



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 7**

CERTIFICATION TEST REPORT

FOR

802.11ag / Draft 802.11n WLAN + BLUETOOTH PCI-E MINICARD

MODEL NUMBER: BCM943224PCIEBT

**FCC ID: QDS-BRCM1047
IC: 4324A-BRCM1047**

REPORT NUMBER: 09U12658-1

ISSUE DATE: AUGUST 10, 2009

Prepared for

**BROADCOM CORPORATION
190 MATHILDA PLACE
SUNNYVALE, CA 94086, U.S.A.**

Prepared by

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



NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	08/10/09	Initial Issue	F. Ibrahim

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	6
2. TEST METHODOLOGY	7
3. FACILITIES AND ACCREDITATION	7
4. CALIBRATION AND UNCERTAINTY	7
4.1. MEASURING INSTRUMENT CALIBRATION	7
4.2. SAMPLE CALCULATION	7
4.3. MEASUREMENT UNCERTAINTY	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT	8
5.2. MAXIMUM OUTPUT POWER	8
5.3. SOFTWARE AND FIRMWARE	9
5.4. WORST-CASE CONFIGURATION AND MODE	9
5.5. DESCRIPTION OF AVAILABLE ANTENNAS	10
5.6. DESCRIPTION OF TEST SETUP	11
6. TEST AND MEASUREMENT EQUIPMENT	13
7. ANTENNA PORT TEST RESULTS	14
7.1. 802.11b MODE IN THE 2.4 GHz BAND	14
7.1.1. 6 dB BANDWIDTH	14
7.1.2. 99% BANDWIDTH	17
7.1.3. OUTPUT POWER	20
7.1.4. POWER SPECTRAL DENSITY	21
7.1.5. CONDUCTED SPURIOUS EMISSIONS	24
7.2. 802.11g MODE IN THE 2.4 GHz BAND	28
7.2.1. 6 dB BANDWIDTH	28
7.2.2. 99% BANDWIDTH	31
7.2.3. OUTPUT POWER	34
7.2.4. POWER SPECTRAL DENSITY	35
7.2.5. CONDUCTED SPURIOUS EMISSIONS	38
7.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND	42
7.3.1. 6 dB BANDWIDTH	42
7.3.2. 99% BANDWIDTH	46
7.3.3. OUTPUT POWER	50
7.3.4. POWER SPECTRAL DENSITY	51
7.3.5. CONDUCTED SPURIOUS EMISSIONS	54
7.4. 802.11n HT40 SISO MODE IN THE 2.4 GHz BAND	58
7.4.1. 6 dB BANDWIDTH	58
7.4.2. 99% BANDWIDTH	61
7.4.3. OUTPUT POWER	64

7.4.4.	POWER SPECTRAL DENSITY	65
7.4.5.	CONDUCTED SPURIOUS EMISSIONS.....	68
7.5.	<i>802.11n HT40 MCS0 MODE IN THE 2.4 GHz BAND.....</i>	<i>72</i>
7.5.1.	6 dB BANDWIDTH	72
7.5.2.	99% BANDWIDTH	76
7.5.3.	OUTPUT POWER	80
7.5.4.	POWER SPECTRAL DENSITY	81
7.5.5.	CONDUCTED SPURIOUS EMISSIONS.....	84
7.6.	<i>802.11n HT40 MCS15 MODE IN THE 2.4 GHz BAND.....</i>	<i>88</i>
7.6.1.	OUTPUT POWER	88
7.6.2.	POWER SPECTRAL DENSITY	89
7.7.	<i>802.11a MODE IN THE 5.8 GHz BAND.....</i>	<i>92</i>
7.7.1.	6 dB BANDWIDTH	92
7.7.2.	99% BANDWIDTH	95
7.7.3.	OUTPUT POWER	98
7.7.4.	POWER SPECTRAL DENSITY	99
7.7.5.	CONDUCTED SPURIOUS EMISSIONS.....	102
7.8.	<i>802.11n HT20 MODE IN THE 5.8 GHz BAND.....</i>	<i>106</i>
7.8.1.	6 dB BANDWIDTH	106
7.8.2.	99% BANDWIDTH	110
7.8.3.	OUTPUT POWER	114
7.8.4.	POWER SPECTRAL DENSITY	115
7.8.5.	CONDUCTED SPURIOUS EMISSIONS.....	118
7.9.	<i>802.11n HT40 SISO MODE IN THE 5.8 GHz BAND.....</i>	<i>122</i>
7.9.1.	6 dB BANDWIDTH	122
7.9.2.	99% BANDWIDTH	124
7.9.3.	OUTPUT POWER	126
7.9.4.	POWER SPECTRAL DENSITY	127
7.9.5.	CONDUCTED SPURIOUS EMISSIONS.....	129
7.10.	<i>802.11n HT40 MODE IN THE 5.8 GHz BAND.....</i>	<i>132</i>
7.10.1.	6 dB BANDWIDTH	132
7.10.2.	99% BANDWIDTH	135
7.10.3.	OUTPUT POWER	138
7.10.4.	POWER SPECTRAL DENSITY	139
7.10.5.	CONDUCTED SPURIOUS EMISSIONS.....	141
7.11.	<i>RECEIVER CONDUCTED SPURIOUS EMISSIONS.....</i>	<i>144</i>
8.	RADIATED TEST RESULTS	147
8.1.	<i>LIMITS AND PROCEDURE</i>	<i>147</i>
8.2.	<i>TRANSMITTER ABOVE 1 GHz.....</i>	<i>148</i>
8.2.1.	802.11b MODE IN THE 2.4 GHz BAND.....	148
8.2.2.	802.11g MODE IN THE 2.4 GHz BAND.....	151
8.2.3.	802.11n HT20 MODE IN THE 2.4 GHz BAND.....	154
8.2.4.	802.11n HT40 SISO MODE IN THE 2.4 GHz BAND.....	157
8.2.5.	802.11n HT40 MCS0 MODE IN THE 2.4 GHz BAND.....	160
8.2.6.	802.11n HT40 MCS15 MODE IN THE 2.4 GHz BAND.....	163
8.2.7.	802.11a MODE IN THE 5.8 GHz BAND.....	165
8.2.8.	802.11n HT20 MODE IN THE 5.8 GHz BAND.....	166

8.2.9.	802.11n HT40 SISO MODE IN THE 5.8 GHz BAND	167
8.2.10.	802.11n HT40 MODE IN THE 5.8 GHz BAND	168
8.3.	WORST-CASE BELOW 1 GHz.....	169
9.	AC POWER LINE CONDUCTED EMISSIONS	170
10.	MAXIMUM PERMISSIBLE EXPOSURE	177
11.	SETUP PHOTOS	181

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: 802.11ag / Draft 802.11n WLAN + Bluetooth PCI-E Minicard

MODEL: BCM943224PCIEBT

SERIAL NUMBER: 509

DATE TESTED: JULY 20 – AUGUST 01, 2009

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 2	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:



FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES



VIEN TRAN
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, RSS-GEN Issue 2, and RSS-210 Issue 7.

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:

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

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 + Bluetooth PCI-E Minicard.
The radio module is manufactured by Broadcom.

5.2. MAXIMUM OUTPUT POWER

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

2400 to 2483.5 MHz Authorized Band

Frequency Range (MHz)	Mode	Peak Power Chain 0 (dBm)	Peak Power Chain 1 (dBm)	Total Peak Power (dBm)	Output Power (mW)
2412 - 2462	802.11b Legacy			23.23	210.38
2412 - 2462	802.11g Legacy			25.58	361.41
2412 - 2462	802.11n 20MHz SISO	Covered by the worst case 802.11g Mode Legacy testing			
2412 - 2462	802.11g CDD	Covered by the worst case 802.11n 20MHz CDD			
2412 - 2462	802.11n 20MHz CDD	25.45	24.86	28.18	656.95
2422 - 2452	802.11n 40MHz SISO			24.16	260.62
2422 - 2452	802.11n 40MHz CDD MCS0	23.79	22.84	26.35	431.64
2422 - 2452	802.11n 40MHz CDD MCS15	23.15	23.8	26.50	446.42

5725 to 5850 MHz Authorized Band

Frequency Range (MHz)	Mode	Peak Power Chain 0 (dBm)	Peak Power Chain 1 (dBm)	Total Peak Power (dBm)	Output Power (mW)
5745 - 5825	802.11a Legacy			20.99	125.60
5745 - 5825	802.11n 20MHz SISO	Covered by the worst case 802.11a Mode Legacy testing			
5745 - 5825	802.11a Mode CDD	Covered by the worst case 802.11n 20MHz CDD			
5745 - 5825	802.11n 20MHz CDD	20.44	20.11	23.29	213.23
5755 - 5795	802.11n 40MHz SISO			24.27	267.30
5755 - 5795	802.11n 40MHz CDD	22.95	22.99	25.98	396.31

5.3. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom, rev. 5.10.122.0.
The test utility software used during testing was BCM Internal, rev. 5.10.RC122.0.

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT was tested as an external module installed in a test jig board connected to a host Laptop PC.

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

802.11b Mode (20 MHz BW operation): 1 Mbps, CCK.
802.11g Mode (20 MHz BW operation): 6 Mbps, OFDM.
802.11a Mode (20 MHz BW operation): 6 Mbps, OFDM.
802.11n MIMO HT20 Mode: MCS0, 6.5 Mbps, 2 Spatial Streams.
802.11n SISO HT40 Mode: MCS0, 13.5 Mbps, 2 Spatial Streams.
802.11n MIMO HT40 Mode: MCS15, 270 Mbps, 2 Spatial Streams.

For HT40 Mode: MCS15, this for spot checks only to compare with HT40 Mode: MCS0, so the tests only performed at band edge, peak output power and PPSD.

Worst-case mode and channel used for 30-1000 MHz radiated and power line conducted emissions was the mode and channel with the highest output power, that was determined to be 11n HT20 mode, mid channel..

For MIMO conducted spurious measurement preliminary testing showed that combiner is worst-case compared to individual chains; therefore final measurements were performed using combiner for all channels and modes.

For MIMO PSD measurement preliminary testing showed that combiner is worst-case compared to individual chains; therefore final measurements were performed using combiner for all channels and modes.

For Radiated Band Edge measurements preliminary testing showed that the worst case was horizontal polarization, so final measurements were performed with horizontal polarization.

All legacy/SISO modes were measured with the highest gain for each type of antenna.

All MIMO modes were measured with the highest combination of gains for each type of antenna. Note that this combination of antennas will not be implemented in the end product. This combination was selected for testing purposes only, to accommodate the highest gain of each antenna type in one single test configuration. The combined gain of this test configuration is higher than any combined gain that will be implemented in the end product.

5.5. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes with two different types of antenna, with the maximum gain as table below:

Antenna Type	Model	Peak gain (dBi)	
		2.4 GHz Band	5.8 GHz Band
802.11abgn WLAN Antenna	K84WIFI1	4.60 H	3.30 H
802.11abgn WLAN Antenna	K84WIFI2	4.60 H	3.62 H

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

Band	WIFI1 Ant Gain (dBi)	WIFI2 Ant Gain (dBi)
2.4 GHz	4.60	4.60
5.8 GHz	3.30	3.62

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

Frequency Band	Antennas combination	WIFI1 Antenna Gain	WIFI2 Antenna gain	$10^{(Ant\ Main / 10)}$	$10^{(Ant\ Aux / 10)}$	$10^{(ant\ main / 10)} + 10^{(ant\ aux / 10)}$	$10 \cdot \log[10^{(ant\ main / 10)} + 10^{(ant\ aux / 10)}]$ (dBm)
2.4 GHz HT20 & HT40	WIFI1 / WIFI 2	4.60	4.60	2.884	2.884	5.768	7.61
5.8 GHz HT20 & HT40	WIFI1 / WIFI 2	3.30	3.62	2.138	2.301	4.439	6.47

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop PC	Dell	Inspiron 1526	N/A	DoC
AC Adapter	Dell	DA90PS1-00	CN-0MM545-48661-78J-9M4Q	N/A

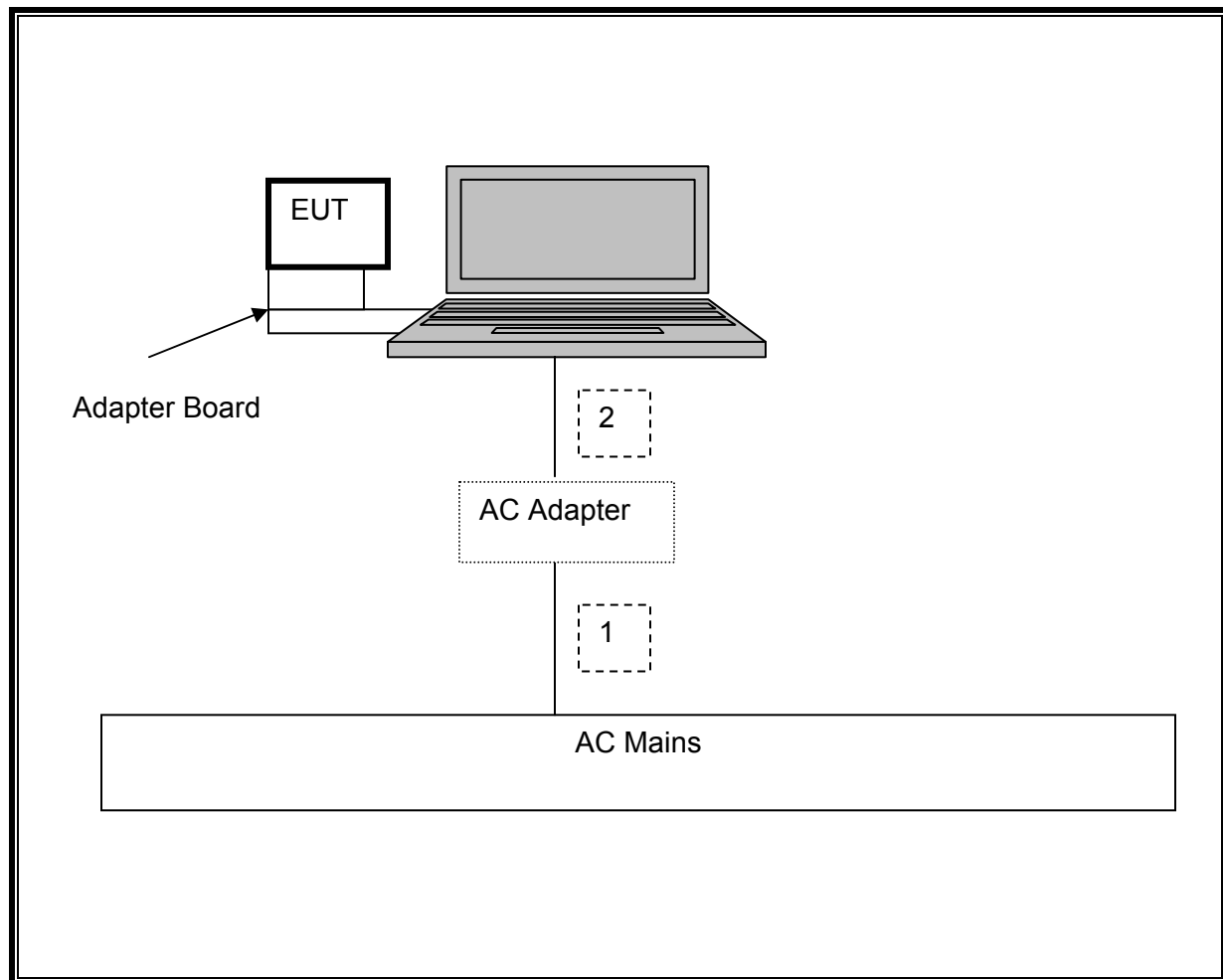
I/O CABLES

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

TEST SETUP

The EUT is connected to a host laptop computer via Express card to MiniPCI-E adapter board during the test. 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 Date	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	01/05/09	01/05/10
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/14/09	01/14/10
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/09	04/22/10
Antenna, Horn, 26.5 GHz	ARA	MMH-1826/B	C00589	09/29/08	11/28/09
Antenna, Horn, 40 GHz	ARA	MMH-2640B	C00981	05/21/09	05/21/10
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	10/11/08	10/11/09
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/09	03/31/10
Preamplifier, 1-26GHz	Agilent / HP	8449B	C01052	07/05/09	07/05/10
Peak Power Meter	Boonton	4541	C01186	01/19/09	01/19/10
Peak Power Sensor	Boonton	4541	C01189	01/15/09	01/15/10
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/08	10/29/09
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	02/06/09	02/06/10

7. ANTENNA PORT TEST RESULTS

7.1. 802.11b MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

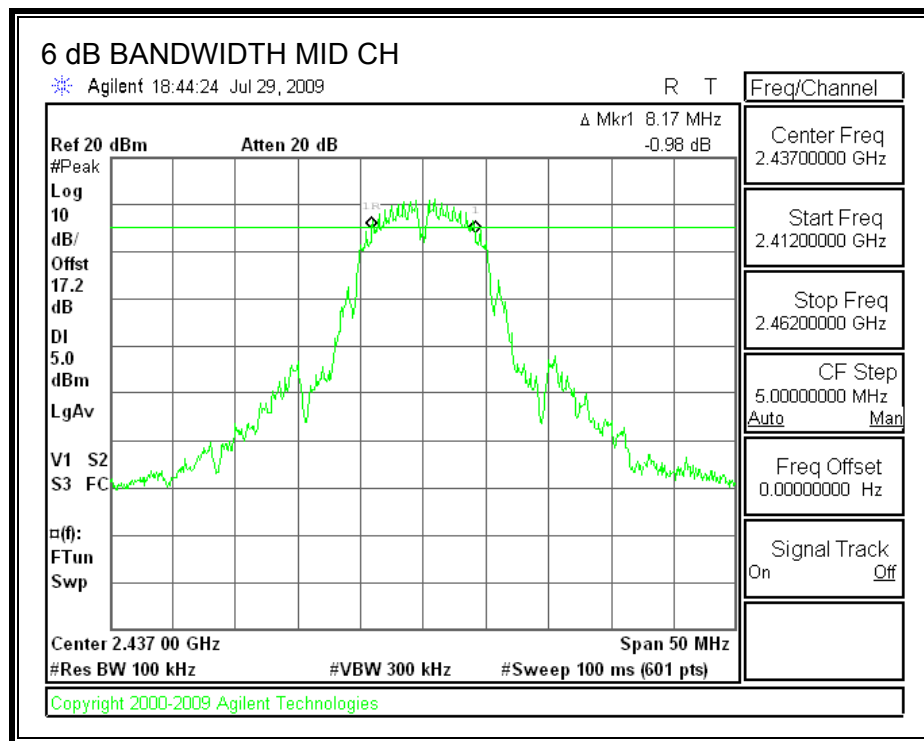
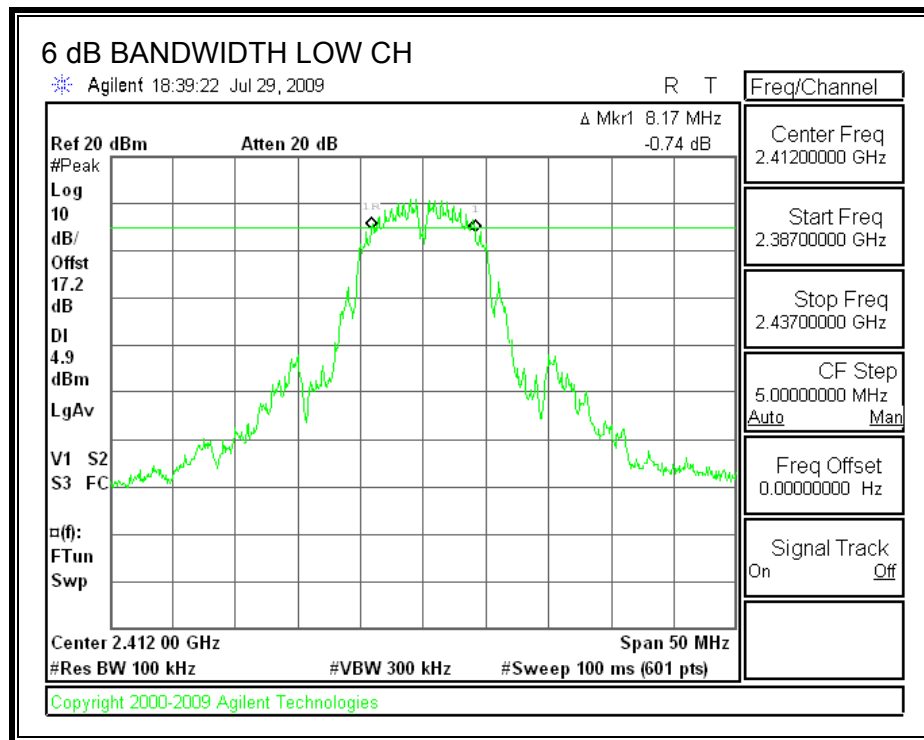
TEST PROCEDURE

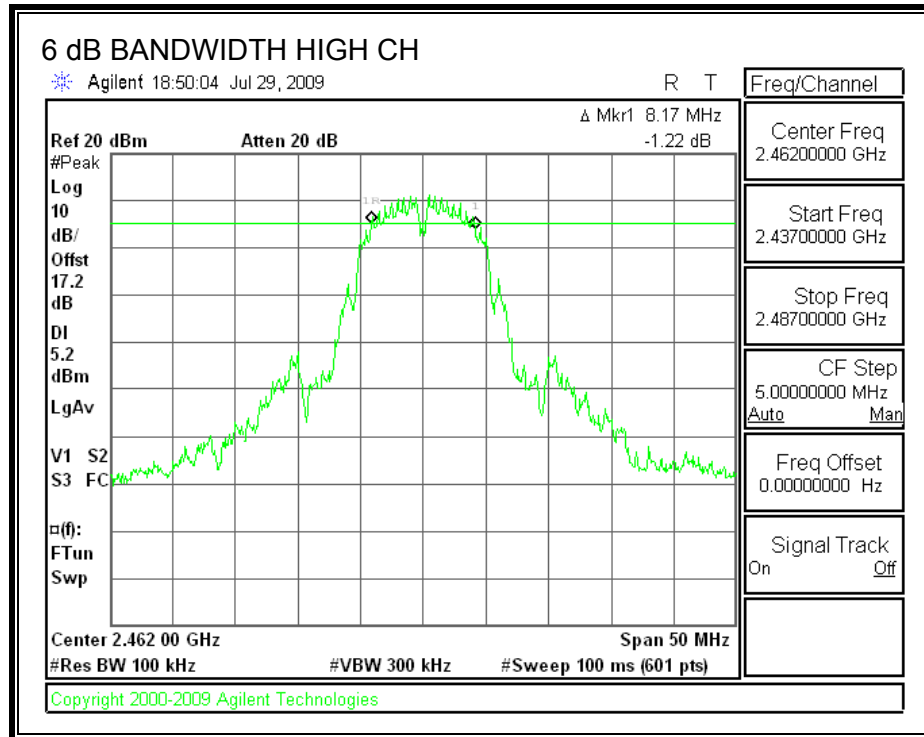
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	8.17	0.5
Middle	2437	8.17	0.5
High	2462	8.17	0.5

6 dB BANDWIDTH





7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

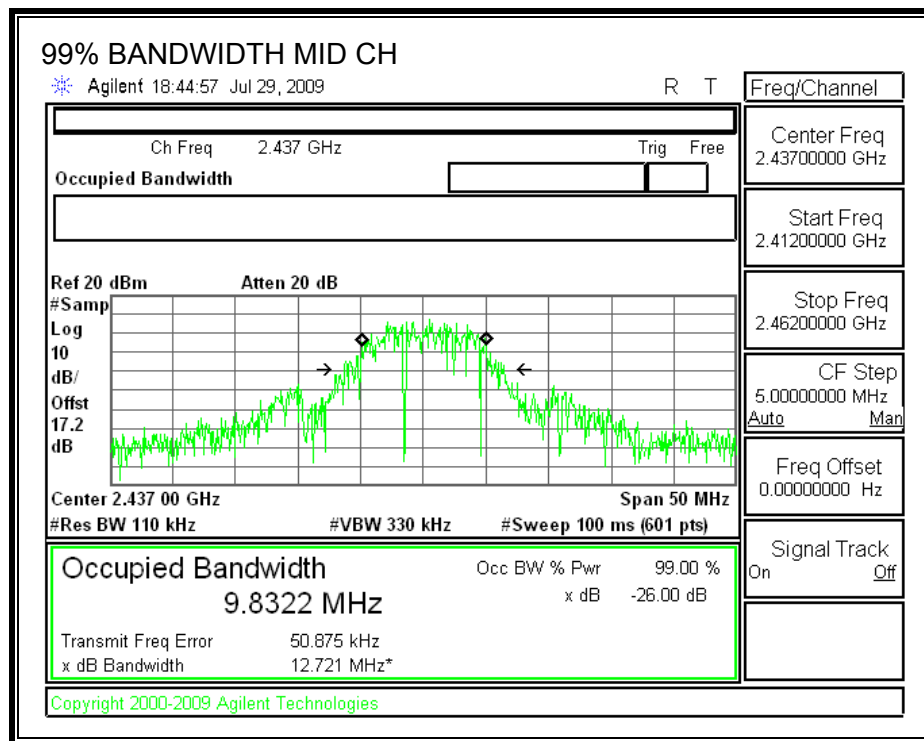
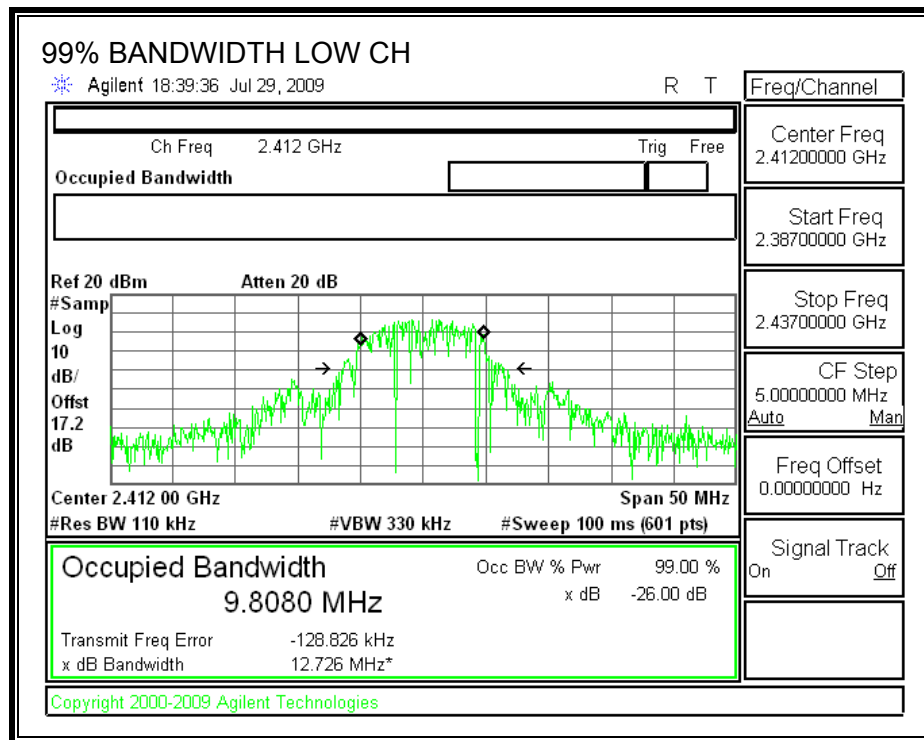
TEST PROCEDURE

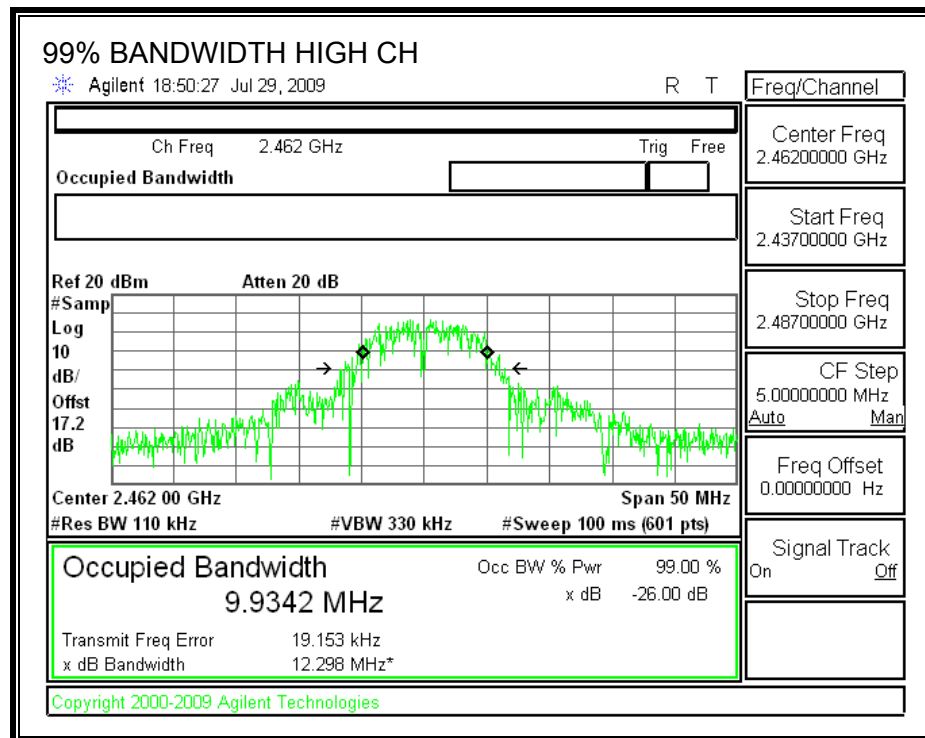
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	9.8080
Middle	2437	9.8322
High	2462	9.9342

99% BANDWIDTH





7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency (MHz)	Peak Power Meter Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2412	23.23	30	-6.77
Middle	2437	23.01	30	-6.99
High	2462	23.07	30	-6.93

7.1.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

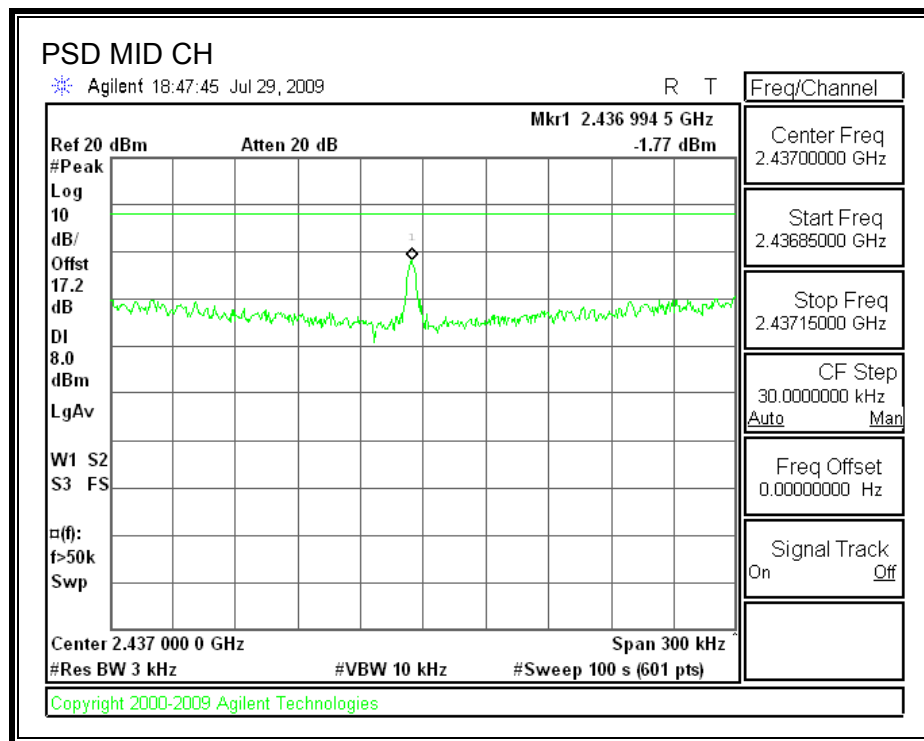
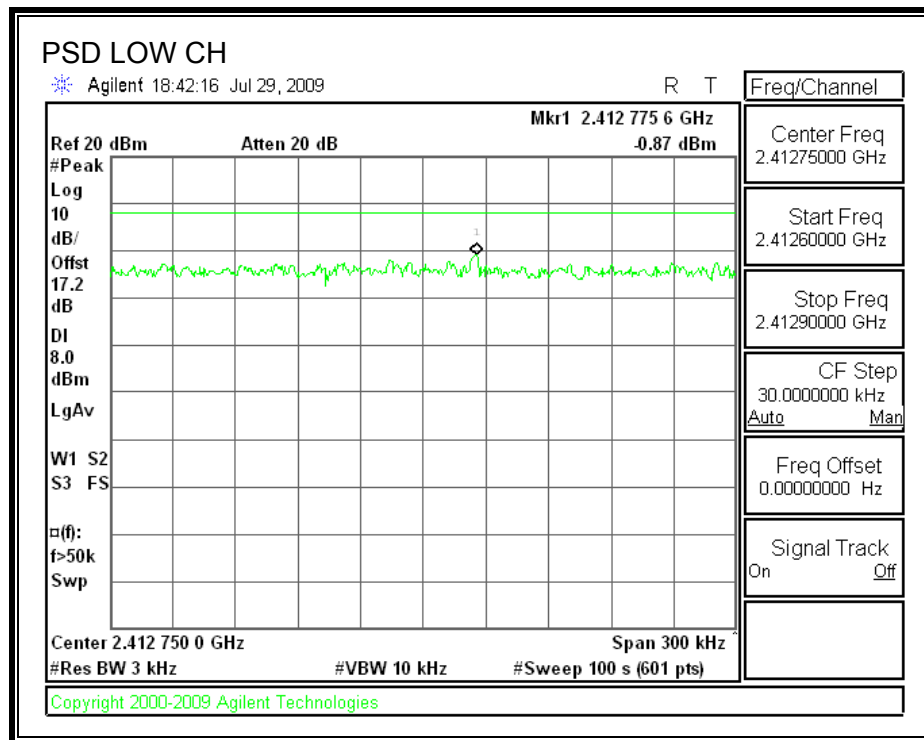
TEST PROCEDURE

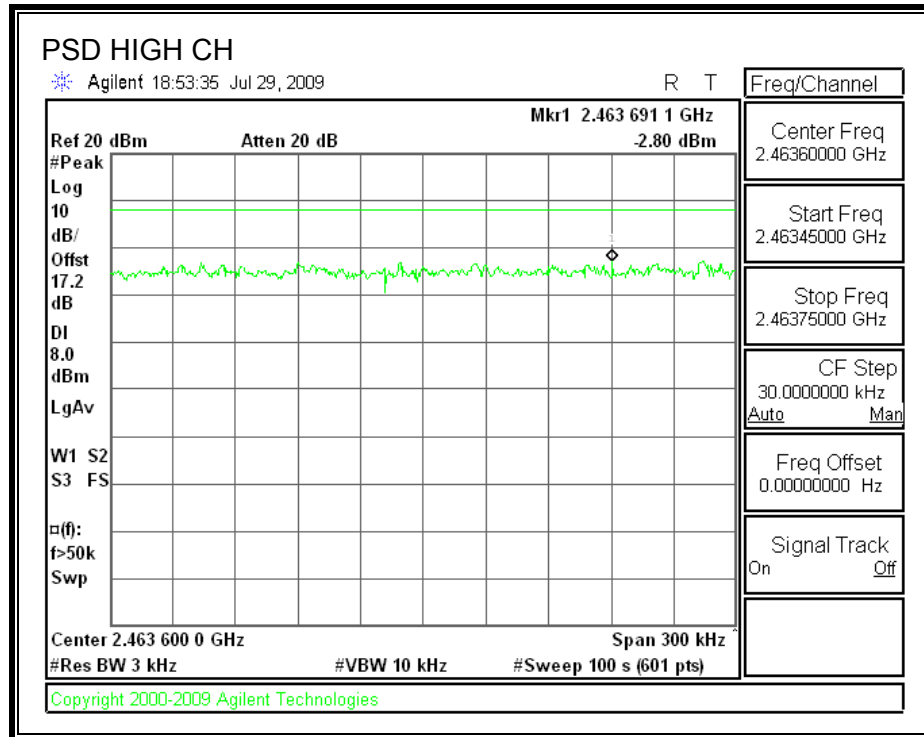
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-0.87	8	-8.87
Middle	2437	-1.77	8	-9.77
High	2462	-2.80	8	-10.80

POWER SPECTRAL DENSITY





7.1.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

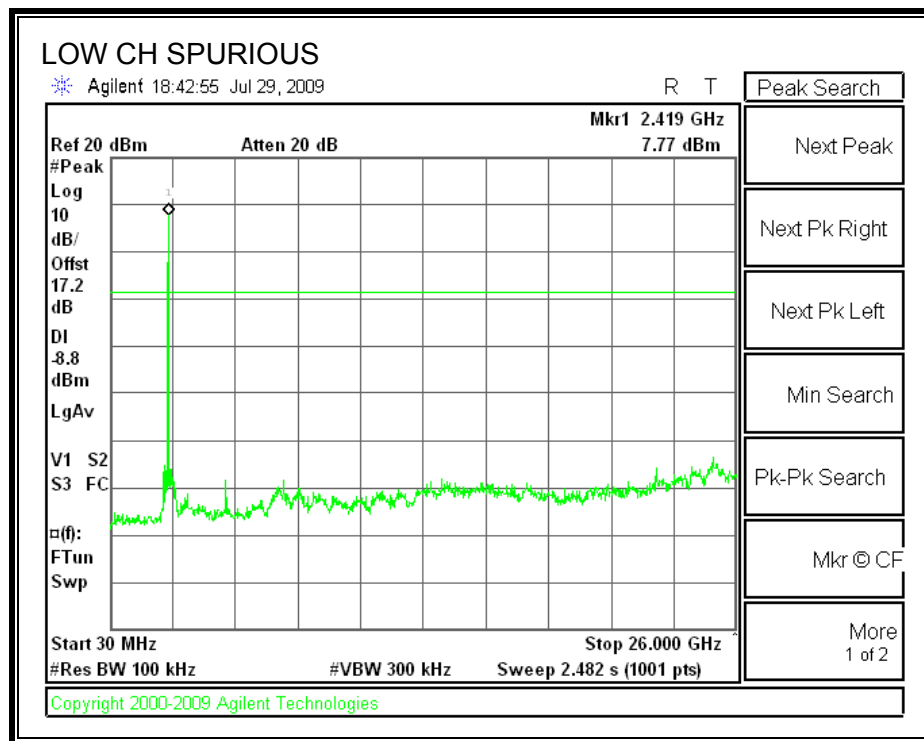
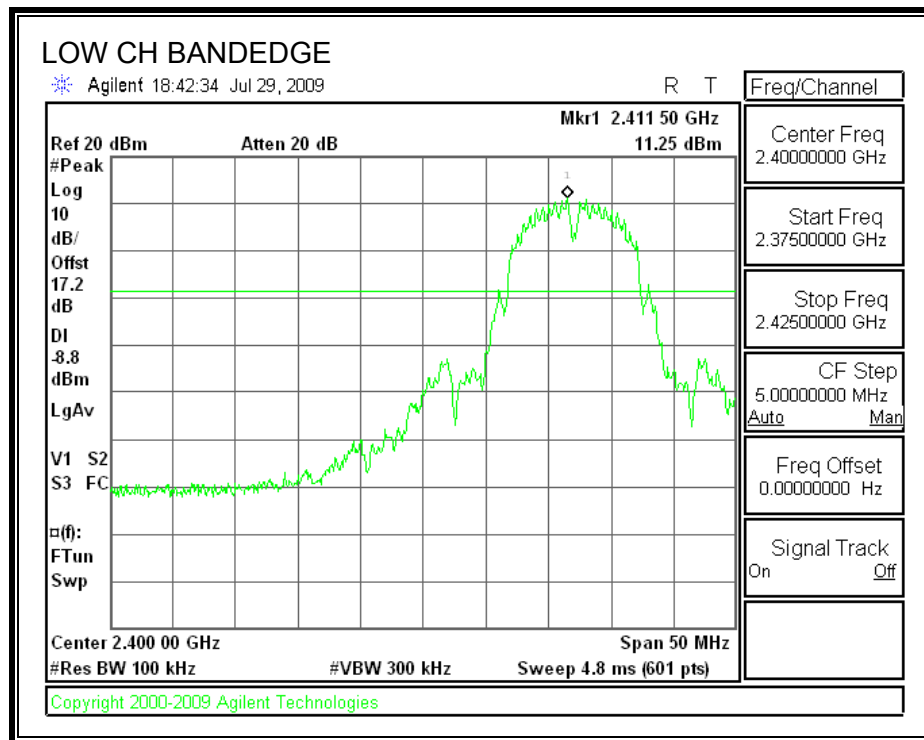
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

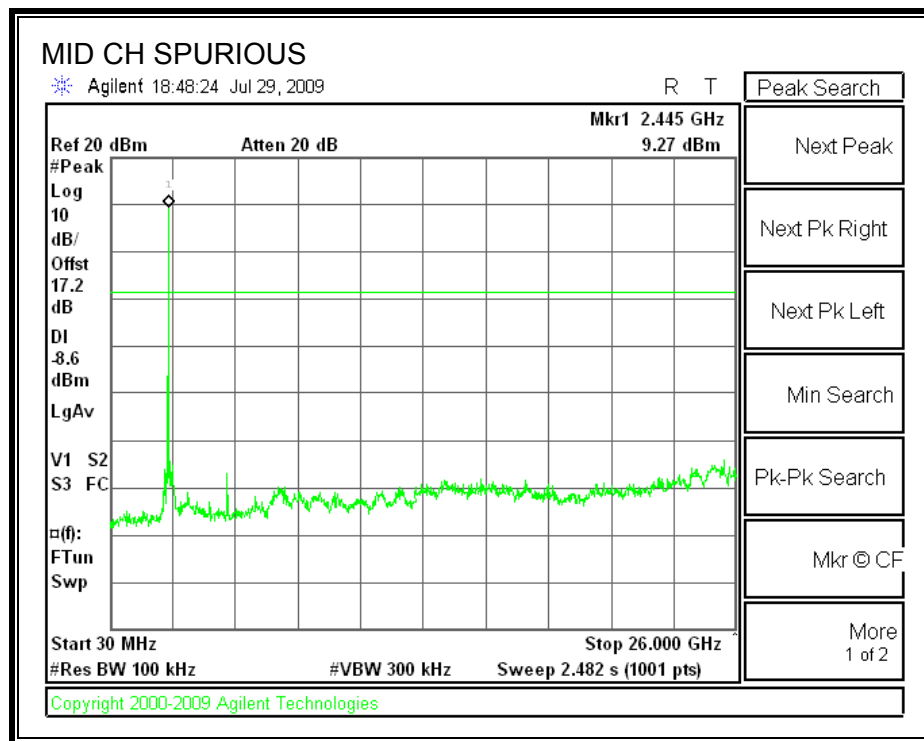
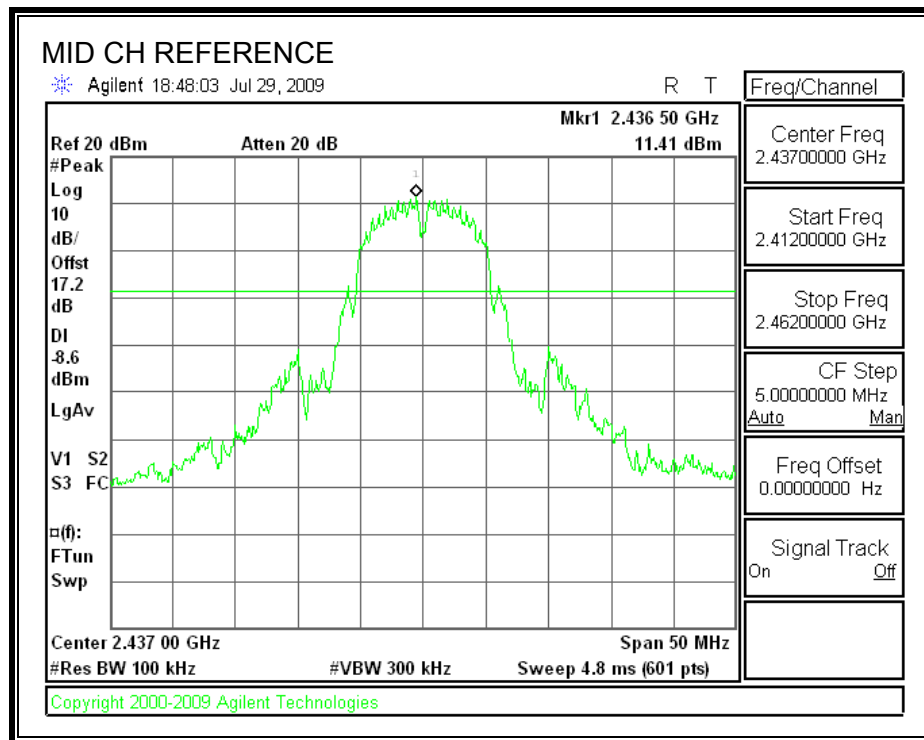
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

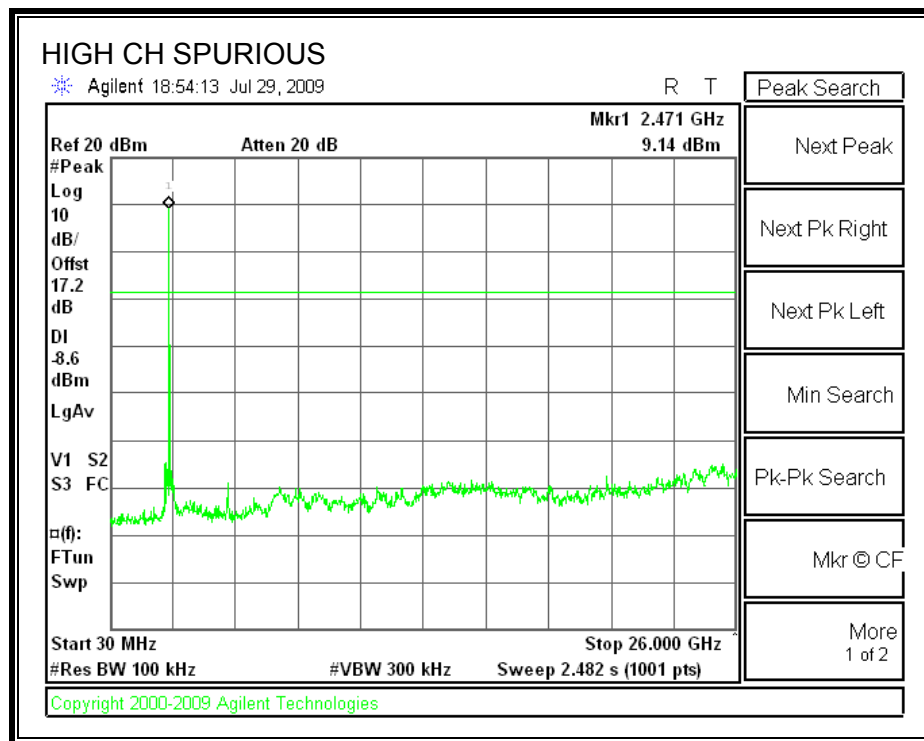
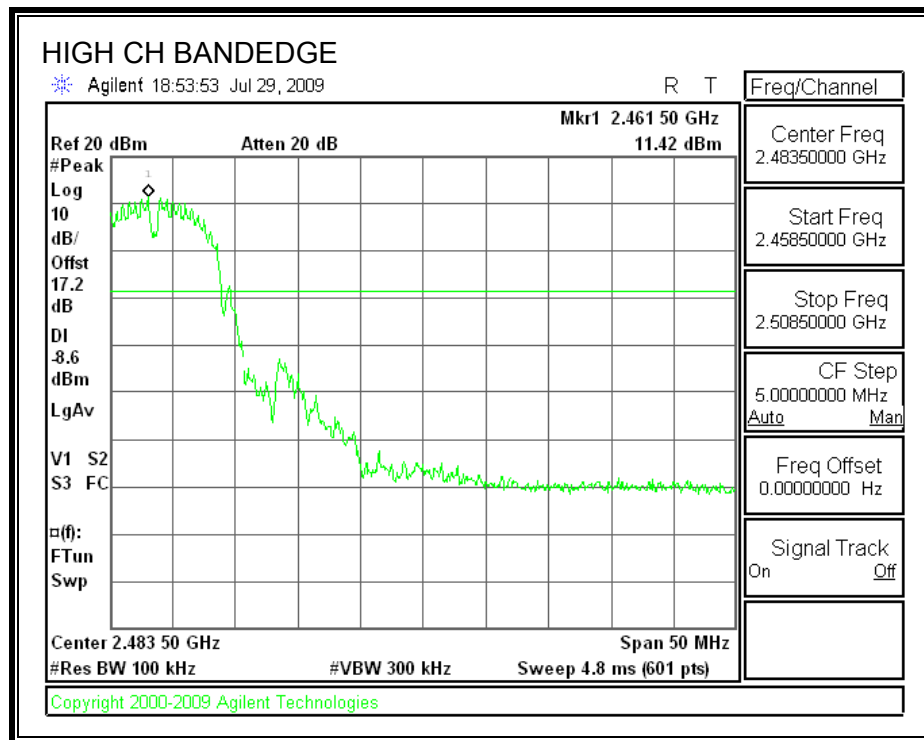
SPURIOUS EMISSIONS, LOW CHANNEL



SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



7.2. 802.11g MODE IN THE 2.4 GHz BAND

7.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

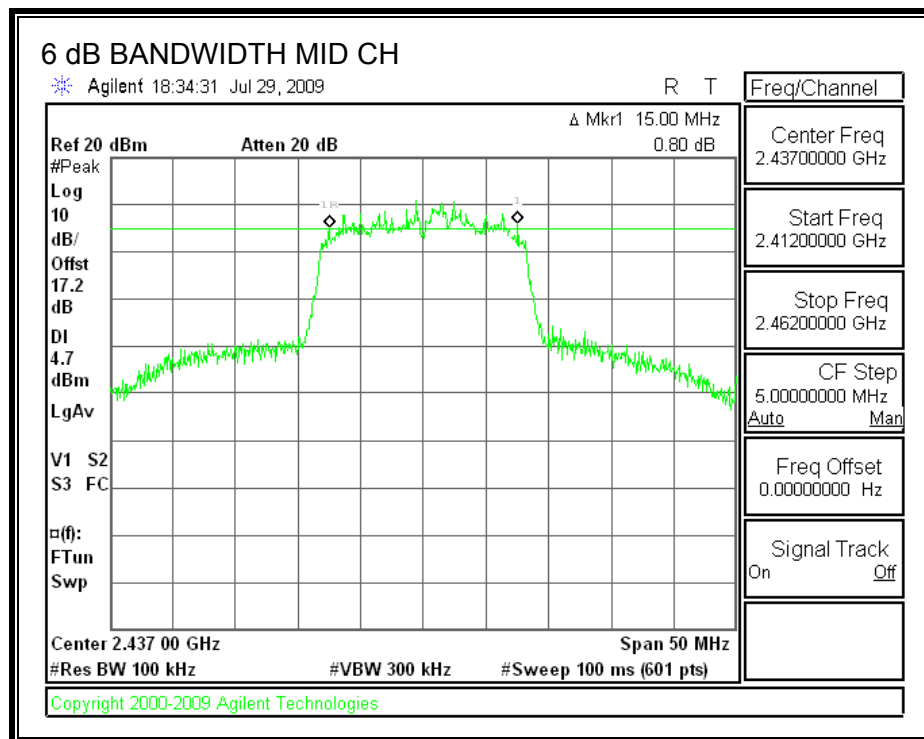
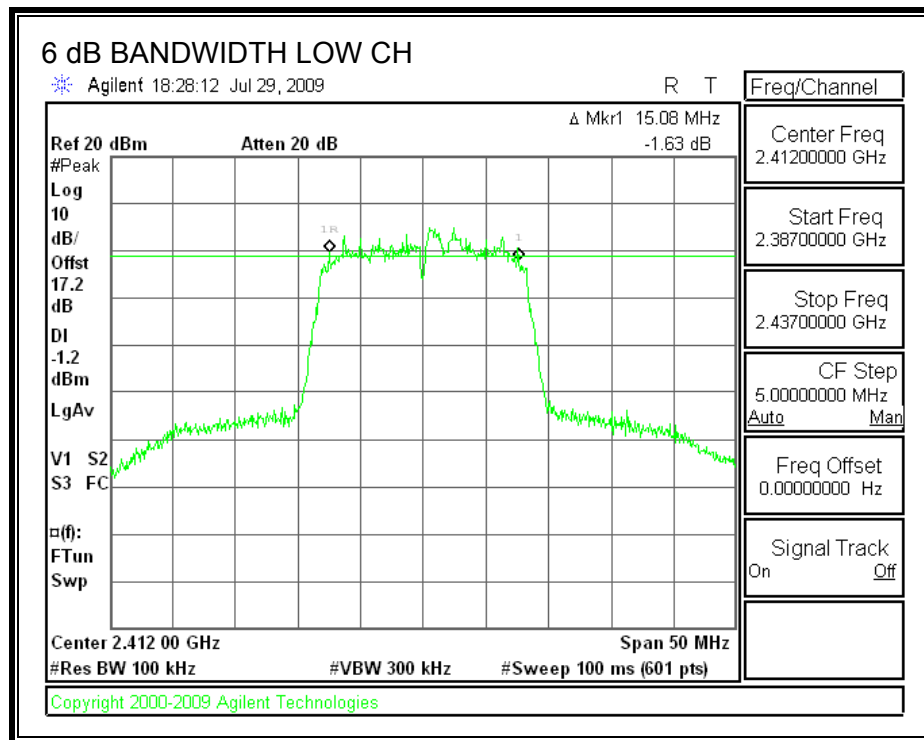
TEST PROCEDURE

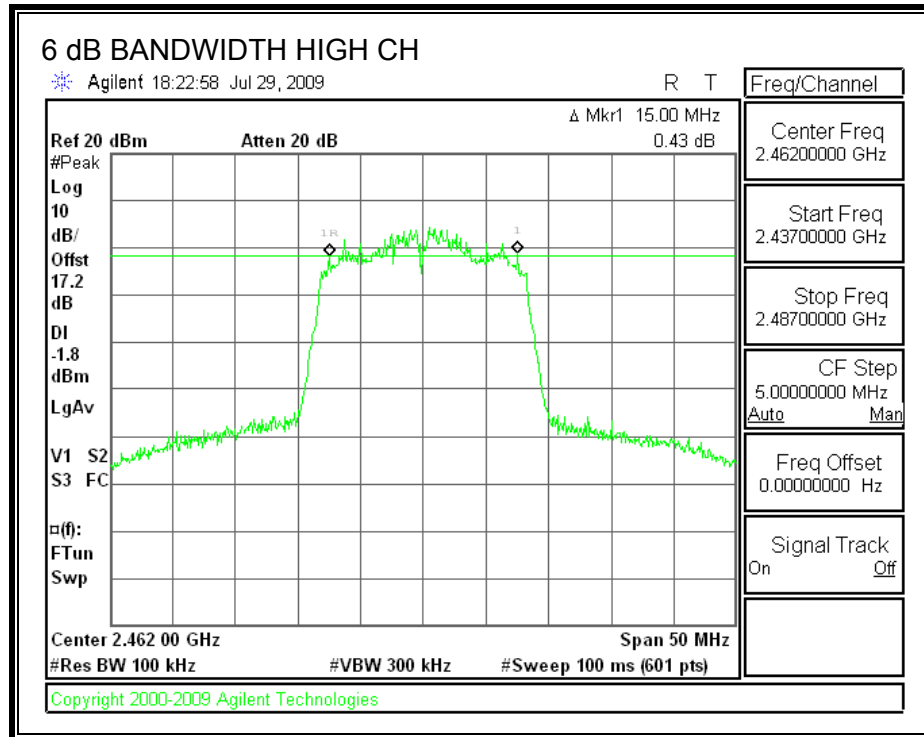
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	15.08	0.5
Middle	2437	15.00	0.5
High	2462	15.00	0.5

