



# HCT CO., LTD.

## CERTIFICATE OF COMPLIANCE FCC Certification

<b>Applicant Name:</b> LG Electronics MobileComm U.S.A., Inc.	<b>Date of Issue:</b> March 02, 2012
<b>Address:</b> 10101 Old Grove Road, San Diego, CA 92131	<b>Location:</b> HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea
	<b>Test Report No.:</b> HCTR1202FR13-1
	<b>HCT FRN:</b> 0005866421

<b>FCC ID:</b>	<b>ZNFL04D</b>
<b>APPLICANT:</b>	<b>LG Electronics MobileComm U.S.A., Inc.</b>

<b>FCC Model(s):</b>	L-04D
<b>EUT Type:</b>	Cellular HSPA WCDMA Wireless Router with WLAN
<b>Max. RF Output Power:</b>	Wi-Fi 802.11b(16.18 dBm) / Wi-Fi 802.11g (17.38 dBm) / Wi-Fi 802.11n (17.32 dBm)
<b>Frequency Range:</b>	2412 MHz -2462 MHz
<b>Modulation type</b>	CCK/DSSS/OFDM
<b>FCC Classification:</b>	Digital Transmission System(DTS)
<b>FCC Rule Part(s):</b>	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)

	
<b>Report prepared by</b>	<b>Approved by</b>
<b>: Jong Seok Lee</b>	<b>: Sang Jun Lee</b>
<b>Test engineer of RF Team</b>	<b>Manager of RF Team</b>

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FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D

# Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1202FR13	February 21, 2012	- First Approval Report
HCTR1202FR13-1	March 2, 2012	- Updated new test procedure

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## 1. GENERAL INFORMATION

**Applicant:** LG Electronics MobileComm U.S.A., Inc.  
**Address:** 10101 Old Grove Road, San Diego, CA 92131  
  
**FCC ID:** ZNFL04D  
**EUT Type:** Cellular HSPA WCDMA Wireless Router with WLAN  
**Model Name:** L-04D  
**Date(s) of Tests:** February 11, 2012 ~ February 20, 2012  
**Contact person:** Name: Yun Jin Cho  
 Phone #: +82-2-2033-1328  
  
**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

<b>EUT Type</b>	Cellular HSPA WCDMA Wireless Router with WLAN	
<b>Model Name</b>	L-04D	
<b>Power Supply</b>	DC 3.7 V	
<b>Battery type</b>	Li-ion Battery(Standard)	
<b>Frequency Range</b>	TX: 2412 MHz ~ 2462 MHz RX: 2412 MHz ~ 2462 MHz	
<b>Max. RF Output Power:</b>	Peak:	Wi-Fi 802.11b(16.18 dBm) / Wi-Fi 802.11g (17.38 dBm) / Wi-Fi 802.11n (17.32 dBm)
	Average:	Wi-Fi 802.11b(9.38 dBm) / Wi-Fi 802.11g (8.77 dBm) / Wi-Fi 802.11n (8.62 dBm)
<b>Modulation Type</b>	DSSS/CCK(802.11b), OFDM(802.11g, 802.11n)	
<b>Antenna Specification</b>	Manufacturer: KOMATECH Co., Ltd. Antenna type: Internal Antenna Average Gain : -3.75 dBi	

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### 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 C63.10-2009)

#### 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 6.2 of ANSI C63.10. (Version :2009) 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 6.2 of ANSI C63.10. (Version: 2009)

#### 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 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."

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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. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	CONDUCTED	PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	§15.247(d)	Conducted < 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 8.6		PASS
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 8.5.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.5.2		PASS

## 8. TEST RESULT

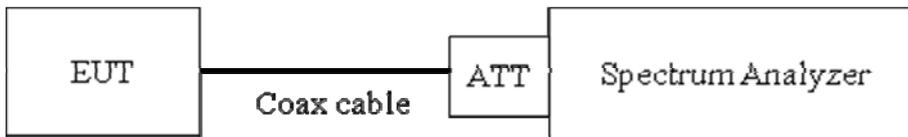
### 8.1 6dB BANDWIDTH MEASUREMENT (802.11b/g/n)

#### 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: 430 kHz

VBW: 1.3 MHz

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	8.354	0.500	Pass
2437	6	8.390	0.500	Pass
2462	11	7.876	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

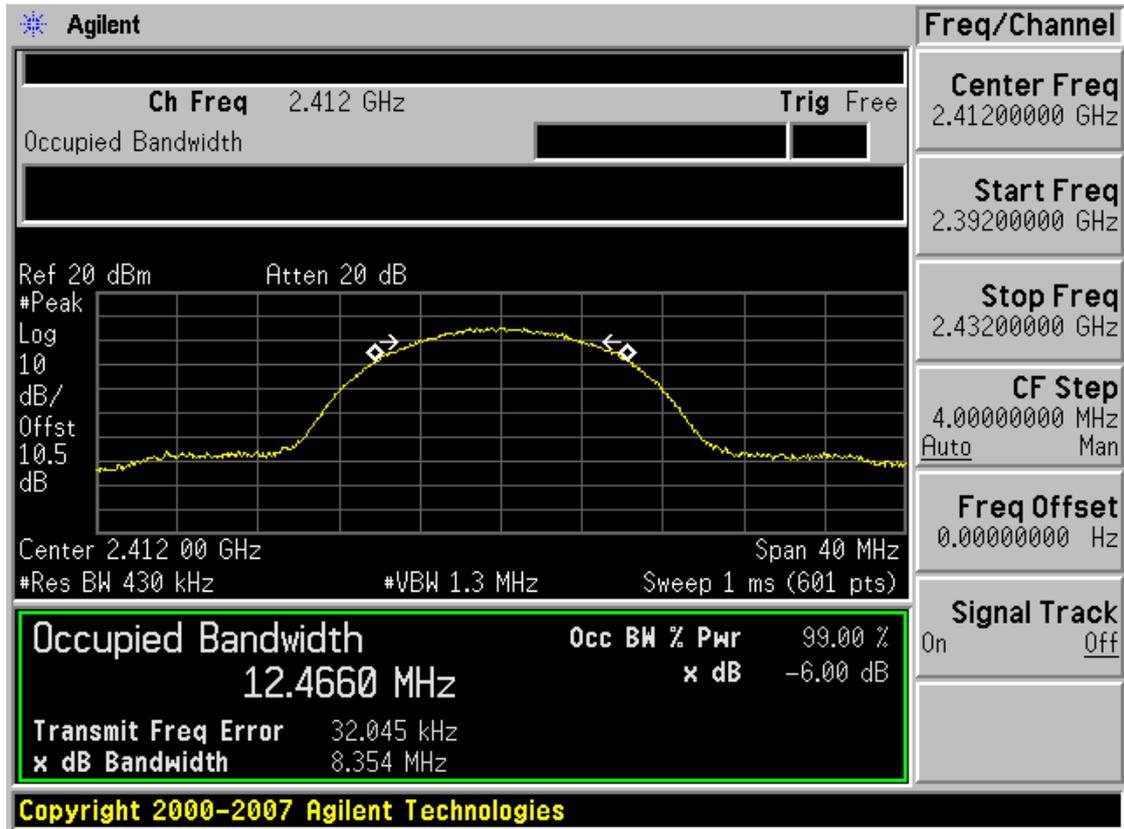
802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.373	0.500	Pass
2437	6	16.545	0.500	Pass
2462	11	16.073	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11n

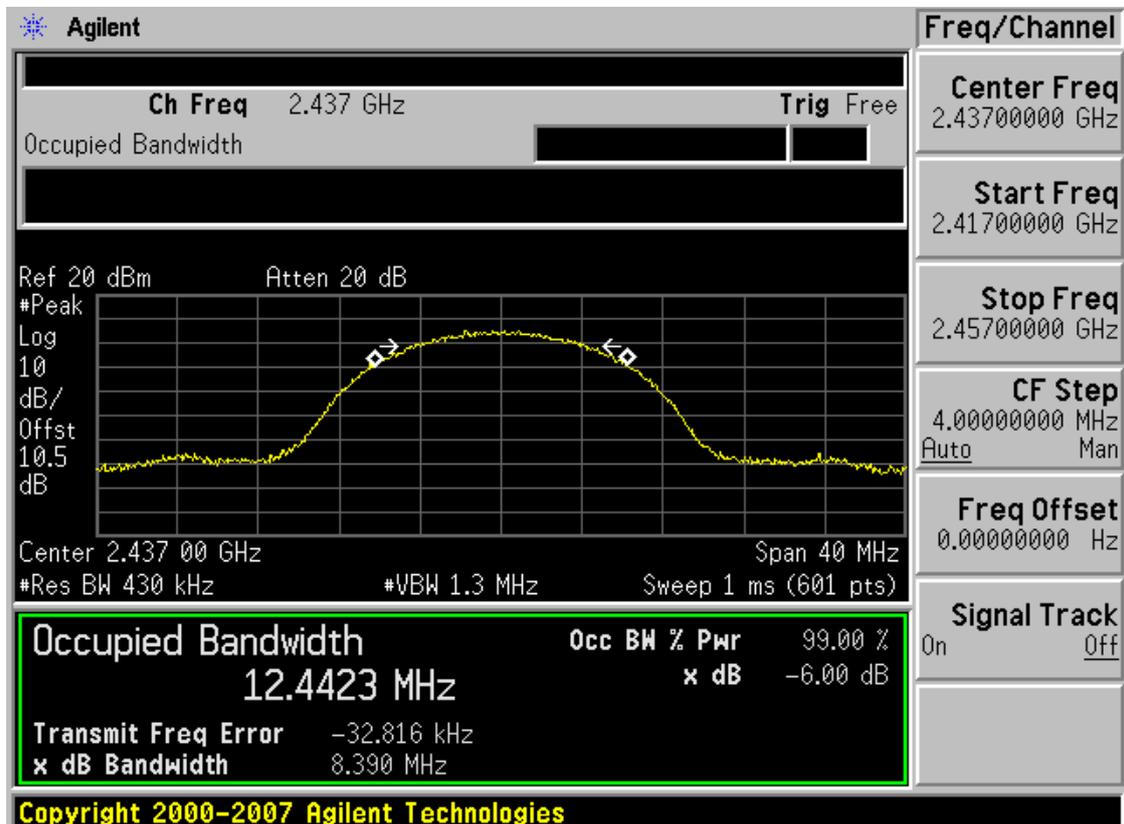
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.223	0.500	Pass
2437	6	17.484	0.500	Pass
2462	11	16.880	0.500	Pass

RESULT PLOTS

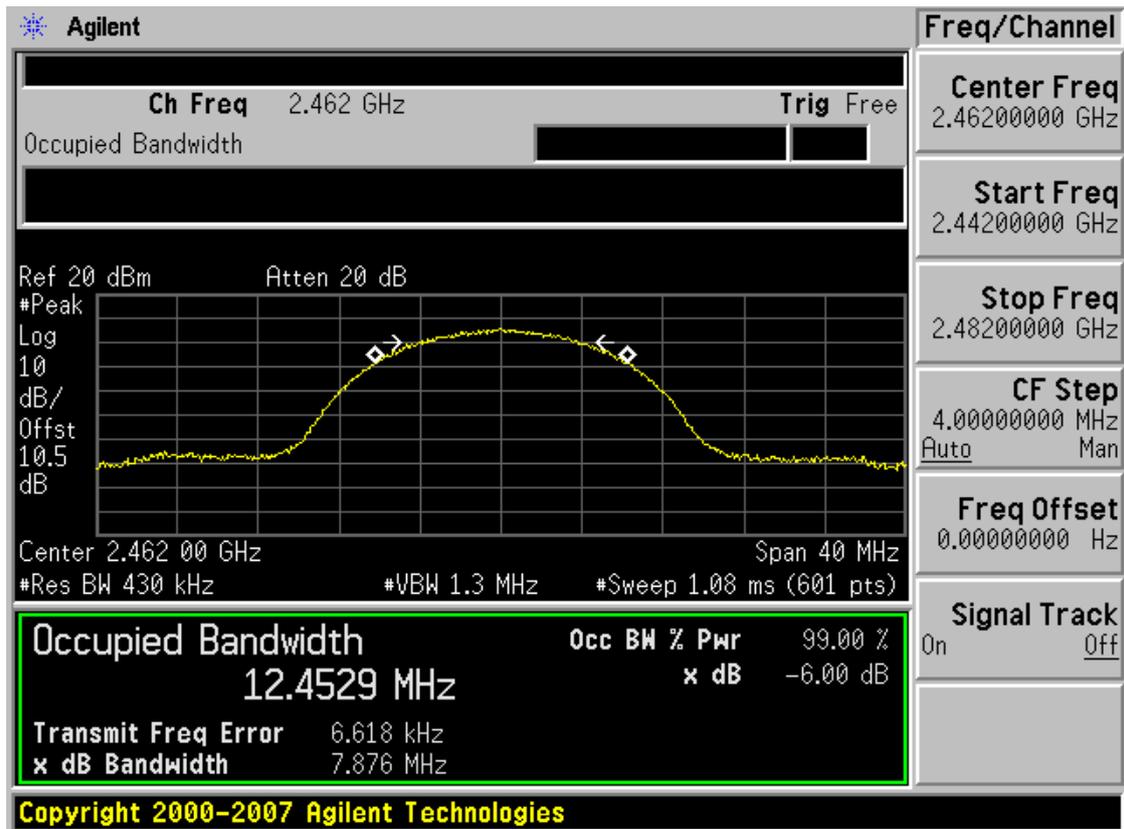
6dB Bandwidth plot (802.11b-CH 1)



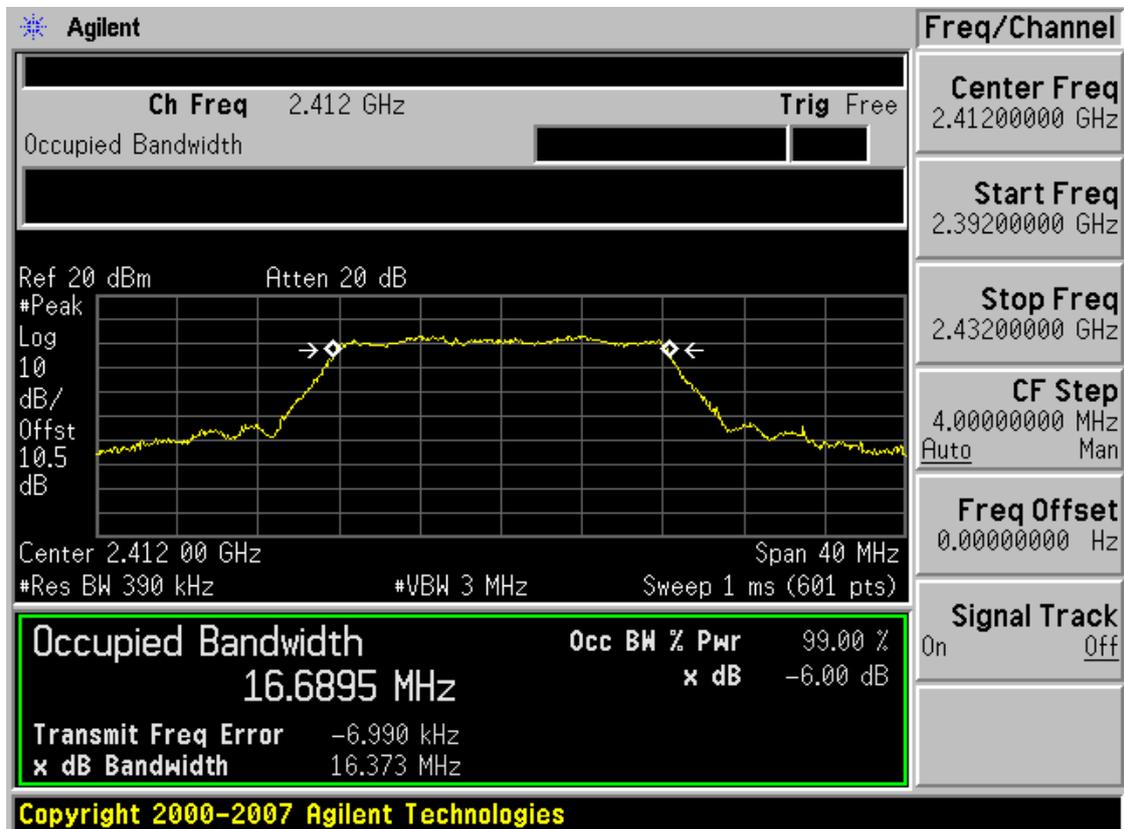
6dB Bandwidth plot (802.11b-CH 6)



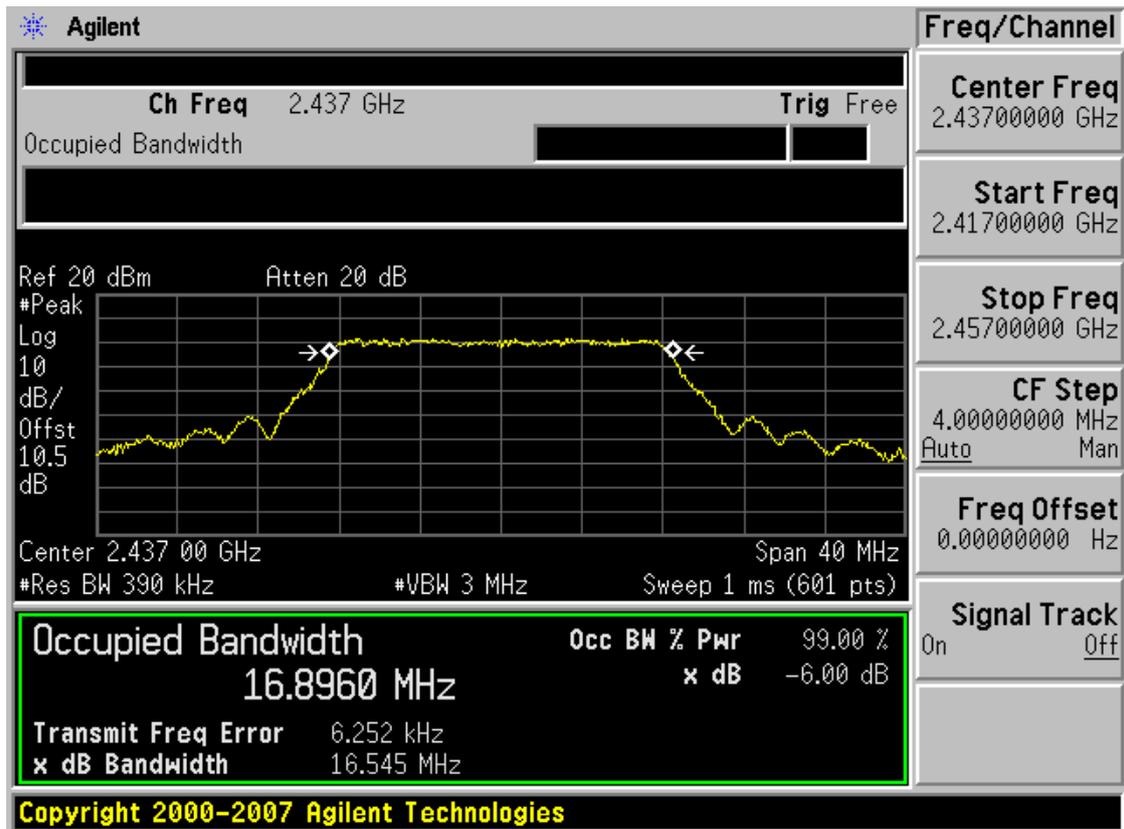
### 6dB Bandwidth plot (802.11b-CH 11)



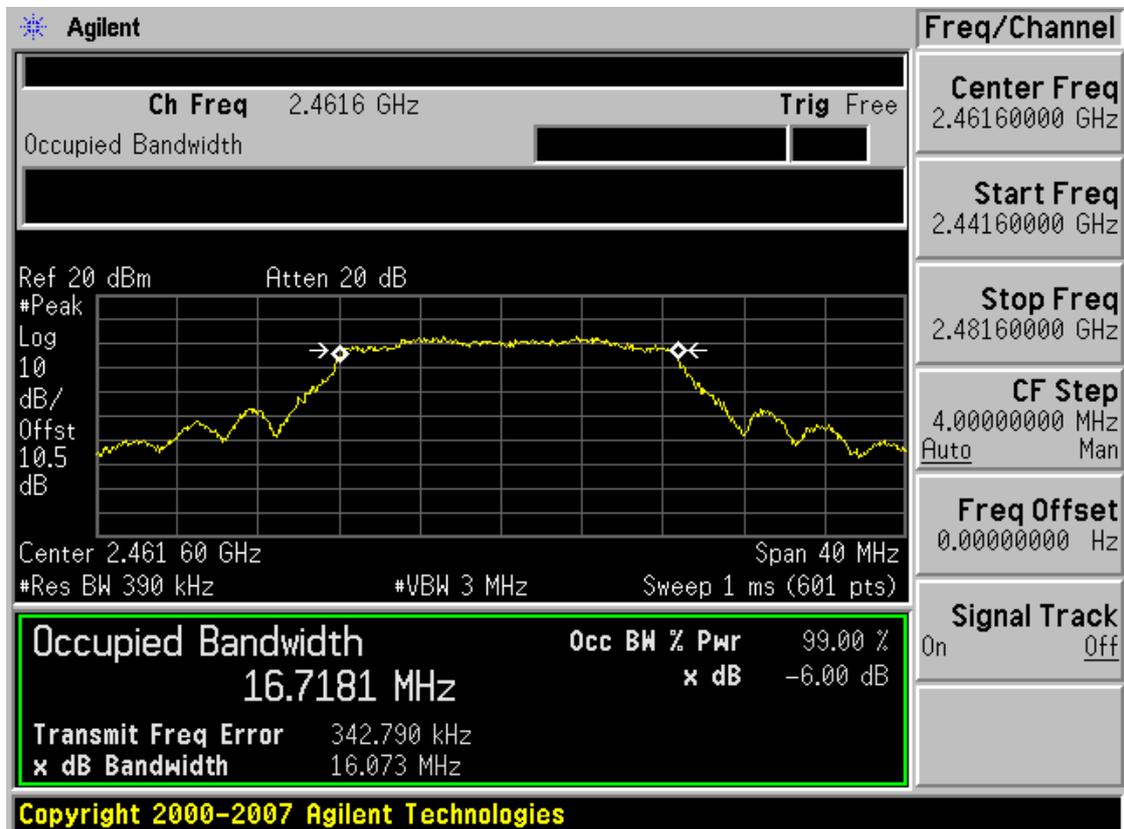
### 6dB Bandwidth plot (802.11g-CH 1)



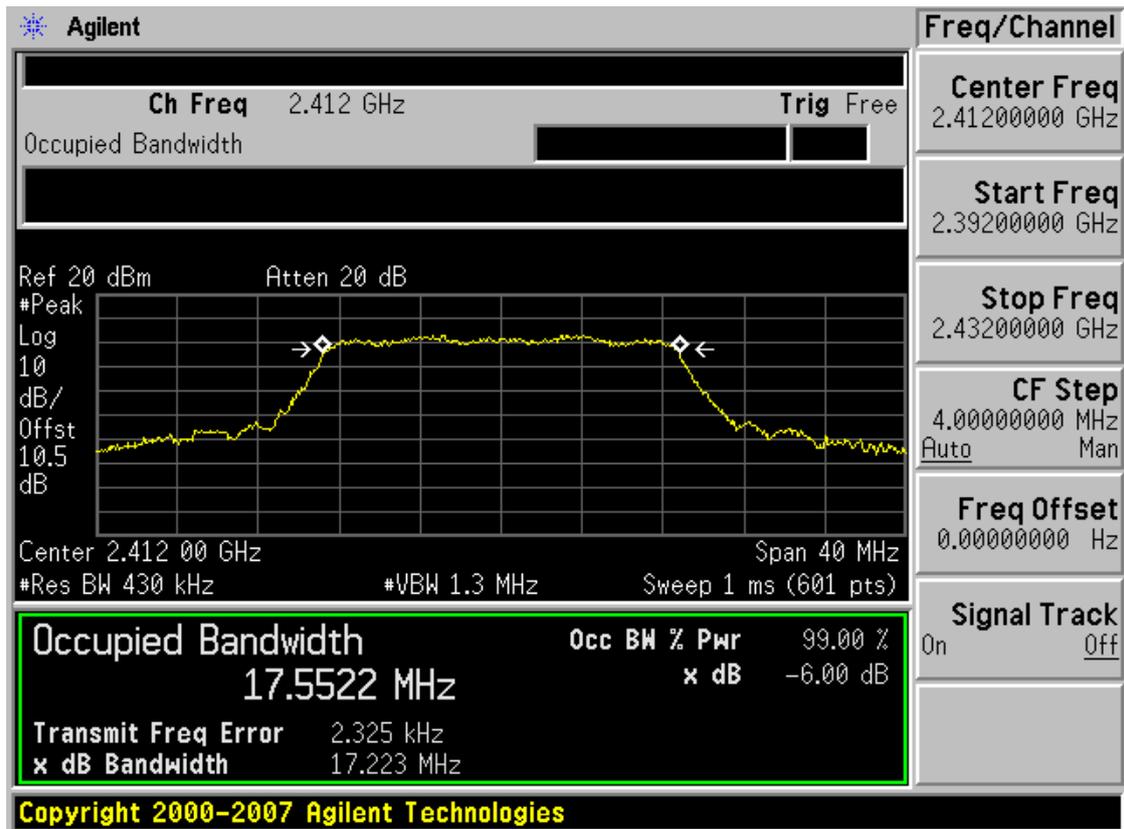
**6dB Bandwidth plot (802.11g-CH 6)**



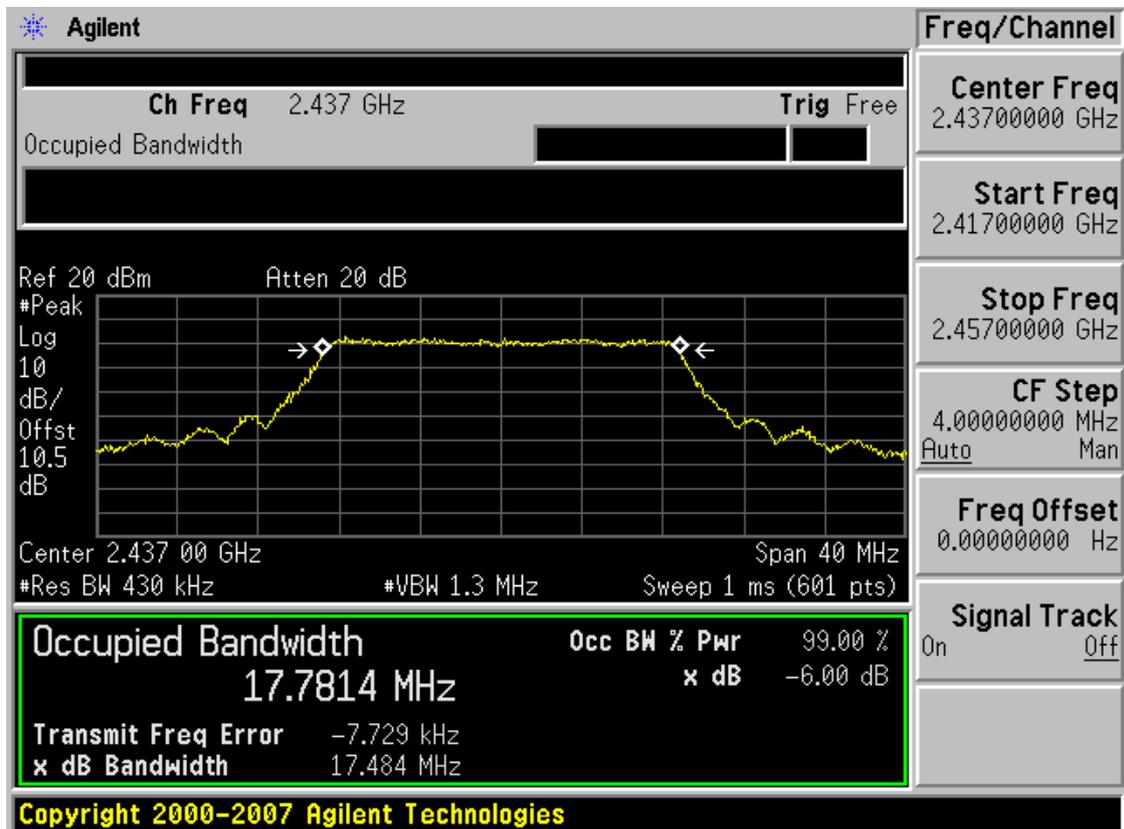
**6dB Bandwidth plot (802.11g-CH 11)**



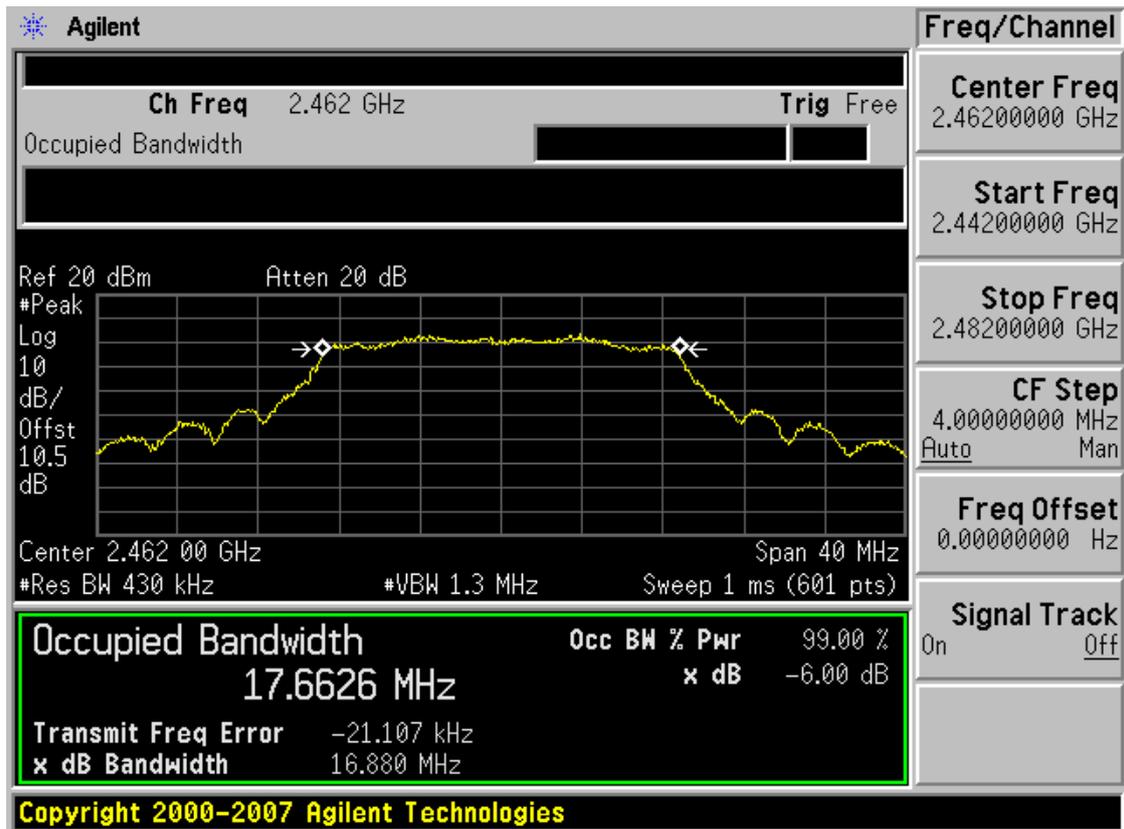
**6dB Bandwidth plot (802.11n-CH 1)**



**6dB Bandwidth plot (802.11n-CH 6)**



6dB Bandwidth plot (802.11n-CH 11)



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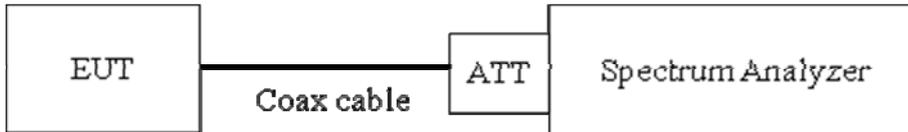
## 8.2 OUTPUT POWER MEASUREMENT (802.11b/g/n)

### 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. We use the spectrum analyzer's integrated band power measurement function. We tested according to KDB 558074(issued 1/18/2012).

This EUT TX condition is actual operating mode(not near 100 % duty cycle) by WLAN test program.

The Spectrum Analyzer is set to

- Peak Power

RBW = 1 MHz

VBW = 3 MHz

SPAN = 5 – 30 % greater than the EBW

Detector Mode = Peak

Integrated bandwidth = EBW

- Average Power

RBW = 1 MHz

VBW = 3 MHz

SPAN = 5 – 30 % greater than the EBW

Detector Mode = Average

Integrated bandwidth = EBW

#### ■ Sample Calculation

$$\begin{aligned} \text{Output Power} &= \text{Reading Value} + \text{ATT loss} + \text{Cable loss}(1 \text{ ea}) \\ &= 10 \text{ dBm} + 10 \text{ dB} + 0.8 \text{ dB} = 20.8 \text{ dBm} \end{aligned}$$

Where) Spectrum offset = ATT loss + Cable loss(1 ea)

Note: Power values in plot are applied offset.

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■ TEST RESULTS-Peak

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	12.65	30
		2 Mbps	12.86	30
		5.5 Mbps	13.50	30
		11 Mbps	16.18	30
2437	6	1 Mbps	12.33	30
		2 Mbps	12.42	30
		5.5 Mbps	13.96	30
		11 Mbps	15.66	30
2462	11	1 Mbps	12.53	30
		2 Mbps	12.85	30
		5.5 Mbps	14.37	30
		11 Mbps	16.12	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	16.18	30
		9 Mbps	16.22	30
		12 Mbps	16.58	30
		18 Mbps	16.63	30
		24 Mbps	17.28	30
		36 Mbps	17.12	30
		48 Mbps	17.33	30
		54 Mbps	17.36	30
2437	6	6 Mbps	16.73	30
		9 Mbps	16.82	30
		12 Mbps	16.85	30
		18 Mbps	16.94	30
		24 Mbps	17.35	30
		36 Mbps	17.38	30
		48 Mbps	17.26	30
		54 Mbps	17.25	30
2462	11	6 Mbps	16.37	30
		9 Mbps	16.31	30
		12 Mbps	16.57	30
		18 Mbps	16.45	30
		24 Mbps	16.79	30
		36 Mbps	16.65	30
		48 Mbps	16.77	30
		54 Mbps	16.83	30

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6.5 Mbps	16.77	30
		13 Mbps	16.91	30
		19.5 Mbps	16.73	30
		26 Mbps	17.22	30
		39 Mbps	17.16	30
		52 Mbps	17.00	30
		58.5 Mbps	16.87	30
		65 Mbps	17.08	30
2437	6	6.5 Mbps	16.70	30
		13 Mbps	16.98	30
		19.5 Mbps	16.93	30
		26 Mbps	17.32	30
		39 Mbps	17.31	30
		52 Mbps	17.24	30
		58.5 Mbps	17.29	30
		65 Mbps	17.23	30
2462	11	6.5 Mbps	16.40	30
		13 Mbps	16.45	30
		19.5 Mbps	16.59	30
		26 Mbps	16.93	30
		39 Mbps	16.90	30
		52 Mbps	16.82	30
		58.5 Mbps	16.87	30
		65 Mbps	16.82	30

■ TEST RESULTS-Average

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	9.34	30
		2 Mbps	9.06	30
		5.5 Mbps	9.33	30
		11 Mbps	9.10	30
2437	6	1 Mbps	9.24	30
		2 Mbps	8.81	30
		5.5 Mbps	8.84	30
		11 Mbps	8.83	30
2462	11	1 Mbps	9.26	30
		2 Mbps	9.14	30
		5.5 Mbps	9.38	30
		11 Mbps	9.24	30

Conducted Output Power Measurements (802.11g Mode)

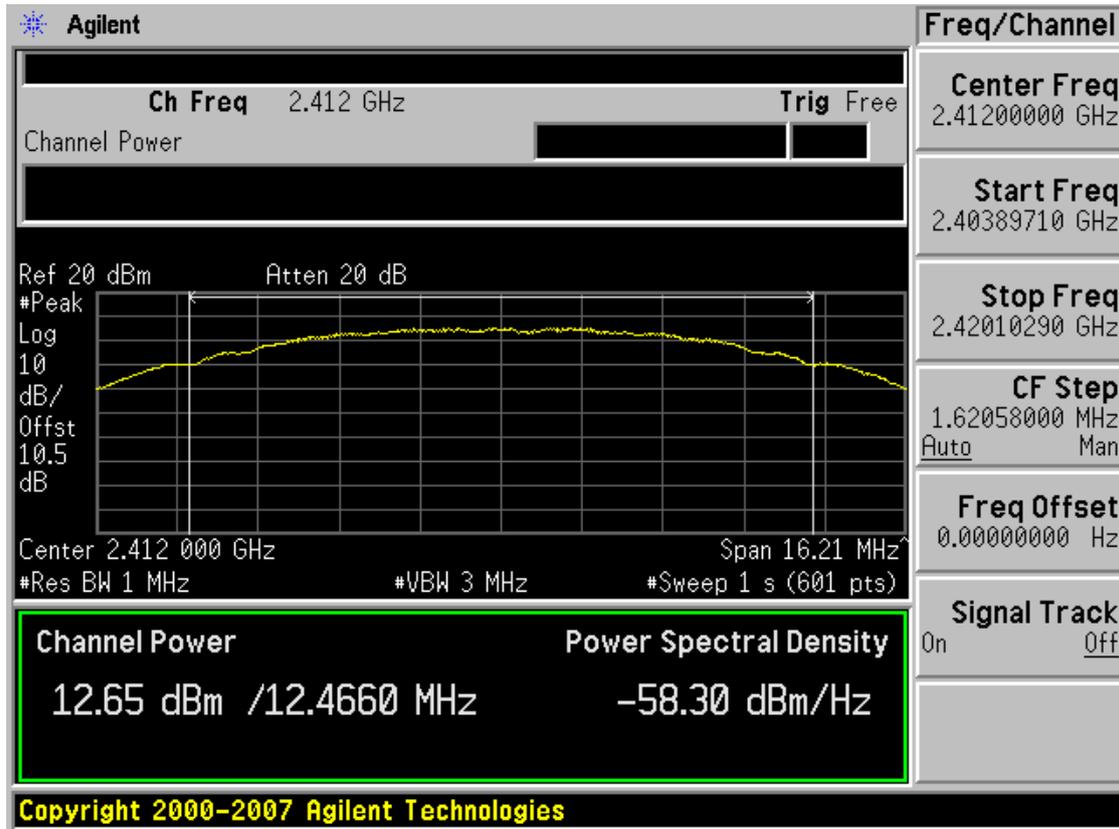
802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	7.98	30
		9 Mbps	7.93	30
		12 Mbps	7.67	30
		18 Mbps	7.53	30
		24 Mbps	7.45	30
		36 Mbps	7.26	30
		48 Mbps	7.01	30
		54 Mbps	7.22	30
2437	6	6 Mbps	8.77	30
		9 Mbps	8.69	30
		12 Mbps	8.53	30
		18 Mbps	8.32	30
		24 Mbps	8.06	30
		36 Mbps	7.92	30
		48 Mbps	7.37	30
		54 Mbps	7.36	30
2462	11	6 Mbps	8.30	30
		9 Mbps	8.08	30
		12 Mbps	7.92	30
		18 Mbps	7.74	30
		24 Mbps	7.68	30
		36 Mbps	7.38	30
		48 Mbps	7.00	30
		54 Mbps	6.95	30

Conducted Output Power Measurements (802.11n Mode)

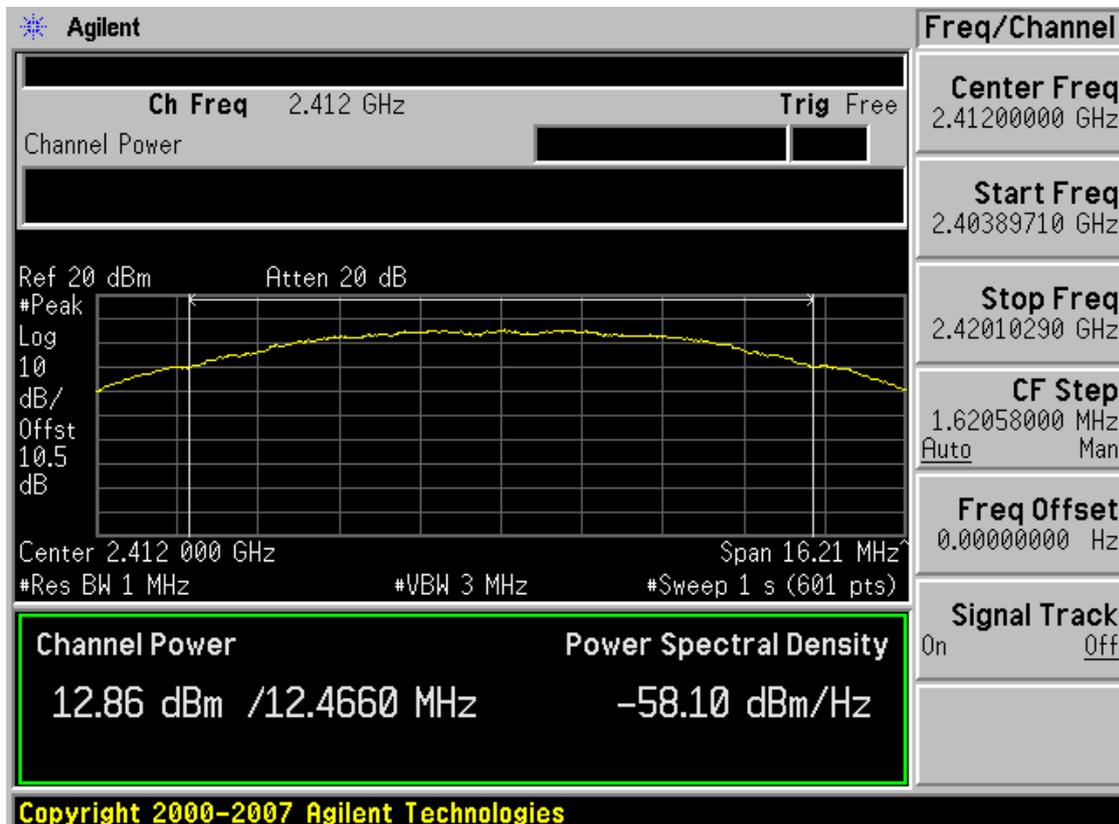
802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6.5 Mbps	8.47	30
		13 Mbps	8.28	30
		19.5 Mbps	8.08	30
		26 Mbps	7.93	30
		39 Mbps	7.62	30
		52 Mbps	7.19	30
		58.5 Mbps	7.06	30
		65 Mbps	6.81	30
2437	6	6.5 Mbps	8.57	30
		13 Mbps	8.62	30
		19.5 Mbps	8.27	30
		26 Mbps	8.11	30
		39 Mbps	7.63	30
		52 Mbps	7.41	30
		58.5 Mbps	7.22	30
		65 Mbps	6.93	30
2462	11	6.5 Mbps	8.08	30
		13 Mbps	7.90	30
		19.5 Mbps	7.82	30
		26 Mbps	7.55	30
		39 Mbps	7.29	30
		52 Mbps	6.92	30
		58.5 Mbps	6.70	30
		65 Mbps	6.78	30

RESULT PLOTS-Peak

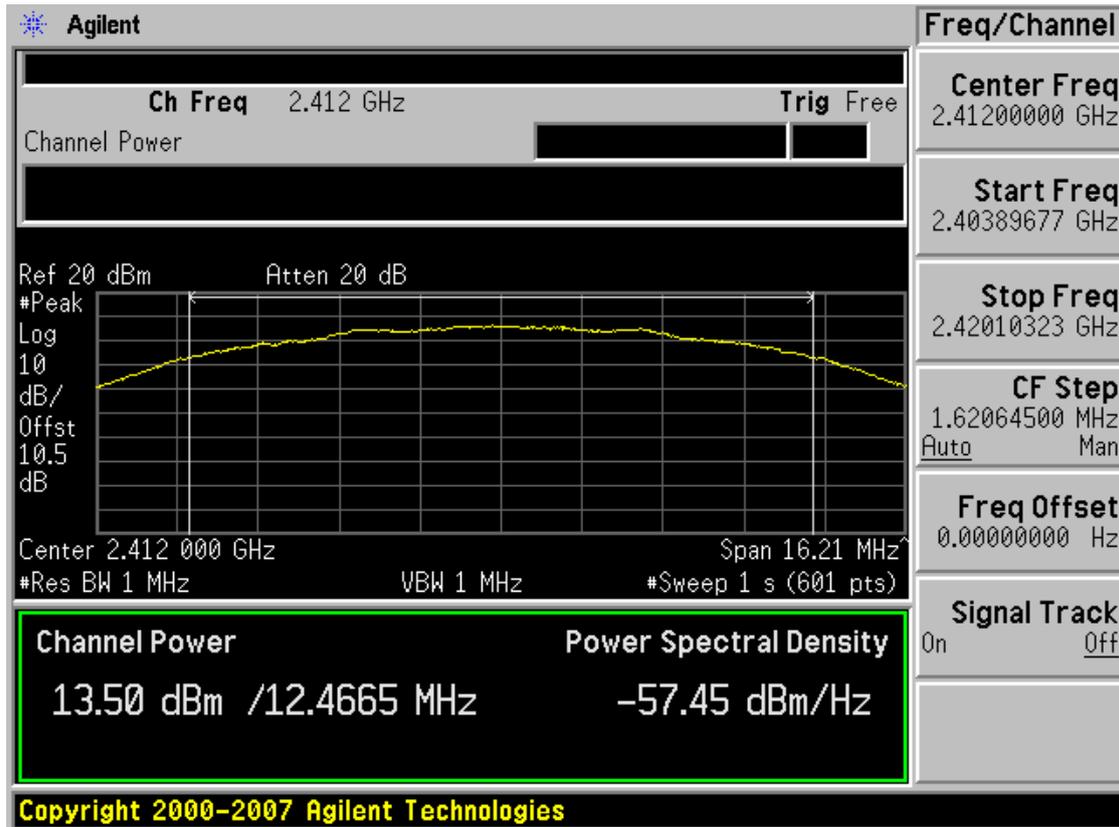
Conducted Output Power (802.11b-CH 1) 1Mbps



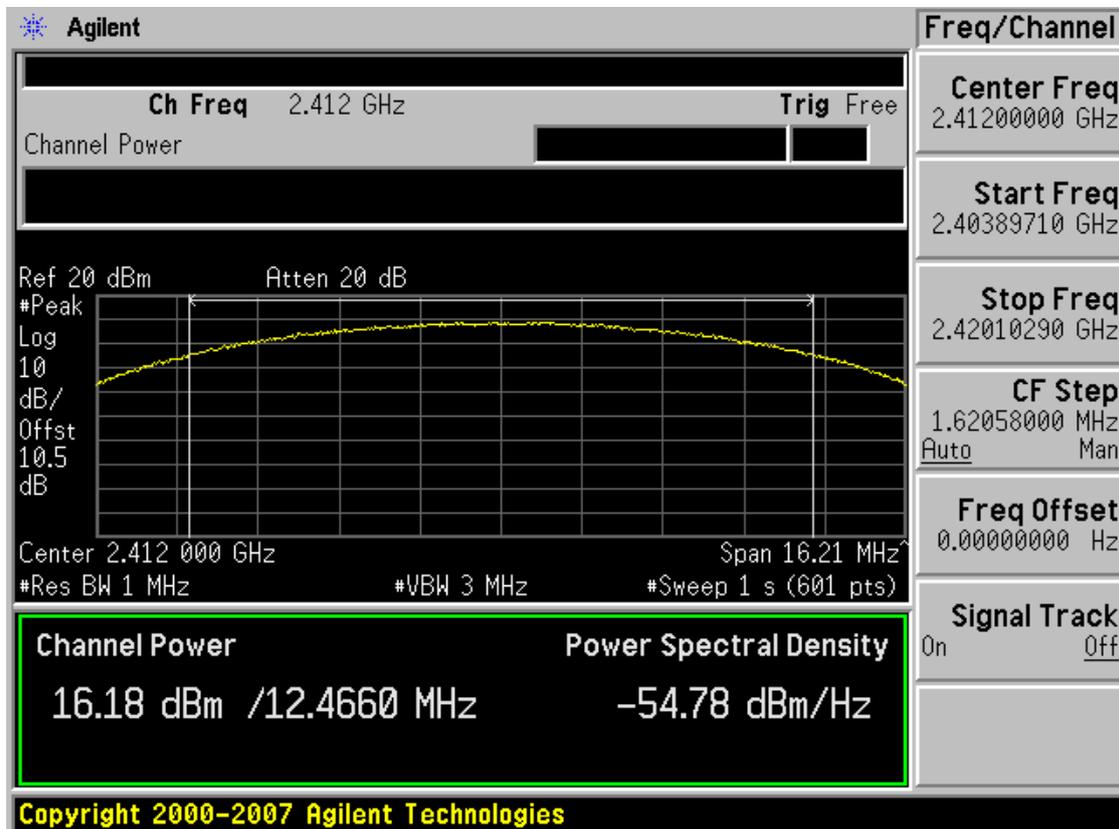
Conducted Output Power (802.11b-CH 1) 2Mbps



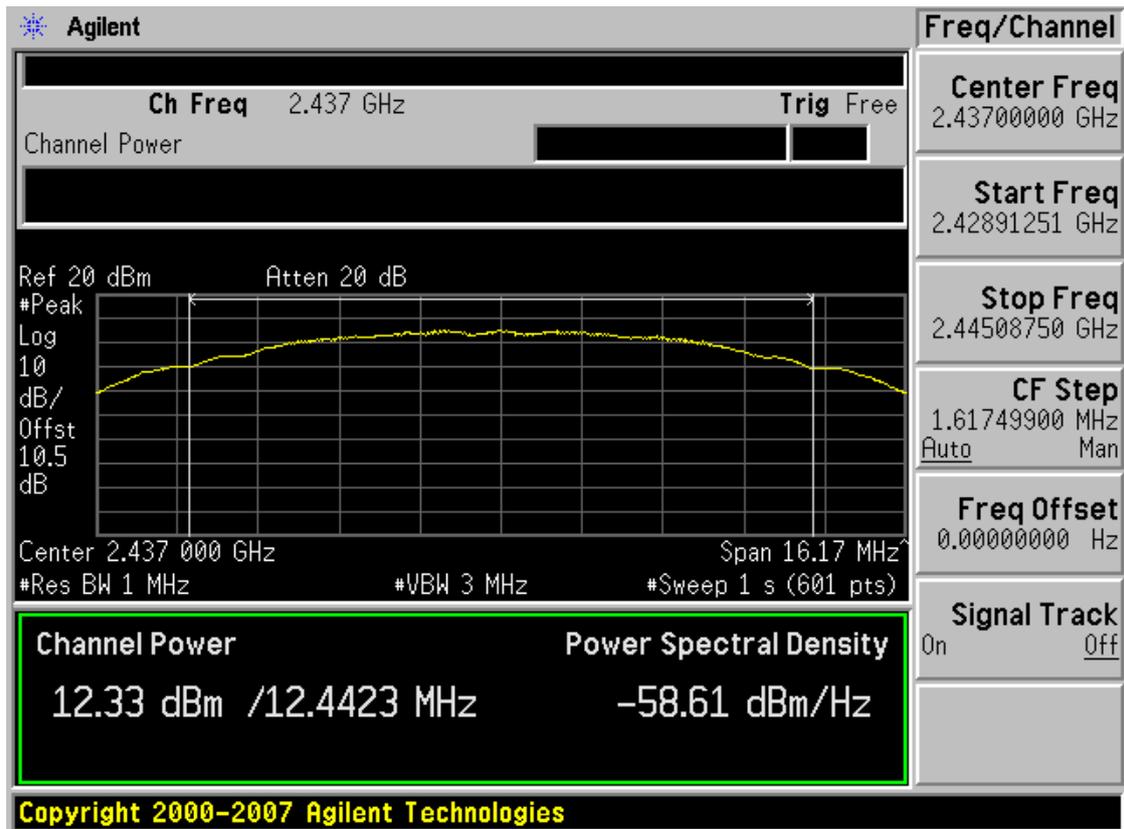
**Conducted Output Power (802.11b-CH 1) 5.5Mbps**



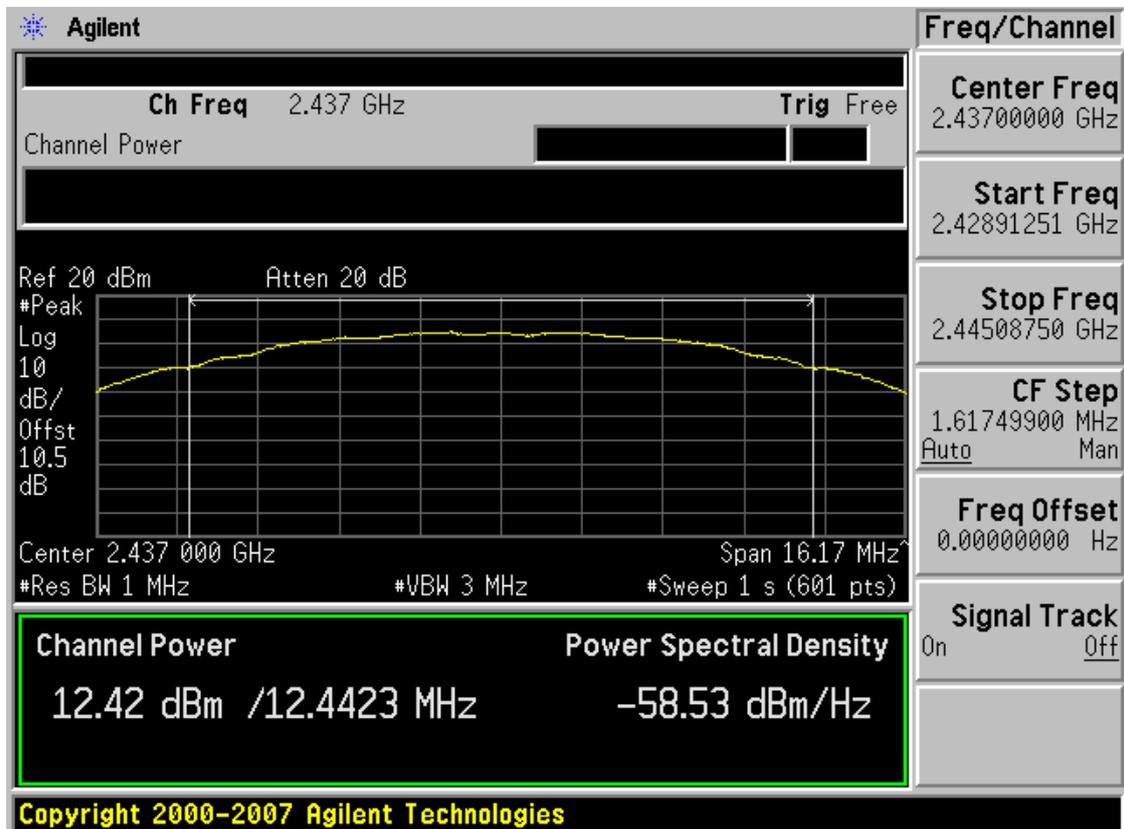
**Conducted Output Power (802.11b-CH 1) 11Mbps**



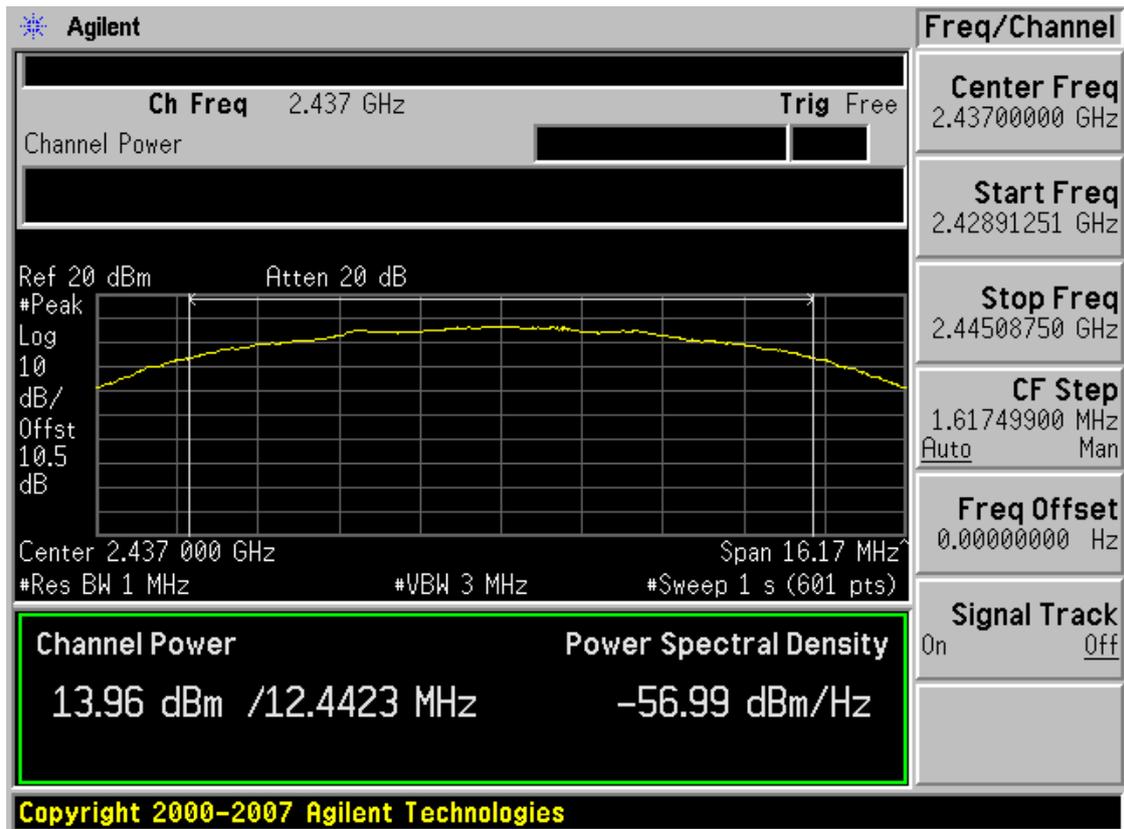
### Conducted Output Power (802.11b-CH 6) 1Mbps



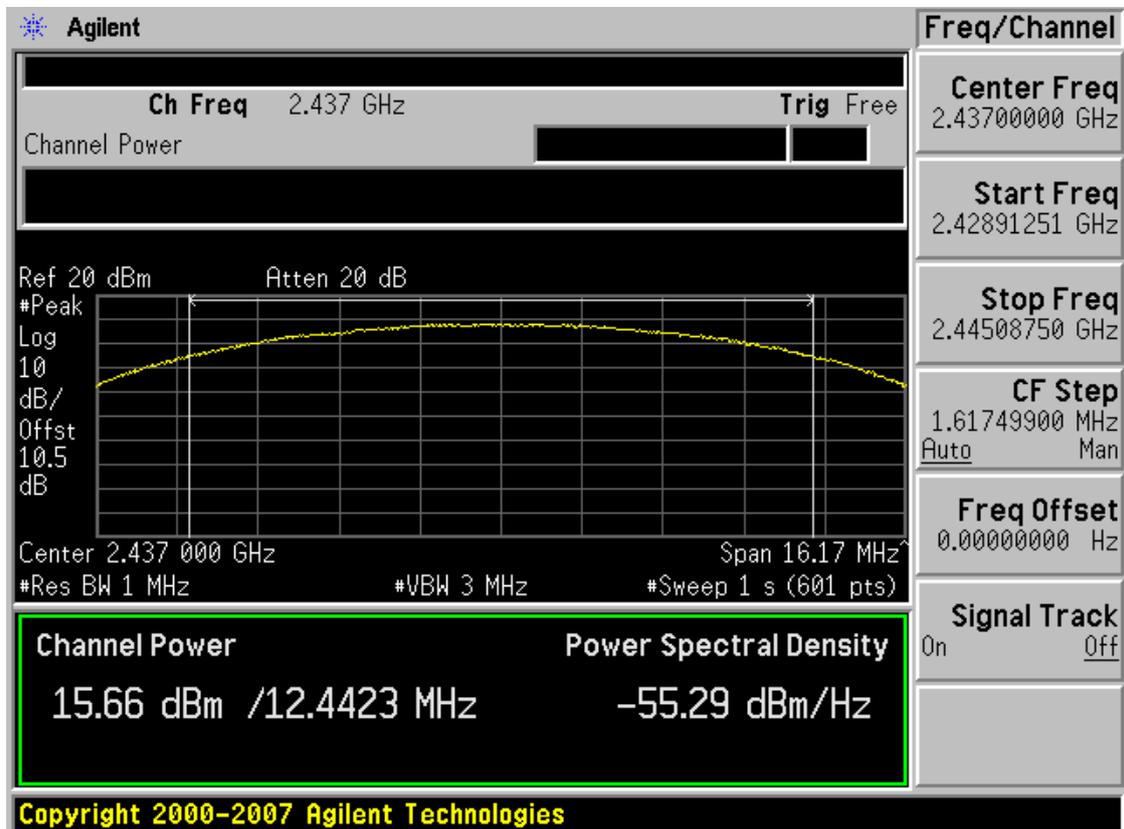
### Conducted Output Power (802.11b-CH 6) 2Mbps



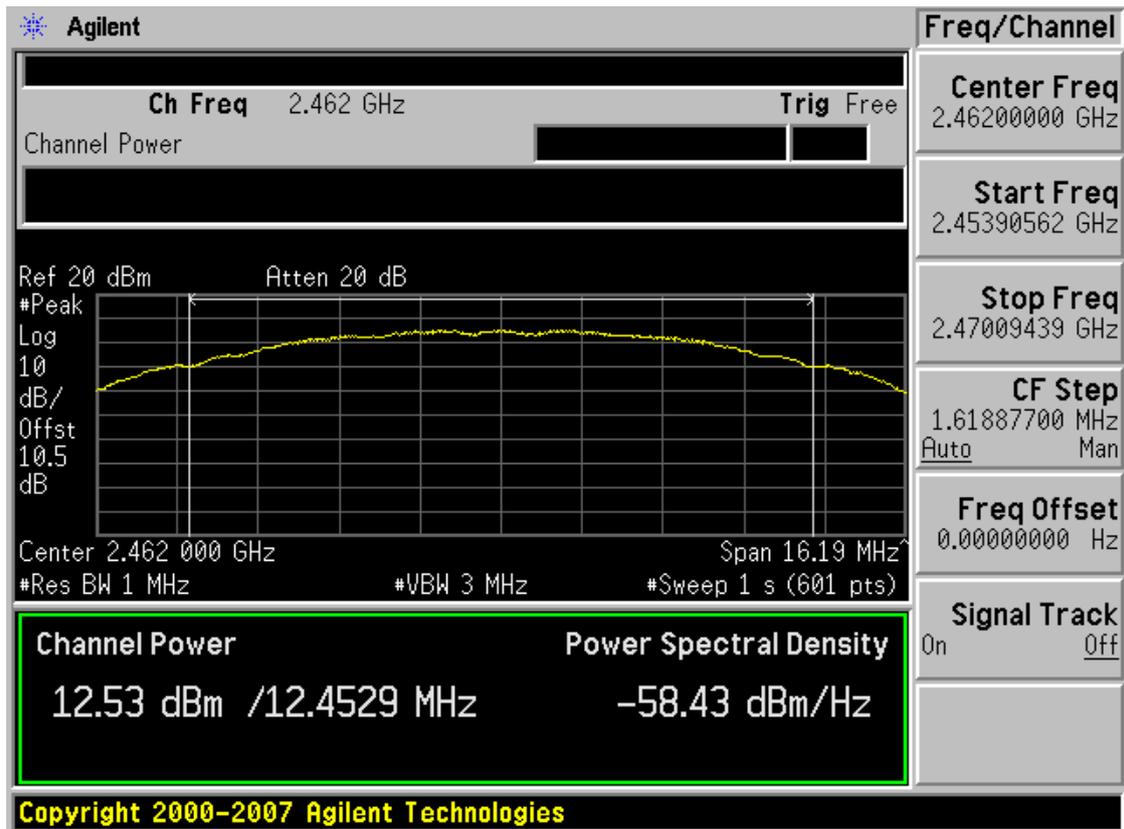
### Conducted Output Power (802.11b-CH 6) 5.5Mbps



