HCT CO.,LTD

HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:
Pantech Co., Ltd.
Address:
Pantech Bldg, I-2, DMC, Sangam-dong, Mapo-gu,
Seoul, 121-792, Korea

Date of Issue:
October 26, 2011
Test Site/Location:
HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea
Report No.: HCTR1110FR07
HCT FRN: 0005866421

FCC ID:	**JYCP4100**
APPLICANT:	**Pantech Co., Ltd.**

FCC Model(s):	P4100
EUT Type:	GSM/WCDMA/LTE Phone with Bluetooth / WLAN
Max. RF Output Power:	Wi-Fi 802.11b (20.90 dBm) / Wi-Fi 802.11g (22.07 dBm)) / Wi-Fi 802.11n (18.92 dBm) / Wi-Fi 802.11a (5745 MHz ~5825 MHz) (21.15 dBm)/ Wi-Fi 802.11n (5745 MHz ~5825 MHz) (18.77 dBm)
Frequency Range:	2412 MHz - 2462 MHz (2.4 GHz Band) 5745 MHz - 5825 MHz (5.8 GHz Band)
Modulation type	CCK/DSSS/OFDM
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Jong Seok Lee

Report prepared by
: Jong Seok Lee
Test engineer of RF Team

Approved by
: Chang Seok Choi
Manager of RF Team

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1110FR07	October 26, 2011	- First Approval Report

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1. GENERAL INFORMATION

Applicant:	Pantech Co., Ltd.
Address:	Pantech Bldg, I-2, DMC, Sangam-dong, Mapo-gu, Seoul, 121-792, Korea
FCC ID:	JYCP4100
EUT Type:	GSM/WCDMA/LTE Phone with Bluetooth / WLAN
Model Name:	P4100
Date(s) of Tests:	August 09,2011 ~ September 15, 2011
Contact person:	Name: Jong Ku Park Phone #: +82-2-2030-1358
Place of Tests:	HCT Co., Ltd. 105-1, Jangam-ri , Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, KOREA. (IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

EUT Type	GSM/WCDMA/LTE Phone with Bluetooth / WLAN
Model Name	P4100
Power Supply	DC 3.7 V
Battery type	Li-ion Battery(Standard)
Frequency Range	TX: 2412 MHz ~ 2462 MHz, 5745 MHz – 5825 MHz RX: 2412 MHz ~ 2462 MHz, 5745 MHz – 5825 MHz
Max. RF Output Power:	Wi-Fi 802.11b (20.90 dBm) / Wi-Fi 802.11g (22.07 dBm)) / Wi-Fi 802.11n (18.92 dBm) / Wi-Fi 802.11a (5745 MHz ~5825 MHz) (21.15 dBm)/ Wi-Fi 802.11n (5745 MHz ~5825 MHz) (18.77 dBm)
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11a, 802.11g, 802.11n)
Antenna Specification	Manufacturer: DONGNAM Antenna type: Internal Antenna Peak Gain : -1.8 dBi (2.4 GHz Band), -1.0 dBi (5.8 GHz Band)

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz(ANSI C63.4-2003)

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. (Version :2003) 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 3 m away from the receiving antenna, which varied from 1 m to 4 m 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 max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. 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 equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated March 02, 2011 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, 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.”

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

7. TEST RESULT

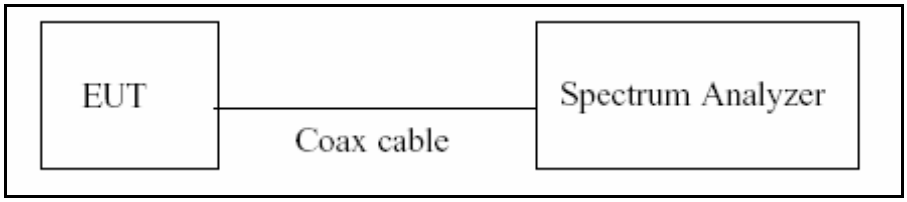
7.1 6dB BANDWIDTH MEASUREMENT (802.11a/b/g/n)

Test Requirements and limit, §15.247(a)(2)

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW: 100 kHz

VBW: 100 kHz

SPAN: 40 MHz

▣ TEST RESULTS

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	9.999	0.5	Pass
2437	6	9.997	0.5	Pass
2462	11	9.935	0.5	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.508	0.5	Pass
2437	6	16.499	0.5	Pass
2462	11	16.484	0.5	Pass

Conducted 6dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.670	0.5	Pass
2437	6	17.668	0.5	Pass
2462	11	17.717	0.5	Pass

Conducted 6dB Bandwidth Measurements for 802.11a

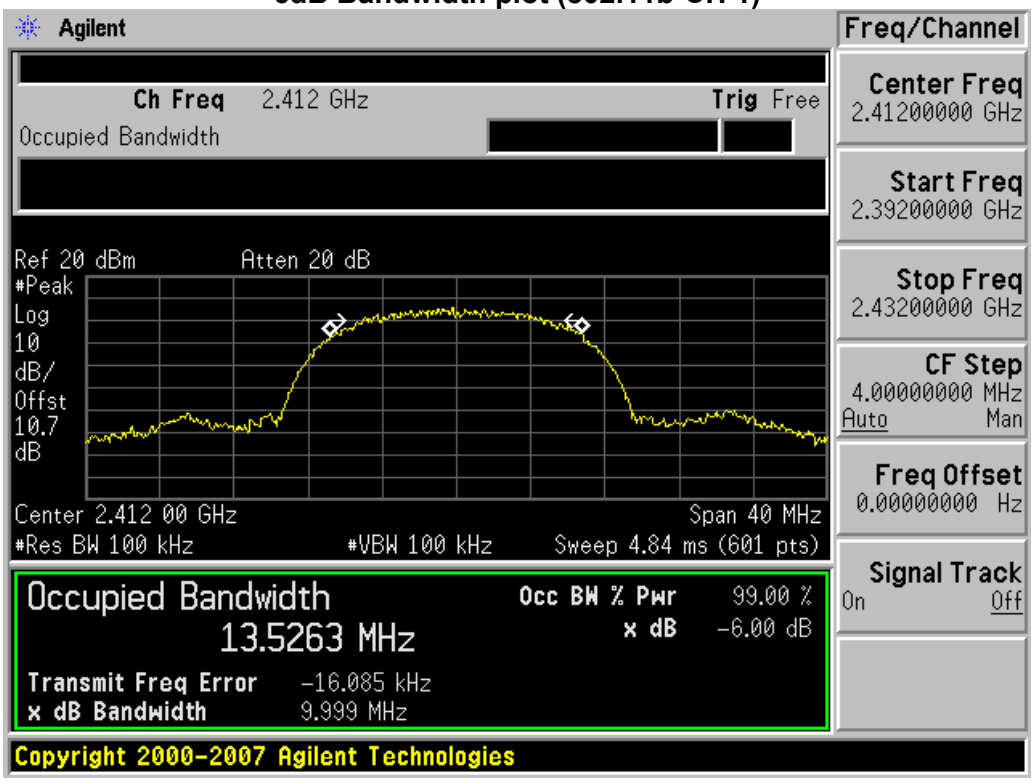
802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Frequency [MHz]			
5745	149	16.32	0.5	Pass
5785	157	16.33	0.5	Pass
5825	165	16.32	0.5	Pass

Conducted 6dB Bandwidth Measurements for 802.11n

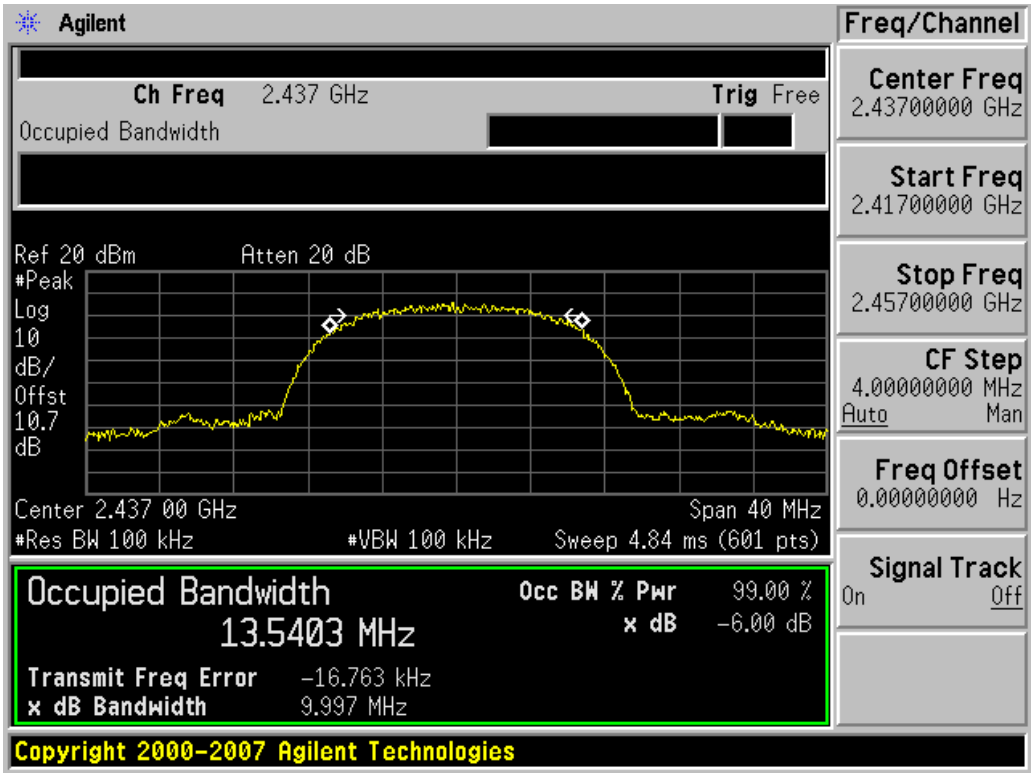
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Frequency [MHz]			
5745	149	16.95	0.5	Pass
5785	157	16.84	0.5	Pass
5825	165	16.96	0.5	Pass

▣ RESULT PLOTS

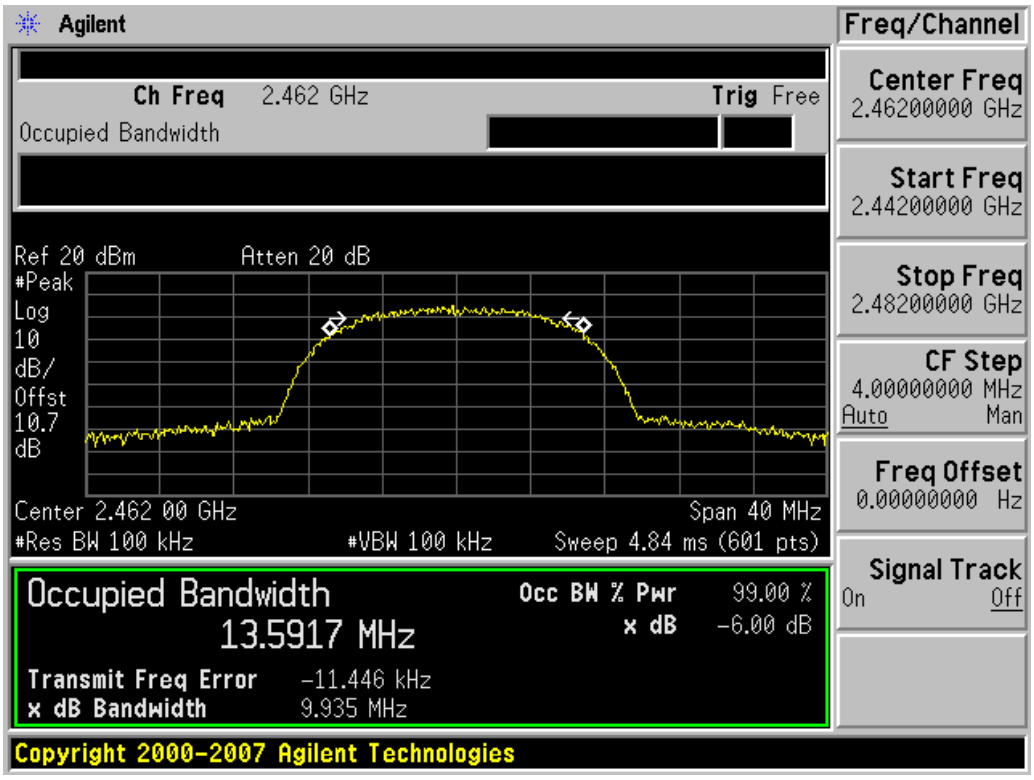
6dB Bandwidth plot (802.11b-CH 1)



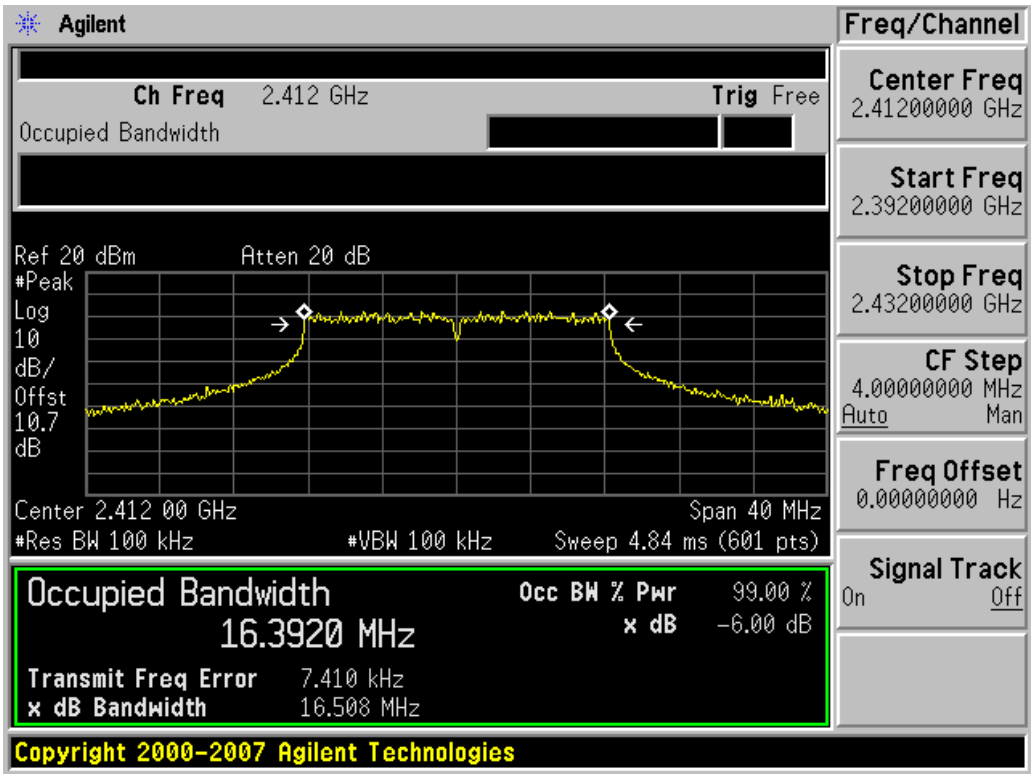
6dB Bandwidth plot (802.11b-CH 6)



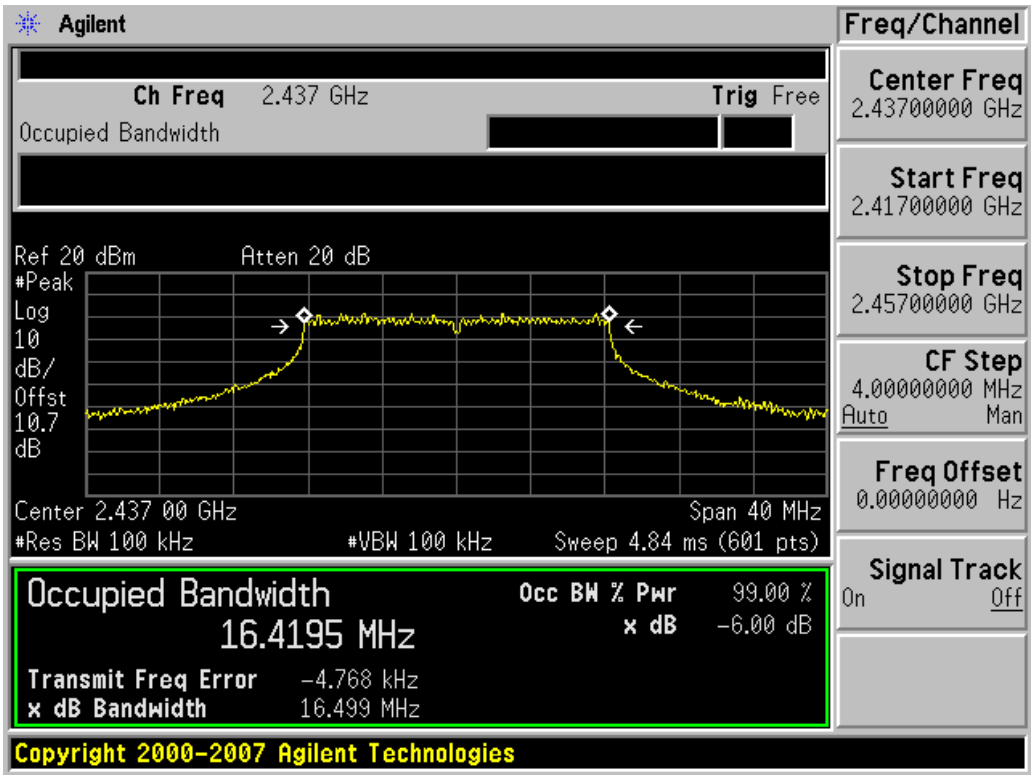
6dB Bandwidth plot (802.11b-CH 11)



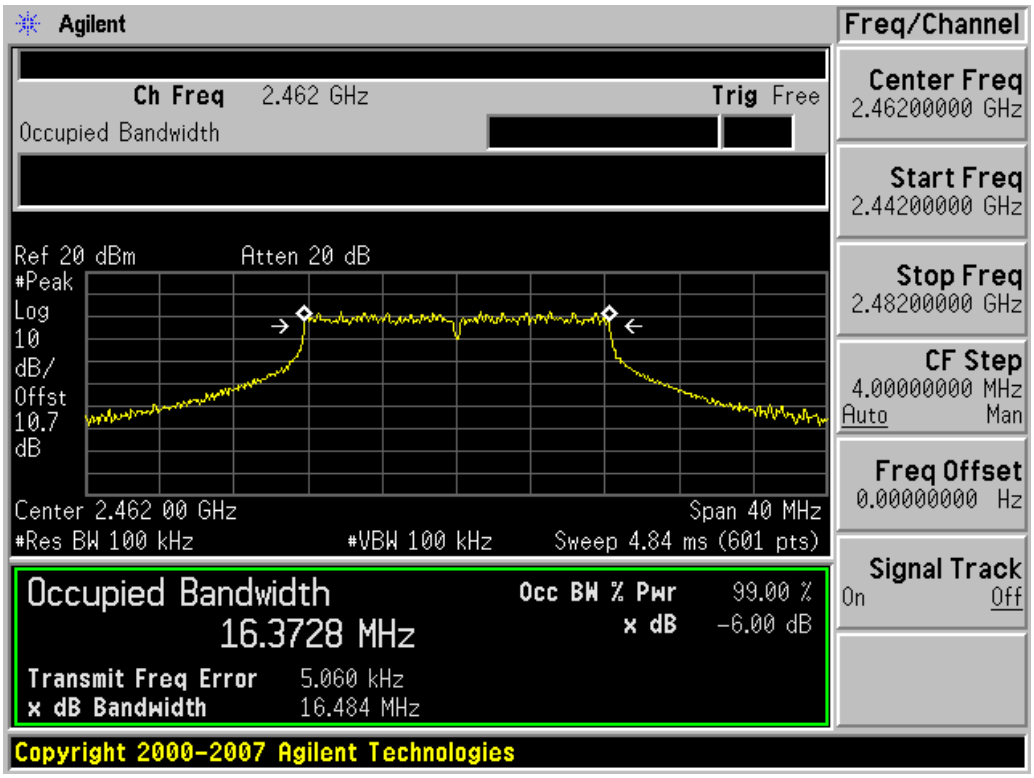
6dB Bandwidth plot (802.11g-CH 1)



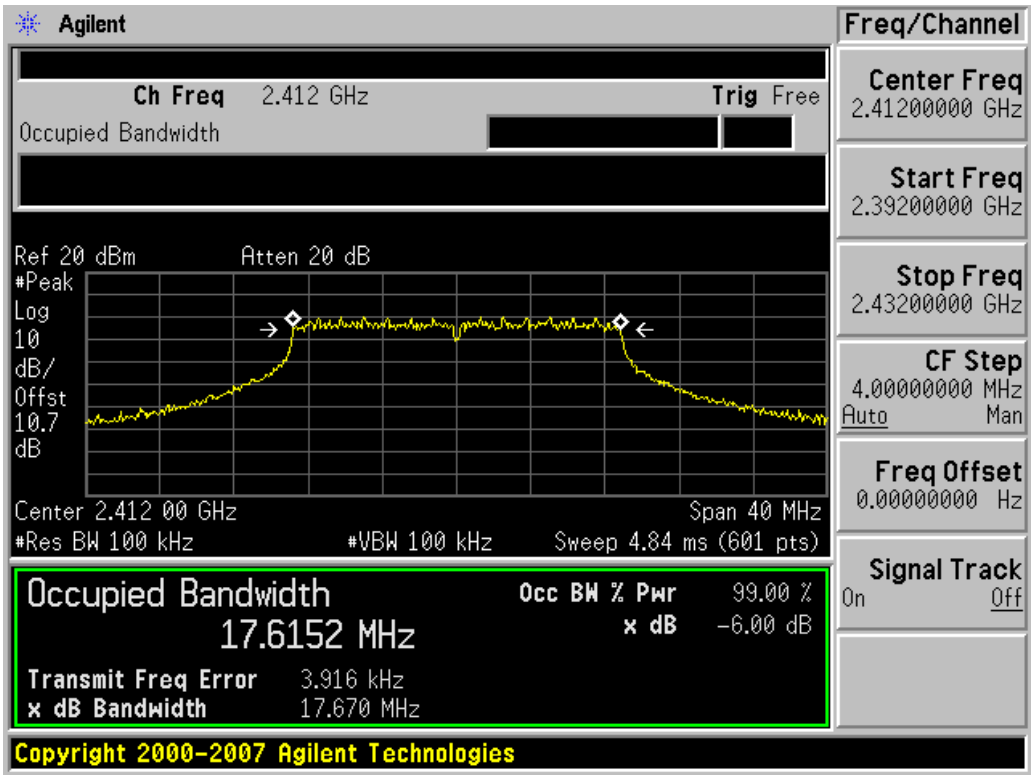
6dB Bandwidth plot (802.11g-CH 6)



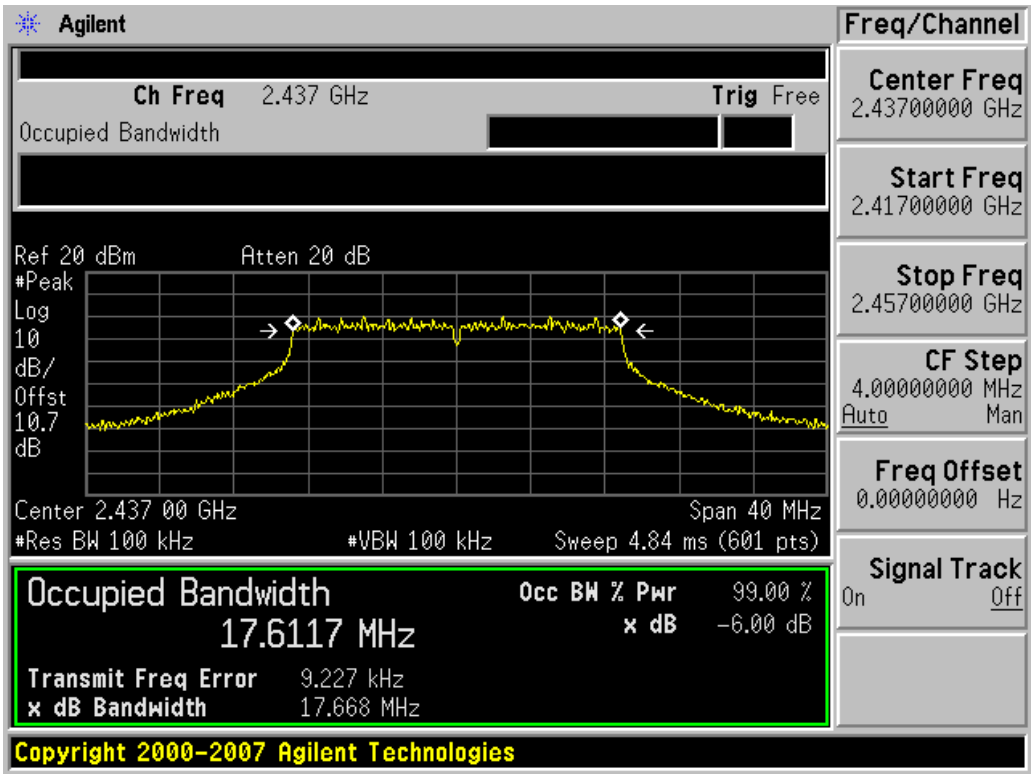
6dB Bandwidth plot (802.11g-CH 11)



