



**FCC CFR47 PART 15 SUBPART C  
CLASS II PERMISSIVE CHANGE  
TEST REPORT**

**FOR**

**802.11 bg GEN 3 2x3 CARDBUS RoHS COMPLIANT and NON-RoHS  
COMPLIANT**

**MODEL NUMBER: AGN3023PC-01 AND  
AGN3023PC-11 (RoHS COMPLIANT)**

**FCC ID: SA3-AGN3023PC0100**

**REPORT NUMBER: 06U10003-1B**

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**LAB CODE:200065-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
A	1/27/2006	Initial Issue	DG
B	<u>2/2/2006</u>	Added RoHS product model number to report.	DG

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** AIRGO NETWORKS, INC.  
900 ARASTRADERO ROAD  
PALO ALTO, CA 94304  
U.S.A.

**EUT DESCRIPTION:** 802.11 bg Gen 3 2x3 Cardbus

**MODEL:** AGN3023PC-01, AGN3023PC-11

**SERIAL NUMBER:** 1274

**DATE TESTED:** JANUARY 9-23, 2006

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



DAVID GARCIA  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES



FRANK IBRAHIM  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g 2x3 MIMO Cardbus Card.

The radio module is manufactured by Airgo.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power per chain as follows:

2400 to 2483.5 MHz Authorized Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	23.43	220.29
2412 - 2462	802.11g	25.06	320.63
2412 - 2462	SIMO	20.93	123.88
2412 - 2462	MIMO	21.37	137.09

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes three omni antennas in MIMO configuration, two RX/TX and one RX only, each with a maximum gain of 2.1 dBi.

### 5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was Airgo PTT 2.1.0.81. The test software is capable of operating both chains simultaneously for MIMO and SIMO operation.

All MIMO and SIMO mode antenna port conducted tests were done on each chain individually. Radiated emissions testing for MIMO and SIMO modes were done with both chains operating simultaneously.

### 5.5. WORST-CASE CONFIGURATION AND MODE

For radiated emissions below 1 GHz, the worst-case channel was determined as the channel with the highest output power. The highest measured output power was at 2437 MHz in 802.11b mode.

## 5.6. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

Summary of design changes to Airgo cardbus board:

- The board material has been changed to an RoHS compliant material – this material exhibits the same RF properties as the material used in the current design – ie Dk (dielectric constant) = 4.3 at 2-10GHz.
- A coupler used at the output of the PAs has been replaced with a device that integrates a low-pass filter with the coupler function. This provides additional filtering of PA harmonics.
- A low pass filter used at the output of the PAs has been replaced with an improved part that has a slightly different footprint than the previous part. This also provides improved filtering of the PA harmonics.
- Some LO traces that were routed on the backside of the PCB were moved to the topside where there is an RF shield on the board which helps to reduce radiated LO energy.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop Computer	Dell	PP08L	CN-0F3553-12961-48H	DoC
AC/DC Adapter	Dell	PA-1900-02D	CN-09T215-71615-47I-7634	DoC
CardBus Extender Card	Sycara Technology	N/A	C140A-12805	DoC

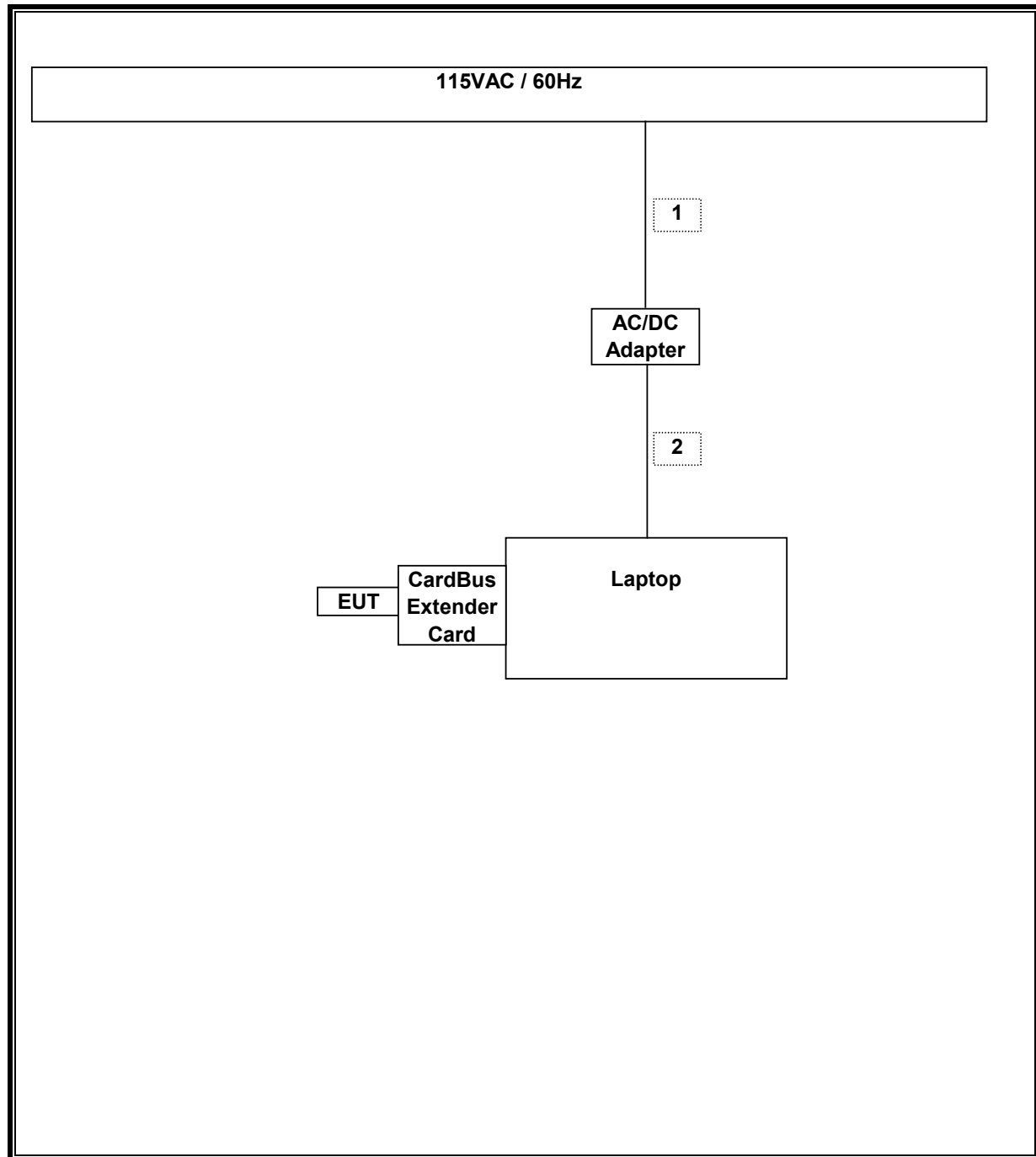
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	AC	Unshielded	1m	N/A
2	DC	1	DC	Unshielded	2m	N/A

### TEST SETUP

The EUT is connected to a host laptop computer via a cardbus-to-miniPCI adapter / extension board during the tests. Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**





## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
Antenna, Horn 1 ~ 18 GHz	ETS	3117	35234	4/22/2006
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent	E4446A	US42070220	7/29/2006
Spectrum Analyzer, 26.5 GHz	HP	8593EM	3710A00205	7/26/2006
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	4/22/2006
Preamplifier, 1 ~ 26.5 GHz	Agilent	8449B	3008A00561	10/3/2007
Spectrum Analyzer	Agilent	E4446	MY45300064	12/19/2006
Preamplifier, 1 ~ 26.5 GHz	Agilent	8449B	3008A00561	10/3/2007
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	4/22/2006
Antenna, Horn 18 ~ 26 GHz	ARA	MWH-1826/B	1049	9/12/2006
Peak Power Meter	Agilent	E4416A	GB41291160	2/9/2006
Peak / Average Power Sensor	Agilent	E9327A	US40440755	2/10/2006
Preamplifier, 1300 MHz	HP	8447D	1937A02062	1/7/2006
Antenna, Bilog 30 MHz ~ 2 GHz	Sunol Sciences	JB1	A121003	3/3/2006
Spectrum Analyzer, 26.5 GHz	HP	8593EM	3710A00205	7/26/2006

## 7. LIMITS AND RESULTS

### 7.1. CHANNEL TESTS FOR THE 2400 TO 2483.5 MHz BAND

#### 7.1.1. 99% BANDWIDTH

##### LIMIT

None: for reporting purposes only.

##### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

## **RESULTS**

No non-compliance noted:

### 802.11b Mode, Chain 0

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Bandwidth (MHz)</b>
Low	2412	14.8280
Middle	2437	14.8034
High	2462	14.9632

### 802.11g Mode, Chain 0

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Bandwidth (MHz)</b>
Low	2412	16.3087
Middle	2437	16.2804
High	2462	16.3581

### 802.11b Mode, Chain 1

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Bandwidth (MHz)</b>
Low	2412	14.9265
Middle	2437	15.0539
High	2462	14.9670

### 802.11g Mode, Chain 1

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Bandwidth (MHz)</b>
Low	2412	16.3198
Middle	2437	16.2965
High	2462	16.3565

SIMO Mode, Chain 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2422	31.7662
High	2452	31.7376

MIMO Mode, Chain 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2422	31.4533
High	2452	31.9098

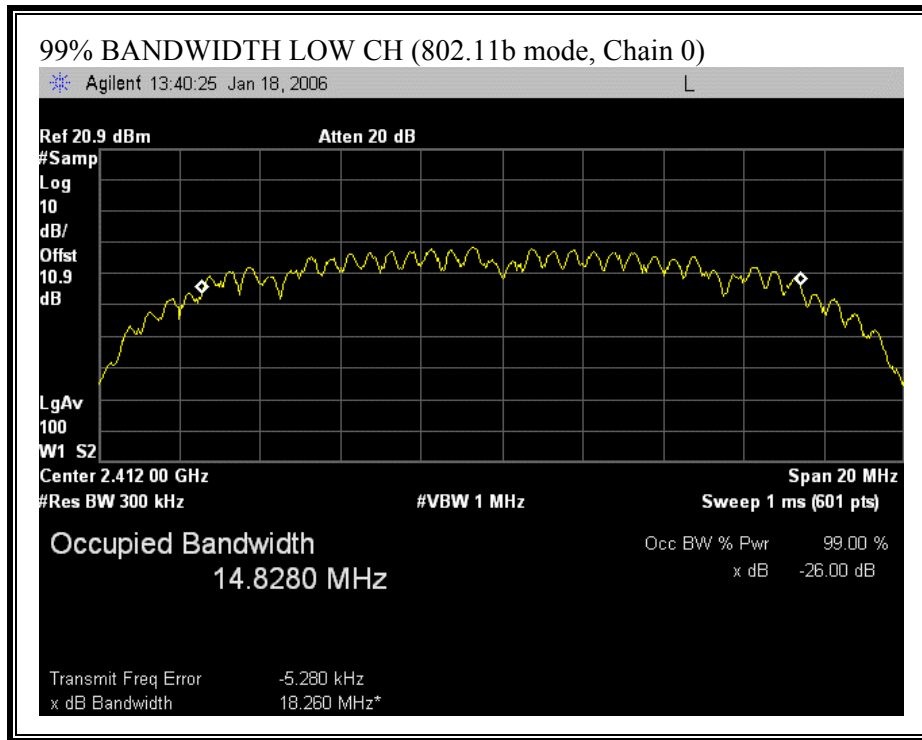
SIMO Mode, Chain 1

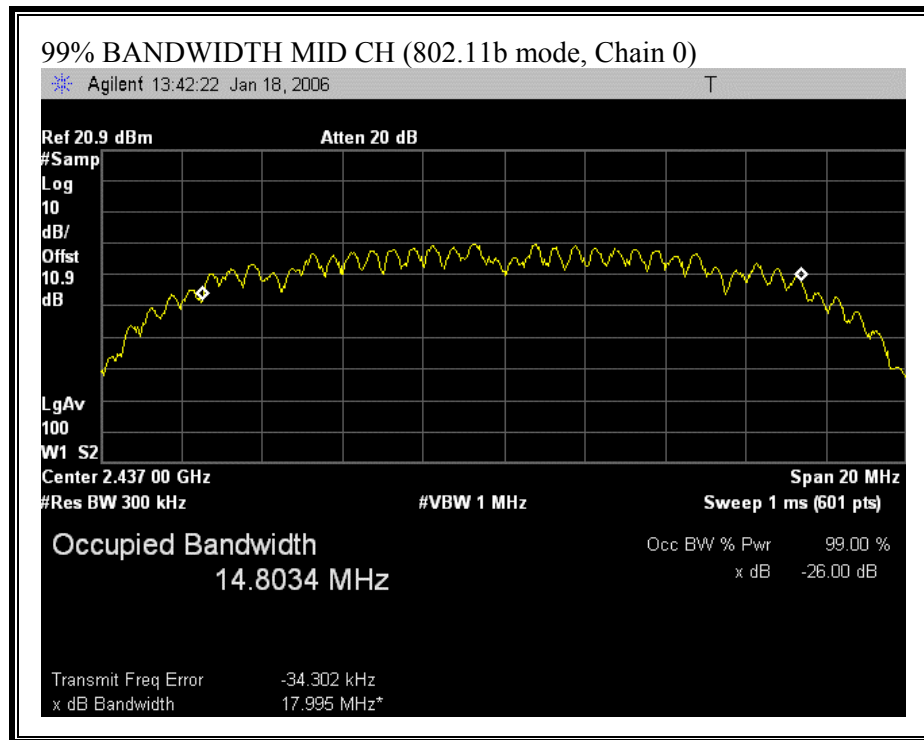
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2422	31.7207
High	2452	31.7865

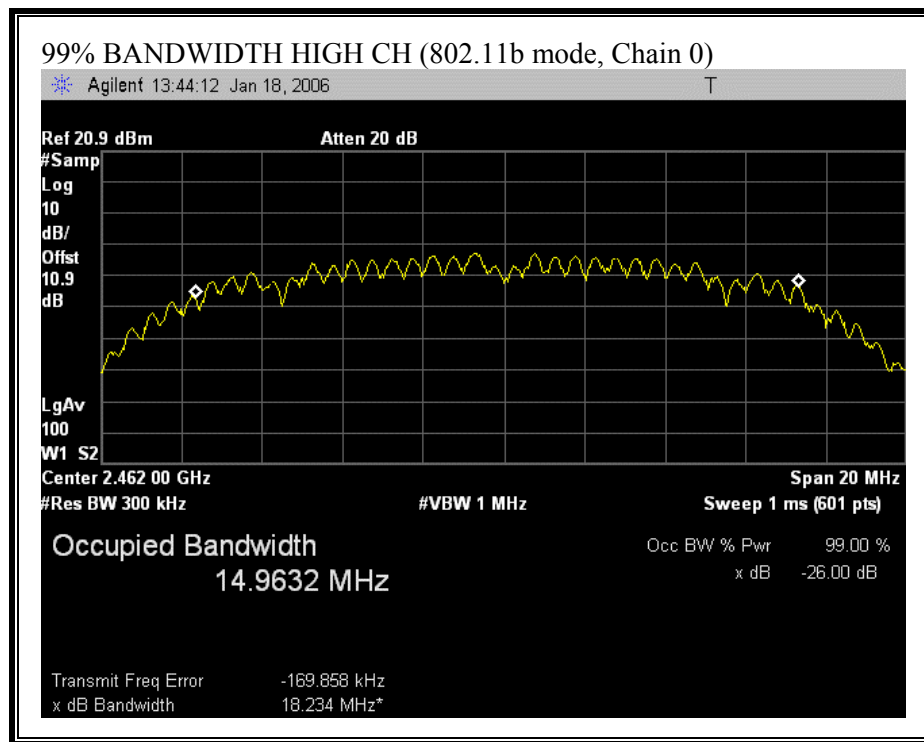
MIMO Mode, Chain 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2422	31.9718
High	2452	31.8451

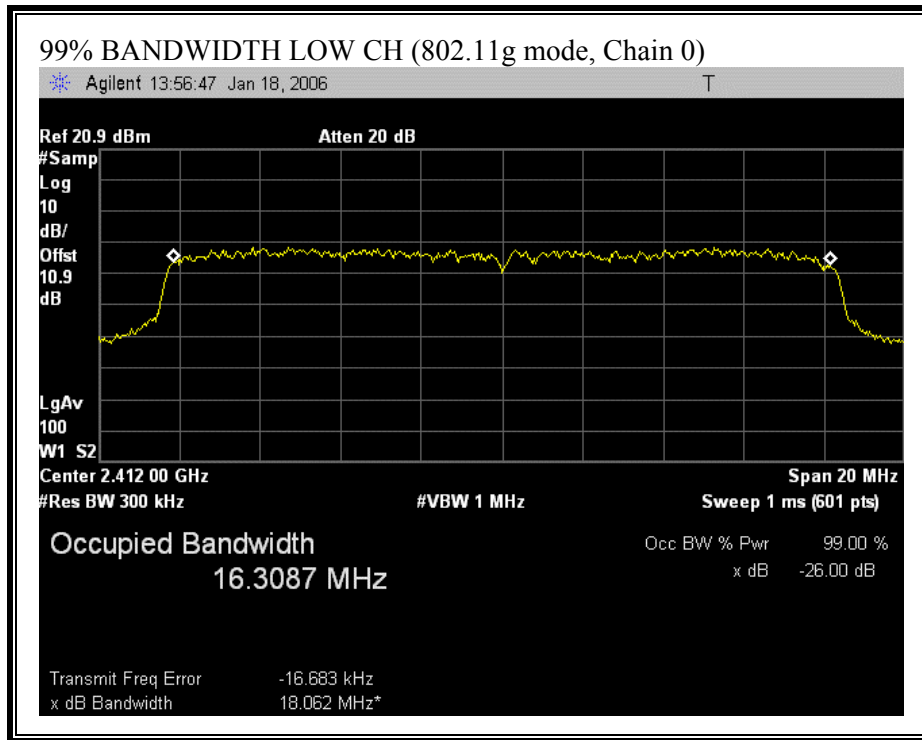
**99% BANDWIDTH (802.11b MODE, CHAIN 0)**



