FCC CFR47 PART 15 SUBPART C
FCC CFR47 PART 15 SUBPART B
INDUSTRY CANADA RSS-210 ISSUE 8
ICES-003 ISSUE 4

CERTIFICATION TEST REPORT

FOR

802.11a/b/g/n WLAN MODULE

MODEL NUMBER: SDGOB-1191, SDGOB-1192*

FCC ID: **B94SDGOB1191**
IC: 466D-SDGOB191

REPORT NUMBER: 11U13822-7, Revision B

ISSUE DATE: AUGUST 8, 2011

Prepared for
Hewlett Packard Company
3000 Hanover Street
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* Models differences are explained within the body of this report.

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	07/14/11	Initial Issue	F. Ibrahim
A	07/25/11	Updated Frequency Range in section 5.1	A. Zaffar
B	08/08/11	Corrected corrupt maximum output table	A. Zaffar

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Applicant: Hewlett Packard Company
Address: 3000 Hanover Street
Palo Alto, CA 94304, U.S.A.

EUT DESCRIPTION: 802.11a/b/g/n WLAN MODULE

MODEL: SDGOB-1191 (Part # 1150-7953)

SERIAL NUMBER: 00 50 43 21 2C CF

DATE TESTED: JUNE 3-26, 2011

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
CFR 47 Part 15 Subpart B	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass
ICES-003 ISSUE 4	Pass

Compliance Certification Services (UL 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 UL 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 UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL 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 UL CCS By:

FRANK IBRAHIM
EMC SUPERVISOR
UL CCS

Tested By:

THANH NGUYEN
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8. The tests documented in this report were also performed in accordance with CAN/CSA-CEI/IEC CISPR 22:02 as referenced by ICES-003 Issue 4.

3. FACILITIES AND ACCREDITATION

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

UL 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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 802.11a/b/g/n SISO MODULE.

Product	802.11 a/b/g/n WLAN Module
Model No.	SDGOB-1191, SDGOB-1192
Type of Equipment	Data transmission equipment operating in 2.4GHz ISM band and 5GHz UNII and DTS band using spread spectrum techniques
Power Supply	3.3 V DC from the host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64 QAM, 16 QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0/5.5/2.0/1.0 Mbps 802.11g: 54.0/48.0/36.0/24.0/18.0/12.0/9.0/6.0 Mbps 802.11n: upto 150 Mbps
Frequency Range	2412 MHz - 2462 MHz 5150 MHz - 5350 MHz 5500 MHz - 5700 MHz 5745 MHz - 5825 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (20MHz) in 2.4G 7 for 802.11n (40MHz) in 2.4G 20 for 802.11a, 802.11n (20MHz) and 802.11n (40MHz) in 5G
Antenna Type	PCB PIFA like antenna with maximum gain of 2.5 dB in 2G and 3.75 dB in 5G

5.2. DESCRIPTION OF MODELS DIFFERENCES

Brand	Product Name	Model #	Part #	Description
HP	802.11 a/b/g/n WLAN Module	SDGOB-1191	1150-7951	USB right angle, top mount
HP	802.11 a/b/g/n WLAN Module	SDGOB-1191	1150-7953	USB straight, bottom mount (worst case)
HP	802.11 a/b/g/n WLAN Module	SDGOB-1191	1150-7957	USB straight shrouded, bottom mount
HP	802.11 a/b/g/n WLAN Module	SDGOB-1192	1150-7952	SDIO straight, bottom mount
HP	802.11 a/b/g/n WLAN Module	SDGOB-1192	1150-7954	SDIO right angle, top mount

These 5 parts have the same radio module and antenna; the only difference is the digital input interface and the way they are mounted.

Both Main Antenna and Aux Antenna of the EUT were investigated for output power and radiated emissions (harmonics and bandedge), it was determined that the main antenna on Model # SDGOB-1191 , Part # 1150-7953 is the worst case of the 5 parts in the above table. Therefore, final testing was done on the main antenna on Model # SDGOB-1191 , Part # 1150-7953.

5.3. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	20.39	109.40
2412 - 2462	802.11g	23.04	201.37
2412 - 2462	802.11n HT20	22.57	180.72
2422 - 2452	802.11n HT40	20.43	110.41

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745-5825	802.11a	19.40	87.10
5745-5825	802.11n HT20	19.01	79.62
5755-5795	802.11n HT20	15.68	36.98

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

- Dual 2.4/5 GHz PCB Antennas
- Orthogonal antenna orientation for optimal coverage (Diversity)
- 2.4-2.5, 5.1-5.9 GHz Frequency Range
- VSWR Better than 2:1 across Frequency Range
- Measured Efficiency > 65% across Frequency Range
- Typical Gain 2.4-2.5 GHZ: 2.50 DBI across Frequency Range
- Typical Gain 5.1-5.9 GHZ: 3.75 DBI across Frequency Range

5.5. SOFTWARE AND FIRMWARE

The firmware version 14.0.11.26 was installed in the EUT during testing.

The EUT driver software installed during testing was USB Labtool DLL version 1.0.7.7

The test utility software used during testing was DutApiBRIDGEETH8782.exe.

5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. Therefore, radiated emissions below 1 GHz and power line conducted emissions were performed with the EUT set to transmit at the channel with highest output power.

The following worst-case data rates based on an input from the client were used:
802.11b: 1Mbps
802.11g: 6Mbps
802.11a: 6Mbps
802.11n: MCS0

EUT was investigated in three orthogonal orientations X,Y and Z, it was found that Y orientation is worst-case; therefore, all final testing was performed with the EUT laid down in the Y orientation.

For band edge testing multiple channels were tested since the output power is not the same, but whenever inside channel was tested and the BE was not worse no more inside channels were tested for the BE.

For harmonics radiated emissions, the power was set to a maximum value for low and high channels so this is worst-case scenario.

5.7. DESCRIPTION OF TEST SETUP (Wireless Portion)

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST			
Description	**Manufacturer**	**Model**	**Serial Number**
Support Laptop	DELL	VOSTRO 1000	WSH0765
AC/DC Adapter	DELL	PA 12	CN0928G4-71615-06E-0D24-A00
USB Interface Box	SHEEVA PLUG	003-SP1001	1043-002836
Test JIG	MARVELL	N/A	14628-PCA087

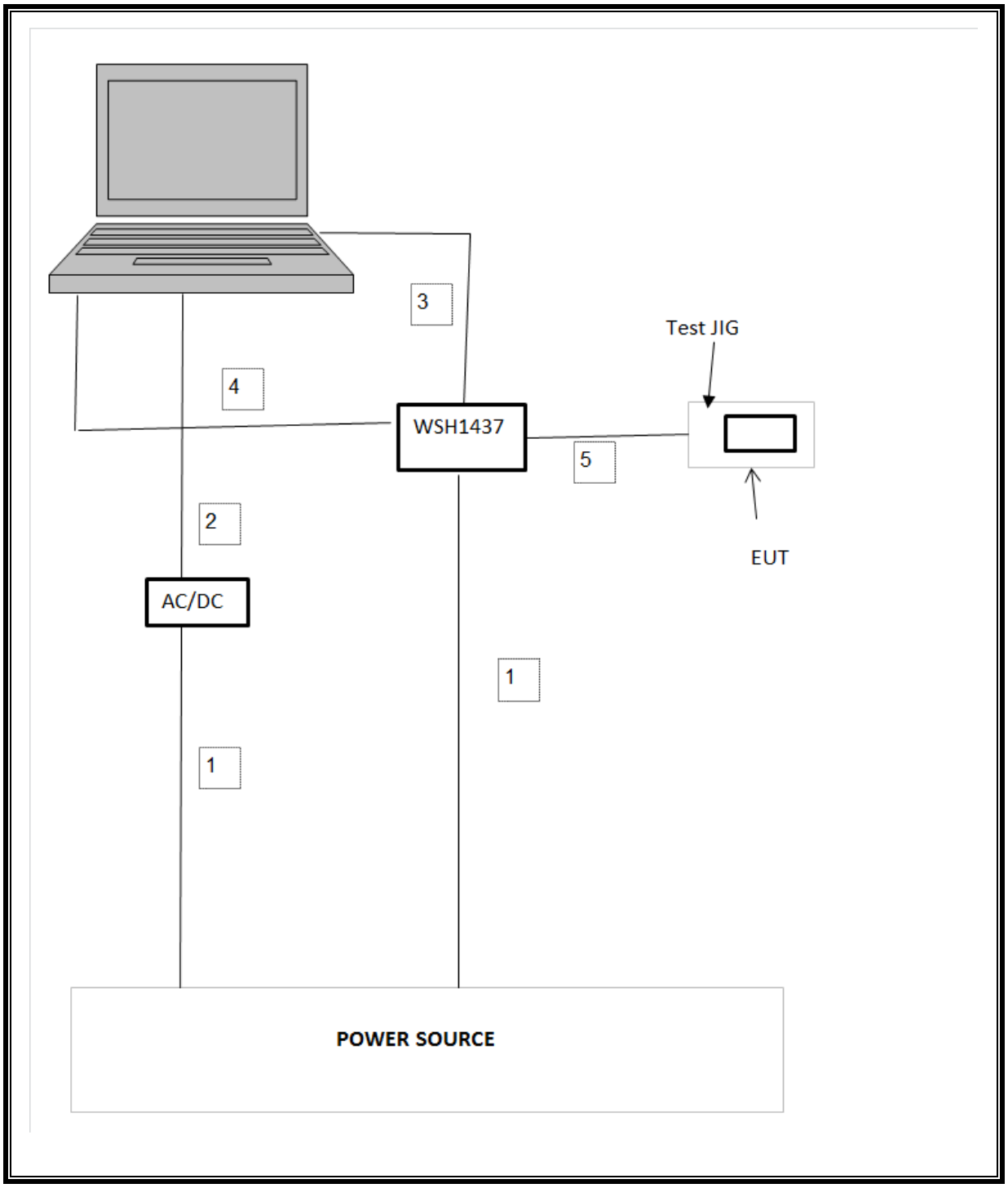
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US115VAC	Unshield	1.5m	Power for Laptop and USB
2	DC	1	DC Plug	Unshield	1.5m	Power for Laptop
3	LAN	1	RJ45	Unshield	1.5m	Connected to Laptop LAN
4	USB	1	USB	Shielded	1m	To test JIG and Laptop
5	USB	1	USB	Shielded	1m	EUT to WSH

TEST SETUP

The EUT is plugged to a test JIG card, connected to the USB Sheeva plug and a laptop computer during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



5.8. DESCRIPTION OF TEST SETUP (Digital Portion)

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST			
Description	**Manufacturer**	**Model**	**Serial Number**
Support Laptop	DELL	VOSTRO 1000	WSH0765
AC/DC Adapter	DELL	PA 12	CN0928G4-71615-06E-0D24-A00
USB Interface Box	SHEEVA PLUG	003-SP1001	1043-002836
Test JIG	MARVELL	N/A	14628-PCA087
Floppy Drive	SONY	PCGA-UFD5	28997700-1461486
Printer	HP	7850	MY56K1304B
USB Mouse	HP	M-S34	LZA80450240

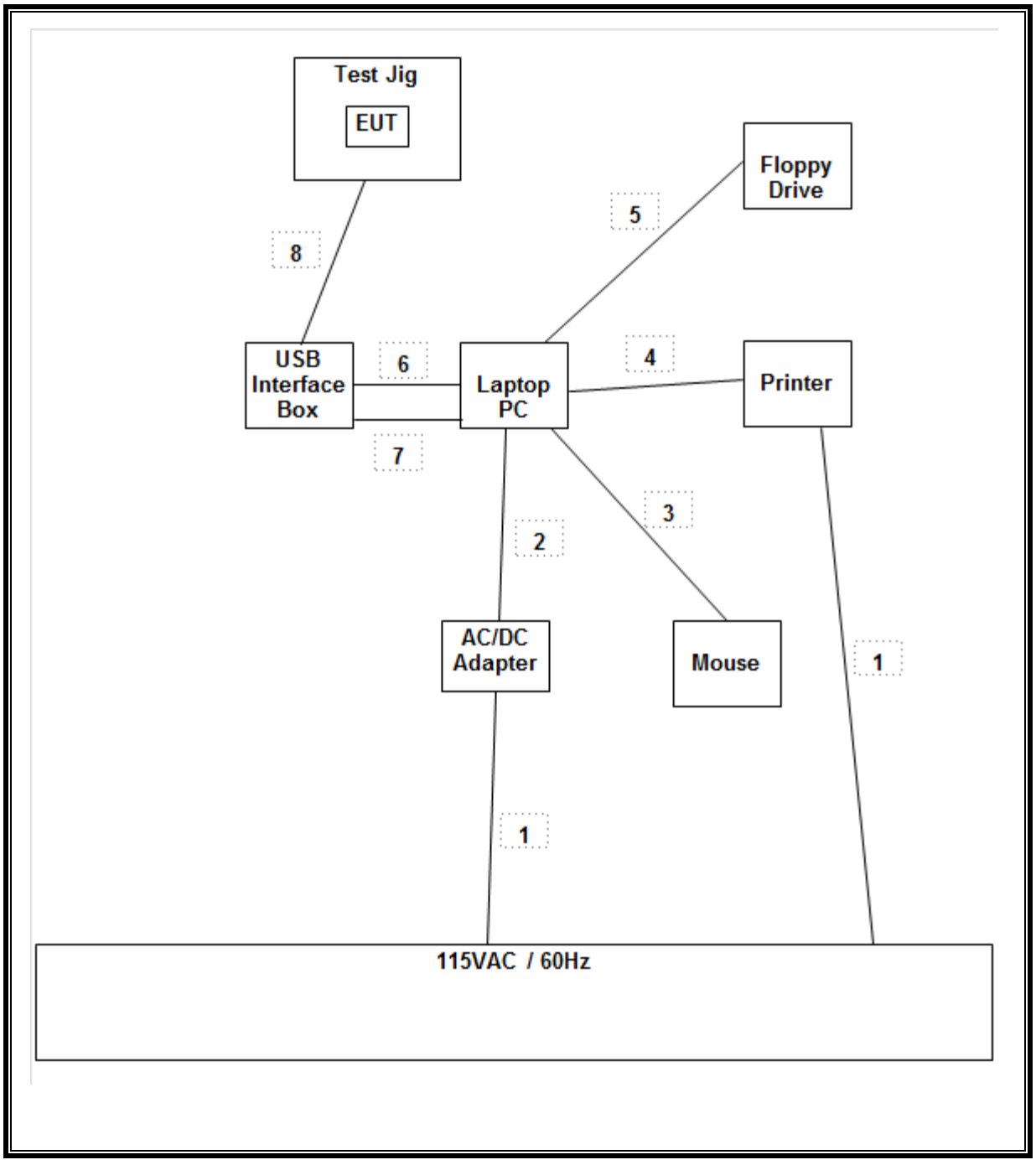
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US115VAC	Unshield	1.5m	
2	DC	1	DC Plug	Unshield	1.5m	
3	Mouse	1	USB	Shielded	1m	
4	Printer	1	USB	Shielded	1m	
5	Floppy Drive	1	USB	Shielded	0.3m	
6	USB	1	USB	Shielded	1m	
7	Ethernet	1	RJ45	Unshield	2m	
8	USB	1	USB	Shielded	1m	

TEST SETUP

The EUT is plugged to a test JIG card, connected to the USB Sheeva plug and a laptop computer with peripheral during the test. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due Date**
EMI Receiver, 2.9 GHz	Agilent / HP	85462A	C00147	8/19/2011
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	7/10/2011
Preamplifier, 1GHz	Agilent / HP	8447D	C00885	1/27/2012
Antenna, Horn, 18 GHz	EMCO	3115	C00872	7/15/2011
Antenna, Horn, 18 -26GHz	ARA	SWH 28	C01015	8/15/2011
Antenna, Horn, 26-40GHz	ARA	SWH 2640	1029	10/15/2011
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	8/3/2011
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	10/4/2011
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	11/10/2011
EMI Test Receiver	R & S	ESC17	1000741	7/2/2011
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/10/2011
Peak Power Meter	Agilent / HP	E4416A	C00963	3/22/2012
Peak / Average Power Sensor	Agilent	E9327A	C00964	4/13/2012
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	8/11/2012

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.

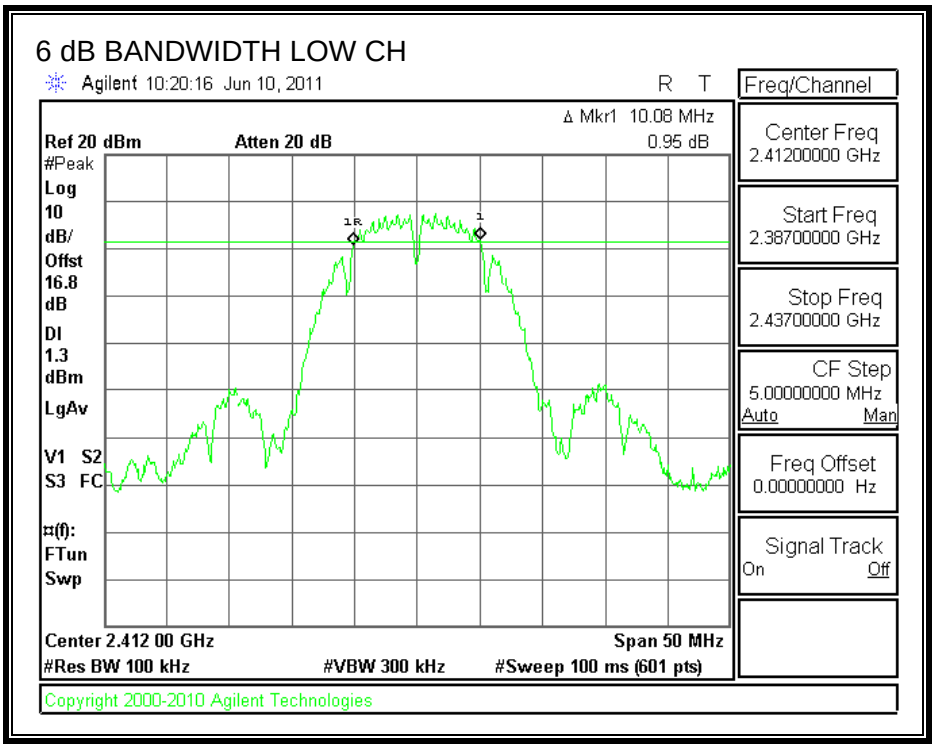
TEST PROCEDURE

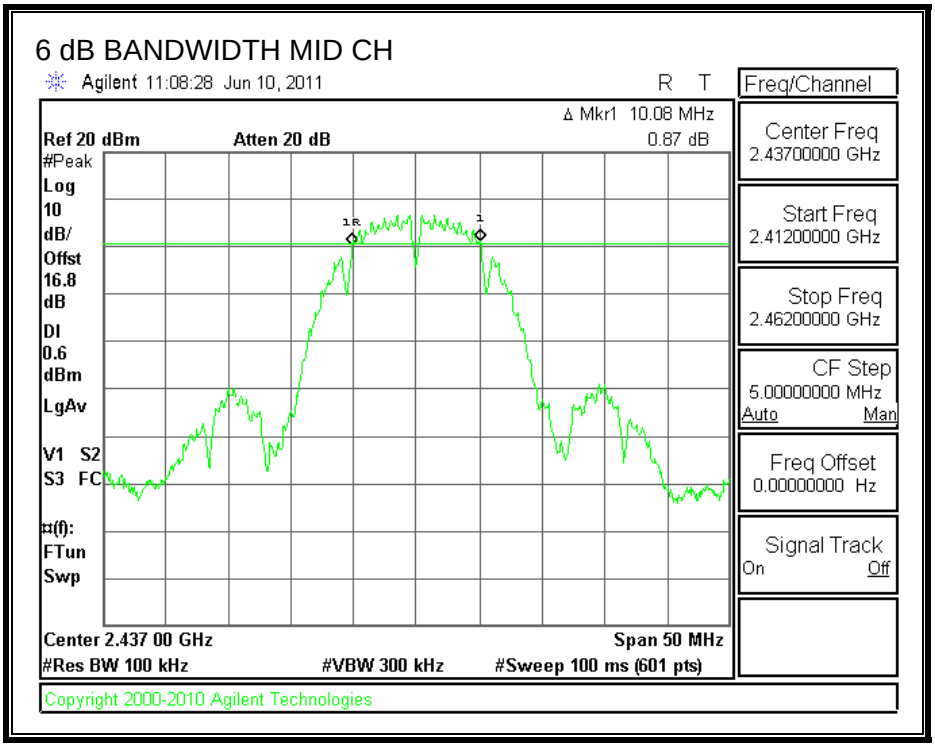
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

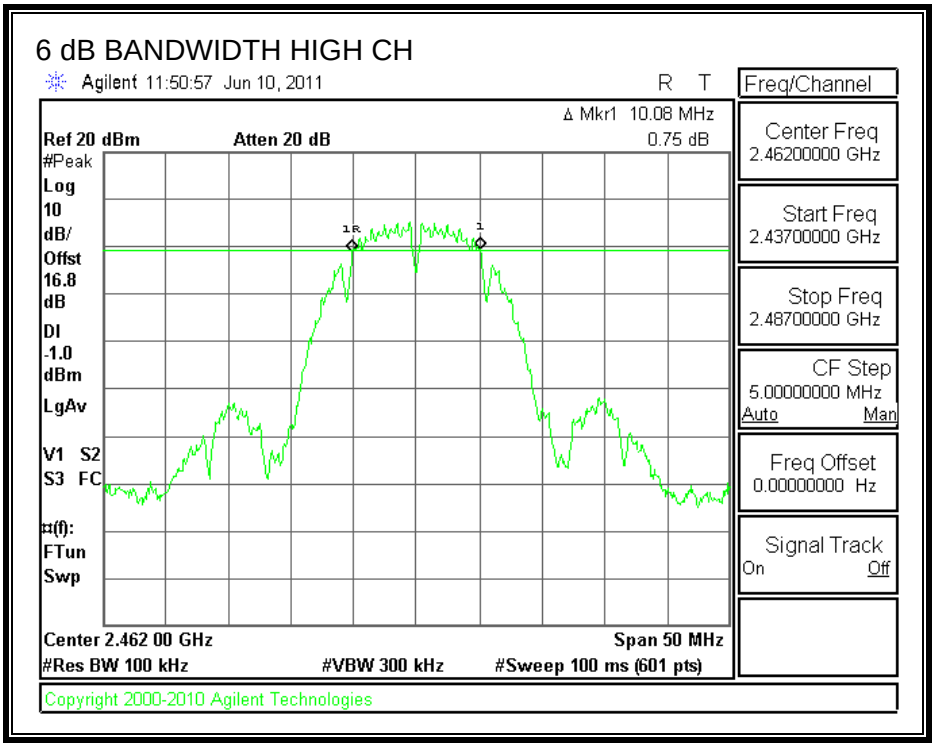
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	10.08	0.5
Middle	2437	10.08	0.5
High	2462	10.08	0.5

6 dB BANDWIDTH







7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

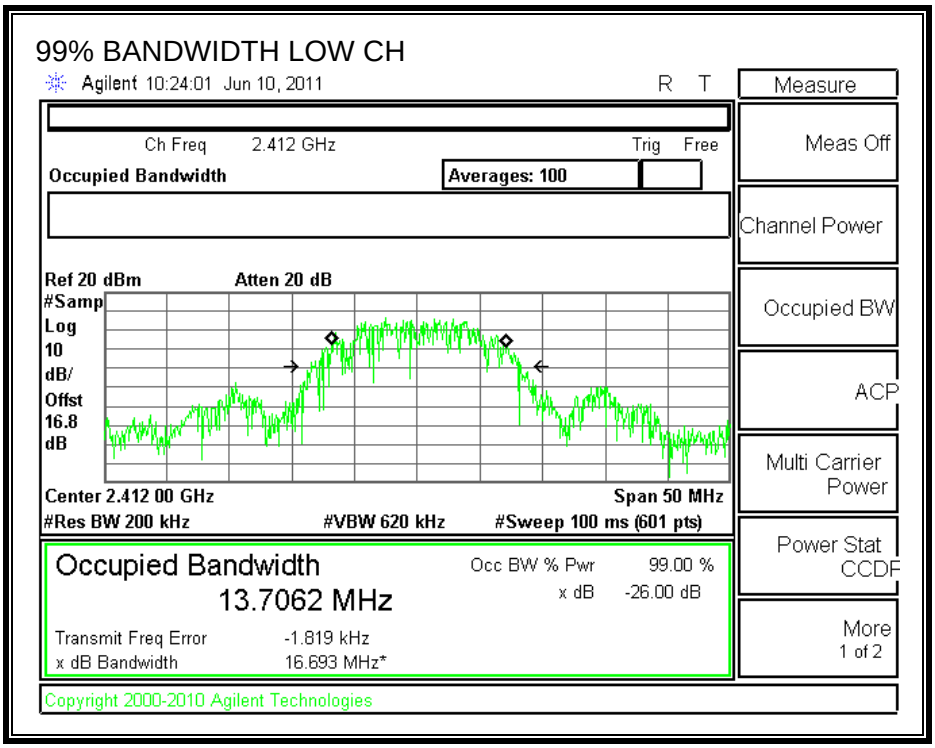
TEST PROCEDURE

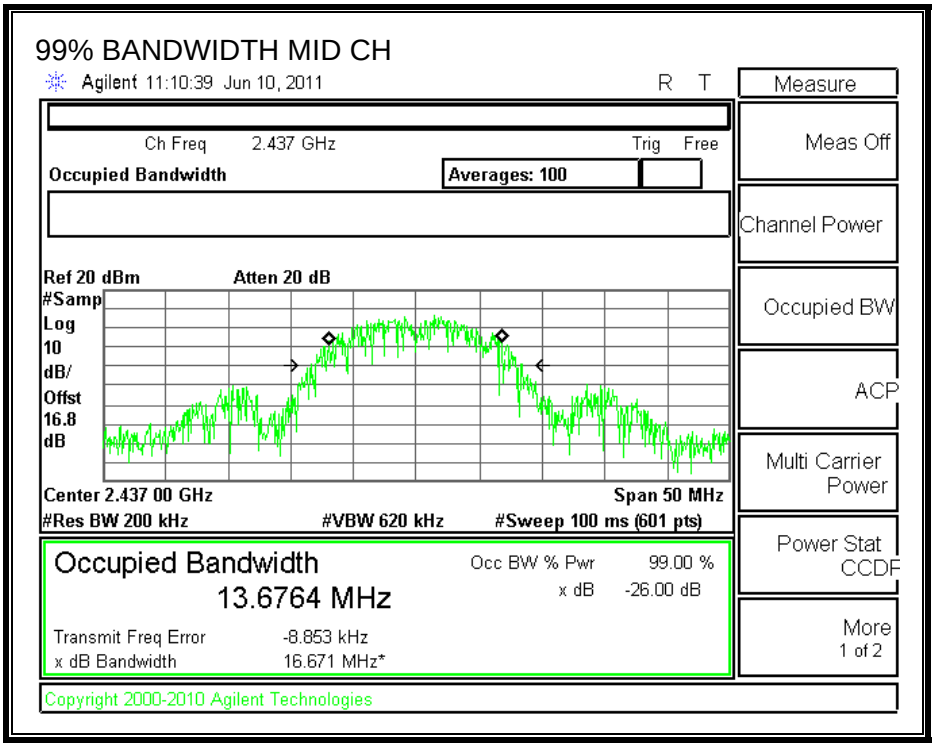
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

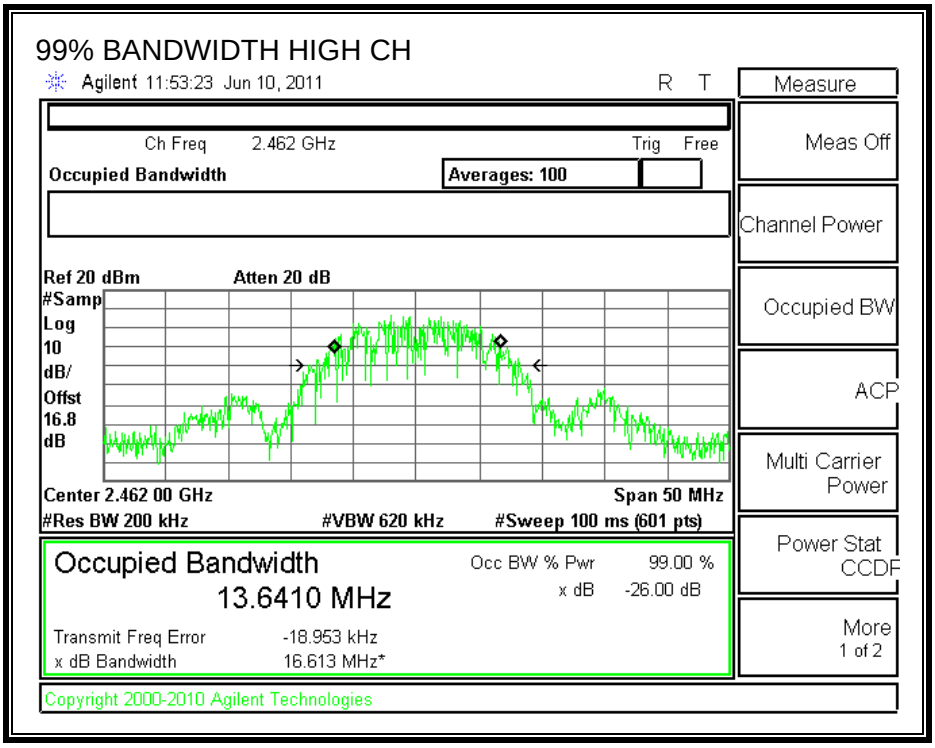
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	13.7062
Middle	2437	13.6764
High	2462	13.641

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

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

Peak power is measured using wide bandwidth Peak Power Meter.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	3.78	16.5	20.28	30	-9.72
Middle	2437	3.894	16.5	20.39	30	-9.61
High	2462	3.43	16.5	19.93	30	-10.07

7.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 16.5 dB (including 10 dB pad and 6.5dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	17.92
Middle	2437	18.04
High	2462	17.52

7.1.5. 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.

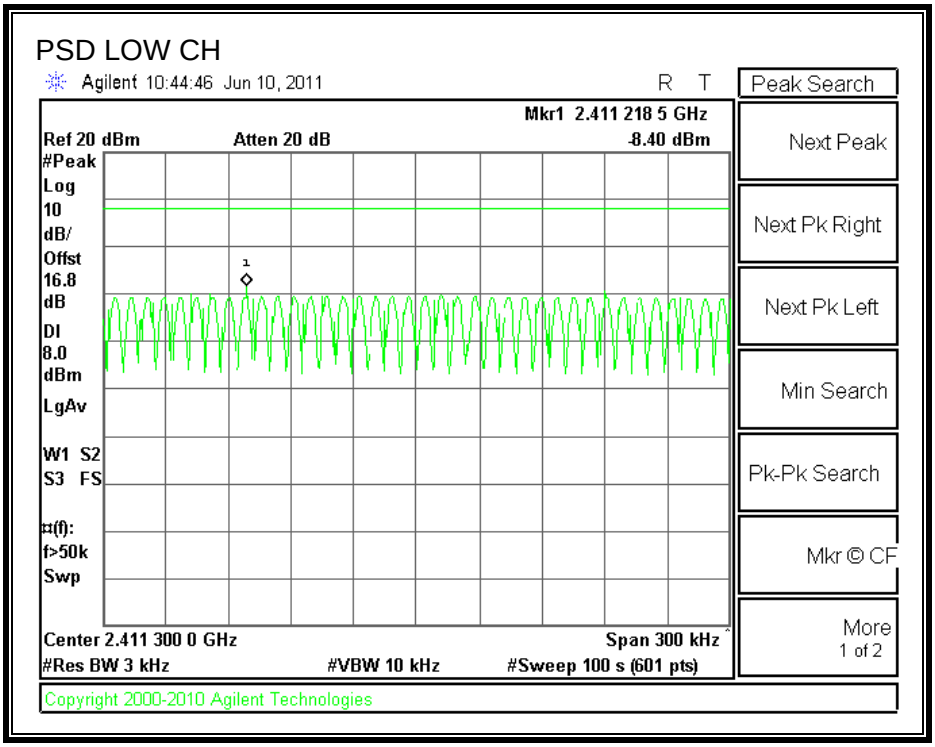
TEST PROCEDURE

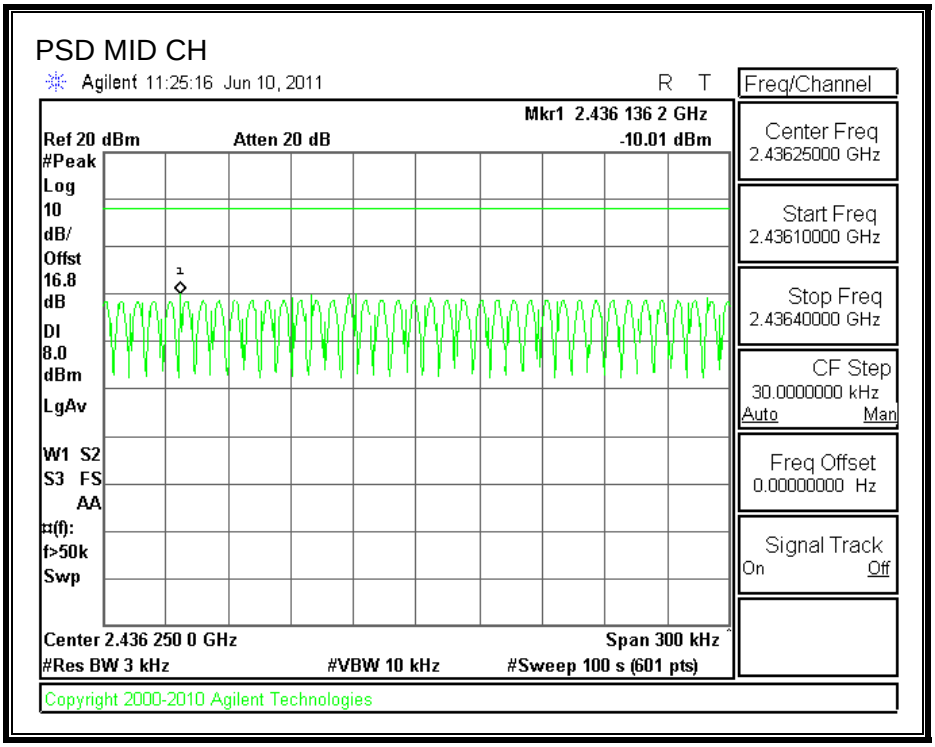
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

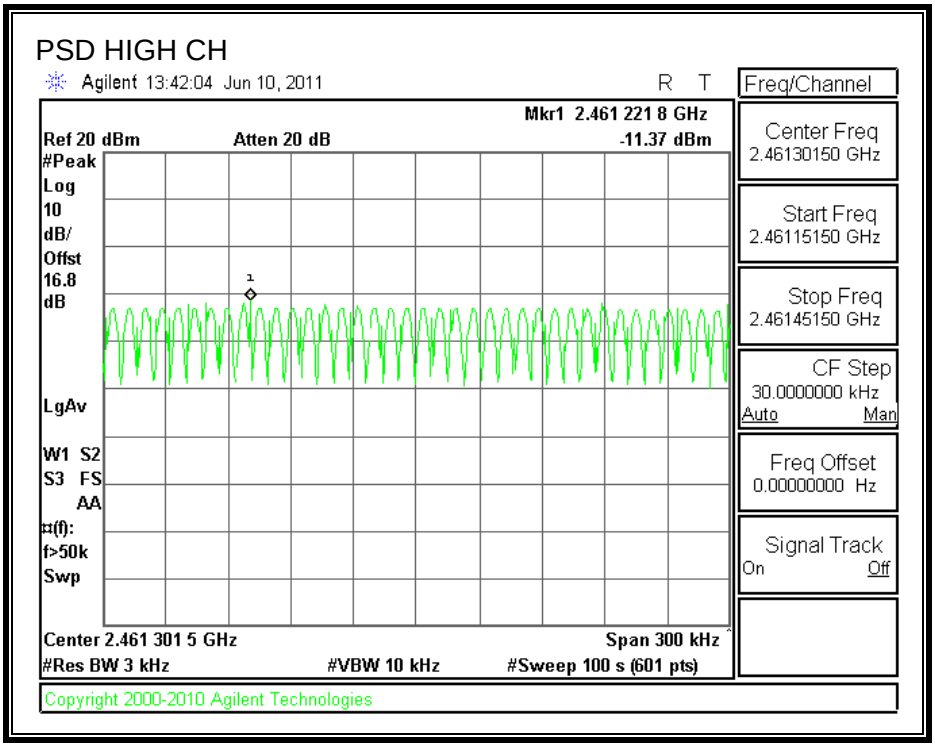
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-8.40	8	-16.40
Middle	2437	-10.01	8	-18.01
High	2462	-11.37	8	-19.37

POWER SPECTRAL DENSITY







7.1.6. 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.

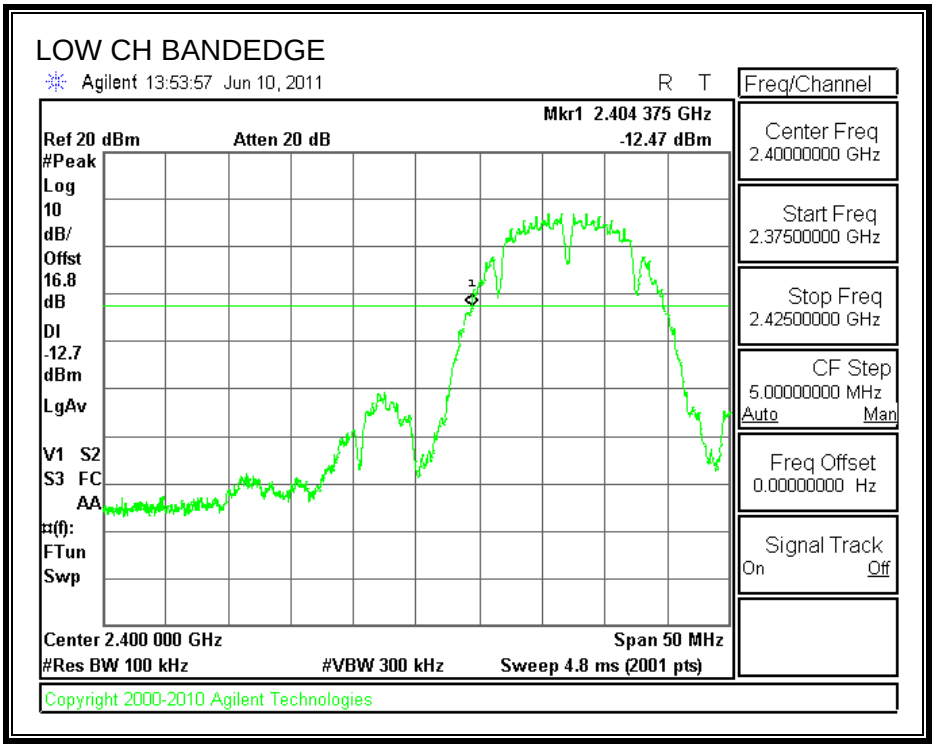
TEST PROCEDURE

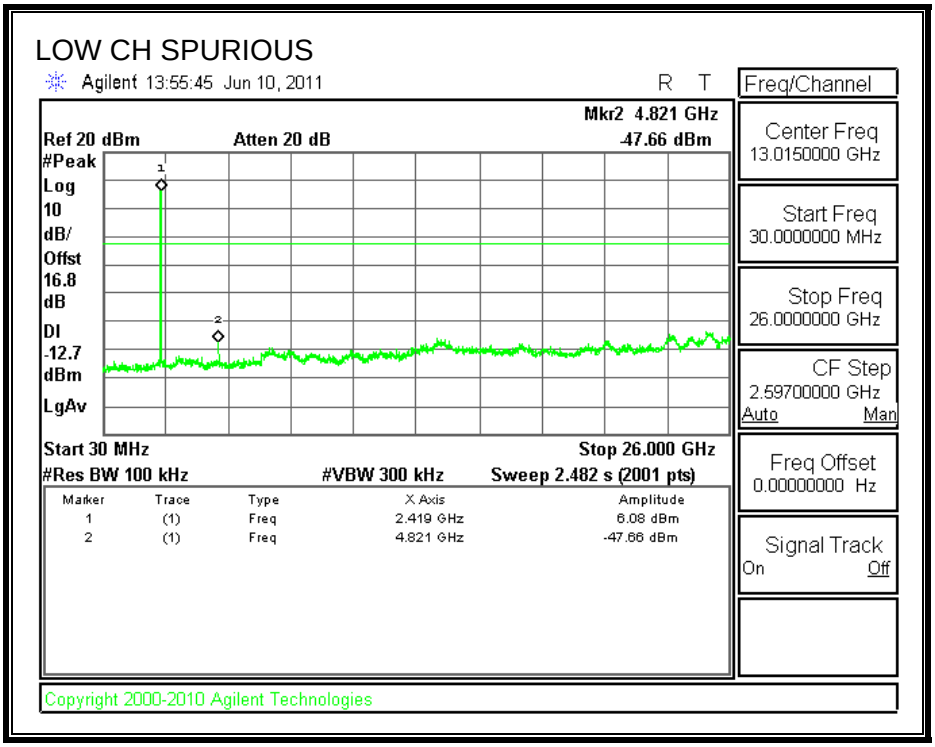
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

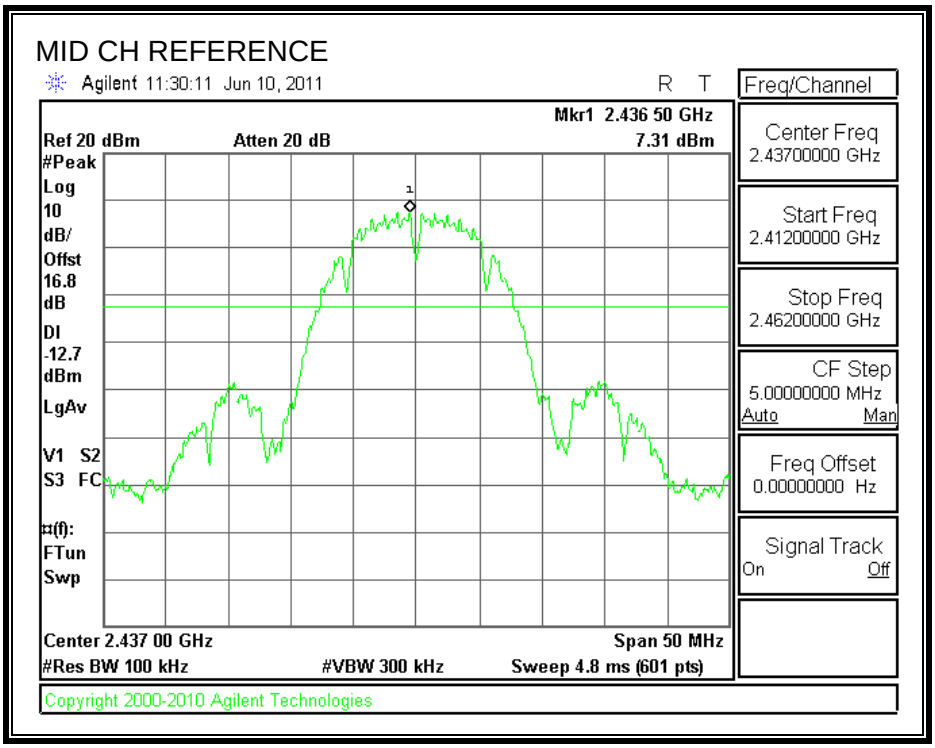
RESULTS

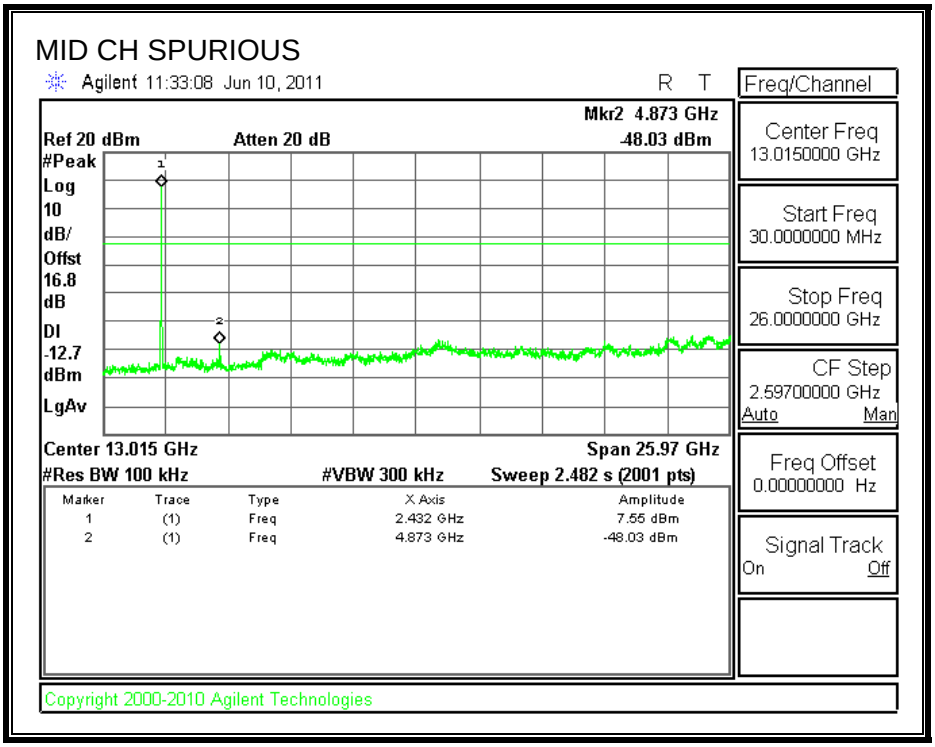
SPURIOUS EMISSIONS, LOW CHANNEL



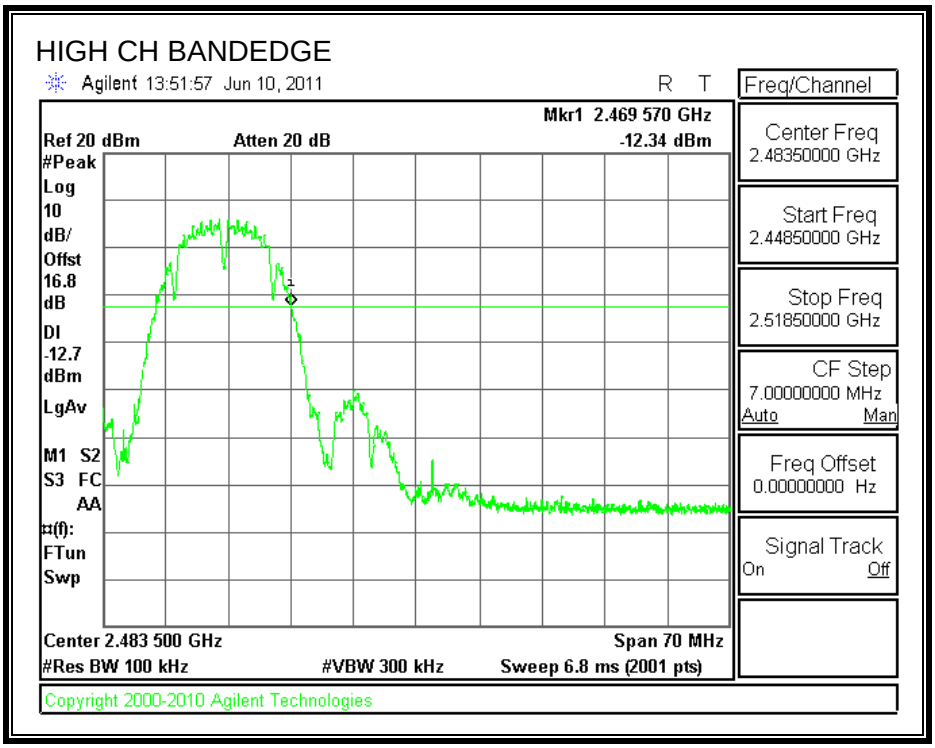


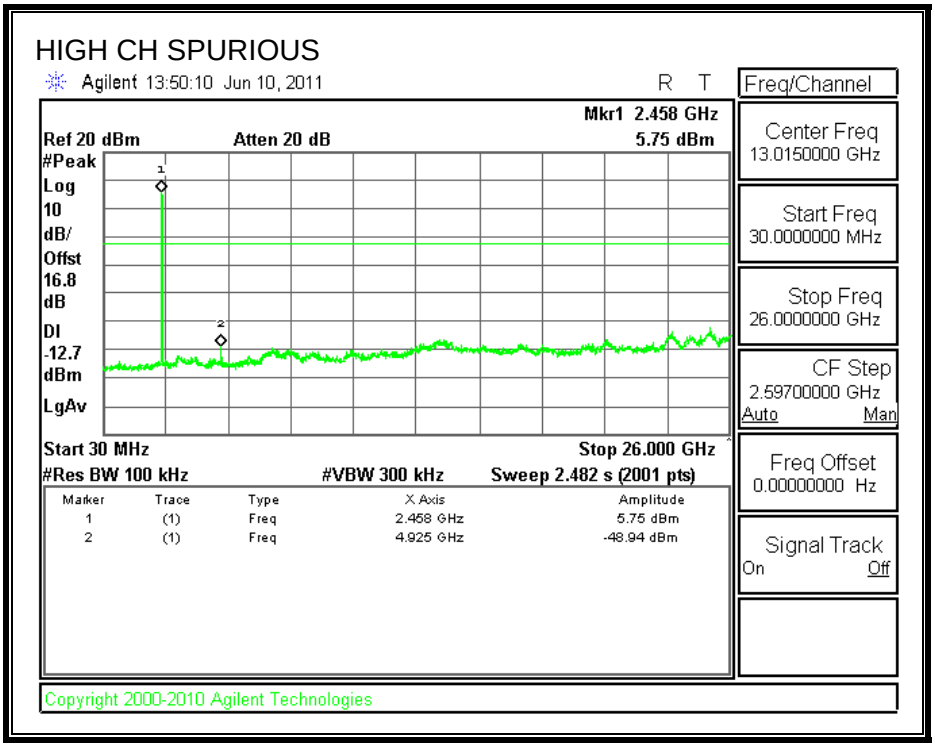
SPURIOUS EMISSIONS, MID CHANNEL





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.

