



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

FOR

**BROADCOM 802.11ag /DRAFT 802.11n
WIRELESS LAN PCI-E MINI CARD**

MODEL NUMBER: BCM94321MC

FCC ID: QDS-BRCM1022

REPORT NUMBER: 07U11194-2A

ISSUE DATE: DECEMBER 4, 2007

Prepared for
**BROADCOM CORP.
190 MATHILDA PLACE
SUNNYVALE, CA 94086, USA**

Prepared by
**COMPLIANCE CERTIFICATION SERVICES
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	7/31/07	Initial Issue	Sunny Shih
A	12/4/07	Added DFS Slave Non-Occupancy Test Results	M. Heckrotte

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY.....	5
4.1. MEASURING INSTRUMENT CALIBRATION.....	5
4.2. MEASUREMENT UNCERTAINTY.....	5
5. EQUIPMENT UNDER TEST.....	6
5.1. DESCRIPTION OF EUT	6
5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE.....	6
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	6
5.4. SOFTWARE AND FIRMWARE	6
5.5. WORST-CASE CONFIGURATION AND MODE.....	7
5.6. DESCRIPTION OF TEST SETUP	8
6. TEST AND MEASUREMENT EQUIPMENT	10
7. LIMITS AND RESULTS	11
7.1. RADIATED EMISSIONS.....	11
7.1.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS	11
7.1.2. TRANSMITTER ABOVE 1 GHz FOR 5150 TO 5350 MHz BAND	14
7.1.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz	31
7.2. DYNAMIC FREQUENCY SELECTION: SLAVE NON-OCCUPANCY	33
7.2.1. 20 MHz BANDWIDTH	34
7.2.2. 40 MHz BANDWIDTH	36
8. SETUP PHOTOS	38

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: BROADCOM 802.11AG/DRAFT 802.11n WIRELESS LAN PCI-E
MINI CARD

MODEL: BCM94321MC

SERIAL NUMBER: 107 & 316

DATE TESTED: JULY 17 – NOVEMBER 20, 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:



THU CHAN
ENGINEERING SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES



KEITH NG
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, FCC CFR 47 Part 15 and FCC 06-96 APPENDIX "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

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 802.11ag/Draft 802.11n Wireless LAN PCI-E Mini Card, model number BCM94321MC.

The radio module is manufactured by Broadcom Corp.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The EUT is installed in a DELL laptop, Model PRK-E2PT2-2 with 2 different Antennas ACON and AMPHENOL Stamped Metal sheet

The major changes filed under this application are:

1. Add a portable platform, Dell PP12S.
2. Add co-location with Bluetooth, FCC ID: PIWW360BT.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

<i>DESCRIPTION OF EACH ANTENNA</i> (List all antennas)			
Antenna Manufacturer / Model Number	Antenna Type (Dipole, Patch, Panel, Yagi, etc.)	Maximum Peak Antenna Gain (dBi) 2.4GHz	Maximum Peak Antenna Gain (dBi) 5GHz
Acon Stamped metal sheet	AMP6P-700000	Main 1.0 (V) Main 2.6 (H+V)	Aux -0.5 (H) Aux 0.7 (H+V)
Amphenol Stamped metal sheet	WT0541-22-003	Aux -0.43 (V) Aux 1.81 (H+V)	Aux 1.72 (H) Aux 2.58 (H+V)

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 channel is determined as the channel with the highest output power, and oriented with mobile laptop, X, Y, Z positions. The highest emissions measurement was at normal laptop position.

Regarding the selection of the antennas being tested, the antenna with the highest antenna gain was chosen. Therefore, ACON antenna was used for testing in 2.4GHz b and g Legacy mode, and Amphenol antenna was used for testing in MIMO modes for 2.4GHz and Legacy & MIMO 5GHz band.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

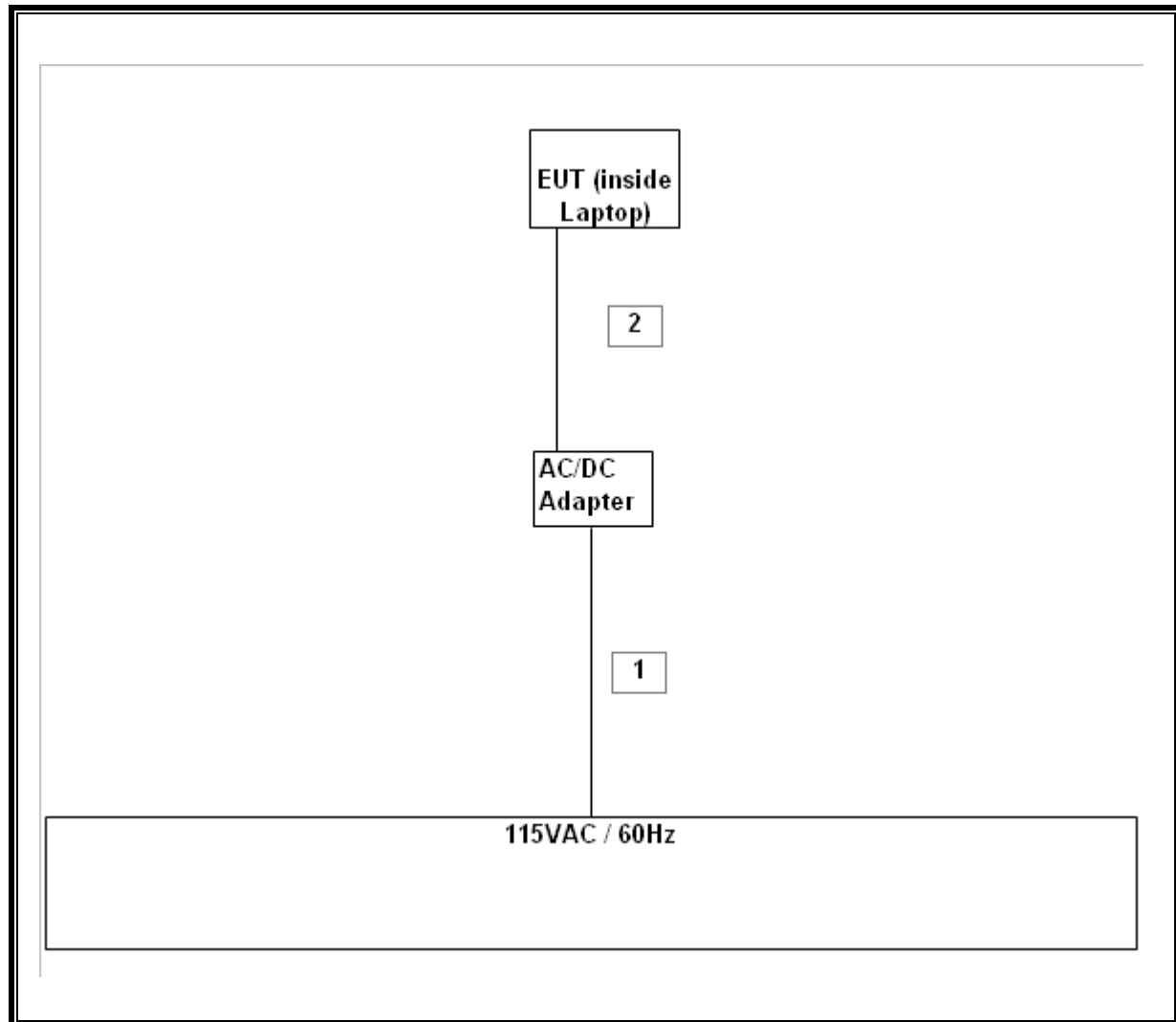
PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
NoteBook	DELL	PRK-E2PT2-2	PRKE2PT2051	DoC
AC/DC Adapter	DELL	DA65NS0-00	CN0CF745-48661-738 2D4U	N/A

I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US115VAC	Unsheilded	1.5m	No
2	DC	1	DC Plug	Unsheilded	1.5m	No

TEST SETUP

The EUT is installed in a host laptop 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
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	11/26/2007
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00931	8/1/2007
5.15-5.35 GHz Reject Filter	Micro-Tronics	BRC13190	2	CNR
Quasi-Peak Adaptor	Agilent / HP	85650A	3145A01654	1/21/2008
SA RF Section, 1.5 GHz	Agilent / HP	85680B	2814A04227	1/7/2008
SA Display Section 2	Agilent / HP	85662A	2816A16696	4/7/2008
Antenna, Bilog 30 MHz ~ 2 GHz	Sunol Sciences	JB1	A0022704	8/13/2007
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	9001-3245	4/15/2008
Power Sensor 10MHz - 18GHz	Agilent / HP	8481A	2349A36506	4/22/2008
Power Meter	Agilent / HP	438B	2822A05684	6/20/2008
EMI Receiver, 9 kHz ~ 2.9 GHz	Agilent / HP	8542E	3942A00286	12/62008
RF Filter Section	Agilent / HP	85420E	3705A00256	12/62009

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
¹ 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	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² 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.

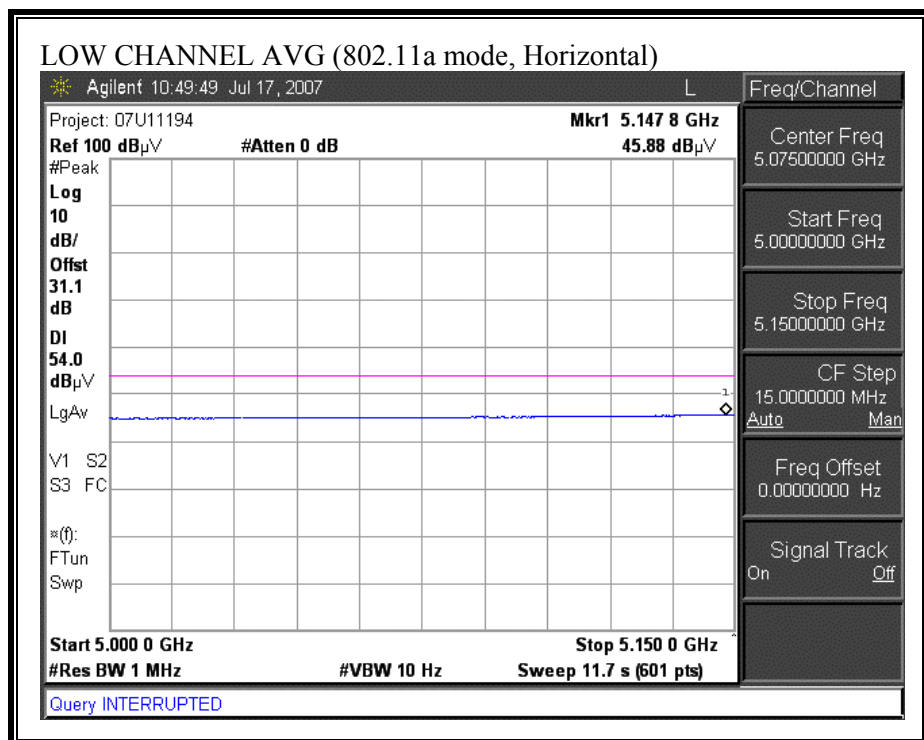
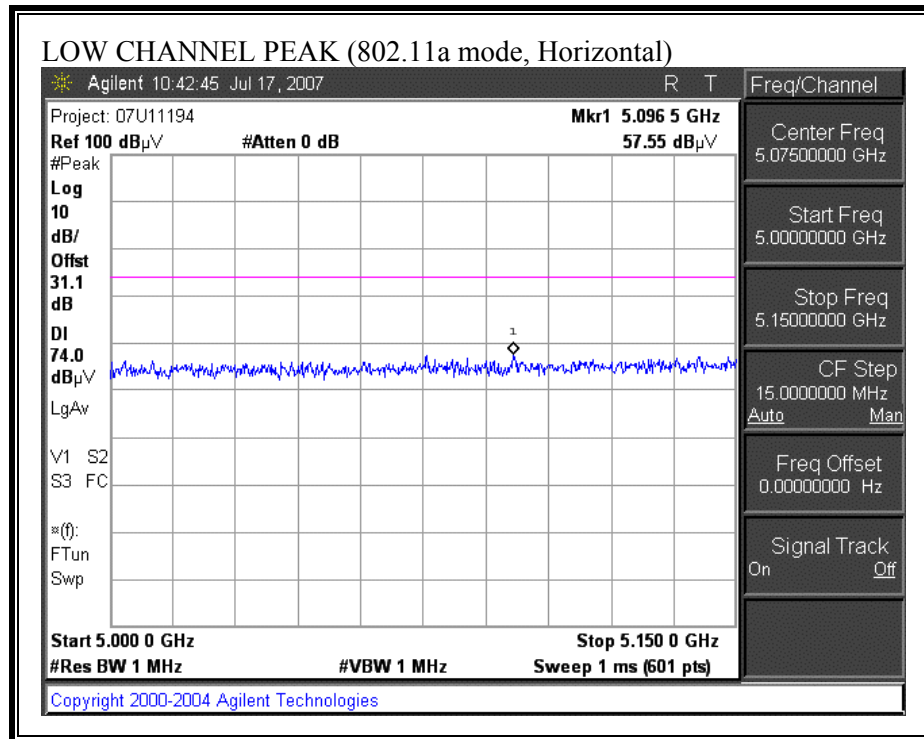
For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

