



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA AND LTE PHONE WITH BLUETOOTH AND WLAN

MODEL NUMBER: LG-P930, P930, LGP930

**FCC ID: BEJP930
IC: 2703C-P930**

REPORT NUMBER: 11U13917-1, Revision A

ISSUE DATE: AUGUST 24, 2011

Prepared for
**LG ELECTRONICS INC.
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS, NEW JERSEY 07632**

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



NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	07/18/11	Initial Issue	F. Ibrahim
A	08/24/11	Revised the report to add IC data	F. Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS, NEW JERSEY 07632

EUT DESCRIPTION: GSM/WCDMA and LTE PHONE with Bluetooth and WLAN

MODEL: LG-P930

SERIAL NUMBER: 106KPCA038187 for conducted sample &
106KPAE038176 for radiated sample

DATE TESTED: July 13 - August 23, 2011

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	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:



VIEN TRAN
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, and FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

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:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a smart phone with the feature of GSM/WCDMA and LTE PHONE with BLUETOOTH AND WLAN.

The radio module is manufactured by Broadcom Co.

5.2. 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	18.51	70.96
2412 - 2462	802.11g	20.55	113.50
2412 - 2462	802.11n HT20 SISO	19.17	82.60

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA (Planar Inverted F Antenna) with a maximum peak gain of -1.95 dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT software installed during testing was V07D_June 23, 2011

The test utility software used during testing was FTM Test.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1 GHz and power line conducted emissions were performed with the EUT set to the channel with highest output power.

For the fundamental investigation, since the EUT is a portable device that has three orientations; X, Y and Z orientations have been investigated, also with AC/DC adapter, and earphone, and the worst case was found to be at X orientation with AC/USB adapter and earphone.

Worst-case data rates used based on an input from the client were as follows:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n mode: MCS0

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG Electronics	STA-U13WV	VA11020019236	N/A
Ear Phone	LG Electronics	N/A	N/A	N/A

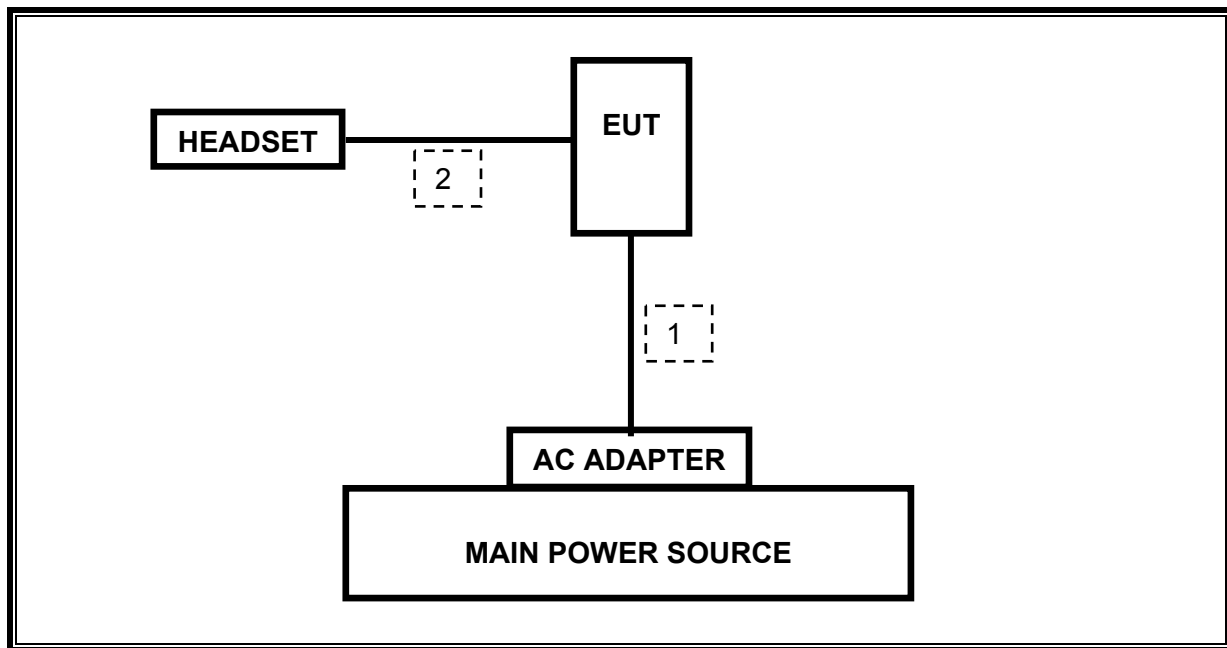
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	DC	1	MINI USB	Un-Shielded	1.0m	External ferrite added
2	AUDIO	1	MINI JACK	Un-Shielded	1.0m	Volume control on cable

TEST SETUP

The EUT is a stand-alone device and was tested with AC/USB adapter and earphone.

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
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/30/11
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	07/14/11
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	01/27/12
Antenna, Horn, 18 GHz	EMCO	3115	C00783	06/29/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	07/12/11
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRM50702	N02685	CNR
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4407B	C01098	04/30/12
Power Meter	Agilent / HP	437B	N02778	08/11/12
Power Sensor, 18 GHz	Agilent / HP	8481A	N02784	07/28/11
DC Power Supply	Agilent / HP	E36108	N02844	CNR

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.

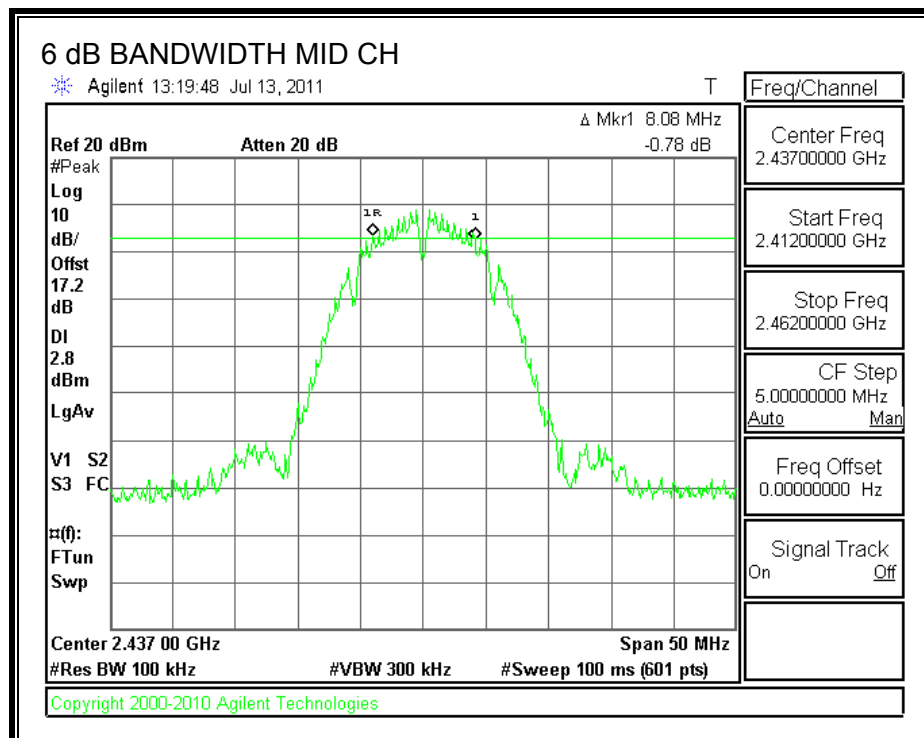
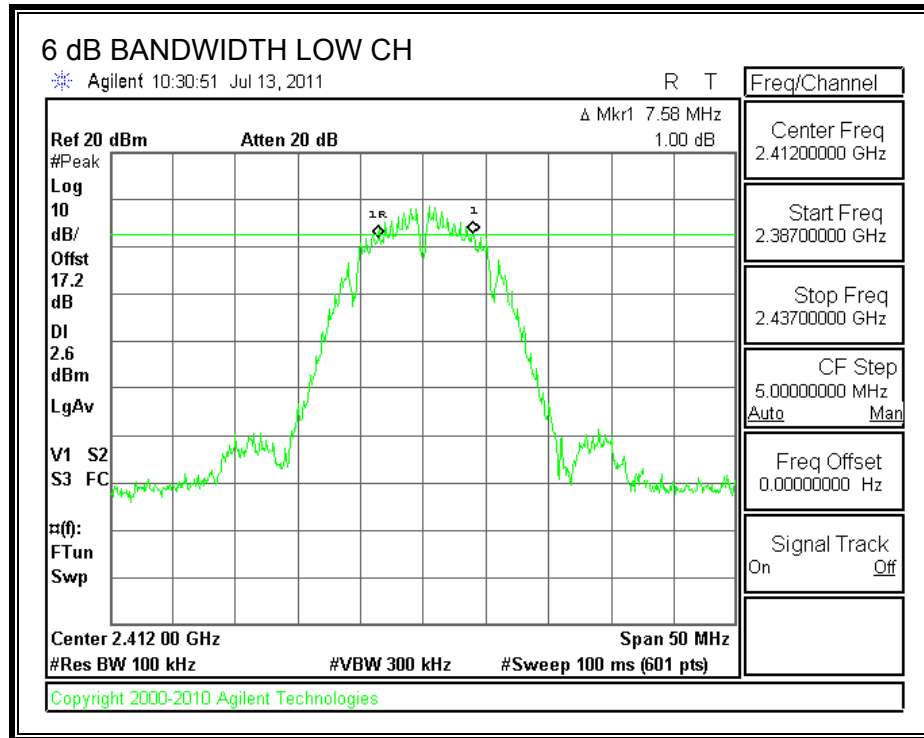
TEST PROCEDURE

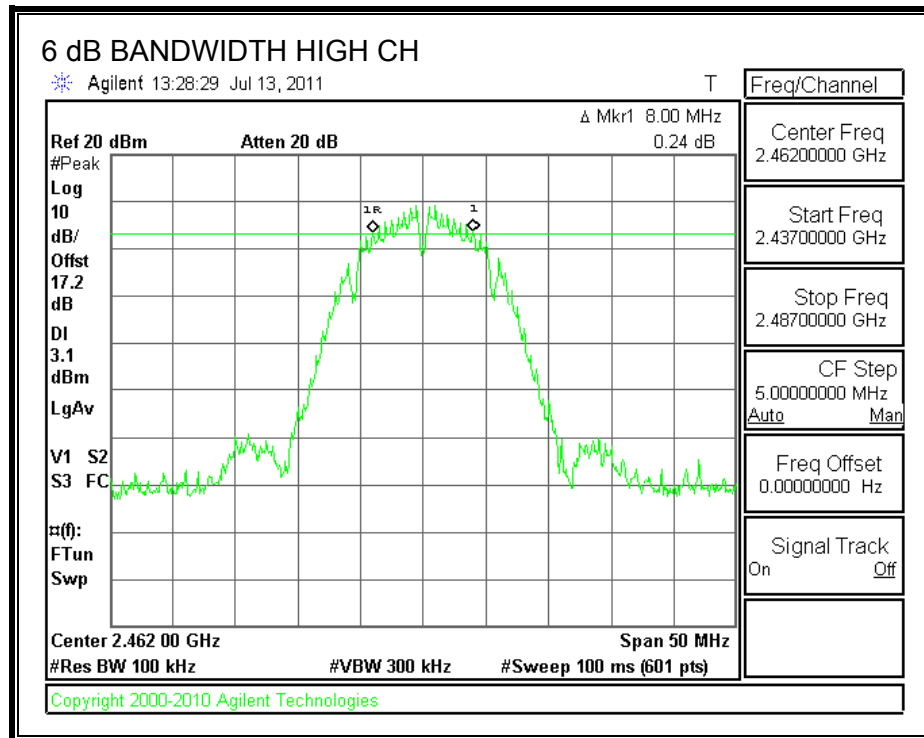
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	7.58	0.5
Middle	2437	8.08	0.5
High	2462	8.00	0.5

6 dB BANDWIDTH





7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

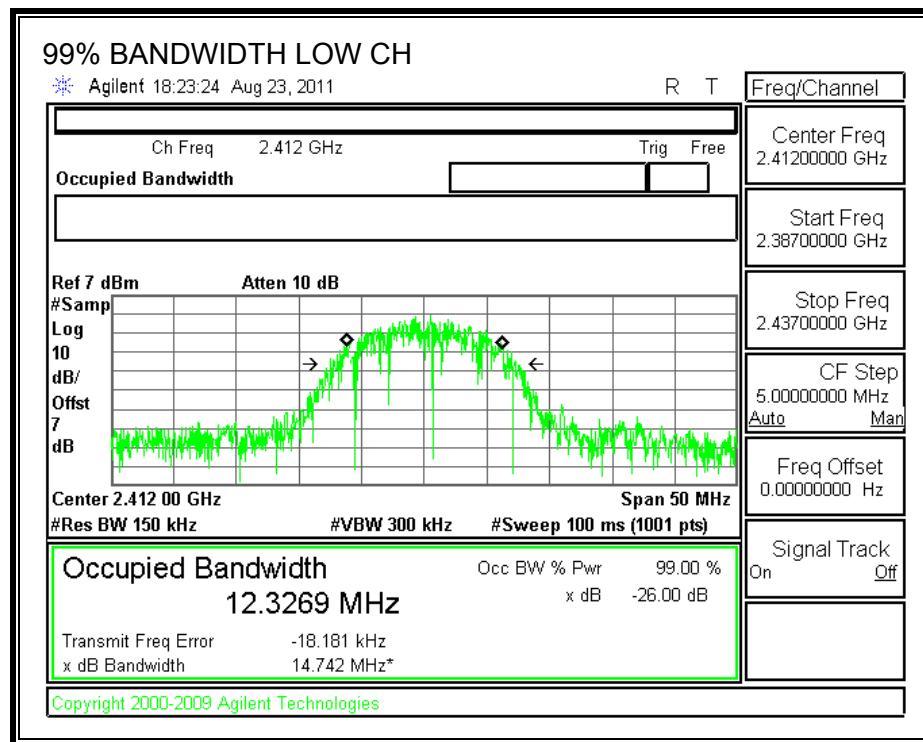
TEST PROCEDURE

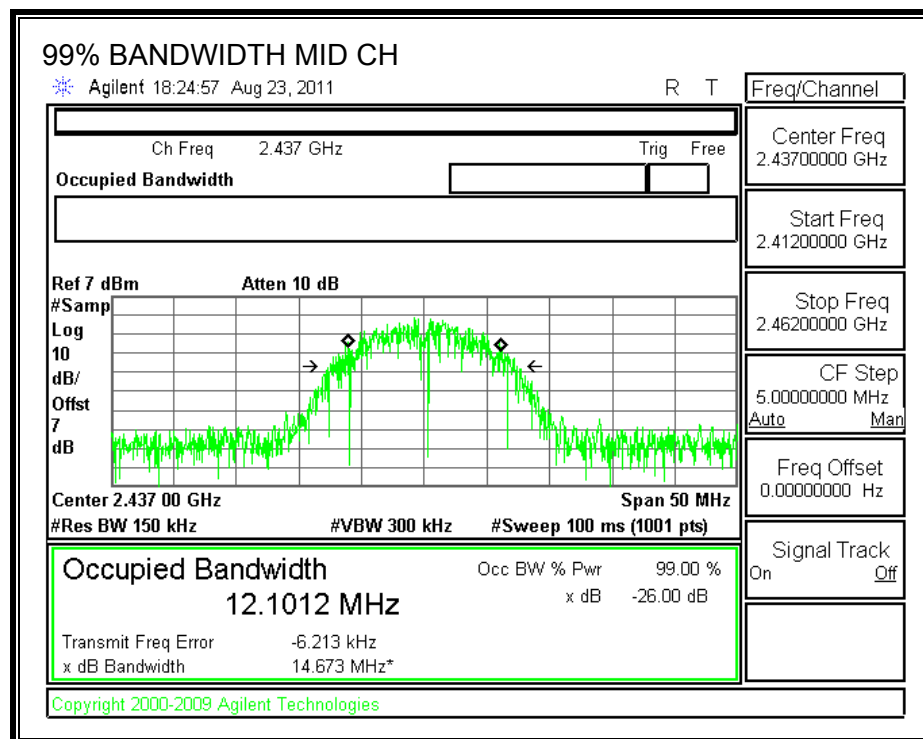
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

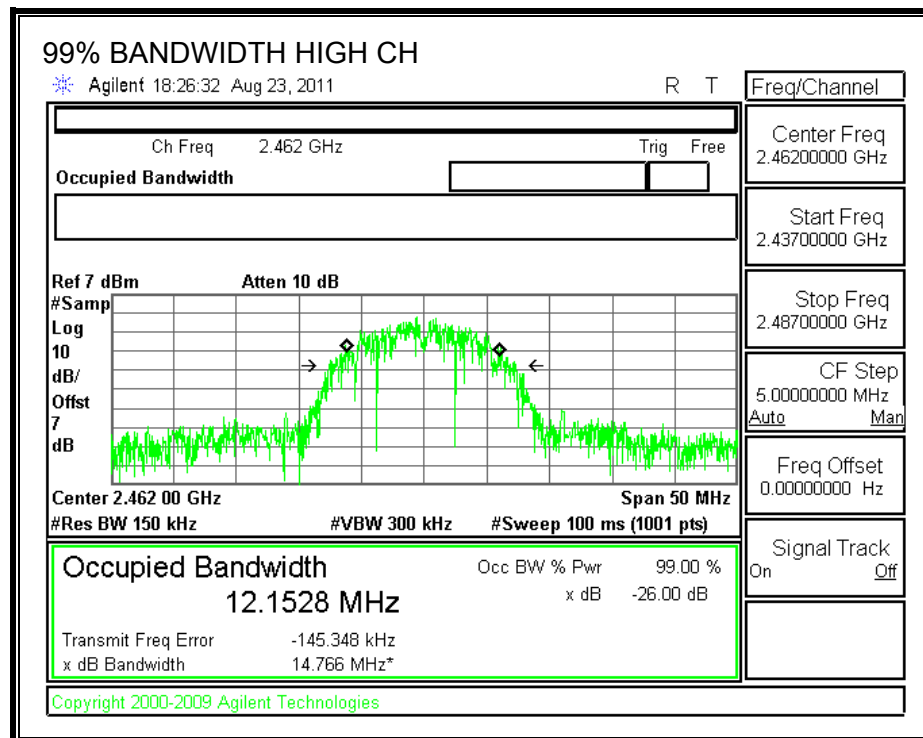
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.3269
Middle	2437	12.1012
High	2462	12.1528

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.

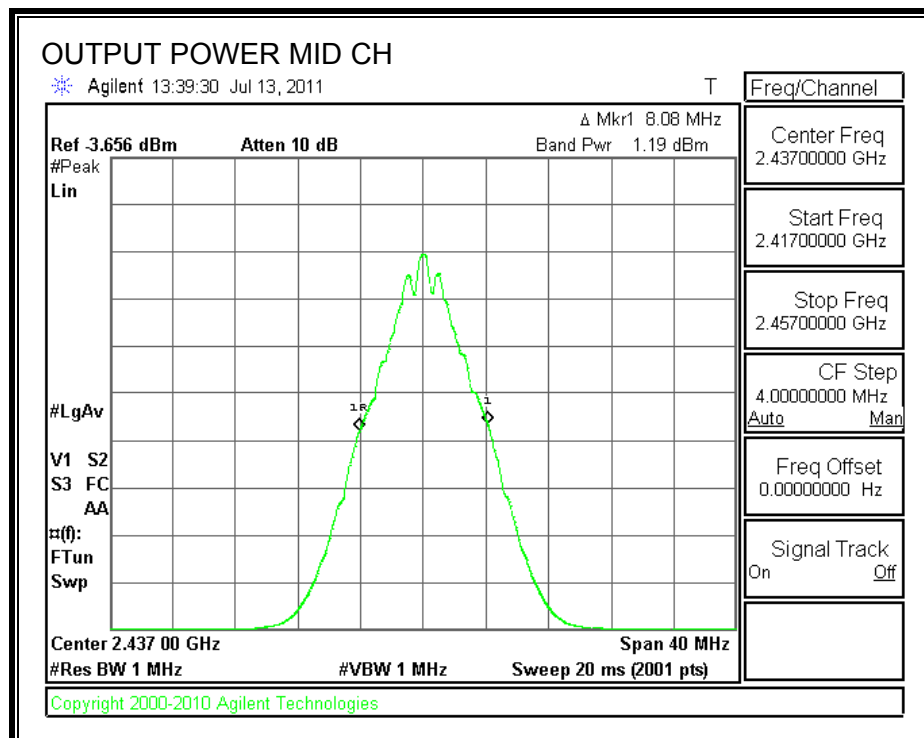
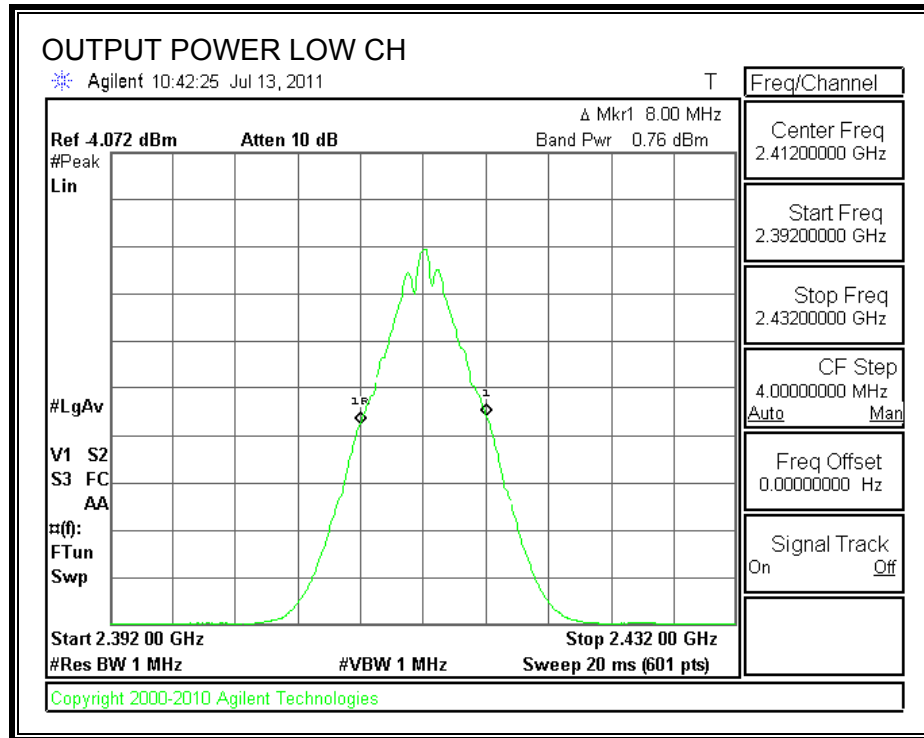
TEST PROCEDURE

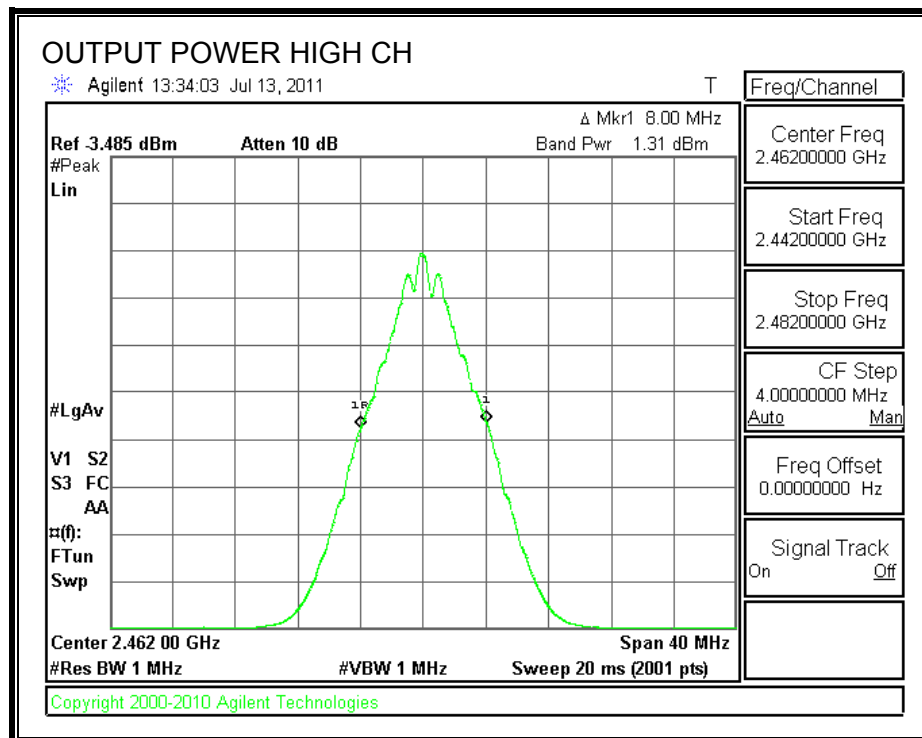
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	0.76	17.2	17.96	30	-12.04
Middle	2437	1.19	17.2	18.39	30	-11.61
High	2462	1.31	17.2	18.51	30	-11.49

OUTPUT POWER





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 17.2 dB (including 16.2 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	15.90
Middle	2437	16.30
High	2462	16.50

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.