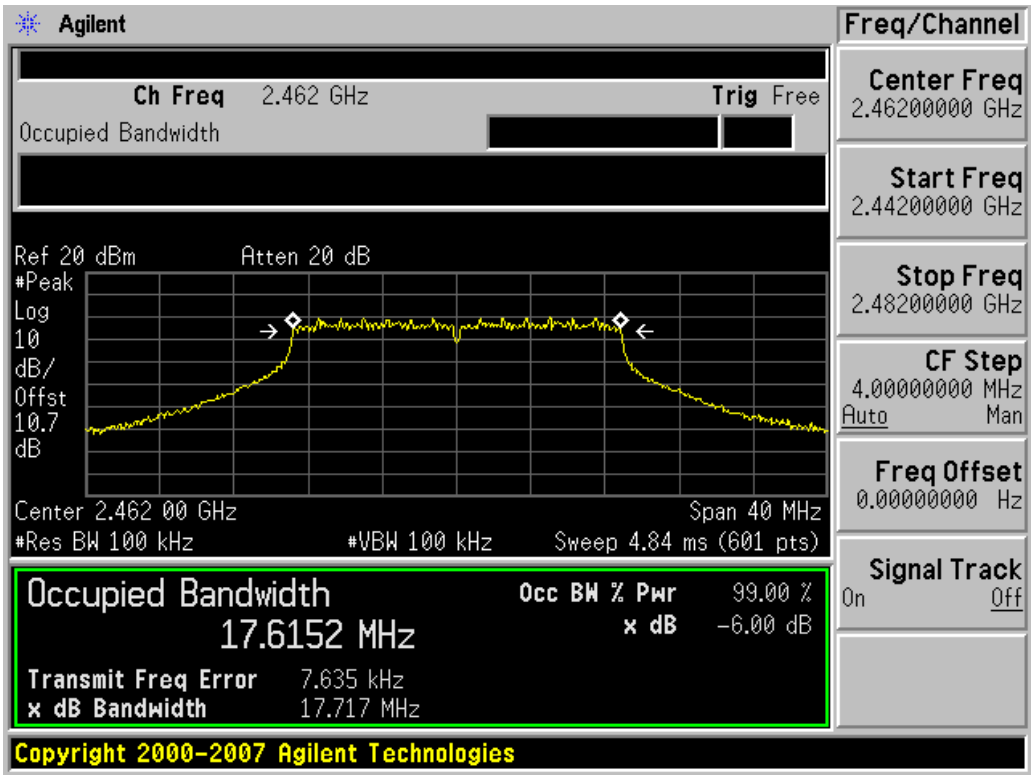
6dB Bandwidth plot (802.11n-CH 1)



6dB Bandwidth plot (802.11n-CH 6)

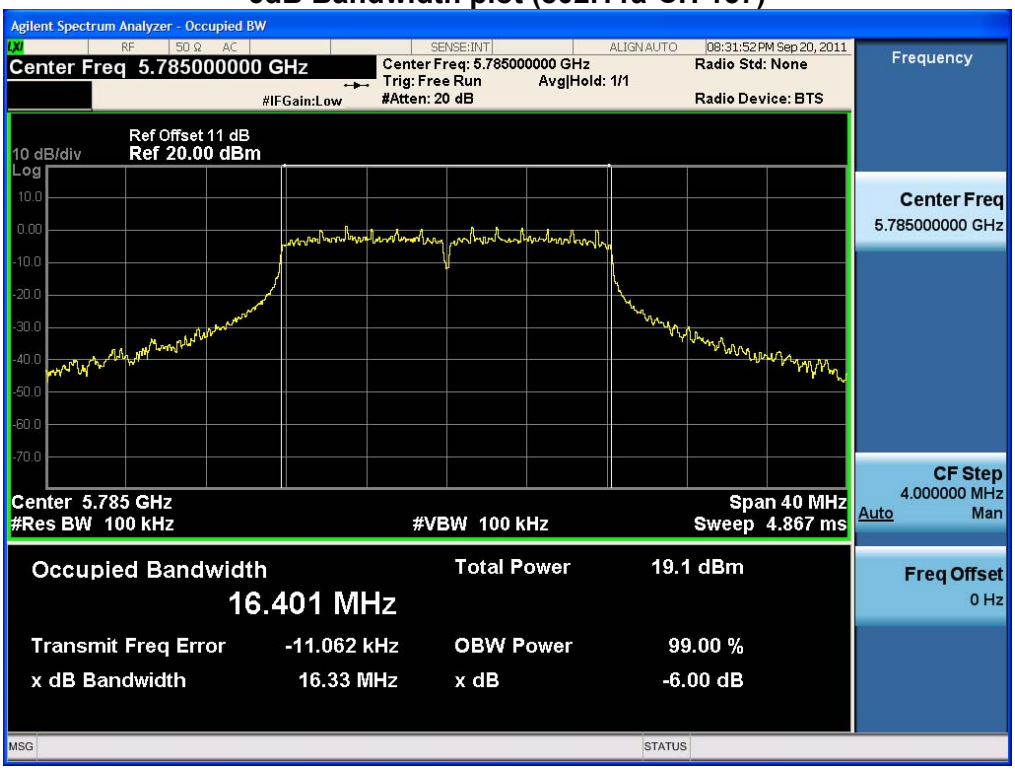


6dB Bandwidth plot (802.11n-CH 11)

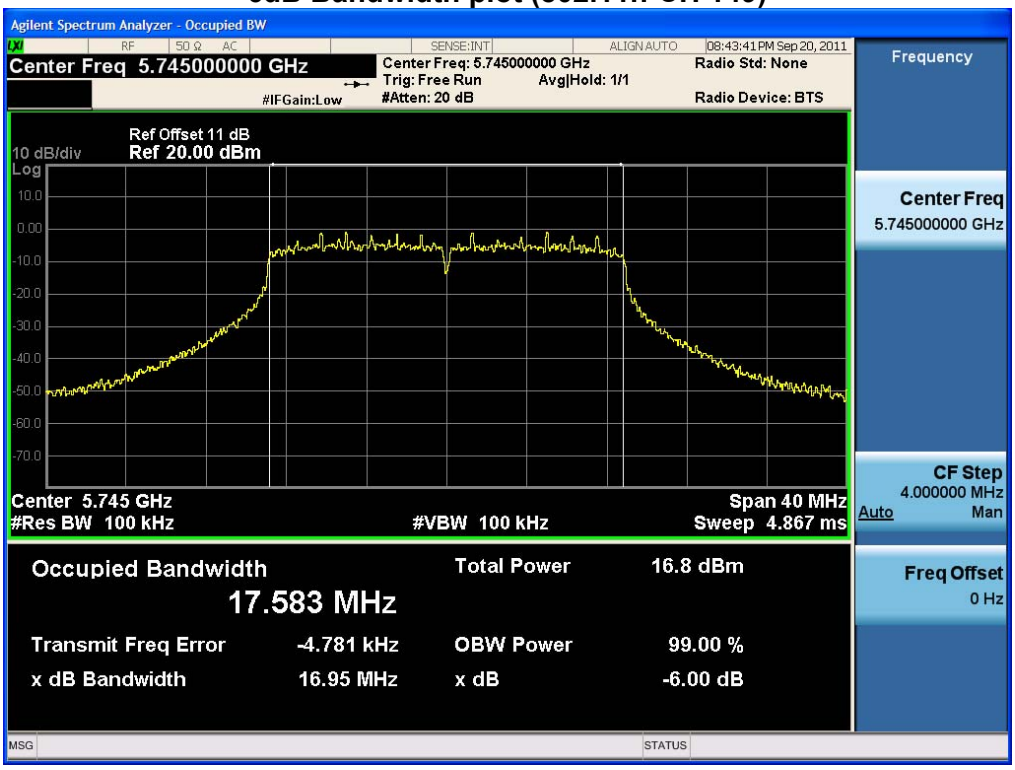


6dB Bandwidth plot (802.11a-CH 149)

6dB Bandwidth plot (802.11a-CH 157)

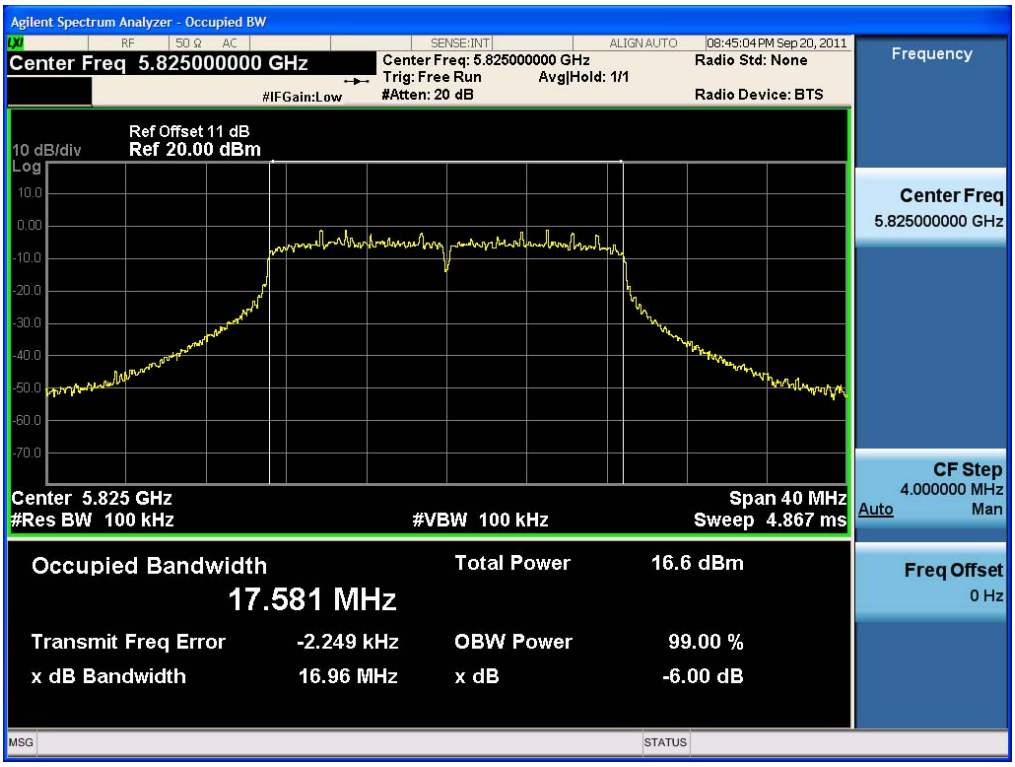


6dB Bandwidth plot (802.11n-CH 149)

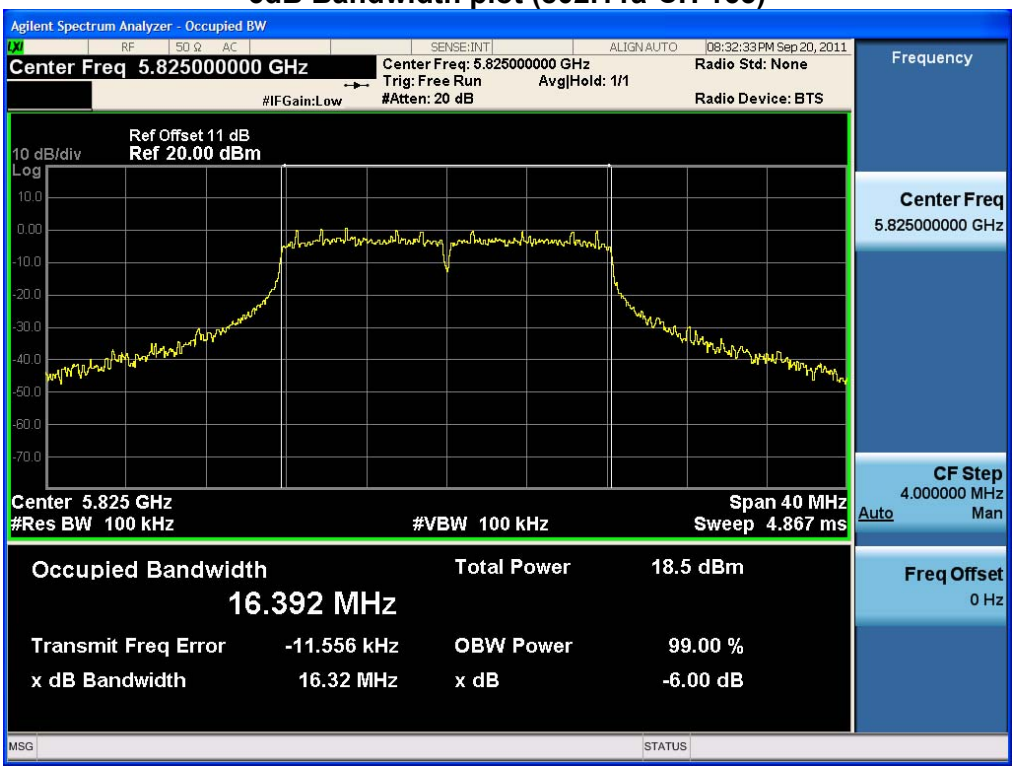


6dB Bandwidth plot (802.11n-CH 157)

6dB Bandwidth plot (802.11n-CH 165)



6dB Bandwidth plot (802.11a-CH 165)



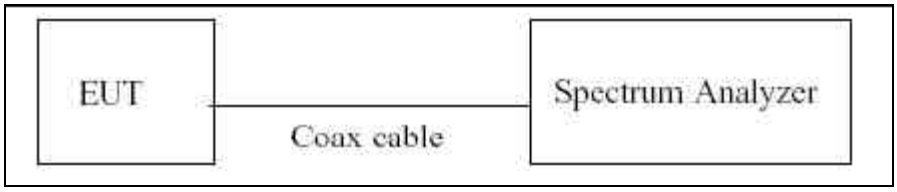
7.2 OUTPUT POWER MEASUREMENT (802.11a/b/g/n)

Test Requirements and limit, §15.247(b)(3)

A transmitter antenna terminal of EUT is connected to the input of a Spectrum Analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

The maximum permissible conducted output power is 1 Watt.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW: 1 MHz

VBW: 1 MHz

SPAN: 40 MHz

Detector Mode = Peak

▣ TEST RESULTS

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	1 Mbps	17.71	30
		2 Mbps	17.79	30
		5.5 Mbps	19.58	30
		11 Mbps	20.90	30
2437	6	1 Mbps	17.33	30
		2 Mbps	17.74	30
		5.5 Mbps	19.41	30
		11 Mbps	20.82	30
2462	11	1 Mbps	16.58	30
		2 Mbps	17.06	30
		5.5 Mbps	18.95	30
		11 Mbps	20.19	30

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6 Mbps	20.04	30
		9 Mbps	20.68	30
		12 Mbps	21.04	30
		18 Mbps	20.51	30
		24 Mbps	21.30	30
		36 Mbps	20.94	30
		48 Mbps	21.41	30
		54 Mbps	20.31	30
2437	6	6 Mbps	21.30	30
		9 Mbps	21.41	30
		12 Mbps	21.97	30
		18 Mbps	21.37	30
		24 Mbps	22.07	30
		36 Mbps	21.72	30
		48 Mbps	21.90	30
		54 Mbps	21.02	30
2462	11	6 Mbps	20.01	30
		9 Mbps	20.31	30
		12 Mbps	20.90	30
		18 Mbps	20.37	30
		24 Mbps	21.06	30
		36 Mbps	20.76	30
		48 Mbps	21.12	30
		54 Mbps	20.13	30

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6.5 Mbps	18.22	30
		13 Mbps	18.30	30
		19.5 Mbps	18.41	30
		26 Mbps	18.73	30
		39 Mbps	18.81	30
		52 Mbps	18.89	30
		58.5 Mbps	18.92	30
		65 Mbps	17.47	30
2437	6	6.5 Mbps	18.11	30
		13 Mbps	18.29	30
		19.5 Mbps	18.30	30
		26 Mbps	18.77	30
		39 Mbps	18.65	30
		52 Mbps	18.89	30
		58.5 Mbps	18.85	30
		65 Mbps	17.38	30
2462	11	6.5 Mbps	18.07	30
		13 Mbps	18.19	30
		19.5 Mbps	18.29	30
		26 Mbps	18.62	30
		39 Mbps	18.63	30
		52 Mbps	18.86	30
		58.5 Mbps	18.87	30
		65 Mbps	17.38	30

▣ TEST RESULTS

Conducted Output Power Measurements (802.11a Mode: 5745~5825)

802.11a Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6 Mbps	20.02	30
		9 Mbps	19.97	30
		12 Mbps	20.70	30
		18 Mbps	20.13	30
		24 Mbps	20.87	30
		36 Mbps	20.69	30
		48 Mbps	19.91	30
		54 Mbps	19.15	30
5785	157	6 Mbps	20.34	30
		9 Mbps	20.72	30
		12 Mbps	20.95	30
		18 Mbps	20.62	30
		24 Mbps	21.15	30
		36 Mbps	21.00	30
		48 Mbps	20.24	30
		54 Mbps	19.32	30
5825	165	6 Mbps	19.83	30
		9 Mbps	20.01	30
		12 Mbps	20.43	30
		18 Mbps	19.93	30
		24 Mbps	20.59	30
		36 Mbps	20.34	30
		48 Mbps	19.69	30
		54 Mbps	18.68	30

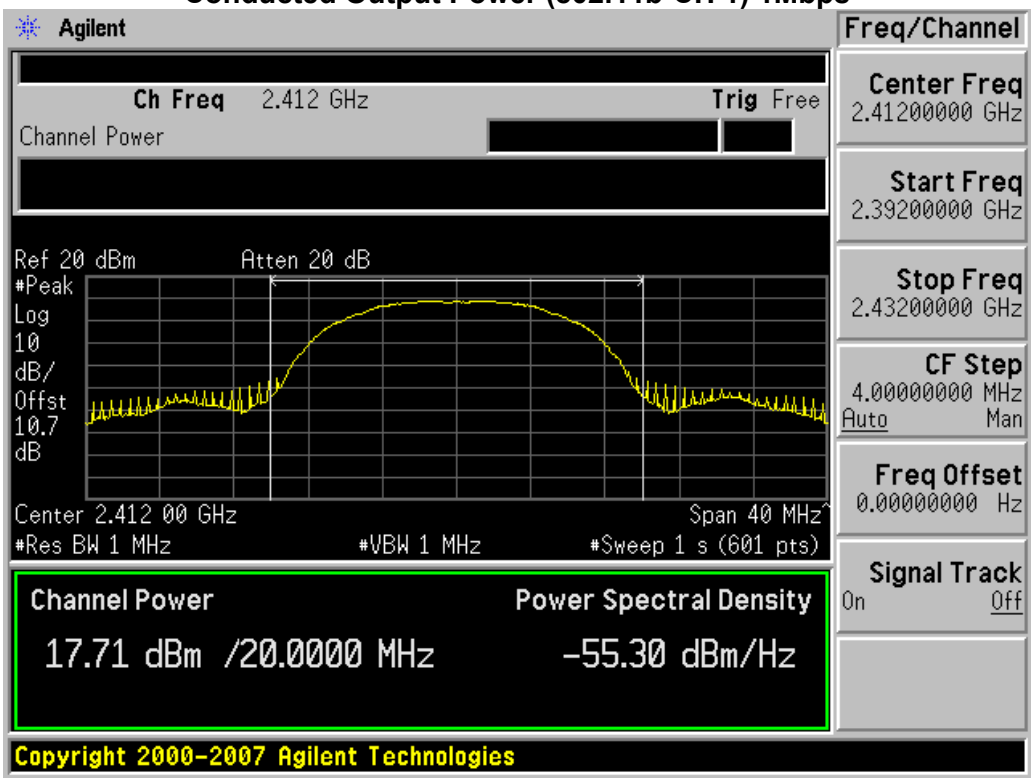
▣ TEST RESULTS

Conducted Output Power Measurements (802.11n Mode:5745~5825)

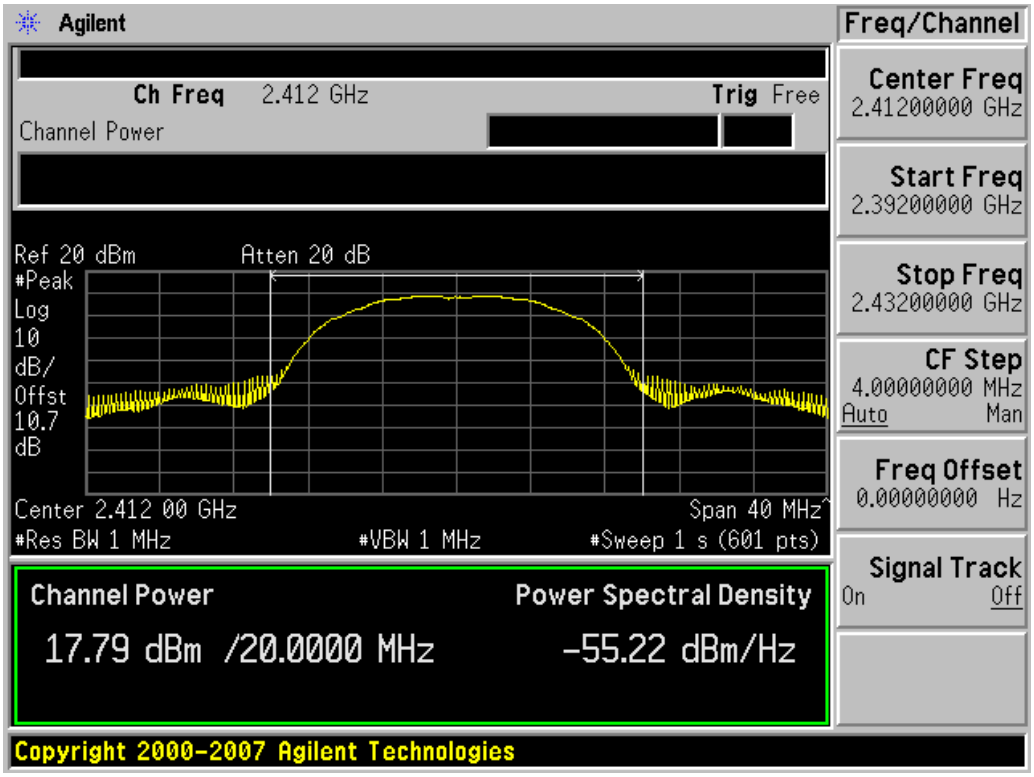
802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
5745	149	6.5 Mbps	18.28	30
		13 Mbps	18.12	30
		19.5 Mbps	18.09	30
		26 Mbps	18.44	30
		39 Mbps	18.59	30
		52 Mbps	18.53	30
		58.5 Mbps	18.51	30
		65 Mbps	15.01	30
5785	157	6.5 Mbps	18.67	30
		13 Mbps	18.32	30
		19.5 Mbps	18.55	30
		26 Mbps	18.65	30
		39 Mbps	18.51	30
		52 Mbps	18.63	30
		58.5 Mbps	18.77	30
		65 Mbps	15.37	30
5825	165	6.5 Mbps	18.12	30
		13 Mbps	18.11	30
		19.5 Mbps	18.13	30
		26 Mbps	18.54	30
		39 Mbps	18.24	30
		52 Mbps	18.27	30
		58.5 Mbps	18.31	30
		65 Mbps	15.31	30

▣ RESULT PLOTS

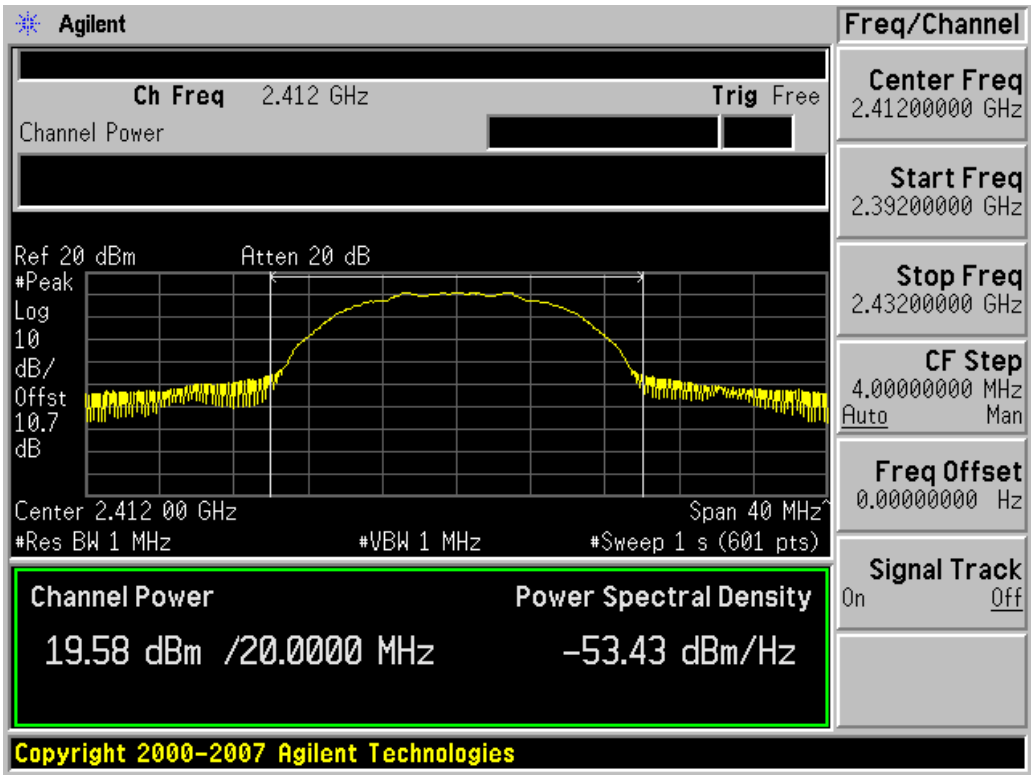
Conducted Output Power (802.11b-CH 1) 1Mbps