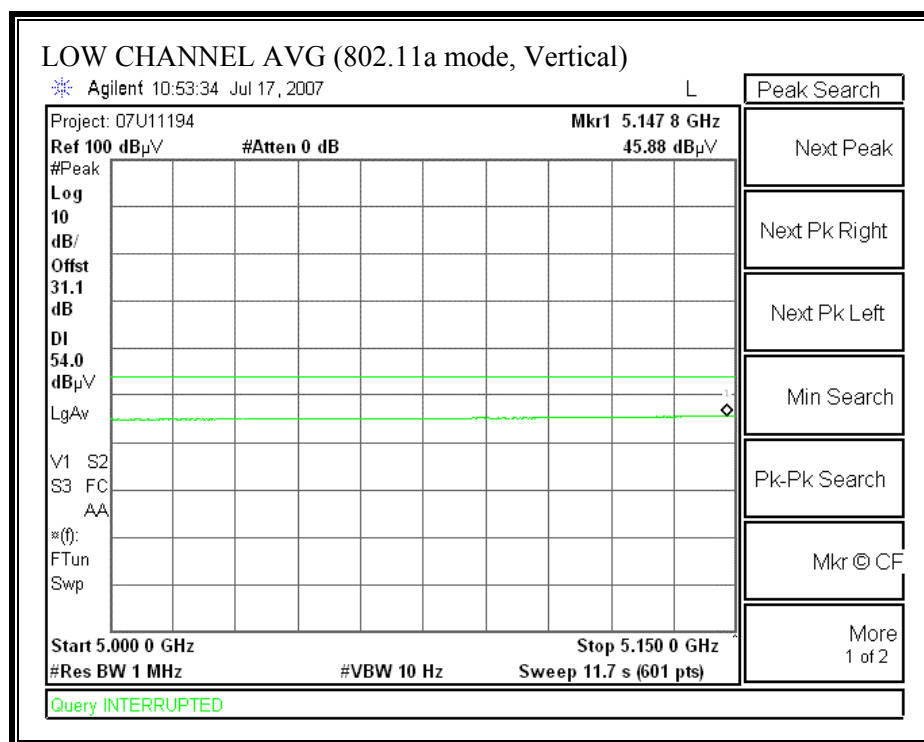
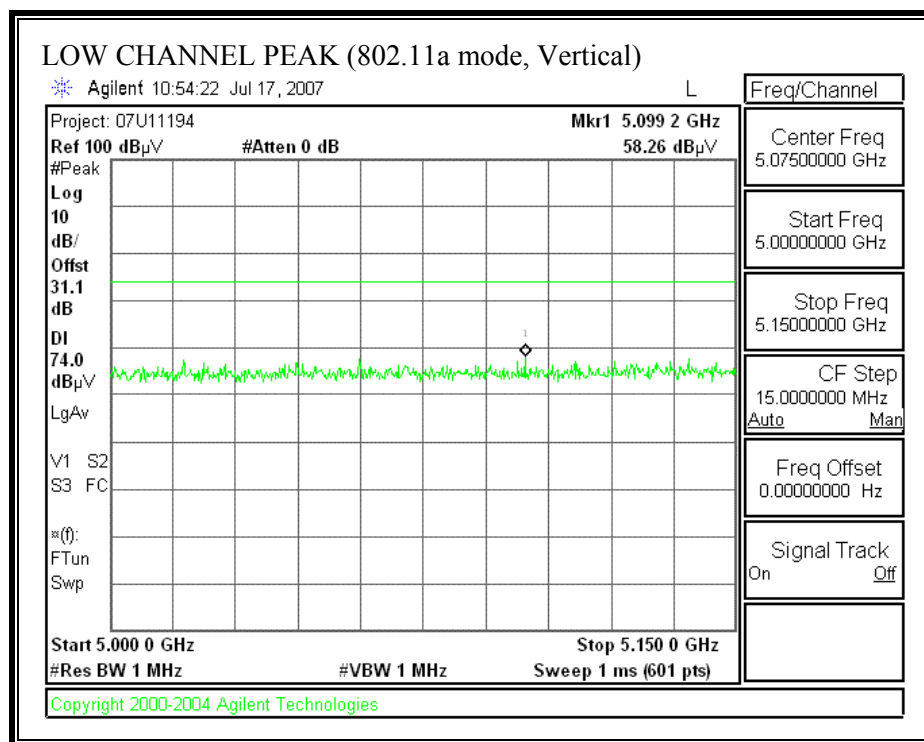
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

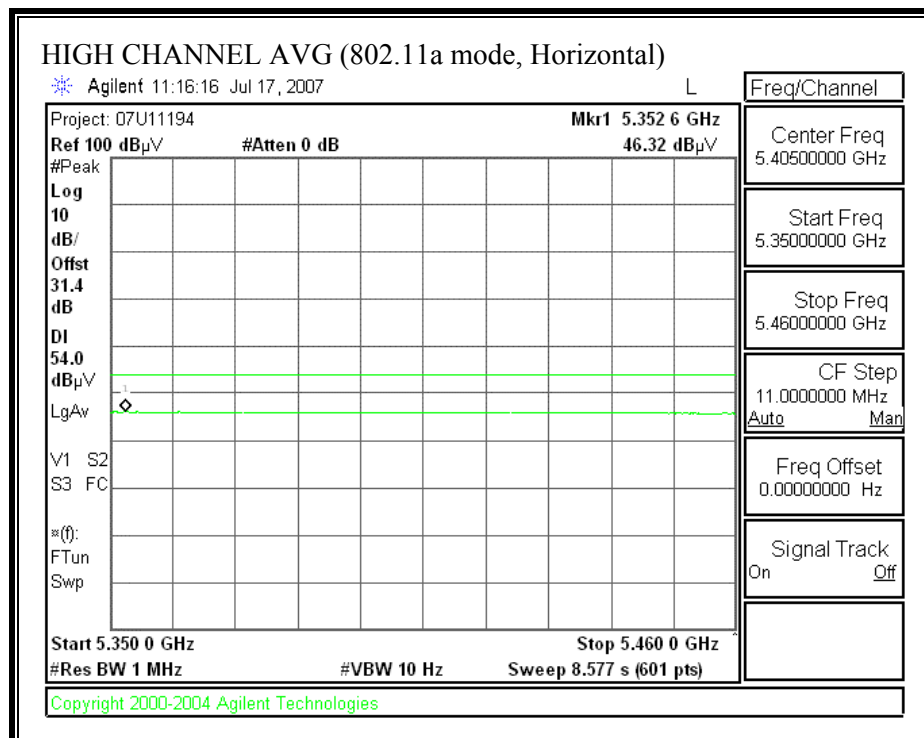
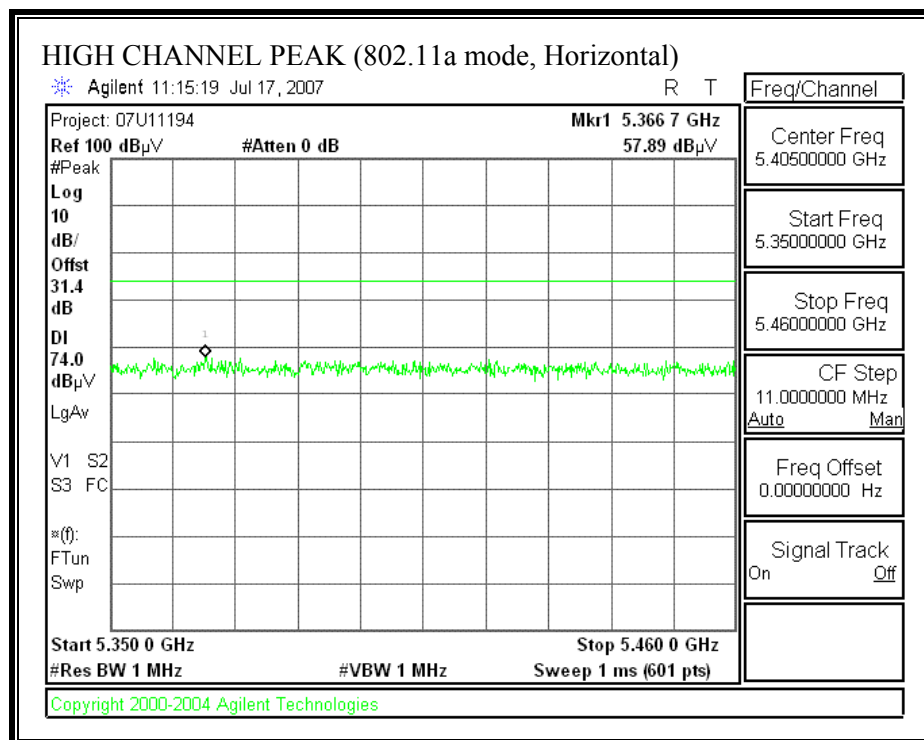
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

