



## HCT CO., LTD.

### CERTIFICATE OF COMPLIANCE FCC Certification

**Applicant Name:**

Vertex Wireless Co., Ltd.

**Date of Issue:**

November 03, 2010

**Test Site/Location:**

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

**Address:**5F, Dongnam B/D, 8-8 Sunae-Dong, Bundang-Gu,  
Seongnam-City, Kyunggi-Do, Korea**Report No.:** HCTR1011FR05**HCT FRN:** 0005866421**IC Recognition No.:** 5944A-2**FCC ID:** XAVVW340**APPLICANT:** Vertex Wireless Co., Ltd.**FCC Rule Part(s):** Part 15.247**Application Type:** Certification**EUT Type:** CDMA EV-DO Rev.A Mini Wi-Fi Hotspot**FCC Model(s):** VW340**Tx Frequency:** 2412-2462 MHz(DSSS/OFDM)**Rx Frequency:** 2412-2462 MHz(DSSS/OFDM)**Max. RF Output Power:** Wi-Fi 802.11b(12.65 dBm) / Wi-Fi 802.11g (12.33 dBm)**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 Seouk 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		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1011FR05	Date of Issue: November 03, 2010	EUT Type: CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	FCC ID: XAVVW340



## Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1011FR05	November 03, 2010	First Approval Report



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## 1. GENERAL INFORMATION

**Applicant:** Vertex Wireless Co., Ltd.  
**Address:** 5F, Dongnam B/D, 8-8 Sunae-Dong, Bundang-Gu, Seongnam-City, Kyunggi-Do, Korea  
**FCC ID:** XAVVW340  
**EUT:** CDMA EV-DO Rev.A Mini Wi-Fi Hotspot  
**Model Name:** VW340  
**Date of Test:** October 18, 2010 ~ November 02, 2010  
**Contact person:** Name: Sin Bok, Lee  
Phone #: +82-31-702-4901  
Fax #: +82-31-702-4567

## 2. EUT DESCRIPTION

<b>Product</b>	CDMA EV-DO Rev.A Mini Wi-Fi Hotspot
<b>Model Name</b>	VW340
<b>Power Supply</b>	DC 3.7 V
<b>Battery type</b>	Li-ion Battery(Standard)
<b>Frequency Range</b>	TX: 2412 ~ 2462 MHz RX: 2412 ~ 2462 MHz
<b>Max. RF Output Power:</b>	Wi-Fi 802.11b(12.65 dBm) / Wi-Fi 802.11g (12.33 dBm)
<b>Modulation Type</b>	DSSS/CCK(802.11b), OFDM(802.11g)
<b>Antenna Specification</b>	Manufacturer: RadiAnt Antenna type: PCB Antenna Peak Gain : 1.83 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.

#### 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

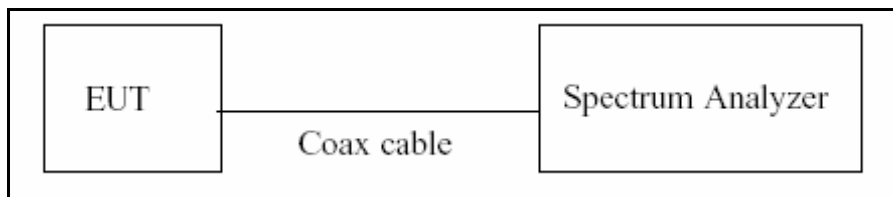
### 7.1 6dB BANDWIDTH MEASUREMENT (802.11b/g)

#### 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	11.599	0.500	Pass
2437	6	11.308	0.500	Pass
2462	11	11.595	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

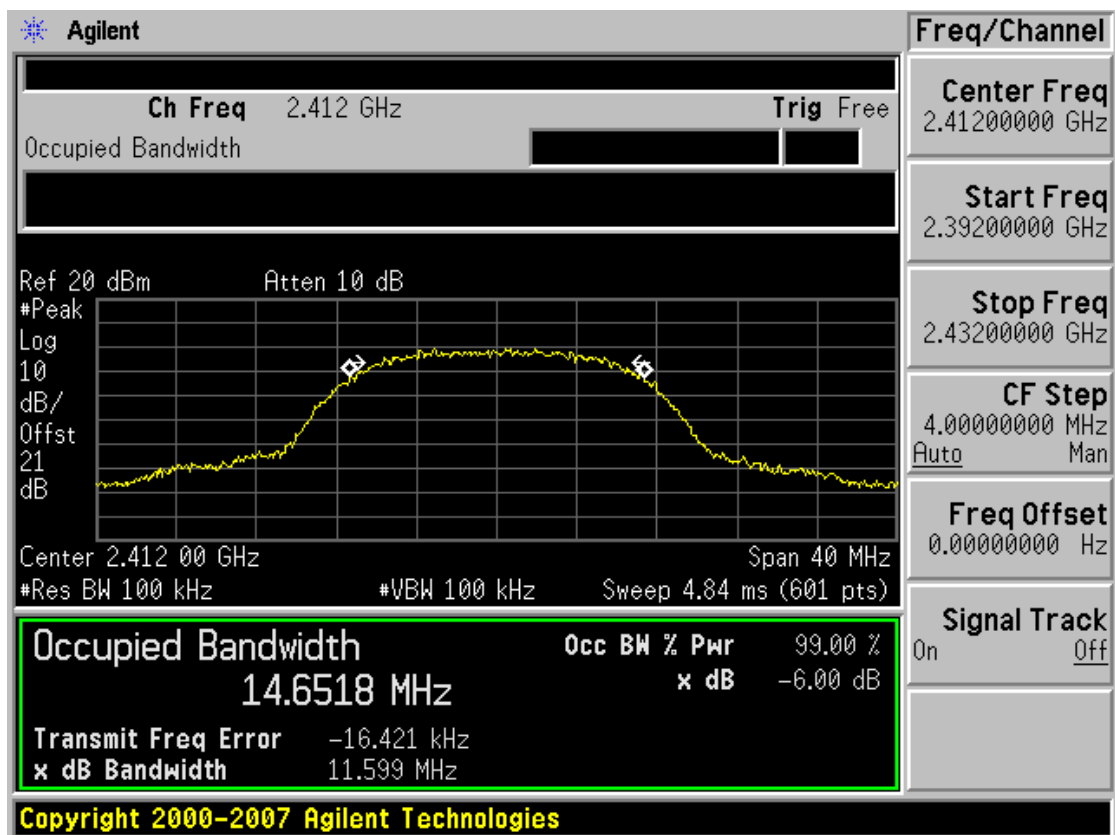
802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.498	0.500	Pass
2437	6	16.514	0.500	Pass
2462	11	16.489	0.500	Pass



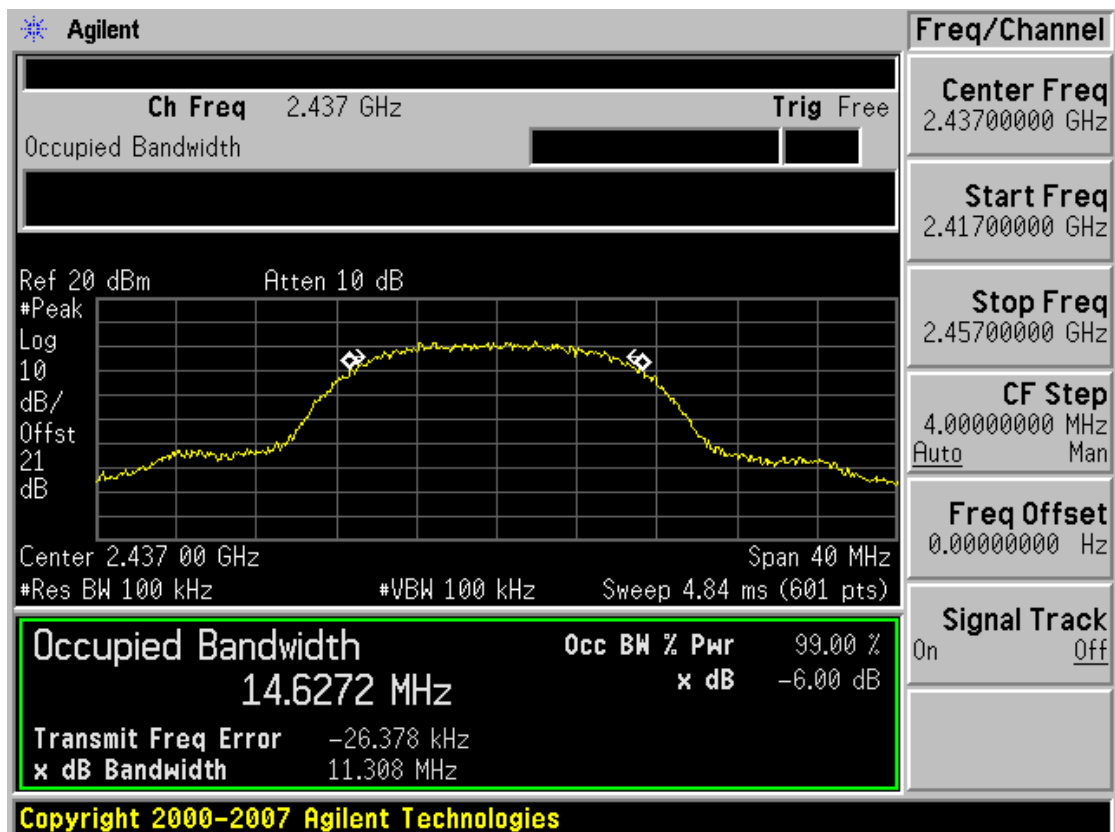


## RESULT PLOTS

6dB Bandwidth plot (802.11b-CH 1)

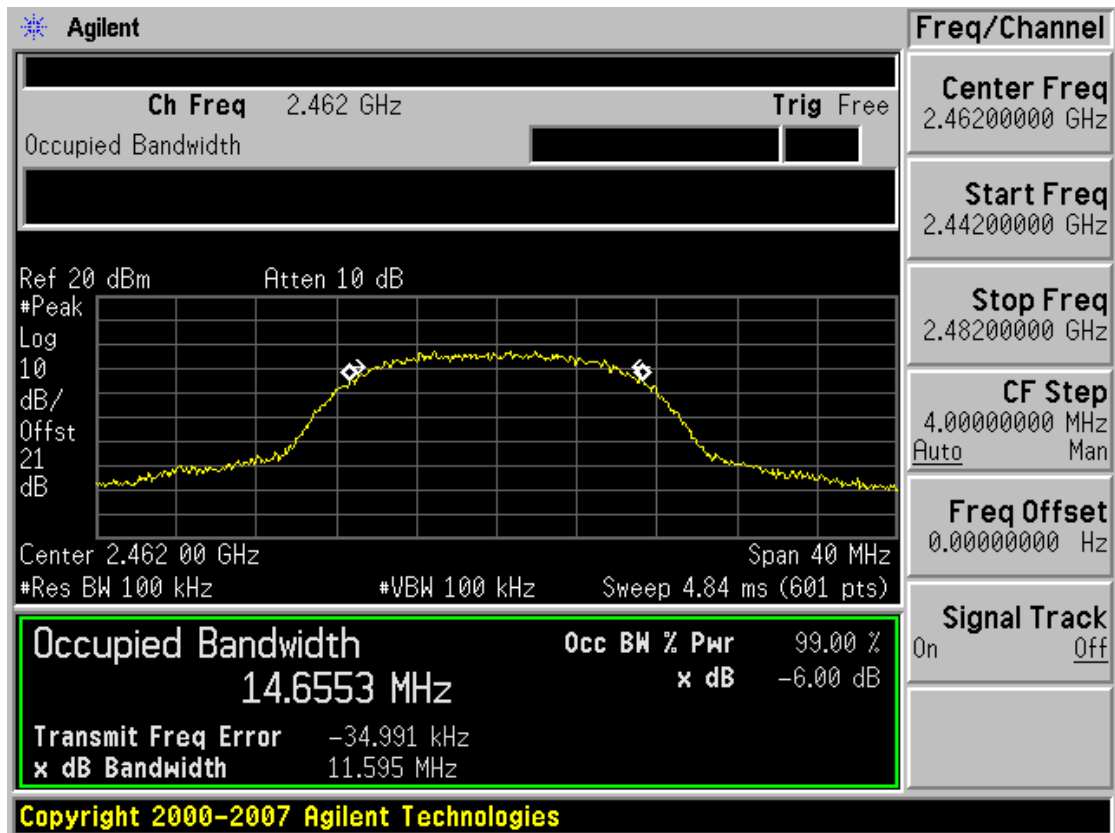


6dB Bandwidth plot (802.11b-CH 6)

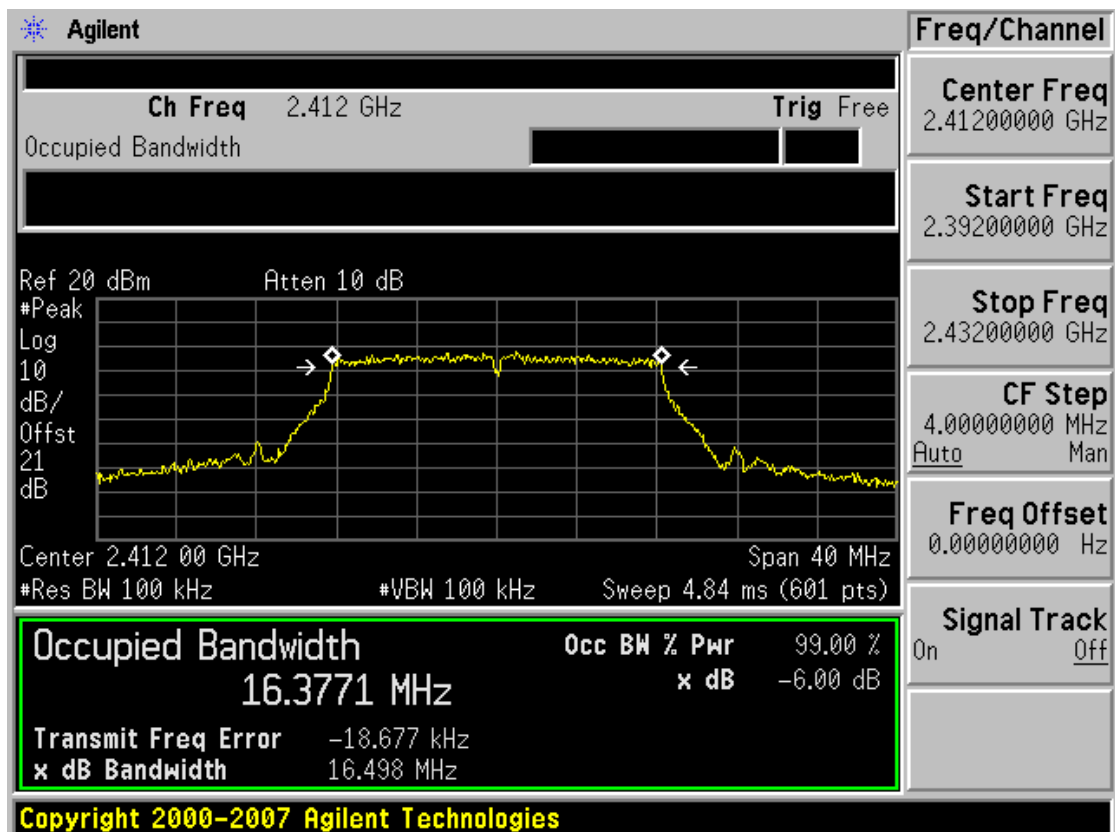




6dB Bandwidth plot (802.11b-CH 11)

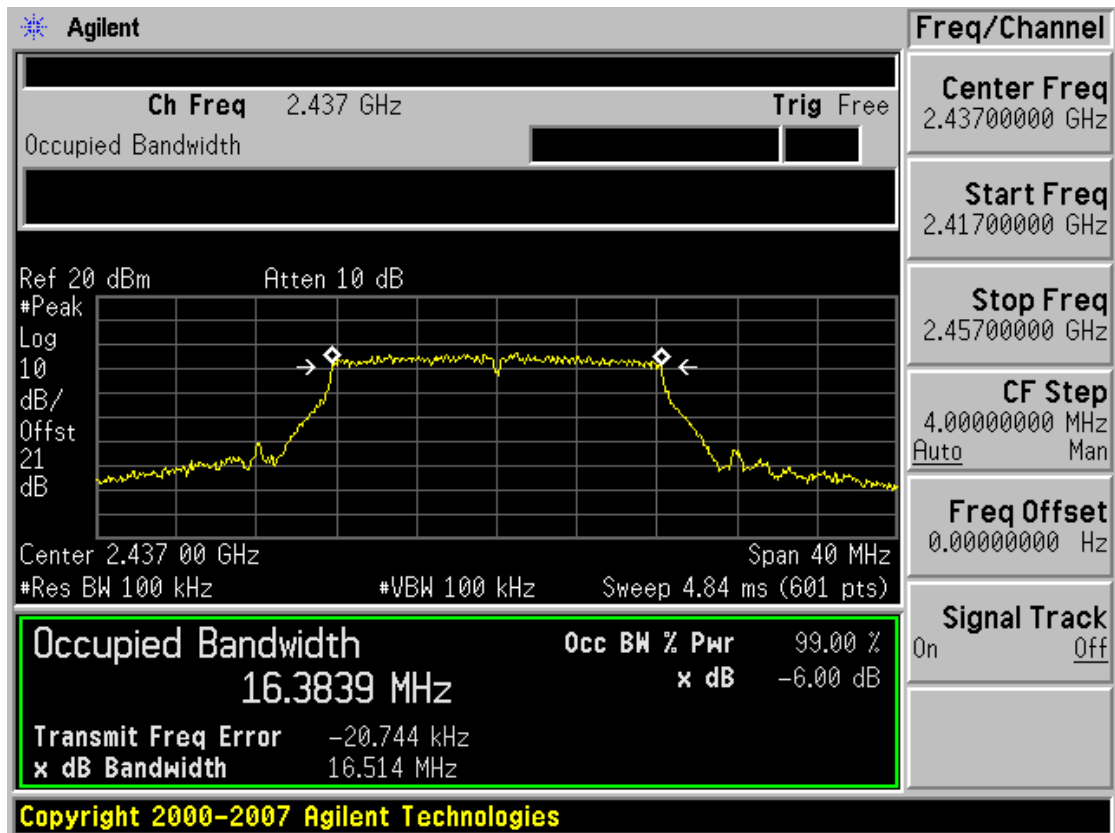


6dB Bandwidth plot (802.11g-CH 1)

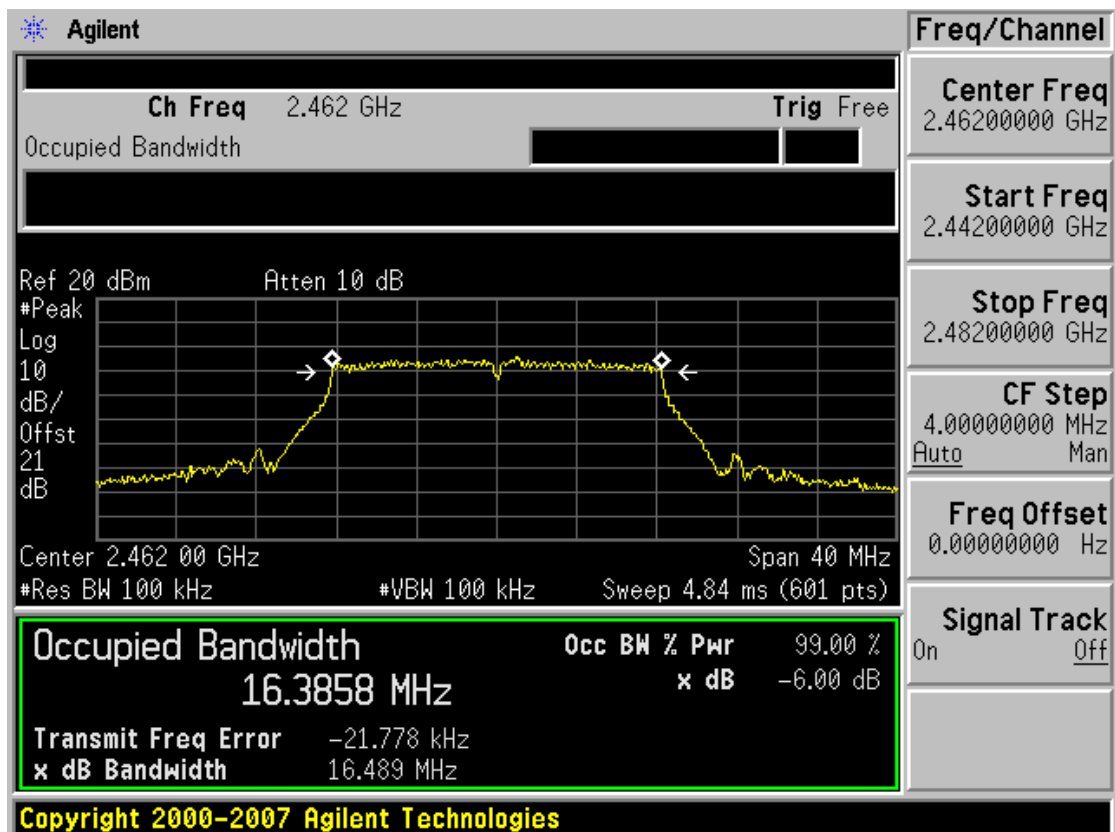




6dB Bandwidth plot (802.11g-CH 6)



6dB Bandwidth plot (802.11g-CH 11)





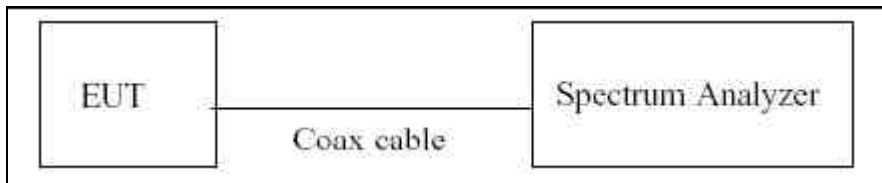
## 7.2 OUTPUT POWER MEASUREMENT (802.11b/g)

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

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

**The maximum permissible conducted output power is 1 Watt.**

#### ■ TEST CONFIGURATION



#### ■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW: 1 MHz

VBW: 1 MHz

SPAN: 40 MHz

Detector Mode = Peak

#### ■ TEST RESULTS

##### Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1 Mbps	11.92	30
		2 Mbps	12.12	30
		5.5 Mbps	12.45	30
		11 Mbps	12.65	30
2437	6	1 Mbps	10.58	30
		2 Mbps	10.85	30
		5.5 Mbps	11.25	30
		11 Mbps	11.43	30
2462	11	1 Mbps	9.12	30
		2 Mbps	9.37	30
		5.5 Mbps	9.74	30
		11 Mbps	9.99	30

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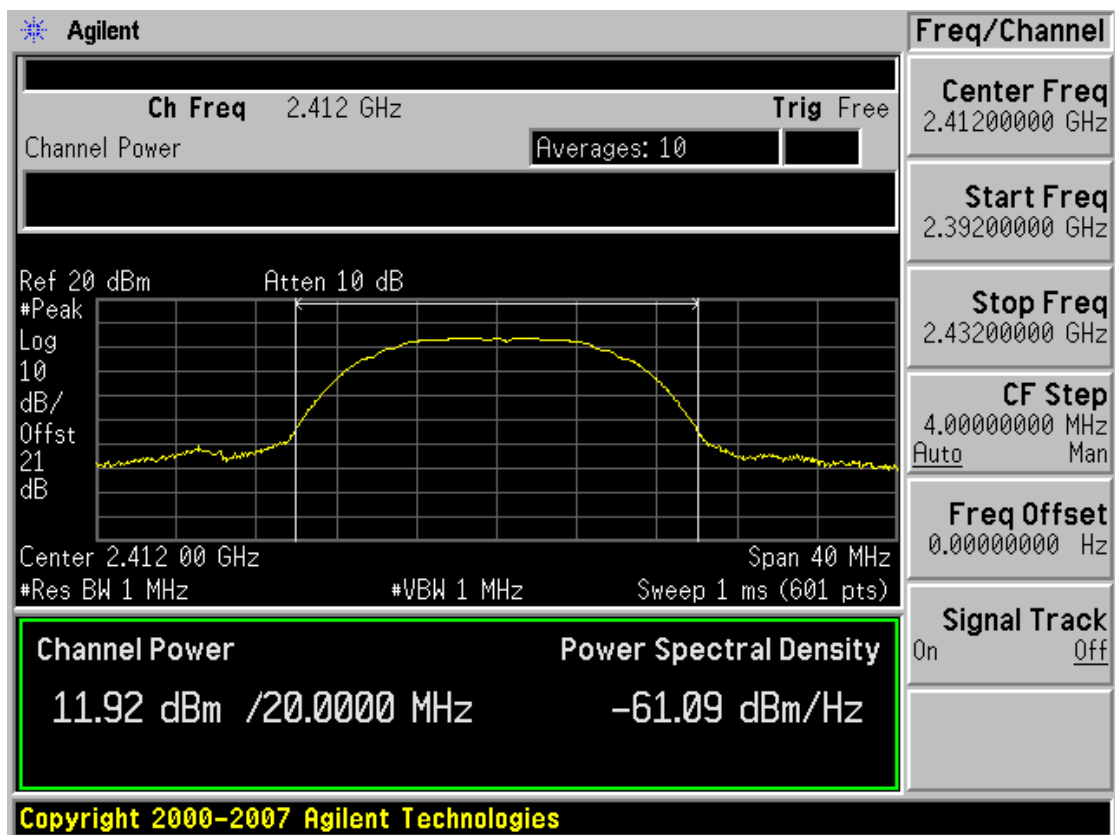
### Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	12.05	30
		9 Mbps	12.12	30
		12 Mbps	12.16	30
		18 Mbps	12.18	30
		24 Mbps	12.14	30
		36 Mbps	12.19	30
		48 Mbps	12.23	30
		54 Mbps	12.33	30
2437	6	6 Mbps	11.27	30
		9 Mbps	11.24	30
		12 Mbps	11.27	30
		18 Mbps	11.21	30
		24 Mbps	11.23	30
		36 Mbps	11.13	30
		48 Mbps	11.13	30
		54 Mbps	11.15	30
2462	11	6 Mbps	9.84	30
		9 Mbps	9.83	30
		12 Mbps	9.82	30
		18 Mbps	9.84	30
		24 Mbps	9.86	30
		36 Mbps	9.87	30
		48 Mbps	9.85	30
		54 Mbps	9.88	30

