



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

LifeBook S Series

Model: S7220

Trade Name: Fujitsu

Issued to

Fujitsu Limited
1-1, Kamikodanaka 4-chome, Nakahara-ku,
Kawasaki, 211-8588, Japan

Issued by

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1. TEST RESULT CERTIFICATION

Applicant: Fujitsu Limited
1-1, Kamikodanaka 4-chome, Nakahara-ku,
Kawasaki, 211-8588, Japan

Equipment Under Test: LifeBook S Series

Trade Name: Fujitsu

Model Number: S7220

Date of Test: July 15 ~ 31, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted
Deviation from Applicable Standard	
None	

We hereby certify that:

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

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

Approved by:

Rex Lai
Section Manager
Compliance Certification Services Inc.

Reviewed by:

Amanda Wu
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	LifeBook S Series
Trade Name	Fujitsu
Model Number	S7220
Model Discrepancy	N/A
Power Supply	1. Brand Name: Sanken Model: SED110P2-19.0 I/P: 100-240V, 1.35-0.6A, 50-60Hz O/P: 19V, 5.27A 2. Brand Name: FUJITSU Model: SED100P2-19.0 I/P: 100-240V, 1.2-0.6A, 50-60Hz O/P: 19V, 4.22A 3. Brand Name: DELTA Model: ADP80NBA I/P: 100-240V, 1.2A, 50-60Hz O/P: 19V, 4.22A 4. Li-ion Battery: Brand Name: FUJITSU Model: CP345705-01 Rating: 10.8V, 5800 mAh
Frequency Range	IEEE 802.11a mode: 5.745~5.825 GHz IEEE 802.11b/g mode: 2.412~2.462 GHz
Transmit Power	IEEE 802.11a mode: 16.24 dBm draft 802.11n Standard-20 MHz Channel mode: 23.12 dBm draft 802.11n Wide-40 MHz Channel mode: 23.33 dBm EEE 802.11b mode: 18.35 dBm IEEE 802.11g mode: 19.33 dBm draft 802.11n Standard-20 MHz Channel mode: 20.50 dBm draft 802.11n Wide-40 MHz Channel mode: 24.31 dBm
Modulation Technique	IEEE 802.11a: OFDM (QPSK, BPSK, 16-QAM, 64-QAM) draft 802.11n Standard-20 MHz Channel mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33, 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps) draft 802.11n Wide-40 MHz Channel mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps) IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mbps) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mbps) draft 802.11n Standard-20 MHz Channel mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33, 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps) draft 802.11n Wide-40 MHz Channel mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)



Number of Channels	IEEE 802.11a mode: 5 Channels draft 802.11n Standard-20 MHz Channel mode : 5 Channels draft 802.11n Wide-40 MHz Channel mode: 3 Channels IEEE 802.11b/g mode: 11 Channels draft 802.11n Standard-20 MHz Channel mode: 11 Channels draft 802.11n Wide-40 MHz Channel mode: 7 Channels
Antenna Specification	Antenna Type: PIFA Antenna Antenna Gain: IEEE 802.11a: -0.21dBi IEEE 802.11b/g mode: 2.42dBi

Remark:

1. *The sample selected for test was production product and was provided by manufacturer.*
2. *This submittal(s) (test report) is intended for FCC ID: EJE-WB0062 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*



3. TEST METHODOLOGY

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

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

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

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

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

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

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

² Above 38.6

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



3.5 DESCRIPTION OF TEST MODES

The EUT (model: S7220) comes with three types of power adapter (Model: SED110P2-19.0 & SED100P2-19.0 & ADP80NBA) for sale. After the preliminary test, the EUT with power adapter (Model: SED110P2-19.0) was found to emit the worst emissions and therefore had been tested under operating condition.

The EUT is a 3x3 configuration spatial MIMO (3Tx & 3Rx) without beam forming function. The 3x3 configuration is implemented with three outside TX & RX chains (Chain 0, Chain 1 and Chain 2).

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

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

IEEE 802.11a mode:

Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with 6Mbps data rate were chosen for full testing.

draft 802.11n Standard-20 MHz Channel mode:

Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with 6.5Mbps data rate were chosen for full testing.

draft 802.11n Wide-40 MHz Channel mode:

Channel Low(5755MHz) and Channel High(5795MHz) with 13.5Mbps data rate were chosen for full testing.

IEEE 802.11b mode:

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

IEEE 802.11g mode:

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

draft 802.11n Standard-20 MHz Channel mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

draft 802.11n Wide-40 MHz Channel mode:

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



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

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

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

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

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	02/24/2009

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	09/11/2008
Test Receiver	Rohde&Schwarz	ESCI	100064	11/13/2008
Switch Controller	TRC	Switch Controller	SC94050010	05/03/2009
4 Port Switch	TRC	4 Port Switch	SC94050020	05/03/2009
Horn Antenna	EMCO	3115	9903-5761	01/11/2009
Bilog- Antenna	Sunol Sciences	JB3	A030205	03/28/2009
Turn Table	Max-Full	MFT-120S	T120S940302	N.C.R.
Antenna Tower	Max-Full	MFA-430	A440940302	N.C.R.
Controller	Max-Full	MF-CM886	CC-C-1F-13	N.C.R.
Site NSA	CCS	N/A	FCC: 965860 IC: IC 6106	09/25/2008
Test S/W			LABVIEW (V 6.1)	

Remark: The measurement uncertainty is less than +/- 3.7046dB (30MHz ~ 1GHz), +/- 3.0958dB (Above 1GHz) which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.

Conducted Emission room # A				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
TEST RECEIVER	R&S	ESHS20	840455/006	02/18/2009
LISN (EUT)	SCHWARZBECK	NSLK 8127	8127382	12/03/2008
LISN	SOLAR	8012-50-R-24-BNC	8305114	12/03/2008
BNC CABLE	Huber+Suhner	RG-223/U	BNC A2	05/12/2009
THERMO-HYGRO METER	TECPTEL	DTM-303	No.7	11/15/2008
Test S/W			EMI 32.exe	

Remark: The measurement uncertainty is less than +/- 1.7376dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

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

5.2 EQUIPMENT

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

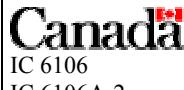
Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

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

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



5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	EN 55011, EN 55014-1/2, CISPR 11, CISPR 14-1/2, EN 55022, EN 55015, CISPR 22, CISPR 15, AS/NZS 3548, VCCI V3 (2001), CFR 47, FCC Part 15/18, CNS 13783-1, CNS 13439, CNS 13438, CNS 13803, CNS 14115, EN 55024, IEC 801-2, IEC 801-3, IEC 801-4, IEC/EN 61000-3-2, EIC/EN 61000-3-3, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 50081-1/EN 61000-6-3, EN 50081-2/EN 61000-6-4, EN 50081-2/EN 61000-6-1: 2001	 ACCREDITED TESTING CERT #0824.01
USA	FCC	3M Semi Anechoic Chamber (965860 and 898658) to perform FCC Part 15/18 measurements	 965860, 898658
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method –47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 6106 & IC 6106A-2) to perform RSS 212 Issue 1	 IC 6106 IC 6106A-2

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



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	LCD Monitor	Samsung	173P	DI17H4JXB04968Y	FCC DoC	Shielded, 1.8m with 2 cores	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	USB 2.0 External HDD	TeraSyS	F12-U	A0100214-2Bq0039	FCC DoC	Shielded, 1.8m	N/A
3.	USB 2.0 External HDD	TeraSyS	F12-U	A0100214-31d0014	FCC DoC	Shielded, 1.8m	N/A
4.	USB 2.0 External HDD	TeraSyS	F12-U	A0100214-31d0028	FCC DoC	Shielded, 1.8m	N/A
5.	Multimedia Earphone	Labtec	Axis-301	N/A	FCC DoC	Unshielded, 1.8m*2	N/A

Remark:

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

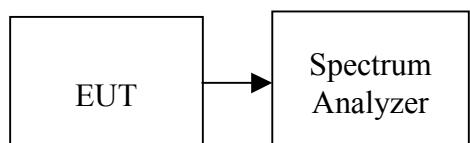
7. FCC PART 15.247 REQUIREMENTS

7.1 6DB BANDWIDTH

LIMIT

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

Test Configuration



TEST PROCEDURE

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



TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.25	>500	PASS
Mid	2437	10.33		PASS
High	2462	10.33		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.50	>500	PASS
Mid	2437	16.50		PASS
High	2462	16.58		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode / Chain 0

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	17.50	>500	PASS
Mid	2437	17.67		PASS
High	2462	17.58		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode / Chain 1

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	17.17	>500	PASS
Mid	2437	17.50		PASS
High	2462	17.67		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode / Chain 2

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	17.67	>500	PASS
Mid	2437	17.67		PASS
High	2462	17.67		PASS

**Test mode: draft 802.11n Wide-40 MHz Channel mode / Chain 0**

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
Low	2422	17.67	>500	PASS
Mid	2437	17.58		PASS
High	2452	17.67		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode / Chain 1

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
Low	2422	17.75	>500	PASS
Mid	2437	17.33		PASS
High	2452	17.75		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode / Chain 2

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
Low	2422	17.58	>500	PASS
Mid	2437	17.75		PASS
High	2452	17.58		PASS

**Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Test Result
Low	5745	17.08	>500	PASS
Mid	5785	17.67		PASS
High	5825	17.75		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5745	17.50	>500	PASS
Mid	5785	17.33		PASS
High	5825	16.75		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5745	17.25	>500	PASS
Mid	5785	17.75		PASS
High	5825	17.33		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 2

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5745	17.58	>500	PASS
Mid	5785	17.33		PASS
High	5825	17.58		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5755	35.17	>500	PASS
High	5795	35.58		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5755	34.50	>500	PASS
High	5795	36.08		PASS

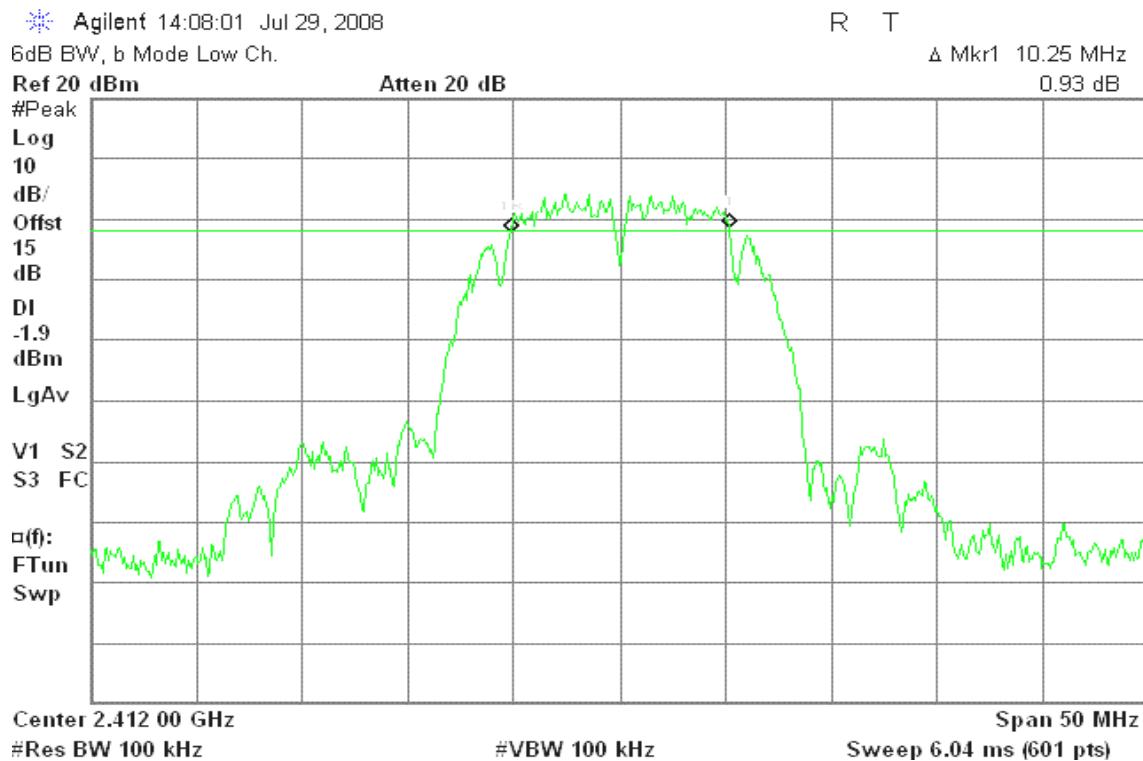
Test mode: draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 2

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5755	34.50	>500	PASS
High	5795	34.83		PASS

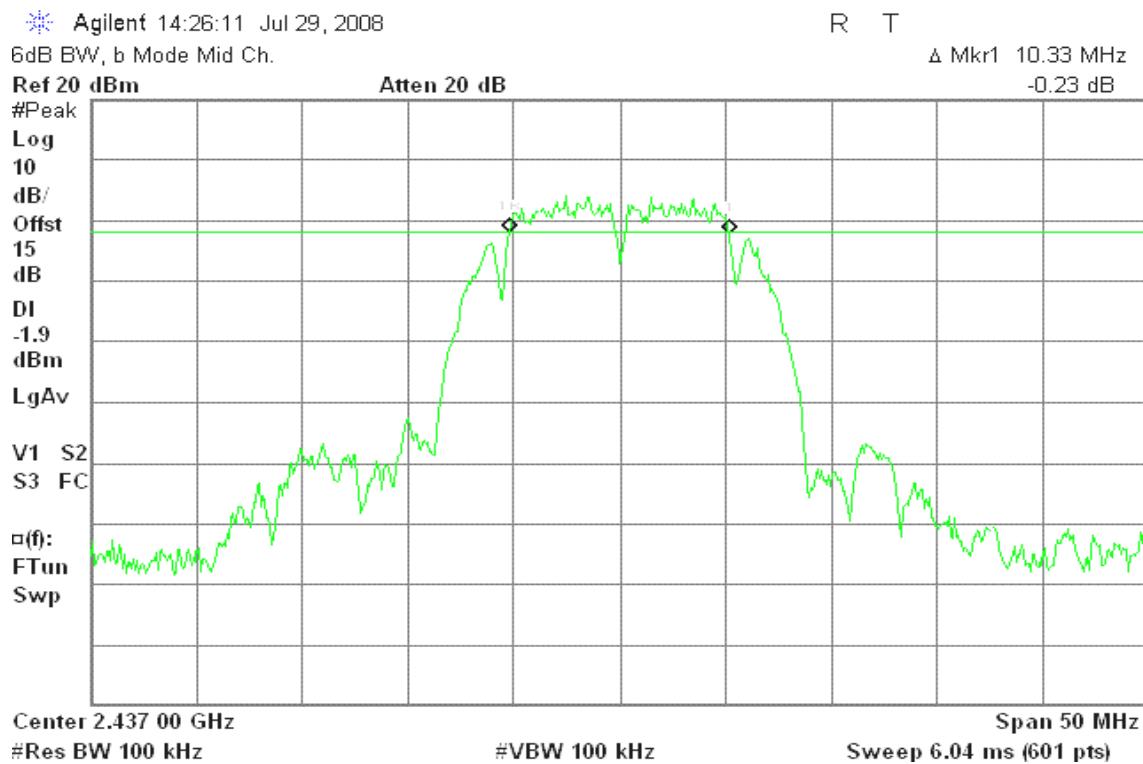
Test Plot

IEEE 802.11b mode

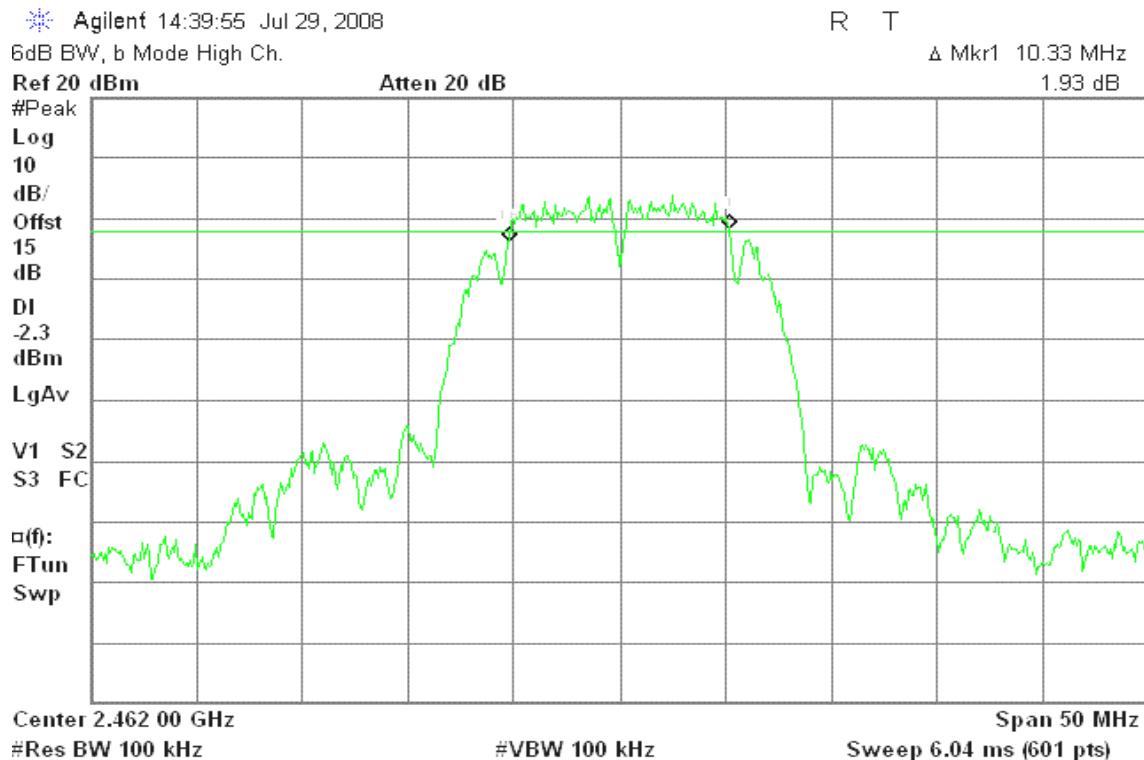
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

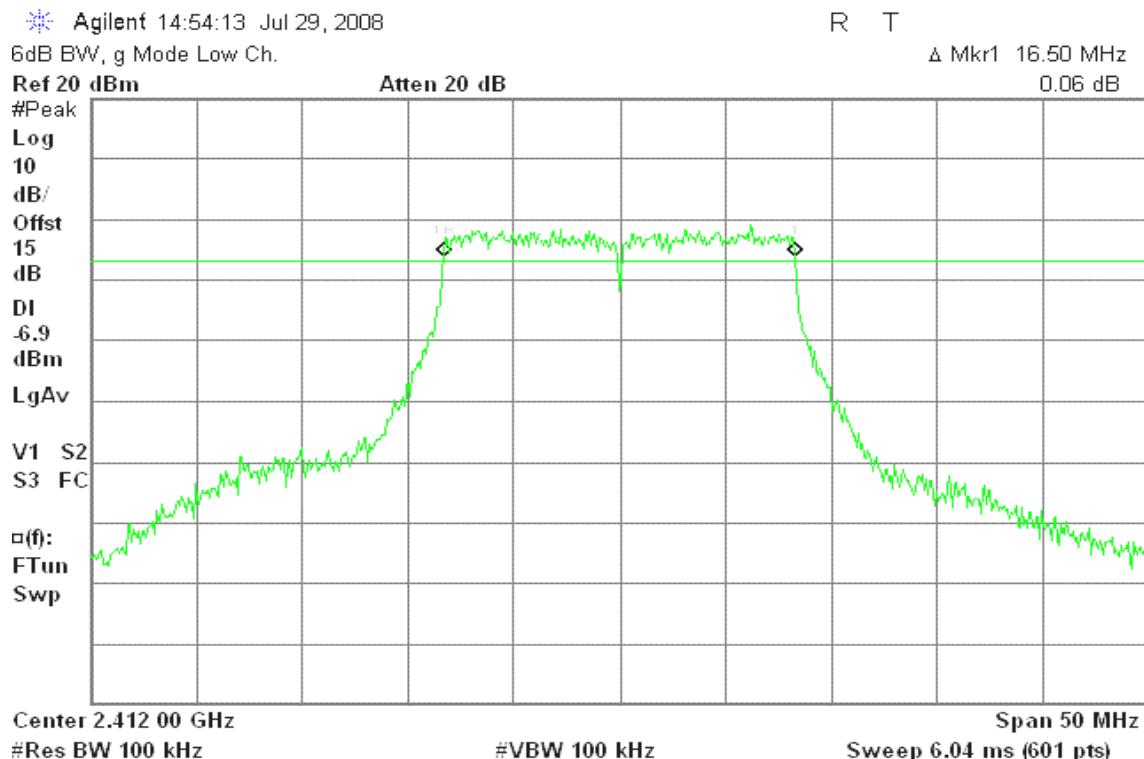


6dB Bandwidth (CH High)

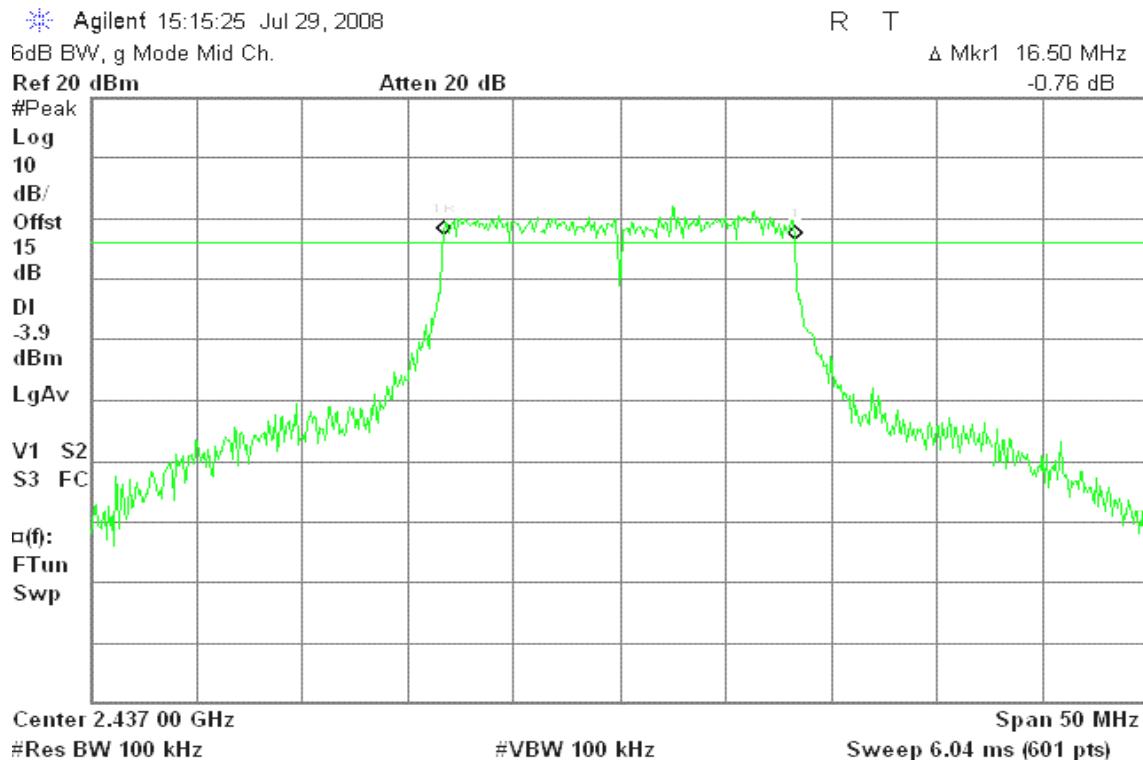


IEEE 802.11g mode

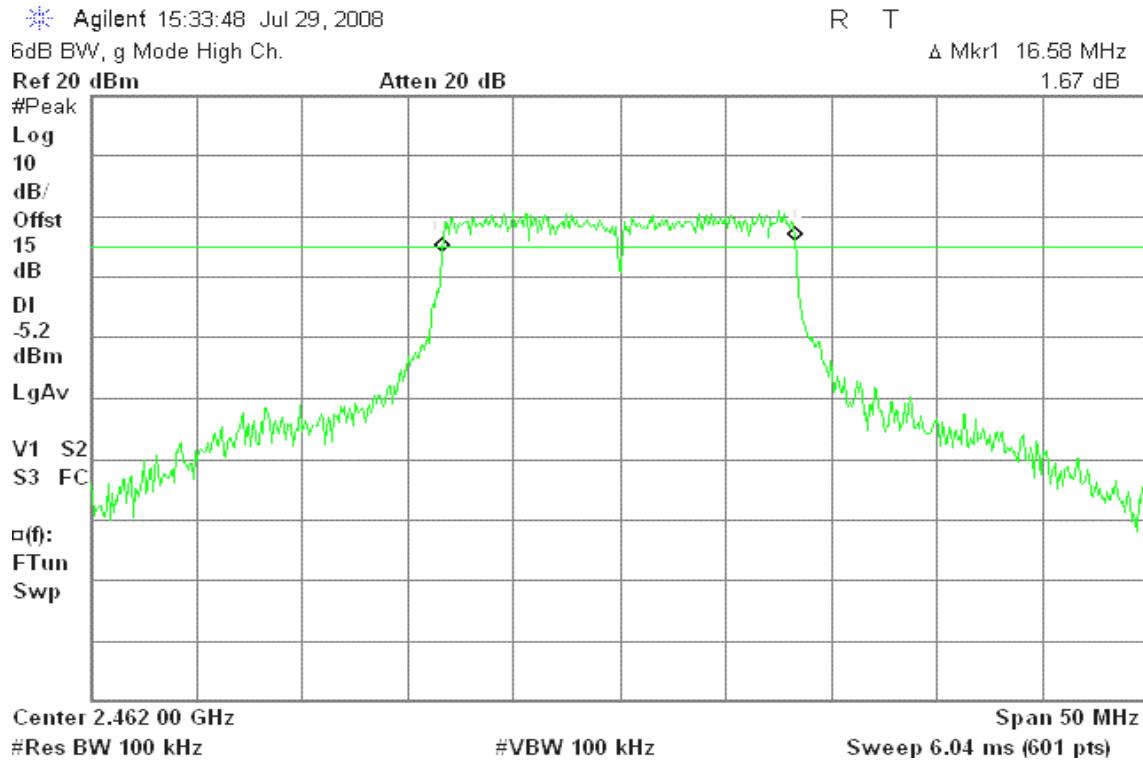
6dB Bandwidth (CH Low)

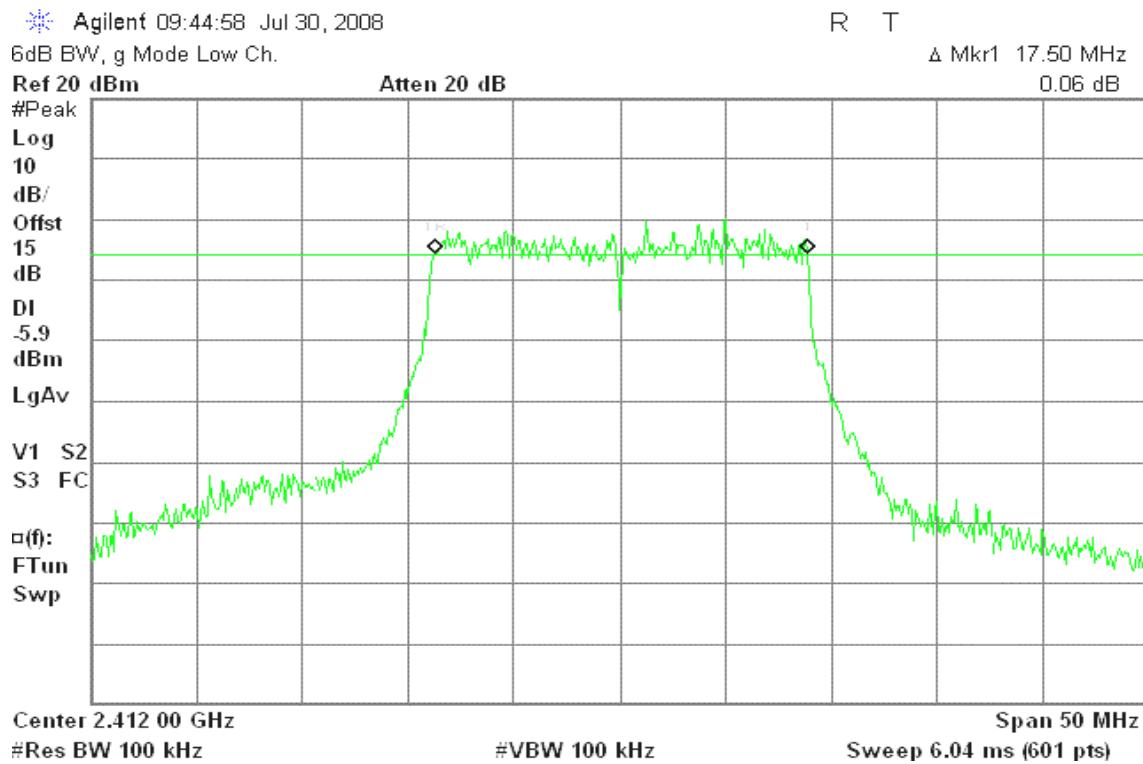
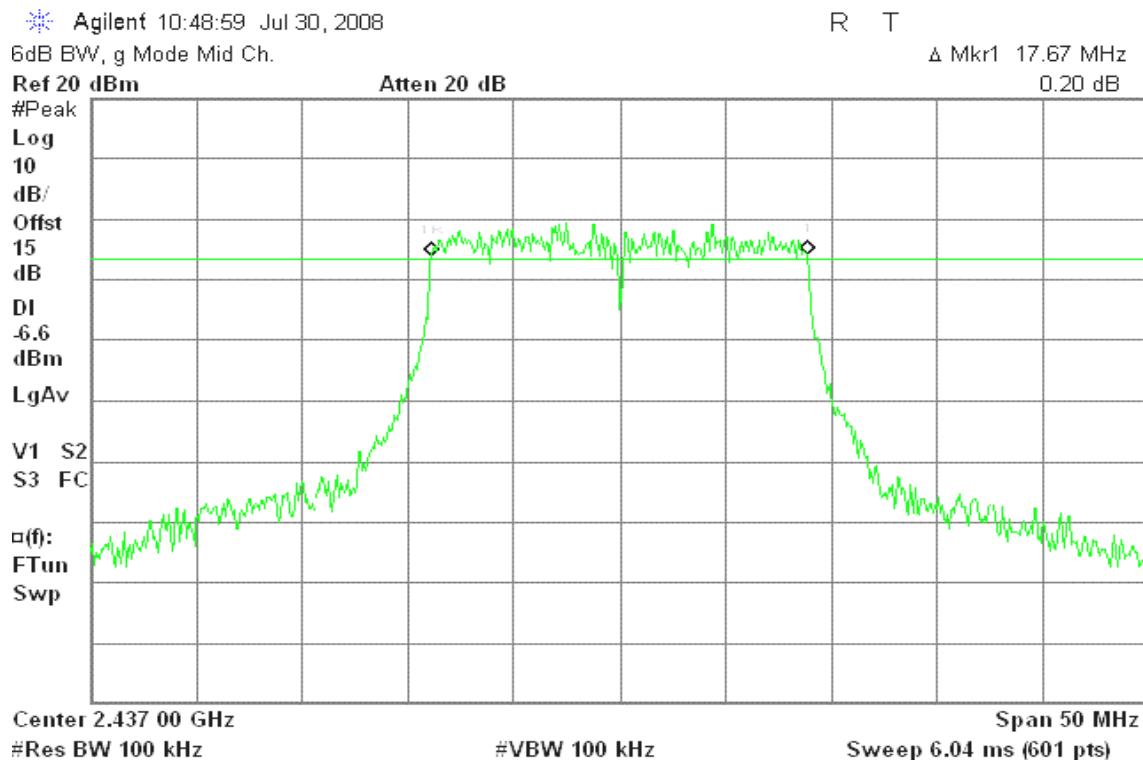


6dB Bandwidth (CH Mid)

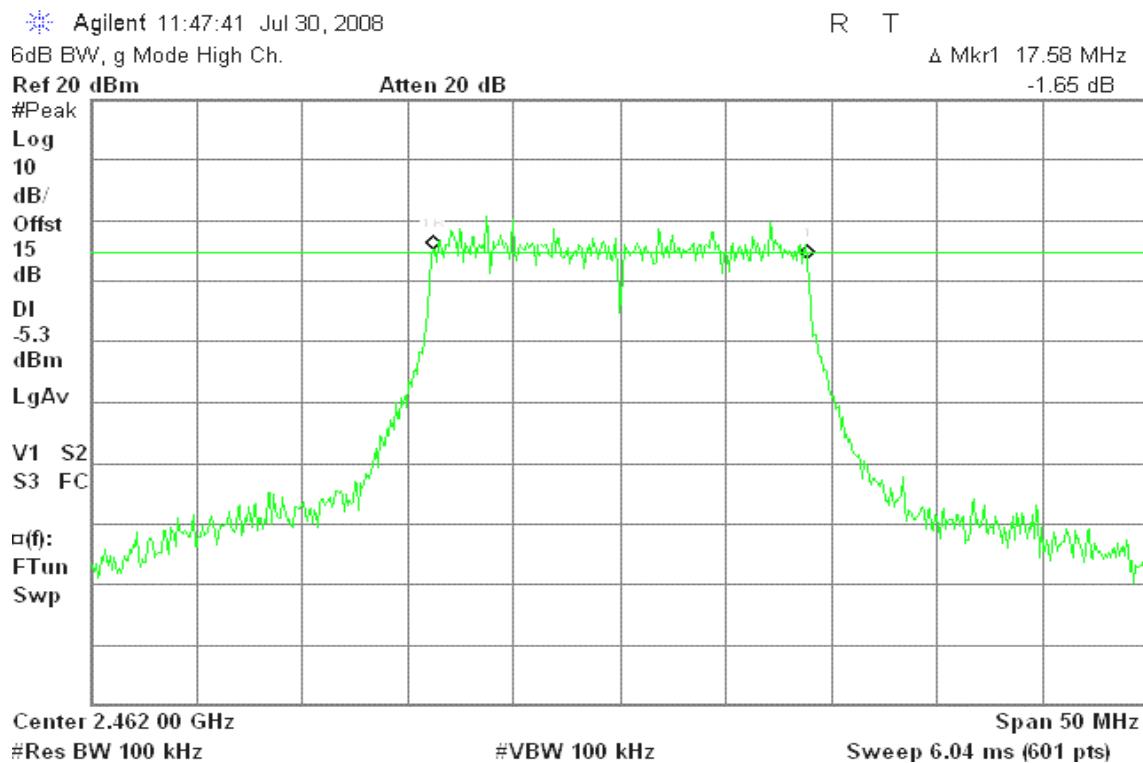


6dB Bandwidth (CH High)



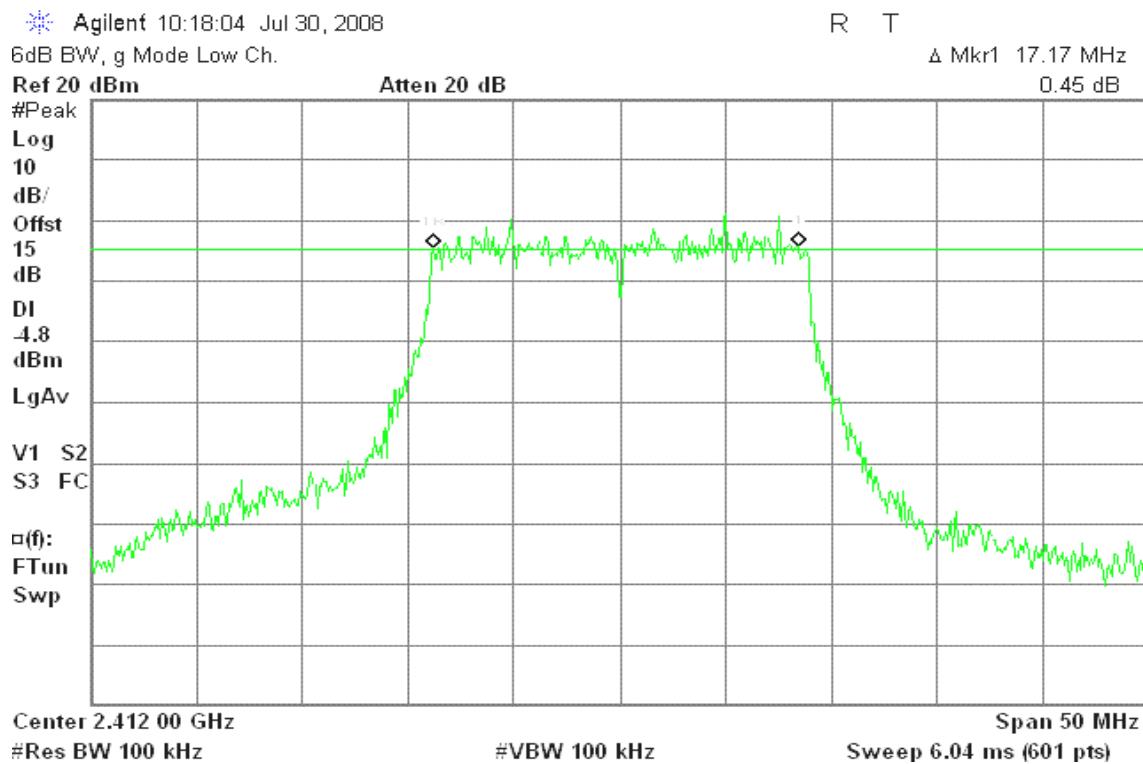
draft 802.11n Standard-20 MHz Channel mode / Chain 0**6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

6dB Bandwidth (CH High)