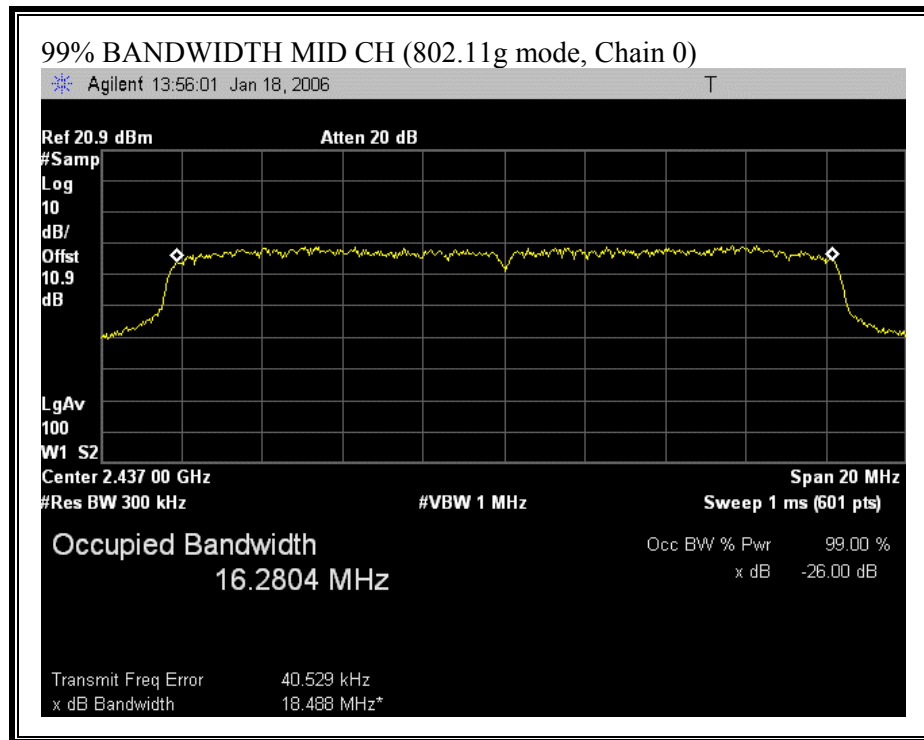


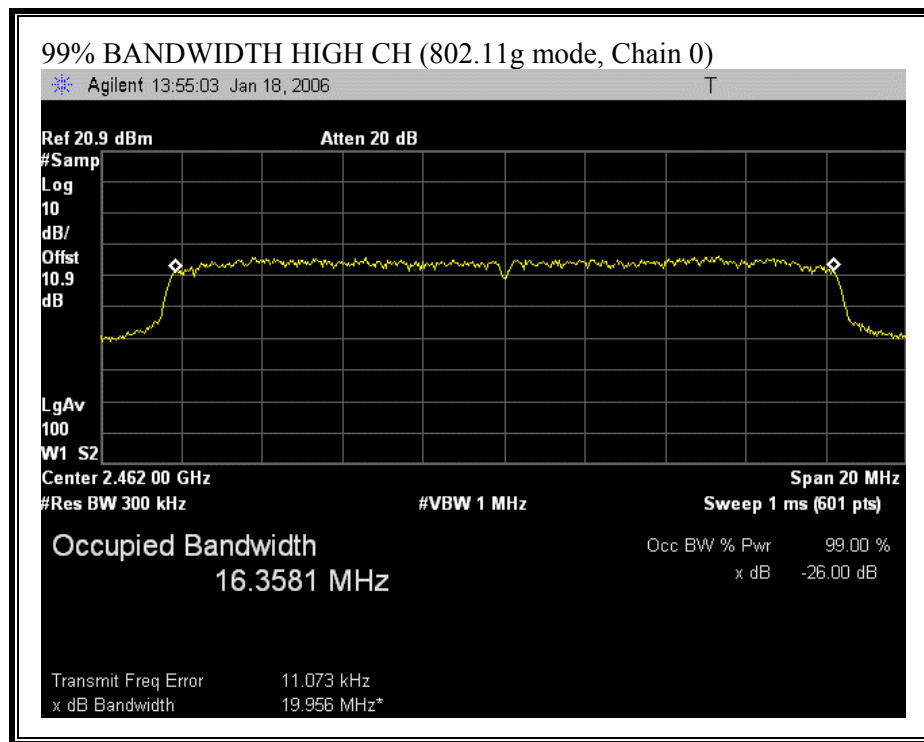


**99% BANDWIDTH (802.11g MODE, CHAIN 0)**

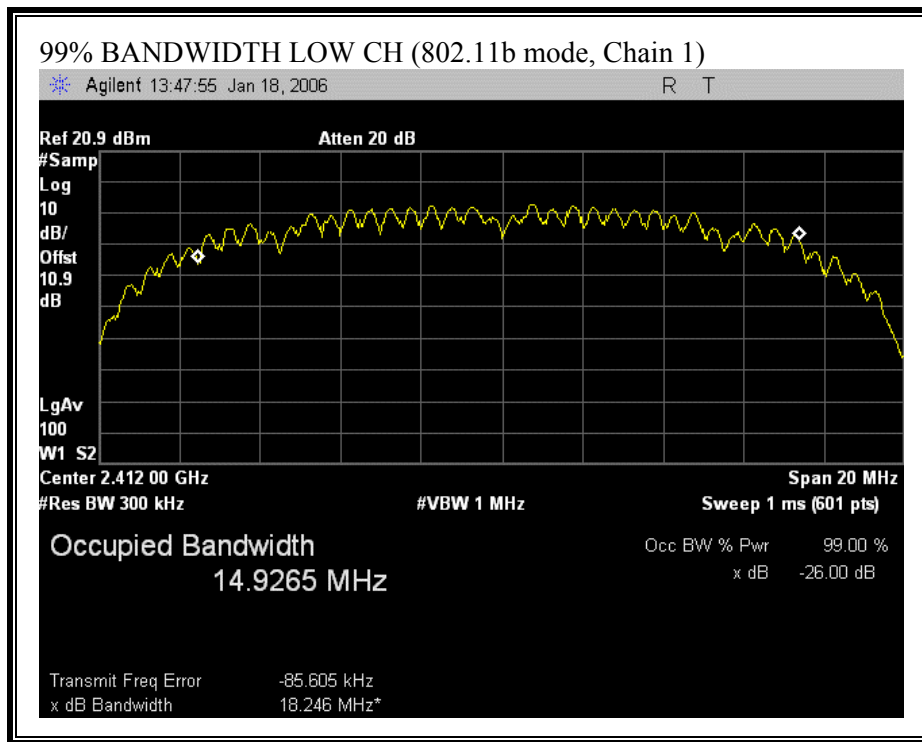


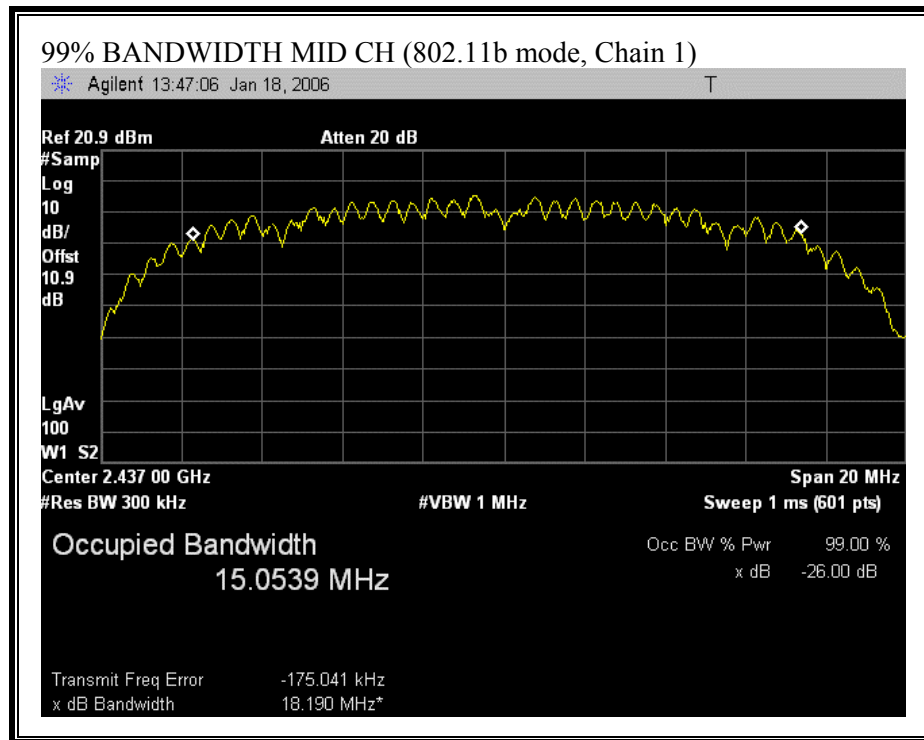


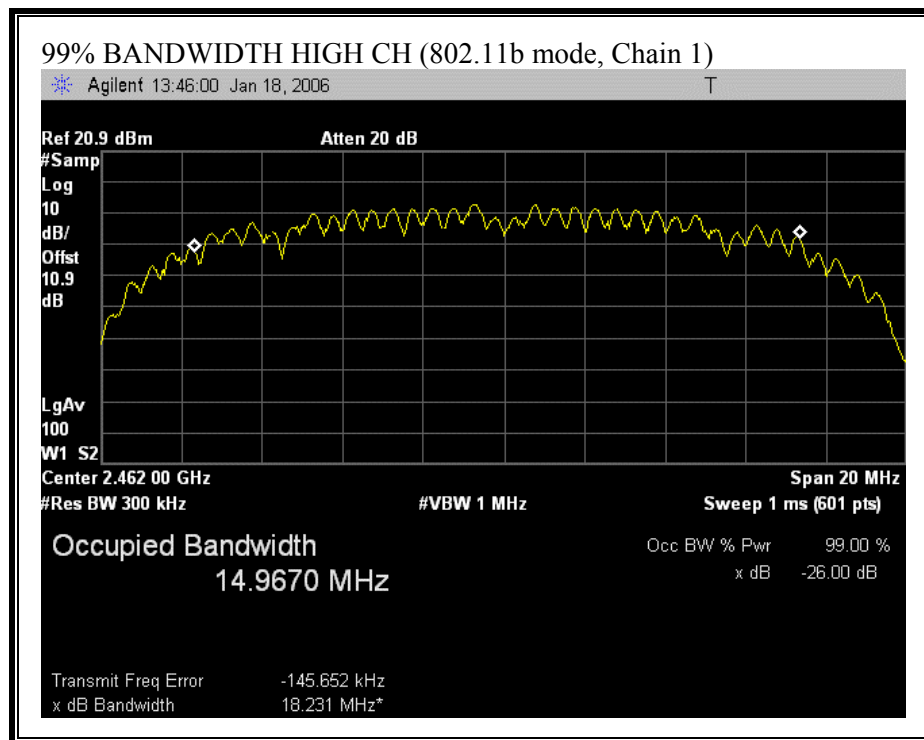




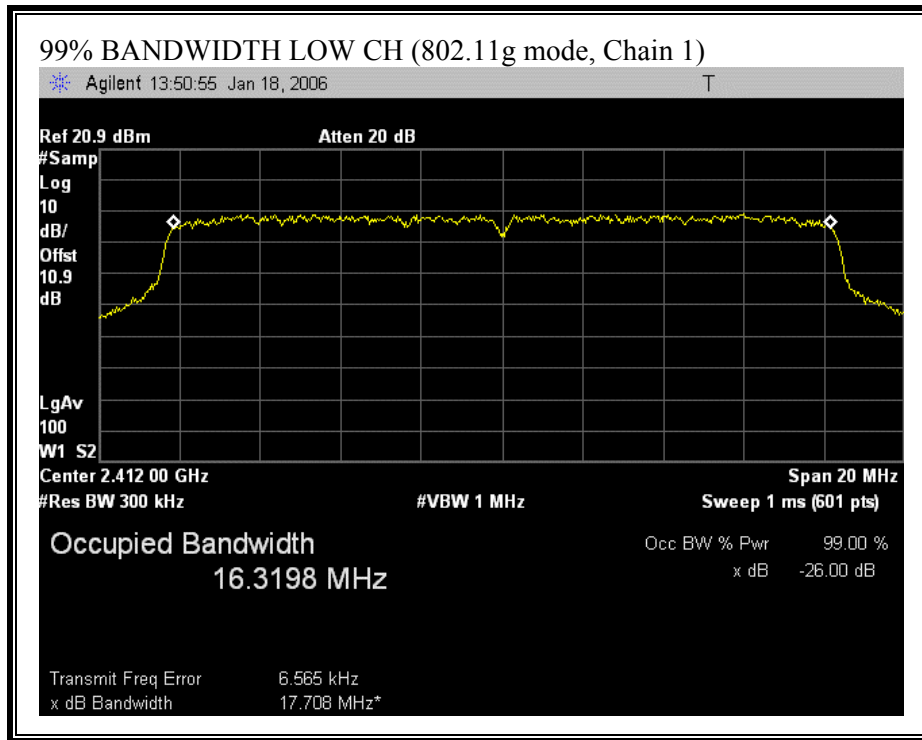
**99% BANDWIDTH (802.11b MODE, CHAIN 1)**