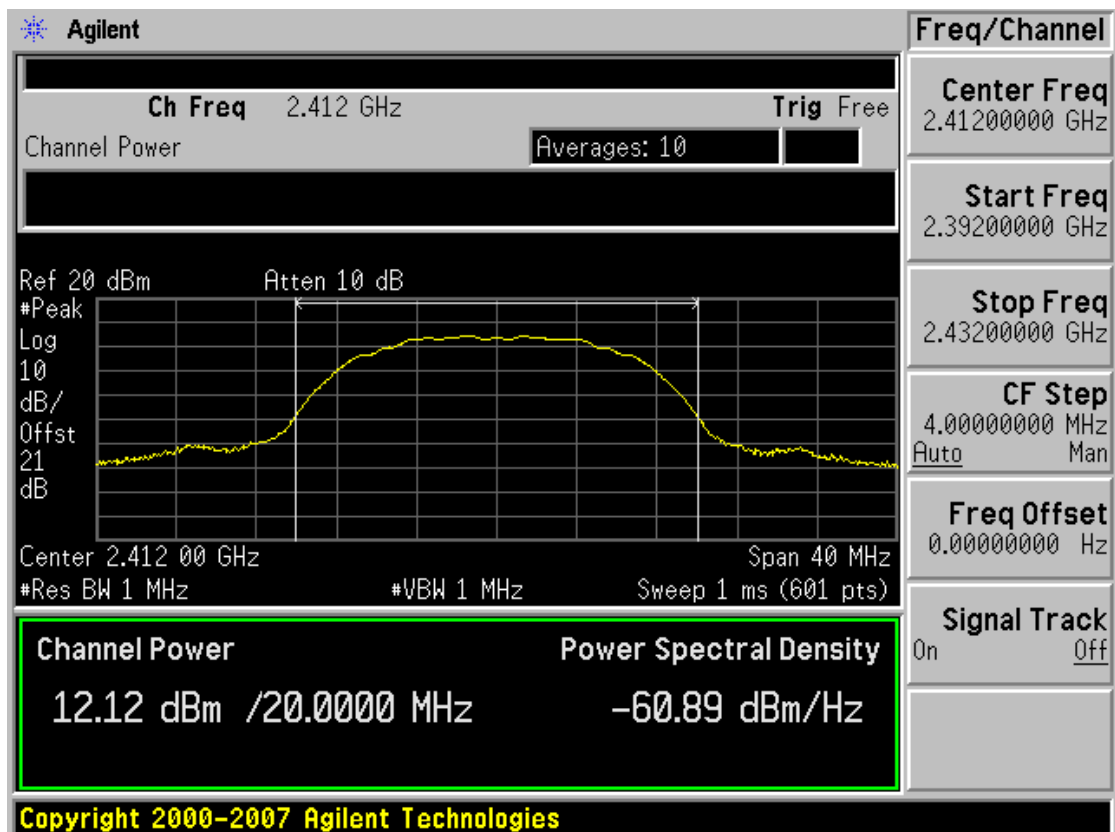


## RESULT PLOTS

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



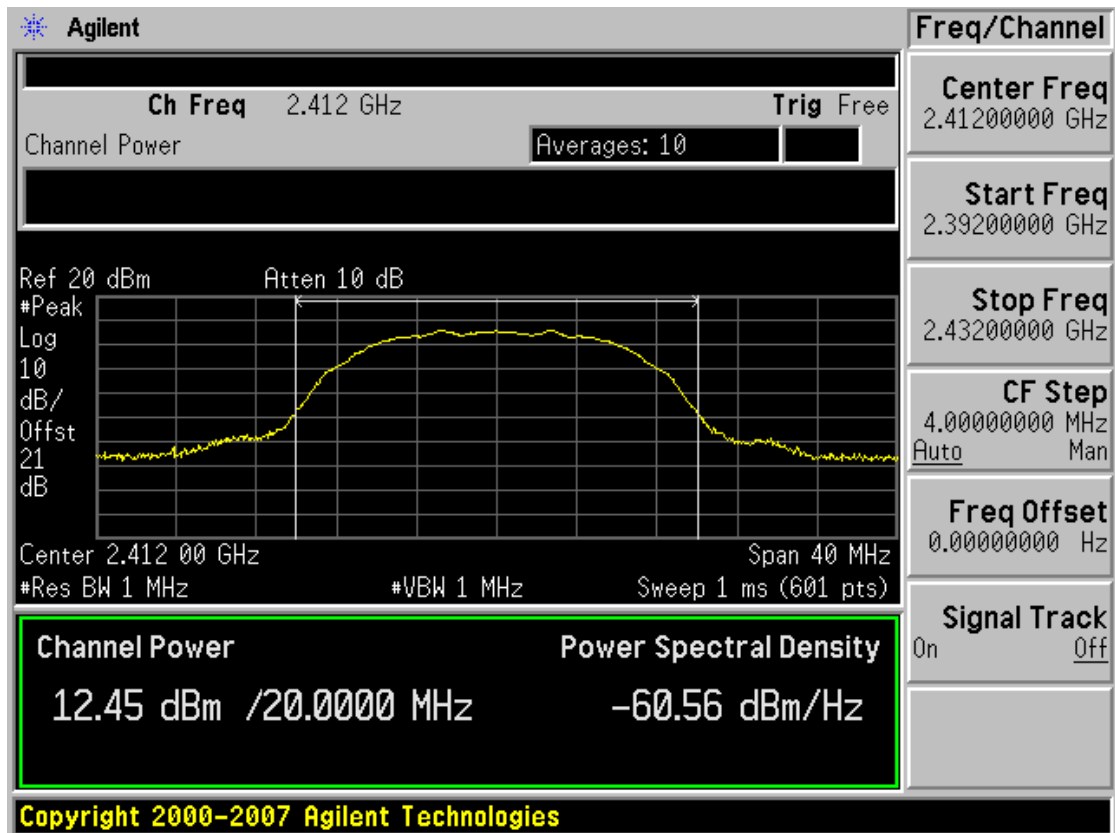
### Conducted Output Power (802.11b-CH 1) 2Mbps



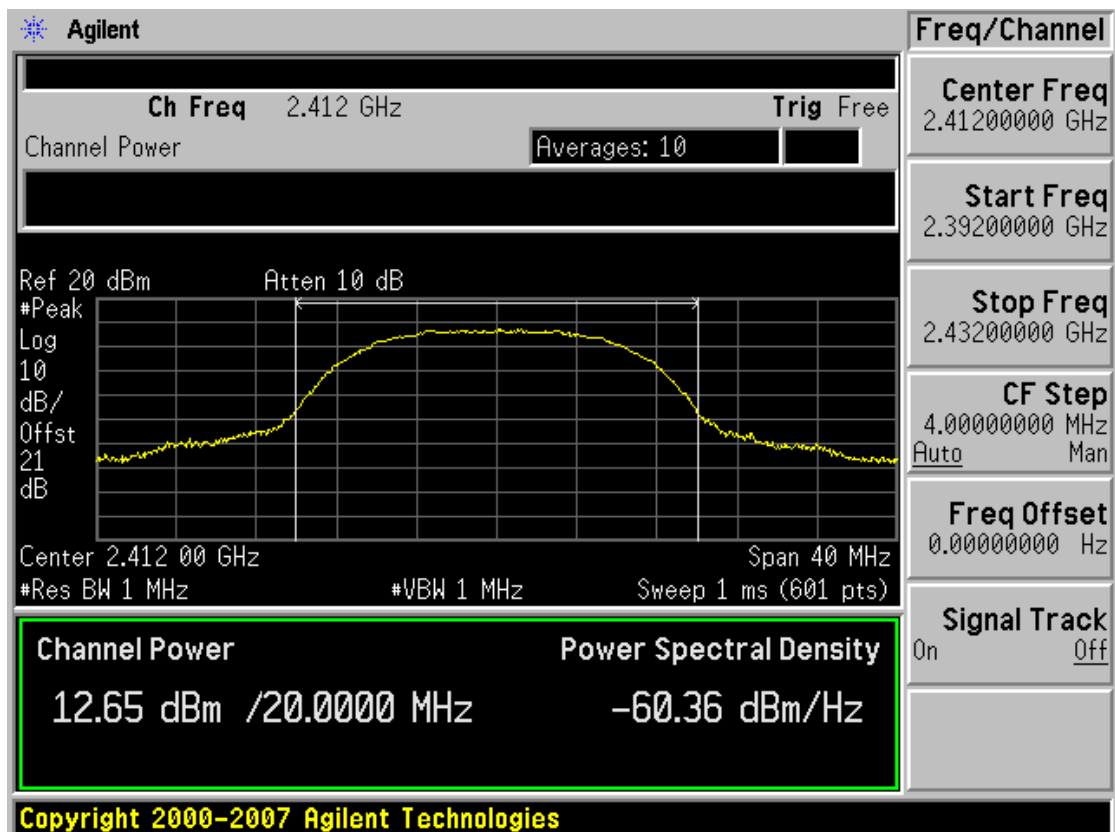
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### Conducted Output Power (802.11b-CH 1) 5.5Mbps

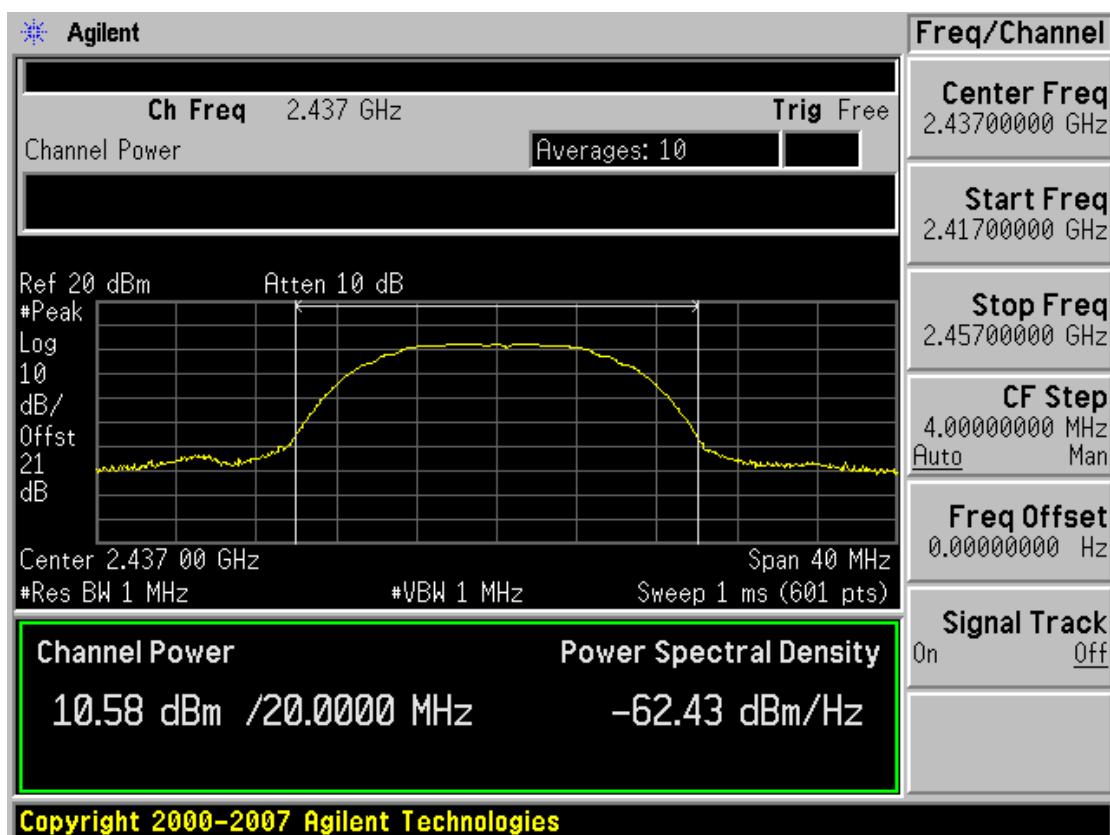


### Conducted Output Power (802.11b-CH 1) 11Mbps

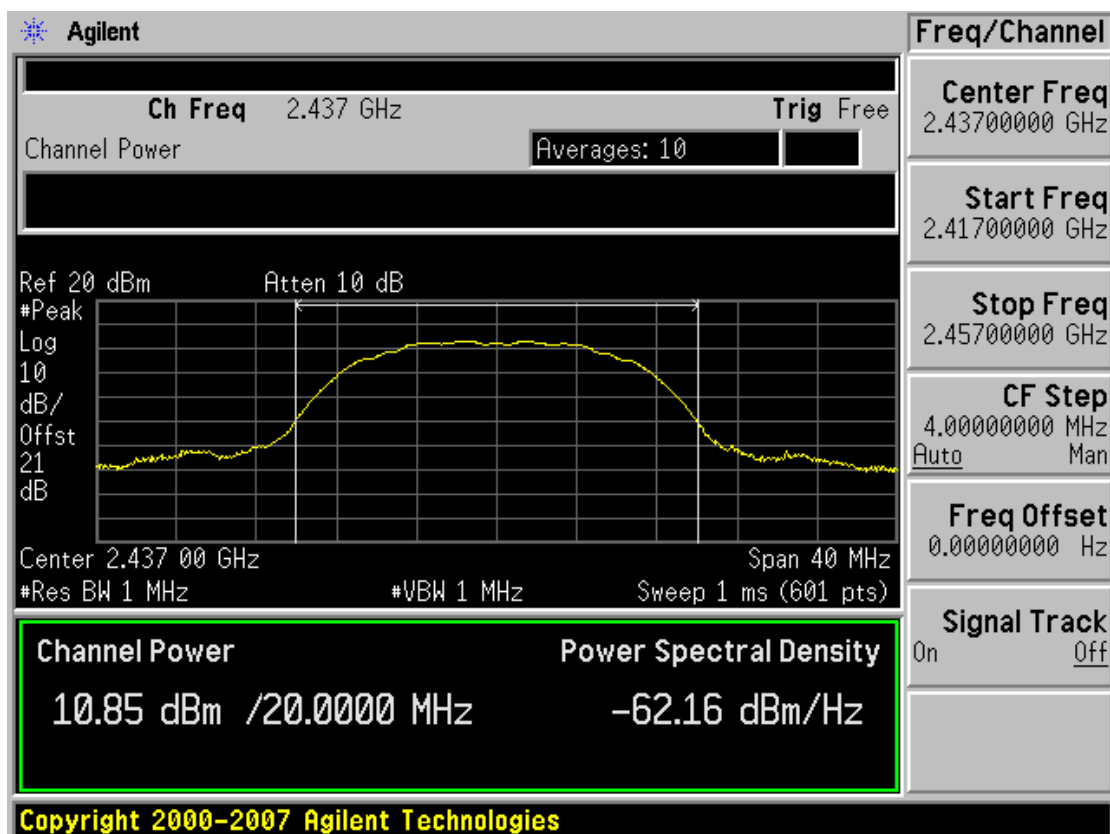




### Conducted Output Power (802.11b-CH 6) 1Mbps



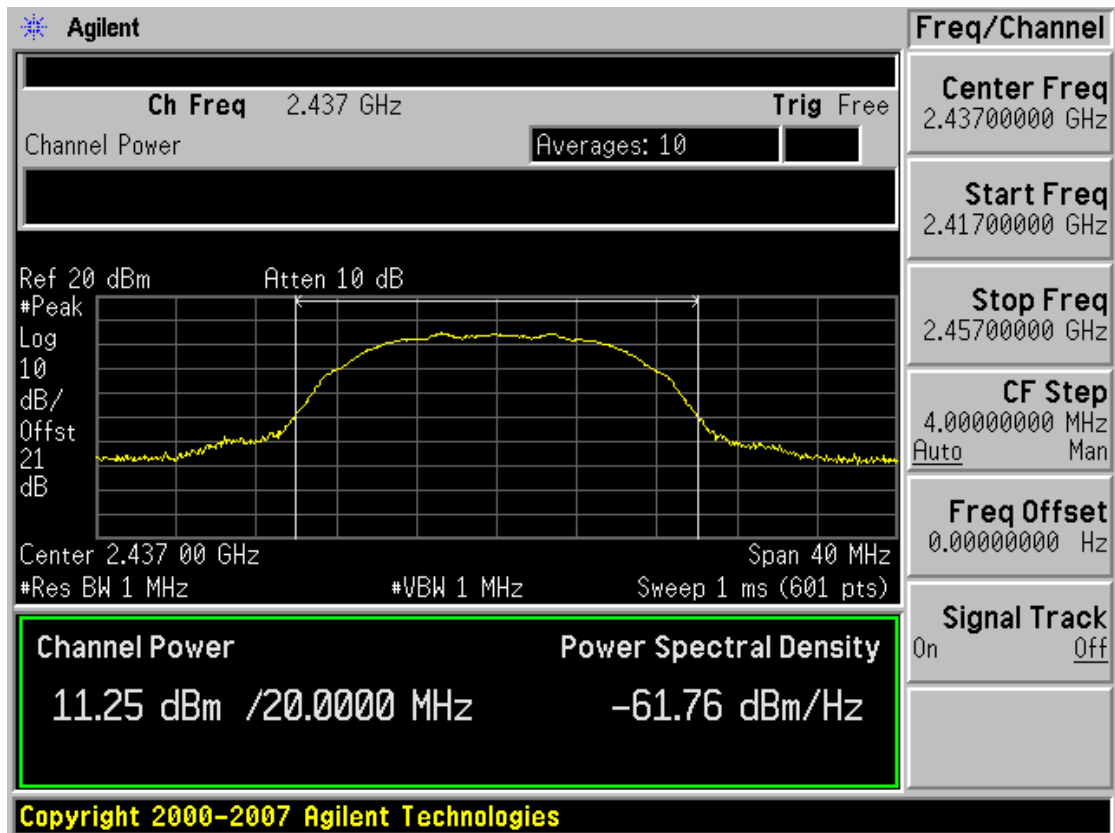
### Conducted Output Power (802.11b-CH 6) 2Mbps