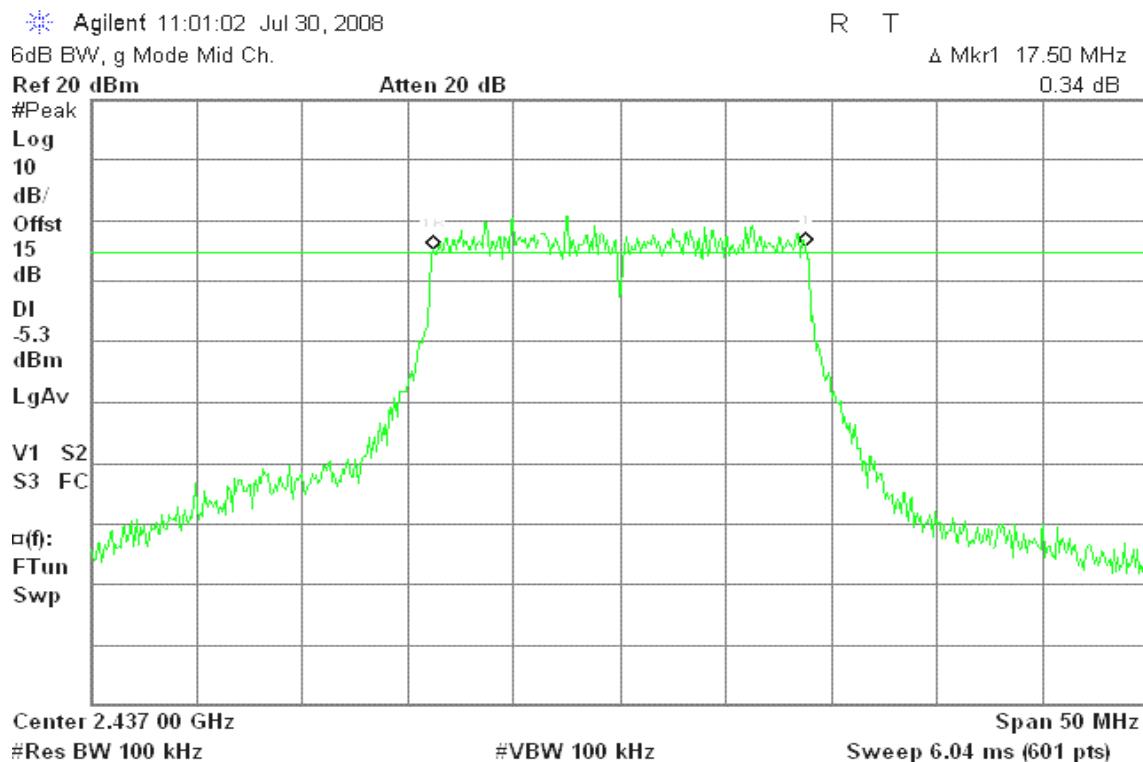


draft 802.11n Standard-20 MHz Channel mode / Chain 1

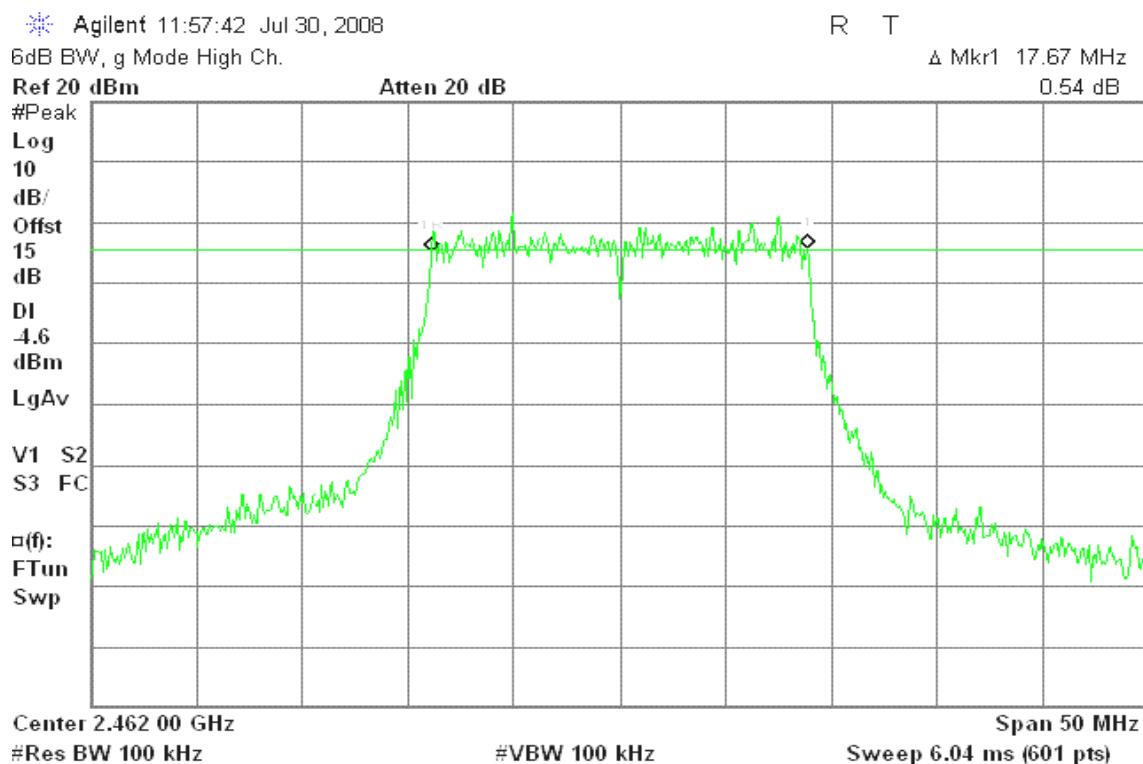
6dB Bandwidth (CH Low)

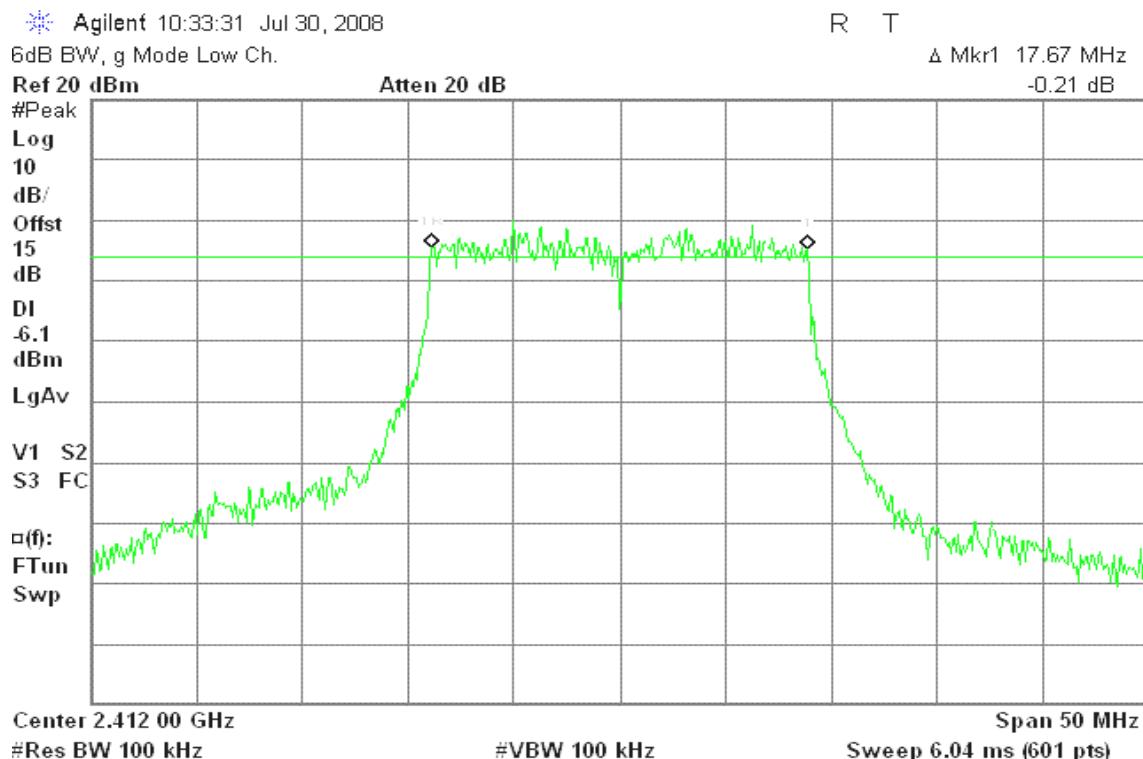
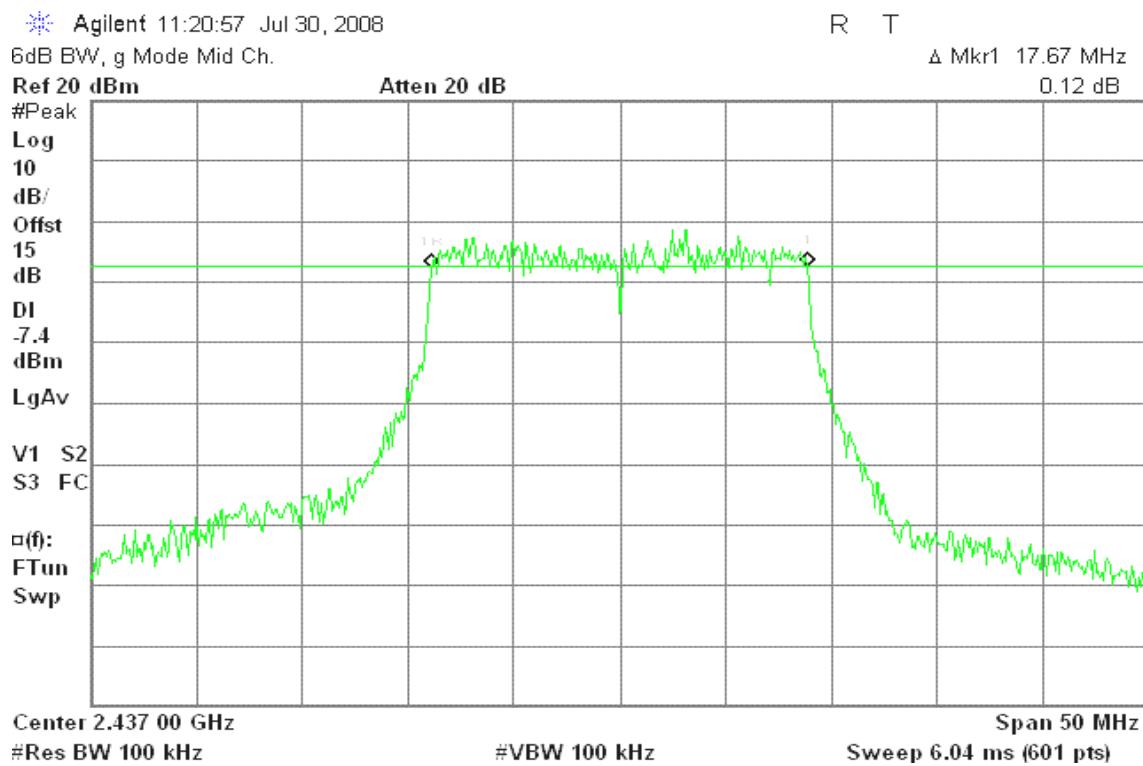


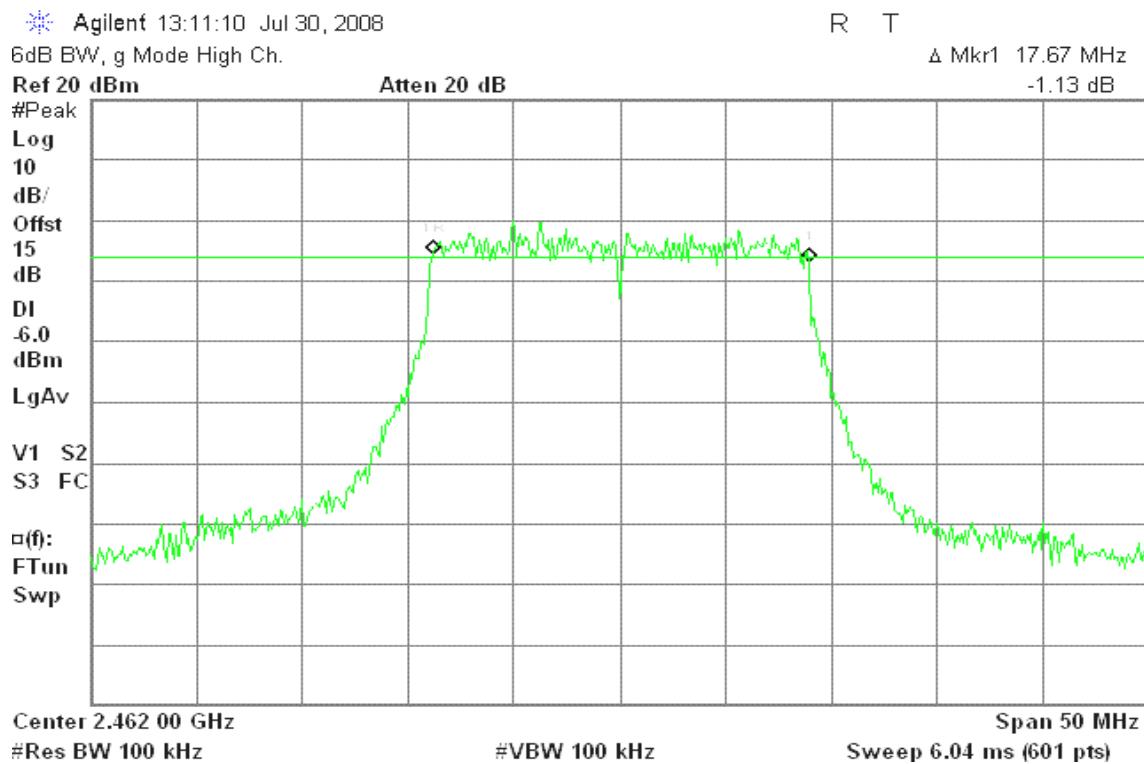
6dB Bandwidth (CH Mid)

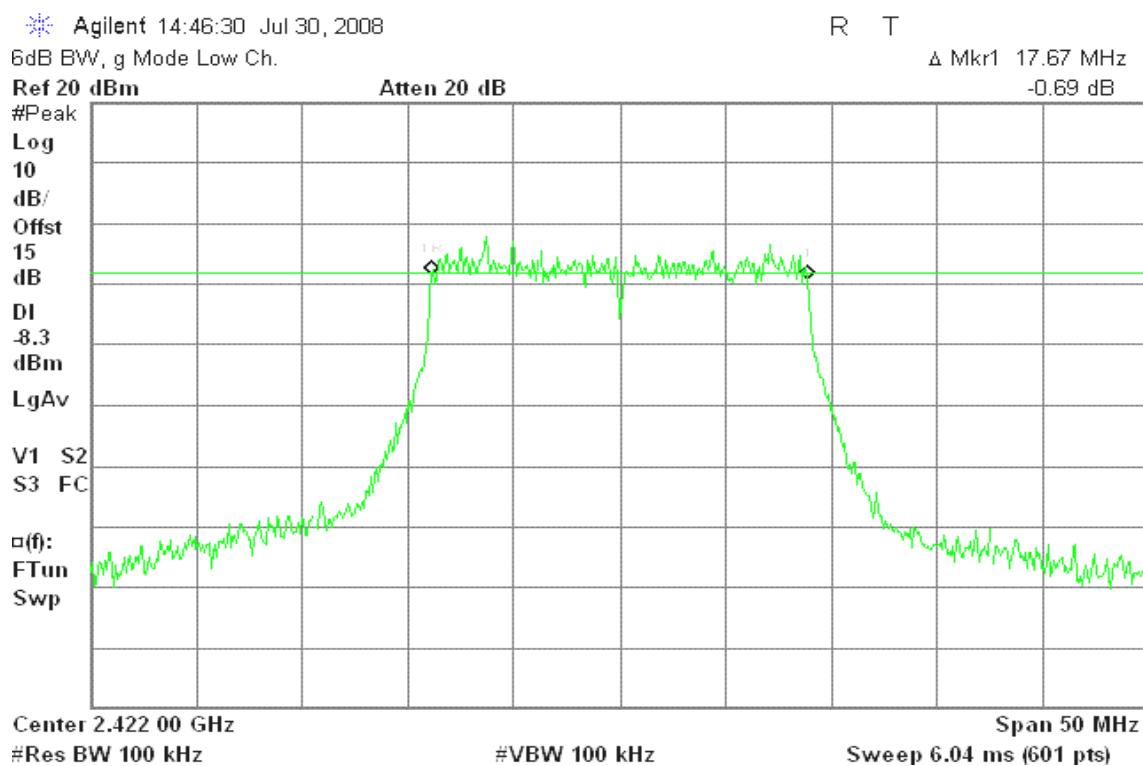
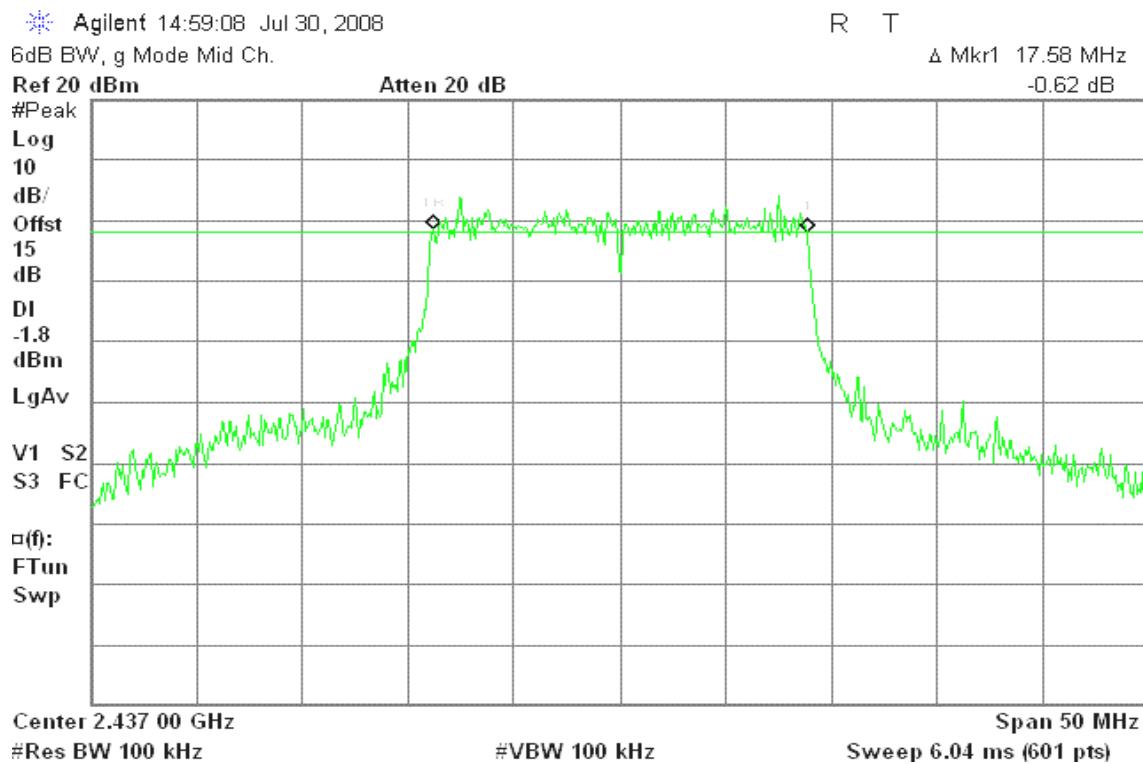


6dB Bandwidth (CH High)

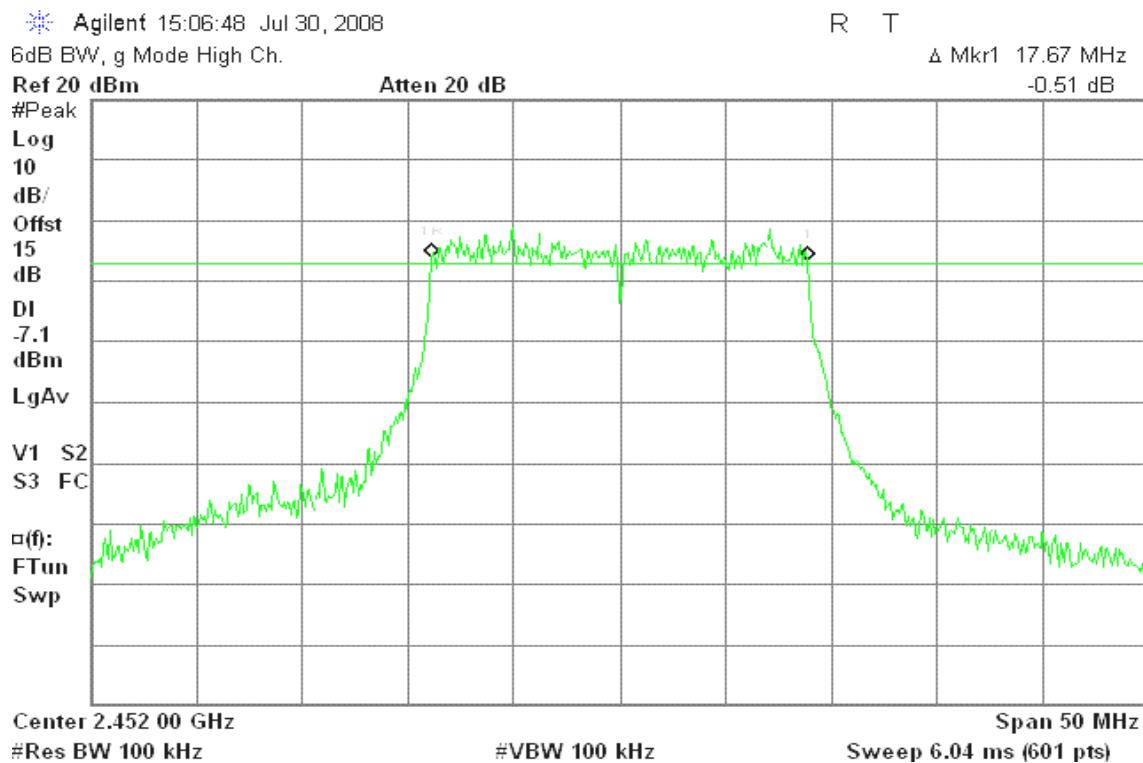


draft 802.11n Standard-20 MHz Channel mode / Chain 2**6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

6dB Bandwidth (CH High)

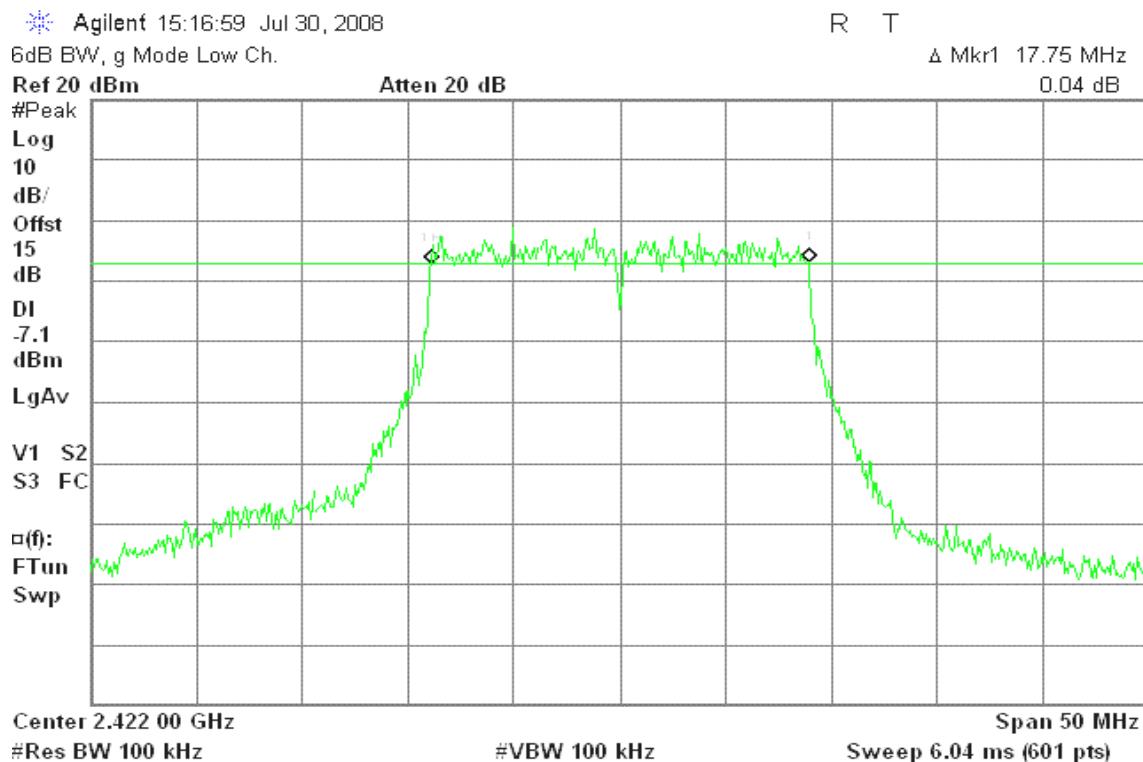
draft 802.11n Wide-40 MHz Channel mode / Chain 0**6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

6dB Bandwidth (CH High)

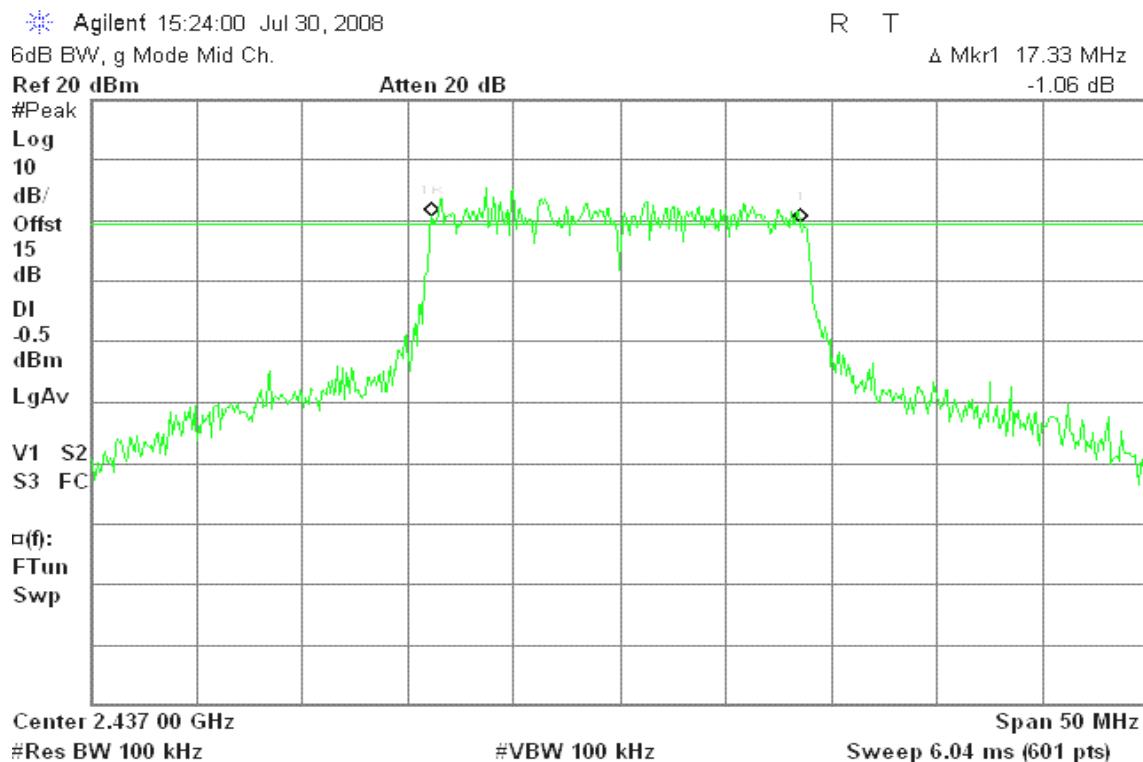


draft 802.11n Wide-40 MHz Channel mode / Chain 1

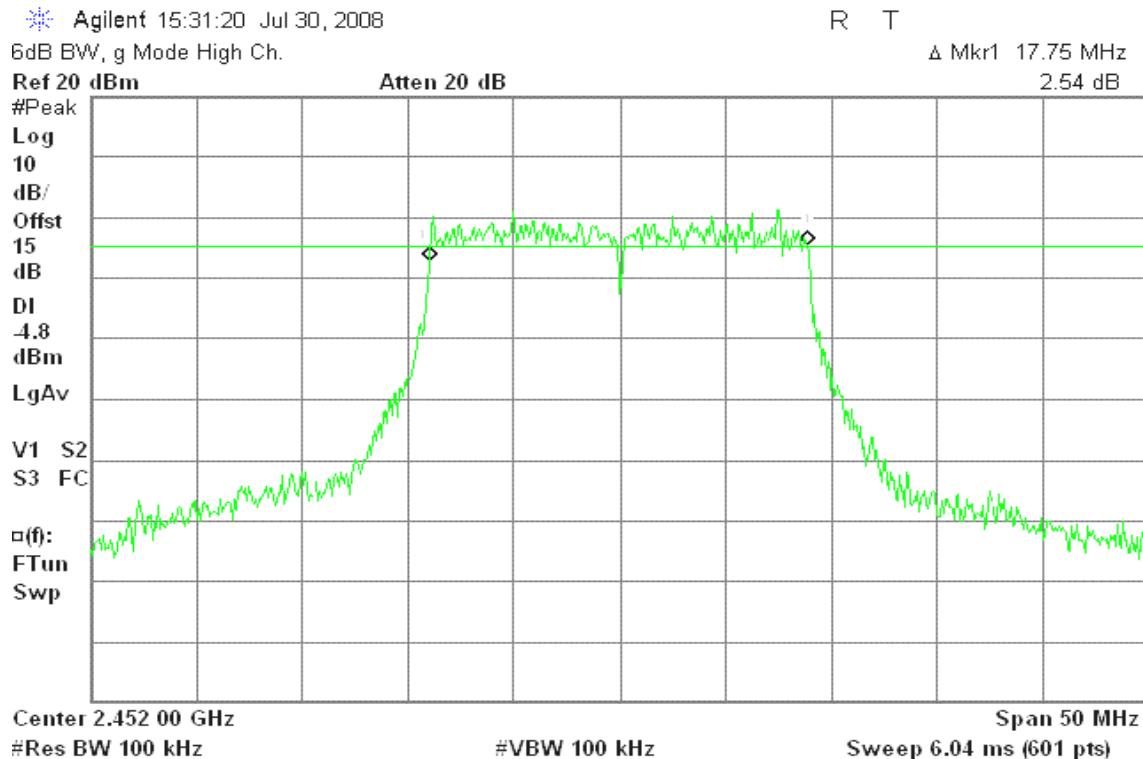
6dB Bandwidth (CH Low)

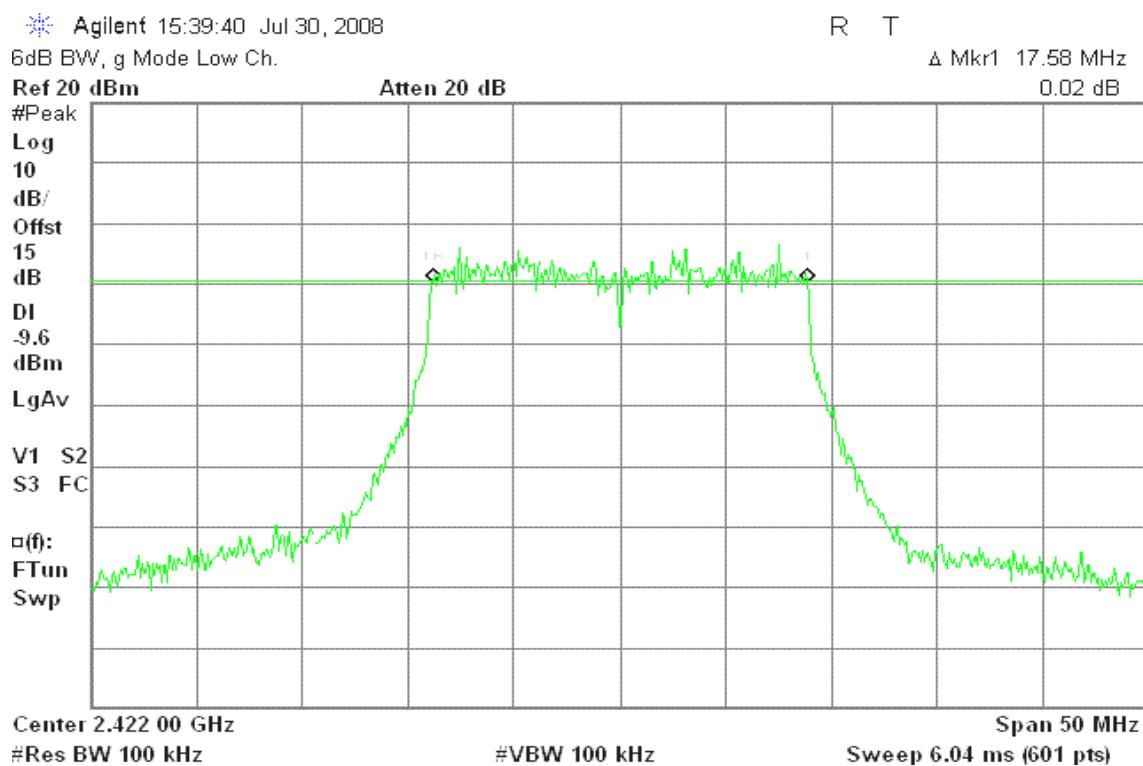
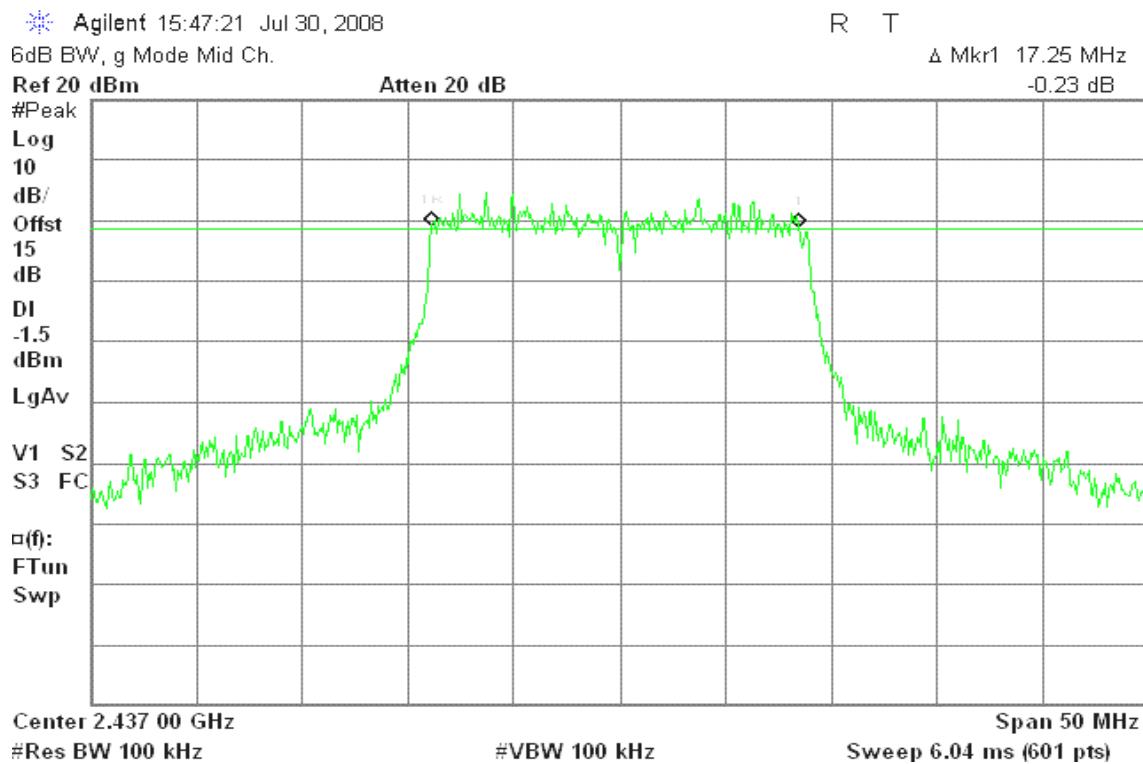


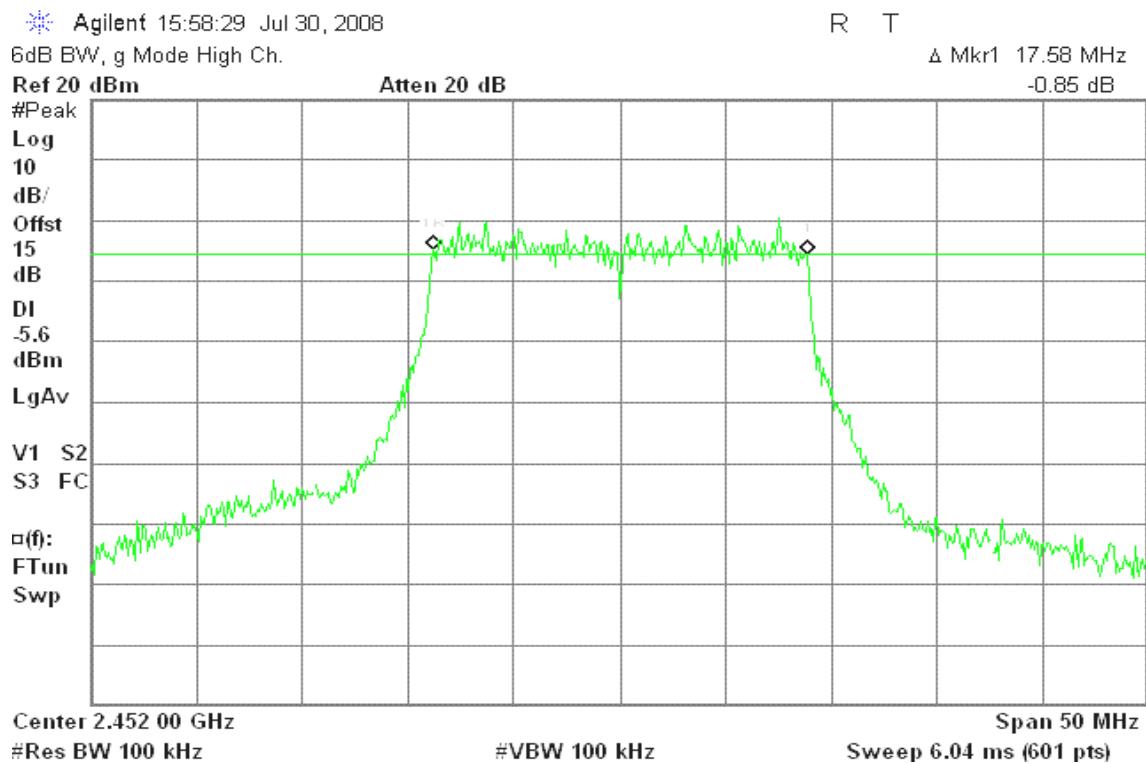
6dB Bandwidth (CH Mid)

