



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

CERTIFICATION TEST REPORT

FOR

**SYNCHRONOUS NETWORK SYSTEM AC POWERED DUAL PROBE
TEMPERATURE SENSOR**

MODEL NUMBER: SNSATPD

**FCC ID: PZ3-SNST
IC: 4256A-SNST**

REPORT NUMBER: 10U13133-1, Revision A

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NVLAP LAB CODE 200065-0

Revision History

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--	04/12/10	Initial Issue	F. Ibrahim
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PRIMEX WIRELESS INC.,
965 WELLS STREET
LAKE GENEVA, WI, 53147, U.S.A

EUT DESCRIPTION: SYNCHRONOUS NETWORK SYSTEM AC POWERED DUAL
PROBE TEMPERATURE SENSOR

MODEL: SNSATPD

SERIAL NUMBER: 02139

DATE TESTED: APRIL 2-5, 2010

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

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

Tested By:



FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

TOM CHEN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

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 2, and RSS-210 Issue 7.

3. FACILITIES AND ACCREDITATION

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

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g Synchronous network system AC powered dual probe temperature sensor.

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	17.57	57.15
2412 - 2462	802.11g	22.92	195.88

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB antenna, with a maximum gain of -1.2 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was SNS_TEMP_SENS-1_2.a43 and SNS_RADIO-2.1.20.rom.

The test utility software used during testing was ART, rev. 5.2 #58.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power; therefore, radiated emissions 30-1000 MHz were performed at 11g High Channel (2462 MHz).

Worst-case data rates as provided by the client were:

11b: 1 Mbps

11g: 6 Mbps

5.6. DESCRIPTION OF TEST SETUP

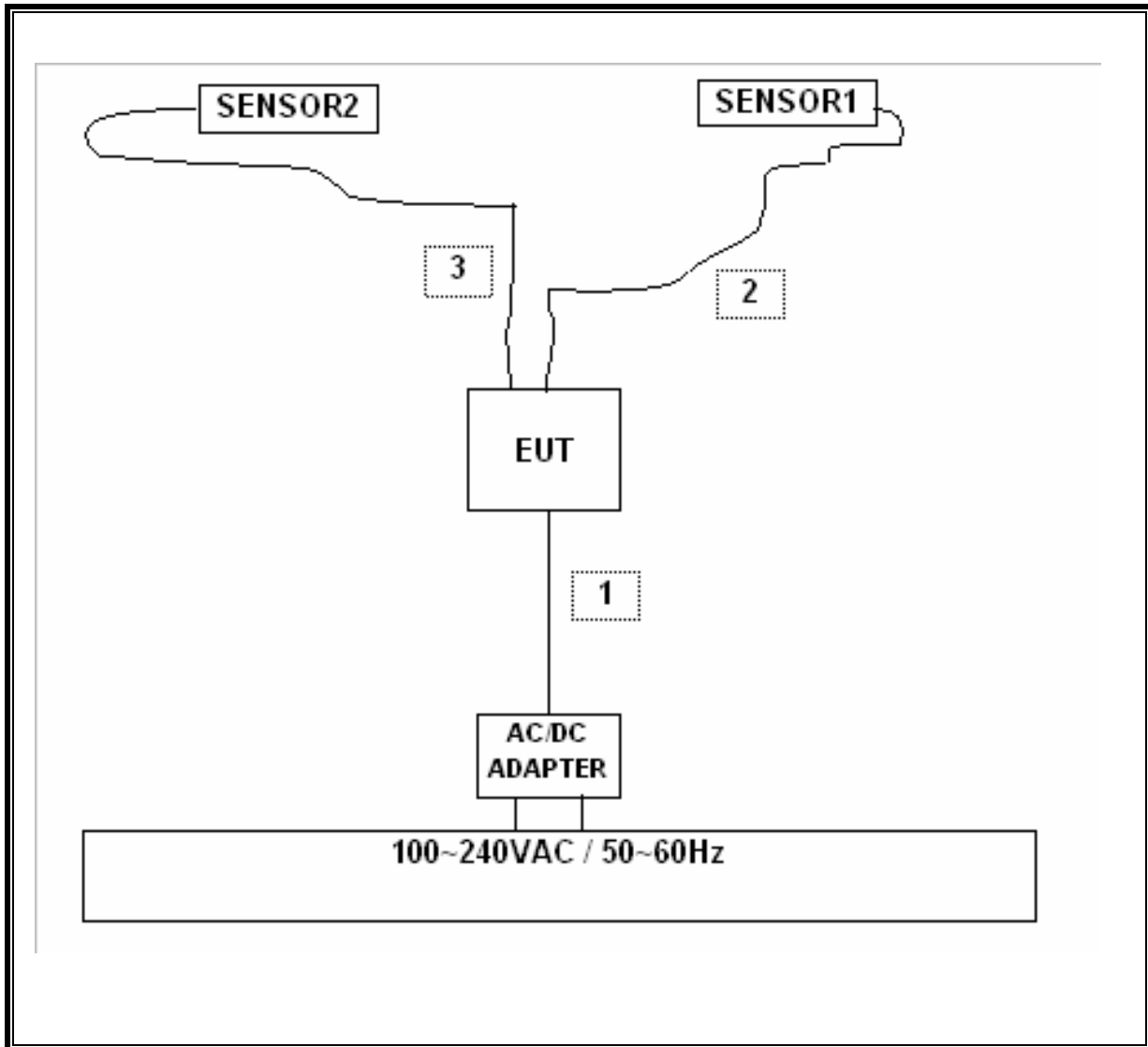
SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC/DC Adapter	CUI Inc.	3A-161WU09	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	DC	Un-Shielded	0.8 m	Ferrite at one end
2	IO1	1	JACK	Un-Shielded	1.5m	N/A
3	IO2	1	JACK	Un-Shielded	1.5m	N/A