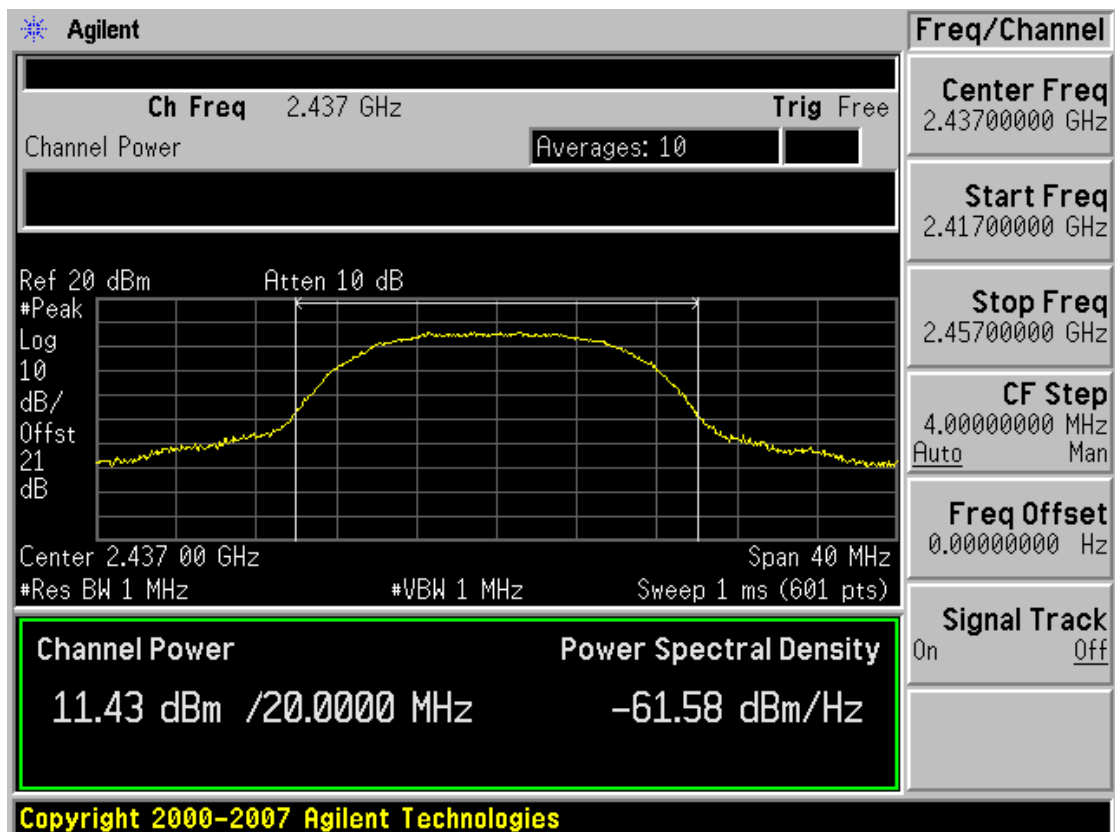




### Conducted Output Power (802.11b-CH 6) 5.5Mbps

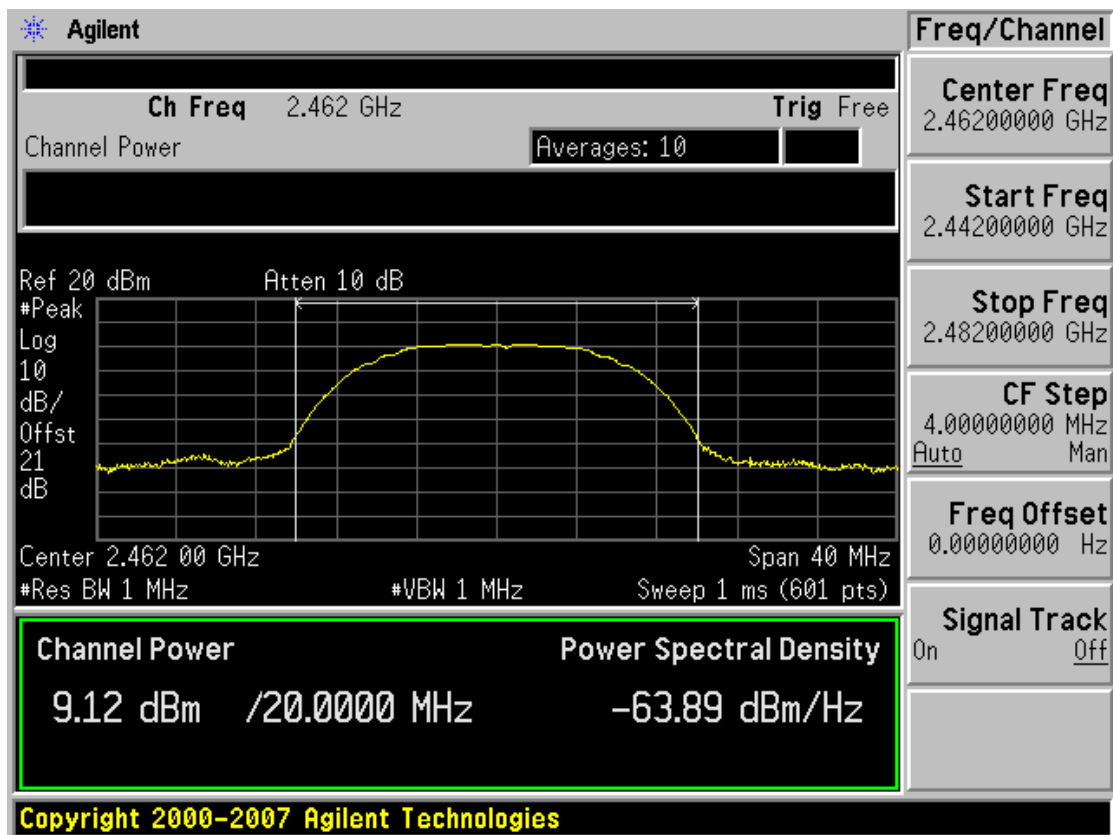


### Conducted Output Power (802.11b-CH 6) 11Mbps

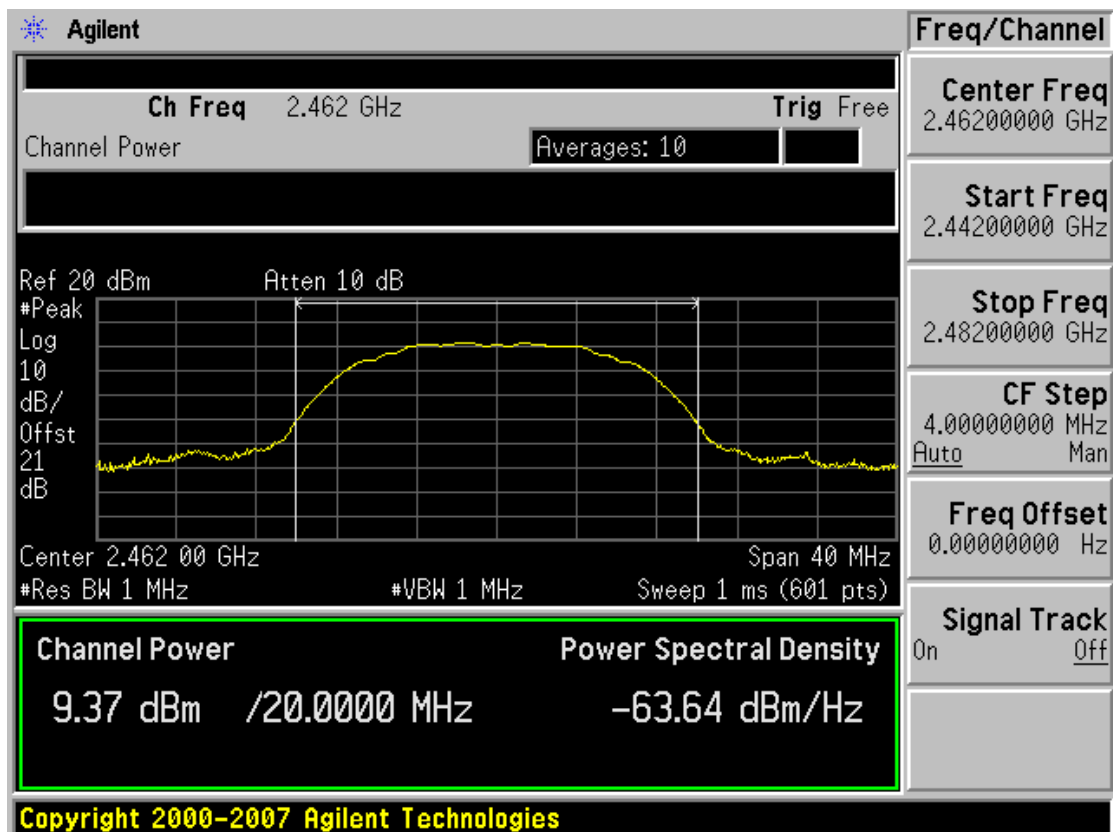




### Conducted Output Power (802.11b-CH 11) 1Mbps

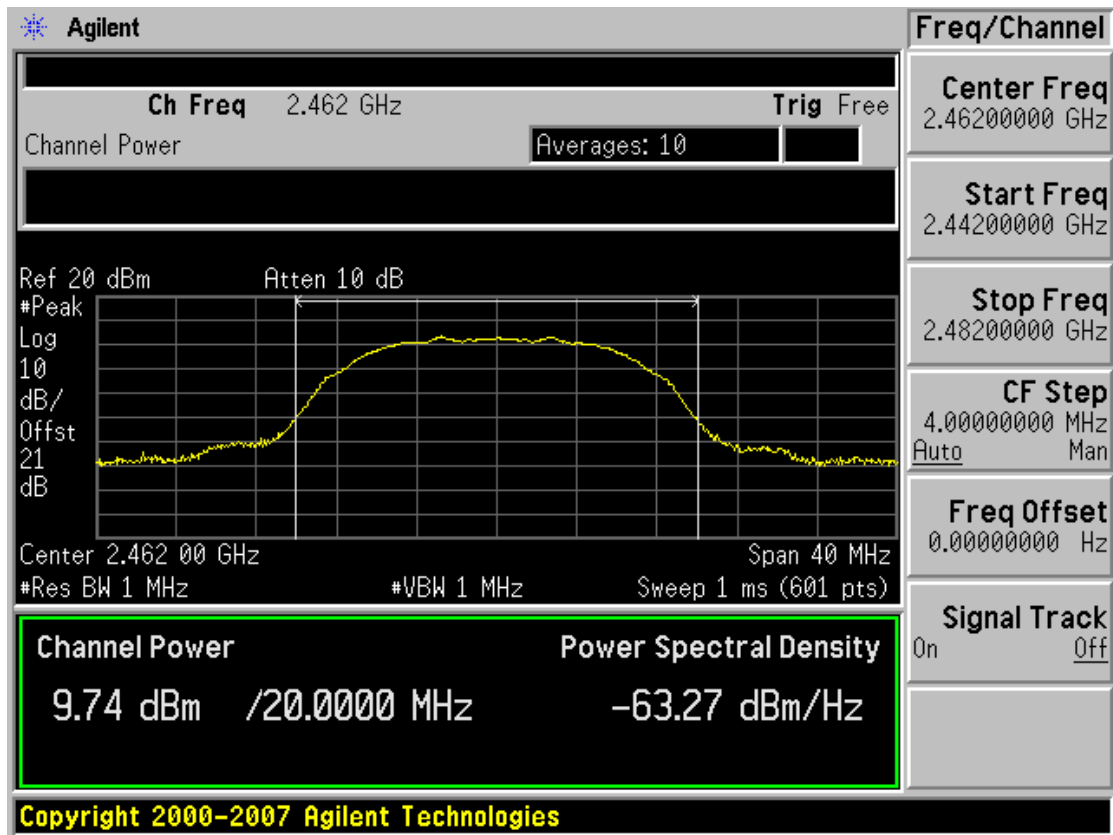


### Conducted Output Power (802.11b-CH 11) 2Mbps

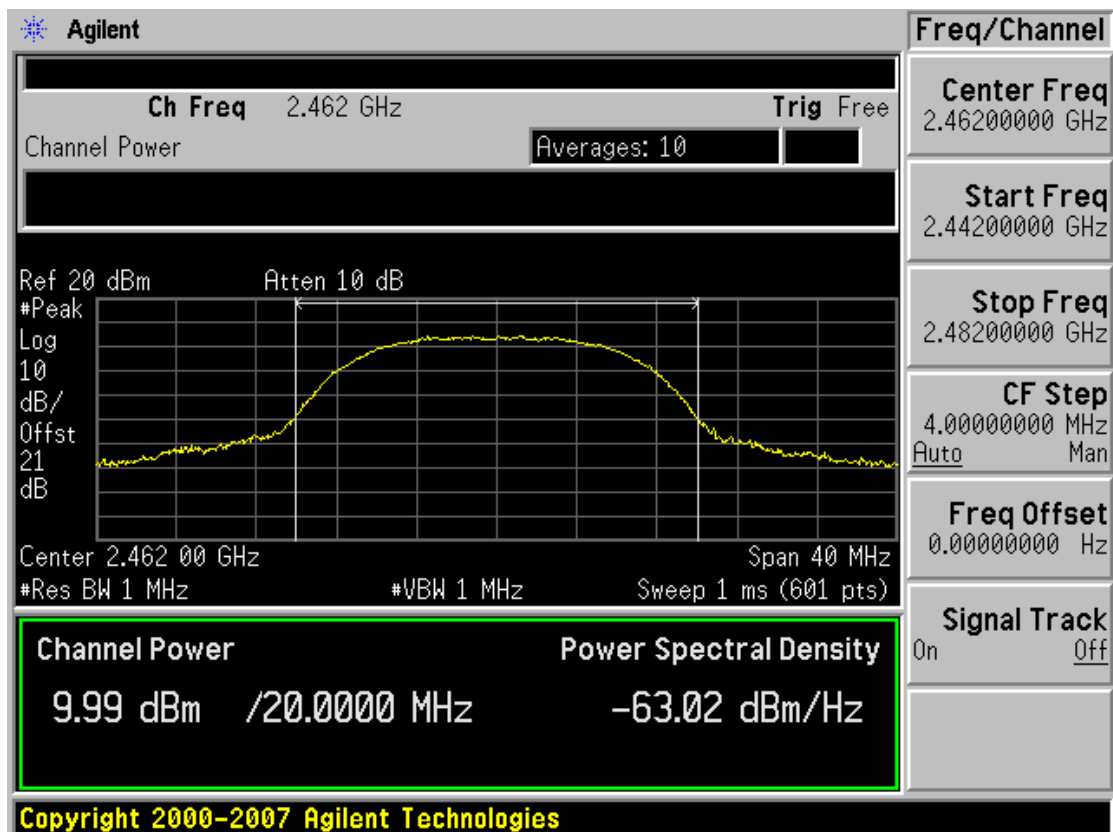




### Conducted Output Power (802.11b-CH 11) 5.5Mbps

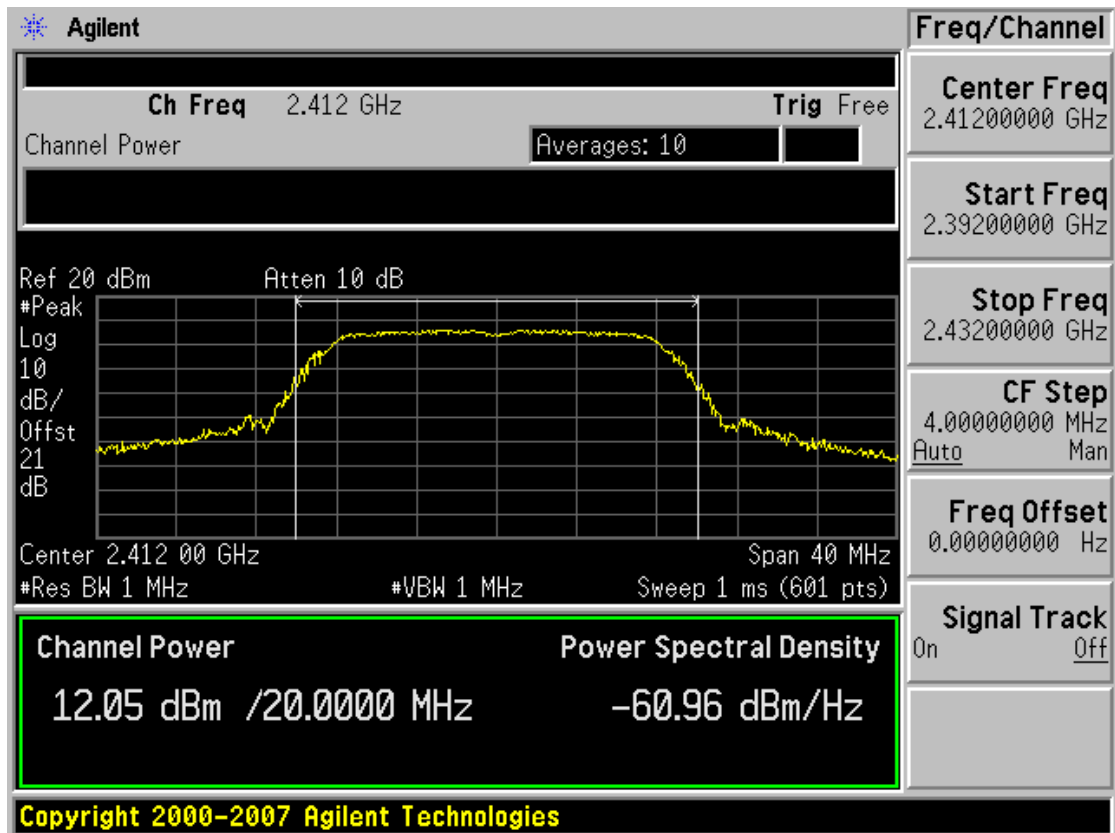


### Conducted Output Power (802.11b-CH 11) 11Mbps

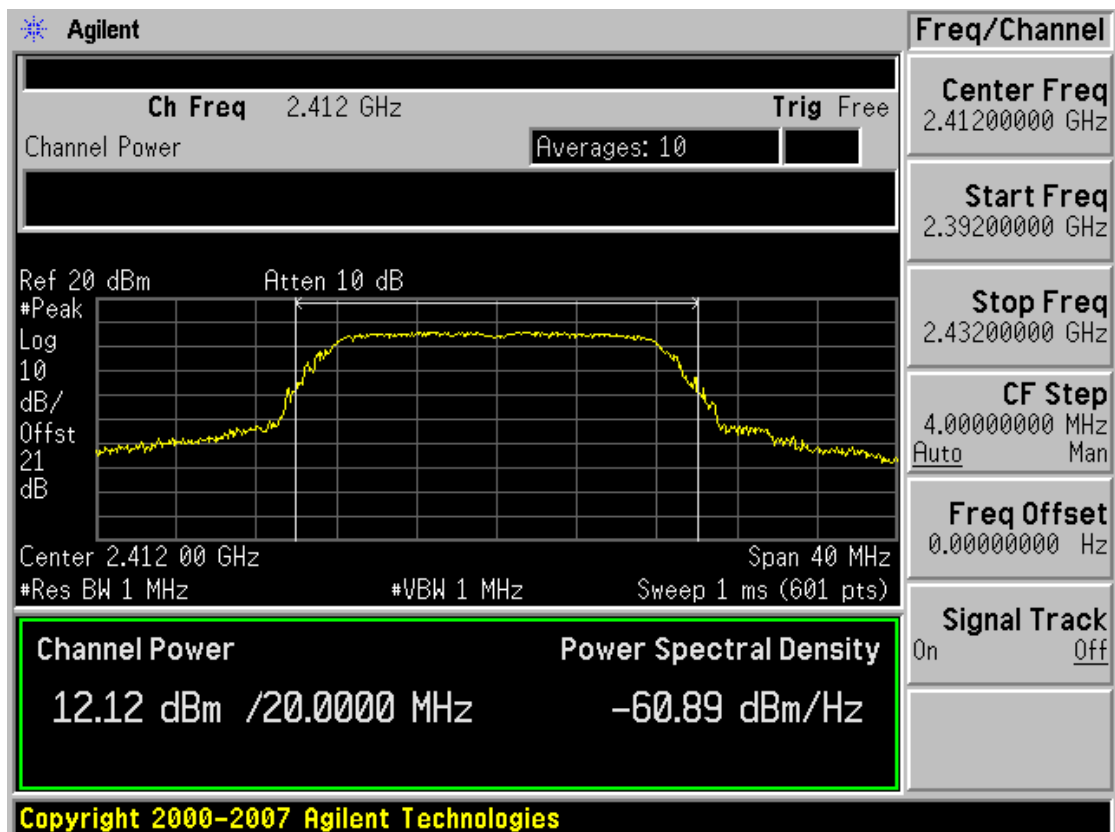




### Conducted Output Power (802.11g-CH 1) 6Mbps

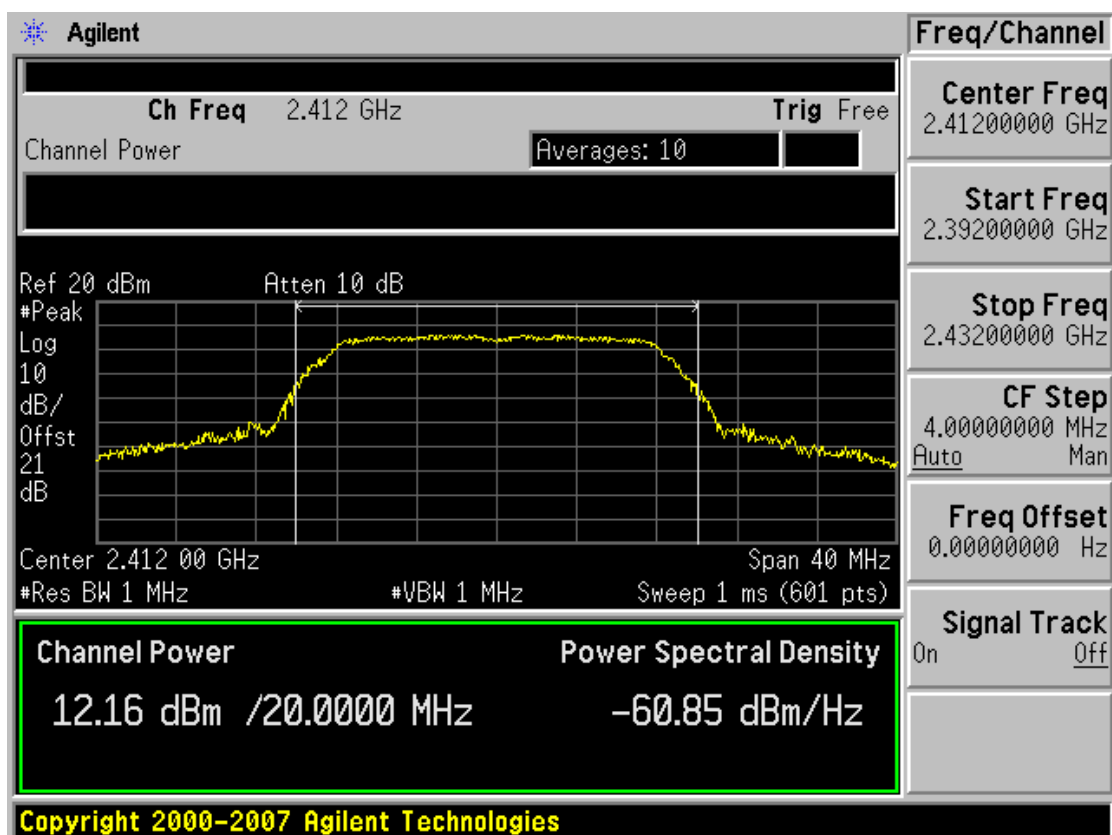


### Conducted Output Power (802.11g-CH 1) 9Mbps

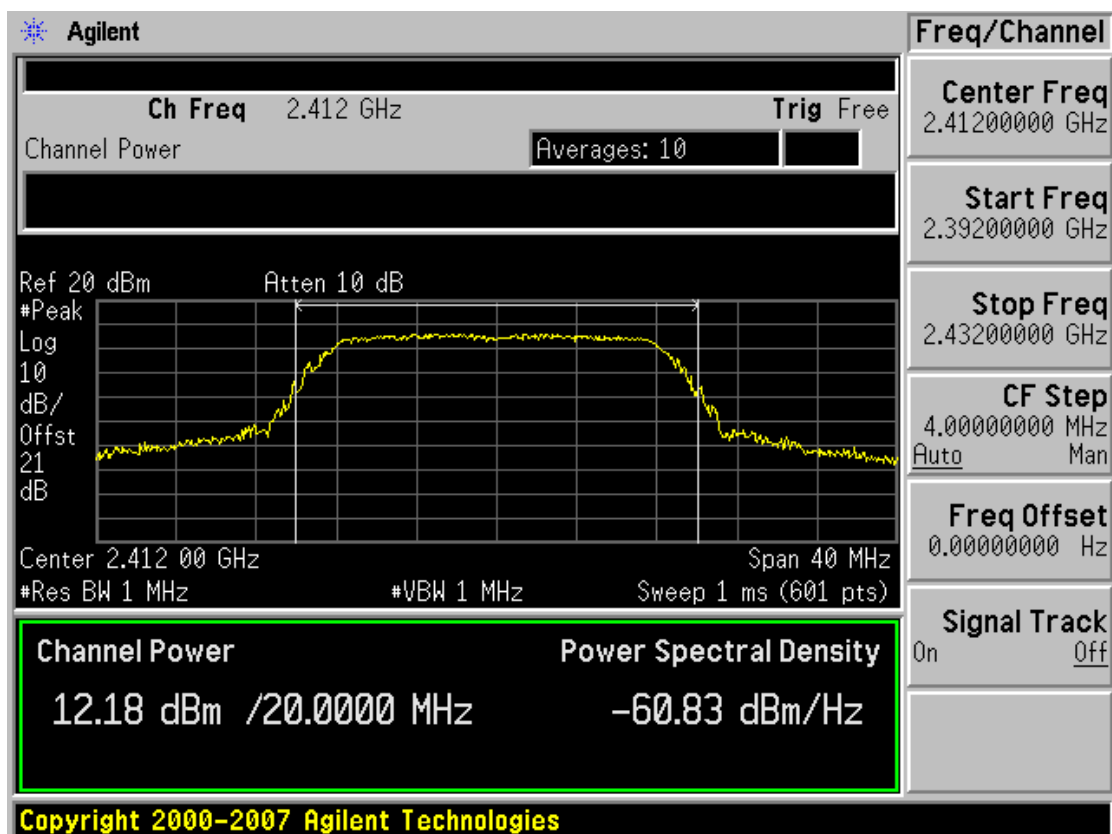




### Conducted Output Power (802.11g-CH 1) 12Mbps



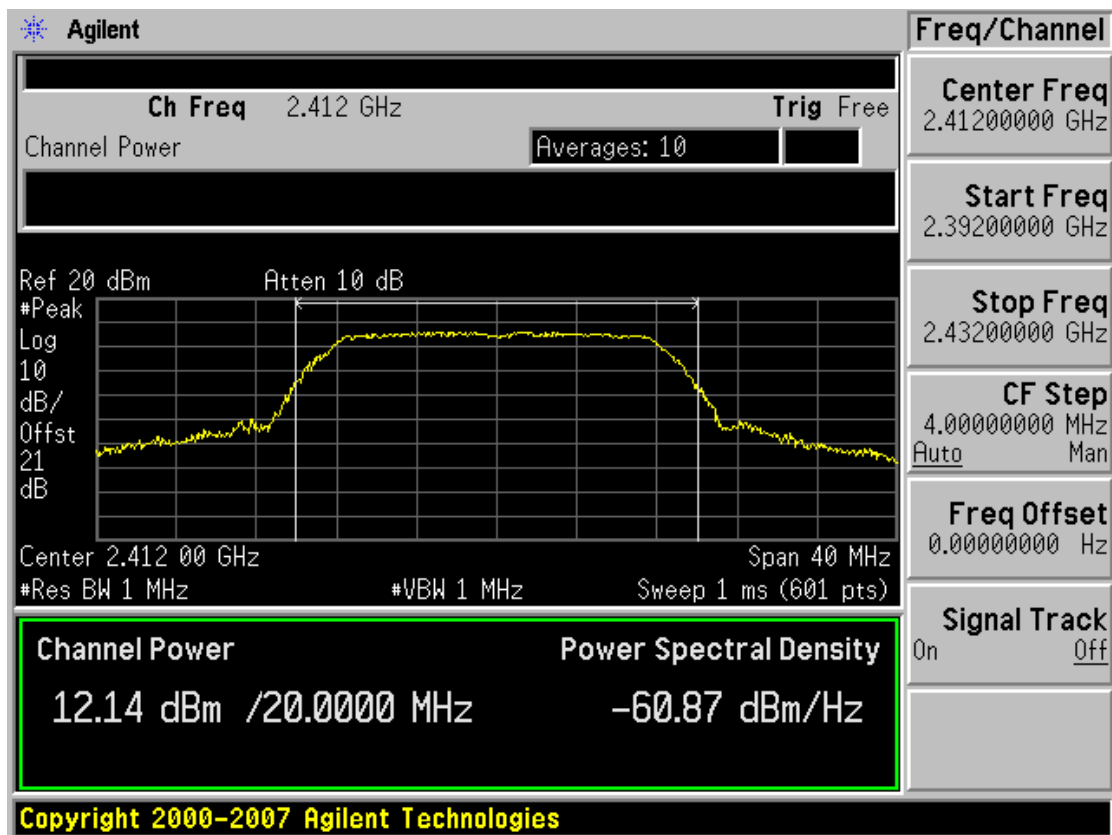
### Conducted Output Power (802.11g-CH 1) 18Mbps



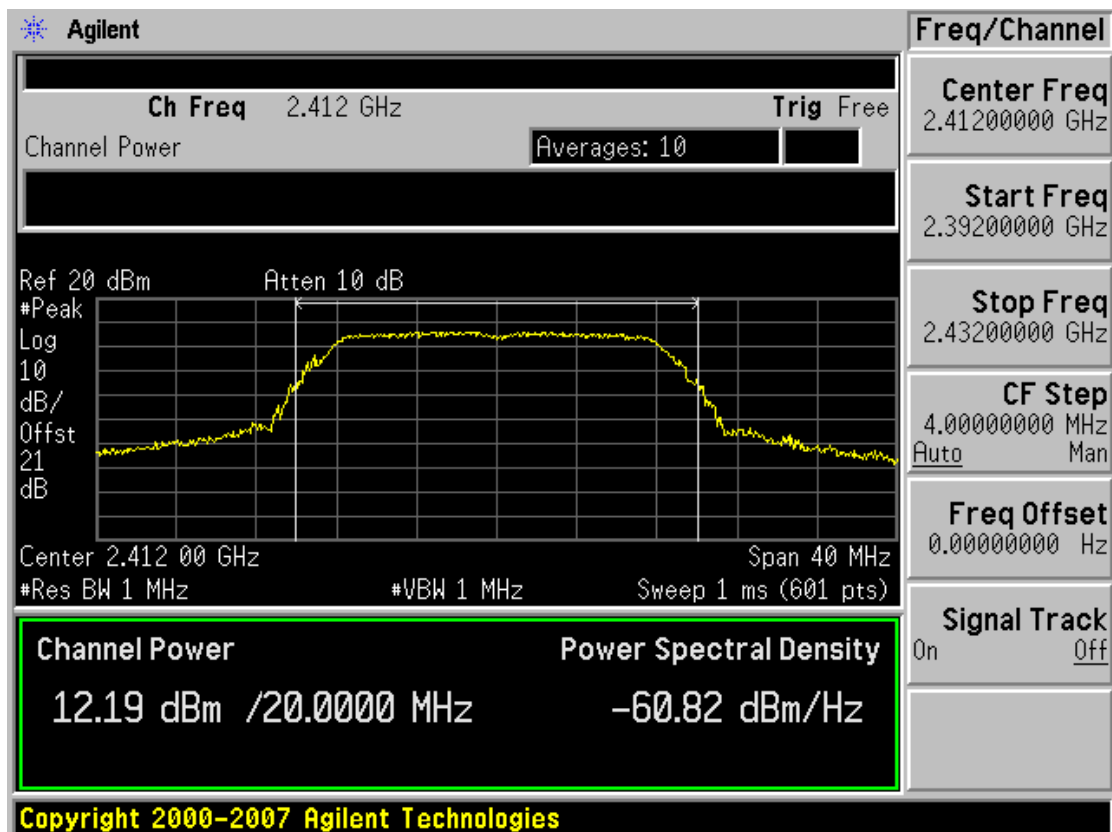
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### Conducted Output Power (802.11g-CH 1) 24Mbps