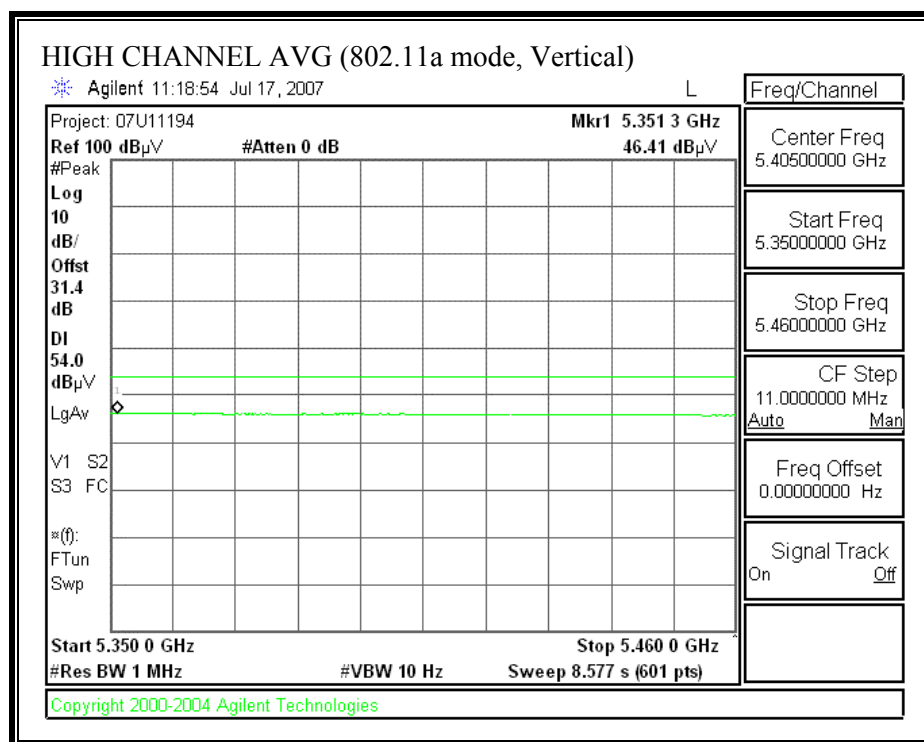
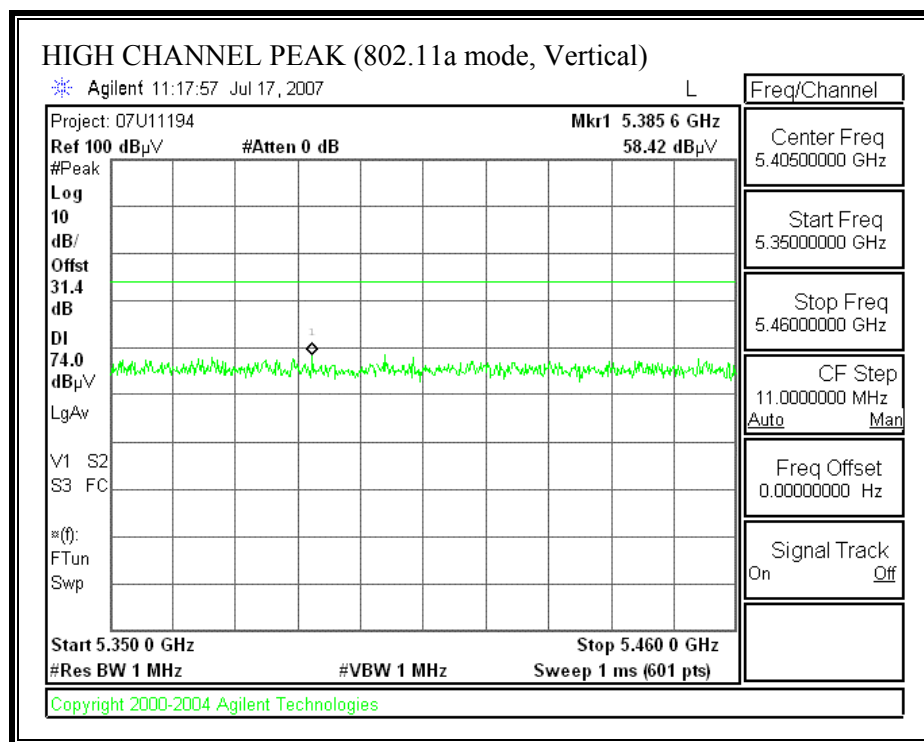
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

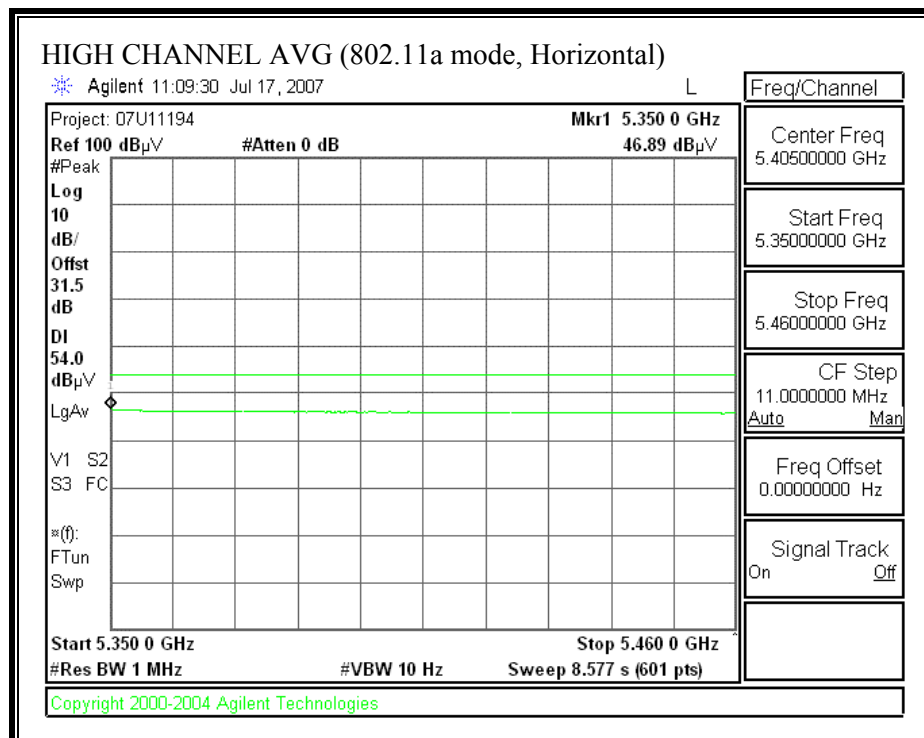
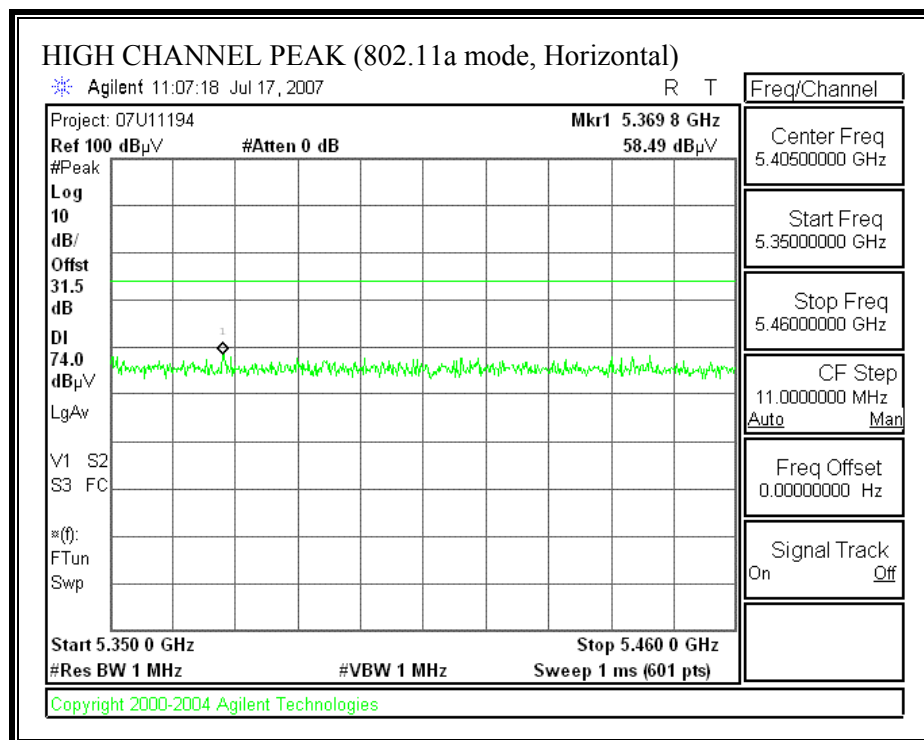
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

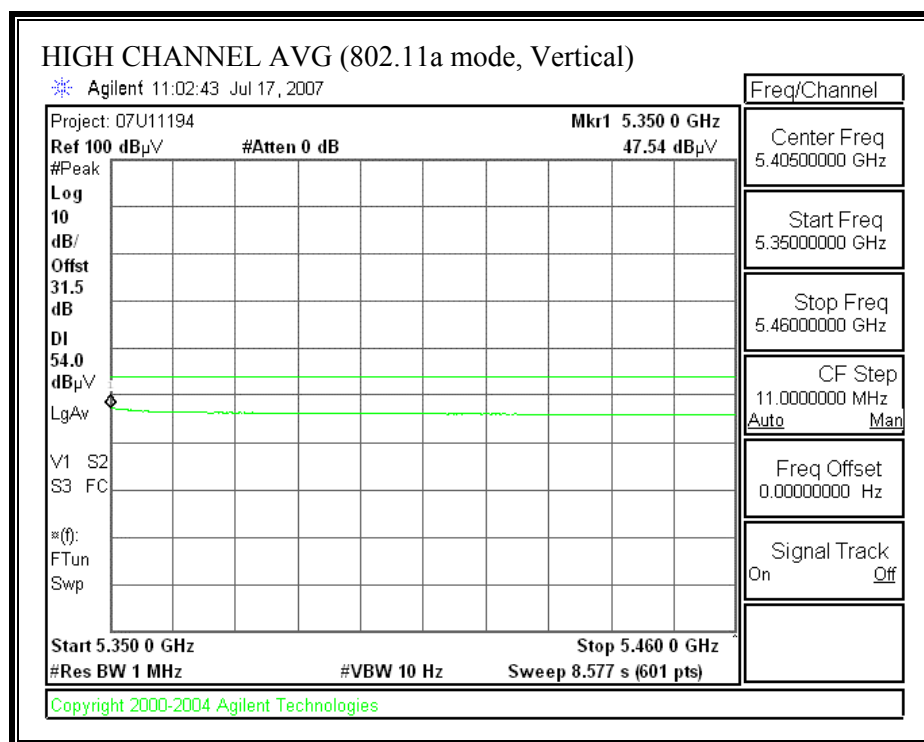
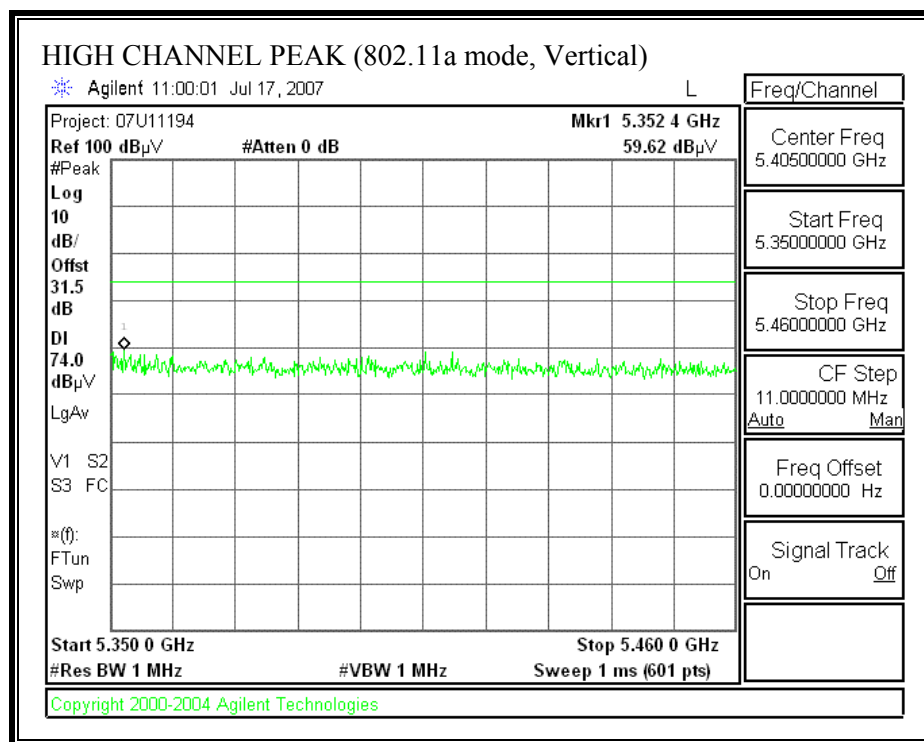
7.1.2. TRANSMITTER ABOVE 1 GHz FOR 5150 TO 5350 MHz BAND**RESTRICTED BANDEDGE (802.11a MODE, 5180MHz, With Amphenol Antenna)**



RESTRICTED BANDEDGE (802.11a MODE, 5300MHz, With Amphenol Antenna)



RESTRICTED BANDEDGE (802.11a MODE, 5320MHz, With Amphenol Antenna)