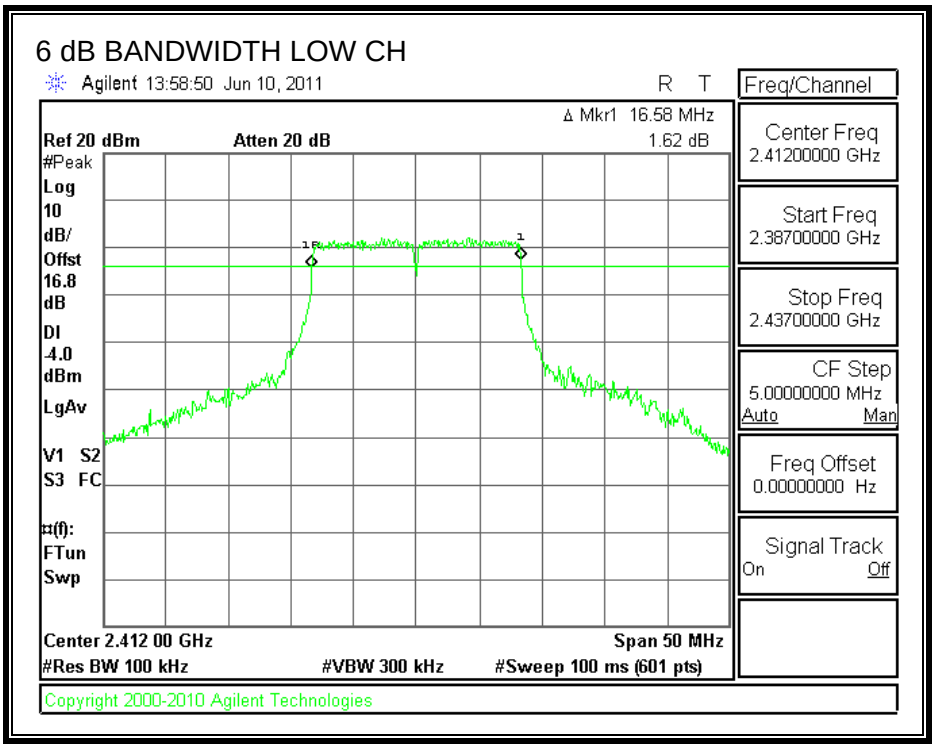
TEST PROCEDURE

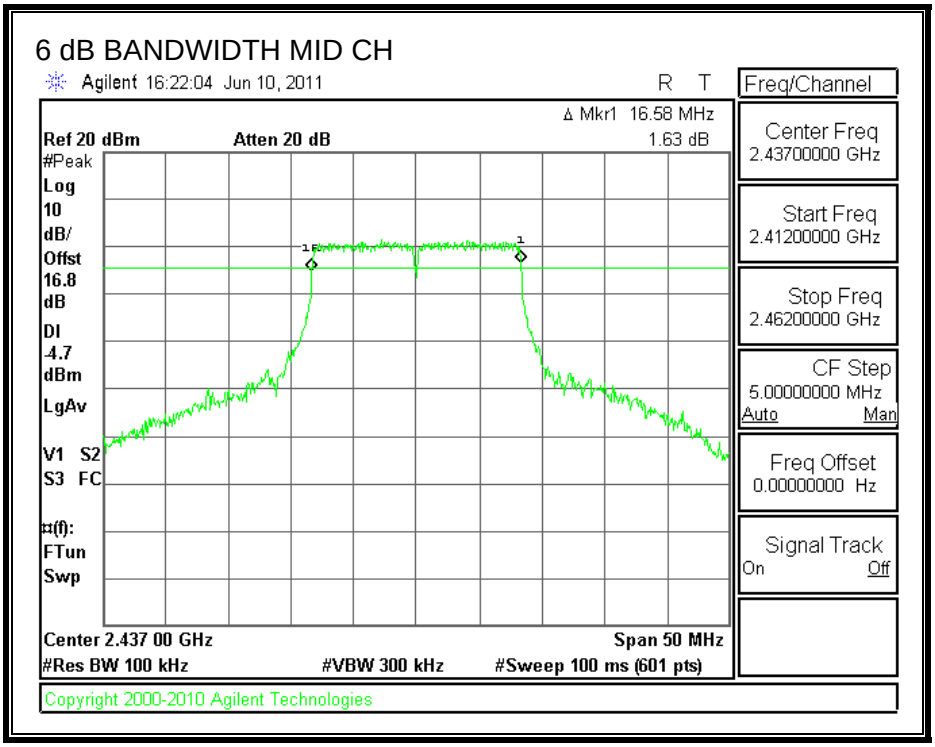
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

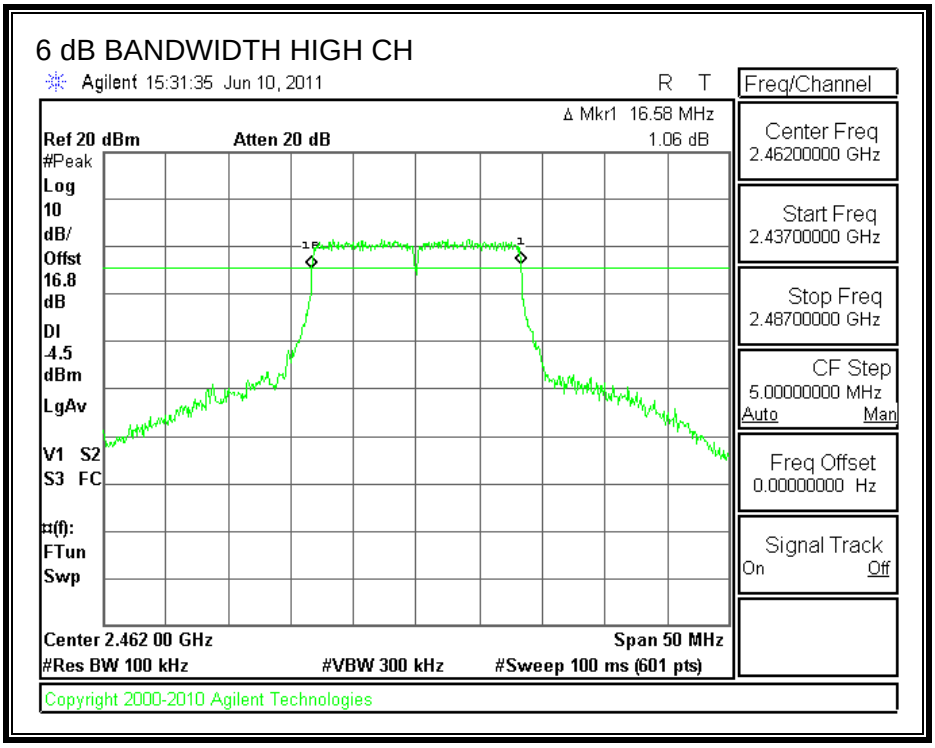
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.58	0.5
Middle	2437	16.58	0.5
High	2462	16.58	0.5

6 dB BANDWIDTH







7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

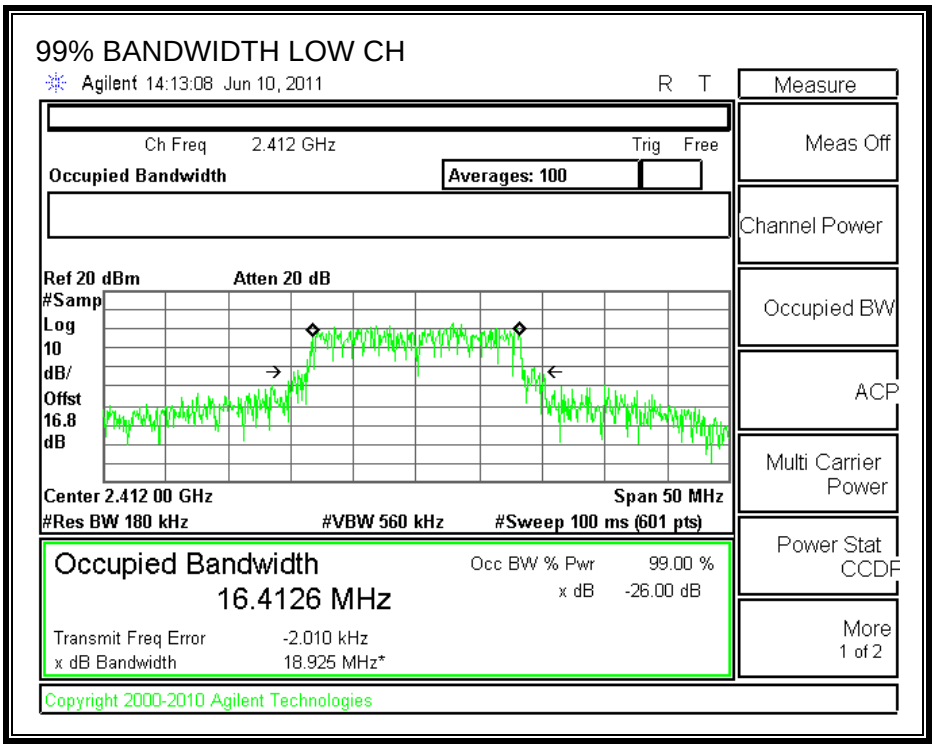
TEST PROCEDURE

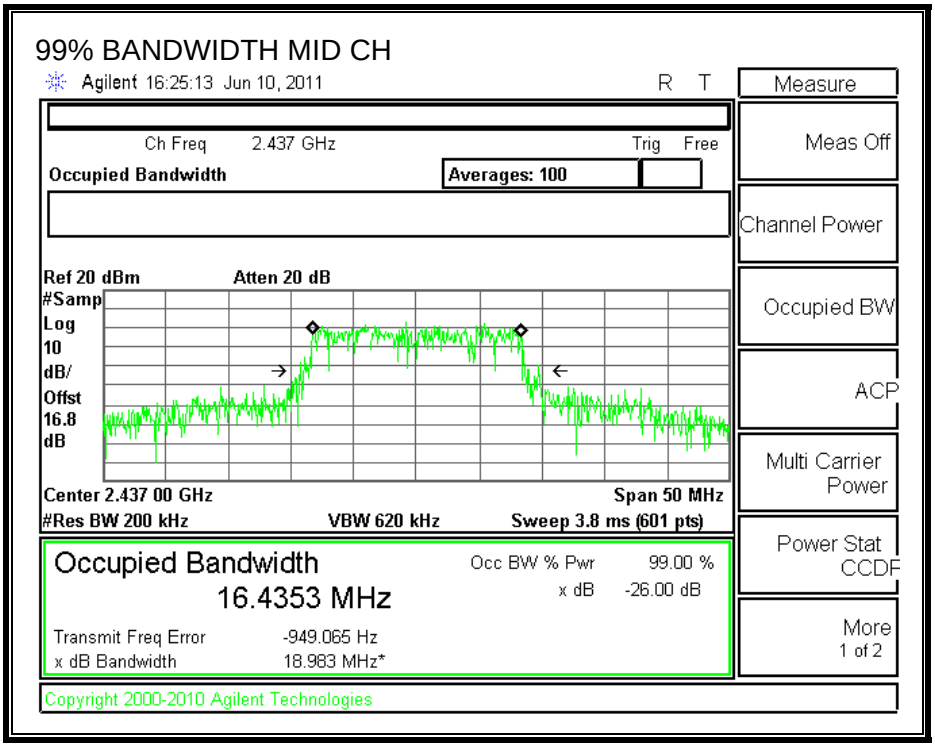
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

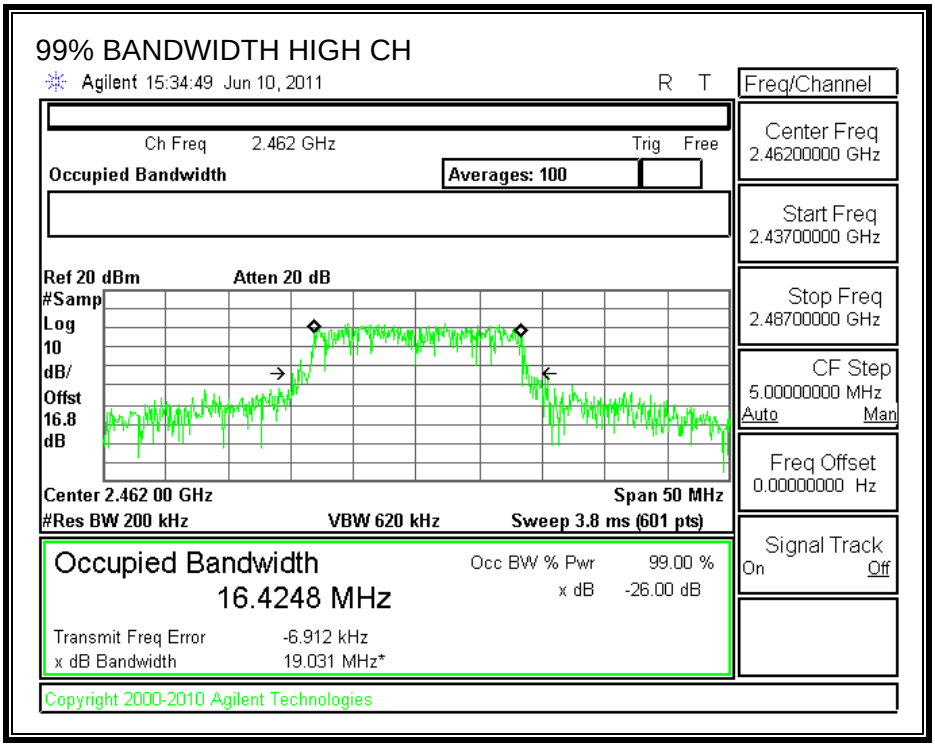
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.4126
Middle	2437	16.4353
High	2462	16.4248

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

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

Peak power is measured using wide bandwidth Peak Power Meter.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
CH1	2412	5.75	16.5	22.25	30	-7.75
CH2	2417	5.47	16.5	21.97	30	-8.03
CH3	2422	5.87	16.5	22.37	30	-7.63
CH6	2437	6.37	16.5	22.87	30	-7.13
CH10	2457	6.54	16.5	23.04	30	-6.96
CH11	2462	5.58	16.5	22.08	30	-7.92

7.2.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 16.8dB (including 10 dB pad and 6.8 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
CH1	2412	14.56
CH2	2417	15.58
CH3	2422	16.37
CH6	2437	16.28
CH10	2457	16.46
CH11	2462	14.67

7.2.5. 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.

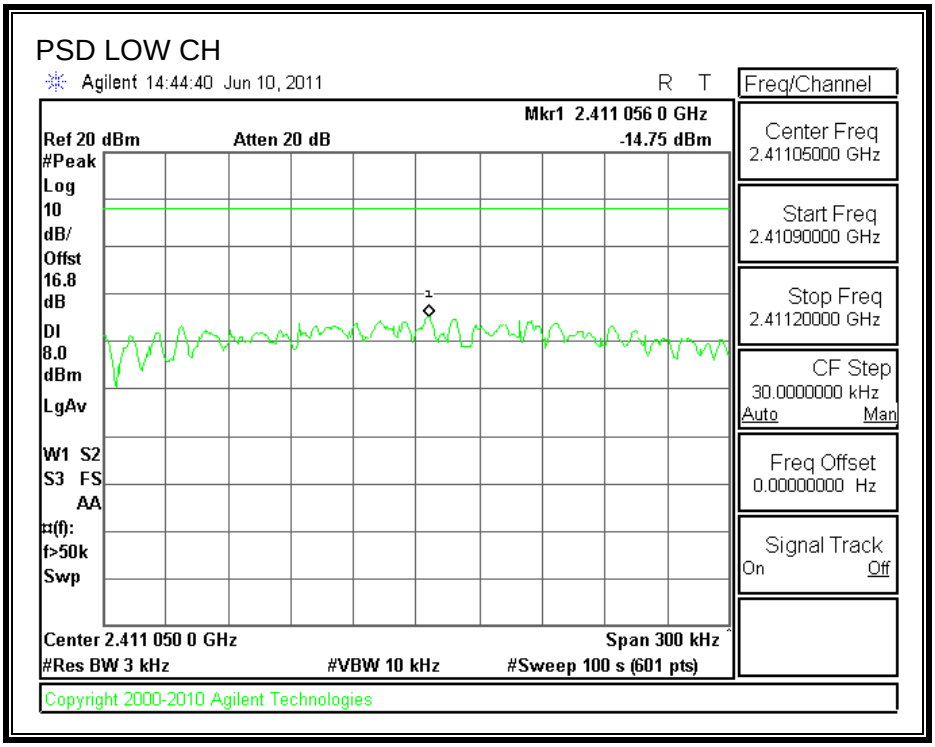
TEST PROCEDURE

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.

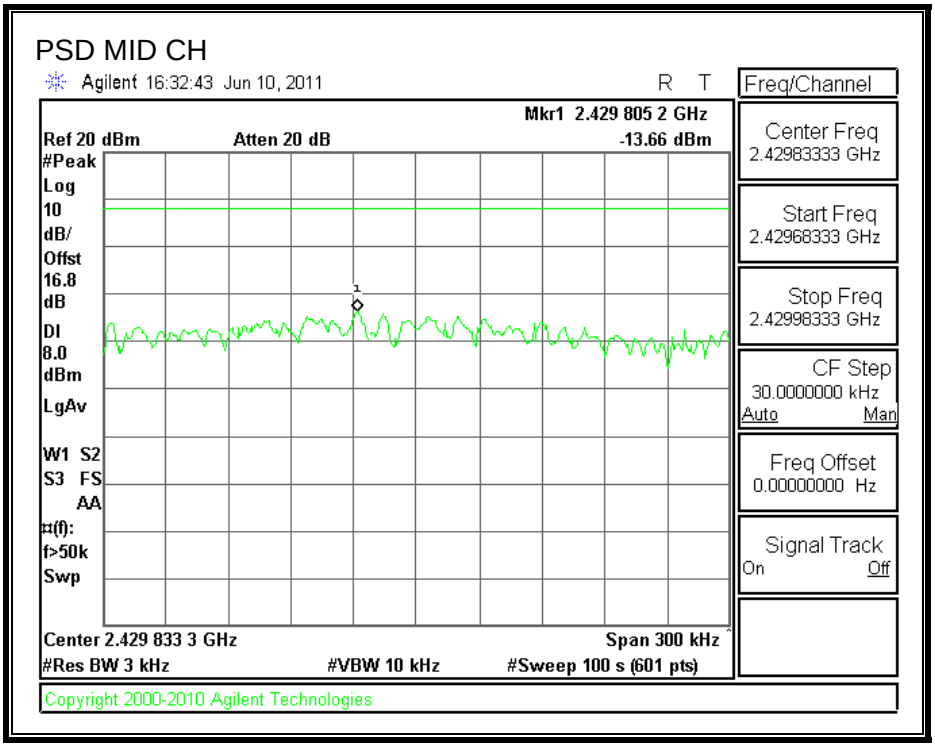
RESULTS

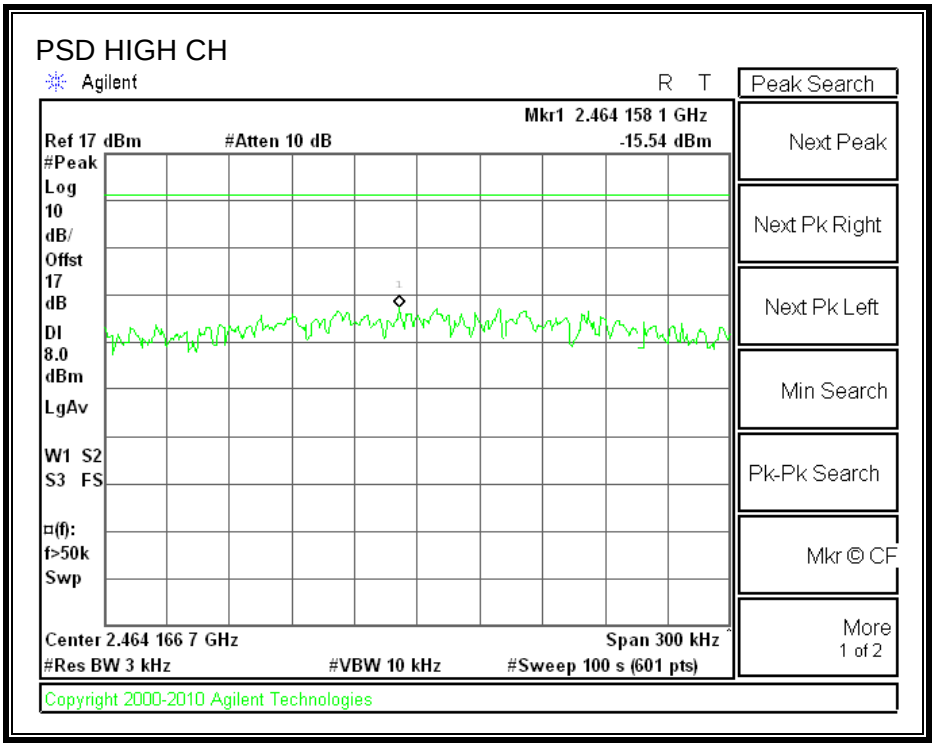
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-14.75	8	-22.75
Middle	2437	-13.66	8	-21.66
High	2462	-15.54	8	-23.54

POWER SPECTRAL DENSITY



PSD MID CH





7.2.6. 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.

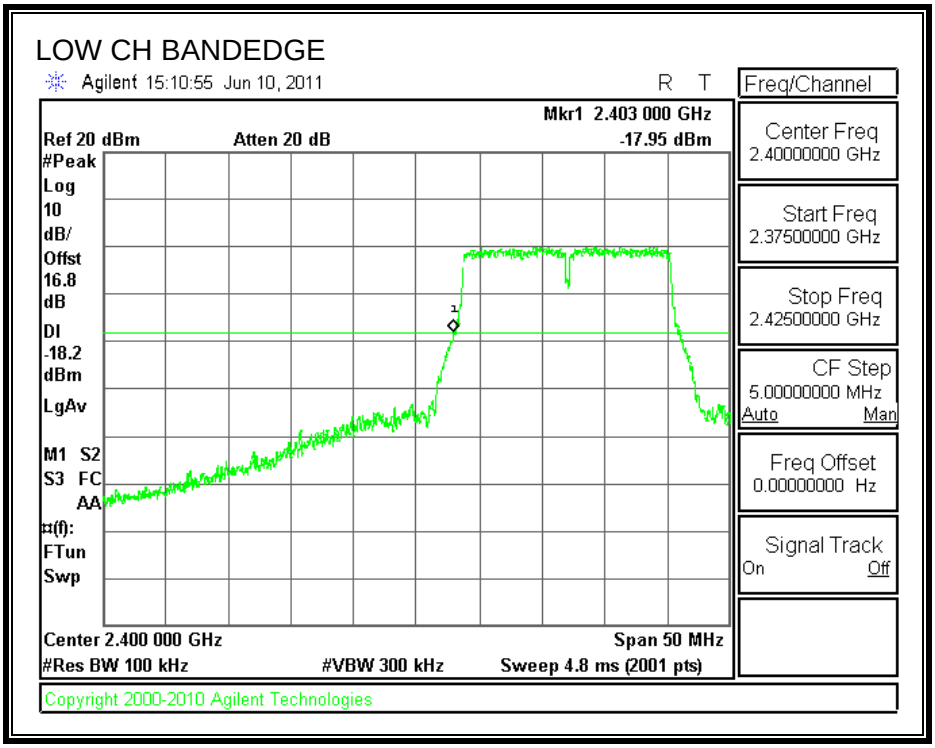
TEST PROCEDURE

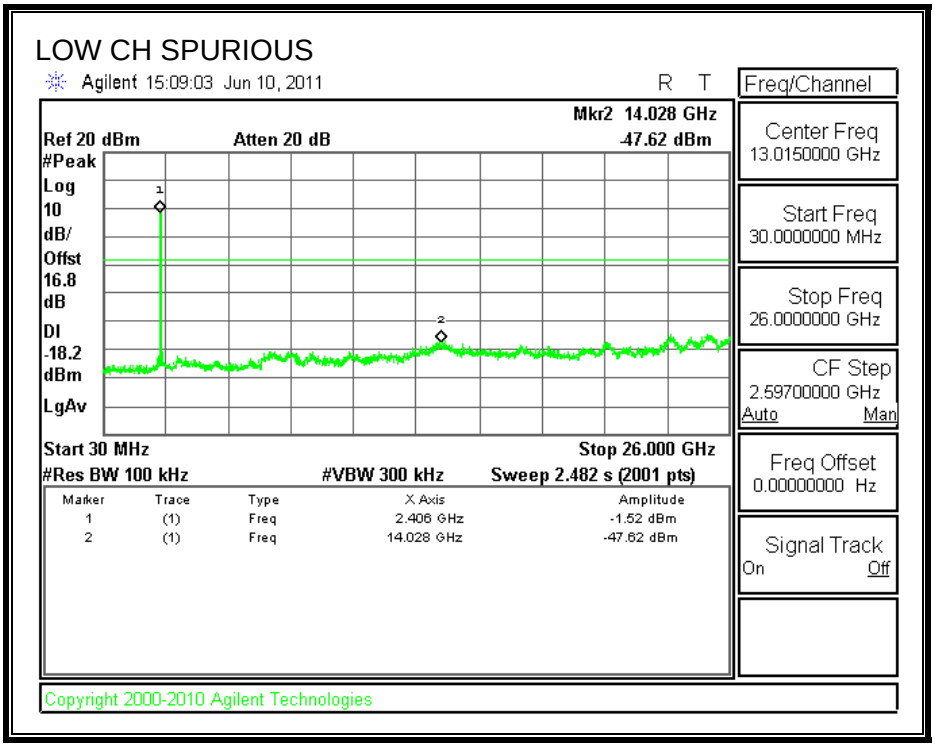
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

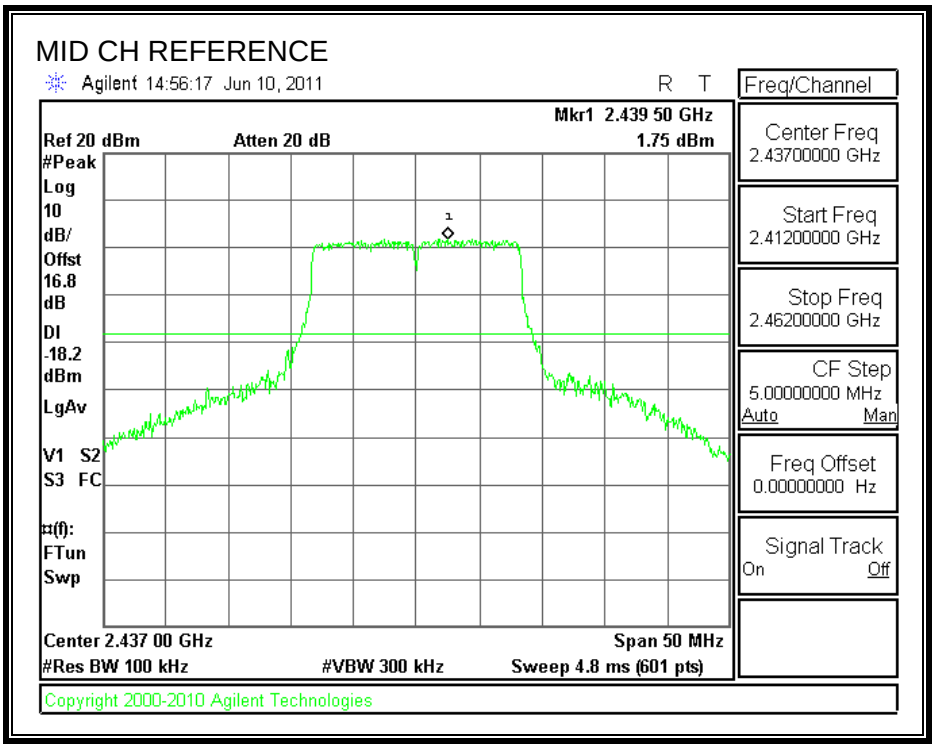
RESULTS

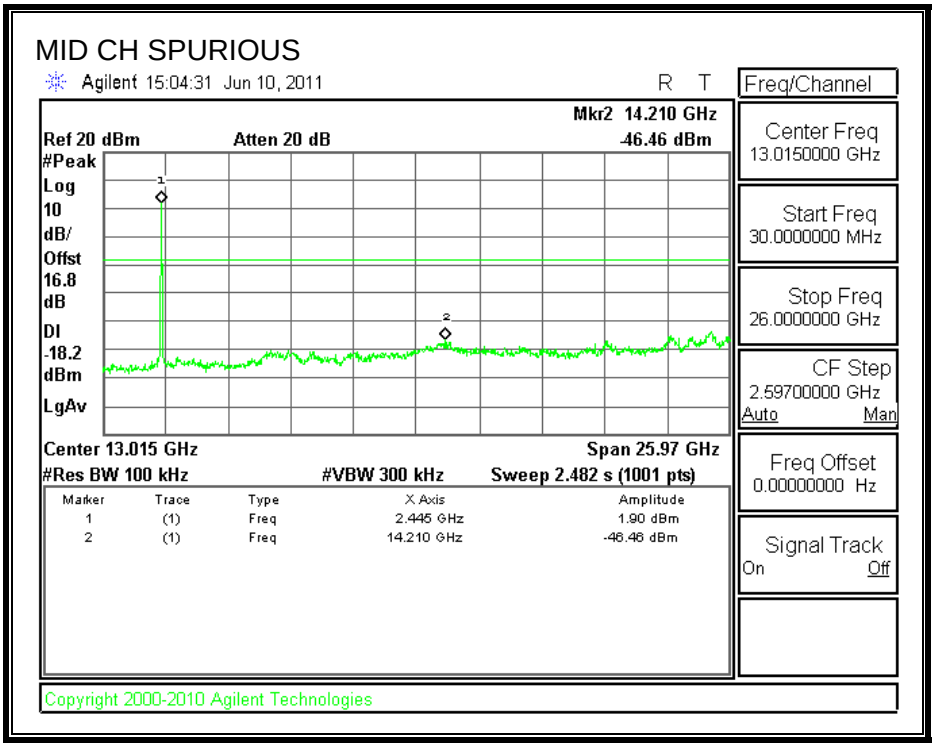
SPURIOUS EMISSIONS, LOW CHANNEL



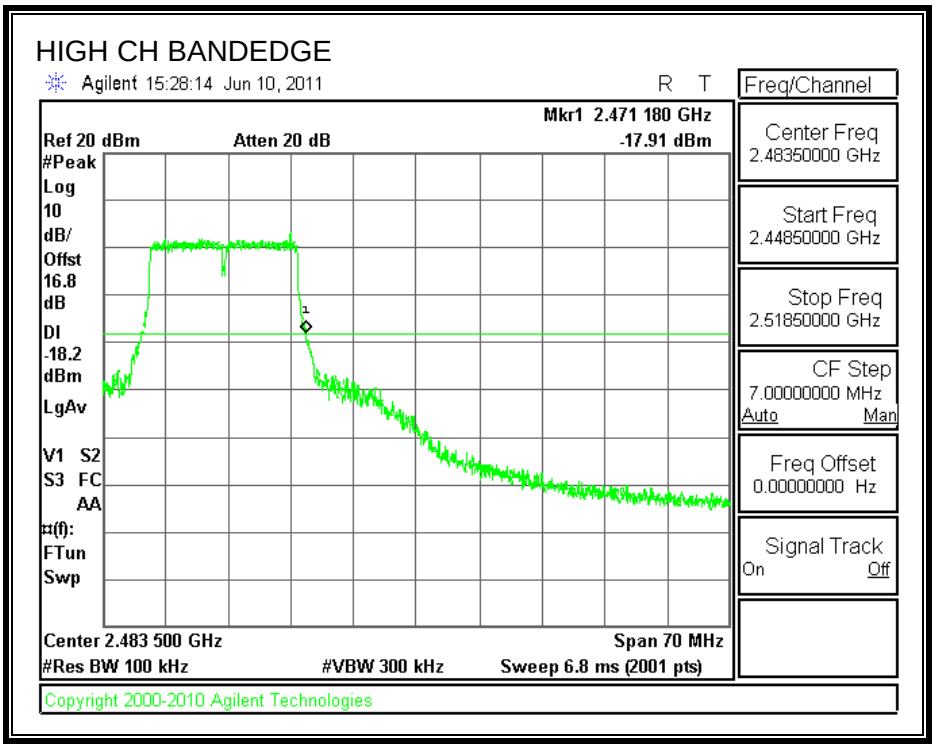


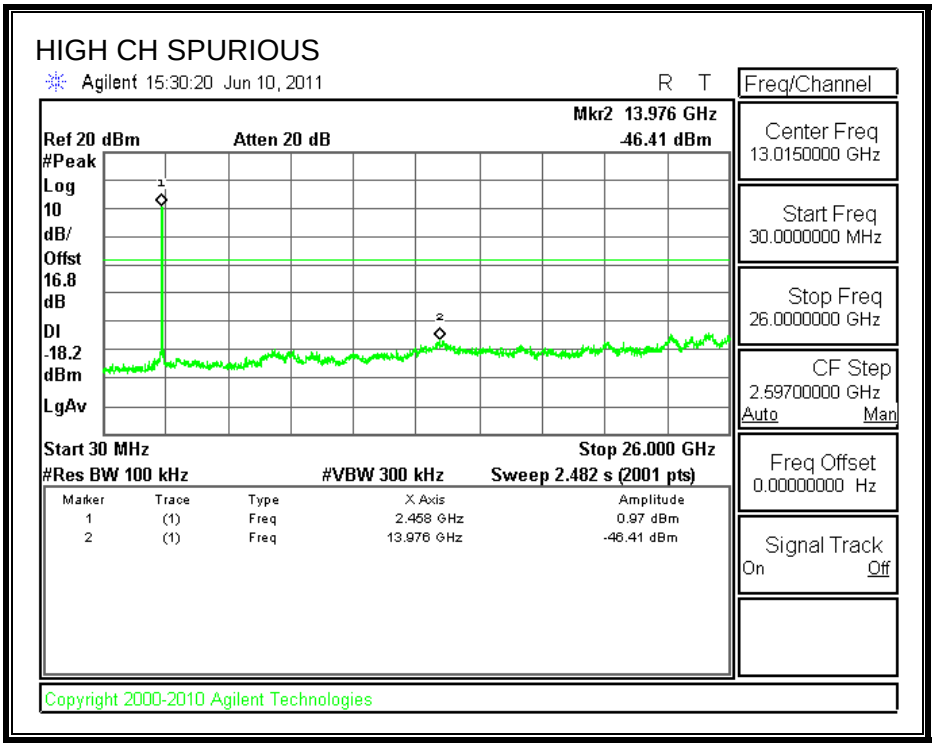
SPURIOUS EMISSIONS, MID CHANNEL





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.

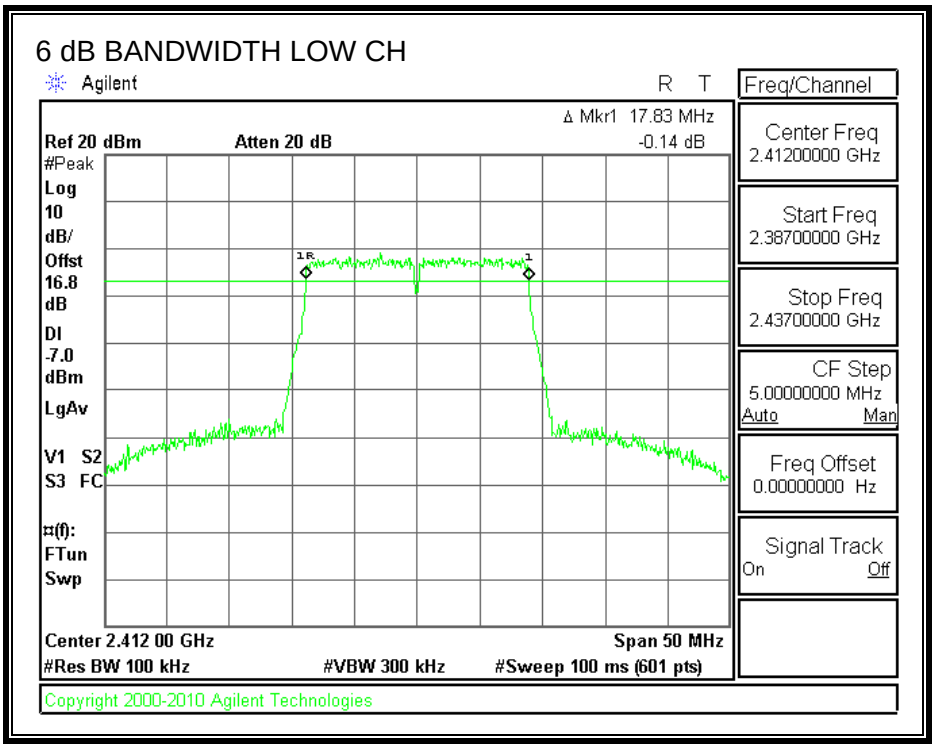
TEST PROCEDURE

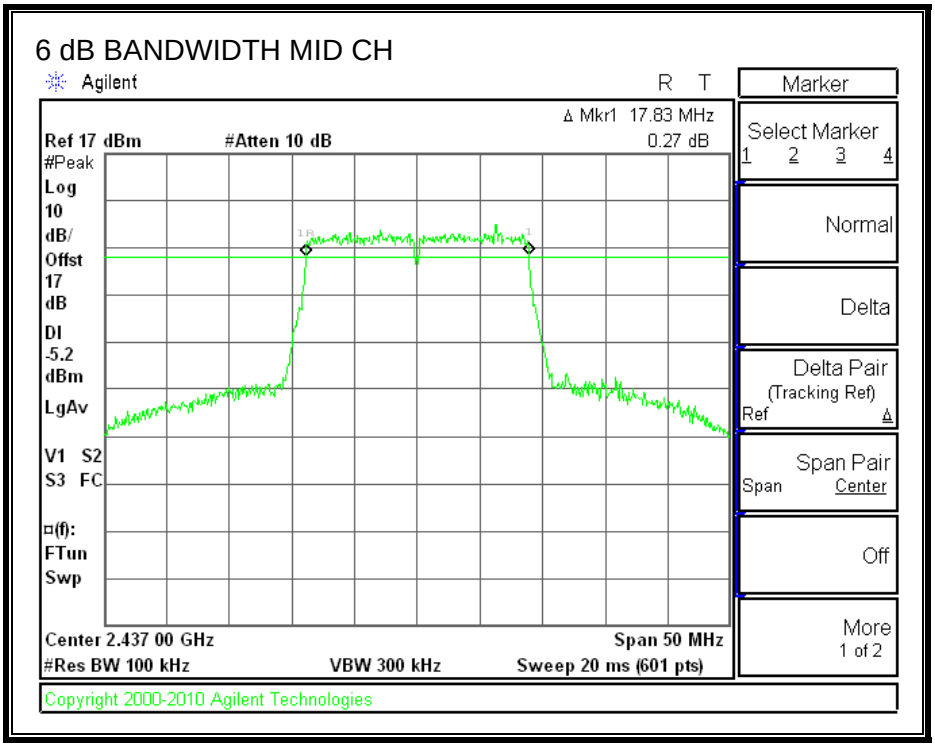
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

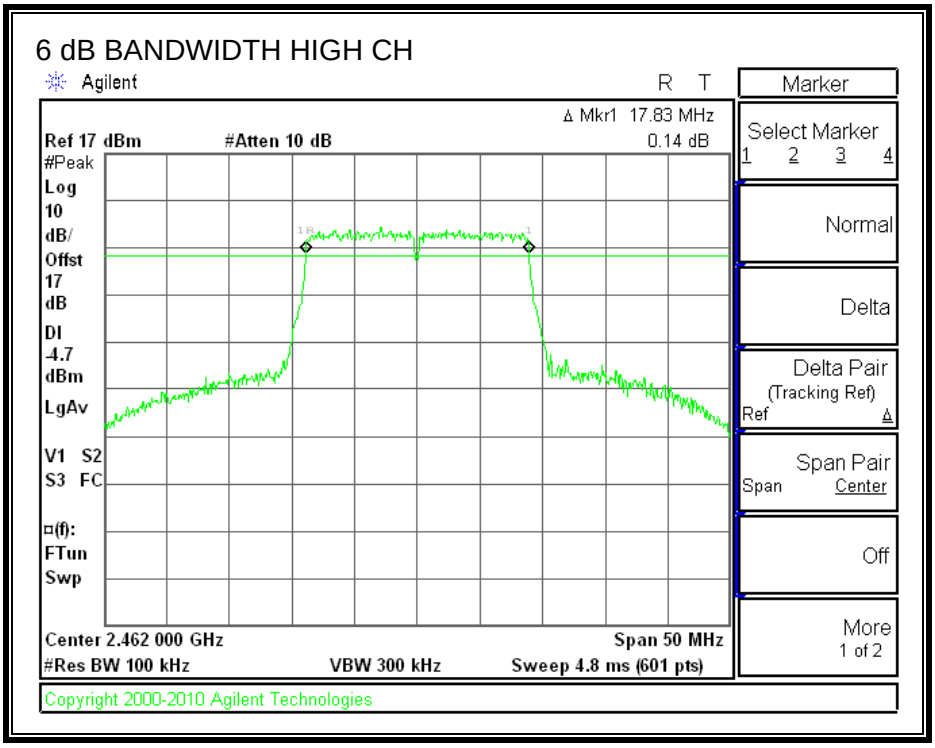
RESULTS

Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Low	2412	17.83	0.5
Middle	2437	17.83	0.5
High	2462	17.83	0.5

6 dB BANDWIDTH







7.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

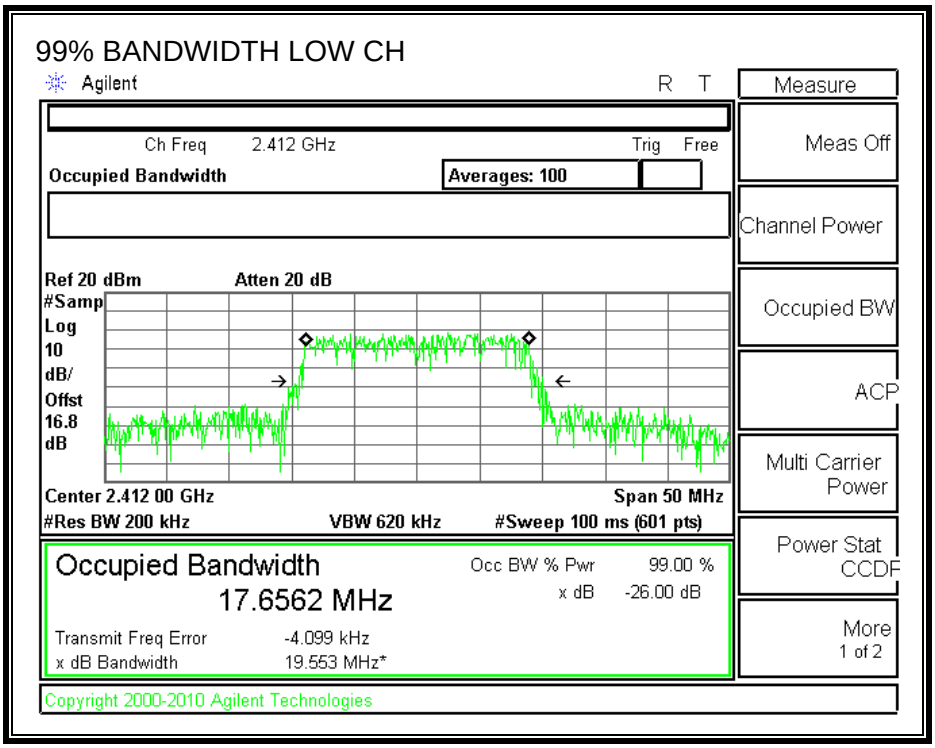
TEST PROCEDURE

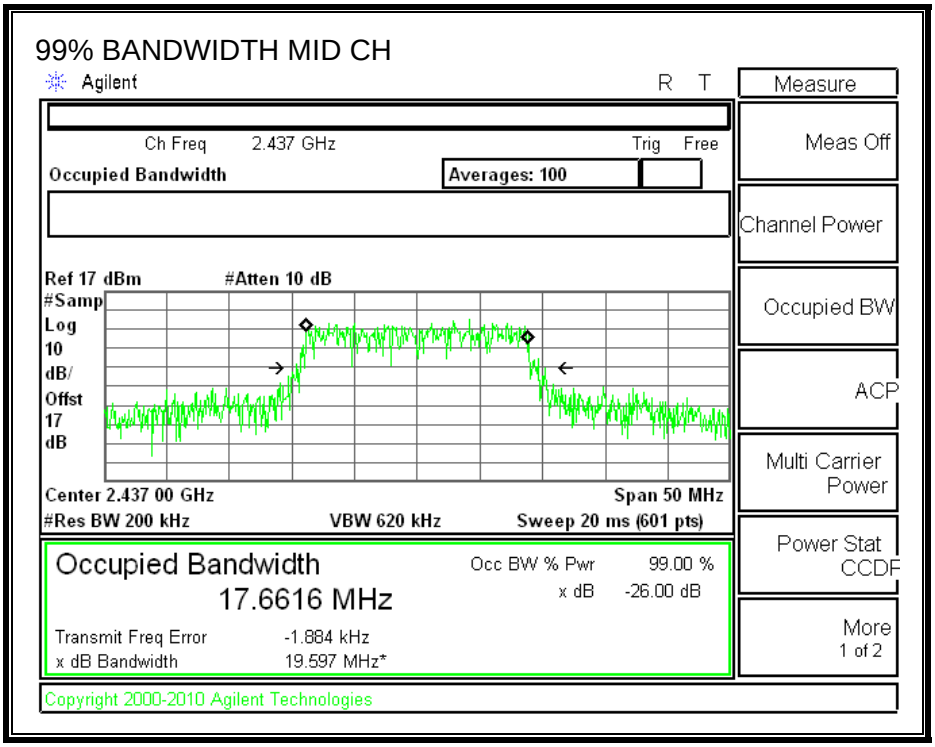
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

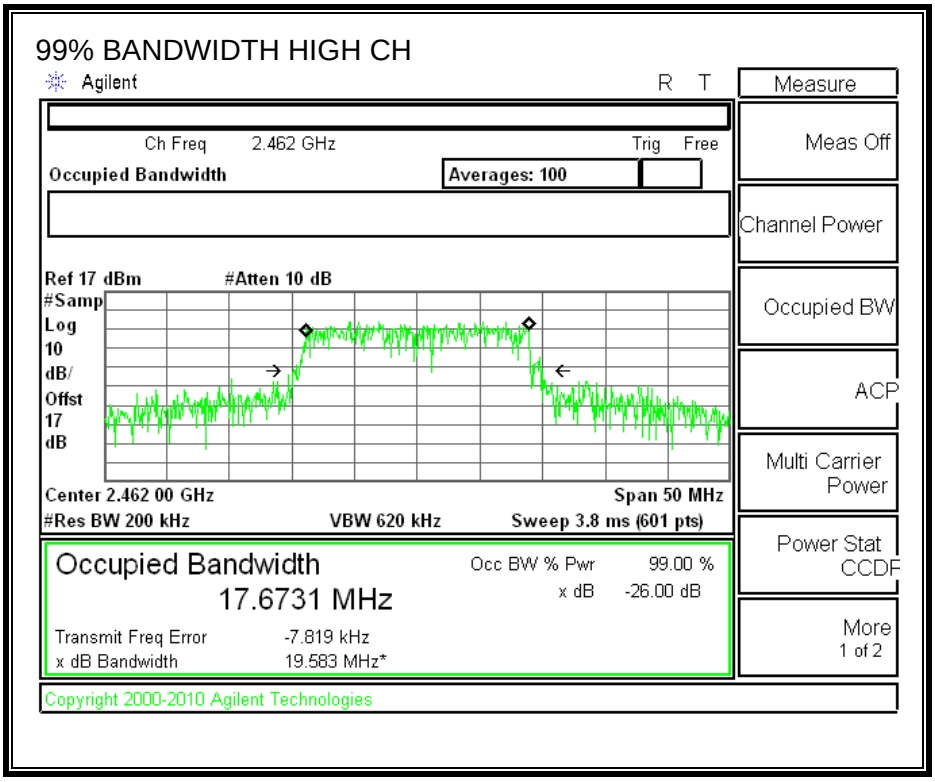
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.6562
Middle	2437	17.6616
High	2462	17.6731

99% BANDWIDTH







7.3.3. 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

Peak power is measured using a wide bandwidth Peak Power Meter.

RESULTS

Channel	Frequency (MHz)	PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
CH1	2412	4.77	16.50	21.27	30.00	-8.73
CH2	2417	5.75	16.50	22.25	30.00	-7.75
CH6	2437	5.85	16.50	22.35	30.00	-7.65
CH10	2457	6.07	16.50	22.57	30.00	-7.43
CH11	2462	5.29	16.50	21.79	30.00	-8.22

7.3.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 16.5 dB (including 10 dB pad and 6.5dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
CH1	2412	13.70
CH2	2417	15.62
CH6	2437	15.36
CH10	2457	15.49
CH11	2462	14.77

7.3.5. 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.

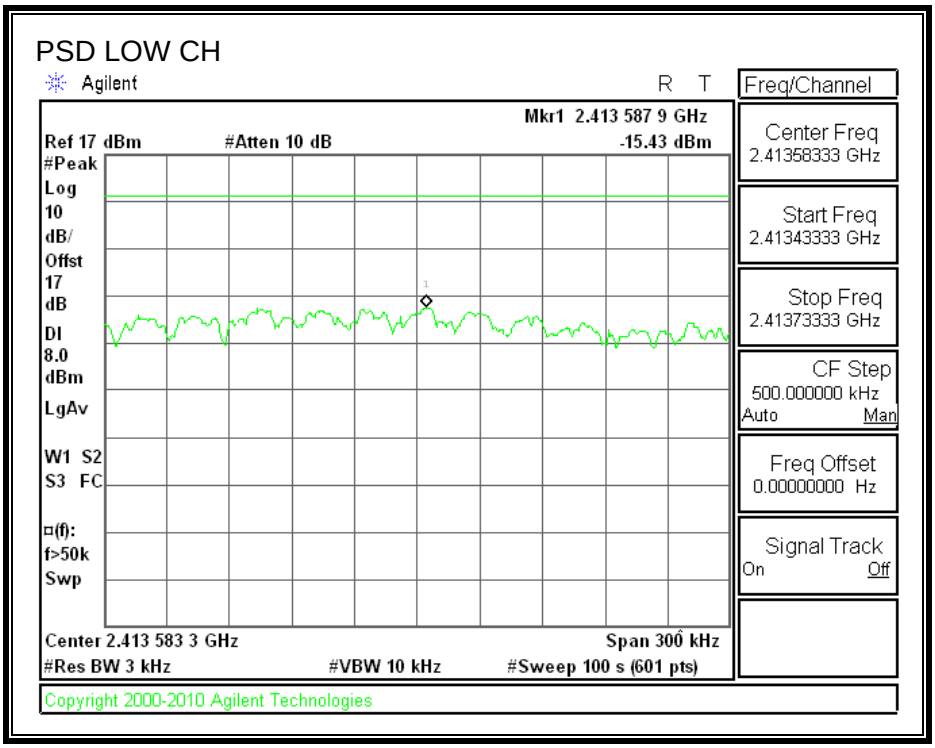
TEST PROCEDURE

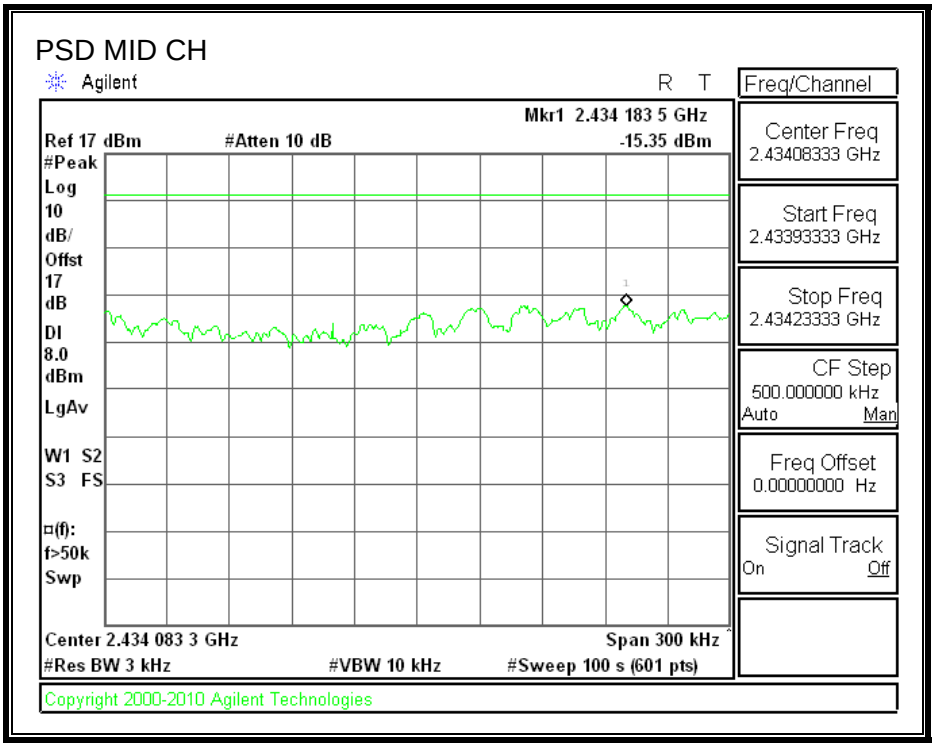
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

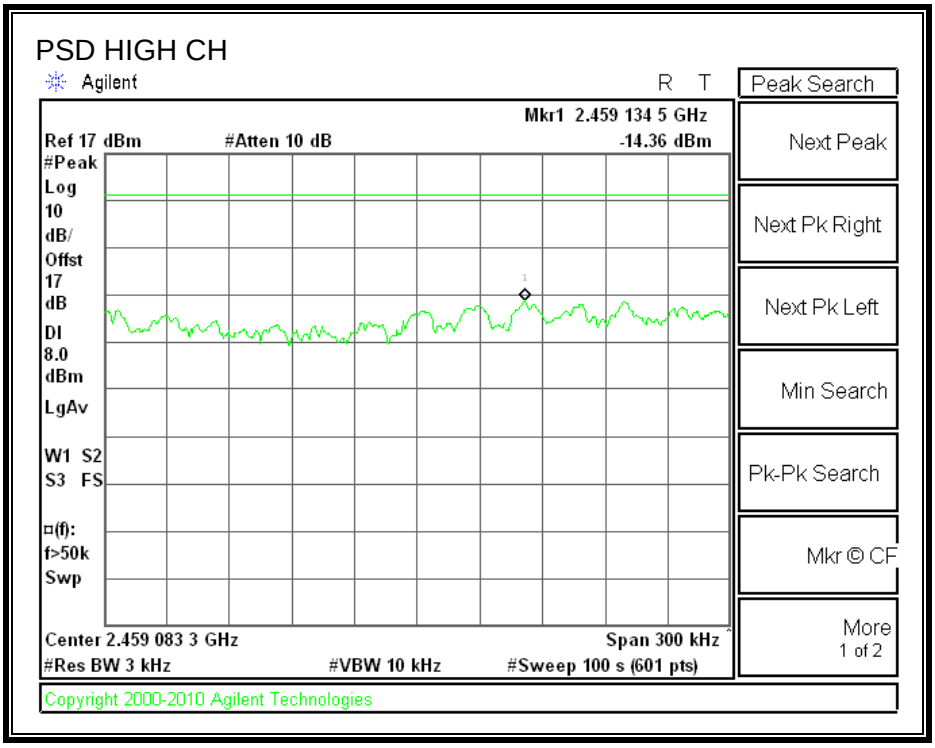
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-15.43	8	-23.43
Middle	2437	-15.35	8	-23.35
High	2462	-14.36	8	-22.36

POWER SPECTRAL DENSITY







7.3.6. 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.