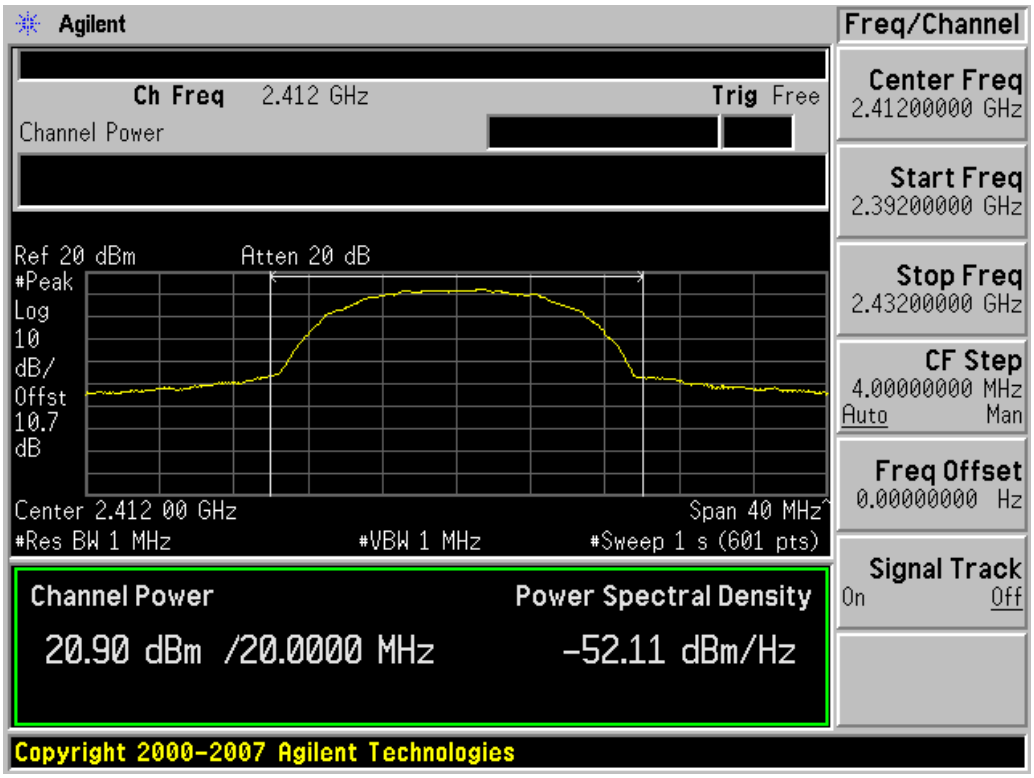
Conducted Output Power (802.11b-CH 1) 2Mbps



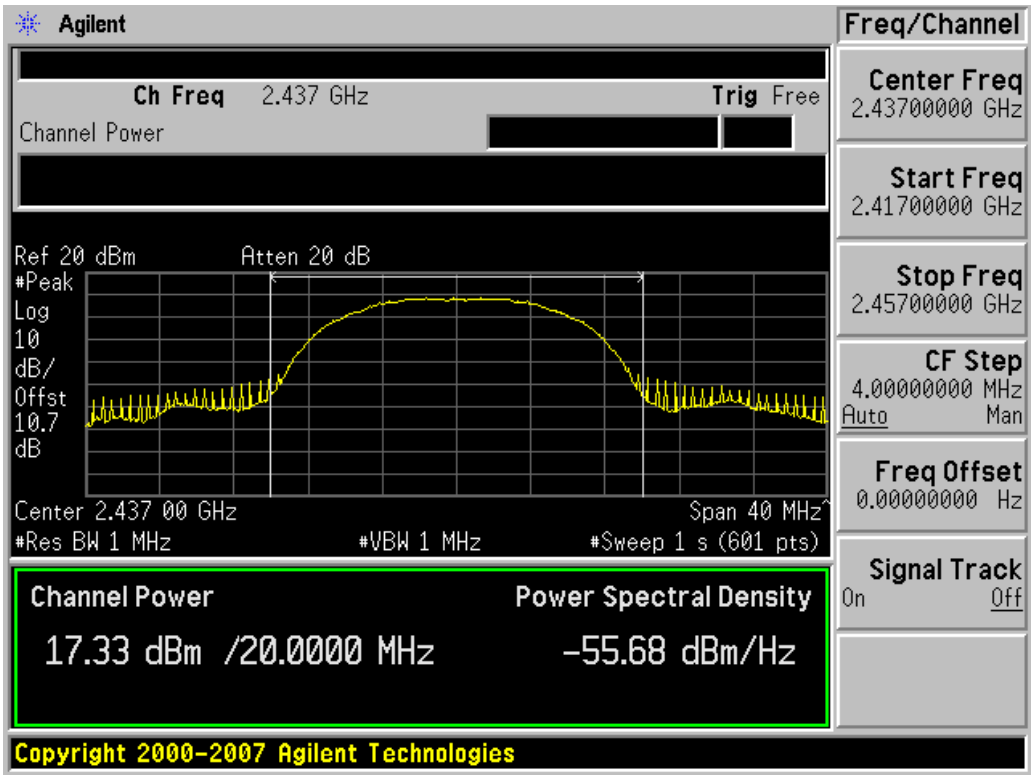
Conducted Output Power (802.11b-CH 1) 5.5Mbps



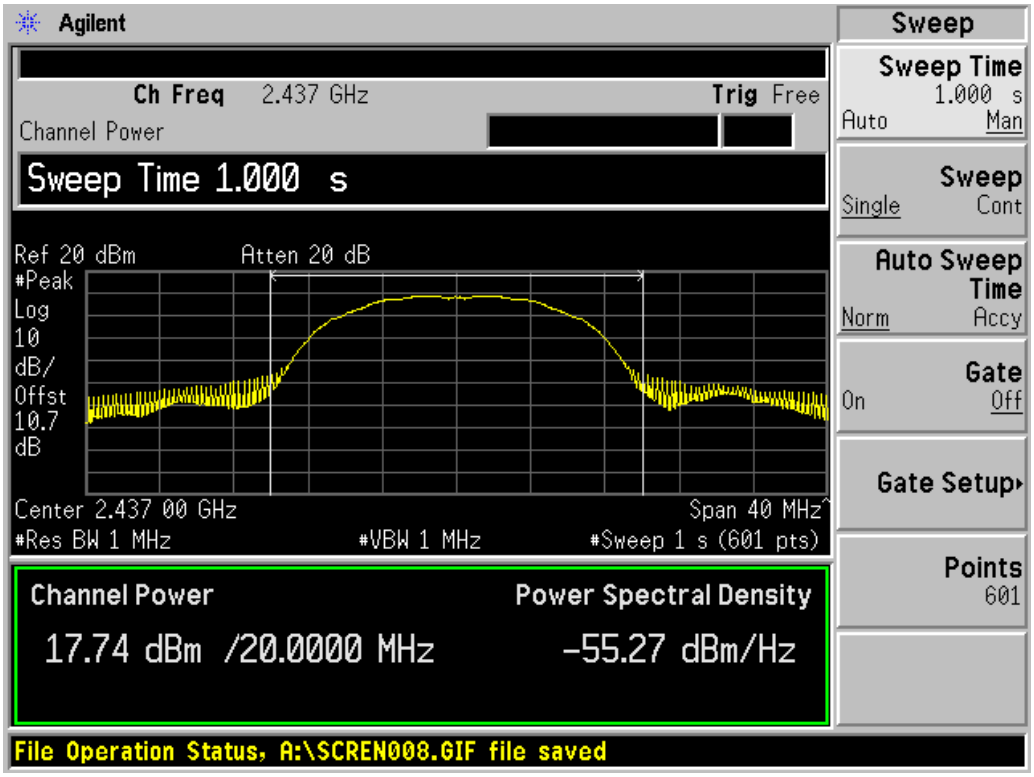
Conducted Output Power (802.11b-CH 1) 11Mbps



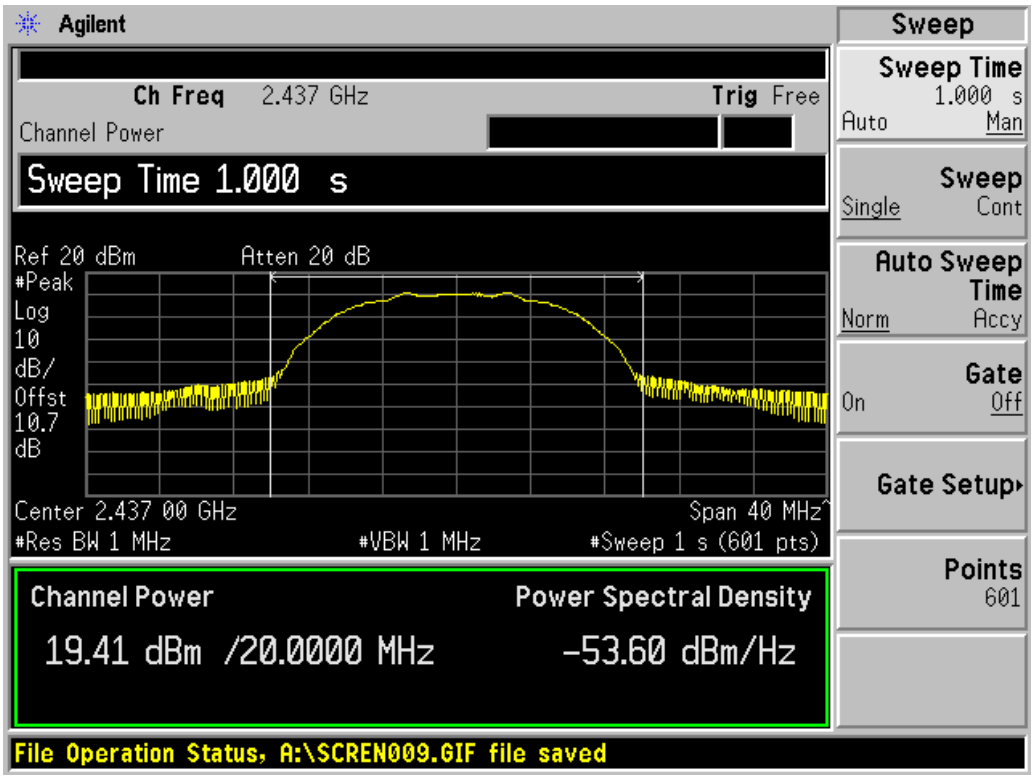
Conducted Output Power (802.11b-CH 6) 1Mbps



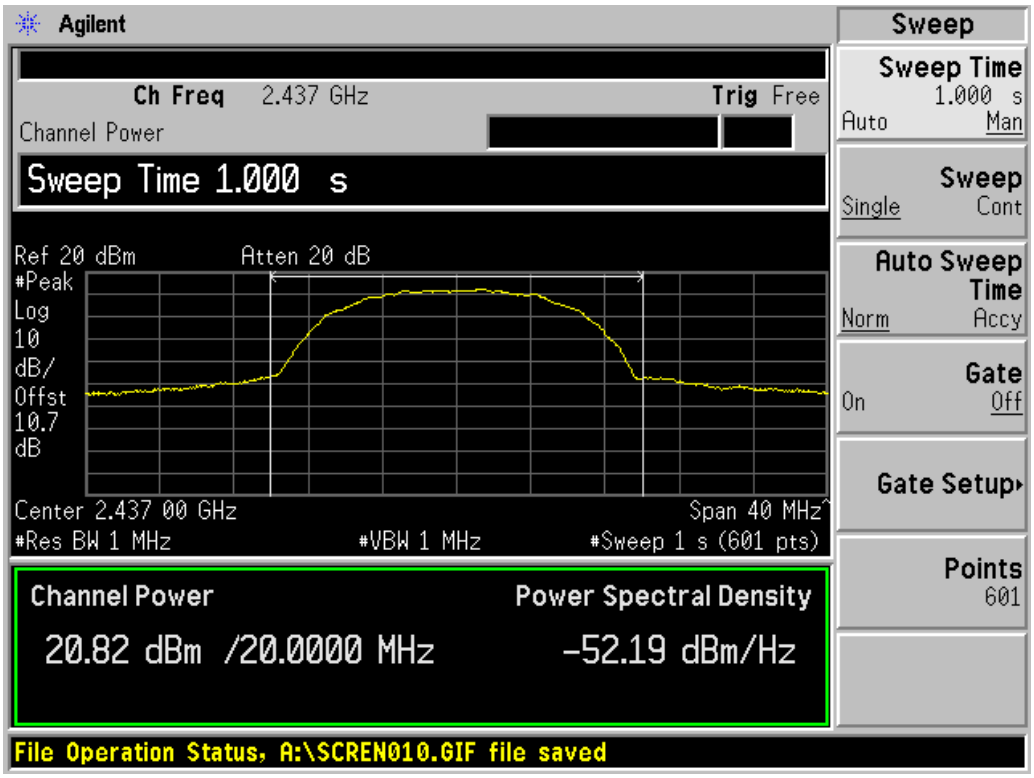
Conducted Output Power (802.11b-CH 6) 2Mbps



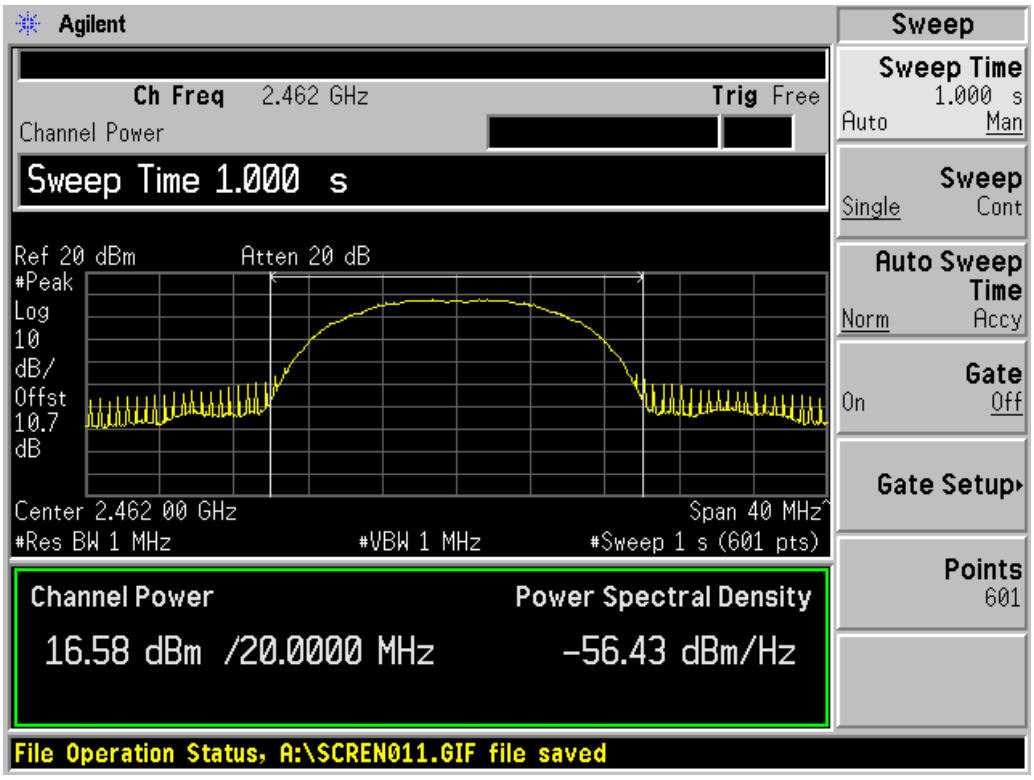
Conducted Output Power (802.11b-CH 6) 5.5Mbps



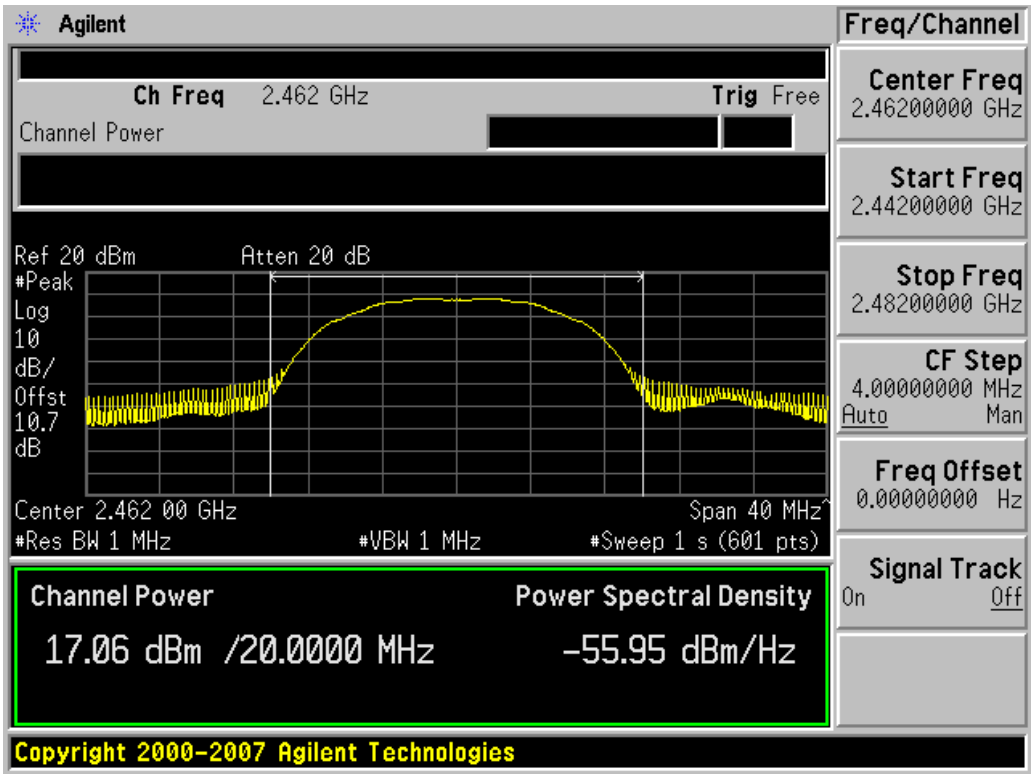
Conducted Output Power (802.11b-CH 6) 11Mbps



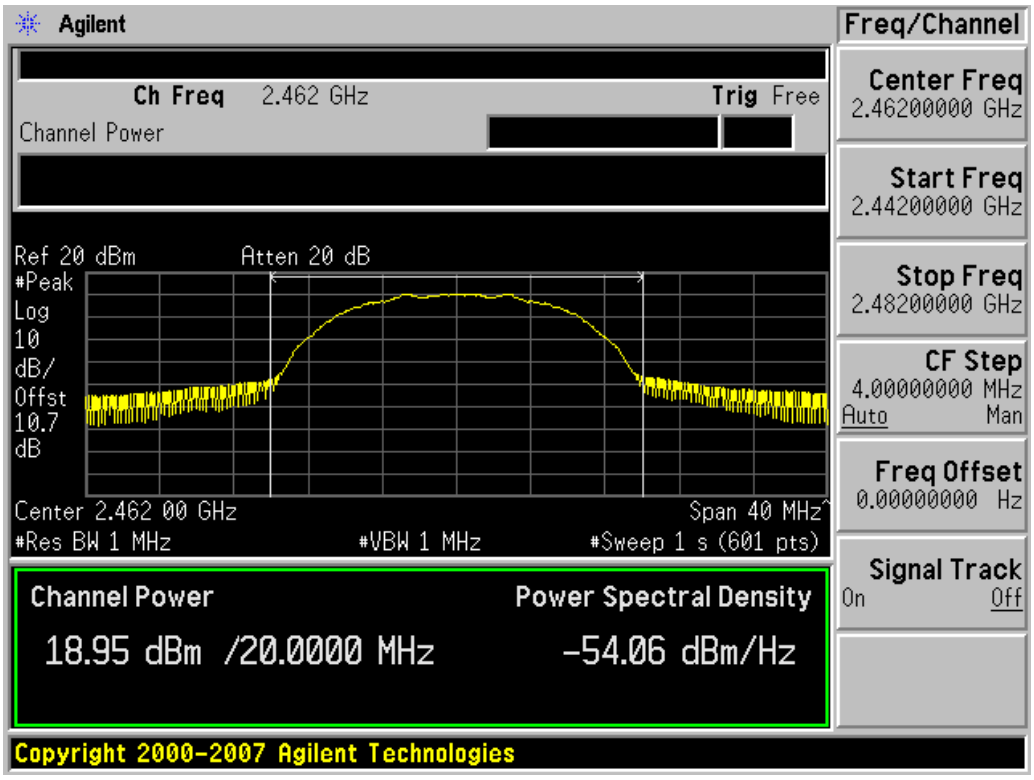
Conducted Output Power (802.11b-CH 11) 1Mbps



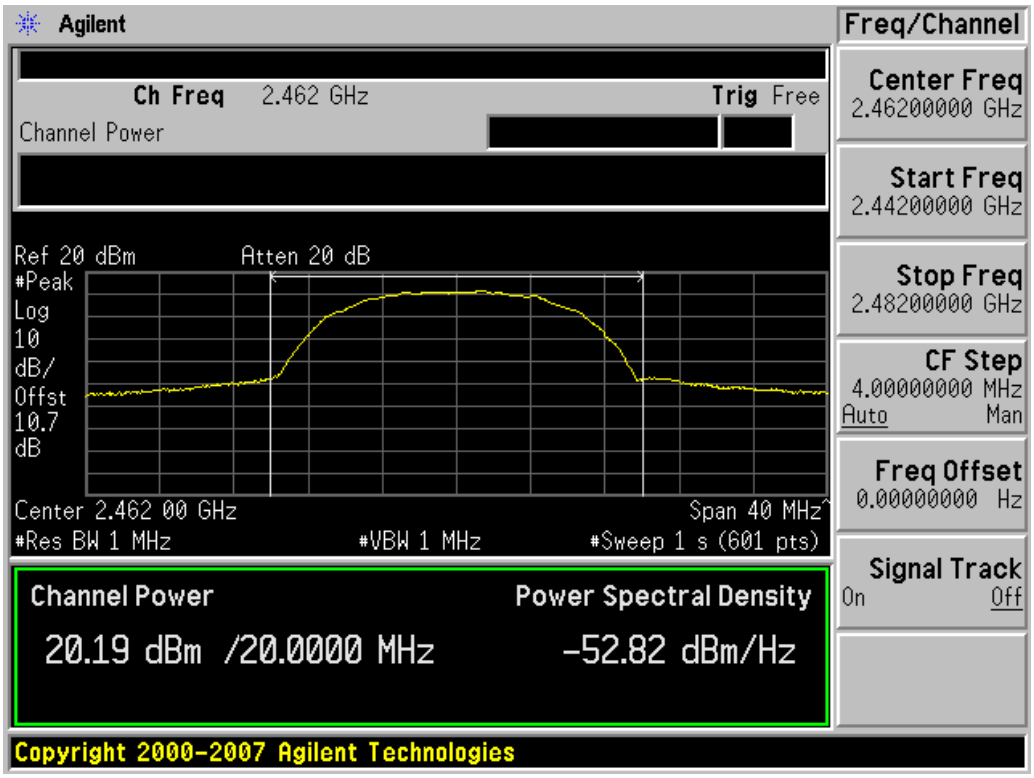
Conducted Output Power (802.11b-CH 11) 2Mbps



