

HCT CO., LTD.

CERTIFICATE OF COMPLIANCE FCC Certification

Applicant Name:

LG Electronics Inc.

Address:

 60-39, Gasan-dong, Gumchon-gu,
Seoul 153-023, Korea

Date of Issue:

December 14, 2010

Test Site/Location:

HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea(Lab)

Report No.: HCTR1012FR08-1

HCT FRN: 0005866421

IC Recognition No.: 5944A-2

FCC ID: BEJP990

APPLICANT: LG Electronics Inc.

FCC Model(s): LG-P990

FCC Additional Model(s): P990

EUT Type: Cellular/PCS GSM/EDGE and PCS WCDMA with Bluetooth & WLAN

Max. RF Output Power: Wi-Fi 802.11b(22.32 dBm) / Wi-Fi 802.11g (20.79 dBm) / Wi-Fi 802.11n (19.67 dBm)

Frequency Range: 2412-2462 MHz

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)


Report prepared by
: Jong Seok Lee

Test engineer of RF Team

Approved by
: Sang Jun Lee

Manager of RF Team

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FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1012FR08	December 09, 2010	First Approval Report
HCTR1012FR08-1	December 14, 2010	Change of the EUT Type

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1. GENERAL INFORMATION

Applicant: LG Electronics Inc.
Address: 60-39, Gasan-dong, Gumchon-gu, Seoul 153-023, Korea

FCC ID: BEJP990
EUT Type: Cellular/PCS GSM/EDGE and PCS WCDMA with Bluetooth & WLAN
Model Name: LG-P990
Additional Model Name: P990
Date of Test: November 29, 2010 ~ December 06, 2010
Contact person: Name: Hyon Kyun, Kim
Phone #: +82-2-2033-1107
Fax #: +82-2-2033-1222
Place of Tests: HCT Co., Ltd.
Icheon-si, Kyunggi-Do, Korea(Lab) (IC Recognition No. : 5944A-2)

2. EUT DESCRIPTION

EUT Type	Cellular/PCS GSM/EDGE and PCS WCDMA with Bluetooth & WLAN
Model Name	LG-P990
Additional Model Name	P990
Power Supply	DC 3.7 V
Battery type	Li-ion Battery(Standard)
Frequency Range	TX: 2412 ~ 2462 MHz RX: 2412 ~ 2462 MHz
Max. RF Output Power:	Wi-Fi 802.11b(22.32 dBm) / Wi-Fi 802.11g (20.79 dBm)) / Wi-Fi 802.11n (19.67 dBm)
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11g, 802.11n)
Antenna Specification	Manufacturer: Mobitech Antenna type: Built-in Antenna Peak Gain : -1.20 dBi

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.

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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 June 10, 2009 (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."

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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

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7. TEST RESULT

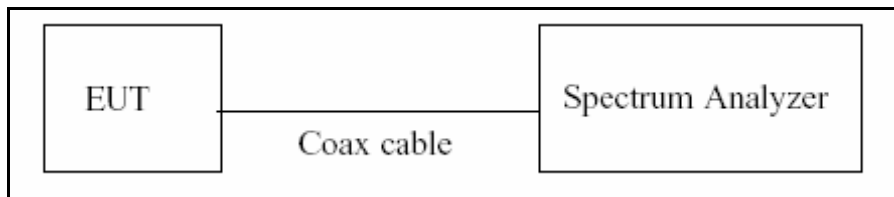
7.1 6dB BANDWIDTH MEASUREMENT (802.11b/g/n)

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	7.107	0.500	Pass
2437	6	7.137	0.500	Pass
2462	11	7.102	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

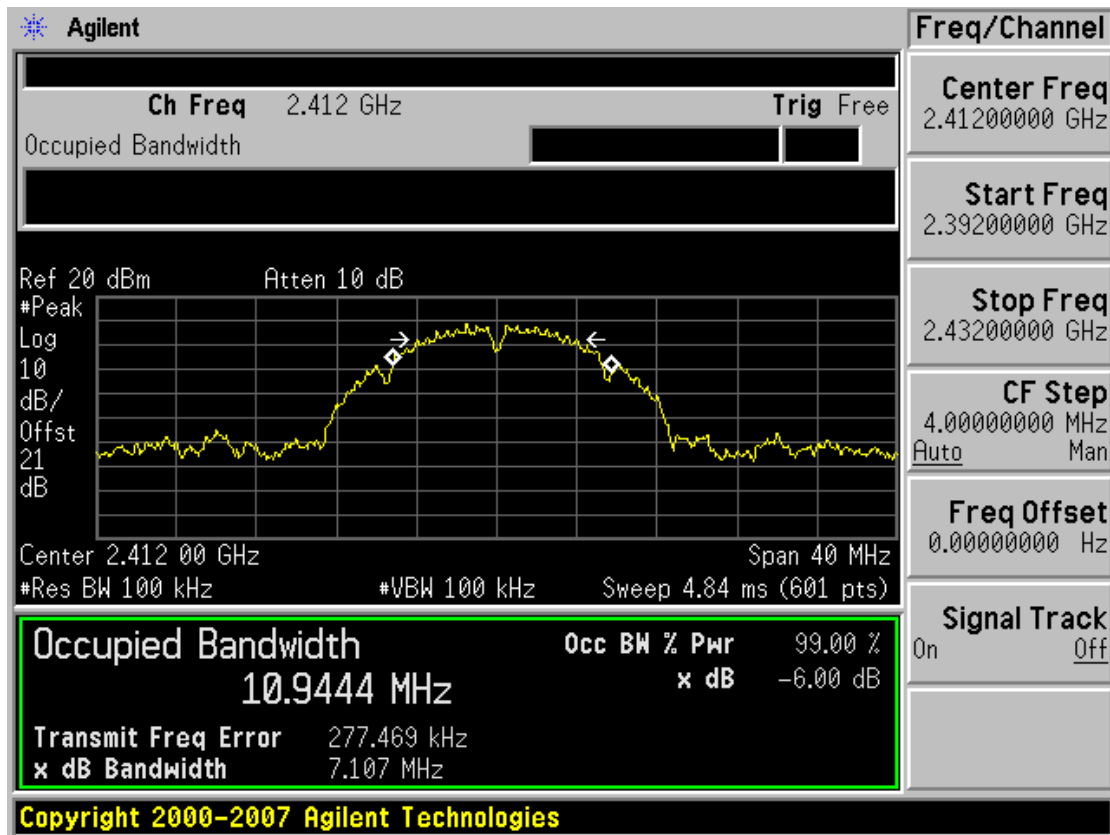
802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	15.181	0.500	Pass
2437	6	15.197	0.500	Pass
2462	11	15.079	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11n

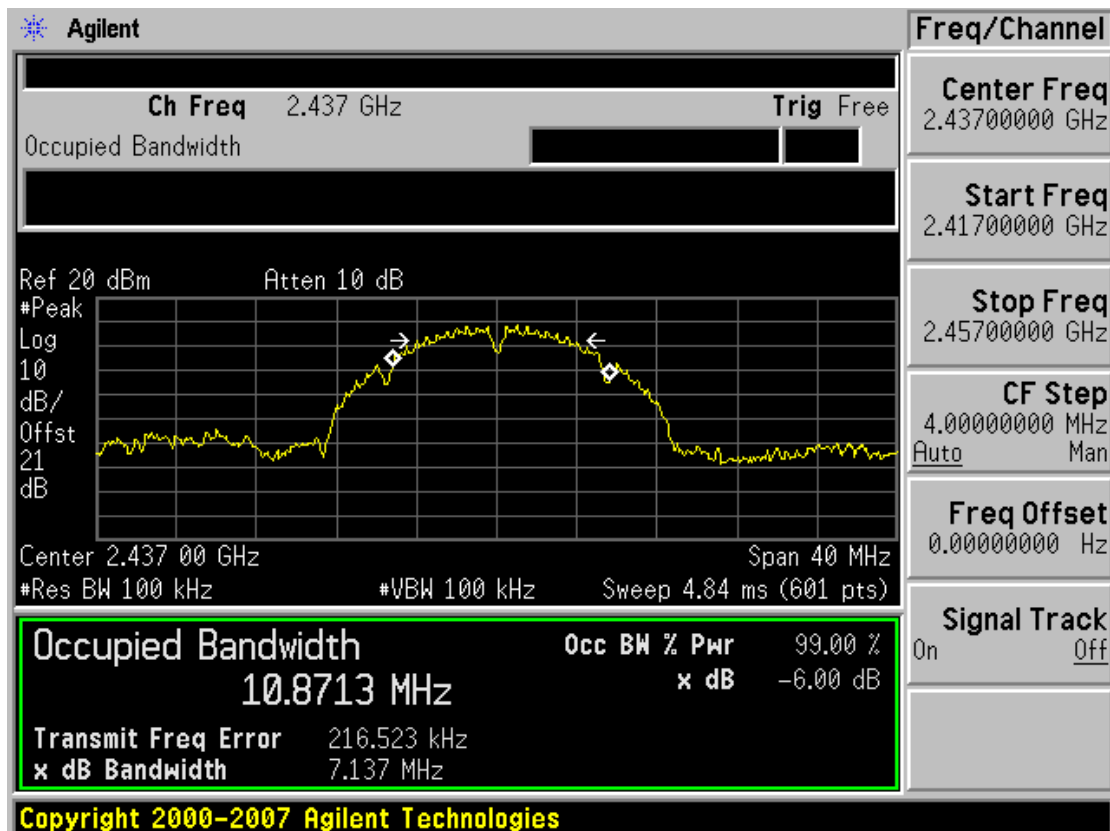
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	15.092	0.500	Pass
2437	6	15.151	0.500	Pass
2462	11	15.163	0.500	Pass

■ RESULT PLOTS

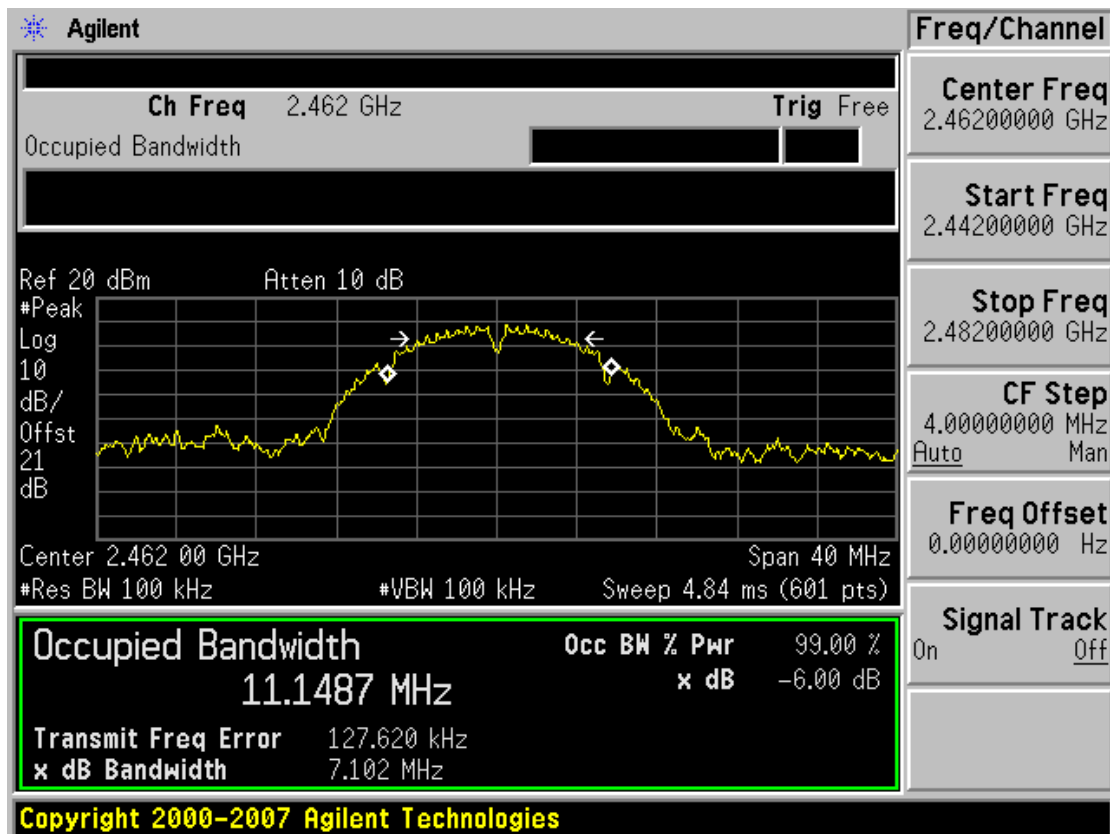
6dB Bandwidth plot (802.11b-CH 1)



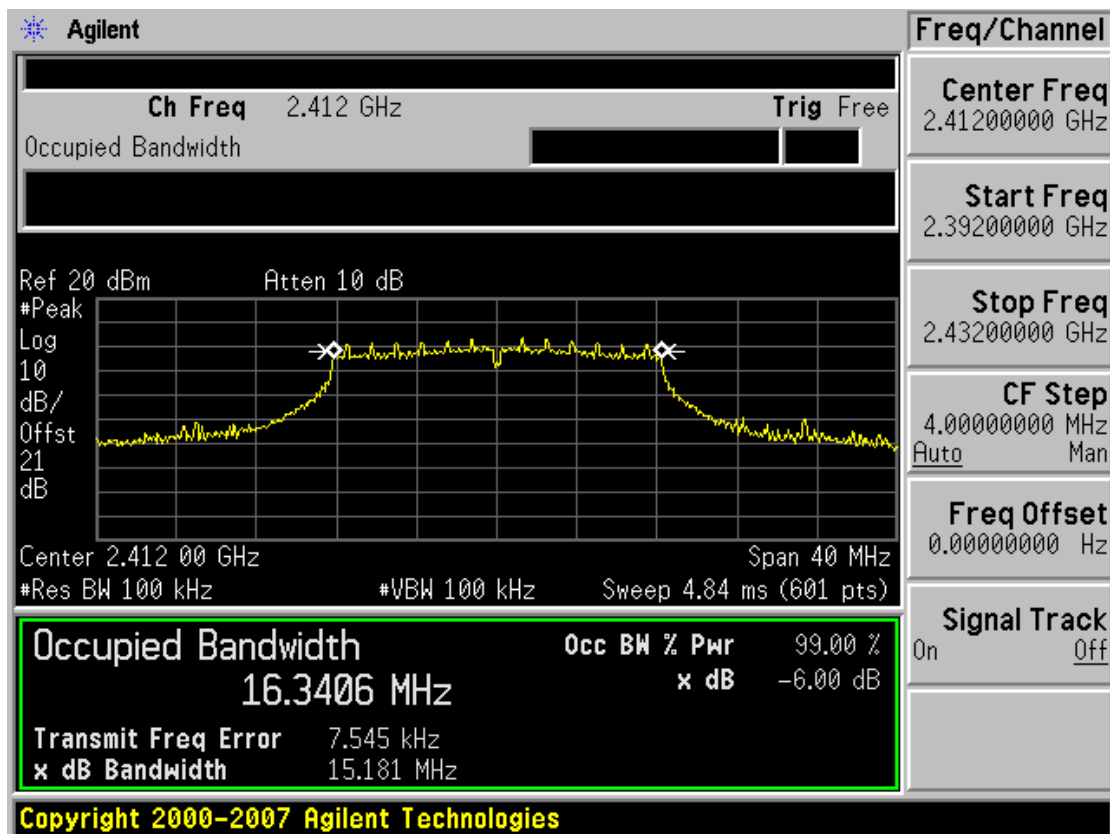
6dB Bandwidth plot (802.11b-CH 6)



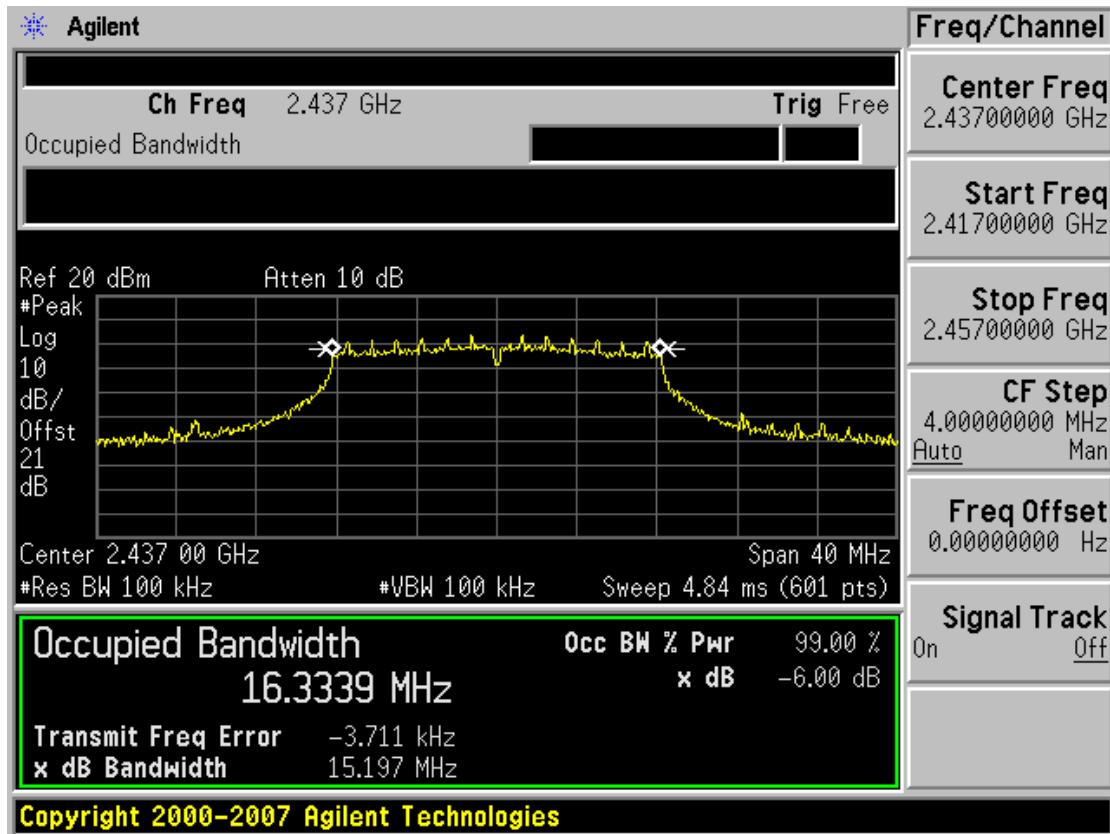
6dB Bandwidth plot (802.11b-CH 11)



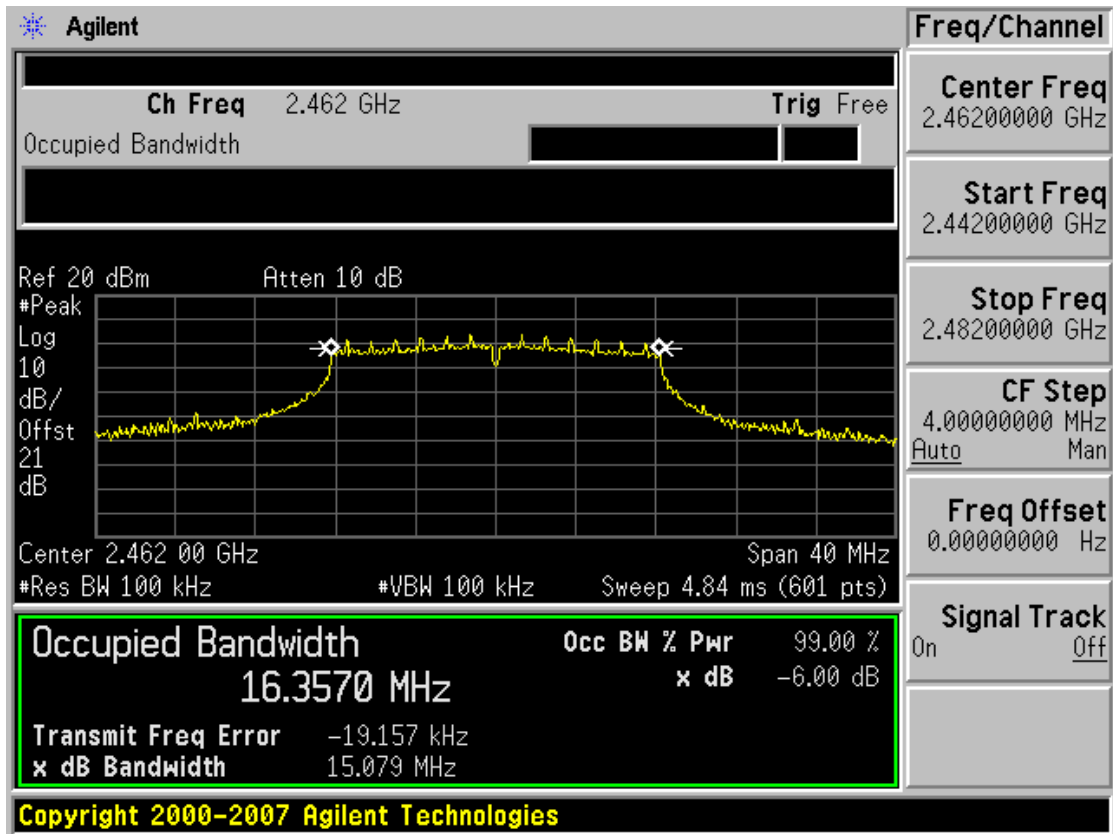
6dB Bandwidth plot (802.11g-CH 1)



6dB Bandwidth plot (802.11g-CH 6)

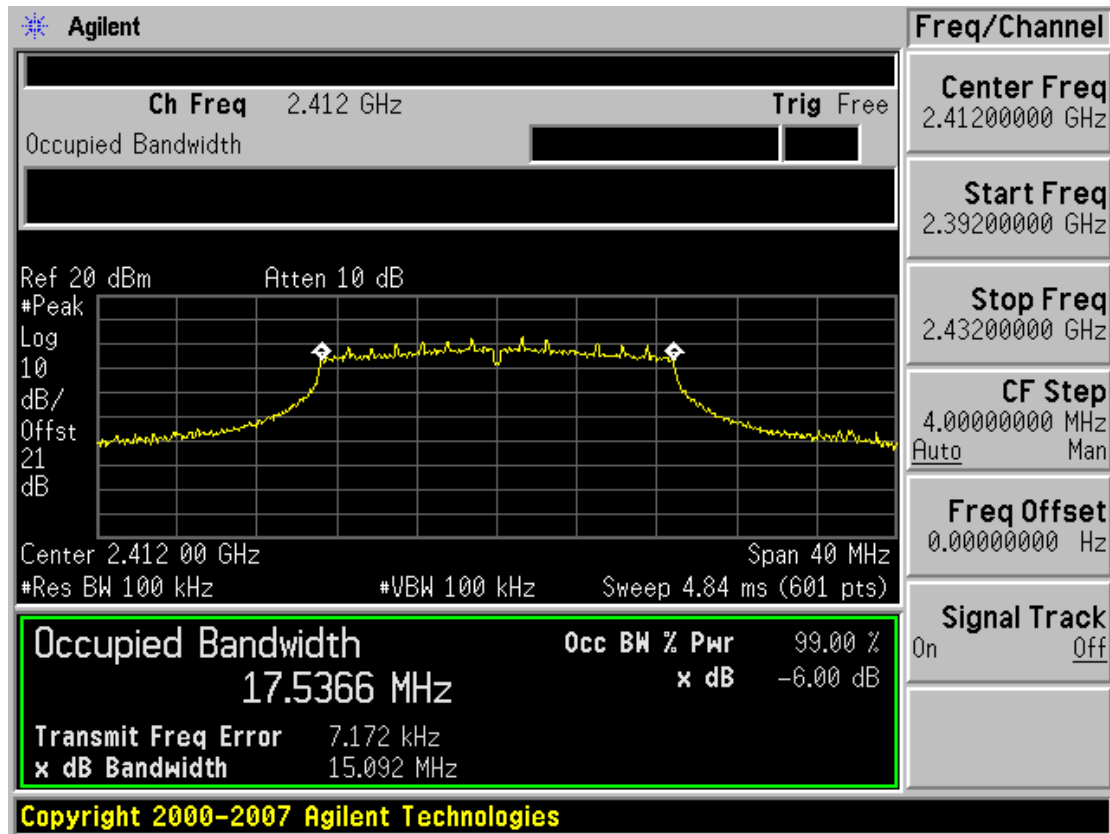


6dB Bandwidth plot (802.11g-CH 11)

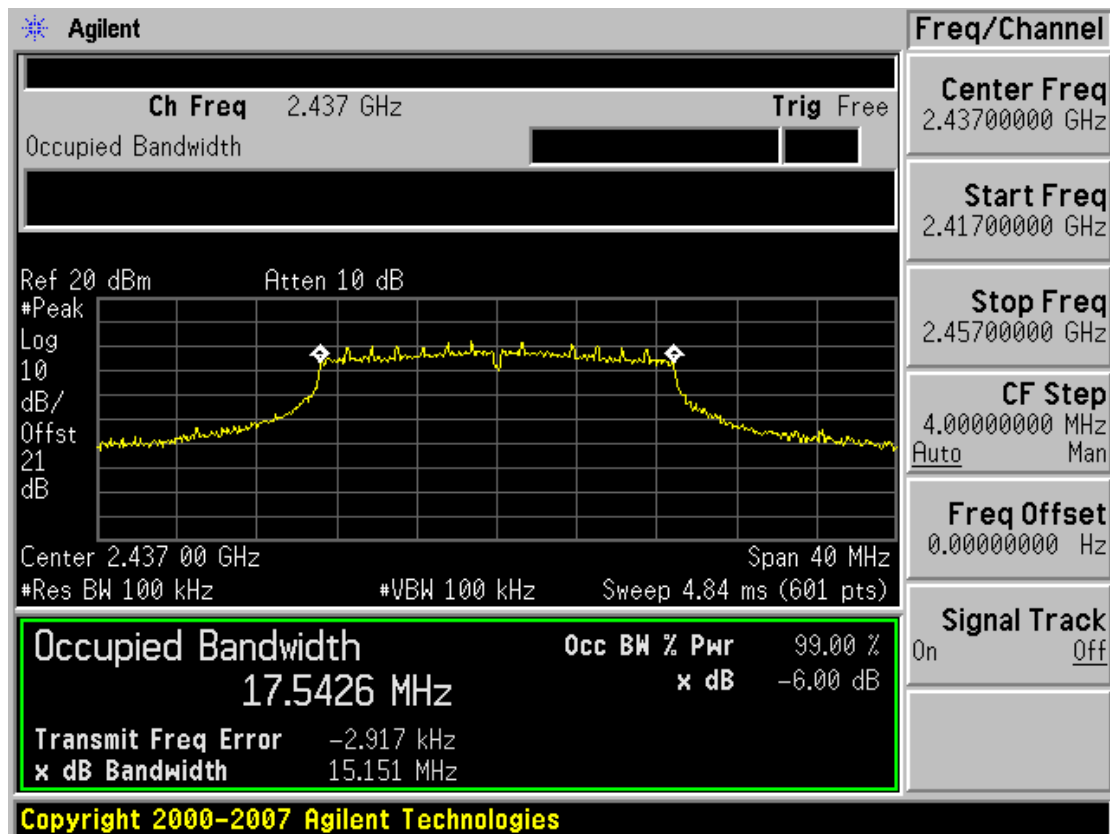


6dB

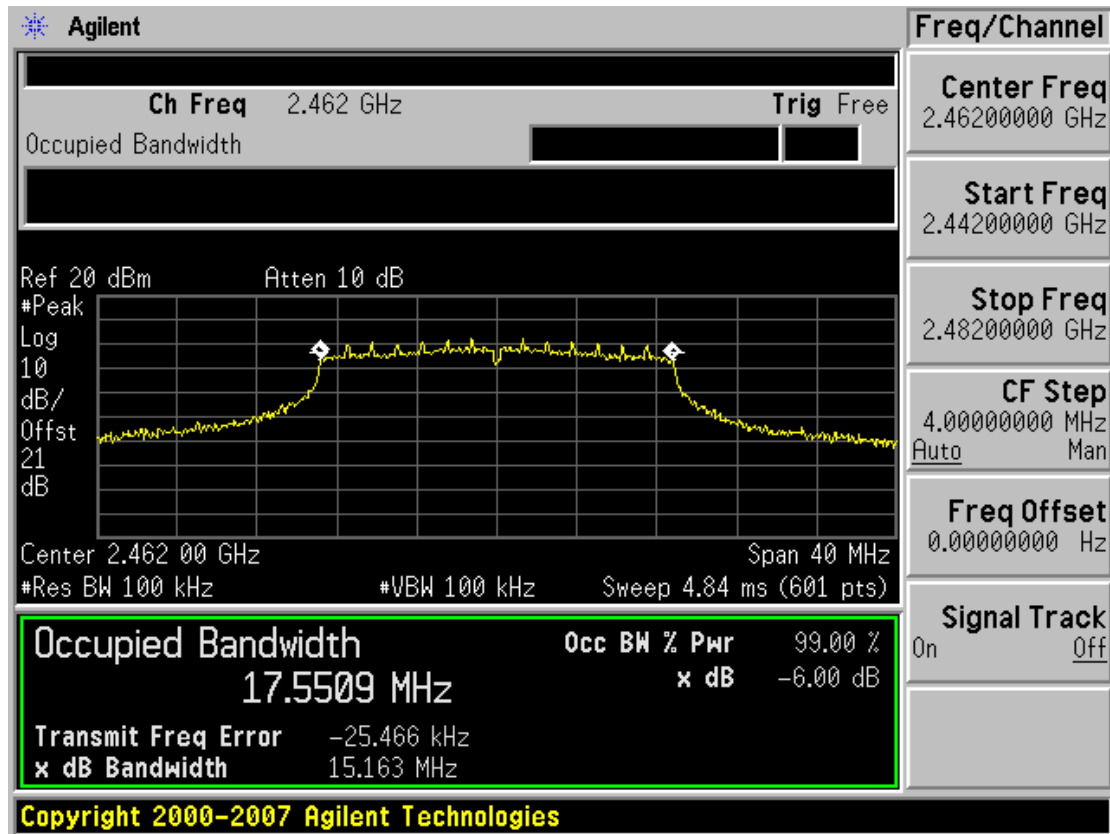
6dB Bandwidth plot (802.11n-CH 1)



6dB Bandwidth plot (802.11n-CH 6)



6dB Bandwidth plot (802.11n-CH 11)



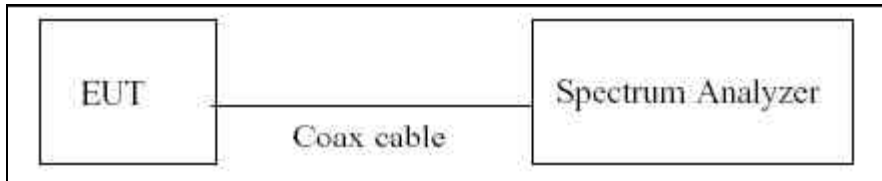
7.2 OUTPUT POWER MEASUREMENT (802.11b/g/n)

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

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■ TEST RESULTS

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1 Mbps	18.54	30
		2 Mbps	18.44	30
		5.5 Mbps	20.31	30
		11 Mbps	21.89	30
2437	6	1 Mbps	18.51	30
		2 Mbps	18.87	30
		5.5 Mbps	20.85	30
		11 Mbps	22.12	30
2462	11	1 Mbps	18.92	30
		2 Mbps	19.15	30
		5.5 Mbps	21.27	30
		11 Mbps	22.32	30

Conducted Output Power Measurements (802.11g Mode)

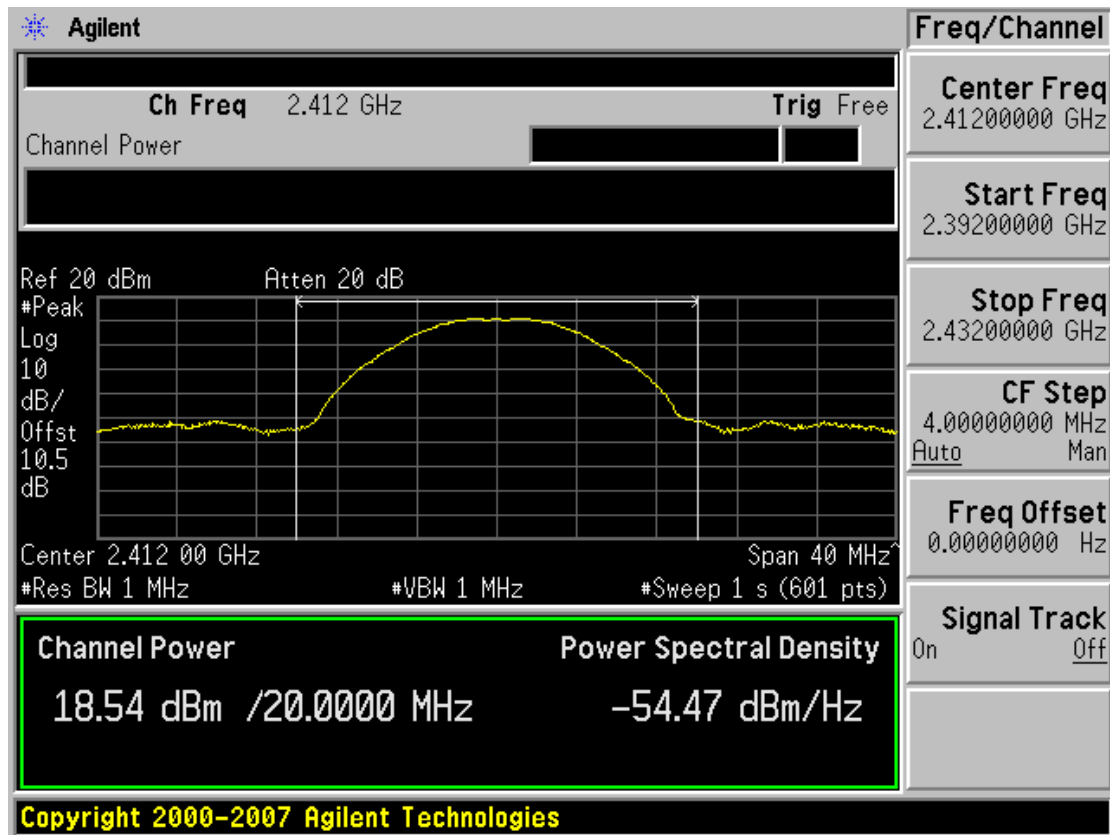
802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	20.27	30
		9 Mbps	20.28	30
		12 Mbps	20.40	30
		18 Mbps	20.20	30
		24 Mbps	20.79	30
		36 Mbps	20.54	30
		48 Mbps	20.49	30
		54 Mbps	20.57	30
2437	6	6 Mbps	20.09	30
		9 Mbps	19.98	30
		12 Mbps	20.10	30
		18 Mbps	20.09	30
		24 Mbps	20.62	30
		36 Mbps	20.27	30
		48 Mbps	20.41	30
		54 Mbps	20.51	30
2462	11	6 Mbps	20.18	30
		9 Mbps	20.22	30
		12 Mbps	20.44	30
		18 Mbps	20.19	30
		24 Mbps	20.78	30
		36 Mbps	20.54	30
		48 Mbps	20.62	30
		54 Mbps	20.72	30

Conducted Output Power Measurements (802.11n Mode)

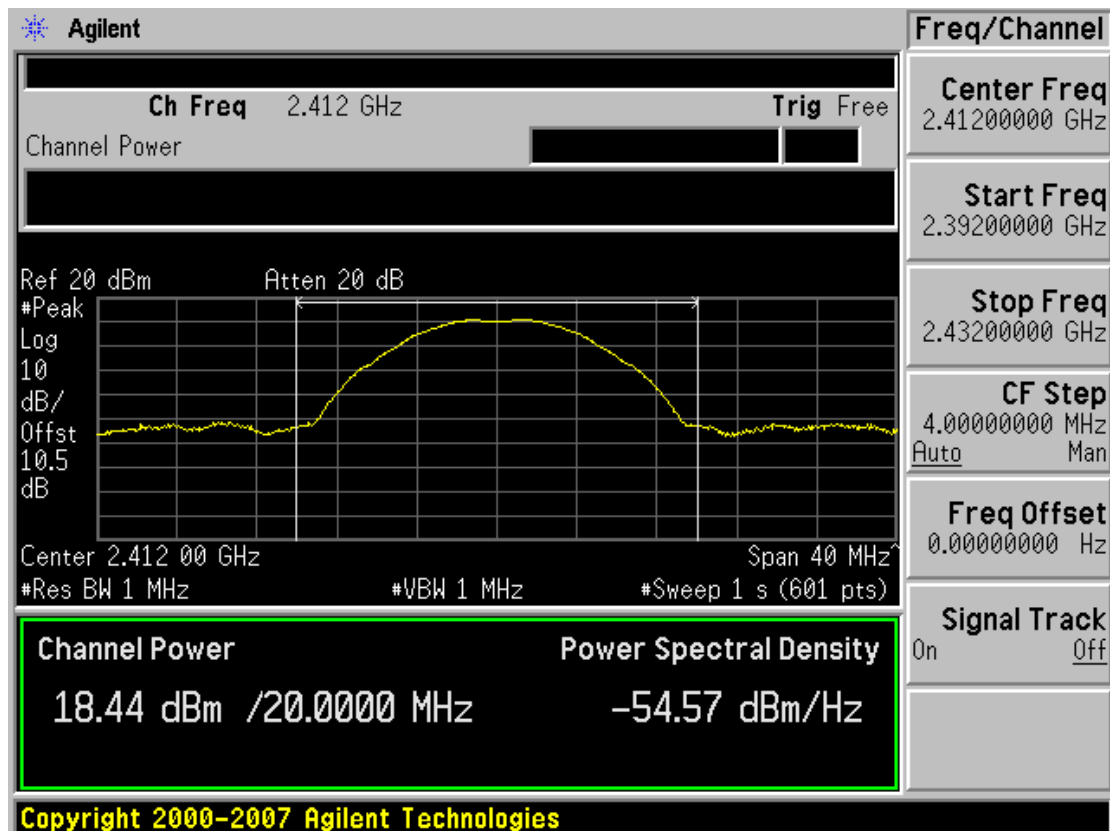
802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6.5 Mbps	18.74	30
		13 Mbps	19.09	30
		19.5 Mbps	19.04	30
		26 Mbps	19.60	30
		39 Mbps	19.36	30
		52 Mbps	19.20	30
		58.5 Mbps	19.32	30
		65 Mbps	19.34	30
2437	6	6.5 Mbps	18.81	30
		13 Mbps	19.05	30
		19.5 Mbps	19.06	30
		26 Mbps	19.67	30
		39 Mbps	19.44	30
		52 Mbps	19.47	30
		58.5 Mbps	19.50	30
		65 Mbps	19.06	30
2462	11	6.5 Mbps	19.07	30
		13 Mbps	19.08	30
		19.5 Mbps	19.06	30
		26 Mbps	19.40	30
		39 Mbps	19.36	30
		52 Mbps	19.30	30
		58.5 Mbps	19.23	30
		65 Mbps	19.62	30

■ RESULT PLOTS

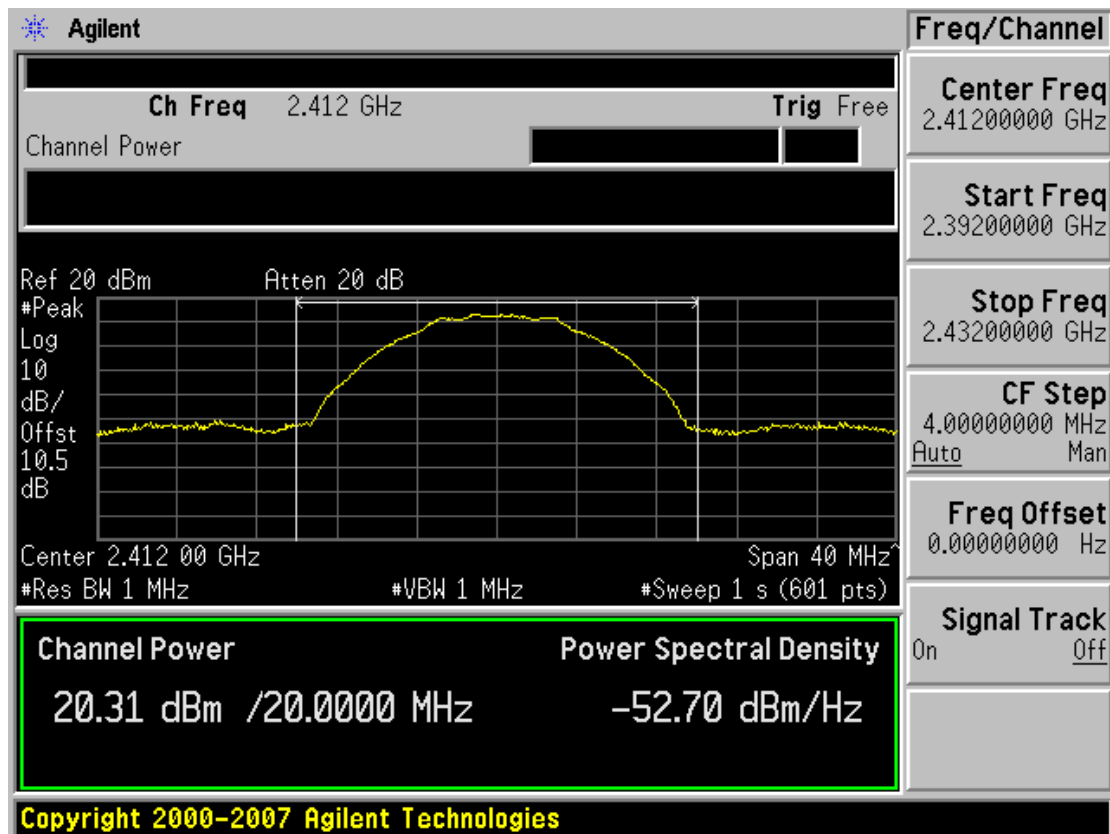
Conducted Output Power (802.11b-CH 1) 1Mbps