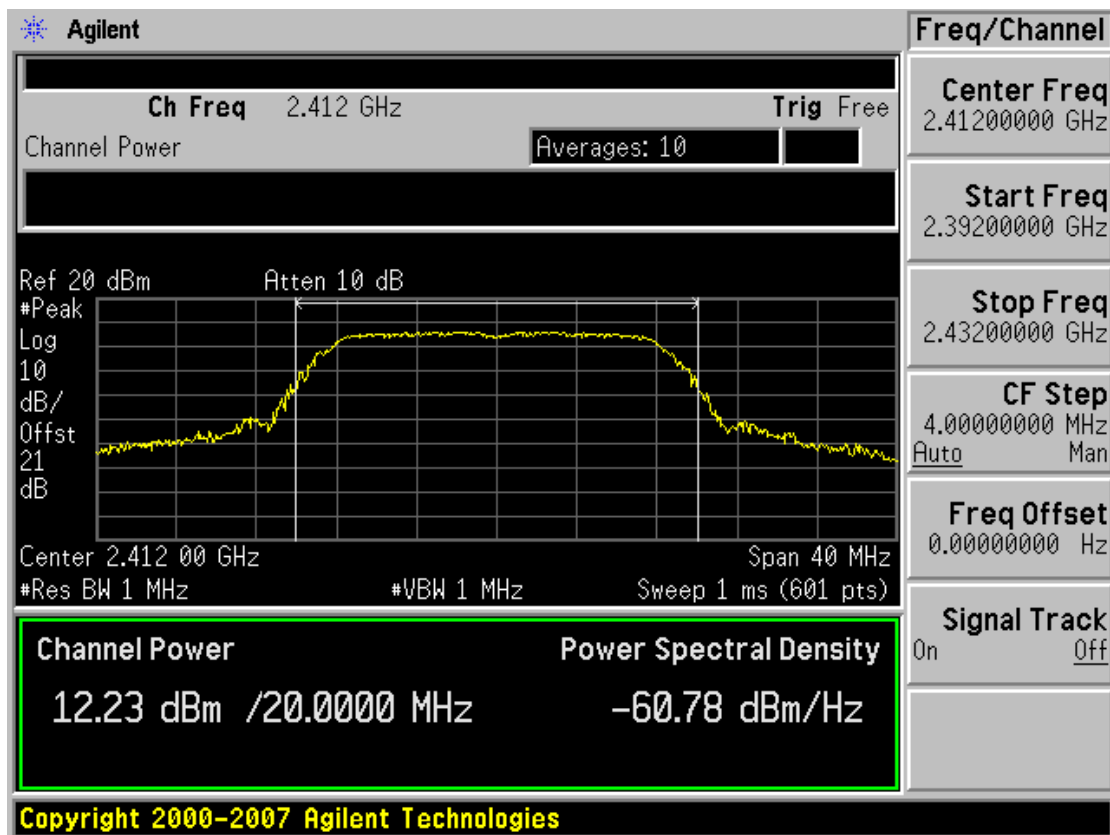


### Conducted Output Power (802.11g-CH 1) 36Mbps

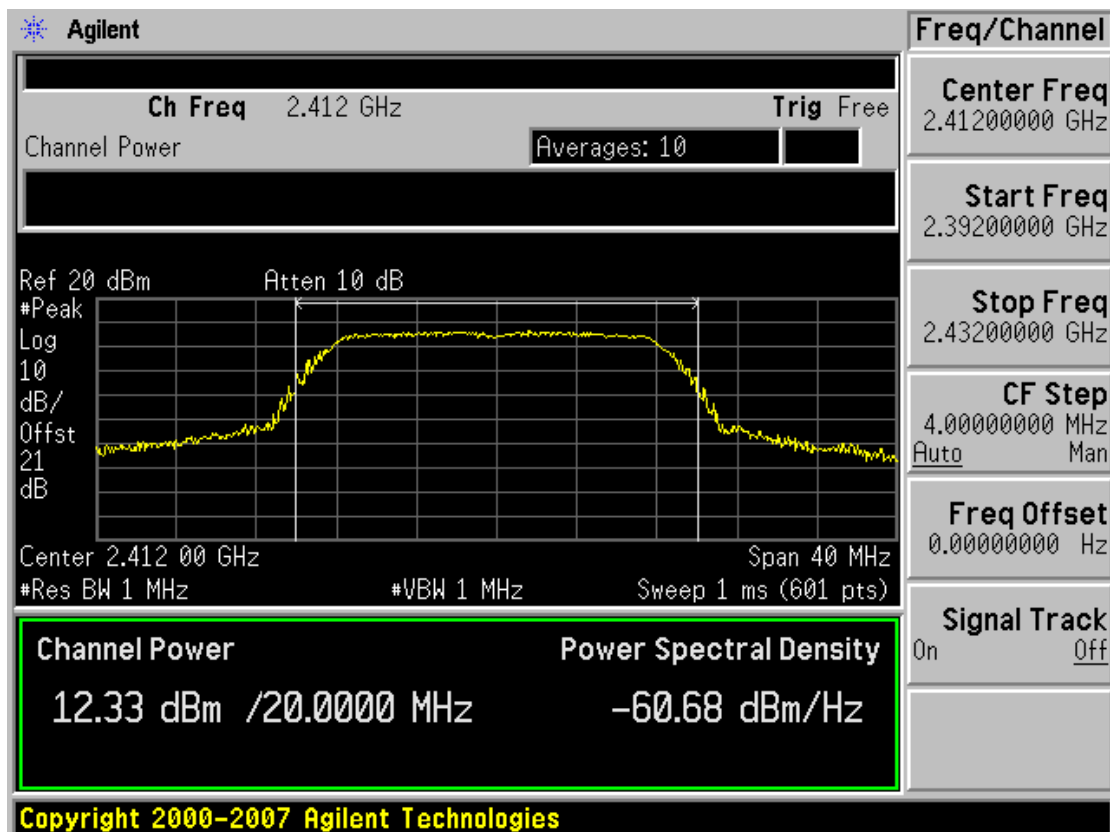




### Conducted Output Power (802.11g-CH 1) 48Mbps

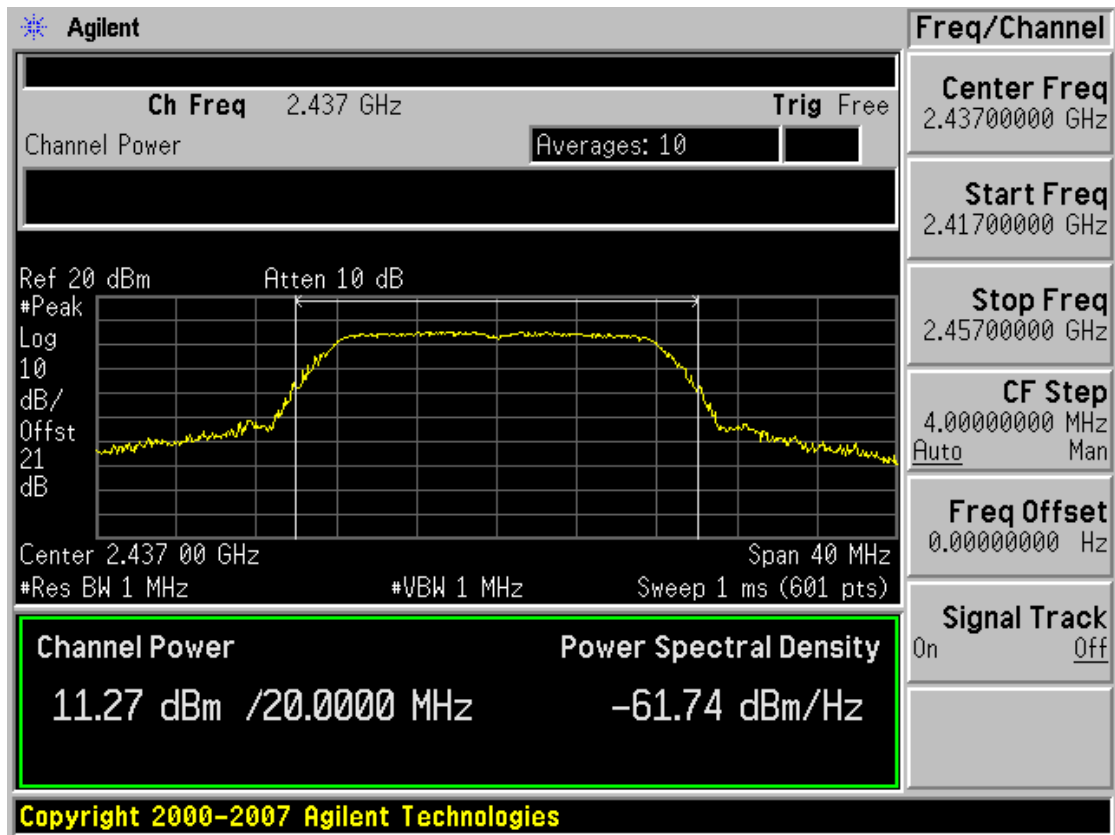


### Conducted Output Power (802.11g-CH 1) 54Mbps

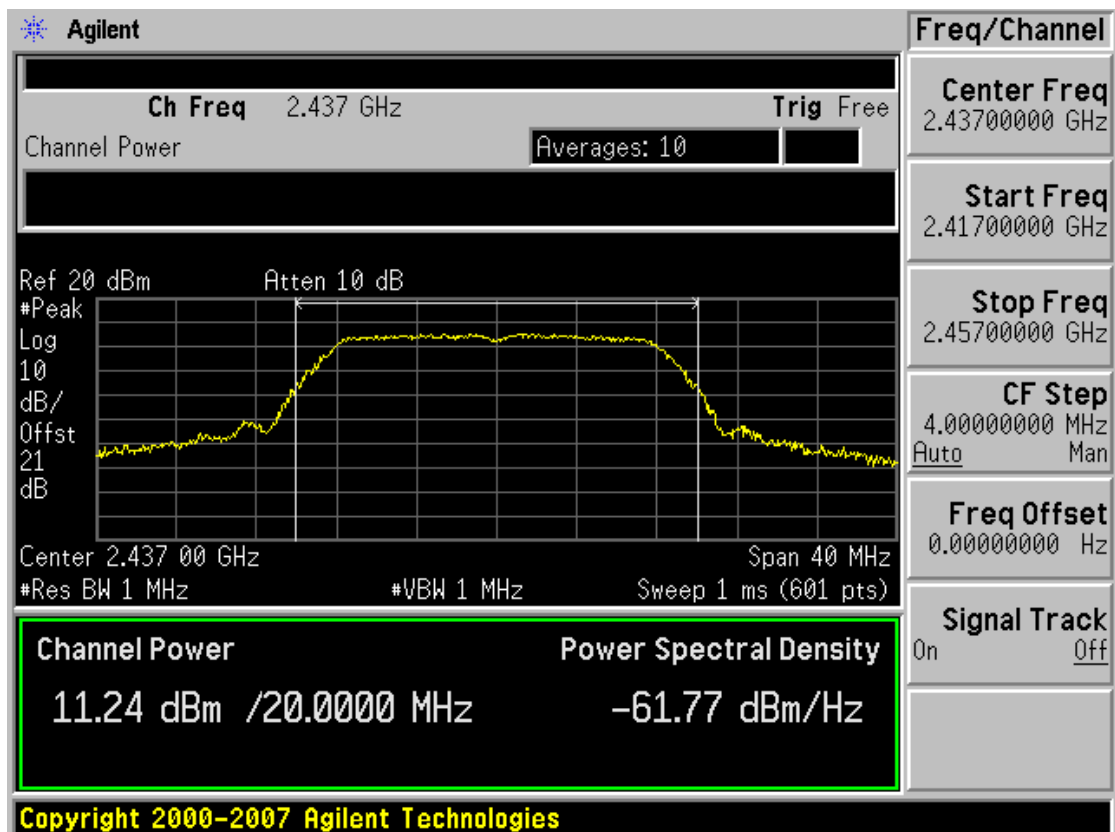




### Conducted Output Power (802.11g-CH 6) 6Mbps



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

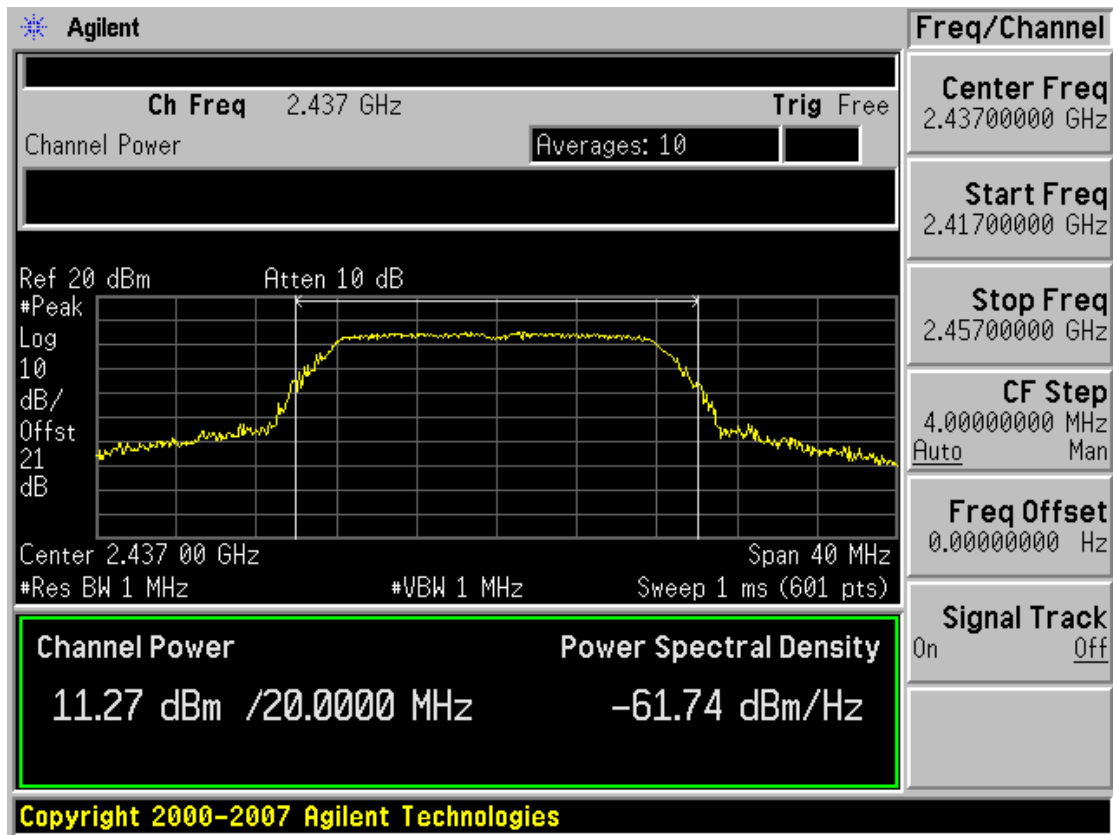


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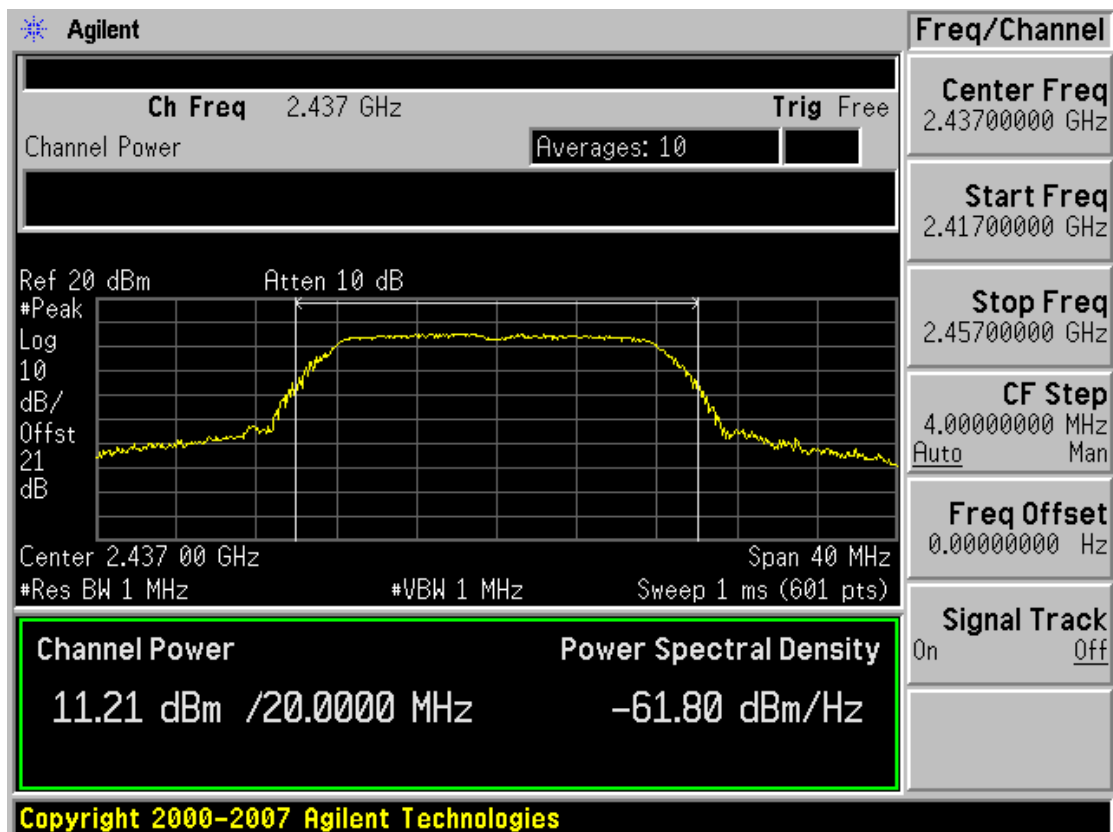