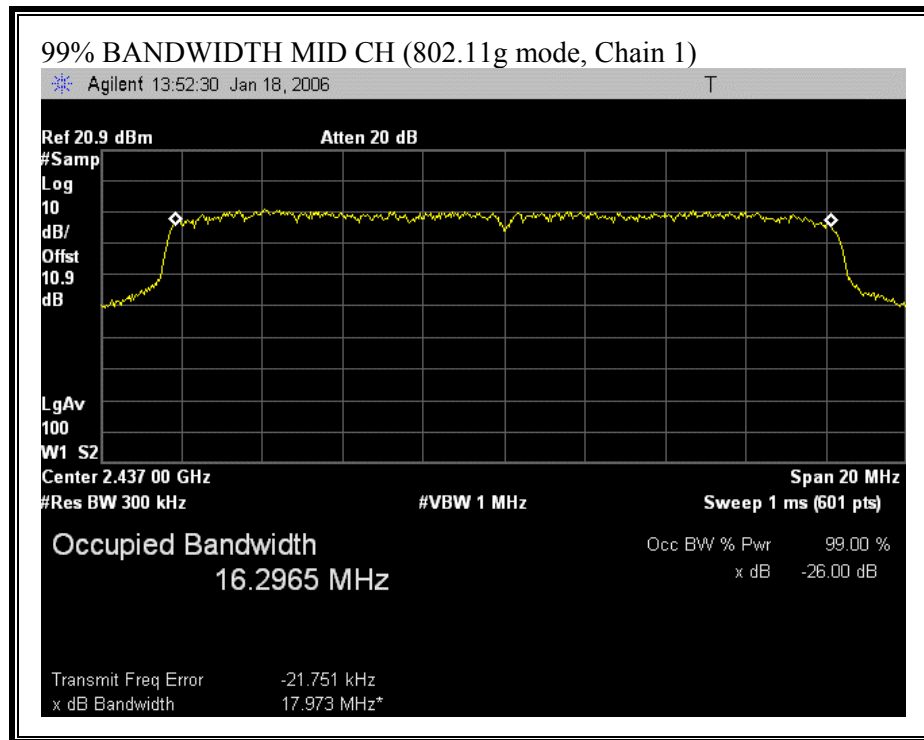


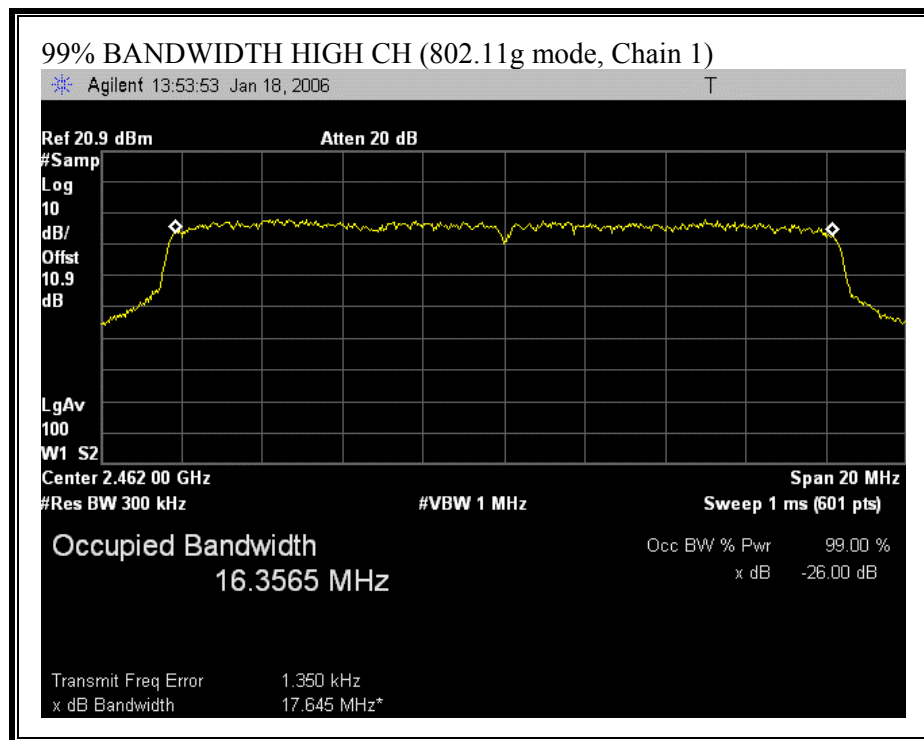




**99% BANDWIDTH (802.11g MODE, CHAIN 1)**

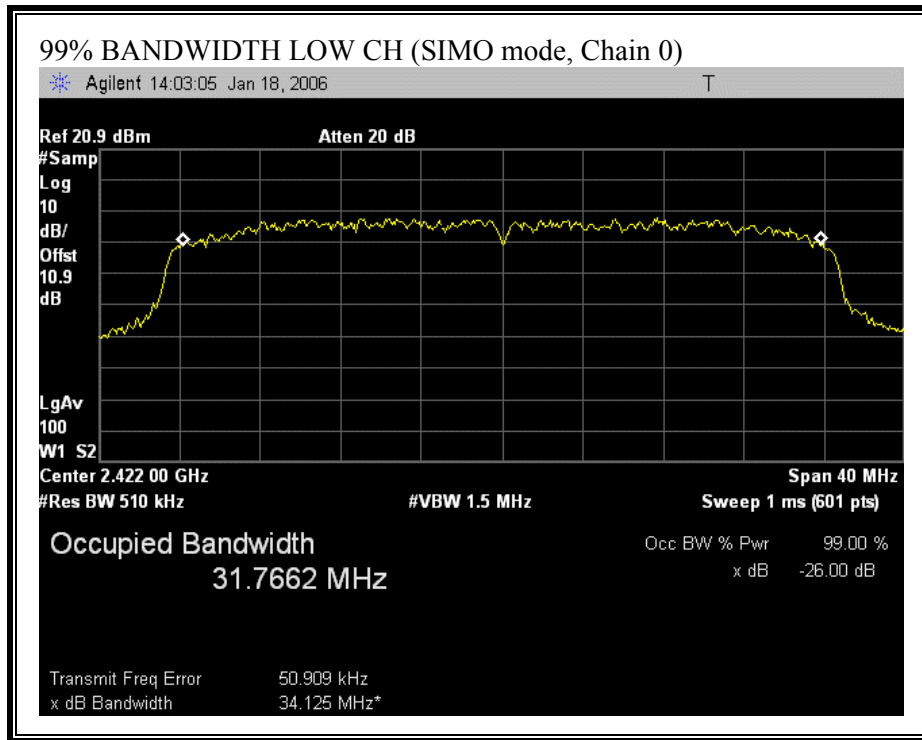


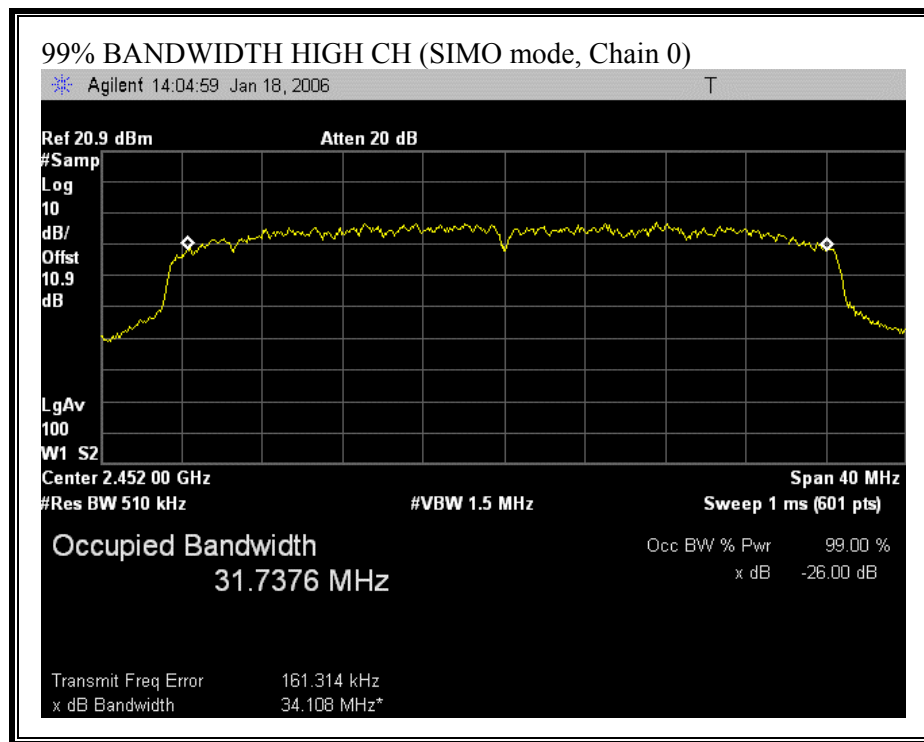




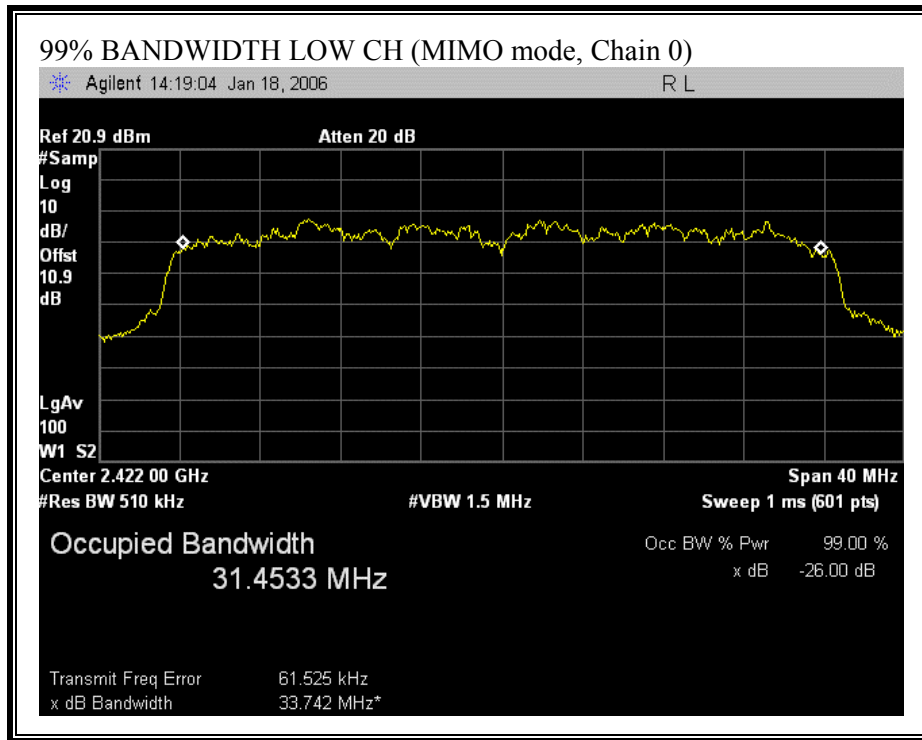


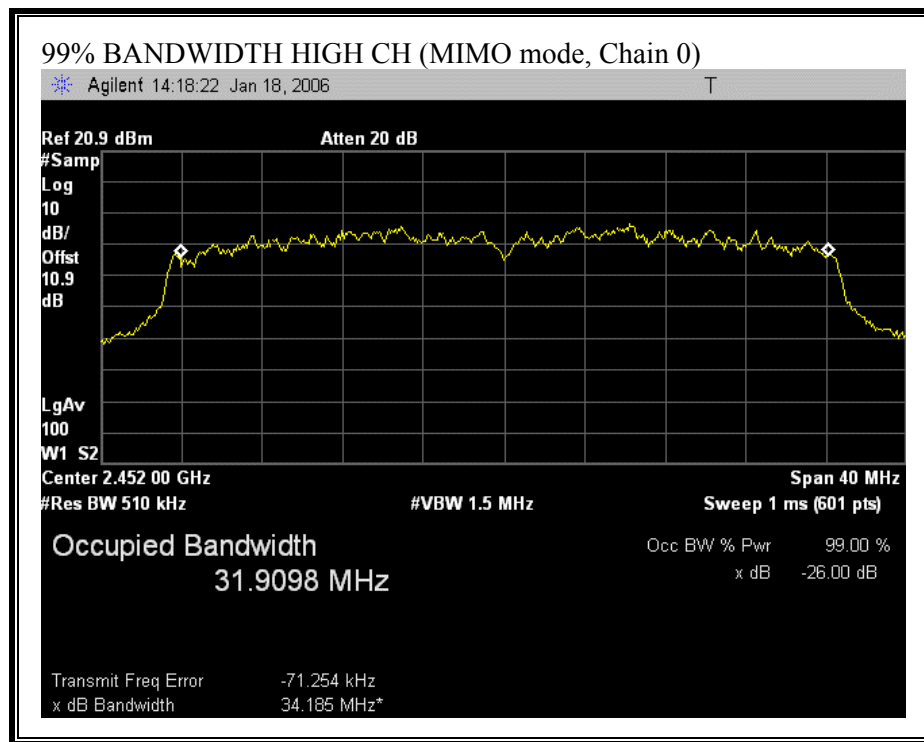
**99% BANDWIDTH (SIMO MODE, CHAIN 0)**



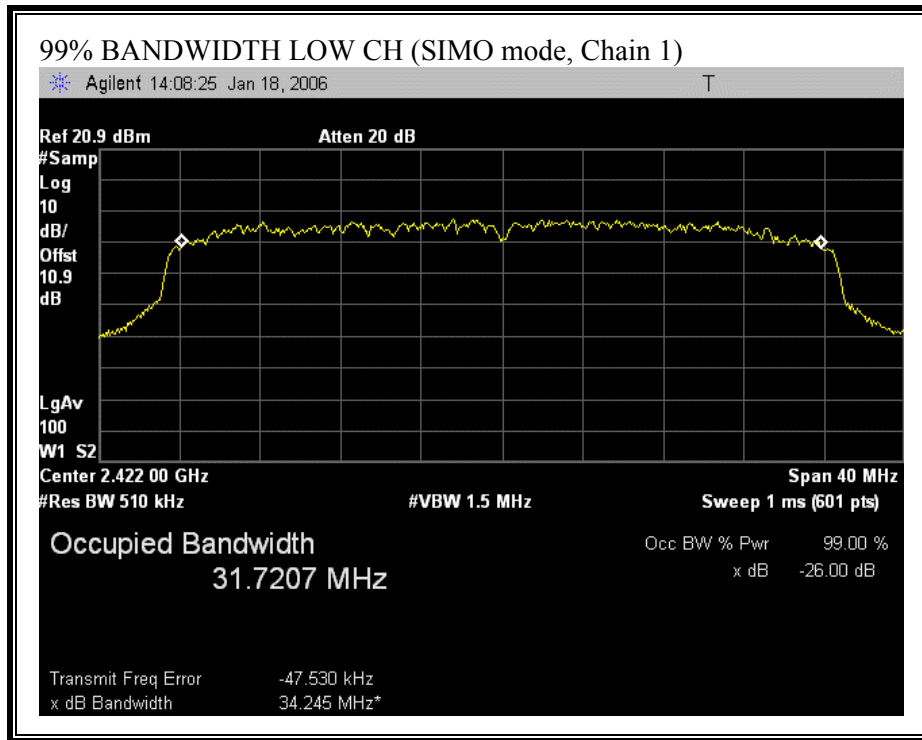


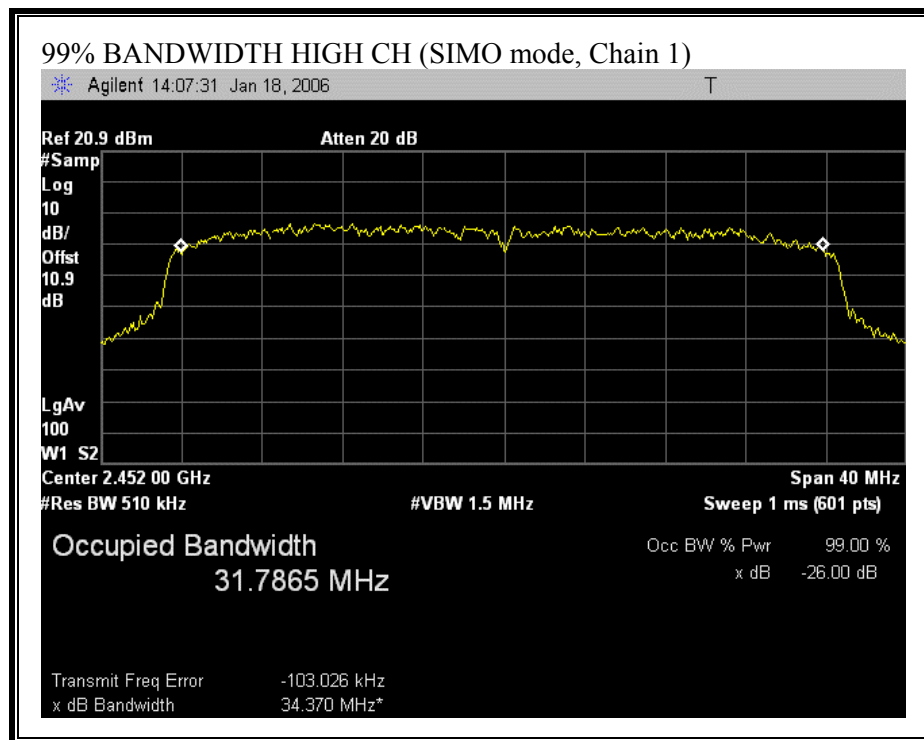
**99% BANDWIDTH (MIMO MODE, CHAIN 0)**



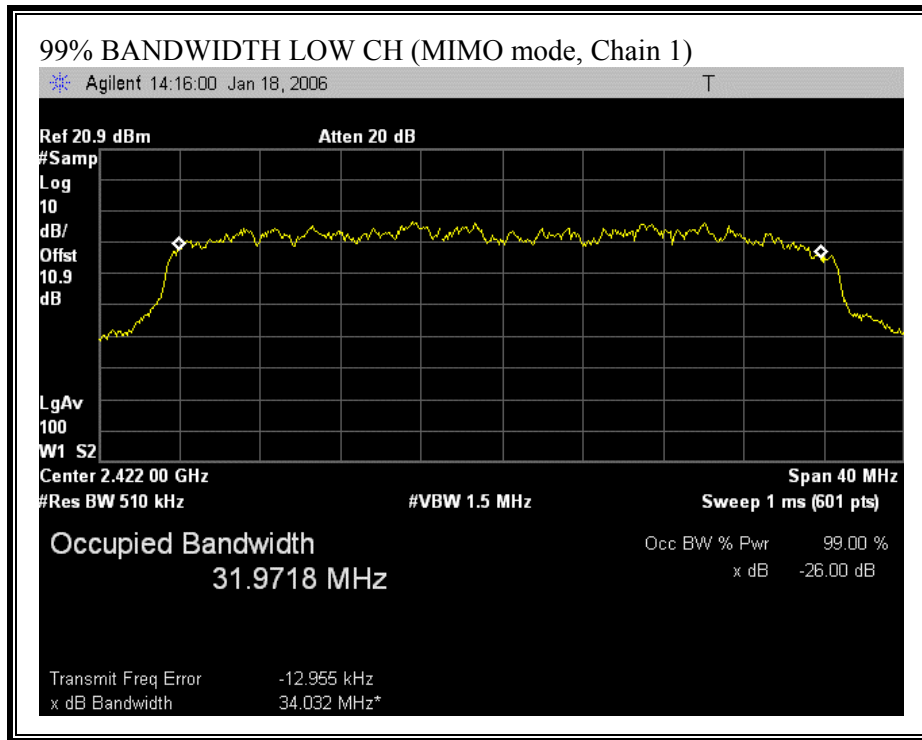


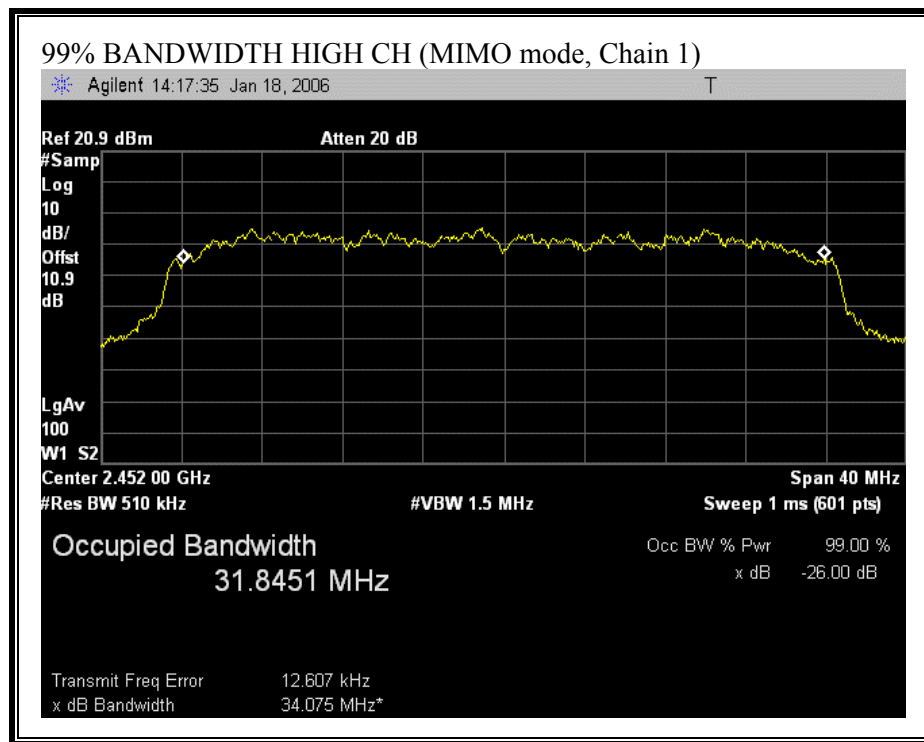
**99% BANDWIDTH (SIMO MODE, CHAIN 1)**





**99% BANDWIDTH (MIMO MODE, CHAIN 1)**







## **7.1.2. PEAK OUTPUT POWER**

### **PEAK POWER LIMIT**

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz , and 5725-5850 MHz bands: 1 watt.

§15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz , and 5725-5850 MHz bands: 1 watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

§15.247 (b) (4) (i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

### **TEST PROCEDURE**

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 99% bandwidth.

## RESULTS

The maximum antenna gain is 2.1 dBi for other than fixed, point-to-point operations, therefore the limit is 30 dBm.

No non-compliance noted:

### 802.11b MODE

Frequency (MHz)	Peak Power Chain 0 (dBm)	Peak Power Chain 1 (dBm)	Peak Power Total (dBm)	Limit (dBm)	Margin (dB)
2412	19.04	20.58	22.89	30	-7.11
2437	20.42	20.41	23.43	30	-6.57
2462	20.09	19.91	23.01	30	-6.99

### 802.11g MODE

Frequency (MHz)	Peak Power Chain 0 (dBm)	Peak Power Chain 1 (dBm)	Peak Power Total (dBm)	Limit (dBm)	Margin (dB)
2412	19.34	19.45	22.41	30	-7.59
2437	22.03	22.07	25.06	30	-4.94
2462	19.77	19.18	22.50	30	-7.50

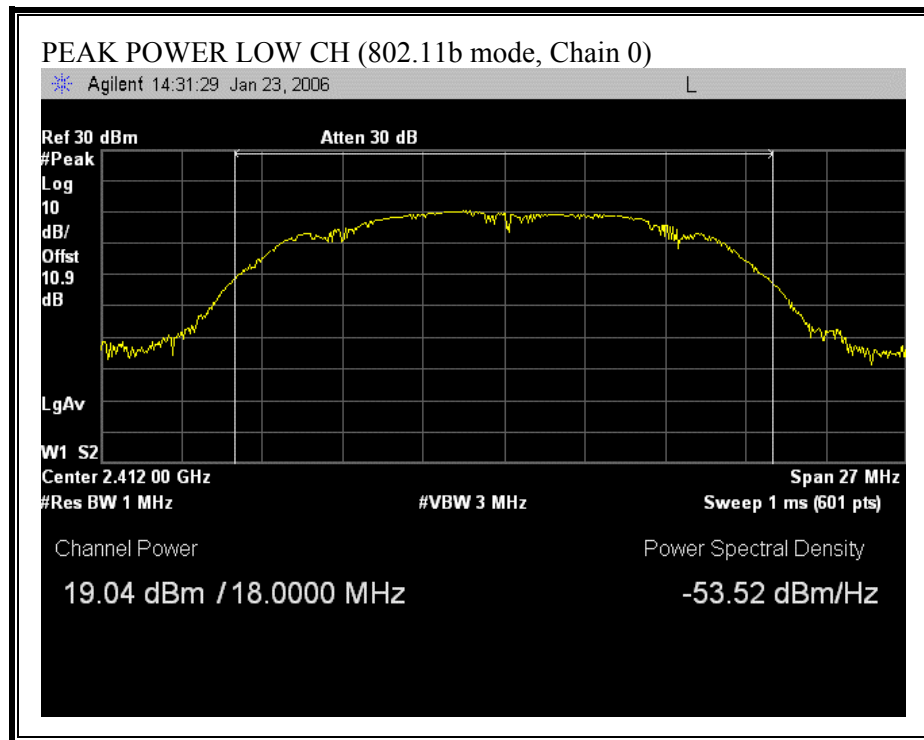
### 802.11g SIMO MODE

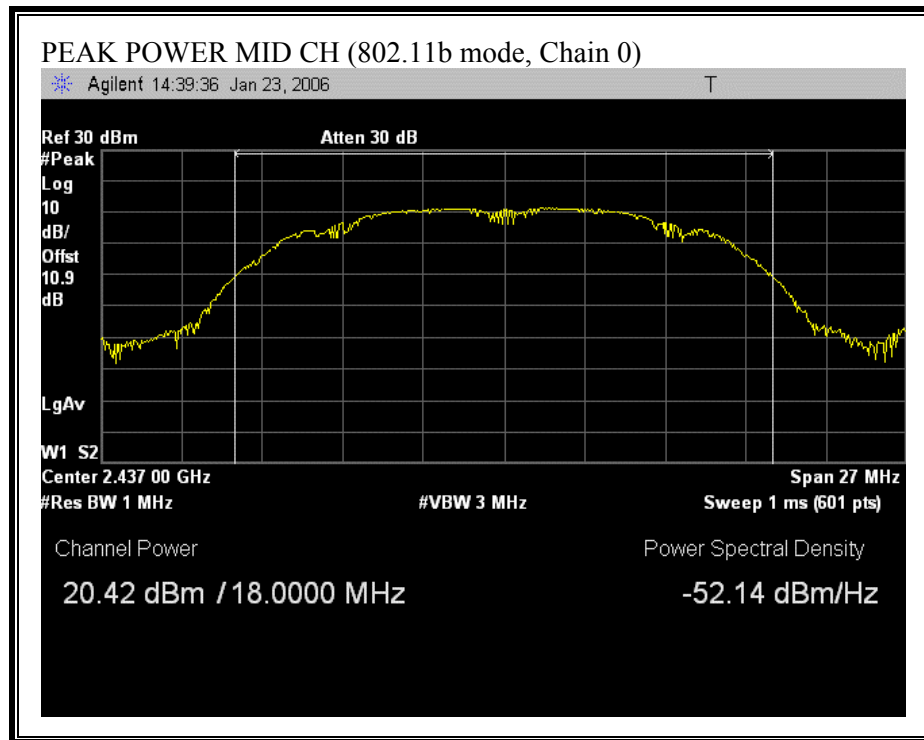
Frequency (MHz)	Peak Power Chain 0 (dBm)	Peak Power Chain 1 (dBm)	Peak Power Total (dBm)	Limit (dBm)	Margin (dB)
2422	16.68	16.26	19.49	30	-10.51
2452	18.10	17.74	20.93	30	-9.07

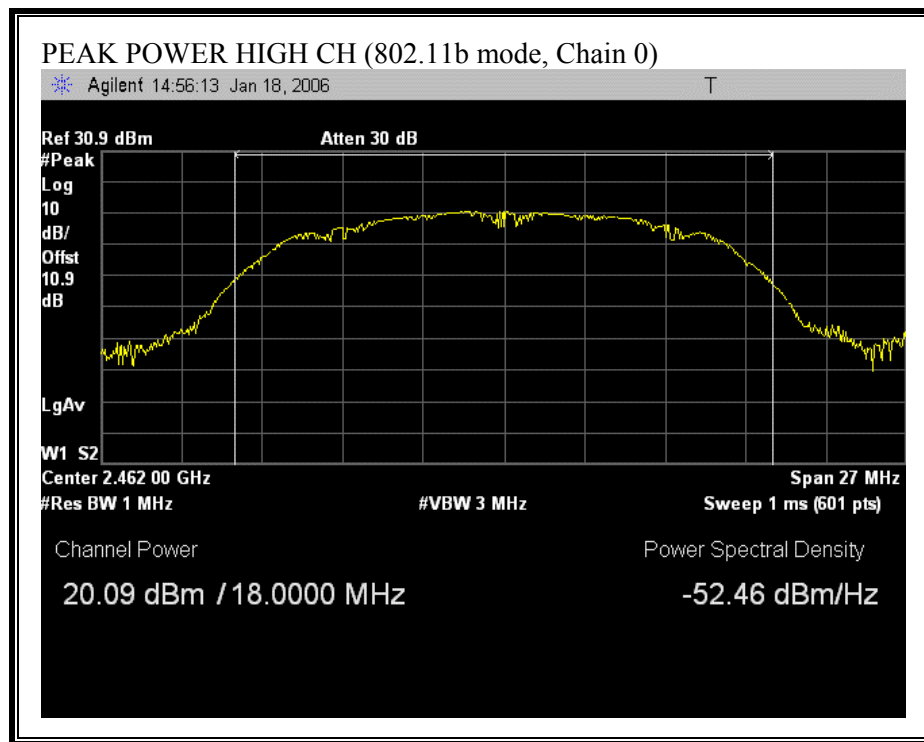
### 802.11g MIMO MODE

Frequency (MHz)	Peak Power Chain 0 (dBm)	Peak Power Chain 1 (dBm)	Peak Power Total (dBm)	Limit (dBm)	Margin (dB)
2422	14.83	14.53	17.69	30	-12.31
2452	18.60	18.11	21.37	30	-8.63

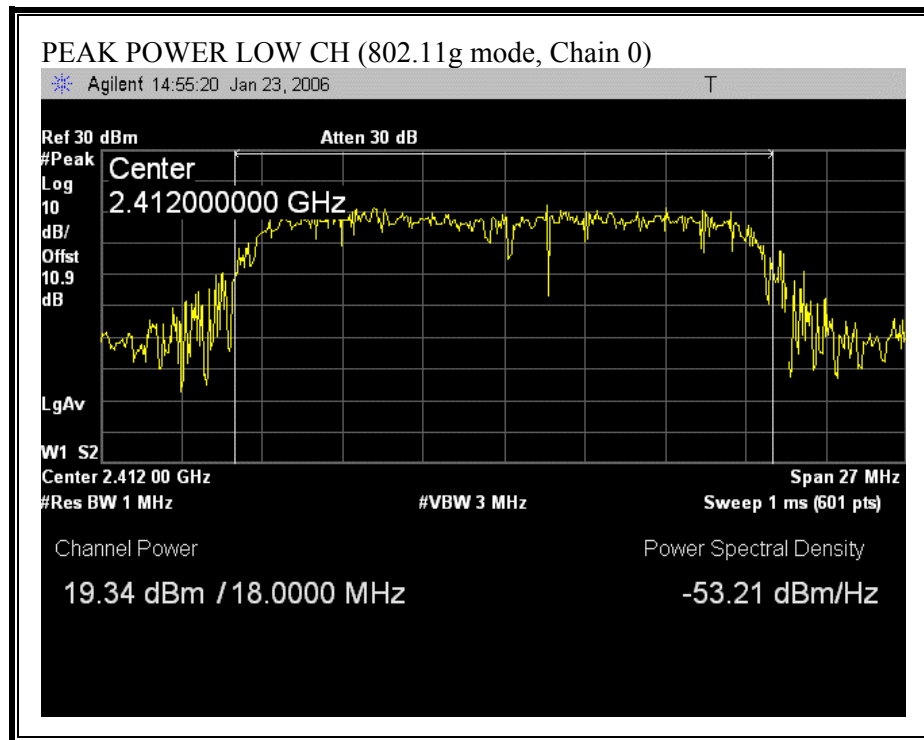
**OUTPUT POWER (802.11b MODE, CHAIN 0)**

