

# RF TEST REPORT

Test item : MP3 player  
Model No. : D3  
Order No. : 1008-00780  
Date of receipt : 2010-08-27  
Test duration : 2010-10-06 ~ 2010-10-21  
Date of issue : 2010-12-10  
Use of report : FCC Original Grant

Applicant : COWON SYSTEMS, Inc.  
6th FL. COWON TOWER, 689-3, Yeoksam-Dong, Gangnam-Gu, Seoul, 135-080, Korea

Test laboratory : Digital EMC Co., Ltd.  
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, 449-080, Korea

Test specification : FCC Part 15.247 Subpart C  
Test environment : See appended test report  
Test result :  Pass  Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DIGITAL EMC CO., LTD.

Tested by:



Engineer  
D.C. Cha

Witnessed by:



N/A

Reviewed by:



Manager  
W.J. Lee

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## 1. Equipment information

### 1.1 Equipment description

FCC Equipment Class	Digital Transmission System (DTS)
Equipment type	MP3 player
Equipment model name	D3
Equipment add model name	N/A
Equipment serial no.	Identical prototype
Frequency band	2412 ~ 2462 MHz
Modulation type	CCK, OFDM
Channel Access Protocol	CSMA/CA
Channel Spacing	5.0 MHz
Antenna type	Internal Type: Chip Antenna (Max. peak gain: 0.7 dBi)
Power Supply	Li-ion polymer Battery: DC 3.7 V AC-DC Adapter: AC 120 V 60 Hz

### 1.2 Ancillary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
Adapter	KSAFD0500300W1UV	N/A	Kuantech (shenZhen) Co., Ltd.	-
-	-	-	-	-

## 2. Information about test items

### 2.1 Test mode

This device was tested in continuous transmitting mode at maximum power.

<b>Test Case 1</b>	EUT
<b>Test Case 2</b>	EUT + Adapter

Note: The maximum power was investigated at all the supported rate.

### 2.2 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

### 2.3 Tested frequency

	TX Frequency (MHz)	RX Frequency (MHz)
<b>Lowest Channel</b>	2412	2412
<b>Middle Channel</b>	2442	2442
<b>Highest Channel</b>	2462	2462

### 2.4 Tested environment

<b>Temperature</b>	: 20 ~ 24 °C
<b>Relative humidity content</b>	: 38 ~ 55 % R.H.
<b>Details of power supply</b>	: Li-ion polymer Battery: DC 3.7 V AC-DC Adapter: AC 120 V 60 Hz

### 2.5 EMI Suppression Device(s)/Modifications

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

→ None

### 3. Test Report

#### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit (Using in 2400 ~ 2483.5MHz)	Test Condition	Status Note 1
<b>I. Test Items (TX)</b>				
15.247(a)	6 dB Bandwidth	> 500 kHz	Conducted	<b>C</b> Note.2
15.247(b)	Transmitter Output Power	< 1Watt		<b>C</b> Note.2
15.247(d)	Out of Band Emissions / Band Edge	30dBc in any 100kHz BW		<b>C</b> Note.2
15.247(e)	Transmitter Power Spectral Density	< 8dBm / 3kHz		<b>C</b> Note.2
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	<FCC 15.209 Limits	Radiated	<b>C</b> Note.3
15.207	AC Conducted Emissions	<FCC 15.207 Limits	AC Line Conducted	<b>C</b> Note.4
15.203	Antenna Requirements	FCC 15.203	-	<b>C</b>
<p>Note 1: <b>C</b>=Comply    <b>NC</b>=Not Comply    <b>NT</b>=Not Tested    <b>NA</b>=Not Applicable</p> <p>Note 2: The test item was performed at only test case1 with the worst case rate. (802.11b: 11Mbps &amp; 802.11g: 54Mbps)</p> <p>Note 3: This test item was performed in each axis. and the worst case data were reported (802.11b: test case 1, 802.11g: test case 2).</p> <p>Note 4: This test item was performed in test case 2.</p>				

The sample was tested according to the following specification:  
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 Frequencies

Span = 50 MHz (Greater than EBW)

RBW = 100 kHz

VBW =  $\geq$  RBW

Trace = max hold

Sweep = auto

Detector function = peak

#### - Measurement Data: **Comply**

Test Mode	Frequency	Test Results (MHz)
802.11b	Lowest	8.35
	Middle	7.70
	Highest	7.70
802.11g	Lowest	16.50
	Middle	16.35
	Highest	16.50

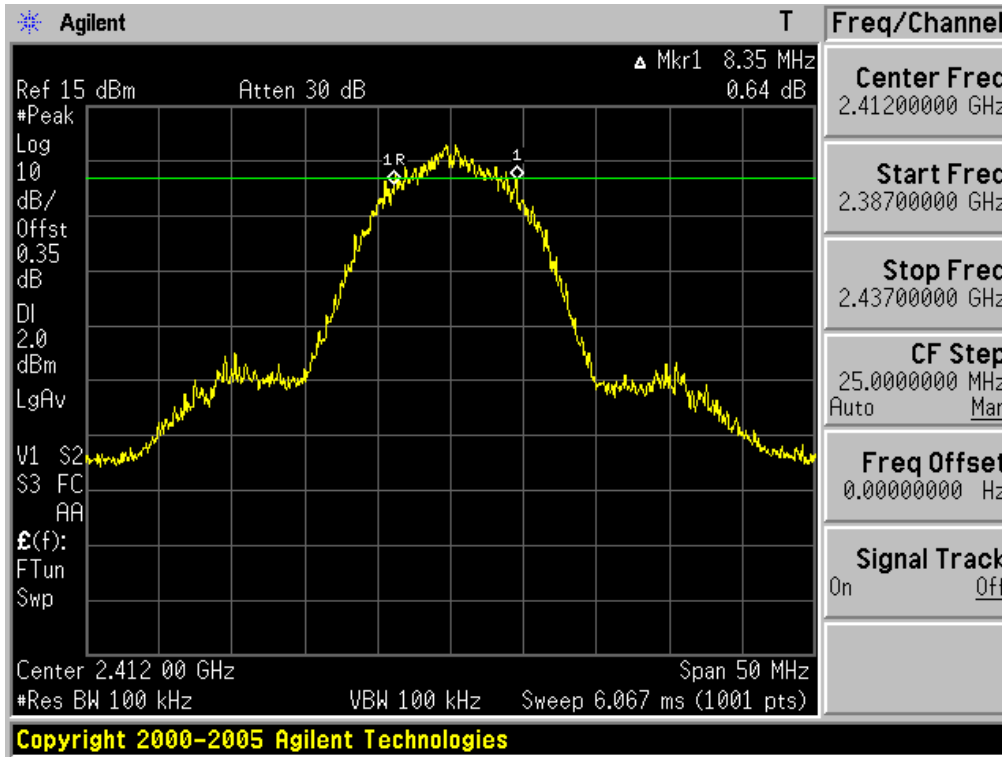
Note 1: See next pages for actual measured spectrum plots.

#### - Minimum Standard:

The minimum 6 dB bandwidth shall be at least 500 kHz

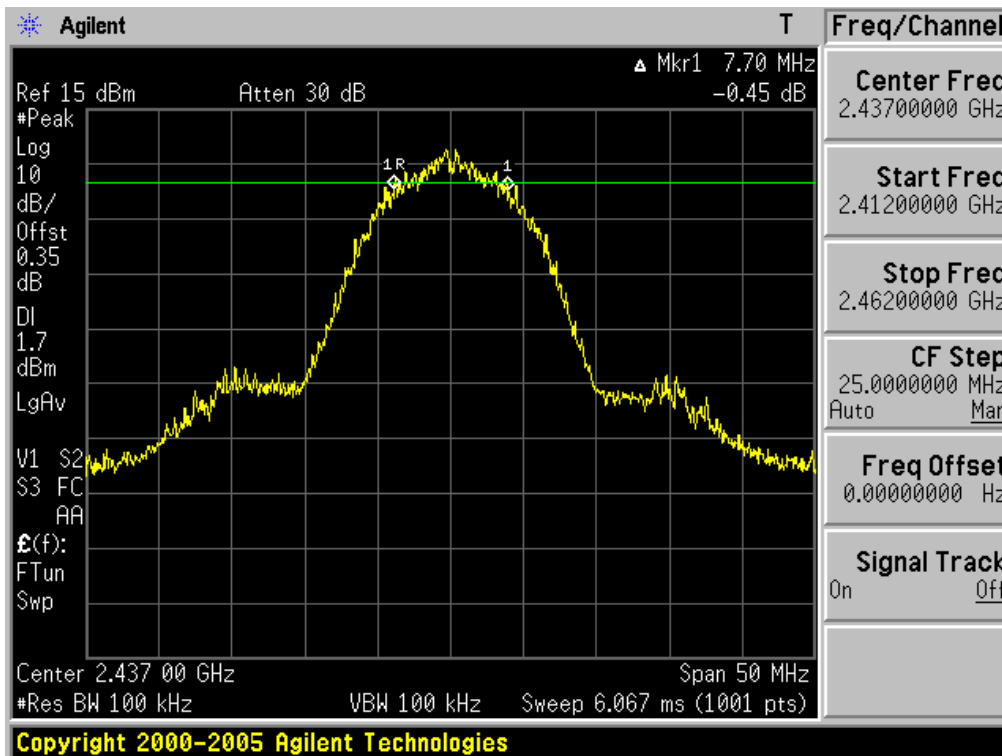
6 dB Bandwidth

Test Mode: 802.11b & Lowest Frequency



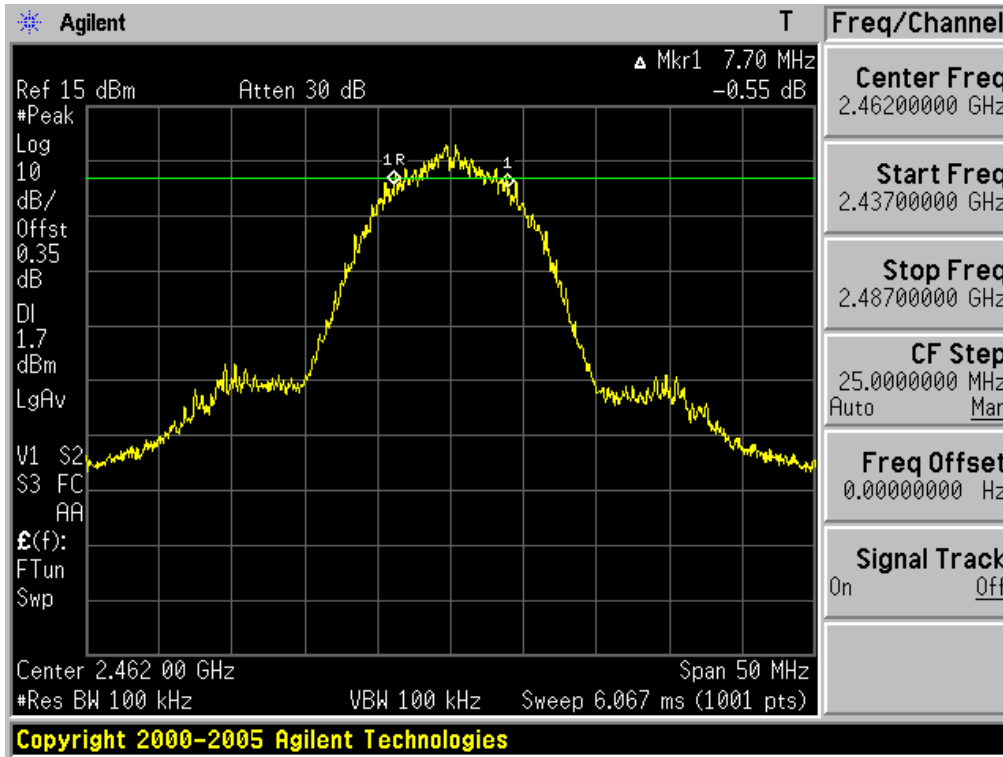
6 dB Bandwidth

Test Mode: 802.11b & Middle Frequency



6 dB Bandwidth

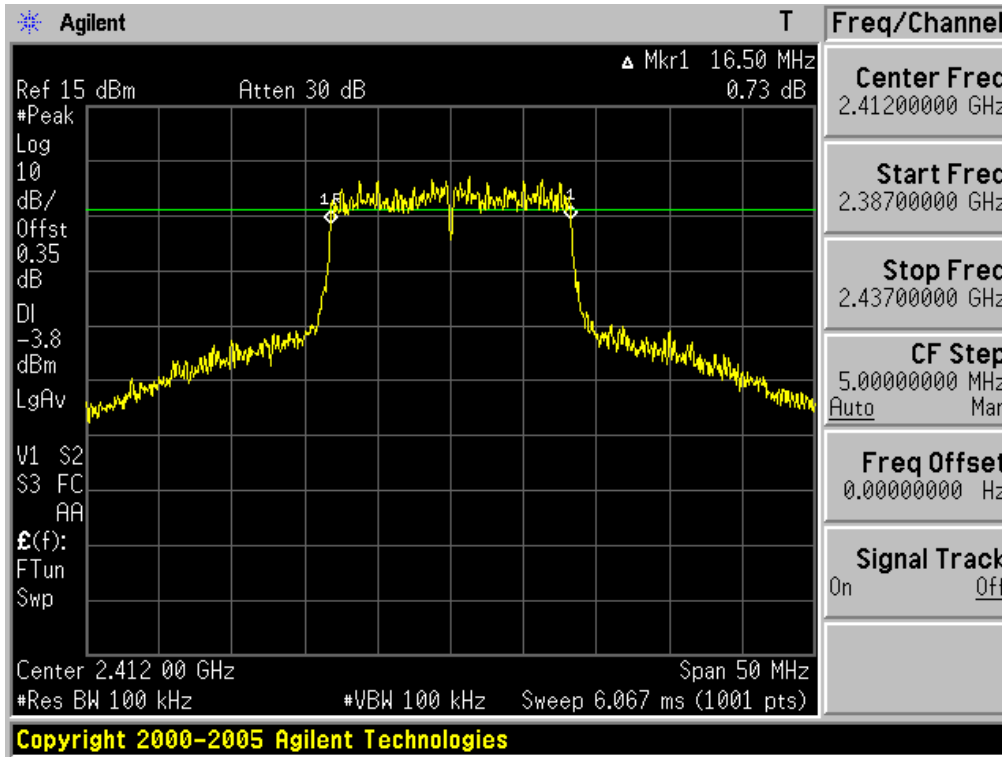
Test Mode: 802.11b & Highest Frequency





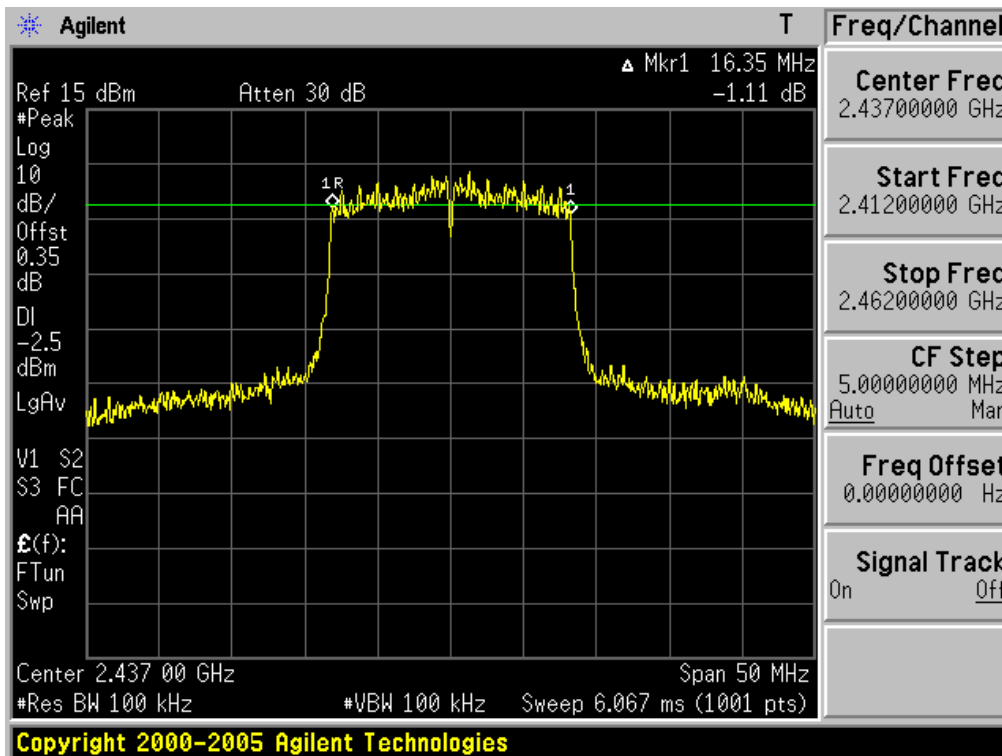
6 dB Bandwidth

Test Mode: 802.11g & Lowest Frequency



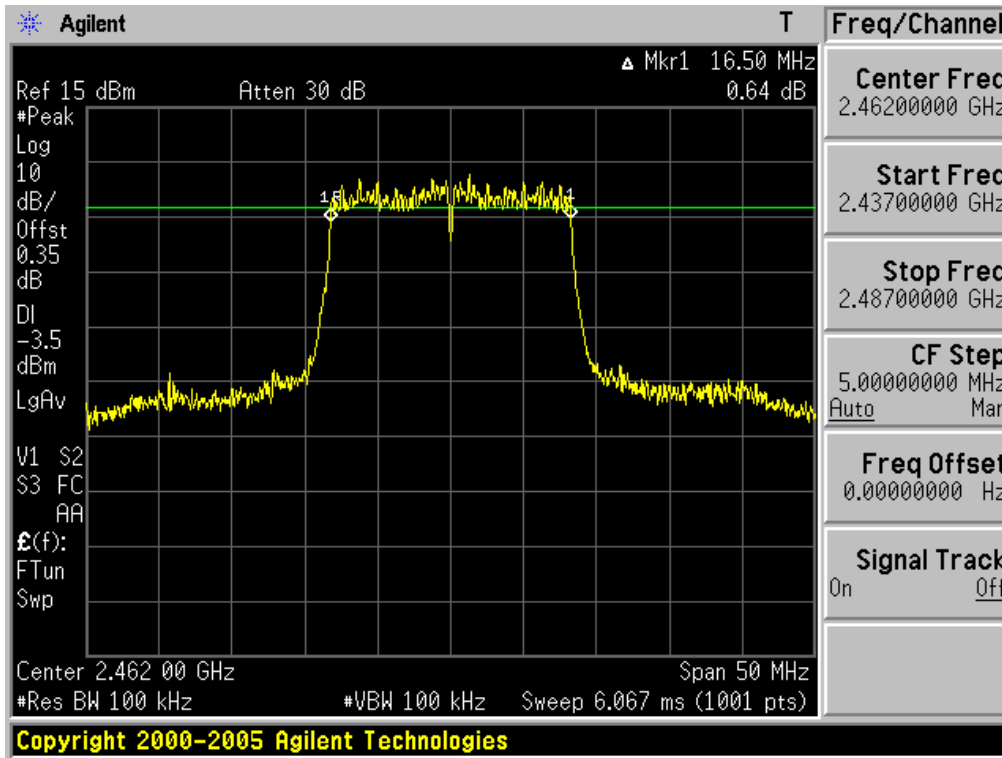
6 dB Bandwidth

Test Mode: 802.11g & Middle Frequency



6 dB Bandwidth

Test Mode: 802.11g & Highest Frequency



### 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: **Comply**

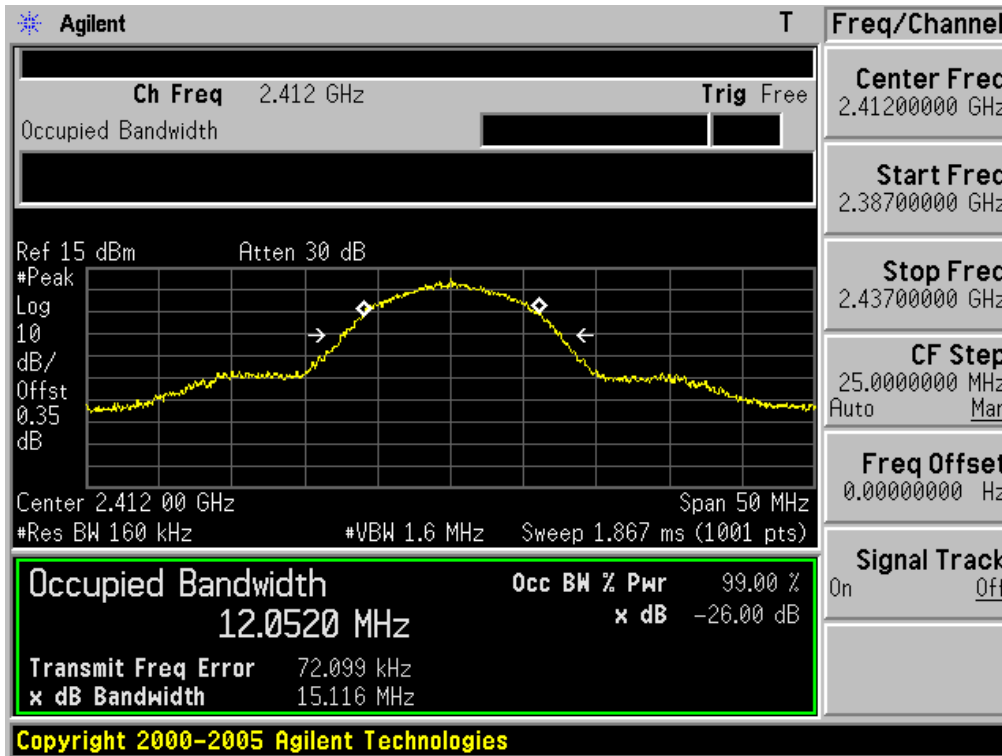
Test mode	Rate	Test Result					
		Lowest Frequency		Middle Frequency		High Frequency	
		dBm	W	dBm	W	dBm	W
802.11b	1 Mbps	14.270	0.0267	14.410	0.0276	14.430	0.0277
	2 Mbps	14.230	0.0265	14.870	0.0307	14.100	0.0257
	5.5 Mbps	14.030	0.0253	14.620	0.0290	13.850	0.0243
	<b>11 Mbps</b>	<b>14.620</b>	<b>0.0290</b>	<b>15.010</b>	<b>0.0317</b>	<b>14.470</b>	<b>0.0280</b>
802.11g	6 Mbps	11.990	0.0158	11.780	0.0151	11.140	0.0130
	9 Mbps	12.090	0.0162	11.690	0.0148	11.970	0.0157
	12 Mbps	11.830	0.0152	11.720	0.0149	11.660	0.0147
	18 Mbps	12.140	0.0164	11.850	0.0153	11.790	0.0151
	24 Mbps	11.790	0.0151	11.860	0.0153	11.550	0.0143
	36 Mbps	11.870	0.0154	11.510	0.0142	11.860	0.0153
	48 Mbps	11.760	0.0150	11.610	0.0145	11.800	0.0151
	<b>54 Mbps</b>	<b>12.190</b>	<b>0.0166</b>	<b>11.880</b>	<b>0.0154</b>	<b>11.960</b>	<b>0.0157</b>

Note 1: See next pages for actual measured spectrum plots.

<b>Minimum Standard:</b>	< 1W
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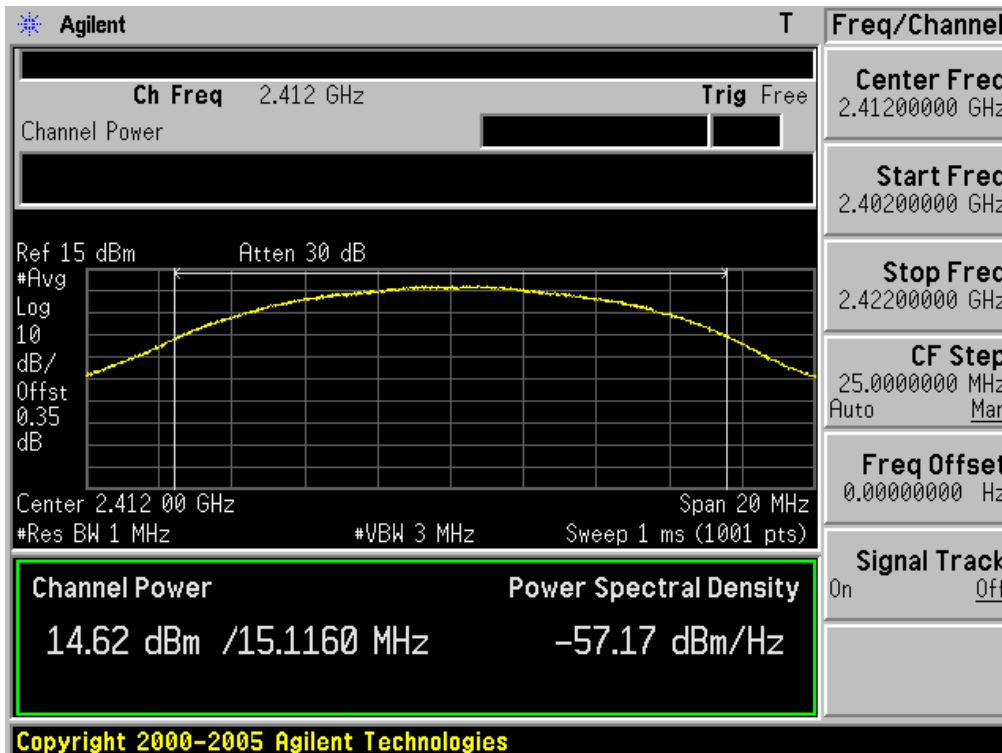
26 dB Bandwidth

