



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

CERTIFICATION TEST REPORT

FOR

**802.11ag/Draft 802.11n WLAN PCI-E Minicard
(Installed inside HP Laptop HSTNN-W75C)**

MODEL NUMBER: BCM943224HMS

FCC ID: QDS-BRCM1041

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NVLAP LAB CODE 200065-0

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: 802.11ag/Draft 802.11n WLAN PCI-E Minicard
(Installed inside of HP Tablet HSTNN-W75C)

MODEL: BCM943224HMS

SERIAL NUMBER: 002682258BAC

DATE TESTED: DECEMBER 22, 2009 – JANUARY 12, 2010

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

Tested By:



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EMC MANAGER
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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.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

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. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 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 WLAN PCI-E Minicard and installed inside HP tablet laptops. The radio module is manufactured by Broadcom.

5.2. MAXIMUM OUTPUT POWER

In order to pass Bandedge and PPSD measurements, the 5.6GHz band high channel must be reduced the output powers as table shown below:

MODE / CHANNEL	Output Power (dBm)	Measured Chain 2 Output Power (dBm)
5.6GHz Band		
11a		
High Ch, 5700MHz		16.58
11n HT20		
High Ch, 5700MHz	15.74	16.54
11n HT40		
High Ch, 5670MHz	15.59	16.52

5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major change filed under this application is adding portable platform, HP HSTNN-I77C & HSTNN-W75C.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes with the maximum gain @ 5GHz bands in Omega tablet as table below:

Antenna Type	Peak gain (dBi)	
	5150-5250MHz 5250-5350MHz	5470-5725MHz
802.11abgn WLAN Antenna - TX1 (Main)	2.63	2.81
802.11abgn WLAN Antenna - TX2 (Aux)	-0.98	0.41

The highest gains of each type of antennas for all legacy / SISO modes test.

Band	TX1 (Main) Ant Gain (dBi)	TX2 (Aux) Ant Gain (dBi)
5150 – 5350 MHz	2.63	-0.98
5470 – 5725 MHz	2.81	0.41

The antennas combinations for 2x2 (CCD) modes test.

Frequency Band	TX1 (Main) Antenna Gain (dBi)	TX2 (Aux) Antenna Gain (dBi)	$10^{(\text{Ant Main}/10)}$	$10^{(\text{Ant Aux}/10)}$	$10^{(\text{ant main}/10)+10^{(\text{ant aux}/10)}}$	$10 \cdot \log[10^{(\text{ant main}/10)+10^{(\text{ant aux}/10)}}]$ (dBi)
5.2 GHz & 5.3 GHz HT20 & HT40	2.63	-0.98	1.832	0.798	2.630	4.20
5.5 GHz HT20 & HT40	2.81	0.41	1.910	1.099	3.009	4.78

5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom, version 5.60.51.
 .The test utility software used during testing was BCM Internal version 5.60.51.

5.6. WORST-CASE CONFIGURATION AND MODE

Worst-Case data rates were utilized from preliminary testing of the Chipset, worst-case data rates used during the testing are as follows:

802.11a Mode (20 MHz BW operation): 6 Mbps, OFDM.
802.11n MIMO HT20 Mode: MCS0, 6.5 Mbps, 1 Spatial Stream.
802.11n MIMO HT40 Mode: MCS0. 13.5 Mbps, 1 Spatial Stream.

The tests were performed on worst-case channel with highest antennas gain of Omega laptop @ 5.2, 5.3 & 5.6GHz bands.

Worst-case mode and channel used for 30-1000 MHz radiated emissions was the mode and channel with the highest output power.

The tablet laptop was investigated under normal (mobile) and potable positions (X, Y, Z) to determine the worst case and the mobile position was the worse case to test.

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5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	HP	HSTNN-W75C	ABC941007F	DoC
Adapter Board	HP	PPP009H	F3-07110423090F	DoC

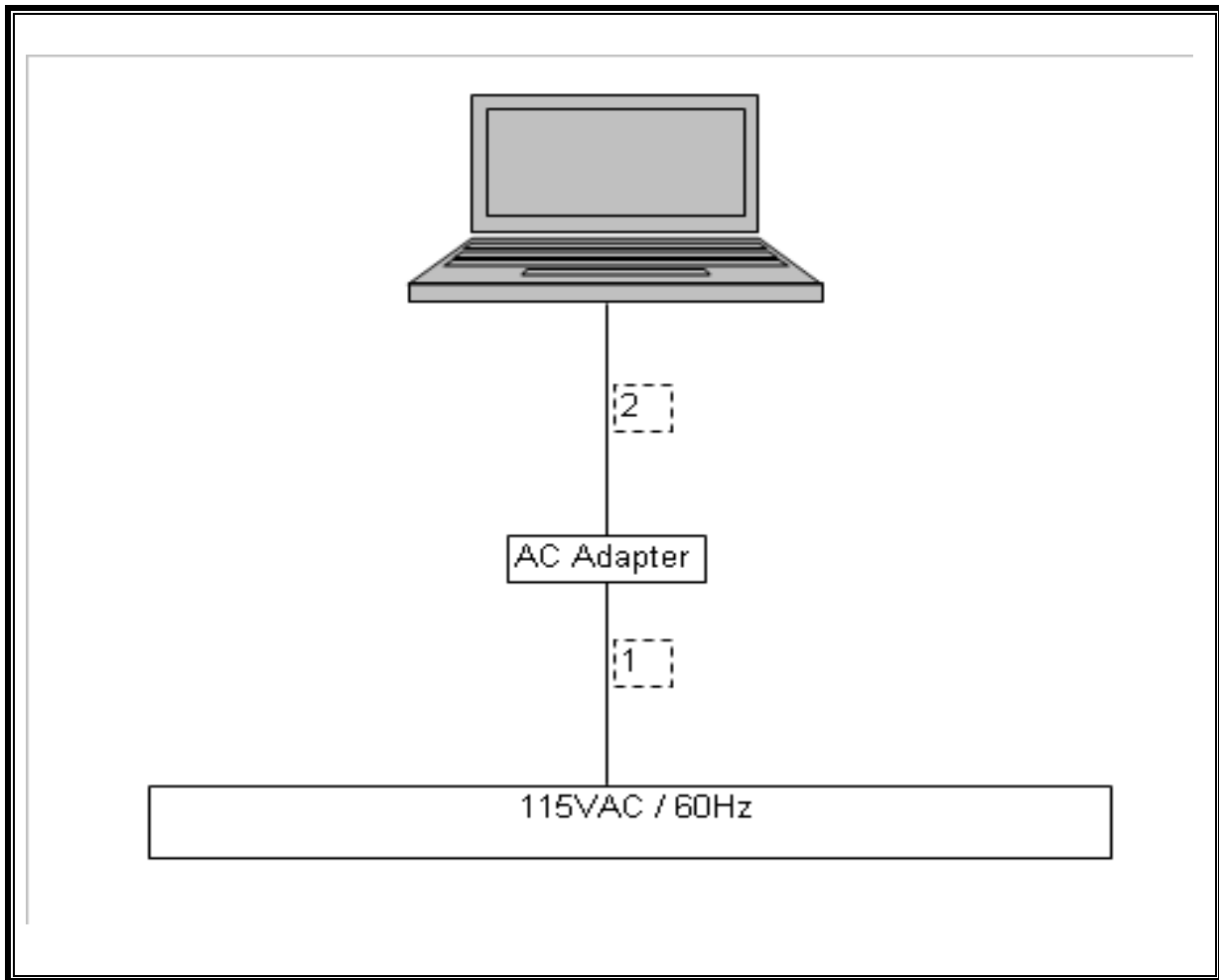
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	AC	Unshielded	1.8 m	N/A
2	DC	1	DC	Unshielded	1.8 m	Ferrite on laptop's end

TEST SETUP

The EUT is installed inside a host laptop computer. Test software exercised the radio card.

SETUP DIAGRAM



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	Asset	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	01/05/11
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/14/11
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/10
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	11/28/10
Antenna, Horn, 40 GHz	ARA	MWH-2640B	C00981	05/21/10
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	10/11/10
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/10
Preamplifier, 1-26GHz	Agilent / HP	8449B	C01052	08/05/10
Power Meter	Agilent / HP	437B	N02778	10/18/10
Power Sensor	Agilent / HP	8481A	N02784	10/22/10

7. ANTENNA PORT TEST RESULTS

7.1. 802.11a MODE IN THE 5.6 GHz BAND

7.1.1. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 2.81dBi

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

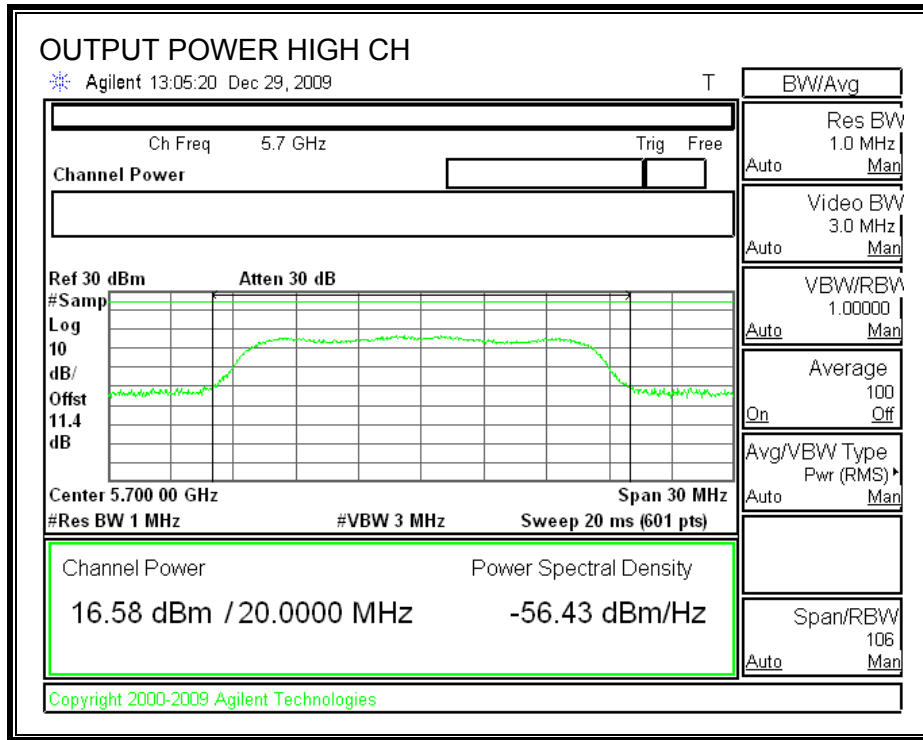
Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
High	5700	24	18.706	23.72	2.81	23.72

Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
High	5700	16.58	23.72	-7.14

OUTPUT POWER



7.1.2. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 2.81 dBi, therefore the limit is 11 dBm.

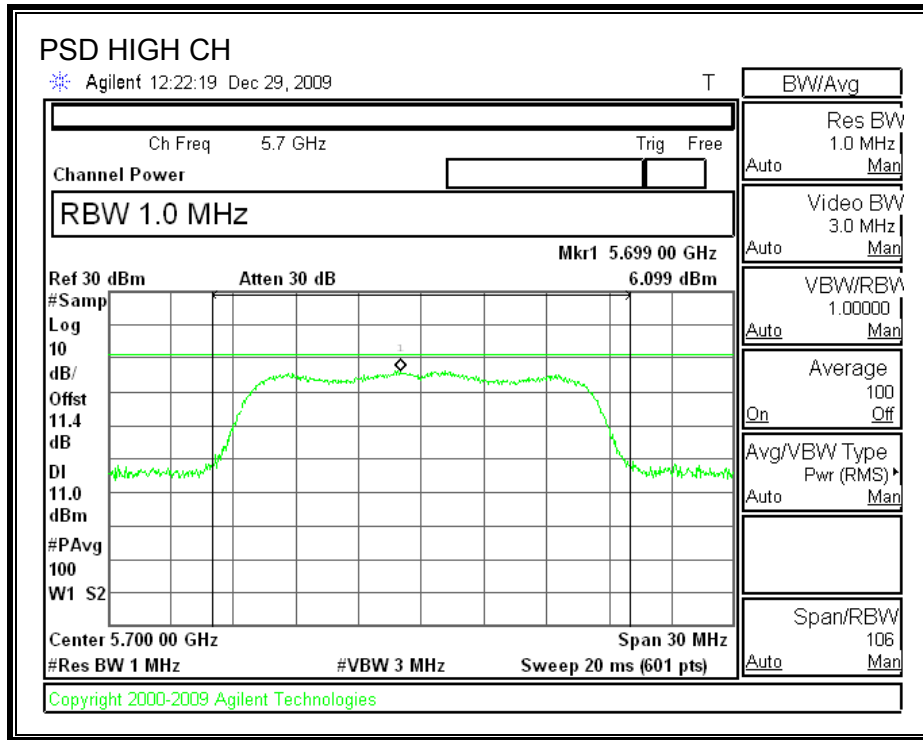
TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
High	5700	6.10	11	-4.90

POWER SPECTRAL DENSITY



7.2. 802.11n HT20 MODE IN THE 5.6 GHz BAND

7.2.1. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The composite antenna gain is 4.78dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

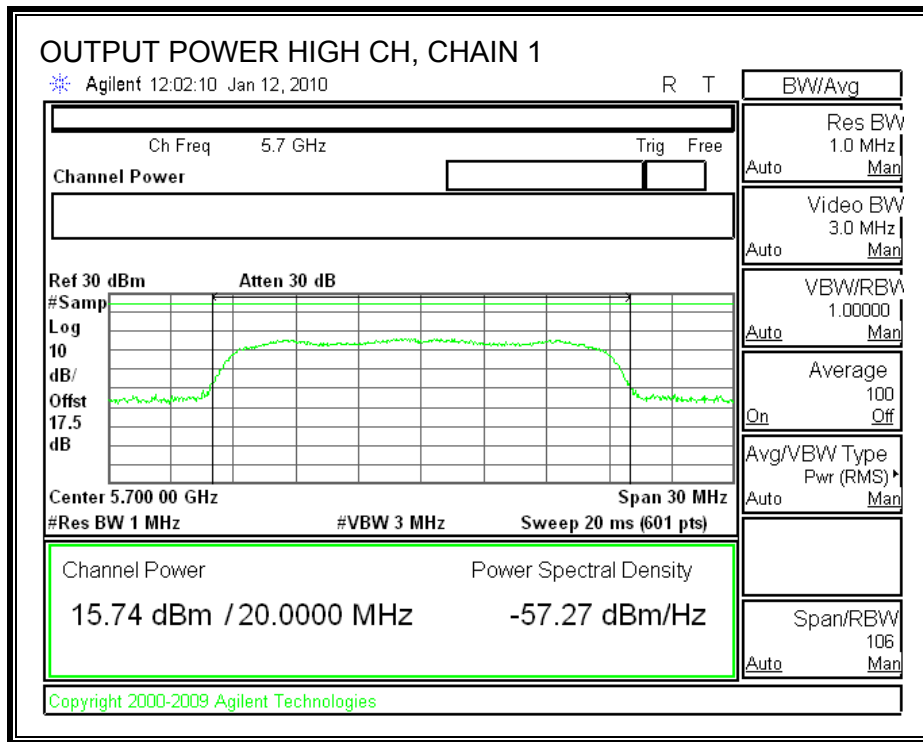
Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
High	5700	24	18.713	23.72	4.78	23.72

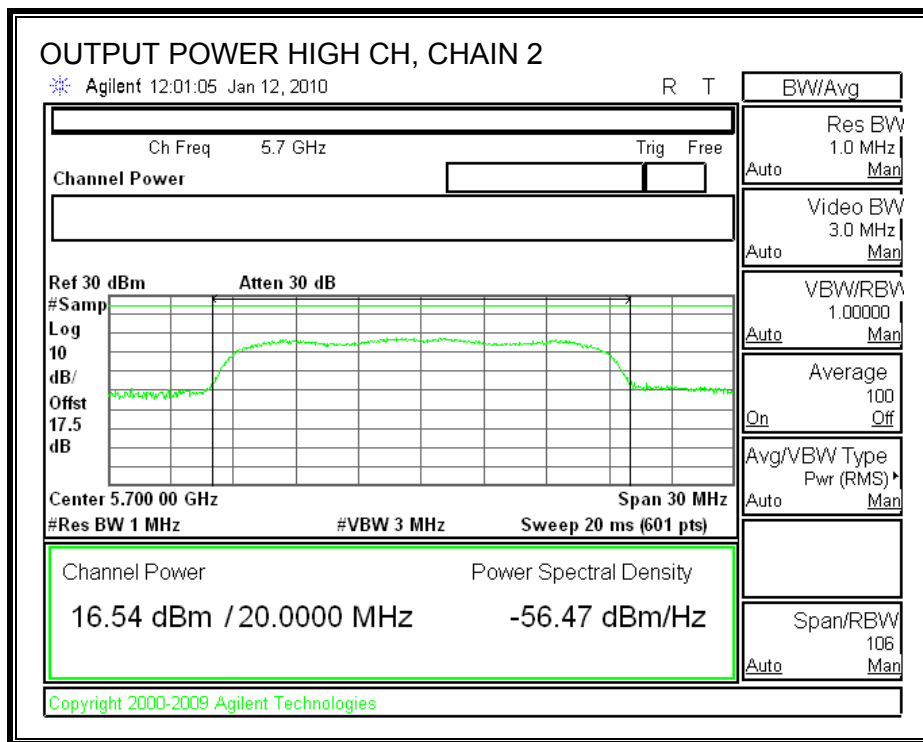
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
High	5700	15.74	16.54	19.17	23.72	-7.98

CHAIN 1 OUTPUT POWER



CHAIN 2 OUTPUT POWER



7.2.2. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is equal to 4.78 dBi, therefore the limit is 11 dBm.