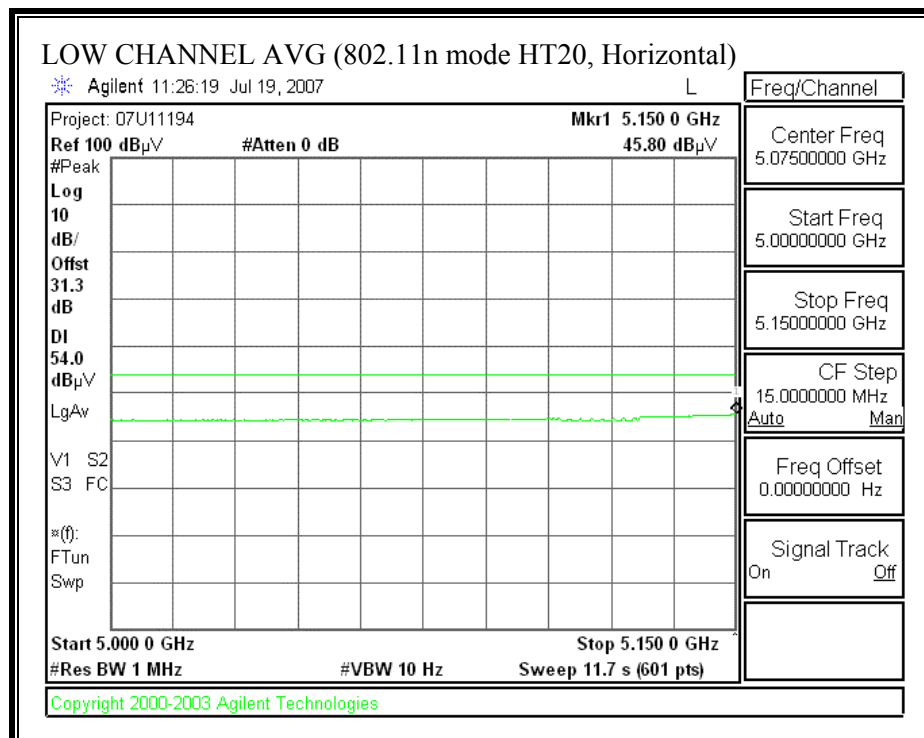
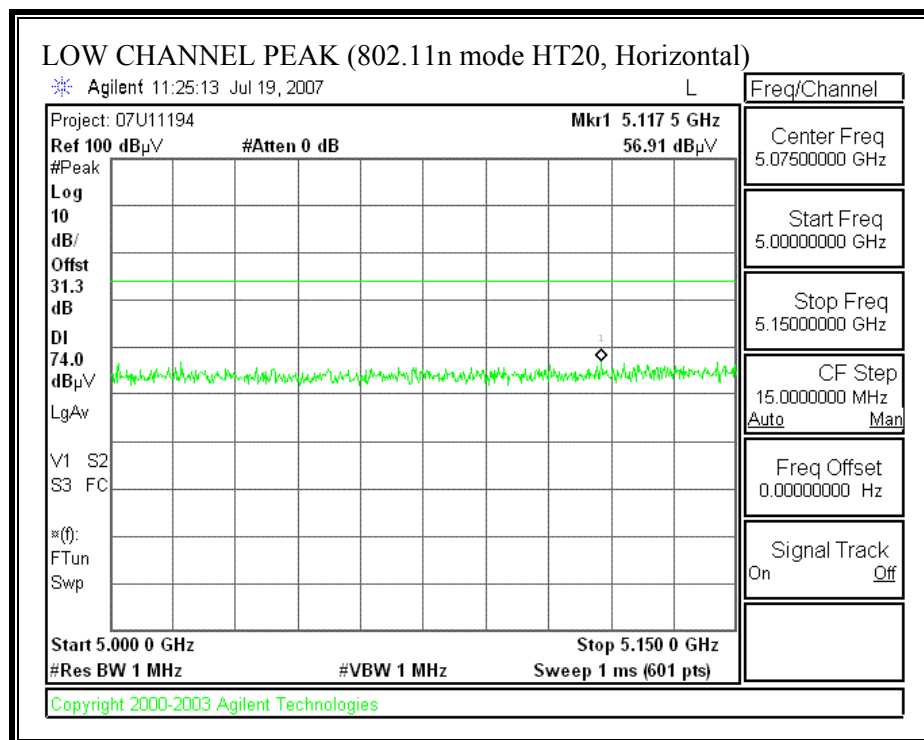
HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

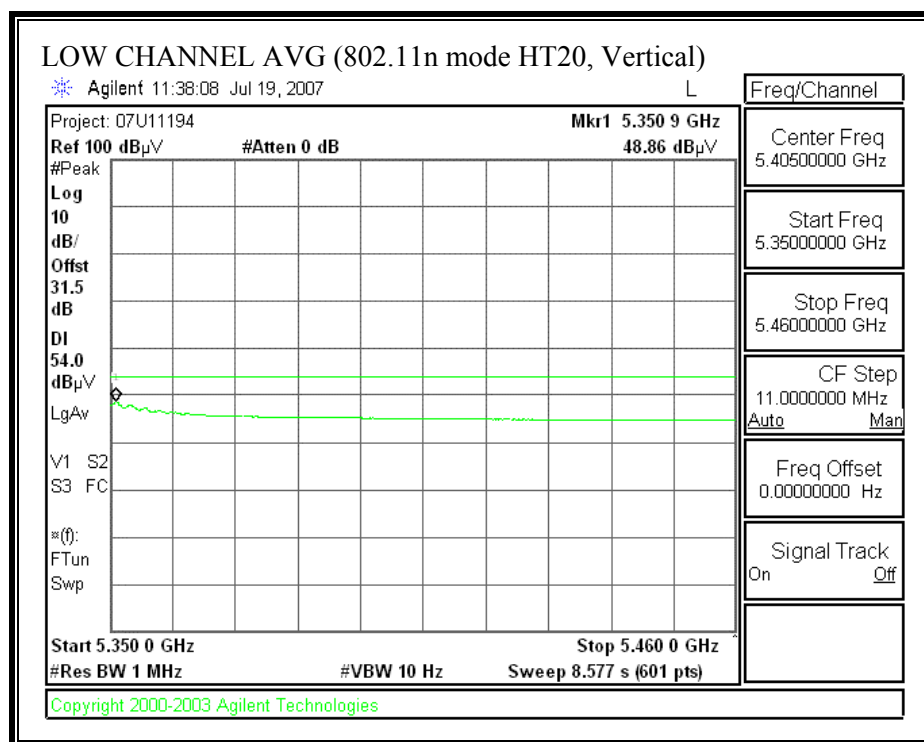
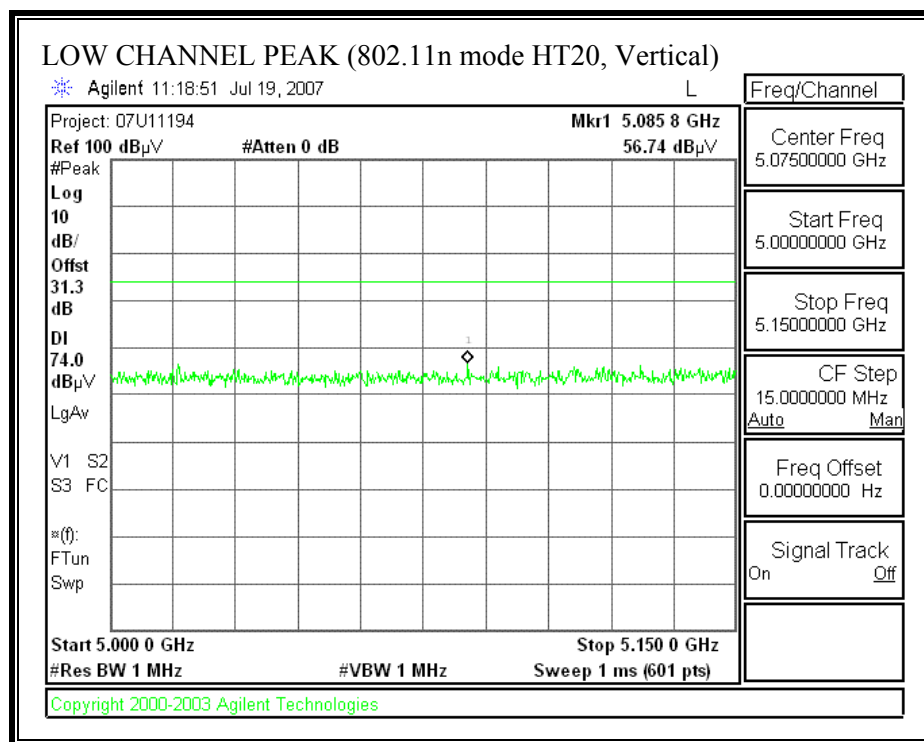
With Amphenol Antenna

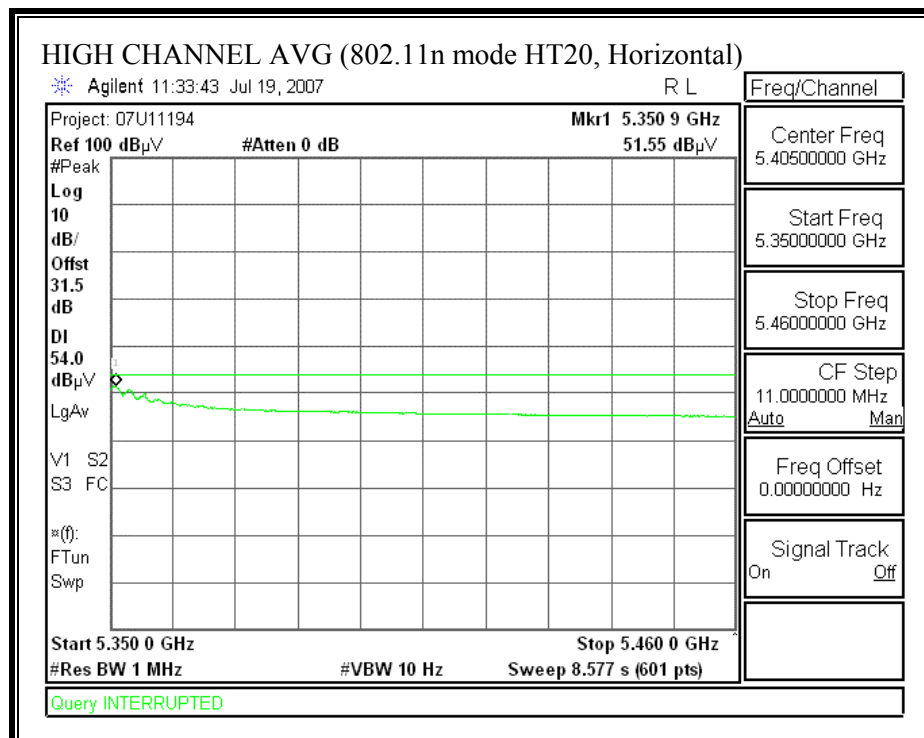
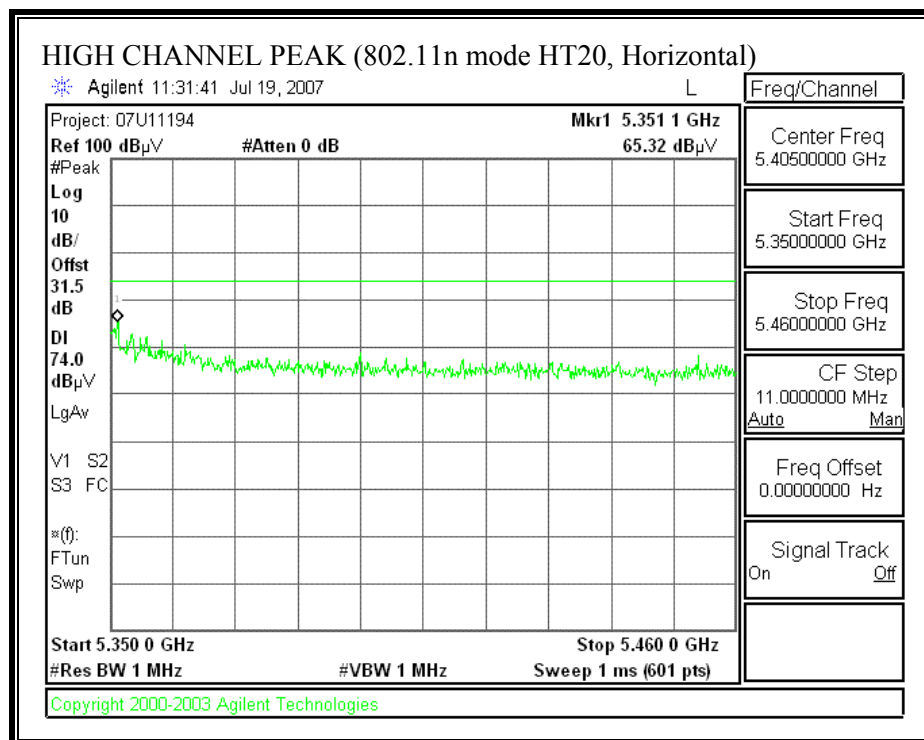
High Frequency Measurement															
Compliance Certification Services, Fremont 5 meter Chamber A															
Company:		Broadcom													
Project #:		07U11194													
Date:		07/17/07													
Test Engineer:		Thanh Nguyen													
Configuration:		EUT inside Dell Laptop PC, transmitting at 11a 5200MHz band, using Amphenol antenna													
Mode: Transmit		Continuous transmitting													
		Radio Module: 6F634002HWQXE, Laptop PC: 814370101607230001BK500													
Test Equipment:															
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit							
T60; S/N: 2238 @3m		T144 Miteq 3008A00931						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		HPF_7.6GHz									
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 Channel 5180MHz															
10.360	1.0	54.5	37.0	37.4	10.4	-36.8	-9.5	0.8	56.7	39.2	74	54	-17.3	-14.8	V
15.540	1.0	53.9	34.7	38.0	12.7	-34.8	-9.5	0.7	60.9	41.7	74	54	-13.1	-12.3	H
10.360	1.0	51.9	32.1	37.4	10.4	-36.8	-9.5	0.8	54.1	34.3	74	54	-19.9	-19.7	V
15.540	1.0	43.8	29.6	38.0	12.7	-34.8	-9.5	0.7	50.8	36.6	74	54	-23.2	-17.4	H
Mid Channel 5260															
10.520	1.0	55.7	34.9	37.4	10.6	-36.7	-9.5	0.8	58.2	37.4	74	54	-15.8	-16.6	H
15.780	1.0	42.1	29.3	37.9	12.8	-34.6	-9.5	0.7	49.3	36.5	74	54	-24.7	-17.5	H
10.520	1.0	55.6	35.9	37.4	10.6	-36.7	-9.5	0.8	58.1	38.4	74	54	-15.9	-15.6	V
15.780	1.0	43.5	29.1	37.9	12.8	-34.6	-9.5	0.7	50.7	36.4	74	54	-23.3	-17.6	V
Channel 5300MHz															
10.600	1.0	56.3	35.3	37.4	10.7	-36.6	-9.5	0.8	59.0	37.9	74	54	-15.0	-16.1	V
15.900	1.0	43.2	30.1	37.9	12.8	-34.6	-9.5	0.7	50.5	37.4	74	54	-23.5	-16.6	V
10.600	1.0	55.3	34.6	37.4	10.7	-36.6	-9.5	0.8	58.0	37.2	74	54	-16.0	-16.8	H
15.900	1.0	43.7	30.2	37.9	12.8	-34.6	-9.5	0.7	51.0	37.5	74	54	-23.0	-16.5	H
High Channel 5320MHz															
10.640	1.0	54.4	34.2	37.3	10.7	-36.6	-9.5	0.8	57.1	37.0	74	54	-16.9	-17.0	V
15.960	1.0	43.1	29.6	37.8	12.8	-34.5	-9.5	0.7	50.5	36.9	74	54	-23.5	-17.1	V
10.640	1.0	58.5	40.1	37.3	10.7	-36.6	-9.5	0.8	61.2	42.8	74	54	-12.8	-11.2	H
15.960	1.0	42.7	29.7	37.8	12.8	-34.5	-9.5	0.7	50.1	37.0	74	54	-23.9	-17.0	H
No other emissions were detected above 3rd harmonics															
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											