Test Mode: 802.11b & Lowest Frequency



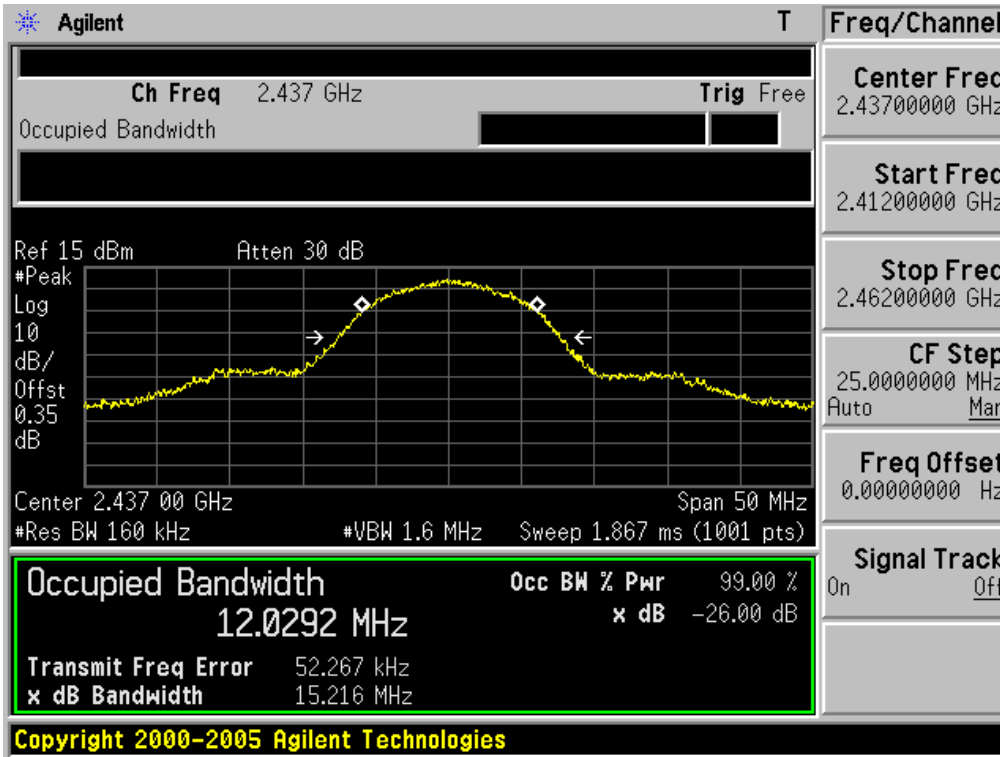
Peak Output Power

Test Mode: 802.11b & Lowest Frequency



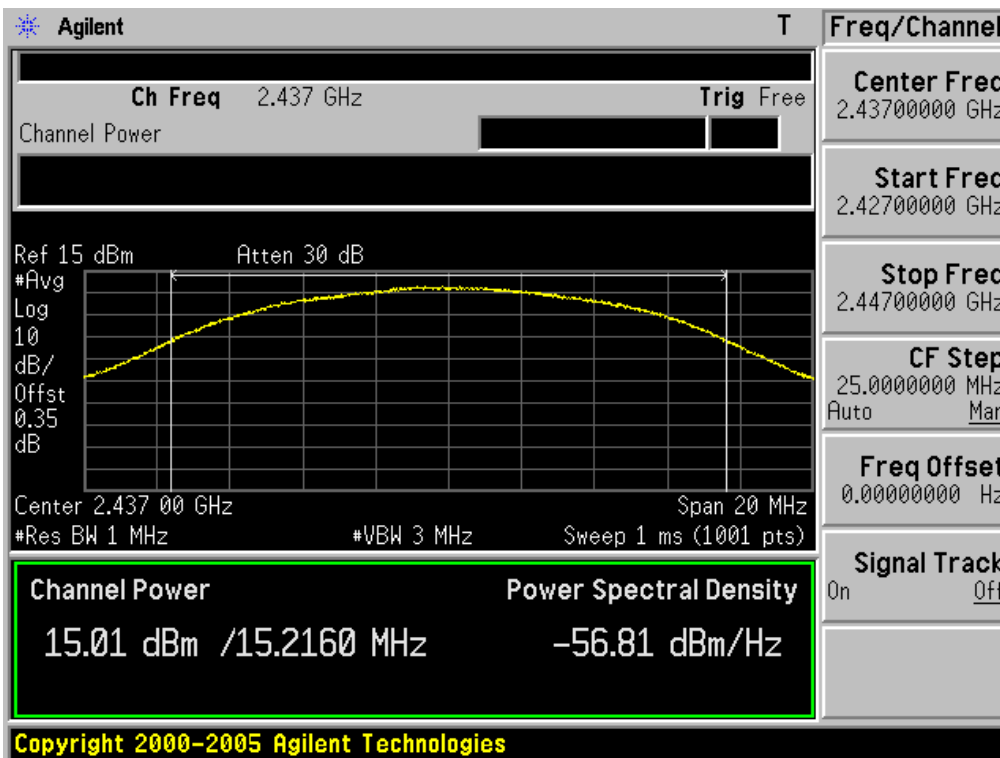
**26 dB Bandwidth**

Test Mode: 802.11b & Middle Frequency



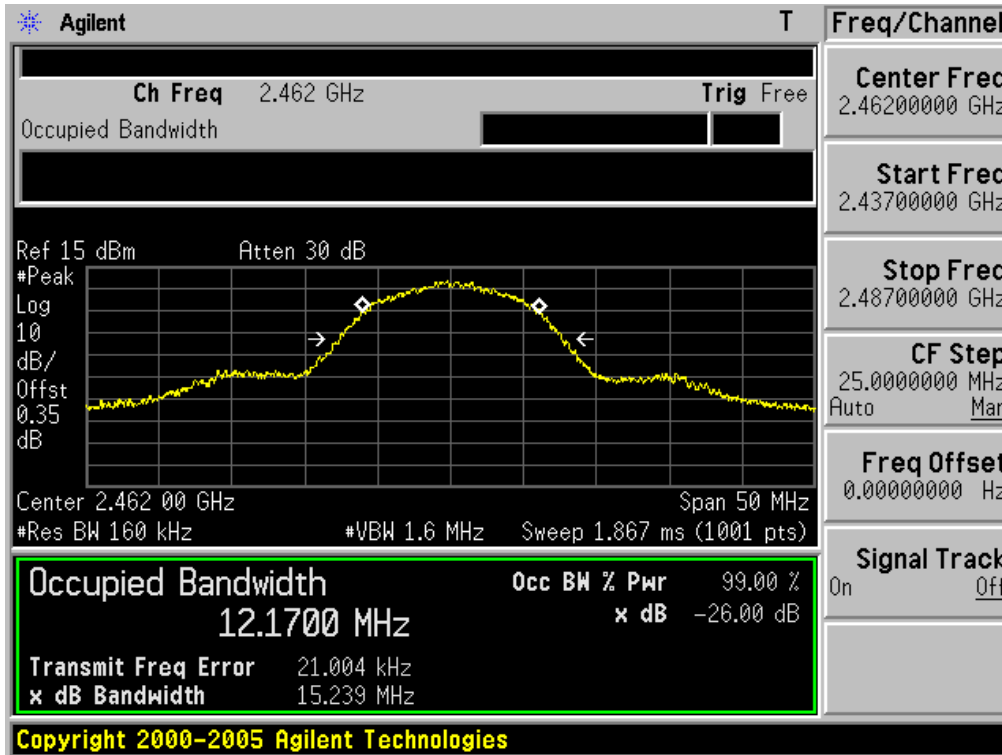
**Peak Output Power**

Test Mode: 802.11b & Middle Frequency



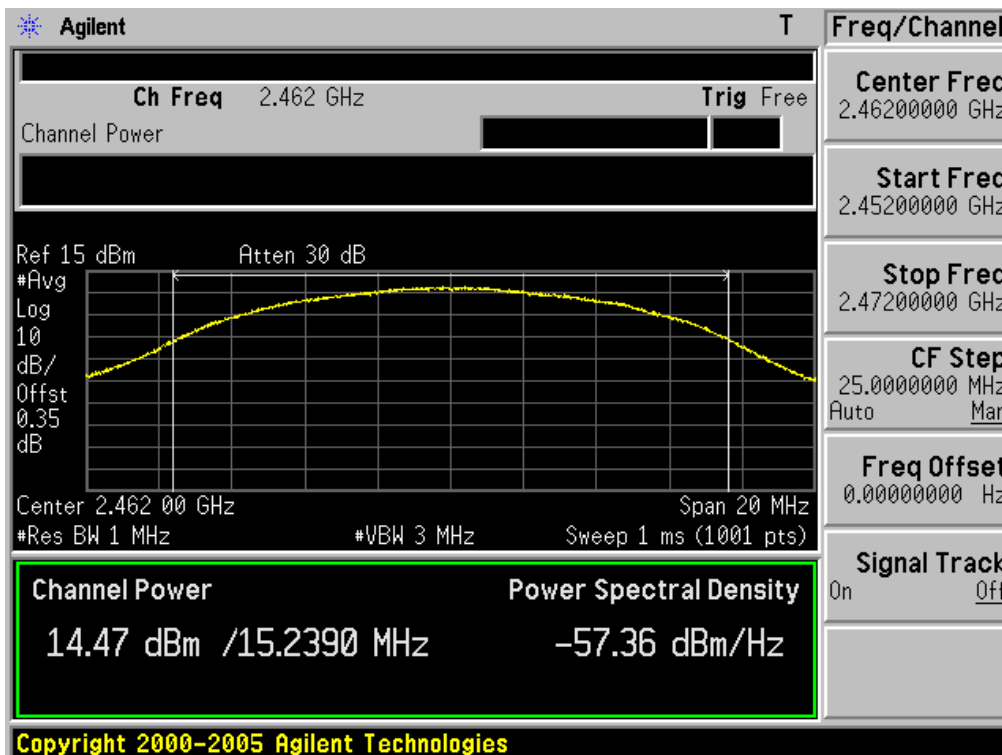
**26 dB Bandwidth**

Test Mode: 802.11b & Highest Frequency



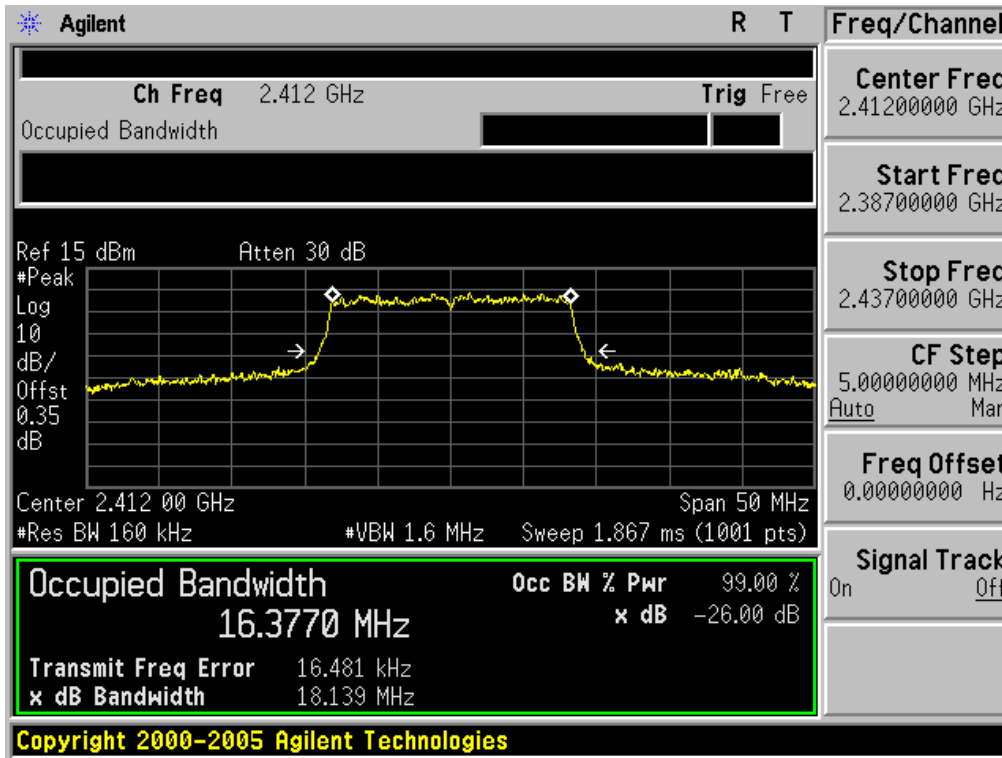
**Peak Output Power**

Test Mode: 802.11b & Highest Frequency



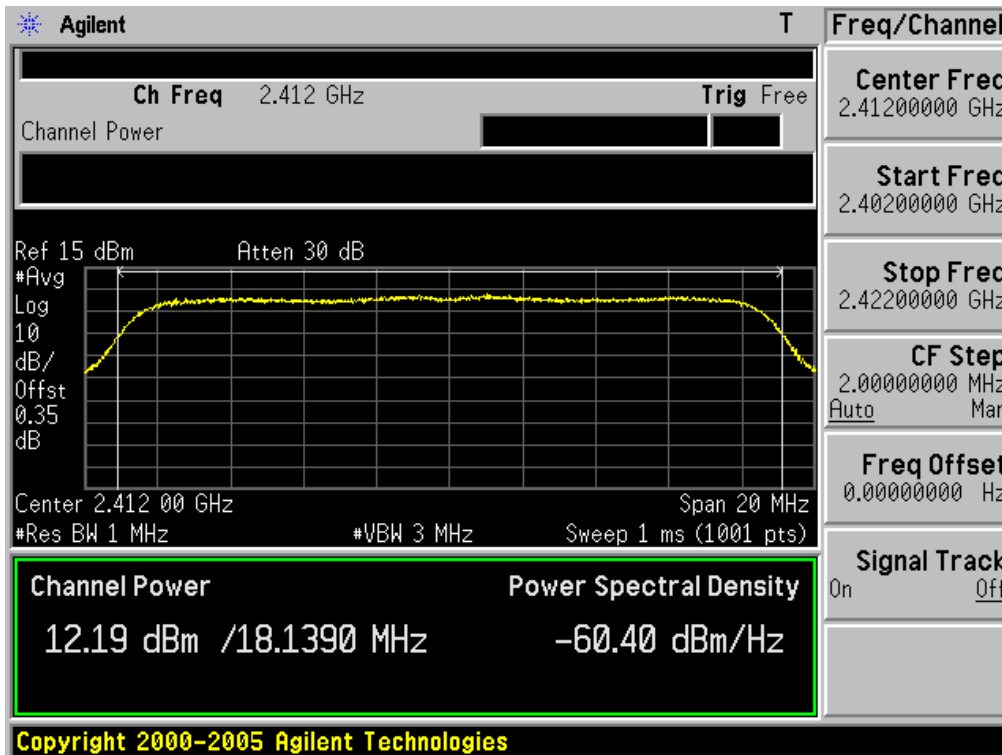
26 dB Bandwidth

Test Mode: 802.11g & Lowest Frequency



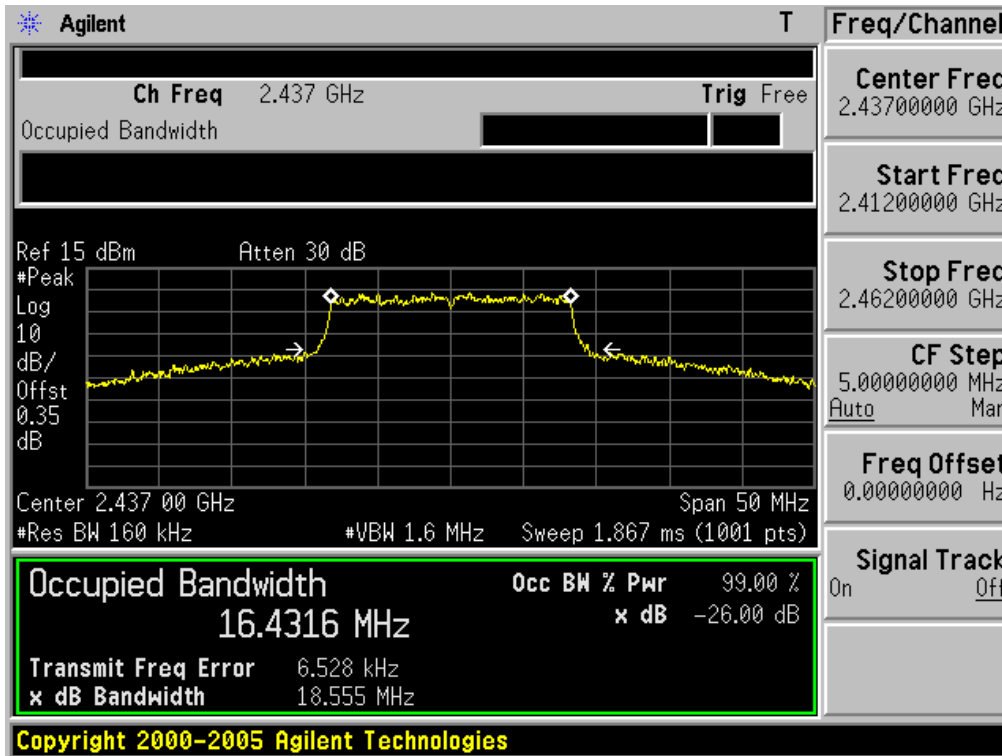
Peak Output Power

Test Mode: 802.11g & Lowest Frequency



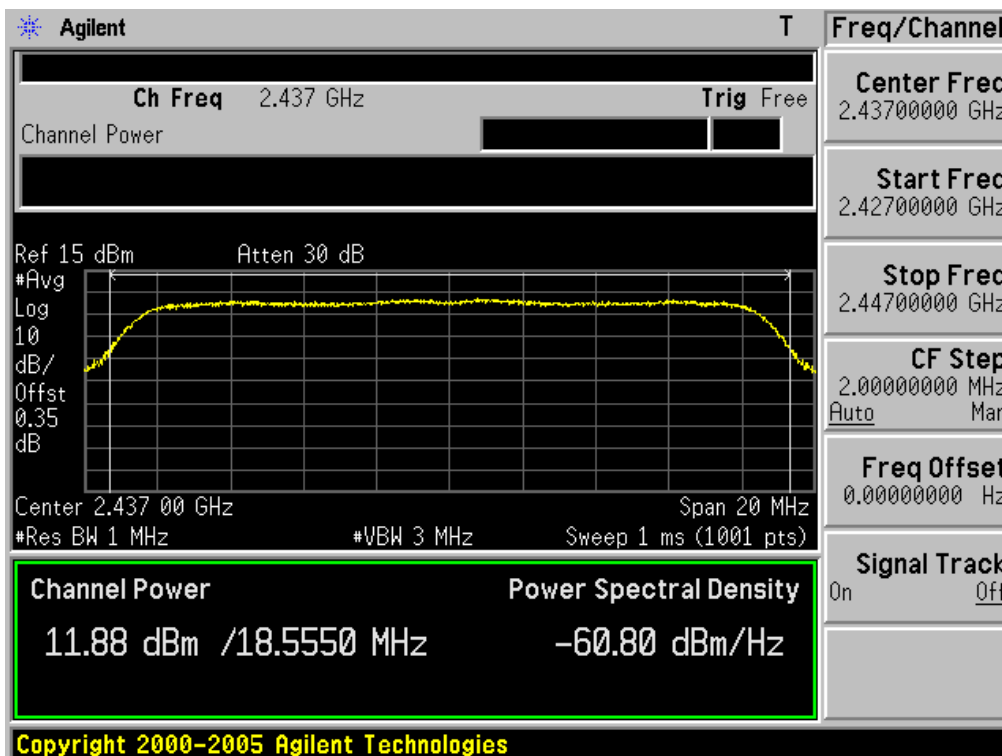
26 dB Bandwidth

Test Mode: 802.11g & Middle Frequency



Peak Output Power

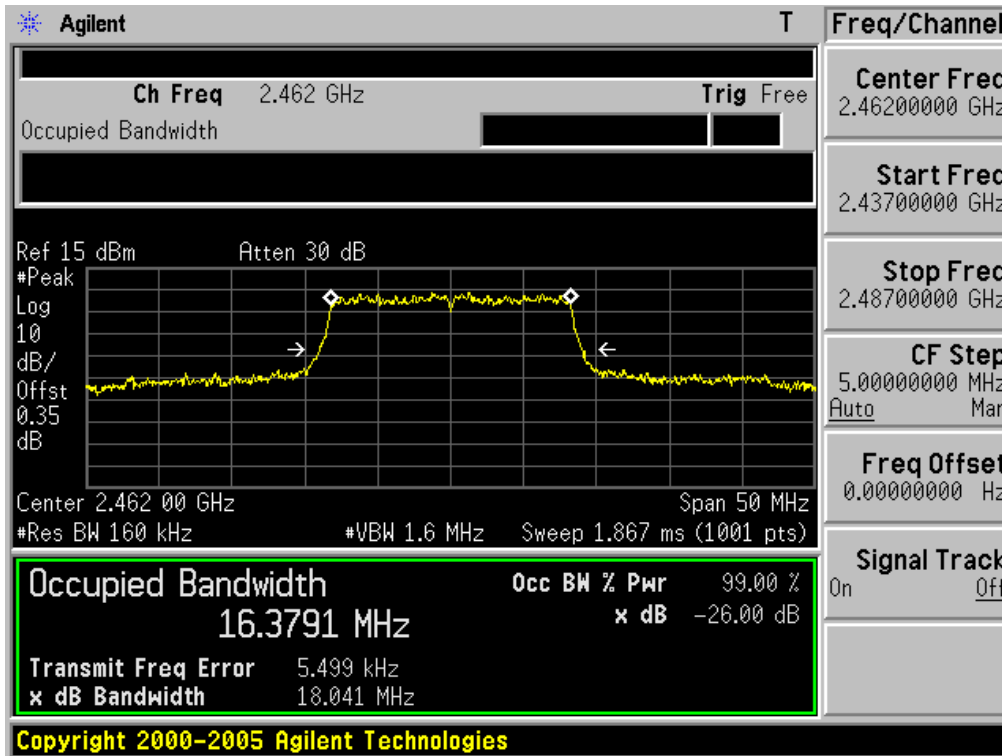
Test Mode: 802.11g & Middle Frequency





26 dB Bandwidth

Test Mode: 802.11g & Highest Frequency



Peak Output Power

Test Mode: 802.11g & Highest Frequency



### 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.

For Band-edge testing the spectrum analyzer is set to:

Tested frequency = the highest and the lowest Frequencies

Center frequency = 2400MHz, 2483.5MHz

Span = 100MHz

Detector function = peak

RBW = 1% of the span

VBW = 100 kHz

Trace = max hold

Sweep = auto

For spurious testing the spectrum analyzer is set to:

Tested frequency = the highest, middle and the lowest Frequencies

RBW = 100 kHz

VBW = 100 kHz

Detector function = peak

Sweep = auto

Trace = max hold

**- Measurement Data: Comply**

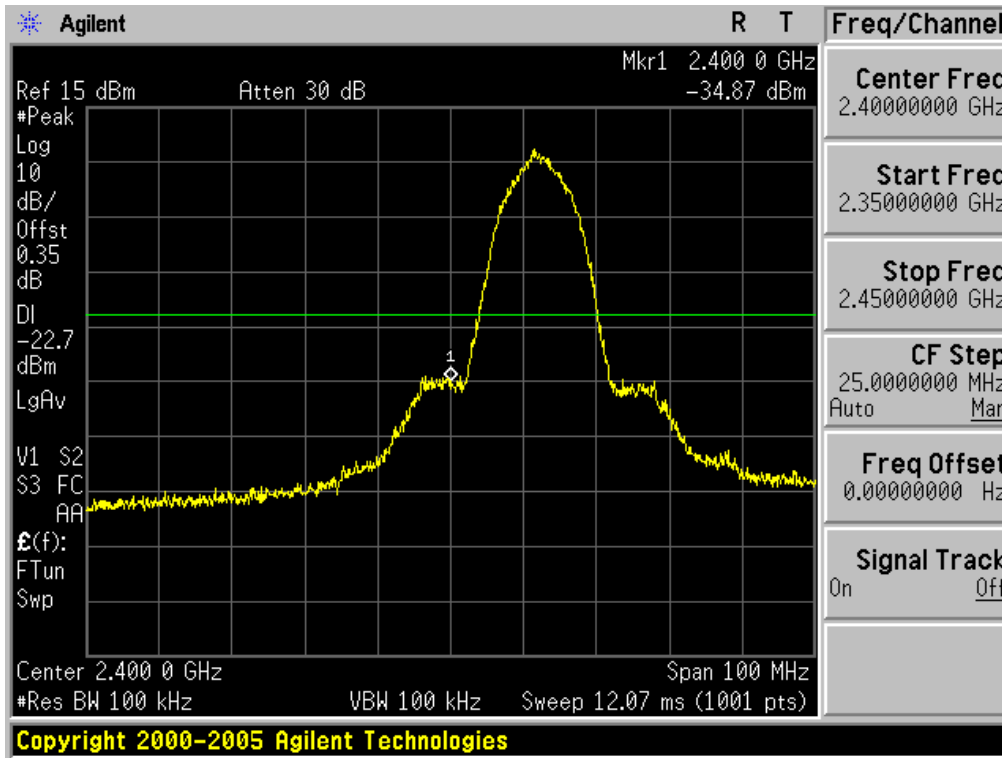
- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 30dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.

Note 1: See next pages for actual measured spectrum plots.

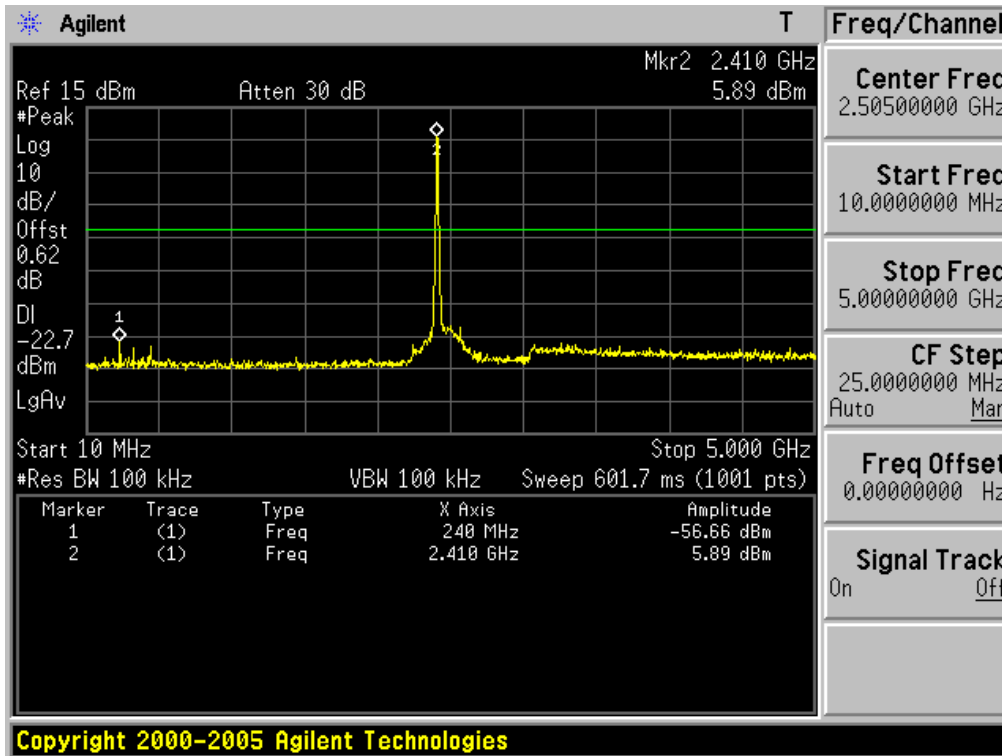
<b>Minimum Standard:</b>	> 30 dBc
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Low Band-edge at 30 dB blow

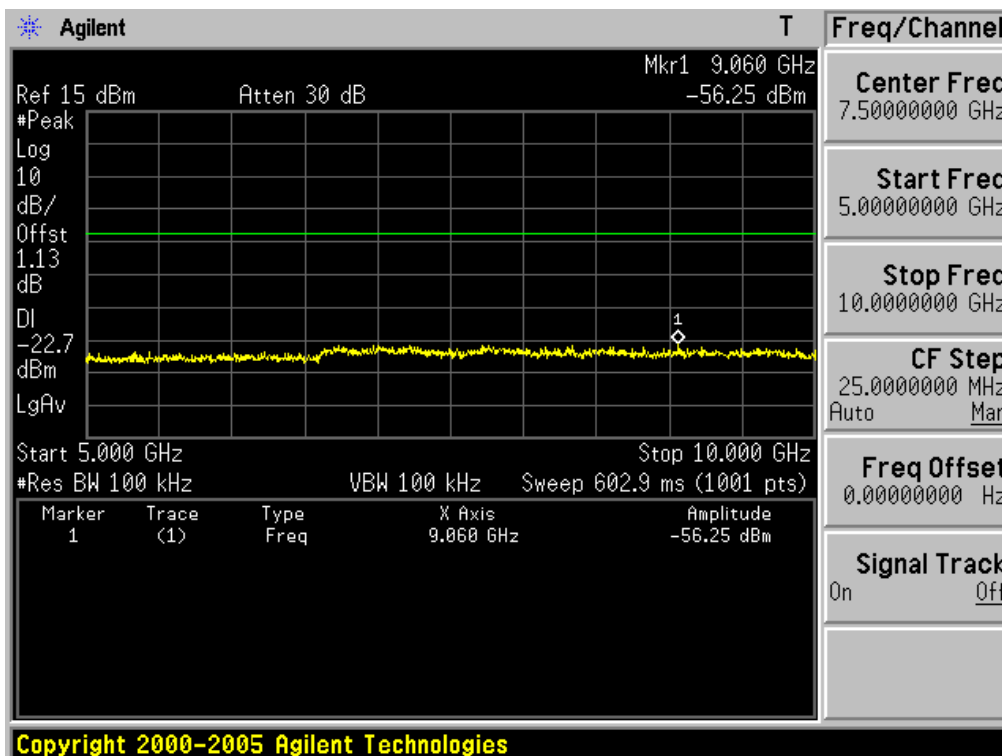
Test Mode: 802.11b



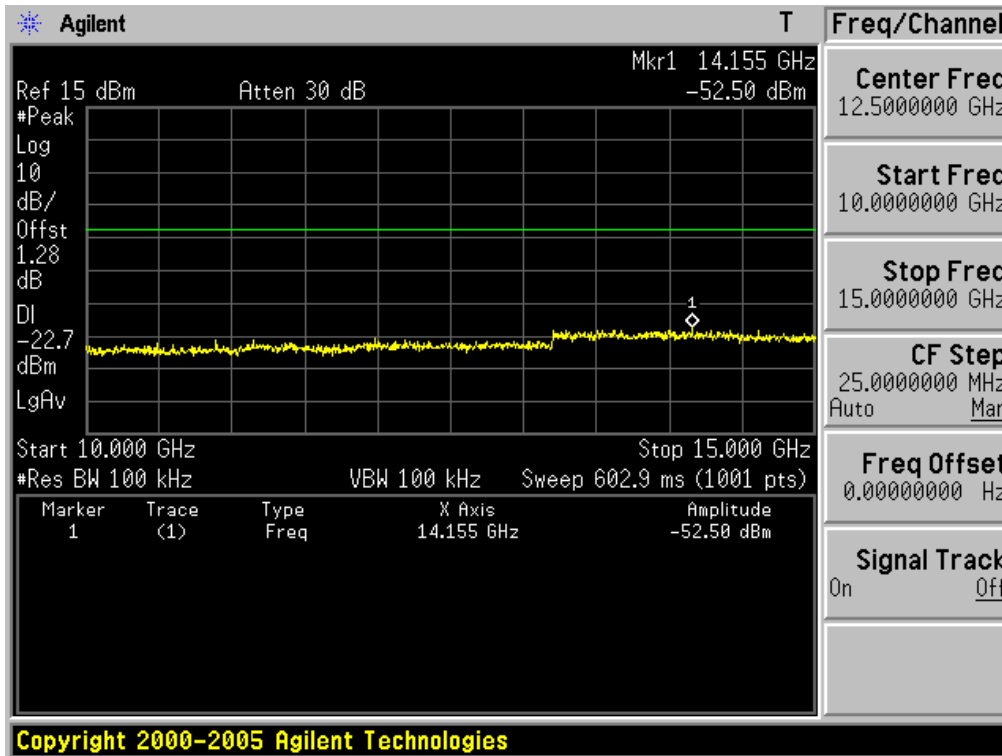
**10MHz ~ 5GHz Conducted Spurious Emissions** Test Mode: 802.11b & Lowest Frequency