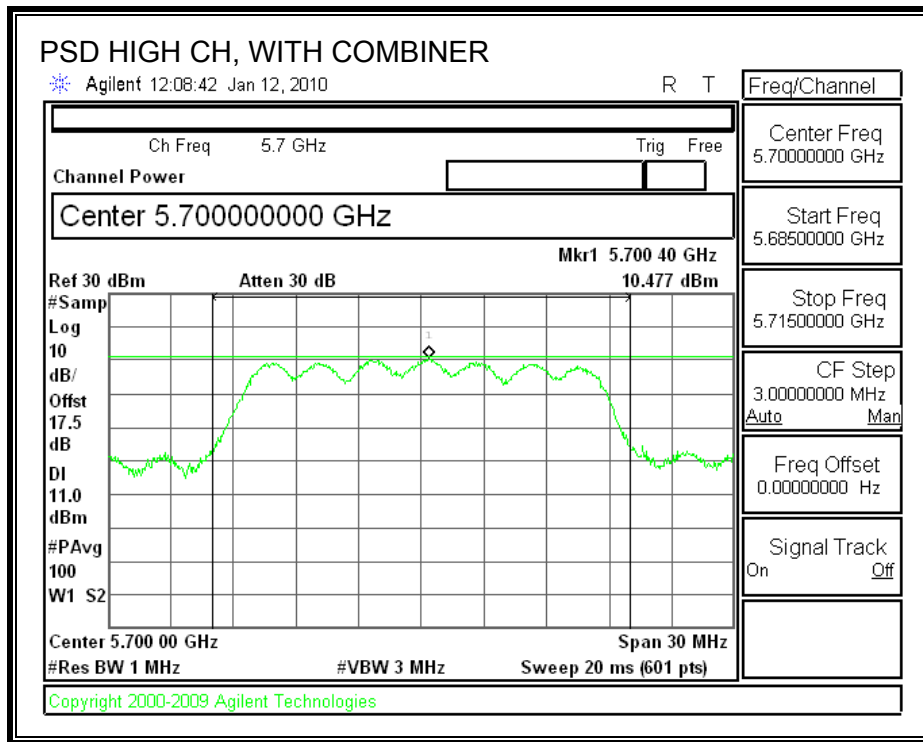
TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

Channel	Frequency (MHz)	PPSD With Combiner (dBm)	Limit (dBm)	Margin (dB)
High	5700	10.48	11.00	-0.52

POWER SPECTRAL DENSITY WITH COMBINER



7.3. 802.11n HT40 MODE IN THE 5.6 GHz BAND

7.3.1. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 4.78 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

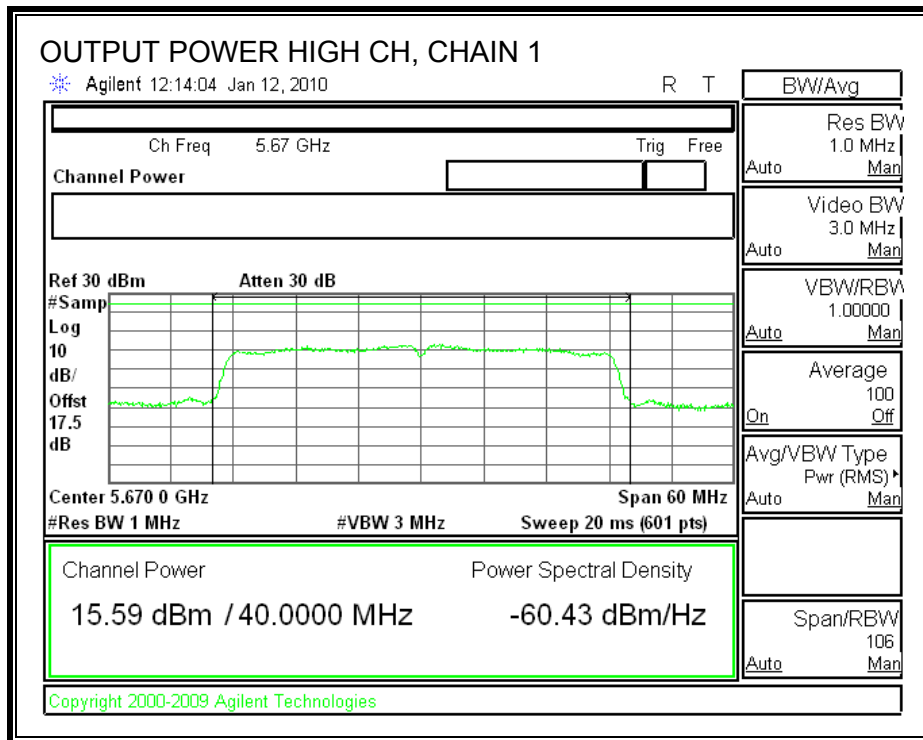
Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
High	5670	24	37.382	26.73	4.78	24.00

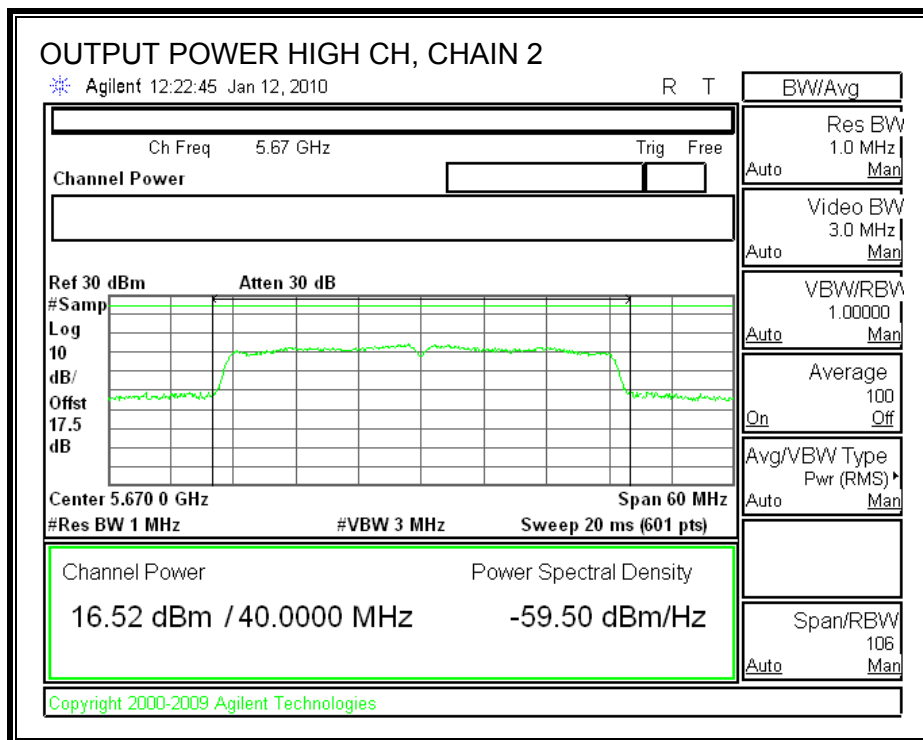
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
High	5670	15.59	16.52	19.09	24.00	-8.41

CHAIN 1 OUTPUT POWER



CHAIN 2 OUTPUT POWER



7.3.2. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 4.78 dBi, therefore the limit is 11 dBm.

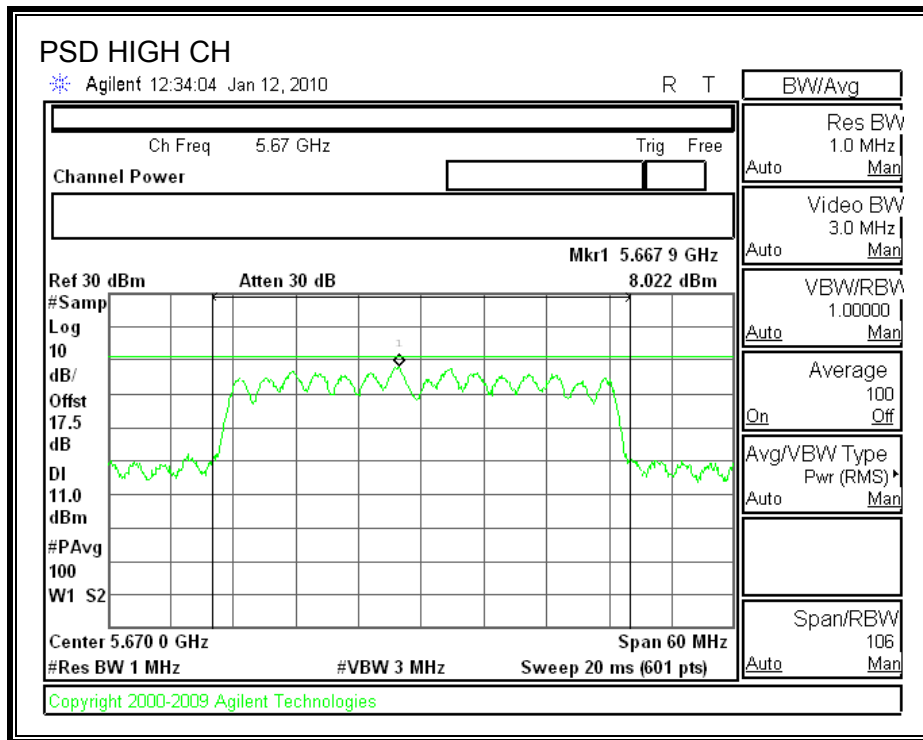
TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
High	5700	8.02	11	-2.98

POWER SPECTRAL DENSITY



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

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.

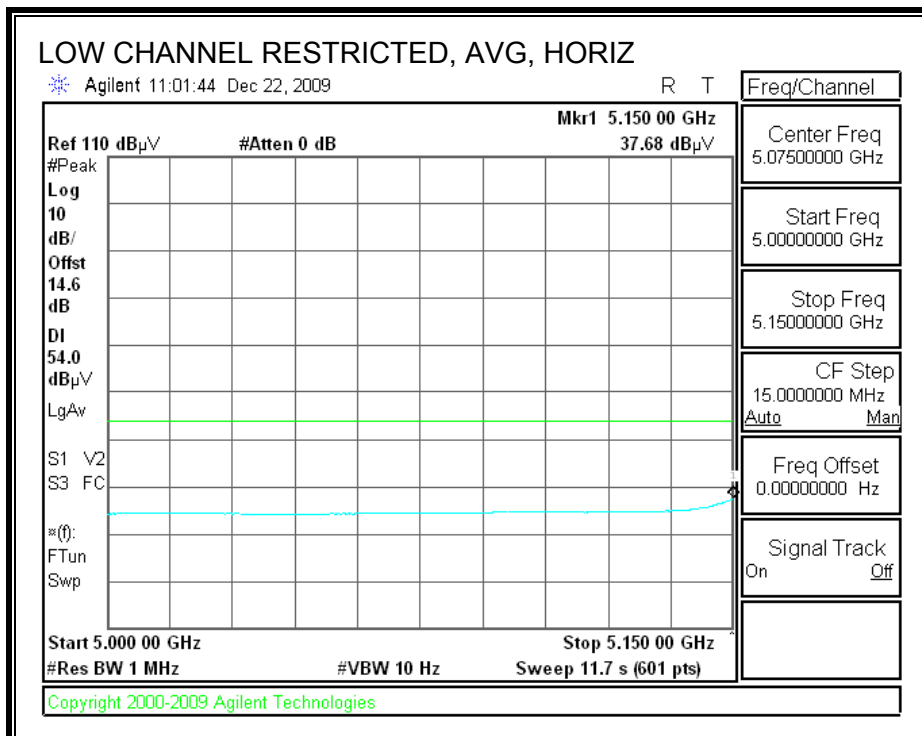
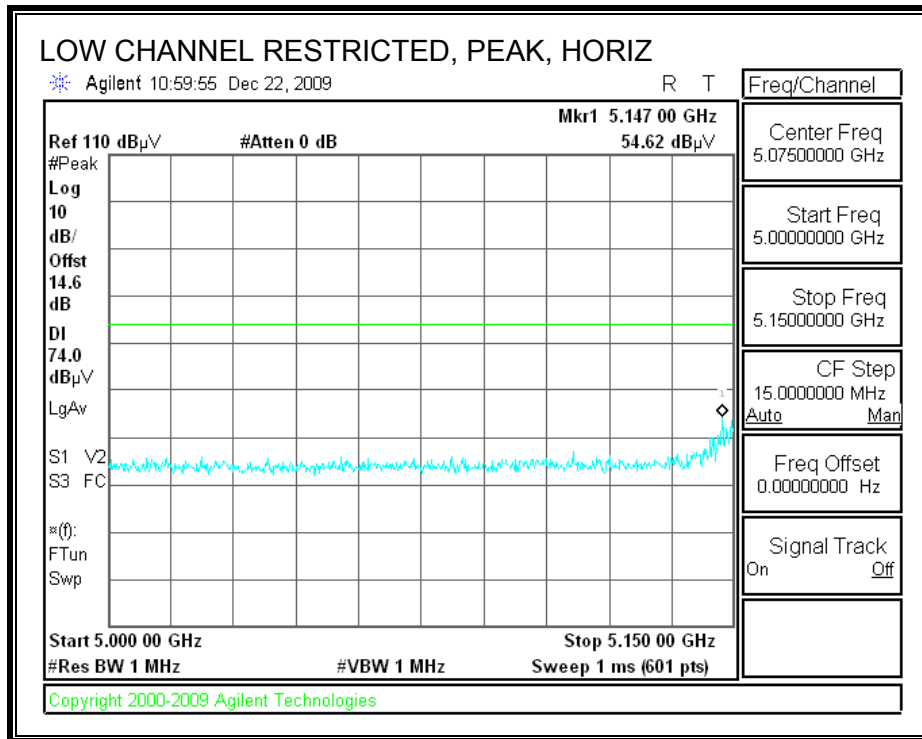
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