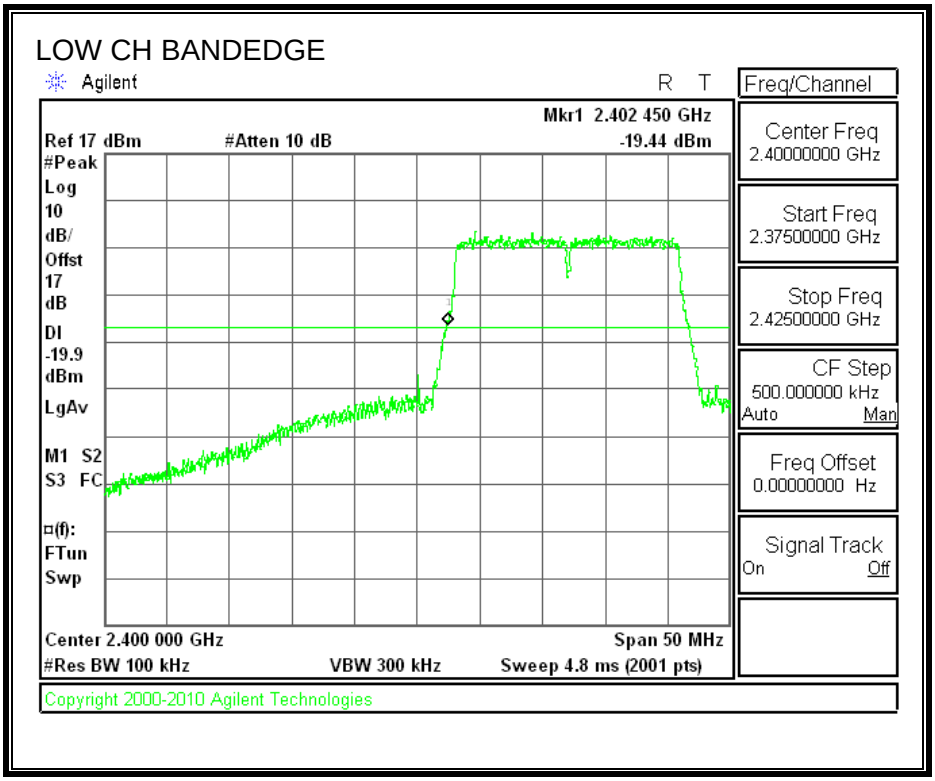
TEST PROCEDURE

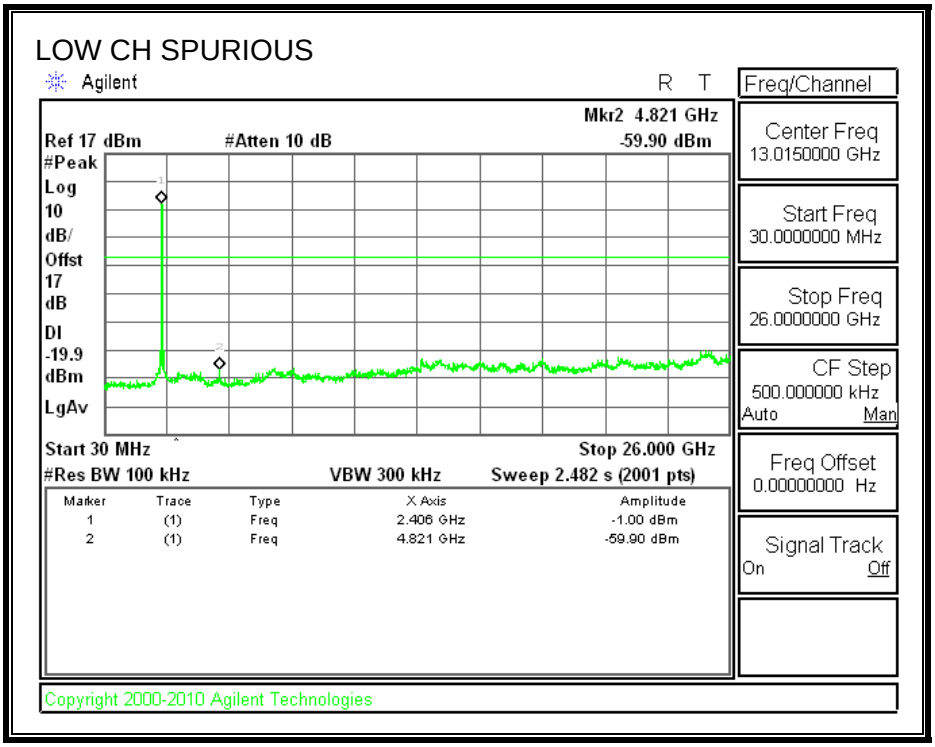
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

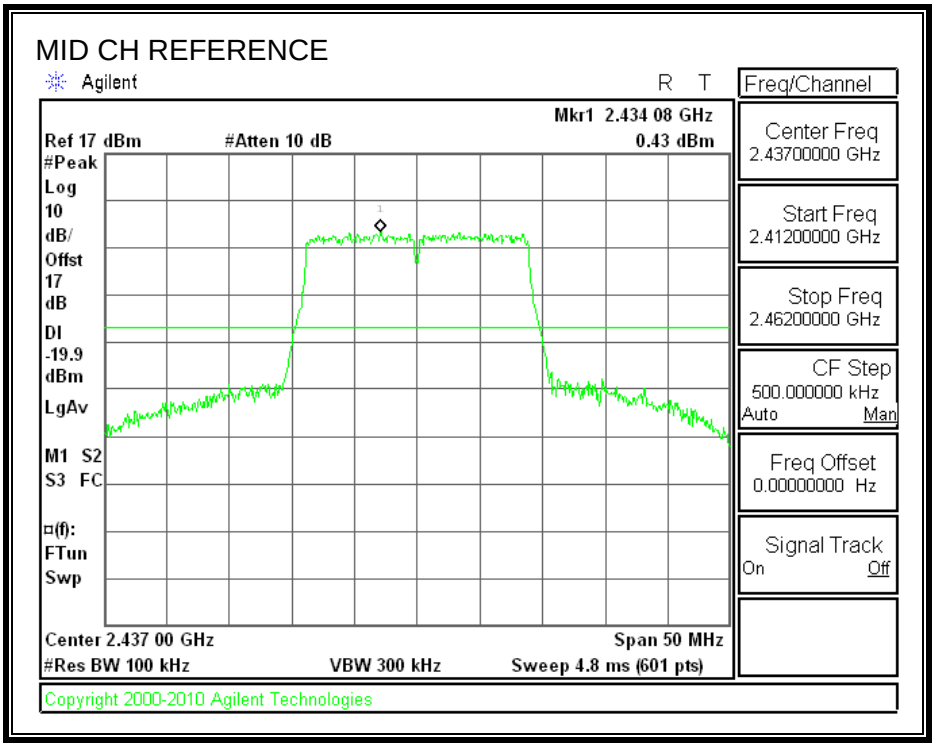
RESULTS

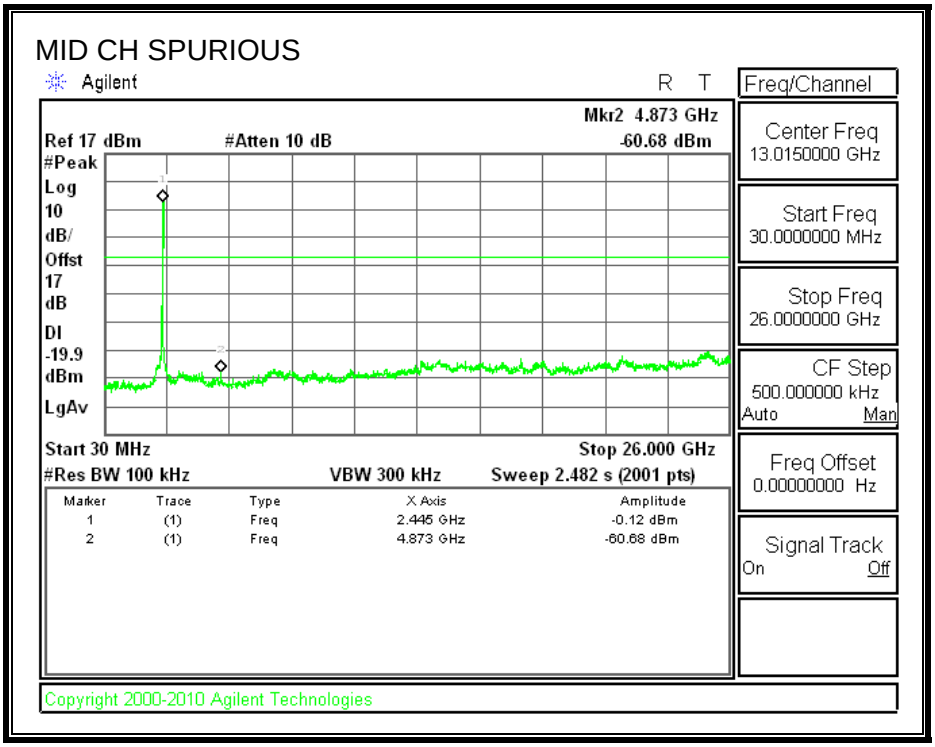
SPURIOUS EMISSIONS

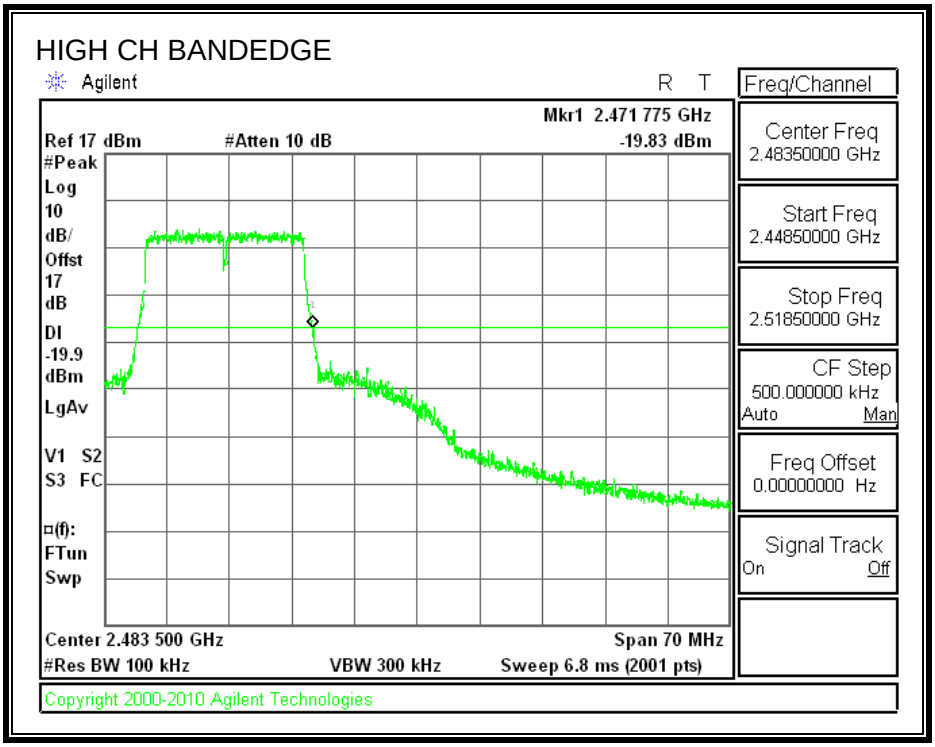


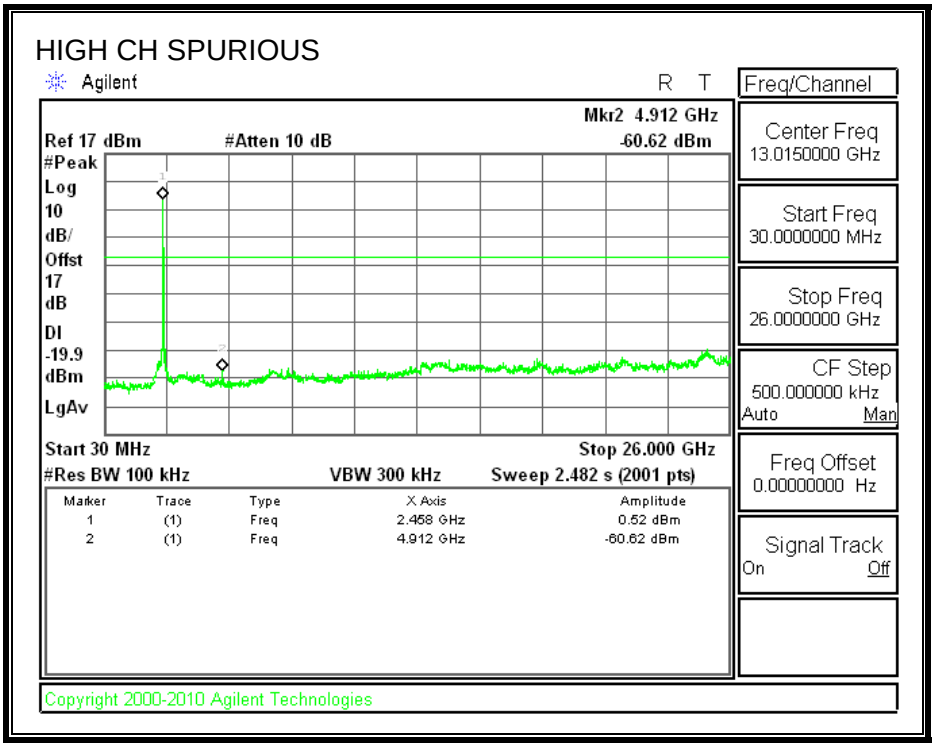


MID CH REFERENCE









7.4. 802.11n HT40 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.

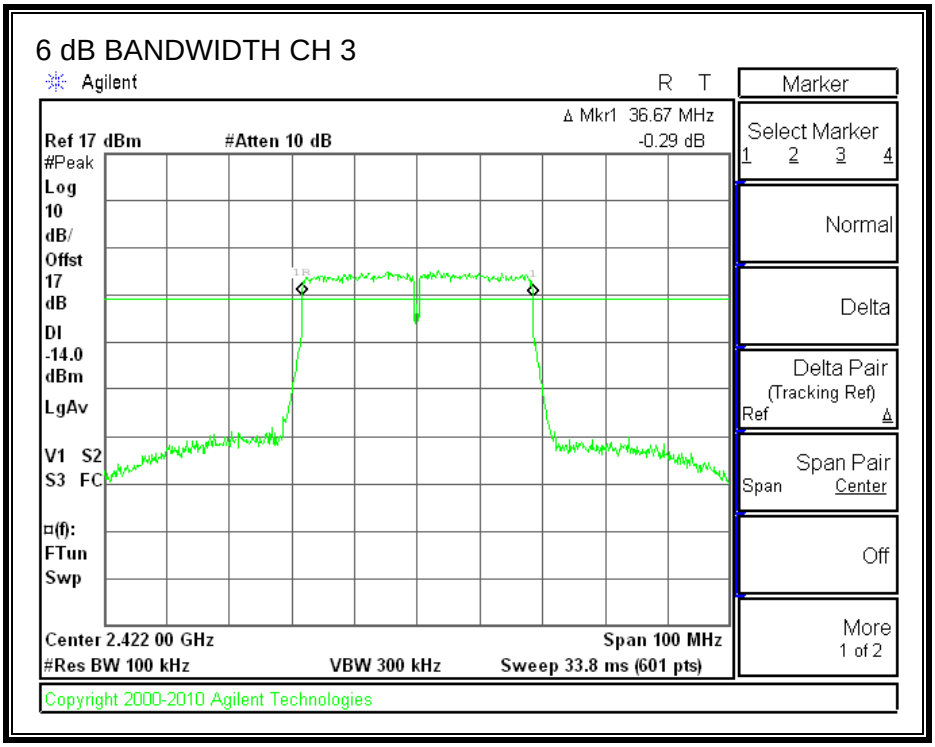
TEST PROCEDURE

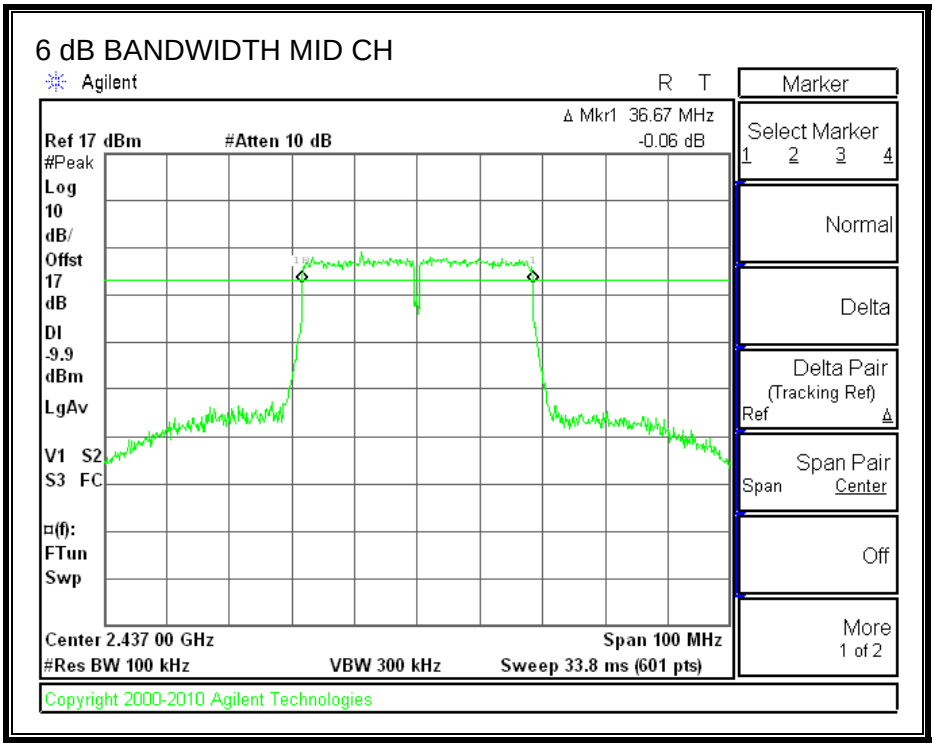
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

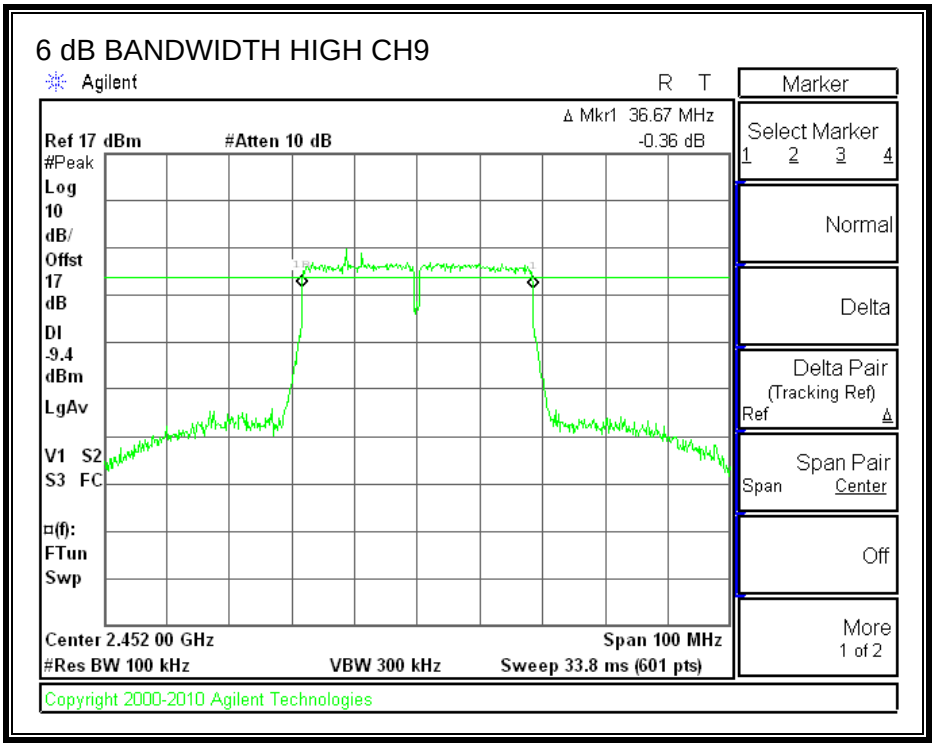
RESULTS

Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Low	2422	36.67	0.5
Middle	2437	36.67	0.5
High	2452	36.67	0.5

6 dB BANDWIDTH







7.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

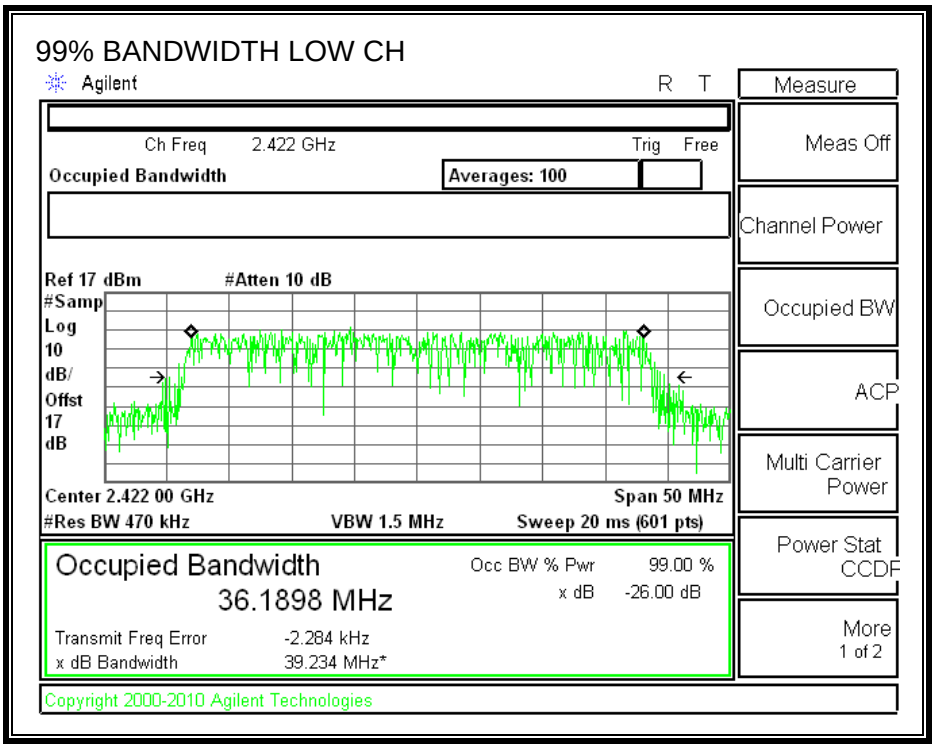
TEST PROCEDURE

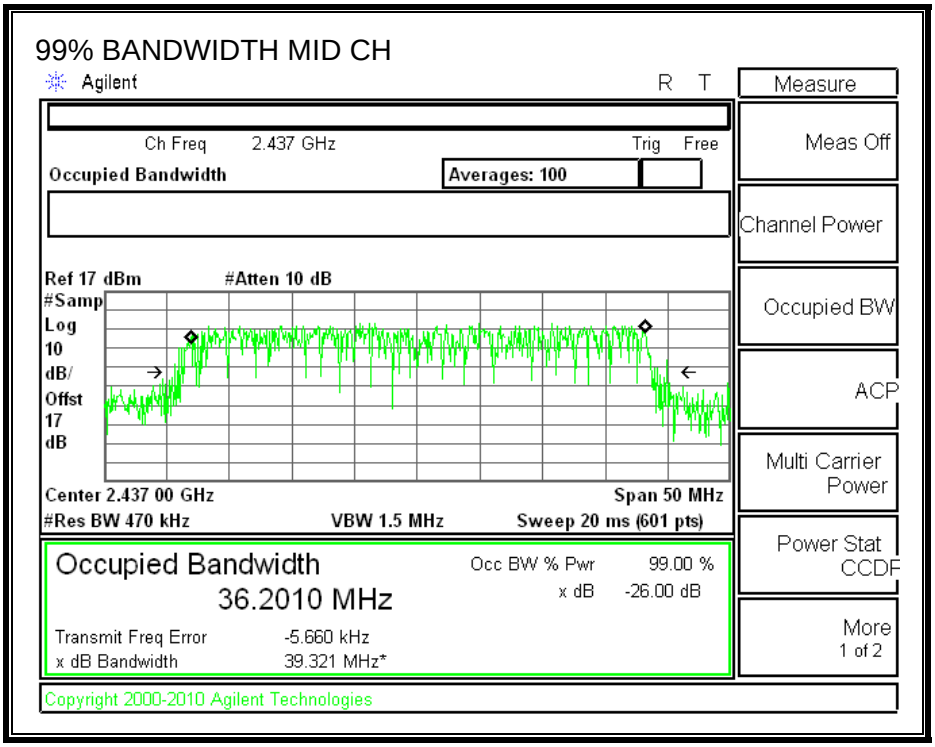
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

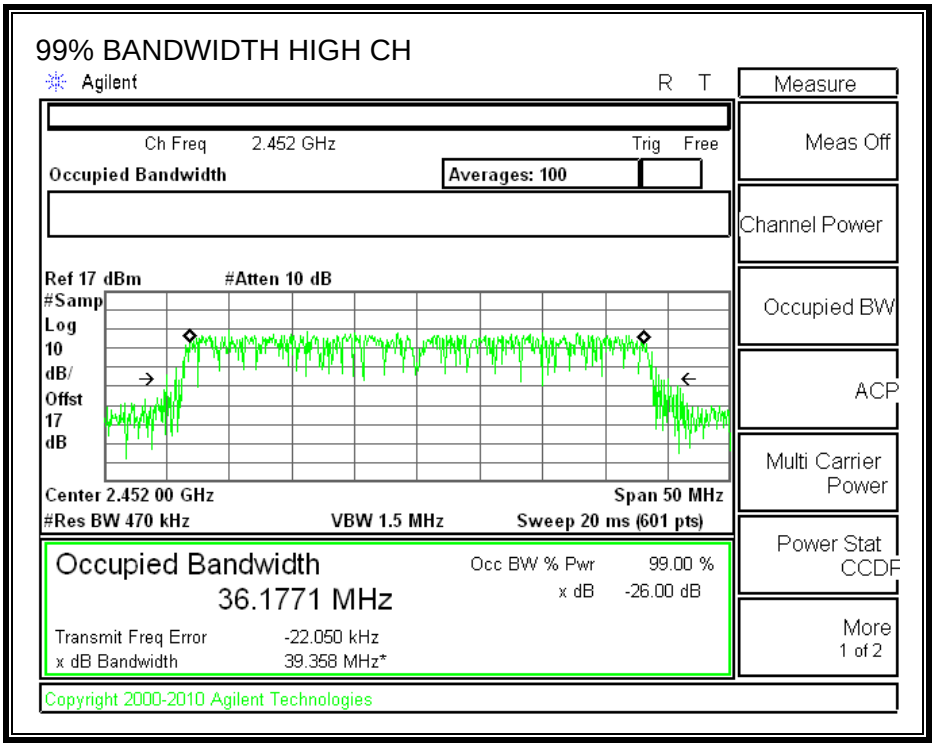
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2422	36.1898
Middle	2437	36.201
High	2452	36.1771

99% BANDWIDTH







7.4.3. 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

Peak power is measured using a wide bandwidth Peak Power Meter.

RESULTS

Channel	Frequency (MHz)	PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
CH3	2422	1.35	16.50	17.85	30.00	-12.15
CH4	2427	2.10	16.50	18.60	30.00	-11.40
CH5	2432	2.50	16.50	19.00	30.00	-11.00
CH6	2437	3.93	16.50	20.43	30.00	-9.57
CH8	2447	2.60	16.50	19.10	30.00	-10.90
CH9	2452	1.28	16.50	17.78	30.00	-12.22

7.4.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 16.5 dB (including 10 dB pad and 6.5dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
CH3	2422	10.44
CH4	2427	11.62
CH5	2432	12.20
CH6	2437	13.80
CH8	2447	12.69
CH9	2452	10.45

7.4.5. 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.

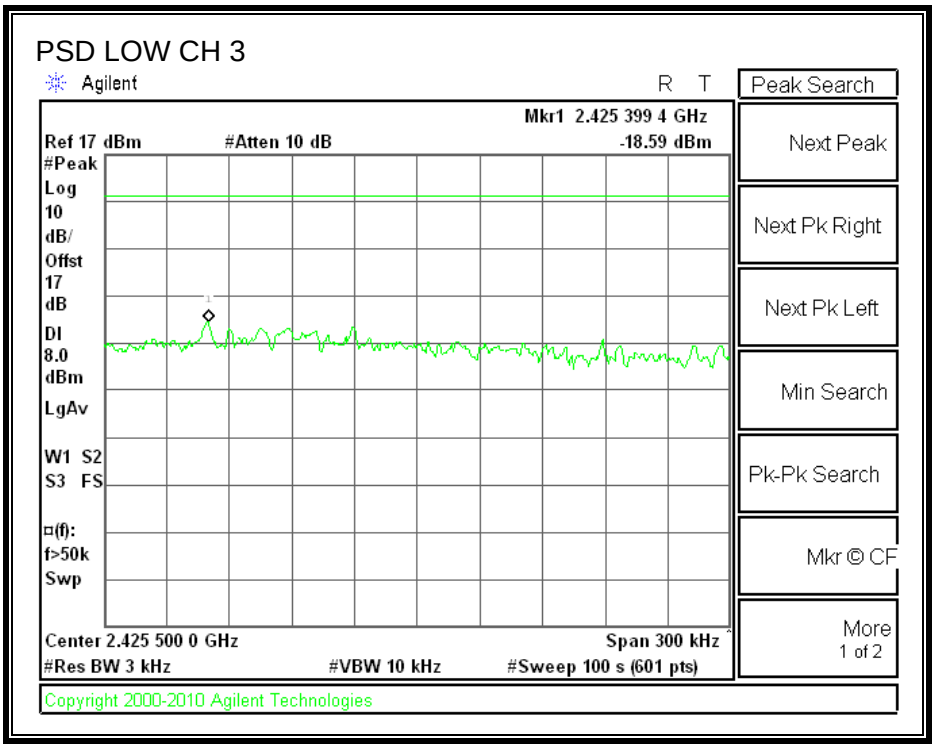
TEST PROCEDURE

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.

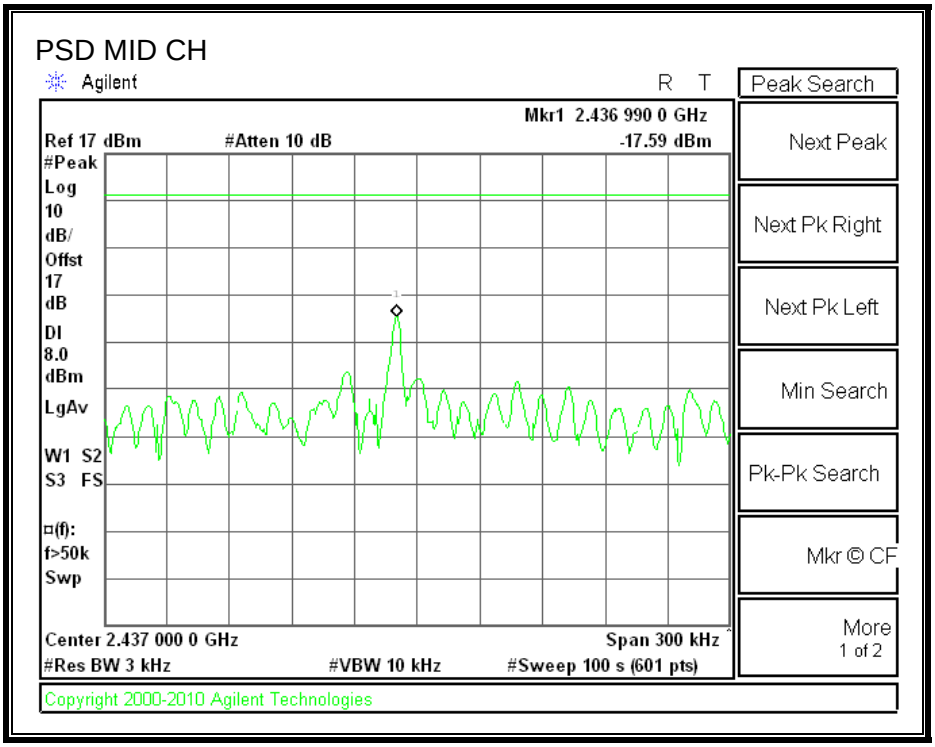
RESULTS

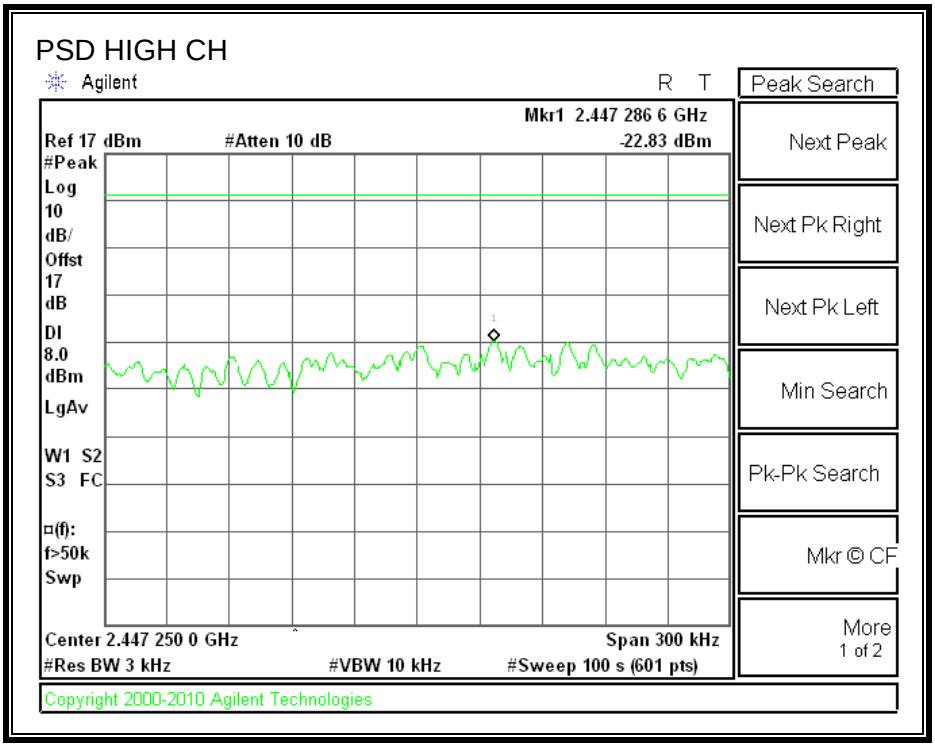
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2422	-18.59	8	-26.59
Middle	2437	-17.59	8	-25.59
High	2452	-22.83	8	-30.83

POWER SPECTRAL DENSITY



PSD MID CH





7.4.6. 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.

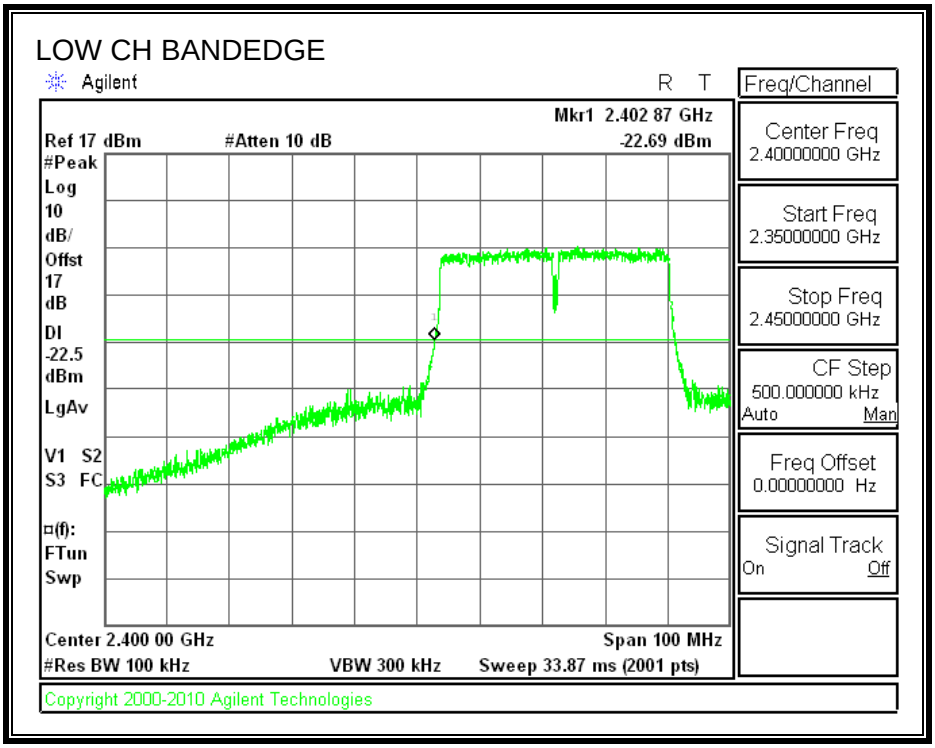
TEST PROCEDURE

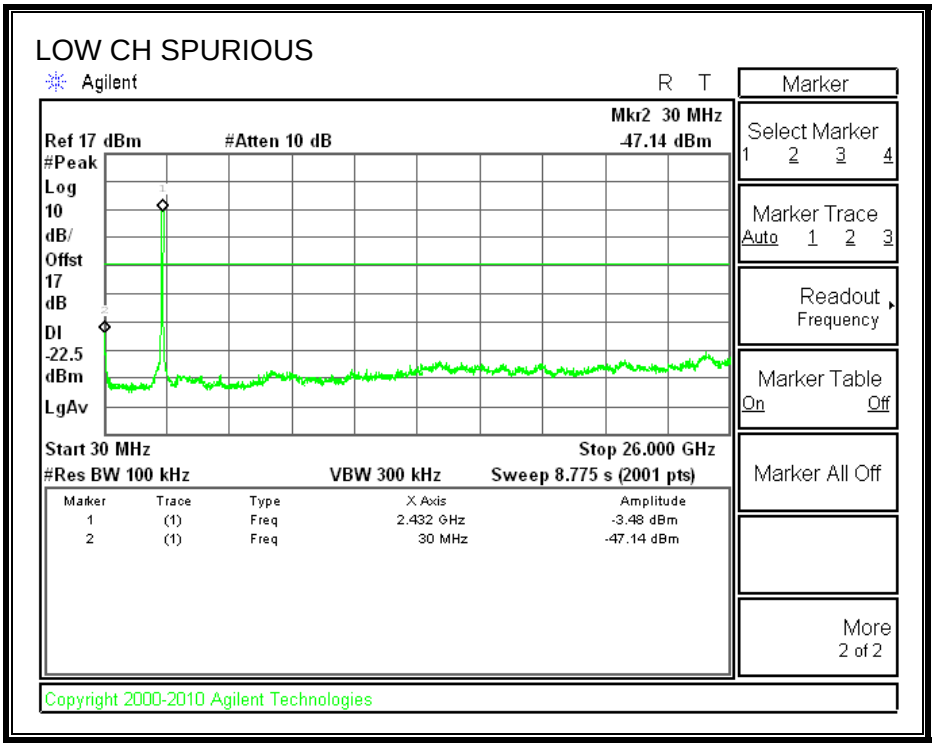
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

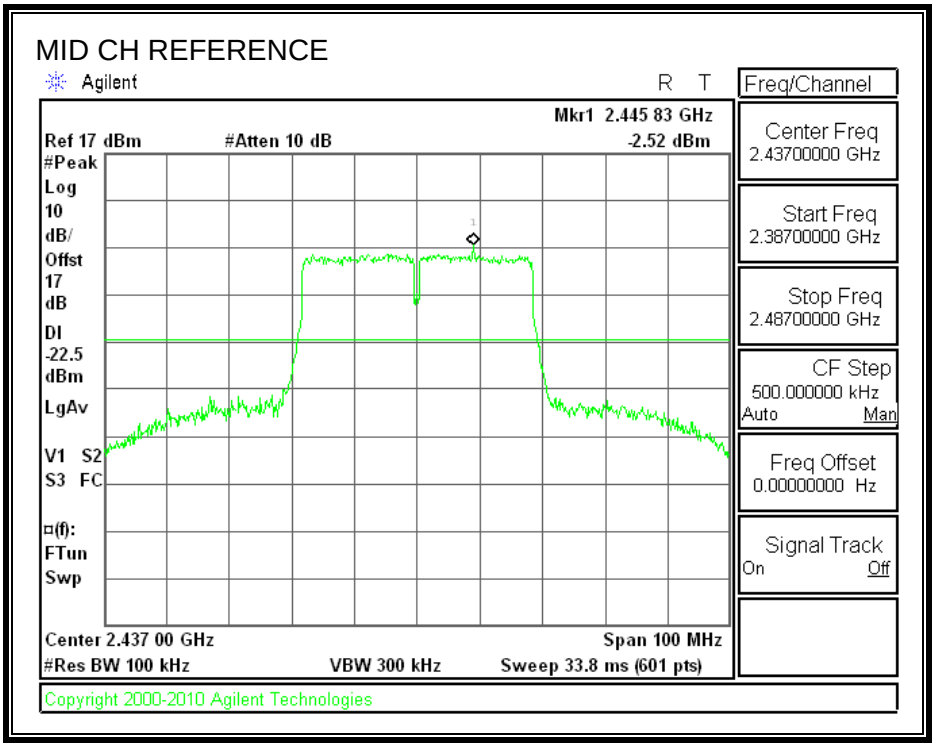
RESULTS

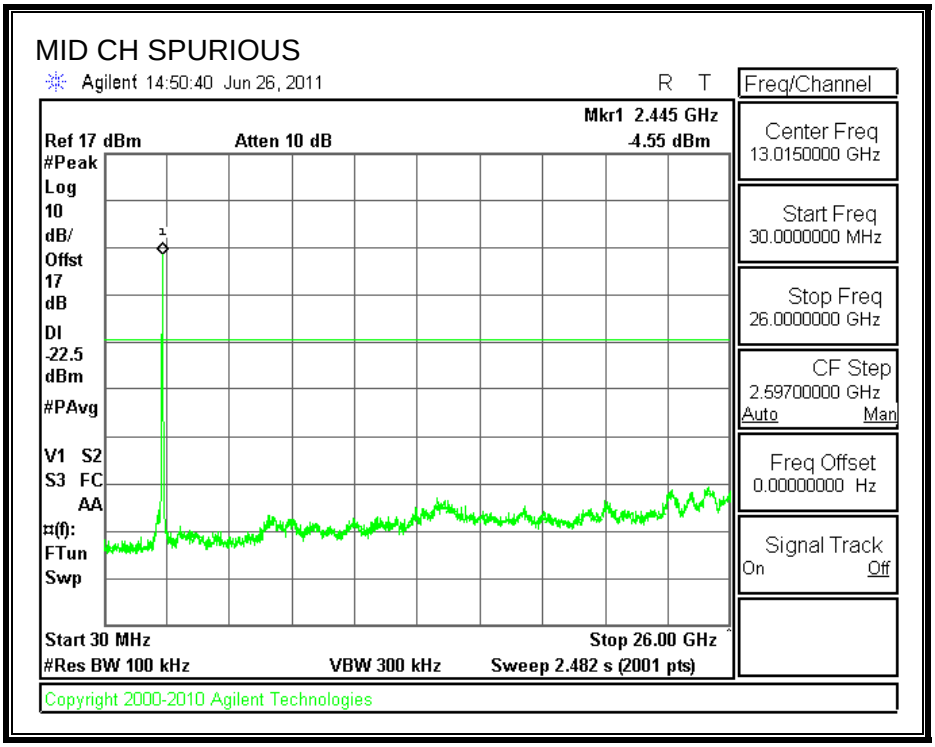
SPURIOUS EMISSIONS

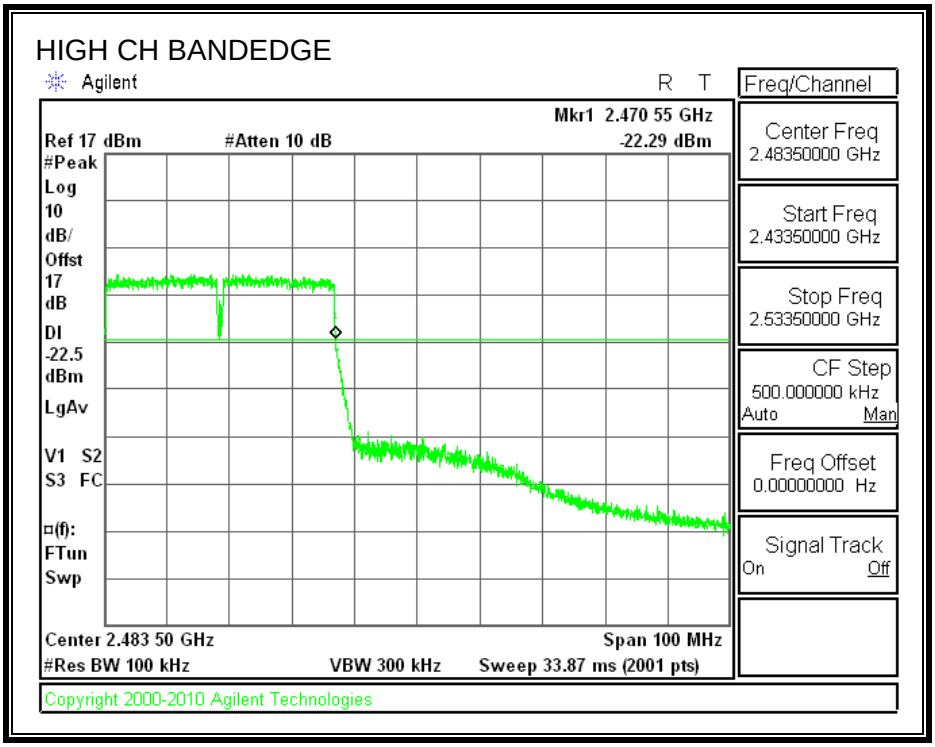


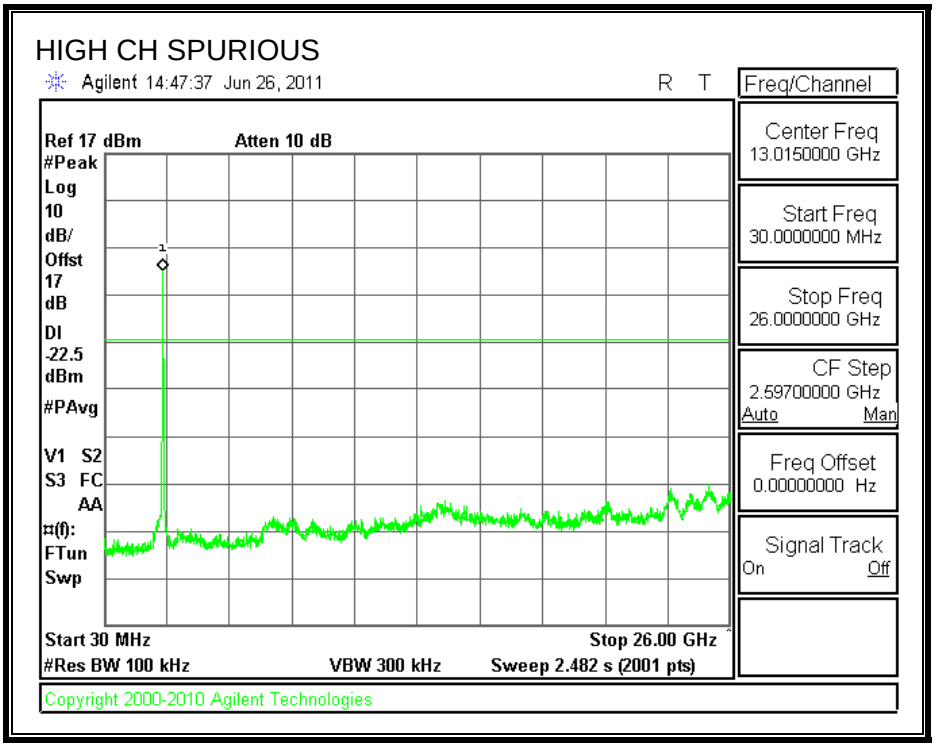


MID CH REFERENCE









7.5. 802.11a MODE IN THE 5.8 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.