6 dB BANDWIDTH





7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

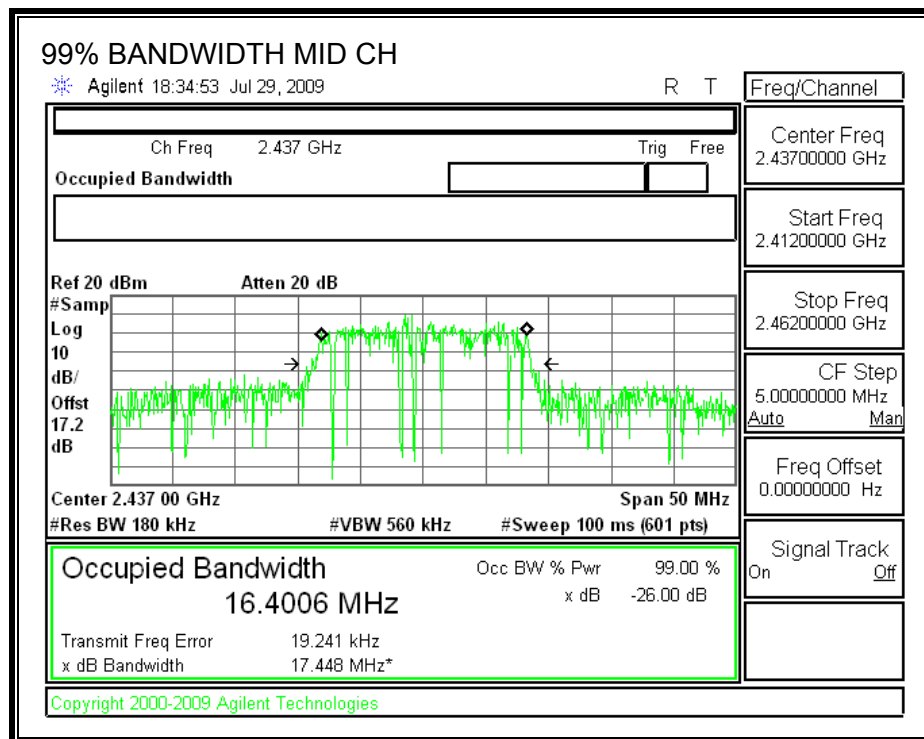
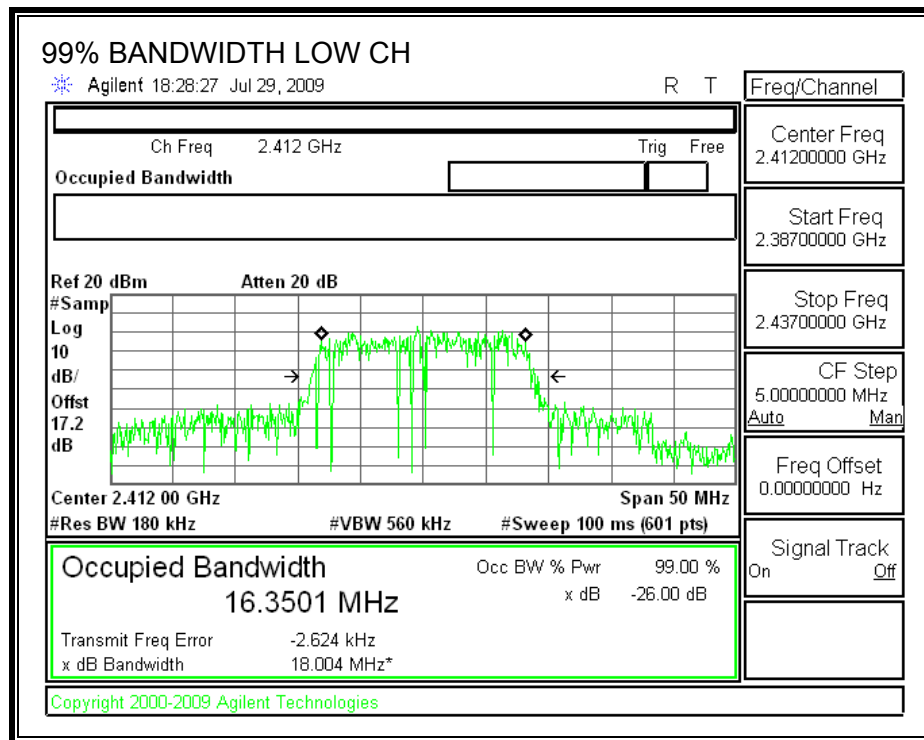
TEST PROCEDURE

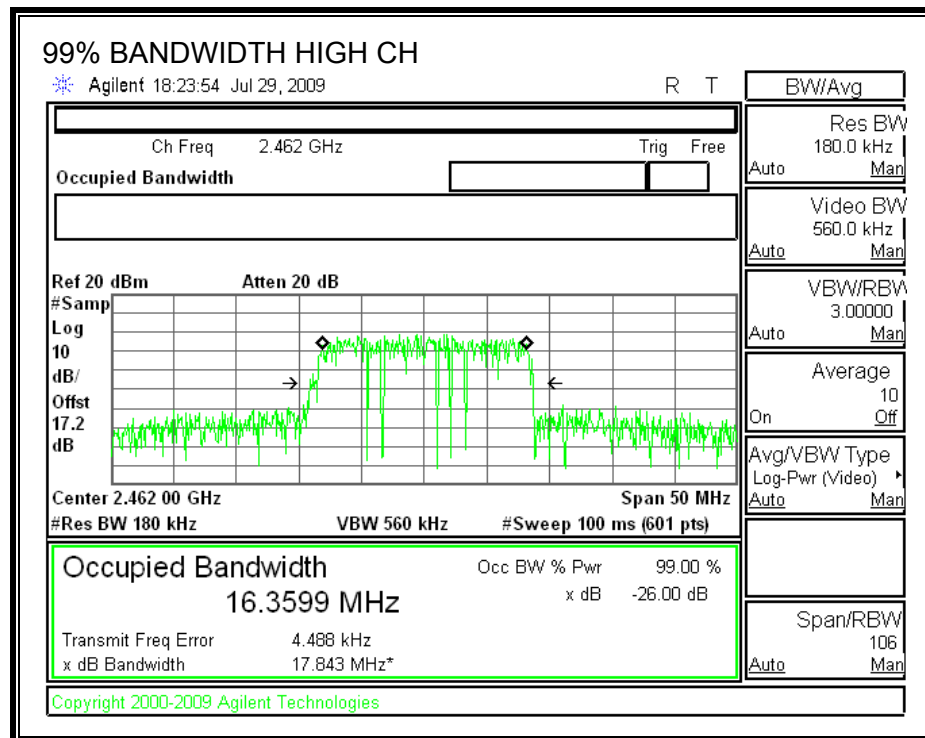
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.3501
Middle	2437	16.4006
High	2462	16.3599

99% BANDWIDTH





7.2.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Peak Power Meter Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2412	22.11	30	-7.89
Middle	2437	25.58	30	-4.42
High	2462	20.32	30	-9.68

7.2.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

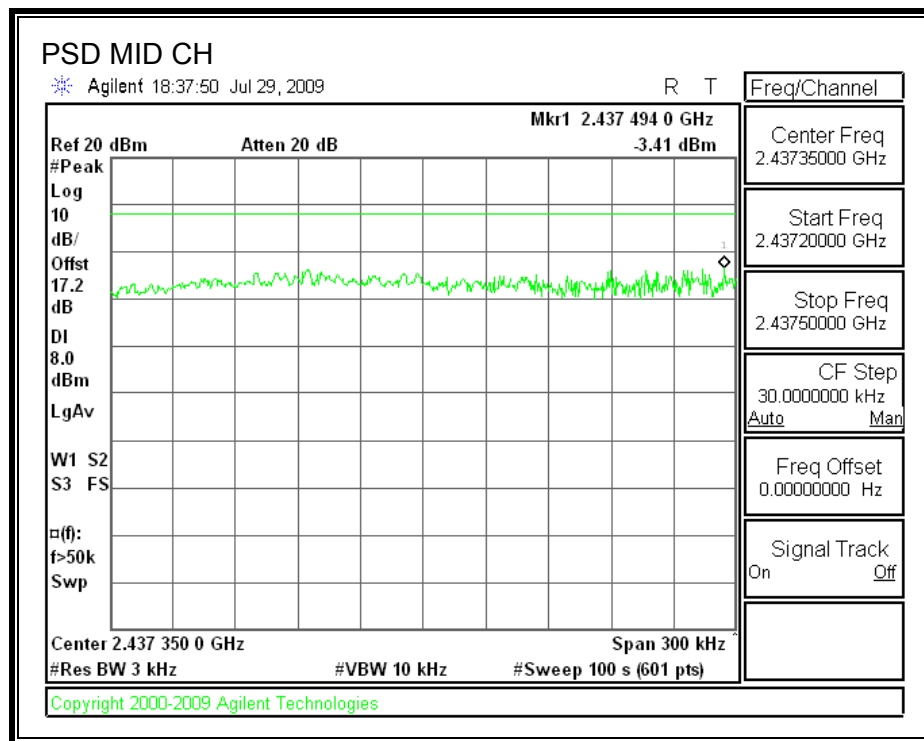
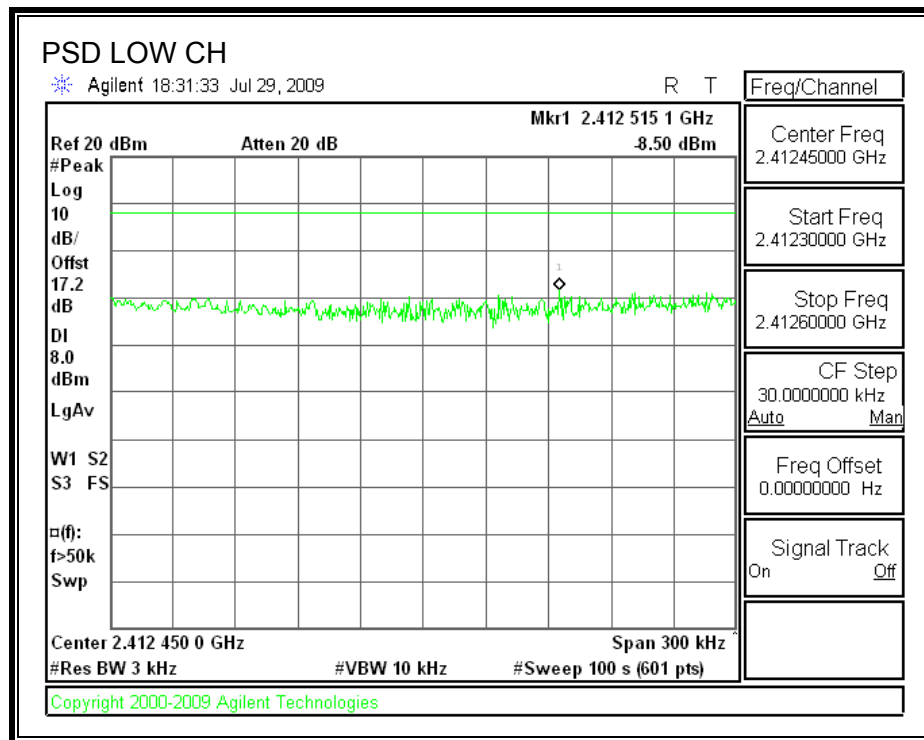
TEST PROCEDURE

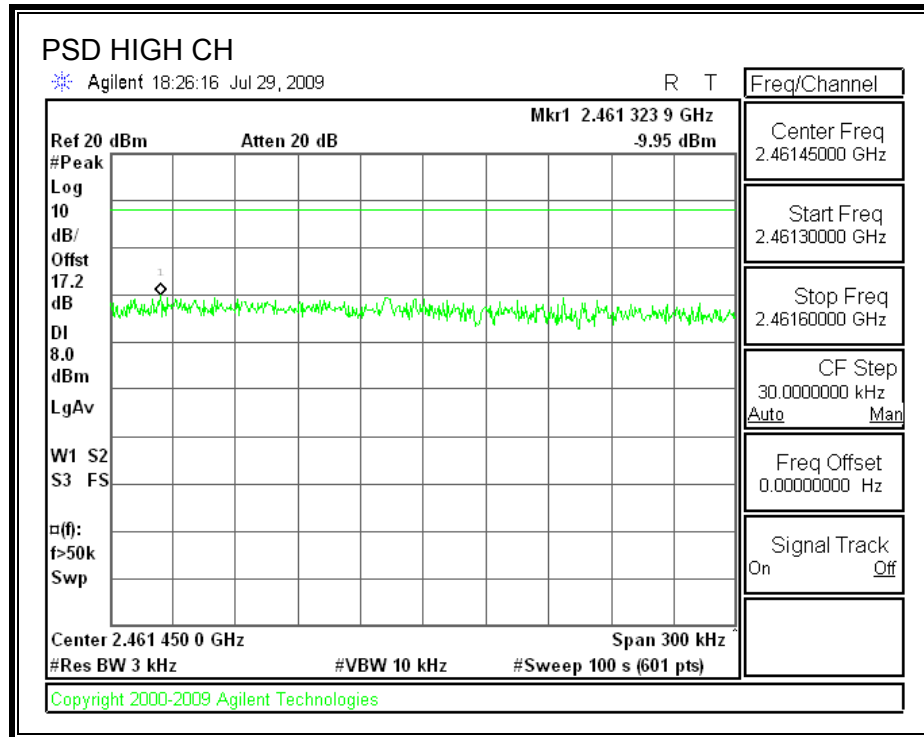
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-8.50	8	-16.50
Middle	2437	-3.41	8	-11.41
High	2462	-9.95	8	-17.95

POWER SPECTRAL DENSITY





7.2.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

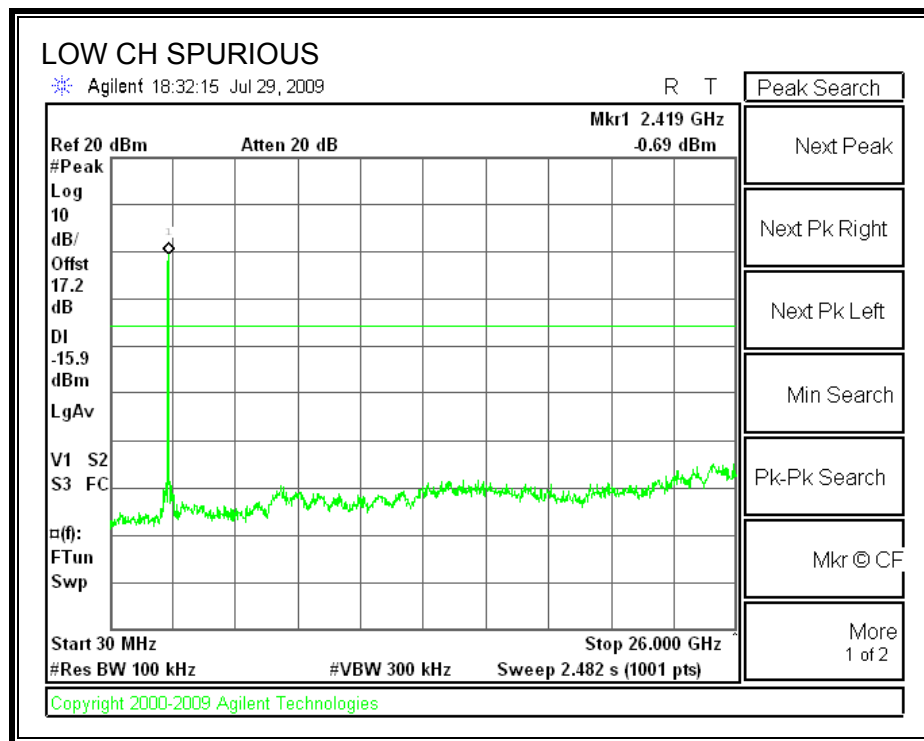
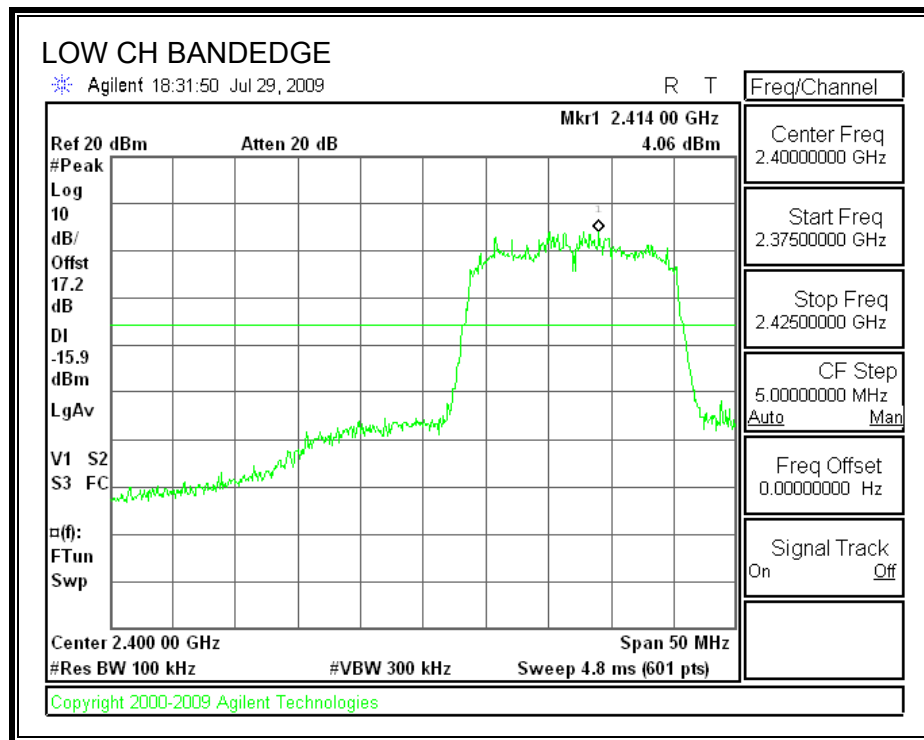
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

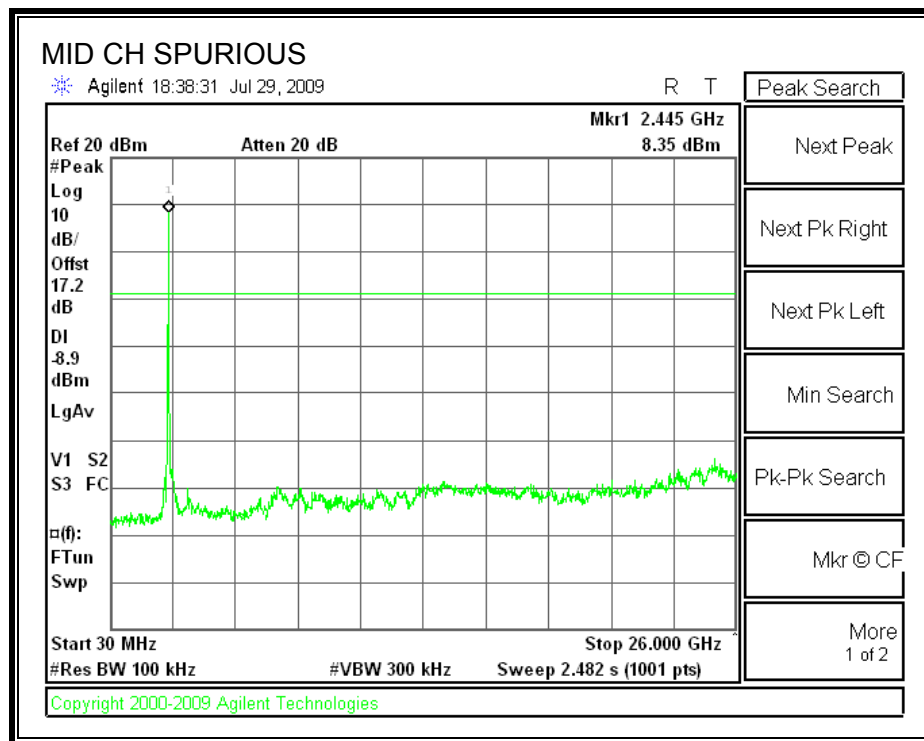
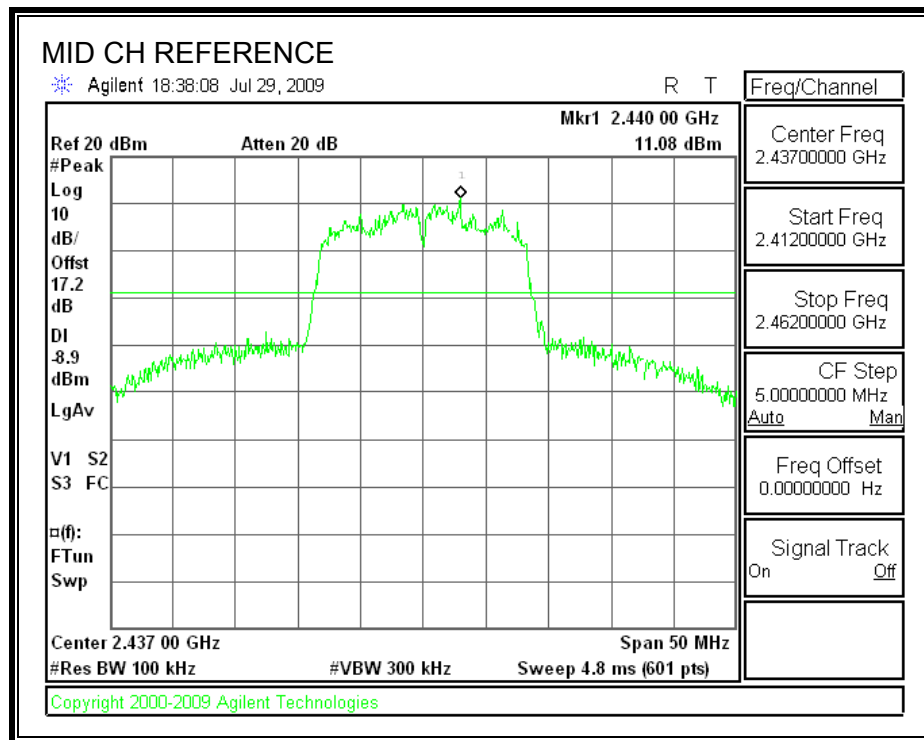
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

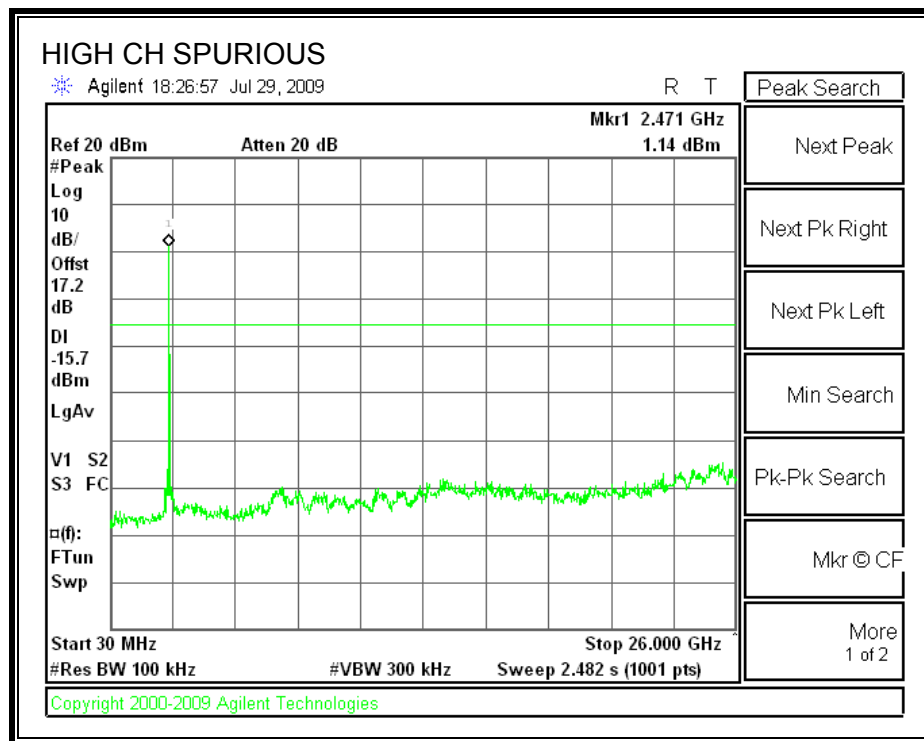
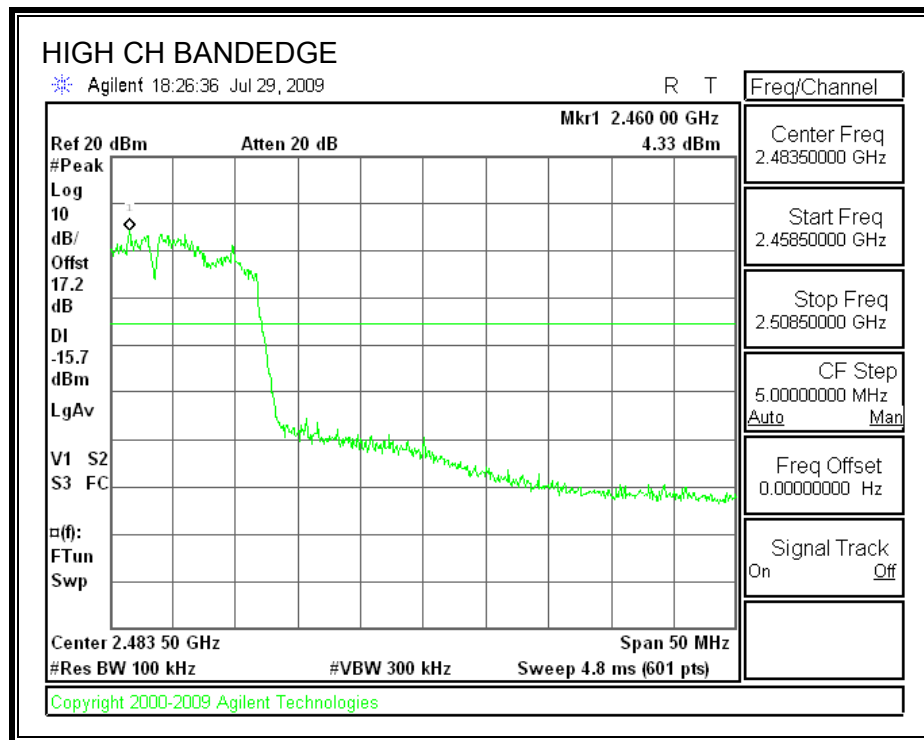
SPURIOUS EMISSIONS, LOW CHANNEL



SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



7.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

7.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

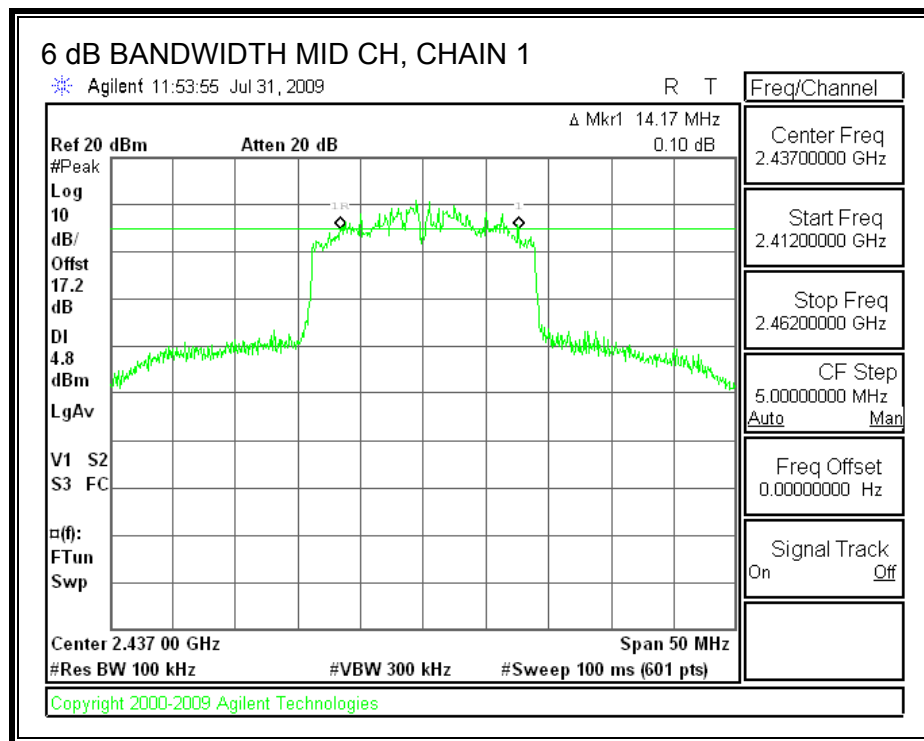
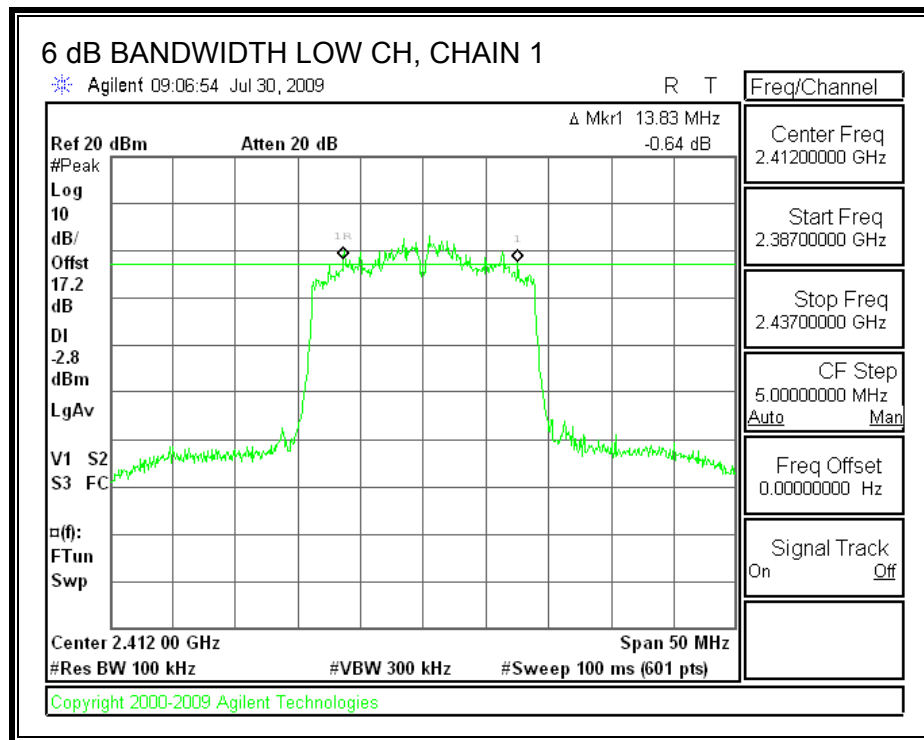
TEST PROCEDURE

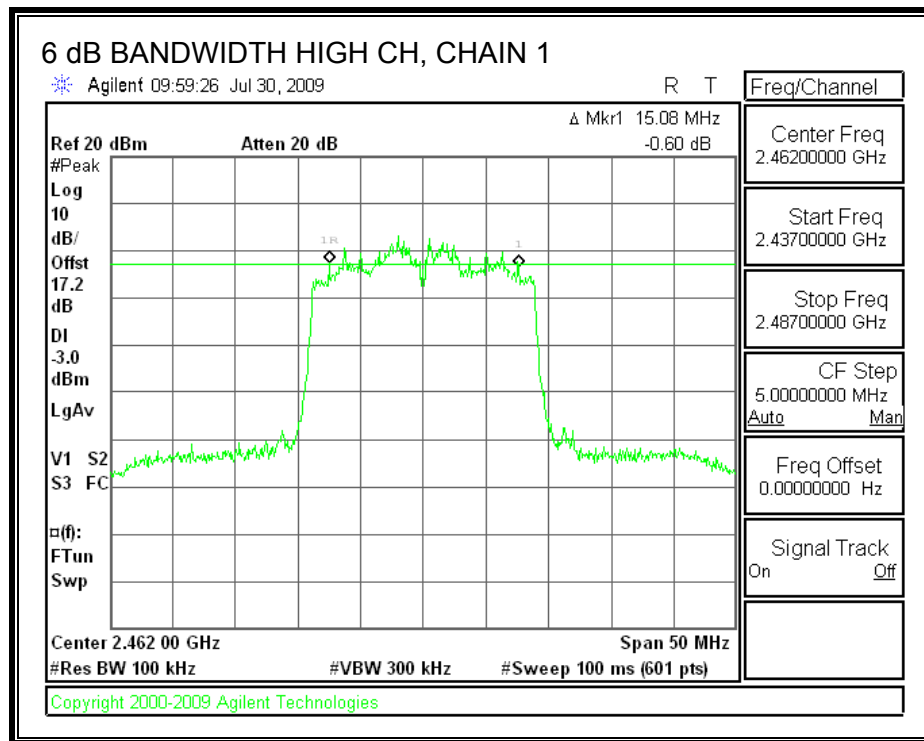
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

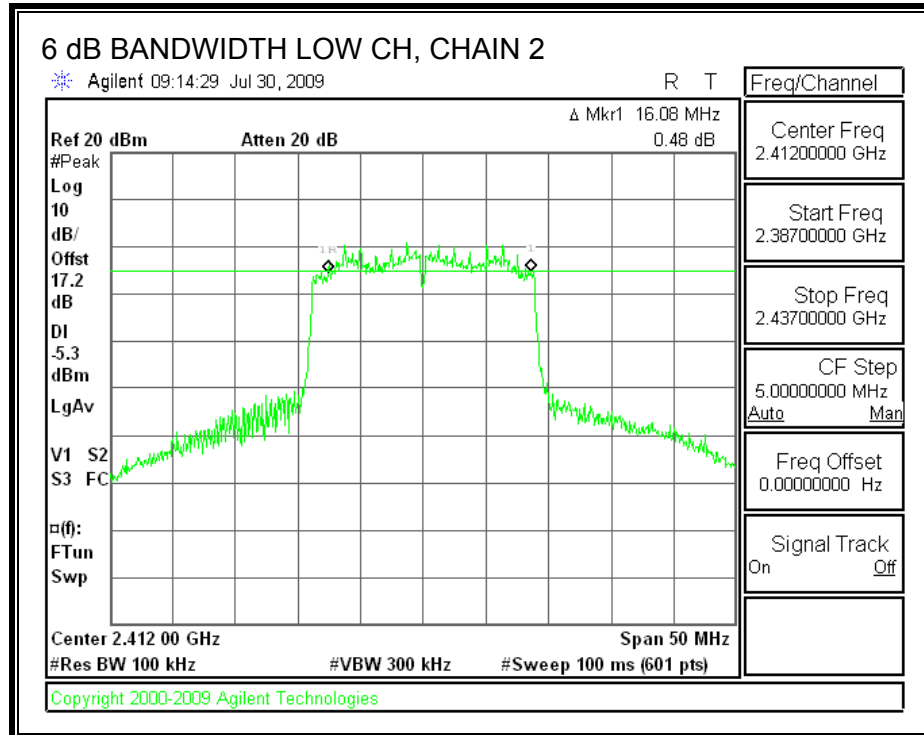
Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	2412	13.83	16.08	0.5
Middle	2437	14.17	16.17	0.5
High	2462	15.08	15.17	0.5

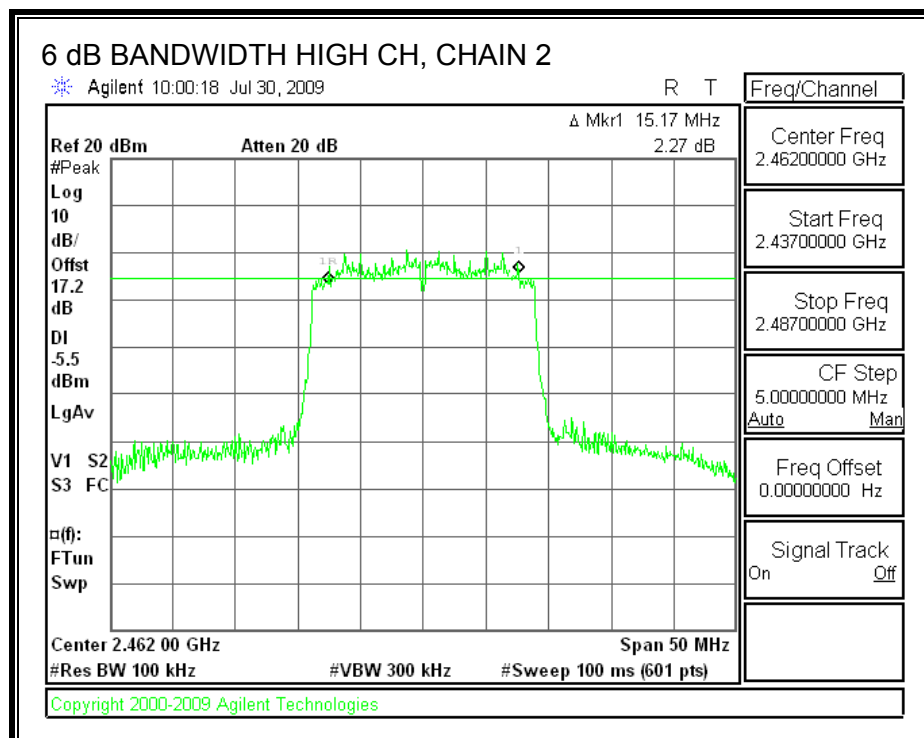
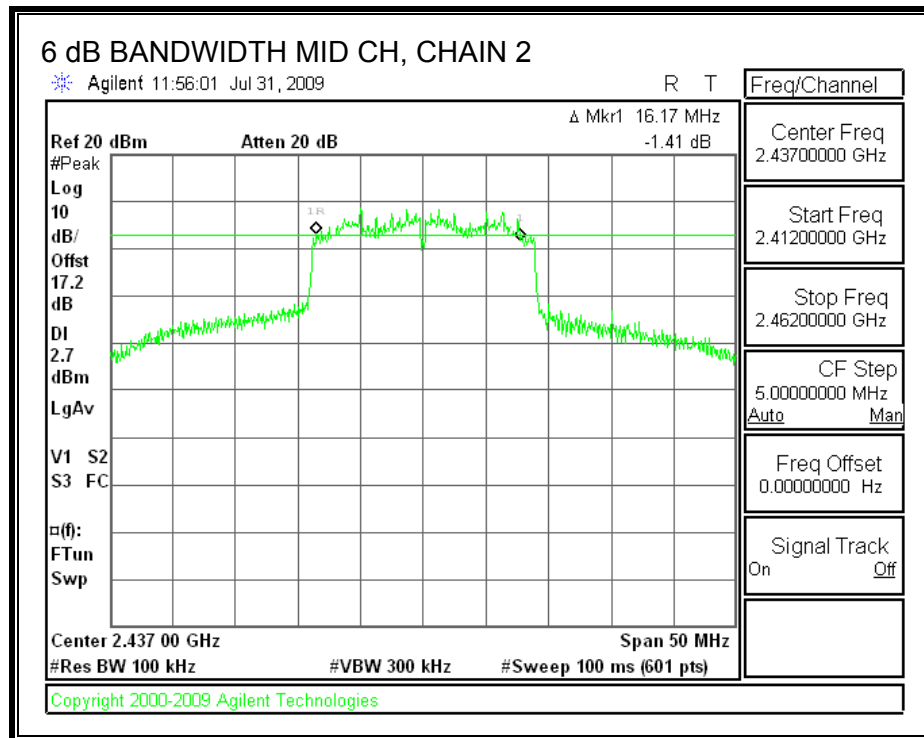
6 dB BANDWIDTH, CHAIN 1





6 dB BANDWIDTH, CHAIN 2





7.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

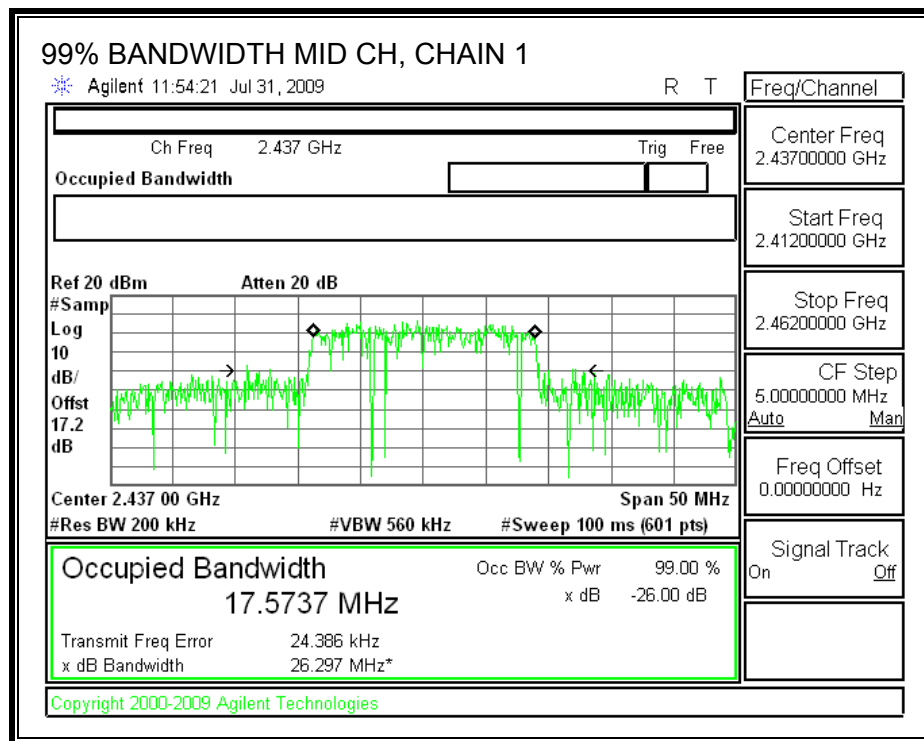
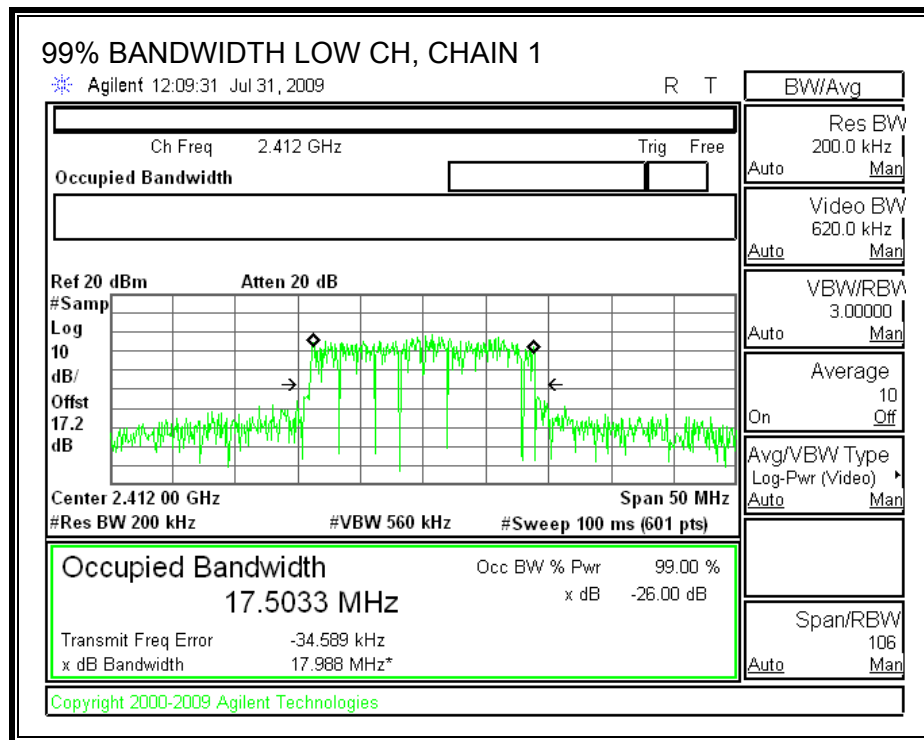
TEST PROCEDURE

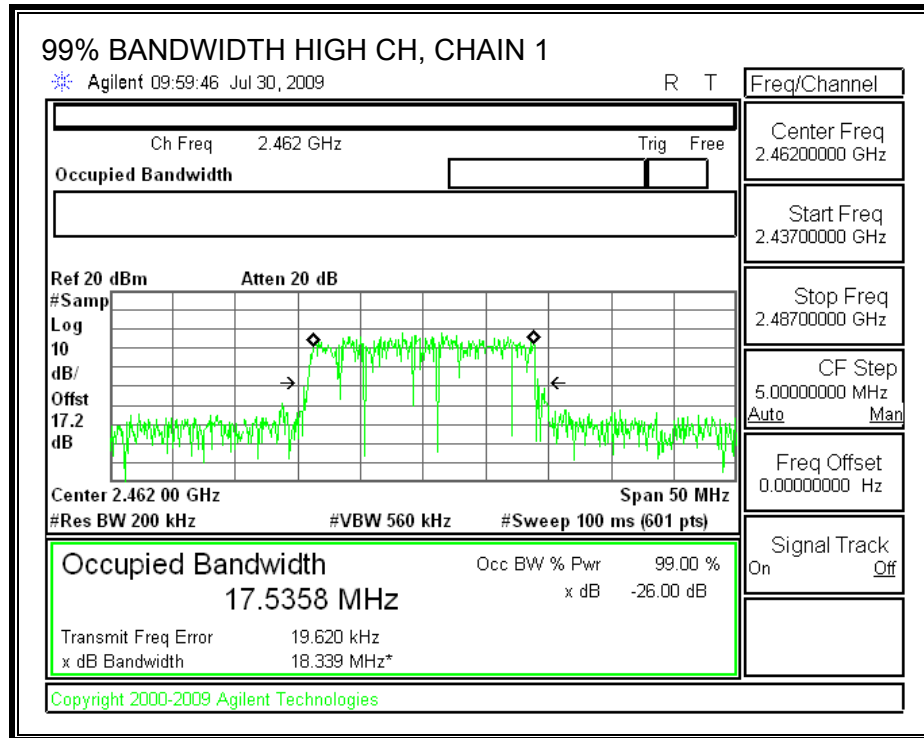
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

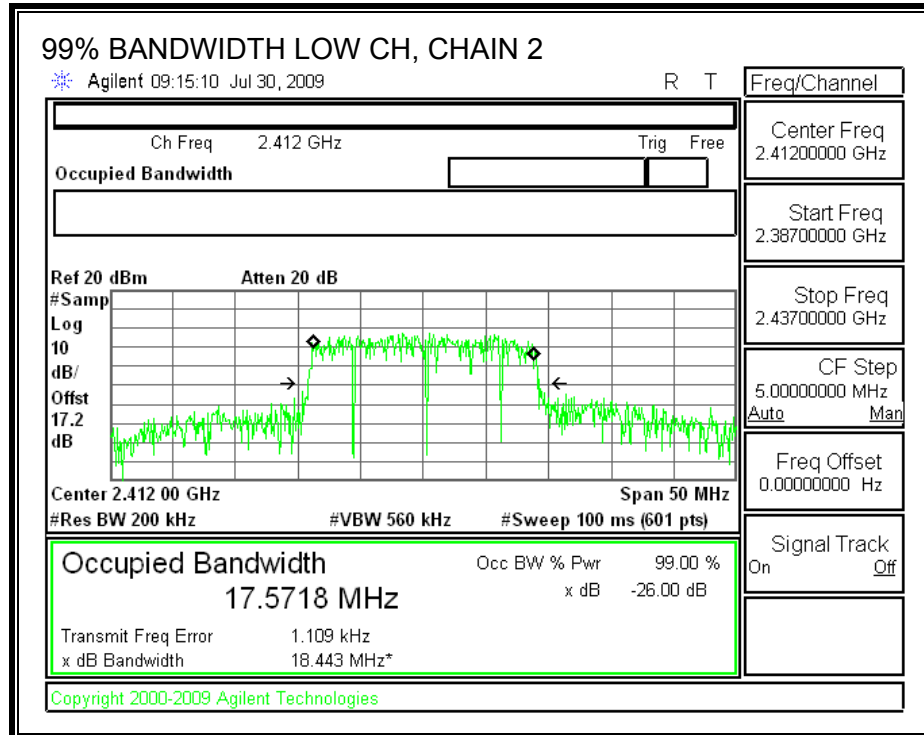
Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	2412	17.5033	17.5718
Middle	2437	17.5737	17.6617
High	2462	17.5358	17.5444

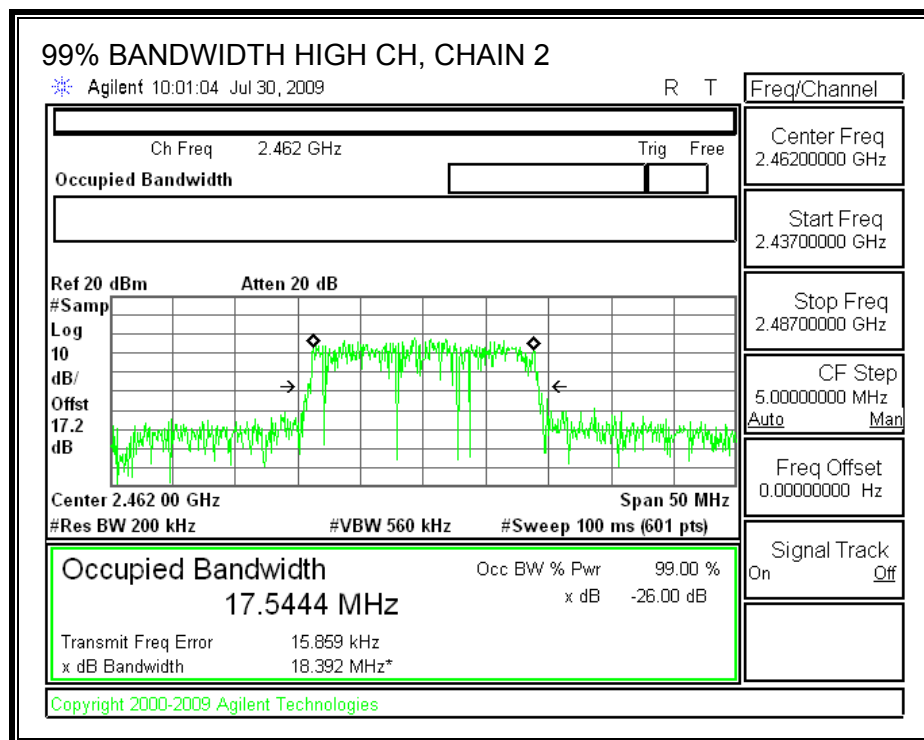
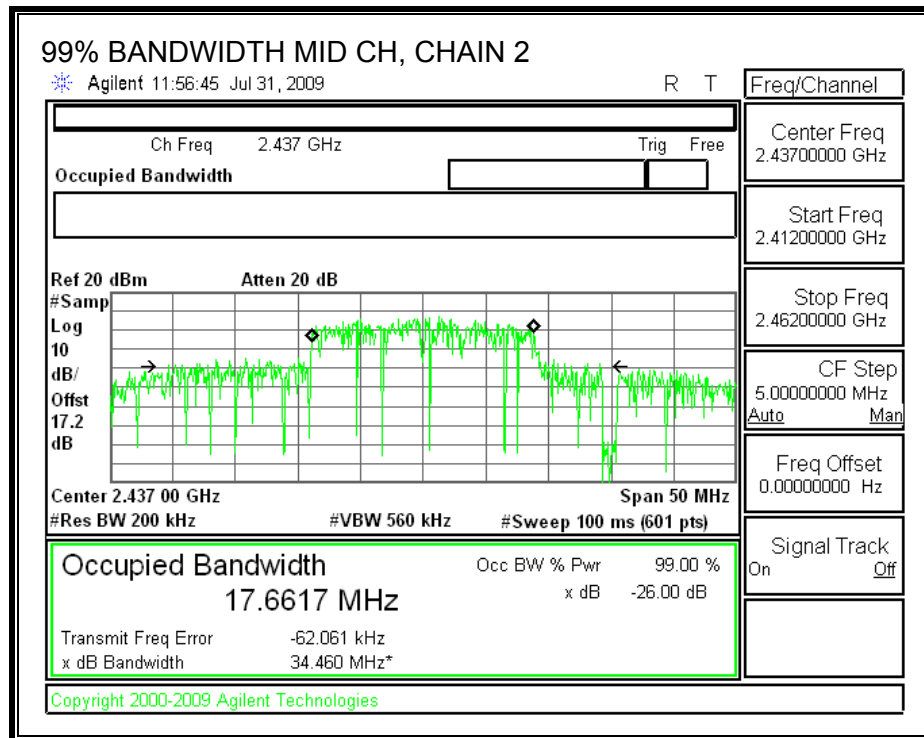
99% BANDWIDTH, CHAIN 1





99% BANDWIDTH, CHAIN 2





7.3.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The highest combination of antenna gains is equal to 7.61 dBi, therefore the limit is 28.39 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Limit (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Margin (dB)
Low	2412	28.39	18.18	18.22	21.21	-7.18
Low	2437	28.39	25.45	24.86	28.18	-0.21
High	2462	28.39	17.47	17.58	20.53	-7.86

7.3.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

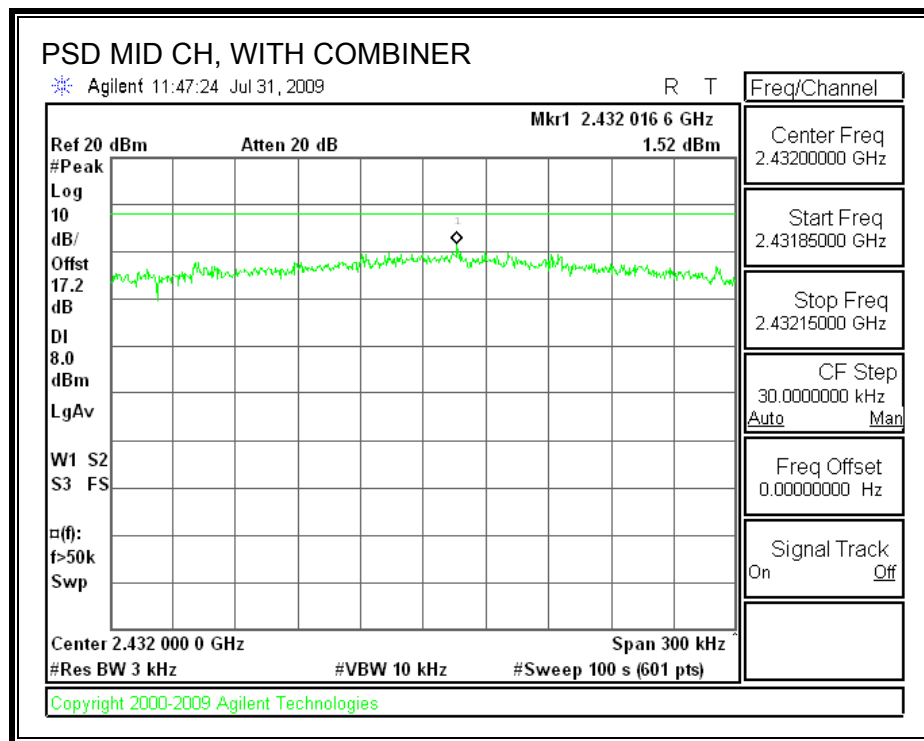
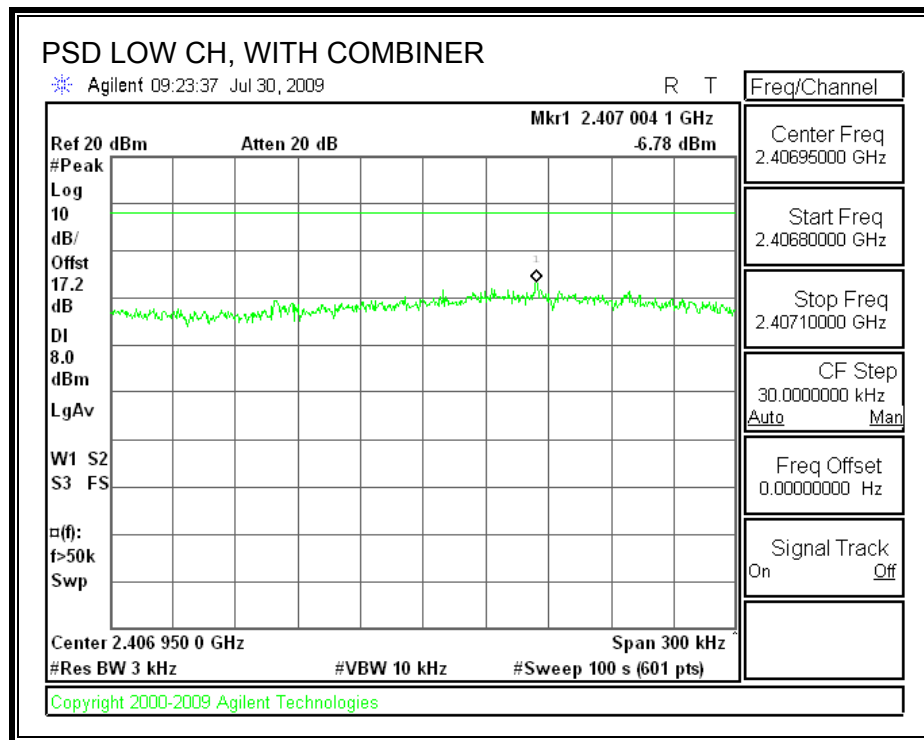
TEST PROCEDURE