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	MY46180491	05/08/11
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	MY48250925	08/31/10
Peak Power Meter	Agilent / HP	E4416A	GB41291160	12/04/11
Preamplifier, 1300 MHz	Agilent / HP	8447D	2944A06589	07/06/10
Preamplifier, 26.5 GHz	Agilent / HP	8449B	3008A00561	08/04/10
Antenna, Horn, 18 GHz	EMCO	3115	9001-3245	07/29/10
Antenna, Bilog, 2 GHz	Sundt Sciences	JB1	A0022704	07/14/10
EMI Test Receiver, 30 MHz	R & S	ESHS 20	827129/006	05/06/11
LISN, 30 MHz	FCC	LISN-50/250-25-2	2023	11/06/10

7. ANTENNA PORT TEST RESULTS

7.1. 802.11b MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

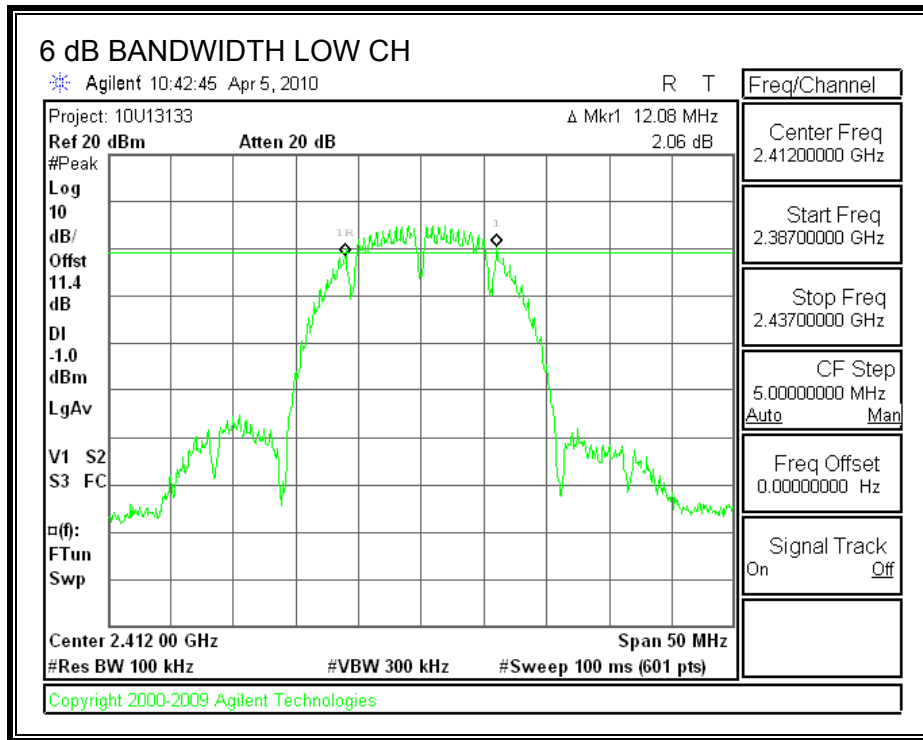
TEST PROCEDURE

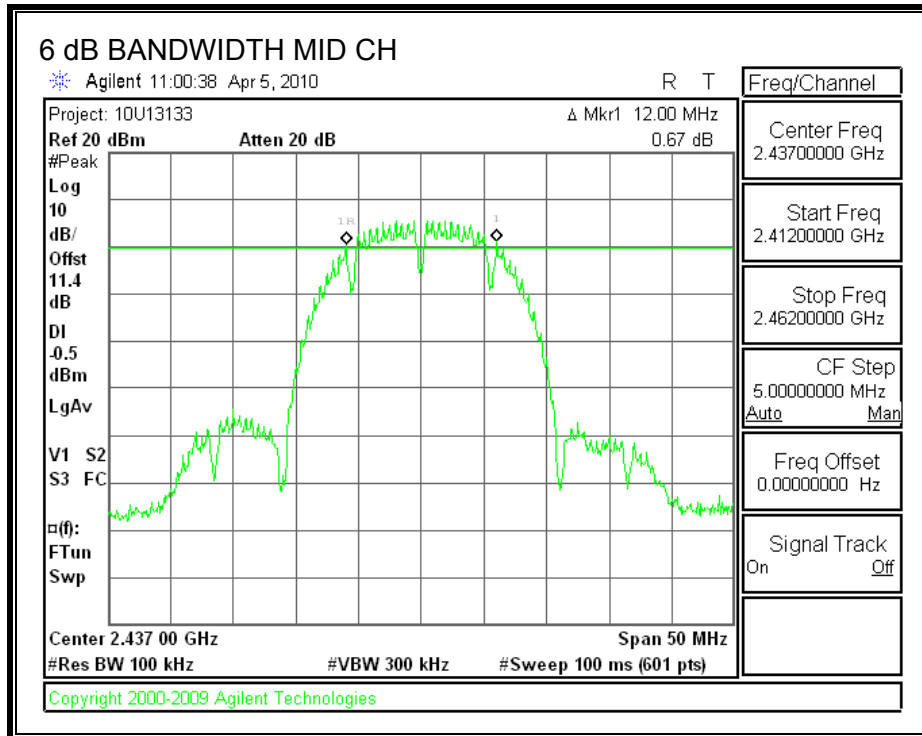
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

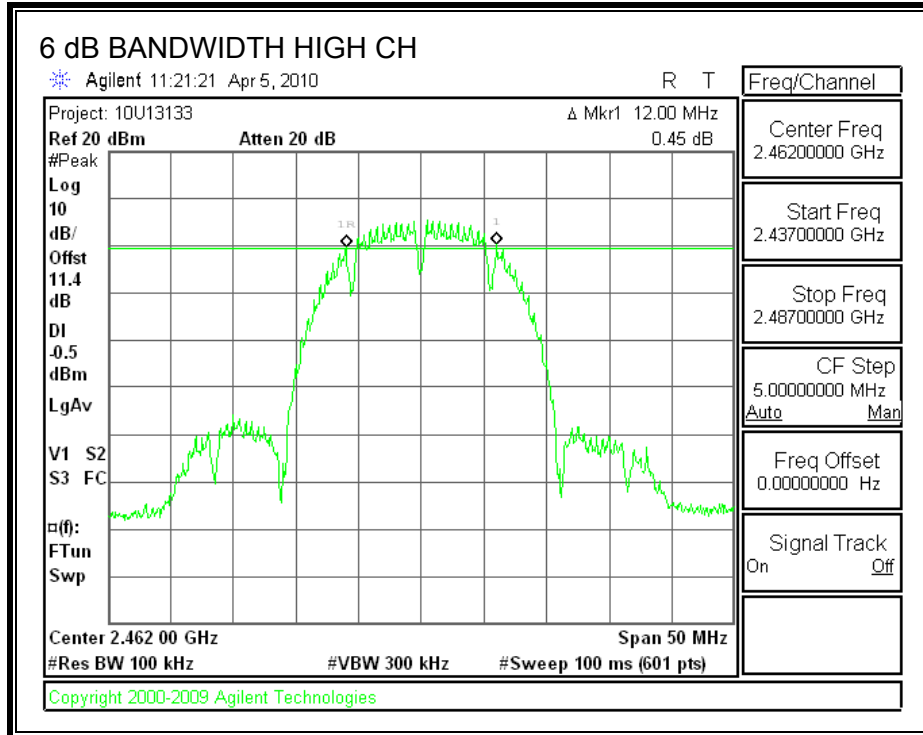
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	12.08	0.5
Middle	2437	12.00	0.5
High	2462	12.00	0.5