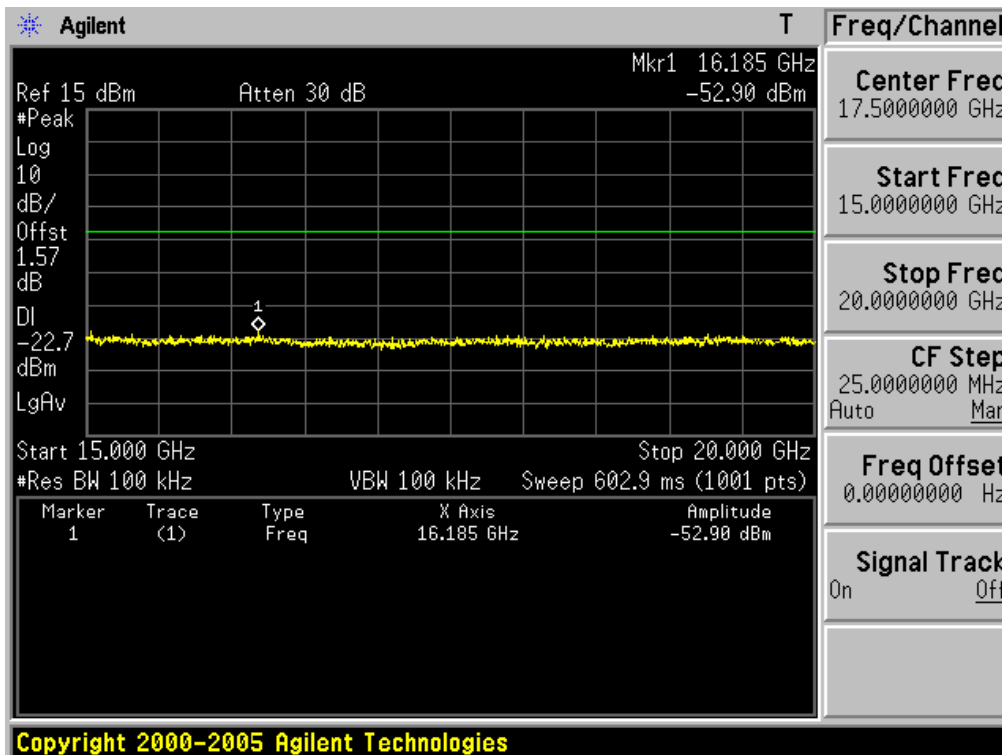
**5GHz ~ 10GHz Conducted Spurious Emissions** Test Mode: 802.11b & Lowest Frequency



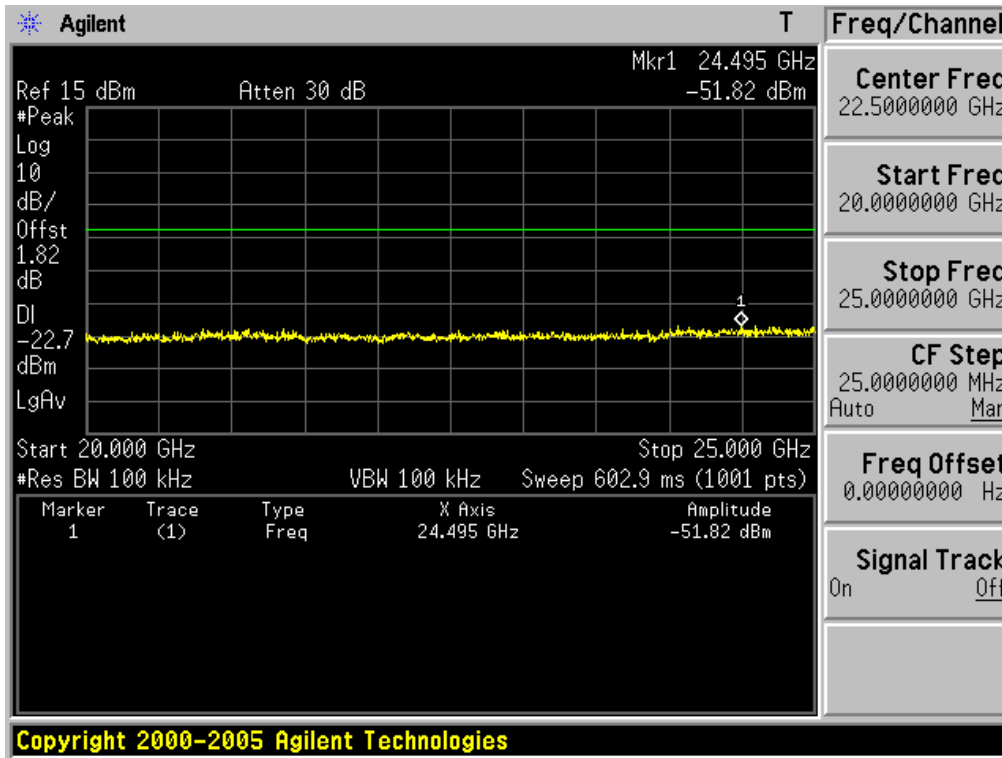
**10GHz ~ 15GHz Conducted Spurious Emissions** Test Mode: 802.11b & Lowest Frequency



**15GHz ~ 20GHz Conducted Spurious Emissions** Test Mode: 802.11b & Lowest Frequency

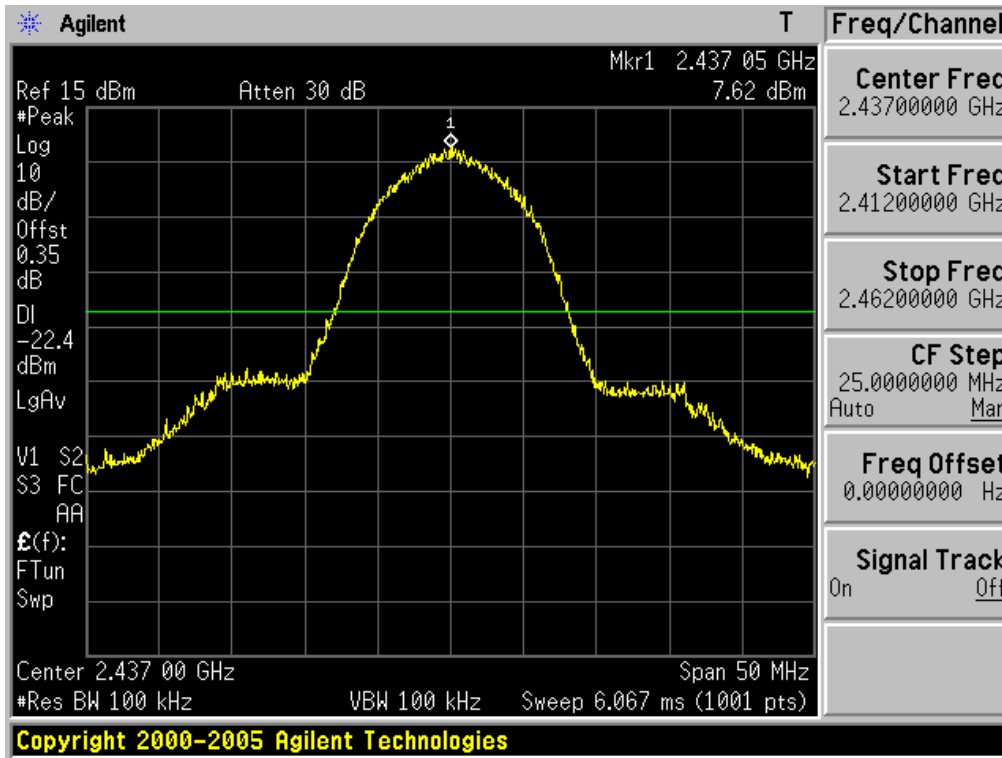


20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11b & Lowest Frequency

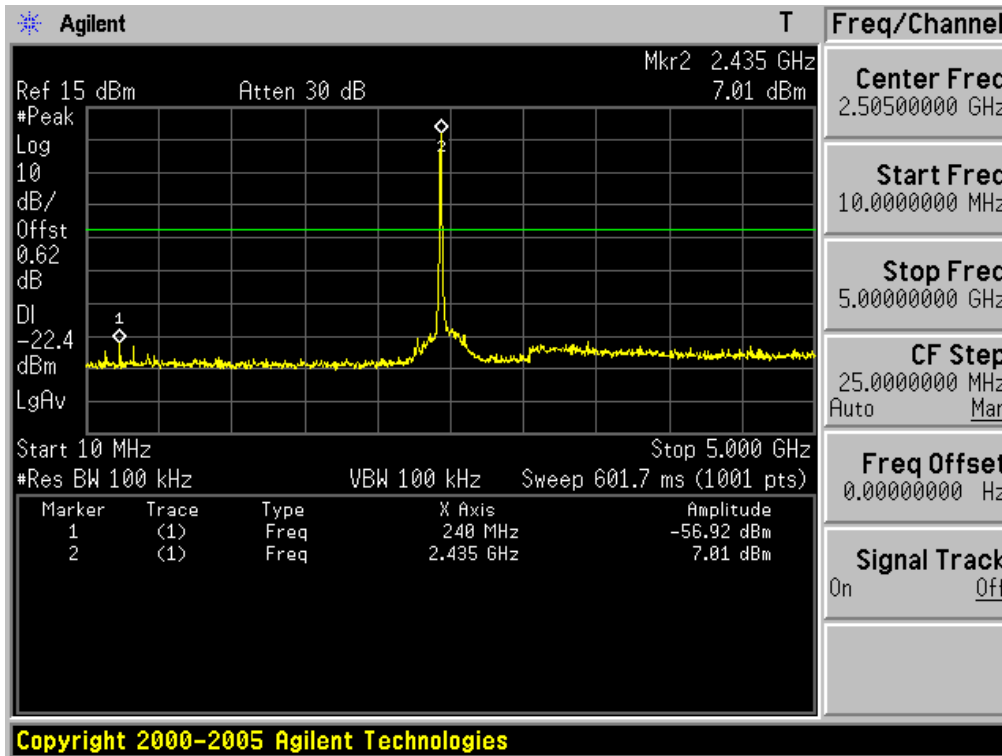


Reference for limit

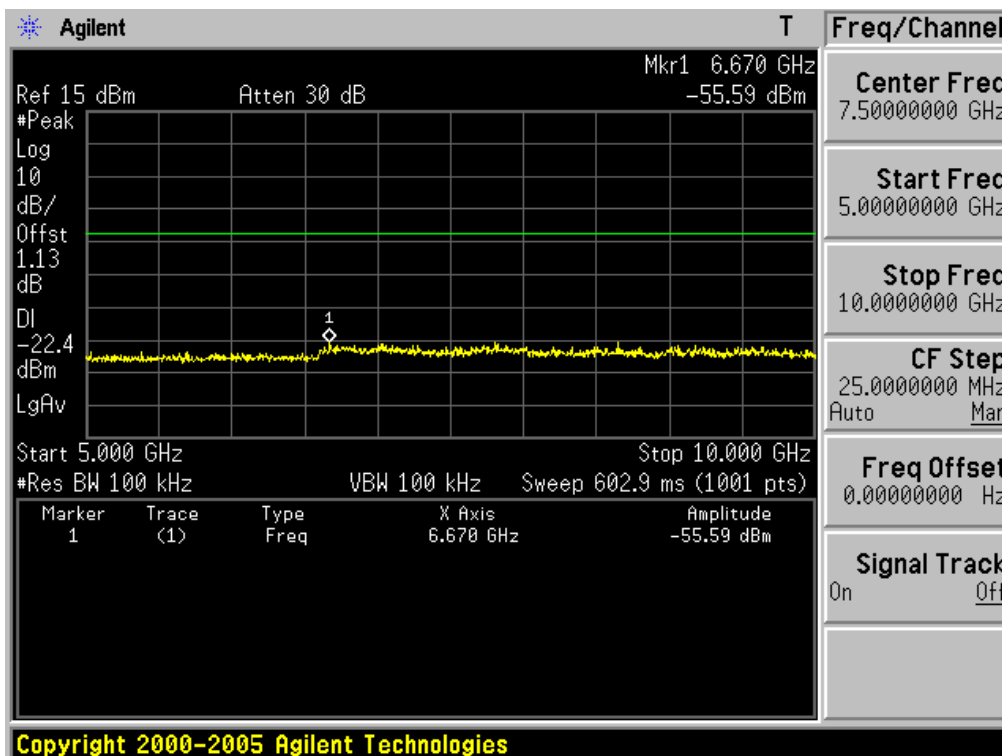
Test Mode: 802.11b & Middle Frequency



10MHz ~ 5GHz Conducted Spurious Emissions Test Mode: 802.11b & Middle Frequency

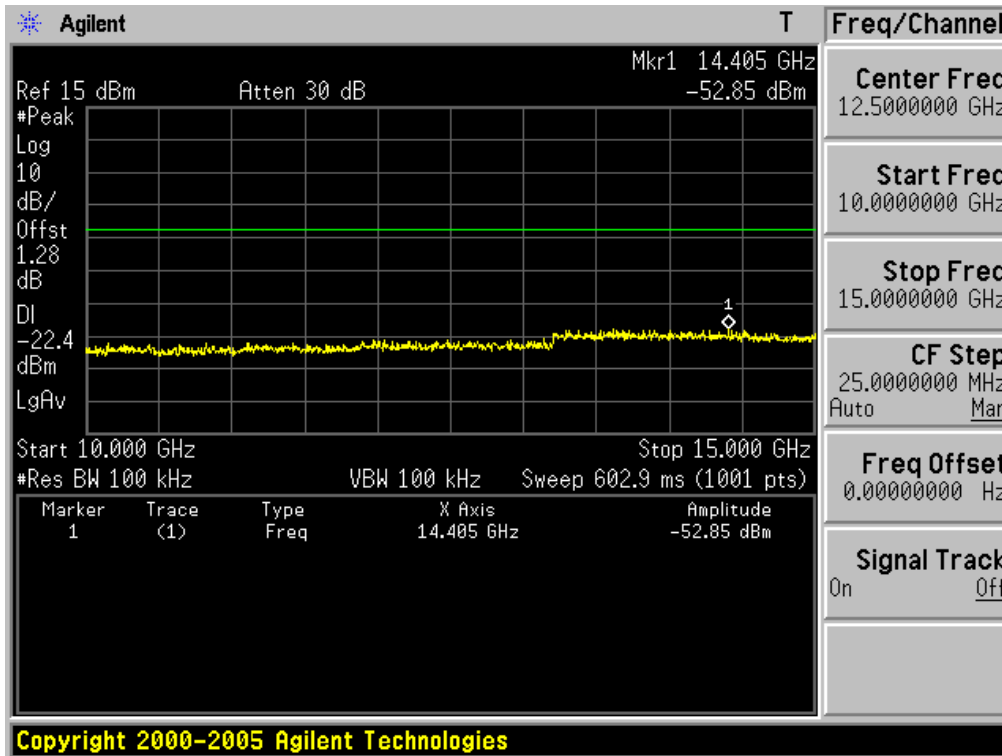


5GHz ~ 10GHz Conducted Spurious Emissions Test Mode: 802.11b & Middle Frequency

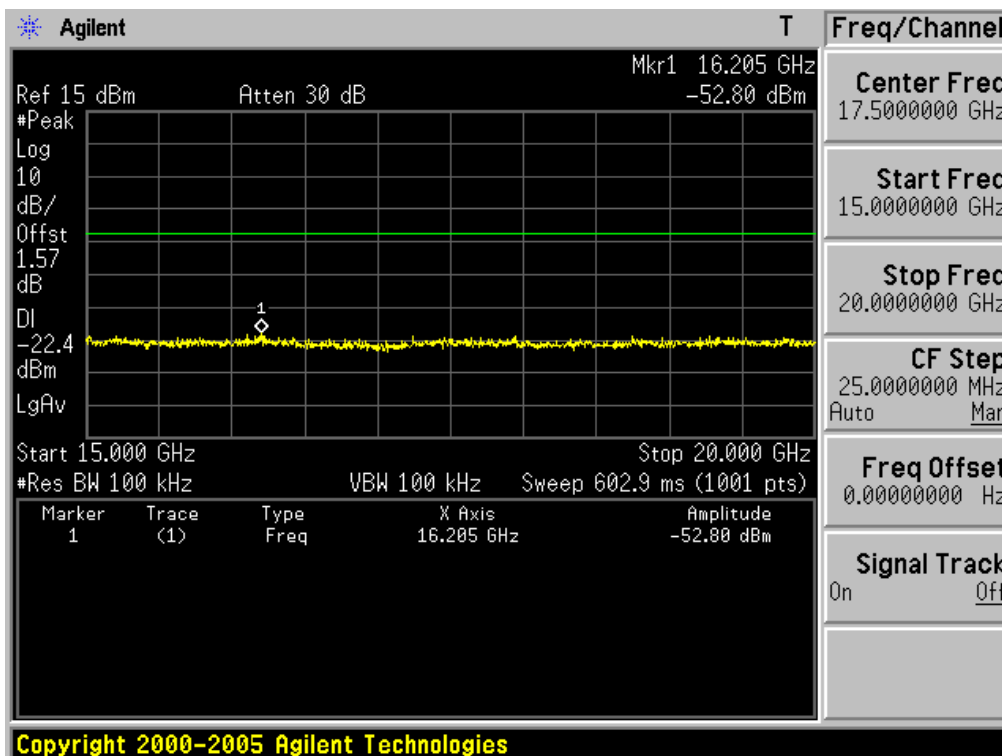




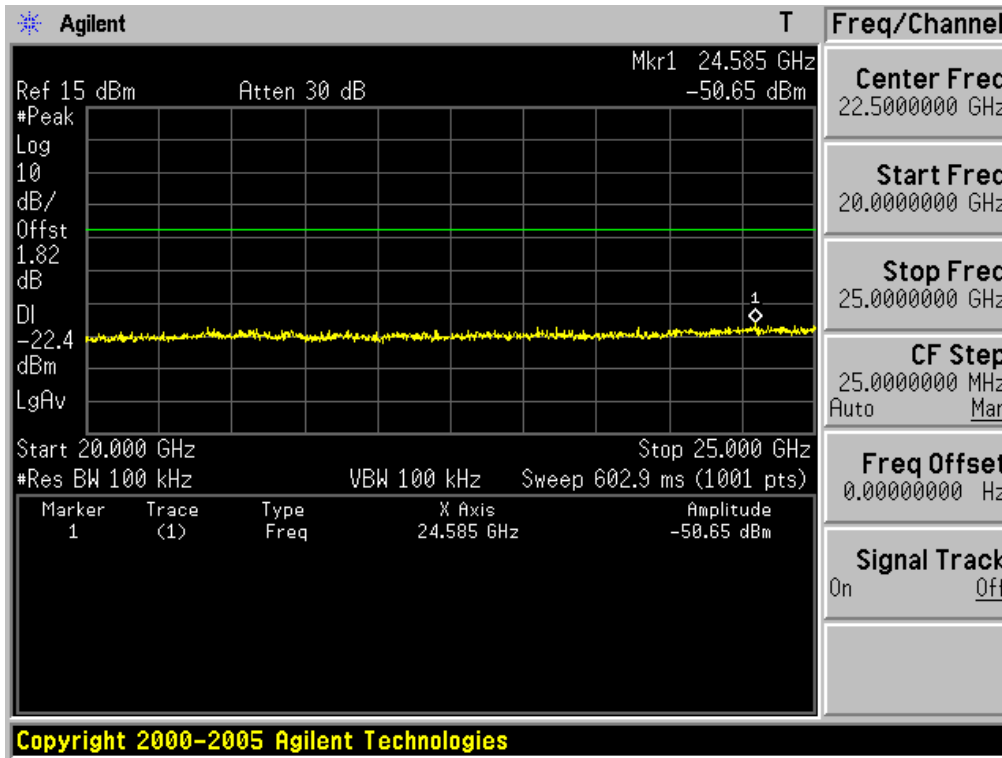
**10GHz ~ 15GHz Conducted Spurious Emissions**      Test Mode: 802.11b & Middle Frequency



**15GHz ~ 20GHz Conducted Spurious Emissions**      Test Mode: 802.11b & Middle Frequency

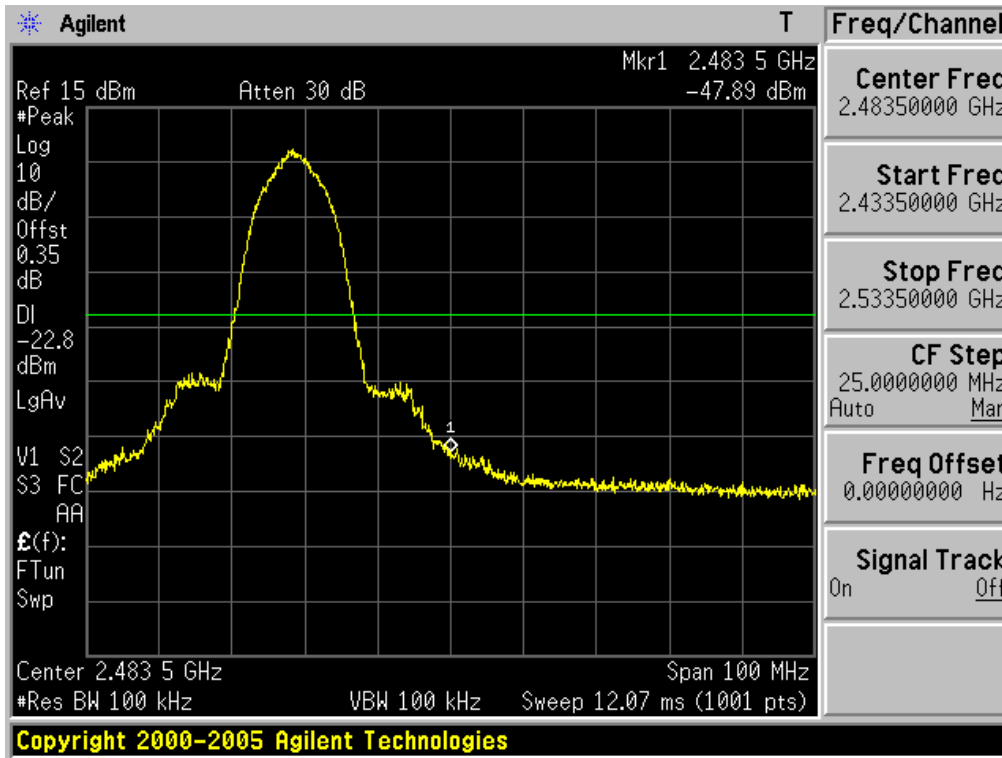


20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11b & Middle Frequency

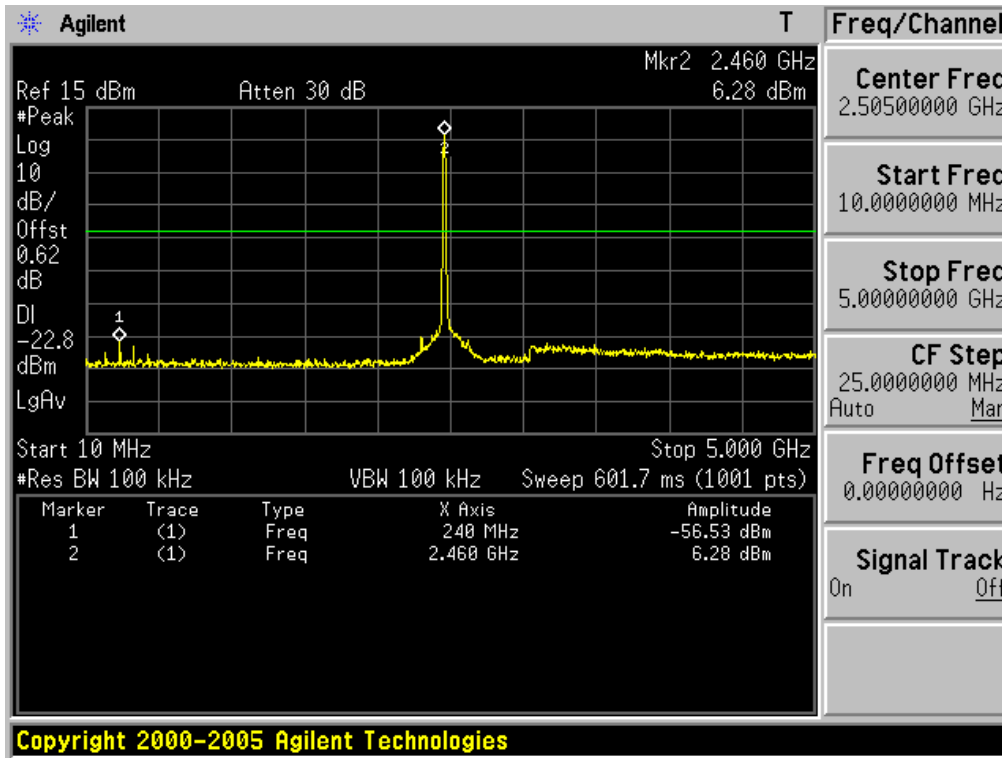


High Band-edge at 30 dB blow

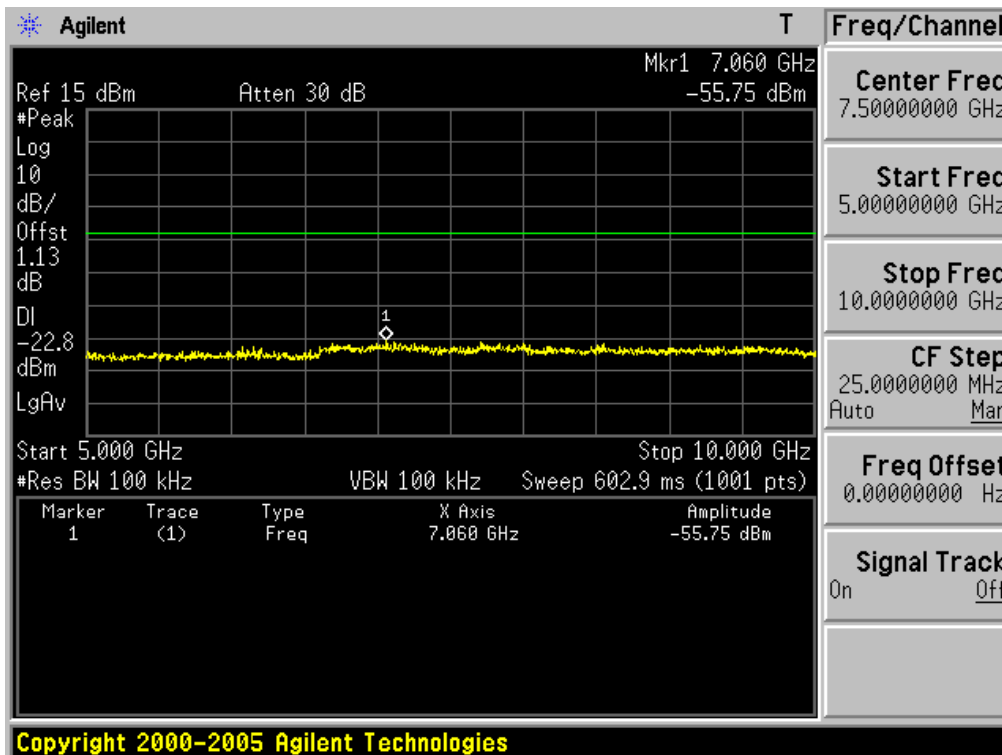
Test Mode: 802.11b & Highest Frequency



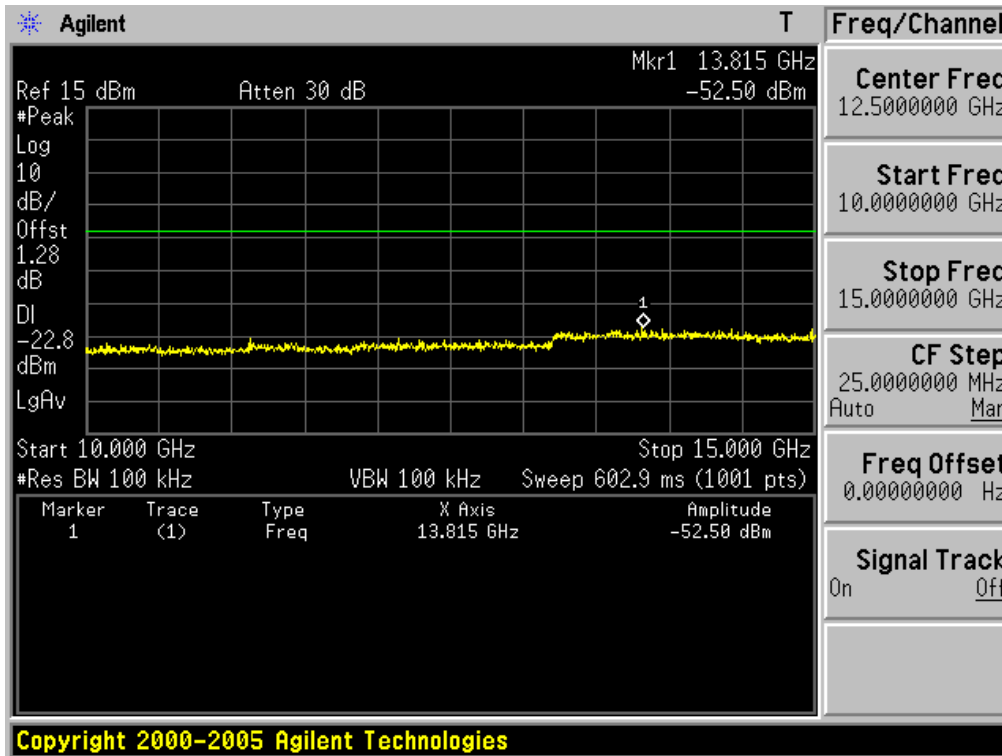
**10MHz ~ 5GHz Conducted Spurious Emissions** Test Mode: 802.11b & Highest Frequency