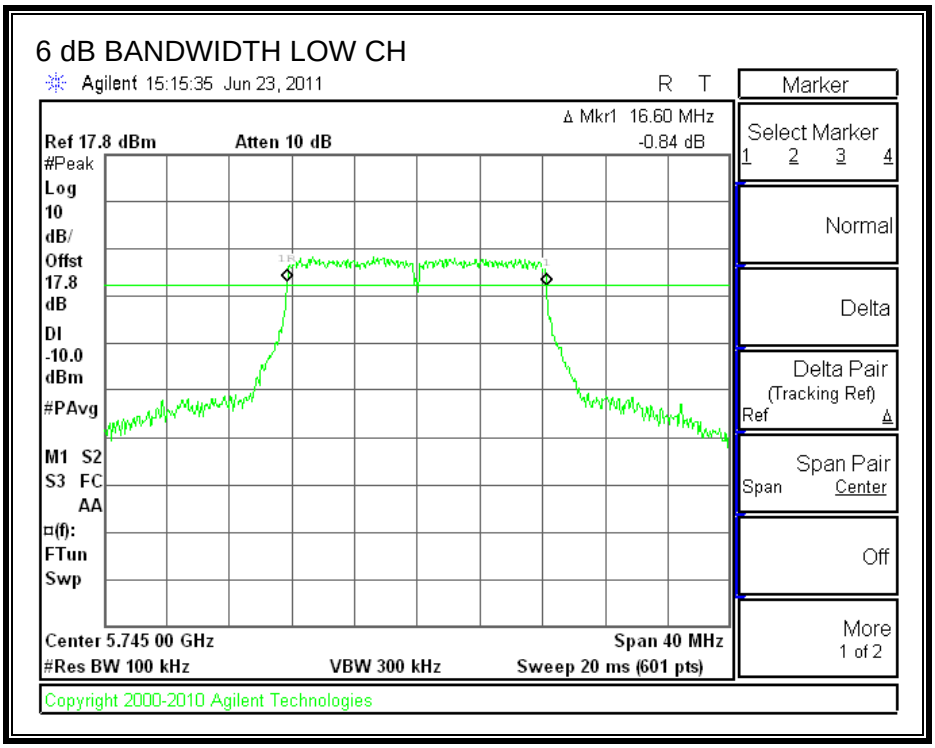
TEST PROCEDURE

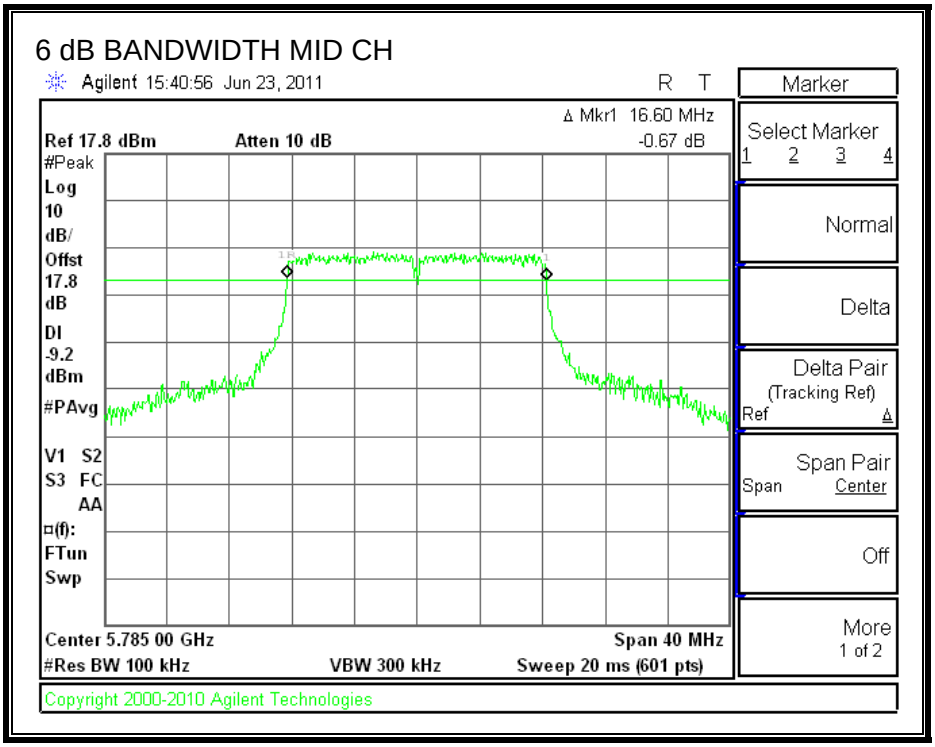
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

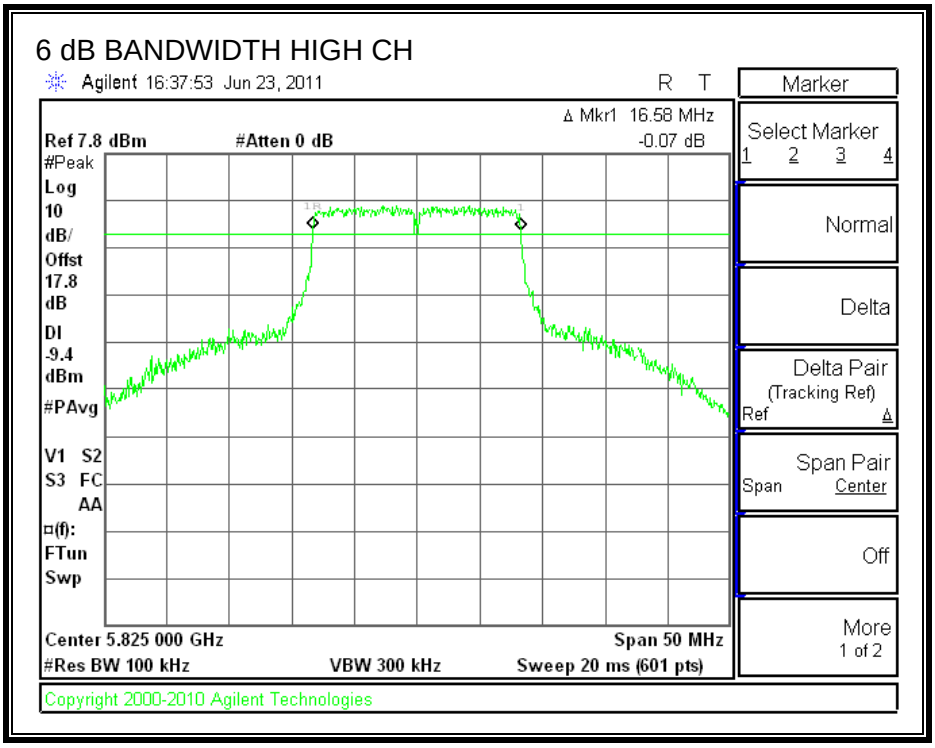
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.6	0.5
Middle	5785	16.6	0.5
High	5825	16.58	0.5

6 dB BANDWIDTH







7.5.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

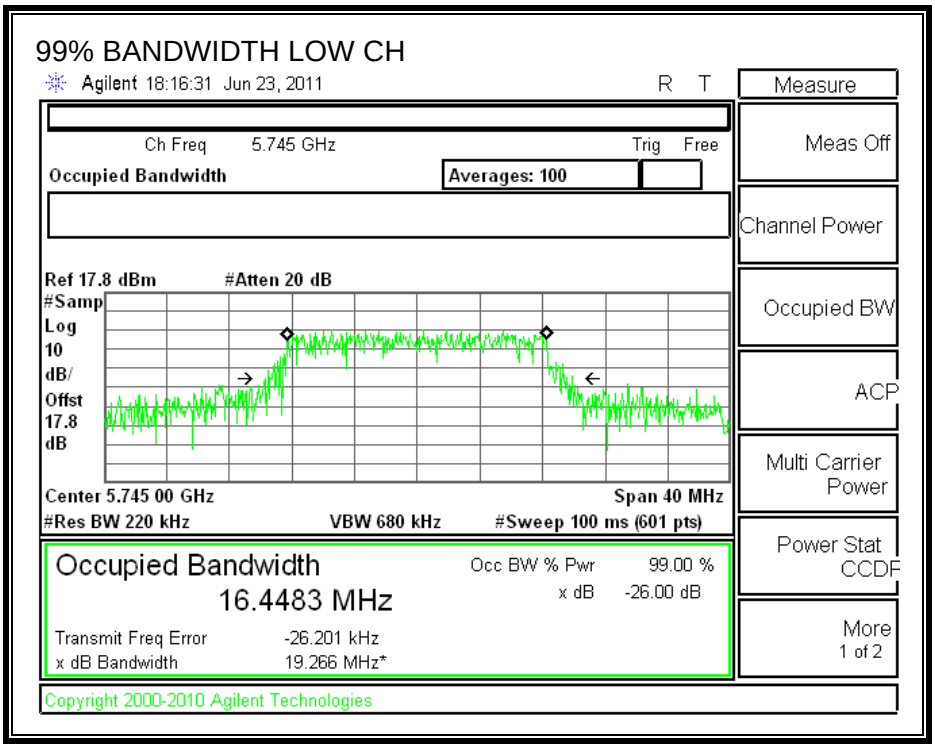
TEST PROCEDURE

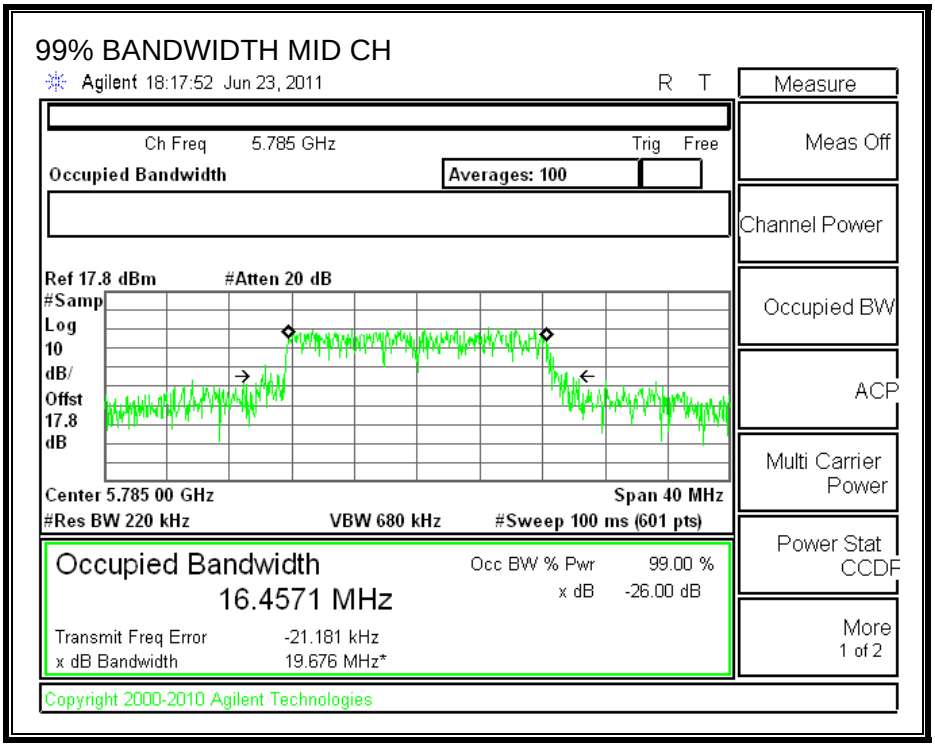
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

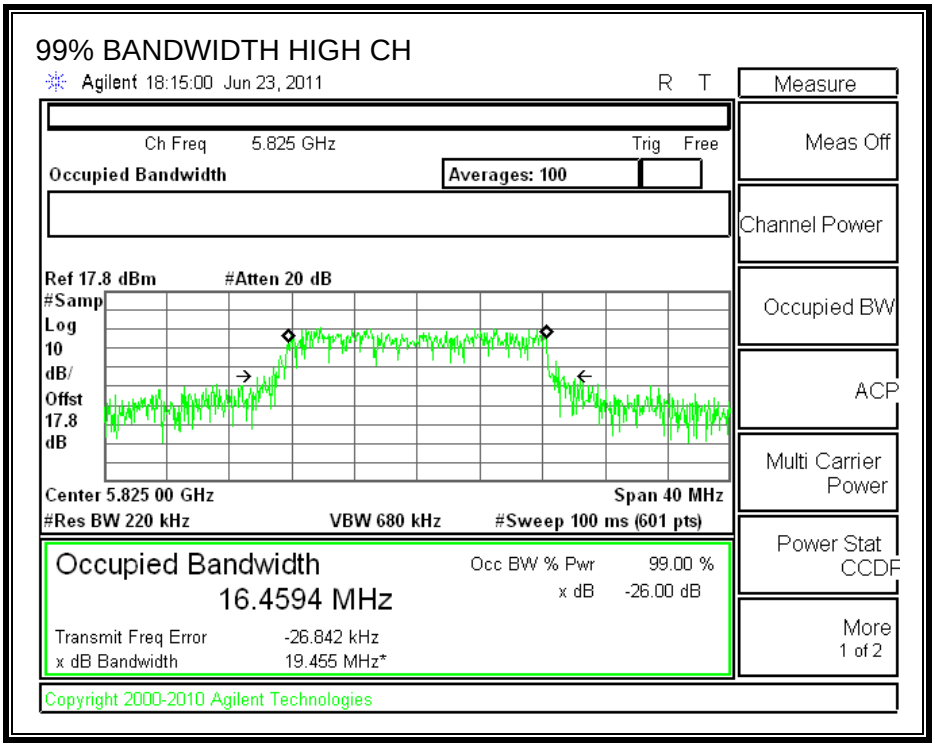
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.4483
Middle	5785	16.4571
High	5825	16.4594

99% BANDWIDTH







7.5.3. 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

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

Peak power is measured using a wide bandwidth Peak Power Meter.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	1.55	17.7	19.25	30	-10.75
Middle	5785	1.7	17.7	19.40	30	-10.60
High	5825	1.62	17.7	19.32	30	-10.68

7.5.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.7 dB (including 10 dB pad and 7.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5745	14.87
Middle	5785	14.49
High	5825	14.86

7.5.5. 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.

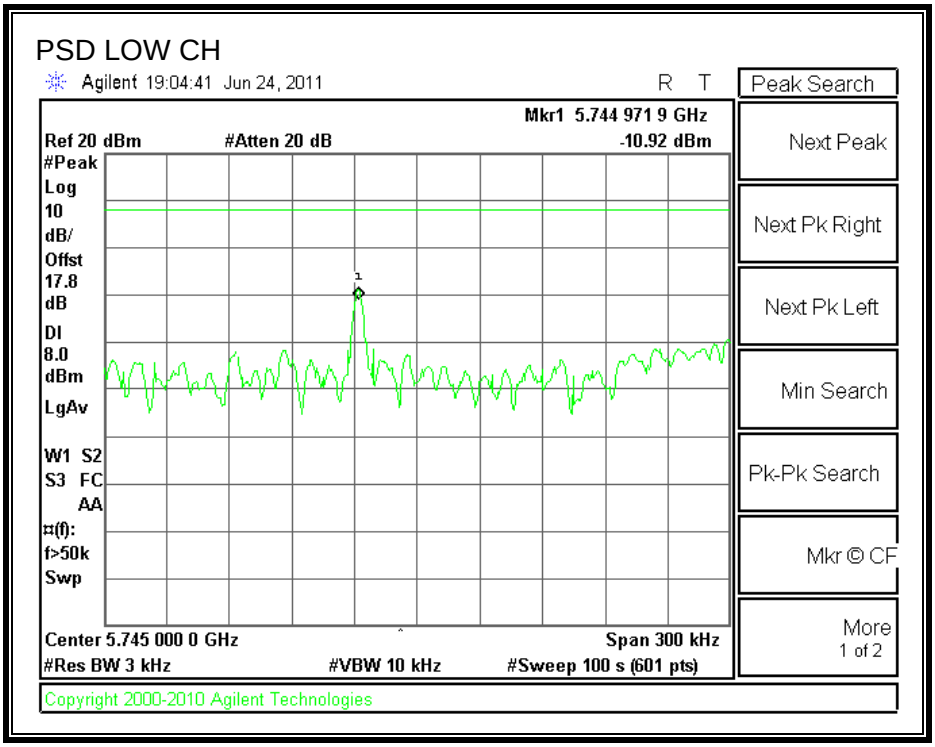
TEST PROCEDURE

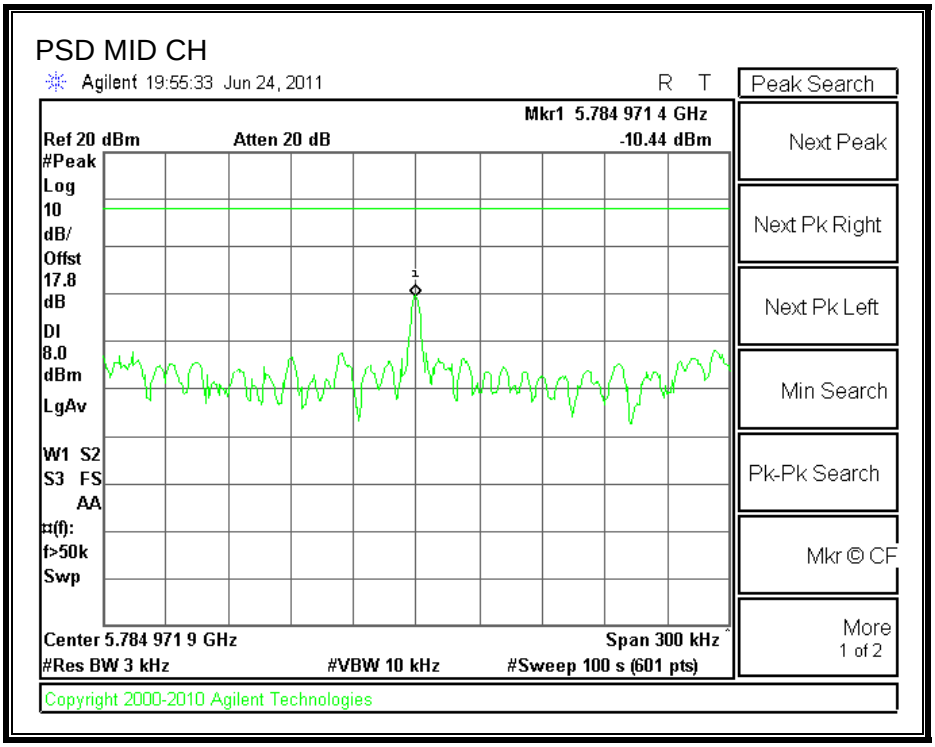
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

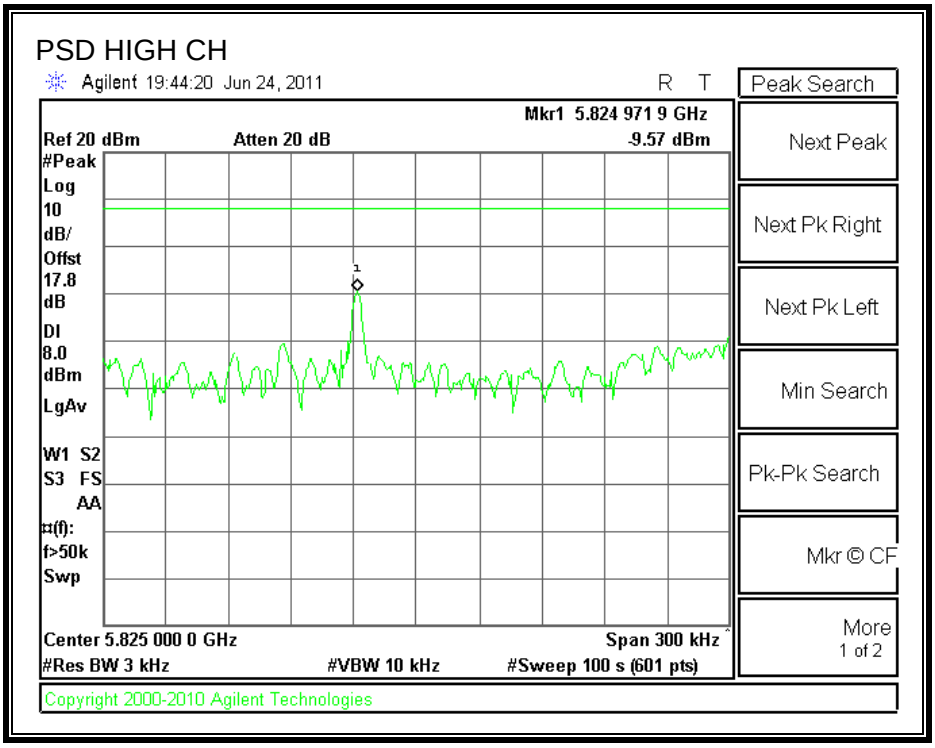
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-10.92	8	-18.92
Middle	5785	-10.44	8	-18.44
High	5825	-9.57	8	-17.57

POWER SPECTRAL DENSITY







7.5.6. 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.

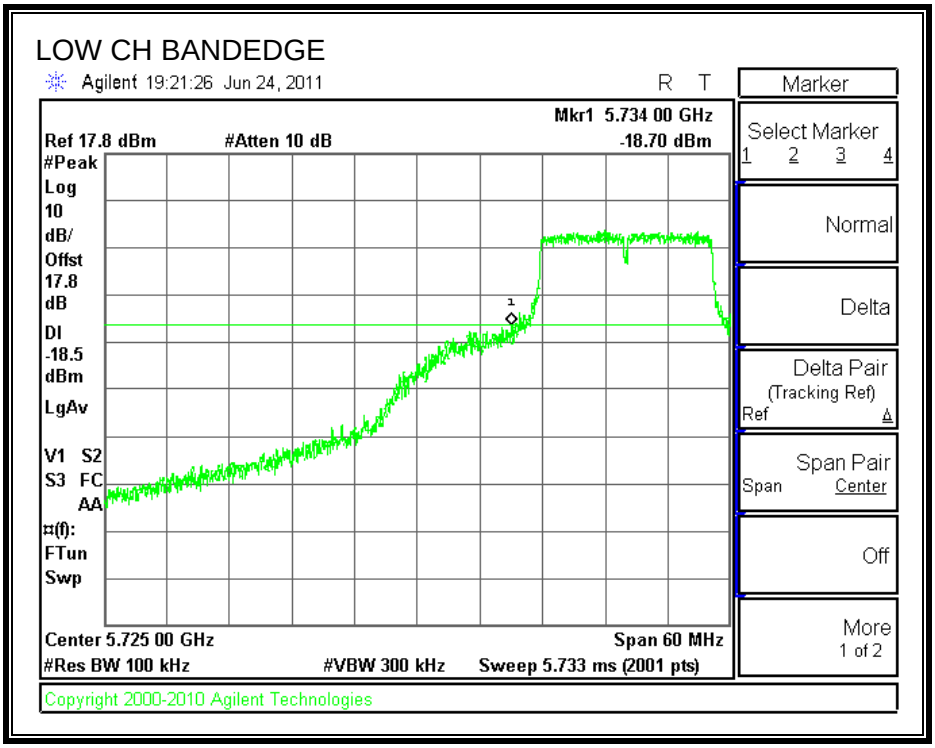
TEST PROCEDURE

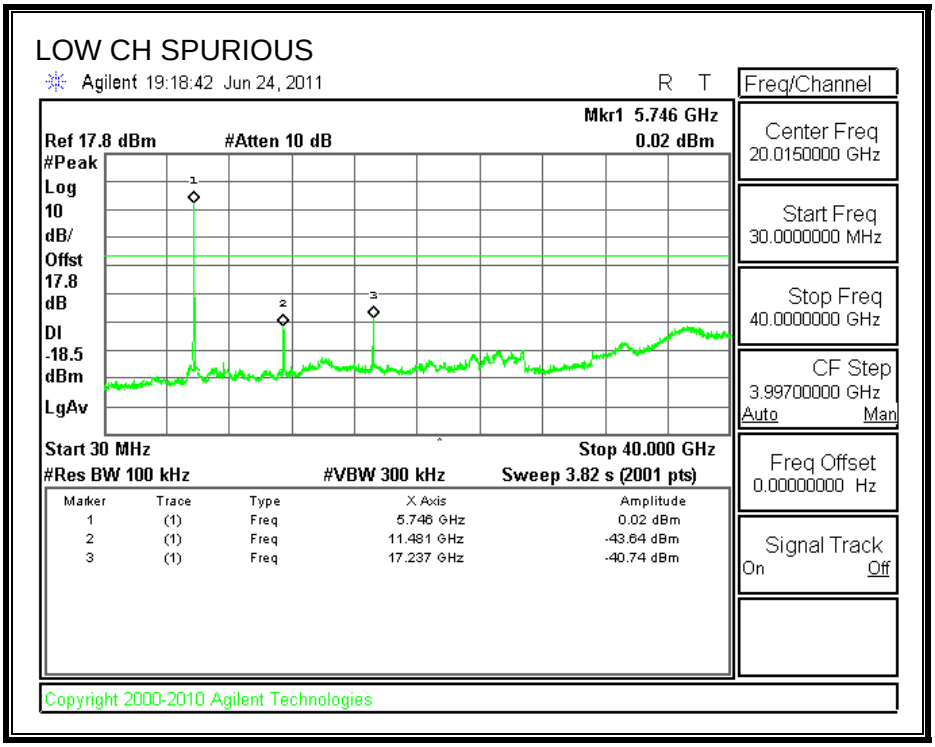
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

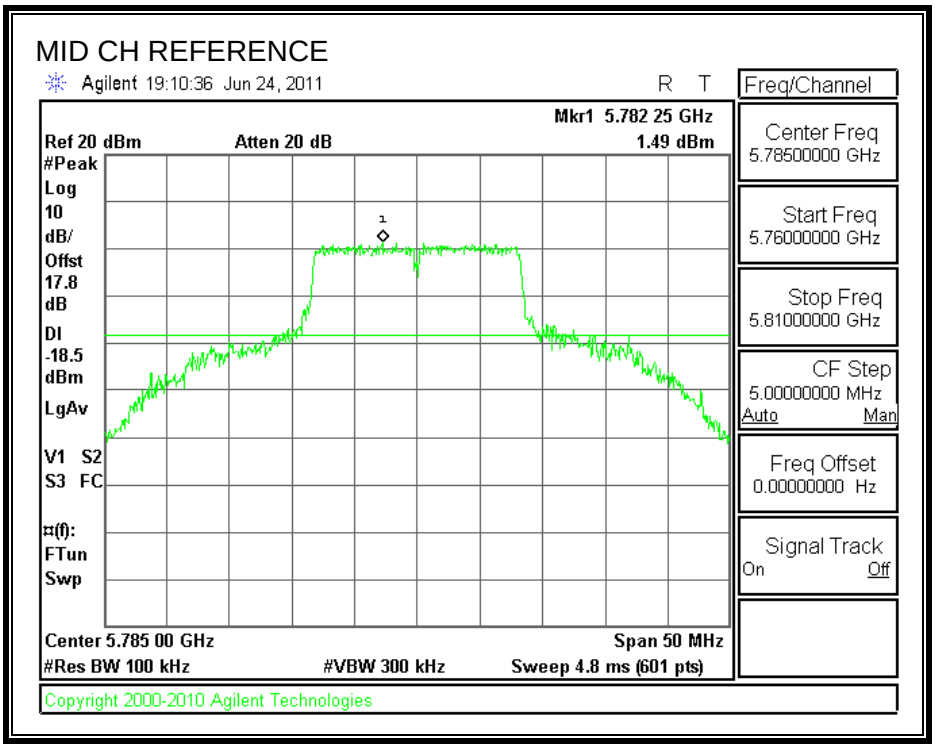
RESULTS

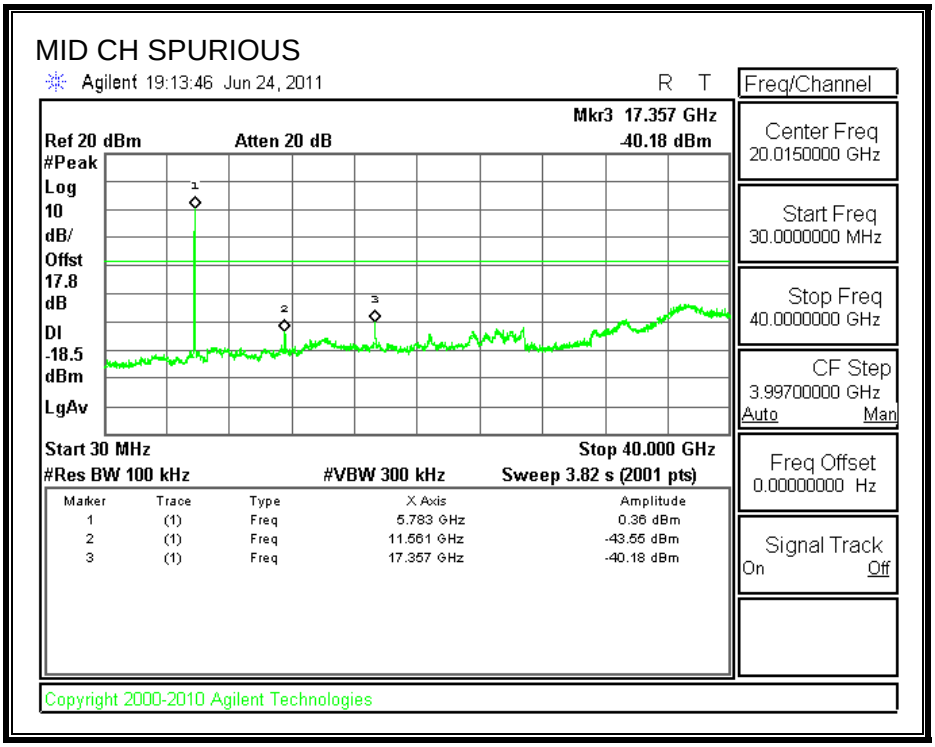
SPURIOUS EMISSIONS, LOW CHANNEL



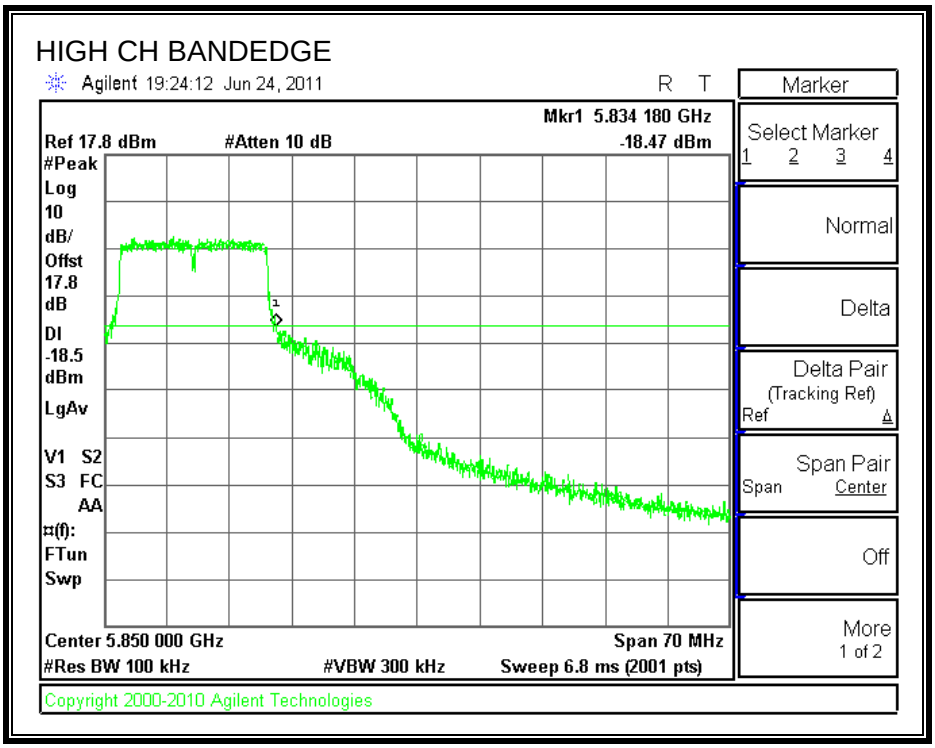


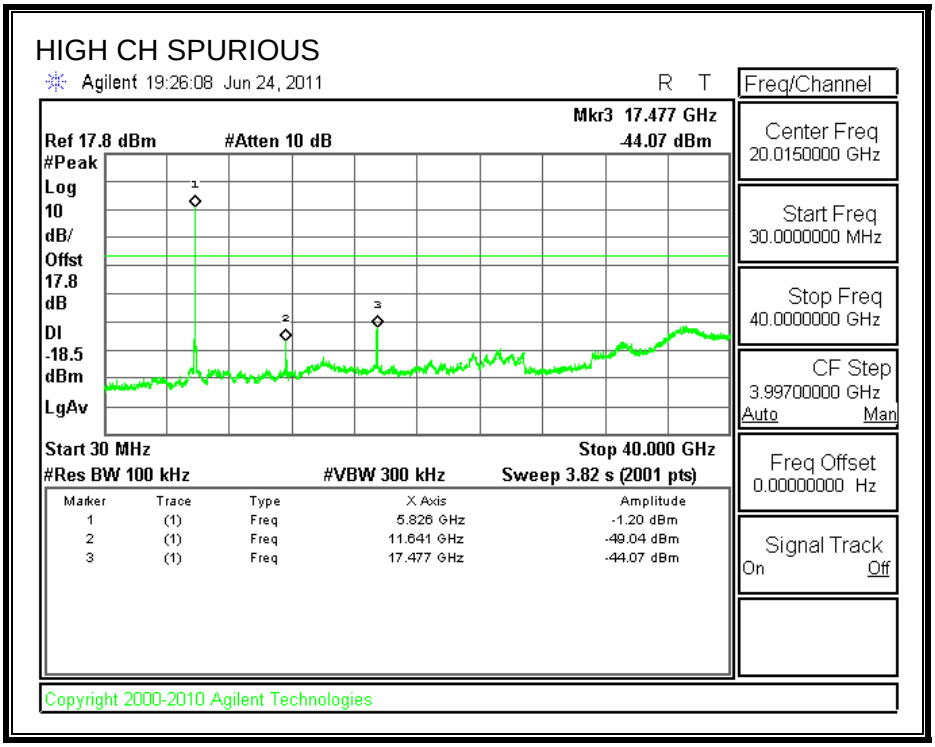
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





7.6. 802.11n HT20 MODE IN THE 5.8 GHz BAND

7.6.1. 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.

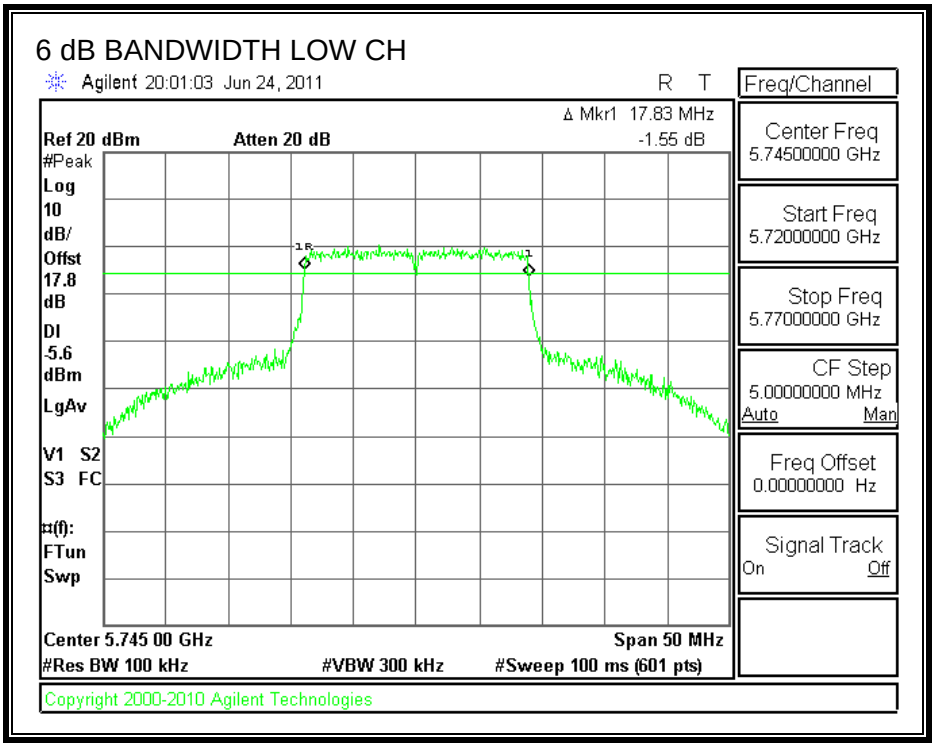
TEST PROCEDURE

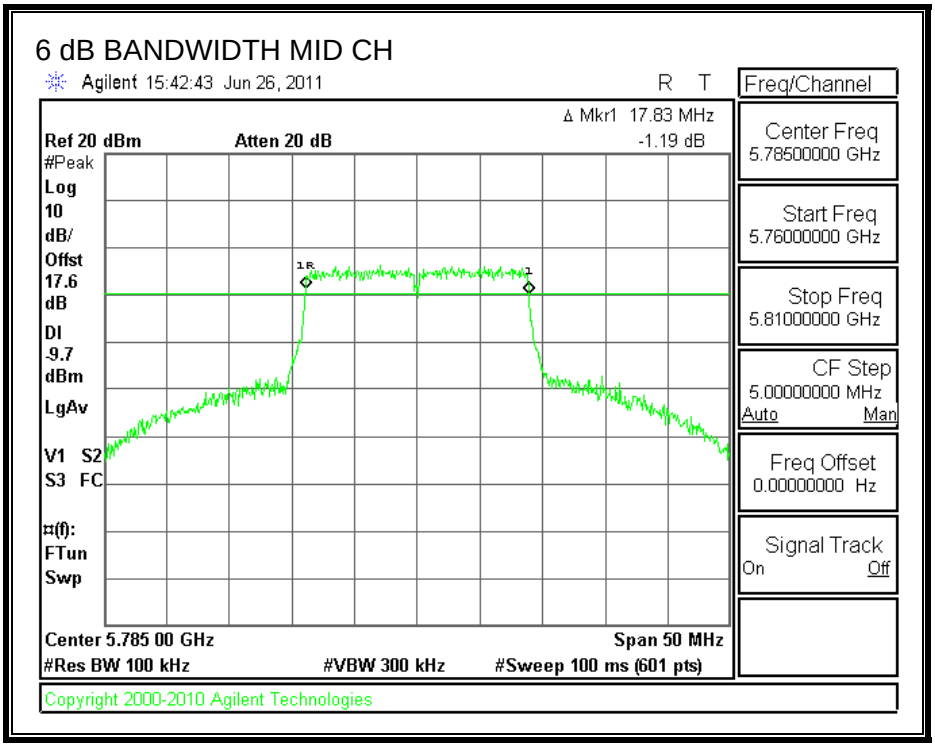
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

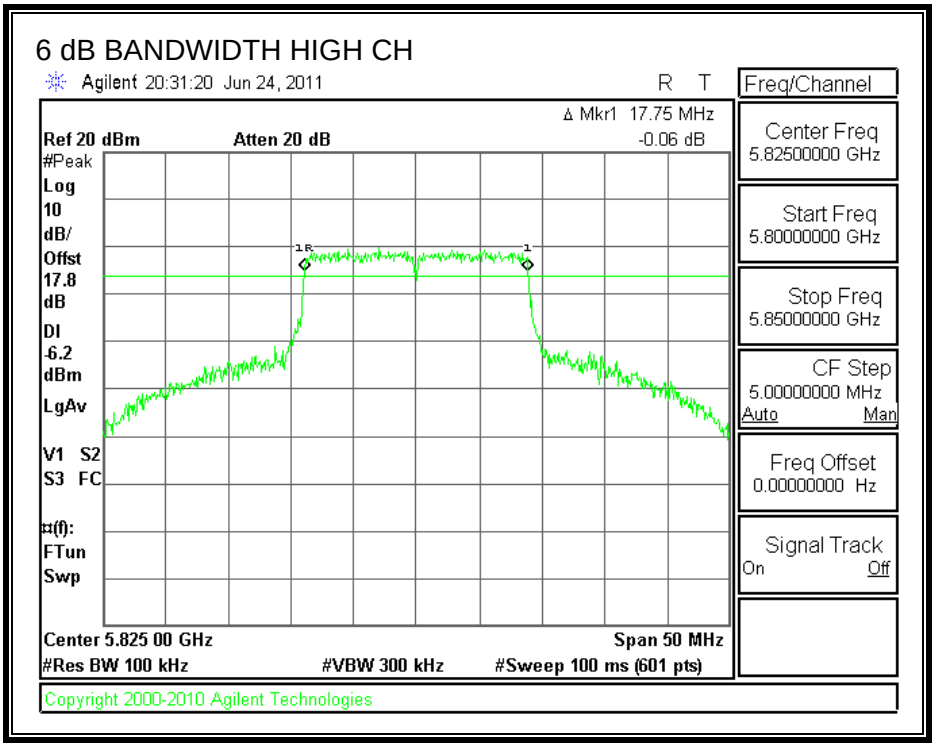
RESULTS

Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Low	5745	17.83	0.5
Middle	5785	17.83	0.5
High	5825	17.75	0.5

6 dB BANDWIDTH







7.6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

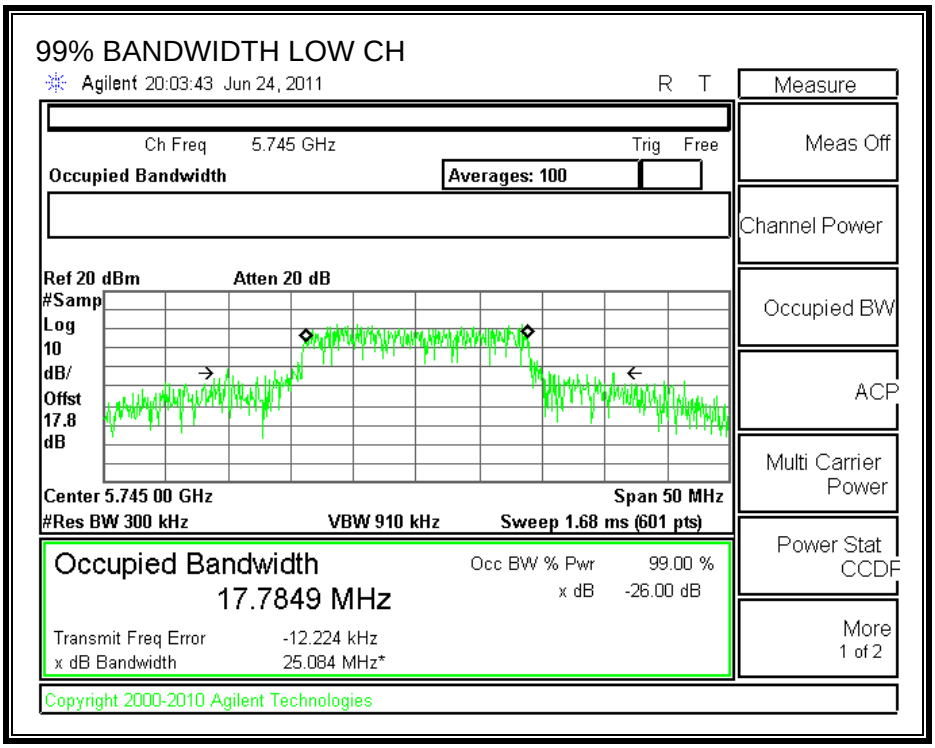
TEST PROCEDURE

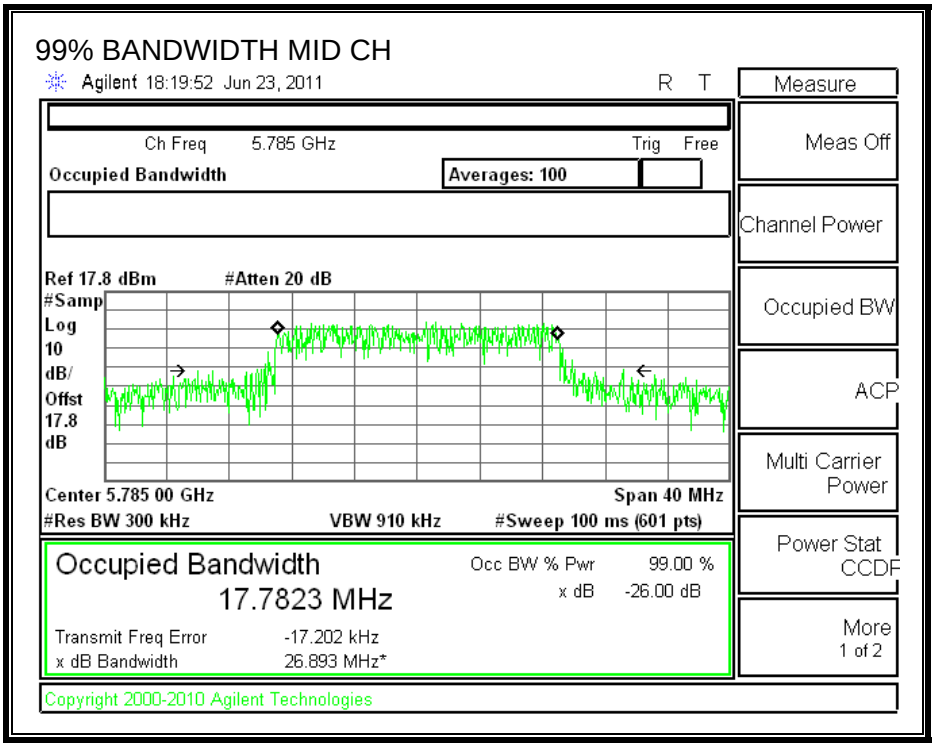
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

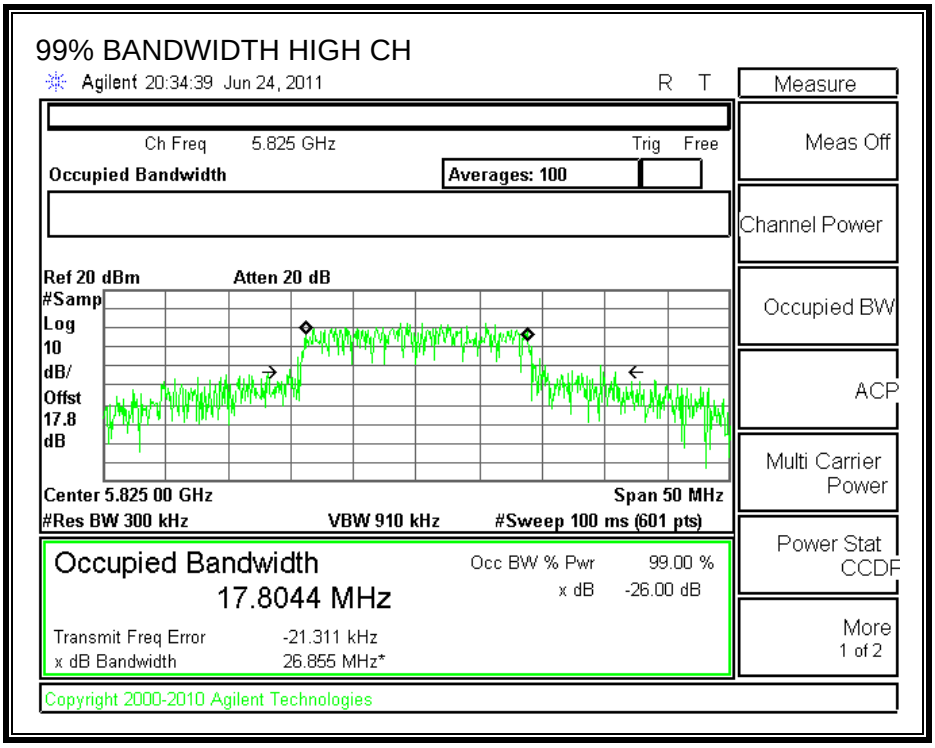
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.7849
Middle	5785	17.7823
High	5825	17.8044

99% BANDWIDTH







7.6.3. 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

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

Peak power is measured using a wide bandwidth Peak Power Meter.

RESULTS

Channel	Frequency (MHz)	PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	0.81	17.70	18.51	30.00	-11.49
Mid	5785	1.31	17.70	19.01	30.00	-10.99
High	5825	0.94	17.70	18.64	30.00	-11.36

7.6.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.7 dB (including 10 dB pad and 7.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5745	13.26
Middle	5785	13.66
High	5825	13.40

7.6.5. 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.

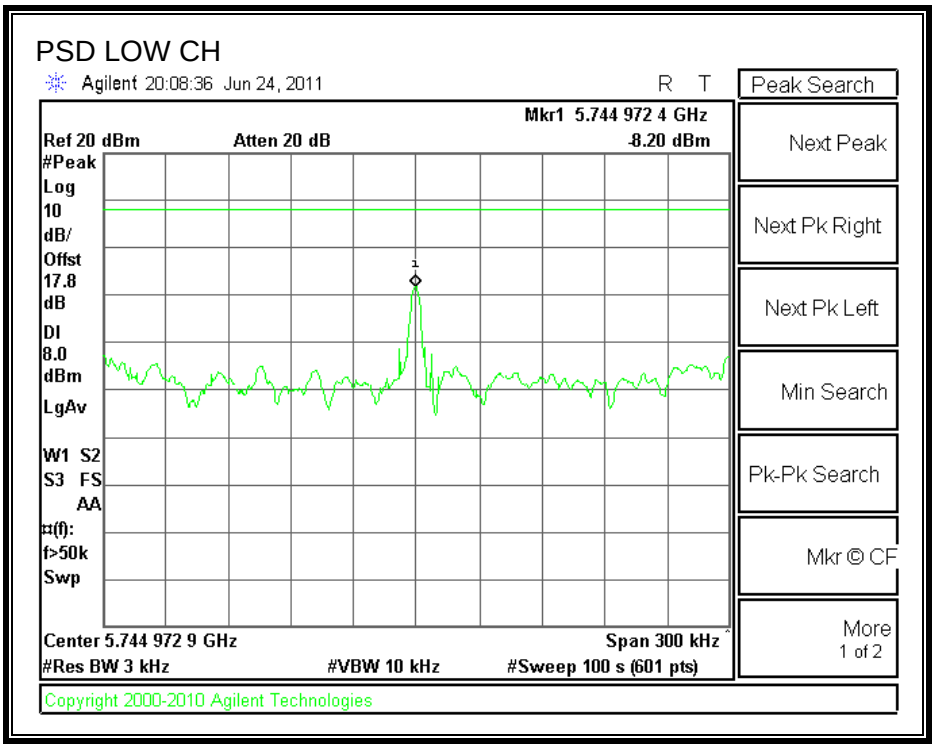
TEST PROCEDURE

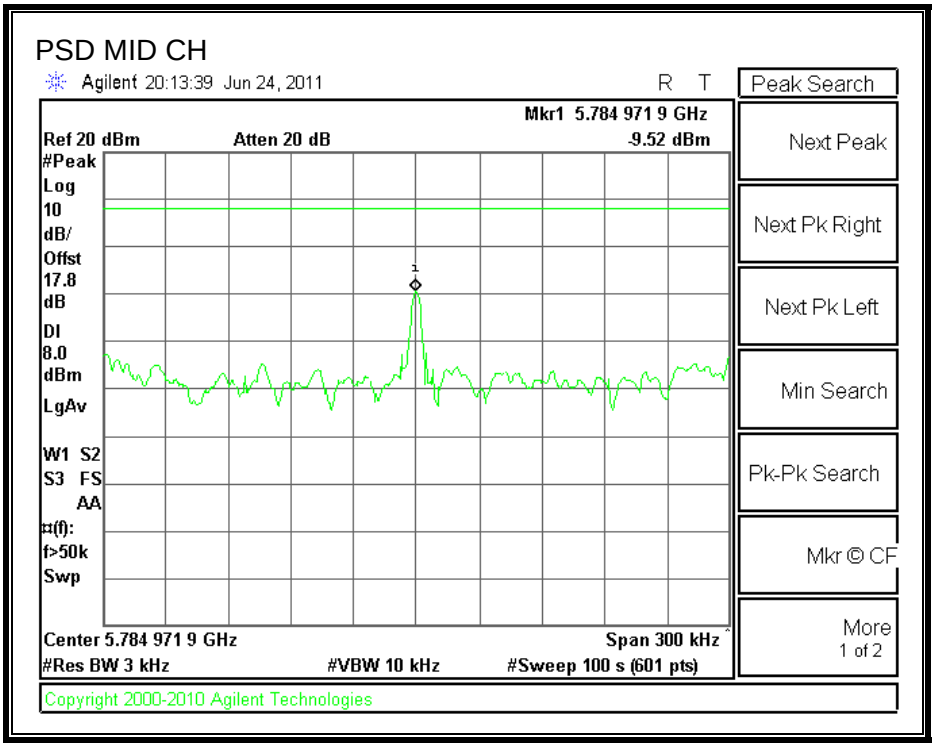
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

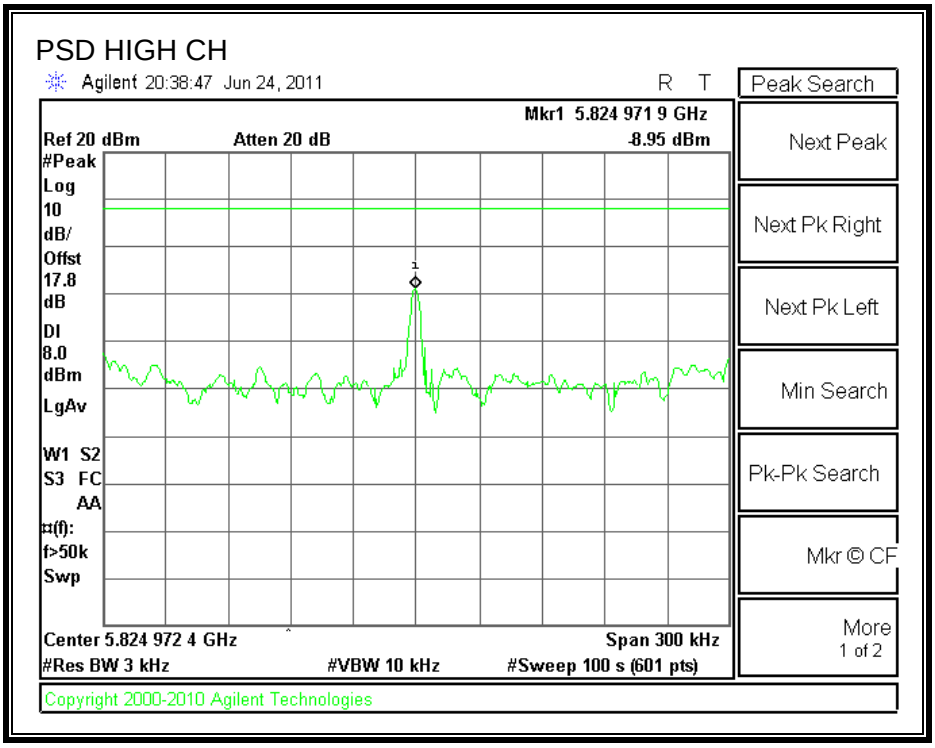
RESULTS:

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-8.2	8	-16.20
Middle	5785	-9.52	8	-17.52
High	5825	-8.95	8	-16.95

POWER SPECTRAL DENSITY







7.6.6. 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.