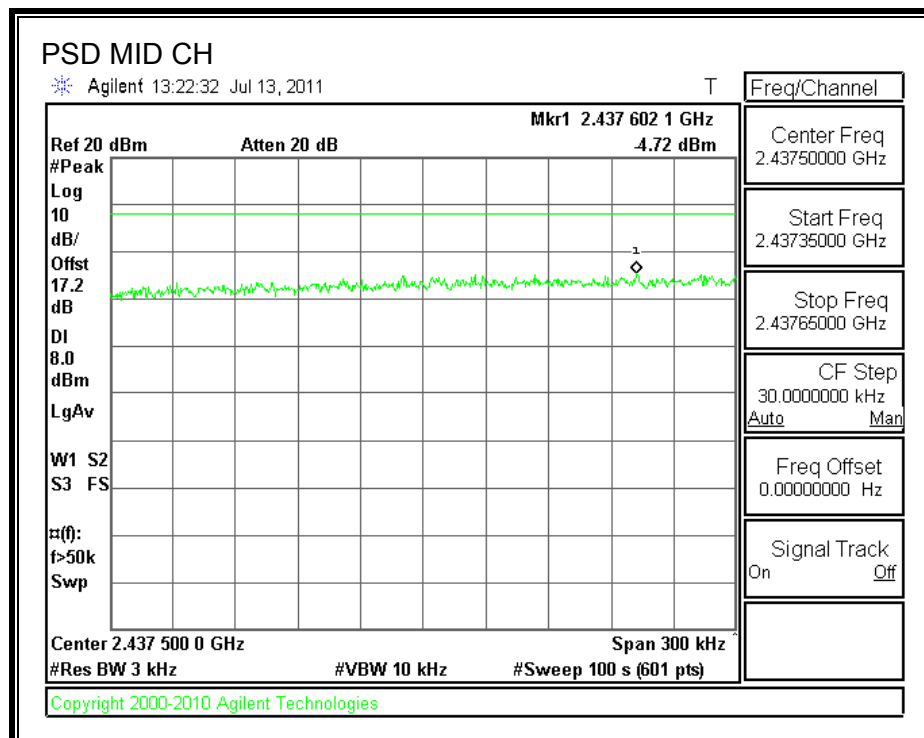
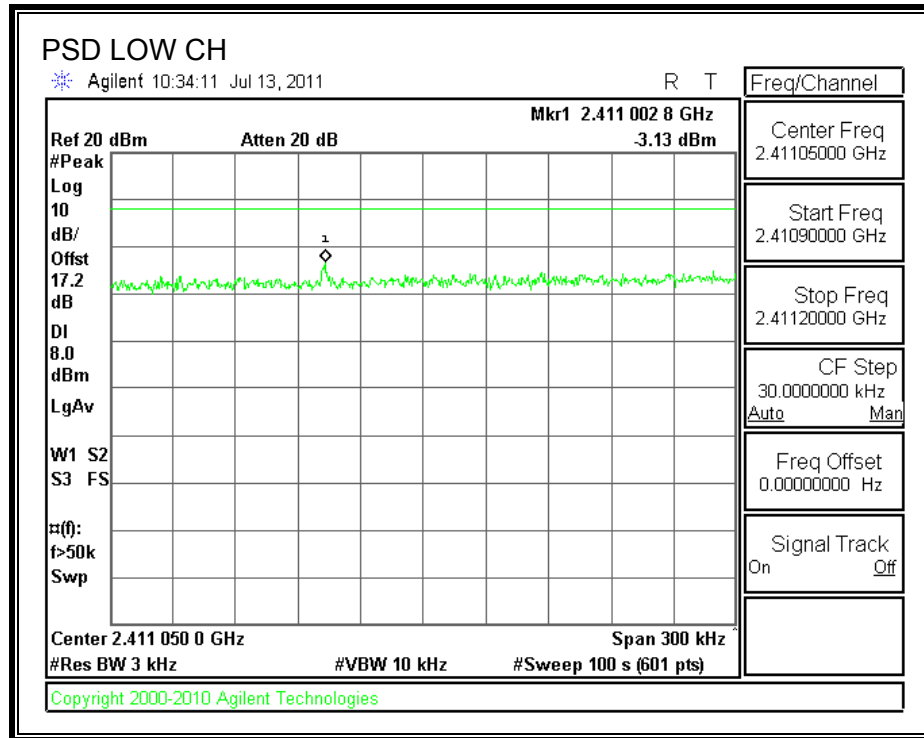
TEST PROCEDURE

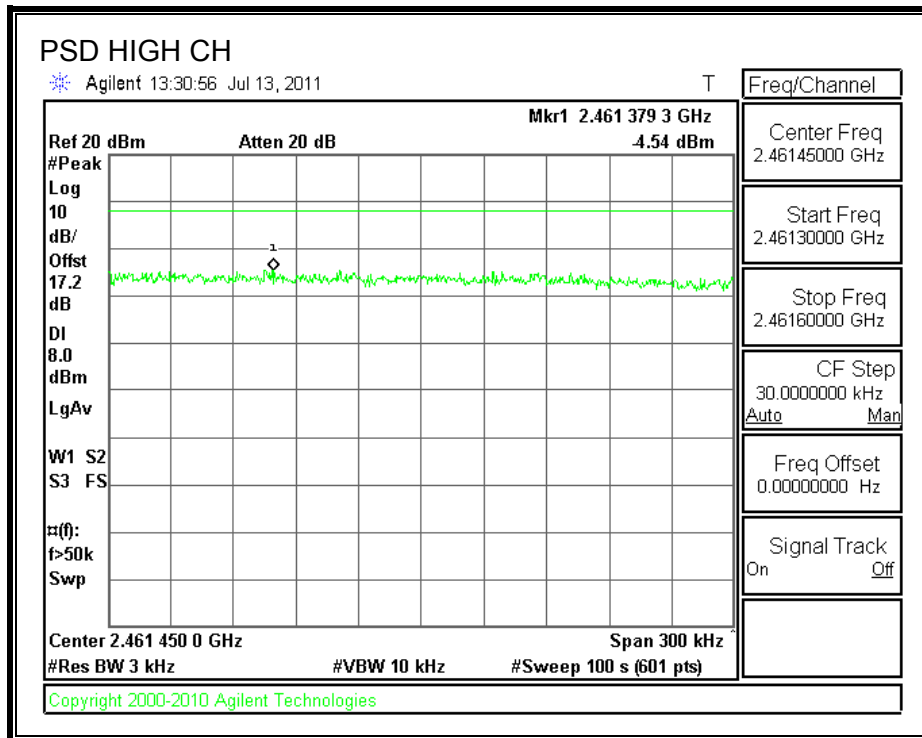
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-3.13	8	-11.13
Middle	2437	-4.72	8	-12.72
High	2462	-4.54	8	-12.54

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.

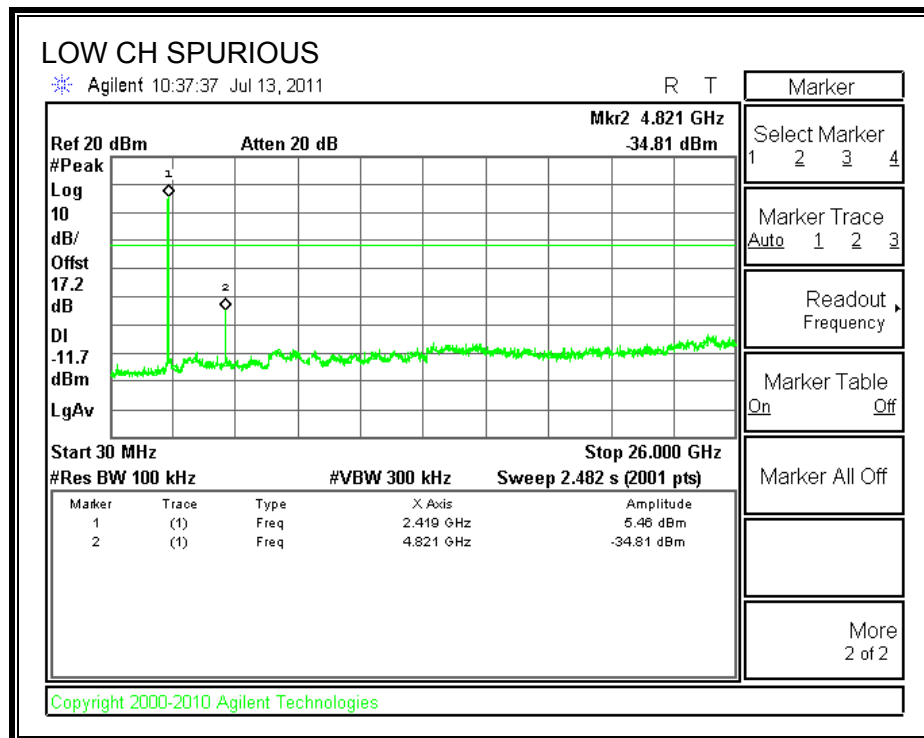
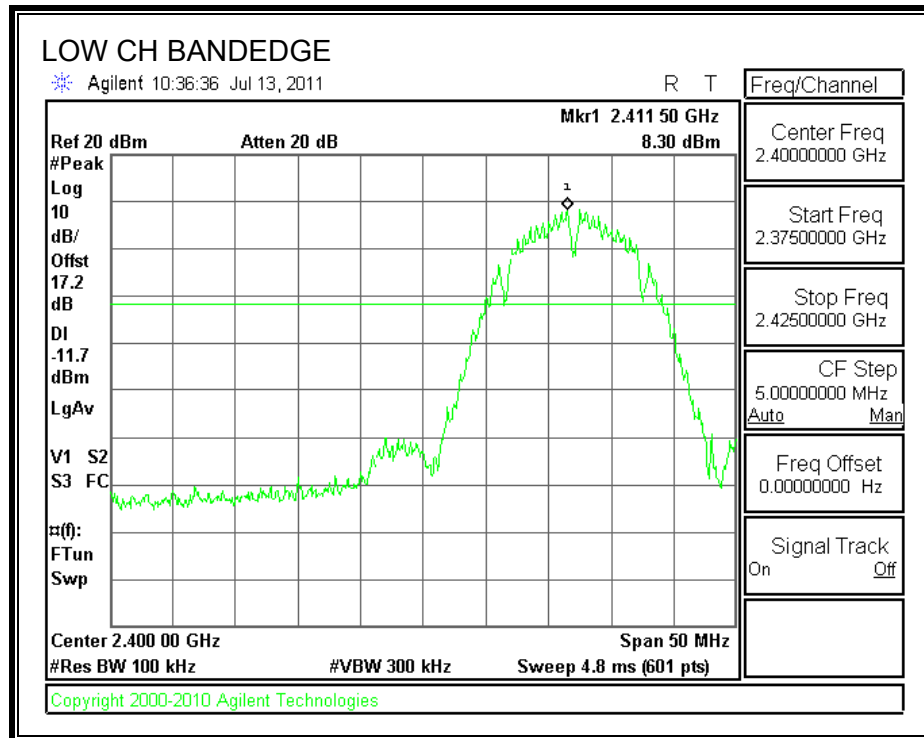
TEST PROCEDURE

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.

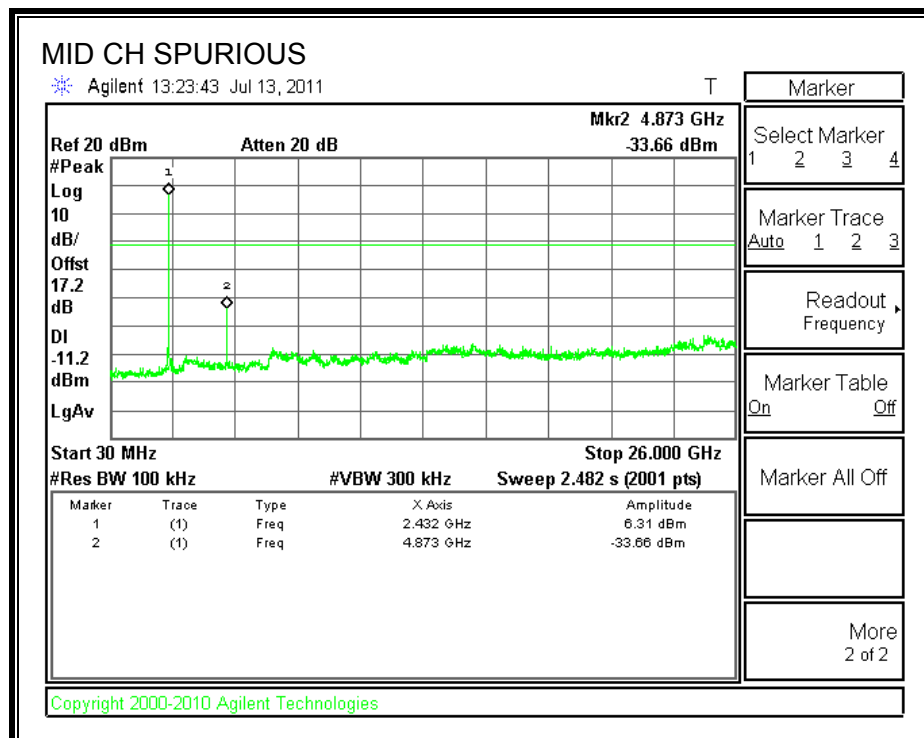
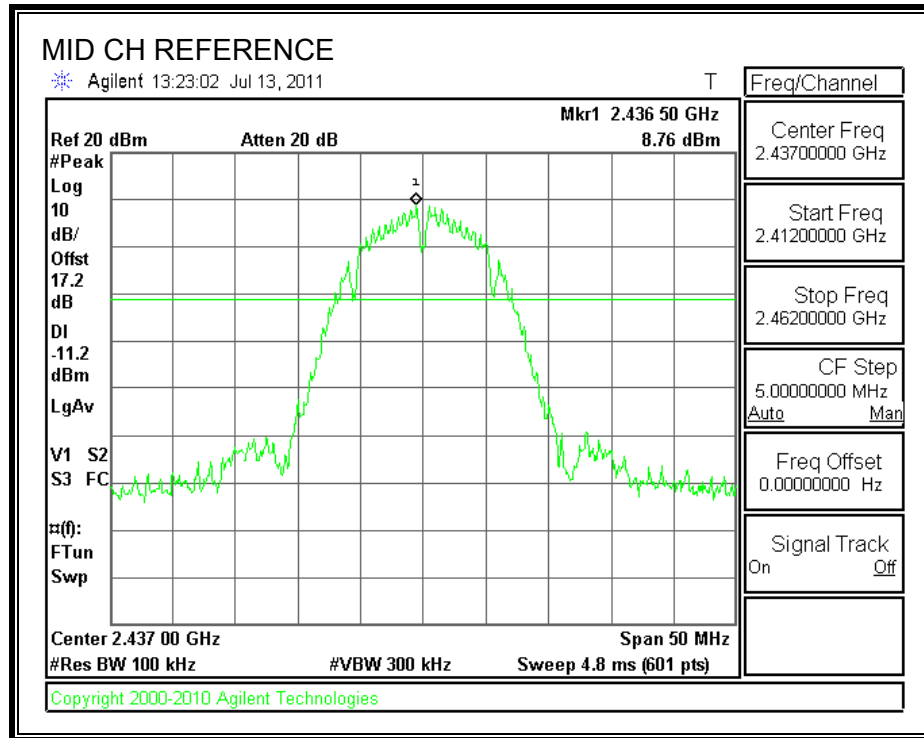
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

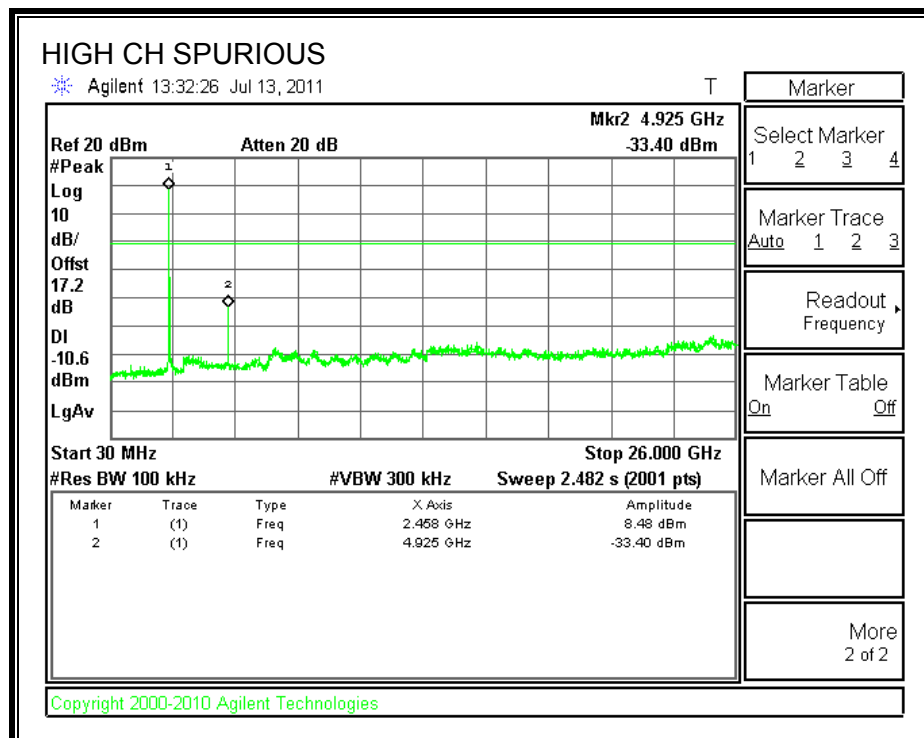
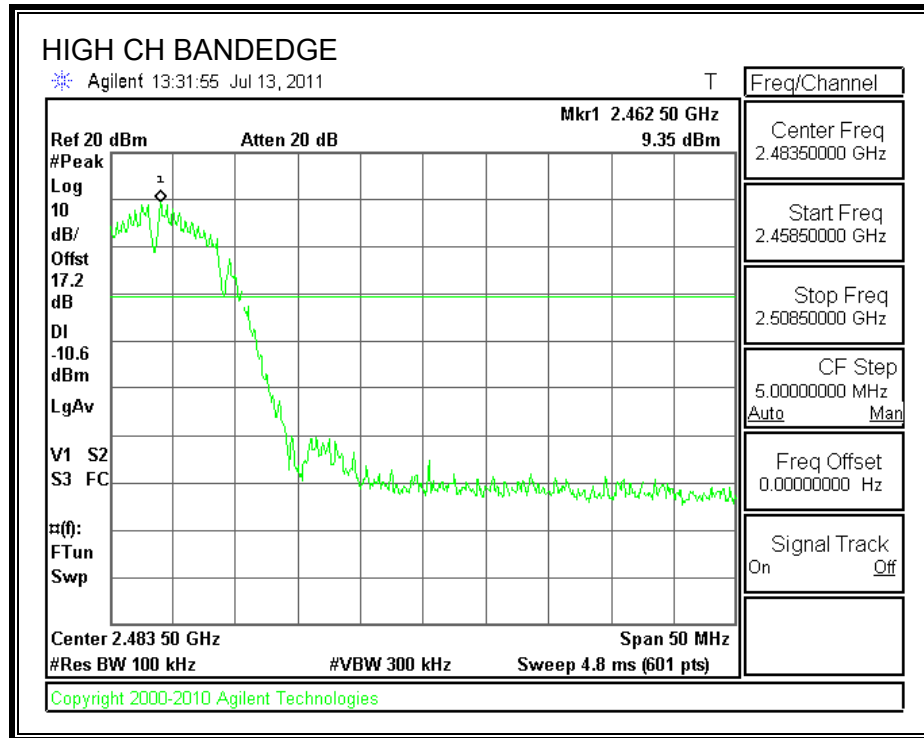
SPURIOUS EMISSIONS, LOW CHANNEL



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.

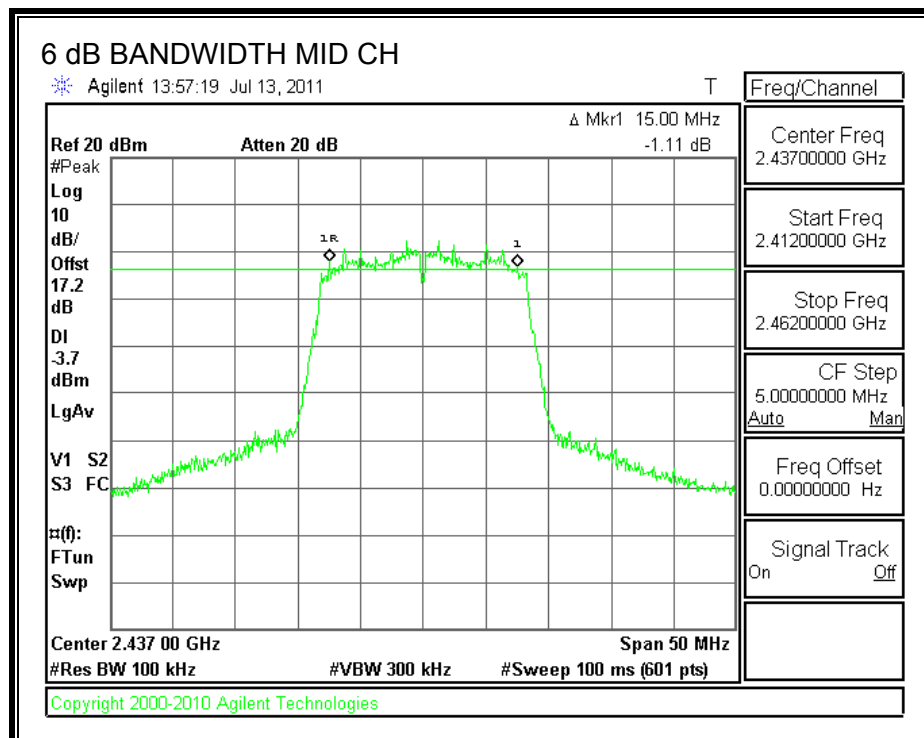
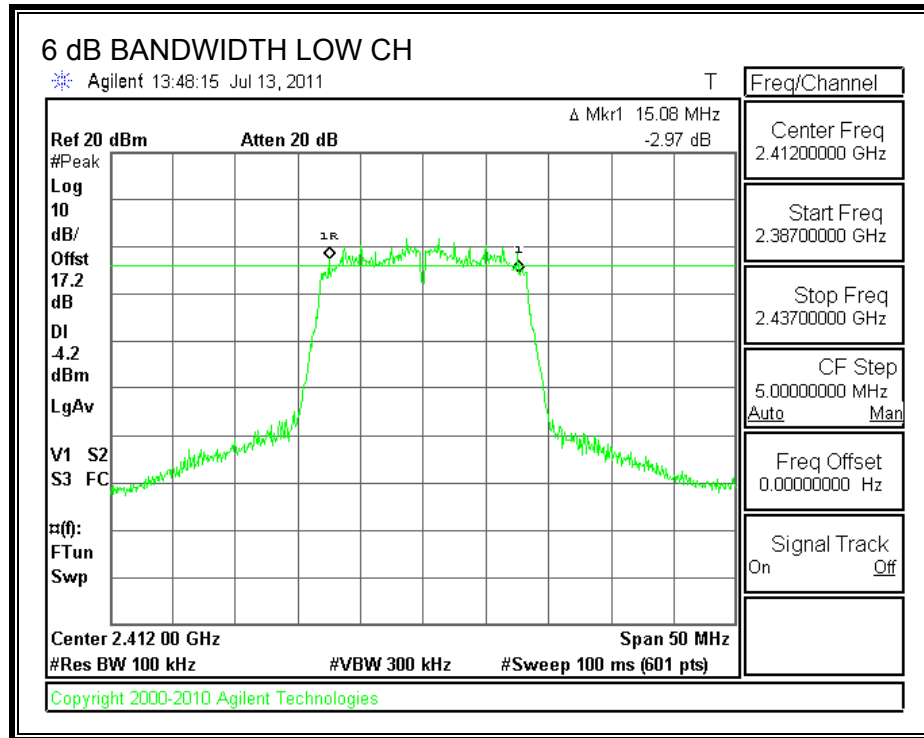
TEST PROCEDURE

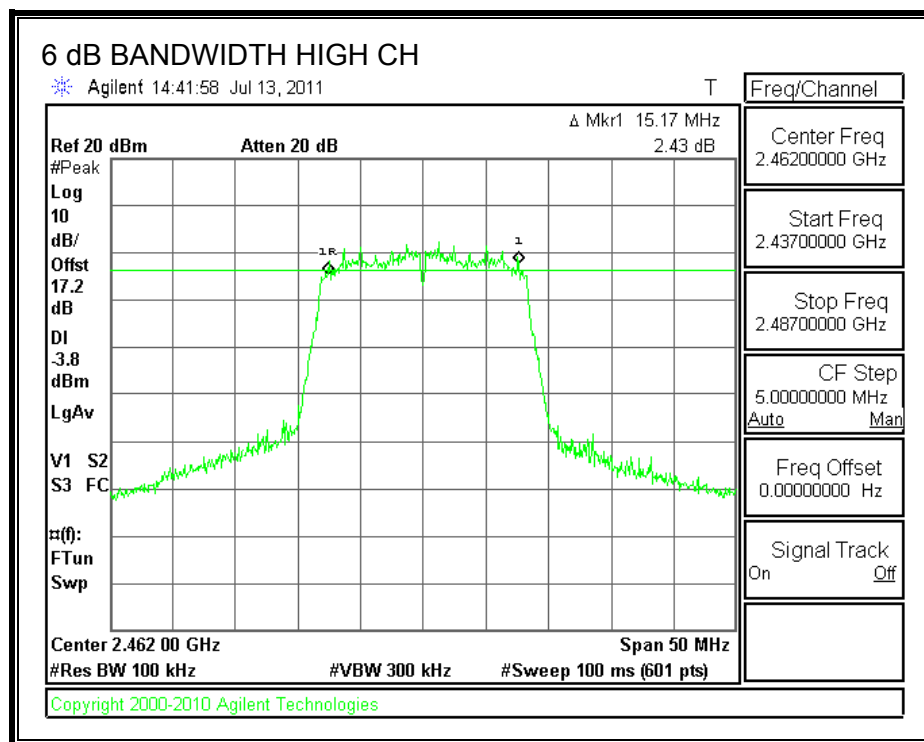
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	15.08	0.5
Middle	2437	15.00	0.5
High	2462	15.17	0.5