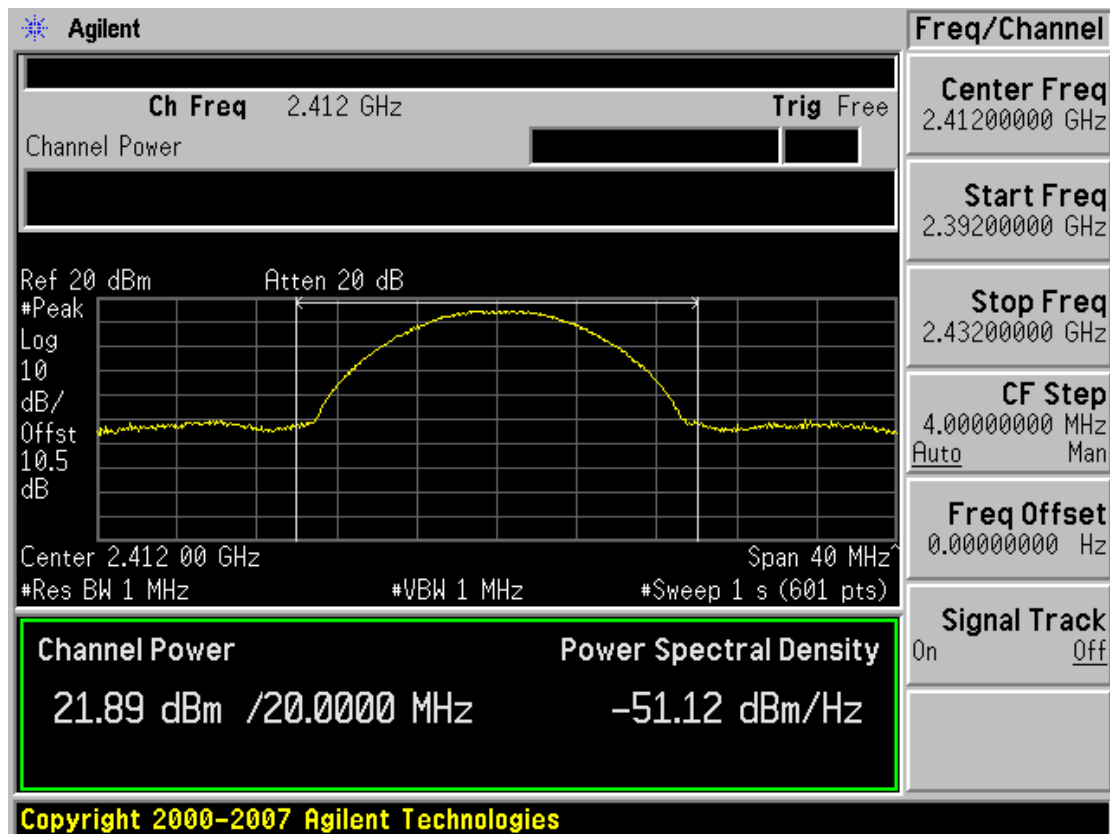
Conducted Output Power (802.11b-CH 1) 2Mbps



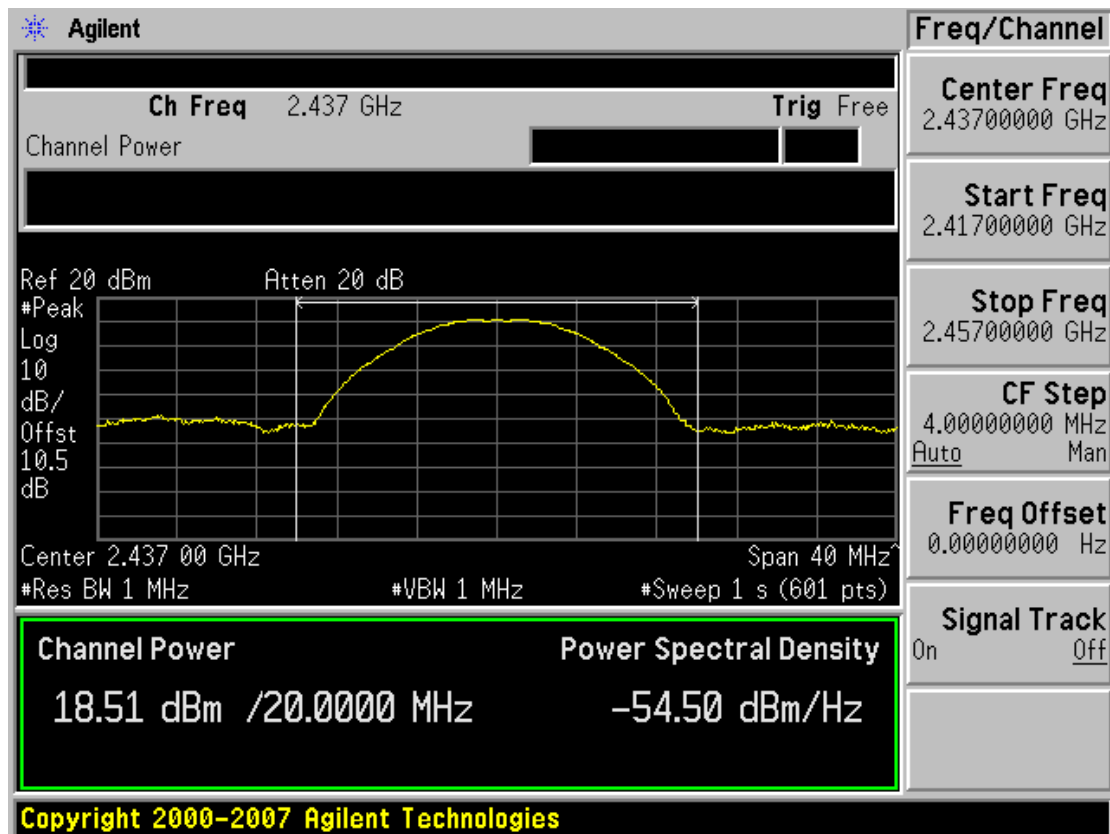
Conducted Output Power (802.11b-CH 1) 5.5Mbps



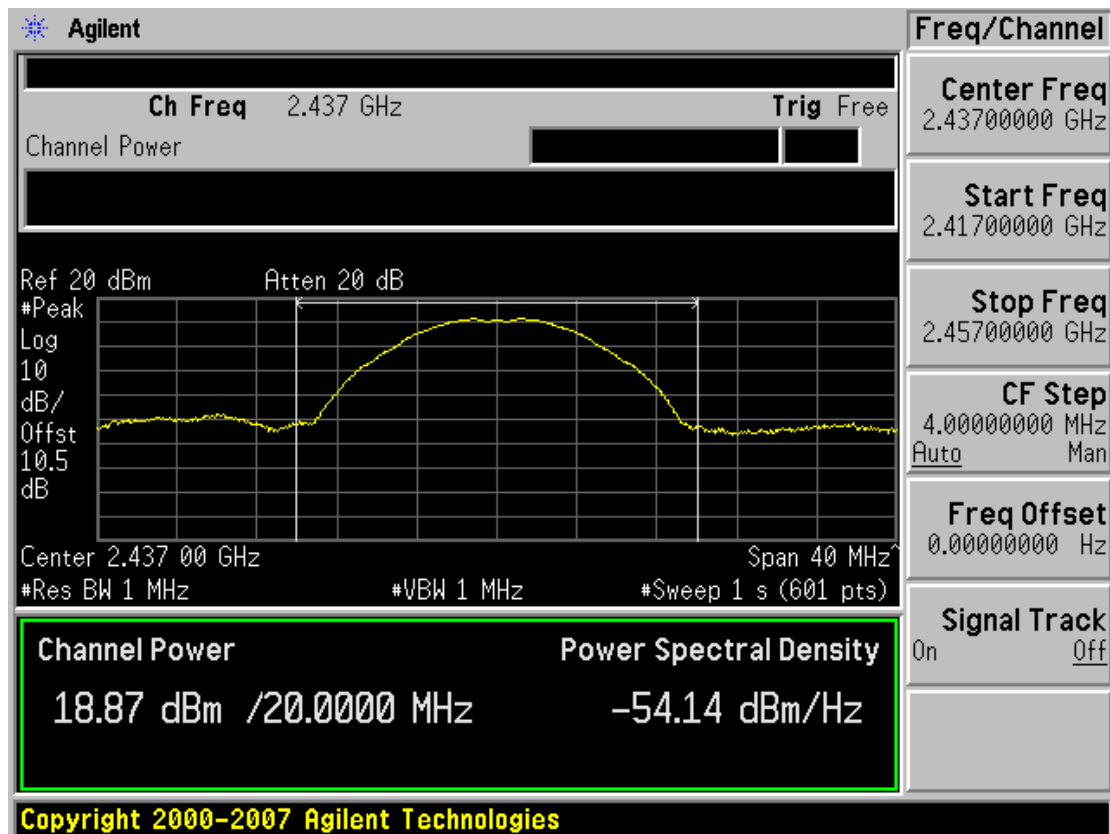
Conducted Output Power (802.11b-CH 1) 11Mbps



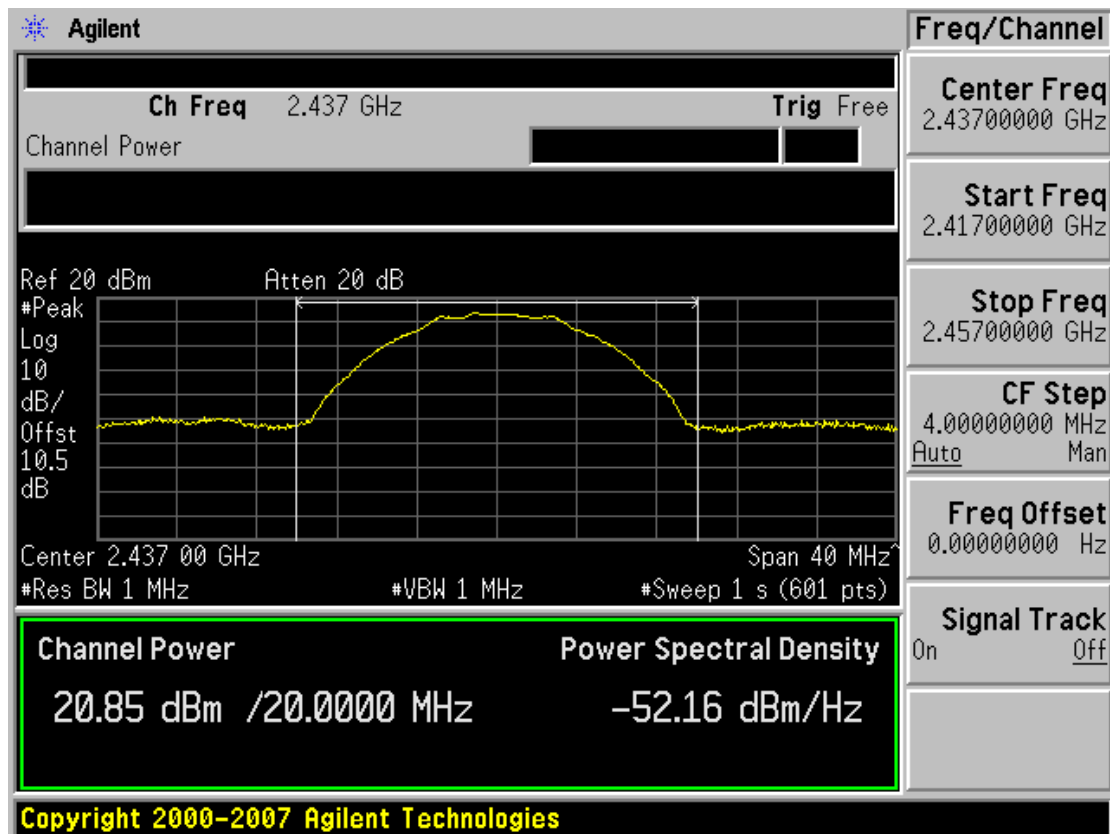
Conducted Output Power (802.11b-CH 6) 1Mbps



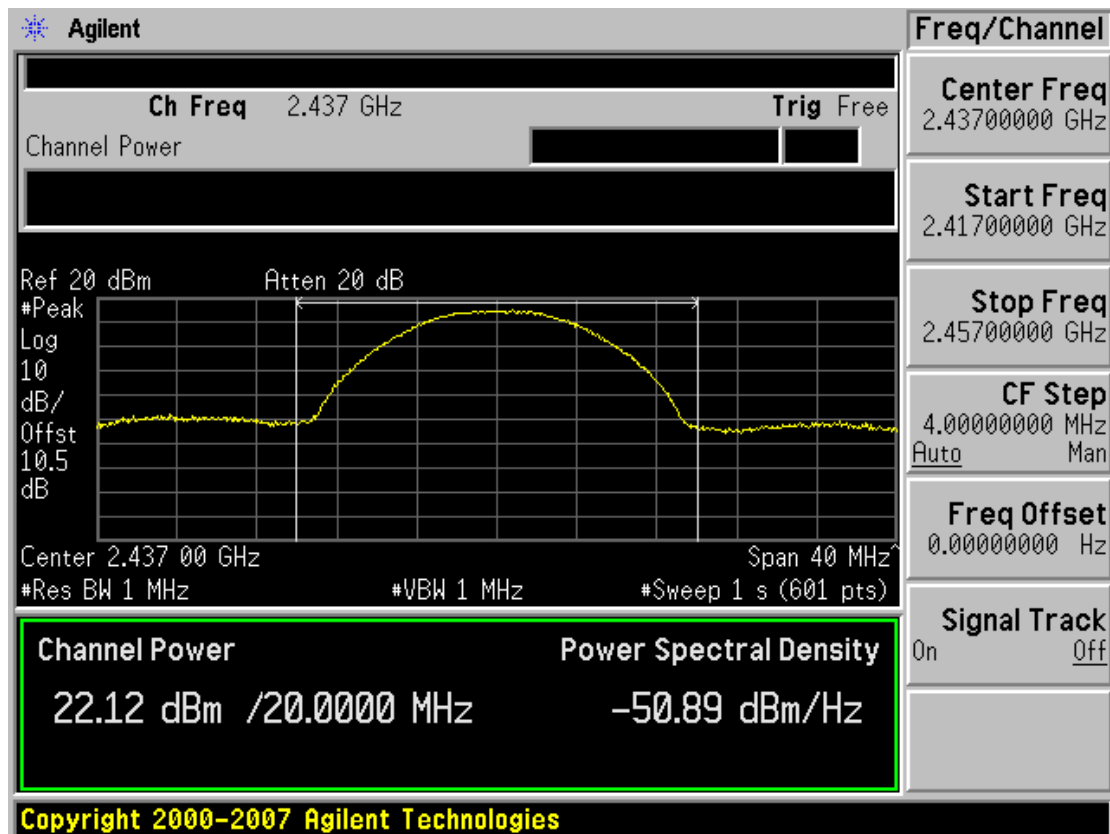
Conducted Output Power (802.11b-CH 6) 2Mbps



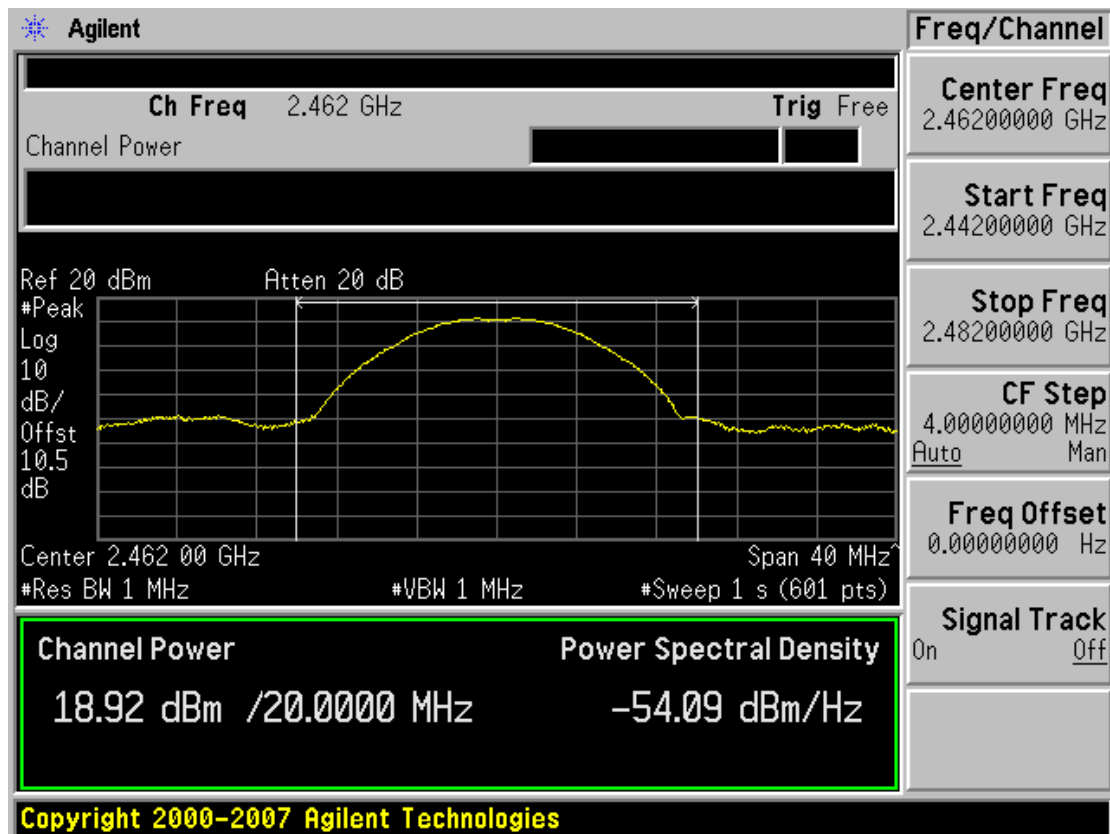
Conducted Output Power (802.11b-CH 6) 5.5Mbps



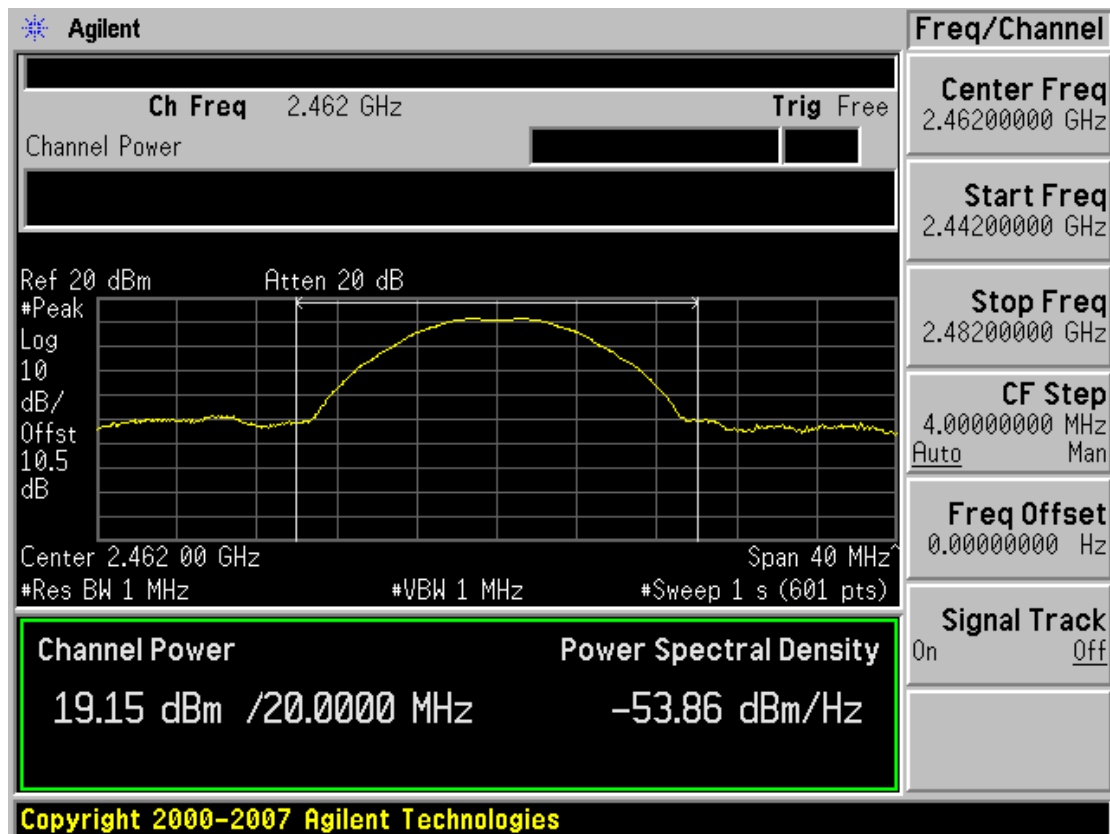
Conducted Output Power (802.11b-CH 6) 11Mbps



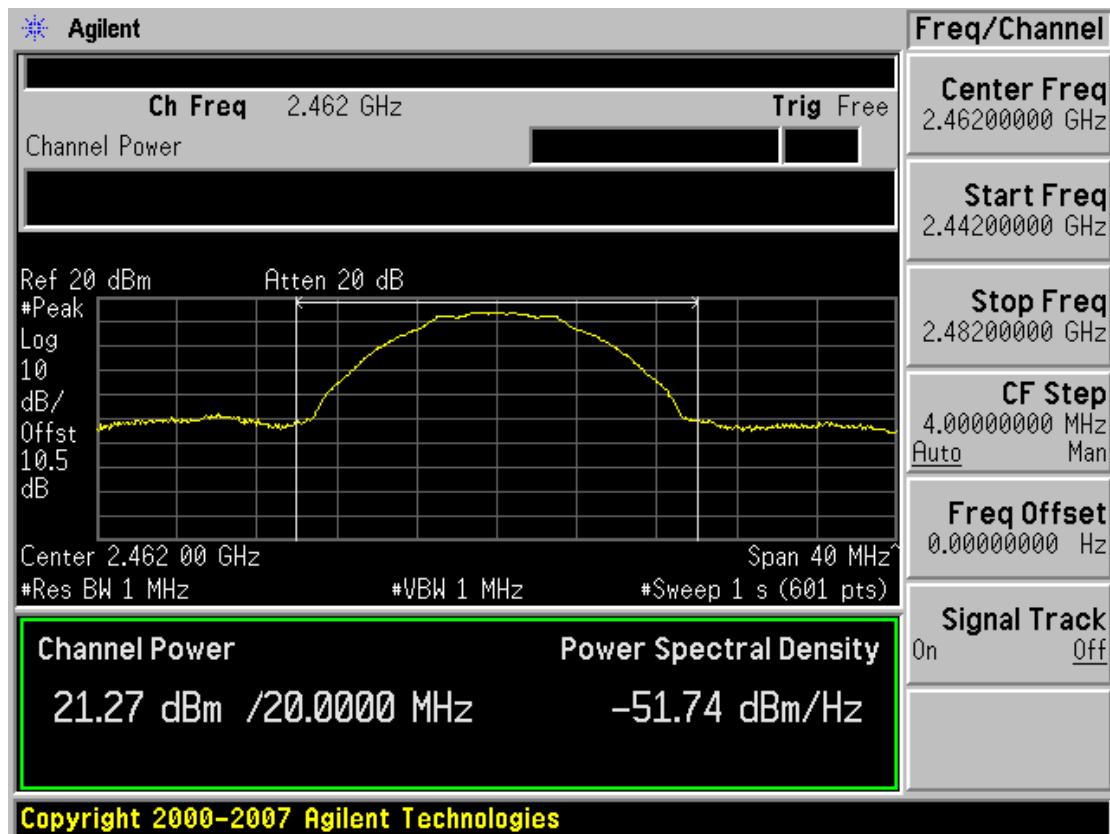
Conducted Output Power (802.11b-CH 11) 1Mbps



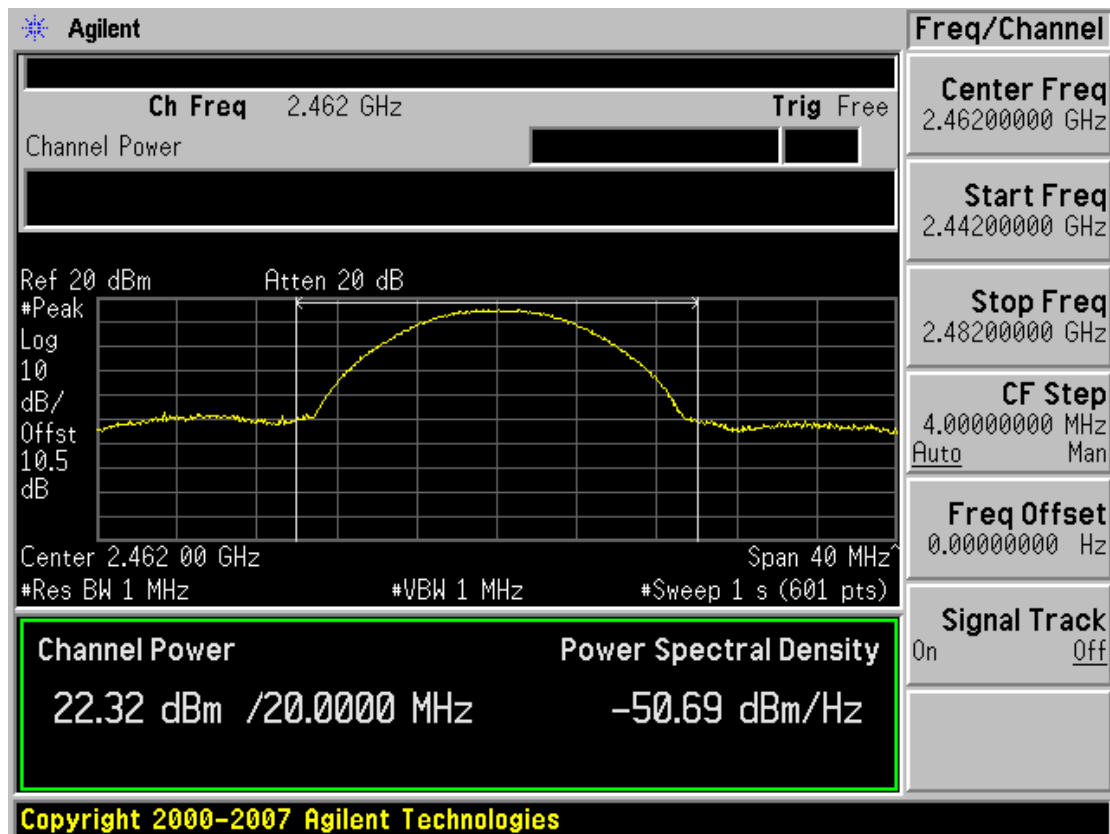
Conducted Output Power (802.11b-CH 11) 2Mbps



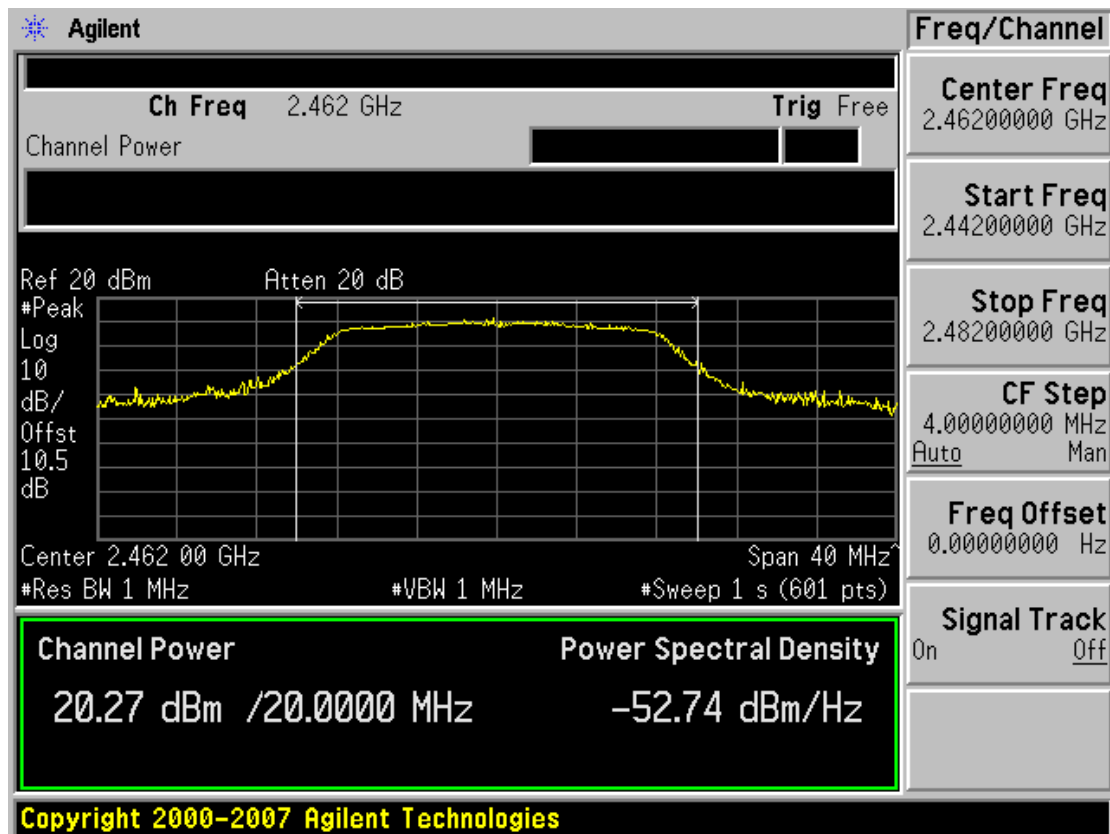
Conducted Output Power (802.11b-CH 11) 5.5Mbps



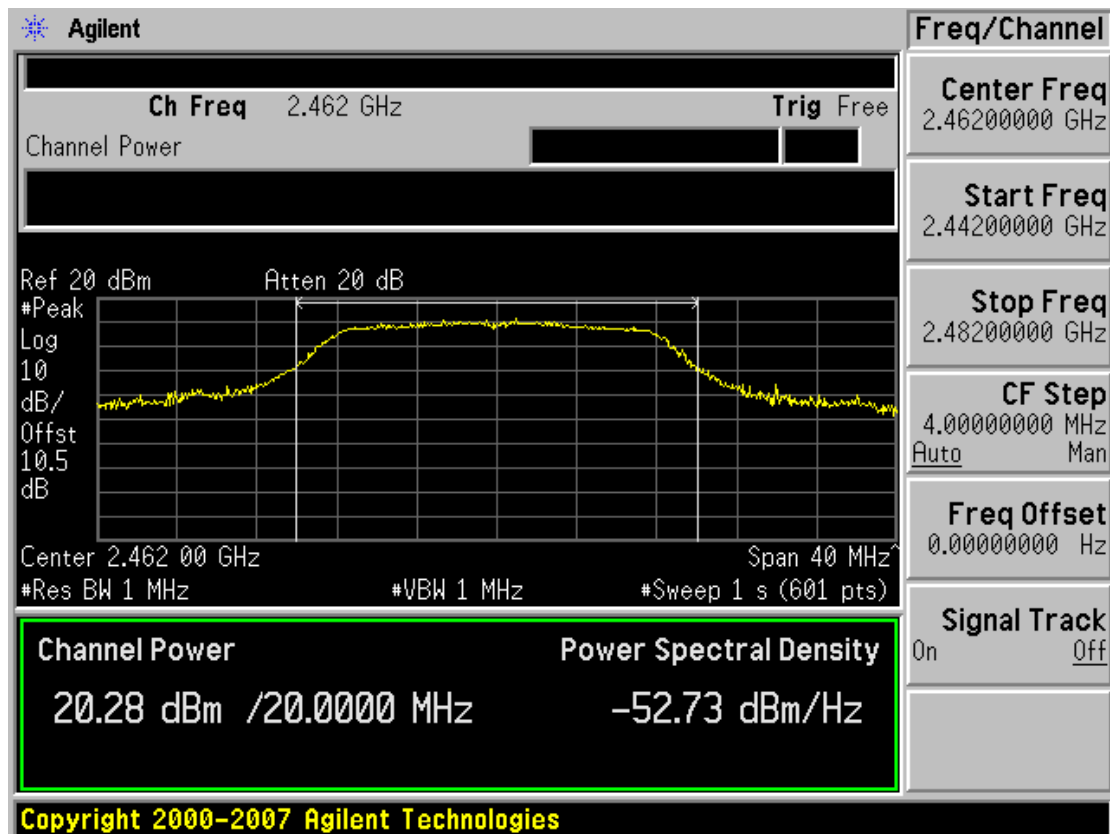
Conducted Output Power (802.11b-CH 11) 11Mbps



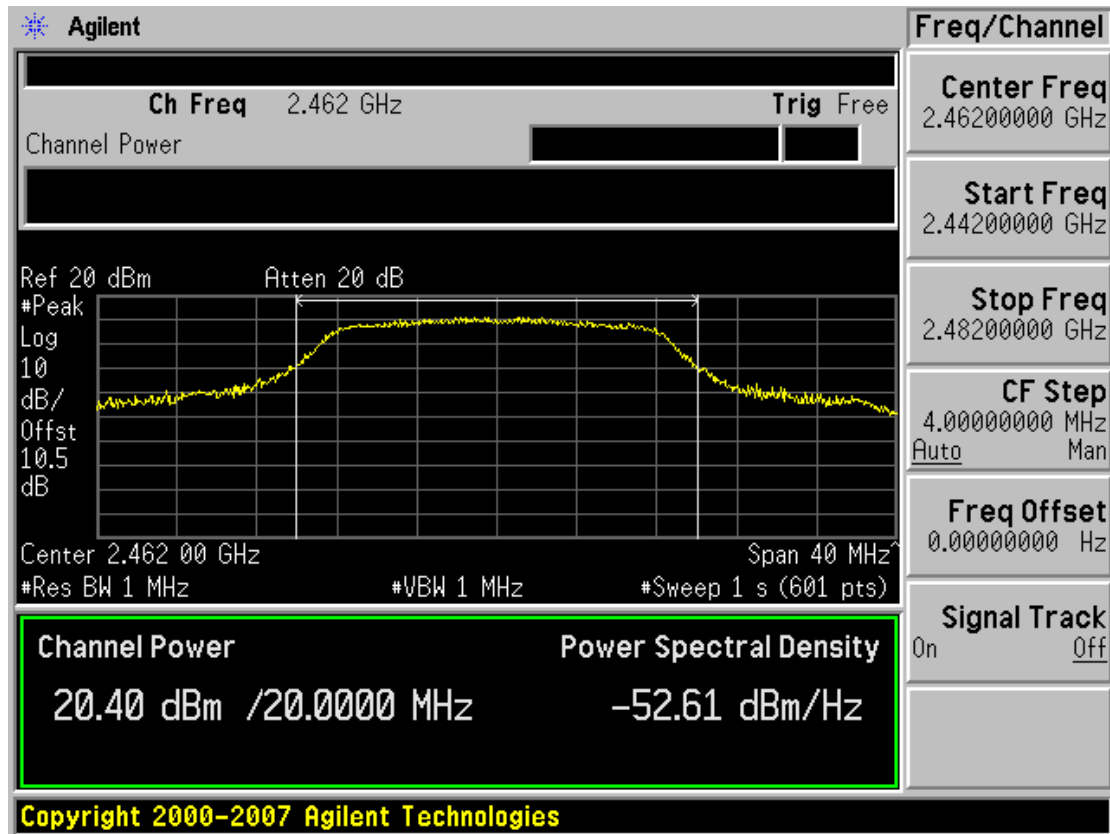
Conducted Output Power (802.11g-CH 1) 6Mbps



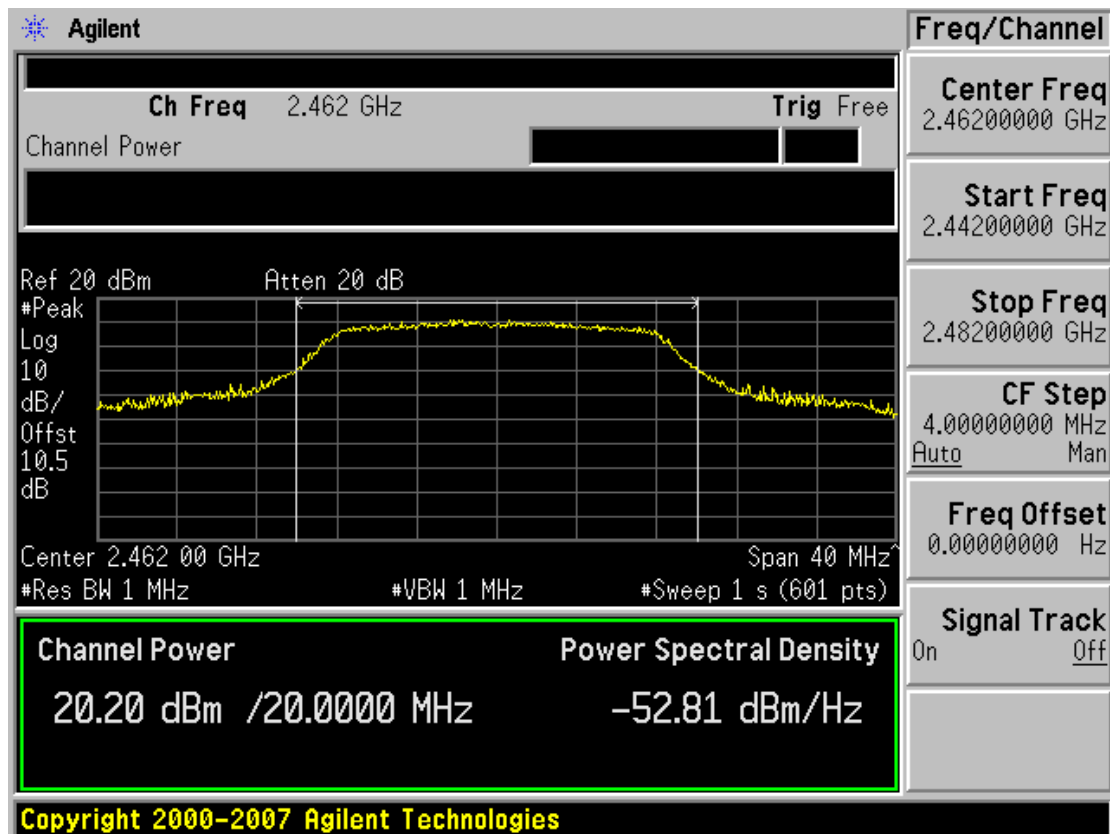
Conducted Output Power (802.11g-CH 1) 9Mbps



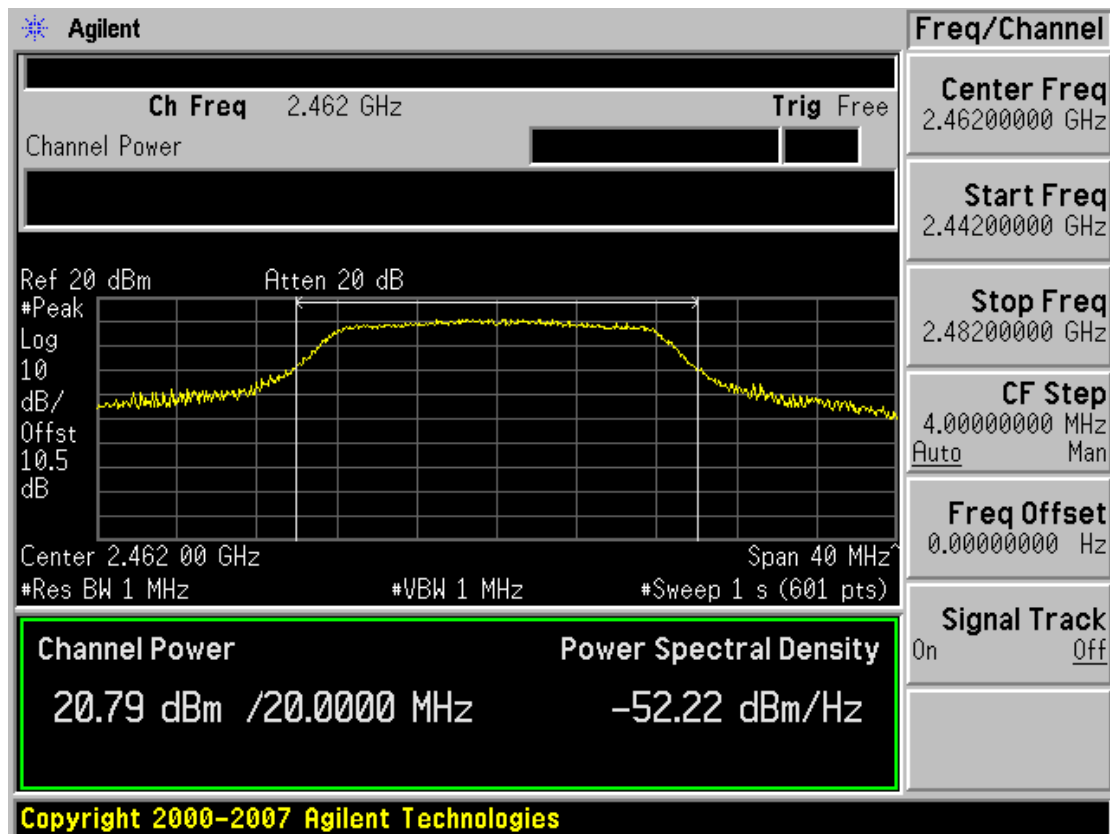
Conducted Output Power (802.11g-CH 1) 12Mbps