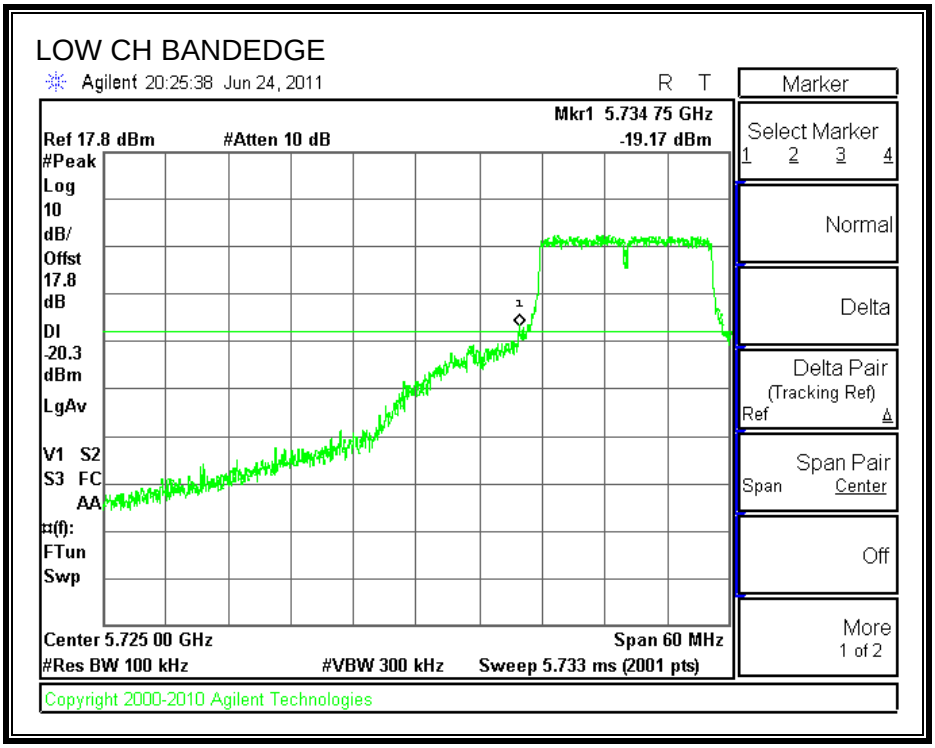
TEST PROCEDURE

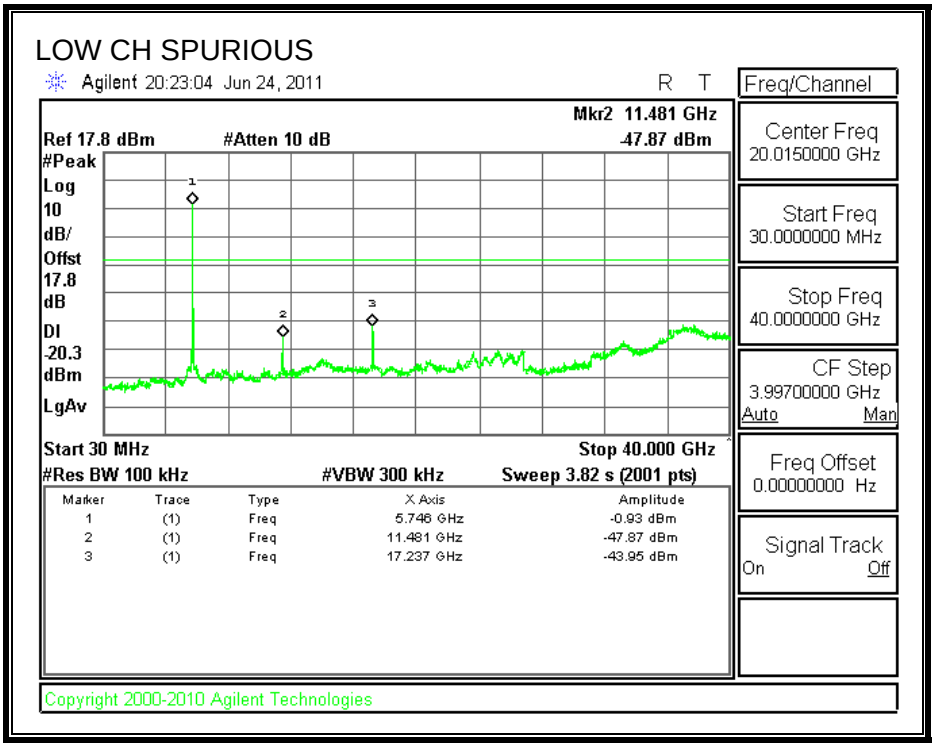
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

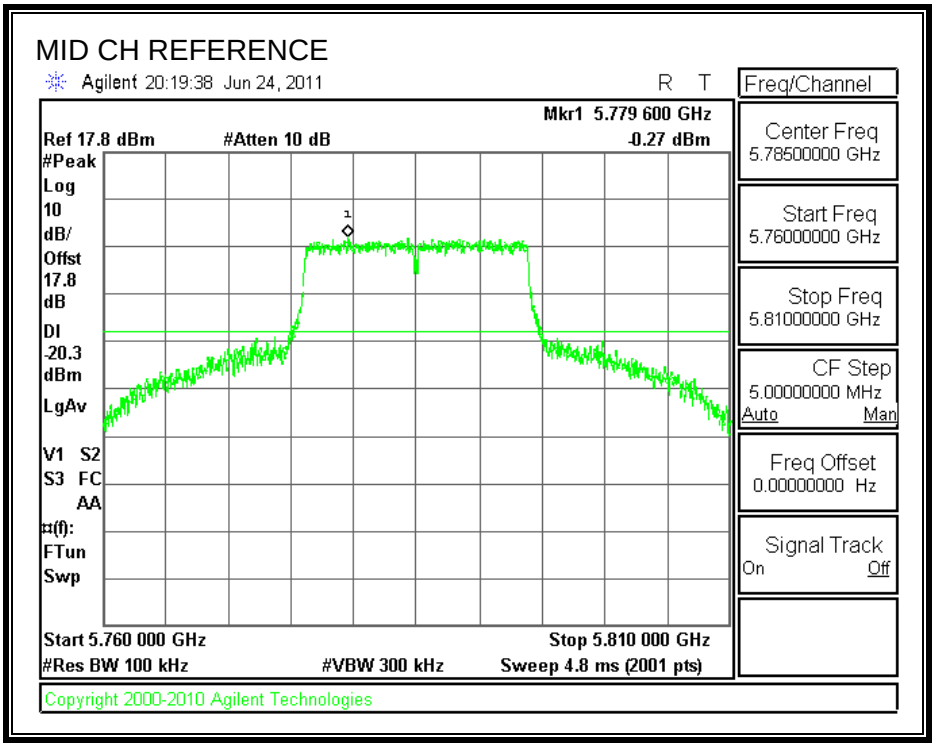
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

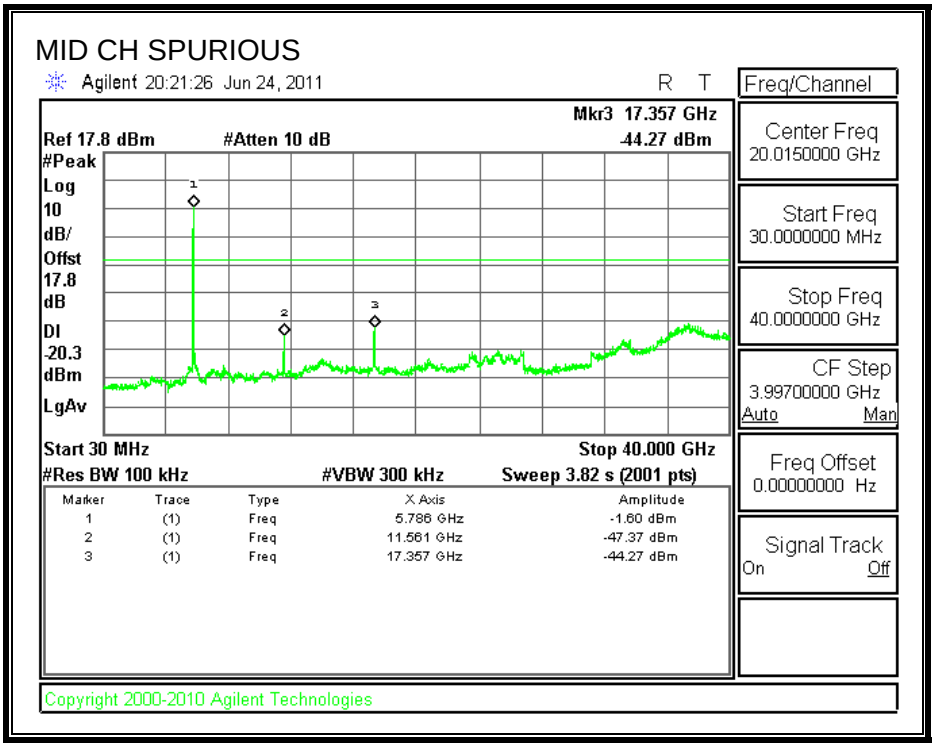
RESULTS

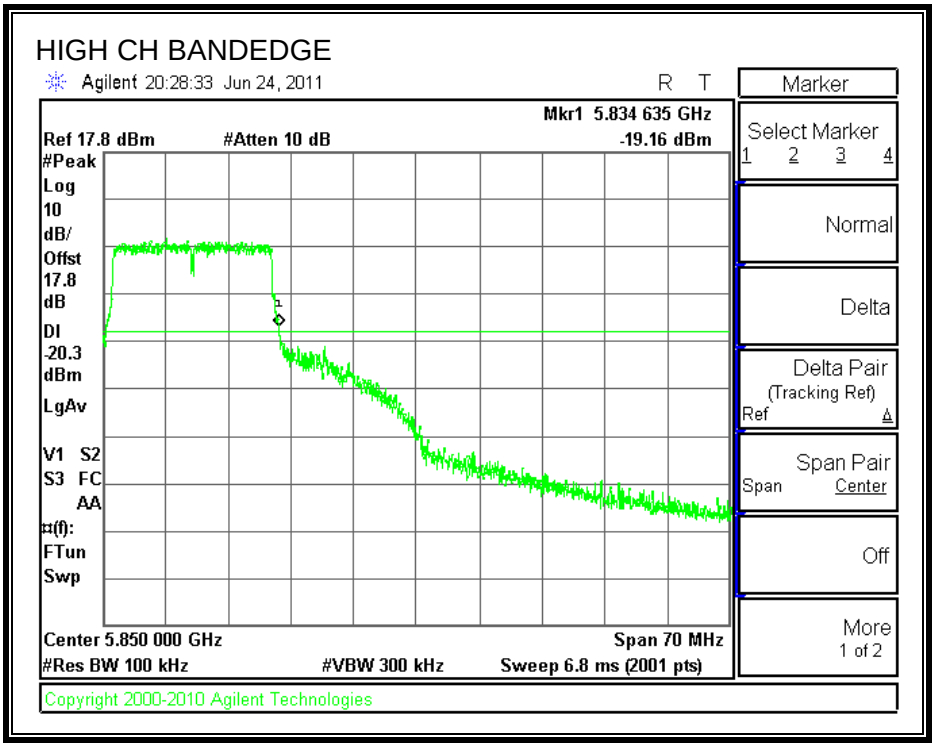
SPURIOUS EMISSIONS

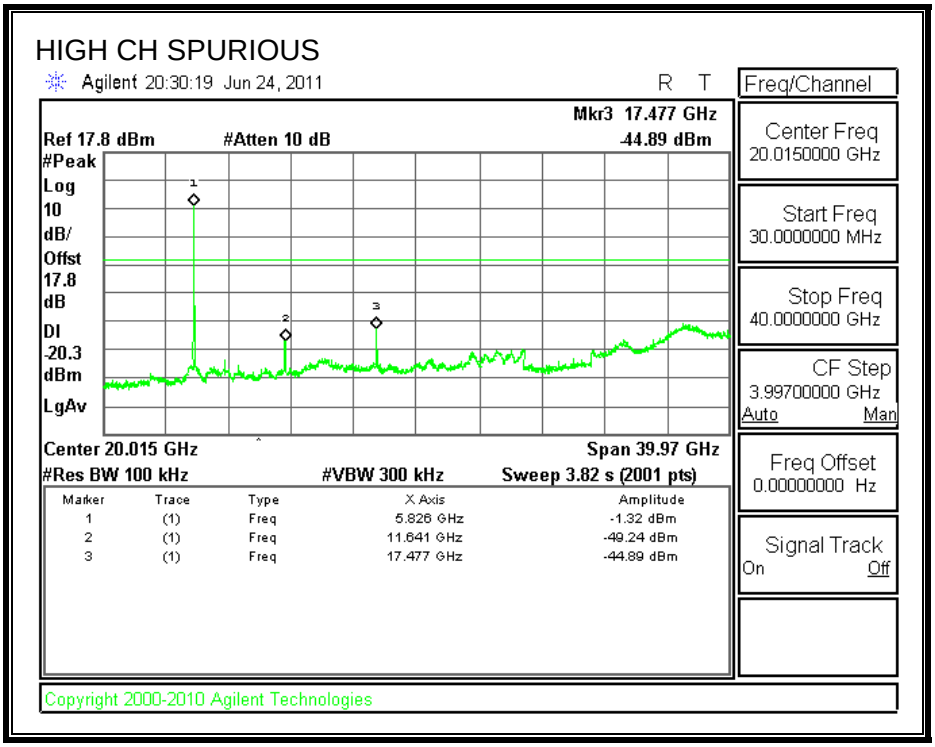












7.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

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.

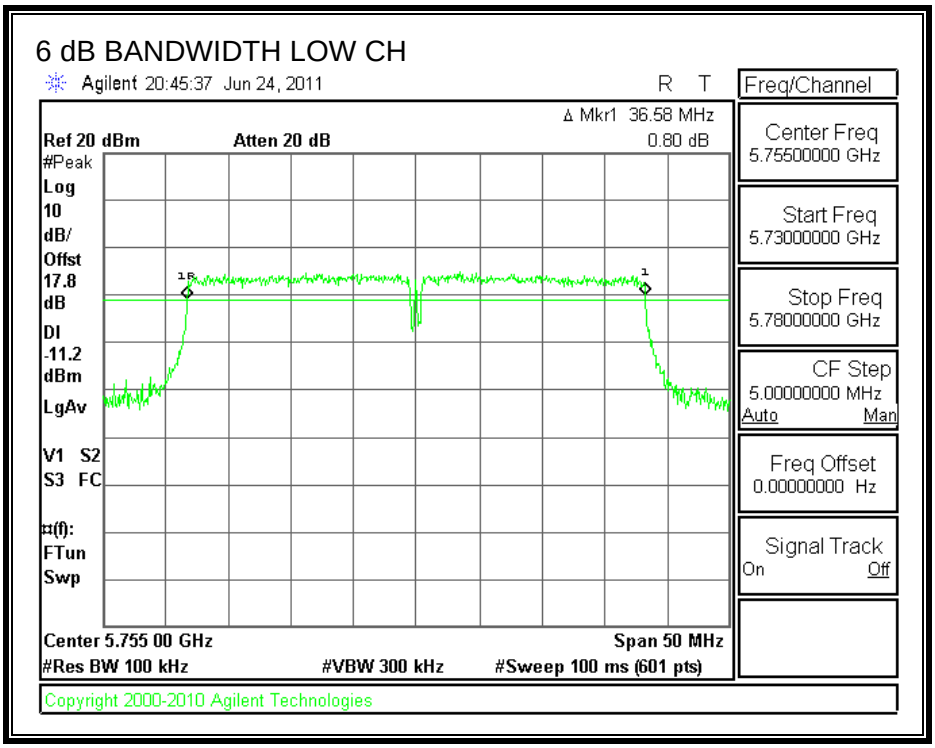
TEST PROCEDURE

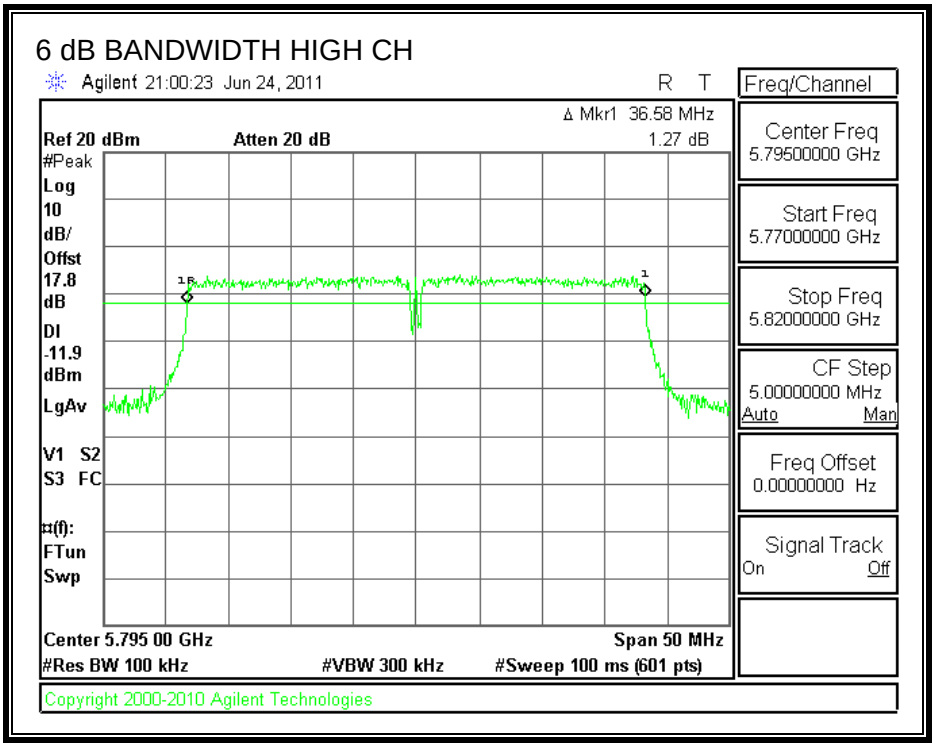
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Low	5755	36.58	0.5
High	5795	36.58	0.5

6 dB BANDWIDTH





7.7.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

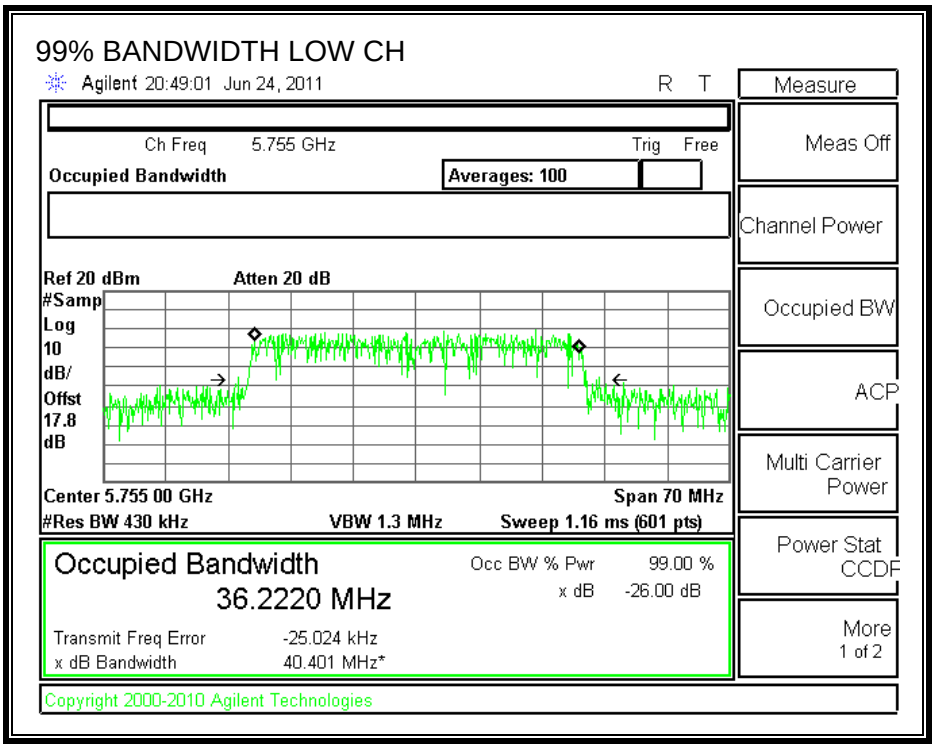
TEST PROCEDURE

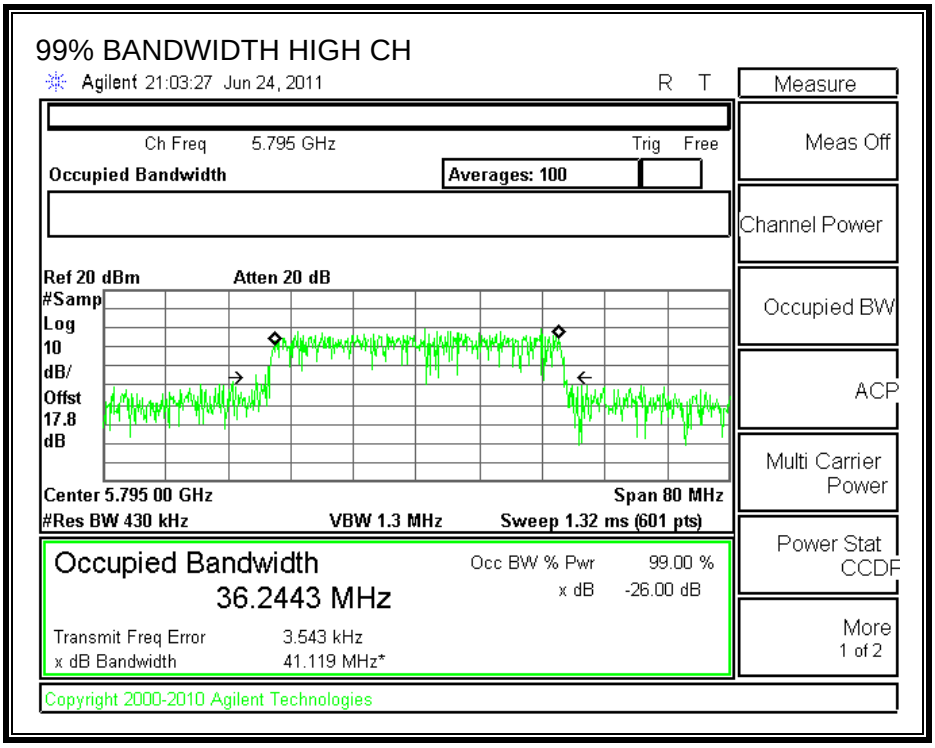
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.222
High	5795	36.2443

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

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

Peak power is measured using a wide bandwidth Peak Power Meter.

RESULTS

Channel	Frequency (MHz)	PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-2.02	17.70	15.68	30.00	-14.32
High	5795	-2.25	17.70	15.45	30.00	-14.55

7.7.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.7 dB (including 10 dB pad and 7.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Total Power (dBm)
Low	5755	11.80
High	5795	11.56

7.7.5. 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.

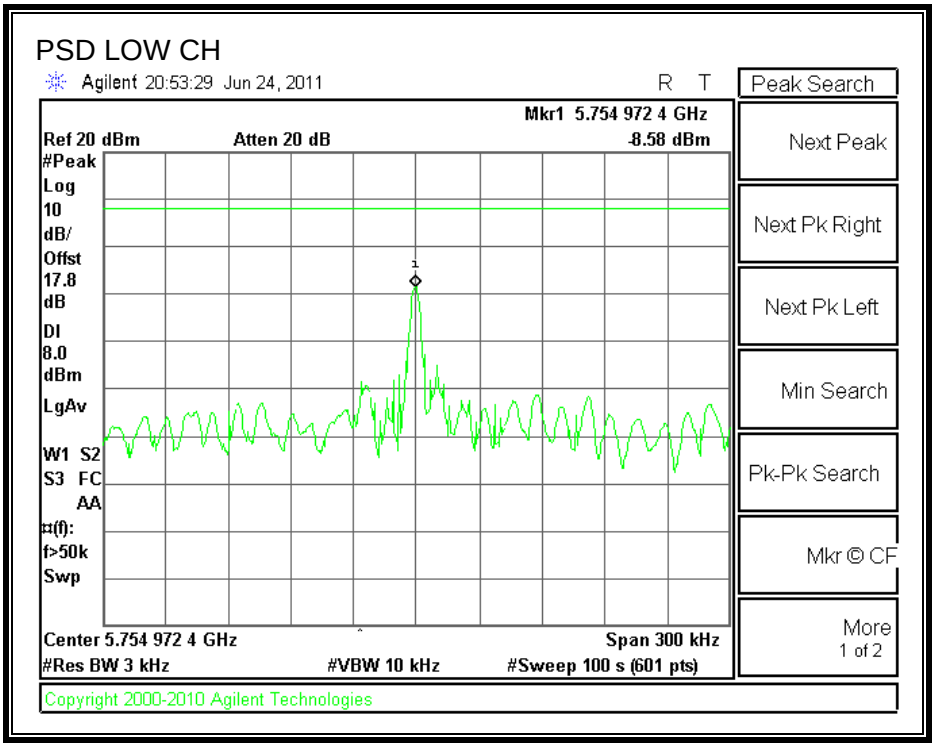
TEST PROCEDURE

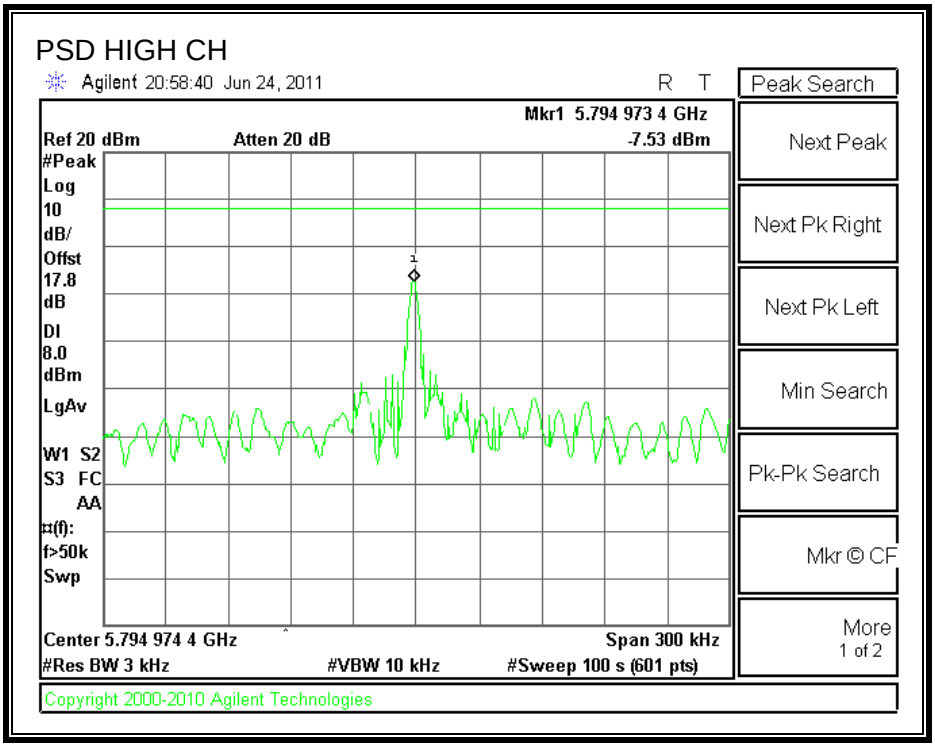
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS:

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-8.58	8	-16.58
High	5795	-7.53	8	-15.53

POWER SPECTRAL DENSITY





7.7.6. 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.

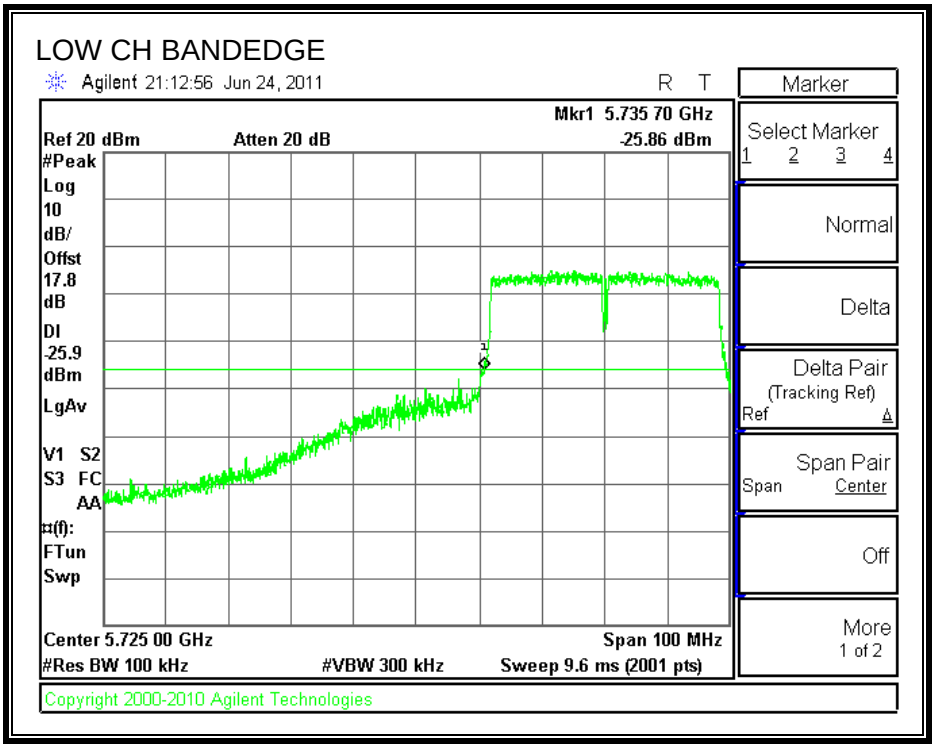
TEST PROCEDURE

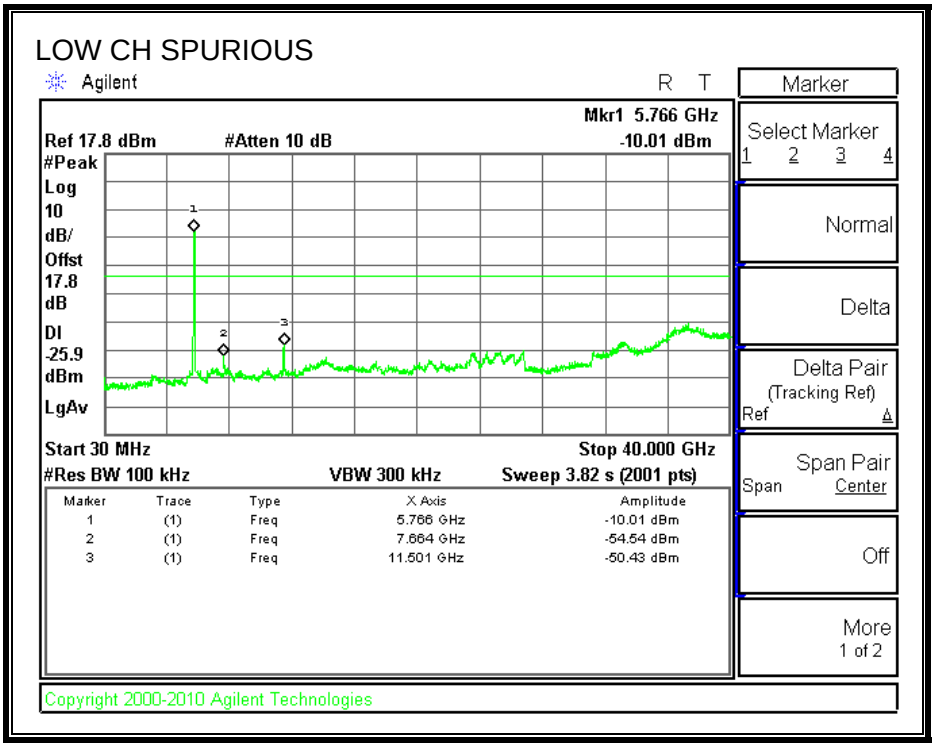
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

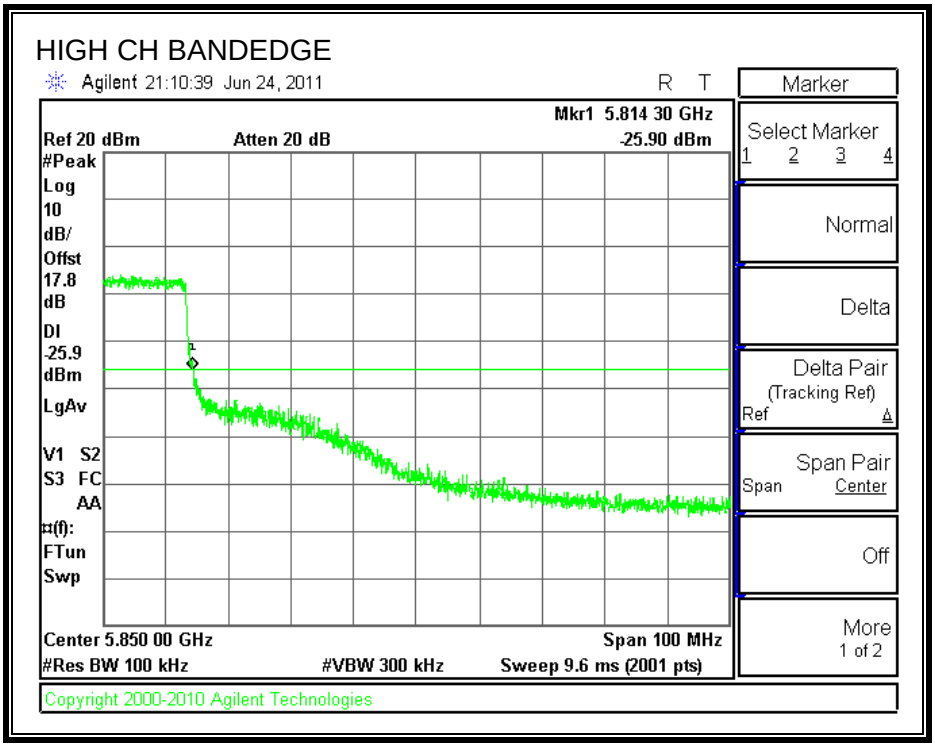
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest and highest channels.

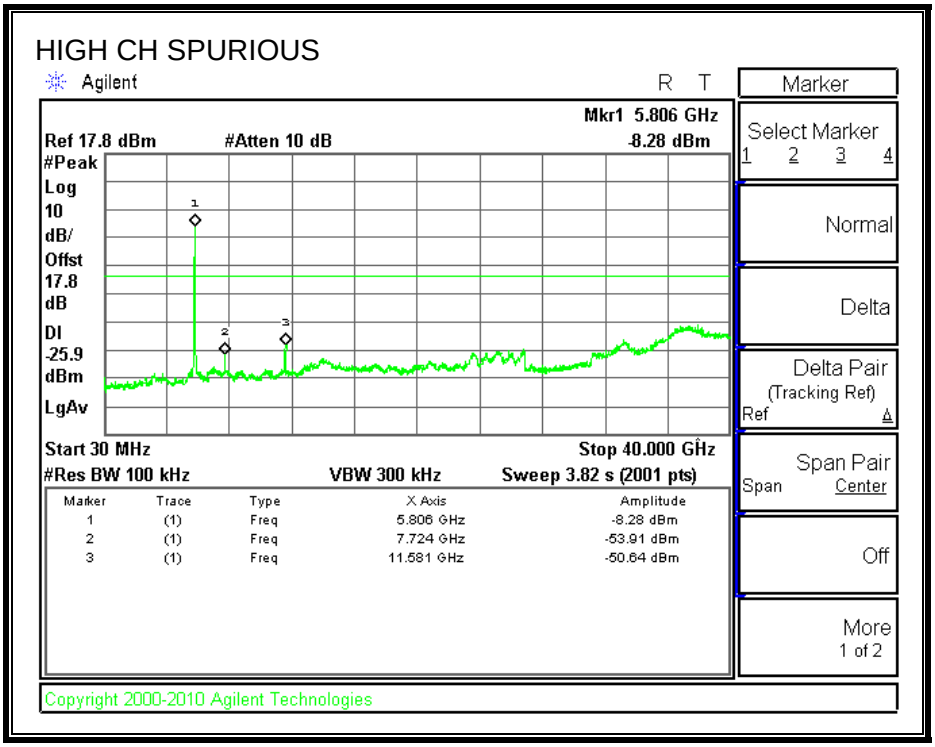
RESULTS

SPURIOUS EMISSIONS









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.

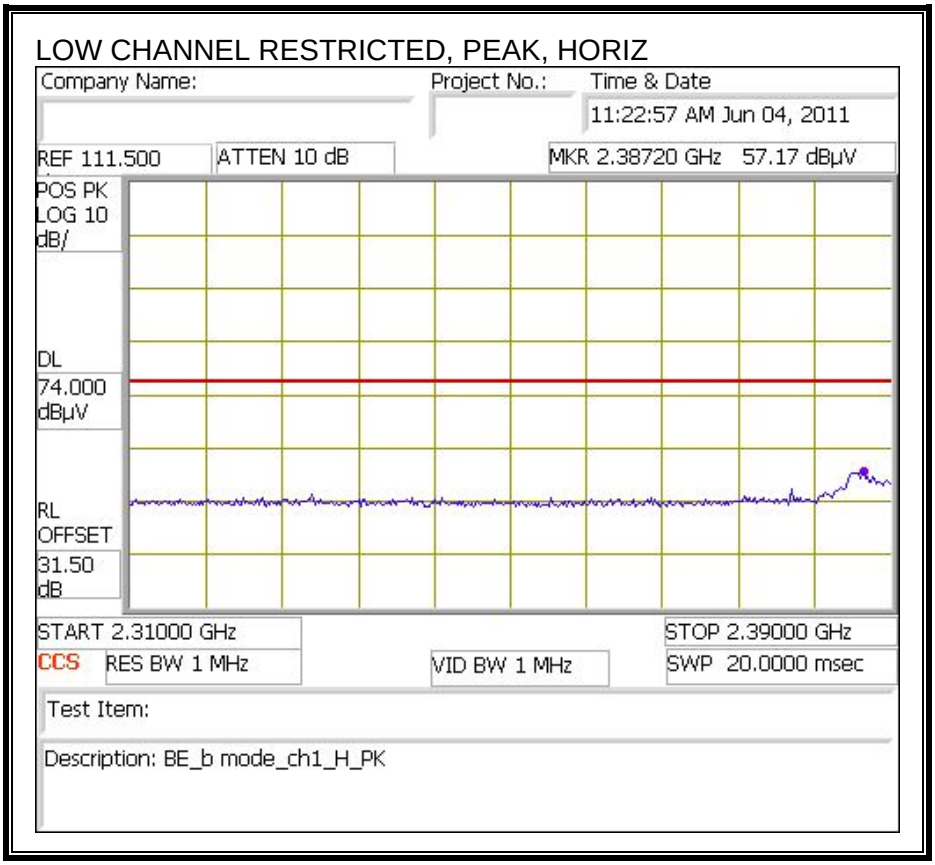
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

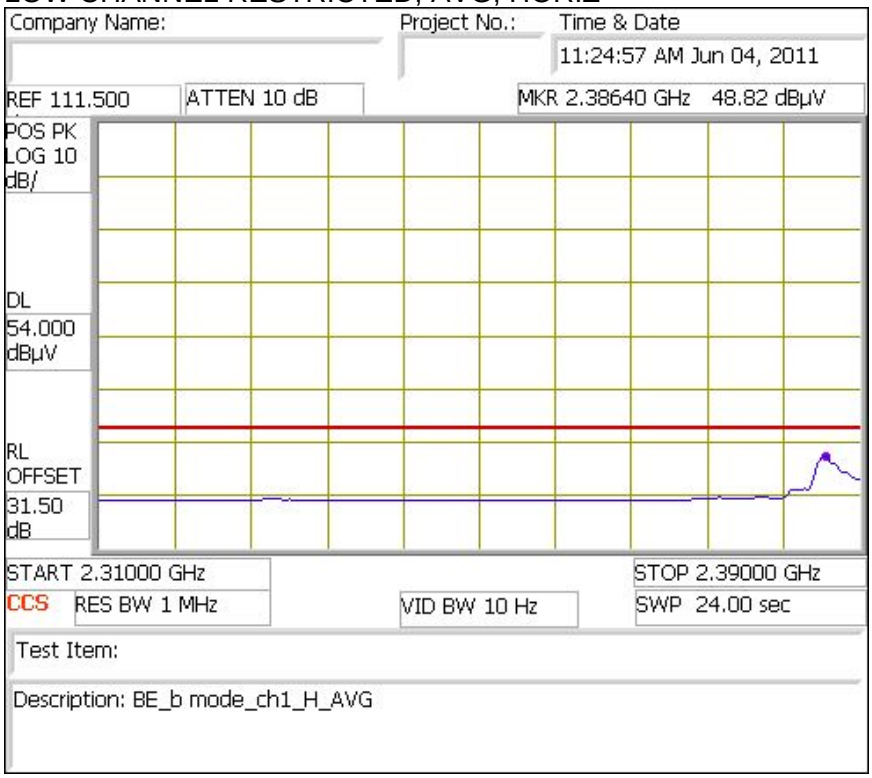
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. TX ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

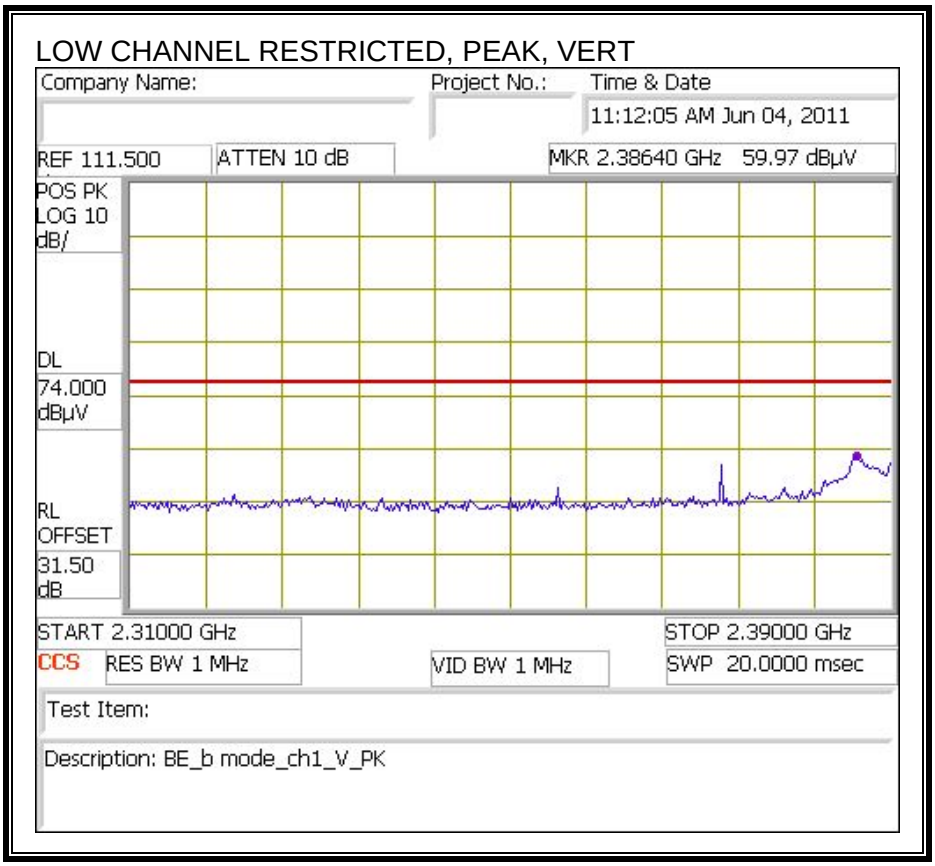
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



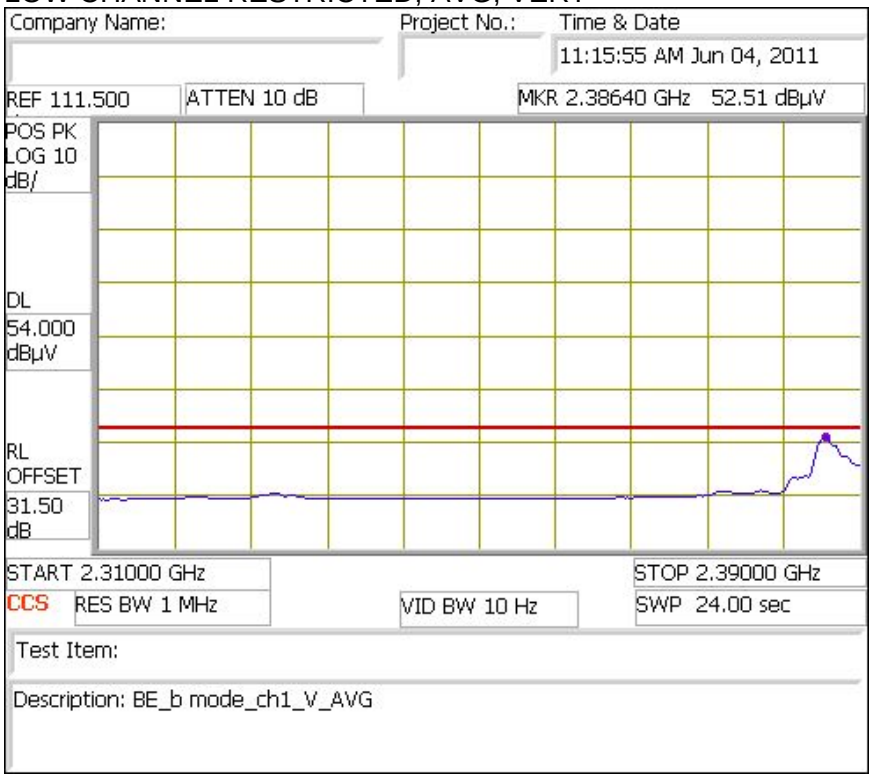
LOW CHANNEL RESTRICTED, AVG, HORIZ



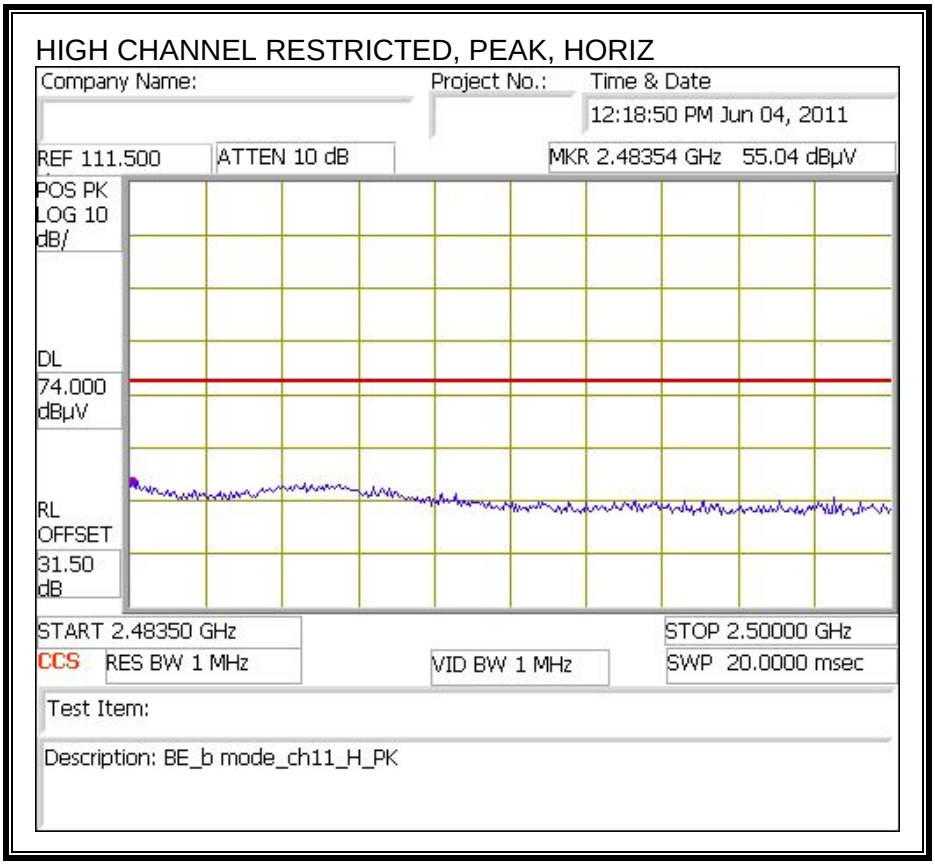
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