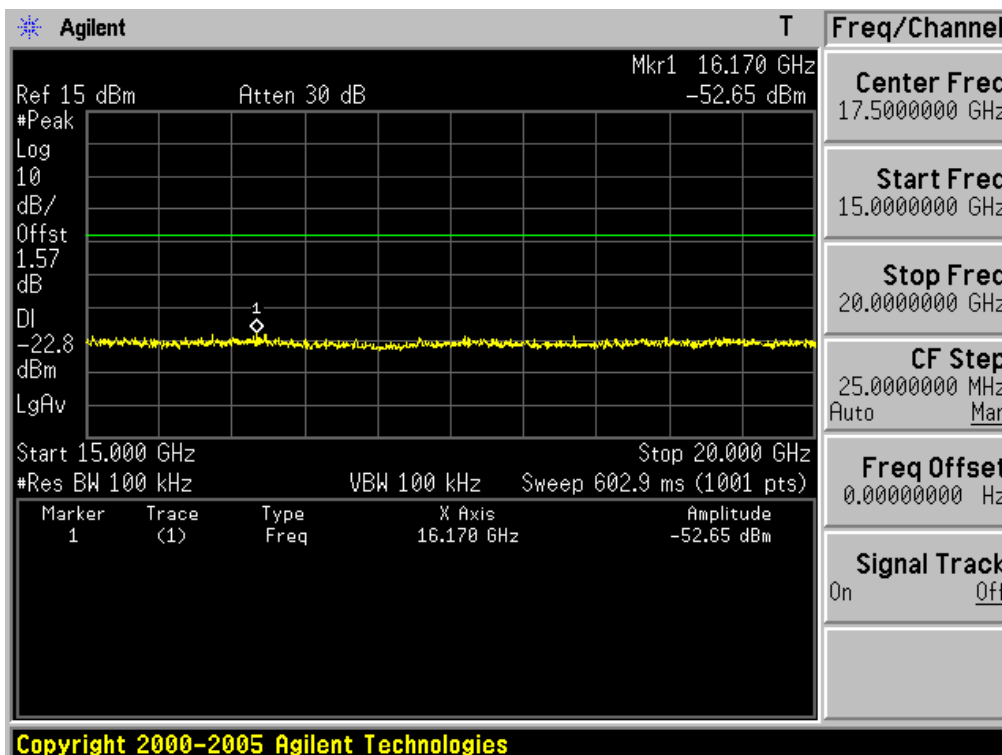
**5GHz ~ 10GHz Conducted Spurious Emissions** Test Mode: 802.11b & Highest Frequency



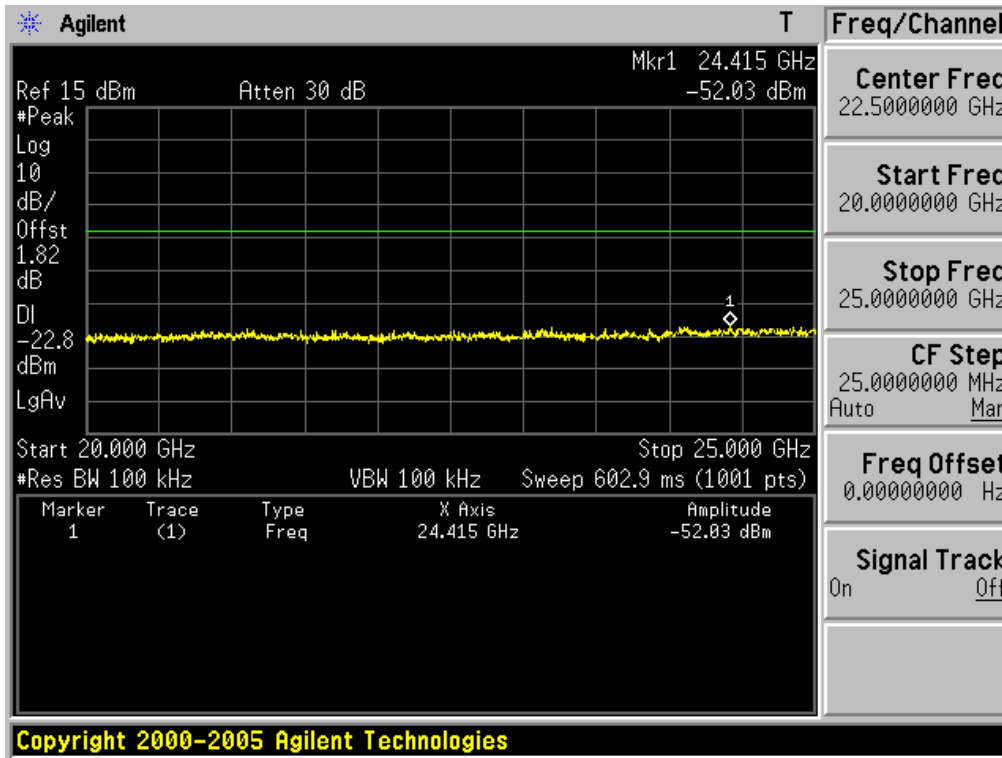
**10GHz ~ 15GHz Conducted Spurious Emissions** Test Mode: 802.11b & Highest Frequency



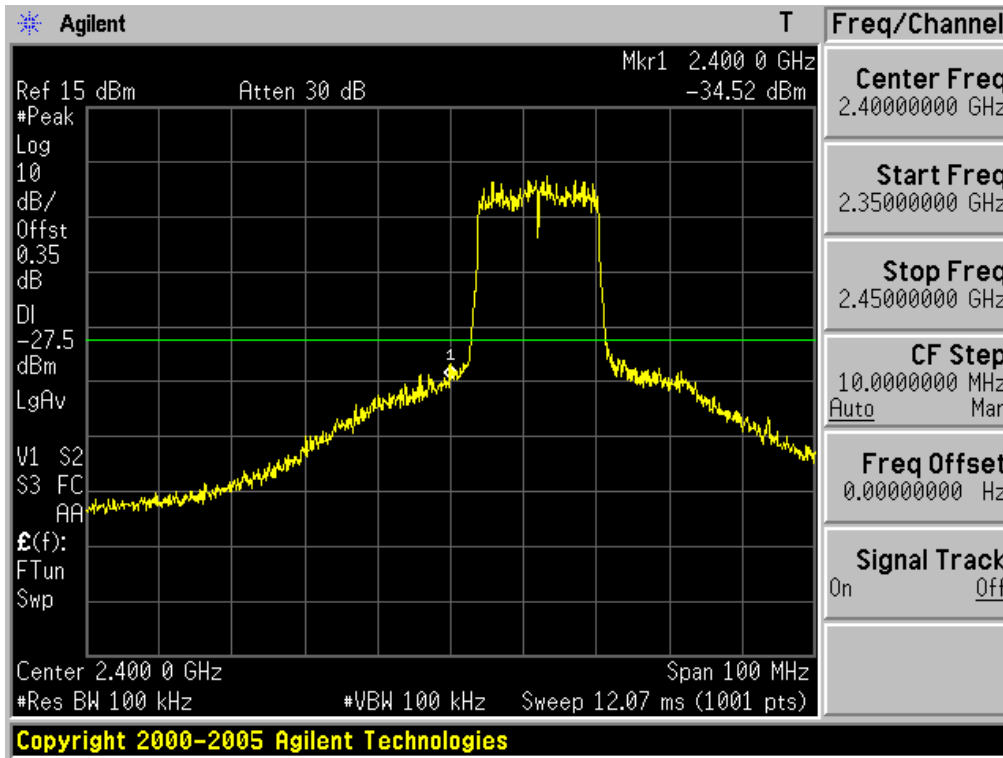
**15GHz ~ 20GHz Conducted Spurious Emissions** Test Mode: 802.11b & Highest Frequency



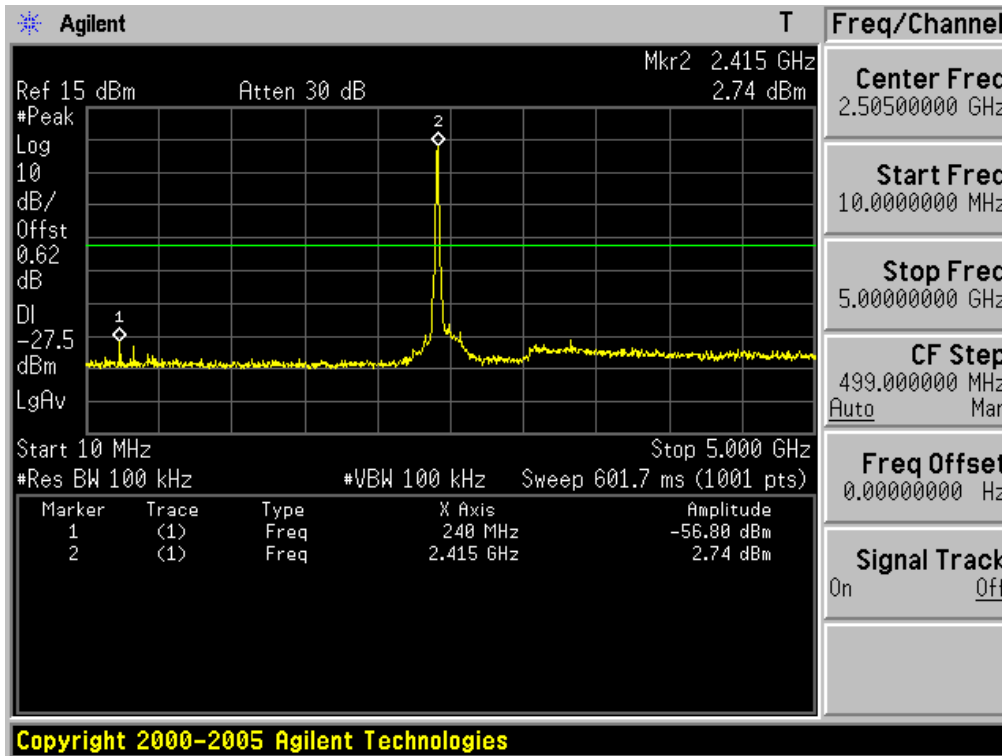
20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11b & Highest Frequency



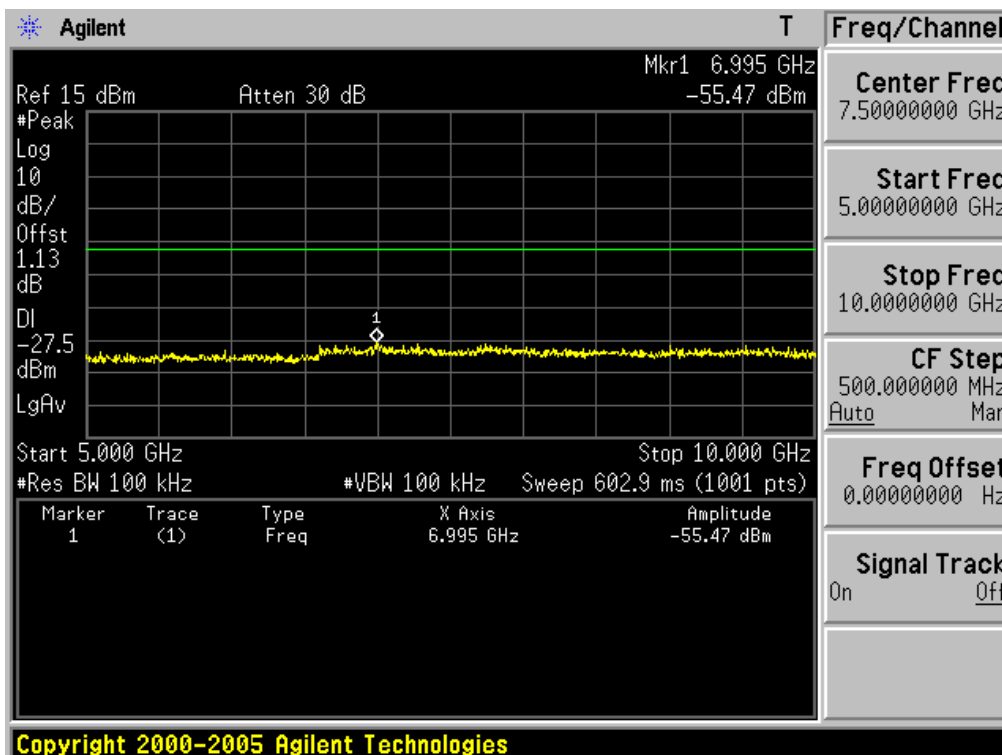
**Low Band-edge at 30 dB blow**      Test Mode: 802.11g



**10MHz ~ 5GHz Conducted Spurious Emissions** Test Mode: 802.11g & Lowest Frequency

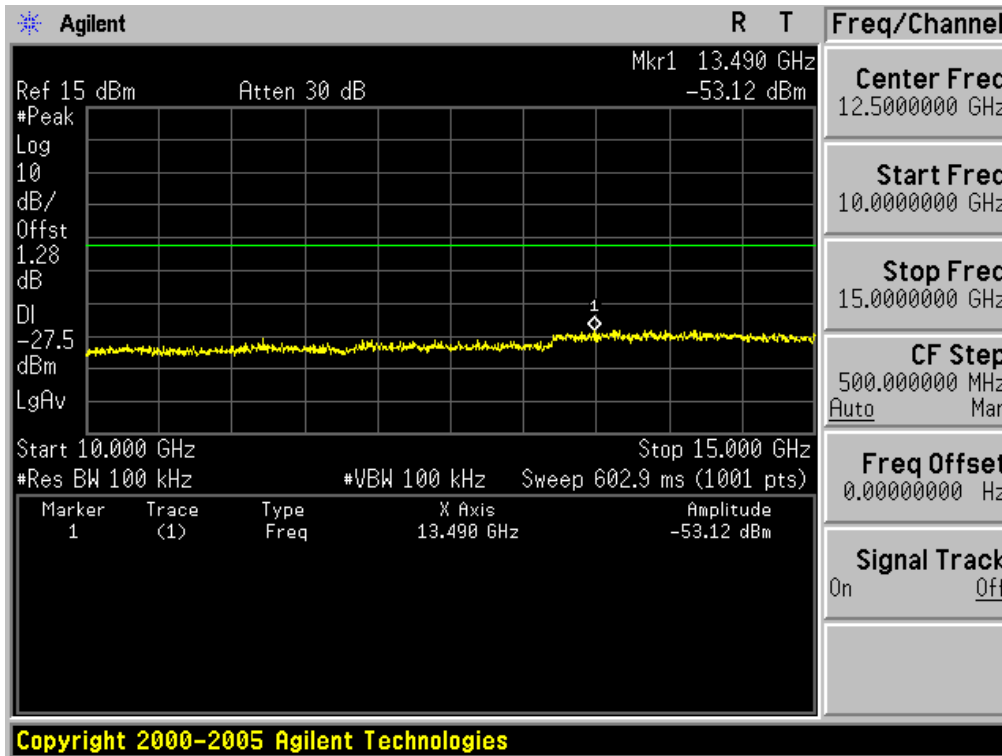


**5GHz ~ 10GHz Conducted Spurious Emissions** Test Mode: 802.11g & Lowest Frequency

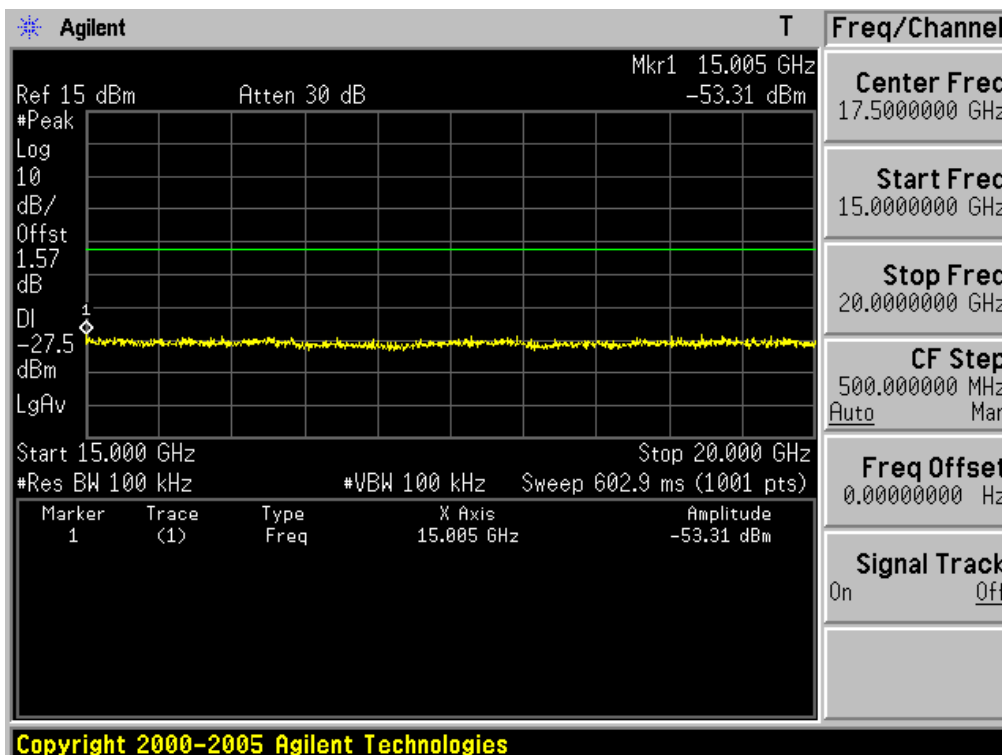




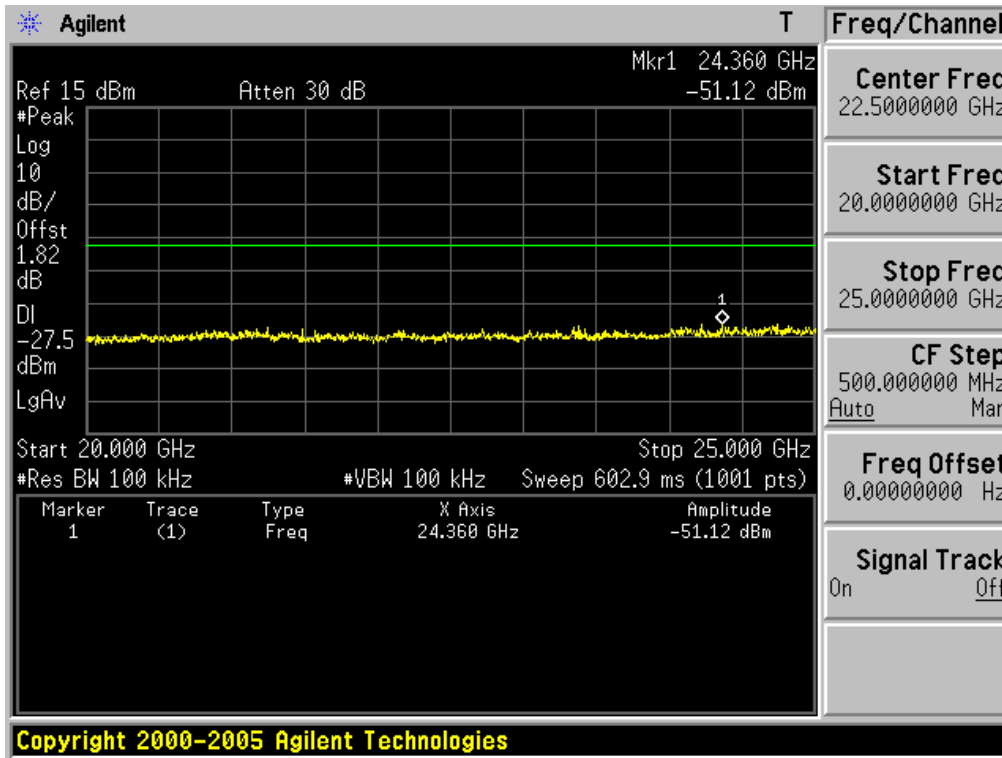
**10GHz ~ 15GHz Conducted Spurious Emissions** Test Mode: 802.11g & Lowest Frequency



**15GHz ~ 20GHz Conducted Spurious Emissions** Test Mode: 802.11g & Lowest Frequency

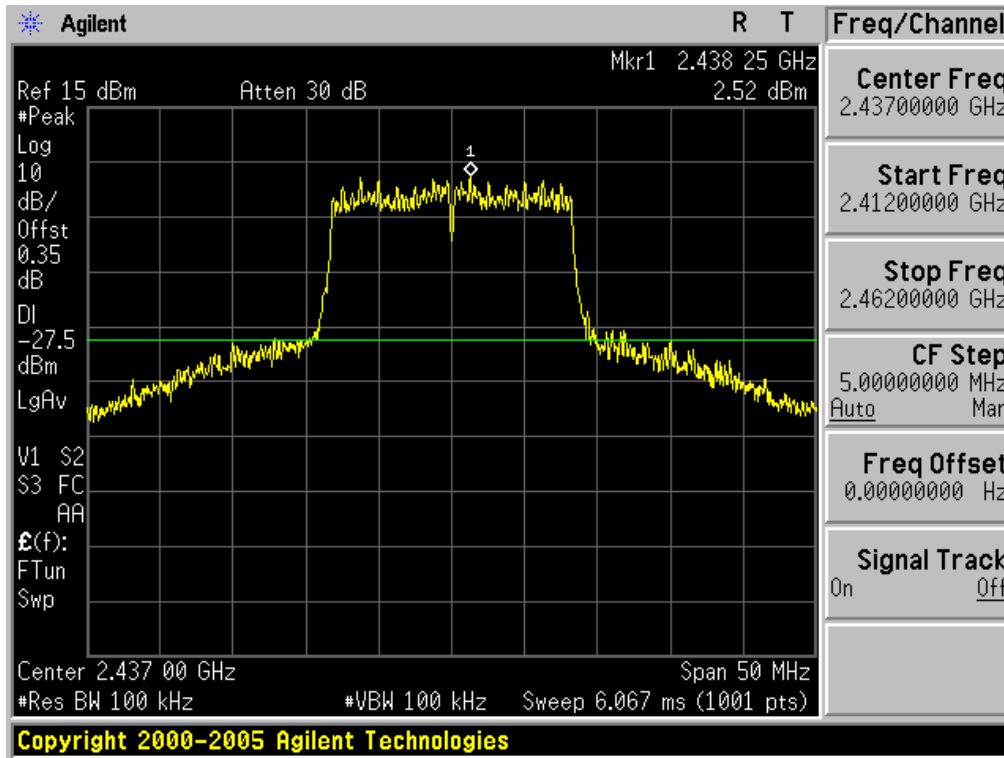


20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11g & Lowest Frequency

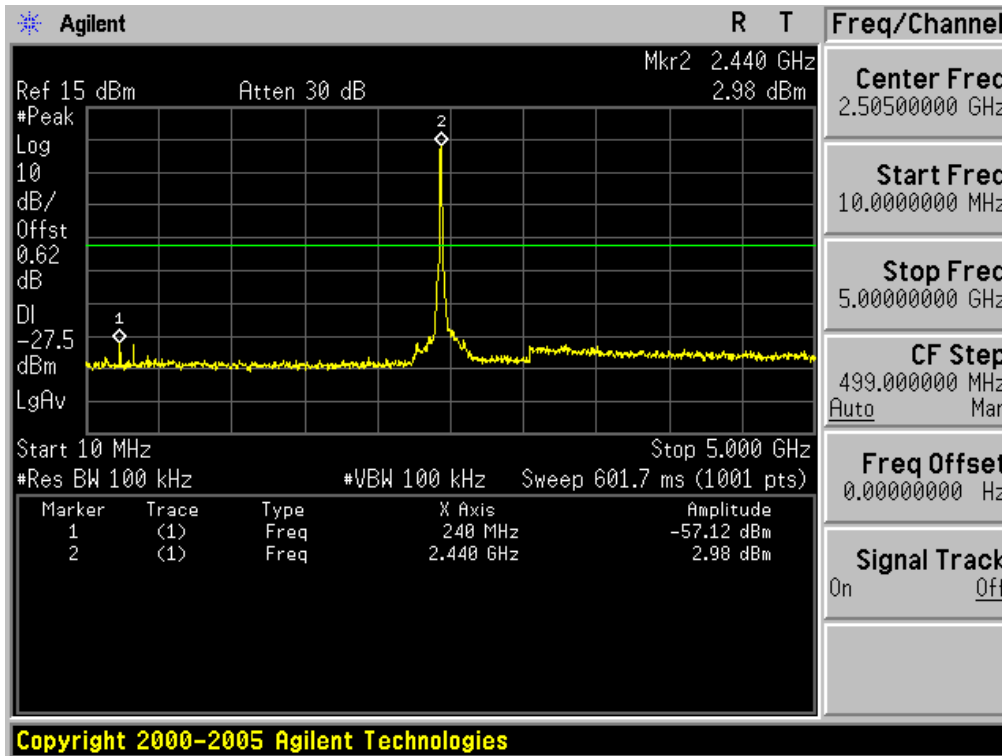


Reference for limit

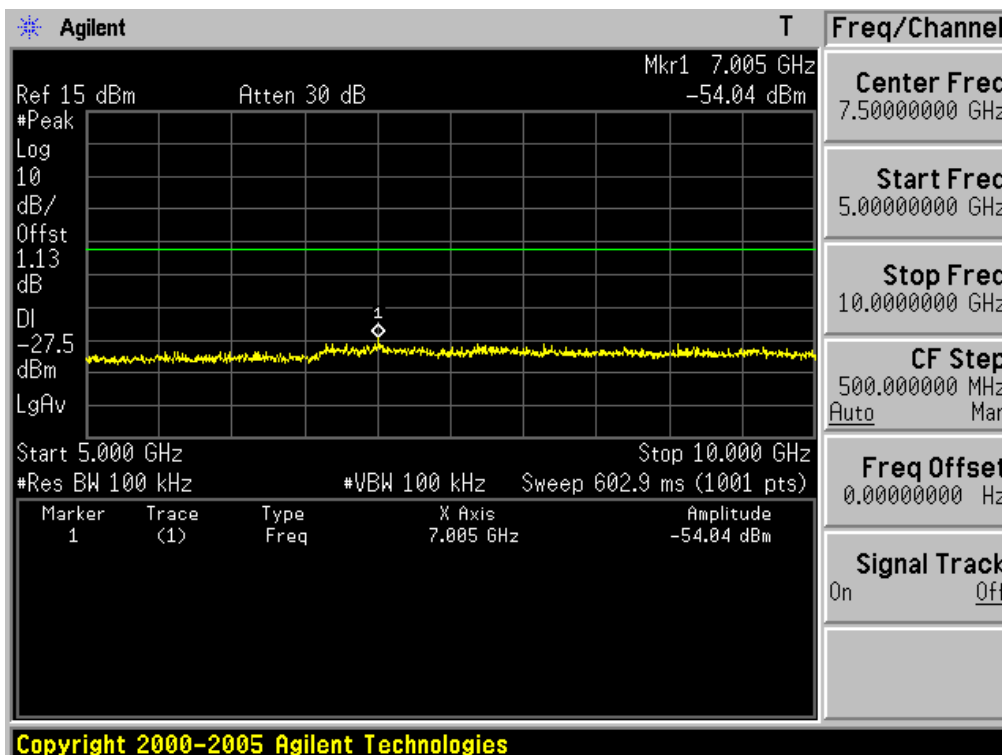
Test Mode: 802.11g & Middle Frequency



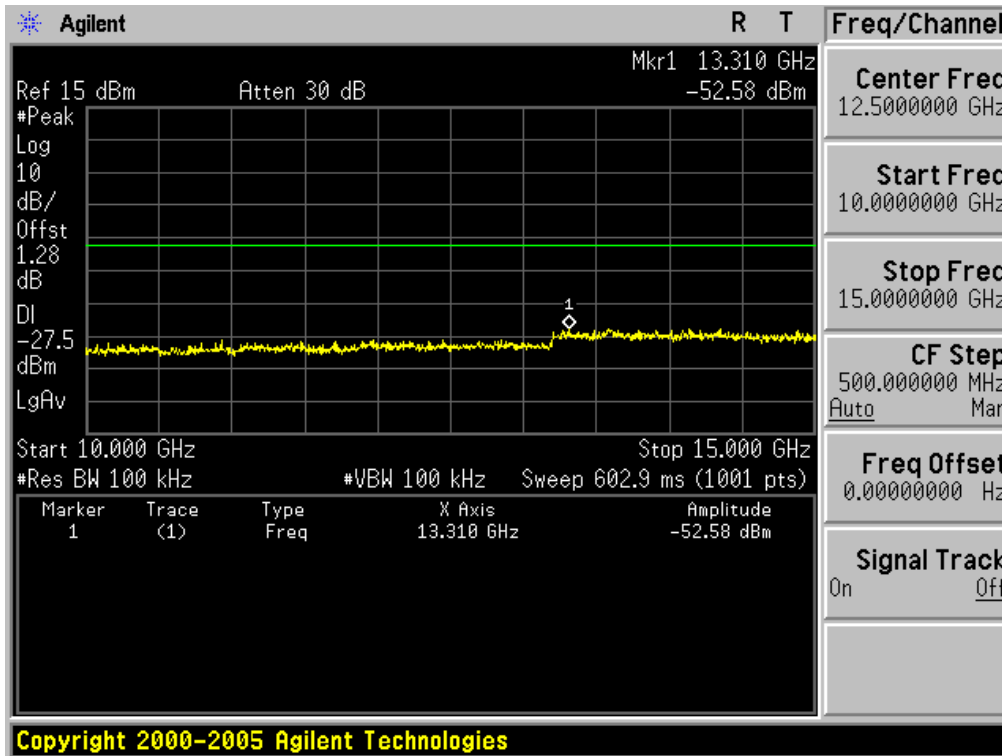
10MHz ~ 5GHz Conducted Spurious Emissions Test Mode: 802.11g & Middle Frequency