6 dB BANDWIDTH





7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

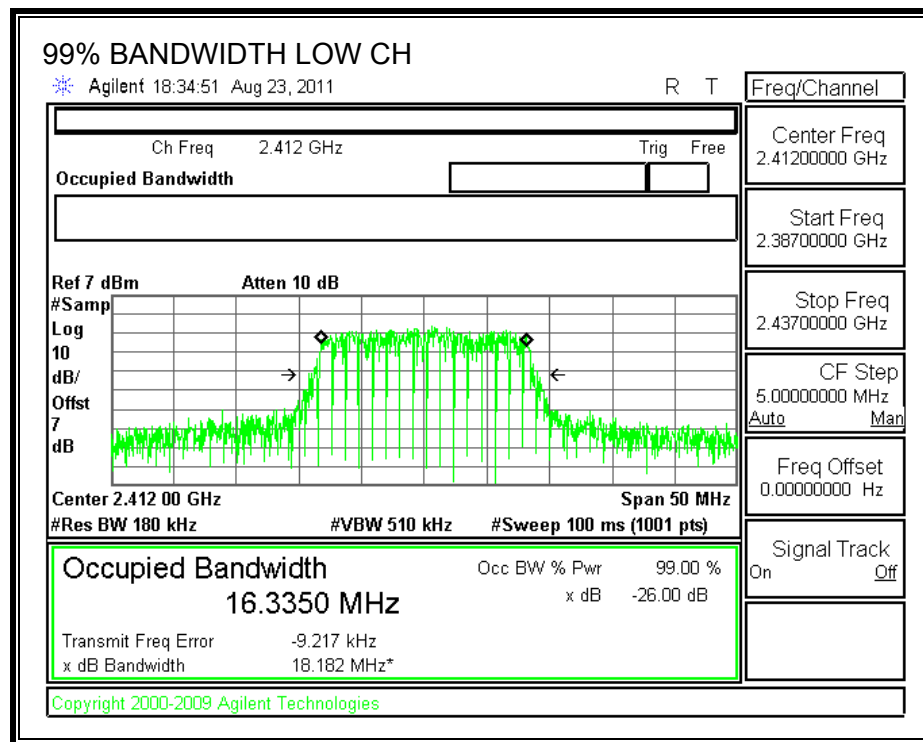
TEST PROCEDURE

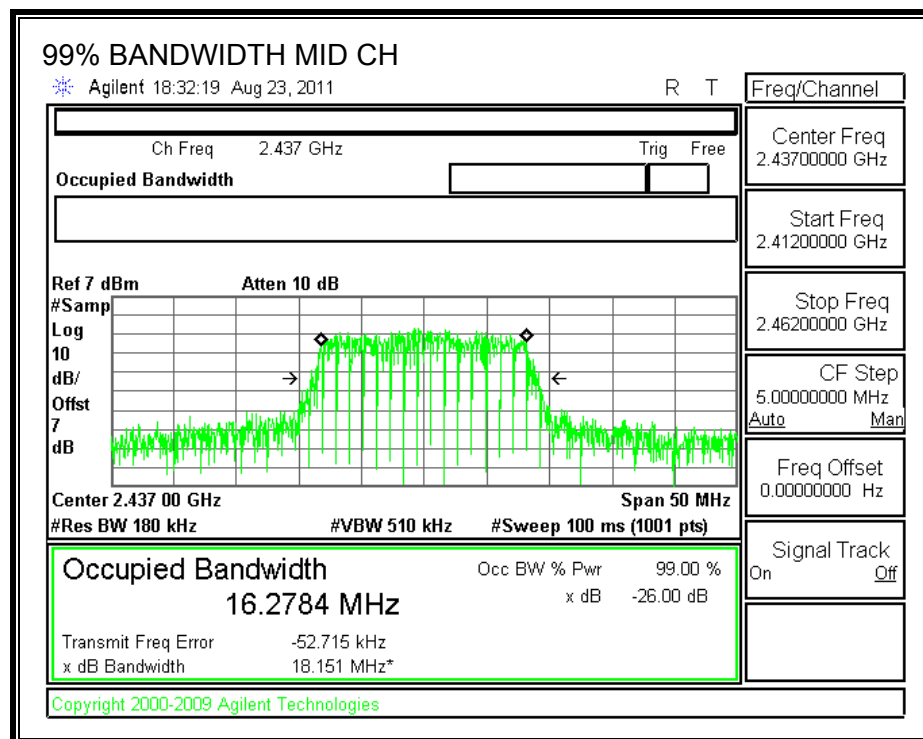
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

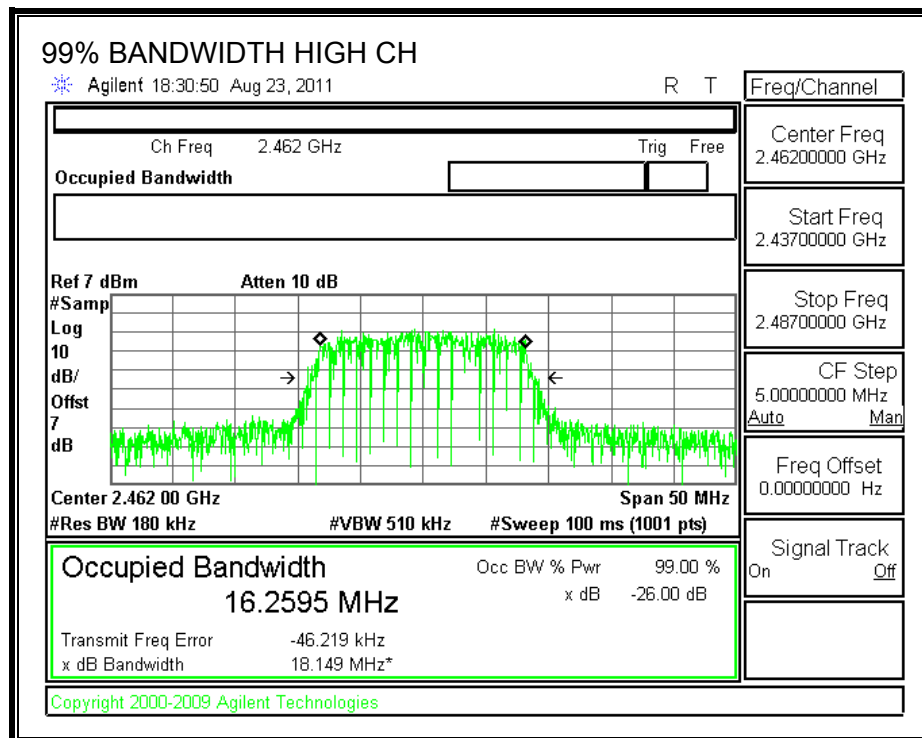
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.335
Middle	2437	16.2784
High	2462	16.2595

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.

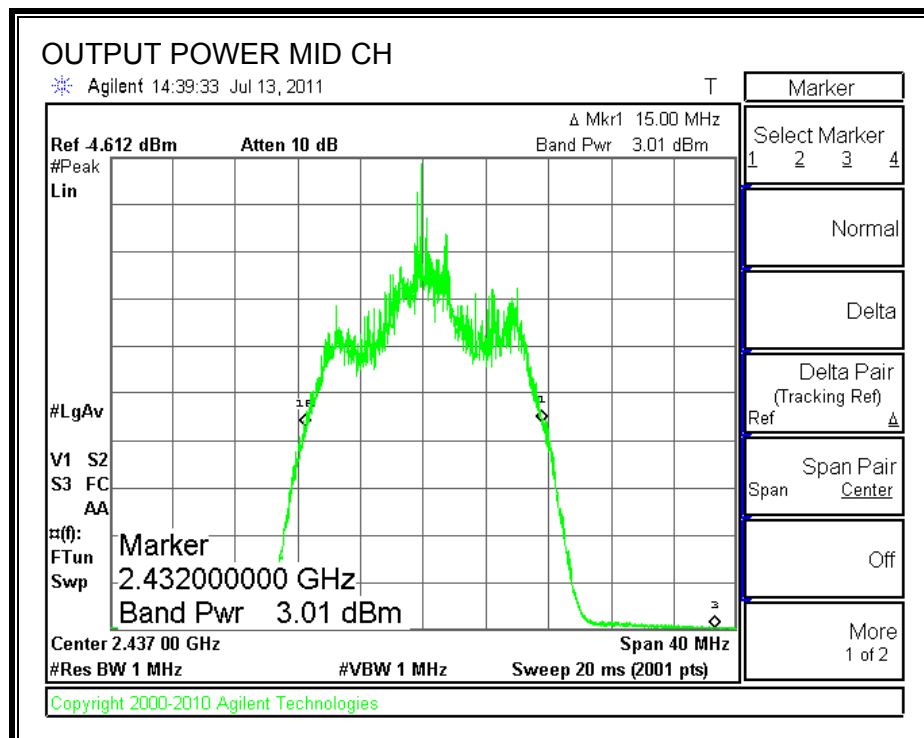
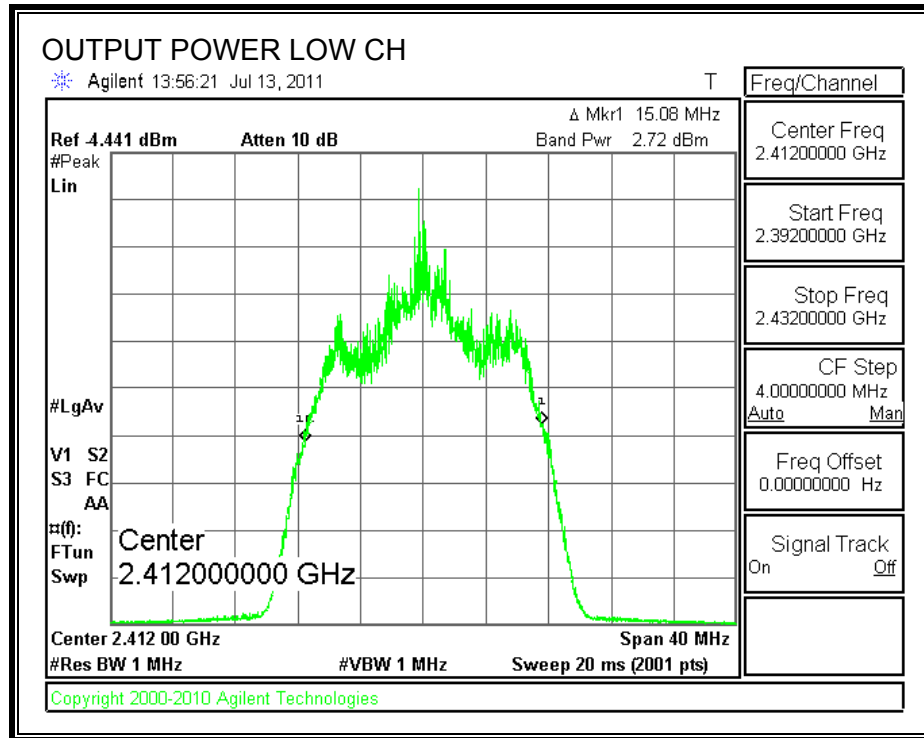
TEST PROCEDURE

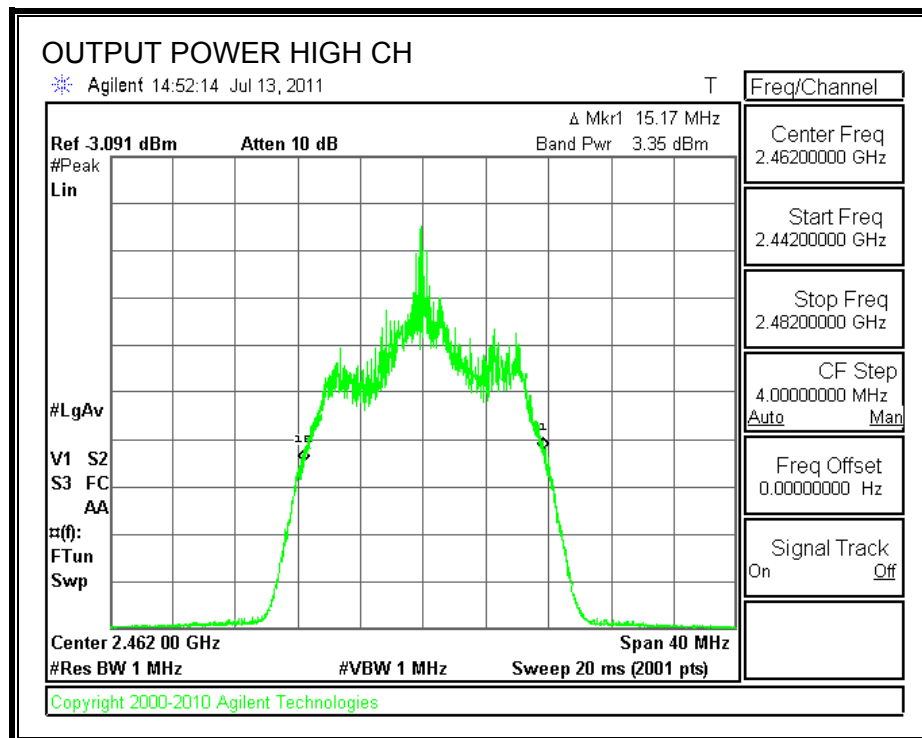
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	2.72	17.2	19.92	30	-10.08
Middle	2437	3.01	17.2	20.21	30	-9.79
High	2462	3.35	17.2	20.55	30	-9.45

OUTPUT POWER





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 17.2 dB (including 16.2 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.00
Middle	2437	12.40
High	2462	12.60

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.

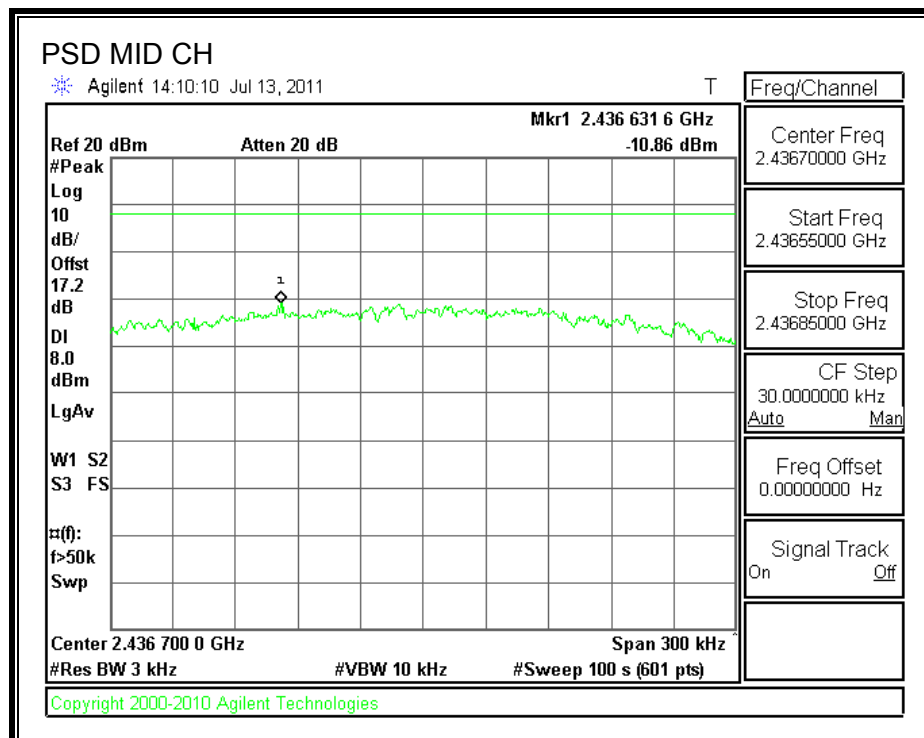
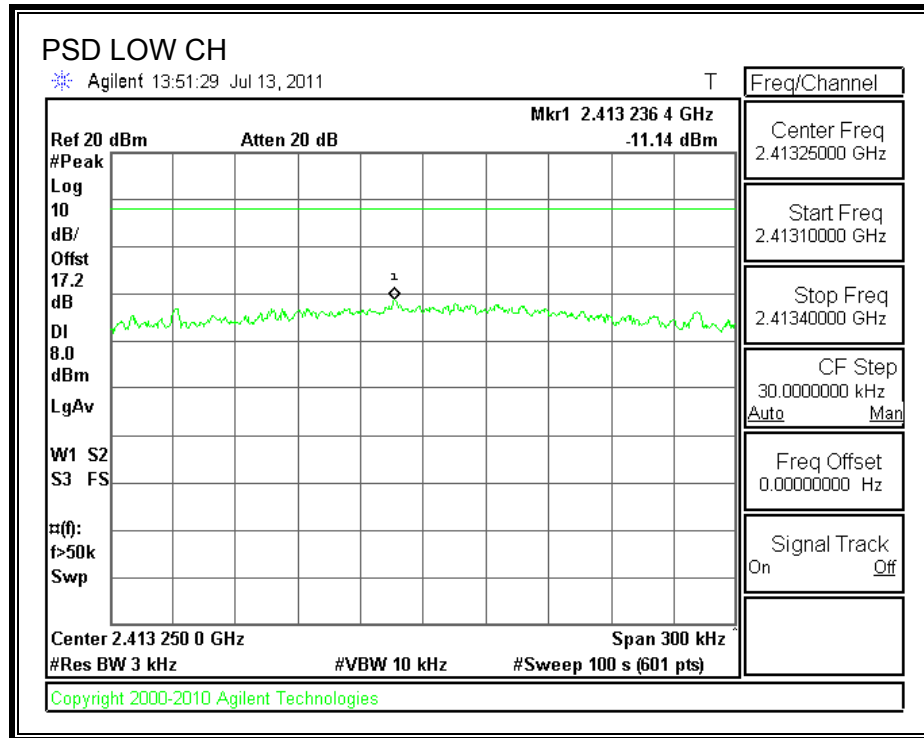
TEST PROCEDURE

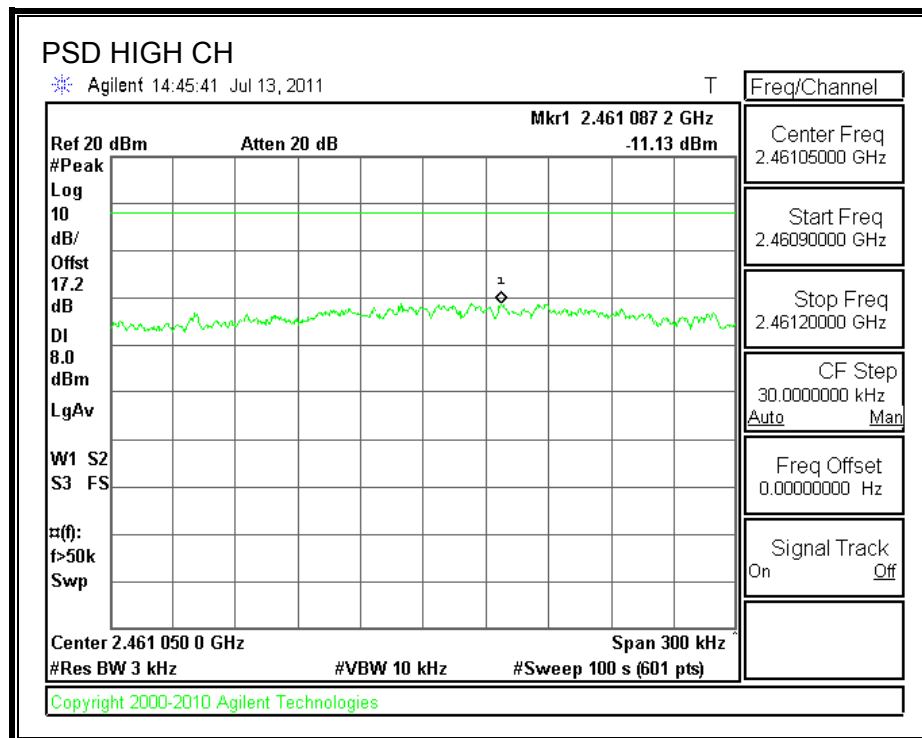
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.14	8	-19.14
Middle	2437	-10.86	8	-18.86
High	2462	-11.13	8	-19.13

POWER SPECTRAL DENSITY





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.

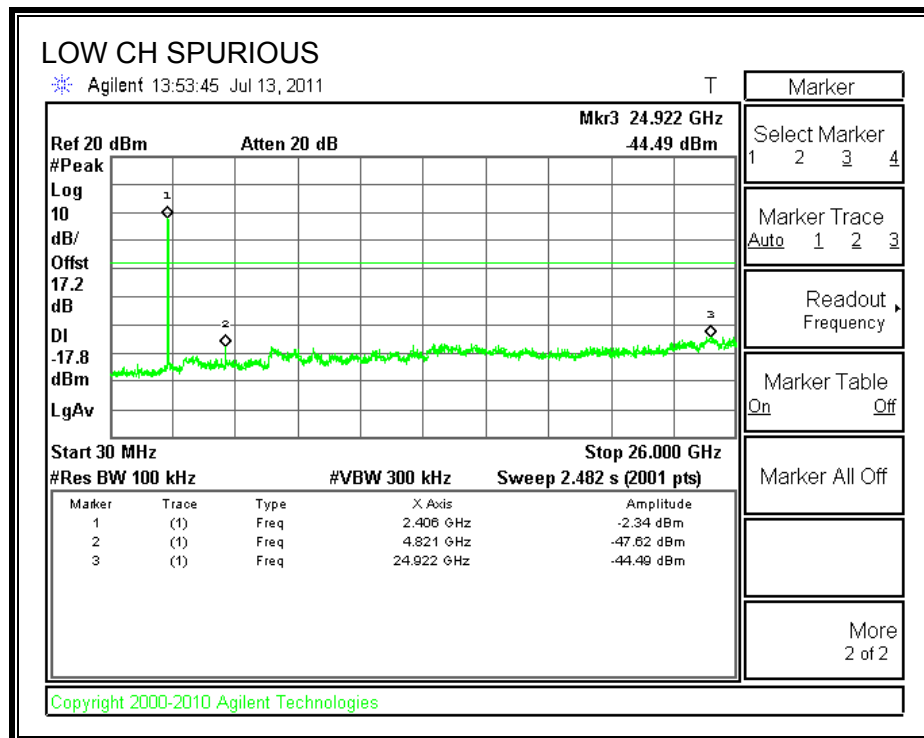
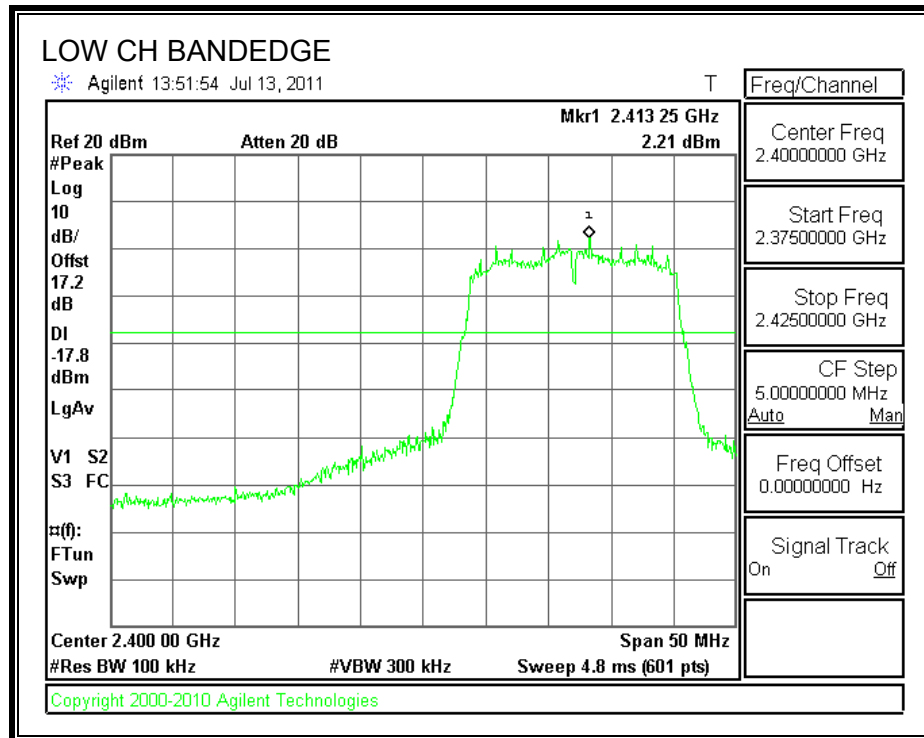
TEST PROCEDURE

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.