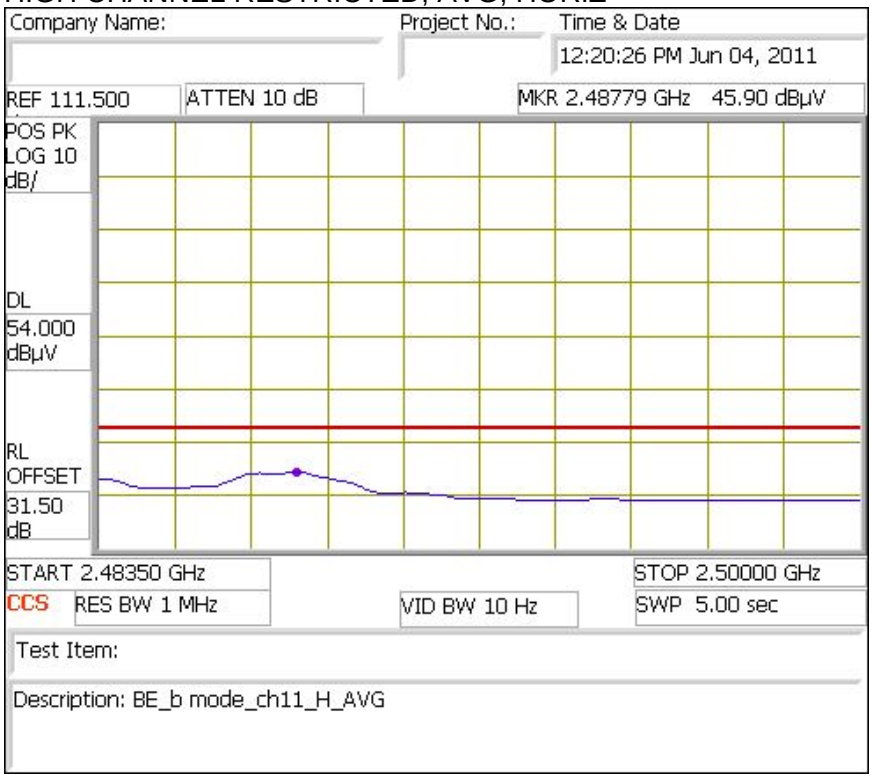
LOW CHANNEL RESTRICTED, AVG, VERT



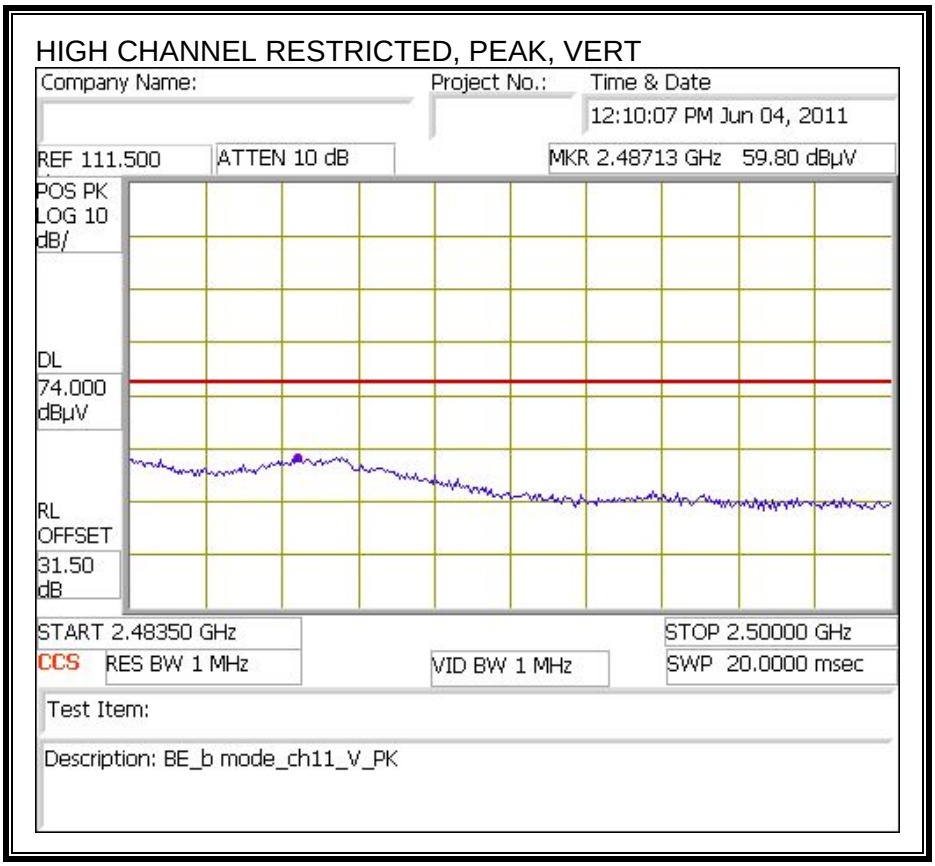
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



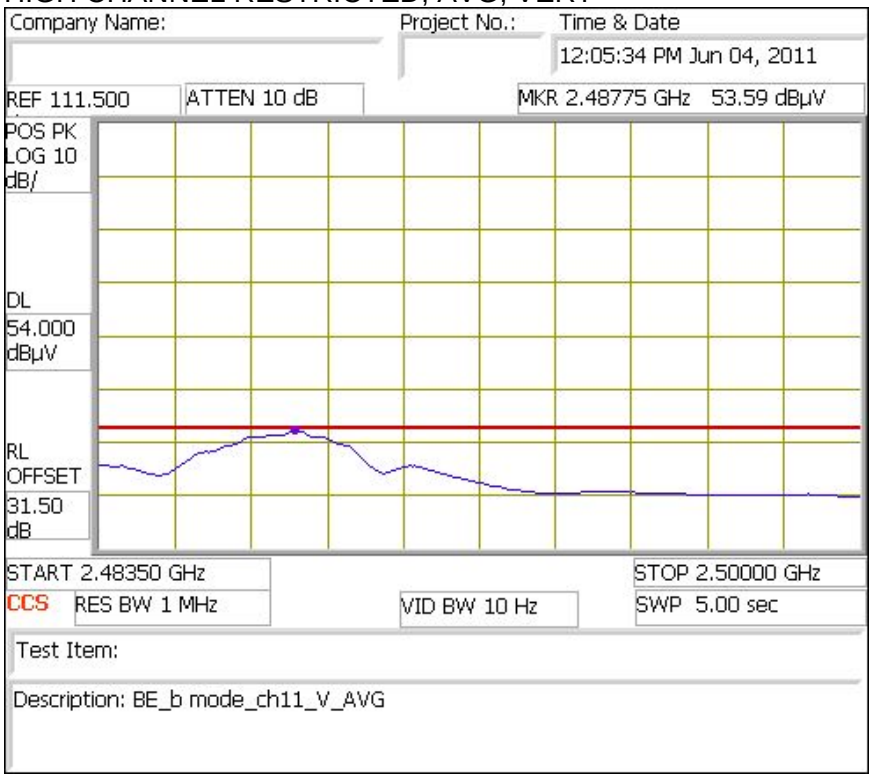
HIGH CHANNEL RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company:
Project #: 11U13822
Date: 6/4/11
Test Engineer: Thanh Nguyen
Configuration: EUT , SHEEVA Plug USB, support Laptop
Mode: Transmit b mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T145 Agilent 3008A0056	T88 Miteq 26-40GHz	T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch															
4.824	3.0	46.1	40.3	32.8	5.8	-34.8	0.0	0.0	49.8	44.0	74	54	-24.2	-10.0	V
4.824	3.0	47.7	44.9	32.8	5.8	-34.8	0.0	0.0	51.4	48.6	74	54	-22.6	-5.4	H
Mid Ch															
4.874	3.0	47.3	43.5	32.8	5.8	-34.9	0.0	0.0	51.1	47.3	74	54	-22.9	-6.7	V
7.311	3.0	43.6	31.3	35.2	7.3	-34.7	0.0	0.0	51.4	39.1	74	54	-22.6	-14.9	V
4.874	3.0	48.8	44.8	32.8	5.8	-34.9	0.0	0.0	52.6	48.6	74	54	-21.4	-5.4	H
7.311	3.0	44.8	34.5	35.2	7.3	-34.7	0.0	0.0	52.6	42.3	74	54	-21.4	-11.7	H
High Ch															
4.924	3.0	47.5	43.9	32.8	5.9	-34.9	0.0	0.0	51.4	47.8	74	54	-22.6	-6.2	V
7.386	3.0	42.0	31.5	35.3	7.3	-34.6	0.0	0.0	50.0	39.5	74	54	-24.0	-14.5	V
4.924	3.0	48.8	45.9	32.8	5.9	-34.9	0.0	0.0	52.7	49.7	74	54	-21.3	-4.3	H
7.386	3.0	43.6	35.6	35.3	7.3	-34.6	0.0	0.0	51.6	43.5	74	54	-22.4	-10.5	H
No other emissions were detected above the system noise floor.															

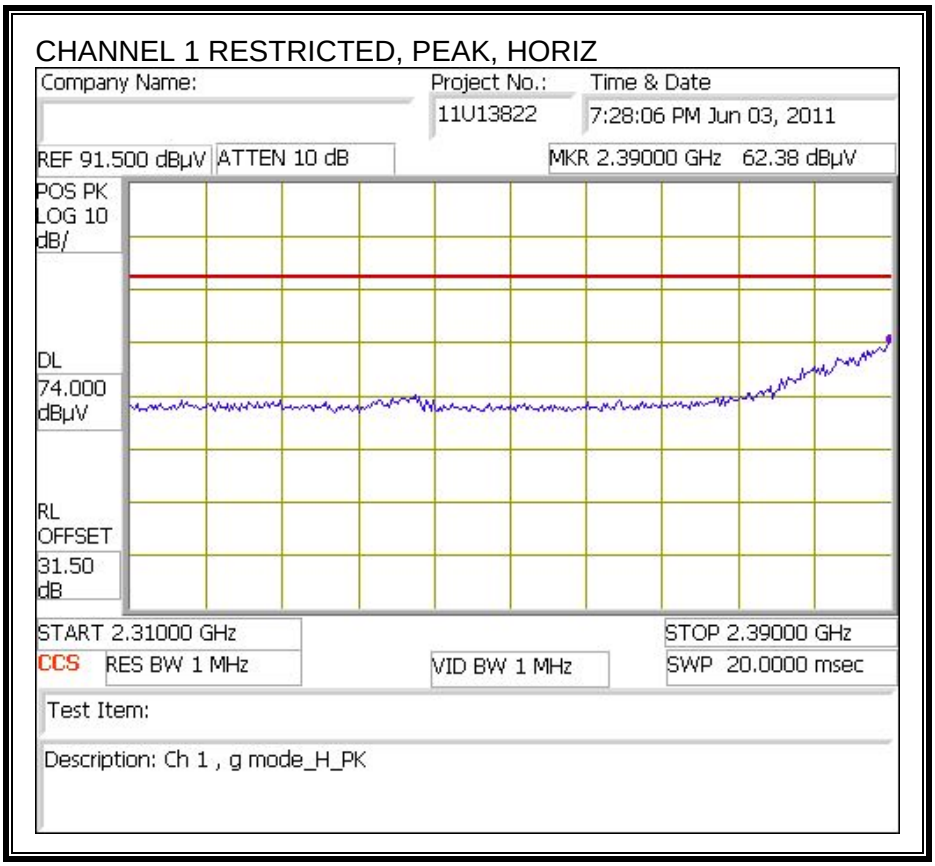
Rev. 07.22.09

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

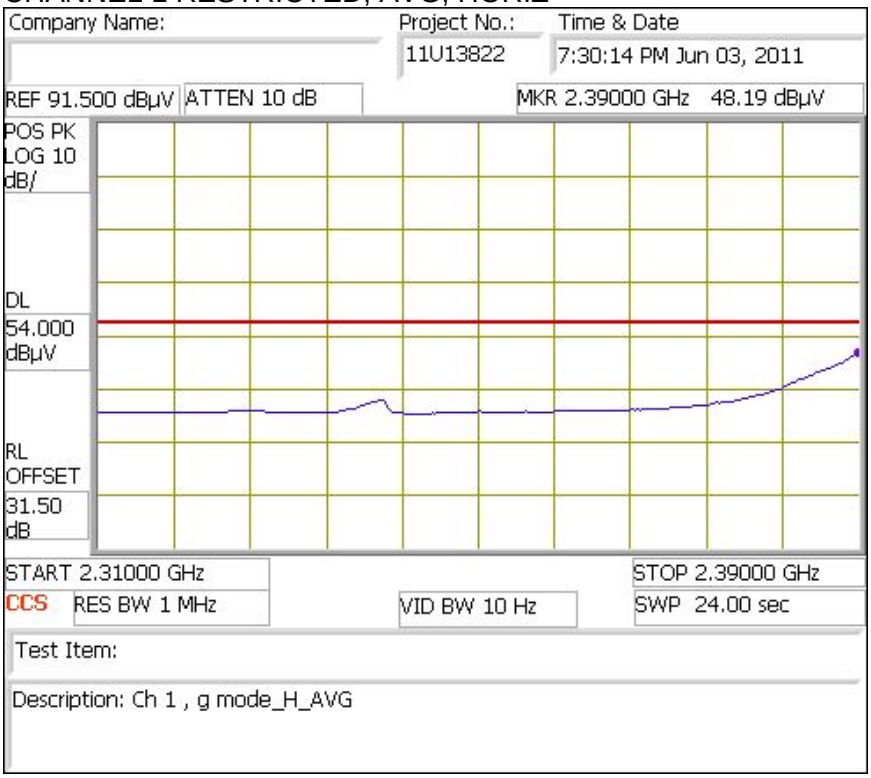
8.2.2. TX ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

Channel 1

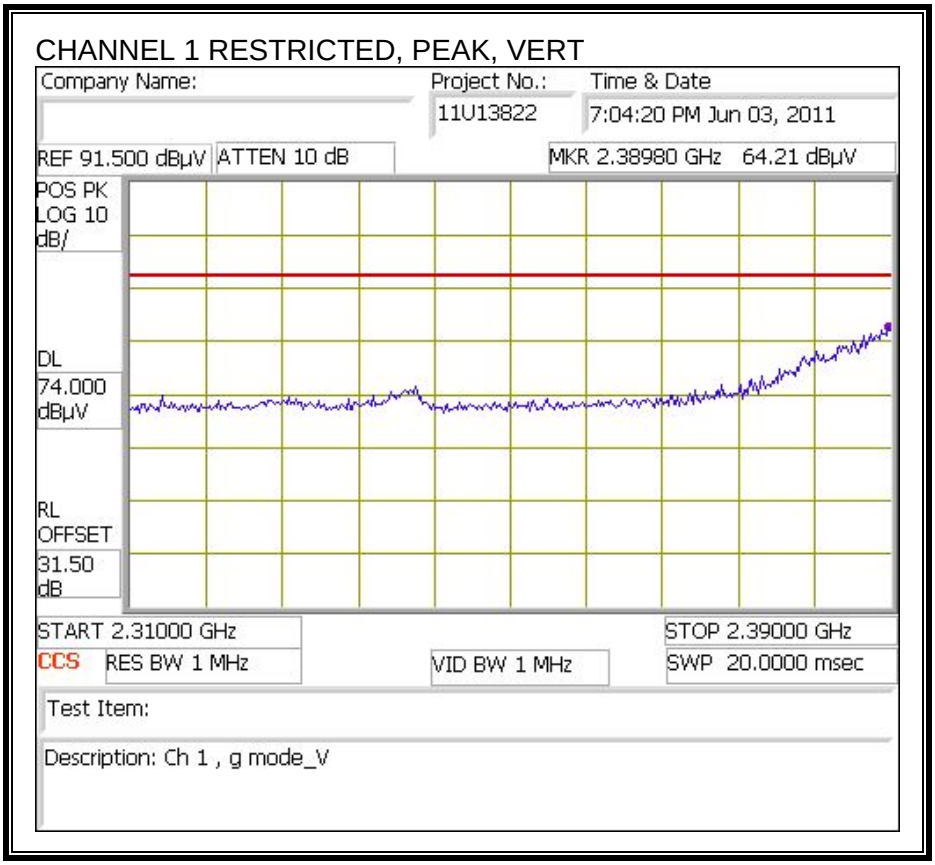
RESTRICTED BANDEDGE (CHANNEL 1, HORIZONTAL)



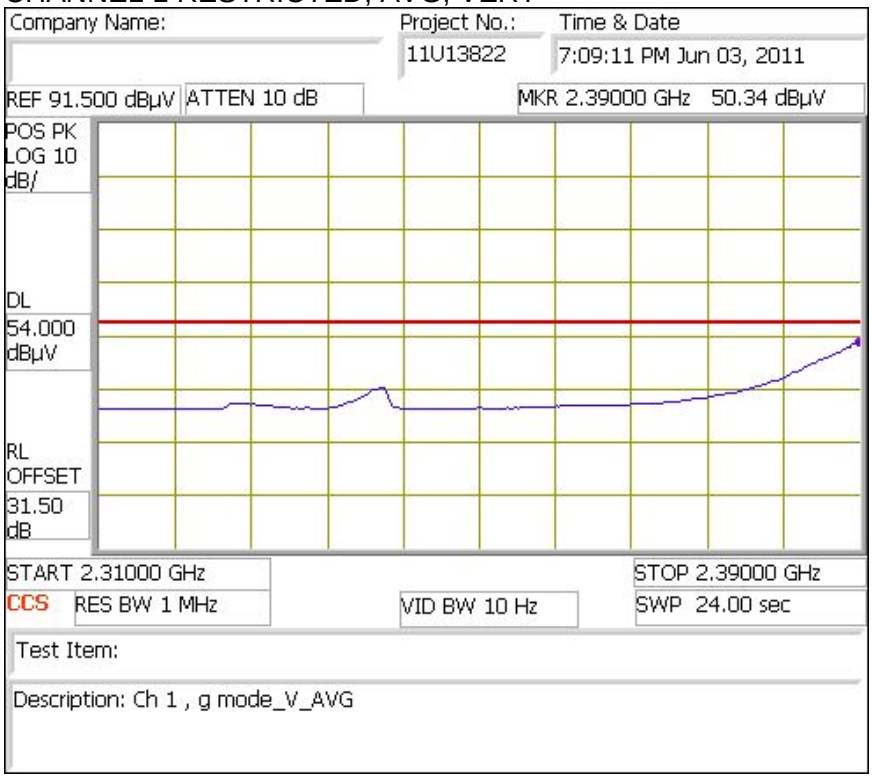
CHANNEL 1 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (CHANNEL 1, VERTICAL)

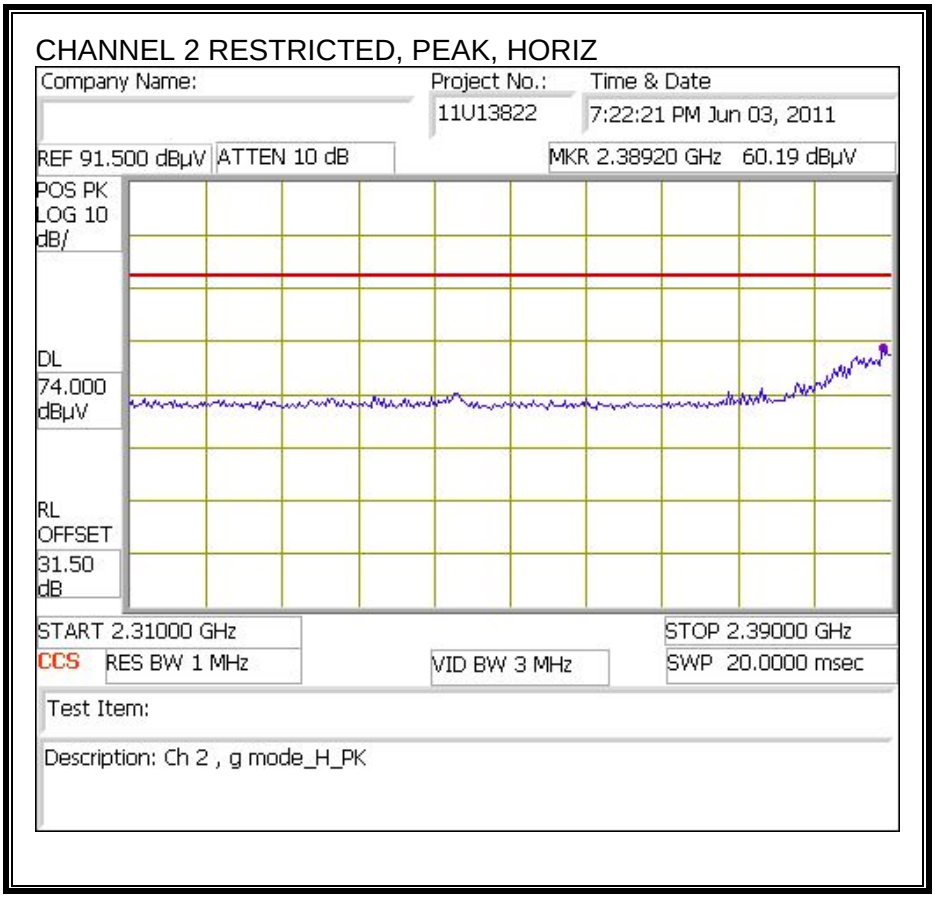


CHANNEL 1 RESTRICTED, AVG, VERT

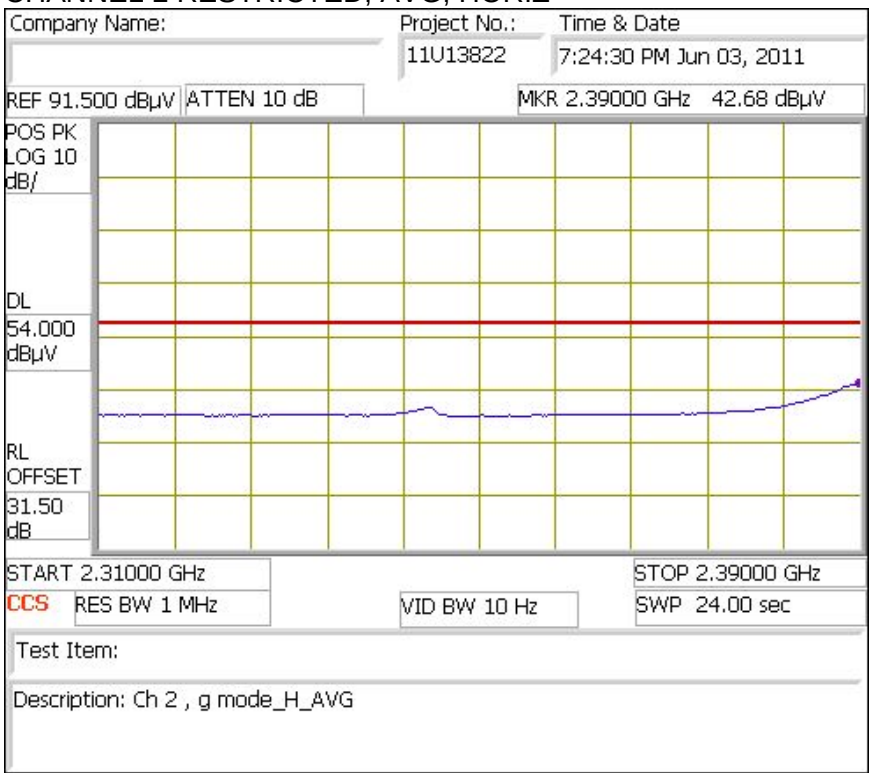


Channel 2

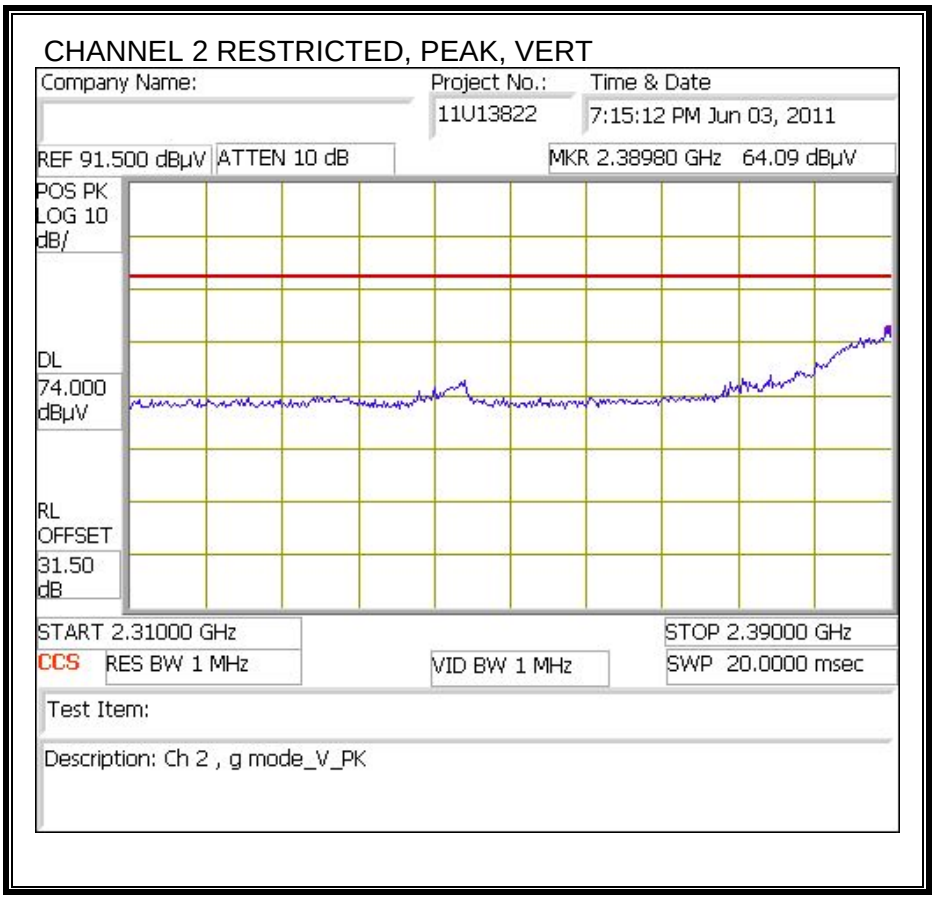
RESTRICTED BANDEDGE (CHANNEL 2, HORIZONTAL)



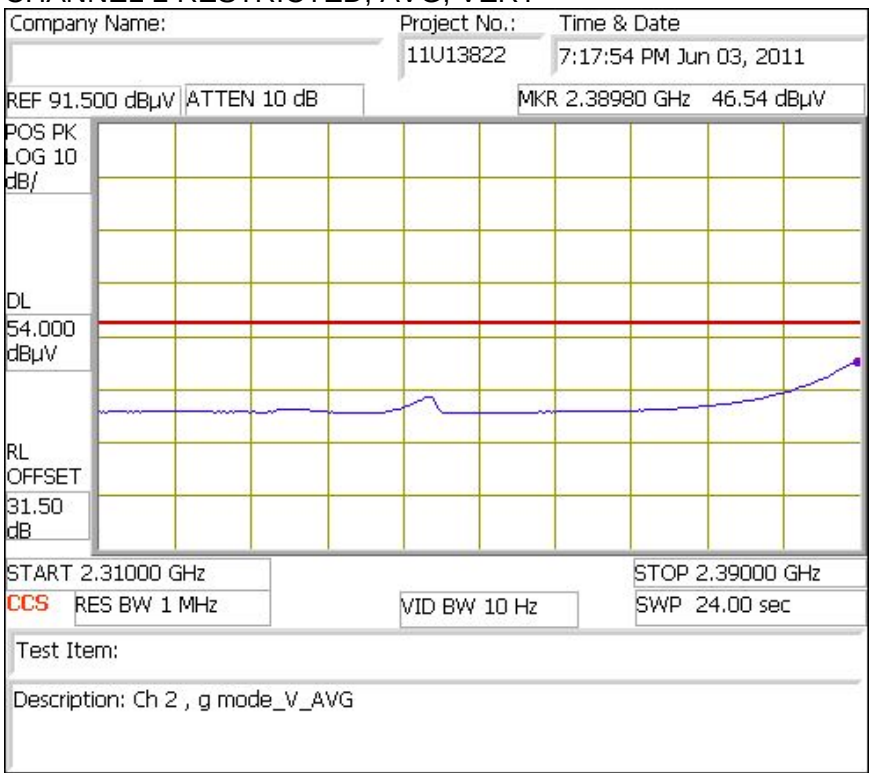
CHANNEL 2 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (CHANNEL 2, VERTICAL)

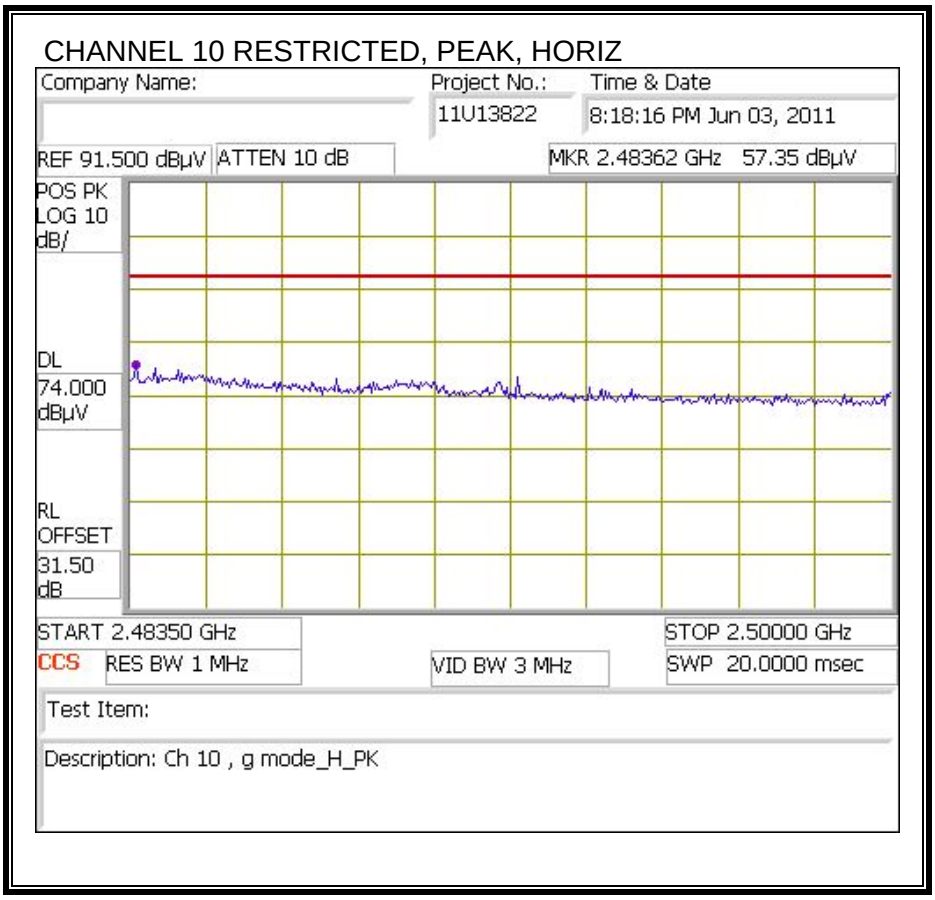


CHANNEL 2 RESTRICTED, AVG, VERT

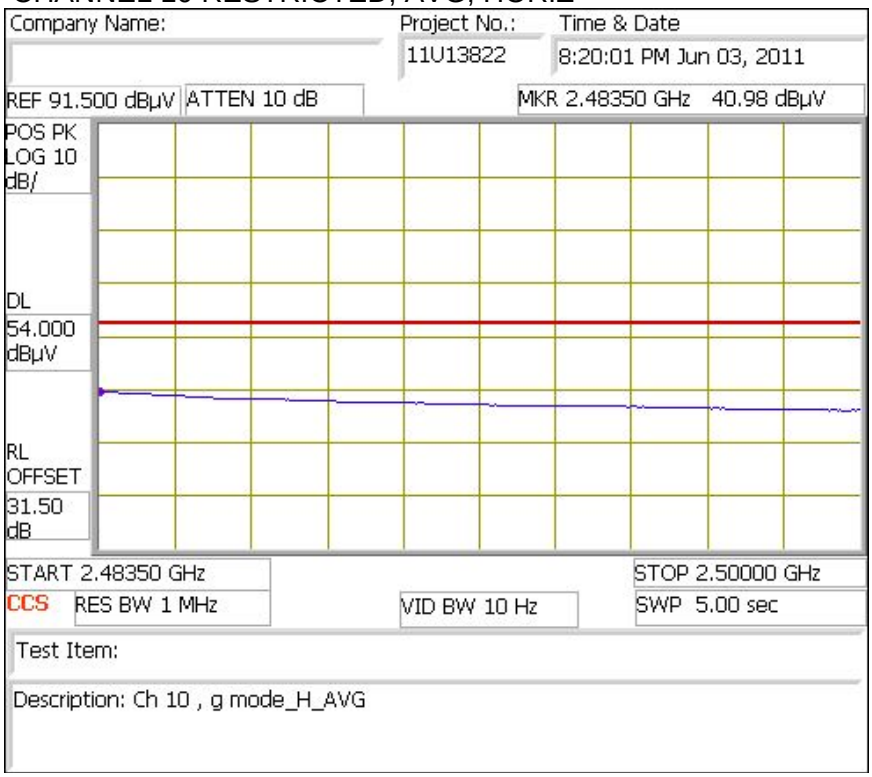


Channel 10

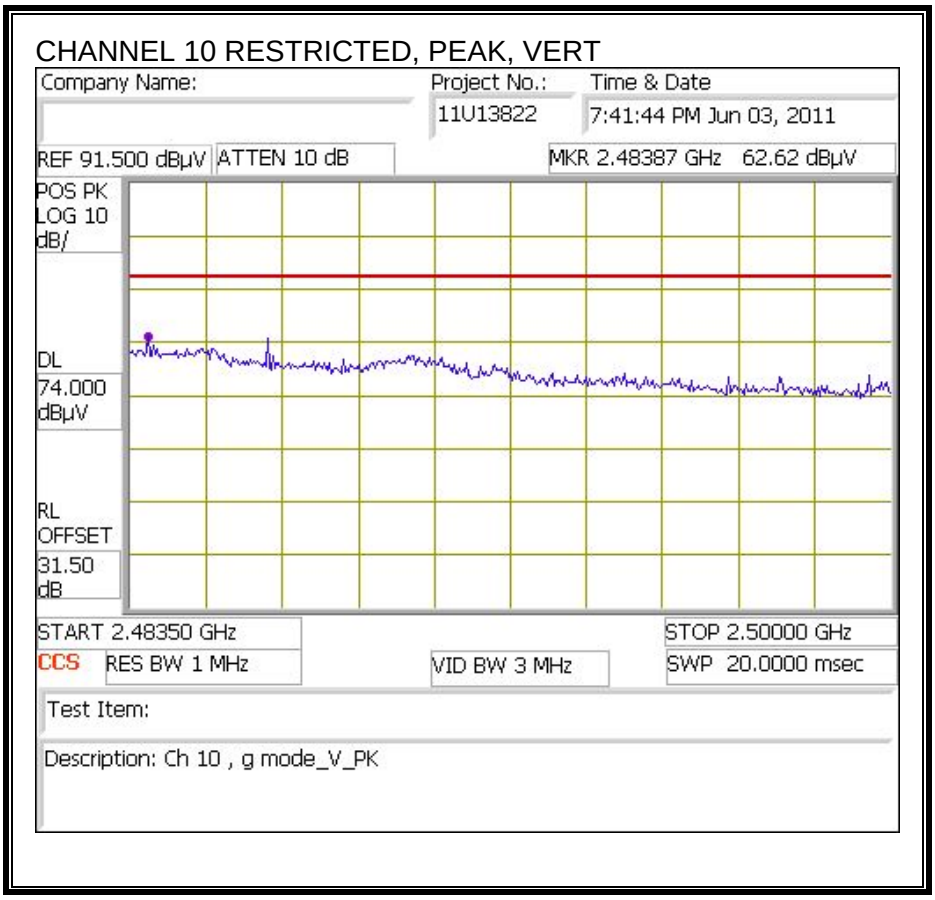
RESTRICTED BANDEDGE (CHANNEL 10, HORIZONTAL)



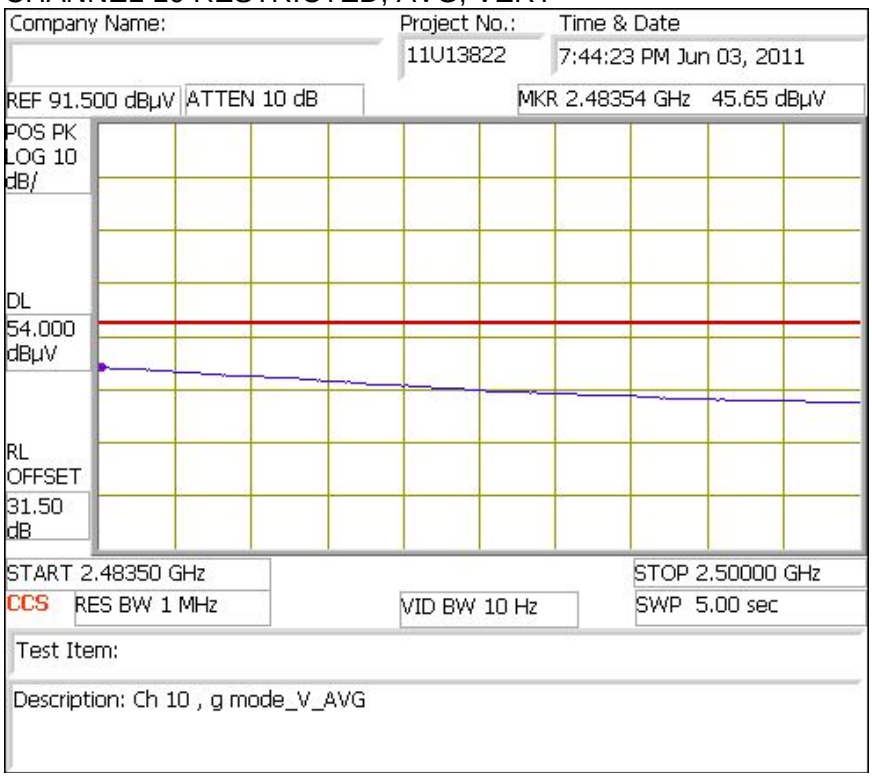
CHANNEL 10 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (CHANNEL 10, VERTICAL)

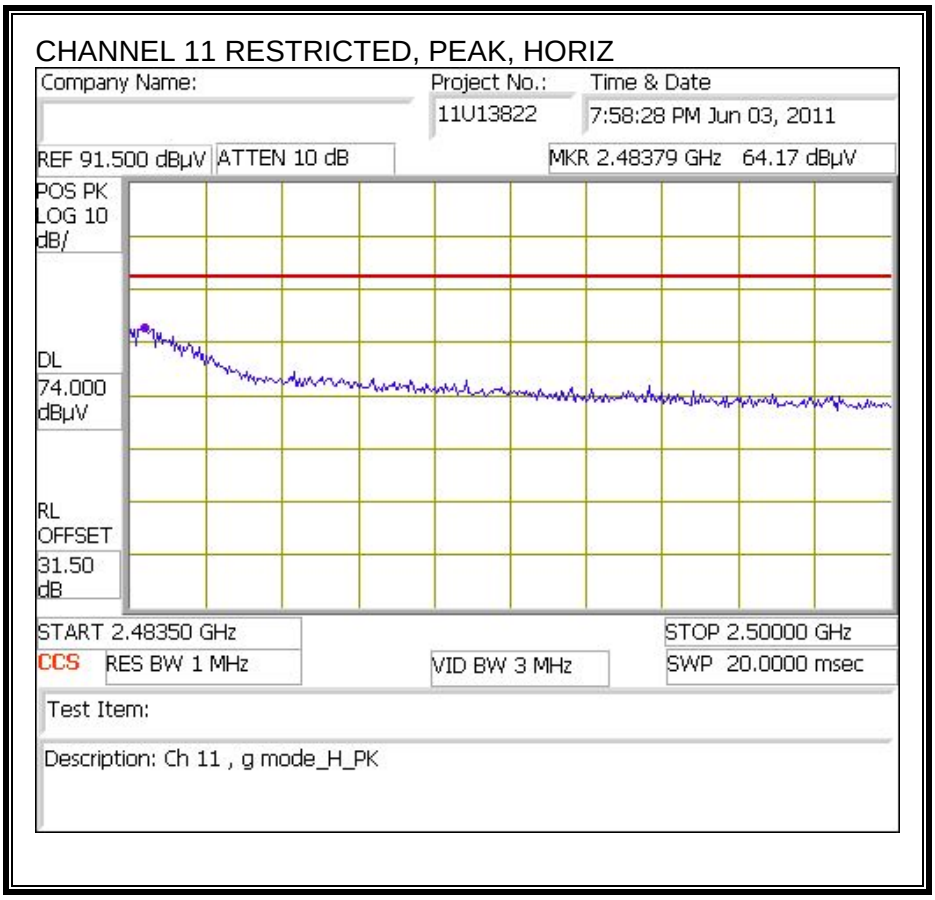


CHANNEL 10 RESTRICTED, AVG, VERT

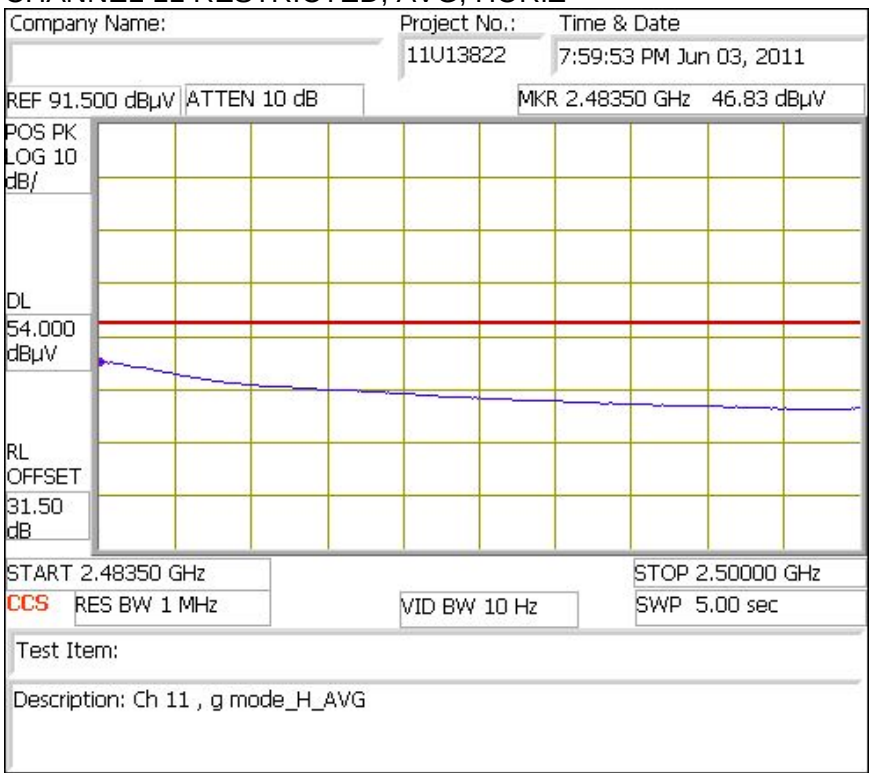


Channel 11

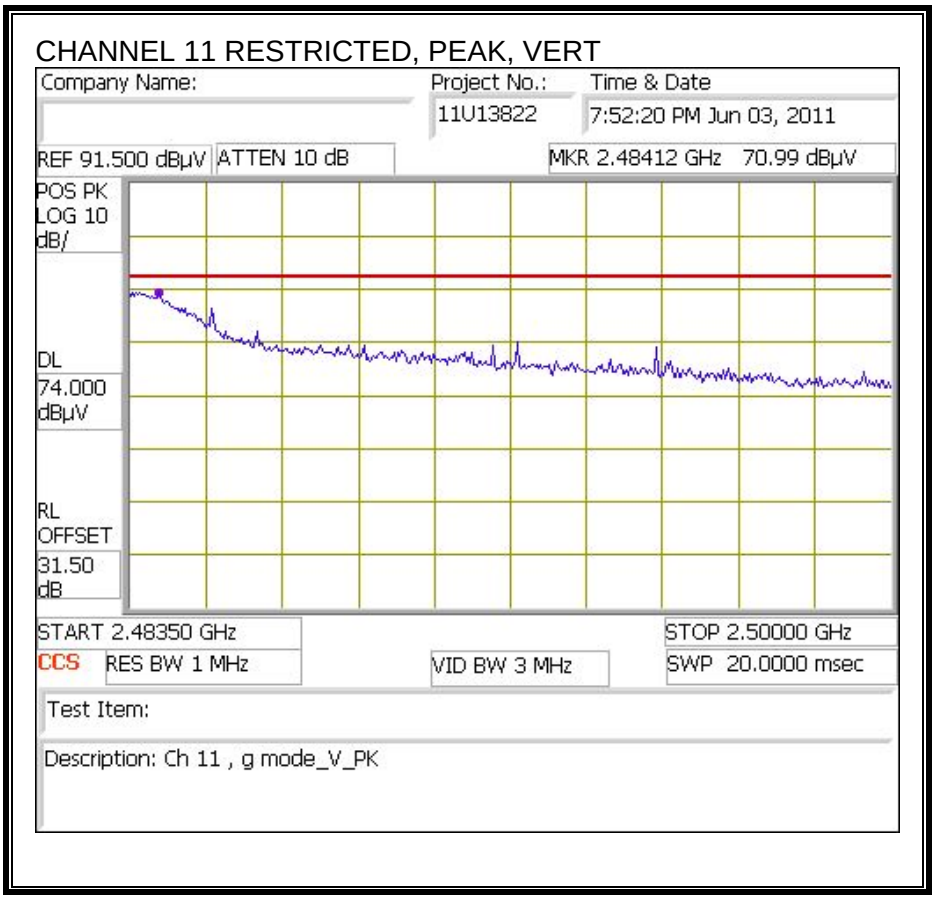
RESTRICTED BANDEDGE (CHANNEL11, HORIZONTAL)



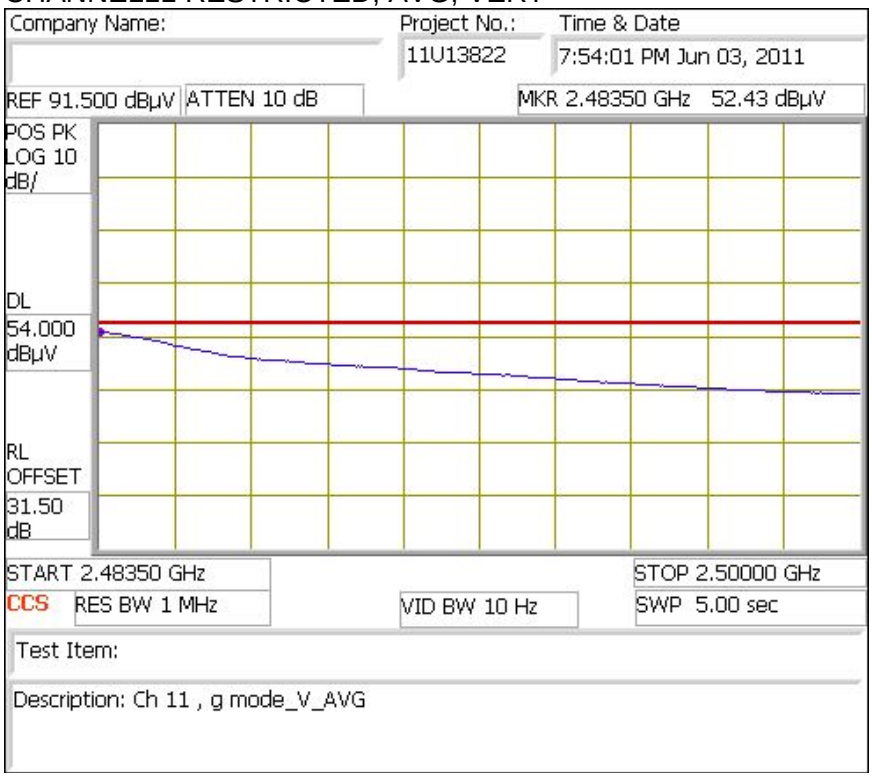
CHANNEL 11 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (CHANNEL 11, VERTICAL)



CHANNEL11 RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company:
Project #: 11U13822
Date: 6/4/11
Test Engineer: Thanh Nguyen
Configuration: EUT , remote SHEEVA Plug USB, support Laptop
Mode: Transmit g mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T145 Agilent 3008A0056	T88 Miteq 26-40GHz	T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch															
4.824	3.0	36.9	26.1	32.8	5.8	-34.8	0.0	0.0	40.7	29.8	74	54	-33.3	-24.2	V
4.824	3.0	40.9	26.0	32.8	5.8	-34.8	0.0	0.0	44.6	29.7	74	54	-29.4	-24.3	H
Mid Ch															
4.874	3.0	40.0	26.7	32.8	5.8	-34.9	0.0	0.0	43.7	30.5	74	54	-30.3	-23.5	V
7.311	3.0	40.2	26.4	35.2	7.3	-34.7	0.0	0.0	48.0	34.2	74	54	-26.0	-19.8	Noise floor
4.874	3.0	43.3	30.7	32.8	5.8	-34.9	0.0	0.0	47.1	34.5	74	54	-26.9	-19.5	H
7.311	3.0	40.4	26.8	35.2	7.3	-34.7	0.0	0.0	48.2	34.6	74	54	-25.8	-19.4	Noise floor
High Ch															
4.924	3.0	41.3	27.3	32.8	5.9	-34.9	0.0	0.0	45.1	31.2	74	54	-28.9	-22.8	V
7.386	3.0	47.4	33.4	35.3	7.3	-34.6	0.0	0.0	55.4	41.4	74	54	-18.6	-12.6	V
4.924	3.0	44.6	32.1	32.8	5.9	-34.9	0.0	0.0	48.4	35.9	74	54	-25.6	-18.1	H
7.386	3.0	41.3	28.3	35.3	7.3	-34.6	0.0	0.0	49.3	36.3	74	54	-24.7	-17.7	H
No other emissions were detected above the system noise floor.															