### Conducted Output Power (802.11g-CH 6) 12Mbps

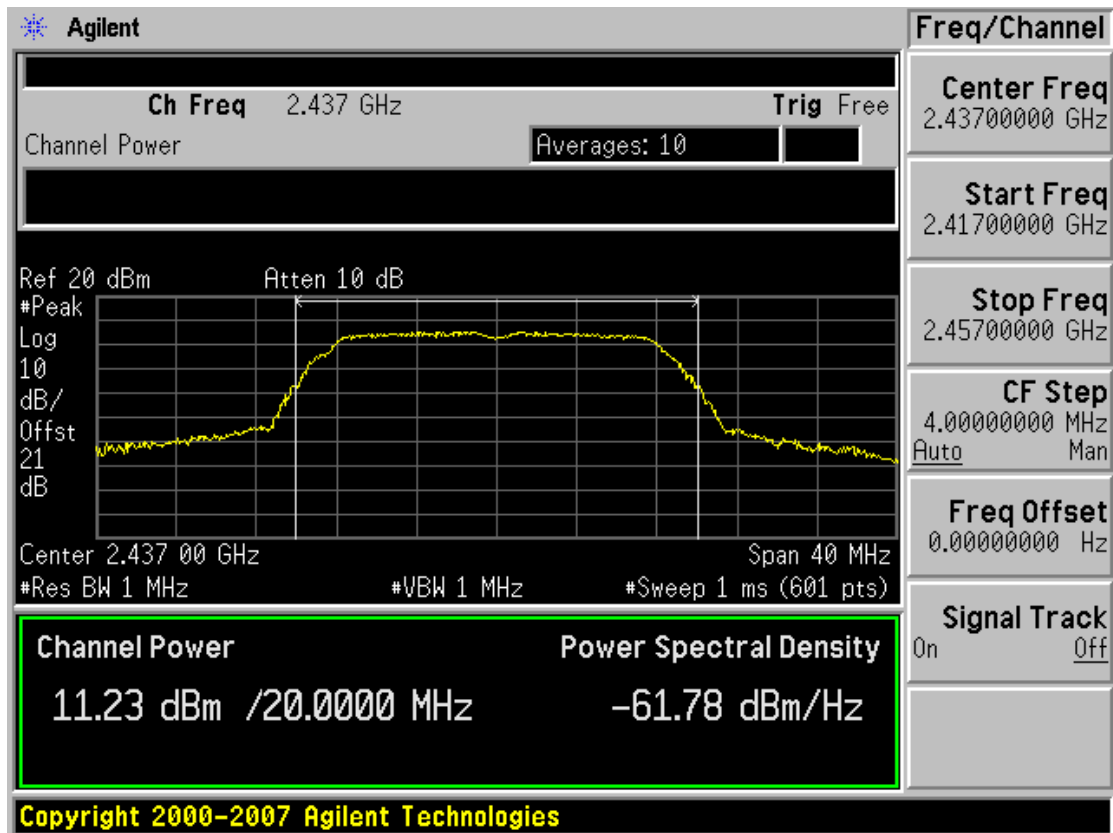


### Conducted Output Power (802.11g-CH 6) 18Mbps

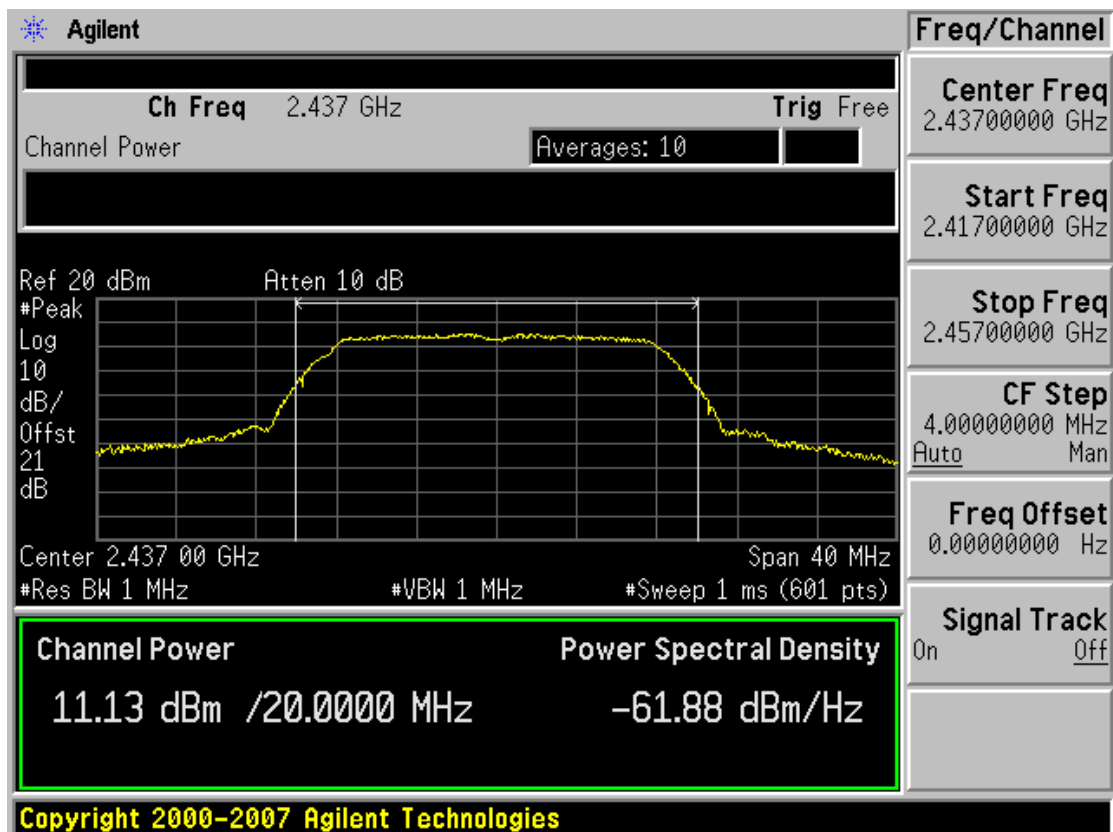




### Conducted Output Power (802.11g-CH 6) 24Mbps

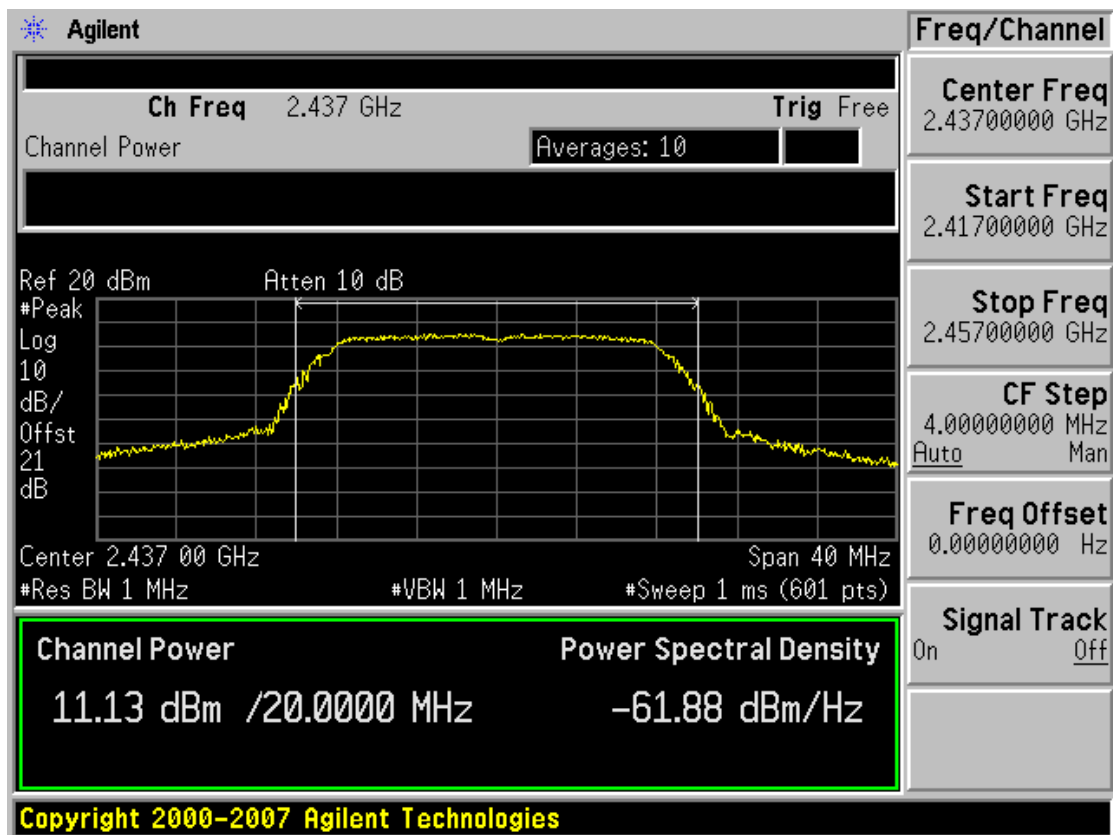


### Conducted Output Power (802.11g-CH 6) 36Mbps

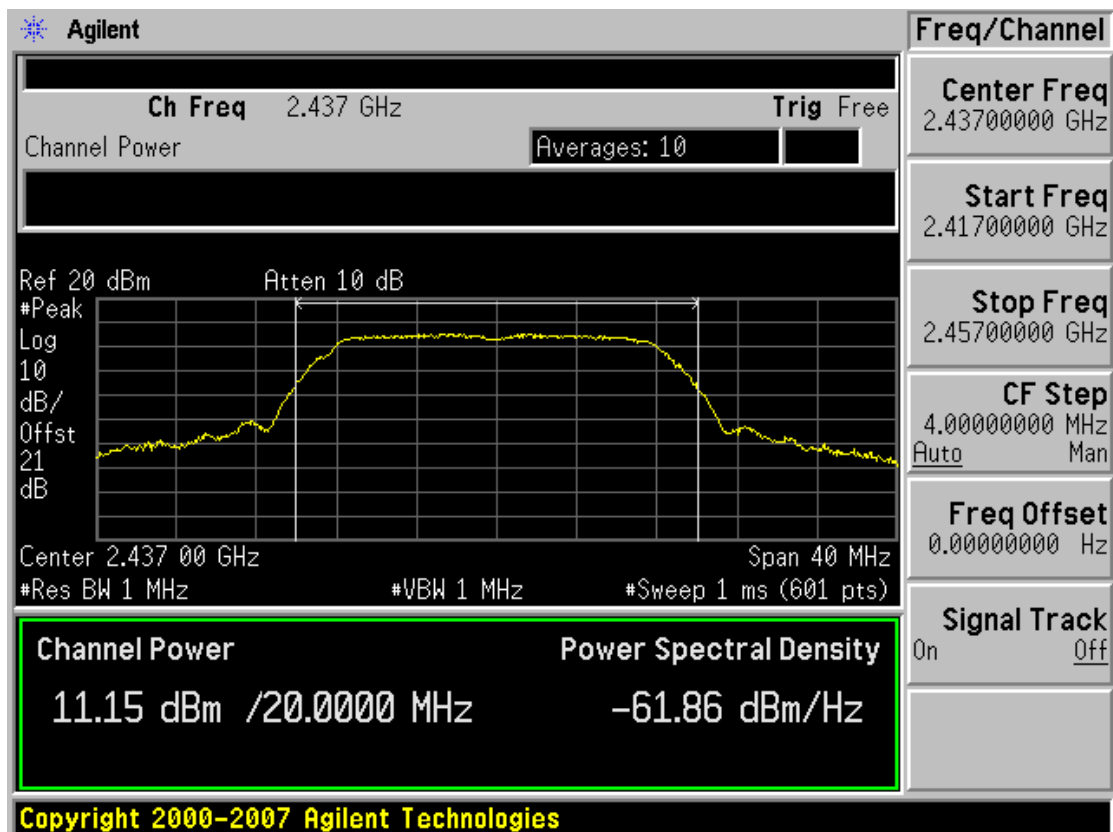




### Conducted Output Power (802.11g-CH 6) 48Mbps

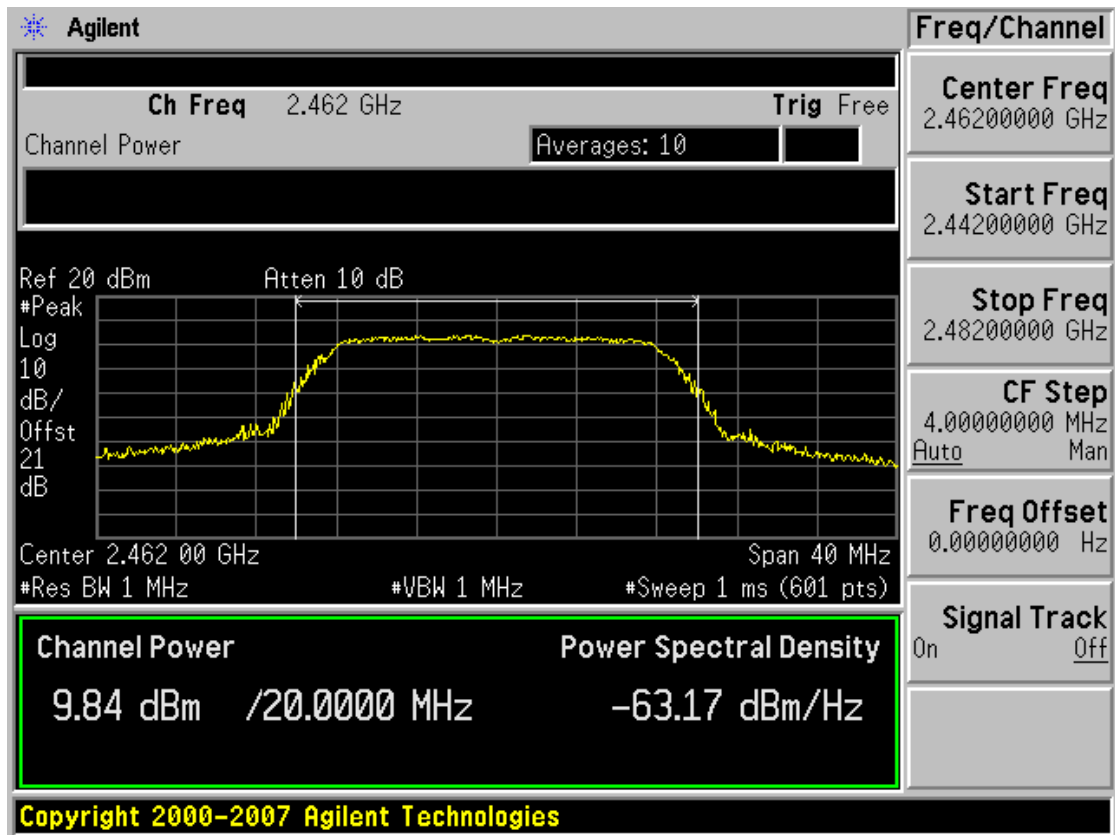


### Conducted Output Power (802.11g-CH 6) 54Mbps

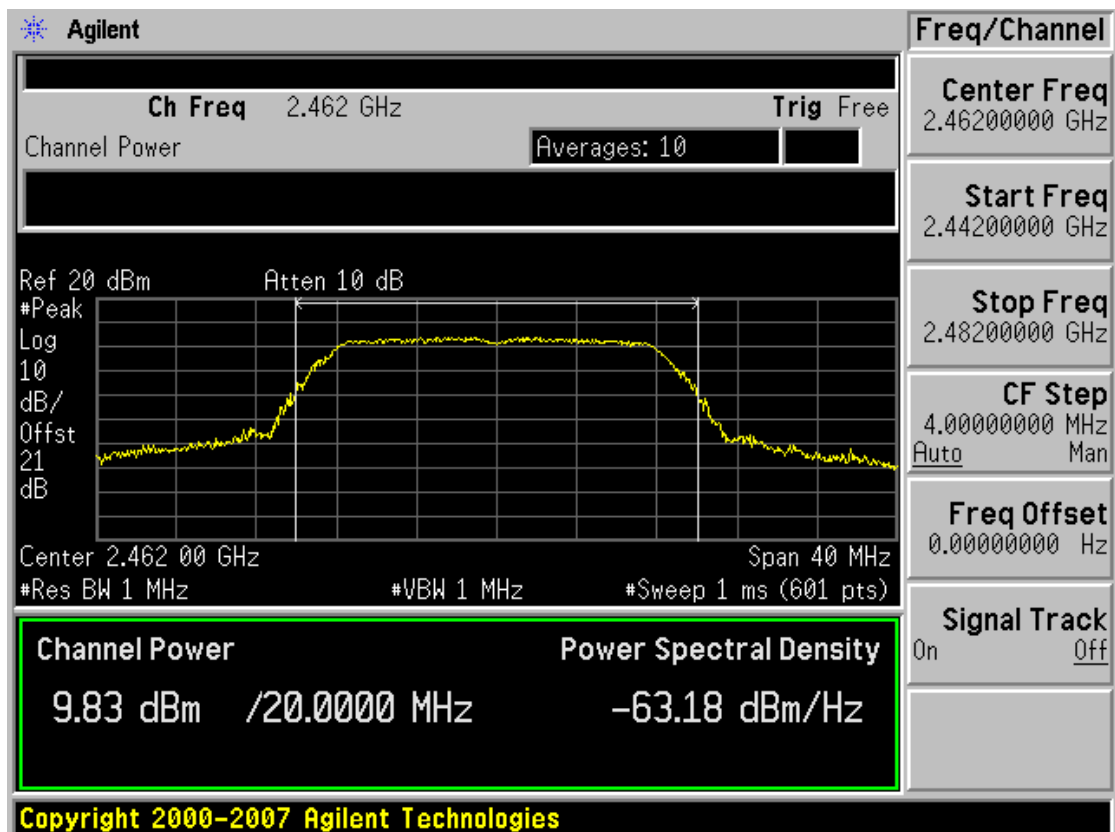




### Conducted Output Power (802.11g-CH 11) 6Mbps

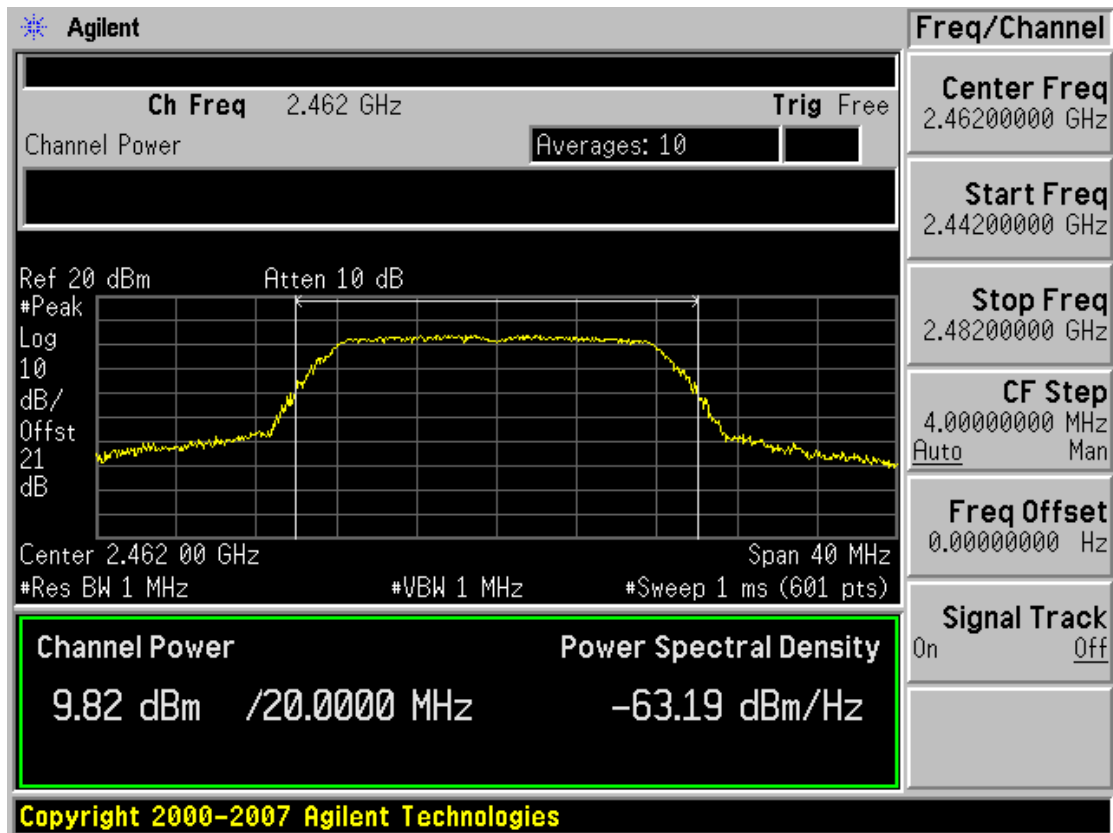


### Conducted Output Power (802.11g-CH 11) 9Mbps

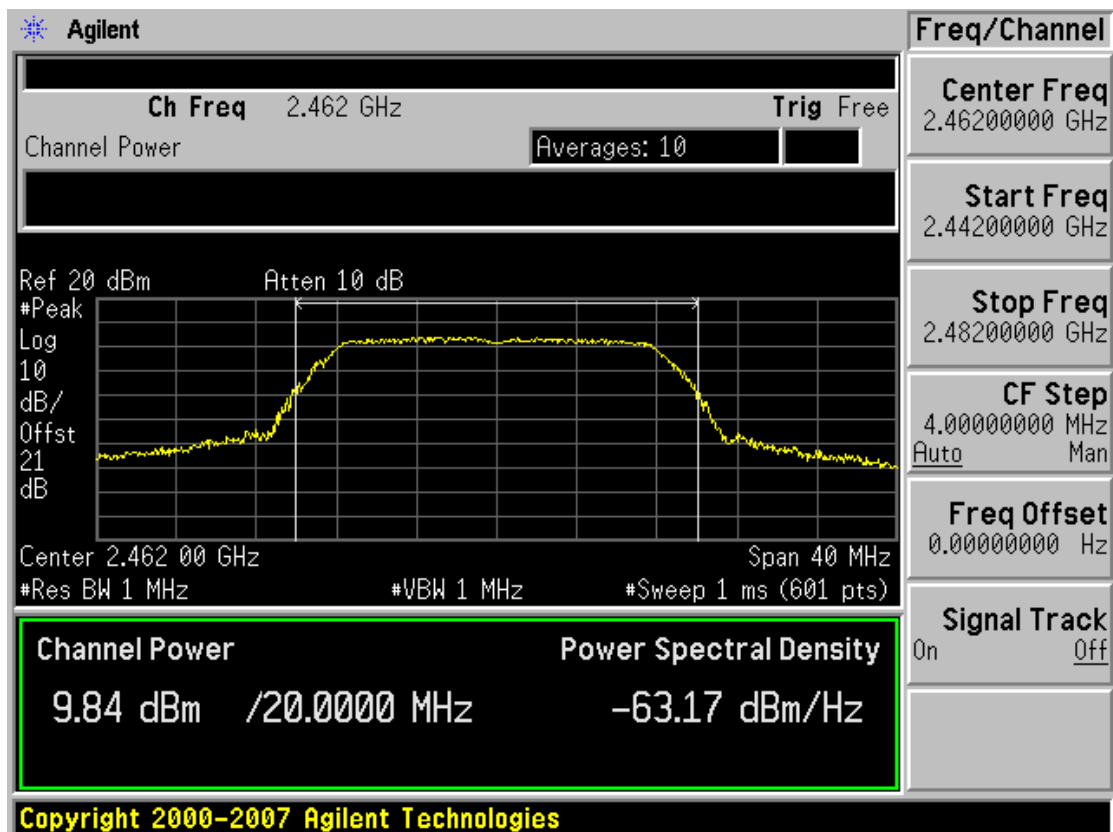




### Conducted Output Power (802.11g-CH 11) 12Mbps

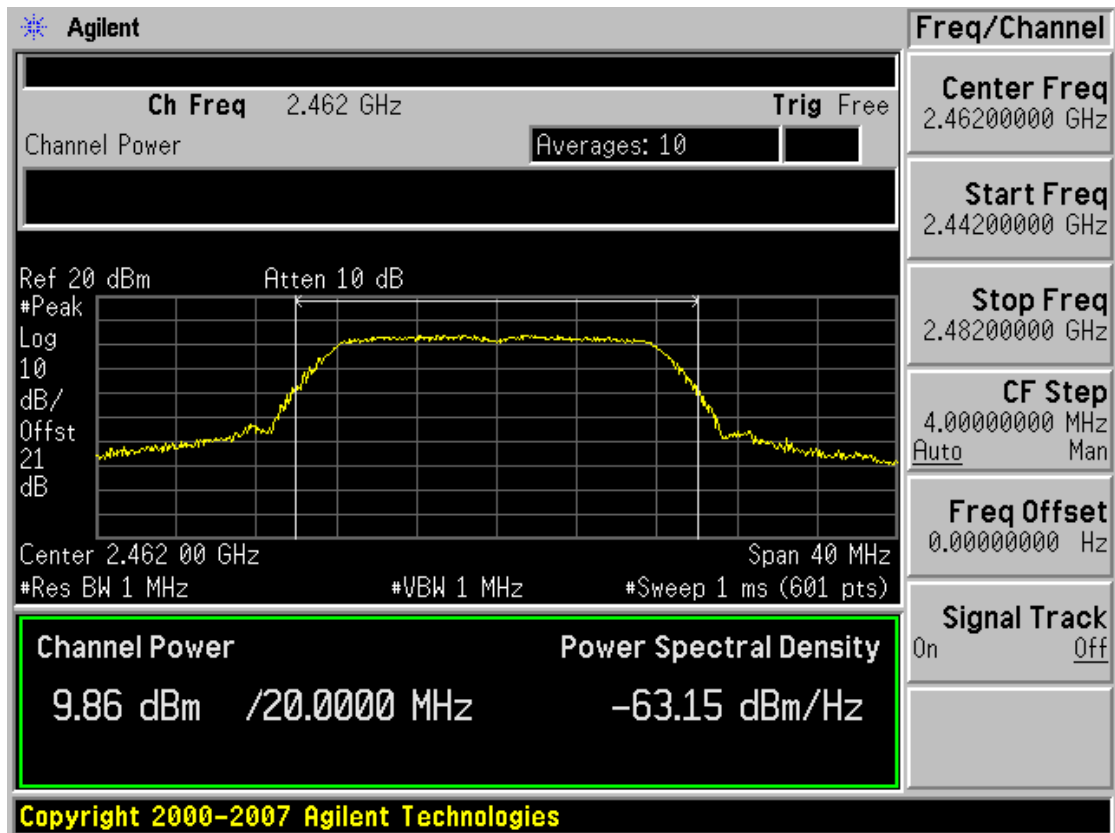


### Conducted Output Power (802.11g-CH 11) 18Mbps

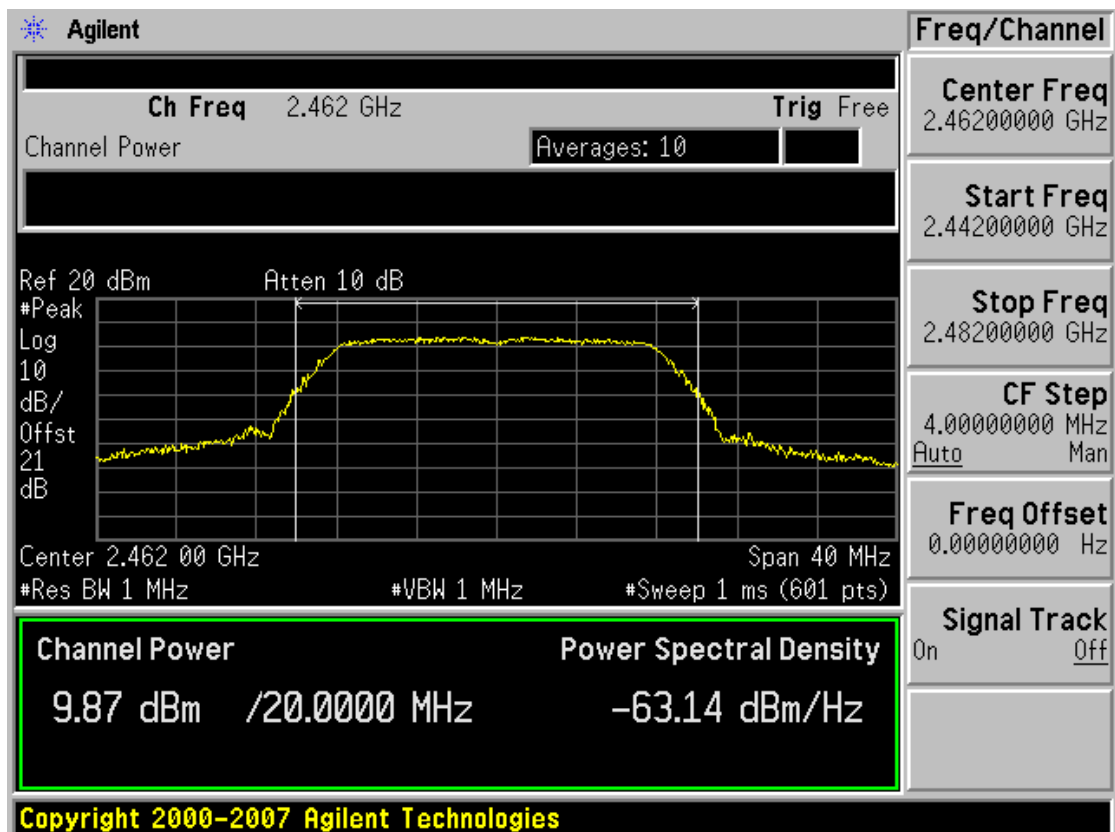




### Conducted Output Power (802.11g-CH 11) 24Mbps

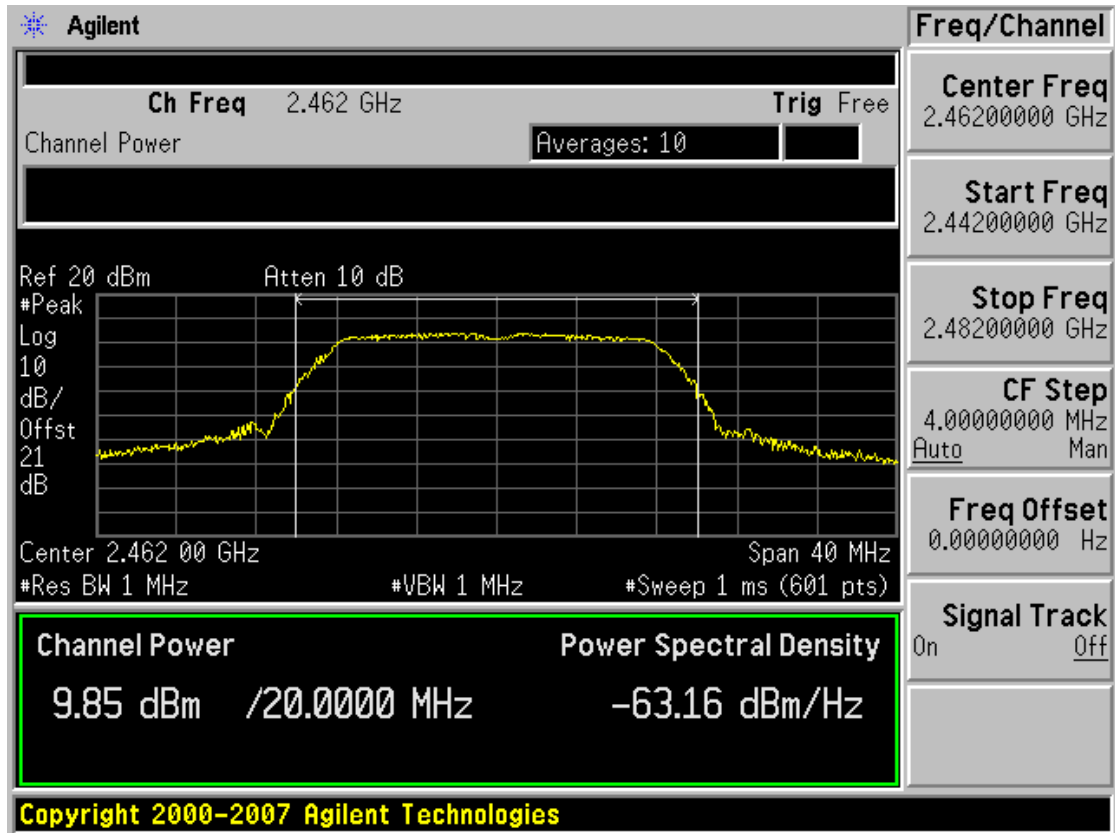


### Conducted Output Power (802.11g-CH 11) 36Mbps

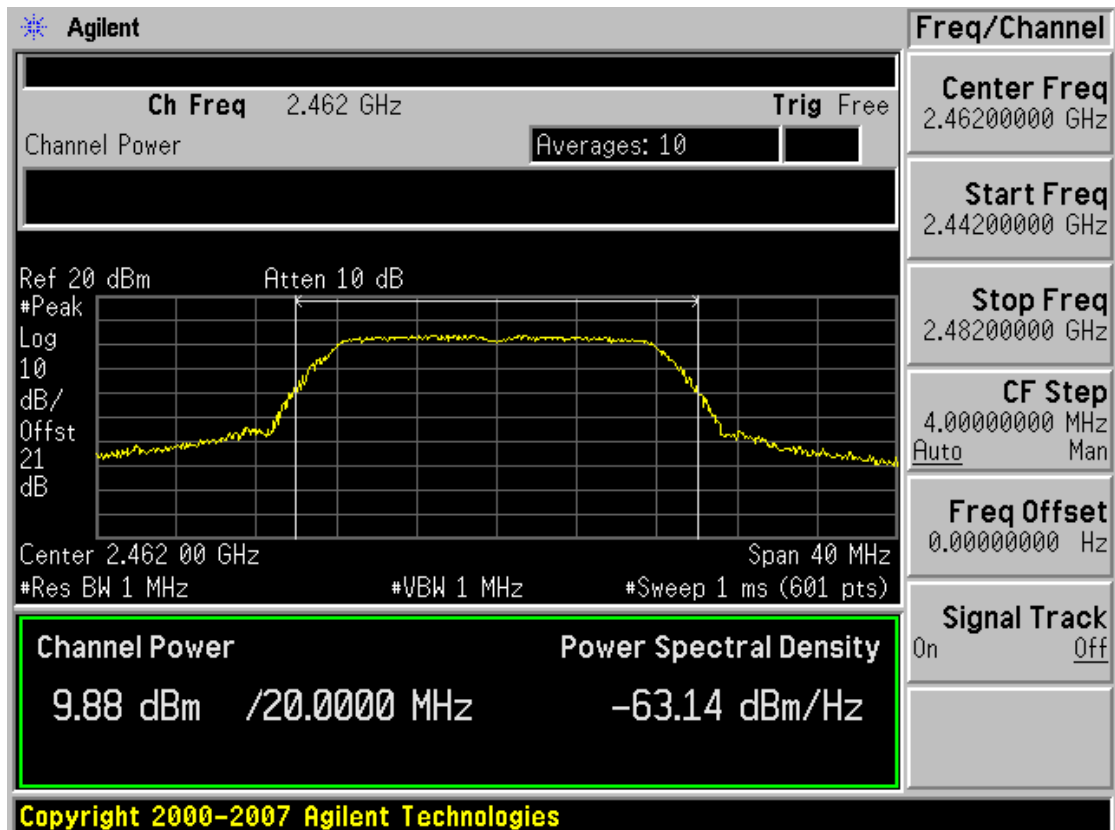




### Conducted Output Power (802.11g-CH 11) 48Mbps



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



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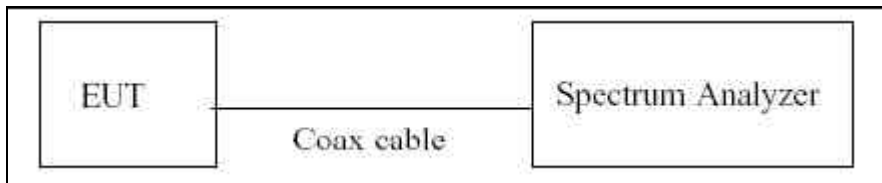
### 7.3 POWER SPECTRAL DENSITY (802.11b/g)

#### 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	-17.32	Pass
2437	6		-17.66	Pass
2462	11		-19.21	Pass
2412	1	802.11g	-18.03	Pass
2437	6		-19.58	Pass
2462	11		-20.54	Pass

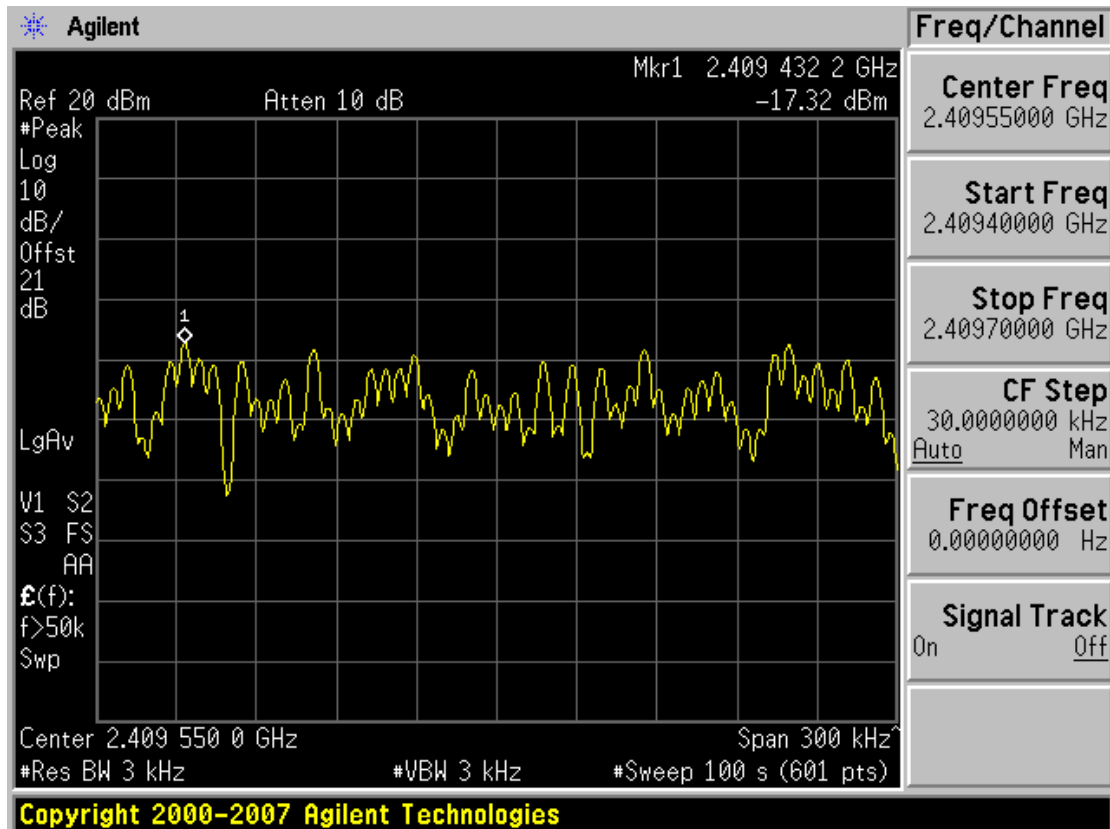
#### ■ RESULT PLOTS

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1011FR05	Date of Issue: November 03, 2010	EUT Type: CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	FCC ID: XAVVW340