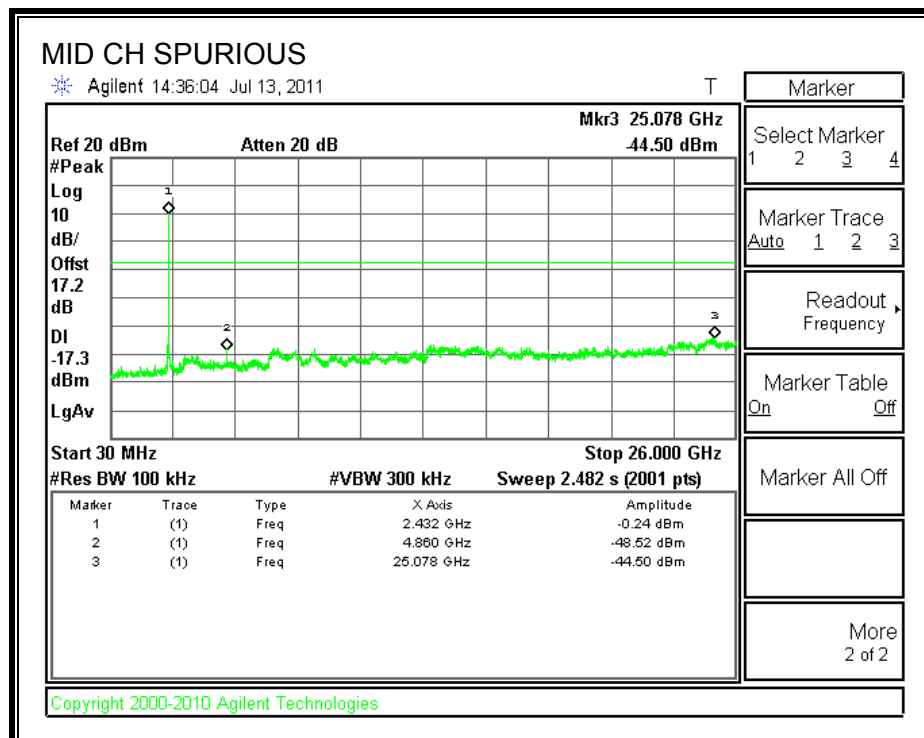
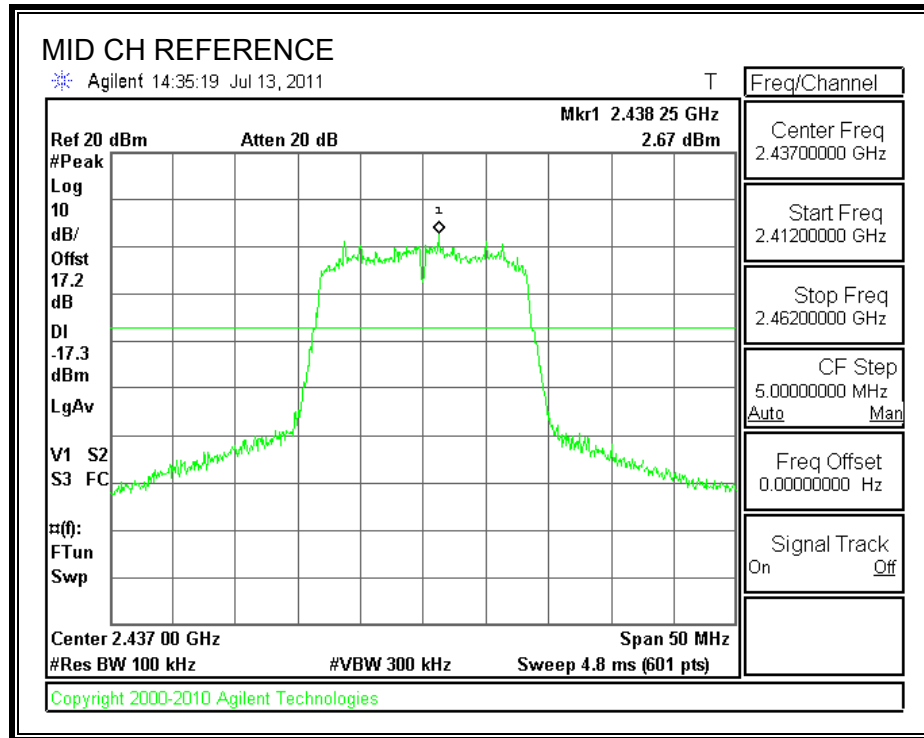
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

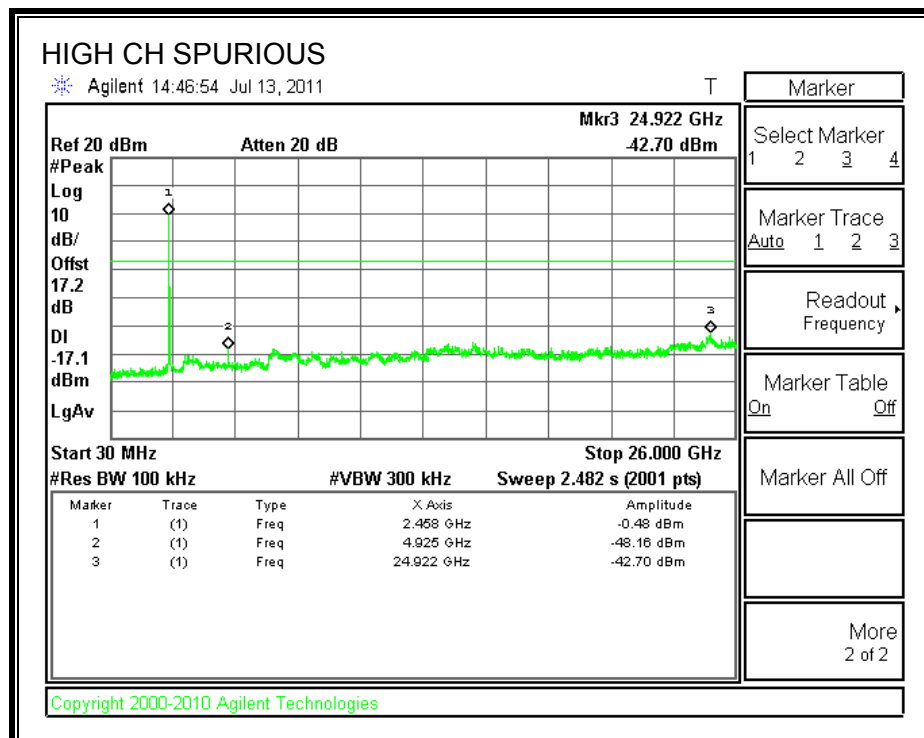
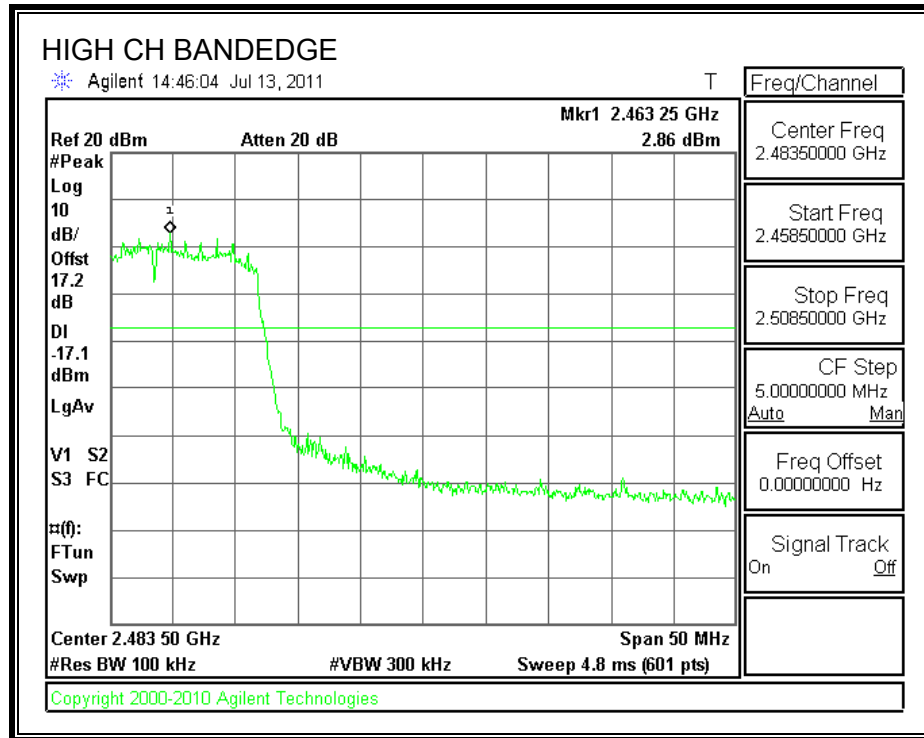
SPURIOUS EMISSIONS, LOW CHANNEL



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.

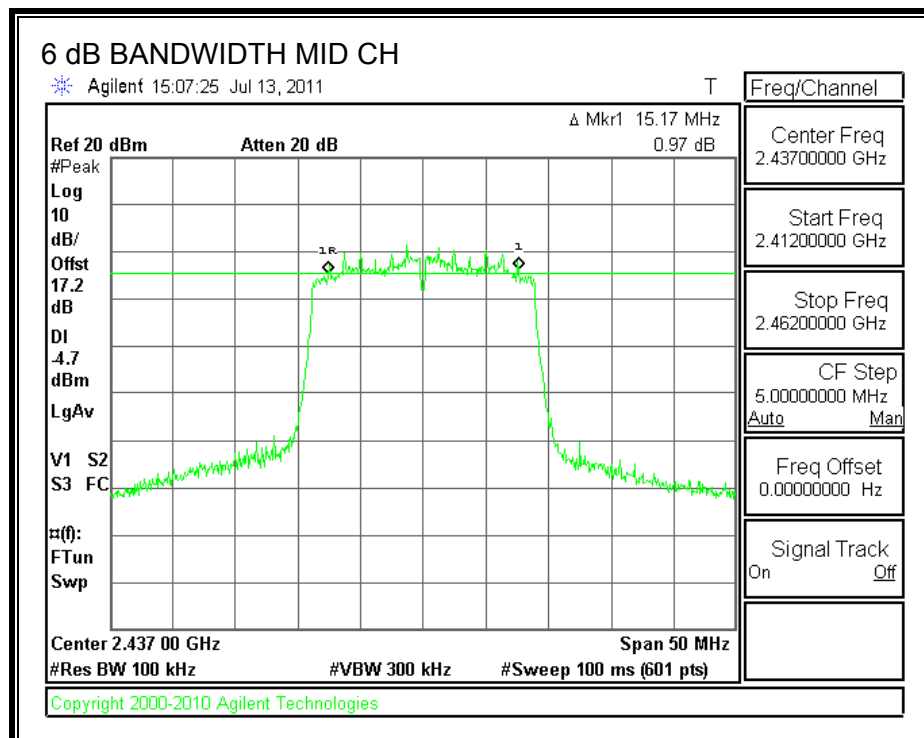
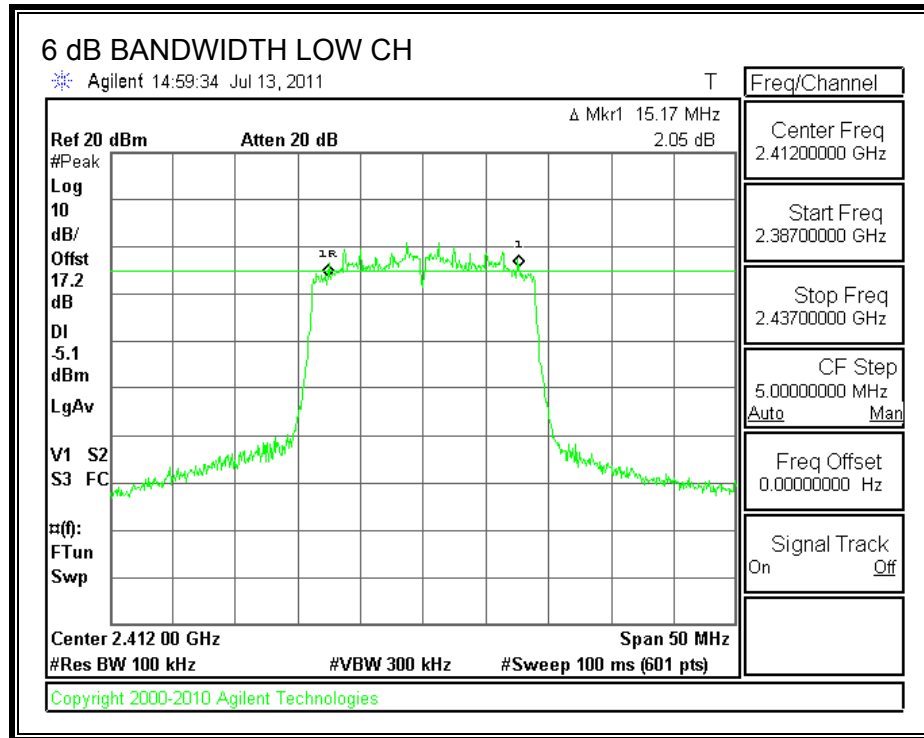
TEST PROCEDURE

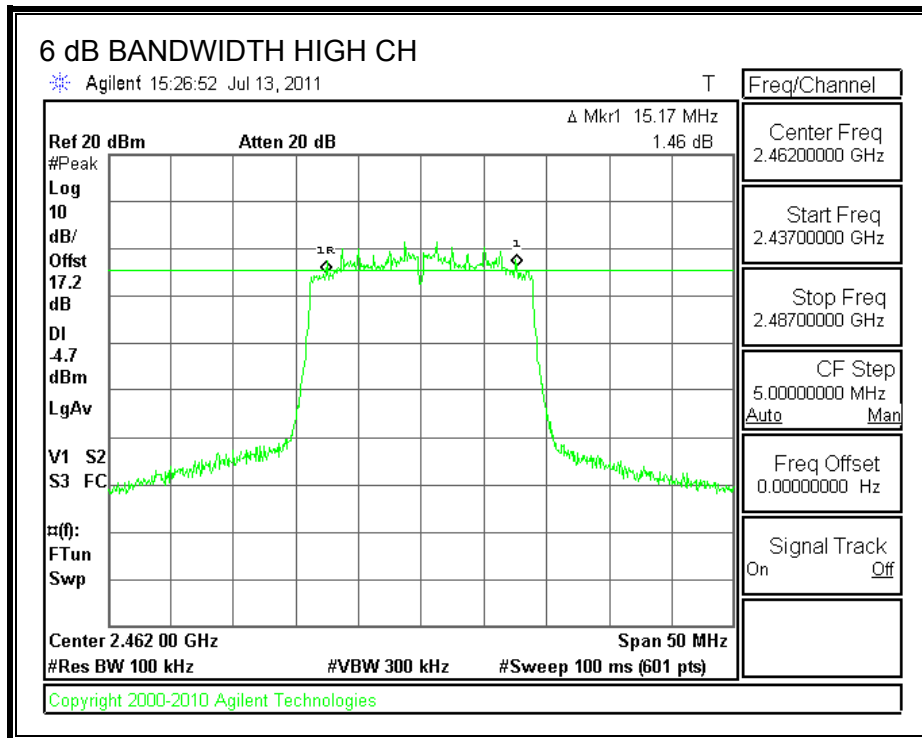
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	15.17	0.5
Middle	2437	15.17	0.5
High	2462	15.17	0.5

6 dB BANDWIDTH





7.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

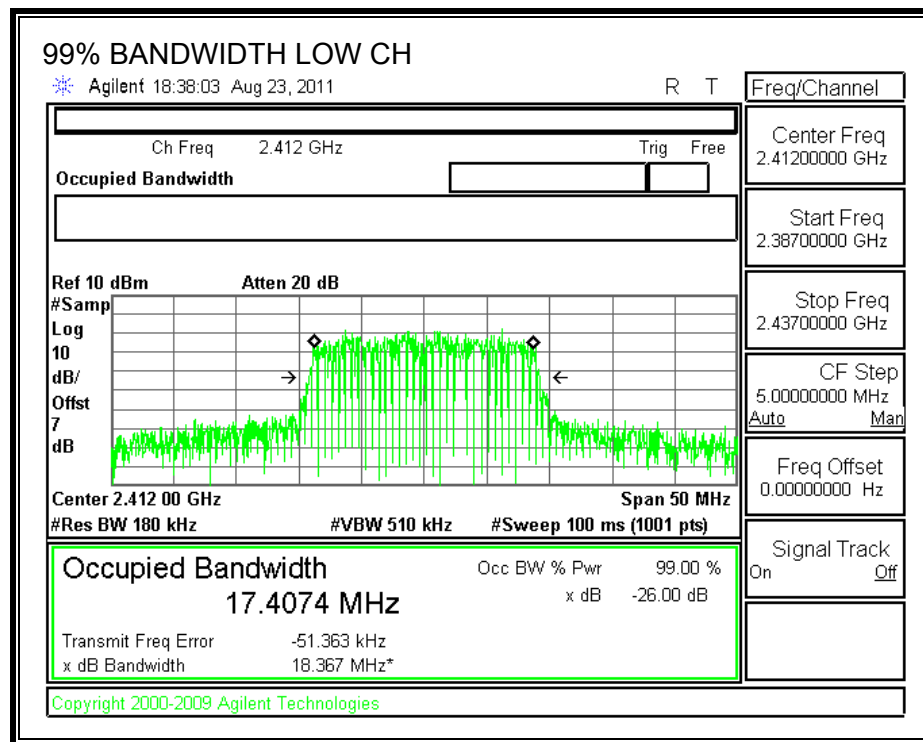
TEST PROCEDURE

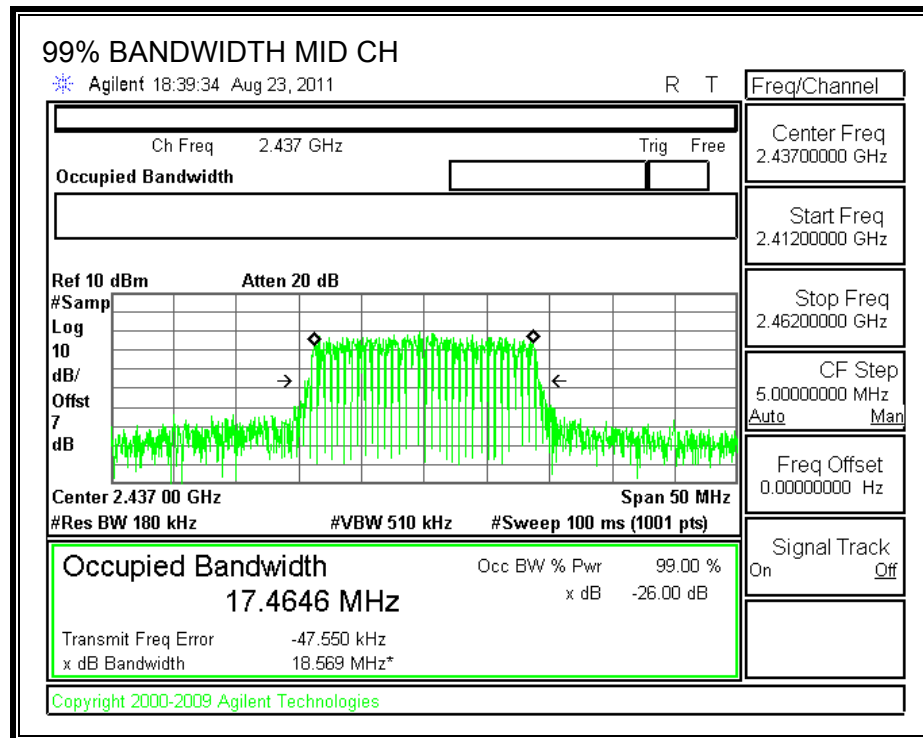
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

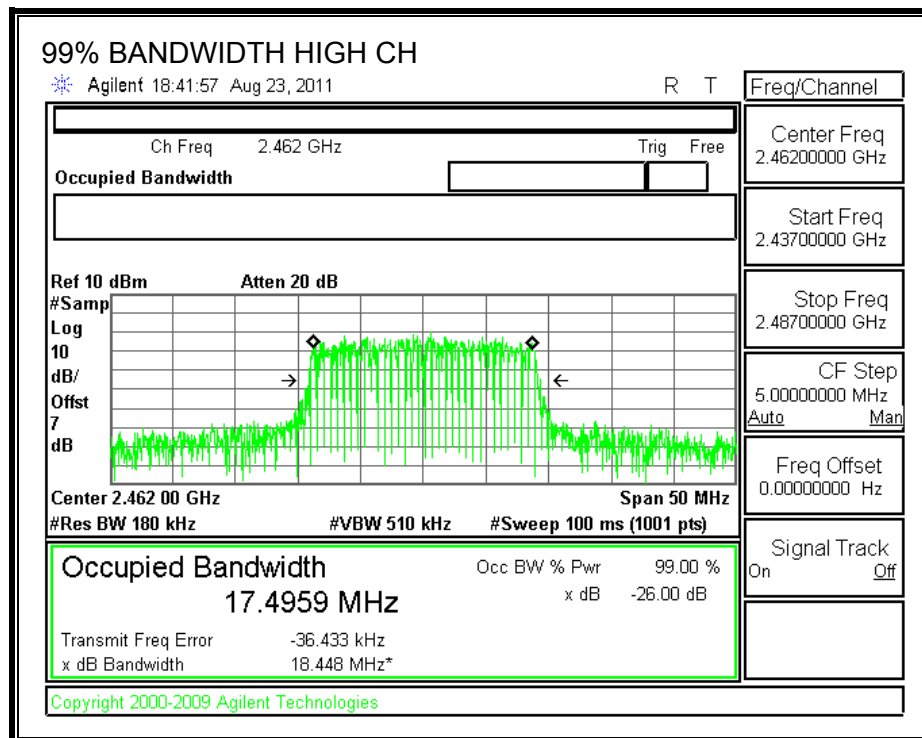
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.4074
Middle	2437	17.4646
High	2462	17.4959

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.

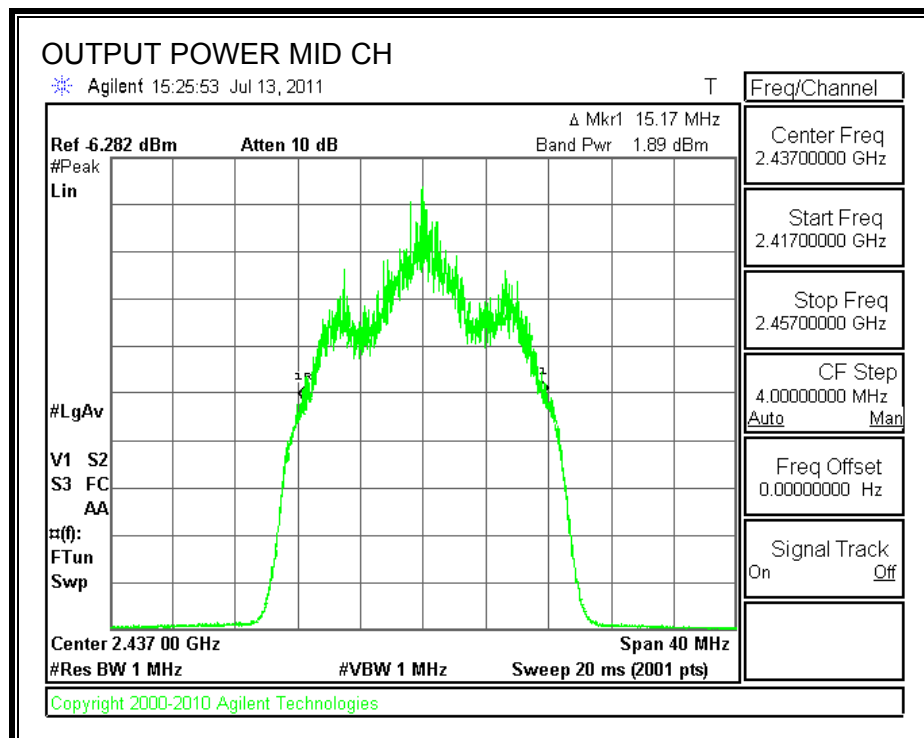
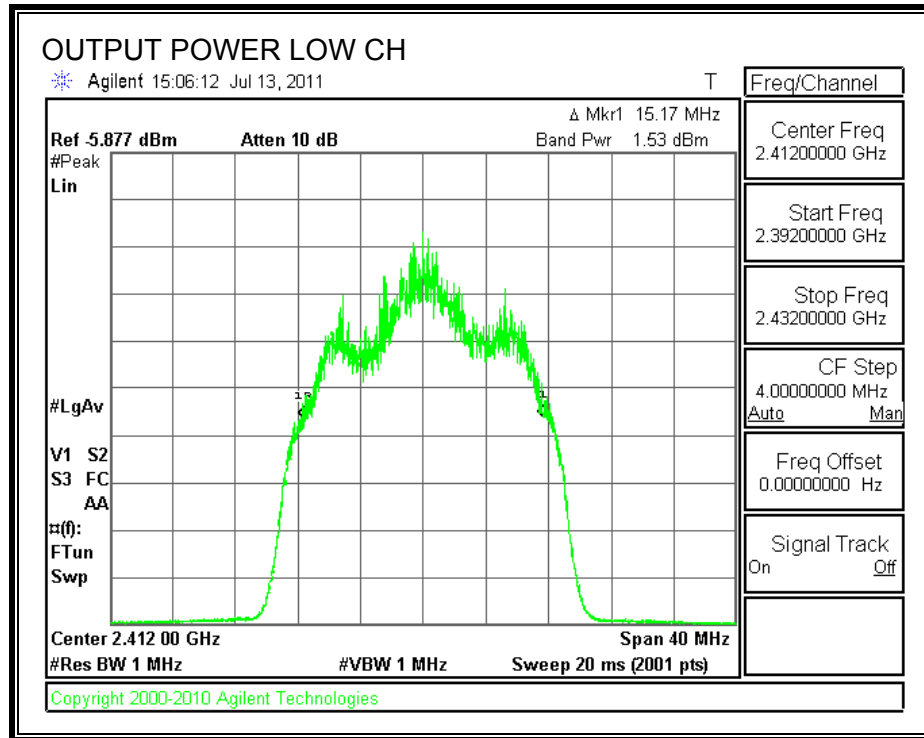
TEST PROCEDURE

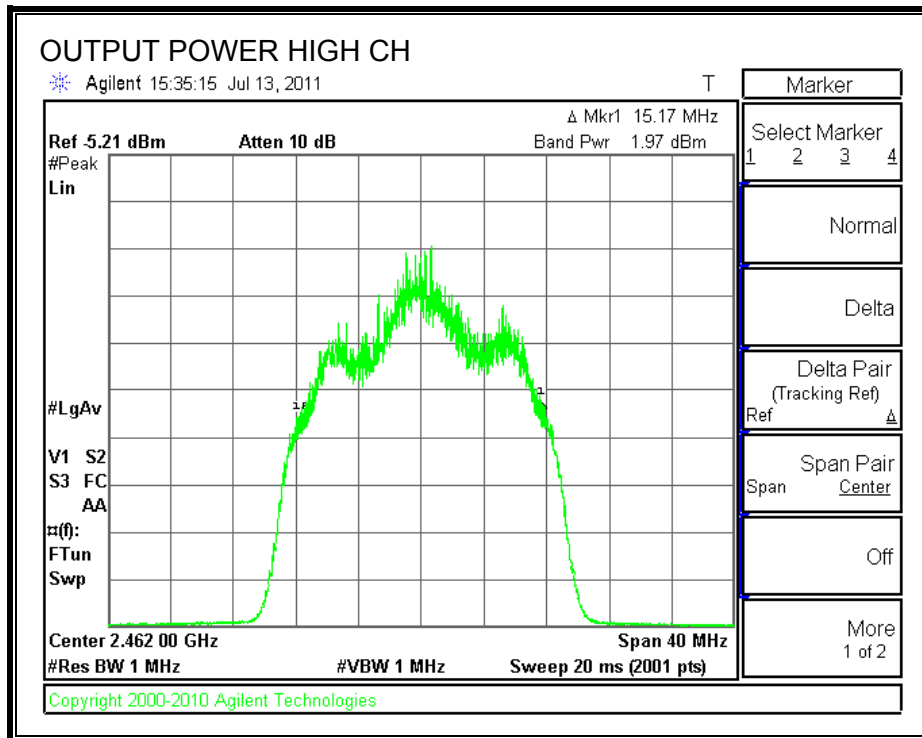
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	1.53	17.2	18.73	30	-11.27
Middle	2437	1.89	17.2	19.09	30	-10.91
High	2462	1.97	17.2	19.17	30	-10.83

OUTPUT POWER





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 17.2 dB (including 16.2 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	10.9
Middle	2437	11.2
High	2462	11.5

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.

