



**DIGITAL EMC CO., LTD.**

683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080  
 Tel: +82-31-321-2664 Fax: +82-31-321-1664  
<http://www.digitalemc.com>

**CERTIFICATIO OF COMPLIANCE**

NOVATRON CO., LTD  
 #601 Polaris 1<sup>st</sup> Bldg., Jeongja-dong 15-2, bundang-gu,  
 Seongnam-si, Gyeonggi-do,, Korea.

Dates of Tests: August 1 ~ 7, 2006  
 Test Report S/N: DR50110608F  
 Test Site : DIGITAL EMC CO., LTD.

FCC ID

**UDSHD36WNTD**

APPLICANT

**NOVATRON CO., LTD**

- FCC Classification** : Digital Transmission System (DTS)
- Kind of Equipment** : MEDIA PLAYER
- Manufacturer** : NOVATRON CO., LTD
- FCC ID** : UDSHD36WNTD
- Model name** : NTD36HD
- Band name** : IAMM
- Test Device Serial number** : Identical prototype
- Standard(s)** : FCC Part 15.247 Subpart C  
ANSI C-63.4-2003
- Frequency Range** : 2412 ~ 2462 MHz
- Max. Output power** : 802.11b – 14.70dBm Conducted  
802.11g – 9.86dBm Conducted
- Data of issue** : August 7, 2006

**I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.**



NVLAP LAB CODE 200559-0

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**1. General information**

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

Address : 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

<http://www.digitalemc.com> E-mail : demc@unitel.co.kr

Tel: +82-31-321-2664 Fax: +82-31-321-1664

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competent of calibration and testing laboratory”.

This laboratory is accredited by NVLAP and NVLAP Lab. Code is 200559-0.

**Test operator: engineer**

August 7, 2006

Won -Jung LEE

Data

Name

Signature

**Report Reviewed By: manager**

August 7, 2006

Harvey Sung

Data

Name

Signature

Ordering party:

Company name : NOVATRON CO., LTD

Address : #601 Polaris 1<sup>st</sup> Bldg., Jeongja-dong 15-2, bundang-gu, Seongnam-si, Gyeonggi-do,

Country : Korea

Date of order : March 25, 2006

## 2. Information about test item

### UDSHD36WNTD

#### 2.1 Equipment information

Equipment model no.	NTD36HD
Equipment add model no.	LX350HD, CIBOX, RivX HD
Brand name	IAMM
Add Brand name	Eureka, CIBOX, RivX
Kind of equipment	MEDIA PLAYER
Frequency band	2412 ~ 2462 MHz
Type of Modulation	802.11b – CCK, DQPSK, DBPSK 802.11g – OFDM
Type of antenna	Dipole Antenna
Power	Adaptor – Input : AC 120V, 60Hz Output : DC 12V

#### 2.2 Tested frequency

Frequency	DSSS
Low frequency	2412MHz
Middle frequency	2437MHz
High frequency	2462MHz

#### 2.3 Tested environment

Temperature	: 15 ~ 35 (°C)
Relative humidity content	: 20 ~ 75 %
Air pressure	: 86 ~ 103 kPa
Details of power supply	: 120 V / 60Hz (powered by power supply)

## UDSHD36WNTD

**2.4 EMI Suppression Device(s)/Modifications**

EMI suppression device(s) added and/or modifications made during testing

-> none

**2.5 Ancillary Equipment**

<b>Equipment</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Manufacturer</b>
Color Monitor	SAM-14MV	F509M0962	SAMSUNG
-	-	-	-

### 3. Test Result

#### 3.1 Summary of tests

FCC Section(s)	Parameter	Limit	Test Condition	Status (note 1)
<b>I. Transmit mode(Tx)</b>				
15.247(a)(2)	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)(3)	Transmitter Output Power	< 1Watt		C
15.247(c)	Out of Band Emissions / Band Edge	20dBc in any 100kHz BW		C
15.247(d)	Transmitter Power Spectral Density	< 8dBm / 3kHz		C
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	< FCC 15.209 limits	Radiated	C
15.207	AC Conducted Emissions	EN 55022	Line Conducted	C
<b>II. Receive mode(Rx)</b>				
15.207	AC Conducted Emissions	EN 55022	Line Conducted	C
15.209	Receiver Spurious Emissions	< FCC 15.209 limits	Radiated	C
Note 1: C=Comply    NC=Not Comply    NT=Not Tested    NA=Not Applicable				

The sample was tested according to the following specification:

- FCC Parts 15.247; ANSI C-63.4-2003

### 3.2 Transmitter requirements

#### 3.2.1 6 dB Bandwidth

**Procedure:**

The bandwidth at 6 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is ( as close as possible to ) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Span = 50 MHz (Greater than EBW)

RBW = 100 kHz

Sweep = auto

VBW = 100 kHz (VBW ≥ RBW)

Detector function = peak

Trace = max hold

**Measurement Data:**

Test Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11b	2412	1	11.92	Comply
	2437	6	11.83	Comply
	2462	11	12.00	Comply
802.11g	2412	1	16.67	Comply
	2437	6	16.67	Comply
	2462	11	16.67	Comply

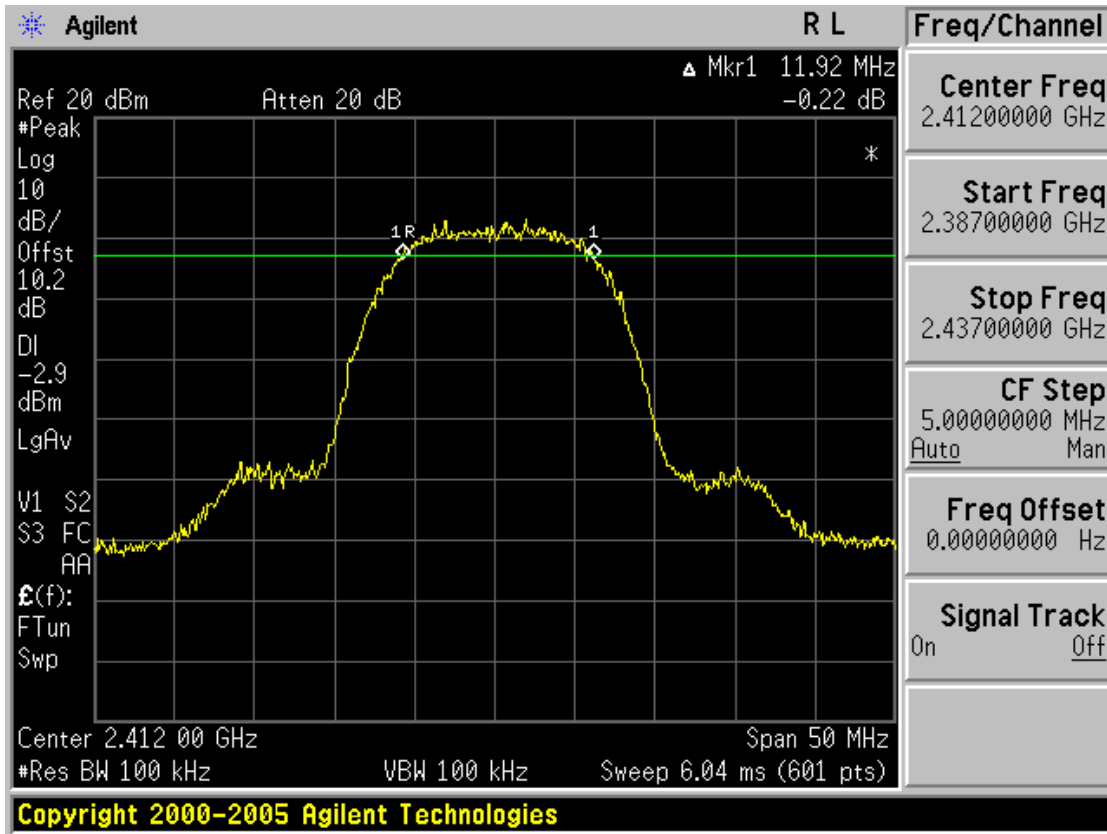
- See next pages for actual measured spectrum plots.

**Minimum Standard:**

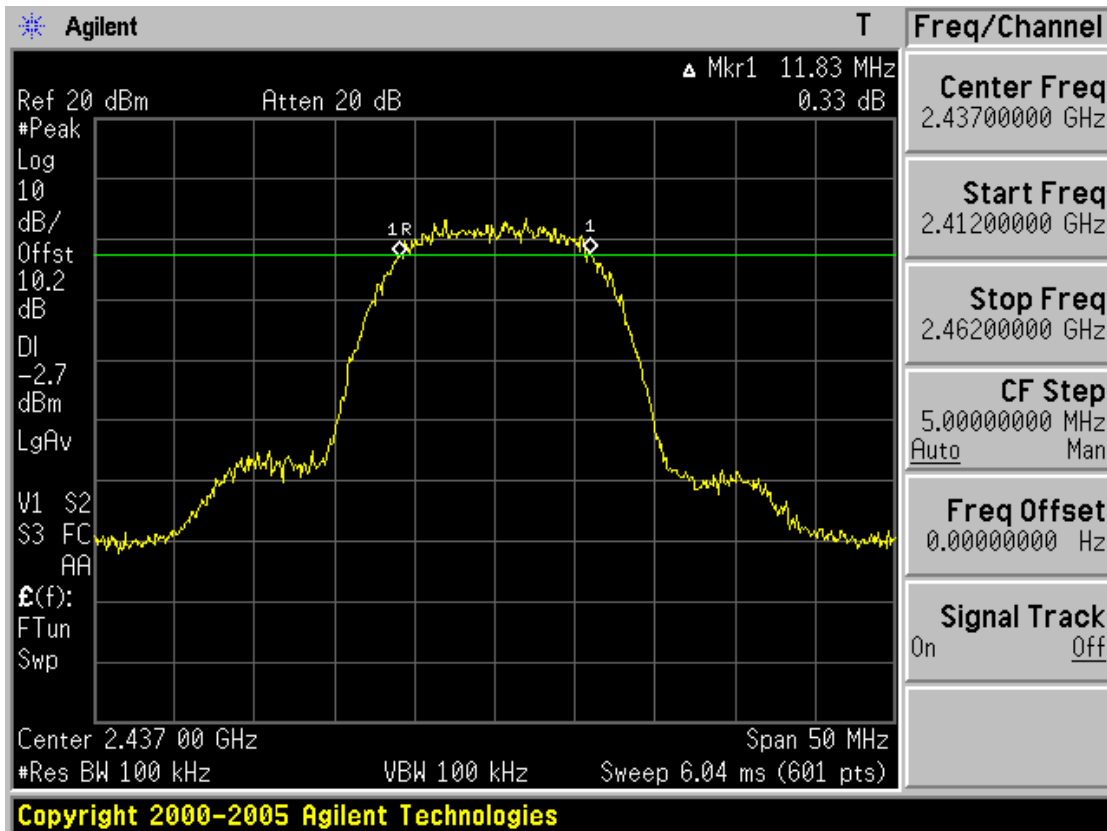
The minimum 6 dB bandwidth shall be at least 500 kHz

6 dB Bandwidth

802.11b Mode



Low Channel

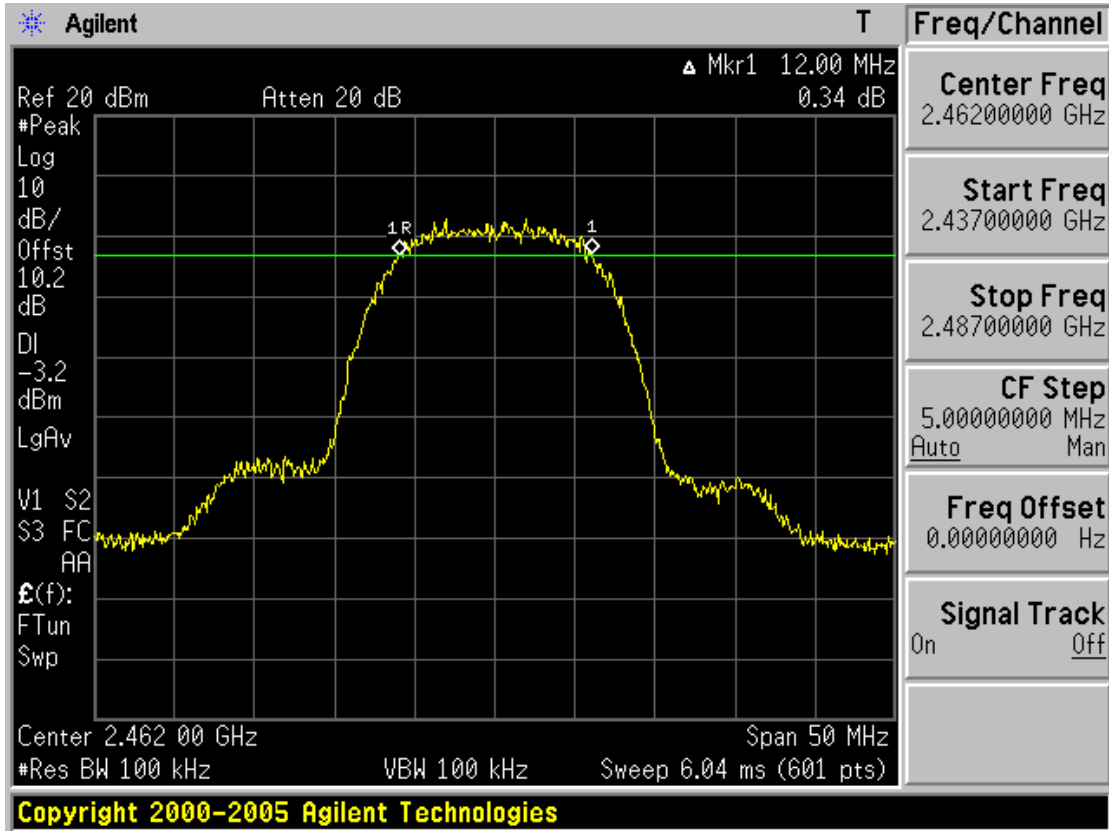


Middle Channel



6 dB Bandwidth

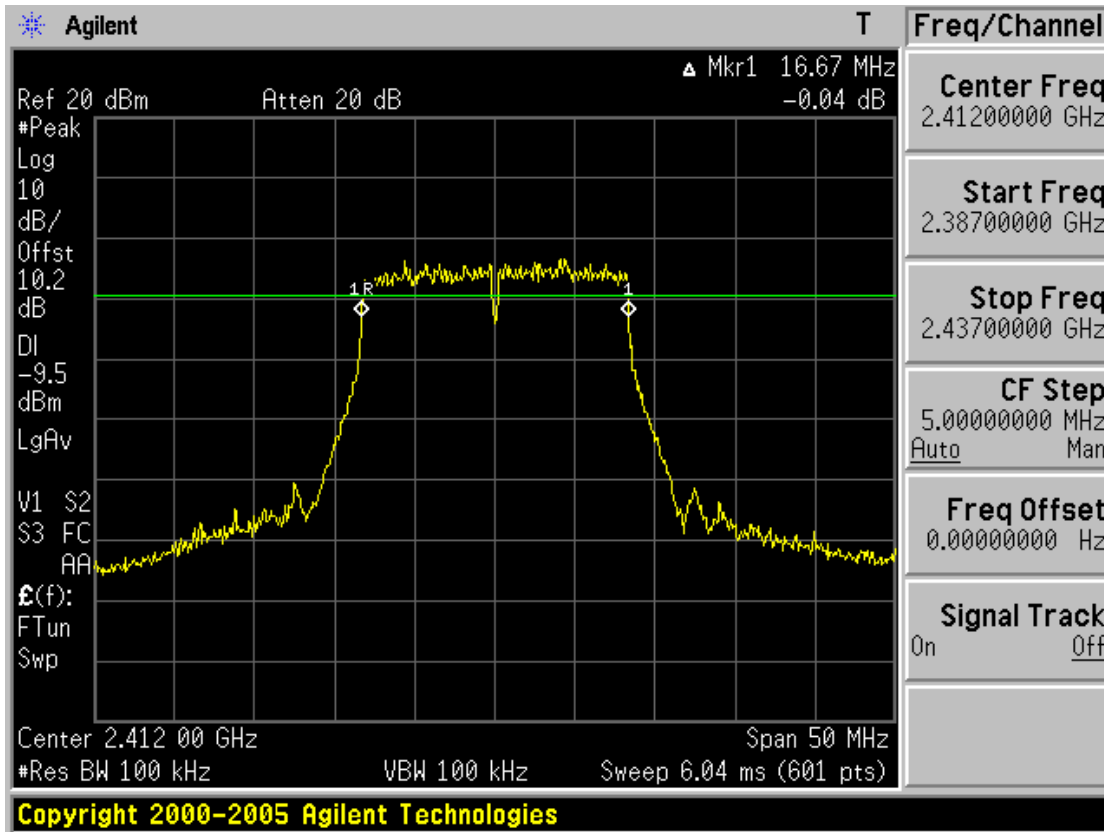
802.11b Mode



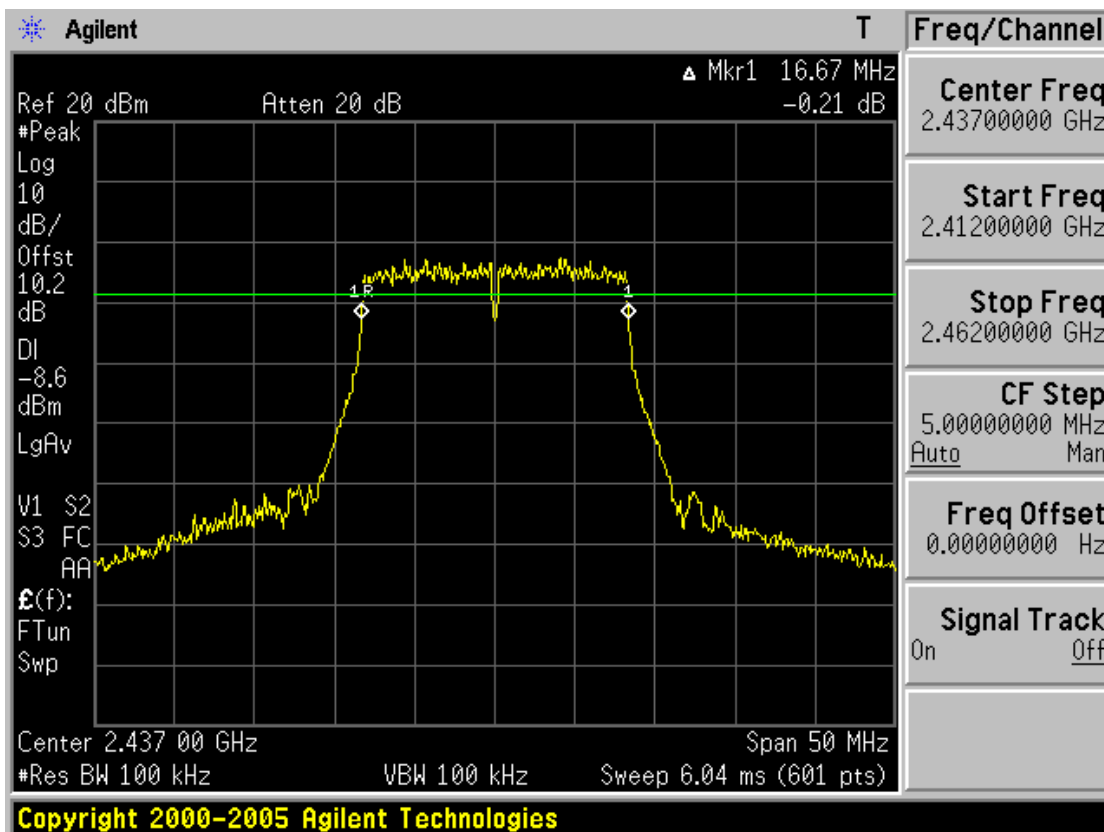
High Channel

6 dB Bandwidth

802.11g Mode



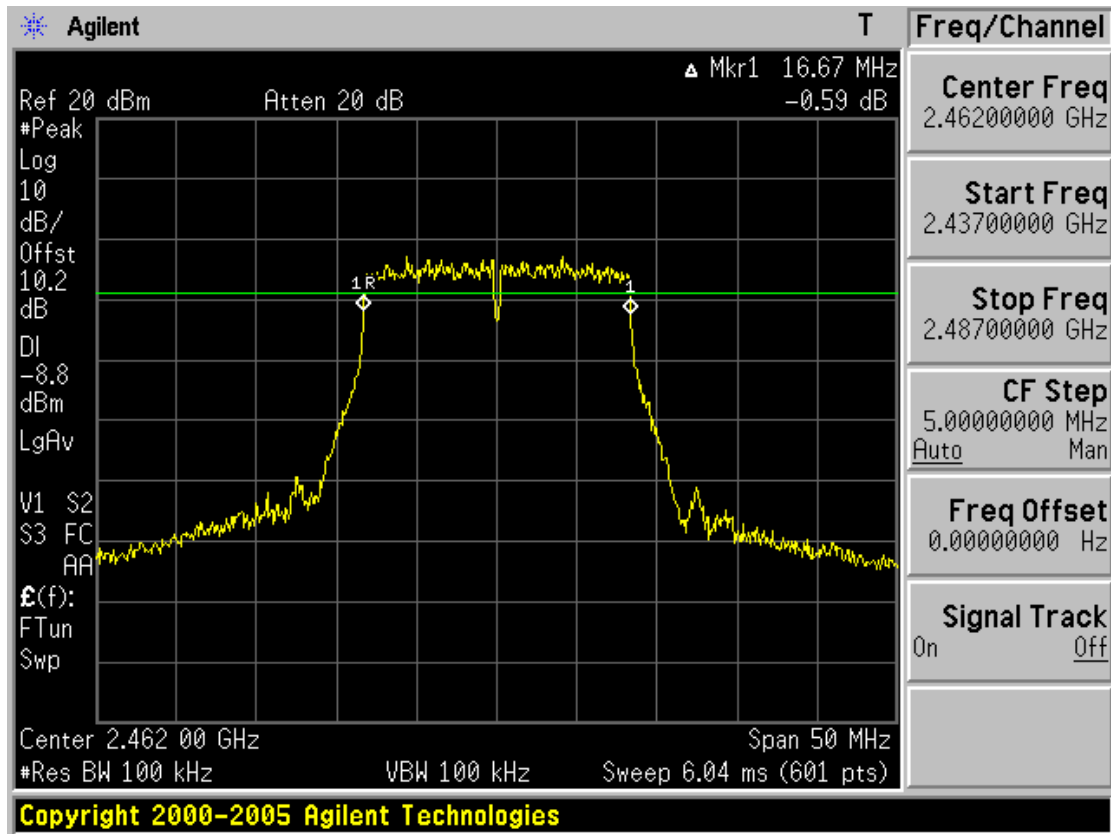
Low Channel



Middle Channel

6 dB Bandwidth

802.11g Mode



High Channel

### 3.2.2 Peak Output Power

**Test Procedure and Spectrum Analyzer setting:**

The peak output power was measured with a spectrum analyzer connected to the antenna terminal at the highest, middle and the lowest available channels.