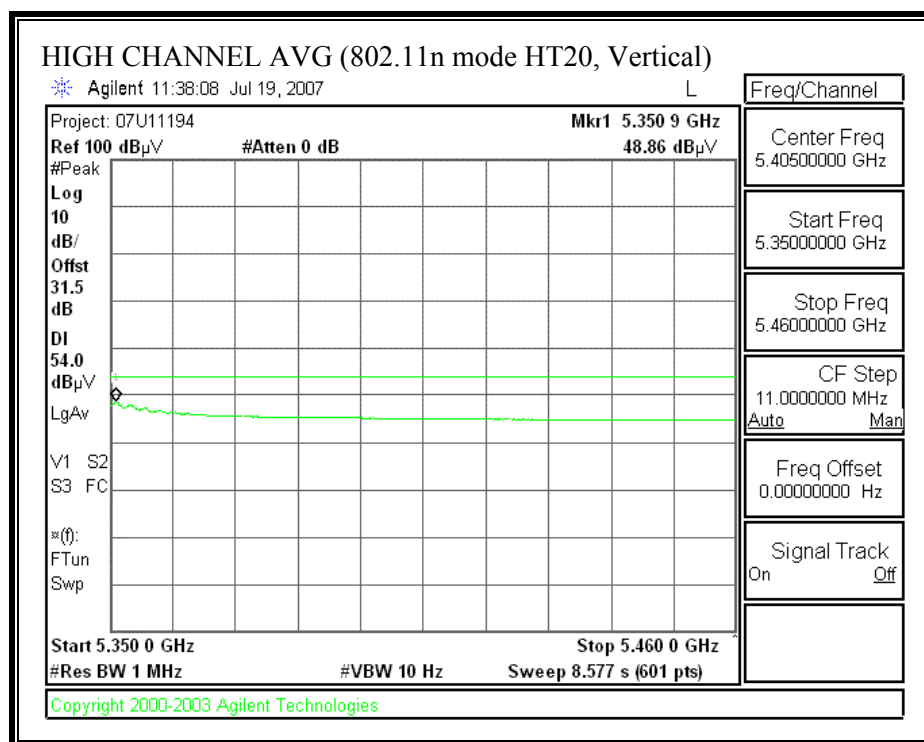
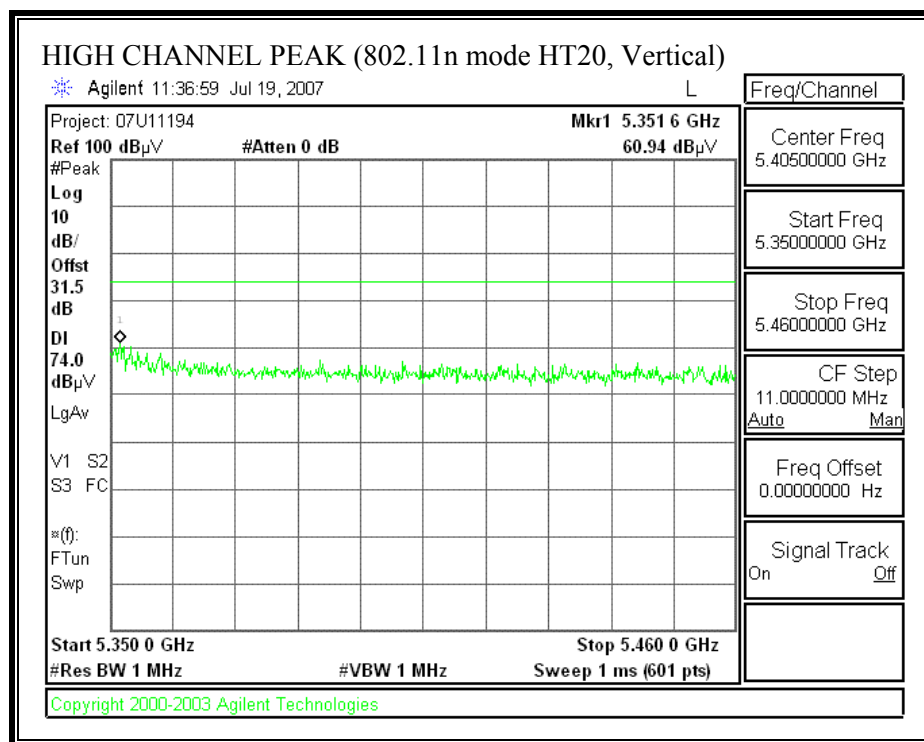
RESTRICTED BANDEDGE (802.11n MODE HT20, 5180MHz, With Amphenol Antenna)

With Amphenol Antenna





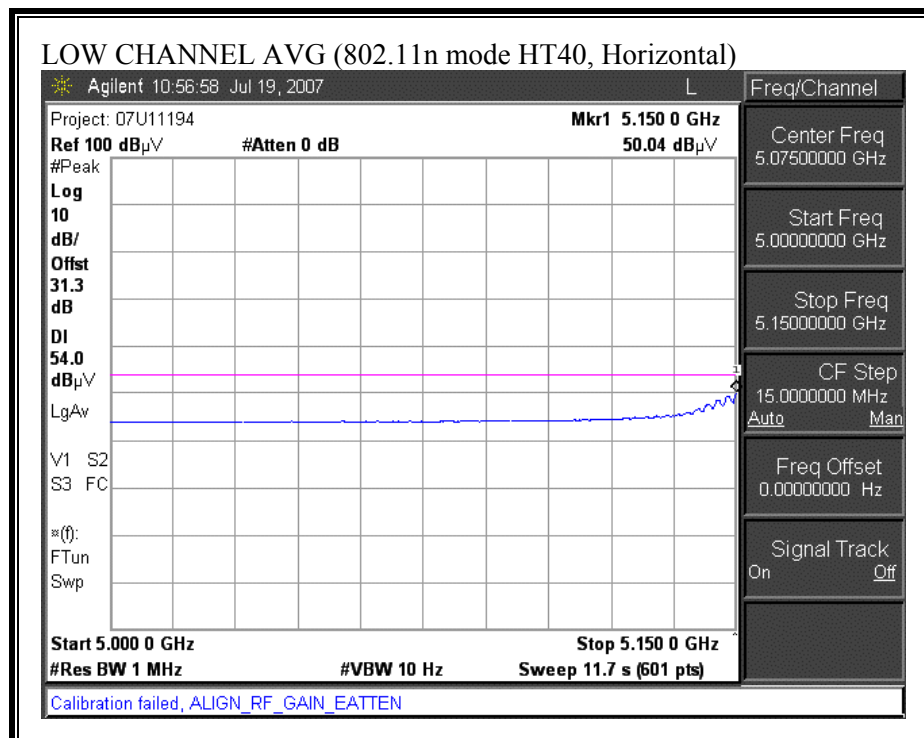
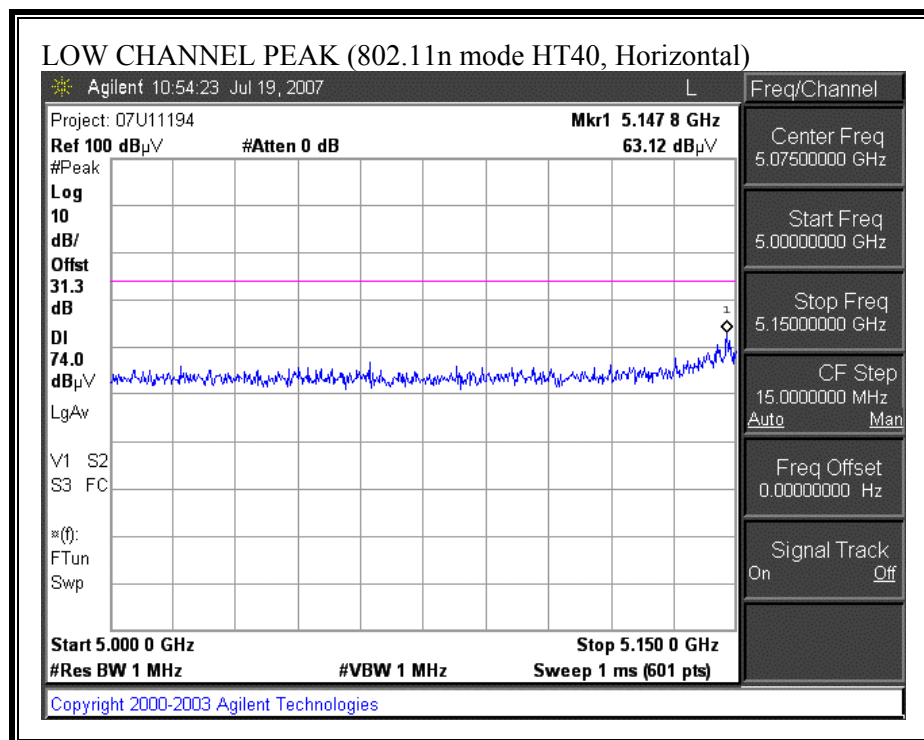
RESTRICTED BANDEDGE (802.11n MODE HT20, 5320MHz, With Amphenol Antenna)