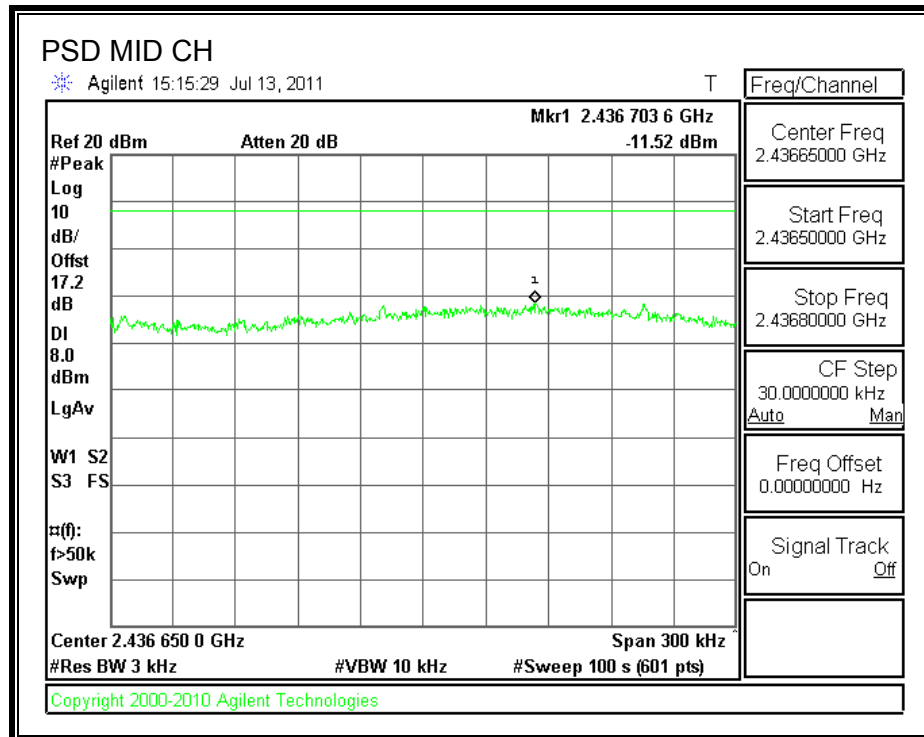
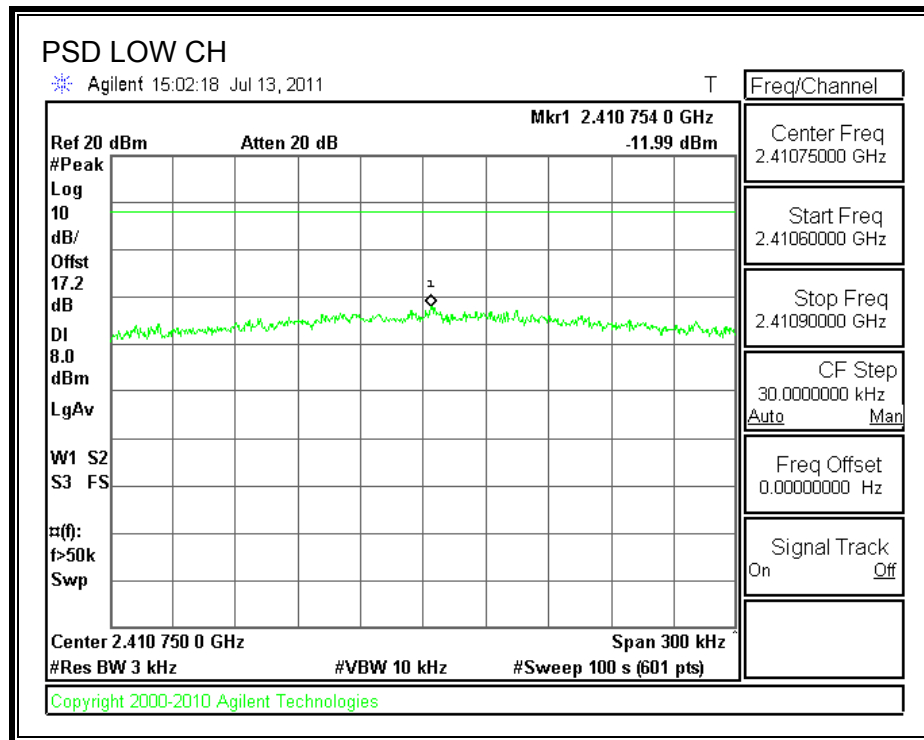
TEST PROCEDURE

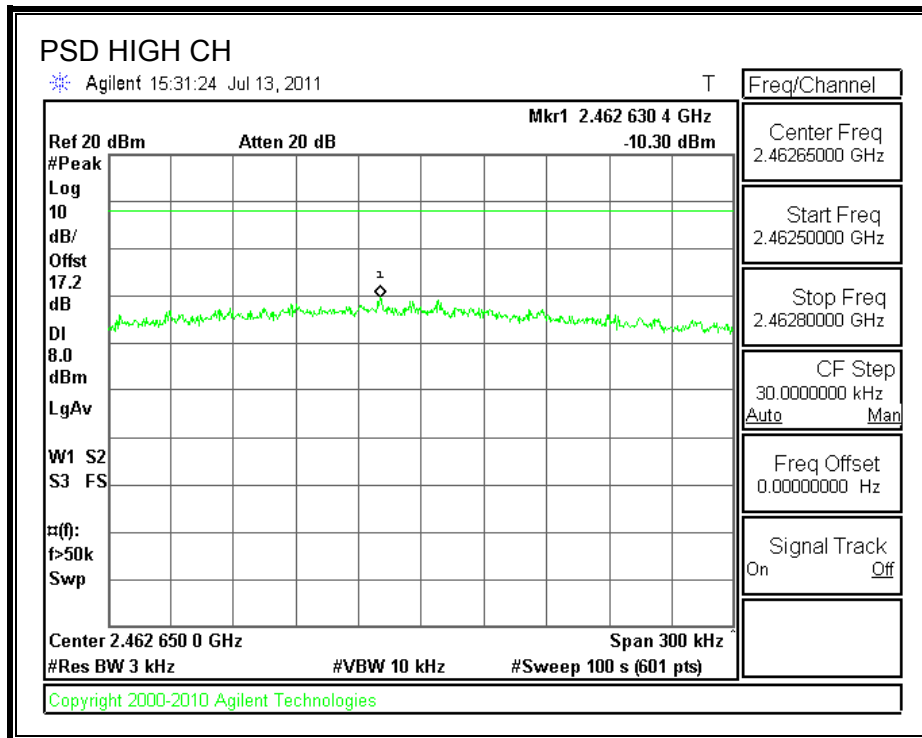
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.99	8	-19.99
Middle	2437	-11.52	8	-19.52
High	2462	-10.30	8	-18.30

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.

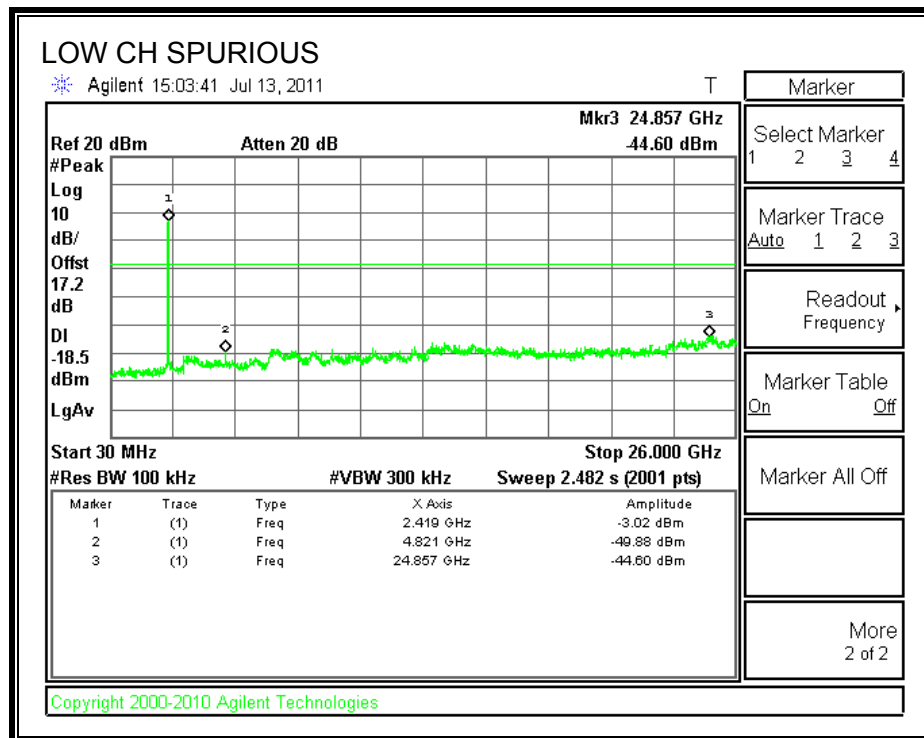
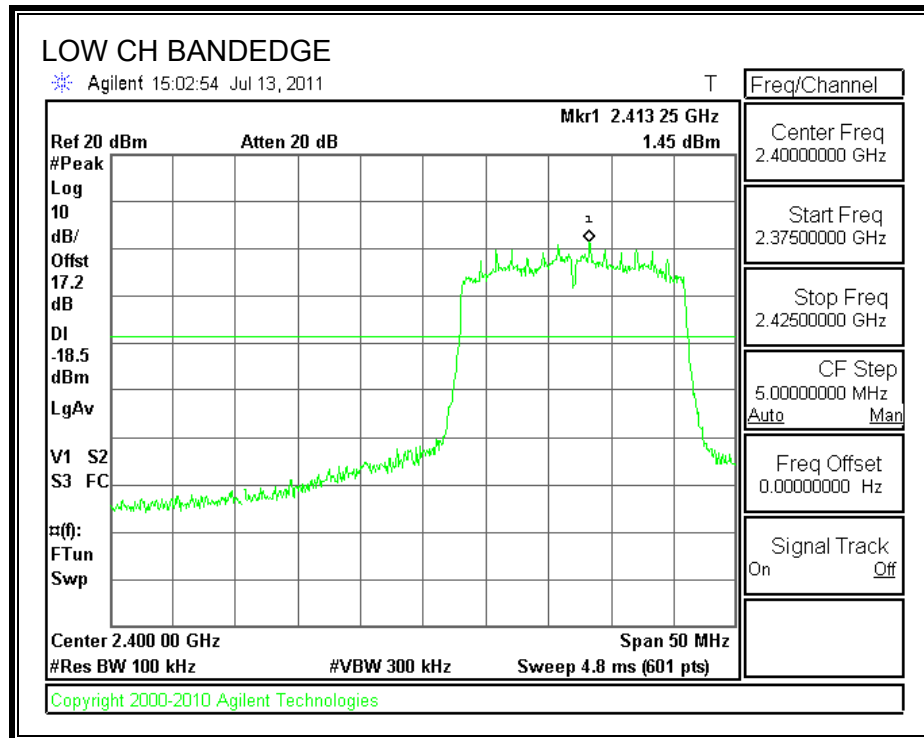
TEST PROCEDURE

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.

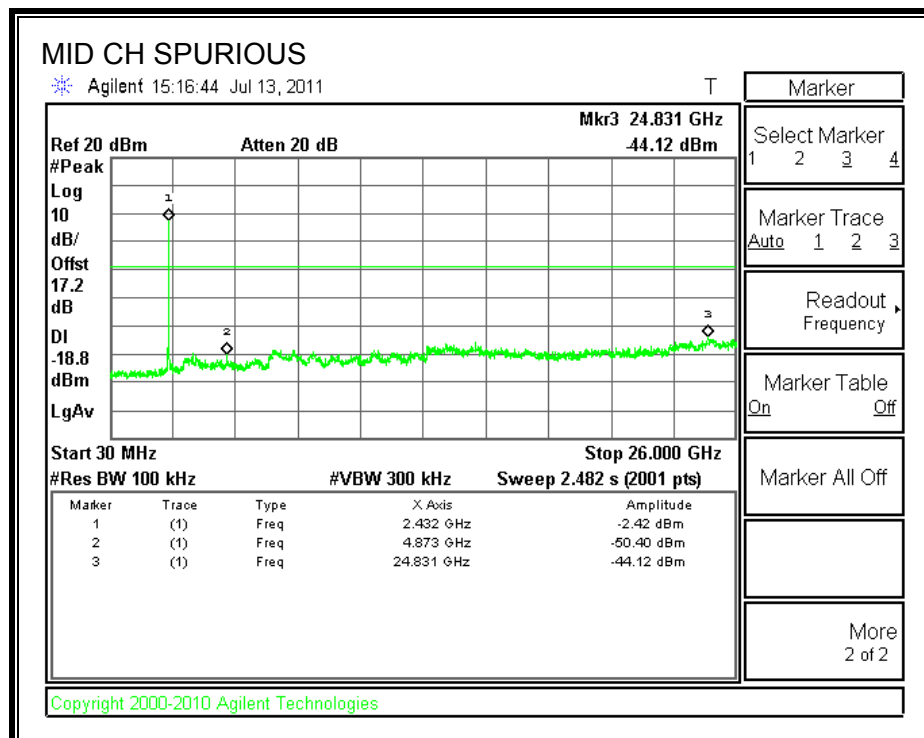
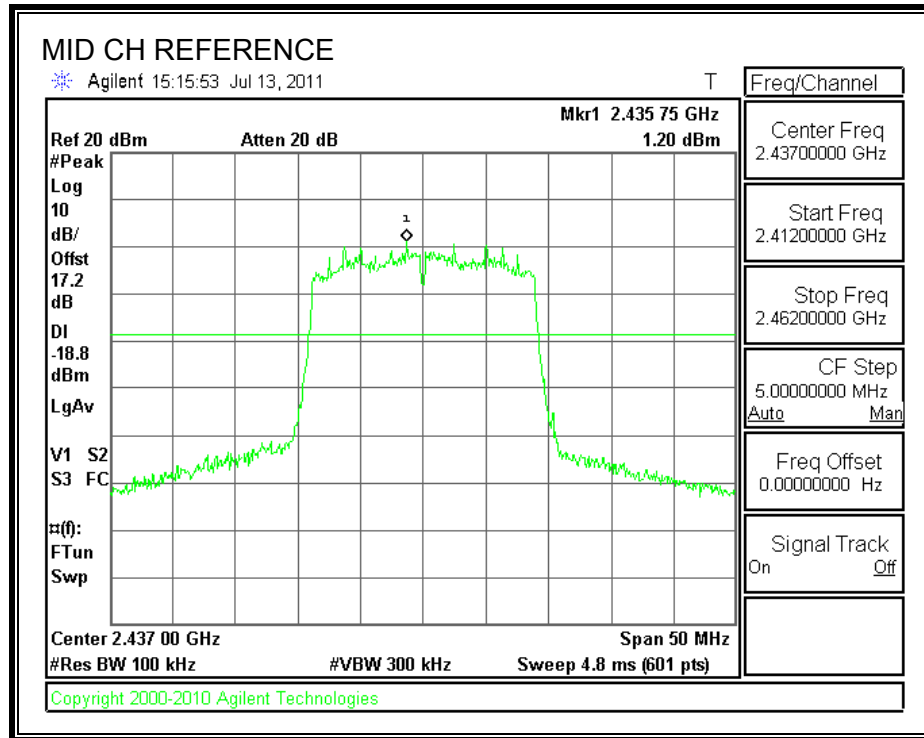
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

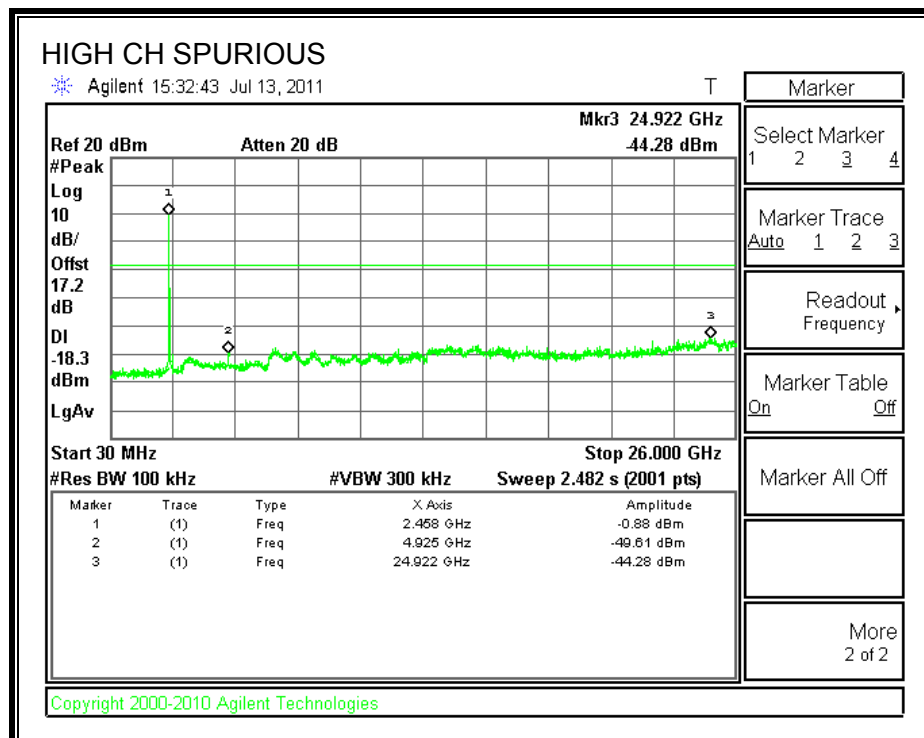
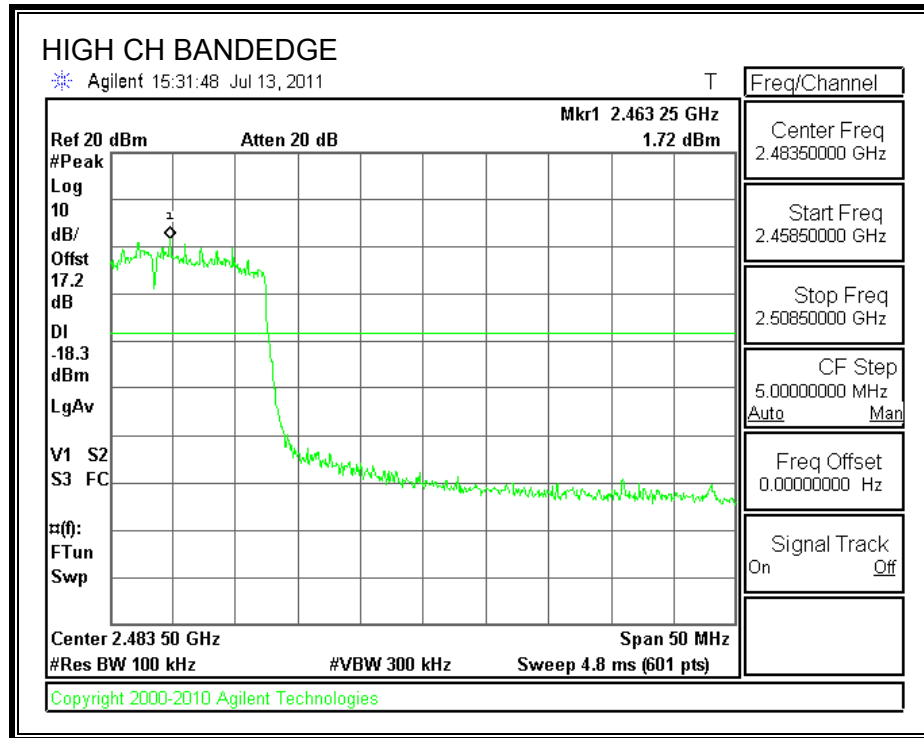
SPURIOUS EMISSIONS, LOW CHANNEL



SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



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.

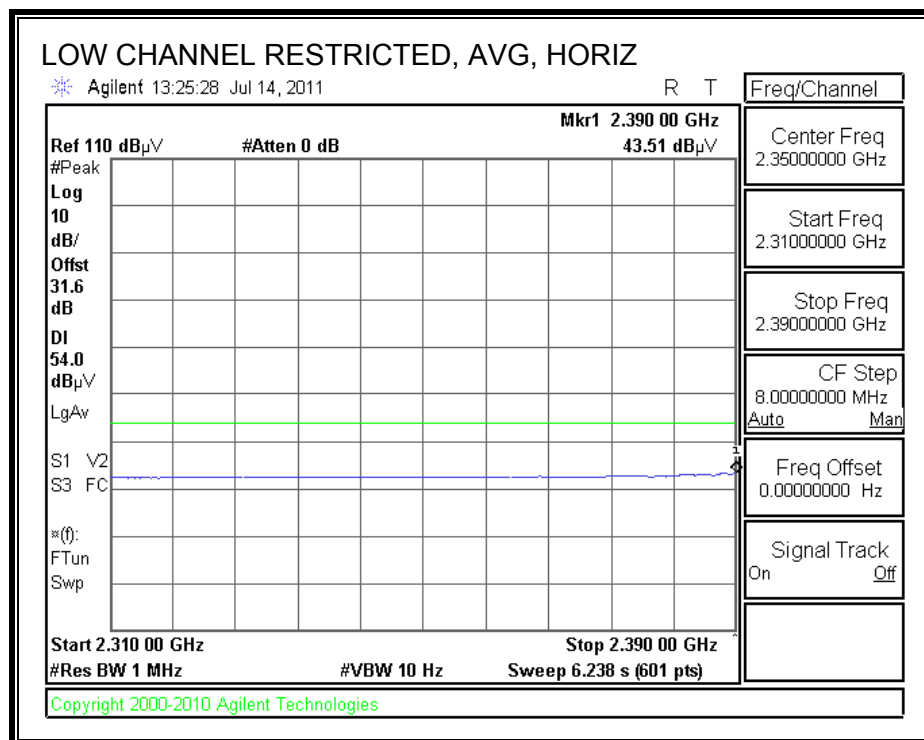
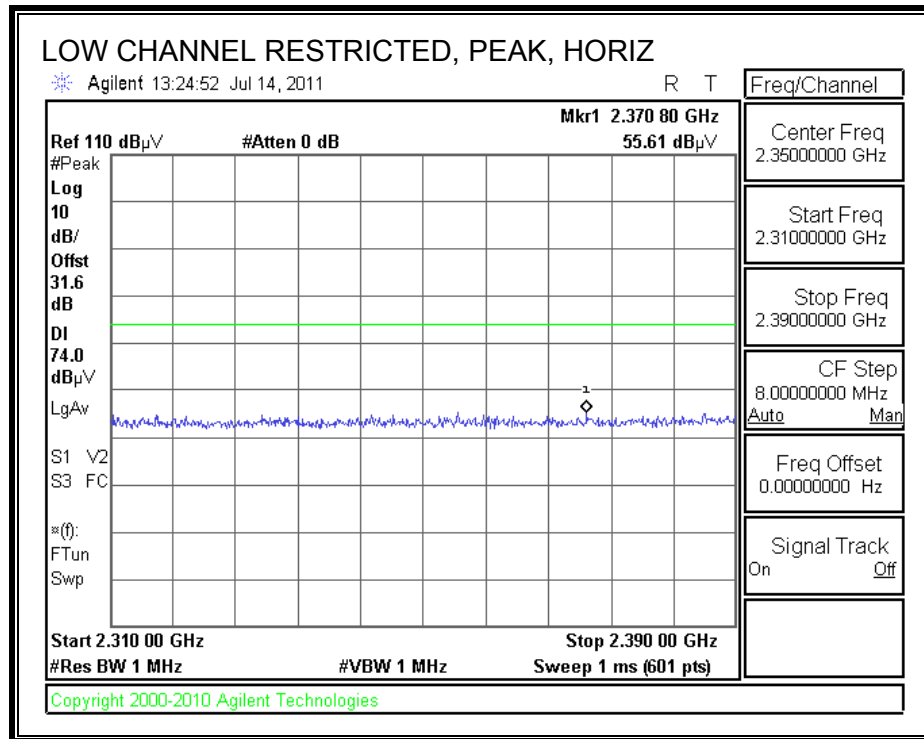
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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