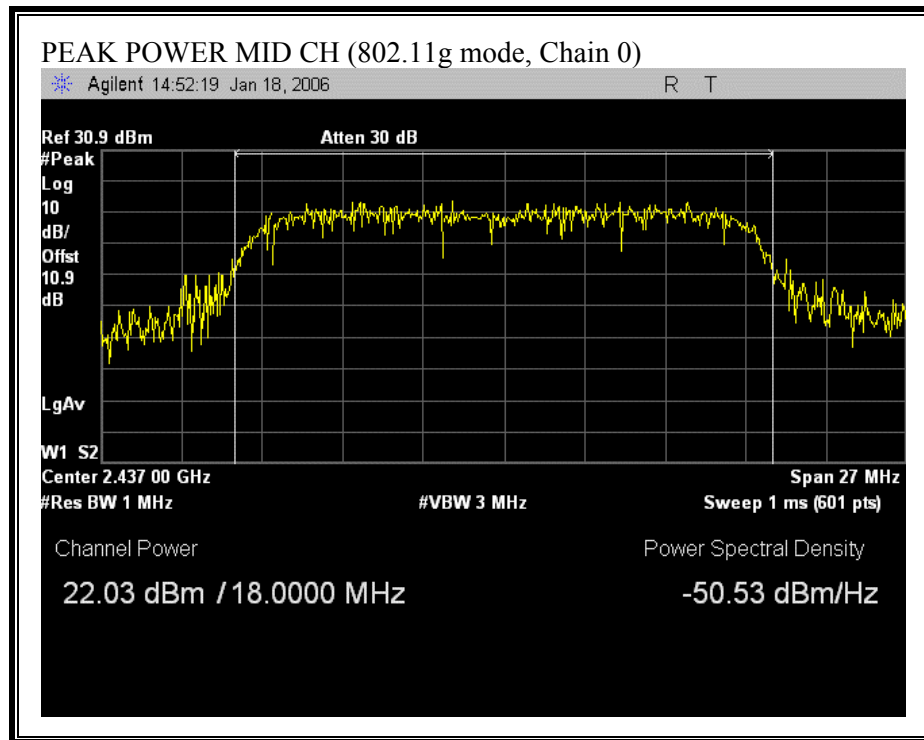


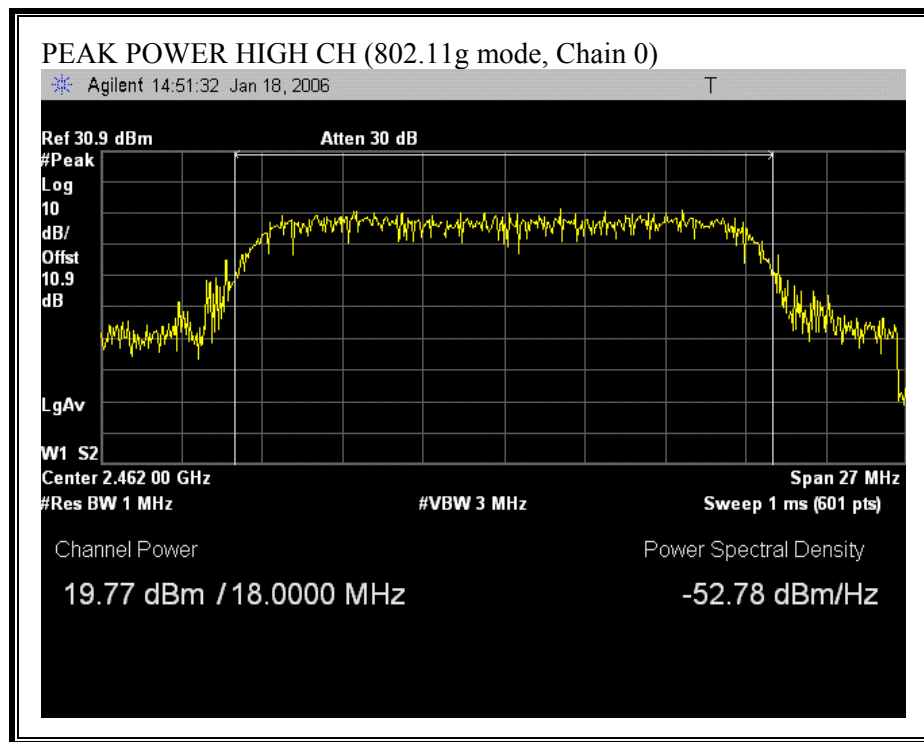




**OUTPUT POWER (802.11g MODE, CHAIN 0)**

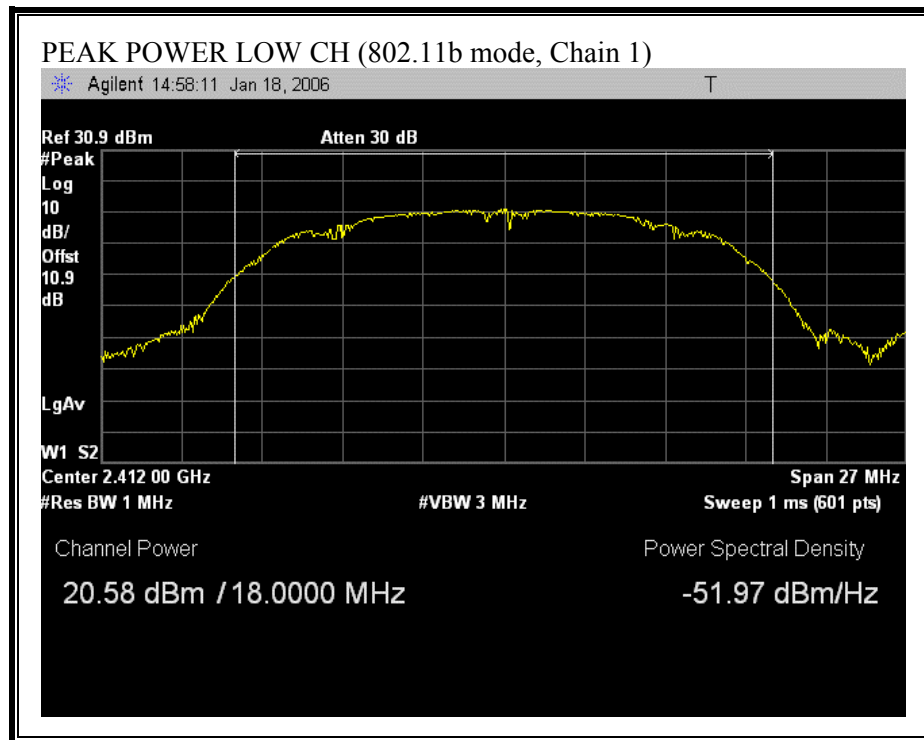


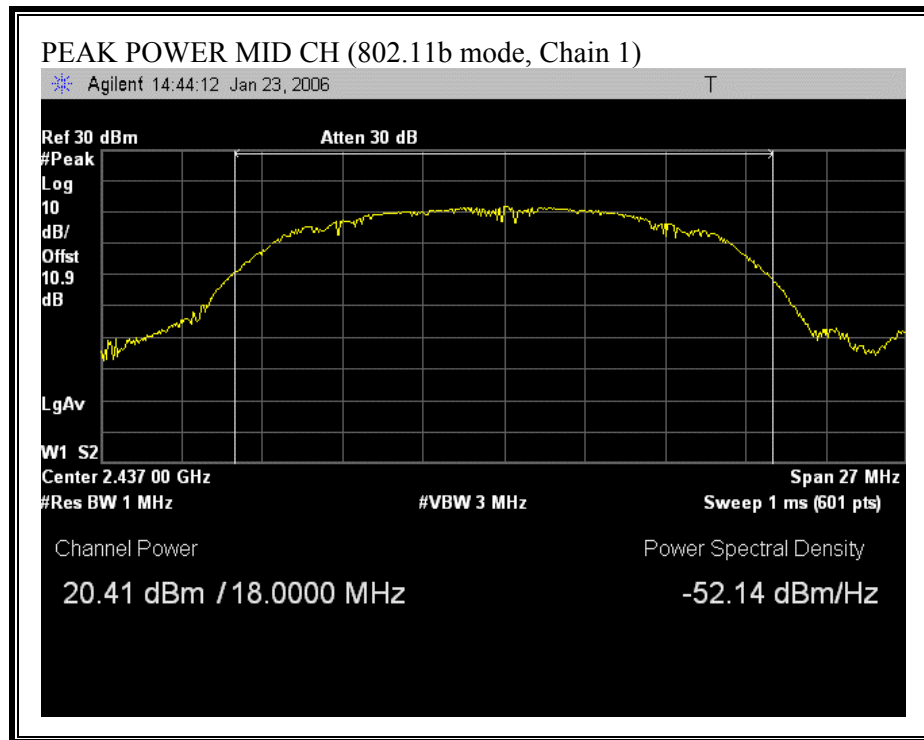


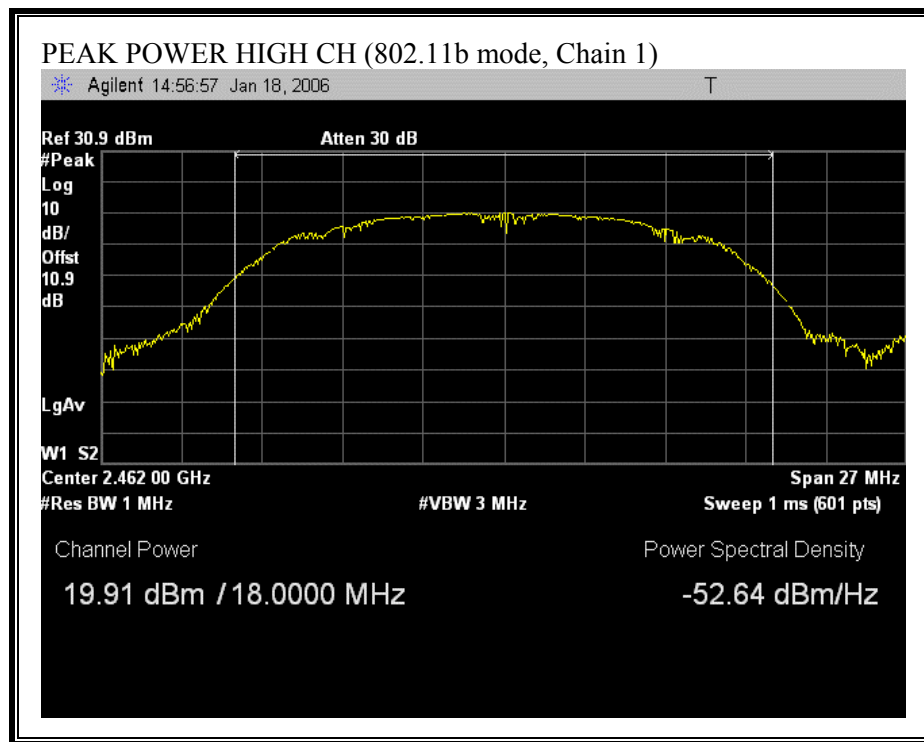




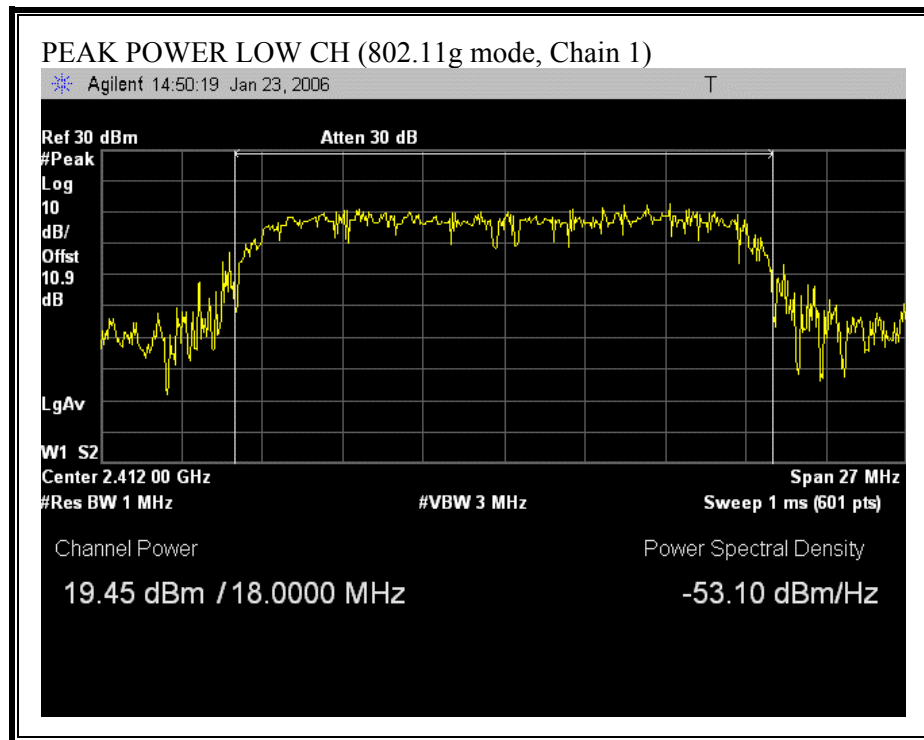
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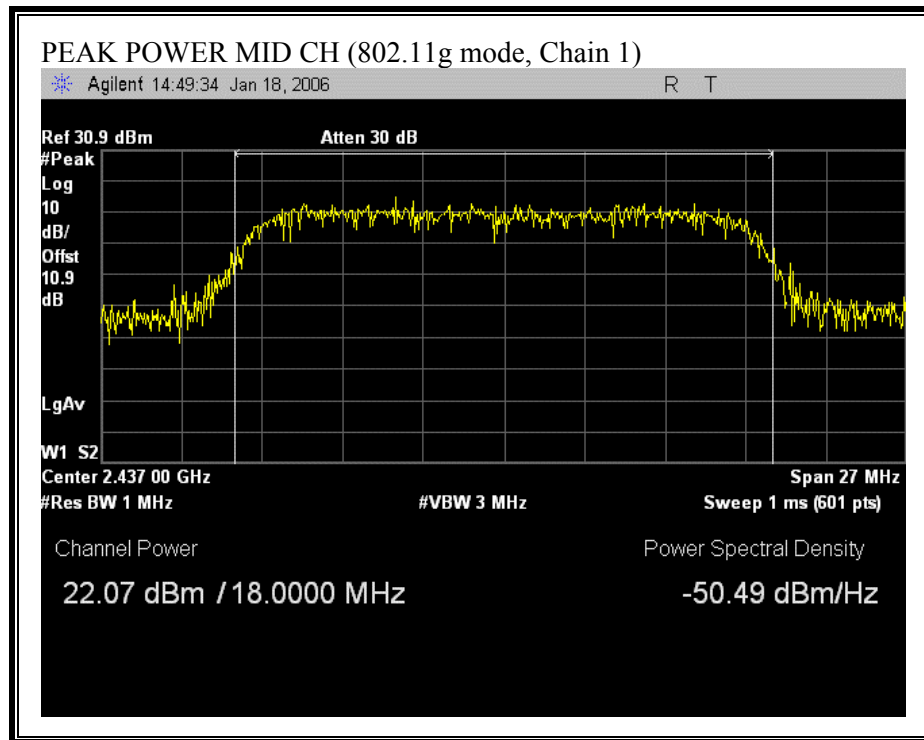


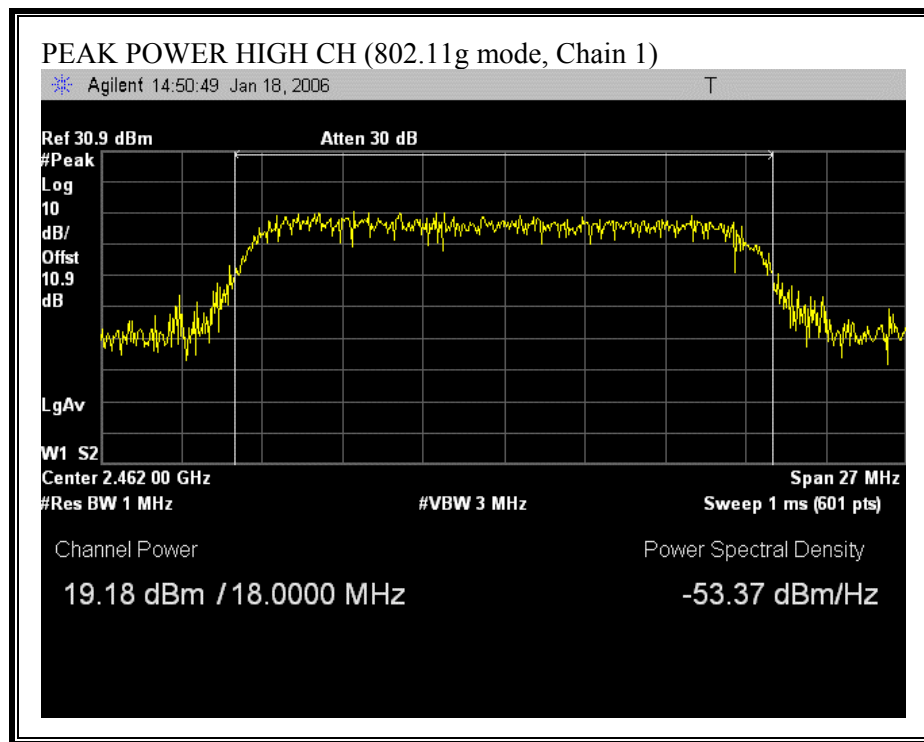




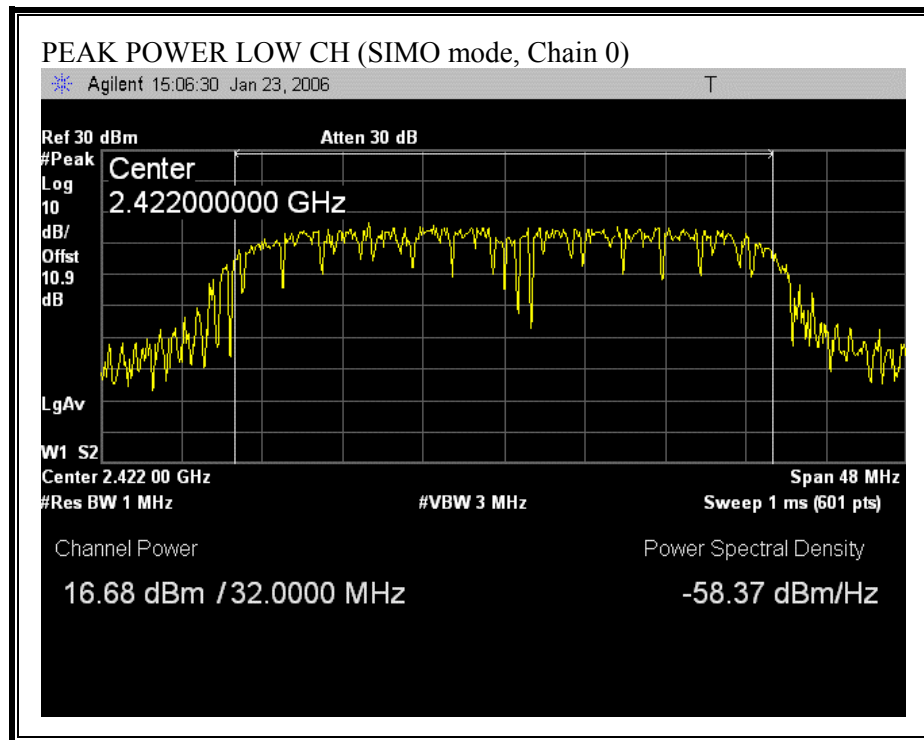
**OUTPUT POWER (802.11g MODE, CHAIN 1)**

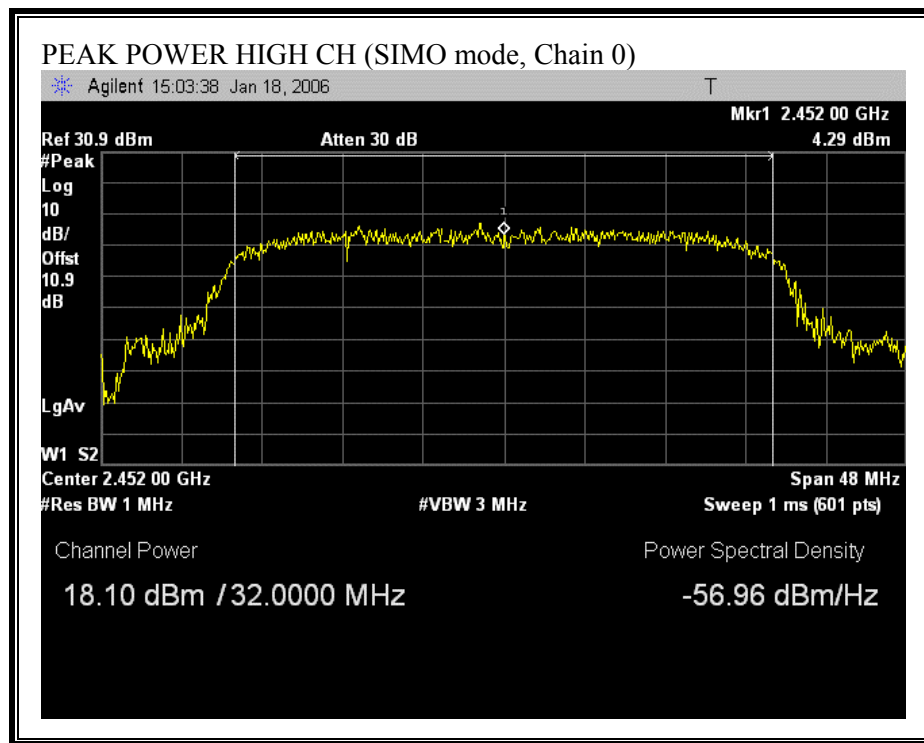






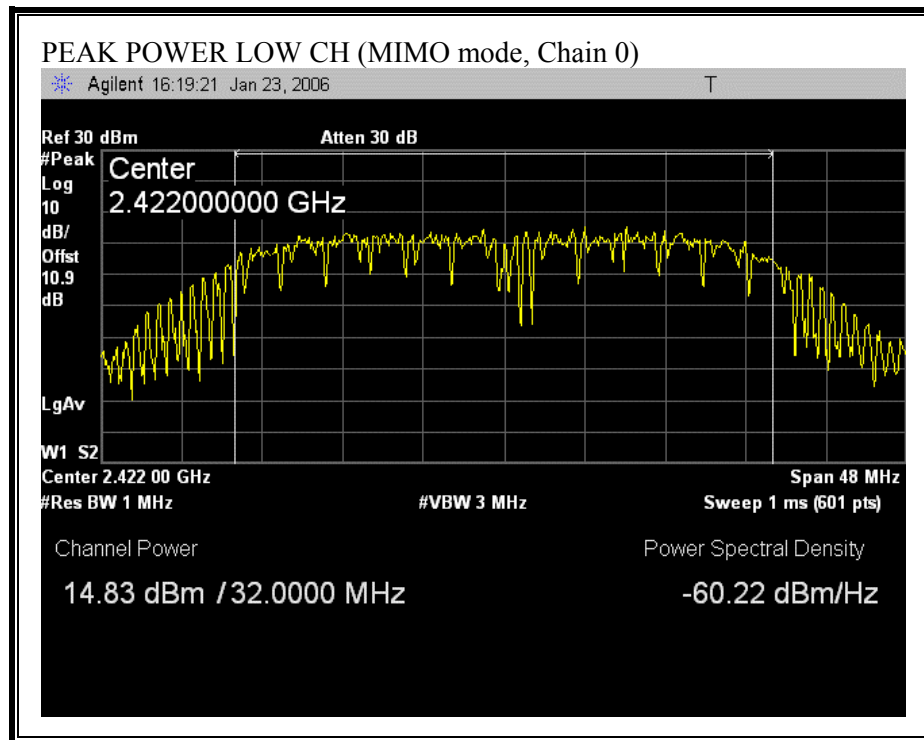
**OUTPUT POWER (SIMO MODE, CHAIN 0)**

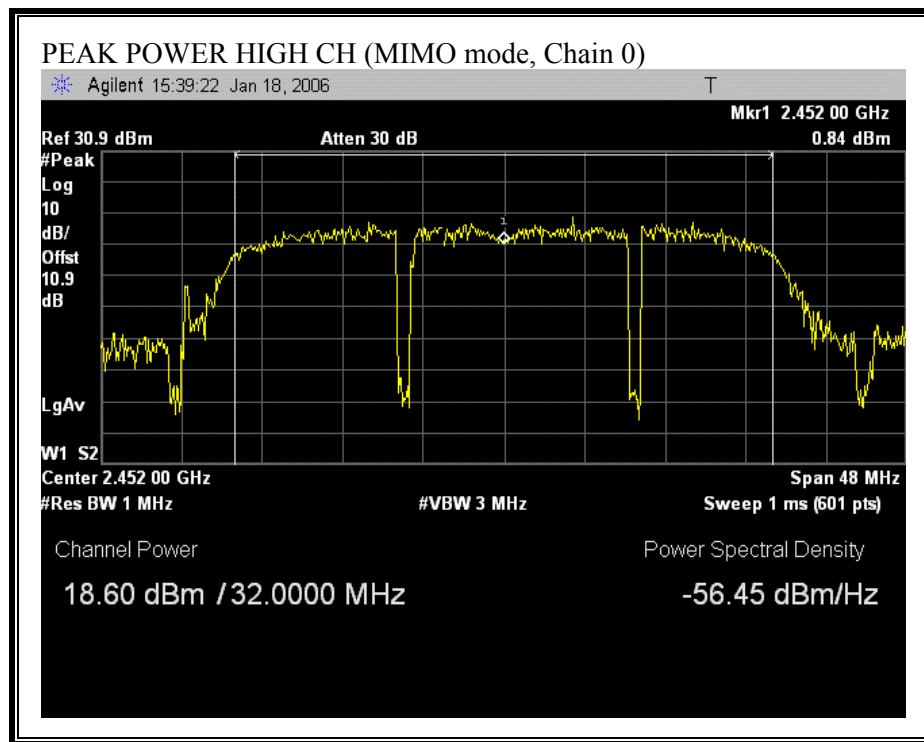




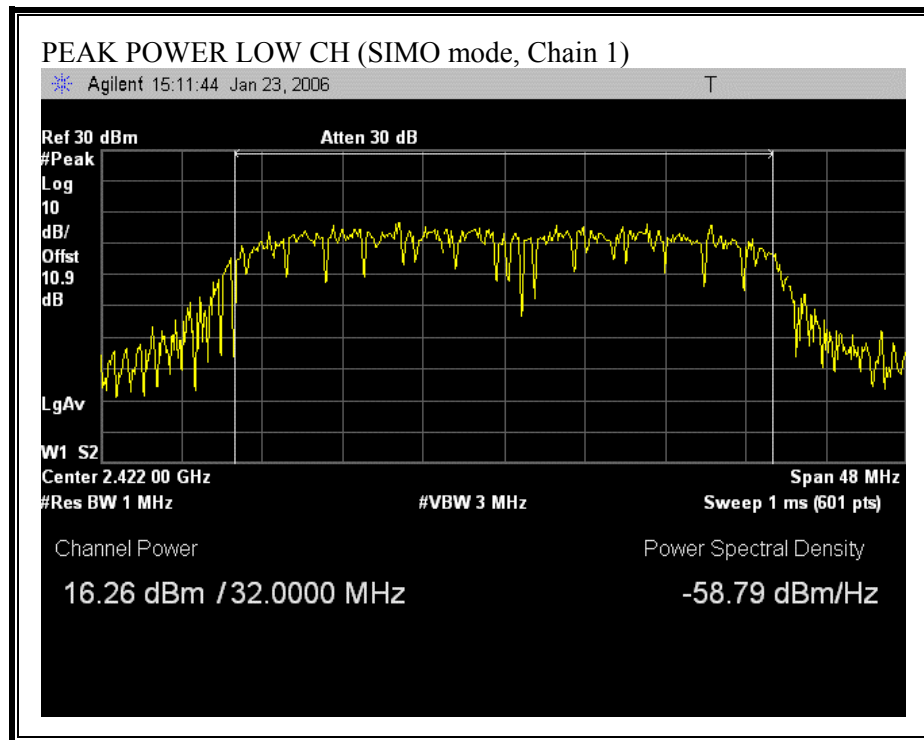


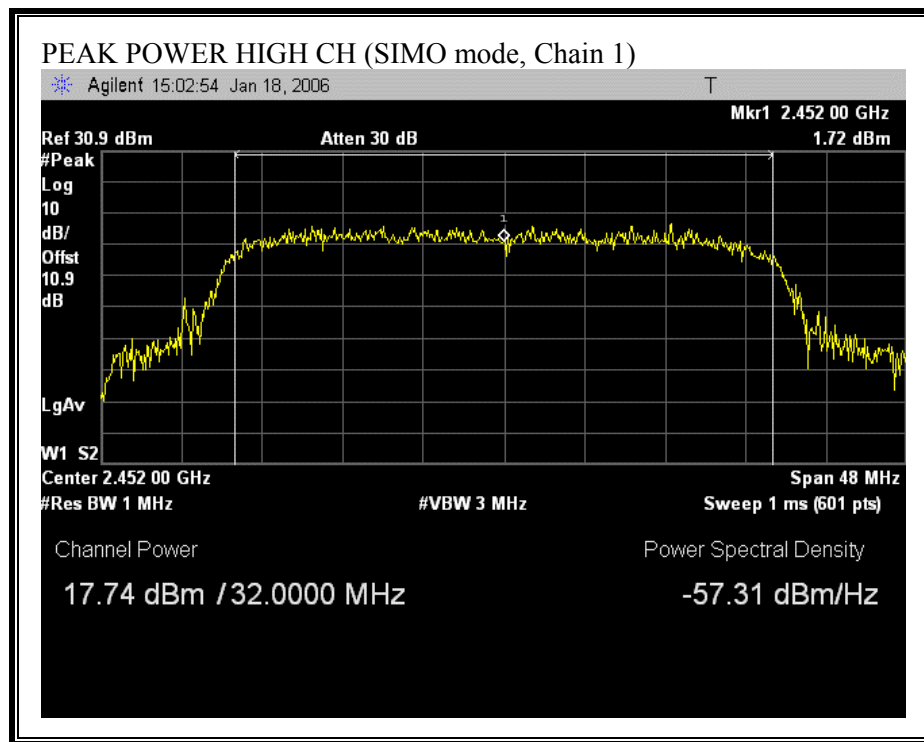
**OUTPUT POWER (MIMO MODE, CHAIN 0)**



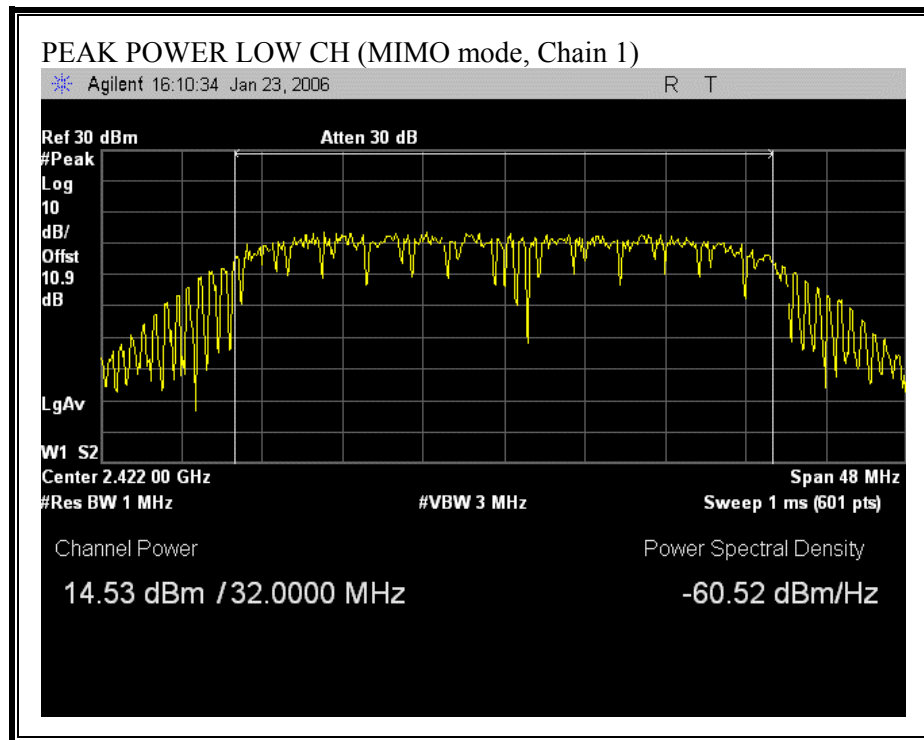


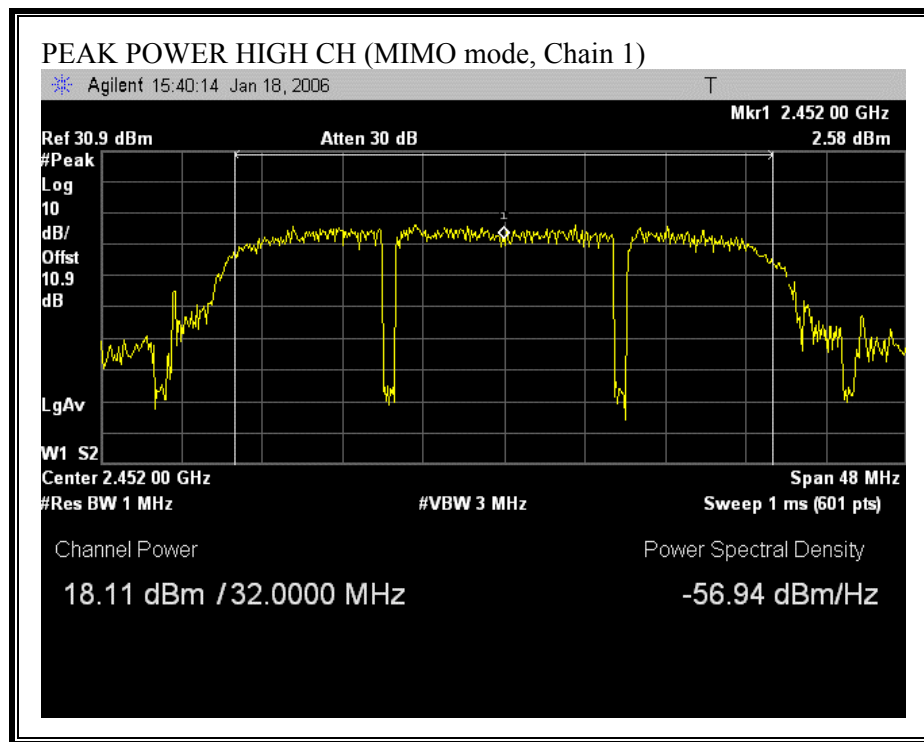
**OUTPUT POWER (SIMO MODE, CHAIN 1)**





**OUTPUT POWER (MIMO MODE, CHAIN 1)**





### **7.1.3. AVERAGE POWER**

#### **AVERAGE POWER LIMIT**

None: for reporting purposes only.