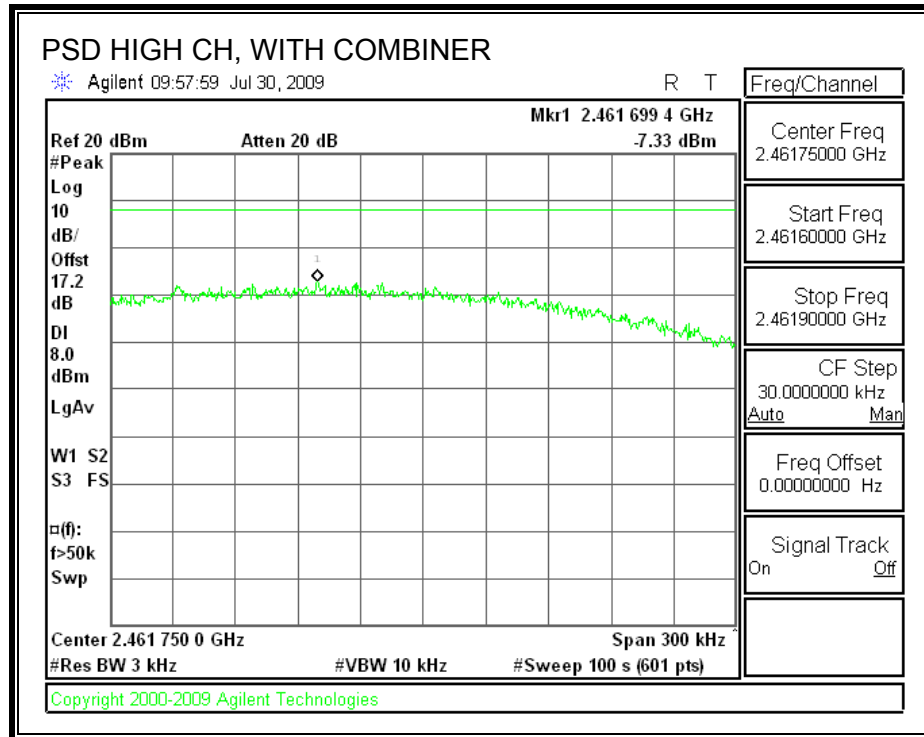
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PSD with Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-6.78	8	-14.78
Middle	2437	1.52	8	-6.48
High	2462	-7.33	8	-15.33

POWER SPECTRAL DENSITY, WITH COMBINER





7.3.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

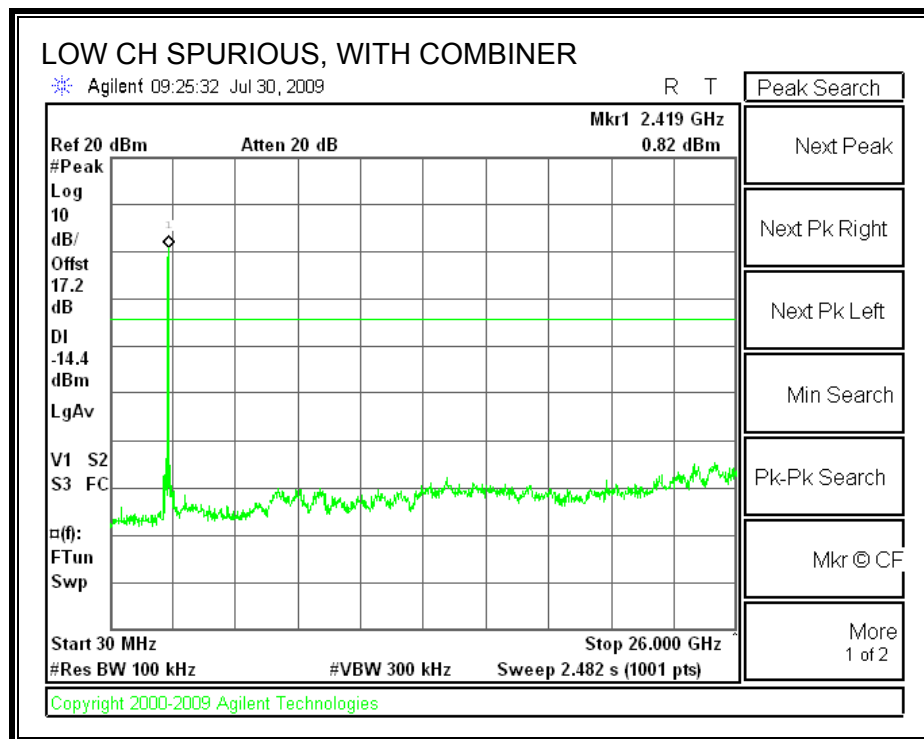
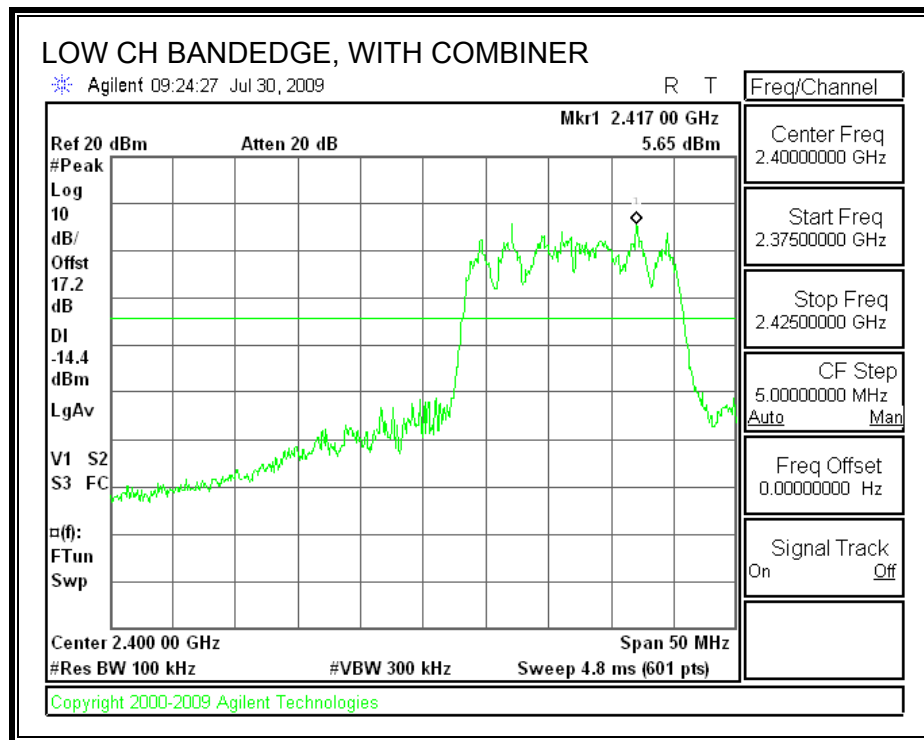
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

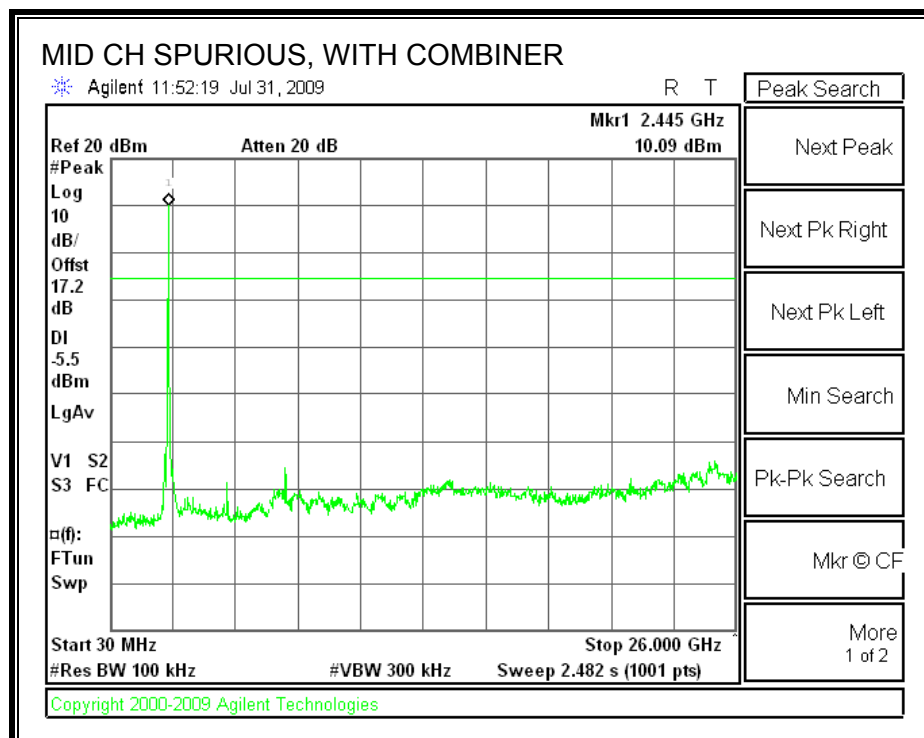
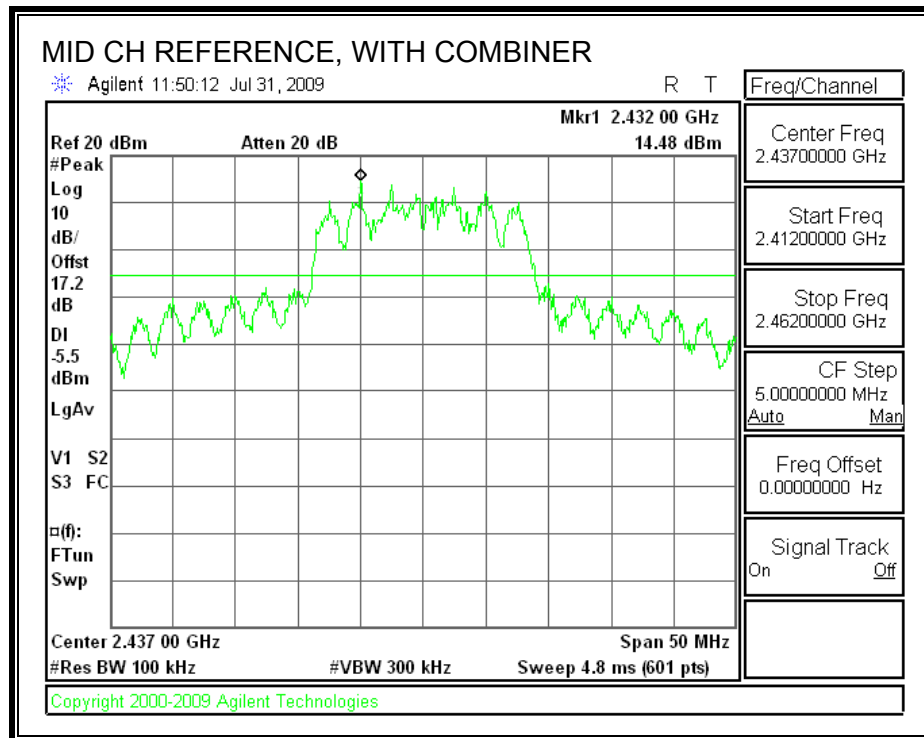
TEST PROCEDURE

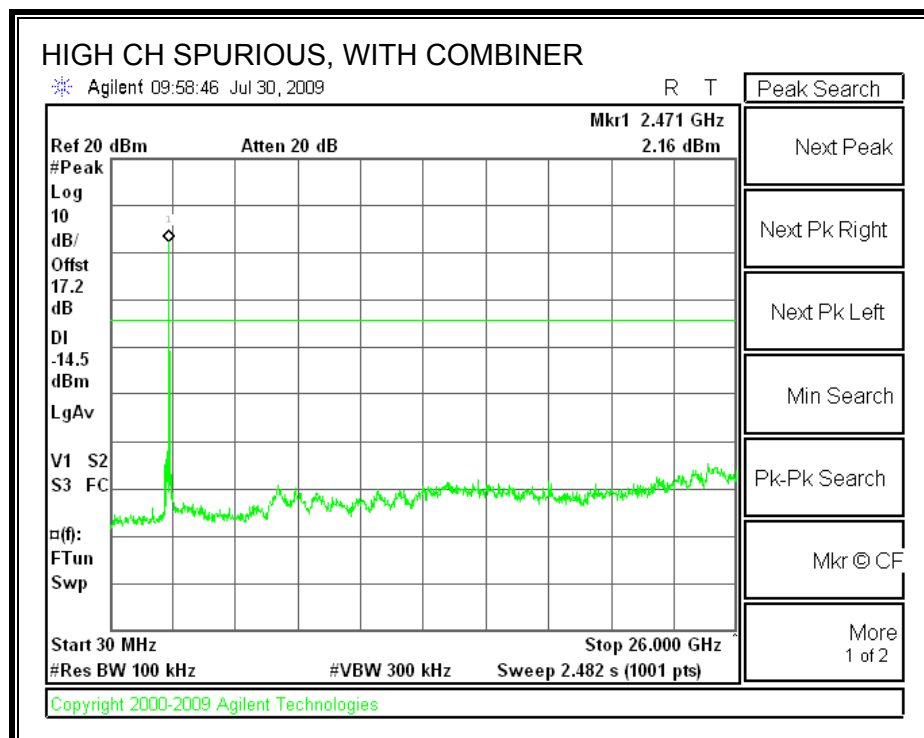
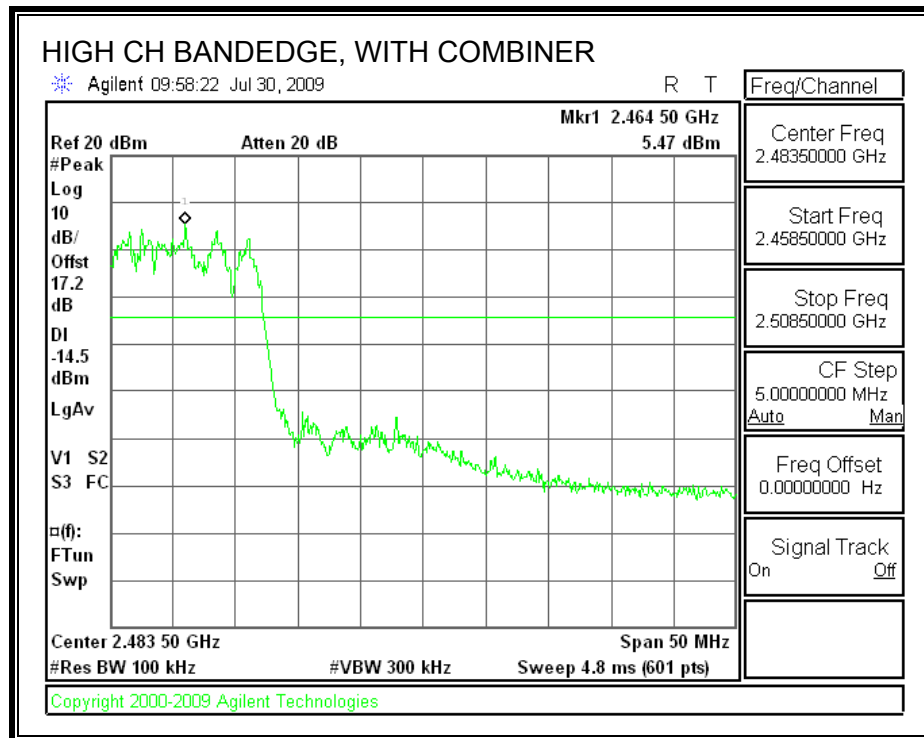
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

SPURIOUS EMISSIONS WITH COMBINER







7.4. 802.11n HT40 SISO MODE IN THE 2.4 GHz BAND

7.4.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

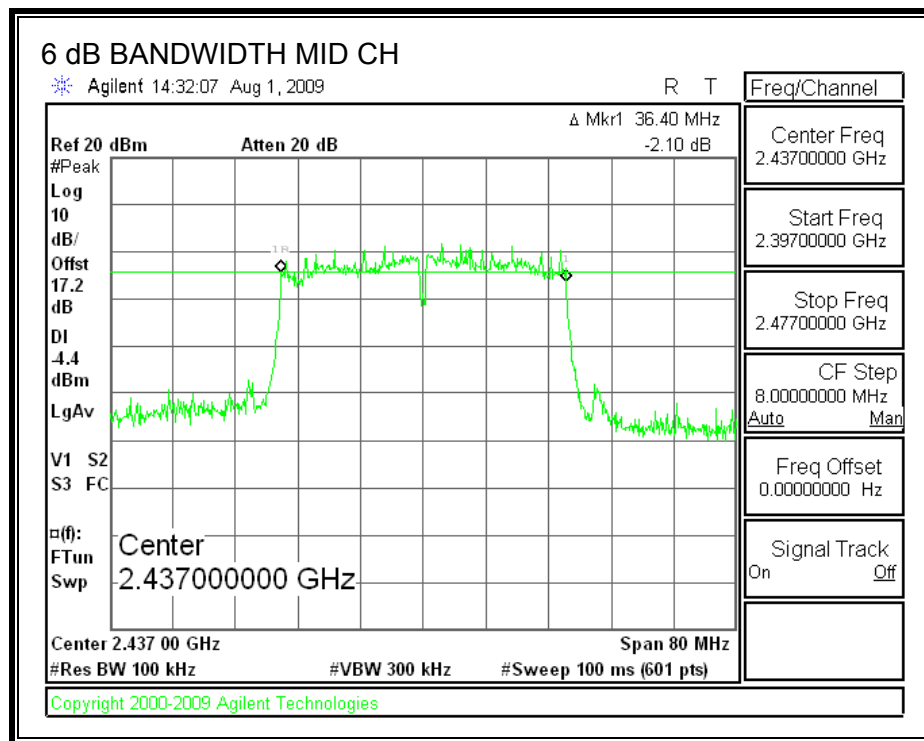
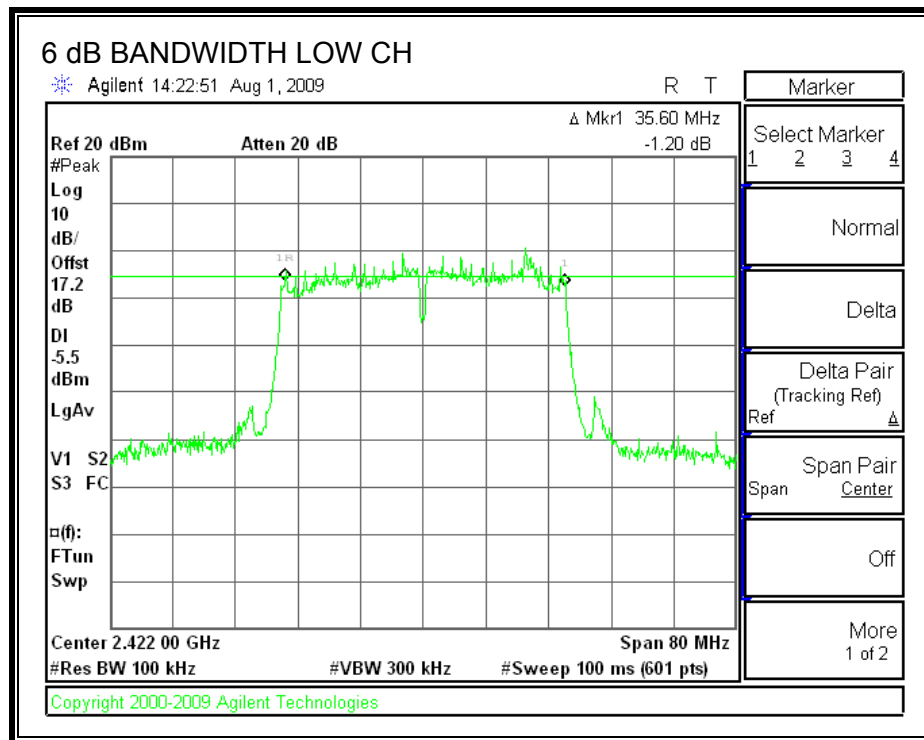
TEST PROCEDURE

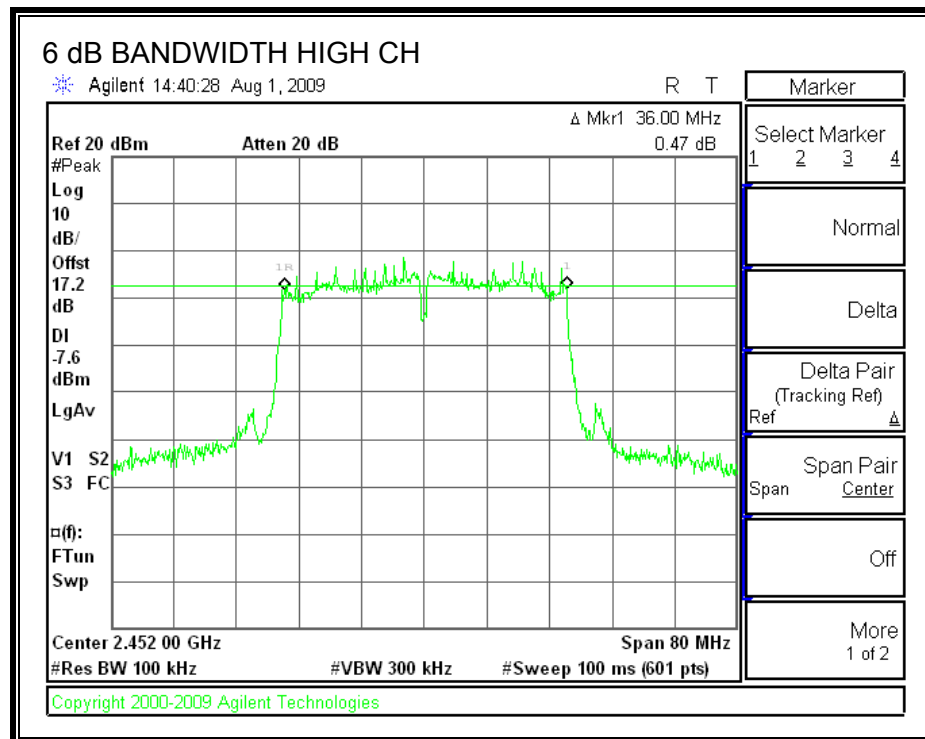
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Low	2422	35.60	0.5
Middle	2437	36.40	0.5
High	2452	36.00	0.5

6 dB BANDWIDTH





7.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

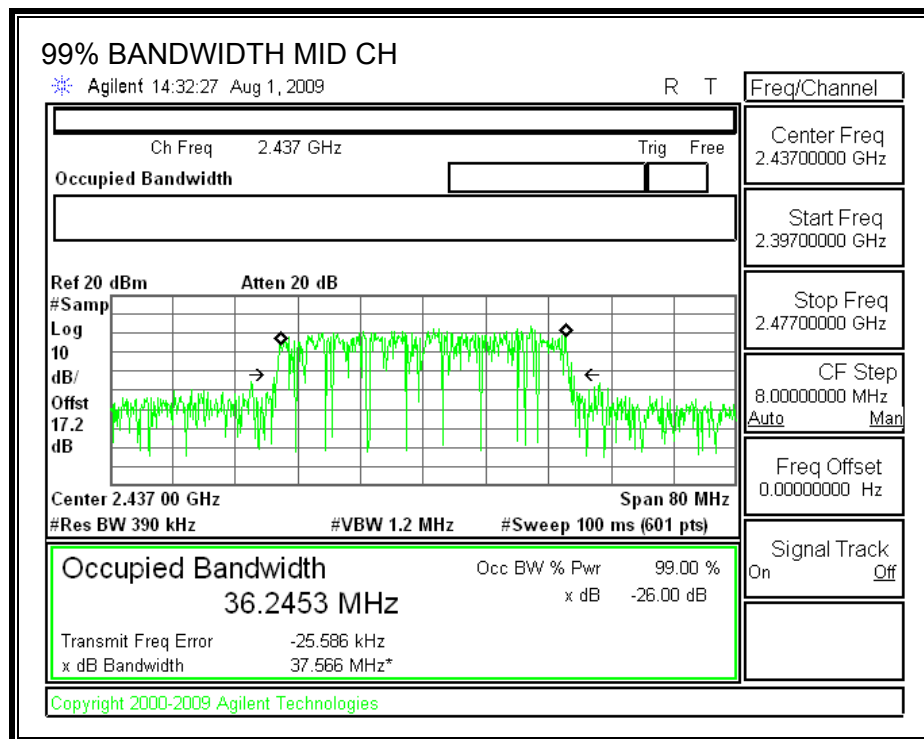
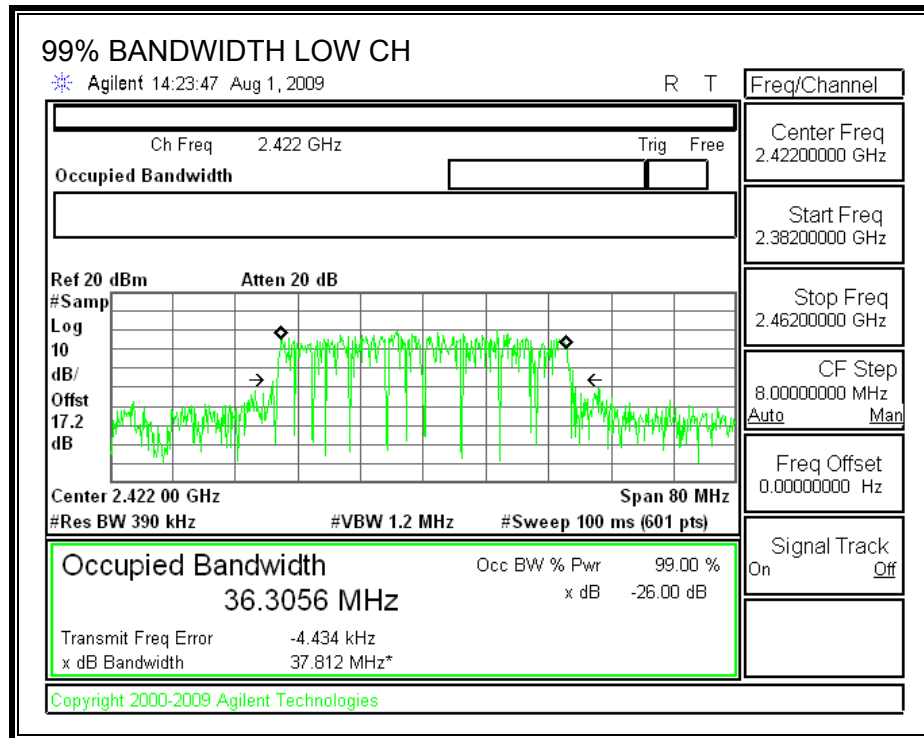
TEST PROCEDURE

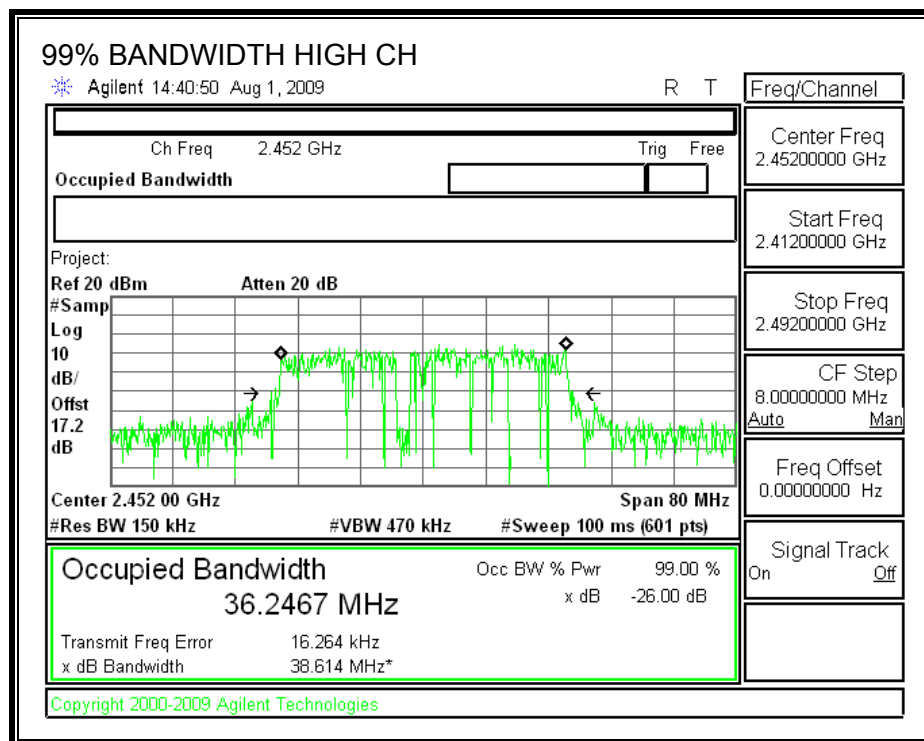
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2422	36.3056
Middle	2437	36.2453
High	2452	36.2467

99% BANDWIDTH





7.4.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Peak Power Meter Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2422	21.45	30	-8.55
Mid	2437	24.16	30	-5.84
High	2452	20.95	30	-9.05

7.4.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

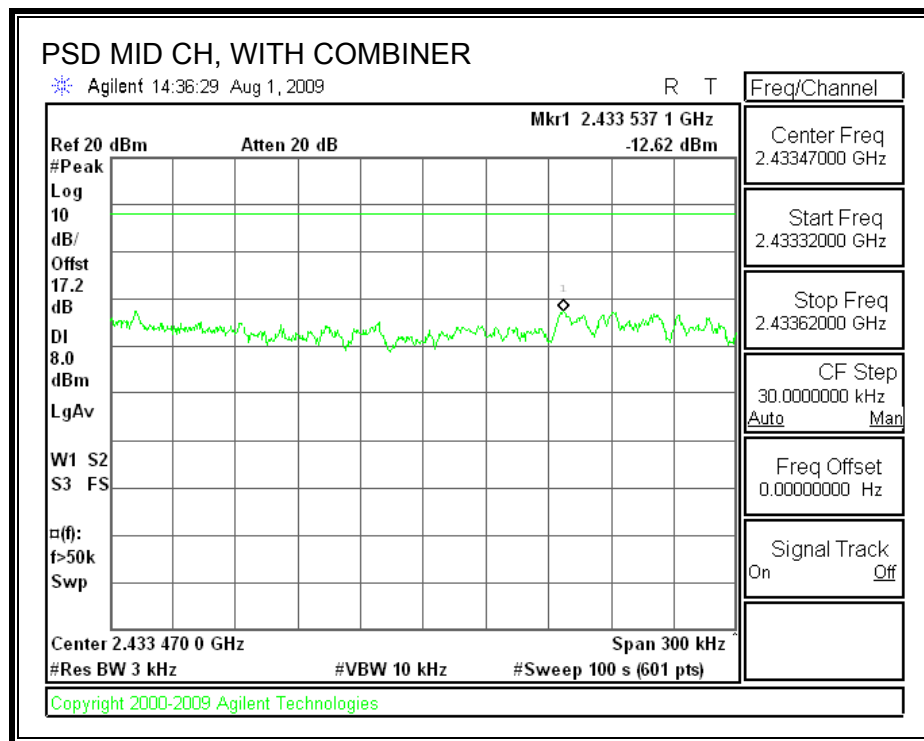
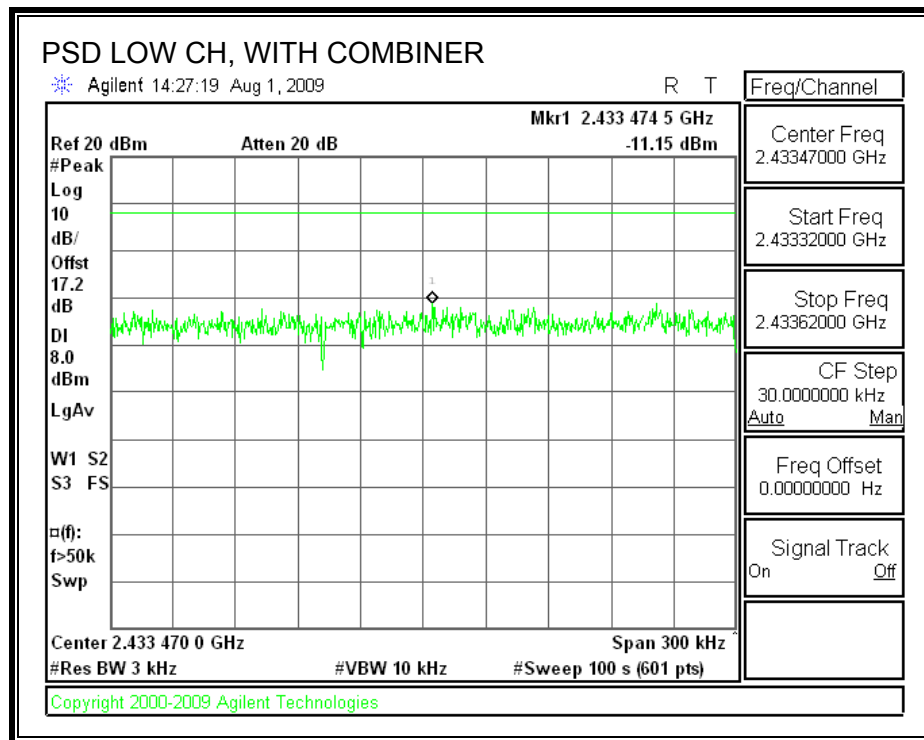
TEST PROCEDURE

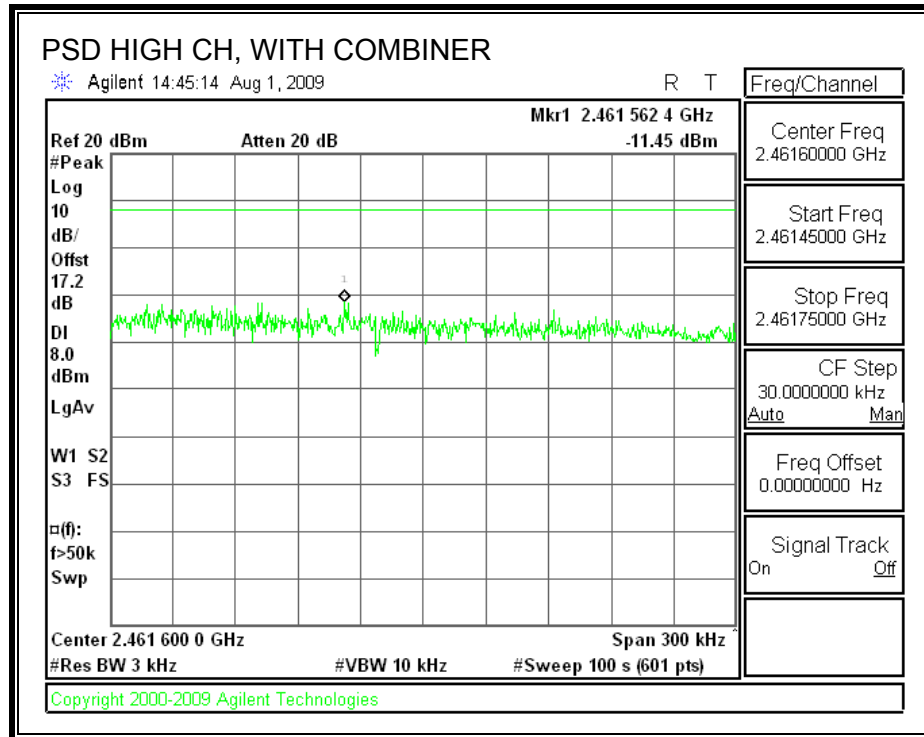
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PSD with Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	2422	-11.15	8	-19.15
Middle	2437	-12.62	8	-20.62
High	2452	-11.45	8	-19.45

POWER SPECTRAL DENSITY, WITH COMBINER





7.4.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

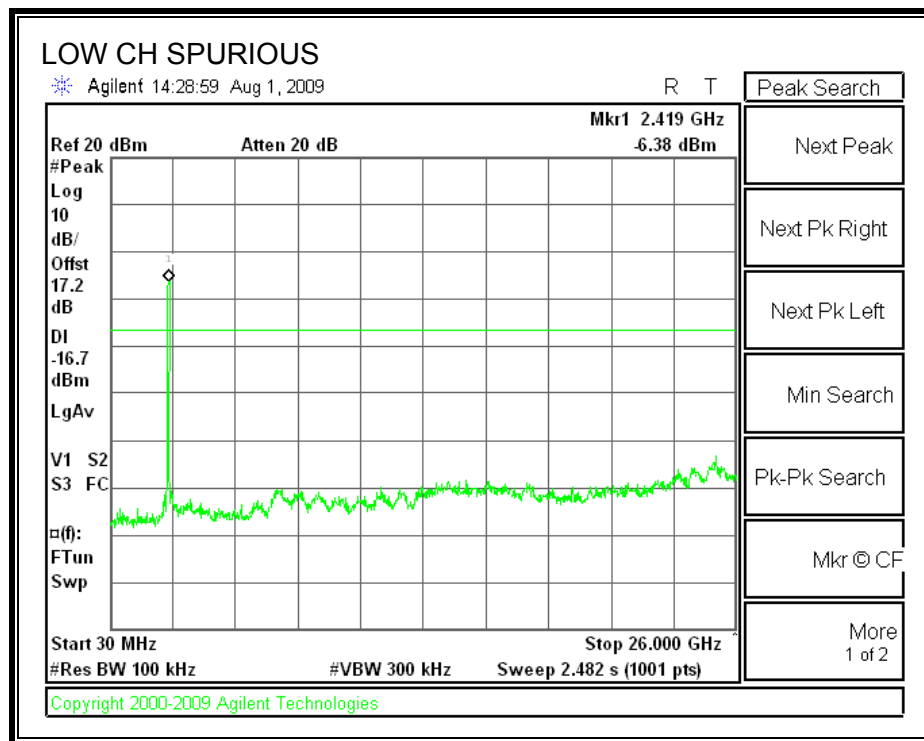
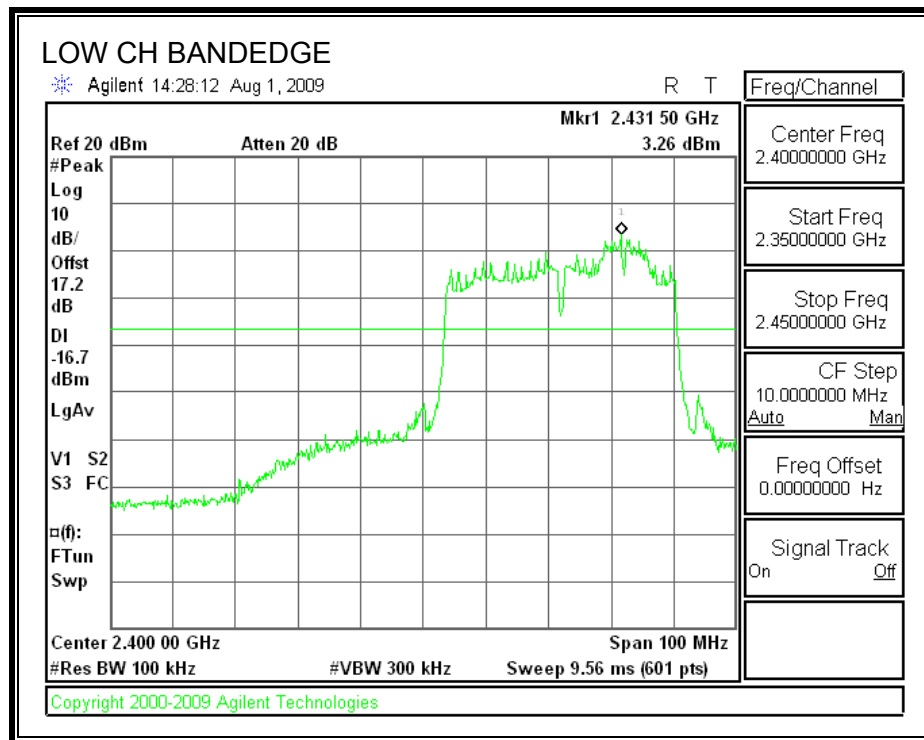
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

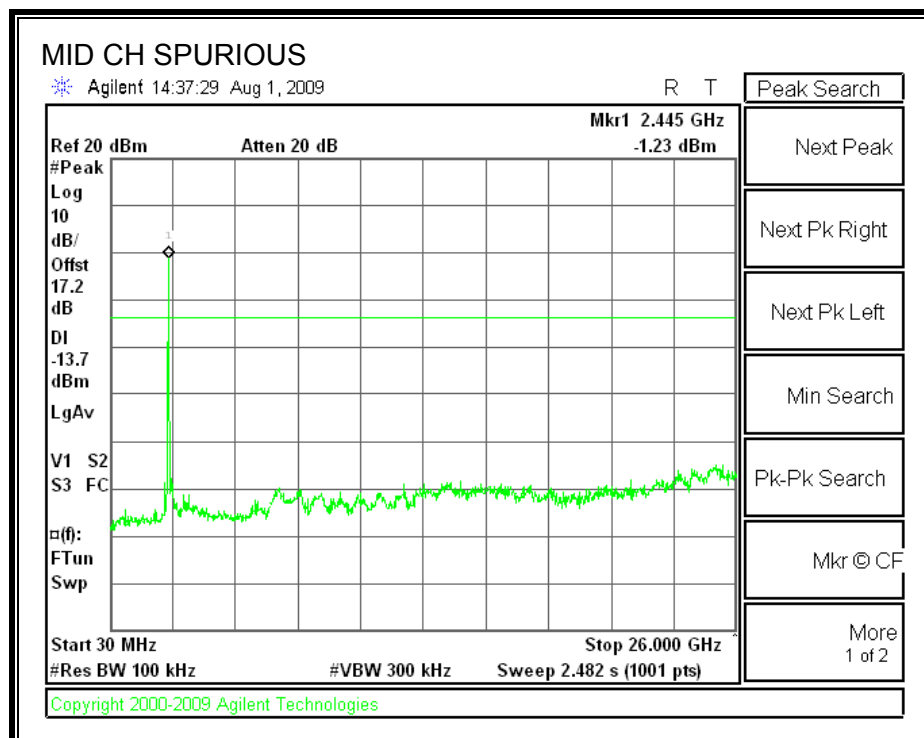
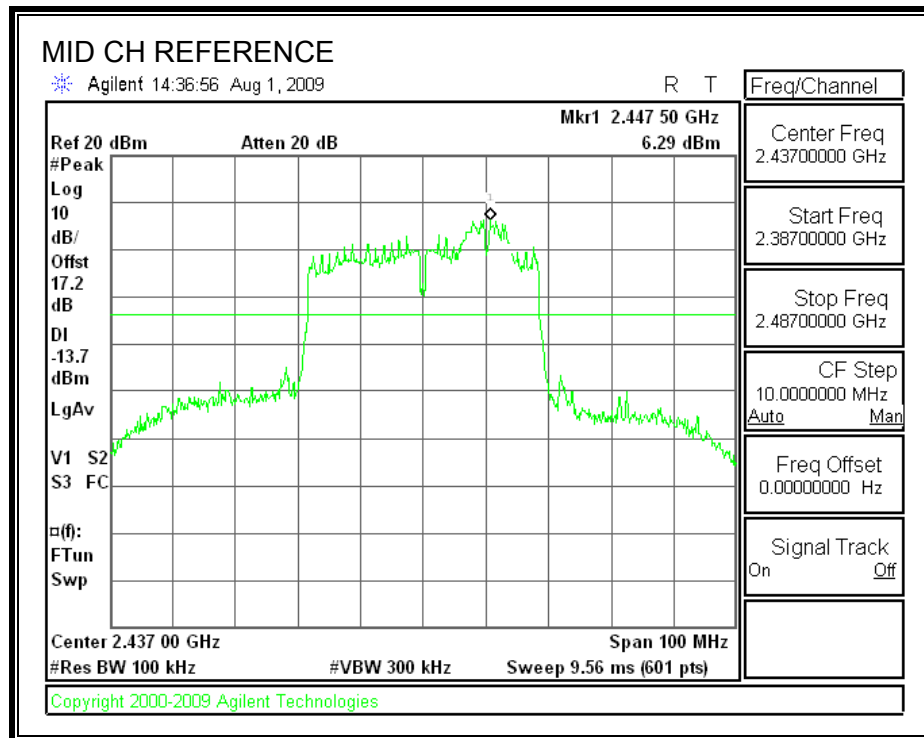
TEST PROCEDURE

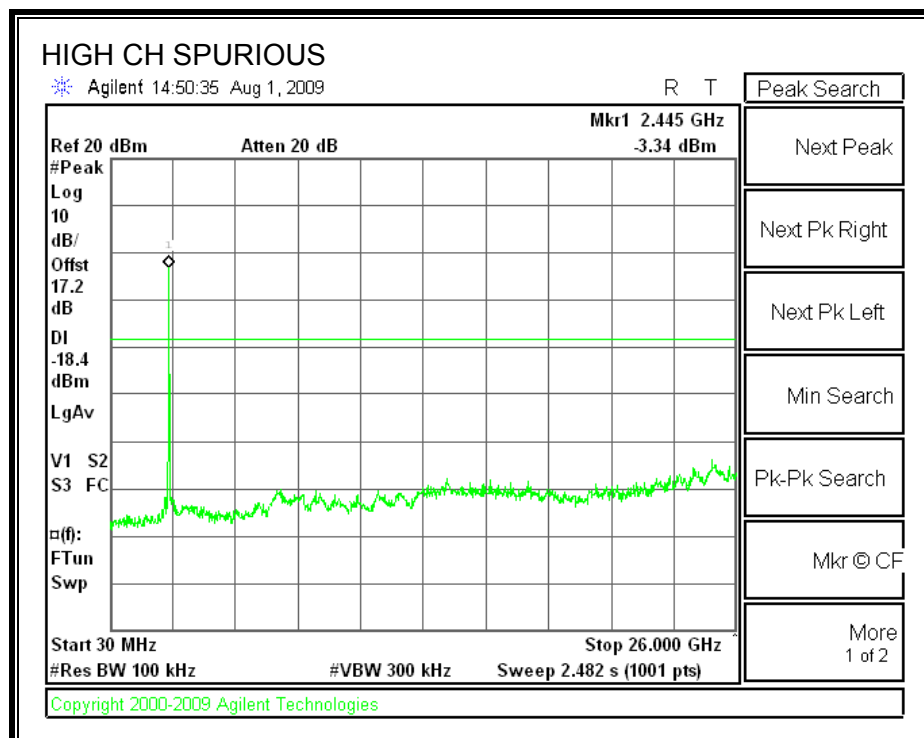
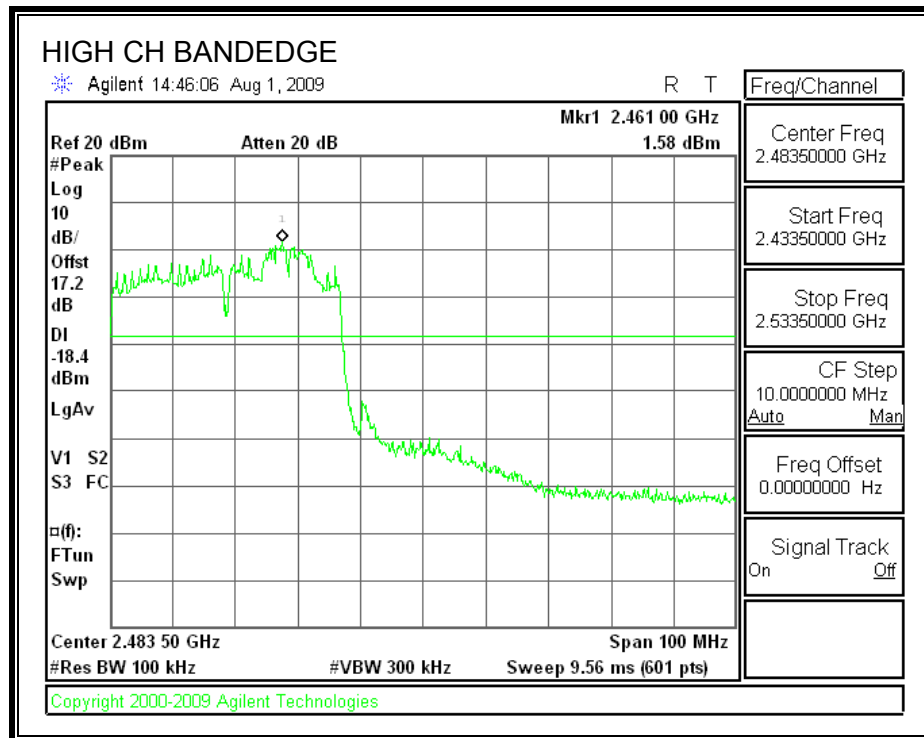
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

SPURIOUS EMISSIONS







7.5. 802.11n HT40 MCS0 MODE IN THE 2.4 GHz BAND

7.5.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

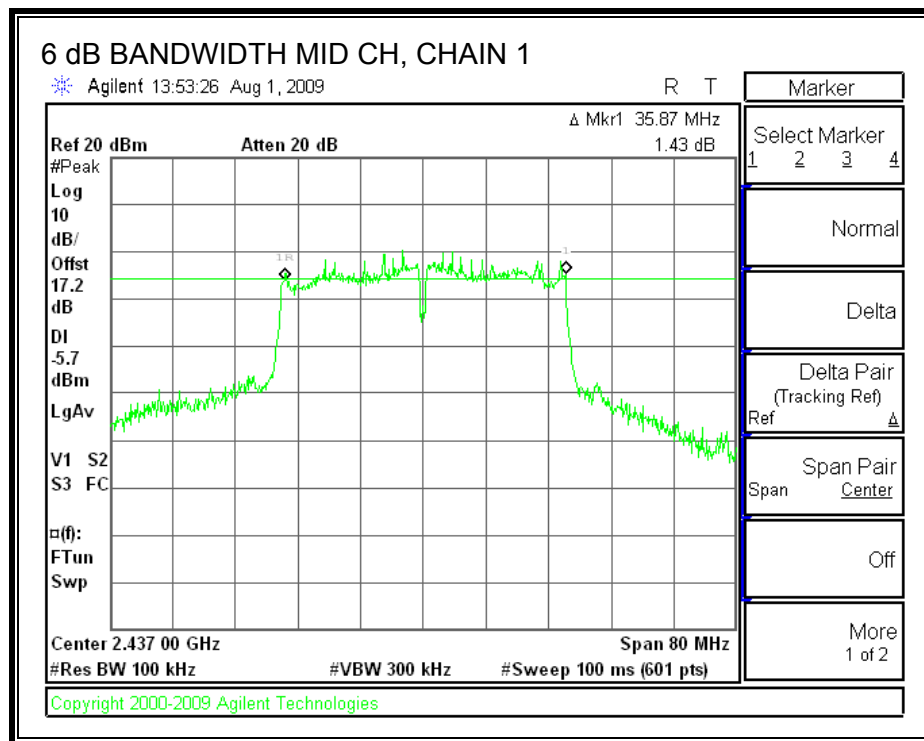
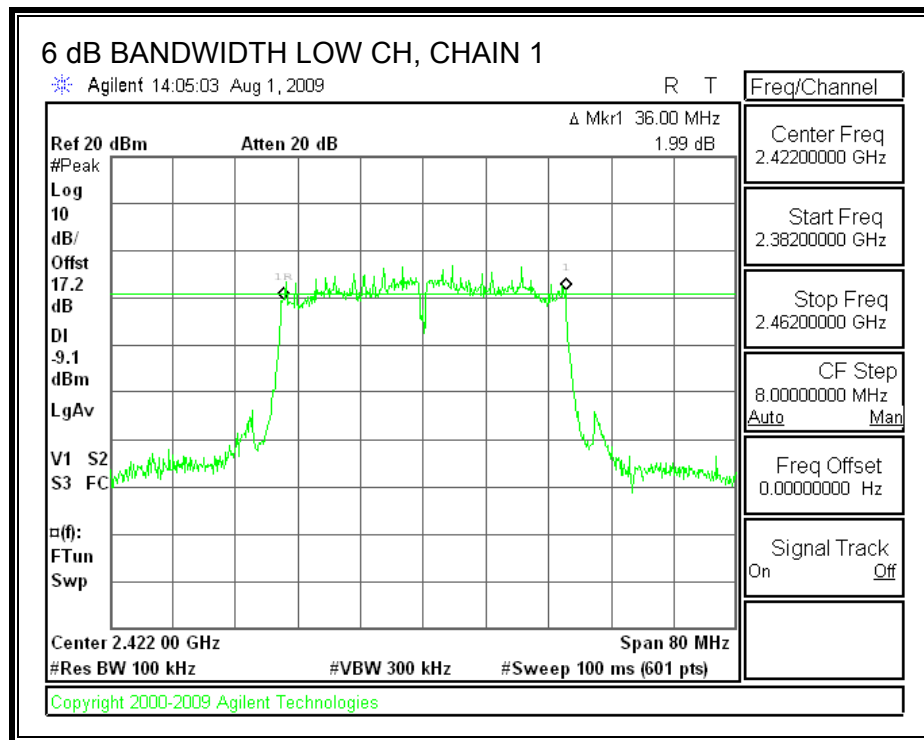
TEST PROCEDURE

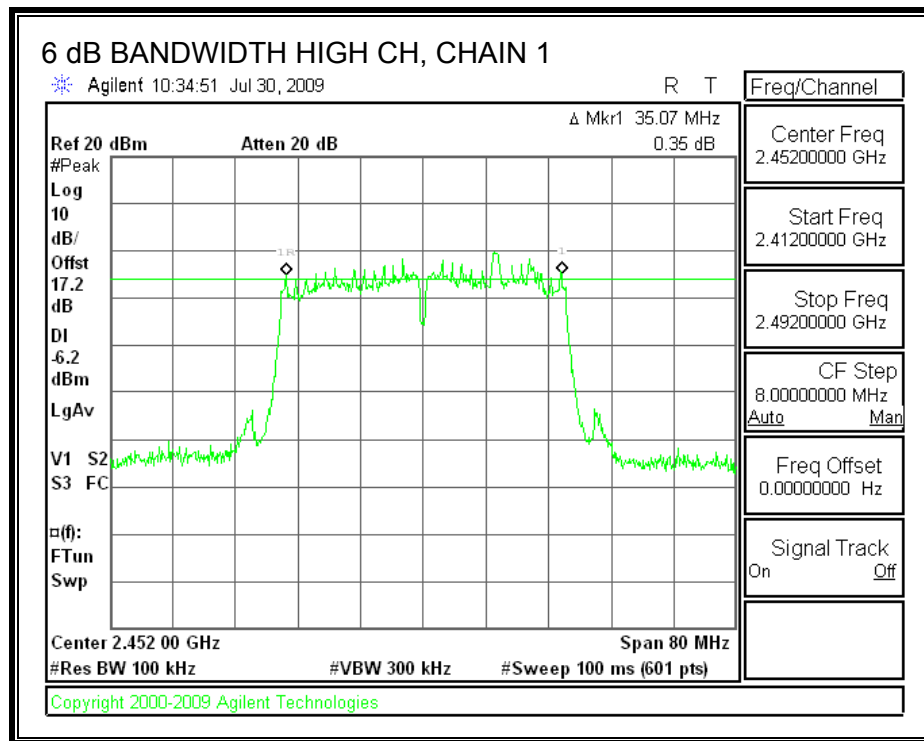
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

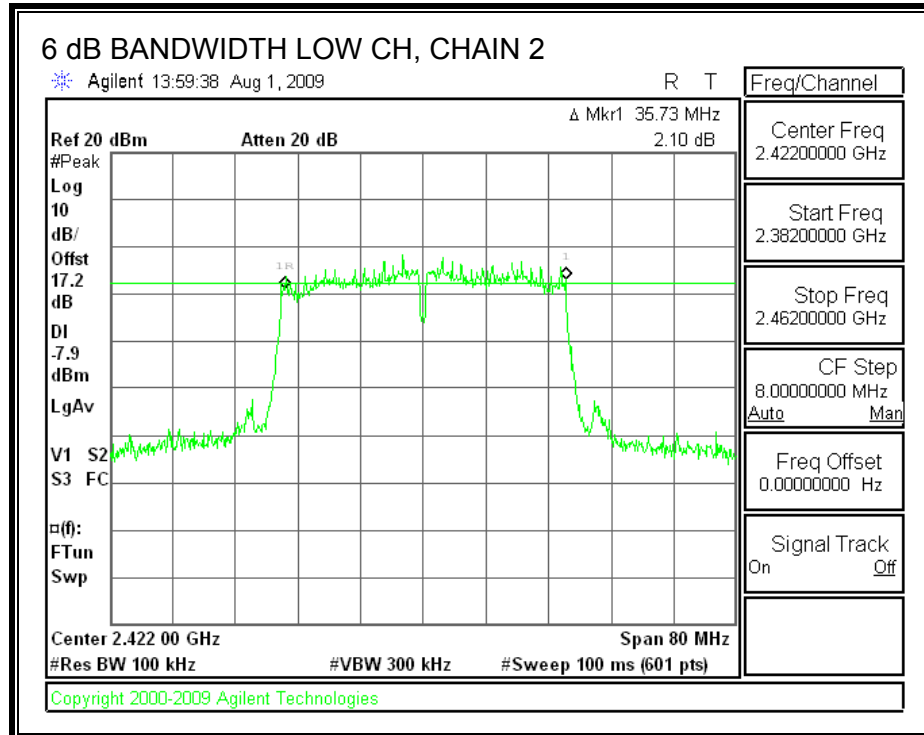
Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	2422	36.00	35.73	0.5
Middle	2437	35.87	35.73	0.5
High	2452	35.07	36.27	0.5