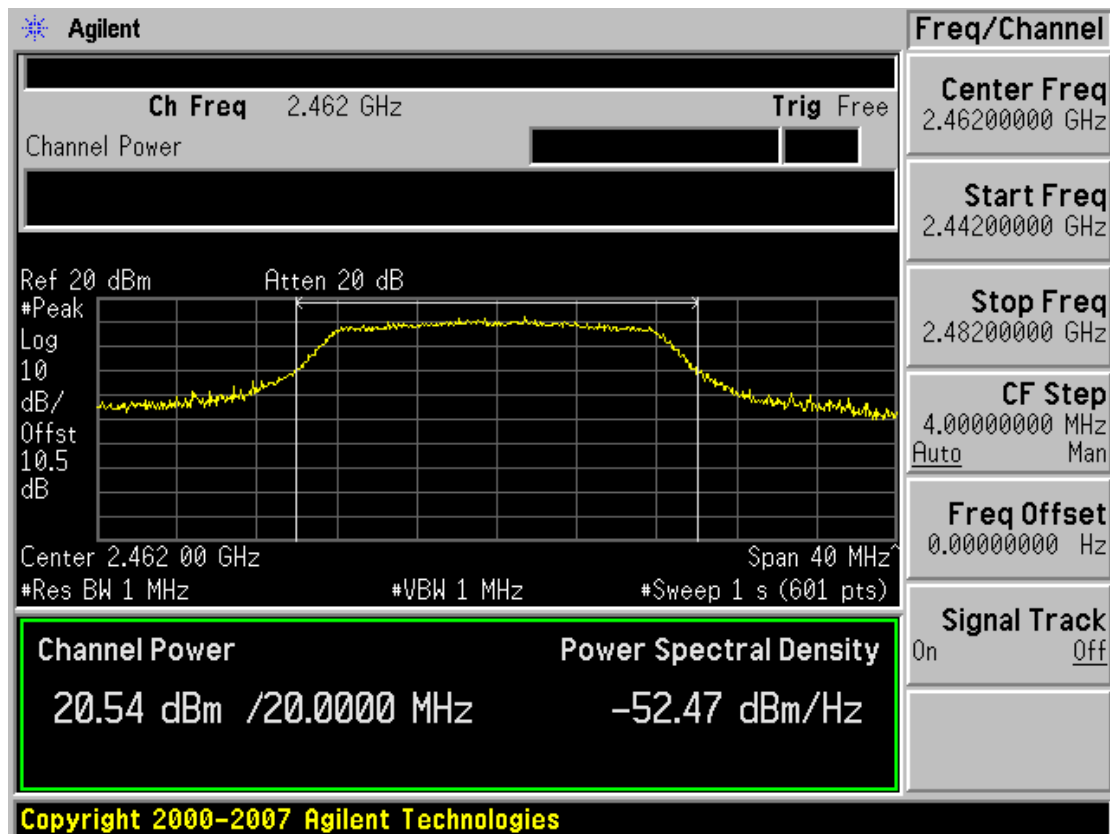
Conducted Output Power (802.11g-CH 1) 18Mbps



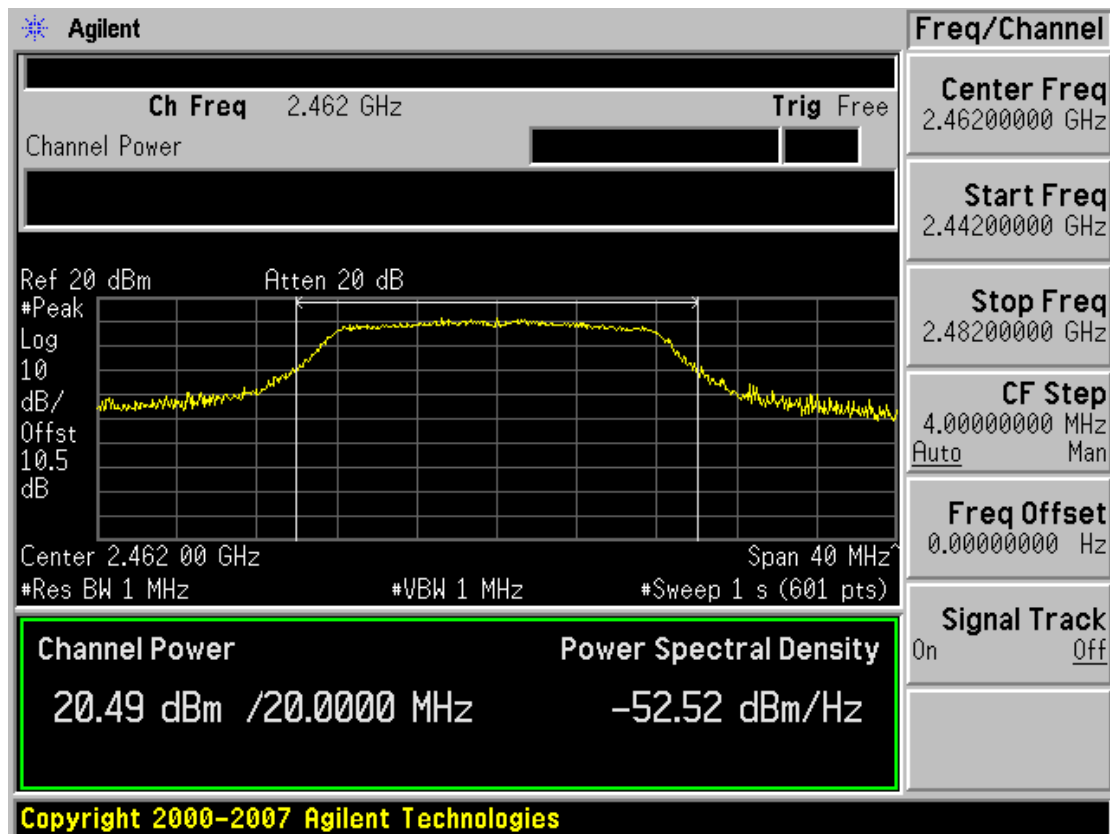
Conducted Output Power (802.11g-CH 1) 24Mbps



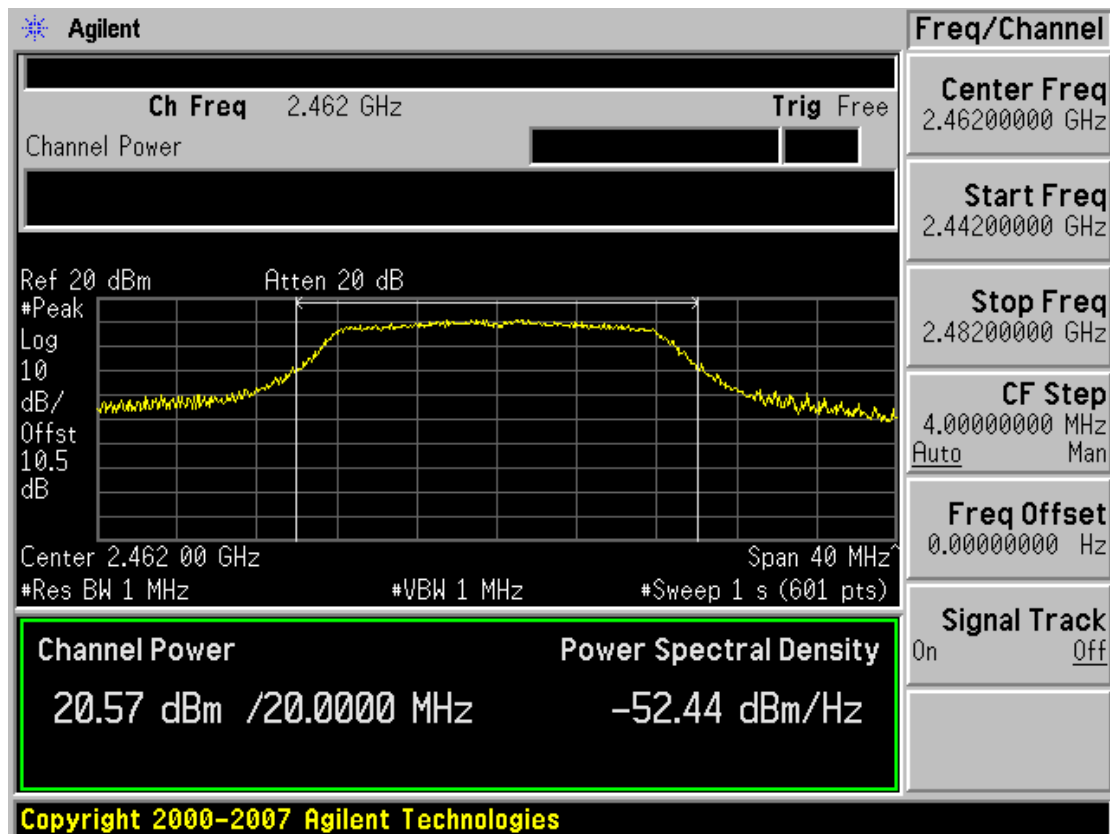
Conducted Output Power (802.11g-CH 1) 36Mbps



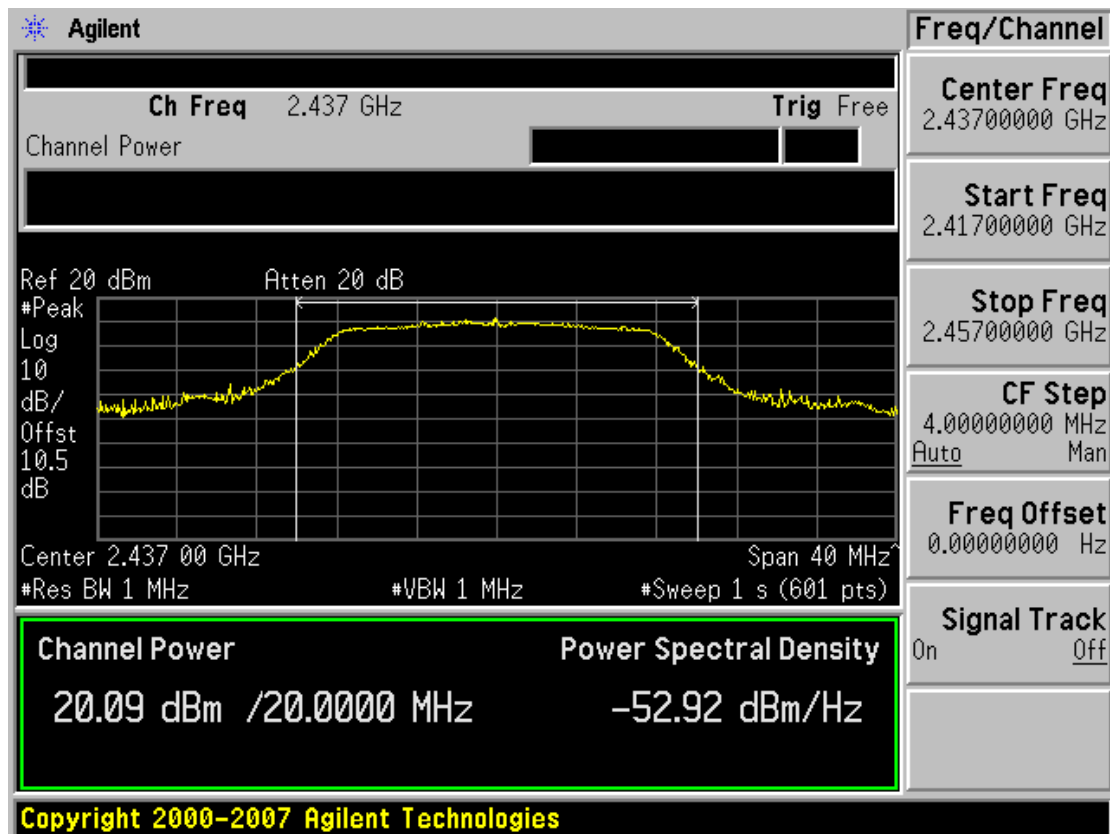
Conducted Output Power (802.11g-CH 1) 48Mbps



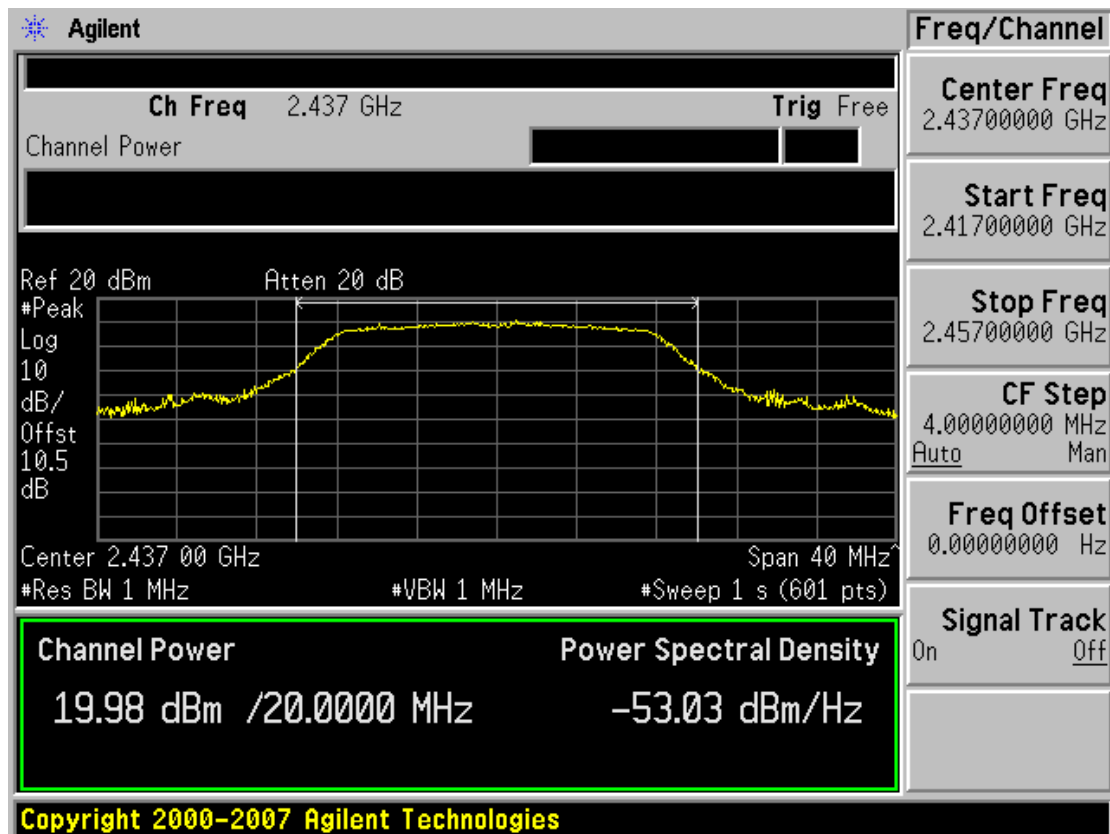
Conducted Output Power (802.11g-CH 1) 54Mbps



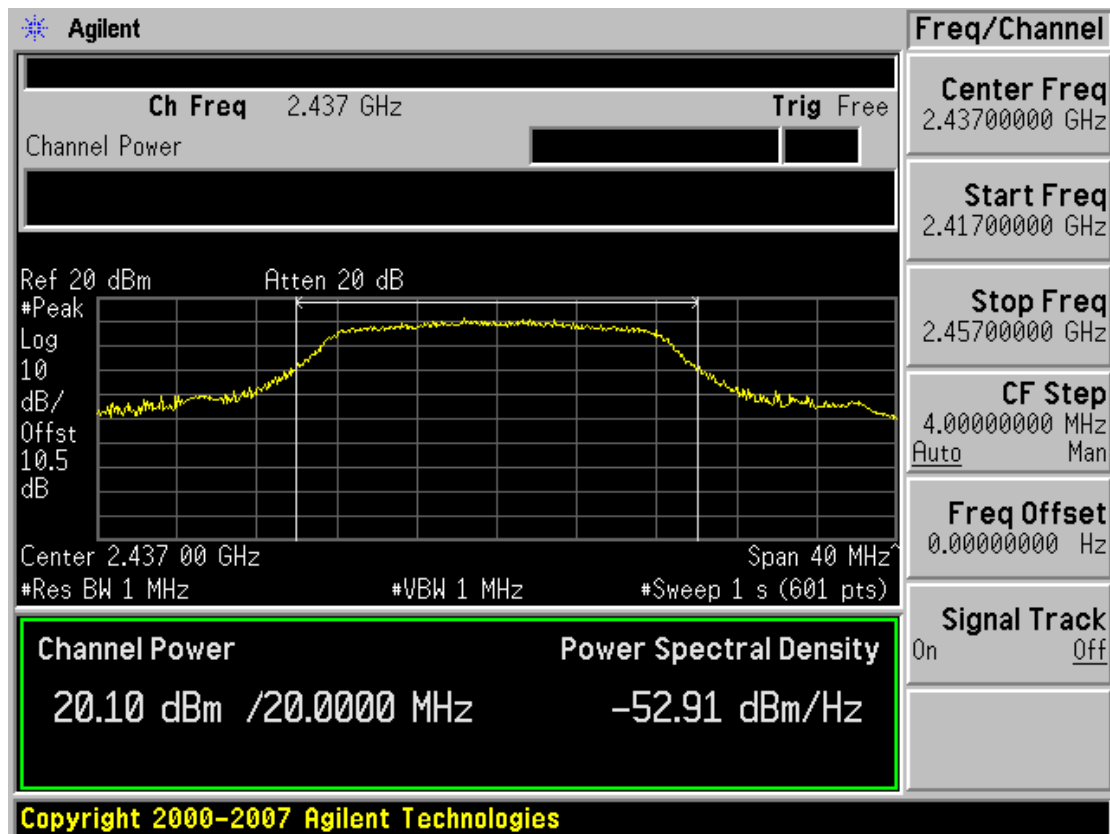
Conducted Output Power (802.11g-CH 6) 6Mbps



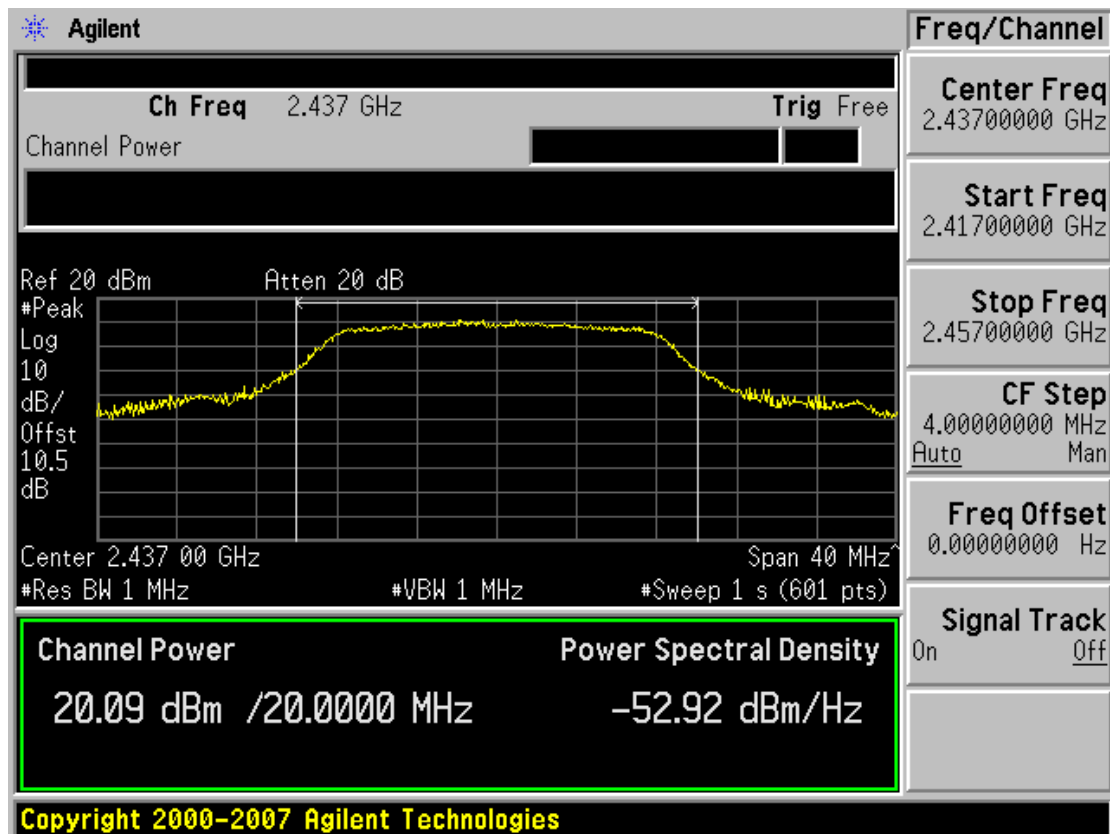
Conducted Output Power (802.11g-CH 6) 9Mbps



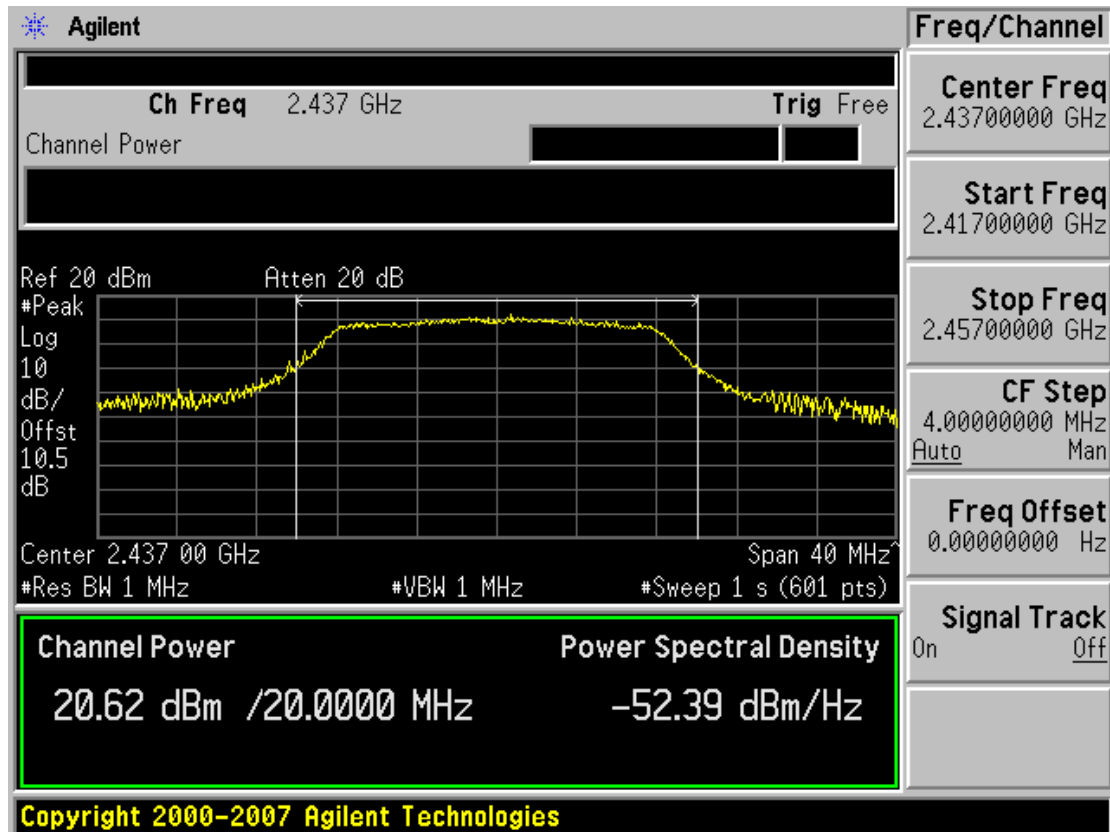
Conducted Output Power (802.11g-CH 6) 12Mbps



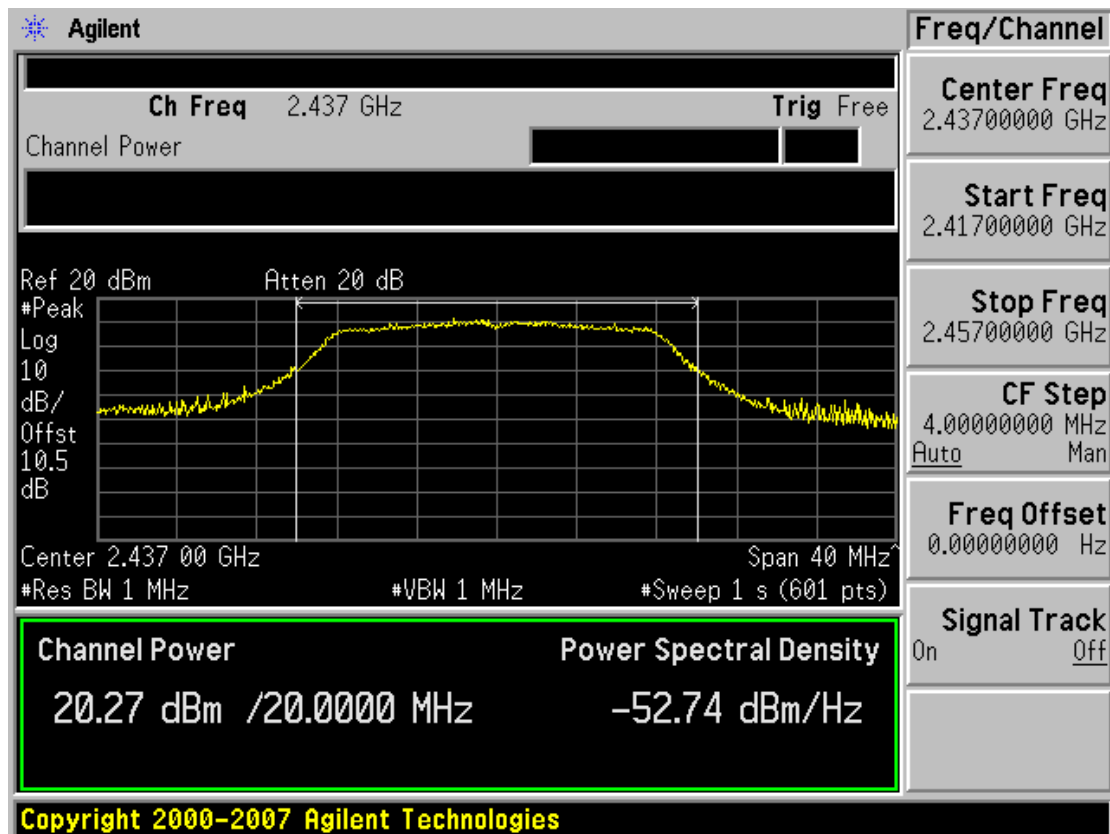
Conducted Output Power (802.11g-CH 6) 18Mbps



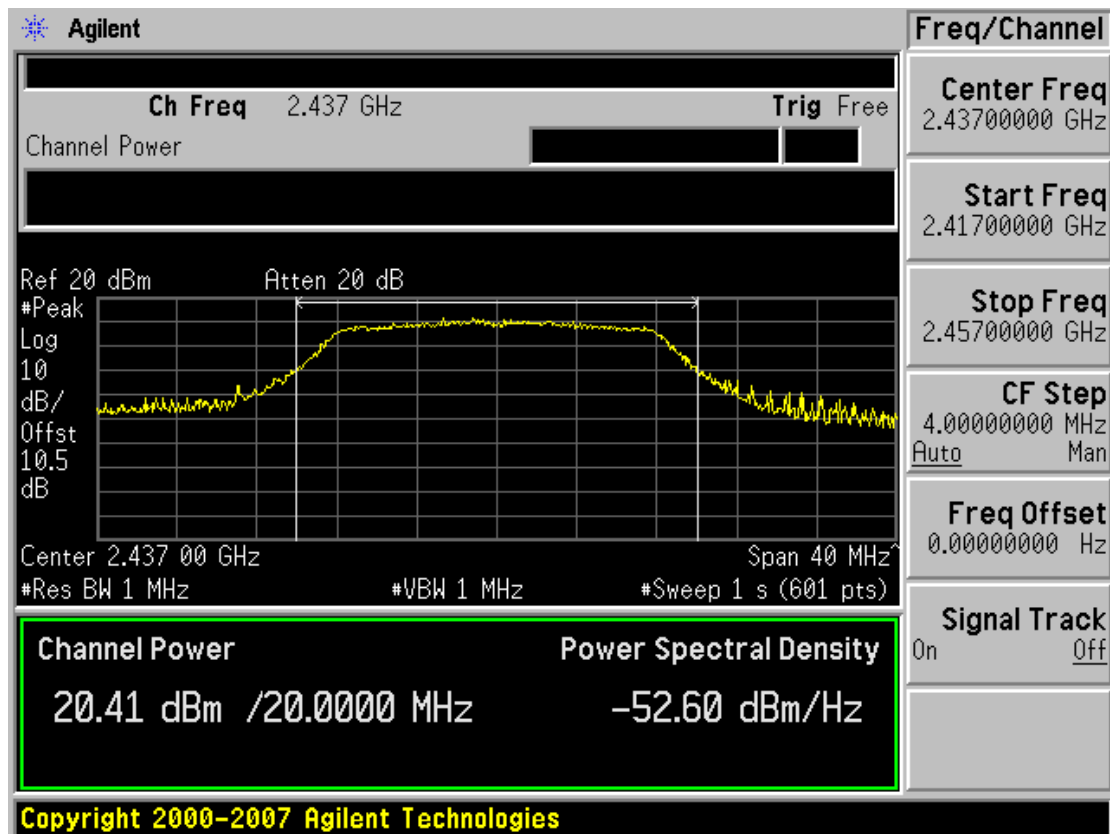
Conducted Output Power (802.11g-CH 6) 24Mbps



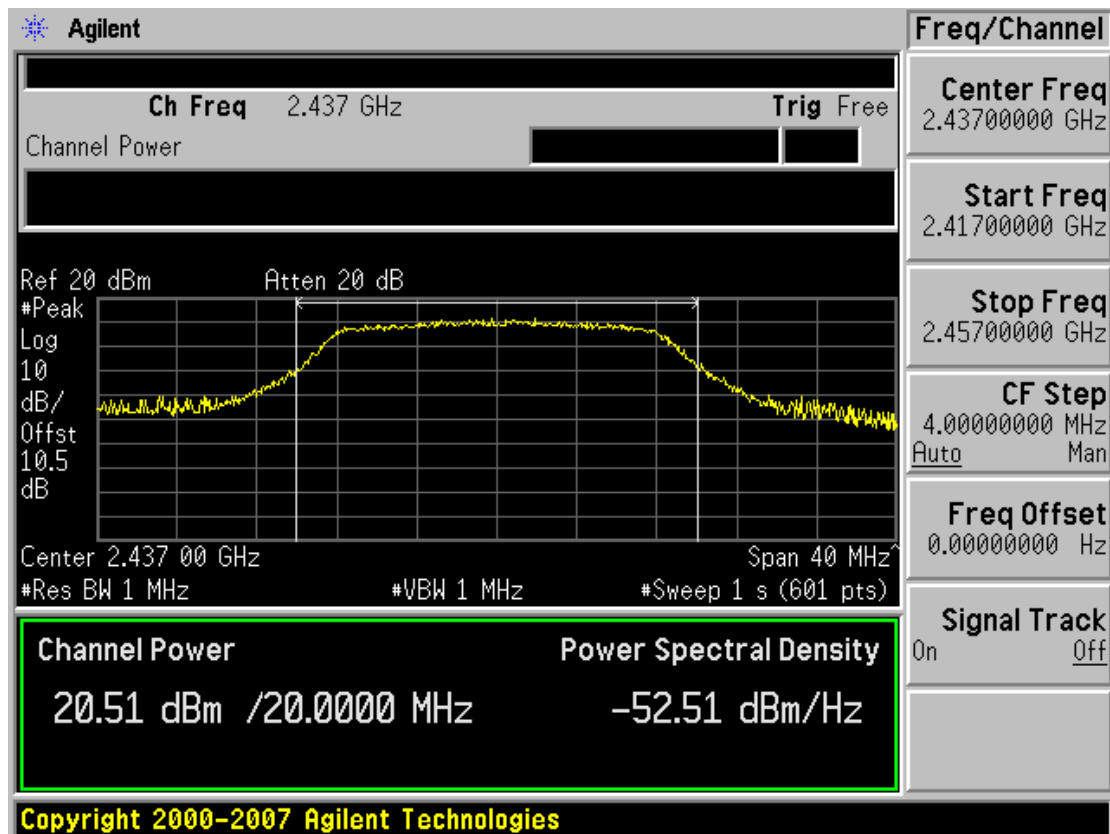
Conducted Output Power (802.11g-CH 6) 36Mbps



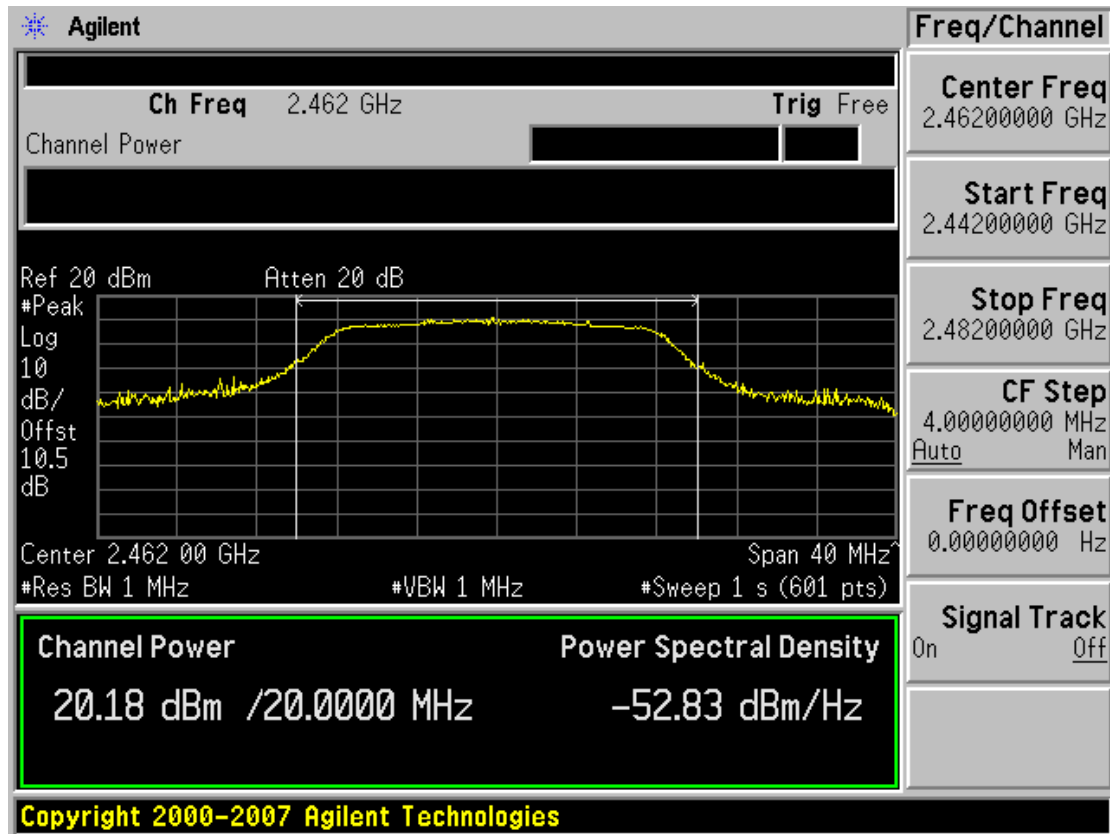
Conducted Output Power (802.11g-CH 6) 48Mbps



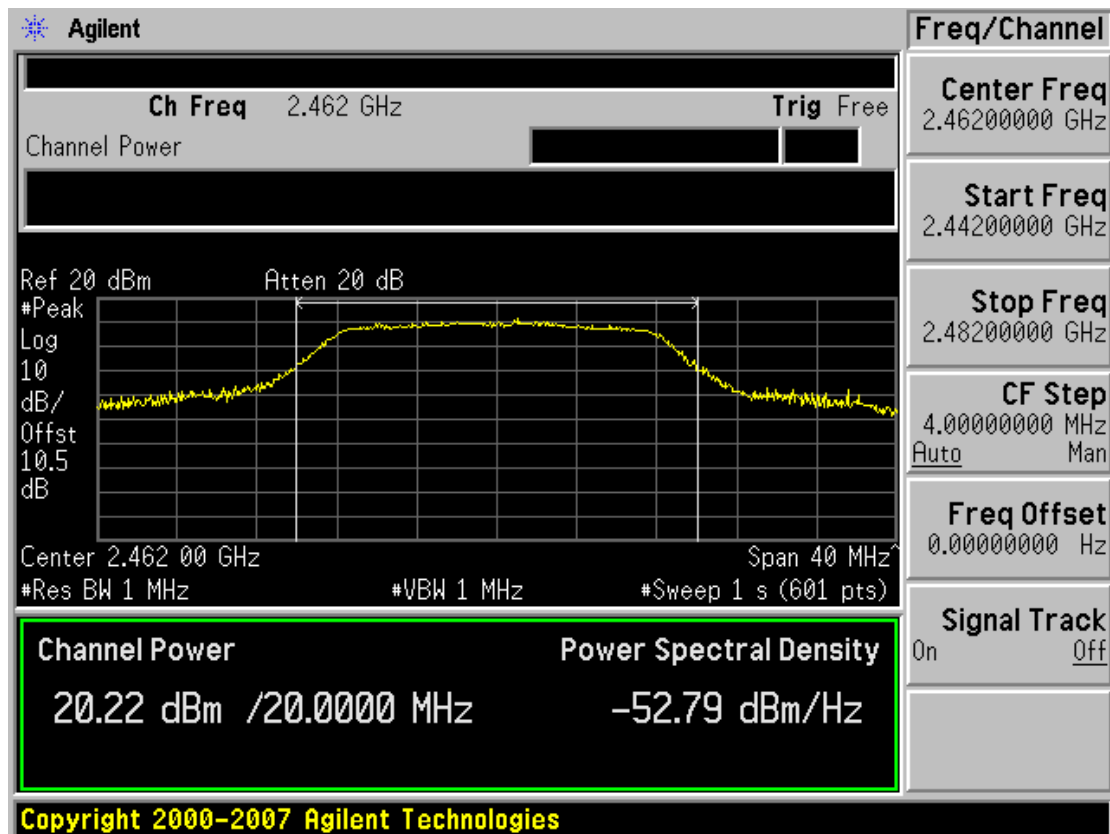
Conducted Output Power (802.11g-CH 6) 54Mbps