The transmitter output is connected to a spectrum analyzer and the analyzer`s internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 26dB EBW.

The test is performed in accordance with FCC document “Measurement of Digital Transmission Systems Operating under Section 15.247”, March 23, 2005. The transmitter operates continuously therefore Power Output Option 2, Method #1 is used.

**Measurement Data:**

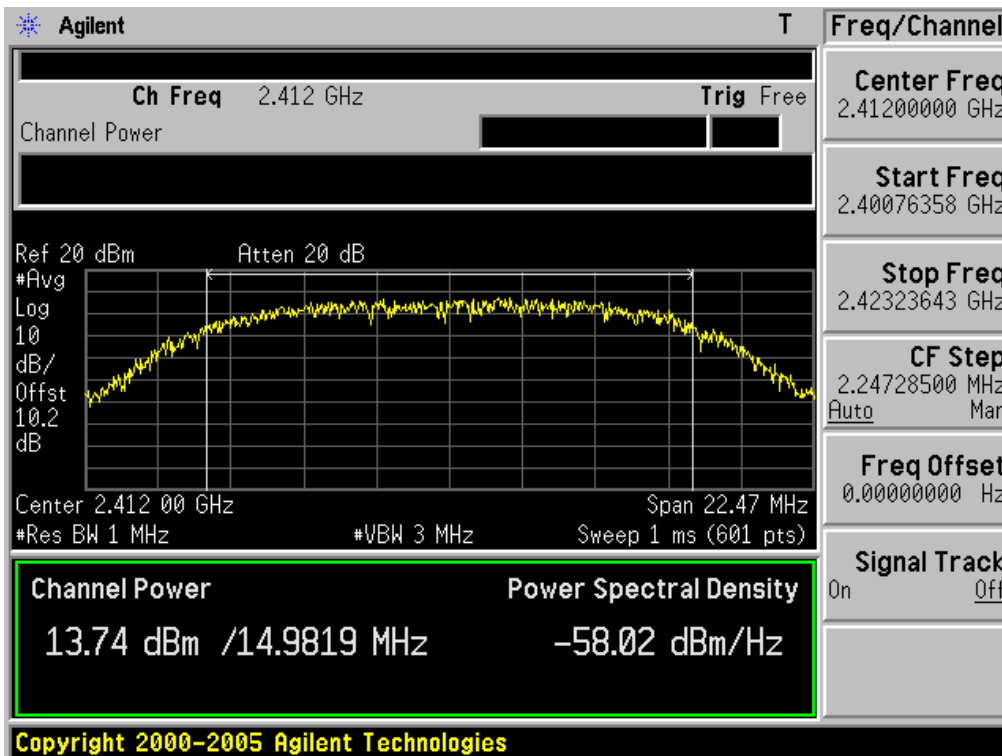
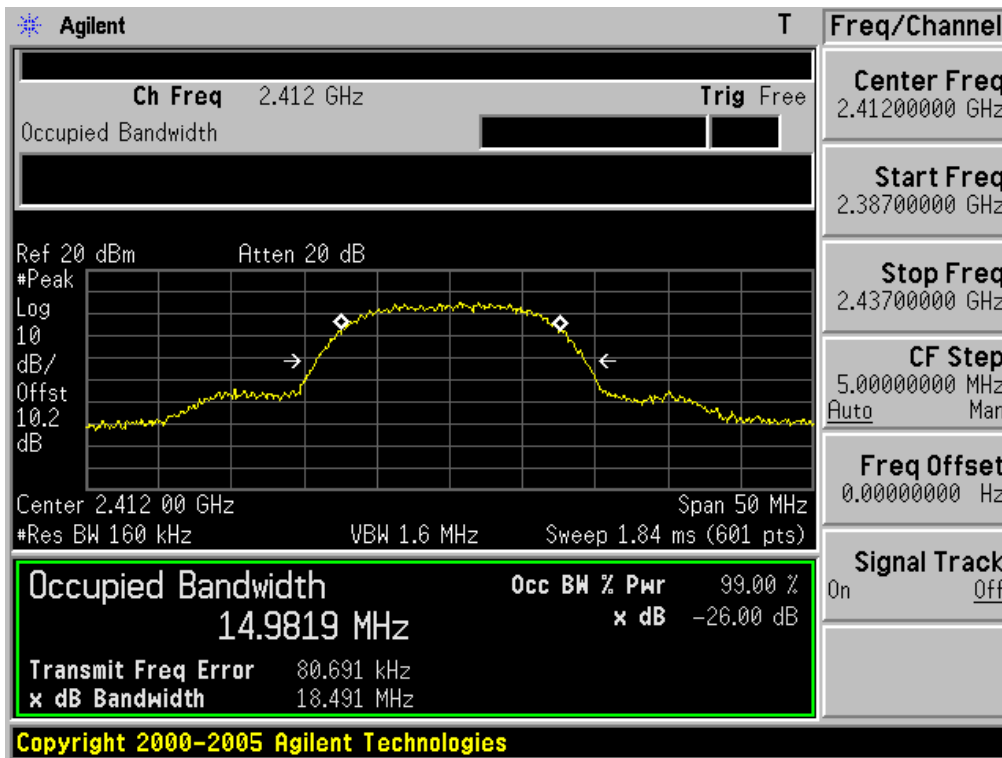
Test Mode	Frequency (MHz)	Ch.	Test Results		
			dBm	W	Result
802.11b	2412	1	13.74	0.024	Comply
	<b>2437</b>	<b>6</b>	<b>14.70</b>	<b>0.030</b>	<b>Comply</b>
	2462	11	14.17	0.026	Comply
802.11g	2412	1	9.09	0.008	Comply
	<b>2437</b>	<b>6</b>	<b>9.86</b>	<b>0.010</b>	<b>Comply</b>
	2462	11	9.70	0.009	Comply

- See next pages for actual measured spectrum plots.

<b>Minimum Standard:</b>	< 1W
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26 dB Bandwidth and Peak Output Power

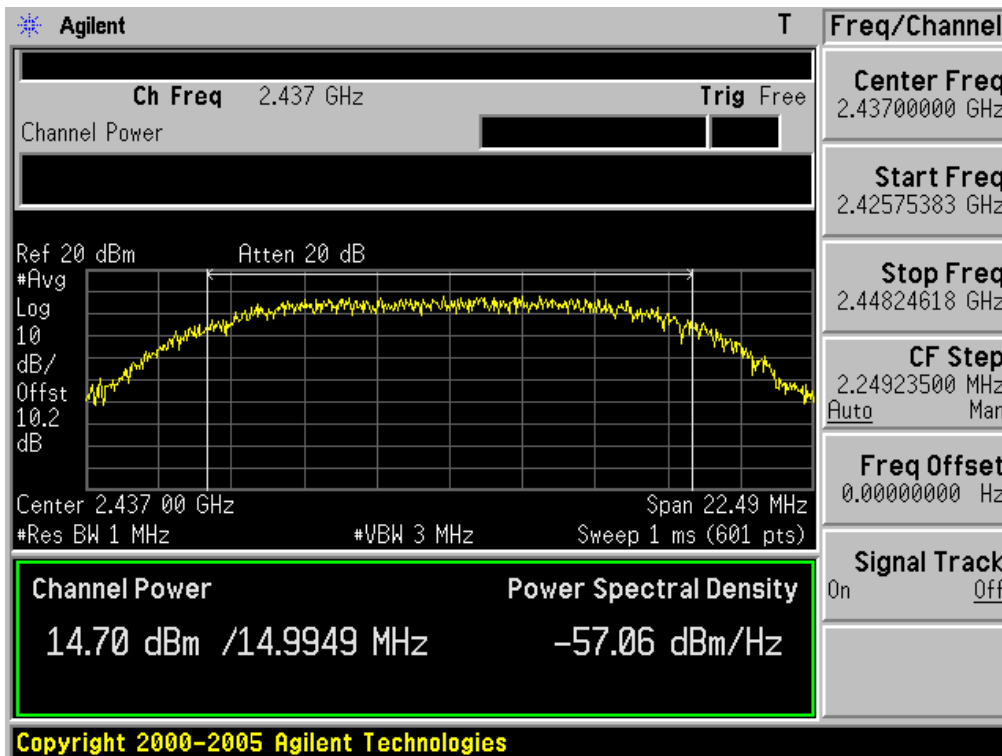
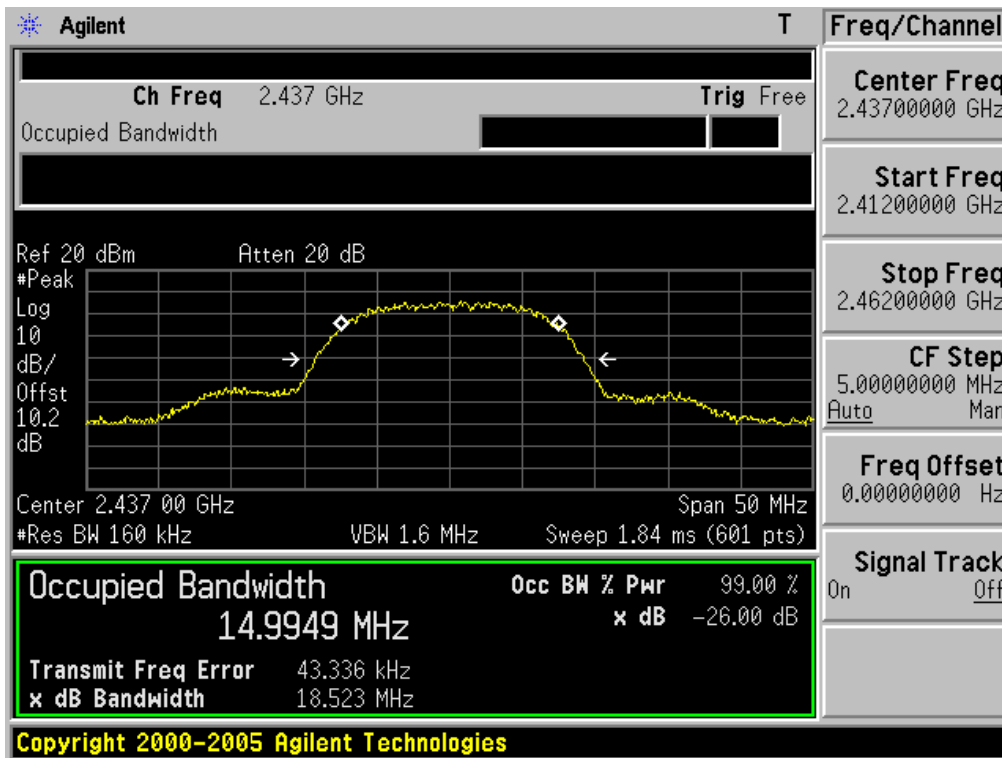
802.11b Mode



Low Channel

26 dB Bandwidth and Peak Output Power

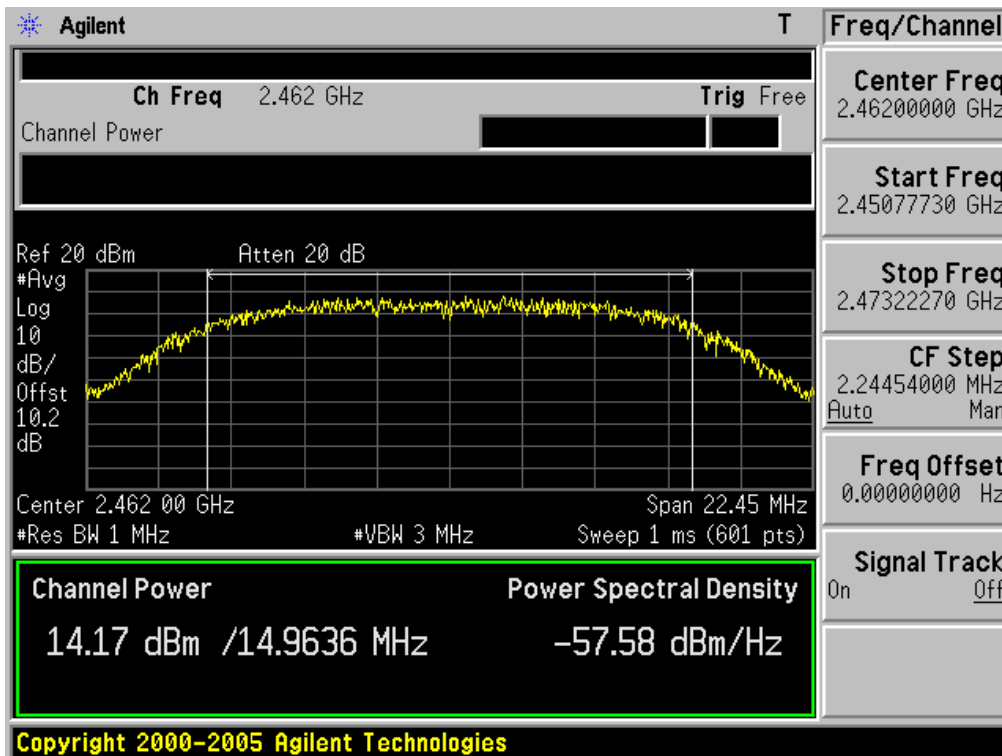
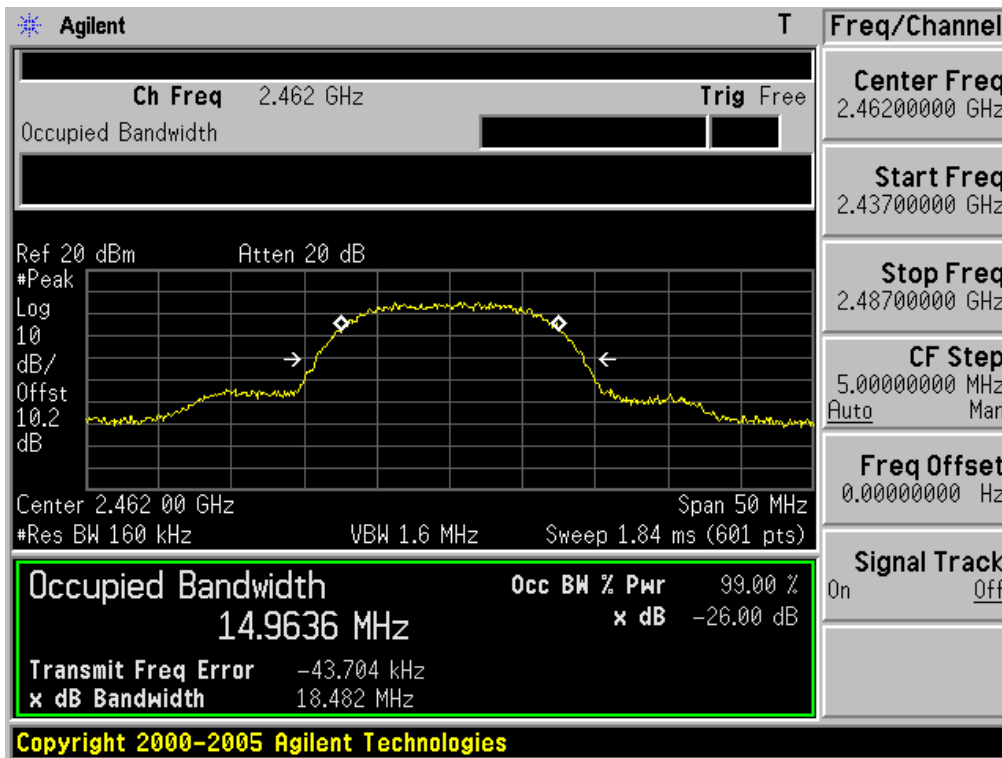
802.11b Mode



Middle Channel

6 dB Bandwidth and Peak Output Power

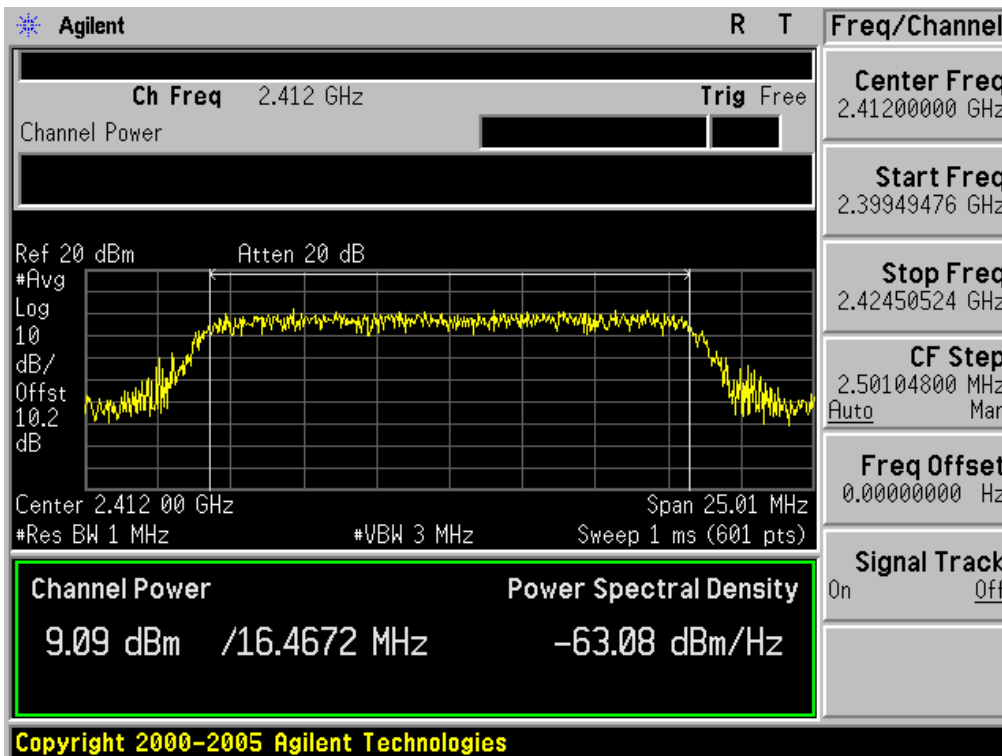
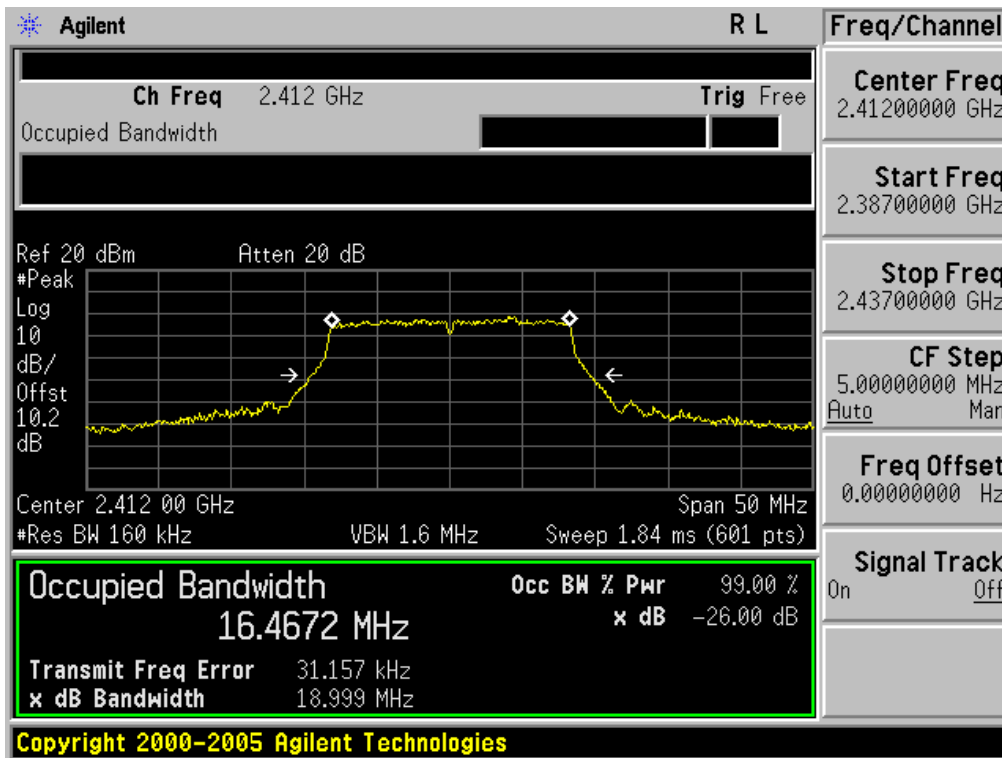
802.11b Mode