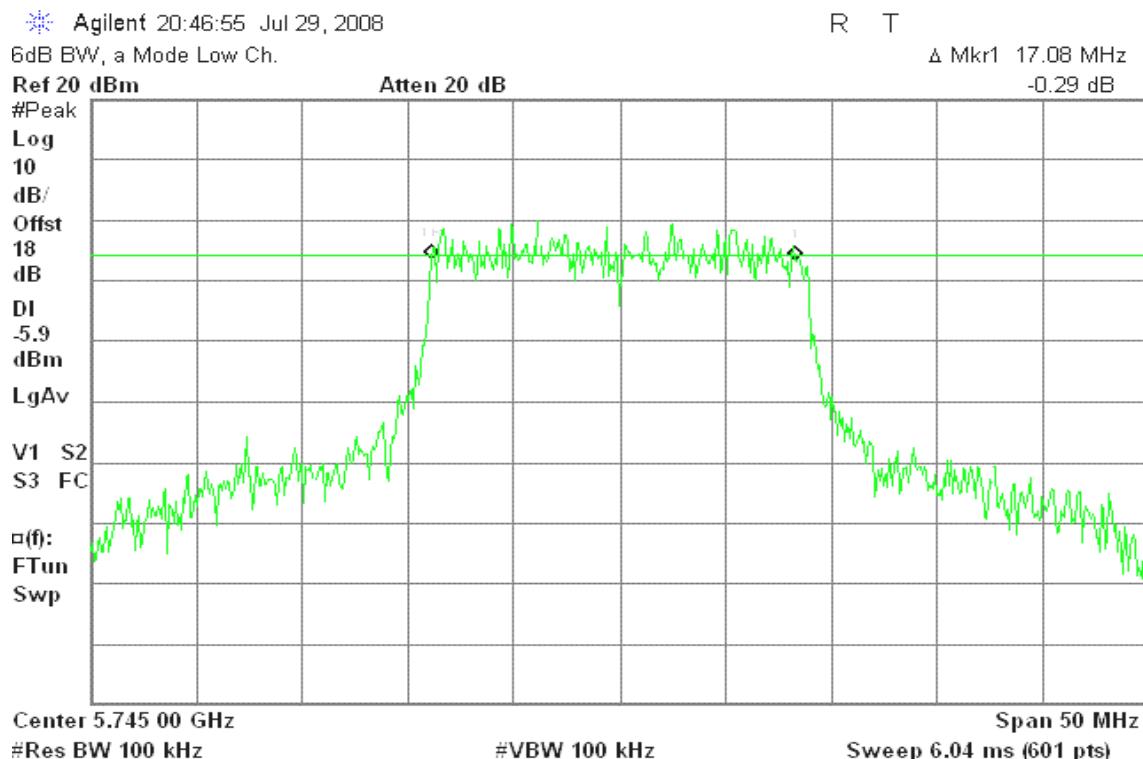
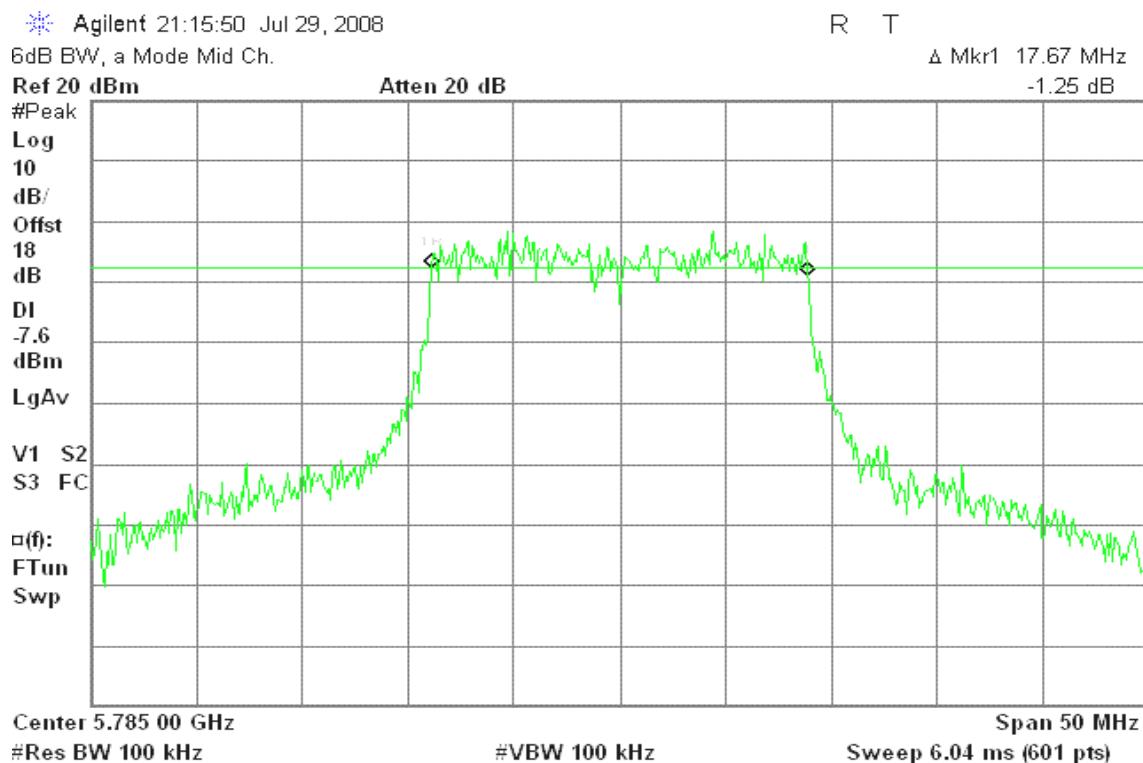


6dB Bandwidth (CH High)

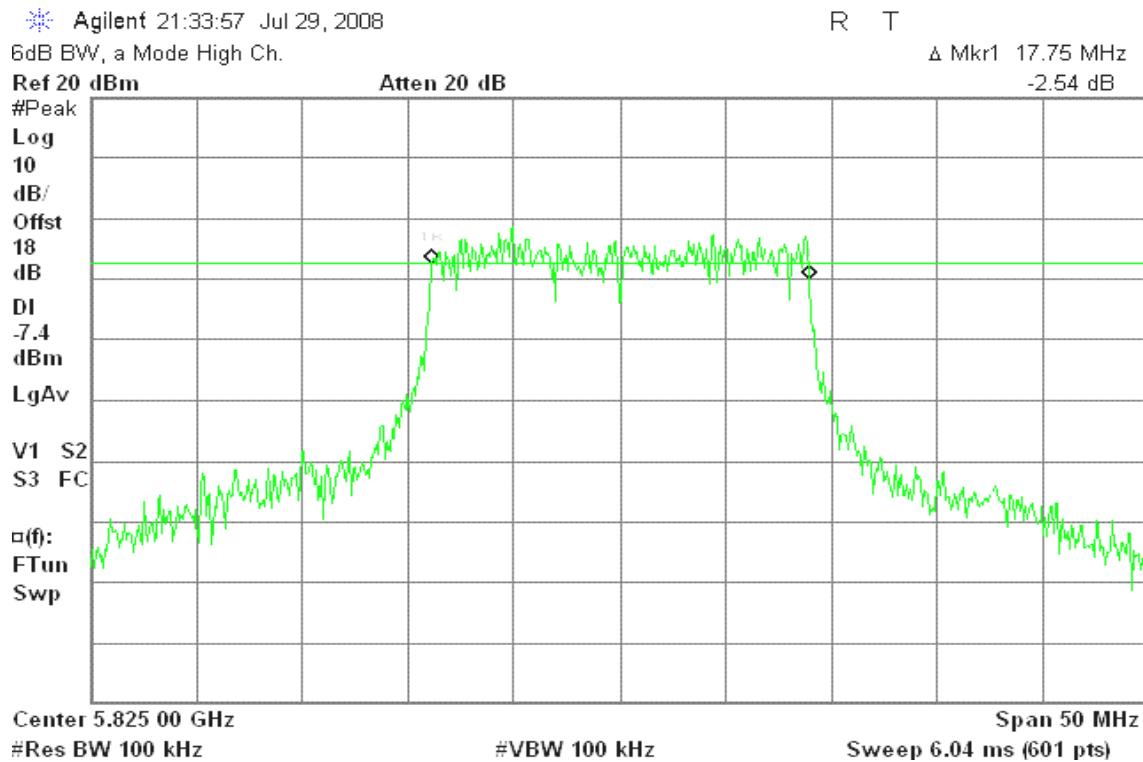


draft 802.11n Wide-40 MHz Channel mode / Chain 2**6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

6dB Bandwidth (CH High)

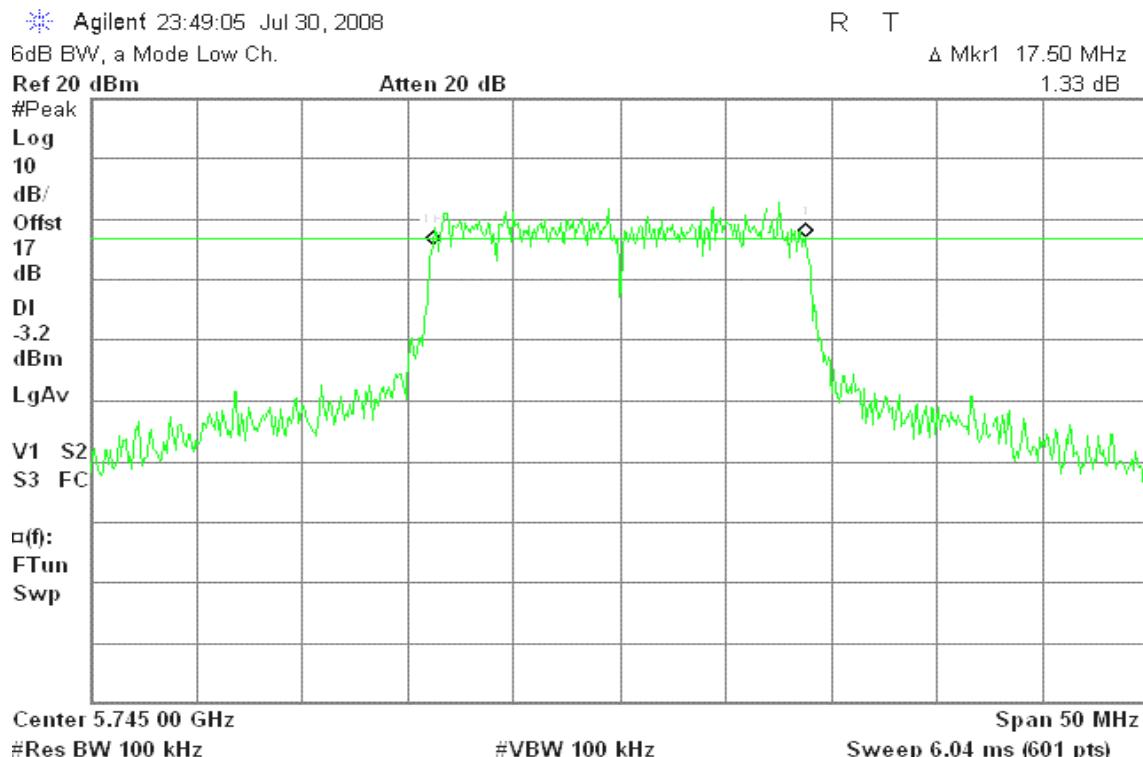
IEEE 802.11a mode / 5745 ~ 5825MHz**6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

6dB Bandwidth (CH High)

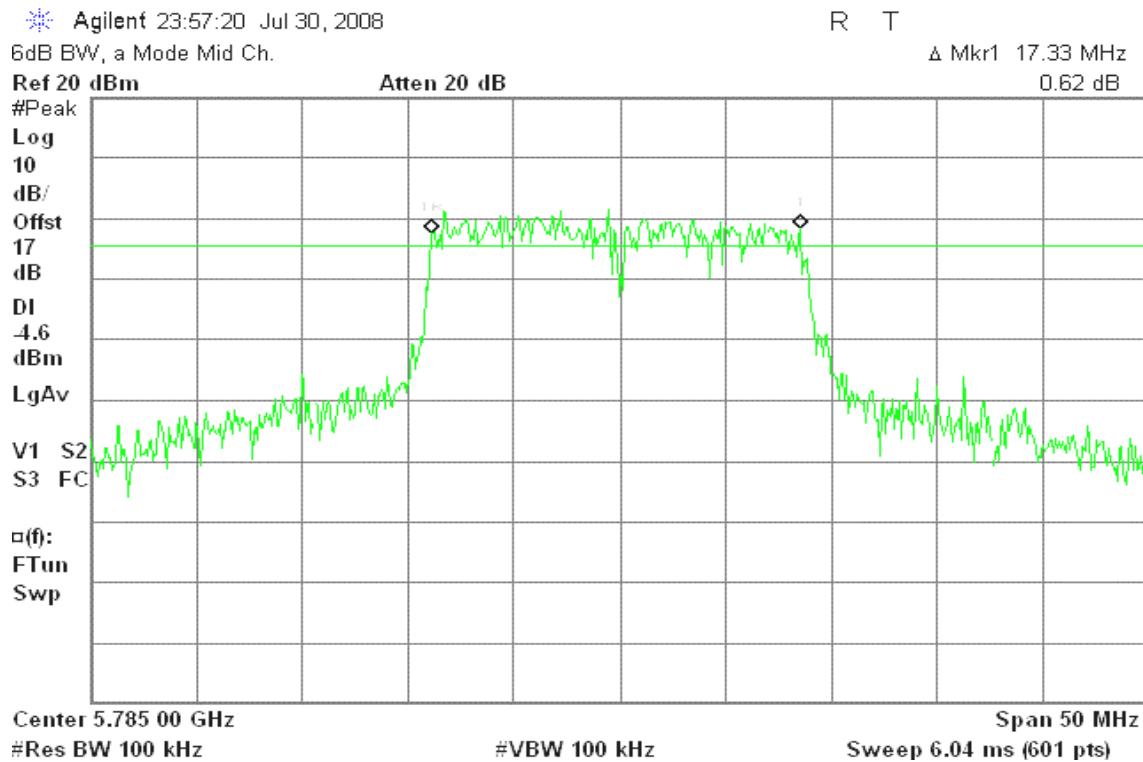


draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 0

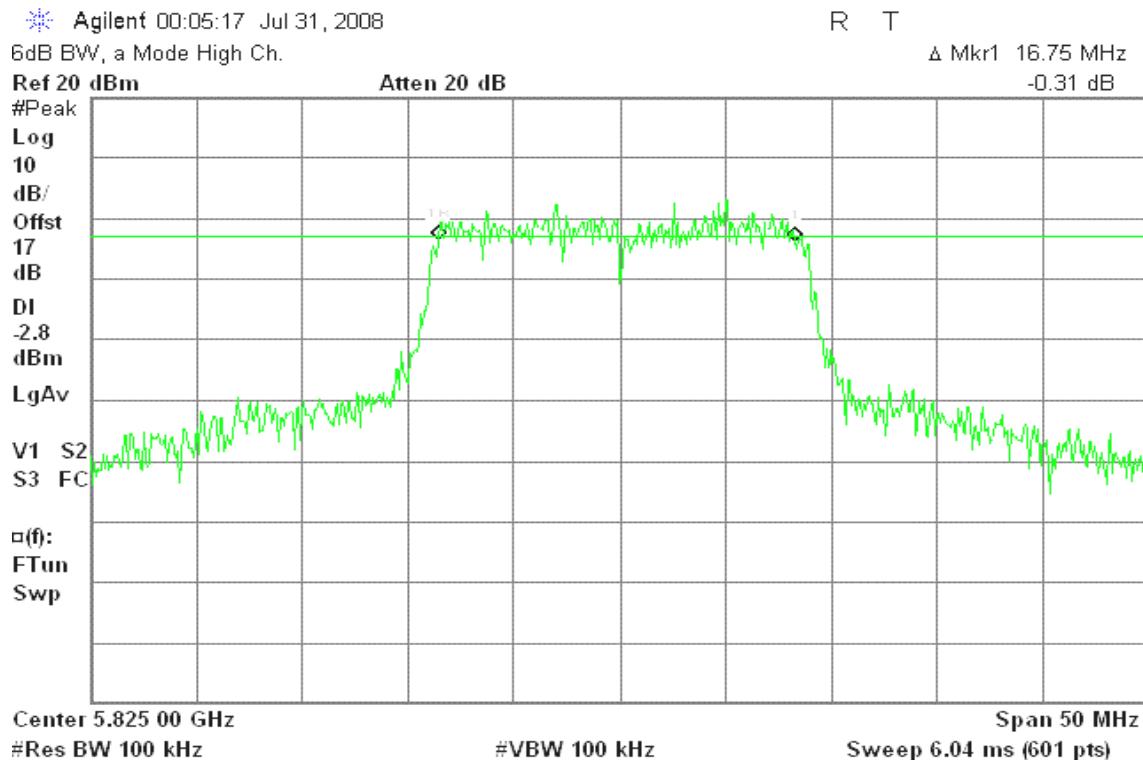
6dB Bandwidth (CH Low)

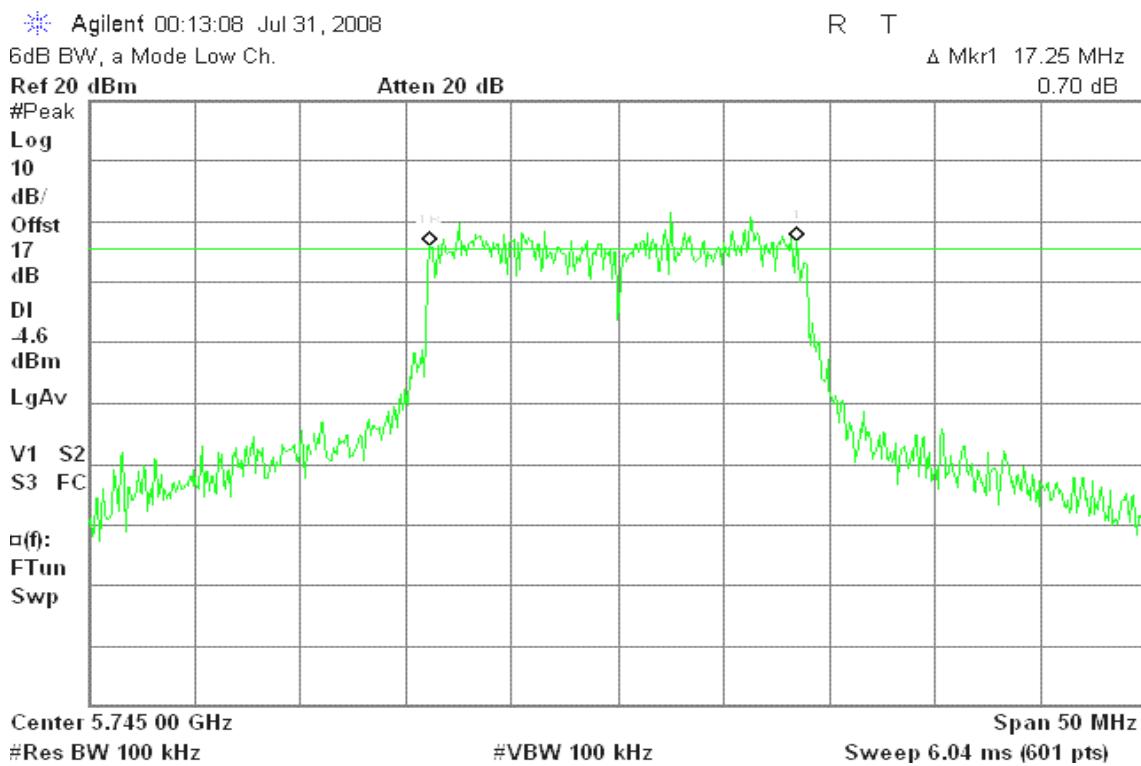
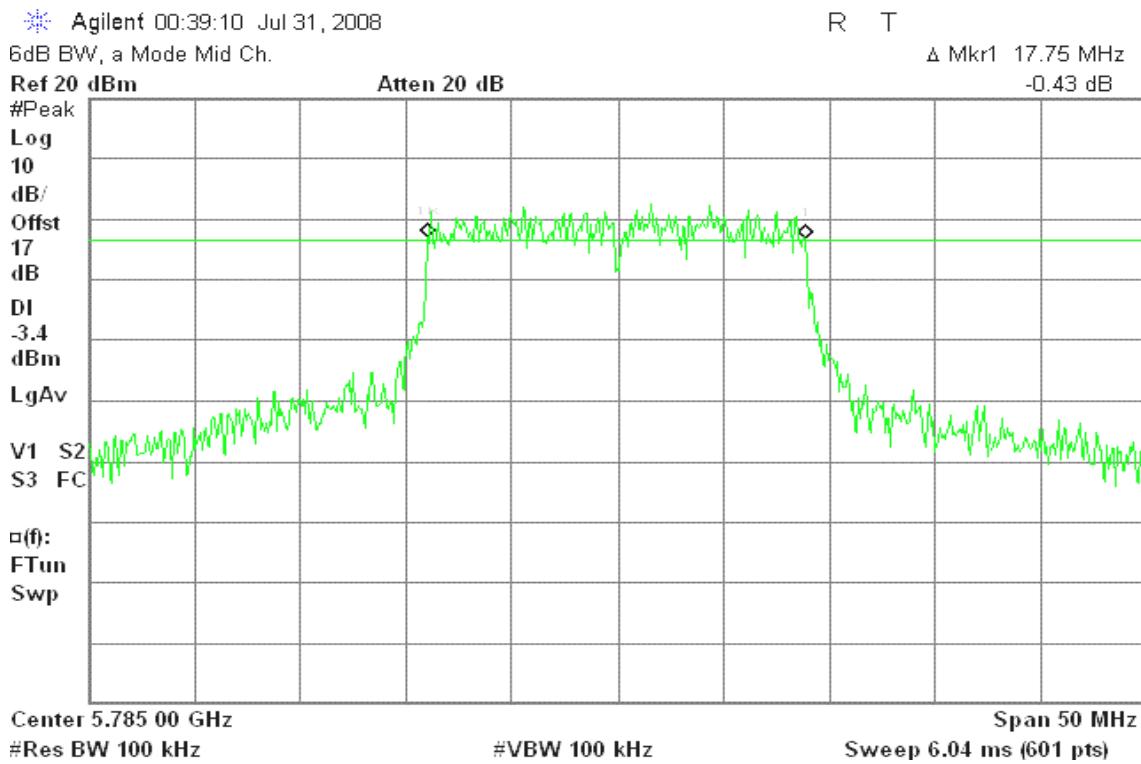


6dB Bandwidth (CH Mid)

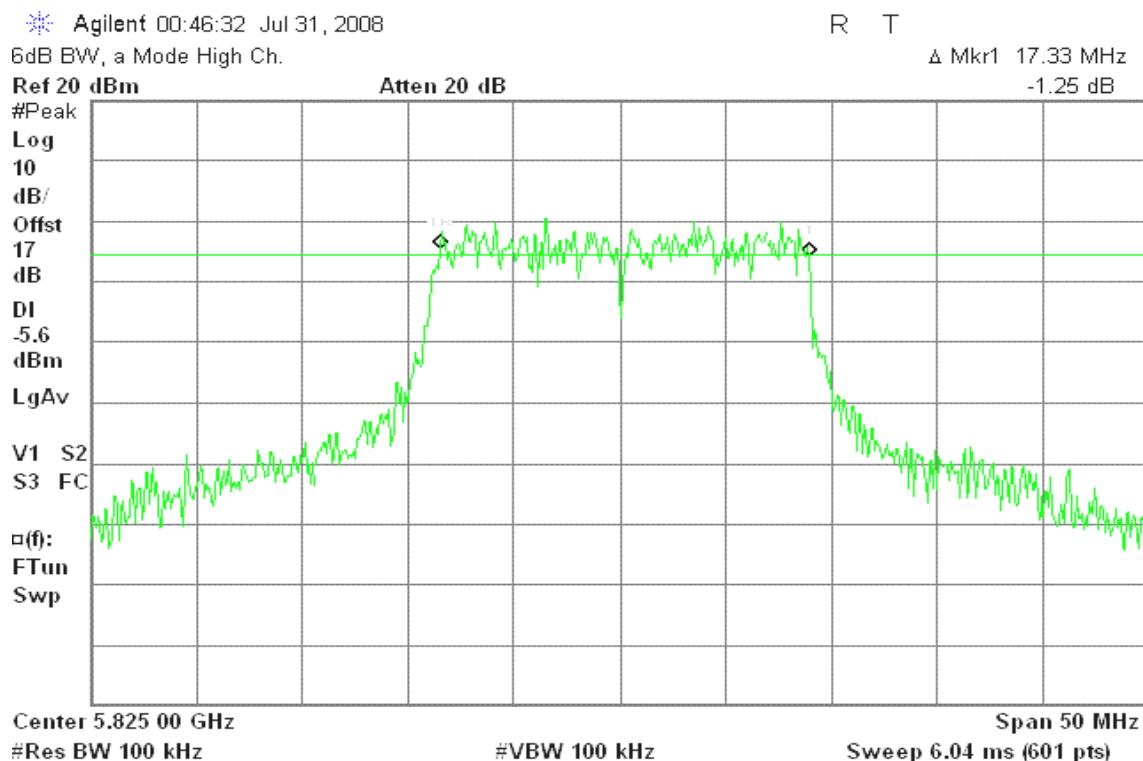


6dB Bandwidth (CH High)



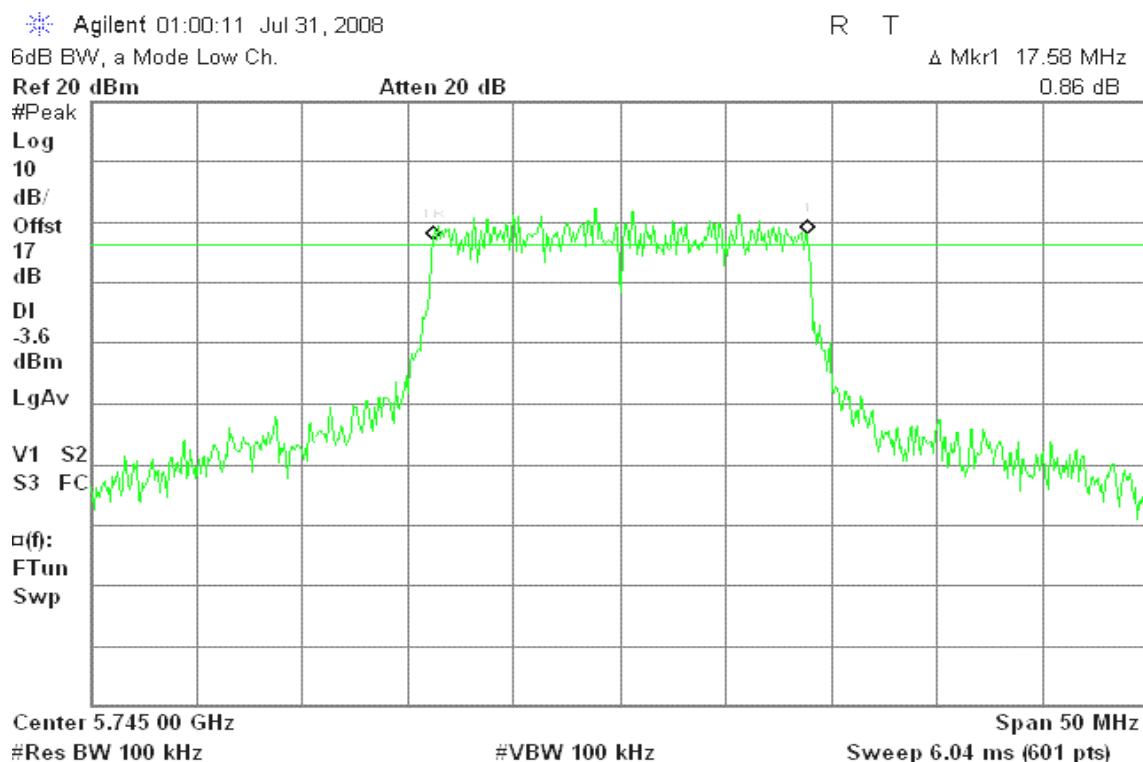
draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 1**6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

6dB Bandwidth (CH High)

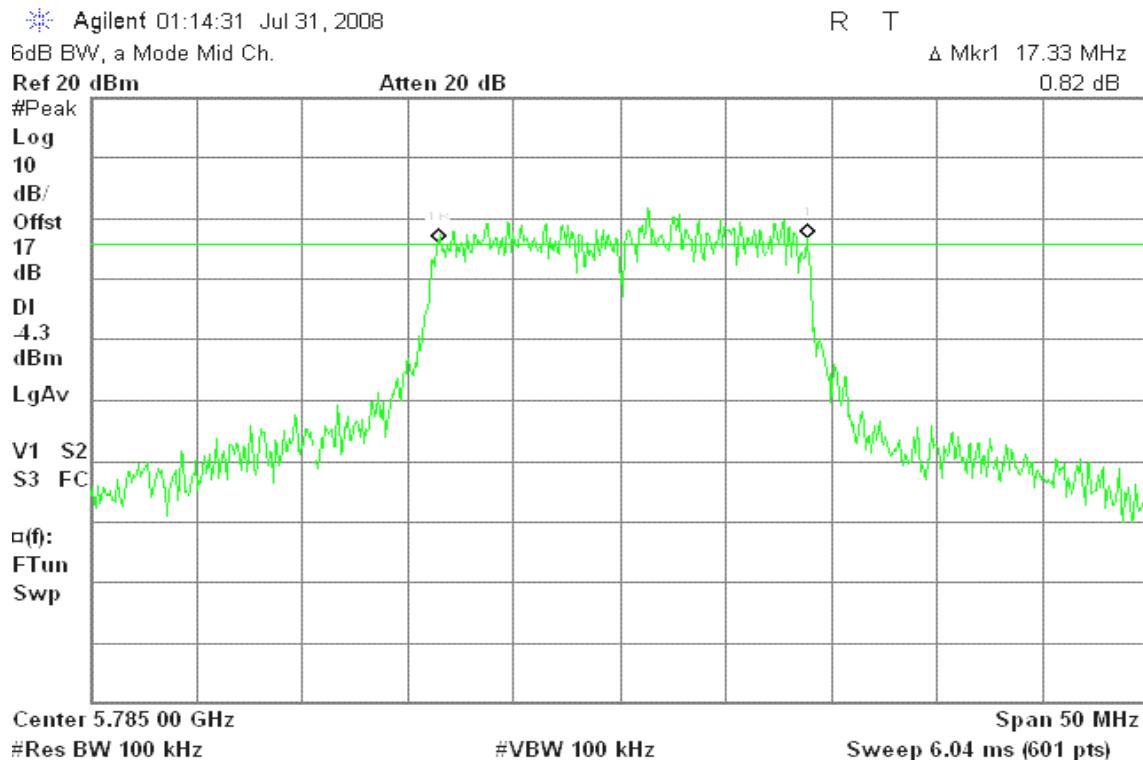


draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 2

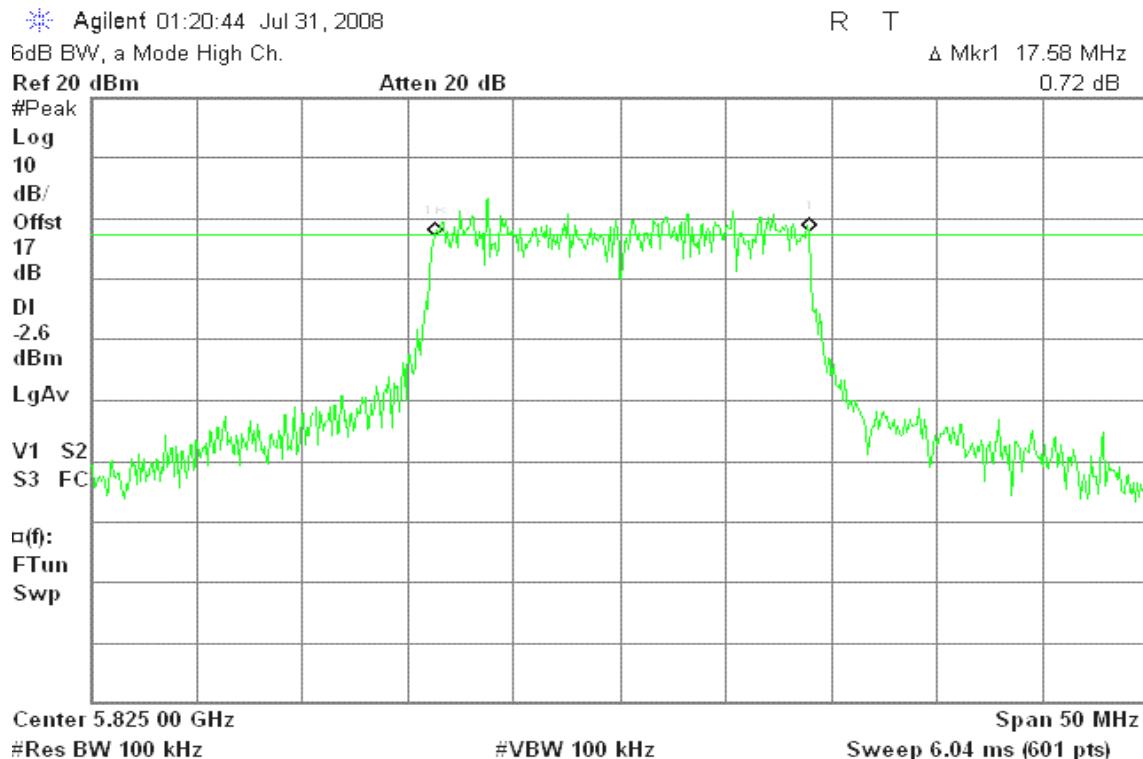
6dB Bandwidth (CH Low)

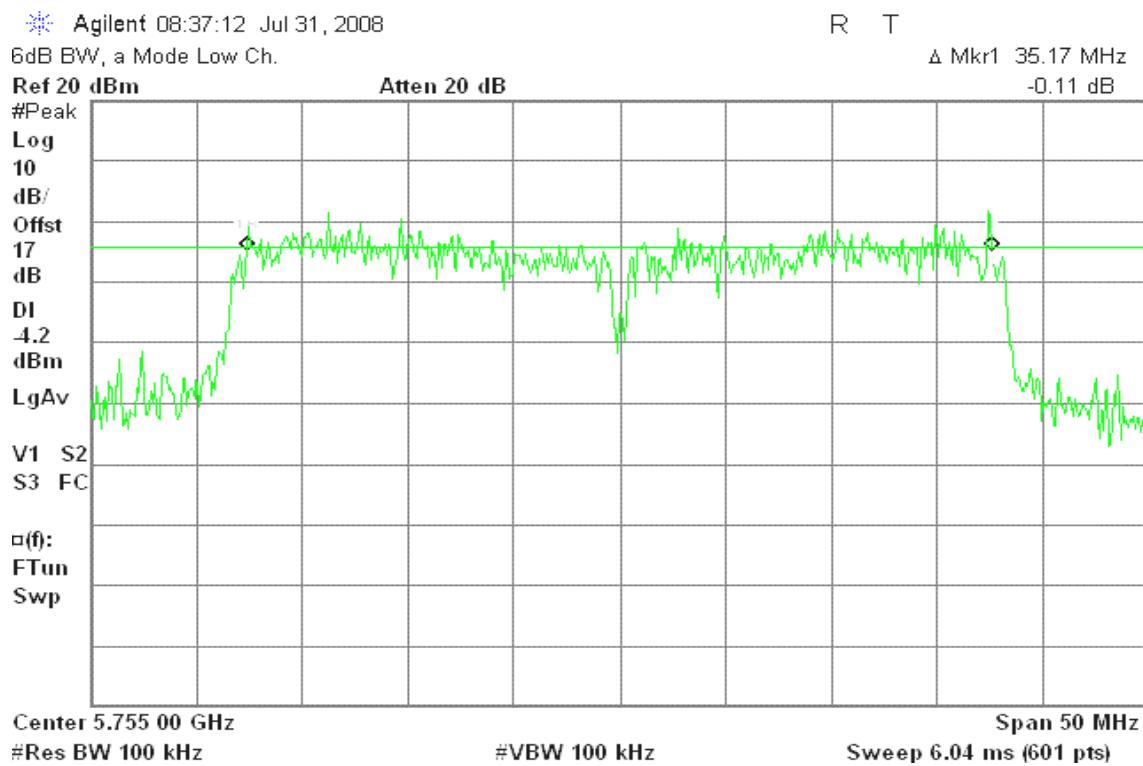
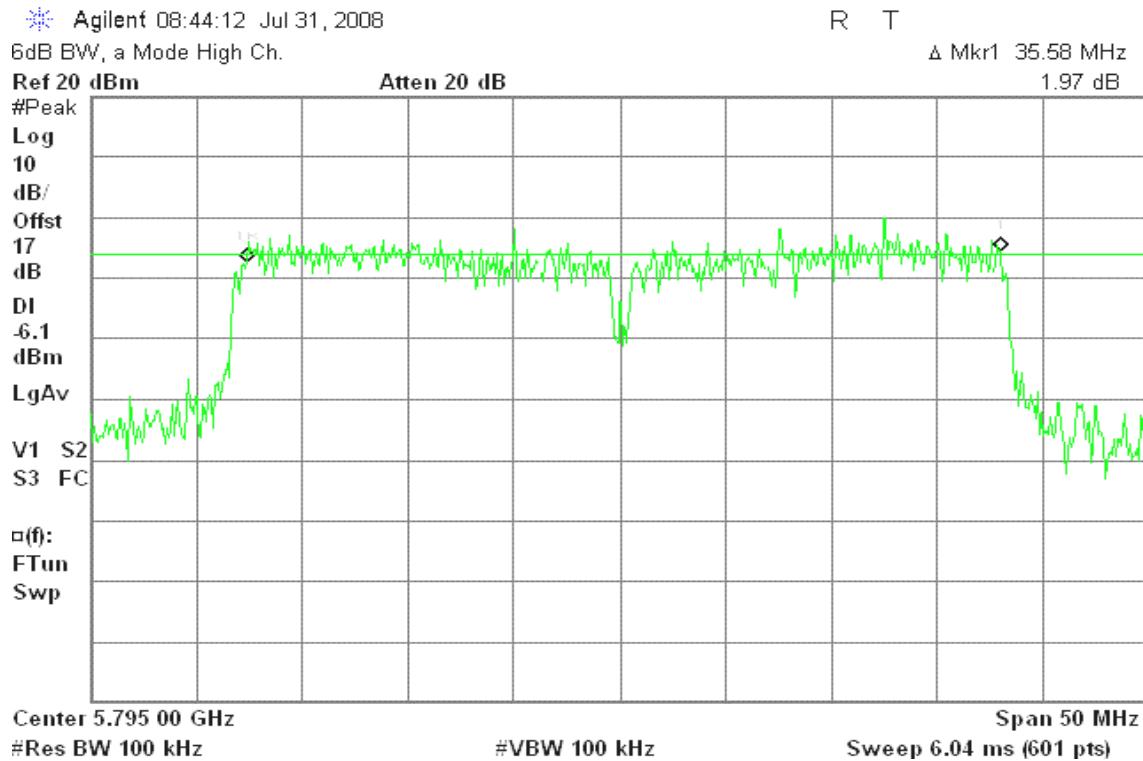