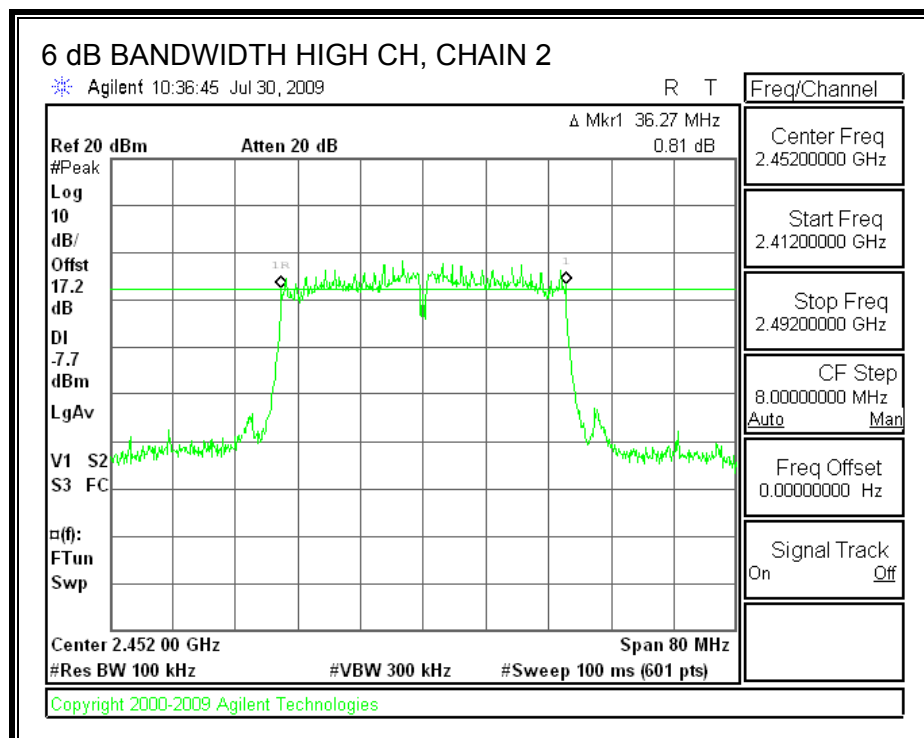
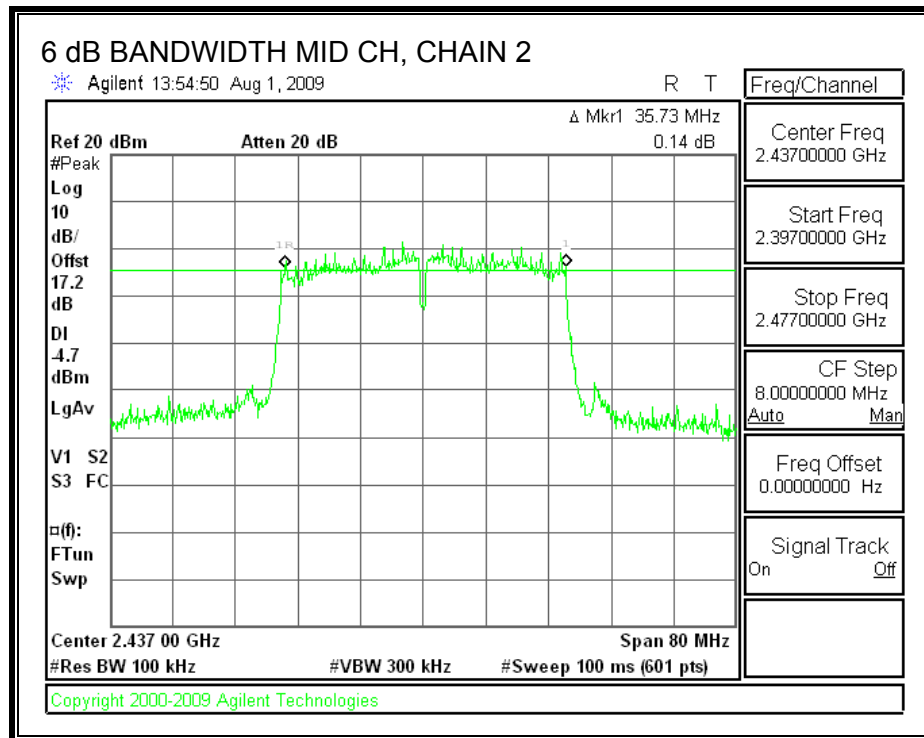
6 dB BANDWIDTH, CHAIN 1





6 dB BANDWIDTH, CHAIN 2





7.5.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

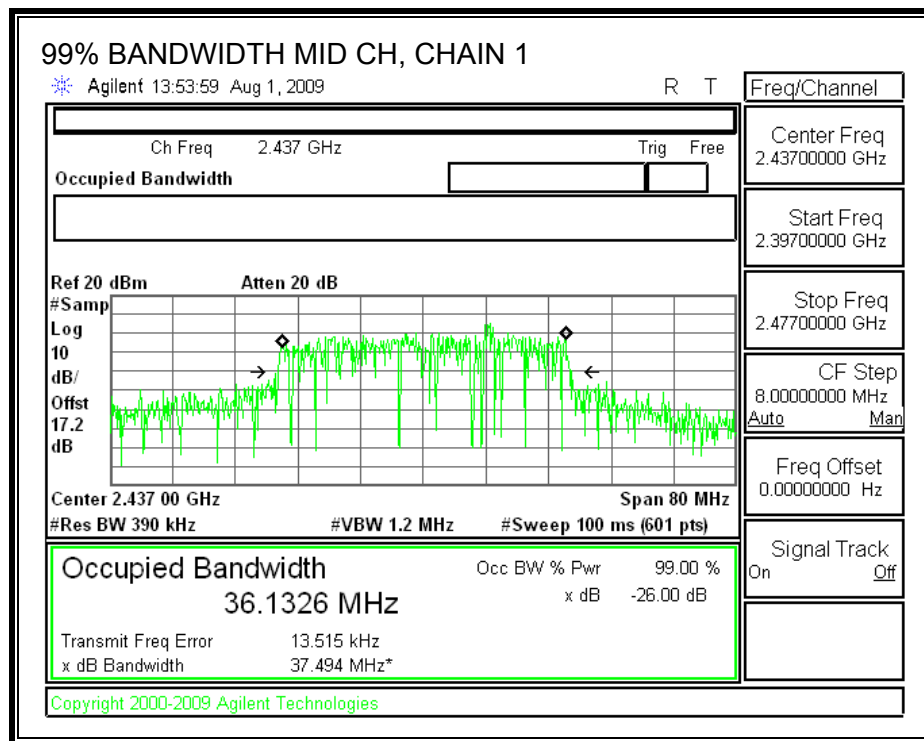
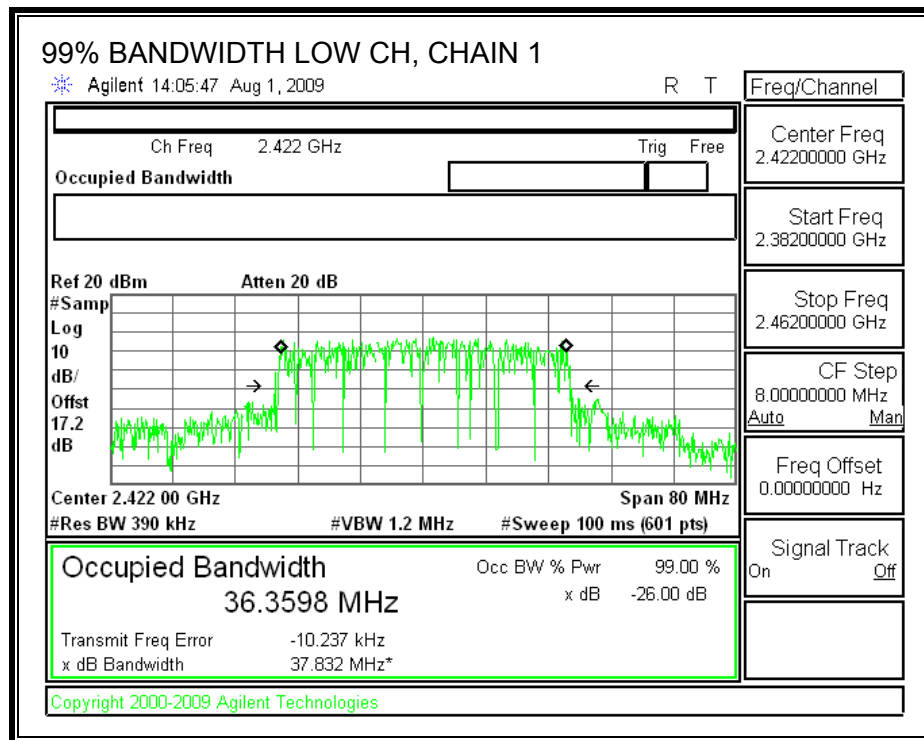
TEST PROCEDURE

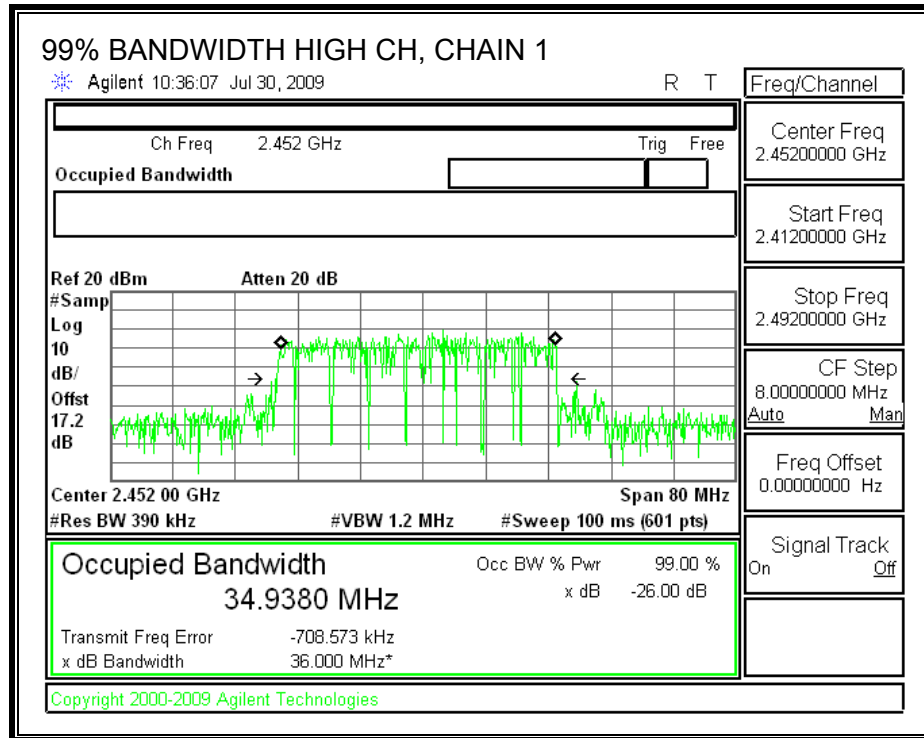
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

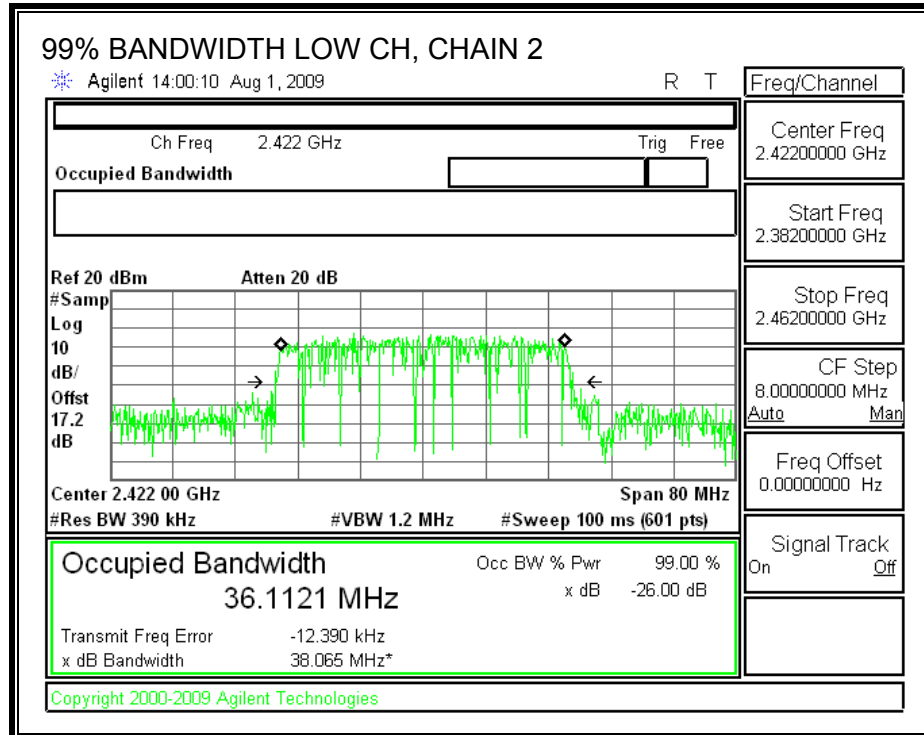
Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	2422	36.3598	36.1121
Middle	2437	36.1326	36.2109
High	2452	34.9380	35.8888

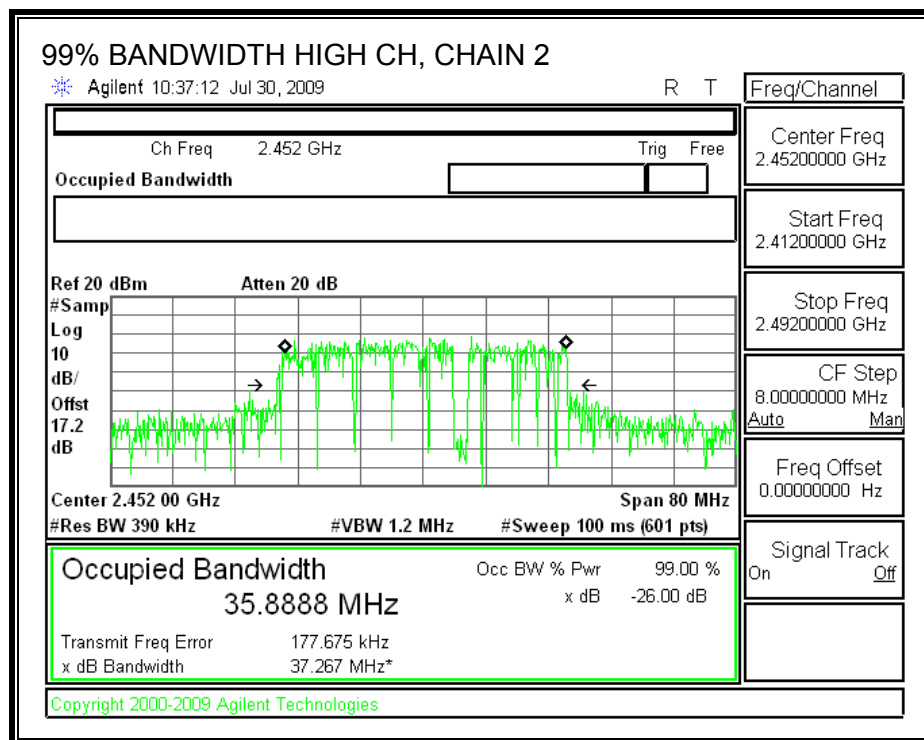
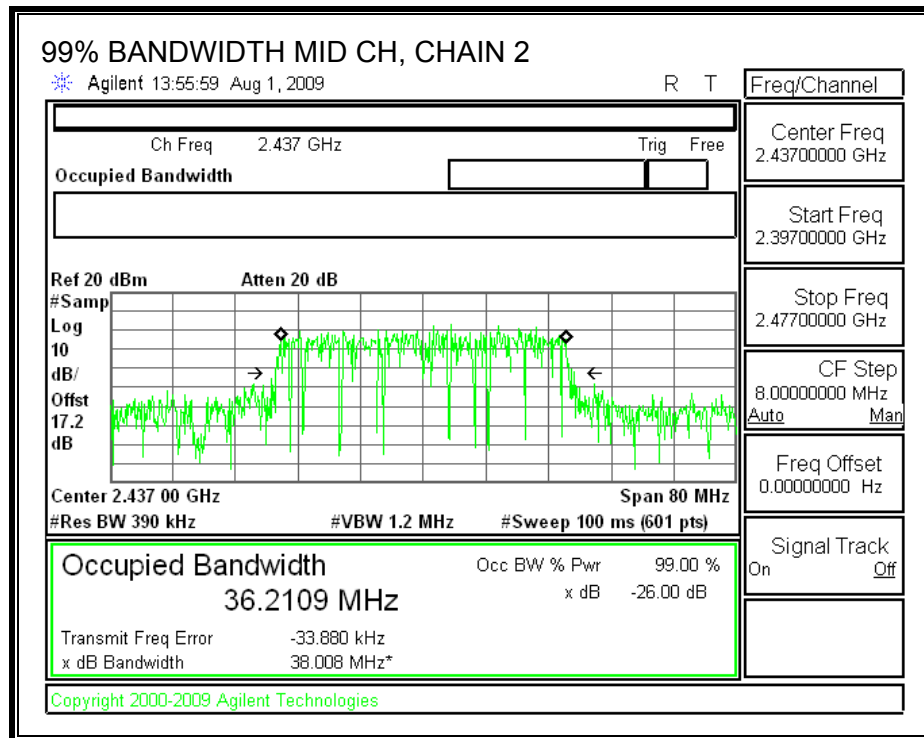
99% BANDWIDTH, CHAIN 1





99% BANDWIDTH, CHAIN 2





7.5.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The highest combination of antenna gains is equal to 7.61 dBi, therefore the limit is 28.39 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Limit (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Margin (dB)
Low	2422	28.39	21.23	20.87	24.06	-4.33
Low	2437	28.39	23.79	22.84	26.35	-2.04
High	2452	28.39	21.00	20.94	23.98	-4.41

7.5.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

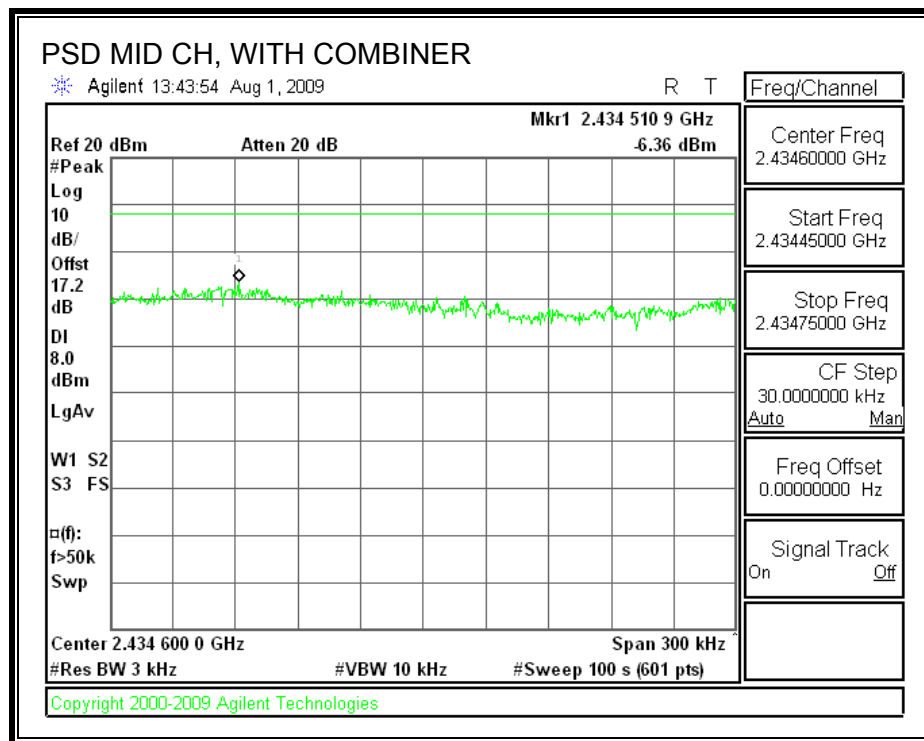
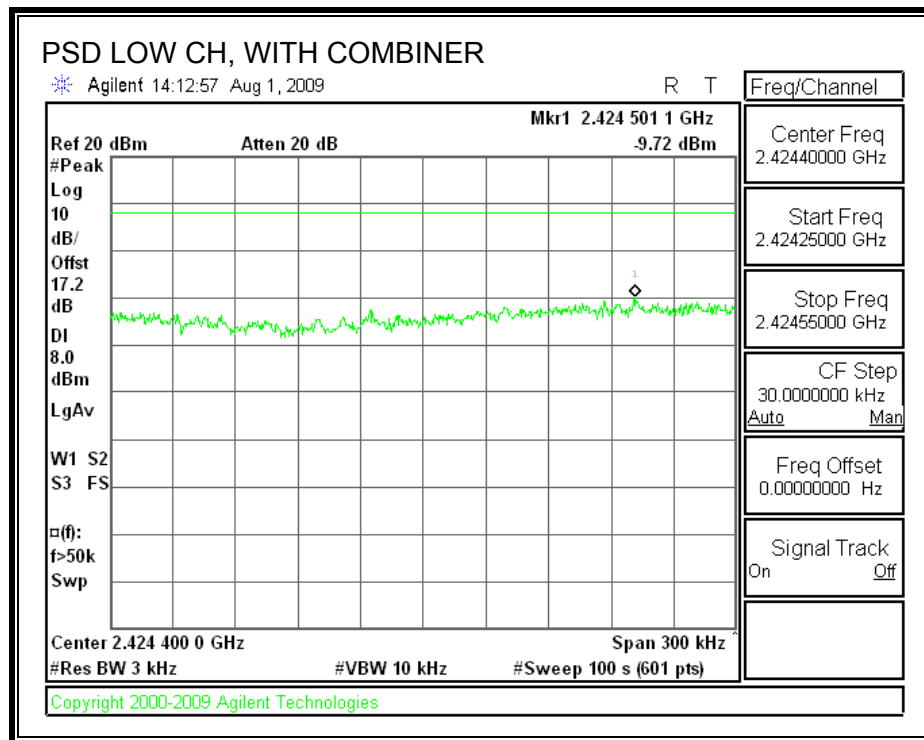
TEST PROCEDURE

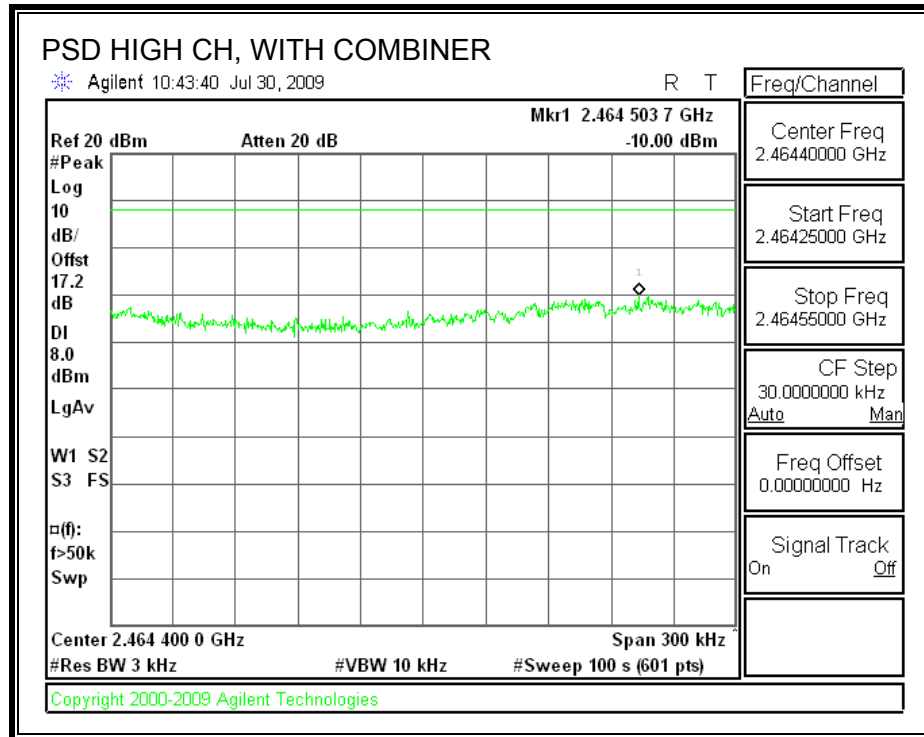
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PSD with Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	2422	-9.72	8	-17.72
Middle	2437	-6.36	8	-14.36
High	2452	-10.00	8	-18.00

POWER SPECTRAL DENSITY, WITH COMBINER





7.5.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

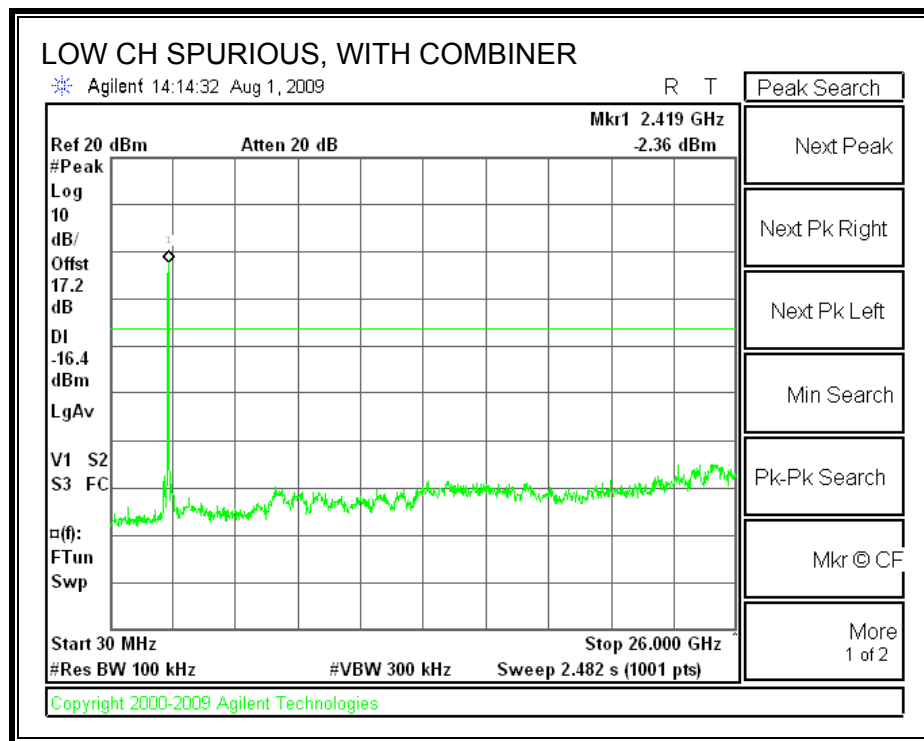
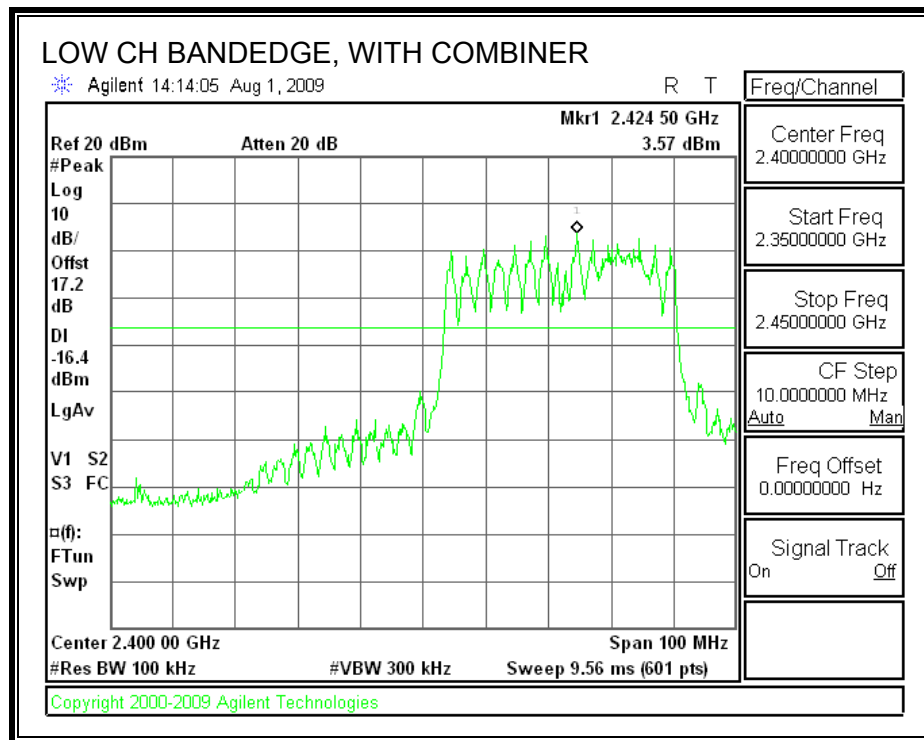
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

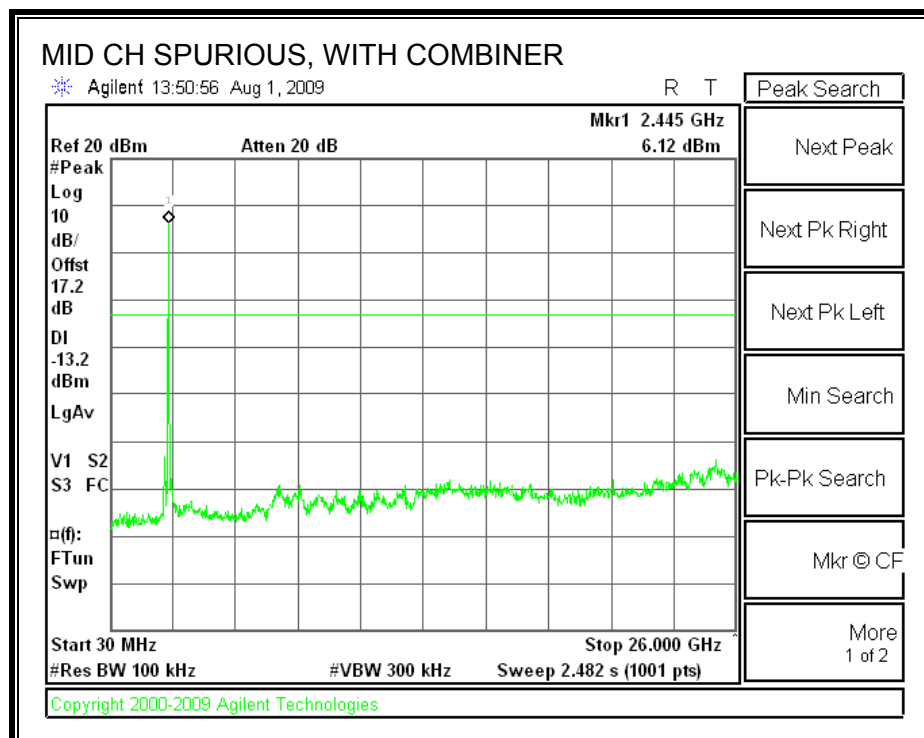
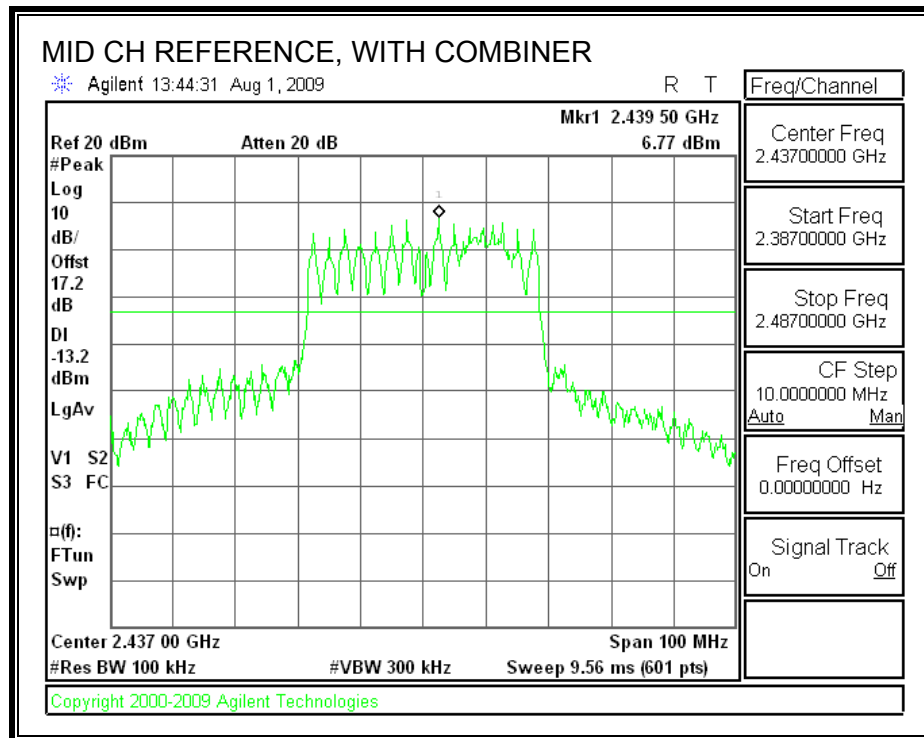
TEST PROCEDURE

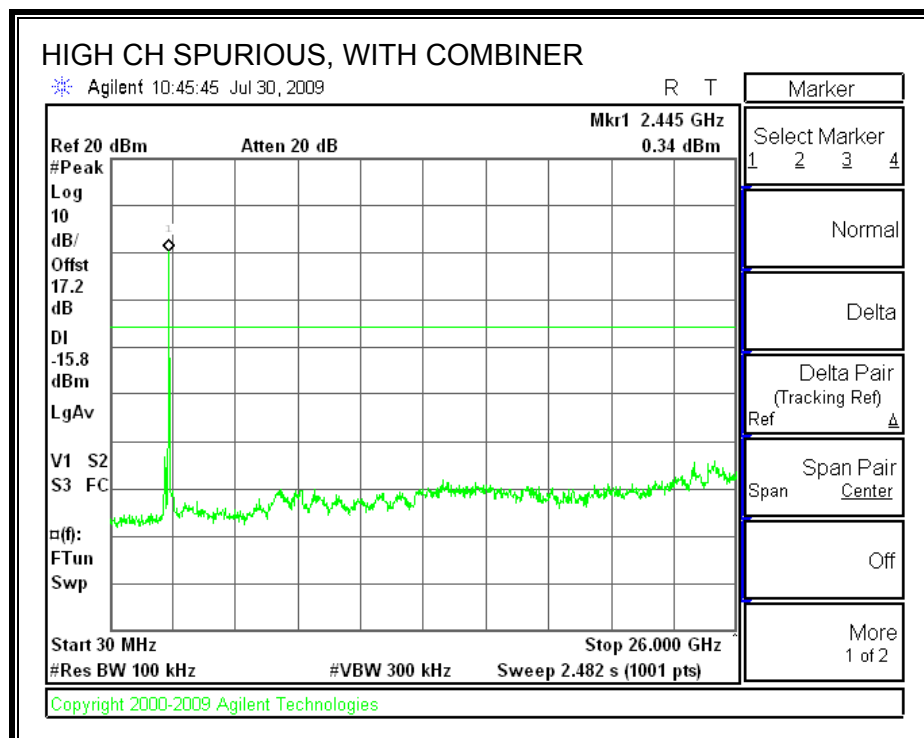
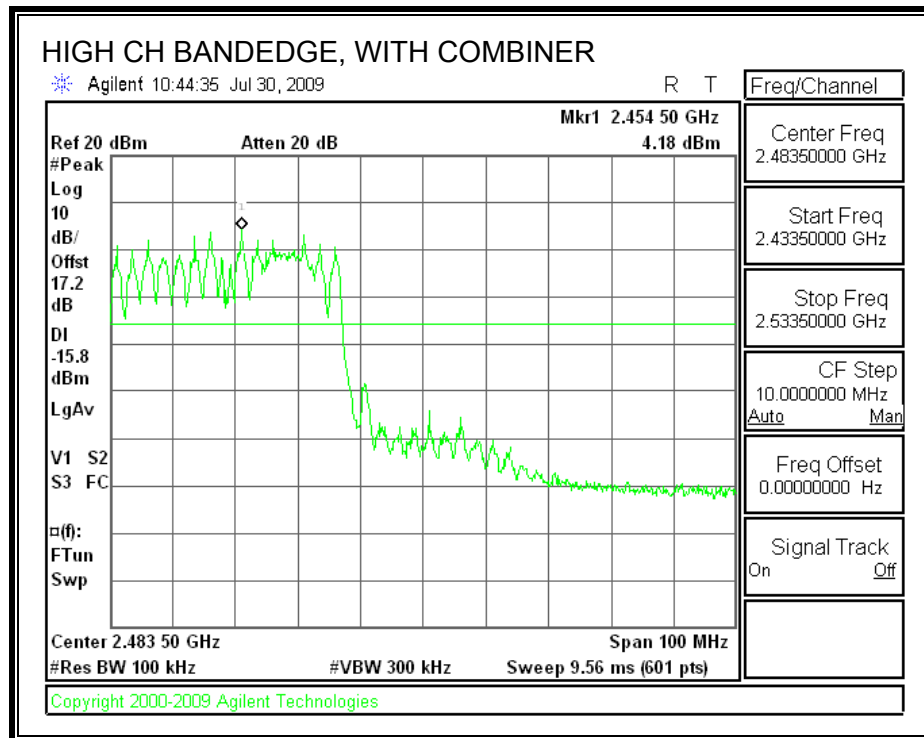
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

SPURIOUS EMISSIONS WITH COMBINER







7.6. 802.11n HT40 MCS15 MODE IN THE 2.4 GHz BAND

7.6.1. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The highest combination of antenna gains is equal to 7.61 dBi, therefore the limit is 28.39 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Limit (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Margin (dB)
Low	2422	28.39	21.45	20.62	24.06	-4.33
Low	2437	28.39	23.15	23.80	26.50	-1.89
High	2452	28.39	21.89	21.25	24.59	-3.80

7.6.2. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

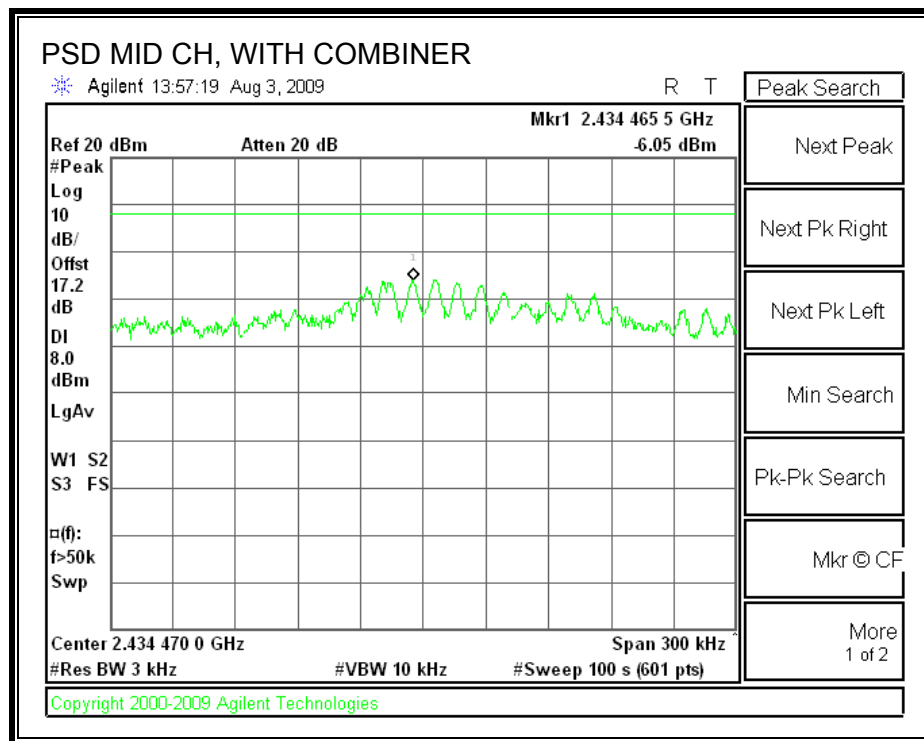
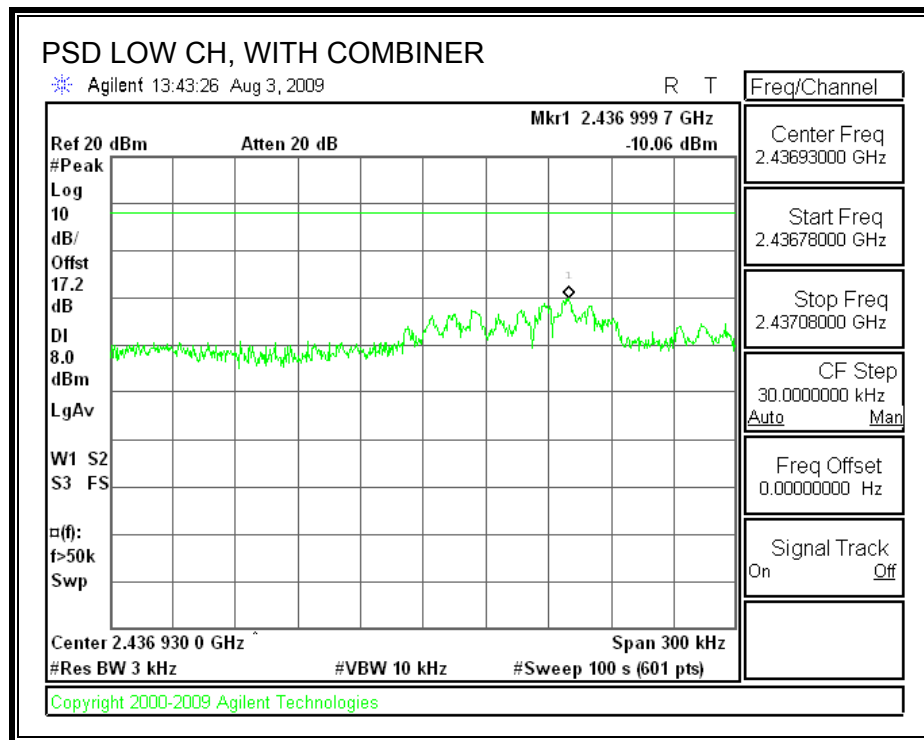
TEST PROCEDURE

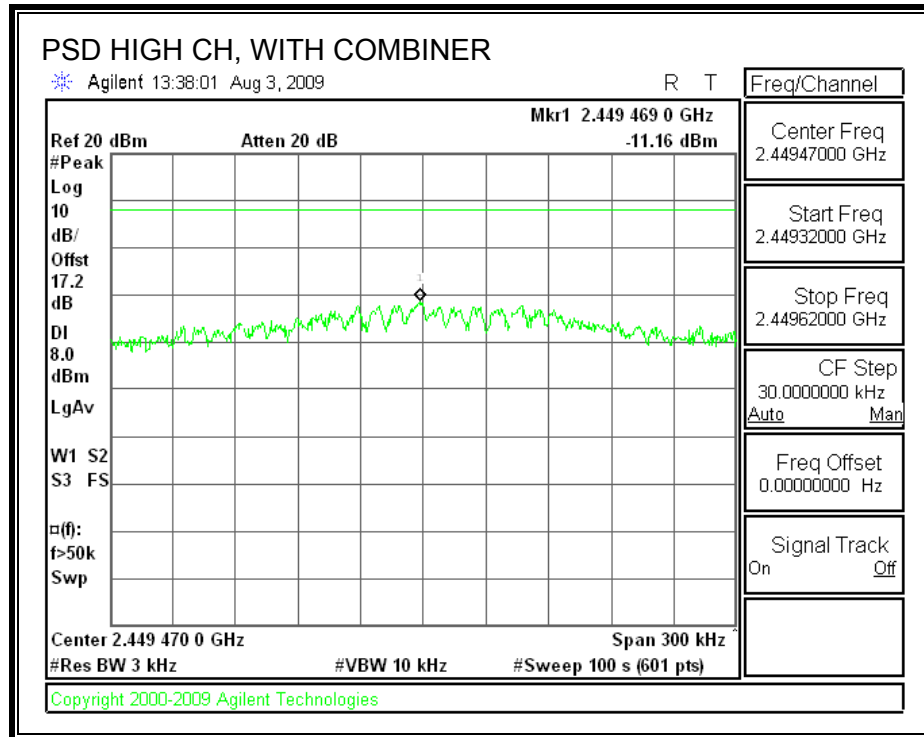
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PSD with Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	2422	-10.06	8	-18.06
Middle	2437	-6.05	8	-14.05
High	2452	-11.16	8	-19.16

POWER SPECTRAL DENSITY, WITH COMBINER





7.7. 802.11a MODE IN THE 5.8 GHz BAND

7.7.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

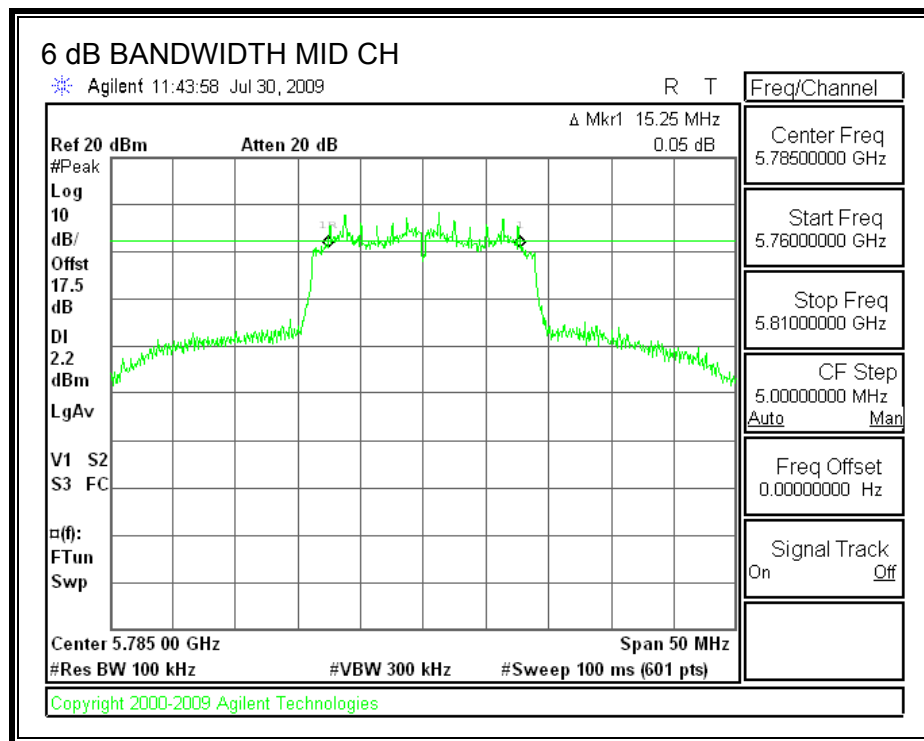
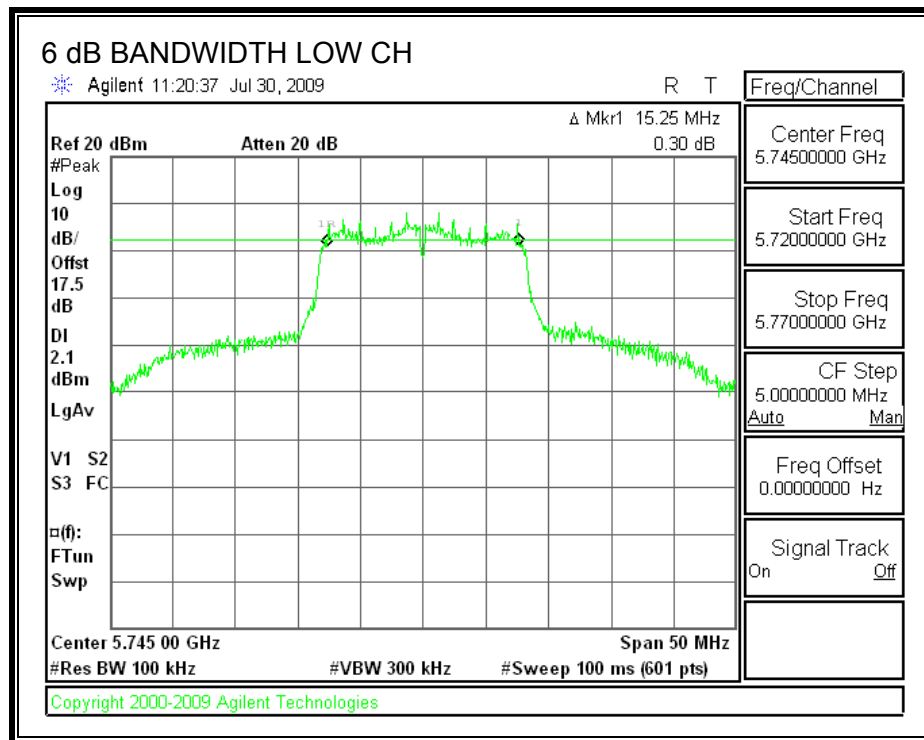
TEST PROCEDURE

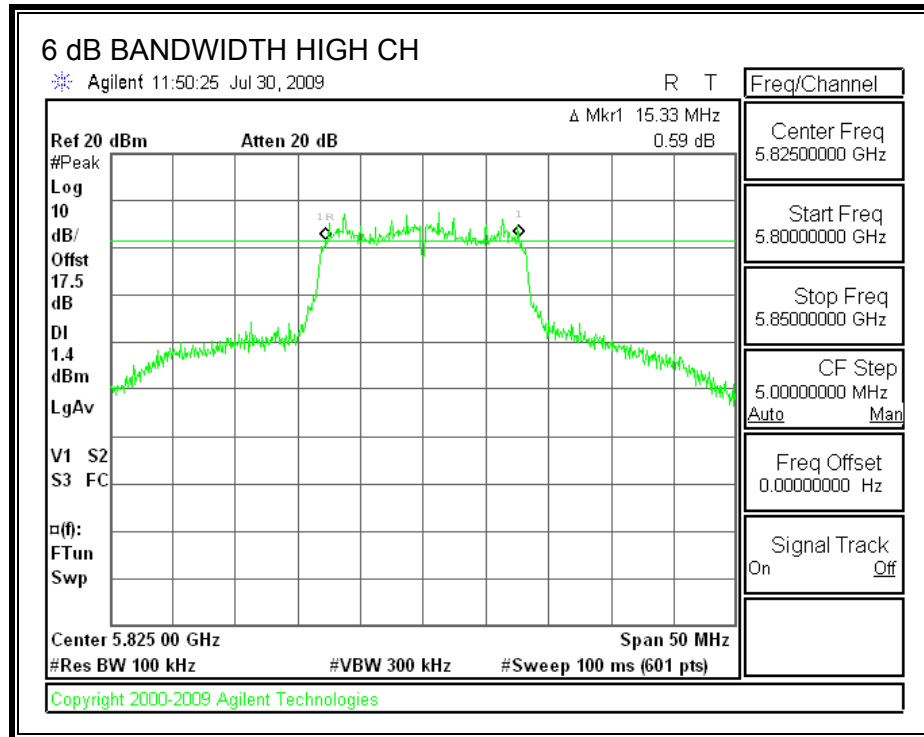
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.25	0.5
Middle	5785	15.25	0.5
High	5825	15.33	0.5

6 dB BANDWIDTH





7.7.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

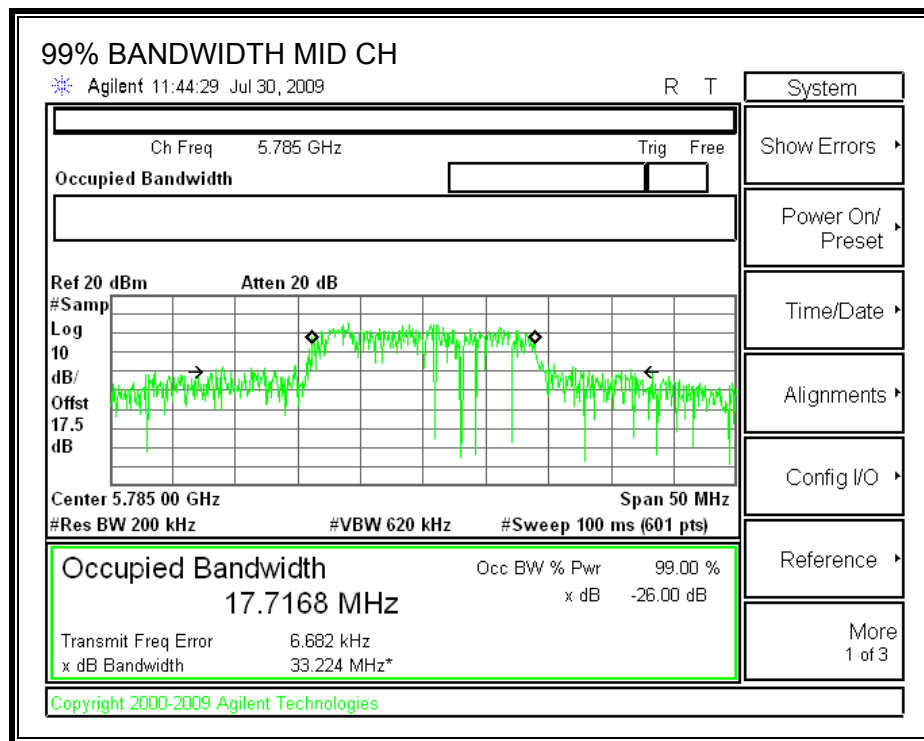
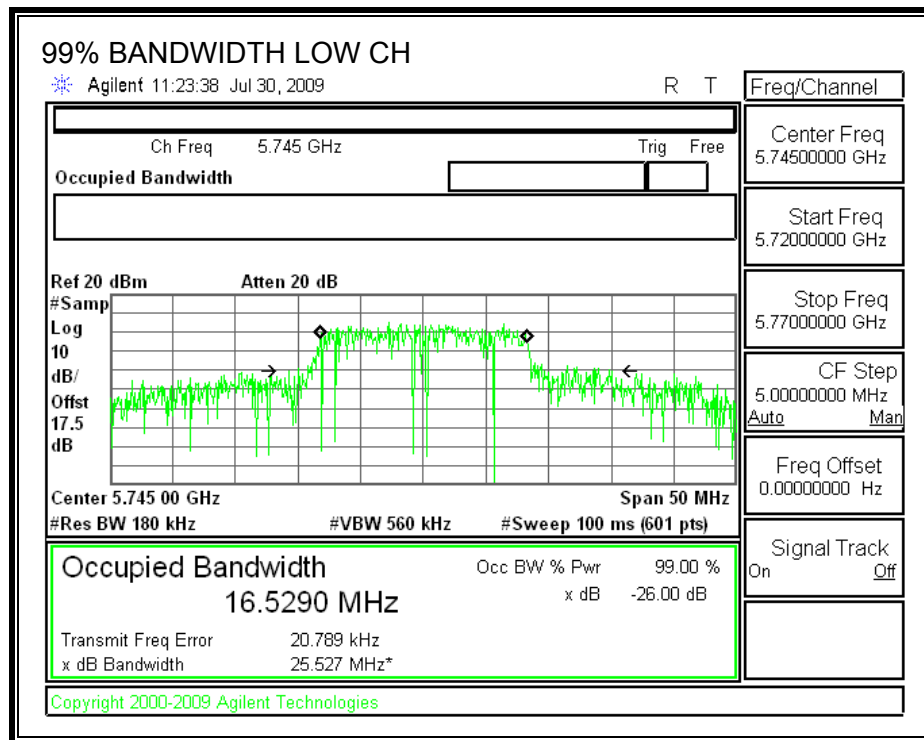
TEST PROCEDURE