High Channel

26 dB Bandwidth and Peak Output Power

802.11g Mode

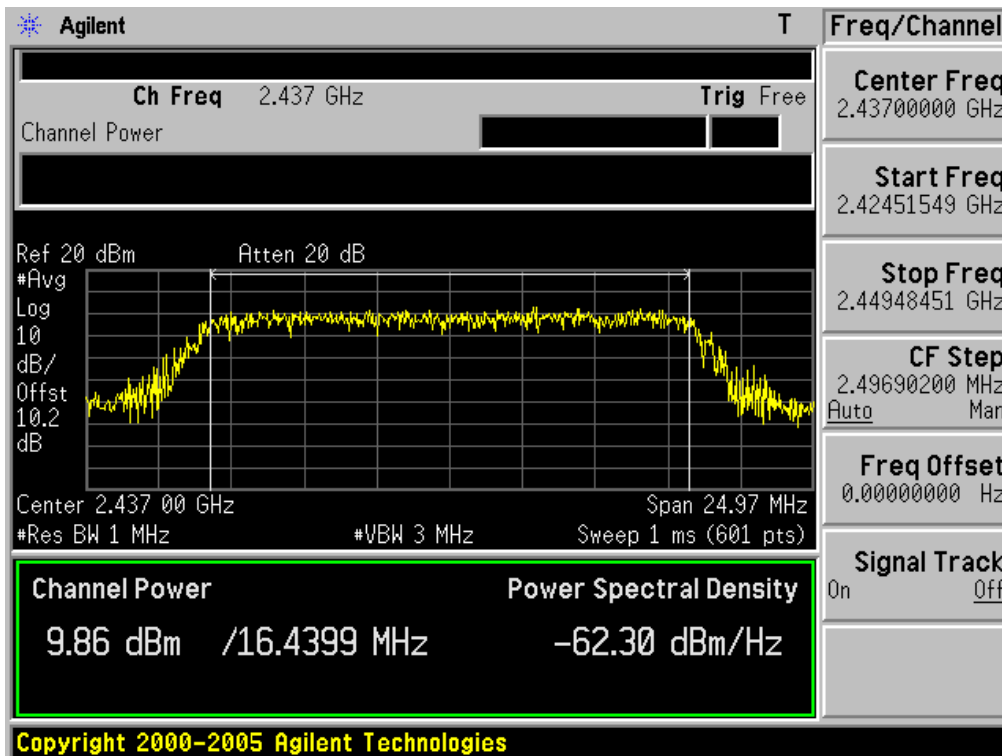
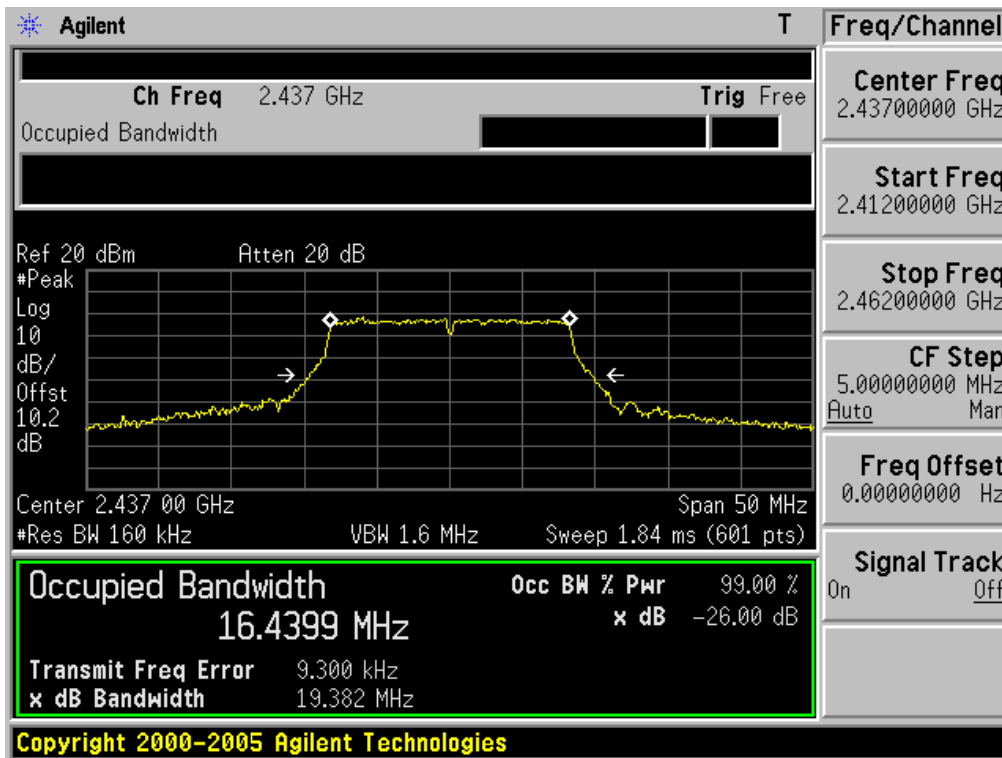


Low Channel



26 dB Bandwidth and Peak Output Power

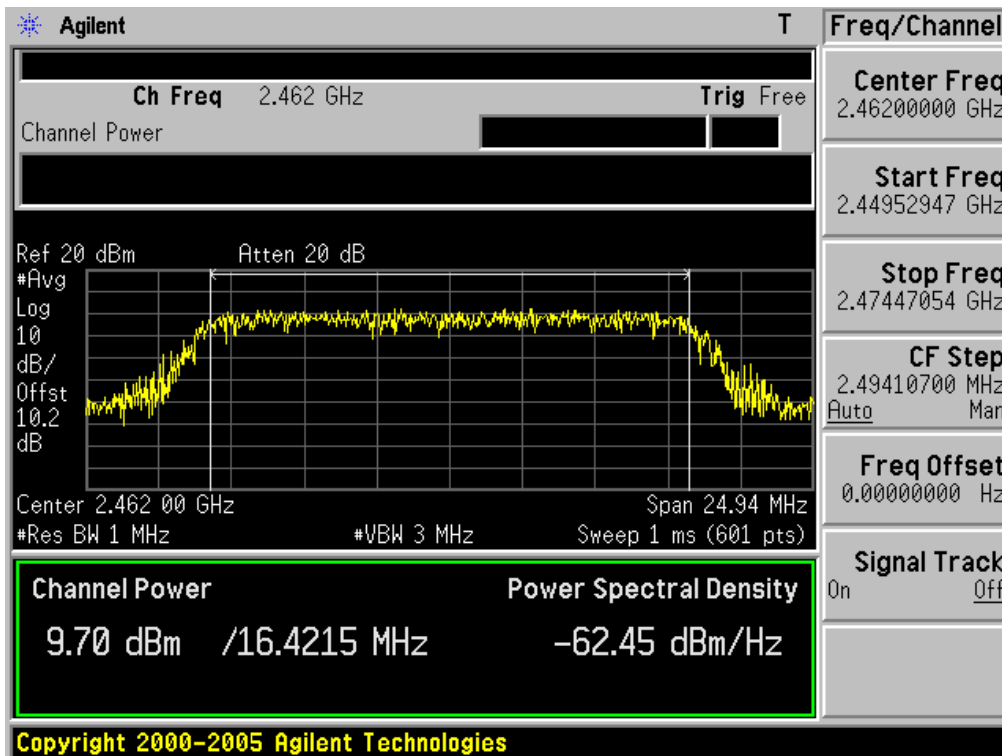
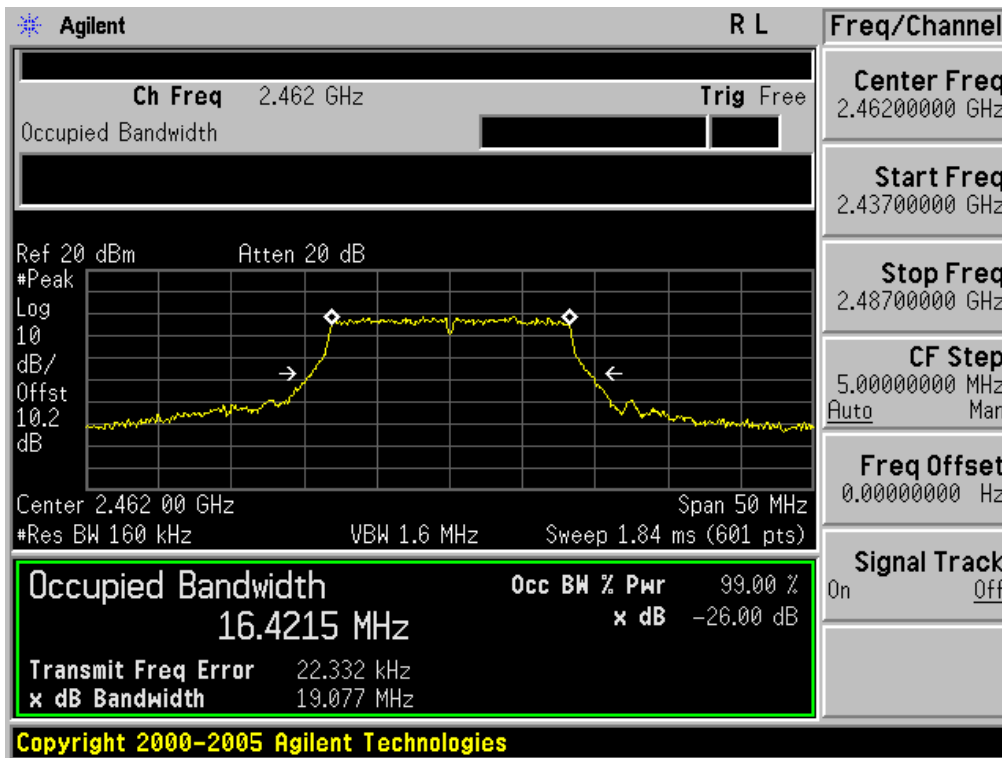
802.11g Mode



Middle Channel

26 dB Bandwidth and Peak Output Power

802.11g Mode



High Channel

### 3.2.3 Out of Band Emissions / Band Edge

**Procedure:**

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

This device complies with use of power option 2. The attenuation under this paragraph shall be 30dB instead of 20dB.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 100 kHz

Span = 100 MHz

Detector function = peak

Trace = max hold

Sweep = auto

**Measurement Data: Comply**

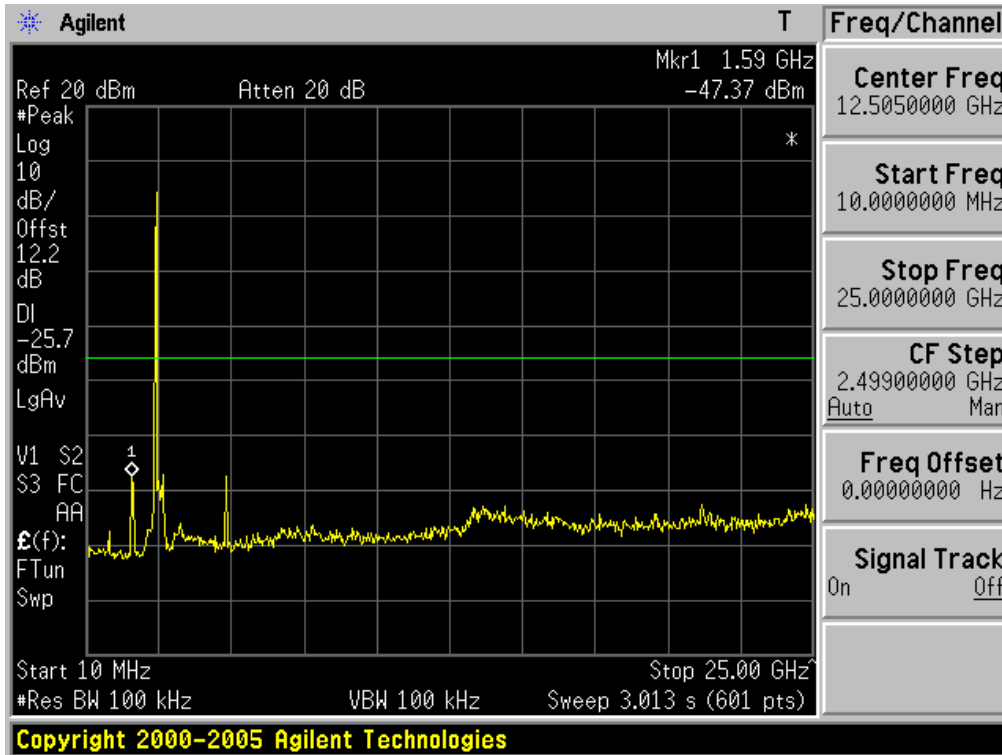
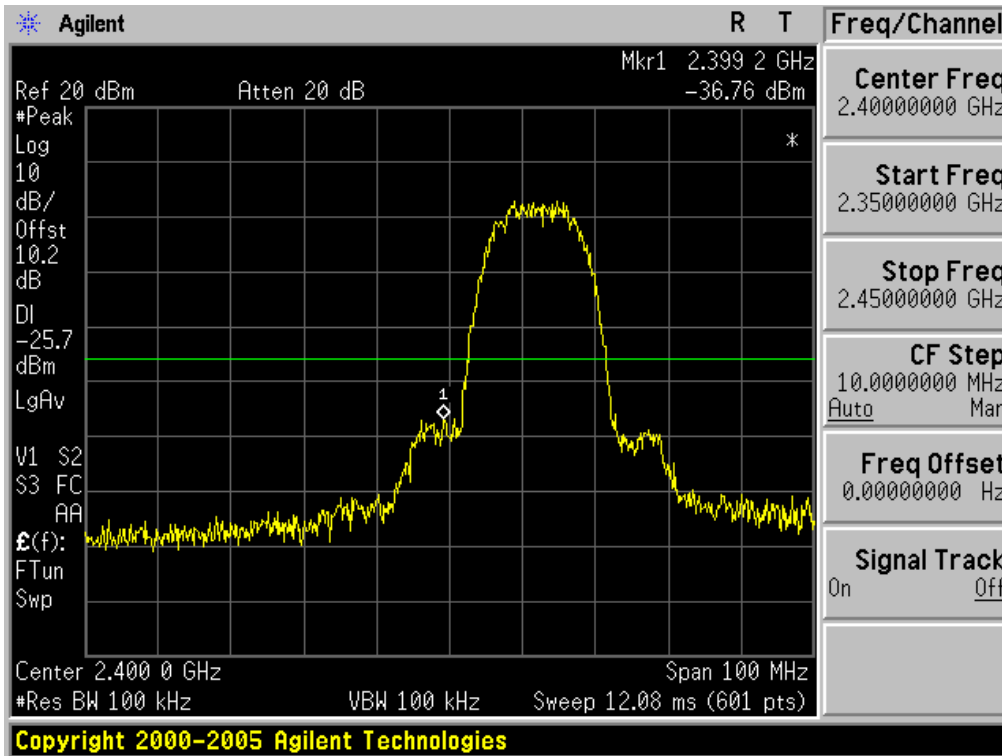
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 30dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

<b>Minimum Standard:</b>	> 30 dBc
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**Measurement Setup**

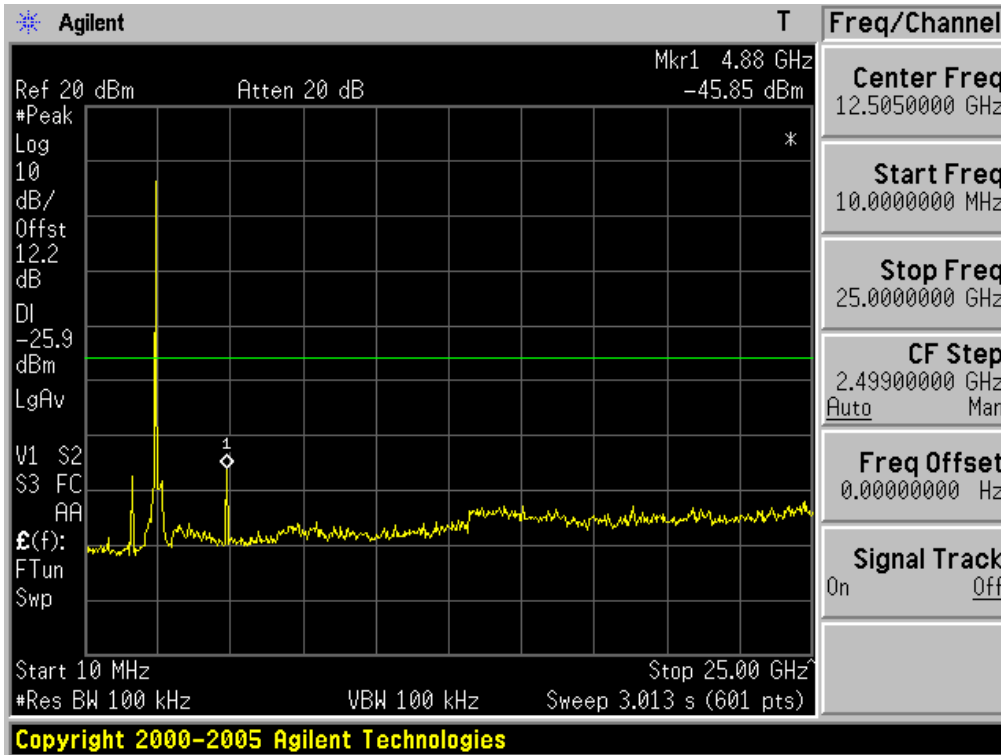
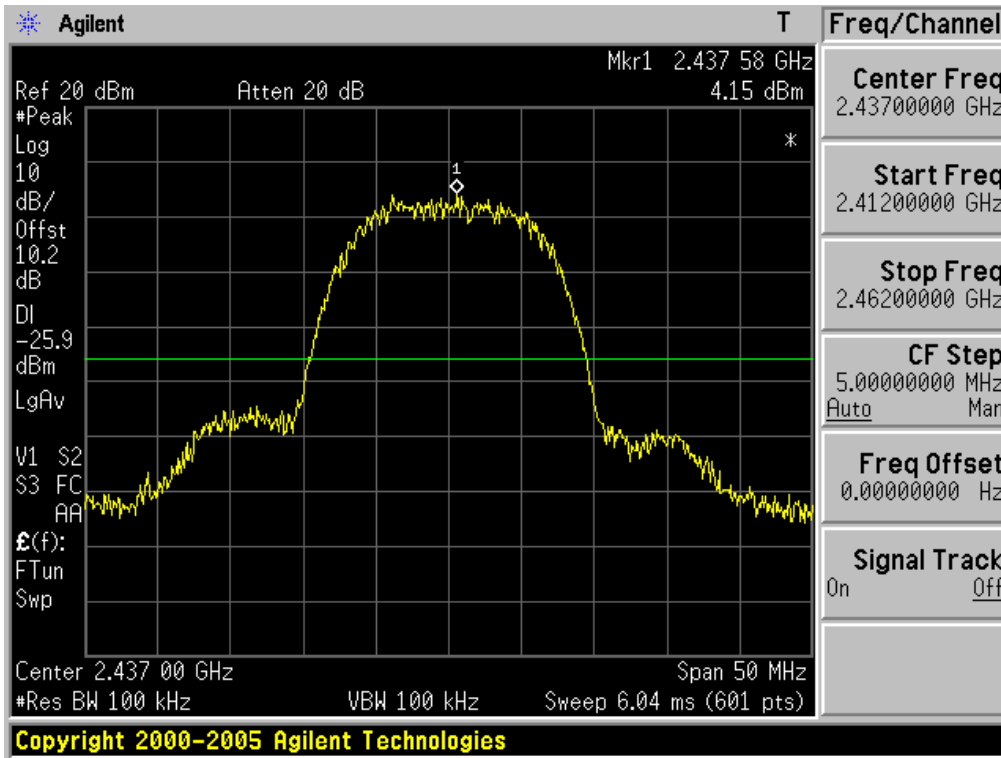
Same as the Chapter 3.2.1 (Figure 1)

Out of Band Emissions / Band Edge (at 30 dB blow) 802.11b Mode



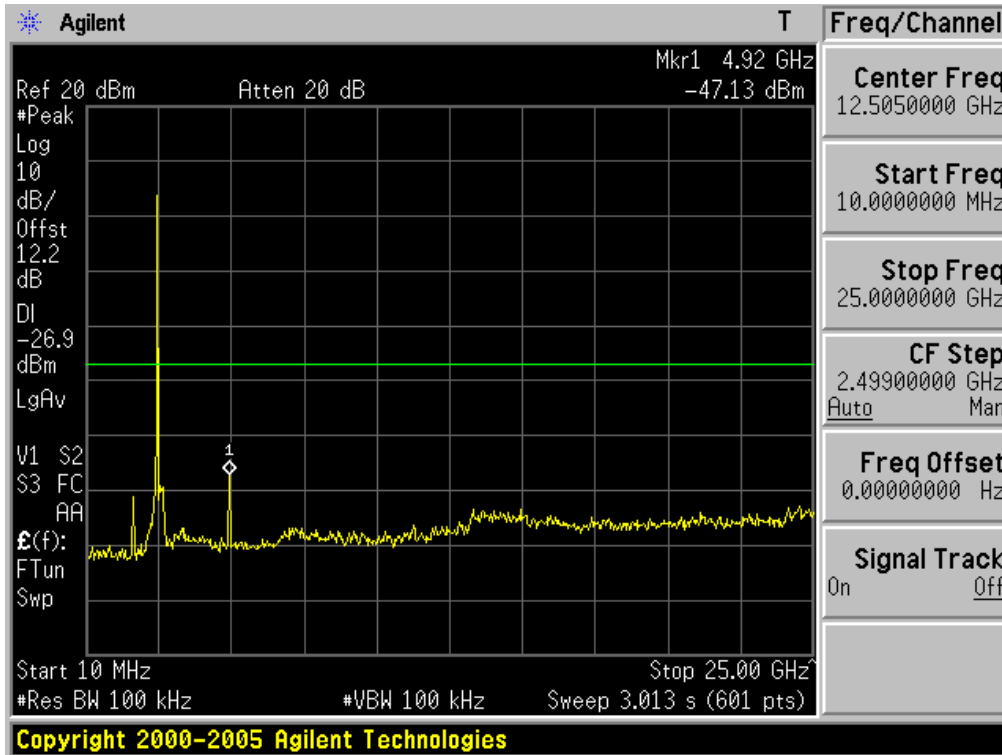
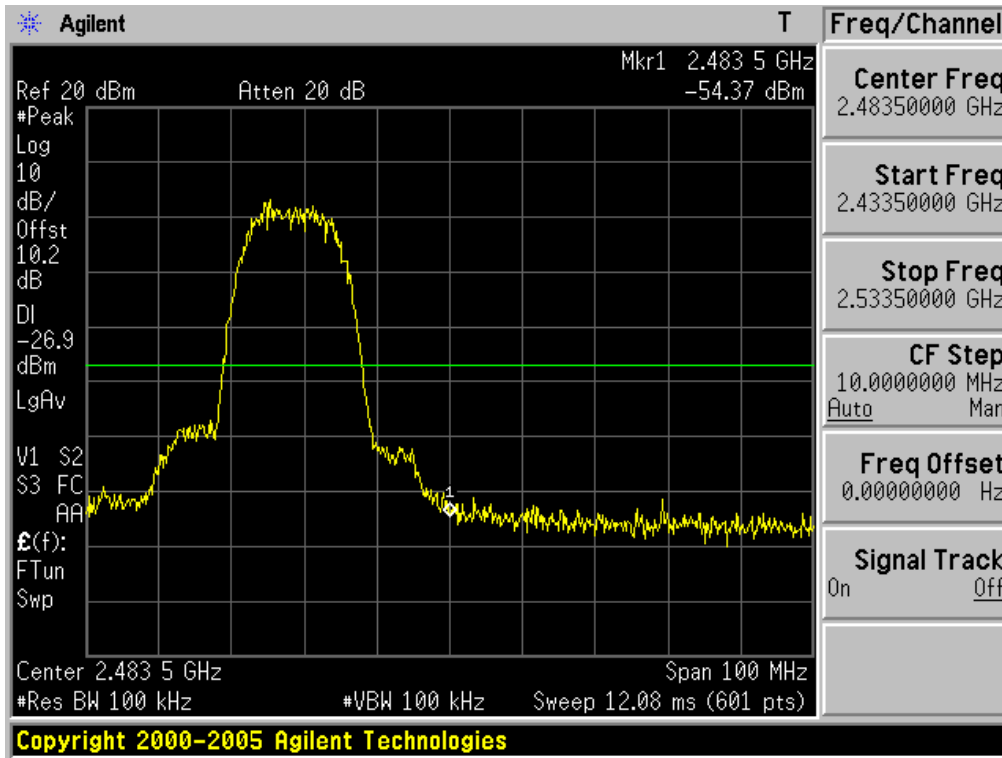
Low Channel