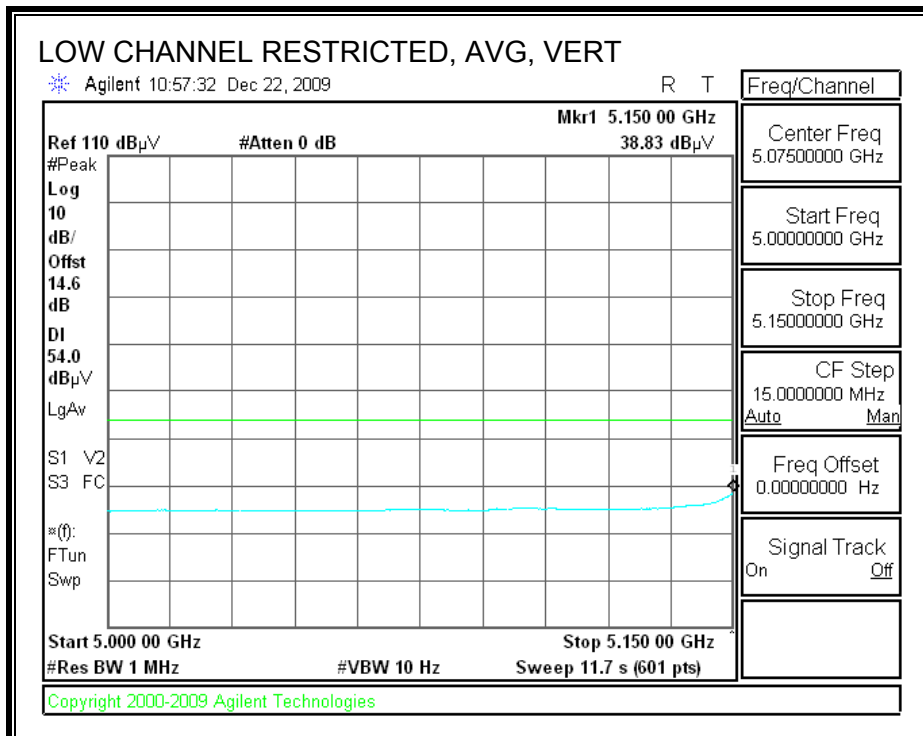
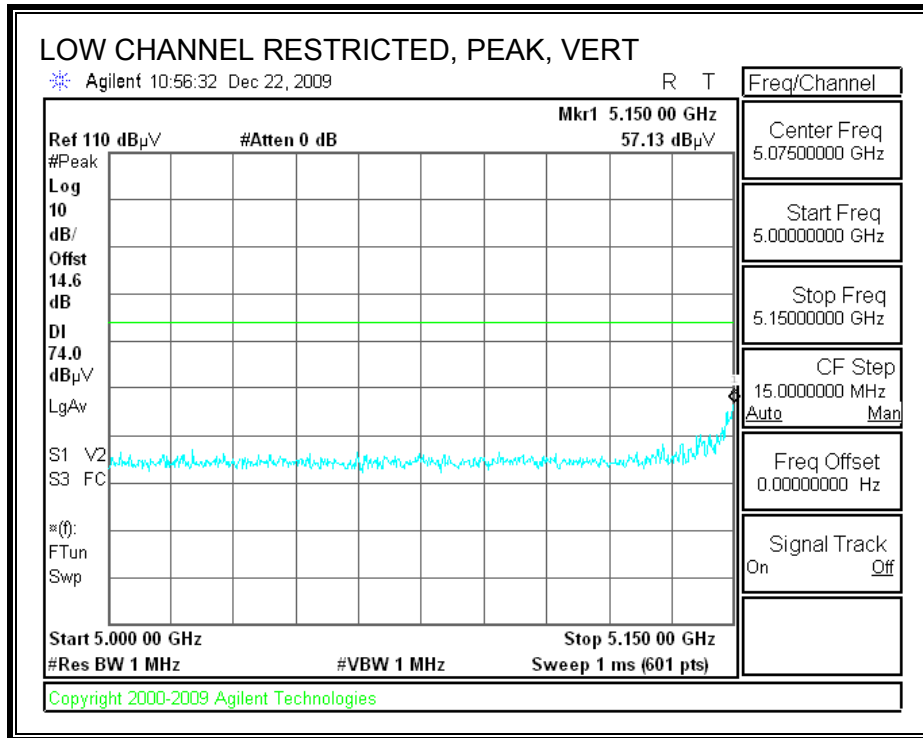
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. 802.11a MODE IN THE LOWER 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

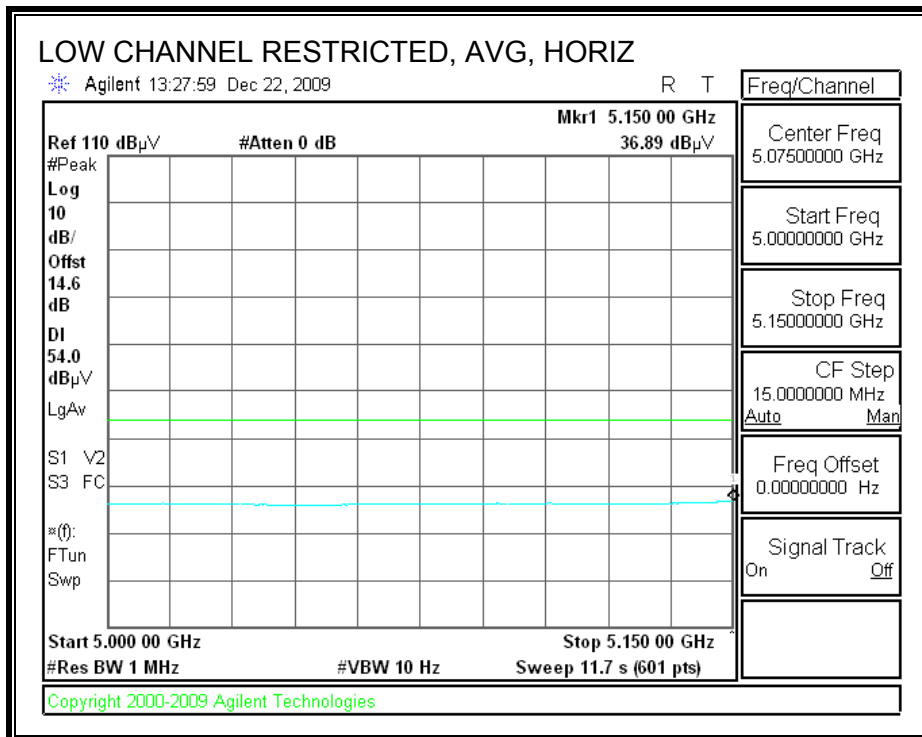
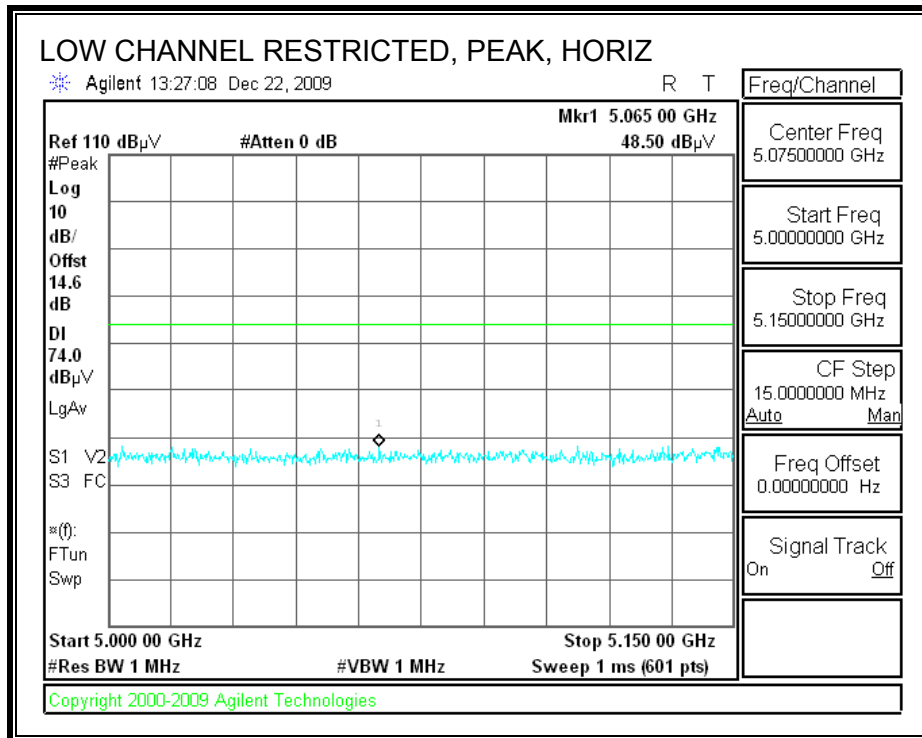


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

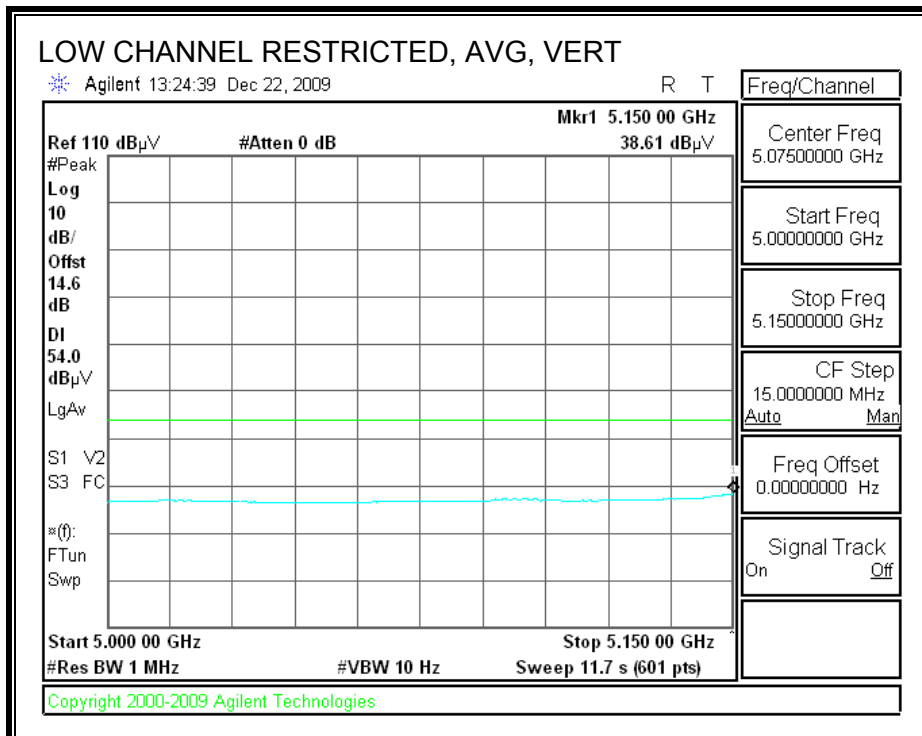
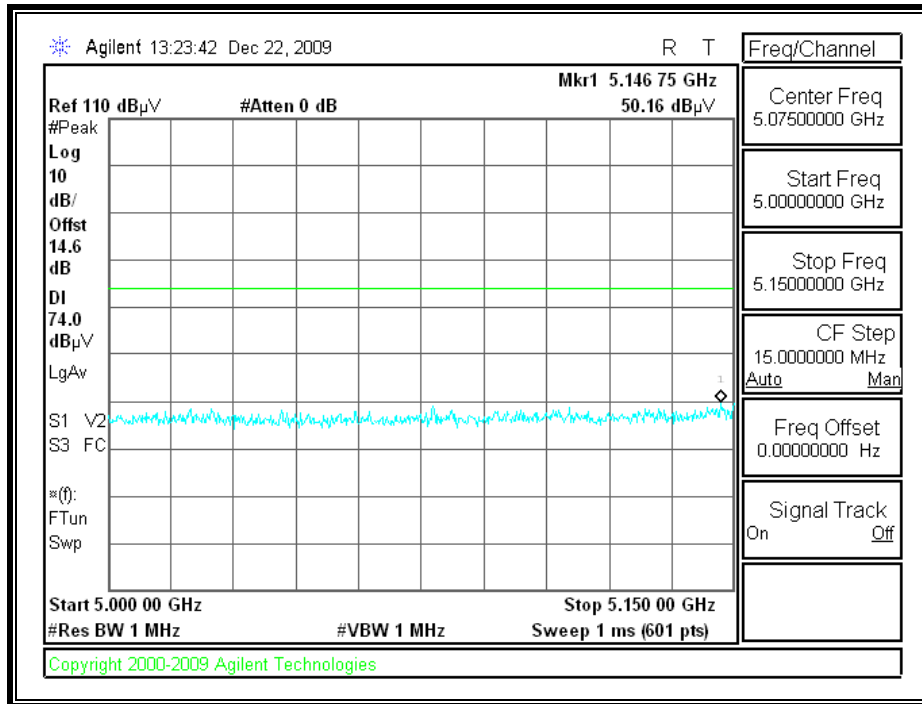


8.2.2. 802.11n HT20 MODE IN THE LOWER 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

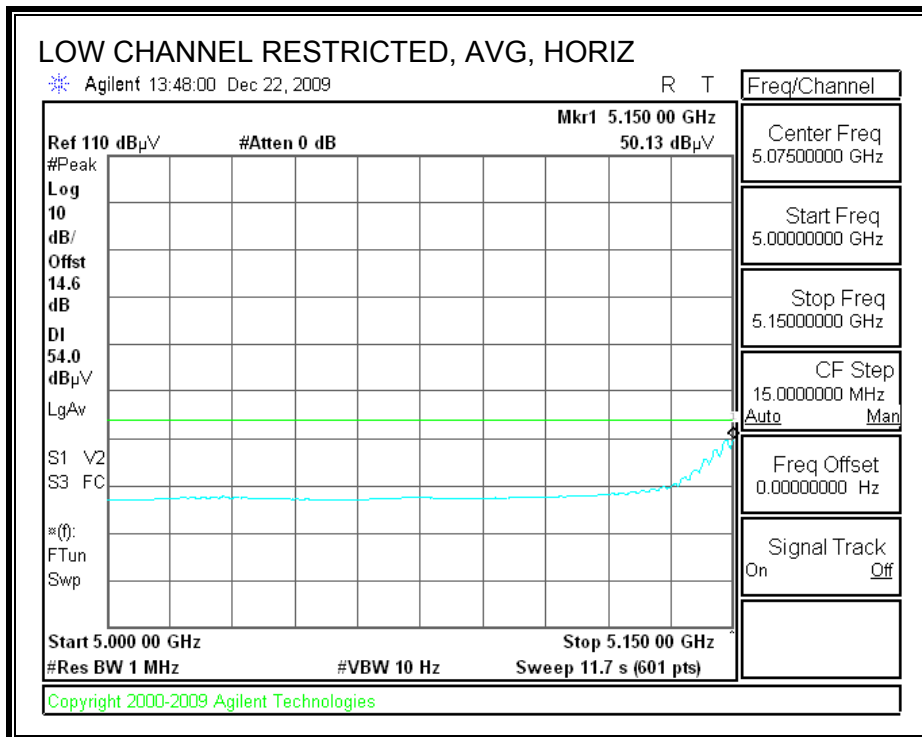
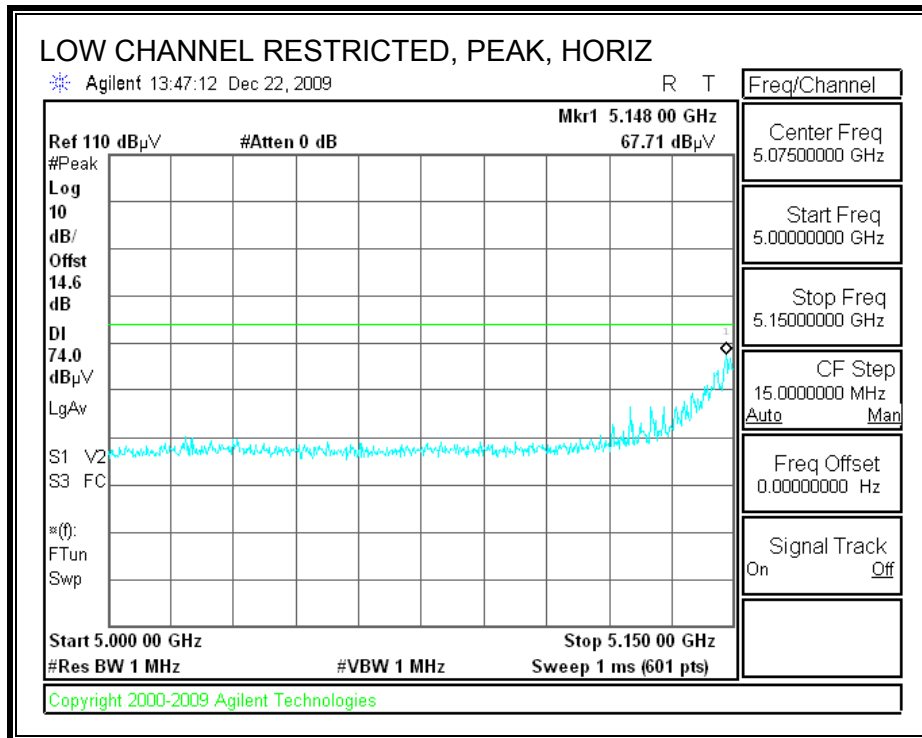


RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

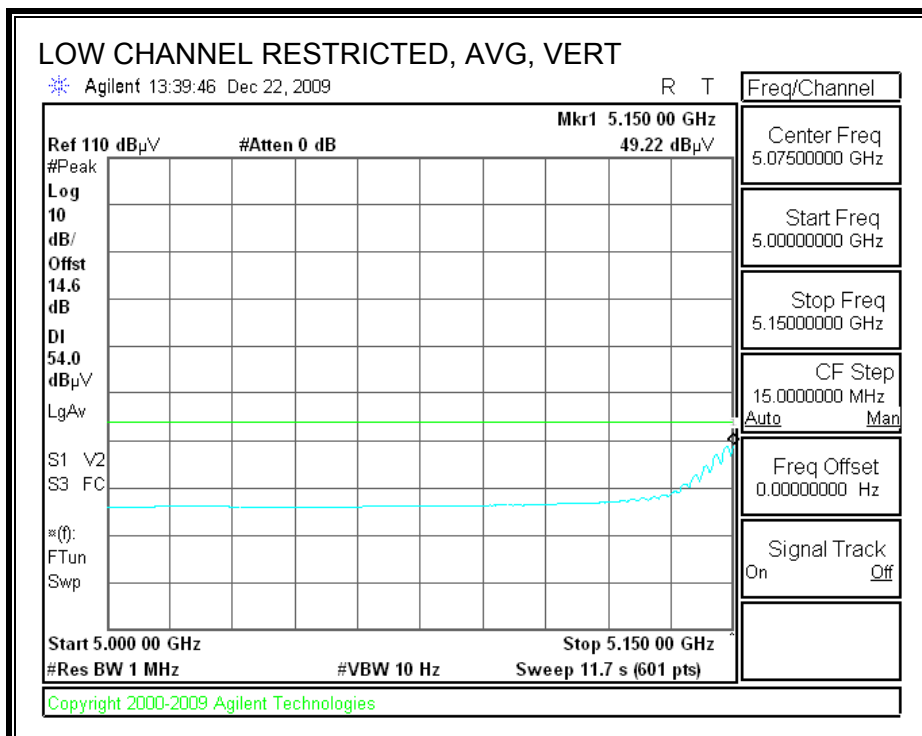
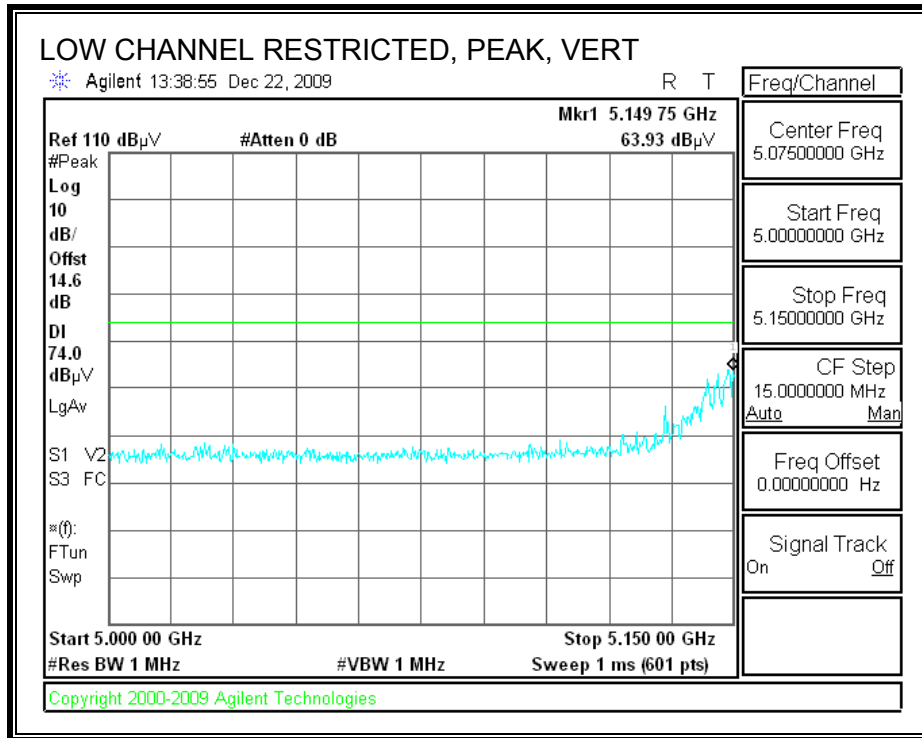


8.2.3. 802.11n HT40 MIMO MCS0 MODE IN THE LOWER 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL

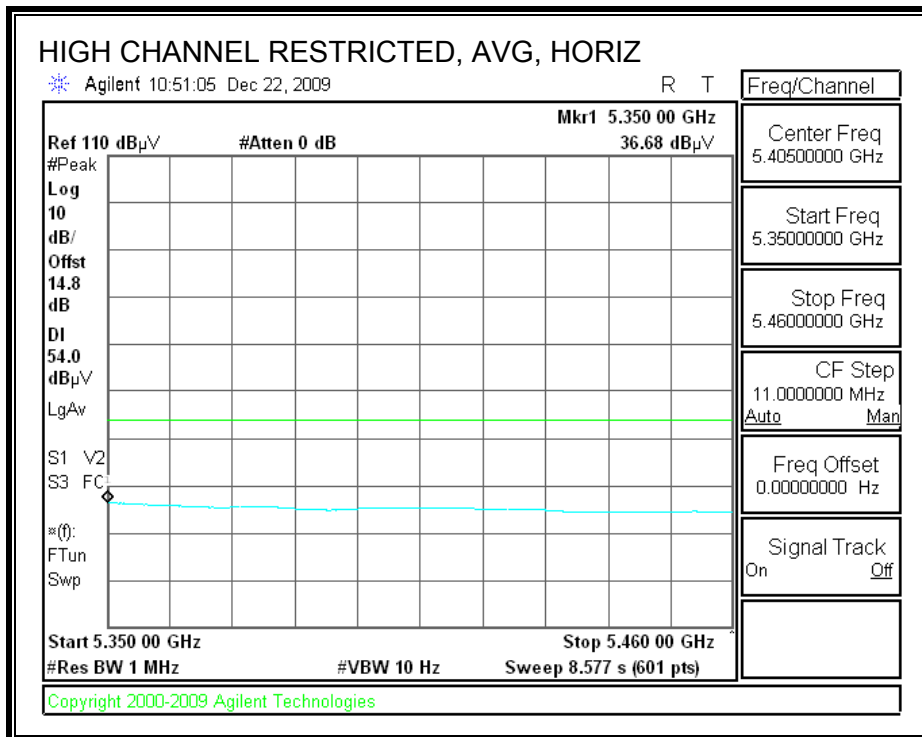
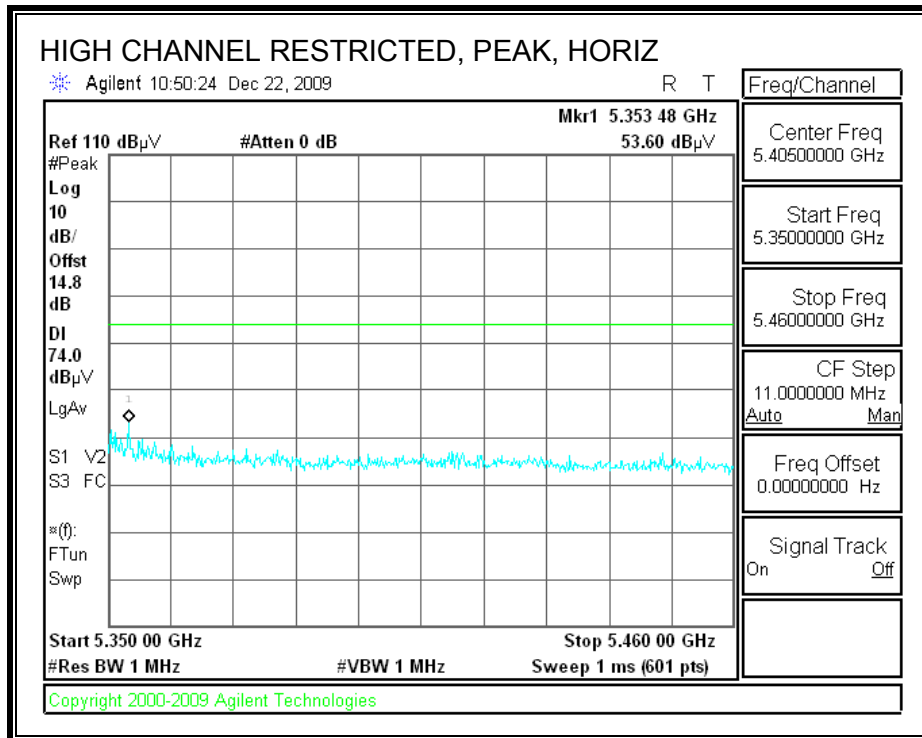


WORST CASE - 5.2 GHz BAND - HARMONICS AND SPURIOUS EMISSIONS

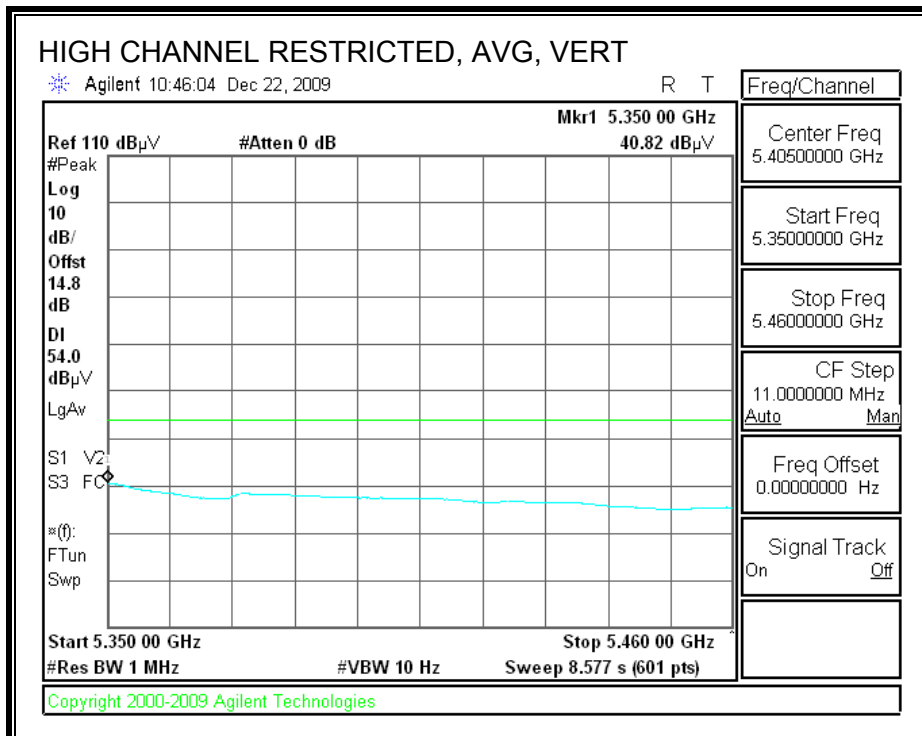
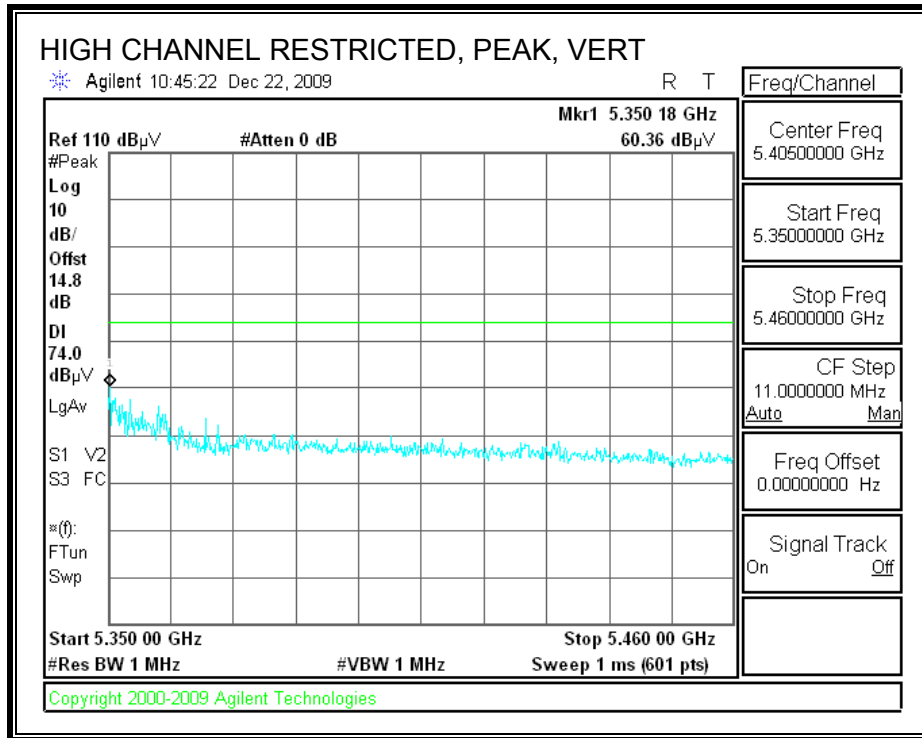
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Chin Pang											
Date:		12/22/09											
Project #:		09U12939											
Company:		Broadcom											
EUT Description:		802.11ag/Draft 802.11n WLAN PCI-E Minicard											
EUT M/N:		BCM943224HMS											
Test Target:		FCC 15.407											
Mode Oper:		HT20, Mid Ch											
f	Measurement Frequency			Amp	Preamp Gain			Average Field Strength Limit					
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Peak Field Strength Limit					
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Margin vs. Average Limit					
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Margin vs. Peak Limit					
CL	Cable Loss			HPF	High Pass Filter								
f	Dist	Read	AF	CL	Amp	D Corr	Ftr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
Mid Ch, 5260MHz													
15.780	3.0	31.1	37.8	11.5	-32.2	0.0	10.0	58.2	74.0	-15.8	H	P	
15.780	3.0	19.2	37.8	11.5	-32.2	0.0	10.0	46.3	54.0	-7.7	H	A	
15.780	3.0	32.2	37.8	11.5	-32.2	0.0	10.0	59.3	74.0	-14.7	V	P	
15.780	3.0	20.3	37.8	11.5	-32.2	0.0	10.0	47.4	54.0	-6.6	V	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

8.2.4. 802.11a MODE IN THE UPPER 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

