



**FCC CFR47 PART 15 SUBPART E  
CLASS II PERMISSIVE CHANGE  
CERTIFICATION TEST REPORT  
FOR**

**802.11 a/b/g/n PCI EXPRESS MINICARD**

**MODEL NUMBER: BCM94321MC**

**FCC ID: QDS-BRCM1024**

**REPORT NUMBER: 07U10976-1**

**ISSUE DATE: APRIL 15, 2007**

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**NVLAP LAB CODE 200065-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
--	04/15/07	Initial Issue	T. Chan

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** BROADCOM CORP.  
190 MATHILDA PLACE  
SUNNYVALE, CA 94086, USA

**EUT DESCRIPTION:** 802.11a/b/g/n PCI EXPRESS MINICARD

**MODEL:** BCM94321MC (Production Sample)

**SERIAL NUMBER:** Apple Lucky 2 sample, Serial #3  
AOU257941 (EUT Laptop)

**DATE TESTED:** APRIL 10-12, 2007

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART E	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:



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THU CHAN  
ENGINEERING SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

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THANH NGUYEN  
EMC TECHNICIAN  
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 47173 Benicia Street, Fremont, 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 802.11 a/b/g/n PCIExpress Minicard.

### **5.2. DESCRIPTION OF CLASS II CHANGE**

Adding 5470-5725 MHz band to portable client card.

### **5.3. DESCRIPTION OF AVAILABLE ANTENNAS**

The antenna is a PIFA, model 056-1579, with a peak gain of 7.4 dBi at 5590 MHz.

### **5.4. SOFTWARE AND FIRMWARE**

The EUT was tested in the following manner:

- “epi\_tcp.exe” was used to transmit UDP packets to a broadcast IP address (192.168.66.255) – i.e. no ACK required. This test mode sends a continuous packetized data stream with duty cycles that vary dependant upon data rate/MCS Index selected.
- “wl\_ampdu” and “frameburst” were enabled to ensure worst case data packet transfer and duty cycle.
- Worst case packet length have also been used to ensure max duty cycle

### **5.5. WORST-CASE CONFIGURATION AND MODE**

The worst-case mode from the original filing, as determined by the highest spurious emissions levels, is the 802.11n HT20 and 802.11n HT40 Mode.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
MacBookPro	Apple	A1150	AOU257941	DoC
Power Adapter	Apple	A1172	N/A	N/A

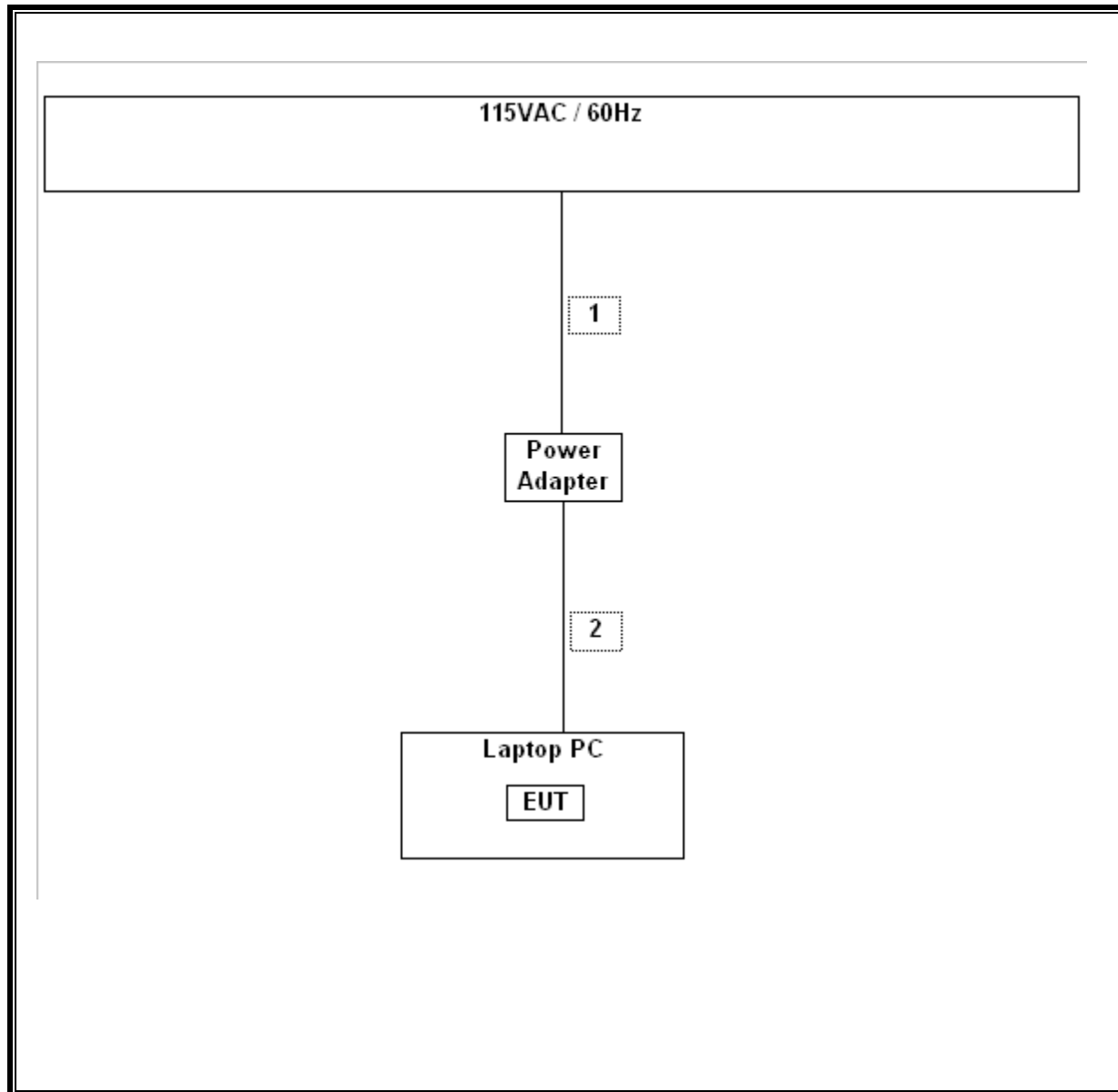
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	AC	Unshielded	1.8m	No
2	DC	1	DC	Unshielded	1.8m	No

### TEST SETUP

The EUT is installed in the host laptop computer. 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
Quasi-Peak Adaptor	Agilent / HP	85650A	3145A01654	1/21/2008
SA Display Section 2	Agilent / HP	85662A	2816A16696	4/7/2008
SA RF Section, 1.5 GHz	Agilent / HP	85680B	2814A04227	1/7/2008
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	4/23/2007
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	8/13/2007
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	9/15/2007
EMI Test Receiver	R & S	ESHS 20	827129/006	1/27/2008
EMI Test Receiver	R & S	ESIB40	100192	9/26/2007
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	11/26/2007
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00561	10/3/2007
Antenna, Horn 1 ~ 18 GHz	ETS	3117	29301	4/22/2007

## 7. LIMITS AND RESULTS

### 7.1. RADIATED EMISSIONS

#### 7.1.1. 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 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 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.

### **7.1.2. TRANSMITTER ABOVE 1 GHZ FOR 5470 TO 5725 MHz BAND**

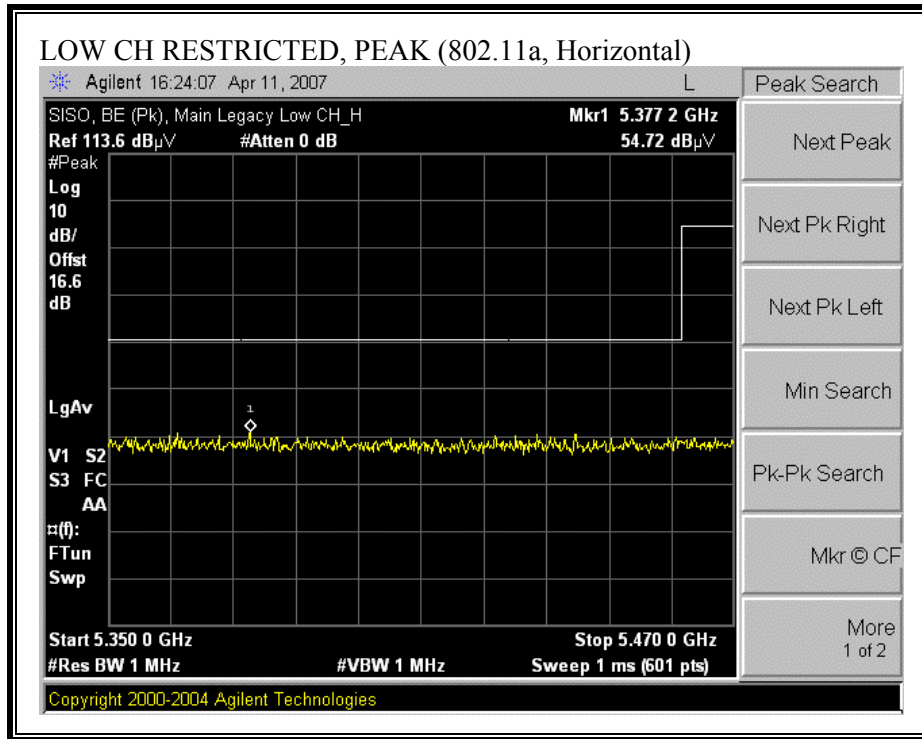
#### **REPORTING NOTES**

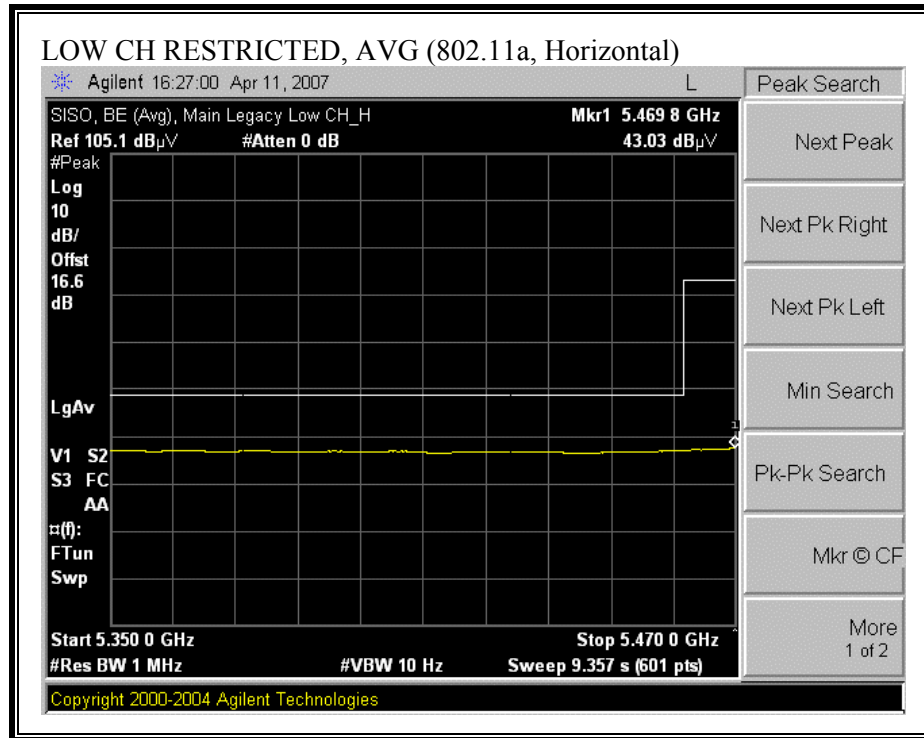
The nearby restricted band stops 10 MHz below the authorized band. A single plot is taken to show both restricted band emission levels and out-of-band radiated spurious emission levels at and near the lower authorized bandedge. The out-of-band spurious limits of -7 dBm Peak EIRP and -27 dBm Average EIRP are converted to the equivalent 3 meter field strengths of 88.2 dBuV/m Peak and 68.2 dBuV/m Average, respectively, for reporting purposes.

The out-of- band radiated spurious emission levels at and near the upper authorized bandedge are reported as EIRP values.