Out of Band Emissions / Band Edge (at 30 dB blow) 802.11b Mode



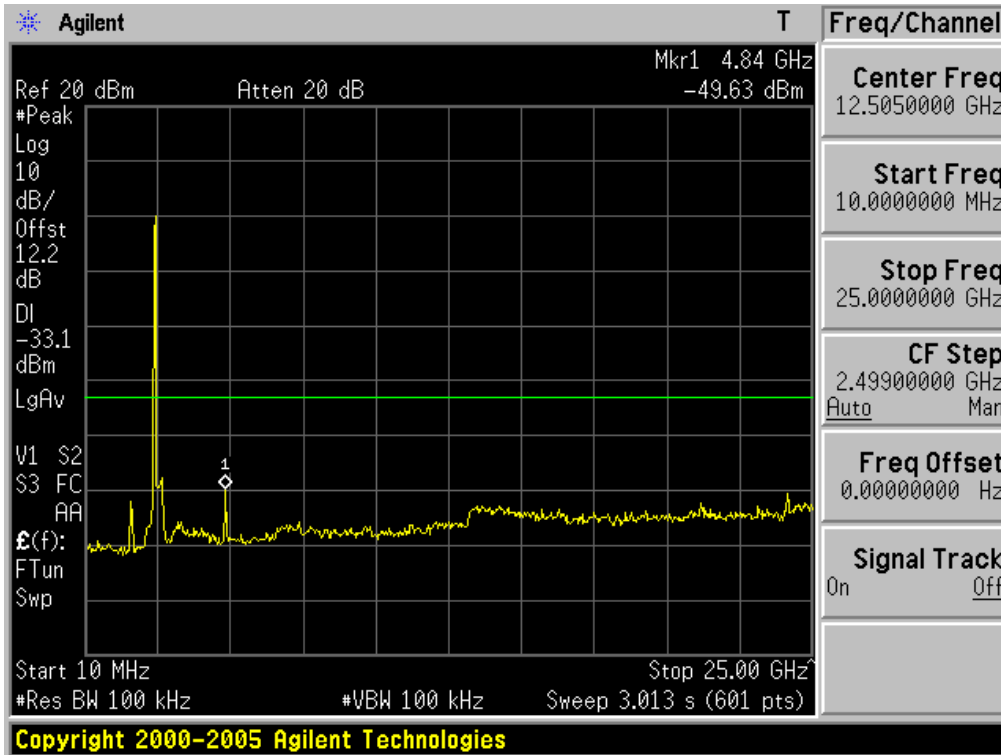
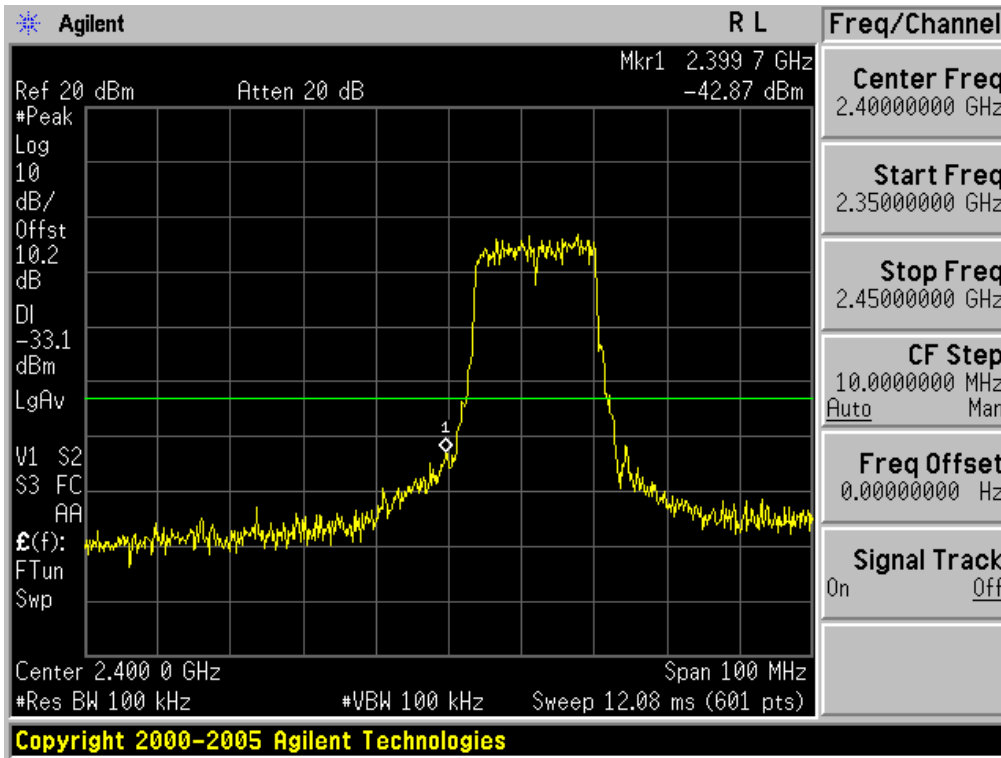
Middle Channel

Out of Band Emissions / Band Edge (at 30 dB blow) 802.11b Mode



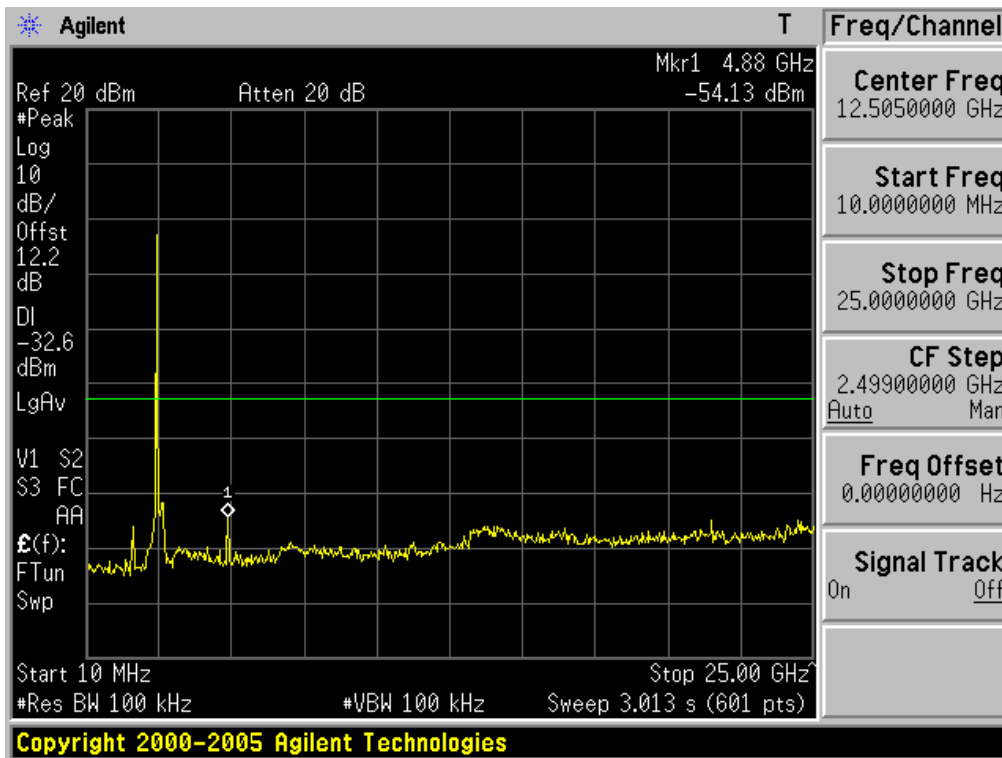
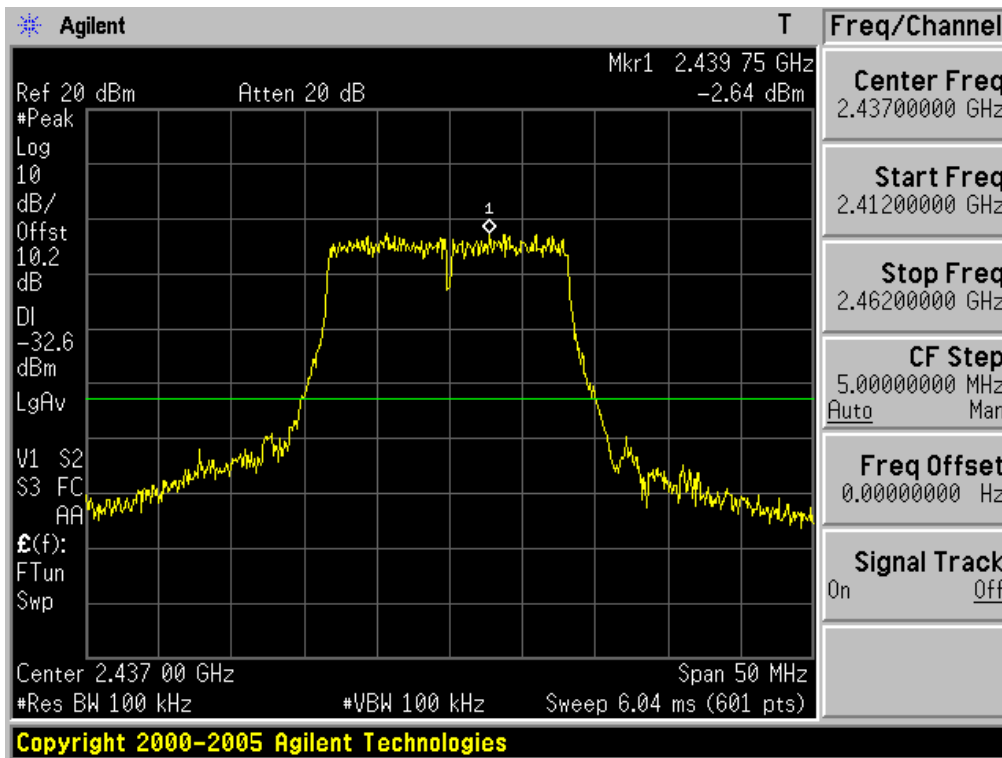
High Channel

Out of Band Emissions / Band Edge (at 30 dB blow) 802.11g Mode



Low Channel

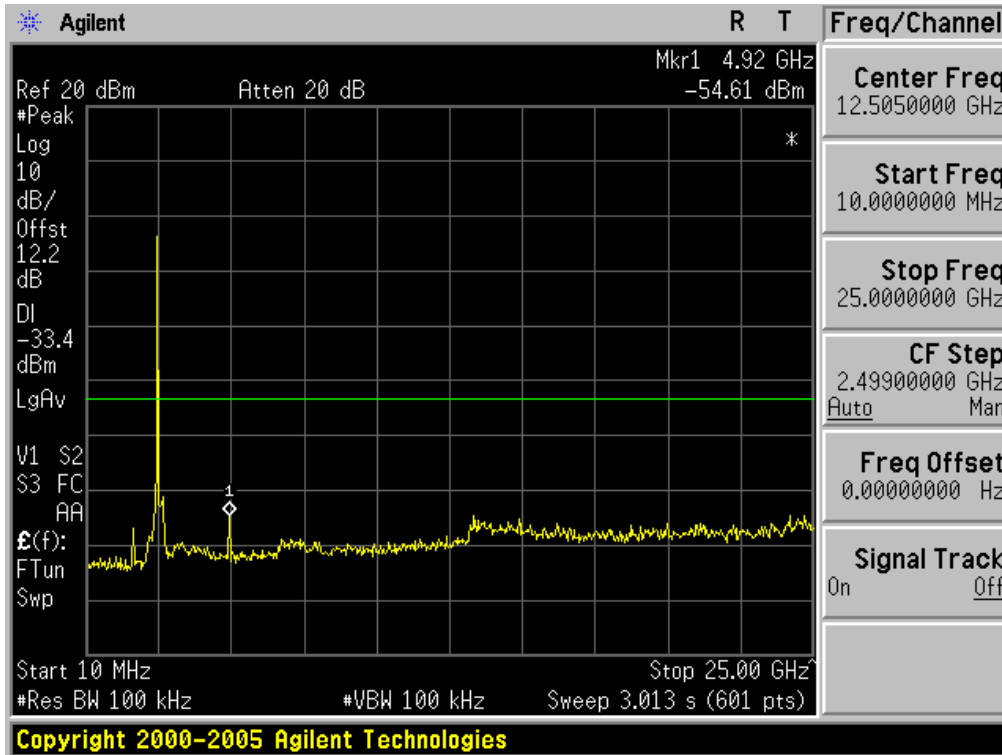
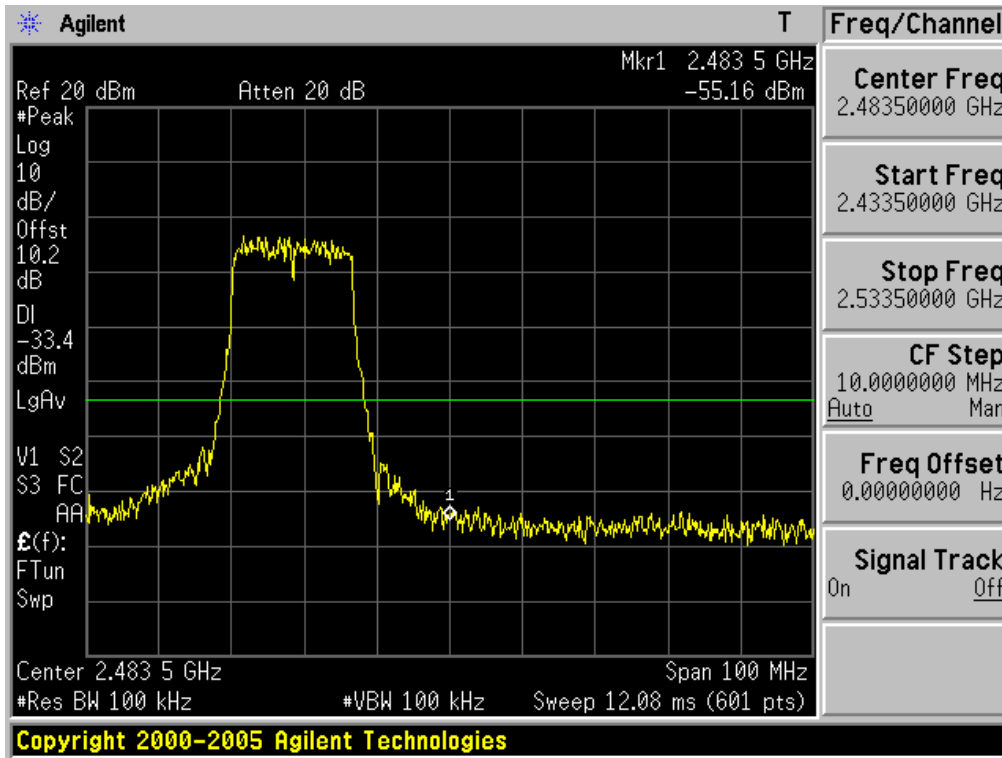
Out of Band Emissions / Band Edge (at 30 dB blow) 802.11g Mode



Middle Channel



Out of Band Emissions / Band Edge (at 30 dB blow) 802.11g Mode



High Channel

**3.2.4 Out of band Emission - Radiated**

**Procedure:**

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

RBW = 120 kHz ( 30MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

VBW = 10Hz (Average), VBW ≥ RBW ( Peak)

Trace = max hold

Sweep = auto

**Measurement Data: Comply**

- No emissions were detected at a level greater than 10dB below limit.
- Refer to the next page.

**Minimum Standard: FCC Part 15.205 (a), 15.205(b), 15.209(a) and (b)**

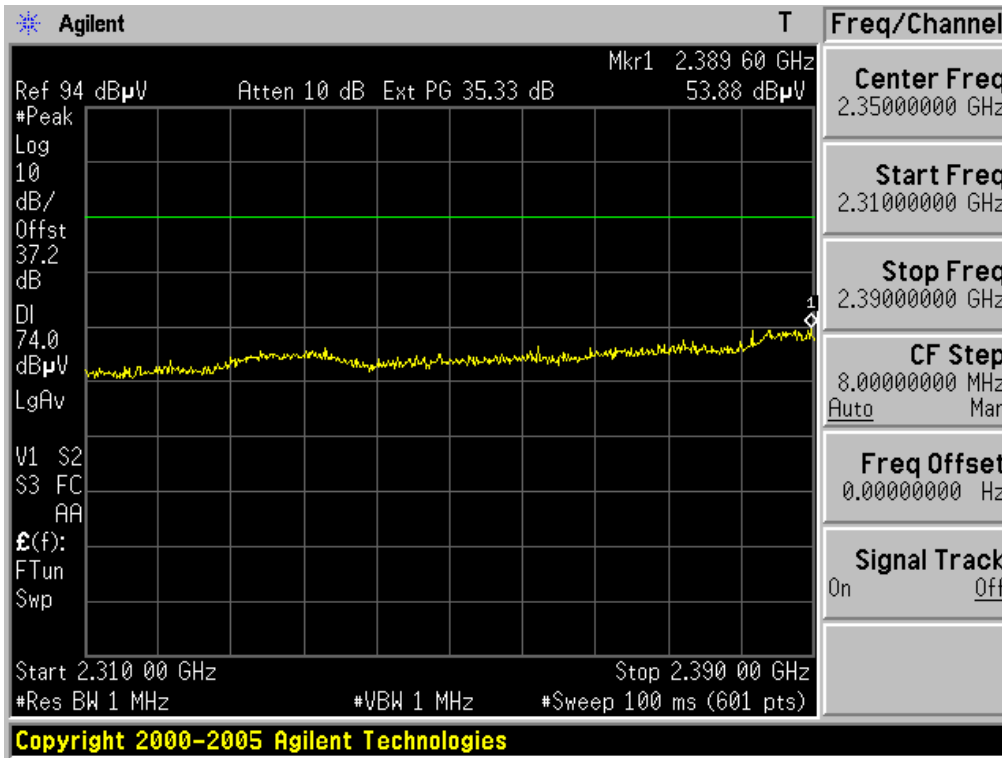
**Limit : FCC P15.209(a)**

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

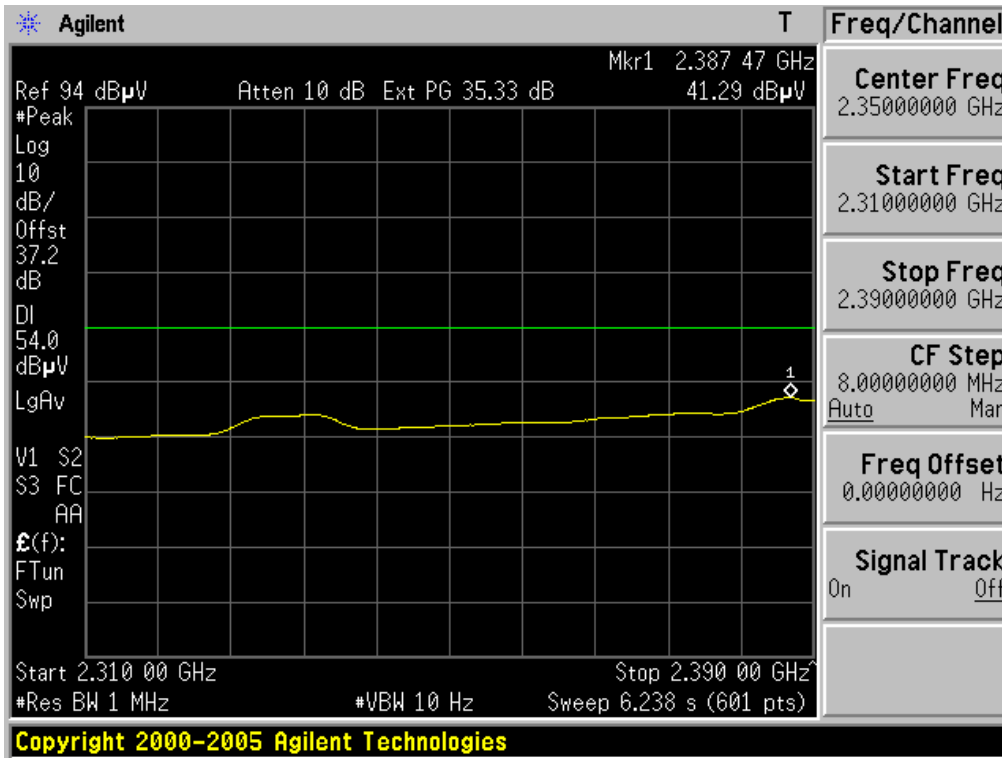
Restricted Band Edge: Low Channel (Peak, Horizontal)