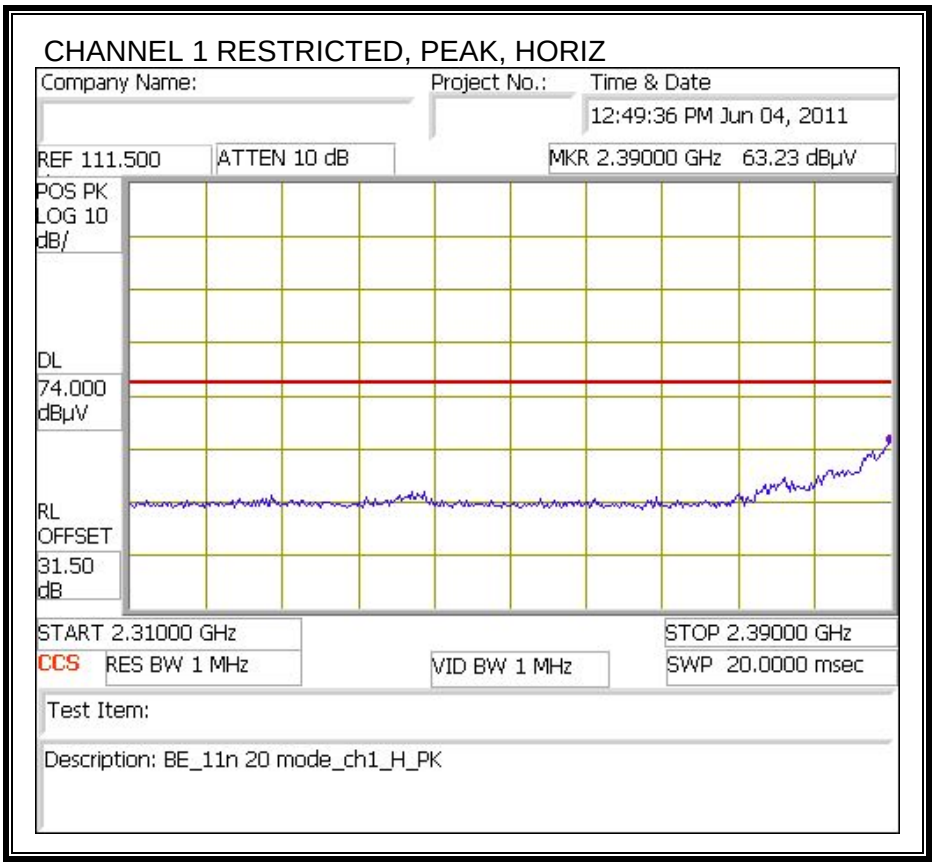
Rev. 07.22.09

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

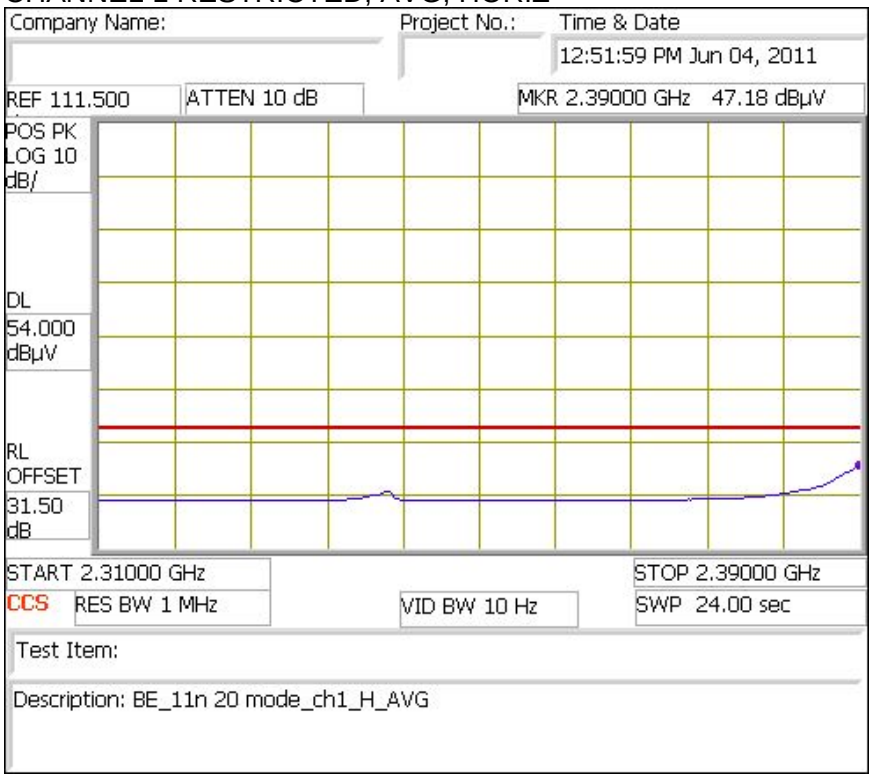
8.2.3. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel 1

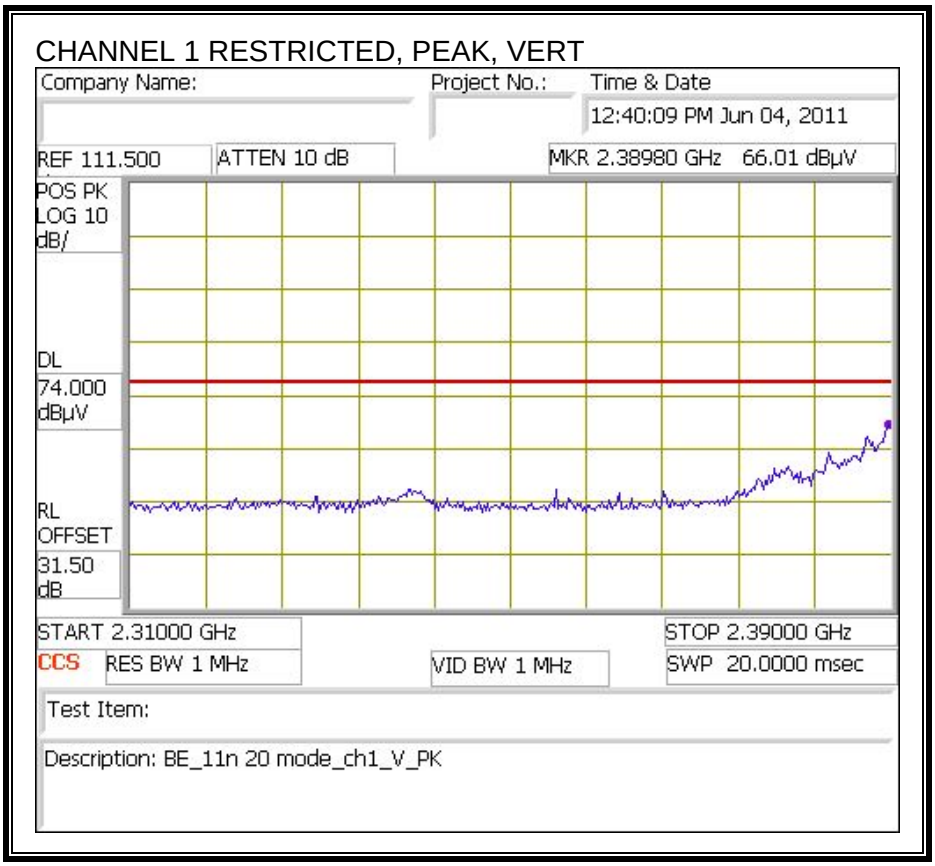
RESTRICTED BANDEDGE (CHANNEL1, HORIZONTAL)



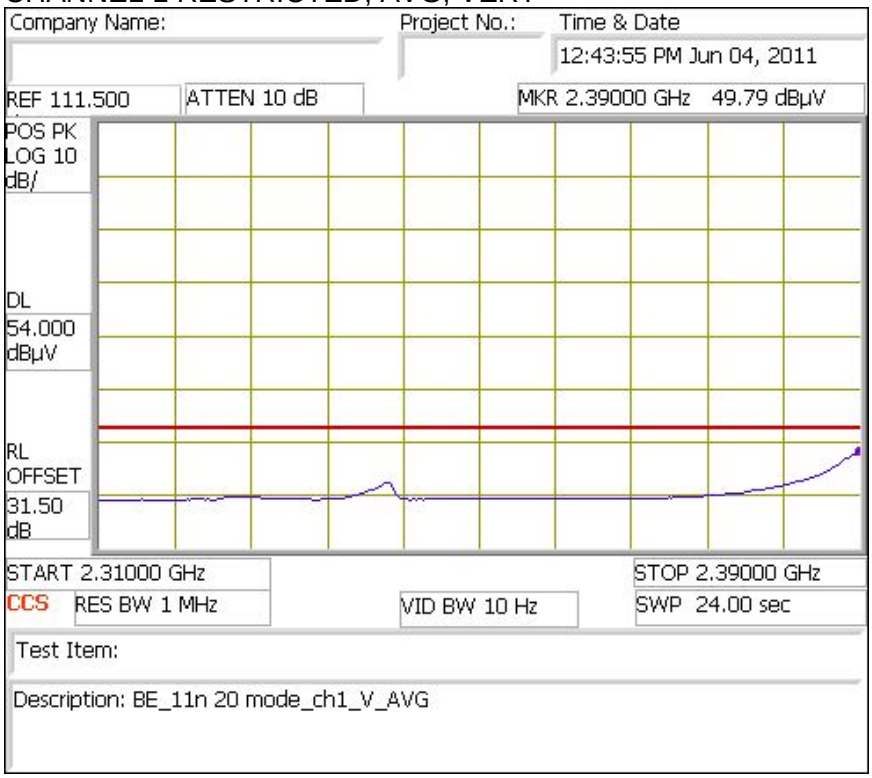
CHANNEL 1 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (CHANNEL 1, VERTICAL)

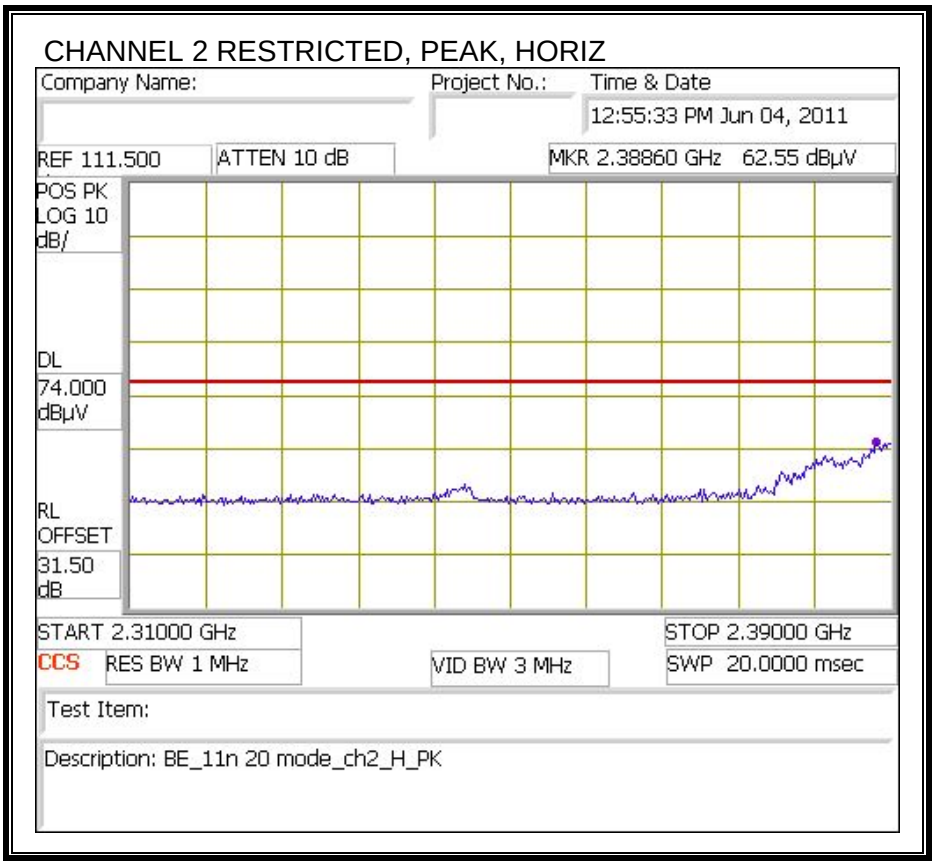


CHANNEL 1 RESTRICTED, AVG, VERT

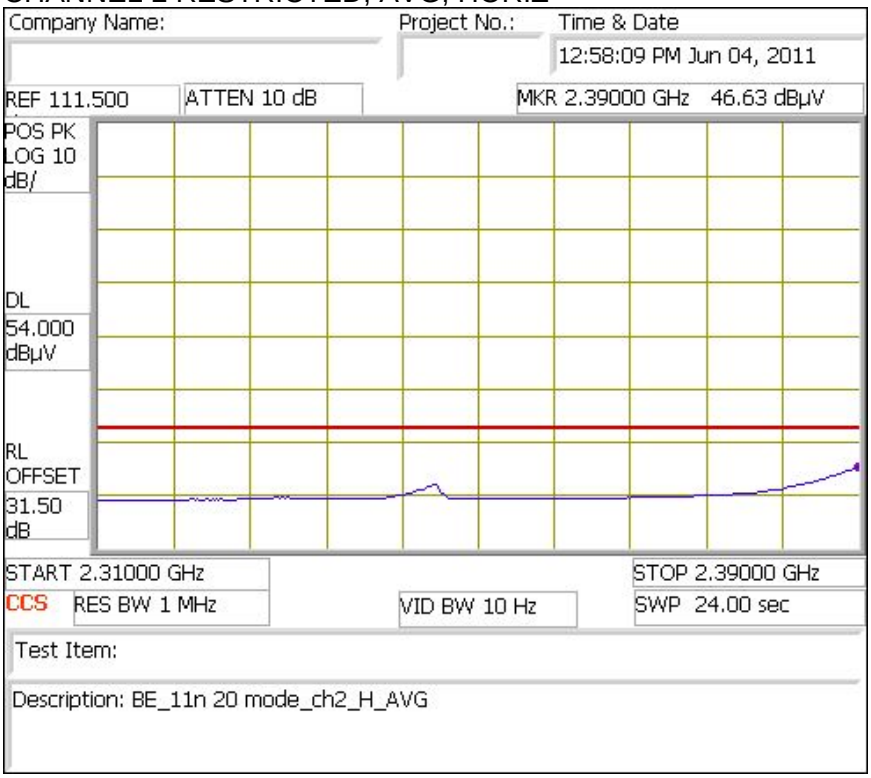


Channel 2

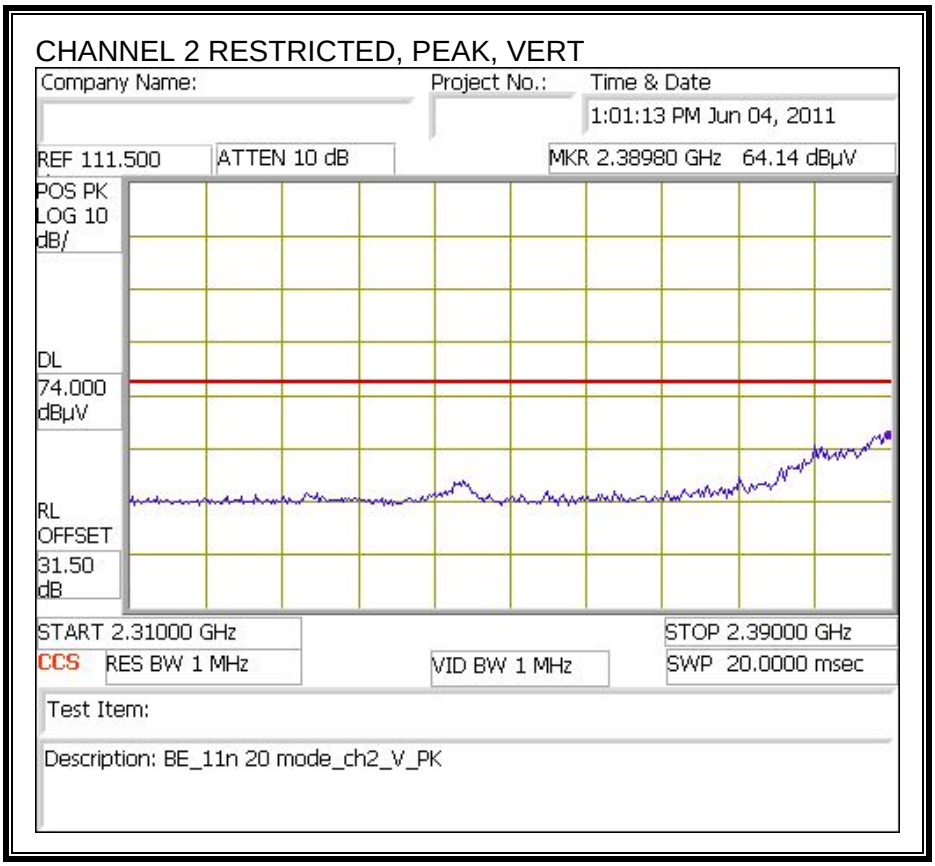
RESTRICTED BANDEDGE (CHANNEL2, HORIZONTAL)



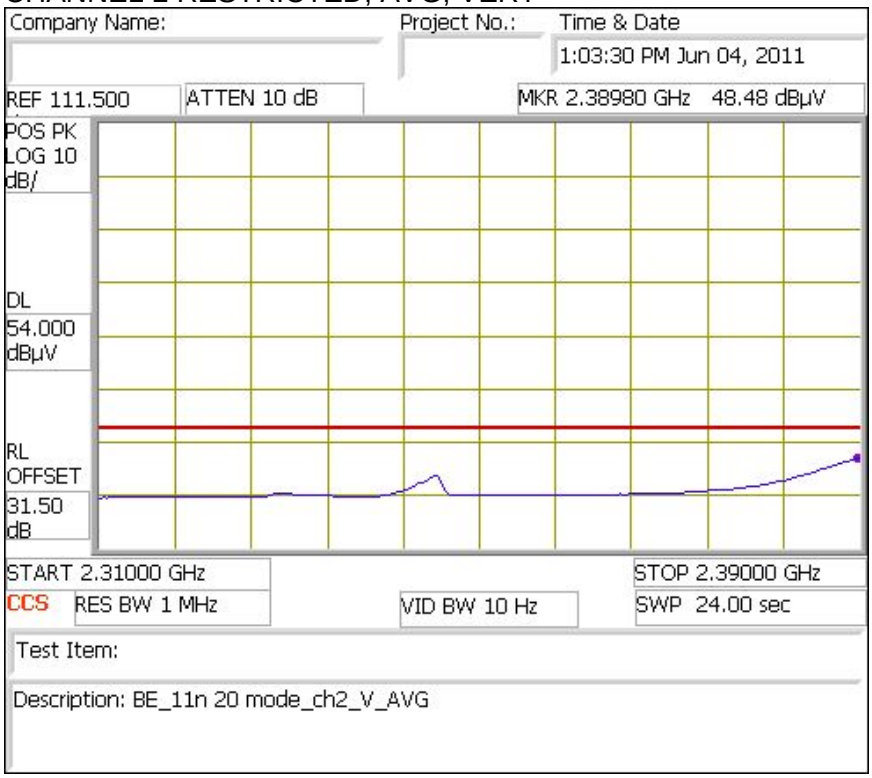
CHANNEL 2 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (CHANNEL 2, VERTICAL)

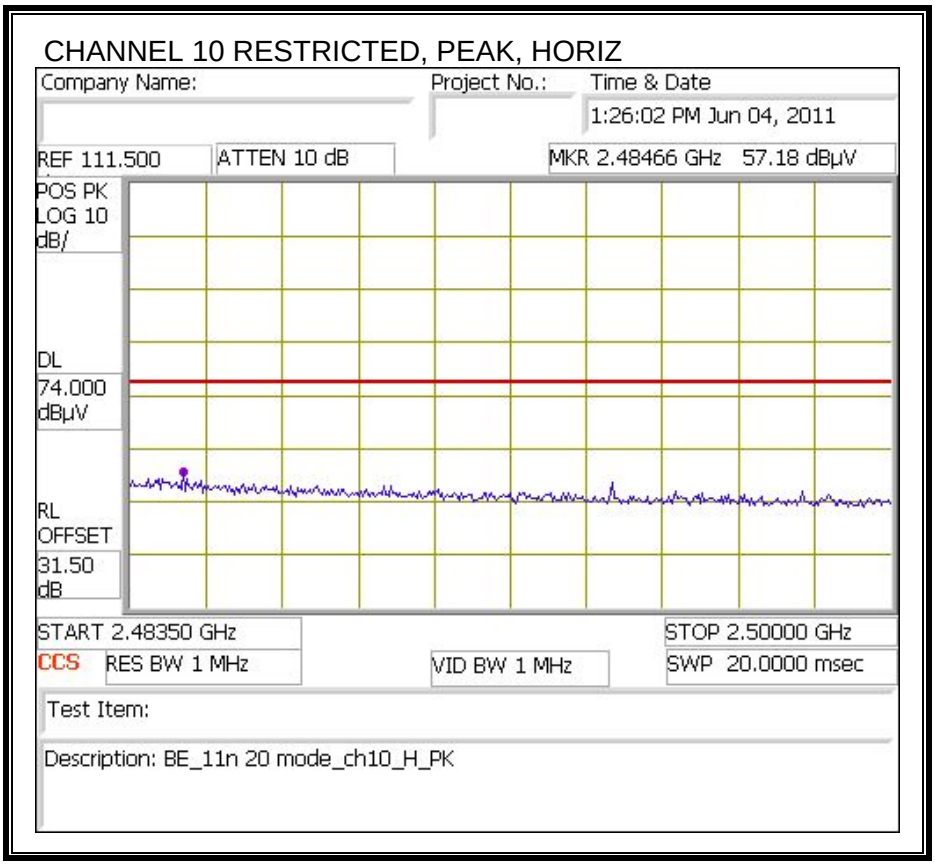


CHANNEL 2 RESTRICTED, AVG, VERT

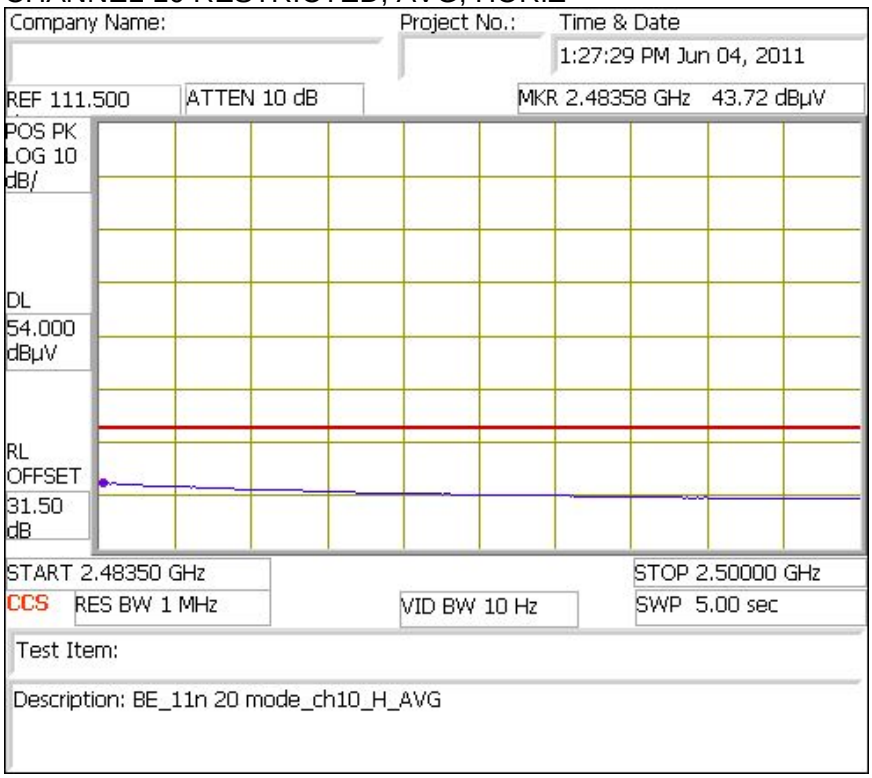


Channel 10

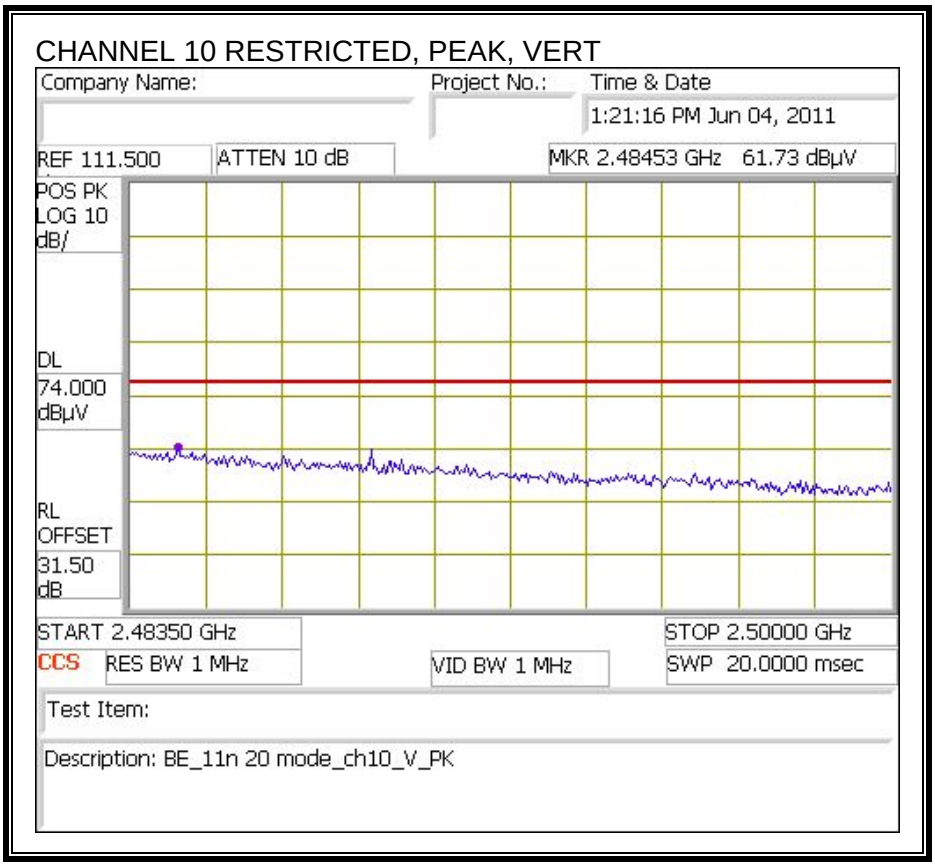
RESTRICTED BANDEDGE (HIGH CHANNEL 10, HORIZONTAL)



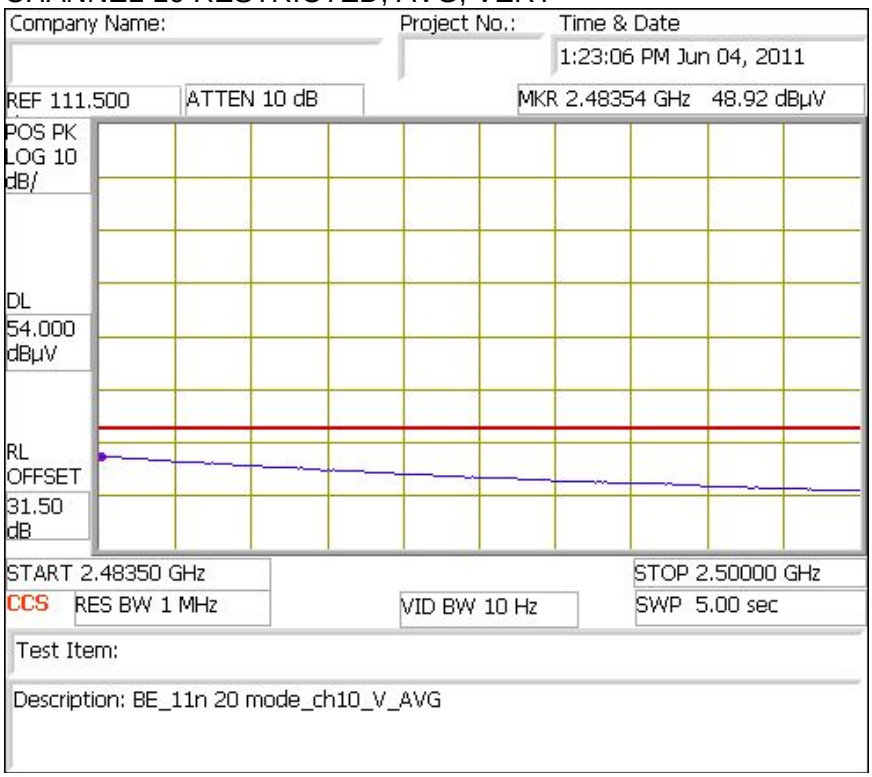
CHANNEL 10 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL10, VERTICAL)

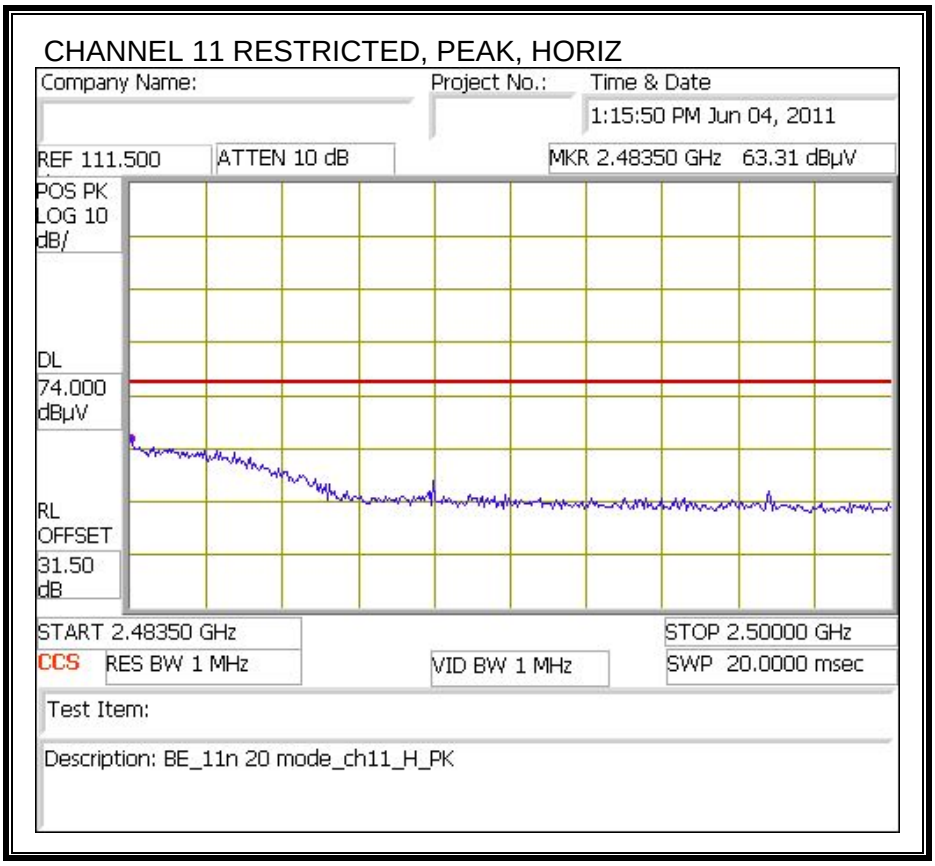


CHANNEL 10 RESTRICTED, AVG, VERT

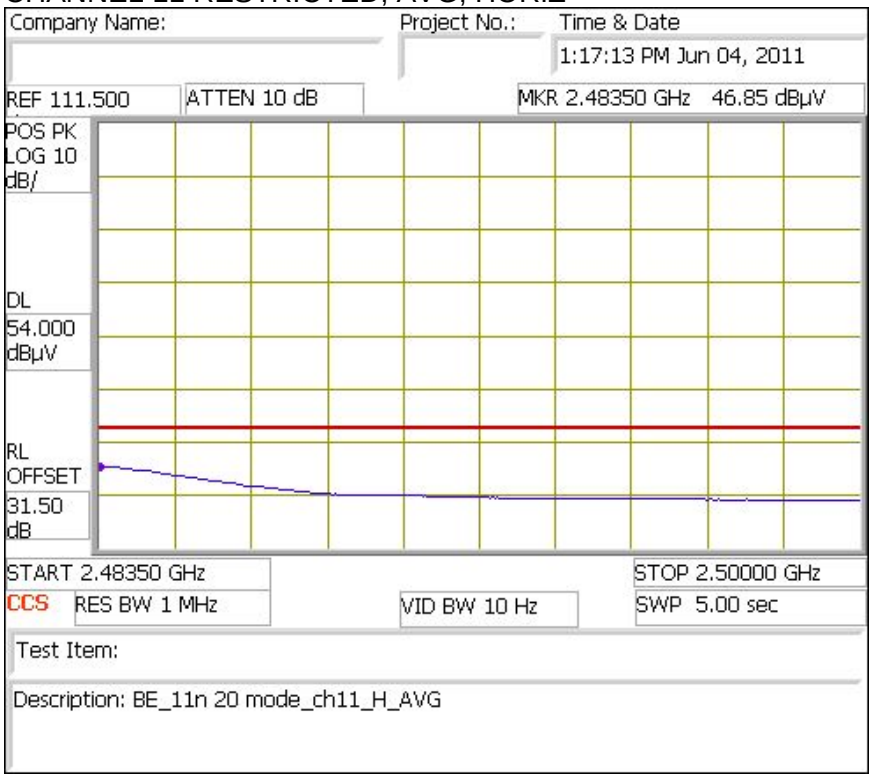


Channel 11

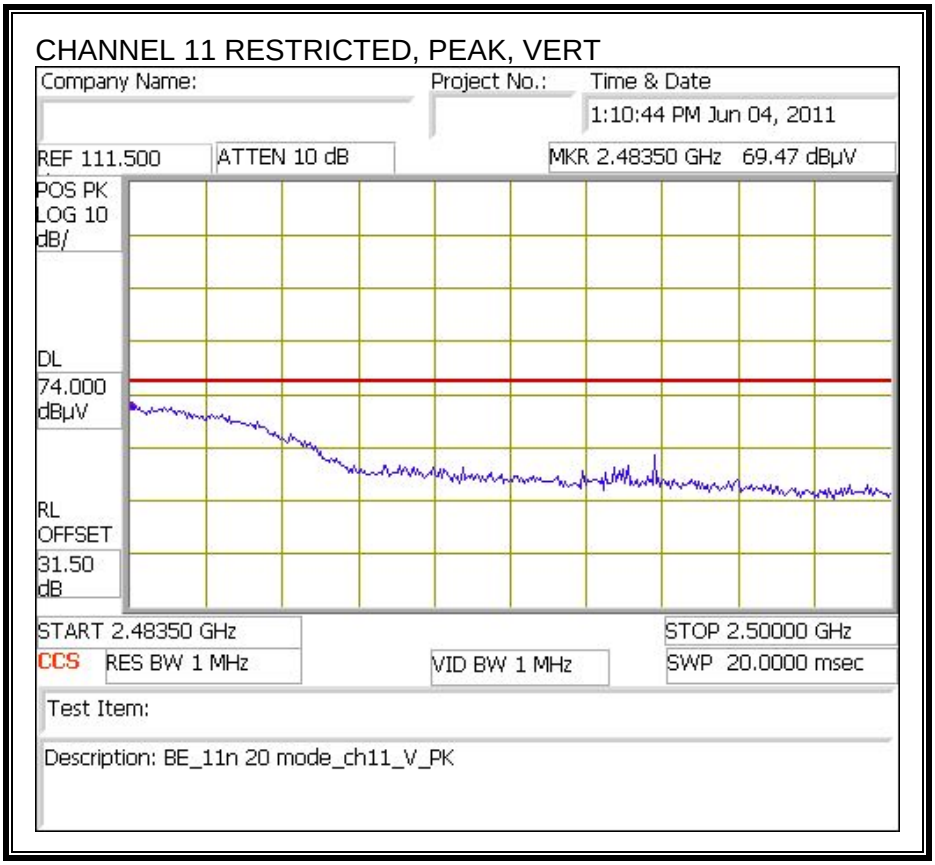
RESTRICTED BANDEDGE (HIGH CHANNEL 11, HORIZONTAL)



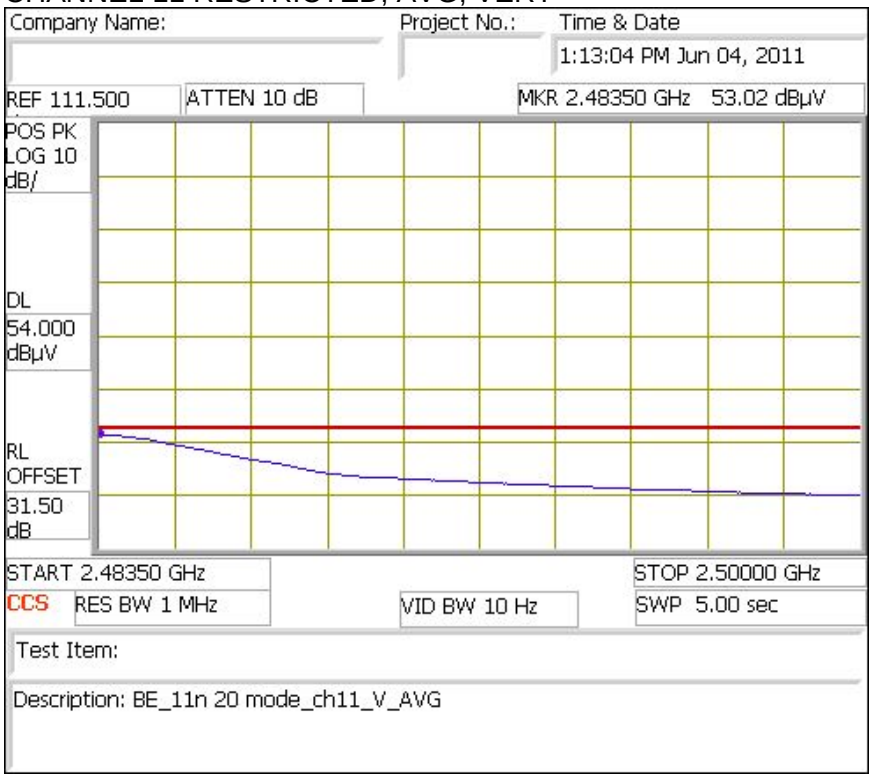
CHANNEL 11 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL11, VERTICAL)



CHANNEL 11 RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company:
Project #: 11U13822
Date: 6/4/11
Test Engineer: Thanh Nguyen
Configuration: EUT , remote SHEEVA Plug USB, support Laptop
Mode: Transmit 11n 20 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T145 Agilent 3008A0056	T88 Miteq 26-40GHz	T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch set															
4.824	3.0	39.8	26.0	32.8	5.8	-34.8	0.0	0.0	43.5	29.7	74	54	-30.5	-24.3	V
4.824	3.0	39.3	26.0	32.8	5.8	-34.8	0.0	0.0	43.0	29.7	74	54	-31.0	-24.3	H
Mid Ch															
4.874	3.0	40.7	27.4	32.8	5.8	-34.9	0.0	0.0	44.5	31.1	74	54	-29.5	-22.9	V
7.311	3.0	41.2	26.2	35.2	7.3	-34.7	0.0	0.0	49.0	34.0	74	54	-25.0	-20.0	Noise floo
4.874	3.0	44.3	31.4	32.8	5.8	-34.9	0.0	0.0	48.1	35.2	74	54	-25.9	-18.8	H
7.311	3.0	41.3	28.6	35.2	7.3	-34.7	0.0	0.0	49.1	36.4	74	54	-24.9	-17.6	Noise floo
High Ch															
4.924	3.0	41.7	28.4	32.8	5.9	-34.9	0.0	0.0	45.6	32.2	74	54	-28.4	-21.8	V
7.386	3.0	48.2	33.5	35.3	7.3	-34.6	0.0	0.0	56.2	41.5	74	54	-17.8	-12.5	Noise floo
4.924	3.0	45.3	31.6	32.8	5.9	-34.9	0.0	0.0	49.2	35.4	74	54	-24.8	-18.6	H
7.386	3.0	42.6	30.6	35.3	7.3	-34.6	0.0	0.0	50.5	38.5	74	54	-23.5	-15.5	Noise floo
No other emissions were detected above the system noise floor.															

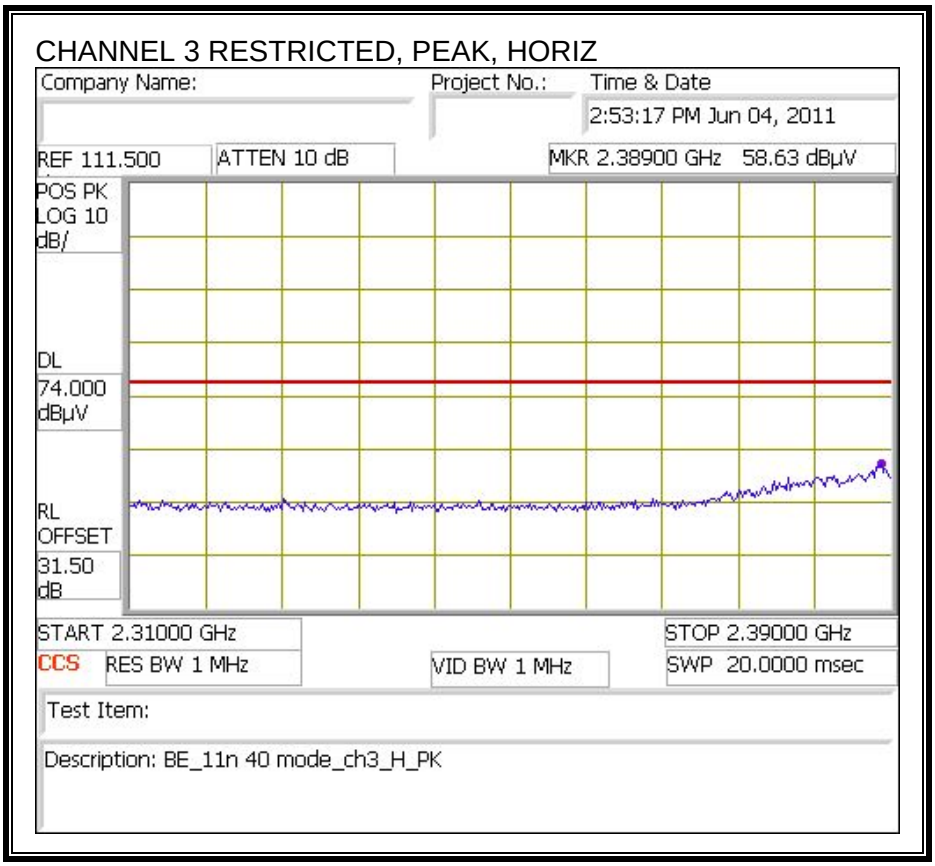
Rev. 07.22.09

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

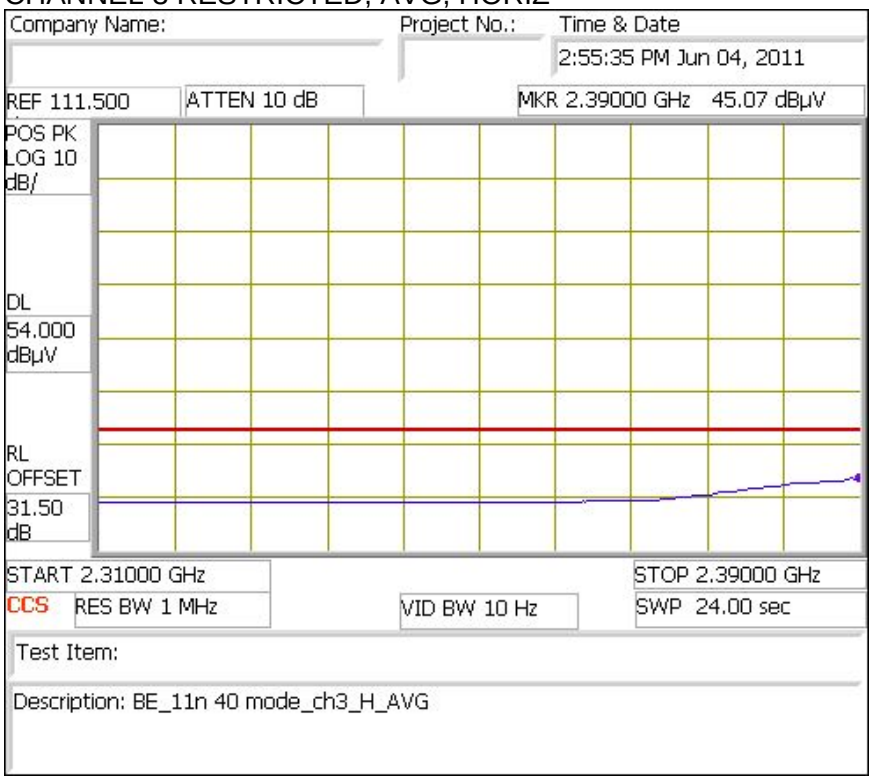
8.2.4. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 2.4 GHz BAND

Channel 3

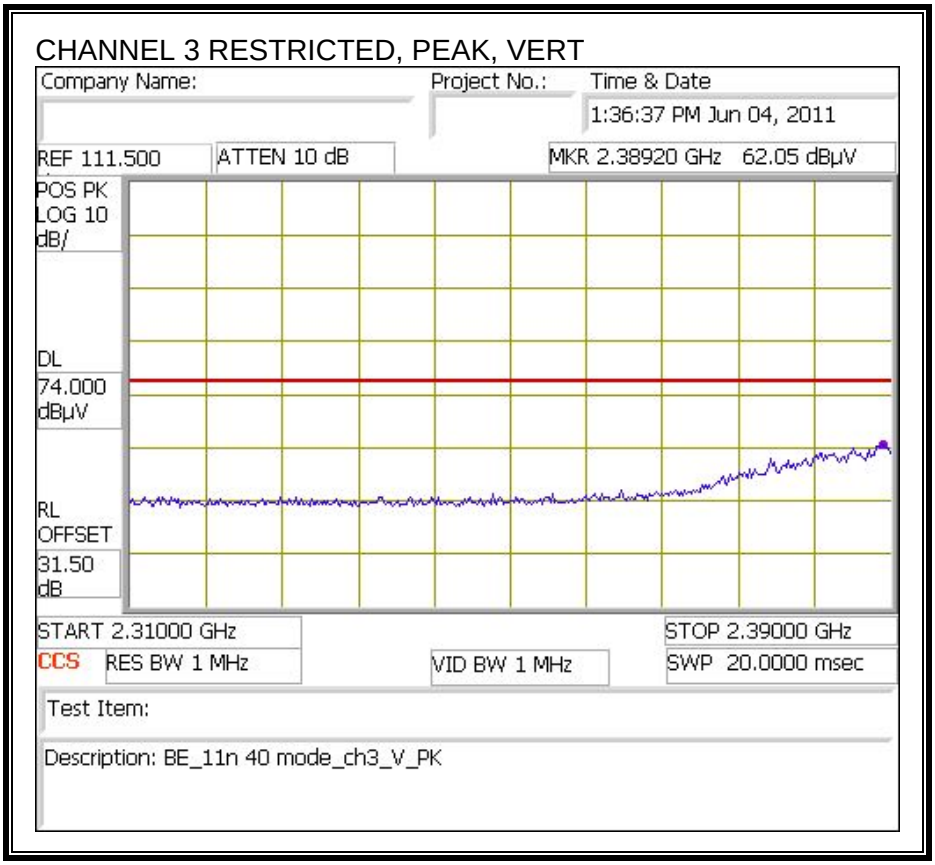
RESTRICTED BANDEDGE (CHANNEL 3, HORIZONTAL)



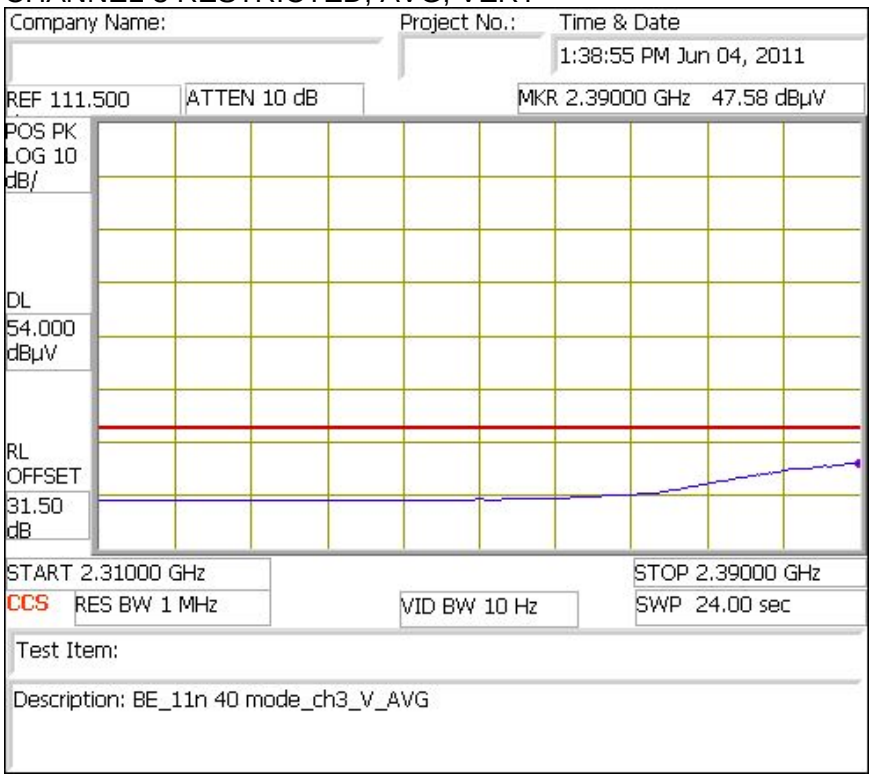
CHANNEL 3 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (CHANNEL 3, VERTICAL)