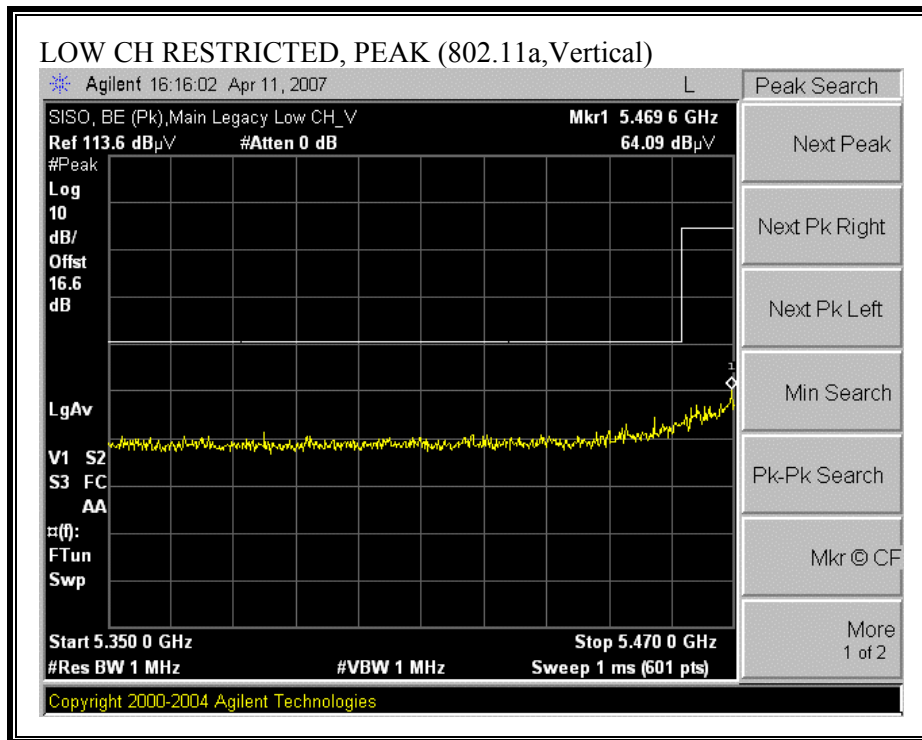
**SISO MODE:**

**RESTRICTED BAND & BANDEDGE (802.11a Mode LOW CHANNEL, HORIZONTAL)**

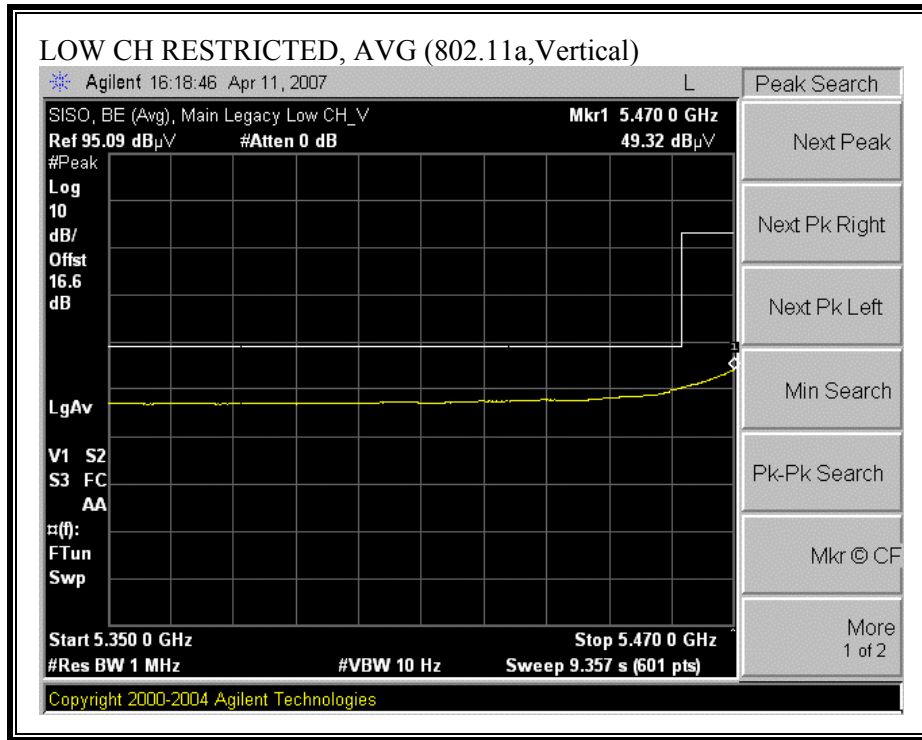




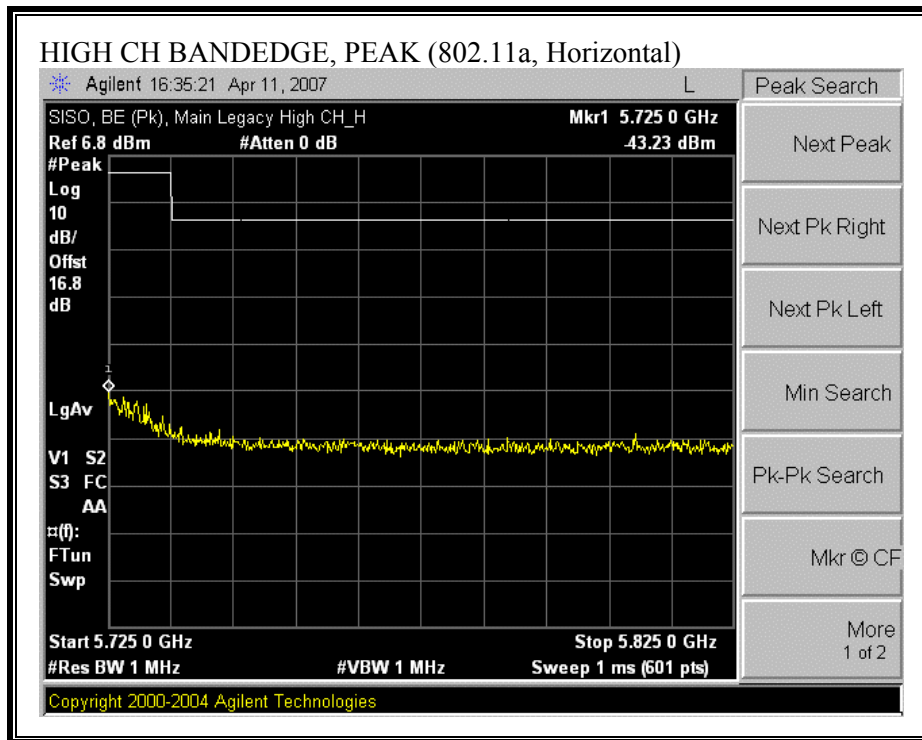
**RESTRICTED BAND & BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)**

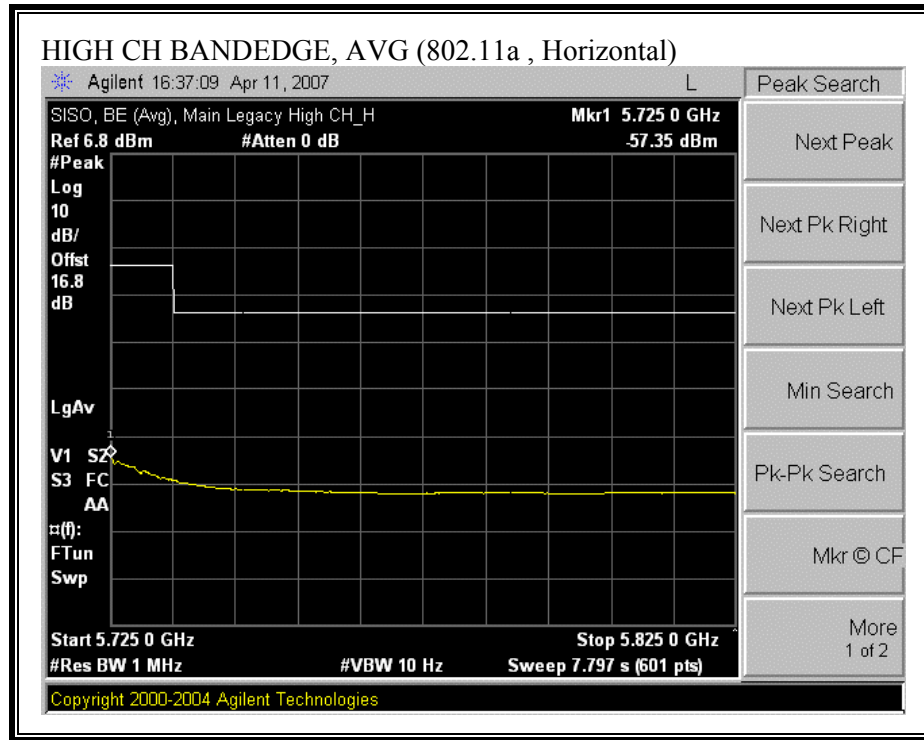




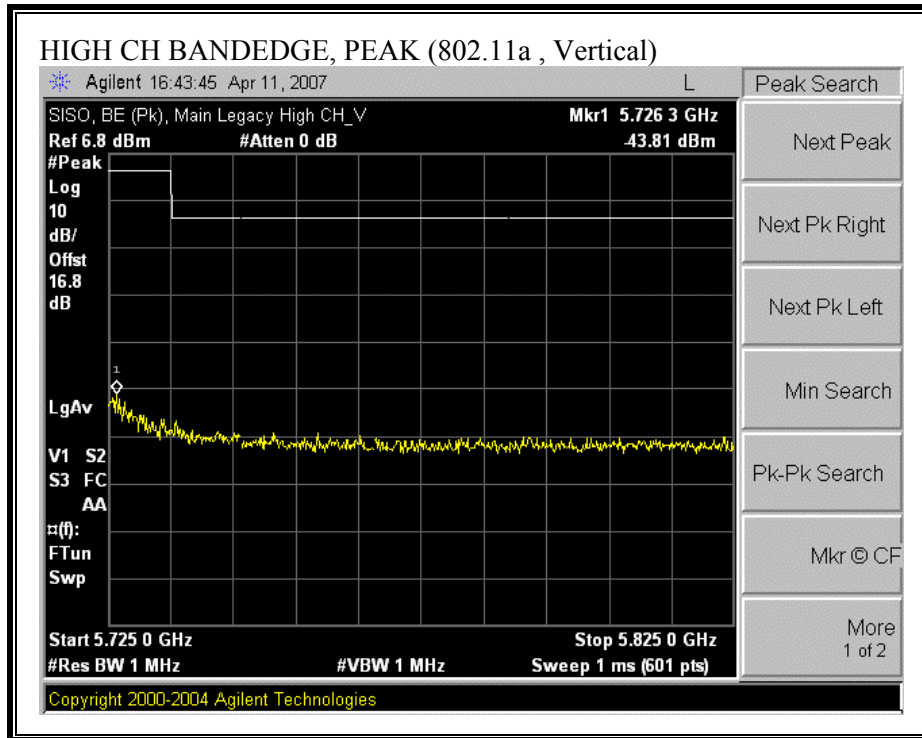


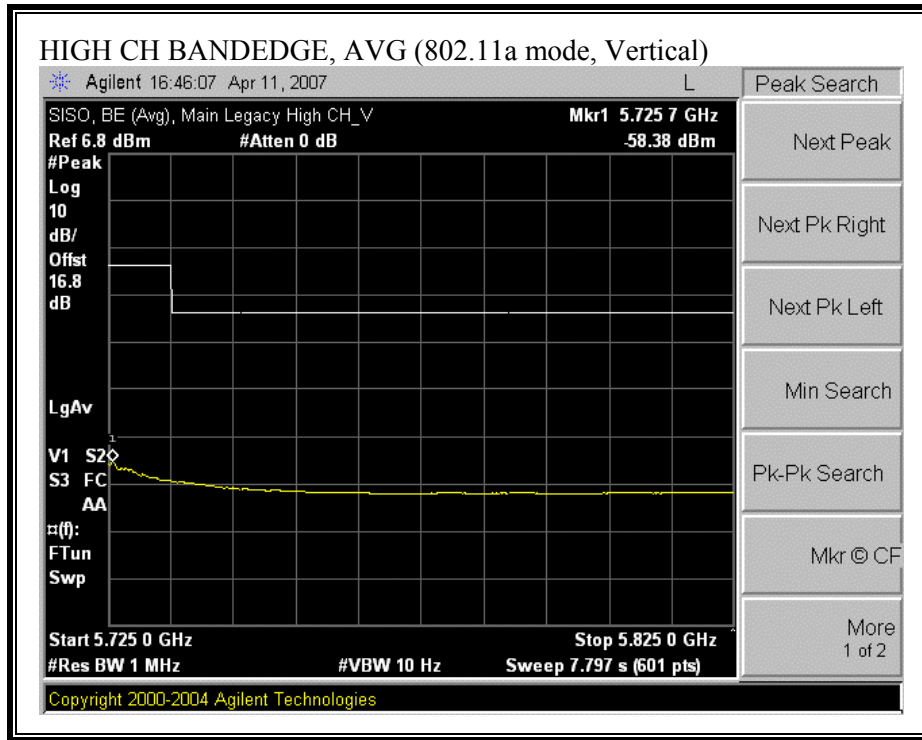
**BANDEDGE (802.11a, HIGH CHANNEL, HORIZONTAL)**