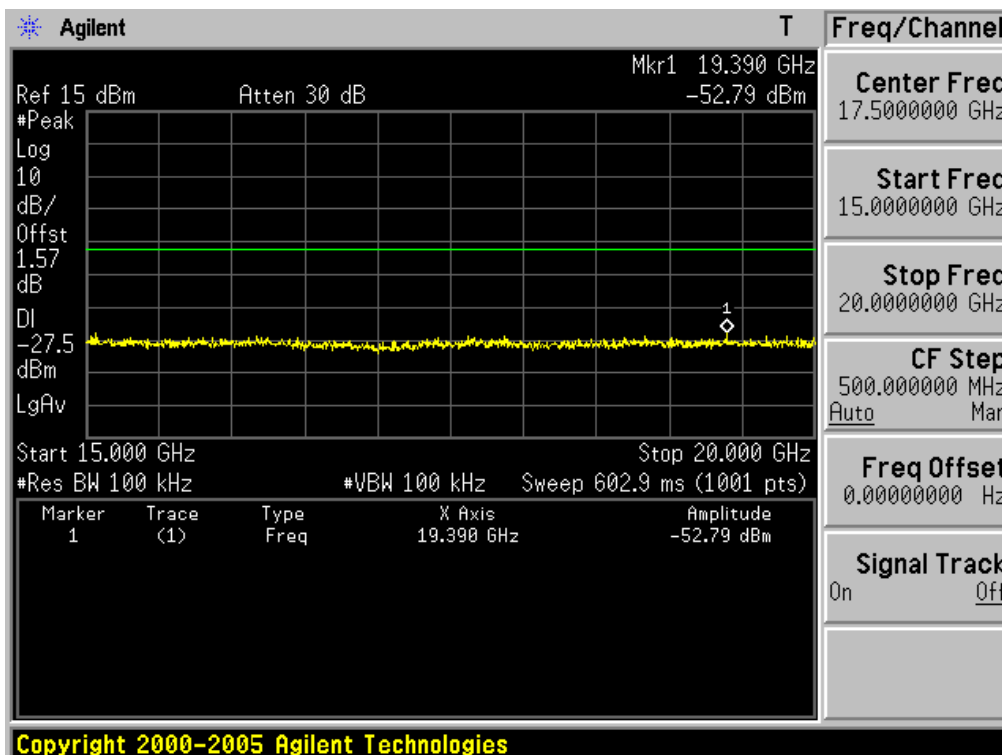
5GHz ~ 10GHz Conducted Spurious Emissions Test Mode: 802.11g & Middle Frequency



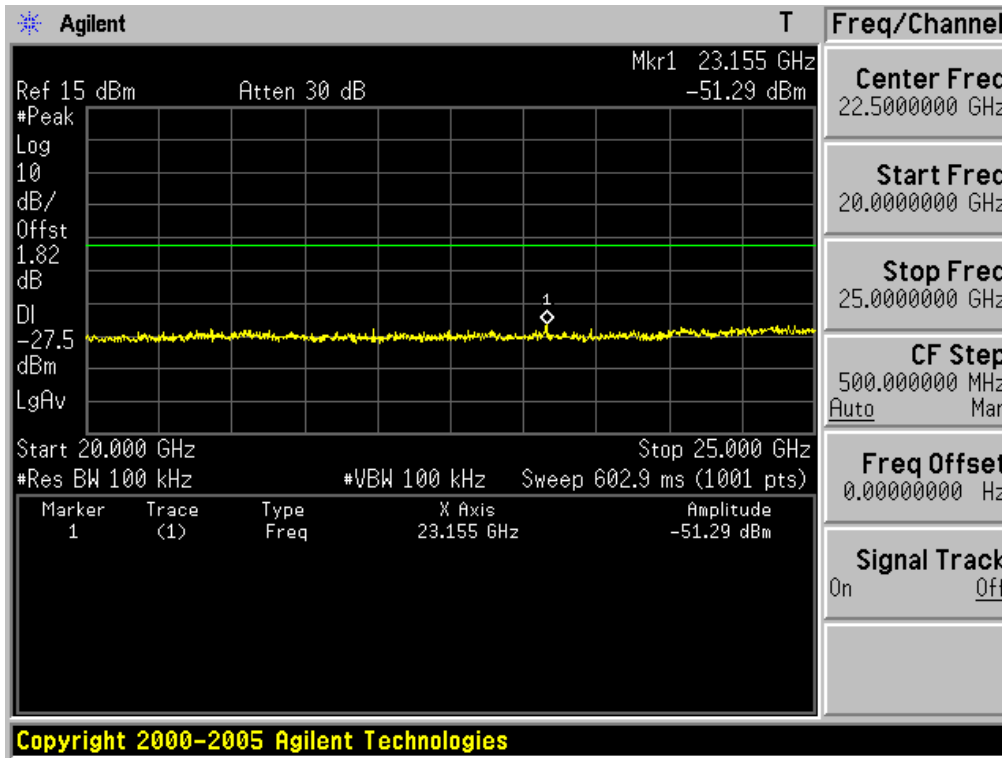
**10GHz ~ 15GHz Conducted Spurious Emissions** Test Mode: 802.11g & Middle Frequency



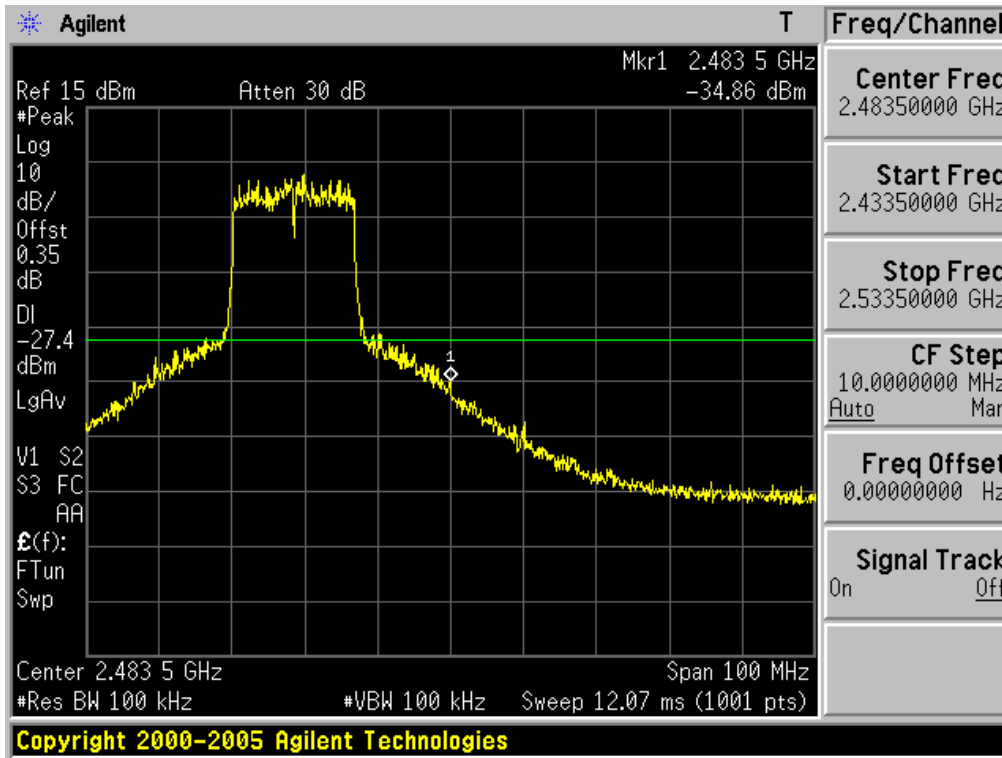
**15GHz ~ 20GHz Conducted Spurious Emissions** Test Mode: 802.11g & Middle Frequency



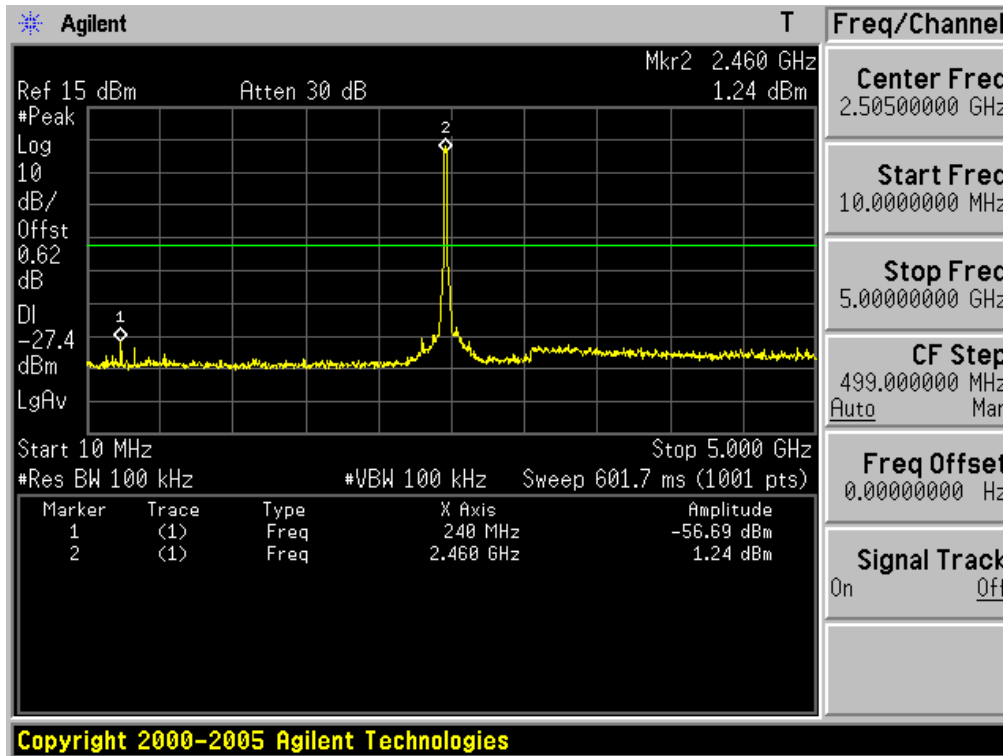
20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11g & Middle Frequency



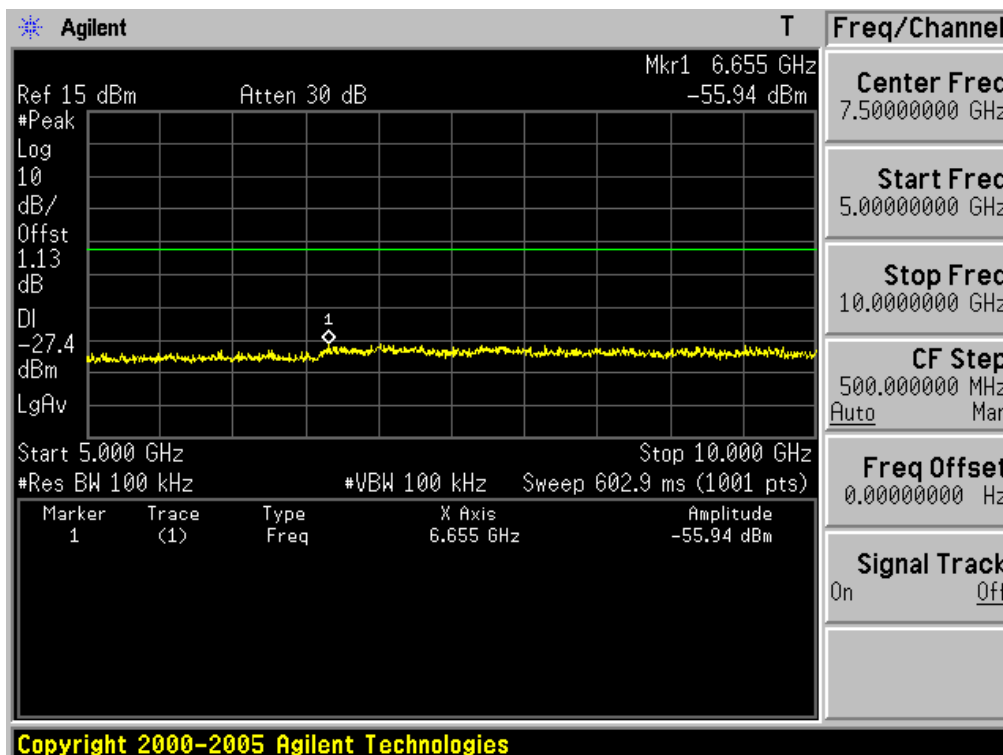
High Band-edge at 30 dB blow Test Mode: 802.11g & Highest Frequency



**10MHz ~ 5GHz Conducted Spurious Emissions** Test Mode: 802.11g & Highest Frequency

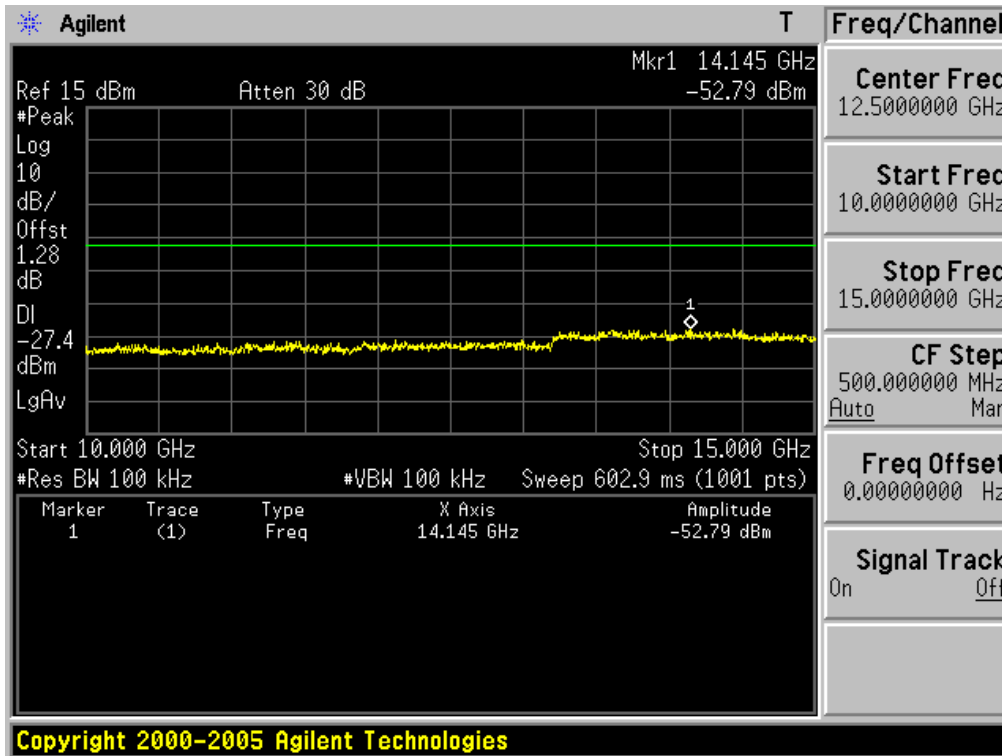


**5GHz ~ 10GHz Conducted Spurious Emissions** Test Mode: 802.11g & Highest Frequency

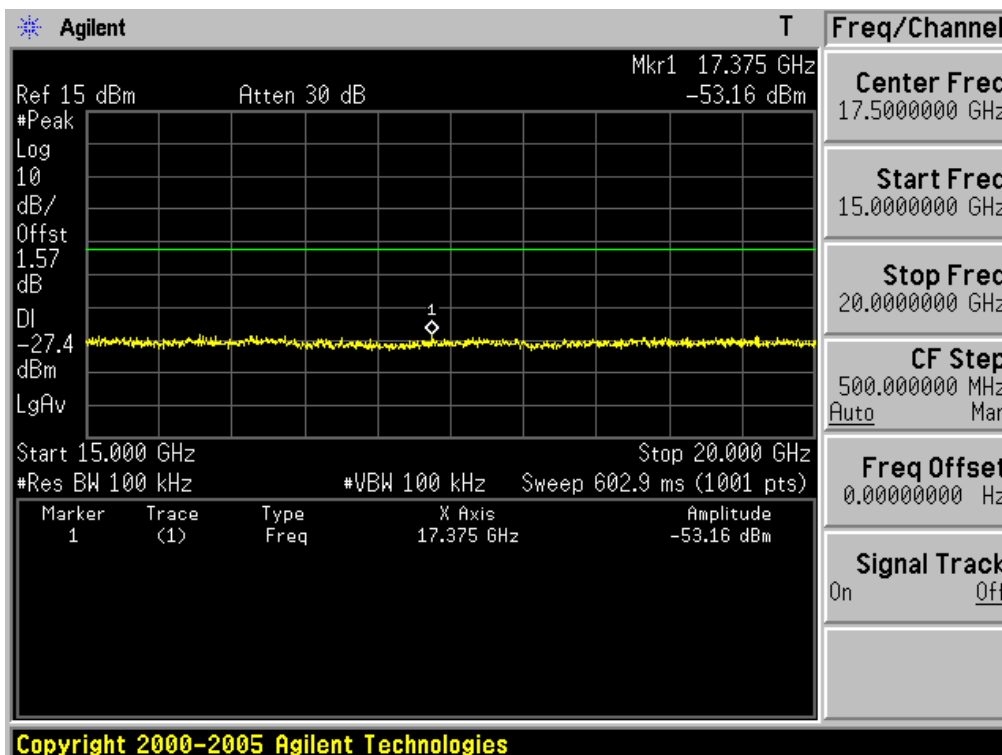




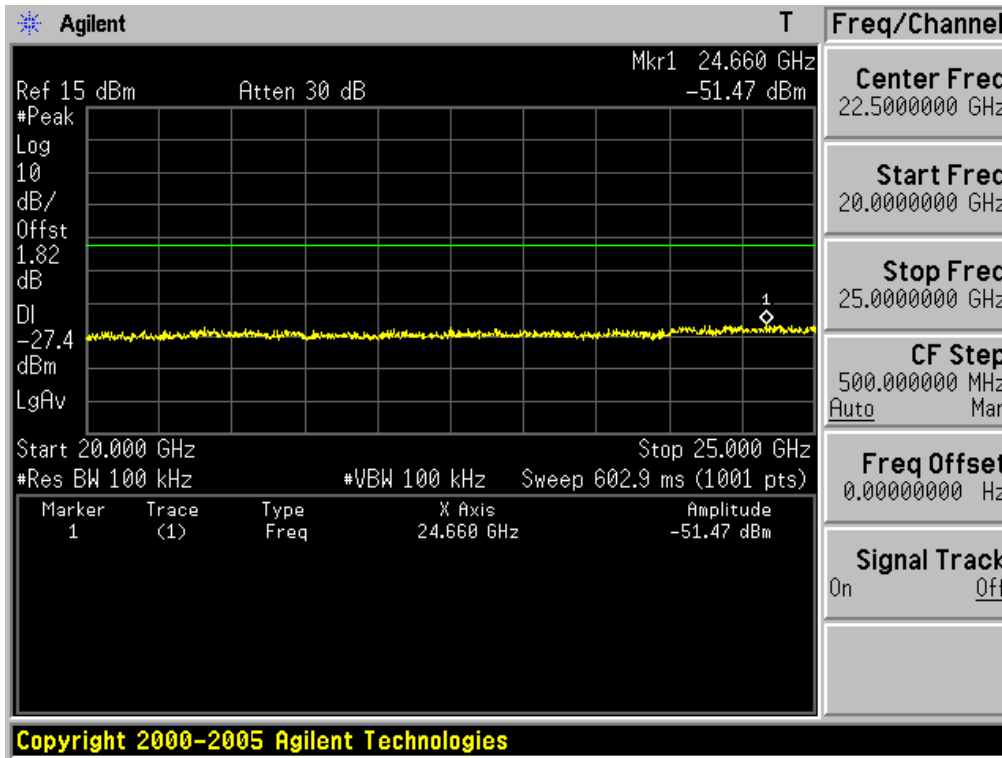
**10GHz ~ 15GHz Conducted Spurious Emissions** Test Mode: 802.11g & Highest Frequency



**15GHz ~ 20GHz Conducted Spurious Emissions** Test Mode: 802.11g & Highest Frequency



20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11g & Highest Frequency



### 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:

Tested frequency = Low, Middle, High Frequencies

Frequency Range = 30 MHz ~ 10th harmonic.

RBW and VBW = 1. Frequency range: 30MHz ~ 1GHz

RBW = 120KHz / VBW =  $\geq$  RBW

2. Frequency range: 1GHz ~ 10<sup>th</sup> harmonics

Peak mode: RBW = 1MHz / VBW =  $\geq$  RBW

Average mode: RBW = 1MHz / VBW = 10Hz

Detector function = Peak

Sweep = auto

Trace = max hold

#### - Measurement Data: **Comply**

Note 1: See next pages for actual measured spectrum plots and data.

#### - Minimum Standard:

##### • FCC Part 15.209(a) and (b)

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.

##### • FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

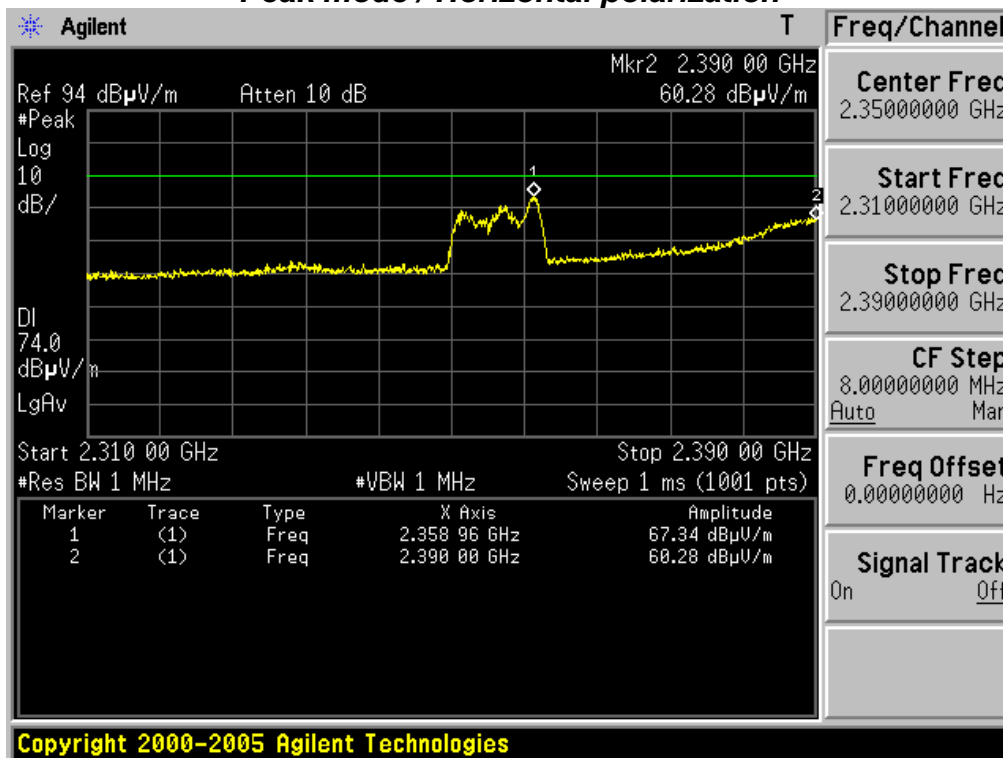
MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	3600 ~ 4400	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	4.5 ~ 5.15	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	156.52475 ~	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	156.52525	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	156.7 ~ 156.9	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900	13.25 ~ 13.4	
8.291 ~ 8.294	16.69525	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	16.80425 ~	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	16.80475	608 ~ 614	3345.8 ~ 3358		
	25.5 ~ 25.67	960 ~ 1240			
	37.5 ~ 38.25				
	73 ~ 74.6				
	74.8 ~ 75.2				

• **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

**Restricted Band Edge**

Test Mode: 802.11b & Lowest Frequency & The worst case EUT position: Y-axis

**Peak mode / Horizontal polarization**

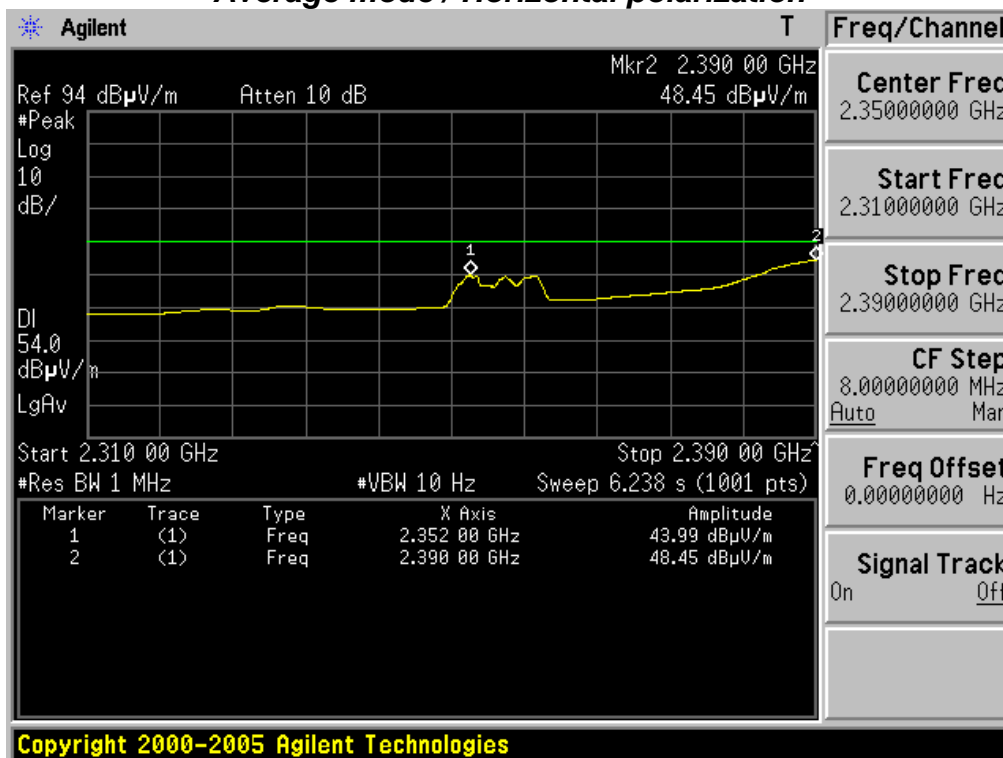


Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

**Restricted Band Edge**

Test Mode: 802.11b & Lowest Frequency & The worst case EUT position: Y-axis

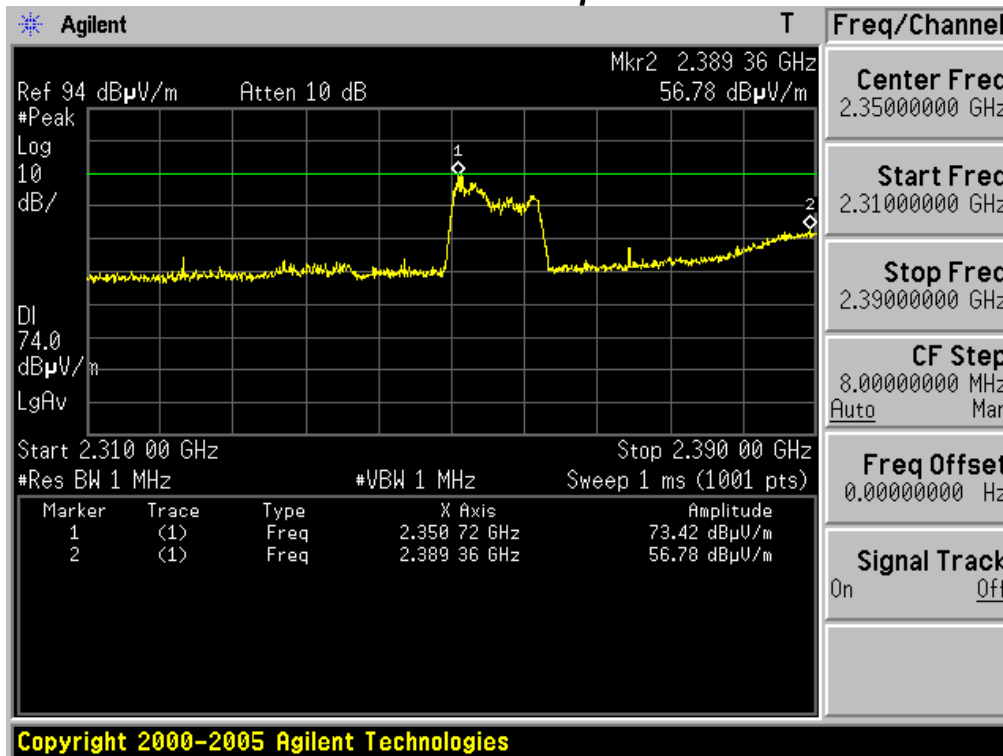
**Average mode / Horizontal polarization**



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

**Restricted Band Edge**    Test Mode: 802.11b & Lowest Frequency & The worst case EUT position: Z-axis

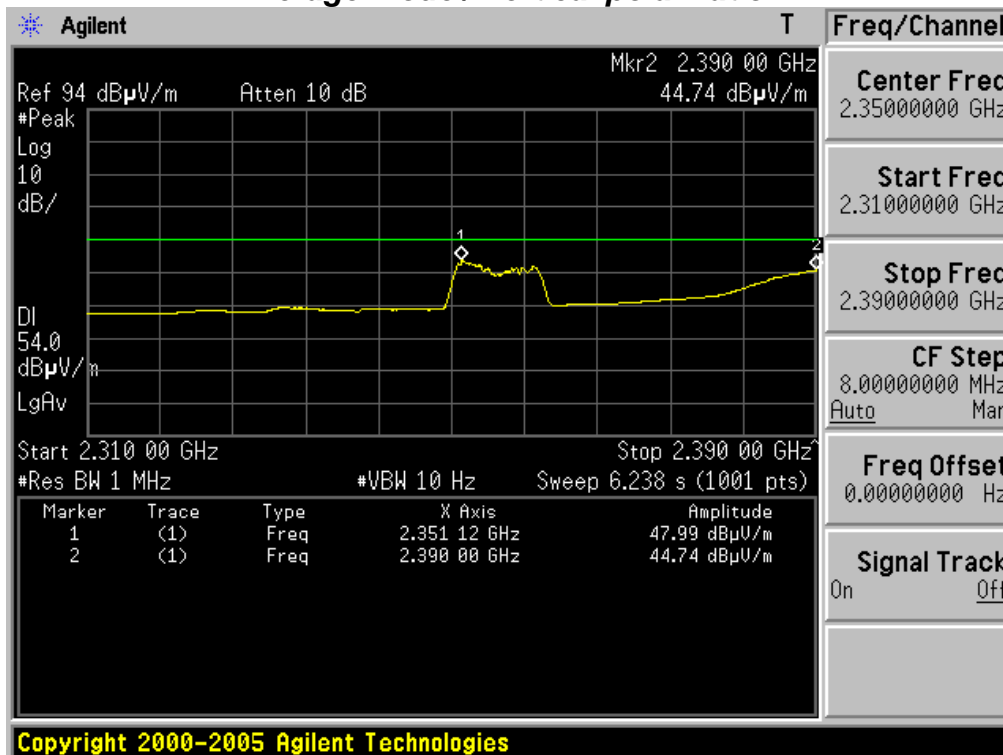
**Peak mode / Vertical polarization**



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

**Restricted Band Edge**    Test Mode: 802.11b & Lowest Frequency & The worst case EUT position: Z-axis

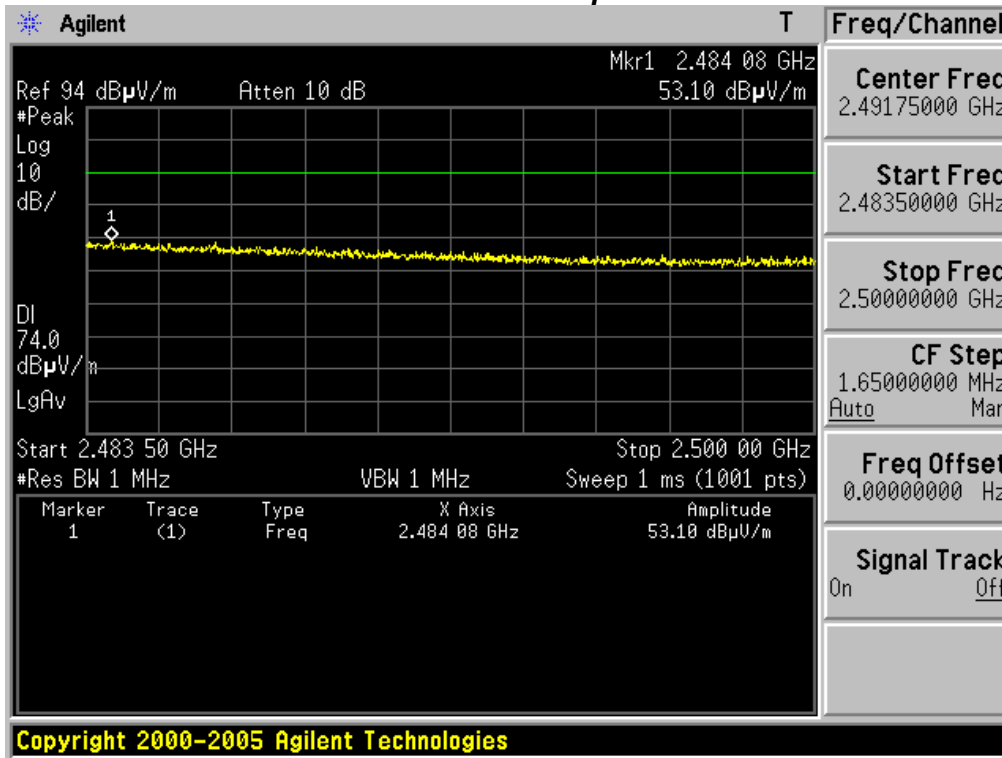
**Average mode / Vertical polarization**



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

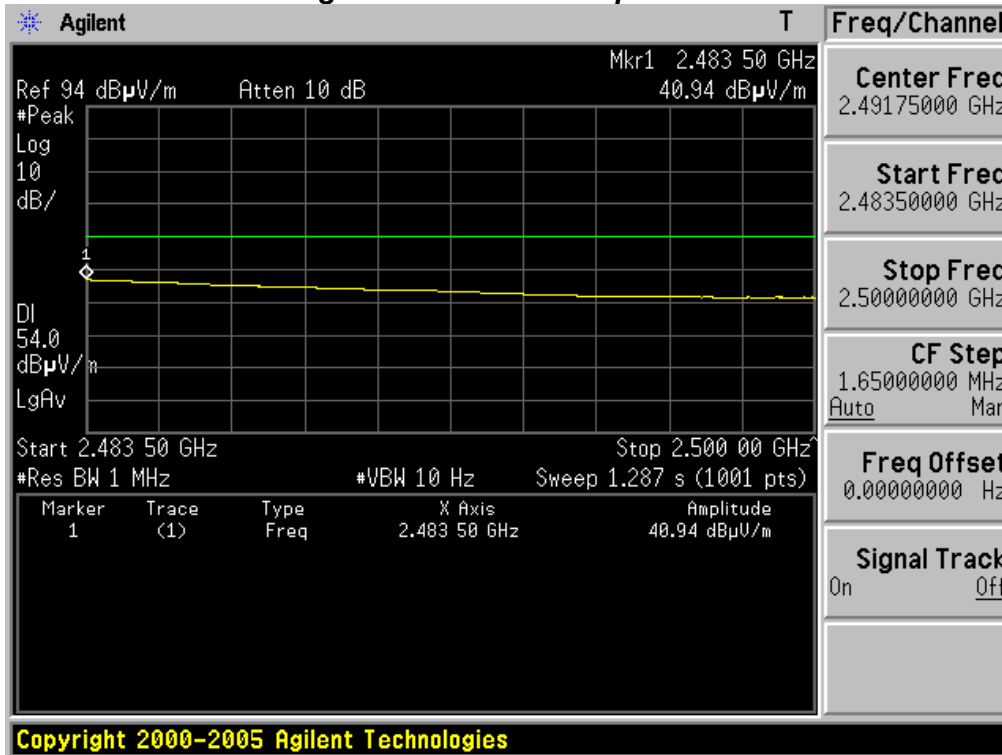
**Restricted Band Edge** Test Mode: 802.11b & Highest Frequency & The worst case EUT position: Z-axis

**Peak mode / Horizontal polarization**



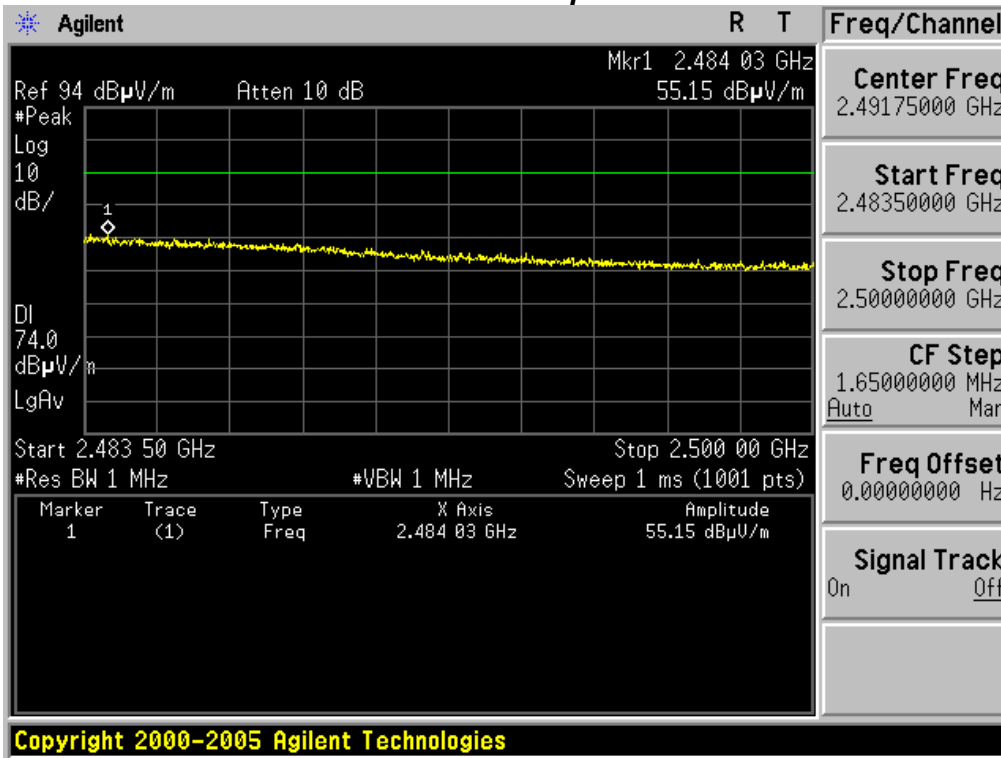
**Restricted Band Edge** Test Mode: 802.11b & Highest Frequency & The worst case EUT position: Z-axis

**Average mode / Horizontal polarization**



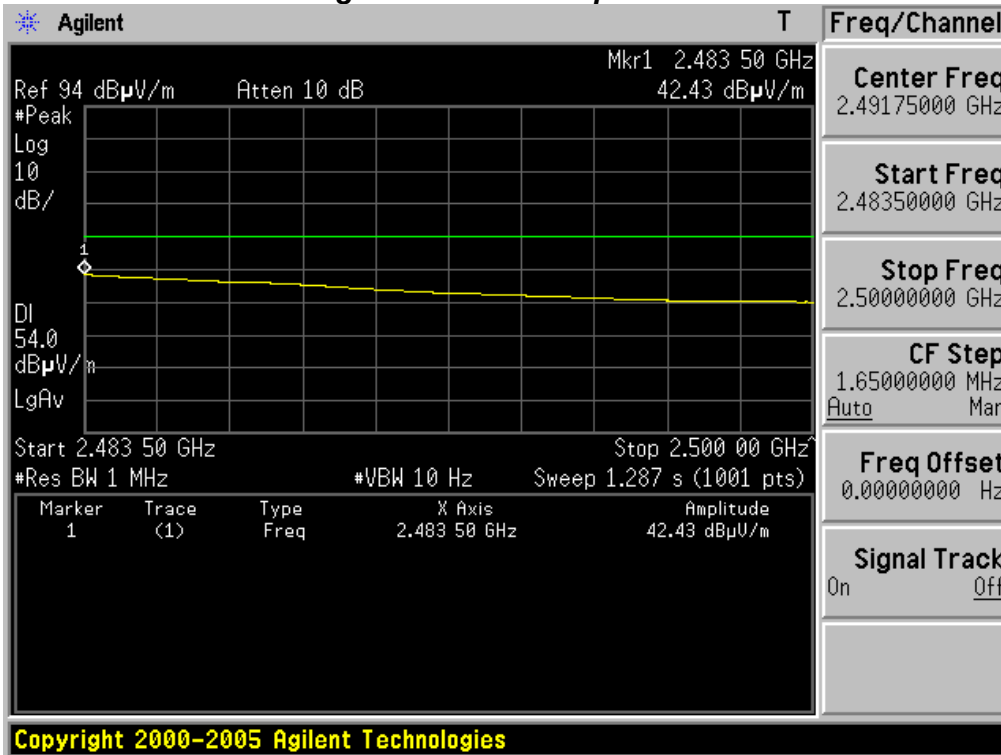
**Restricted Band Edge** Test Mode: 802.11b & Highest Frequency & The worst case EUT position: Z-axis

*Peak mode / Vertical polarization*



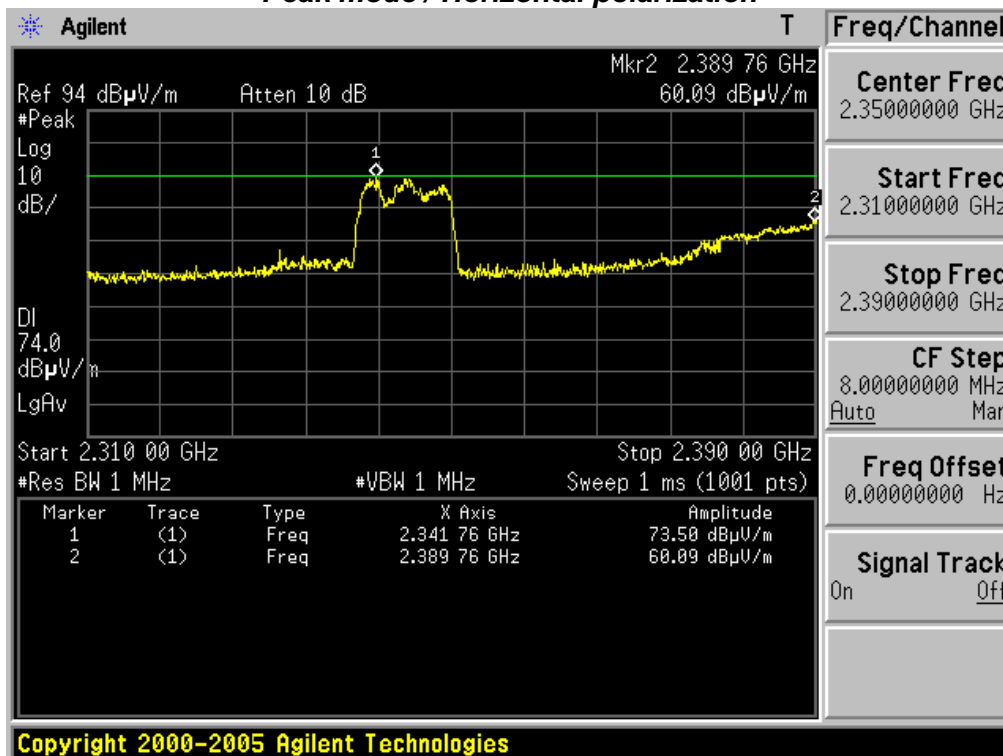
**Restricted Band Edge** Test Mode: 802.11b & Highest Frequency & The worst case EUT position: Z-axis

*Average mode / Vertical polarization*



**Restricted Band Edge** Test Mode: 802.11g & Lowest Frequency & The worst case EUT position: Z-axis

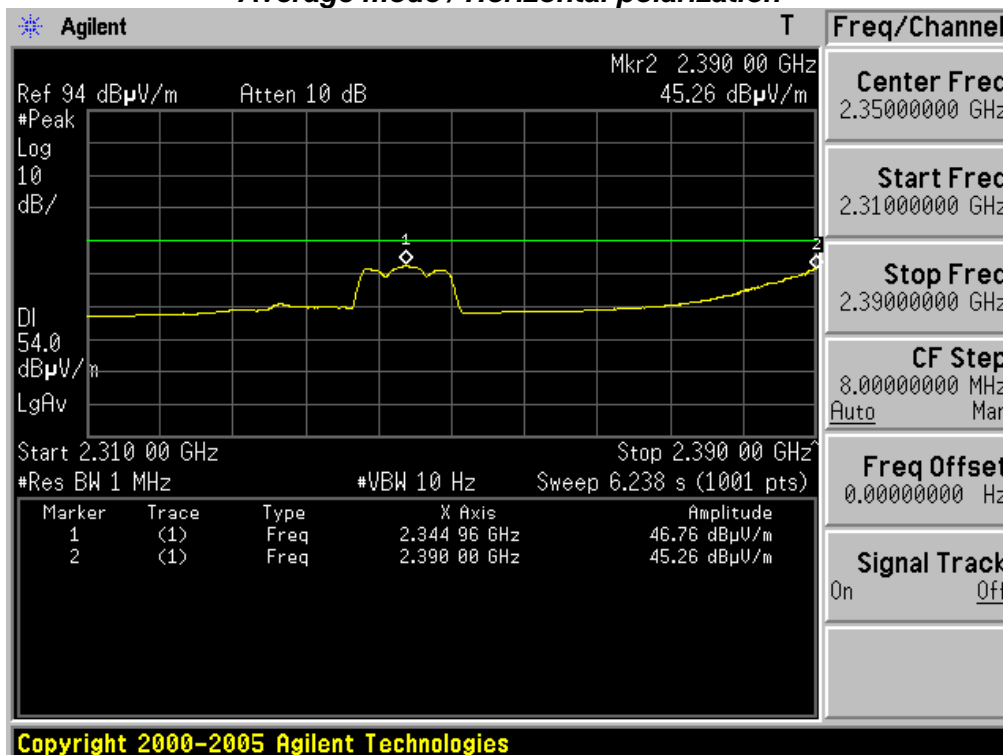
**Peak mode / Horizontal polarization**



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

**Restricted Band Edge** Test Mode: 802.11g & Lowest Frequency & The worst case EUT position: Z-axis

**Average mode / Horizontal polarization**

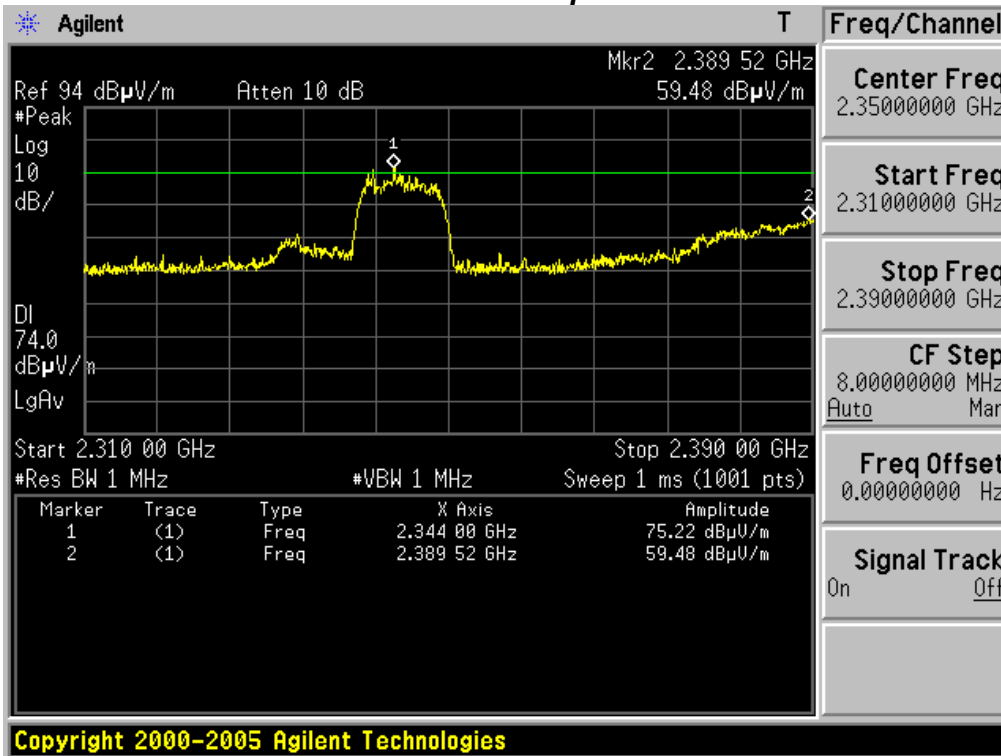


Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.