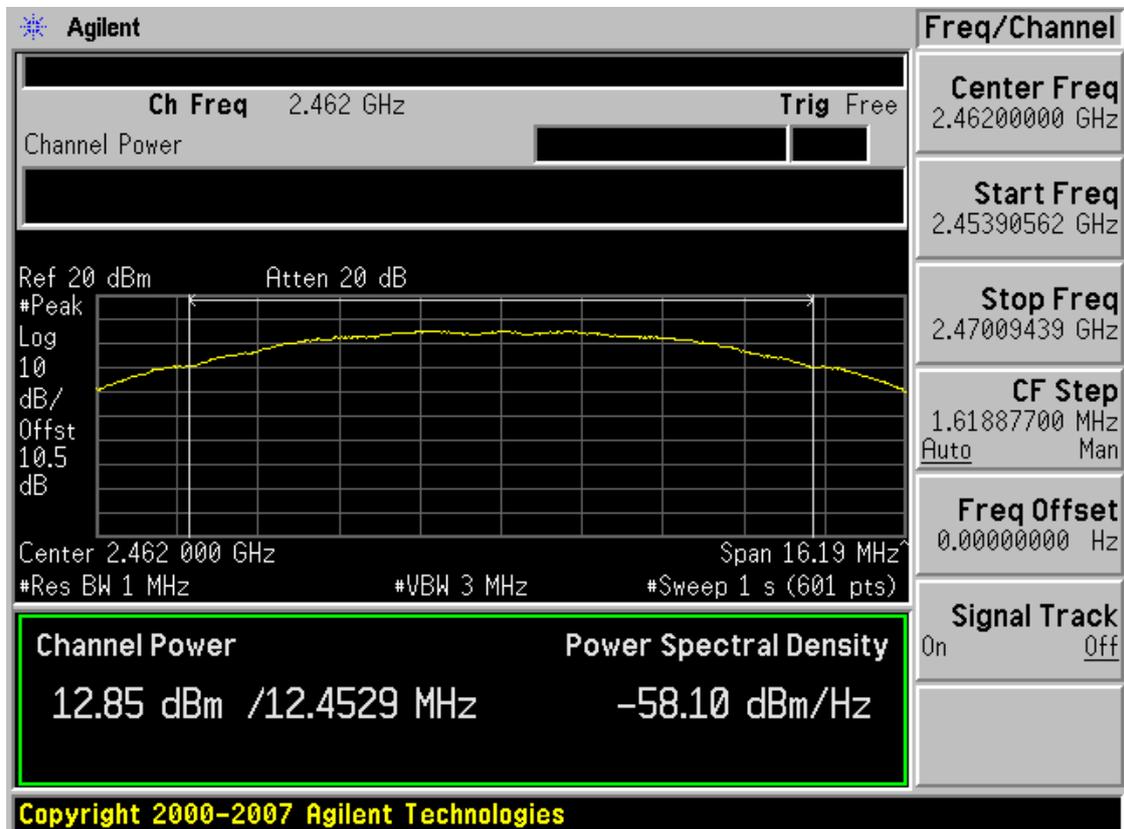
### Conducted Output Power (802.11b-CH 6) 11Mbps



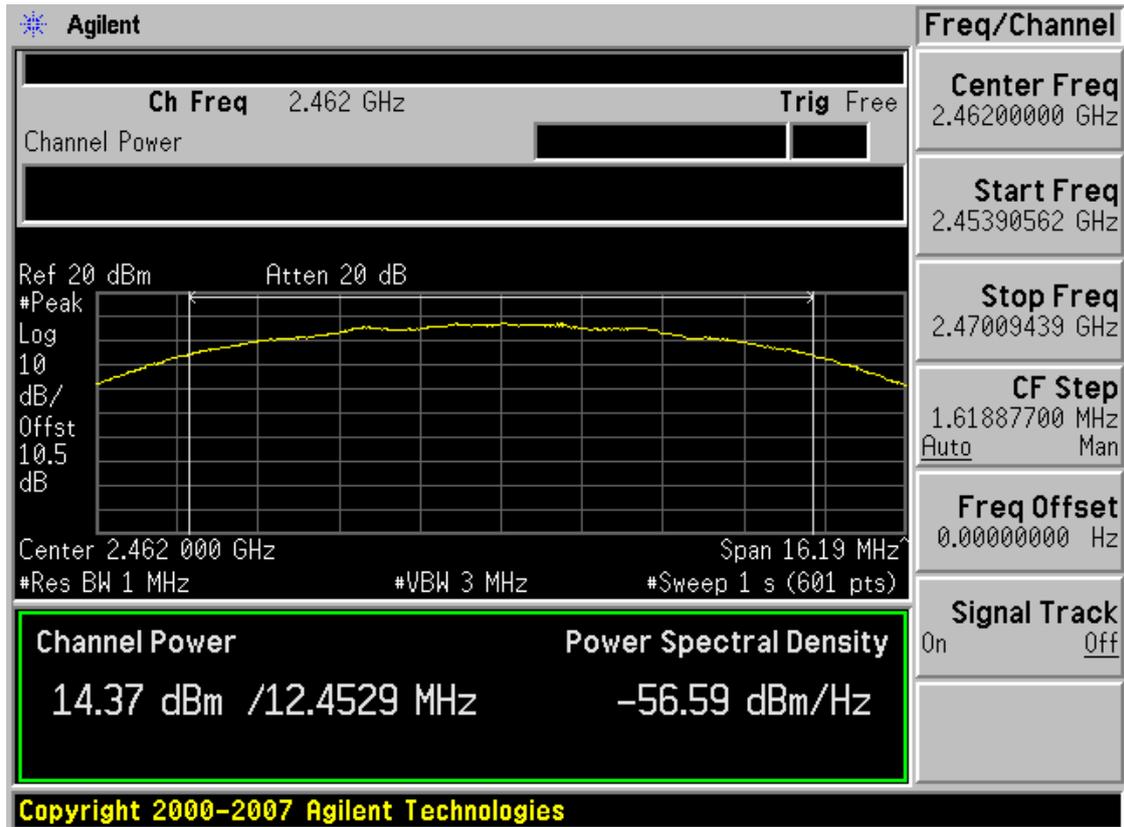
### Conducted Output Power (802.11b-CH 11) 1Mbps



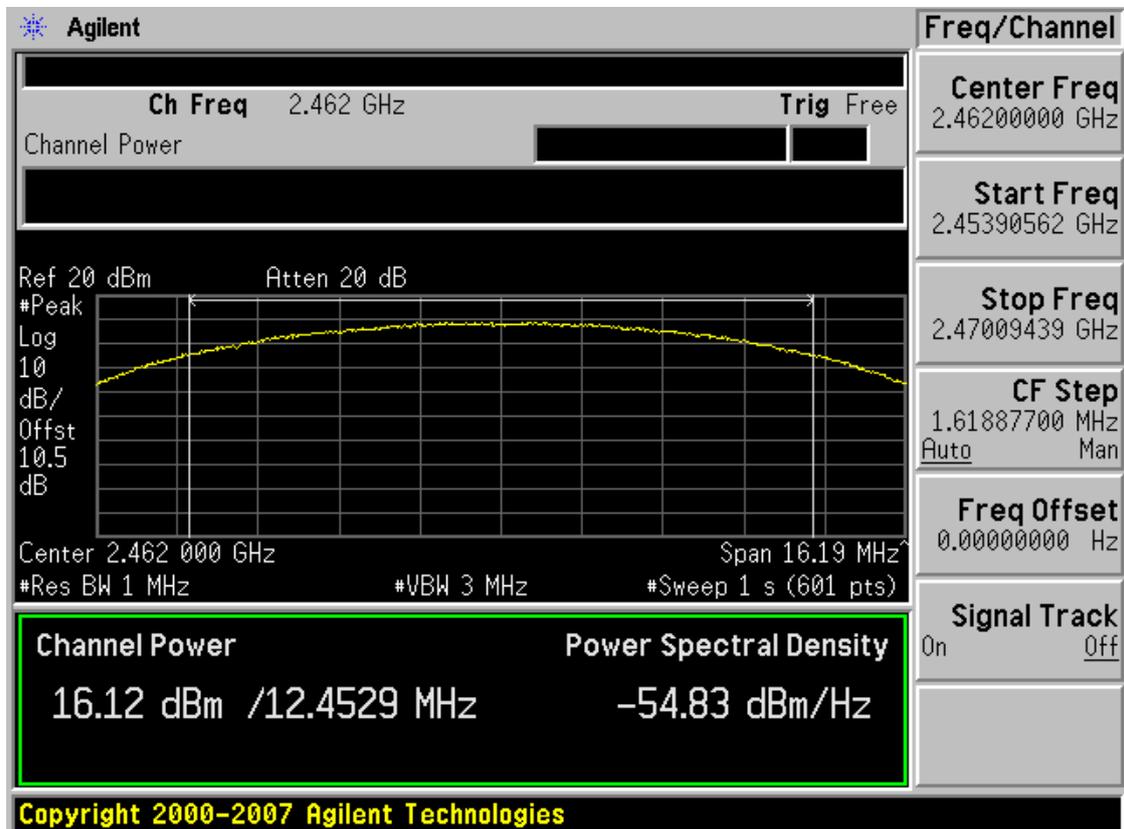
### Conducted Output Power (802.11b-CH 11) 2Mbps



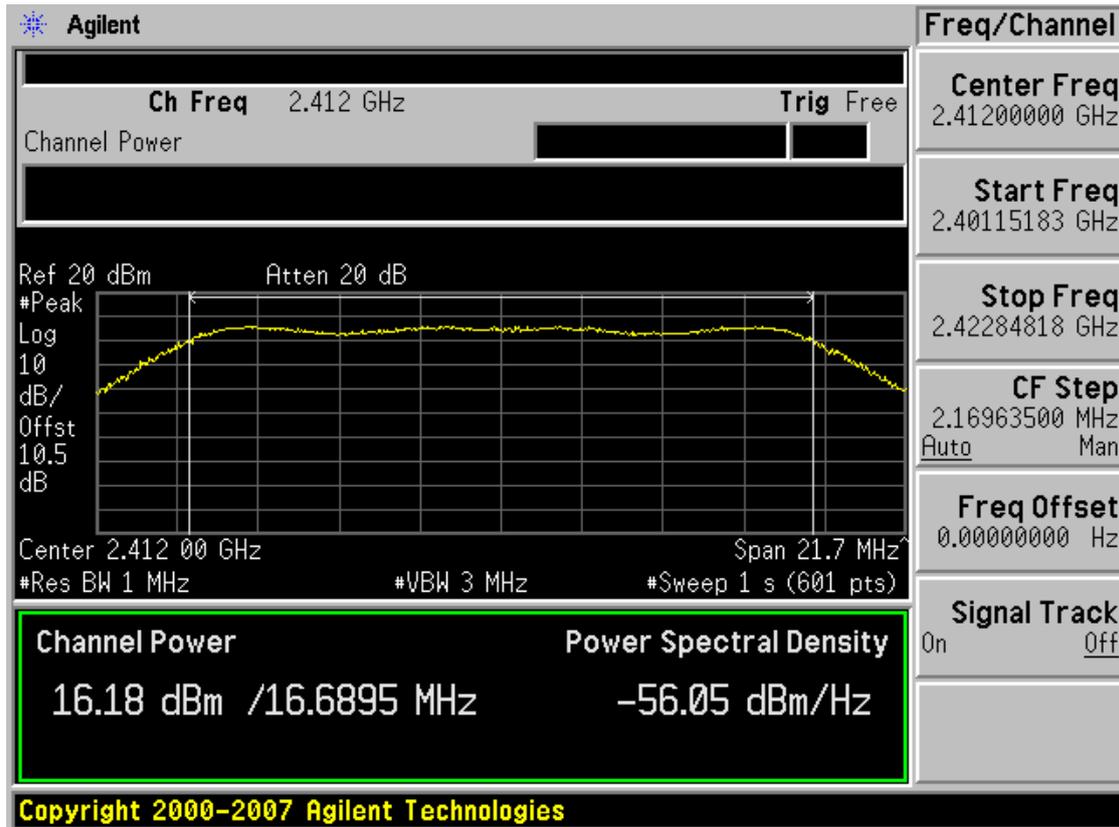
**Conducted Output Power (802.11b-CH 11) 5.5Mbps**



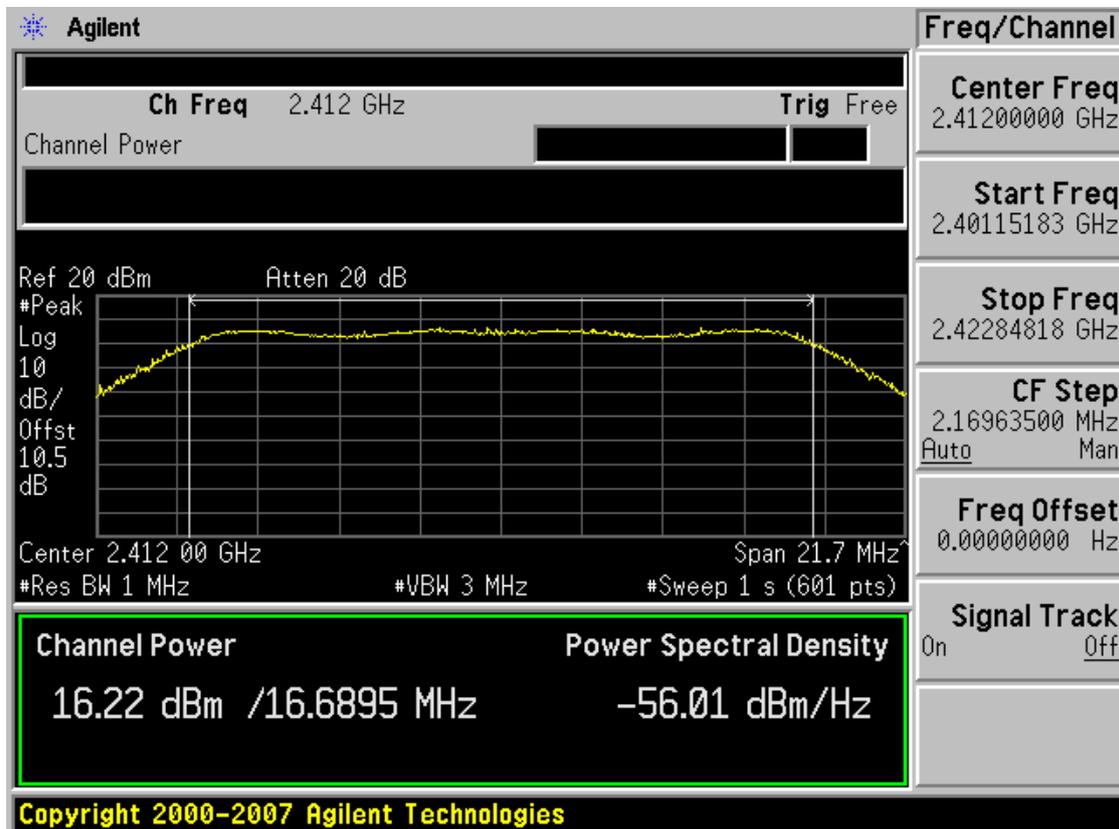
**Conducted Output Power (802.11b-CH 11) 11Mbps**



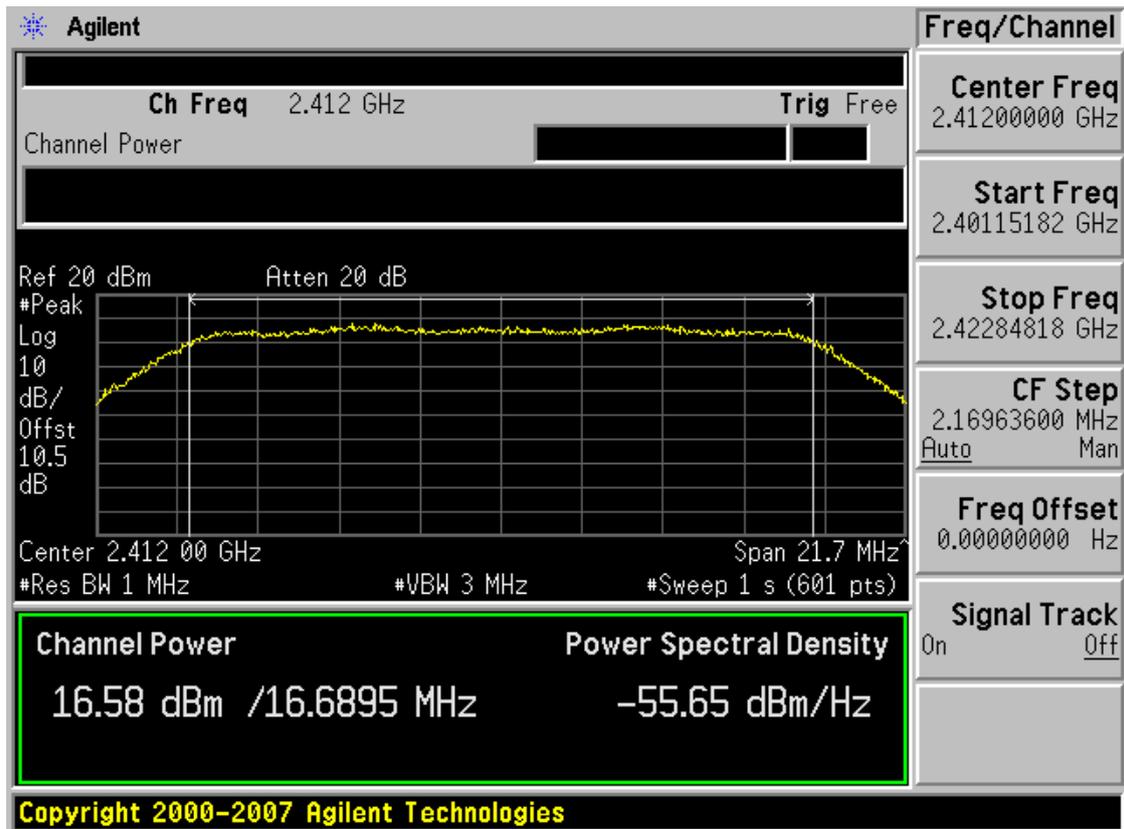
### Conducted Output Power (802.11g-CH 1) 6Mbps



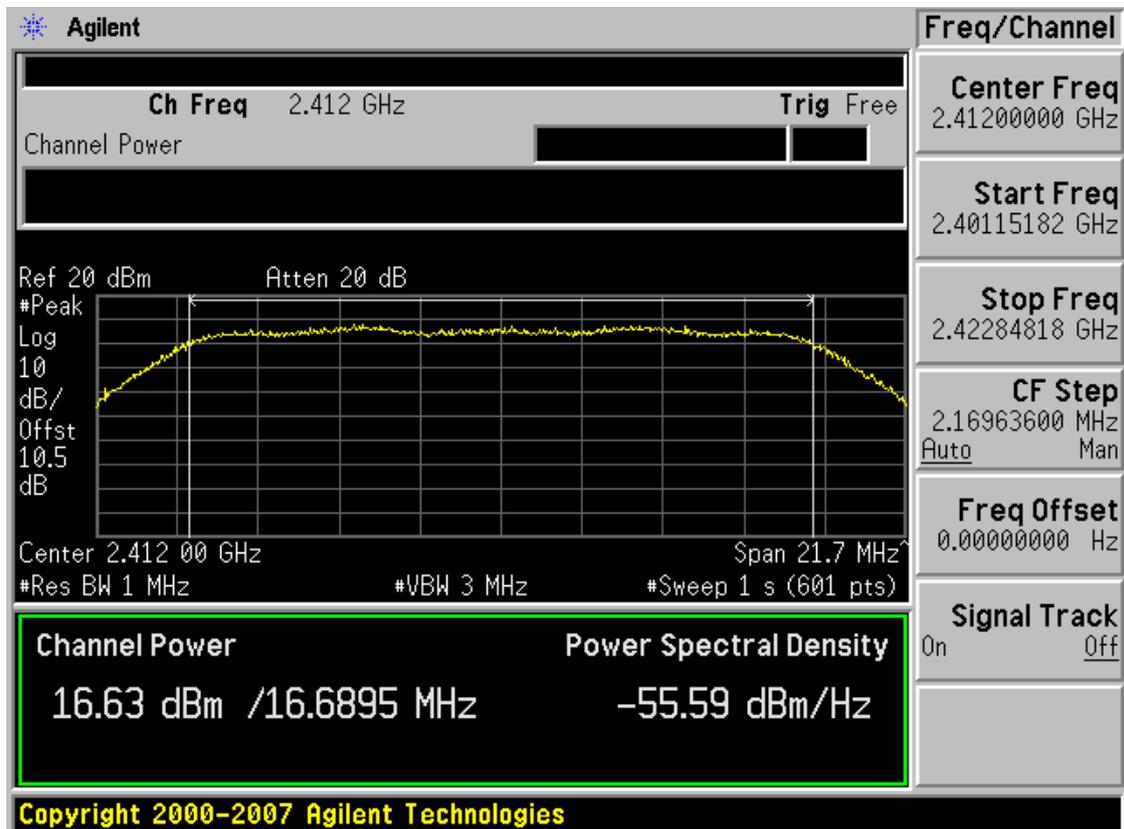
### Conducted Output Power (802.11g-CH 1) 9Mbps



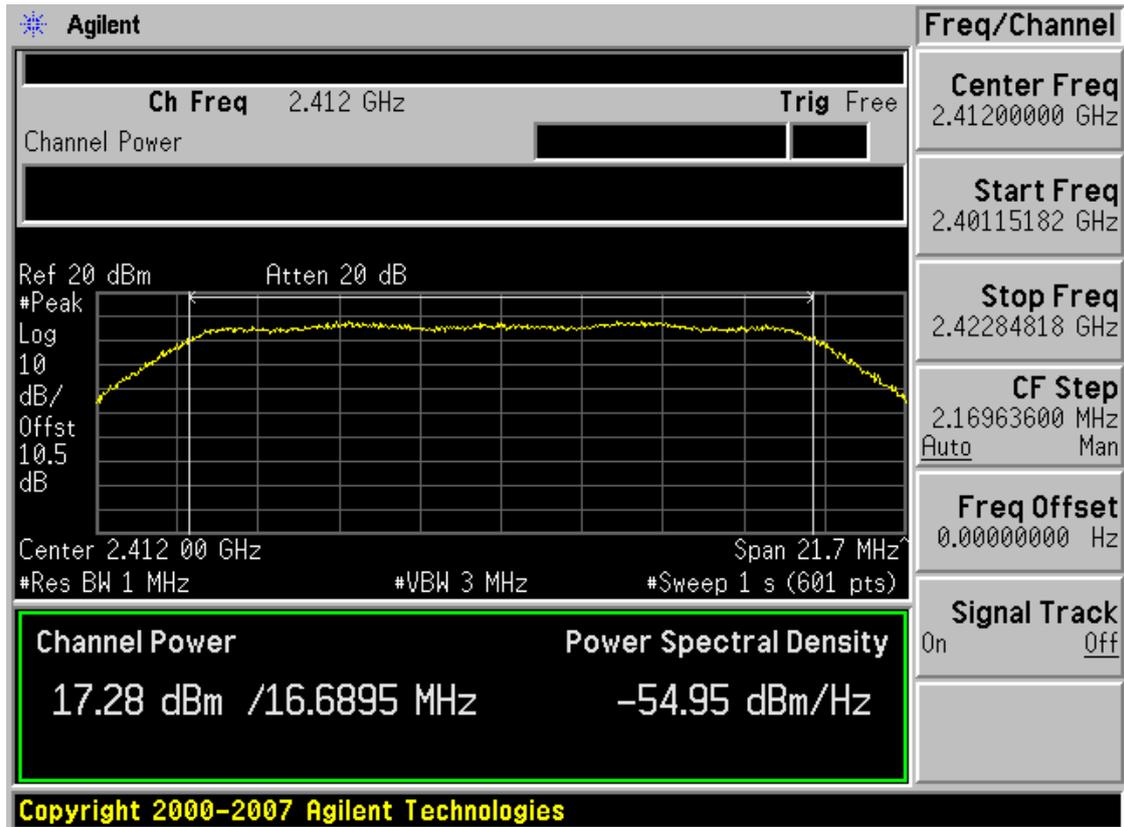
### Conducted Output Power (802.11g-CH 1) 12Mbps



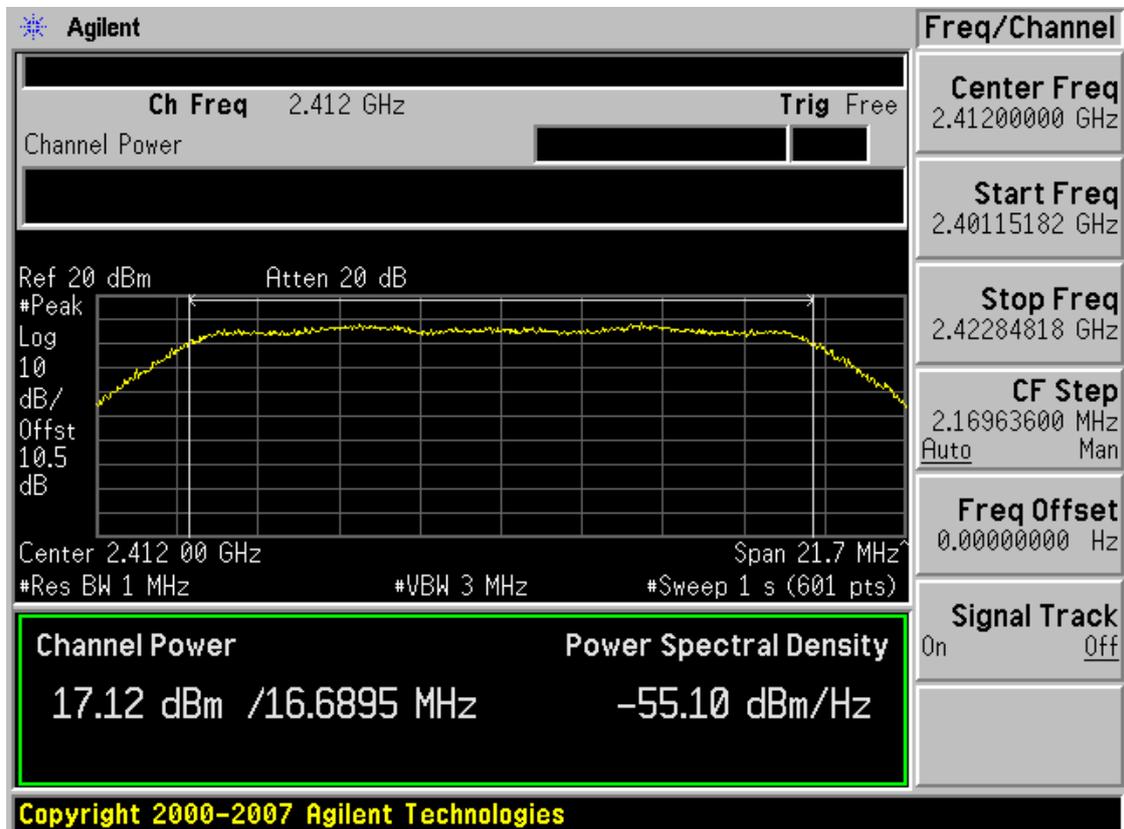
### Conducted Output Power (802.11g-CH 1) 18Mbps



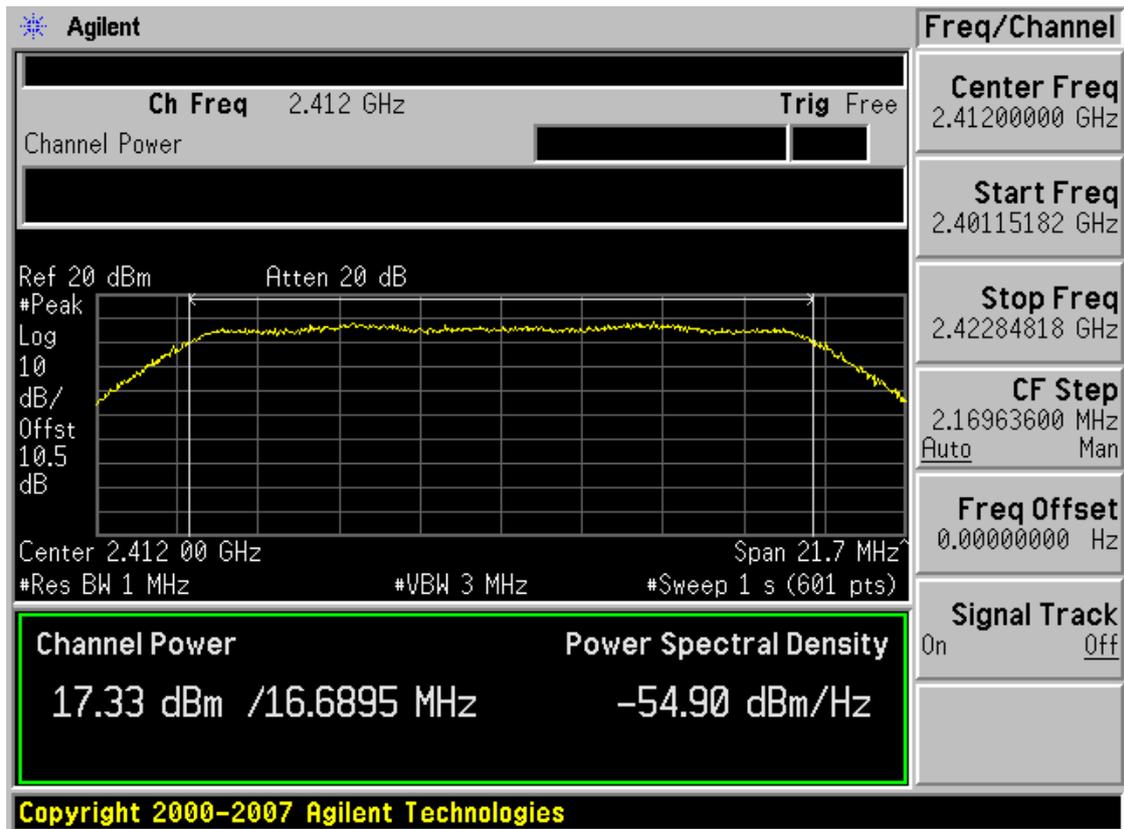
### Conducted Output Power (802.11g-CH 1) 24Mbps



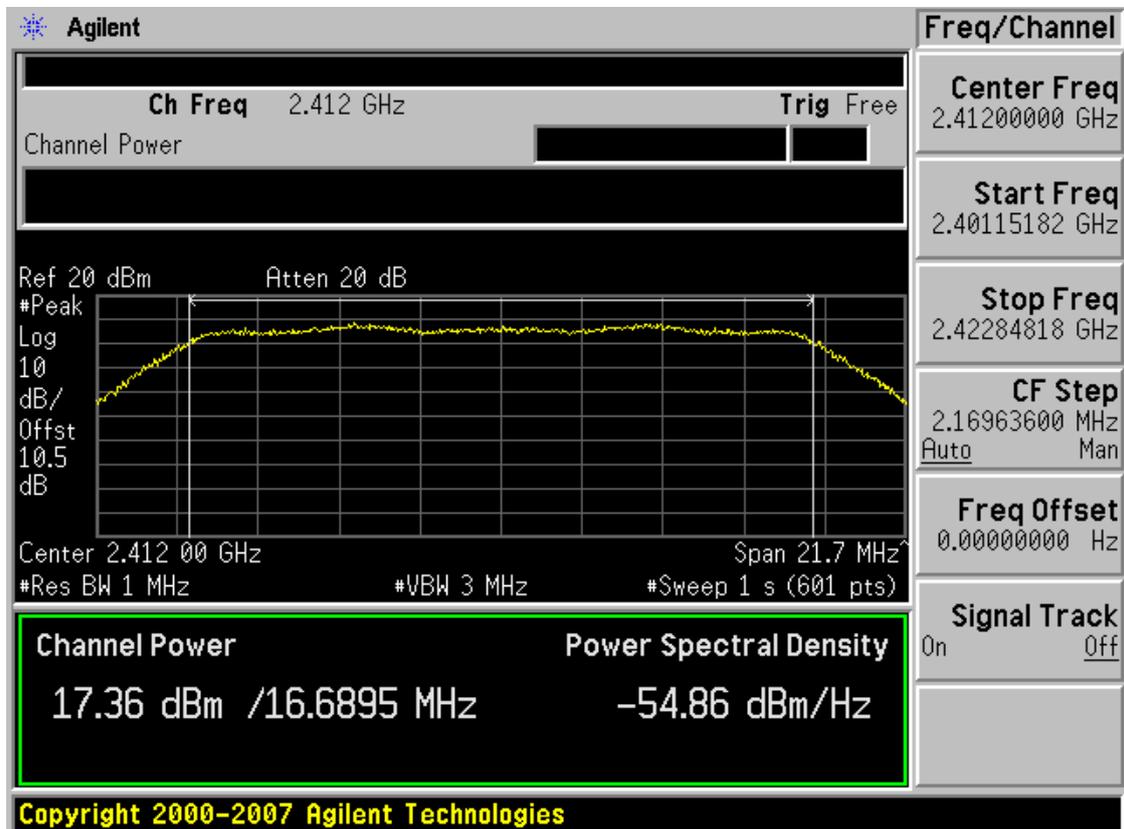
### Conducted Output Power (802.11g-CH 1) 36Mbps



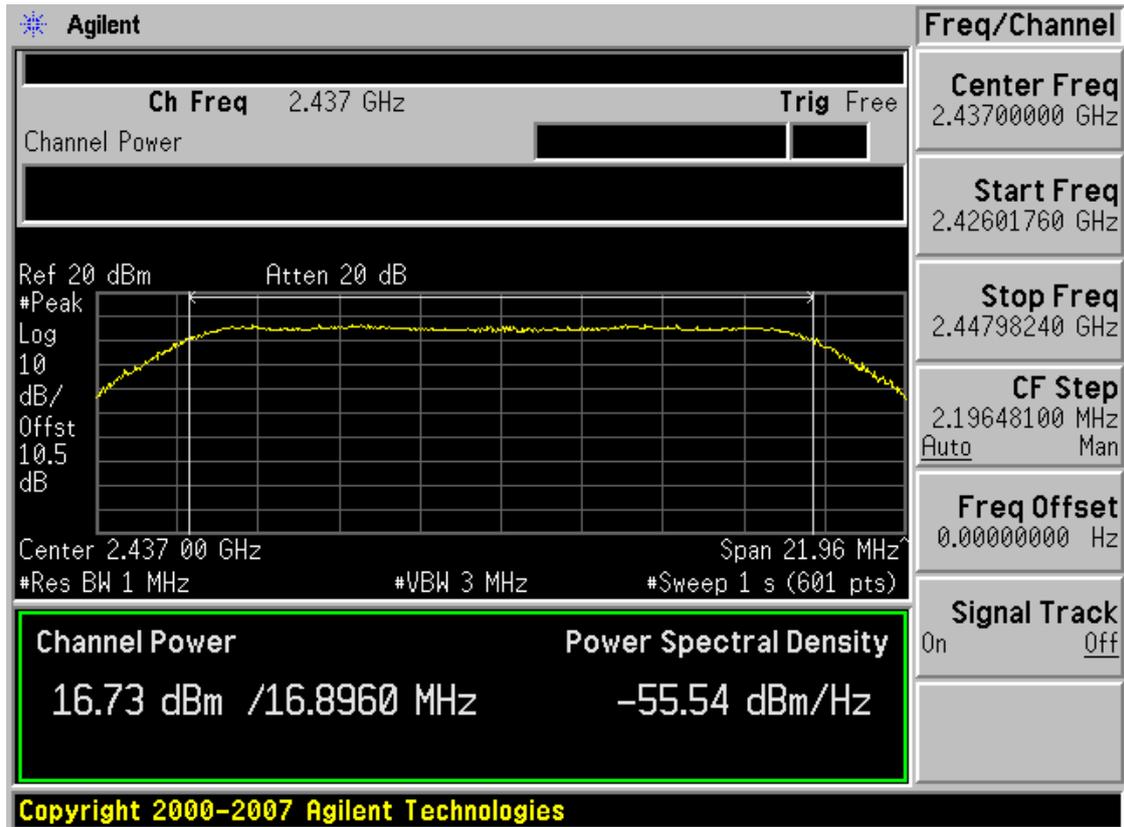
### Conducted Output Power (802.11g-CH 1) 48Mbps



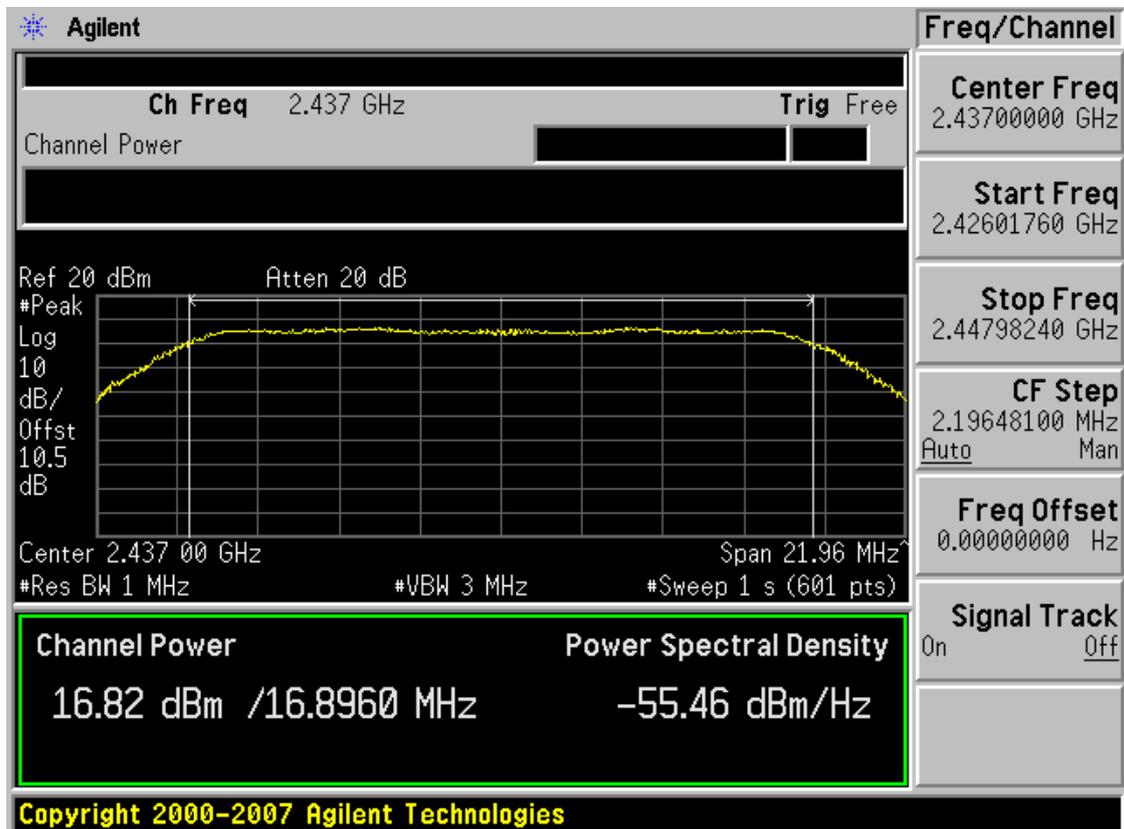
### Conducted Output Power (802.11g-CH 1) 54Mbps



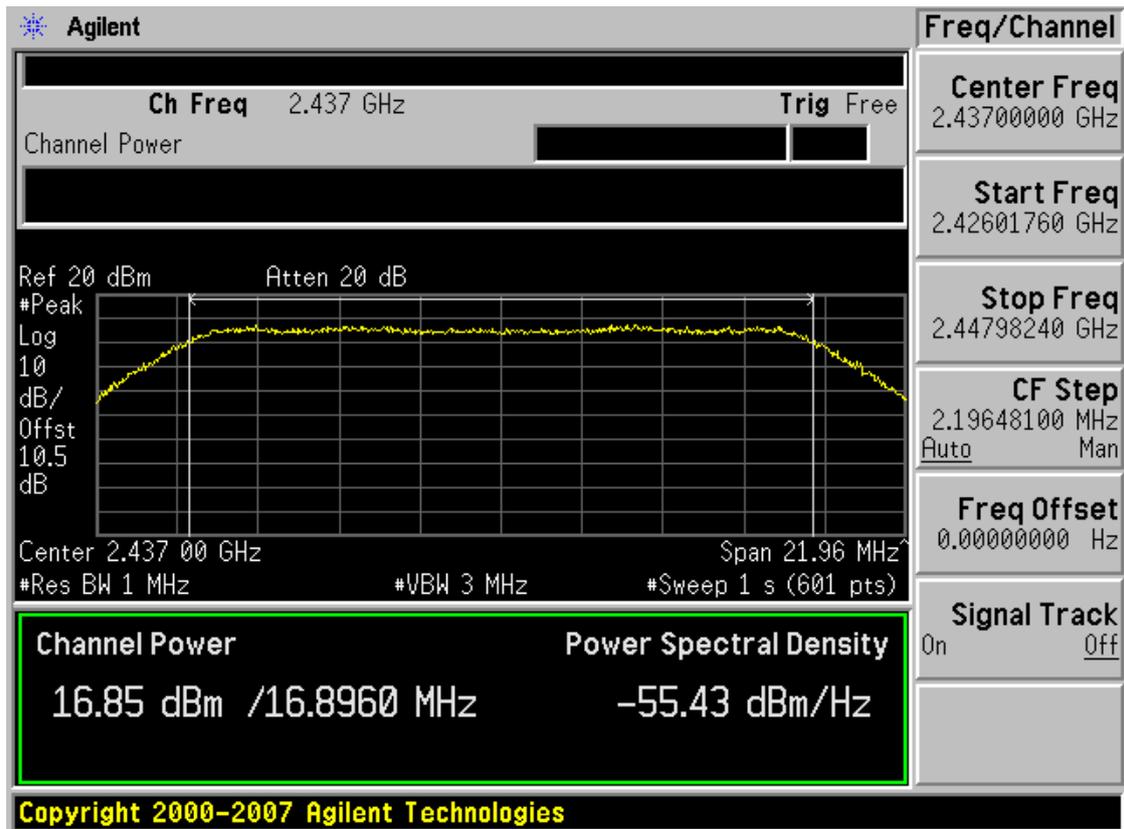
### Conducted Output Power (802.11g-CH 6) 6Mbps



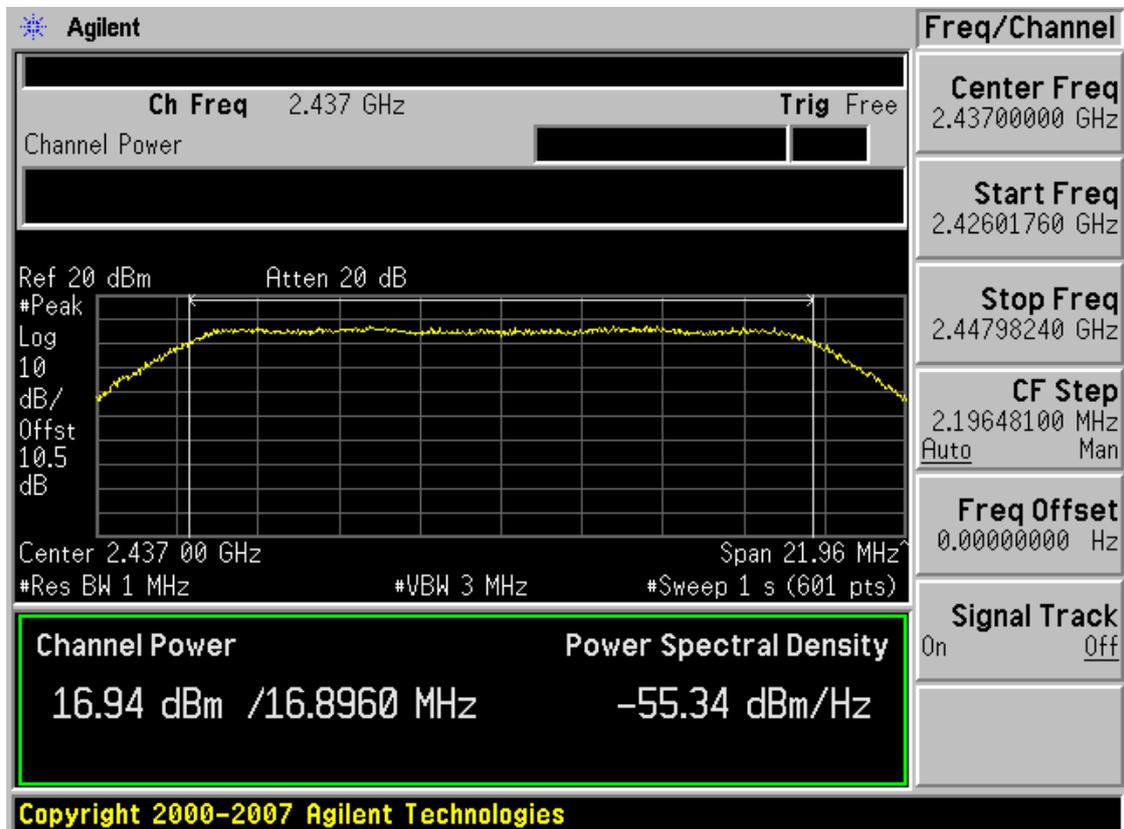
### Conducted Output Power (802.11g-CH 6) 9Mbps



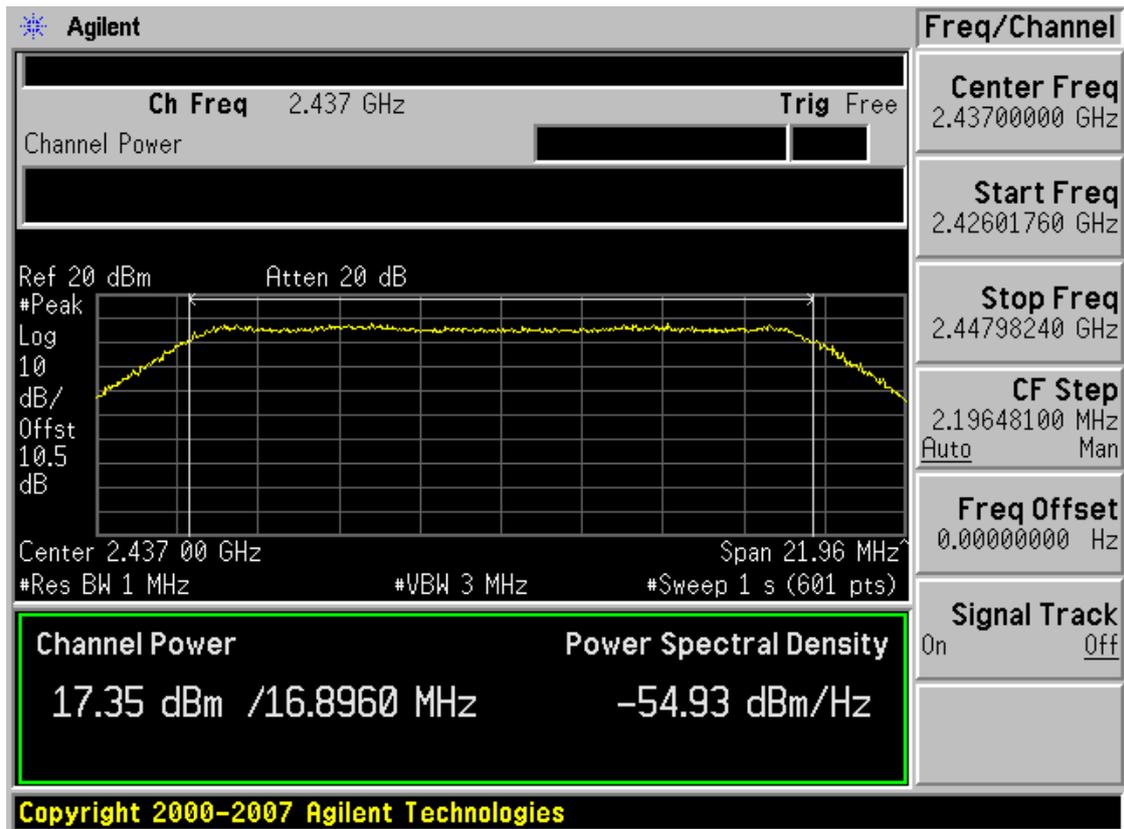
### Conducted Output Power (802.11g-CH 6) 12Mbps



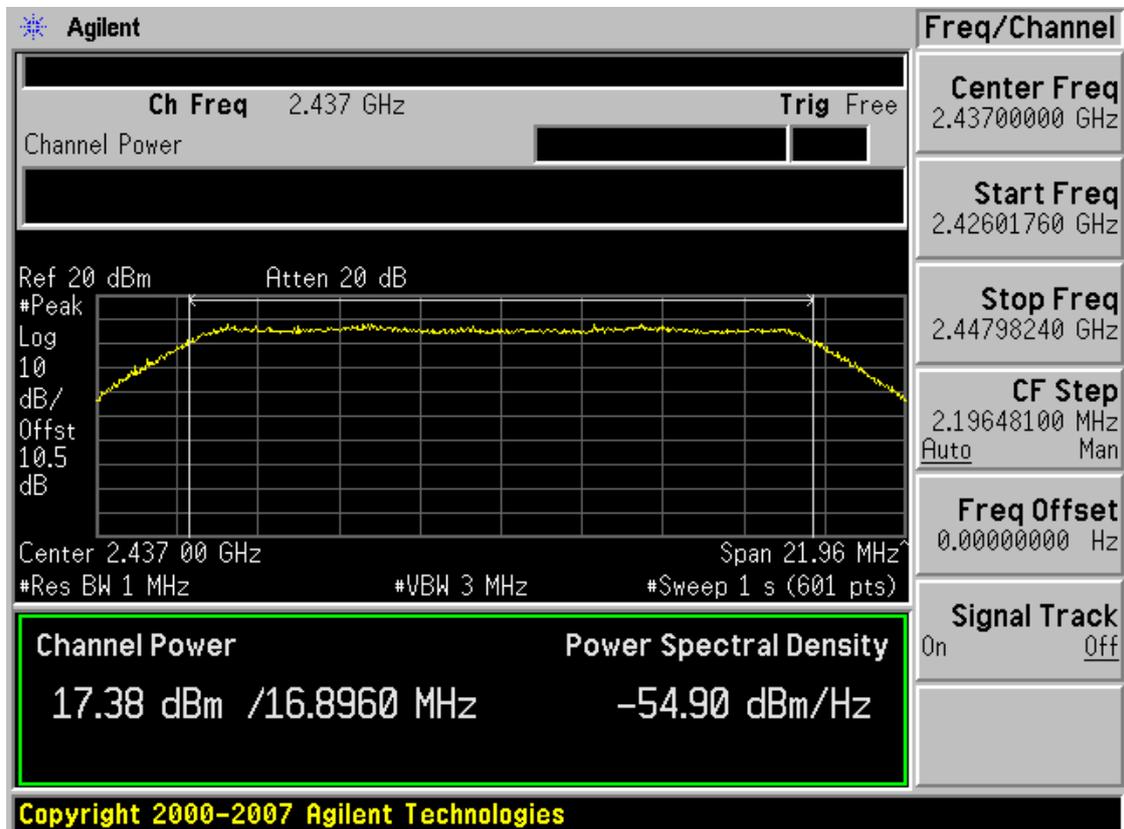
### Conducted Output Power (802.11g-CH 6) 18Mbps



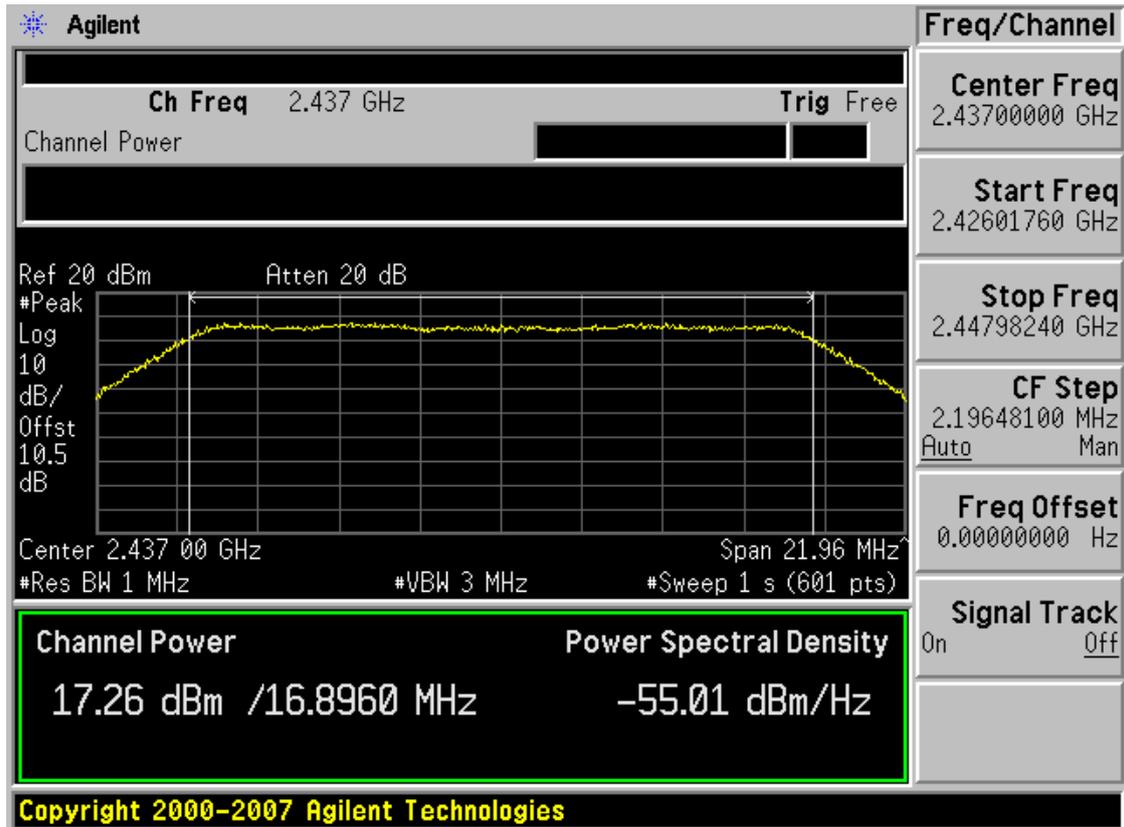
### Conducted Output Power (802.11g-CH 6) 24Mbps



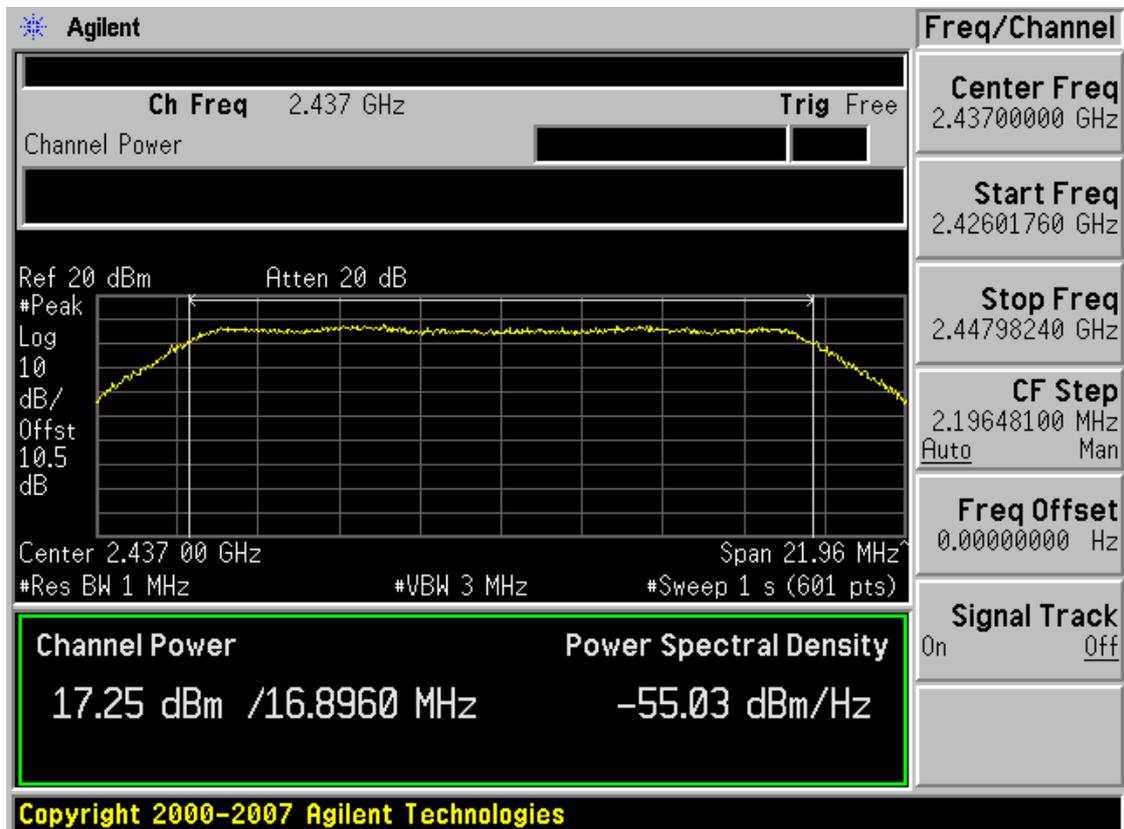
### Conducted Output Power (802.11g-CH 6) 36Mbps



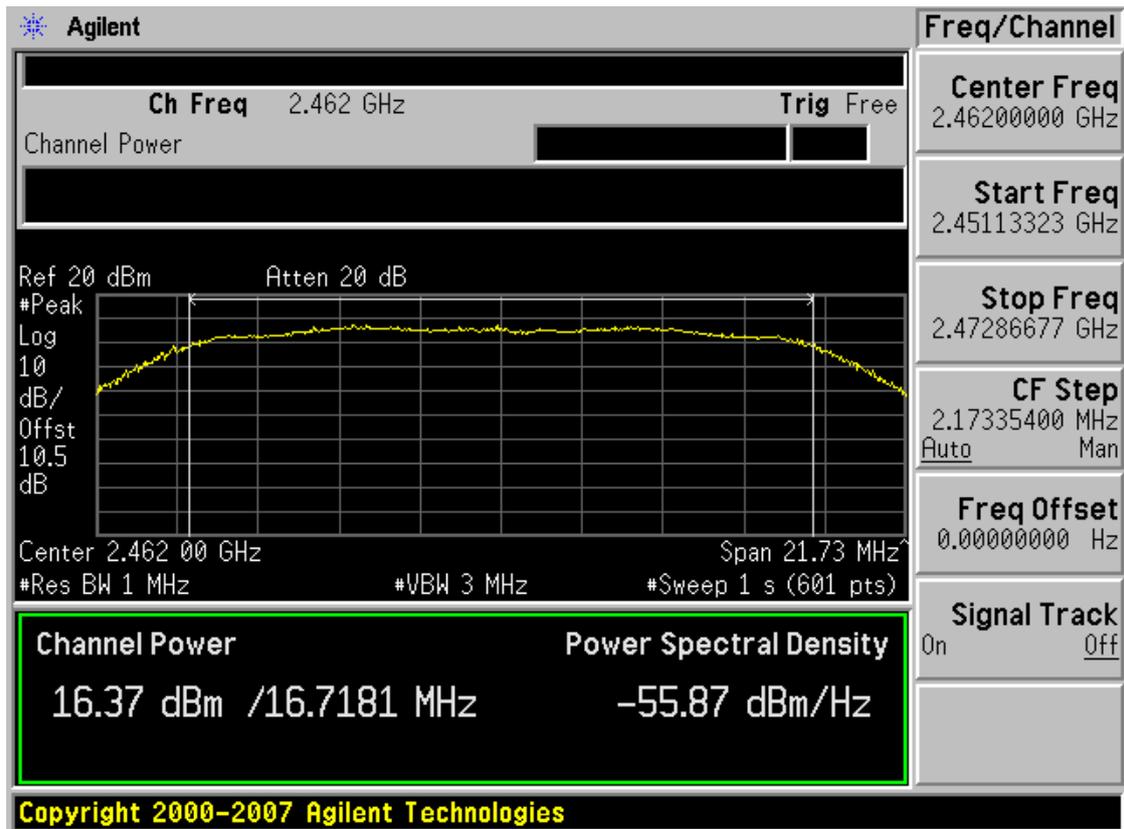
**Conducted Output Power (802.11g-CH 6) 48Mbps**



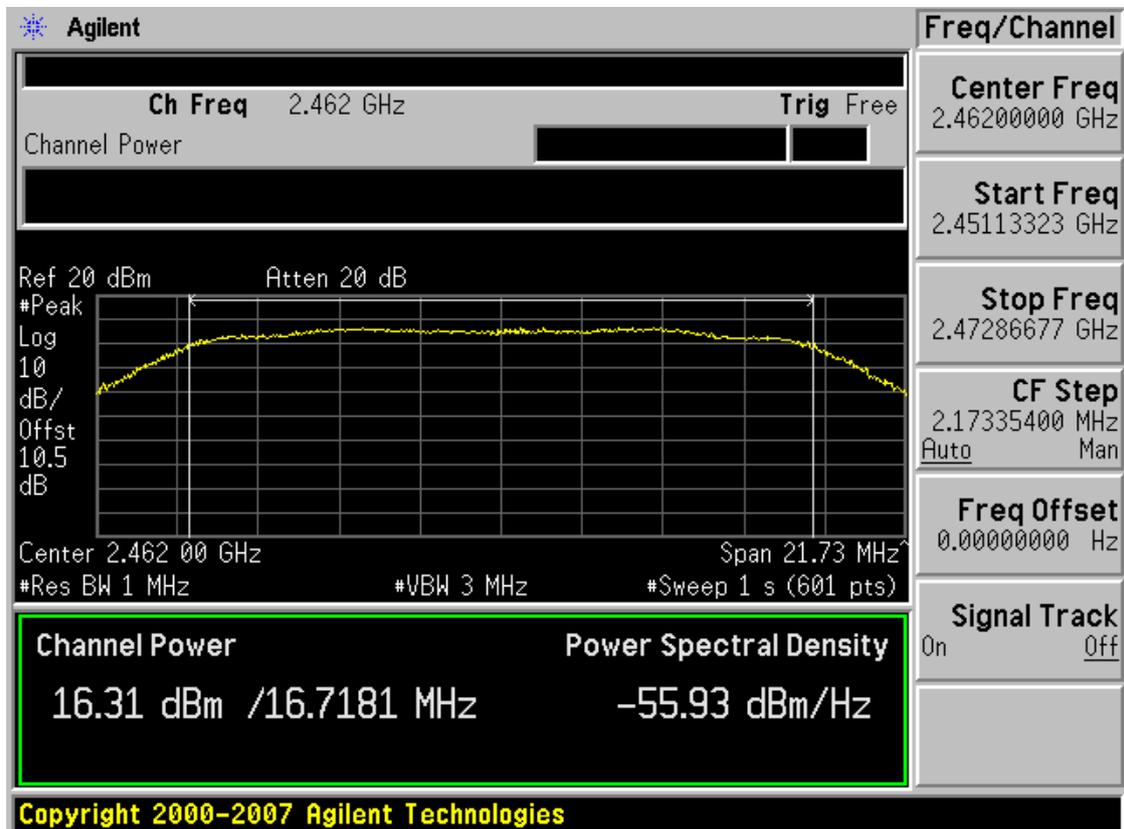
**Conducted Output Power (802.11g-CH 6) 54Mbps**