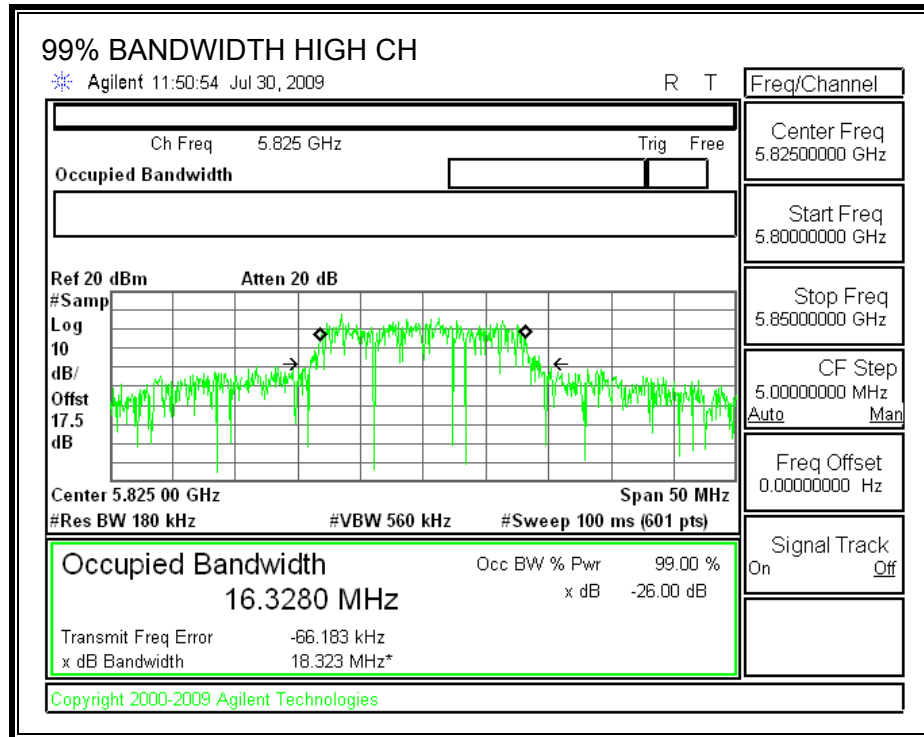
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.5290
Middle	5785	17.7168
High	5825	16.3280

99% BANDWIDTH





7.7.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Peak Power Meter Reading (dBm)	Limit (dBm)	Margin (dB)
Low	5745	20.67	30	-9.33
Middle	5784	20.58	30	-9.42
High	5825	20.99	30	-9.01

7.7.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

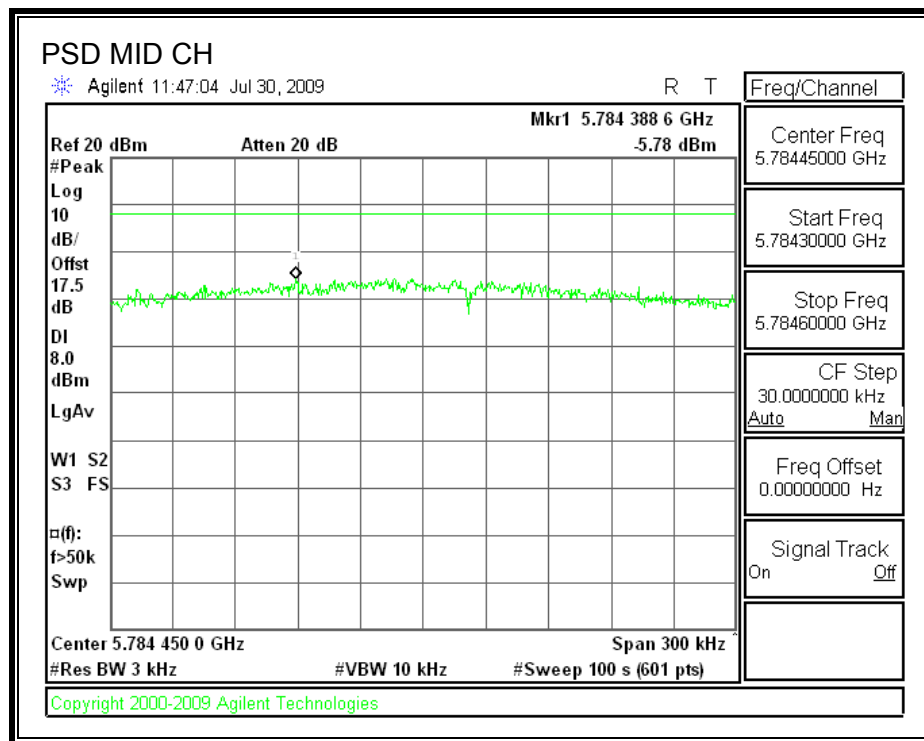
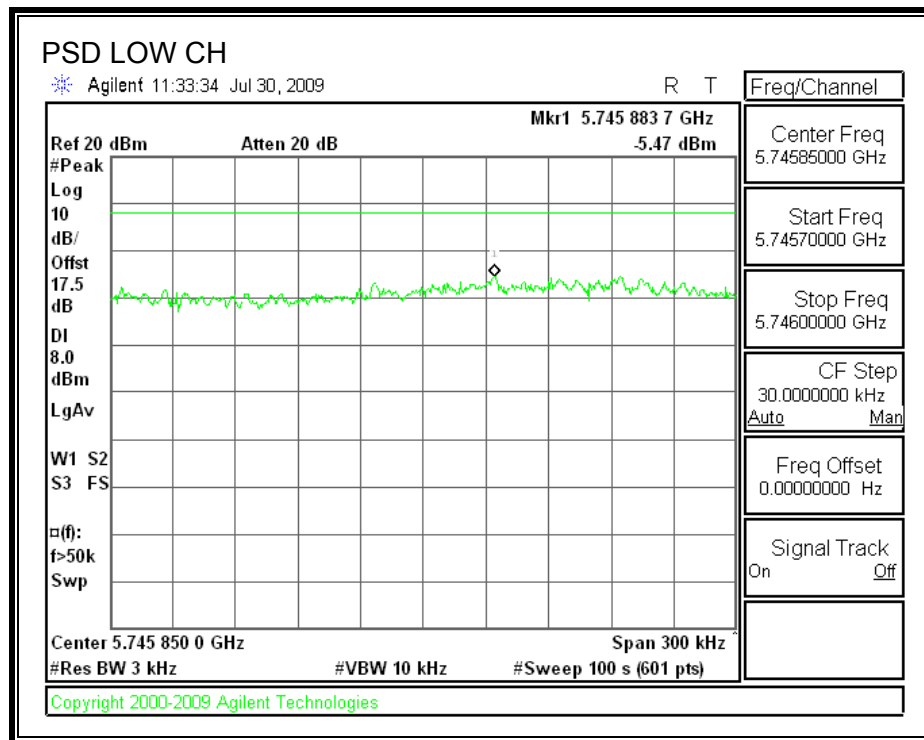
TEST PROCEDURE

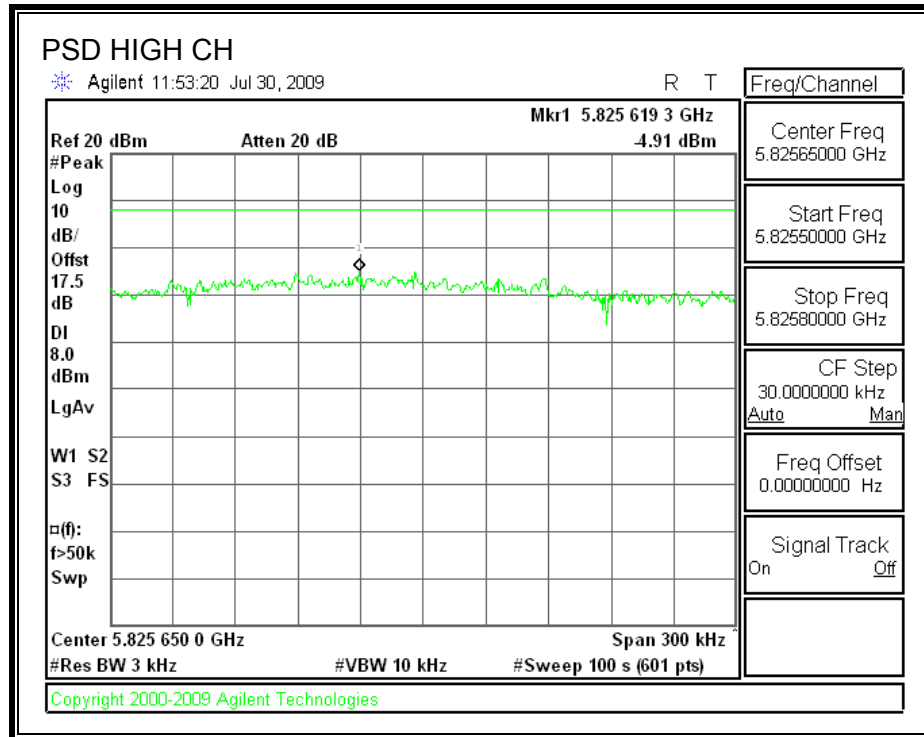
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-5.47	8	-13.47
Middle	5785	-5.78	8	-13.78
High	5825	-4.91	8	-12.91

POWER SPECTRAL DENSITY





7.7.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

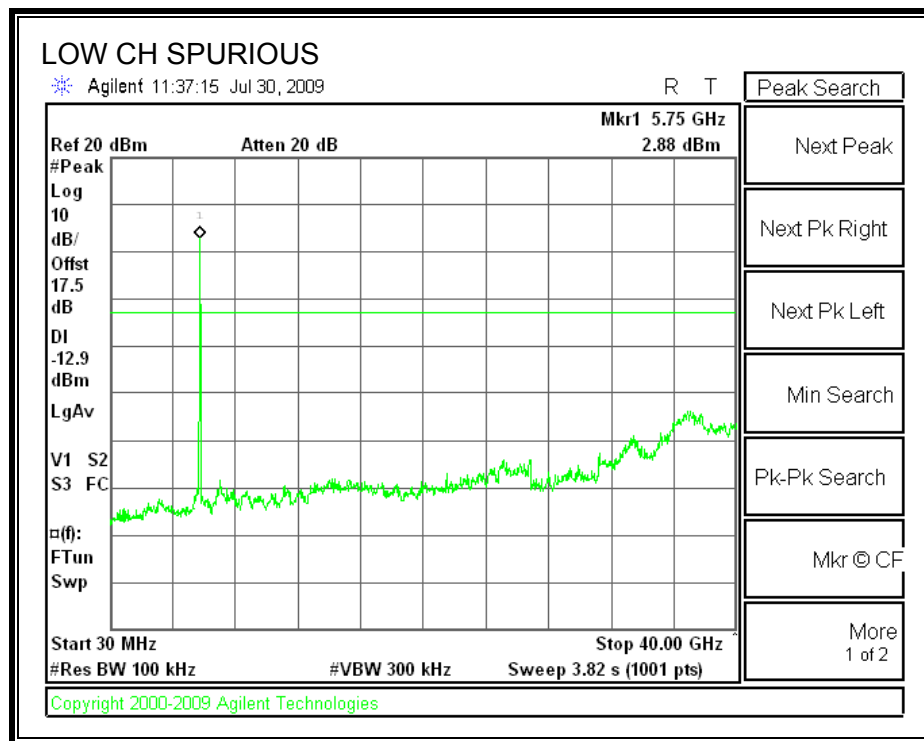
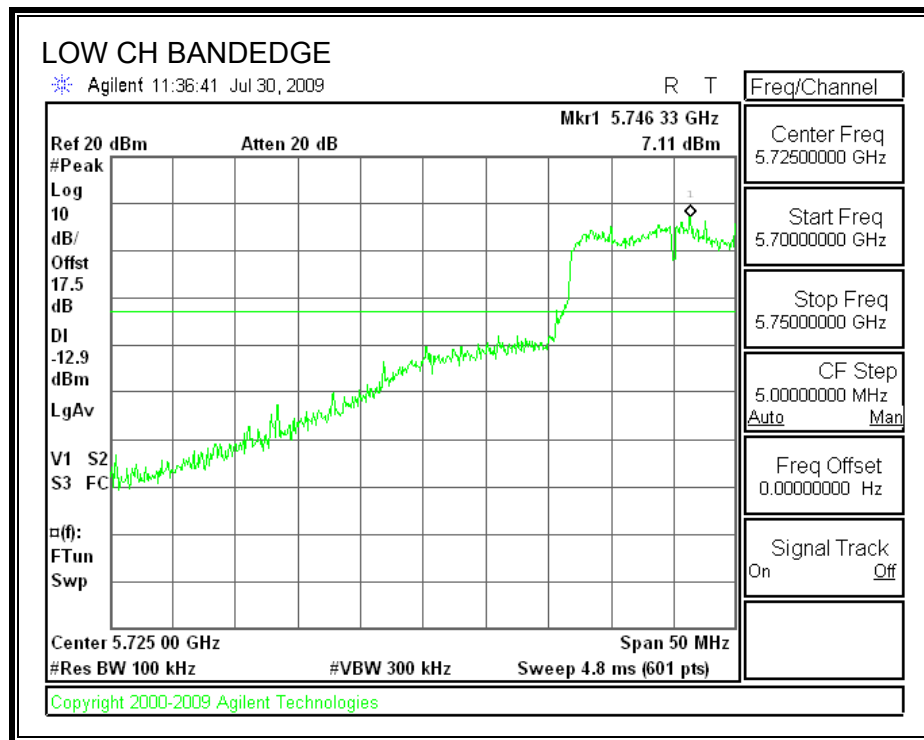
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

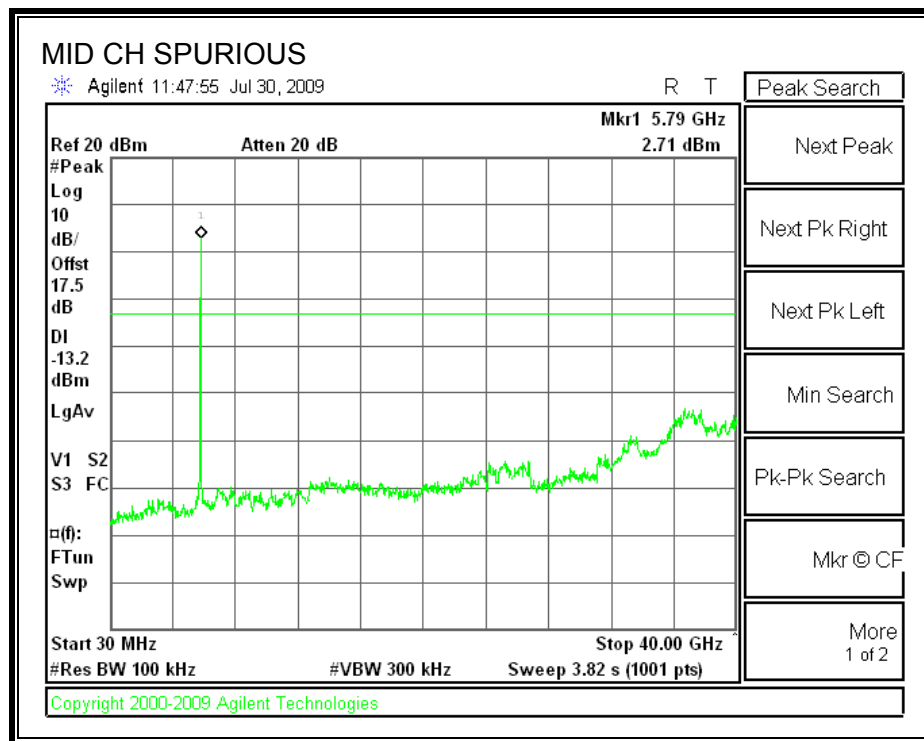
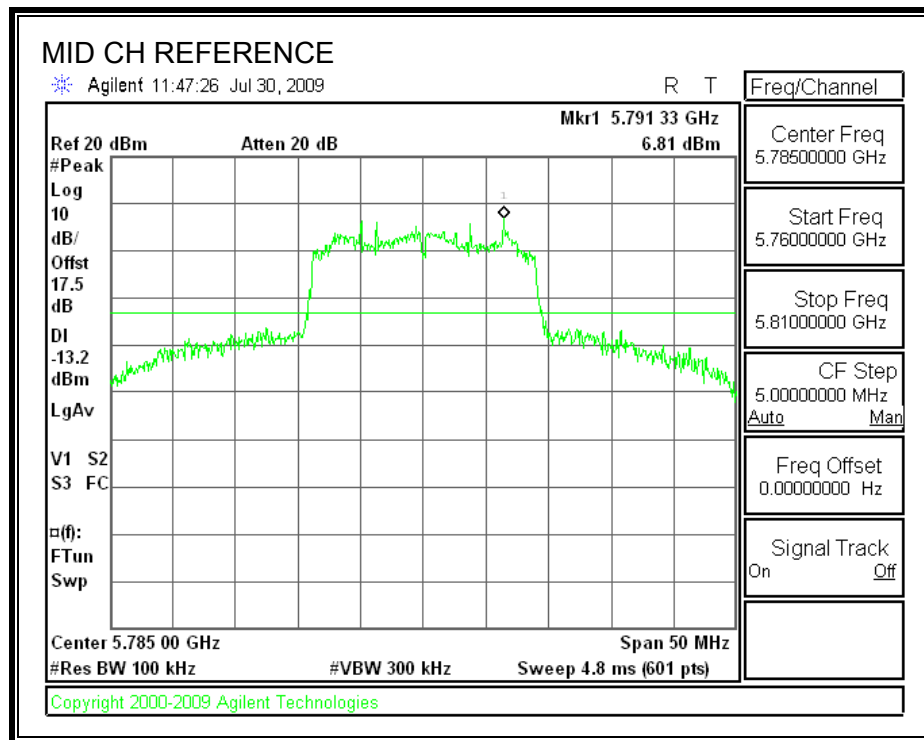
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

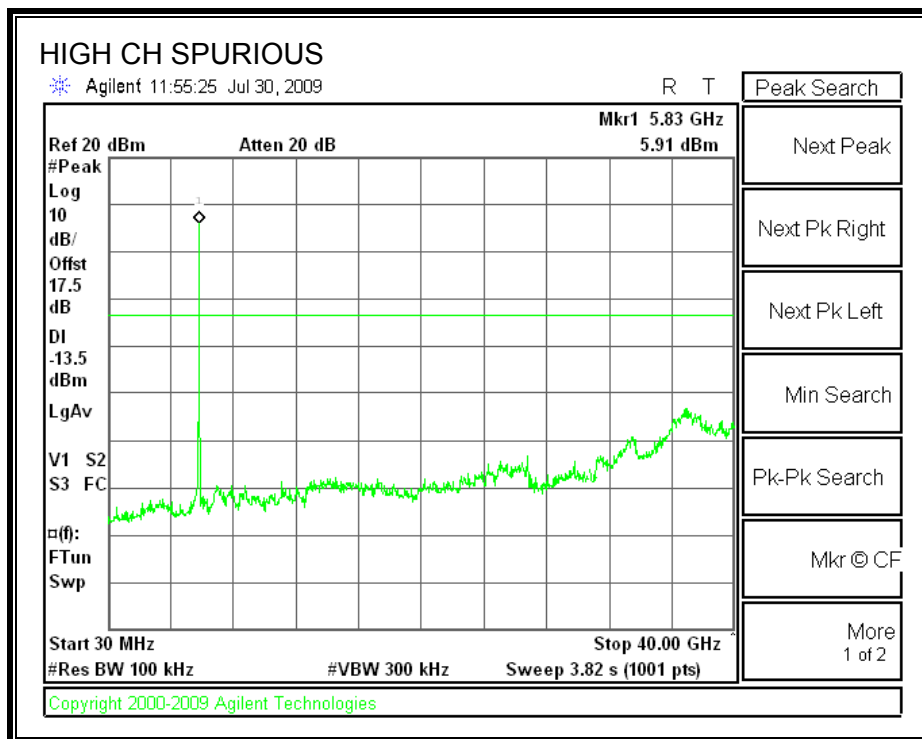
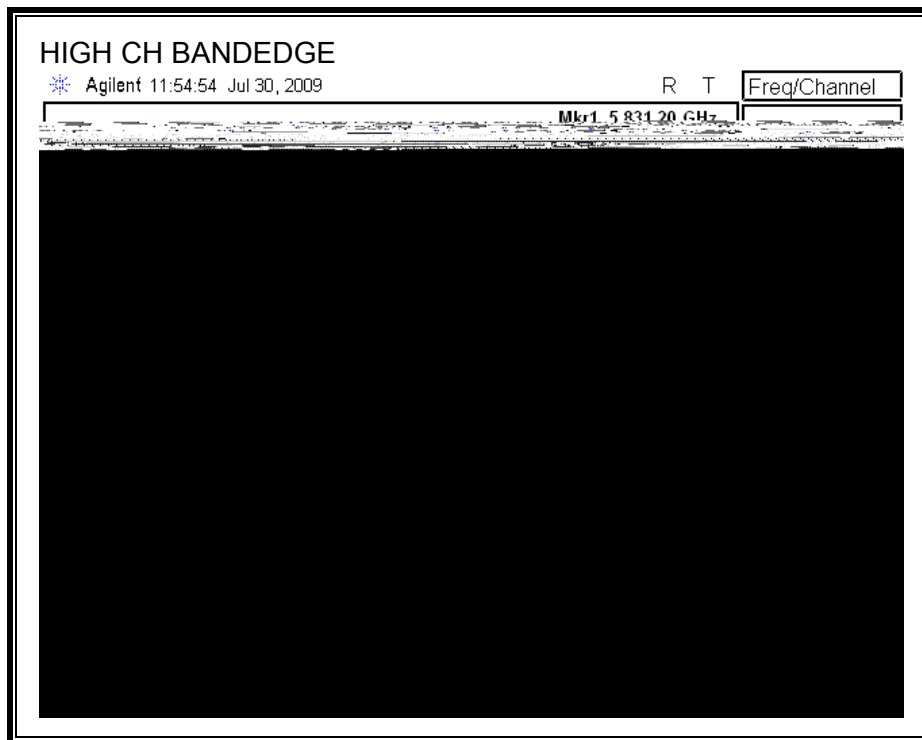
SPURIOUS EMISSIONS, LOW CHANNEL



SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



7.8. 802.11n HT20 MODE IN THE 5.8 GHz BAND

7.8.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

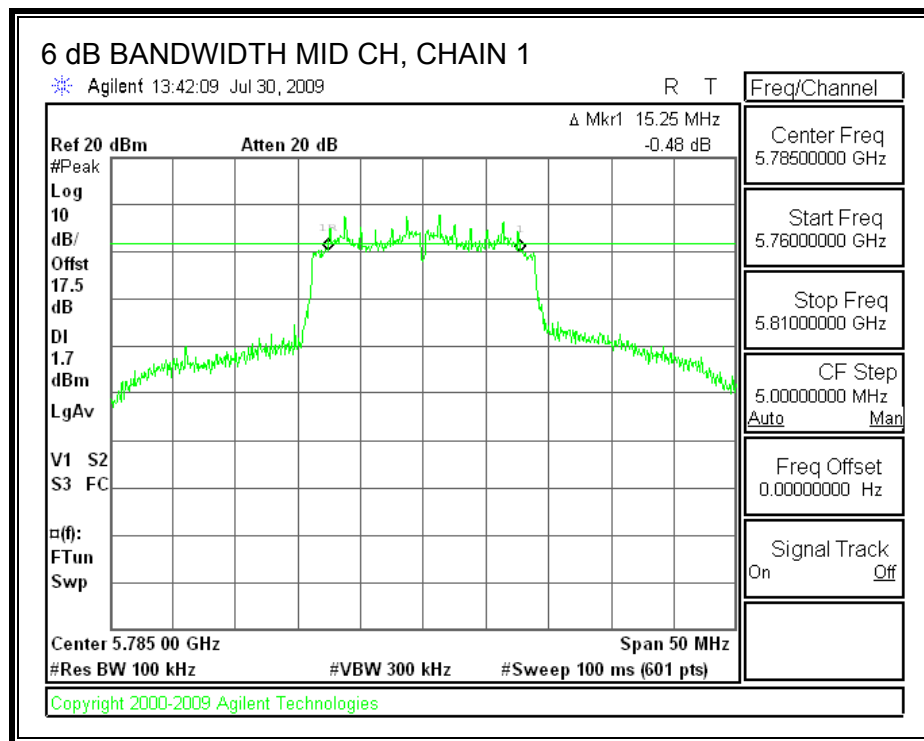
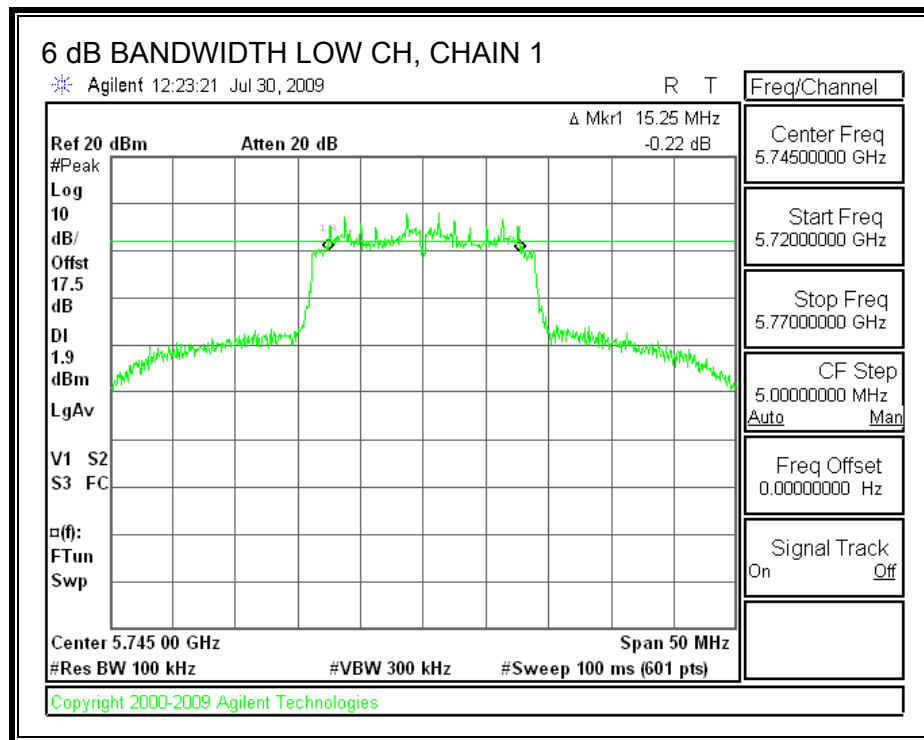
TEST PROCEDURE

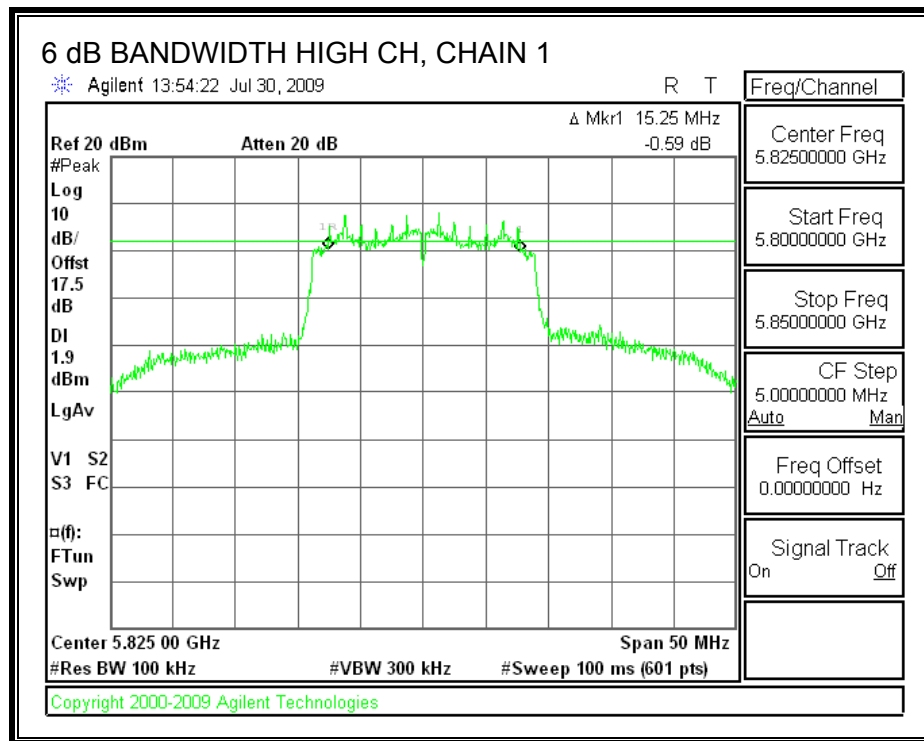
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

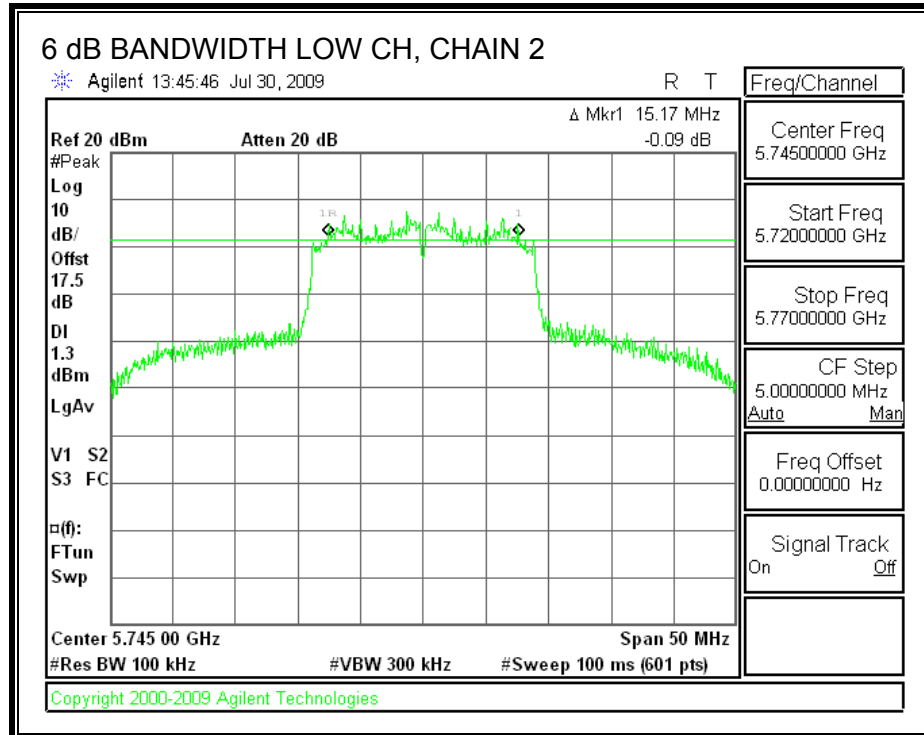
Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	5745	15.25	15.17	0.5
Middle	5785	15.25	15.75	0.5
High	5825	15.25	15.75	0.5

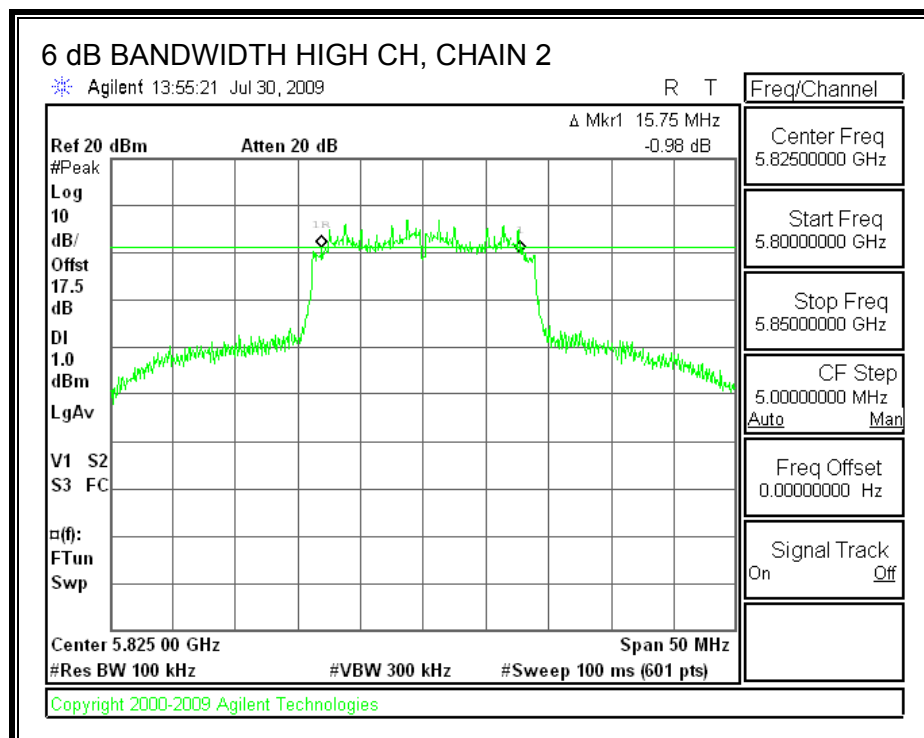
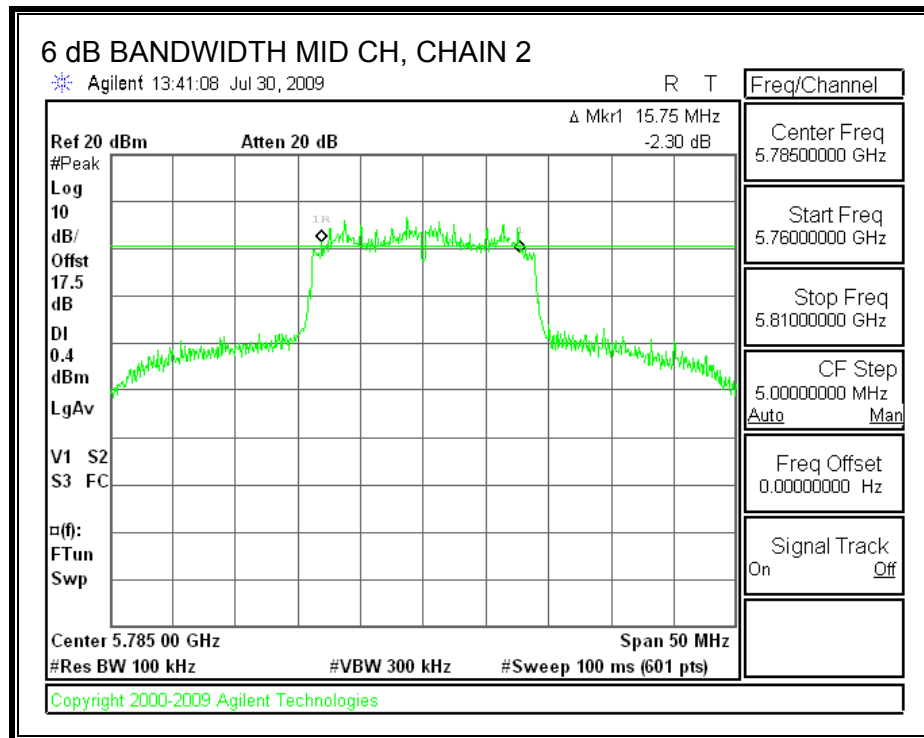
6 dB BANDWIDTH, CHAIN 1





6 dB BANDWIDTH, CHAIN 2





7.8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

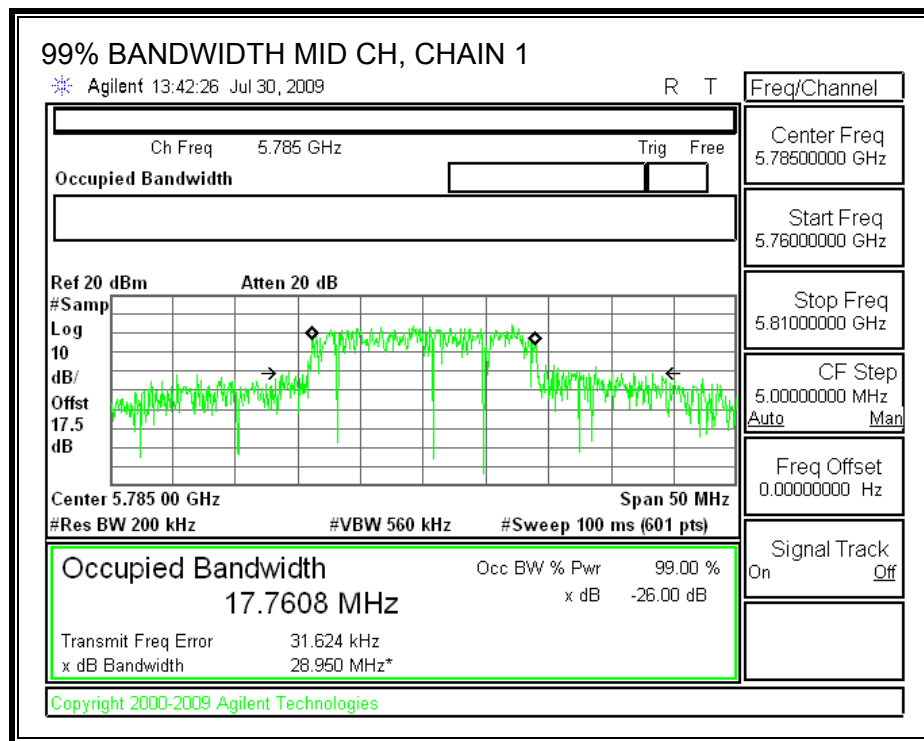
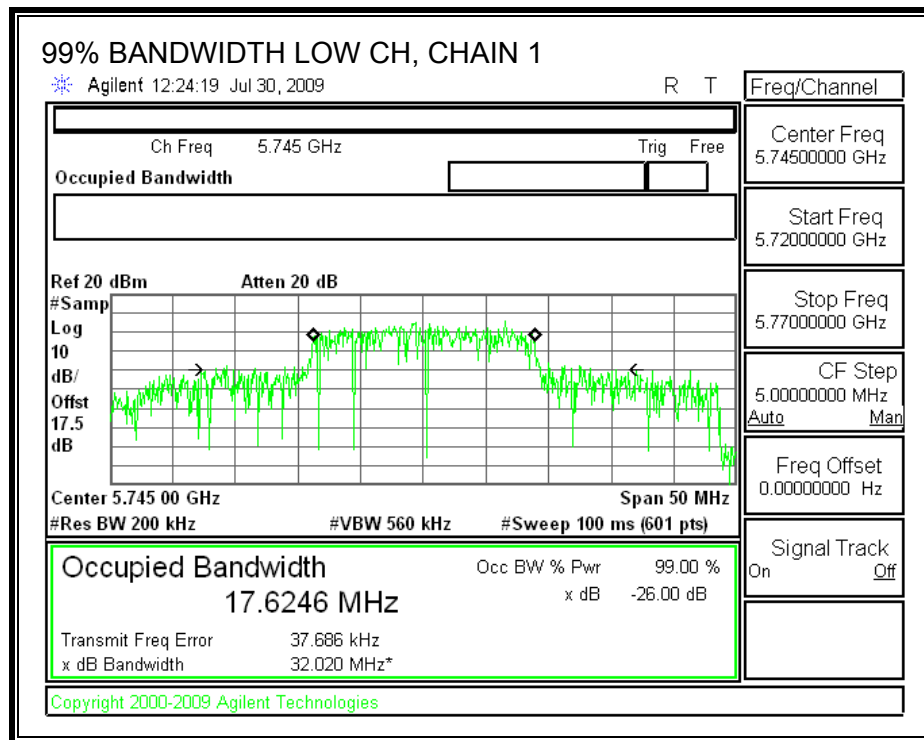
TEST PROCEDURE

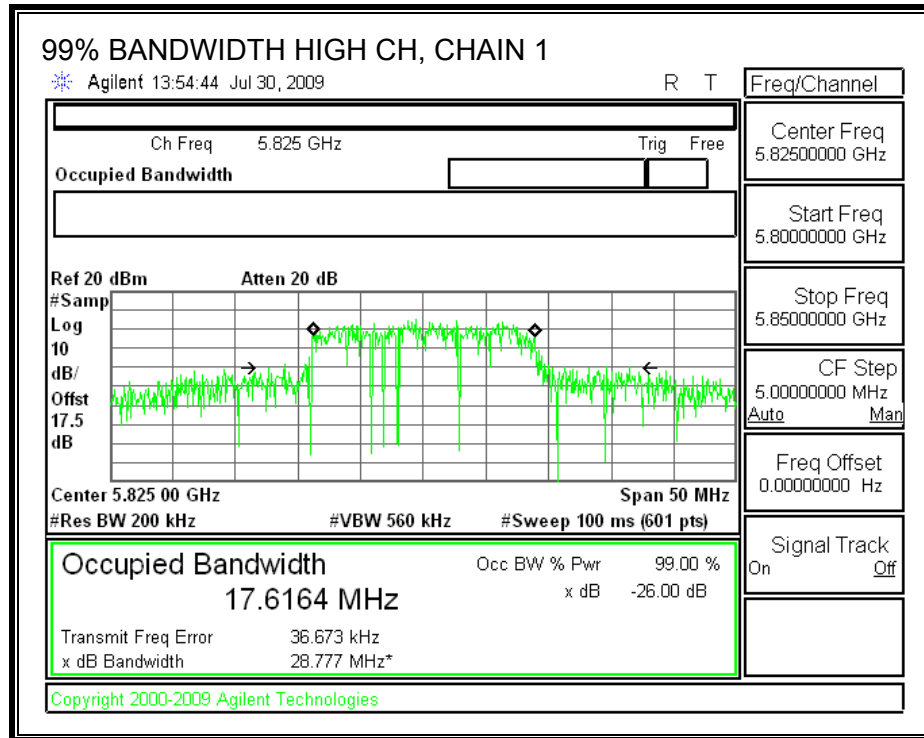
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

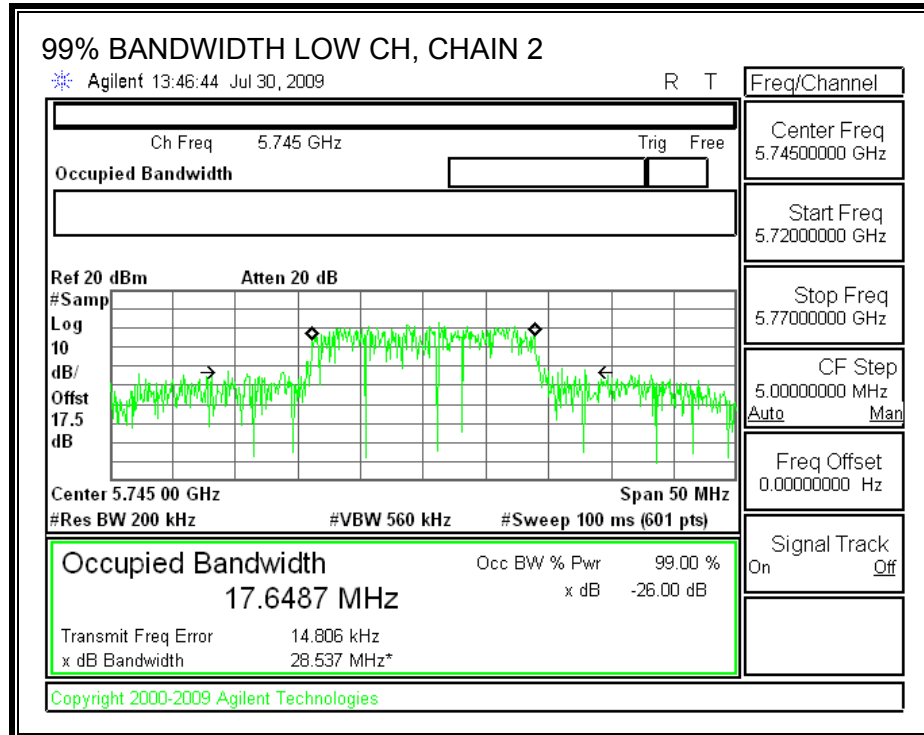
Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	5745	17.6246	17.6487
Middle	5785	17.7608	17.5461
High	5825	17.6164	17.7366

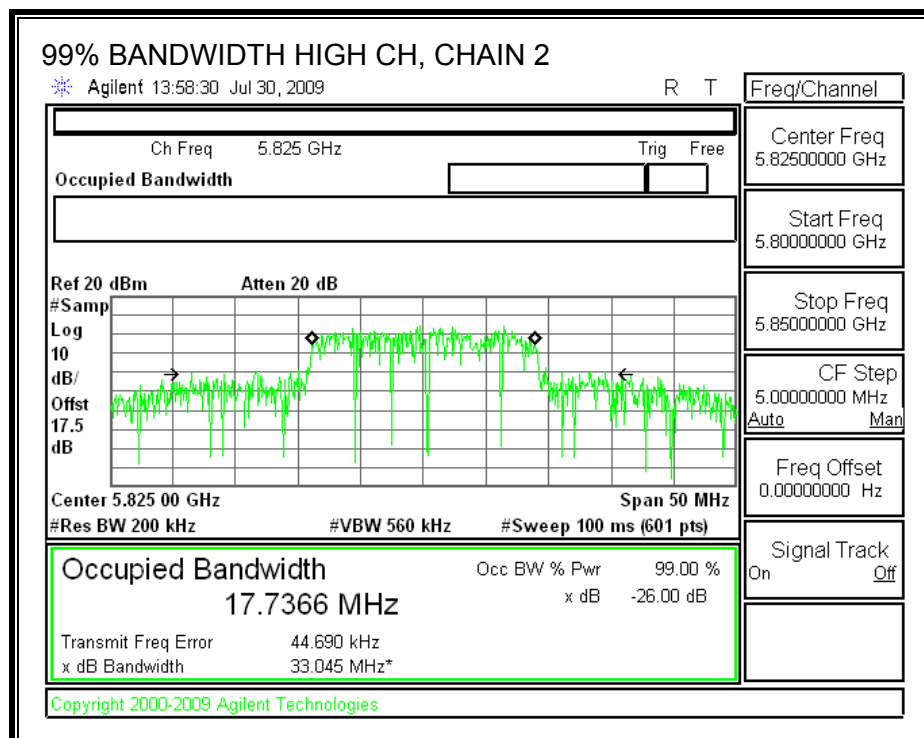
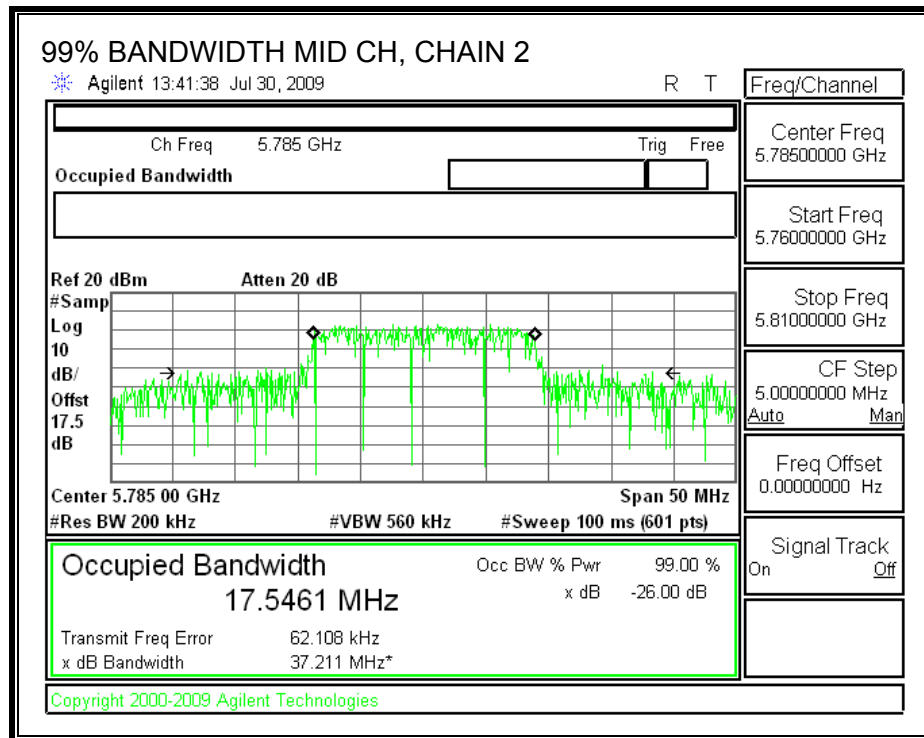
99% BANDWIDTH, CHAIN 1





99% BANDWIDTH, CHAIN 2





7.8.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The highest combination of antenna gains is equal to 6.47 dBi, therefore the limit is 29.53 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Limit (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Margin (dB)
Low	5745	29.53	20.54	19.84	23.21	-6.32
Mid	5785	29.53	20.44	20.11	23.29	-6.24
High	5825	29.53	20.84	20.26	23.57	-5.96

7.8.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

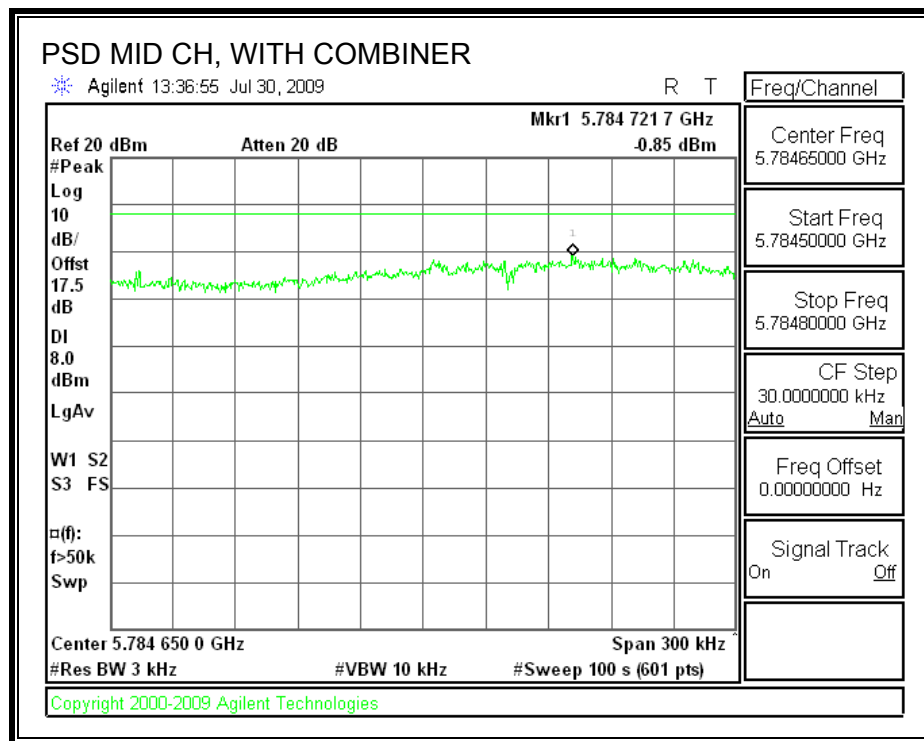
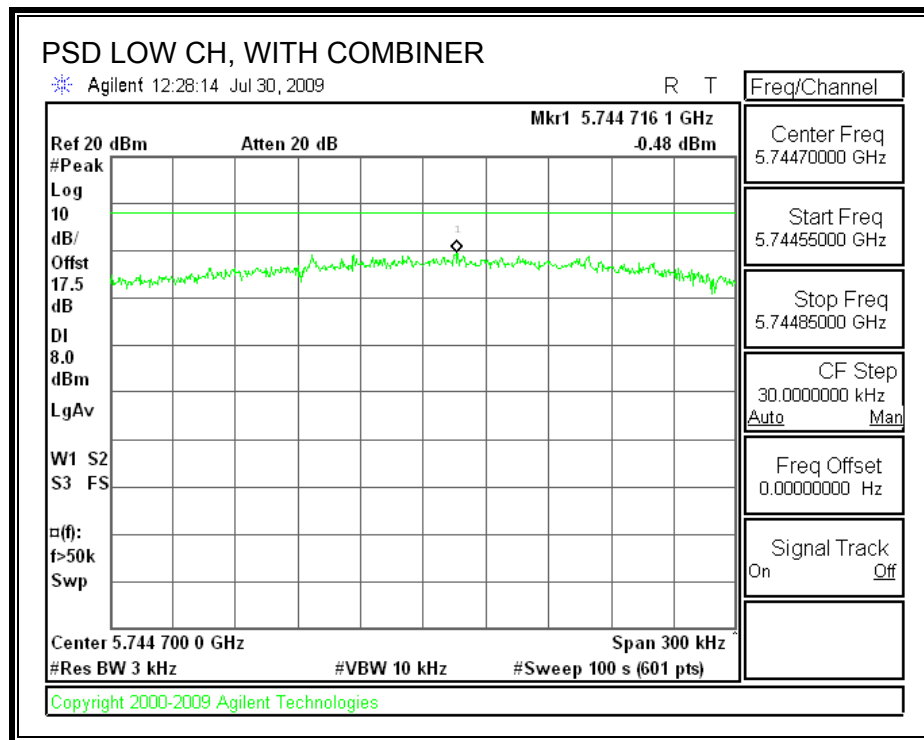
TEST PROCEDURE

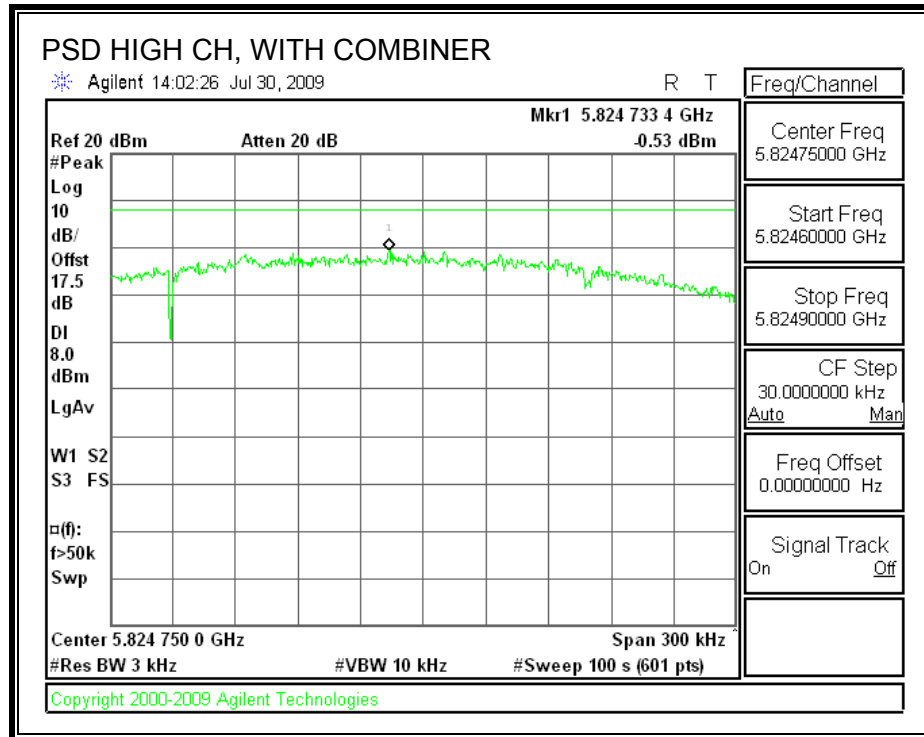
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS:

Channel	Frequency (MHz)	PSD with Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-0.48	8	-8.48
Middle	5785	-0.85	8	-8.85
High	5825	-0.53	8	-8.53