#### **TEST PROCEDURE**

The transmitter output is connected to a power meter.

## **RESULTS**

No non-compliance noted:

The cable assembly insertion loss of 10.9 dB (including 10 dB pad and 0.9 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

### 802.11b MODE

Channel	Frequency (MHz)	Average Power Chain 0 (dBm)	Average Power Chain 1 (dBm)	Average Power Total (dBm)
Low	2412	16.60	17.80	20.25
Middle	2437	17.60	17.70	20.66
High	2462	17.30	17.10	20.21

### 802.11g MODE

Channel	Frequency (MHz)	Average Power Chain 0 (dBm)	Average Power Chain 1 (dBm)	Average Power Total (dBm)
Low	2412	16.20	16.40	19.31
Middle	2437	18.90	18.90	21.91
High	2462	16.60	16.00	19.32

### SIMO MODE

Channel	Frequency (MHz)	Average Power Chain 0 (dBm)	Average Power Chain 1 (dBm)	Average Power Total (dBm)
Low	2422	13.60	13.30	16.46
High	2452	15.10	14.70	17.91

### MIMO MODE

Channel	Frequency (MHz)	Average Power Chain 0 (dBm)	Average Power Chain 1 (dBm)	Average Power Total (dBm)
Low	2422	12.20	12.40	15.31
High	2452	16.00	16.00	19.01



## 7.2. RADIATED EMISSIONS

### 7.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

#### LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

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

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

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

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

## **TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

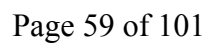
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

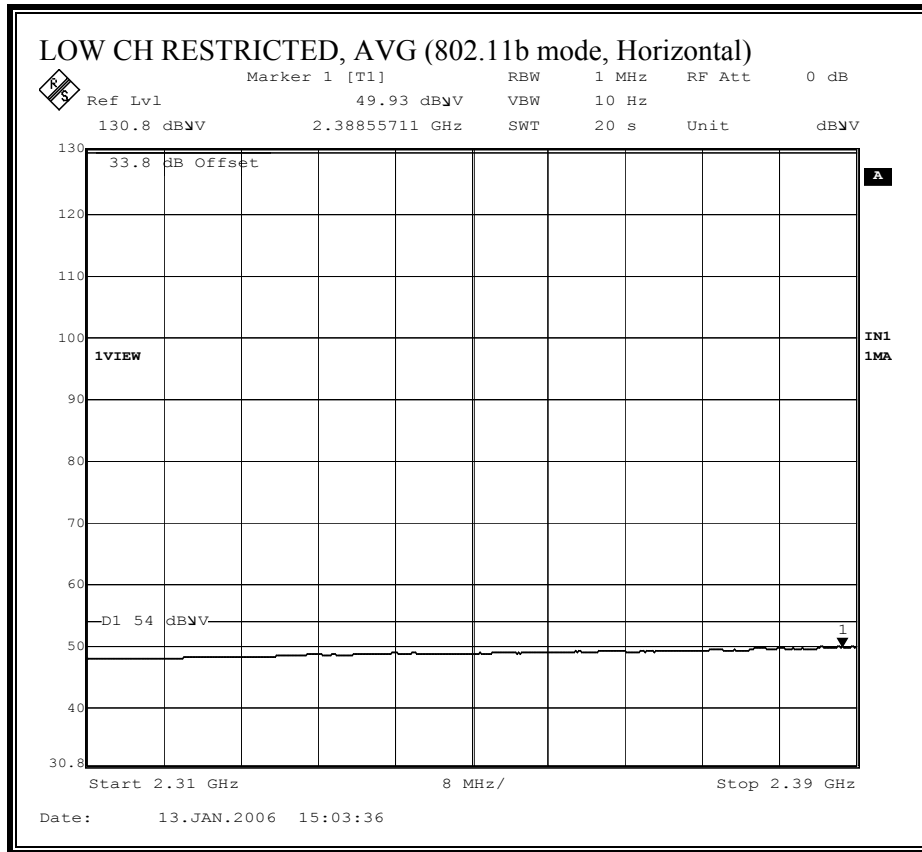
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

## **RESULTS**

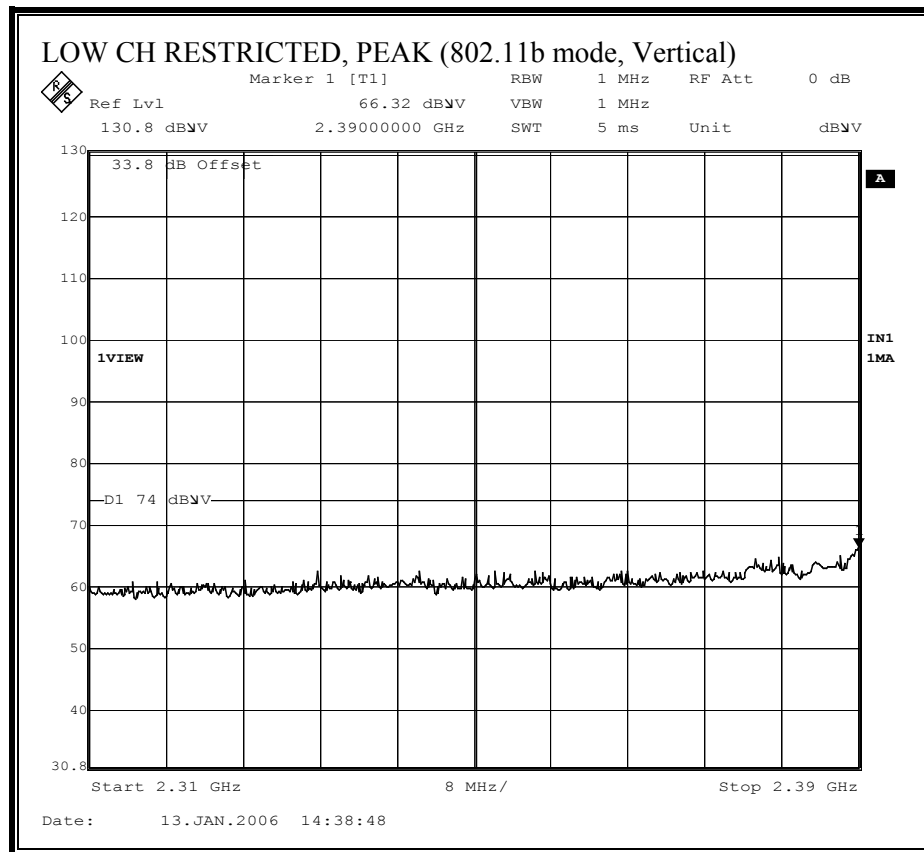
No non-compliance noted.

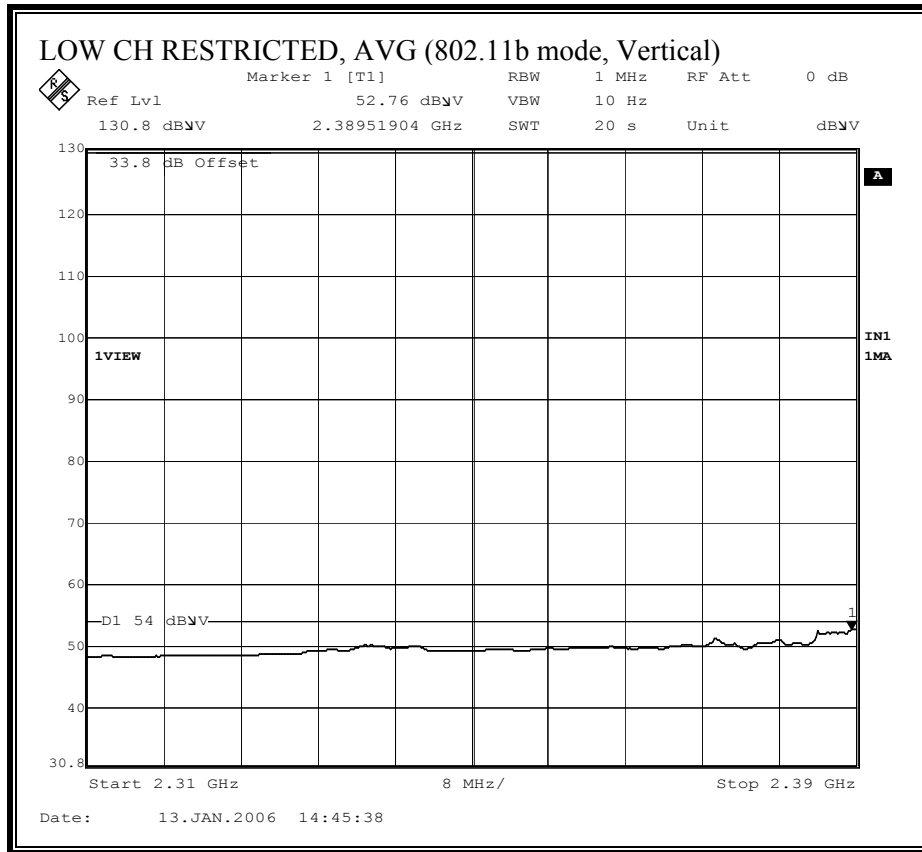
**RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)**



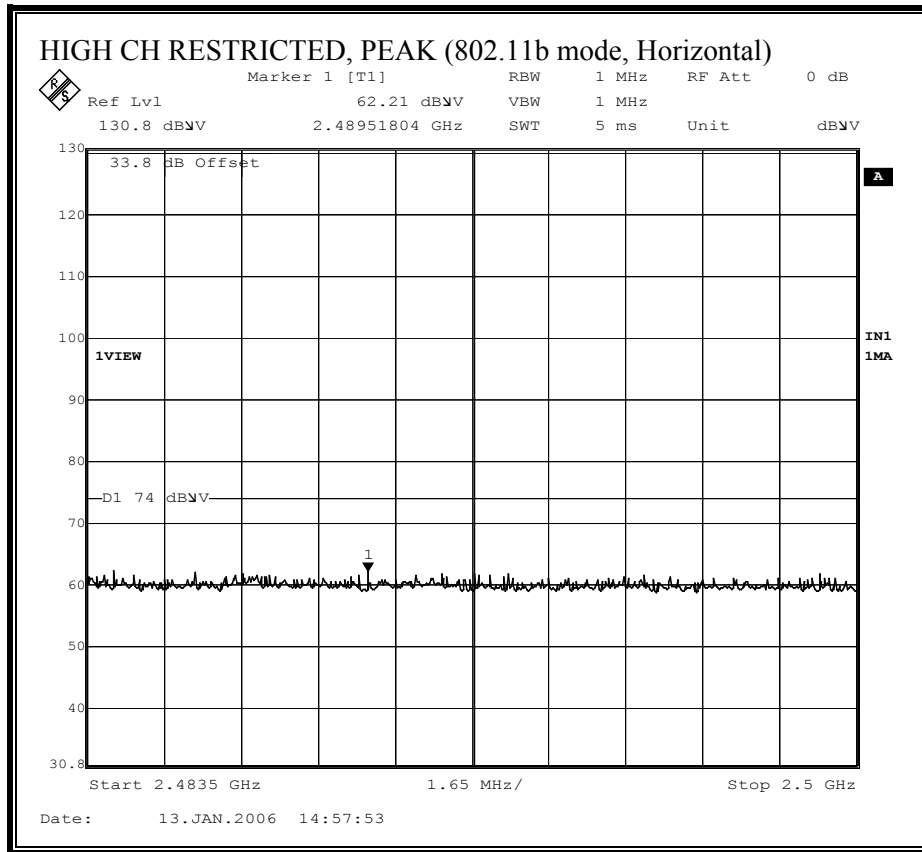


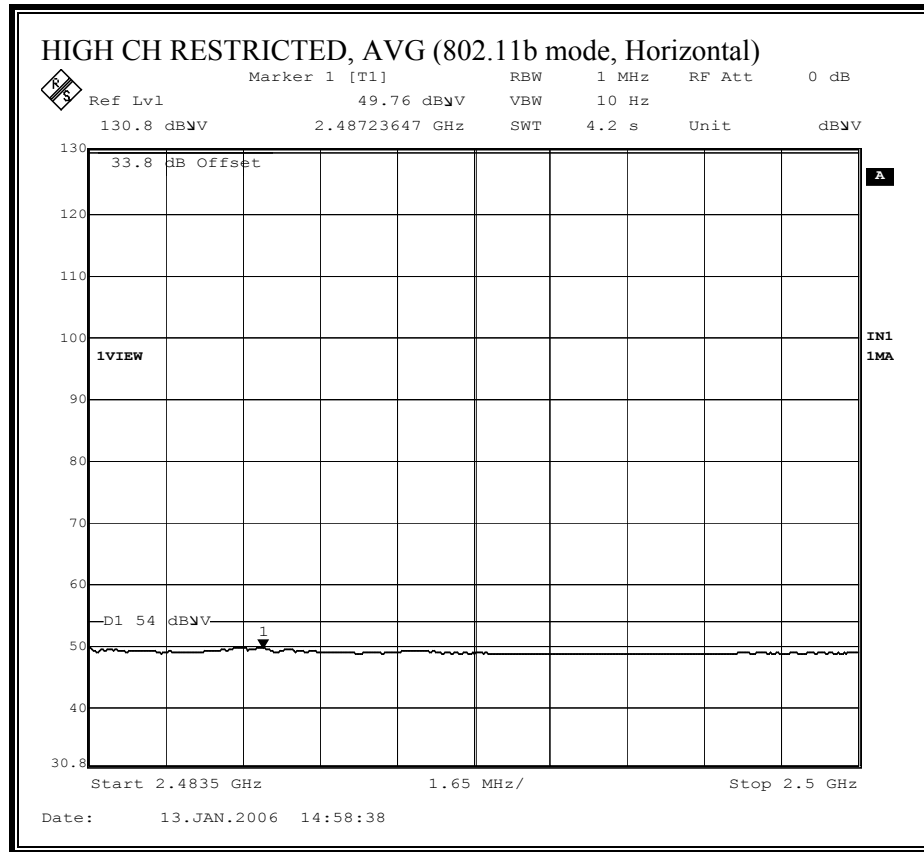
**RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)**





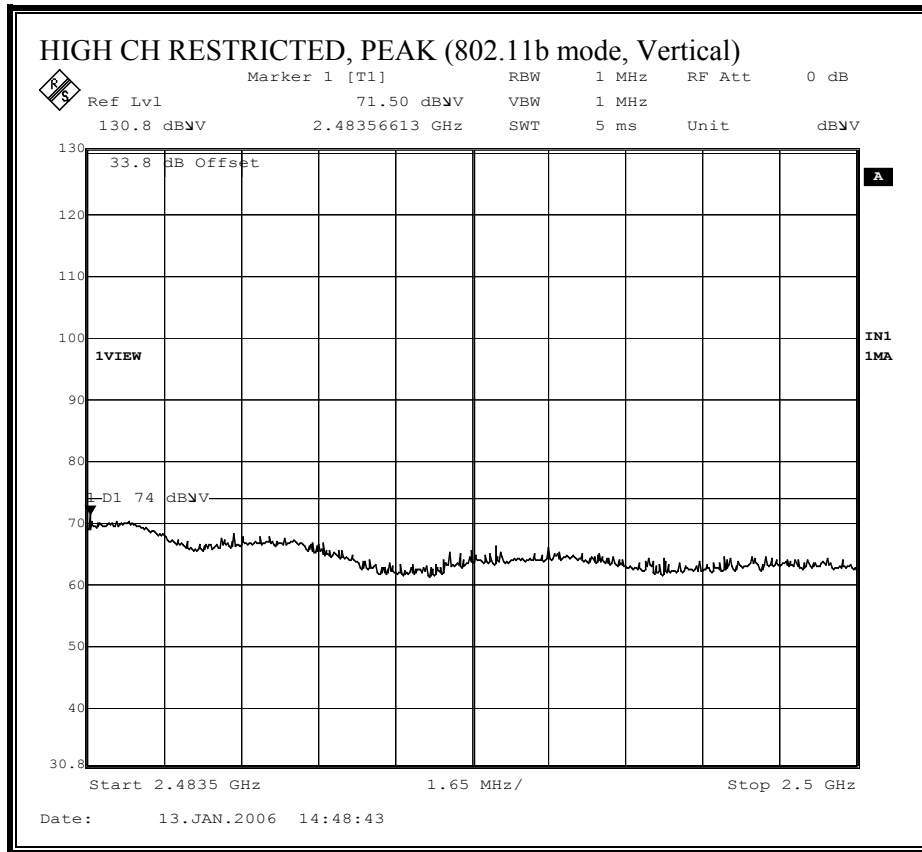
**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)**