802.11b Mode



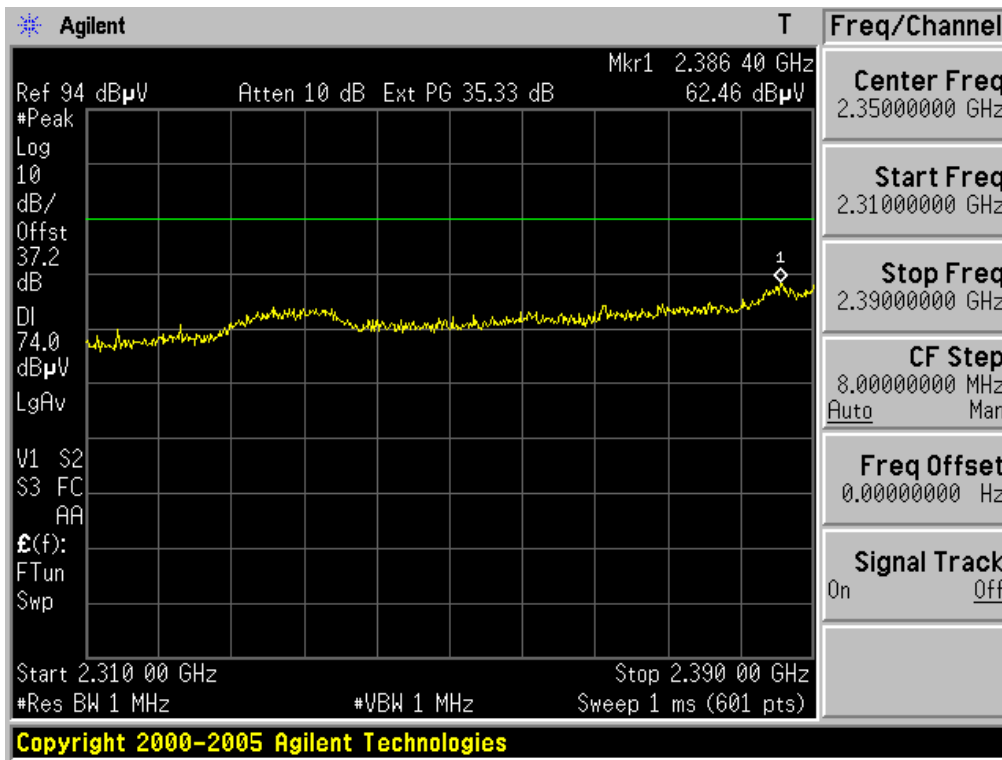
Restricted Band Edge: Low Channel (Average, Horizontal)

802.11b Mode



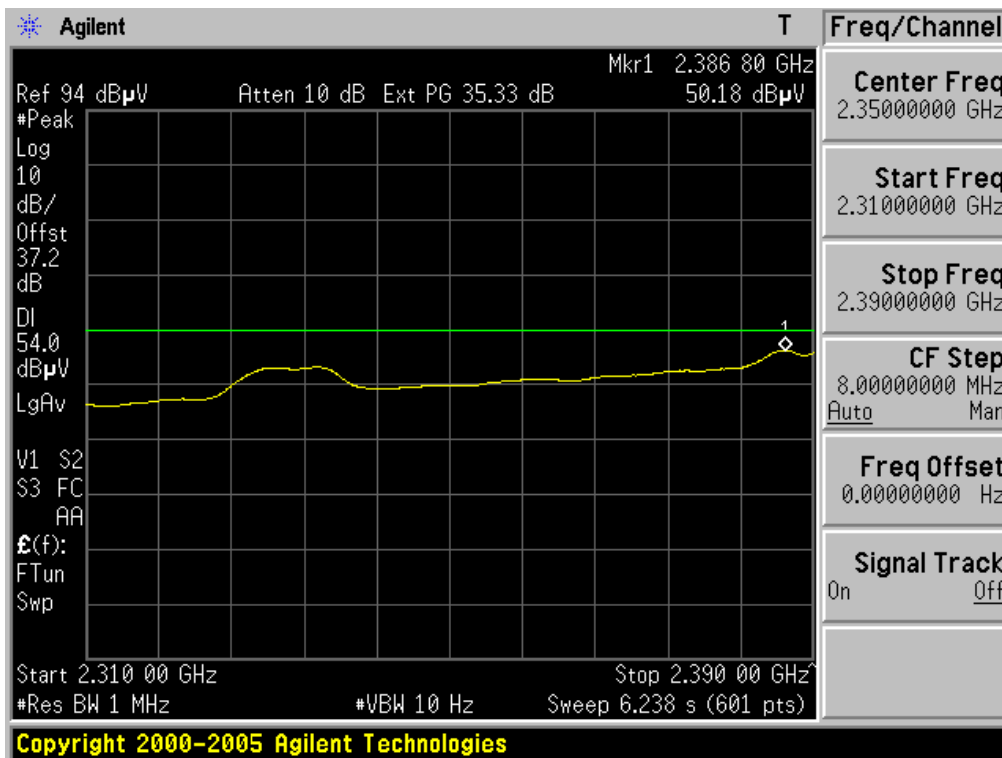
Restricted Band Edge: Low Channel (Peak, Vertical)

802.11b Mode



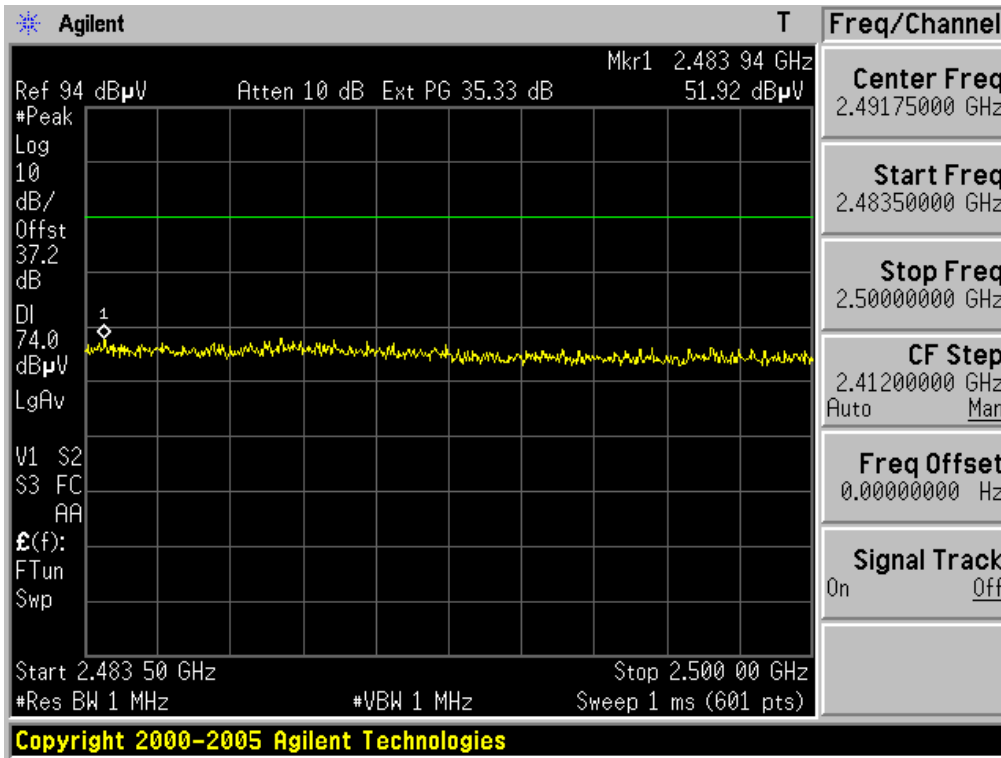
Restricted Band Edge: Low Channel (Average, Vertical)

802.11b Mode



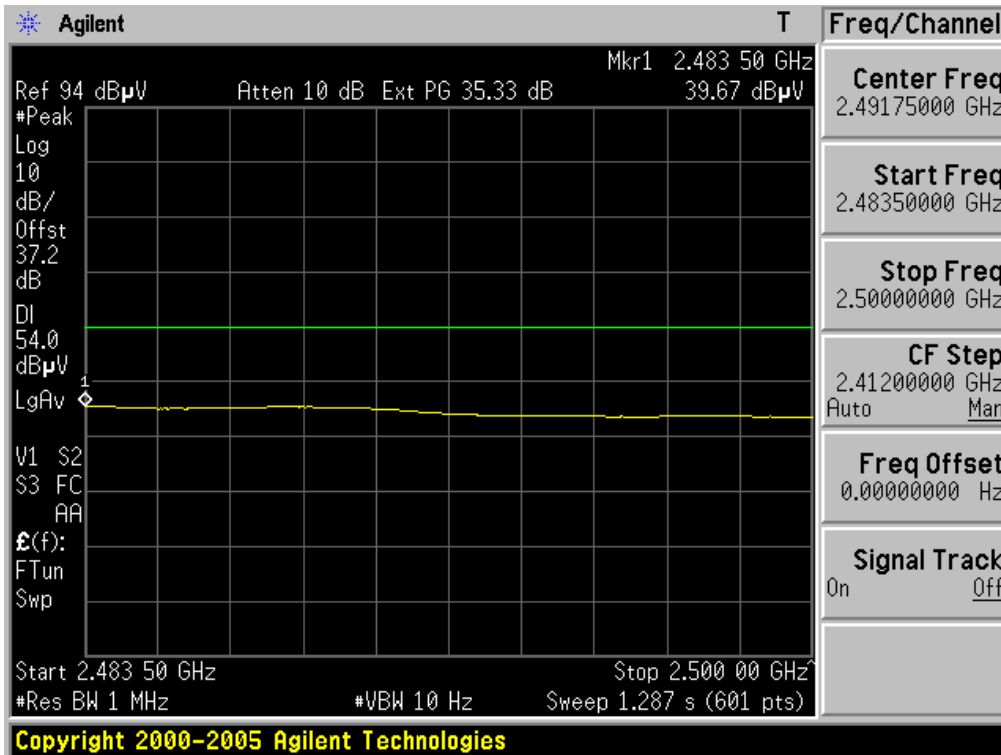
Restricted Band Edge: High Channel (Peak, Horizontal)

802.11b Mode



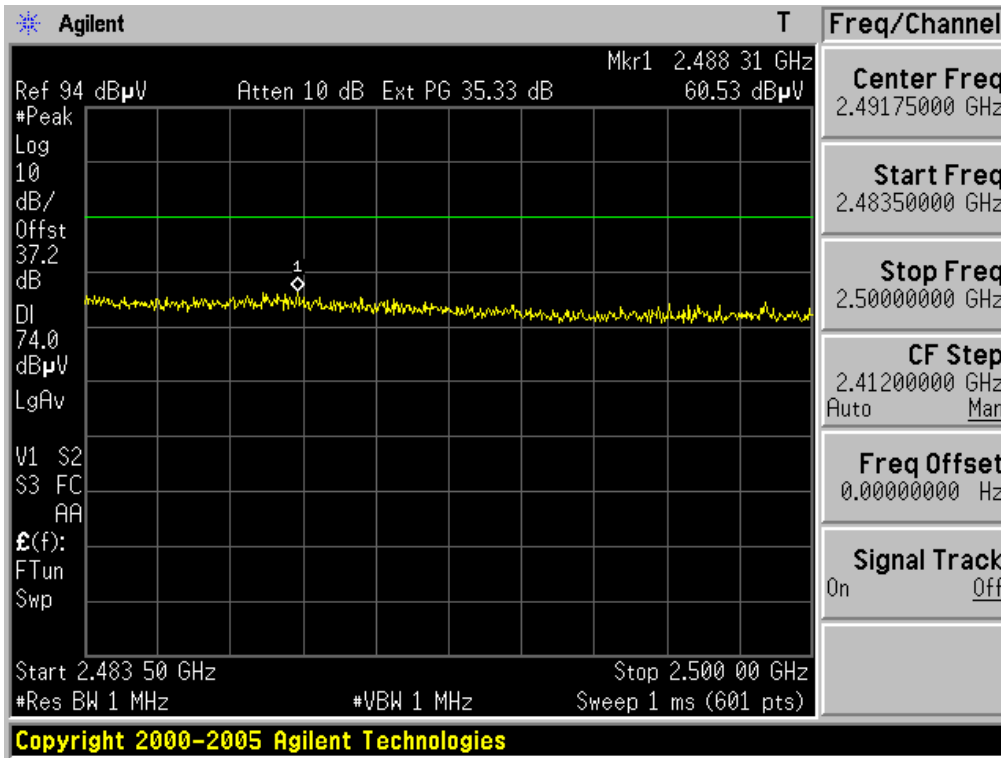
Restricted Band Edge: High Channel (Average, Horizontal)

802.11b Mode



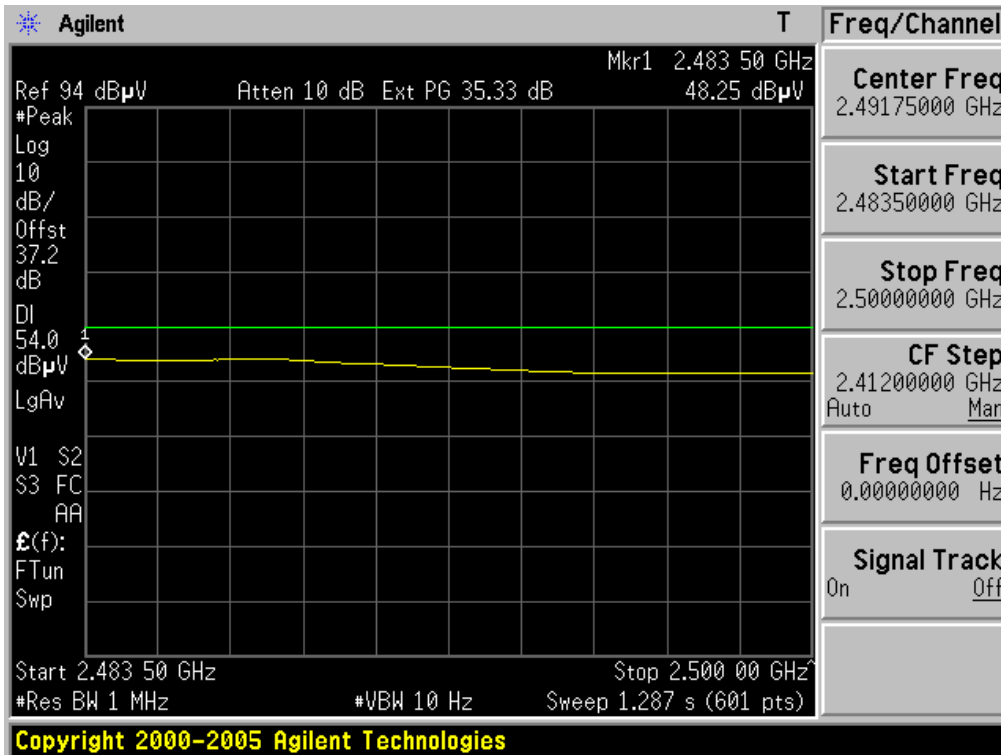
Restricted Band Edge: High Channel (Peak, Vertical)

802.11b Mode



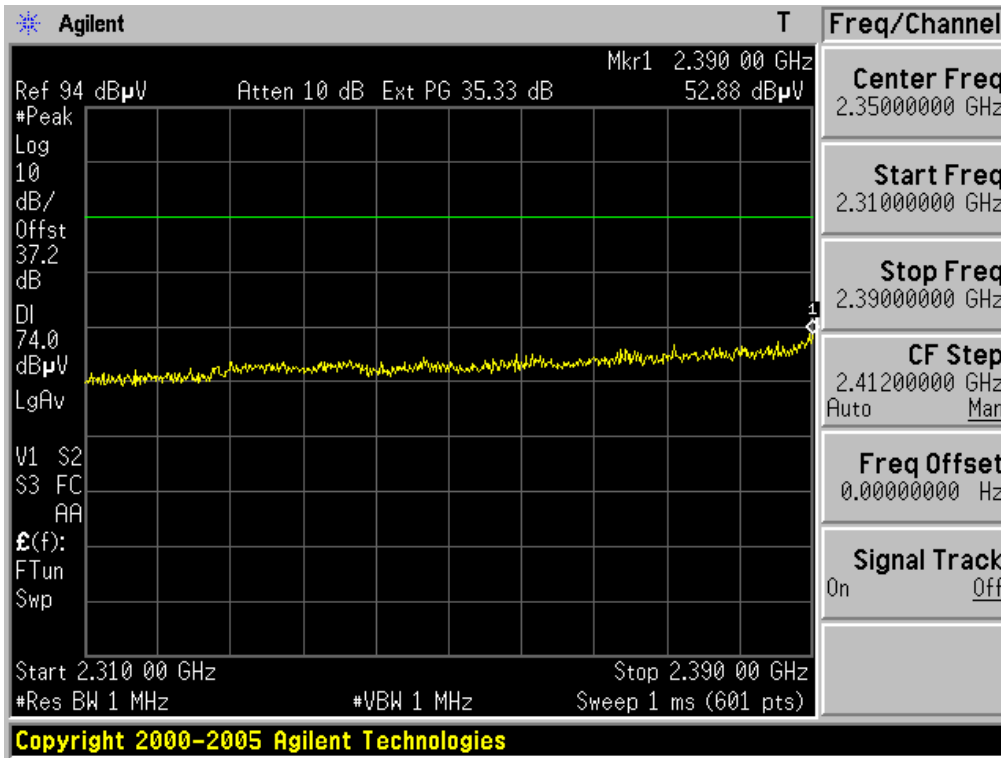
Restricted Band Edge: High Channel (Average, Vertical)

802.11b Mode



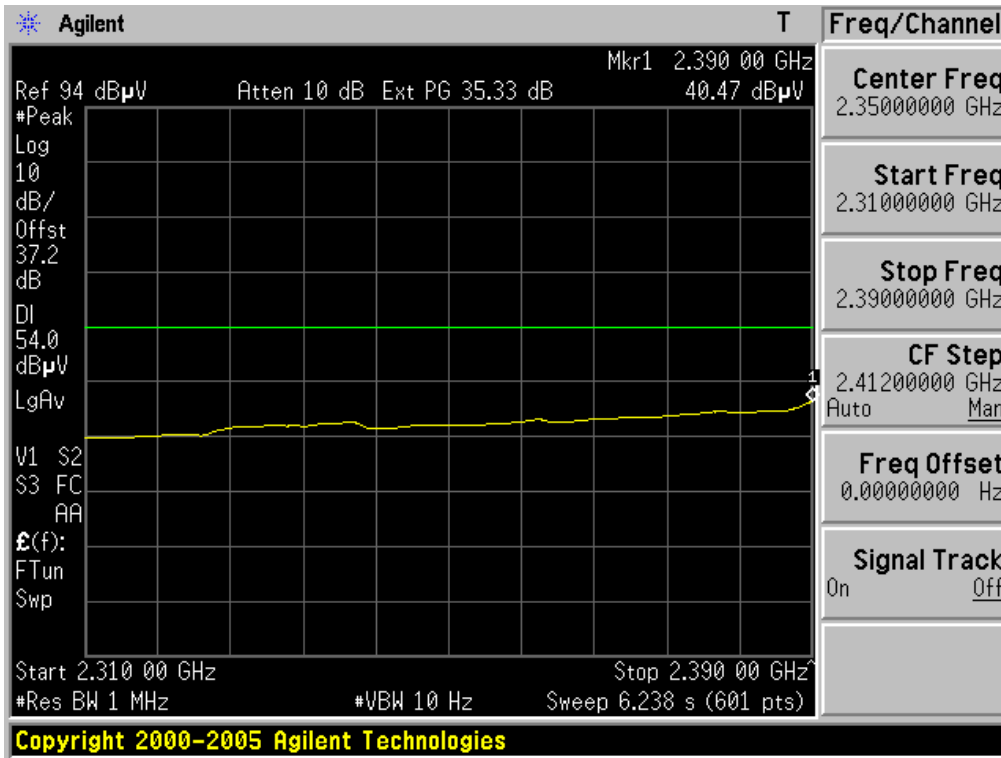
Restricted Band Edge: Low Channel (Peak, Horizontal)

802.11g Mode



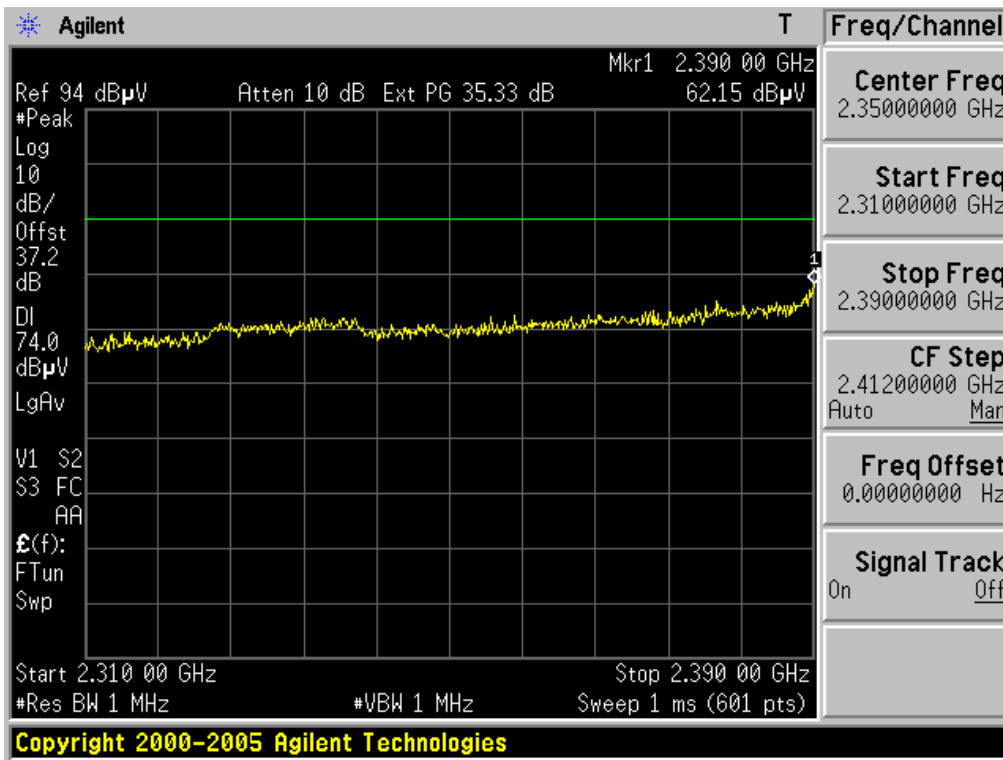
Restricted Band Edge: Low Channel (Average, Horizontal)