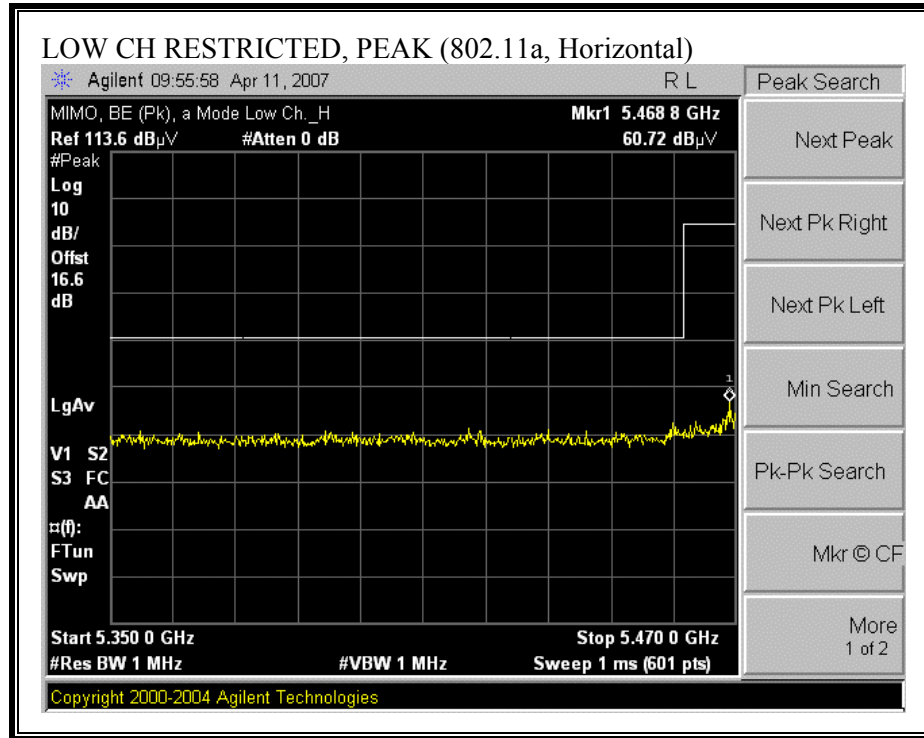
**BANDEDGE (802.11a, HIGH CHANNEL, VERTICAL)**

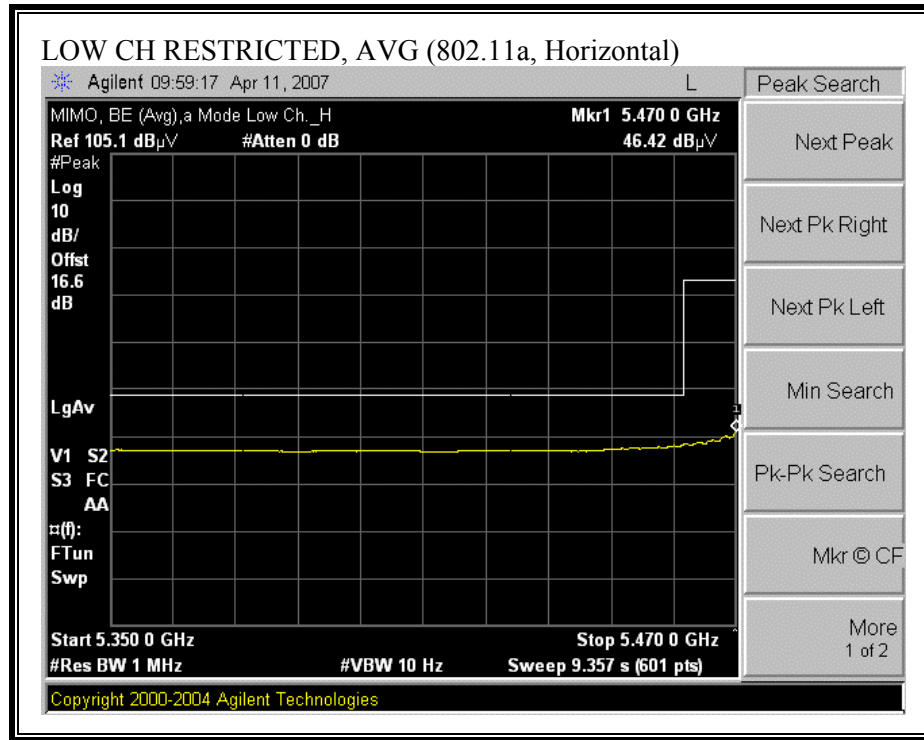




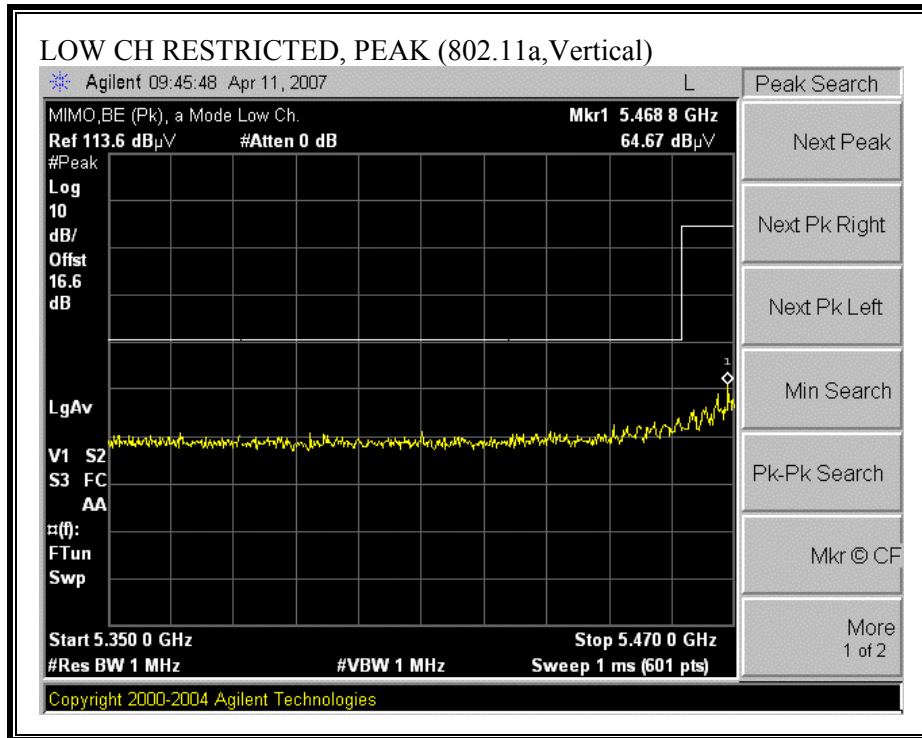
**MIMO MODE:**

**RESTRICTED BAND & BANDEDGE (802.11a Mode LOW CHANNEL, HORIZONTAL)**

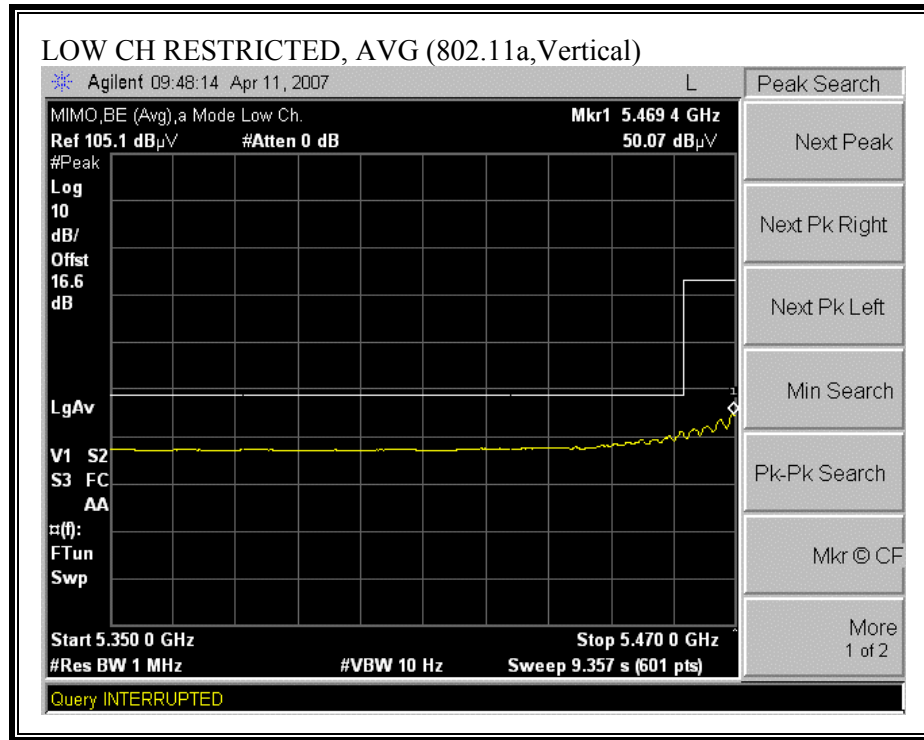




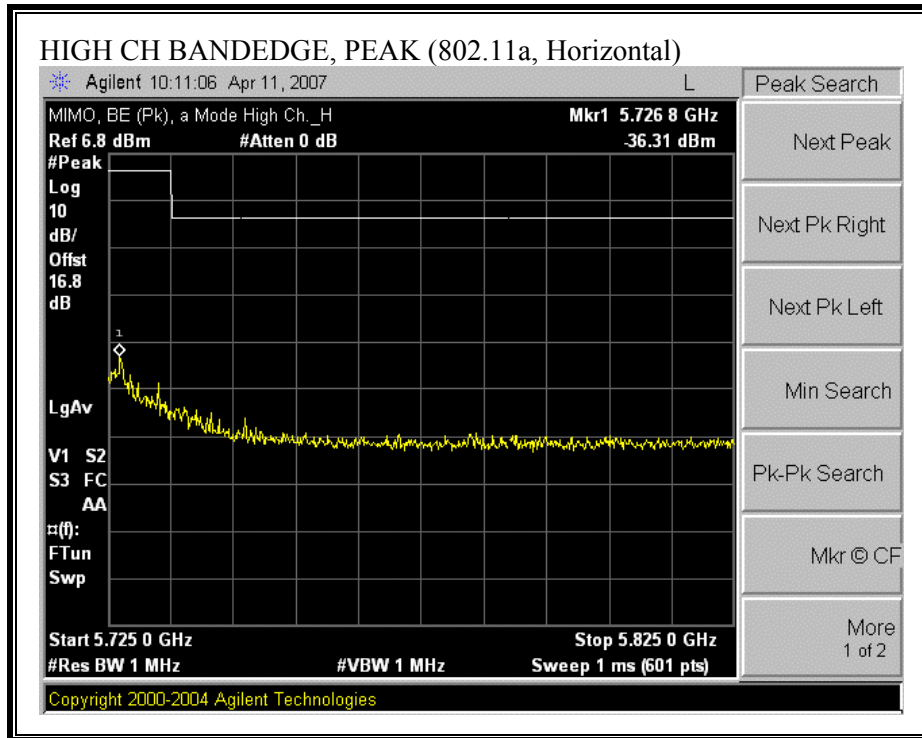
**RESTRICTED BAND & BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)**