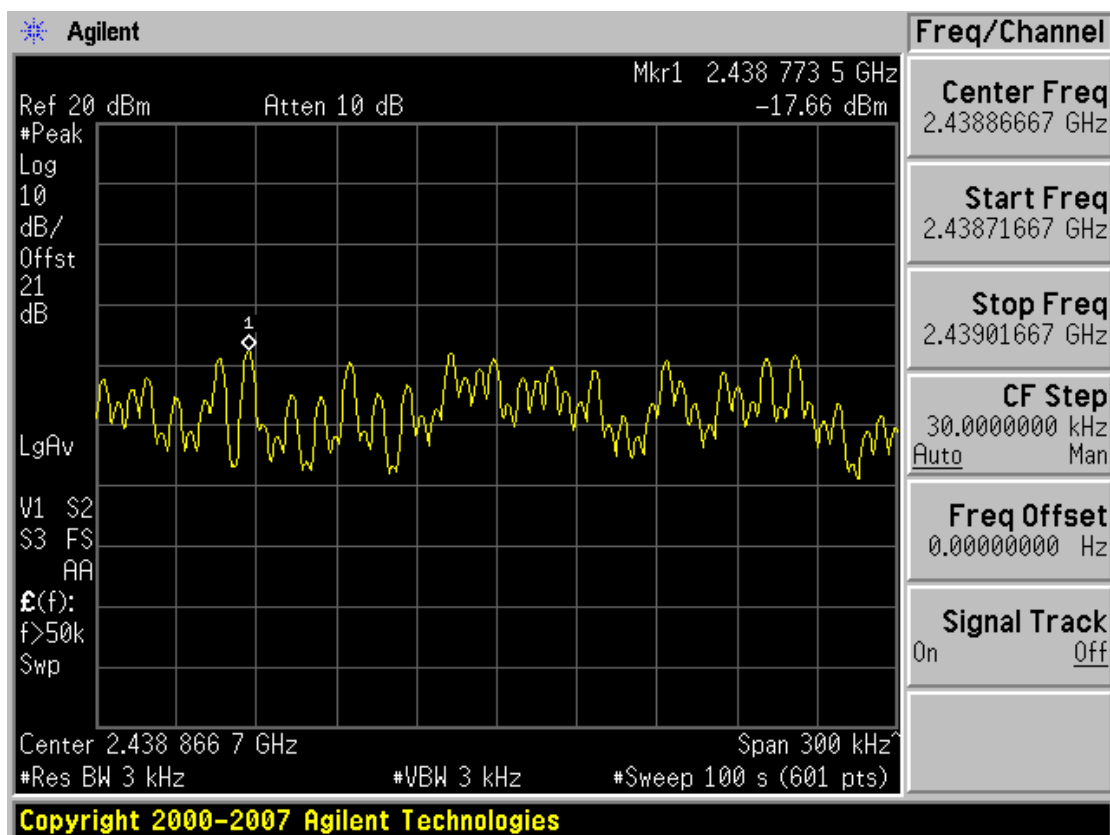




### Power Spectral Density (802.11b-CH 1)



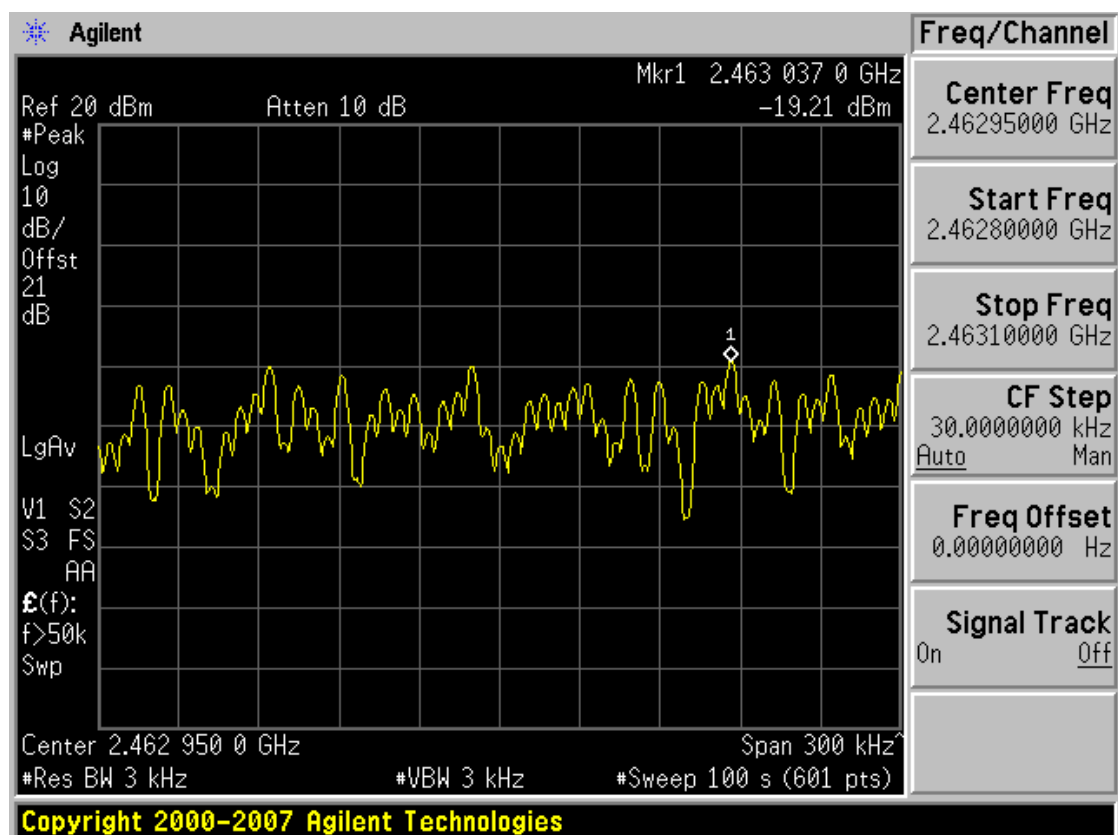
### Power Spectral Density (802.11b-CH 6)



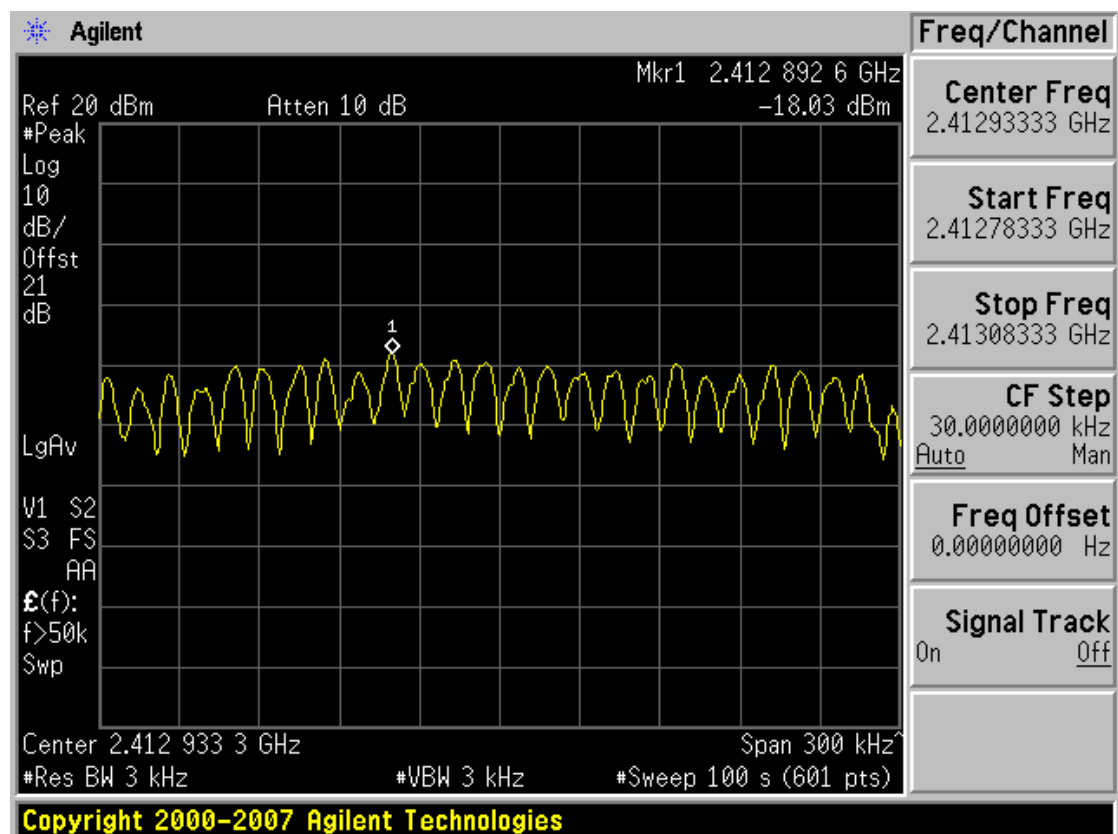
FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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### Power Spectral Density (802.11b-CH 11)



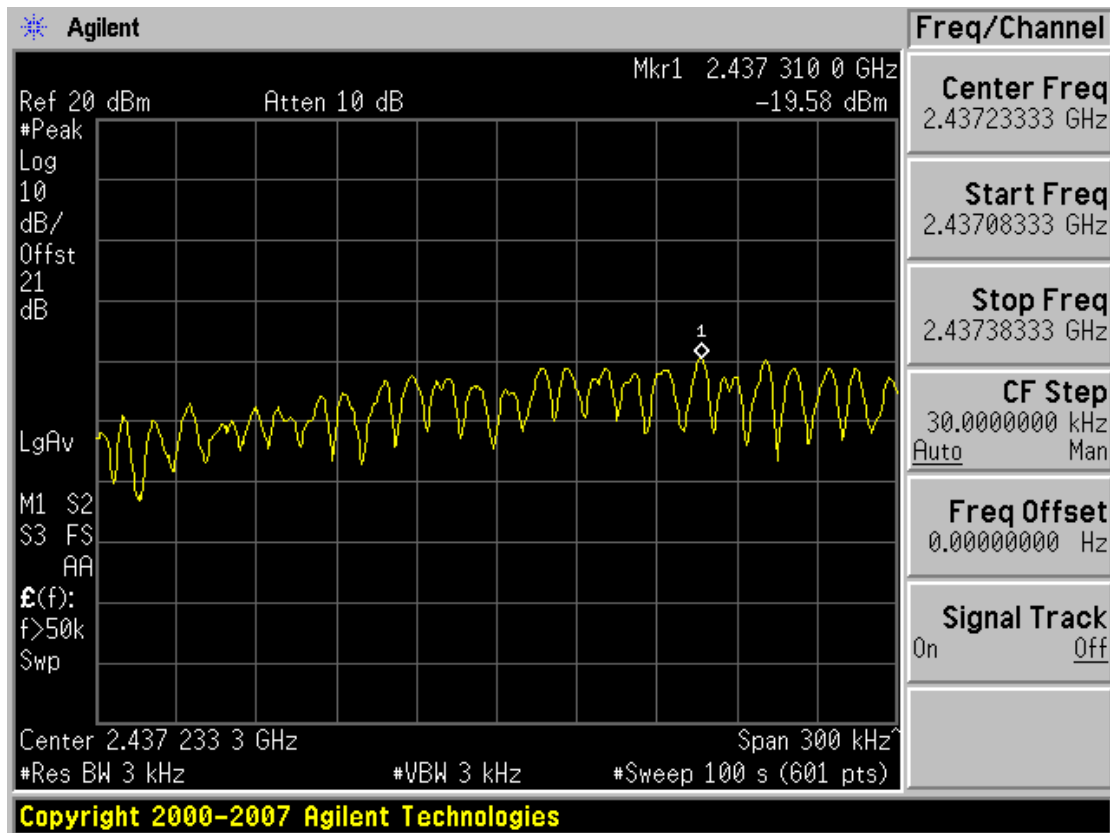
### Power Spectral Density (802.11g-CH 1)



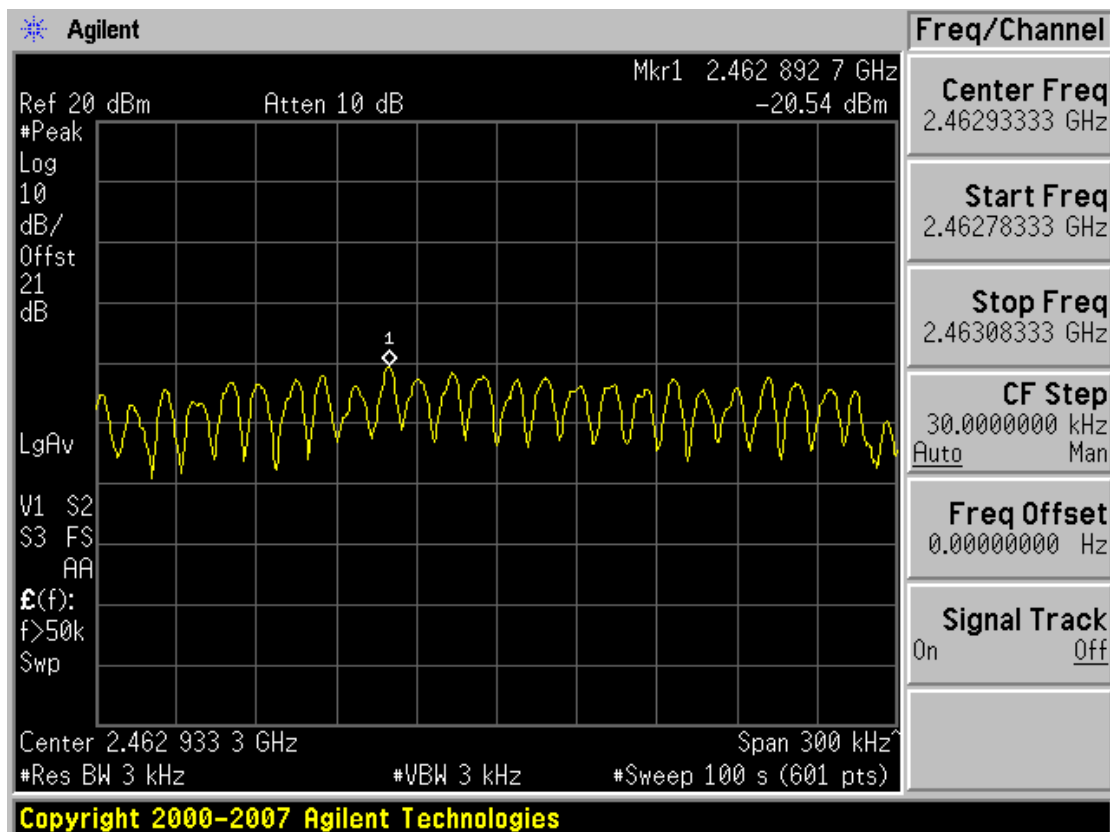
FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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### Power Spectral Density (802.11g-CH 6)



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



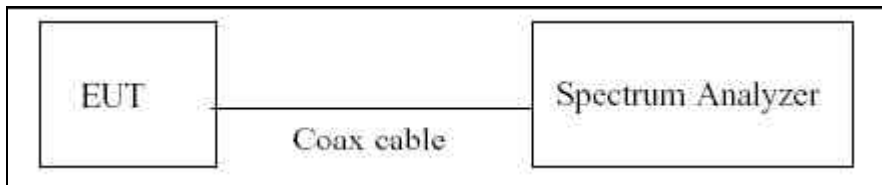
FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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## 7.4 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

### 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.

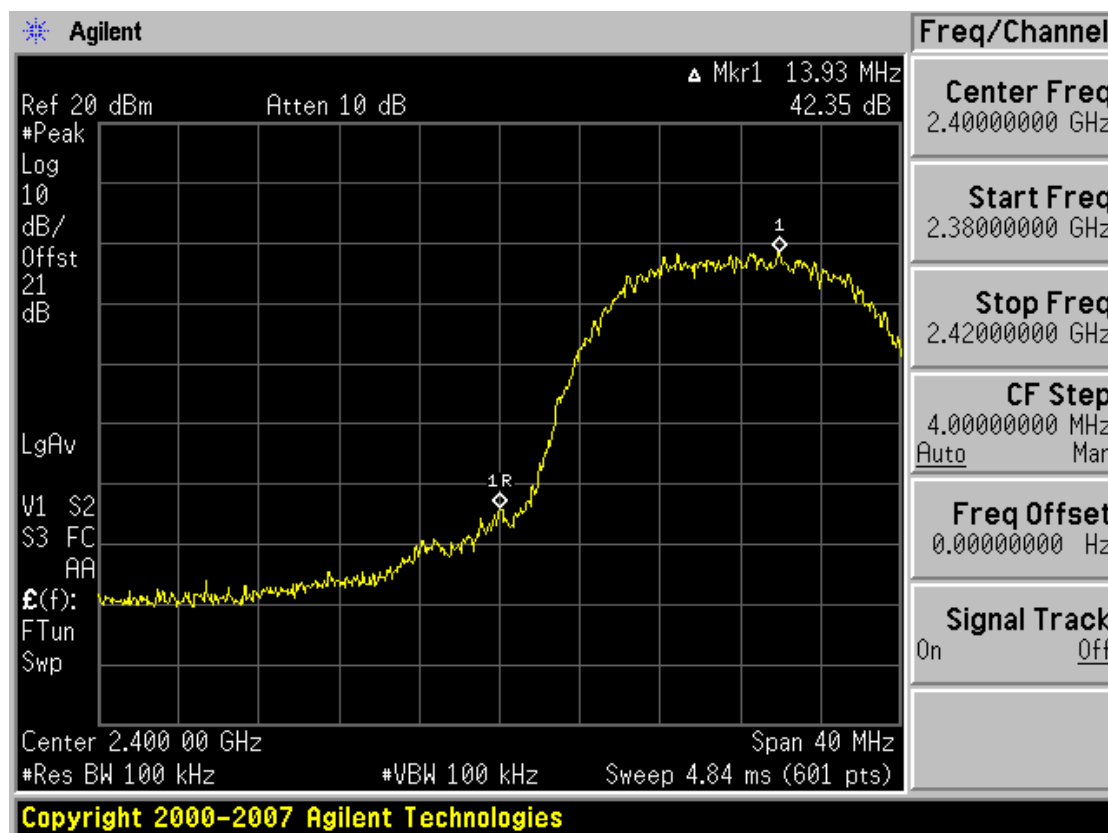
Detector Mode is set to a peak detector Mode.

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

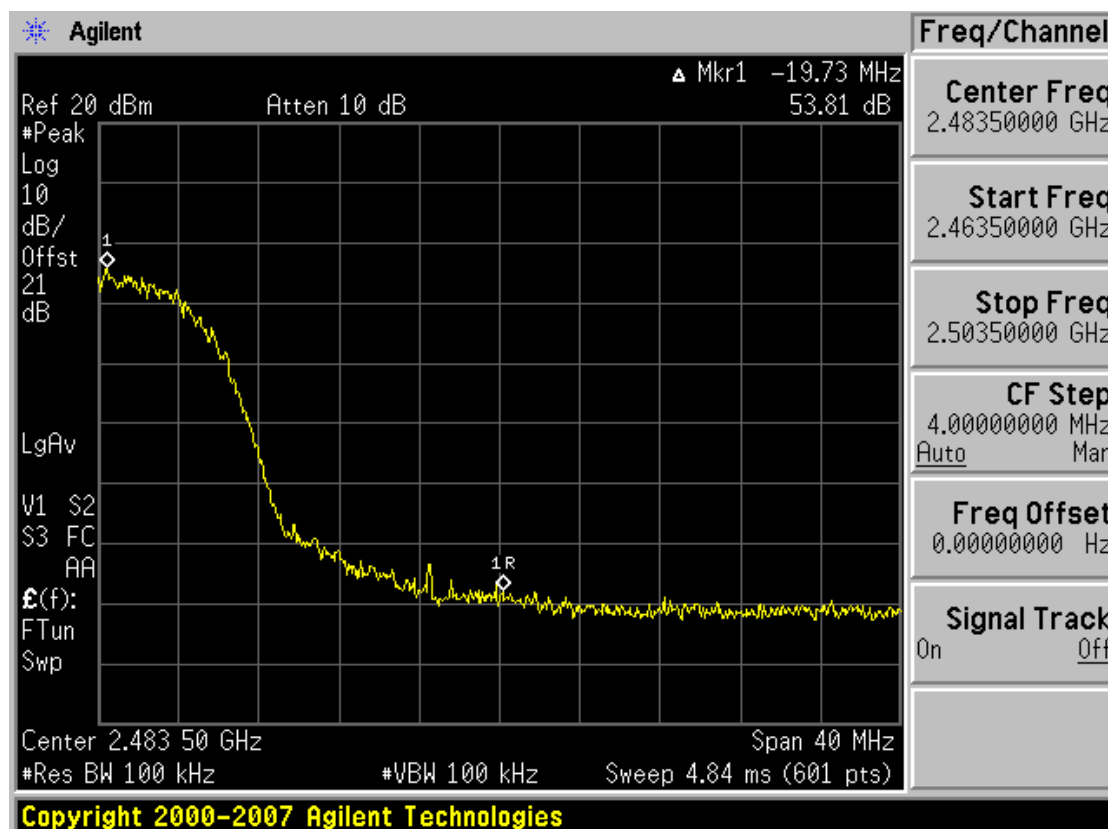


## ■ RESULT PLOTS

BandEdge (802.11b-CH1)

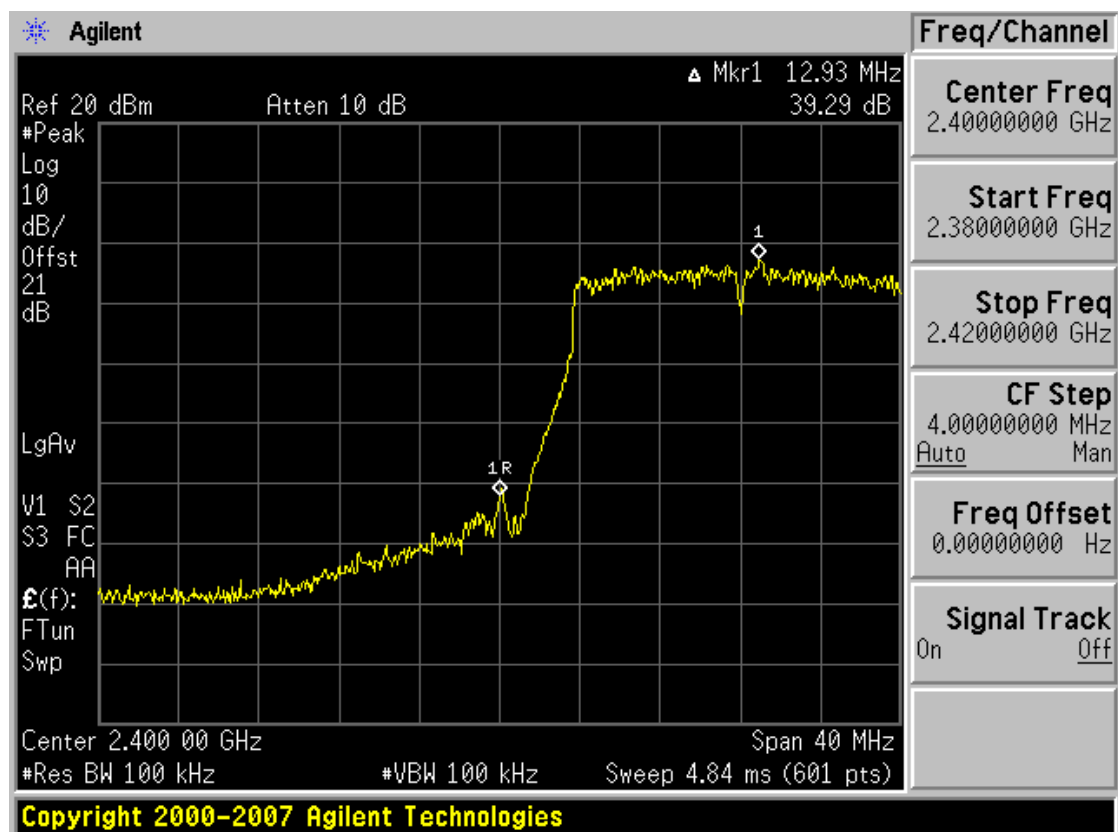


BandEdge (802.11b-CH11)

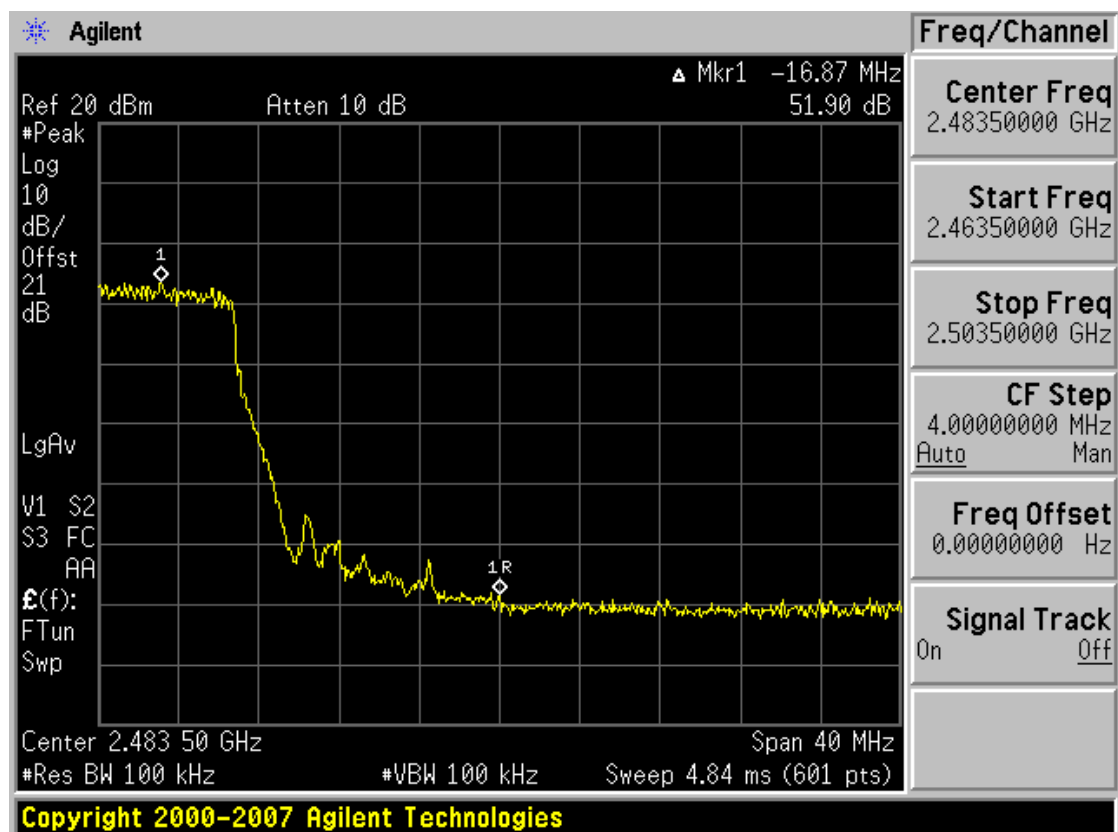


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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### BandEdge (802.11g-CH1)