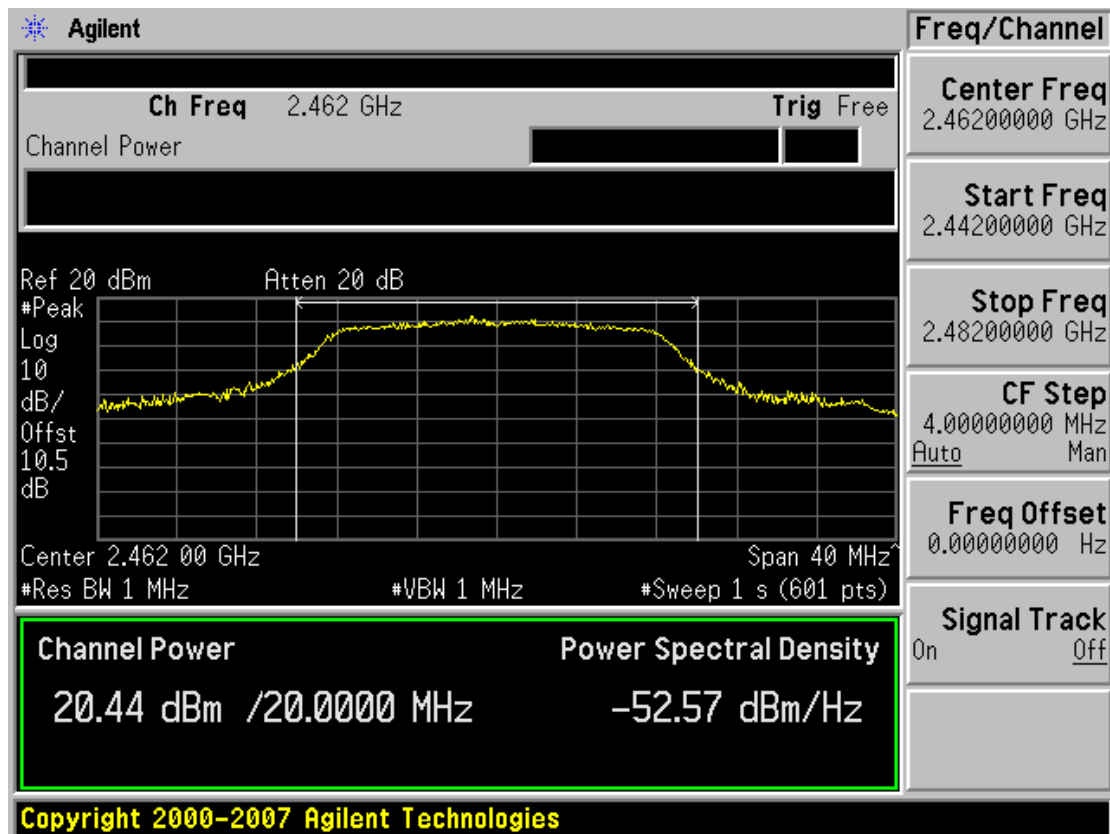
Conducted Output Power (802.11g-CH 11) 6Mbps



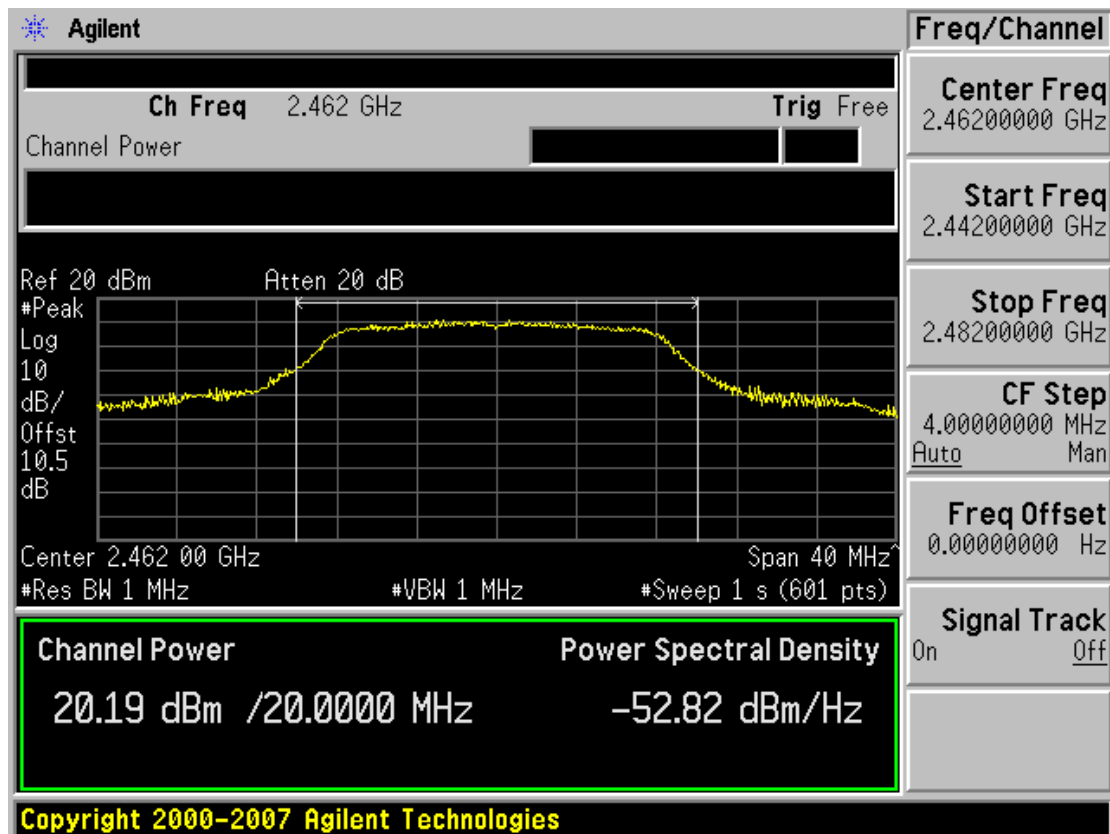
Conducted Output Power (802.11g-CH 11) 9Mbps



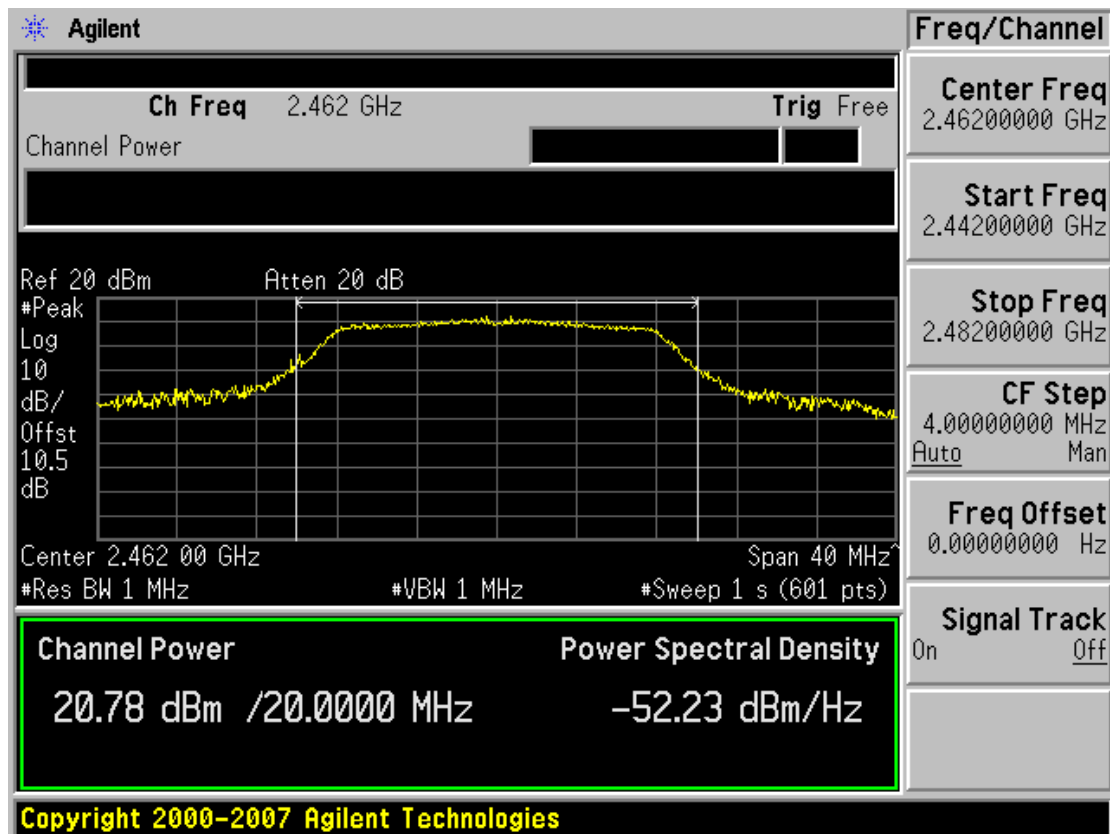
Conducted Output Power (802.11g-CH 11) 12Mbps



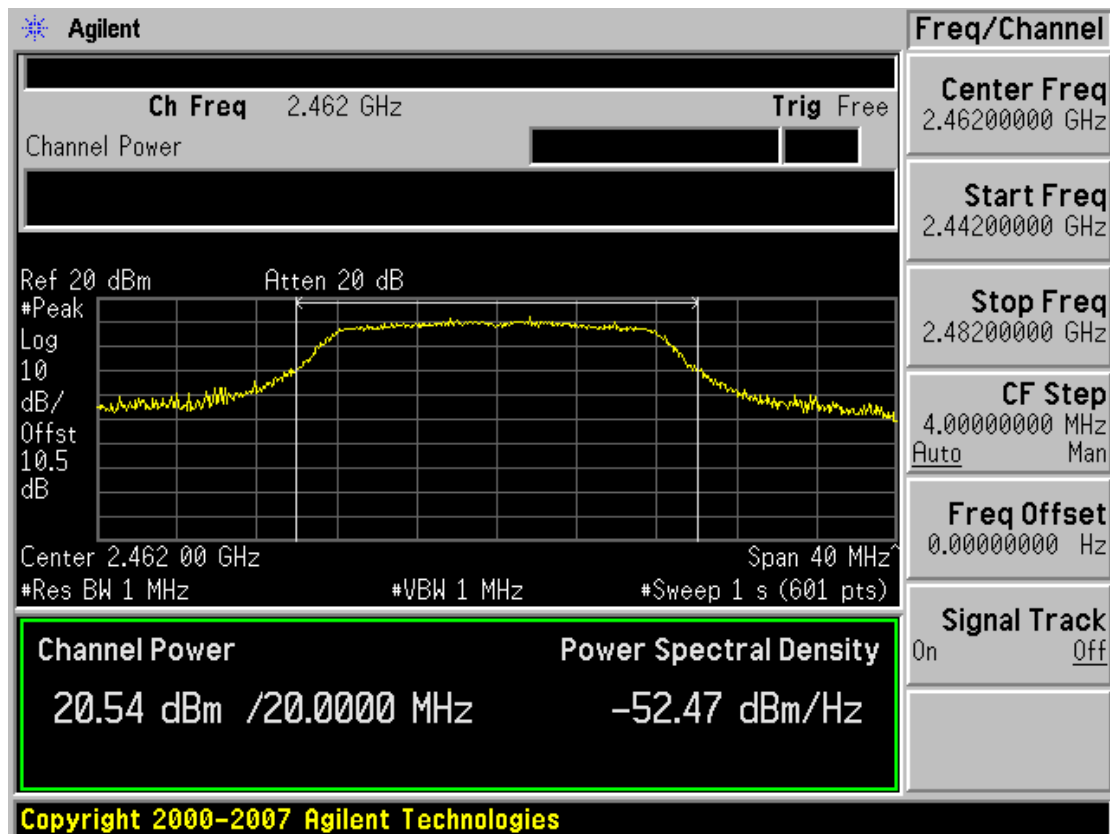
Conducted Output Power (802.11g-CH 11) 18Mbps



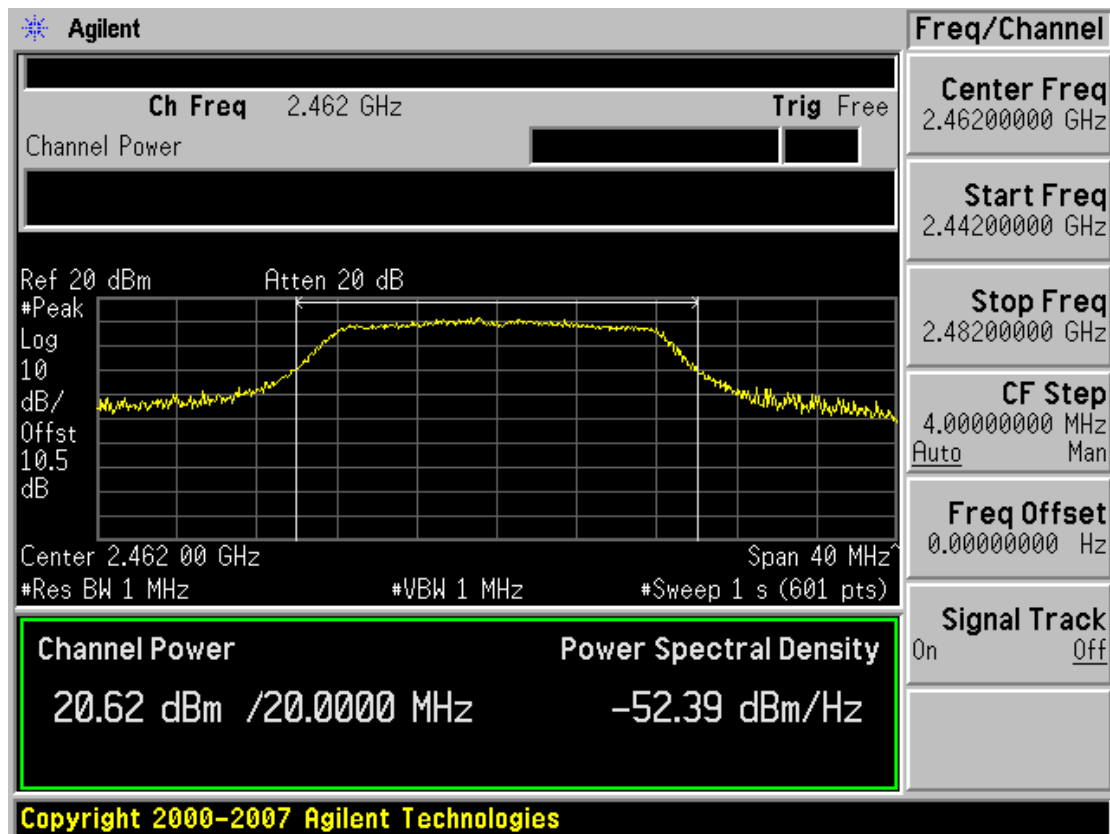
Conducted Output Power (802.11g-CH 11) 24Mbps



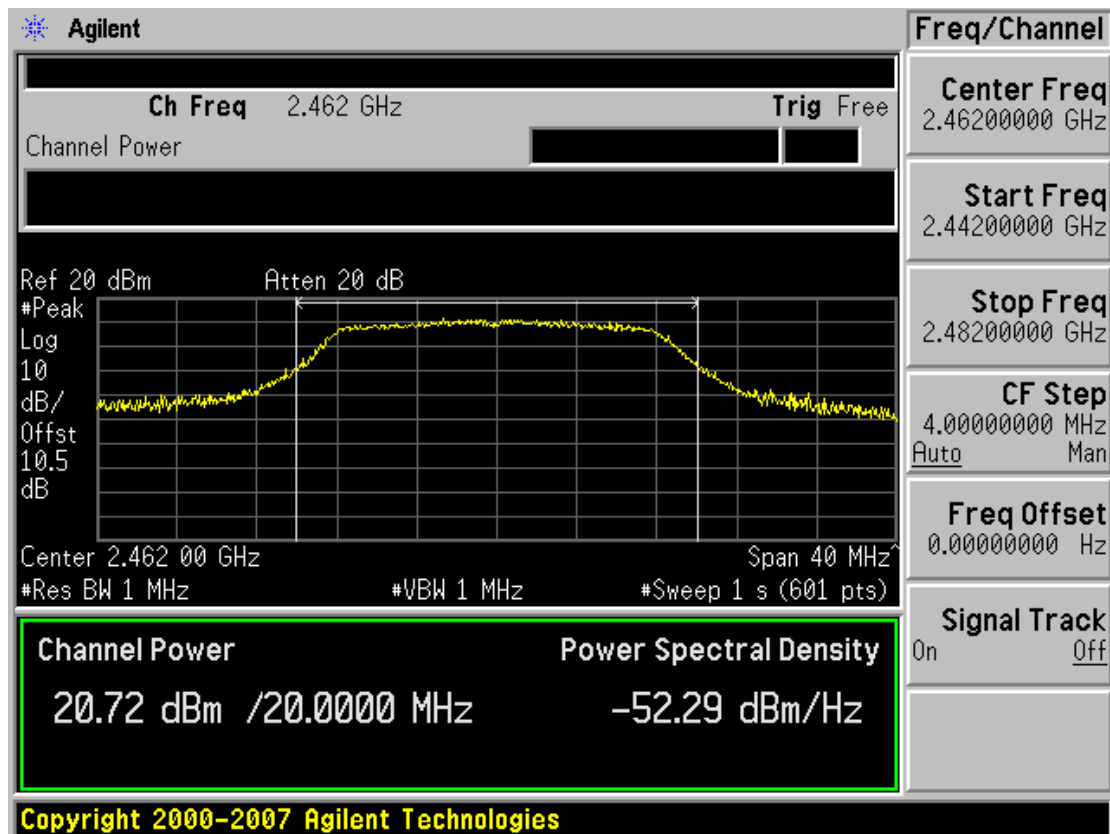
Conducted Output Power (802.11g-CH 11) 36Mbps



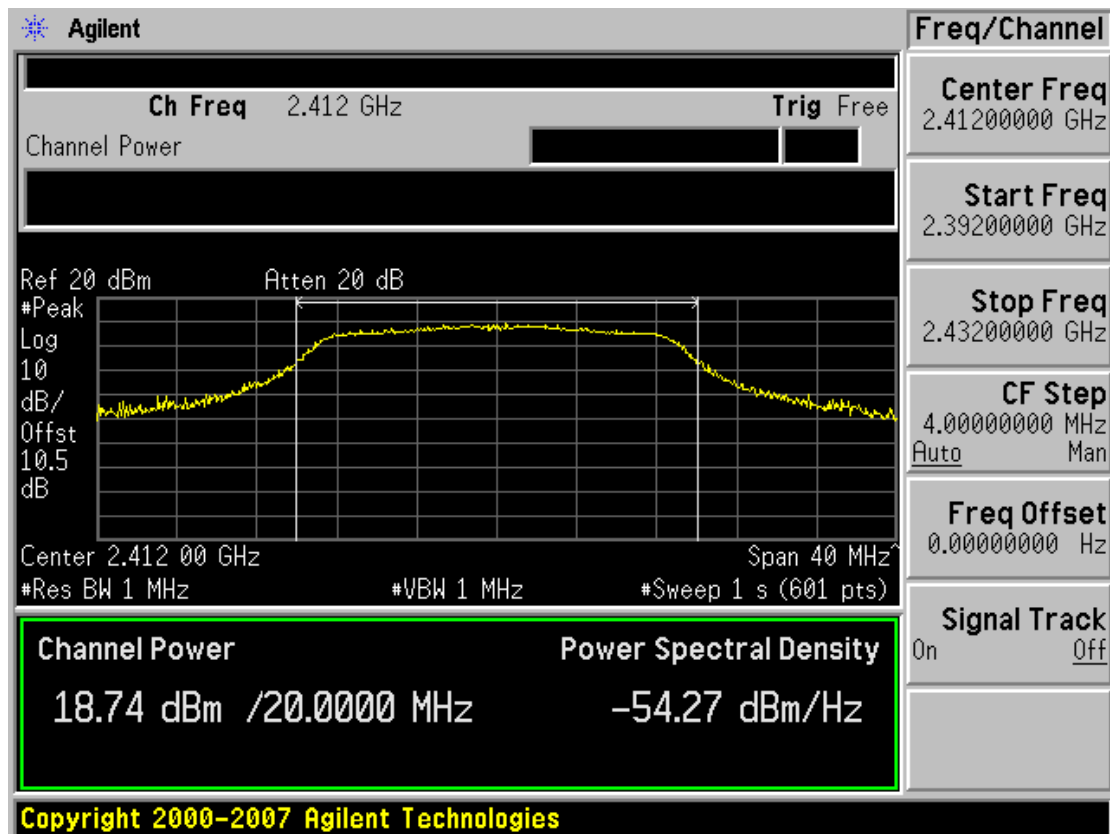
Conducted Output Power (802.11g-CH 11) 48Mbps



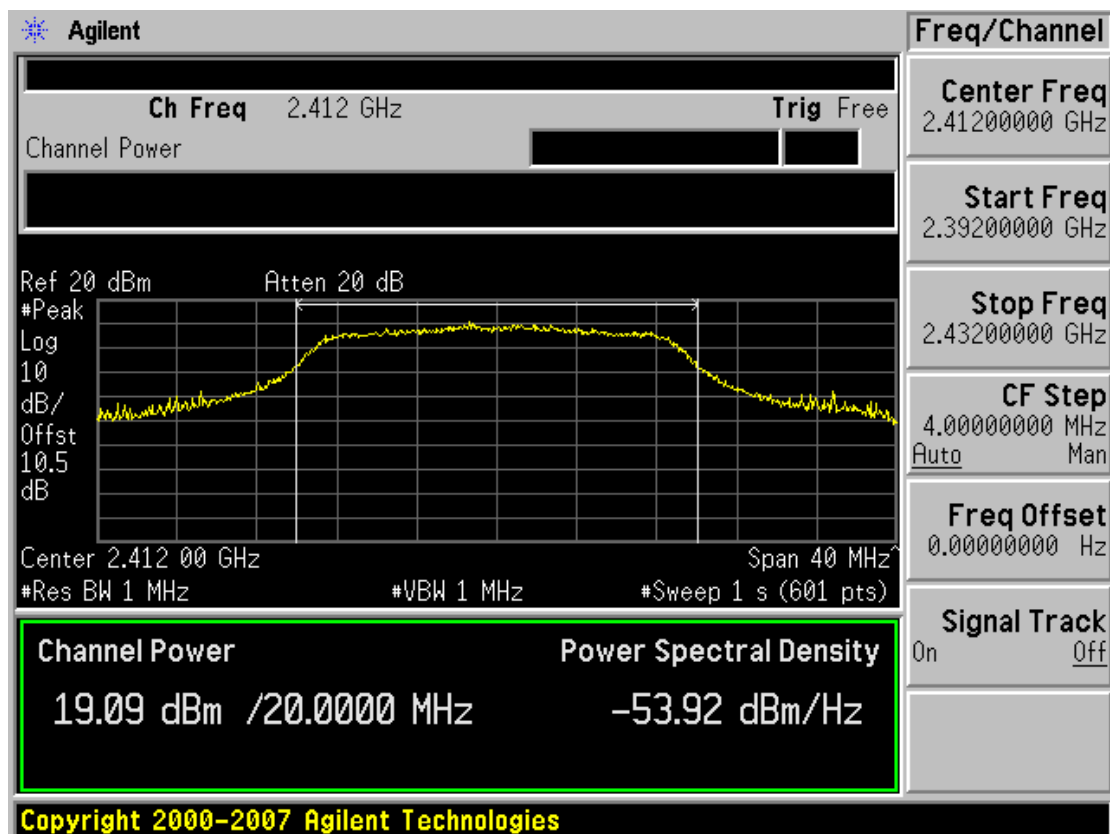
Conducted Output Power (802.11g-CH 11) 54Mbps



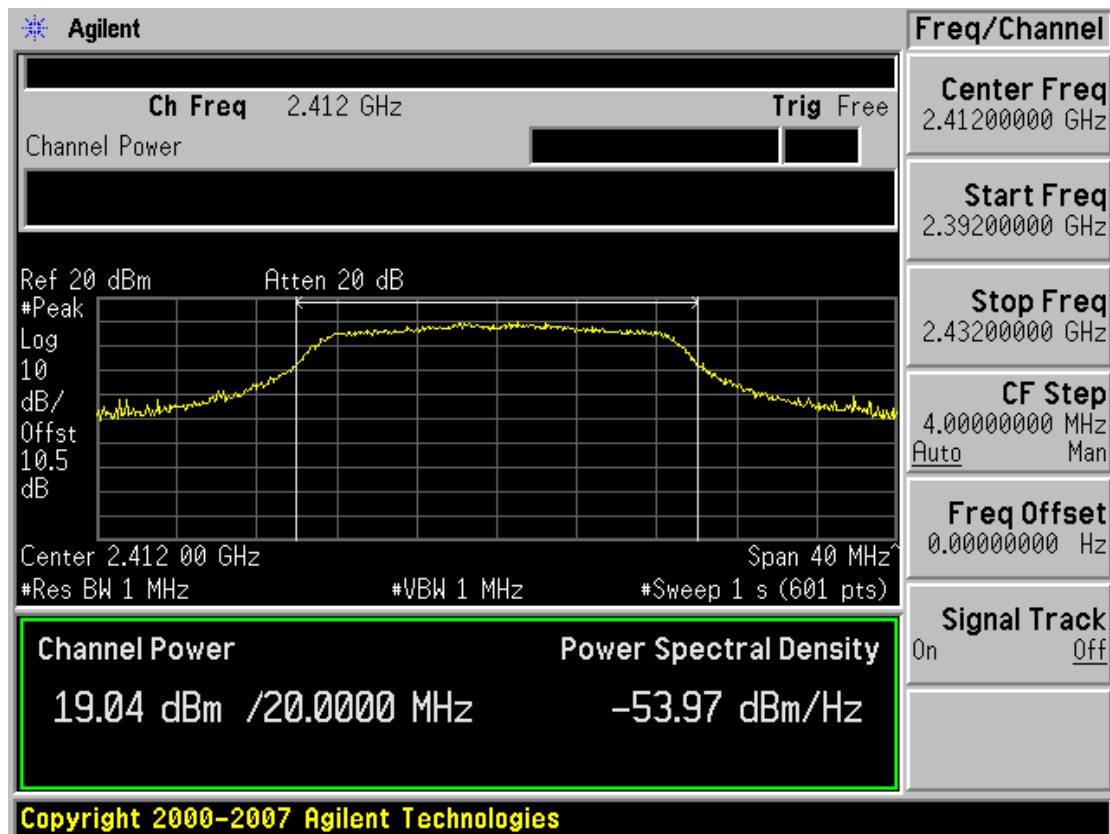
Conducted Output Power (802.11n-CH 1) 6.5Mbps



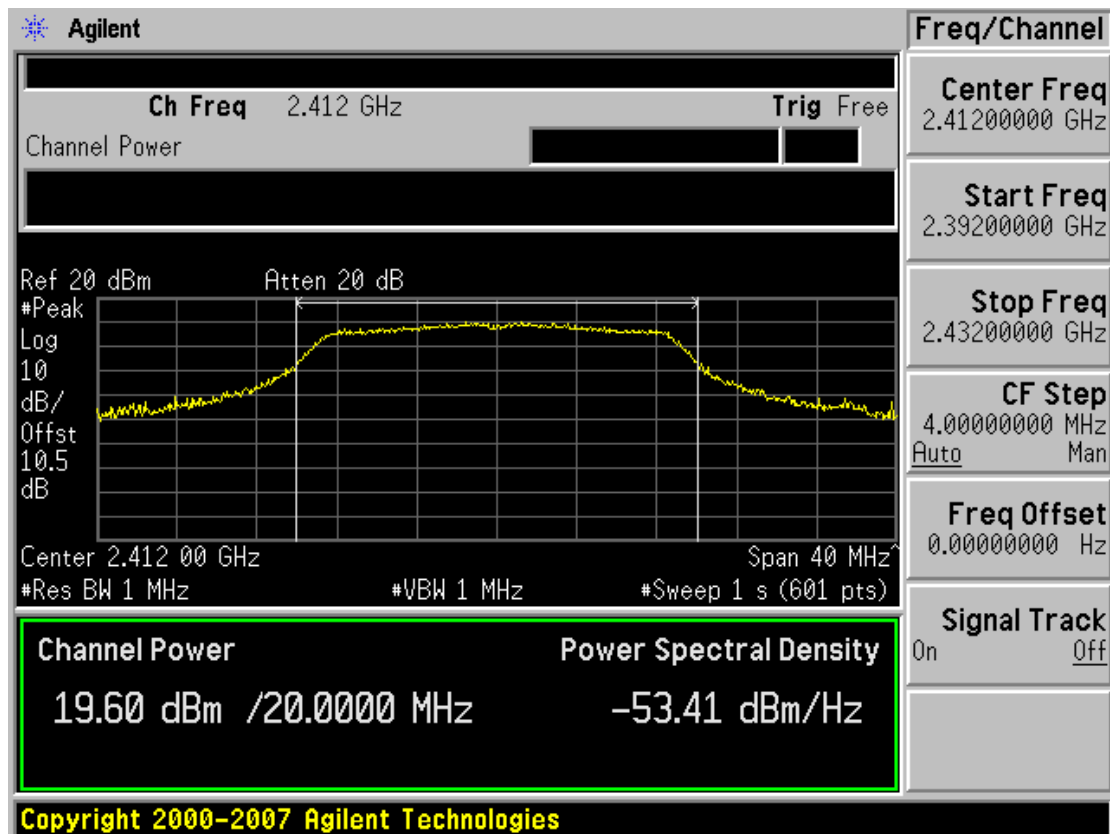
Conducted Output Power (802.11n-CH 1) 13Mbps



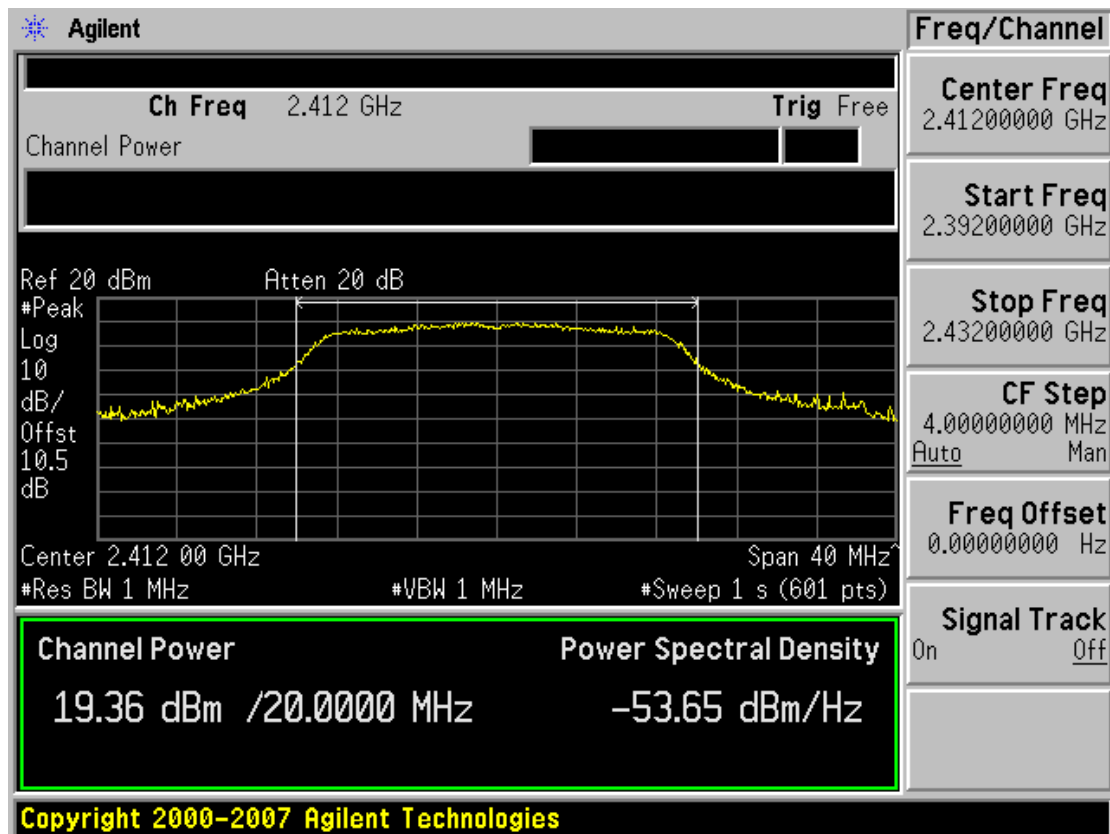
Conducted Output Power (802.11n-CH 1) 19.5Mbps



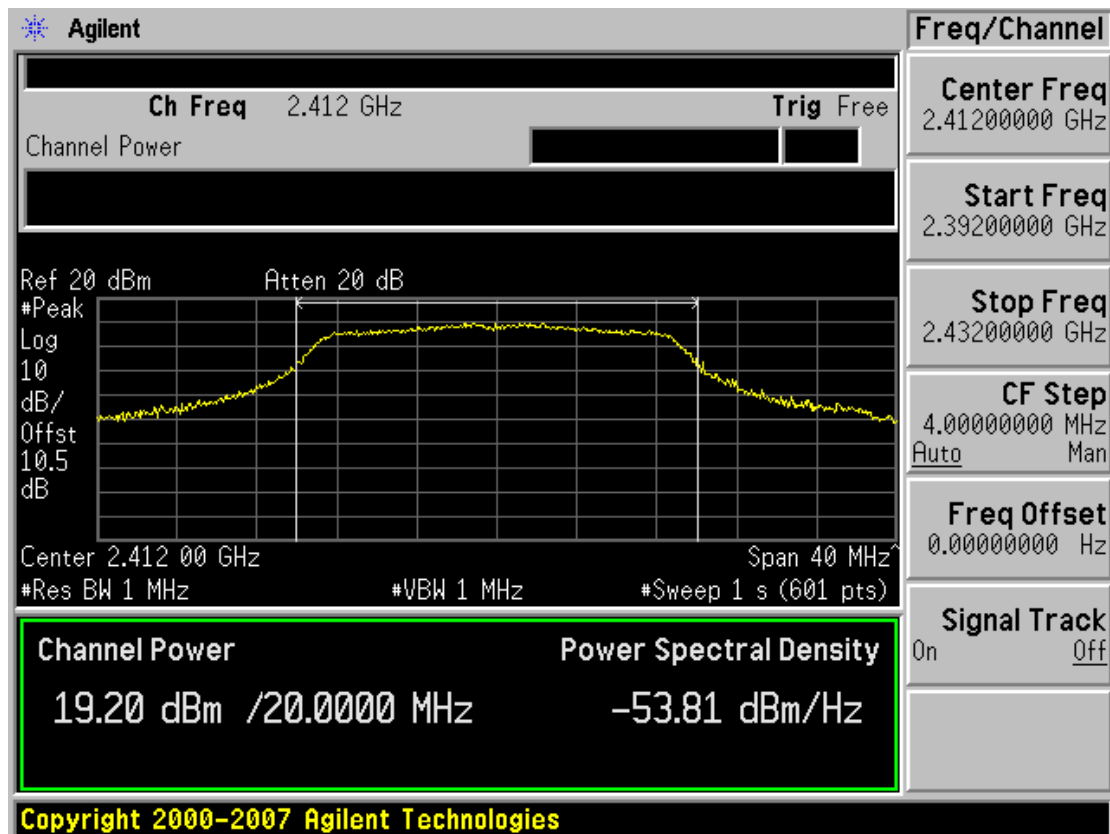
Conducted Output Power (802.11n-CH 1) 26Mbps



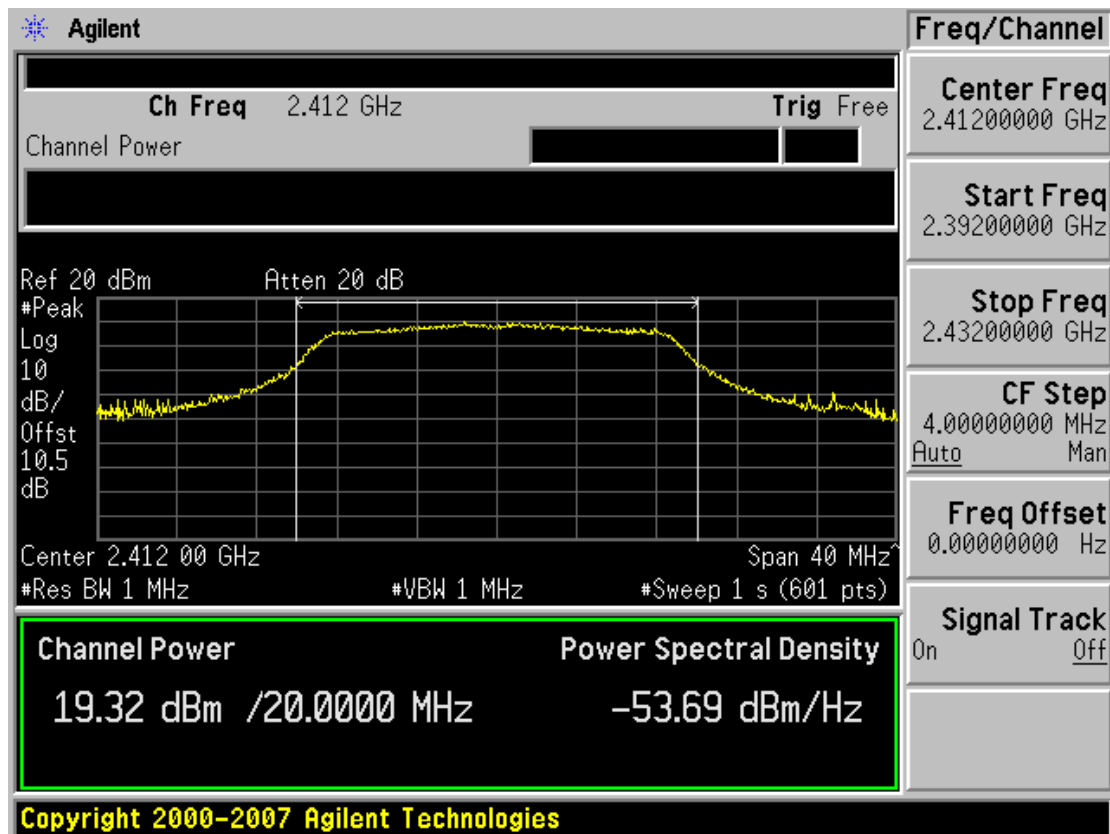
Conducted Output Power (802.11n-CH 1) 39Mbps



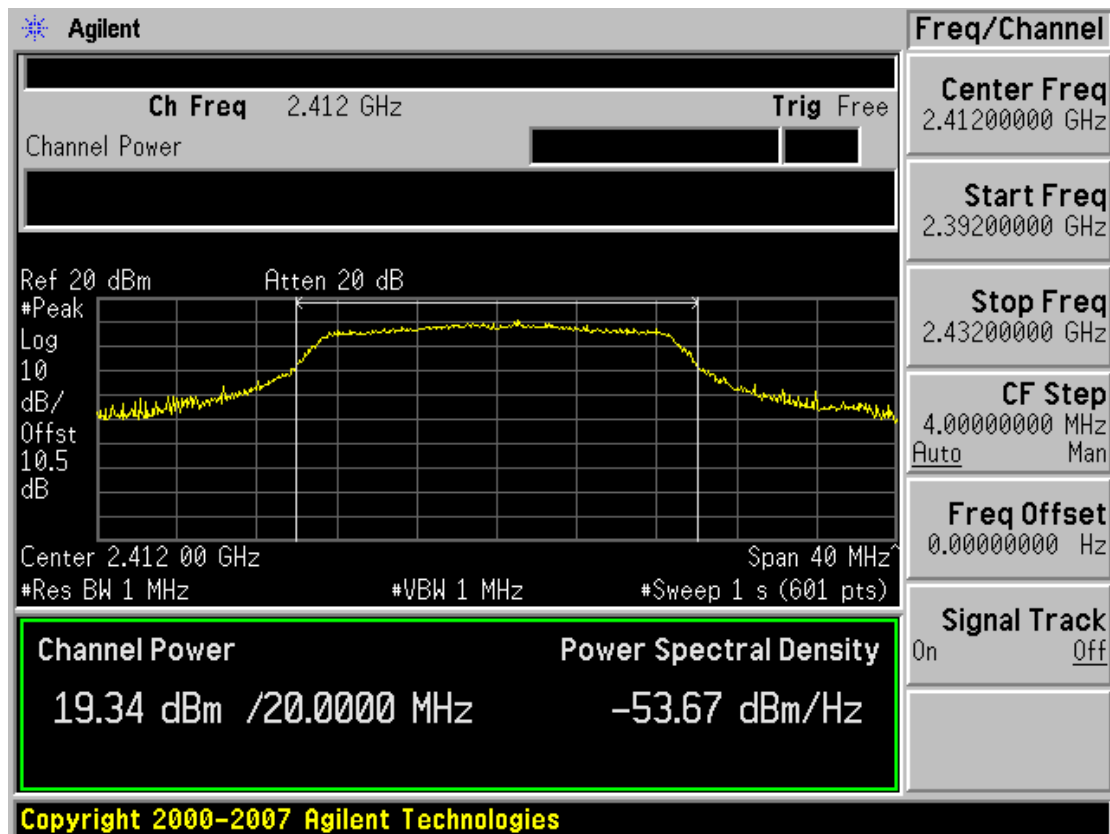
Conducted Output Power (802.11n-CH 1) 52Mbps