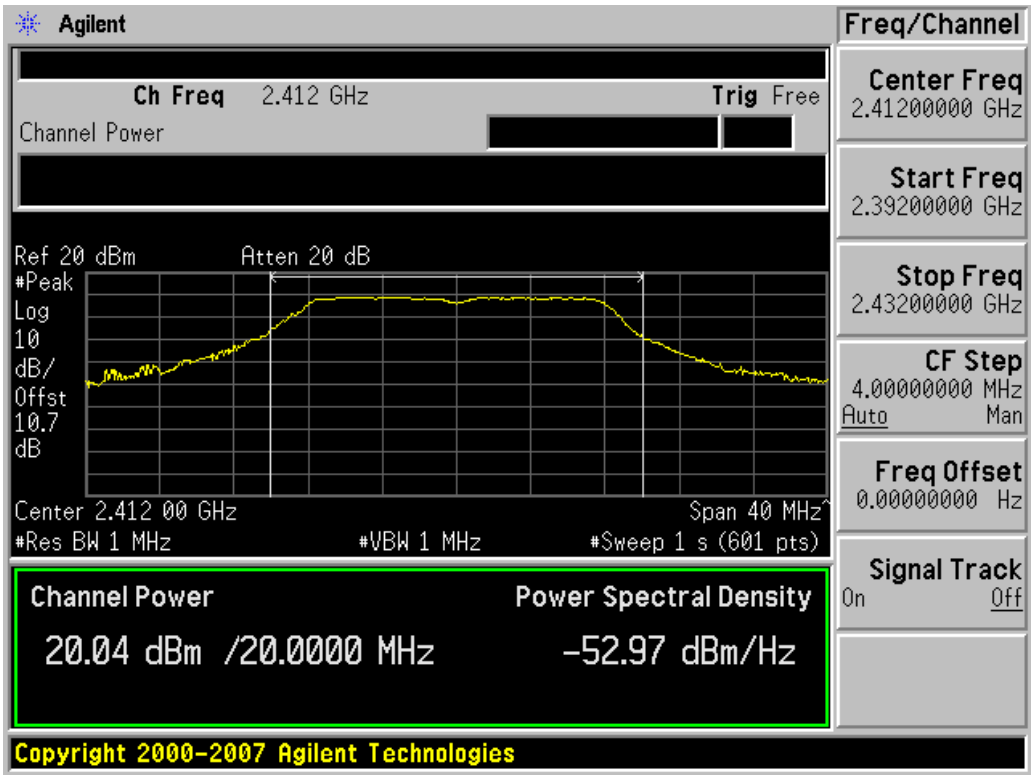
Conducted Output Power (802.11b-CH 11) 5.5Mbps



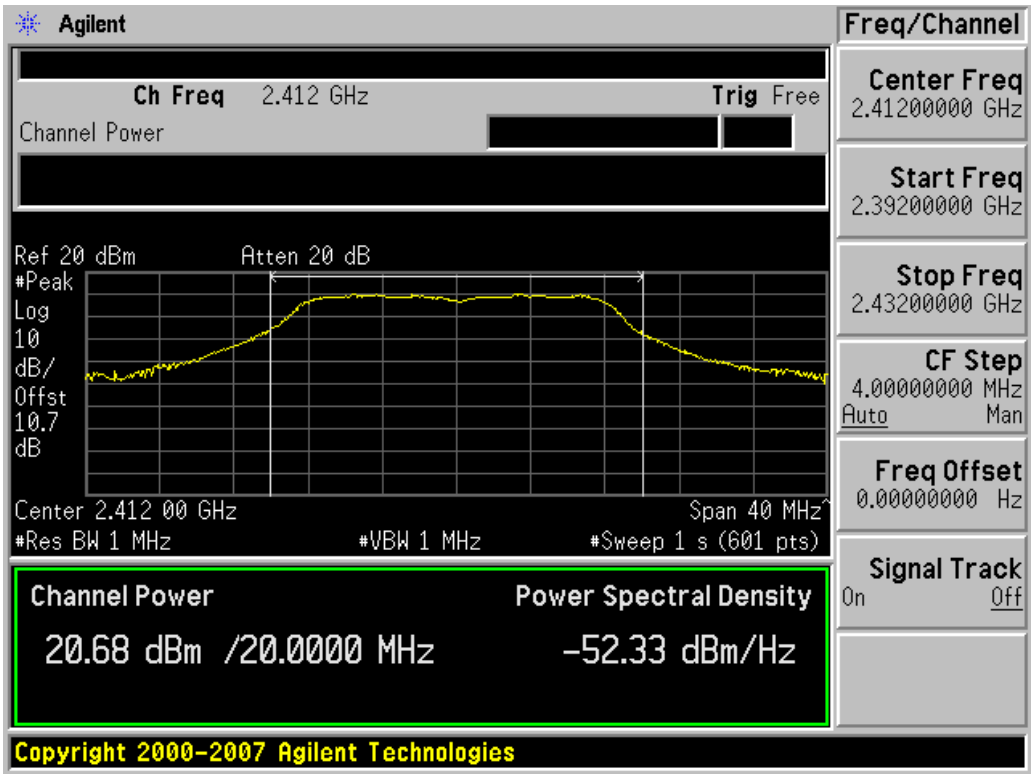
Conducted Output Power (802.11b-CH 11) 11Mbps



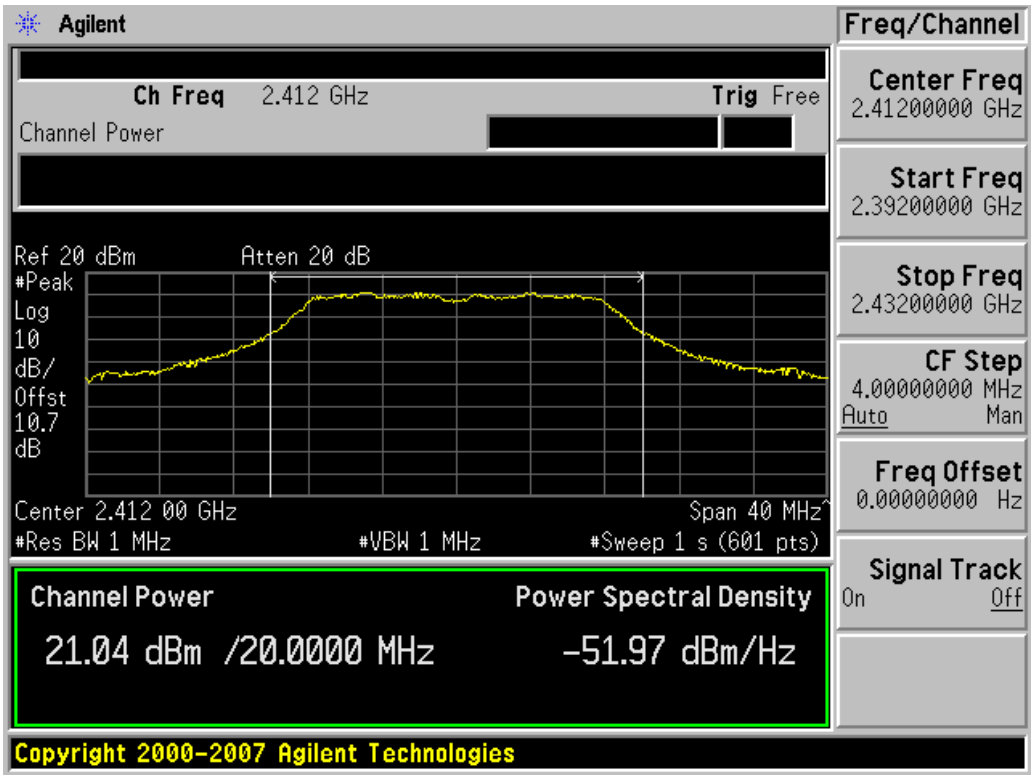
Conducted Output Power (802.11g-CH 1) 6Mbps



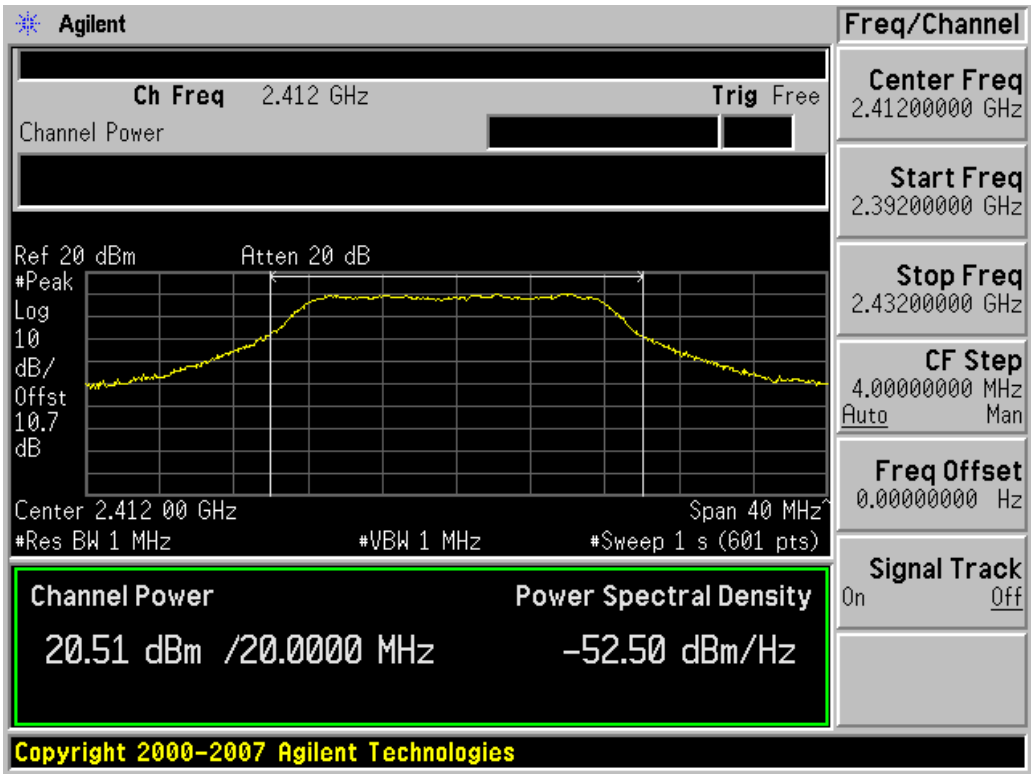
Conducted Output Power (802.11g-CH 1) 9Mbps



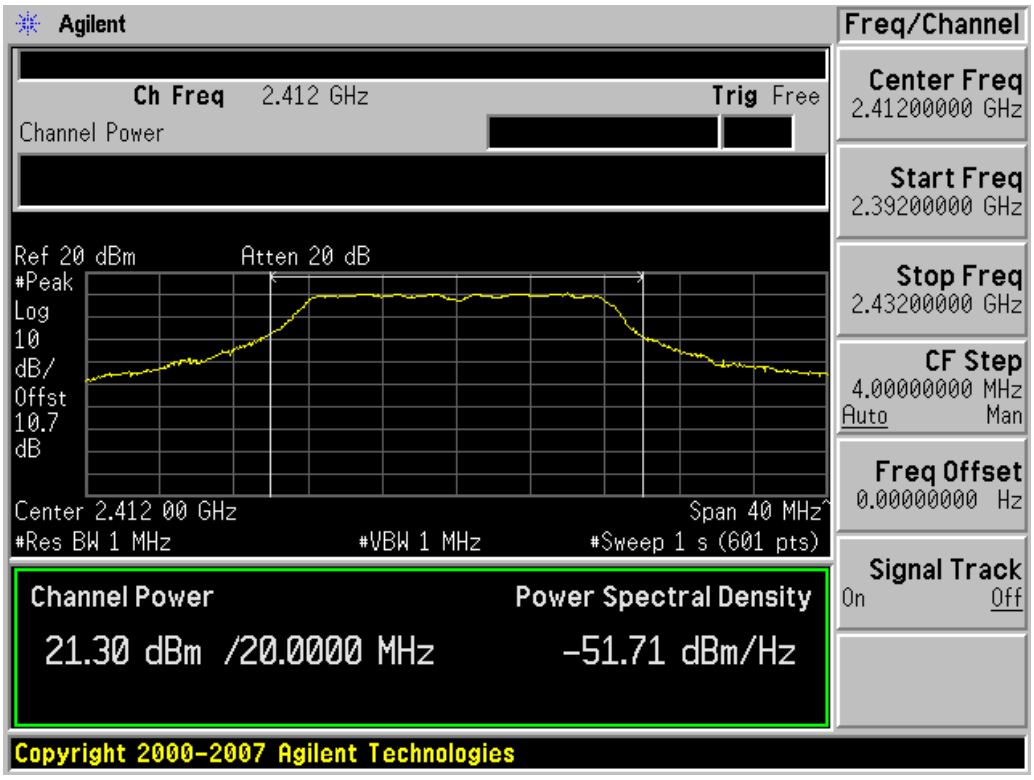
Conducted Output Power (802.11g-CH 1) 12Mbps



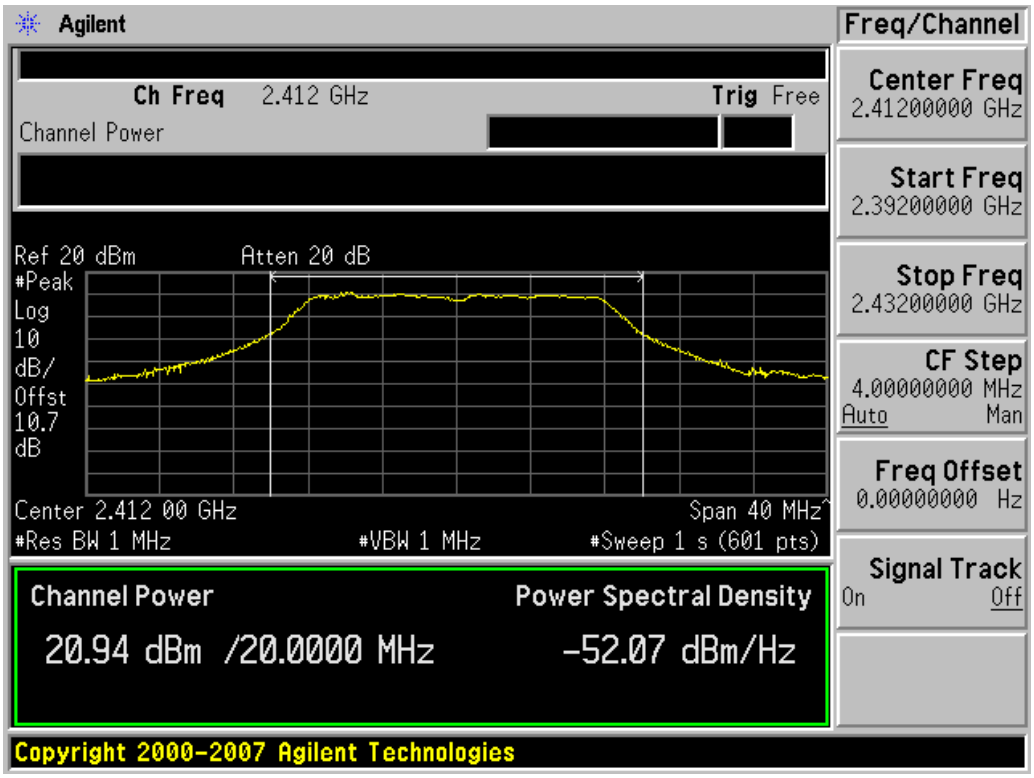
Conducted Output Power (802.11g-CH 1) 18Mbps



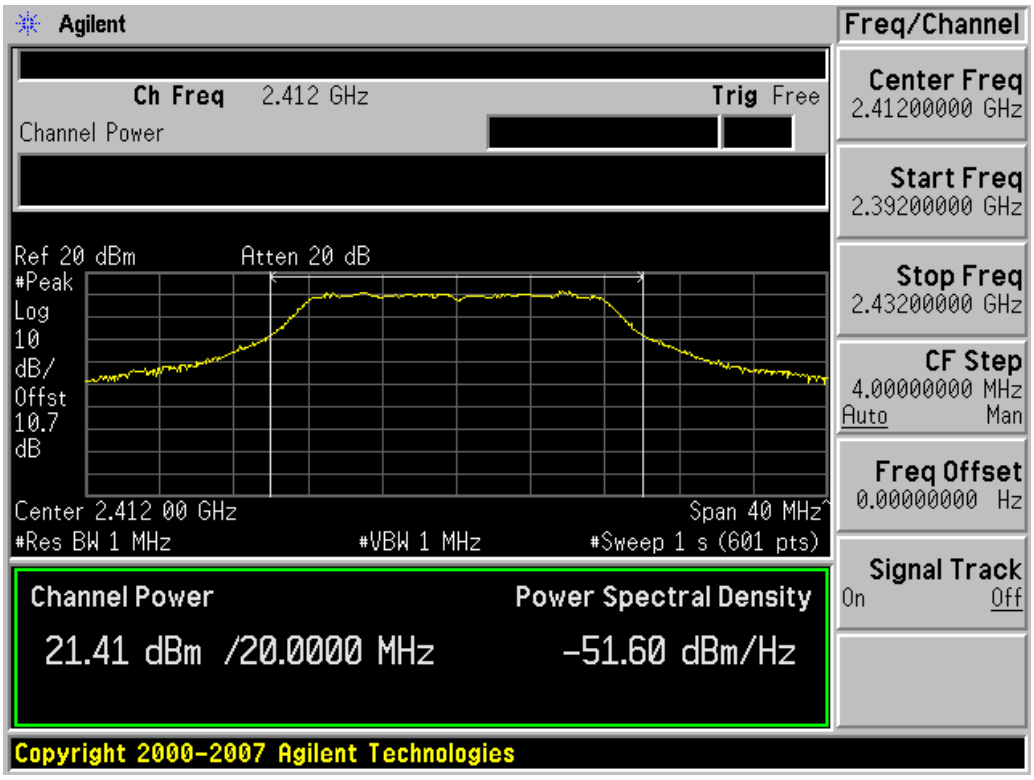
Conducted Output Power (802.11g-CH 1) 24Mbps



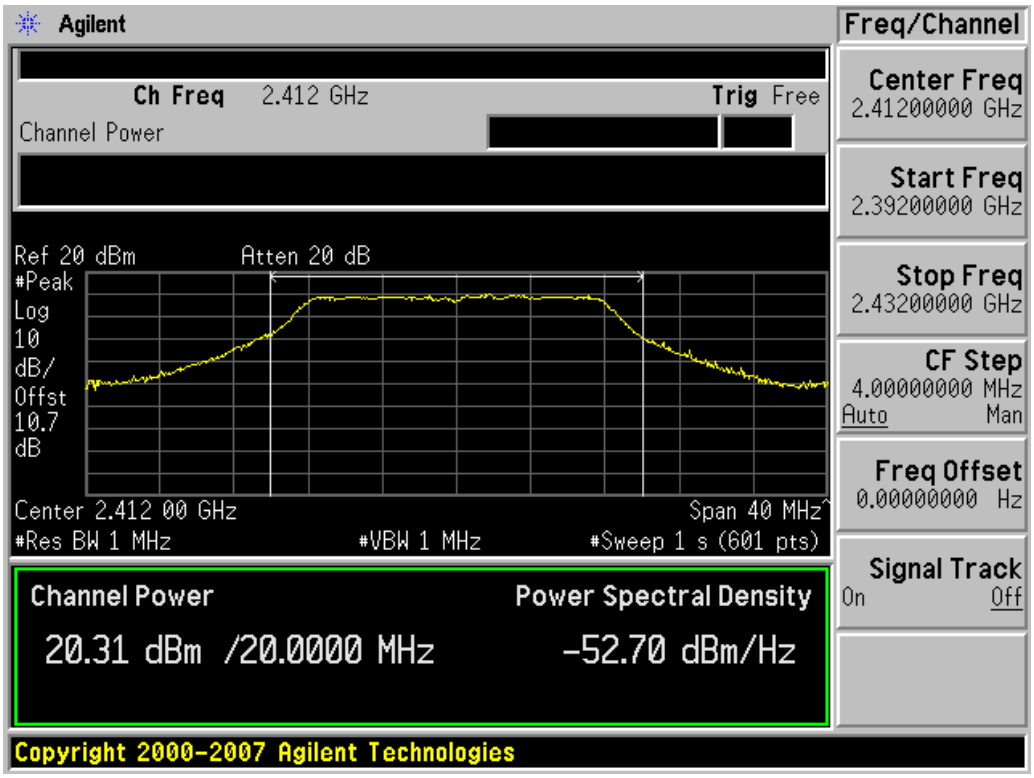
Conducted Output Power (802.11g-CH 1) 36Mbps



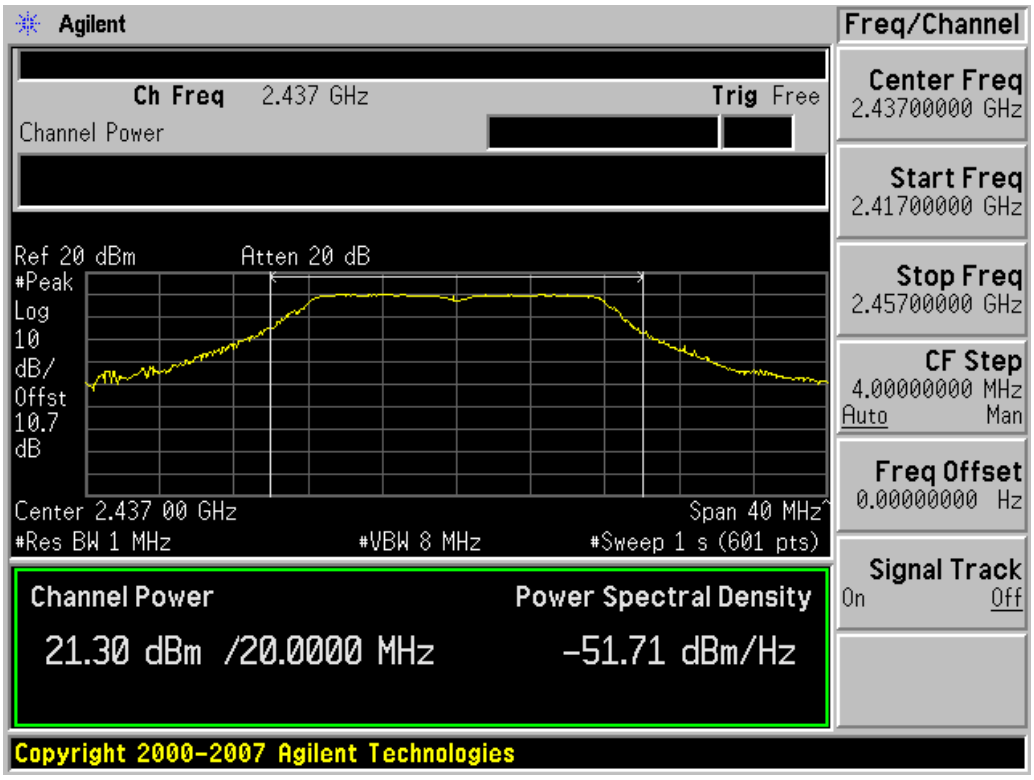
Conducted Output Power (802.11g-CH 1) 48Mbps



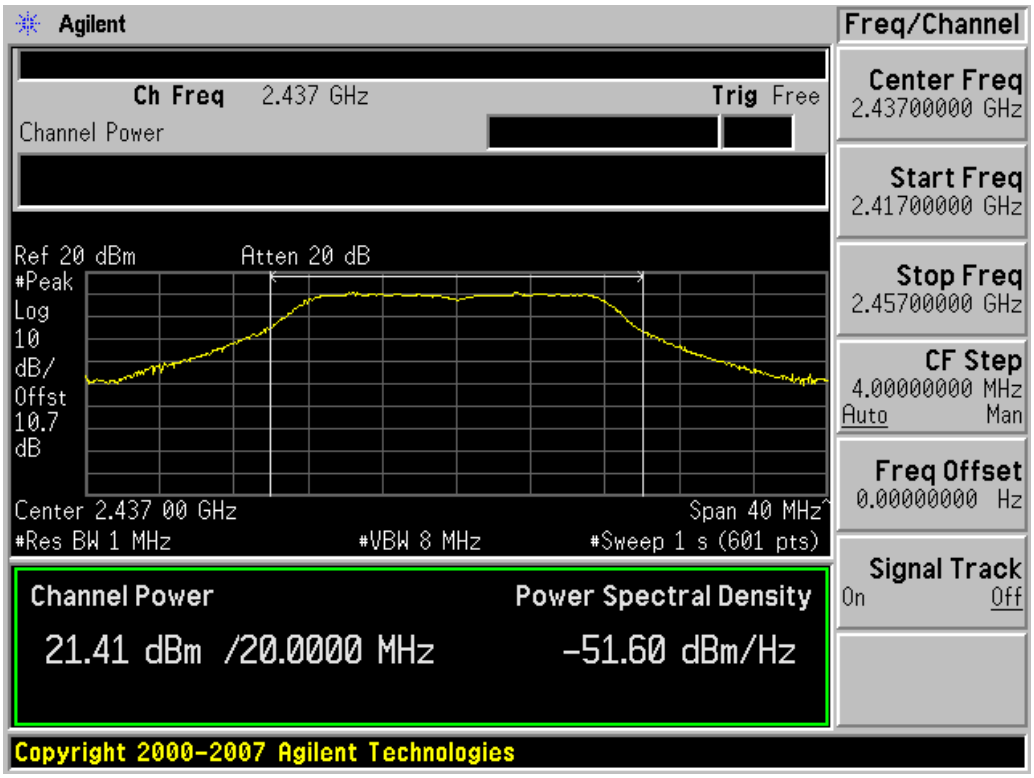
Conducted Output Power (802.11g-CH 1) 54Mbps