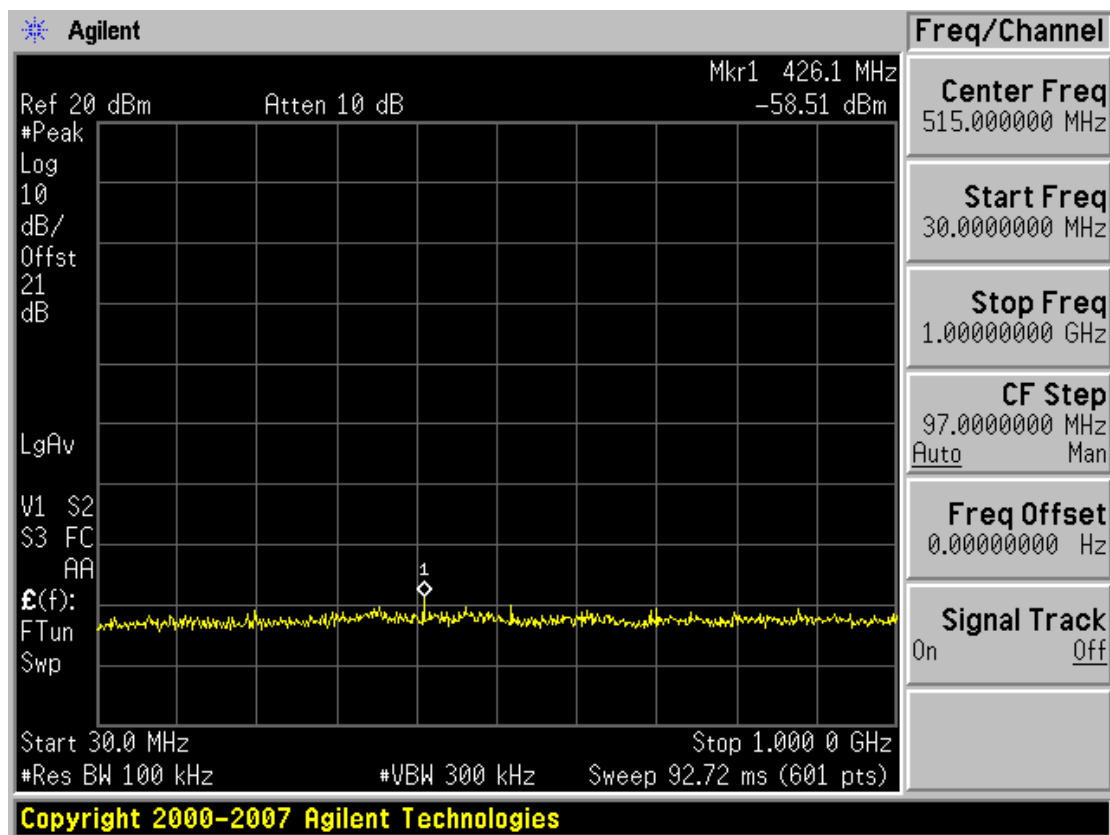
### BandEdge (802.11g-CH11)



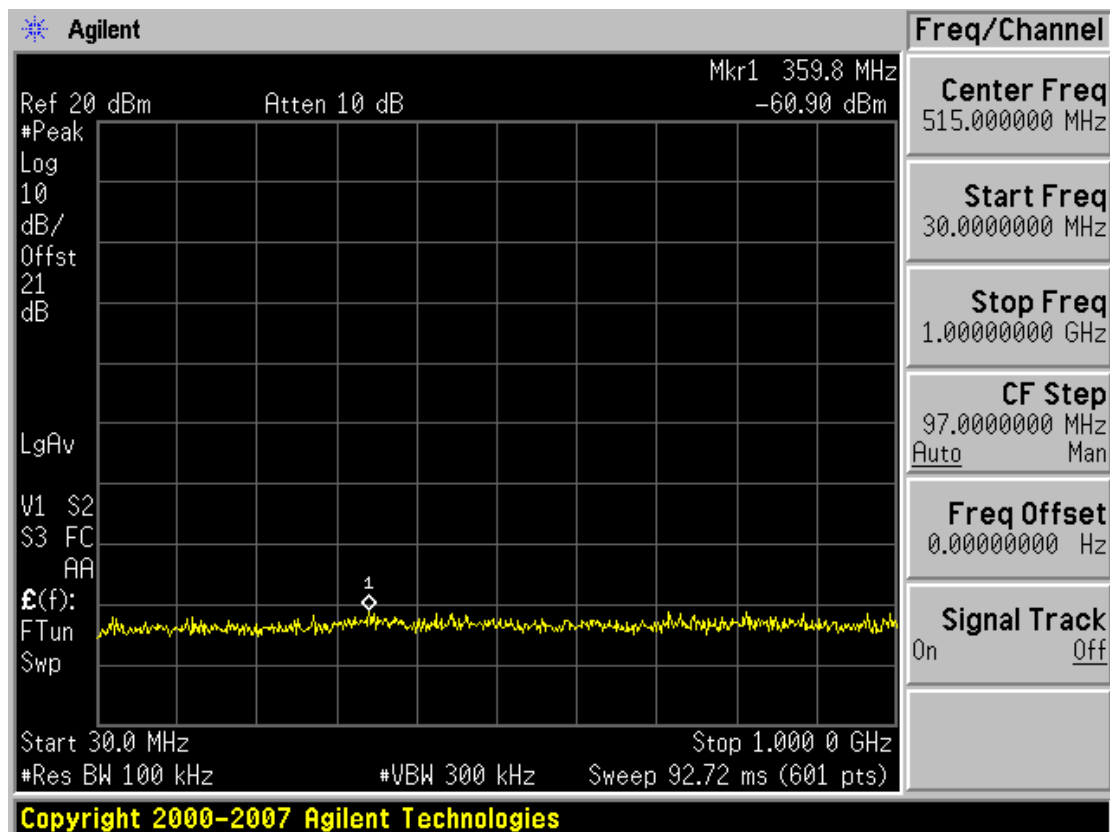


30 MHz ~ 1 GHz

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



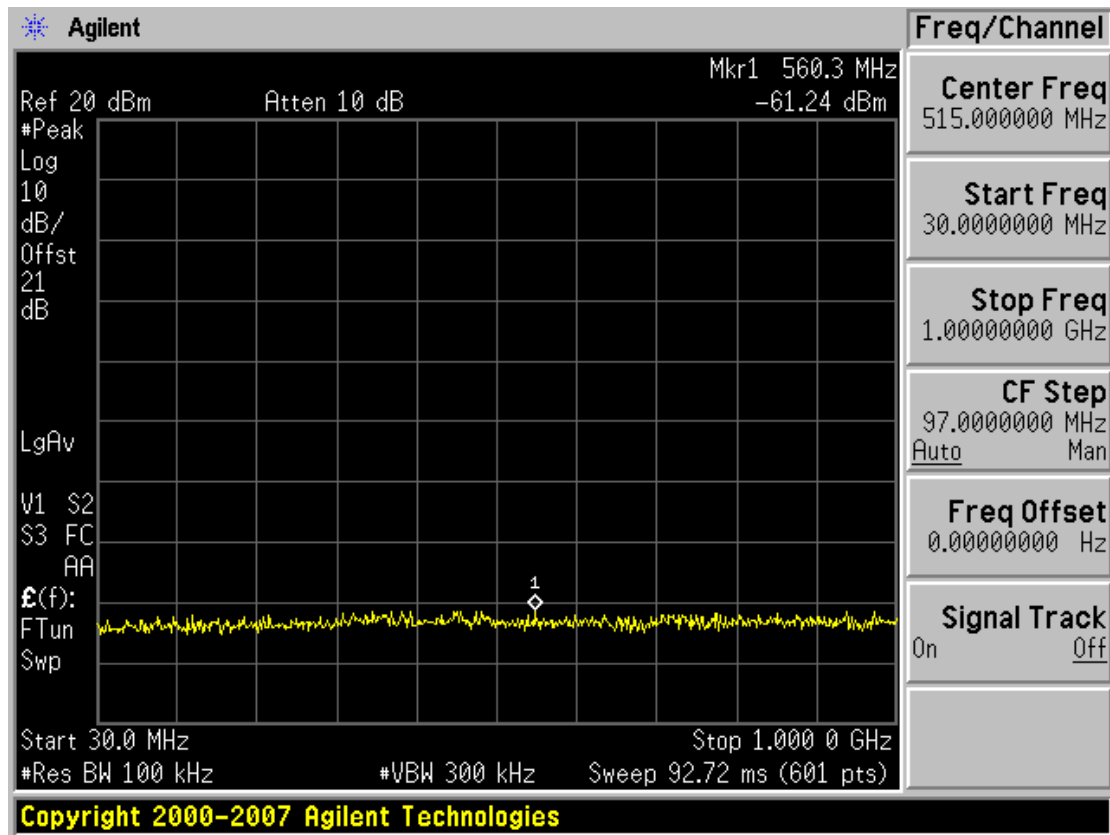
### Conducted Spurious Emission (802.11b-CH6)



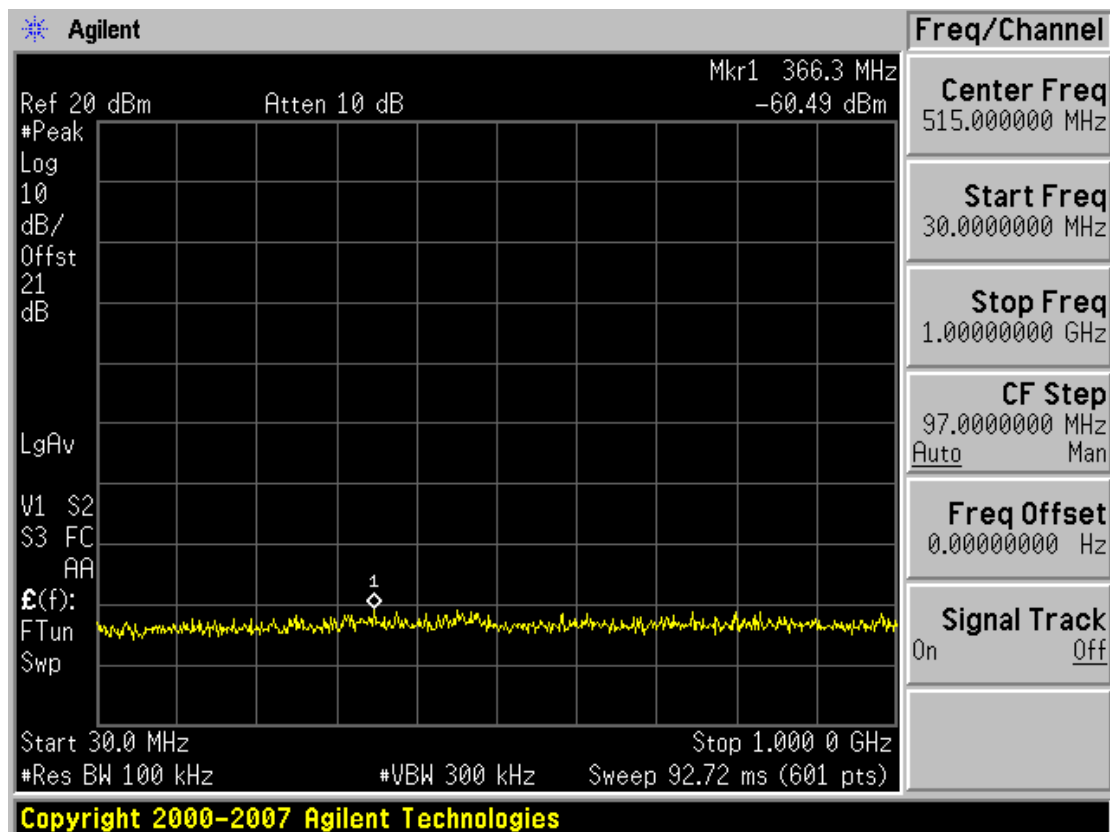
FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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### Conducted Spurious Emission (802.11b-CH11)



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

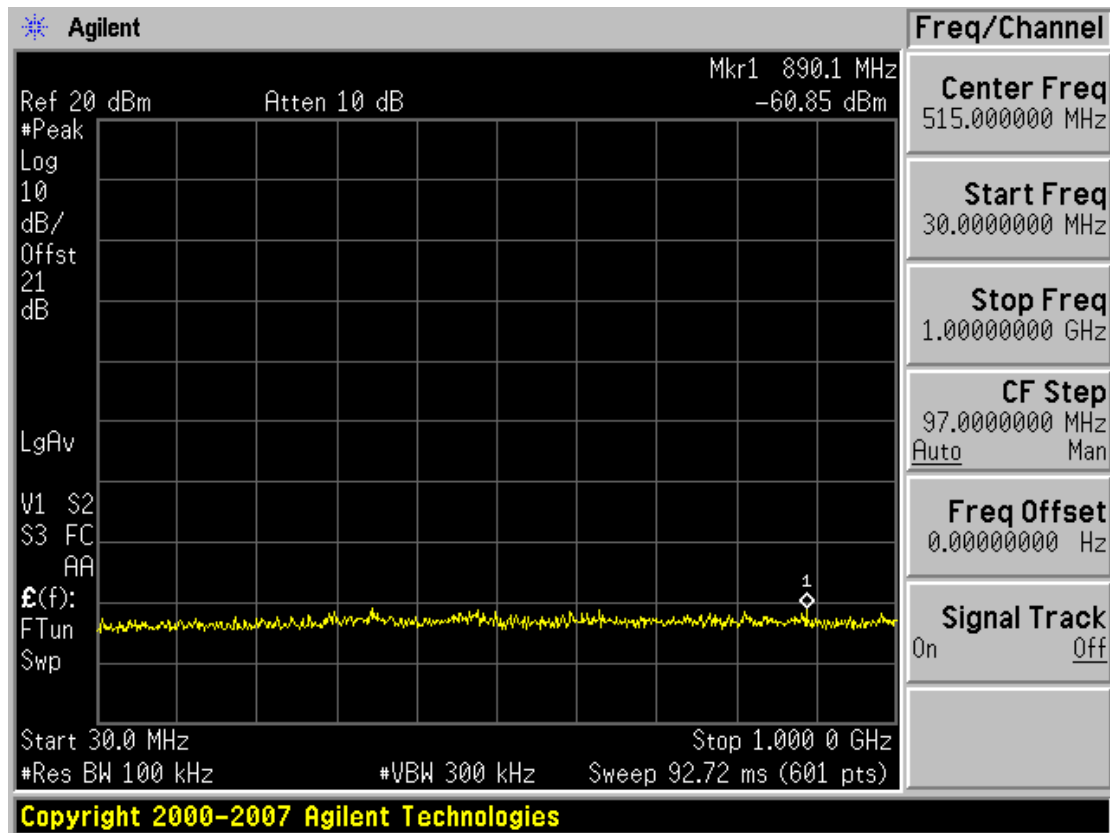


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1011FR05	Date of Issue: November 03, 2010	EUT Type: CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	FCC ID: XAVVW340

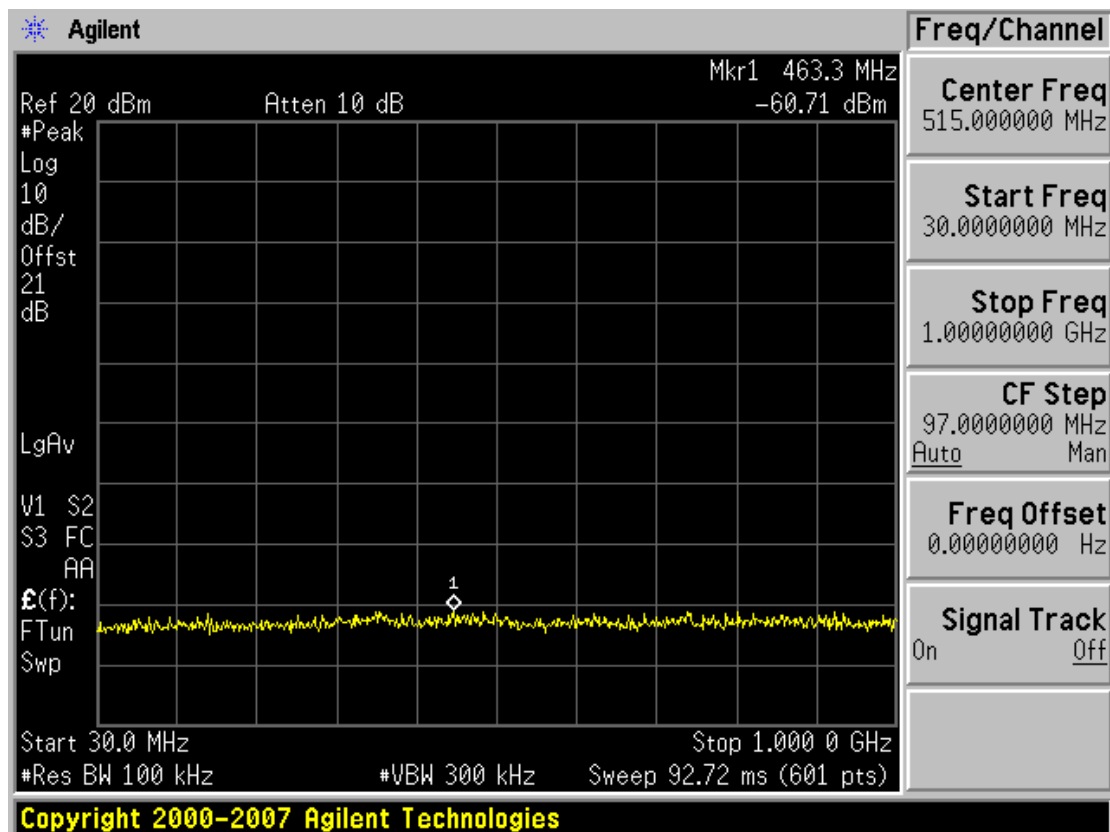




### Conducted Spurious Emission (802.11g-CH6)



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

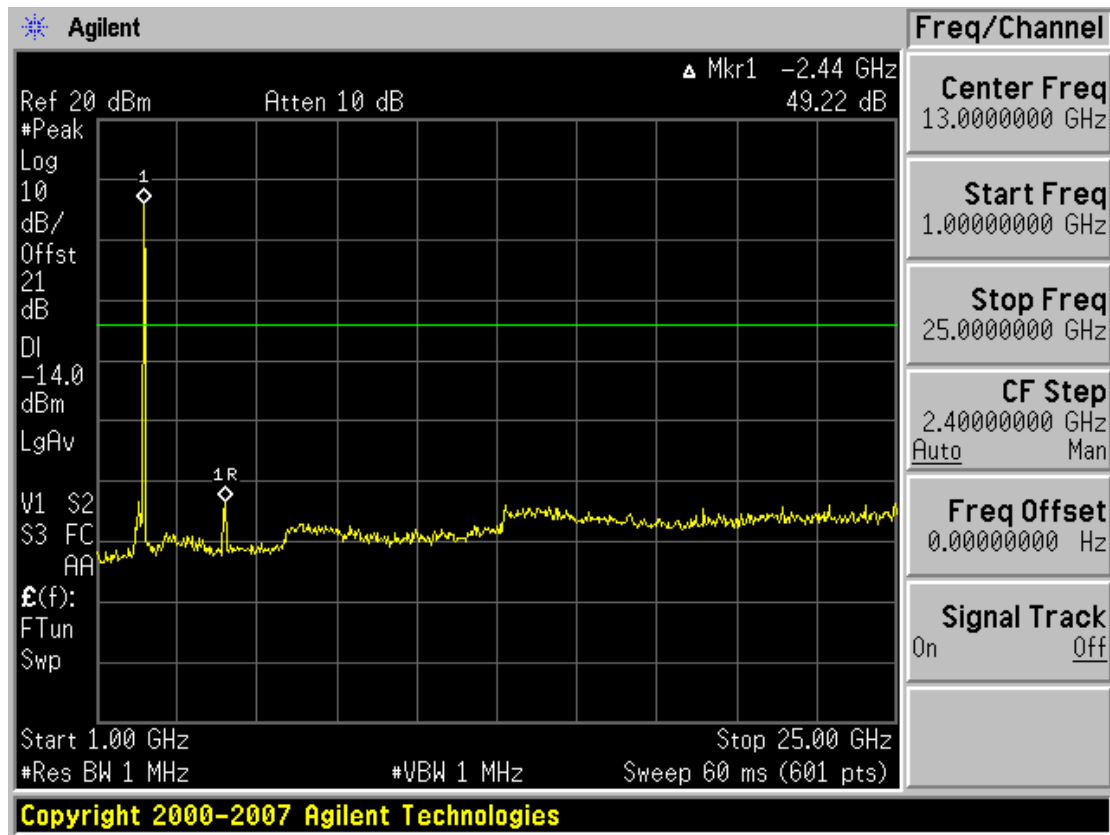


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1011FR05	Date of Issue: November 03, 2010	EUT Type: CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	FCC ID: XAVVW340