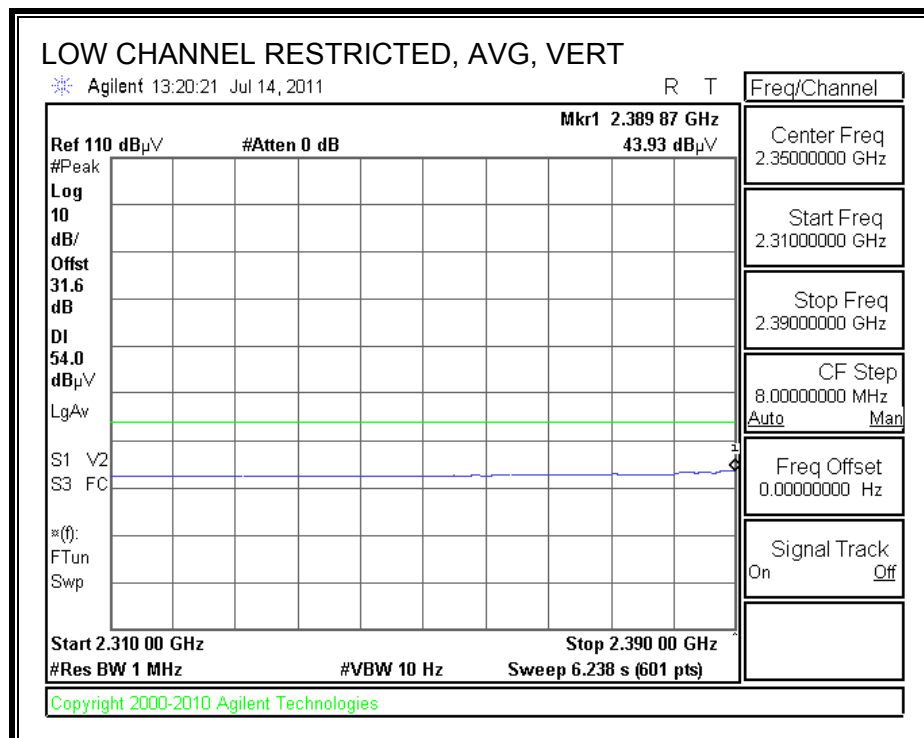
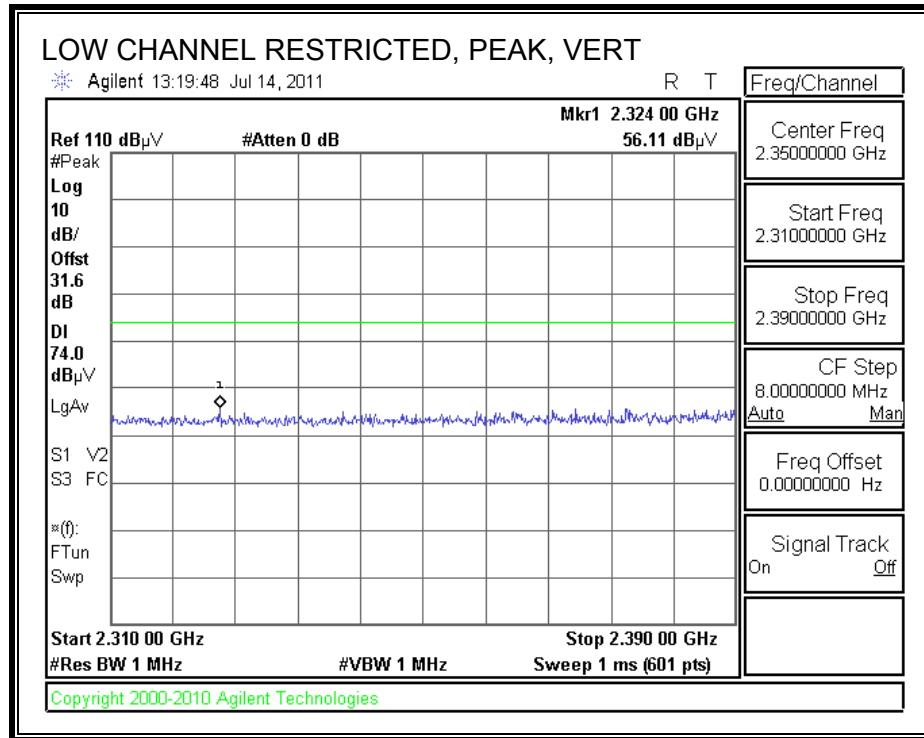
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. 802.11b MODE IN THE 2.4 GHz BAND

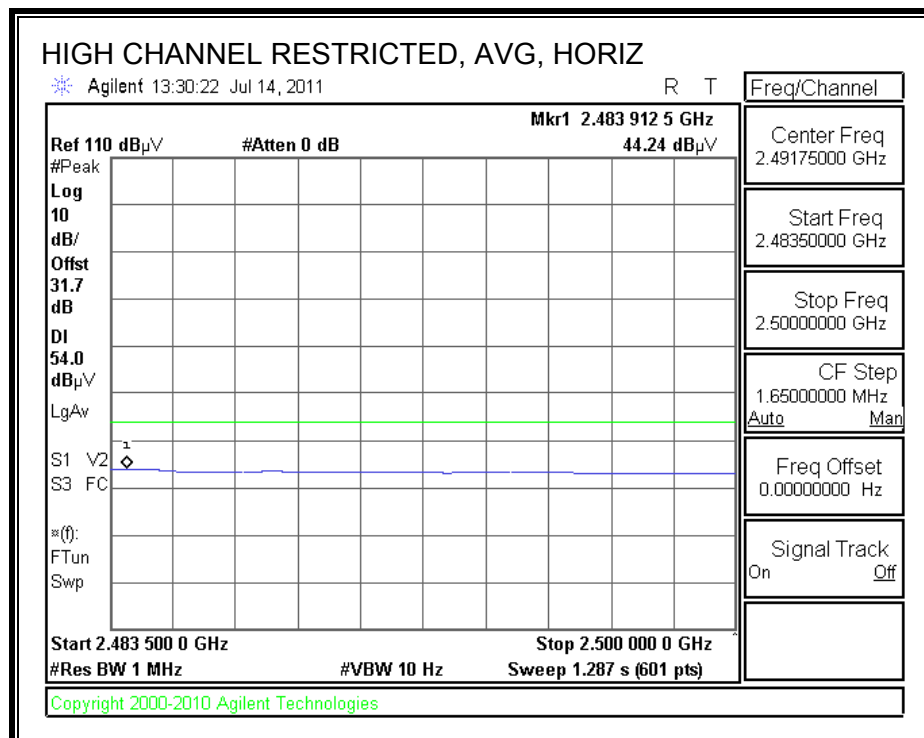
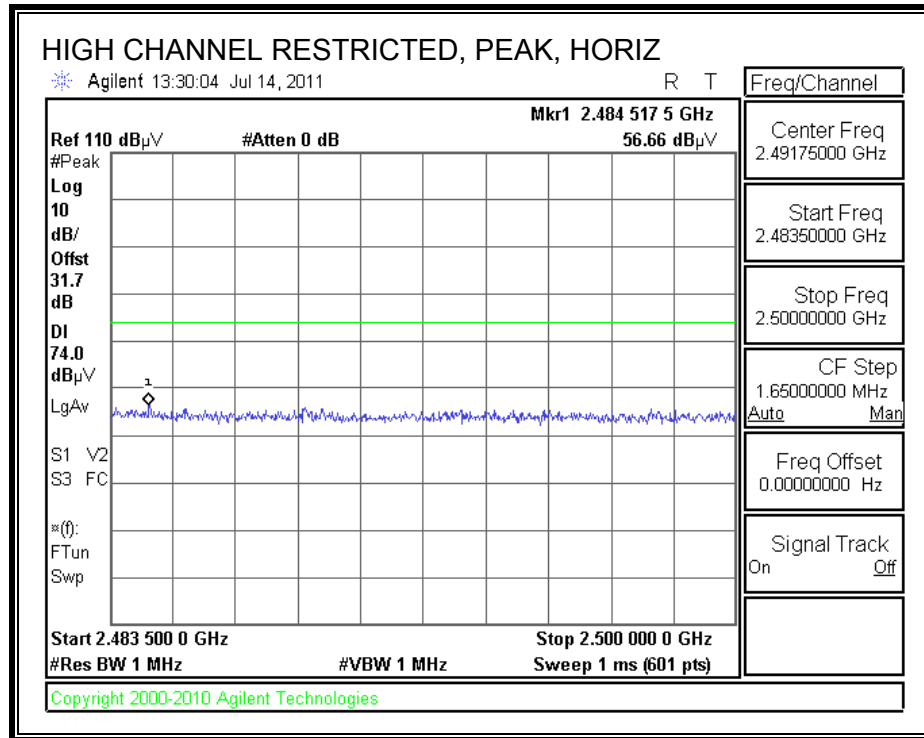
RESTRICTED BANEDGE(LOW CHANNEL, HORIZONTAL)



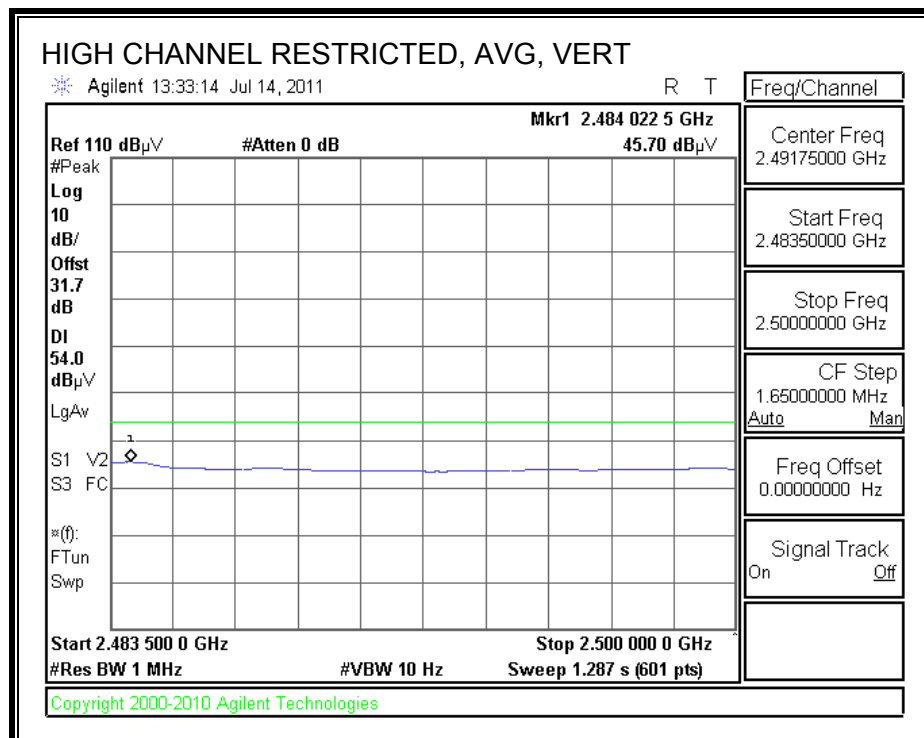
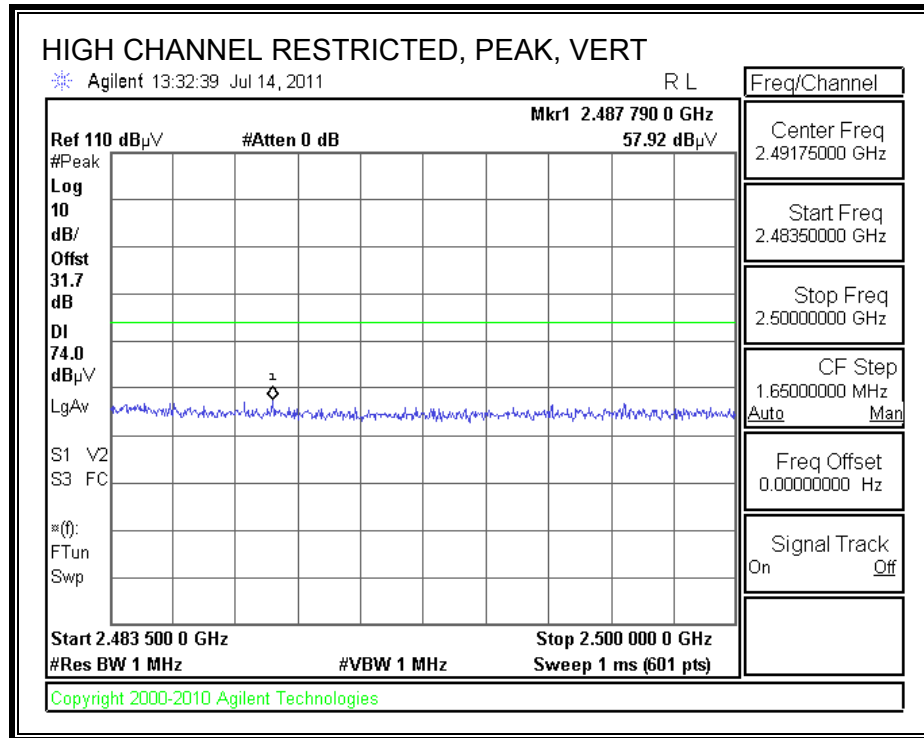
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 07/14/11
Project #: 11U13917
Company: LG Electronics
Test Target: FCC Class B
Mode Oper: Tx 11b Mode

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

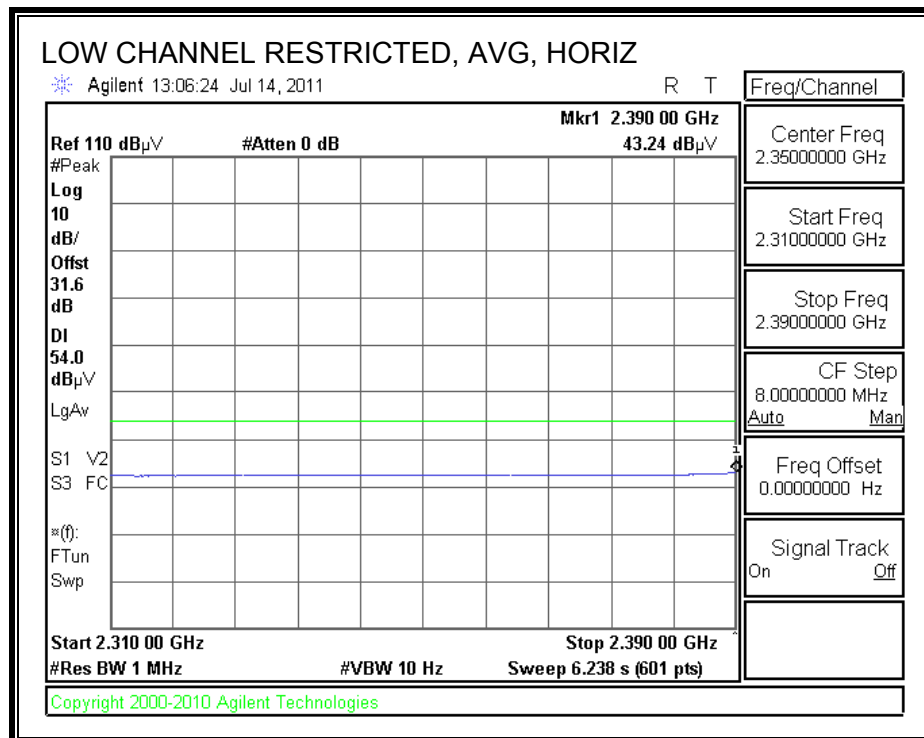
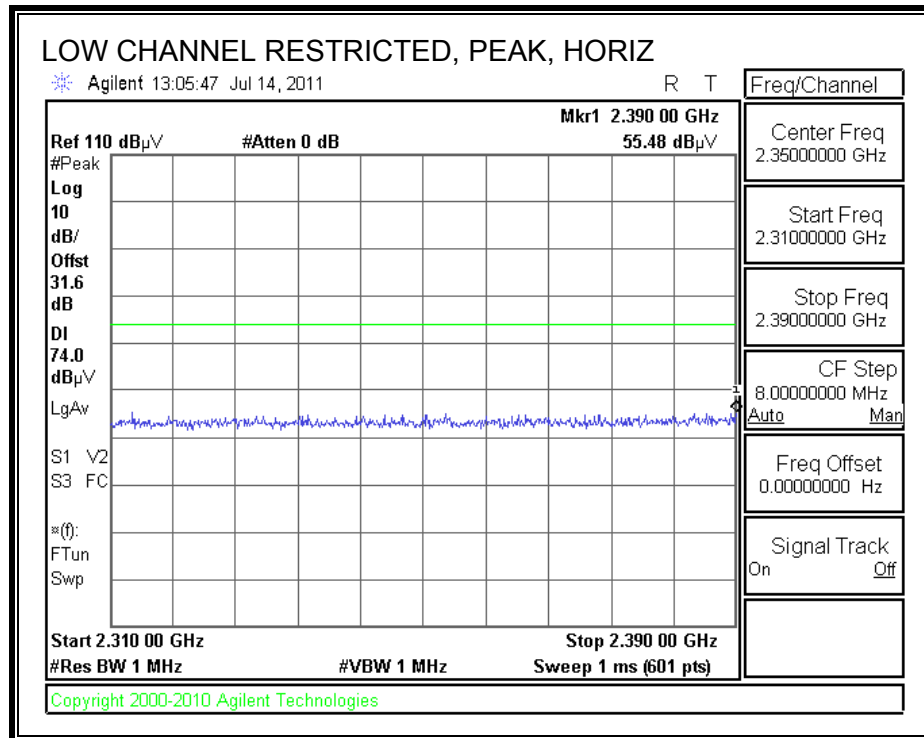
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
LOW CHANNEL, 2412MHz															
4.824	3.0	49.5	32.7	5.8	-34.8	0.0	0.0	53.1	74.0	-20.9	V	P	98.0	18.0	
4.824	3.0	47.4	32.7	5.8	-34.8	0.0	0.0	51.0	54.0	-3.0	V	A	98.0	18.0	
12.060	3.0	33.7	38.5	9.8	-32.5	0.0	0.0	49.5	74.0	-24.5	V	P	150.0	356.0	
12.060	3.0	21.1	38.5	9.8	-32.5	0.0	0.0	36.9	54.0	-17.1	V	A	150.0	356.0	
4.824	3.0	46.9	32.7	5.8	-34.8	0.0	0.0	50.6	74.0	-23.4	H	P	100.0	341.0	
4.824	3.0	44.4	32.7	5.8	-34.8	0.0	0.0	48.0	54.0	-6.0	H	A	100.0	341.0	
12.060	3.0	34.3	38.5	9.8	-32.5	0.0	0.0	50.1	74.0	-23.9	H	P	129.0	78.0	
12.060	3.0	21.3	38.5	9.8	-32.5	0.0	0.0	37.1	54.0	-16.9	H	A	129.0	78.0	
MID CHANNEL, 2437MHz															
4.874	3.0	48.5	32.7	5.8	-34.8	0.0	0.0	52.2	74.0	-21.8	V	P	98.0	147.0	
4.874	3.0	46.3	32.7	5.8	-34.8	0.0	0.0	50.0	54.0	-4.0	V	A	98.0	147.0	
7.311	3.0	46.5	35.5	7.3	-34.1	0.0	0.0	55.1	74.0	-18.9	V	P	98.0	325.0	
7.311	3.0	41.9	35.5	7.3	-34.1	0.0	0.0	50.6	54.0	-3.4	V	A	98.0	325.0	
4.874	3.0	47.3	32.7	5.8	-34.8	0.0	0.0	51.0	74.0	-23.0	H	P	101.0	213.0	
4.874	3.0	44.9	32.7	5.8	-34.8	0.0	0.0	48.6	54.0	-5.4	H	A	101.0	213.0	
7.311	3.0	40.4	35.5	7.3	-34.1	0.0	0.0	49.0	74.0	-25.0	H	P	101.0	52.0	
7.311	3.0	33.6	35.5	7.3	-34.1	0.0	0.0	42.2	54.0	-11.8	H	A	101.0	52.0	
HIGH CHANNEL, 2462MHz															
4.924	3.0	47.4	32.7	5.9	-34.8	0.0	0.0	51.2	74.0	-22.8	H	P	99.0	206.0	
4.924	3.0	45.1	32.7	5.9	-34.8	0.0	0.0	48.9	54.0	-5.1	H	A	99.0	206.0	
7.386	3.0	39.9	35.6	7.3	-34.1	0.0	0.0	48.7	74.0	-25.3	H	P	150.0	52.0	
7.386	3.0	32.3	35.6	7.3	-34.1	0.0	0.0	41.0	54.0	-13.0	H	A	150.0	52.0	
12.310	3.0	33.1	38.5	9.9	-32.5	0.0	0.0	48.9	74.0	-25.1	H	P	118.0	59.0	Noise floor
12.310	3.0	20.7	38.5	9.9	-32.5	0.0	0.0	36.6	54.0	-17.4	H	A	118.0	59.0	Noise floor
4.924	3.0	48.5	32.7	5.9	-34.8	0.0	0.0	52.3	74.0	-21.7	V	P	101.0	294.0	
4.924	3.0	46.7	32.7	5.9	-34.8	0.0	0.0	50.5	54.0	-3.5	V	A	101.0	294.0	
7.386	3.0	41.3	35.6	7.3	-34.1	0.0	0.0	50.1	74.0	-23.9	V	P	101.0	362.0	
7.386	3.0	35.4	35.6	7.3	-34.1	0.0	0.0	44.2	54.0	-9.8	V	A	101.0	362.0	
12.310	3.0	33.1	38.5	9.9	-32.5	0.0	0.0	48.9	74.0	-25.1	V	P	107.0	206.0	Noise floor
12.310	3.0	20.7	38.5	9.9	-32.5	0.0	0.0	36.5	54.0	-17.5	V	A	107.0	206.0	Noise floor

Rev. 4.1.2.7

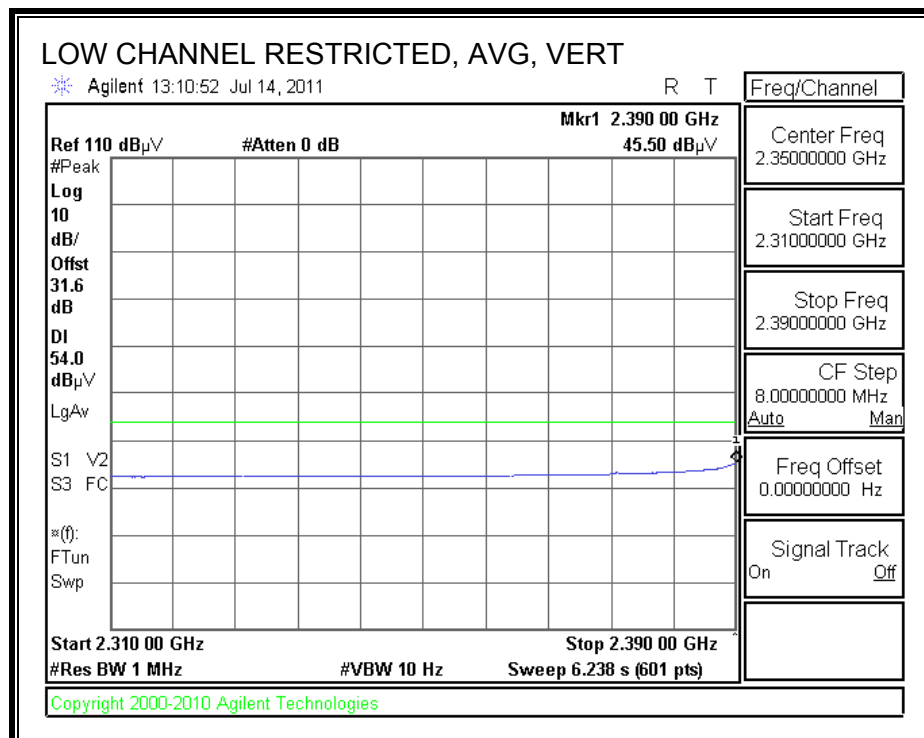
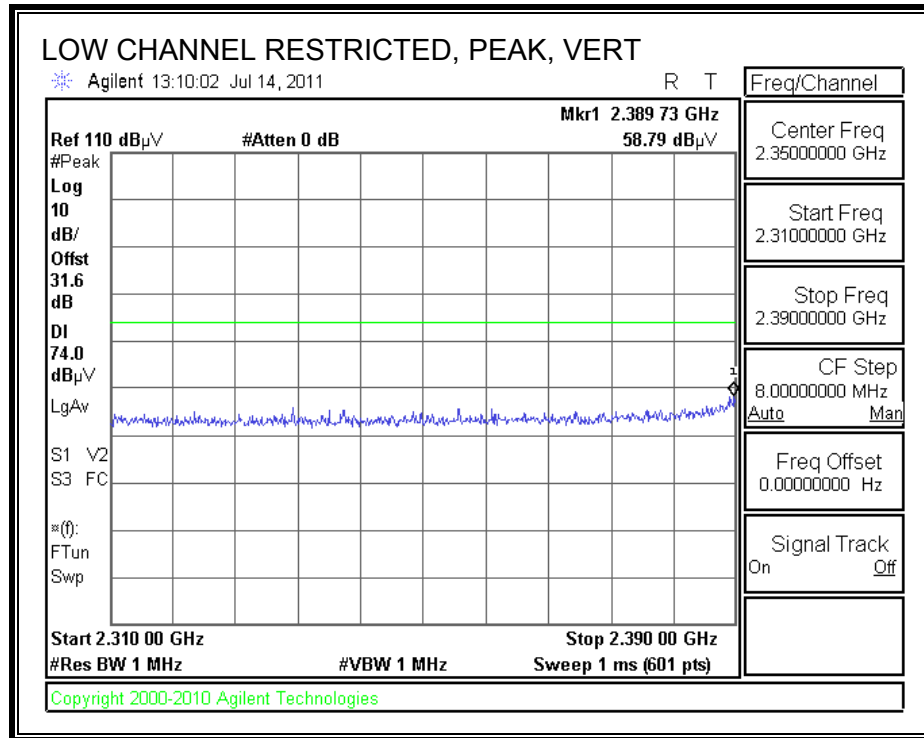
Note: No other emissions were detected above the system noise floor.