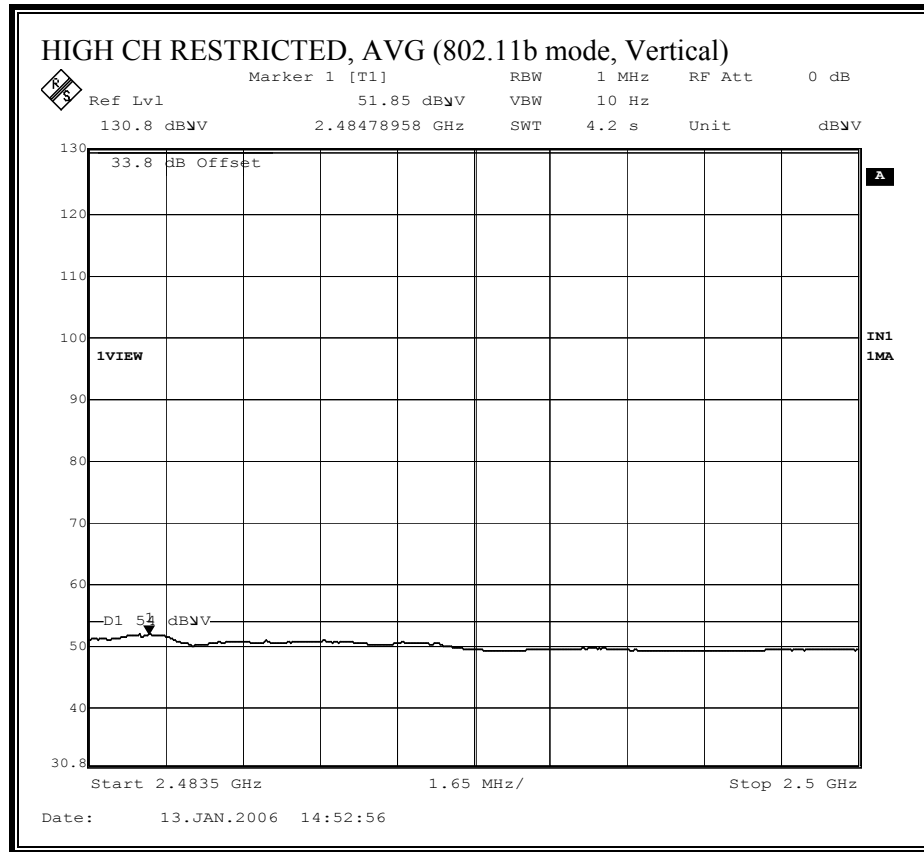






**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)**

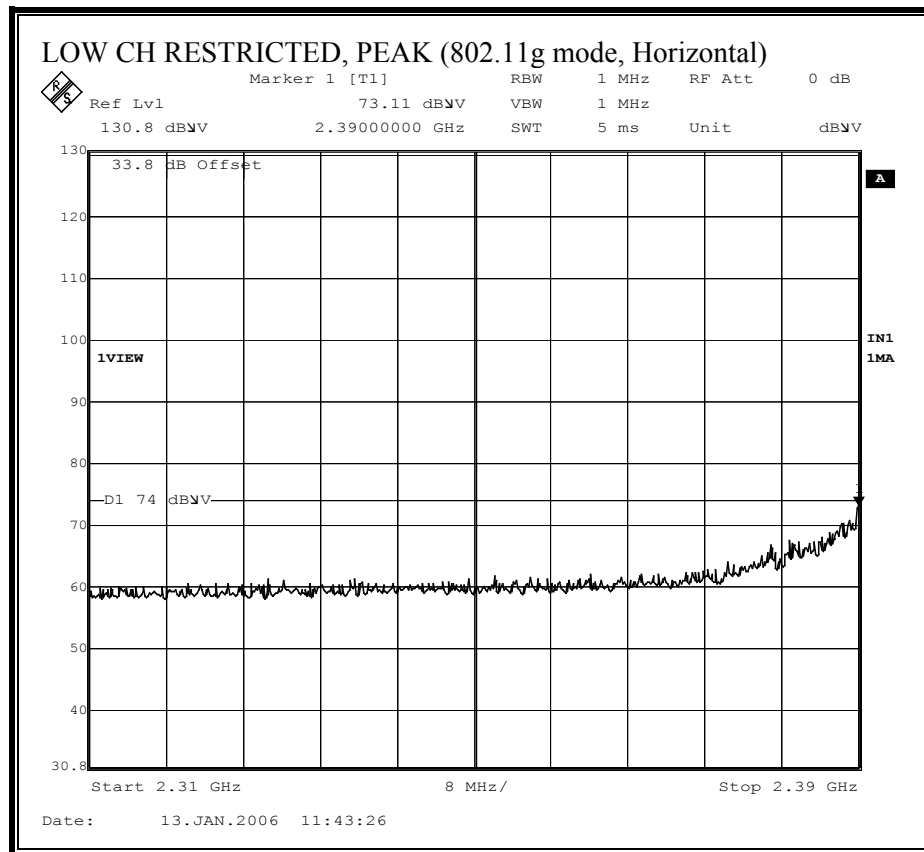


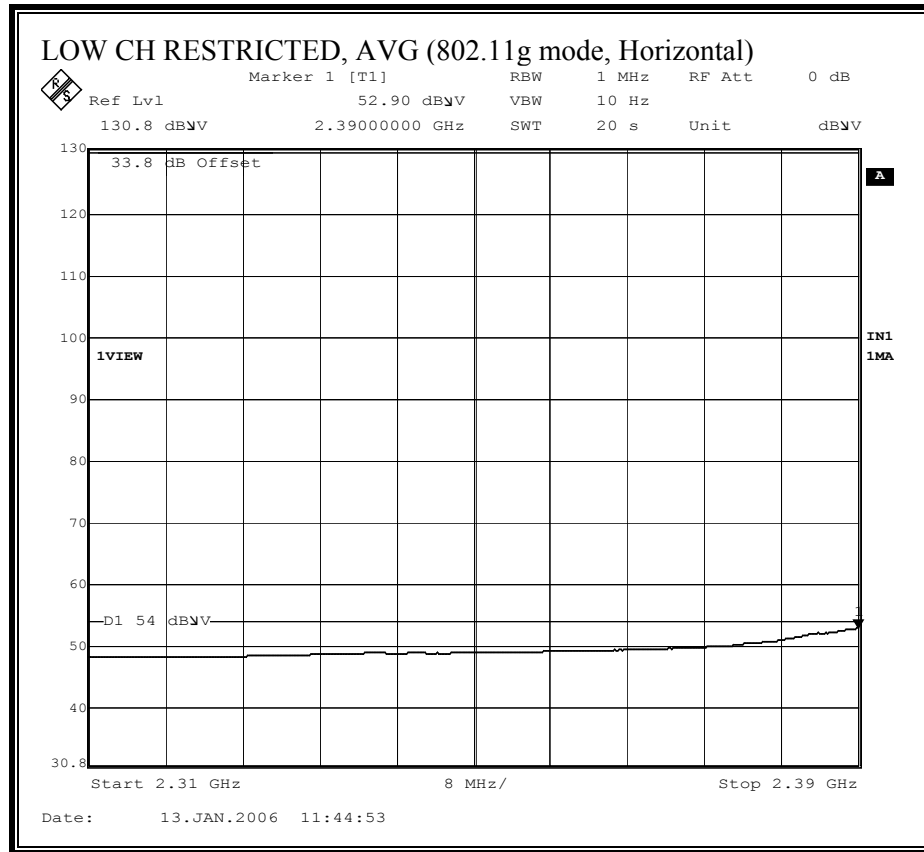


## HARMONICS AND SPURIOUS EMISSIONS (b MODE)

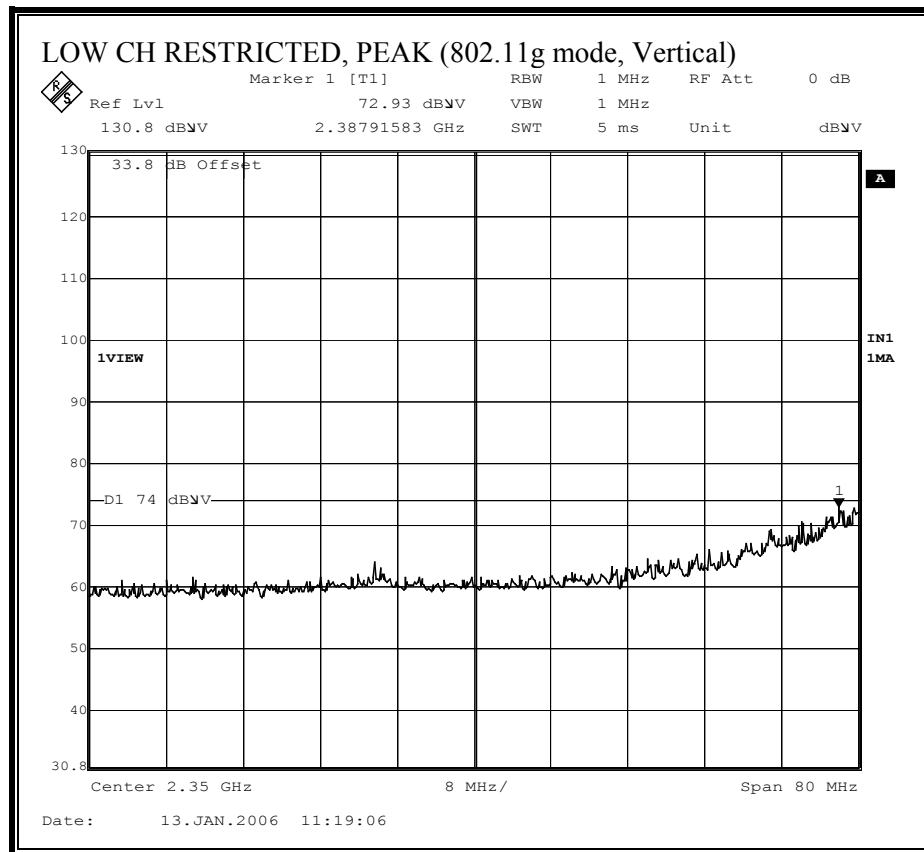
01/16/06 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site																	
Test Engr: Frank Ibrahim Project #: 06U10003 Company: AIRGO EUT Description.: 802.11bg Gen 3RoHS Card Bus EUT M/N: AGN3023PC-01 Test Target: FCC 15.247 Mode of Operation: TX ON, in 11b Mode																	
Test Equipment:																	
Horn 1-18GHz T60; S/N: 2238 @3m				Pre-amplifier 1-26GHz T145 Agilent 3008A0056				Pre-amplifier 26-40GHz				Horn > 18GHz T125; ARA 18-26GHz; S/N:1007					
Hi Frequency Cables																	
2 foot cable				3 foot cable Frank 177080001				12 foot cable Frank 187209001				HPF HPF_4.0GHz		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz; VBW=10Hz	
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)		
Low Channel, 2412 MHz																	
4.824	3.0	43.3	29.4	33.6	4.0	-34.8	0.0	0.6	46.6	32.7	74	54	-27.4	-21.3	V, 17 dBm		
4.824	3.0	42.5	29.1	33.6	4.0	-34.8	0.0	0.6	45.8	32.4	74	54	-28.2	-21.6	H, 17 dBm		
Mid Channel, 2437 MHz																	
4.874	3.0	45.0	36.1	33.7	4.0	-34.9	0.0	0.6	48.4	39.5	74	54	-25.6	-14.5	V, 19 dBm		
7.311	3.0	54.3	44.9	36.2	4.6	-34.7	0.0	0.6	61.1	51.7	74	54	-12.9	-2.3	V, 19 dBm		
4.874	3.0	45.7	36.9	33.7	4.0	-34.9	0.0	0.6	49.1	40.3	74	54	-24.9	-13.7	H, 19 dBm		
7.311	3.0	51.3	41.5	36.2	4.6	-34.7	0.0	0.6	58.0	48.2	74	54	-16.0	-5.8	H, 19 dBm		
High Channel, 2462 MHz																	
4.924	3.0	42.5	28.8	33.7	4.0	-34.9	0.0	0.6	46.0	32.3	74	54	-28.0	-21.7	V, 16.5 dBm		
7.386	3.0	45.6	36.0	36.2	4.6	-34.6	0.0	0.6	52.4	42.8	74	54	-21.6	-11.2	V, 16.5 dBm		
4.924	3.0	45.4	37.3	33.7	4.0	-34.9	0.0	0.6	48.9	40.8	74	54	-25.1	-13.2	H, 16.5 dBm		
7.386	3.0	44.7	30.2	36.2	4.6	-34.6	0.0	0.6	51.5	37.1	74	54	-22.5	-16.9	H, 16.5 dBm		
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										
EUT was scanned from 1 GHz to 25 GHz, no other signals were found above the noise floor.																	

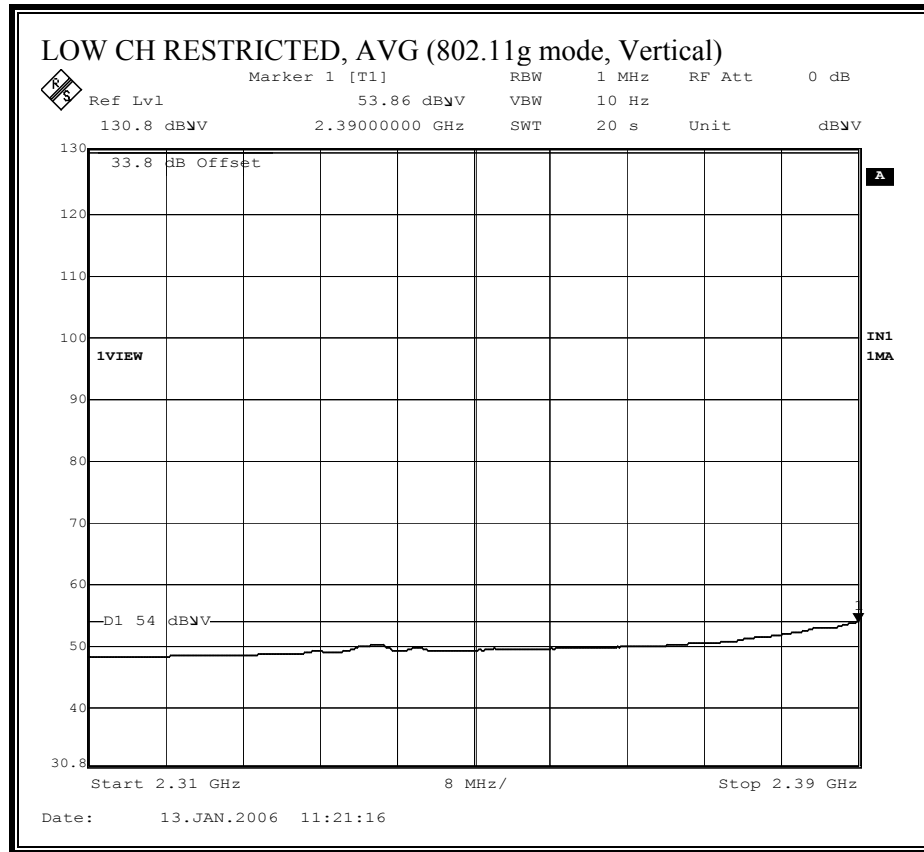
**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)**



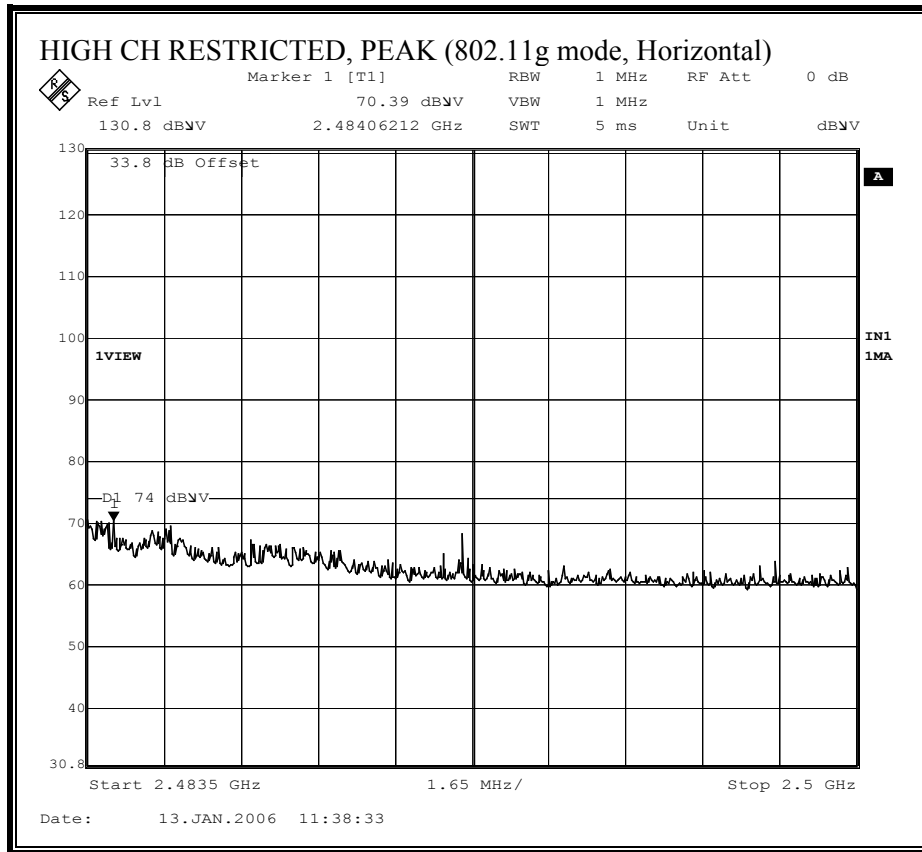


**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)**

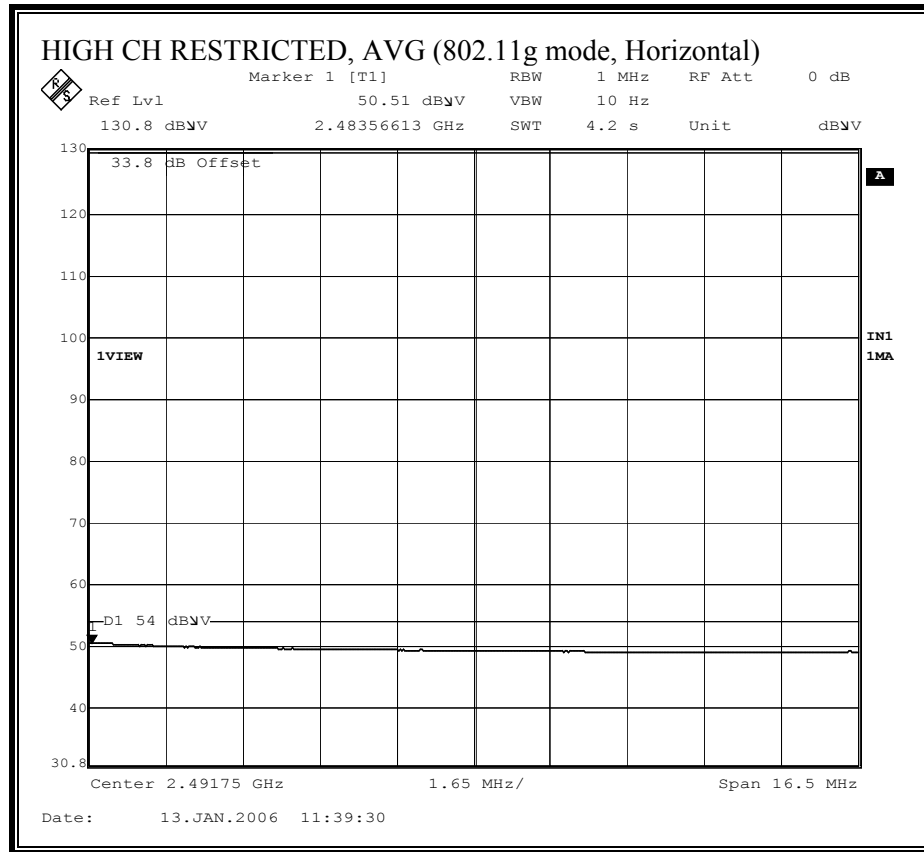




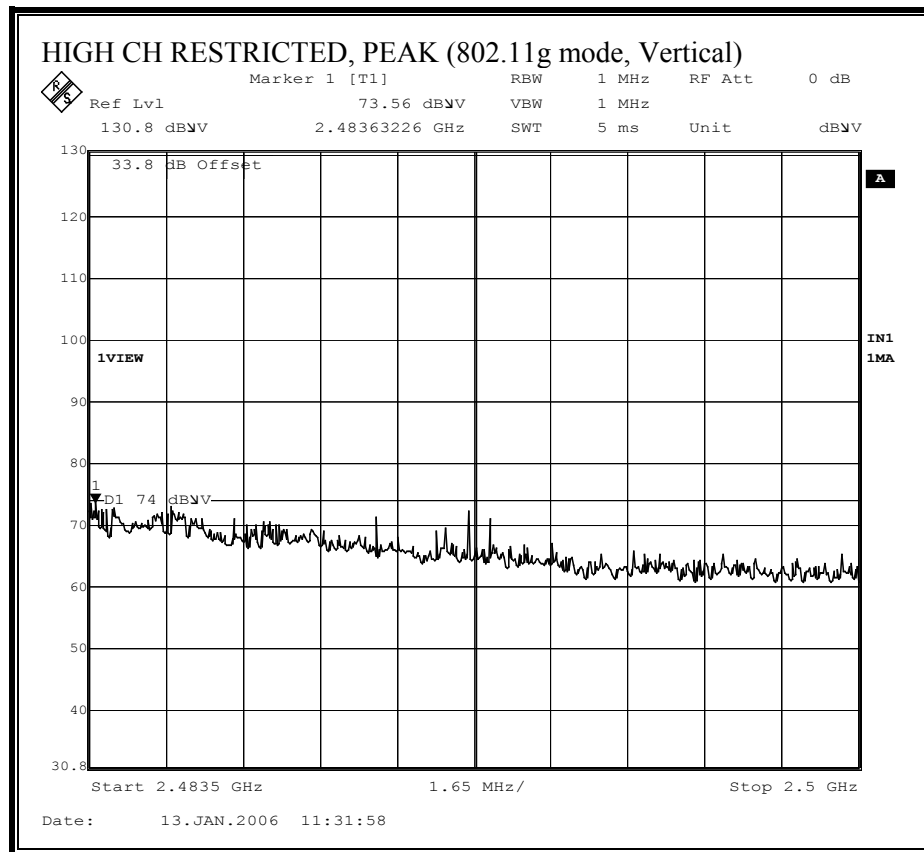
**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)**

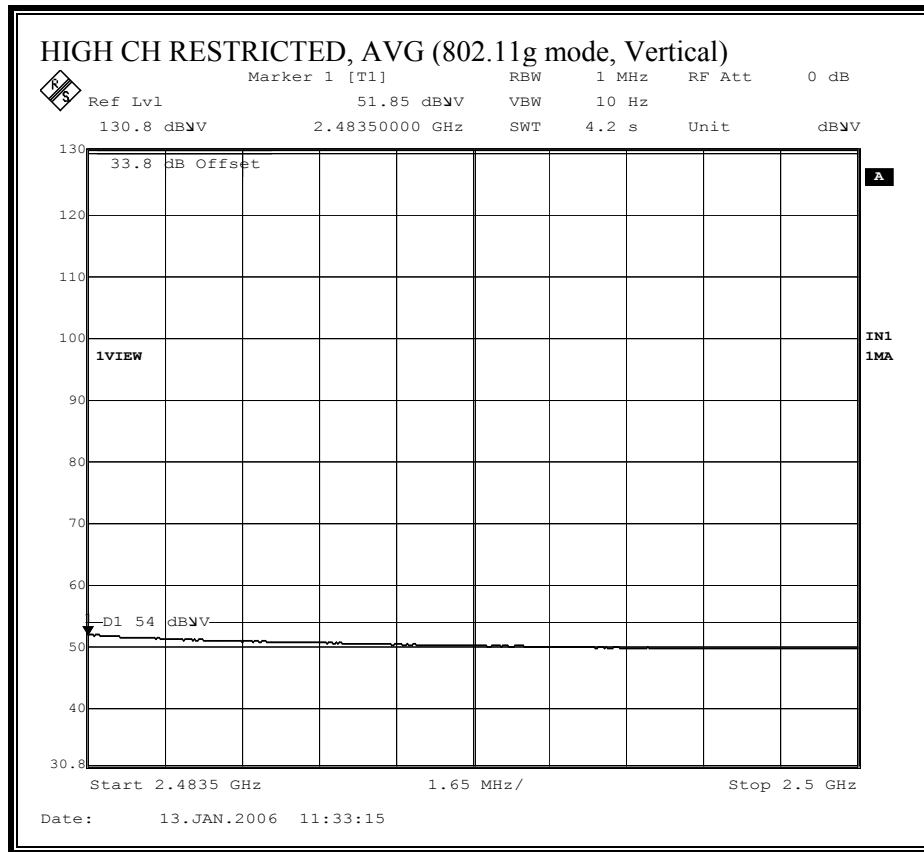






**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)**

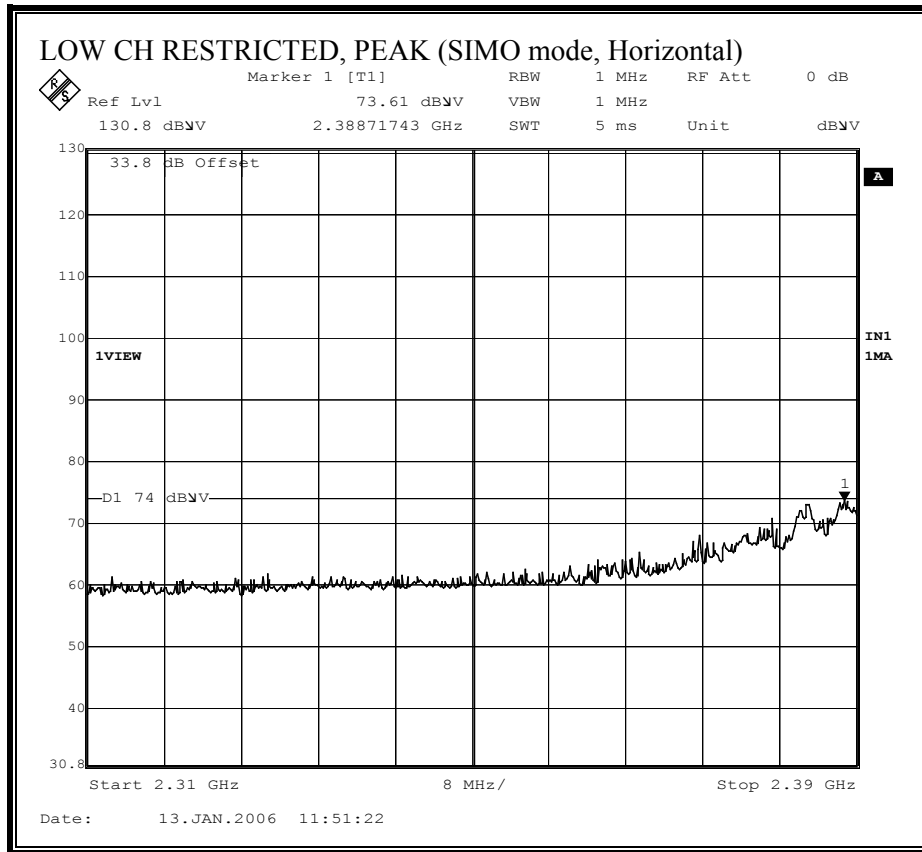


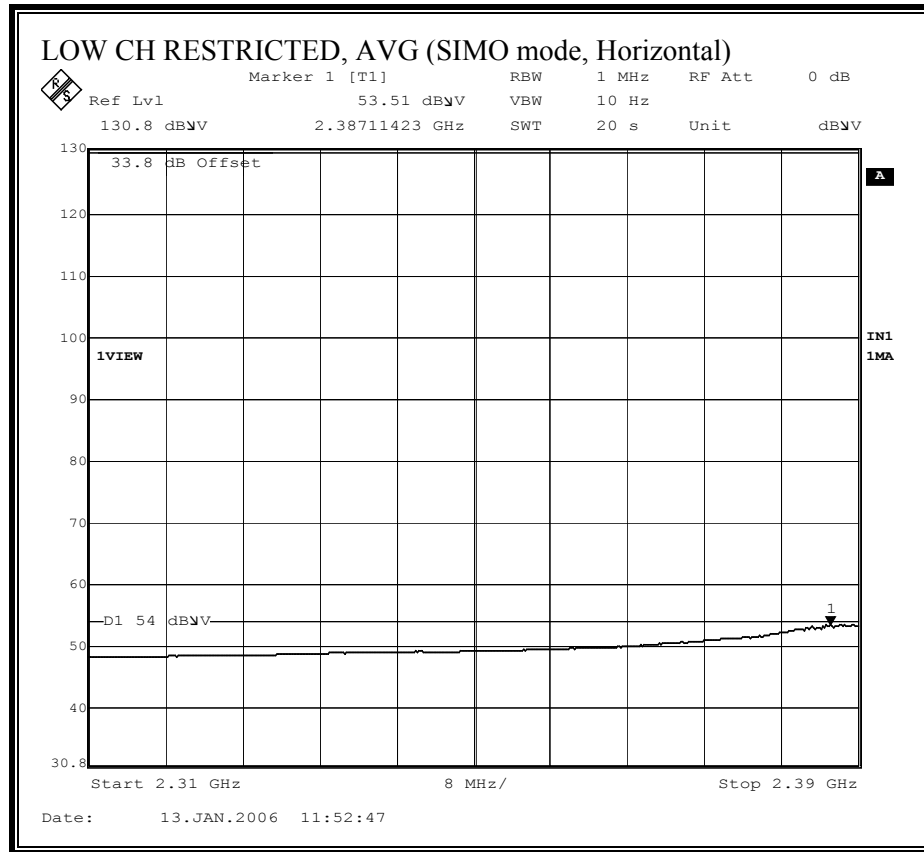


## HARMONICS AND SPURIOUS EMISSIONS (g MODE)

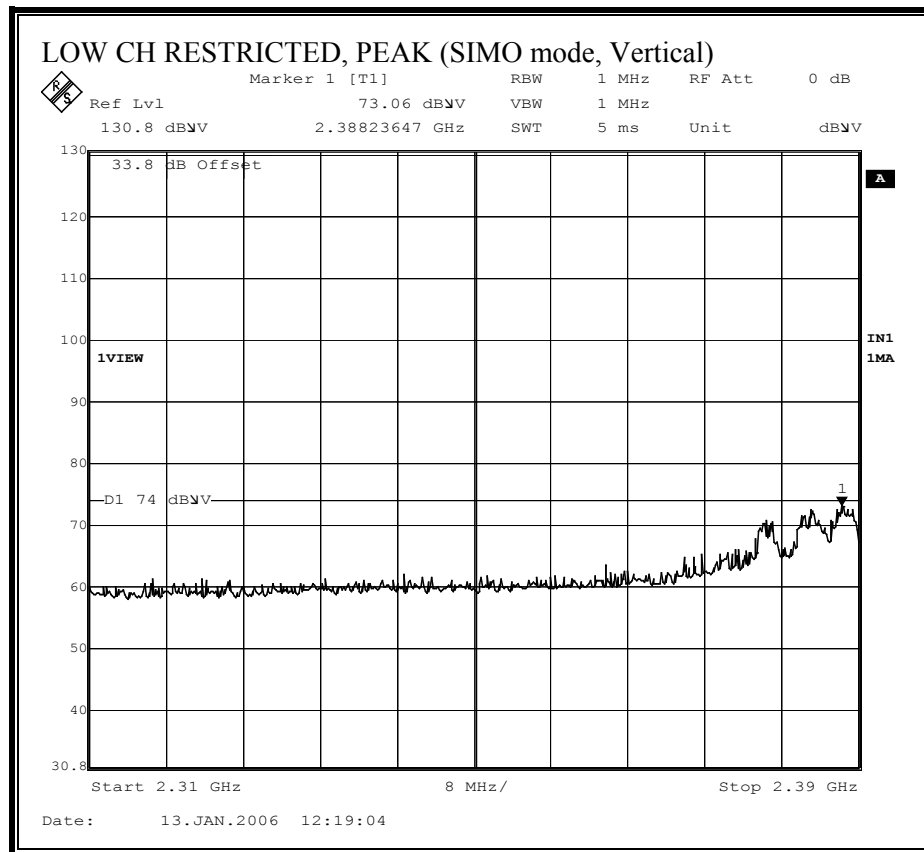
01/16/06 <b>High Frequency Measurement</b> <b>Compliance Certification Services, Morgan Hill Open Field Site</b>															
Test Engr: Frank Ibrahim Project #: 06U10003 Company: AIRGO EUT Description.: 802.11bg Gen 3RoHS Card Bus EUT M/N: AGN3023PC-01 Test Target: FCC 15.247 Mode of Operation: TX ON, in 11g Mode															
<b>Test Equipment:</b>															
Horn 1-18GHz T60; S/N: 2238 @3m		Pre-amplifier 1-26GHz T145 Agilent 3008A0056		Pre-amplifier 26-40GHz		Horn > 18GHz T125; ARA 18-26GHz; S/N:1007									
Hi Frequency Cables															
2 foot cable		3 foot cable Frank 177080001		12 foot cable Frank 187209001		HPF HPF_4.0GHz		Reject Filter		<b>Peak Measurements</b> RBW=VBW=1MHz <b>Average Measurements</b> RBW=1MHz ; VBW=10Hz					
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fldr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Channel, 2412 MHz</b>															
4.824	3.0	43.4	30.2	33.6	4.0	-34.8	0.0	0.6	46.7	33.5	74	54	-27.3	-20.5	V, 16.5 dBm
4.824	3.0	43.2	30.3	33.6	4.0	-34.8	0.0	0.6	46.5	33.6	74	54	-27.5	-20.4	H, 16.5 dBm
<b>Mid Channel, 2437 MHz</b>															
4.874	3.0	50.9	36.7	33.7	4.0	-34.9	0.0	0.6	54.3	40.1	74	54	-19.7	-13.9	V, 19 dBm
7.311	3.0	64.5	45.9	36.2	4.6	-34.7	0.0	0.6	71.2	52.6	74	54	-2.8	-1.4	V, 18 dBm
4.874	3.0	48.0	34.1	33.7	4.0	-34.9	0.0	0.6	51.5	37.5	74	54	-22.5	-16.5	H, 19 dBm
7.311	3.0	55.7	38.9	36.2	4.6	-34.7	0.0	0.6	62.5	45.6	74	54	-11.5	-8.4	H, 19 dBm
<b>High Channel, 2462 MHz</b>															
4.924	3.0	42.5	29.2	33.7	4.0	-34.9	0.0	0.6	46.0	32.7	74	54	-28.0	-21.3	V, 15 dBm
7.386	3.0	56.7	33.2	36.2	4.6	-34.6	0.0	0.6	63.5	40.1	74	54	-10.5	-13.9	V, 15 dBm
4.924	3.0	44.2	29.6	33.7	4.0	-34.9	0.0	0.6	47.7	33.1	74	54	-26.3	-20.9	H, 15 dBm
7.386	3.0	50.3	31.6	36.2	4.6	-34.6	0.0	0.6	57.2	38.5	74	54	-16.8	-15.5	H, 15 dBm
f      Measurement Frequency      Amp      Preamp Gain      Avg Lim      Average Field Strength Limit Dist      Distance to Antenna      D Corr      Distance Correct to 3 meters      Pk Lim      Peak Field Strength Limit Read      Analyzer Reading      Avg      Average Field Strength @ 3 m      Avg Mar      Margin vs. Average Limit AF      Antenna Factor      Peak      Calculated Peak Field Strength      Pk Mar      Margin vs. Peak Limit CL      Cable Loss      HPF      High Pass Filter															
EUT was scanned from 1 GHz to 25 GHz, no other signals were found above the noise floor.															