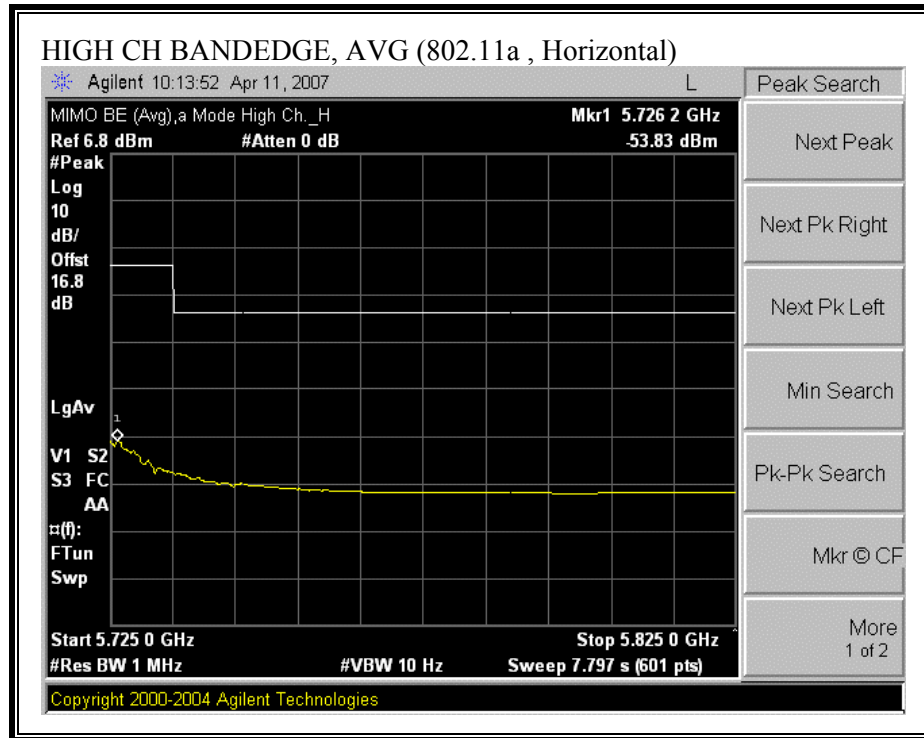




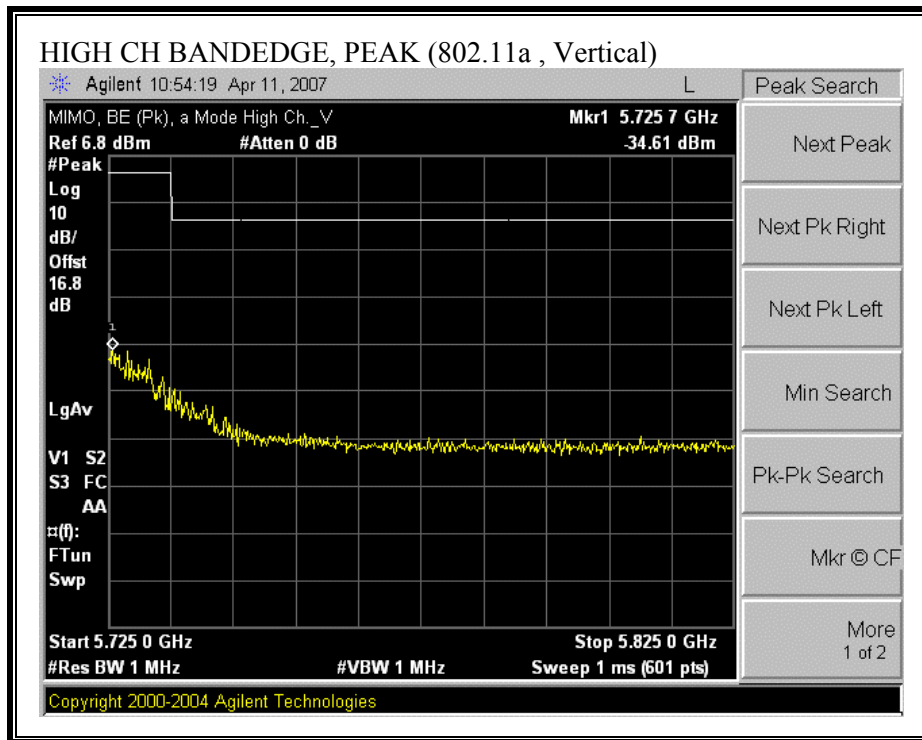


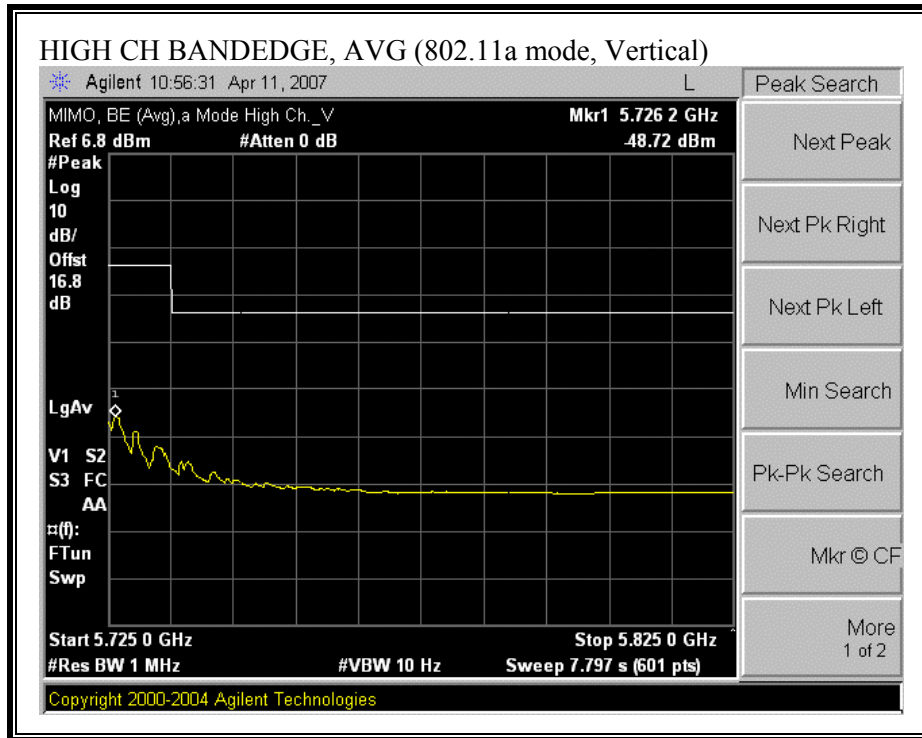
**BANDEDGE (802.11a, HIGH CHANNEL, HORIZONTAL)**



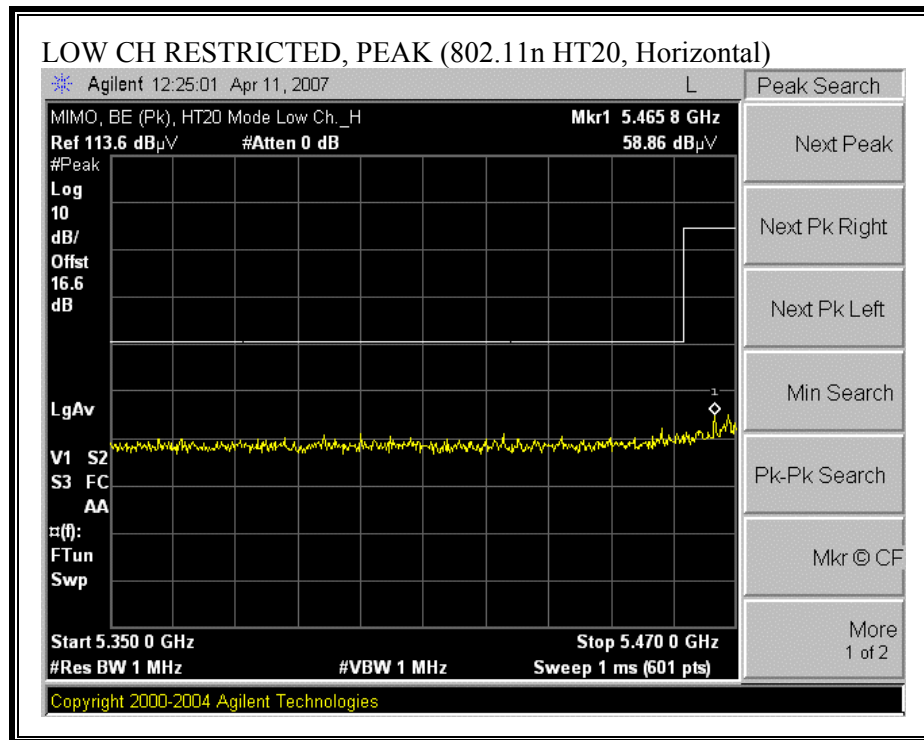


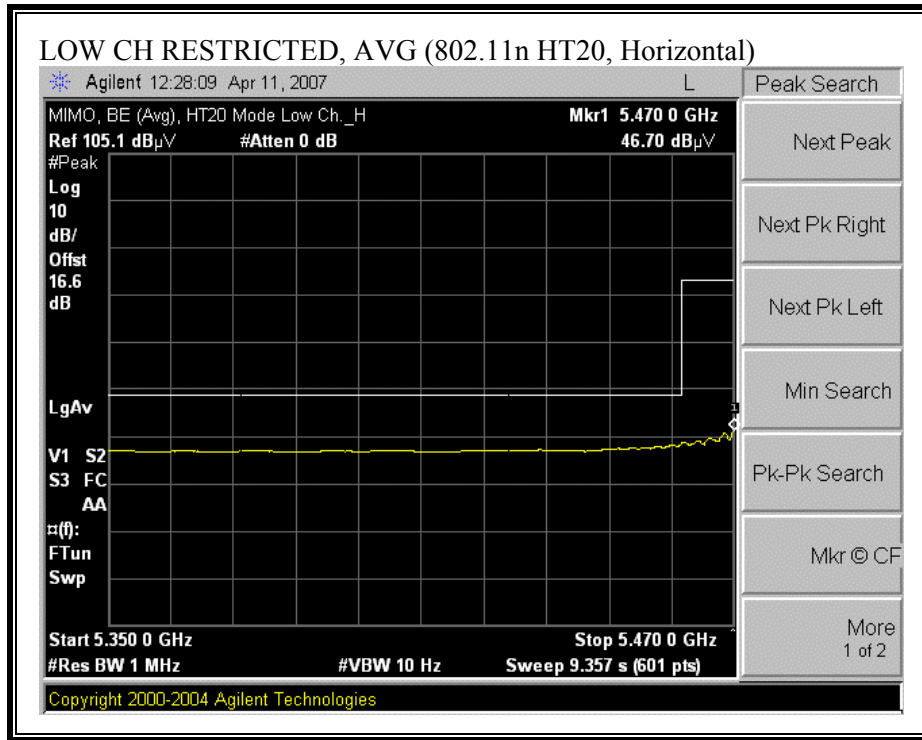
**BANDEDGE (802.11a, HIGH CHANNEL, VERTICAL)**