802.11g Mode



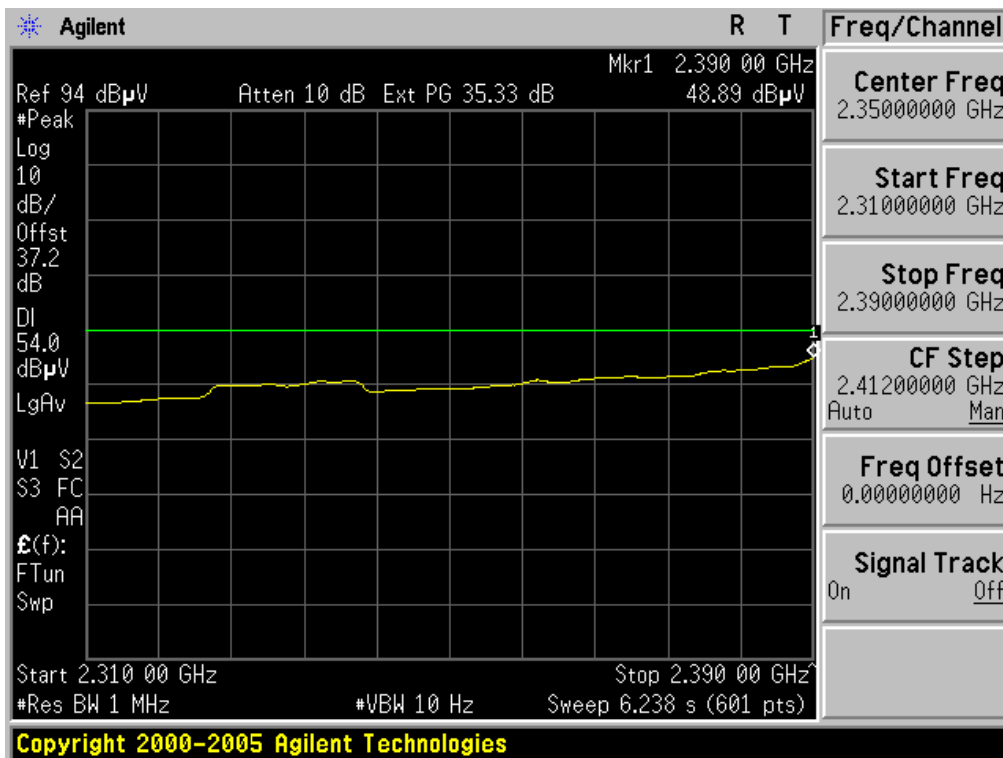
Restricted Band Edge: Low Channel (Peak, Vertical)

802.11g Mode



Restricted Band Edge: Low Channel (Average, Vertical)

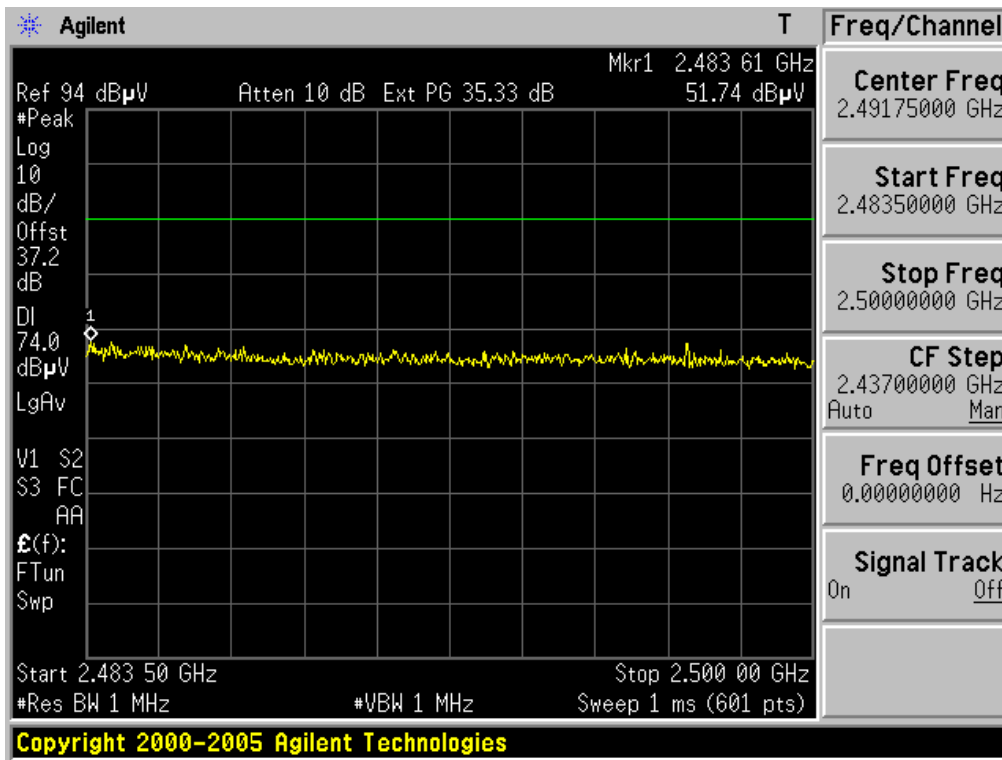
802.11g Mode





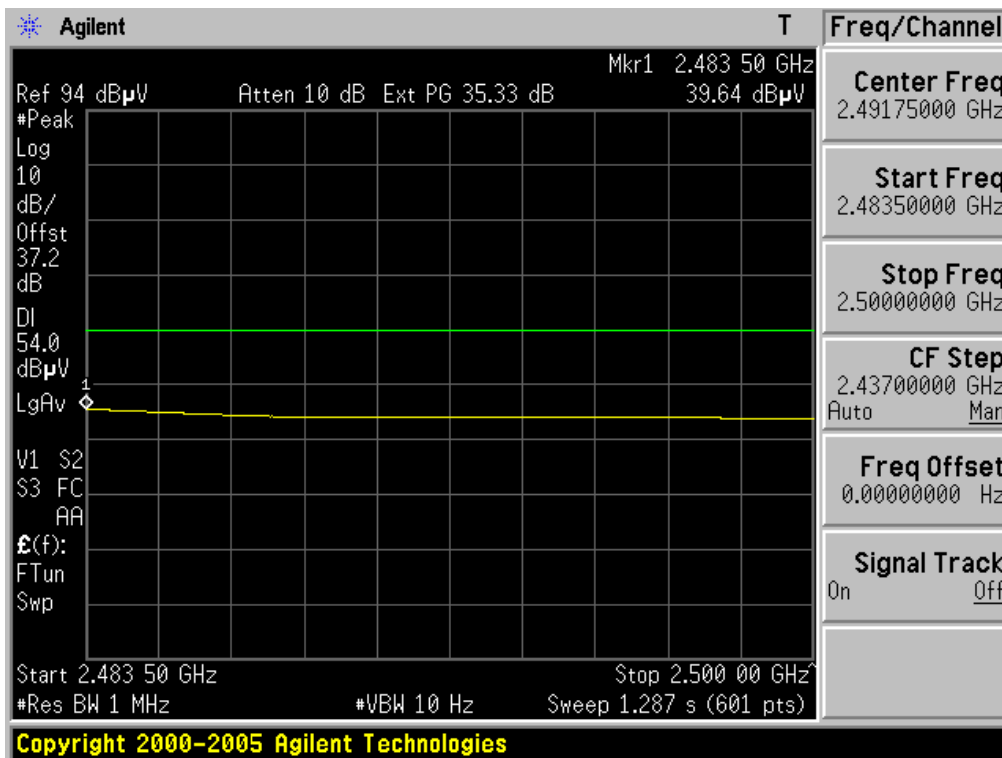
Restricted Band Edge: High Channel (Peak, Horizontal)

802.11g Mode



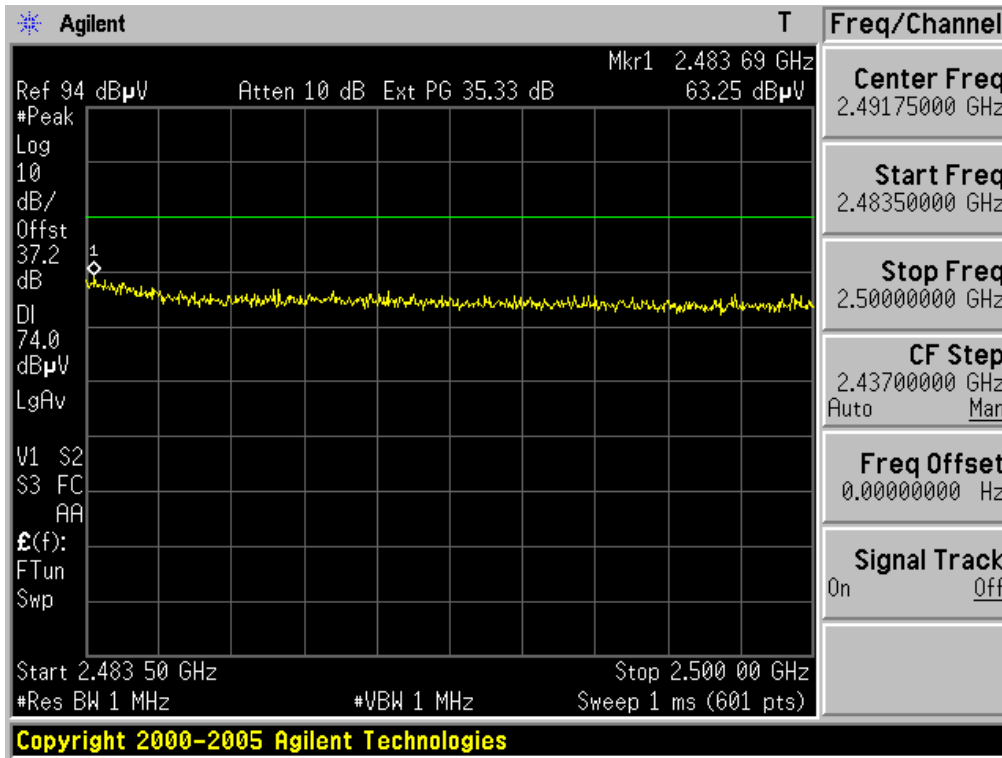
Restricted Band Edge: High Channel (Average, Horizontal)

802.11g Mode



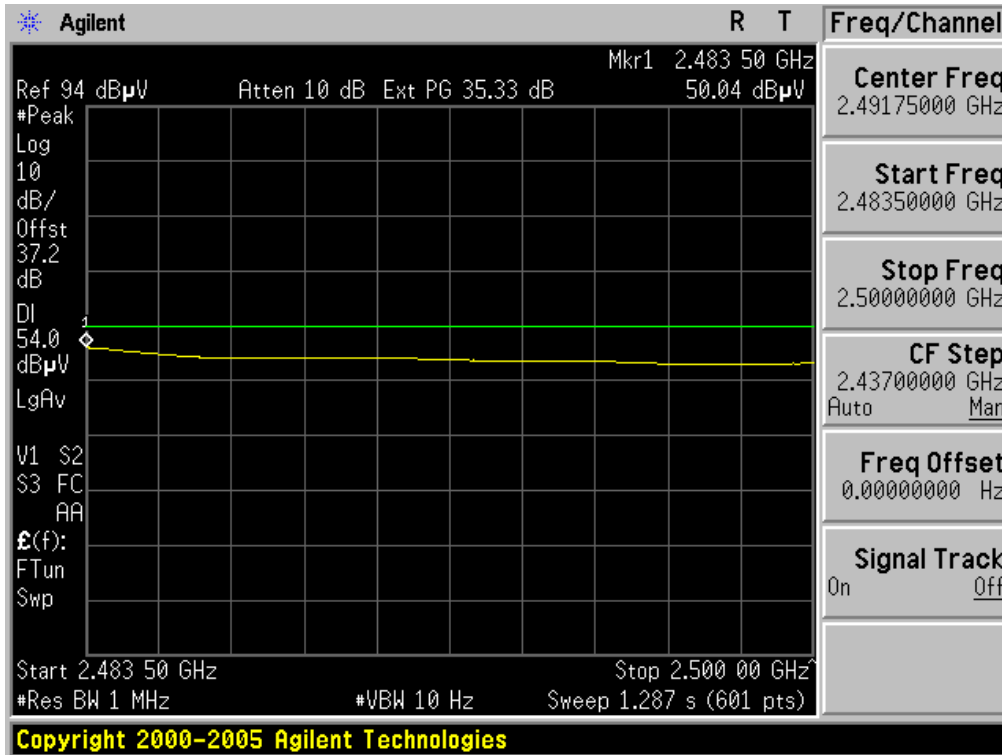
Restricted Band Edge: High Channel (Peak, Vertical)

802.11g Mode



Restricted Band Edge: High Channel (Average, Vertical)

802.11g Mode



**Radiated Spurious Emission Data**

- Harmonics

802.11b Mode

<b><u>Low Channel(2412MHz)</u></b>										
Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)		T.F (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4824	V	51.84	39.11	10.25	62.09	49.36	74	54	11.91	4.64
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

<b><u>Middle Channel(2437MHz)</u></b>										
Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)		T.F (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4874	V	50.42	38.14	10.14	60.56	48.28	74	54	13.44	5.72
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

<b><u>High Channel(2462MHz)</u></b>										
Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)		T.F (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4924	V	49.97	37.37	10.86	60.83	48.23	74	54	13.17	5.77
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note 1. No other emissions were detected at a level greater than 10dB below limit.

2. T.F(Total Factor) = Cable Loss + Ant Factor –AMP Gain

3. Result = Reading Value + T.F

4. Margin = Limit - Result

Radiated Spurious Emission Data

- Continued

- Spurious

802.11b Mode

**Low Channel(2412MHz)**

Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)			T.F (dB)	Result (dBuV/m)			Limit (dBuV/m)			Margin (dB)		
		PK	QP	AV		PK	QP	AV	PK	QP	AV	PK	QP	AV
30	V	-	44.0	-	-7.80	-	36.20	-	-	40.0	-	-	3.80	-
71	V	-	55.0	-	-20.04	-	34.96	-	-	40.0	-	-	5.04	-
124	V	-	51.0	-	-12.57	-	38.43	-	-	43.5	-	-	5.07	-
170	H	-	49.0	-	-8.87	-	40.13	-	-	43.5	-	-	3.37	-
178	V	-	44.5	-	-8.41	-	36.09	-	-	43.5	-	-	7.41	-
338	H	-	50.5	-	-8.16	-	42.34	-	-	46.0	-	-	3.66	-
565	V	-	44.0	-	-5.05	-	38.95	-	-	46.0	-	-	7.05	-
1607	V	57.86	-	46.82	3.46	61.32	-	50.28	74	-	54	12.68	-	3.72
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Middle Channel(2437MHz)**

Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)			T.F (dB)	Result (dBuV/m)			Limit (dBuV/m)			Margin (dB)		
		PK	QP	AV		PK	QP	AV	PK	QP	AV	PK	QP	AV
30	V	-	43.5	-	-7.80	-	35.70	-	-	40.0	-	-	4.30	-
71	V	-	55.5	-	-20.04	-	35.46	-	-	40.0	-	-	4.54	-
124	V	-	51.5	-	-12.57	-	38.93	-	-	43.5	-	-	4.57	-
170	H	-	48.5	-	-8.87	-	39.63	-	-	43.5	-	-	3.87	-
178	V	-	45.0	-	-8.41	-	36.59	-	-	43.5	-	-	6.91	-
338	H	-	50.0	-	-8.16	-	41.84	-	-	46.0	-	-	4.16	-
565	V	-	44.0	-	-5.05	-	38.95	-	-	46.0	-	-	7.05	-
1624	V	56.98	-	44.67	3.49	60.47	-	48.16	74	-	54	13.53	-	5.84
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**High Channel(2462MHz)**

Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)			T.F (dB)	Result (dBuV/m)			Limit (dBuV/m)			Margin (dB)		
		PK	QP	AV		PK	QP	AV	PK	QP	AV	PK	QP	AV
30	V	-	44.0	-	-7.80	-	36.20	-	-	40.0	-	-	3.80	-
71	V	-	55.5	-	-20.04	-	35.46	-	-	40.0	-	-	4.54	-
124	V	-	51.5	-	-12.57	-	38.93	-	-	43.5	-	-	4.57	-
170	H	-	49.0	-	-8.87	-	40.13	-	-	43.5	-	-	3.37	-
178	V	-	45.0	-	-8.41	-	36.59	-	-	43.5	-	-	6.91	-
338	H	-	50.0	-	-8.16	-	41.84	-	-	46.0	-	-	4.16	-
565	V	-	44.5	-	-5.05	-	39.45	-	-	46.0	-	-	6.55	-
1641	V	55.79	-	42.78	3.53	59.32	-	46.31	74	-	54	14.68	-	7.69
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1. No other emissions were detected at a level greater than 10dB below limit.

2. T.F(Total Factor) = Cable Loss + Ant Factor –AMP Gain

3. Result = Reading Value + T.F

4. Margin = Limit - Result

**Radiated Spurious Emission Data**

- Harmonics

802.11g Mode

<b><u>Low Channel(2412MHz)</u></b>										
Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)		T.F (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4824	V	45.76	34.07	10.25	56.01	44.32	74	54	17.99	9.68
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

<b><u>Middle Channel(2437MHz)</u></b>										
Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)		T.F (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4874	V	47.07	35.28	10.14	57.21	45.42	74	54	16.79	8.58
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

<b><u>High Channel(2462MHz)</u></b>										
Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)		T.F (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4924	V	44.02	31.8	10.86	54.88	42.66	74	54	19.12	11.34
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note 1. No other emissions were detected at a level greater than 10dB below limit.

2. T.F(Total Factor) = Cable Loss + Ant Factor –AMP Gain

3. Result = Reading Value + T.F

4. Margin = Limit - Result

Radiated Spurious Emission Data

- Continued

- Spurious

802.11g Mode

**Low Channel(2412MHz)**

Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)			T.F (dB)	Result (dBuV/m)			Limit (dBuV/m)			Margin (dB)		
		PK	QP	AV		PK	QP	AV	PK	QP	AV	PK	QP	AV
30	V	-	45.0	-	-7.80	-	37.20	-	-	40	-	-	2.80	-
71	V	-	54.0	-	-20.04	-	33.96	-	-	40	-	-	6.04	-
124	V	-	49.5	-	-12.57	-	36.93	-	-	43.5	-	-	6.57	-
170	H	-	48.0	-	-8.87	-	39.13	-	-	43.5	-	-	4.37	-
178	V	-	43.0	-	-8.41	-	34.59	-	-	43.5	-	-	8.91	-
338	H	-	49.5	-	-8.16	-	41.34	-	-	46	-	-	4.66	-
565	V	-	42.0	-	-5.05	-	36.95	-	-	46	-	-	9.05	-
1608	V	53.18	-	39.93	3.46	56.64	-	43.39	74	-	54	17.36	-	10.61
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Middle Channel(2437MHz)**

Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)			T.F (dB)	Result (dBuV/m)			Limit (dBuV/m)			Margin (dB)		
		PK	QP	AV		PK	QP	AV	PK	QP	AV	PK	QP	AV
30	V	-	43.5	-	-7.80	-	35.70	-	-	40.0	-	-	4.30	-
71	V	-	55.5	-	-20.04	-	35.46	-	-	40.0	-	-	4.54	-
124	V	-	51.5	-	-12.57	-	38.93	-	-	43.5	-	-	4.57	-
170	H	-	48.5	-	-8.87	-	39.63	-	-	43.5	-	-	3.87	-
178	V	-	45.0	-	-8.41	-	36.59	-	-	43.5	-	-	6.91	-
338	H	-	50.0	-	-8.16	-	41.84	-	-	46.0	-	-	4.16	-
565	V	-	44.0	-	-5.05	-	38.95	-	-	46.0	-	-	7.05	-
1624	V	57.13	-	43.35	3.49	60.62	-	46.84	74	-	54	13.38	-	7.16
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**High Channel(2462MHz)**

Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)			T.F (dB)	Result (dBuV/m)			Limit (dBuV/m)			Margin (dB)		
		PK	QP	AV		PK	QP	AV	PK	QP	AV	PK	QP	AV
30	V	-	44.5	-	-7.80	-	36.70	-	-	40.0	-	-	3.30	-
71	V	-	55.0	-	-20.04	-	34.96	-	-	40.0	-	-	5.04	-
124	V	-	50.5	-	-12.57	-	37.93	-	-	43.5	-	-	5.57	-
170	H	-	48.5	-	-8.87	-	39.63	-	-	43.5	-	-	3.87	-
178	V	-	43.0	-	-8.41	-	34.59	-	-	43.5	-	-	8.91	-
338	H	-	49.0	-	-8.16	-	40.84	-	-	46.0	-	-	5.16	-
565	V	-	42.5	-	-5.05	-	37.45	-	-	46.0	-	-	8.55	-
1641	V	57.01	-	42.92	3.53	60.54	-	46.45	74	-	54	13.46	-	7.55
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1. No other emissions were detected at a level greater than 10dB below limit.

2. T.F(Total Factor) = Cable Loss + Ant Factor –AMP Gain

3. Result = Reading Value + T.F

4. Margin = Limit - Result

### 3.2.5 Transmitter Power Spectral Density

**Procedure:**

The transmitter output is connected to a spectrum analyzer. Locate and zoom in on emission peak within the passband. The maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3kHz and VBW > 9kHz, sweep time= auto, video averaging is turned off. . Trace average 100 traces in power averaging mode. The PPSD is the highest level found across the emission in any 3kHz band. The test is performed in accordance with FCC document “Measurement of Digital Transmission Systems Operating under Section 15.247”, March 23, 2005. The transmitter output power was measured with power output option #2. Therefore, PSD was measured with PSD option #2.

**Measurement Data:**

Test Mode	Frequency (MHz)	Channel No.	Test Results	
			Power Density (dBm)	Result
802.11b	2412	1	-12.22	Comply
	2437	6	-11.32	Comply
	2462	11	-11.84	Comply
802.11g	2412	1	-17.54	Comply
	2437	6	-16.83	Comply
	2462	11	-16.86	Comply

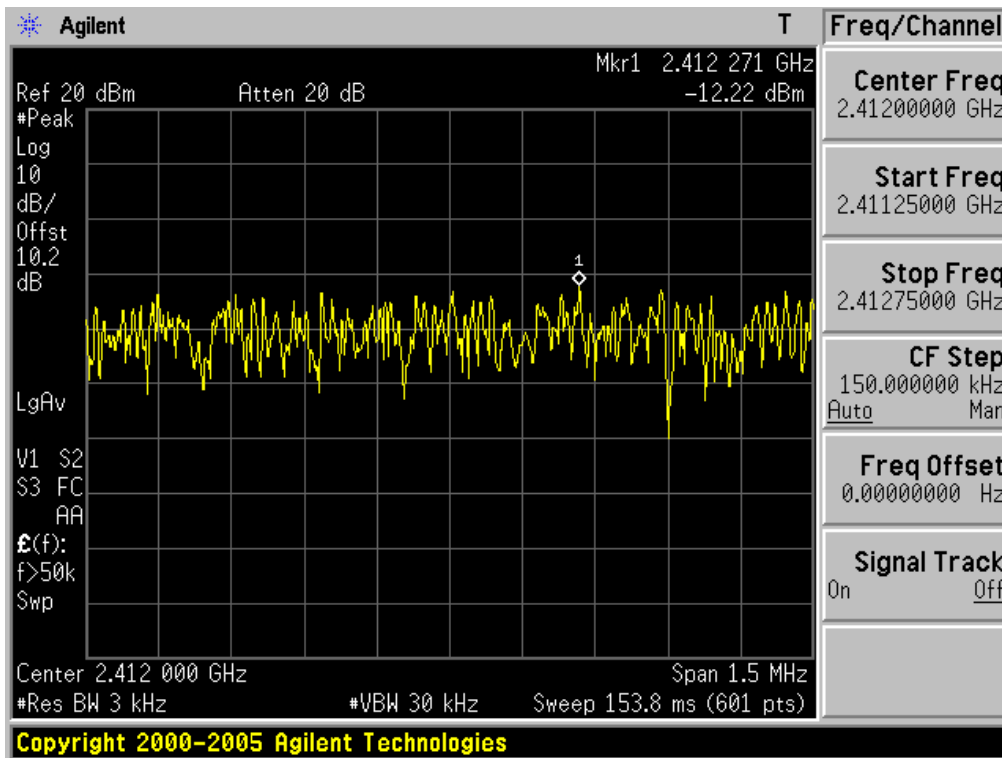
- See next pages for actual measured spectrum plots.