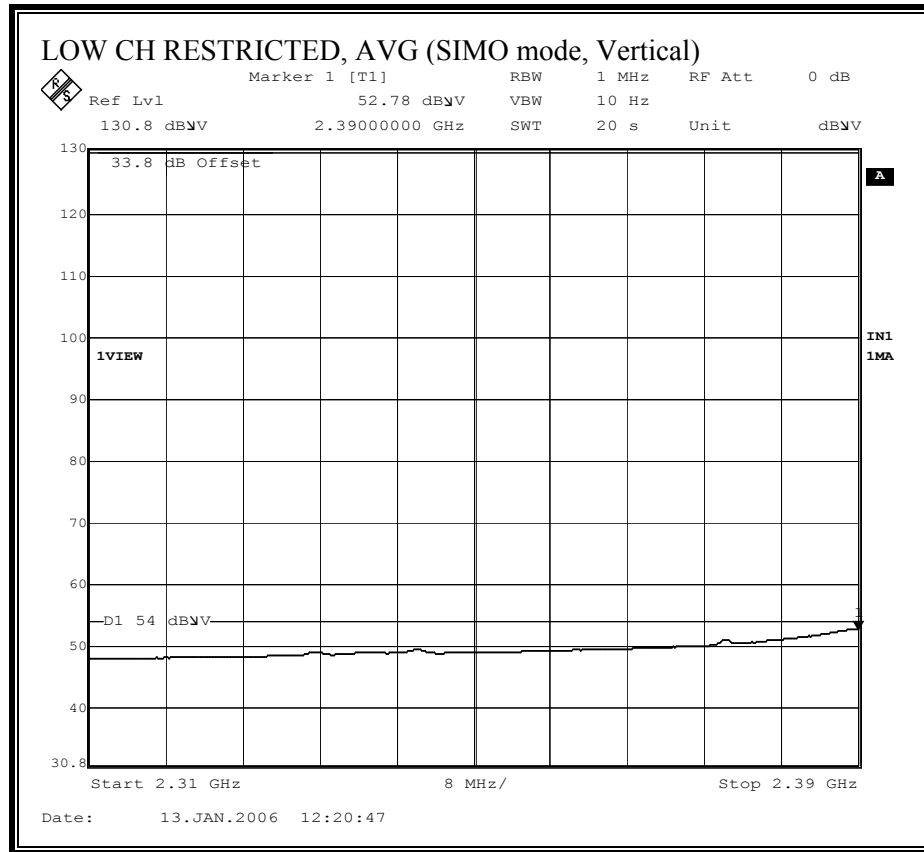
**RESTRICTED BANDEDGE (SIMO, LOW CHANNEL, HORIZONTAL)**





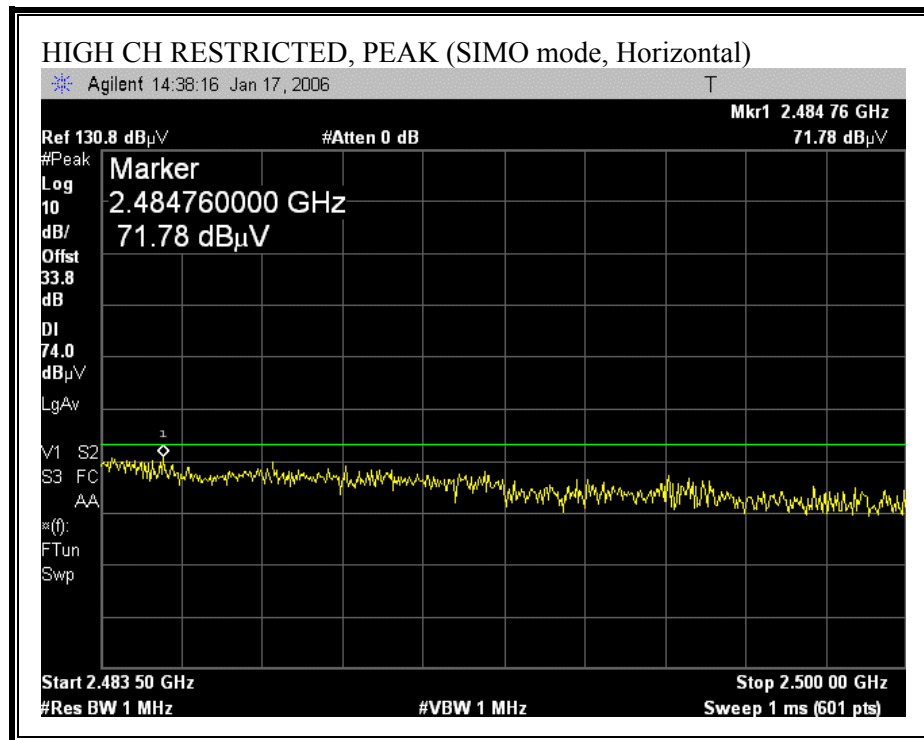
**RESTRICTED BANDEDGE (SIMO MODE, LOW CHANNEL, VERTICAL)**

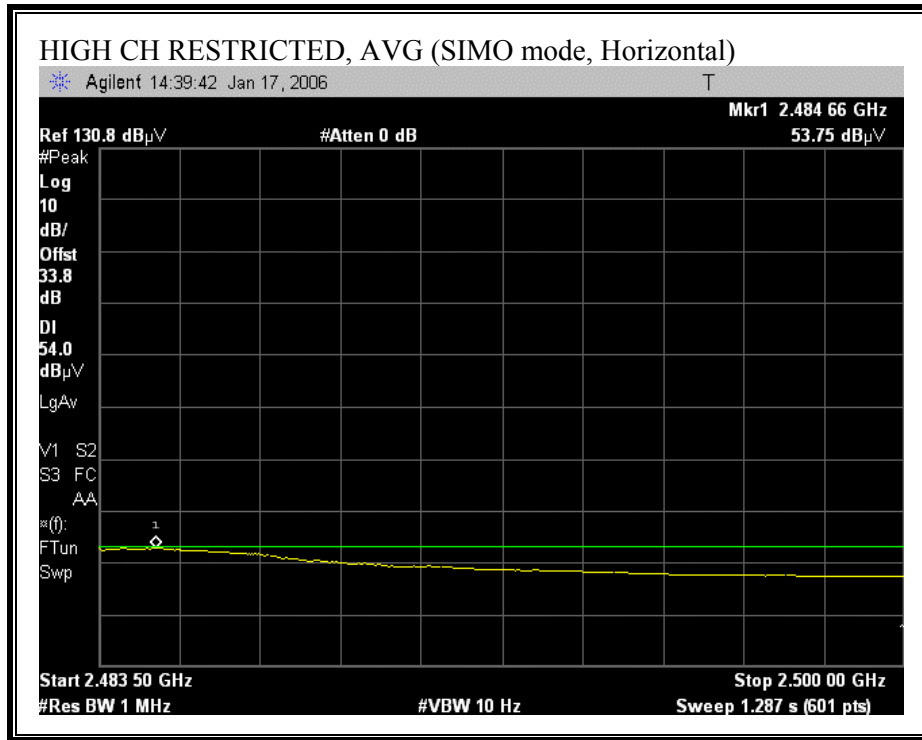




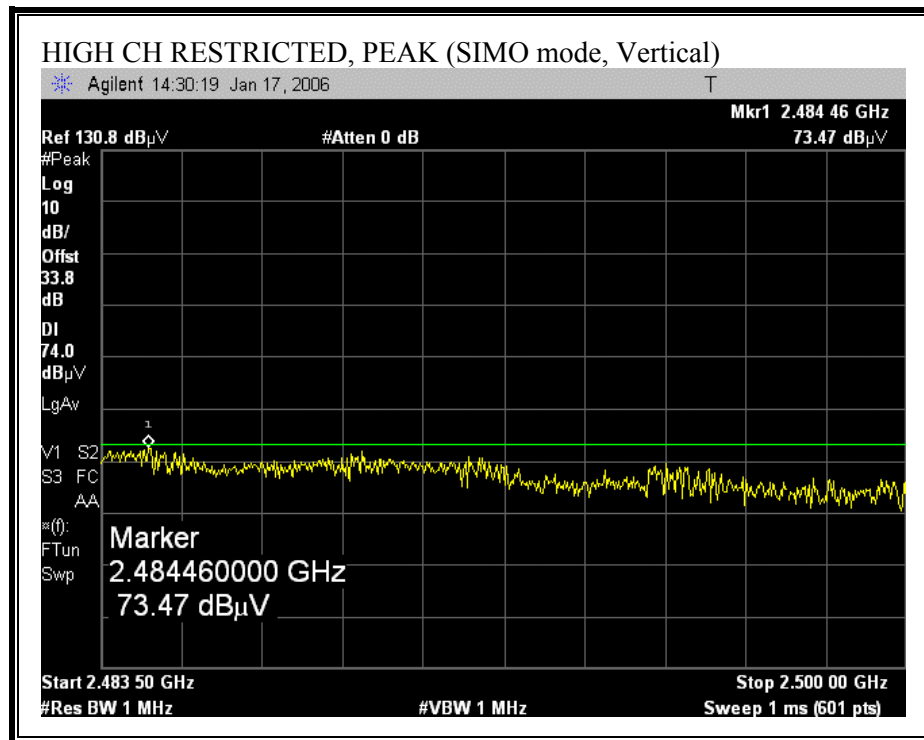


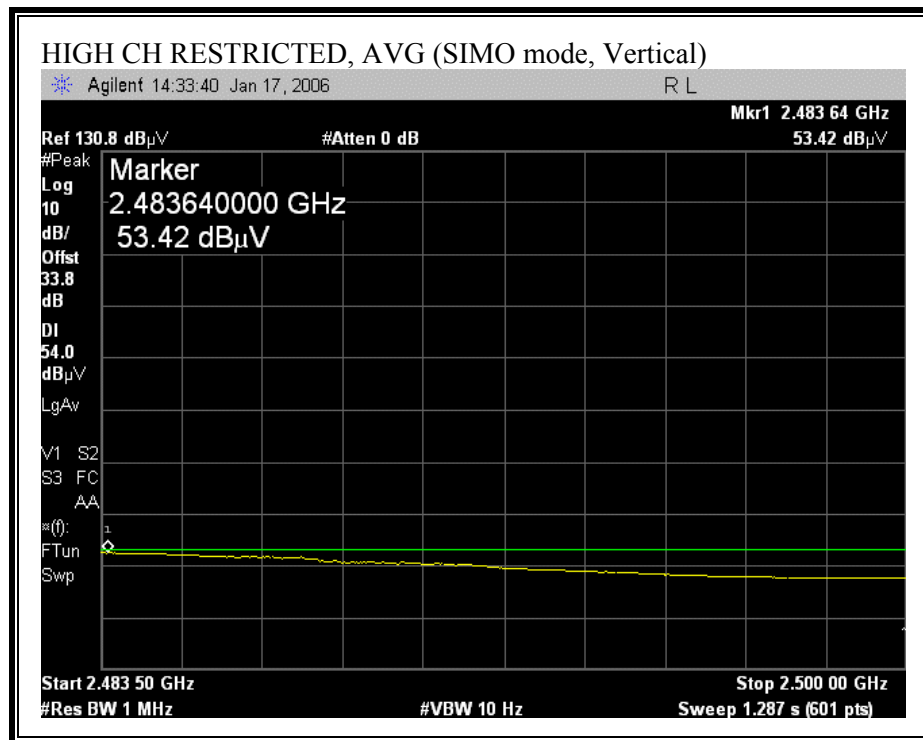
**RESTRICTED BANDEDGE (SIMO MODE, HIGH CHANNEL, HORIZONTAL)**





**RESTRICTED BANDEDGE (SIMO MODE, HIGH CHANNEL, VERTICAL)**





## HARMONICS AND SPURIOUS EMISSIONS (SIMO MODE)

01/16/06 High Frequency Measurement  
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Frank Ibrahim  
Project #: 06U10003  
Company: AIRGO  
EUT Description.: 802.11bg Gen 3RoHS Card Bus  
EUT M/N: AGN3023PC-01  
Test Target: FCC 15.247  
Mode of Operation: TX ON, in SIMO Mode

### Test Equipment:

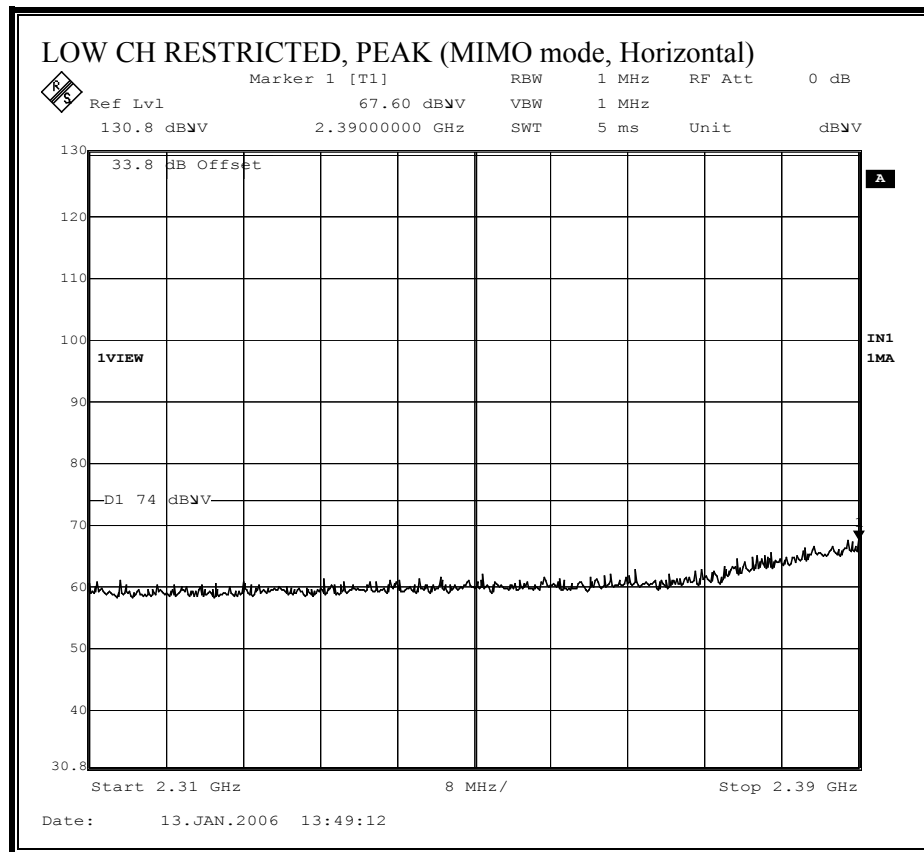
<b>Horn 1-18GHz</b> T60; S/N: 2238 @3m	<b>Pre-amplifier 1-26GHz</b> T145 Agilent 3008A0056	<b>Pre-amplifier 26-40GHz</b>	<b>Horn &gt; 18GHz</b> T125; ARA 18-26GHz; S/N:1007
Hi Frequency Cables			
<b>2 foot cable</b>	<b>3 foot cable</b> Frank 177080001	<b>12 foot cable</b> Frank 187209001	<b>HPF</b> HPF_4.0GHz
			<b>Reject Filter</b>
			<b>Peak Measurements</b> RBW=VBW=1MHz <b>Average Measurements</b> RBW=1MHz ; VBW=10Hz

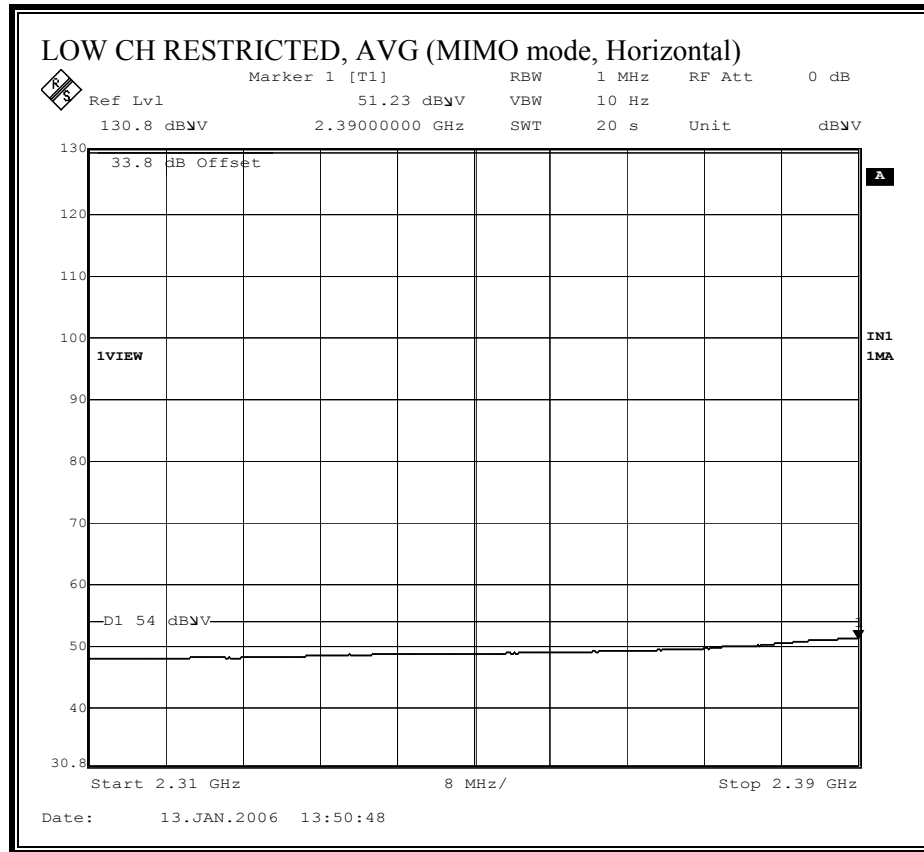
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fldr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel, 2412 MHz															
4.844	3.0	42.3	29.6	33.6	4.0	-34.8	0.0	0.6	45.7	33.0	74	54	-28.3	-21.0	V, 15.5 dBm
7.266	3.0	52.7	32.7	36.1	4.6	-34.7	0.0	0.6	59.4	39.4	74	54	-14.6	-14.6	V, 15.5 dBm
4.844	3.0	42.5	30.1	33.6	4.0	-34.8	0.0	0.6	45.8	33.5	74	54	-28.2	-20.5	H, 15.5 dBm
7.266	3.0	46.7	31.0	36.1	4.6	-34.7	0.0	0.6	53.4	37.7	74	54	-20.6	-16.3	H, 15.5 dBm
High Channel, 2462 MHz															
4.904	3.0	43.8	30.5	33.7	4.0	-34.9	0.0	0.6	47.2	34.0	74	54	-26.8	-20.0	V, 14 dBm
7.356	3.0	50.7	32.4	36.2	4.6	-34.6	0.0	0.6	57.5	39.2	74	54	-16.5	-14.8	V, 14 dBm
4.904	3.0	44.9	30.3	33.7	4.0	-34.9	0.0	0.6	48.4	33.8	74	54	-25.6	-20.2	H, 14 dBm
7.356	3.0	47.3	31.6	36.2	4.6	-34.6	0.0	0.6	54.1	38.4	74	54	-19.9	-15.6	H, 14 dBm

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

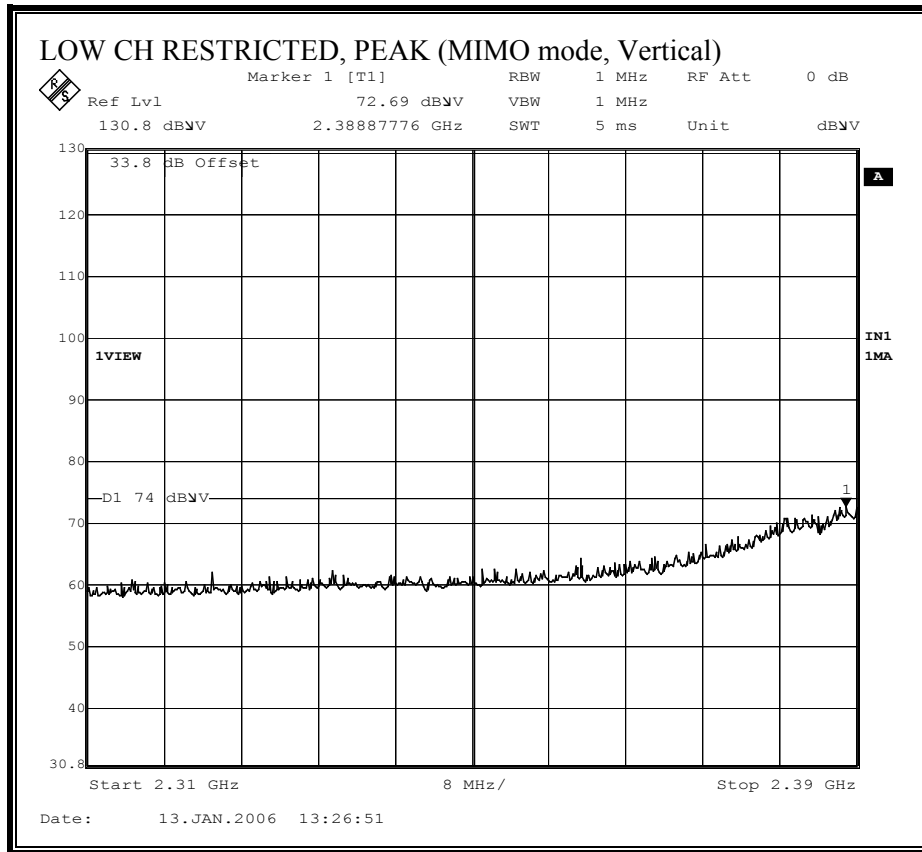
EUT was scanned from 1 GHz to 25 GHz, no other signals were found above the noise floor.