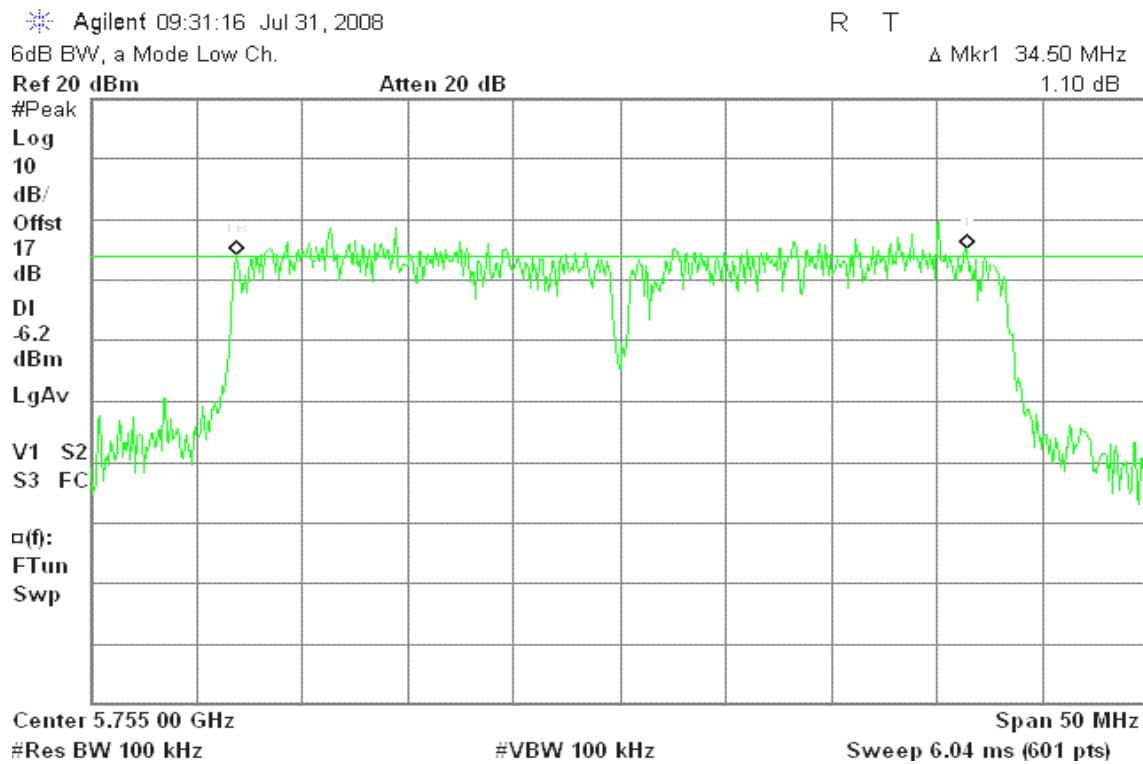
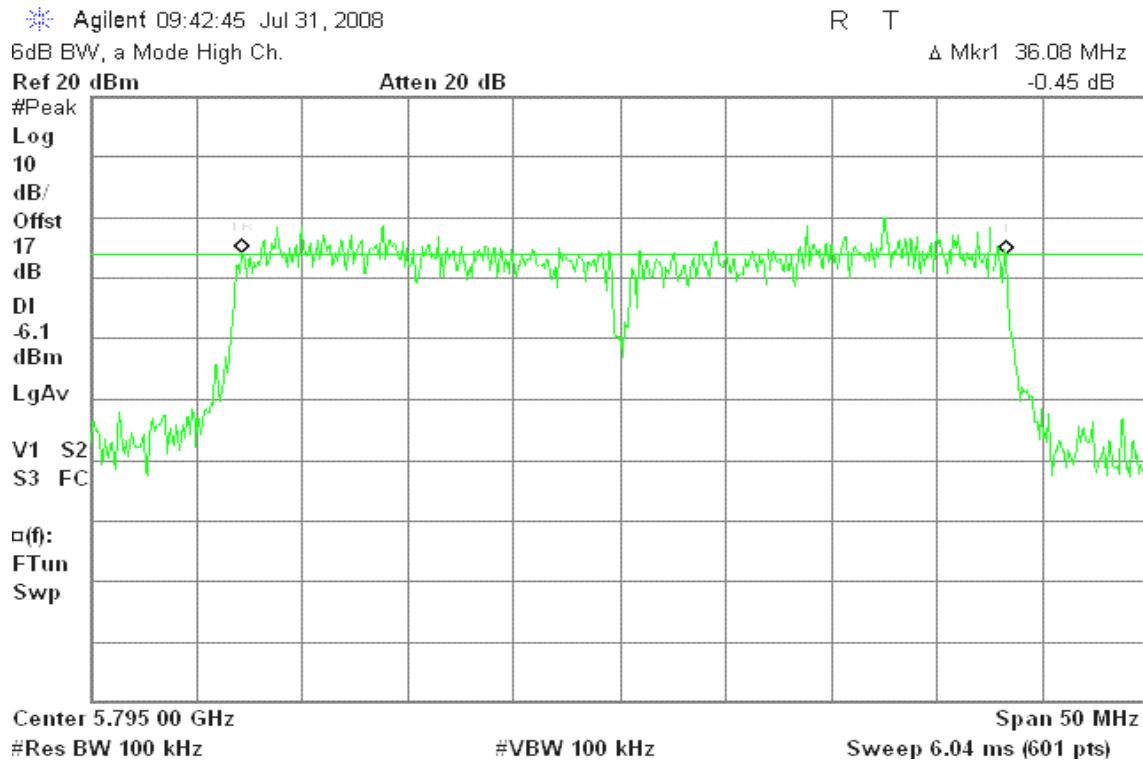
6dB Bandwidth (CH Mid)

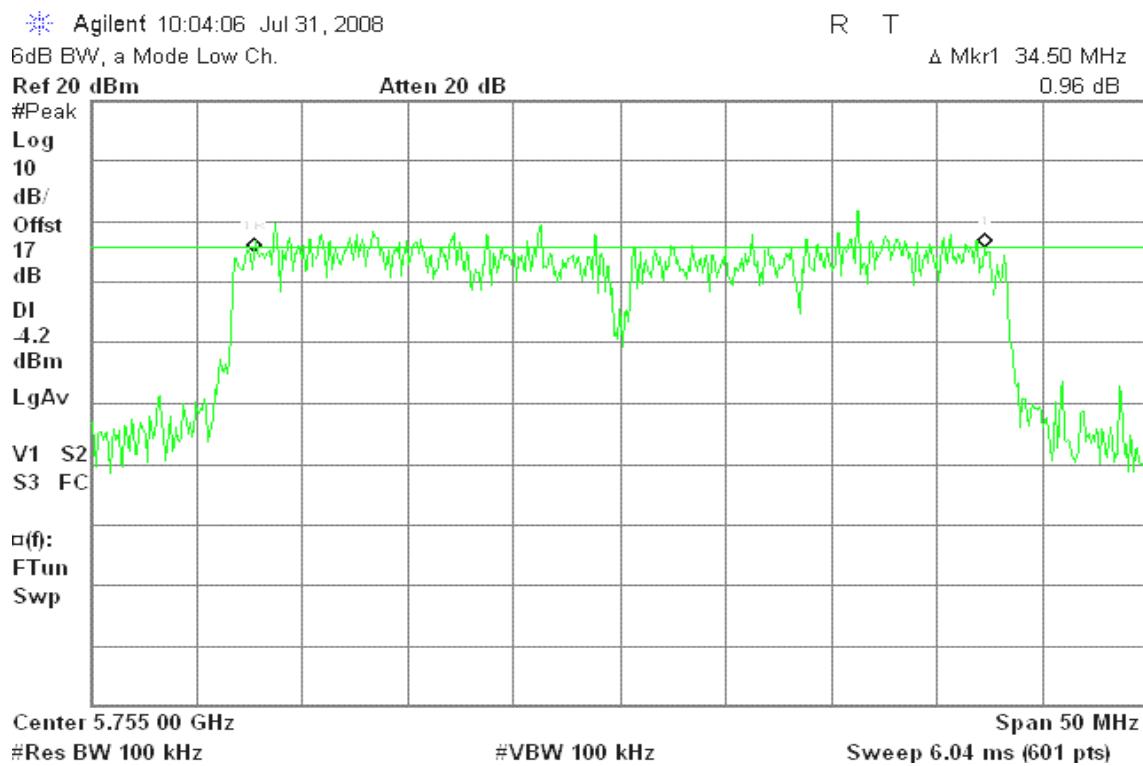
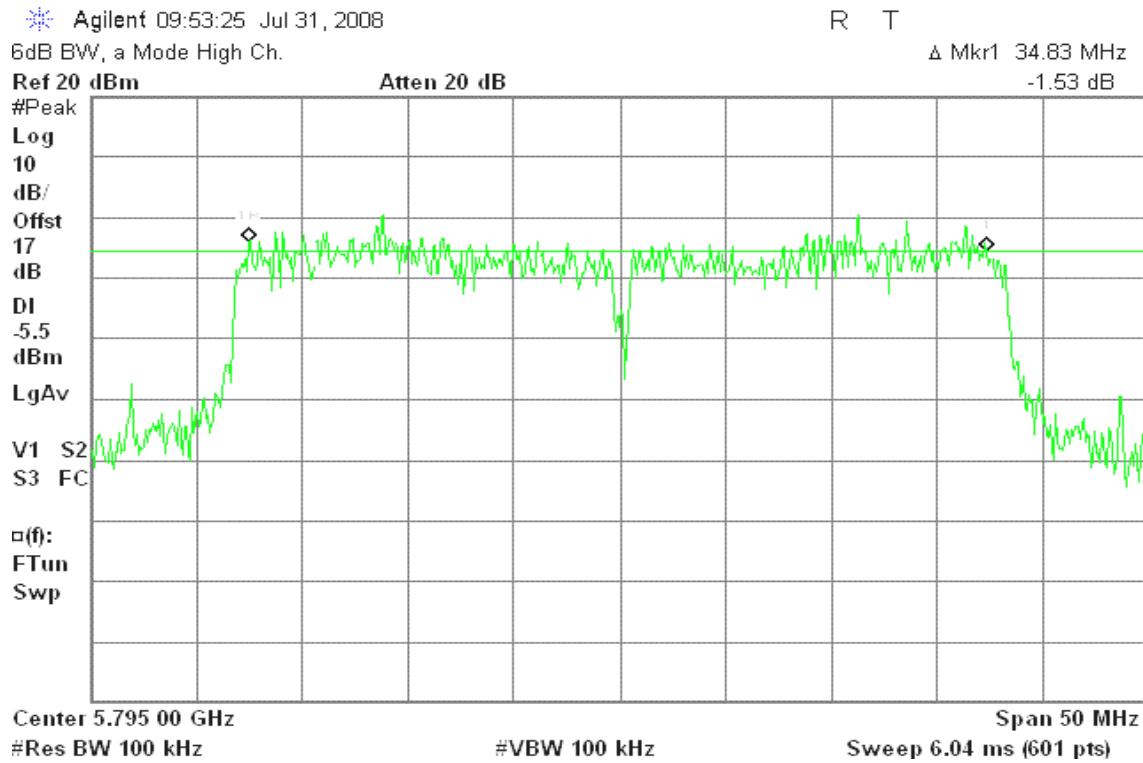


6dB Bandwidth (CH High)



draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 0**6dB Bandwidth (CH Low)****6dB Bandwidth (CH High)**

draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 1**6dB Bandwidth (CH Low)****6dB Bandwidth (CH High)**

draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 2**6dB Bandwidth (CH Low)****6dB Bandwidth (CH High)**

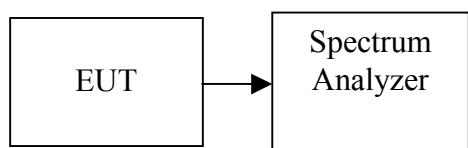
7.2 PEAK POWER

LIMIT

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

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

Test Configuration



TEST PROCEDURE

1. Peak power is measured using the spectrum analyzer's internal channel power integration function.
2. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.



TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	18.35	0.0684	1.00	PASS
Mid	2437	18.23	0.0665		PASS
High	2462	17.91	0.0618		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	16.32	0.0429	1.00	PASS
Mid	2437	19.32	0.0855		PASS
High	2462	19.33	0.0857		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	16.12	15.16	14.96	20.21	0.1051	1.00	PASS
Mid	2437	15.43	16.05	14.69	20.20	0.1046		PASS
High	2462	15.43	16.32	15.37	20.50	0.1122		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	12.43	13.58	11.67	17.40	0.0550	1.00	PASS
Mid	2437	19.16	20.18	19.19	24.31	0.2696		PASS
High	2452	14.05	16.19	15.55	20.12	0.1029		PASS

Remark: Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000) + Chain 2 (10^(Output Power /10)/1000)

**Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	5745	16.24	0.0421	1.00	PASS
Mid	5785	15.52	0.0356		PASS
High	5825	15.99	0.0397		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	5745	18.35	17.01	18.32	22.71	0.1865	1.00	PASS
Mid	5785	18.02	17.70	18.50	22.86	0.1931		PASS
High	5825	18.72	17.11	19.00	23.12	0.2053		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz

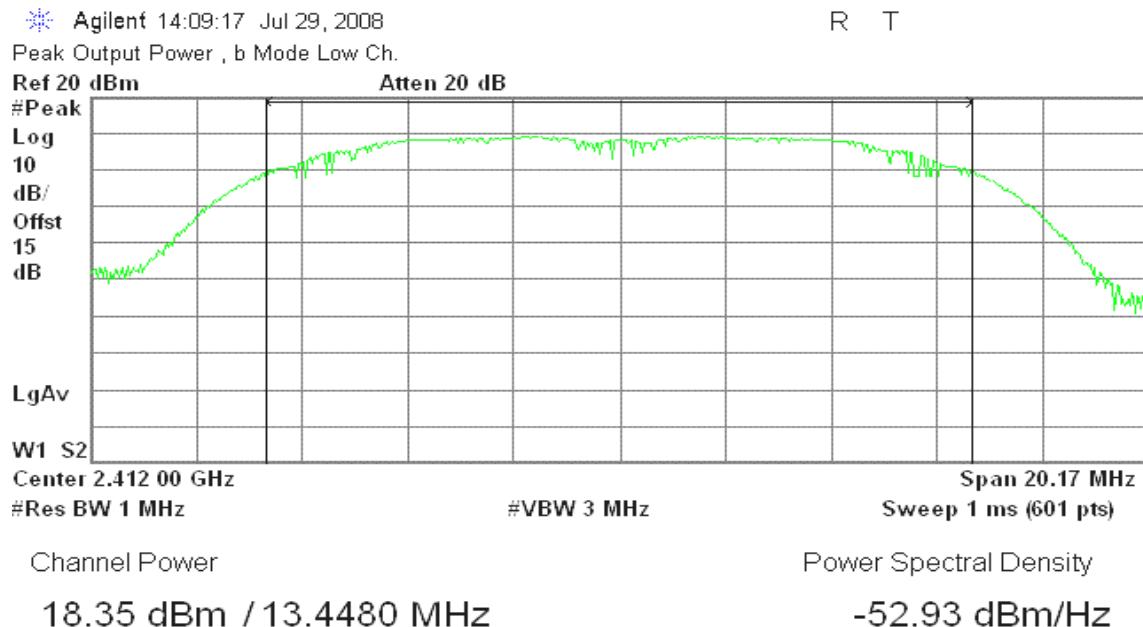
Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	5755	18.35	18.12	19.15	23.33	0.2155	1.00	PASS
Mid	5795	17.88	17.71	18.52	22.82	0.1915		PASS

Remark: Total Output Power (w) = Chain 0 ($10^{(Output\ Power/10)/1000}$) + Chain 1 ($10^{(Output\ Power/10)/1000}$) + Chain 2 ($10^{(Output\ Power/10)/1000}$)

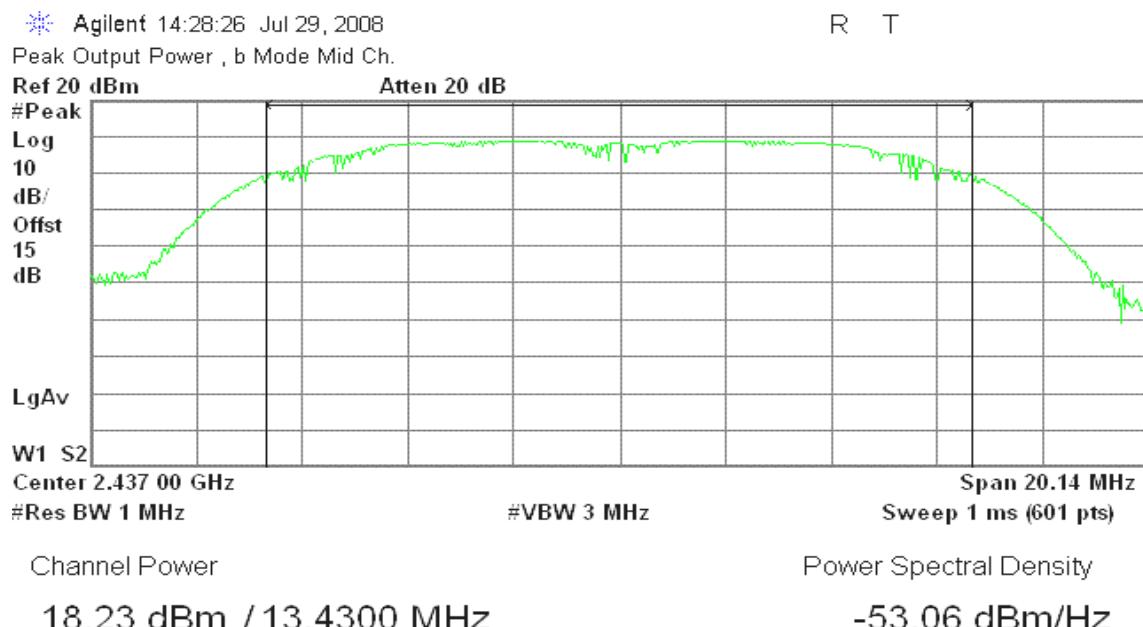
Test Plot

IEEE 802.11b mode

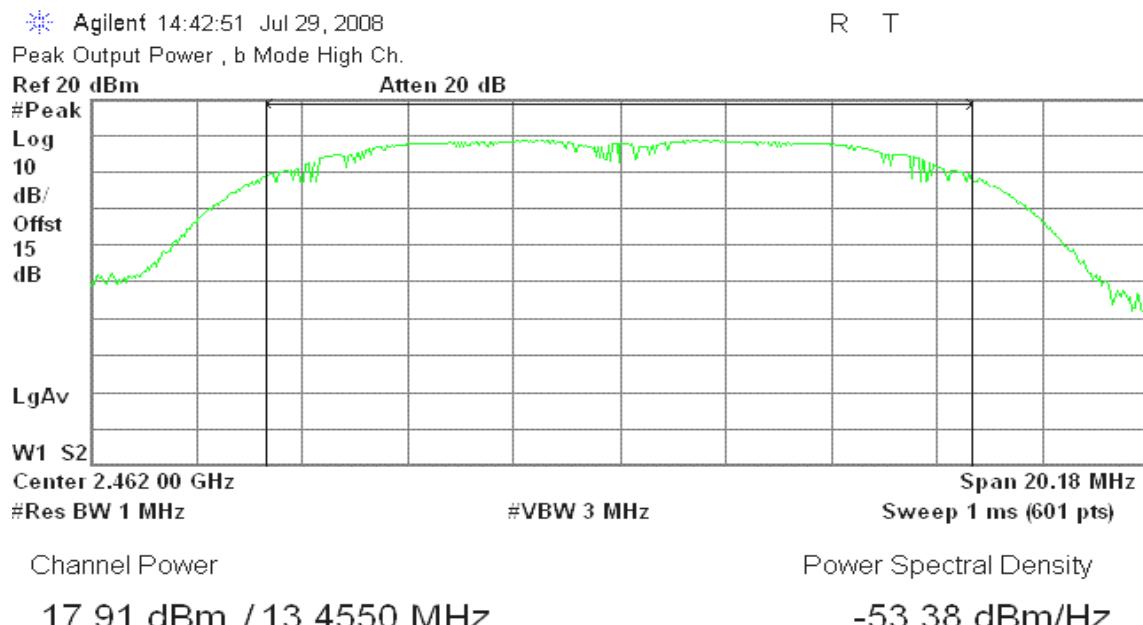
Peak Power (CH Low)



Peak Power (CH Mid)

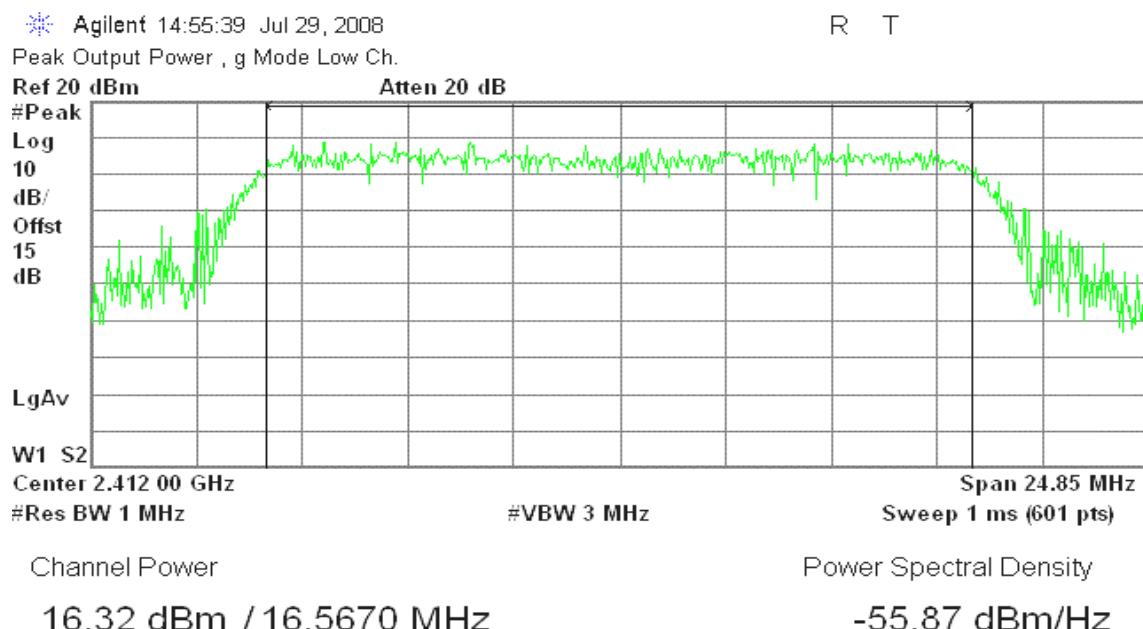


Peak Power (CH High)

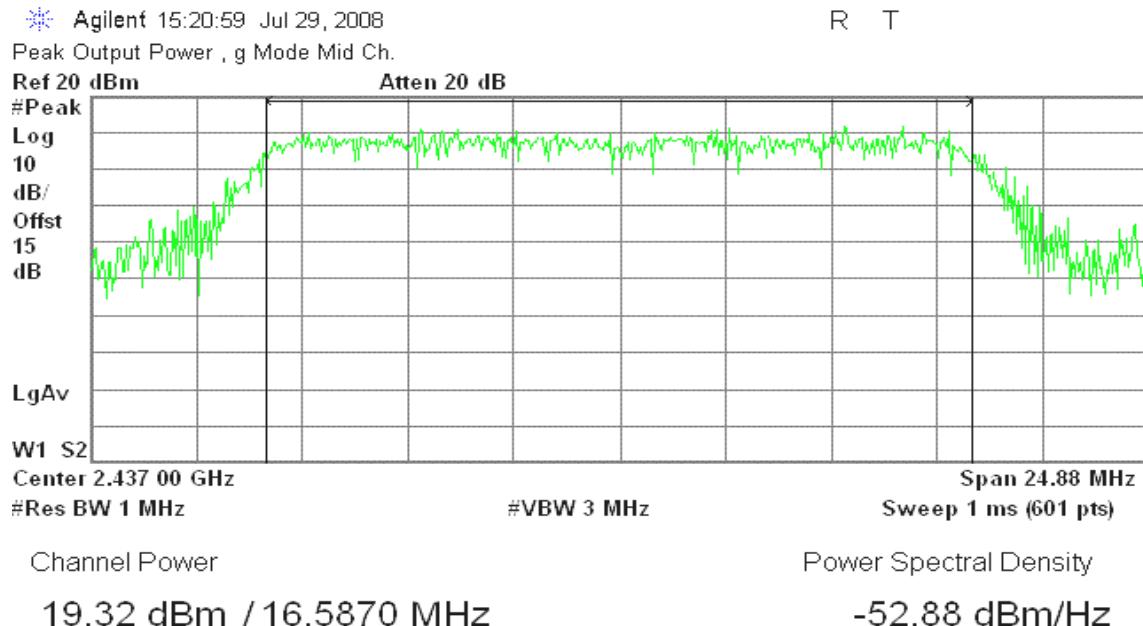


IEEE 802.11g mode

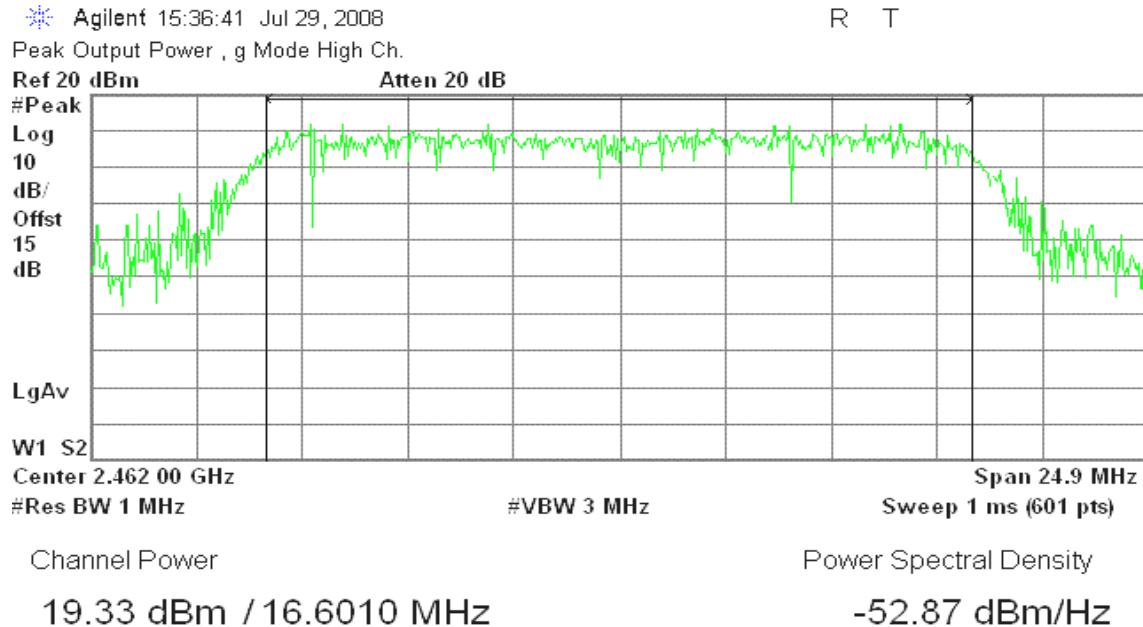
Peak Power (CH Low)

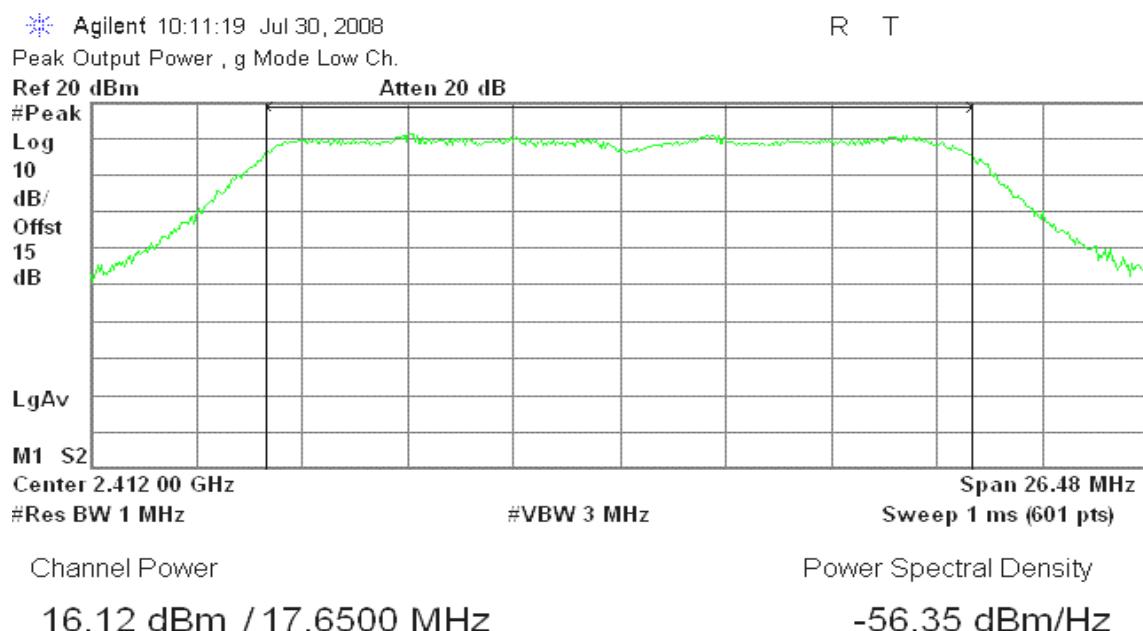
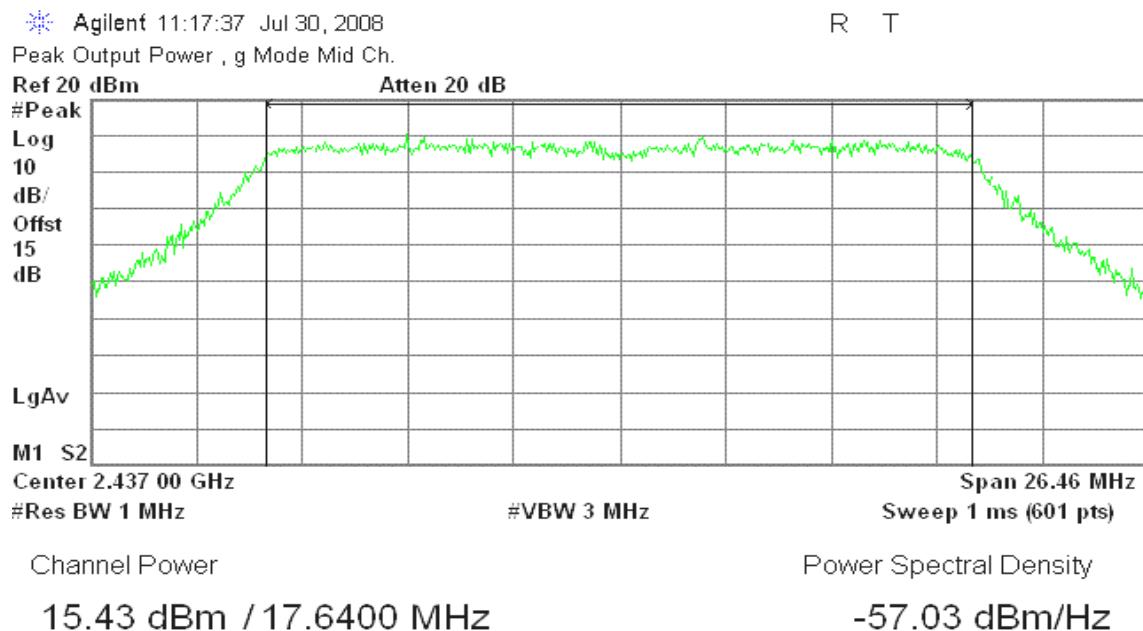


Peak Power (CH Mid)

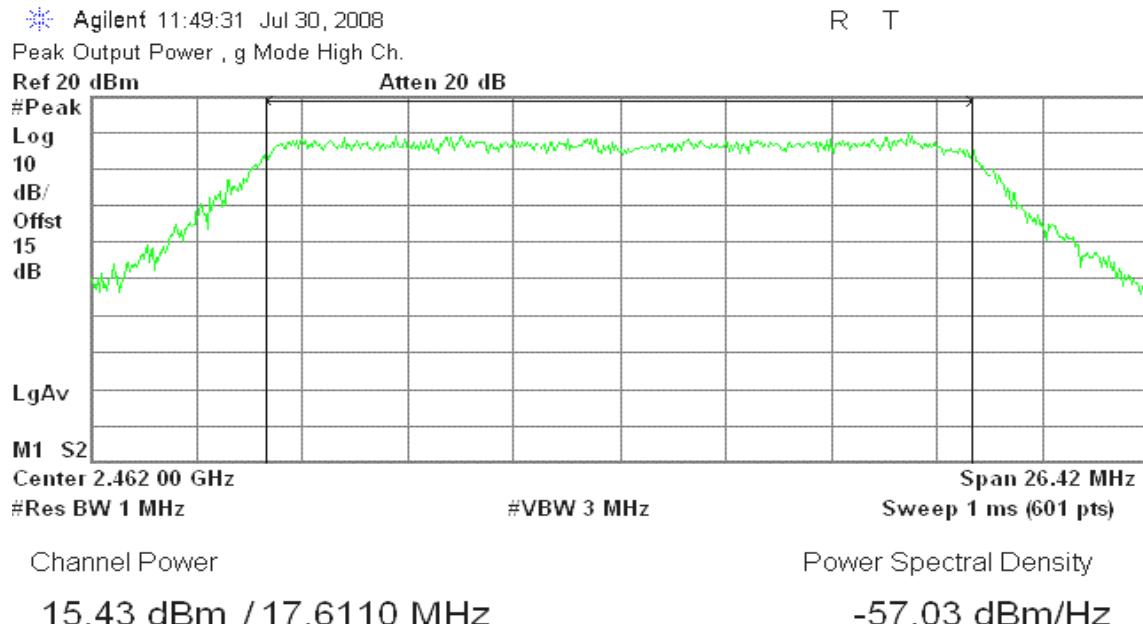


Peak Power (CH High)



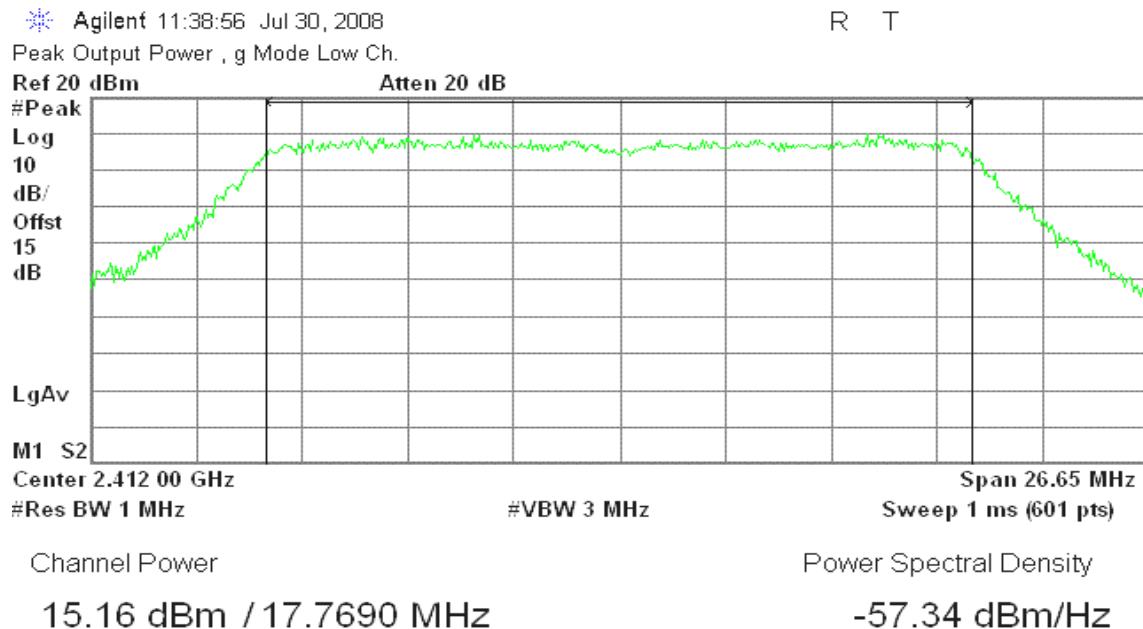
draft 802.11n Standard-20 MHz Channel mode / Chain 0**Peak Power (CH Low)****Peak Power (CH Mid)**

Peak Power (CH High)

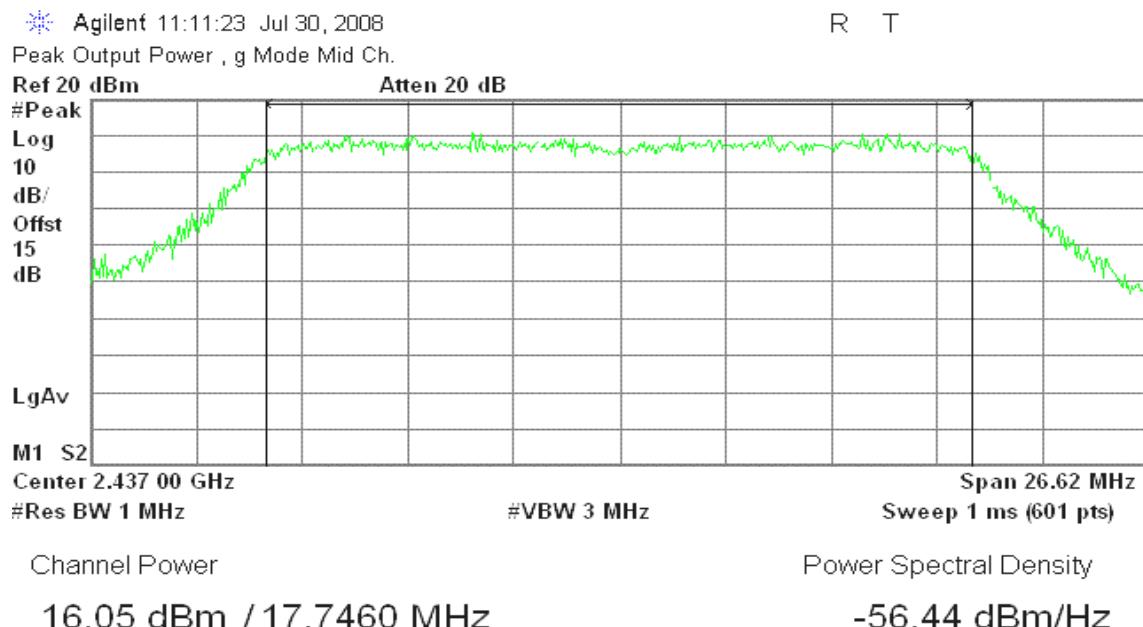


draft 802.11n Standard-20 MHz Channel mode / Chain 1

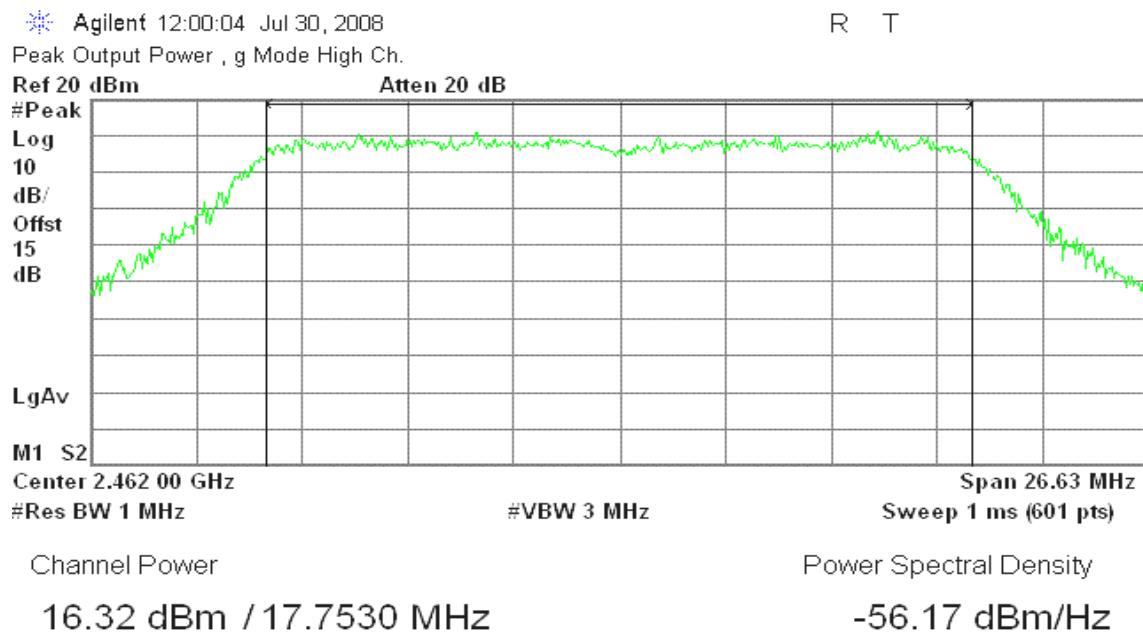
Peak Power (CH Low)