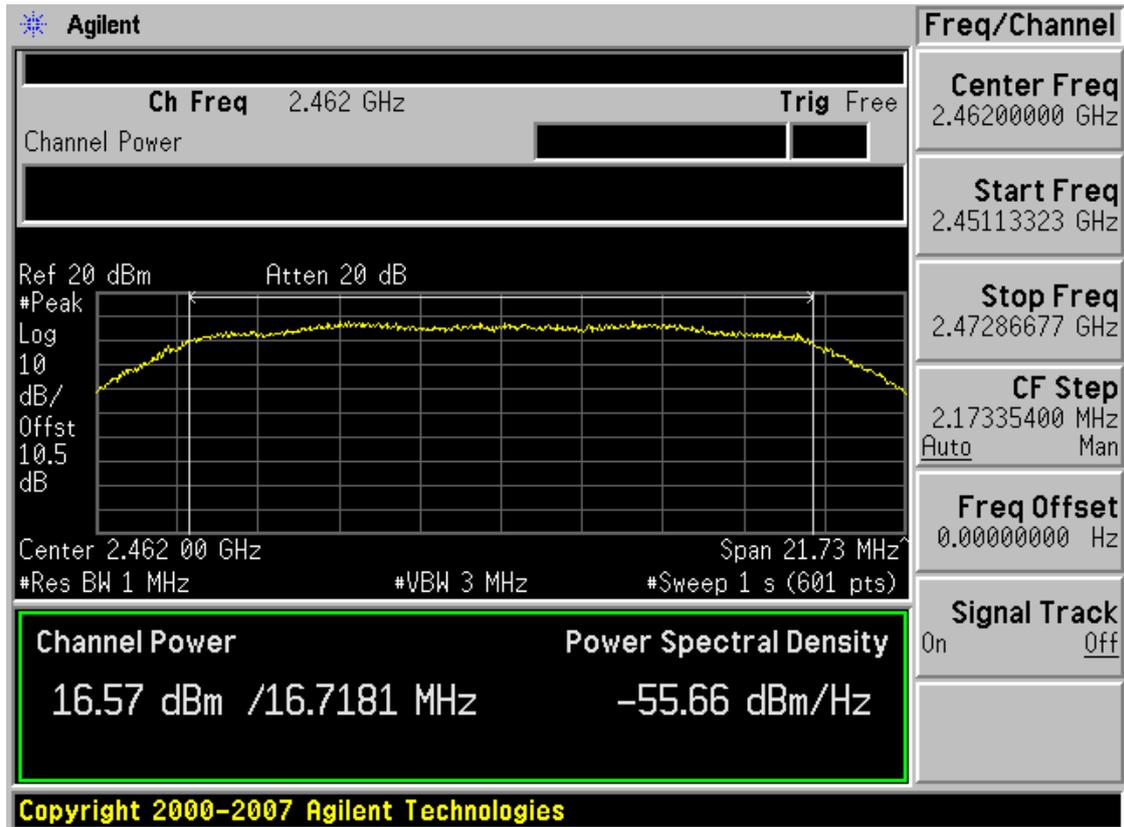
### Conducted Output Power (802.11g-CH 11) 6Mbps



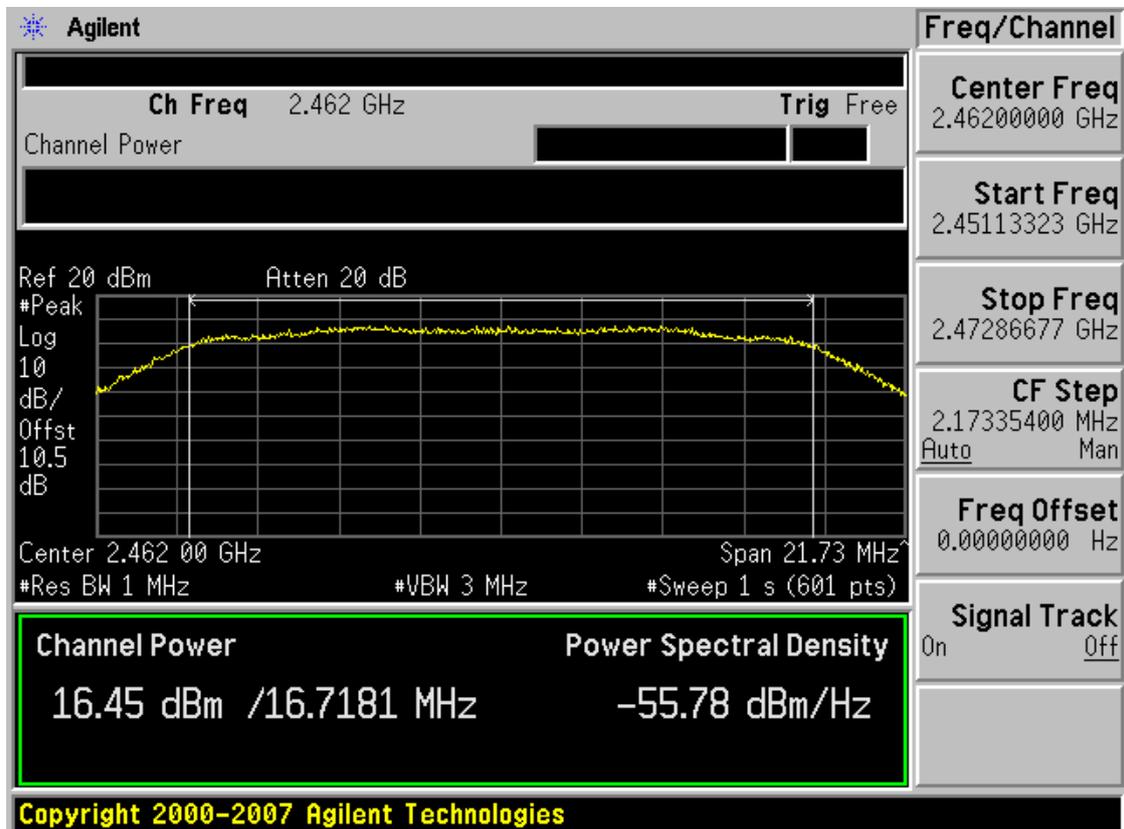
### Conducted Output Power (802.11g-CH 11) 9Mbps



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

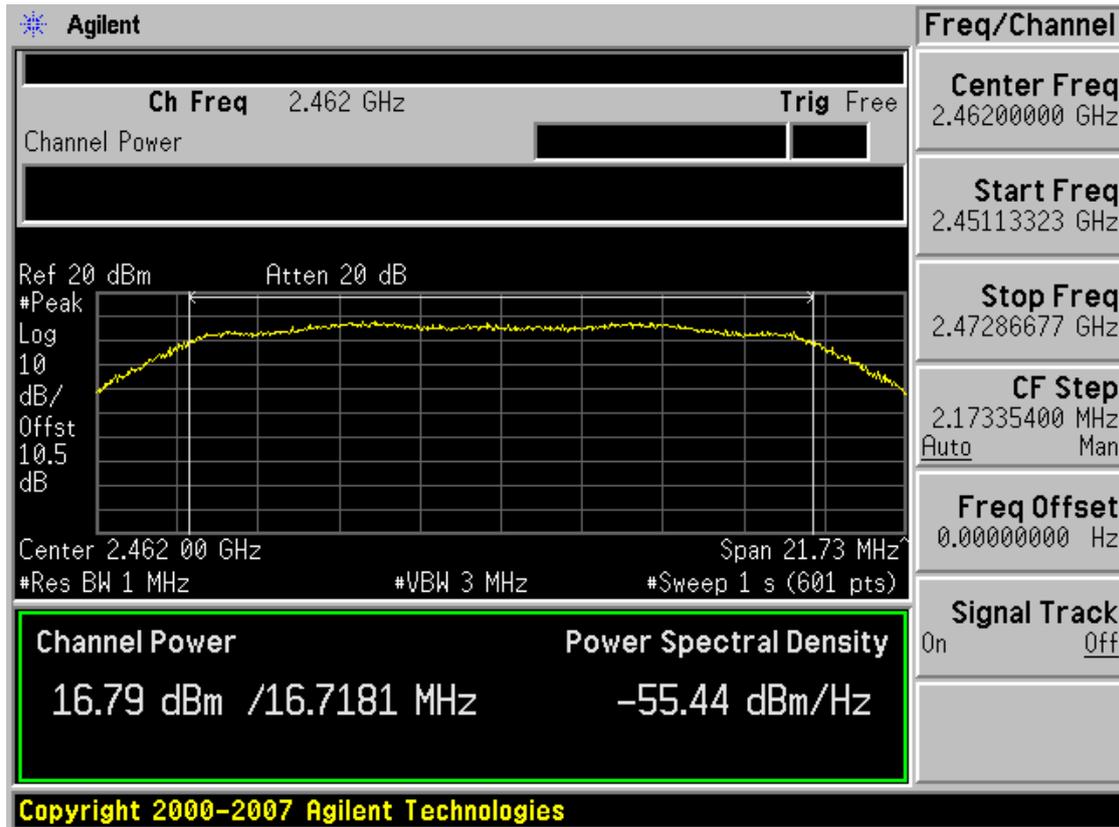


**Conducted Output Power (802.11g-CH 11) 18Mbps**

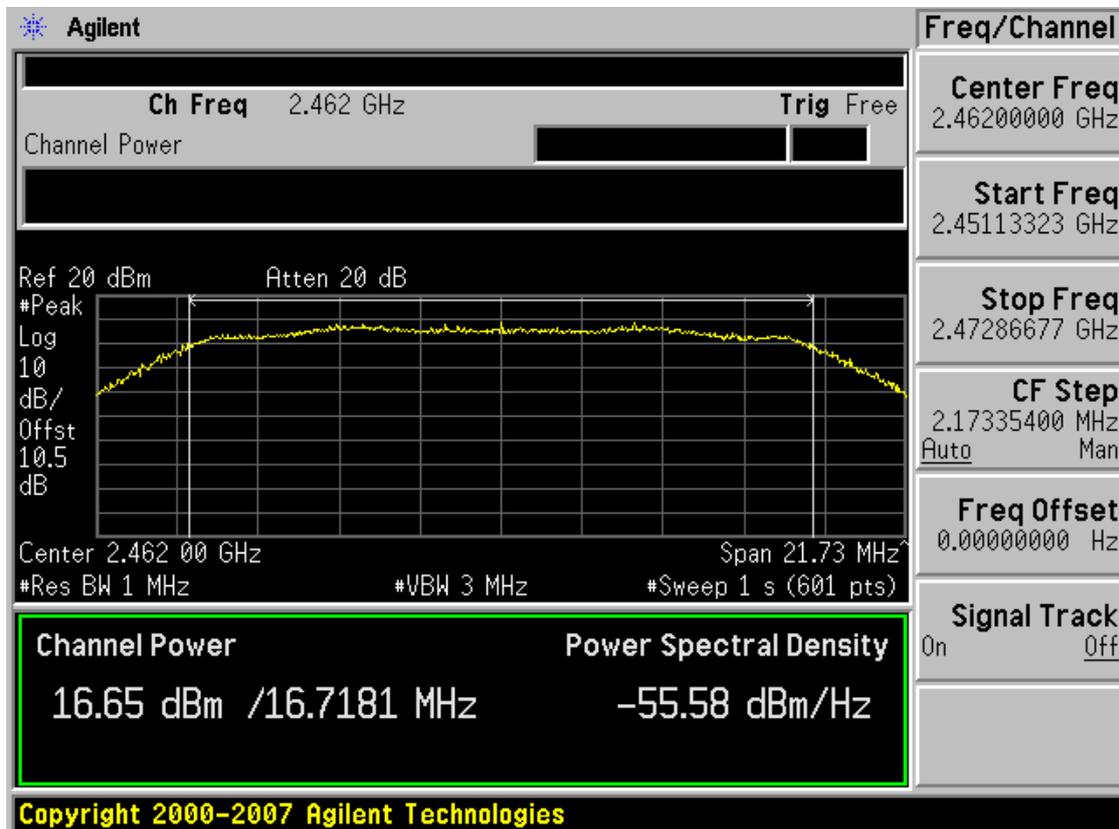


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN		FCC ID: ZNFL04D

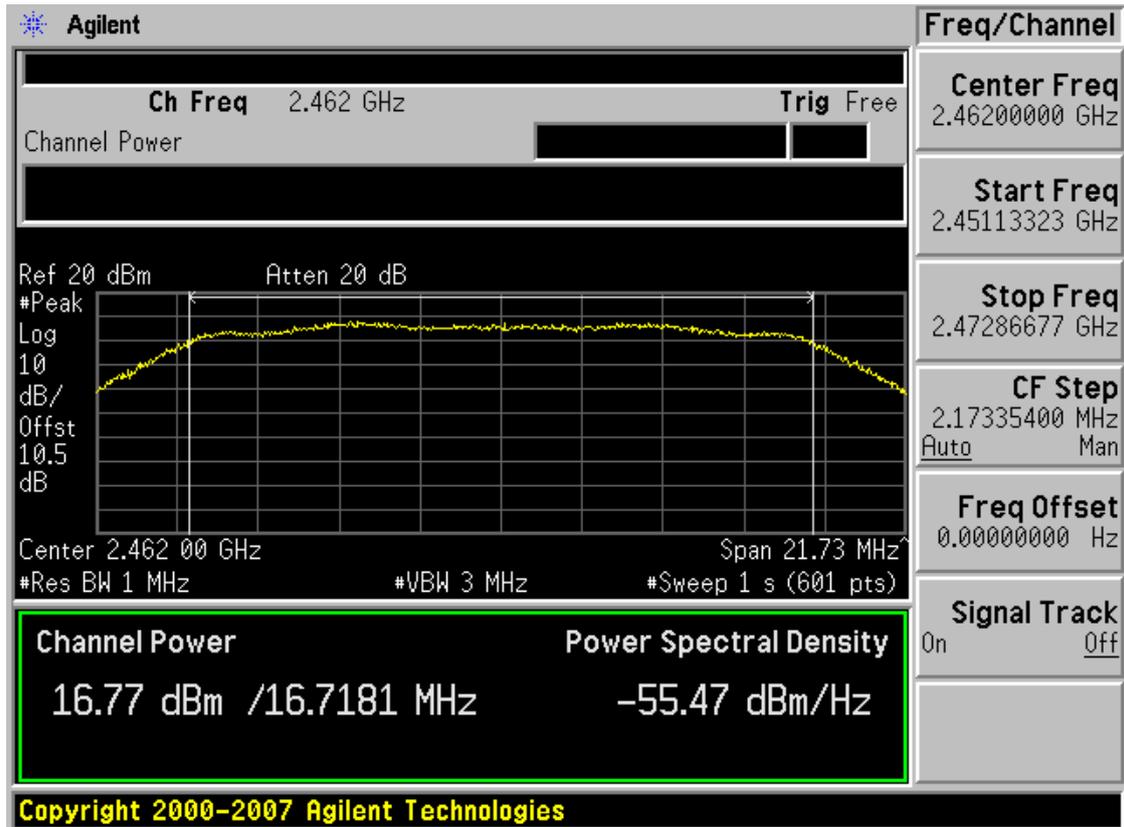
**Conducted Output Power (802.11g-CH 11) 24Mbps**



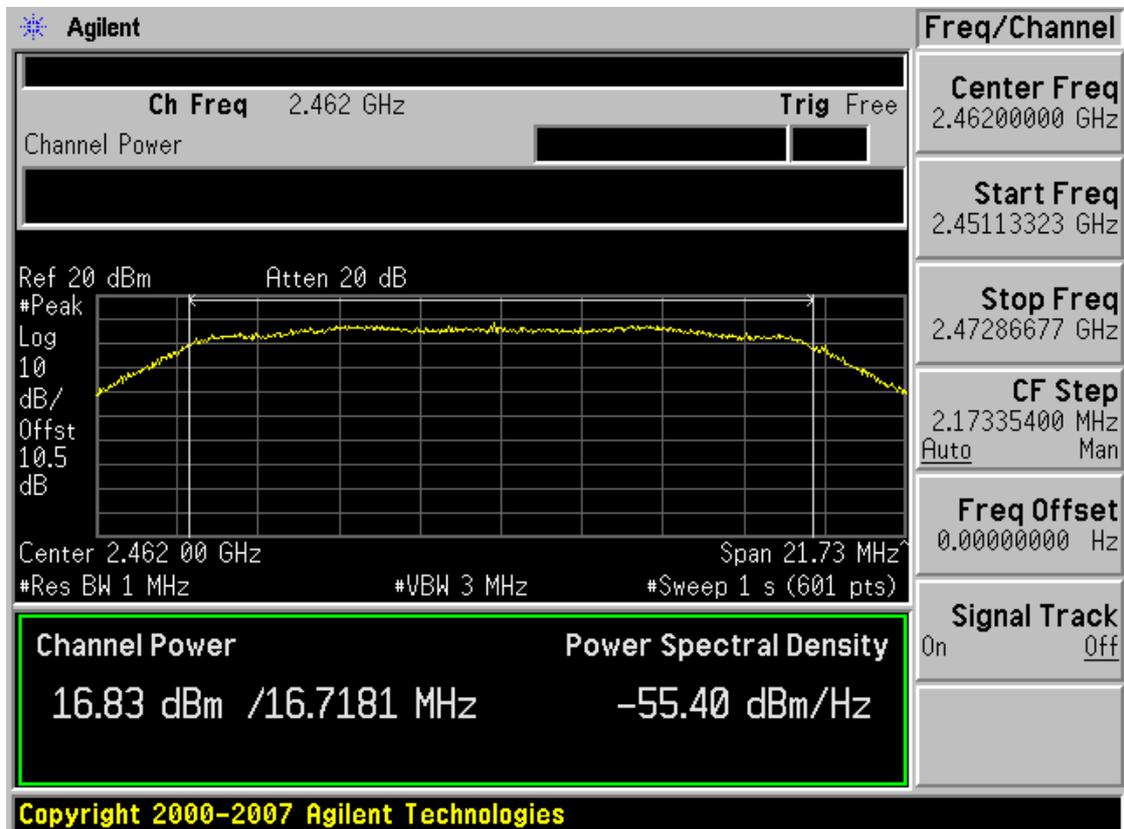
**Conducted Output Power (802.11g-CH 11) 36Mbps**



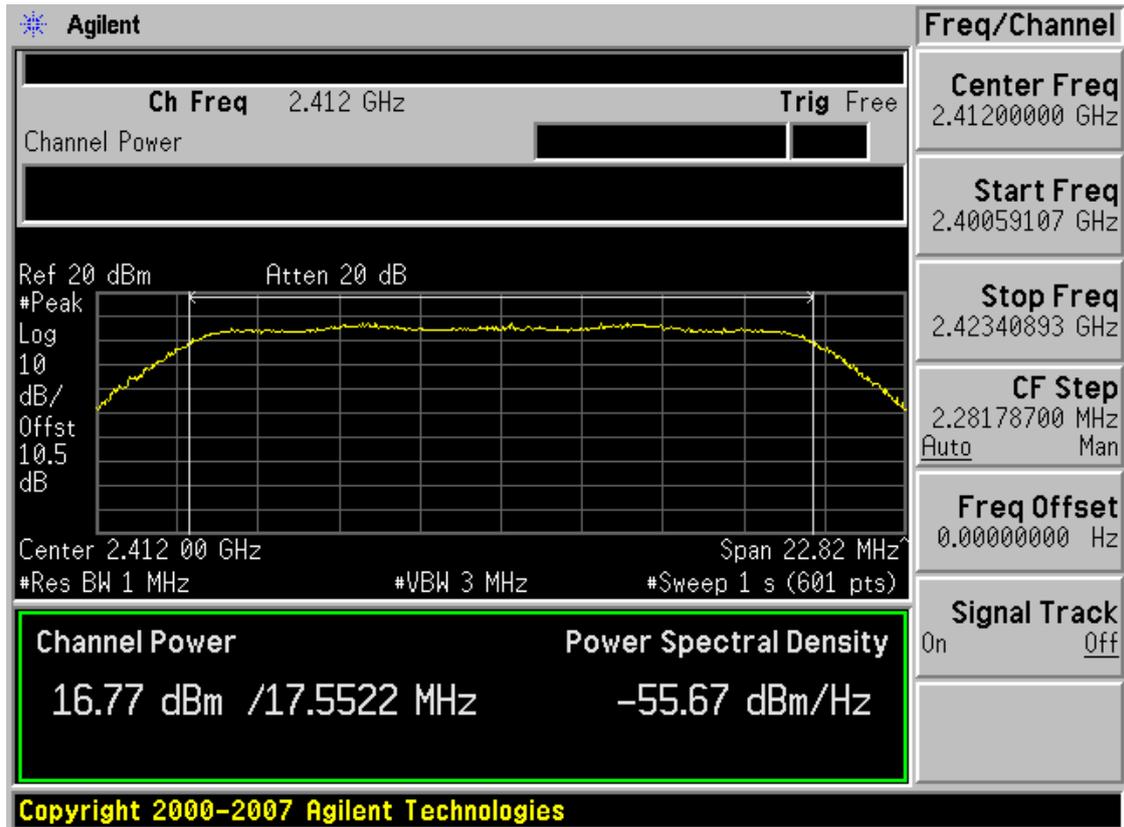
**Conducted Output Power (802.11g-CH 11) 48Mbps**



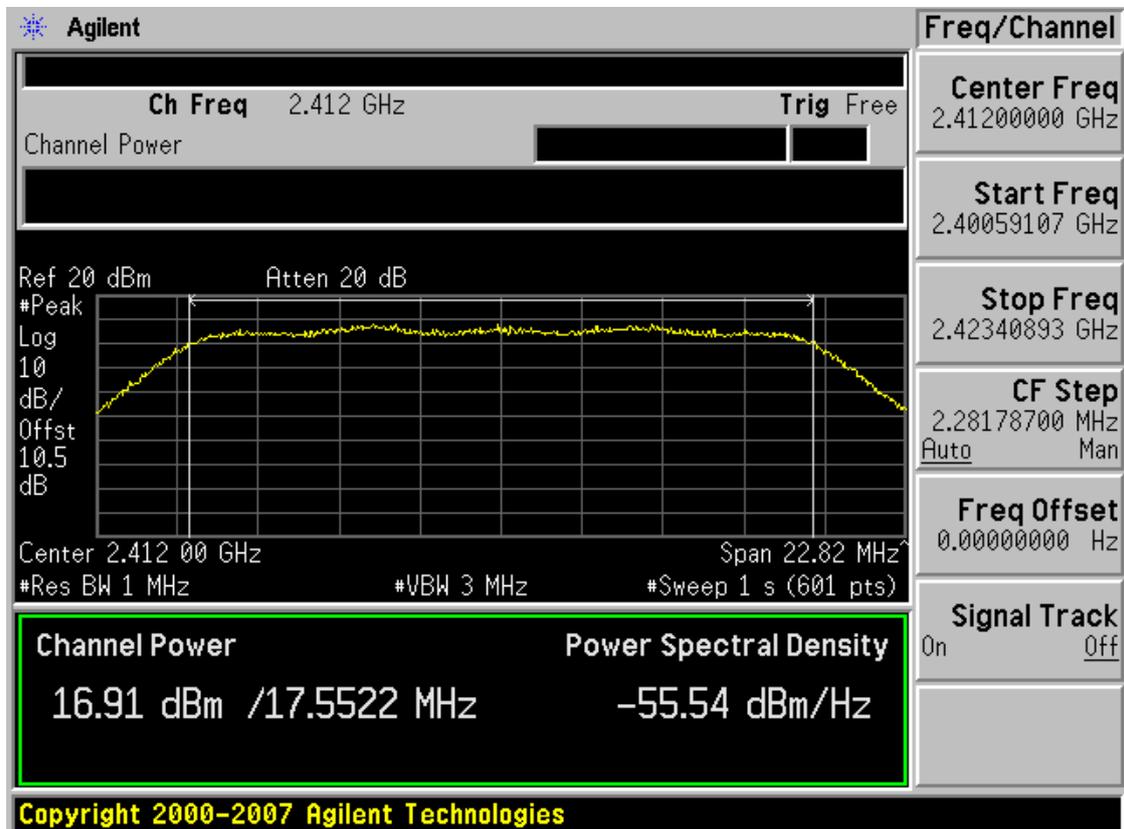
**Conducted Output Power (802.11g-CH 11) 54Mbps**



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

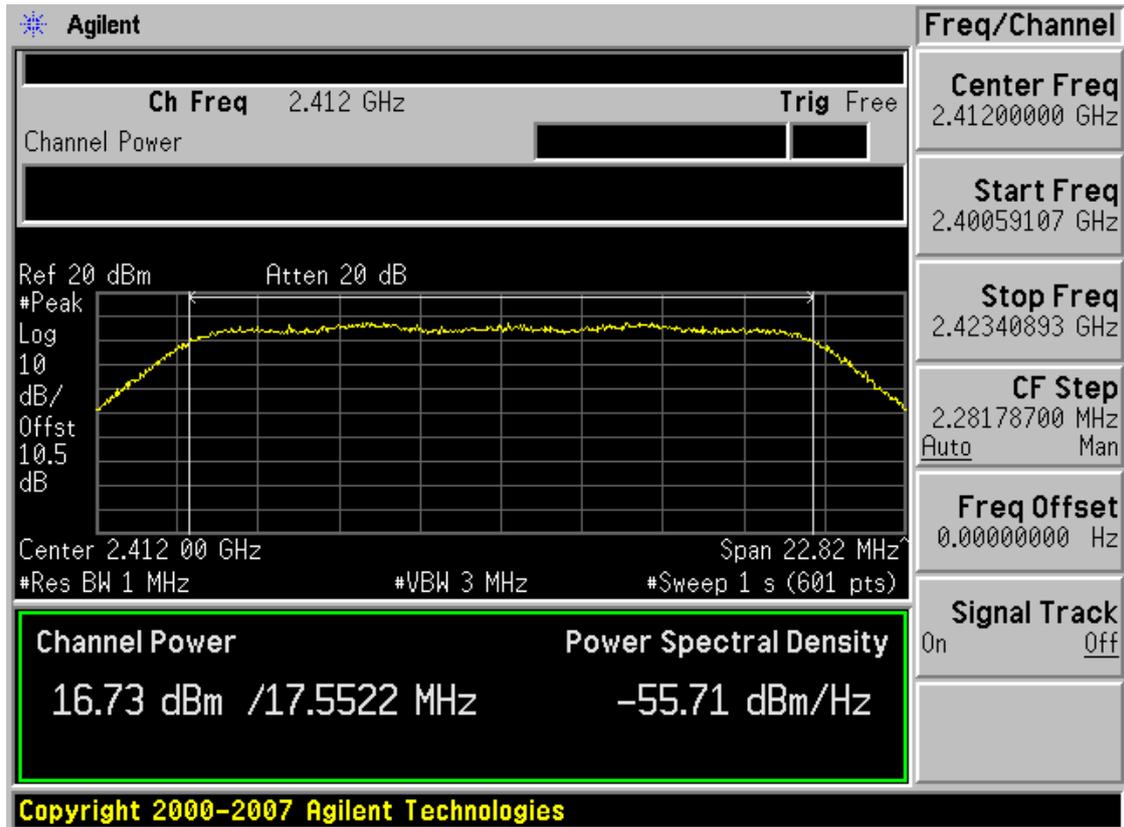


**Conducted Output Power (802.11n-CH 1) 13Mbps**

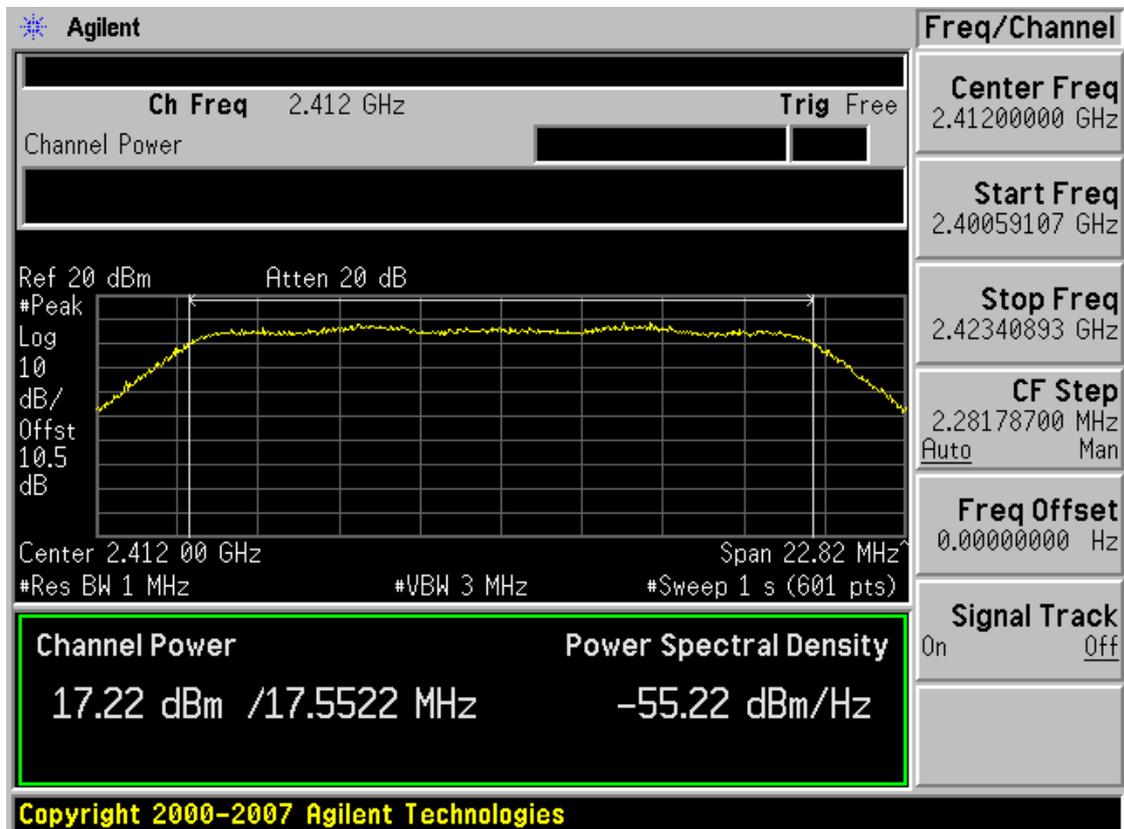


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN		FCC ID: ZNFL04D

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

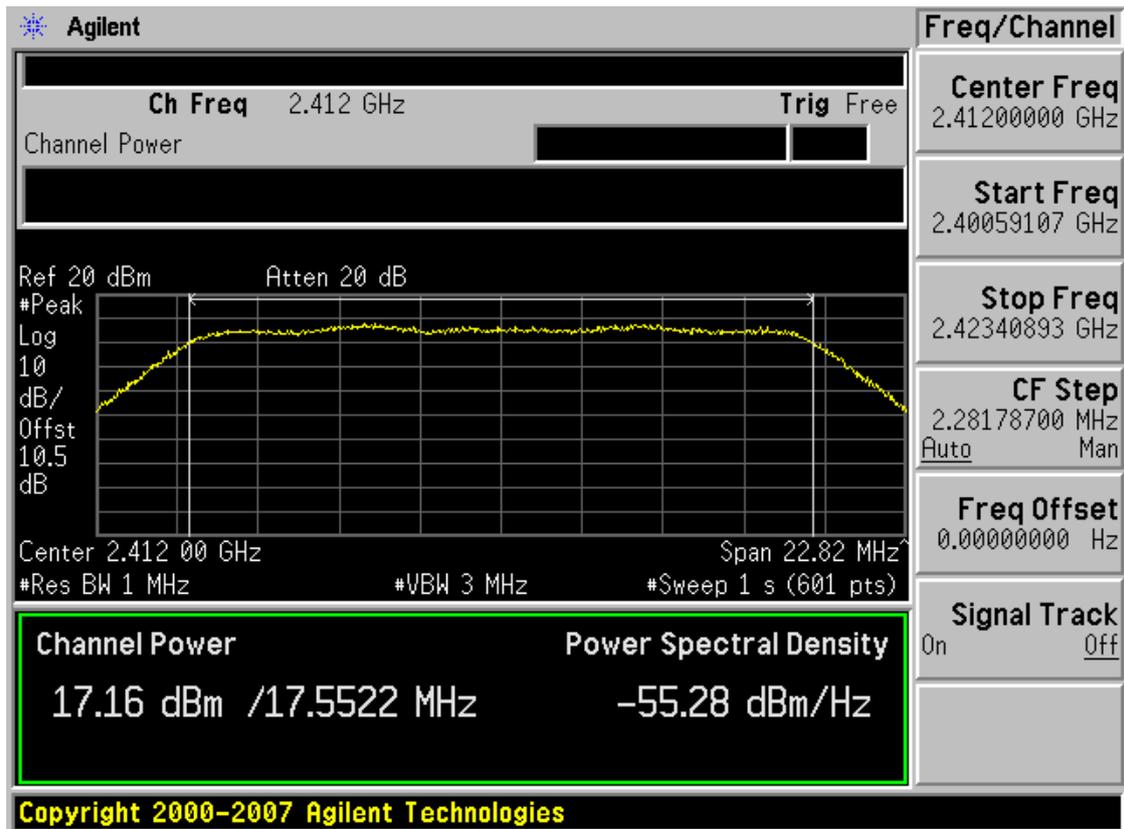


### Conducted Output Power (802.11n-CH 1) 26Mbps

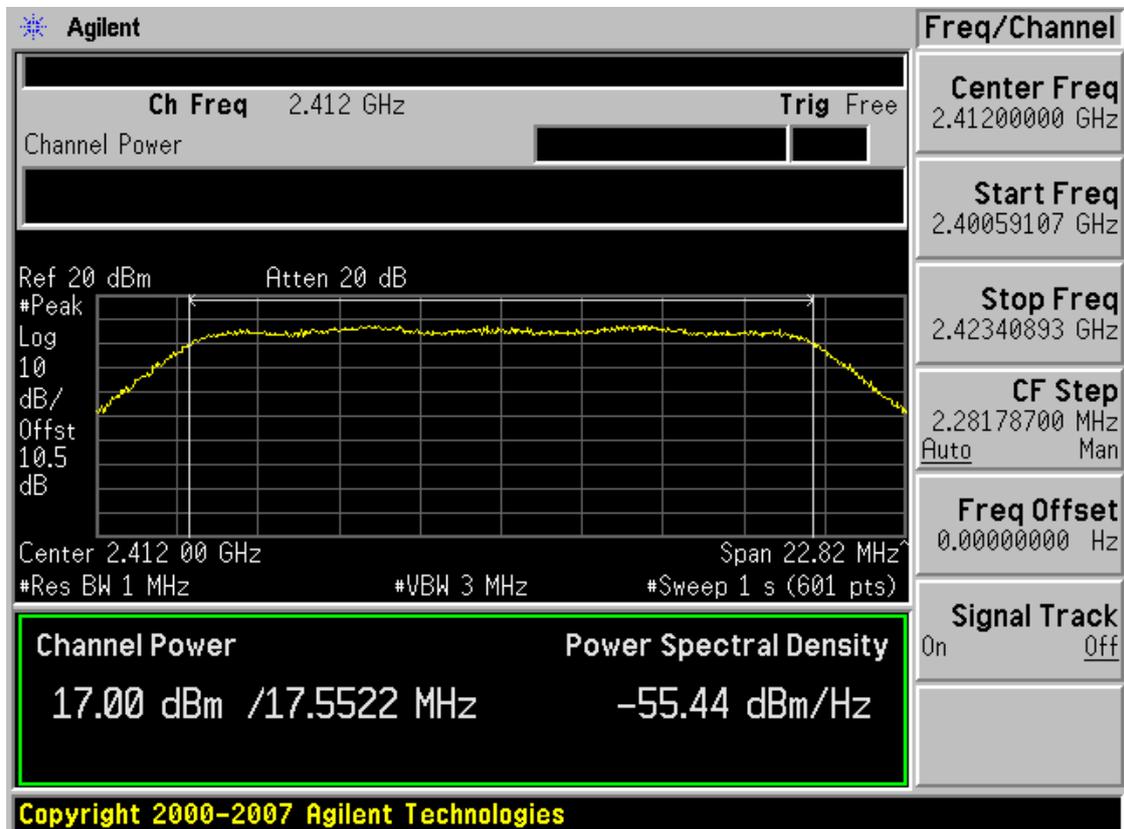


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D

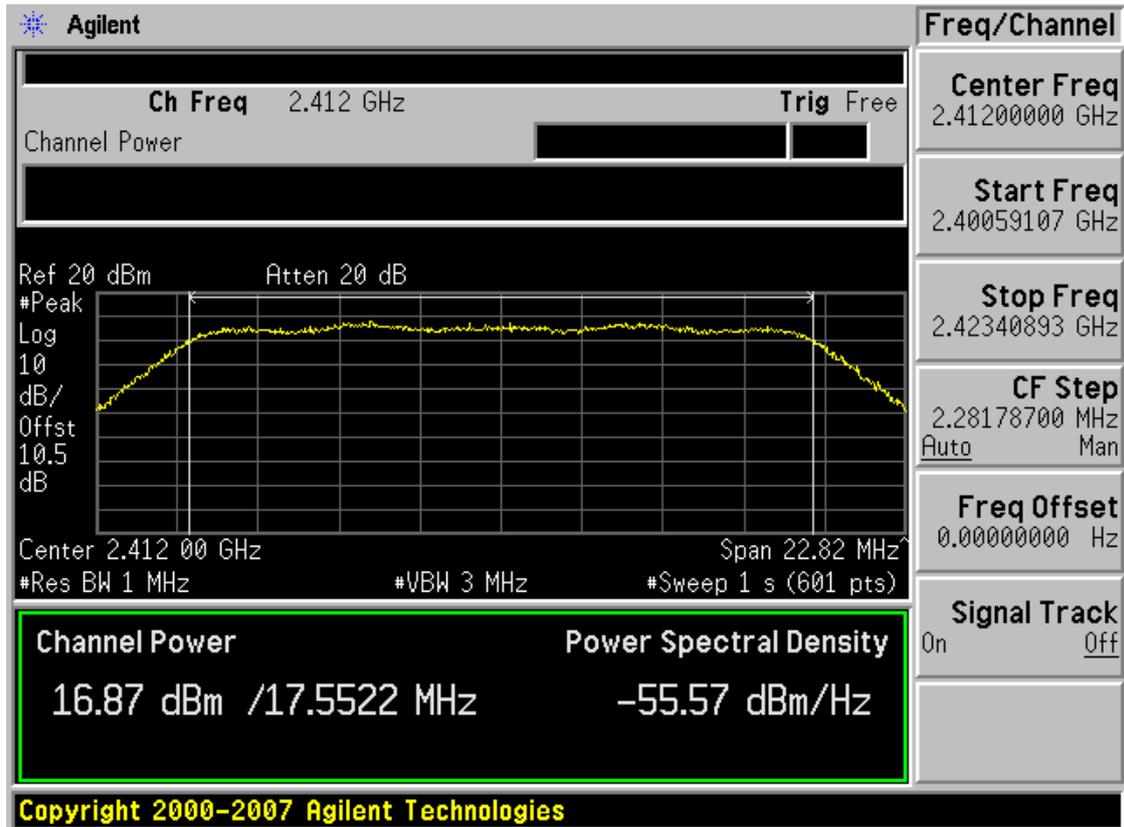
### Conducted Output Power (802.11n-CH 1) 39Mbps



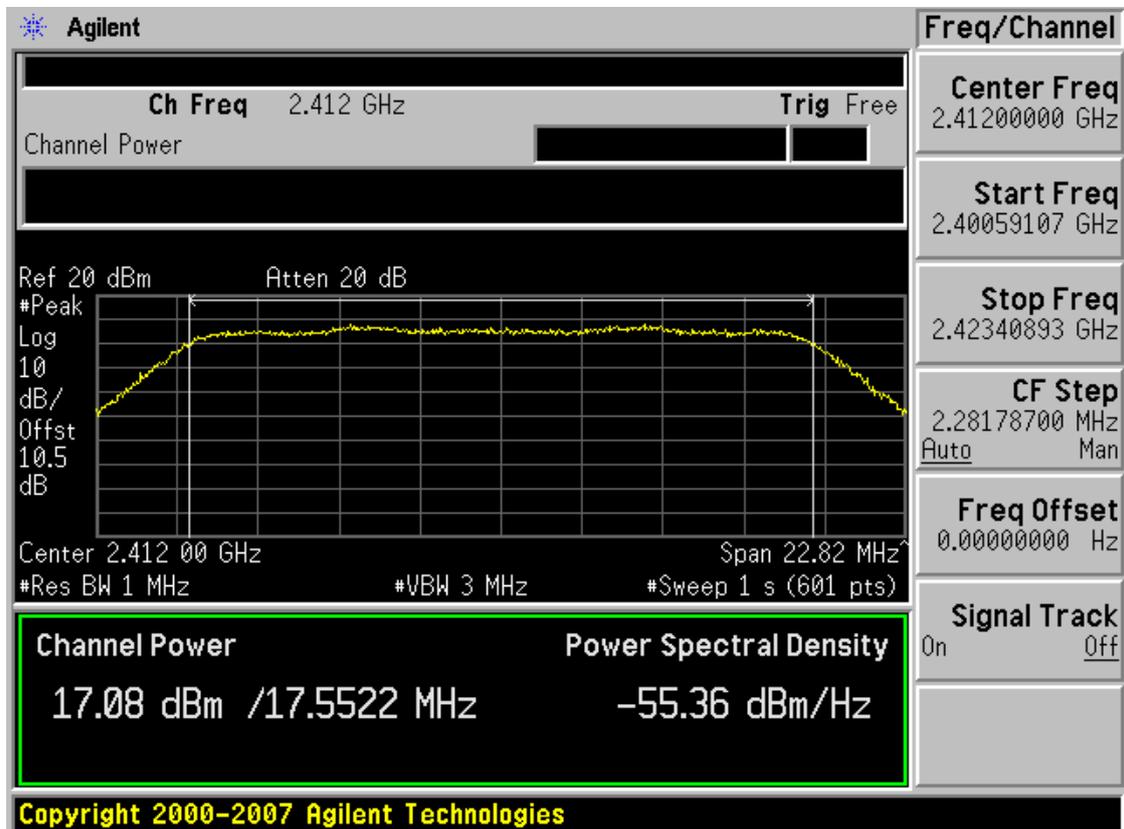
### Conducted Output Power (802.11n-CH 1) 52Mbps



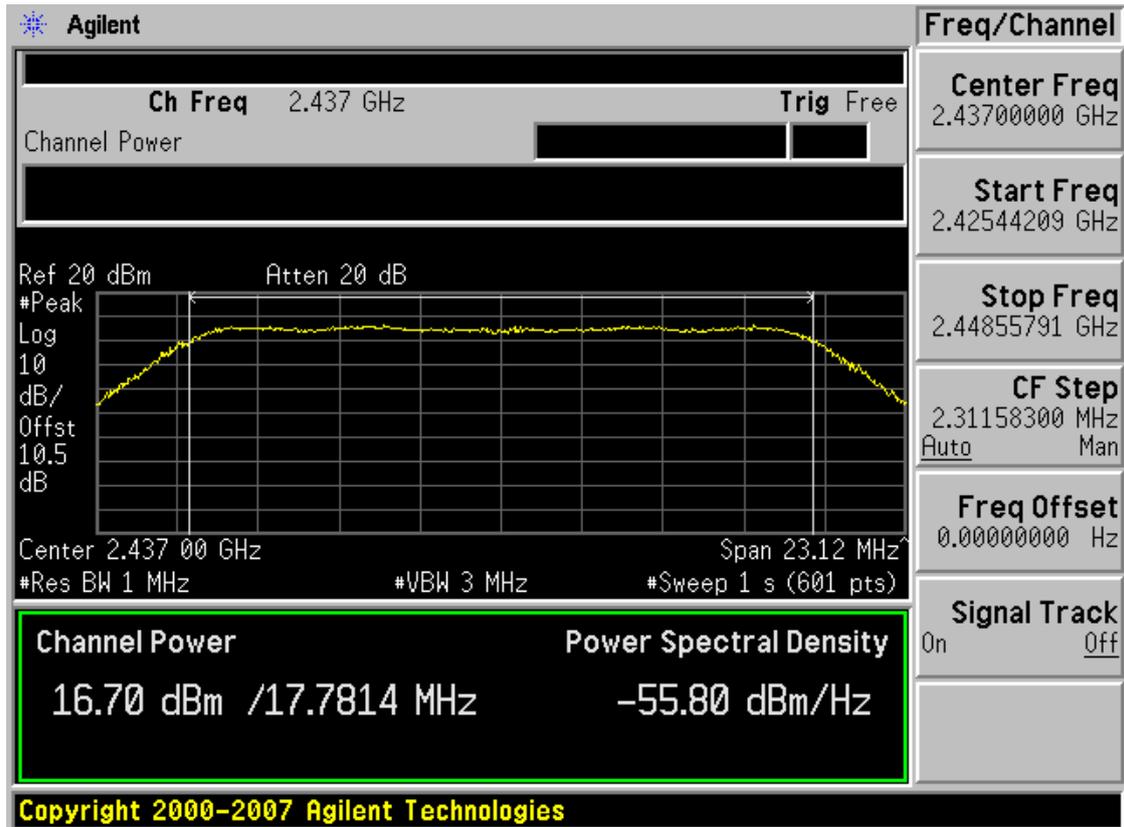
**Conducted Output Power (802.11n-CH 1) 58.5Mbps**



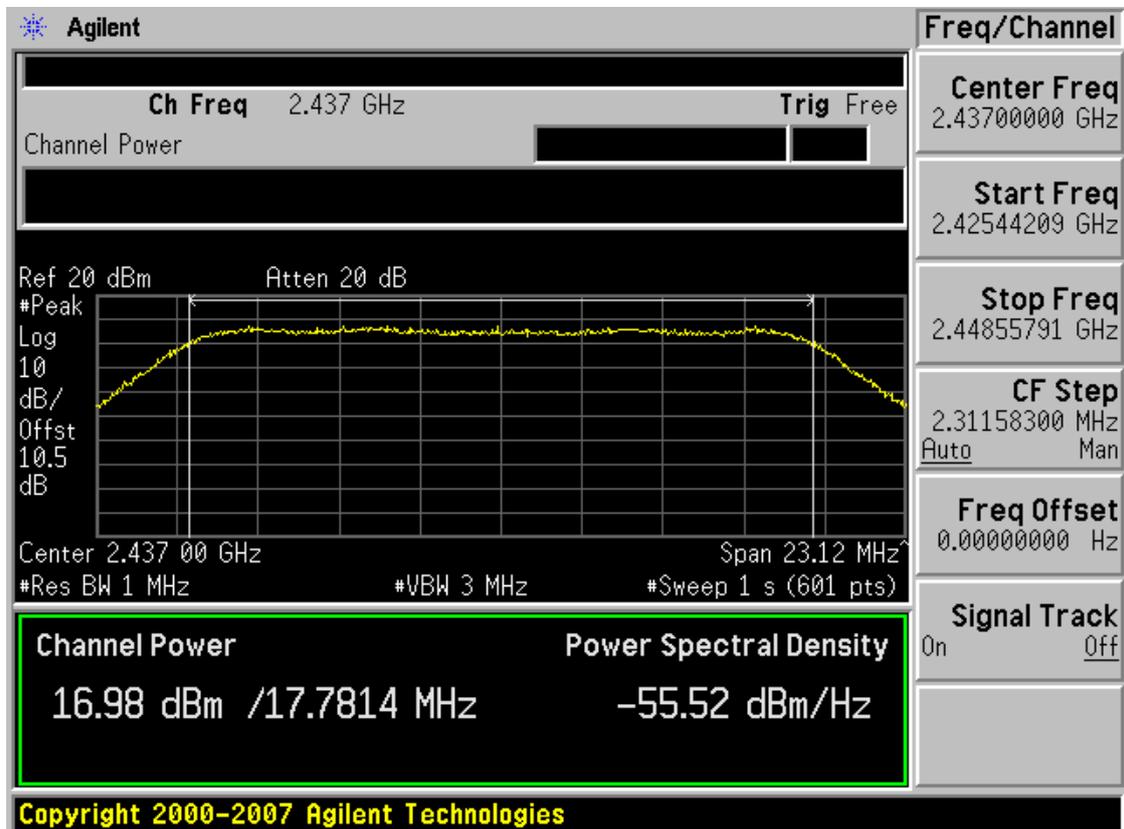
**Conducted Output Power (802.11n-CH 1) 65Mbps**



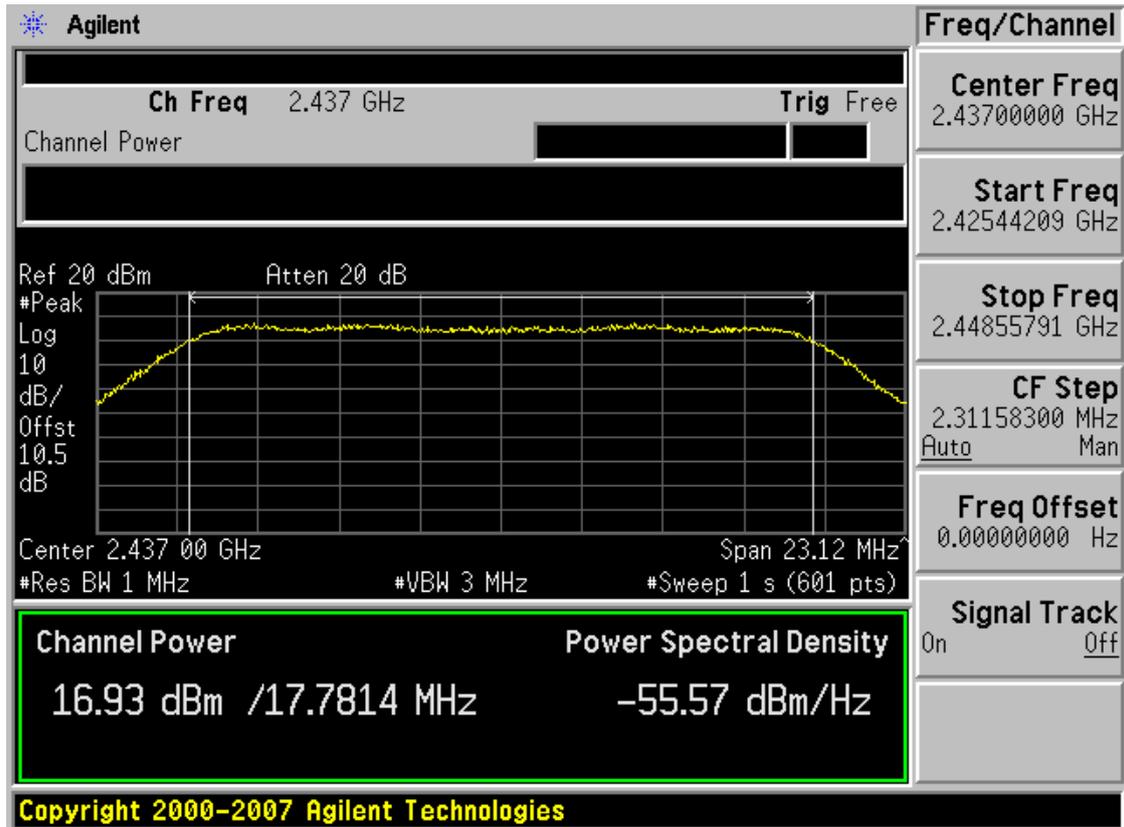
**Conducted Output Power (802.11n-CH 6) 6.5Mbps**



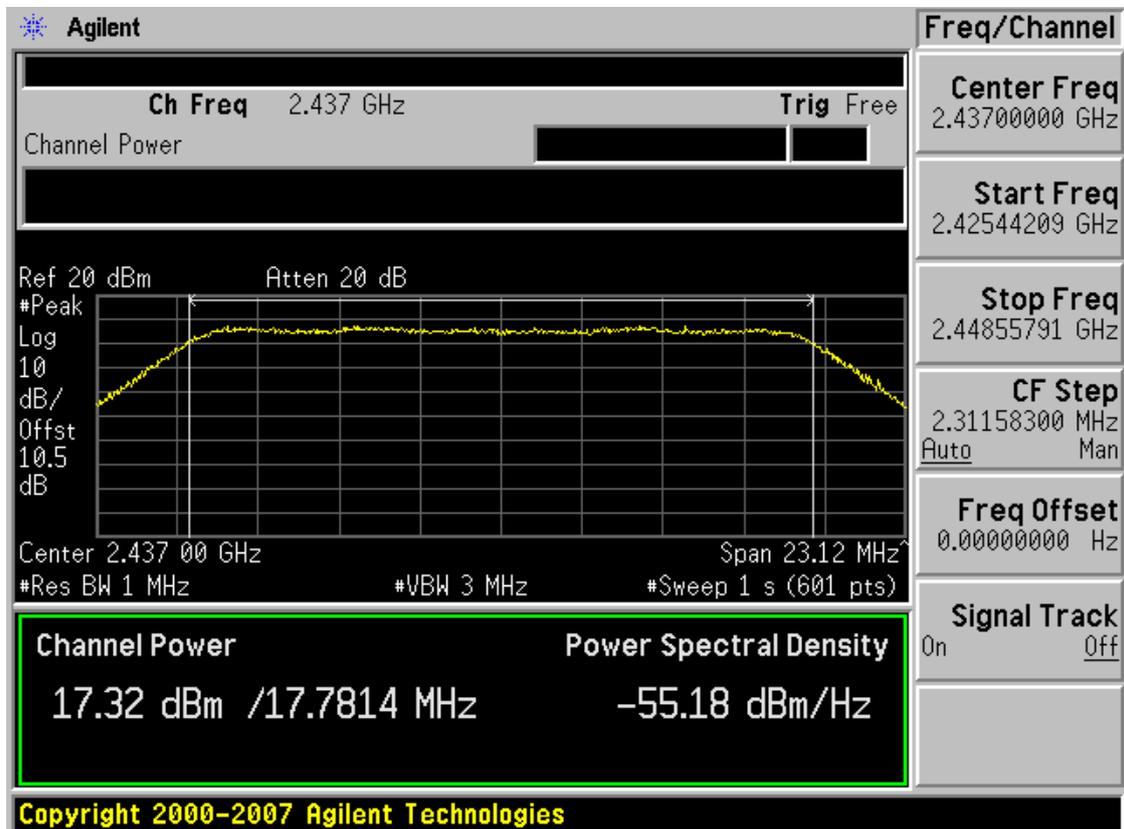
**Conducted Output Power (802.11n-CH 6) 13Mbps**



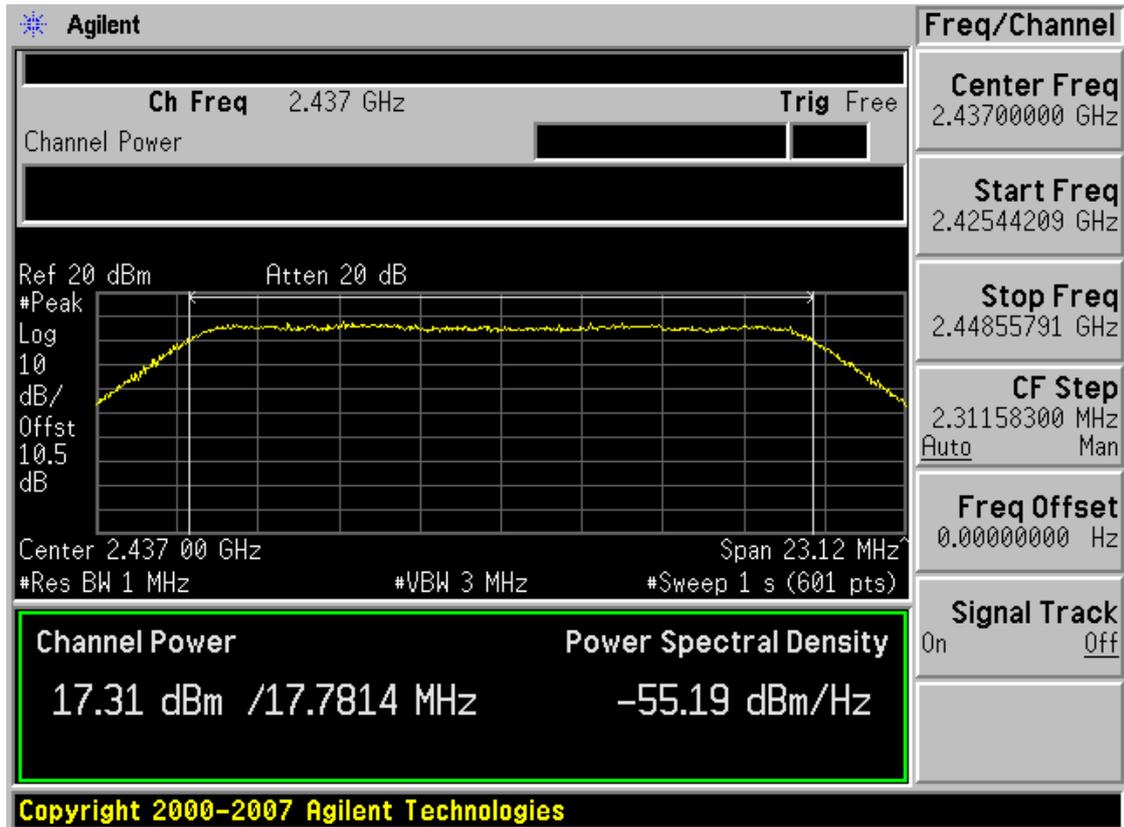
**Conducted Output Power (802.11n-CH 6) 19.5Mbps**



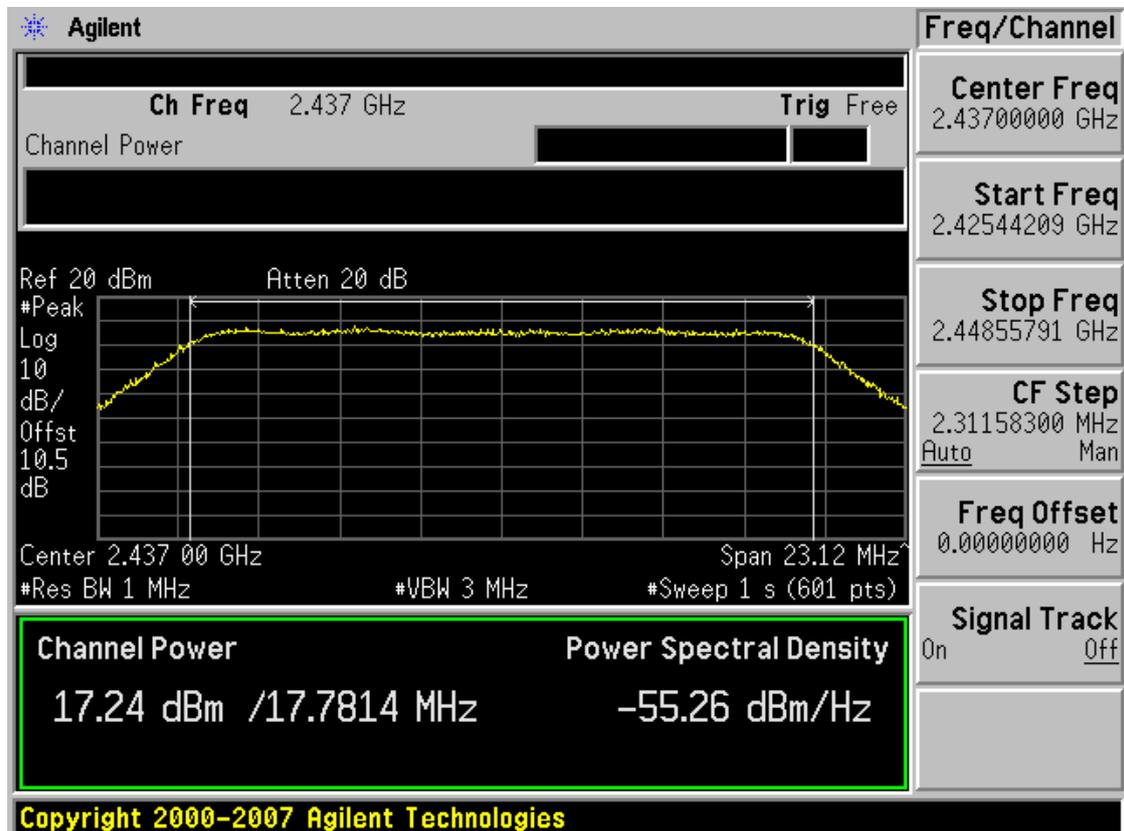
**Conducted Output Power (802.11n-CH 6) 26Mbps**



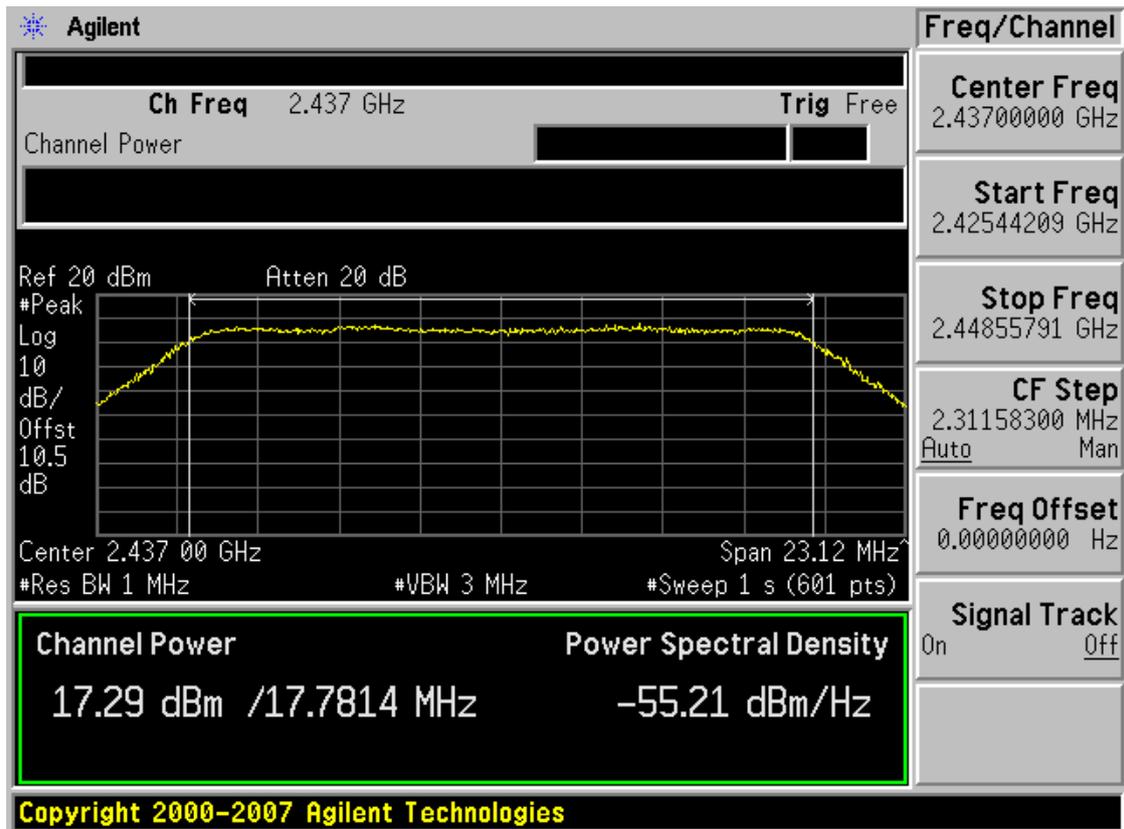
**Conducted Output Power (802.11n-CH 6) 39Mbps**