POWER SPECTRAL DENSITY, WITH COMBINER





7.8.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

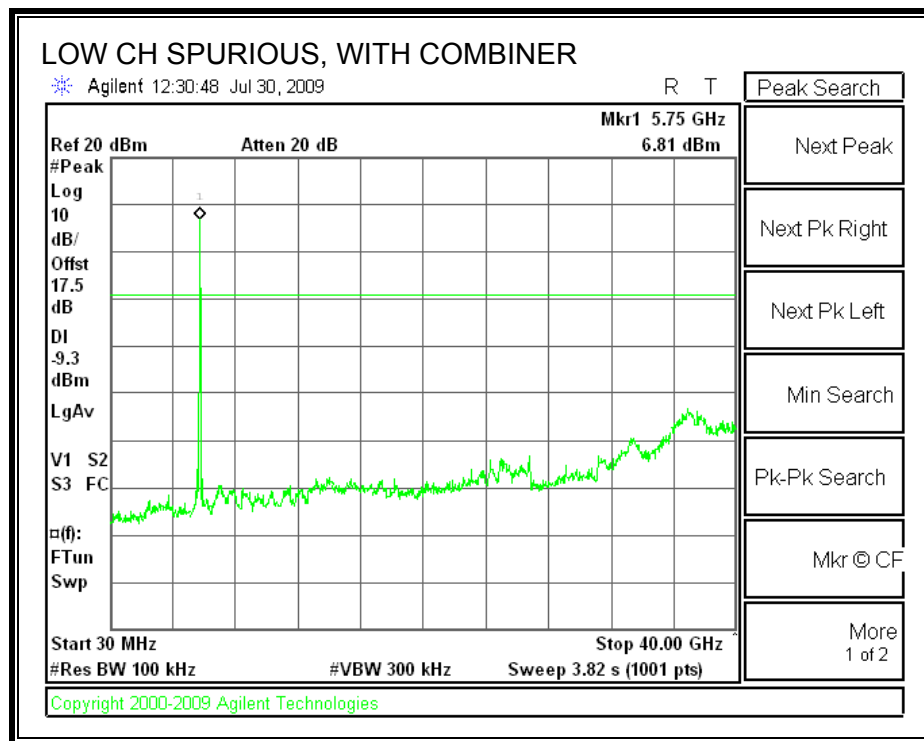
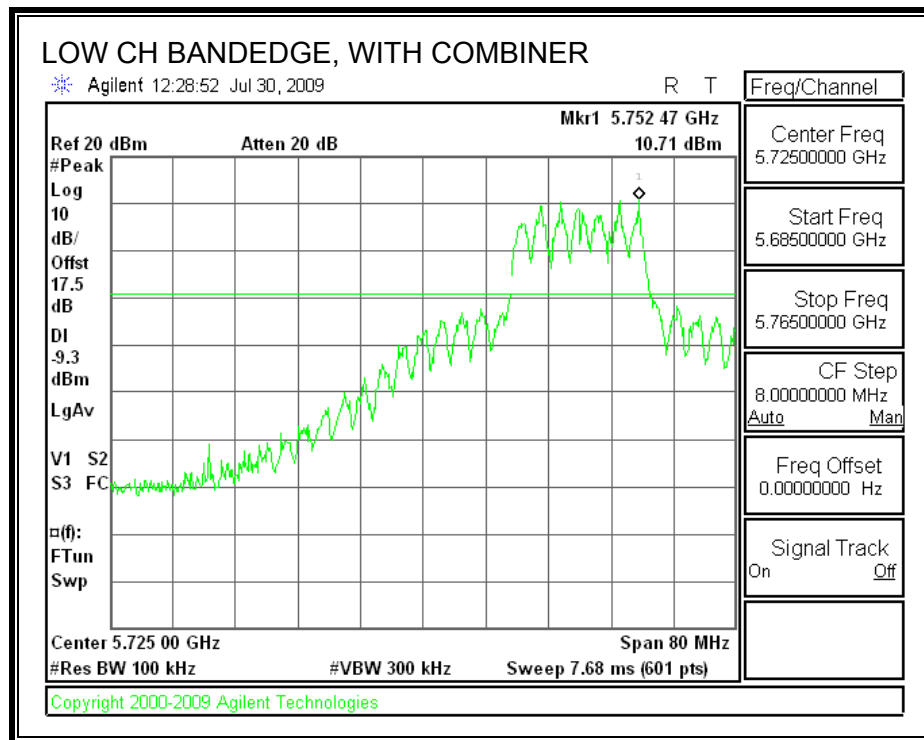
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

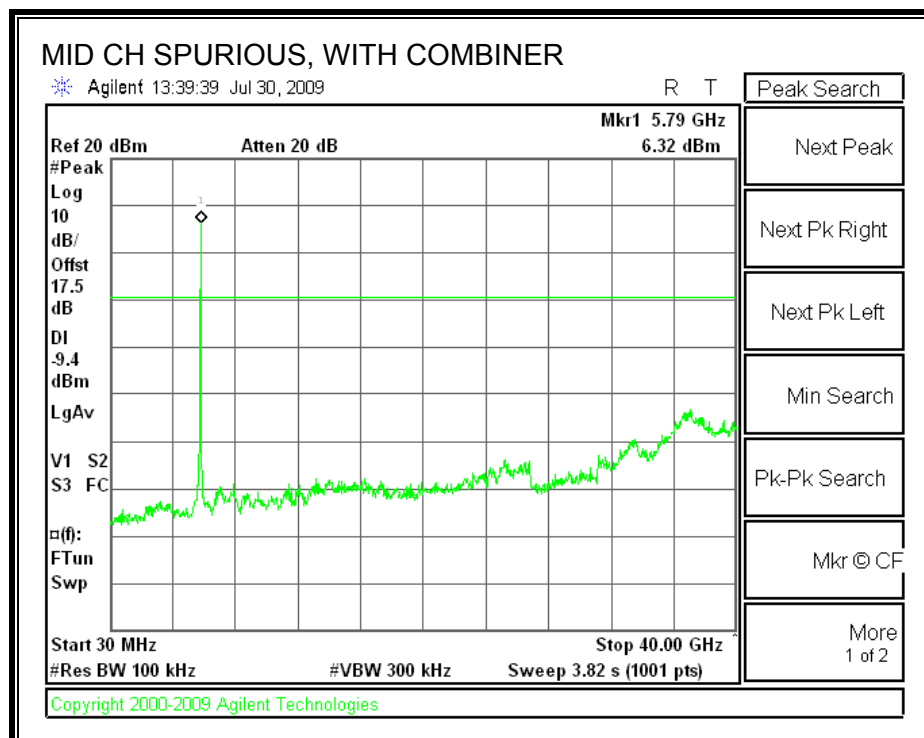
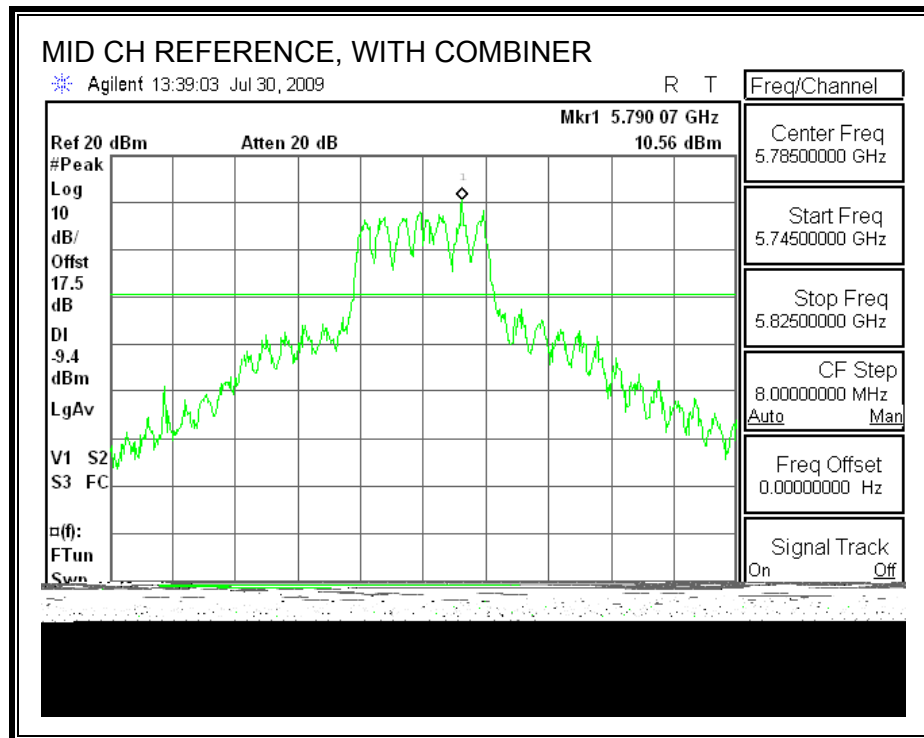
TEST PROCEDURE

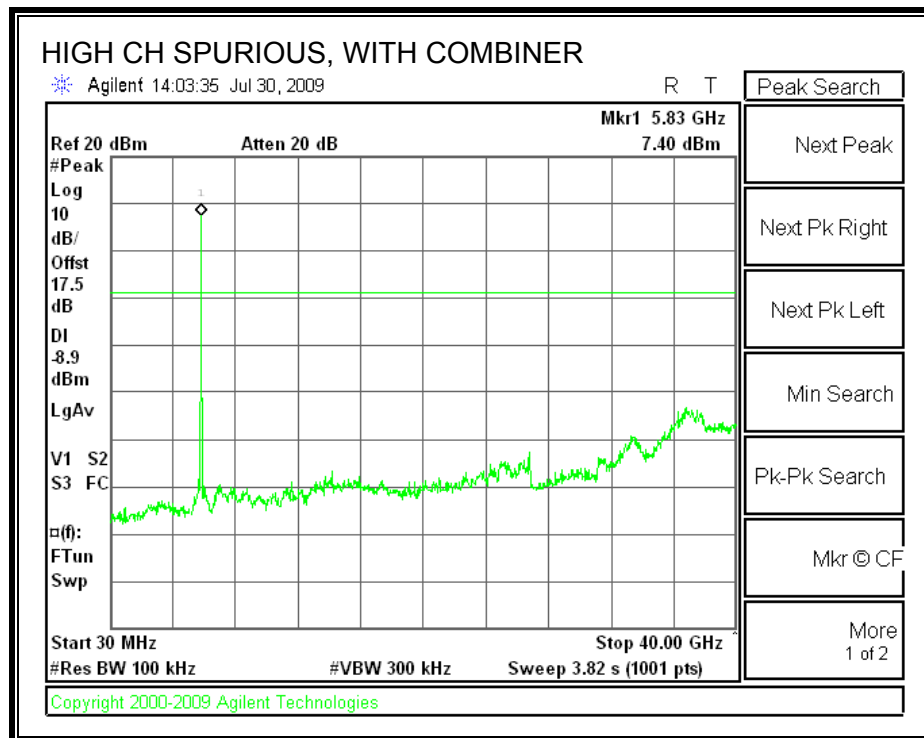
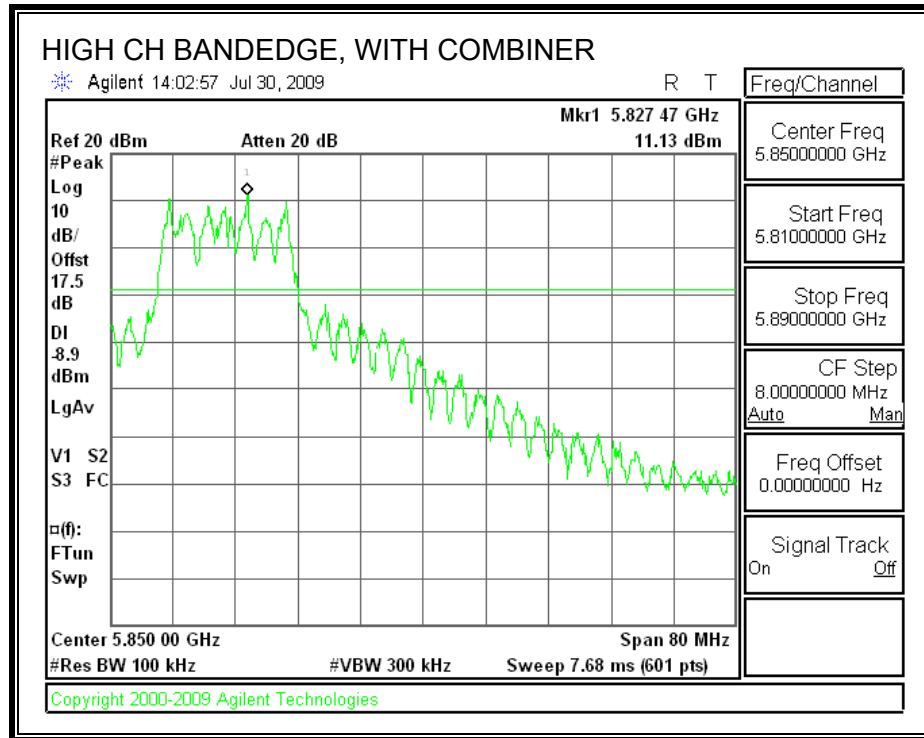
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

SPURIOUS EMISSIONS WITH COMBINER







7.9. 802.11n HT40 SISO MODE IN THE 5.8 GHz BAND

7.9.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

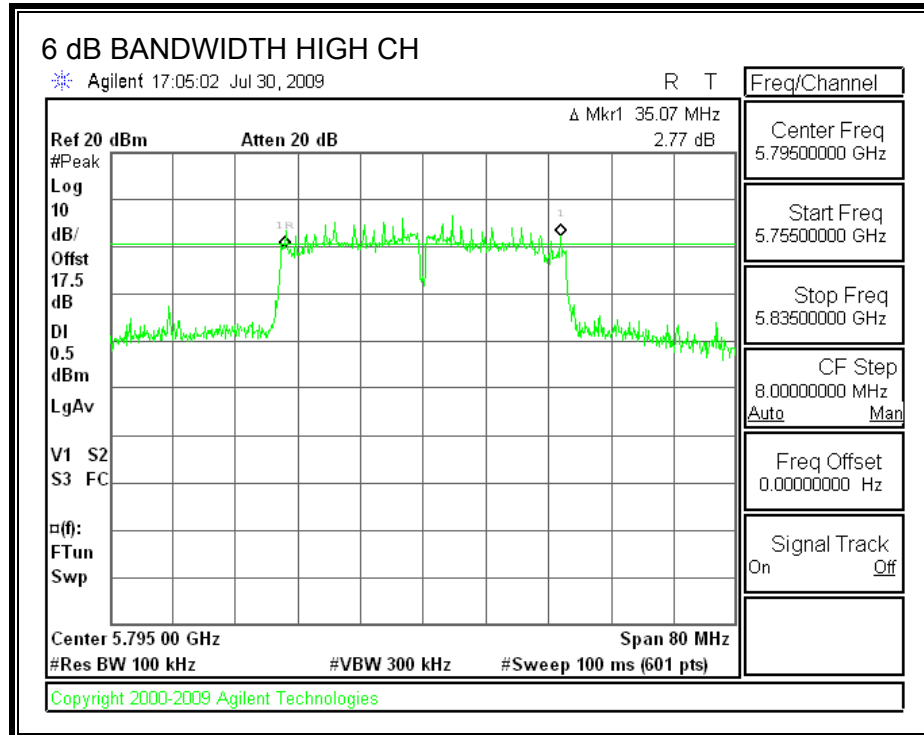
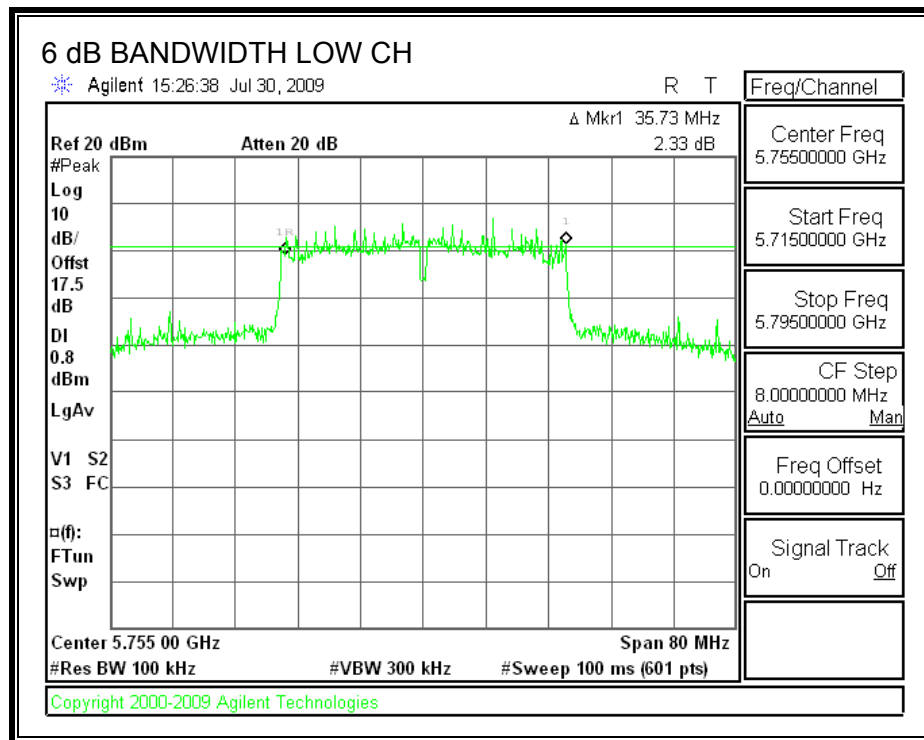
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	35.73	0.5
High	5795	35.07	0.5

6 dB BANDWIDTH



7.9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

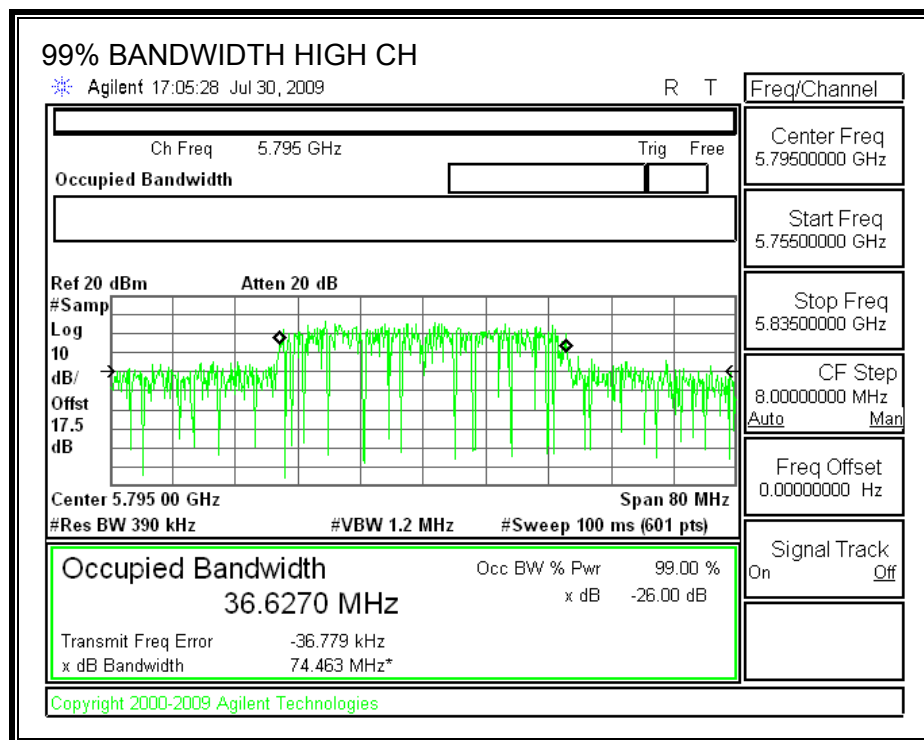
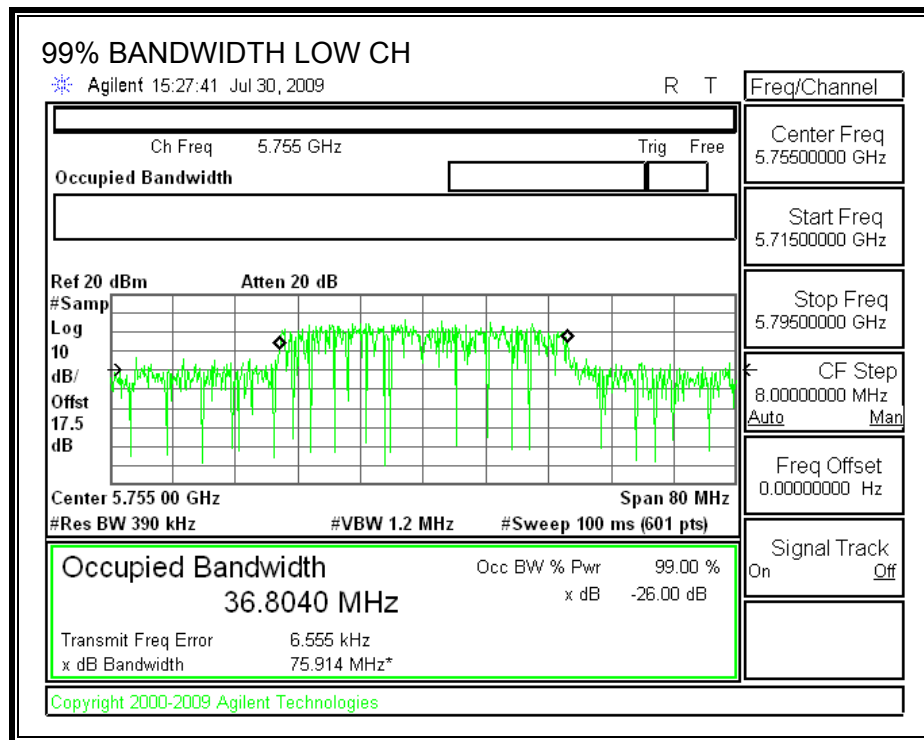
TEST PROCEDURE

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

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.8040
High	5795	36.6270

99% BANDWIDTH



7.9.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Peak Power Meter Reading (dBm)	Limit (dBm)	Margin (dB)
Low	5755	24.27	30	-5.73
High	5795	24.17	30	-5.83

7.9.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

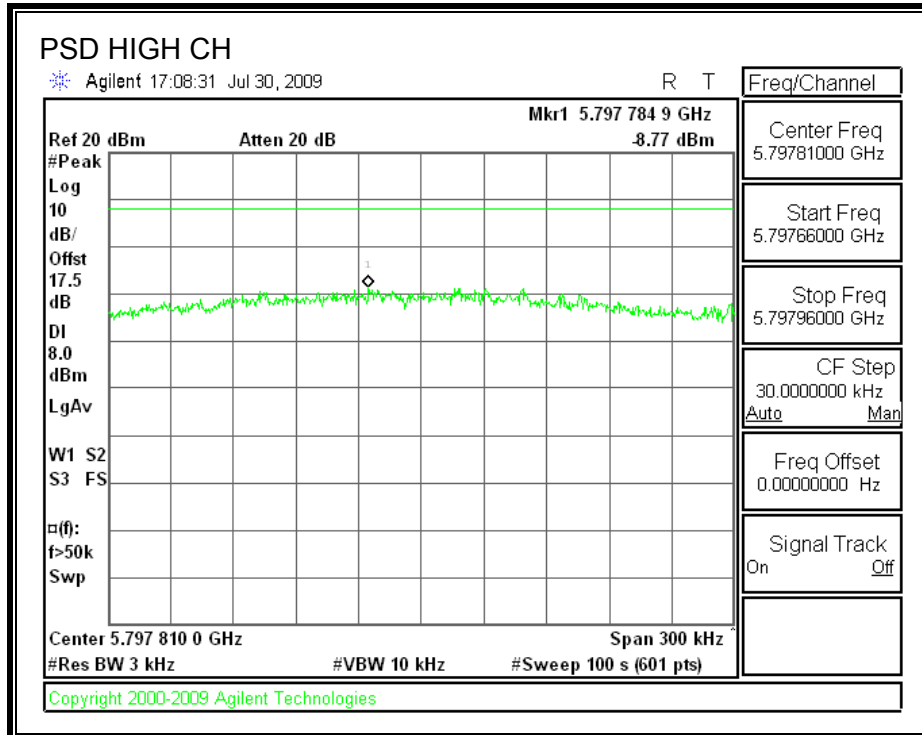
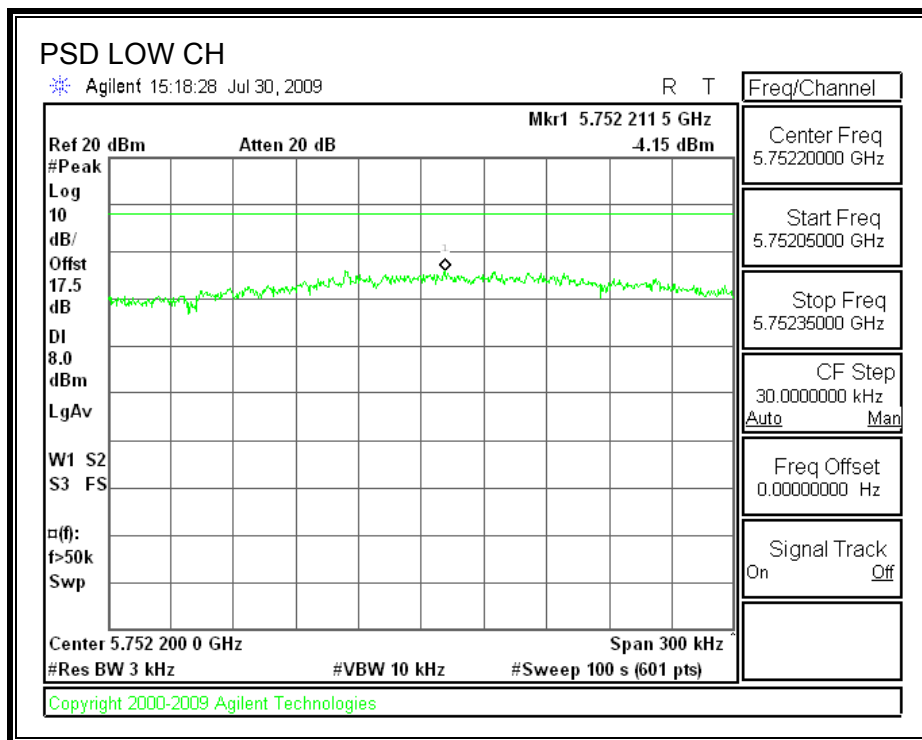
TEST PROCEDURE

Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS:

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-4.15	8	-12.15
High	5795	-8.77	8	-16.77

POWER SPECTRAL DENSITY



7.9.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

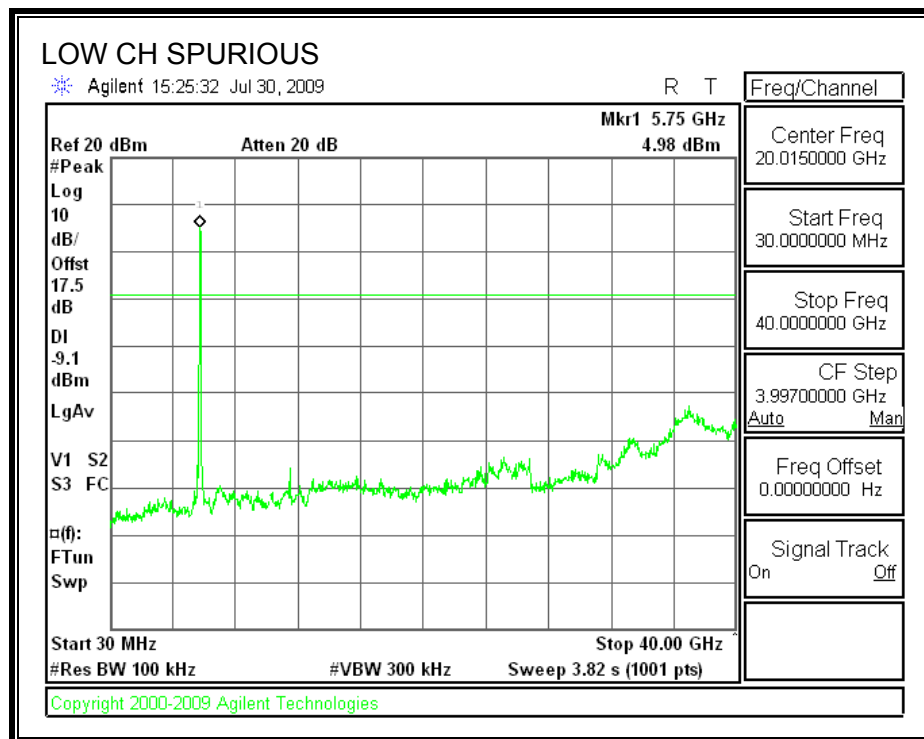
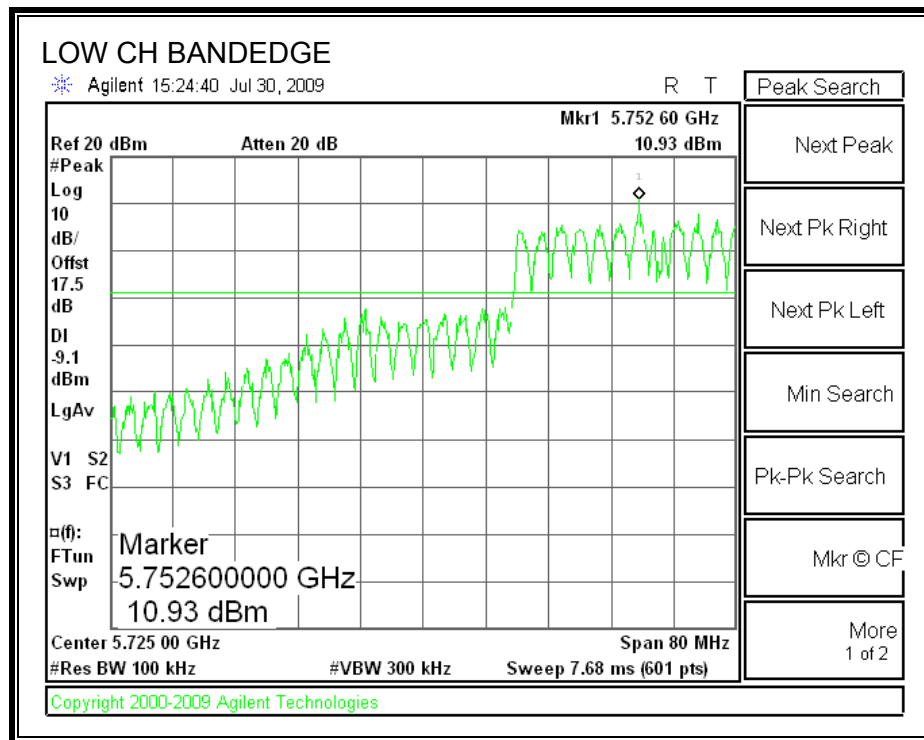
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

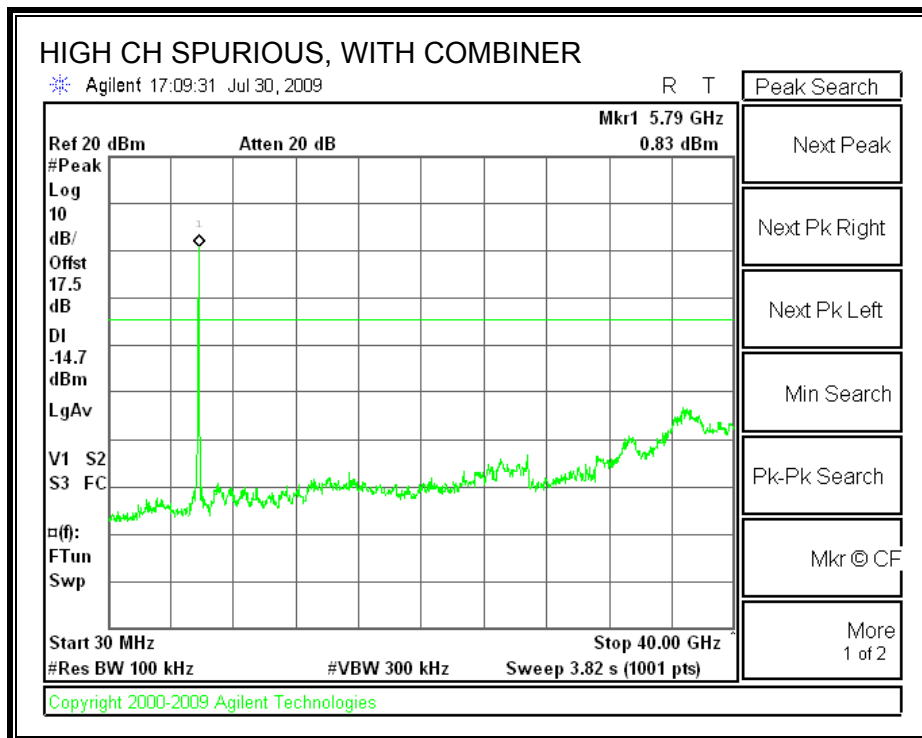
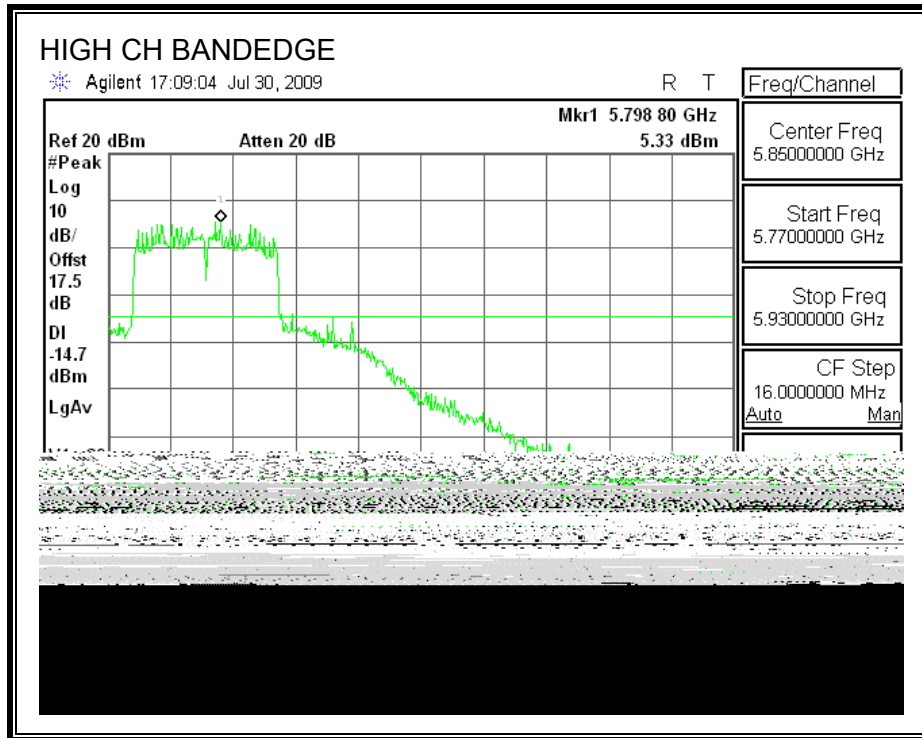
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest and highest channels.

SPURIOUS EMISSIONS





7.10. 802.11n HT40 MODE IN THE 5.8 GHz BAND

7.10.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

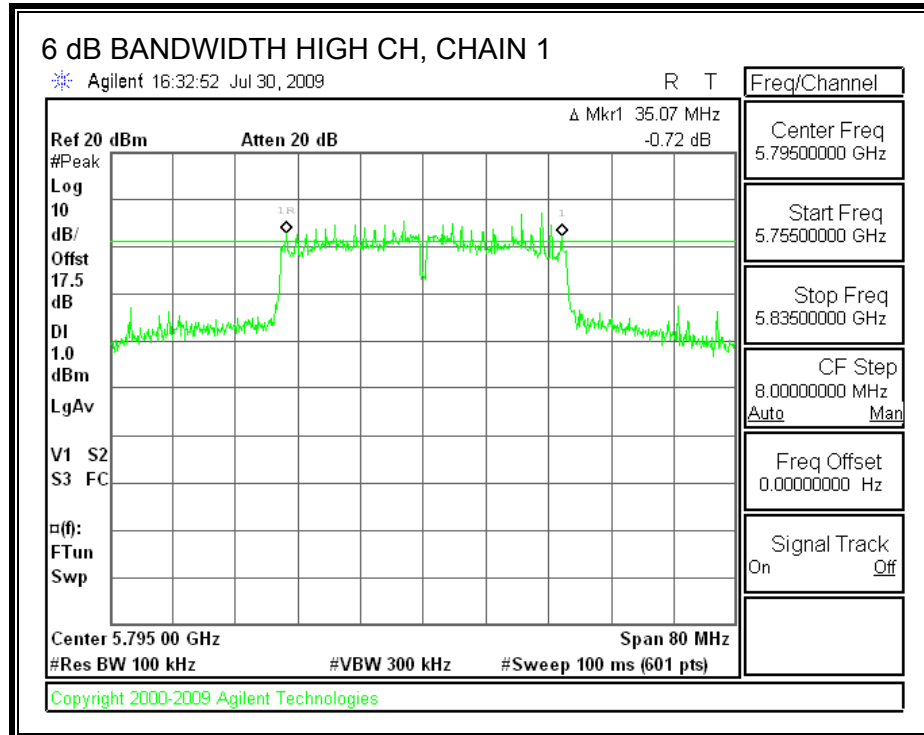
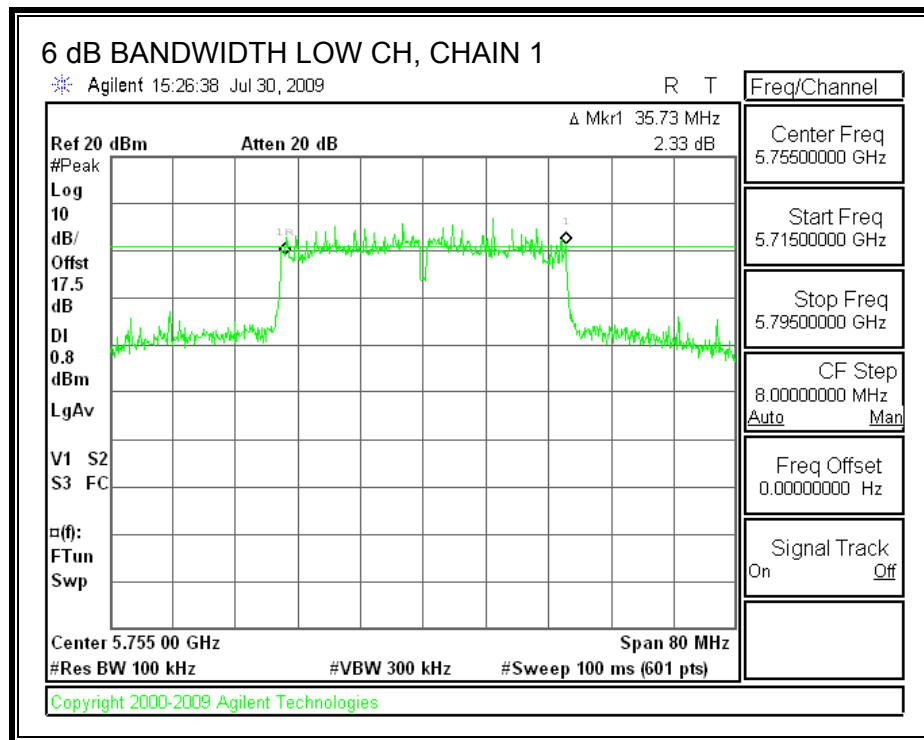
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

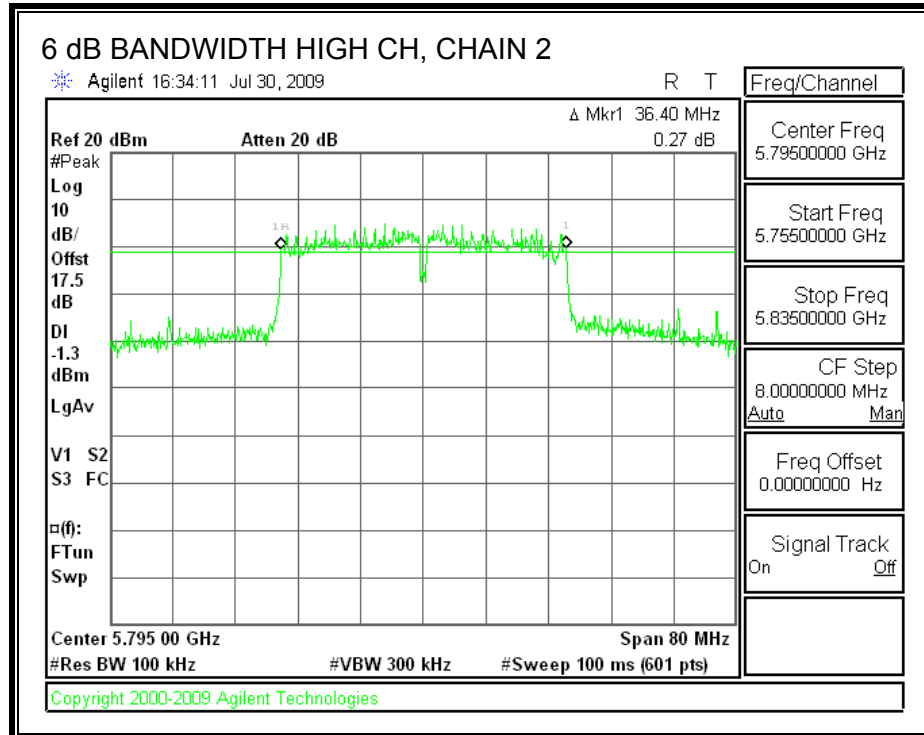
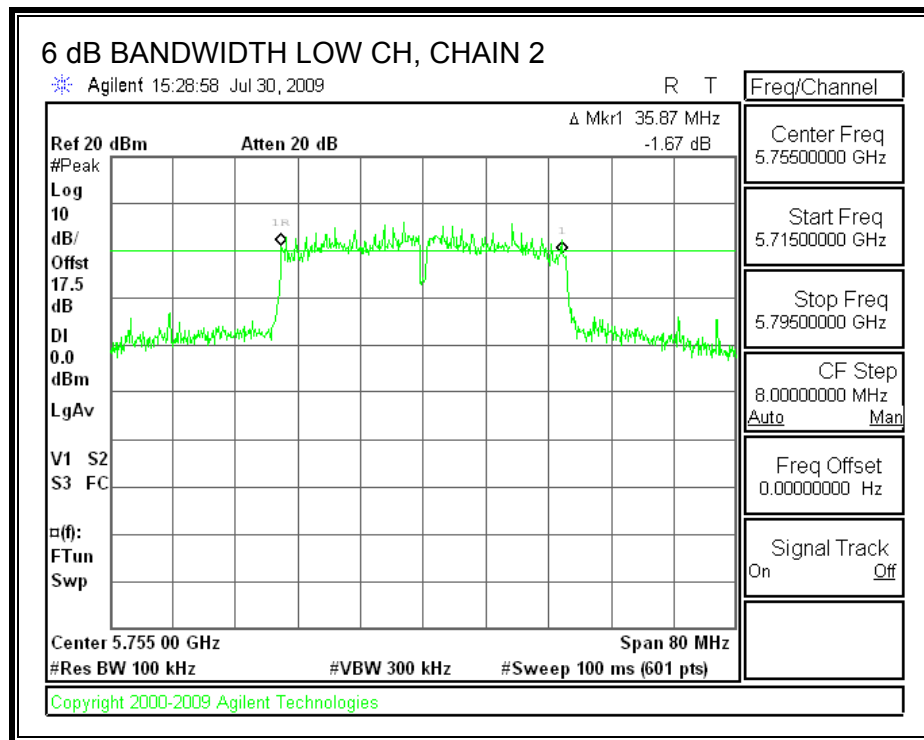
RESULTS

Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	5755	35.73	35.87	0.5
High	5795	35.07	36.4	0.5

6 dB BANDWIDTH, CHAIN 1



6 dB BANDWIDTH, CHAIN 2



7.10.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

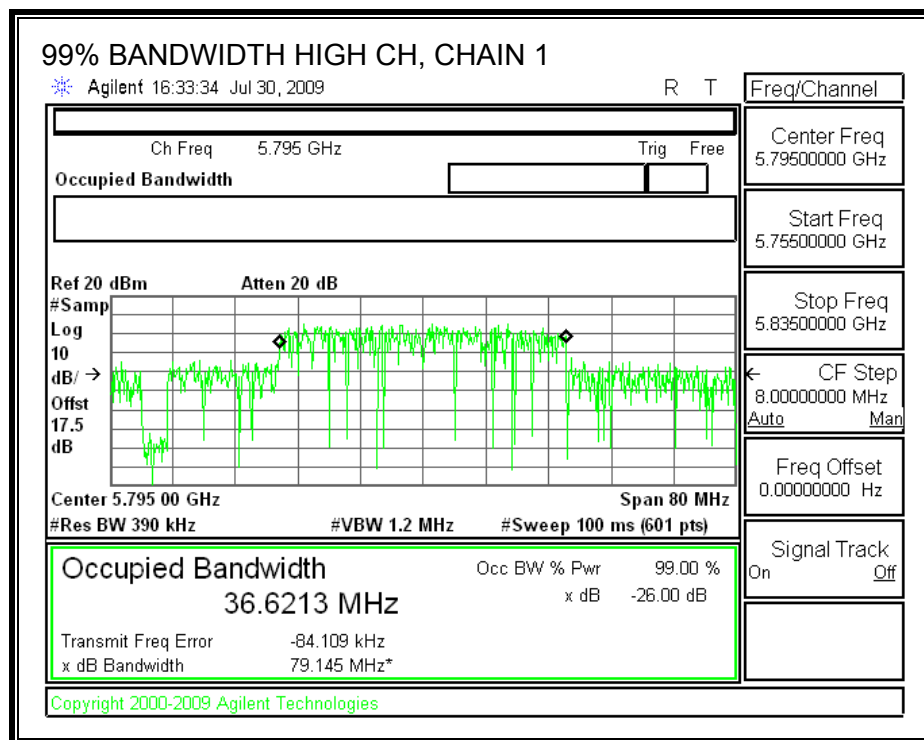
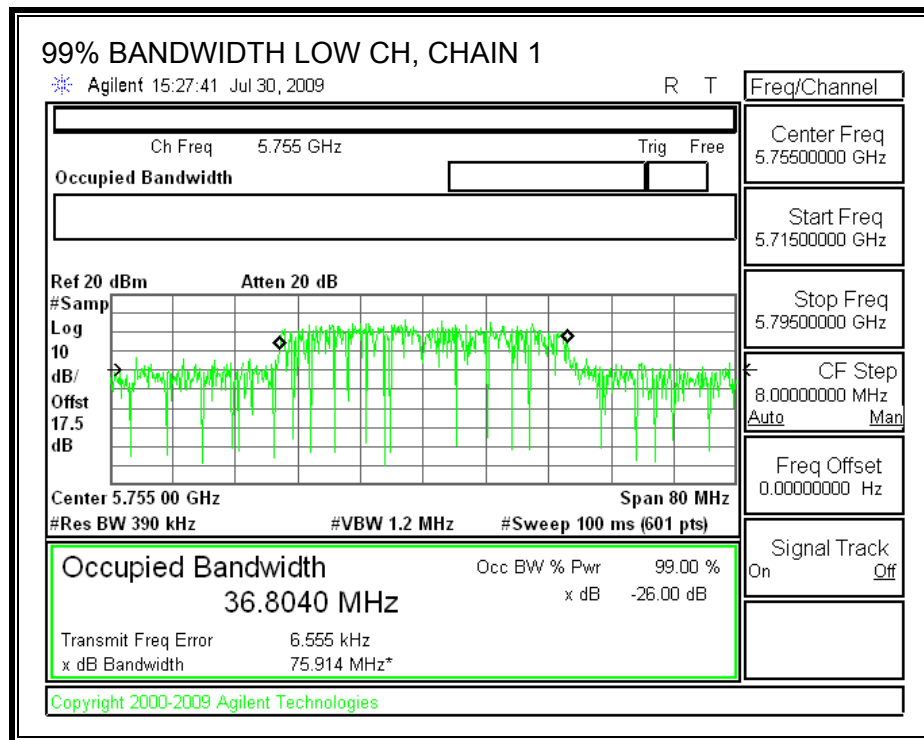
TEST PROCEDURE

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

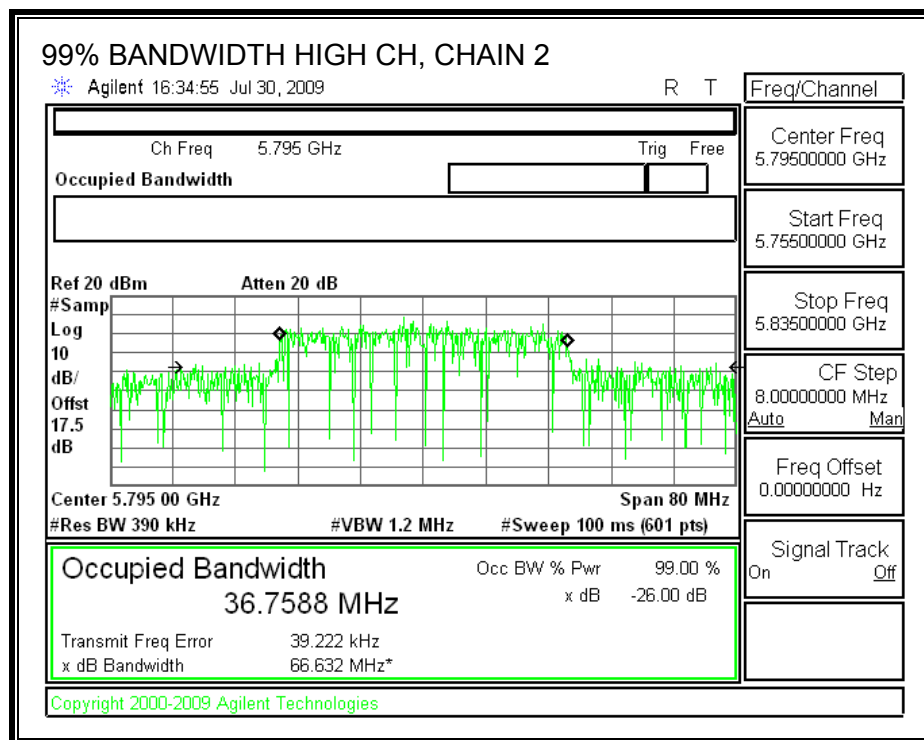
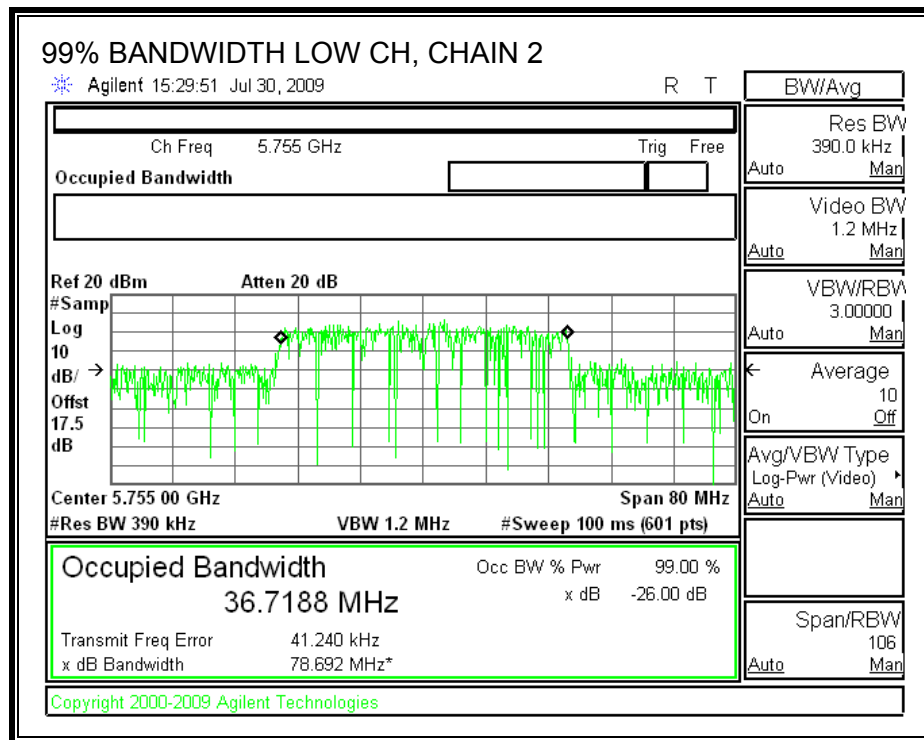
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	5755	36.8040	36.7188
High	5795	36.6213	36.7588

99% BANDWIDTH, CHAIN 1



99% BANDWIDTH, CHAIN 2



7.10.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The highest combination of antenna gains is equal to 6.47 dBi, therefore the limit is 29.53 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Limit (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Margin (dB)
Low	5755	29.53	22.95	22.99	25.98	-3.55
High	5795	29.53	22.85	22.91	25.89	-3.64

7.10.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

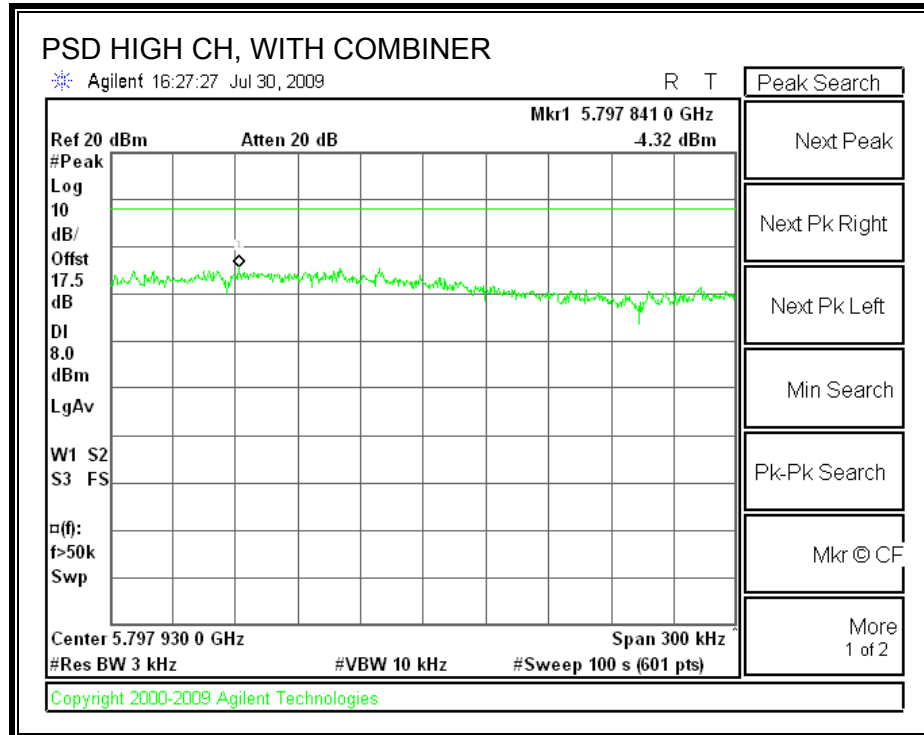
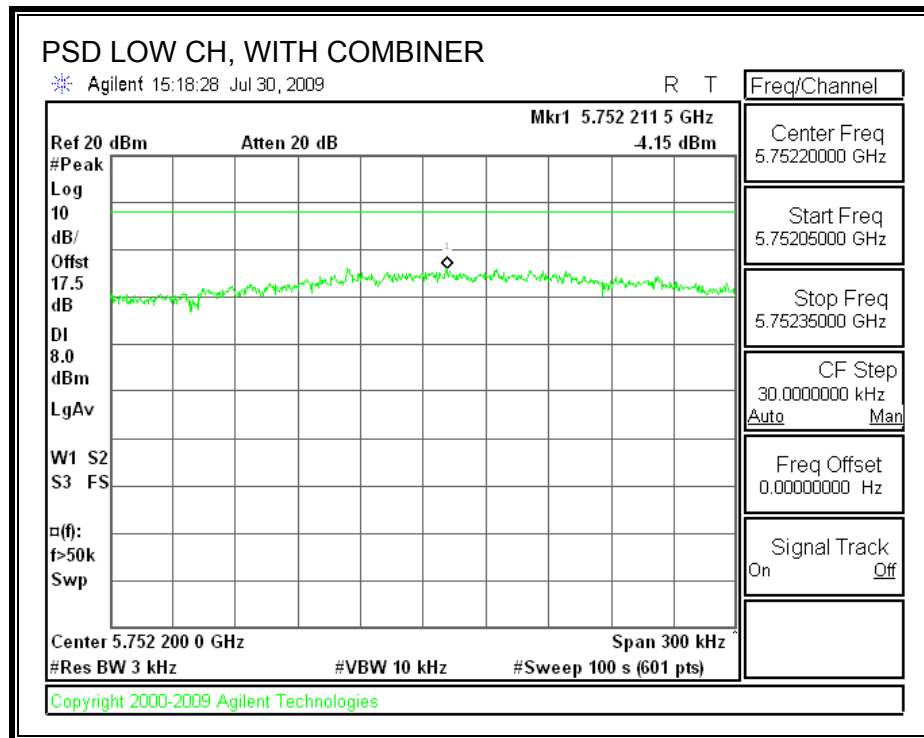
TEST PROCEDURE

Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS:

Channel	Frequency (MHz)	PSD with Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-4.15	8	-12.15
High	5795	-4.32	8	-12.32

POWER SPECTRAL DENSITY, WITH COMBINER



7.10.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

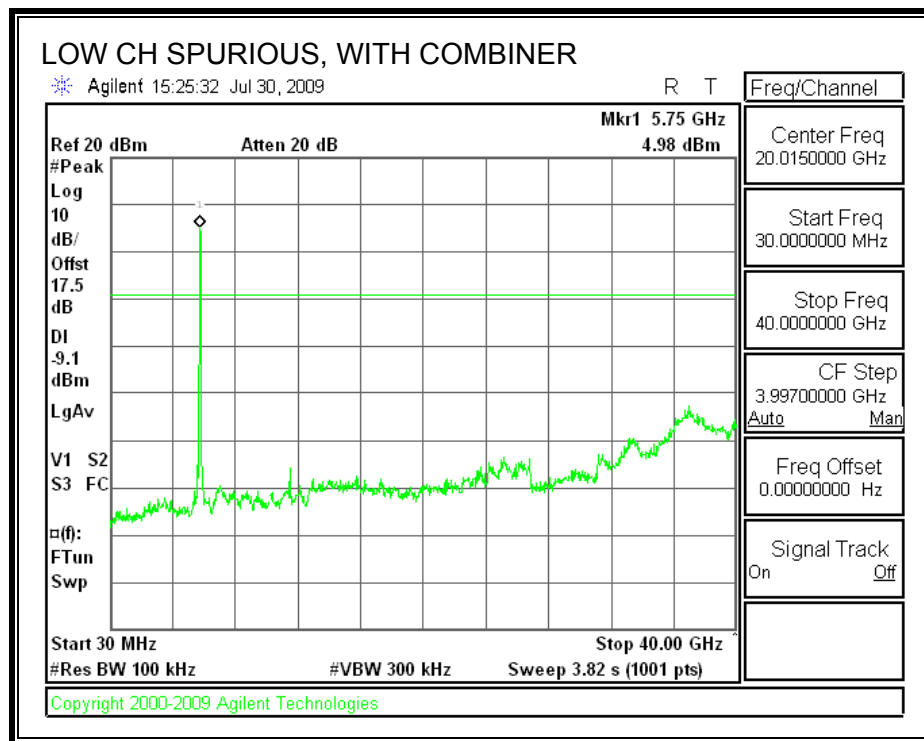
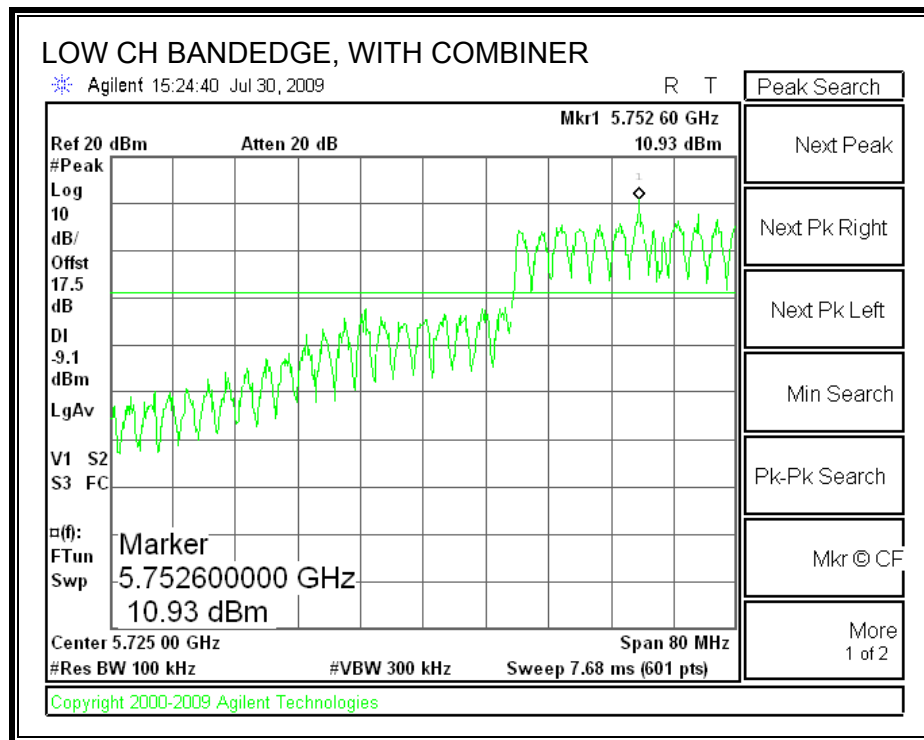
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

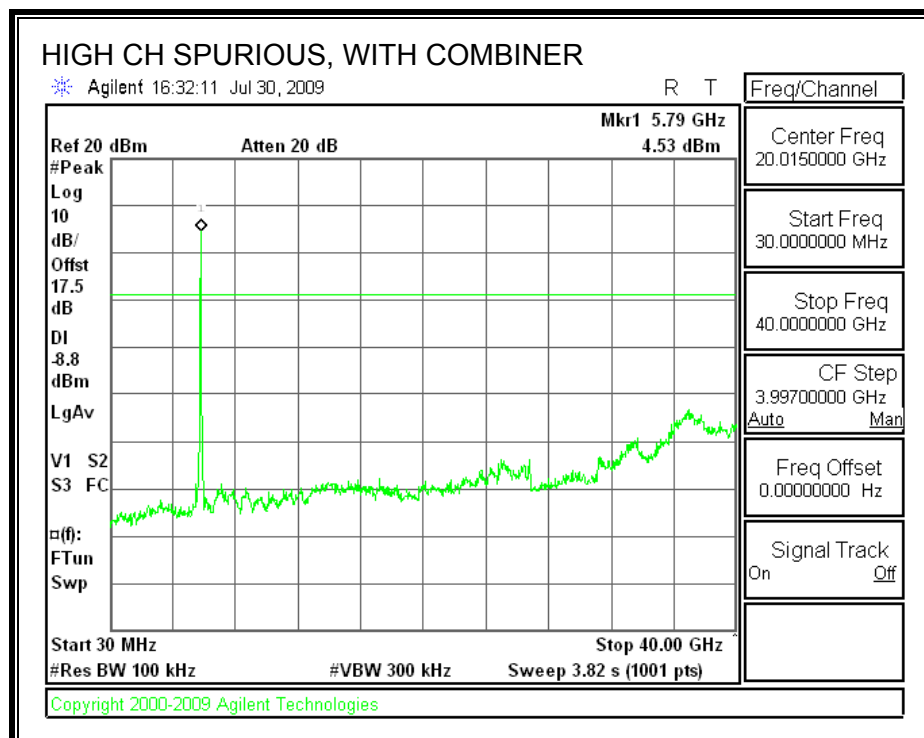
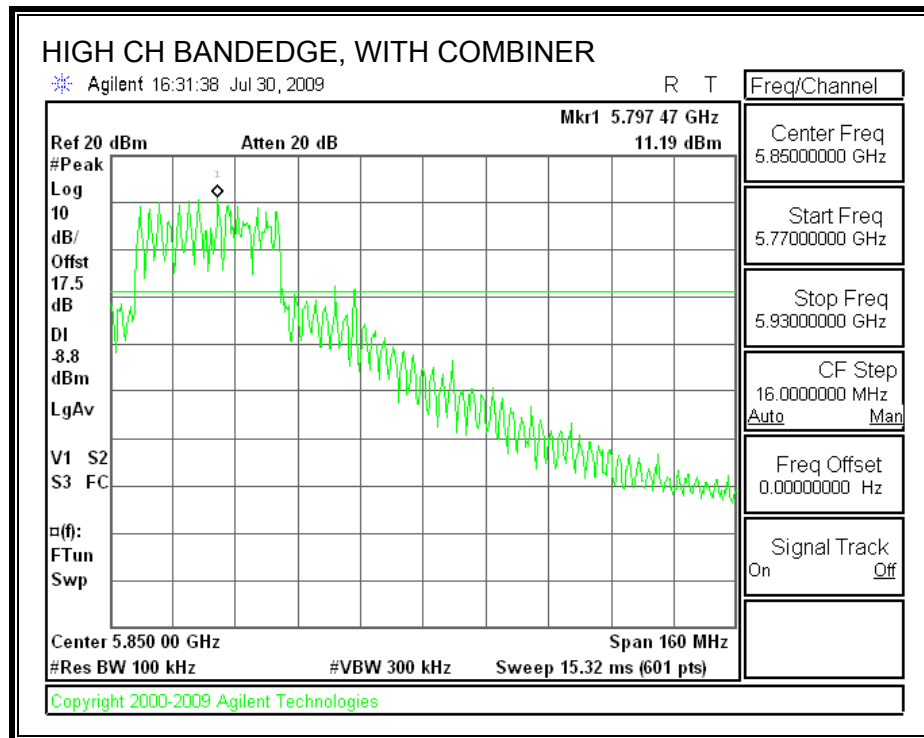
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest and highest channels.

SPURIOUS EMISSIONS WITH COMBINER





7.11. RECEIVER CONDUCTED SPURIOUS EMISSIONS

LIMITS

IC RSS-GEN 7.2.3.1

Antenna Conducted Measurement: Receiver spurious emissions at any discrete frequency shall not exceed 2 nanowatts (-57 dBm) in the band 30-1000 MHz, or 5 nanowatts (-53 dBm) above 1 GHz.

TEST PROCEDURE

IC RSS-GEN 4.10, Conducted Method

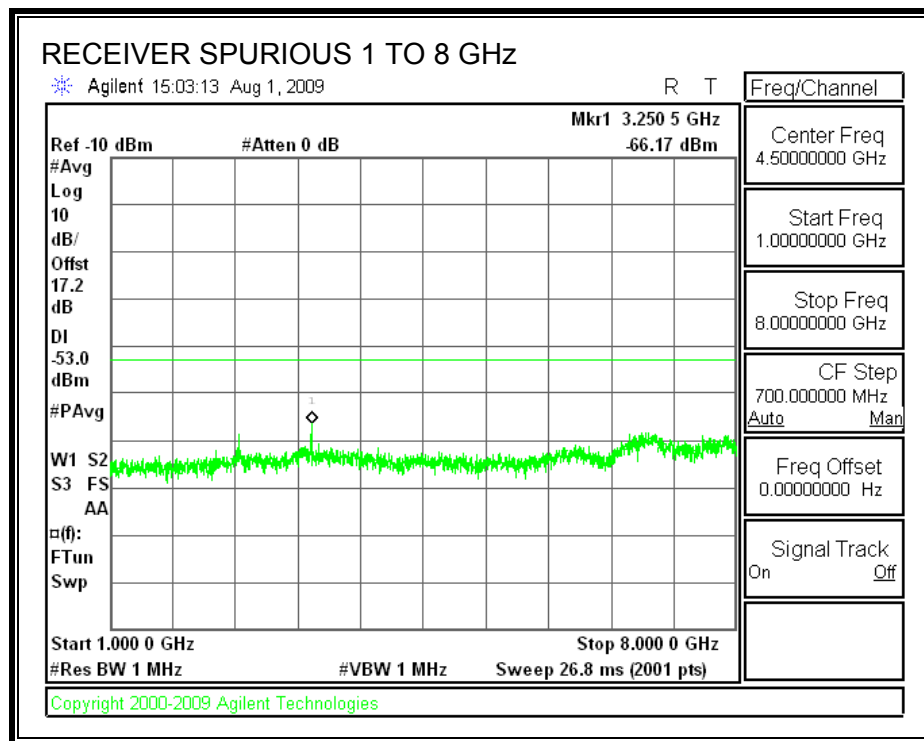
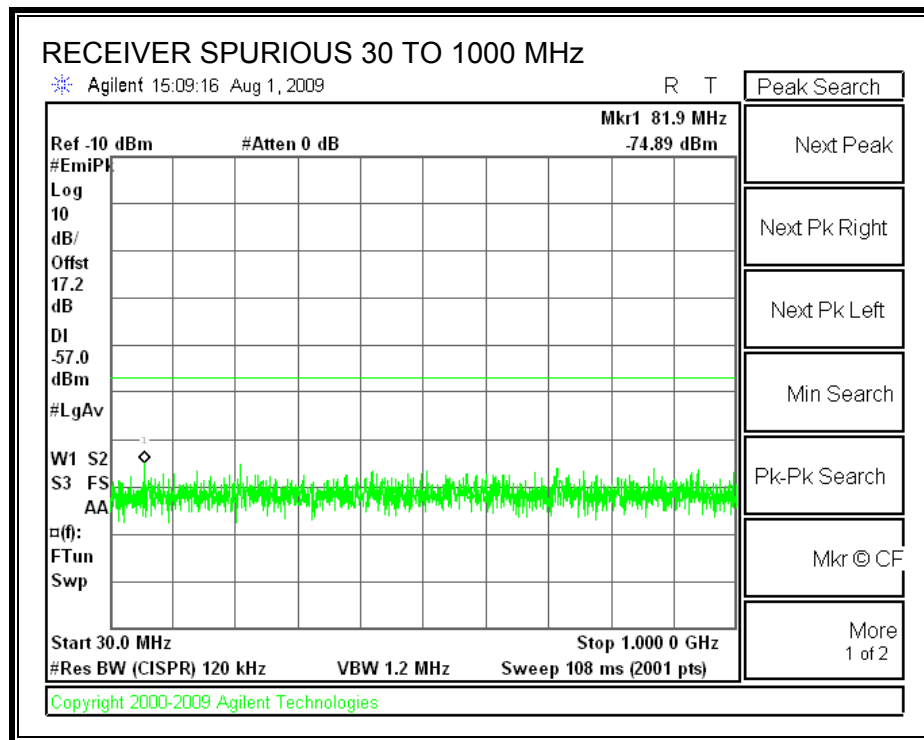
The receiver antenna port is connected to a spectrum analyzer.

The spectrum from 30 MHz to 8 GHz is investigated with the receiver set to the middle channel of the 2.4 GHz band.

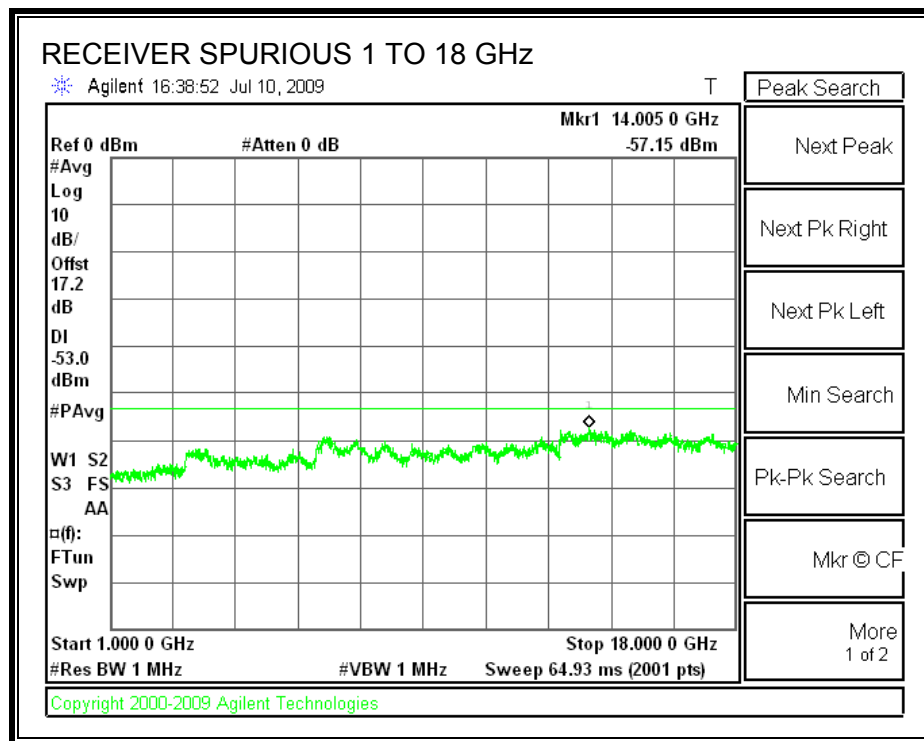
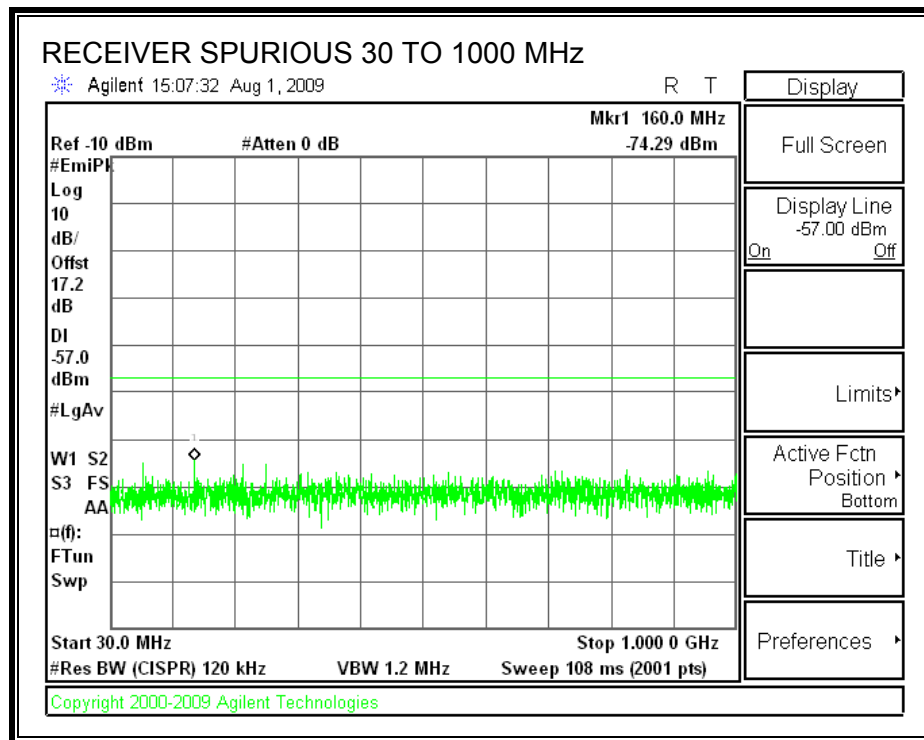
The spectrum from 30 MHz to 18 GHz is investigated with the receiver set to the middle channel of each 5 GHz band.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

RECEIVER SPURIOUS EMISSIONS IN THE 2.4 GHz BAND



RECEIVER SPURIOUS EMISSIONS IN THE 5.8 GHz BAND



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 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

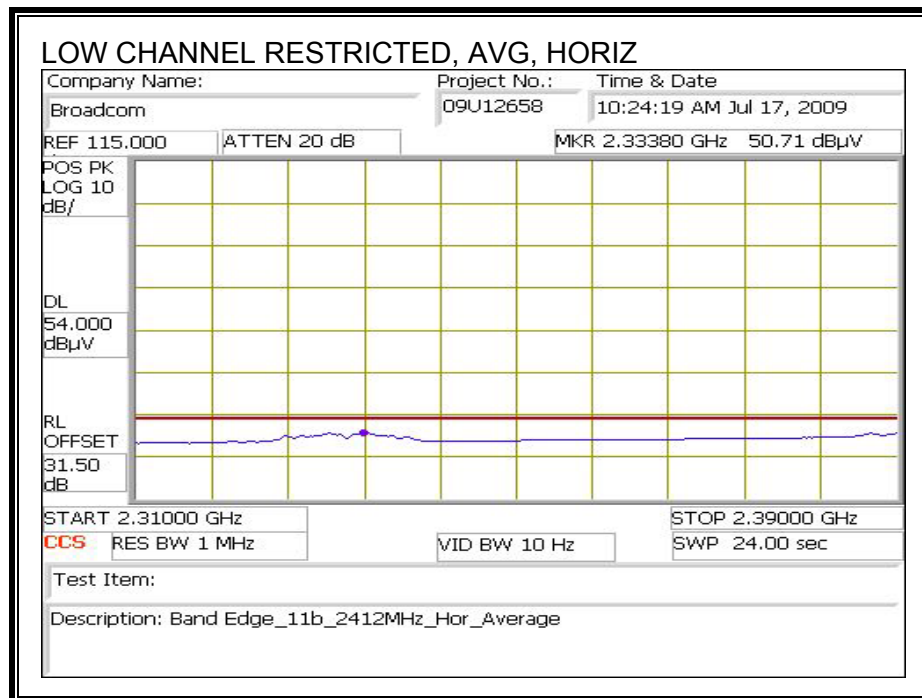
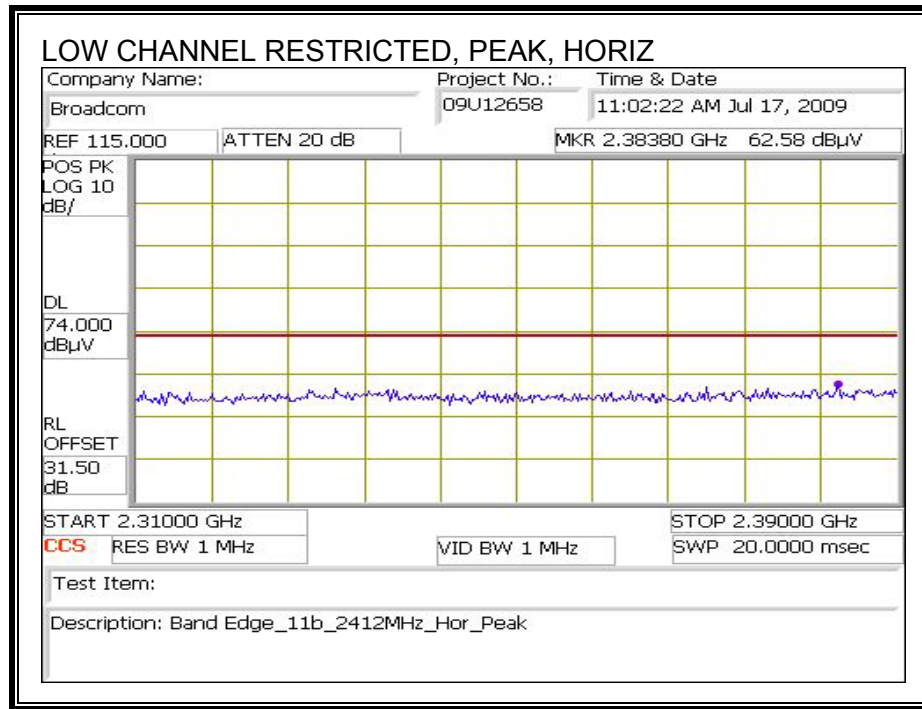
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

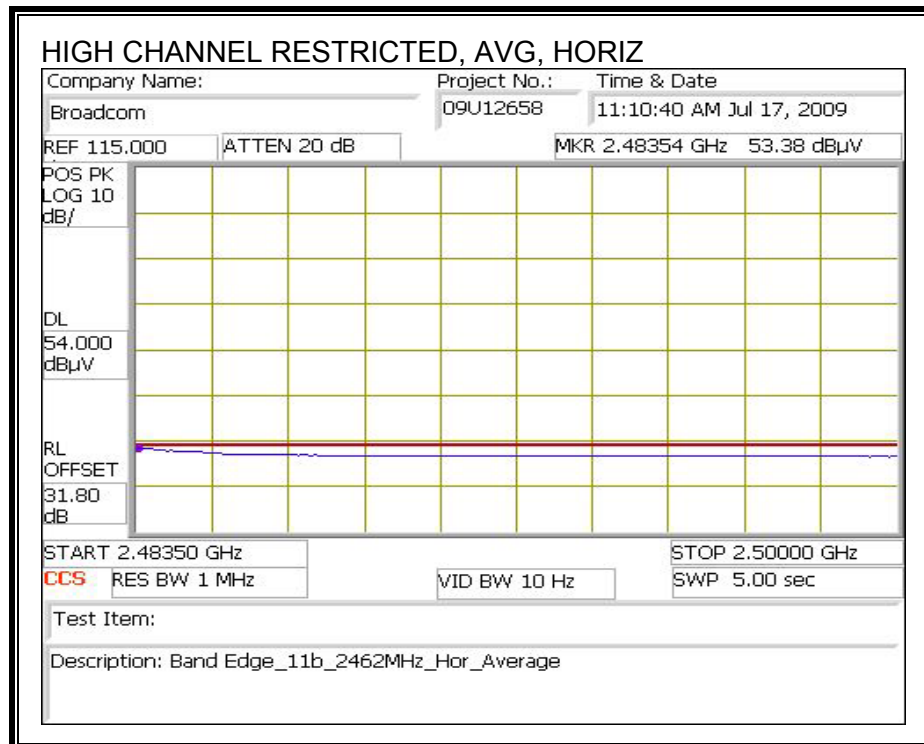
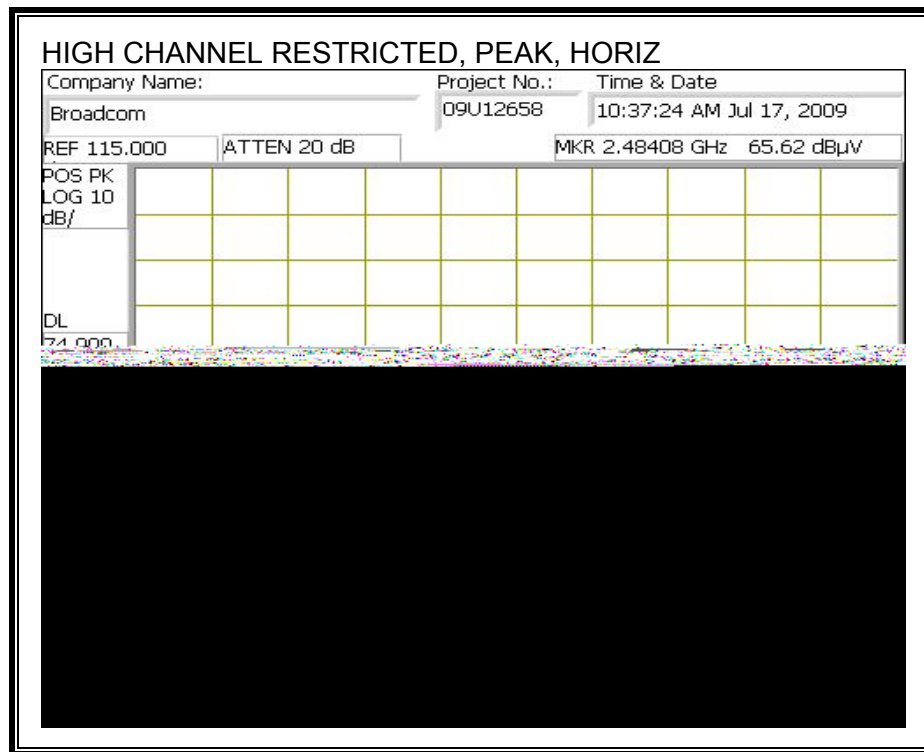
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. 802.11b MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 07/20/09
Project #: 09U12658
Company: Broadcom
EUT Description: 802.11a/b/g/n WLAN + BLUETOOTH PCI-E MINI CARD
EUT M/N: BCM943224PCIEBT
Test Target: FCC B
Mode Oper: Tx 11b Mode

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

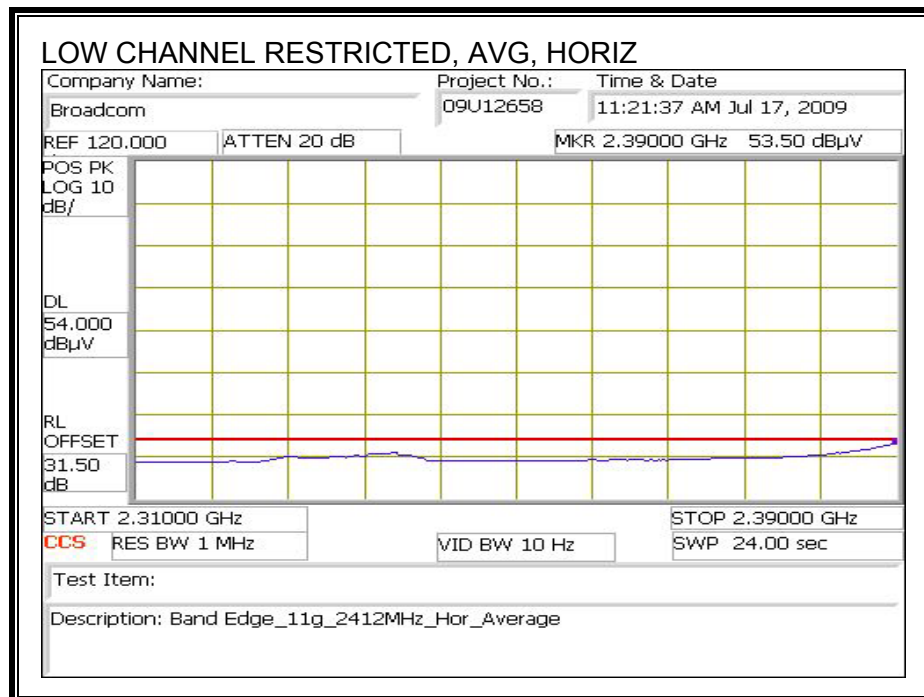
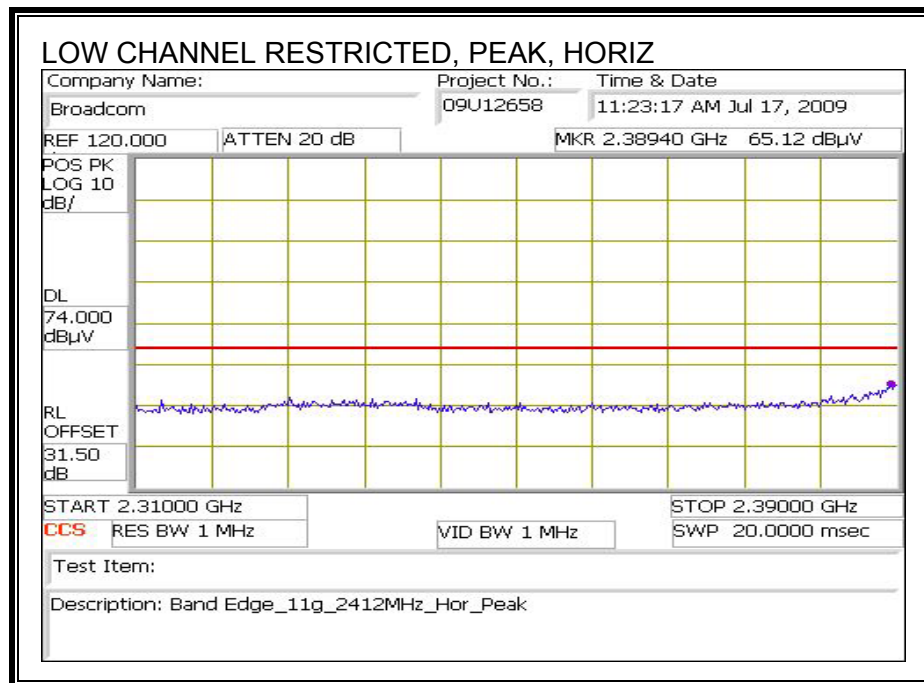
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fldr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Ant. High cm	Table Angle Degree	Notes
Low Channel, 2412MHz															
4.824	3.0	44.4	32.7	5.8	-34.8	0.0	0.6	48.6	74.0	-25.4	V	P	99.0	288.0	
4.824	3.0	40.0	32.7	5.8	-34.8	0.0	0.6	44.3	54.0	-9.7	V	A	99.0	288.0	
4.824	3.0	45.9	32.7	5.8	-34.8	0.0	0.6	50.1	74.0	-23.9	H	P	100.0	88.0	
4.824	3.0	42.6	32.7	5.8	-34.8	0.0	0.6	46.9	54.0	-7.1	H	A	100.0	88.0	
Mid Ch, 2437MHz															
4.874	3.0	42.6	32.7	5.8	-34.8	0.0	0.6	46.9	74.0	-27.1	V	P	98.0	195.0	
4.874	3.0	38.3	32.7	5.8	-34.8	0.0	0.6	42.6	54.0	-11.4	V	A	98.0	195.0	
7.311	3.0	41.3	35.5	7.3	-34.1	0.0	0.6	50.6	74.0	-23.4	V	P	122.0	12.0	
7.311	3.0	35.7	35.5	7.3	-34.1	0.0	0.6	44.9	54.0	-9.1	V	A	122.0	12.0	
4.874	3.0	44.9	32.7	5.8	-34.8	0.0	0.6	49.3	74.0	-24.7	H	P	102.0	243.0	
4.874	3.0	41.3	32.7	5.8	-34.8	0.0	0.6	45.6	54.0	-8.4	H	A	102.0	243.0	
7.311	3.0	42.7	35.5	7.3	-34.1	0.0	0.6	51.9	74.0	-22.1	H	P	142.0	325.0	
7.311	3.0	36.4	35.5	7.3	-34.1	0.0	0.6	45.6	54.0	-8.4	H	A	142.0	325.0	
Hi Channel, 2462MHz															
4.924	3.0	40.4	32.7	5.9	-34.8	0.0	0.6	44.9	74.0	-29.1	V	P	100.0	76.0	
4.924	3.0	35.1	32.7	5.9	-34.8	0.0	0.6	39.5	54.0	-14.5	V	A	100.0	76.0	
7.386	3.0	43.9	35.6	7.3	-34.1	0.0	0.6	53.4	74.0	-20.6	V	P	174.0	179.0	
7.386	3.0	37.2	35.6	7.3	-34.1	0.0	0.6	46.6	54.0	-7.4	V	A	174.0	179.0	
4.924	3.0	41.9	32.7	5.9	-34.8	0.0	0.6	46.3	74.0	-27.7	H	P	107.0	259.0	
4.924	3.0	38.0	32.7	5.9	-34.8	0.0	0.6	42.4	54.0	-11.6	H	A	107.0	259.0	
7.386	3.0	40.3	35.6	7.3	-34.1	0.0	0.6	49.7	74.0	-24.3	H	P	98.0	208.0	
7.386	3.0	33.7	35.6	7.3	-34.1	0.0	0.6	43.1	54.0	-10.9	H	A	98.0	208.0	

Rev. 4.1.2.7

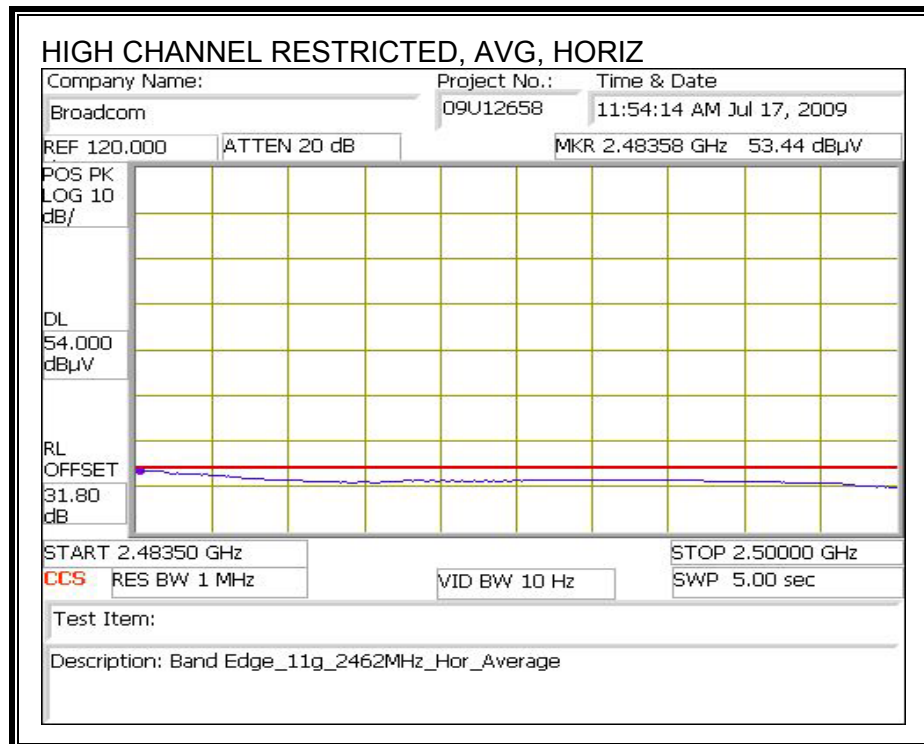
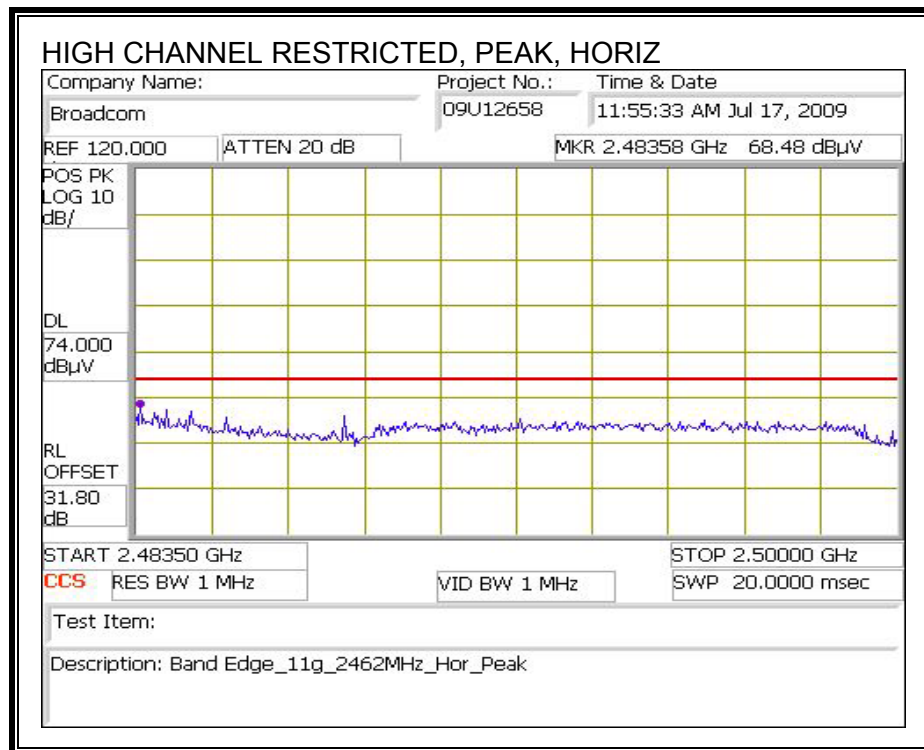
Note: No other emissions were detected above the system noise floor.

8.2.2. 802.11g MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE HIGH CHANNEL, HORIZONTAL



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement **Compliance Certification Services, Fremont 5m Chamber**

Test Engr: Vien Tran
Date: 07/20/09
Project #: 09U12658
Company: Broadcom
EUT Description: 802.11a/b/g/n WLAN + BLUETOOTH PCI-E MINI CARD
EUT M/N: BCM943224PCIEBT
Test Target: FCC B
Mode Oper: Tx 11g Mode

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

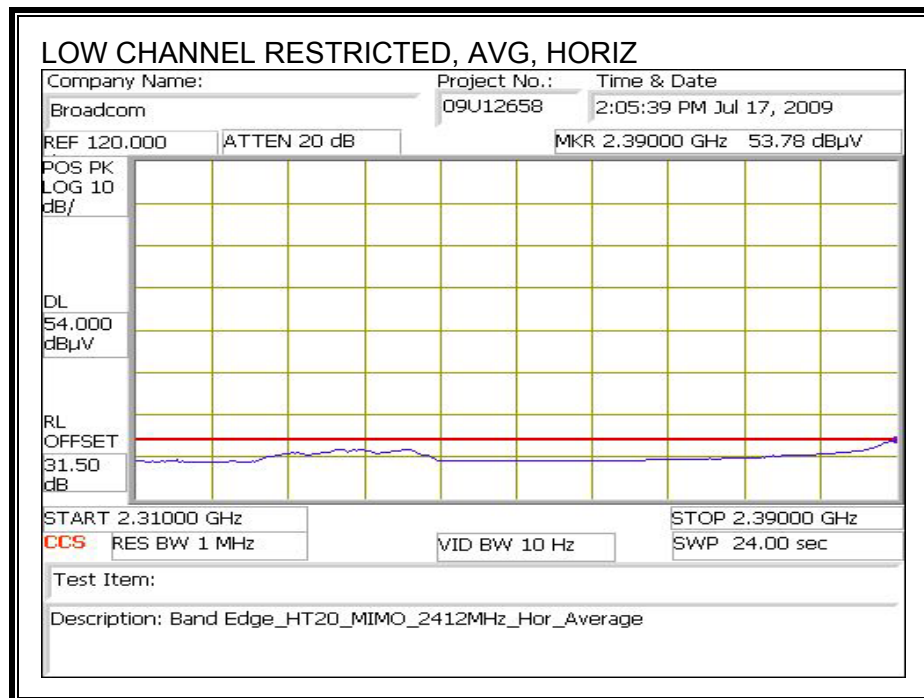
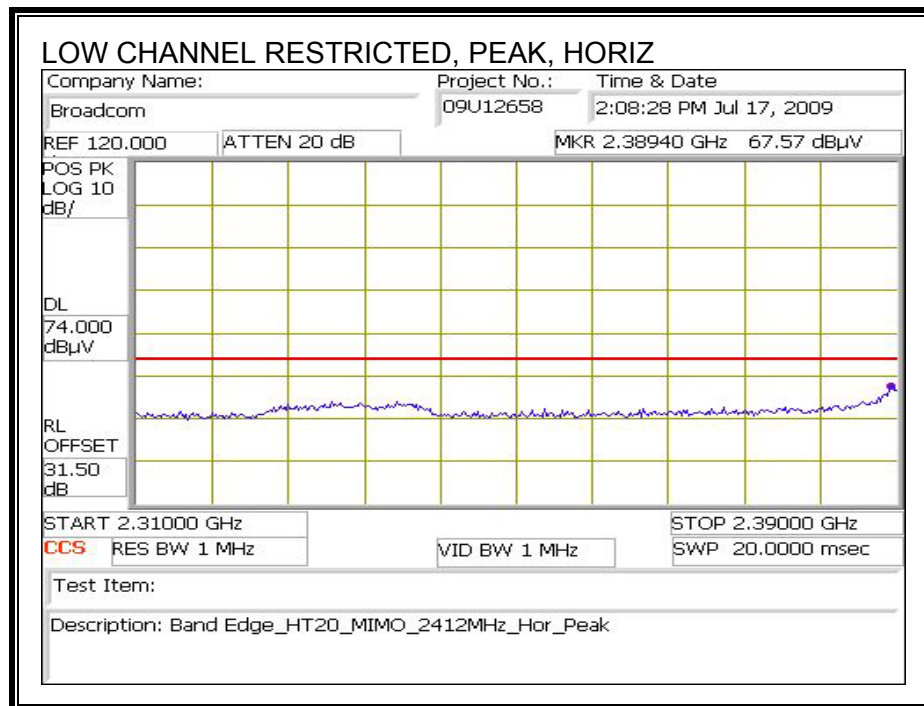
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fldr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant. High cm	Table Angle Degree	Notes
2412MHz															
4.824	3.0	47.5	32.7	5.8	-34.8	0.0	0.6	51.7	74.0	-22.3	V	P	100.0	80.0	
4.824	3.0	32.0	32.7	5.8	-34.8	0.0	0.6	36.2	54.0	-17.8	V	A	100.0	80.0	
4.824	3.0	48.6	32.7	5.8	-34.8	0.0	0.6	52.9	74.0	-21.1	H	P	102.0	323.0	
4.824	3.0	33.0	32.7	5.8	-34.8	0.0	0.6	37.2	54.0	-16.8	H	A	102.0	323.0	
2437MHz															
4.874	3.0	41.8	32.7	5.8	-34.8	0.0	0.6	46.1	74.0	-27.9	V	P	168.0	36.0	
4.874	3.0	28.0	32.7	5.8	-34.8	0.0	0.6	32.3	54.0	-21.7	V	A	168.0	36.0	
7.311	3.0	40.6	35.5	7.3	-34.1	0.0	0.6	49.9	74.0	-24.1	V	P	99.0	358.0	
7.311	3.0	27.5	35.5	7.3	-34.1	0.0	0.6	36.7	54.0	-17.3	V	A	99.0	358.0	
4.874	3.0	42.3	32.7	5.8	-34.8	0.0	0.6	46.6	74.0	-27.4	H	P	179.0	122.0	
4.874	3.0	29.0	32.7	5.8	-34.8	0.0	0.6	33.4	54.0	-20.6	H	A	179.0	122.0	
7.311	3.0	43.0	35.5	7.3	-34.1	0.0	0.6	52.3	74.0	-21.7	H	P	99.0	69.0	
7.311	3.0	30.0	35.5	7.3	-34.1	0.0	0.6	39.3	54.0	-14.7	H	A	99.0	69.0	
2462MHz															
4.924	3.0	44.7	32.7	5.9	-34.8	0.0	0.6	49.2	74.0	-24.8	V	P	114.0	340.0	
4.924	3.0	30.0	32.7	5.9	-34.8	0.0	0.6	34.4	54.0	-19.6	V	A	114.0	340.0	
7.386	3.0	42.5	35.6	7.3	-34.1	0.0	0.6	51.9	74.0	-22.1	V	P	172.0	188.0	
7.386	3.0	29.7	35.6	7.3	-34.1	0.0	0.6	39.1	54.0	-14.9	V	A	172.0	188.0	
4.924	3.0	45.2	32.7	5.9	-34.8	0.0	0.6	49.7	74.0	-24.3	H	P	103.0	261.0	
4.924	3.0	31.1	32.7	5.9	-34.8	0.0	0.6	35.6	54.0	-18.4	H	A	103.0	261.0	
7.386	3.0	41.8	35.6	7.3	-34.1	0.0	0.6	51.2	74.0	-22.8	H	P	98.0	202.0	
7.386	3.0	28.6	35.6	7.3	-34.1	0.0	0.6	38.0	54.0	-16.0	H	A	98.0	202.0	

Rev. 4.1.2.7

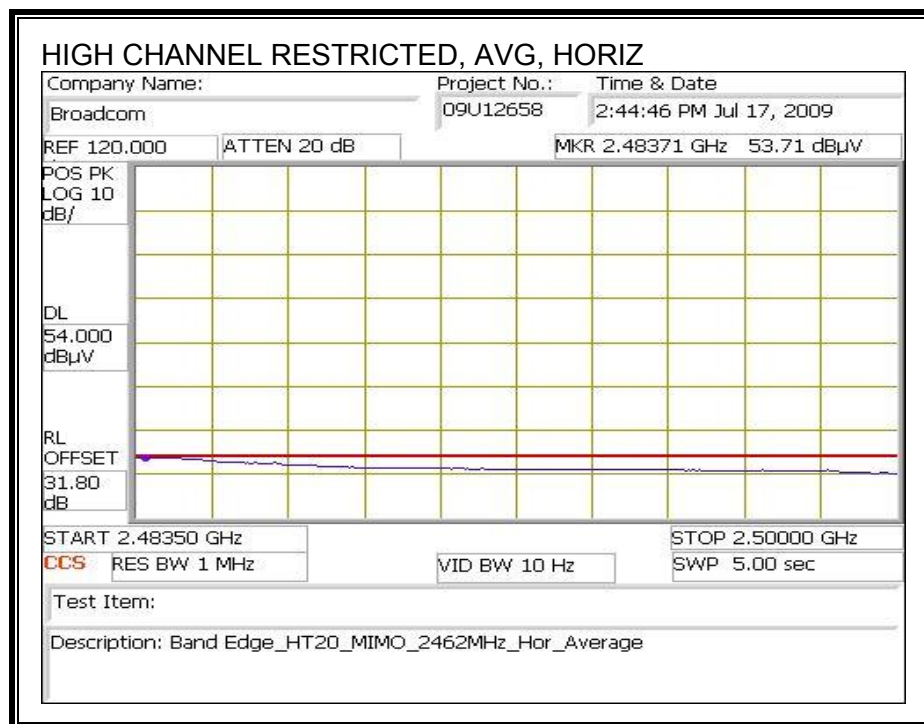
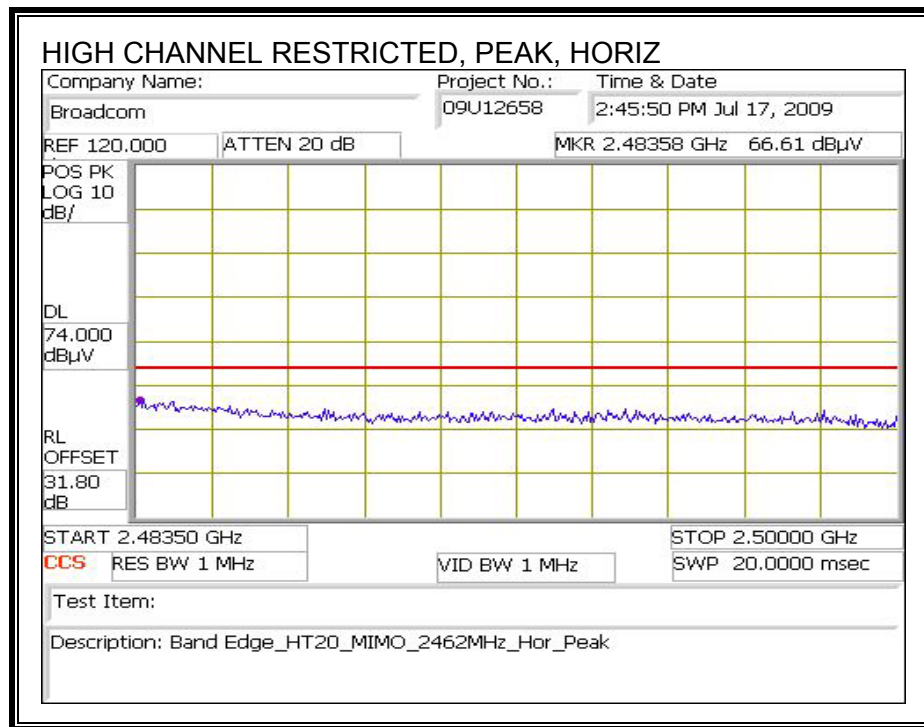
Note: No other emissions were detected above the system noise floor.

8.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE HIGH CHANNEL, HORIZONTAL



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 07/21/09
Project #: 09U12658
Company: Broadcom
EUT Description: 802.11a/b/g/n WLAN + BLUETOOTH PCI-E MINI CARD
EUT M/N: BCM943224PCIEBT
Test Target: FCC B
Mode Oper: Tx HT20 Mode

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

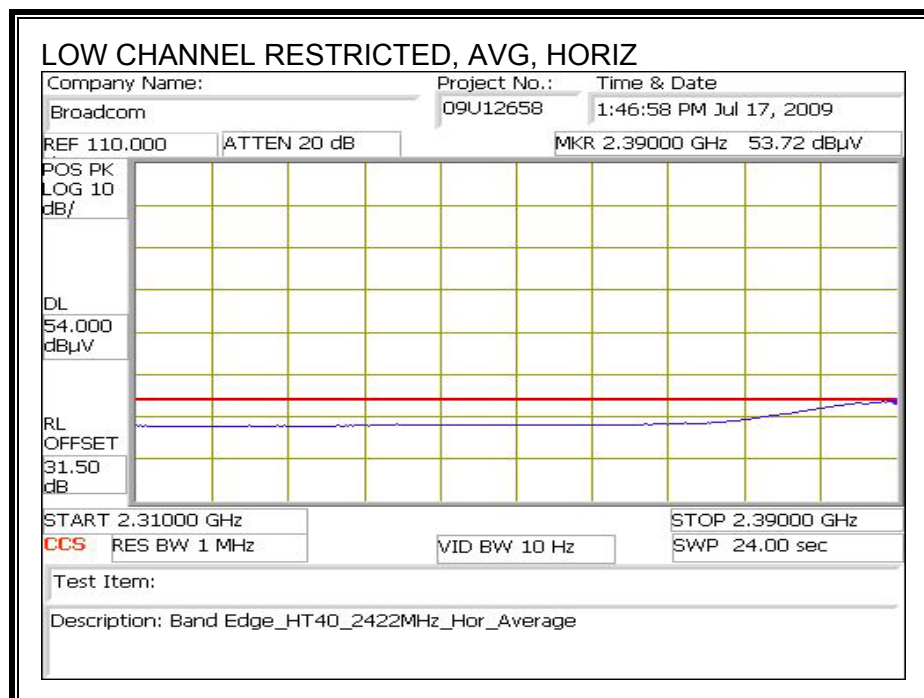
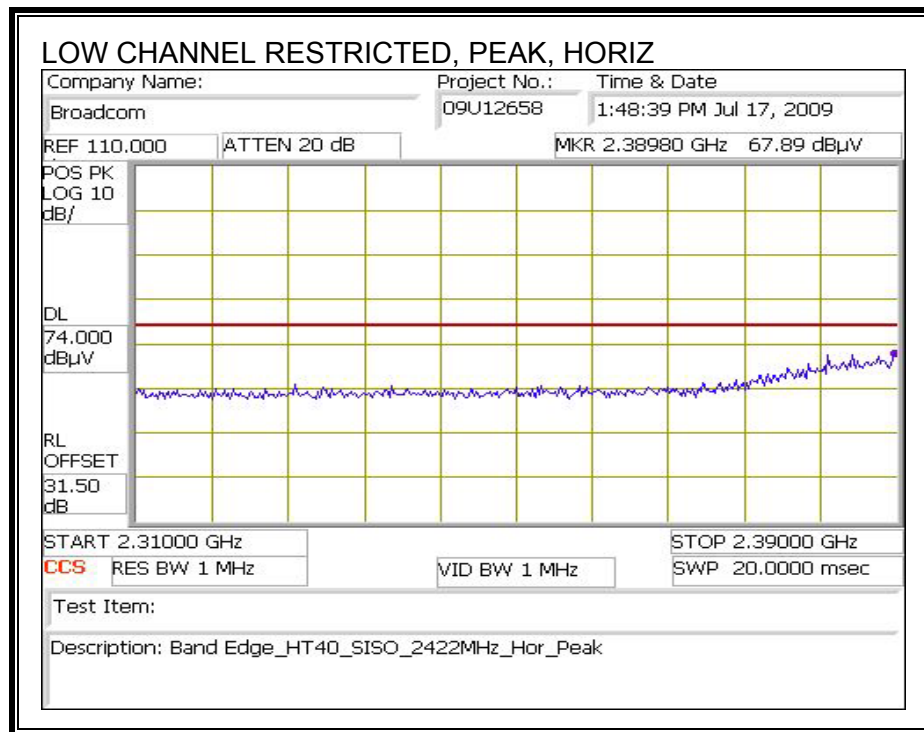
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fctr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Ant. High cm	Table Angle Degree	Notes
2412MHz															
4.824	3.0	49.5	32.7	5.8	-34.8	0.0	0.6	53.7	74.0	-20.3	V	P	113.0	65.0	
4.824	3.0	36.4	32.7	5.8	-34.8	0.0	0.6	40.6	54.0	-13.4	V	A	113.0	65.0	
4.824	3.0	49.6	32.7	5.8	-34.8	0.0	0.6	53.9	74.0	-20.1	H	P	123.0	94.0	
4.824	3.0	36.2	32.7	5.8	-34.8	0.0	0.6	40.4	54.0	-13.6	H	A	123.0	94.0	
2437MHz															
4.874	3.0	45.3	32.7	5.8	-34.8	0.0	0.6	49.6	74.0	-24.4	V	P	108.0	11.0	
4.874	3.0	31.3	32.7	5.8	-34.8	0.0	0.6	35.6	54.0	-18.4	V	A	108.0	11.0	
7.311	3.0	41.6	35.5	7.3	-34.1	0.0	0.6	50.8	74.0	-23.2	V	P	100.0	344.0	
7.311	3.0	28.5	35.5	7.3	-34.1	0.0	0.6	37.7	54.0	-16.3	V	A	100.0	344.0	
4.874	3.0	44.6	32.7	5.8	-34.8	0.0	0.6	48.9	74.0	-25.1	H	P	107.0	20.0	
4.874	3.0	30.1	32.7	5.8	-34.8	0.0	0.6	34.4	54.0	-19.6	H	A	107.0	20.0	
7.311	3.0	46.0	35.5	7.3	-34.1	0.0	0.6	55.2	74.0	-18.8	H	P	99.0	64.0	
7.311	3.0	32.9	35.5	7.3	-34.1	0.0	0.6	42.1	54.0	-11.9	H	A	99.0	64.0	
2462MHz															
4.924	3.0	43.8	32.7	5.9	-34.8	0.0	0.6	48.3	74.0	-25.7	H	P	100.0	331.0	
4.924	3.0	29.6	32.7	5.9	-34.8	0.0	0.6	34.0	54.0	-20.0	H	A	100.0	331.0	
7.386	3.0	43.2	35.6	7.3	-34.1	0.0	0.6	52.6	74.0	-21.4	H	P	143.0	68.0	
7.386	3.0	30.3	35.6	7.3	-34.1	0.0	0.6	39.7	54.0	-14.3	H	A	143.0	68.0	
4.924	3.0	44.7	32.7	5.9	-34.8	0.0	0.6	49.2	74.0	-24.8	V	P	125.0	336.0	
4.924	3.0	30.8	32.7	5.9	-34.8	0.0	0.6	35.2	54.0	-18.8	V	A	125.0	336.0	
7.386	3.0	43.9	35.6	7.3	-34.1	0.0	0.6	53.4	74.0	-20.6	V	P	185.0	166.0	
7.386	3.0	31.4	35.6	7.3	-34.1	0.0	0.6	40.8	54.0	-13.2	V	A	185.0	166.0	

Rev. 4.1.2.7

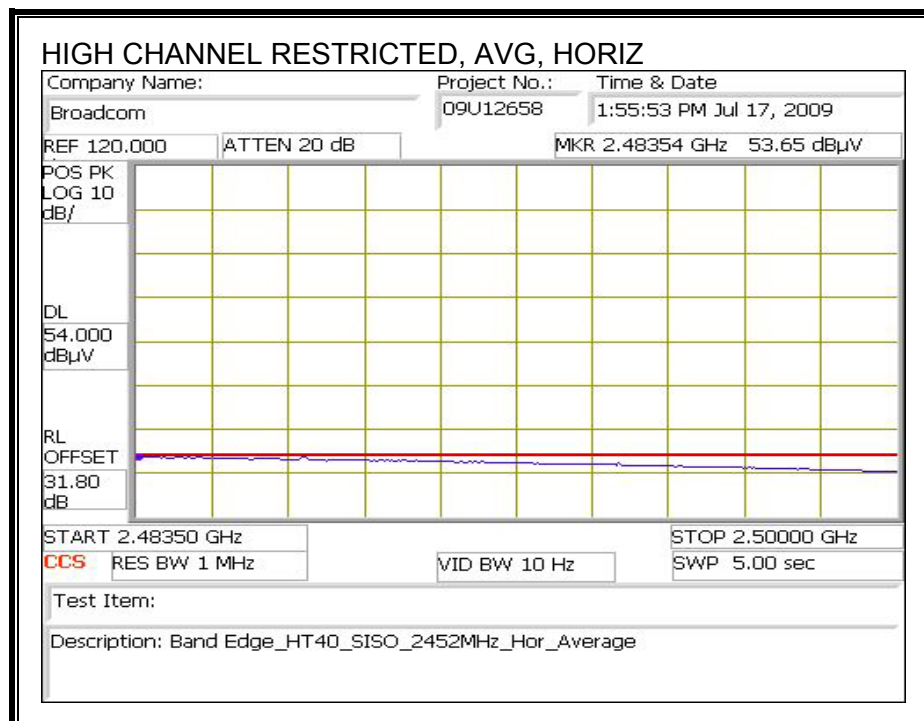
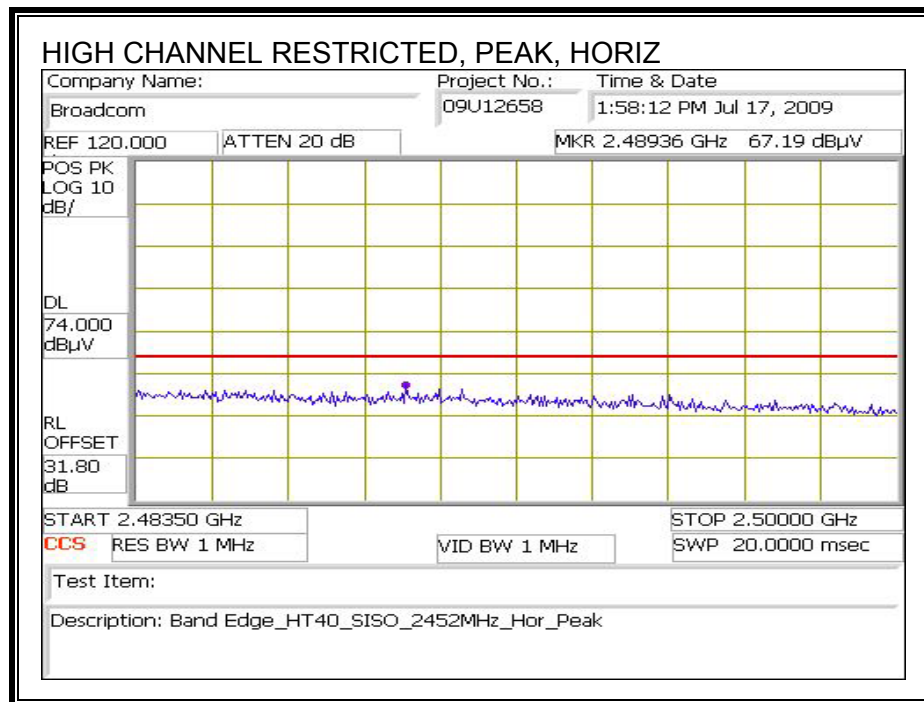
Note: No other emissions were detected above the system noise floor.