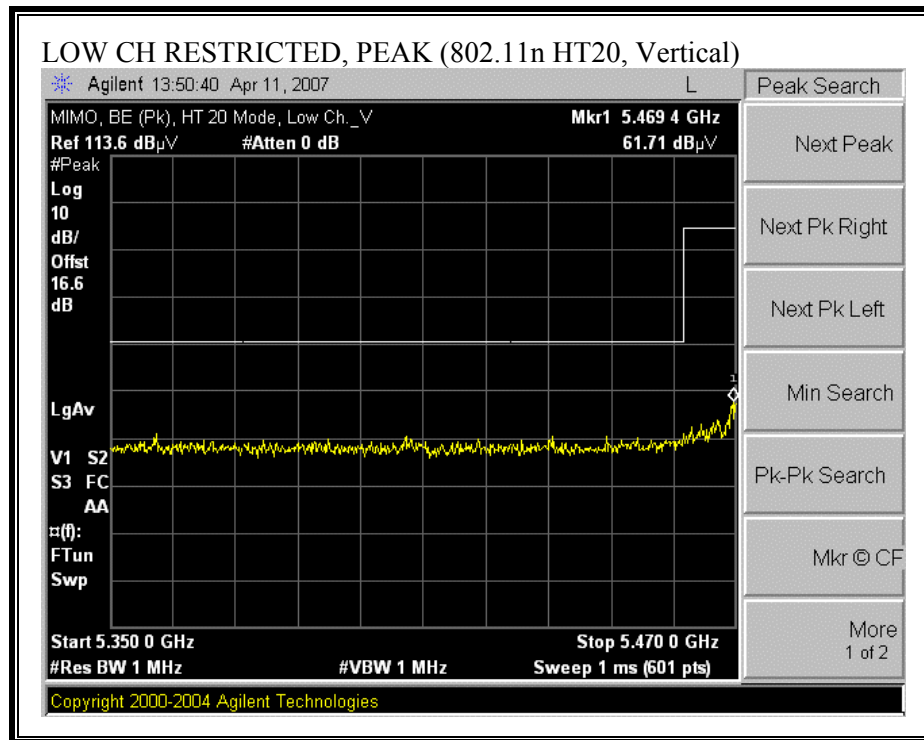


**RESTRICTED BAND & BANDEDGE (802.11n HT20 LOW CHANNEL, HORIZONTAL)**

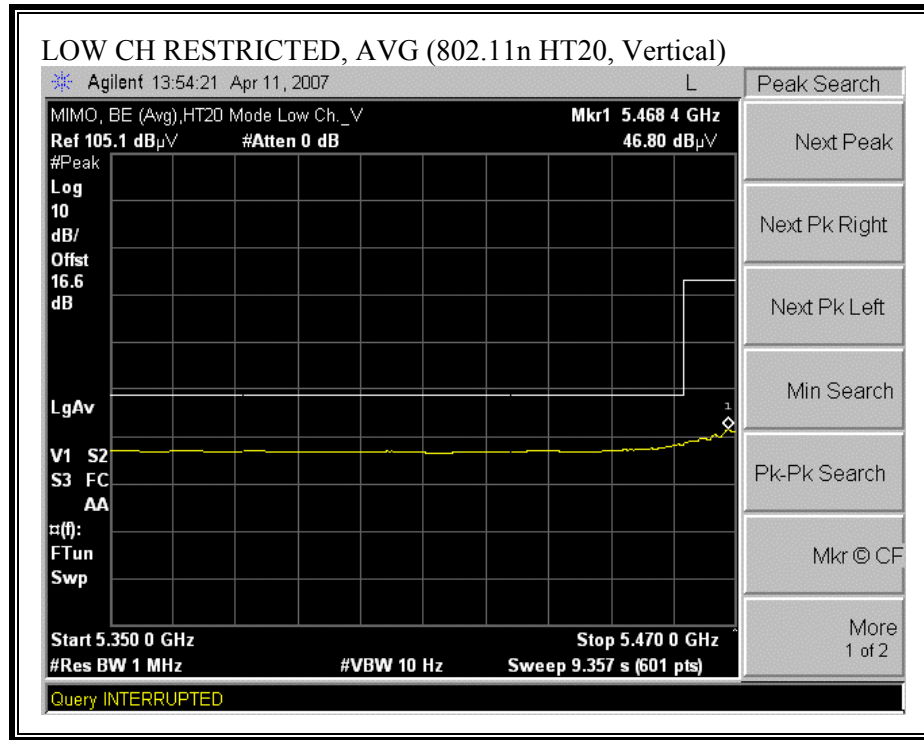




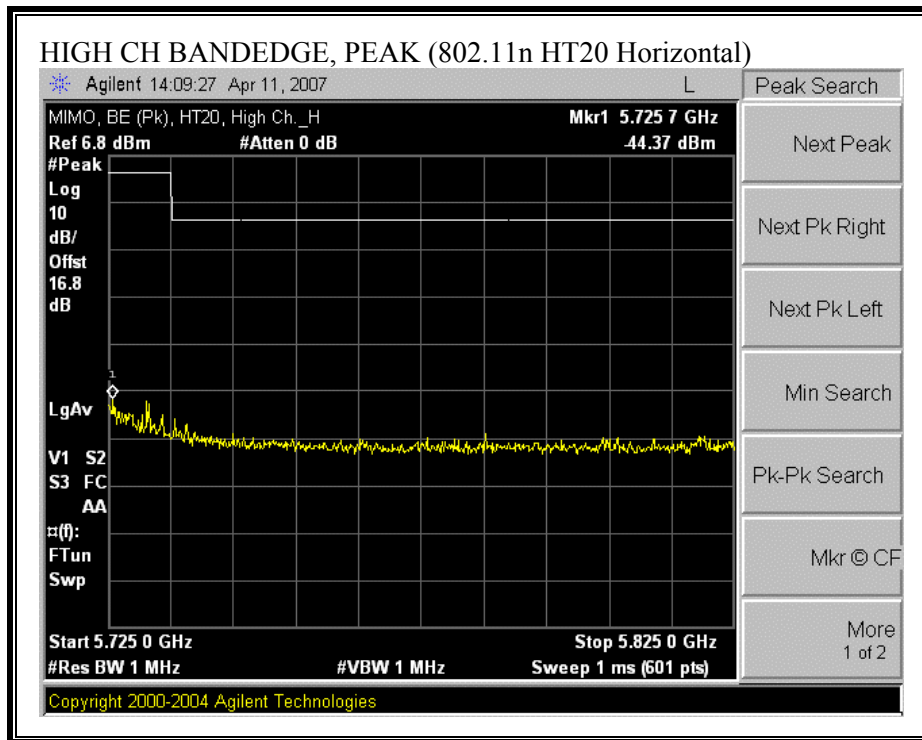
**RESTRICTED BAND & BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)**

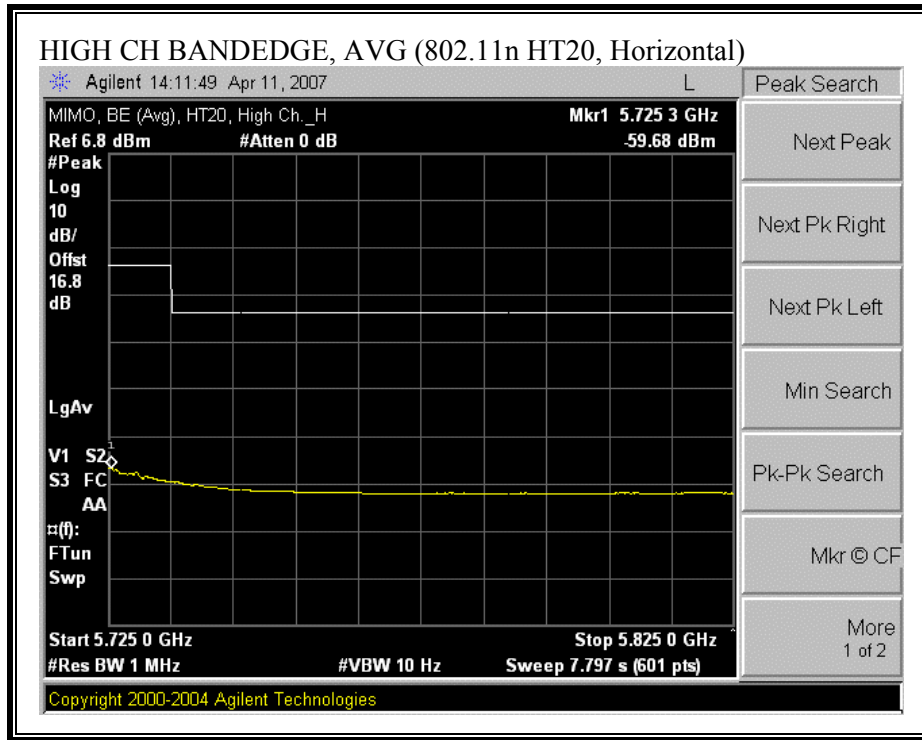




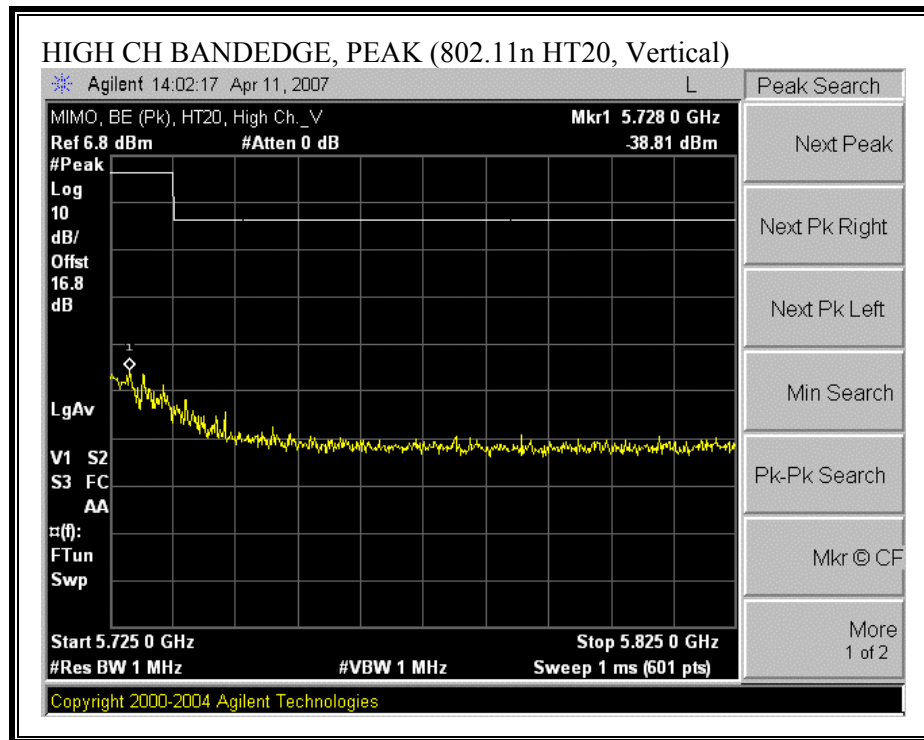


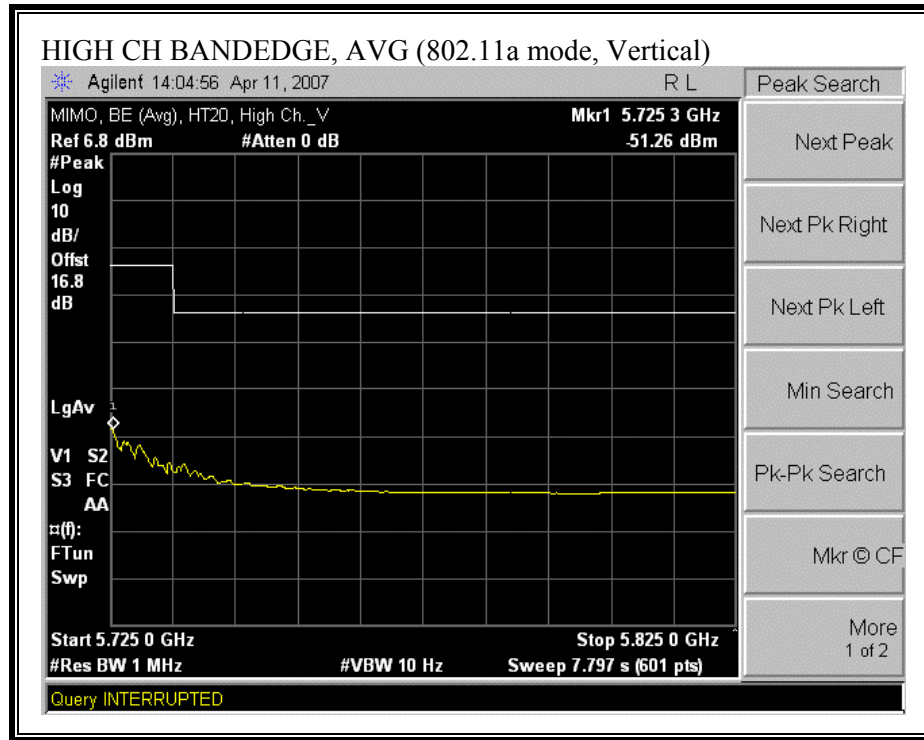
**BANDEDGE (802.11n HT20, HIGH CHANNEL, HORIZONTAL)**



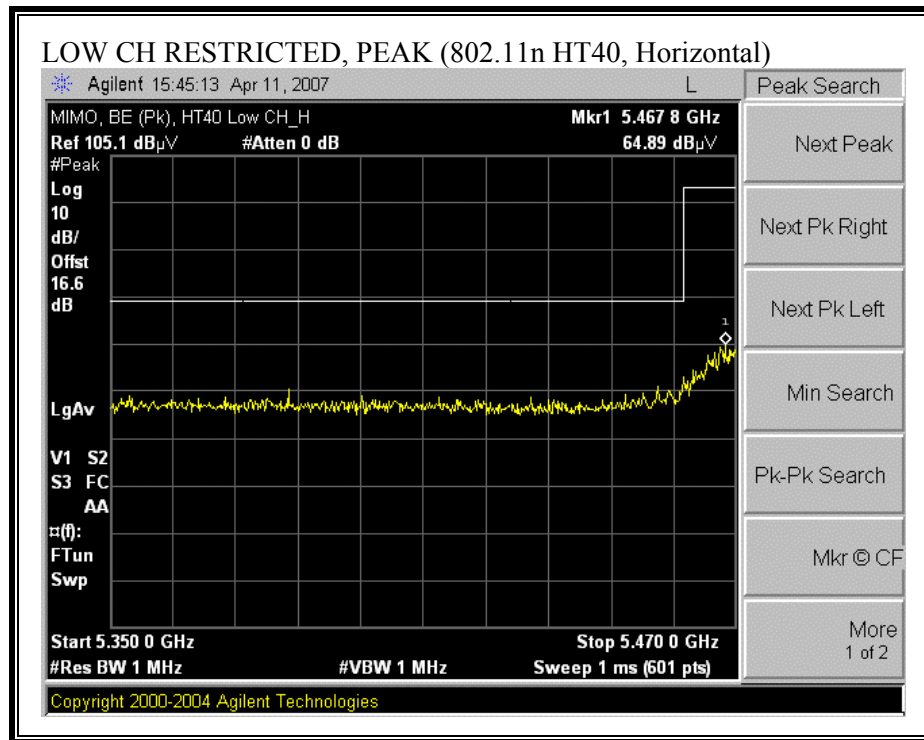


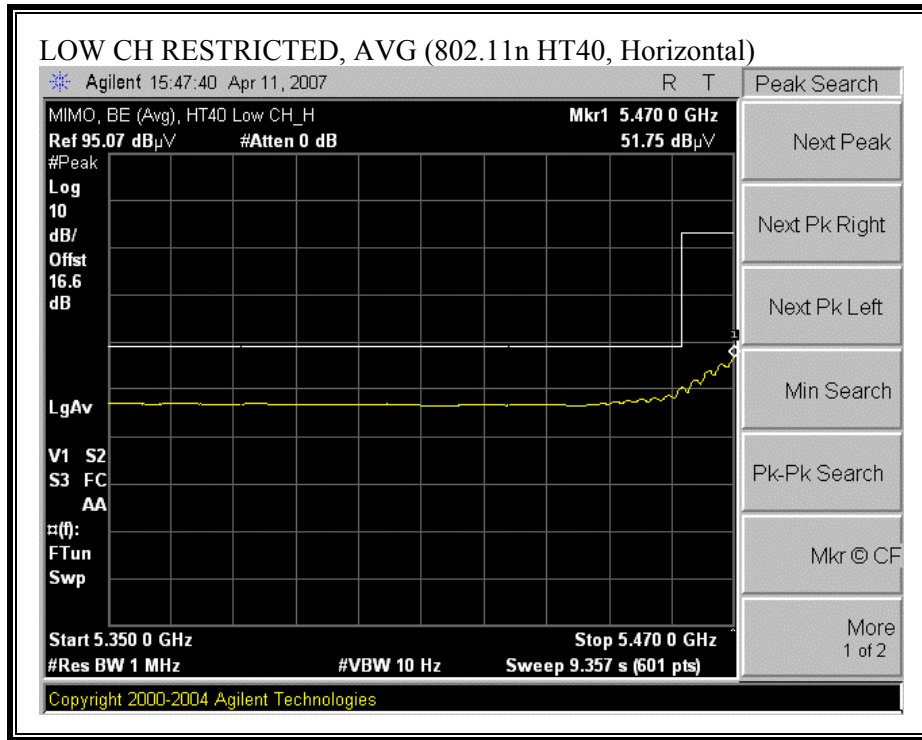
**BANDEDGE (802.11n HT20, HIGH CHANNEL, VERTICAL)**