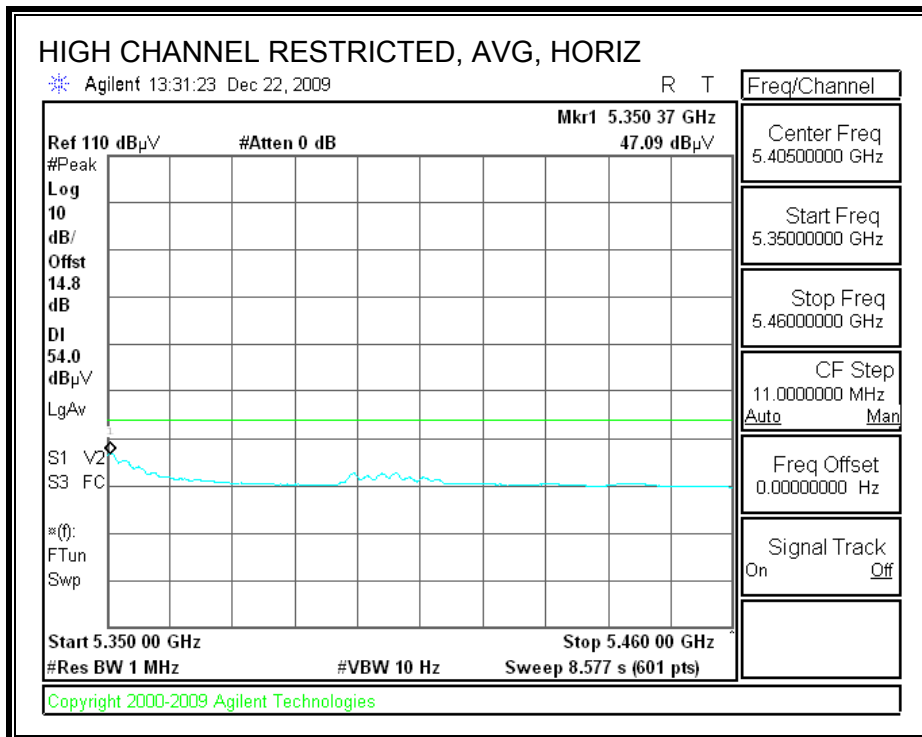
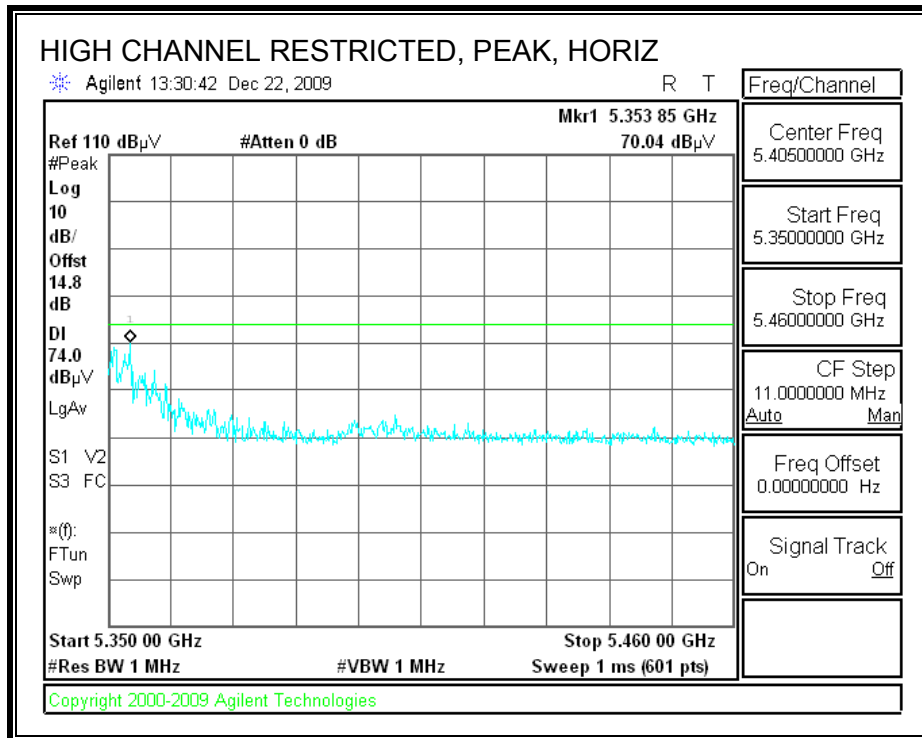


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

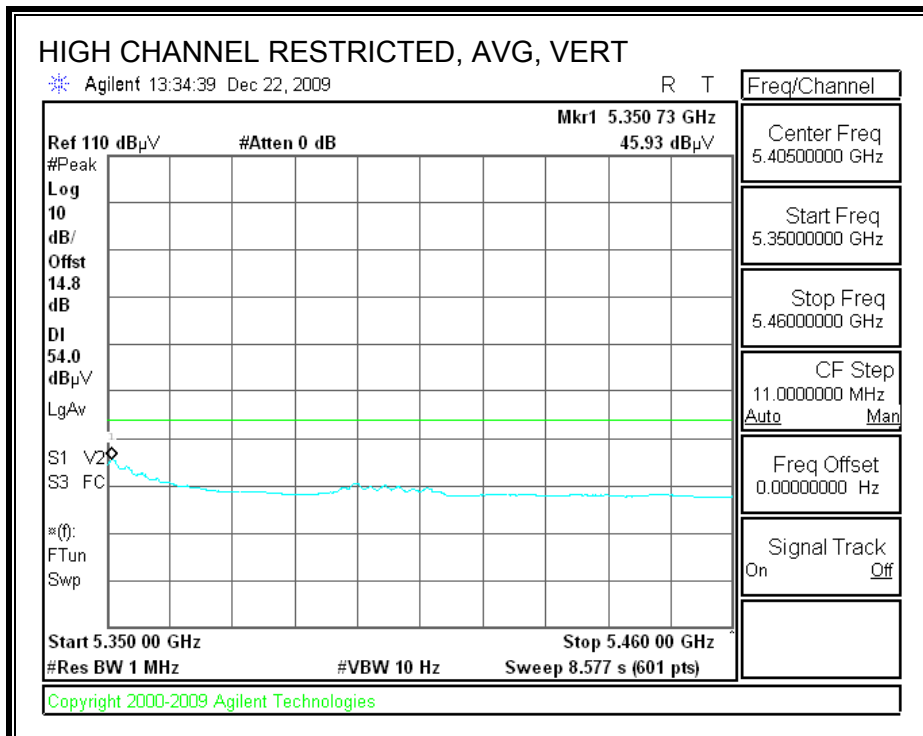
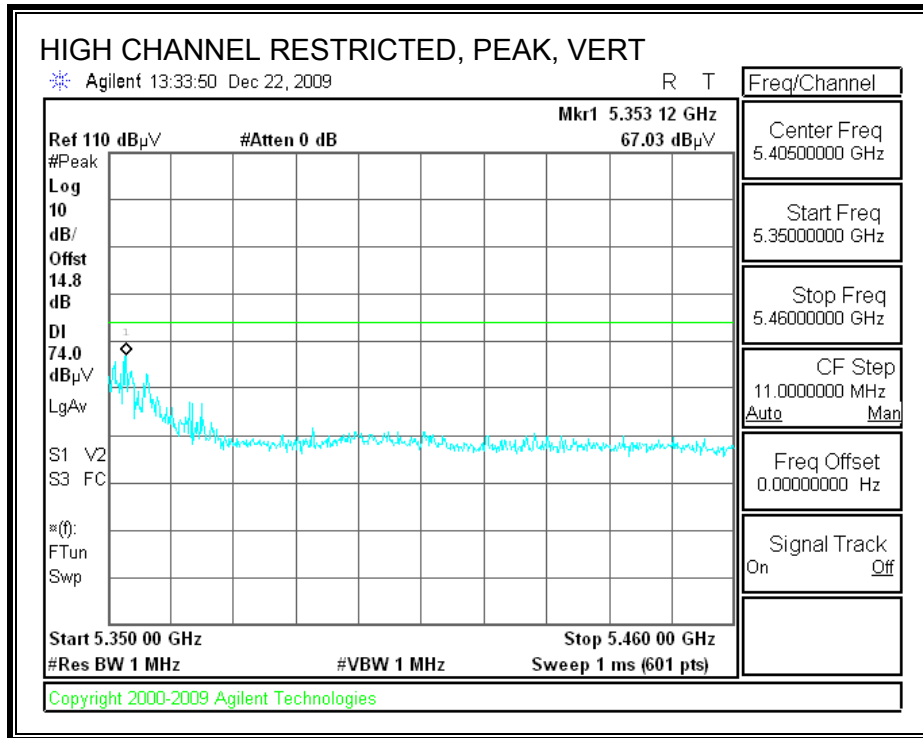


8.2.5. 802.11n HT20 MODE IN THE UPPER 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

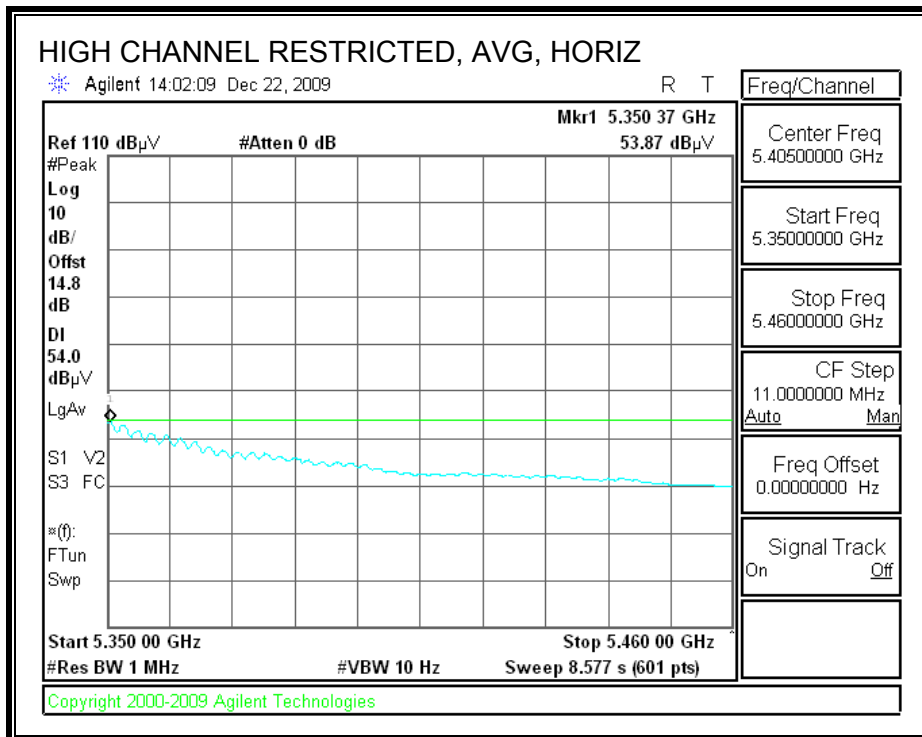
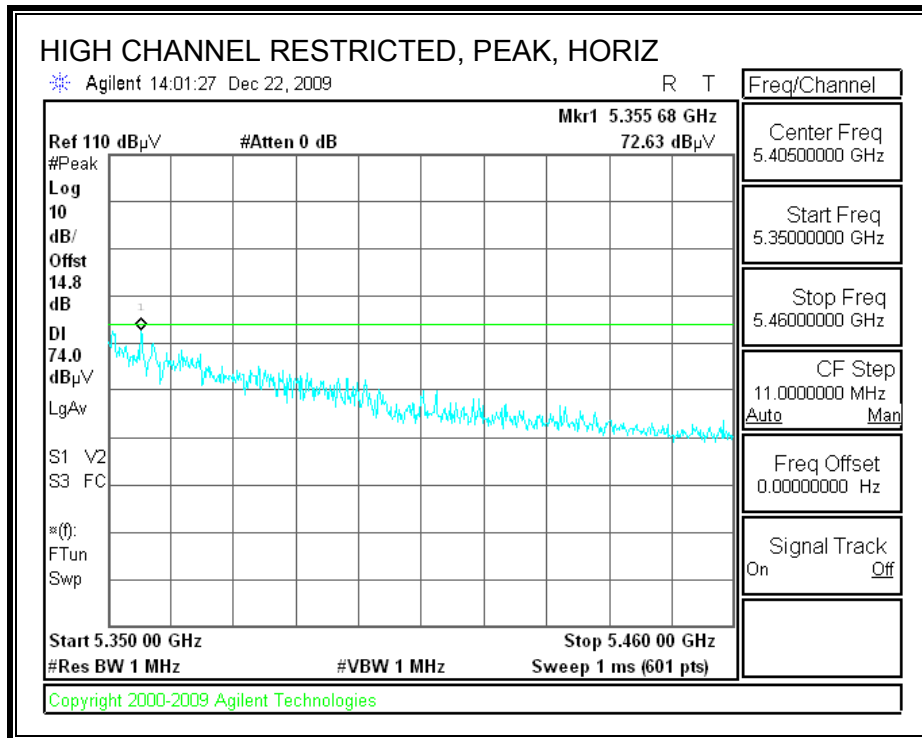


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

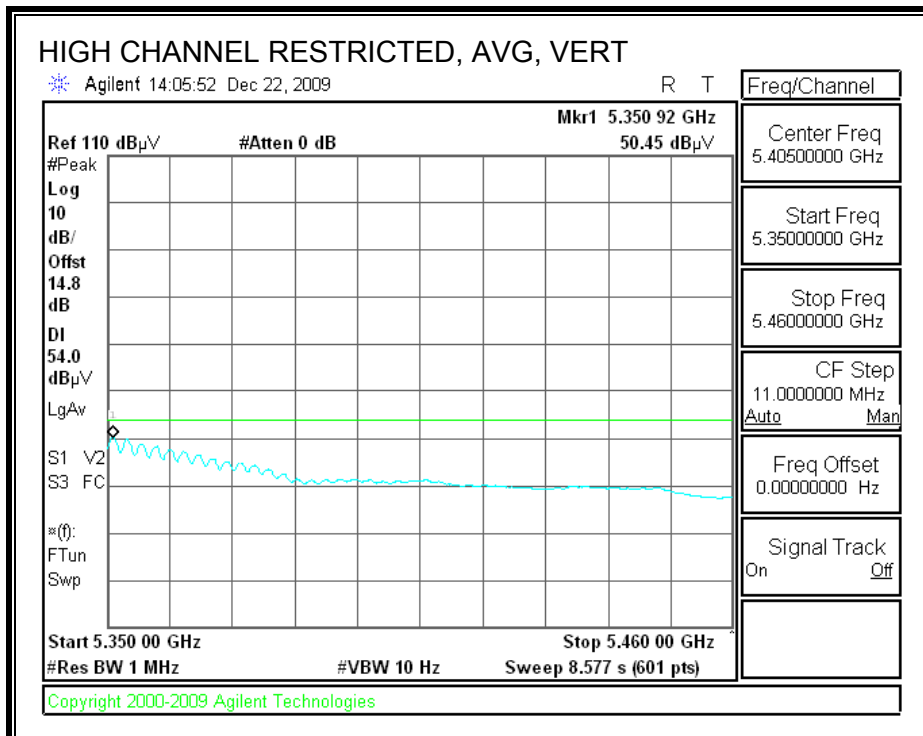
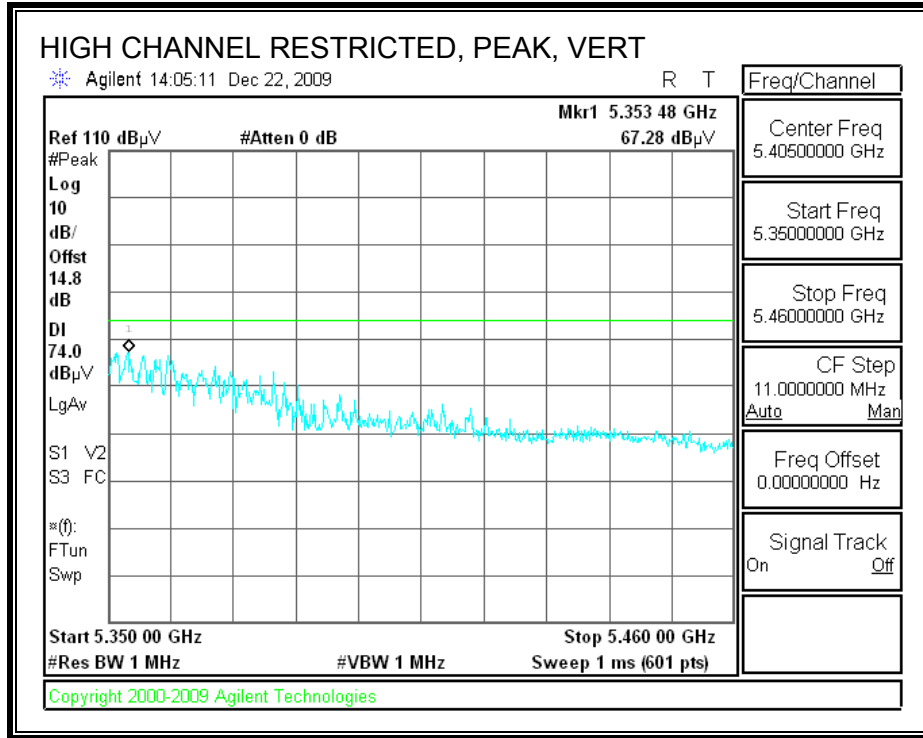