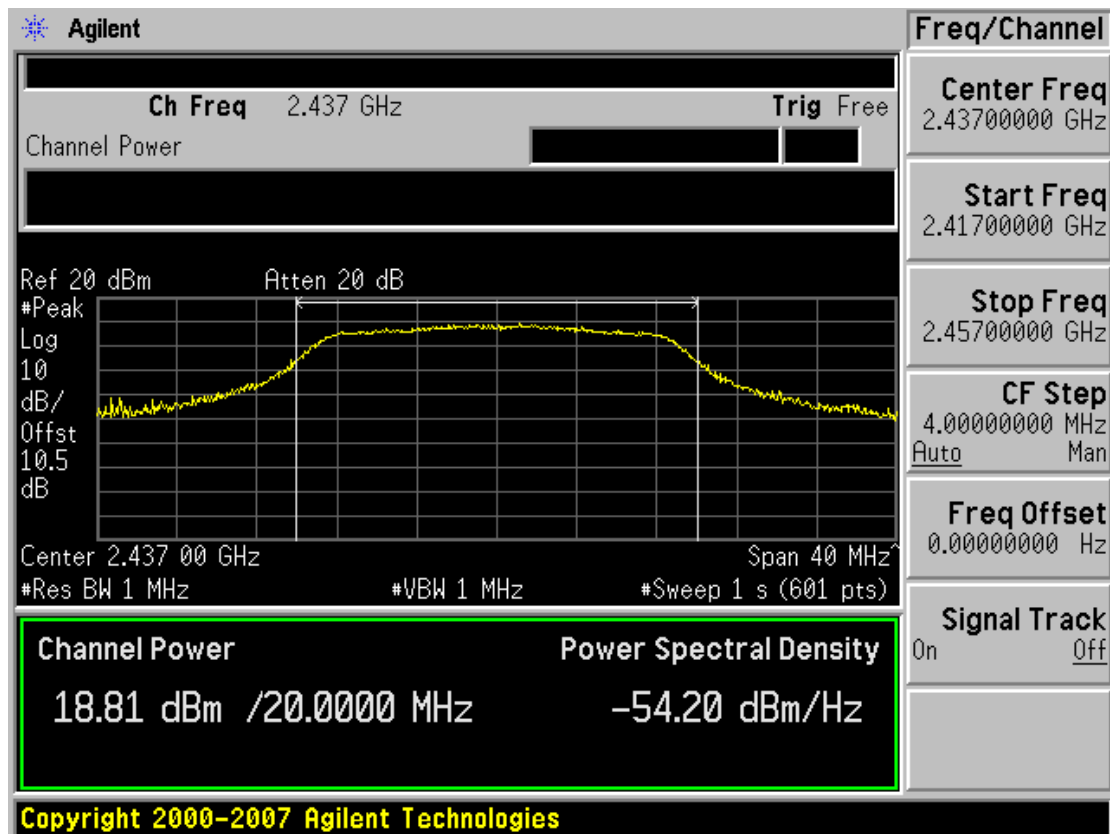
Conducted Output Power (802.11n-CH 1) 58.5Mbps



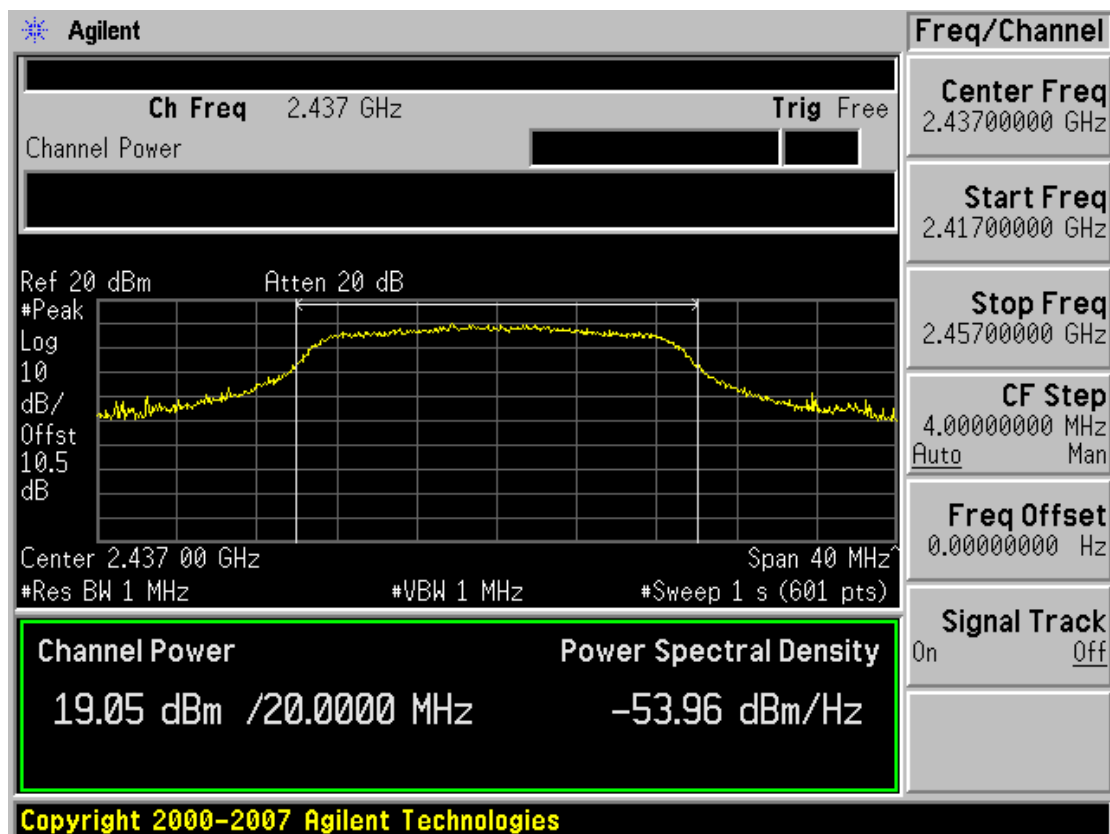
Conducted Output Power (802.11n-CH 1) 65Mbps



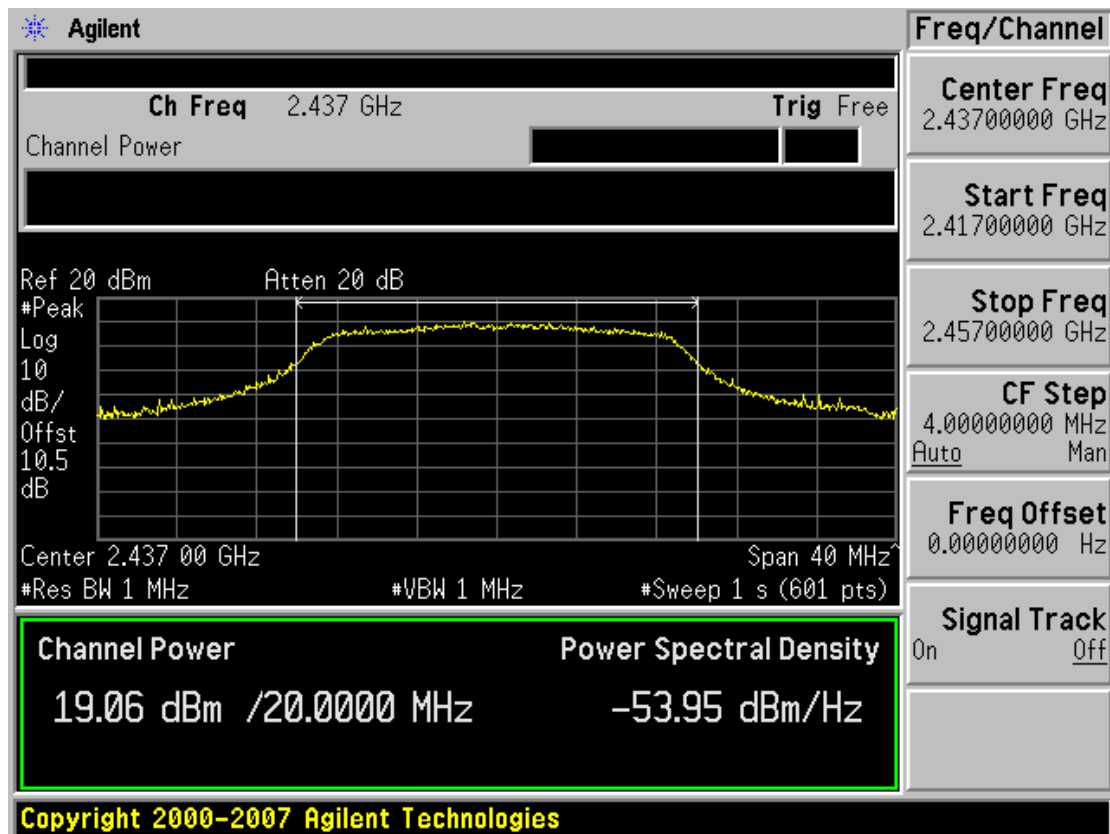
Conducted Output Power (802.11n-CH 6) 6.5Mbps



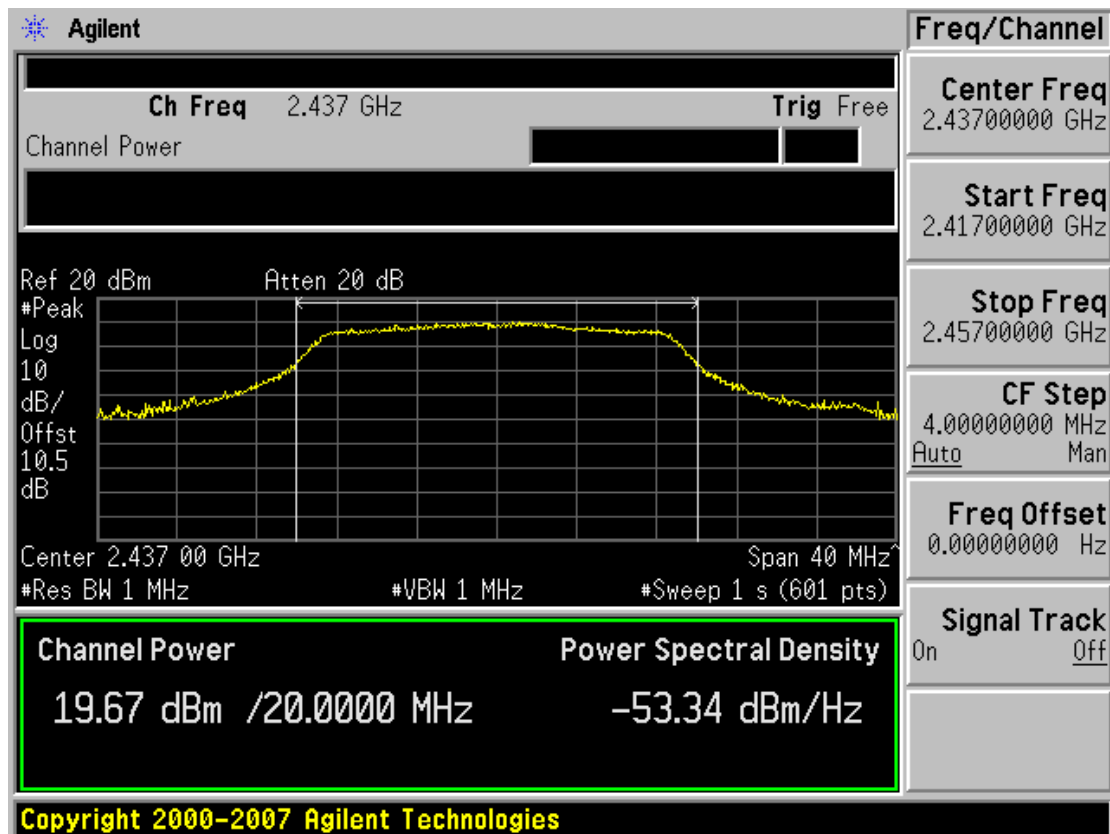
Conducted Output Power (802.11n-CH 6) 13Mbps



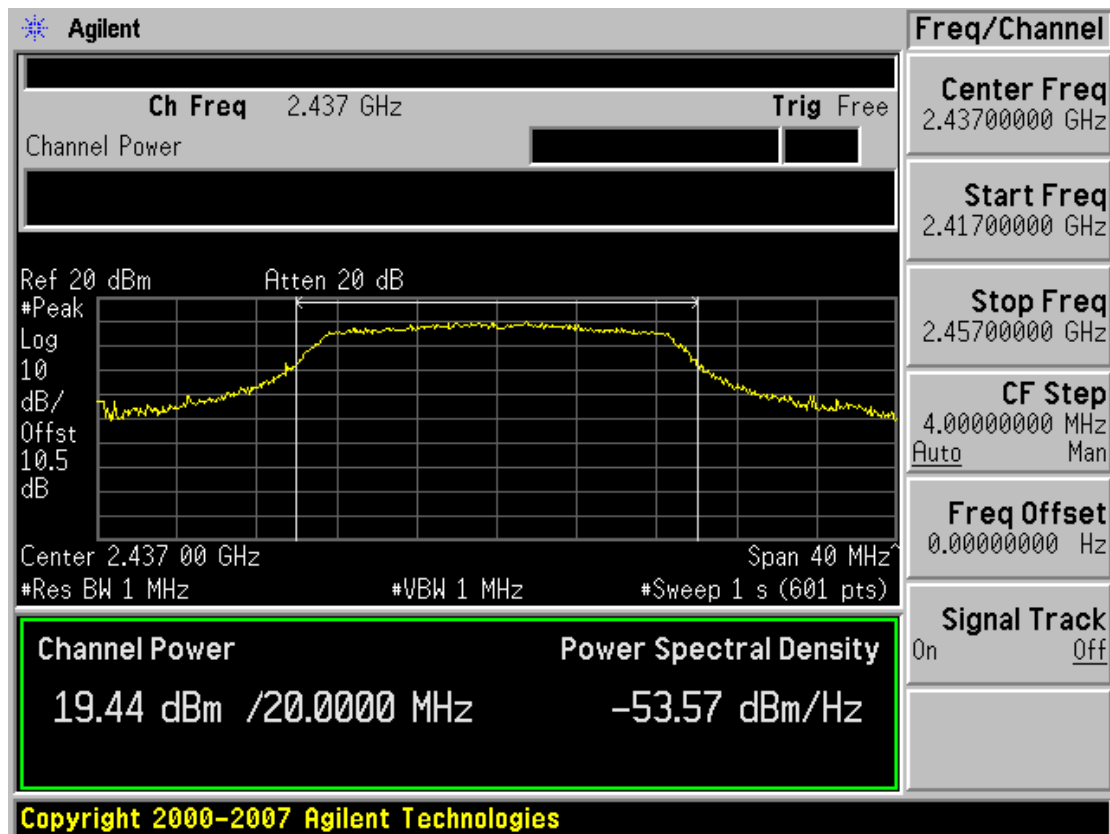
Conducted Output Power (802.11n-CH 6) 19.5Mbps



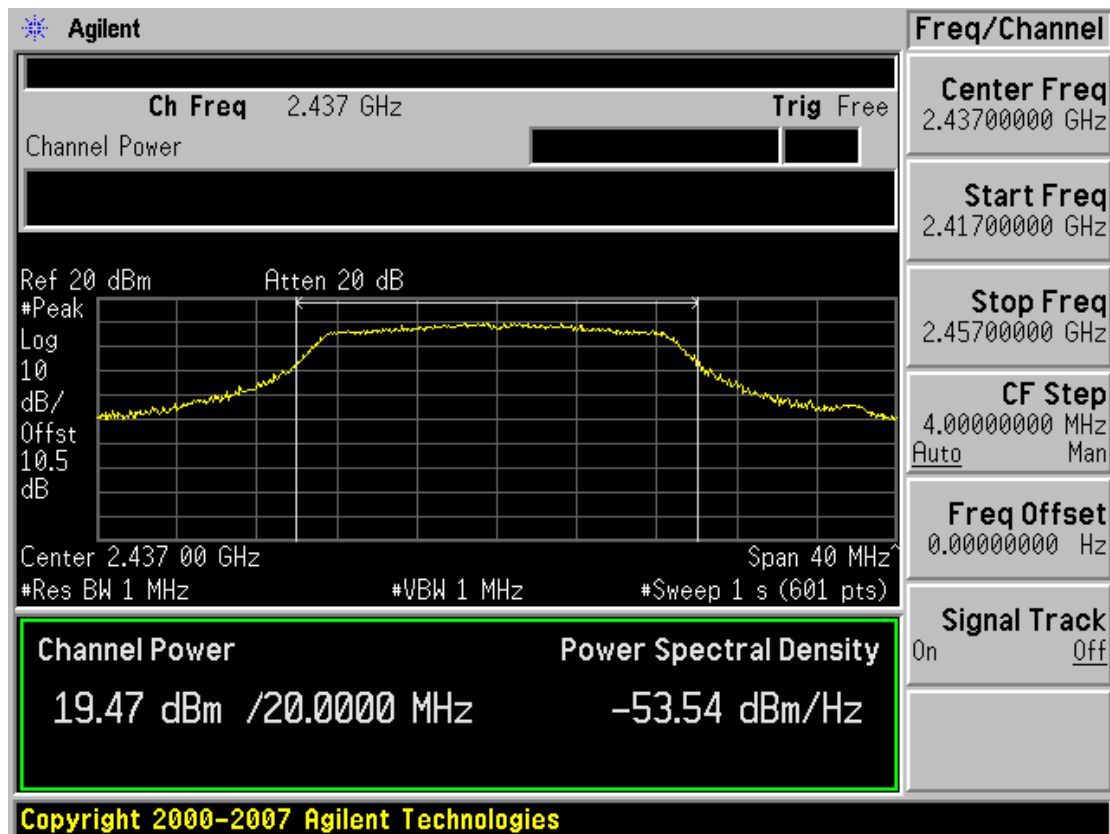
Conducted Output Power (802.11n-CH 6) 26Mbps



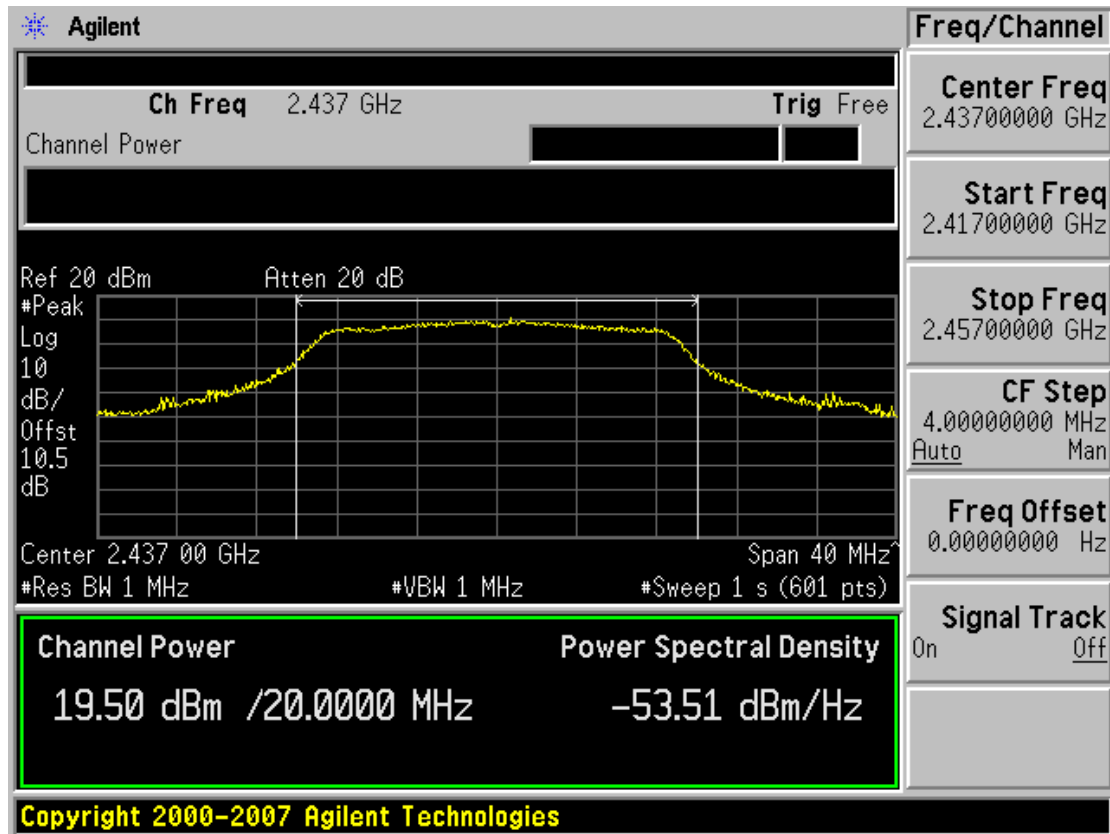
Conducted Output Power (802.11n-CH 6) 39Mbps



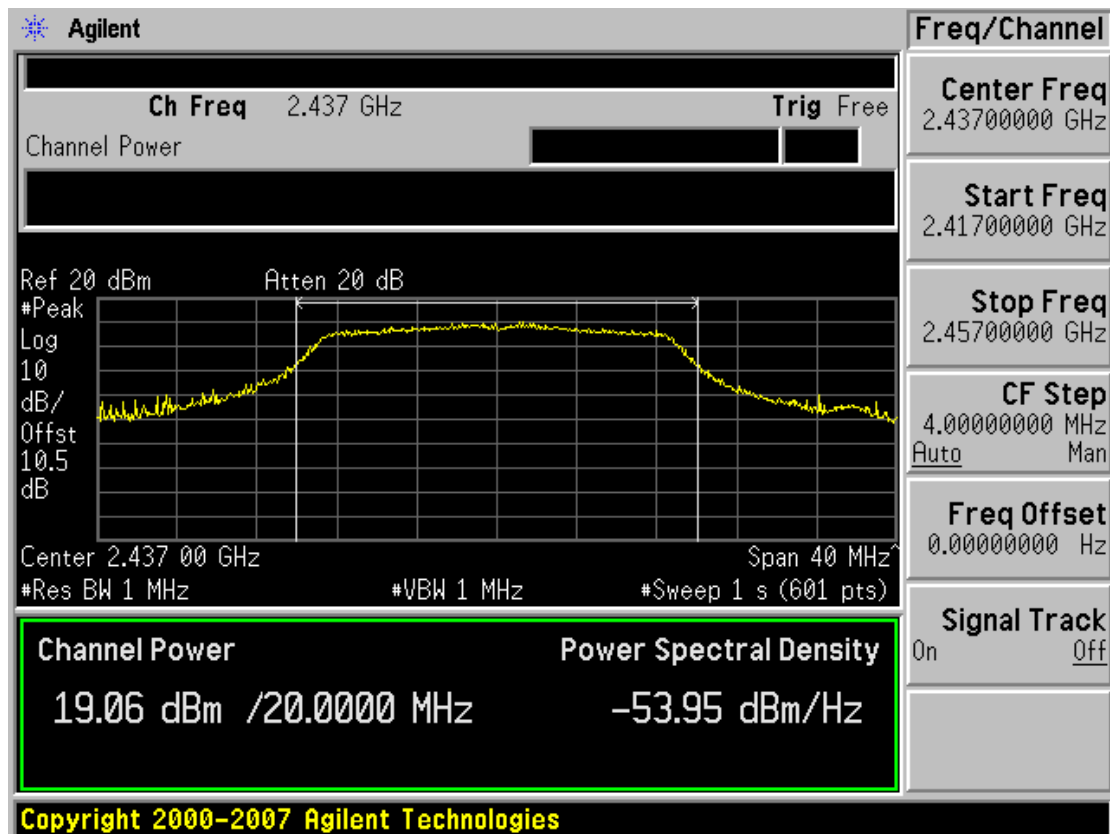
Conducted Output Power (802.11n-CH 6) 52Mbps



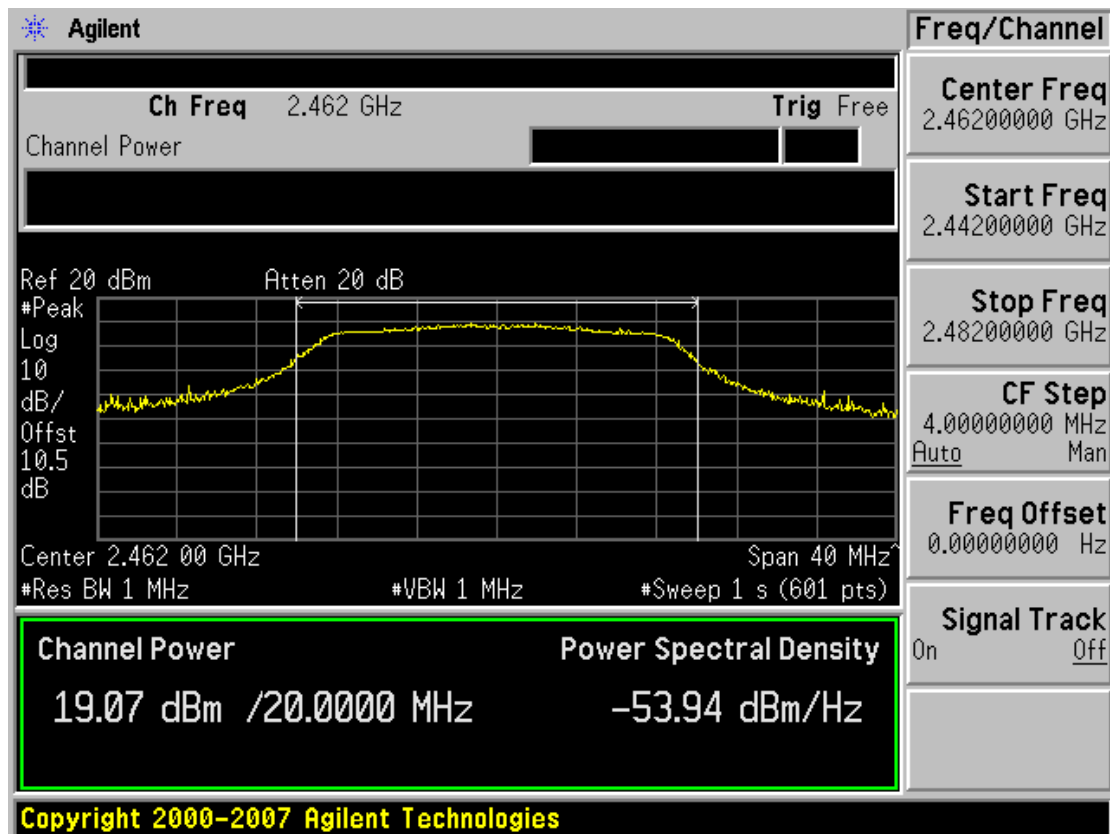
Conducted Output Power (802.11n-CH 6) 58.5Mbps



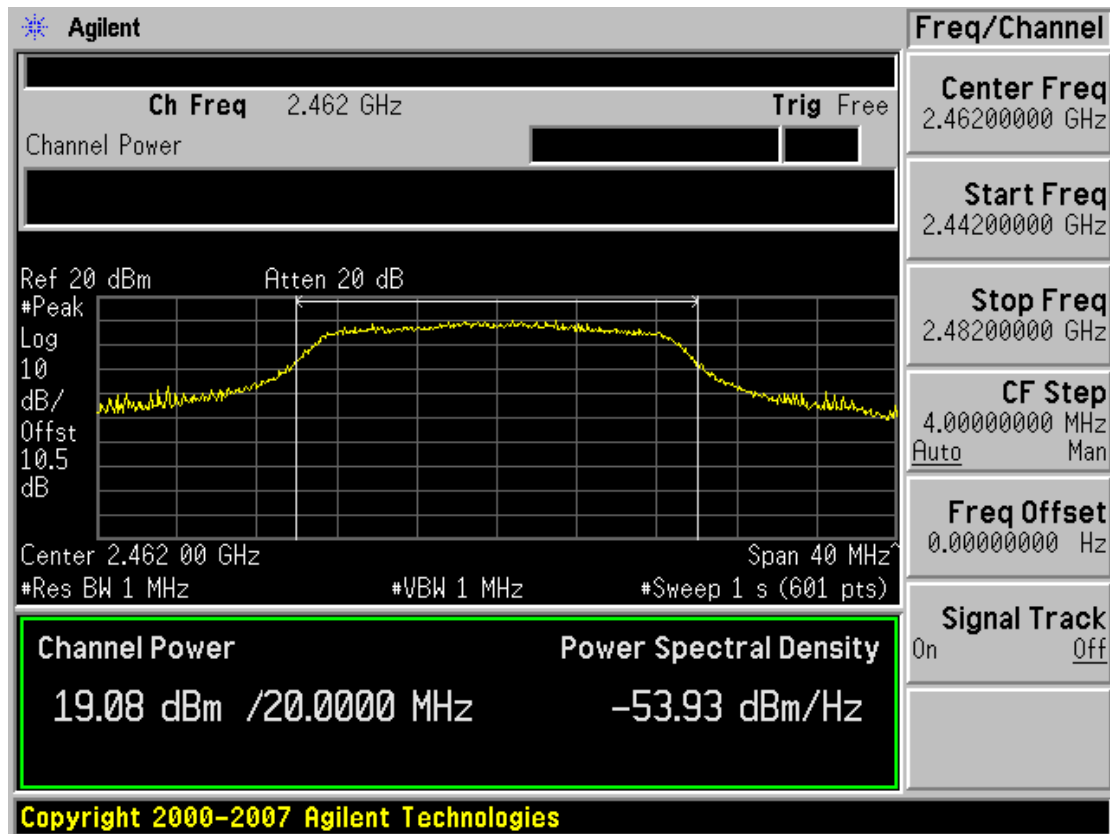
Conducted Output Power (802.11n-CH 6) 65Mbps



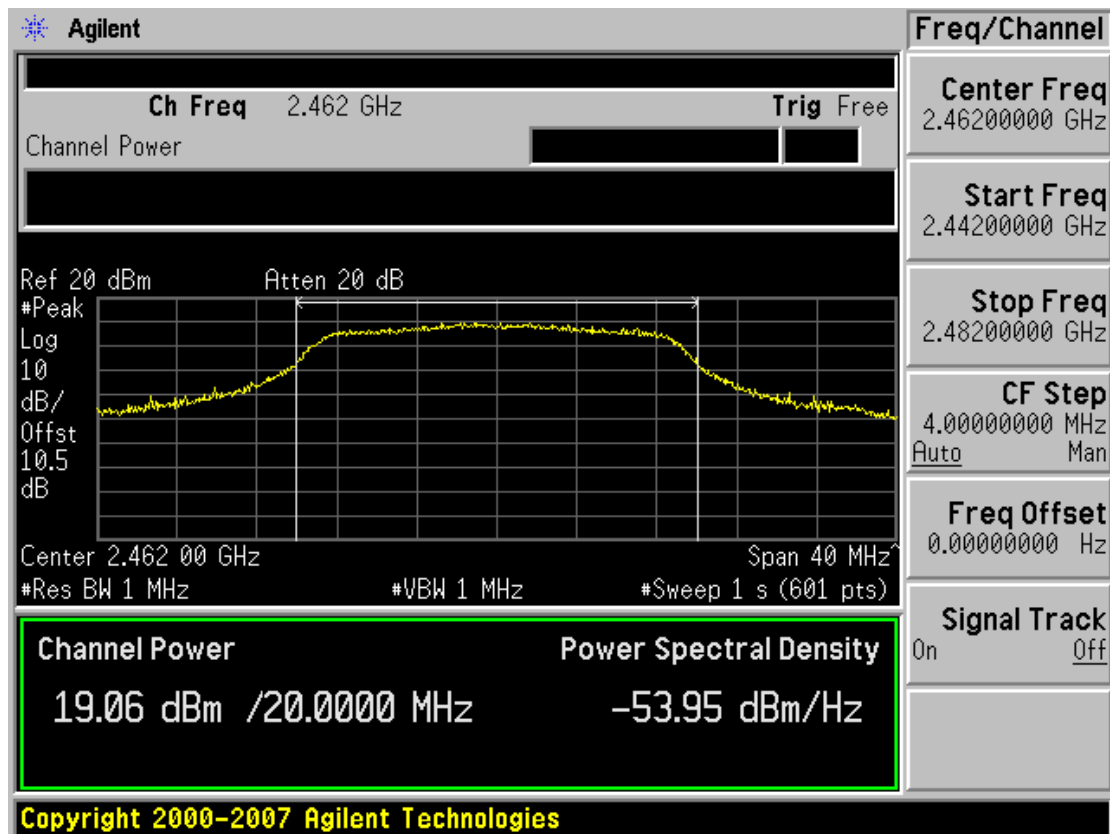
Conducted Output Power (802.11n-CH 11) 6.5Mbps



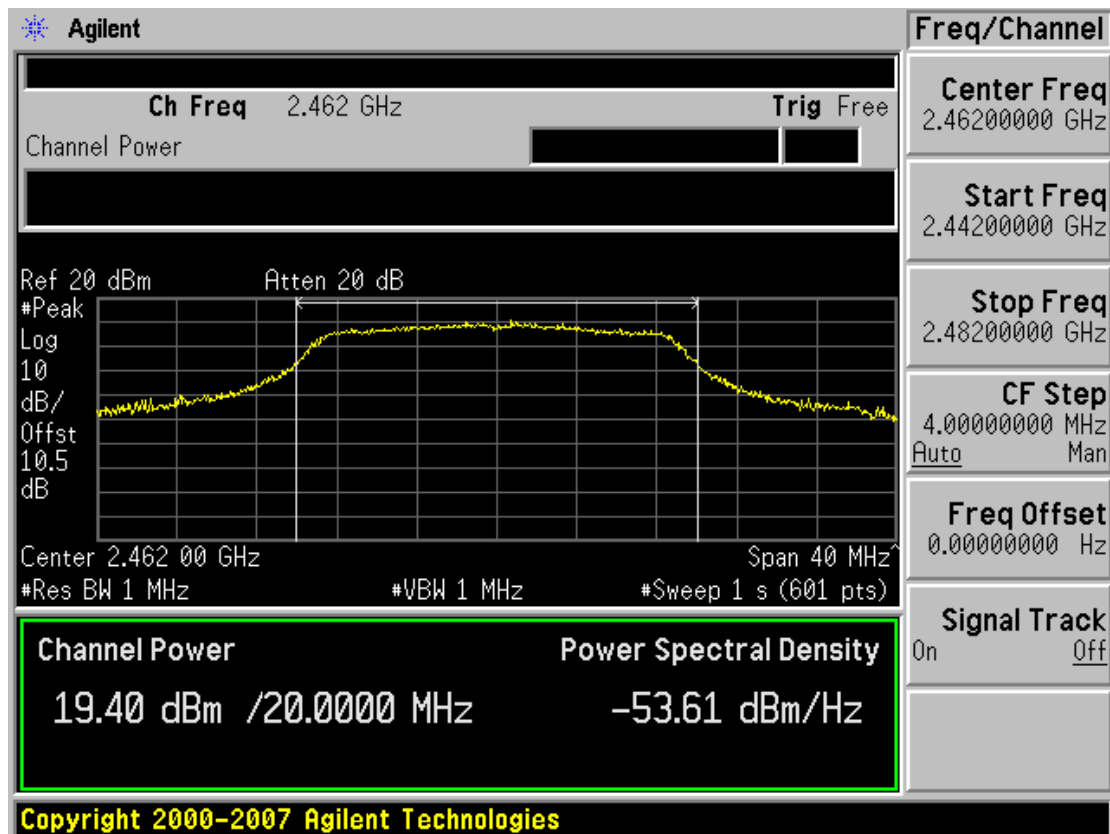
Conducted Output Power (802.11n-CH 11) 13Mbps



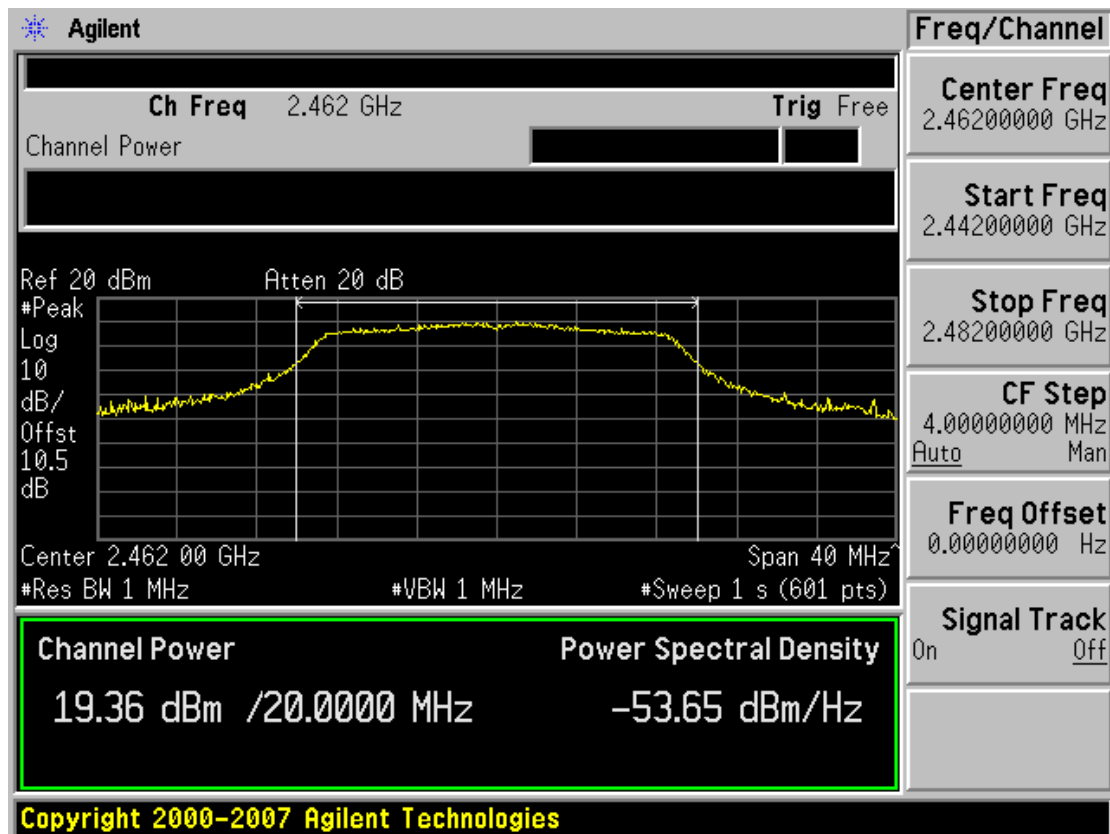
Conducted Output Power (802.11n-CH 11) 19.5Mbps



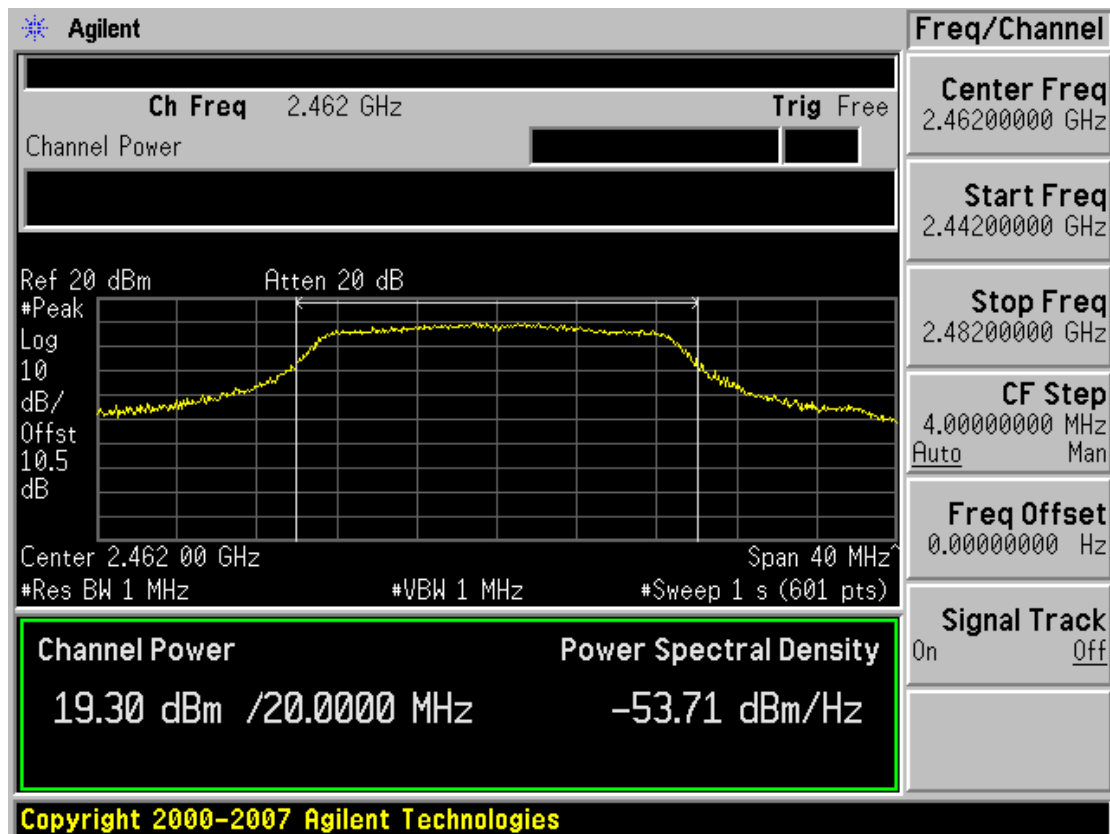
Conducted Output Power (802.11n-CH 11) 26Mbps