**Minimum Standard:**

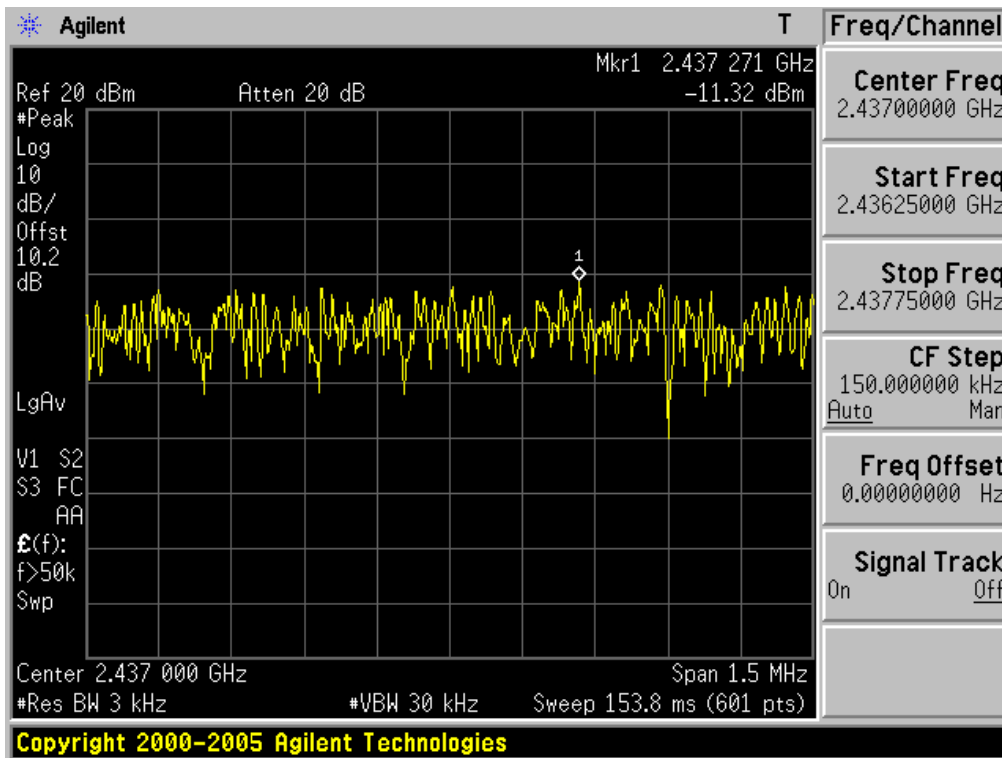
The transmitter power density average over 1-second interval shall not be greater than 8 dBm in any 3kHz BW.

Transmitter Power Spectral Density

802.11b Mode



Low Channel

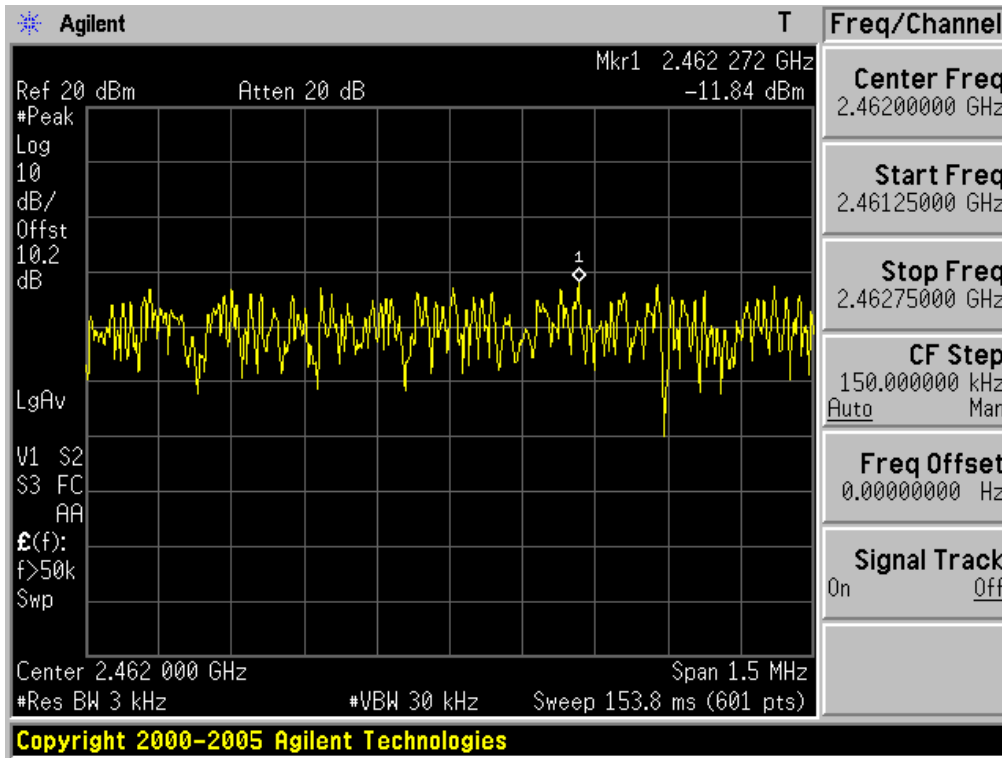


Middle Channel



Transmitter Power Spectral Density

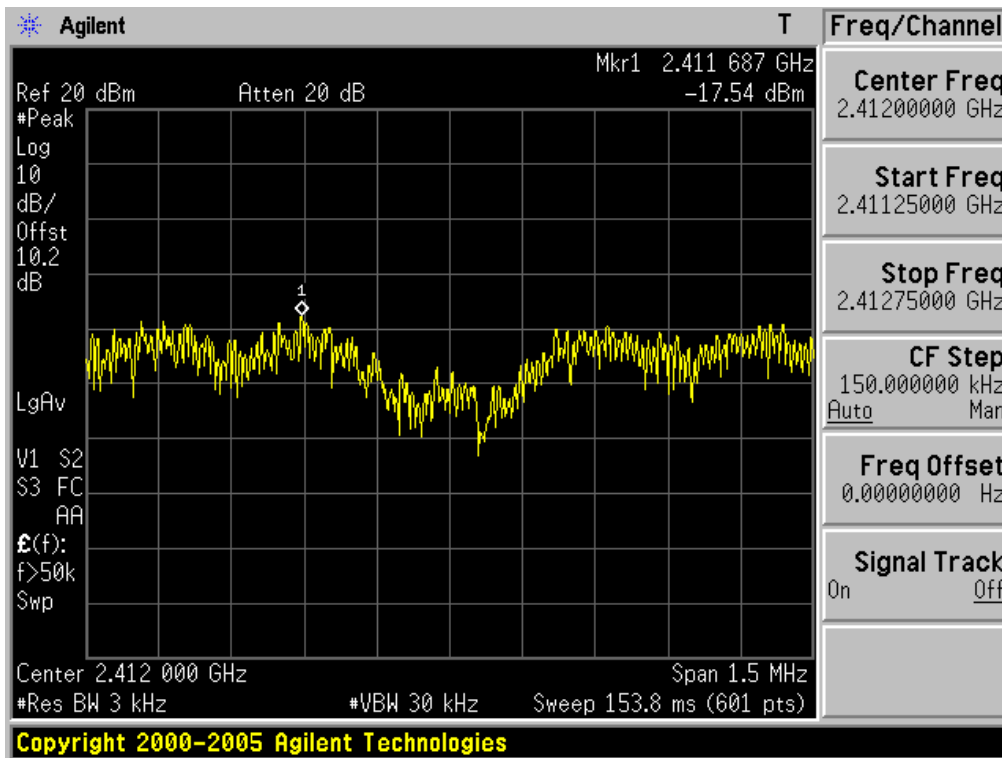
802.11b Mode



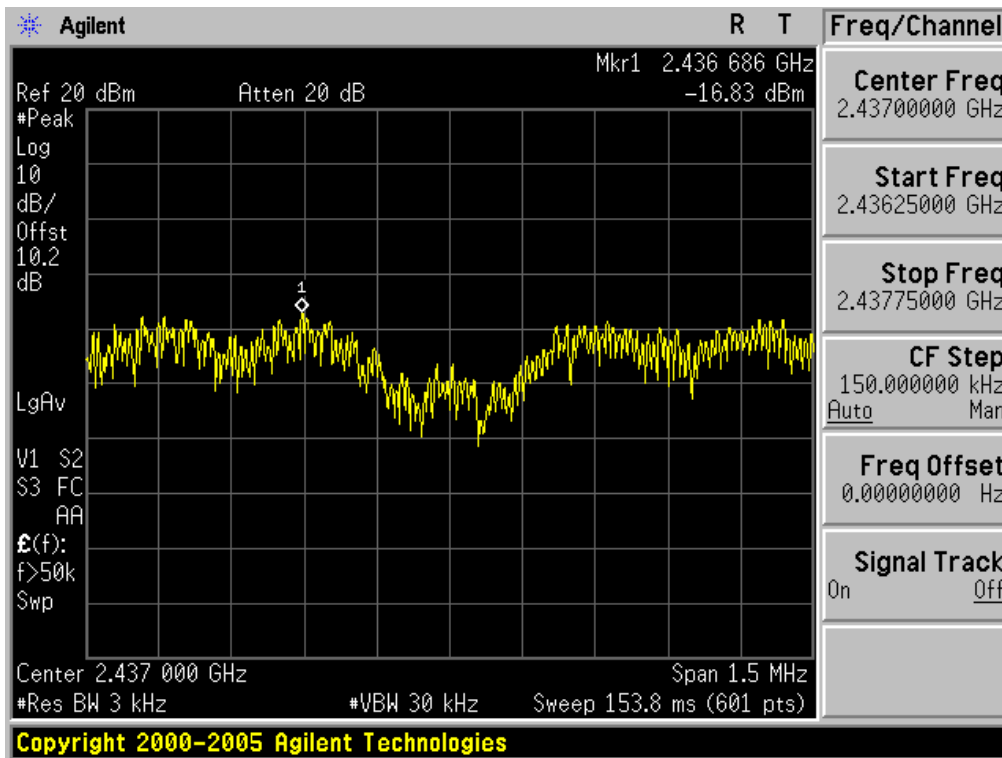
High Channel

Transmitter Power Spectral Density

802.11g Mode



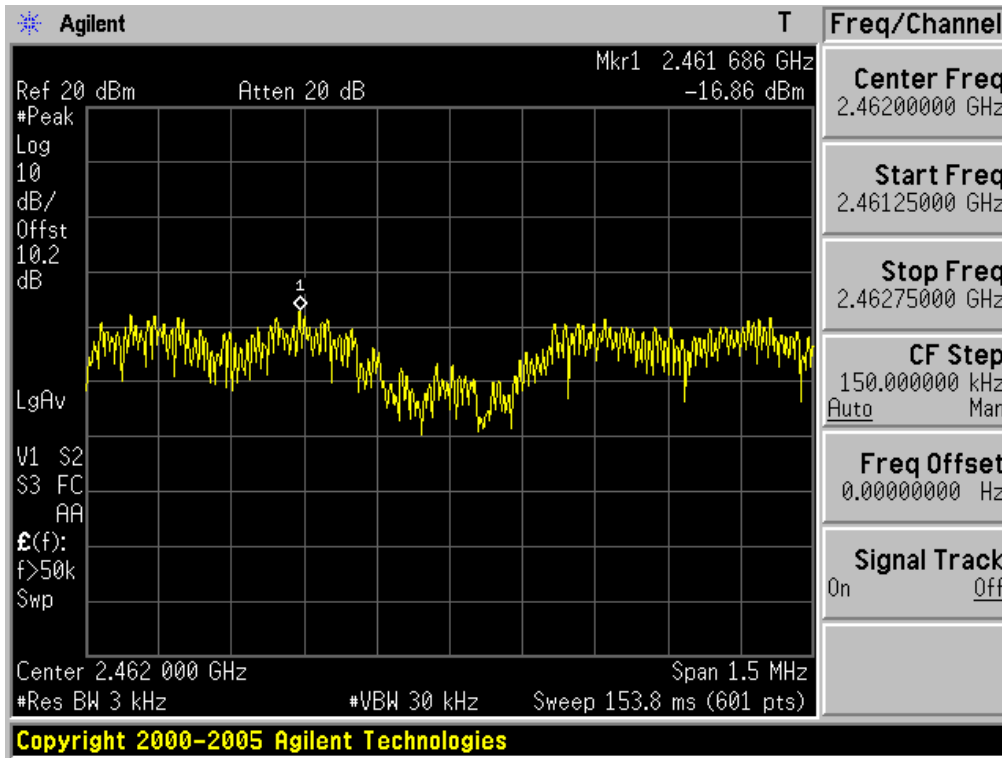
Low Channel



Middle Channel

Transmitter Power Spectral Density

802.11g Mode



High Channel

### 3.2.6 AC Conducted Emissions

**Procedure:**

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. Emissions closest to the limit are measured in the quasi-peak mode (QP) and average mode(AV) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

**Measurement Data: Comply**

- See next pages for actual measured spectrum plots.

**Minimum Standard: FCC Part 15.207(a)/EN 55022**

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

\* Decreases with the logarithm of the frequency

**Measurement Setup**

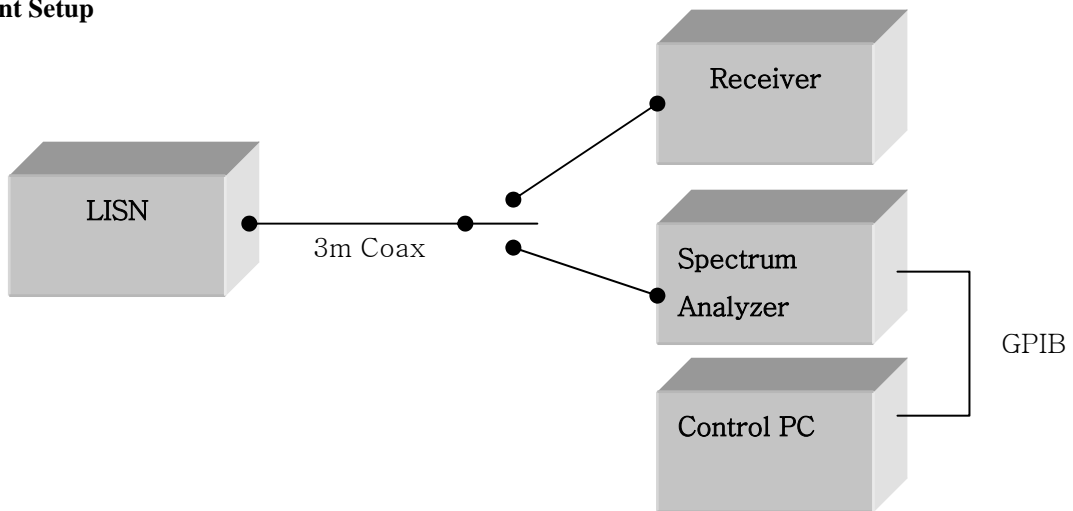
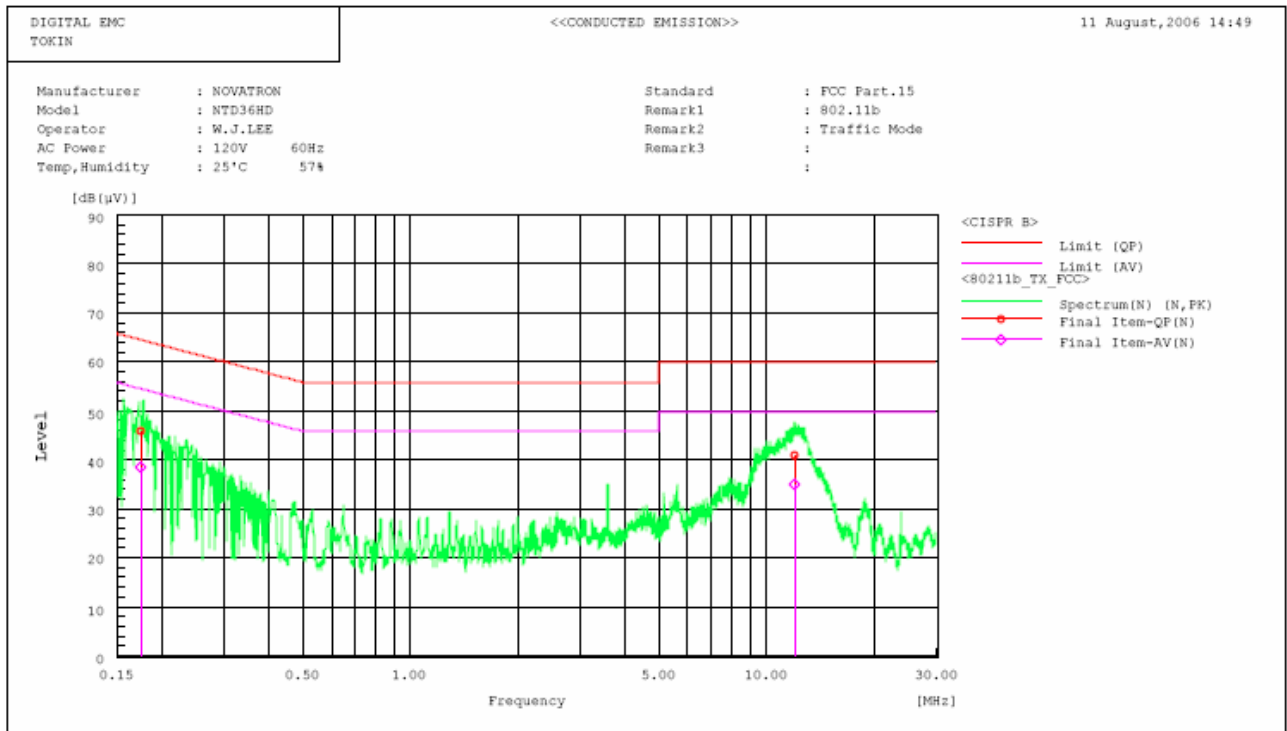
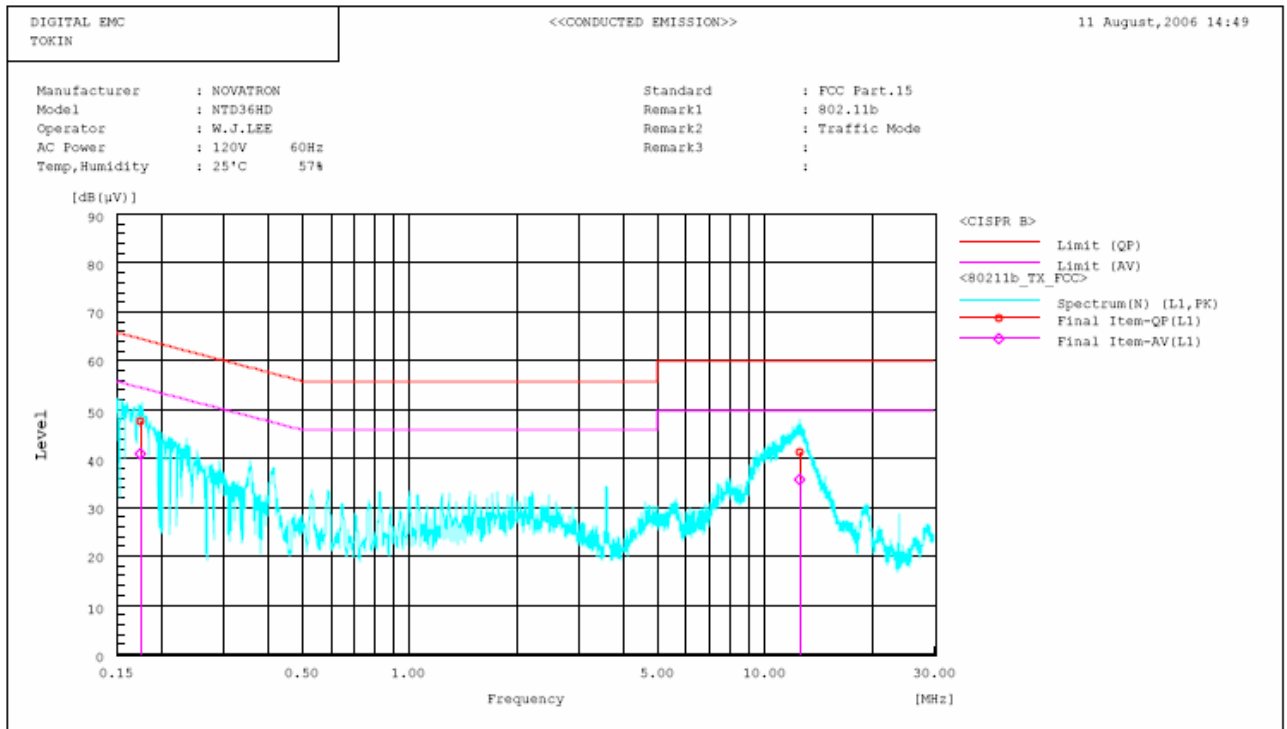


Figure 2: Measurement setup for AC Conducted Emission

### AC Conducted Emissions - Neutral Graph(802.11b Mode)



### AC Conducted Emissions - Line Graph(802.11b Mode)



AC Conducted Emissions -DATA(802.11b Mode)