6 dB BANDWIDTH







7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

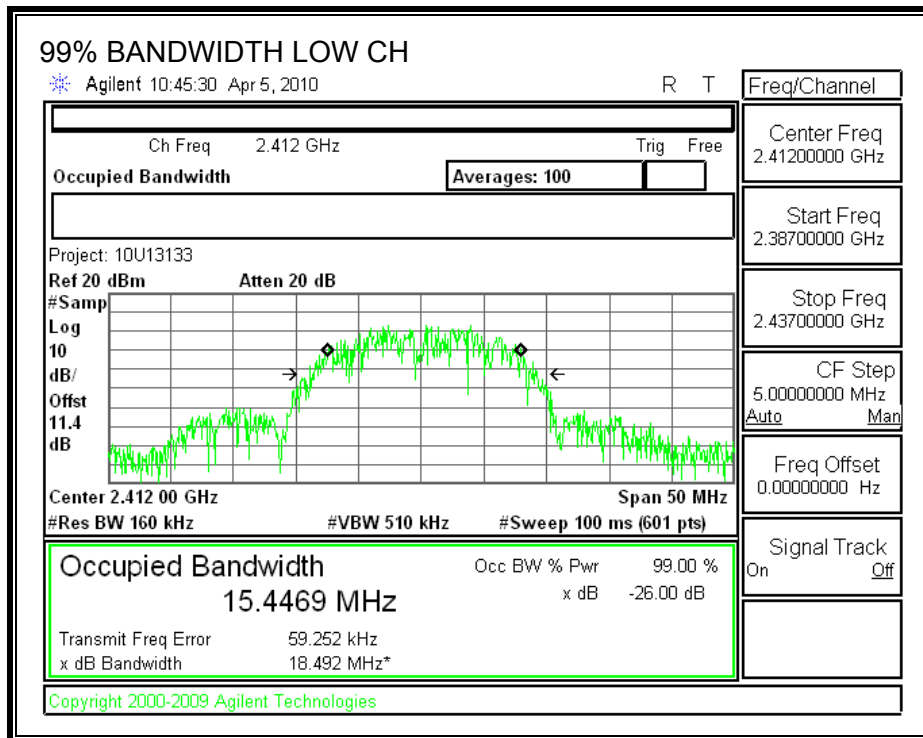
TEST PROCEDURE

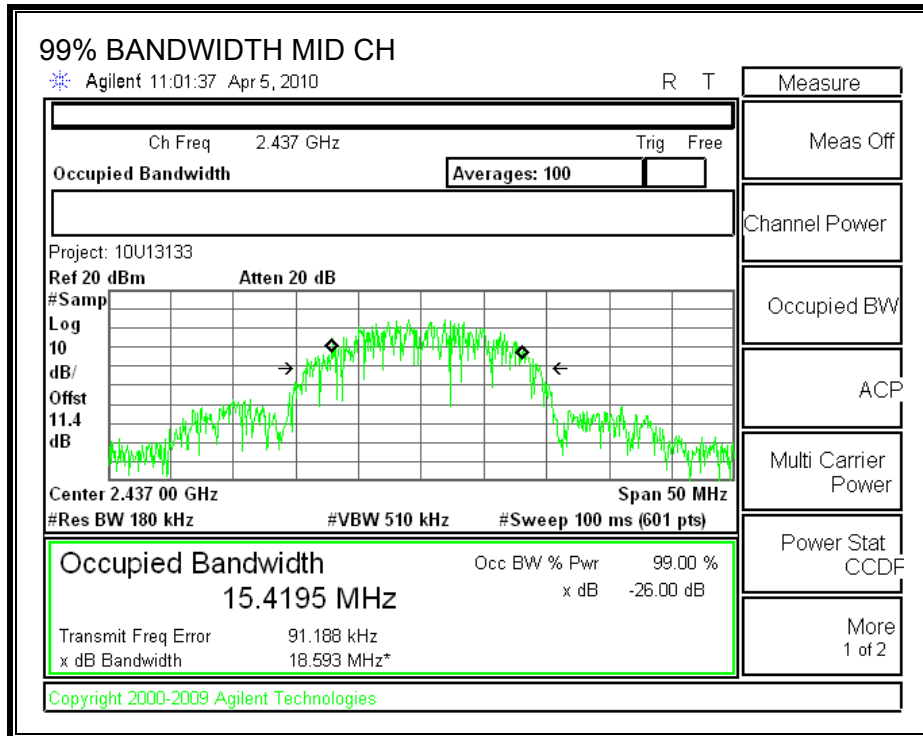
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