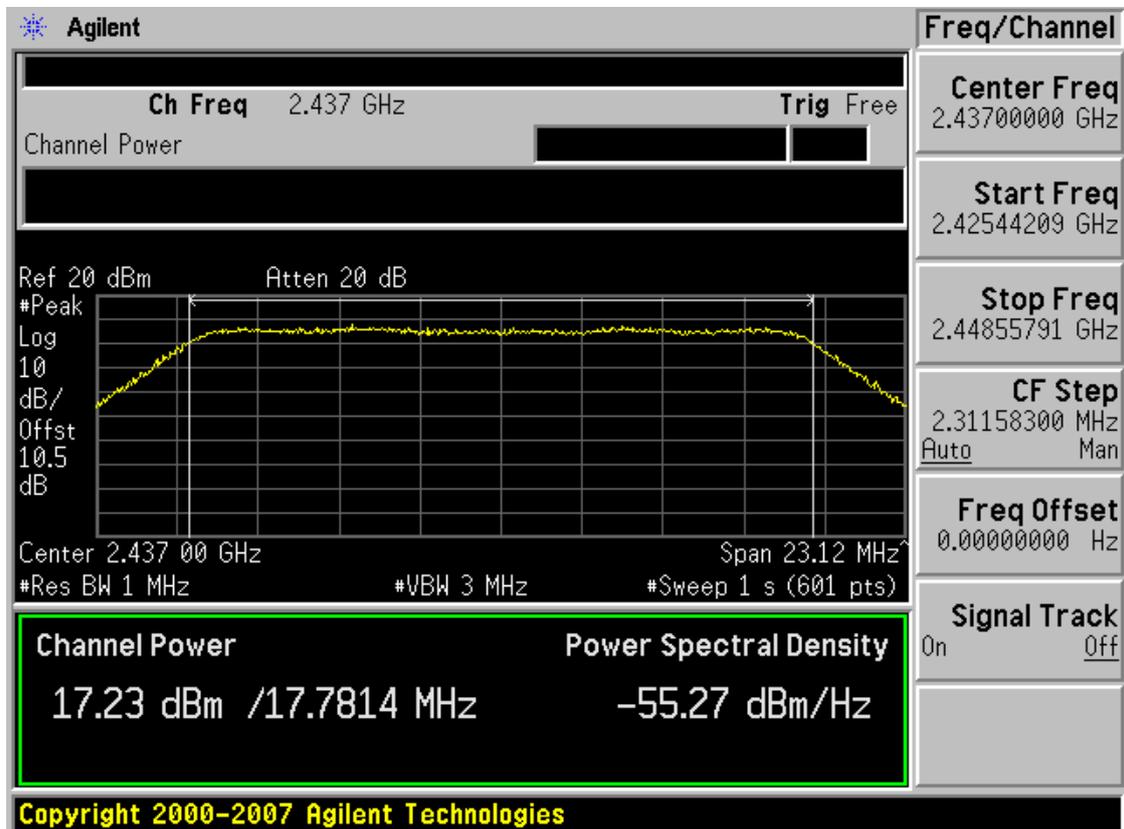
**Conducted Output Power (802.11n-CH 6) 52Mbps**



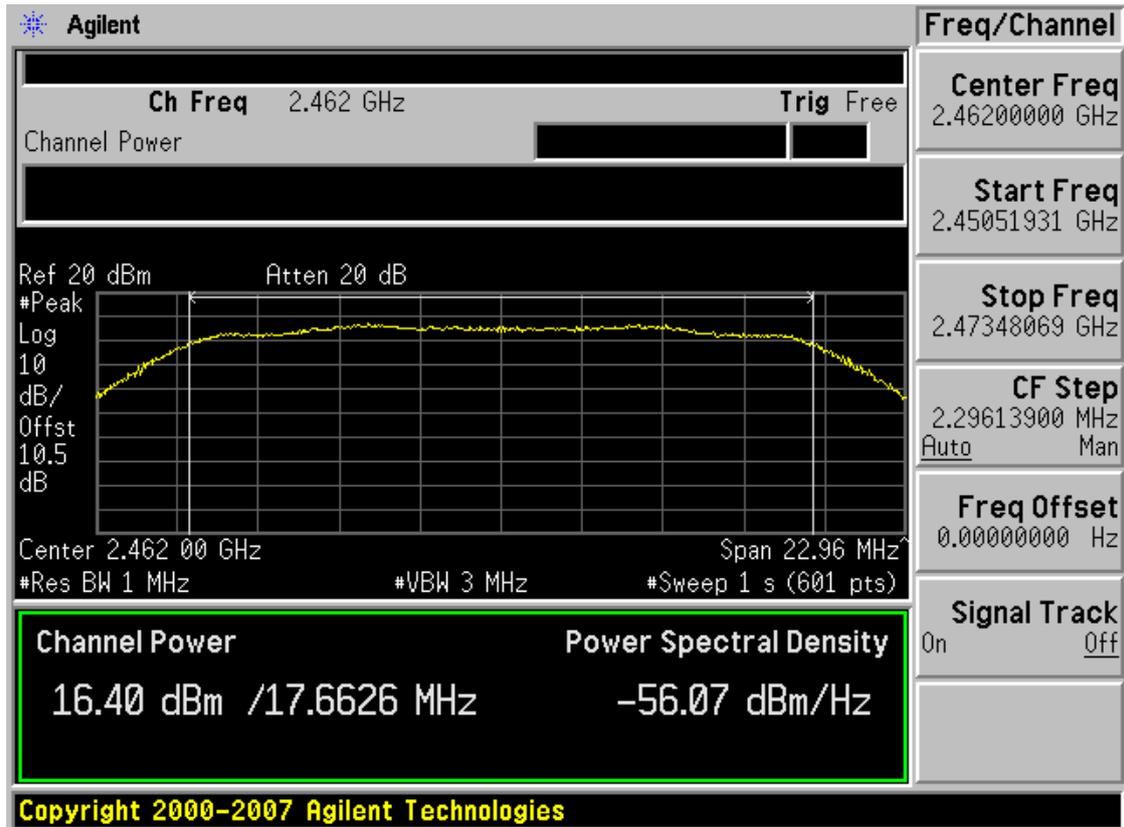
### Conducted Output Power (802.11n-CH 6) 58.5Mbps



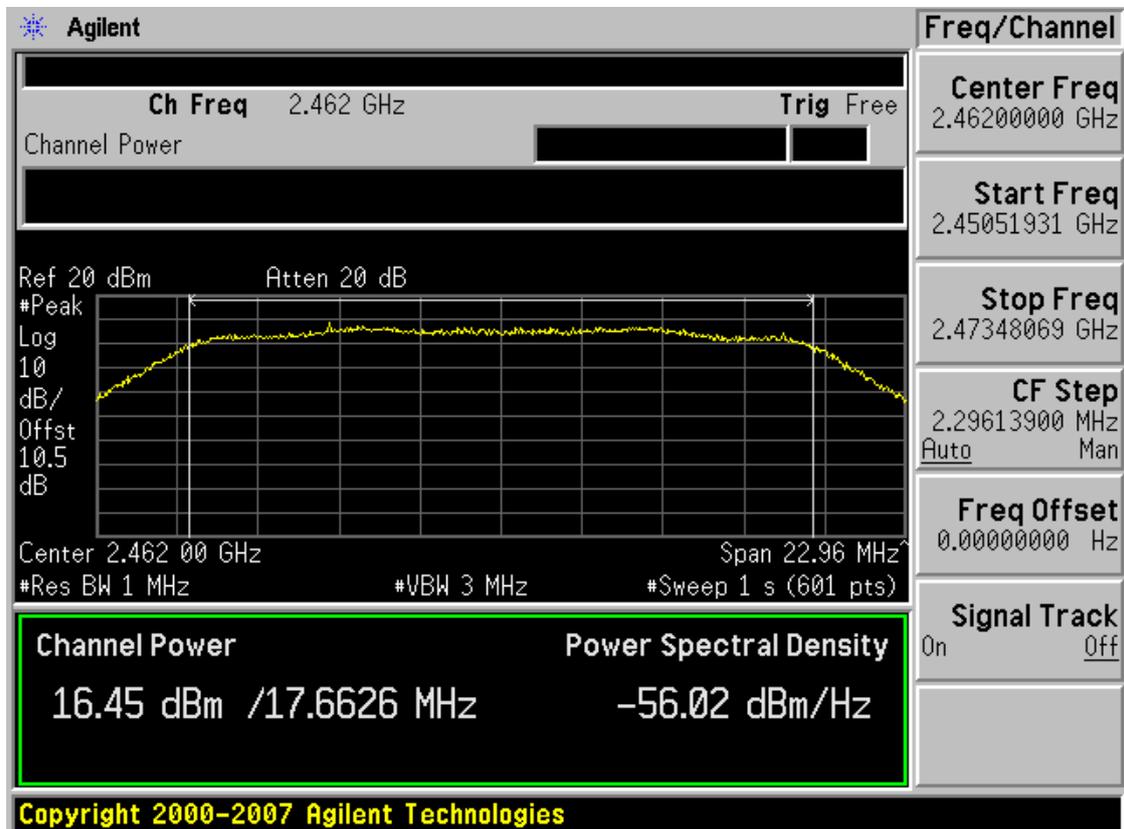
### Conducted Output Power (802.11n-CH 6) 65Mbps



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

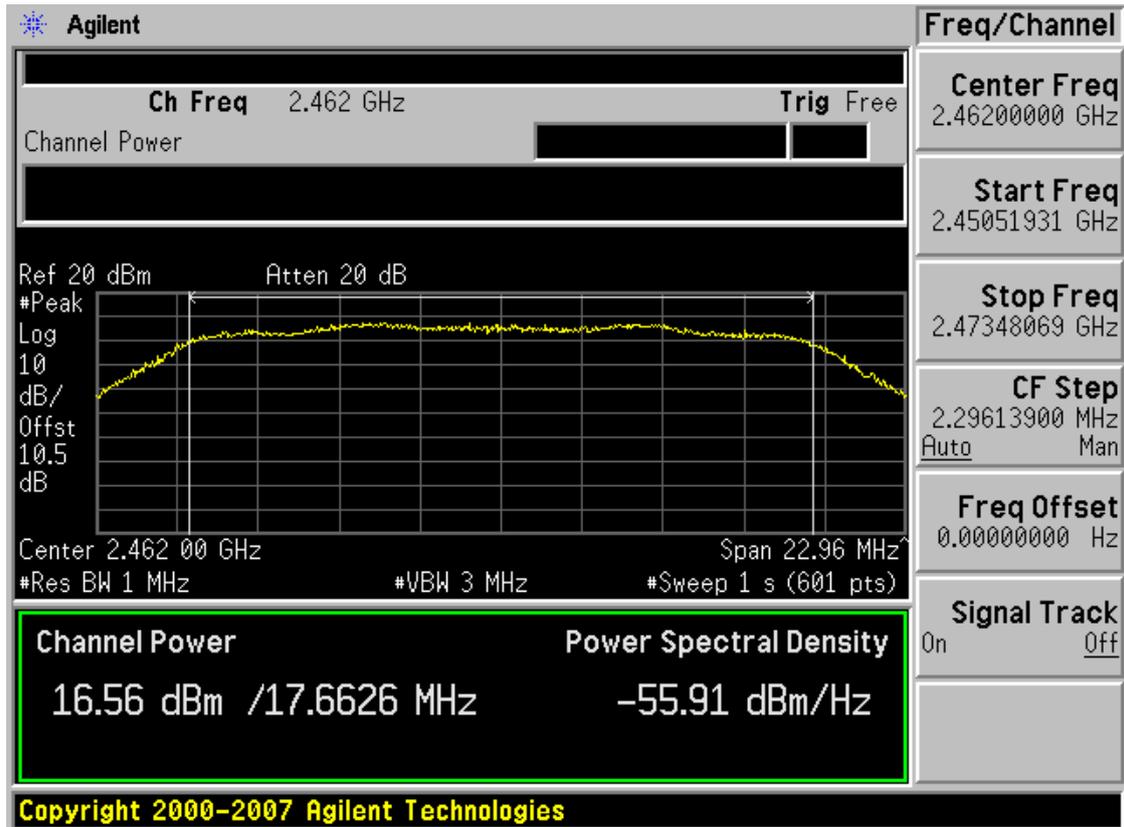


**Conducted Output Power (802.11n-CH 11) 13Mbps**

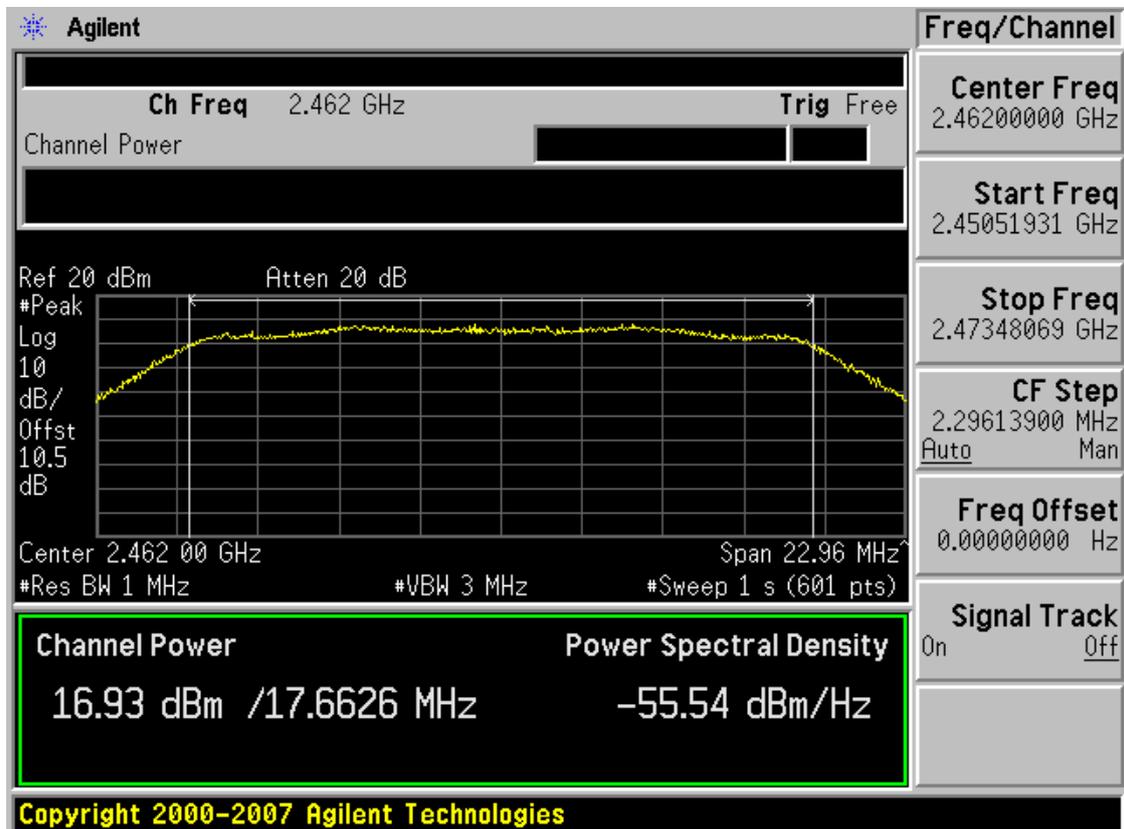


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D

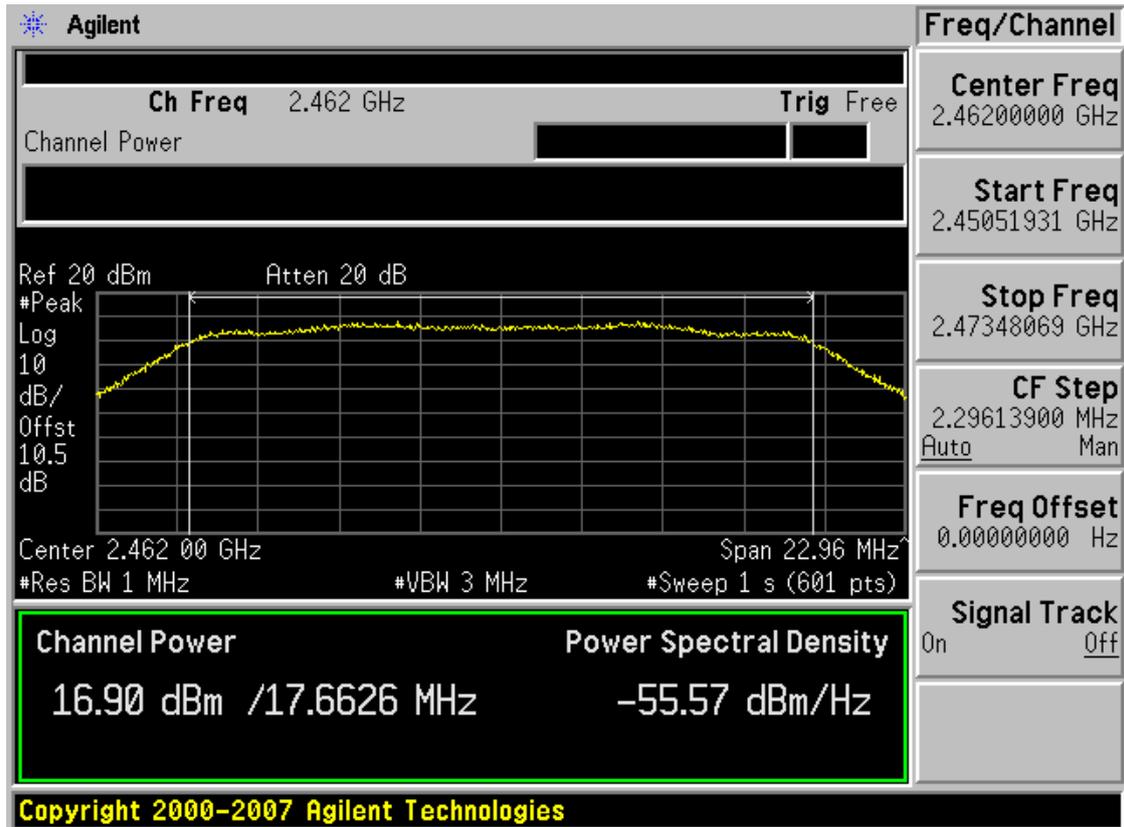
**Conducted Output Power (802.11n-CH 11) 19.5Mbps**



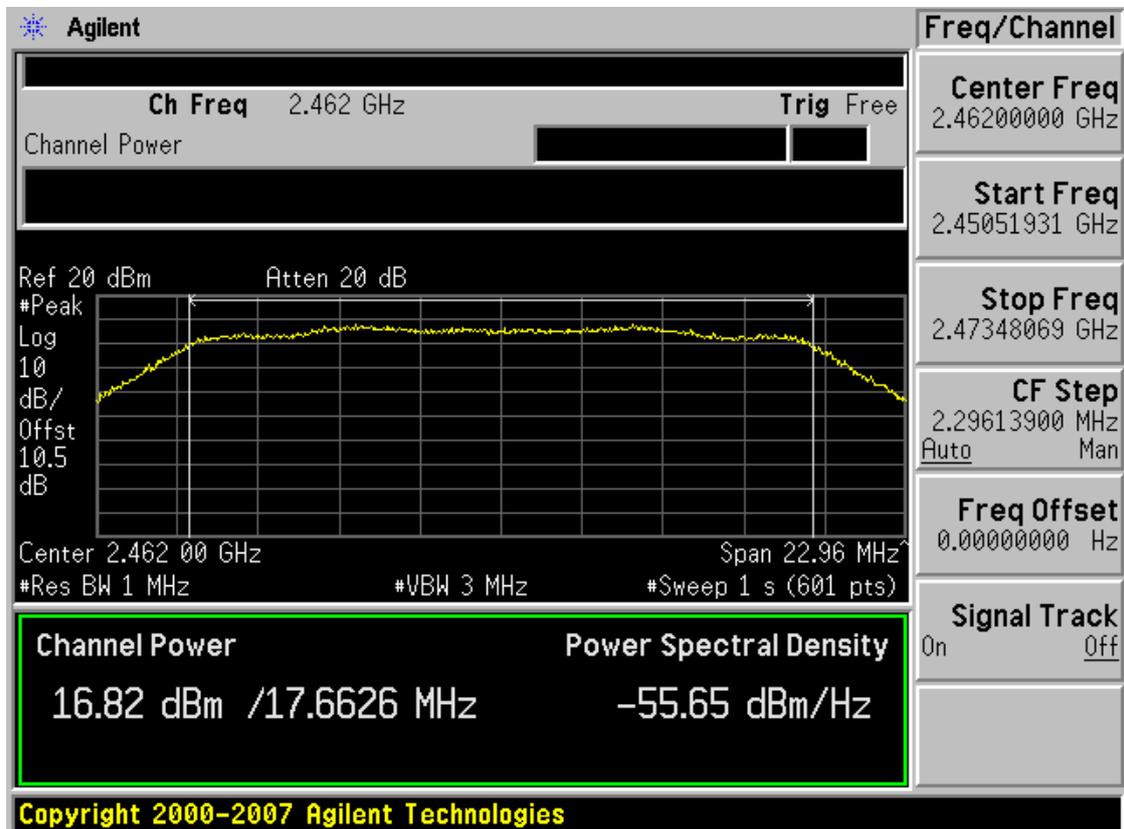
**Conducted Output Power (802.11n-CH 11) 26Mbps**



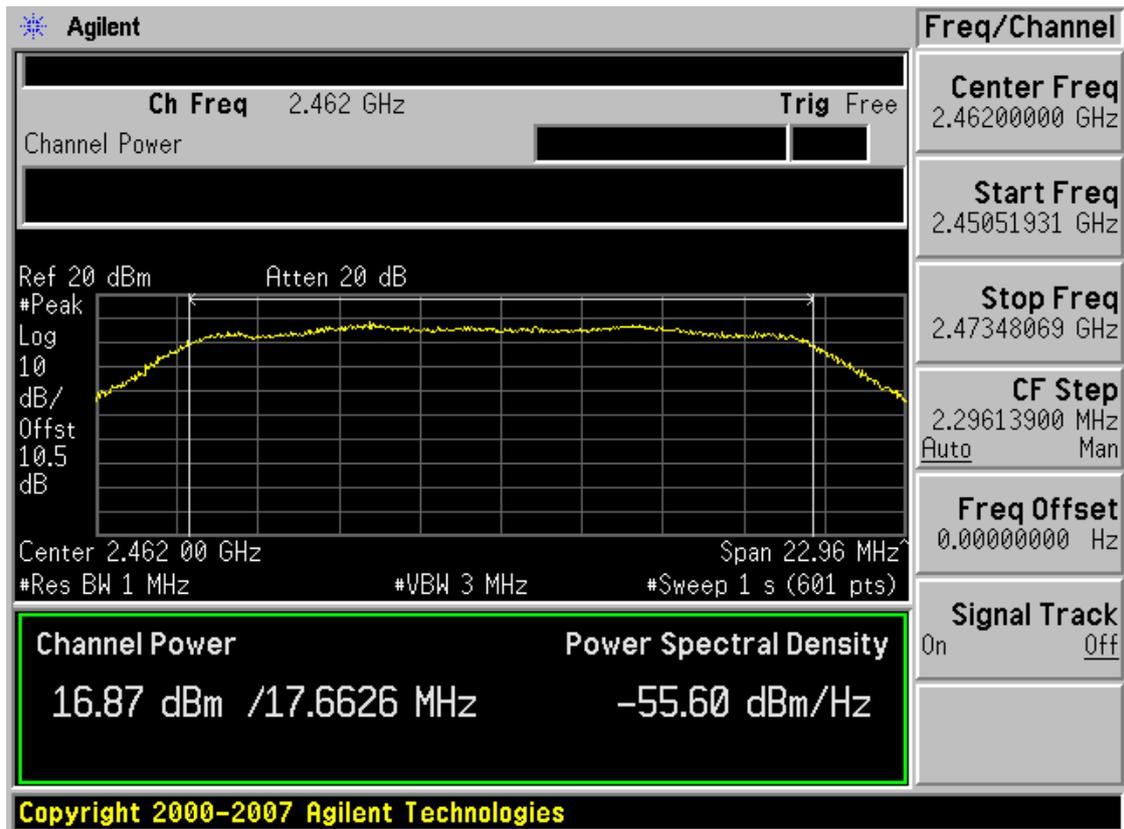
**Conducted Output Power (802.11n-CH 11) 39Mbps**



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



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

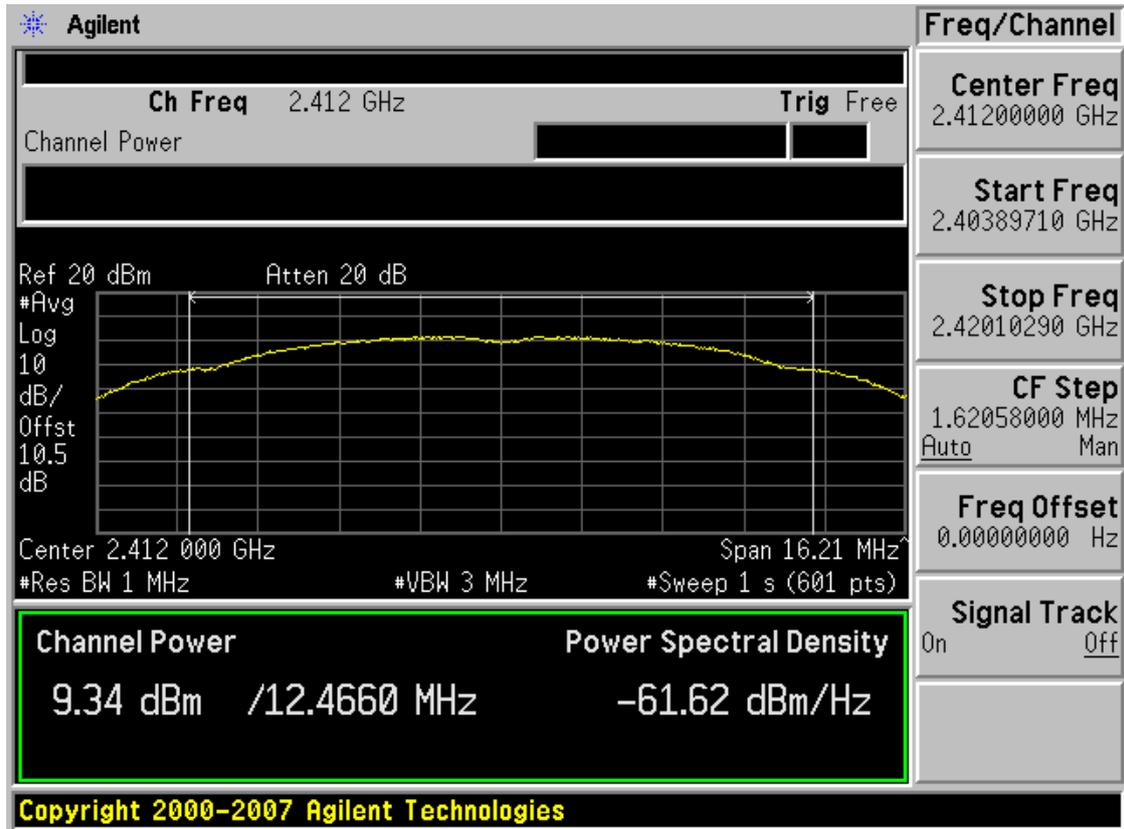


### Conducted Output Power (802.11n-CH 11) 65Mbps

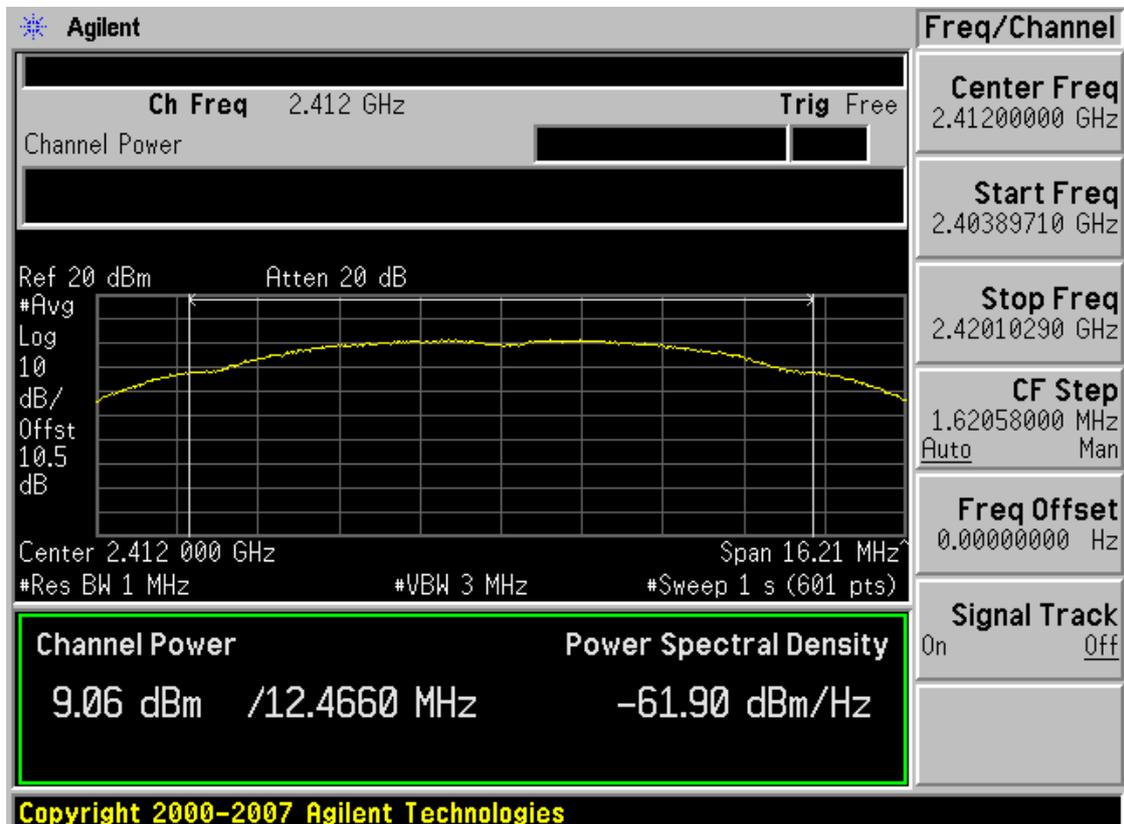


■ RESULT PLOTS-Average

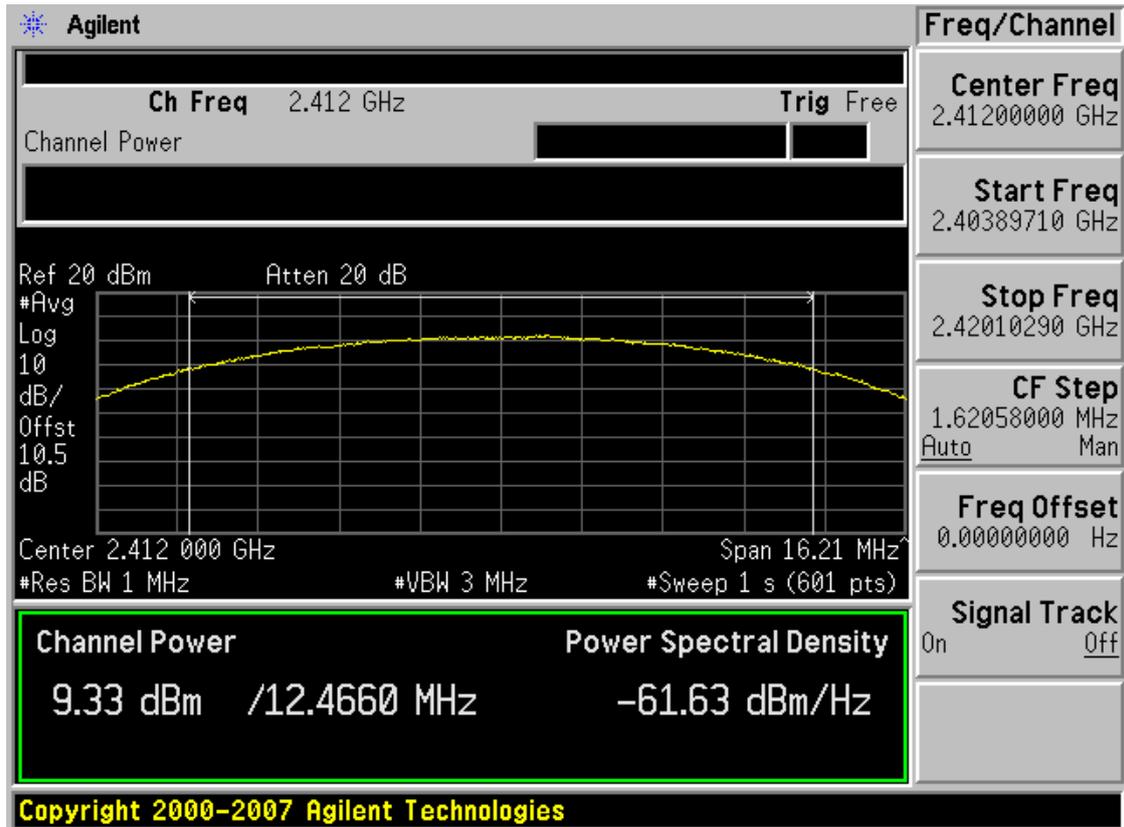
Conducted Output Power (802.11b-CH 1) 1Mbps



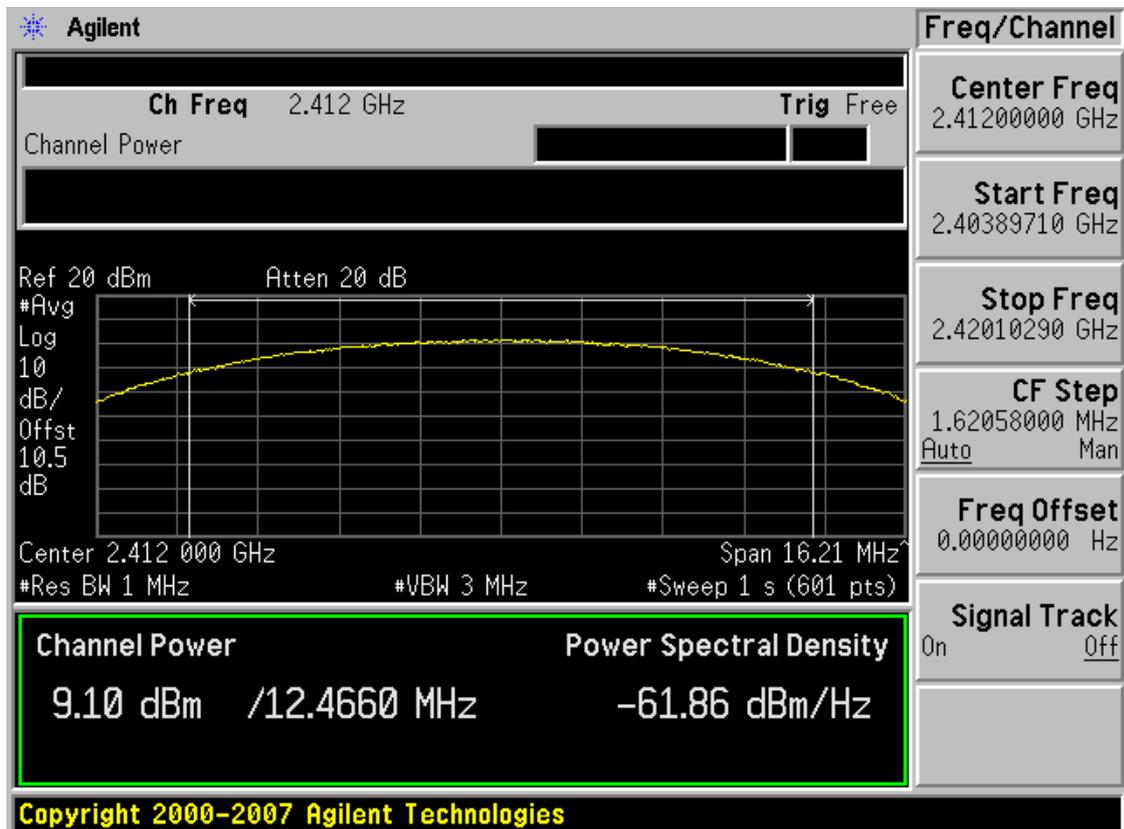
Conducted Output Power (802.11b-CH 1) 2Mbps



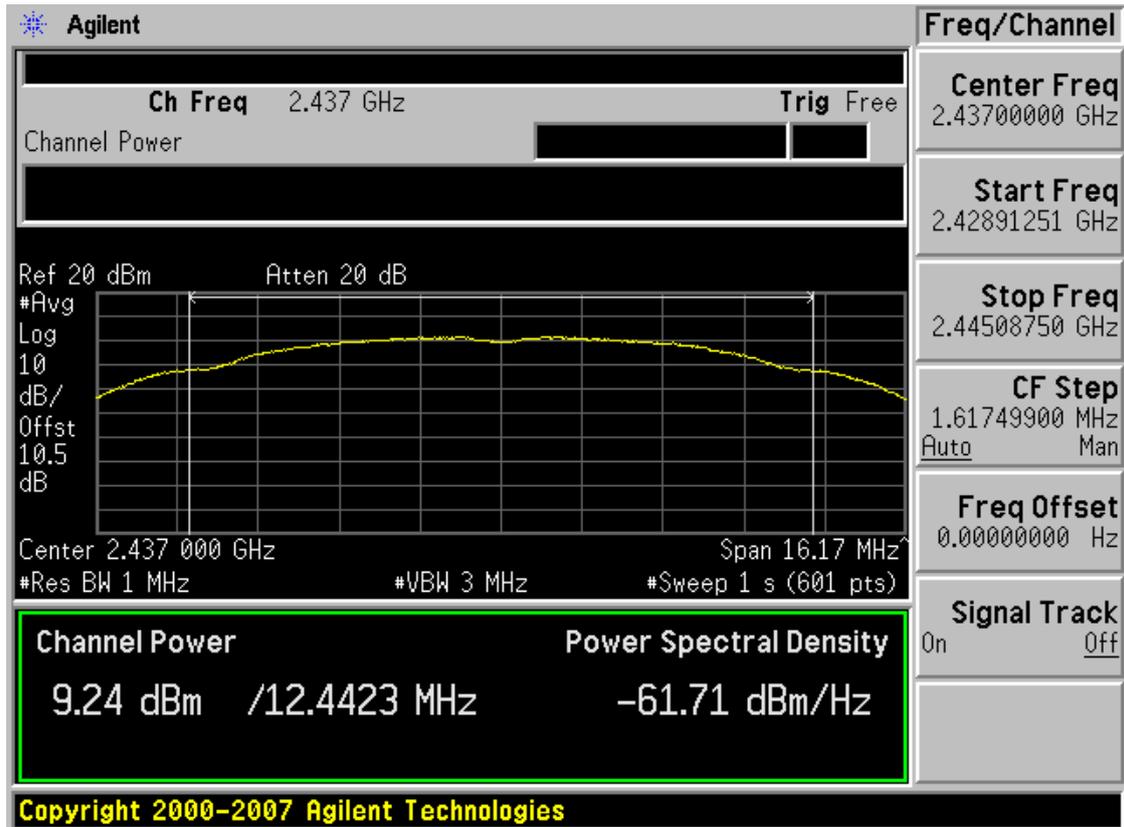
### Conducted Output Power (802.11b-CH 1) 5.5Mbps



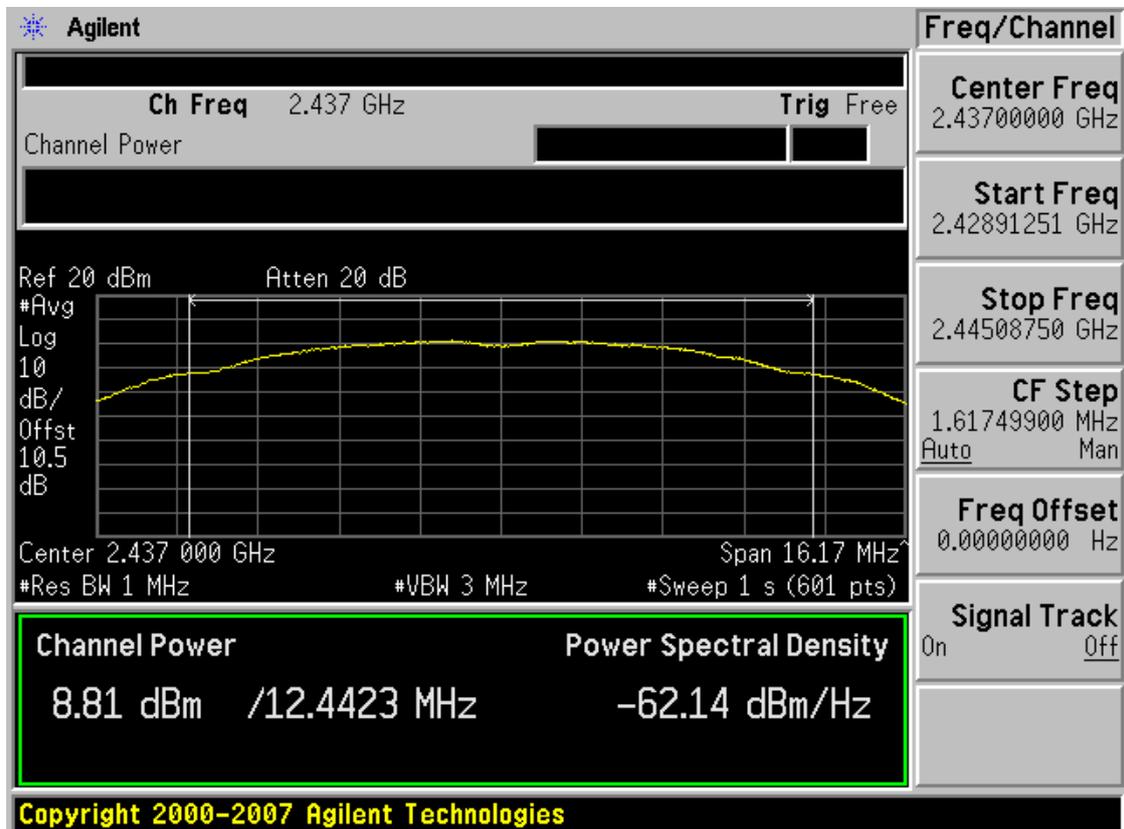
### Conducted Output Power (802.11b-CH 1) 11Mbps



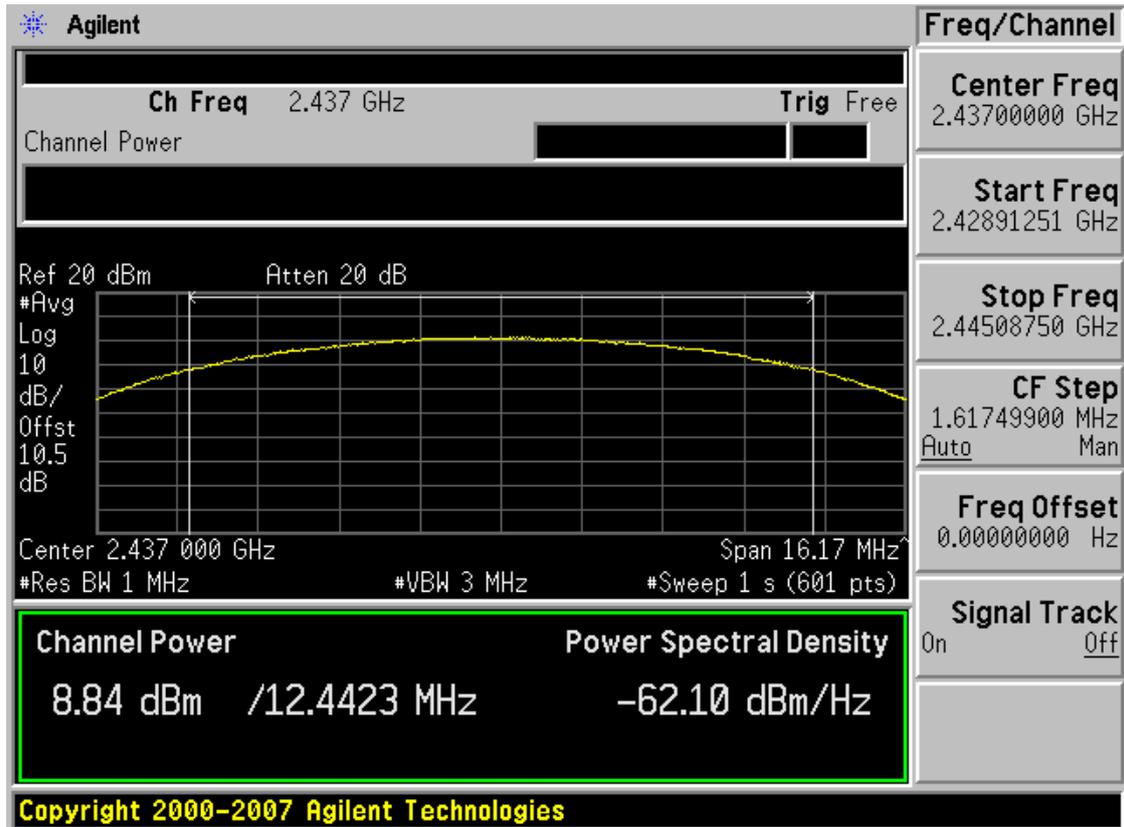
### Conducted Output Power (802.11b-CH 6) 1Mbps



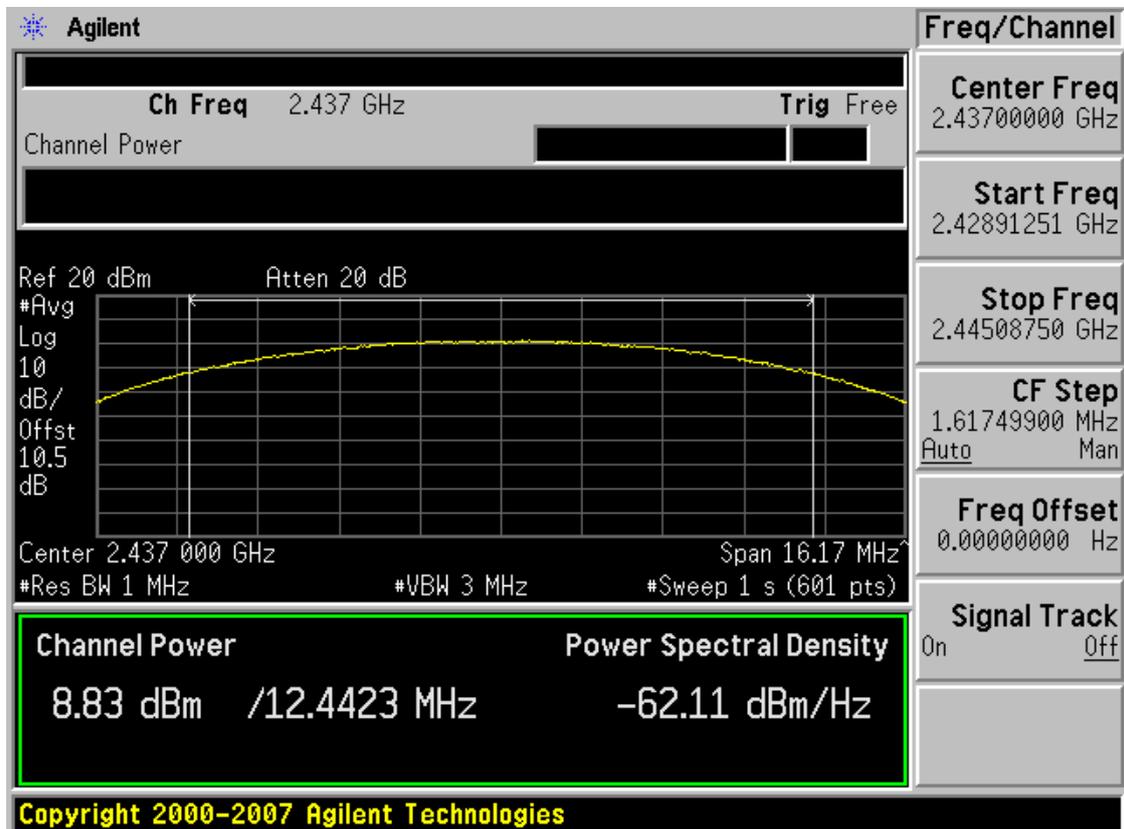
### Conducted Output Power (802.11b-CH 6) 2Mbps



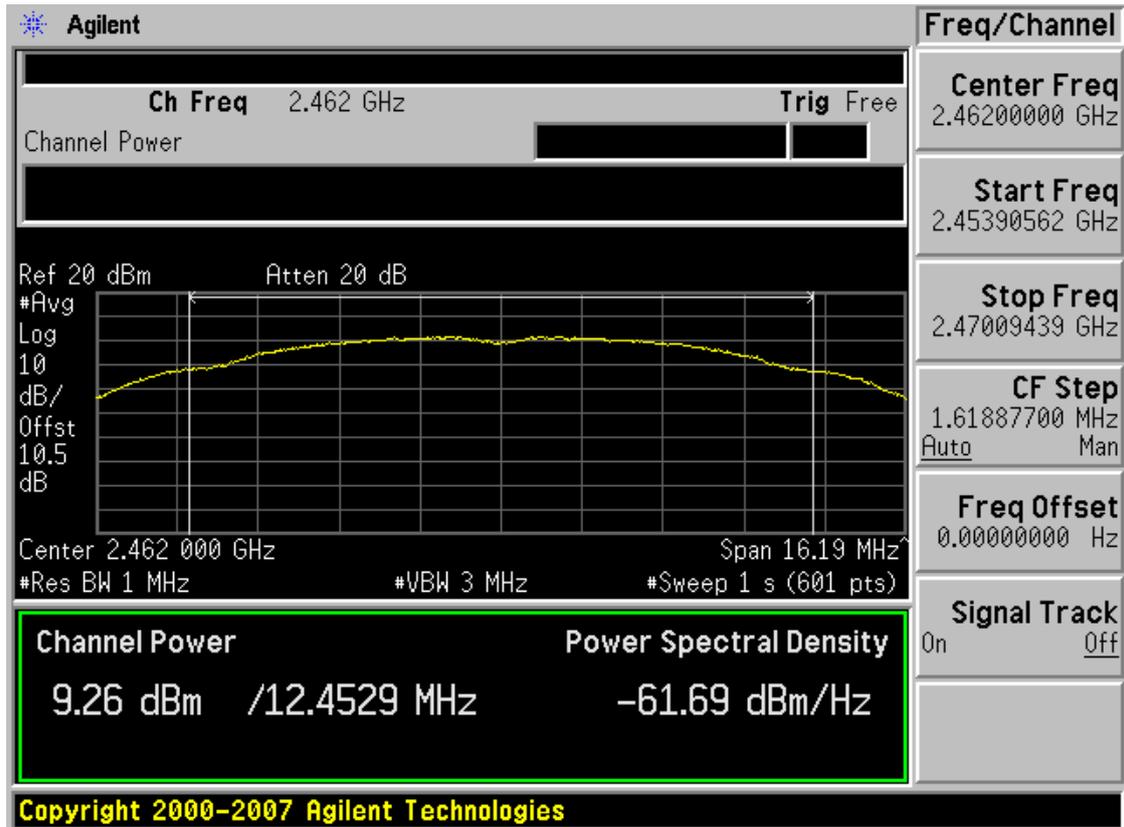
### Conducted Output Power (802.11b-CH 6) 5.5Mbps



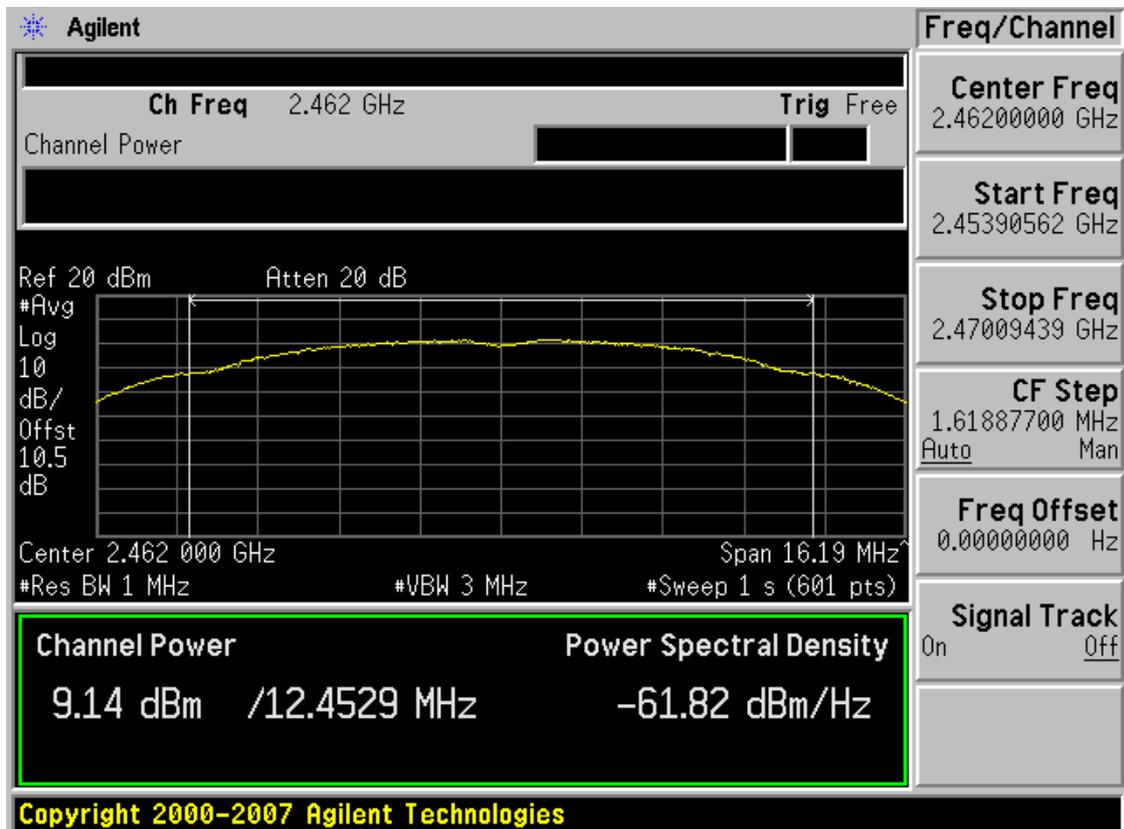
### Conducted Output Power (802.11b-CH 6) 11Mbps



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

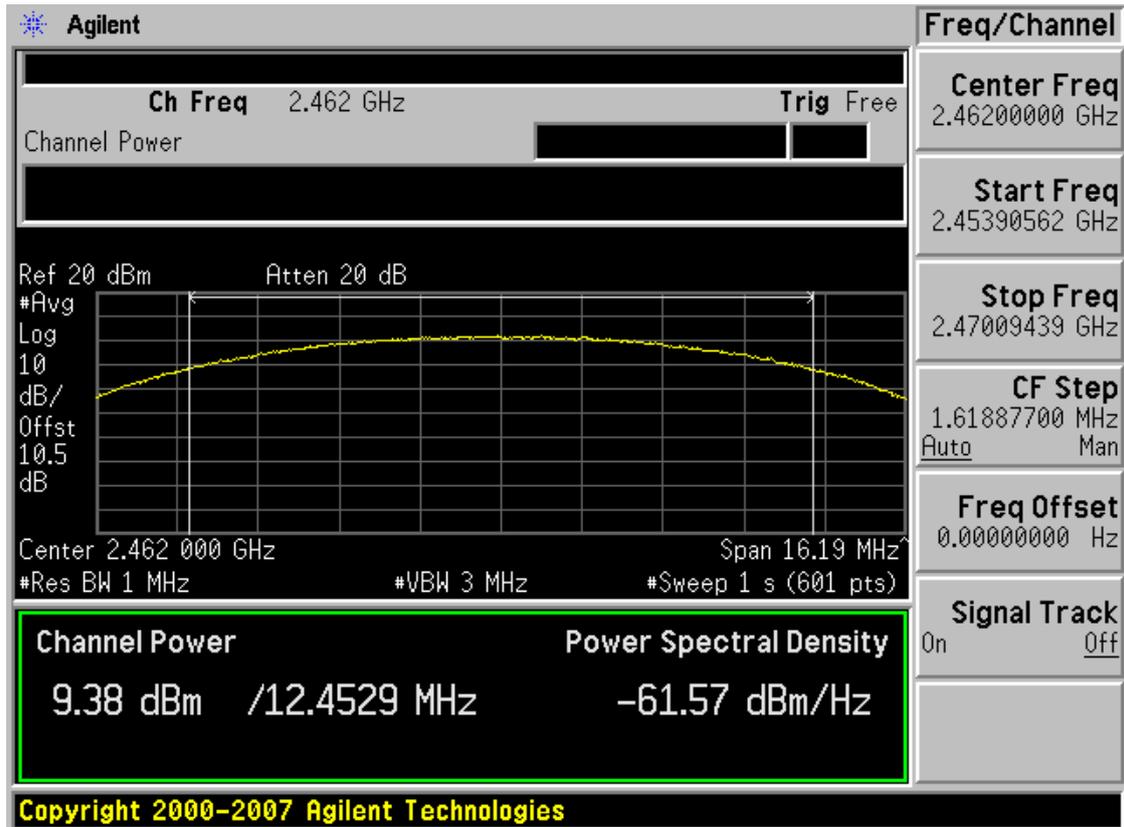


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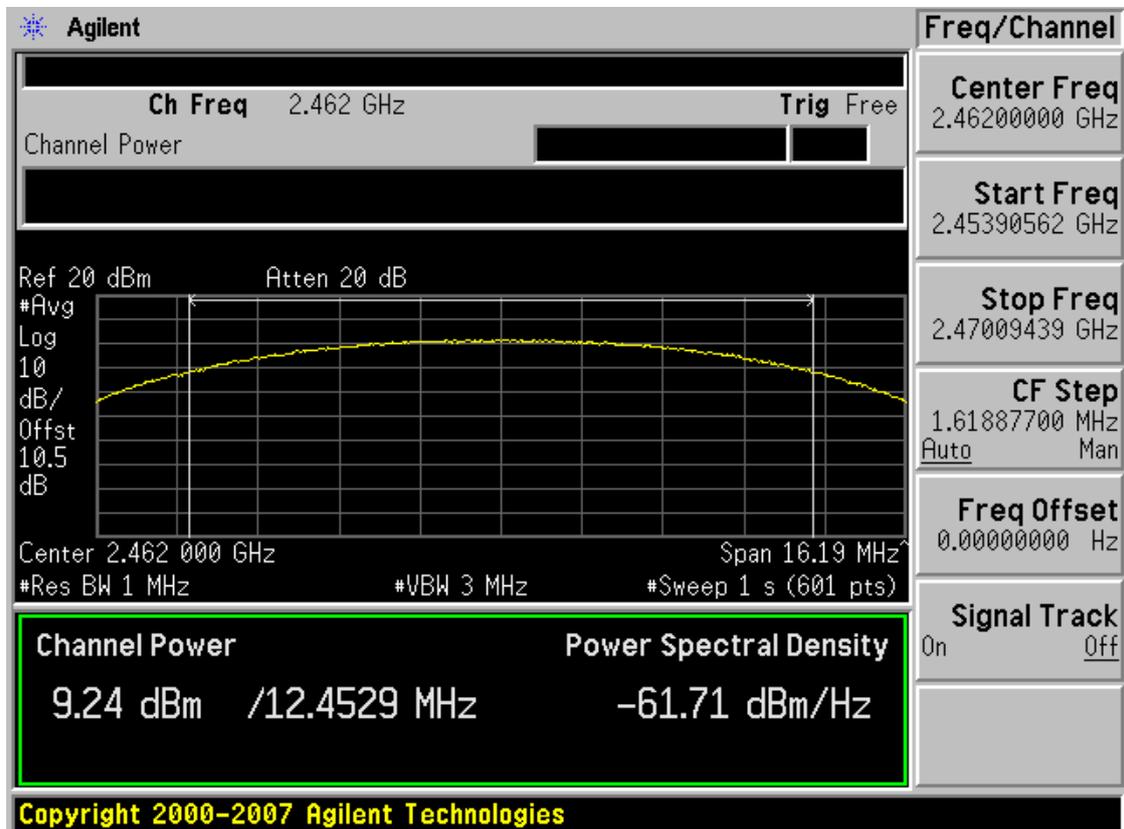


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D	

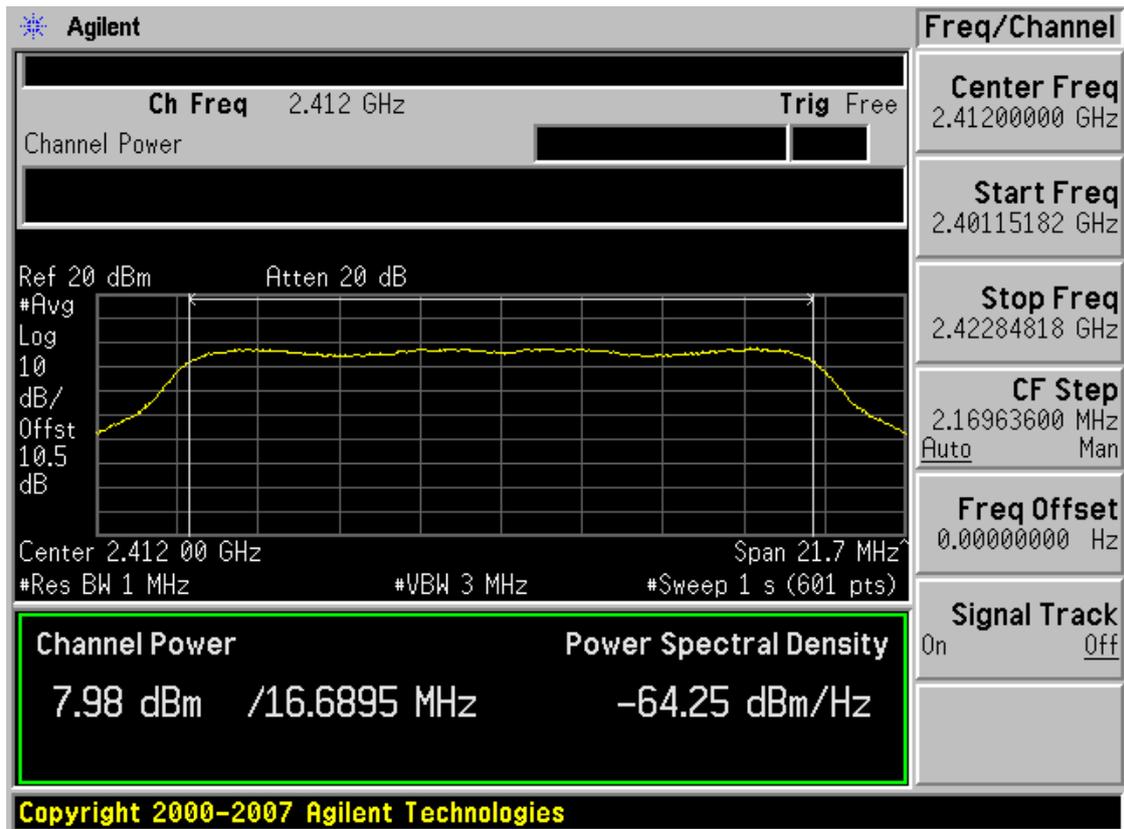
### Conducted Output Power (802.11b-CH 11) 5.5Mbps



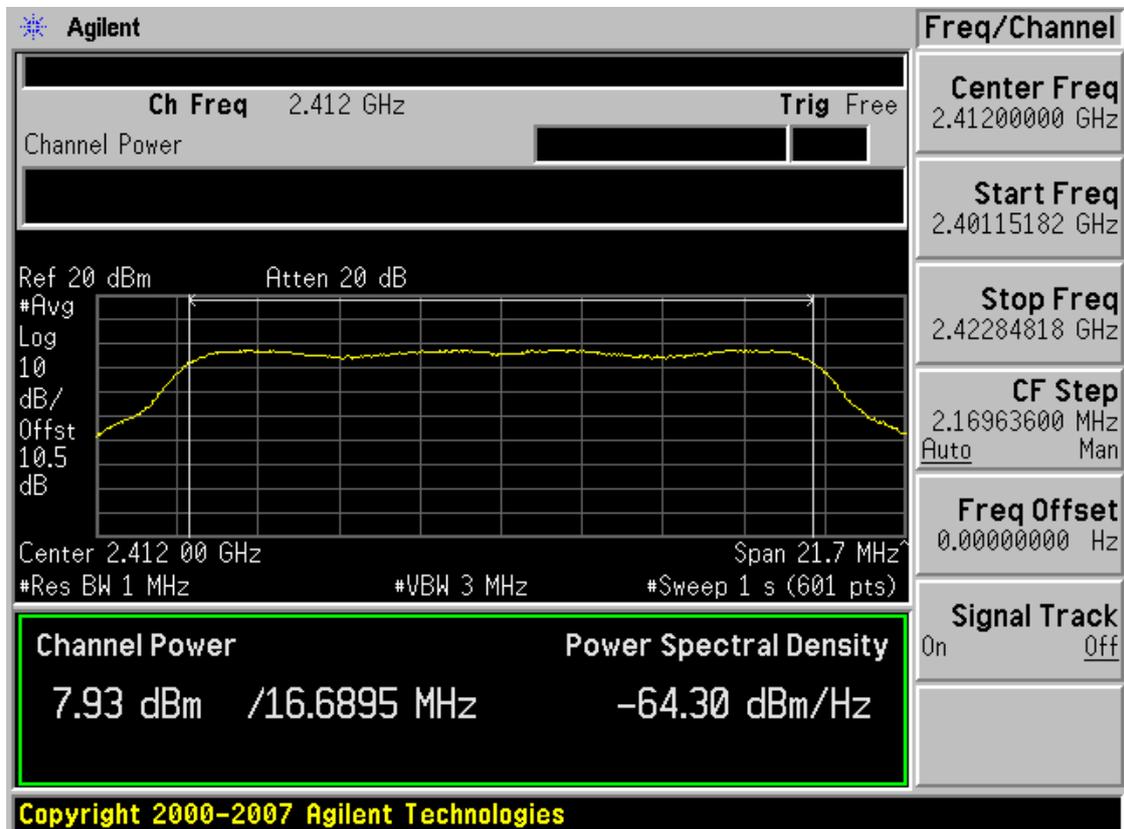
### Conducted Output Power (802.11b-CH 11) 11Mbps