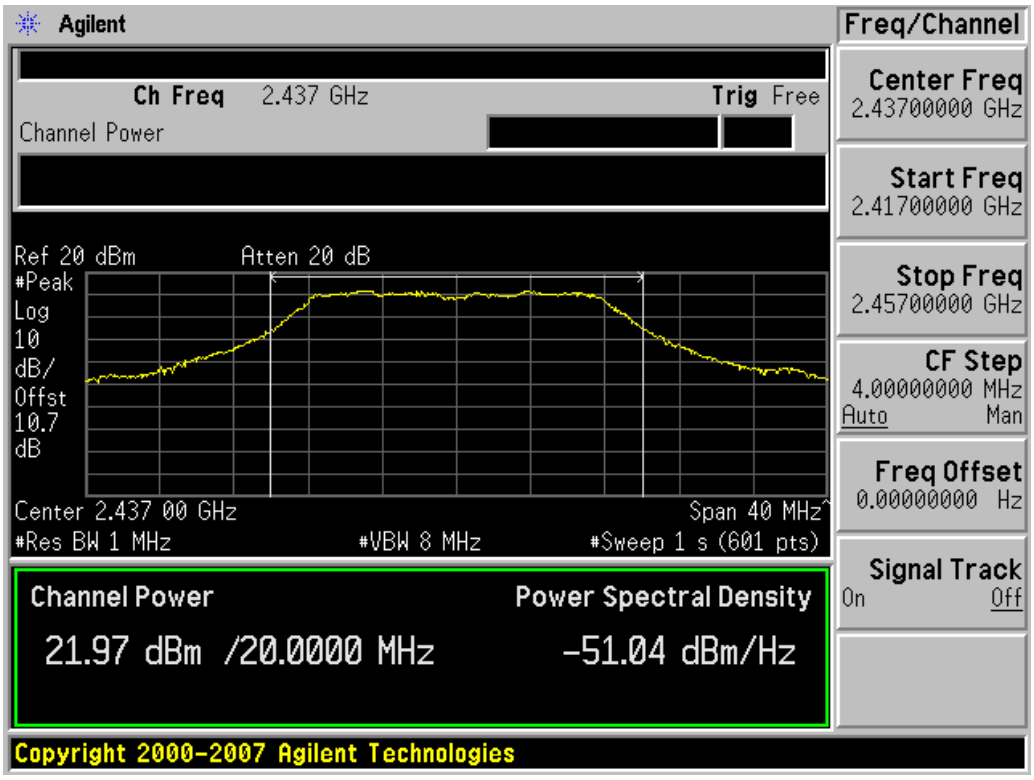
Conducted Output Power (802.11g-CH 6) 6Mbps



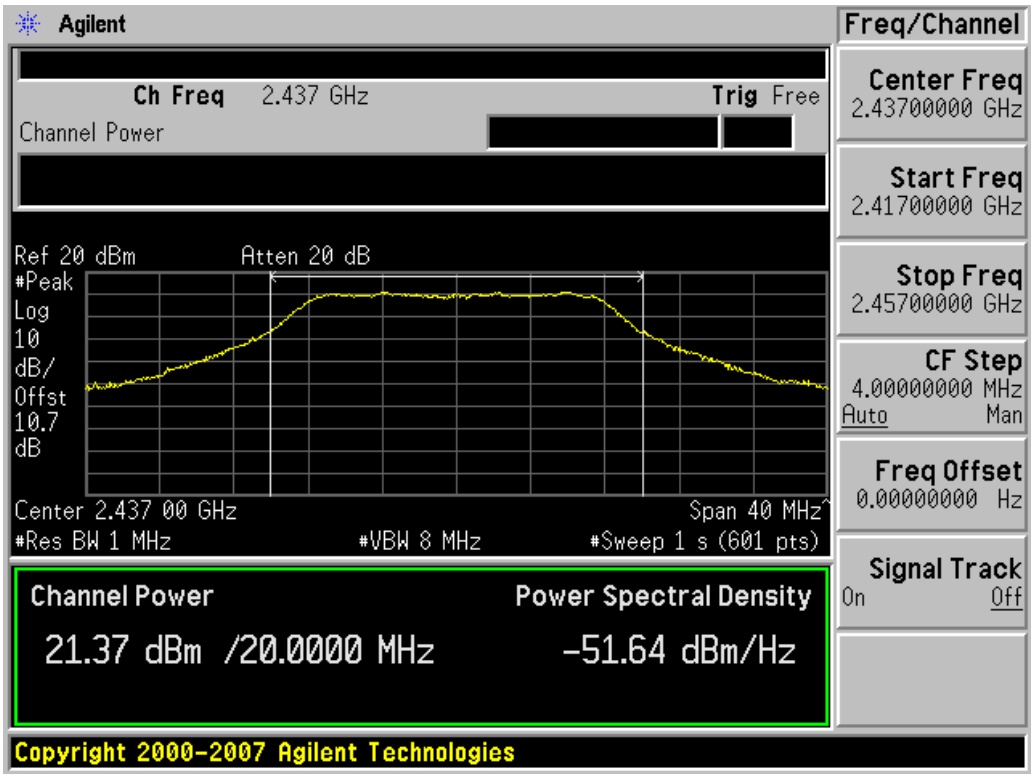
Conducted Output Power (802.11g-CH 6) 9Mbps



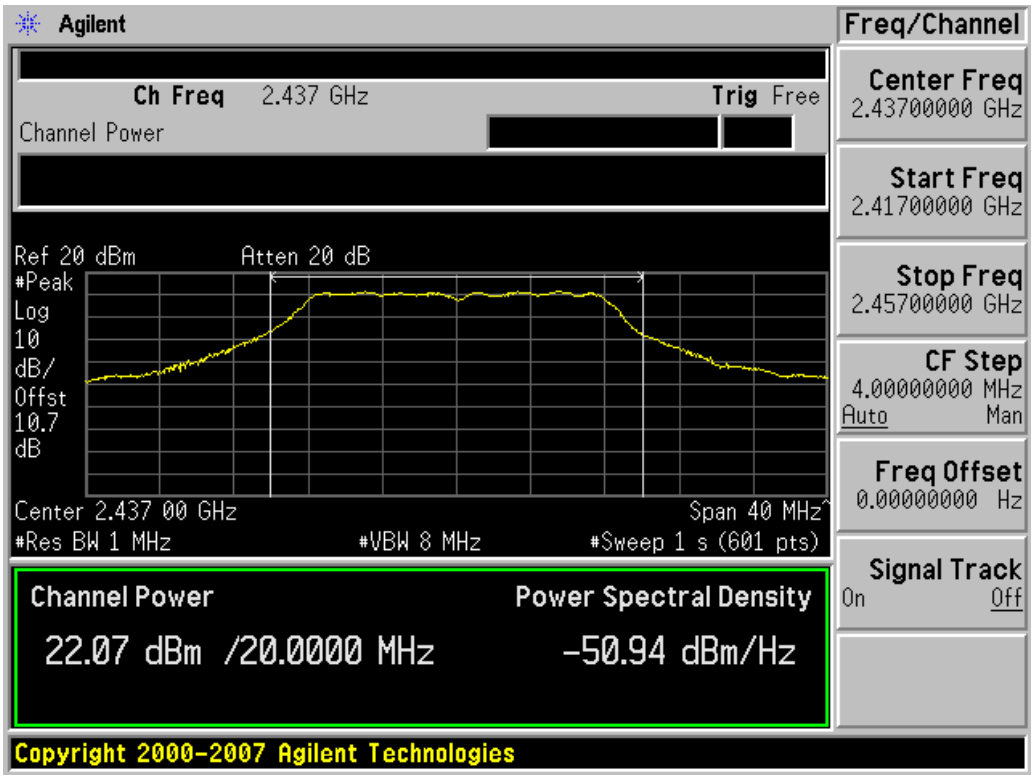
Conducted Output Power (802.11g-CH 6) 12Mbps



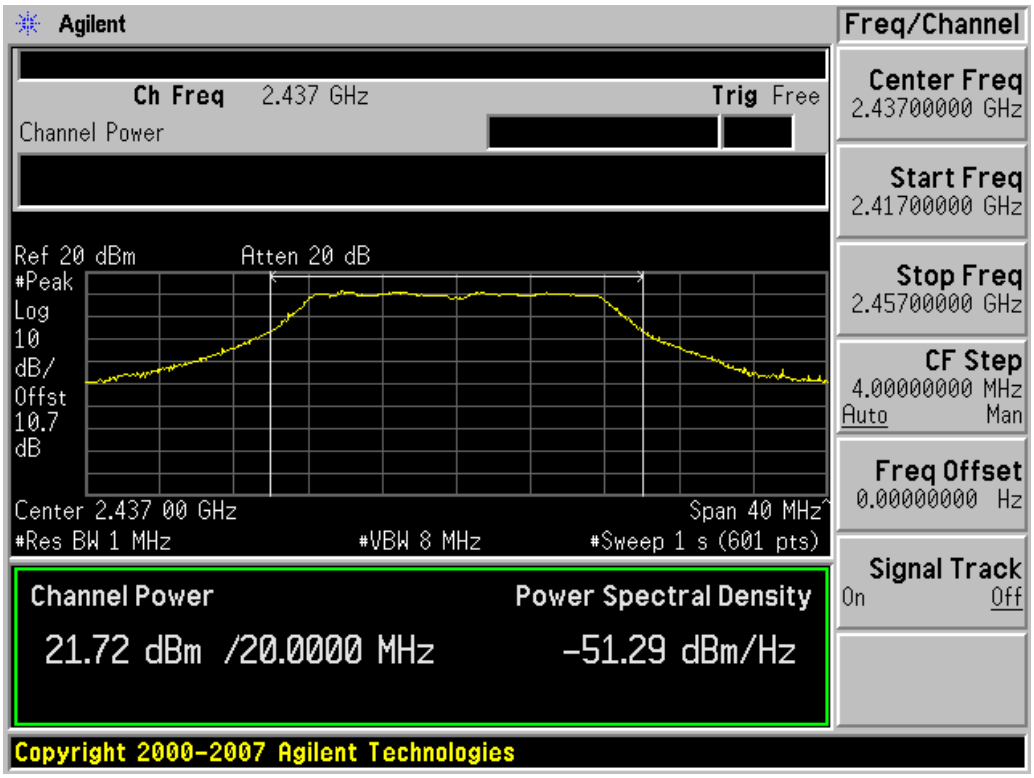
Conducted Output Power (802.11g-CH 6) 18Mbps



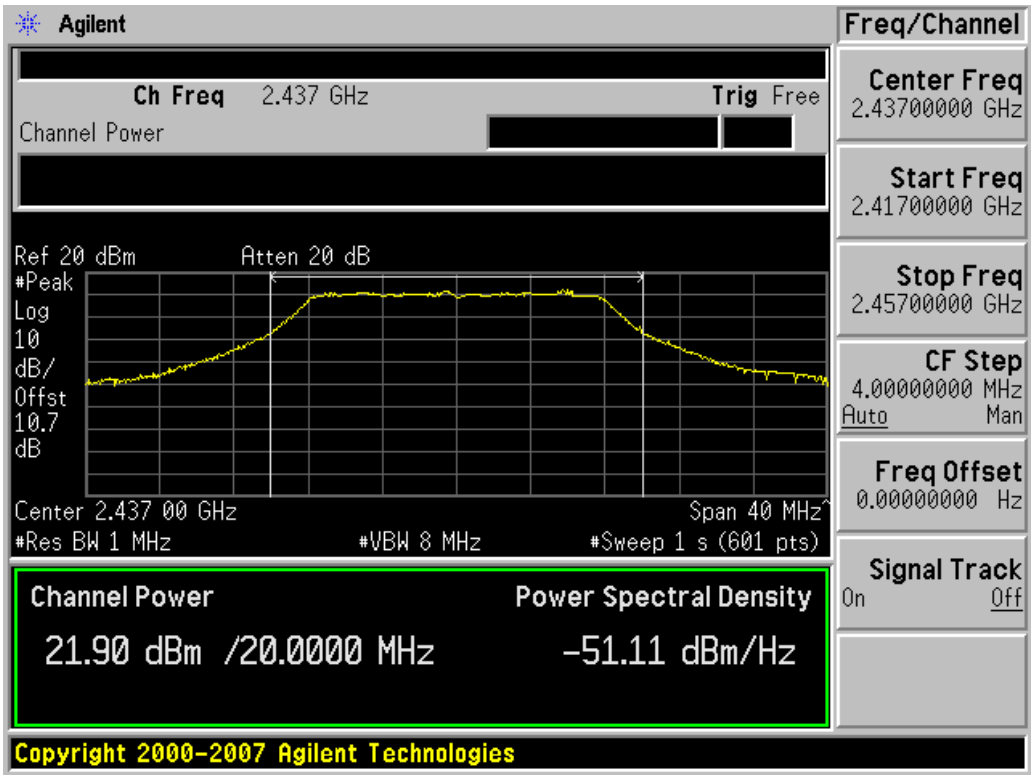
Conducted Output Power (802.11g-CH 6) 24Mbps



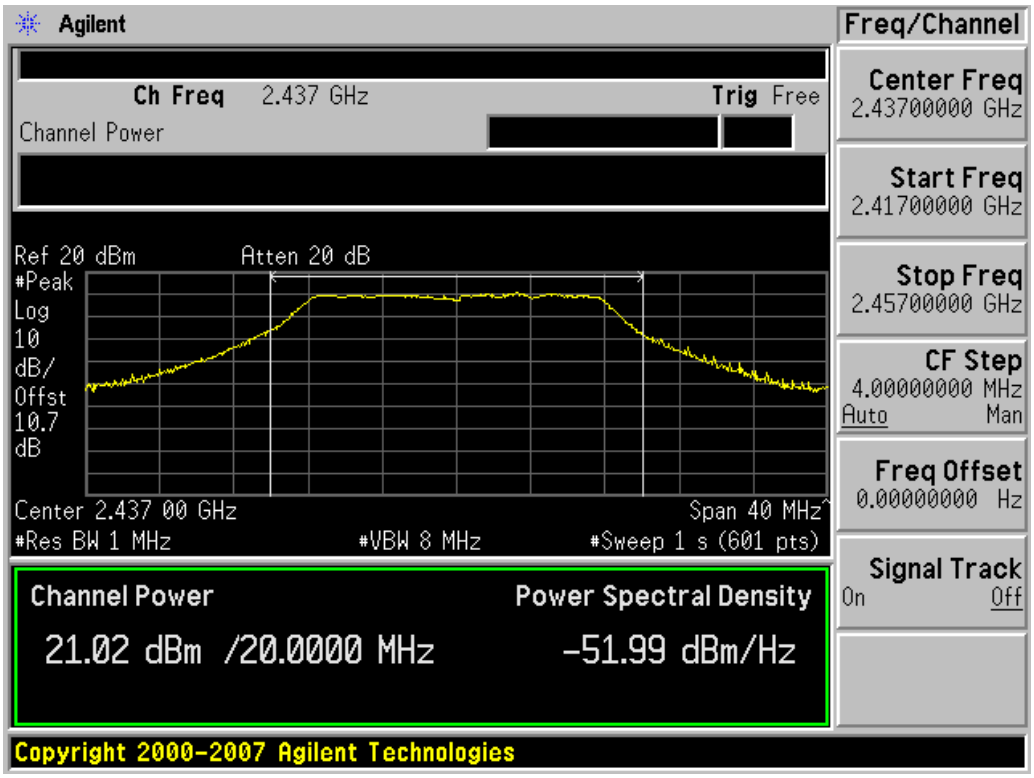
Conducted Output Power (802.11g-CH 6) 36Mbps



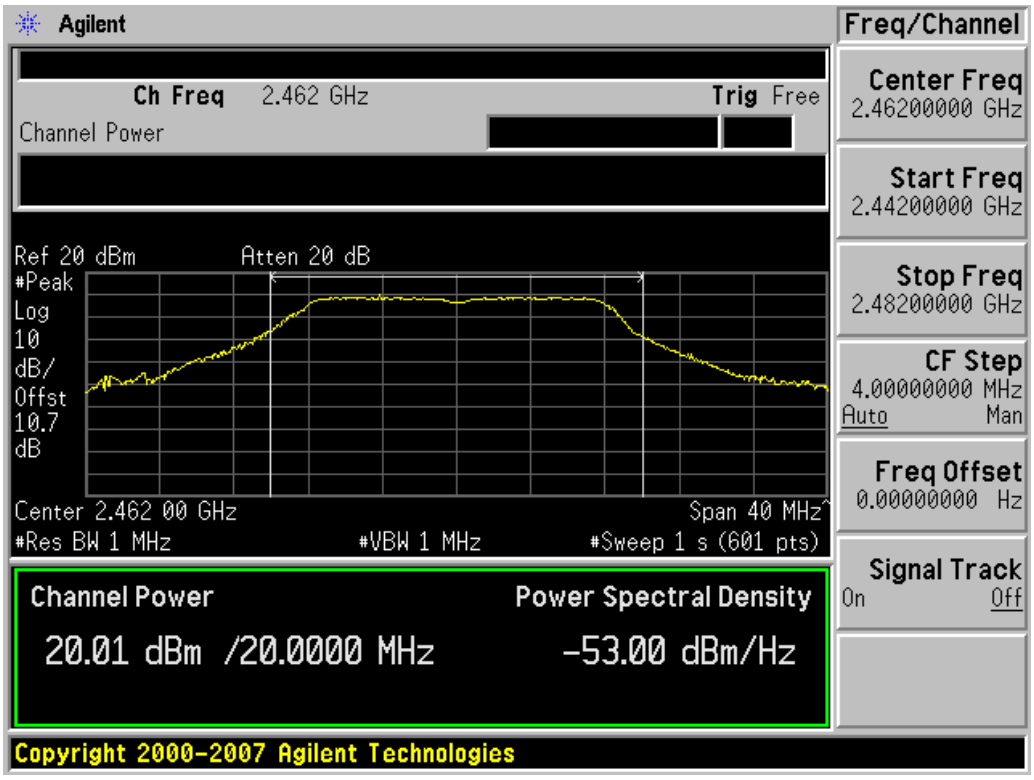
Conducted Output Power (802.11g-CH 6) 48Mbps



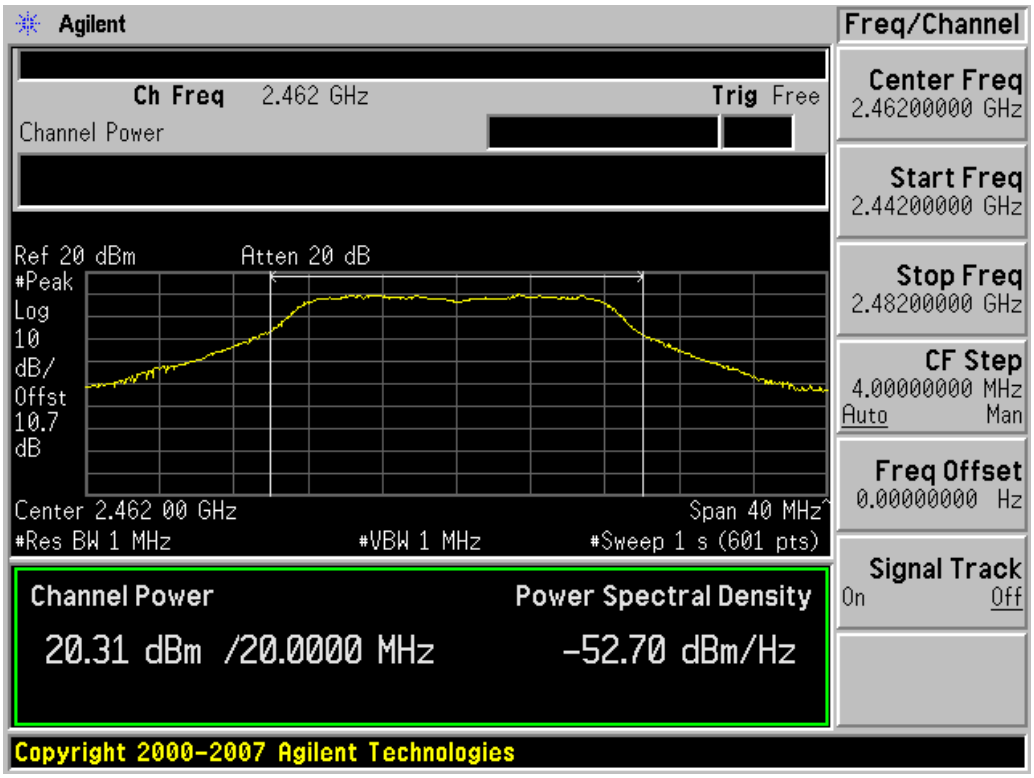
Conducted Output Power (802.11g-CH 6) 54Mbps



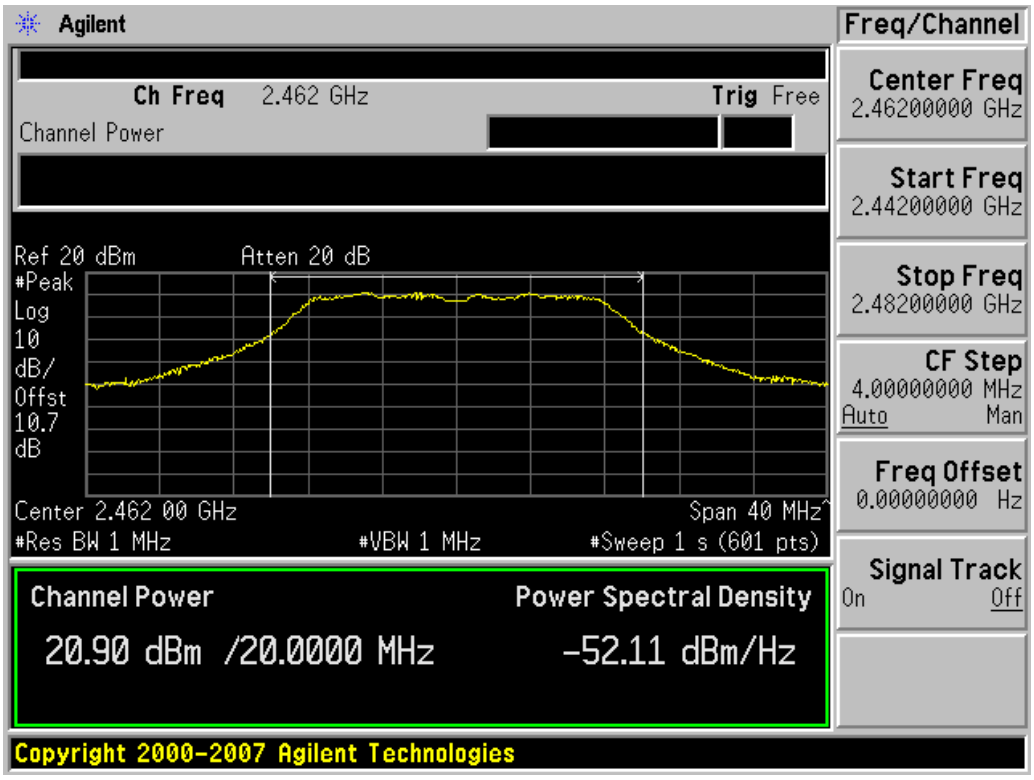
Conducted Output Power (802.11g-CH 11) 6Mbps