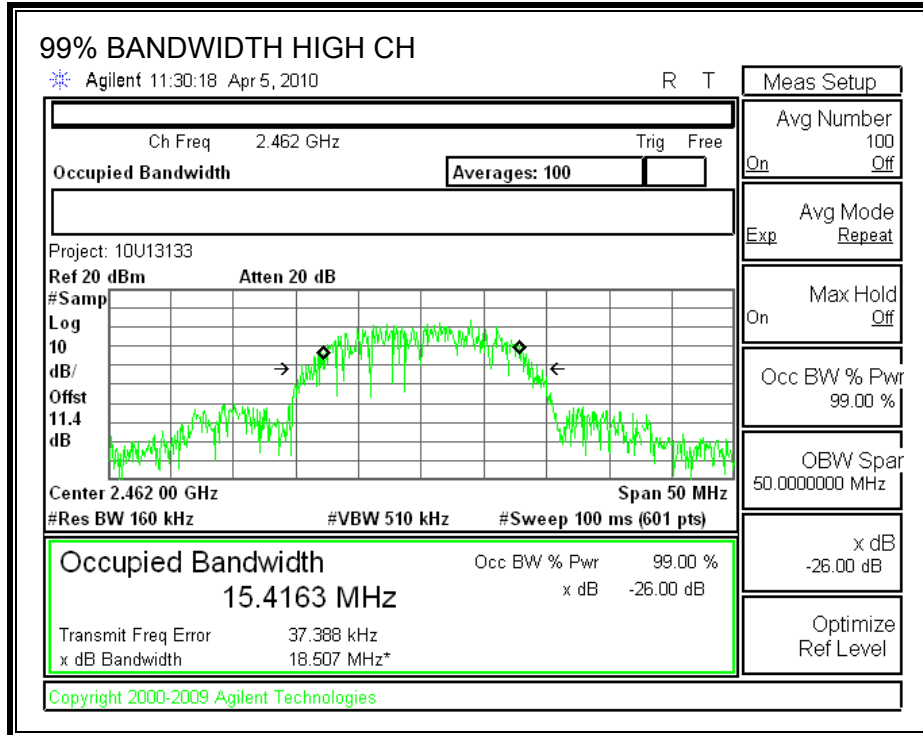
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	15.4469
Middle	2437	15.4195
High	2462	15.4163

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.