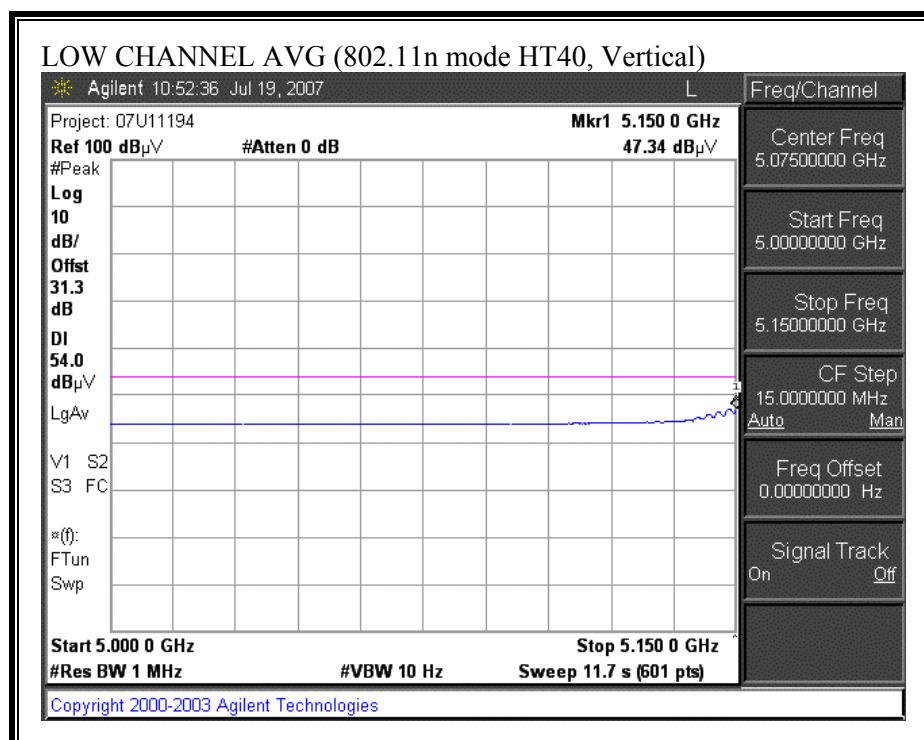
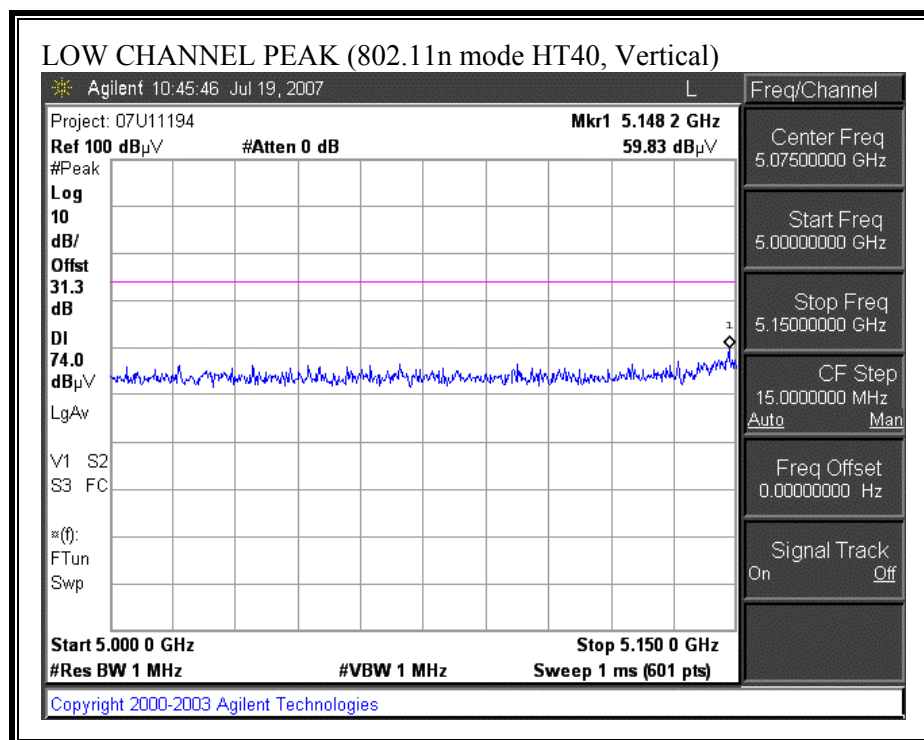


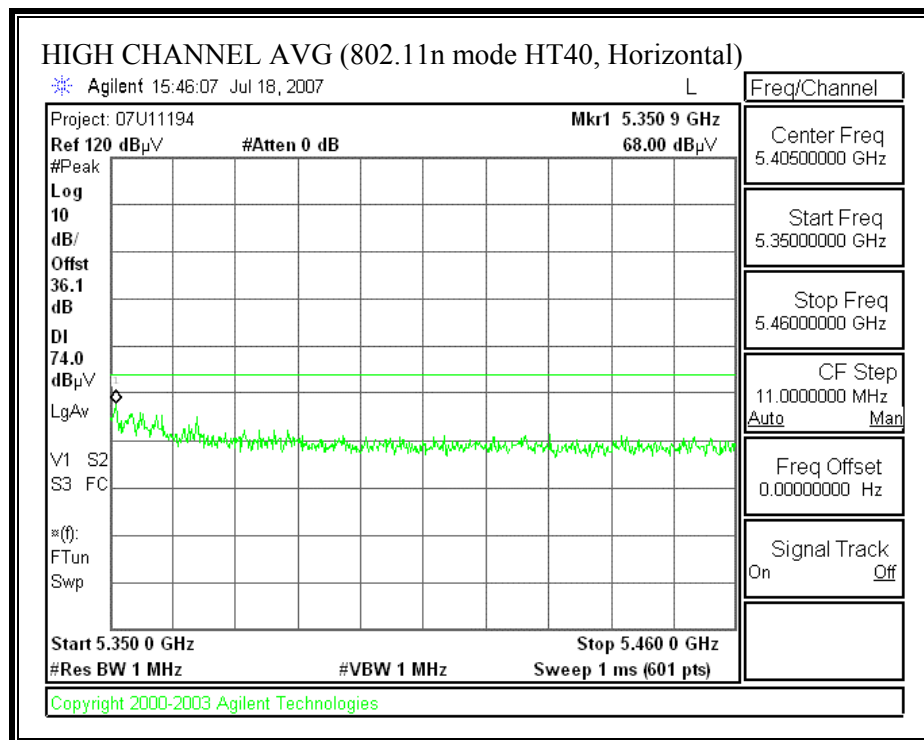
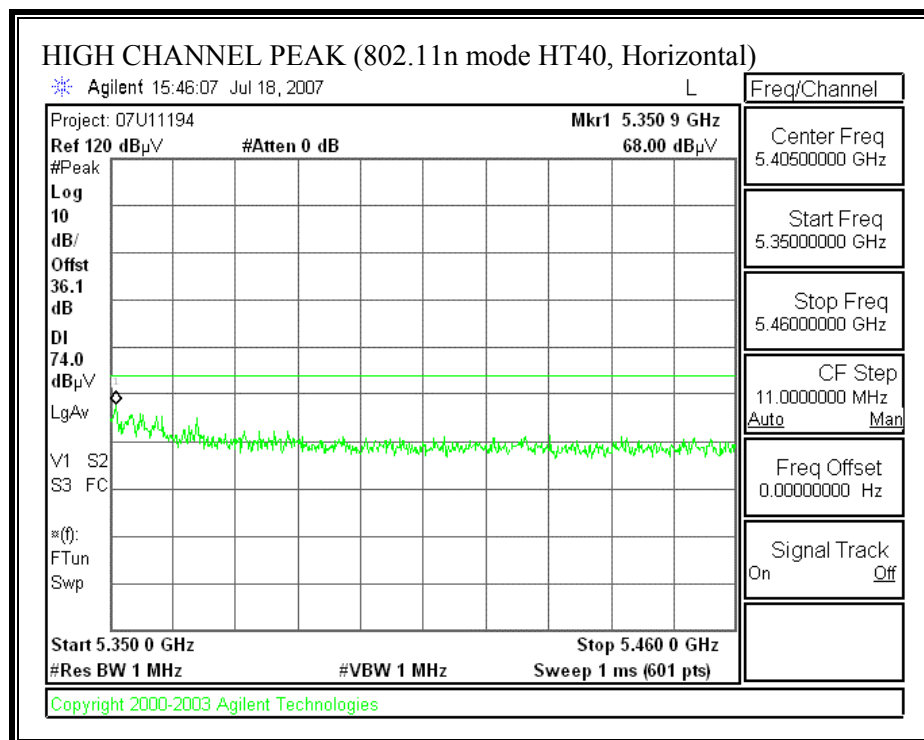
HARMONICS AND SPURIOUS EMISSIONS (802.11n MODE HT20)

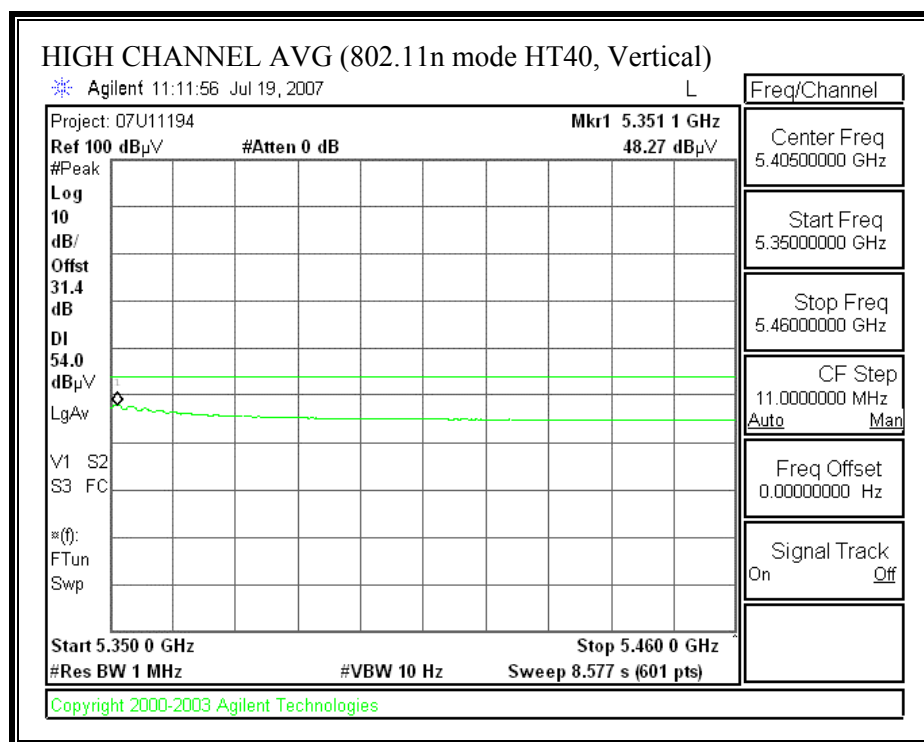
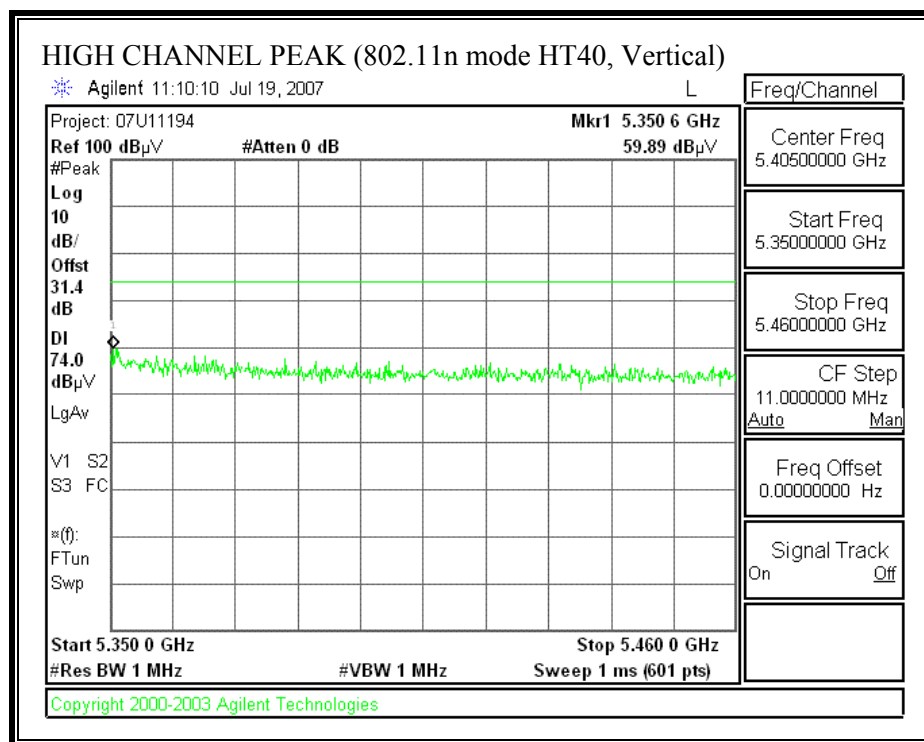
With Amphenol Antenna