8.2.4. 802.11n HT40 SISO MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 07/21/09
Project #: 09U12658
Company: Broadcom
EUT Description: 802.11a/b/g/n WLAN + BLUETOOTH PCI-E MINI CARD
EUT M/N: BCM943224PCIEBT
Test Target: FCC B
Mode Oper: Tx HT40_SISO_Mode

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

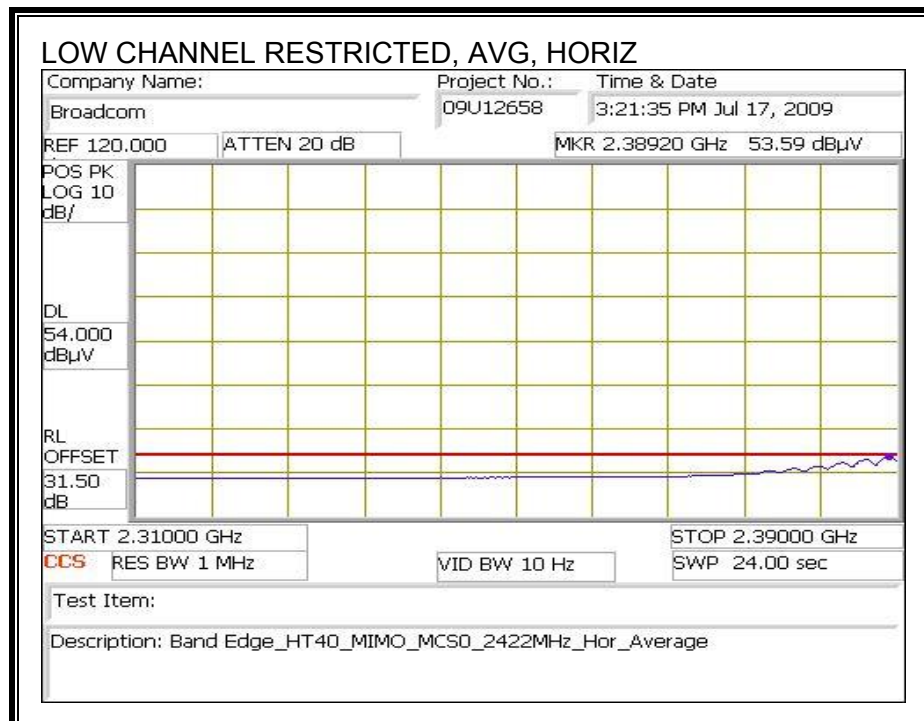
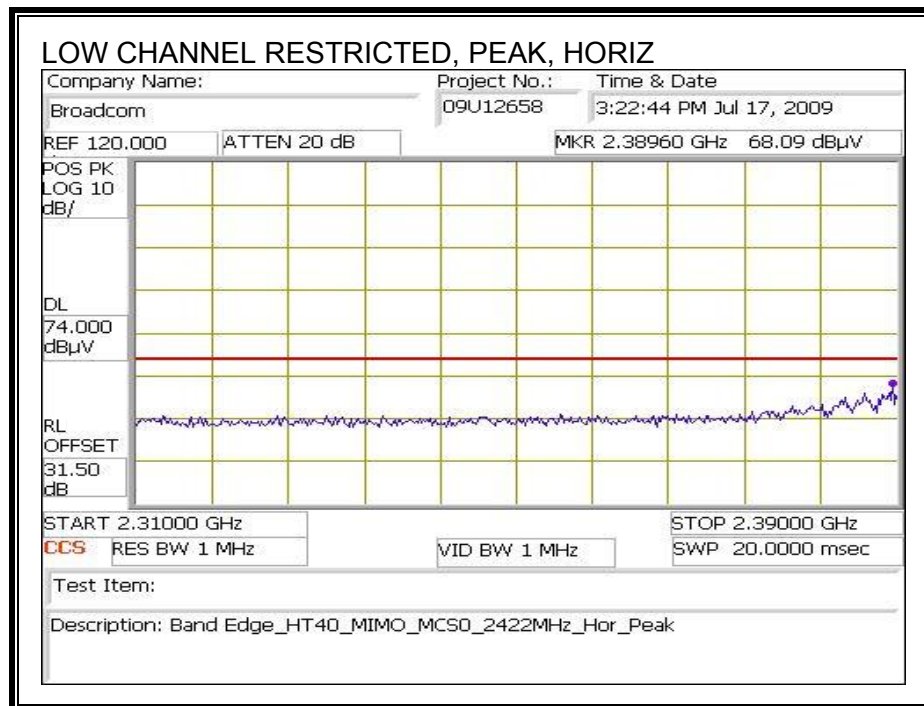
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fldr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant. High cm	Table Angle Degree	Notes
Low Channel 2422MHz															
4.844	3.0	35.7	32.7	5.8	-34.8	0.0	0.6	40.0	74.0	-34.0	V	P	99.0	67.0	
4.844	3.0	23.3	32.7	5.8	-34.8	0.0	0.6	27.6	54.0	-26.4	V	A	99.0	67.0	
7.266	3.0	35.6	35.4	7.2	-34.1	0.0	0.6	44.7	74.0	-29.3	V	P	100.0	0.0	
7.266	3.0	22.8	35.4	7.2	-34.1	0.0	0.6	32.0	54.0	-22.0	V	A	100.0	0.0	
4.844	3.0	36.3	32.7	5.8	-34.8	0.0	0.6	40.6	74.0	-33.4	H	P	100.0	256.0	
4.844	3.0	23.7	32.7	5.8	-34.8	0.0	0.6	27.9	54.0	-26.1	H	A	100.0	256.0	
7.266	3.0	35.8	35.4	7.2	-34.1	0.0	0.6	45.0	74.0	-29.0	H	P	100.0	204.0	
7.266	3.0	23.2	35.4	7.2	-34.1	0.0	0.6	32.3	54.0	-21.7	H	A	100.0	204.0	
Mid Channel 2437MHz															
4.874	3.0	35.1	32.7	5.8	-34.8	0.0	0.6	39.4	74.0	-34.6	V	P	100.0	358.0	
4.874	3.0	22.6	32.7	5.8	-34.8	0.0	0.6	27.0	54.0	-27.0	V	A	100.0	358.0	
7.311	3.0	36.3	35.5	7.3	-34.1	0.0	0.6	45.6	74.0	-28.4	V	P	194.0	194.0	
7.311	3.0	23.3	35.5	7.3	-34.1	0.0	0.6	32.6	54.0	-21.4	V	A	194.0	194.0	
4.874	3.0	34.6	32.7	5.8	-34.8	0.0	0.6	38.9	74.0	-35.1	H	P	134.0	342.0	
4.874	3.0	22.0	32.7	5.8	-34.8	0.0	0.6	26.3	54.0	-27.7	H	A	134.0	342.0	
7.311	3.0	35.3	35.5	7.3	-34.1	0.0	0.6	44.6	74.0	-29.4	H	P	99.0	64.0	
7.311	3.0	22.9	35.5	7.3	-34.1	0.0	0.6	32.1	54.0	-21.9	H	A	99.0	64.0	
High Channel 2452MHz															
4.904	3.0	34.6	32.7	5.9	-34.8	0.0	0.6	39.0	74.0	-35.0	V	P	99.0	360.0	
4.904	3.0	22.5	32.7	5.9	-34.8	0.0	0.6	26.9	54.0	-27.1	V	A	99.0	360.0	
7.356	3.0	35.9	35.5	7.3	-34.1	0.0	0.6	45.2	74.0	-28.8	V	P	189.0	172.0	
7.356	3.0	23.5	35.5	7.3	-34.1	0.0	0.6	32.8	54.0	-21.2	V	A	189.0	172.0	
4.904	3.0	35.3	32.7	5.9	-34.8	0.0	0.6	39.7	74.0	-34.3	H	P	100.0	96.0	
4.904	3.0	22.8	32.7	5.9	-34.8	0.0	0.6	27.2	54.0	-26.8	H	A	100.0	96.0	
7.356	3.0	35.7	35.5	7.3	-34.1	0.0	0.6	45.0	74.0	-29.0	H	P	100.0	206.0	
7.356	3.0	22.9	35.5	7.3	-34.1	0.0	0.6	32.2	54.0	-21.8	H	A	100.0	206.0	

Rev. 4.1.2.7

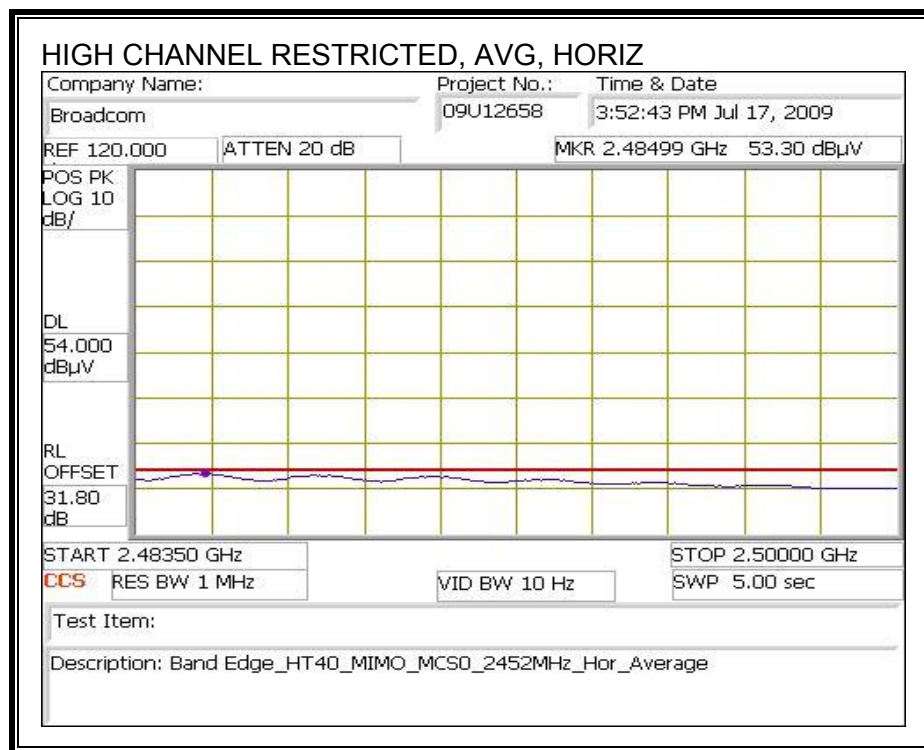
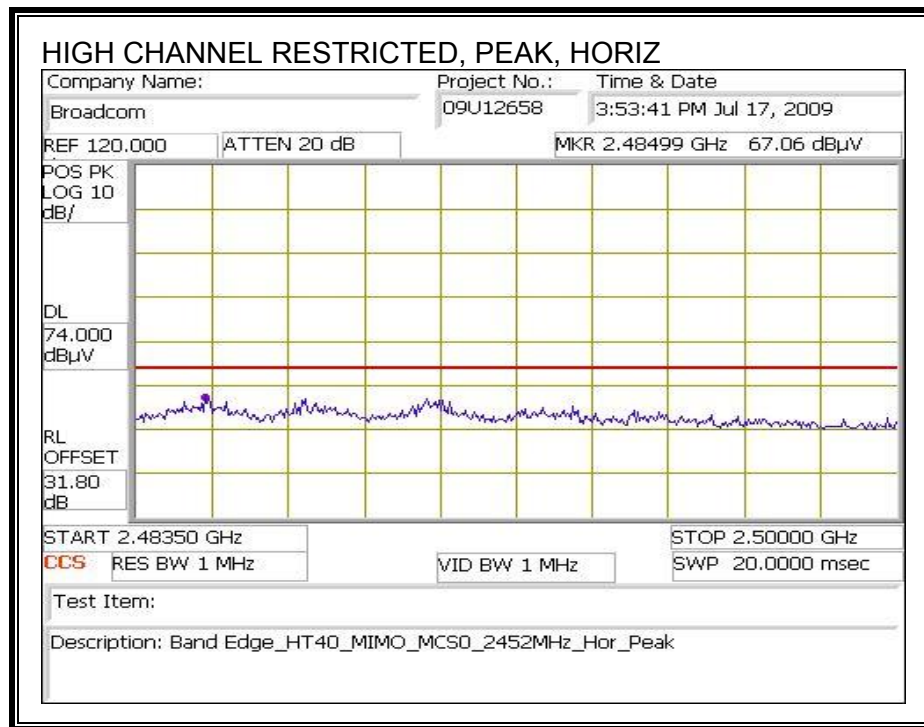
Note: No other emissions were detected above the system noise floor.

8.2.5. 802.11n HT40 MCS0 MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement **Compliance Certification Services, Fremont 5m Chamber**

Test Engr: Vien Tran
Date: 07/22/09
Project #: 09U12658
Company: Broadcom
EUT Description: 802.11a/b/g/n WLAN + BLUETOOTH PCI-E MINI CARD
EUT M/N: BCM943224PCIEBT
Test Target: FCC B
Mode Oper: Tx HT40_MIMO_MCS0 Mode

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

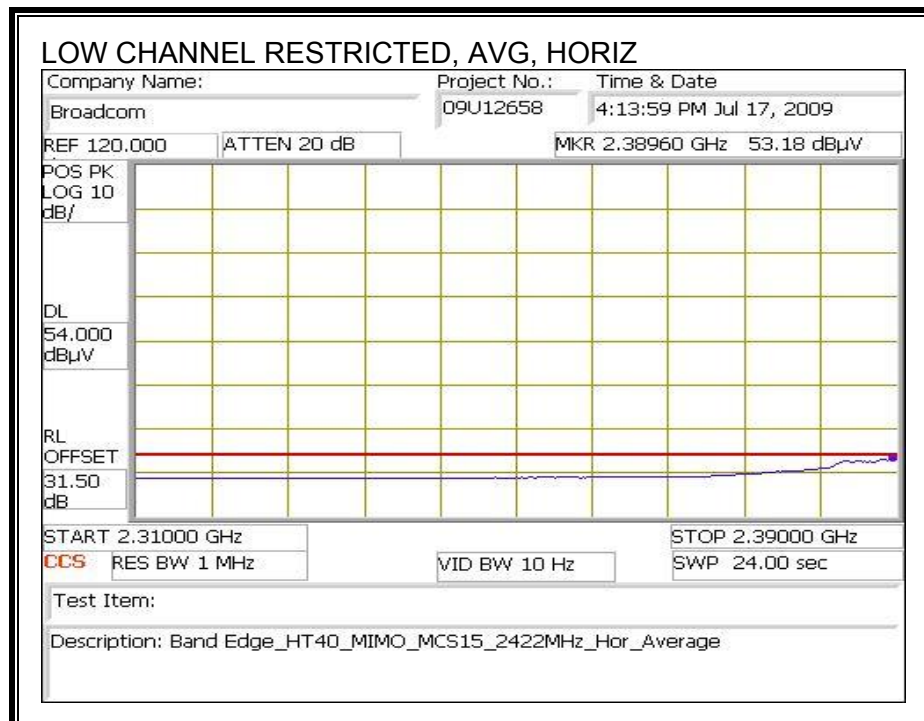
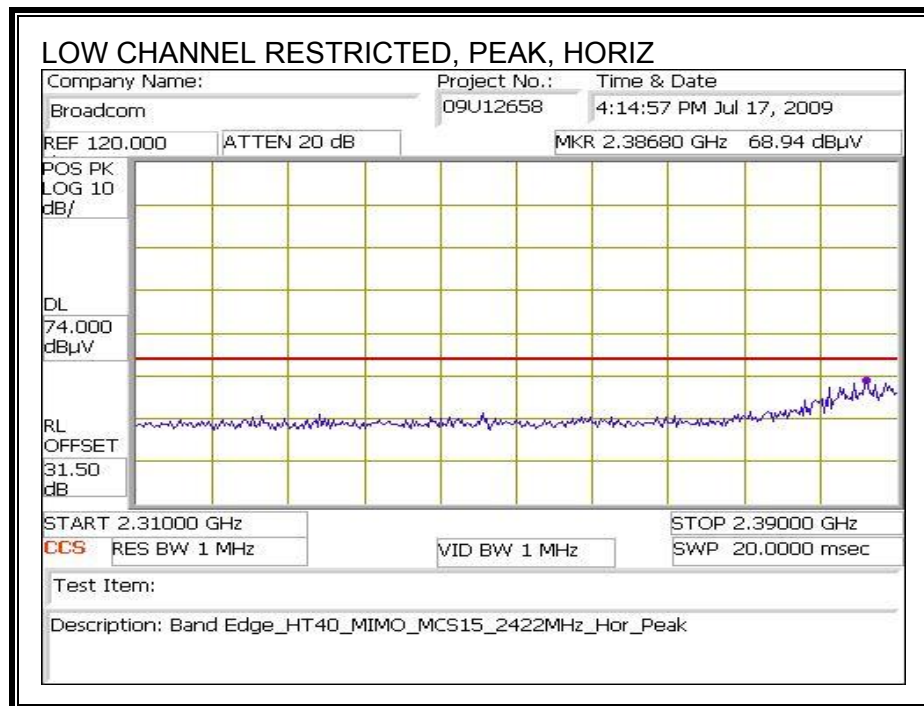
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant. High cm	Table Angle Degree	Notes
Low Channel 2422MHz															
4.844	3.0	44.8	33.1	5.8	-36.5	0.0	10.6	57.8	74.0	-16.2	V	P	102.8	229.2	
4.844	3.0	29.2	33.1	5.8	-36.5	0.0	10.6	42.2	54.0	-11.8	V	A	102.8	229.2	
7.266	3.0	39.9	35.2	7.2	-36.2	0.0	10.6	56.8	74.0	-17.2	V	P	199.0	192.8	
7.266	3.0	27.2	35.2	7.2	-36.2	0.0	10.6	44.0	54.0	-10.0	V	A	199.0	192.8	
4.844	3.0	39.7	33.1	5.8	-36.5	0.0	10.6	52.7	74.0	-21.3	H	P	115.6	114.1	
4.844	3.0	28.2	33.1	5.8	-36.5	0.0	10.6	41.2	54.0	-12.8	H	A	115.6	114.1	
7.266	3.0	38.8	35.2	7.2	-36.2	0.0	10.6	55.7	74.0	-18.3	H	P	100.0	252.2	
7.266	3.0	26.7	35.2	7.2	-36.2	0.0	10.6	43.6	54.0	-10.4	H	A	100.0	252.2	
Mid Channel 2437MHz															
4.874	3.0	41.0	33.1	5.8	-36.5	0.0	10.6	54.1	74.0	-19.9	V	P	131.1	177.0	
4.874	3.0	27.5	33.1	5.8	-36.5	0.0	10.6	40.6	54.0	-13.4	V	A	131.1	177.0	
7.311	3.0	37.5	35.3	7.3	-36.2	0.0	10.6	54.5	74.0	-19.5	V	P	117.2	354.4	
7.311	3.0	25.4	35.3	7.3	-36.2	0.0	10.6	42.4	54.0	-11.6	V	A	117.2	354.4	
4.874	3.0	38.1	33.1	5.8	-36.5	0.0	10.6	51.2	74.0	-22.8	H	P	138.3	262.5	
4.874	3.0	26.6	33.1	5.8	-36.5	0.0	10.6	39.7	54.0	-14.3	H	A	138.3	262.5	
7.311	3.0	38.2	35.3	7.3	-36.2	0.0	10.6	55.1	74.0	-18.9	H	P	138.3	262.5	
7.311	3.0	25.3	35.3	7.3	-36.2	0.0	10.6	42.3	54.0	-11.7	H	A	138.3	262.5	
High Channel 2452MHz															
4.904	3.0	41.3	33.1	5.9	-36.5	0.0	10.6	54.4	74.0	-19.6	V	P	100.9	230.0	
4.904	3.0	27.9	33.1	5.9	-36.5	0.0	10.6	41.0	54.0	-13.0	V	A	100.9	230.0	
7.356	3.0	37.4	35.4	7.3	-36.2	0.0	10.6	54.5	74.0	-19.5	V	P	110.4	341.0	
7.356	3.0	25.5	35.4	7.3	-36.2	0.0	10.6	42.6	54.0	-11.4	V	A	110.4	341.0	
4.904	3.0	38.7	33.1	5.9	-36.5	0.0	10.6	51.8	74.0	-22.2	H	P	139.6	318.0	
4.904	3.0	26.7	33.1	5.9	-36.5	0.0	10.6	39.8	54.0	-14.2	H	A	139.6	318.0	
7.356	3.0	37.6	35.4	7.3	-36.2	0.0	10.6	54.6	74.0	-19.4	H	P	139.6	318.0	
7.356	3.0	25.0	35.4	7.3	-36.2	0.0	10.6	42.1	54.0	-11.9	H	A	139.6	318.0	

Rev. 4.1.2.7

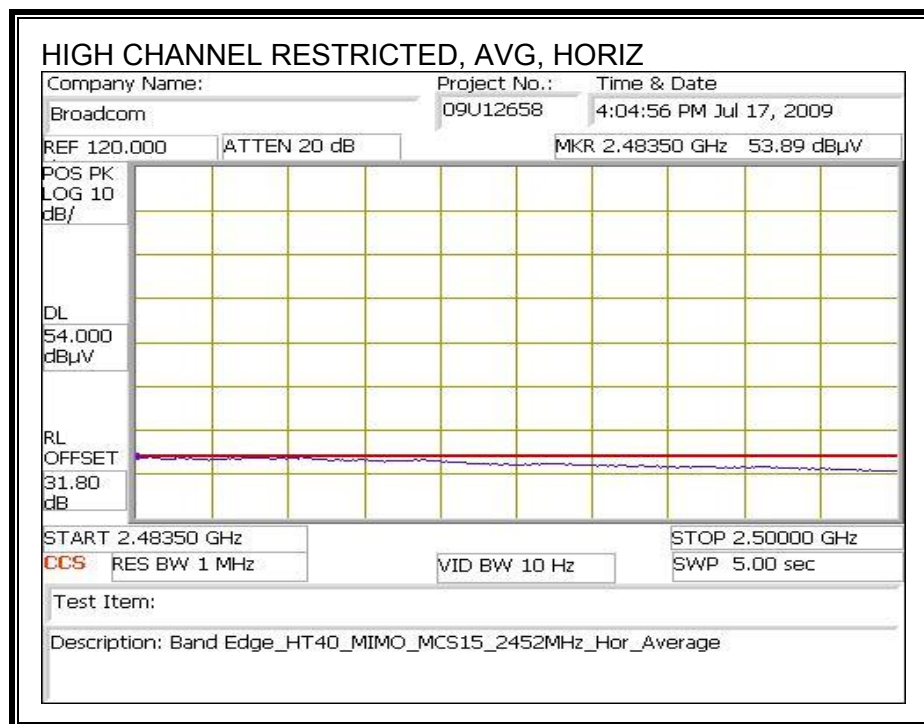
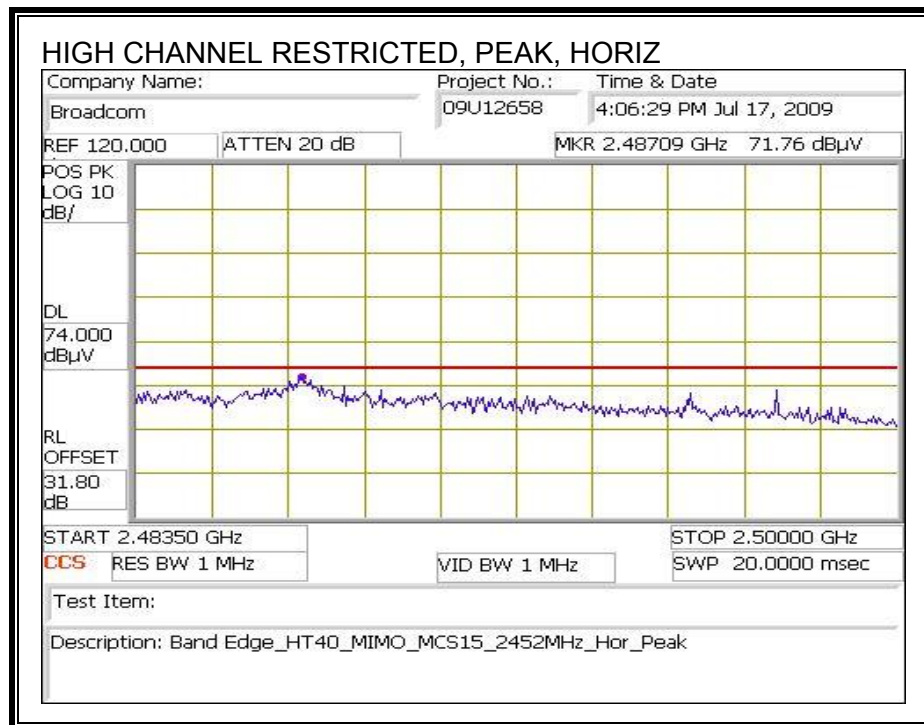
Note: No other emissions were detected above the system noise floor.

8.2.6. 802.11n HT40 MCS15 MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE HIGH CHANNEL, HORIZONTAL



8.2.7. 802.11a MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement																																									
Compliance Certification Services, Fremont 5m Chamber																																									
Test Engr:		Vien Tran																																							
Date:		07/28/09																																							
Project #:		09U12658																																							
Company:		Broadcom																																							
EUT Description:		802.11a/b/g/n WLAN + BLUETOOTH PCI-E MINI CARD																																							
EUT M/N:		BCM943224PCIEBT																																							
Test Target:		FCC B																																							
Mode Oper:		Tx 11a Mode_5.8 GHz Band																																							
<table border="0"> <tr> <td>f</td> <td>Measurement Frequency</td> <td>Amp</td> <td>Preamp Gain</td> <td>Average Field Strength Limit</td> </tr> <tr> <td>Dist</td> <td>Distance to Antenna</td> <td>D Corr</td> <td>Distance Correct to 3 meters</td> <td>Peak Field Strength Limit</td> </tr> <tr> <td>Read</td> <td>Analyzer Reading</td> <td>Avg</td> <td>Average Field Strength @ 3 m</td> <td>Margin vs. Average Limit</td> </tr> <tr> <td>AF</td> <td>Antenna Factor</td> <td>Peak</td> <td>Calculated Peak Field Strength</td> <td>Margin vs. Peak Limit</td> </tr> <tr> <td>CL</td> <td>Cable Loss</td> <td>HPF</td> <td>High Pass Filter</td> <td></td> </tr> </table>																	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	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	Filt dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/Q/P	Ant. High cm	Table Angle Degree	Notes																										
Low Channel 5745MHz																																									
11.490	3.0	35.9	38.0	9.5	-32.5	0.0	0.7	51.6	74.0	-22.4	H	P	178.0	90.0																											
11.490	3.0	21.4	38.0	9.5	-32.5	0.0	0.7	37.1	54.0	-16.9	H	A	178.0	90.0																											
11.490	3.0	37.2	38.0	9.5	-32.5	0.0	0.7	52.9	74.0	-21.1	V	P	100.0	295.0																											
11.490	3.0	24.0	38.0	9.5	-32.5	0.0	0.7	39.7	54.0	-14.3	V	A	100.0	295.0																											
Mid Channel 5785MHz																																									
11.570	3.0	42.3	38.1	9.5	-32.5	0.0	0.7	58.2	74.0	-15.8	H	P	146.0	290.0																											
11.570	3.0	29.3	38.1	9.5	-32.5	0.0	0.7	45.1	54.0	-8.9	H	A	146.0	290.0																											
11.570	3.0	34.3	38.1	9.5	-32.5	0.0	0.7	50.1	74.0	-23.9	V	P	99.0	146.0																											
11.570	3.0	22.4	38.1	9.5	-32.5	0.0	0.7	38.3	54.0	-15.8	V	A	99.0	146.0																											
High Channel 5825MHz																																									
11.650	3.0	34.3	38.2	9.6	-32.5	0.0	0.7	50.2	74.0	-23.8	H	P	99.0	202.0																											
11.650	3.0	22.0	38.2	9.6	-32.5	0.0	0.7	37.9	54.0	-16.1	H	A	99.0	202.0																											
11.650	3.0	35.7	38.2	9.6	-32.5	0.0	0.7	51.6	74.0	-22.4	V	P	100.0	303.0																											
11.650	3.0	22.3	38.2	9.6	-32.5	0.0	0.7	38.3	54.0	-15.7	V	A	100.0	303.0																											
Rev. 4.1.2.7																																									
Note: No other emissions were detected above the system noise floor.																																									

8.2.8. 802.11n HT20 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 07/28/09
Project #: 09U12658
Company: Broadcom
EUT Description: 802.11a/b/g/n WLAN + BLUETOOTH PCI-E MINI CARD
EUT M/N: BCM943224PCIEBT
Test Target: FCC B
Mode Oper: Tx HT20 Mode_5.8 GHz Band

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	Fldr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant. High cm	Table Angle Degree	Notes
Low Channel 5745MHz															
11.490	3.0	42.0	38.0	9.5	-32.5	0.0	0.7	57.7	74.0	-16.3	H	P	105.0	277.0	
11.490	3.0	29.4	38.0	9.5	-32.5	0.0	0.7	45.1	54.0	-8.9	H	A	105.0	277.0	
11.490	3.0	40.6	38.0	9.5	-32.5	0.0	0.7	56.3	74.0	-17.7	V	P	105.0	130.0	
11.490	3.0	28.4	38.0	9.5	-32.5	0.0	0.7	44.1	54.0	-9.9	V	A	105.0	130.0	
Mid Channel 5785MHz															
11.570	3.0	38.7	38.1	9.5	-32.5	0.0	0.7	54.5	74.0	-19.5	H	P	106.0	275.0	
11.570	3.0	25.9	38.1	9.5	-32.5	0.0	0.7	41.7	54.0	-12.3	H	A	106.0	275.0	
11.570	3.0	35.8	38.1	9.5	-32.5	0.0	0.7	51.6	74.0	-22.4	V	P	100.0	122.0	
11.570	3.0	23.8	38.1	9.5	-32.5	0.0	0.7	39.6	54.0	-14.4	V	A	100.0	122.0	
High Channel 5825MHz															
11.650	3.0	37.3	38.2	9.6	-32.5	0.0	0.7	53.2	74.0	-20.8	H	P	158.0	266.0	
11.650	3.0	25.5	38.2	9.6	-32.5	0.0	0.7	41.4	54.0	-12.6	H	A	158.0	266.0	
11.650	3.0	35.9	38.2	9.6	-32.5	0.0	0.7	51.8	74.0	-22.2	V	P	100.0	166.0	
11.650	3.0	22.9	38.2	9.6	-32.5	0.0	0.7	38.8	54.0	-15.2	V	A	100.0	166.0	

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

8.2.9. 802.11n HT40 SISO MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 07/28/09
Project #: 09U12658
Company: Broadcom
EUT Description: 802.11a/b/g/n WLAN + BLUETOOTH PCIE MINI CARD
EUT M/N: BCM943224PCIEBT
Test Target: FCC B
Mode Oper: Tx HT40 SISO Mode_5.8 GHz Band

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	Fldr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant. High cm	Table Angle Degree	Notes
Low Channel 5755MHz															
11.510	3.0	34.1	38.1	9.5	-32.5	0.0	0.7	49.9	74.0	-24.1	H	P	100.0	263.0	
11.510	3.0	20.5	38.1	9.5	-32.5	0.0	0.7	36.2	54.0	-17.8	H	A	100.0	263.0	
11.510	3.0	36.2	38.1	9.5	-32.5	0.0	0.7	51.9	74.0	-22.1	V	P	100.0	298.0	
11.510	3.0	23.7	38.1	9.5	-32.5	0.0	0.7	39.5	54.0	-14.5	V	A	100.0	298.0	
High Channel 5795MHz															
11.510	3.0	32.3	38.1	9.5	-32.5	0.0	0.7	48.0	74.0	-26.0	H	P	135.0	222.0	
11.510	3.0	19.5	38.1	9.5	-32.5	0.0	0.7	35.2	54.0	-18.8	H	A	135.0	222.0	
11.510	3.0	33.1	38.1	9.5	-32.5	0.0	0.7	48.8	74.0	-25.2	V	P	198.0	56.0	
11.510	3.0	19.9	38.1	9.5	-32.5	0.0	0.7	35.6	54.0	-18.4	V	A	198.0	56.0	

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

8.2.10. 802.11n HT40 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement																
Compliance Certification Services, Fremont 5m Chamber																
Test Engr:		Vien Tran														
Date:		07/28/09														
Project #:		09U12658														
Company:		Broadcom														
EUT Description:		802.11a/b/g/n WLAN + BLUETOOTH PCI-E MINI CARD														
EUT M/N:		BCM943224PCIEBT														
Test Target:		FCC B														
Mode Oper:		Tx HT40 MIMO MCS0 Mode 5.8 GHz Band														
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.	Ant. High	Table Angle	Notes	
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/Q/P	cm	Degree		
Low Channel 5755MHz																
11.510	3.0	39.2	38.1	9.5	-32.5	0.0	0.7	54.9	74.0	-19.1	H	P	111.0	251.0		
11.510	3.0	27.0	38.1	9.5	-32.5	0.0	0.7	42.8	54.0	-11.2	H	A	111.0	251.0		
11.510	3.0	36.4	38.1	9.5	-32.5	0.0	0.7	52.1	74.0	-21.9	V	P	100.0	121.0		
11.510	3.0	24.2	38.1	9.5	-32.5	0.0	0.7	39.9	54.0	-14.1	V	A	100.0	121.0		
High Channel 5795MHz																
11.590	3.0	36.9	38.1	9.5	-32.5	0.0	0.7	52.7	74.0	-21.3	H	P	99.0	281.0		
11.590	3.0	24.4	38.1	9.5	-32.5	0.0	0.7	40.2	54.0	-13.8	H	A	99.0	281.0		
11.590	3.0	36.1	38.1	9.5	-32.5	0.0	0.7	51.9	74.0	-22.1	V	P	103.0	167.0		
11.590	3.0	24.1	38.1	9.5	-32.5	0.0	0.7	39.9	54.0	-14.1	V	A	103.0	167.0		
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)

30-1000MHz Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Vien Tran											
Date:		07/22/09											
Project #:		09U12658											
Company:		Broadcom											
EUT Description:		802.11a/b/g/n WLAN + BLUETOOTH PCI-E MIMI CARD											
EUT M/N:		BCM943224PCIEBT											
Test Target:		FCC B											
Mode Oper:		Tx Below 1GHz_Worst-Case											
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
HORIZONTAL													
99.603	3.0	51.5	10.0	0.9	29.5	0.0	0.0	32.8	43.5	-10.7	H	EP	
120.004	3.0	47.8	13.7	1.0	29.5	0.0	0.0	33.0	43.5	-10.5	H	EP	
787.591	3.0	48.8	20.8	2.8	29.2	0.0	0.0	41.1	46.0	-4.9	H	EP	
816.152	3.0	48.9	21.1	2.8	29.1	0.0	0.0	41.8	46.0	-4.2	H	EP	
997.840	3.0	48.0	22.6	3.2	28.4	0.0	0.0	45.4	54.0	-8.6	H	EP	
VERTICAL													
33.120	3.0	39.9	18.9	0.5	29.7	0.0	0.0	29.6	40.0	-10.4	V	EP	
99.603	3.0	49.1	10.0	0.9	29.5	0.0	0.0	30.4	43.5	-13.1	V	EP	
216.008	3.0	53.5	11.9	1.3	28.9	0.0	0.0	37.9	46.0	-8.1	V	EP	
240.009	3.0	50.8	11.8	1.4	28.8	0.0	0.0	35.2	46.0	-10.8	V	EP	
398.895	3.0	54.0	15.0	1.9	29.3	0.0	0.0	41.6	46.0	-4.4	V	EP	
599.063	3.0	49.2	18.2	2.4	29.6	0.0	0.0	40.2	46.0	-5.8	V	EP	
787.591	3.0	44.6	20.8	2.8	29.2	0.0	0.0	39.0	46.0	-7.0	V	EP	
796.592	3.0	44.5	21.0	2.8	29.2	0.0	0.0	39.0	46.0	-7.0	V	EP	
Rev. 1.27.09													
Note: No other emissions were detected above the system noise floor.													

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

ANSI C63.4

RESULTS

2.4GHz BAND

6 WORST EMISSIONS

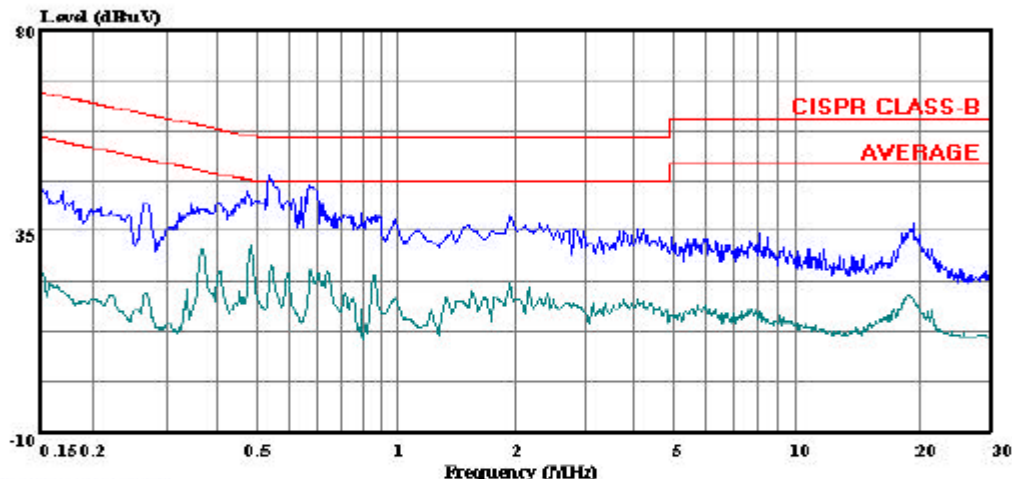
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.37	41.31	--	30.48	0.00	58.61	48.61	-17.30	-18.13	L1
5.32	47.77	--	31.51	0.00	60.00	50.00	-12.23	-18.49	L1
19.33	36.67	--	20.50	0.00	60.00	50.00	-23.33	-29.50	L1
0.37	43.52	--	31.21	0.00	58.61	48.61	-15.09	-17.40	L2
0.48	45.24	--	32.02	0.00	56.27	46.27	-11.03	-14.25	L2
19.33	32.95	--	20.87	0.00	60.00	50.00	-27.05	-29.13	L2
6 Worst Data									

LINE 1 RESULTS



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

Data#: 7 File#: 09U12658.EMI Date: 07-22-2009 Time: 13:14:06



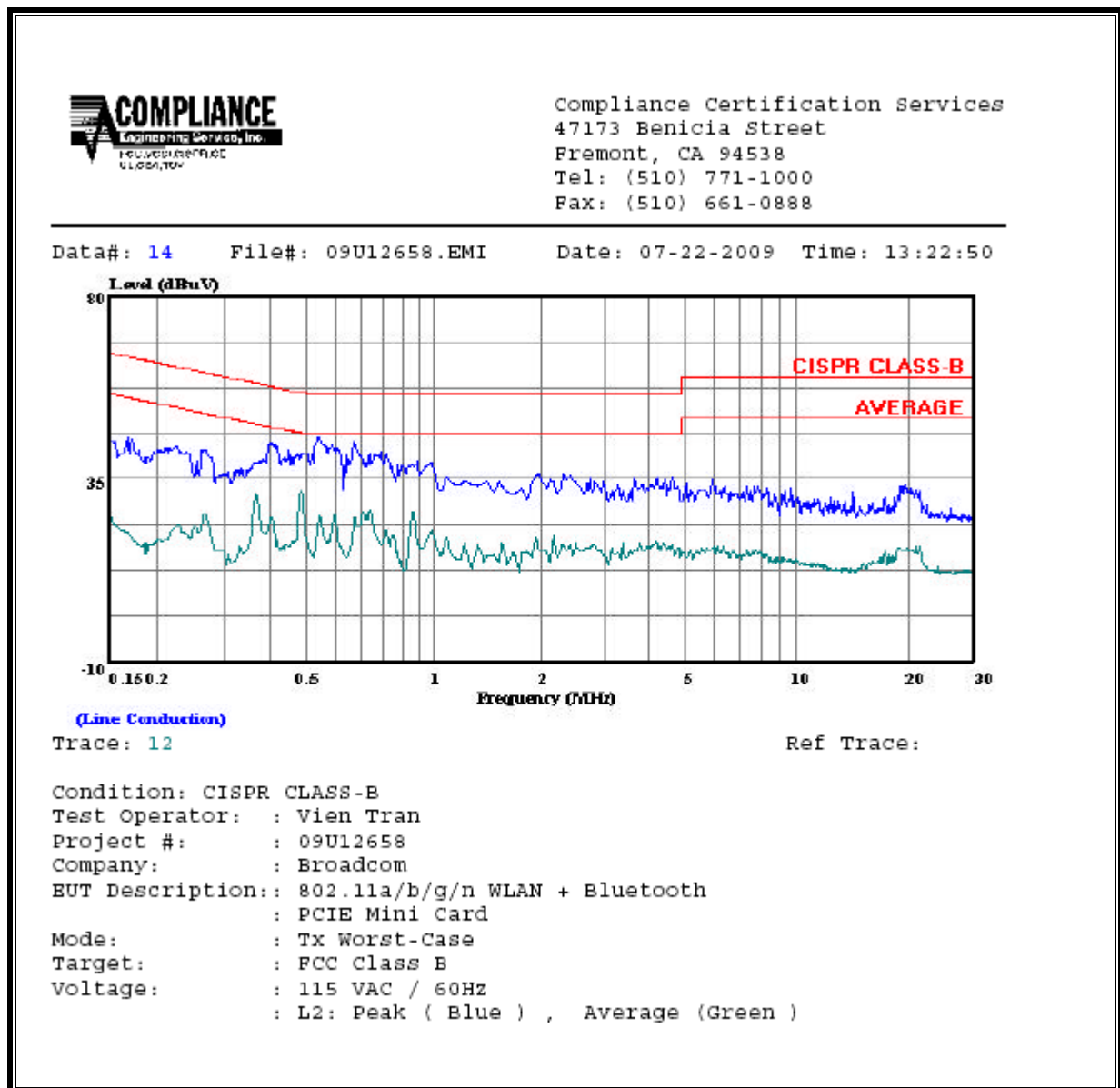
(Line Conduction)

Trace: 5

Ref Trace:

Condition: CISPR CLASS-B
Test Operator: : Vien Tran
Project #: : 09U12658
Company: : Broadcom
EUT Description: : 802.11a/b/g/n WLAN + Bluetooth
: PCIE Mini Card
Mode: : Tx Worst-Case
Target: : FCC Class B
Voltage: : 115 VAC / 60Hz
: L1: Peak (Blue) , Average (Green)

LINE 2 RESULTS

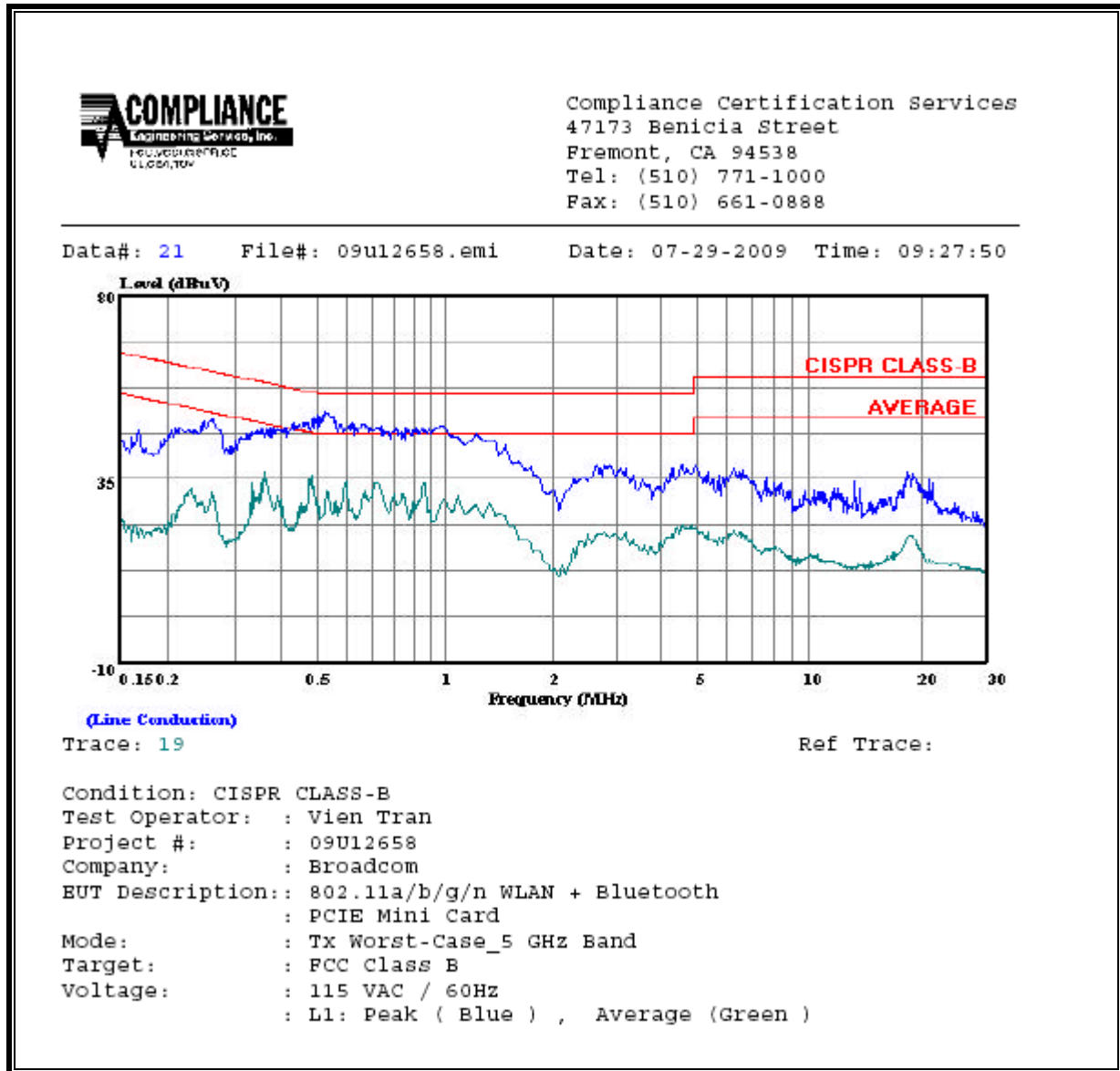


5.8GHz BAND

6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Class	Limit	FCC B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.27	49.44	--	29.43	0.00	61.24	51.24	-11.80	-21.81	L1
0.53	51.19	--	32.16	0.00	56.00	46.00	-4.81	-13.84	L1
6.39	37.69	--	22.62	0.00	60.00	50.00	-22.31	-27.38	L1
0.39	47.13	--	27.10	0.00	58.00	48.00	-10.87	-20.90	L2
0.67	46.26	--	24.80	0.00	56.00	46.00	-9.74	-21.20	L2
20.92	38.94	--	23.42	0.00	60.00	50.00	-21.06	-26.58	L2
6 Worst Data									

LINE 1 RESULTS

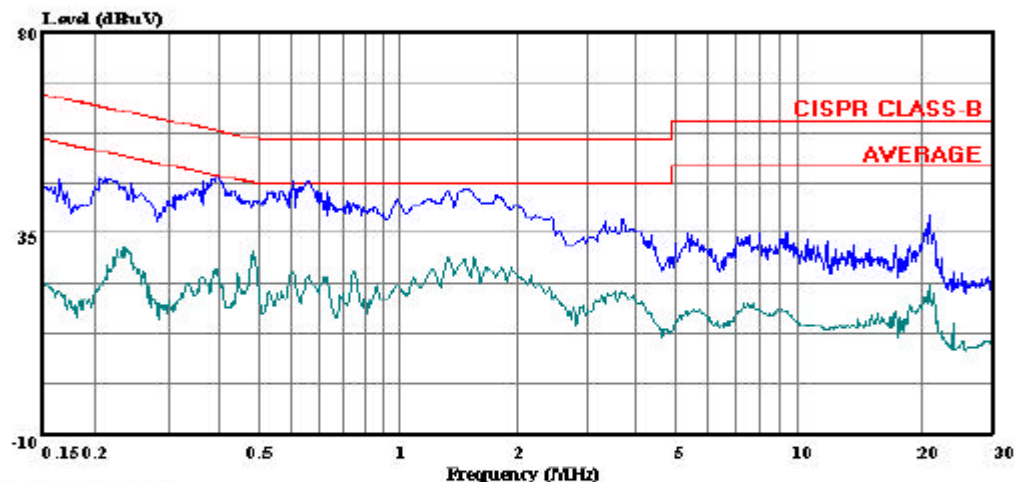


LINE 2 RESULTS



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

Data#: 28 File#: 09u12658.emi Date: 07-29-2009 Time: 09:53:14



(Line Conduction)

Trace: 26

Ref Trace:

Condition: CISPR CLASS-B
Test Operator: : Vien Tran
Project #: : 09U12658
Company: : Broadcom
EUT Description: : 802.11a/b/g/n WLAN + Bluetooth
: PCIE Mini Card
Mode: : Tx Worst-Case_5 GHz Band
Target: : FCC Class B
Voltage: : 115 VAC / 60Hz
: L2: Peak (Blue) , Average (Green)

10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m ²)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	280/ <i>f</i>	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 / <i>f</i> ^{1.2}
150 000–300 000	0.158 <i>f</i> ^{0.5}	4.21 × 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 × 10 ⁻⁵ <i>f</i>	616 000 / <i>f</i> ^{1.2}

* Power density limit is applicable at frequencies greater than 100 MHz.

- Notes:**
1. Frequency, *f*, is in MHz.
 2. A power density of 10 W/m² is equivalent to 1 mW/cm².
 3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

EQUATIONS

Power density is given by:

$$S = \text{EIRP} / (4 * \pi * D^2)$$

where

S = Power density in W/m²

EIRP = Equivalent Isotropic Radiated Power in W

D = Separation distance in m

Power density in units of W/m² is converted to units of mWc/m² by dividing by 10.

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \pi * S))$$

where

D = Separation distance in m

EIRP = Equivalent Isotropic Radiated Power in W

S = Power density in W/m²

For multiple colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the Power * Gain product (in linear units) of each transmitter.

$$\text{Total EIRP} = (P_1 * G_1) + (P_2 * G_2) + \dots + (P_n * G_n)$$

where

P_x = Power of transmitter x

G_x = Numeric gain of antenna x

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of $S = 1.0 \text{ mW/cm}^2$

From IC Safety Code 6, Section 2.2 Table 5 Column 4, $S = 10 \text{ W/m}^2$

RESULTS

Band (MHz)	Mode	Separation Distance (m)	Output Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m ²)	FCC Power Density (mW/cm ²)
2412 - 2462	g-mode Legacy	0.20	25.58	4.60	2.07	0.207
2412 - 2462	HT20	0.20	28.18	7.61	7.55	0.755
2422 - 2452	HT40 SISO	0.20	24.16	4.60	1.50	0.150
2422 - 2452	HT40	0.20	26.50	7.61	5.13	0.513
5745 - 5825	a-mode Legacy	0.20	20.99	3.62	0.58	0.058
5745 - 5825	HT20	0.20	23.29	6.47	1.88	0.188
5755 - 5795	HT40 SISO	0.20	24.27	3.62	1.22	0.122
5755 - 5795	HT40	0.20	25.98	6.47	3.50	0.350