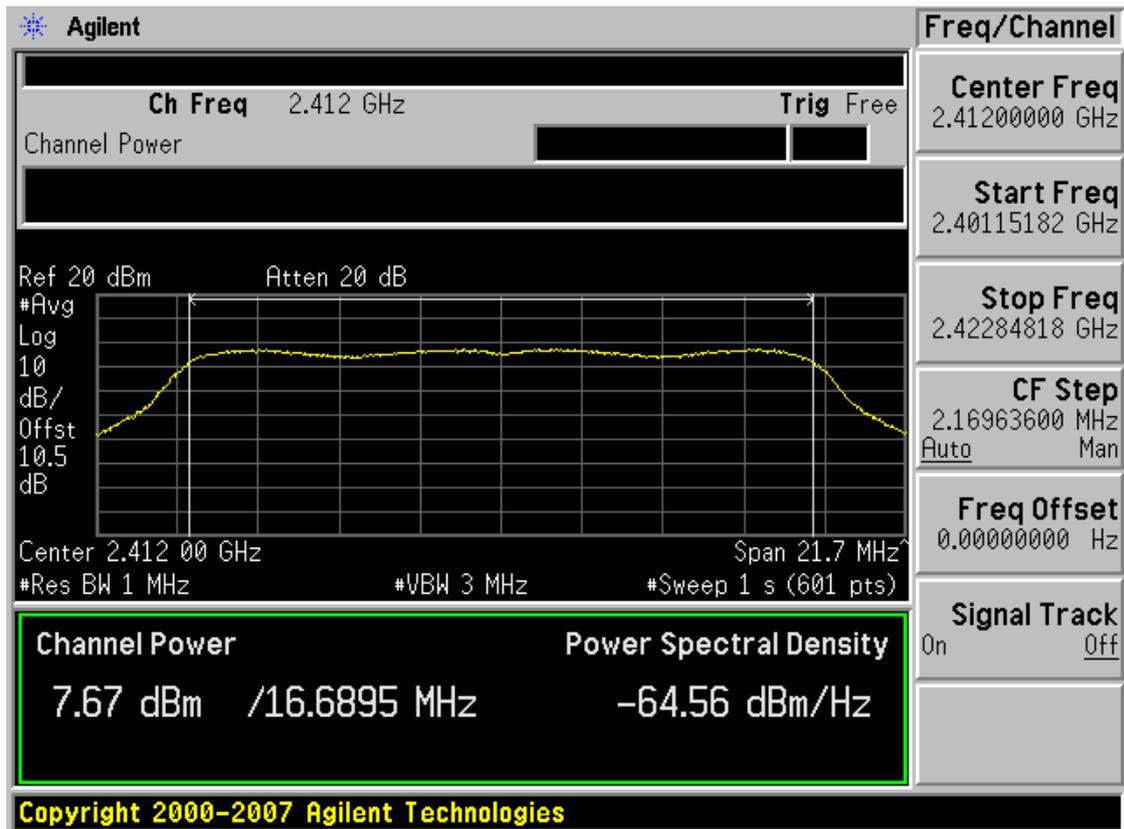
**Conducted Output Power (802.11g-CH 1) 6Mbps**



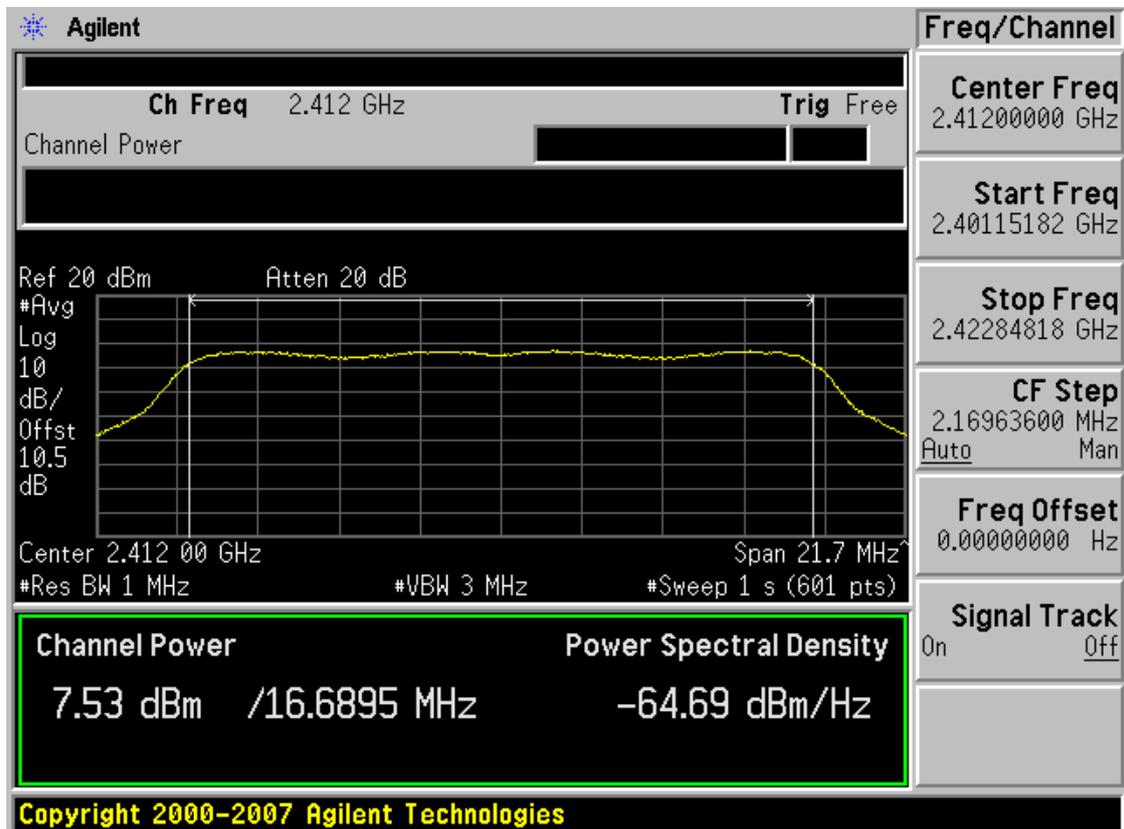
**Conducted Output Power (802.11g-CH 1) 9Mbps**



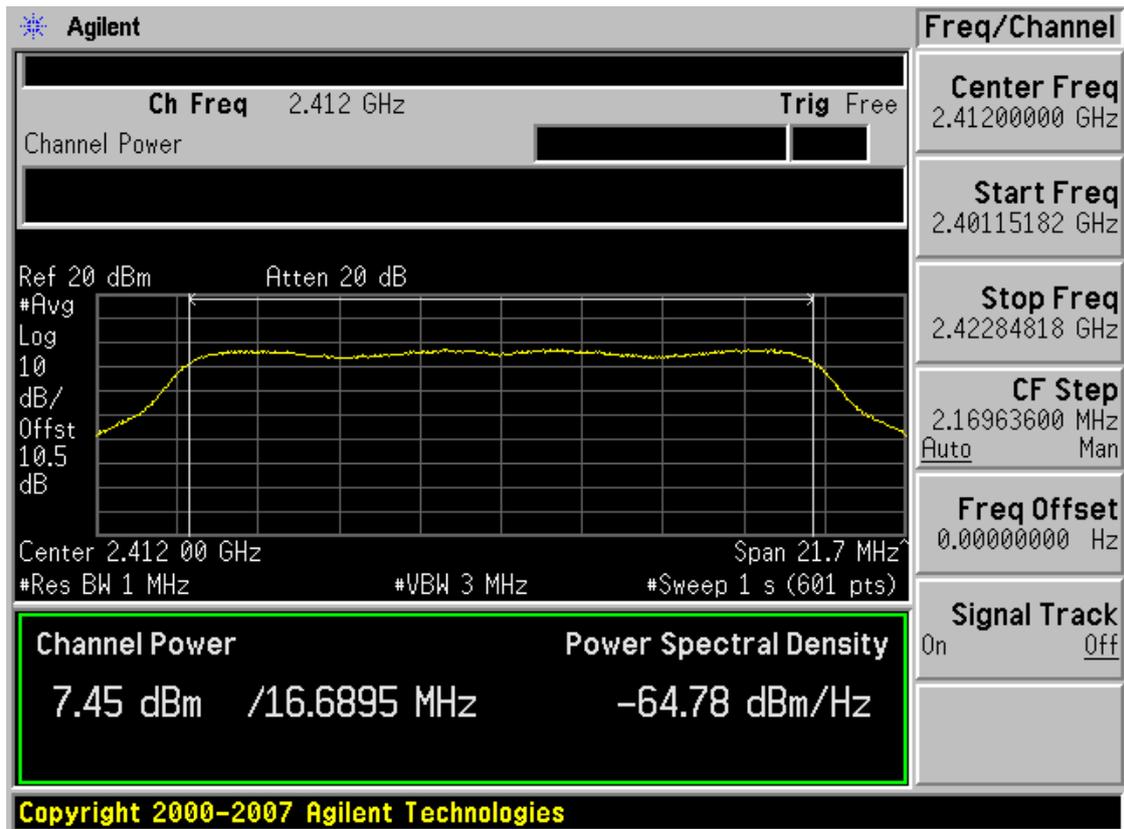
### Conducted Output Power (802.11g-CH 1) 12Mbps



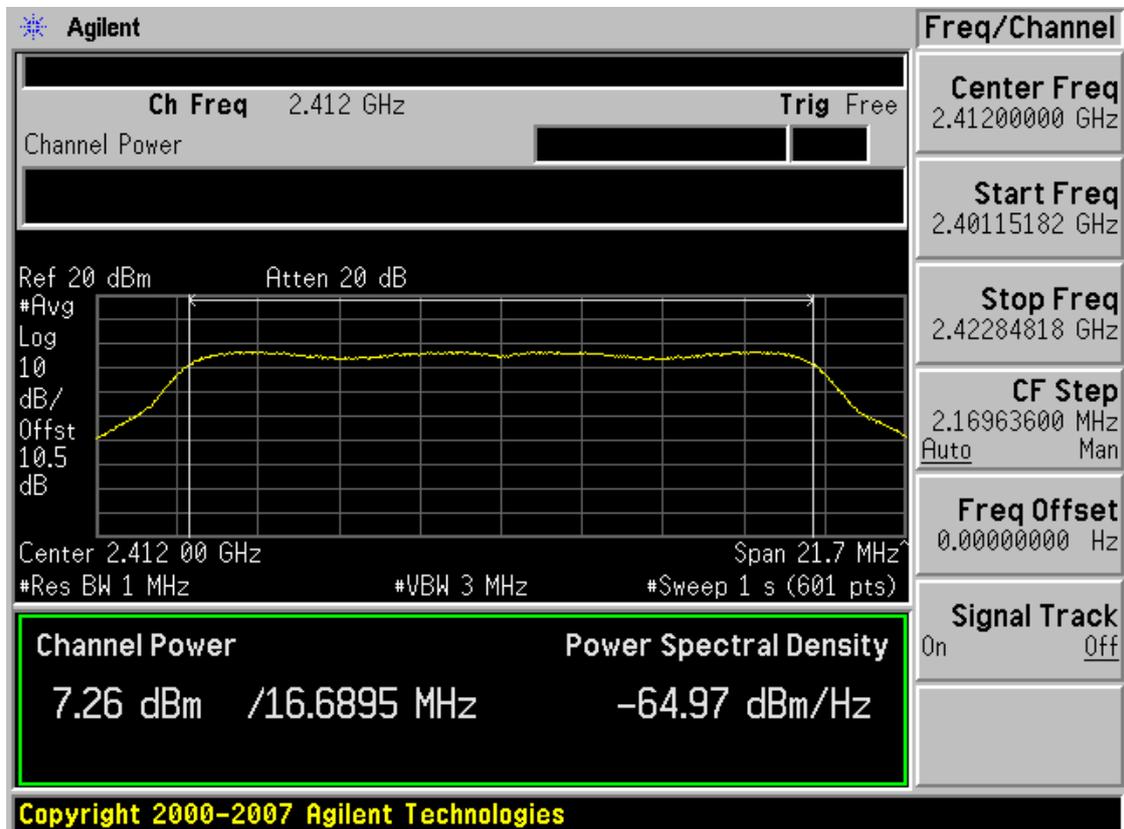
### Conducted Output Power (802.11g-CH 1) 18Mbps



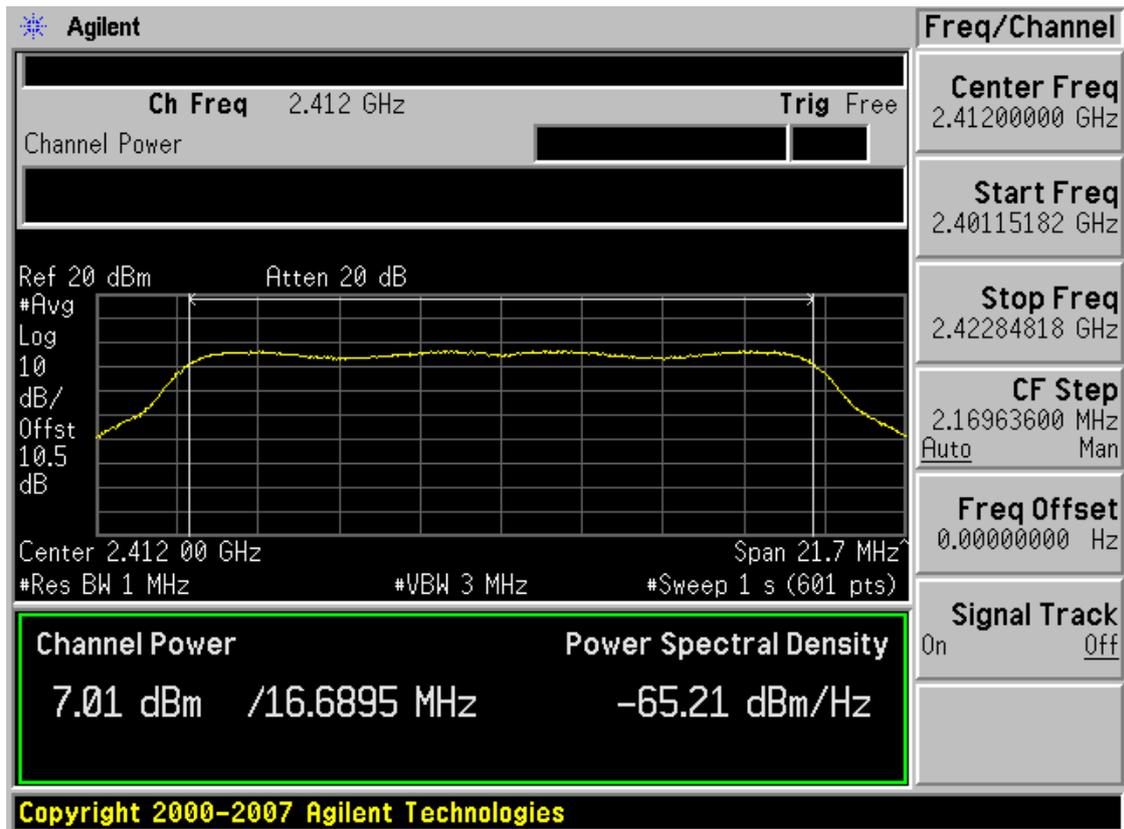
### Conducted Output Power (802.11g-CH 1) 24Mbps



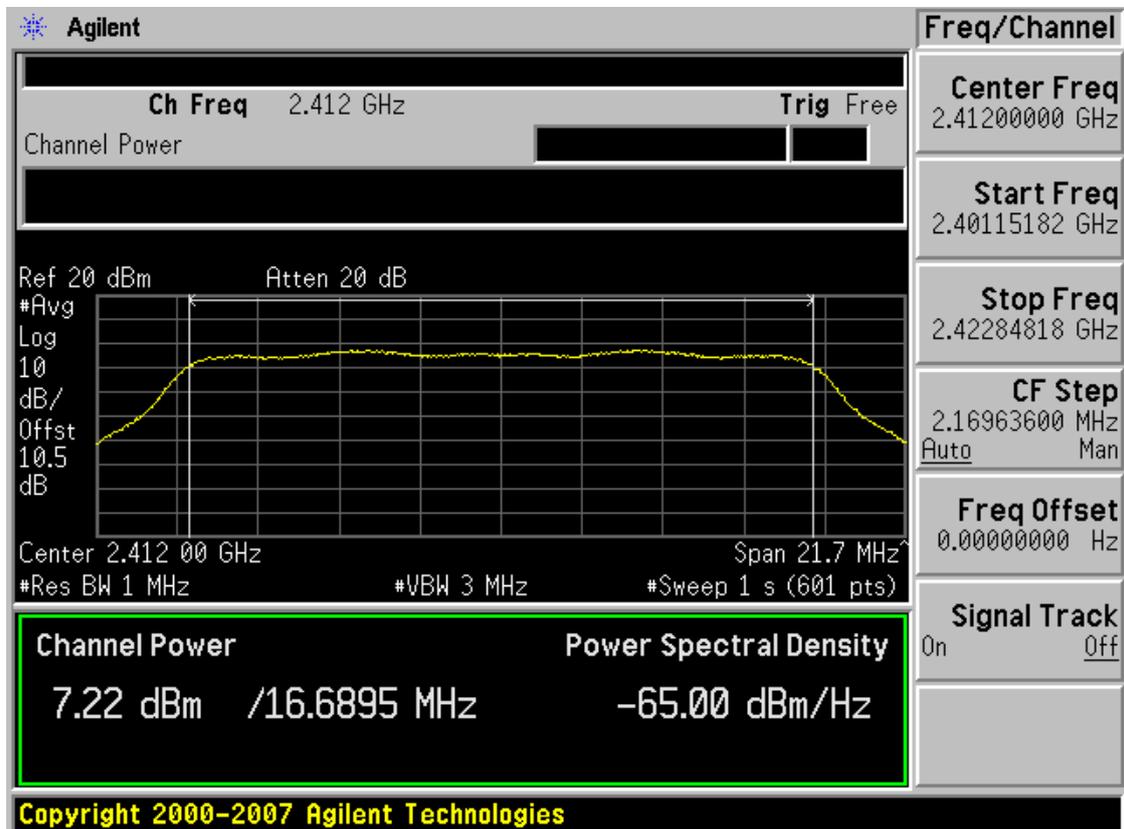
### Conducted Output Power (802.11g-CH 1) 36Mbps



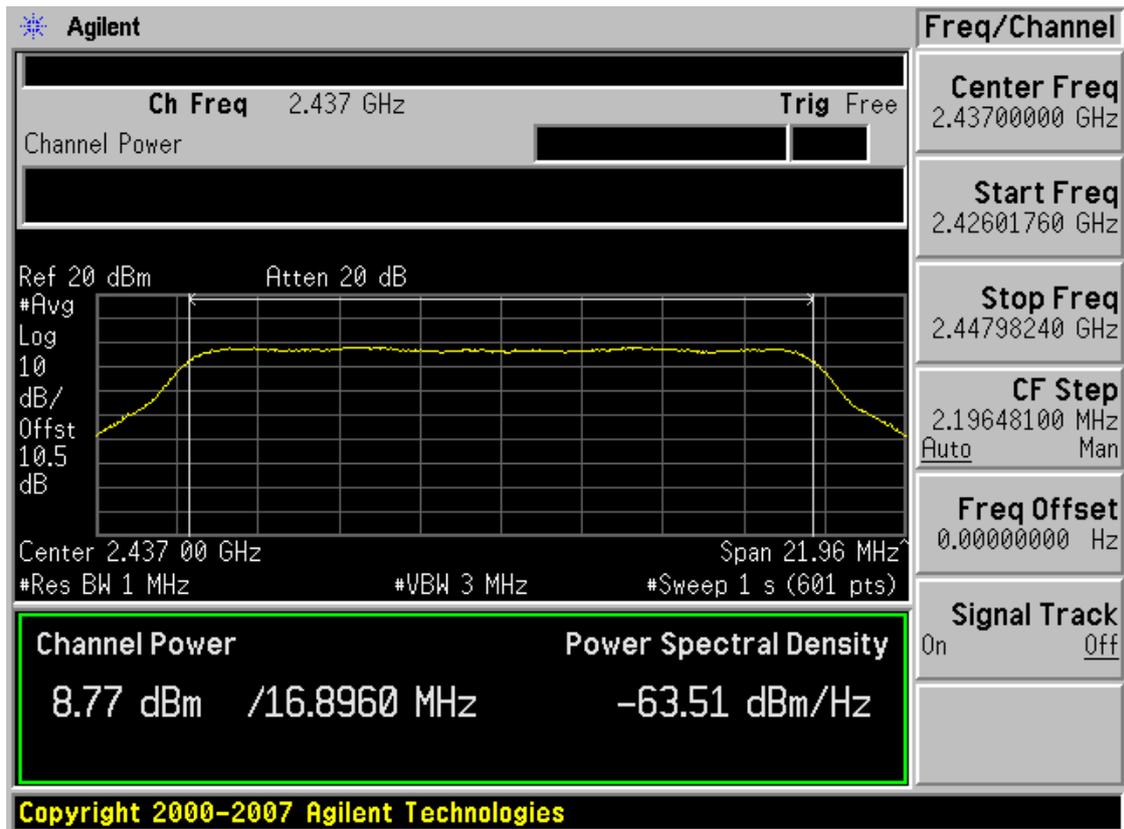
### Conducted Output Power (802.11g-CH 1) 48Mbps



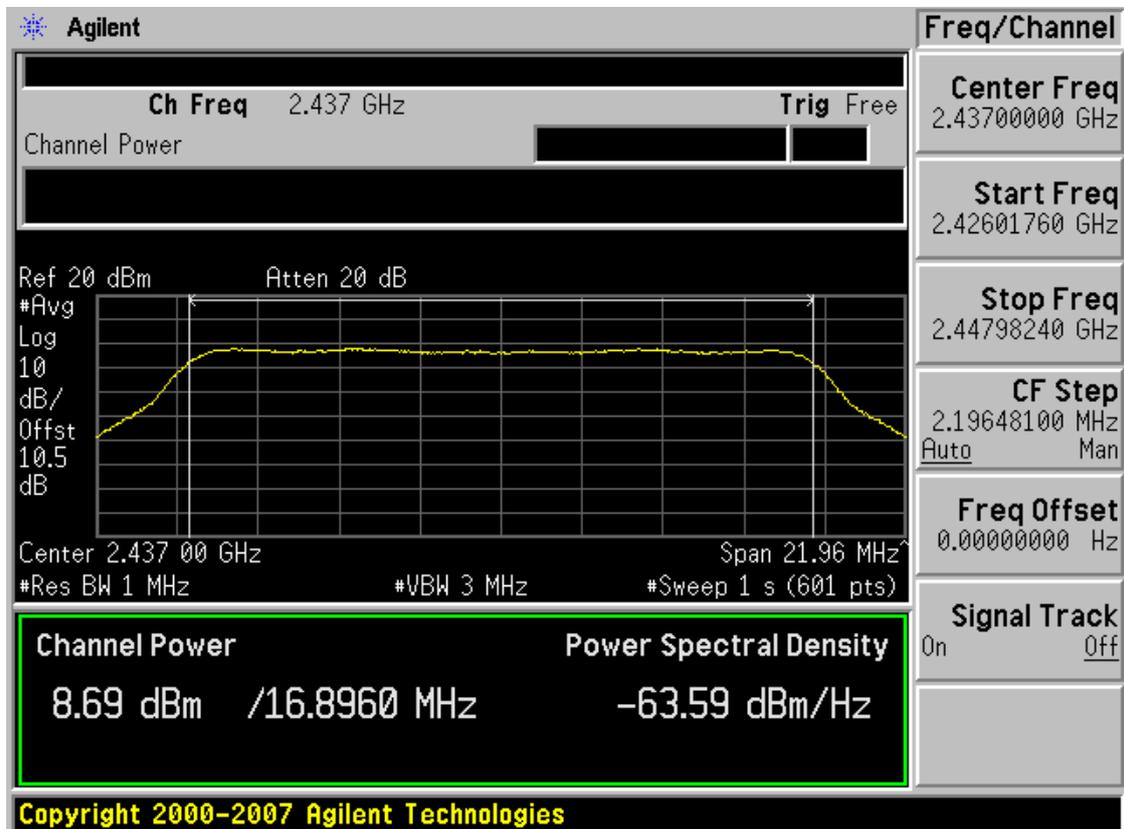
### Conducted Output Power (802.11g-CH 1) 54Mbps



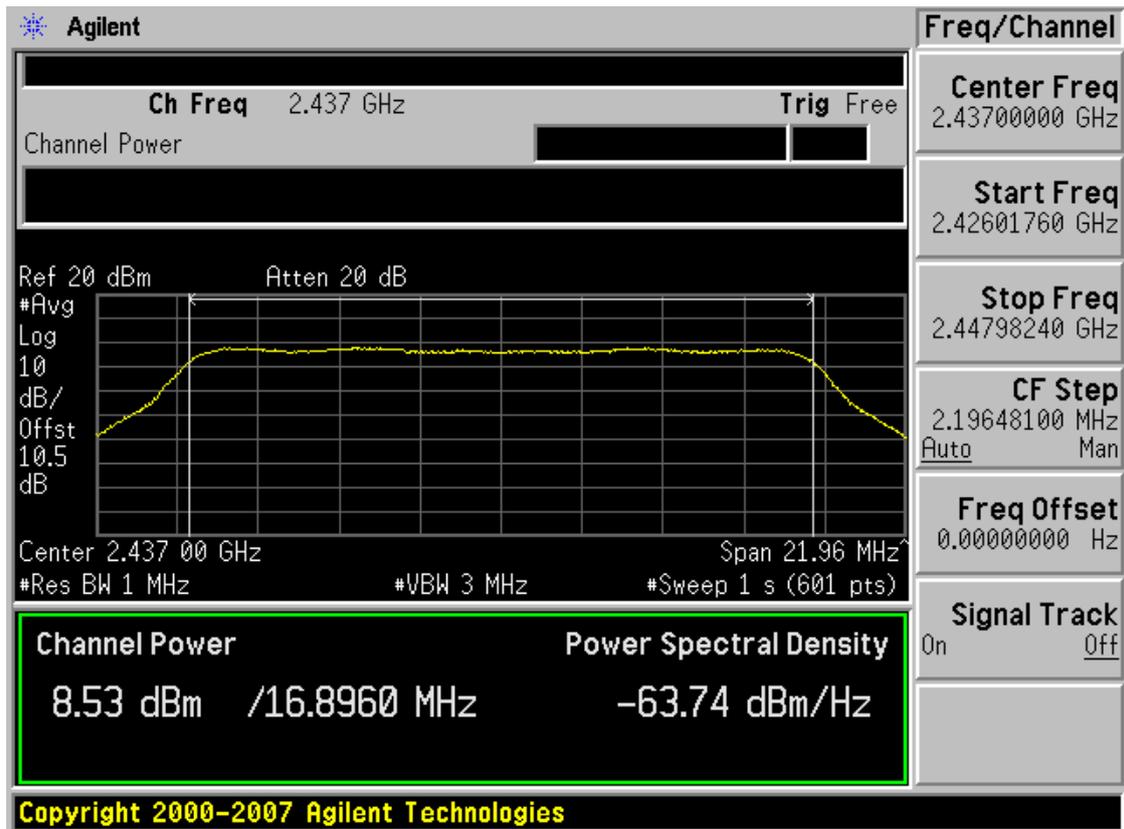
### Conducted Output Power (802.11g-CH 6) 6Mbps



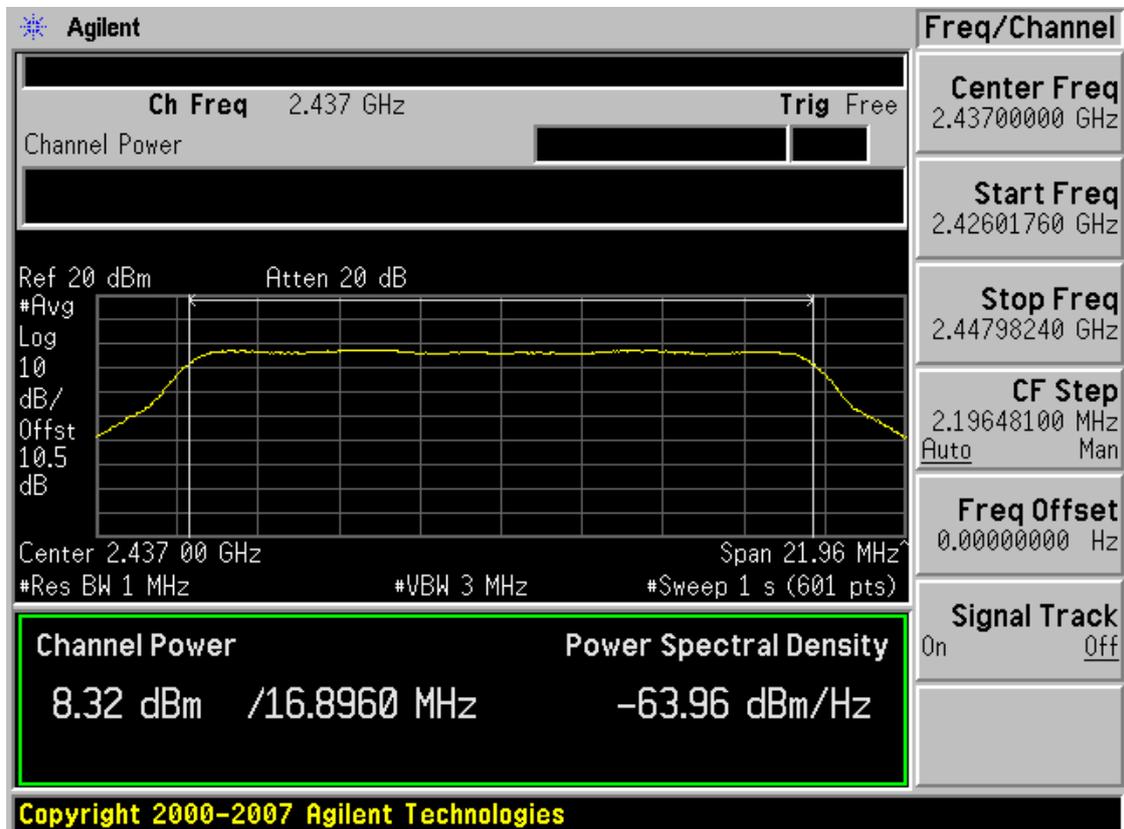
### Conducted Output Power (802.11g-CH 6) 9Mbps



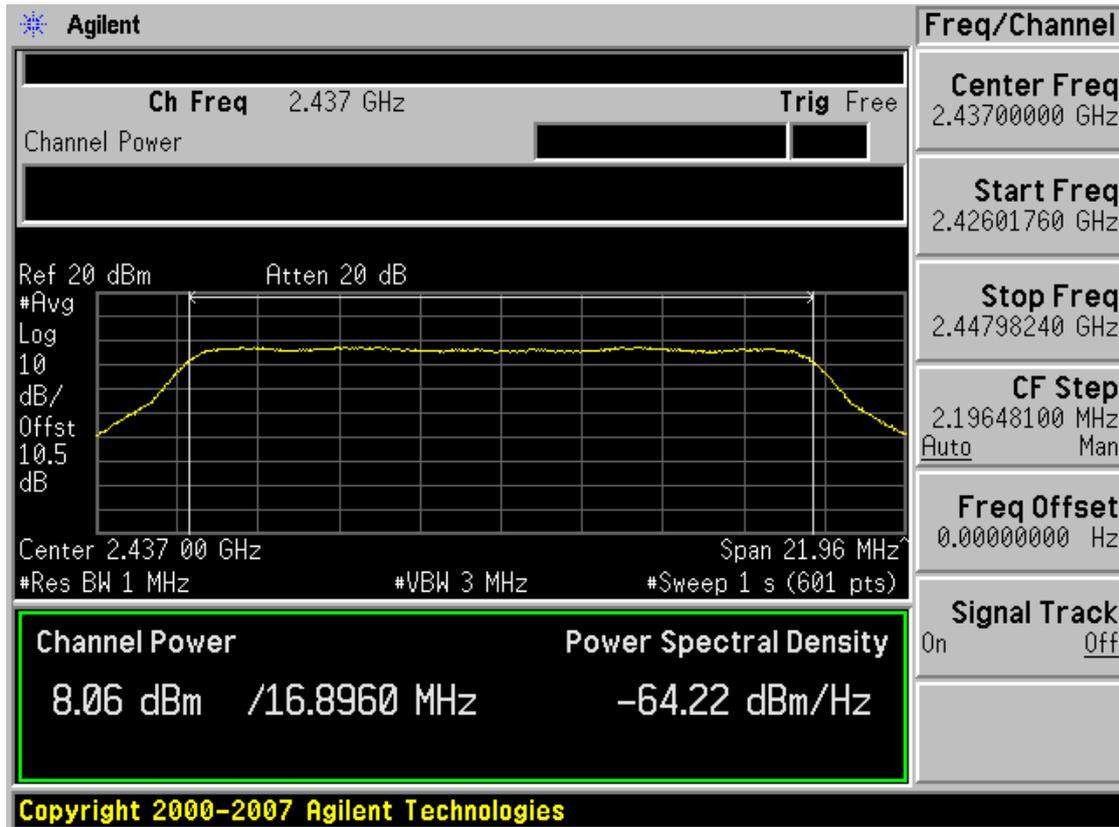
### Conducted Output Power (802.11g-CH 6) 12Mbps



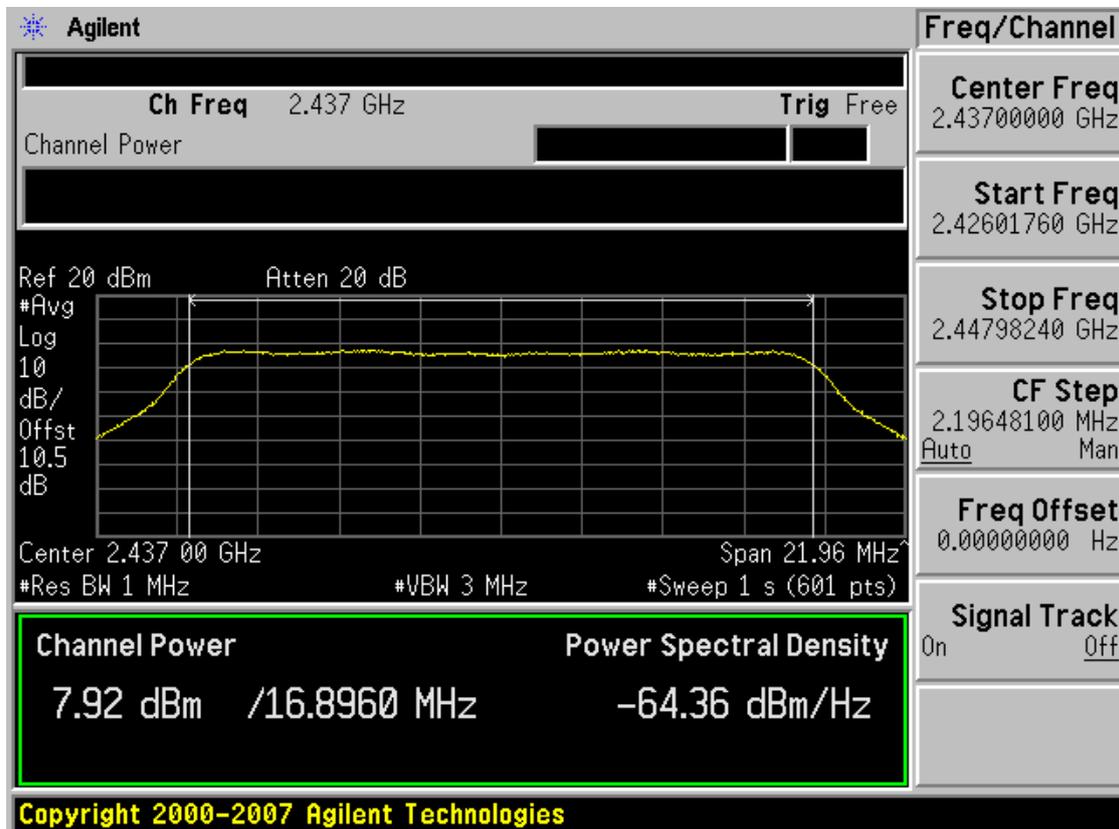
### Conducted Output Power (802.11g-CH 6) 18Mbps



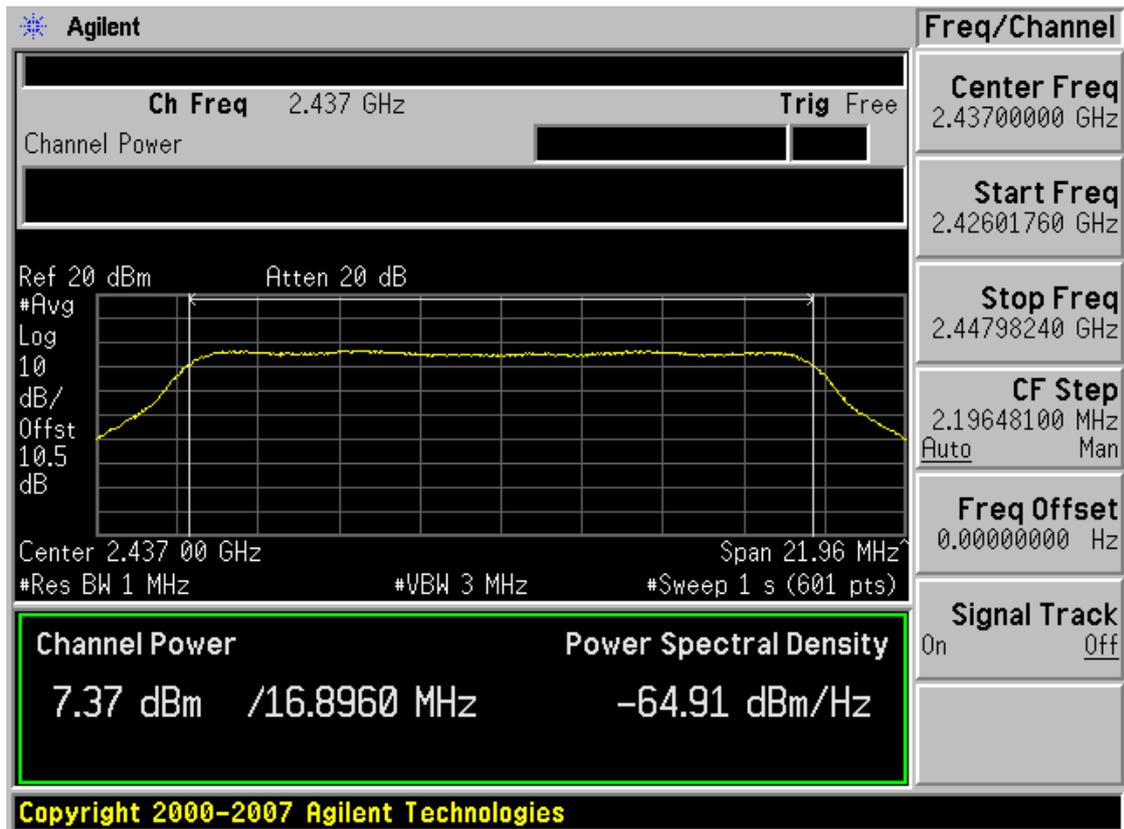
**Conducted Output Power (802.11g-CH 6) 24Mbps**



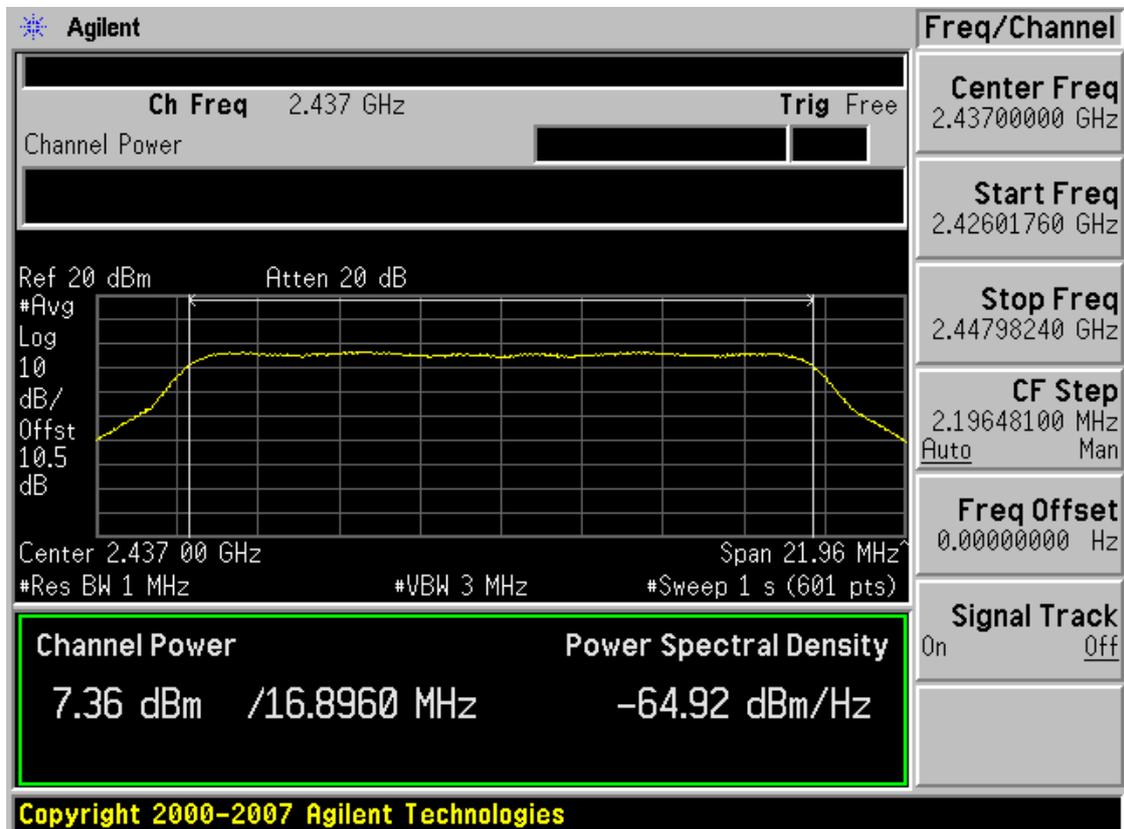
**Conducted Output Power (802.11g-CH 6) 36Mbps**



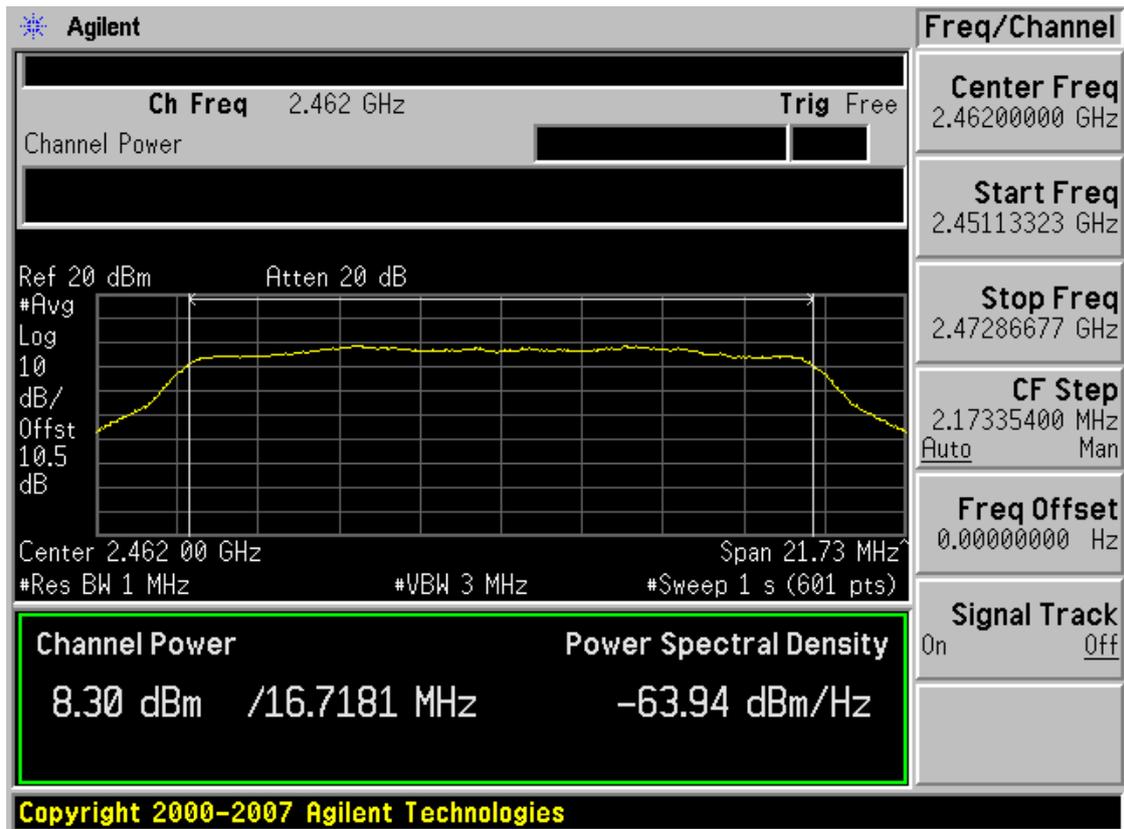
### Conducted Output Power (802.11g-CH 6) 48Mbps



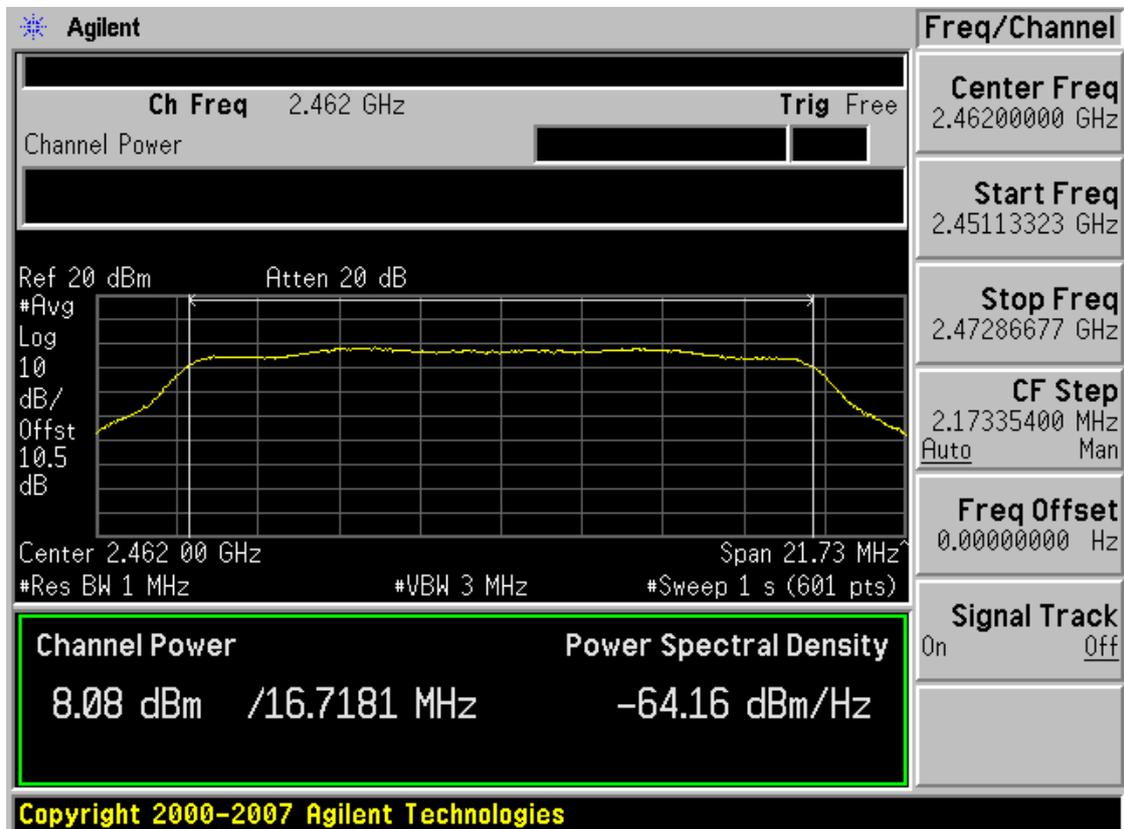
### Conducted Output Power (802.11g-CH 6) 54Mbps



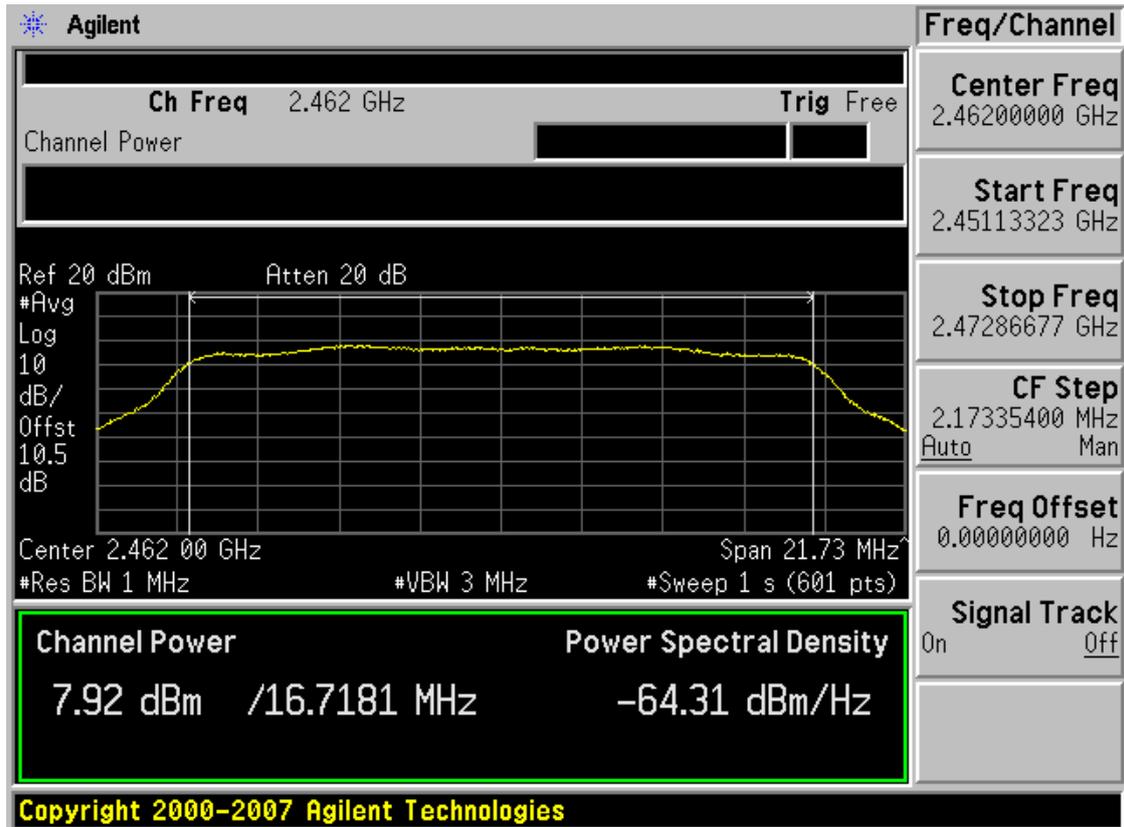
### Conducted Output Power (802.11g-CH 11) 6Mbps



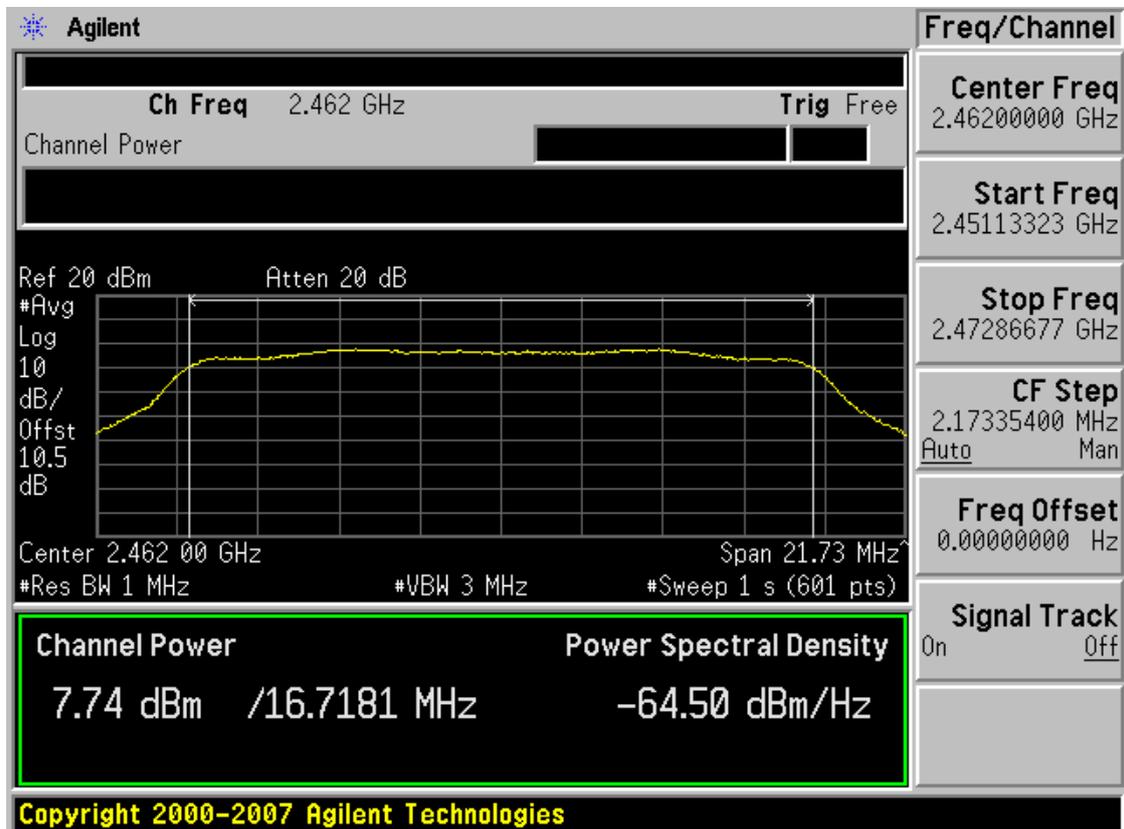
### Conducted Output Power (802.11g-CH 11) 9Mbps



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

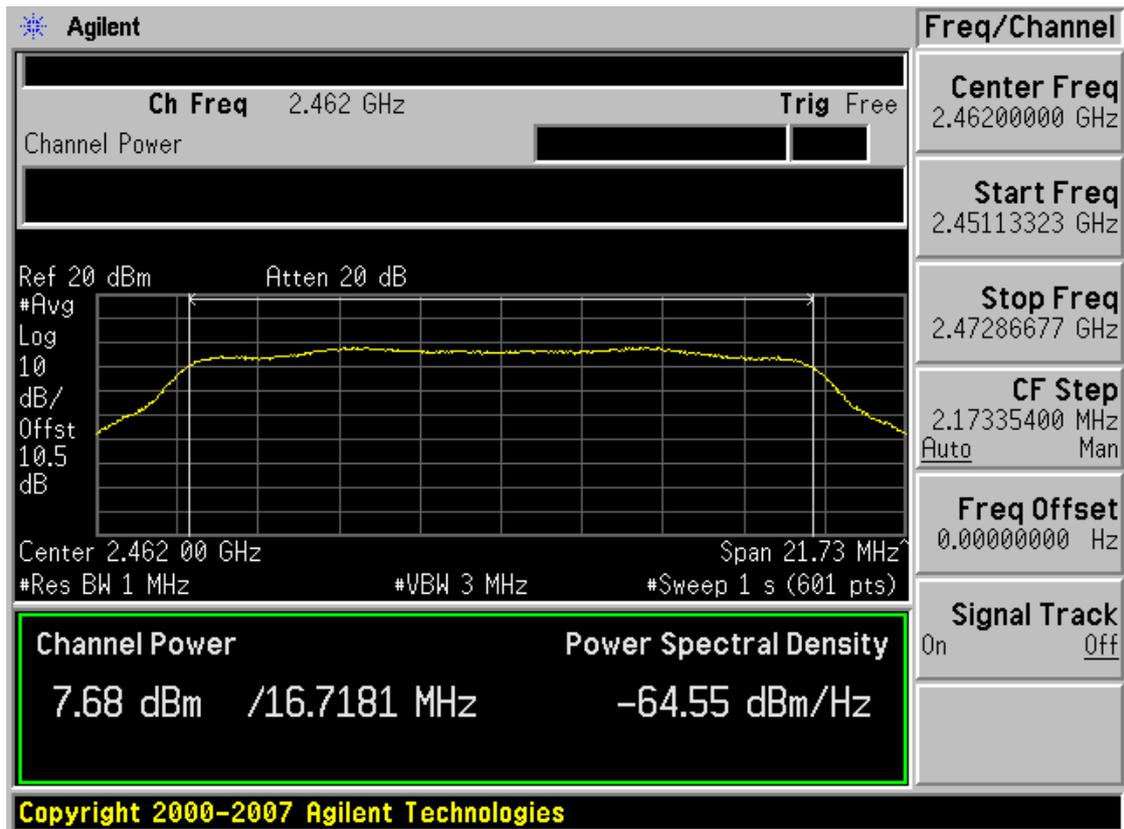


**Conducted Output Power (802.11g-CH 11) 18Mbps**

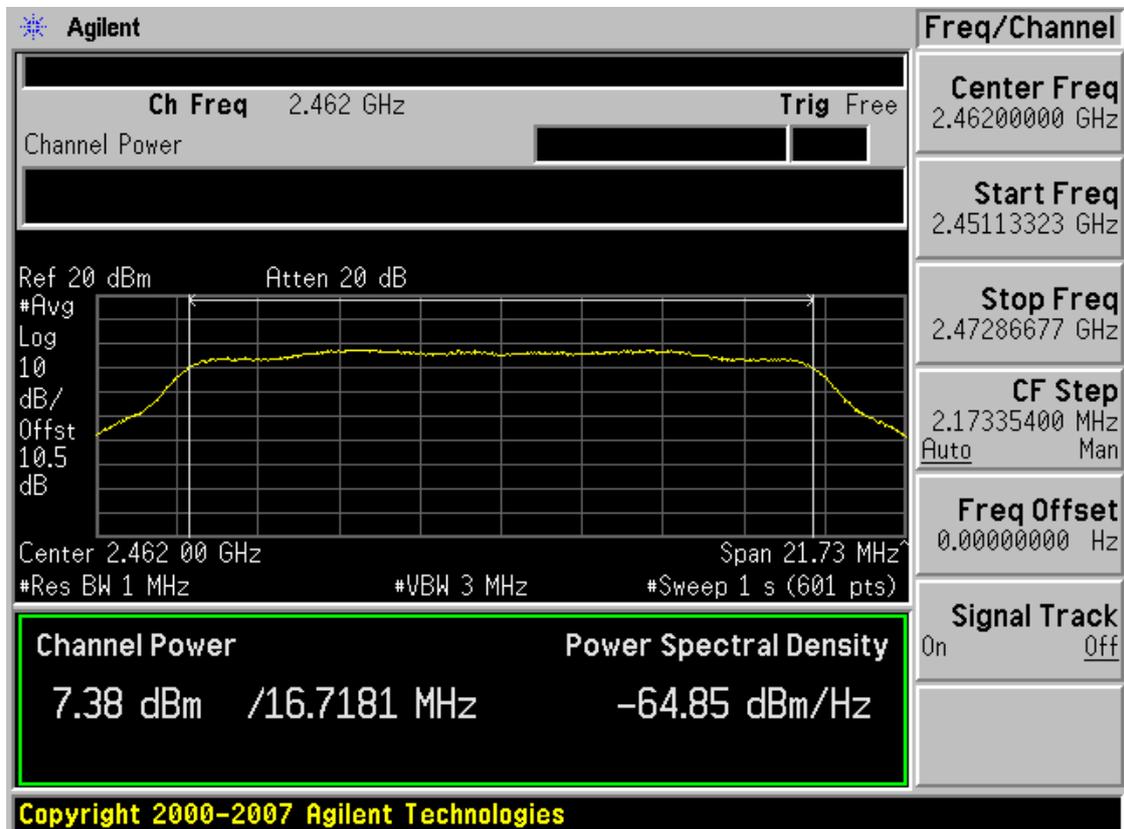


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN		FCC ID: ZNFL04D

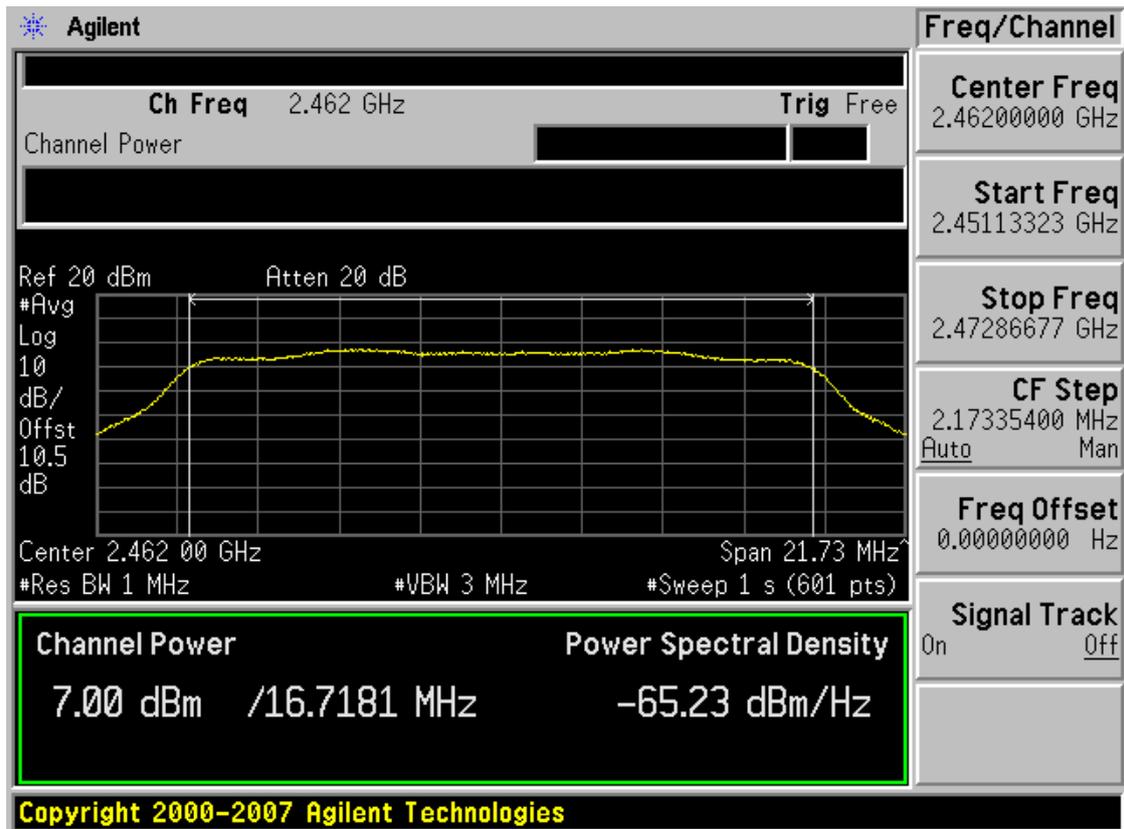
### Conducted Output Power (802.11g-CH 11) 24Mbps