High Frequency Measurement															
Compliance Certification Services, Fremont 5 meter Chamber A															
Company:		Broadcom													
Project #:		07U11194													
Date:		07/18/07													
Test Engineer:		Thanh Nguyen													
Configuration:		EUT inside Dell Laptop PC, transmitting at 11n20 5200MHz band, using Amphenol antenna													
Mode: Transmit		Continuous transmitting													
Test Equipment:		Radio Module: 6F634002HWQXE, Laptop PC: 814370101607230001BK300													
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit							
T73; S/N: 6717 @3m		T34 HP 8449B						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					
Thanh 177079008				Chin 200354001		HPF_7.6GHz									
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 Channel 5180MHz															
10.360	1.0	50.8	35.7	37.0	4.1	-32.6	-9.5	0.8	50.5	35.3	74	54	-23.5	-18.7	V
15.540	1.0	41.0	38.9	38.1	5.4	-32.2	-9.5	0.7	43.5	41.3	74	54	-30.5	-12.7	V
10.360	1.0	56.5	42.8	37.0	4.1	-32.6	-9.5	0.8	56.2	42.4	74	54	-17.8	-11.6	H
15.540	1.0	43.8	28.8	38.1	5.4	-32.2	-9.5	0.7	46.3	31.2	74	54	-27.7	-22.8	H
Mid Channel 5260															
10.520	1.0	54.2	43.4	37.1	4.1	-32.6	-9.5	0.8	54.0	43.2	74	54	-20.0	-10.8	H
15.780	1.0	40.8	30.4	37.5	5.5	-32.2	-9.5	0.7	42.8	32.4	74	54	-31.2	-21.6	H
10.520	1.0	46.4	36.6	37.1	4.1	-32.6	-9.5	0.8	46.2	36.4	74	54	-27.8	-17.6	V
15.780	1.0	41.1	29.6	37.5	5.5	-32.2	-9.5	0.7	43.1	31.6	74	54	-30.9	-22.4	V
High Channel 5320MHz															
10.640	1.0	53.2	42.5	37.1	4.1	-32.6	-9.5	0.8	53.0	42.4	74	54	-21.0	-11.6	V
15.960	1.0	41.1	30.2	37.1	5.5	-32.1	-9.5	0.7	42.8	31.9	74	54	-31.2	-22.1	V
10.640	1.0	49.3	38.6	37.1	4.1	-32.6	-9.5	0.8	49.2	38.5	74	54	-24.8	-15.5	H
15.960	1.0	42.7	29.7	37.1	5.5	-32.1	-9.5	0.7	44.4	31.3	74	54	-29.6	-22.7	H
No other emissions were detected above 3rd harmonics															
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								

RESTRICTED BANDEDGE (802.11n MODE HT40, 5190MHz, With Amphenol Antenna)



RESTRICTED BANDEDGE (802.11n MODE HT40, 5310MHz, With Amphenol Antenna)



HARMONICS AND SPURIOUS EMISSIONS (802.11n MODE HT40)

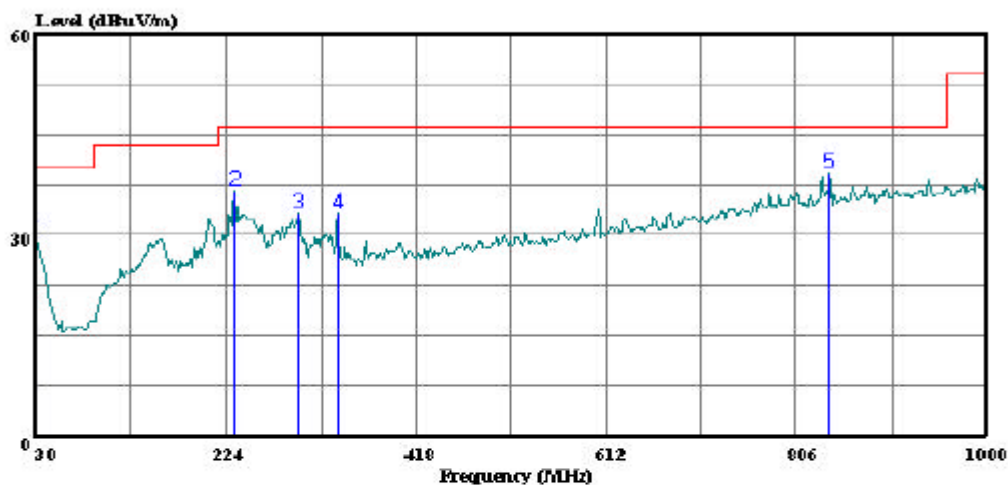
With Amphenol Antenna

High Frequency Measurement																	
Compliance Certification Services, Fremont 5 meter Chamber A																	
Company:		Broadcom															
Project #:		07U11194															
Date:		07/18/07															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT inside Dell Laptop PC, transmitting at 11n40 MCS0 5200MHz band, using Amphenol antenna															
Mode: Transmit		Continuous transmitting															
		Radio Module: 6F634002HWQXE, Laptop PC: 814370101607230001BK500															
Test Equipment:																	
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit					
T73; S/N: 6717 @3m			T34 HP 8449B									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		
Thanh 177079008						Chin 200354001			HPF_7.6GHz								
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 Channel 5190MHz																	
10.380	1.0	49.3	36.4	37.0	4.1	-32.6	-9.5	0.8	49.0	36.1	74	54	-25.0	-17.9	V		
15.570	1.0	39.1	28.8	38.0	5.4	-32.2	-9.5	0.7	41.5	31.2	74	54	-32.5	-22.8	V		
10.380	1.0	45.9	34.4	37.0	4.1	-32.6	-9.5	0.8	45.6	34.1	74	54	-28.4	-19.9	H		
15.570	1.0	39.7	28.3	38.0	5.4	-32.2	-9.5	0.7	42.1	30.7	74	54	-31.9	-23.3	H		
Mid Channel 5270																	
10.540	1.0	53.8	43.2	37.1	4.1	-32.6	-9.5	0.8	53.6	43.0	74	54	-20.4	-11.0	H		
15.810	1.0	40.2	29.9	37.4	5.5	-32.2	-9.5	0.7	42.2	31.8	74	54	-31.8	-22.2	H		
10.540	1.0	47.4	35.6	37.1	4.1	-32.6	-9.5	0.8	47.2	35.4	74	54	-26.8	-18.6	V		
15.810	1.0	43.2	32.5	37.4	5.5	-32.2	-9.5	0.7	45.1	34.4	74	54	-28.9	-19.6	V		
High Channel 5310MHz																	
10.620	1.0	53.6	41.5	37.1	4.1	-32.6	-9.5	0.8	53.4	41.3	74	54	-20.6	-12.7	V		
15.930	1.0	41.8	30.2	37.2	5.5	-32.1	-9.5	0.7	43.5	31.9	74	54	-30.5	-22.1	V		
10.620	1.0	50.5	39.5	37.1	4.1	-32.6	-9.5	0.8	50.3	39.3	74	54	-23.7	-14.7	H		
15.930	1.0	43.6	32.5	37.2	5.5	-32.1	-9.5	0.7	45.3	34.1	74	54	-28.7	-19.9	H		
No other emissions were detected above 3rd harmonics																	
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)****5GHz Band****HORIZONTAL PLOT**

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

Data#: 18 File#: 11194emi.emi Date: 07-19-2007 Time: 10:05:24



Trace: 17

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Thanh Nguyen
Project #: 07U11194
Company: BROADCOM CORP.
Configuration:: EUT in the Notebook
Mode : Tx 5GHz Band worst case
Target: FCC Class B

Page: 1

	Freq	Read		Limit	Over	
	MHz	Level	Factor	Level	Line	Limit Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	30.000	6.44	22.65	29.09	40.00	-10.91 Peak
2	232.730	23.18	13.33	36.51	46.00	-9.49 Peak
3	298.690	17.55	15.69	33.24	46.00	-12.76 Peak
4	337.490	16.63	16.72	33.35	46.00	-12.65 Peak
5	838.980	13.97	25.33	39.30	46.00	-6.70 Peak

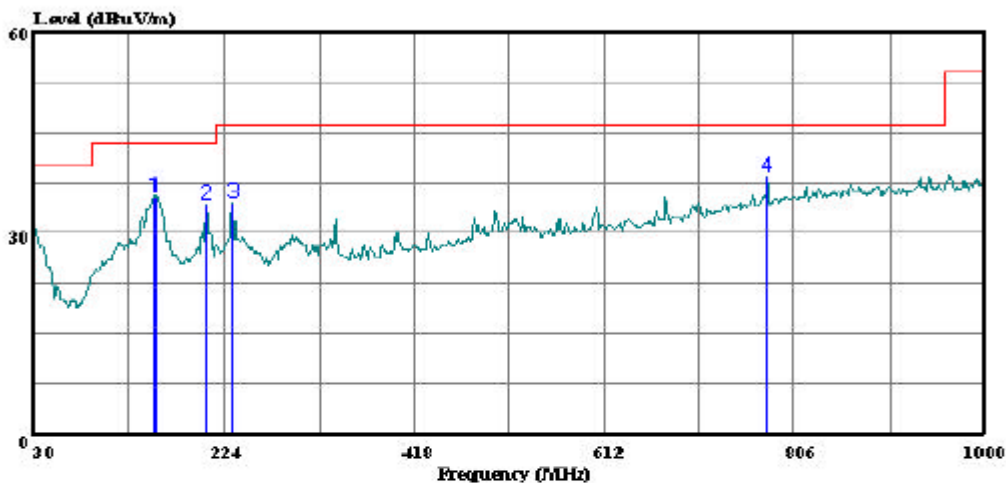
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**5GHz Band**

VERTICAL PLOT



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

Data#: 13 File#: 11194emi.emi Date: 07-19-2007 Time: 09:40:29



Trace: 11

Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator:: Thanh Nguyen
Project #: : 07U11194
Company: : BROADCOM CORP.
Configuration: EUT in the Notebook
Mode : : Transmit 5GHz band worst case
Target: : FCC Class B
: Experiment using 8542E EMI receiver's
: PreAmp on, without external amplifier.