8.2.2. 802.11g MODE IN THE 2.4 GHz BAND

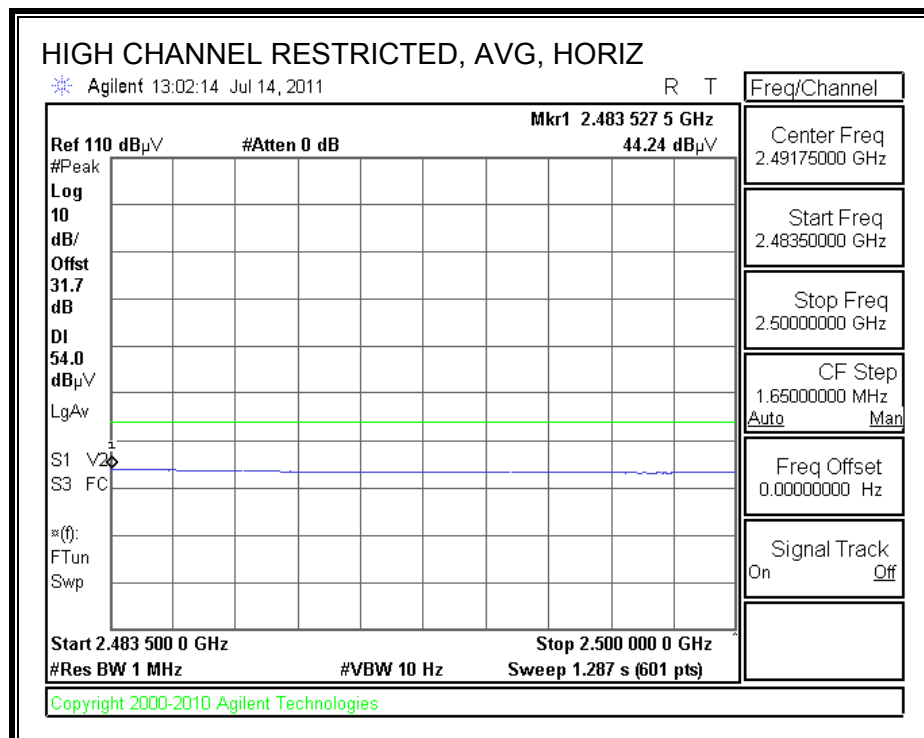
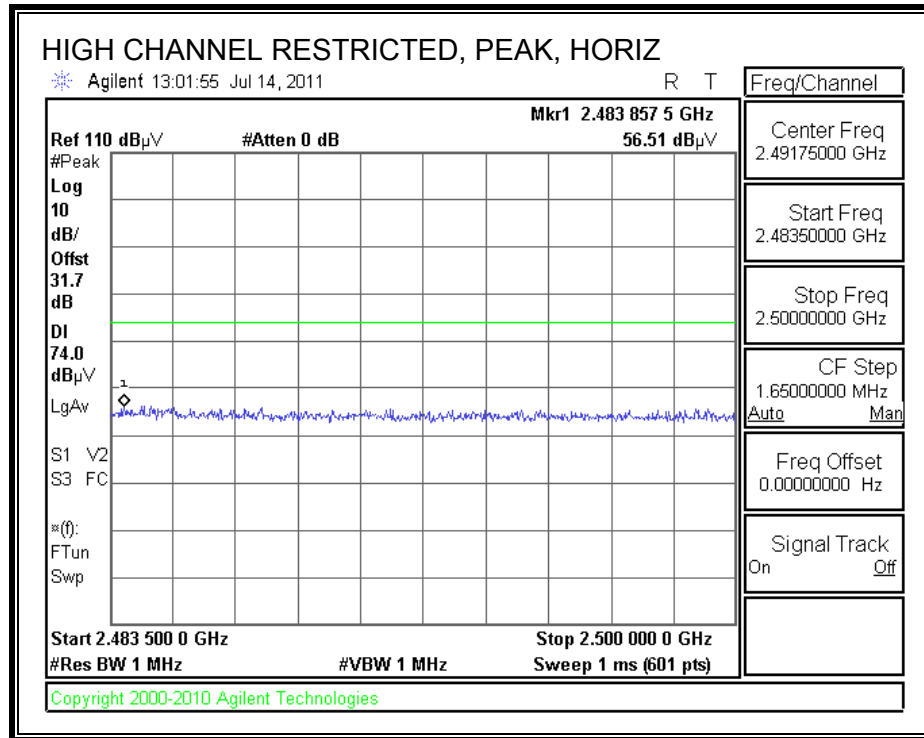
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



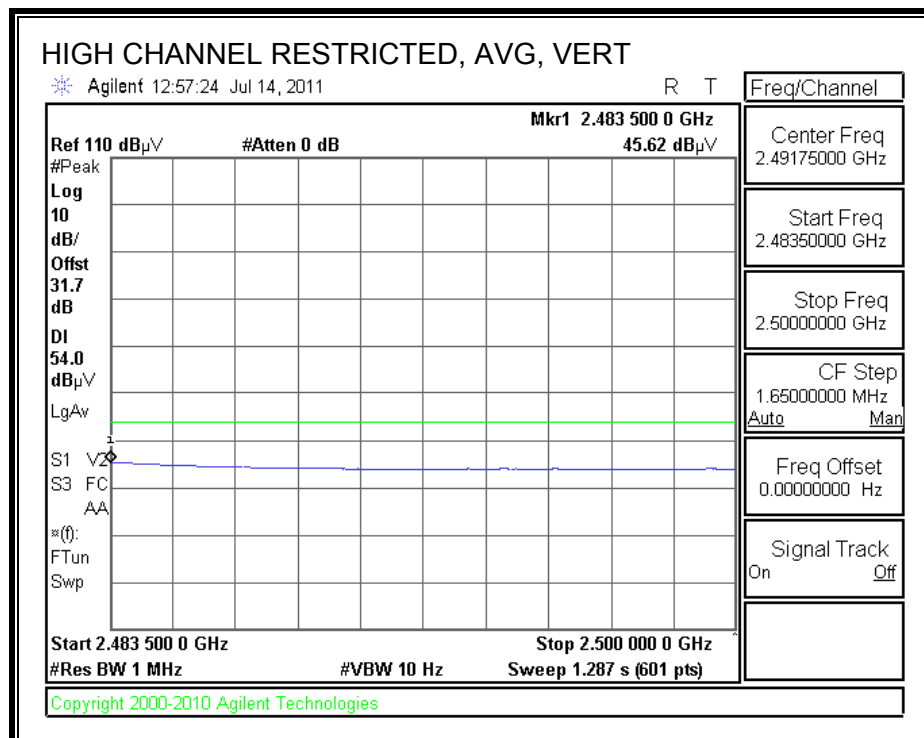
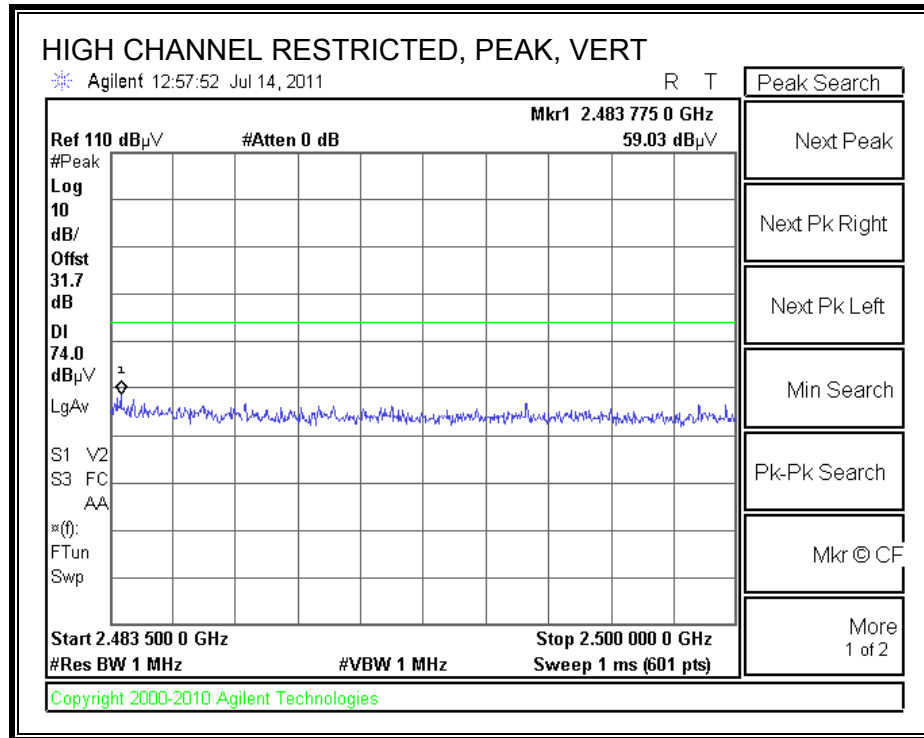
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Thanh Nguyen
Date: 07/14/11
Project #: 11U13917
Company: LG Electronics
Test Target: FCC Class B
Mode Oper: Tx 11g Mode

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

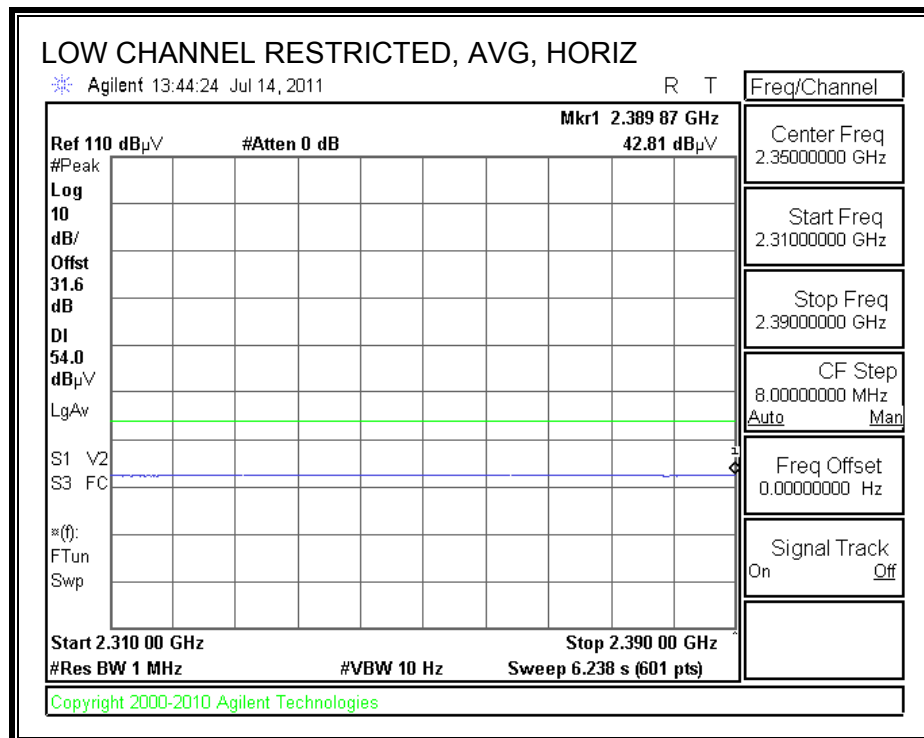
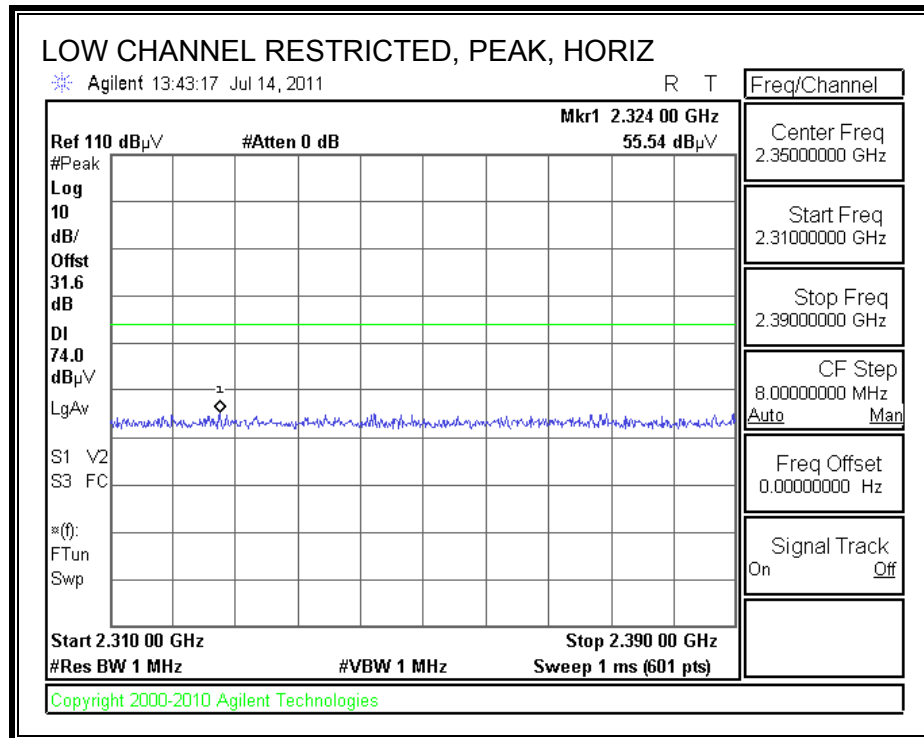
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel, 2412MHz															
4.824	3.0	46.5	32.7	5.8	-34.8	0.0	0.0	50.1	74.0	-23.9	V	P	98.0	268.0	
4.824	3.0	32.4	32.7	5.8	-34.8	0.0	0.0	36.0	54.0	-18.0	V	A	98.0	268.0	
4.824	3.0	41.2	32.7	5.8	-34.8	0.0	0.0	44.9	74.0	-29.1	H	P	98.0	352.0	
4.824	3.0	28.2	32.7	5.8	-34.8	0.0	0.0	31.8	54.0	-22.2	H	A	98.0	352.0	
Mid Channel, 2437MHz															
4.874	3.0	41.5	32.7	5.8	-34.8	0.0	0.0	45.2	74.0	-28.8	V	P	98.0	163.0	
4.874	3.0	28.8	32.7	5.8	-34.8	0.0	0.0	32.5	54.0	-21.5	V	A	98.0	163.0	
7.311	3.0	47.3	35.5	7.3	-34.1	0.0	0.0	55.9	74.0	-18.1	V	P	170.0	327.0	
7.311	3.0	30.2	35.5	7.3	-34.1	0.0	0.0	38.8	54.0	-15.2	V	A	170.0	327.0	
4.874	3.0	42.4	32.7	5.8	-34.8	0.0	0.0	46.1	74.0	-27.9	H	P	98.0	353.0	
4.874	3.0	29.6	32.7	5.8	-34.8	0.0	0.0	33.3	54.0	-20.7	H	A	98.0	353.0	
7.311	3.0	37.3	35.2	7.3	-34.1	0.0	0.0	45.7	74.0	-28.3	H	P	128.0	273.0	
7.311	3.0	24.1	35.2	7.3	-34.1	0.0	0.0	32.5	54.0	-21.5	H	A	128.0	273.0	
High Channel, 2462MHz															
4.924	3.0	46.5	32.8	5.9	-34.8	0.0	0.0	50.4	74.0	-23.6	V	P	169.0	99.0	
4.924	3.0	31.9	32.8	5.9	-34.8	0.0	0.0	35.8	54.0	-18.2	V	A	169.0	99.0	
7.386	3.0	44.6	35.3	7.3	-34.1	0.0	0.0	53.1	74.0	-20.9	V	P	150.0	317.0	
7.386	3.0	28.8	35.3	7.3	-34.1	0.0	0.0	37.4	54.0	-16.6	V	A	150.0	317.0	
4.924	3.0	42.7	32.8	5.9	-34.8	0.0	0.0	46.6	74.0	-27.4	H	P	102.0	201.0	
4.924	3.0	29.5	32.8	5.9	-34.8	0.0	0.0	33.4	54.0	-20.6	H	A	102.0	201.0	
7.386	3.0	37.0	35.3	7.3	-34.1	0.0	0.0	45.6	74.0	-28.4	H	P	107.0	35.0	
7.386	3.0	24.0	35.3	7.3	-34.1	0.0	0.0	32.5	54.0	-21.5	H	A	107.0	35.0	

Rev. 4.1.2.7

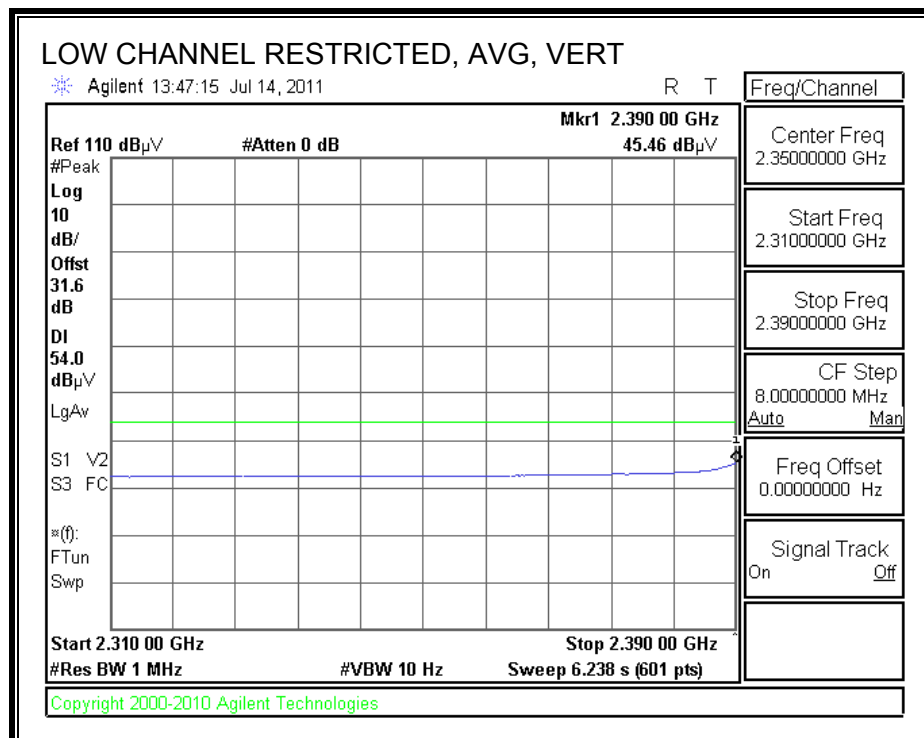
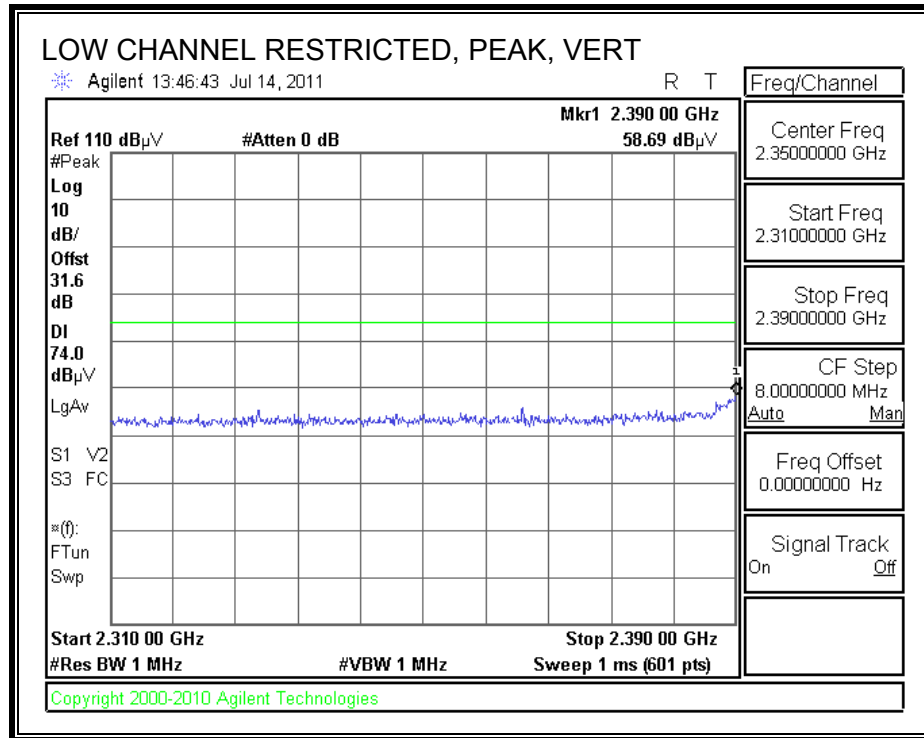
Note: No other emissions were detected above the system noise floor.

8.2.3. 802.11n HT20 SISO MODE IN THE 2.4 GHz BAND

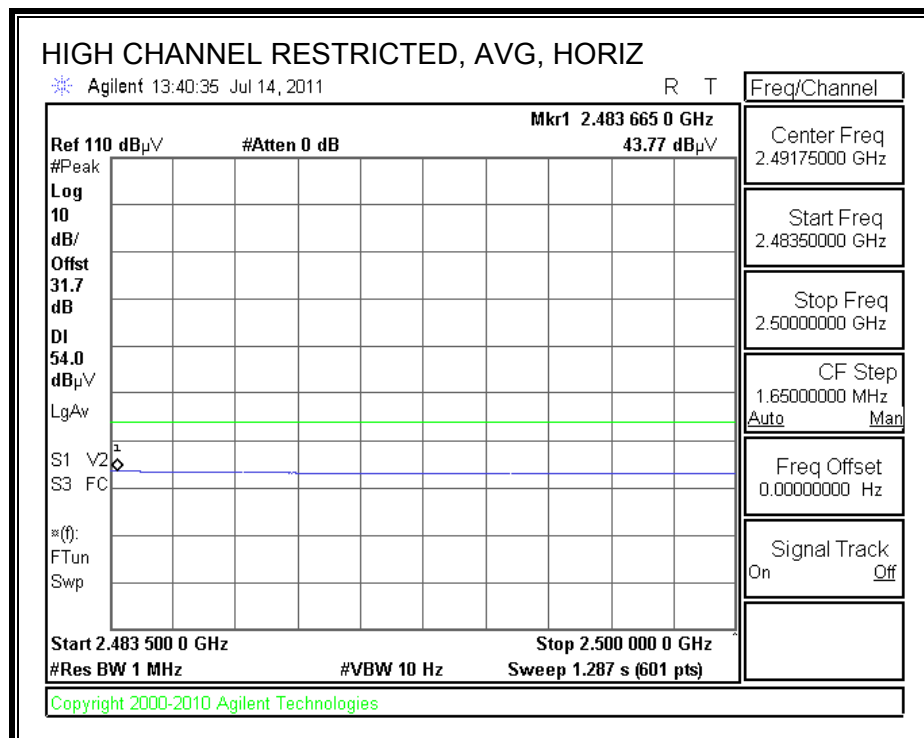
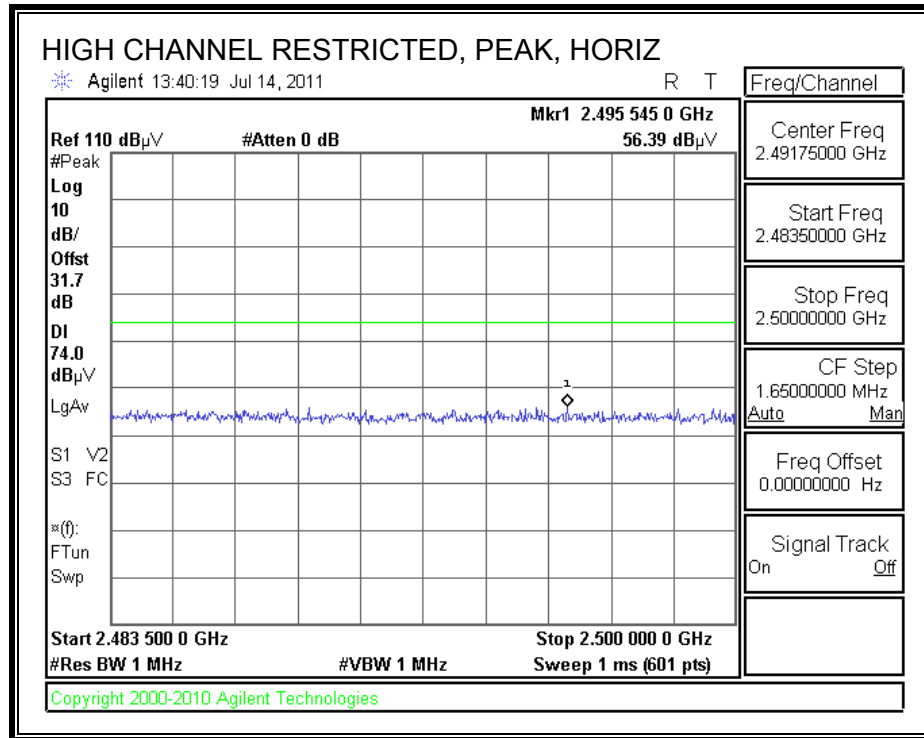
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



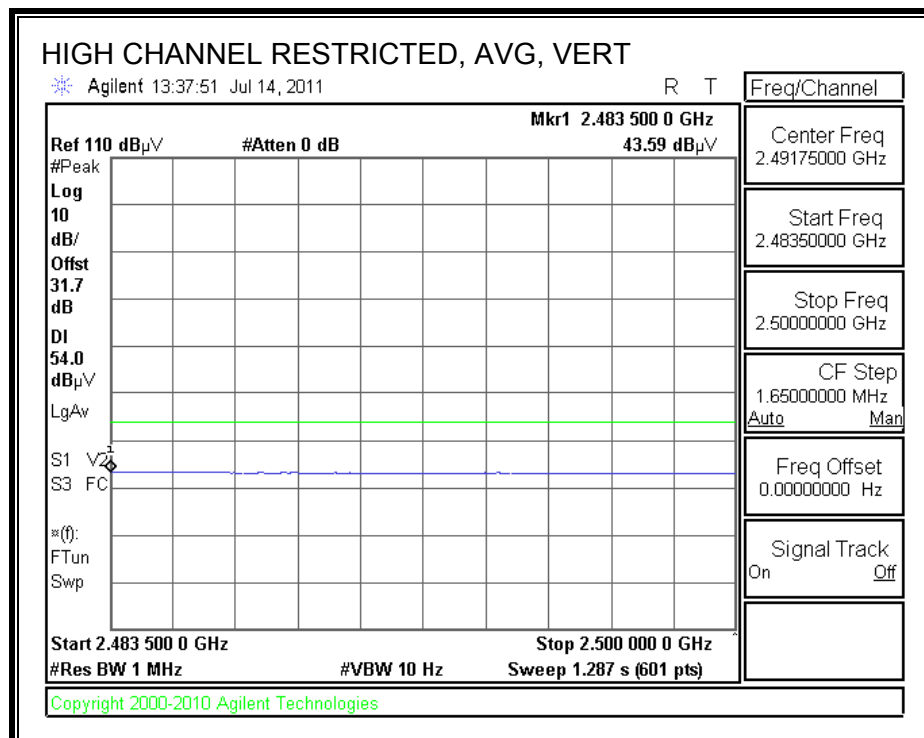
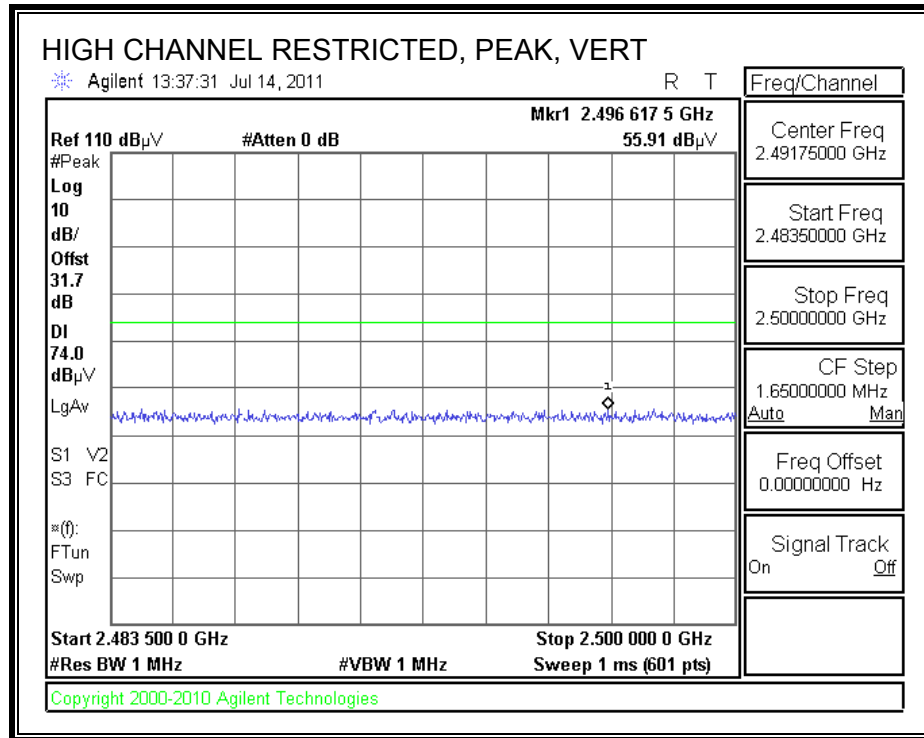
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Thanh Nguyen
Date: 07/14/11
Project #: 11U13917
Company: LG Electronics
Test Target: FCC Class B
Mode Oper: Tx 11n Mode