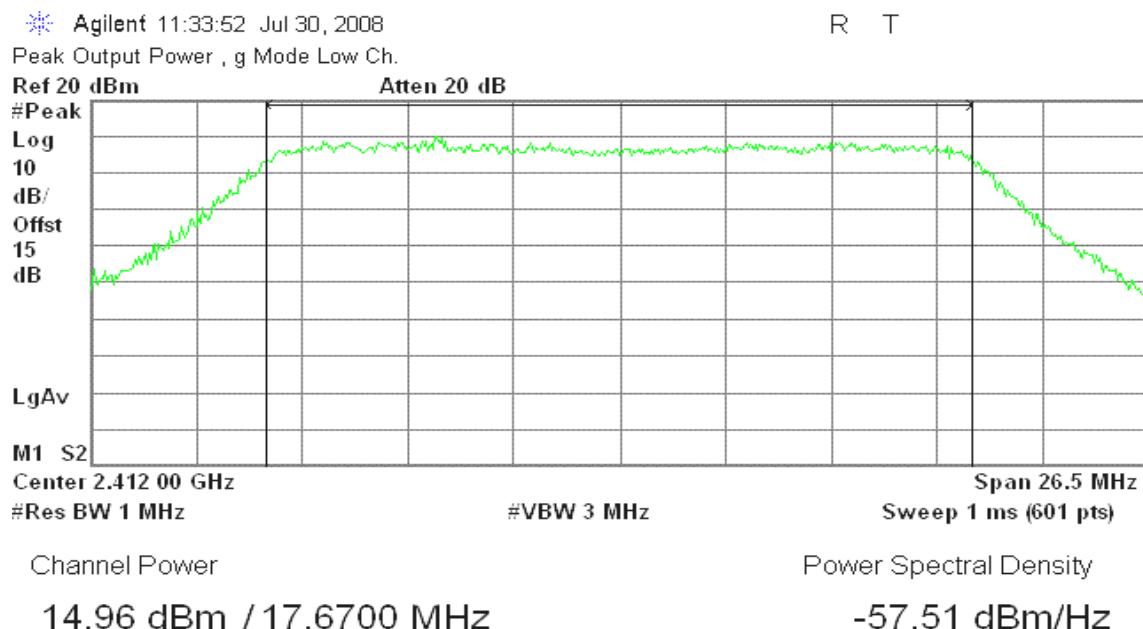
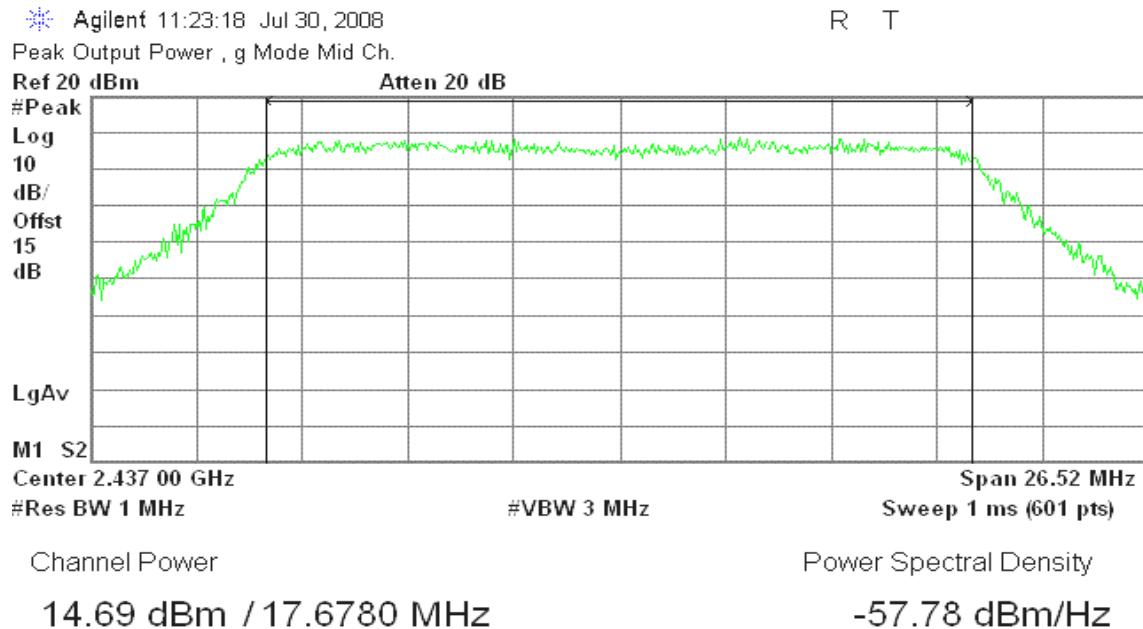


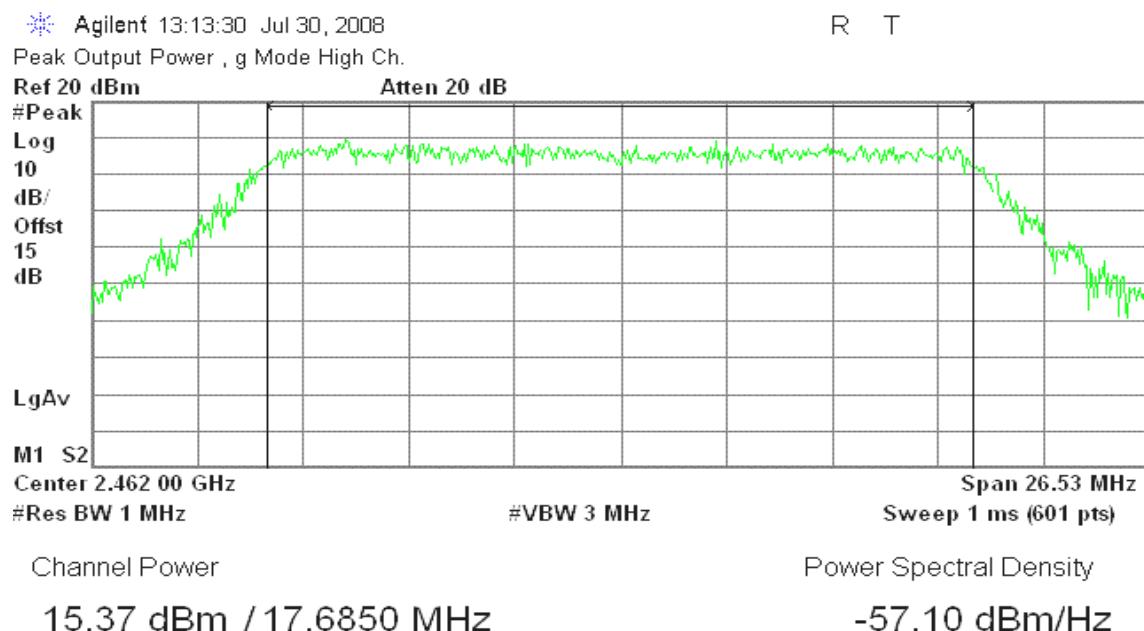
Peak Power (CH Mid)

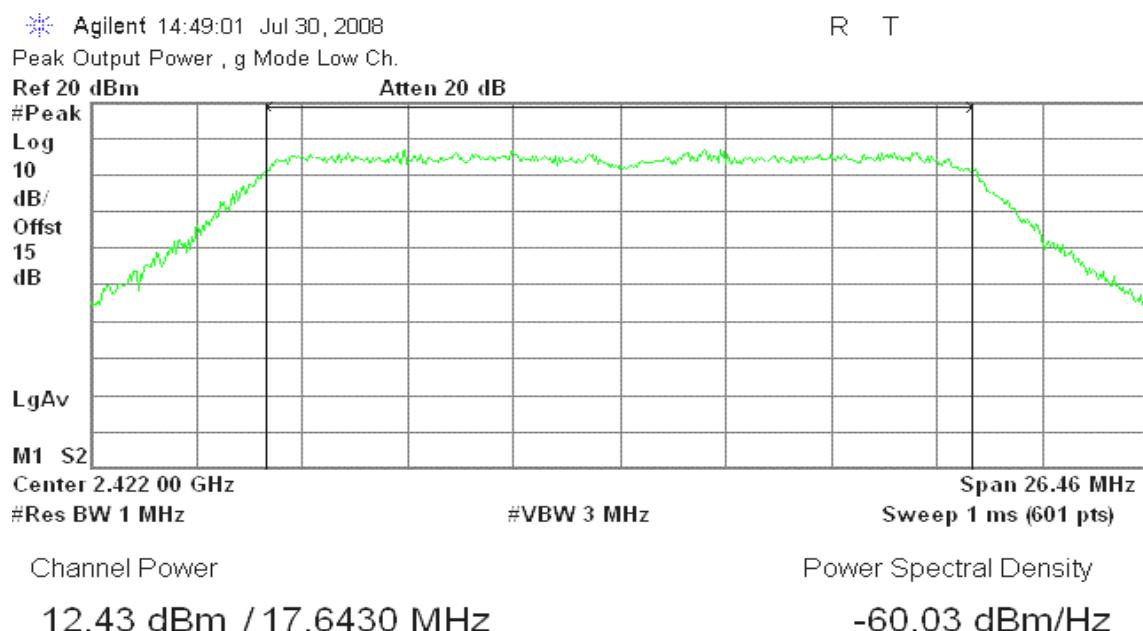
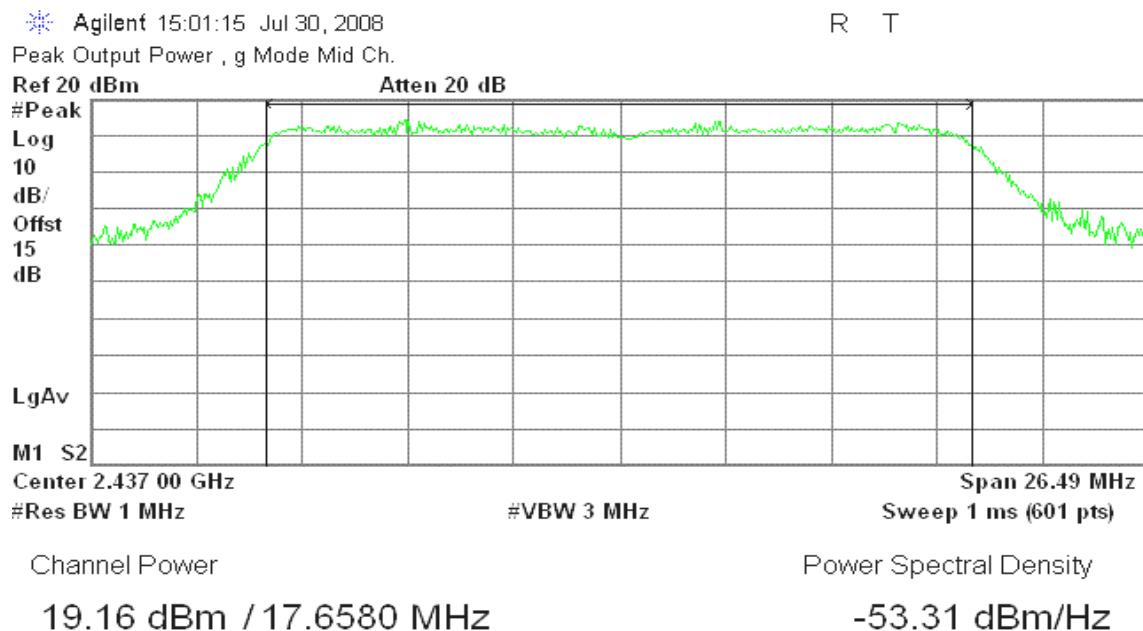


Peak Power (CH High)

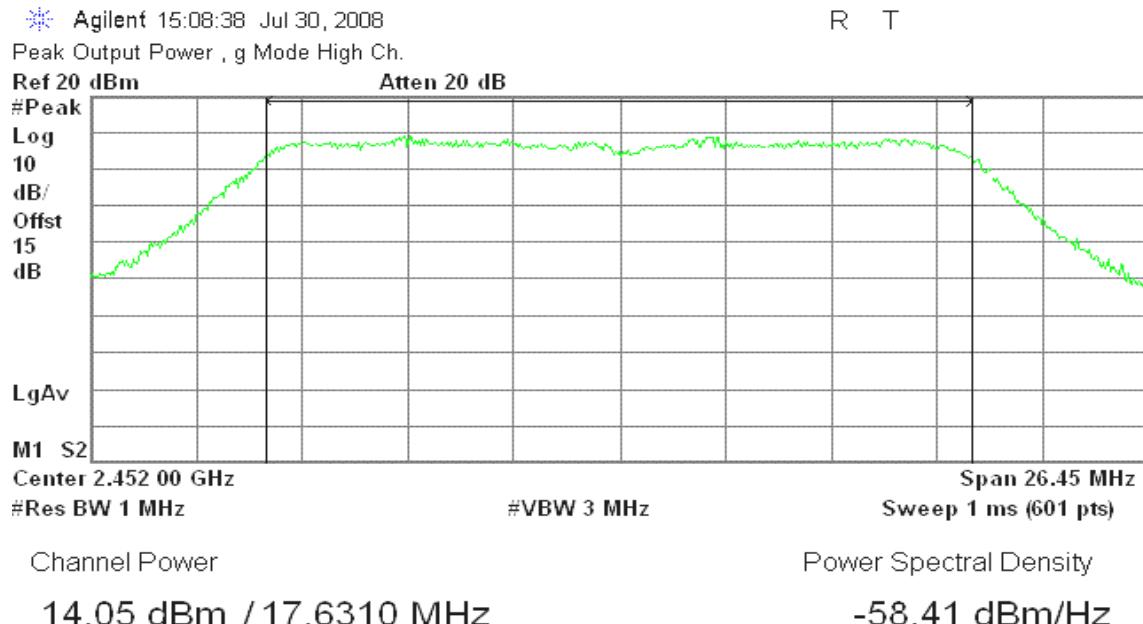


draft 802.11n Standard-20 MHz Channel mode / Chain 2**Peak Power (CH Low)****Peak Power (CH Mid)**

Peak Power (CH High)

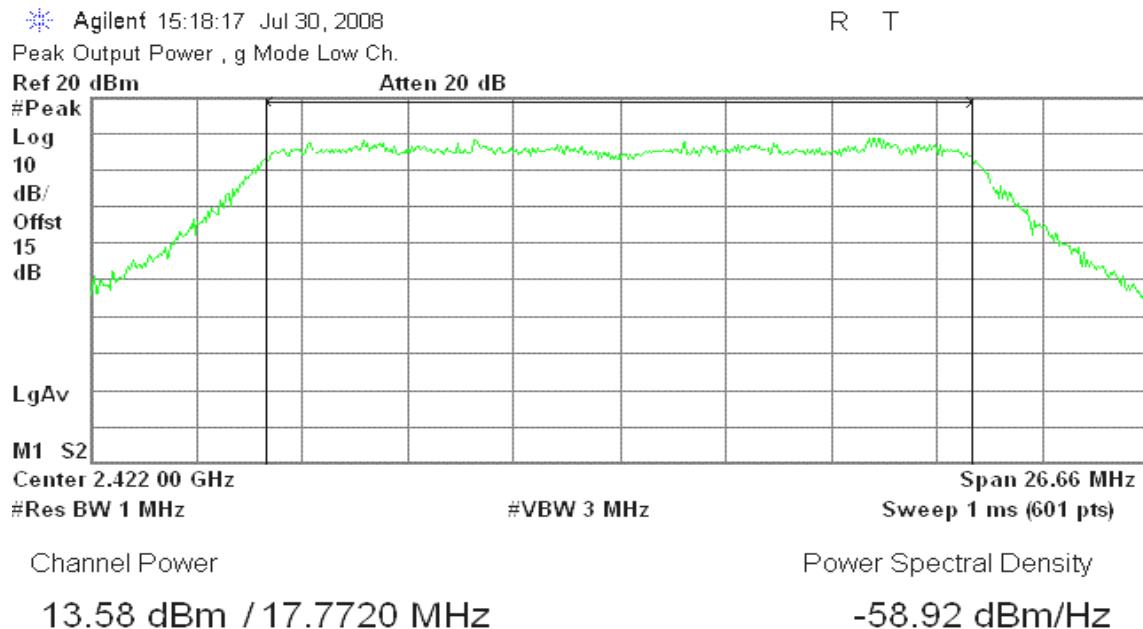
draft 802.11n Wide-40 MHz Channel mode / Chain 0**Peak Power (CH Low)****Peak Power (CH Mid)**

Peak Power (CH High)

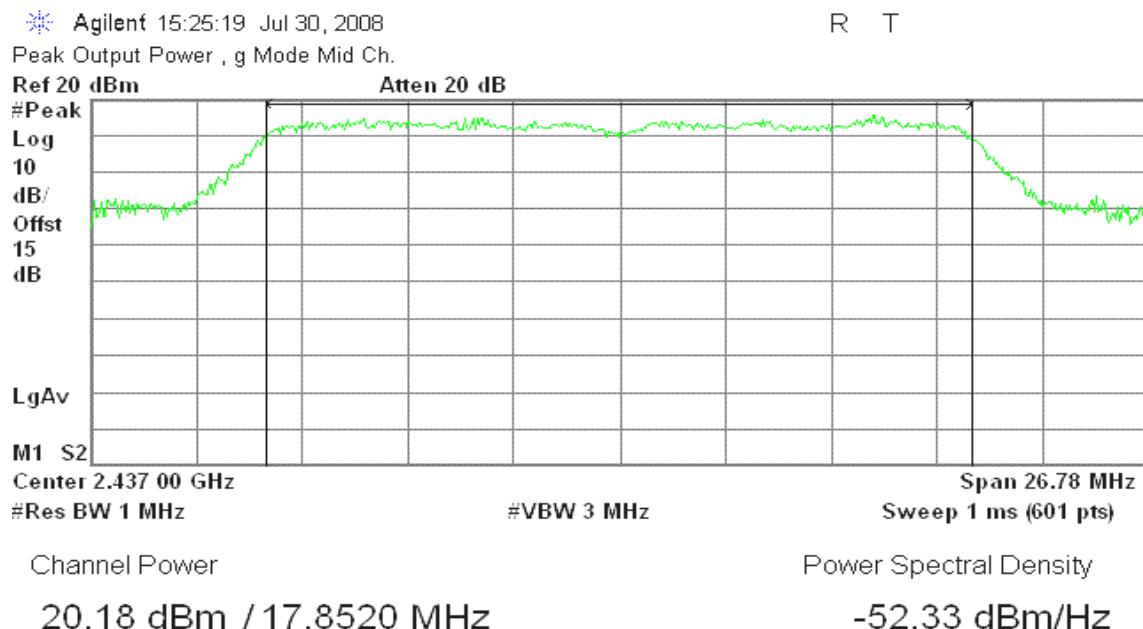


draft 802.11n Wide-40 MHz Channel mode / Chain 1

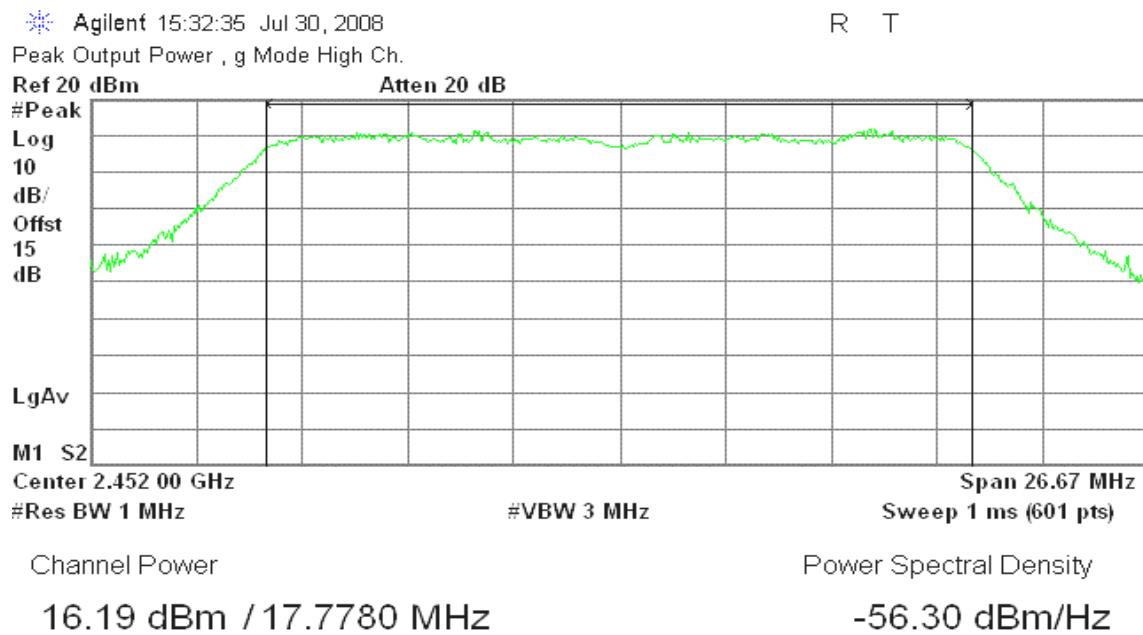
Peak Power (CH Low)

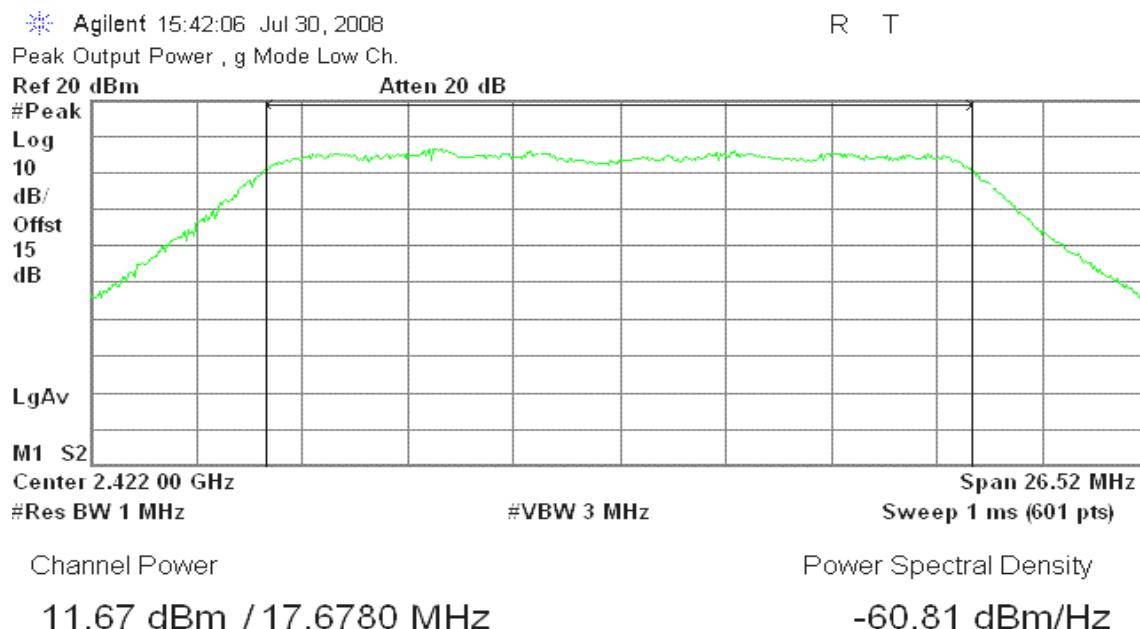
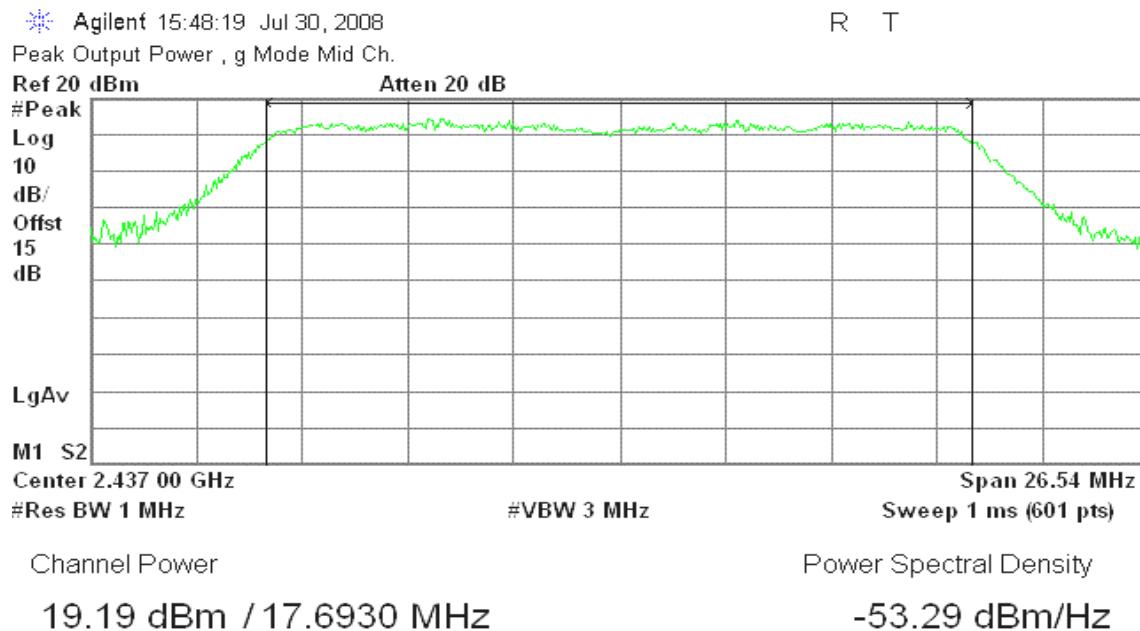


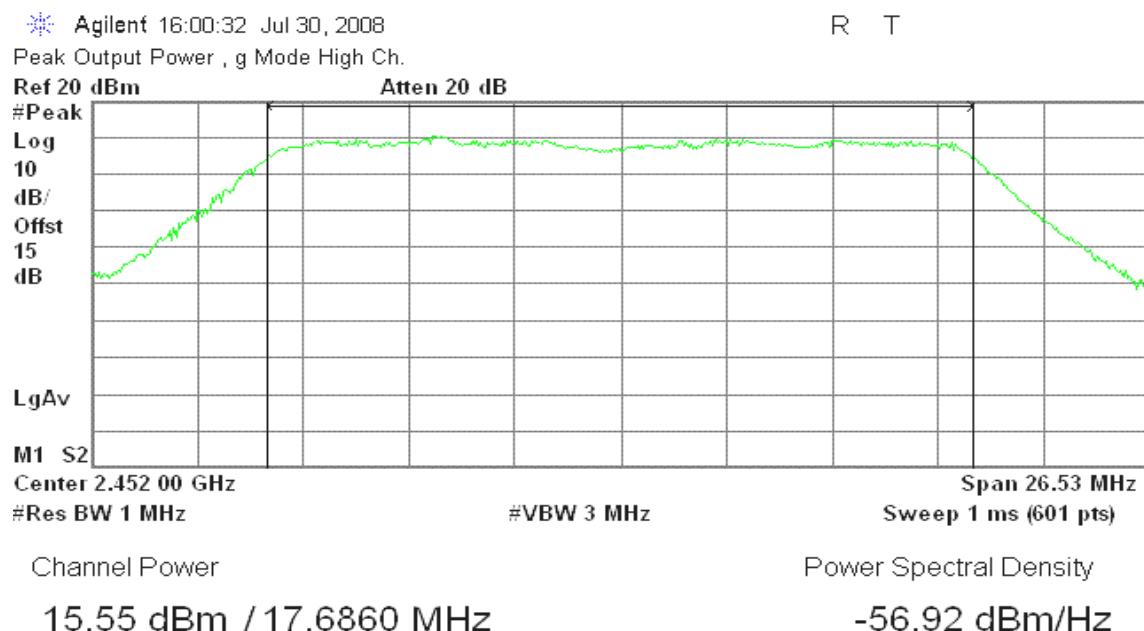
Peak Power (CH Mid)

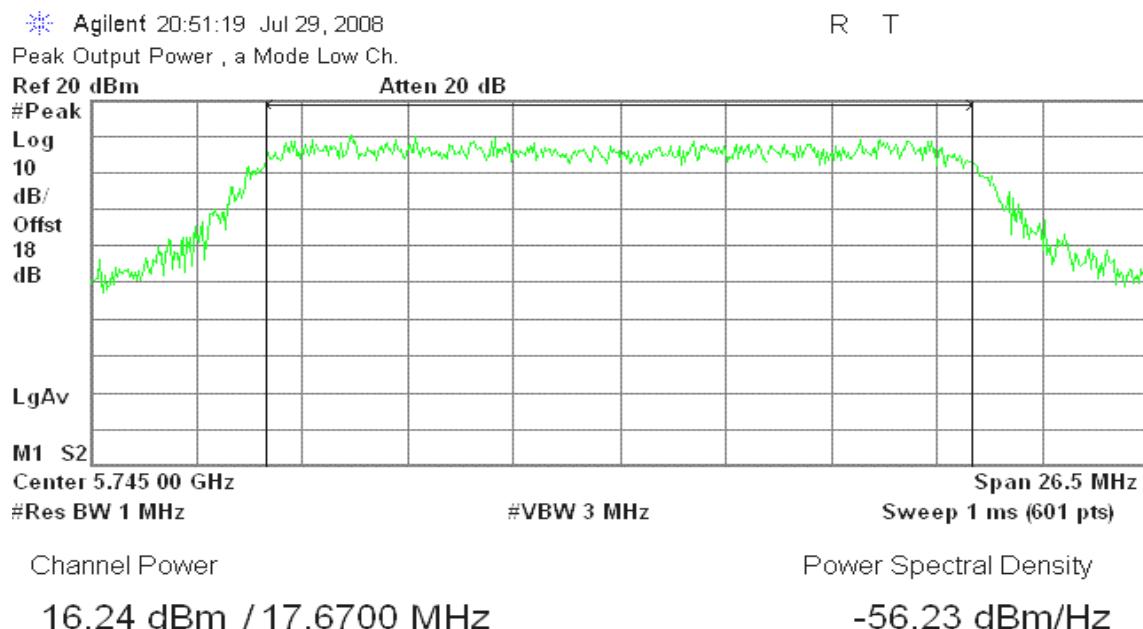
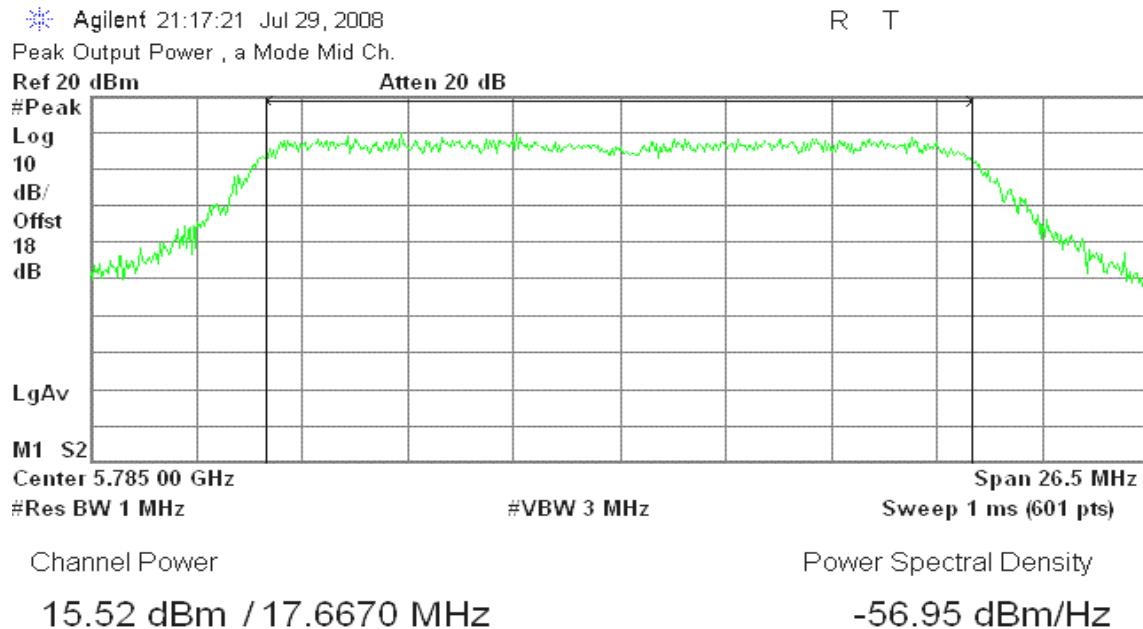


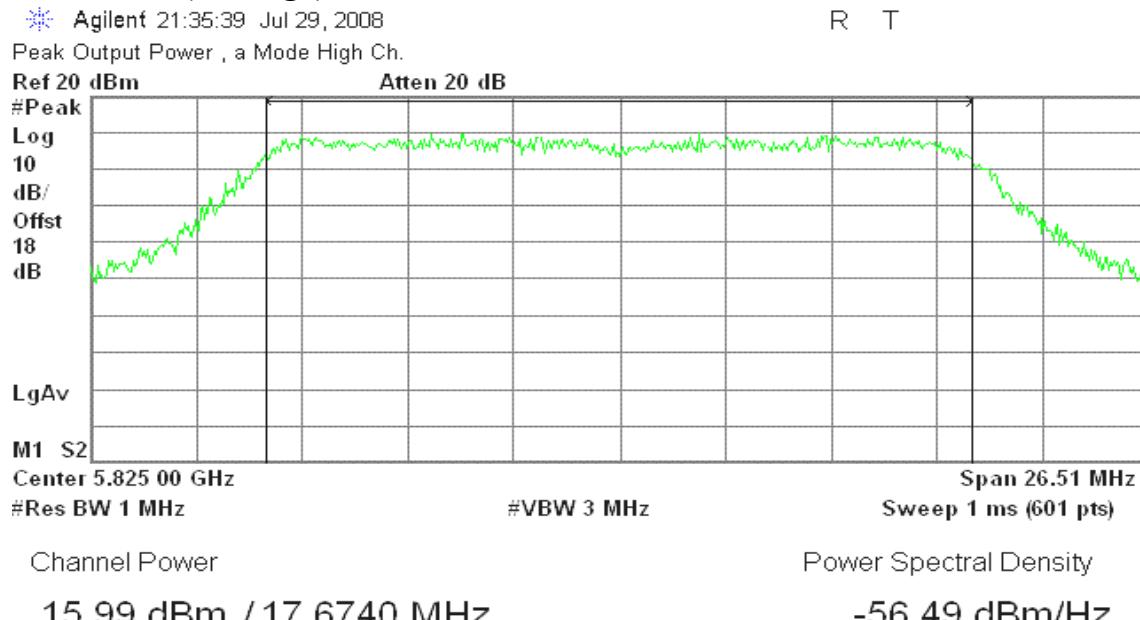
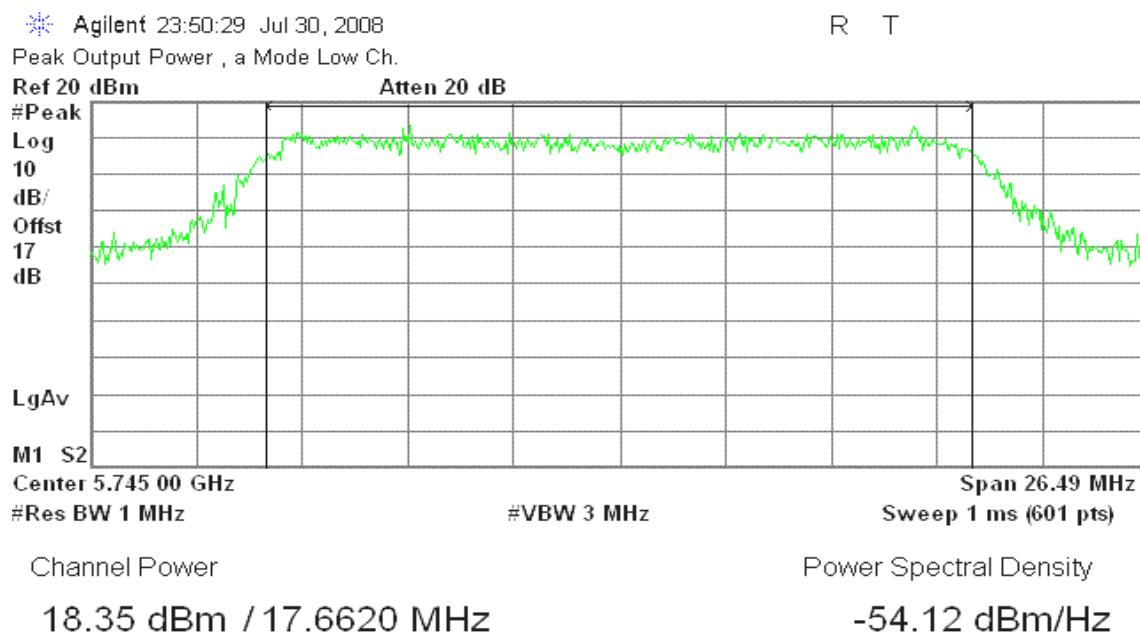
Peak Power (CH High)