8.2.6. 802.11n HT40 MIMO MCS0 MODE IN THE UPPER 5.3 GHZ BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

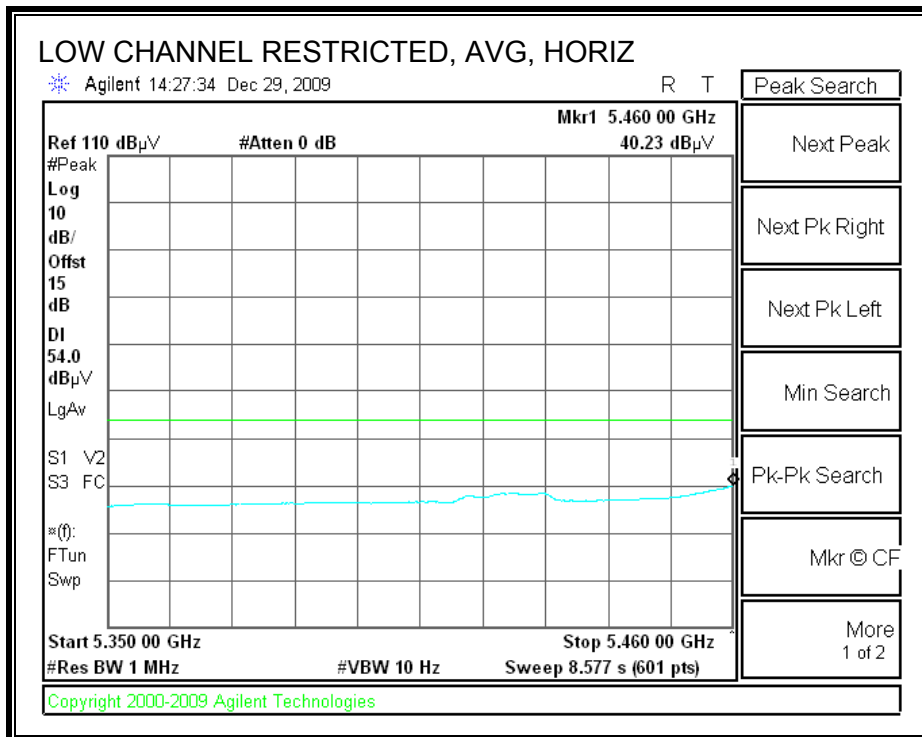
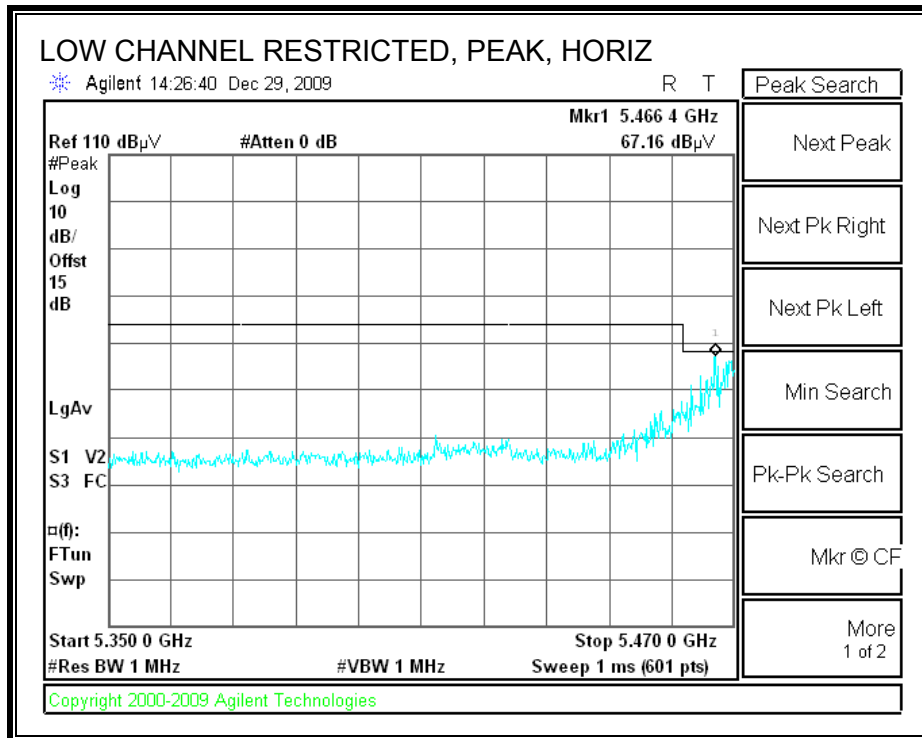


WORST CASE - 5.3 GHz BAND - HARMONICS AND SPURIOUS EMISSIONS

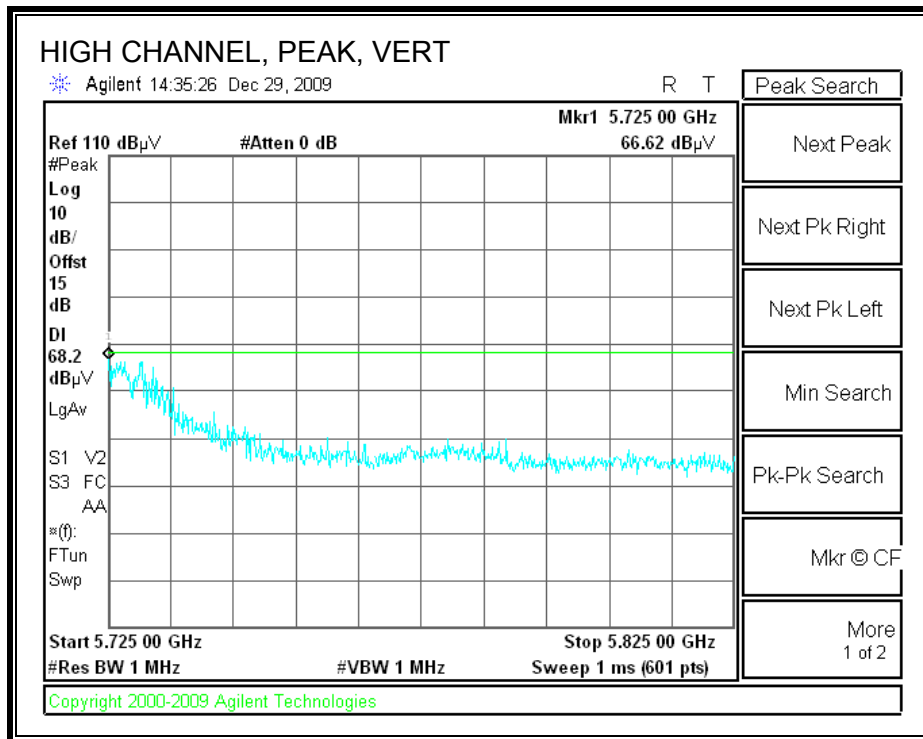
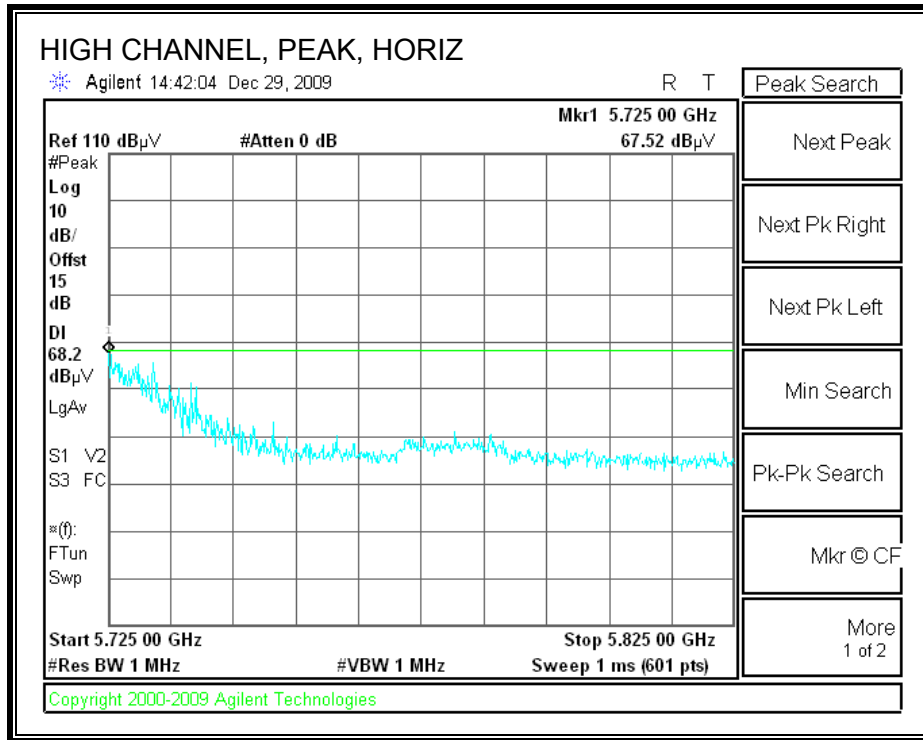
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Chin Pang											
Date:		12/29/09											
Project #:		09U12939											
Company:		Broadcom											
EUT Description:		802.11ag/Draft 802.11n WLAN PCI-E Minicard											
EUT M/N:		BCM943224HMS											
Test Target:		FCC 15.407											
Mode Oper:		TX, 5.3GHz Band, Mid Ch (worst Case)											
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit									
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit									
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit									
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit									
CL	Cable Loss	HPF	High Pass Filter										
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Corr. dB	Limit dB	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Mid Ch, 5300MHz													
10.600	3.0	32.3	37.6	9.0	-32.6	0.0	0.8	47.1	74.0	-26.9	H	P	
10.600	3.0	19.4	37.6	9.0	-32.6	0.0	0.8	34.2	54.0	-19.8	H	A	
15.900	3.0	31.5	37.5	11.5	-32.1	0.0	0.7	49.0	74.0	-25.0	H	P	
15.900	3.0	18.9	37.5	11.5	-32.1	0.0	0.7	36.5	54.0	-17.5	H	A	
10.600	3.0	32.2	37.6	9.0	-32.6	0.0	0.8	47.0	74.0	-27.0	V	P	
10.600	3.0	20.2	37.6	9.0	-32.6	0.0	0.8	35.0	54.0	-19.0	V	A	
15.900	3.0	32.2	37.5	11.5	-32.1	0.0	0.7	49.7	74.0	-24.3	V	P	
15.900	3.0	19.1	37.5	11.5	-32.1	0.0	0.7	36.7	54.0	-17.3	V	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

8.2.7. 802.11a MODE IN THE 5.6 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

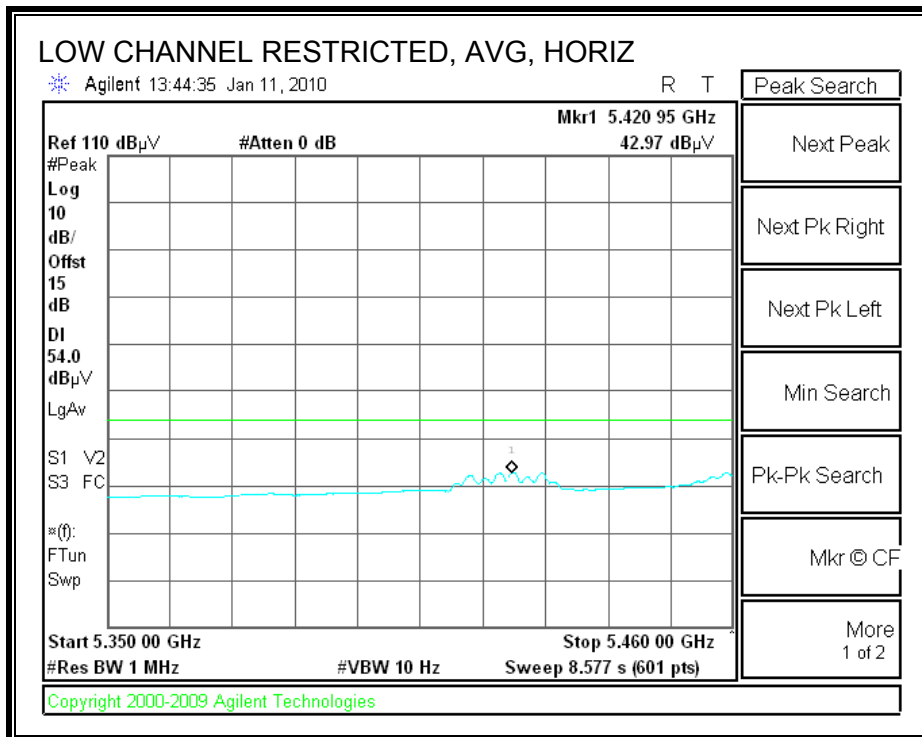
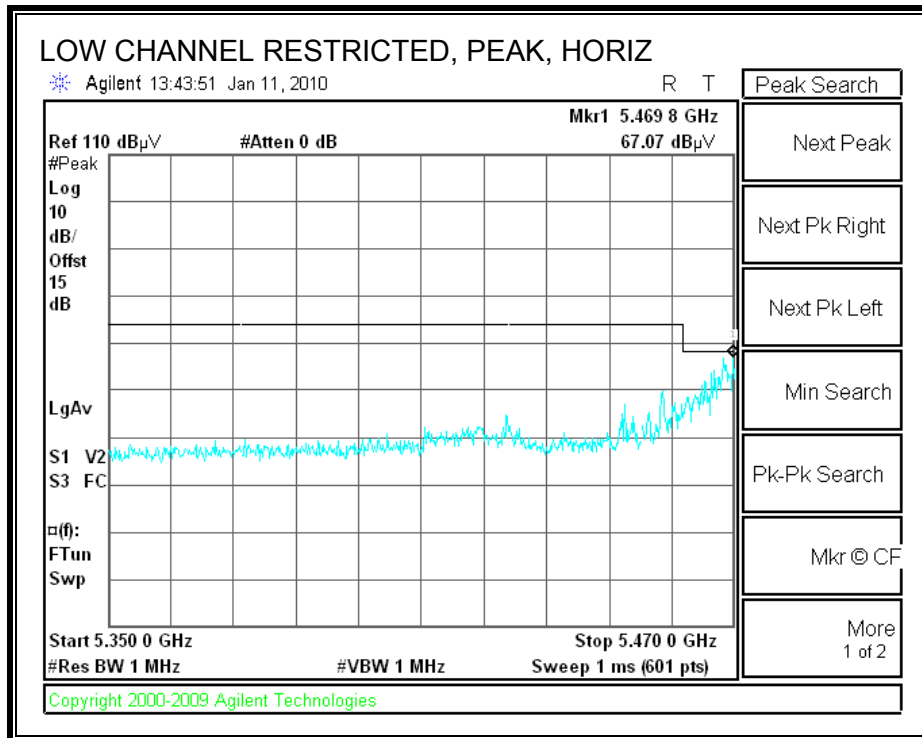


AUTHORIZED BANDEGE (HIGH CHANNEL, HORIZONTAL)