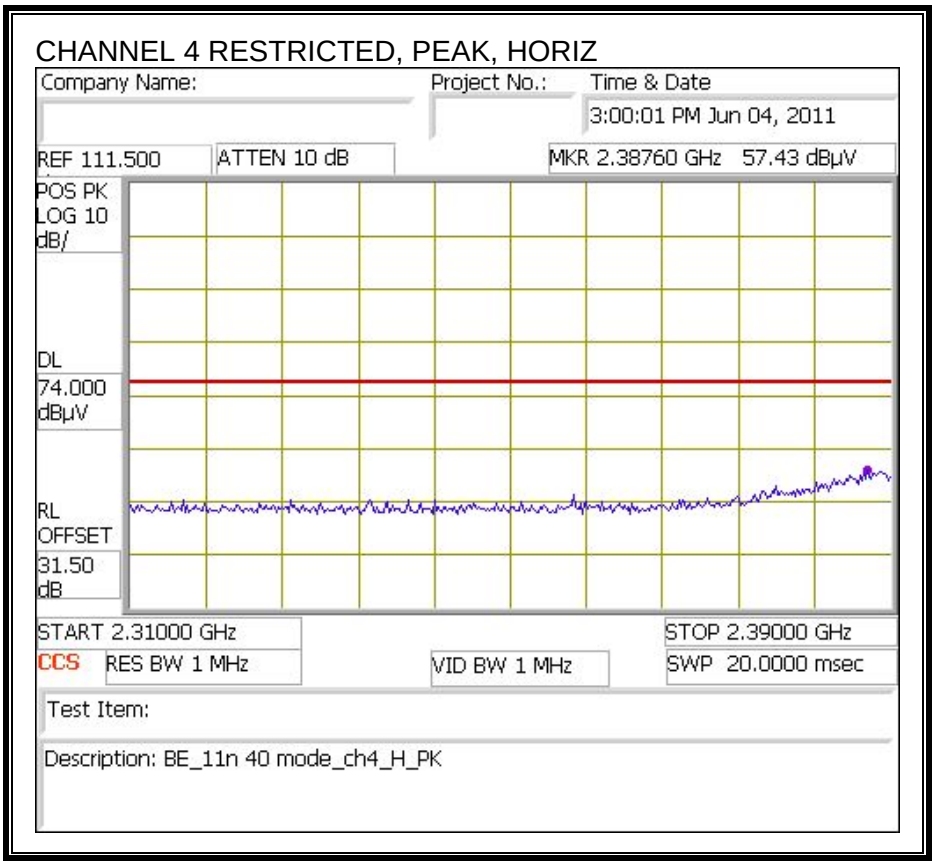


CHANNEL 3 RESTRICTED, AVG, VERT

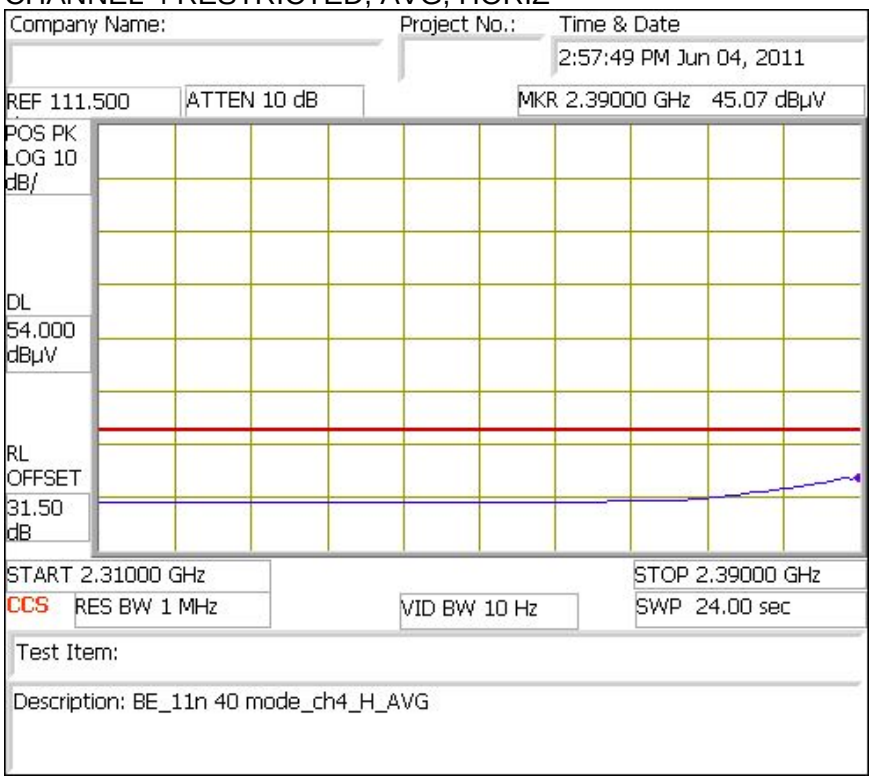


Channel 4

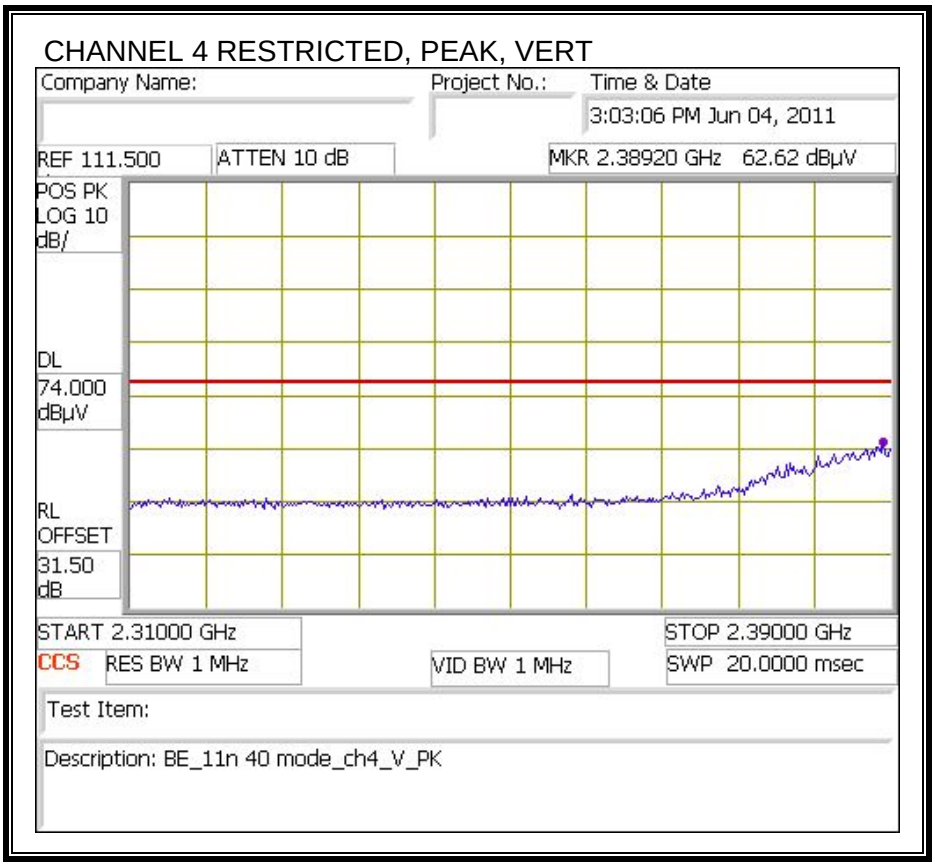
RESTRICTED BANDEDGE (CHANNEL 4, HORIZONTAL)



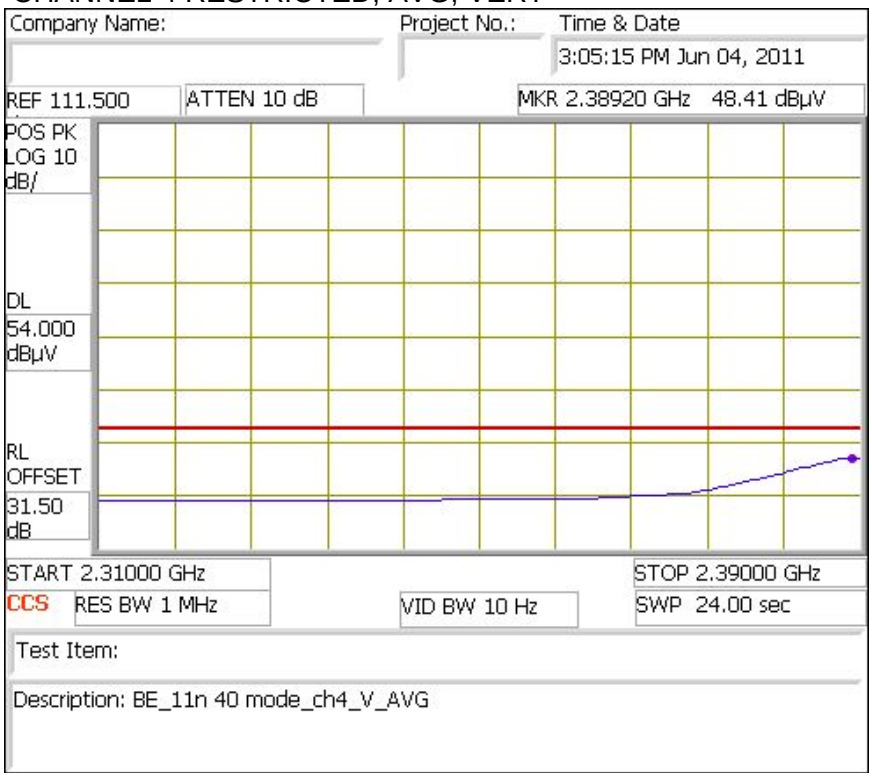
CHANNEL 4 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (CHANNEL 4, VERTICAL)

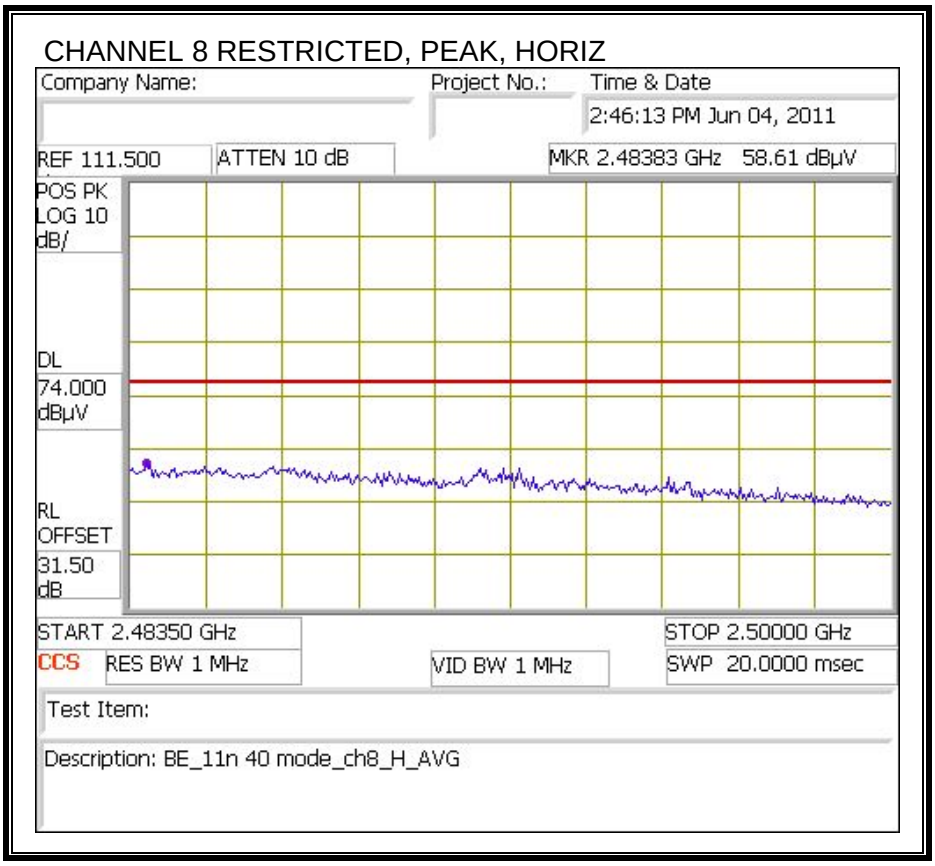


CHANNEL 4 RESTRICTED, AVG, VERT



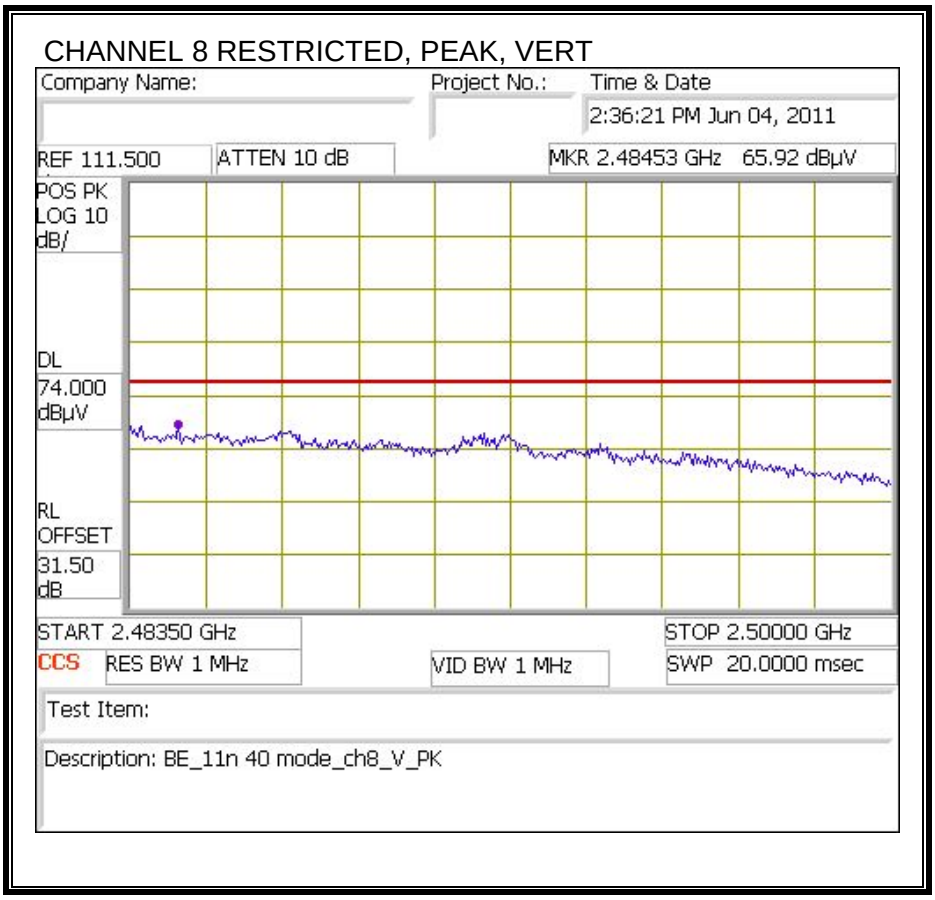
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

Channel 8



CHANNEL 8 RESTRICTED, AVG, HORIZ

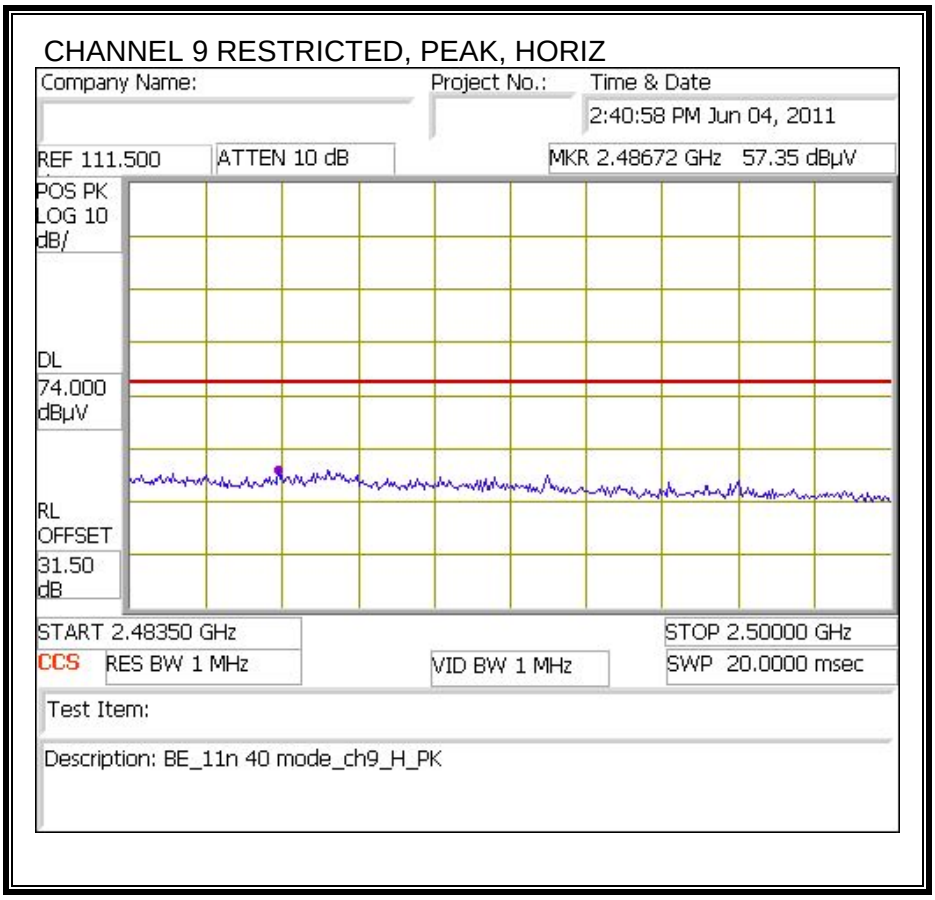
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



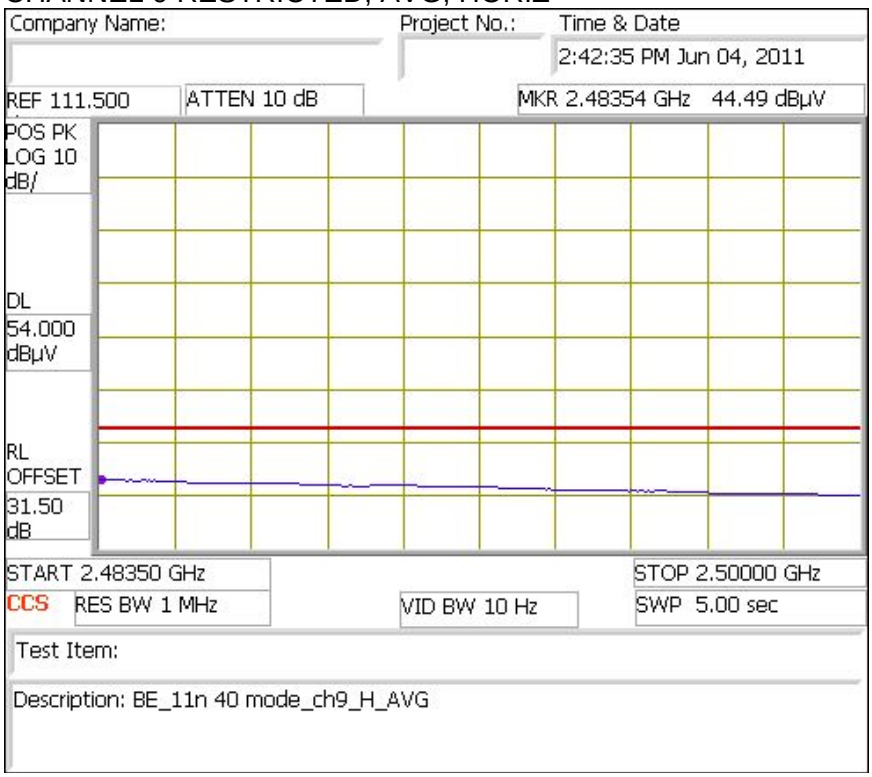
CHANNEL 8 RESTRICTED, AVG, VERT

Channel 9

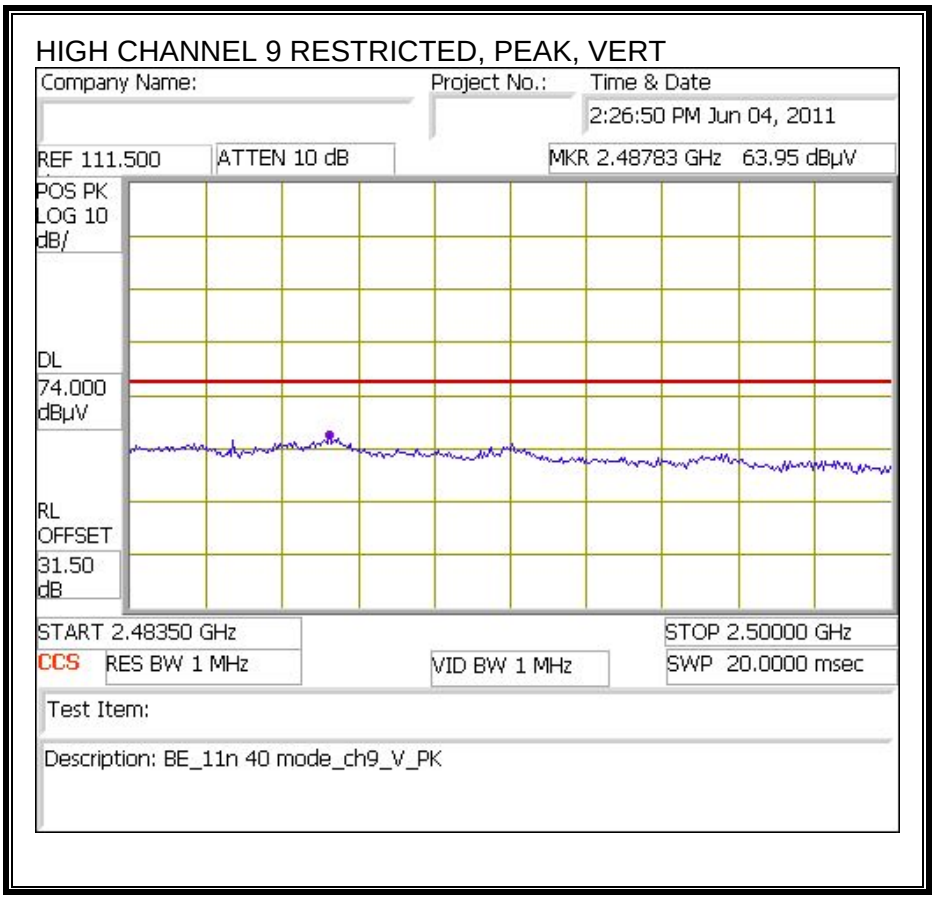
RESTRICTED BANDEDGE (HIGH CHANNEL 9, HORIZONTAL)



CHANNEL 9 RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL 9, VERTICAL)



HIGH CHANNEL 9 RESTRICTED, AVG, VERT

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company:
Project #: 11U13822
Date: 6/4/11
Test Engineer: Thanh Nguyen
Configuration: EUT , remote SHEEVA Plug USB, support Laptop
Mode: Transmit 11n 40 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T145 Agilent 3008A0056	T88 Miteq 26-40GHz	T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements RBW=VBW=1MHz
Average Measurements RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch															
4.844	3.0	38.1	24.1	32.8	5.8	-34.8	0.0	0.0	41.8	27.8	74	54	-32.2	-26.2	V
7.266	3.0	36.5	23.0	35.1	7.2	-34.7	0.0	0.0	44.2	30.7	74	54	-29.8	-23.3	Noise floo
4.844	3.0	39.3	26.0	32.8	5.8	-34.8	0.0	0.0	43.0	29.8	74	54	-31.0	-24.2	H
7.266	3.0	36.6	22.8	35.1	7.2	-34.7	0.0	0.0	44.3	30.5	74	54	-29.7	-23.5	Noise floo
Mid Ch															
4.874	3.0	37.3	24.0	32.8	5.8	-34.9	0.0	0.0	41.1	27.8	74	54	-32.9	-26.2	V
7.311	3.0	36.0	23.2	35.2	7.3	-34.7	0.0	0.0	43.8	31.0	74	54	-30.2	-23.0	Noise floo
4.874	3.0	37.8	23.8	32.8	5.8	-34.9	0.0	0.0	41.6	27.6	74	54	-32.4	-26.4	H
7.311	3.0	36.2	23.1	35.2	7.3	-34.7	0.0	0.0	44.0	30.9	74	54	-30.0	-23.1	Noise floo
High Ch															
4.869	3.0	37.7	23.9	32.8	5.8	-34.9	0.0	0.0	41.4	27.7	74	54	-32.6	-26.3	V
7.356	3.0	36.3	23.3	35.3	7.3	-34.6	0.0	0.0	44.2	31.2	74	54	-29.8	-22.8	Noise floo
4.869	3.0	37.5	23.9	32.8	5.8	-34.9	0.0	0.0	41.2	27.7	74	54	-32.8	-26.3	H
7.356	3.0	36.3	23.3	35.3	7.3	-34.6	0.0	0.0	44.2	31.2	74	54	-29.8	-22.8	Noise floo
No other emissions were detected above the system noise floor.															

Rev. 07.22.09

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

8.2.5. TX ABOVE 1 GHz FOR 802.11a MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company:
Project #: 11U13822
Date: 6/4/11
Test Engineer: Thanh Nguyen
Configuration: EUT with extended cable, remote SHEEVA Plug USB, support Laptop
Mode: Transmit 802.11 a mode, 5.8GHz

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B	T88 Miteq 26-40GHz	T89; ARA 18-26GHz; S/N:1049	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch 5745MHz															
11.490	3.0	47.1	37.0	38.0	9.5	-32.5	0.0	0.7	62.8	52.7	74	54	-11.2	-1.3	V
11.490	3.0	45.0	34.1	38.0	9.5	-32.5	0.0	0.7	60.7	49.8	74	54	-13.3	-4.2	H
Mid Ch 5785MHz															
11.570	3.0	47.1	37.3	38.1	9.5	-32.5	0.0	0.7	62.9	53.1	74	54	-11.1	-0.9	V
11.570	3.0	45.8	36.5	38.1	9.5	-32.5	0.0	0.7	61.6	52.3	74	54	-12.4	-1.7	H
High Ch 5825MHz															
11.650	3.0	47.0	36.1	38.2	9.6	-32.5	0.0	0.7	62.9	52.1	74	54	-11.1	-1.9	V
11.650	3.0	45.0	35.2	38.2	9.6	-32.5	0.0	0.7	60.9	51.1	74	54	-13.1	-2.9	H
No other emissions were detected above the system noise floor.															

Rev. 07.22.09

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

8.2.6. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company:
Project #: 11U13822
Date: 6/4/11
Test Engineer: Thanh Nguyen
Configuration: EUT with extended cable, remote SHEEVA Plug USB, support Laptop
Mode: Transmit 802.11n HT 20, 5.8GHz

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B	T88 Miteq 26-40GHz	T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch 5745MHz															
11.490	3.0	47.3	37.1	38.0	9.5	-32.5	0.0	0.7	63.0	52.8	74	54	-11.0	-1.2	V
11.490	3.0	47.6	37.5	38.0	9.5	-32.5	0.0	0.7	63.2	53.2	74	54	-10.8	-0.8	H
Mid Ch 5785MHz															
11.570	3.0	45.6	35.3	38.1	9.5	-32.5	0.0	0.7	61.4	51.1	74	54	-12.6	-2.9	V
11.570	3.0	44.9	35.6	38.1	9.5	-32.5	0.0	0.7	60.7	51.4	74	54	-13.3	-2.6	H
High Ch 5825MHz															
11.650	3.0	46.2	35.6	38.2	9.6	-32.5	0.0	0.7	62.2	51.6	74	54	-11.8	-2.4	V
11.650	3.0	44.9	34.4	38.2	9.6	-32.5	0.0	0.7	60.8	50.3	74	54	-13.2	-3.7	H
No other emissions were detected above the system noise floor.															

Rev. 07.22.09

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

8.2.7. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company:
Project #: 11U13822
Date: 6/23/11
Test Engineer: Thanh Nguyen
Configuration: EUT with extended cable, Remote SHEEVA Plug USB, support Laptop
Mode: Transmit 802.11 HT 40 mode, 5.8GHz

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B	T88 Miteq 26-40GHz	T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch 5755MHz															
11.510	3.0	46.4	36.0	38.1	9.5	-32.5	0.0	0.7	62.2	51.7	74	54	-11.8	-2.3	V
11.510	3.0	41.7	30.0	38.1	9.5	-32.5	0.0	0.7	57.4	45.7	74	54	-16.6	-8.3	H
Mid Ch 5795MHz															
11.590	3.0	46.4	35.8	38.1	9.5	-32.5	0.0	0.7	62.3	51.6	74	54	-11.7	-2.4	V
11.590	3.0	41.8	29.3	38.1	9.5	-32.5	0.0	0.7	57.6	45.2	74	54	-16.4	-8.8	H
No other emissions were detected above the system noise floor.															

Rev. 07.22.09

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

8.3. RECEIVER ABOVE 1 GHz

8.3.1. RECEIVER ABOVE 1 GHz FOR 20 MHz BANDWIDTH

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company:
Project #: 11U13822
Date: 6/8/2011
Test Engineer: Thanh Nguyen
Configuration: EUT , remote Laptop, USB stimulator.
Mode: Receive 20Mhz

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			RX RSS 210

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.105	3.0	58.4	48.4	24.8	2.5	-38.1	0.0	0.0	47.6	37.6	74	54	-26.4	-16.4	V
1.195	3.0	55.8	32.6	25.1	2.6	-38.0	0.0	0.0	45.6	22.3	74	54	-28.4	-31.7	V
1.935	3.0	54.5	33.7	27.6	3.4	-37.0	0.0	0.0	48.5	27.7	74	54	-25.5	-26.3	V
2.135	3.0	56.0	35.7	27.9	3.6	-36.7	0.0	0.0	50.8	30.5	74	54	-23.2	-23.5	V
2.395	3.0	52.7	33.5	28.0	3.8	-36.3	0.0	0.0	48.2	29.1	74	54	-25.8	-24.9	V
2.780	3.0	51.6	40.4	29.1	4.2	-36.1	0.0	0.0	48.8	37.5	74	54	-25.2	-16.5	V
1.185	3.0	57.5	47.4	25.1	2.6	-38.0	0.0	0.0	47.1	37.0	74	54	-26.9	-17.0	H
1.940	3.0	49.9	30.3	27.6	3.4	-37.0	0.0	0.0	43.9	24.3	74	54	-30.1	-29.7	H
2.390	3.0	52.9	32.5	28.0	3.8	-36.3	0.0	0.0	48.4	28.0	74	54	-25.6	-26.0	H
2.790	3.0	51.0	36.5	29.1	4.2	-36.0	0.0	0.0	48.2	33.7	74	54	-25.8	-20.3	H
No other emissions were detected above the system noise floor															

Rev. 07.22.09

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

8.3.2. RECEIVER ABOVE 1 GHz FOR 40 MHz BANDWIDTH

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company:
Project #: 11U13822
Date: 6/8/2011
Test Engineer: Thanh Nguyen
Configuration: EUT , remote Laptop, USB stimulator.
Mode: Receive 40Mhz

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			RX RSS 210

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.000	3.0	56.0	47.1	24.5	2.4	-38.3	0.0	0.0	44.6	35.7	74	54	-29.4	-18.3	V
1.100	3.0	59.7	34.5	24.8	2.5	-38.1	0.0	0.0	48.9	23.7	74	54	-25.1	-30.3	V
1.463	3.0	48.2	31.0	26.0	2.9	-37.6	0.0	0.0	39.5	22.3	74	54	-34.5	-31.7	V
1.850	3.0	54.1	32.2	27.3	3.3	-37.1	0.0	0.0	47.6	25.7	74	54	-26.4	-28.3	V
2.200	3.0	48.7	31.6	27.9	3.6	-36.6	0.0	0.0	43.7	26.5	74	54	-30.3	-27.5	V
3.000	3.0	46.6	41.9	29.7	4.3	-35.9	0.0	0.0	44.7	40.0	74	54	-29.3	-14.0	V
3.792	3.0	41.1	28.4	31.6	5.0	-35.2	0.0	0.0	42.5	29.7	74	54	-31.5	-24.3	V
1.185	3.0	50.1	33.5	25.1	2.6	-38.0	0.0	0.0	39.8	23.1	74	54	-34.2	-30.9	H
2.135	3.0	50.7	32.4	27.9	3.6	-36.7	0.0	0.0	45.4	27.1	74	54	-28.6	-26.9	H
2.390	3.0	48.1	30.4	28.0	3.8	-36.3	0.0	0.0	43.6	25.9	74	54	-30.4	-28.1	H
2.785	3.0	48.5	34.6	29.1	4.2	-36.1	0.0	0.0	45.7	31.7	74	54	-28.3	-22.3	H
No other emissions were detected above the system noise floor															

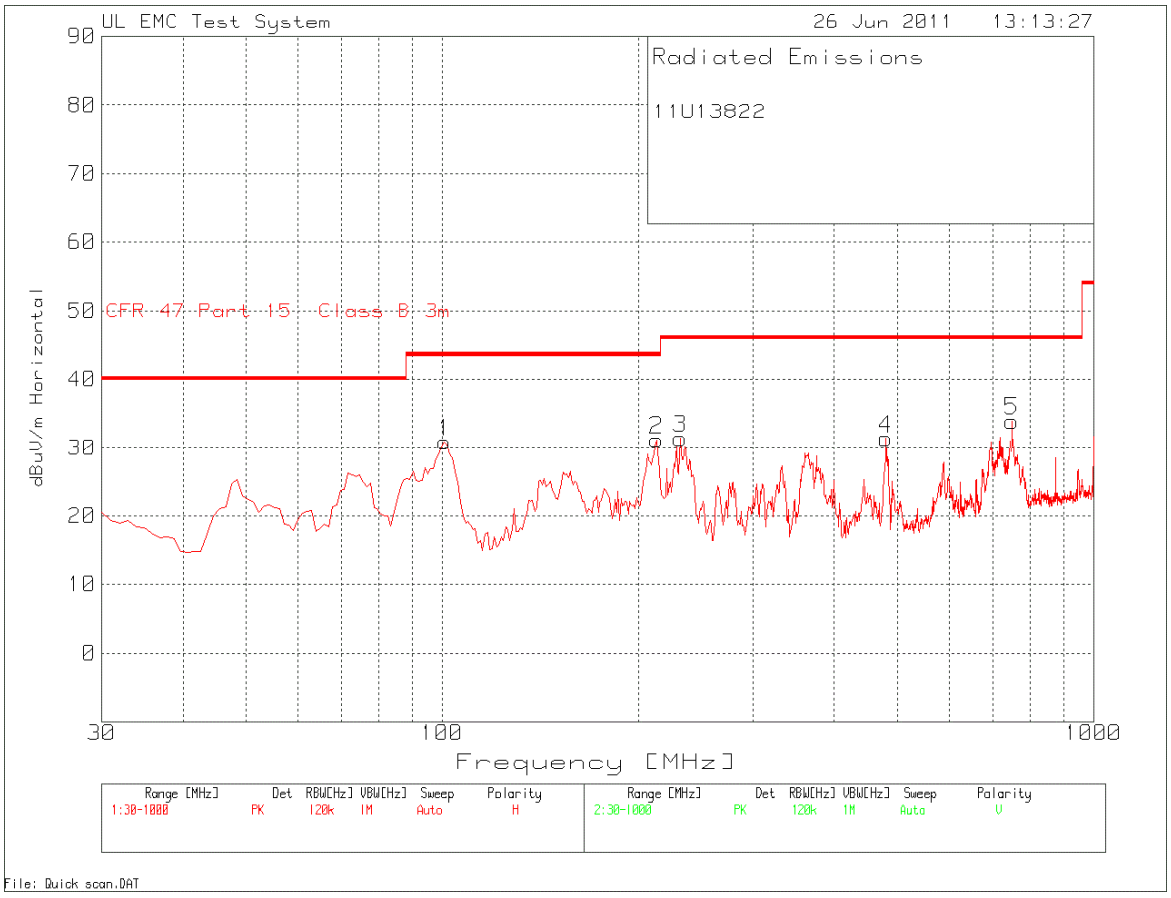
Rev. 07.22.09

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

8.4. WORST-CASE BELOW 1 GHz

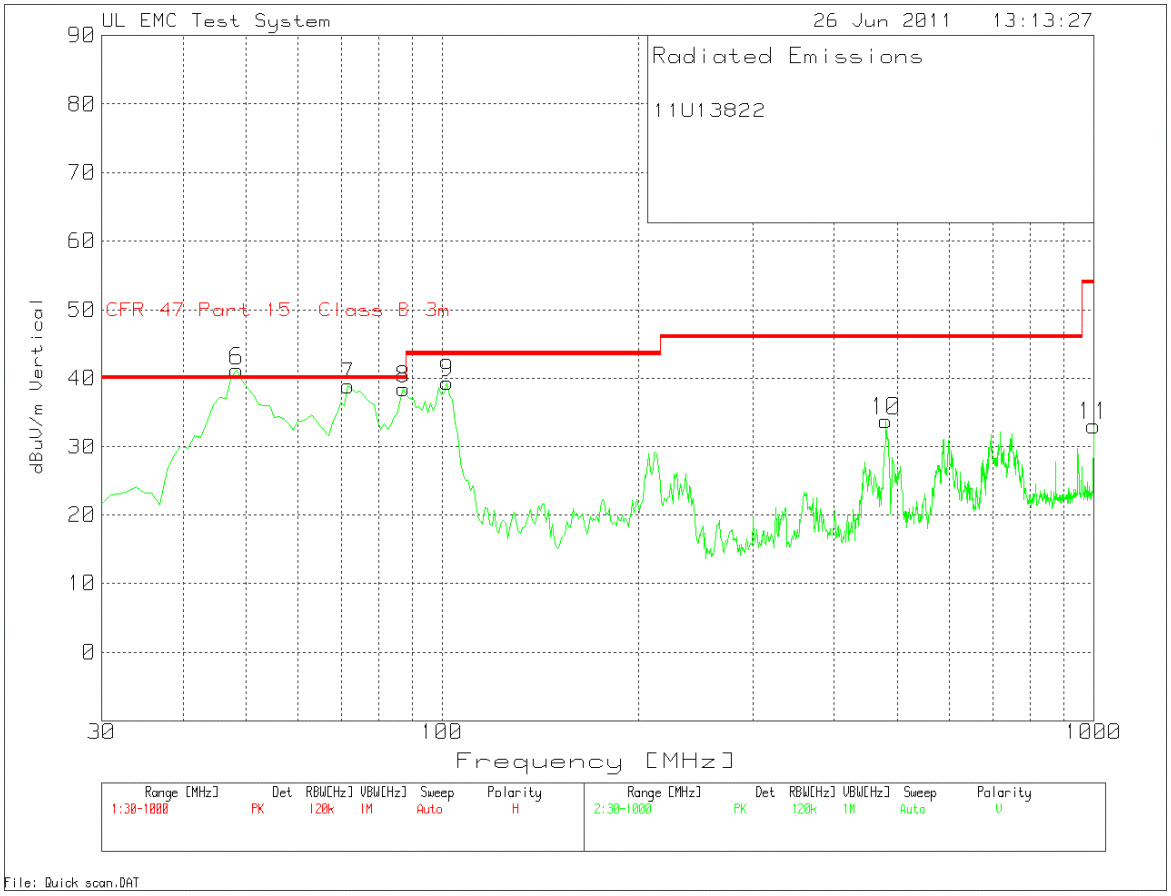
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

VERTICAL PLOT



EMI DATA

11U13822

Range 1 30 - 1000MHz

Test	Meter	Detector	5m A	5m A T64	5m A T122	dBuV/m	CFR 47	Margin	Height [cr	Polarity
Frequency	Reading		Cable loss	Factor	Factor		Part 15			
							Class B 3m			
100.81	47.83	PK	1.1	-28.2	10.1	30.83	43.5	-12.67	100	Horz
213.33	45.77	PK	1.6	-28.1	11.9	31.17	43.5	-12.33	100	Horz
231.76	46	PK	1.6	-28.1	11.9	31.4	46	-14.6	100	Horz
480.08	40.24	PK	2.4	-27.7	16.4	31.34	46	-14.66	100	Horz
749.74	37.64	PK	3.1	-27.1	20.3	33.94	46	-12.06	100	Horz

Range 2 30 - 1000MHz

Test	Meter	Detector	5m A	5m A T64	5m A T122	dBuV/m	CFR 47	Margin	Height [cr	Polarity
Frequency	Reading		Cable loss	Factor	Factor		Part 15			
							Class B 3m			
48.43	59.55	PK	0.8	-28.3	9.1	41.15	40	1.15	109	Vert
48.43	54.36	QP	0.8	-28.3	9.1	35.96	40	-4.04	109	Vert
71.71	58.34	PK	0.9	-28.2	7.9	38.94	40	-1.06	109	Vert
71.71	58.34	QP	0.9	-28.2	7.9	35.27	40	-4.73	109	Vert
87.23	58.18	PK	1	-28.2	7.5	38.48	40	-1.52	109	Vert
87.23	52.93	QP	1	-28.2	7.5	33.23	40	-6.77	109	Vert
101.78	56.2	PK	1.1	-28.2	10.3	39.4	43.5	-4.1	109	Vert
480.08	42.71	PK	2.4	-27.7	16.4	33.81	46	-12.19	109	Vert
1000	34.84	PK	3.5	-27.7	22.5	33.14	54	-20.86	109	Vert

8.5. DIGITAL DEVICE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (DIGITAL DEVICE)

EMISSIONS DATA

11U13822

Range: 1 30 - 1000MHz

Test Frequency	Meter Reading	Detector	3m Cable loss [dB]	3m T15 PreAmp [dB]	3m Bilog below 1GHz [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
33.88	40.13	PK	0.6	-28.3	18.1	30.53	40	-9.47	98	Horz
94.02	50.32	PK	1	-28.1	8.1	31.32	43.5	-12.18	98	Horz
185.2	53.67	PK	1.3	-27.7	11	38.27	43.5	-5.23	98	Horz
219.15	56.41	PK	1.5	-27.6	11.9	42.21	46	-3.79	98	Horz
362.71	53.73	PK	2	-27.6	14.4	42.53	46	-3.47	98	Horz
487.84	50.64	QP	2.2	-28.4	16.6	41.05	46	-4.95	98	Horz
549.92	52.67	PK	2.4	-28.5	17.6	44.17	46	-1.83	98	Horz
549.92	49.42	QP	2.4	-28.5	17.6	40.92	-6.08	-1.83	98	Horz
607.15	50.28	PK	2.6	-28.4	18.5	42.98	46	-3.02	98	Horz
874.87	45.71	PK	3.1	-27.8	21.8	42.81	46	-3.19	98	Horz
1000	42.83	PK	3.3	-27.3	22.7	41.53	54	-12.47	98	Horz

Range: 2 30 - 1000MHz

Test Frequency	Meter Reading	Detector	3m Cable loss [dB]	3m T15 PreAmp [dB]	3m Bilog below 1GHz [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
81.41	55.96	PK	1	-28.1	7.9	36.76	40	-3.24	101	Vert
125.06	51.75	PK	1.1	-27.9	14.1	39.05	43.5	-4.45	101	Vert
250.19	53.18	PK	1.6	-27.4	11.8	39.18	46	-6.82	101	Vert
499.48	49.97	PK	2.2	-28.5	16.8	40.47	46	-5.53	101	Vert
543.13	50.81	PK	2.4	-28.5	17.5	42.21	46	-3.79	101	Vert
624.61	49.63	PK	2.6	-28.4	18.6	42.43	46	-3.57	101	Vert
715.79	46.3	QP	2.8	-28.3	19.2	40	46	-6	101	Vert
799.21	43.32	PK	2.9	-28	20.9	39.12	46	-6.88	101	Vert
874.87	43.91	PK	3.1	-27.8	21.8	41.01	46	-4.99	101	Vert
1000	39.67	PK	3.3	-27.3	22.7	38.37	54	-15.63	101	Vert
51.34	53.73	QP	0.8	-28.2	9.1	39.75	40	-0.25	101	Vert

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

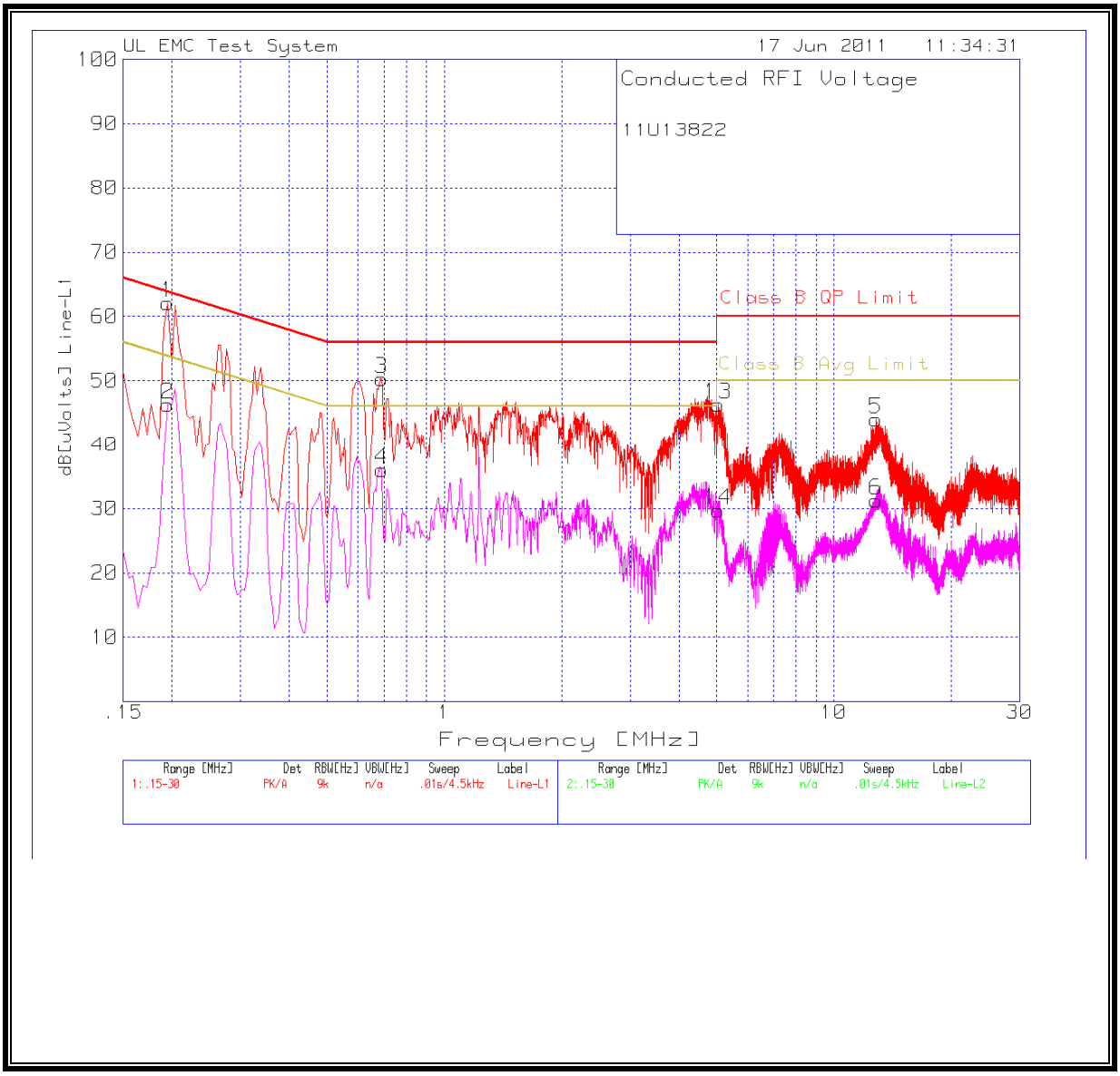
ANSI C63.4

RESULTS

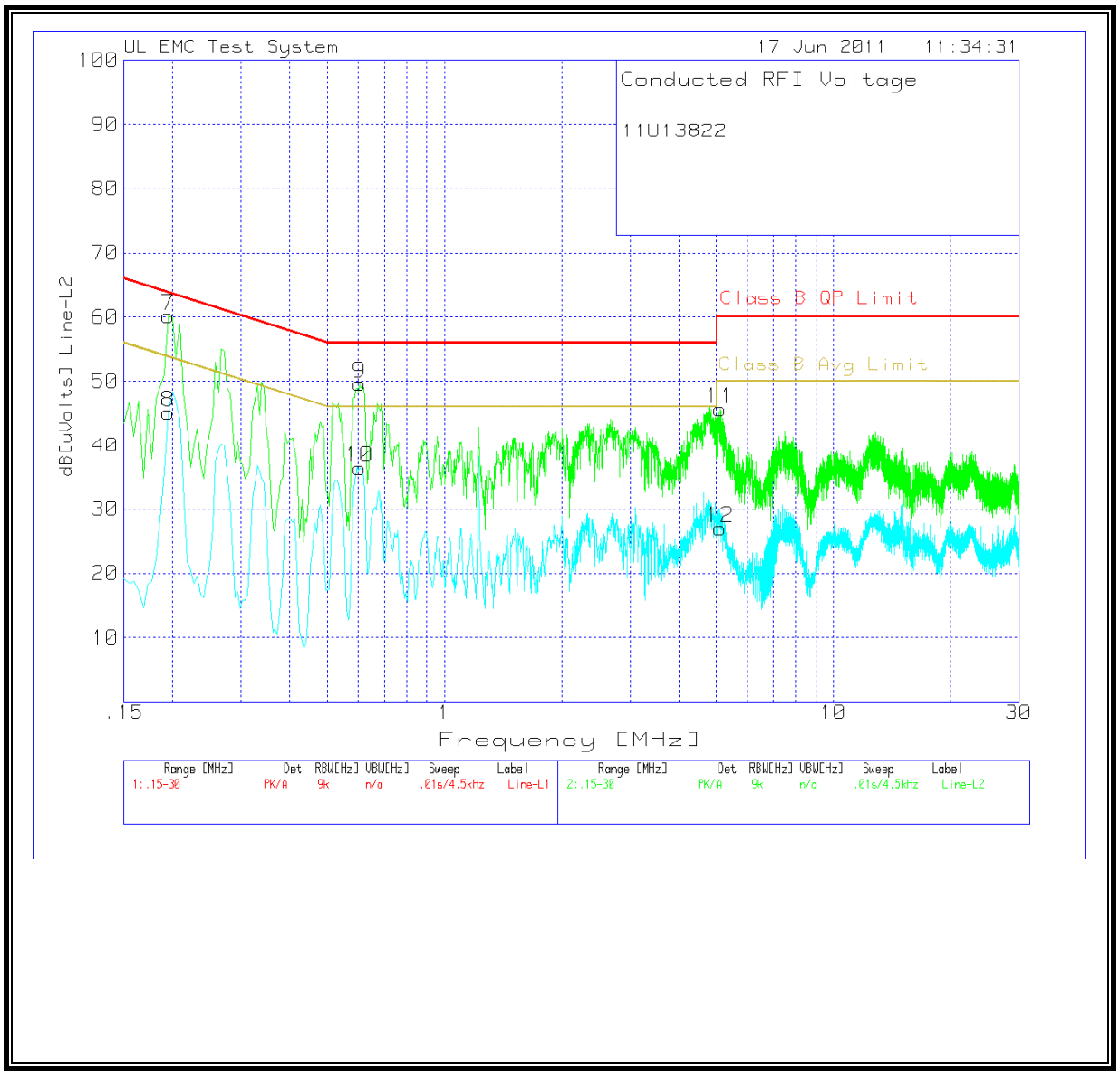
6 WORST EMISSIONS

11U13822							
Line-L1 .15 - 30MHz							
Test							
Frequency	Meter	Detector	dB[uVolts	Class B	Margin	Class B	Margin
	Reading			QP Limit		Avg Limit	
0.195							
0.195	62.06	PK	62.06	63.8	-1.74		
0.69	46.25	Av	46.25	63.8	-17.55	53.8	-7.55
0.69	50.33	PK	50.33	56	-5.67		
12.84	36.04	Av	36.04	56	-19.96	46	-9.96
12.84	43.97	PK	43.97	60	-16.03	50	-6.03
5.055	31.26	Av	31.26	60	-28.74	50	-18.74
5.055	46.25	PK	46.25	60	-13.75	50	-3.75
	29.73	Av	29.73	60	-30.27	50	-20.27
Line-L2 .15 - 30MHz							
Test							
Frequency	Meter	Detector	dB[uVolts	Class B	Margin	Class B	Margin
	Reading			QP Limit		Avg Limit	
0.195							
0.195	60.19	PK	60.19	63.8	-3.61		
0.6045	45.15	Av	45.15	63.8	-18.65	53.8	-8.65
0.6045	49.65	PK	49.65	56	-6.35		
5.127	36.4	Av	36.4	56	-19.6	46	-9.6
5.127	45.64	PK	45.64	60	-14.36	50	-4.36
	26.97	Av	26.97	60	-33.03	50	-23.03

LINE 1 RESULTS



LINE 2 RESULTS



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	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

* 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/m^2 is equivalent to 1 mW/cm^2.
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 = EIRP / (4 * Pi * D^2)

where

S = Power density in W/m^2
EIRP = Equivalent Isotropic Radiated Power in W
D = Separation distance in m

Power density in units of W/m^2 is converted to units of mWc/m^2 by dividing by 10.

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))

where

D = Separation distance in m
EIRP = Equivalent Isotropic Radiated Power in W
S = Power density in W/m^2

For multiple chain devices, and 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.

Total EIRP = (P1 * G1) + (P2 * G2) + ... + (Pn * Pn)

where

Px = Power of transmitter x
Gx = Numeric gain of antenna x

For multiple colocated transmitters operating simultaneously in frequency bands where different limits apply, a fraction of the exposure limit is established for each band, such that the sum of the fractions is less than or equal to one.

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

For mobile radio equipment operating in the cellular phone band, the lowest power density limit is calculated using the lowest frequency, as 824 MHz / 1500 = 0.55 mW/cm^2 (FCC) and 824 MHz / 150 = 5.5 W/m^2 (IC).

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

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

RESULTS

Single Chain and non-colocated transmitters								
Band	**Mode**	**Separation Distance (m)**	**Output Power (dBm)**	**Antenna Gain (dBi)**	**EIRP (dBm)**	**EIRP (W)**	**IC Power Density (W/m^2)**	**FCC Power Density (mW/cm^2)**
2.4 GHz	WLAN	0.20	23.04	2.50	25.54	0.36	0.71	0.071
5 GHz	WLAN	0.20	19.40	3.75	23.15	0.21	0.41	0.041