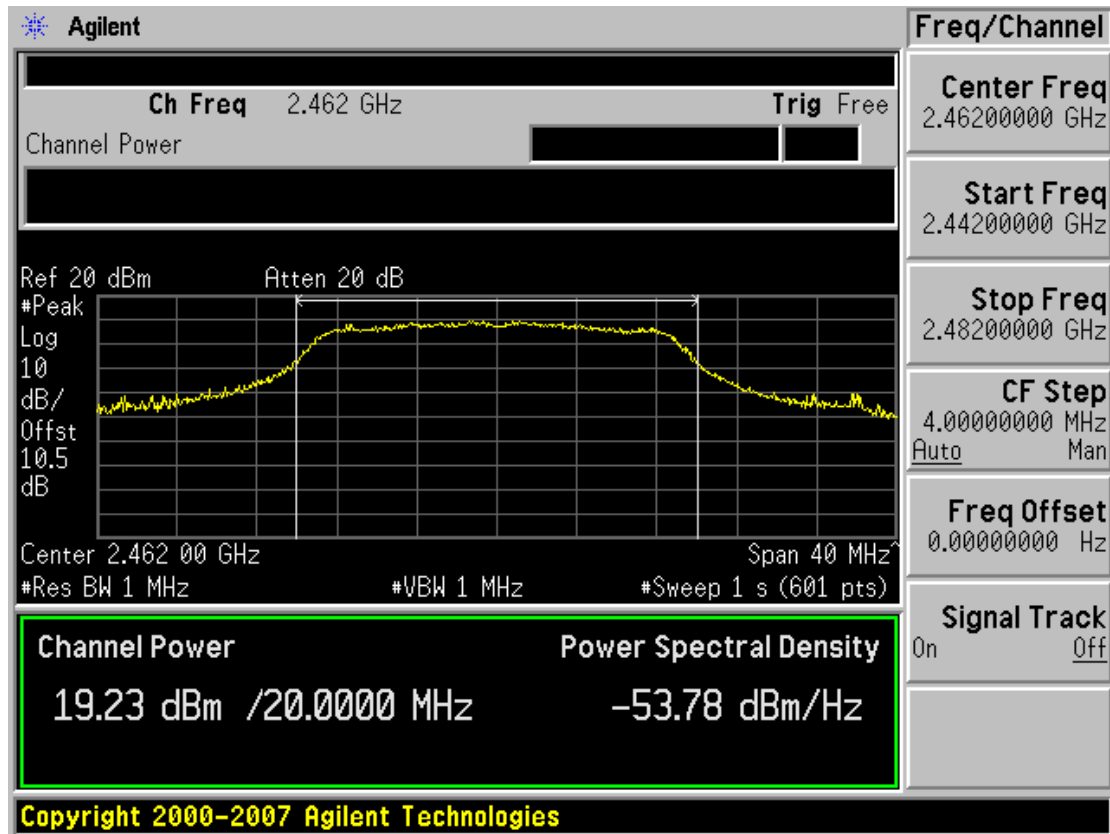
Conducted Output Power (802.11n-CH 11) 39Mbps



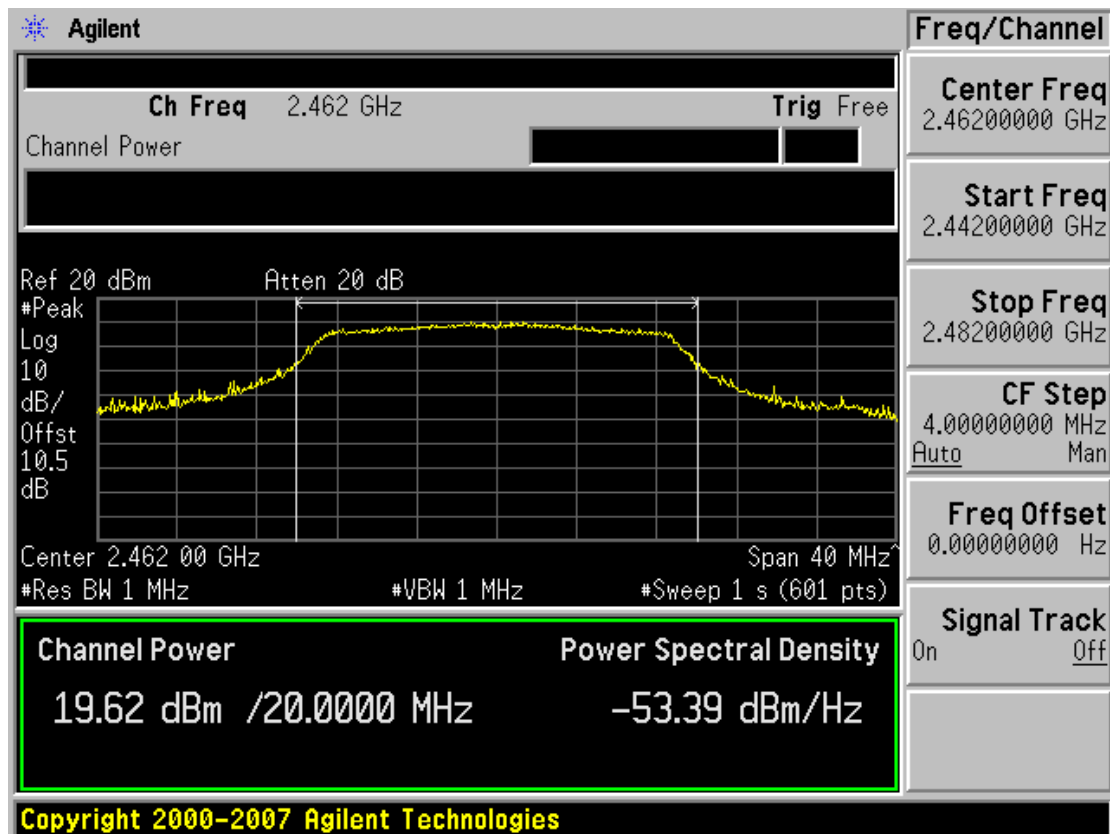
Conducted Output Power (802.11n-CH 11) 52Mbps



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



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



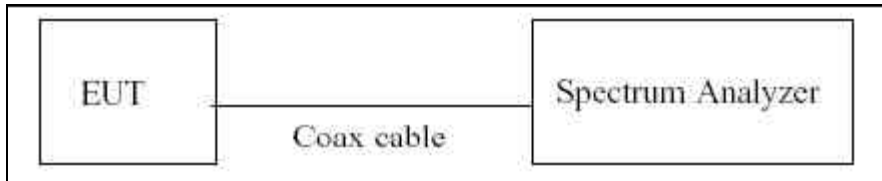
7.3 POWER SPECTRAL DENSITY (802.11b/g/n)

Test Requirements and limit, §15.247(e)

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

Minimum Standard – The transmitter power density average over 1-second interval shall not be greater than 8dBm in any 3kHz BW.

■ TEST CONFIGURATION



■ TEST PROCEDURE

The spectrum analyzer is set to :

1. Span = 300 kHz
2. RBW = 3 kHz (7dB/div)
3. VBW = 3 kHz
4. Sweep = 100 sec
5. Detector Mode = Peak

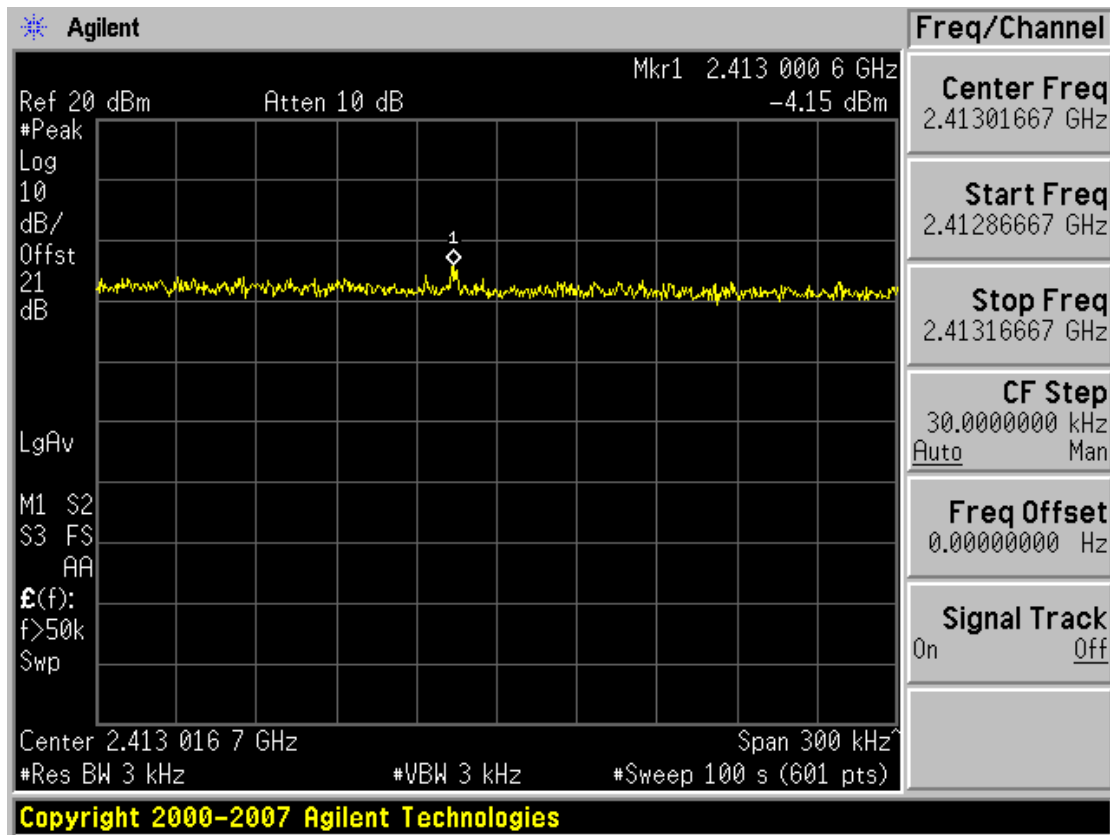
■ TEST RESULTS

Conducted Power Density Measurements

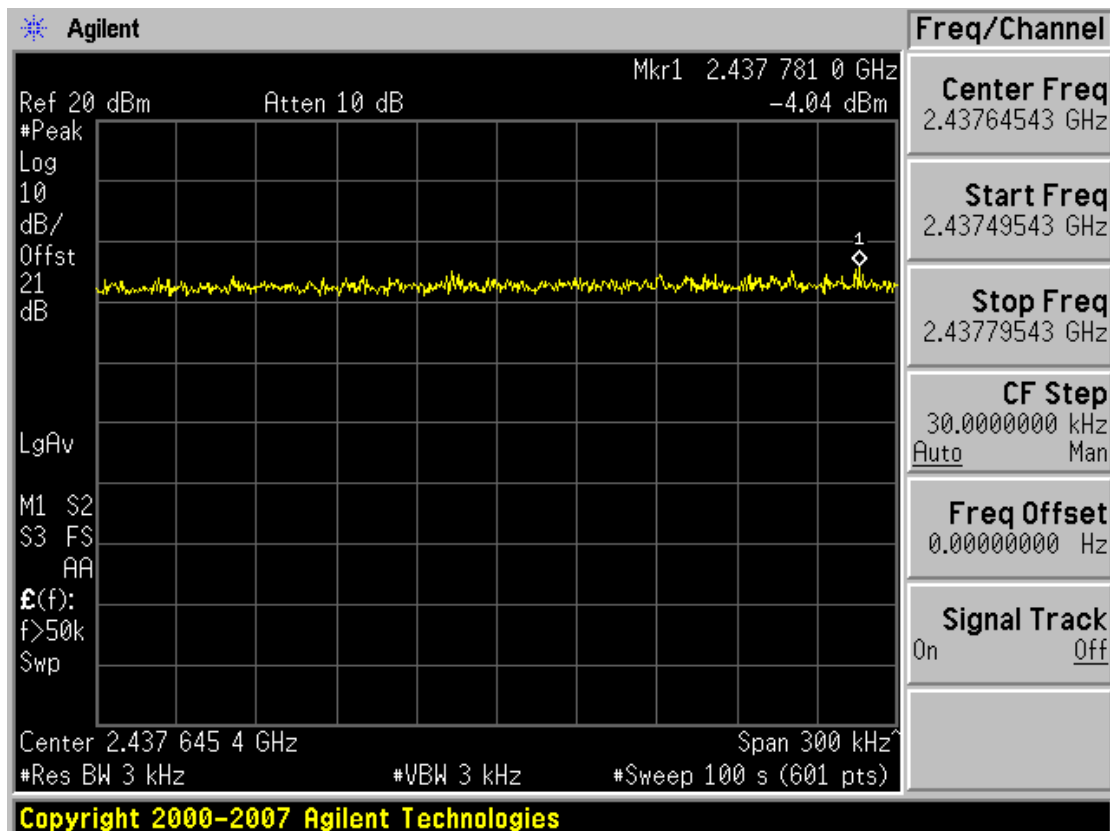
Frequency (MHz)	Channel No.	Mode	Test Result	
			Power Density (dBm)	Pass/Fail
2412	1	802.11b	-4.15	Pass
2437	6		-4.04	Pass
2462	11		-5.52	Pass
2412	1	802.11g	-12.01	Pass
2437	6		-11.86	Pass
2462	11		-12.02	Pass
2412	1	802.11n	-11.91	Pass
2437	6		-12.70	Pass
2462	11		-12.11	Pass

■ RESULT PLOTS

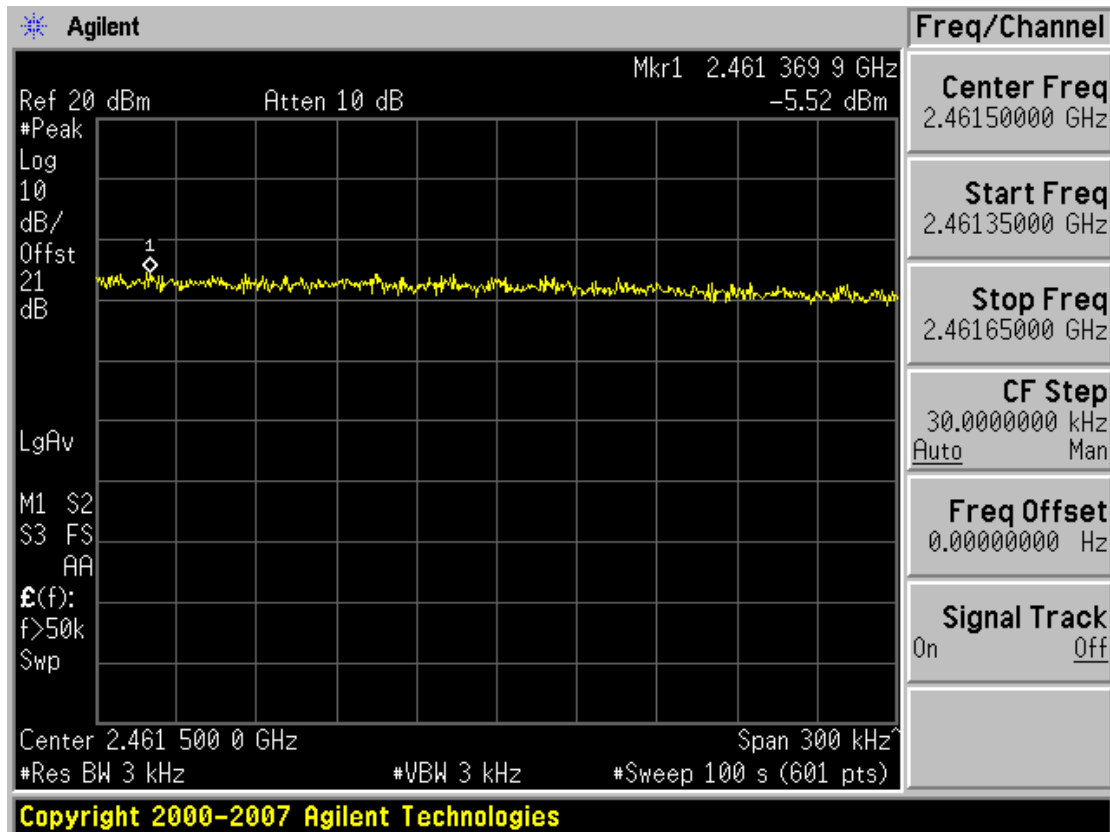
Power Spectral Density (802.11b-CH 1)



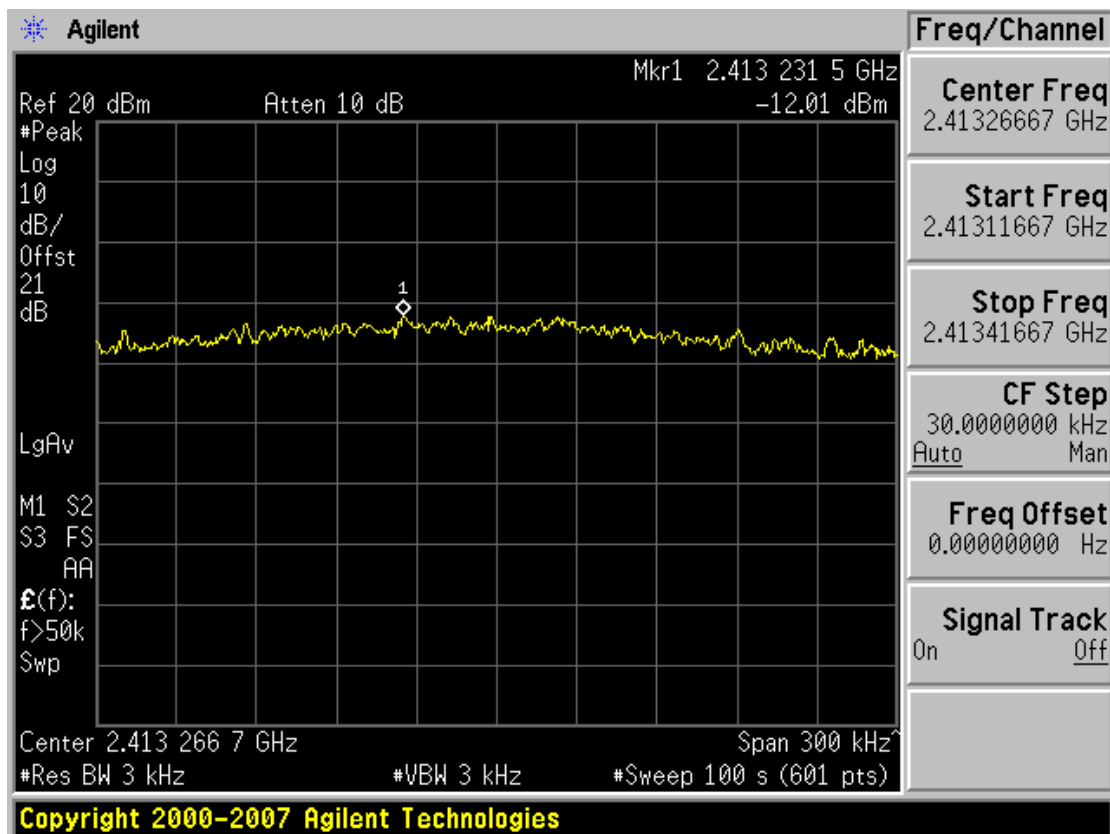
Power Spectral Density (802.11b-CH 6)



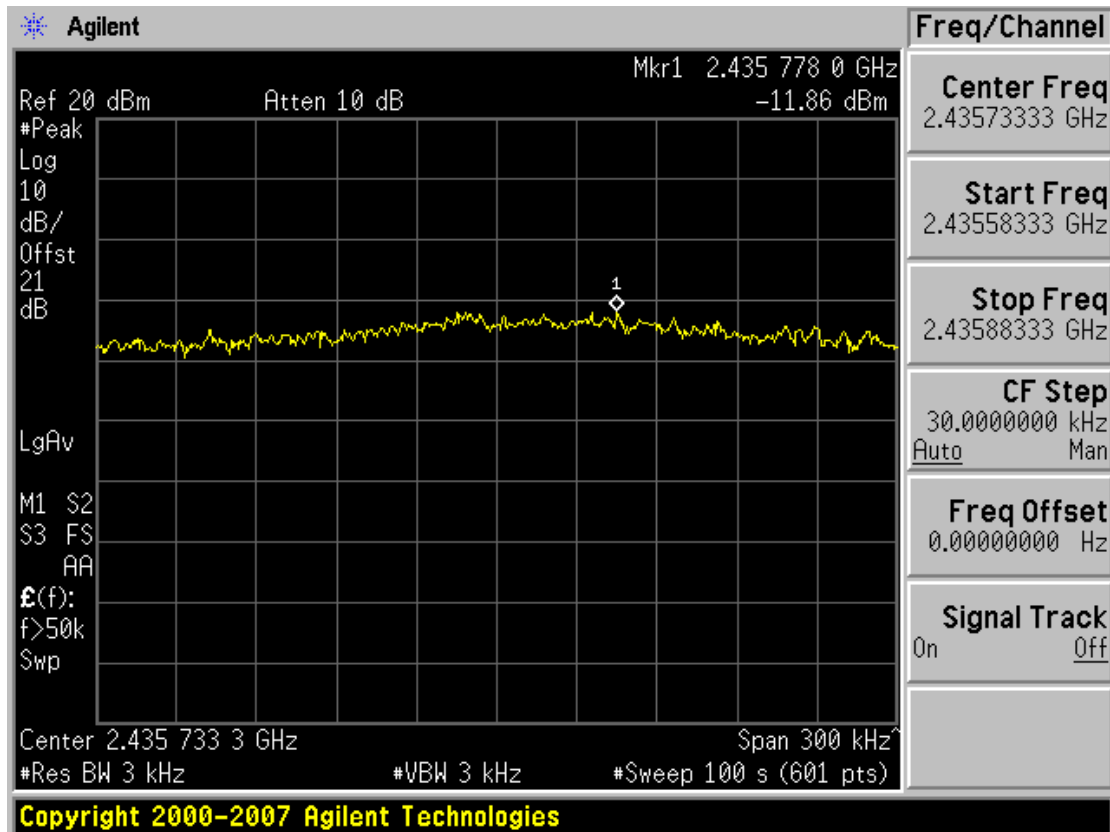
Power Spectral Density (802.11b-CH 11)



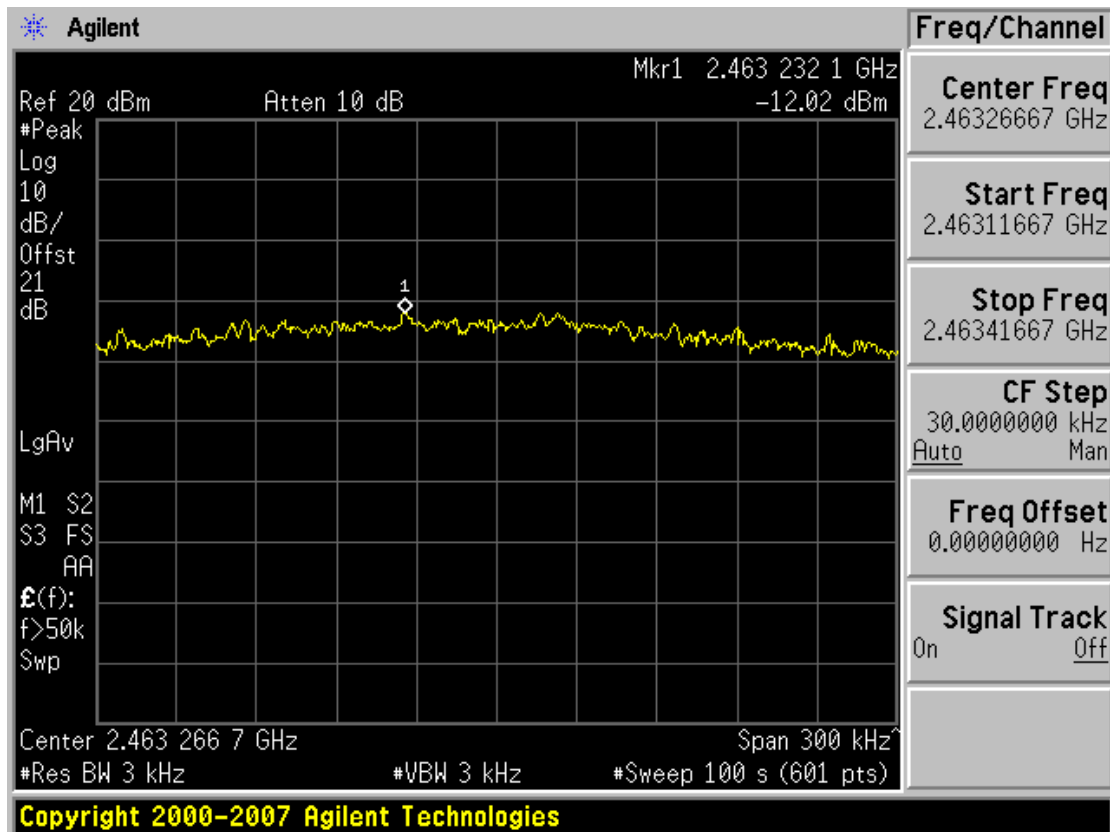
Power Spectral Density (802.11g-CH 1)



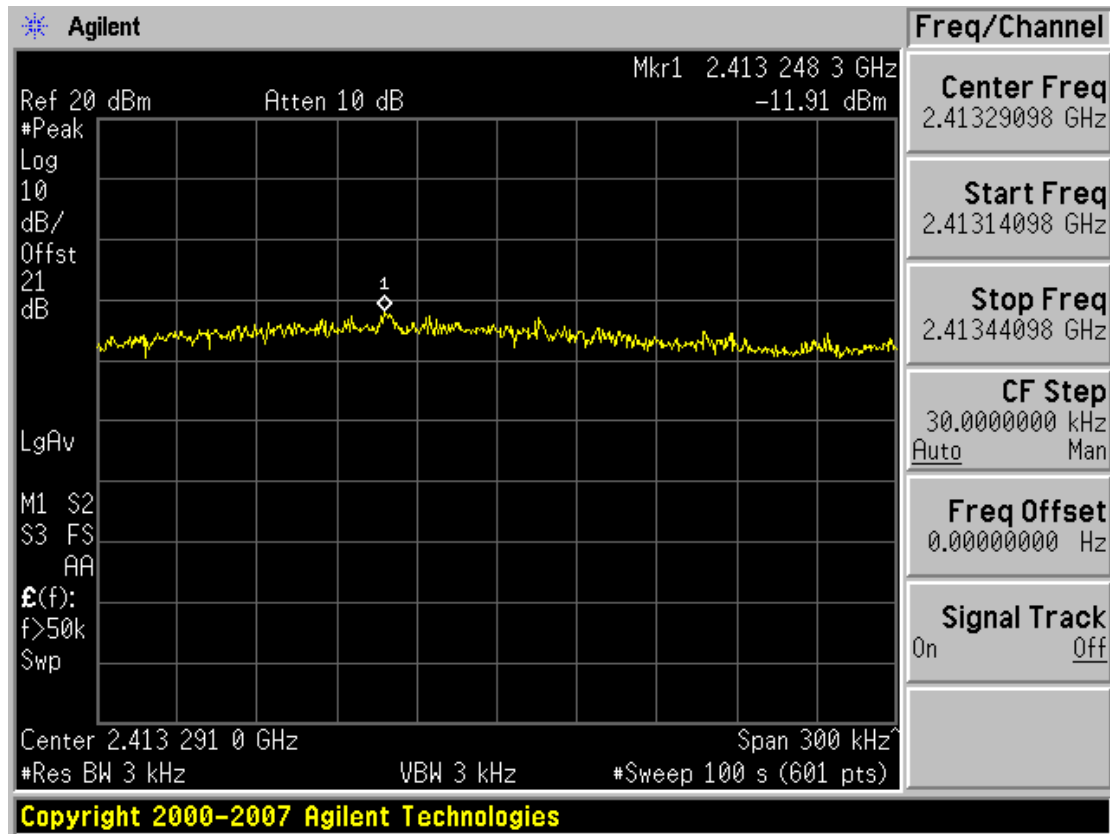
Power Spectral Density (802.11g-CH 6)



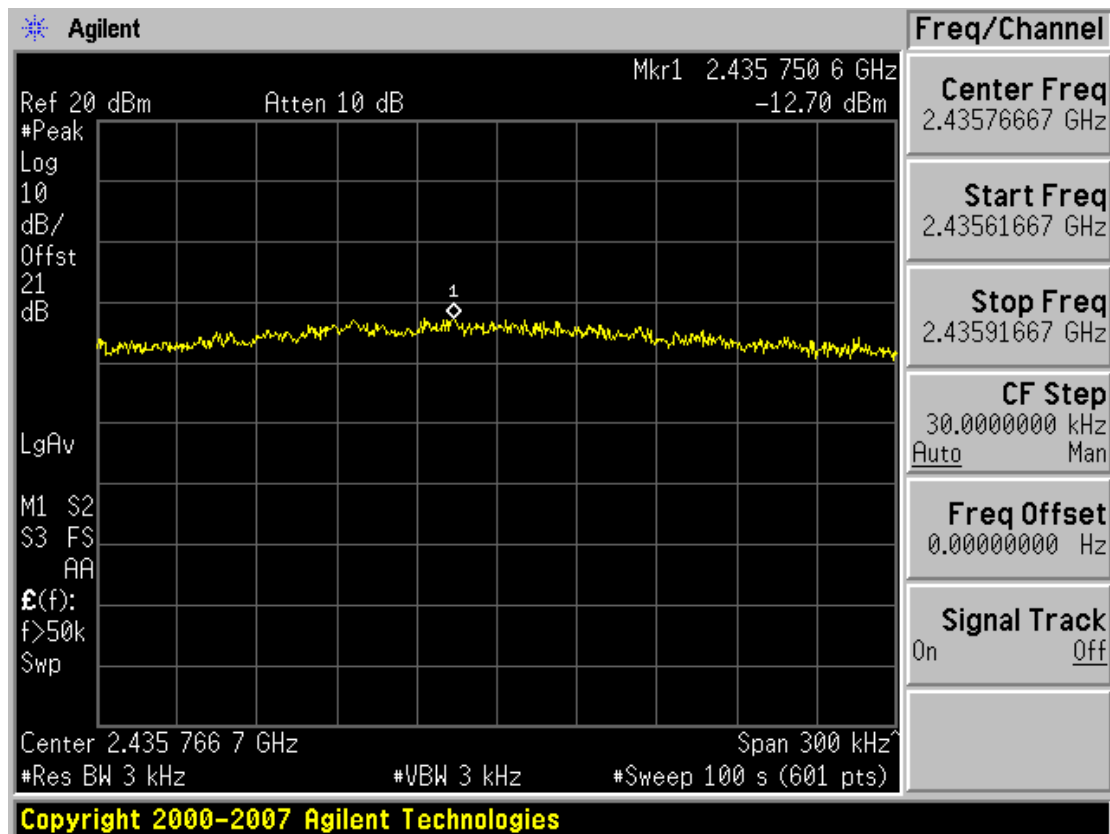
Power Spectral Density (802.11g-CH11)



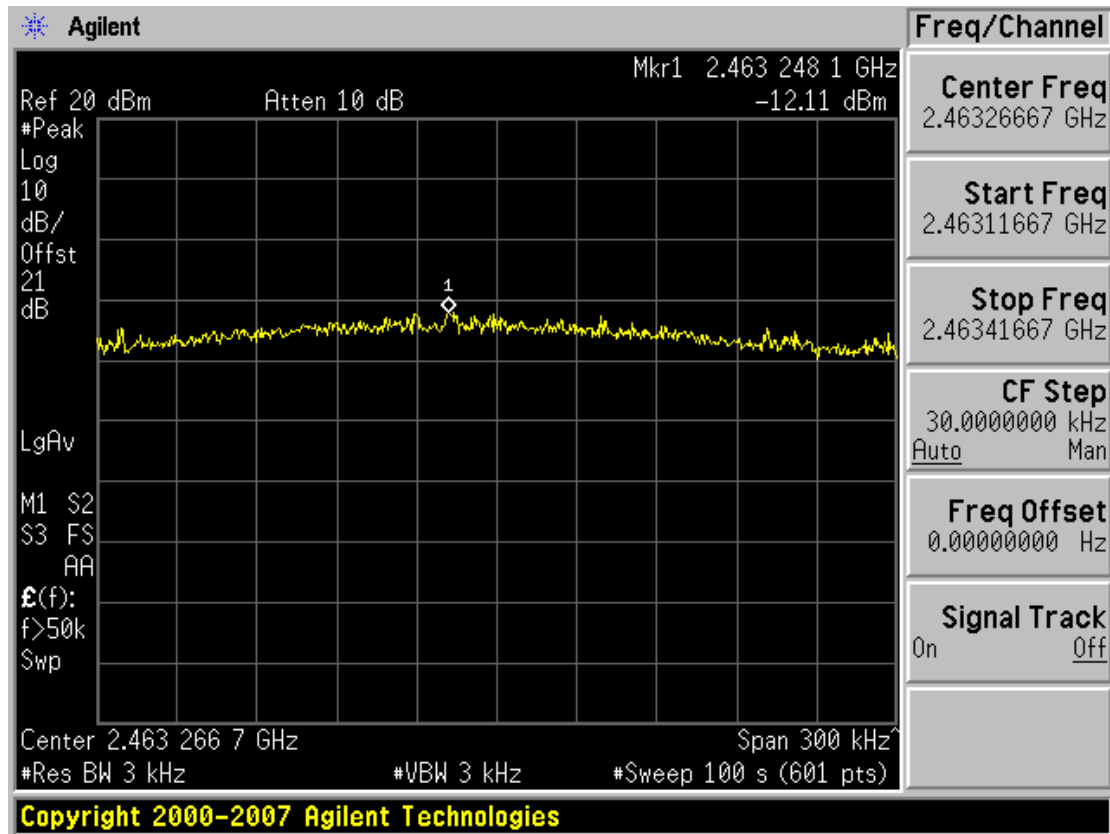
Power Spectral Density (802.11n-CH 1)



Power Spectral Density (802.11n-CH 6)



Power Spectral Density (802.11n-CH11)

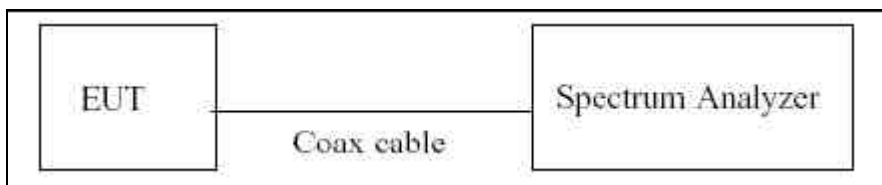


7.4 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §15.247(d)

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

■ TEST CONFIGURATION



■ TEST PROCEDURE

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

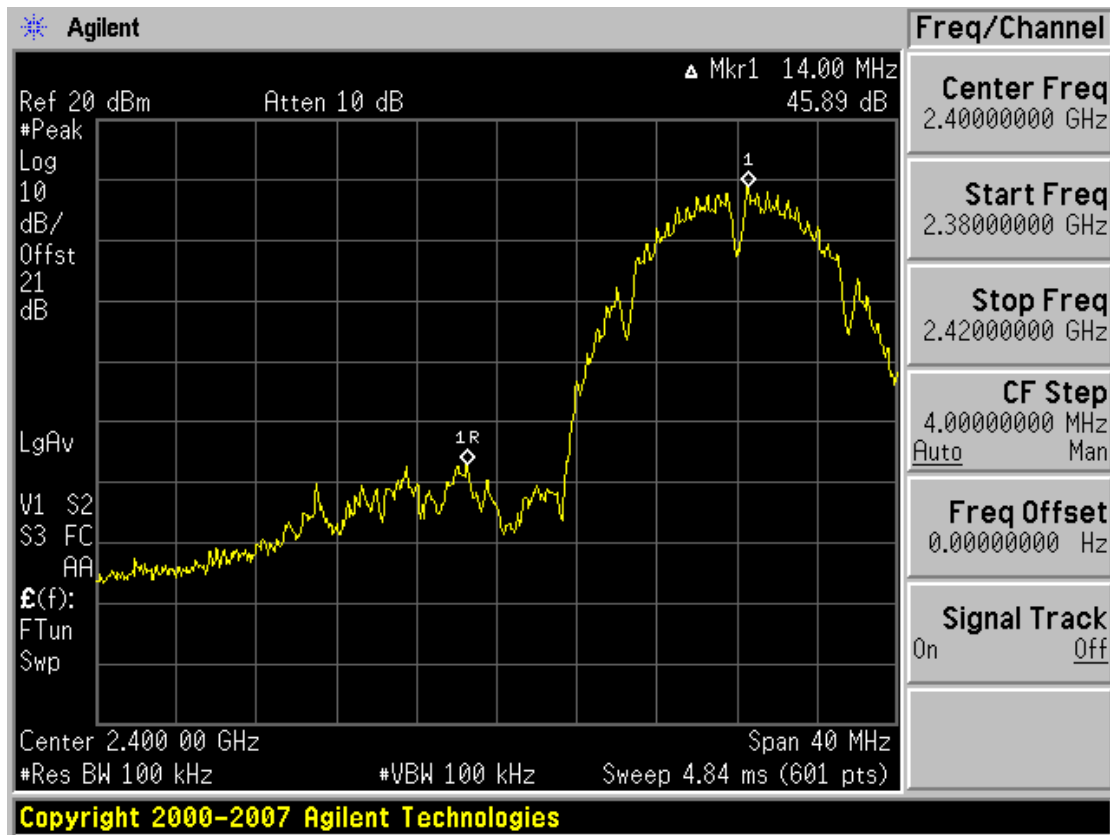
Detector Mode is set to a peak detector Mode.