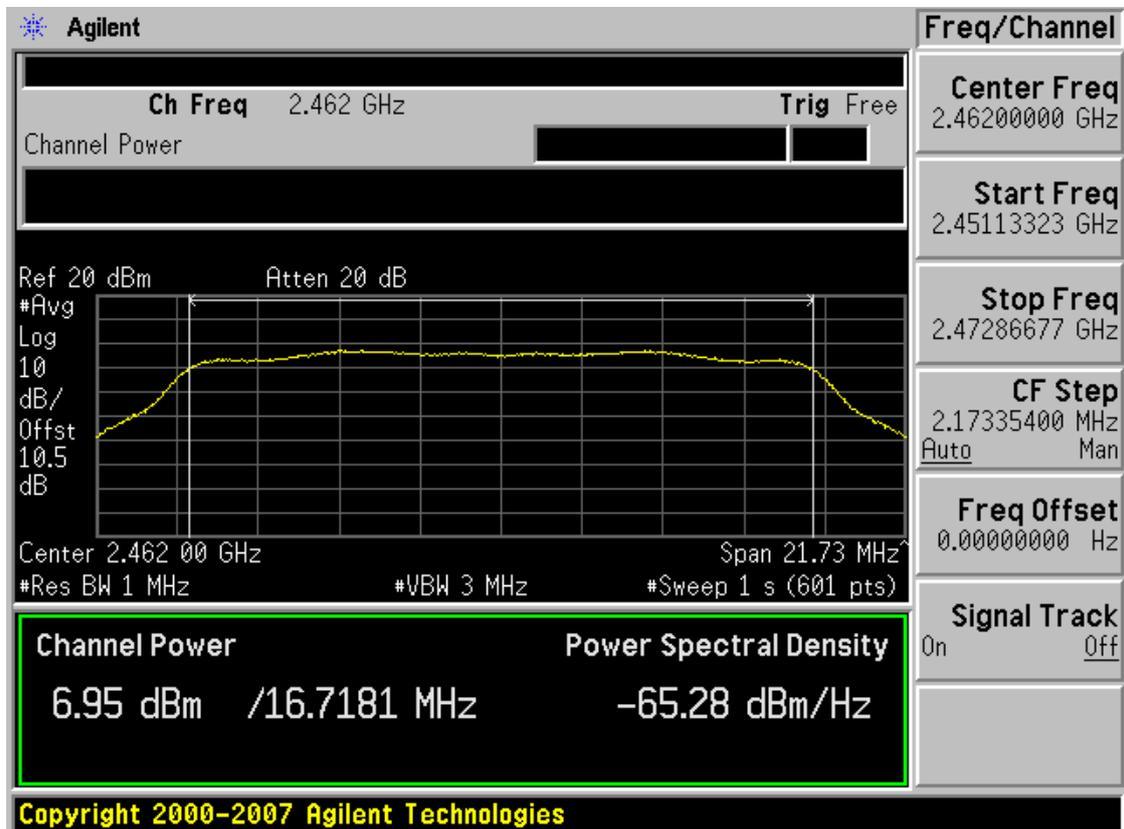
### Conducted Output Power (802.11g-CH 11) 36Mbps



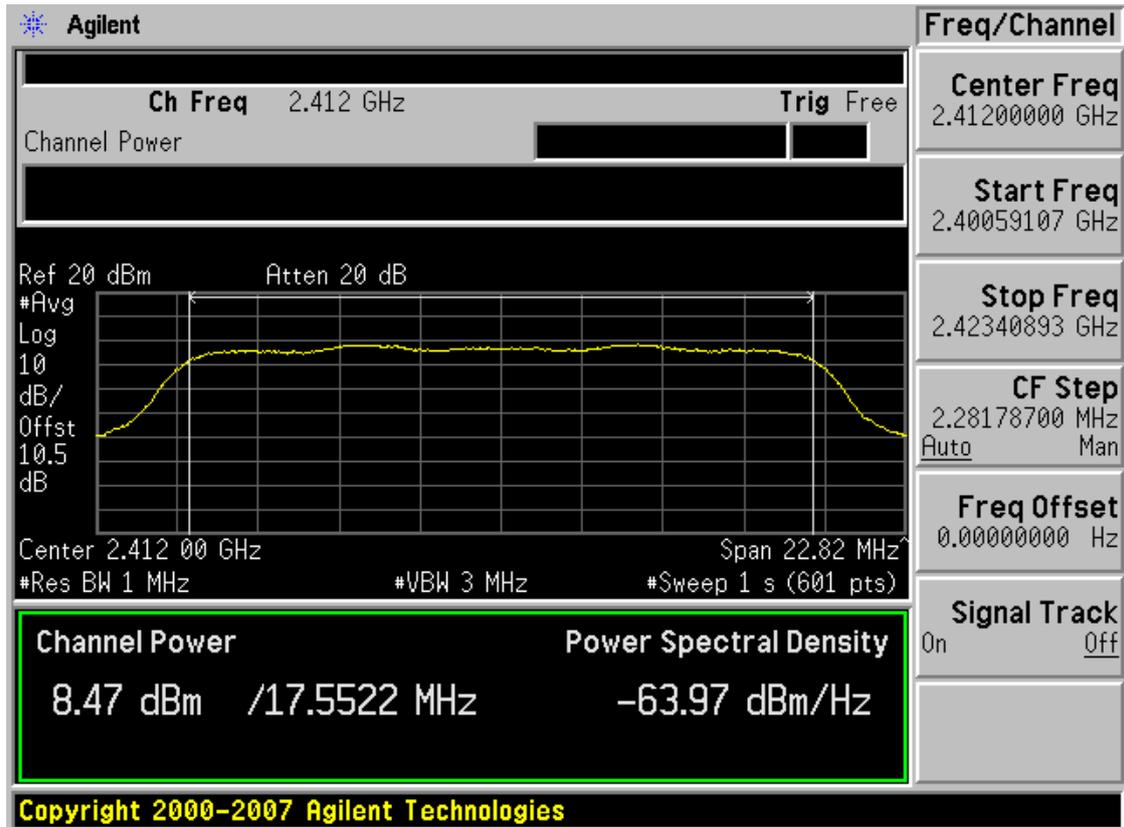
### Conducted Output Power (802.11g-CH 11) 48Mbps



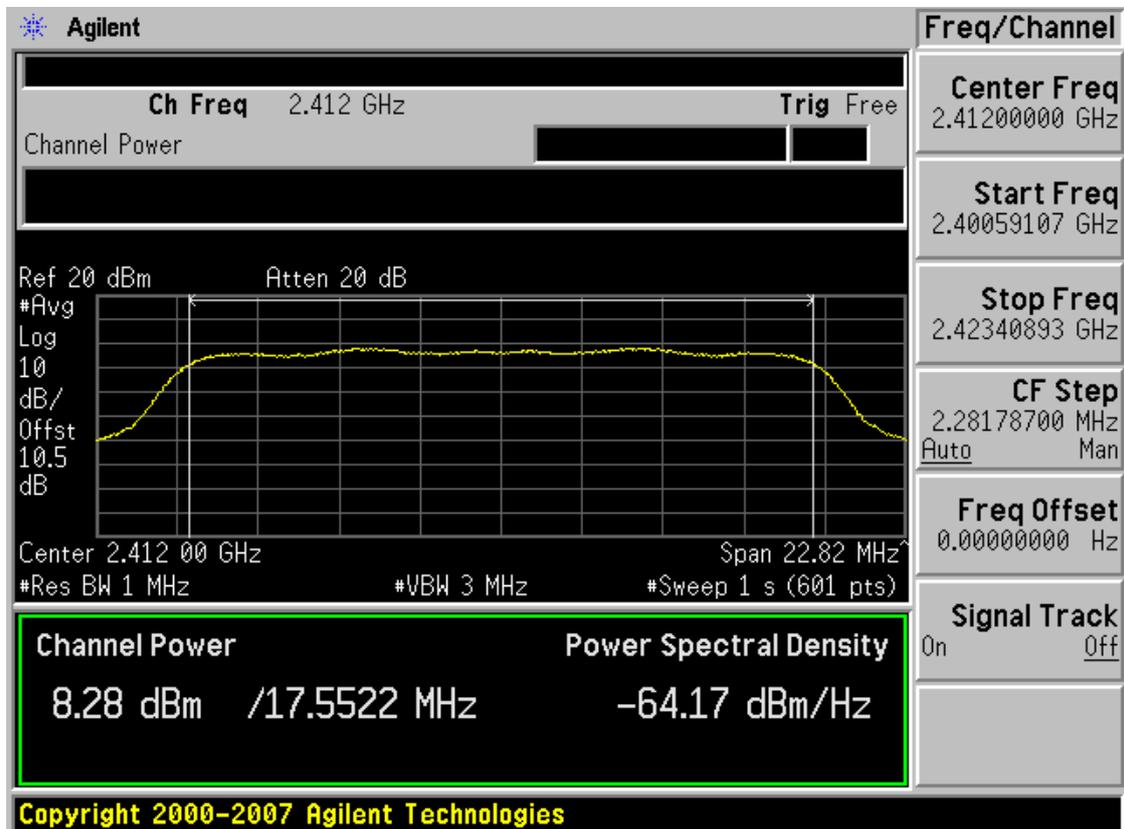
### Conducted Output Power (802.11g-CH 11) 54Mbps



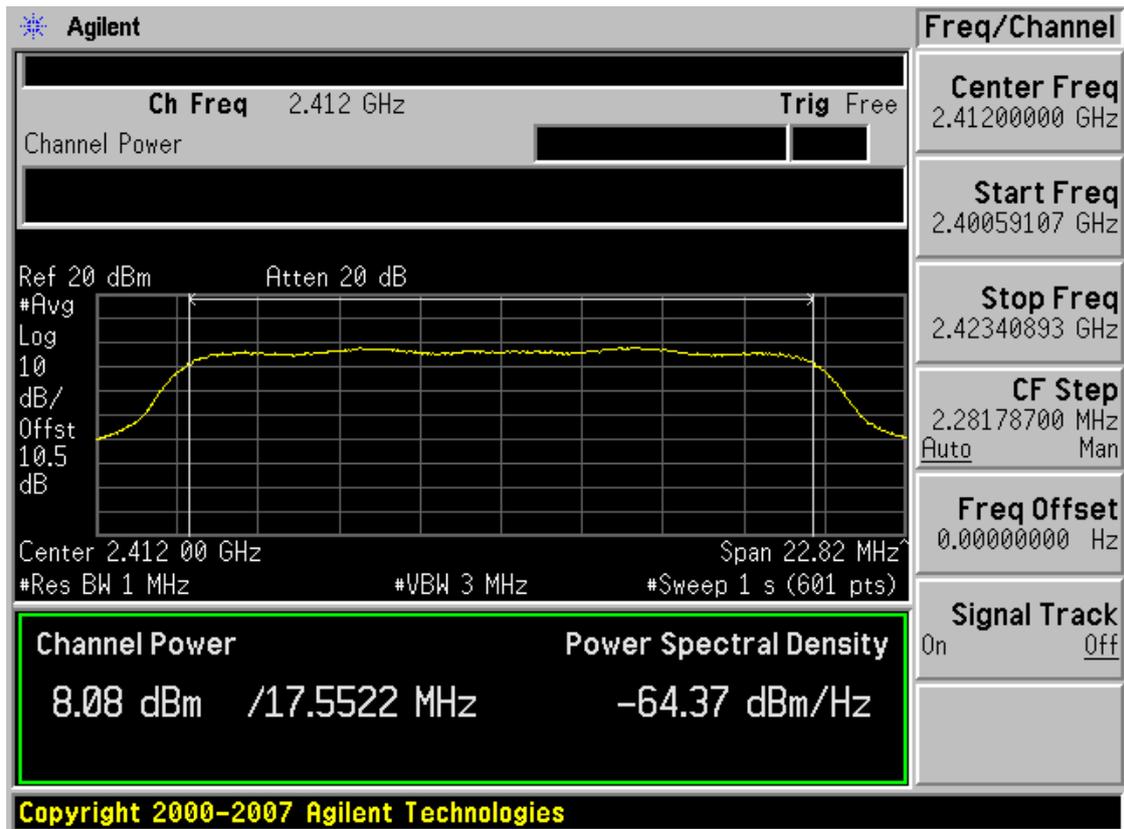
### Conducted Output Power (802.11n-CH 1) 6.5Mbps



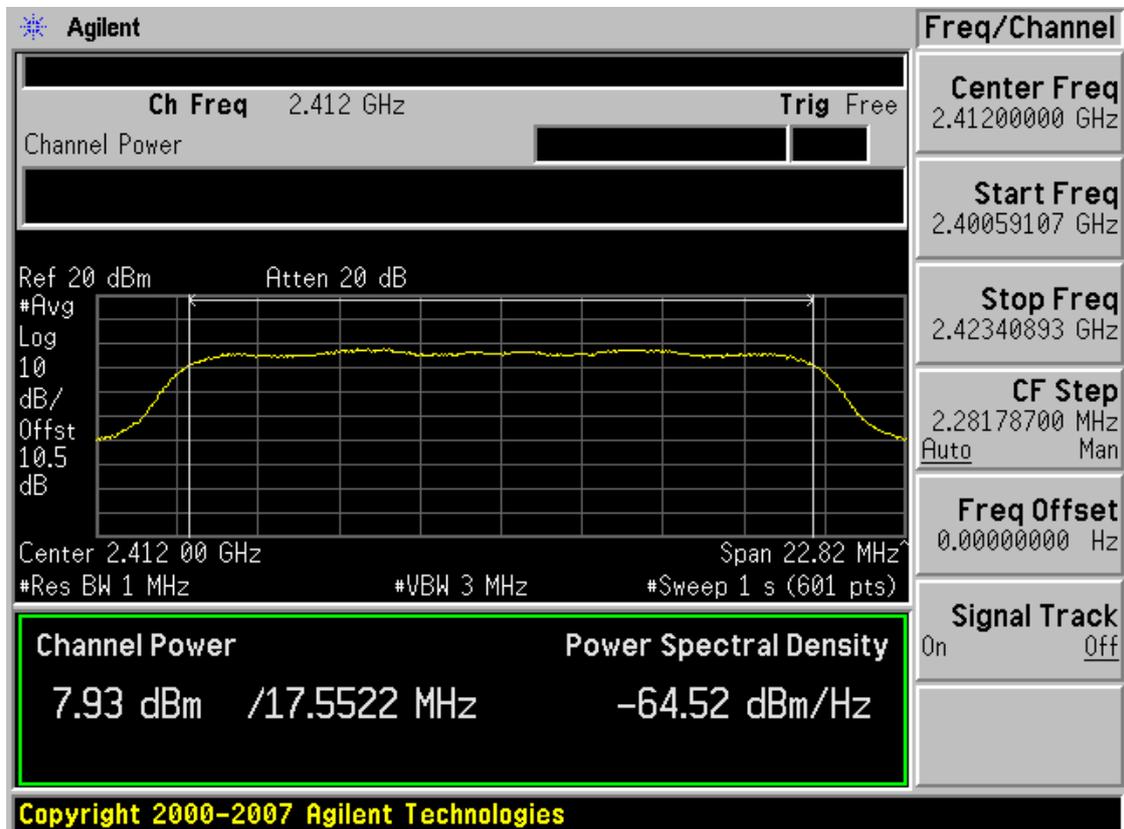
### Conducted Output Power (802.11n-CH 1) 13Mbps



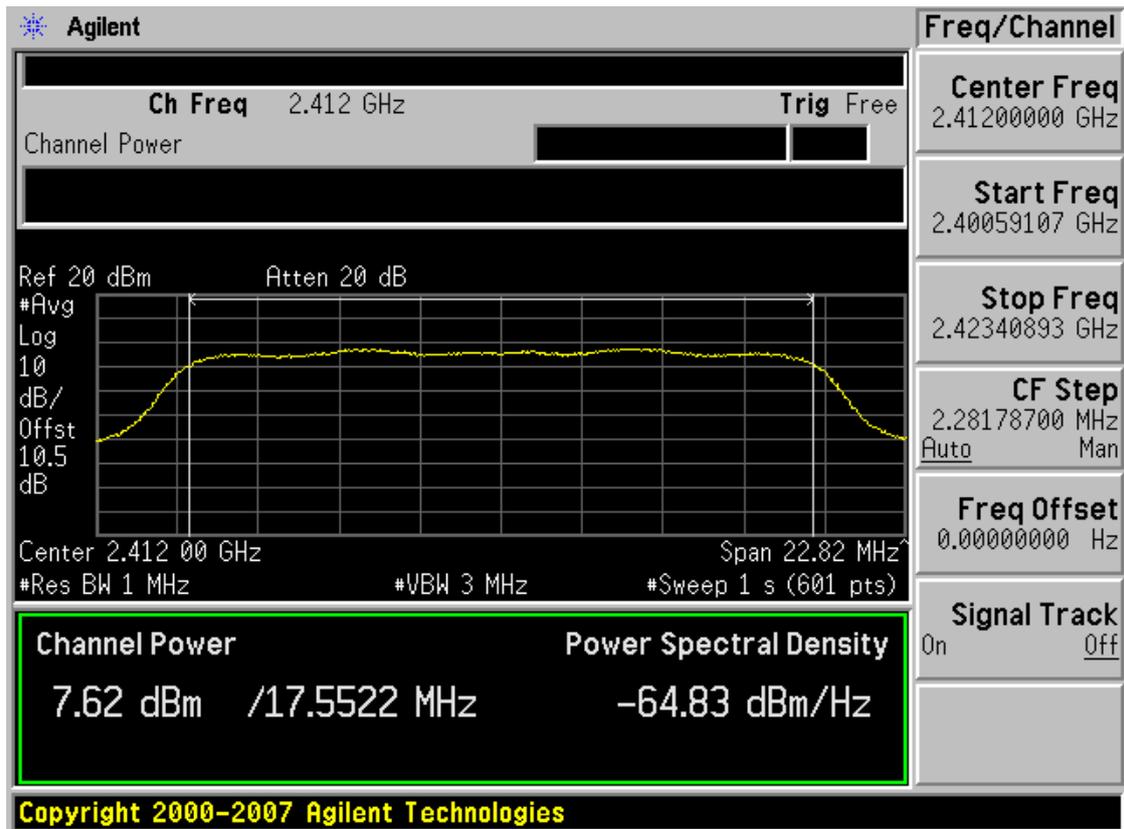
**Conducted Output Power (802.11n-CH 1) 19.5Mbps**



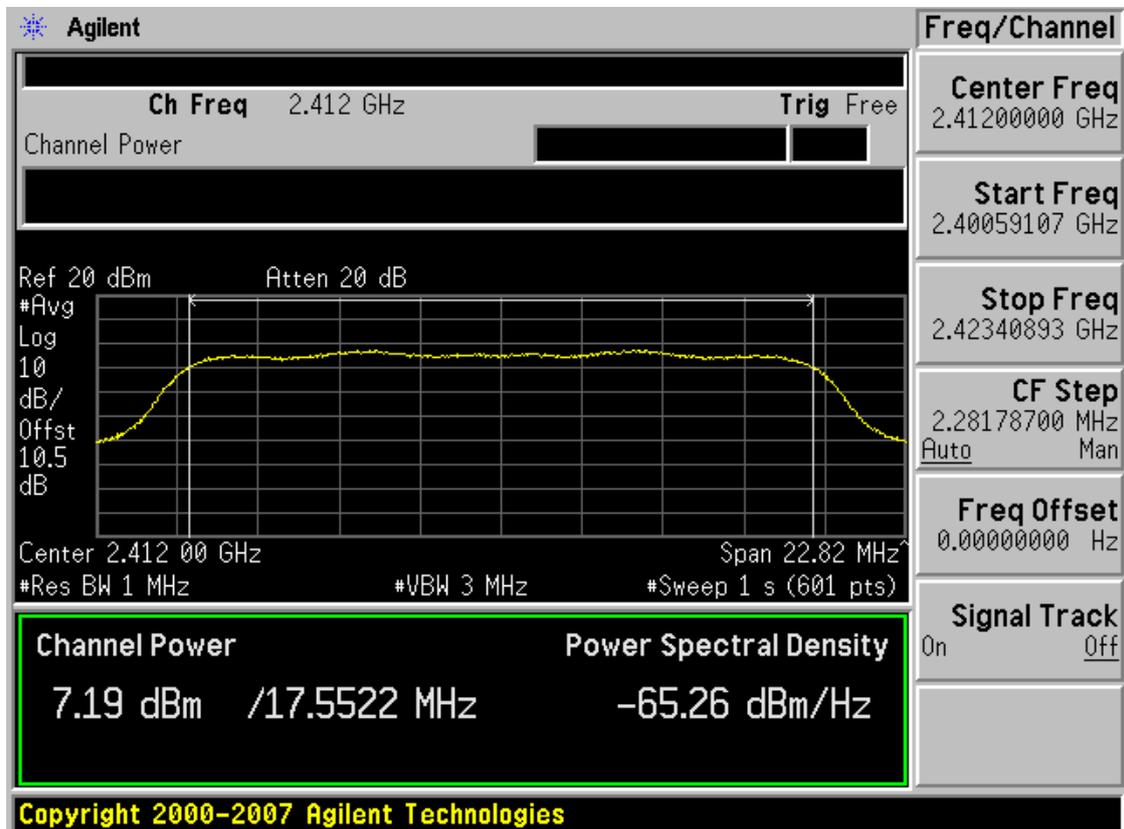
**Conducted Output Power (802.11n-CH 1) 26Mbps**



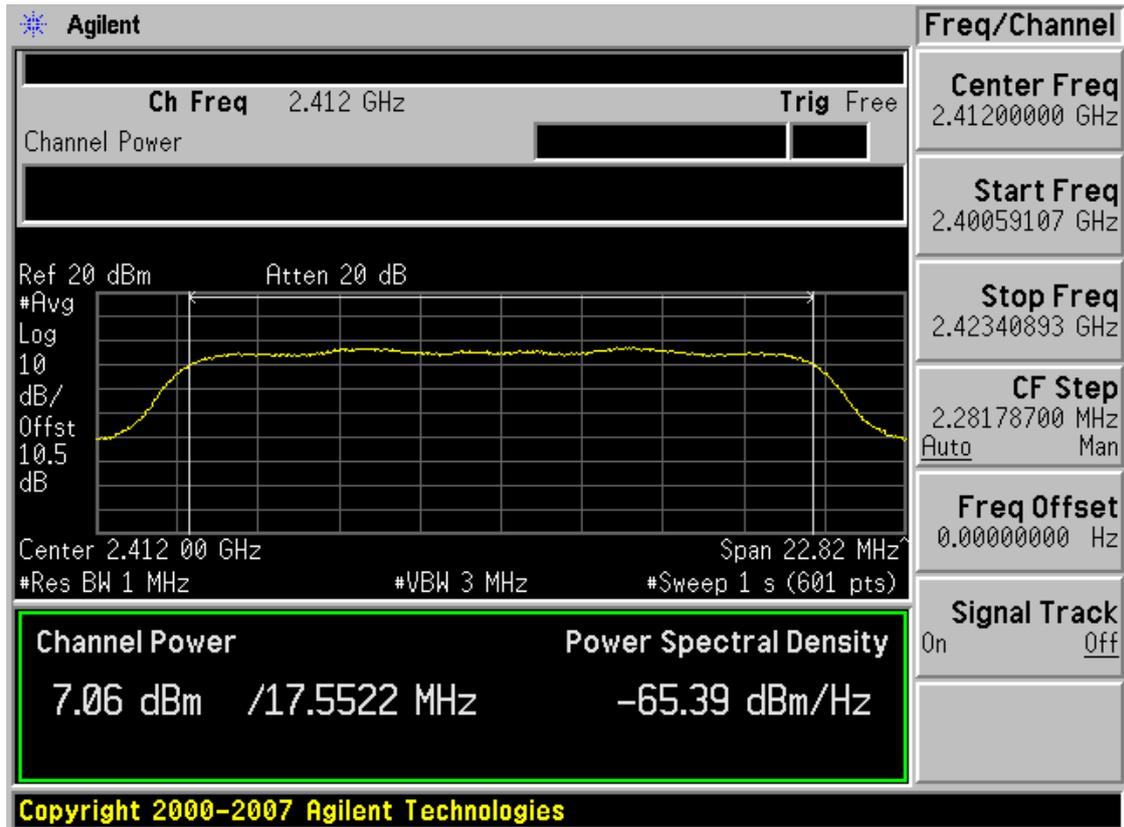
### Conducted Output Power (802.11n-CH 1) 39Mbps



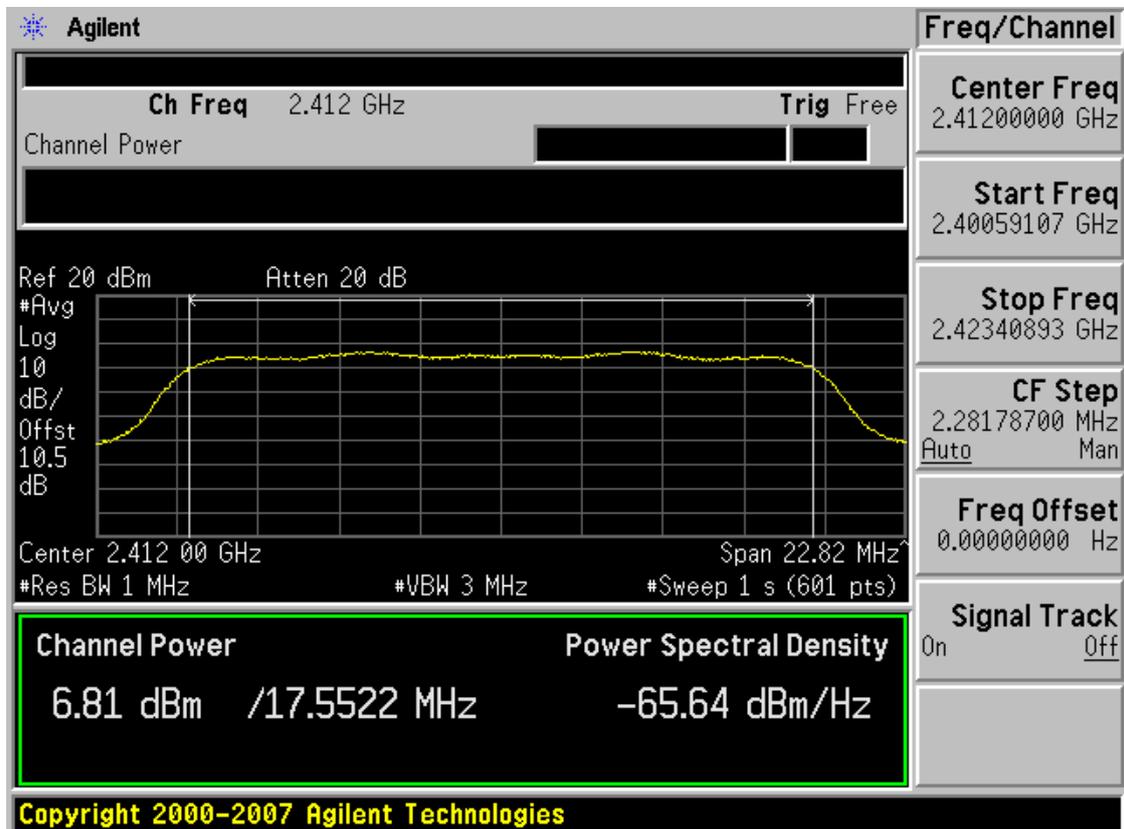
### Conducted Output Power (802.11n-CH 1) 52Mbps



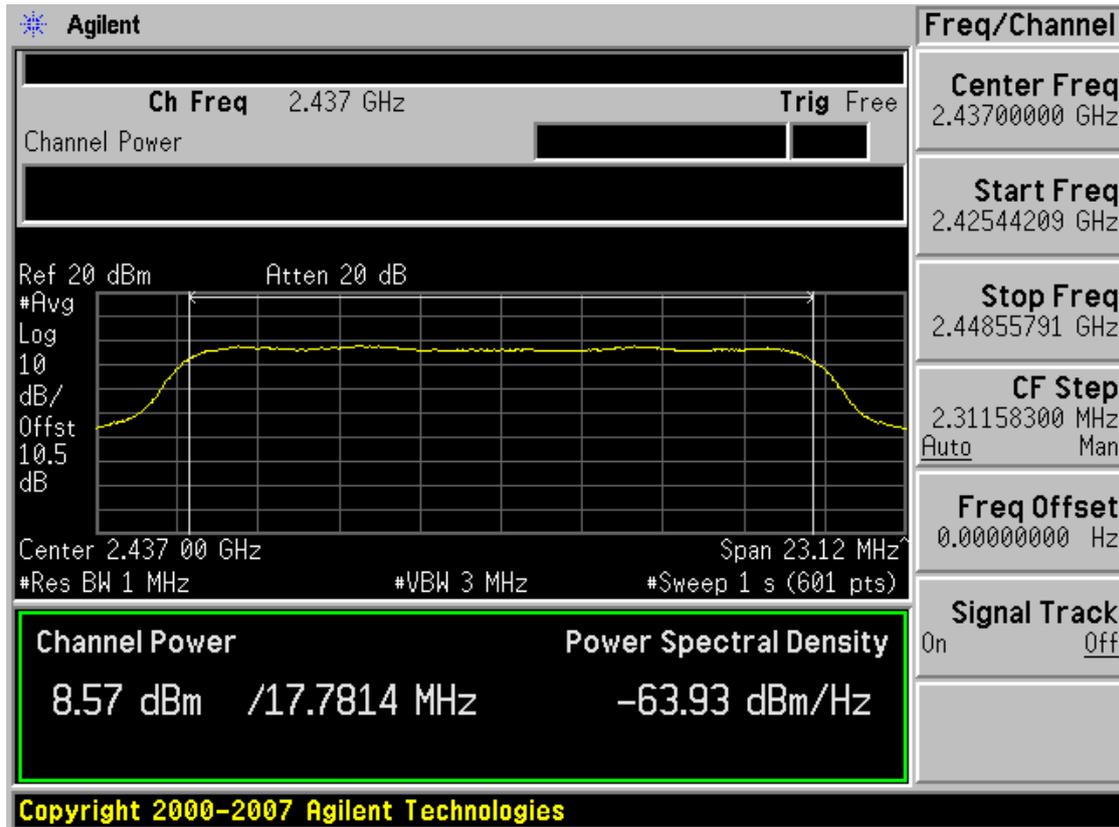
**Conducted Output Power (802.11n-CH 1) 58.5Mbps**



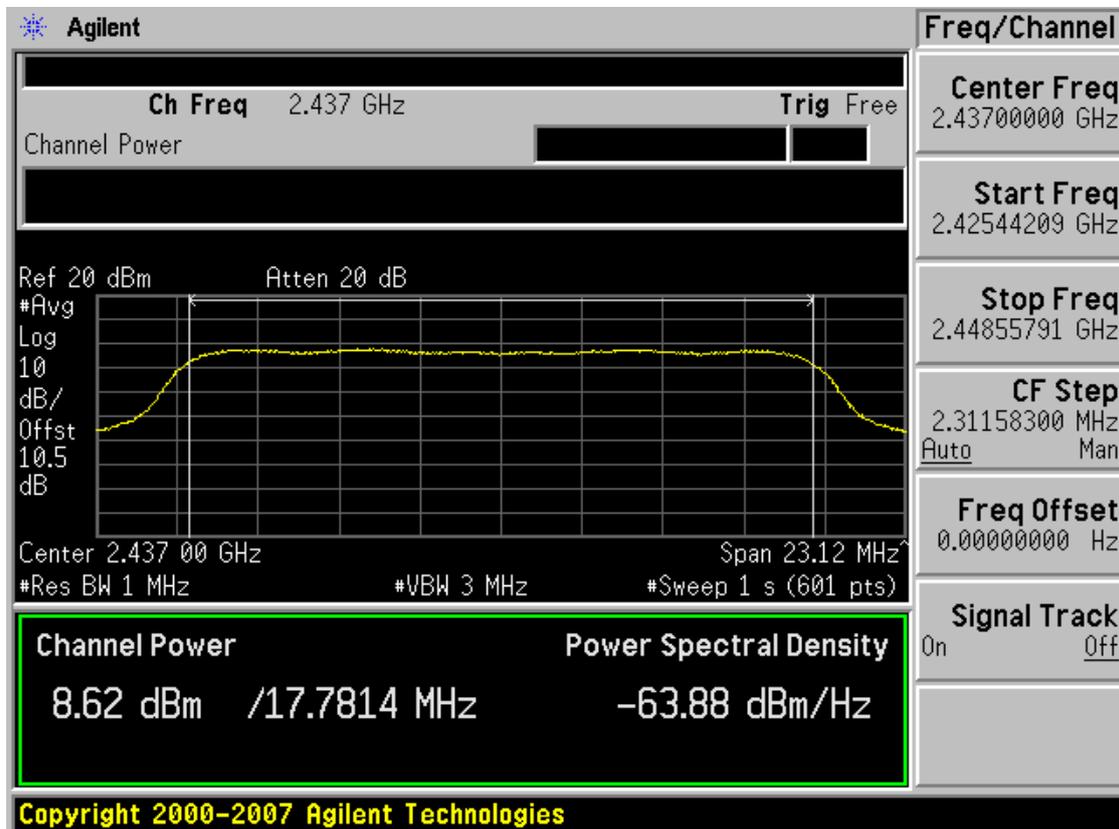
**Conducted Output Power (802.11n-CH 1) 65Mbps**



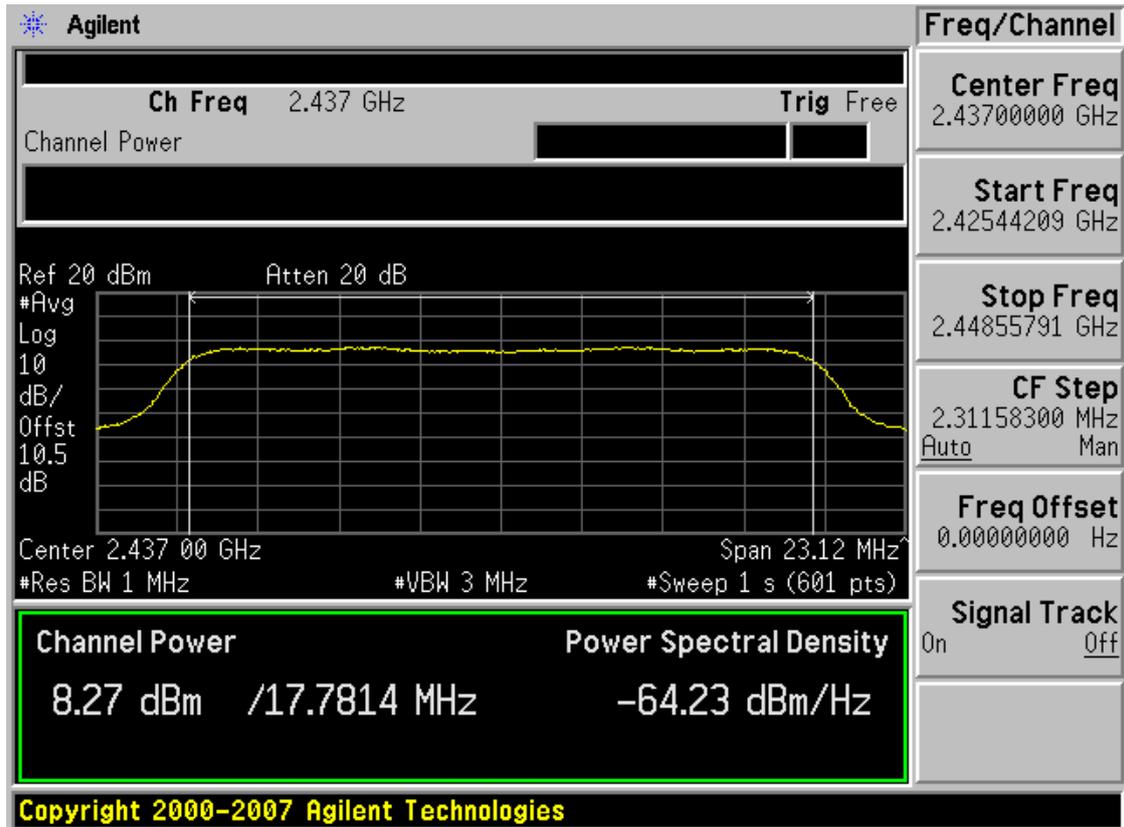
### Conducted Output Power (802.11n-CH 6) 6.5Mbps



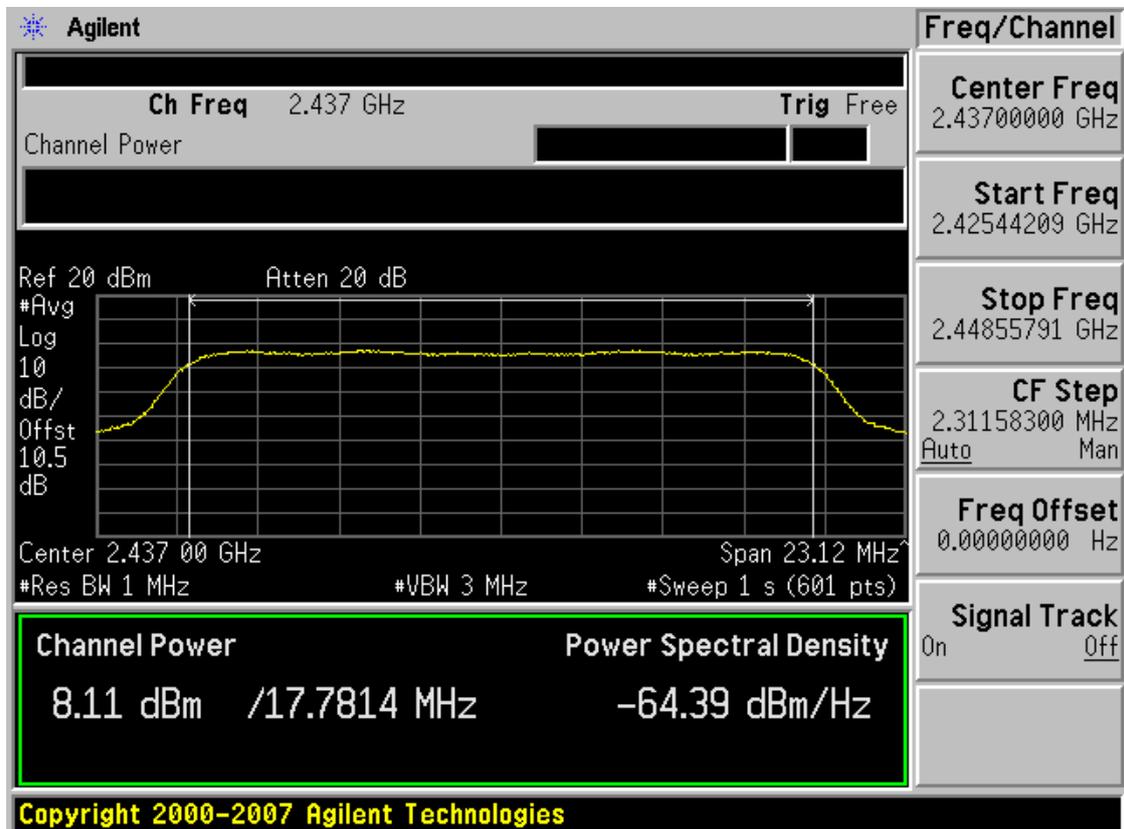
### Conducted Output Power (802.11n-CH 6) 13Mbps



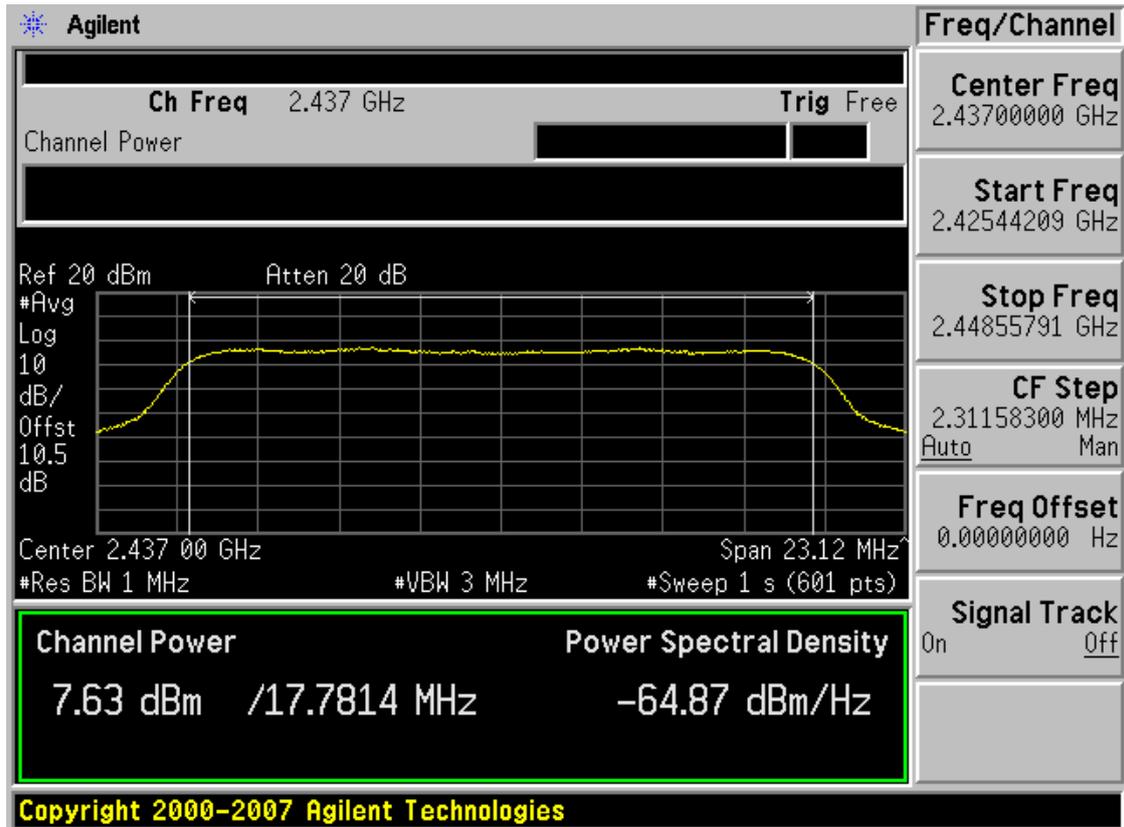
### Conducted Output Power (802.11n-CH 6) 19.5Mbps



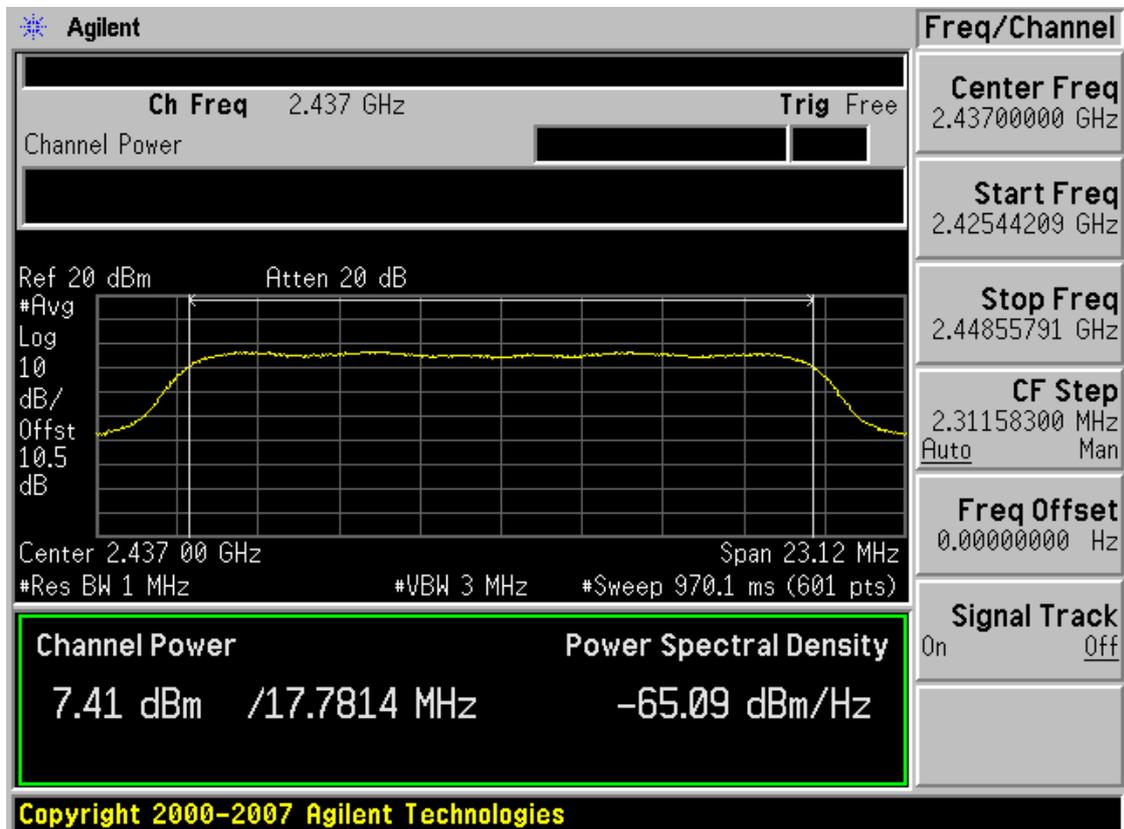
### Conducted Output Power (802.11n-CH 6) 26Mbps



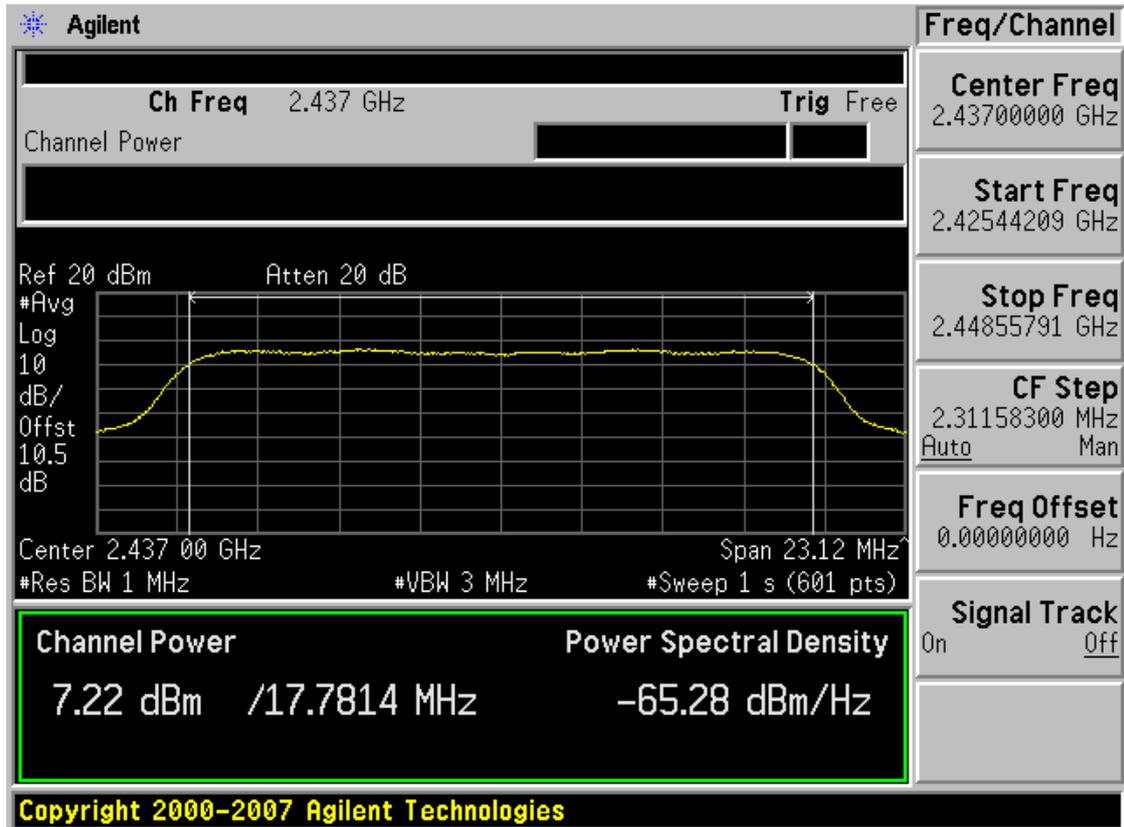
**Conducted Output Power (802.11n-CH 6) 39Mbps**



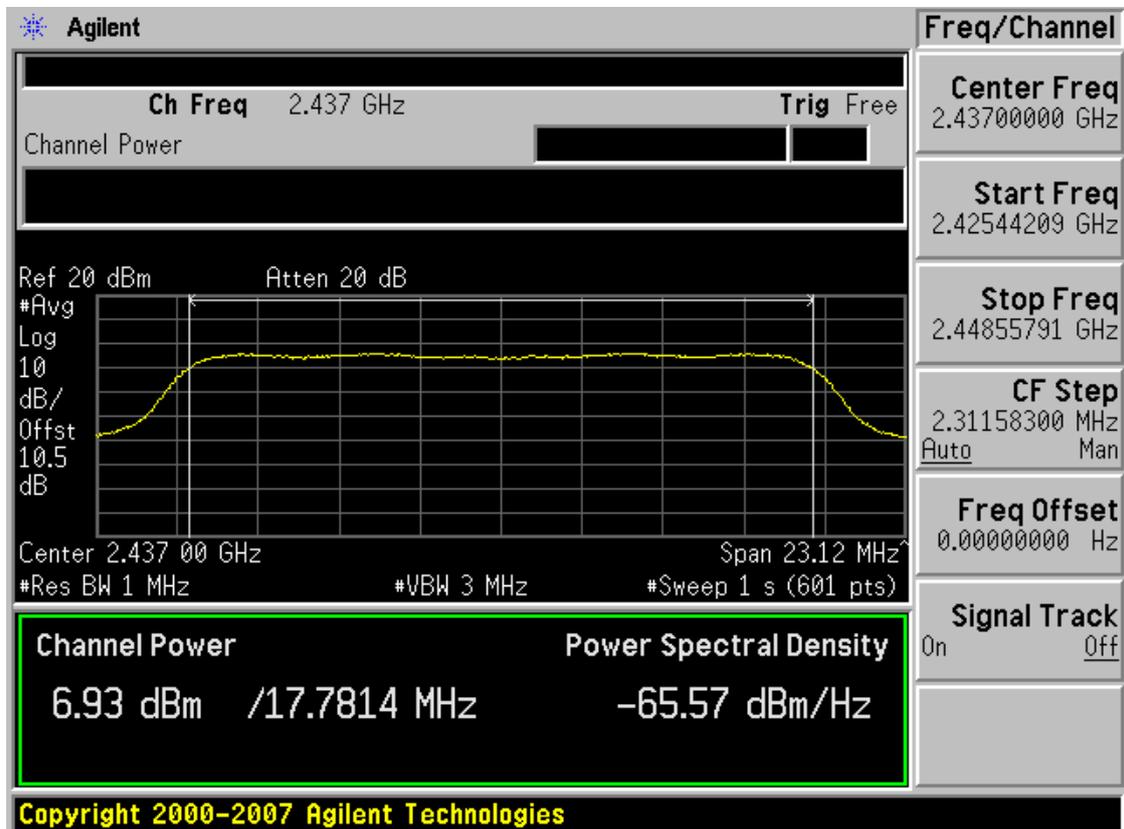
**Conducted Output Power (802.11n-CH 6) 52Mbps**



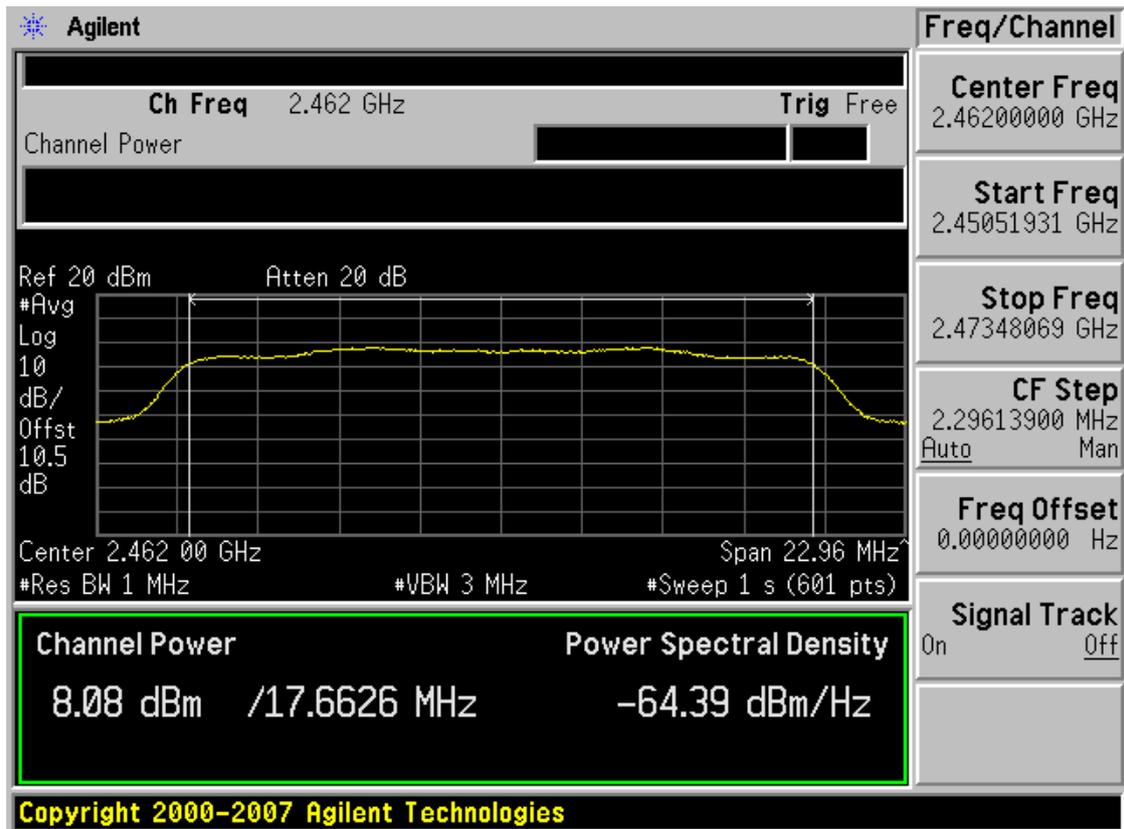
**Conducted Output Power (802.11n-CH 6) 58.5Mbps**



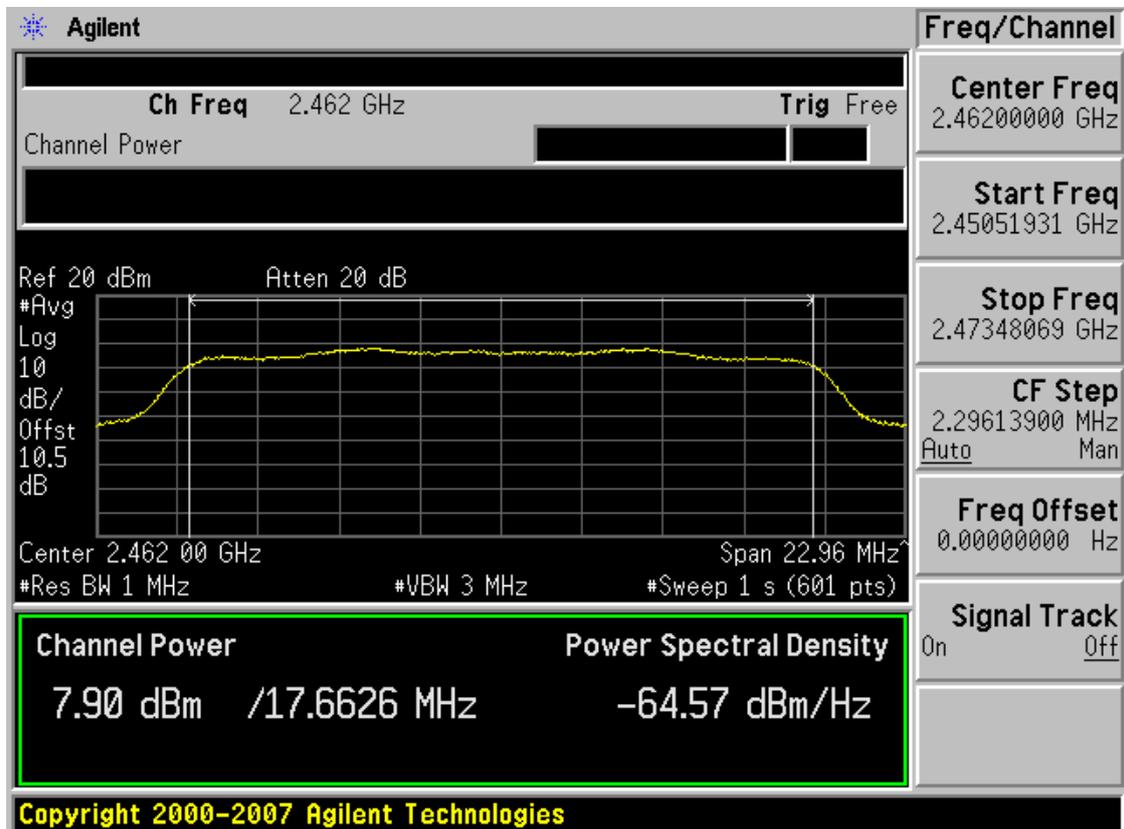
**Conducted Output Power (802.11n-CH 6) 65Mbps**



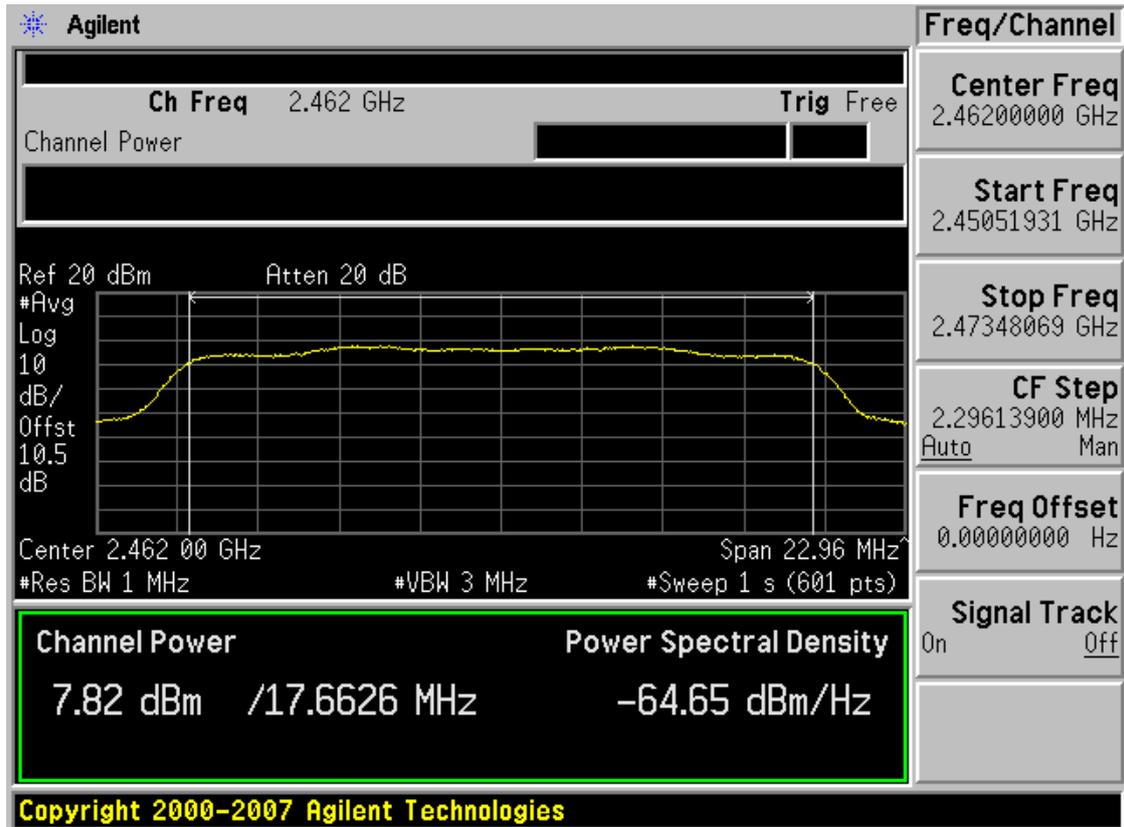
### Conducted Output Power (802.11n-CH 11) 6.5Mbps



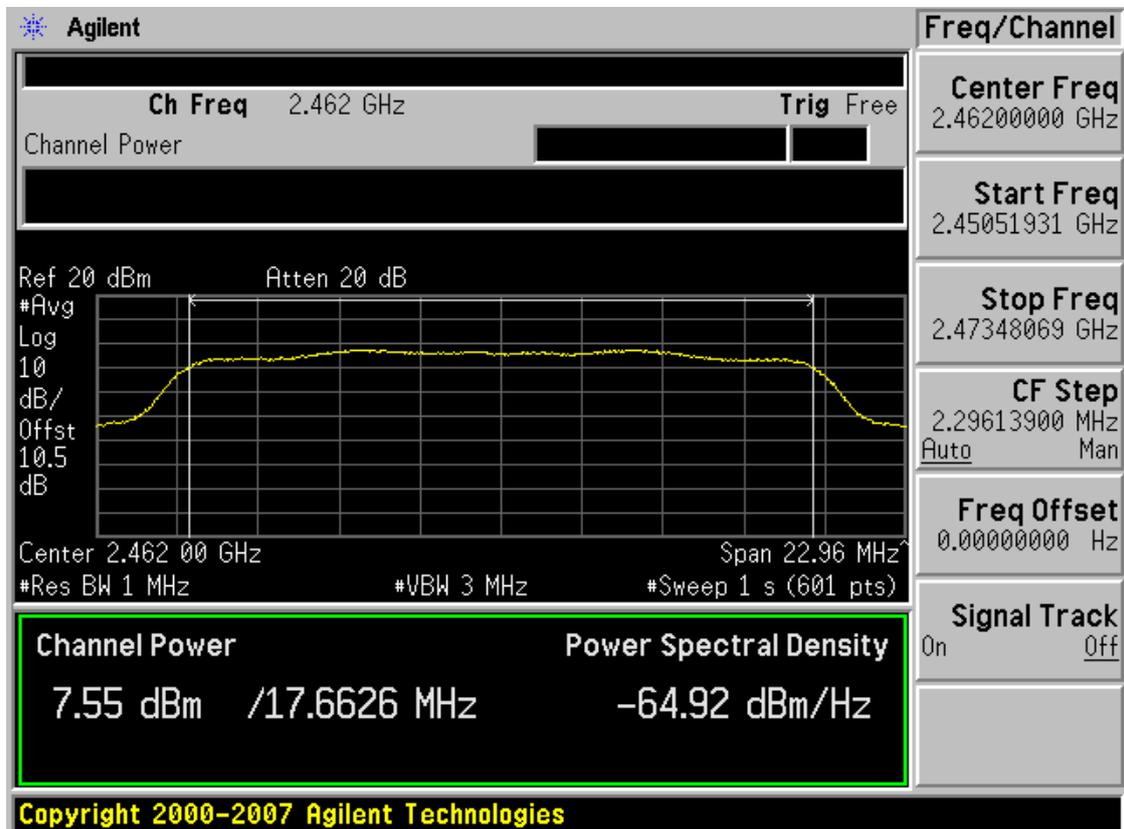
### Conducted Output Power (802.11n-CH 11) 13Mbps