**RESTRICTED BANDEDGE (MIMO MODE, LOW CHANNEL, HORIZONTAL)**

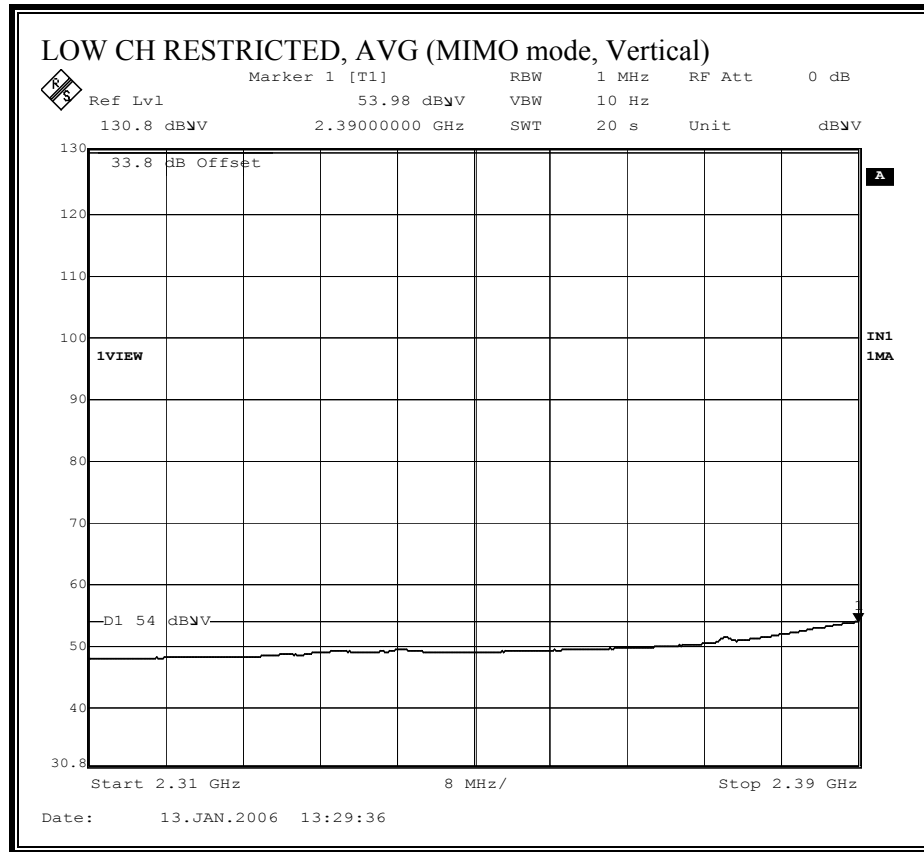




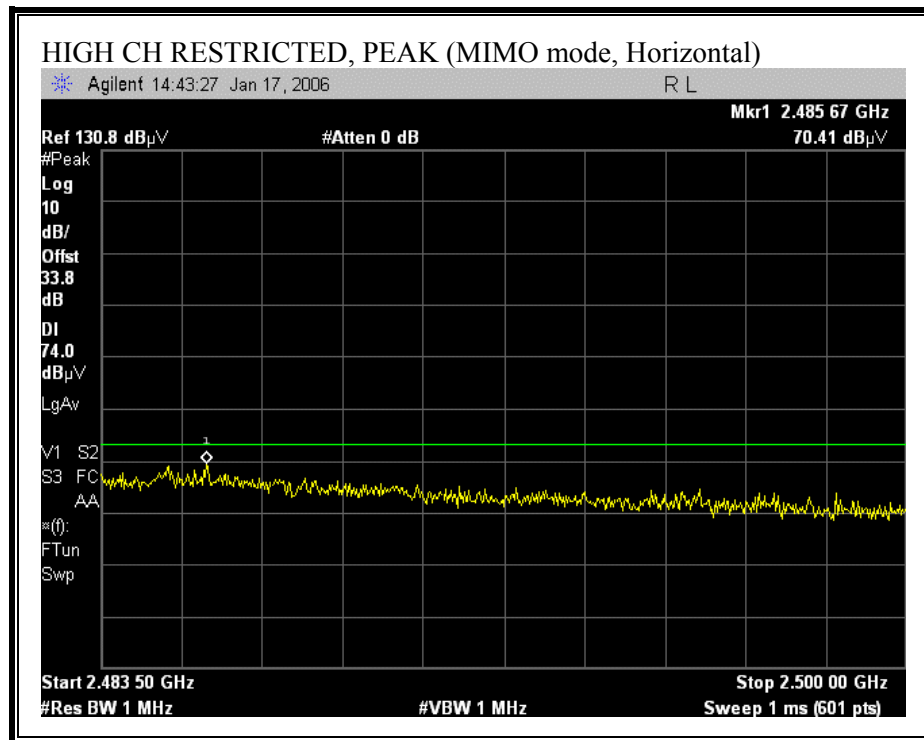
**RESTRICTED BANDEDGE (MIMO MODE, LOW CHANNEL, VERTICAL)**

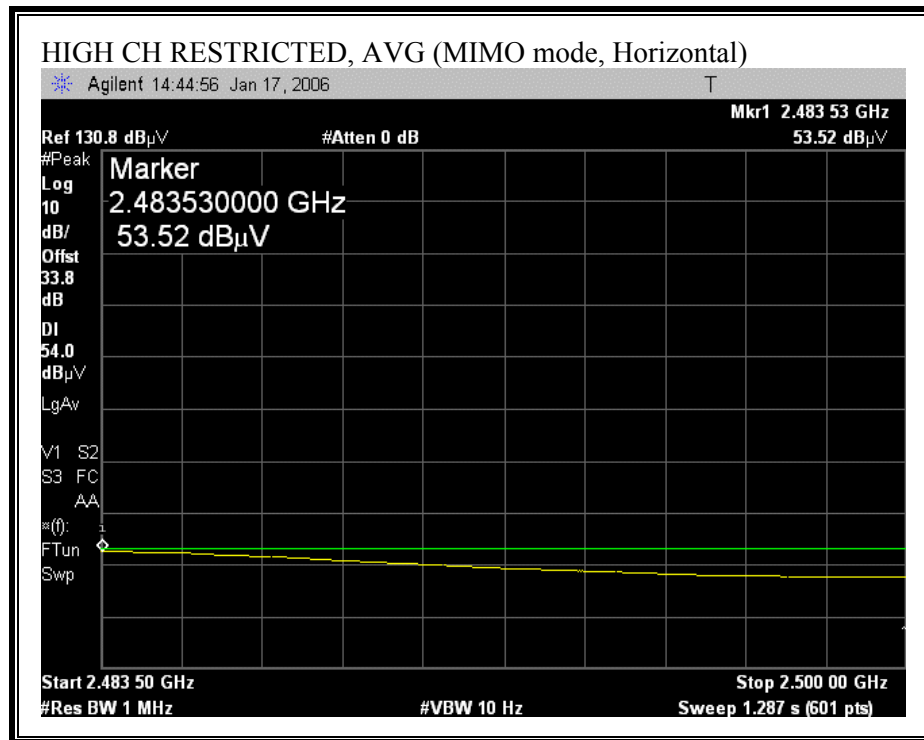




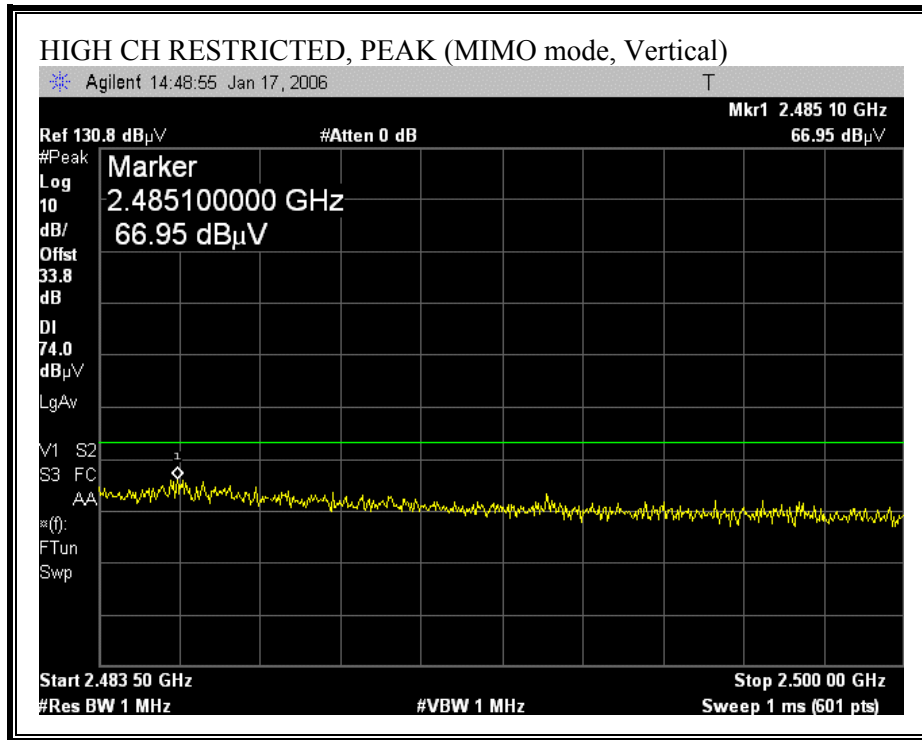


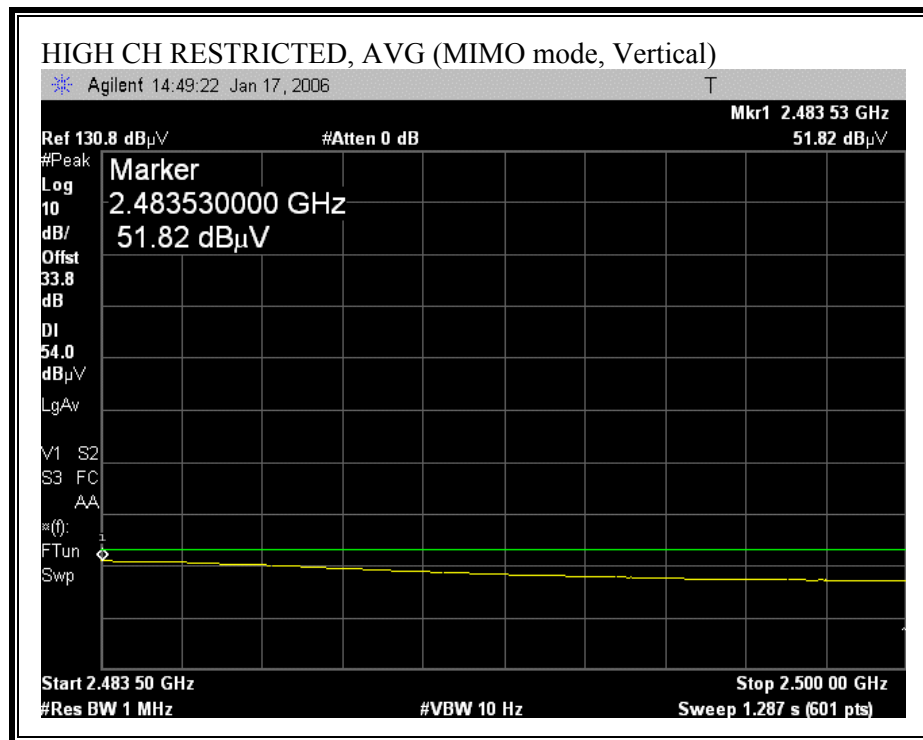
**RESTRICTED BANDEDGE (MIMO MODE, HIGH CHANNEL, HORIZONTAL)**





**RESTRICTED BANDEDGE (MIMO MODE, HIGH CHANNEL, VERTICAL)**





## HARMONICS AND SPURIOUS EMISSIONS (MIMO MODE)

01/16/06 High Frequency Measurement  
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Frank Ibrahim  
Project #: 06U10003  
Company: AIRGO  
EUT Description.: 802.11bg Gen 3RoHS Card Bus  
EUT M/N: AGN3023PC-01  
Test Target: FCC 15.247  
Mode of Operation: TX ON, in MIMO Mode

### Test Equipment:

<b>Horn 1-18GHz</b> T60; S/N: 2238 @3m	<b>Pre-amplifier 1-26GHz</b> T145 Agilent 3008A0056	<b>Pre-amplifier 26-40GHz</b>	<b>Horn &gt; 18GHz</b> T125; ARA 18-26GHz; S/N:1007
Hi Frequency Cables			
<b>2 foot cable</b>	<b>3 foot cable</b> Frank 177080001	<b>12 foot cable</b> Frank 187209001	<b>HPF</b> HPF_4.0GHz
			<b>Reject Filter</b>
			<b>Peak Measurements</b> RBW=VBW=1MHz <b>Average Measurements</b> RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fldr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel, 2412 MHz															
4.844	3.0	42.2	29.8	33.6	4.0	-34.8	0.0	0.6	45.6	33.2	74	54	-28.4	-20.8	V, 16 dBm
7.266	3.0	49.3	32.6	36.1	4.6	-34.7	0.0	0.6	56.0	39.3	74	54	-18.0	-14.7	V, 16 dBm
4.844	3.0	42.9	30.4	33.6	4.0	-34.8	0.0	0.6	46.2	33.8	74	54	-27.8	-20.2	H, 16 dBm
7.266	3.0	44.7	31.5	36.1	4.6	-34.7	0.0	0.6	51.3	38.2	74	54	-22.7	-15.8	H, 16 dBm
High Channel, 2462 MHz															
4.904	3.0	44.4	30.7	33.7	4.0	-34.9	0.0	0.6	47.8	34.2	74	54	-26.2	-19.8	V, 14.5 dBm
7.356	3.0	46.7	32.0	36.2	4.6	-34.6	0.0	0.6	53.5	38.8	74	54	-20.5	-15.2	V, 14.5 dBm
4.904	3.0	43.8	31.1	33.7	4.0	-34.9	0.0	0.6	47.3	34.6	74	54	-26.7	-19.4	H, 14.5 dBm
7.356	3.0	44.6	31.4	36.2	4.6	-34.6	0.0	0.6	51.4	38.2	74	54	-22.6	-15.8	H, 14.5 dBm

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

EUT was scanned from 1 GHz to 25 GHz, no other signals were found above the noise floor.

**WORST-CASE RADIATED EMISSIONS BELOW 1 GHz**

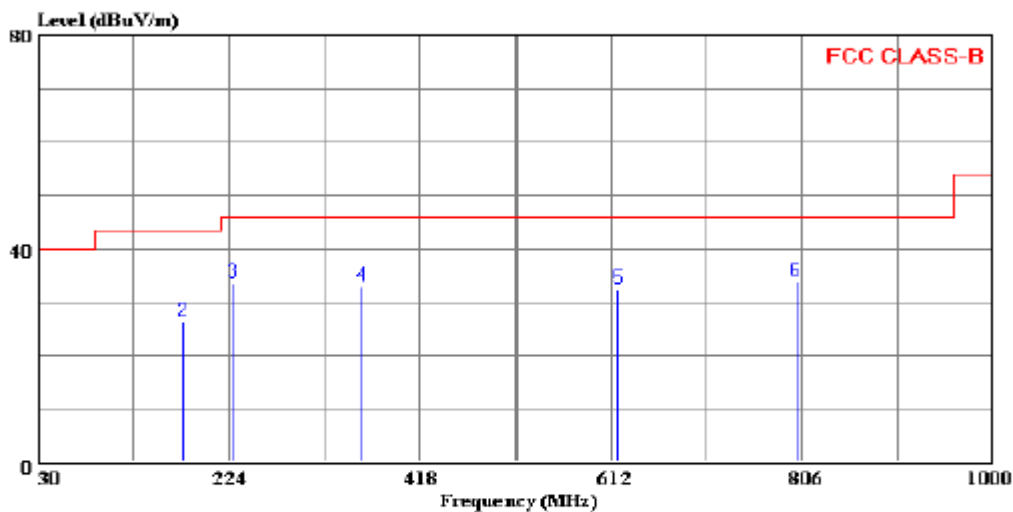
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)**

HORIZONTAL PLOT



561F Monterey Road  
Morgan Hill, CA 95037  
Tel: (408) 463-0888  
Fax: (408) 463-0885

Data#: 14 File#: EMI below 1GHz..EMI Date: 01-09-2006 Time: 15:35:10



(Auxiliary ATC)

Trace:

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL  
Test Operator: : Thanh Nguyen  
Project #: : 06U10003  
Company: : AIRGO  
EUT: : 802.11bgGen RoHSCard Bus  
Model No.: : PY-50  
Configuration: : EUT Plugin Dell Laptop  
Mode of operation: Transmit b Mode, worst case  
Target of Test : FCC 15.247. IC RSS210  
: CISPR22 Class B

HORIZONTAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	31.55	-7.50	24.05	40.00	-15.95	Peak
2	177.440	40.91	-14.56	26.35	43.50	-17.15	Peak
3	227.880	48.21	-14.67	33.54	46.00	-12.46	Peak
4	358.830	43.40	-10.43	32.97	46.00	-13.03	Peak
5	618.790	37.39	-4.97	32.42	46.00	-13.58	Peak
6	800.180	35.71	-1.79	33.92	46.00	-12.08	Peak



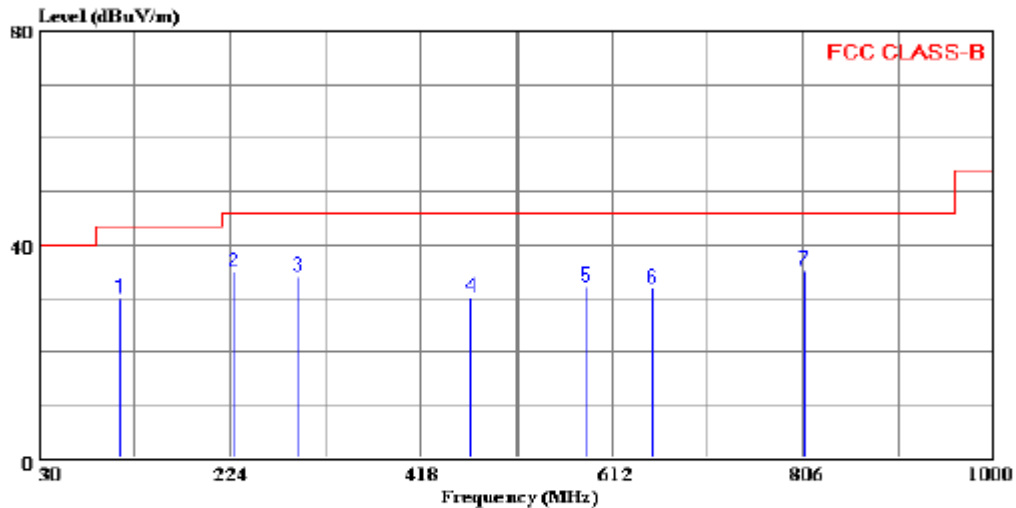
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT



561F Monterey Road  
Morgan Hill, CA 95037  
Tel: (408) 463-0888  
Fax: (408) 463-0885

Data#: 11 File#: EMI below 1GHz..EMI Date: 01-09-2006 Time: 15:22:20



(Auxiliary ATC)

Trace:

Ref Trace:

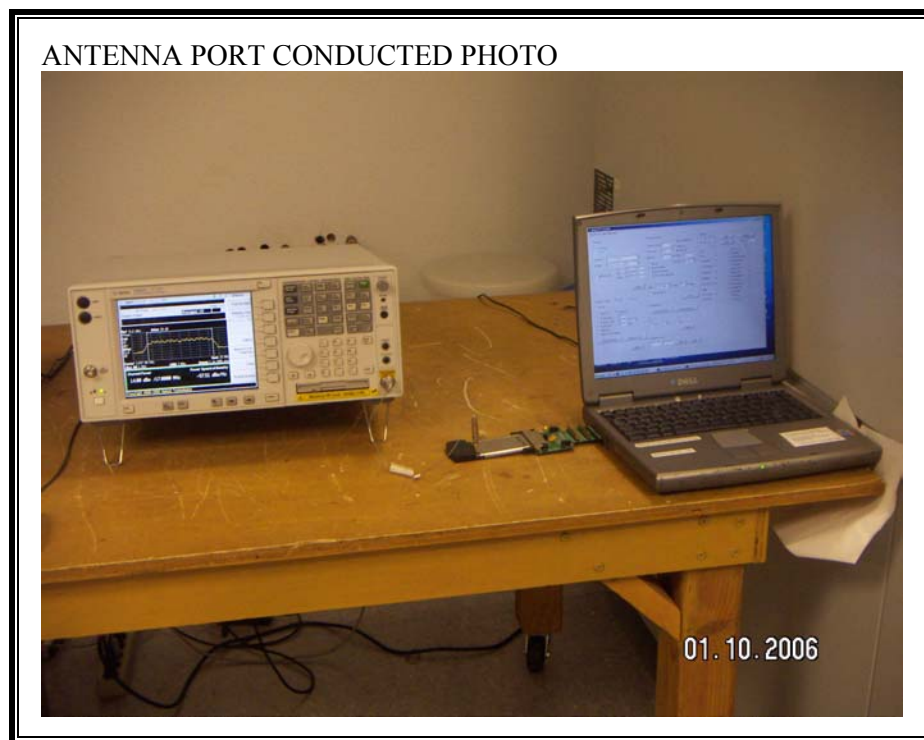
Condition: FCC CLASS-B VERTICAL  
Test Operator: : Thanh Nguyen  
Project #: : 06U10003  
Company: : AIRGO  
EUT: : 802.11bgGen RoHSCard Bus  
Model No.: : PY-50  
Configuration: : EUT Plugin Dell Laptop  
Mode of operation: Transmit b Mode, worst case  
Target of Test : FCC 15.247. IC RSS210

VERTICAL DATA

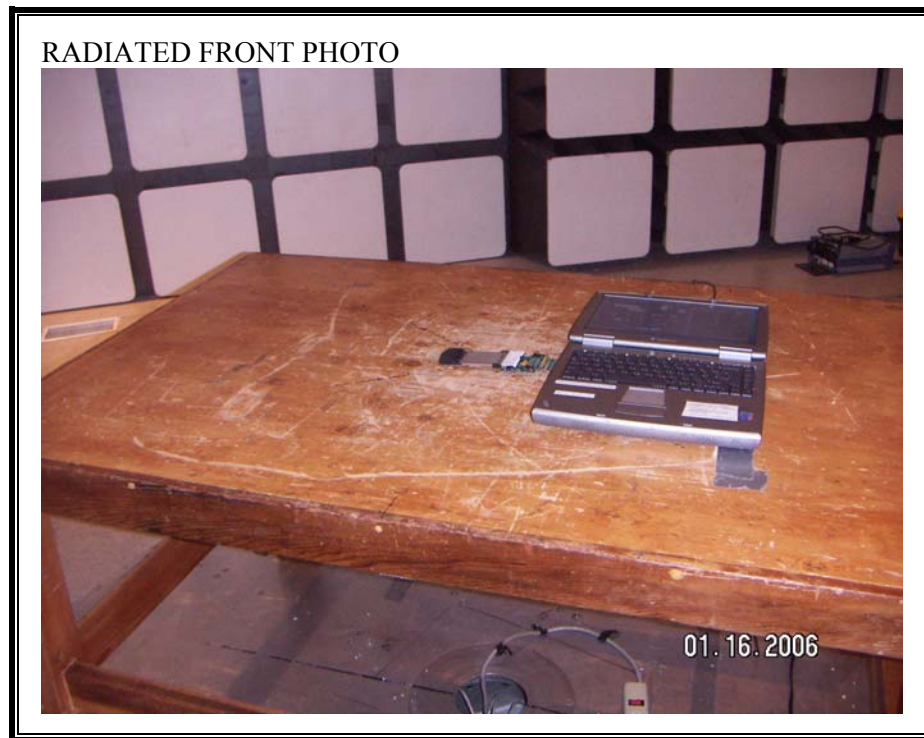
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	112.450	43.59	-13.75	29.84	43.50	-13.66	Peak
2	227.880	49.57	-14.67	34.90	46.00	-11.10	Peak
3	293.840	46.07	-12.11	33.96	46.00	-12.04	Peak
4	469.410	37.94	-7.86	30.07	46.00	-15.93	Peak
5	585.810	37.94	-5.74	32.19	46.00	-13.81	Peak
6	652.740	36.14	-4.26	31.88	46.00	-14.12	Peak
7	806.970	36.93	-1.71	35.22	46.00	-10.78	Peak

## 8. SETUP PHOTOS

### ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



**RADIATED RF MEASUREMENT SETUP**



RADIATED BACK PHOTO



**END OF REPORT**