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

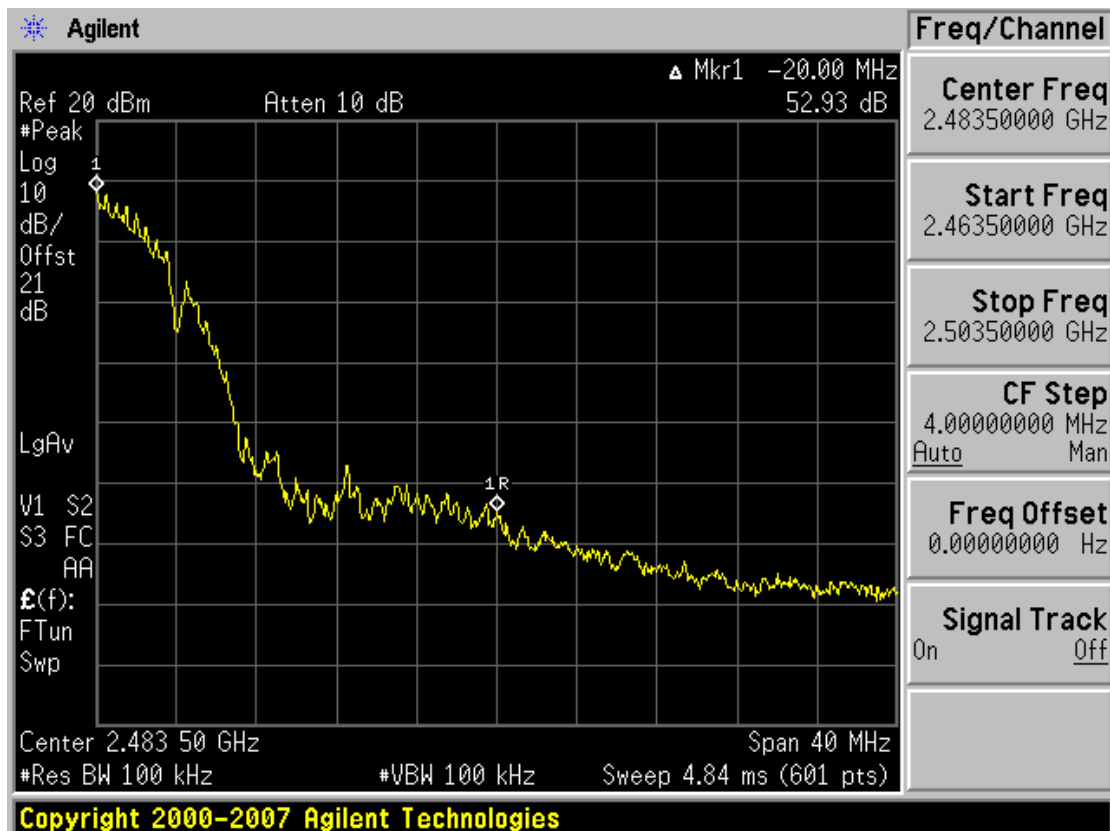
FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1012FR08-1	Date of Issue: December 14, 2010	EUT Type: Cellular/PCS GSM/EDGE and PCS WCDMA with Bluetooth & WLAN	FCC ID: BEJP990

■ RESULT PLOTS

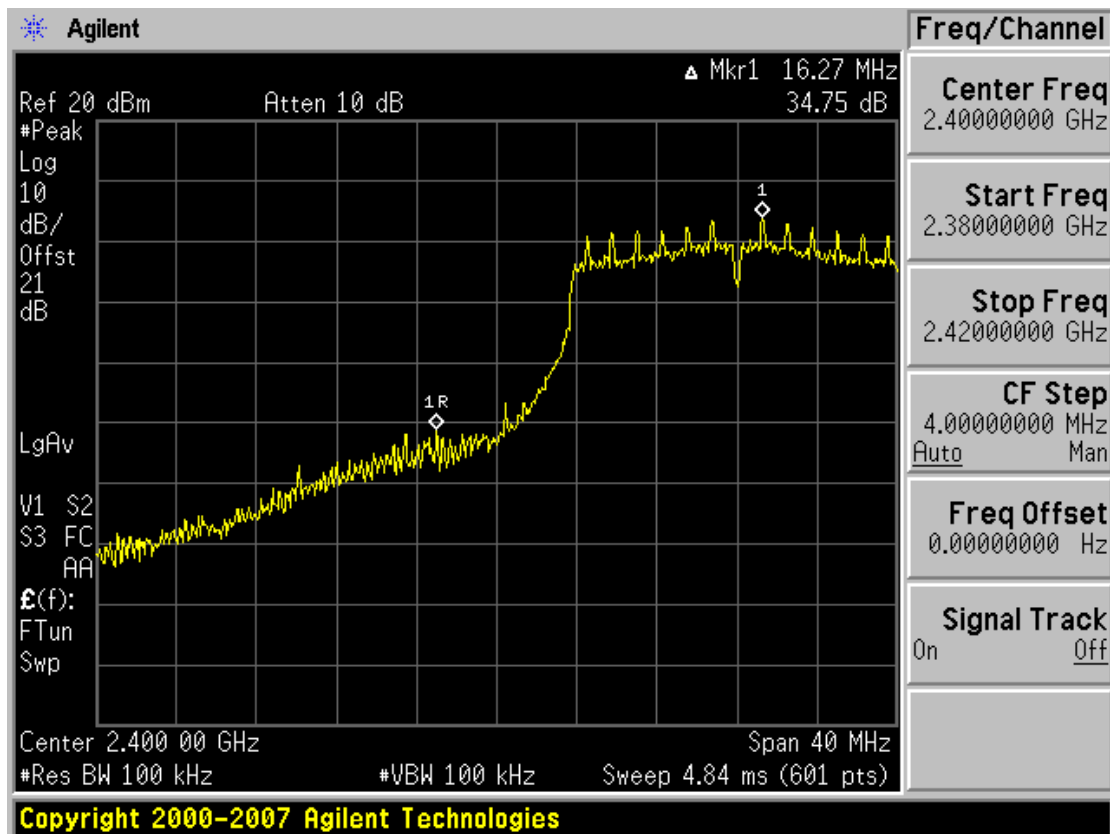
BandEdge (802.11b-CH1)



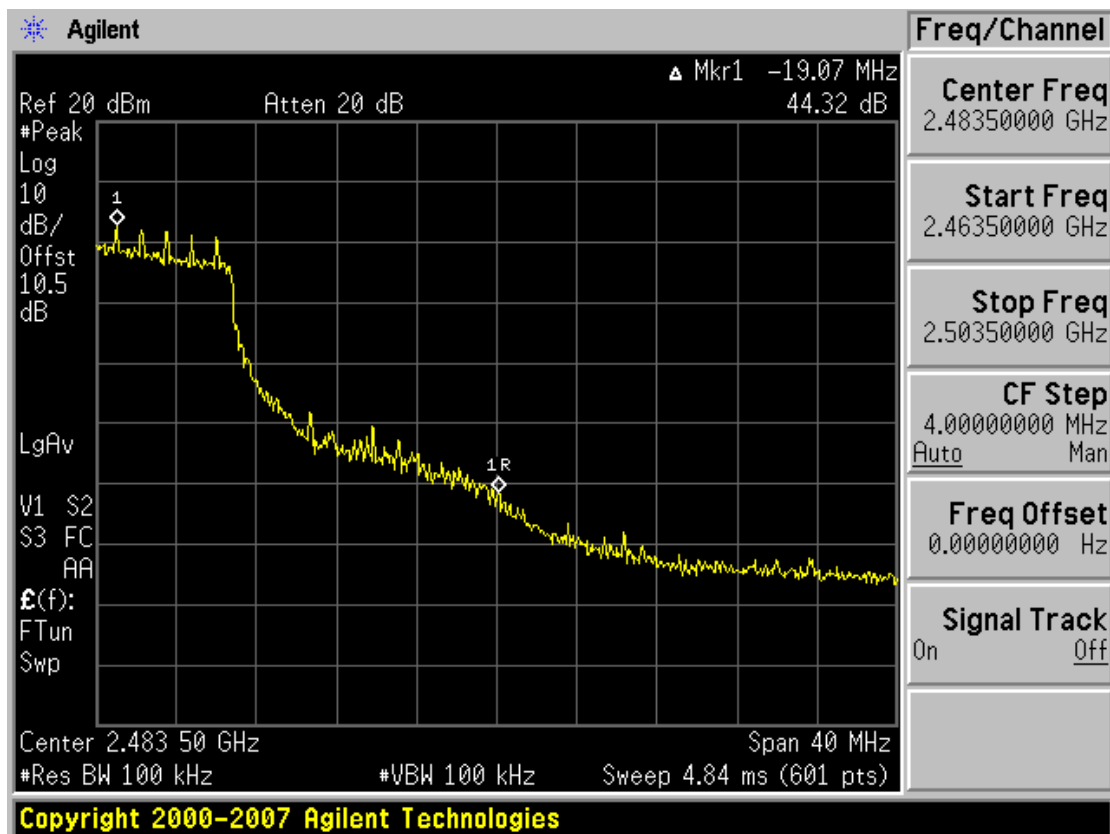
BandEdge (802.11b-CH11)



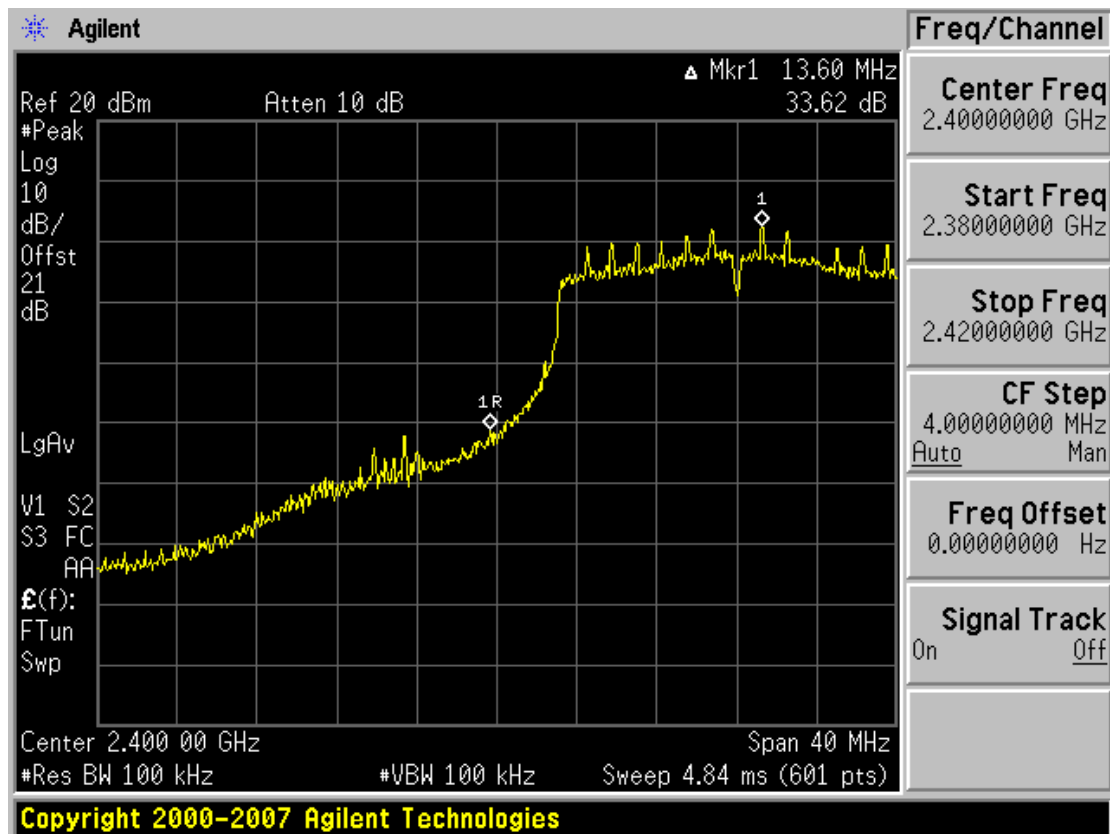
BandEdge (802.11g-CH1)



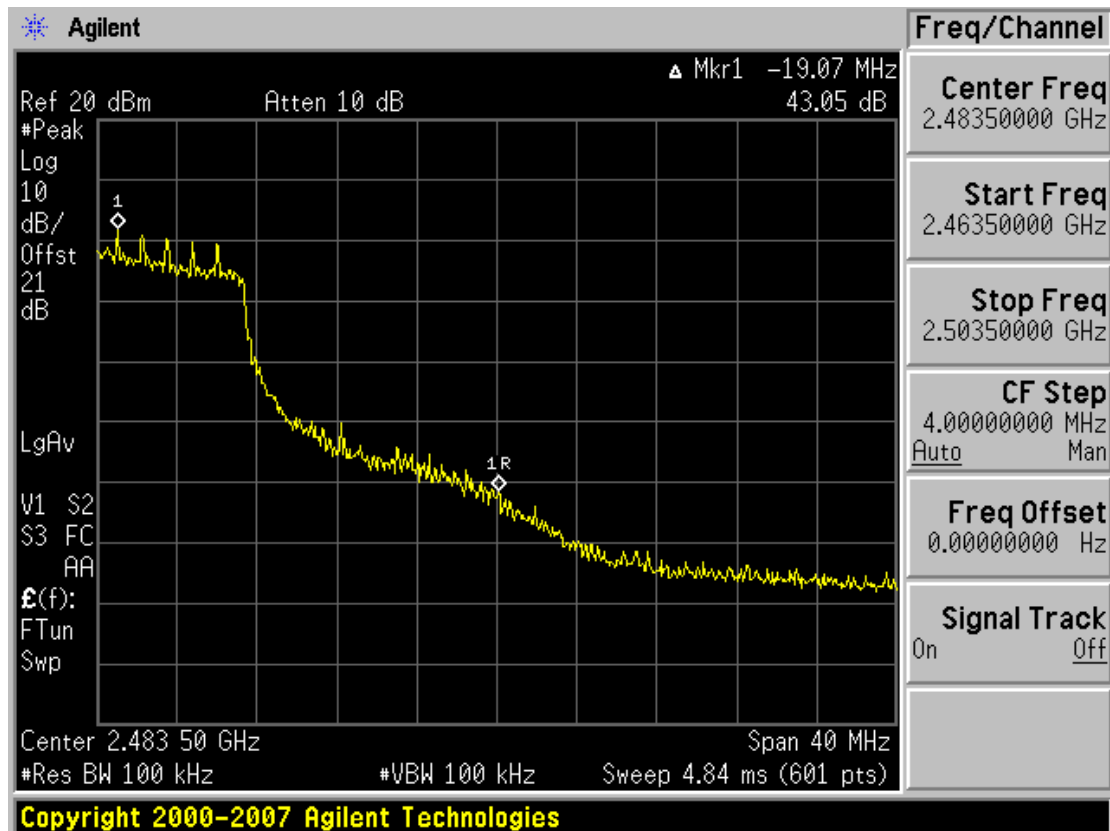
BandEdge (802.11g-CH11)



BandEdge (802.11n-CH1)

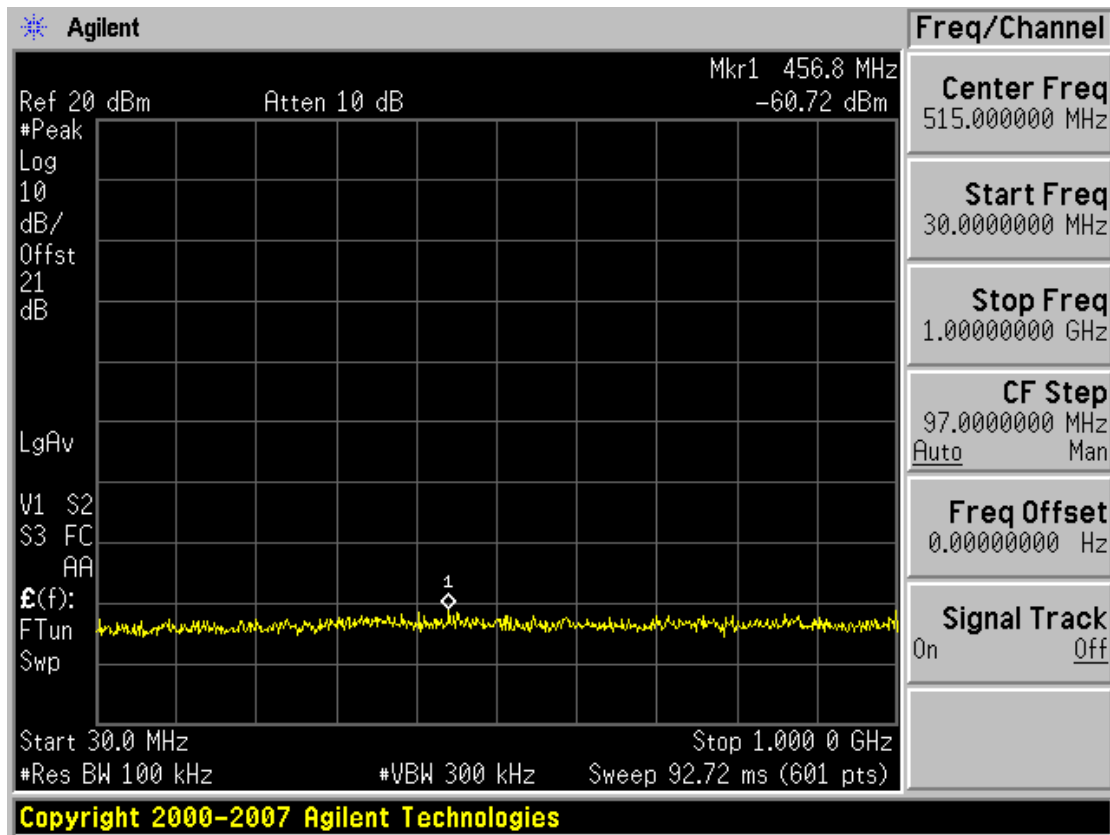


BandEdge (802.11n-CH11)

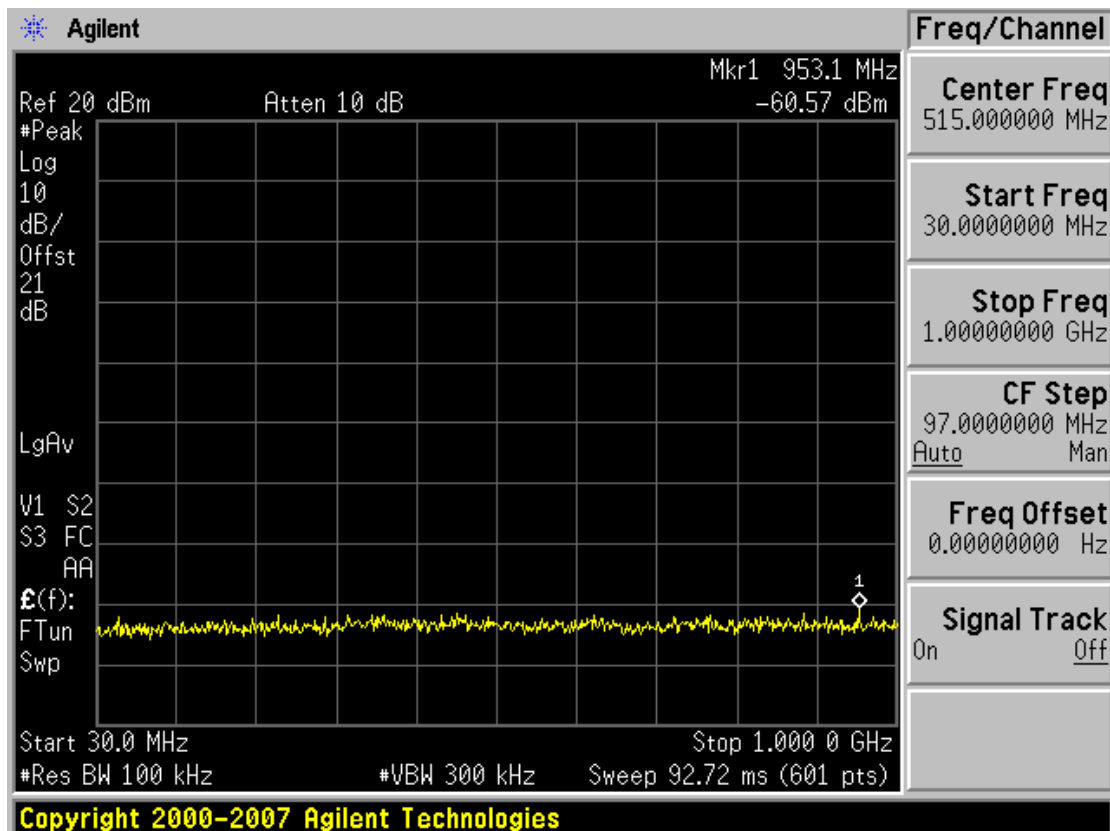


30 MHz ~ 1 GHz

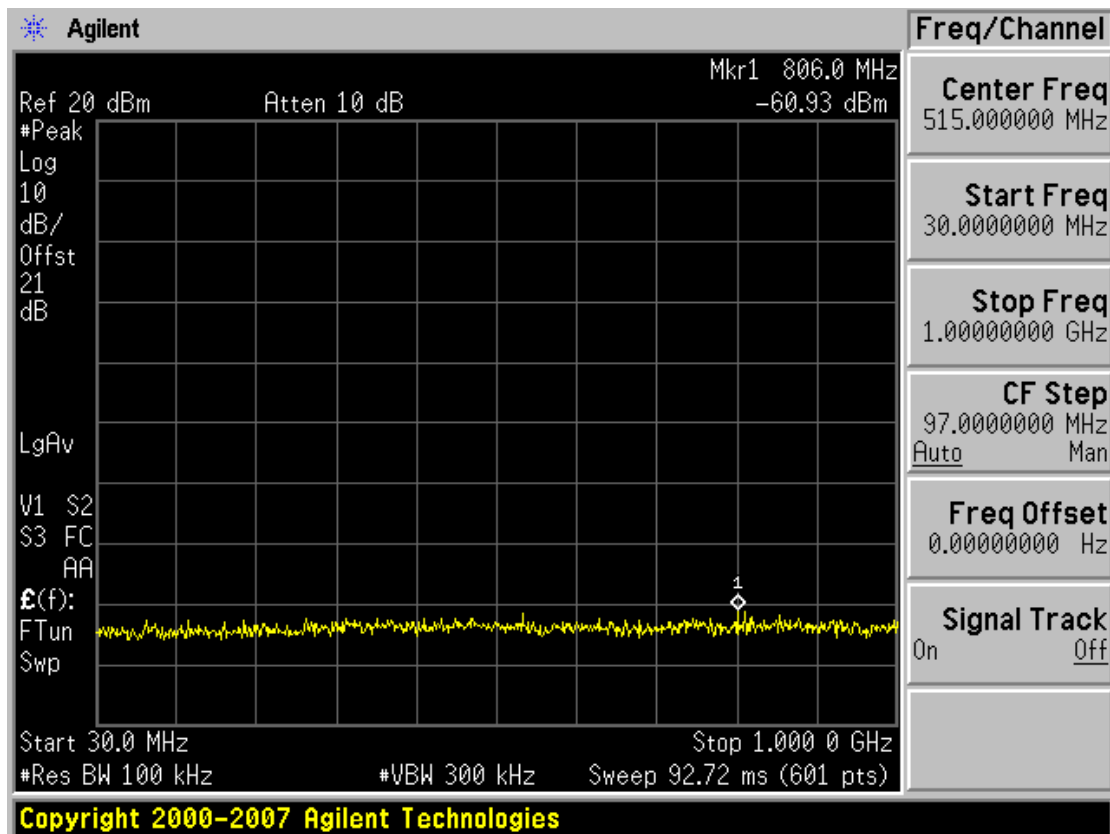
Conducted Spurious Emission (802.11b-CH1)



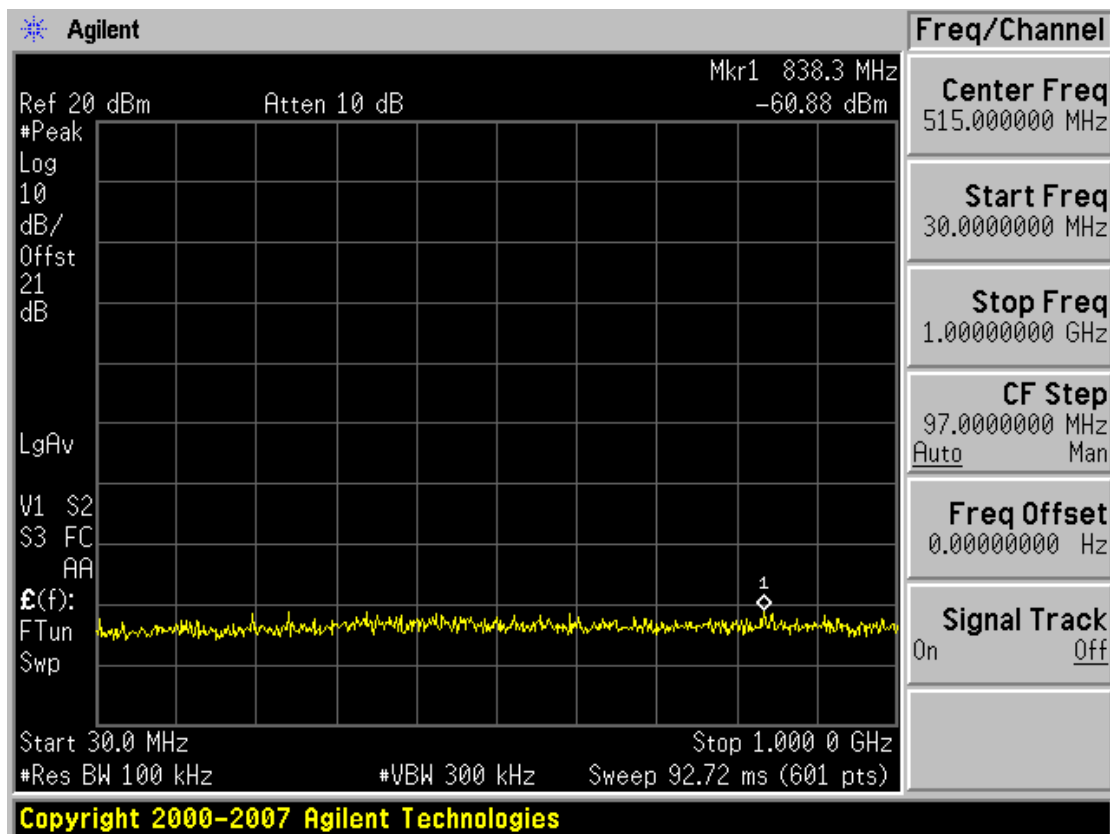
Conducted Spurious Emission (802.11b-CH6)



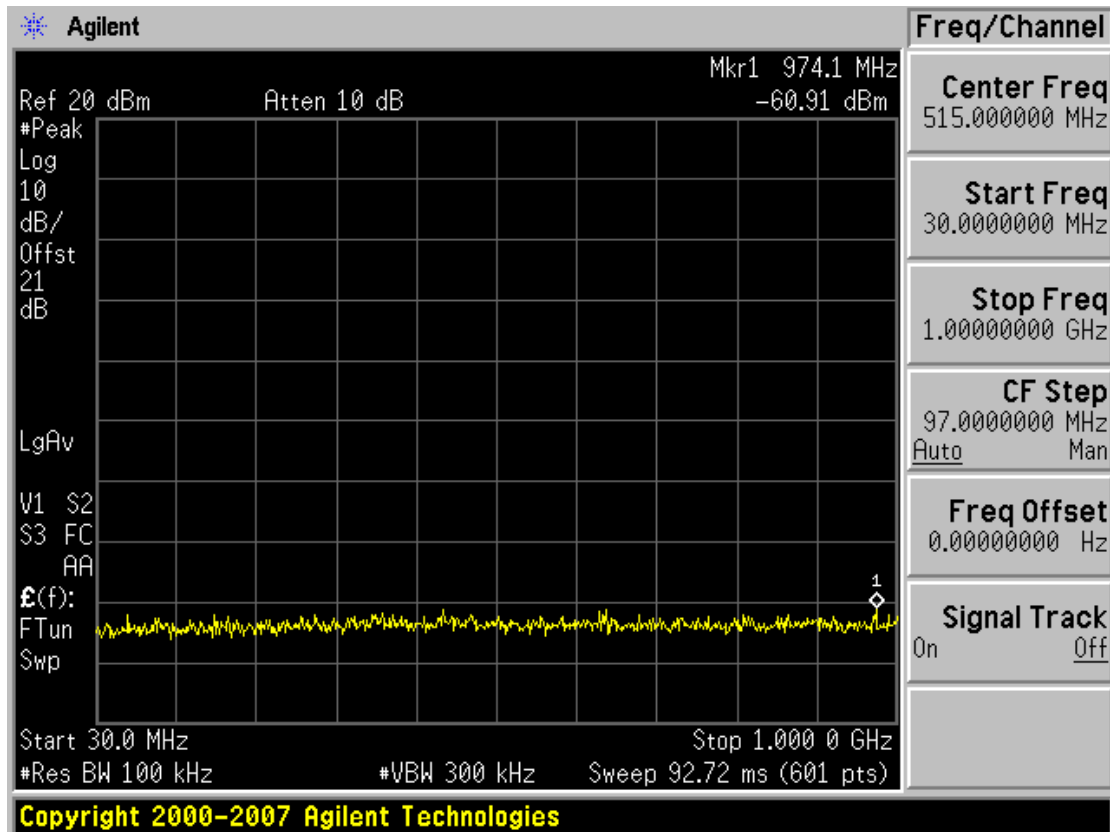
Conducted Spurious Emission (802.11b-CH11)



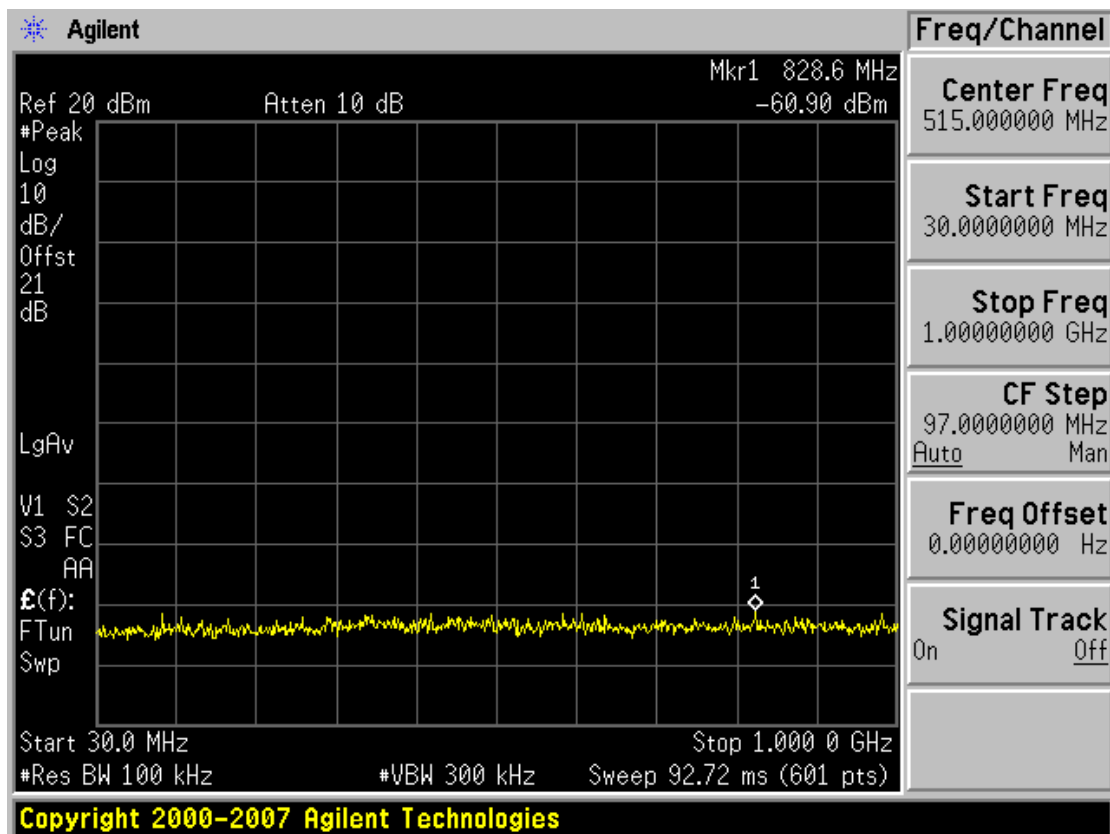
Conducted Spurious Emission (802.11g-CH1)



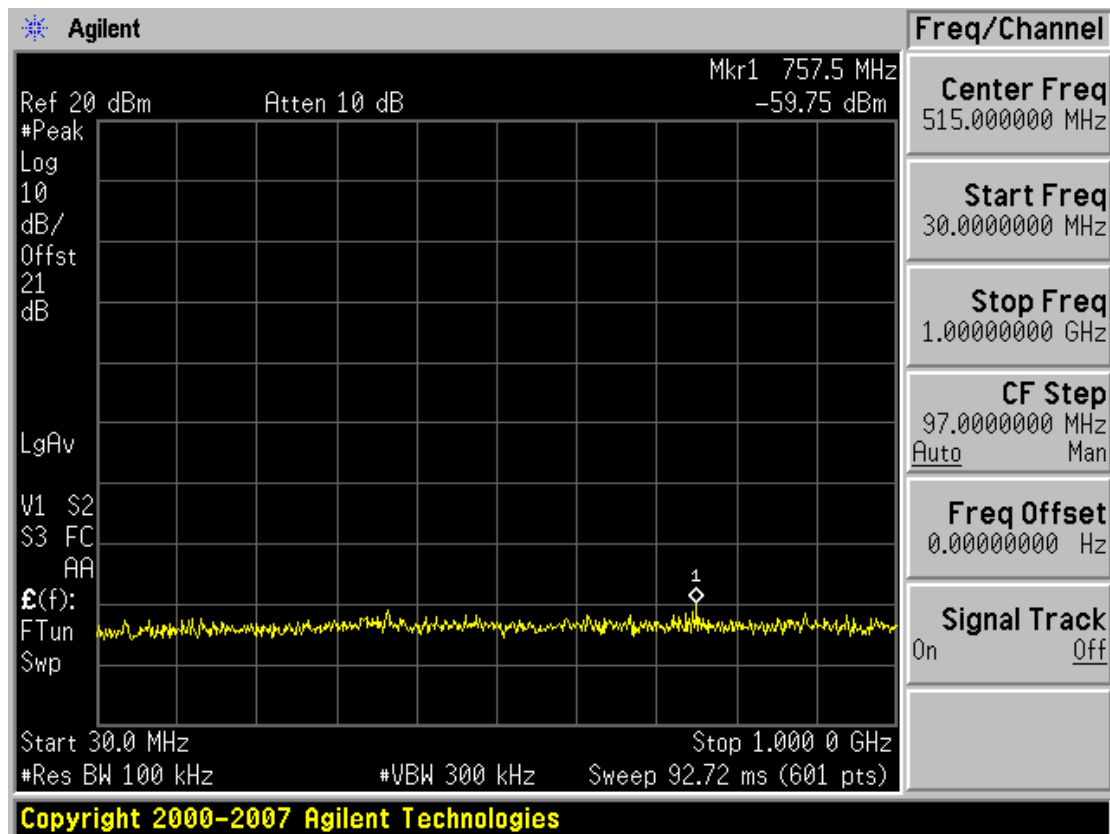
Conducted Spurious Emission (802.11g-CH6)



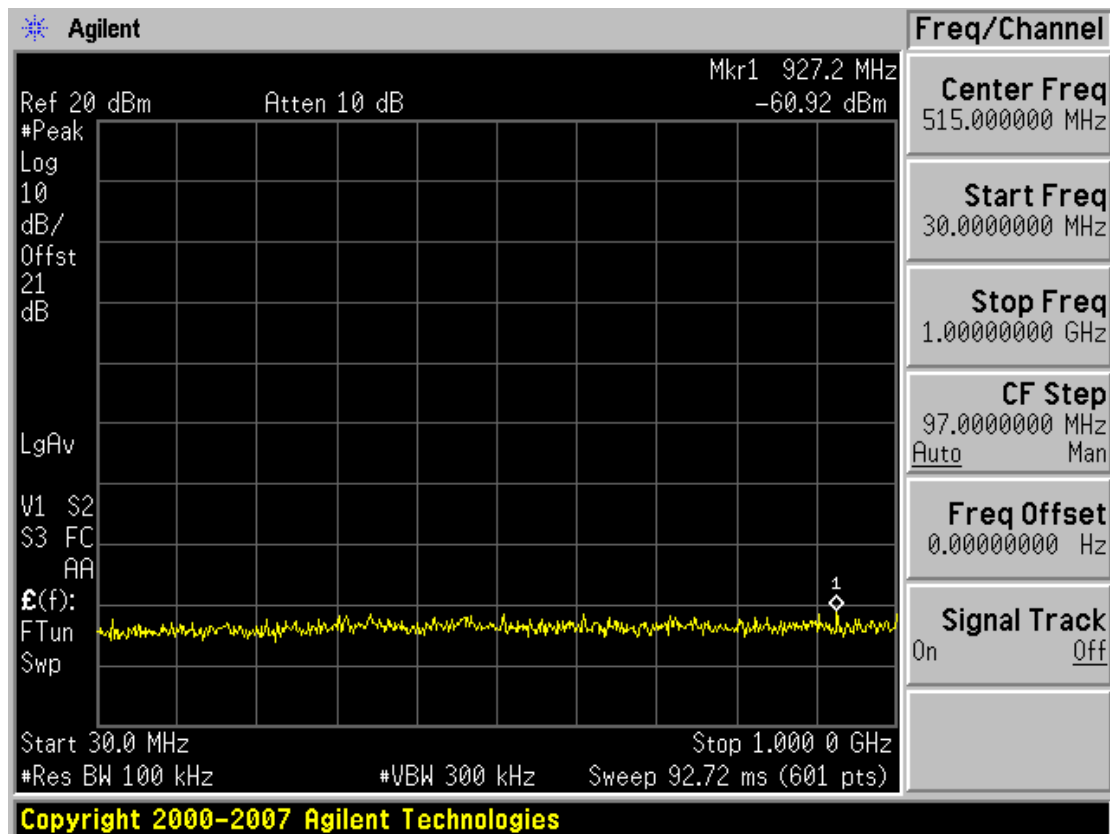
Conducted Spurious Emission (802.11g-CH11)



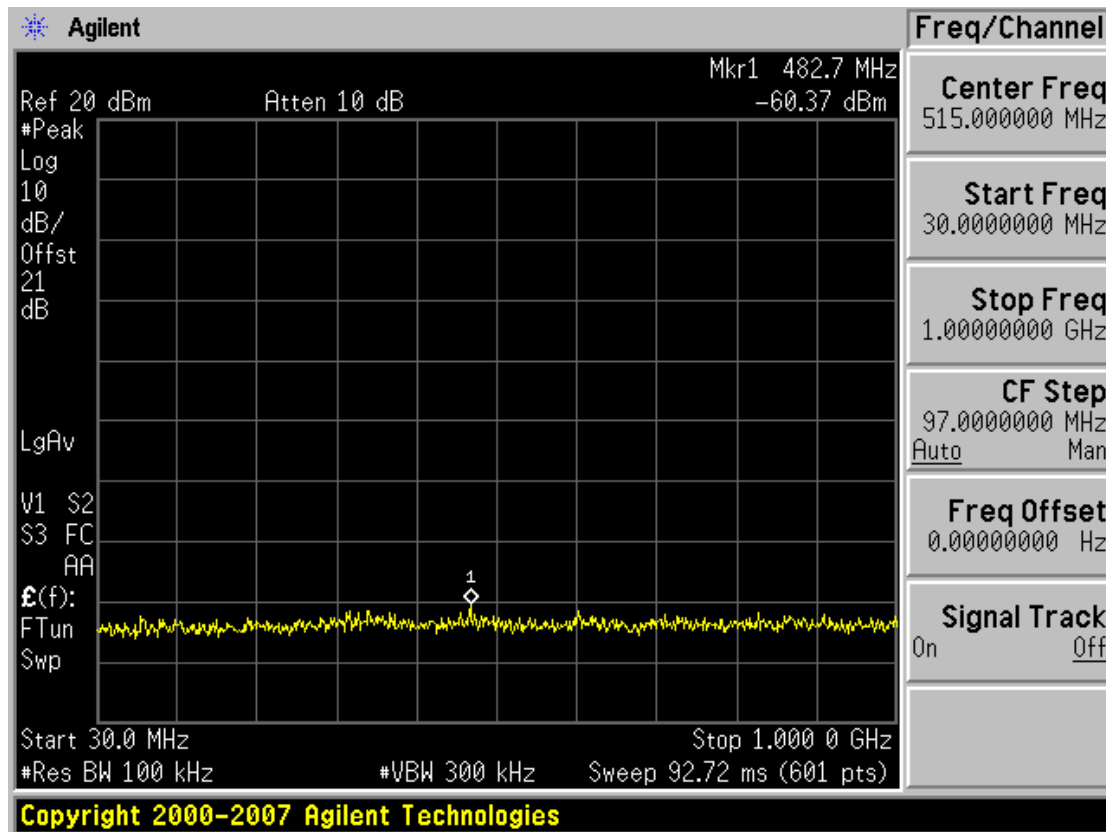
Conducted Spurious Emission (802.11n-CH1)



Conducted Spurious Emission (802.11n-CH6)

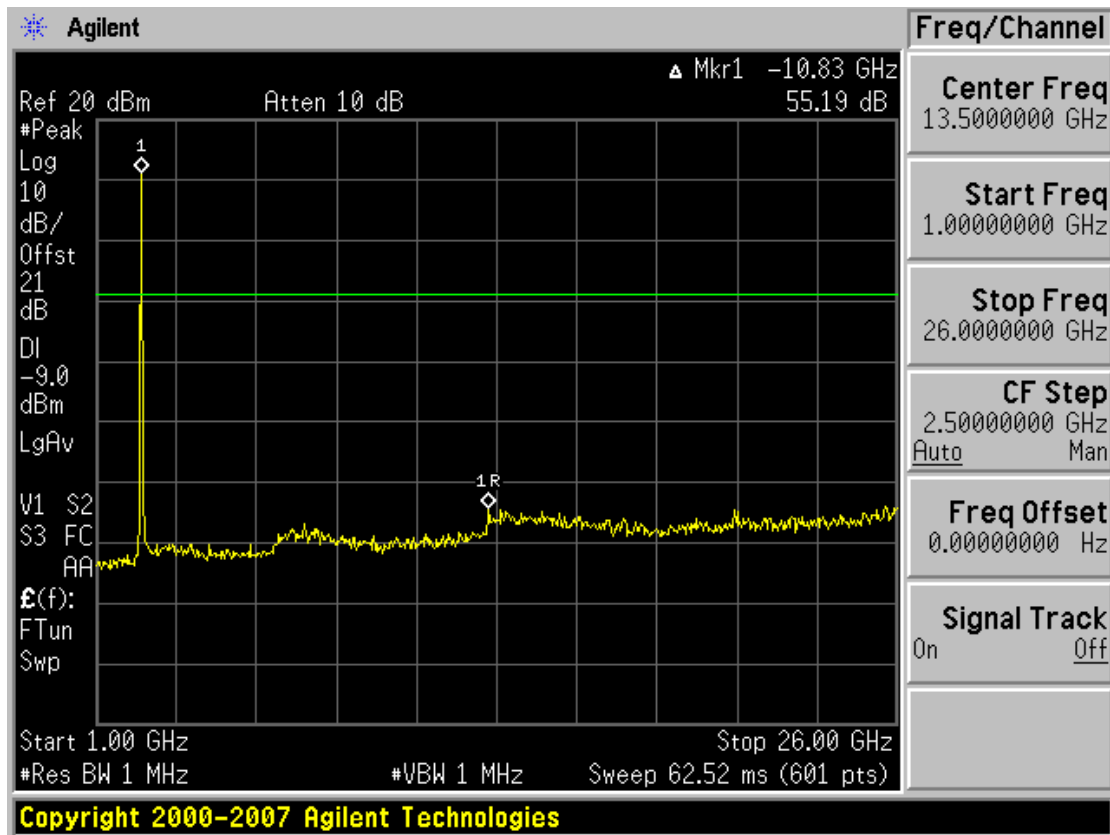


Conducted Spurious Emission (802.11n-CH11)