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

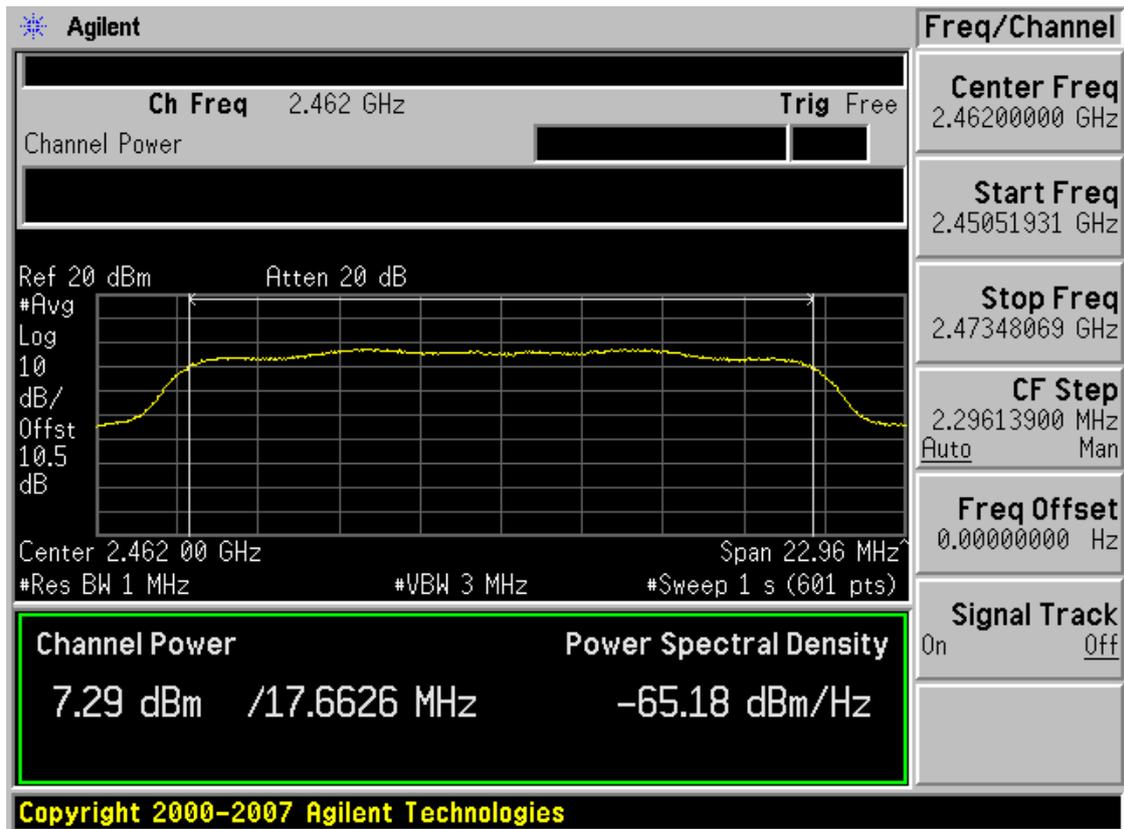


### Conducted Output Power (802.11n-CH 11) 26Mbps

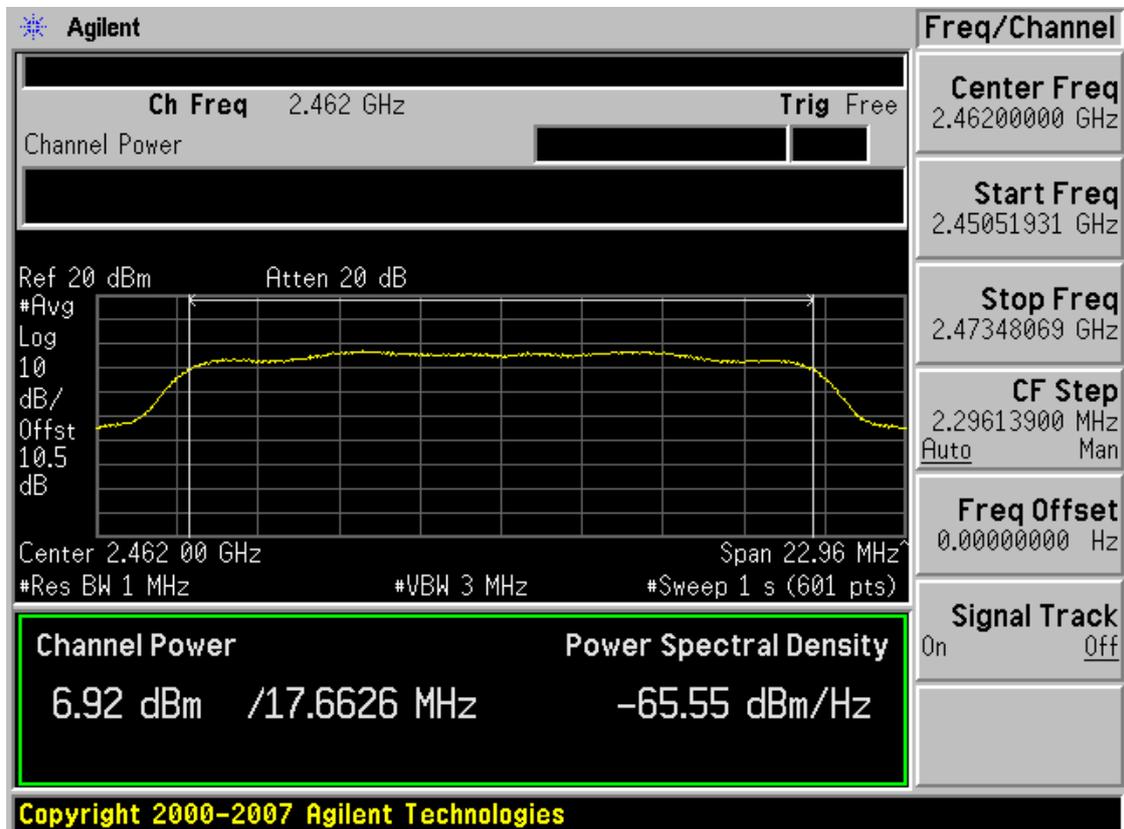


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D

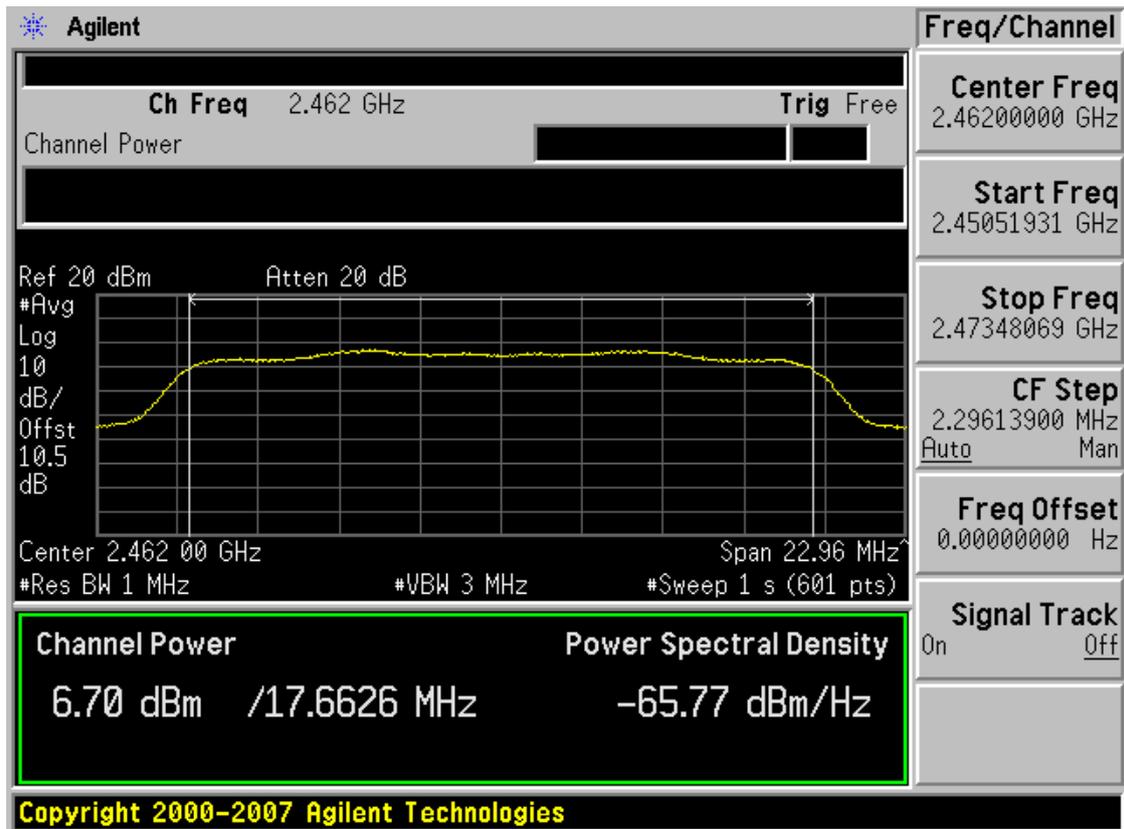
### Conducted Output Power (802.11n-CH 11) 39Mbps



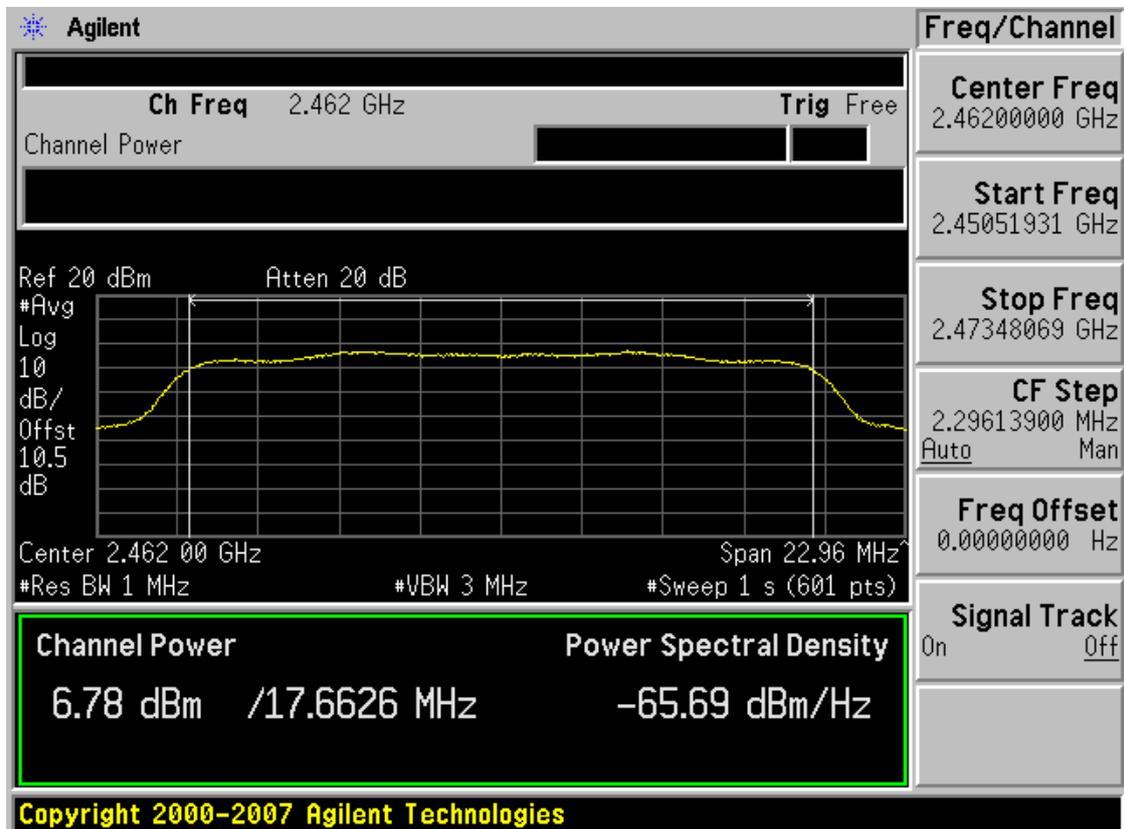
### Conducted Output Power (802.11n-CH 11) 52Mbps



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



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



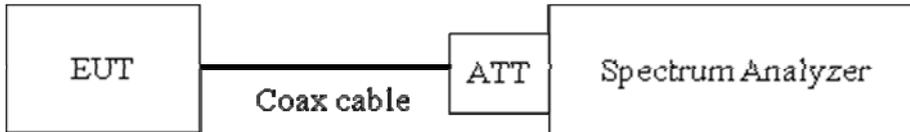
### 8.3 POWER SPECTRAL DENSITY (802.11b/g/n)

#### 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
3. VBW = 3 kHz
4. Sweep = 100 sec
5. Detector Mode = Peak

#### ■ Sample Calculation

$$\text{PSD} = \text{Reading Value} + \text{ATT loss} + \text{Cable loss}(1 \text{ ea})$$

$$= -5 \text{ dBm} + 10 \text{ dB} + 0.8 \text{ dB} = 5.8 \text{ dBm}$$

Where) Spectrum offset = ATT loss + Cable loss(1 ea)

Note: Power values in plot is applied offset.

FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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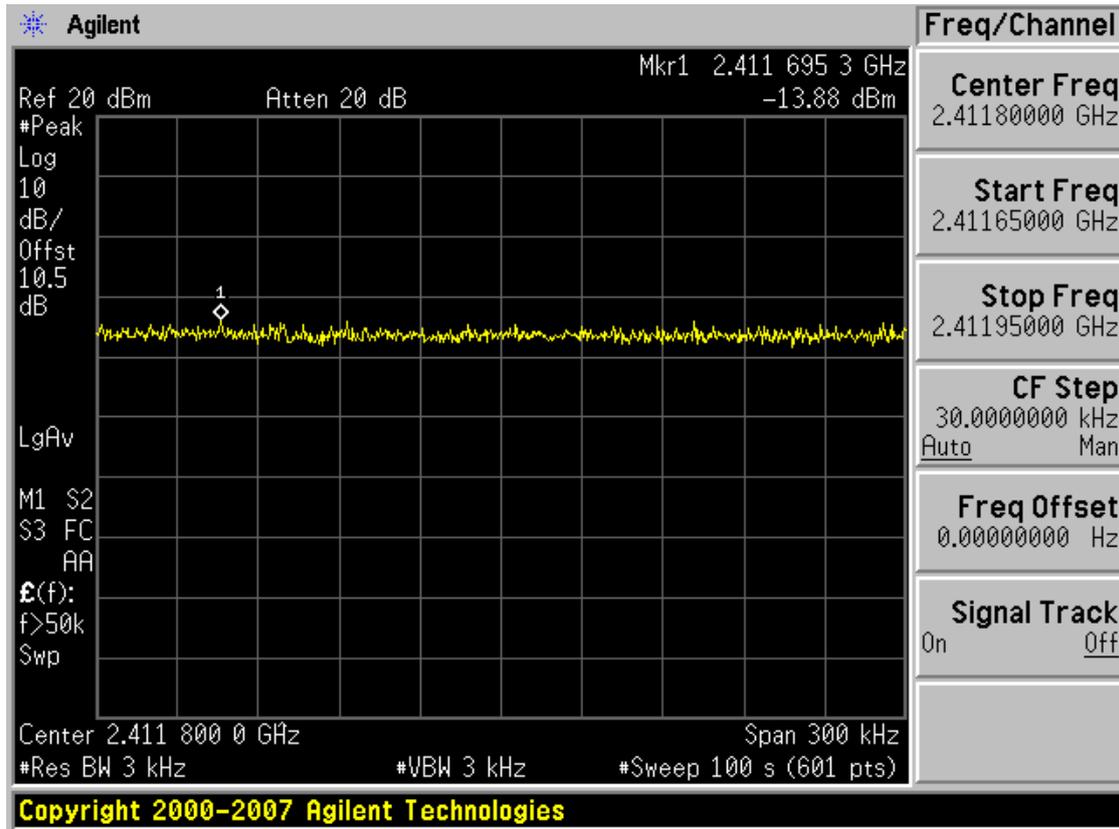
■ TEST RESULTS

Conducted Power Density Measurements

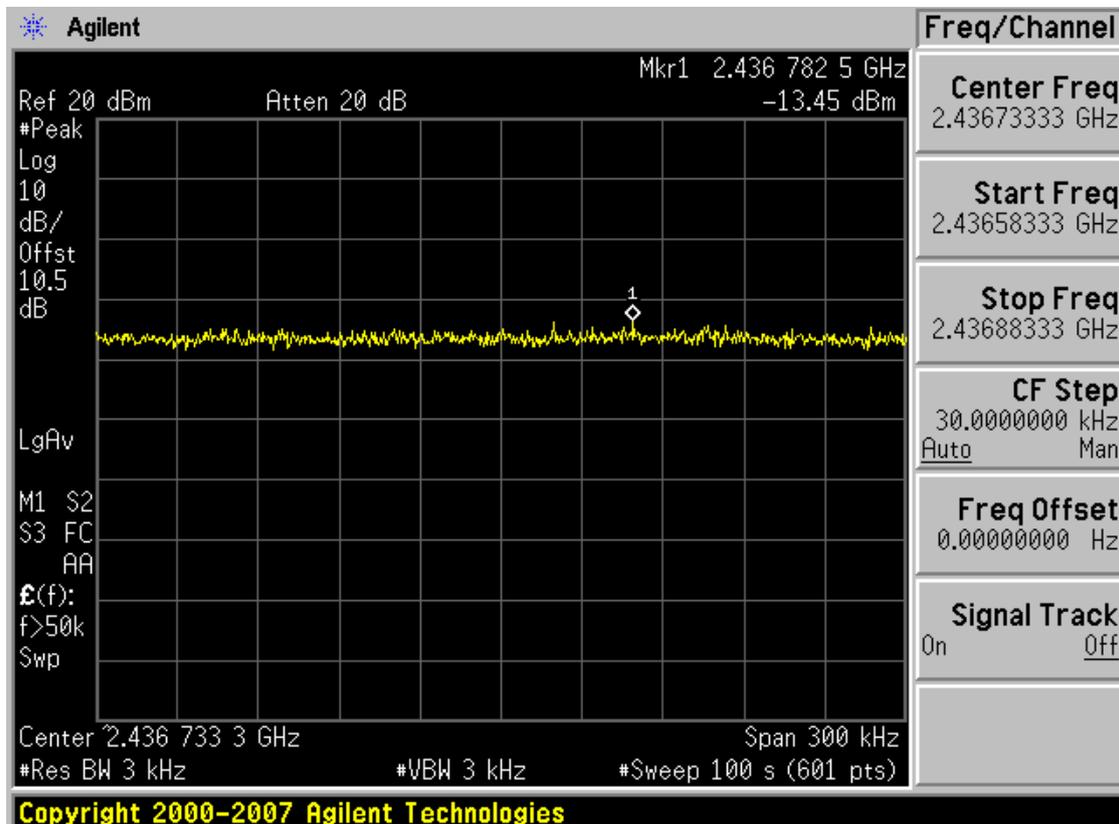
Frequency (MHz)	Channel No.	Mode	Test Result	
			Power Density (dBm)	Pass/Fail
2412	1	802.11b	-13.88	Pass
2437	6		-13.45	Pass
2462	11		-13.14	Pass
2412	1	802.11g	-15.39	Pass
2437	6		-15.63	Pass
2462	11		-15.34	Pass
2412	1	802.11n	-14.56	Pass
2437	6		-15.27	Pass
2462	11		-14.97	Pass

RESULT PLOTS

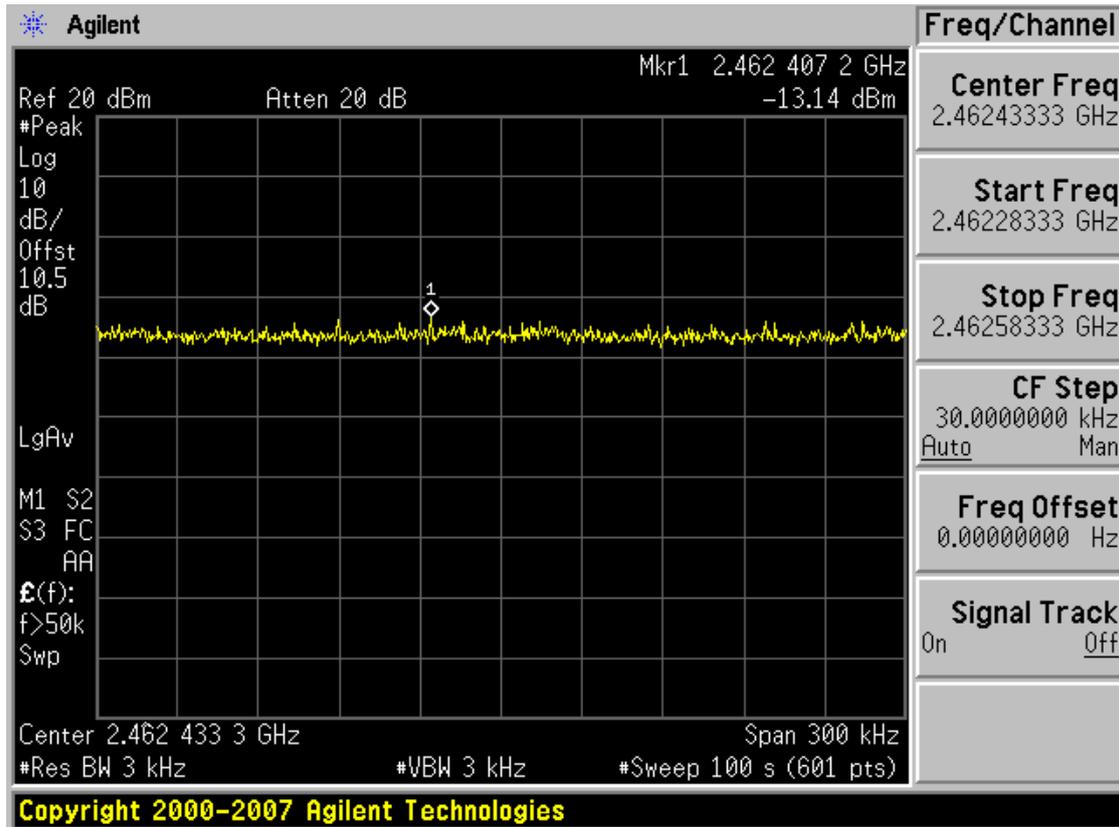
Power Spectral Density (802.11b-CH 1)



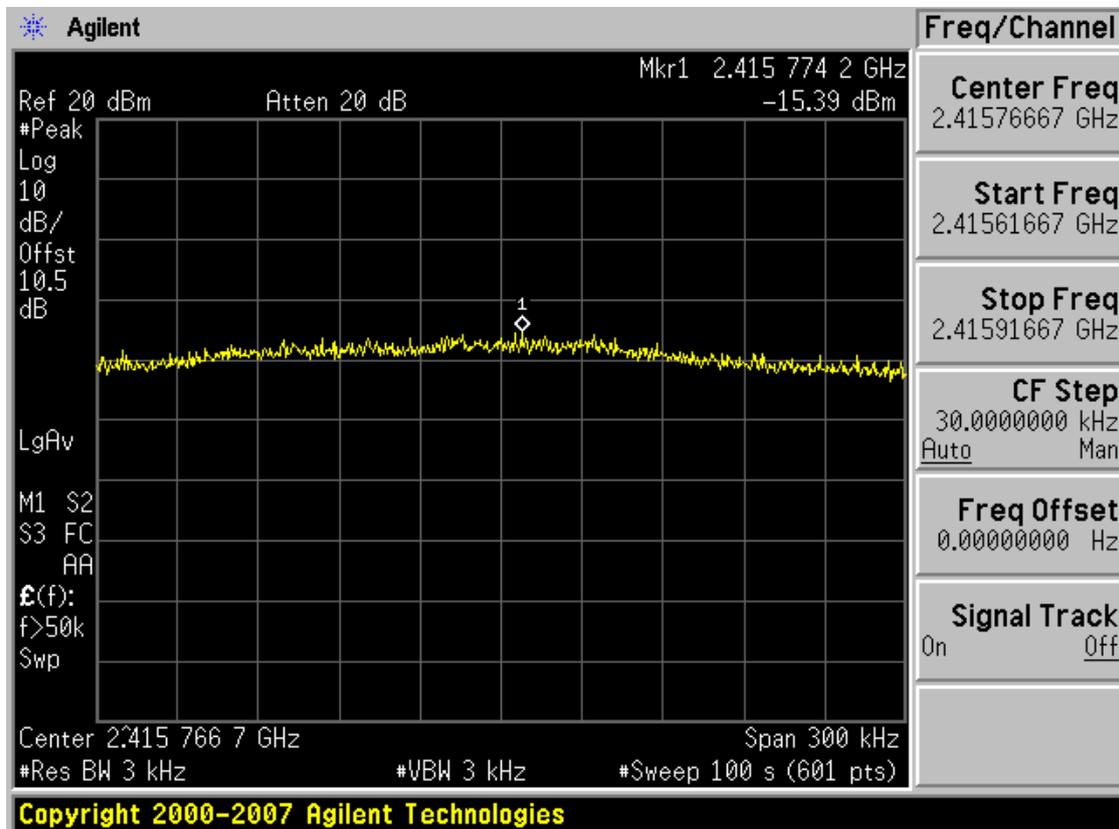
Power Spectral Density (802.11b-CH 6)



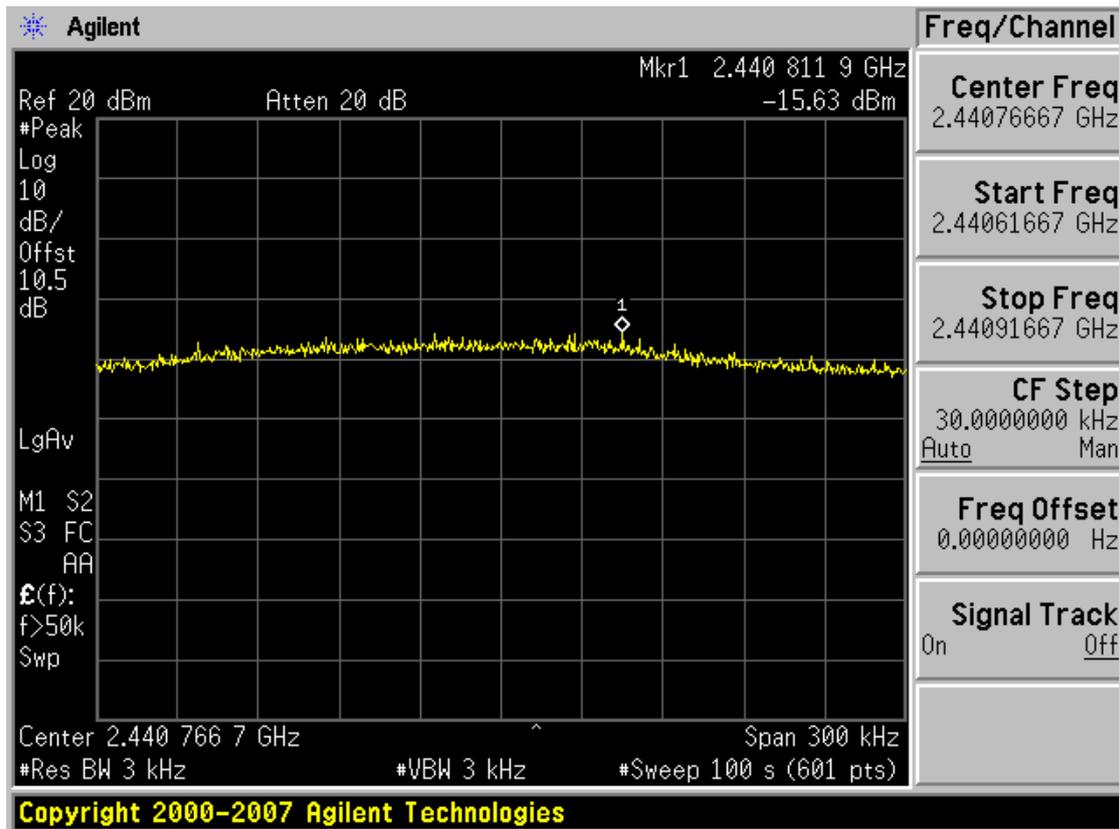
**Power Spectral Density (802.11b-CH 11)**



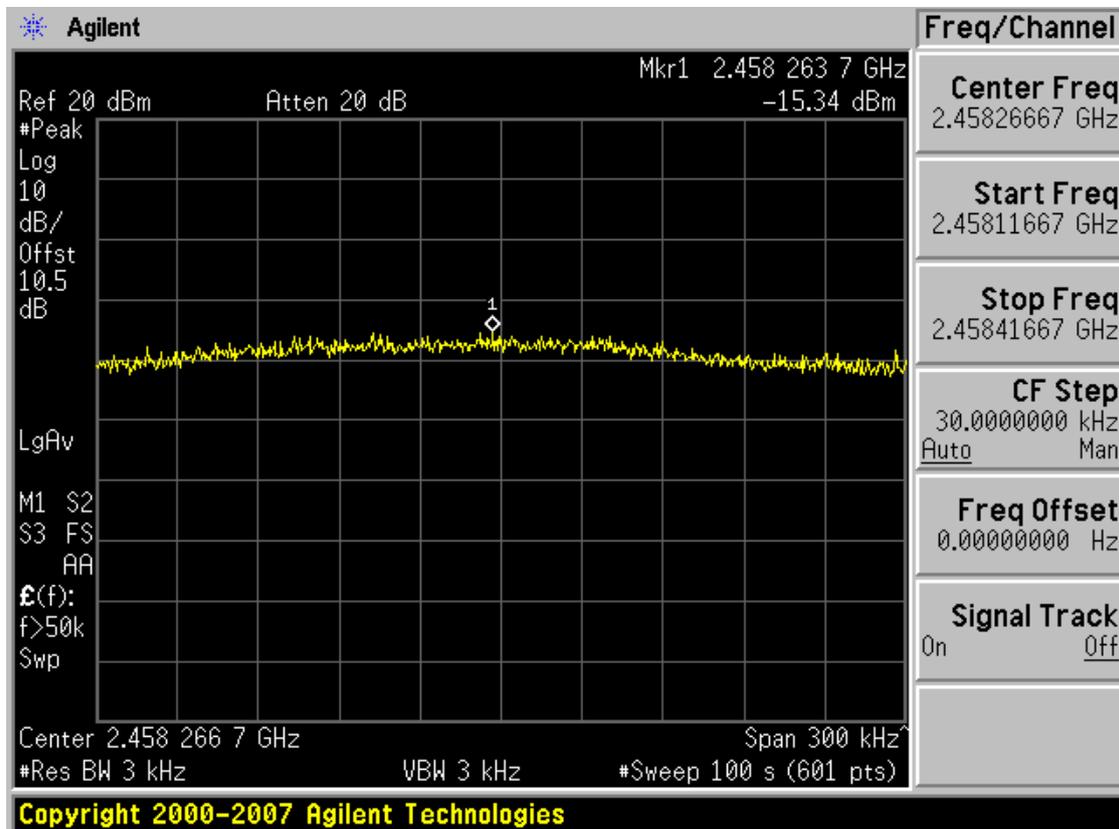
**Power Spectral Density (802.11g-CH 1)**



### Power Spectral Density (802.11g-CH 6)

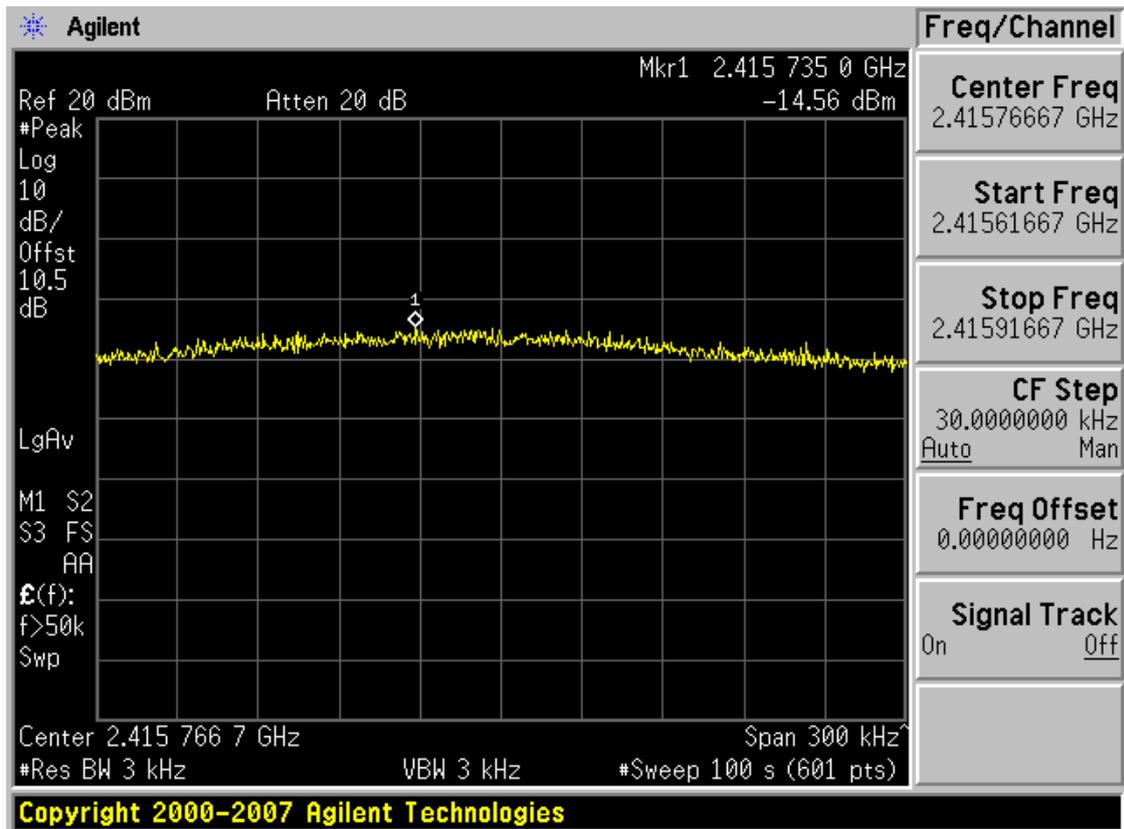


### Power Spectral Density (802.11g-CH11)

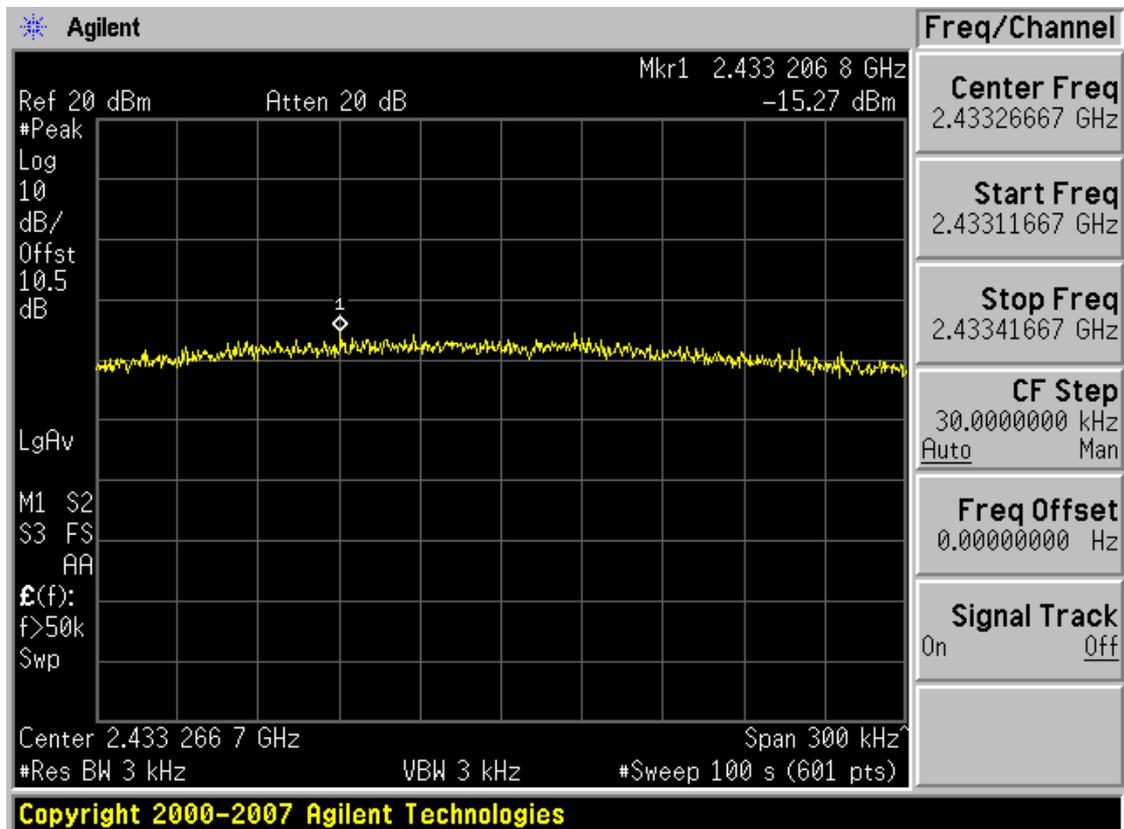


<b>FCC PT.15.247 TEST REPORT</b>		<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN		FCC ID: ZNFL04D

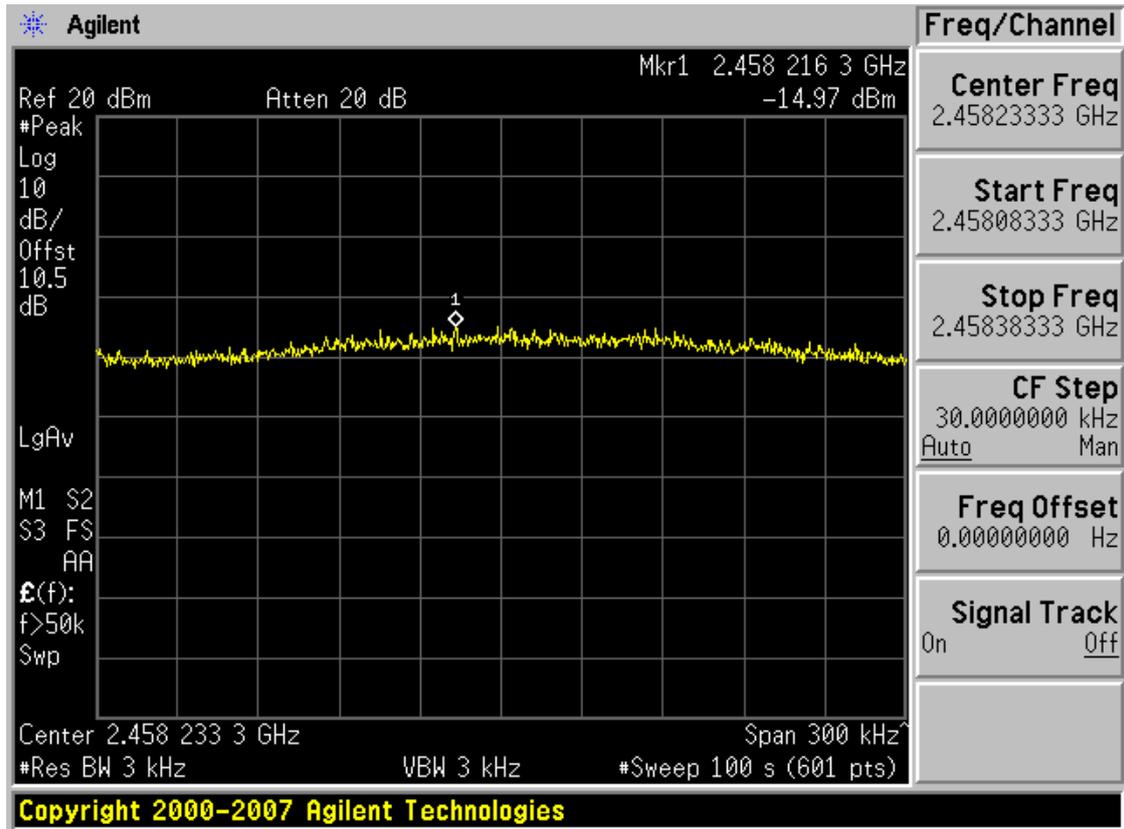
### Power Spectral Density (802.11n-CH 1)



### Power Spectral Density (802.11n-CH 6)



**Power Spectral Density (802.11n-CH11)**



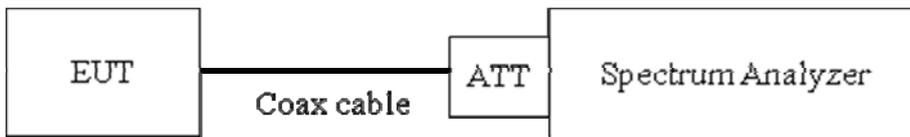
<b>FCC PT.15.247 TEST REPORT</b>	<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1202FR13-1	<b>Date of Issue:</b> March 02, 2012	<b>EUT Type:</b> Cellular HSPA WCDMA Wireless Router with WLAN	<b>FCC ID:</b> ZNFL04D

## 8.4 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 100 kHz.

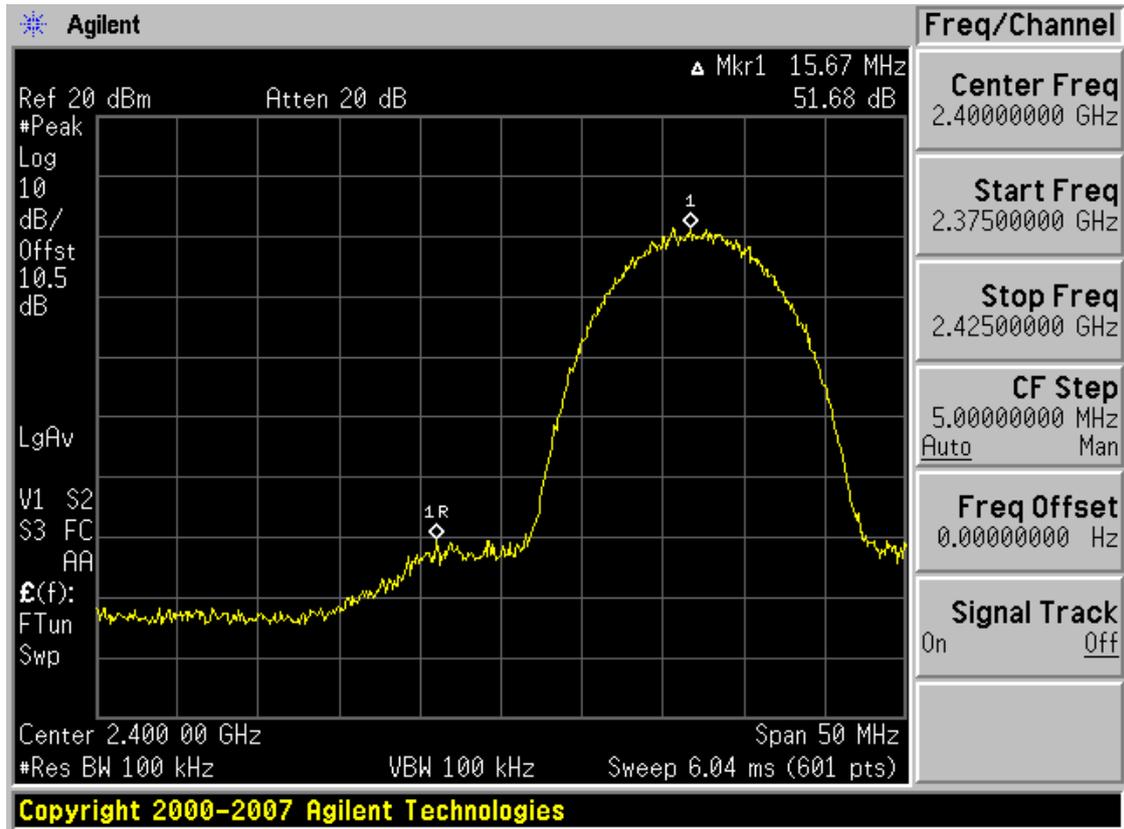
Detector Mode is set to a peak detector Mode.

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

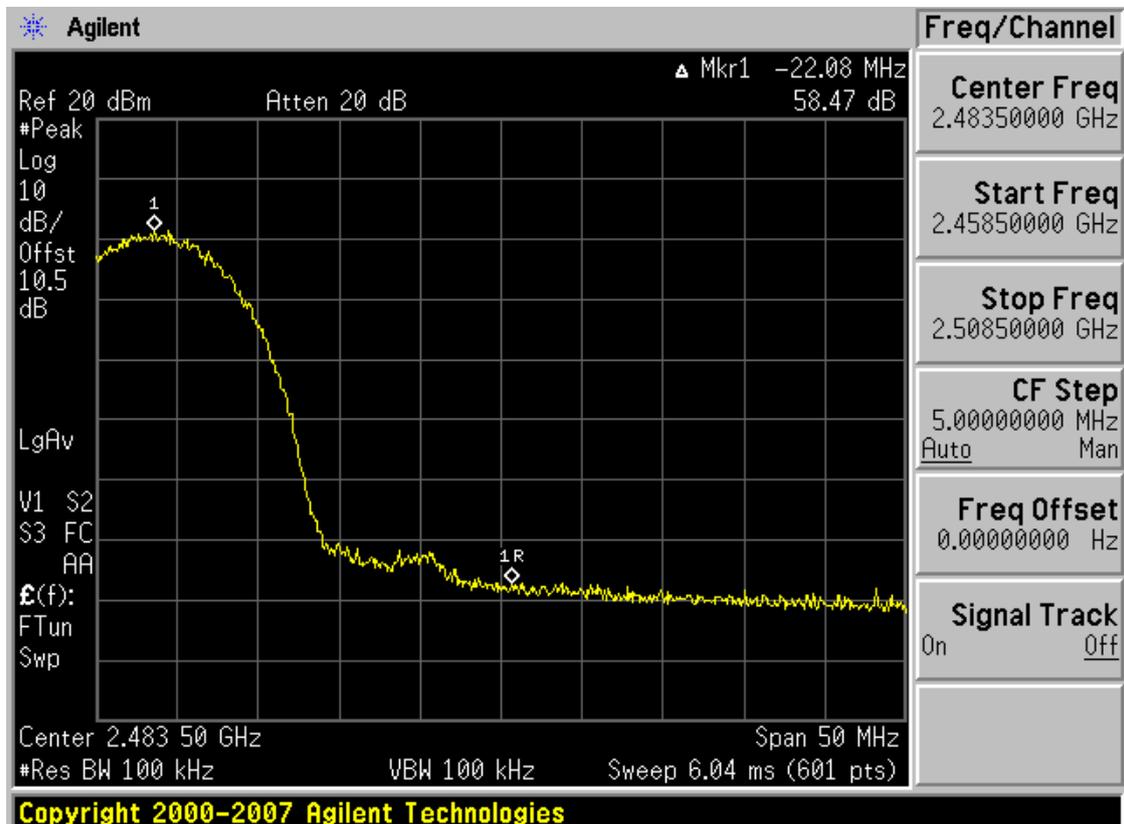
<b>FCC PT.15.247 TEST REPORT</b>		<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1202FR13-1	<b>Date of Issue:</b> March 02, 2012	<b>EUT Type:</b> Cellular HSPA WCDMA Wireless Router with WLAN	<b>FCC ID:</b> ZNFL04D	

RESULT PLOTS

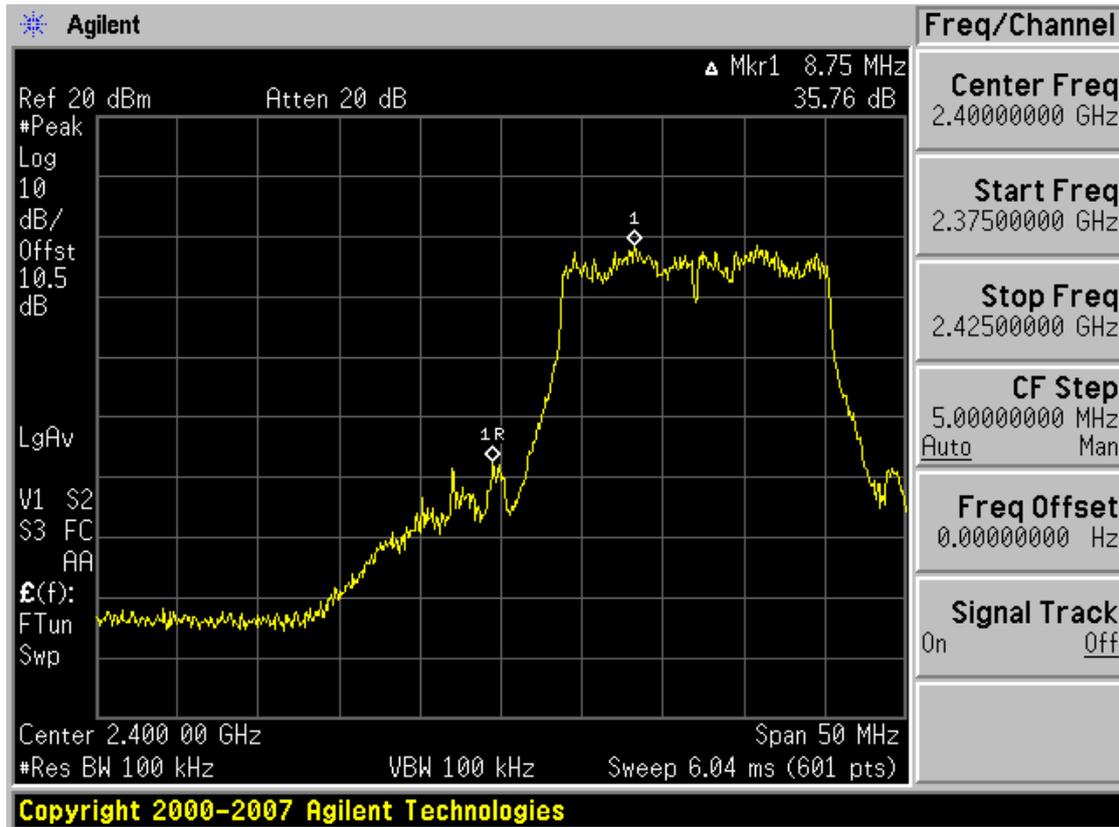
BandEdge (802.11b-CH1)



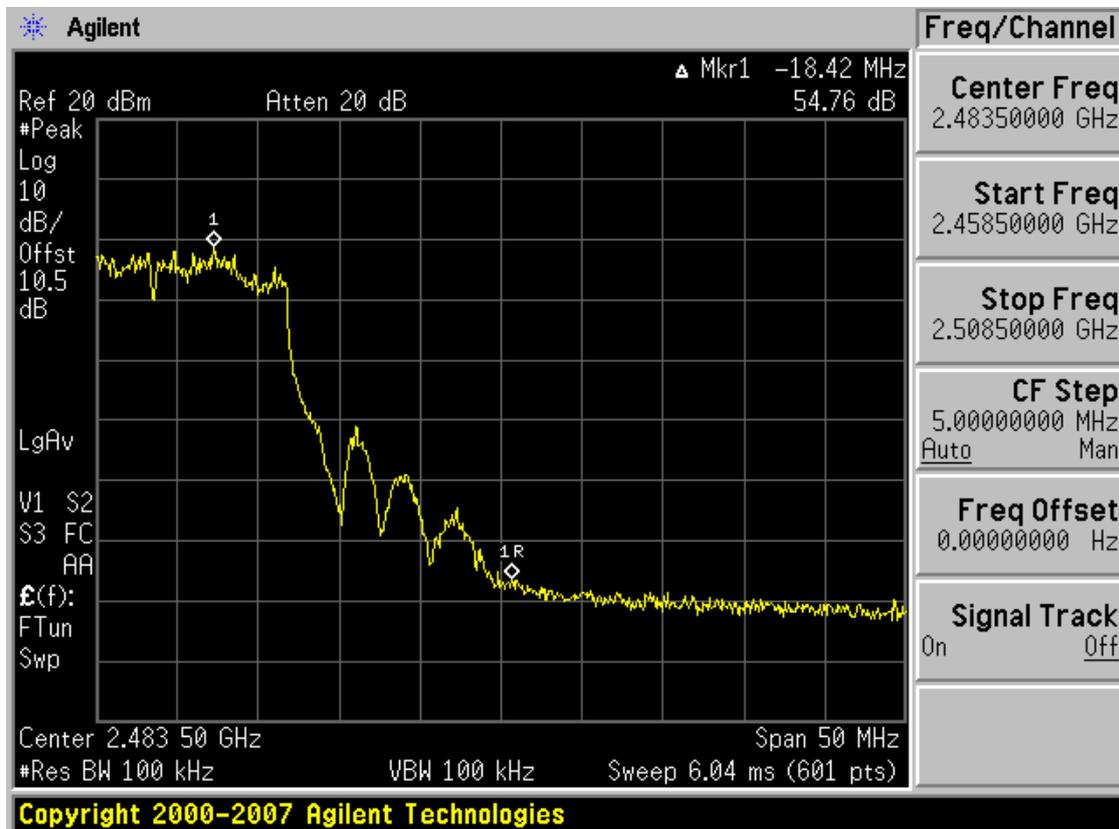
BandEdge (802.11b-CH11)



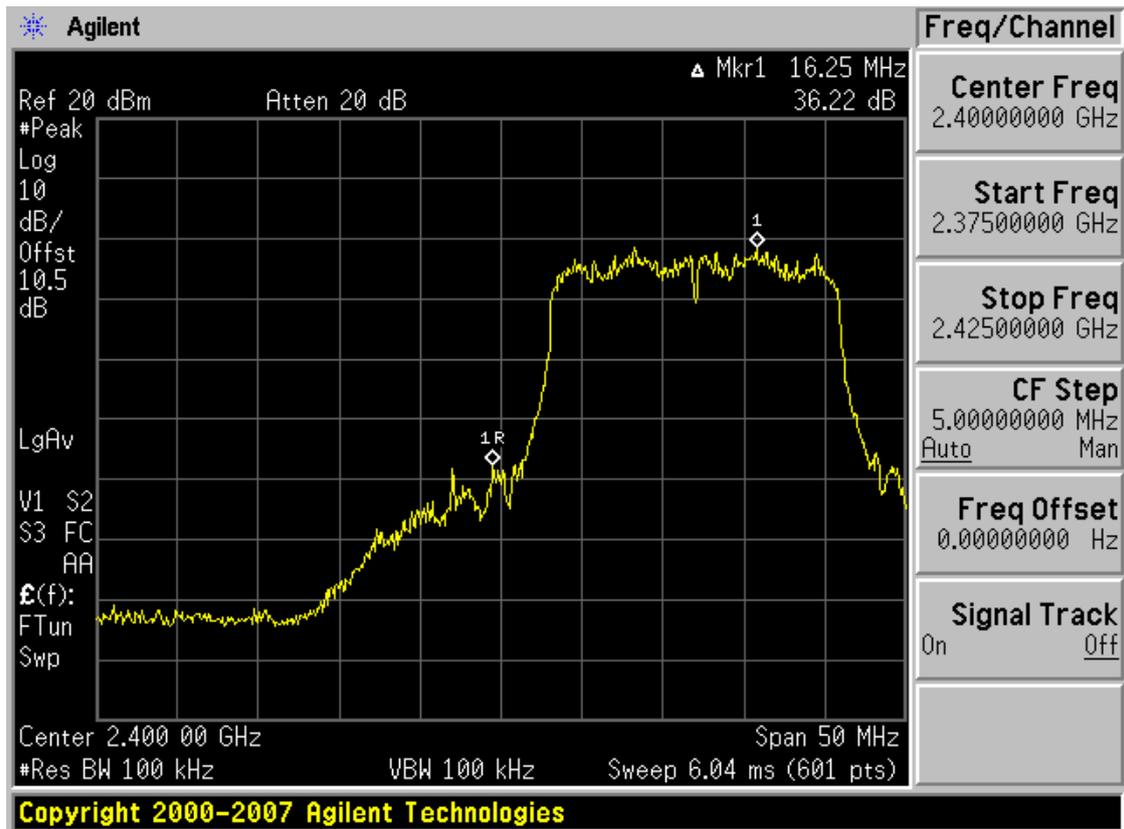
### BandEdge (802.11g-CH1)



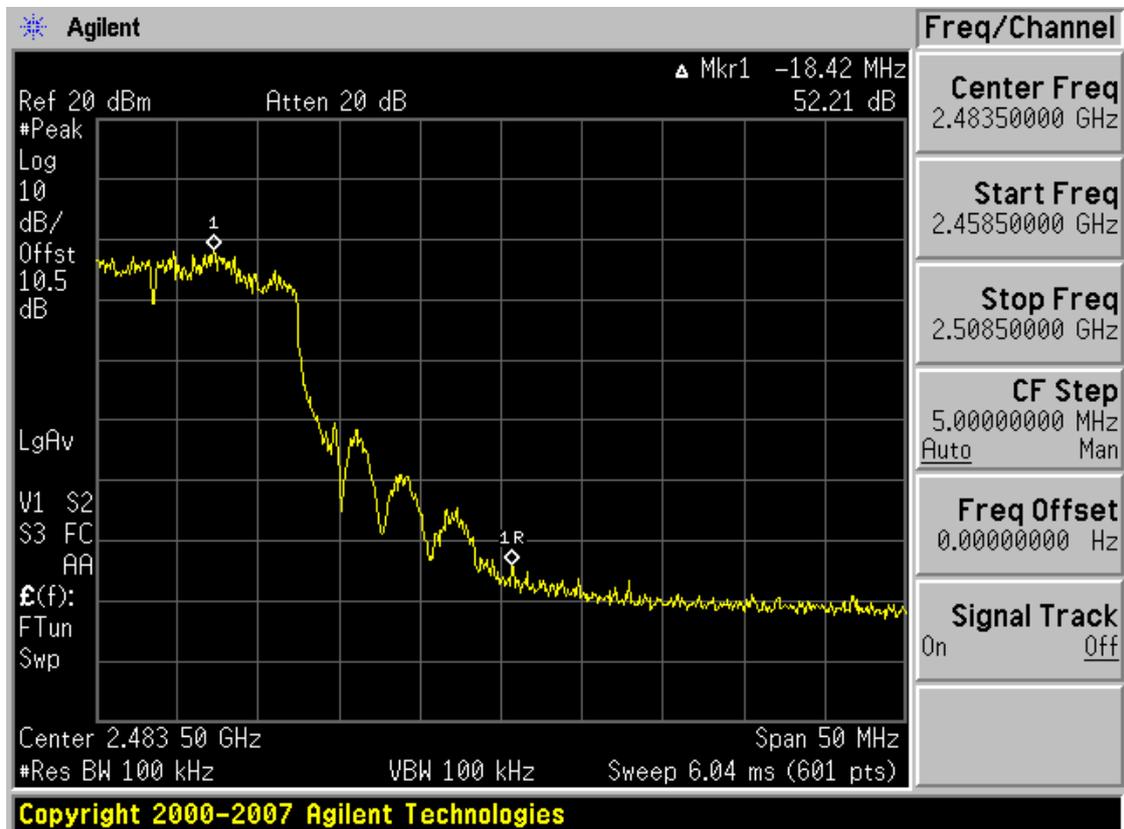
### BandEdge (802.11g-CH11)



### BandEdge (802.11n-CH1)

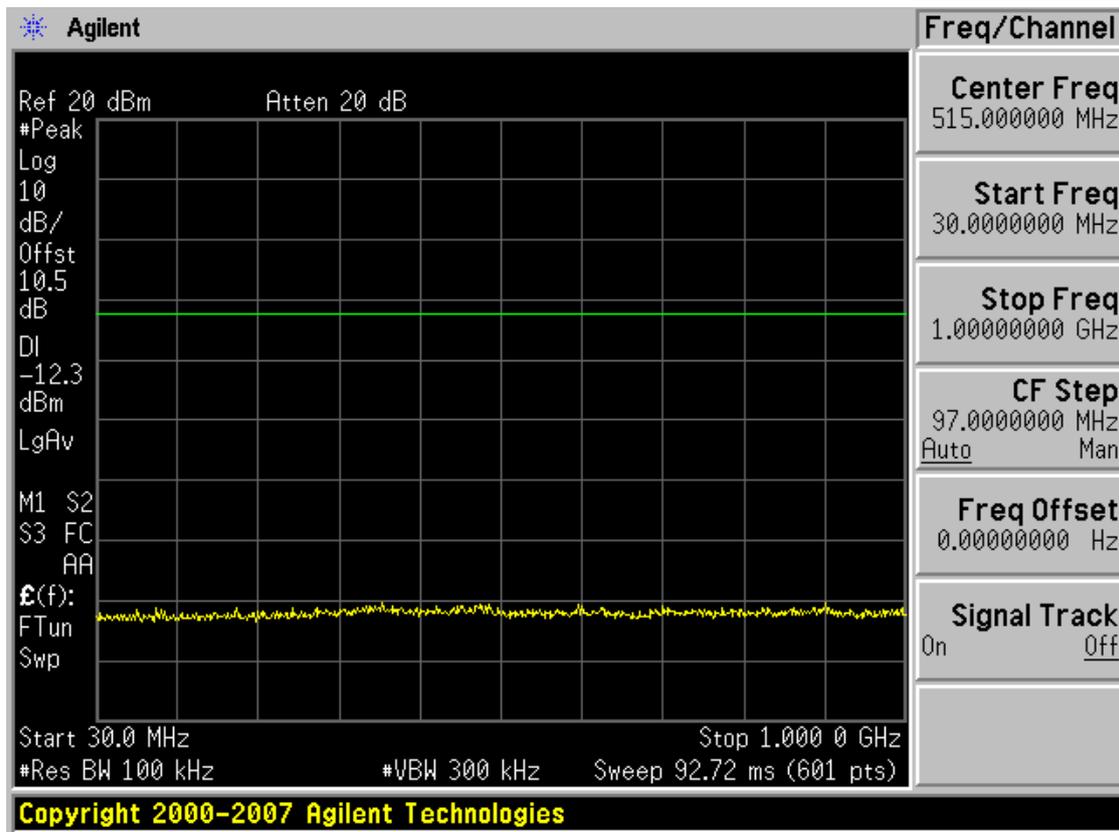


### BandEdge (802.11n-CH11)

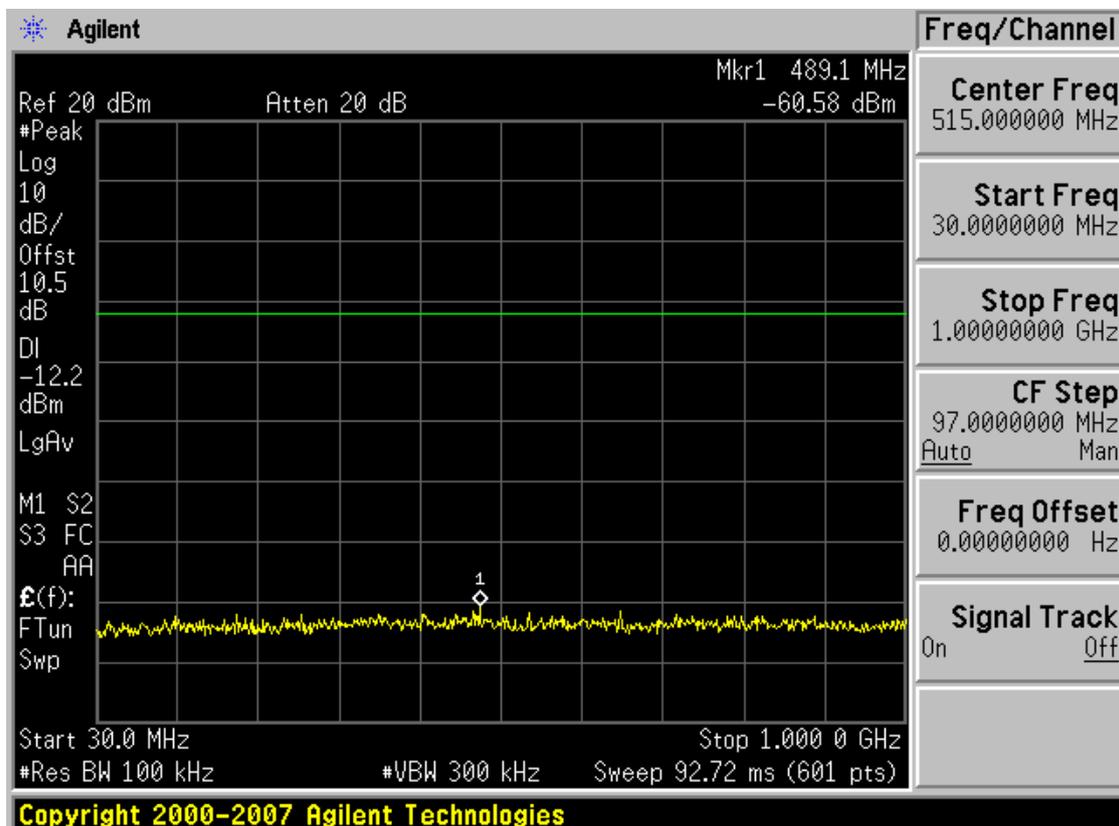


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D	

Conducted Spurious Emission (802.11b-CH1)