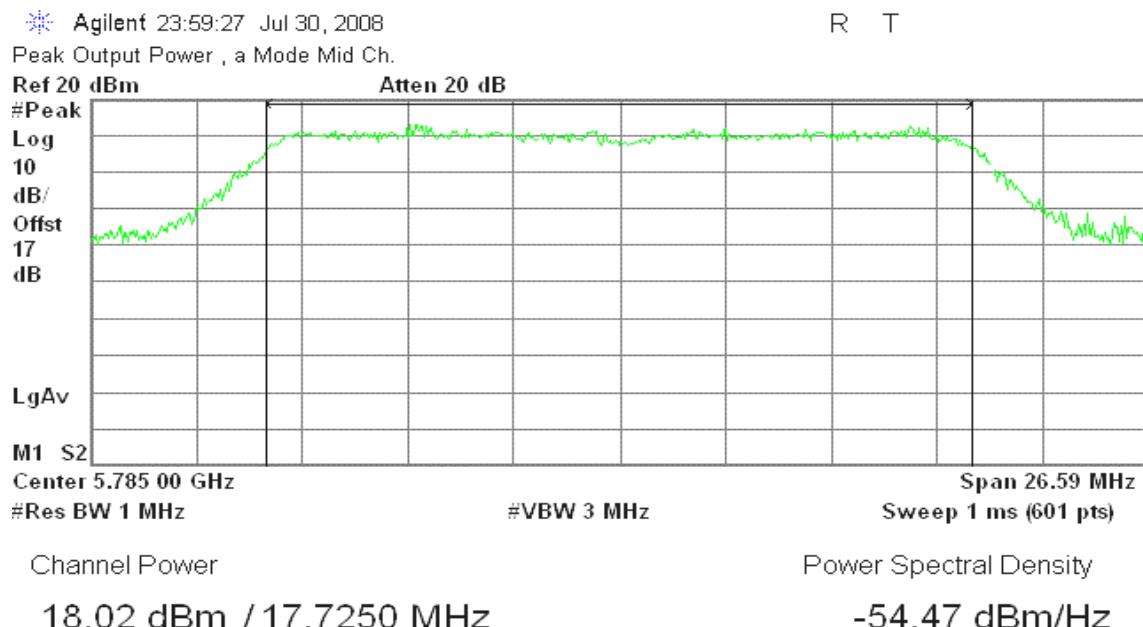
draft 802.11n Wide-40 MHz Channel mode / Chain 2**Peak Power (CH Low)****Peak Power (CH Mid)**

Peak Power (CH High)

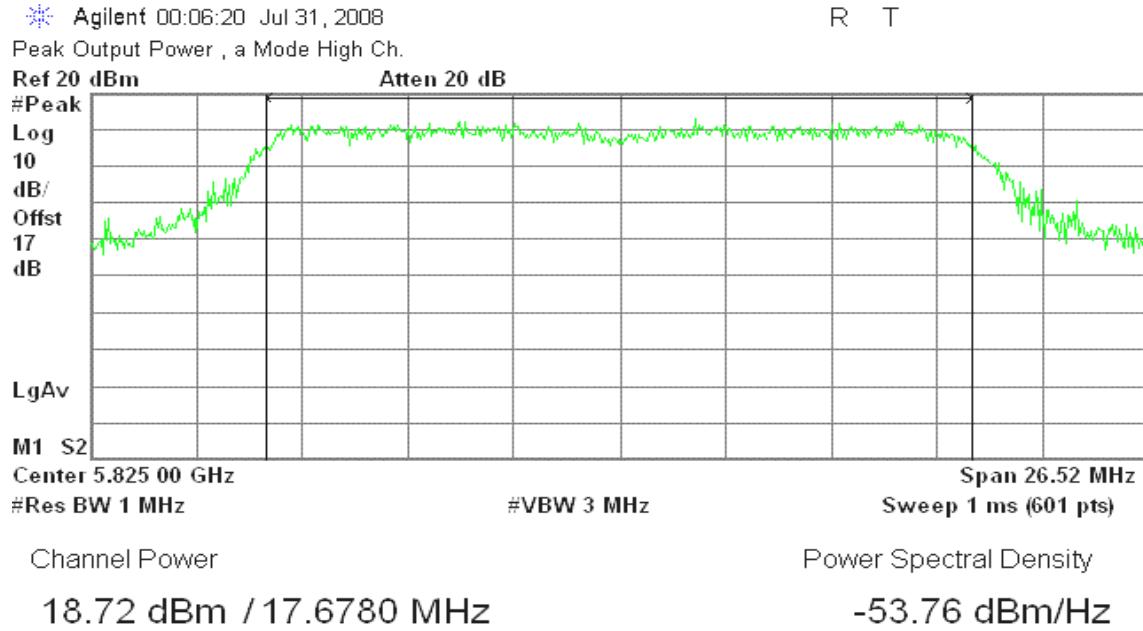
IEEE 802.11a mode / 5745 ~ 5825MHz**Peak Power (CH Low)****Peak Power (CH Mid)**

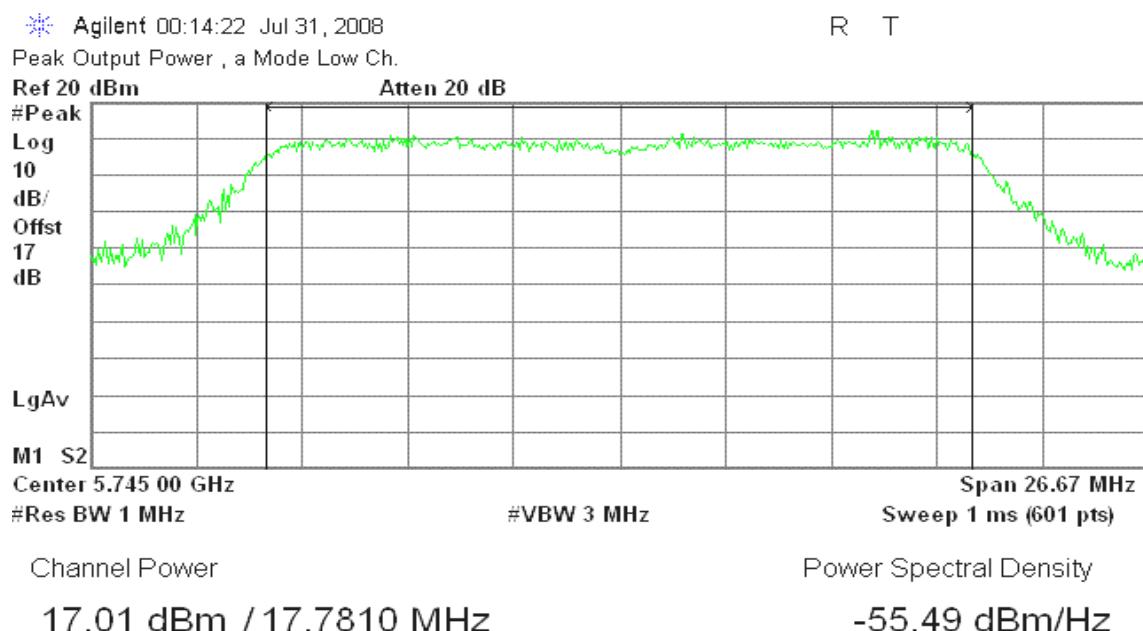
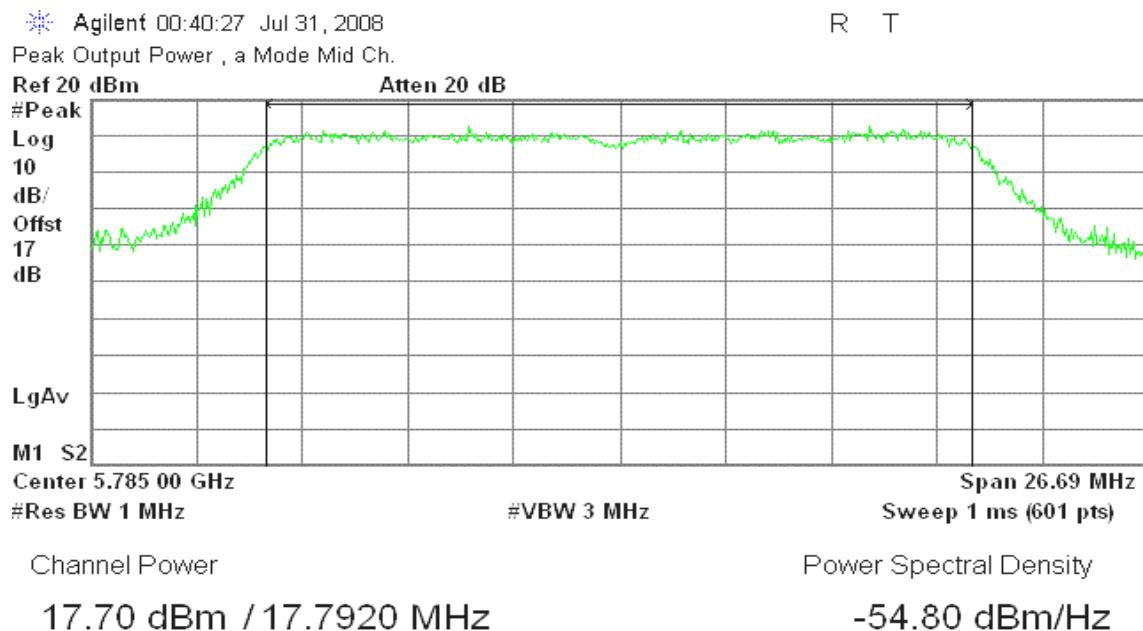
Peak Power (CH High)**draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 0****Peak Power (CH Low)**

Peak Power (CH Mid)

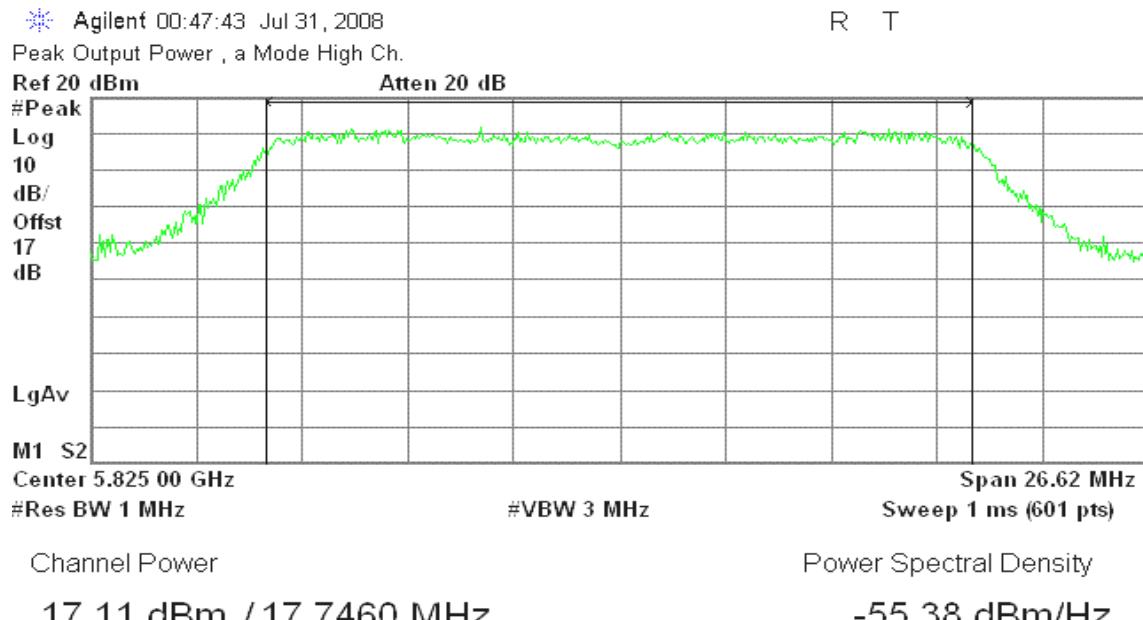


Peak Power (CH High)



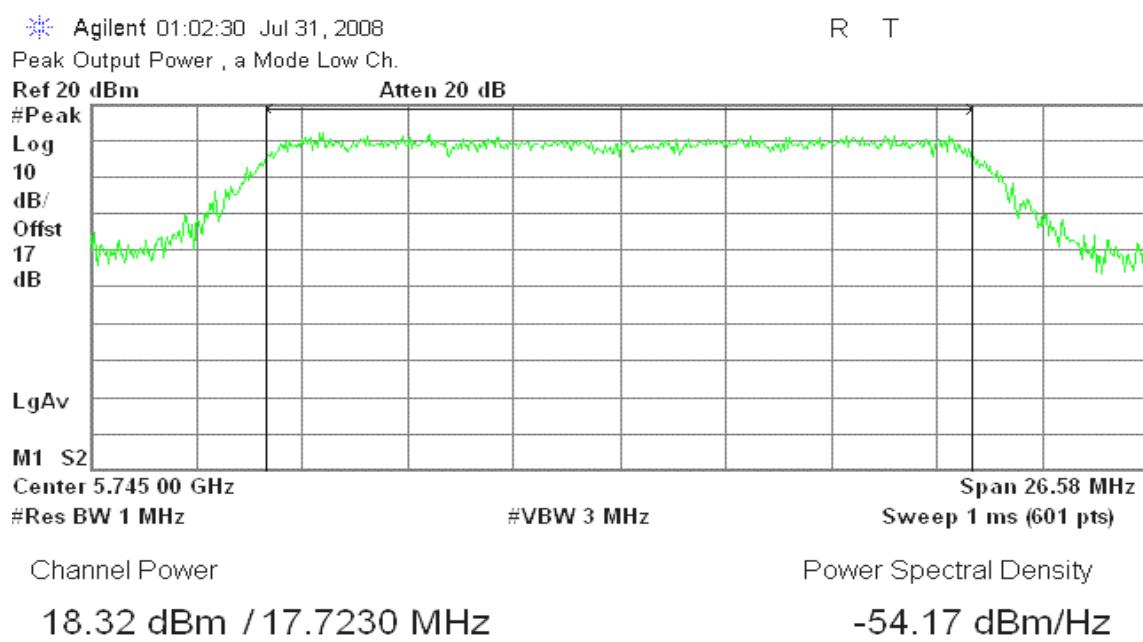
draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 1**Peak Power (CH Low)****Peak Power (CH Mid)**

Peak Power (CH High)

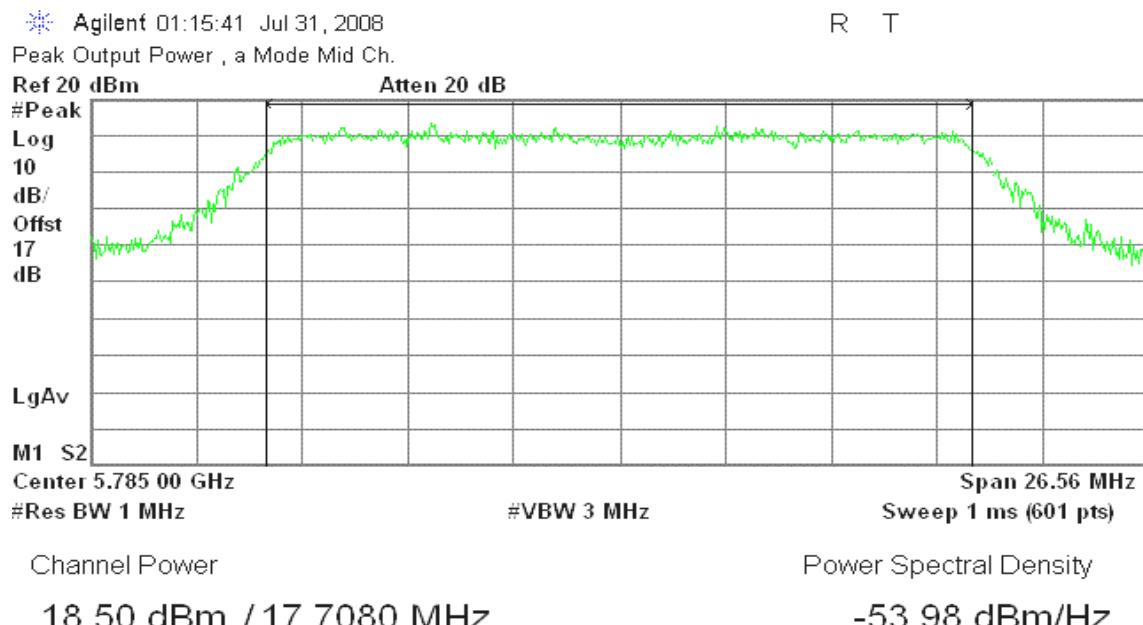


draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 2

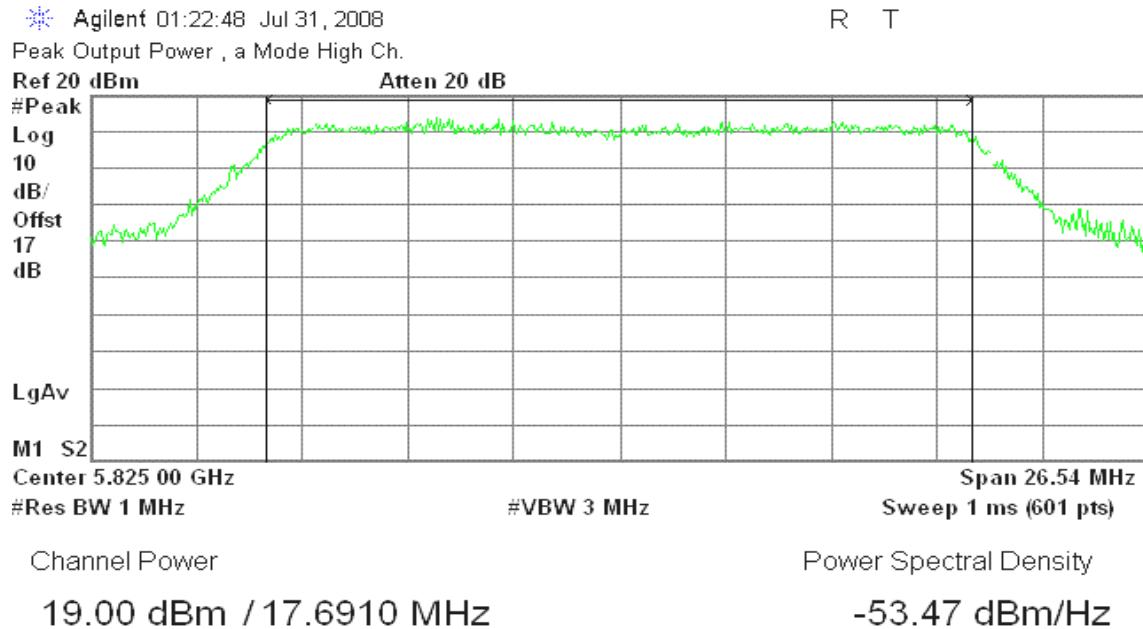
Peak Power (CH Low)

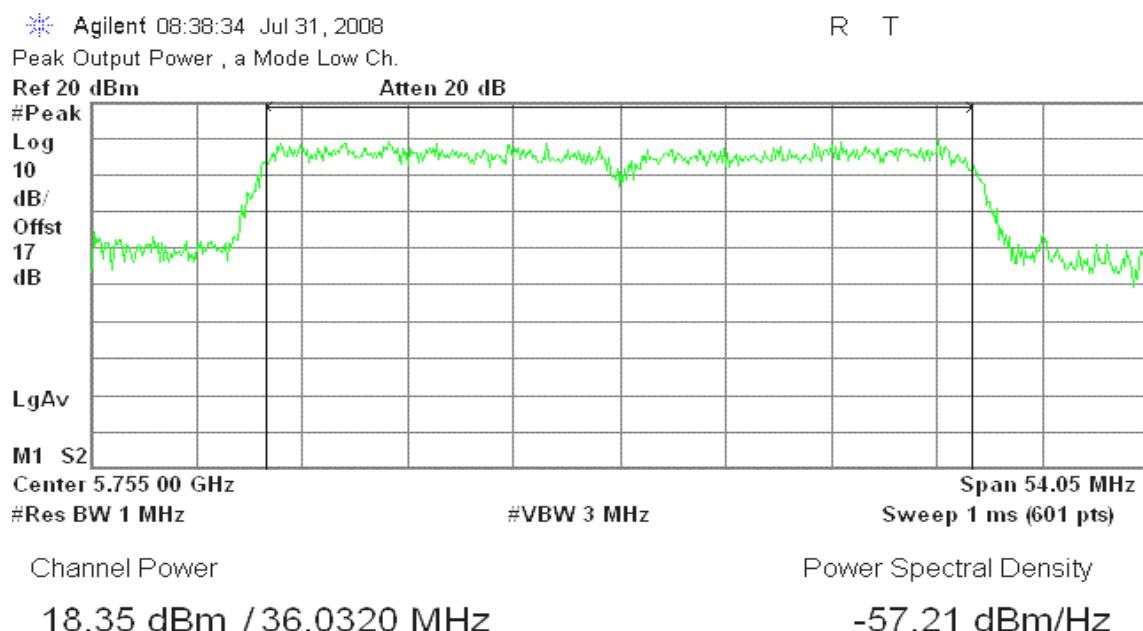
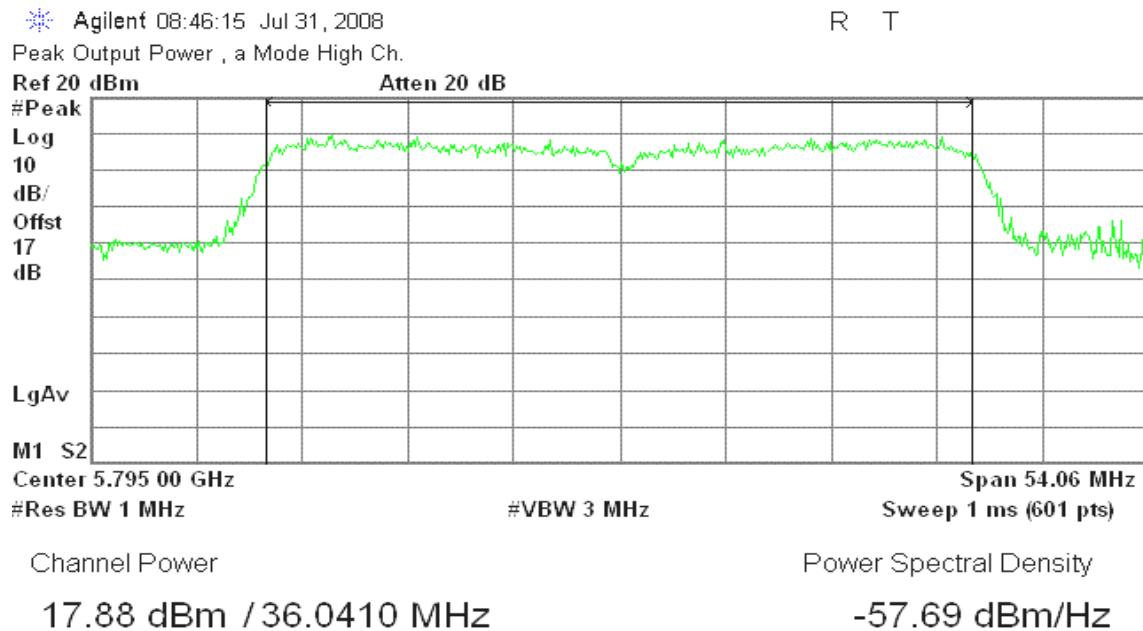


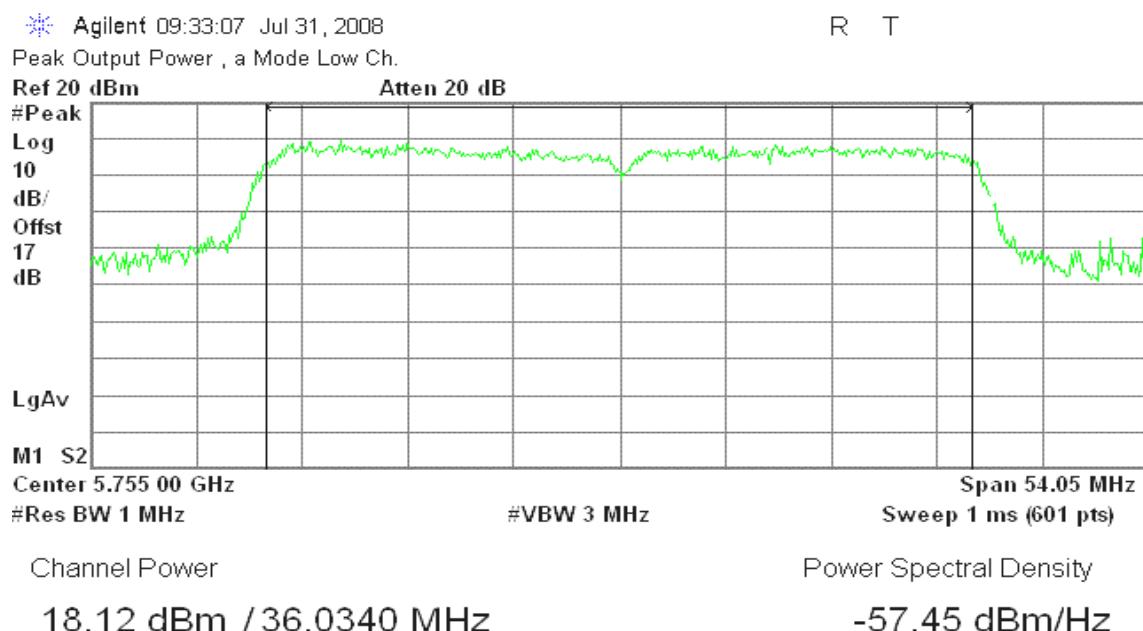
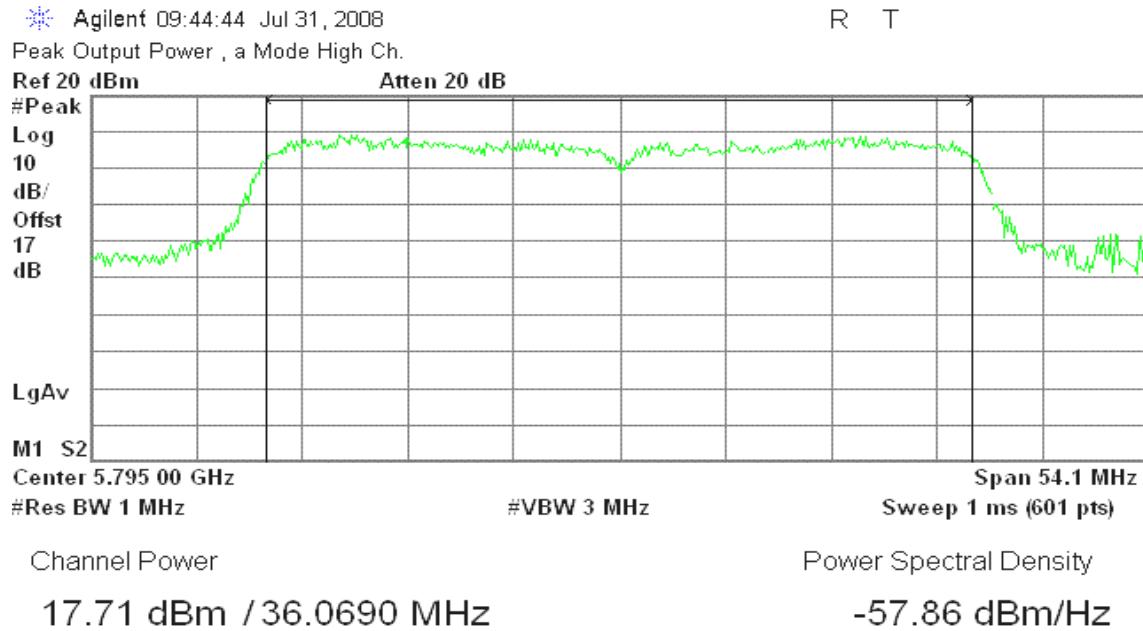
Peak Power (CH Mid)

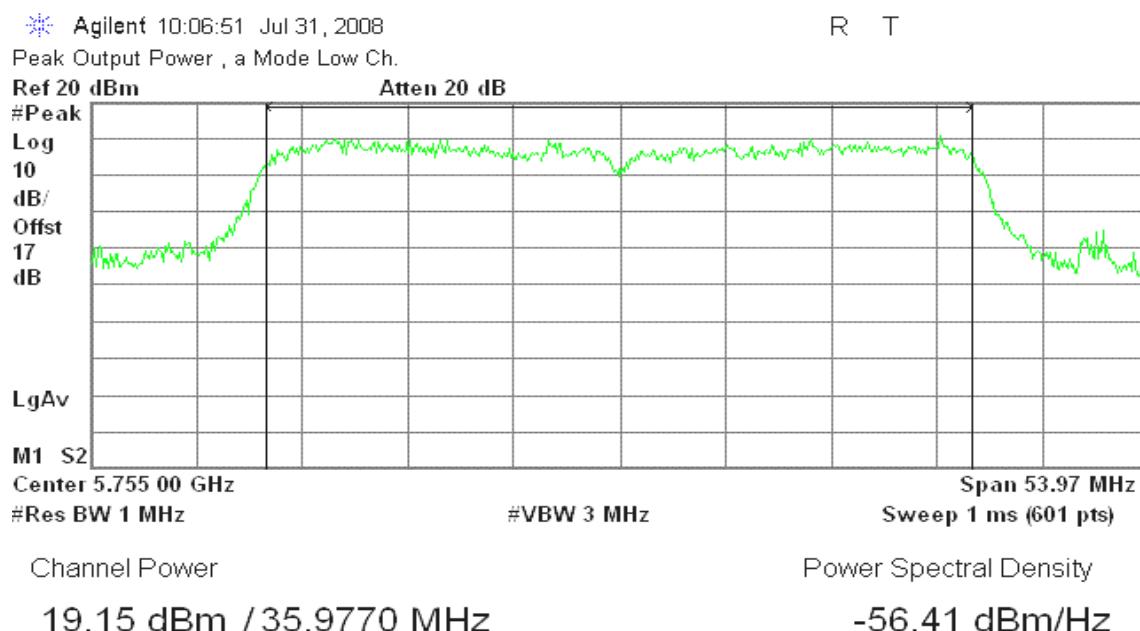
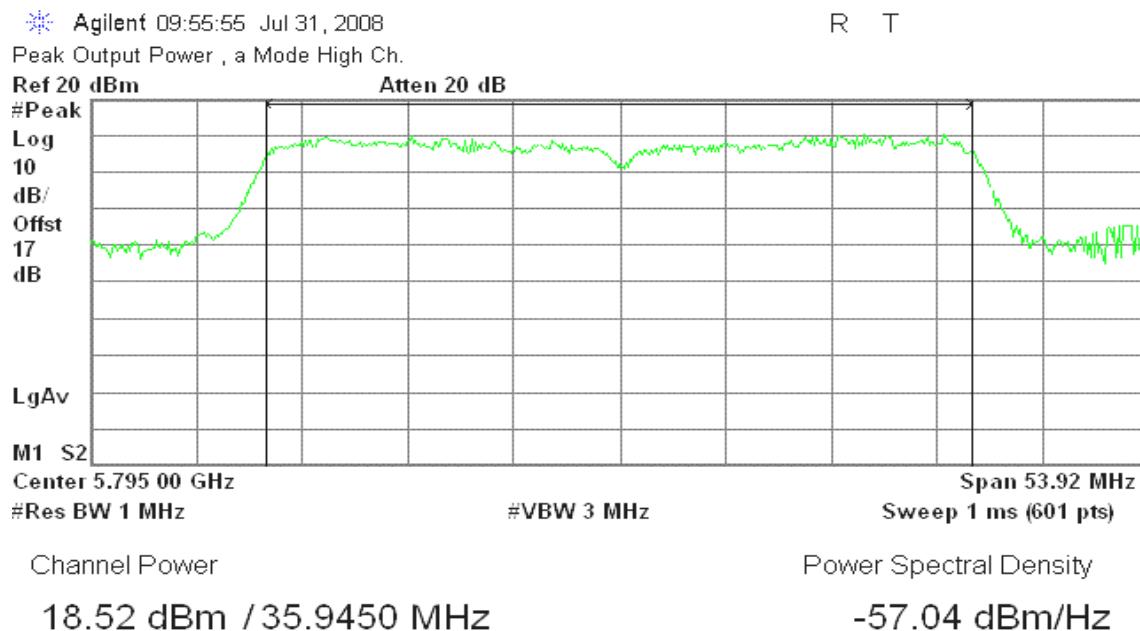


Peak Power (CH High)



draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 0**Peak Power (CH Low)****Peak Power (CH High)**

draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 1**Peak Power (CH Low)****Peak Power (CH High)**

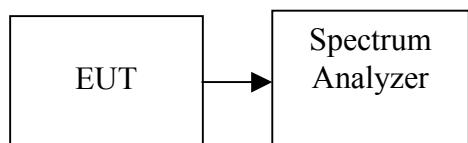
draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 2**Peak Power (CH Low)****Peak Power (CH High)**

7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

1. Average power is measured using the spectrum analyzer's internal channel power integration function.
2. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

TEST RESULTS

No non-compliance noted



Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	15.77
Mid	2437	15.83
High	2462	15.31

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	12.78
Mid	2437	16.02
High	2462	15.84

Test mode: draft 802.11n Standard-20 MHz Channel mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Output Power (dBm)
Low	2412	12.84	11.76	12.07	17.02
Mid	2437	12.46	12.38	11.11	16.80
High	2462	11.84	12.61	11.99	16.93

Test mode: draft 802.11n Wide-40 MHz Channel mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Output Power (dBm)
Low	2422	9.14	10.45	8.71	14.27
Mid	2437	16.02	16.85	15.98	21.07
High	2452	10.58	12.59	11.71	16.47

Remark: Total Output Power (w) = Chain 0 ($10^{(Output\ Power\ /10)/1000}$) + Chain 1 ($10^{(Output\ Power\ /10)/1000}$) + Chain 2 ($10^{(Output\ Power\ /10)/1000}$)

**Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz**

Channel	Frequency (MHz)	Output Power (dBm)
Low	5745	12.55
Mid	5785	11.74
High	5825	12.45

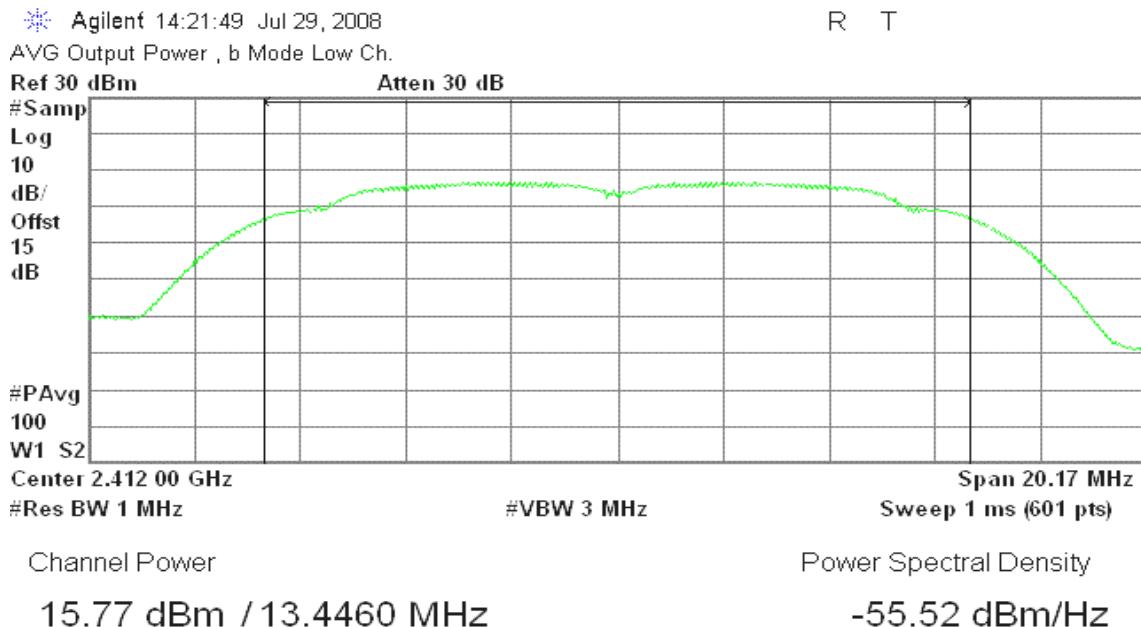
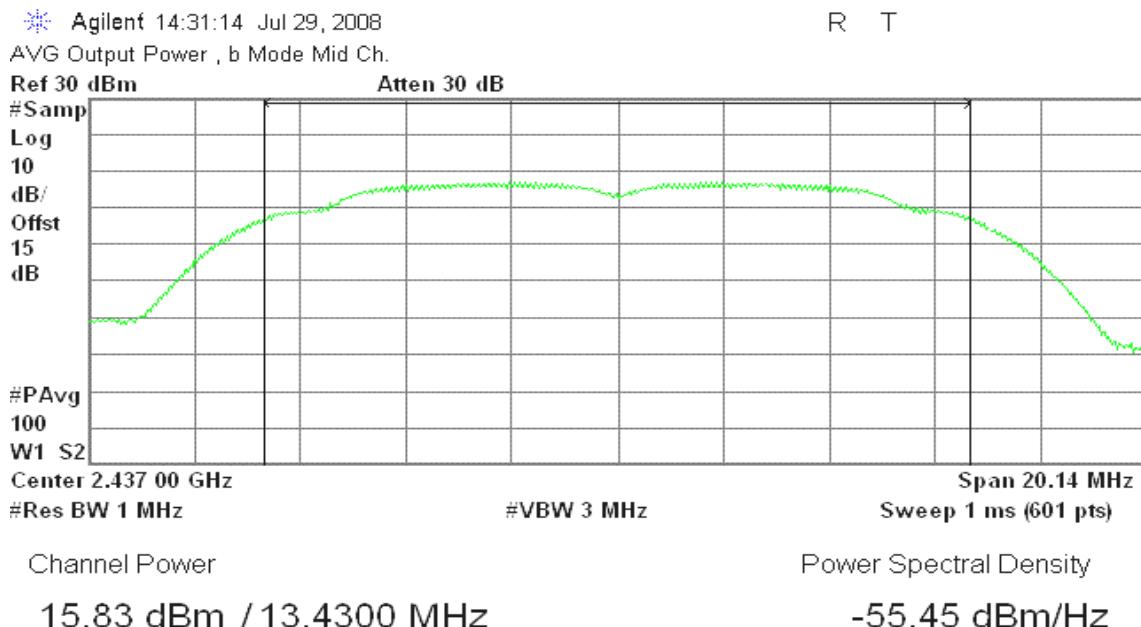
Test mode: draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Output Power (dBm)
Low	5745	14.71	13.66	15.08	19.30
Mid	5785	14.56	13.72	14.72	19.13
High	5825	15.25	13.55	15.46	19.60

Test mode: draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz

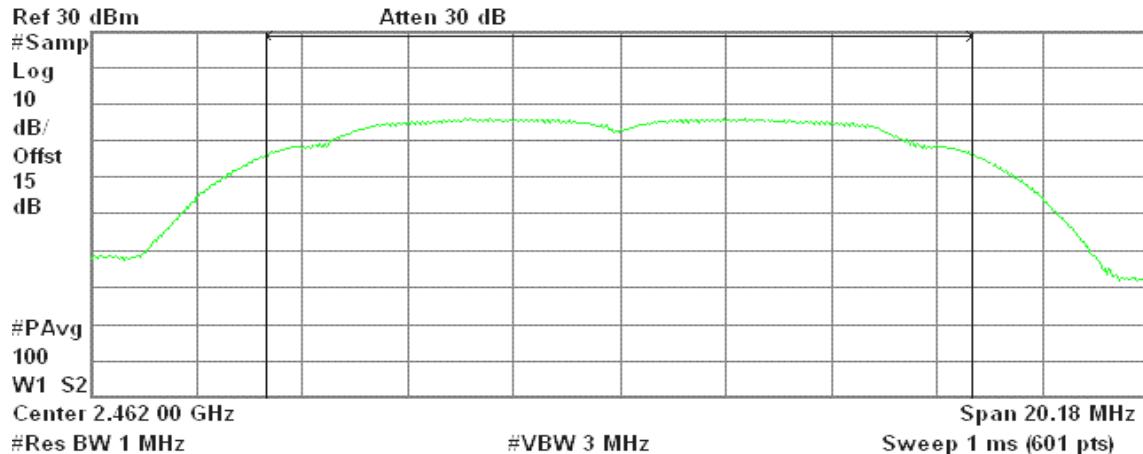
Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Output Power (dBm)
Low	5755	14.52	14.61	15.50	19.67
Mid	5795	13.58	14.06	15.05	19.05

Remark: Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000) + Chain 2 (10^(Output Power /10)/1000)

Test Plot**IEEE 802.11b mode****Average Power (CH Low)****Average Power (CH Mid)**

Average Power (CH High)

* Agilent 14:44:35 Jul 29, 2008
AVG Output Power , b Mode High Ch.