Page: 1

	Read			Limit	Over	
Freq	Level	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	154.160	21.21	14.17	35.37	43.50	-8.13 Peak
2	206.540	20.53	13.66	34.19	43.50	-9.31 Peak
3	232.730	21.32	13.33	34.65	46.00	-11.35 Peak
4	778.840	13.95	24.58	38.53	46.00	-7.47 Peak

7.2. DYNAMIC FREQUENCY SELECTION: SLAVE NON-OCCUPANCY

TEST PROCEDURE

The spectrum analyzer is monitoring the emissions from the Slave.

The AP and Slave are linked in a 20 MHz bandwidth mode, with streaming video. The spectrum analyzer trace is started, then the radar is triggered, and the channel is monitored for > 30 minutes.

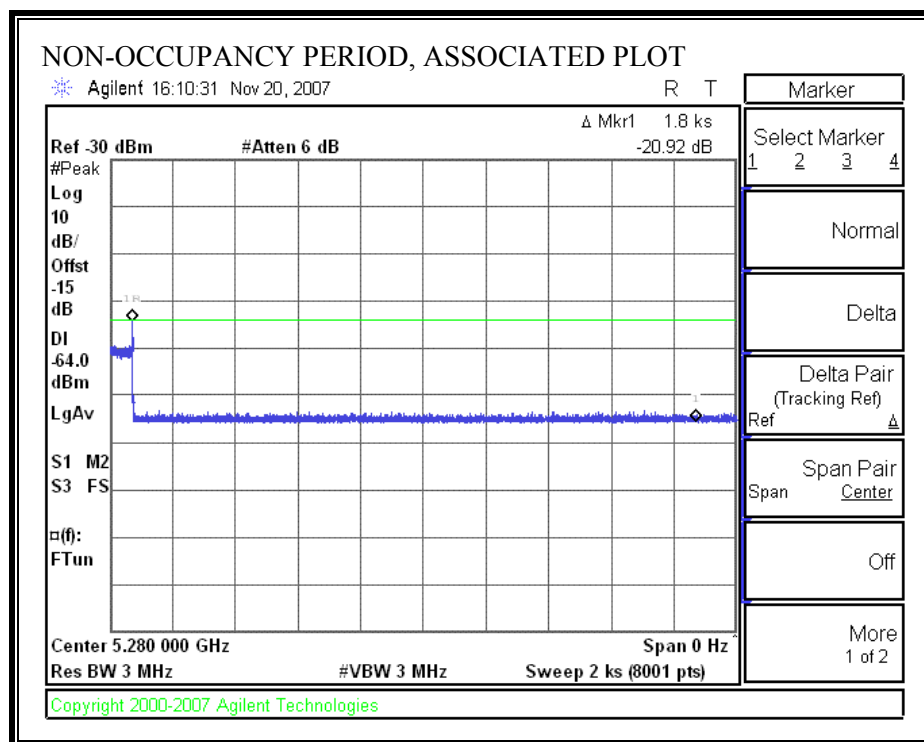
Then the AP is powered down. The spectrum analyzer trace is started, then the Slave is rebooted, and the channel is monitored for > 30 minutes.

The above process is repeated with the link in a 40 MHz bandwidth mode.

7.2.1. 20 MHz BANDWIDTH

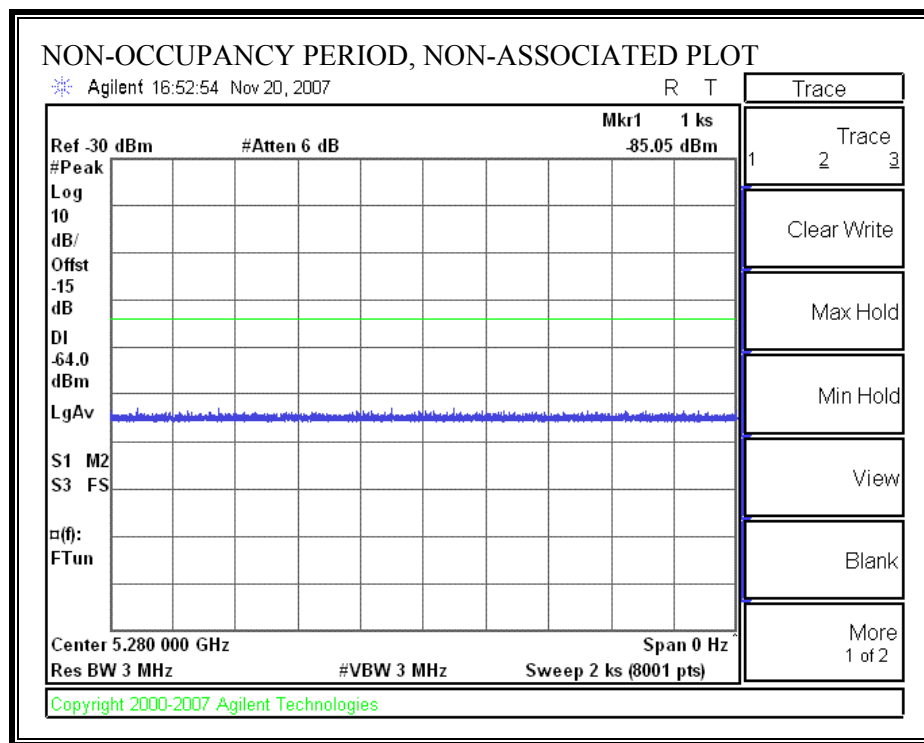
ASSOCIATED TEST RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time.



NON-ASSOCIATED TEST RESULTS

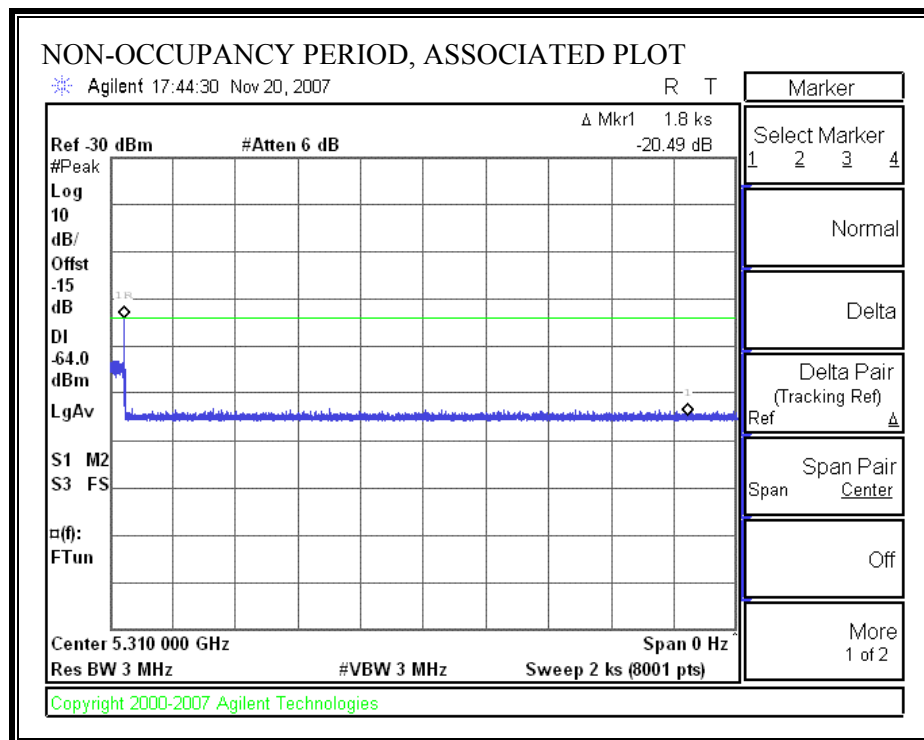
No EUT transmissions were observed on the test channel during the 30-minute observation time.



7.2.2. 40 MHz BANDWIDTH

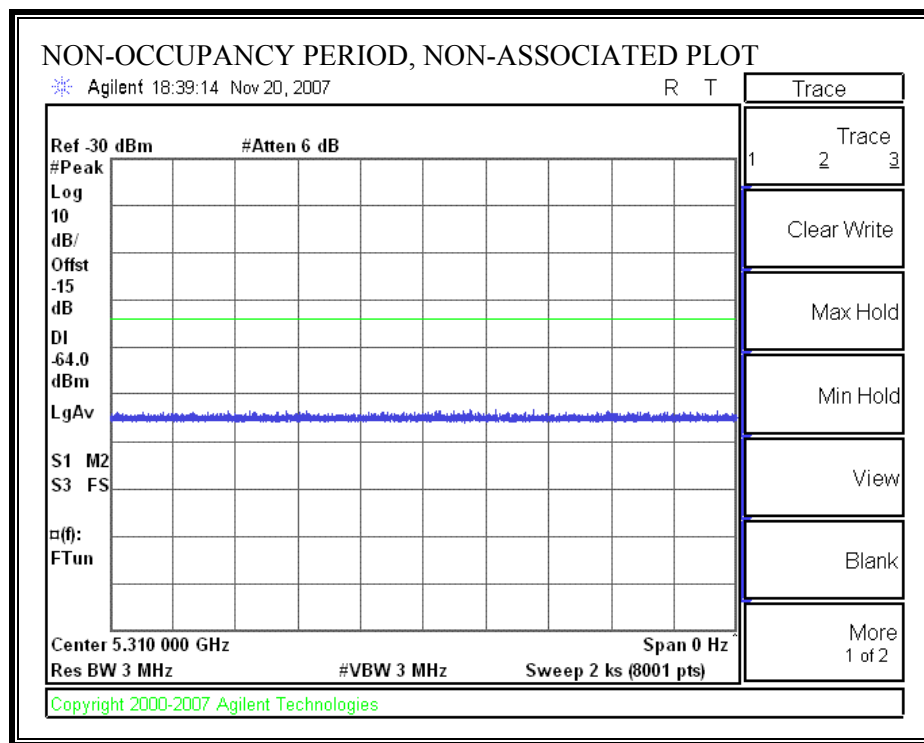
ASSOCIATED TEST RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time.



NON-ASSOCIATED TEST RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time.



8. SETUP PHOTOS

RADIATED RF MEASUREMENT SETUP



RADIATED BACK PHOTO (Desktop Configuration)



X-AXIS FRONT PHOTO



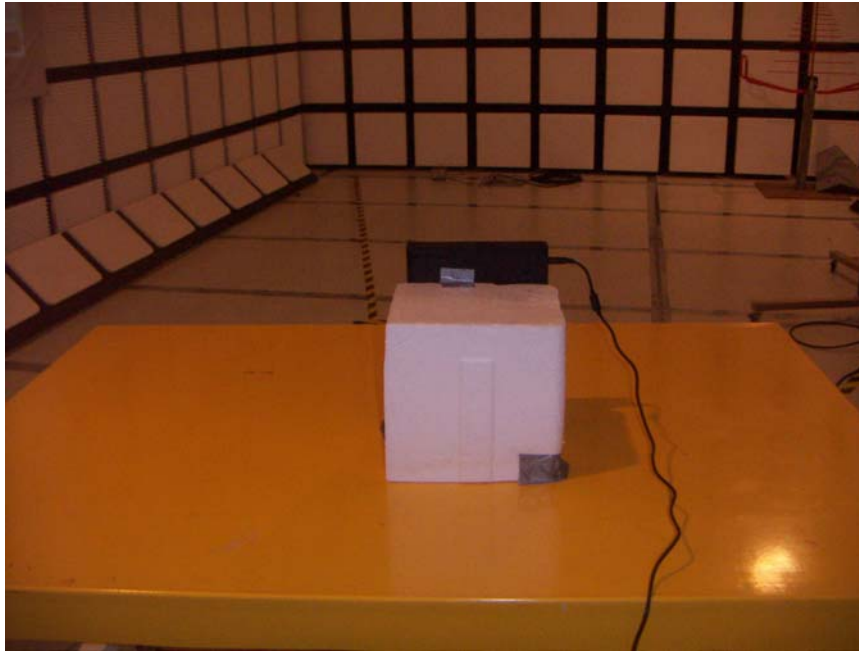
X-AXIS BACK PHOTO



Y-AXIS FRONT PHOTO



Y-AXIS BACK PHOTO



Z-AXIS FRONT PHOTO



Z-AXIS BACK PHOTO



END OF REPORT