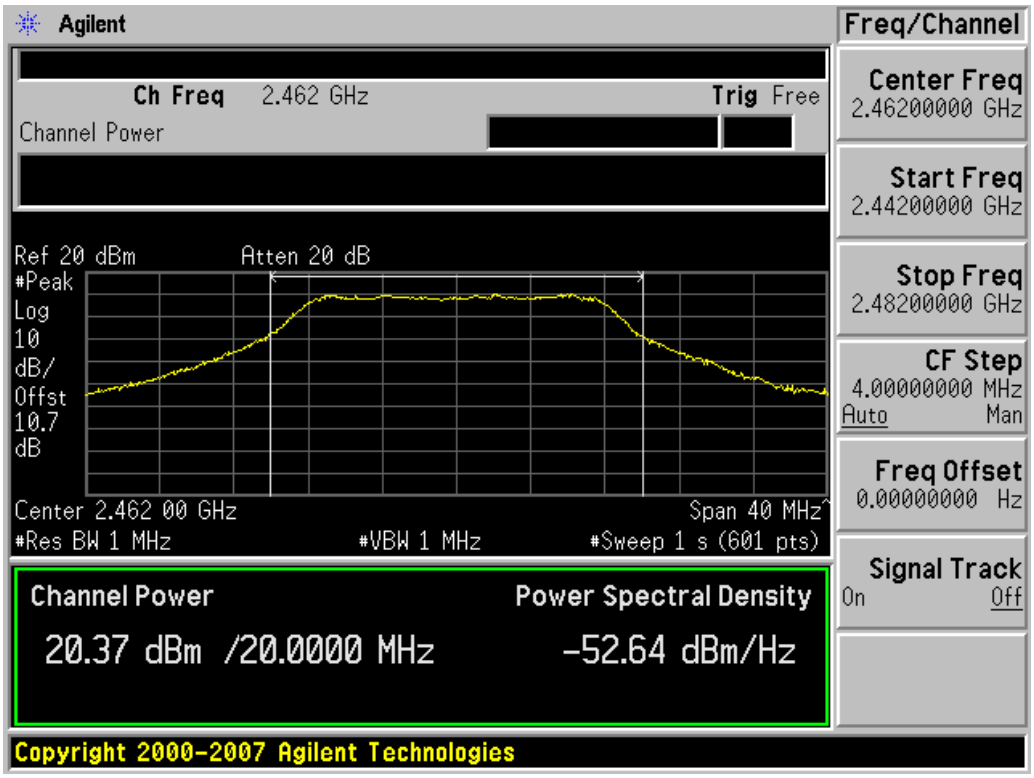
Conducted Output Power (802.11g-CH 11) 9Mbps



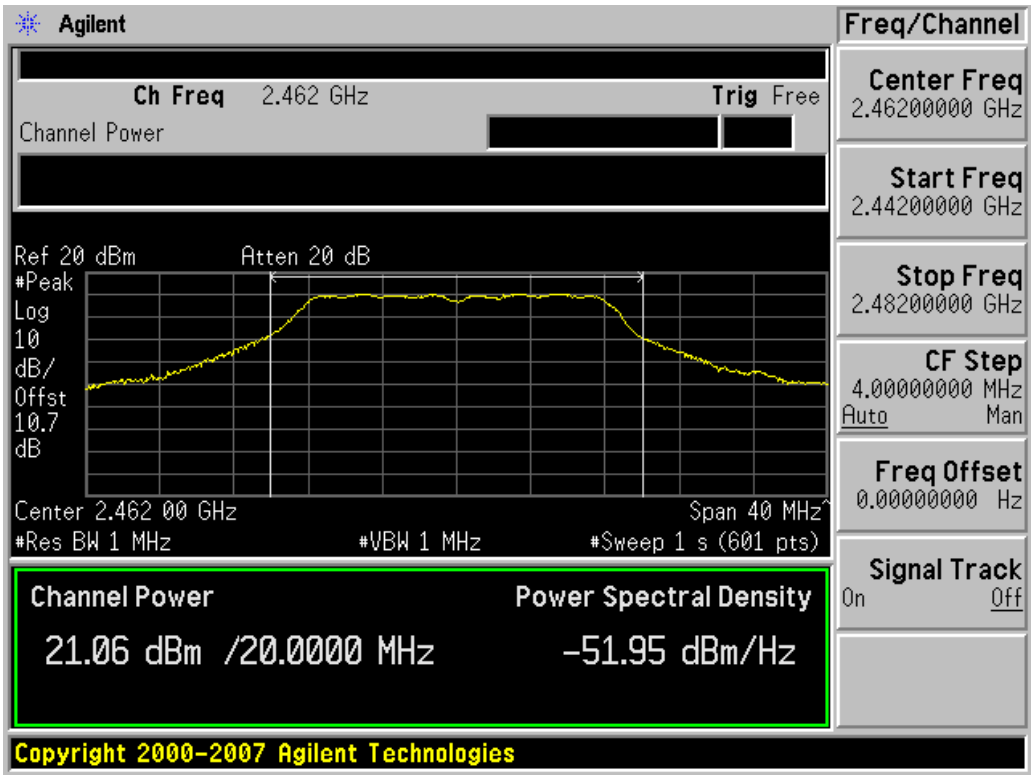
Conducted Output Power (802.11g-CH 11) 12Mbps



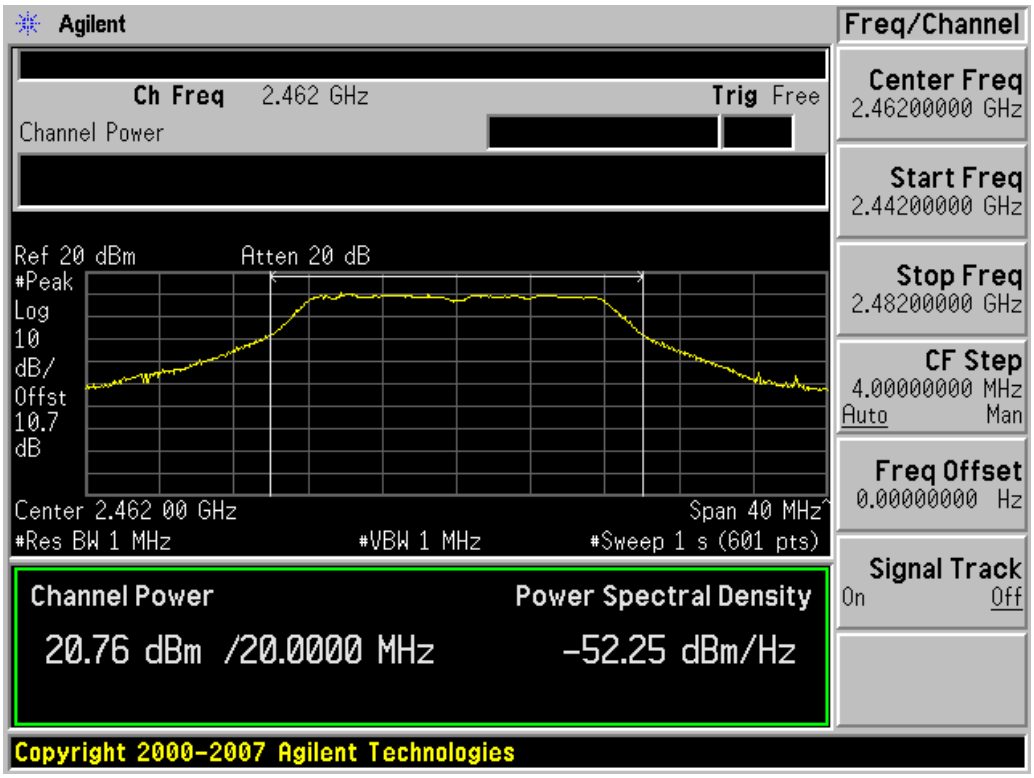
Conducted Output Power (802.11g-CH 11) 18Mbps



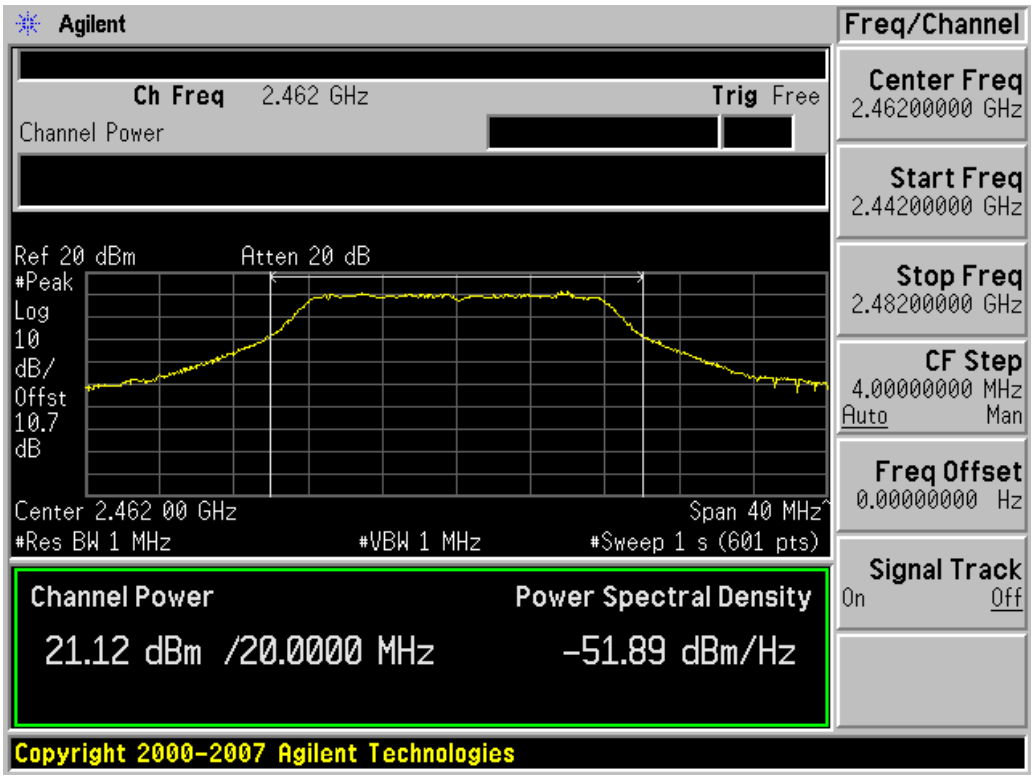
Conducted Output Power (802.11g-CH 11) 24Mbps



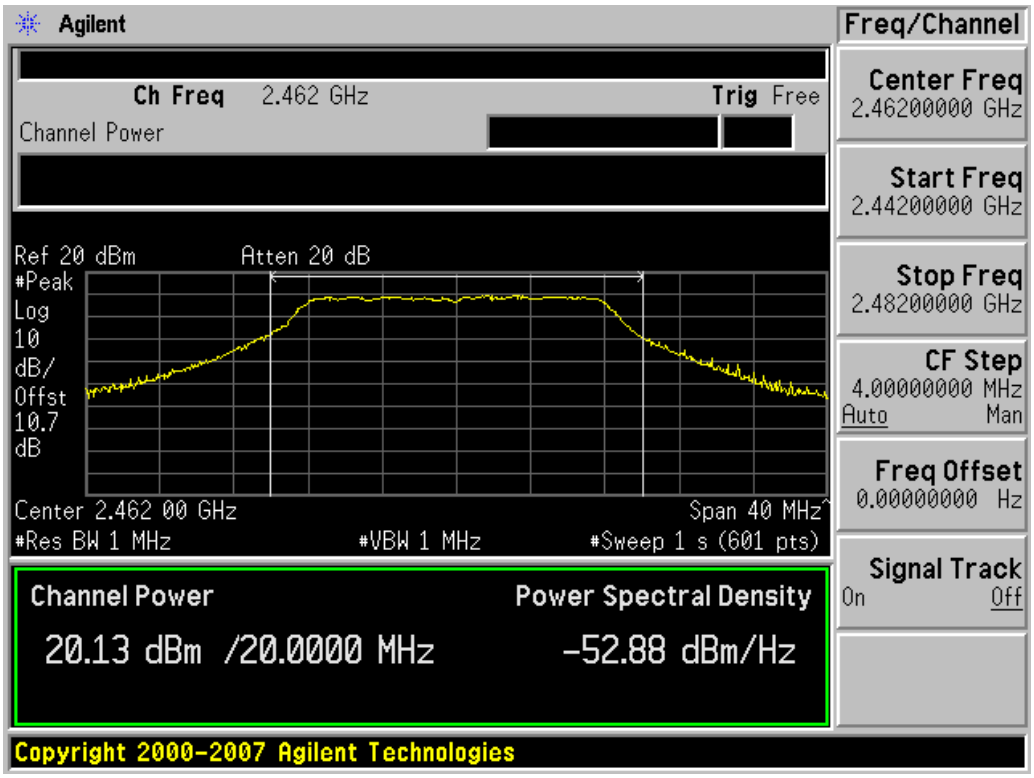
Conducted Output Power (802.11g-CH 11) 36Mbps



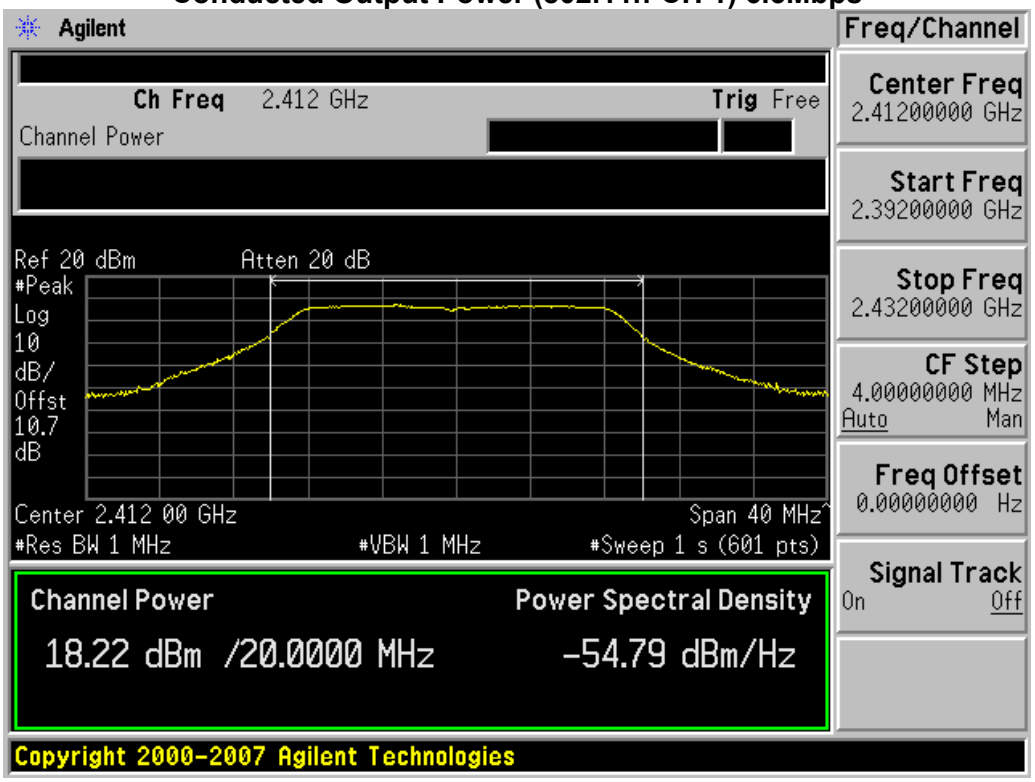
Conducted Output Power (802.11g-CH 11) 48Mbps



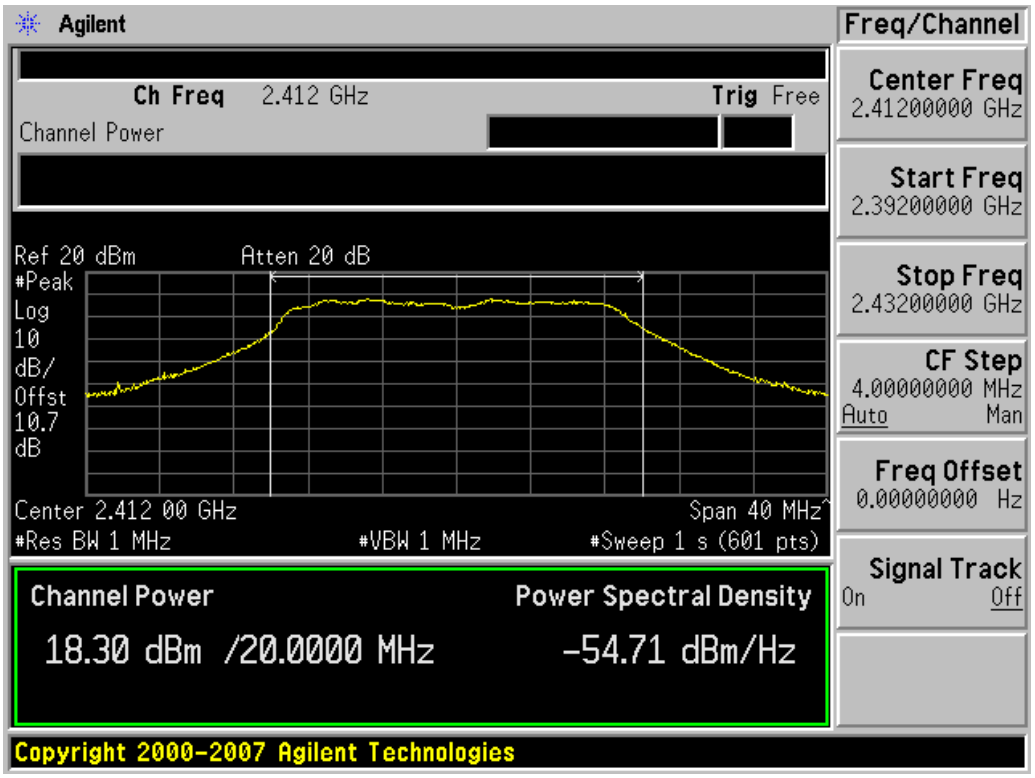
Conducted Output Power (802.11g-CH 11) 54Mbps



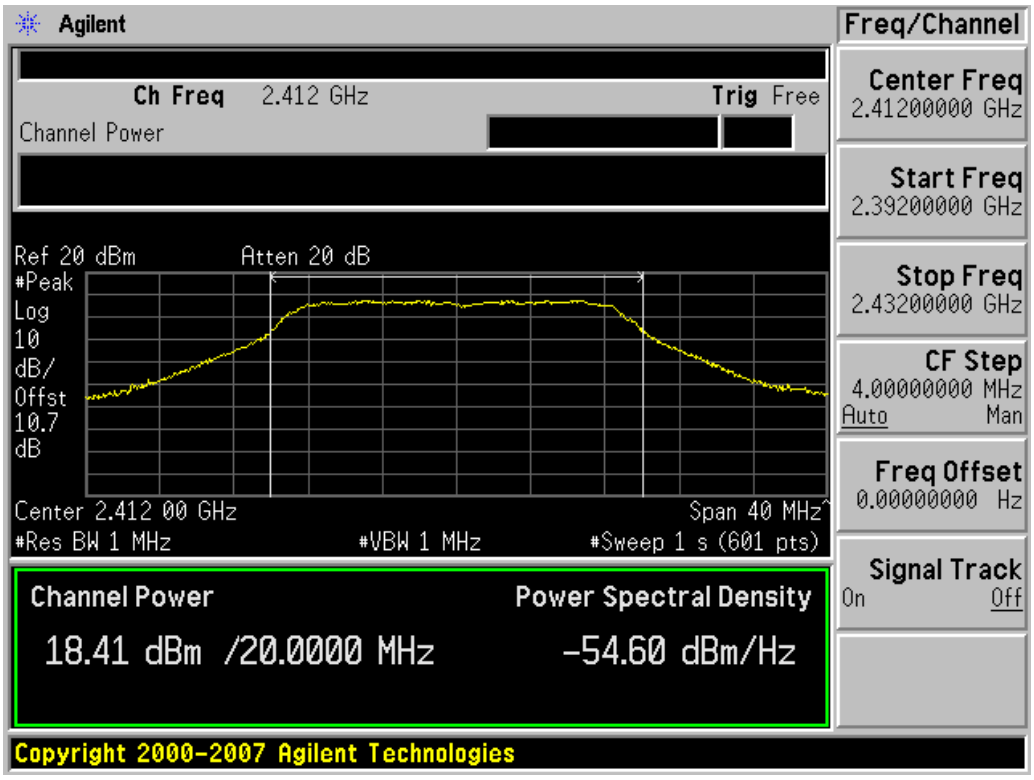
Conducted Output Power (802.11n-CH 1) 6.5Mbps



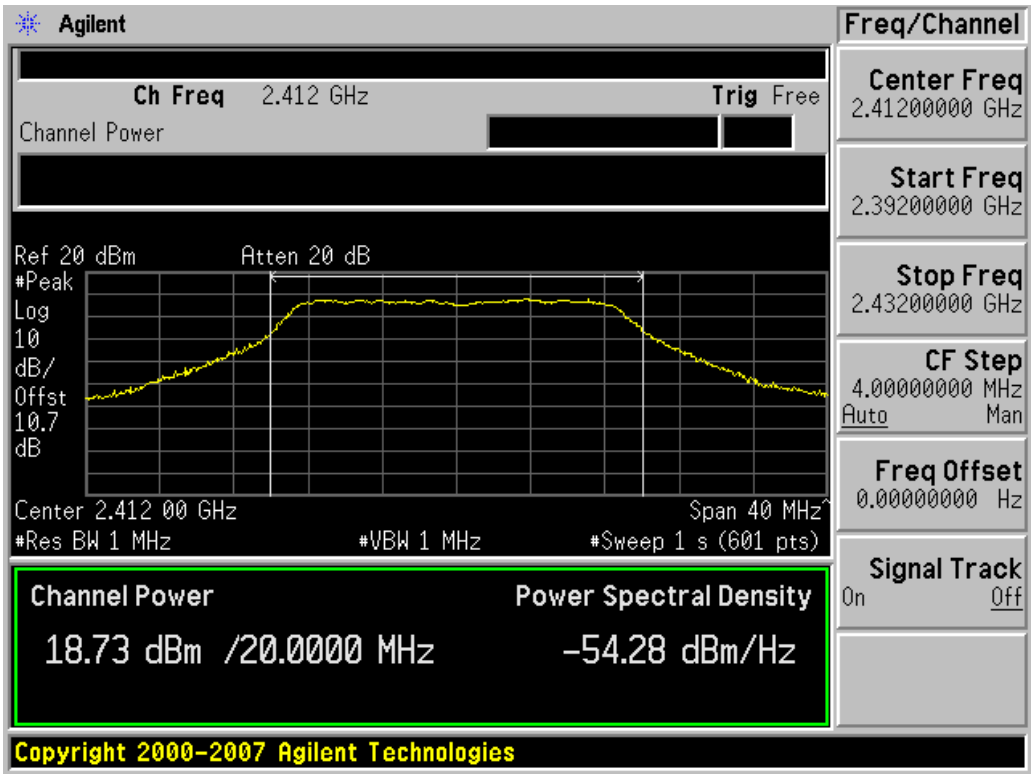
Conducted Output Power (802.11n-CH 1) 13Mbps



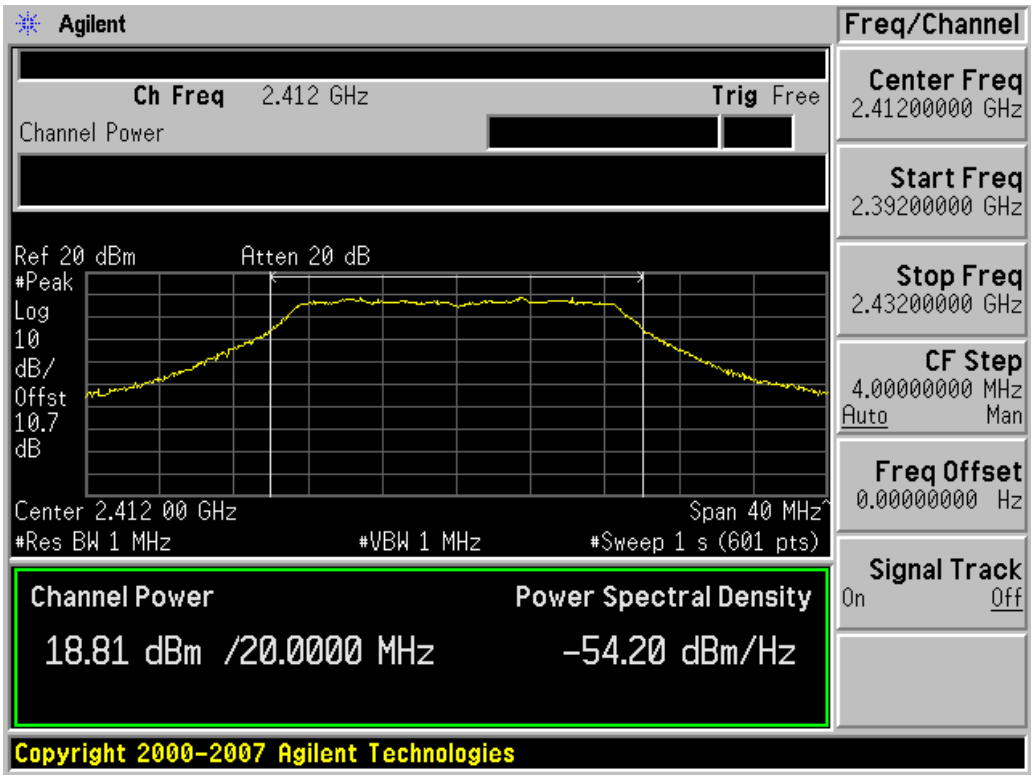
Conducted Output Power (802.11n-CH 1) 19.5Mbps