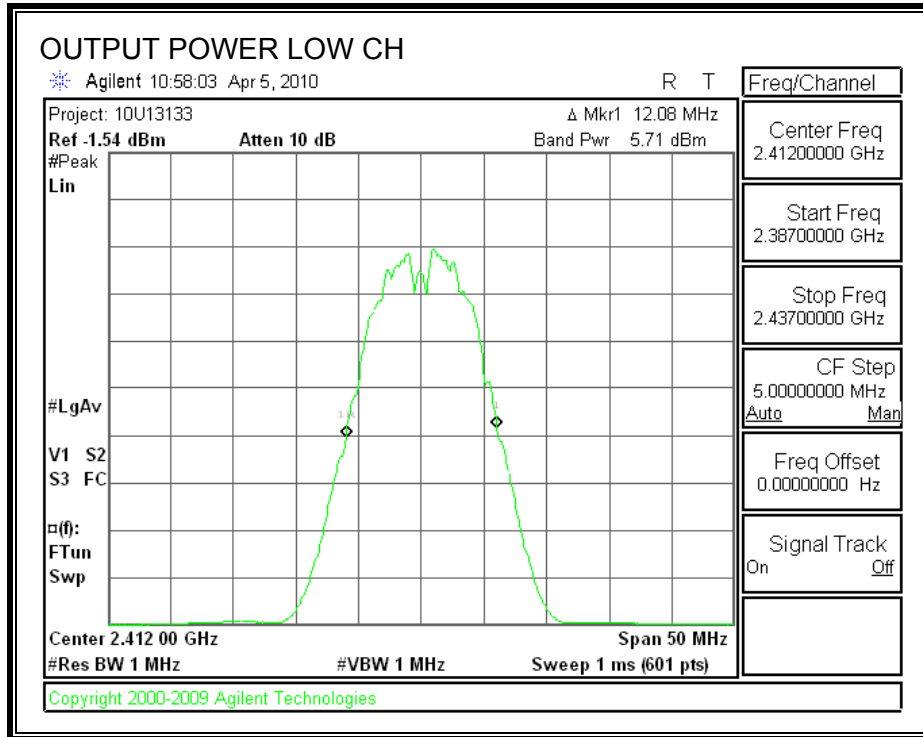
TEST PROCEDURE

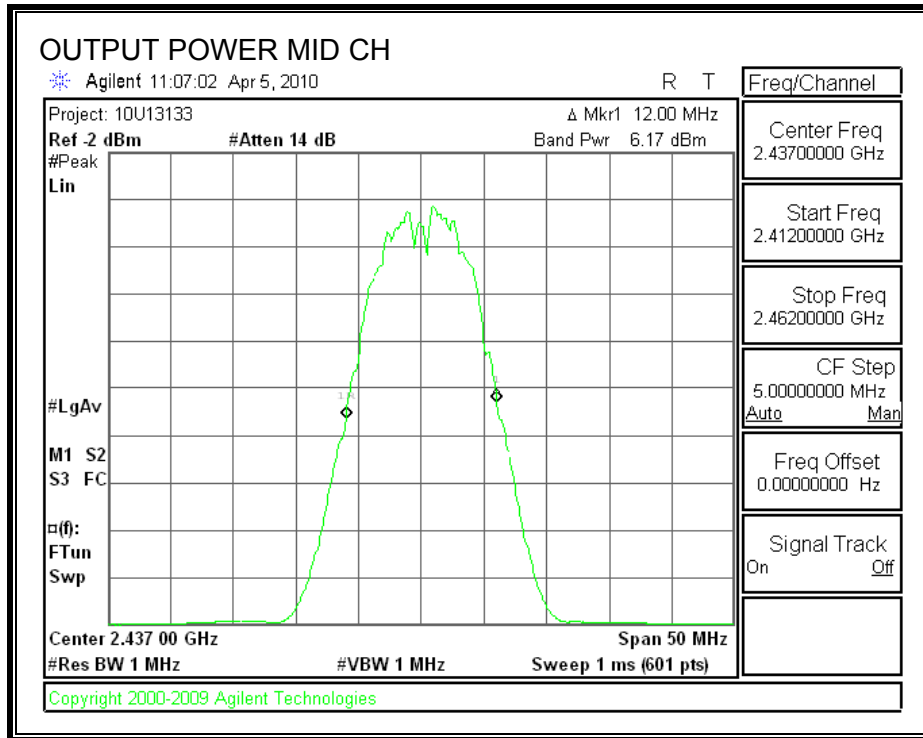
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