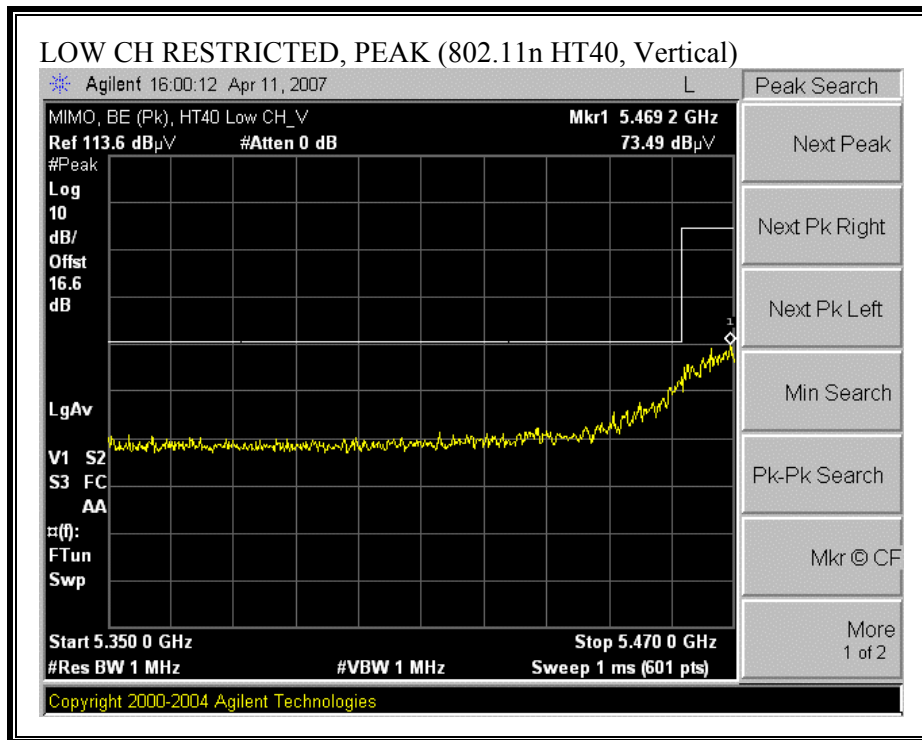


**RESTRICTED BAND & BANDEDGE (802.11n HT40 LOW CHANNEL, HORIZONTAL)**

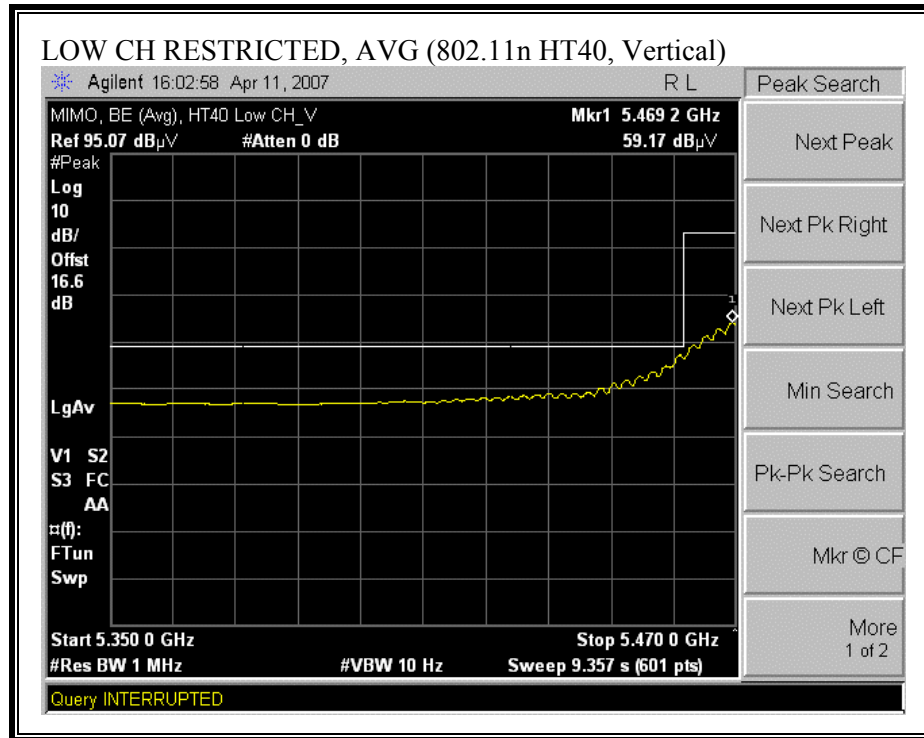




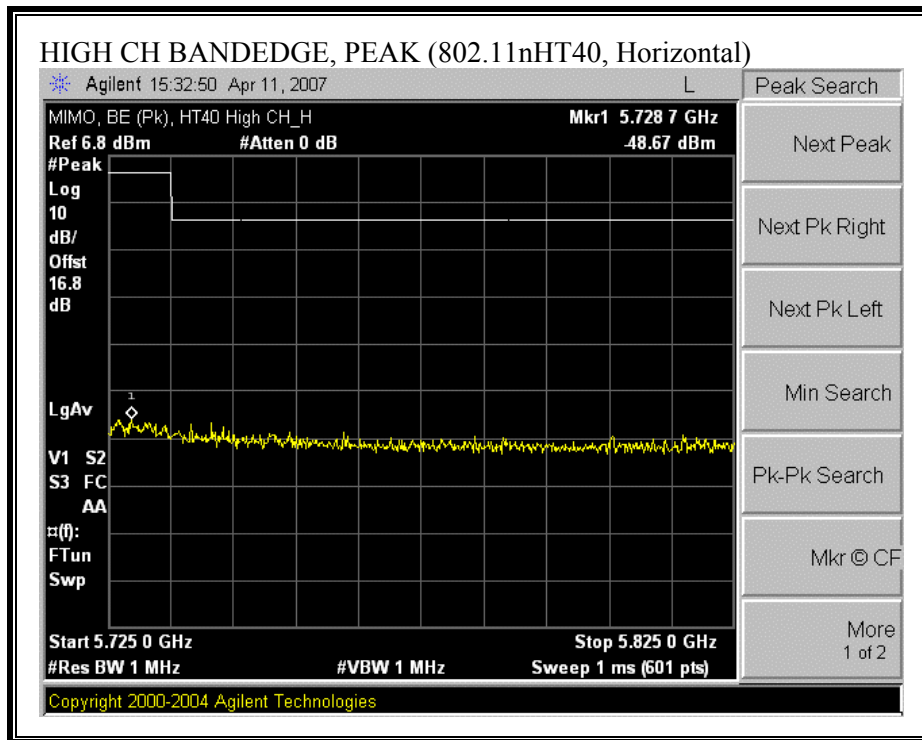
**RESTRICTED BAND & BANDEDGE (802.11n HT40, LOW CHANNEL, VERTICAL)**

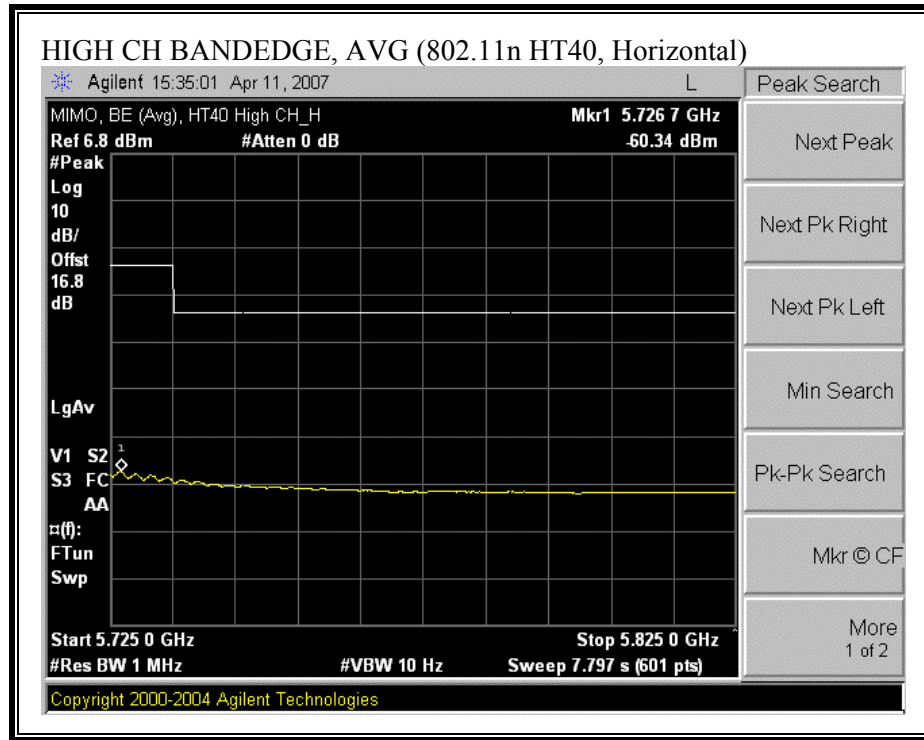




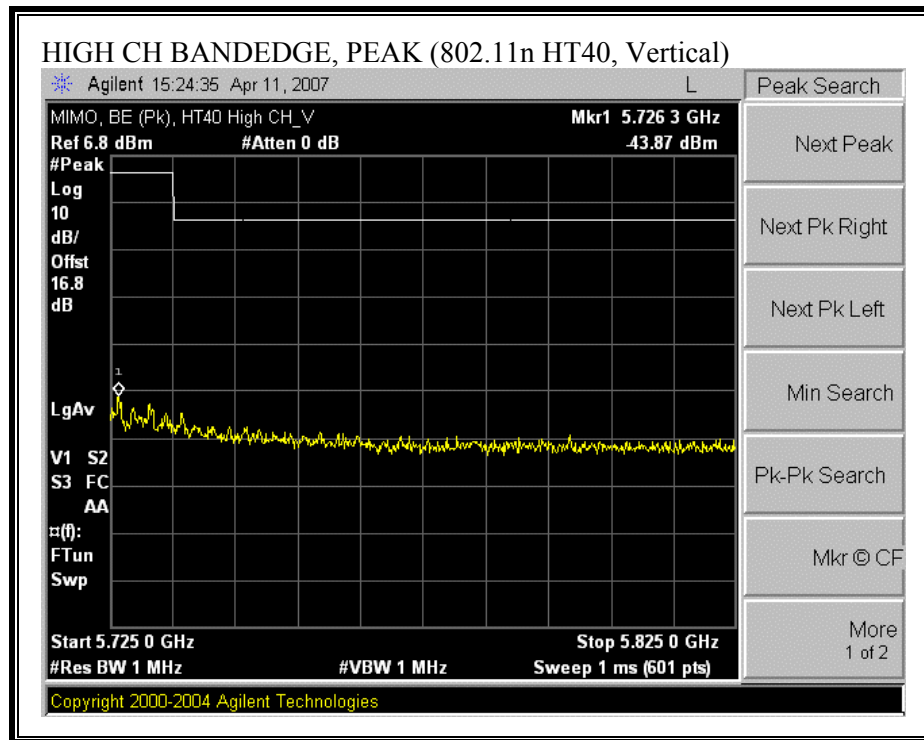


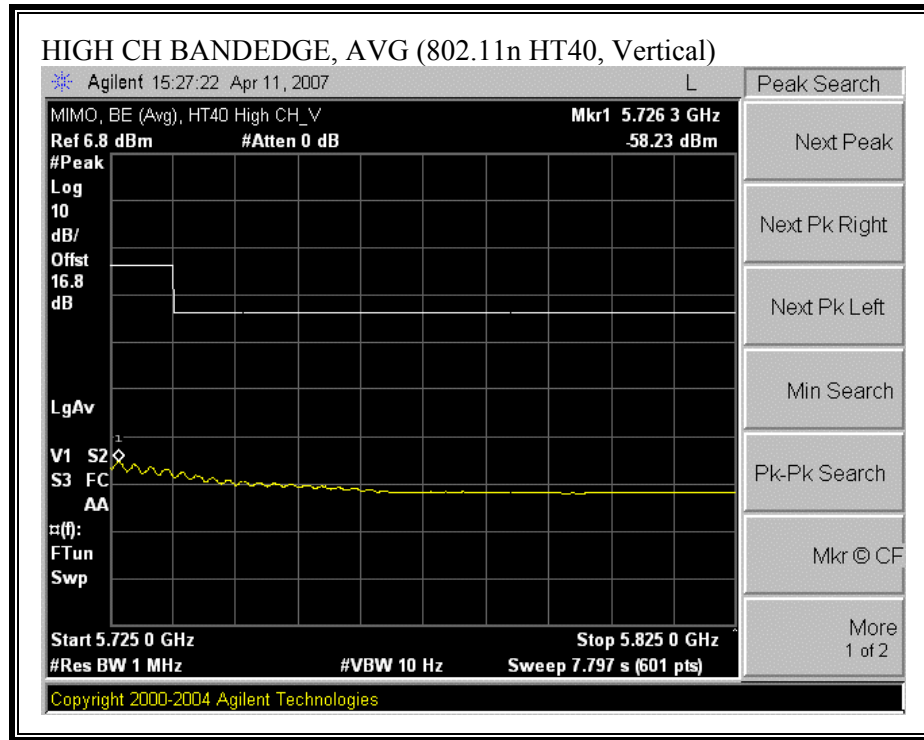
**BANDEDGE (802.11n HT40, HIGH CHANNEL, HORIZONTAL)**