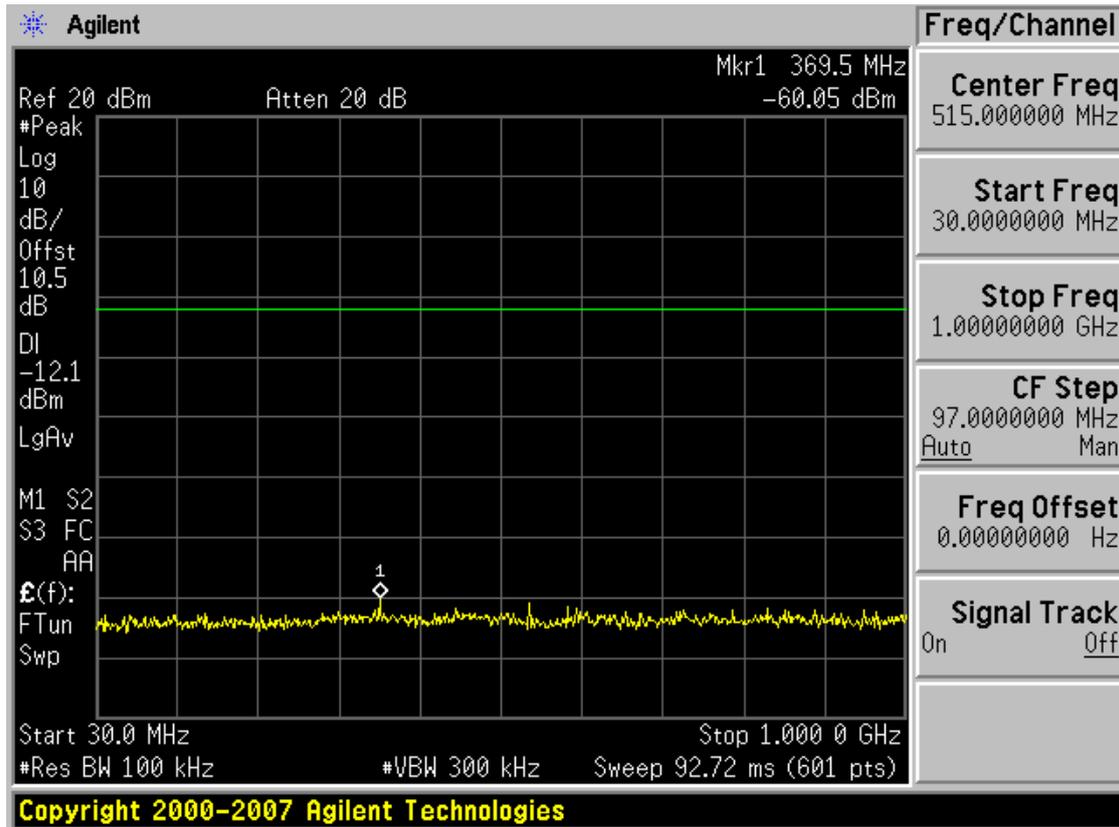


Conducted Spurious Emission (802.11b-CH6)

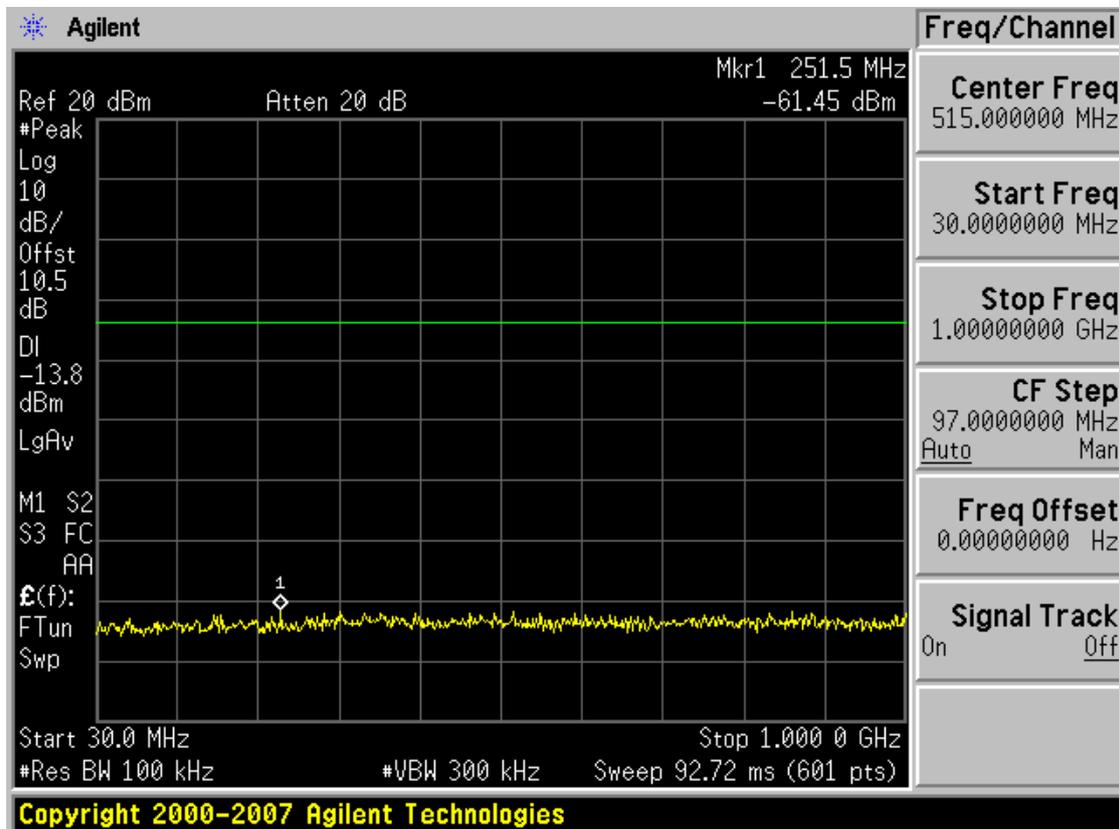


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN		FCC ID: ZNFL04D

### Conducted Spurious Emission (802.11b-CH11)

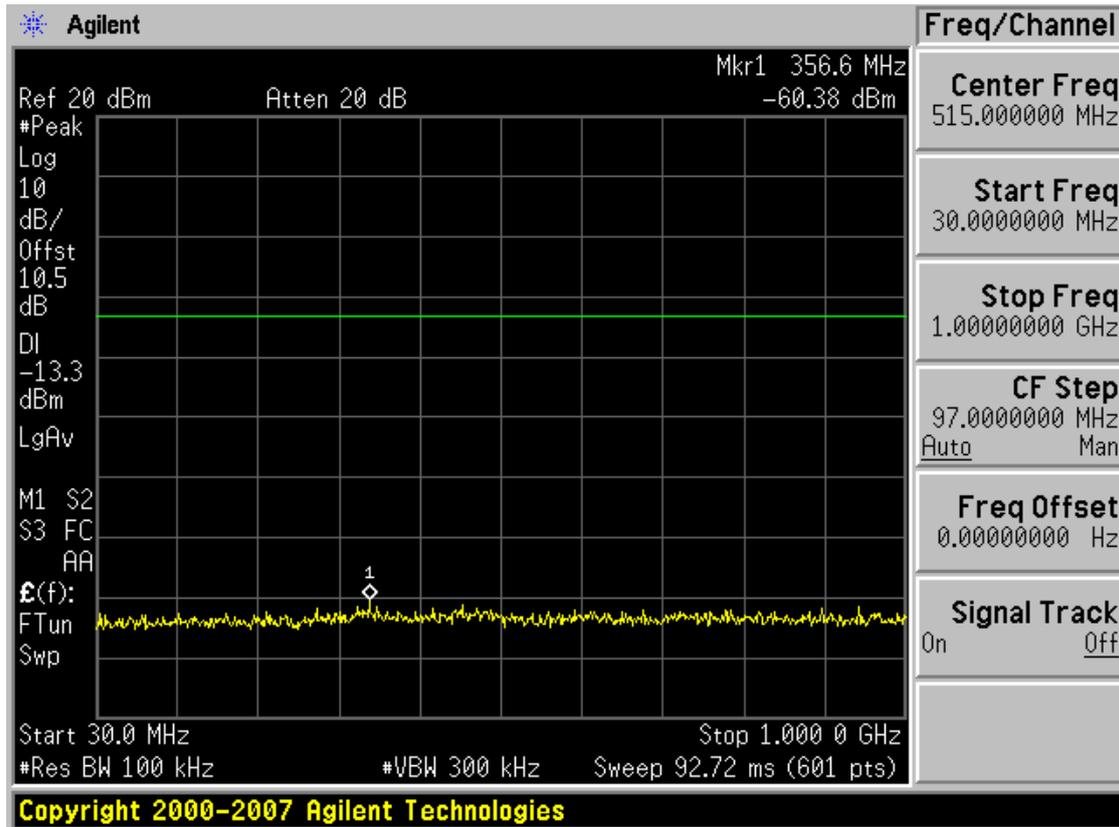


### Conducted Spurious Emission (802.11g-CH1)

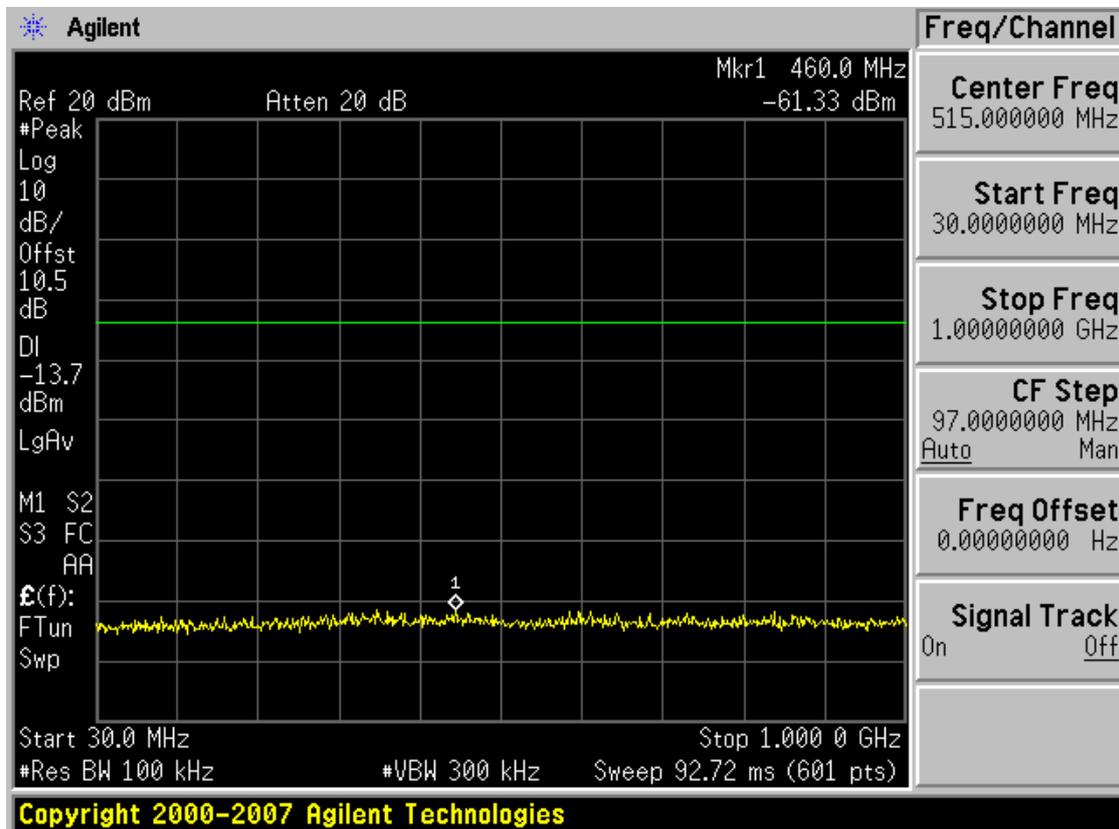


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN		FCC ID: ZNFL04D

### Conducted Spurious Emission (802.11g-CH6)

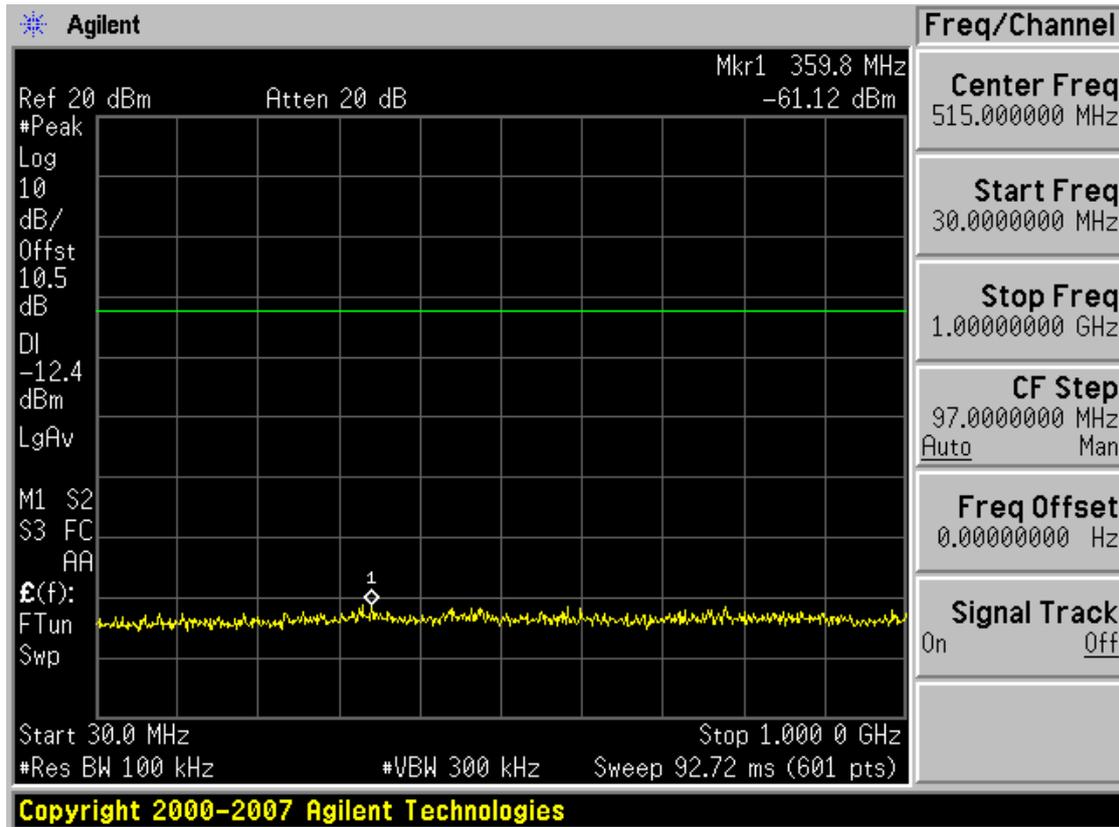


### Conducted Spurious Emission (802.11g-CH11)

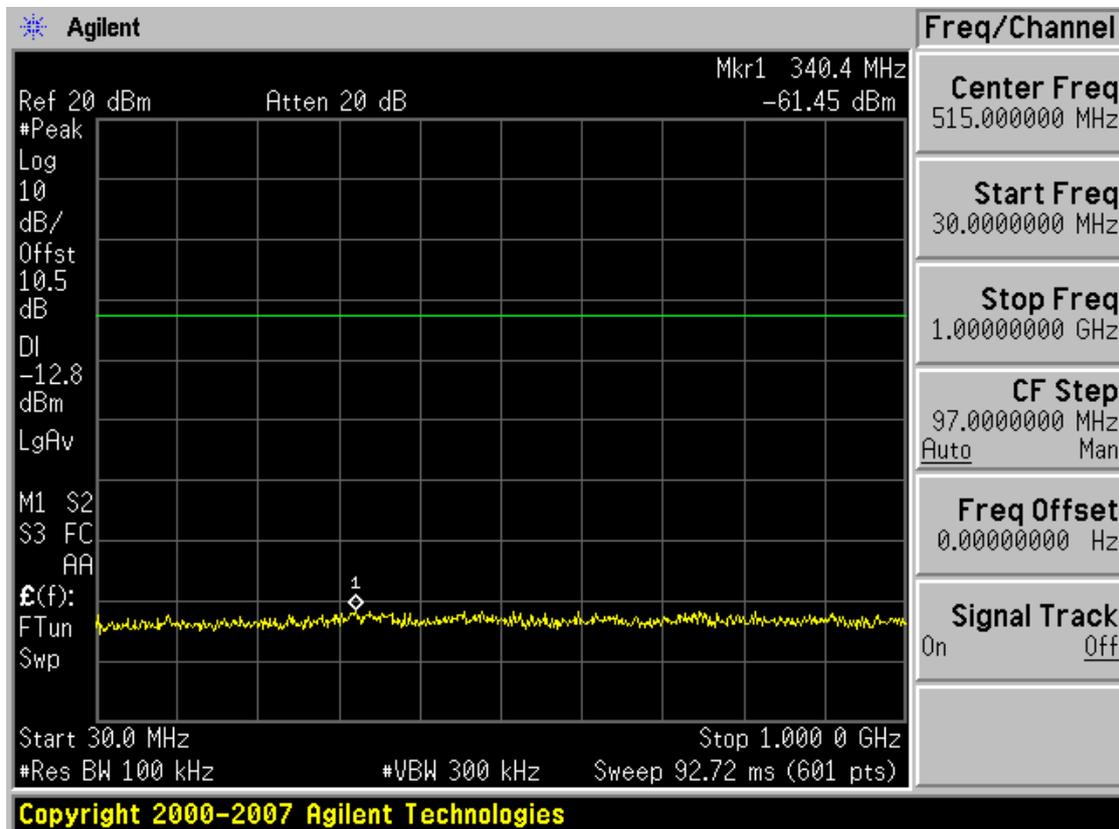


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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### Conducted Spurious Emission (802.11n-CH1)

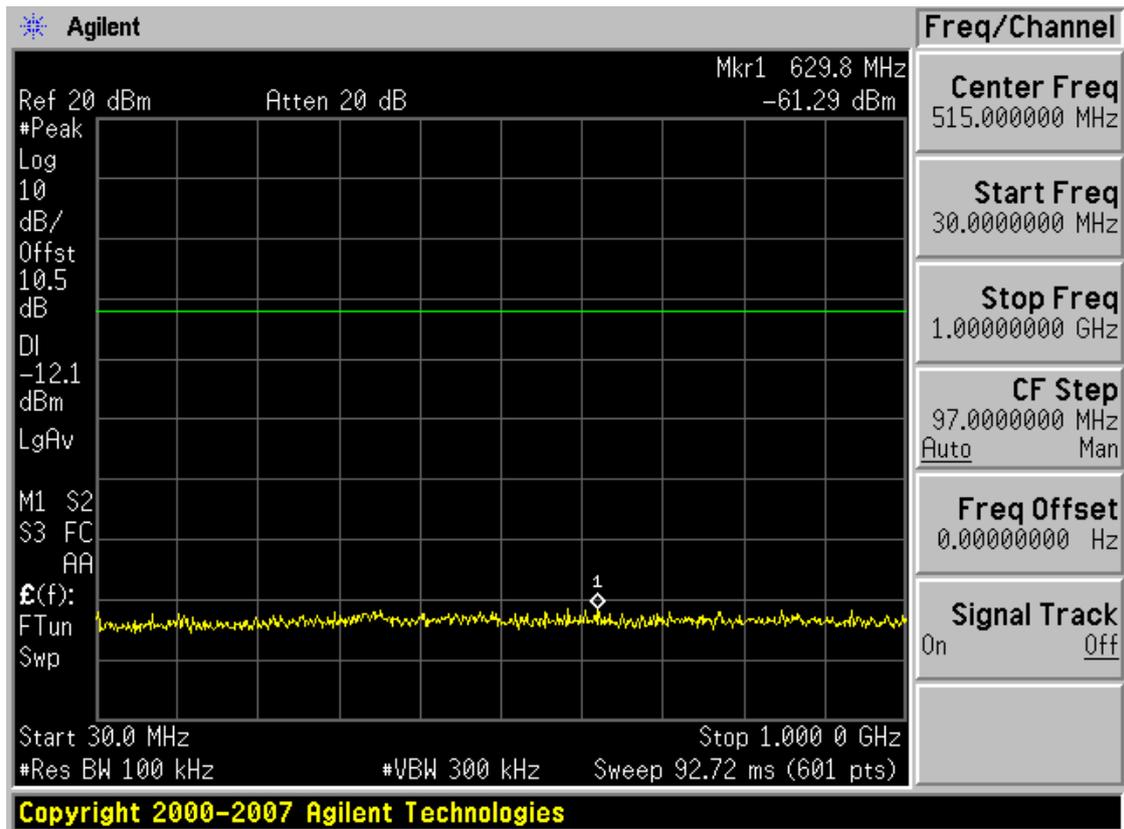


### Conducted Spurious Emission (802.11n-CH6)



<b>FCC PT.15.247 TEST REPORT</b>		<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN		FCC ID: ZNFL04D

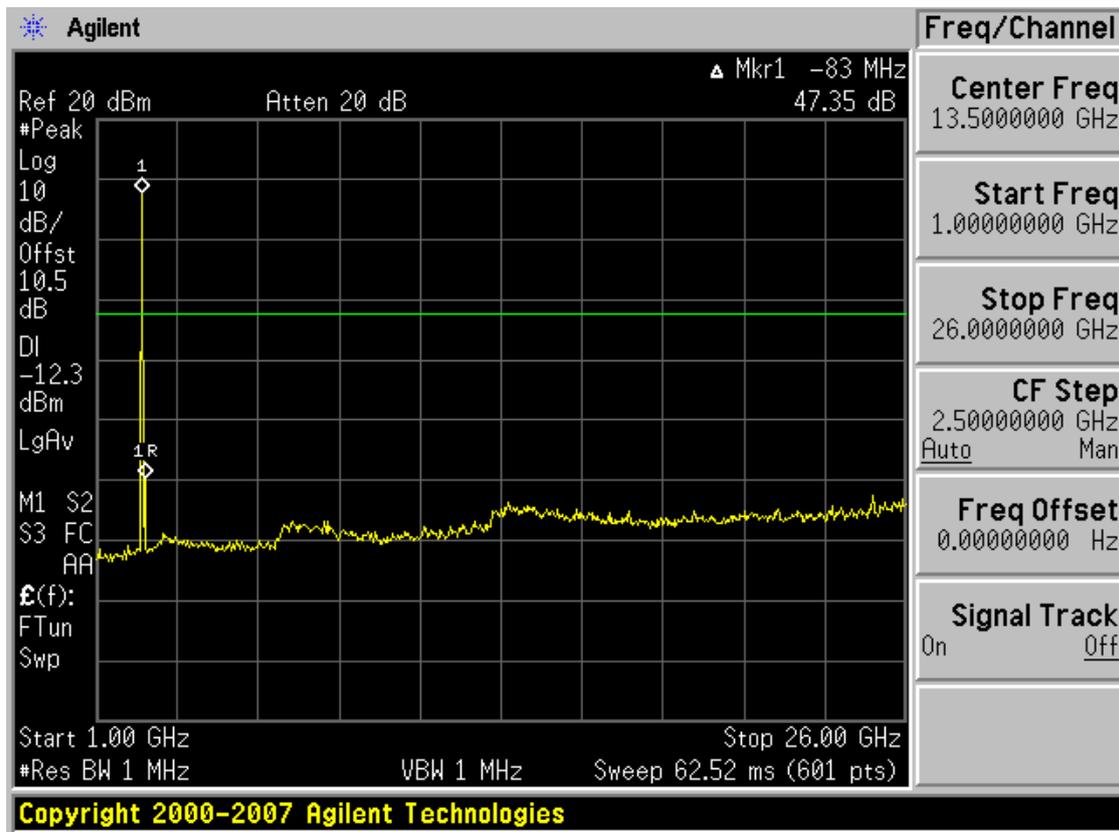
### Conducted Spurious Emission (802.11n-CH11)



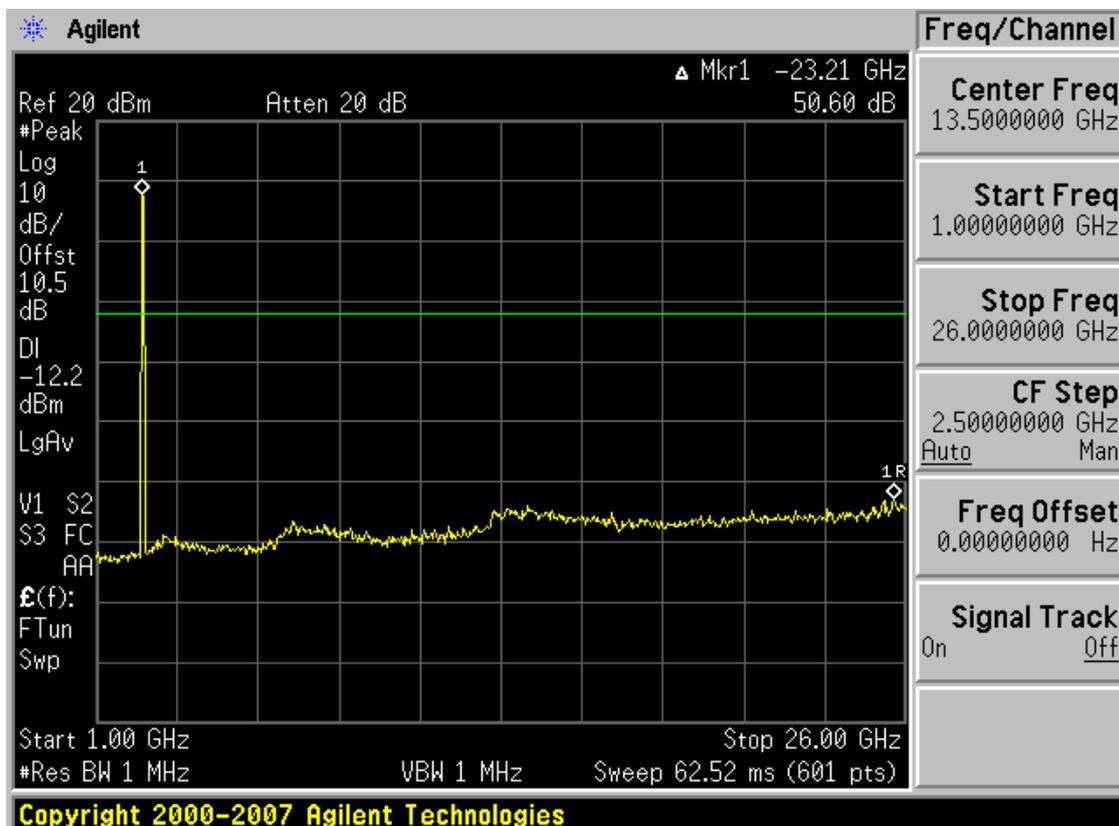
<b>FCC PT.15.247 TEST REPORT</b>	<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1202FR13-1	<b>Date of Issue:</b> March 02, 2012	<b>EUT Type:</b> Cellular HSPA WCDMA Wireless Router with WLAN	<b>FCC ID:</b> ZNFL04D

1 GHz ~ 26 GHz

**Conducted Spurious Emission (802.11b-CH1)**

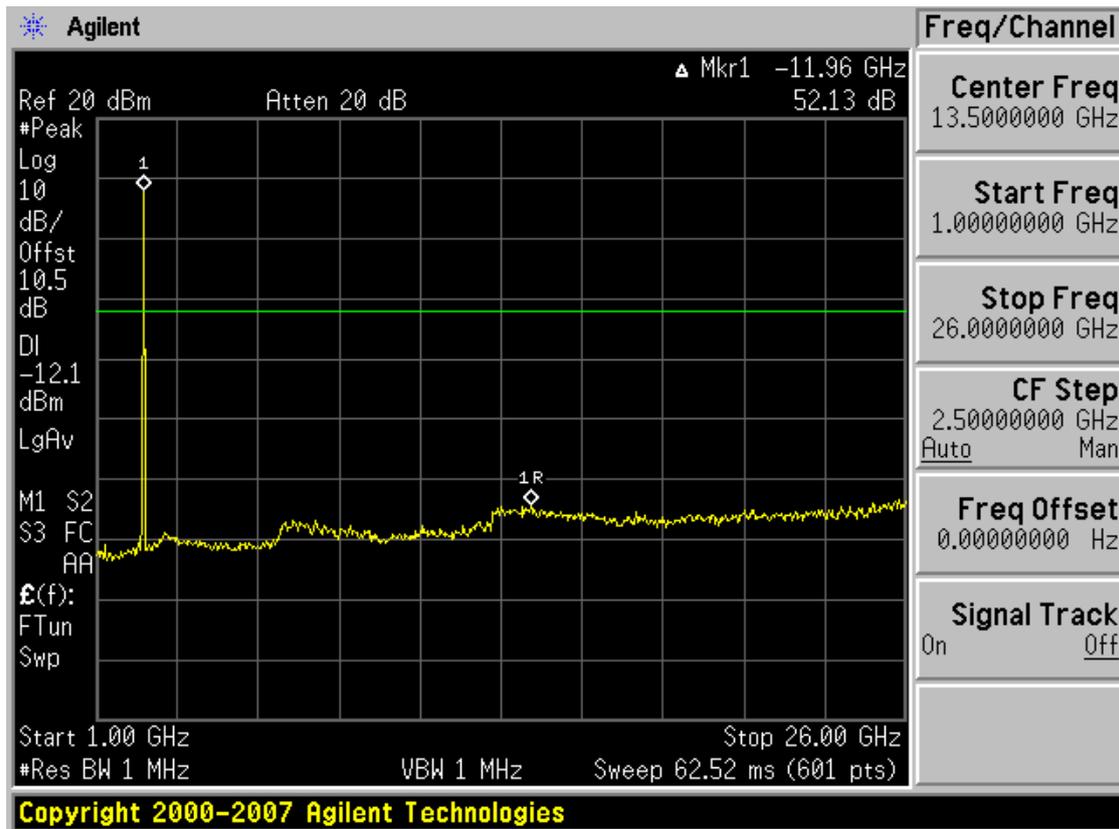


**Conducted Spurious Emission (802.11b-CH6)**

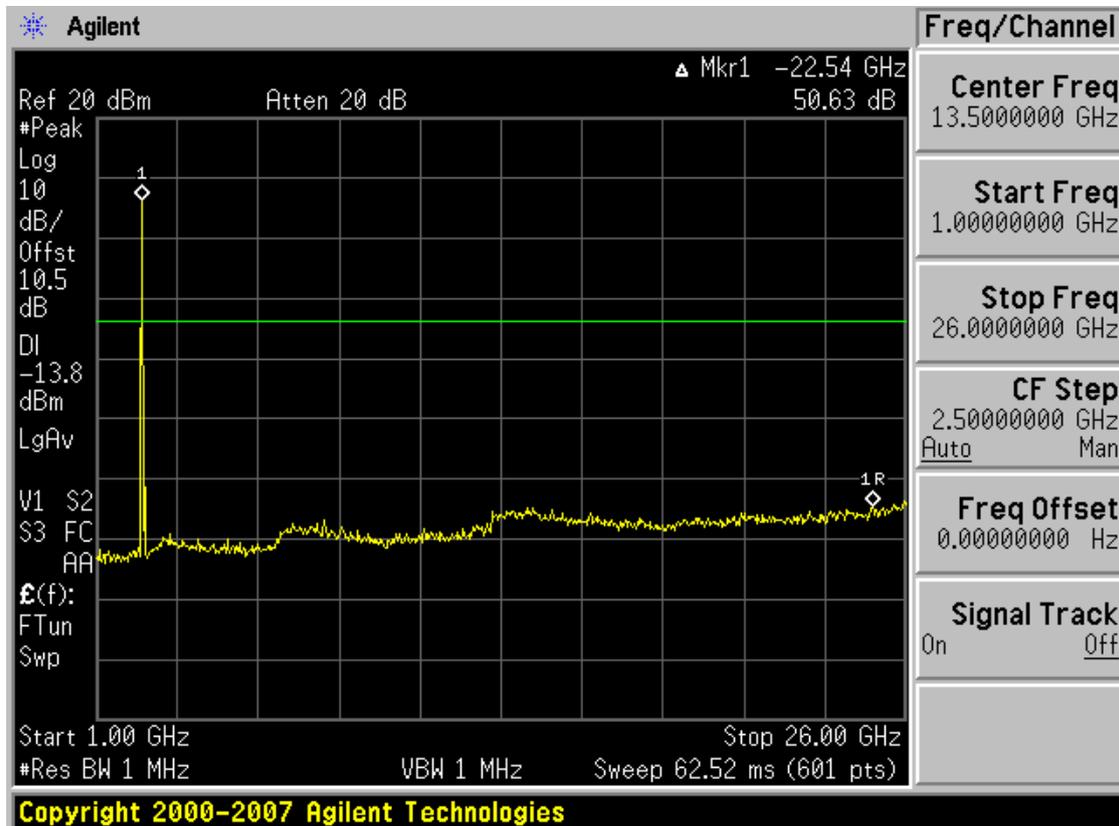


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D

### Conducted Spurious Emission (802.11b-CH11)

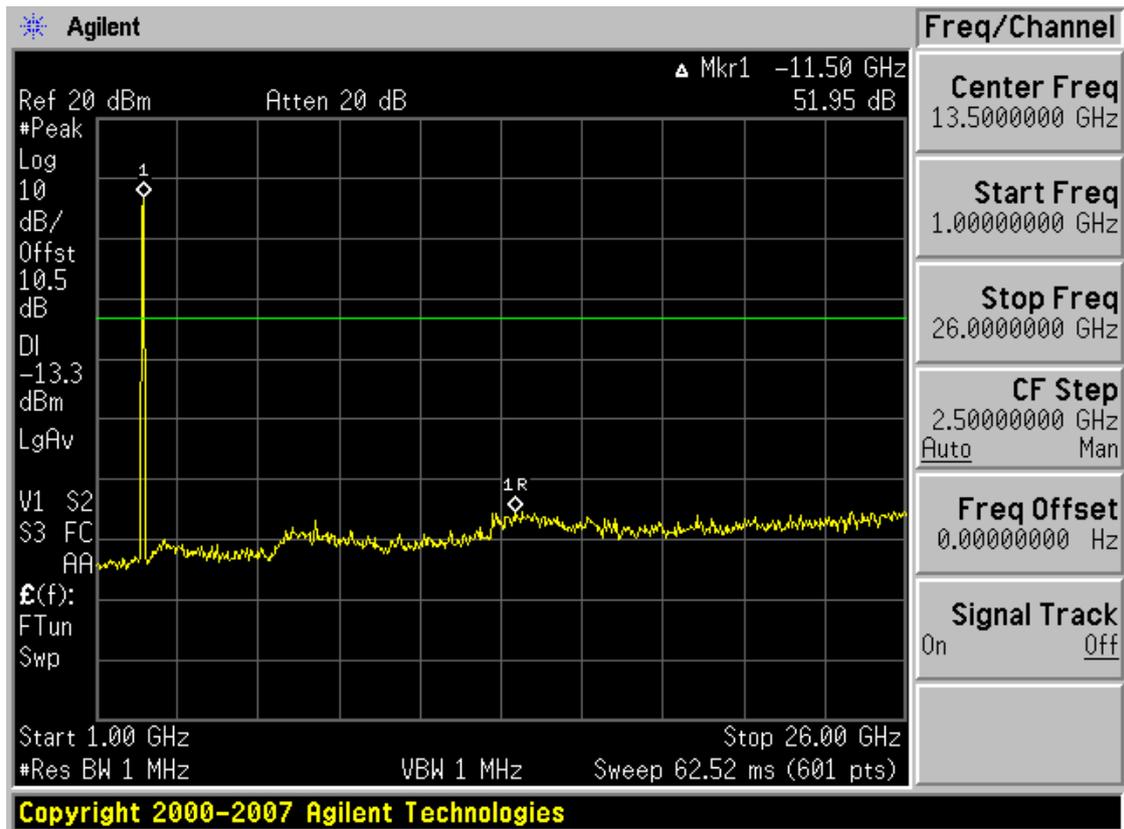


### Conducted Spurious Emission (802.11g-CH1)

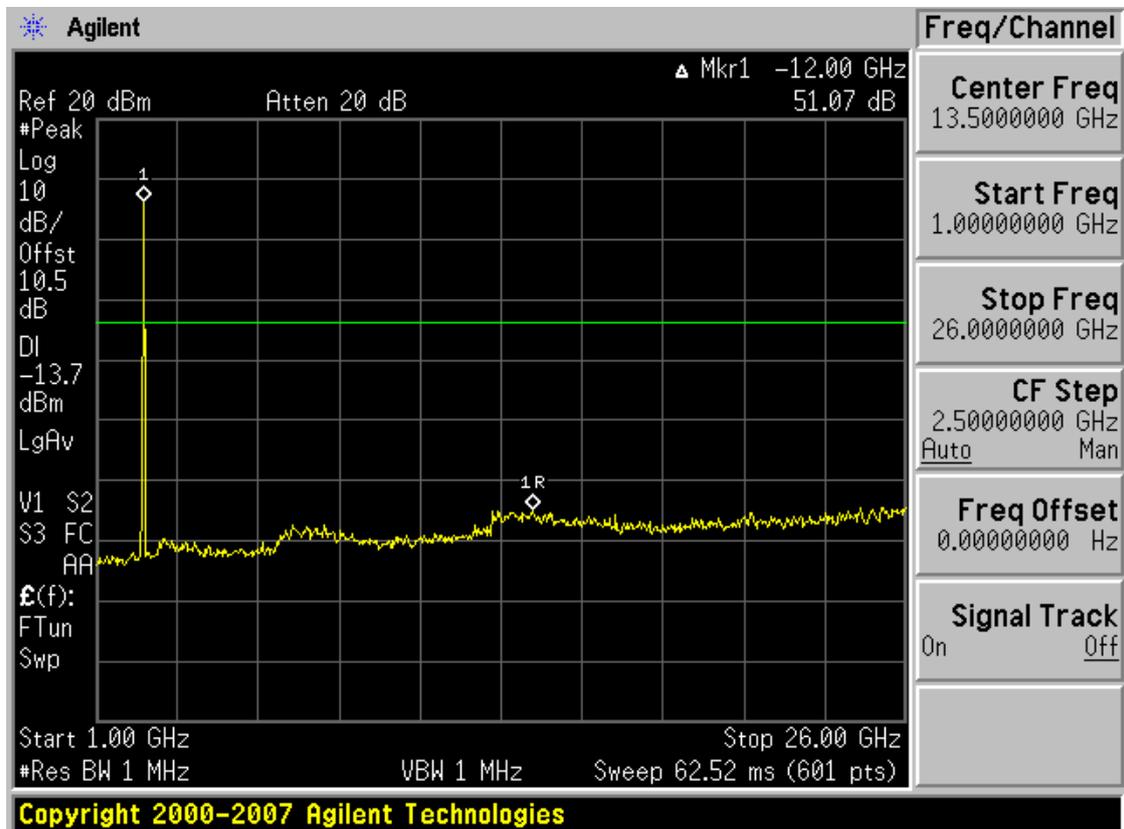


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN		FCC ID: ZNFL04D

### Conducted Spurious Emission (802.11g-CH6)

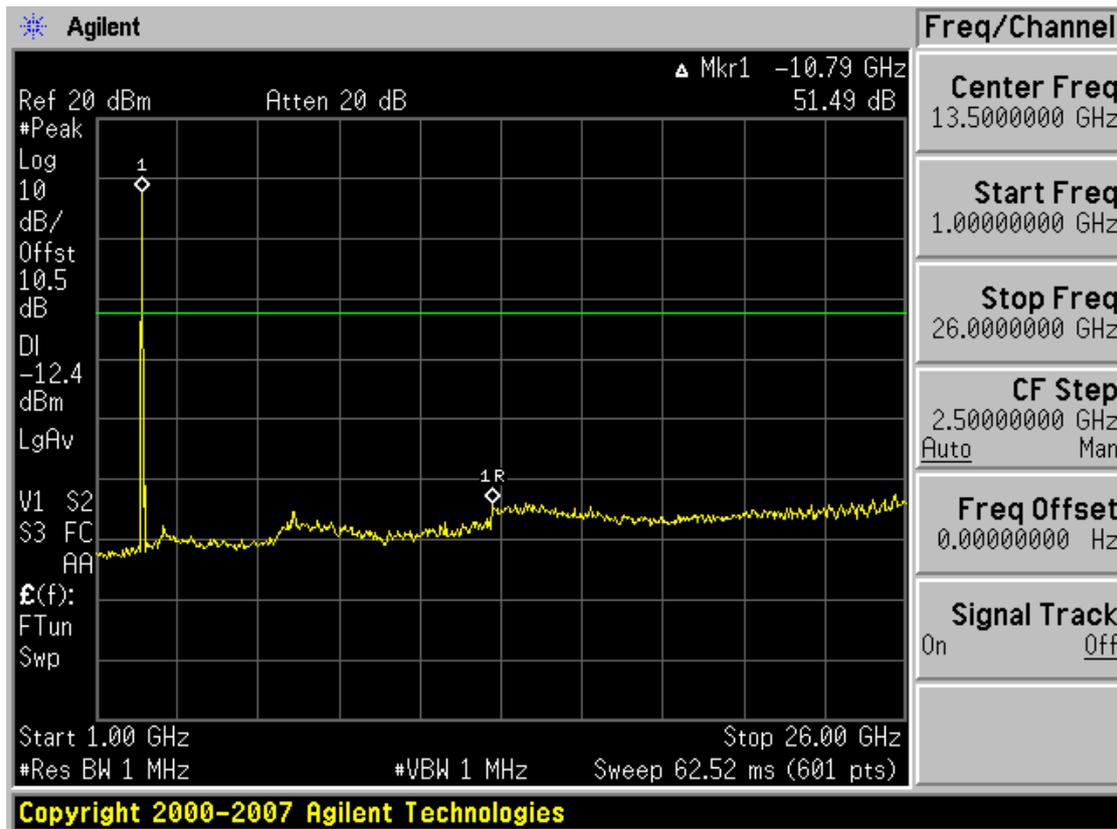


### Conducted Spurious Emission (802.11g-CH11)

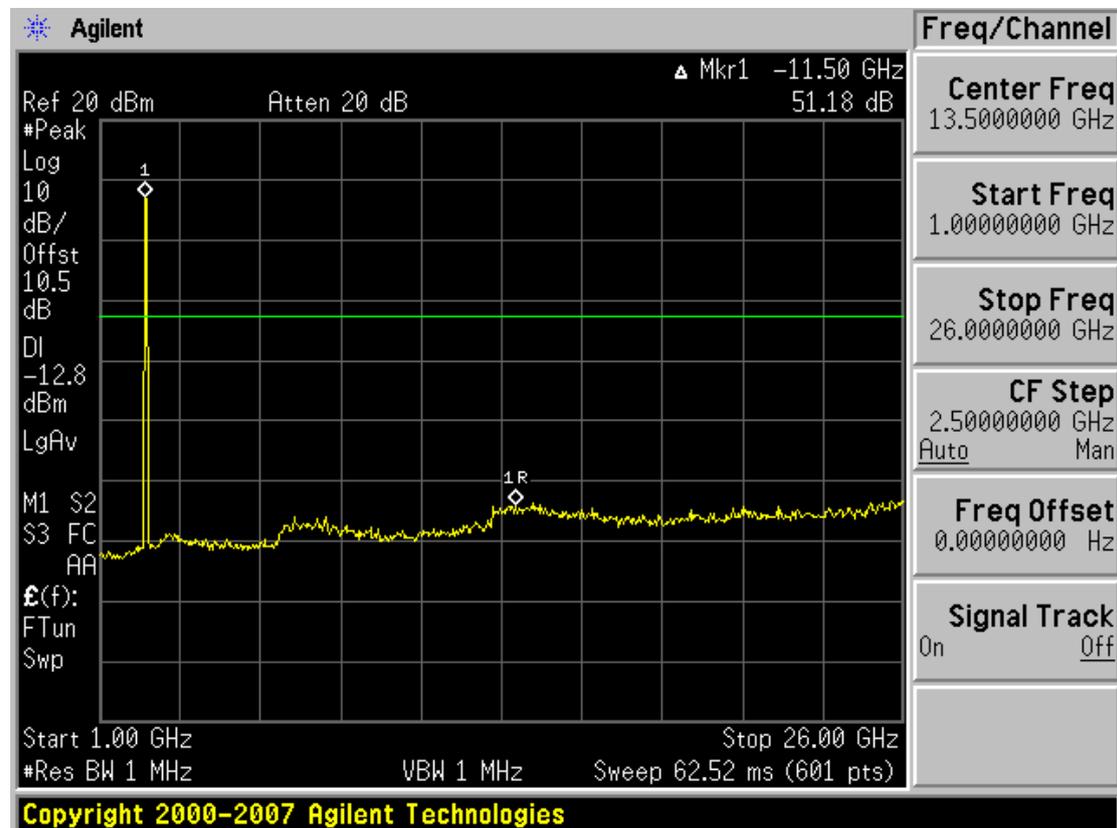


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D

### Conducted Spurious Emission (802.11n-CH1)



### Conducted Spurious Emission (802.11n-CH6)



<b>FCC PT.15.247 TEST REPORT</b>	<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D



**8.5 RADIATED MEASUREMENT.**

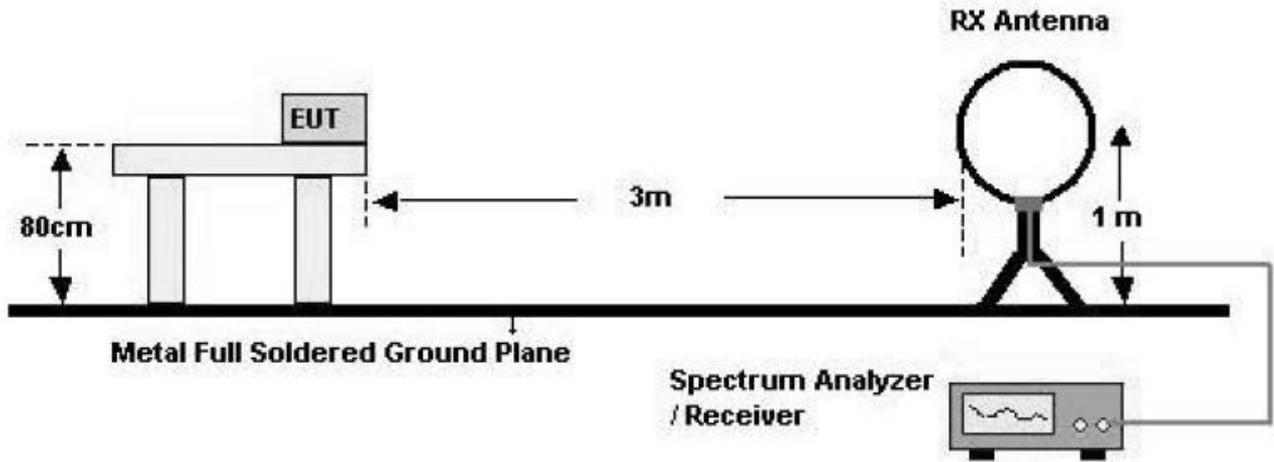
**8.5.1 RADIATED SPURIOUS EMISSIONS.**

Test Requirements and limit, §15.205, §15.209

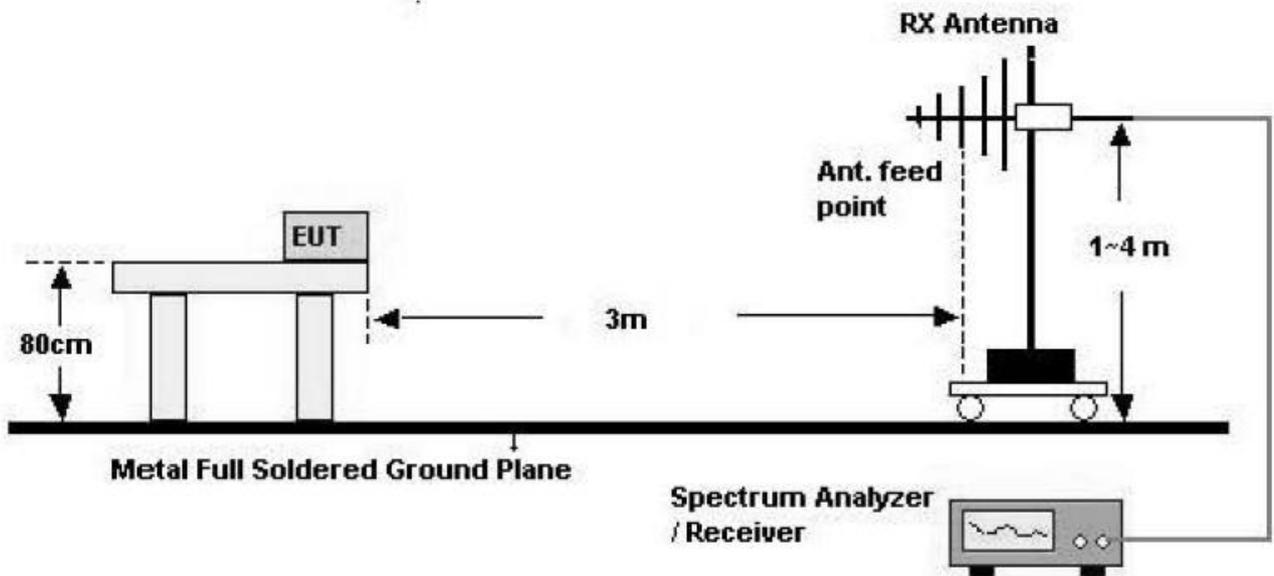
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**Test Configuration**

**Below 30 MHz**

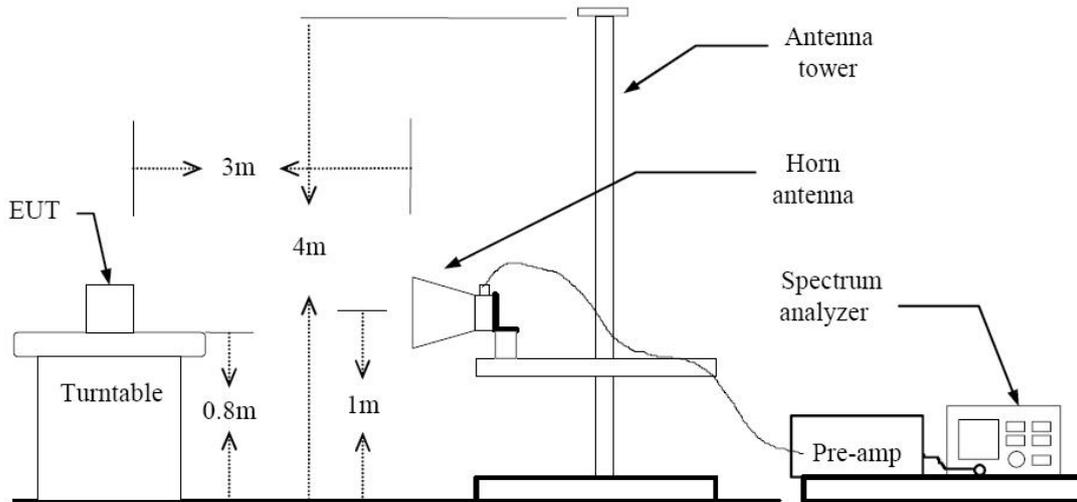


**30 MHz - 1 GHz**



FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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**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.

<b>FCC PT.15.247 TEST REPORT</b>		<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1202FR13-1	<b>Date of Issue:</b> March 02, 2012	<b>EUT Type:</b> Cellular HSPA WCDMA Wireless Router with WLAN	<b>FCC ID:</b> ZNFL04D	

**TEST RESULTS**

**9 kHz – 30MHz**

**Operation Mode:** Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB $\mu$ V	dB /m	dB	(H/V)	dB $\mu$ V/m	dB $\mu$ 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:** Normal Mode

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

**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.

### 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	50.28	-0.10	V	50.18	74	23.82	PK
4824	37.06	-0.10	V	36.96	54	17.04	AV
7236	49.08	10.13	V	59.21	74	14.79	PK
7236	34.83	10.13	V	44.96	54	9.04	AV
4824	50.90	-0.10	H	50.80	74	23.20	PK
4824	37.35	-0.10	H	37.25	54	16.75	AV
7236	47.98	10.13	H	58.11	74	15.89	PK
7236	34.82	10.13	H	44.95	54	9.05	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/g/n mode 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	50.31	0.13	V	50.44	74	23.56	PK
4874	36.66	0.13	V	36.79	54	17.21	AV
7311	49.15	10.01	V	59.16	74	14.84	PK
7311	35.18	10.01	V	45.19	54	8.81	AV
4874	49.61	0.13	H	49.74	74	24.26	PK
4874	36.61	0.13	H	36.74	54	17.26	AV
7311	48.37	10.01	H	58.38	74	15.62	PK
7311	35.28	10.01	H	45.29	54	8.71	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/g/n mode 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	49.13	0.45	V	49.58	74	24.42	PK
4924	35.75	0.45	V	36.20	54	17.80	AV
7386	48.43	10.17	V	58.60	74	15.40	PK
7386	34.70	10.17	V	44.87	54	9.13	AV
4924	48.94	0.45	H	49.39	74	24.61	PK
4924	36.13	0.45	H	36.58	54	17.42	AV
7386	48.23	10.17	H	58.40	74	15.60	PK
7386	34.86	10.17	H	45.03	54	8.97	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/g/n mode test. Worst case of EUT is 1 Mbps in 802.11b.

## 8.5.2 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:	802.11n
Transfer Rate:	6.5 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
2390.0	25.94	33.86	H	59.80	74	14.20	PK
2390.0	13.11	33.86	H	46.97	54	7.03	AV
2390.0	23.00	33.86	V	56.86	74	17.14	PK
2390.0	11.39	33.86	V	45.25	54	8.75	AV
2483.5	29.74	34.02	H	63.76	74	10.24	PK
2483.5	14.72	34.02	H	48.74	54	5.26	AV
2483.5	27.15	34.02	V	61.17	74	12.83	PK
2483.5	12.14	34.02	V	46.16	54	7.84	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/g/n mode test. . Worst case of EUT is 6.5 Mbps in 802.11n.

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## 8.6 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 (dBµV)	
	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 ground plane.
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.
5. We are performed the AC Power Line Conducted Emission test for 36 Mbps, Ch.6 and 802.11g.

■ RESULT PLOTS

Conducted Emissions (Line 1)

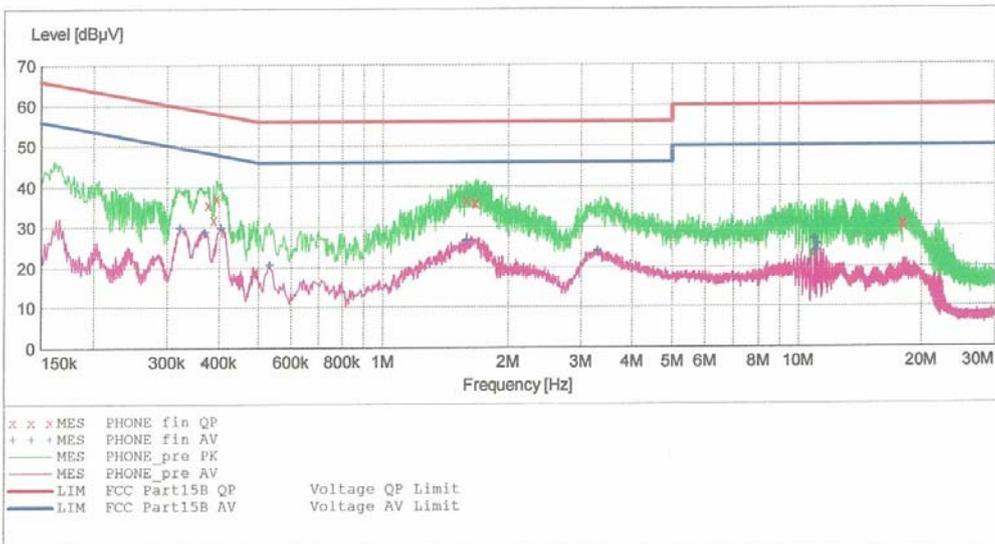
HCT

EMC

EUT: I-04D  
 Manufacturer: LG  
 Operating Condition: WLAN MODE  
 Test Site: SHIELD ROOM  
 Operator: JS LEE  
 Test Specification: FCC PART15 CLASS B  
 Comment: H

SCAN TABLE: "FCC PART 15 B(H)"

Short Description:			FCC PART 15 CLASS B			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	1.0 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: "PHONE\_fin\_QP"

2/20/2012 5:22PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.375010	35.70	10.1	58	22.7	---	---
0.388010	31.90	10.1	58	26.2	---	---
0.394010	37.20	10.1	58	20.8	---	---
1.584000	36.50	10.2	56	19.5	---	---
1.660000	36.10	10.2	56	19.9	---	---
1.668000	35.90	10.2	56	20.1	---	---
17.948000	30.70	11.7	60	29.3	---	---
17.984000	31.00	11.7	60	29.0	---	---
18.068000	30.10	11.7	60	29.9	---	---

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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**MEASUREMENT RESULT: "PHONE\_fin AV"**

2/20/2012 5:22PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.322010	29.90	10.1	50	19.7	---	---
0.369010	28.80	10.1	49	19.7	---	---
0.404010	29.90	10.1	48	17.9	---	---
0.532000	20.70	10.1	46	25.3	---	---
1.588000	26.70	10.2	46	19.3	---	---
3.300000	24.10	10.3	46	21.9	---	---
10.960000	26.80	11.0	50	23.2	---	---
11.004000	24.00	11.0	50	26.0	---	---
11.128000	25.60	11.0	50	24.4	---	---

<b>FCC PT.15.247 TEST REPORT</b>		<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1202FR13-1	<b>Date of Issue:</b> March 02, 2012	<b>EUT Type:</b> Cellular HSPA WCDMA Wireless Router with WLAN		<b>FCC ID:</b> ZNFL04D

## Conducted Emissions (Line 2)

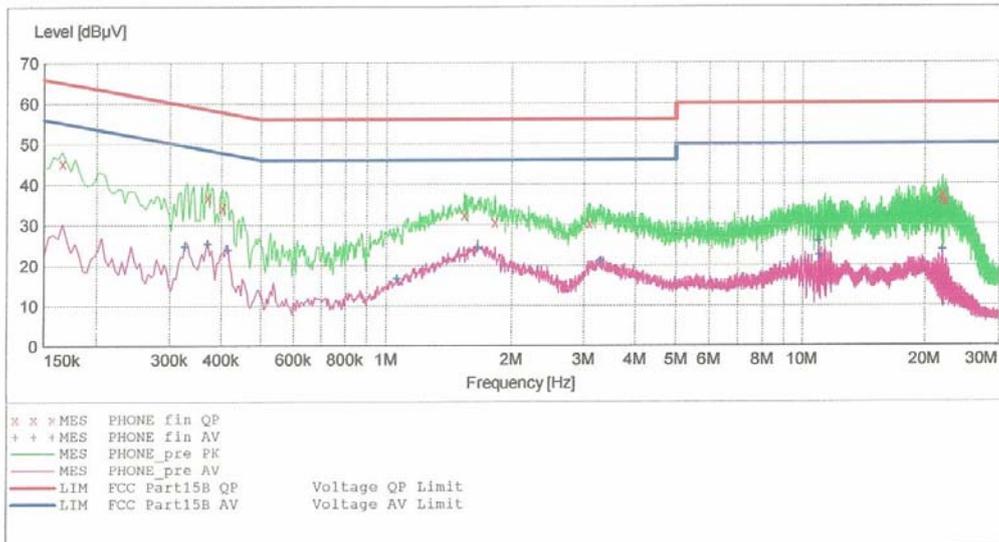
HCT

EMC

EUT: L-04D  
 Manufacturer: LG  
 Operating Condition: WLAN MODE  
 Test Site: SHIELD ROOM  
 Operator: JS LEE  
 Test Specification: FCC PART15 CLASS B  
 Comment: N

**SCAN TABLE: "FCC PART 15 B(N)"**

Short Description:		FCC PART 15 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: "PHONE\_fin\_QP"**

2/20/2012 5:19PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.166010	45.30	10.3	65	19.9	---	---
0.370010	36.90	10.3	59	21.6	---	---
0.402010	34.30	10.3	58	23.5	---	---
1.536000	32.50	10.4	56	23.5	---	---
1.820000	30.70	10.4	56	25.3	---	---
3.100000	30.30	10.5	56	25.7	---	---
22.004000	36.20	11.7	60	23.8	---	---
22.052000	37.60	11.7	60	22.4	---	---
22.452000	35.80	11.8	60	24.2	---	---

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR13-1	Date of Issue: March 02, 2012	EUT Type: Cellular HSPA WCDMA Wireless Router with WLAN	FCC ID: ZNFL04D

**MEASUREMENT RESULT: "PHONE\_fin AV"**

2/20/2012 5:19PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.326010	24.70	10.3	50	24.8	---	---
0.370010	25.40	10.3	49	23.1	---	---
0.414010	23.80	10.3	48	23.8	---	---
1.064000	16.80	10.4	46	29.2	---	---
1.656000	24.40	10.4	46	21.6	---	---
3.308000	21.20	10.5	46	24.8	---	---
10.964000	25.80	11.1	50	24.2	---	---
11.008000	22.40	11.1	50	27.6	---	---
22.048000	23.60	11.7	50	26.4	---	---

<b>FCC PT.15.247 TEST REPORT</b>		<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1202FR13-1	<b>Date of Issue:</b> March 02, 2012	<b>EUT Type:</b> Cellular HSPA WCDMA Wireless Router with WLAN		<b>FCC ID:</b> ZNFL04D

## 9. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ESH2-Z5/ LISN	Annual	02/03/2013	861741/013
Schwarzbeck	VULB 9168/ TRILOG Antenna	Biennial	02/09/2013	200
Rohde & Schwarz	ESI 40 / EMI TEST RECEIVER	Annual	05/26/2012	831564103
Agilent	E4440A/ Spectrum Analyzer	Annual	05/02/2012	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	Annual	09/23/2012	MY51110020
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	08/01/2012	375.8810.352
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	Annual	09/19/2012	10094
MITEQ	AFS44-00102650-42-10P-44-PS/ POWER AMP	Annual	09/23/2012	1532439
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	10/17/2013	937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	Biennial	10/26/2012	BBHA9170342
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	02/09/2013	839117/011
Agilent	E4440A / Spectrum Analyzer	Annual	05/02/2012	US45303008
Agilent	E4416A /Power Meter	Annual	11/07/2012	GB41291412
Agilent	E9327A /POWER SENSOR	Annual	05/02/2012	MY4442009
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	05/02/2012	1
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	05/02/2012	1
Hewlett Packard	11636B/Power Divider	Annual	11/07/2012	11377
Hewlett Packard	11667B / Power Splitter	Annual	11/04/2012	10126
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	11/07/2012	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	11/07/2012	010002156287001199
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	11/14/2012	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	05/02/2012	100422
EMCO	6502.LOOP ANTENNA	Biennial	01/11/2014	9009-2536
MITEQ	AMF-6D-001180-35-20P/ POWER AMP	Annual	12/26/2012	990893
Agilent	8493C / Attenuator(10 dB)	Annual	09/23/2012	76649