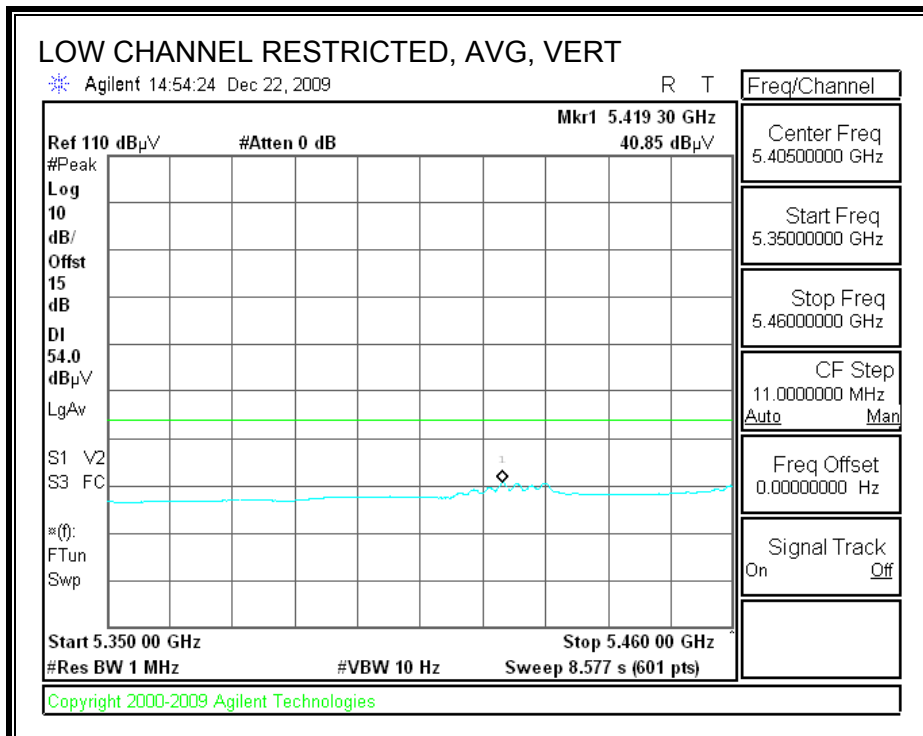
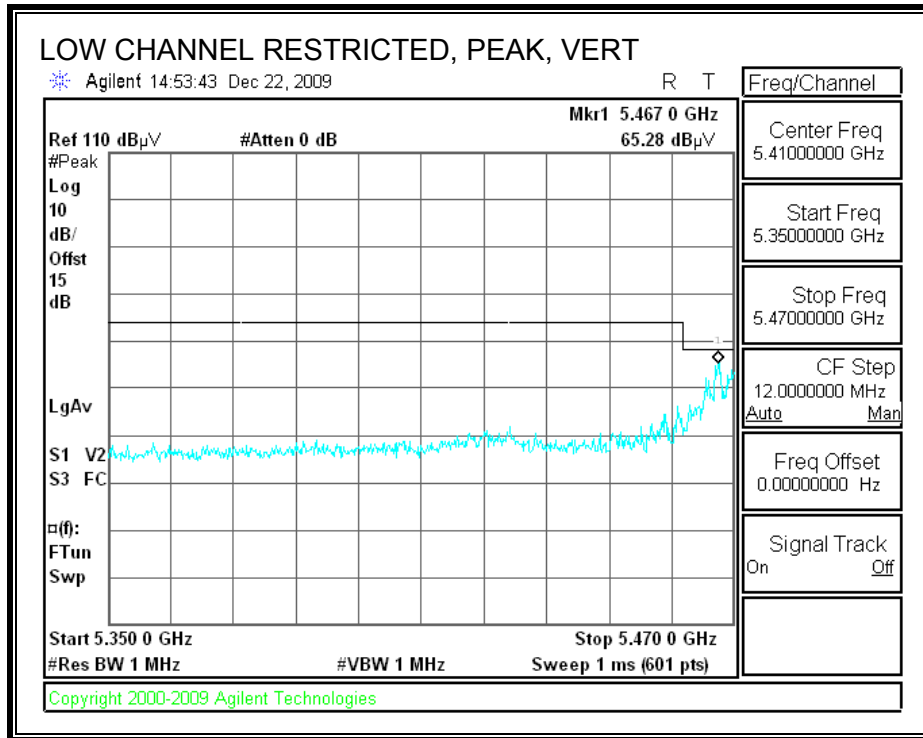


8.2.8. 802.11n HT20 MODE IN THE 5.6 GHz BAND

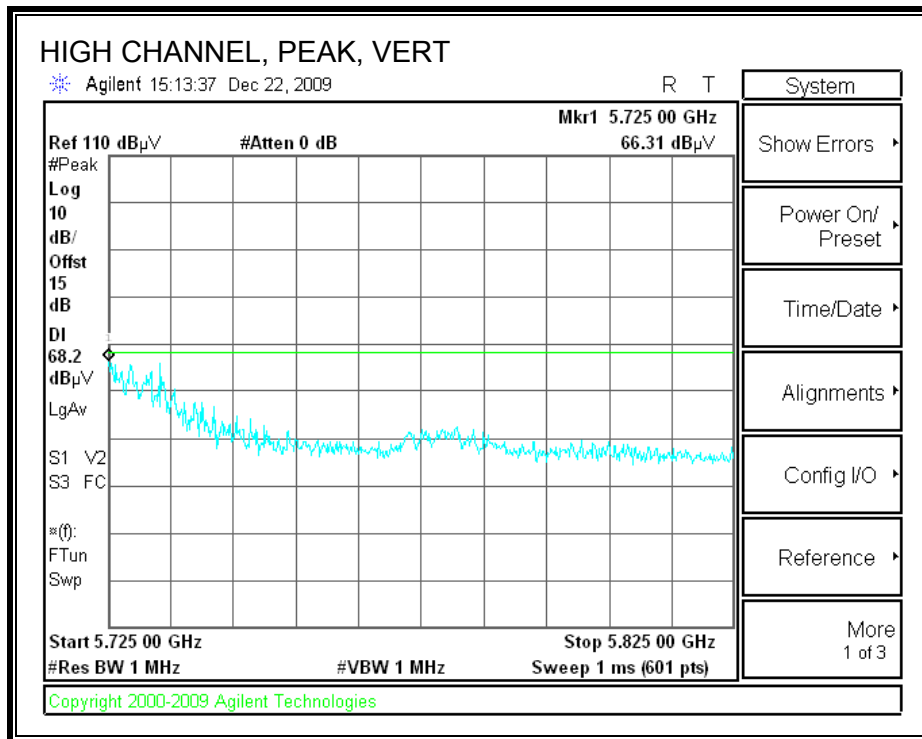
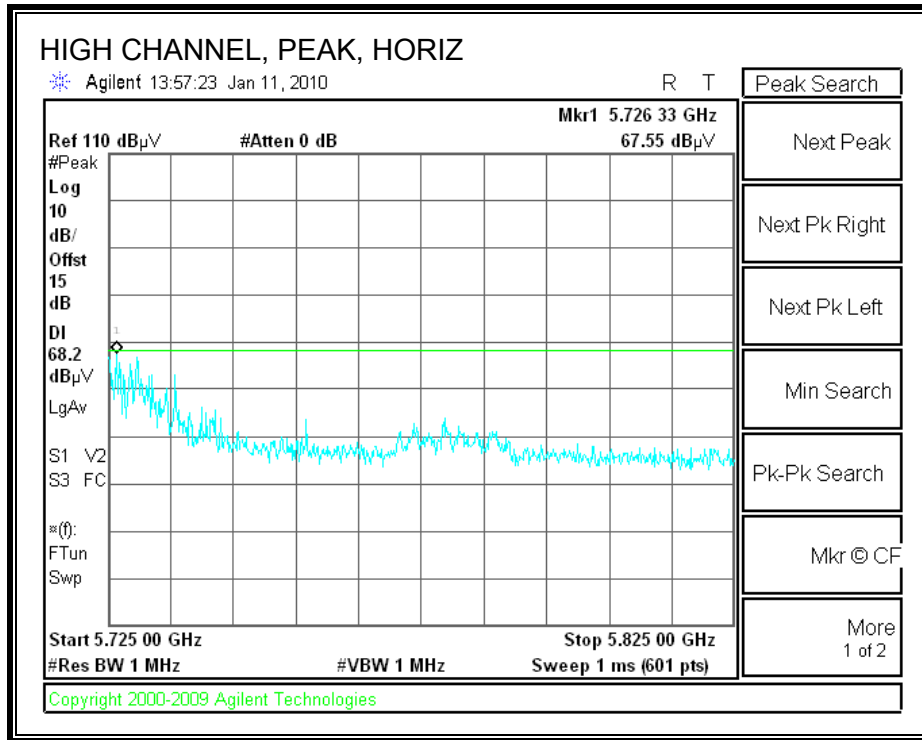
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

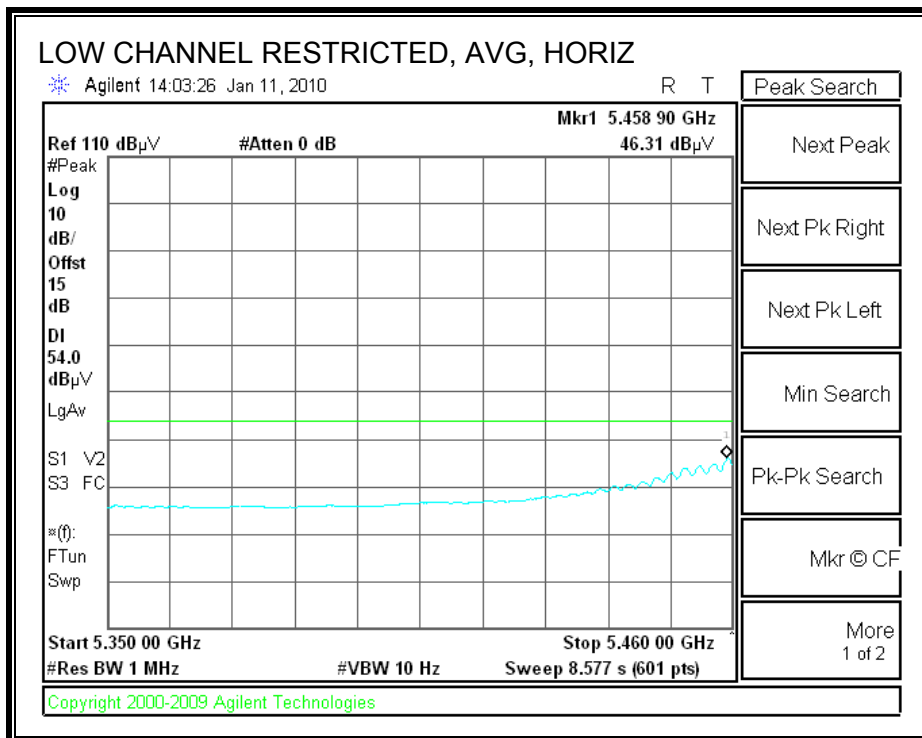
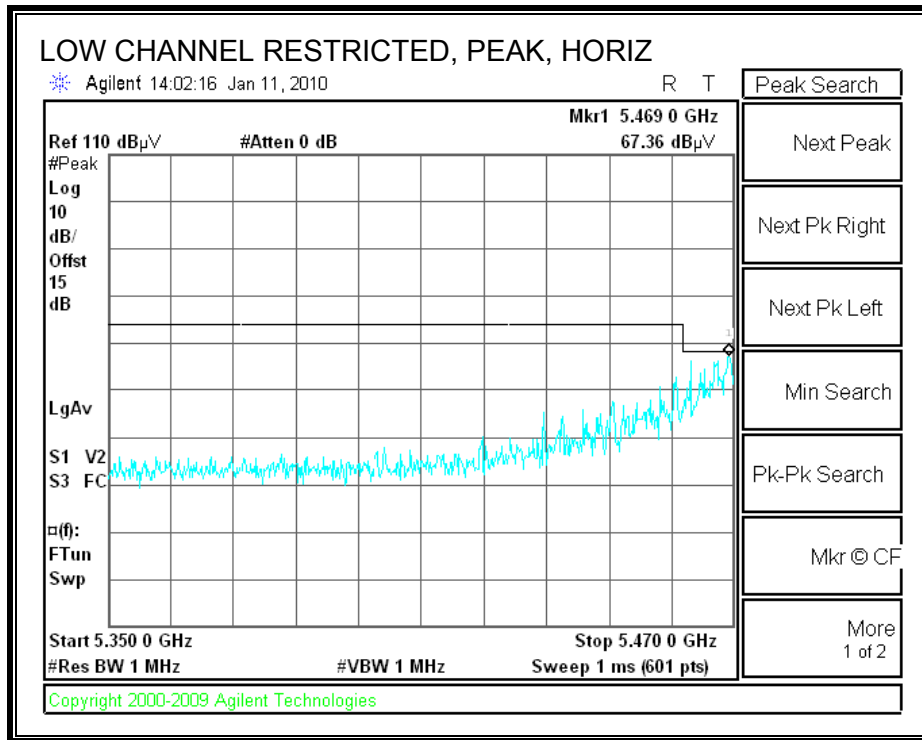


AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

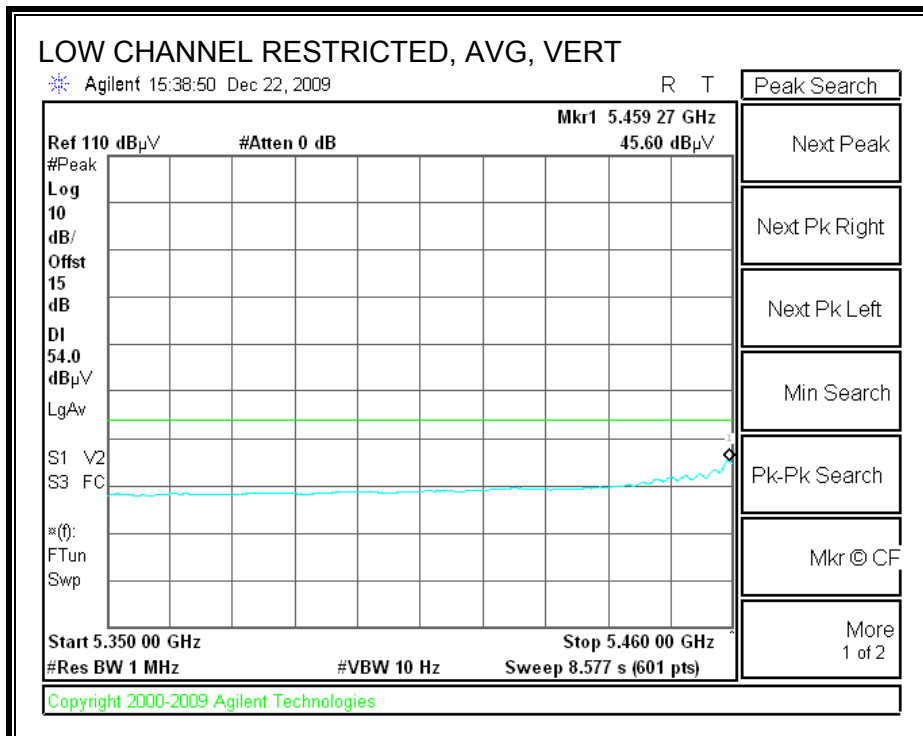
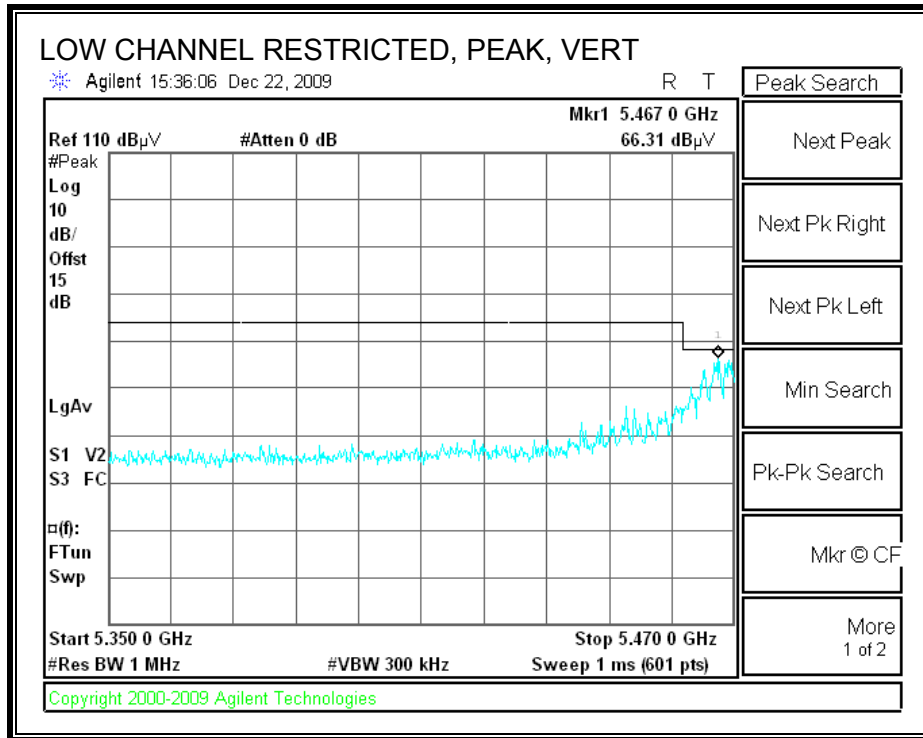