**BANDEDGE (802.11n HT40, HIGH CHANNEL, VERTICAL)**





## HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

### SISO Mode:

High Frequency Measurement																
Compliance Certification Services, Fremont 5 meter chamber B																
Company: BROADCOM CORPORATION																
Project #: 07U10976																
Date: 4-11-2007																
Test Engineer: Thanh Nguyen																
Configuration: EUT Inside the Laptop																
Mode: Transmit SISO, Main Legacy 802.11a Mode																
Test Equipment:																
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit								
T119; S/N: 29301 @3m		T145 Agilent 3008A0050						FCC 15.209								
Hi Frequency Cables																
2 foot cable		3 foot cable		12 foot cable		HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz; VBW=10Hz						
				Gordon 203134001												
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr 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 ch 5500MHz																
11.000	3.0	39.14	25.33	37.0	11.0	-33.8	0.0	0.0	53.3	39.5	74	54	-20.7	-14.5	H	
1.500	3.0	37.45	29.45	29.6	3.5	-35.8	0.0	0.0	34.8	26.8	74	54	-39.2	-27.2	V	
2.497	3.0	34.65	22.67	31.9	4.6	-35.1	0.0	0.0	36.0	24.1	74	54	-38.0	-29.9	V	
11.000	3.0	49.14	29.20	37.0	11.0	-33.8	0.0	0.0	63.3	43.4	74	54	-10.7	-10.6	V	
16.500	3.0	33.76	20.02	39.5	14.1	-32.1	0.0	0.0	55.2	41.5	74	54	-18.8	-12.5	Noise floor	
MID Ch 5600MHz																
11.200	3.0	34.6	22.7	37.1	11.1	-33.5	0.0	0.0	49.2	37.3	74	54	-24.8	-16.7	H	
1.484	3.0	36.97	28.73	29.6	3.5	-35.8	0.0	0.0	34.2	26.0	74	54	-39.8	-28.0	V	
2.500	3.0	37.8	25.7	31.9	4.6	-35.1	0.0	0.0	39.2	27.0	74	54	-34.8	-27.0	V	
11.200	3.0	42.6	28.1	37.1	11.1	-33.5	0.0	0.0	57.3	42.8	74	54	-16.7	-11.2	V	
16.800	3.0	32.8	20.1	39.9	14.3	-32.0	0.0	0.0	55.0	42.3	74	54	-19.0	-11.7	Noise floor	
High ch 5700MHz																
1.500	3.0	39.3	34.4	29.6	3.5	-35.8	0.0	0.0	36.6	31.7	74	54	-37.4	-22.3	V	
2.495	3.0	33.6	28.6	31.9	4.6	-35.1	0.0	0.0	35.0	29.9	74	54	-39.0	-24.1	V	
11.400	3.0	42.9	24.6	37.1	11.2	-33.2	0.0	0.0	58.0	39.7	74	54	-16.0	-14.3	V	
17.100	3.0	31.5	22.2	40.2	14.5	-32.0	0.0	0.0	54.2	44.9	74	54	-19.8	-9.1	Noise floor	
11.400	3.0	36.6	22.5	37.1	11.2	-33.2	0.0	0.0	51.7	37.7	74	54	-22.3	-16.3	H	
No other emissions were detected above noise floor.																
Rev. 5.1.6																
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											

## HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

### MIMO Mode:

High Frequency Measurement																
Compliance Certification Services, Fremont 5 meter chamber B																
Company: BROADCOM CORPORATION																
Project #: 07U10976																
Date: 4-11-2007																
Test Engineer: Thanh Nguyen																
Configuration: EUT Inside the Laptop																
Mode: Transmit MIMO, 802.11a Mode																
Test Equipment:																
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit								
T119; S/N: 29301 @3m		T145 Agilent 3008A005						FCC 15.209								
Hi Frequency Cables																
2 foot cable		3 foot cable		12 foot cable		HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz; VBW=10Hz						
				Gordon 203134001												
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filt 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 ch 5500MHz																
11.000	3.0	41.1	27.3	37.0	11.0	-33.8	0.0	0.0	55.3	41.5	74	54	-18.7	-12.5	H	
2.497	3.0	47.4	32.6	31.9	4.6	-35.1	0.0	0.0	48.7	34.0	74	54	-25.3	-20.0	V	
3.000	3.0	44.5	38.1	32.5	5.1	-35.2	0.0	1.0	47.8	41.4	74	54	-26.2	-12.6	V	
11.000	3.0	49.1	33.9	37.0	11.0	-33.8	0.0	0.0	63.3	48.1	74	54	-10.7	-5.9	V	
16.500	3.0	34.5	22.7	39.5	14.1	-32.1	0.0	0.0	56.0	44.2	74	54	-18.0	-9.8	Noise floor	
MID Ch 5600MHz																
11.200	3.0	45.5	31.8	37.1	11.1	-33.5	0.0	0.0	60.2	46.4	74	54	-13.8	-7.6	H	
2.495	3.0	46.8	32.5	31.9	4.6	-35.1	0.0	0.0	48.2	33.8	74	54	-25.8	-20.2	V	
3.000	3.0	43.9	37.7	32.5	5.1	-35.2	0.0	0.0	46.2	40.0	74	54	-27.8	-14.0	V	
11.200	3.0	48.0	34.7	37.1	11.1	-33.5	0.0	0.0	62.6	49.4	74	54	-11.4	-4.6	V	
16.800	3.0	35.3	22.2	39.9	14.3	-32.0	0.0	0.0	57.5	44.3	74	54	-16.5	-9.7	Noise floor	
High ch 5700MHz																
2.501	3.0	46.4	32.3	31.9	4.6	-35.1	0.0	0.0	47.8	33.7	74	54	-26.2	-20.3	V	
3.000	3.0	45.6	40.9	32.5	5.1	-35.2	0.0	0.0	47.9	43.2	74	54	-26.1	-10.8	V	
3.799	3.0	43.4	38.0	33.1	5.8	-34.8	0.0	0.0	47.4	42.0	74	54	-26.6	-12.0	V	
11.400	3.0	37.8	26.5	37.1	11.2	-33.2	0.0	0.0	52.9	41.7	74	54	-21.1	-12.3	V	
17.100	3.0	35.3	23.1	40.2	14.5	-32.0	0.0	0.0	57.9	45.7	74	54	-16.1	-8.3	Noise floor	
11.400	3.0	38.5	26.0	37.1	11.2	-33.2	0.0	0.0	53.6	41.2	74	54	-20.4	-12.8	H	
No other emissions were detected above noise floor.																
Rev. 5.1.6																
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											

**HARMONICS AND SPURIOUS EMISSIONS (802.11n HT20 MODE)**

High Frequency Measurement																
Compliance Certification Services, Fremont 5 meter chamber B																
Company: BROADCOM CORPORATION																
Project #: 07U10976																
Date: 4-11-2007																
Test Engineer: Thanh Nguyen																
Configuration: EUT Inside the Laptop																
Mode: Transmit MIMO, 802.11n_HT20 Mode																
Test Equipment:																
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit								
T119; S/N: 29301 @3m		T145 Agilent 3008A005C						FCC 15.209								
Hi Frequency Cables																
2 foot cable		3 foot cable		12 foot cable		HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz						
				Gordon 203134001												
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 ch 5500MHz																
11.000	3.0	50.6	36.7	37.0	11.0	-33.8	0.0	0.0	64.8	50.9	74	54	-9.2	-3.1	H	
2.500	3.0	48.6	33.5	31.9	4.6	-35.1	0.0	0.0	49.9	34.9	74	54	-24.1	-19.1	V	
3.000	3.0	46.6	39.5	32.5	5.1	-35.2	0.0	1.0	49.9	42.8	74	54	-24.1	-11.2	V	
11.000	3.0	50.8	38.2	37.0	11.0	-33.8	0.0	0.0	65.0	52.4	74	54	-9.0	-1.6	V	
16.500	3.0	34.5	22.7	39.5	14.1	-32.1	0.0	0.0	56.0	44.2	74	54	-18.0	-9.8	Noise floor	
MID Ch 5600MHz																
11.200	3.0	45.6	32.5	37.1	11.1	-33.5	0.0	0.0	60.2	47.2	74	54	-13.8	-6.8	H	
2.400	3.0	47.4	34.6	31.8	4.5	-35.1	0.0	0.0	48.6	35.8	74	54	-25.4	-18.2	V	
3.005	3.0	44.6	38.9	32.5	5.1	-35.2	0.0	0.0	46.9	41.2	74	54	-27.1	-12.8	V	
11.200	3.0	49.0	37.1	37.1	11.1	-33.5	0.0	0.0	63.6	51.8	74	54	-10.4	-2.2	V	
16.800	3.0	35.2	22.1	39.9	14.3	-32.0	0.0	0.0	57.3	44.2	74	54	-16.7	-9.8	Noise floor	
High ch 5700MHz																
2.500	3.0	47.7	35.3	31.9	4.6	-35.1	0.0	0.0	49.1	36.7	74	54	-24.9	-17.3	V	
3.000	3.0	48.6	41.8	32.5	5.1	-35.2	0.0	0.0	50.9	44.1	74	54	-23.1	-9.9	V	
3.820	3.0	43.7	38.3	33.1	5.8	-34.8	0.0	0.0	47.7	42.4	74	54	-26.3	-11.6	V	
11.400	3.0	44.3	32.1	37.1	11.2	-33.2	0.0	0.0	59.4	47.2	74	54	-14.6	-6.8	V	
17.100	3.0	35.5	23.5	40.2	14.5	-32.0	0.0	0.0	58.2	46.1	74	54	-15.8	-7.9	Noise floor	
11.400	3.0	43.5	31.5	37.1	11.2	-33.2	0.0	0.0	58.6	46.7	74	54	-15.4	-7.3	H	
17.100	3.0	36.4	24.8	40.2	14.5	-32.0	0.0	0.0	59.1	47.5	74	54	-14.9	-6.5	Noise floor	
No other emissions were detected above noise floor.																
Rev. 5.1.6																
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											