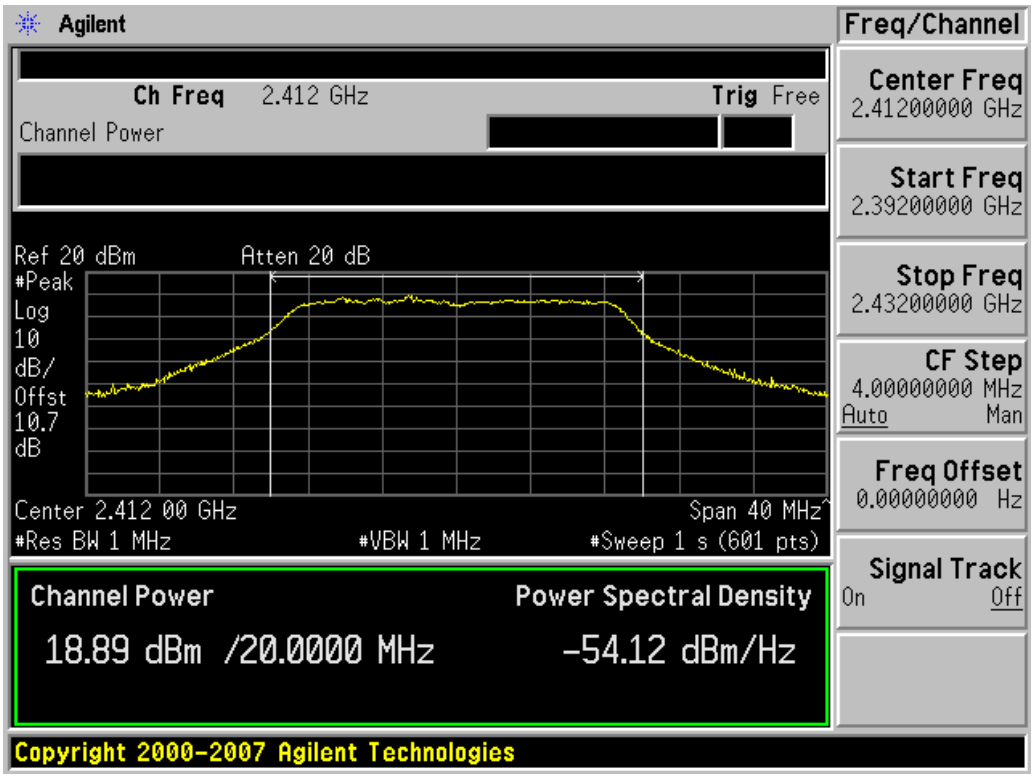
Conducted Output Power (802.11n-CH 1) 26Mbps



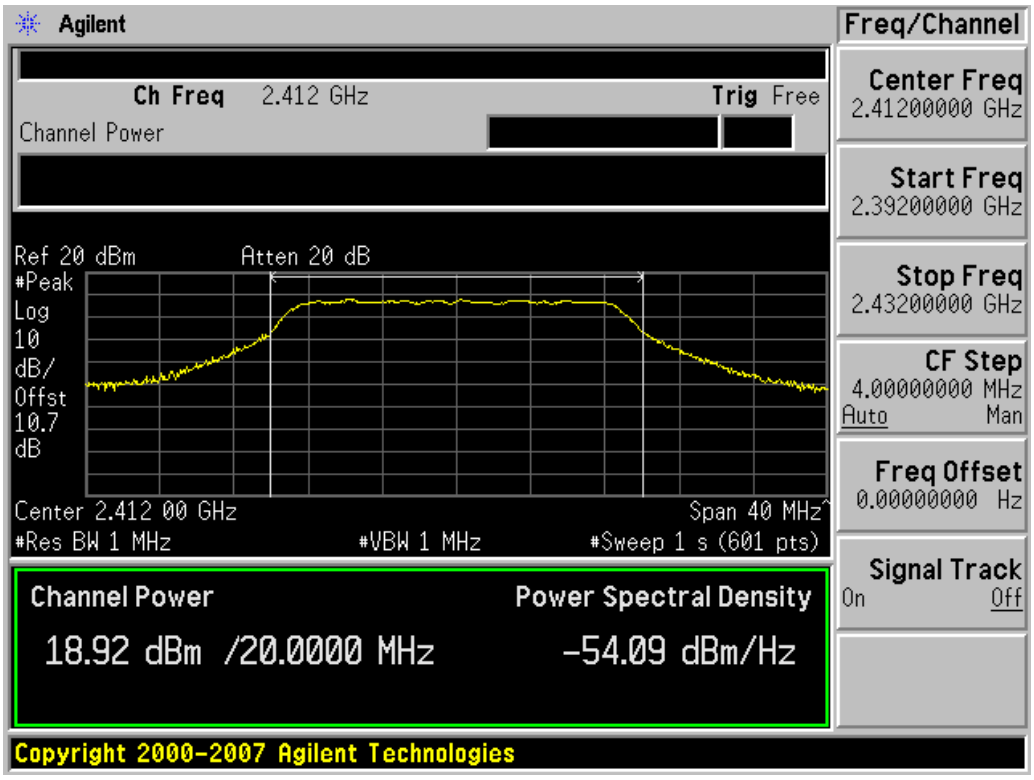
Conducted Output Power (802.11n-CH 1) 39Mbps



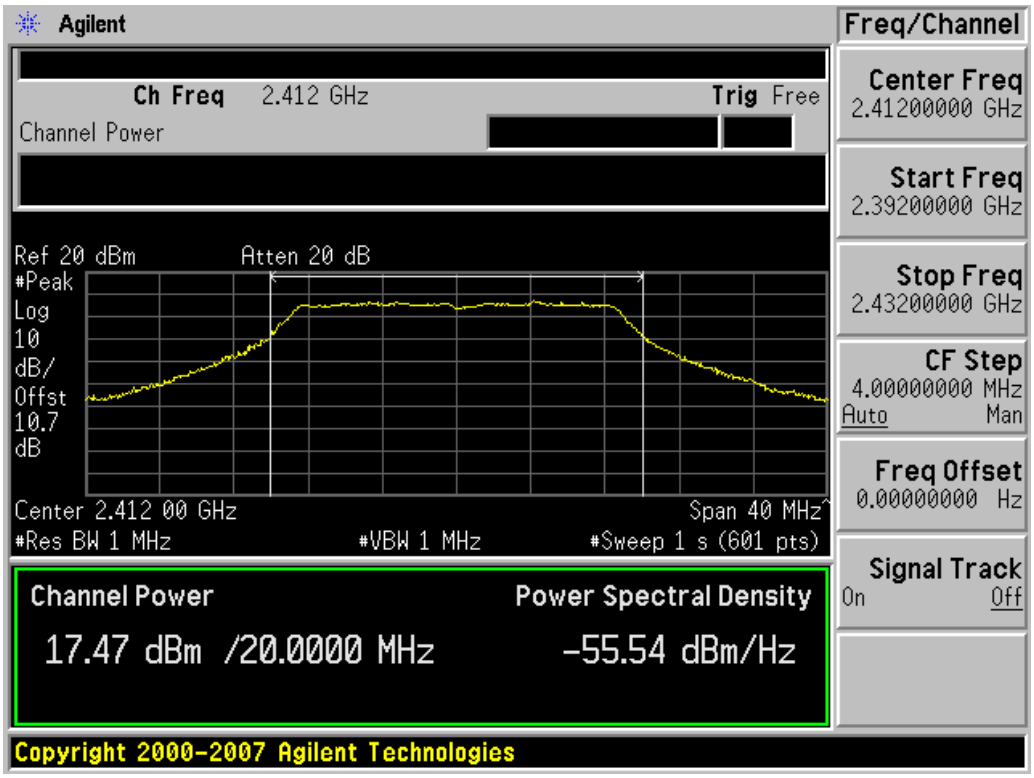
Conducted Output Power (802.11n-CH 1) 52Mbps



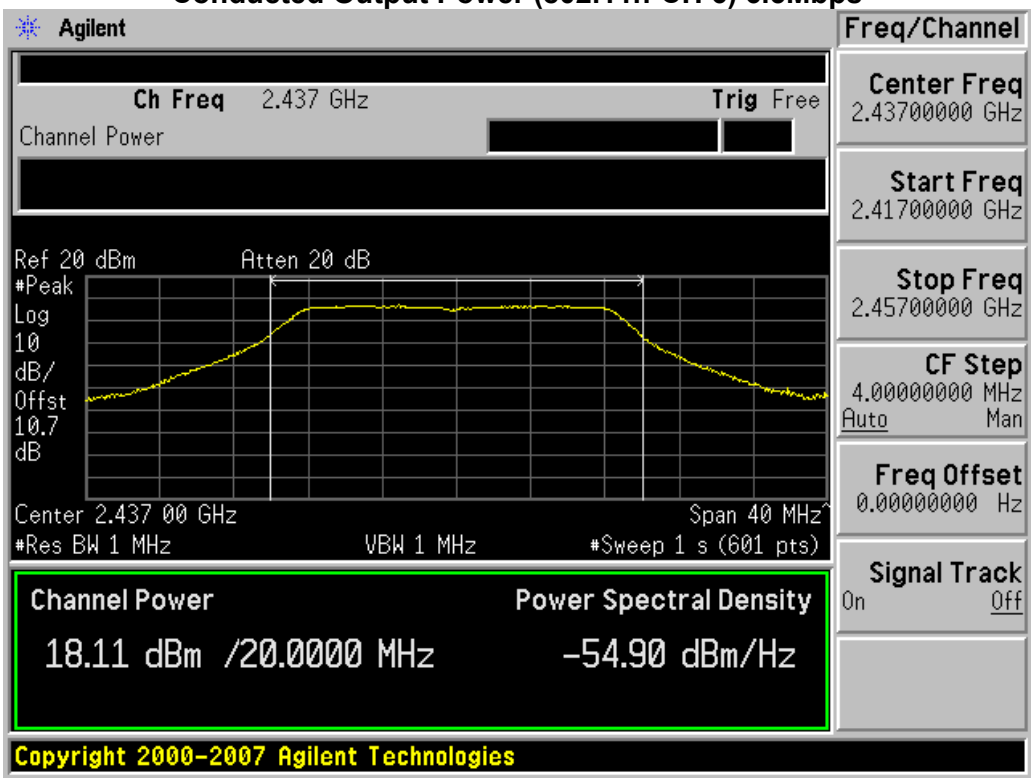
Conducted Output Power (802.11n-CH 1) 58.5Mbps



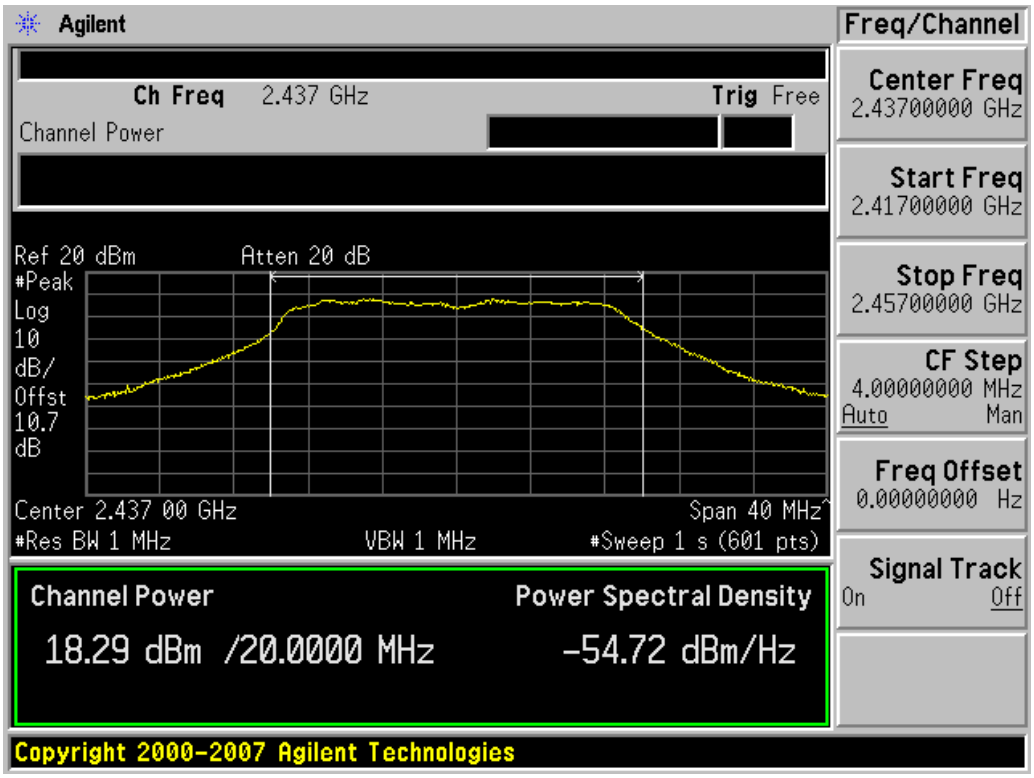
Conducted Output Power (802.11n-CH 1) 65Mbps



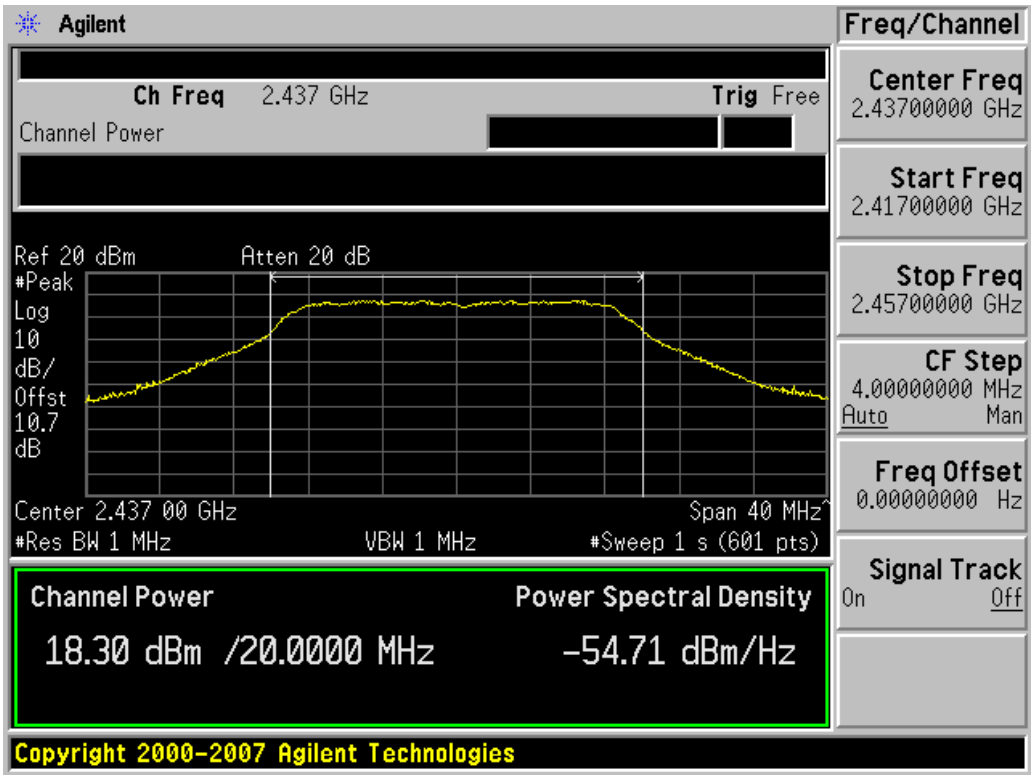
Conducted Output Power (802.11n-CH 6) 6.5Mbps



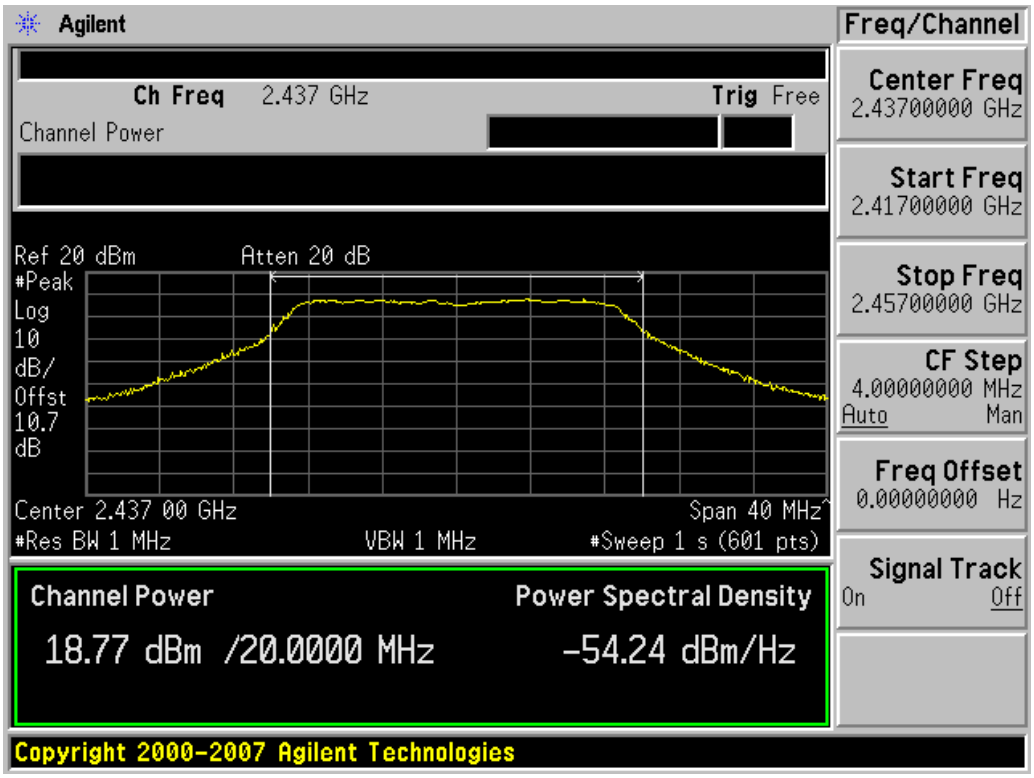
Conducted Output Power (802.11n-CH 6) 13Mbps



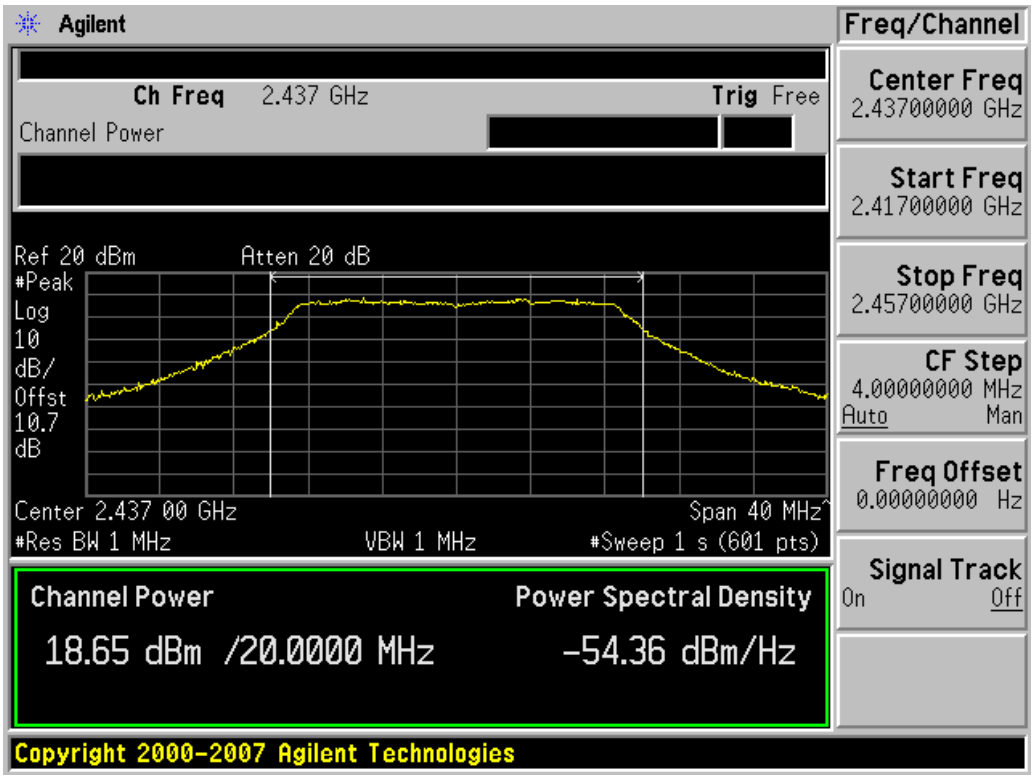
Conducted Output Power (802.11n-CH 6) 19.5Mbps



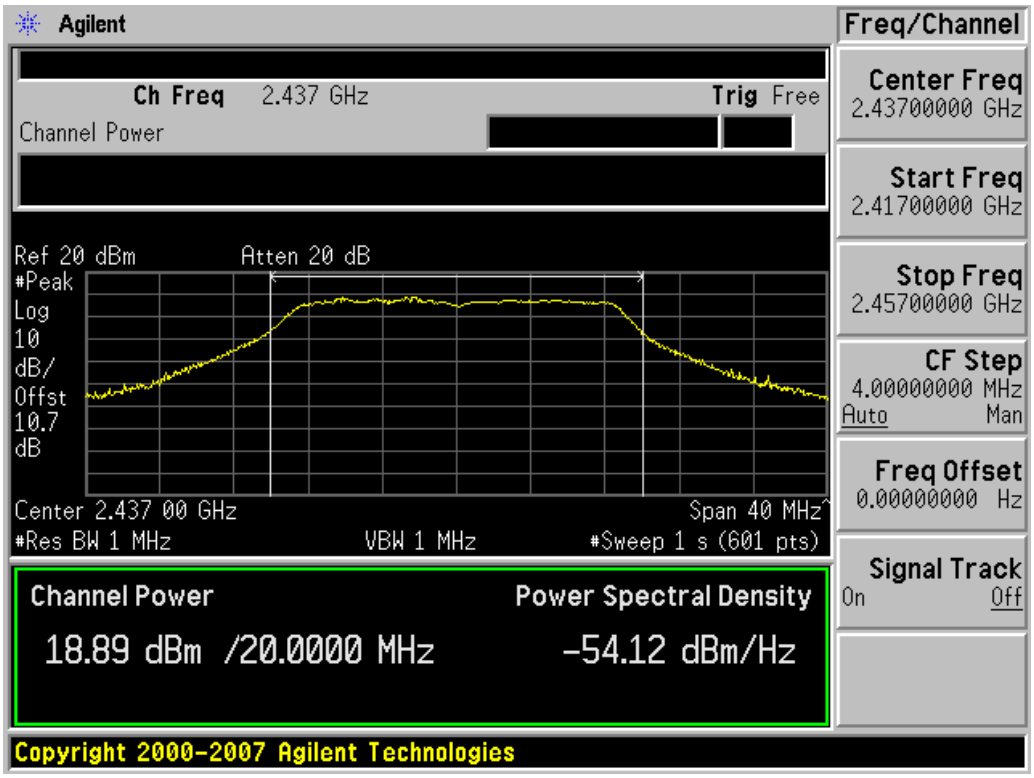
Conducted Output Power (802.11n-CH 6) 26Mbps



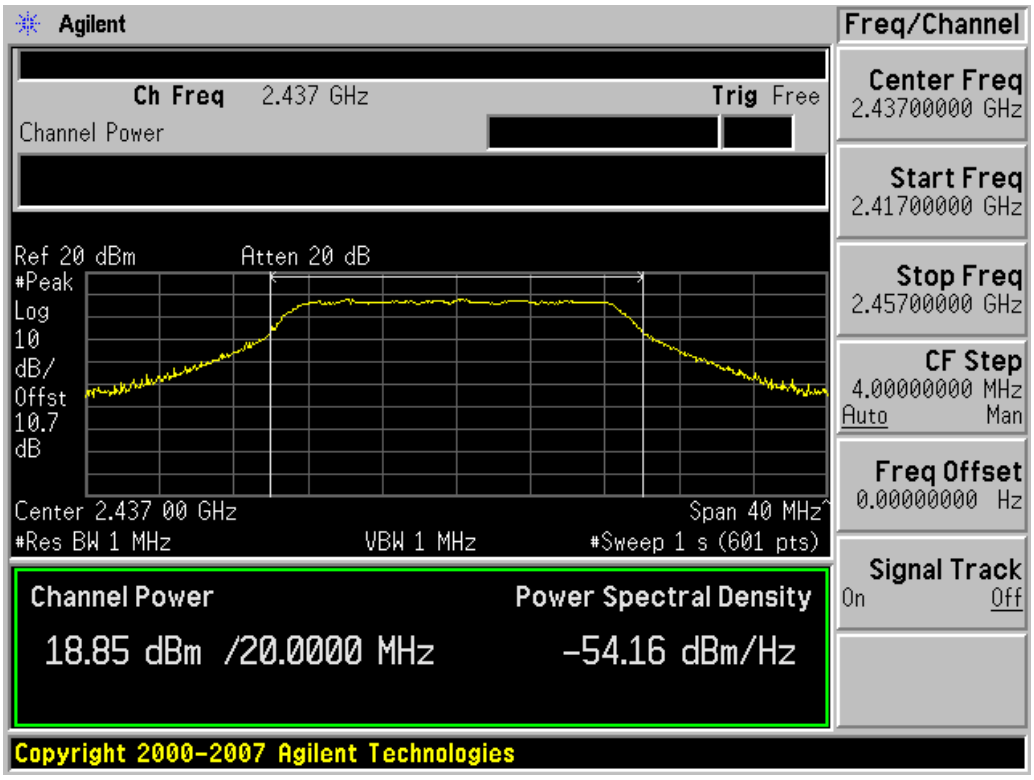
Conducted Output Power (802.11n-CH 6) 39Mbps