**Restricted Band Edge** Test Mode: 802.11g & Lowest Frequency & The worst case EUT position: Z-axis

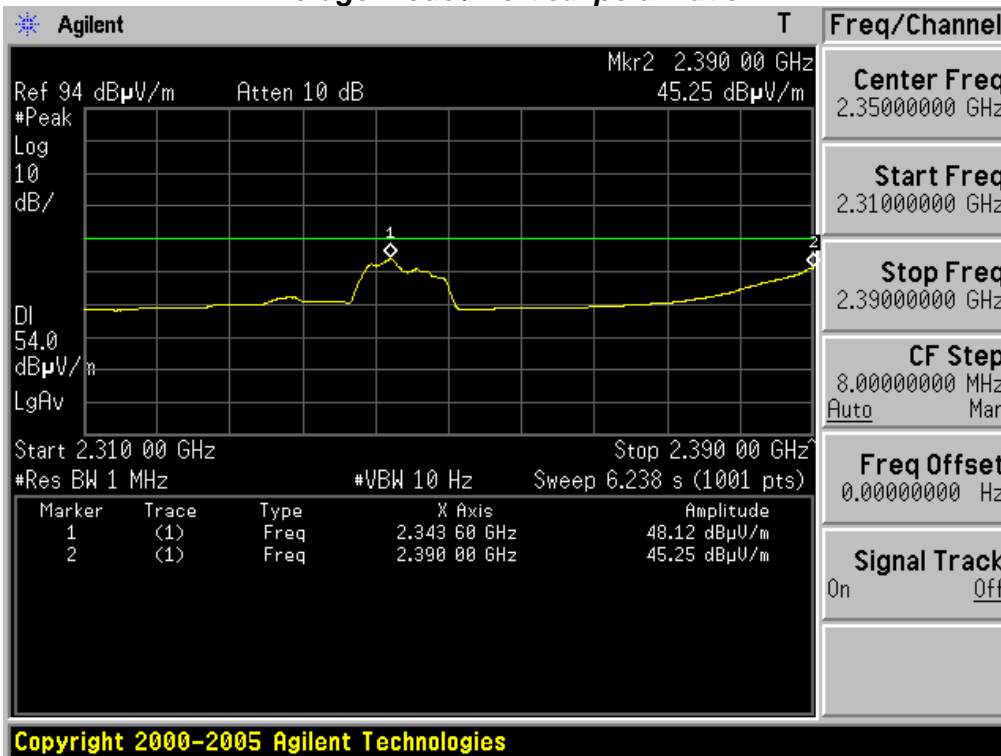
**Peak mode / Vertical polarization**



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

**Restricted Band Edge** Test Mode: 802.11g & Lowest Frequency & The worst case EUT position: Z-axis

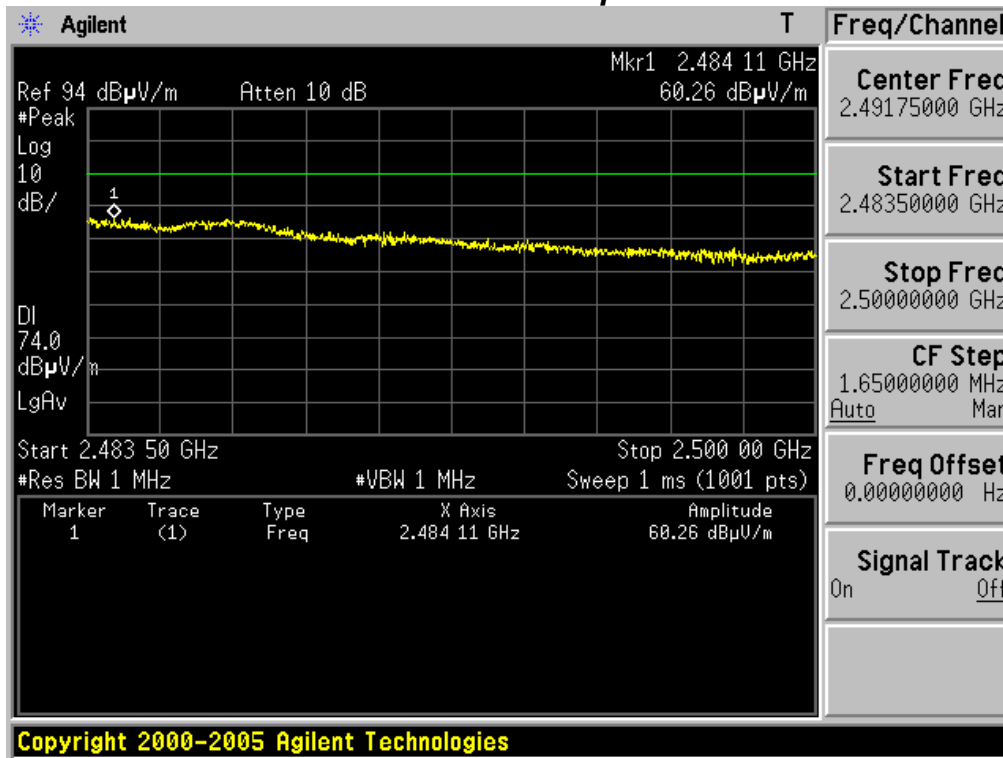
**Average mode / Vertical polarization**



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

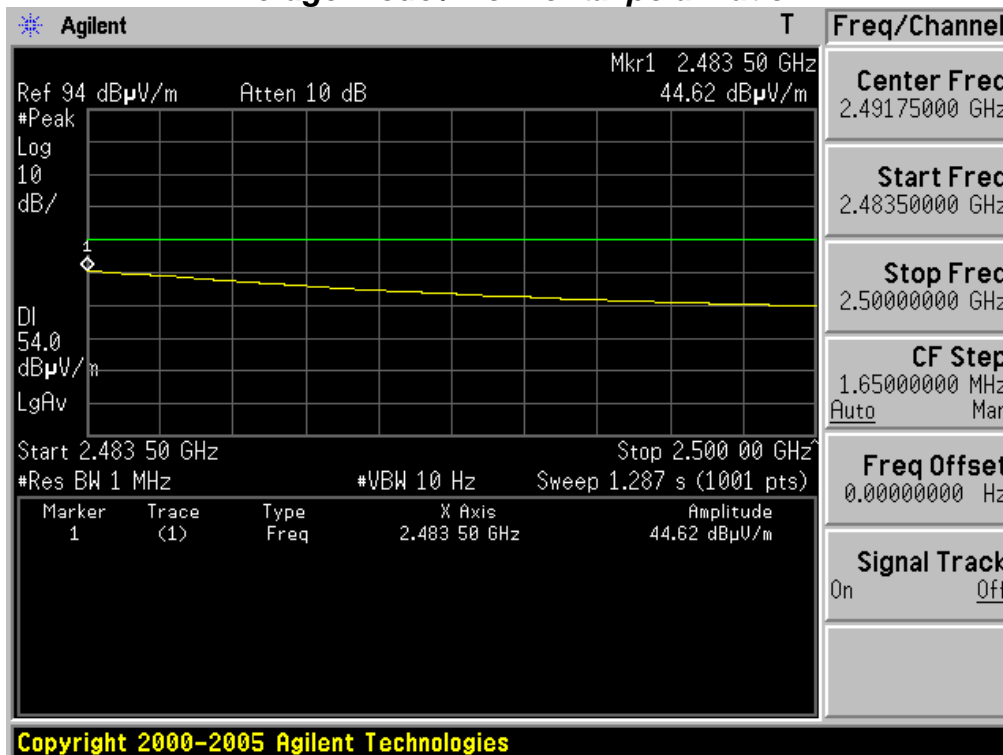
**Restricted Band Edge** Test Mode: 802.11g & Highest Frequency & The worst case EUT position: Z-axis

**Peak mode / Horizontal polarization**



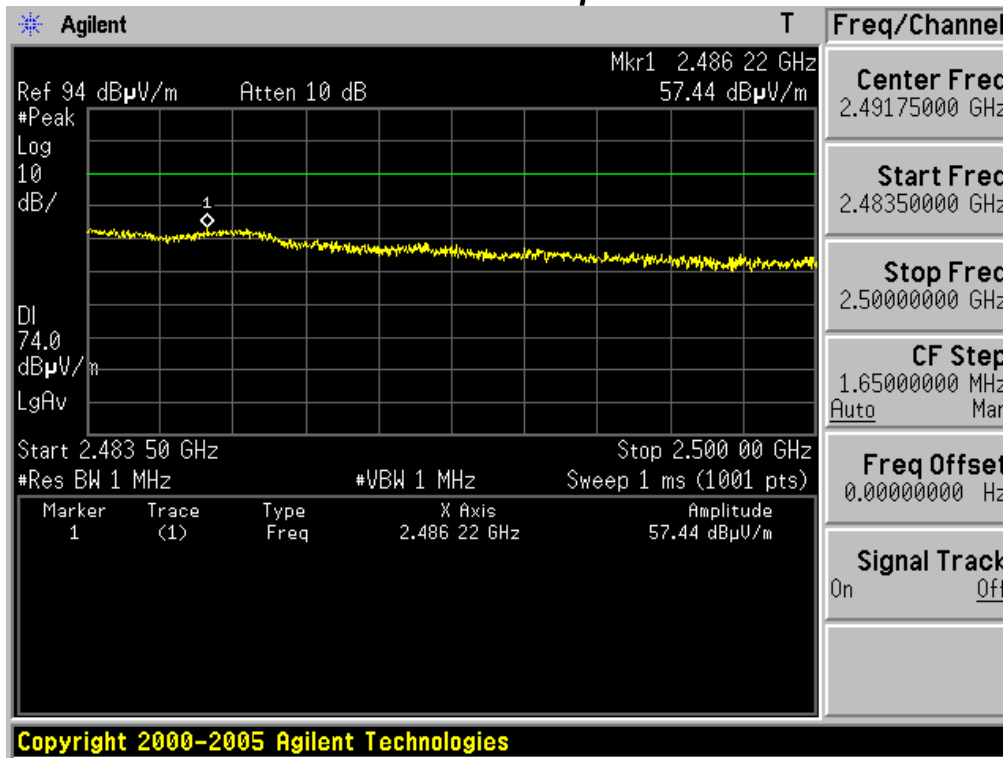
**Restricted Band Edge** Test Mode: 802.11g & Highest Frequency & The worst case EUT position: Z-axis

**Average mode / Horizontal polarization**



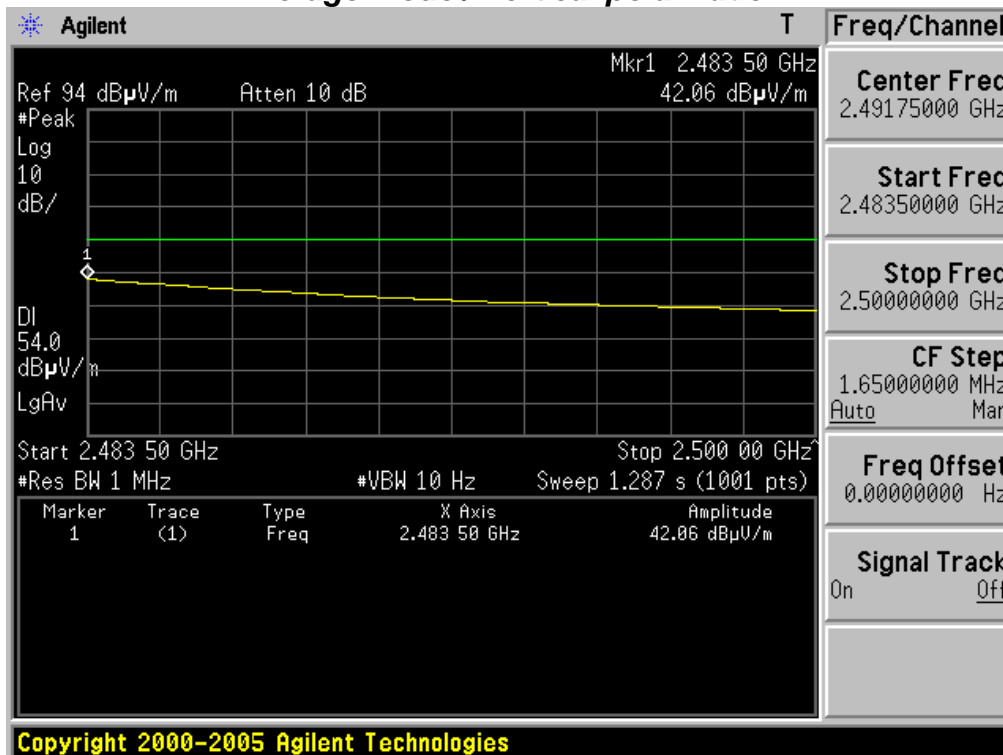
**Restricted Band Edge** Test Mode: 802.11g & Highest Frequency & The worst case EUT position: Z-axis

**Peak mode / Vertical polarization**



**Restricted Band Edge** Test Mode: 802.11g & Highest Frequency & The worst case EUT position: Z-axis

**Average mode / Vertical polarization**



**30MHz ~ 1GHz Radiated Spurious Emissions & 802.11b****▪ Lowest Channel**

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
431.970	V	Z axis	45.10	-5.23	39.87	46.00	6.13
-	-	-	-	-	-	-	-

**▪ Middle Channel**

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
431.977	H	X axis	45.10	-5.23	39.87	46.00	6.13
-	-	-	-	-	-	-	-

**▪ Highest Channel**

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
432.977	H	Z axis	48.09	-5.20	42.89	46.00	3.11
-	-	-	-	-	-	-	-

**Note.**

1. No other spurious and harmonic emissions were detected at a level greater than 10dB below limit.
2. Above listed point data is the worst case data.
3. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

**30MHz ~ 1GHz Radiated Spurious Emissions & 802.11g**▪ **Lowest Channel**

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
431.970	V	Y axis	43.50	-5.23	38.27	46.00	7.73
-	-	-	-	-	-	-	-

▪ **Middle Channel**

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
431.971	H	Z axis	47.70	-5.23	42.47	46.00	3.53
-	-	-	-	-	-	-	-

▪ **Highest Channel**

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
431.970	H	Z axis	47.70	-5.23	42.47	46.00	3.53
-	-	-	-	-	-	-	-

**Note.**

1. No other spurious and harmonic emissions were detected at a level greater than 10dB below limit.
2. Above listed point data is the worst case data.
3. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

## 1GHz ~ 25GHz Radiated Spurious Emissions

### ▪ 802.11b & Lowest Frequency

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
4824.000	H	Y axis	46.88	35.11	5.28	52.16	40.39	74.00	54.00	21.84	13.61
4824.000	V	Y axis	47.27	35.21	5.28	52.55	40.49	74.00	54.00	21.45	13.51
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

### ▪ 802.11b & Middle Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
4876.214	H	Z axis	43.53	31.02	5.27	48.80	36.29	74.00	54.00	25.20	17.71
4868.550	V	Y axis	43.68	31.13	5.27	48.95	36.40	74.00	54.00	25.05	17.60
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

### ▪ 802.11b & Highest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
4919.500	H	Z axis	43.70	31.57	5.64	49.34	37.21	74.00	54.00	24.66	16.79
4921.000	V	X axis	44.43	31.36	5.64	50.07	37.00	74.00	54.00	23.93	17.00
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

#### Note.

- No other spurious and harmonic emissions were detected greater than listed emissions above table.
- Sample Calculation.  

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$
 Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

## 1GHz ~ 25GHz Radiated Spurious Emissions

### ▪ 802.11g & Lowest Frequency

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
4817.950	H	X axis	44.96	31.70	5.28	50.24	36.98	74.00	54.00	23.76	17.02
4826.800	V	Y axis	44.69	31.86	5.28	49.97	37.14	74.00	54.00	24.03	16.86
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

### ▪ 802.11g & Middle Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
4868.780	H	Y axis	44.28	31.13	5.27	49.55	36.40	74.00	54.00	24.45	17.60
4879.360	V	Z axis	44.21	31.03	5.27	49.48	36.30	74.00	54.00	24.52	17.70
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

### ▪ 802.11g & Highest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
4927.100	H	X axis	43.75	31.10	5.64	49.39	36.74	74.00	54.00	24.61	17.26
4929.850	V	X axis	43.69	31.51	5.64	49.33	37.15	74.00	54.00	24.67	16.85
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

#### Note.

- No other spurious and harmonic emissions were detected greater than listed emissions above table.
- Sample Calculation.  

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$
 Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

### 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.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest Frequencies

Span = approximately 5 times of the 20 dB bandwidth

RBW = greater than the 20dB bandwidth of the emission being measured

VBW =  $\geq$  RBW

Trace = max hold

Detector function = peak

Sweep = auto

#### - Measurement Data: **Comply**

Test Mode	Frequency	Test Results (dBm)
802.11b	Lowest	-13.082
	Middle	-11.688
	Highest	-13.011
802.11g	Lowest	-13.137
	Middle	-14.424
	Highest	-14.175

Note 1: See next pages for actual measured spectrum plots.

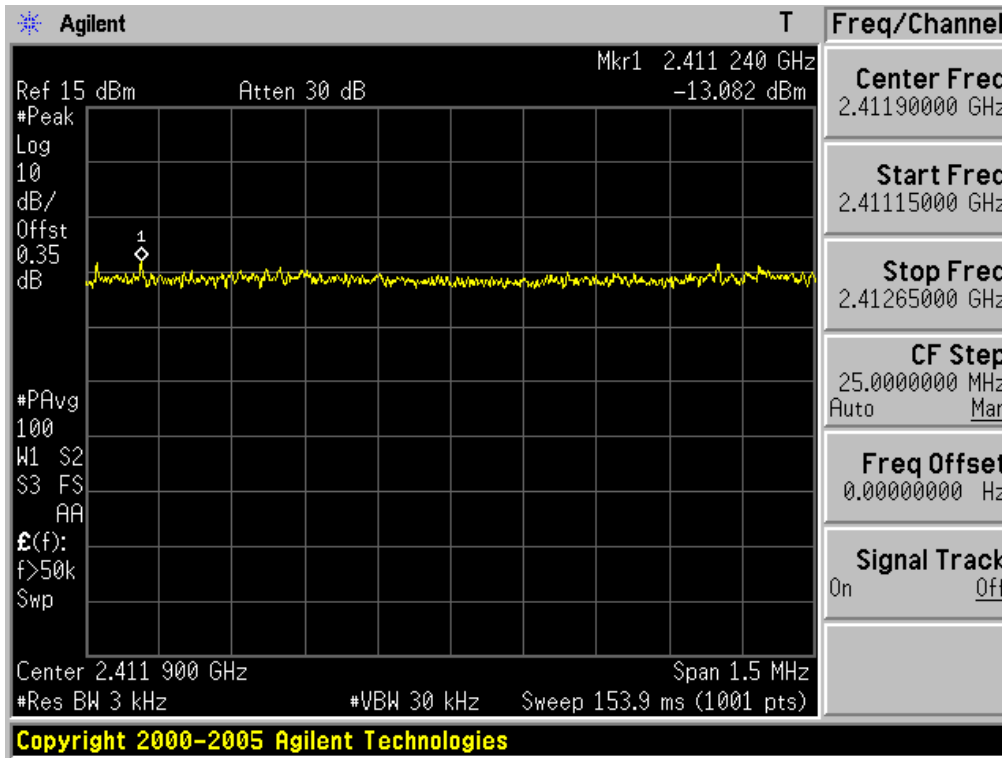
#### - Minimum Standard:

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



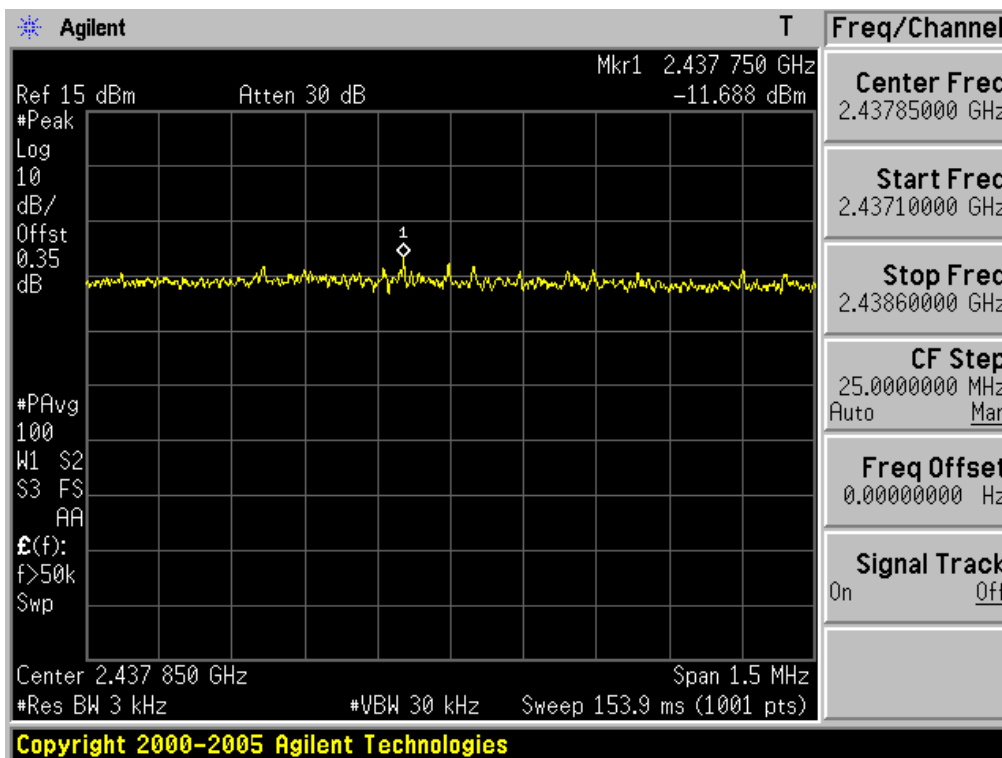
**Transmitter Power Spectral Density**

Test Mode: 802.11b & Lowest Frequency



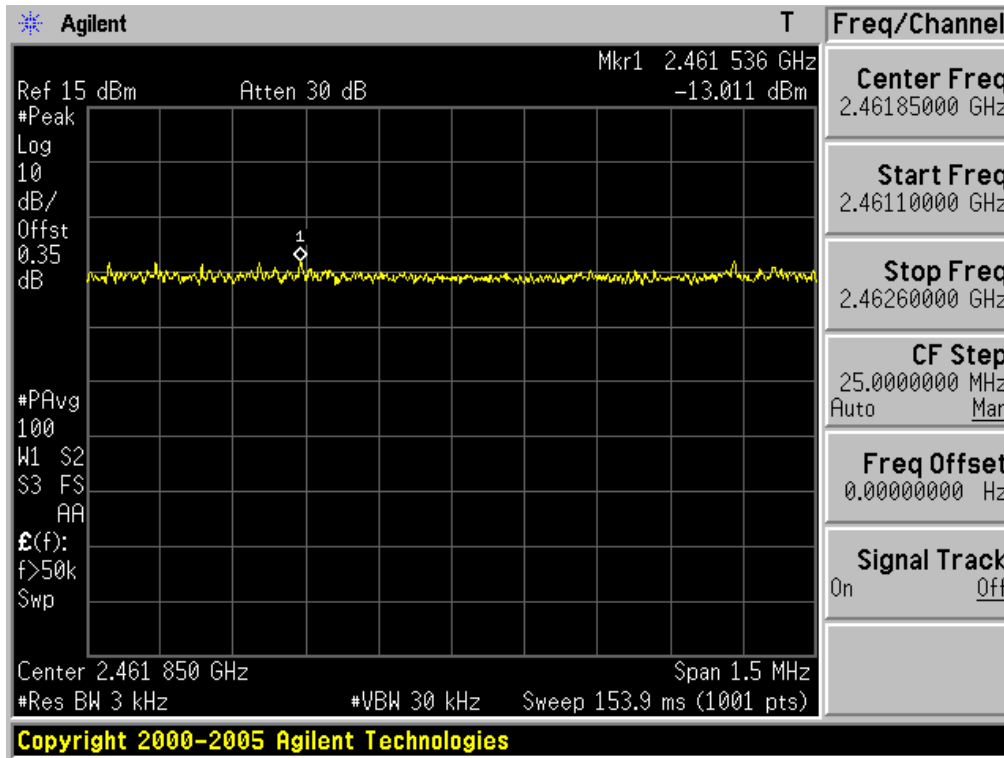
**Transmitter Power Spectral Density**

Test Mode: 802.11b & Middle Frequency



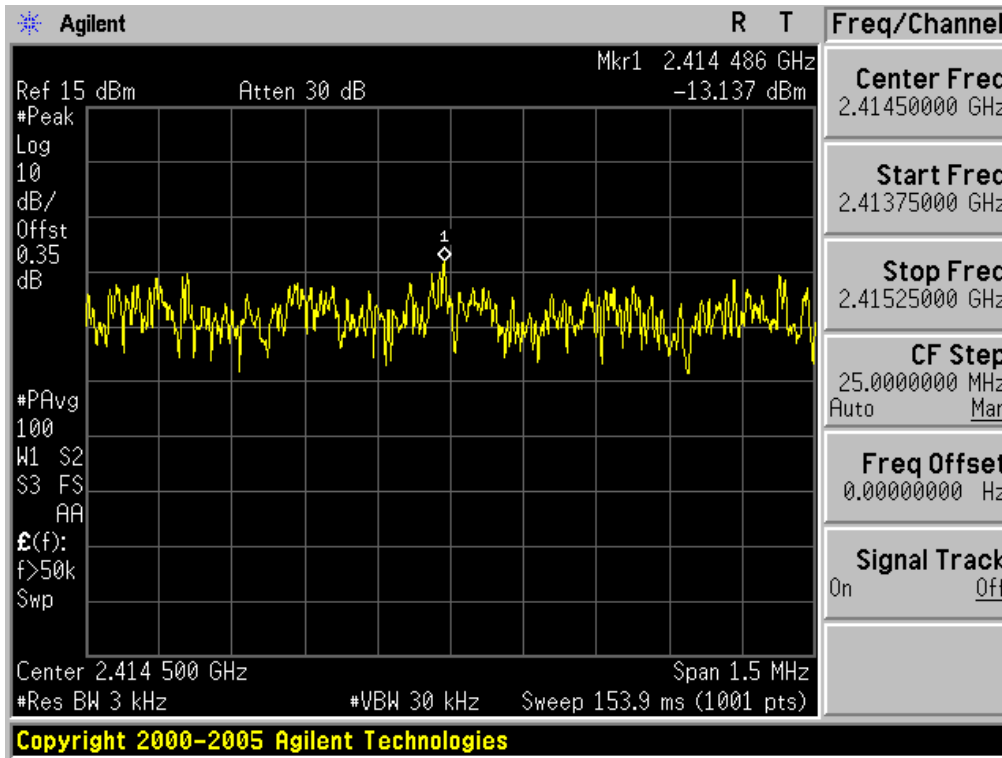
**Transmitter Power Spectral Density**

Test Mode: 802.11b & Highest Frequency



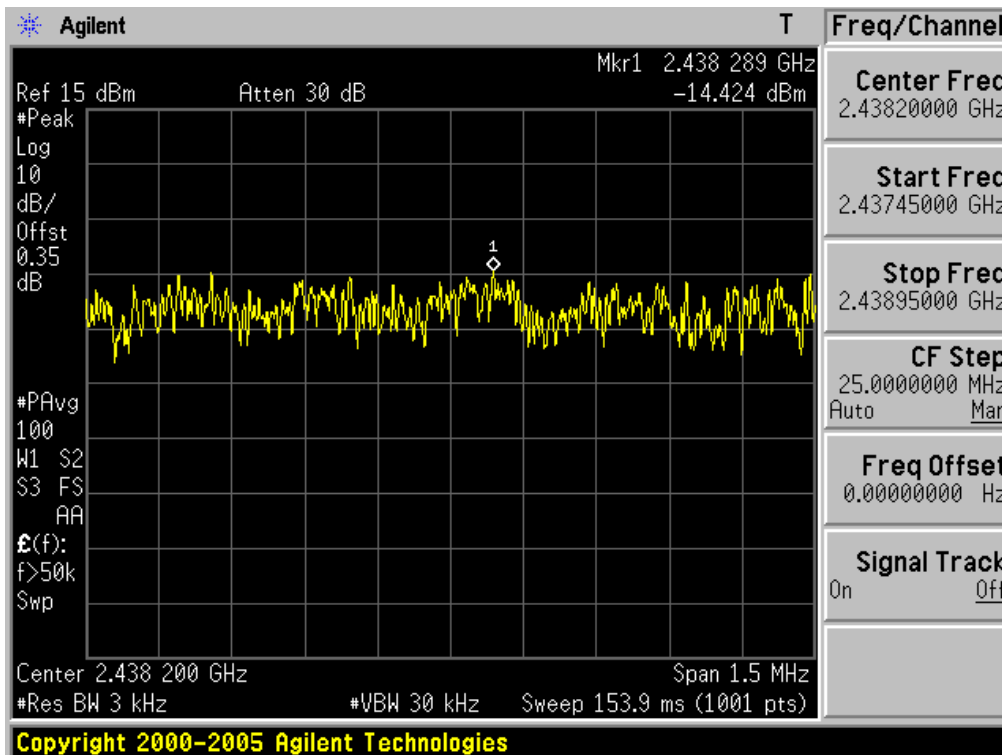
**Transmitter Power Spectral Density**

Test Mode: 802.11g & Lowest Frequency



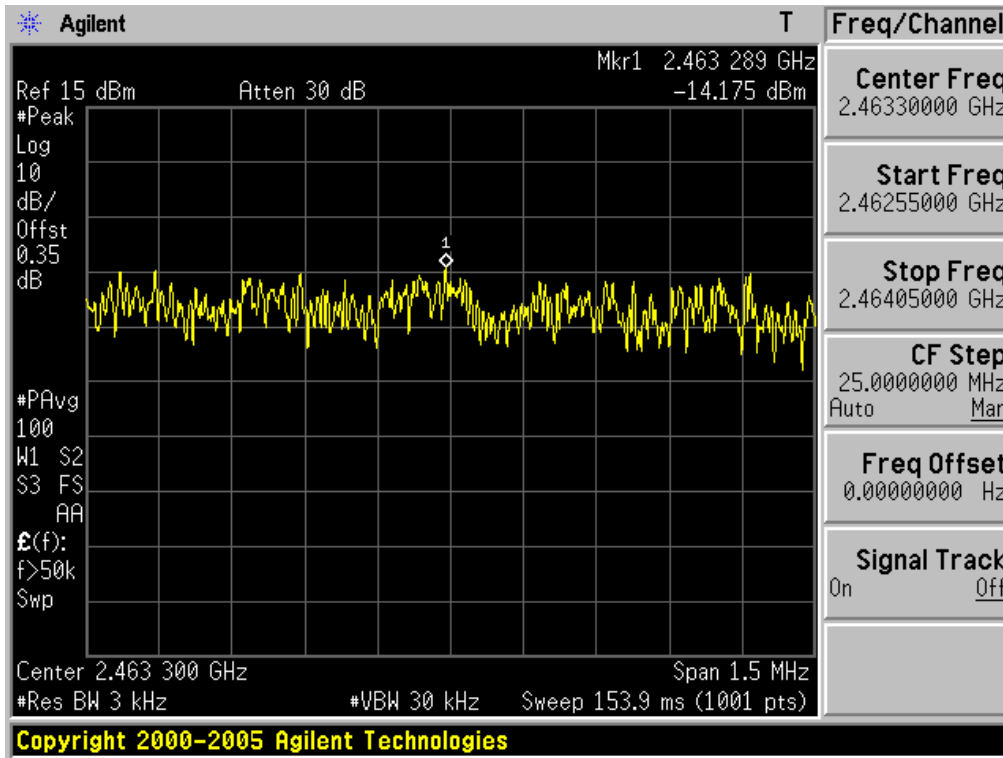
**Transmitter Power Spectral Density**

Test Mode: 802.11g & Middle Frequency



### Transmitter Power Spectral Density

Test Mode: 802.11g & Highest Frequency



### 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**

Note 1: See next pages for actual measured spectrum plots and data.