Channel Power

15.31 dBm / 13.4550 MHz

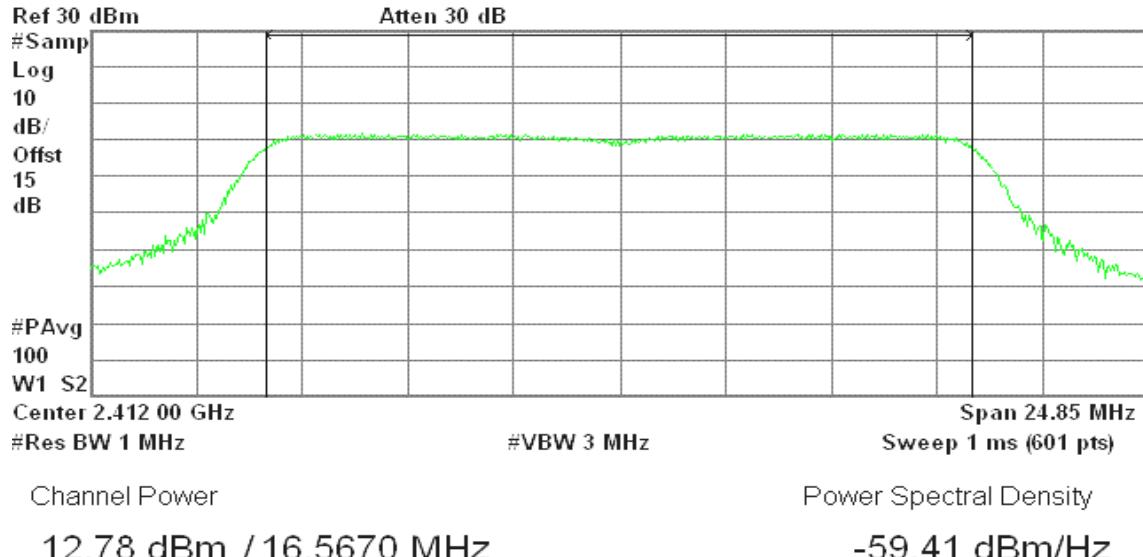
Power Spectral Density

-55.97 dBm/Hz

IEEE 802.11g mode

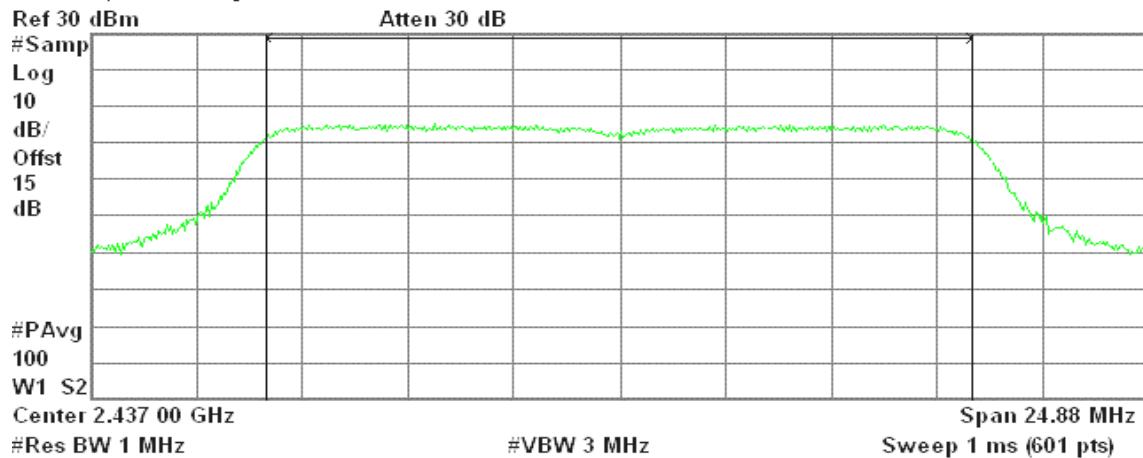
Average Power (CH Low)

Agilent 14:58:24 Jul 29, 2008
AVG Output Power , g Mode Low Ch.



Average Power (CH Mid)

* Agilent 15:22:43 Jul 29, 2008
AVG Output Power , g Mode Mid Ch.



Channel Power

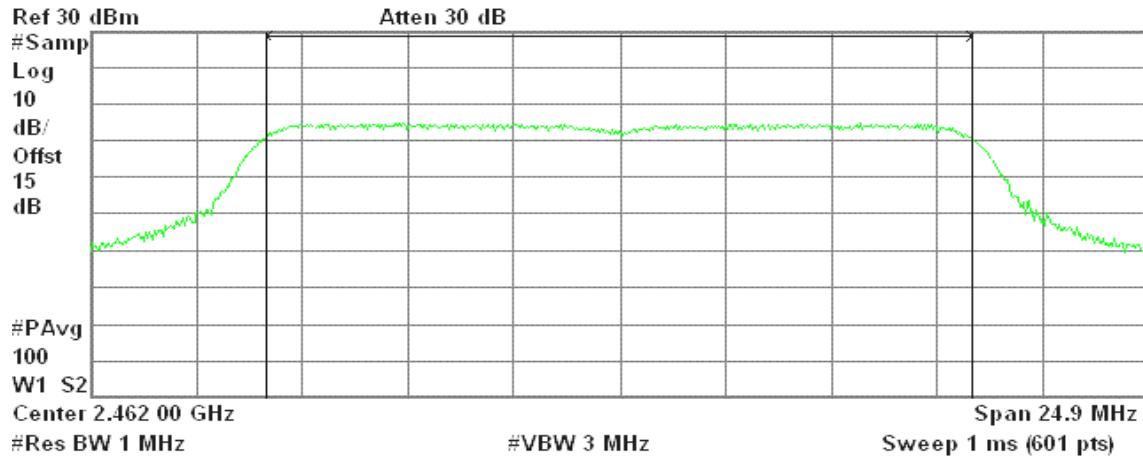
16.02 dBm / 16.5870 MHz

Power Spectral Density

Sweep 1 ms (601 pts)

Average Power (CH High)

* Agilent 15:38:32 Jul 29, 2008
AVG Output Power , g Mode High Ch.

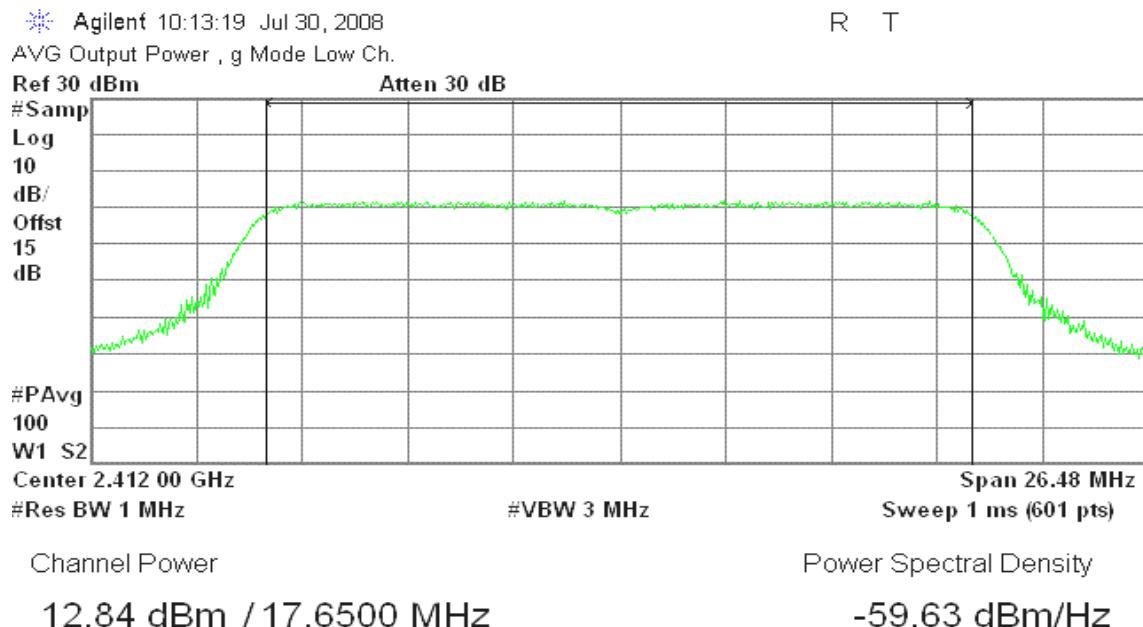
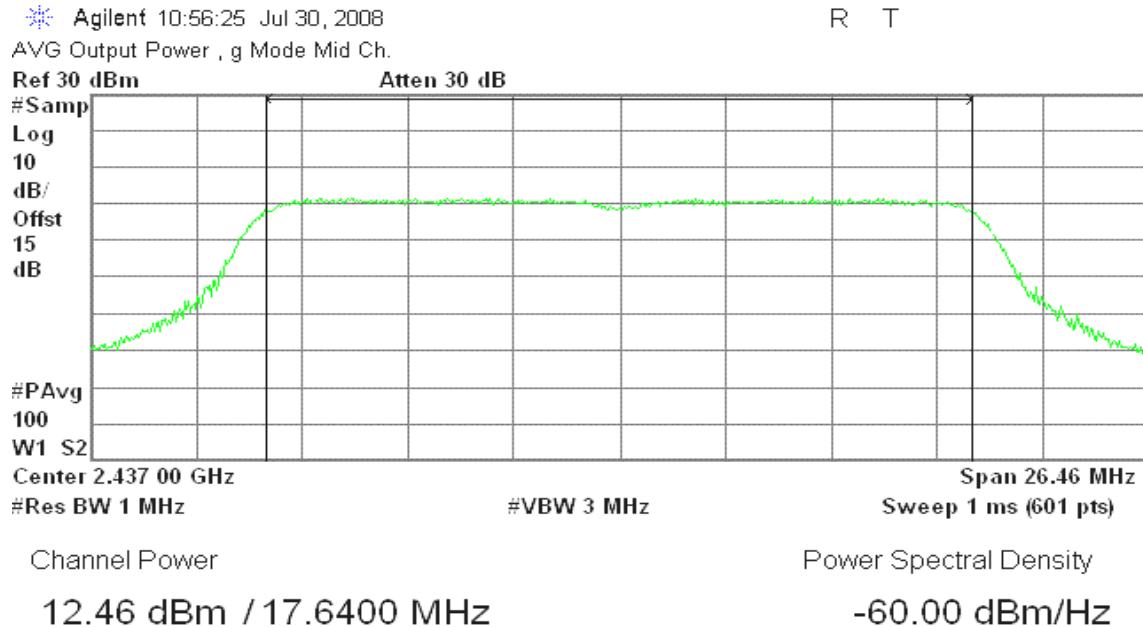


Channel Power

15.84 dBm / 16.6010 MHz

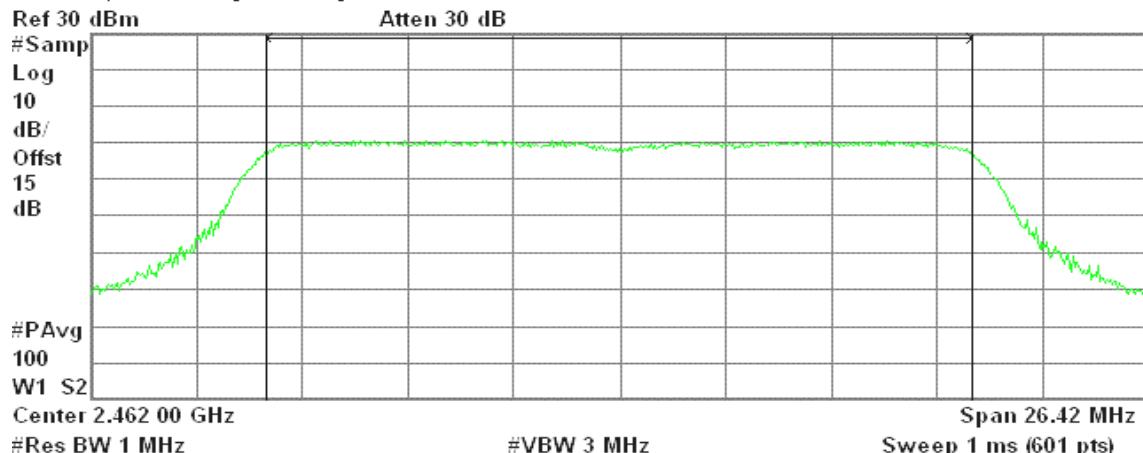
Power Spectral Density

Sweep 1 ms (601 pts)

draft 802.11n Standard-20 MHz Channel mode / Chain 0**Average Power (CH Low)****Average Power (CH Mid)**

Average Power (CH High)

* Agilent 11:51:06 Jul 30, 2008
AVG Output Power , g Mode High Ch.



Channel Power

11.84 dBm / 17.6110 MHz

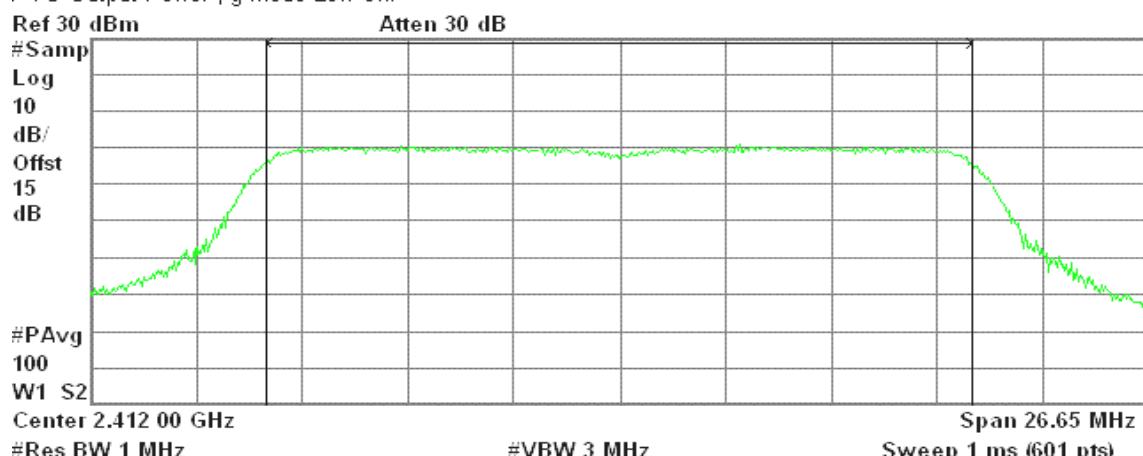
Power Spectral Density

Sweep 1 ms (601 pts)

draft 802.11n Standard-20 MHz Channel mode / Chain 1

Average Power (CH Low)

Agilent 10:30:41 Jul 30, 2008
AVG Output Power , q Mode Low Ch.



Channel Power

11.76 dBm / 17.7690 MHz

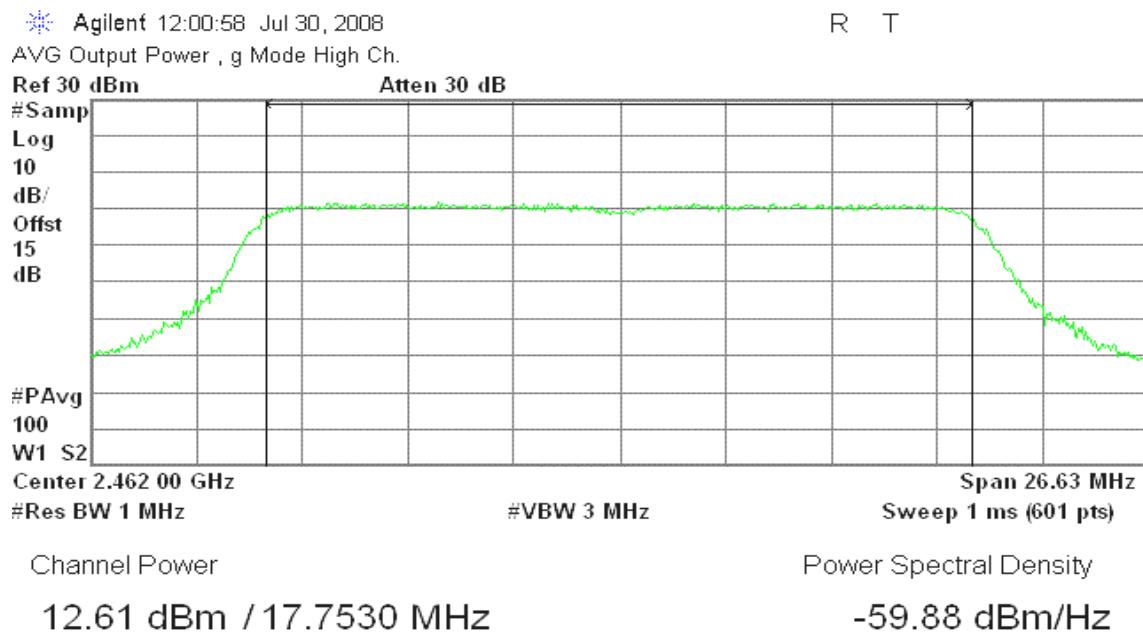
Power Spectral Density

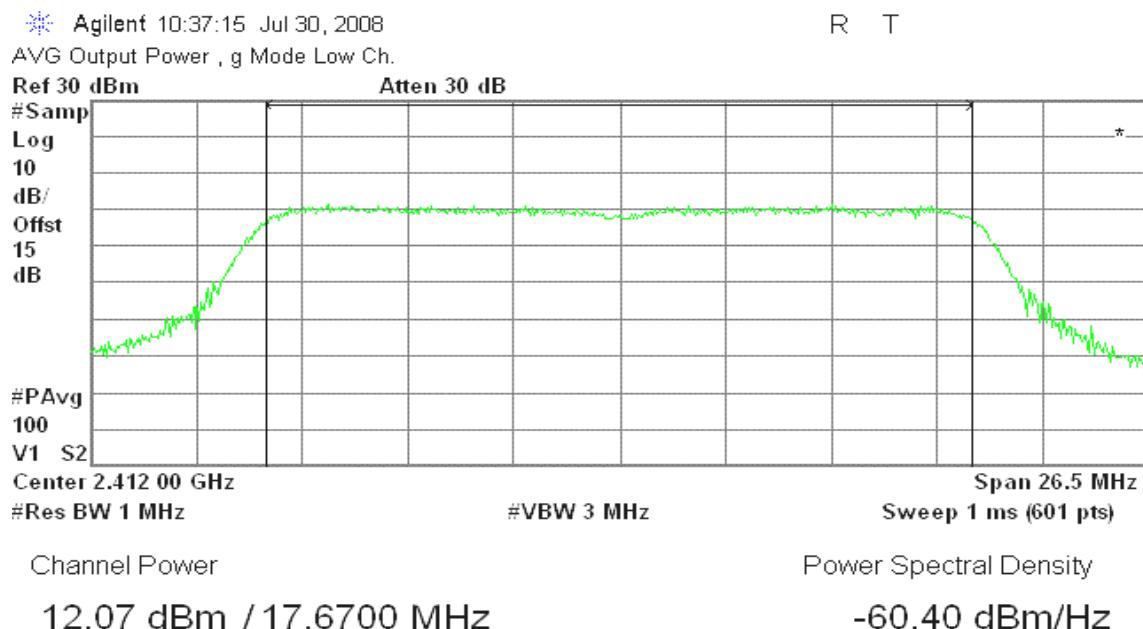
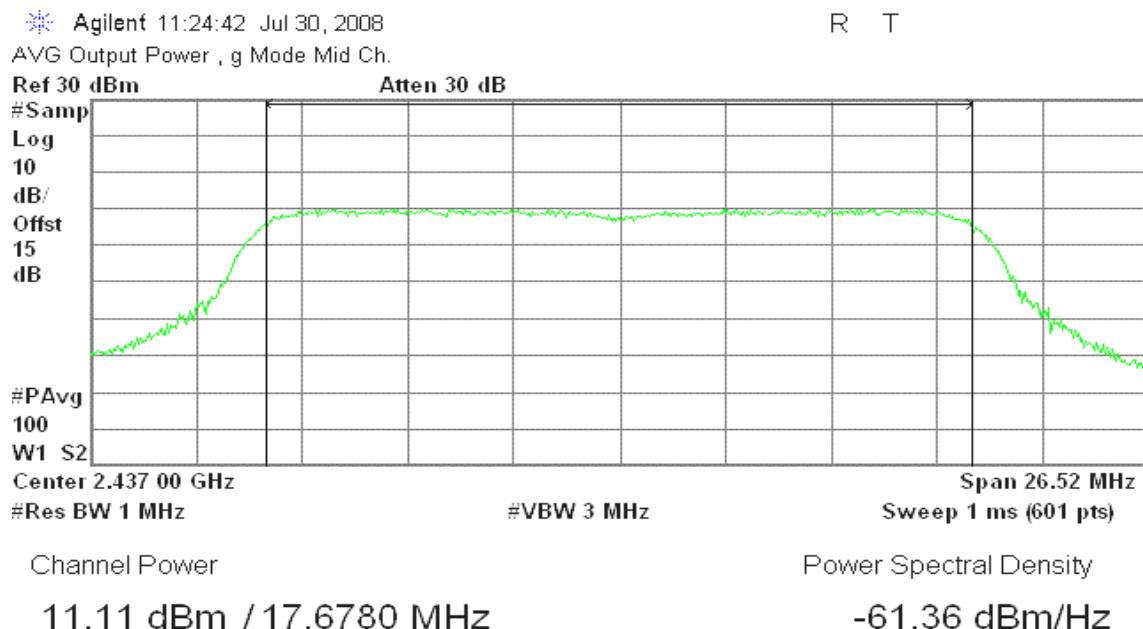
Sweep 1 ms (601 nts)

Average Power (CH Mid)



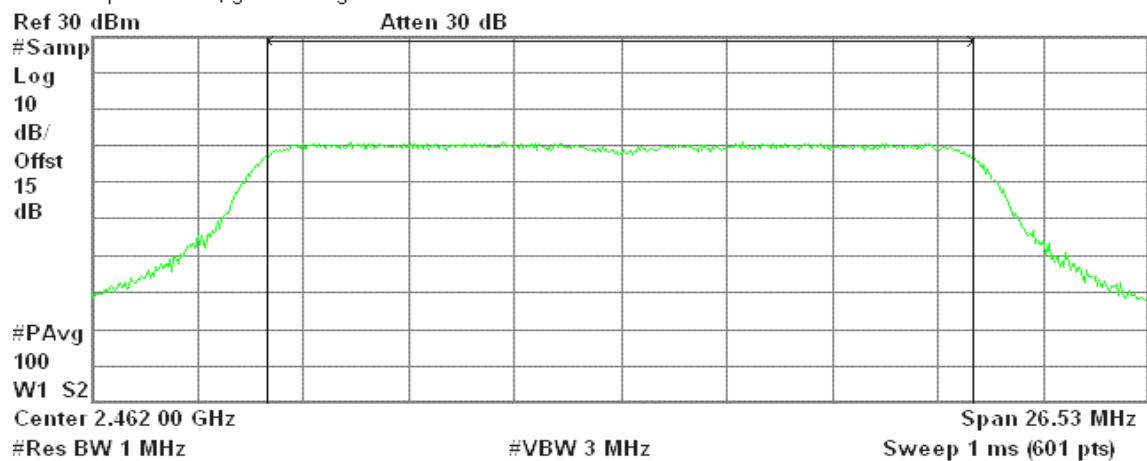
Average Power (CH High)



draft 802.11n Standard-20 MHz Channel mode / Chain 2**Average Power (CH Low)****Average Power (CH Mid)**

Average Power (CH High)

Agilent 13:14:33 Jul 30, 2008
AVG Output Power , g Mode High Ch.



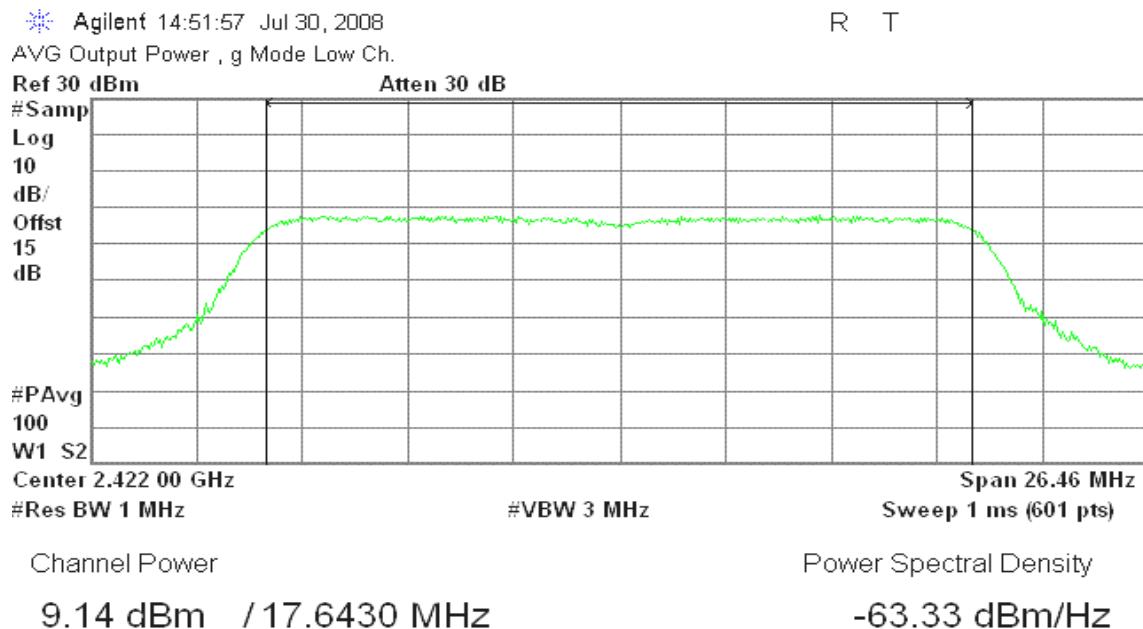
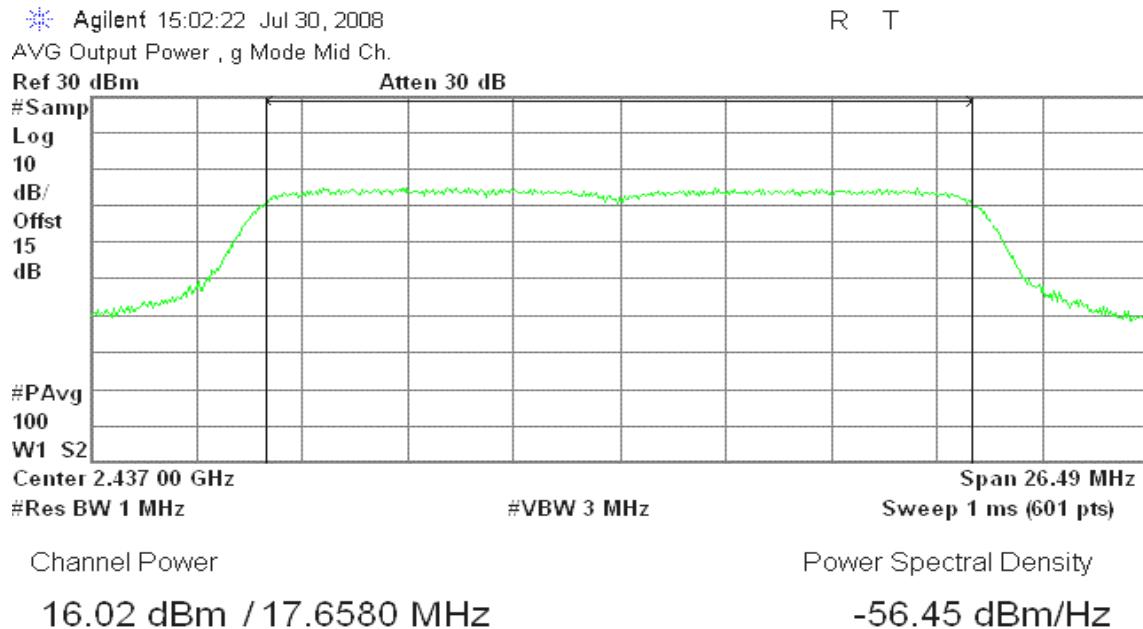
Channel Power

11.99 dBm / 17.6850 MHz

Power Spectral Density

Sweep 1 ms (601 pts)

#VBW 3 MHz

draft 802.11n Wide-40 MHz Channel mode / Chain 0**Average Power (CH Low)****Average Power (CH Mid)**

Average Power (CH High)

Agilent 15:10:03 Jul 30, 2008

Avg Output Power , g Mode High Ch.

Ref 30 dBm

Atten 30 dB

#Samp

Log

10

dB/

Offst

15

dB

#PAvg

100

W1 S2

Center 2.452 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 26.45 MHz

Sweep 1 ms (601 pts)

Channel Power

10.58 dBm / 17.6310 MHz

Power Spectral Density

-61.88 dBm/Hz

draft 802.11n Wide-40 MHz Channel mode / Chain 1

Average Power (CH Low)

Agilent 15:19:59 Jul 30, 2008

Avg Output Power , g Mode Low Ch.

Ref 30 dBm

Atten 30 dB

#Samp

Log

10

dB/

Offst

15

dB

#PAvg

100

W1 S2

Center 2.422 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 26.66 MHz

Sweep 1 ms (601 pts)

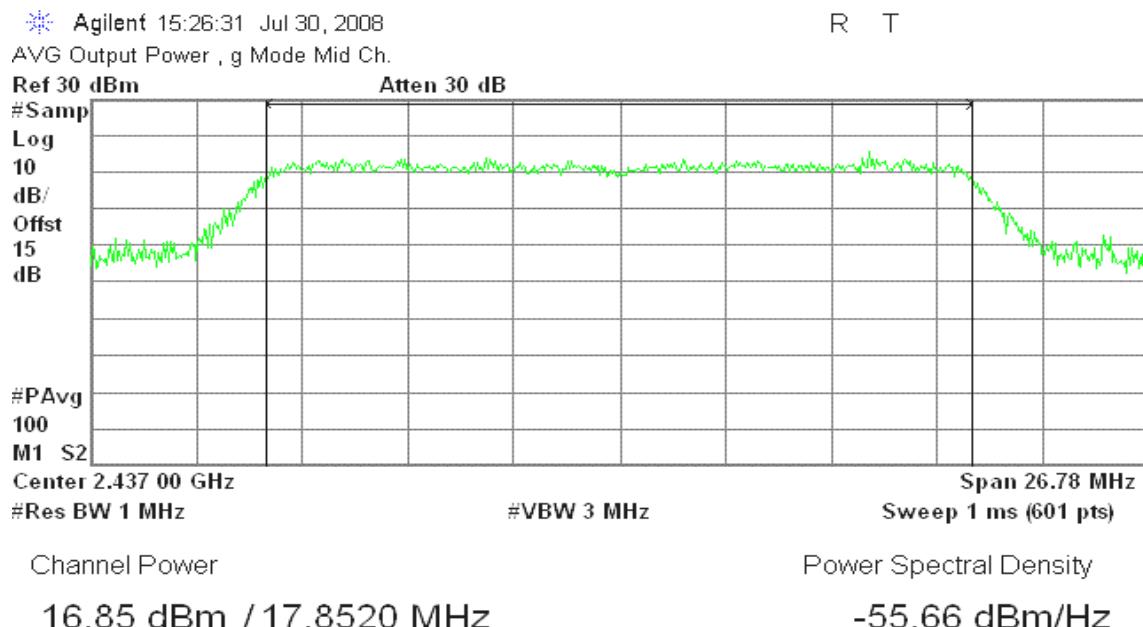
Channel Power

10.45 dBm / 17.7720 MHz

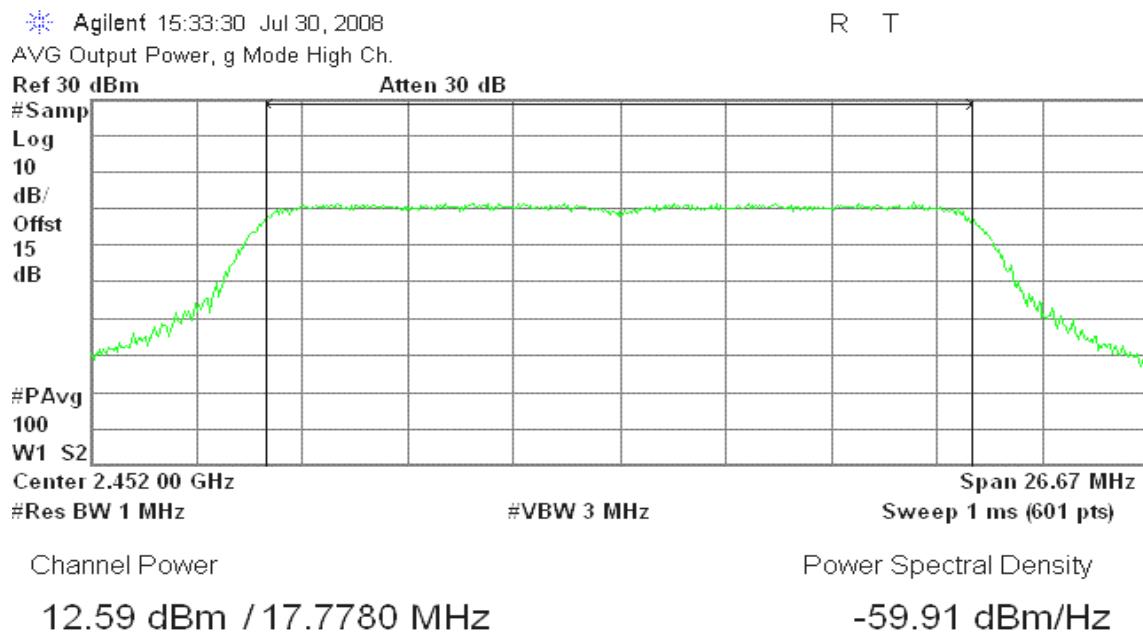
Power Spectral Density

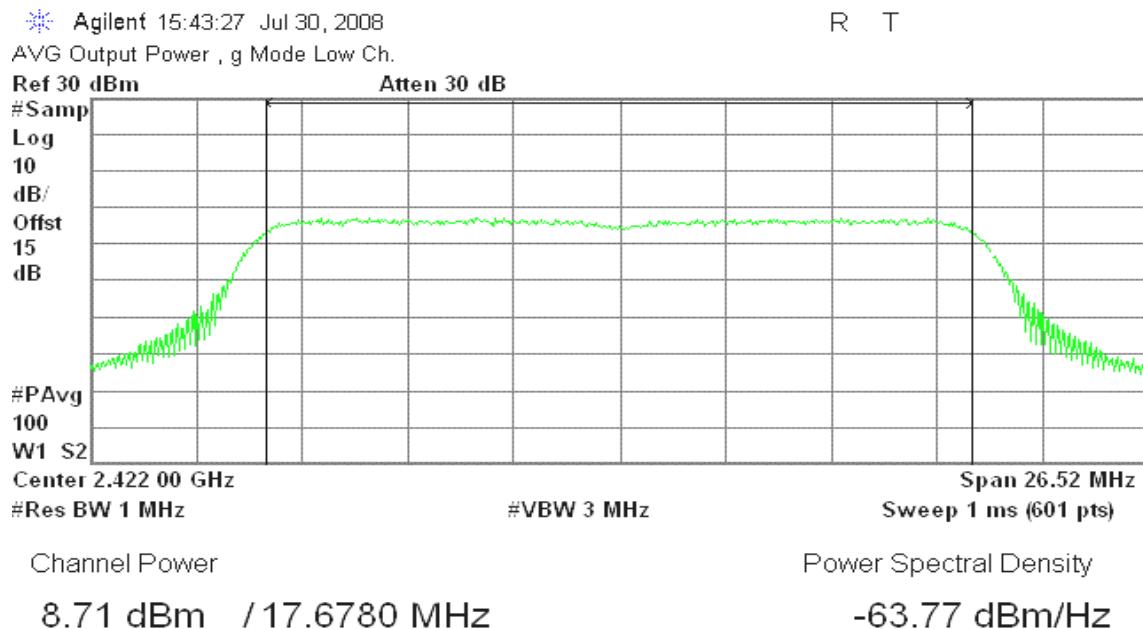
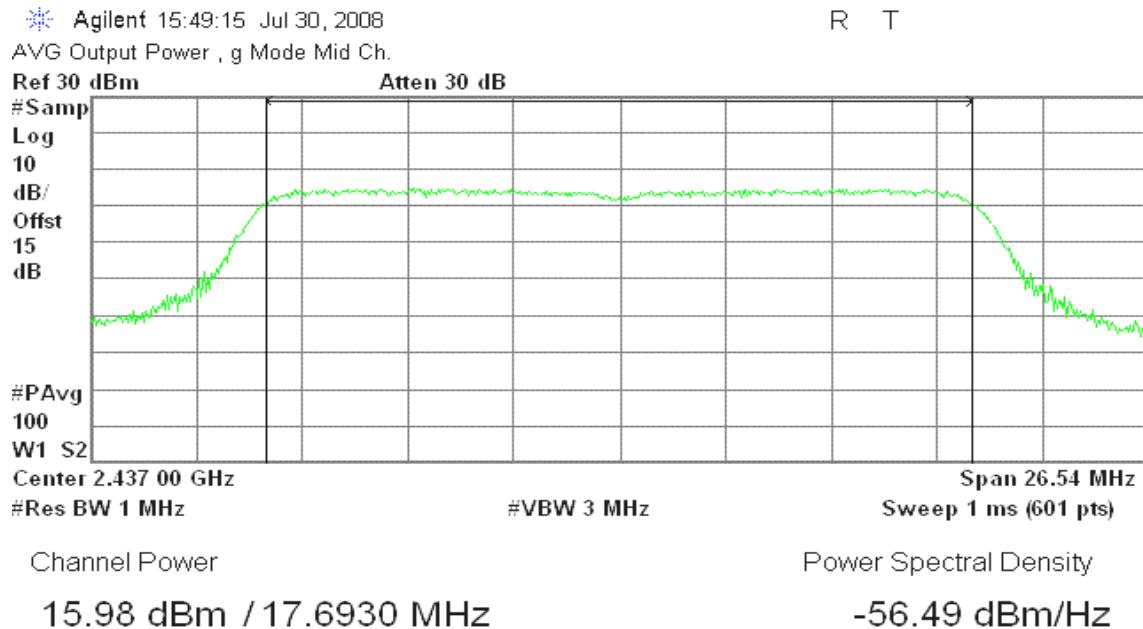
-62.05 dBm/Hz

Average Power (CH Mid)