8.2.9. 802.11n HT40 MIMO MCS0 MODE IN THE 5.6 GHz BAND

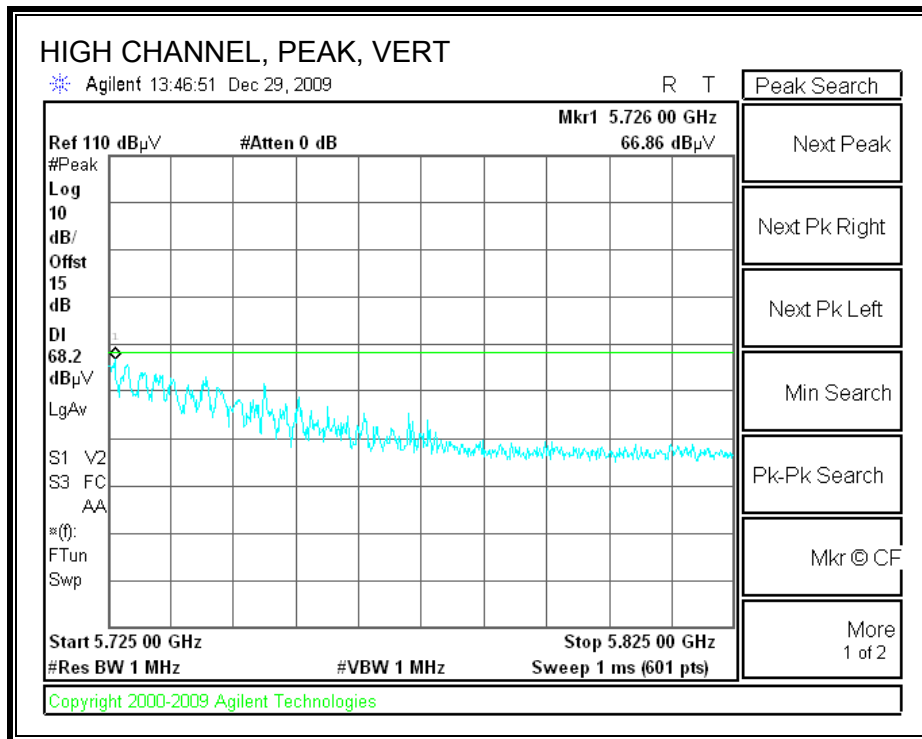
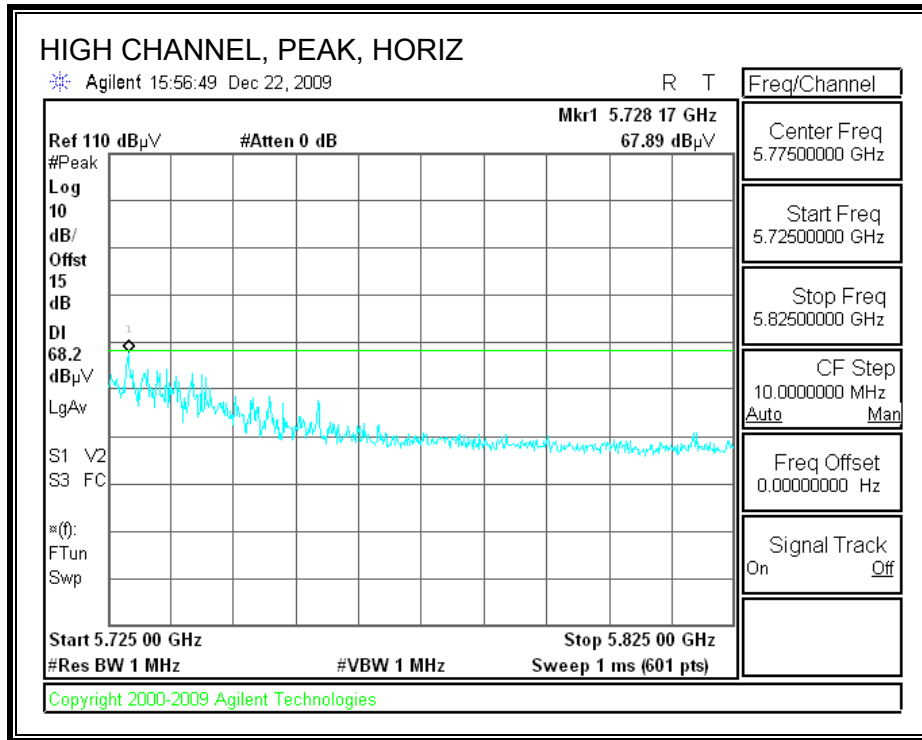
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL



AUTHORIZED BANDEGE (HIGH CHANNEL, HORIZONTAL)

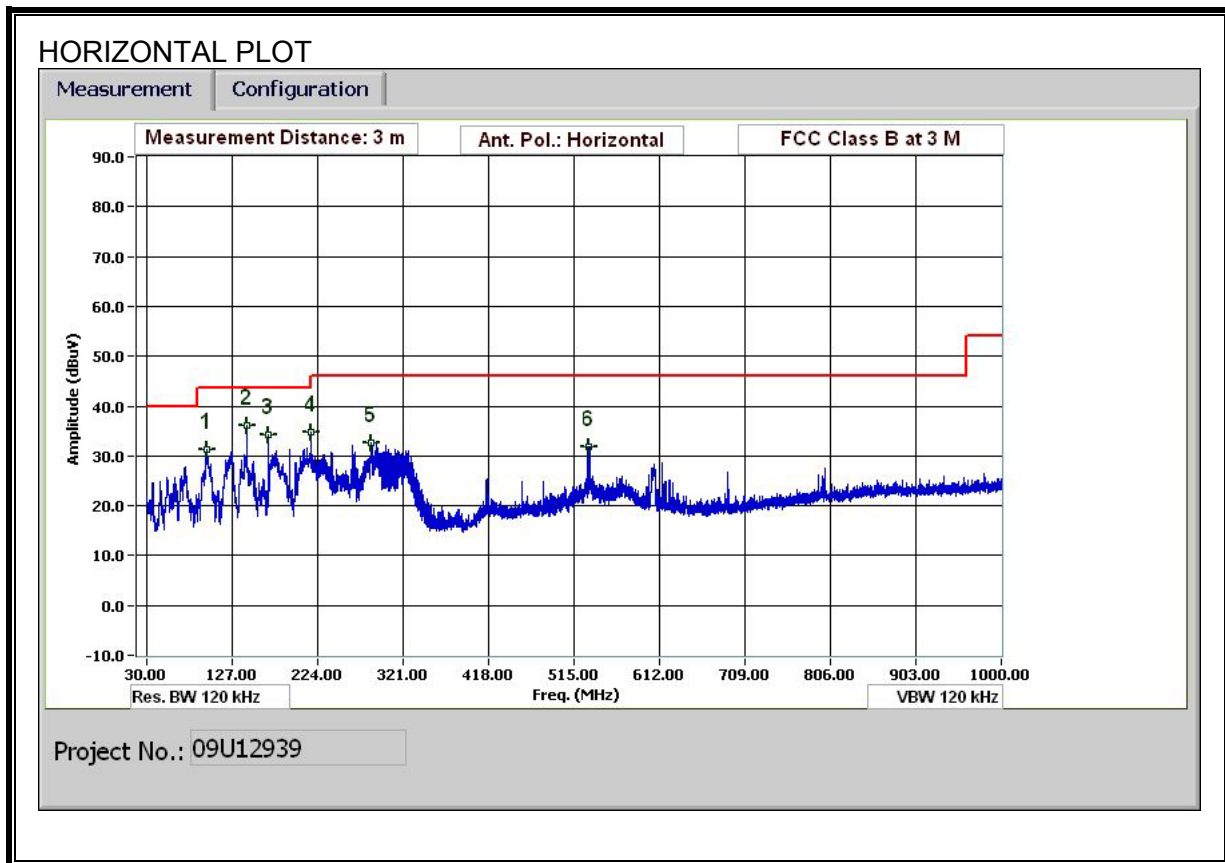


WORST CASE - 5.6 GHz BAND - HARMONICS AND SPURIOUS EMISSIONS

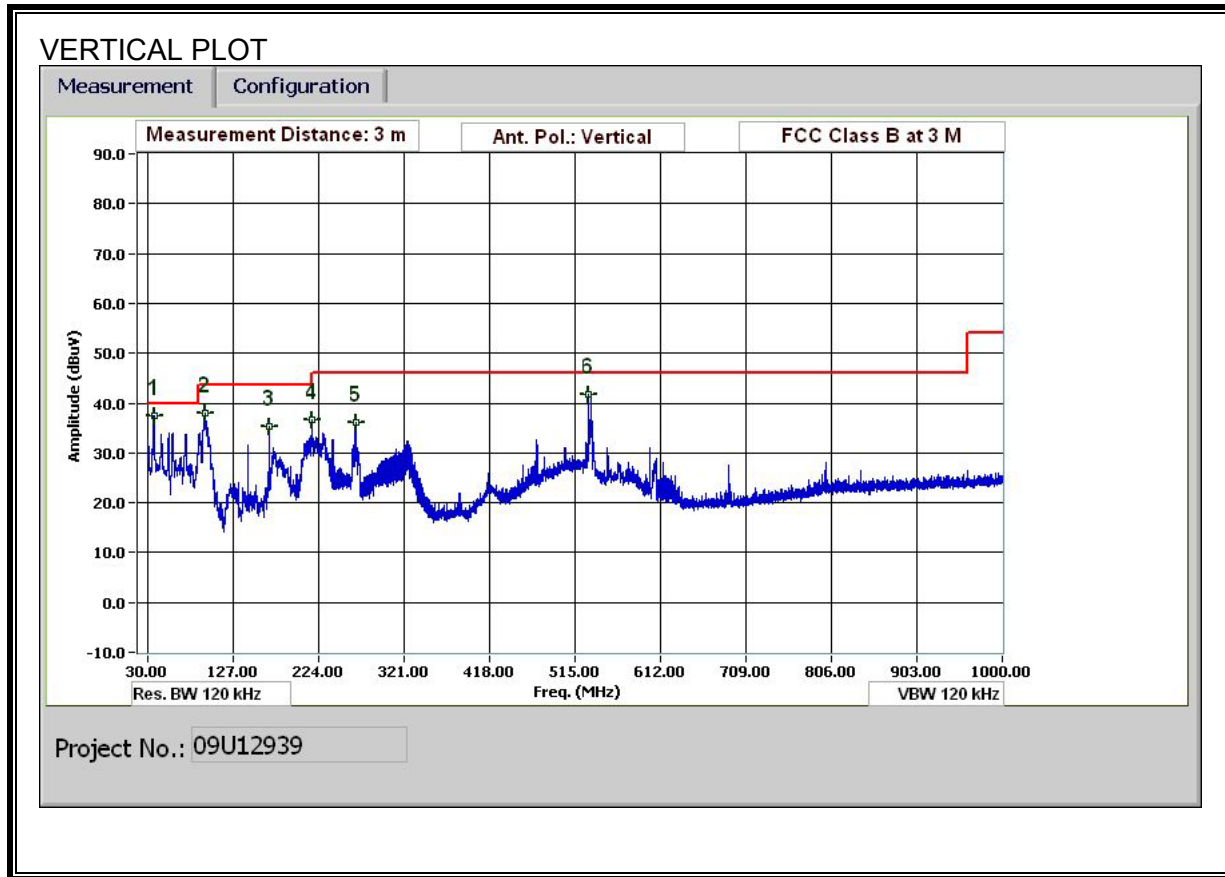
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Chin Pang											
Date:		12/28/09											
Project #:		09U12939											
Company:		Broadcom											
EUT Description:		802.11ag/Draft 802.11n WLAN PCI-E Minicard											
EUT M/N:		BCM943224HMS											
Test Target:		FCC 15.407											
Mode Oper:		5.6GHz Mid Ch (Worst Case)											
f	Measurement Frequency			Amp	Preamp Gain			Average Field Strength Limit					
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Peak Field Strength Limit					
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Margin vs. Average Limit					
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Margin vs. Peak Limit					
CL	Cable Loss			HPF	High Pass Filter								
f	Dist	Read	AF	CL	Amp	D Corr	Fldr	Corr.	Limit	Margin	Ant. Pol	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
Mid Ch, 5600MHz													
11.200	3.0	33.6	37.8	9.3	-32.6	0.0	10.0	58.1	74.0	-15.9	V	P	
11.200	3.0	21.7	37.8	9.3	-32.6	0.0	10.0	46.2	54.0	-7.8	V	A	
11.200	3.0	30.5	37.8	9.3	-32.6	0.0	10.0	55.0	74.0	-19.0	H	P	
11.200	3.0	18.9	37.8	9.3	-32.6	0.0	10.0	43.4	54.0	-10.6	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

8.3. WORST-CASE BELOW 1 GHz

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



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



HORIZONTAL & VERTICAL DATA

30-1000MHz Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
 Date: 12/28/09
 Project #: 09U12939
 Company: Broadcom
 EUT Description: 802.11ag/Draft 802.11n WLAN PCI-E Minicard
 EUT M/N: BCM943224HMS
 Test Target: FCC Class B
 Mode Oper: TX (Worsat Case), 5GHz Band

f Measurement Frequency Amp Preamp Gain Margin Margin vs. Limit
 Dist Distance to Antenna D Corr Distance Correct to 3 meters
 Read Analyzer Reading Filter Filter Insert Loss
 AF Antenna Factor Corr. Calculated Field Strength
 CL Cable Loss Limit Field Strength Limit

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Notes
36.840	3.0	49.3	16.0	0.5	28.4	0.0	0.0	37.4	40.0	-2.6	V	P	
36.840	3.0	47.1	16.0	0.5	28.4	0.0	0.0	34.5	40.0	-5.5	V	QP	
94.803	3.0	57.1	8.3	0.8	28.2	0.0	0.0	38.0	43.5	-5.5	V	P	
168.006	3.0	50.4	11.6	1.1	27.6	0.0	0.0	35.4	43.5	-8.1	V	P	
216.008	3.0	50.9	11.9	1.2	27.4	0.0	0.0	36.7	46.0	-9.3	V	P	
265.810	3.0	49.8	12.3	1.4	27.4	0.0	0.0	36.1	46.0	-9.9	V	P	
530.421	3.0	51.0	17.3	2.0	28.6	0.0	0.0	41.7	46.0	-4.3	V	P	
98.643	3.0	49.6	9.1	0.8	28.2	0.0	0.0	31.2	43.5	-12.3	H	P	
143.885	3.0	49.9	12.9	1.0	27.9	0.0	0.0	36.0	43.5	-7.5	H	P	
168.006	3.0	49.1	11.6	1.1	27.6	0.0	0.0	34.1	43.5	-9.4	H	P	
216.008	3.0	49.2	11.9	1.2	27.4	0.0	0.0	34.9	46.0	-11.1	H	P	
285.371	3.0	45.7	13.0	1.4	27.4	0.0	0.0	32.7	46.0	-13.3	H	P	
531.021	3.0	41.1	17.3	2.0	28.6	0.0	0.0	31.8	46.0	-14.2	H	P	