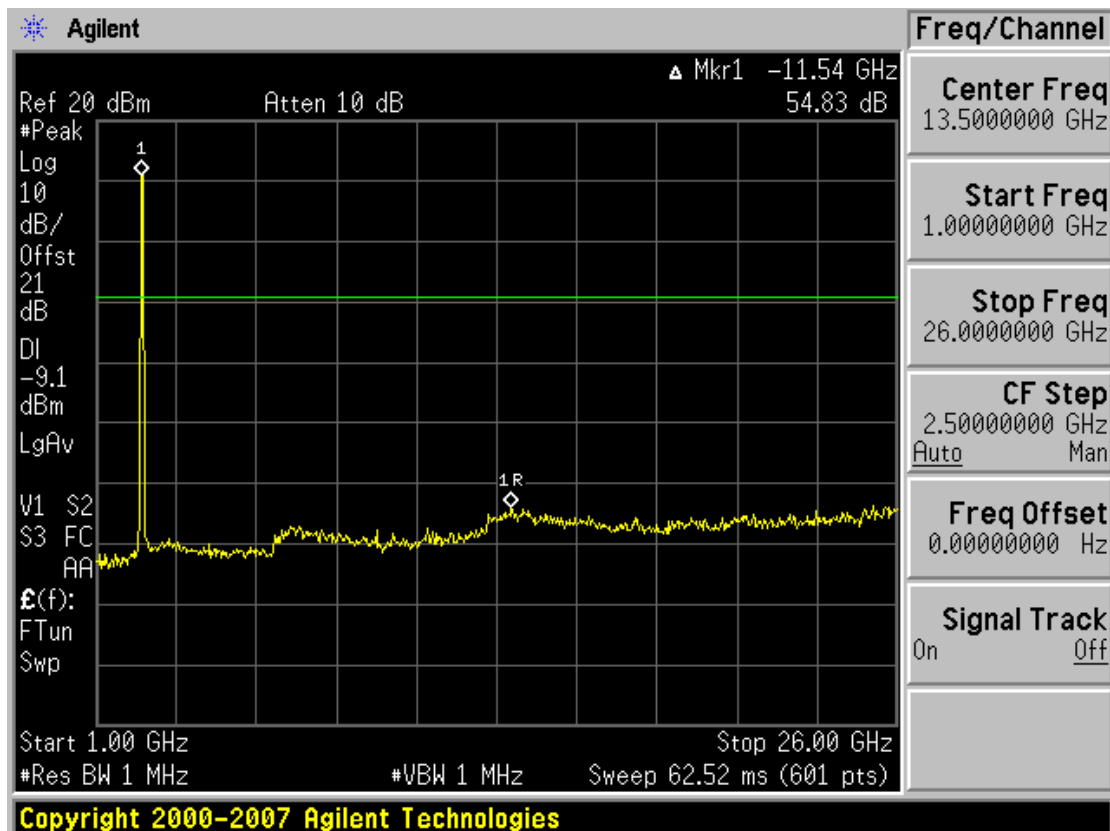


1 GHz ~ 26 GHz

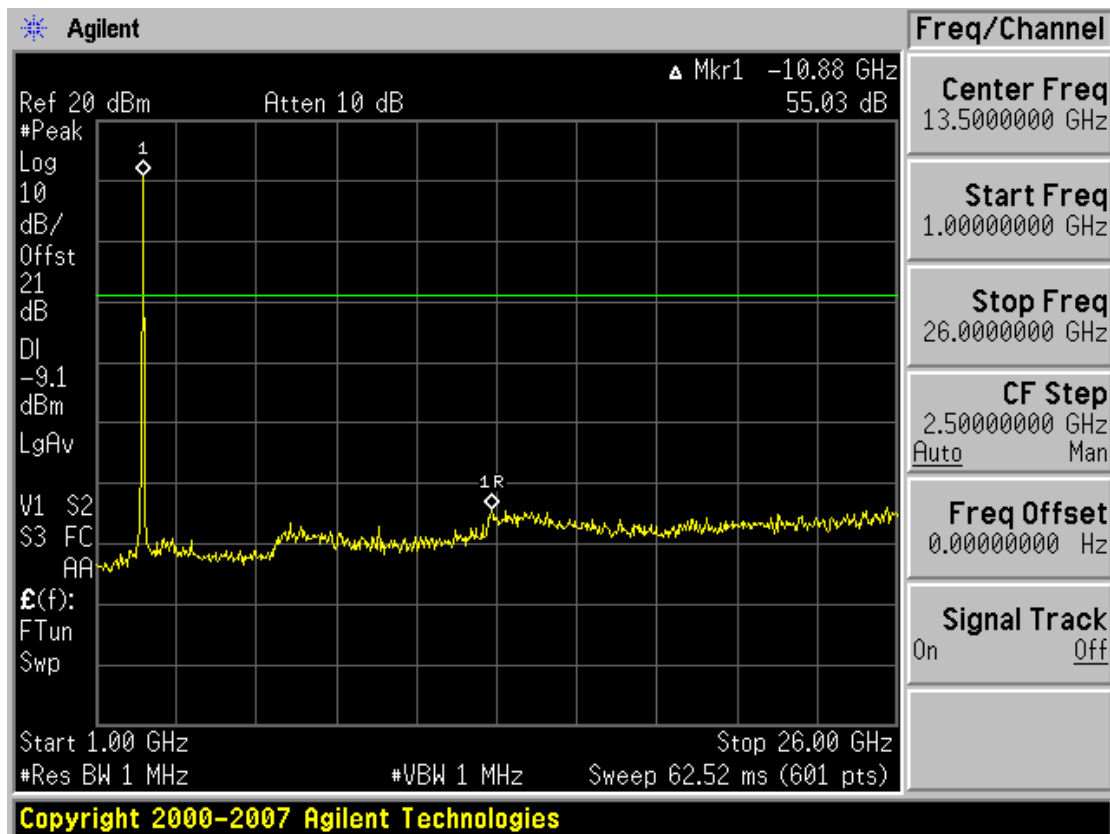
Conducted Spurious Emission (802.11b-CH1)



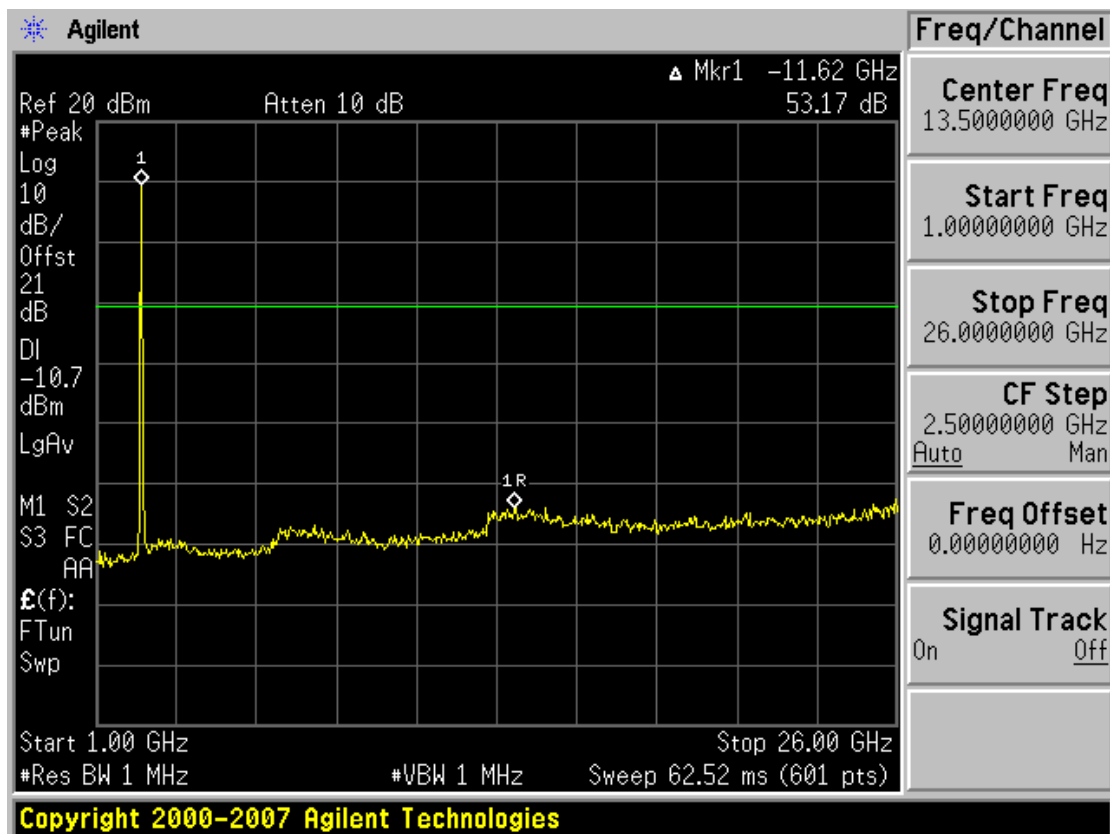
Conducted Spurious Emission (802.11b-CH6)



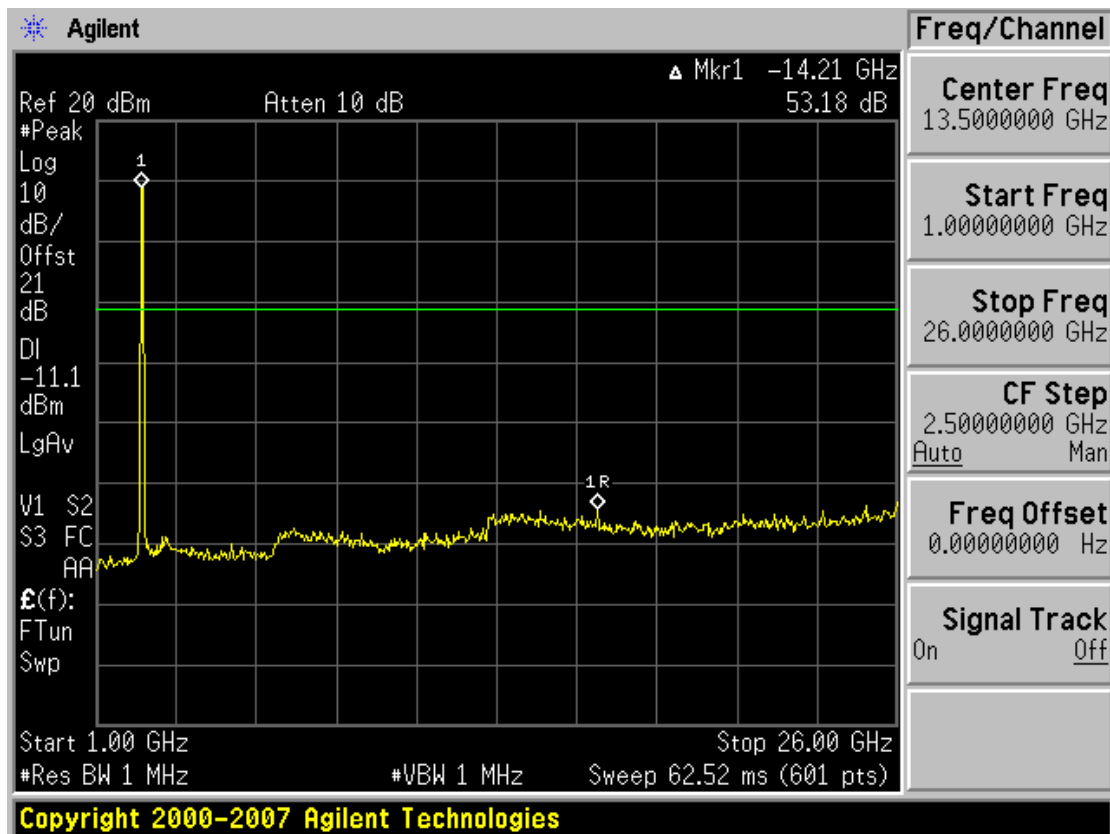
Conducted Spurious Emission (802.11b-CH11)



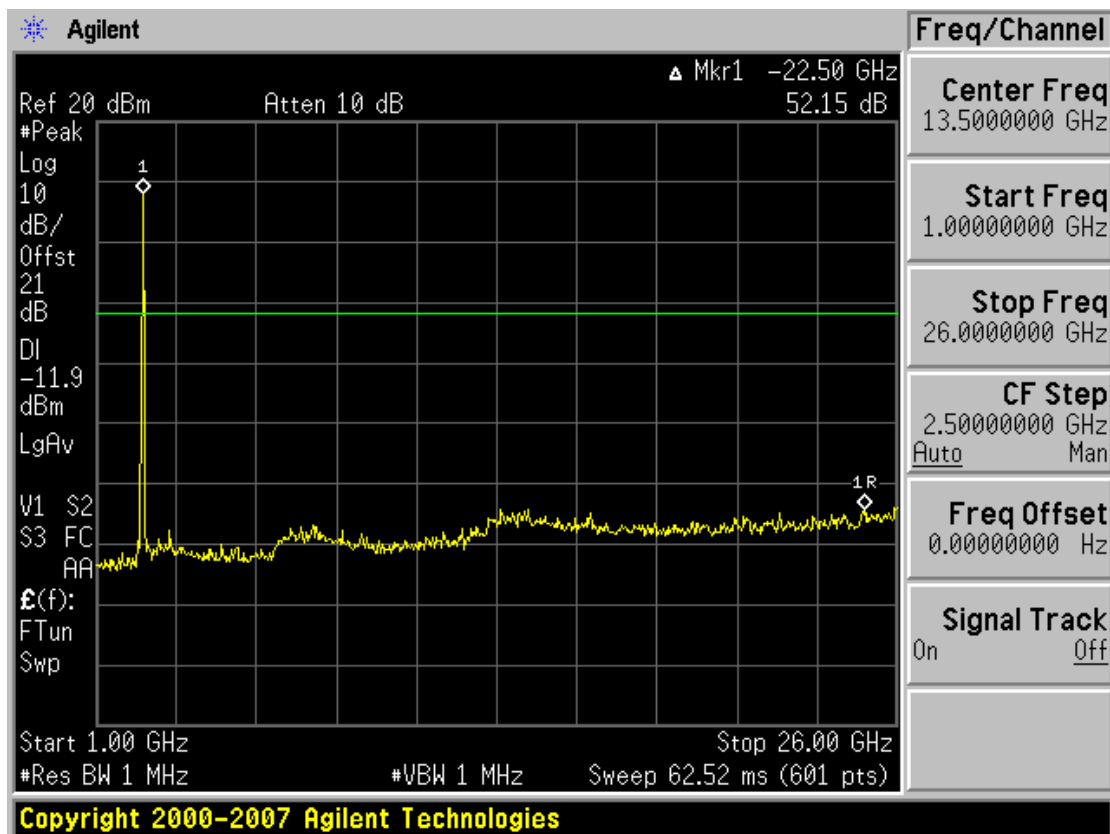
Conducted Spurious Emission (802.11g-CH1)



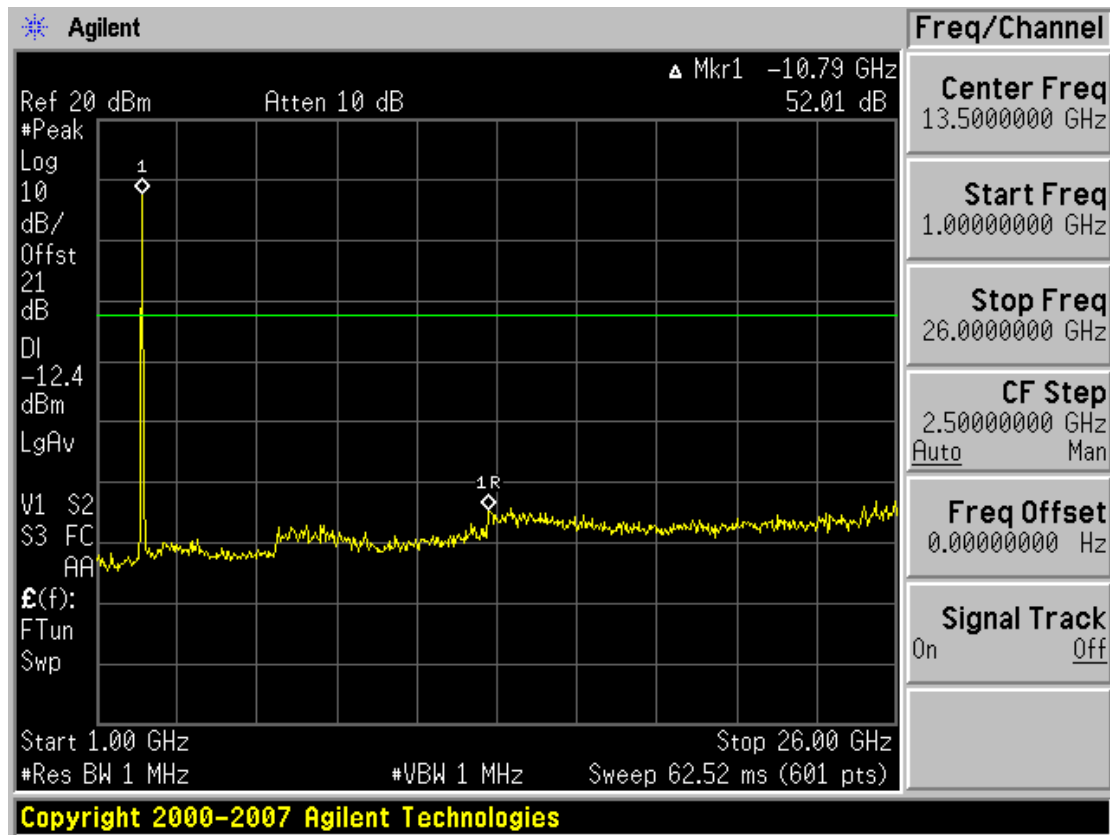
Conducted Spurious Emission (802.11g-CH6)



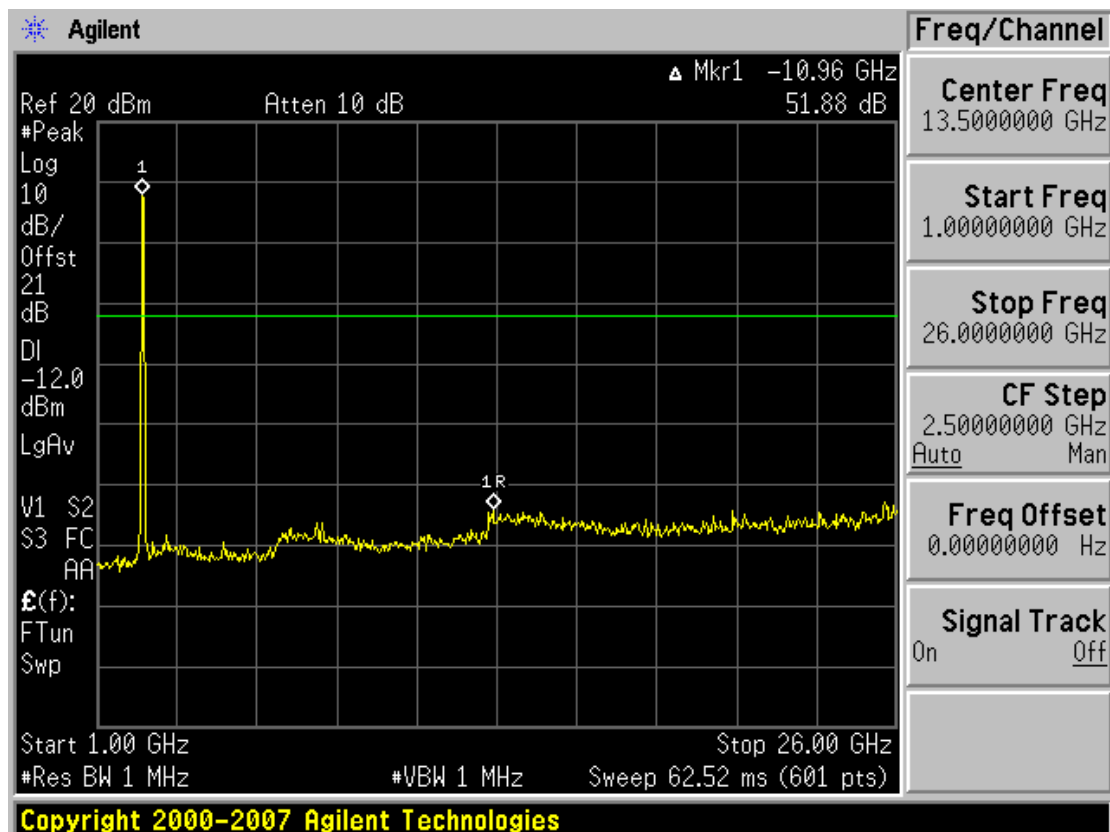
Conducted Spurious Emission (802.11g-CH11)



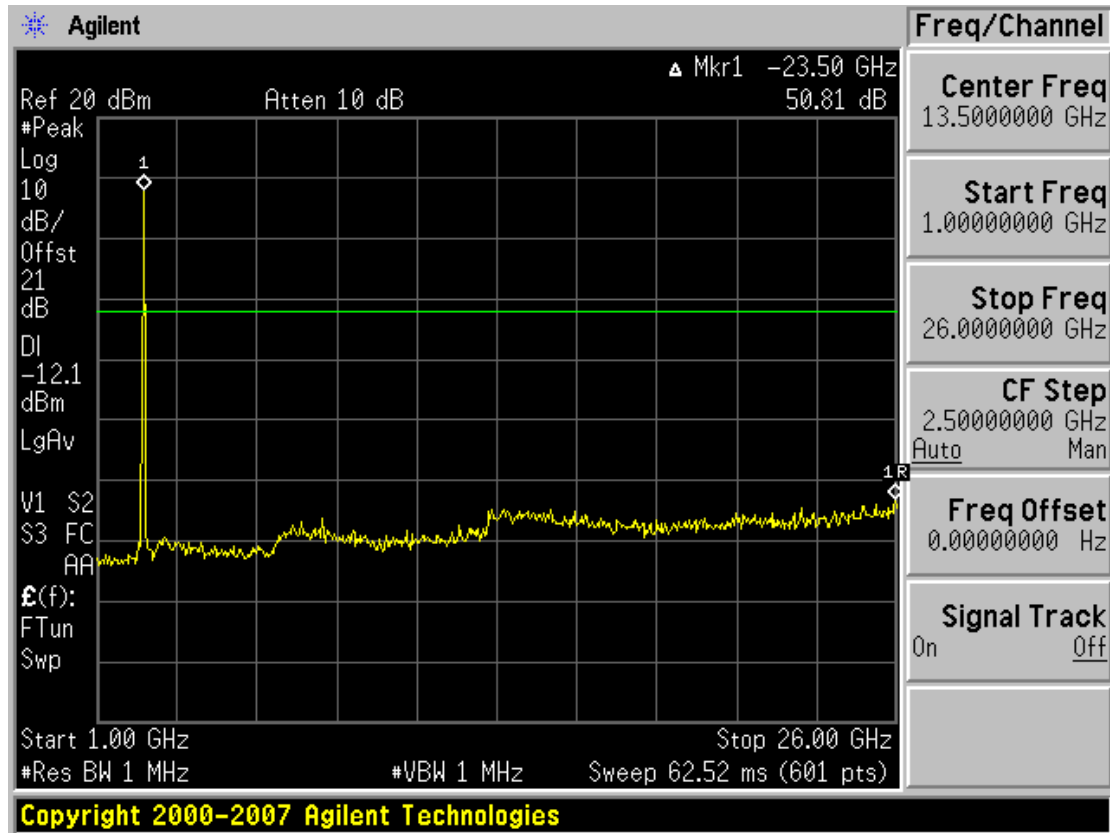
Conducted Spurious Emission (802.11n-CH1)



Conducted Spurious Emission (802.11n-CH6)



Conducted Spurious Emission (802.11n-CH11)



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7.5 RADIATED MEASUREMENT.

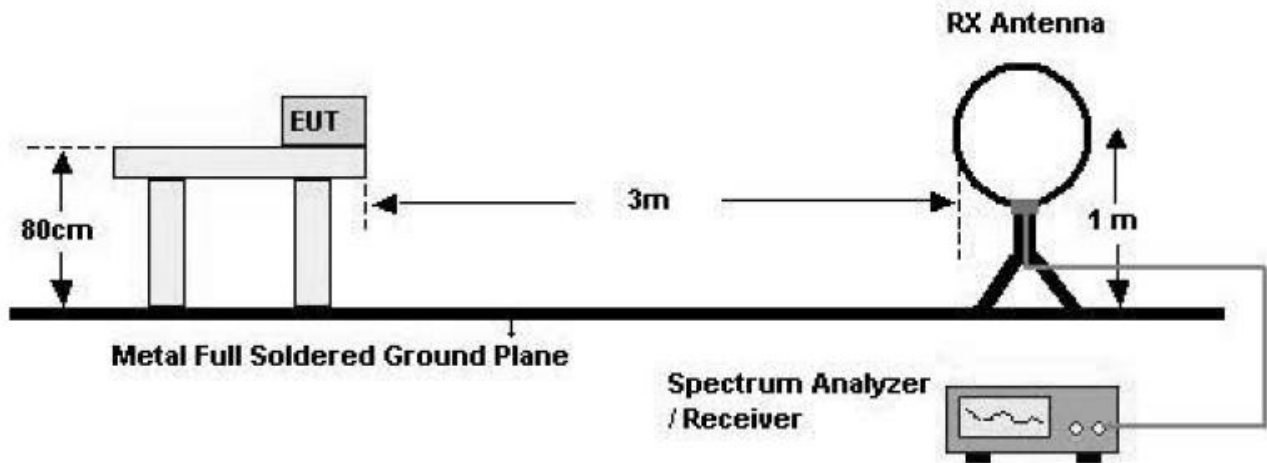
7.5.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209

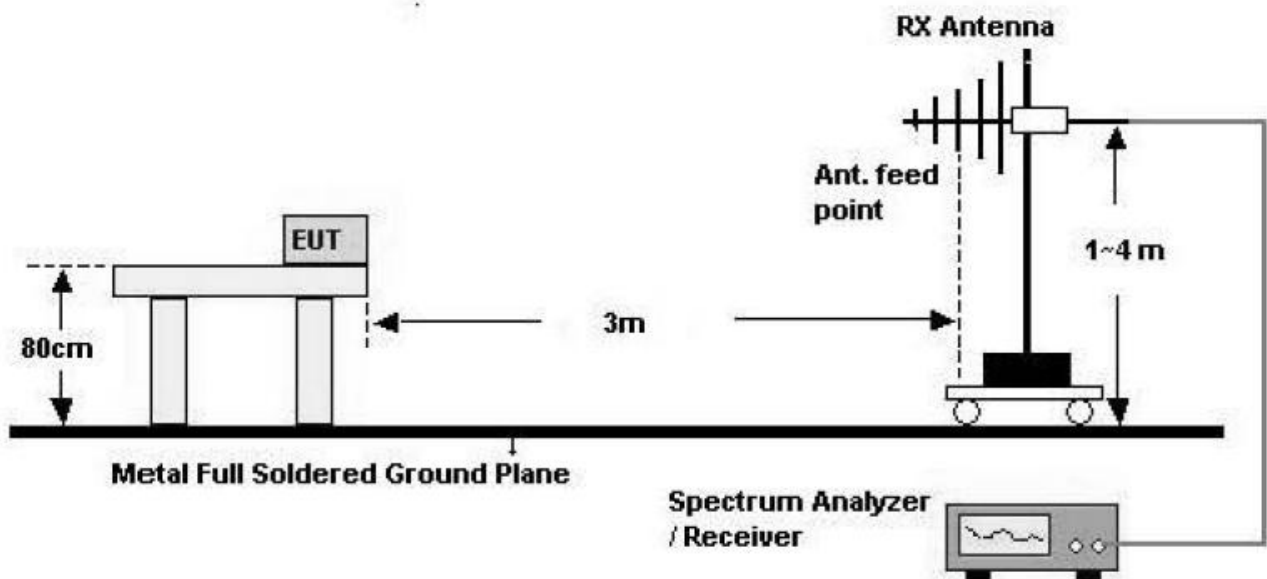
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

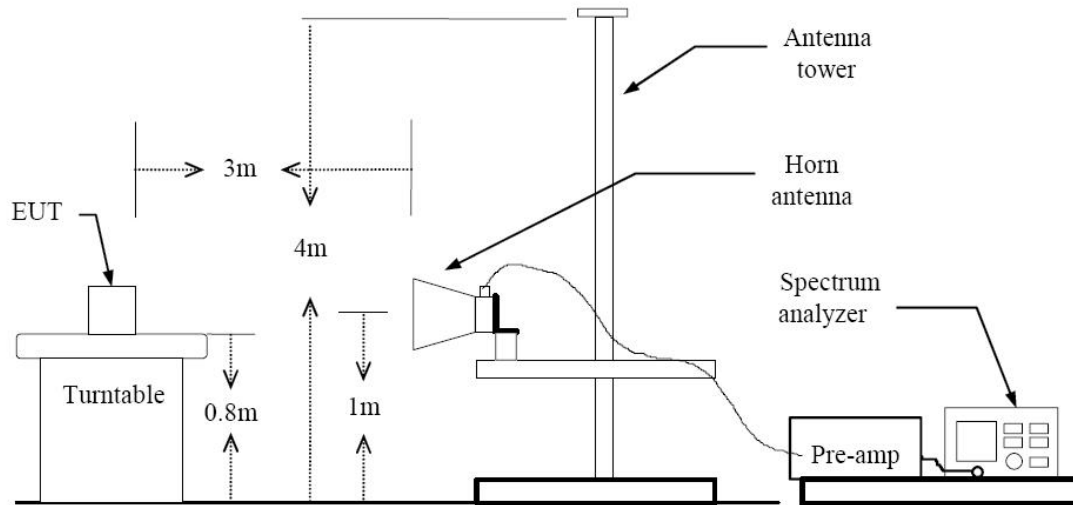
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

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TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor

TEST RESULTS

Below 1 GHz

Operation Mode: 802.11b Mode (Channel : 11 , Data rate : 11 Mbps)

Frequency MHz	Reading dBuV	Ant. Factor dB/m	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
49.4	11.4	12.4	0.9	V	24.7	40.0	15.3
62.0	13.6	11.6	1.0	V	26.2	40.0	13.8
152.2	11.8	13.2	1.5	H	26.5	43.5	17.0
233.7	15.6	11.4	1.9	H	28.9	46.0	17.1
342.3	12.6	14.0	2.3	V	28.9	46.0	17.1
599.3	14.5	19.7	3.2	H	37.4	46.0	8.6

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done 802.11b Mode, 802.11g and 802.11n mode test. Worst case of EUT is 802.11b Mode.

Above 1 GHz

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4824	36.96	9.85	V	46.81	74	27.19	PK
4824	24.42	9.85	V	34.27	54	19.73	AV
7236	30.07	19.11	V	49.18	74	24.82	PK
7236	15.82	19.11	V	34.93	54	19.07	AV
4824	34.62	9.85	H	44.47	74	29.53	PK
4824	23.25	9.85	H	33.10	54	20.90	AV
7236	29.97	19.11	H	49.08	74	24.92	PK
7236	15.49	19.11	H	34.60	54	19.40	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
5. We have done 802.11b, 802.11g and 802.11n test. Worst case of EUT is 1 Mbps in 802.11b.

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	36.51	10.64	V	47.15	74	26.85	PK
4874	27.73	10.64	V	38.37	54	15.63	AV
7311	31.28	18.03	V	49.31	74	24.69	PK
7311	19.16	18.03	V	37.19	54	16.81	AV
4874	33.46	10.64	H	44.10	74	29.90	PK
4874	23.26	10.64	H	33.90	54	20.10	AV
7311	30.38	18.03	H	48.41	74	25.59	PK
7311	17.10	18.03	H	35.13	54	18.87	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
5. We have done 802.11b, 802.11g and 802.11n test. Worst case of EUT is 1 Mbps in 802.11b.

Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4924	33.67	10.80	V	44.47	74	29.53	PK
4924	25.20	10.80	V	36.00	54	18.00	AV
7386	32.90	19.79	V	52.69	74	21.31	PK
7386	21.98	19.79	V	41.77	54	12.23	AV
4924	32.47	10.80	H	43.27	74	30.73	PK
4924	22.10	10.80	H	32.90	54	21.10	AV
7386	32.11	19.79	H	51.90	74	22.10	PK
7386	20.97	19.79	H	40.76	54	13.24	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MH.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
5. We have done 802.11b, 802.11g and 802.11n test. Worst case of EUT is 1 Mbps in 802.11b.

7.5.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

Test Requirements and limit, §15.247(d) §15.205, §15.209

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

Operation Mode:	802.11 g
Transfer Rate:	24 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading dBuV	AN.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.00	18.99	37.96	H	56.95	74	17.05	PK
2390.00	3.92	37.96	H	41.88	54	12.12	AV
2390.00	16.74	37.96	V	54.70	74	19.30	PK
2390.00	3.16	37.96	V	41.12	54	12.88	AV
2483.50	16.88	39.92	H	56.80	74	17.20	PK
2483.50	1.95	39.92	H	41.87	54	12.13	AV
2483.50	14.16	39.92	V	54.08	74	19.92	PK
2483.50	1.27	39.92	V	41.19	54	12.81	AV

Notes:

- Spectrum setting:
 - Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
- We have done 802.11b, 802.11g and 802.11n test. Worst case of EUT is 24 Mbps in 802.11g.

7.6 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

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

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference groundplane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

RESULT PLOTS

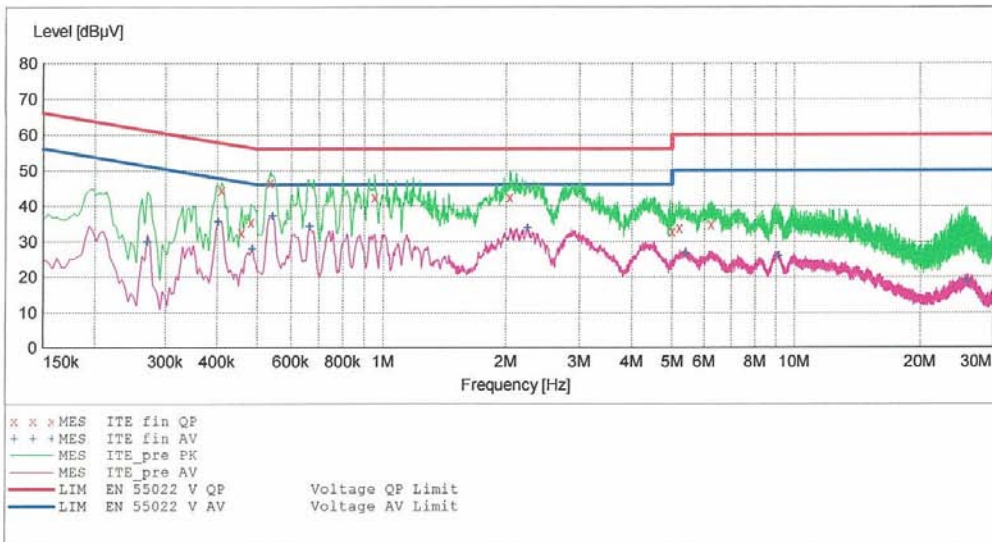
HCT

EMC

EUT: LG-P990
 Manufacturer: LG
 Operating Condition: WLAN MODE
 Test Site: SHIELD ROOM
 Operator: JS-LEE
 Test Specification: CISPR22 CLASS B
 Comment: N

SCAN TABLE: "CISPR22 CLASS B"

Short Description:				CISPR 22 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer	
Frequency	Frequency	Width					
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				



MEASUREMENT RESULT: "ITE_fin QP"

12/6/2010 10:30AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.410010	44.50	10.1	58	13.1	---	---
0.458010	32.50	10.1	57	24.2	---	---
0.482010	35.50	10.1	56	20.8	---	---
0.536000	46.60	10.1	56	9.4	---	---
0.956000	42.40	10.2	56	13.6	---	---
2.044000	42.40	10.3	56	13.6	---	---
5.000000	32.90	10.5	56	23.1	---	---
5.216000	33.90	10.5	60	26.1	---	---
6.240000	34.90	10.6	60	25.1	---	---

MEASUREMENT RESULT: "ITE_fin AV"

12/6/2010 10:30AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.270010	29.80	10.1	51	21.3	---	---
0.402010	35.60	10.1	48	12.2	---	---
0.486010	28.00	10.1	46	18.2	---	---
0.544000	37.10	10.1	46	8.9	---	---
0.664000	34.20	10.1	46	11.8	---	---
2.260000	33.80	10.3	46	12.2	---	---
5.400000	26.70	10.5	50	23.3	---	---
9.148000	25.90	10.7	50	24.1	---	---
25.908000	18.80	11.9	50	31.2	---	---

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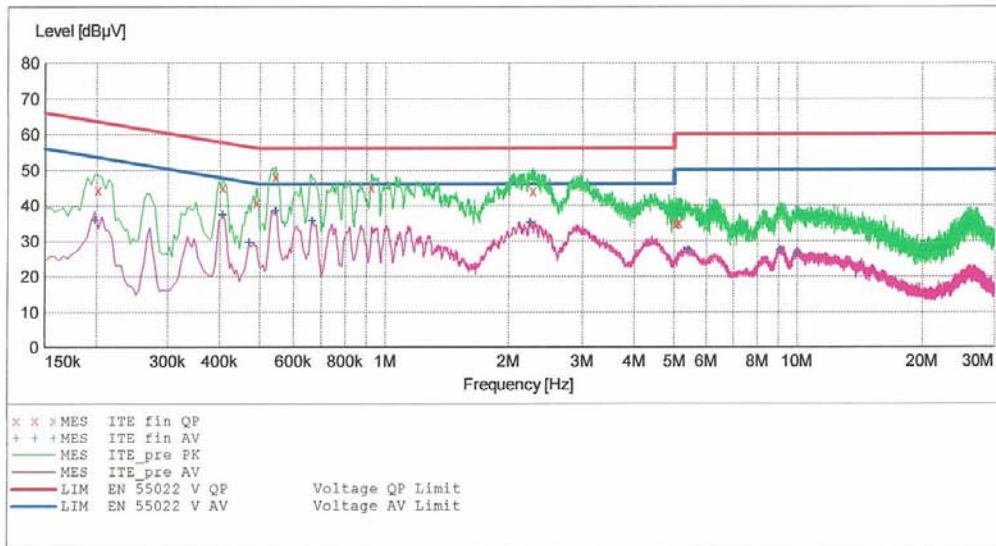
HCT

EMC

EUT: LG-P990
Manufacturer: LG
Operating Condition: WLAN MODE
Test Site: SHIELD ROOM
Operator: JS-LEE
Test Specification: CISPR22 CLASS B
Comment: H

SCAN TABLE: "CISPR22 CLASS B"

Short Description:			CISPR 22 CLASS B			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "ITE_fin QP"

12/6/2010 10:27AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.202010	44.40	10.1	64	19.1	---	---
0.406010	45.10	10.1	58	12.7	---	---
0.490010	40.90	10.1	56	15.3	---	---
0.544000	48.20	10.1	56	7.8	---	---
0.928000	45.20	10.2	56	10.8	---	---
2.288000	44.10	10.3	56	11.9	---	---
5.044000	34.80	10.5	60	25.2	---	---
5.056000	34.90	10.5	60	25.1	---	---
5.148000	35.00	10.5	60	25.0	---	---

MEASUREMENT RESULT: "ITE_fin AV"

12/6/2010 10:27AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.198010	36.00	10.1	54	17.7	---	---
0.406010	37.40	10.1	48	10.3	---	---
0.470010	29.70	10.1	47	16.8	---	---
0.544000	38.50	10.1	46	7.5	---	---
0.664000	35.70	10.1	46	10.3	---	---
2.256000	35.20	10.3	46	10.8	---	---
5.400000	27.50	10.5	50	22.5	---	---
9.104000	27.30	10.7	50	22.7	---	---
10.008000	26.30	10.8	50	23.7	---	---

8. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ESH2-Z5/ LISN	Annual	03/24/2011	861741/013
Rohde & Schwarz	ESH3-Z6/ LISN	Annual	03/05/2011	100329
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	07/15/2012	9160-3150
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	ESH3-Z2/ PULSE LIMITER	Annual	10/25/2011	375.8810.352
MITEQ	AMF-6D-001180-35-20P/AMP	Annual	05/20/2011	990893
MITEQ	AFS44-00101800-35-20P-44-PS/AMP	Annual	04/05/2011	1119544
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	09/23/2011	296
Rohde & Schwarz	FSP30 / Spectrum Analyzer	Annual	03/25/2011	839117/011
Agilent	E4440A / Spectrum Analyzer	Annual	06/09/2011	US45303008
Agilent	E4416A /Power Meter	Annual	01/14/2011	GB41291412
Agilent	E9327A /POWER SENSOR	Annual	07/23/2011	MY4442009
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	06/25/2011	1
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	07/23/2011	1
Hewlett Packard	11636B/Power Divider	Annual	12/24/2010	11377
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	01/08/2011	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	12/01/2011	010002156287001199
TESCOM	TC-3000A / BLUETOOTH TESTER	Annual	01/11/2011	3000A490112
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	06/24/2011	100422
EMCO	6502.LOOP ANTENNA	Biennial	01/13/2012	9009-2536