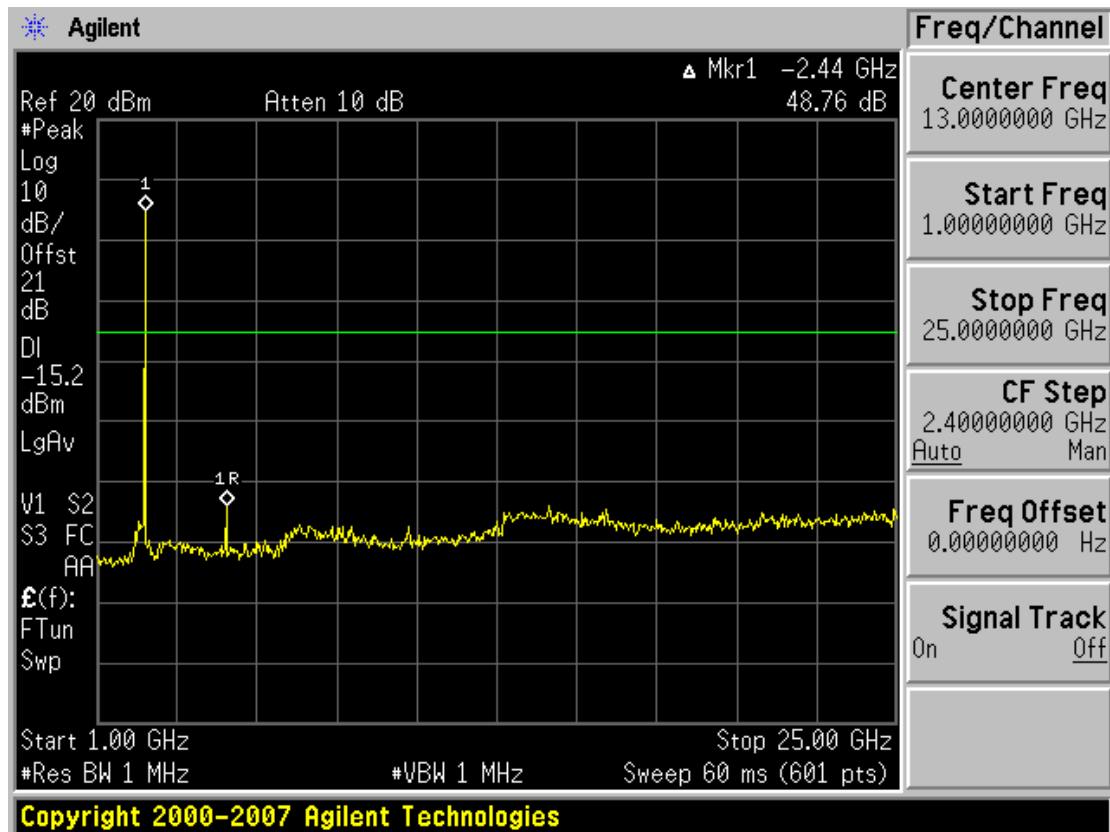


1 GHz ~ 25 GHz

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

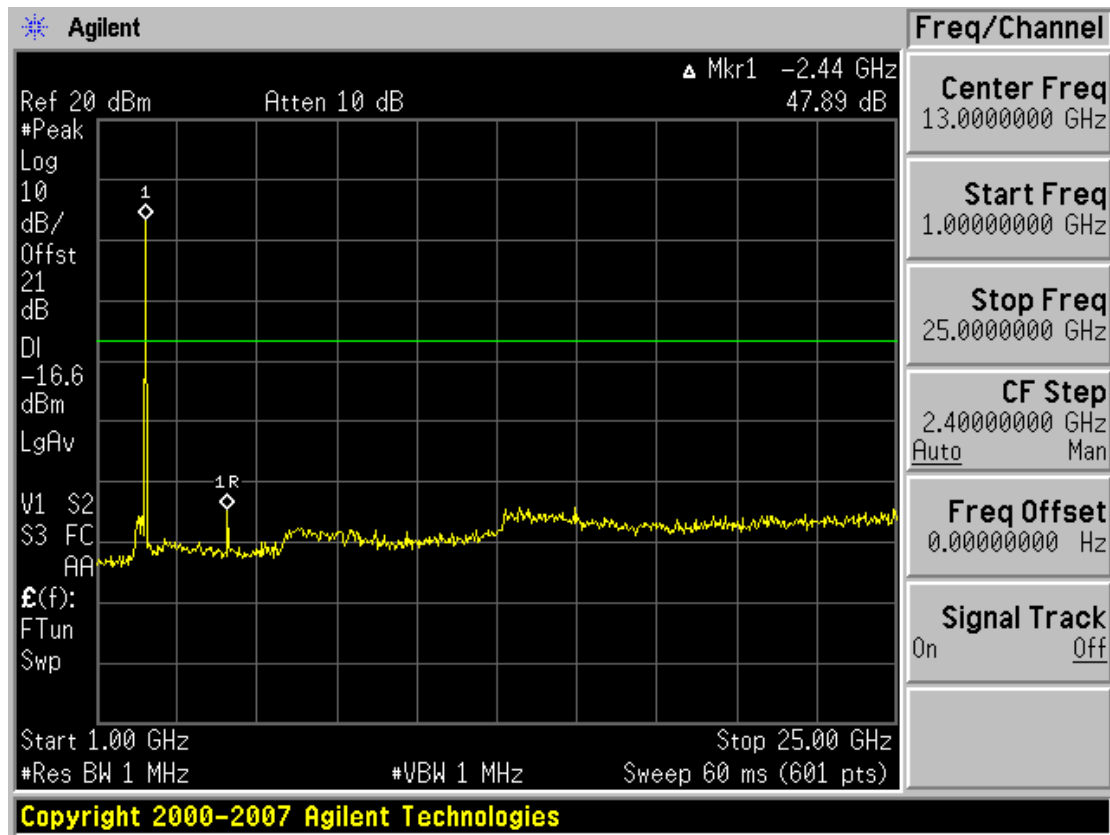


### Conducted Spurious Emission (802.11b-CH6)

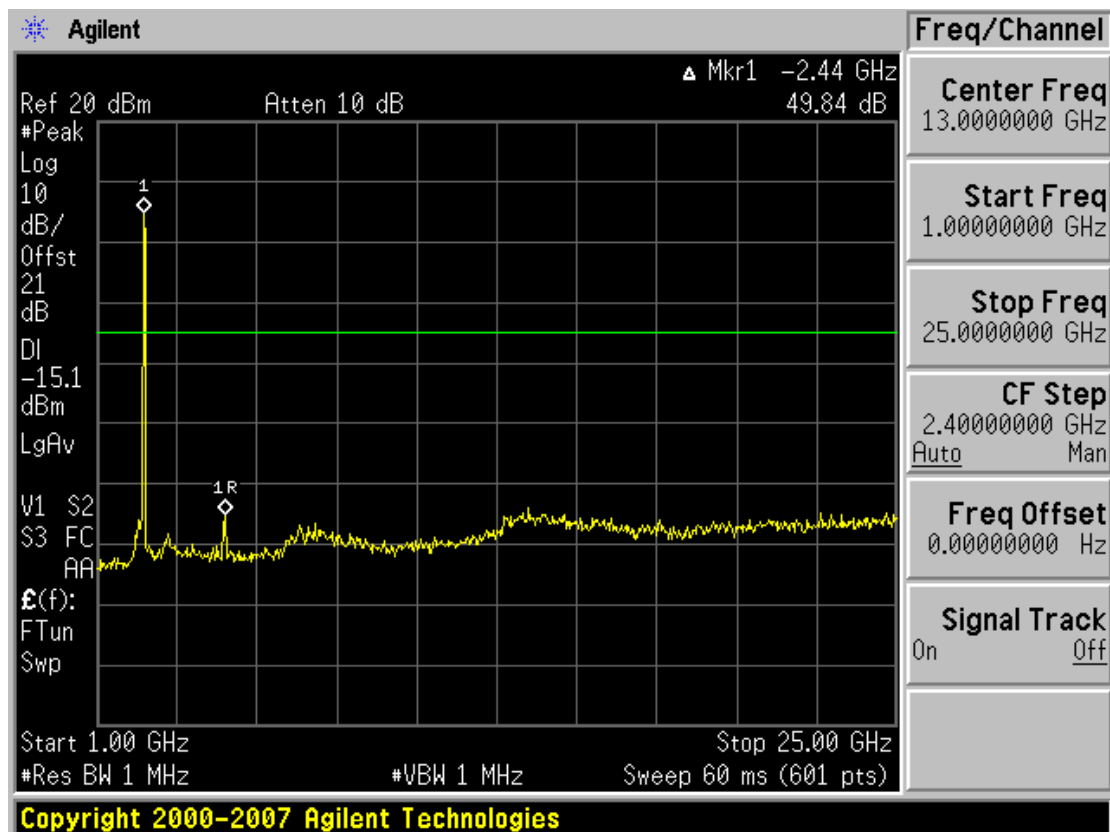


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1011FR05	Date of Issue: November 03, 2010	EUT Type: CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	FCC ID: XAVVW340

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

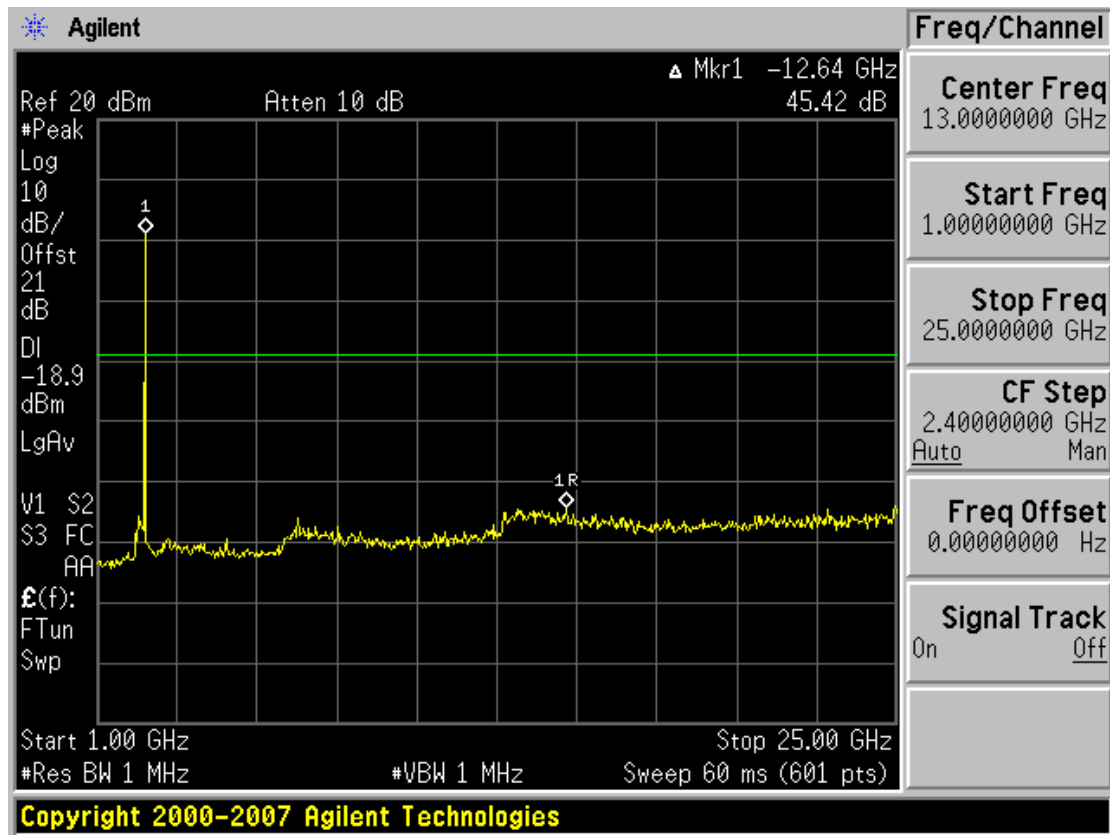


### Conducted Spurious Emission (802.11g-CH1)

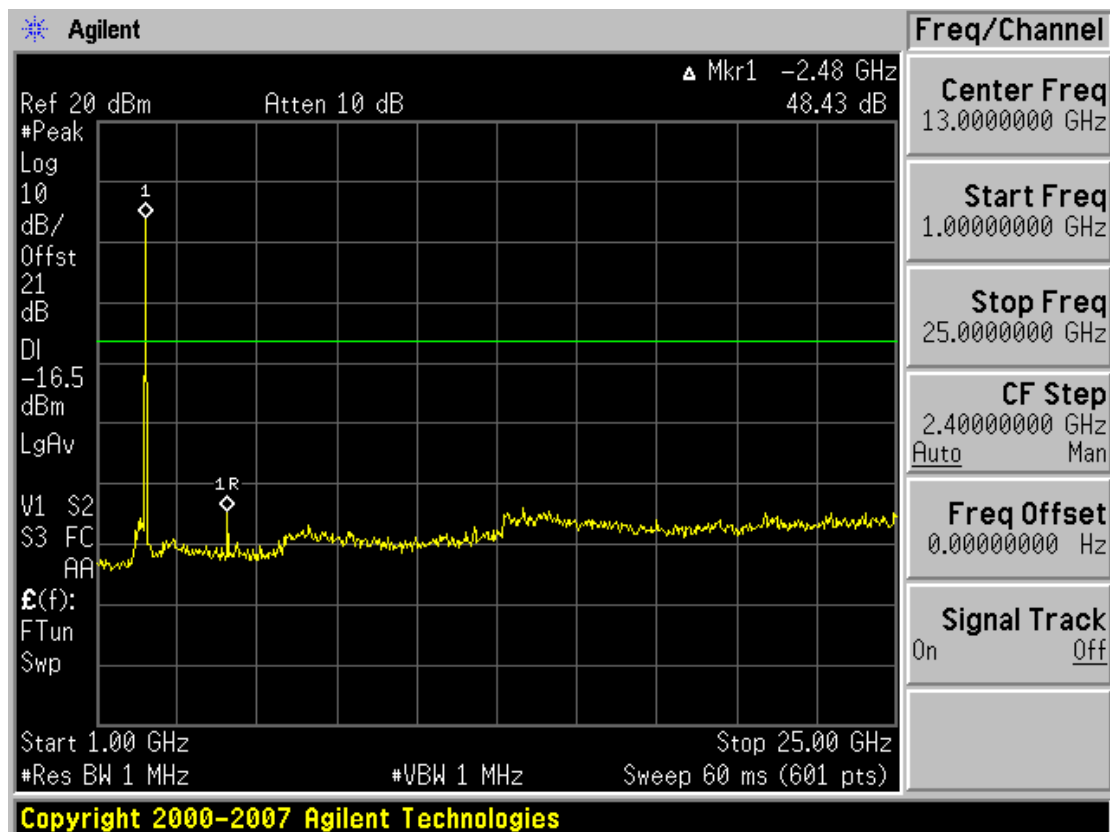




### Conducted Spurious Emission (802.11g-CH6)



### 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. HCTR1011FR05	Date of Issue: November 03, 2010	EUT Type: CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	FCC ID: XAVVW340



## 7.5 RADIATED MEASUREMENT.

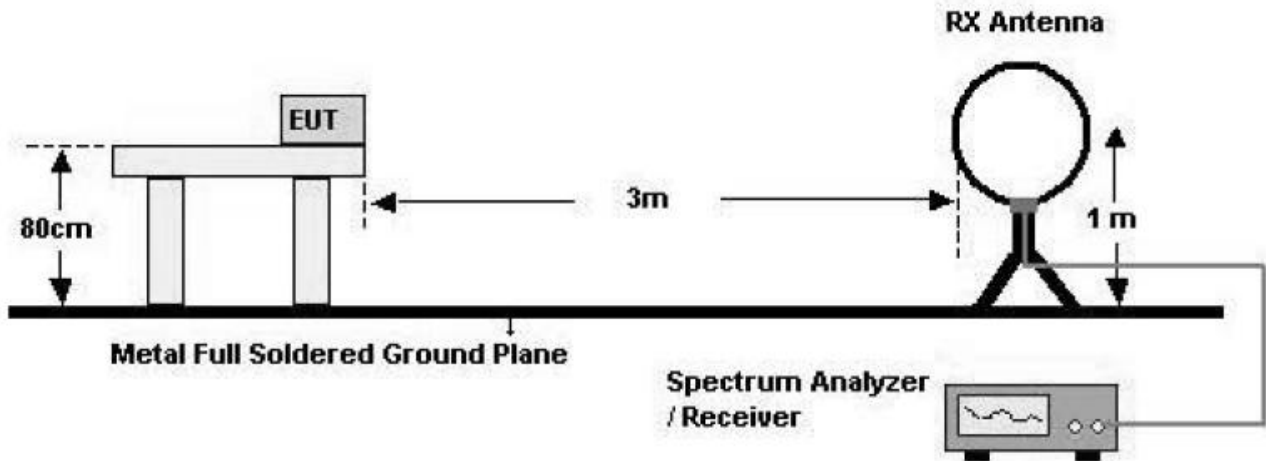
### 7.5.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209

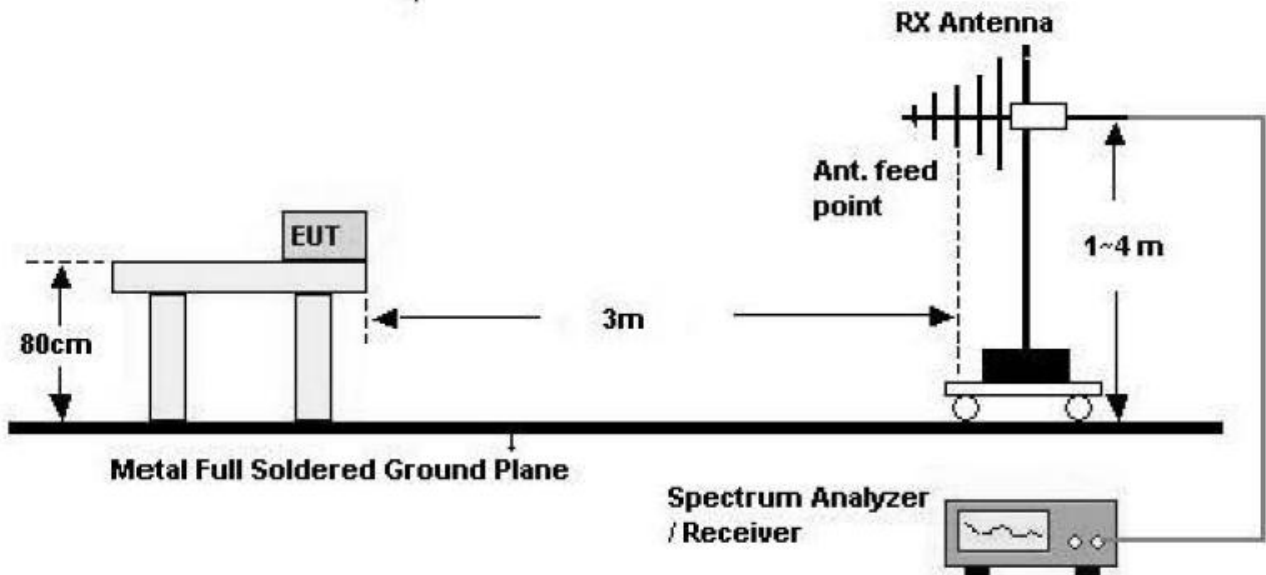
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

## Test Configuration

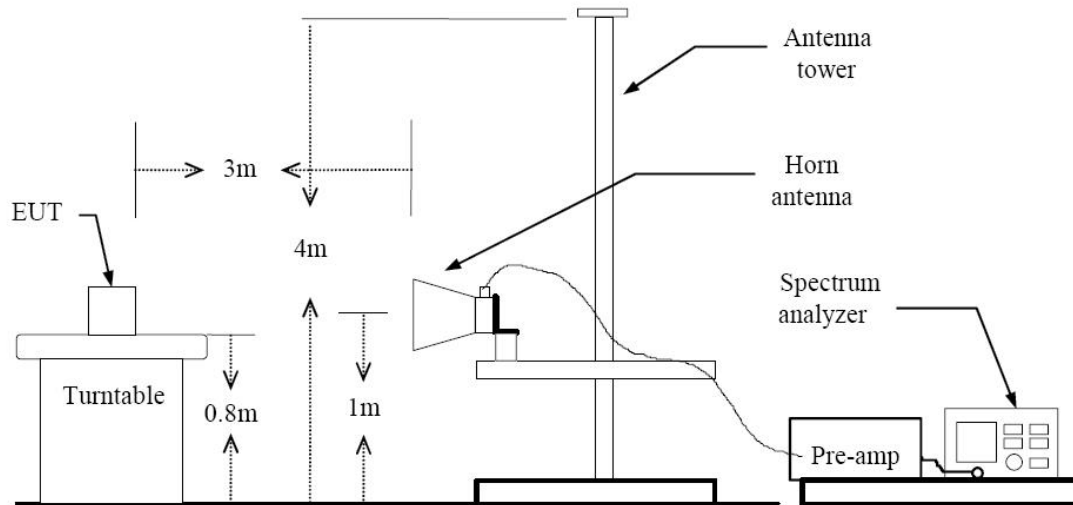
### Below 30 MHz



### 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.

<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> HCTR1011FR05	<b>Date of Issue:</b> November 03, 2010	<b>EUT Type:</b> CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	<b>FCC ID:</b> XAVVW340



## 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 (dB $\mu$ V) + Distance extrapolation factor

<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>
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## TEST RESULTS

Below 1 GHz

Operation Mode: 802.11b Mode (Channel : 1 , 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
52.0	16.8	12.3	0.9	H	30.0	40.0	10.0
83.4	22.9	7.8	1.3	H	32.0	40.0	8.0
168.7	16.6	12.7	1.7	H	31.0	43.5	12.5
183.2	19.4	11.2	1.8	H	32.4	43.5	11.1
273.4	17.0	12.4	2.2	H	31.6	46.0	14.4
289.9	17.3	12.9	2.2	V	32.4	46.0	13.6

### 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 and 802.11g mode test. Worst case of EUT is 802.11b Mode.

<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> HCTR1011FR05	<b>Date of Issue:</b> November 03, 2010	<b>EUT Type:</b> CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	<b>FCC ID:</b> XAVVW340



## 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	41.48	9.85	V	51.33	74	22.67	PK
4824	38.77	9.85	V	48.62	54	5.38	AV
7236	31.14	19.11	V	50.25	74	23.75	PK
7236	16.98	19.11	V	36.09	54	17.91	AV
4824	43.44	9.85	H	53.29	74	20.71	PK
4824	39.76	9.85	H	49.61	54	4.39	AV
7236	31.19	19.11	H	50.30	74	23.70	PK
7236	17.11	19.11	H	36.22	54	17.78	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 and 802.11g test. Worst case of EUT is 11 Mbps in 802.11b.

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<b>Test Report No.</b> HCTR1011FR05	<b>Date of Issue:</b> November 03, 2010	<b>EUT Type:</b> CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	<b>FCC ID:</b> XAVVW340



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	39.61	10.64	V	50.25	74	23.75	PK
4874	35.63	10.64	V	46.27	54	7.73	AV
7311	32.21	18.03	V	50.24	74	23.76	PK
7311	17.98	18.03	V	36.01	54	17.99	AV
4874	41.01	10.64	H	51.65	74	22.35	PK
4874	38.07	10.64	H	48.71	54	5.29	AV
7311	33.01	18.03	H	51.04	74	22.96	PK
7311	18.09	18.03	H	36.12	54	17.88	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 and 802.11g test. Worst case of EUT is 11 Mbps in 802.11b.

<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> HCTR1011FR05	<b>Date of Issue:</b> November 03, 2010	<b>EUT Type:</b> CDMA EV-DO Rev.A Mini Wi-Fi Hotspot	<b>FCC ID:</b> XAVVW340



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	38.14	10.80	V	48.94	74	25.06	PK
4924	32.16	10.80	V	42.96	54	11.04	AV
7386	30.16	19.79	V	49.95	74	24.05	PK
7386	16.74	19.79	V	36.53	54	17.47	AV
4924	40.53	10.80	H	51.33	74	22.67	PK
4924	36.46	10.80	H	47.26	54	6.74	AV
7386	30.52	19.79	H	50.31	74	23.69	PK
7386	16.83	19.79	H	36.62	54	17.38	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 and 802.11g test. Worst case of EUT is 11 Mbps in 802.11b.

<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>
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## 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:	54 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
2346.32	19.08	37.96	H	57.04	74	16.96	PK
2346.32	9.15	37.96	H	47.11	54	6.89	AV
2347.12	17.39	37.96	V	55.35	74	18.65	PK
2347.12	3.34	37.96	V	41.3	54	12.70	AV
2483.52	15.86	39.92	H	55.78	74	18.22	PK
2483.52	4.90	39.92	H	44.82	54	9.18	AV
2483.50	14.40	39.92	V	54.32	74	19.68	PK
2483.50	2.89	39.92	V	42.81	54	11.19	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 and 802.11g test. Worst case of EUT is 54 Mbps in 802.11g.

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## 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 (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 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.

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## ■ RESULT PLOTS

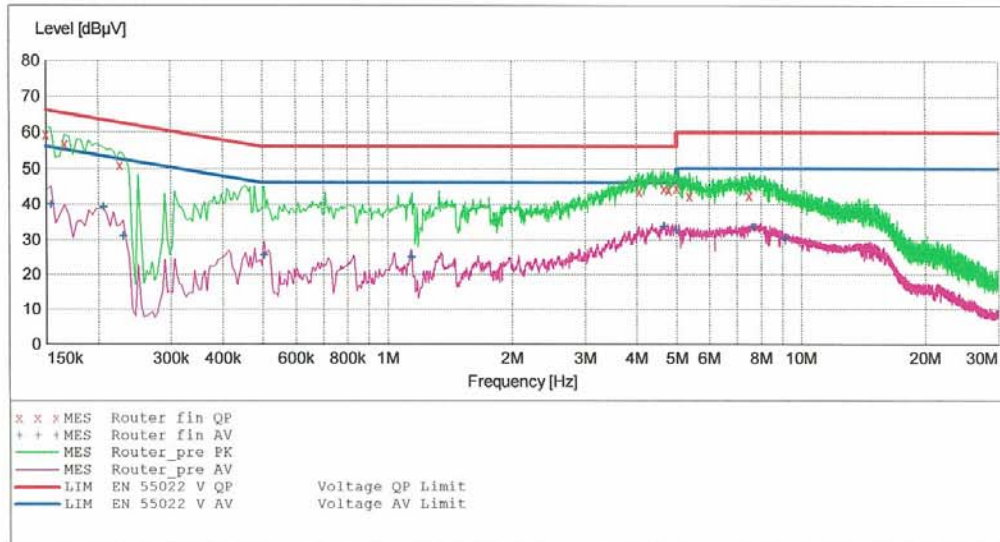
### PHONE

### EMC

EUT: VW340  
Manufacturer: VERTEX  
Operating Condition: DATA COMMUNICATION MODE  
Test Site: SHIELD ROOM  
Operator: DS-KIM  
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: "Router\_fin QP"

10/18/2010 10:46AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150000	59.40	10.1	66	6.6	---	---
0.166000	56.70	10.1	65	8.4	---	---
0.226000	50.90	10.1	63	11.7	---	---
4.060000	43.60	10.4	56	12.4	---	---
4.676000	44.30	10.4	56	11.7	---	---
4.796000	44.10	10.4	56	11.9	---	---
5.000000	44.50	10.5	56	11.5	---	---
5.376000	42.30	10.5	60	17.7	---	---
7.520000	42.60	10.6	60	17.4	---	---



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

10/18/2010 10:46AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.154000	39.80	10.1	56	16.0	---	---
0.206000	39.10	10.1	53	14.3	---	---
0.230000	31.00	10.1	52	21.4	---	---
0.504000	25.40	10.1	46	20.6	---	---
1.144000	24.90	10.2	46	21.1	---	---
4.676000	33.70	10.4	46	12.3	---	---
5.000000	32.50	10.5	46	13.5	---	---
7.708000	33.60	10.6	50	16.4	---	---
9.192000	30.40	10.7	50	19.6	---	---

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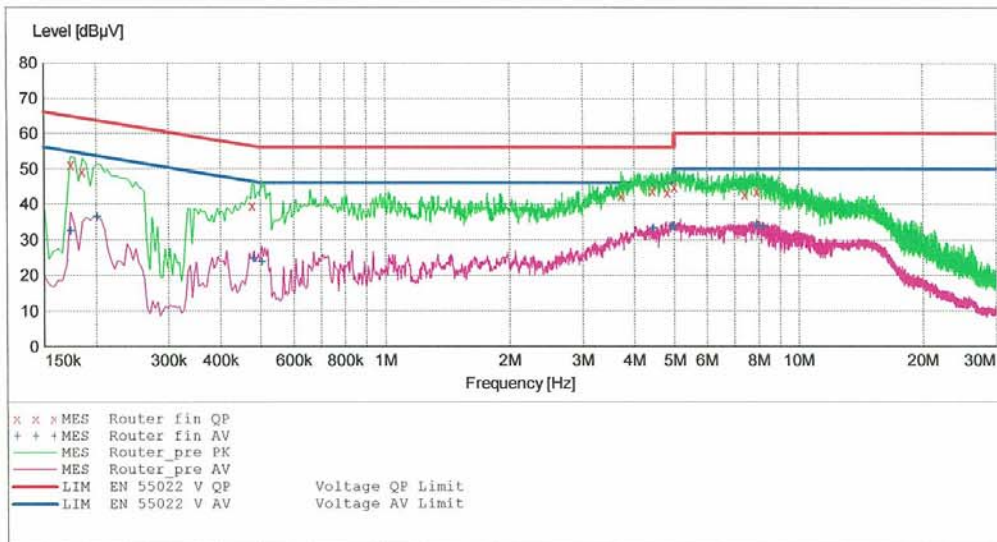
# PHONE

## EMC

EUT: VW340  
Manufacturer: VERTEX  
Operating Condition: DATA COMMUNICATION MODE  
Test Site: SHIELD ROOM  
Operator: DS-KIM  
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: "Router\_fin\_QP"

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Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.174000	51.10	10.1	65	13.7	---	---
0.186000	49.10	10.1	64	15.2	---	---
0.478000	39.60	10.1	56	16.8	---	---
3.728000	42.30	10.4	56	13.7	---	---
4.440000	43.80	10.4	56	12.2	---	---
4.832000	43.40	10.4	56	12.6	---	---
5.000000	44.70	10.5	56	11.3	---	---
7.404000	42.80	10.6	60	17.2	---	---
7.916000	43.50	10.7	60	16.5	---	---

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

10/18/2010 10:42AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.174000	32.40	10.1	55	22.3	---	---
0.202000	36.40	10.1	54	17.2	---	---
0.482000	24.70	10.1	46	21.6	---	---
0.504000	23.90	10.1	46	22.1	---	---
4.460000	33.20	10.4	46	12.8	---	---
4.952000	33.60	10.5	46	12.4	---	---
5.000000	33.70	10.5	46	12.3	---	---
7.916000	34.00	10.7	50	16.0	---	---
8.200000	33.60	10.7	50	16.4	---	---

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## 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	12/18/2010	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	12/01/2010	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