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

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel, 2412MHz															
4.824	3.0	45.4	32.8	5.8	-34.8	0.0	0.0	49.1	74.0	-24.9	V	P	98.0	157.0	
4.824	3.0	31.0	32.8	5.8	-34.8	0.0	0.0	34.7	54.0	-19.3	V	A	98.0	157.0	
4.824	3.0	42.4	32.8	5.8	-34.8	0.0	0.0	46.2	74.0	-27.8	H	P	98.0	342.0	
4.824	3.0	29.4	32.8	5.8	-34.8	0.0	0.0	33.1	54.0	-20.9	H	A	98.0	342.0	
Mid Channel 2437MHz															
4.874	3.0	48.1	32.8	5.8	-34.8	0.0	0.0	52.0	74.0	-22.0	V	P	98.0	285.0	
4.874	3.0	34.4	32.8	5.8	-34.8	0.0	0.0	38.2	54.0	-15.8	V	A	98.0	285.0	
7.311	3.0	43.6	35.2	7.3	-34.1	0.0	0.0	51.9	74.0	-22.1	V	P	114.0	312.0	
7.311	3.0	28.1	35.2	7.3	-34.1	0.0	0.0	36.5	54.0	-17.5	V	A	114.0	312.0	
4.874	3.0	42.1	32.8	5.8	-34.8	0.0	0.0	45.9	74.0	-28.1	H	P	98.0	210.0	
4.874	3.0	29.1	32.8	5.8	-34.8	0.0	0.0	33.0	54.0	-21.0	H	A	98.0	210.0	
7.311	3.0	36.0	35.2	7.3	-34.1	0.0	0.0	44.4	74.0	-29.6	H	P	101.0	263.0	
7.311	3.0	23.3	35.2	7.3	-34.1	0.0	0.0	31.7	54.0	-22.3	H	A	101.0	263.0	
High Channel, 2462MHz															
4.924	3.0	47.8	32.8	5.9	-34.8	0.0	0.0	51.7	74.0	-22.3	V	P	98.0	291.0	
4.924	3.0	34.1	32.8	5.9	-34.8	0.0	0.0	38.0	54.0	-16.0	V	A	98.0	291.0	
7.386	3.0	42.1	35.3	7.3	-34.1	0.0	0.0	50.7	74.0	-23.3	V	P	101.0	325.0	
7.386	3.0	27.4	35.3	7.3	-34.1	0.0	0.0	36.0	54.0	-18.0	V	A	101.0	325.0	
4.924	3.0	40.8	32.8	5.9	-34.8	0.0	0.0	44.7	74.0	-29.3	H	P	98.0	36.0	
4.924	3.0	27.5	32.8	5.9	-34.8	0.0	0.0	31.4	54.0	-22.6	H	A	98.0	36.0	
7.386	3.0	35.9	35.3	7.3	-34.1	0.0	0.0	44.4	74.0	-29.6	H	P	178.0	313.0	
7.386	3.0	23.5	35.3	7.3	-34.1	0.0	0.0	32.0	54.0	-22.0	H	A	178.0	313.0	

Rev. 4.1.2.7

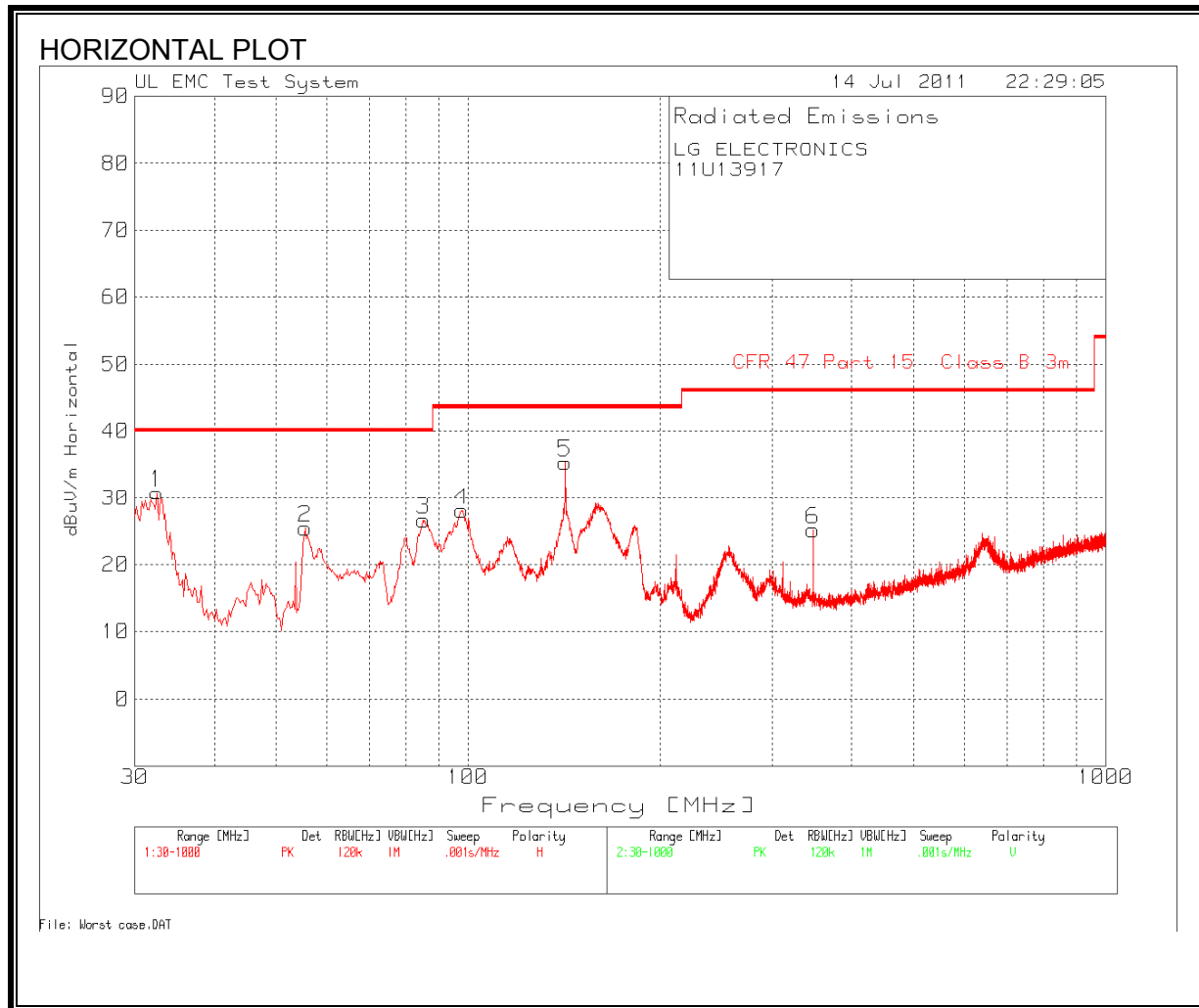
Note: No other emissions were detected above the system noise floor.

8.3. RECEIVER ABOVE 1 GHz

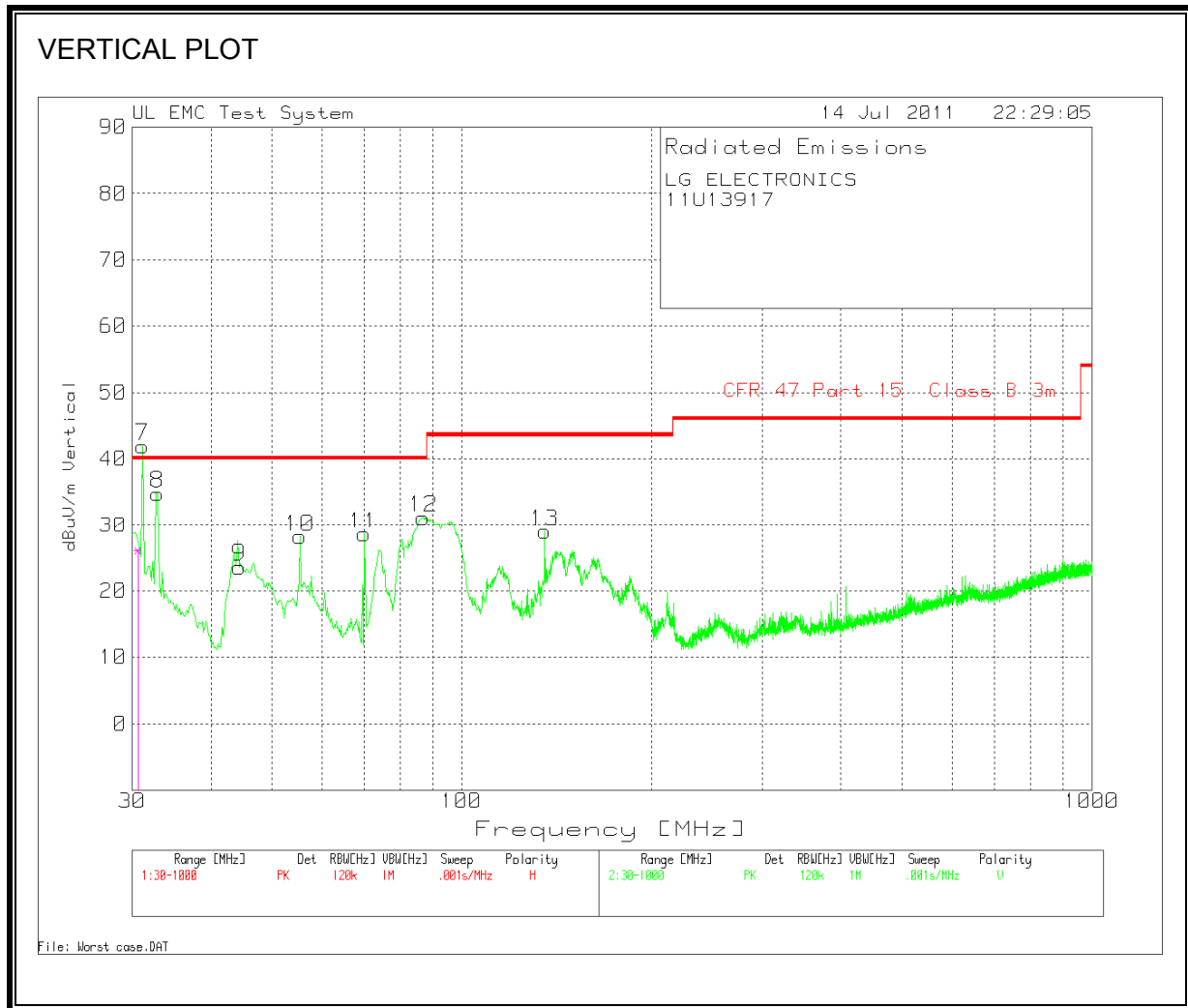
High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Company:		LGELECTRONICS															
Project #:		11U13917															
Date:		22/8/2011															
Test Engineer:		MENGISTU MEKURA															
Configuration:		EUT, HEADSET, AND AC ADAPTER															
Mode:		RX MODE, 20MHz BANDWIDTH															
Test Equipment:																	
Horn 1-18GHz				Pre-amplifier 1-26GHz				Pre-amplifier 26-40GHz				Horn > 18GHz				Limit	
T59; S/N: 3245 @3m				T145 Agilent 3008A005€												RX RSS 210	
Hi Frequency Cables																	
3' cable 22807700				12' cable 22807600				20' cable 22807500				HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz	
3' cable 22807700				12' cable 22807600				20' cable 22807500									
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)		
1.030	3.0	47.3	33.7	24.0	2.4	-36.1	0.0	0.0	37.6	24.0	74	54	-36.4	-30.0	V		
1.048	3.0	46.2	36.0	24.1	2.4	-36.1	0.0	0.0	36.6	26.4	74	54	-37.4	-27.6	H		
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)



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



HORIZONTAL AND VERTICAL DATA

LG Electronics						Test Engineer: Thanh Nguyen				
Project # 11U13917						Date: 07/14/2011				
WiFi										
30 - 1000MHz - HORIZONTAL										
Test Frequency	Meter Reading	Detector	5m B Cable below 1GHz.TX T [dB]	5m B T10 PreAmp below 1GHz.TXT [dB]	5m B T122 Bilog below 1GHz.TX T [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
32.52	39.67	PK	0.60	-28.30	18.80	30.77	40.00	-9.23	101	Horz
55.5875	44.32	PK	0.80	-28.20	8.50	25.42	40.00	-14.58	251	Horz
85.2458	46.14	PK	1.00	-28.10	7.60	26.64	40.00	-13.36	176	Horz
97.8457	46.29	PK	1.00	-28.10	8.90	28.09	43.50	-15.41	176	Horz
142.0424	49.00	PK	1.20	-27.90	13.00	35.30	43.50	-8.20	251	Horz
347.7118	36.53	PK	1.90	-27.50	14.20	25.13	46.00	-20.87	101	Horz
30 - 1000MHz - VERTICAL										
Test Frequency	Meter Reading	Detector	5m B Cable below 1GHz.TX T [dB]	5m B T10 PreAmp below 1GHz.TXT [dB]	5m B T122 Bilog below 1GHz.TX T [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
31.1631	50.21	PK	0.60	-28.30	19.40	41.91	40.00	1.91	250	Vert
31.1631	34.12	QP	0.60	-28.30	19.60	26.02	40.00	-13.98	189	Vert
32.9077	43.85	PK	0.60	-28.30	18.60	34.75	40.00	-5.25	101	Vert
44.3445	39.09	PK	0.70	-28.20	12.00	23.59	40.00	-16.41	101	Vert
55.3937	46.96	PK	0.80	-28.20	8.60	28.16	40.00	-11.84	101	Vert
69.9321	47.57	PK	0.90	-28.10	8.20	28.57	40.00	-11.43	176	Vert
86.8935	50.69	PK	1.00	-28.10	7.50	31.09	40.00	-8.91	101	Vert
135.4516	42.30	PK	1.20	-27.90	13.40	29.00	43.50	-14.50	176	Vert
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										
Text File: LG ELECTRONICS11U13917_QP.TXT										
File: Worst case.DAT										

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

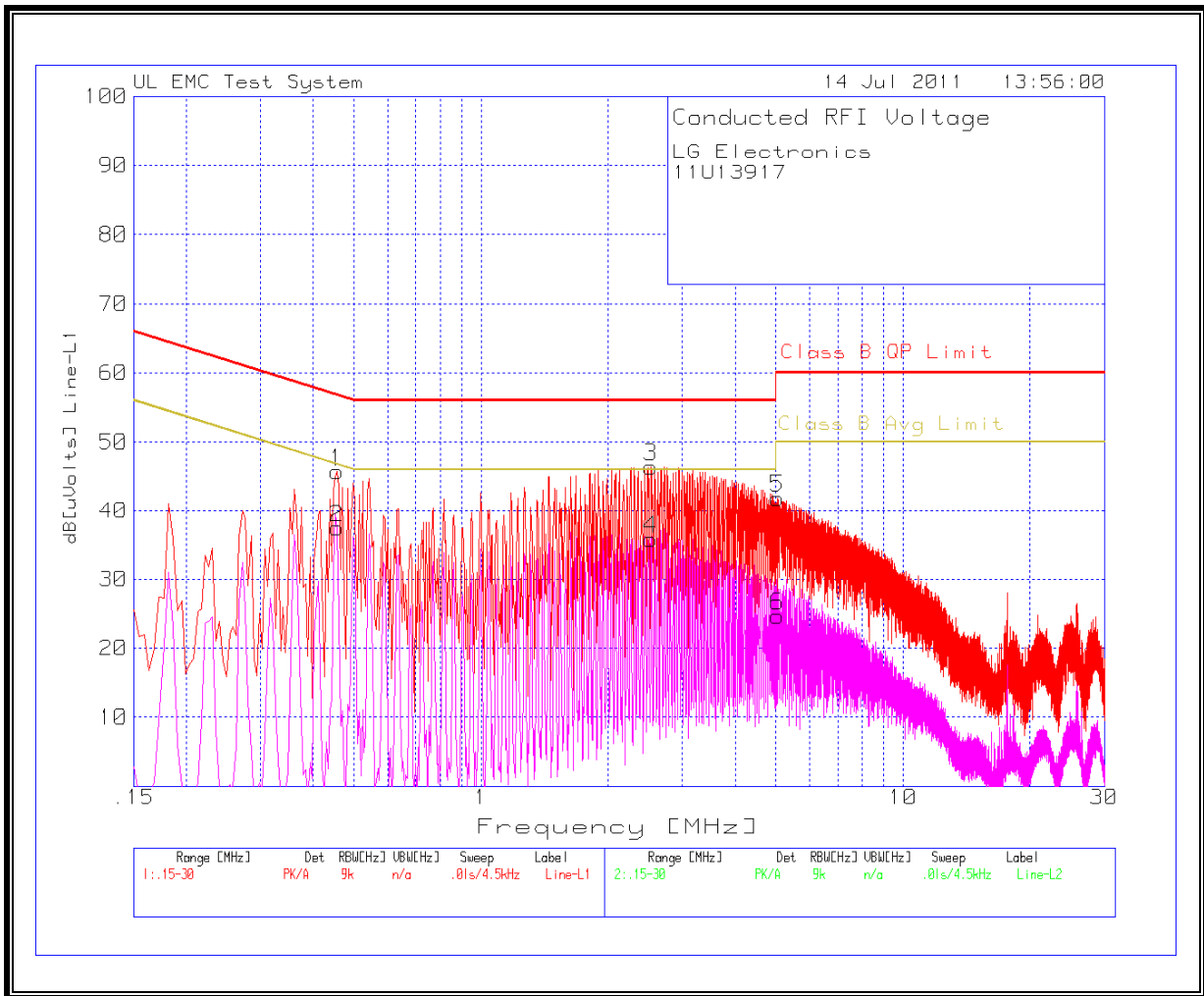
ANSI C63.4

RESULTS

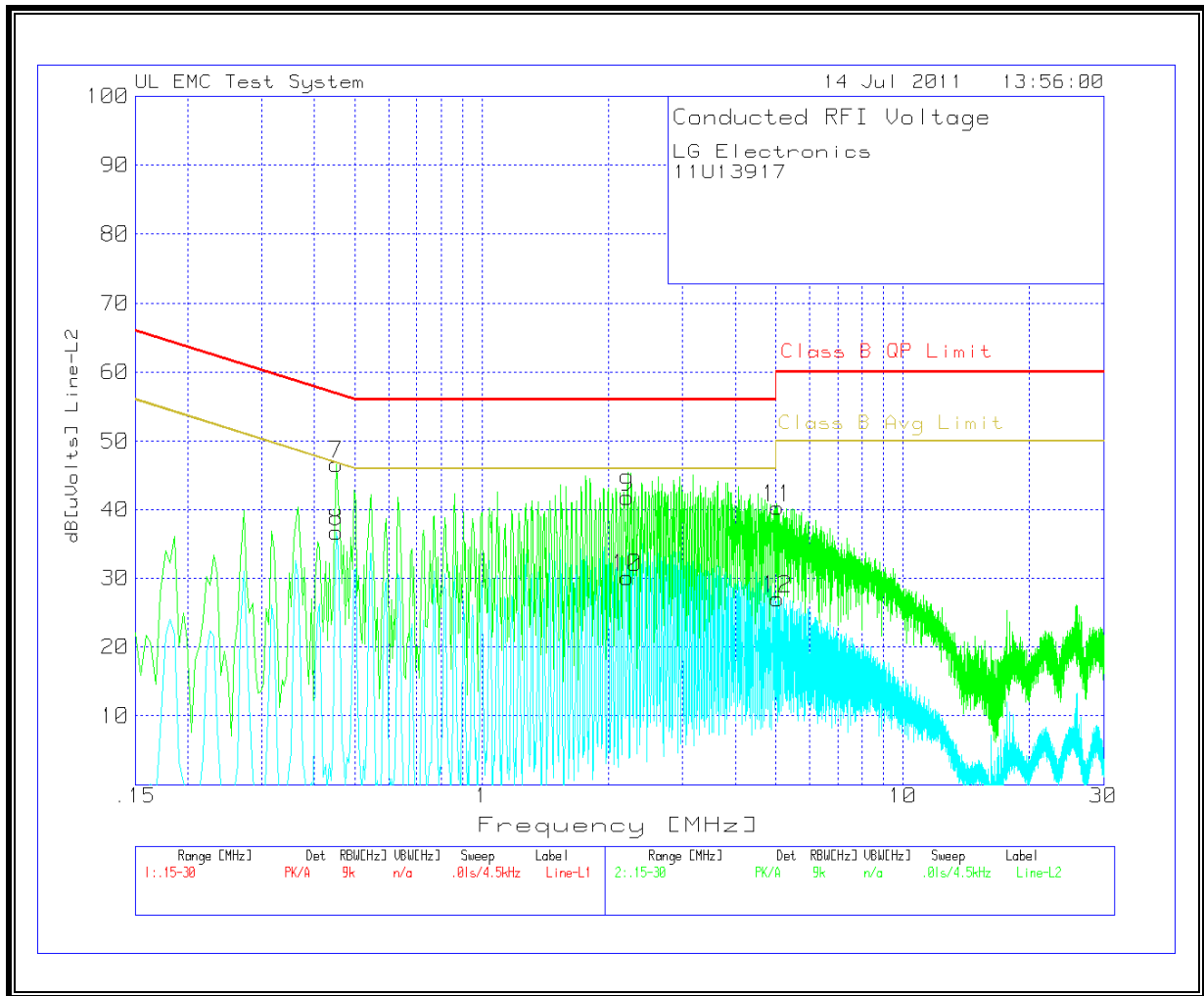
6 WORST EMISSIONS

LG Electronics						Test Enginner: Vien Tran			
11U13917						Date: 07/14/11			
Line-L1 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	LISN [dB]	Conducted Emission Cable [dB]	dB[uVolts]	Class B QP Limit	Margin	Class B Avg Limit	Margin
0.456	45.70	PK	0	0	45.70	56.80	-11.10	46.80	-1.10
0.456	37.50	Av	0	0	37.50	56.80	-19.30	46.80	-9.30
2.5305	46.47	PK	0	0	46.47	56.00	-9.53	46.00	0.47
2.5305	35.76	Av	0	0	35.76	56.00	-20.24	46.00	-10.24
5.0325	41.91	PK	0	0	41.91	60.00	-18.09	50.00	-8.09
5.0325	24.63	Av	0	0	24.63	60.00	-35.37	50.00	-25.37
Line-L2 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	LISN [dB]	Conducted Emission Cable [dB]	dB[uVolts]	Class B QP Limit	Margin	Class B Avg Limit	Margin
0.4515	46.62	PK	0	0	46.62	56.80	-10.18	46.80	-0.18
0.4515	36.75	Av	0	0	36.75	56.80	-20.05	46.80	-10.05
2.2155	41.91	PK	0	0	41.91	56.00	-14.09	46.00	-4.09
2.2155	30.07	Av	0	0	30.07	56.00	-25.93	46.00	-15.93
5.028	40.37	PK	0	0	40.37	60.00	-19.63	50.00	-9.63
5.028	26.98	Av	0	0	26.98	60.00	-33.02	50.00	-23.02
PK - Peak detector									
QP - Quasi-Peak detector									
LnAv - Linear Average detector									
LgAv - Log Average detector									
Av - Average detector									
CAV - CISPR Average detector									
RMS - RMS detection									
CRMS - CISPR RMS detection									

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/ <i>f</i>	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 / <i>f</i> ^{1.2}
150 000–300 000	0.158 <i>f</i> ^{0.5}	4.21 × 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 × 10 ⁻⁵ <i>f</i>	616 000 / <i>f</i> ^{1.2}

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

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

EQUATIONS

Power density is given by:

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

where

S = Power density in W/m²

EIRP = Equivalent Isotropic Radiated Power in W

D = Separation distance in m

Power density in units of W/m² is converted to units of mW/cm² by dividing by 10.

Distance is given by:

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

where

D = Separation distance in m

EIRP = Equivalent Isotropic Radiated Power in W

S = Power density in W/m²

For multiple 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.

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

where

P_x = Power of transmitter x

G_x = Numeric gain of antenna x

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/cm² (FCC) and 824 MHz / 150 = 5.5 W/m² (IC).

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

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	20.55	-1.95	18.60	0.07	0.14	0.014