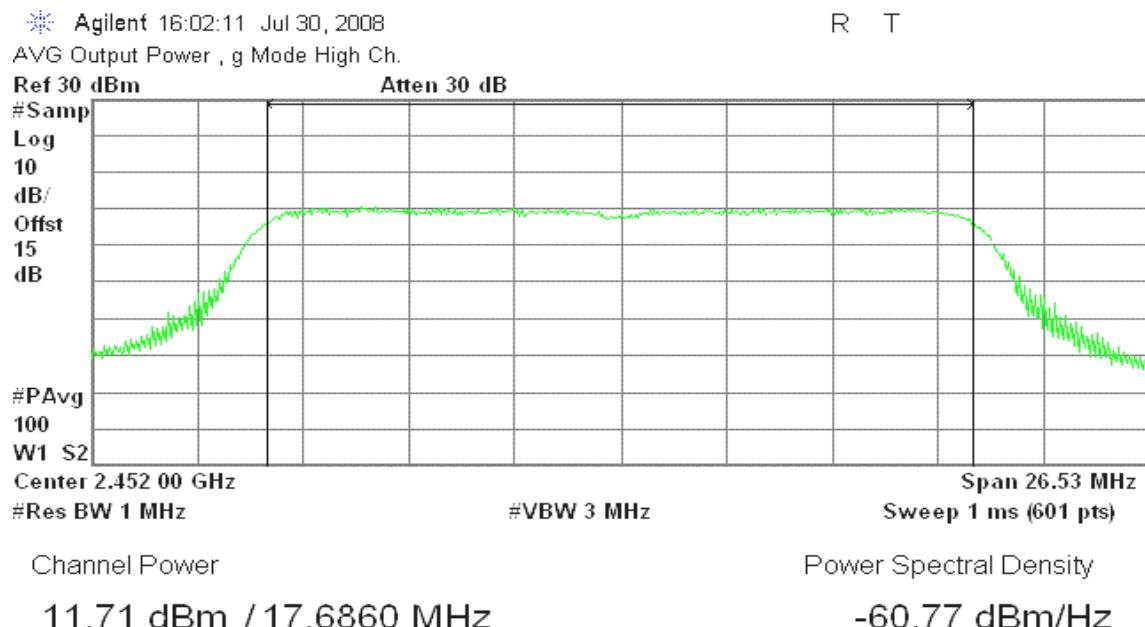


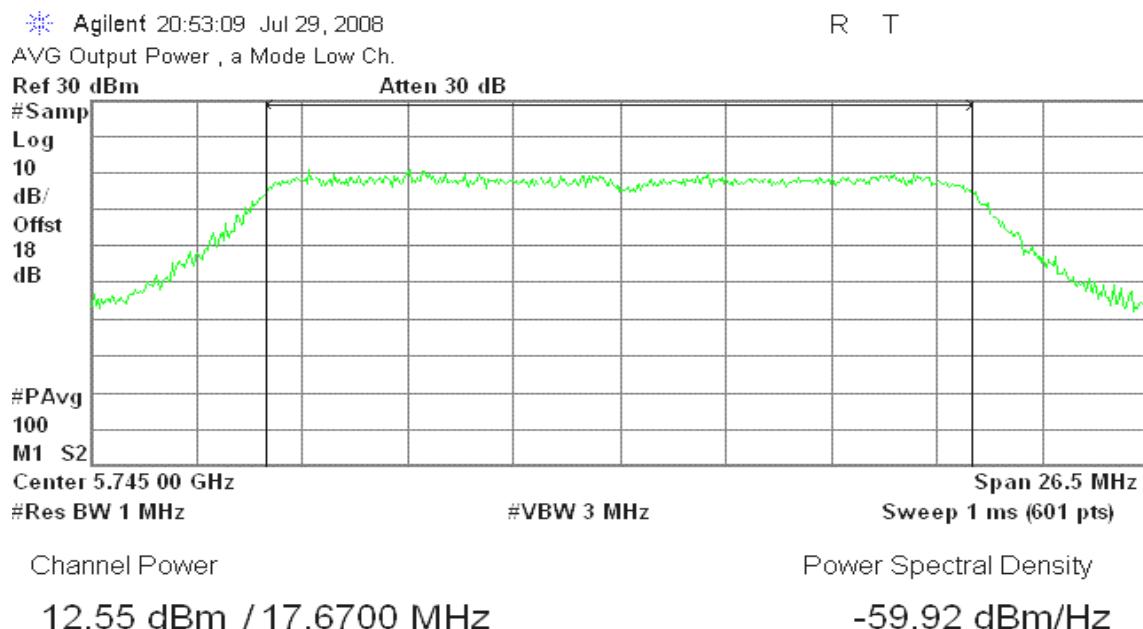
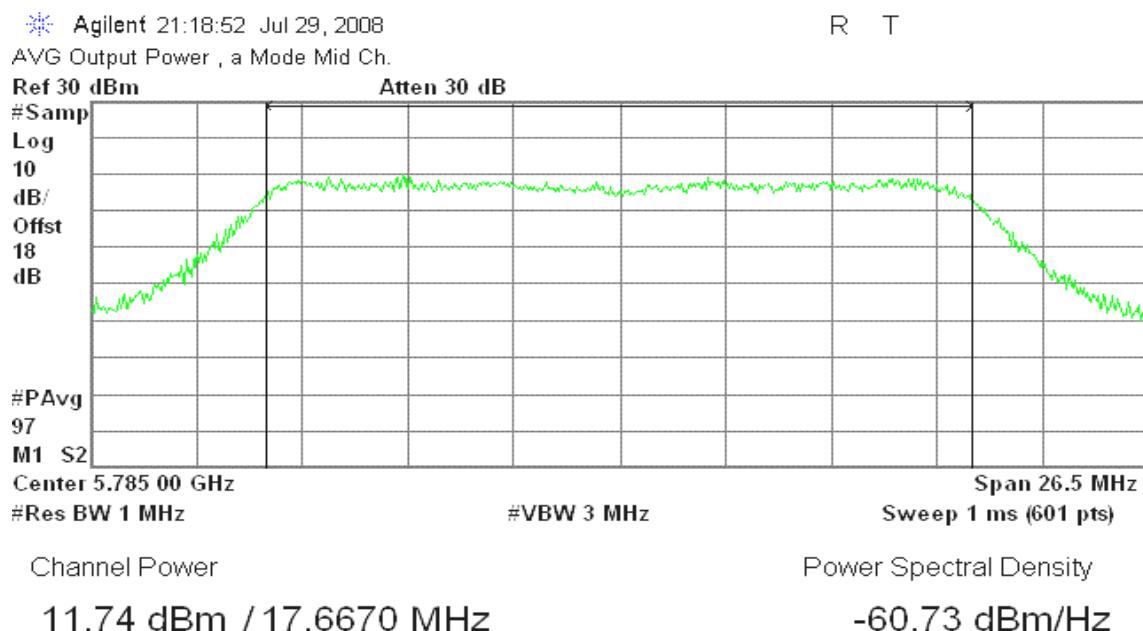
Average Power (CH High)



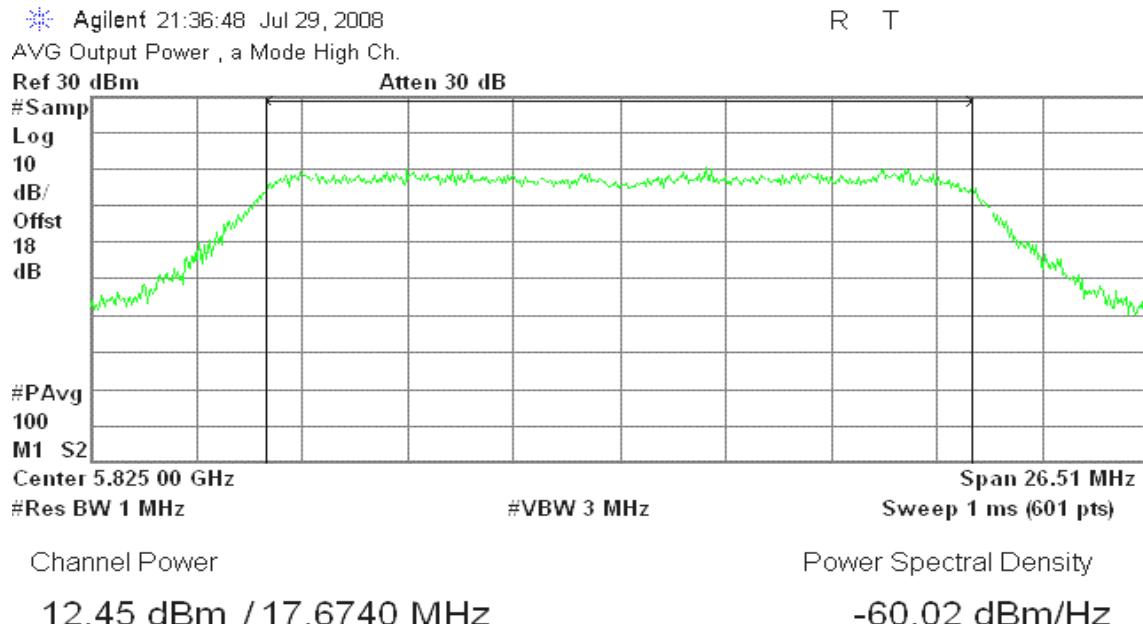
draft 802.11n Wide-40 MHz Channel mode / Chain 2**Average Power (CH Low)****Average Power (CH Mid)**

Average Power (CH High)



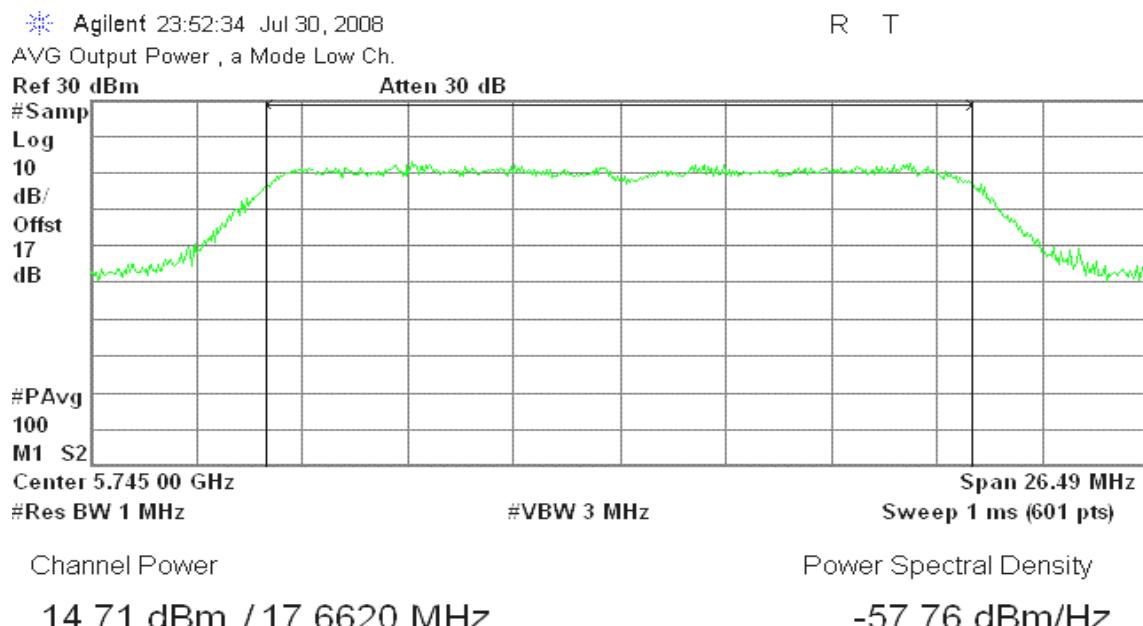
IEEE 802.11a mode / 5745 ~ 5825MHz**Average Power (CH Low)****Average Power (CH Mid)**

Average Power (CH High)



draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 0

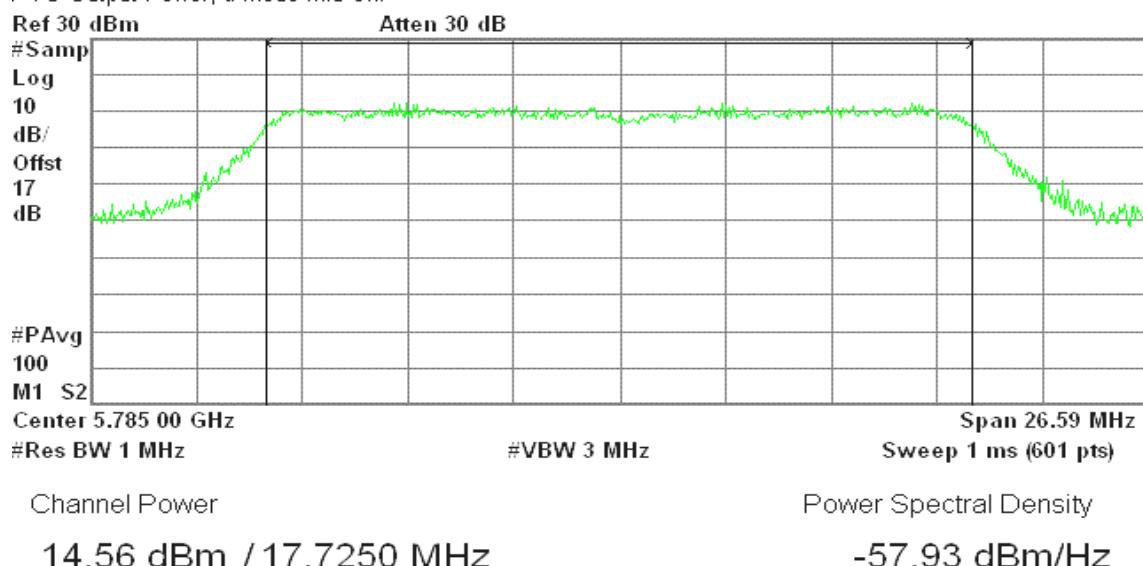
Average Power (CH Low)



Average Power (CH Mid)

Agilent 00:01:06 Jul 31, 2008

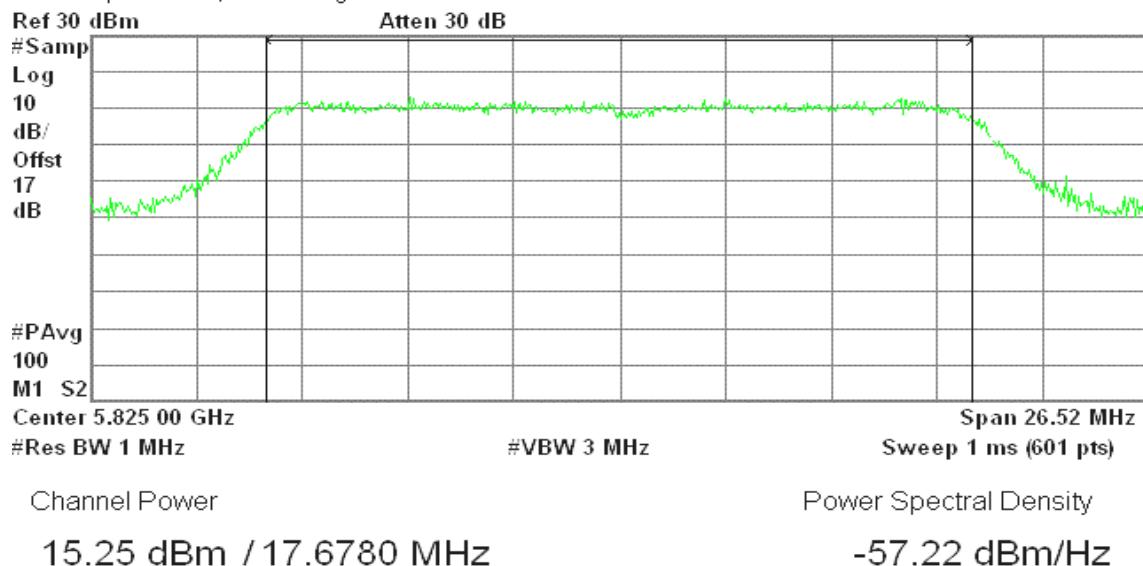
AVG Output Power, a Mode Mid Ch.

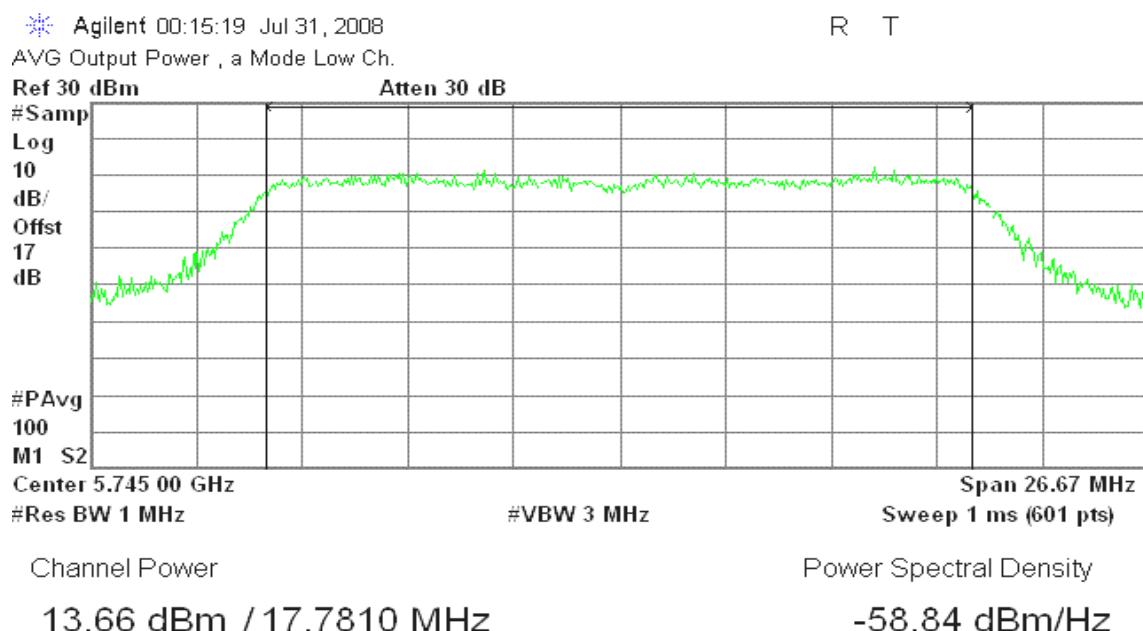
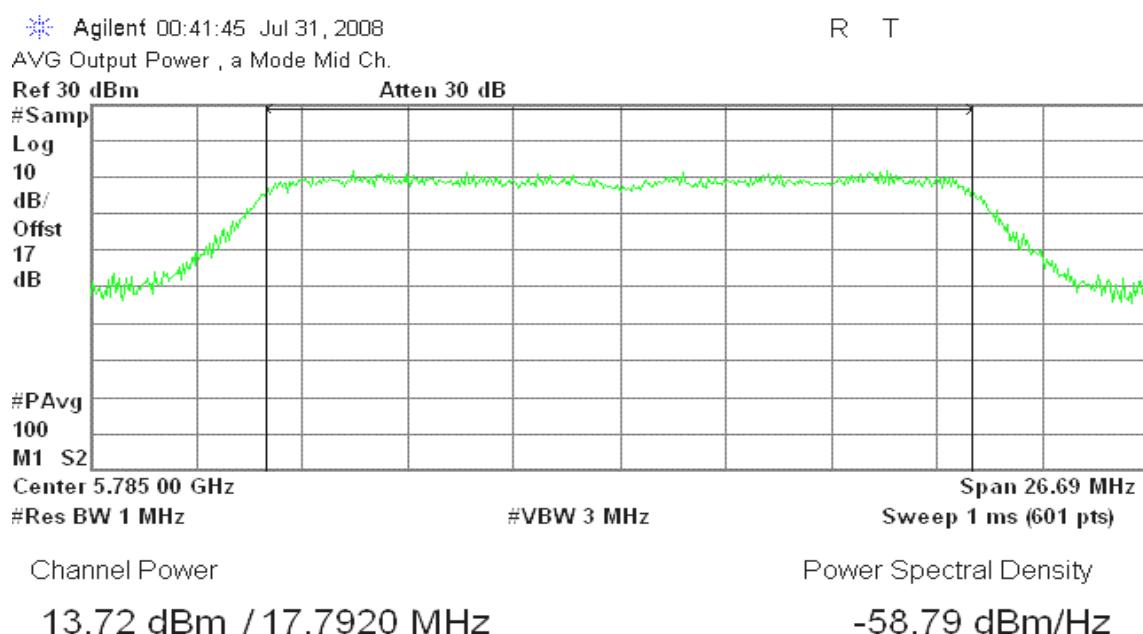


Average Power (CH High)

Agilent 00:07:31 Jul 31, 2008

AVG Output Power , a Mode High Ch.

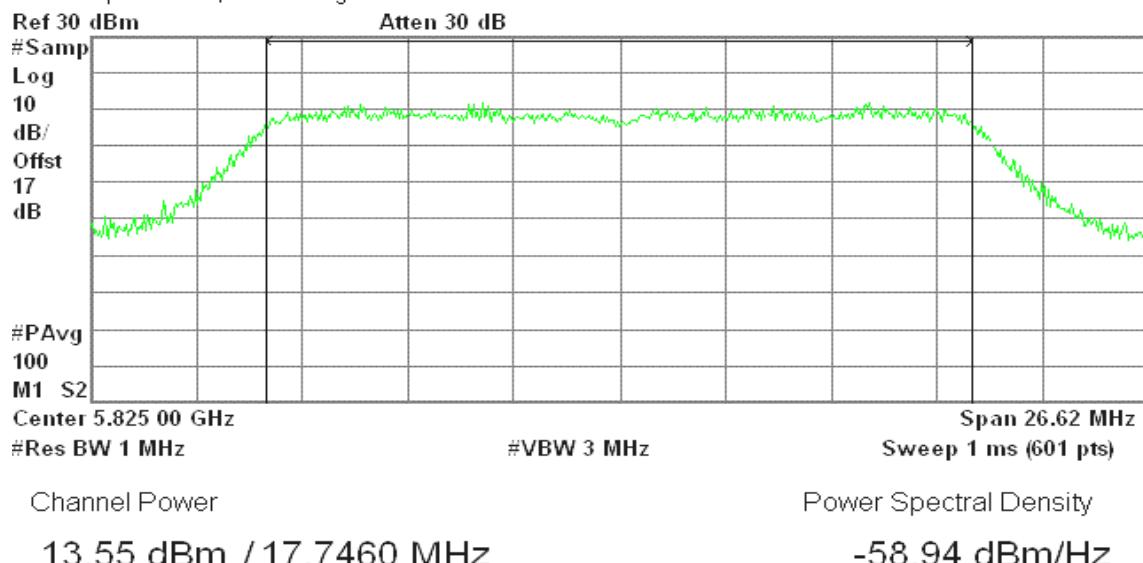


draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 1**Average Power (CH Low)****Average Power (CH Mid)**

Average Power (CH High)

Agilent 00:49:14 Jul 31, 2008
AVG Output Power , a Mode High Ch.

R T

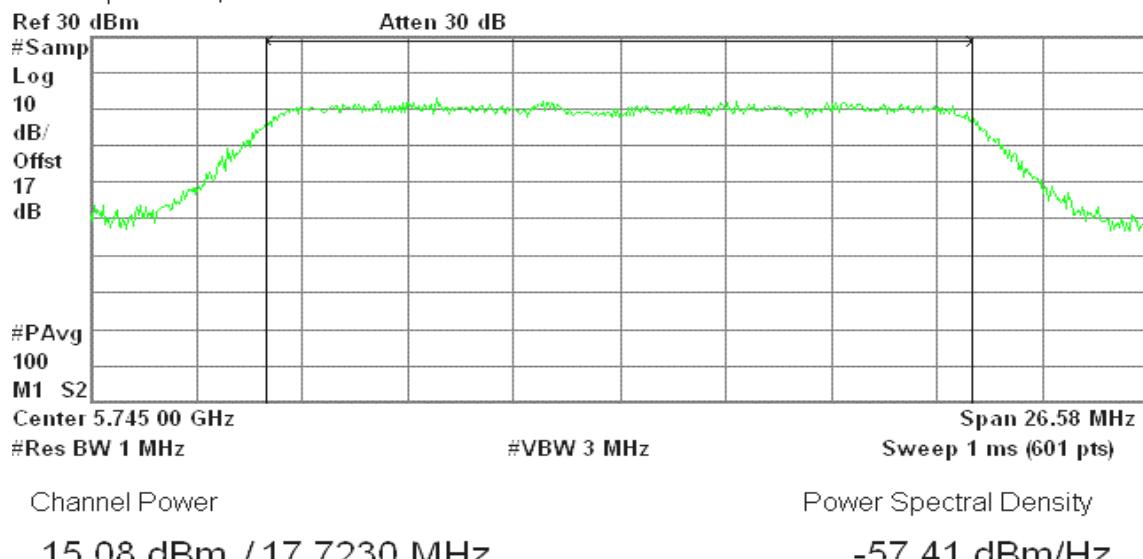


draft 802.11n Standard-20 MHz Channel mode / 5745 ~ 5825MHz / Chain 2

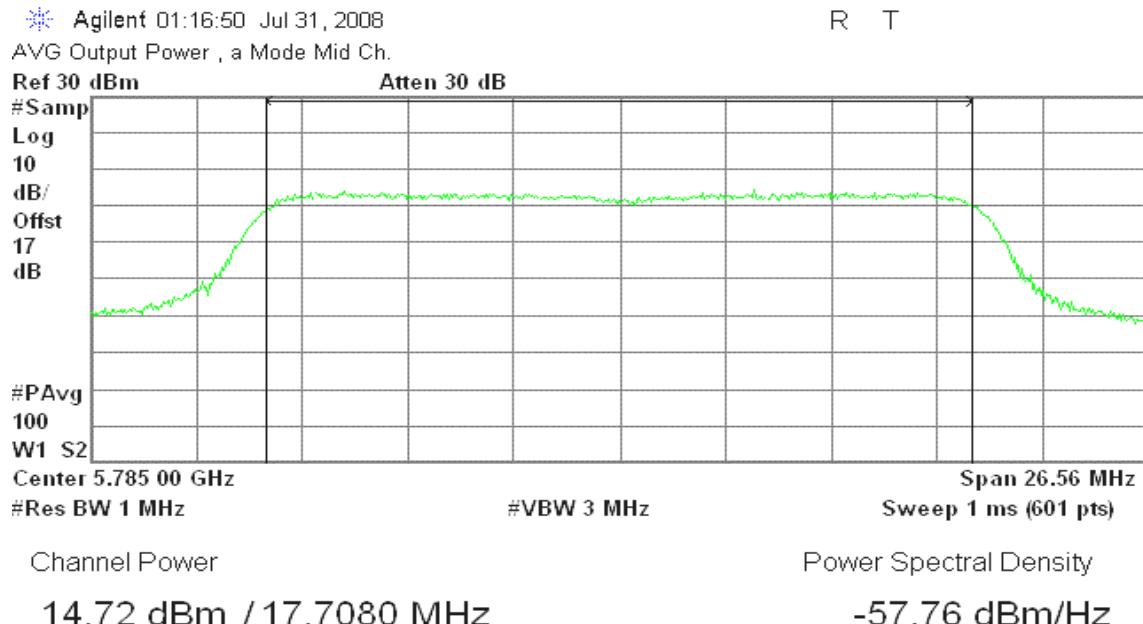
Average Power (CH Low)

Agilent 01:04:07 Jul 31, 2008
AVG Output Power , a Mode Low Ch.

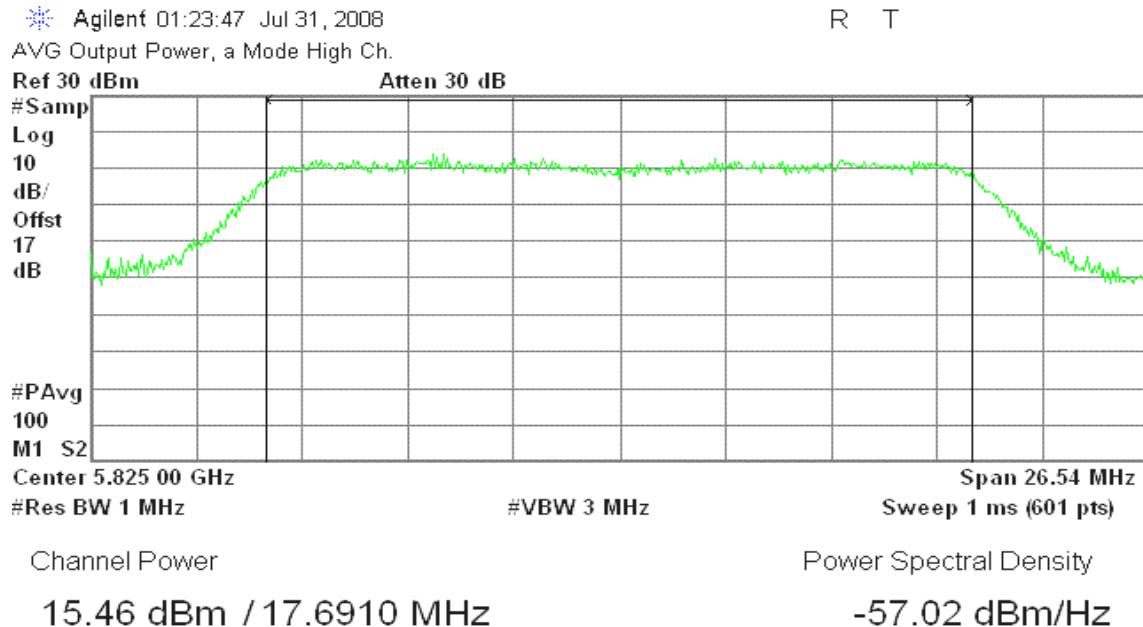
R T

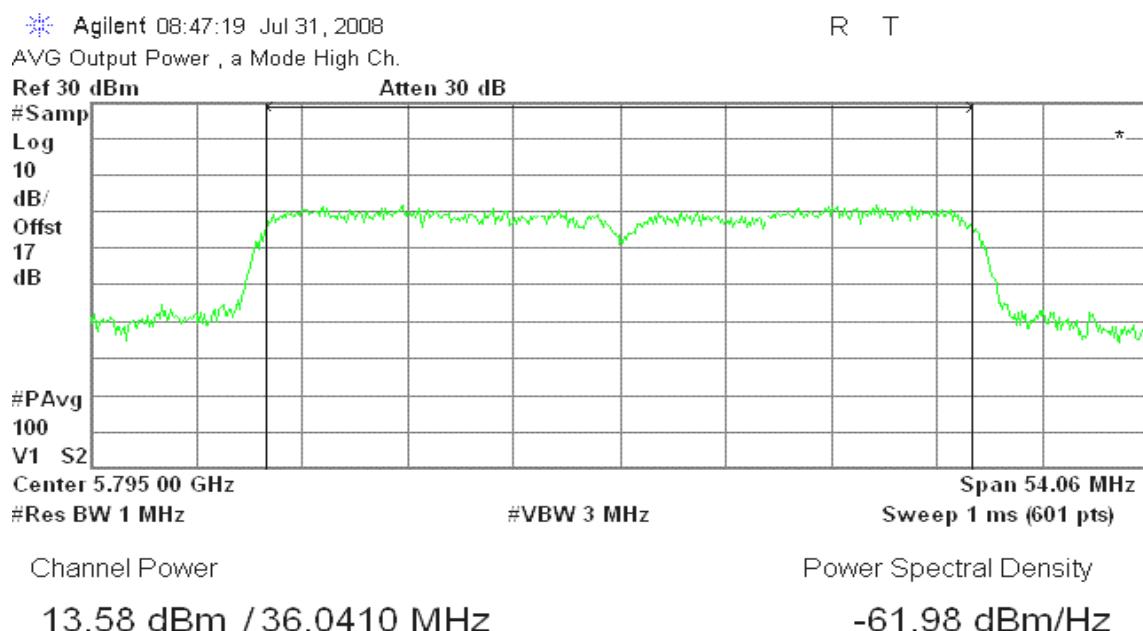


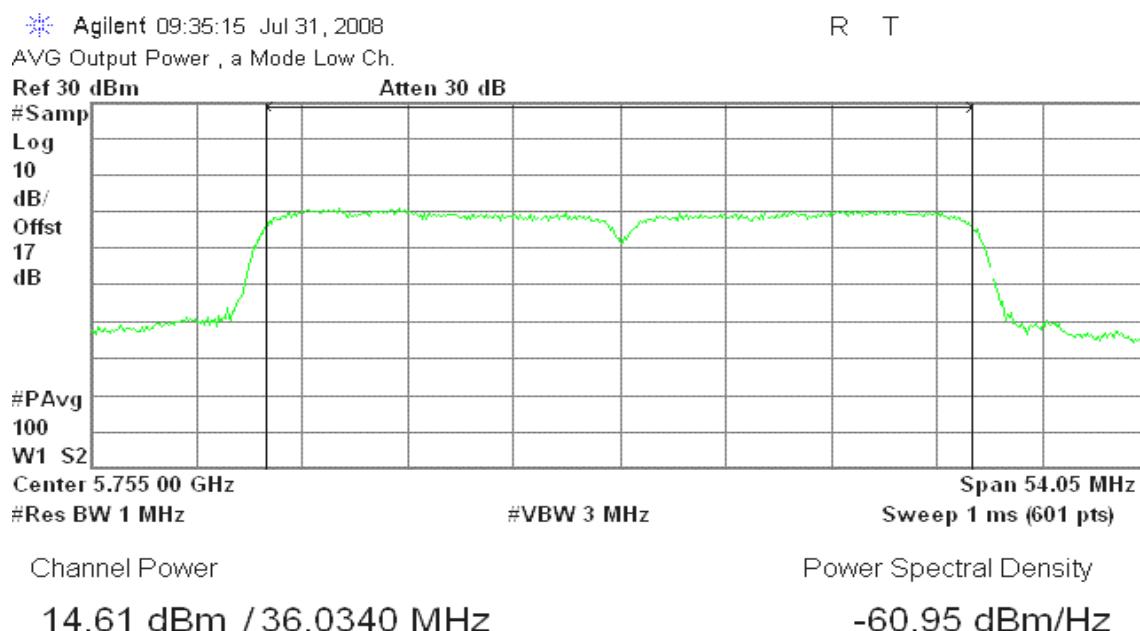
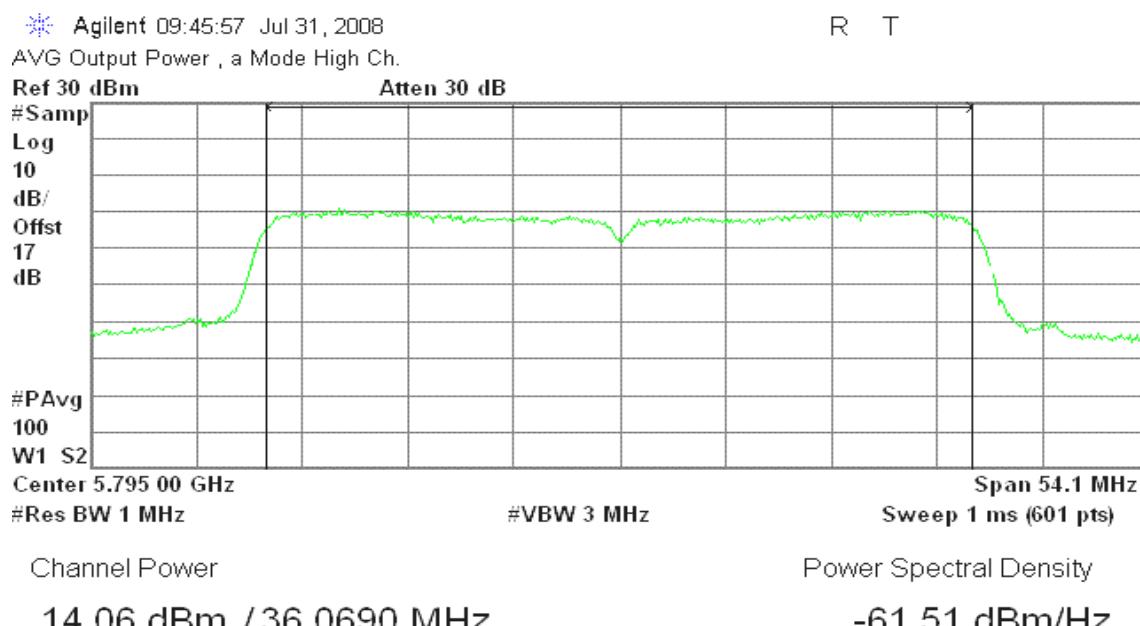
Average Power (CH Mid)

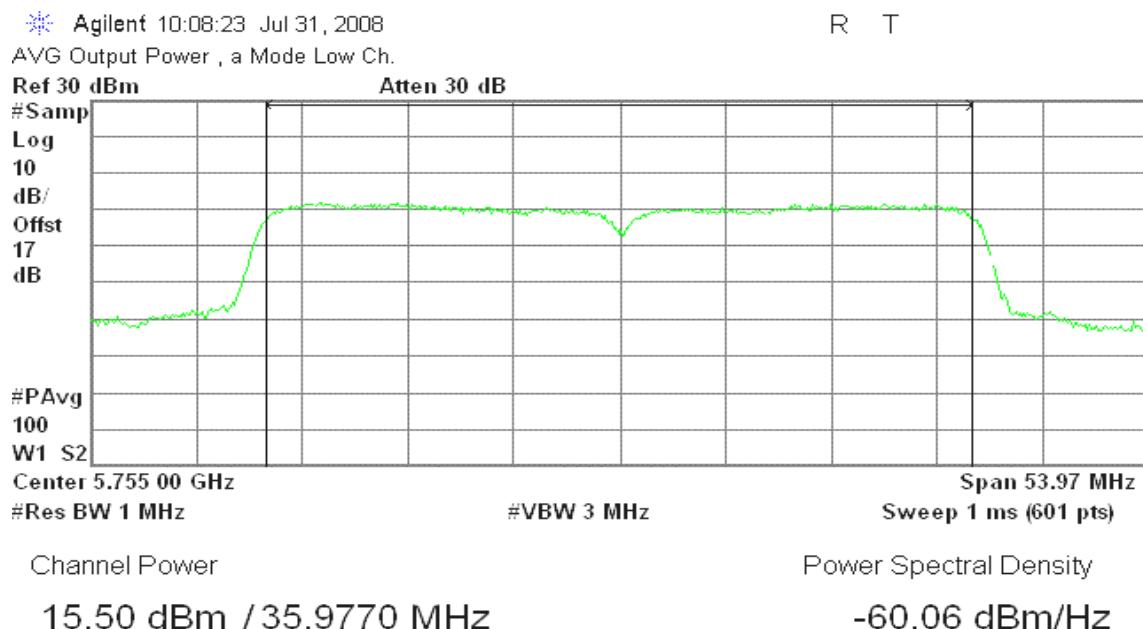


Average Power (CH High)



draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 0**Average Power (CH Low)****Average Power (CH High)**

draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 1**Average Power (CH Low)****Average Power (CH High)**

draft 802.11n Wide-40 MHz Channel mode / 5755 ~ 5795MHz / Chain 2**Average Power (CH Low)****Average Power (CH High)**