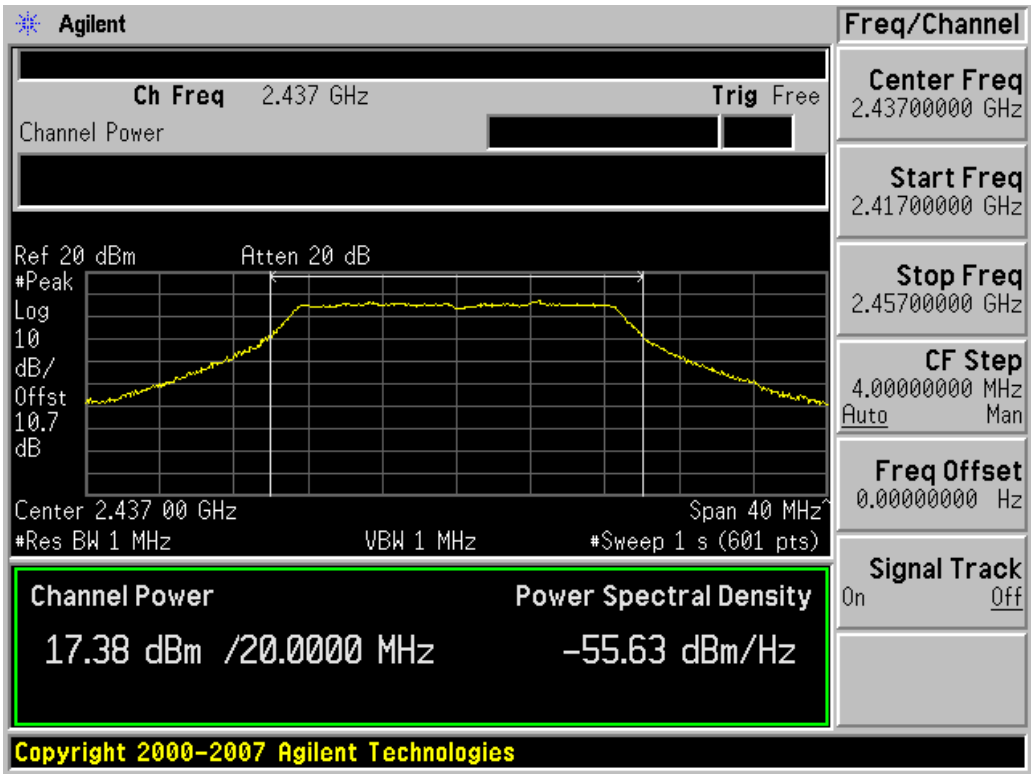
Conducted Output Power (802.11n-CH 6) 52Mbps



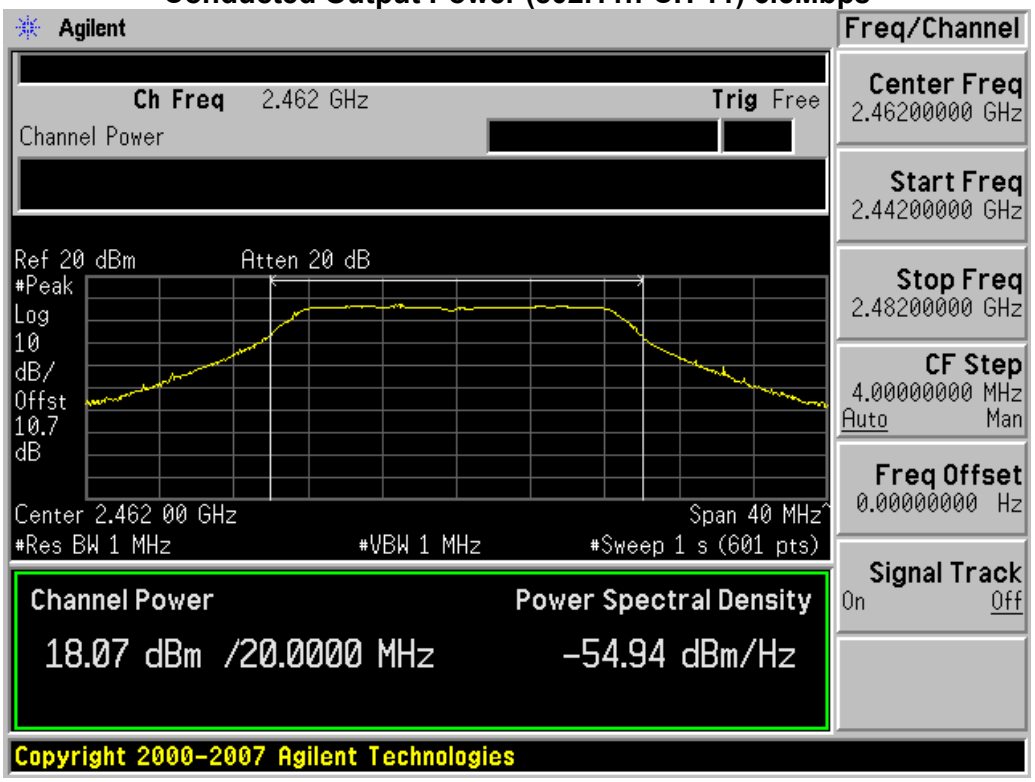
Conducted Output Power (802.11n-CH 6) 58.5Mbps



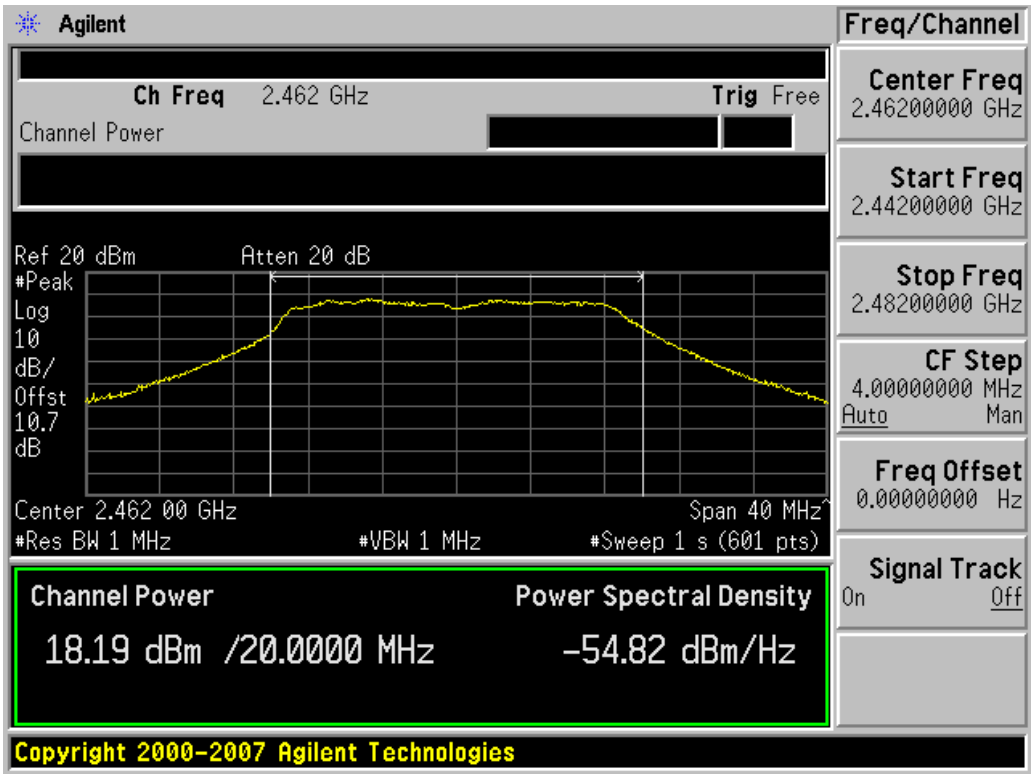
Conducted Output Power (802.11n-CH 6) 65Mbps



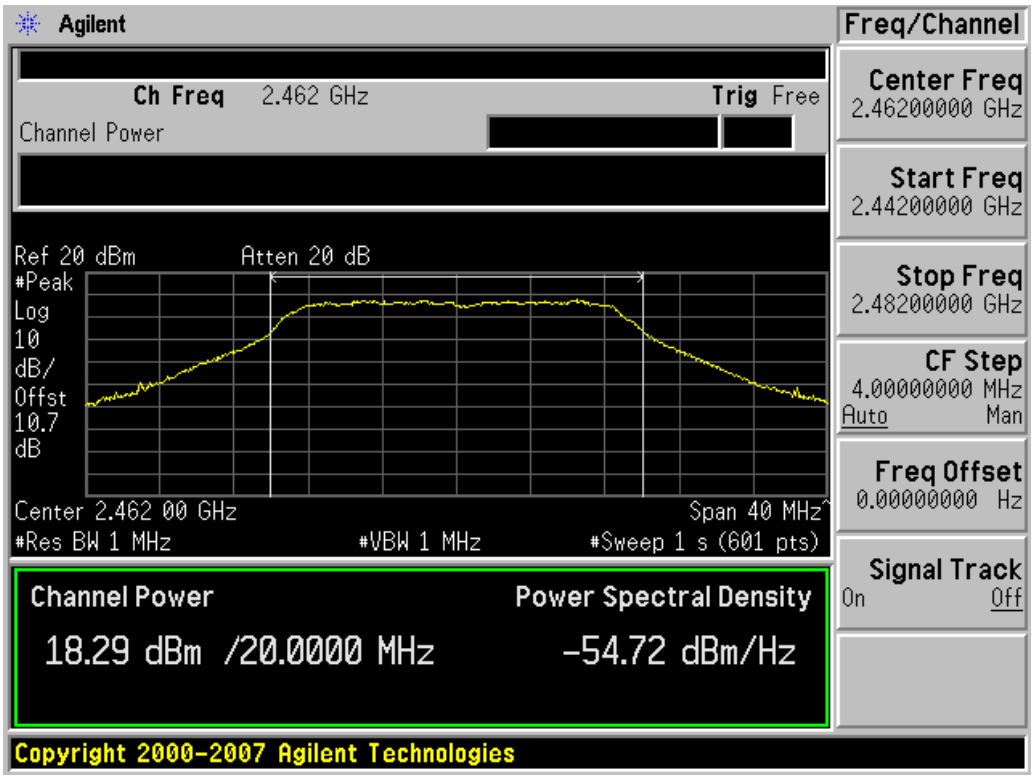
Conducted Output Power (802.11n-CH 11) 6.5Mbps



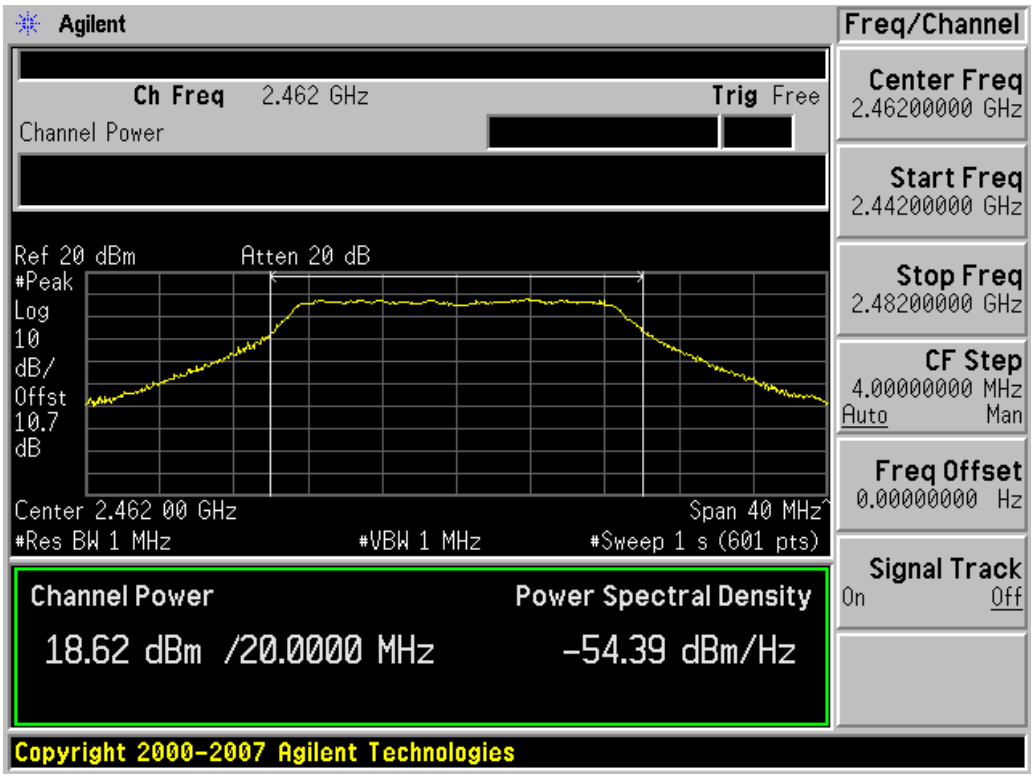
Conducted Output Power (802.11n-CH 11) 13Mbps



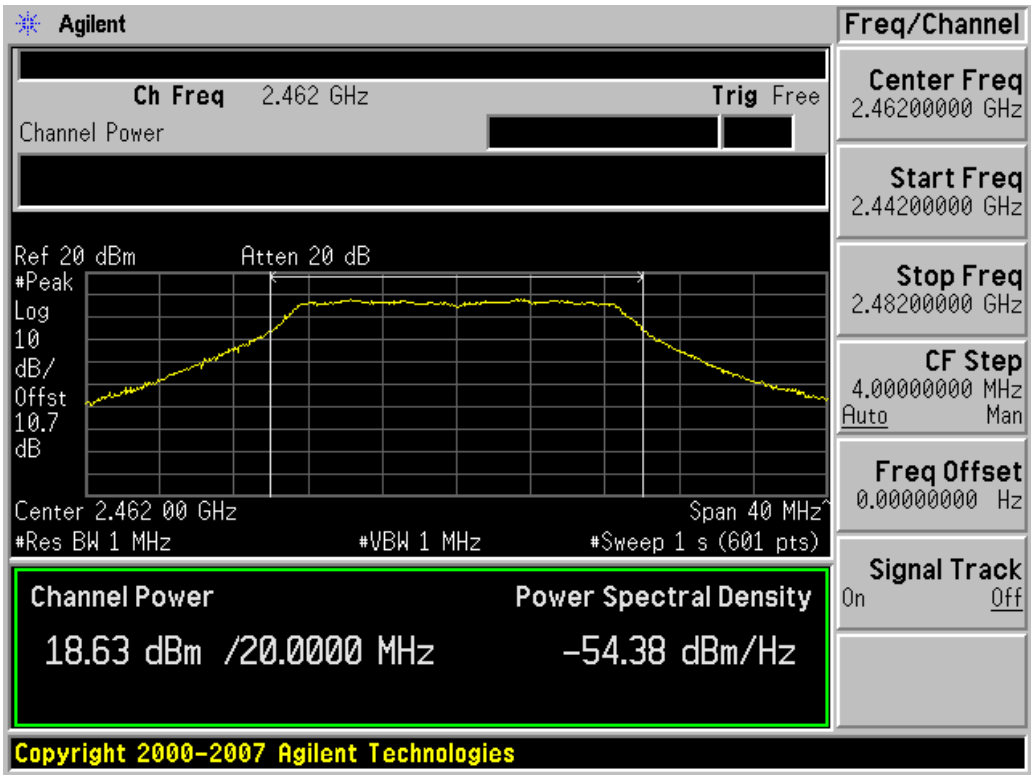
Conducted Output Power (802.11n-CH 11) 19.5Mbps



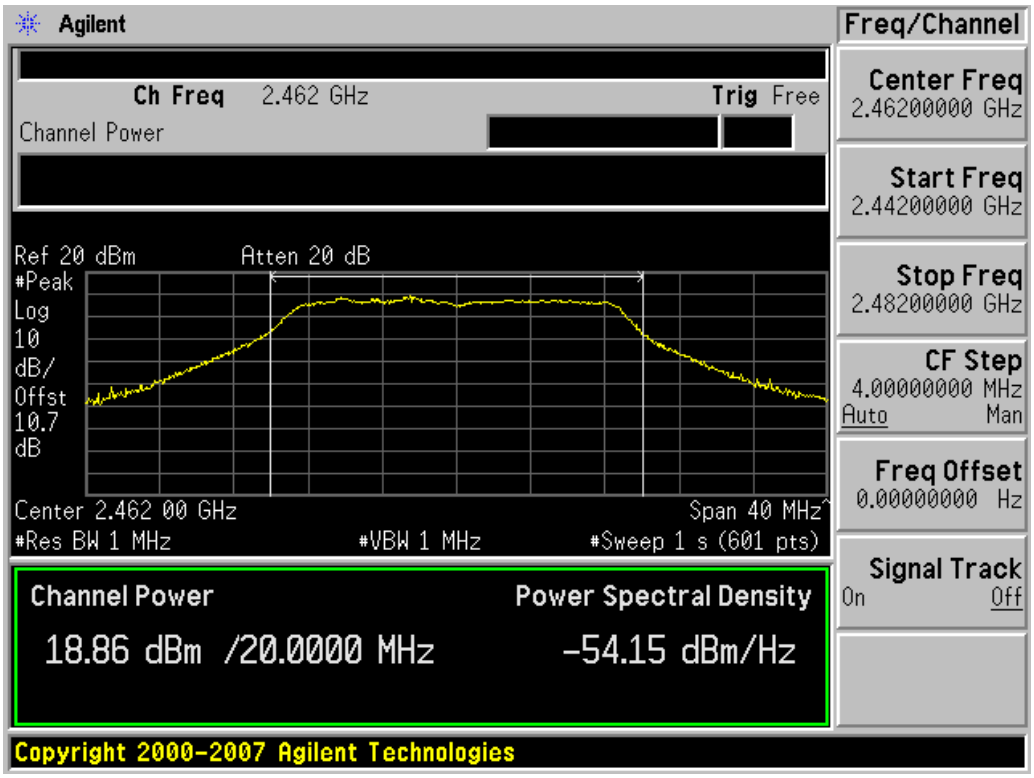
Conducted Output Power (802.11n-CH 11) 26Mbps



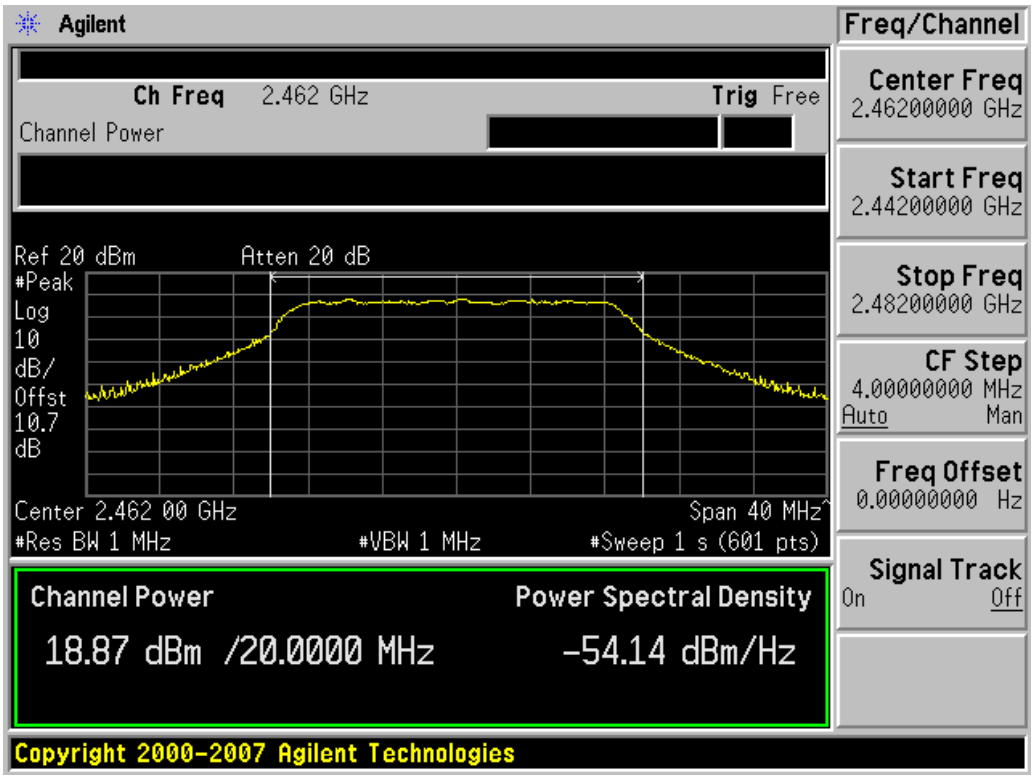
Conducted Output Power (802.11n-CH 11) 39Mbps



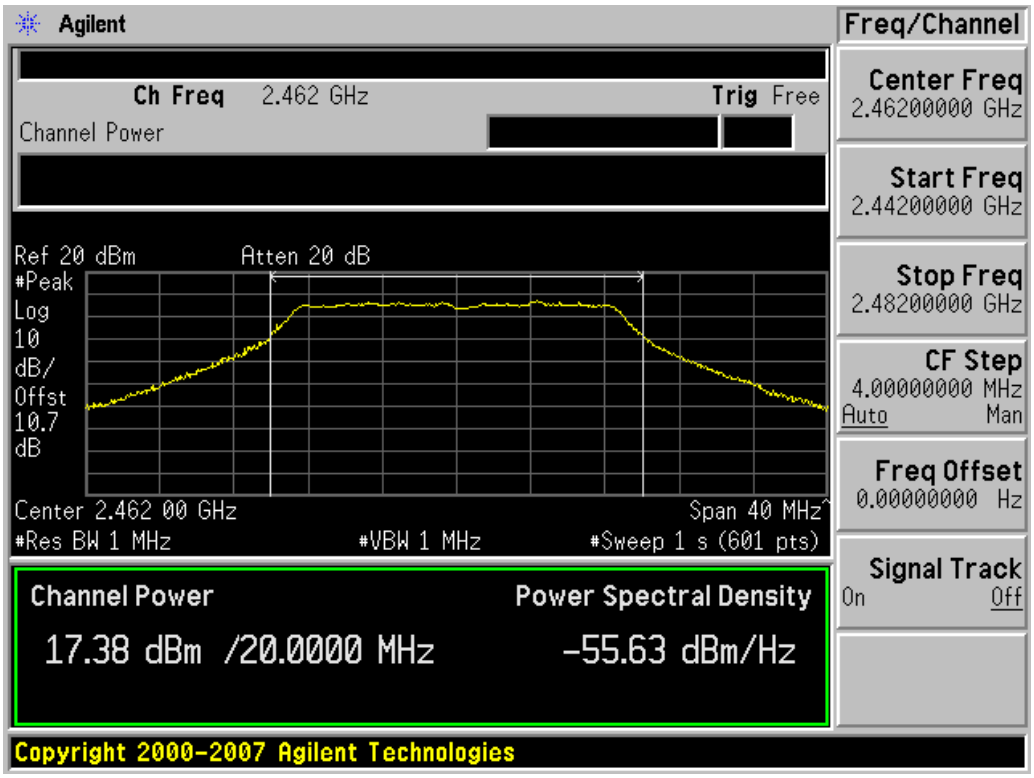
Conducted Output Power (802.11n-CH 11) 52Mbps



Conducted Output Power (802.11n-CH 11) 58.5Mbps



Conducted Output Power (802.11n-CH 11) 65Mbps



5745 MHz ~ 5825 MHz

Conducted Output Power (802.11a-CH 149) 6 Mbps

Conducted Output Power (802.11a-CH 149) 9 Mbps

Conducted Output Power (802.11a-CH 149) 12 Mbps

Conducted Output Power (802.11a-CH 149) 18 Mbps

Conducted Output Power (802.11a-CH 149) 24 Mbps

Conducted Output Power (802.11a-CH 149) 36 Mbps

Conducted Output Power (802.11a-CH 149) 48 Mbps

Conducted Output Power (802.11a-CH 149) 54 Mbps

Conducted Output Power (802.11a-CH 157) 6 Mbps

Conducted Output Power (802.11a-CH 157) 9 Mbps

Conducted Output Power (802.11a-CH 157) 12 Mbps

Conducted Output Power (802.11a-CH 157) 18 Mbps

Conducted Output Power (802.11a-CH 157) 24 Mbps

Conducted Output Power (802.11a-CH 157) 36 Mbps