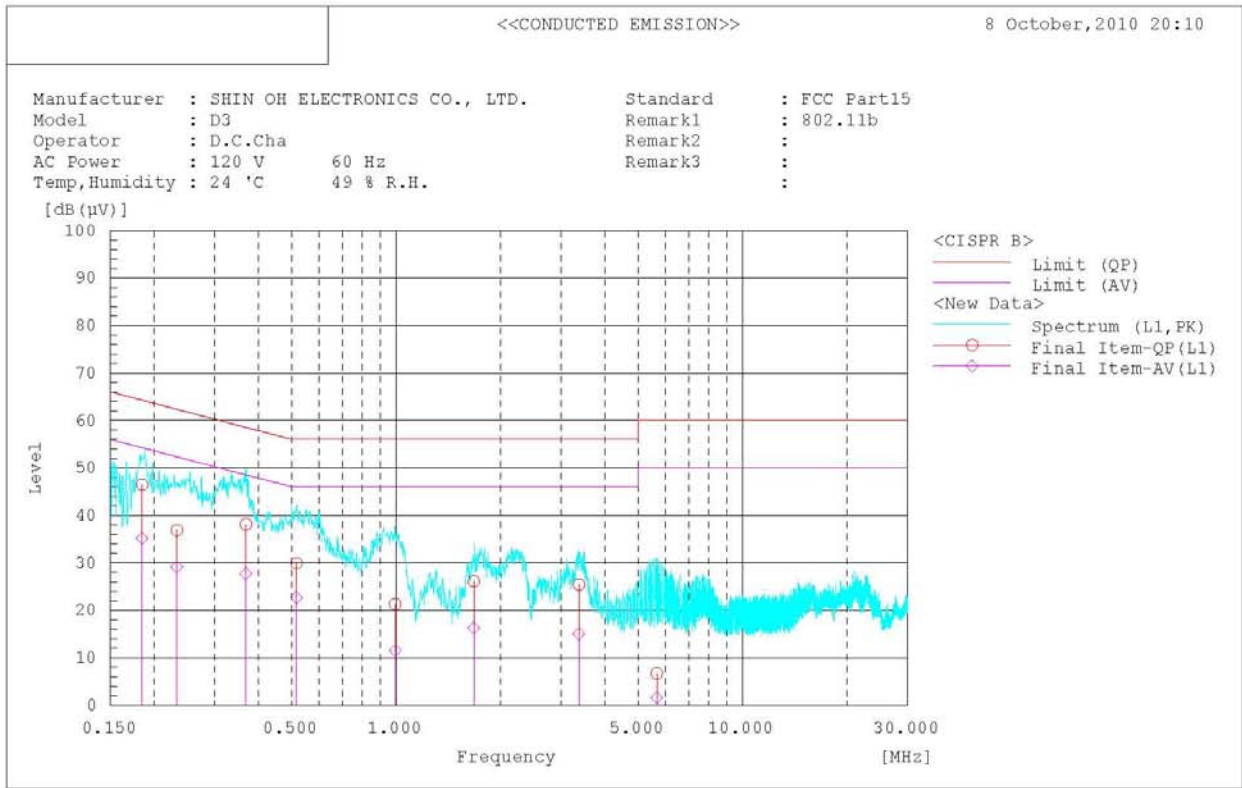
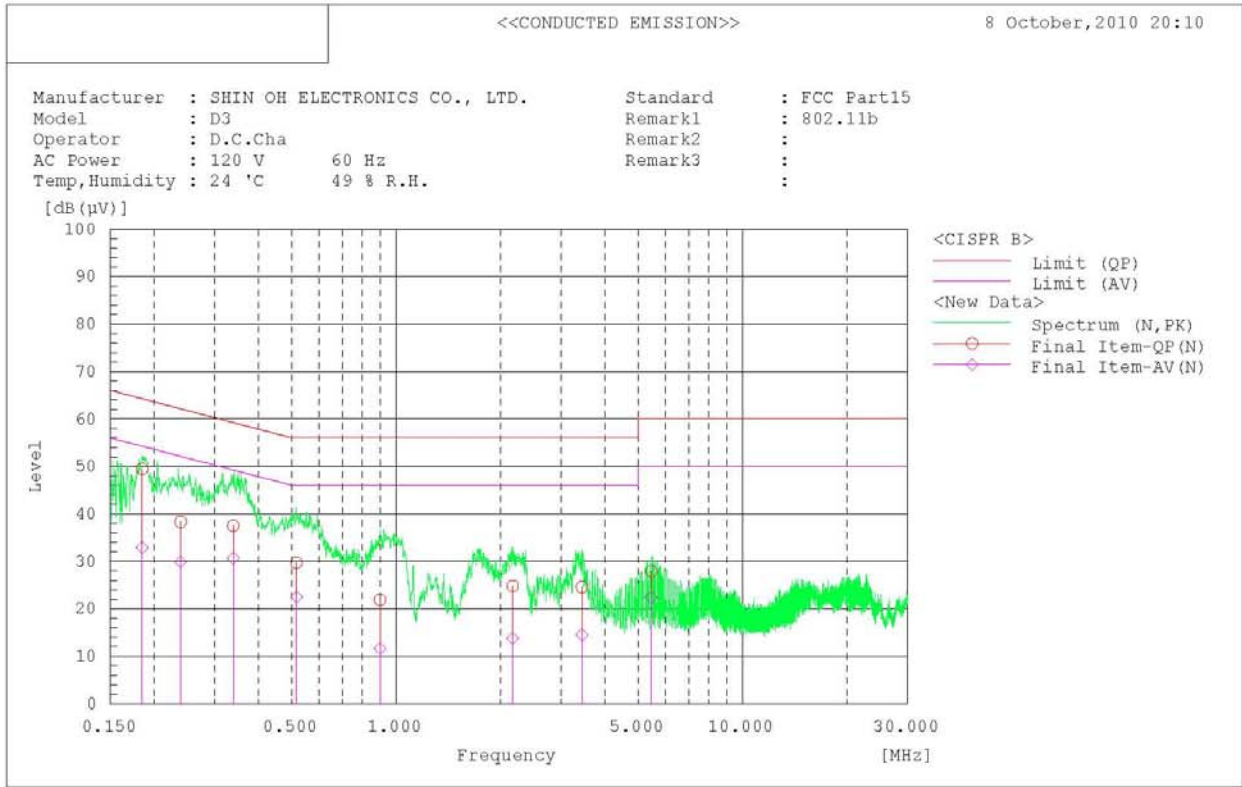
**- Minimum Standard: FCC Part 15.207(a)/EN 55022**

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

### AC Line Conducted Emissions (Graph)

Test Mode: 802.11b & Test case 2



### AC Line Conducted Emissions (Data List)

Test Mode: 802.11b & Test case 2

```

*****
                                  <<CONDUCTED EMISSION>>
                                  8 October,2010 20:10

Standard      : FCC Part15
Manufacturer  : SHIN OH ELECTRONICS CO., LTD.
Model        : D3
Operator      : D.C.Cha
AC Power      : 120 V      60 Hz
Temp, Humidity : 24 'C    49 % R.H.
Remark1      : 802.11b
Remark2      :
Remark3      :
*****

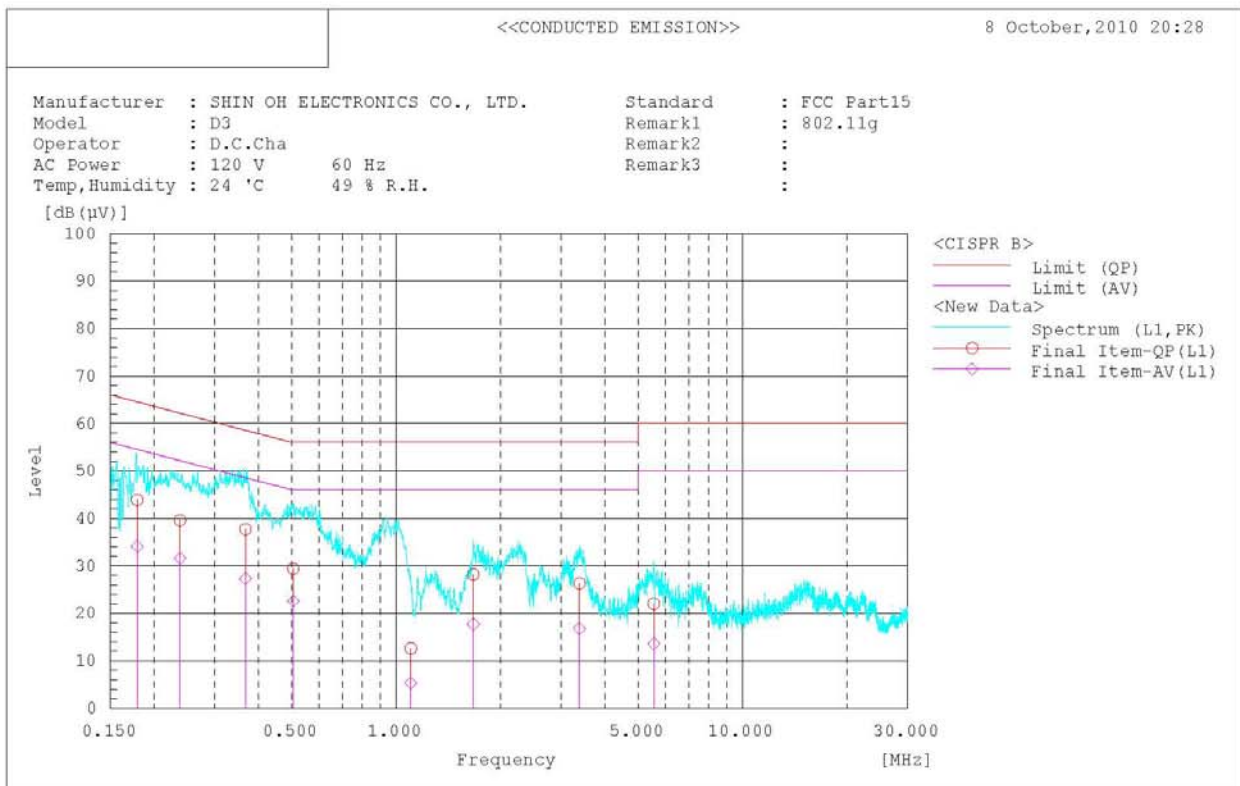
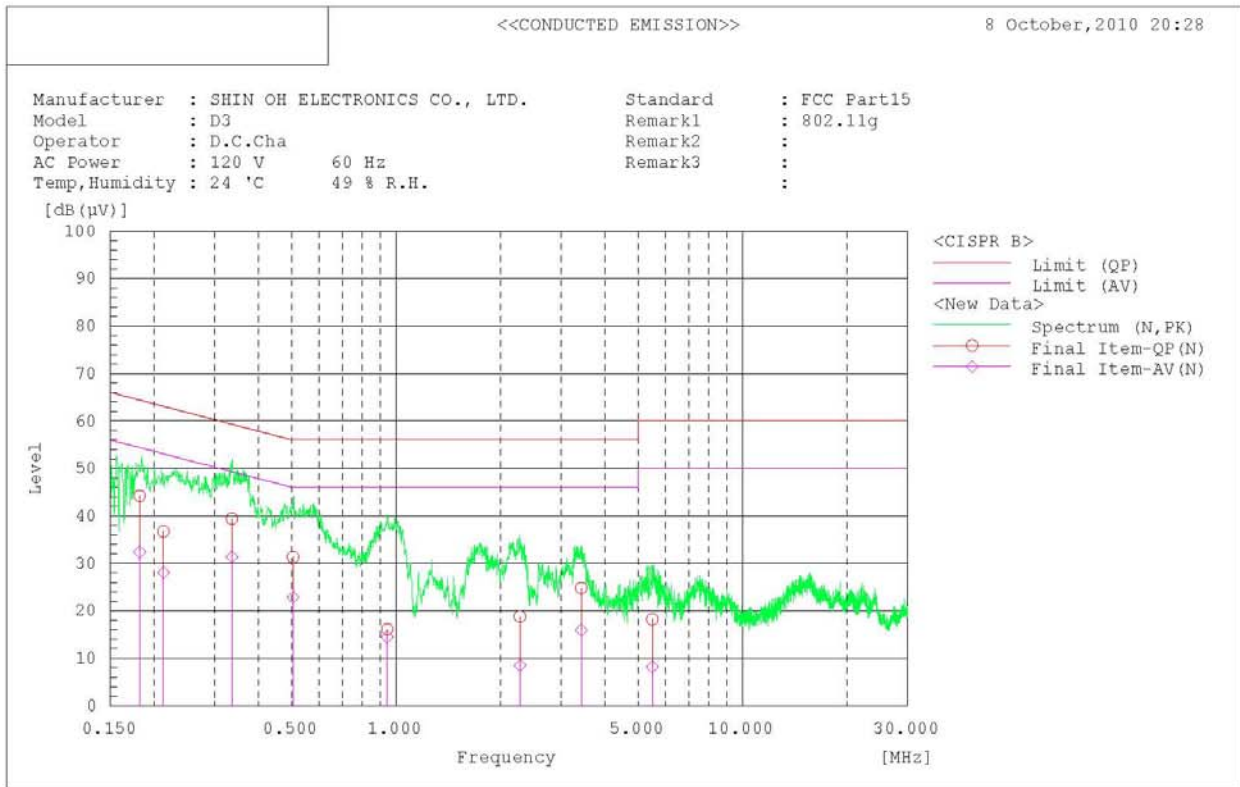
Final Result

--- N Phase ---
No.  Frequency  Reading  Reading  c.f  Result  Result  Limit  Limit  Margin  Margin  Remark
      [MHz]     QP       AV      [dB]  [dB(µV)] [dB(µV)] [dB(µV)] [dB(µV)] [dB]    [dB]
1    0.185      49.4     32.8    0.1  49.5     32.9    64.3    54.3    14.8    21.4
2    0.239      38.2     29.8    0.1  38.3     29.9    62.1    52.1    23.8    22.2
3    0.339      37.4     30.6    0.1  37.5     30.7    59.2    49.2    21.7    18.5
4    0.516      29.6     22.4    0.1  29.7     22.5    56.0    46.0    26.3    23.5
5    0.899      21.8     11.5    0.1  21.9     11.6    56.0    46.0    34.1    34.4
6    2.170      24.6     13.6    0.2  24.8     13.8    56.0    46.0    31.2    32.2
7    3.440      24.3     14.2    0.3  24.6     14.5    56.0    46.0    31.4    31.5
8    5.447      27.5     22.1    0.4  27.9     22.5    60.0    50.0    32.1    27.5

--- L1 Phase ---
No.  Frequency  Reading  Reading  c.f  Result  Result  Limit  Limit  Margin  Margin  Remark
      [MHz]     QP       AV      [dB]  [dB(µV)] [dB(µV)] [dB(µV)] [dB(µV)] [dB]    [dB]
1    0.185      46.2     34.9    0.3  46.5     35.2    64.3    54.3    17.8    19.1
2    0.233      36.6     28.8    0.3  36.9     29.1    62.3    52.3    25.4    23.2
3    0.369      37.8     27.4    0.3  38.1     27.7    58.5    48.5    20.4    20.8
4    0.516      29.6     22.4    0.3  29.9     22.7    56.0    46.0    26.1    23.3
5    0.995      21.0     11.2    0.3  21.3     11.5    56.0    46.0    34.7    34.5
6    1.677      25.8     16.0    0.3  26.1     16.3    56.0    46.0    29.9    29.7
7    3.372      25.0     14.6    0.4  25.4     15.0    56.0    46.0    30.6    31.0
8    5.656      6.2      1.1     0.5  6.7      1.6     60.0    50.0    53.3    48.4
    
```

### AC Line Conducted Emissions (Graph)

Test Mode: 802.11g & Test case 2





### AC Line Conducted Emissions (Data List)

Test Mode: 802.11g & Test case 2

```

*****
                                  <<CONDUCTED EMISSION>>
                                  8 October,2010 20:28

Standard      : FCC Part15
Manufacturer  : SHIN OH ELECTRONICS CO., LTD.
Model        : D3
Operator      : D.C.Cha
AC Power      : 120 V      60 Hz
Temp, Humidity : 24 'C    49 % R.H.
Remark1      : 802.11g
Remark2      :
Remark3      :
*****

Final Result

--- N Phase ---
No.  Frequency  Reading  Reading  c.f  Result  Result  Limit  Limit  Margin  Margin  Remark
      [MHz]     QP       AV      [dB]  [dB(µV)] [dB(µV)] [dB(µV)] [dB(µV)] [dB]    [dB]
1    0.182     44.1    32.3   0.1   44.2    32.4    64.4    54.4    20.2    22.0
2    0.213     36.6    28.0   0.1   36.7    28.1    63.1    53.1    26.4    25.0
3    0.336     39.3    31.3   0.1   39.4    31.4    59.3    49.3    19.9    17.9
4    0.504     31.2    22.8   0.1   31.3    22.9    56.0    46.0    24.7    23.1
5    0.943     16.0    14.4   0.1   16.1    14.5    56.0    46.0    39.9    31.5
6    2.277     18.6    8.3    0.2   18.8    8.5     56.0    46.0    37.2    37.5
7    3.423     24.5    15.6   0.3   24.8    15.9    56.0    46.0    31.2    30.1
8    5.492     17.8    7.8    0.4   18.2    8.2     60.0    50.0    41.8    41.8

--- L1 Phase ---
No.  Frequency  Reading  Reading  c.f  Result  Result  Limit  Limit  Margin  Margin  Remark
      [MHz]     QP       AV      [dB]  [dB(µV)] [dB(µV)] [dB(µV)] [dB(µV)] [dB]    [dB]
1    0.179     43.6    33.8   0.3   43.9    34.1    64.5    54.5    20.6    20.4
2    0.238     39.3    31.3   0.3   39.6    31.6    62.2    52.2    22.6    20.6
3    0.368     37.4    27.0   0.3   37.7    27.3    58.5    48.5    20.8    21.2
4    0.505     29.1    22.3   0.3   29.4    22.6    56.0    46.0    26.6    23.4
5    1.103     12.3    5.0    0.3   12.6    5.3     56.0    46.0    43.4    40.7
6    1.671     27.9    17.4   0.3   28.2    17.7    56.0    46.0    27.8    28.3
7    3.382     25.9    16.4   0.4   26.3    16.8    56.0    46.0    29.7    29.2
8    5.545     21.5    13.1   0.5   22.0    13.6    60.0    50.0    38.0    36.4
    
```

### 3.2.7 Antenna Requirements

**- Procedure:**

Describe how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

**- Conclusion: Comply**

The antenna is permanently attached by soldering. (Refer to Internal Photo file.)

**- Minimum Standard:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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.

# **APPENDIX**

## **TEST EQUIPMENT 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.Date (dd/mm/yy)	Next.Cal.Date (dd/mm/yy)	S/N
<input checked="" type="checkbox"/>	Spectrum Analyzer	Agilent	E4440A	30/09/10	30/09/11	MY45304199
<input type="checkbox"/>	Spectrum Analyzer	Rohde Schwarz	FSQ26	25/02/10	25/02/11	200445
<input type="checkbox"/>	Spectrum Analyzer(RE)	H.P	8563E	04/10/10	04/10/11	3551A04634
<input type="checkbox"/>	Power Meter	H.P	EPM-442A	01/07/10	01/07/11	GB37170413
<input type="checkbox"/>	Power Sensor	H.P	8481A	01/07/10	01/07/11	3318A96332
<input type="checkbox"/>	Power Divider	Agilent	11636B	05/10/10	05/10/11	56471
<input type="checkbox"/>	Power Splitter	Anritsu	K241B	05/10/10	05/10/11	020611
<input type="checkbox"/>	Power Splitter	Anritsu	K241B	01/07/10	01/07/11	017060
<input type="checkbox"/>	Frequency Counter	H.P	5342A	01/07/10	01/07/11	2119A04450
<input type="checkbox"/>	TEMP & HUMIDITY Chamber	JISCO	KR-100/J-RHC2	04/10/10	04/10/11	30604493/021031
<input checked="" type="checkbox"/>	Digital Multimeter	H.P	34401A	12/03/10	12/03/11	3146A13475, US36122178
<input type="checkbox"/>	Multifunction Synthesizer	HP	8904A	11/10/10	11/10/11	3633A08404
<input checked="" type="checkbox"/>	Signal Generator	Rohde Schwarz	SMR20	12/03/10	12/03/11	101251
<input type="checkbox"/>	Signal Generator	H.P	ESG-3000A	01/07/10	01/07/11	US37230529
<input type="checkbox"/>	Vector Signal Generator	Rohde Schwarz	SMJ100A	11/01/10	11/01/11	100148
<input type="checkbox"/>	Vector Signal Generator	Rohde Schwarz	SMBV100A	23/02/10	23/02/11	255571
<input type="checkbox"/>	Audio Analyzer	H.P	8903B	02/07/10	02/07/11	3011A09448
<input type="checkbox"/>	Modulation Analyzer	H.P	8901B	01/07/10	01/07/11	3028A03029
<input type="checkbox"/>	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	02/07/10	02/07/11	GB43461134
<input type="checkbox"/>	Universal Radio communication Tester	Rohde Schwarz	CMU 200	12/03/10	12/03/11	106760
<input type="checkbox"/>	Bluetooth Tester	TESCOM	TC-3000B	01/07/10	01/07/11	3000B000268
<input type="checkbox"/>	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-3
<input checked="" type="checkbox"/>	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-2
<input type="checkbox"/>	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-4
<input type="checkbox"/>	AC Power supply	DAEKWANG	5KVA	12/03/10	12/03/11	20060321-1
<input checked="" type="checkbox"/>	DC Power Supply	HP	6622A	12/03/10	12/03/11	3448A03760
<input type="checkbox"/>	DC Power Supply	HP	6633A	12/03/10	12/03/11	3524A06634
<input type="checkbox"/>	DC Power Supply	Protek	PWS-3010D	04/10/10	04/10/11	4072702
<input type="checkbox"/>	BAND Reject Filter	Microwave Circuits	N0308372	05/10/10	05/10/11	3125-01DC0352
<input type="checkbox"/>	BAND Reject Filter	Wainwright	WRCG1750	05/10/10	05/10/11	2
<input type="checkbox"/>	High-Pass Filter	ANRITSU	MP526D	04/10/10	04/10/11	M27756
<input type="checkbox"/>	High-pass filter	Wainwright	WHNX2.1	N/A	N/A	1
<input checked="" type="checkbox"/>	High-pass filter	Wainwright	WHNX3.0	N/A	N/A	9
<input type="checkbox"/>	High-pass filter	Wainwright	WHNX5.0	N/A	N/A	8
<input type="checkbox"/>	High-Pass Filter	Wainwright	WHKX8.5	N/A	N/A	1
<input type="checkbox"/>	Tunable Notch Filter	Wainwright	WRCT800.0 /960.0-0.2/40-8SSK	N/A	N/A	32
<input type="checkbox"/>	Tunable Notch Filter	Wainwright	WRCD1700.0 /2000.0-0.2/40-10SSK	N/A	N/A	53
<input type="checkbox"/>	Tunable Notch Filter	Wainwright	WRCT1900.0/ 2200.0-5/40-10SSK	N/A	N/A	30
<input checked="" type="checkbox"/>	HORN ANT	ETS	3115	04/10/10	04/10/11	21097
<input type="checkbox"/>	HORN ANT	ETS	3115	14/07/10	14/07/11	6419
<input checked="" type="checkbox"/>	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/11	154
<input type="checkbox"/>	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/11	155

	Type	Manufacturer	Model	Cal.Date (dd/mm/yy)	Next.Cal.Date (dd/mm/yy)	S/N
<input checked="" type="checkbox"/>	HORN ANT	SCHWARZBECK	BBHA9120A	13/04/10	13/04/11	322
<input type="checkbox"/>	Dipole Antenna	Schwarzbeck	VHA9103	29/11/10	29/11/11	2116
<input type="checkbox"/>	Dipole Antenna	Schwarzbeck	VHA9103	29/11/10	29/11/11	2117
<input type="checkbox"/>	Dipole Antenna	Schwarzbeck	UHA9105	29/11/10	29/11/11	2261
<input type="checkbox"/>	Dipole Antenna	Schwarzbeck	UHA9105	29/11/10	29/11/11	2262
<input type="checkbox"/>	LOOP Antenna	ETS	6502	29/10/10	29/10/11	3471
<input type="checkbox"/>	Coaxial Fixed Attenuators	Agilent	8491B	01/07/10	01/07/11	MY39260700
<input type="checkbox"/>	Attenuator (3dB)	WEINSCHHEL	56-3	05/10/10	05/10/11	Y2342
<input type="checkbox"/>	Attenuator (3dB)	WEINSCHHEL	56-3	05/10/10	05/10/11	Y2370
<input type="checkbox"/>	Attenuator (10dB)	WEINSCHHEL	23-10-34	01/10/10	01/10/11	BP4386
<input type="checkbox"/>	Attenuator (10dB)	WEINSCHHEL	23-10-34	11/01/10	11/01/11	BP4387
<input type="checkbox"/>	Attenuator (10dB)	WEINSCHHEL	31696	05/10/10	05/10/11	446
<input type="checkbox"/>	Attenuator (10dB)	WEINSCHHEL	31696	05/10/10	05/10/11	408
<input type="checkbox"/>	Attenuator (20dB)	WEINSCHHEL	86-20-11	05/10/10	05/10/11	432
<input type="checkbox"/>	Attenuator (30dB)	JFW	50FH-030-300	12/03/10	12/03/11	060320-1
<input type="checkbox"/>	Attenuator (40dB)	WEINSCHHEL	57-40-33	01/10/10	01/10/11	NN837
<input type="checkbox"/>	Termination	H.P	HP-909D	02/07/10	02/07/11	02750
<input type="checkbox"/>	Termination	H.P	HP-909D	02/07/10	02/07/11	02702
<input type="checkbox"/>	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0088CAN	01/07/10	01/07/11	788
<input type="checkbox"/>	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0185CAN	01/07/10	01/07/11	790
<input type="checkbox"/>	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0215CAN	01/07/10	01/07/11	112
<input checked="" type="checkbox"/>	Amplifier (30dB)	Agilent	8449B	23/04/10	23/04/11	3008A01590
<input type="checkbox"/>	Amplifier (30dB)	H.P	8449B	13/05/10	13/05/11	3008A00370
<input type="checkbox"/>	Amplifier	EMPOWER	BBS3Q7ELU	04/10/10	04/10/11	1020
<input type="checkbox"/>	RF Power Amplifier	OPHIRRF	5069F	01/07/10	01/07/11	1006
<input type="checkbox"/>	EMI TEST RECEIVER	R&S	ESU	29/01/10	29/01/11	100014
<input type="checkbox"/>	BILOG ANTENNA	SCHAFFNER	CBL6112B	14/07/10	14/07/11	2737
<input type="checkbox"/>	Amplifier (22dB)	H.P	8447E	29/01/10	29/01/11	2945A02865
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	R&S	ESCI	12/05/10	12/05/11	100364
<input checked="" type="checkbox"/>	LOG-PERIODIC ANT.	Schwarzbeck	UHALP 9108 A-1	07/10/09	07/10/11	1098
<input checked="" type="checkbox"/>	BICONICAL ANT.	Schwarzbeck	VHA 9103	06/10/09	06/10/11	91031946
<input type="checkbox"/>	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A	07/07/10	07/07/11	590
<input checked="" type="checkbox"/>	Low Noise Pre Amplifier	TSJ	MLA-100K01-B01-2	12/03/10	12/03/11	1252741
<input type="checkbox"/>	Low Noise Pre Amplifier	TSJ	MLA-00108-B02-36	08/02/10	08/02/11	1518831
<input type="checkbox"/>	Amplifier (25dB)	Agilent	8447D	12/03/10	12/03/11	2944A10144
<input type="checkbox"/>	Amplifier (25dB)	Agilent	8447D	01/07/10	01/07/11	2648A04922
<input checked="" type="checkbox"/>	Spectrum Analyzer(CE)	H.P	8591E	12/03/10	12/03/11	3649A05889
<input checked="" type="checkbox"/>	LISN	Kyoritsu	KNW-407	29/01/10	29/01/11	8-317-8
<input checked="" type="checkbox"/>	LISN	Kyoritsu	KNW-242	29/01/10	29/01/11	8-654-15
<input checked="" type="checkbox"/>	CVCF	NF Electronic	4420	12/03/10	12/03/11	304935/337980
<input checked="" type="checkbox"/>	50 ohm Terminator	HME	CT-01	12/01/10	12/01/11	N/A
<input checked="" type="checkbox"/>	RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	02/07/10	02/07/11	4N-170-3