\*\*\*\*\* DIGITAL EMC \*\*\*\*\*  
 <<CONDUCTED EMISSION>>

11 August, 2006 14:49

Standard : FCC Part.15  
 Manufacturer : NOVATRON  
 Model : NTD86HD  
 Operator : W.J.LEE  
 AC Power : 120V 60Hz  
 Temp, Humidity : 25°C 57%  
 Remark1 : 802.11b  
 Remark2 : Traffic Mode  
 Remark3 :  
 :

Final Result

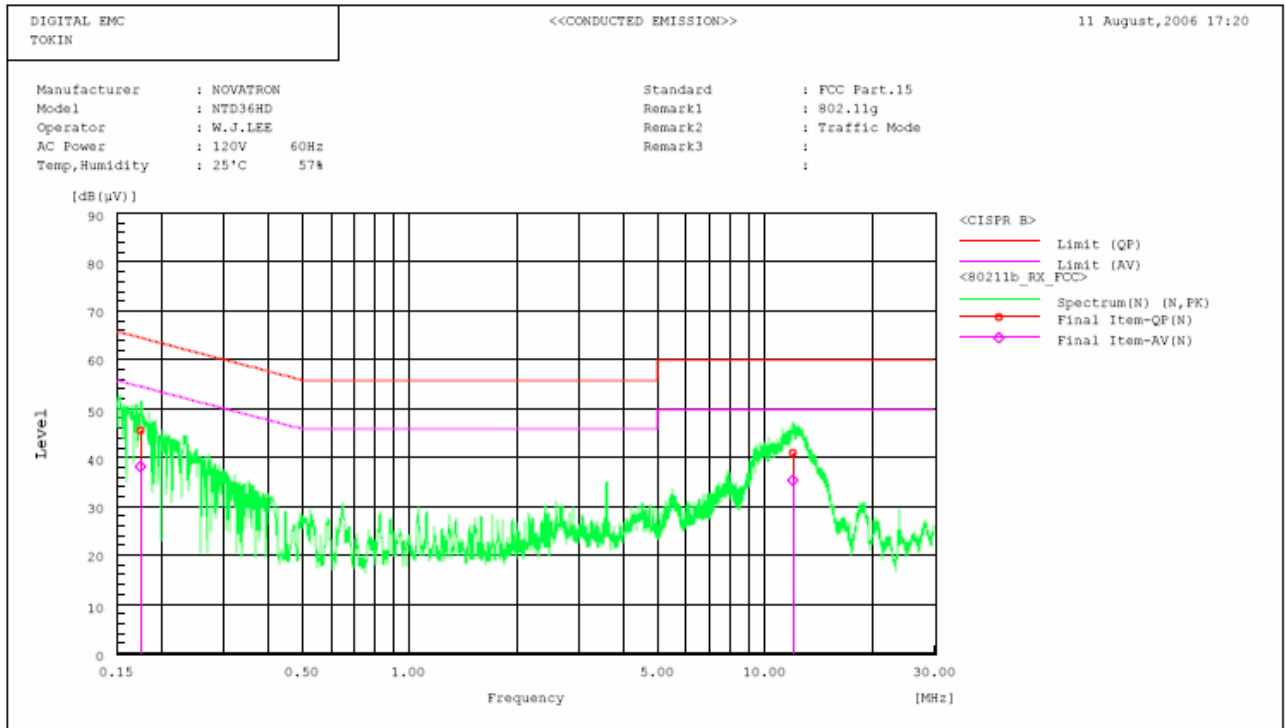
--- N Phase ---

No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB(μV)]	AV [dB(μV)]		QP [dB(μV)]	AV [dB(μV)]	QP [dB(μV)]	AV [dB(μV)]	QP [dB]	AV [dB]	
1	0.176	45.9	38.2	0.3	46.2	38.5	64.7	54.7	18.5	16.2	
2	12.000	40.5	34.2	0.8	41.3	35.0	60.0	50.0	18.7	15.0	

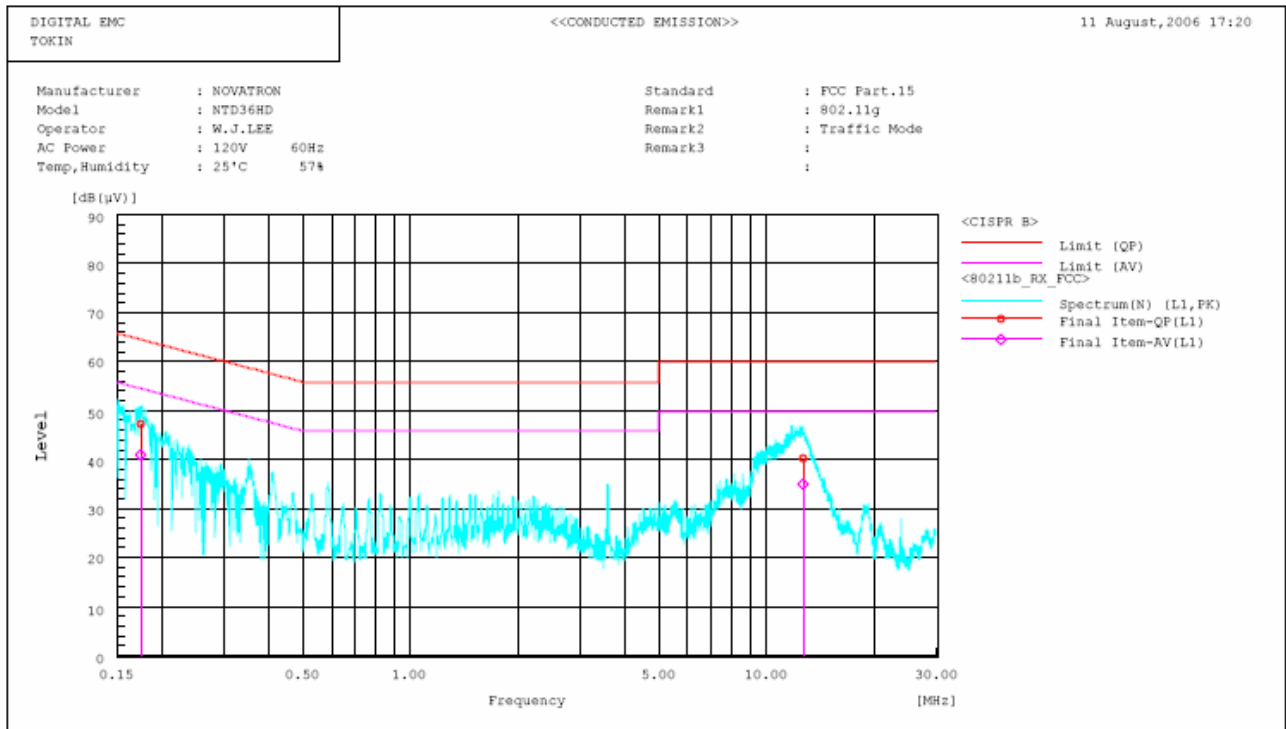
--- L1 Phase ---

No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB(μV)]	AV [dB(μV)]		QP [dB(μV)]	AV [dB(μV)]	QP [dB(μV)]	AV [dB(μV)]	QP [dB]	AV [dB]	
1	0.176	47.8	41.1	0.1	47.9	41.2	64.7	54.7	16.8	13.8	
2	12.554	41.0	35.3	0.6	41.6	35.9	60.0	50.0	18.4	14.1	

### AC Conducted Emissions - Neutral Graph (802.11g Mode)



### AC Conducted Emissions - Line Graph (802.11g Mode)



AC Conducted Emissions - DATA (802.11g Mode)

\*\*\*\*\* DIGITAL EMC \*\*\*\*\*  
 <<CONDUCTED EMISSION>>

11 August, 2006 17:20

Standard : FCC Part.15  
 Manufacturer : NOVATRON  
 Model : NTD36HD  
 Operator : W.J.LEE  
 AC Power : 120V 60Hz  
 Temp, Humidity : 25°C 57%  
 Remark1 : 802.11g  
 Remark2 : Traffic Mode  
 Remark3 :

Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB (µV)]	AV [dB (µV)]		QP [dB (µV)]	AV [dB (µV)]	QP [dB (µV)]	AV [dB (µV)]	QP [dB]	AV [dB]	
1	0.176	45.4	37.9	0.3	45.7	38.2	64.7	54.7	19.0	16.5	
2	12.014	40.5	34.7	0.8	41.3	35.5	60.0	50.0	18.7	14.5	

--- L1 Phase ---

No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB (µV)]	AV [dB (µV)]		QP [dB (µV)]	AV [dB (µV)]	QP [dB (µV)]	AV [dB (µV)]	QP [dB]	AV [dB]	
1	0.176	47.2	41.0	0.1	47.3	41.1	64.7	54.7	17.4	13.6	
2	12.760	40.0	34.4	0.6	40.6	35.0	60.0	50.0	19.4	15.0	



### 3.3 Receiver requirements

#### 3.3.1 AC Conducted Emissions

**Procedure:**

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its receiving function. Emissions closest to the limit are measured in the quasi-peak mode (QP) and average mode(AV) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

**Measurement Data: Comply**

- See next pages for actual measured spectrum plots.

**Minimum Standard: FCC Part 15.207(a)/EN 55022**

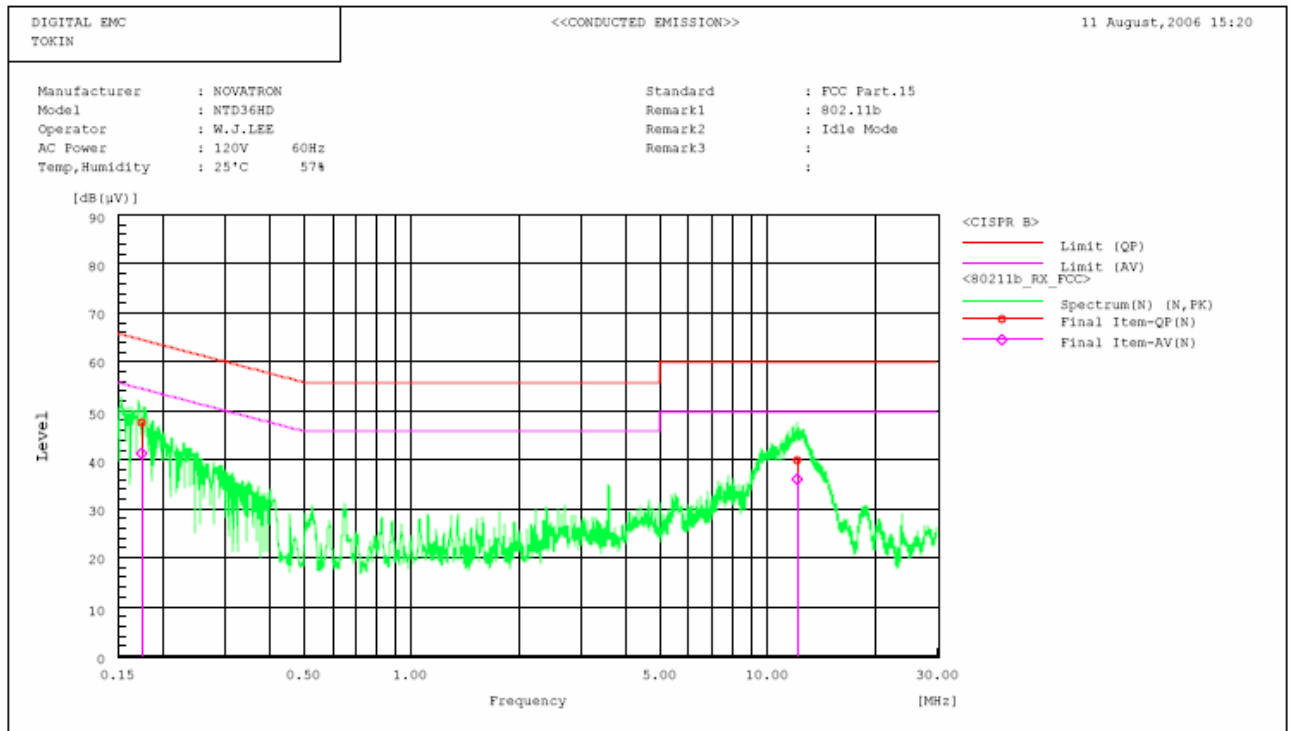
Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

\* Decreases with the logarithm of the frequency

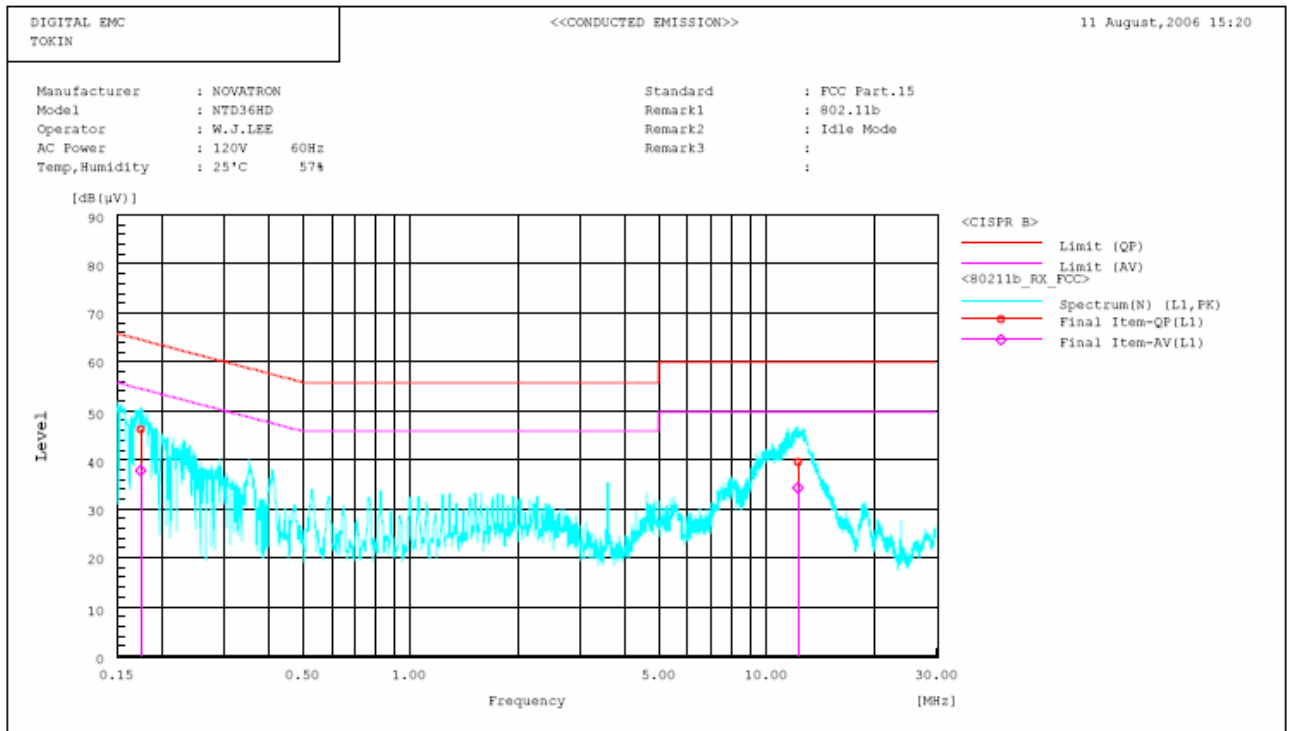
**Measurement Setup**

Same as the Chapter 3.2.9 (Figure 2)

### AC Conducted Emissions -Neutral Graph



### AC Conducted Emissions - Line Graph



AC Conducted Emissions -DATA

\*\*\*\*\* DIGITAL EMC \*\*\*\*\*  
 <<CONDUCTED EMISSION>>

11 August, 2006 15:20

Standard : FCC Part.15  
 Manufacturer : NOVATRON  
 Model : NTD36HD  
 Operator : W.J.LEE  
 AC Power : 120V 60Hz  
 Temp, Humidity : 25°C 57%  
 Remark1 : 802.11b  
 Remark2 : Idle Mode  
 Remark3 :

Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB(μV)]	AV [dB(μV)]		QP [dB(μV)]	AV [dB(μV)]	QP [dB(μV)]	AV [dB(μV)]	QP [dB]	AV [dB]	
1	0.176	47.5	41.1	0.3	47.6	41.4	64.7	54.7	16.9	13.3	
2	12.239	39.3	35.3	0.6	40.1	36.1	60.0	50.0	19.9	13.9	

--- L1 Phase ---

No.	Frequency [MHz]	Reading		c.f [dB]	Result		Limit		Margin		Remark
		QP [dB(μV)]	AV [dB(μV)]		QP [dB(μV)]	AV [dB(μV)]	QP [dB(μV)]	AV [dB(μV)]	QP [dB]	AV [dB]	
1	0.176	46.2	37.9	0.1	46.3	38.0	64.7	54.7	18.4	16.7	
2	12.277	39.1	33.6	0.6	39.7	34.4	60.0	50.0	20.3	15.6	

### 3.3.2 Out of Band Emissions - Radiated

**Procedure:**

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in a OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

RBW = 120 kHz ( 30MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

VBW = 10Hz (Average), VBW ≥ RBW ( Peak)

Trace = max hold

Detector function = peak

Sweep = auto

**Measurement Data: Comply**

- Refer to the Next page

**Minimum Standard: FCC Part 15.209(a)**

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data:

Frequency	P	Reading	C.F	Result	Limit	Margin
30	V	44.0	-7.80	36.20	40.0	3.80
71	V	56.5	-20.04	36.46	40.0	3.54
83	H	54.0	-19.13	34.87	40.0	5.13
83	V	55.0	-19.13	35.87	40.0	4.13
98	H	47.5	-16.49	31.01	43.5	12.49
98	V	50.5	-16.49	34.01	43.5	9.49
125	H	44.5	-12.57	31.93	43.5	11.57
125	V	51.0	-12.57	38.43	43.5	5.07
139	H	46.5	-11.37	35.13	43.5	8.37
139	V	46.0	-11.37	34.63	43.5	8.87
171	H	49.0	-8.87	40.13	43.5	3.37
178	H	40.0	-8.41	31.59	43.5	11.91
178	V	44.5	-8.41	36.09	43.5	7.41
337	H	50.0	-8.16	41.84	46.0	4.16
565	V	43.0	-5.05	37.95	46.0	8.05
805	H	41.5	-1.23	40.27	46.0	5.73
-	-	-	-	-	-	-

## APPENDIX

### TEST EQUIPMENT USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4404B	21/03/07	US41061134
02	Spectrum Analyzer	Agilent	E4440A	05/10/07	MY45304199
03	Spectrum Analyzer	H.P	8563E	06/10/07	3551A04634
04	Power Meter	H.P	EMP-442A	06/07/07	GB37170413
05	Power Sensor	H.P	8481A	23/03/07	3318A96566
06	Frequency Counter	H.P	5342A	21/10/06	2119A04450
07	Multifunction Synthesizer	H.P	8904A	21/10/06	3633A08404
08	Signal Generator	Rohde Schwarz	SMR20	22/03/07	101251
09	Signal Generator	H.P	ESG-3000A	06/07/07	US37230529
10	Audio Analyzer	H.P	8903B	06/07/07	3011A09448
11	Modulation Analyzer	H.P	8901B	10/07/07	3028A03029
12	Oscilloscope	Tektronix	TDS3052	01/10/06	B016821
13	CDMA Mobile Station Test Set	H.P	8924C	21/10/06	US35360688
14	Universal Radio Communication tester	Rohde Schwarz	CMU200	21/03/07	107631
15	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	13/06/07	GB43461134
16	Bluetooth Tester	TESCOM	TC-3000A	21/10/06	3000A4A0121
17	Multisystem Ue Tester	Japan Radio Co.,Ltd	NJZ-2000	14/11/06	ET00095
18	Power Splitter	WEINSCHEL	1593	21/10/06	332
19	BAND Reject Filter	Microwave Circuits	N0308372	21/10/06	3125-01DC0312
20	BAND Reject Filter	Wainwright	WRCG1750	21/10/06	SN2
21	AC Power supply	DAEKWANG	5KVA	20/03/07	N/A
22	DC Power Supply	H.P	6622A	21/03/07	465487
23	Attenuator (30dB)	H.P	8498A	21/10/06	50101
24	Attenuator (10dB)	WEINSCHEL	23-10-34	21/10/06	BP4387
25	HORN ANT	EMCO	3115	06/03/07	6419
26	HORN ANT	EMCO	3115	25/04/07	21097
27	HORN ANT	A.H.Systems	SAS-574	09/11/06	154
28	HORN ANT	A.H.Systems	SAS-574	09/11/06	155
29	Dipole Antenna	Schwarzbeck	VHA9103	18/10/06	2116
30	Dipole Antenna	Schwarzbeck	VHA9103	18/10/06	2117
31	Dipole Antenna	Schwarzbeck	UHA9105	18/10/06	2261
32	Dipole Antenna	Schwarzbeck	UHA9105	18/10/06	2262

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
33	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	07/07/07	SN-161-4
34	Frequency Converter	Kyorits	KCV-604C	07/07/07	4-230-3
35	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	13/09/06	021031
36	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	29/09/06	1098
37	Biconical Antenna	Schwarzbeck	VHA9103	04/04/07	2233
38	Digital Multimeter	H.P	34401A	20/03/07	3146A13475
39	Attenuator (10dB)	WEINSCHEL	23-10-34	21/10/06	BP4386
40	High-Pass Filter	ANRITSU	MP526D	21/10/06	MP27756
41	Attenuator (3dB)	Agilent	8491B	21/10/06	58177
42	Amplifier (25dB)	Agilent	8447D	12/04/07	2944A10144
43	Amplifier (30dB)	Agilent	8449B	21/10/06	3008A01590
44	Position Controller	TOKIN	5901T	N/A	14173
45	Driver	TOKIN	5902T2	N/A	14174
46	Spectrum Analyzer	H.P	8591E	21/03/07	3649A05889
47	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	11/07/07	4N-170-3
48	LISN	Kyorits	KNW-407	11/08/06	8-317-8
49	LISN	Kyorits	KNW-242	27/09/06	8-654-15
50	CVCF	NF Electronic	4400	N/A	344536 4420064
51	Software	ToYo EMI	EP5/RE	N/A	Ver 2.0.800
52	Software	ToYo EMI	EP5/CE	N/A	Ver 2.0.801
53	Software	AUDIX	e3	N/A	Ver 3.0
54	Software	Agilent	Benchlink	N/A	A.01.09 021211