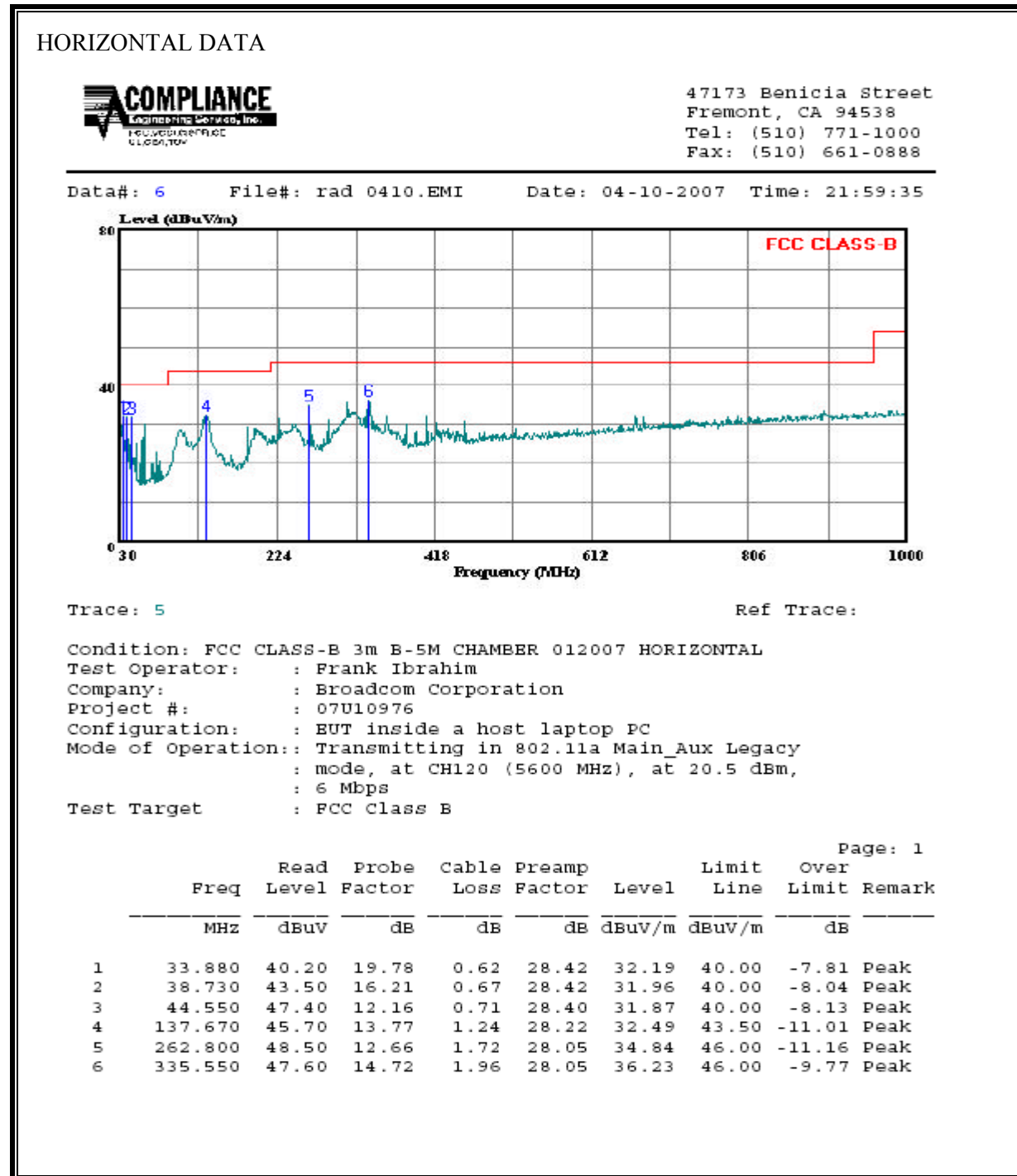


# HARMONICS AND SPURIOUS EMISSIONS (802.11n HT40 MODE)

High Frequency Measurement																
Compliance Certification Services, Fremont 5 meter chamber B																
Company: BROADCOM CORPORATION																
Project #: 07U10976																
Date: 4-11-2007																
Test Engineer: Thanh Nguyen																
Configuration: EUT Inside the Laptop																
Mode: Transmit MIMO, 802.11n_HT40 Mode																
Test Equipment:																
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit				
T119; S/N: 29301 @3m			T145 Agilent 3008A005C									FCC 15.209				
HI Frequency Cables																
2 foot cable			3 foot cable			12 foot cable			HPF			Reject Filter			Peak Measurements RBW=VBW=1MHz	
						Gordon 203134001									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	Filt 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 ch 5510MHz																
11.020	3.0	51.3	37.4	37.0	11.0	-33.7	0.0	0.0	65.6	51.7	74	54	-8.4	-2.3	H	
2.500	3.0	48.6	33.5	31.9	4.6	-35.1	0.0	0.0	49.9	34.9	74	54	-24.1	-19.1	V	
3.000	3.0	46.7	40.3	32.5	5.1	-35.2	0.0	1.0	50.0	43.6	74	54	-24.0	-10.4	V	
11.020	3.0	52.3	39.2	37.0	11.0	-33.7	0.0	0.0	66.5	53.5	74	54	-7.5	-0.5	V	
16.530	3.0	34.5	22.7	39.5	14.1	-32.1	0.0	0.0	56.1	44.3	74	54	-17.9	-9.7	Noise floor	
MID Ch 5590MHz																
11.180	3.0	44.1	32.3	37.1	11.1	-33.5	0.0	0.0	58.7	47.0	74	54	-15.3	-7.0	H	
2.400	3.0	47.4	34.6	31.8	4.5	-35.1	0.0	0.0	48.6	35.8	74	54	-25.4	-18.2	V	
3.005	3.0	44.6	38.9	32.5	5.1	-35.2	0.0	0.0	46.9	41.2	74	54	-27.1	-12.8	V	
11.180	3.0	48.9	36.3	37.1	11.1	-33.5	0.0	0.0	63.5	50.9	74	54	-10.5	-3.1	V	
16.770	3.0	35.2	22.1	39.9	14.3	-32.1	0.0	0.0	57.3	44.2	74	54	-16.7	-9.8	Noise floor	
High ch 5670MHz																
2.500	3.0	46.6	35.0	31.9	4.6	-35.1	0.0	0.0	47.9	36.4	74	54	-26.1	-17.6	V	
3.000	3.0	48.6	42.1	32.5	5.1	-35.2	0.0	0.0	50.9	44.4	74	54	-23.1	-9.6	V	
3.820	3.0	44.4	38.5	33.1	5.8	-34.8	0.0	0.0	48.4	42.6	74	54	-25.6	-11.4	V	
11.340	3.0	42.2	31.3	37.1	11.2	-33.3	0.0	0.0	57.2	46.3	74	54	-16.8	-7.7	V	
17.100	3.0	35.5	23.5	40.2	14.5	-32.0	0.0	0.0	58.2	46.1	74	54	-15.8	-7.9	Noise floor	
11.340	3.0	40.6	30.2	37.1	11.2	-33.3	0.0	0.0	55.6	45.2	74	54	-18.4	-8.8	H	
17.010	3.0	34.8	22.7	40.2	14.4	-32.0	0.0	0.0	57.4	45.2	74	54	-16.6	-8.8	Noise floor	
No other emissions were detected above noise floor.																
Rev. 5.1.6																
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											

### 7.1.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

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



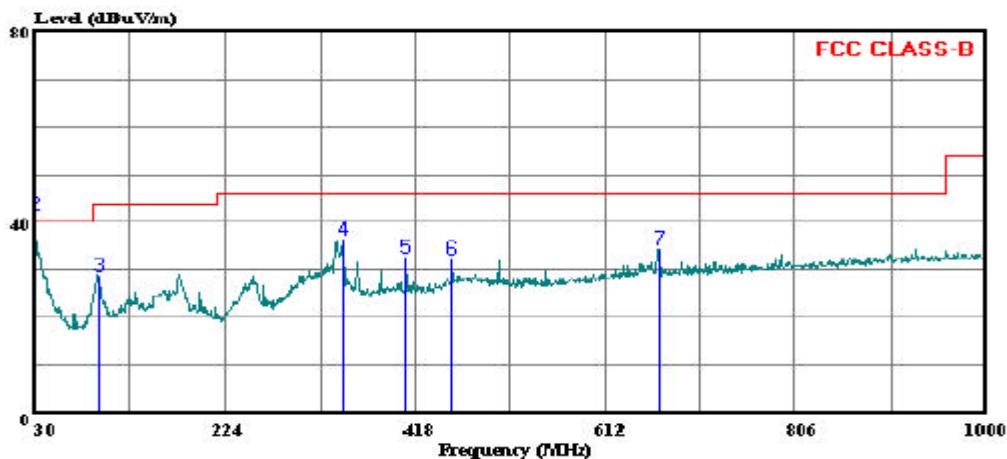
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL DATA



47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 4 File#: rad 0410.EMI Date: 04-10-2007 Time: 21:31:22



Trace: 1

Ref Trace:

Condition: FCC CLASS-B 3m B-5M CHAMBER 012007 VERTICAL  
Test Operator: : Frank Ibrahim  
Company: : Broadcom Corporation  
Project #: : 07U10976  
Configuration: : EUT inside a host laptop PC  
Mode of operation: : Transmitting in 802.11a Main\_Aux Legacy  
: mode, at CH120 (5600 MHz), at 20.5 dBm,  
: 6 Mbps  
Test Target : FCC Class B

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamplifier Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	30.000	44.50	22.03	0.62	28.41	38.74	40.00	-1.26	QP
2 *	30.000	47.40	22.03	0.62	28.41	41.64	40.00	1.64	Peak
3	94.990	47.00	8.98	1.01	28.28	28.71	43.50	-14.79	Peak
4	343.310	47.53	14.85	1.98	28.05	36.32	46.00	-9.68	Peak
5	407.330	42.30	16.14	2.19	28.04	32.59	46.00	-13.41	Peak
6	455.830	40.50	17.15	2.35	27.91	32.10	46.00	-13.90	Peak
7	666.320	38.30	20.15	2.85	27.12	34.18	46.00	-11.82	Peak

## 7.2. POWERLINE CONDUCTED EMISSIONS

### LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (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.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

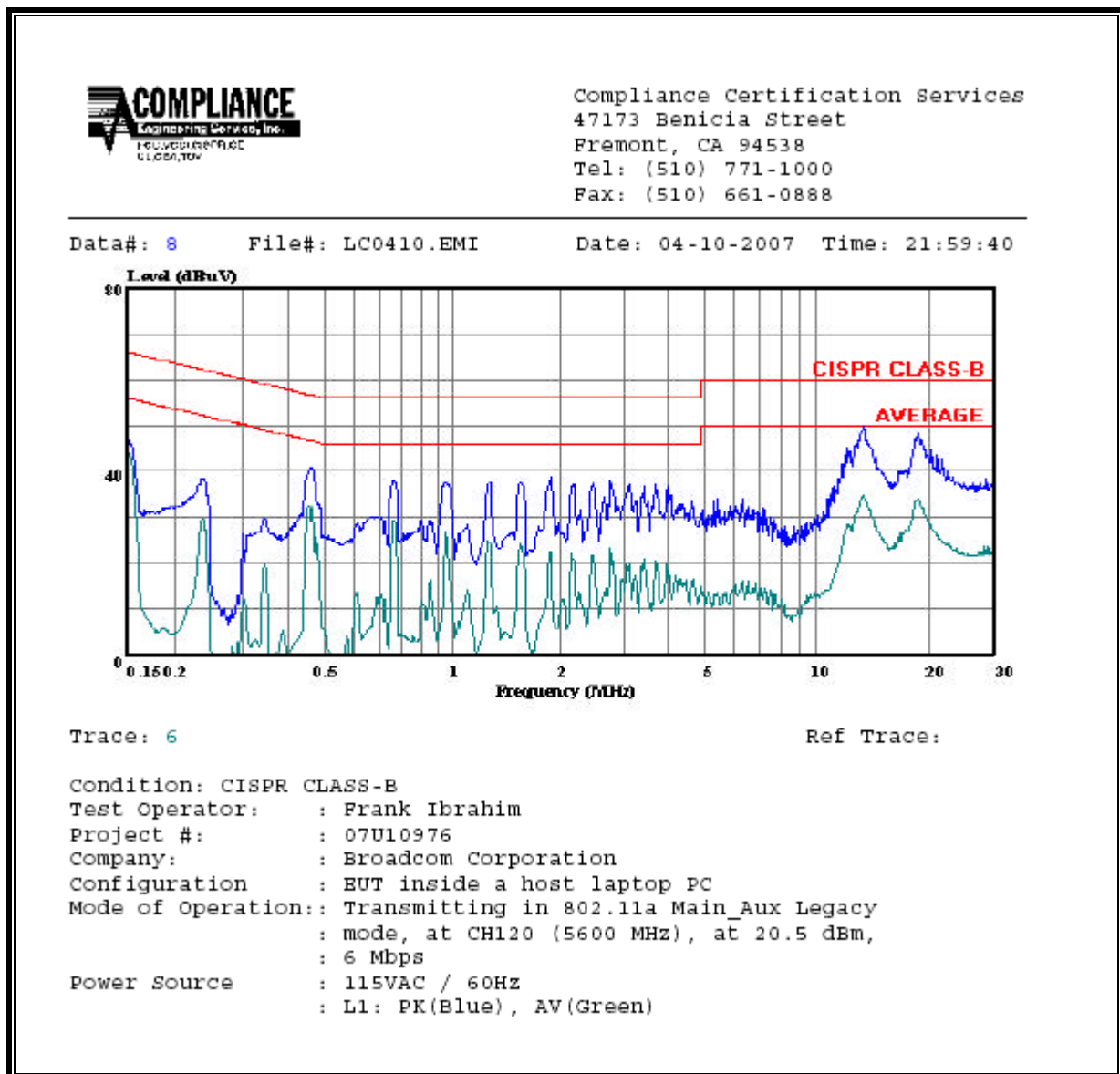
### RESULTS

No non-compliance noted:

# **6 WORST EMISSIONS**

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	46.78	--	44.35	0.00	66.00	56.00	-19.22	-11.65	L1
13.48	49.75	--	34.63	0.00	60.00	50.00	-10.25	-15.37	L1
18.72	48.55	--	33.87	0.00	60.00	50.00	-11.45	-16.13	L1
0.16	39.36	--	38.07	0.00	65.73	55.73	-26.37	-17.66	L2
1.08	38.75	--	27.13	0.00	56.00	46.00	-17.25	-18.87	L2
2.40	38.65	--	21.98	0.00	56.00	46.00	-17.35	-24.02	L2
6 Worst Data									

## LINE 1 RESULTS



## LINE 2 RESULTS