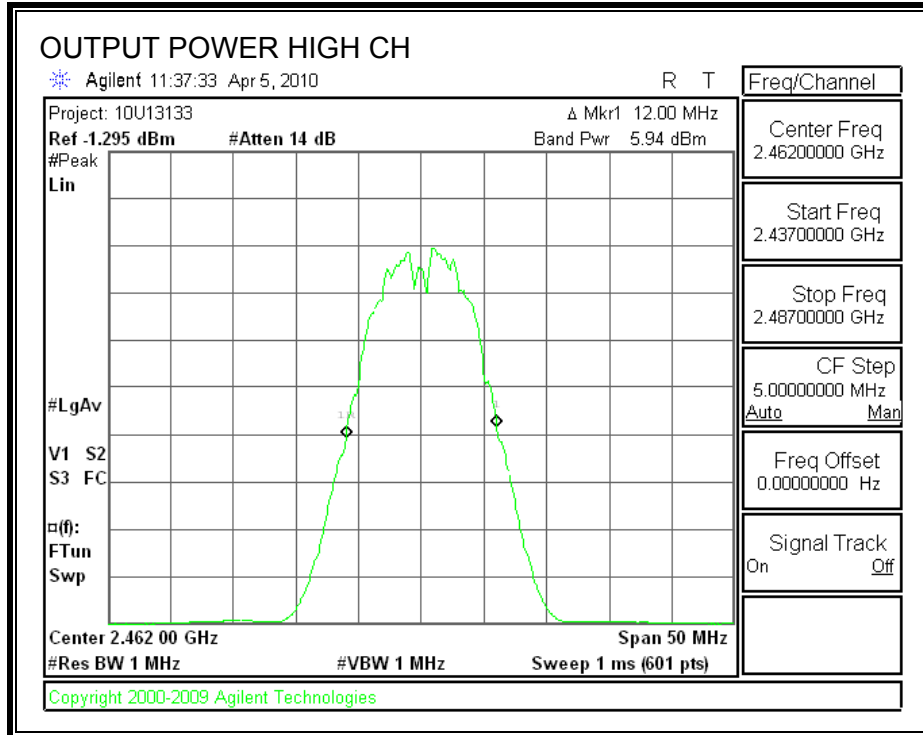
RESULTS

Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	5.71	11.40	17.11	30	-12.89
Middle	2437	6.17	11.40	17.57	30	-12.43
High	2462	5.94	11.40	17.34	30	-12.66

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 11.4 dB (including 10 dB pad and 1.4 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	15.10
Middle	2437	15.20
High	2462	15.30

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.

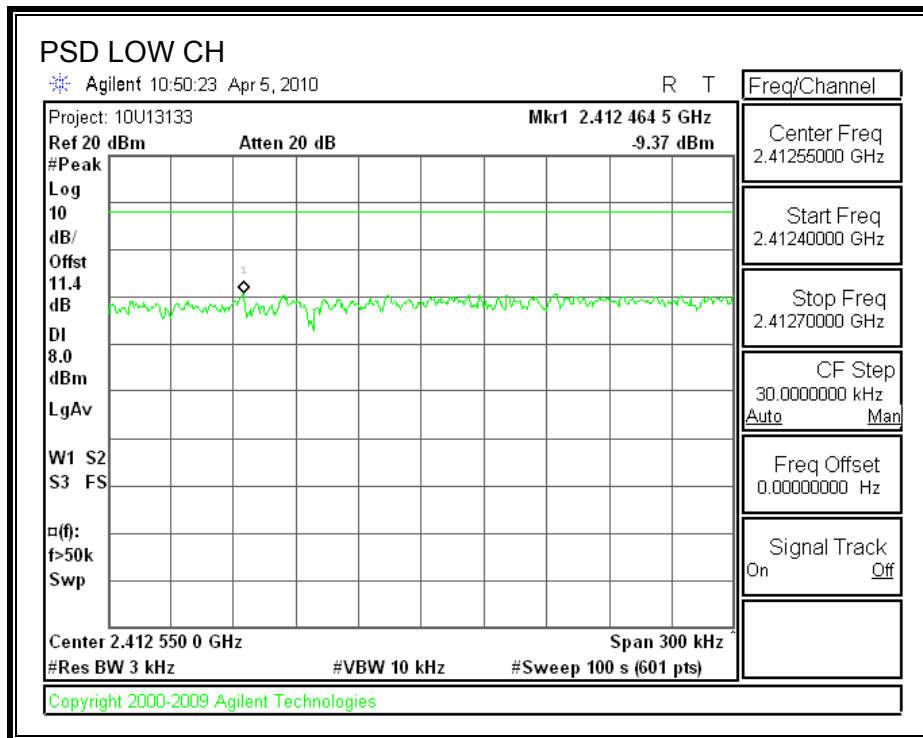
TEST PROCEDURE

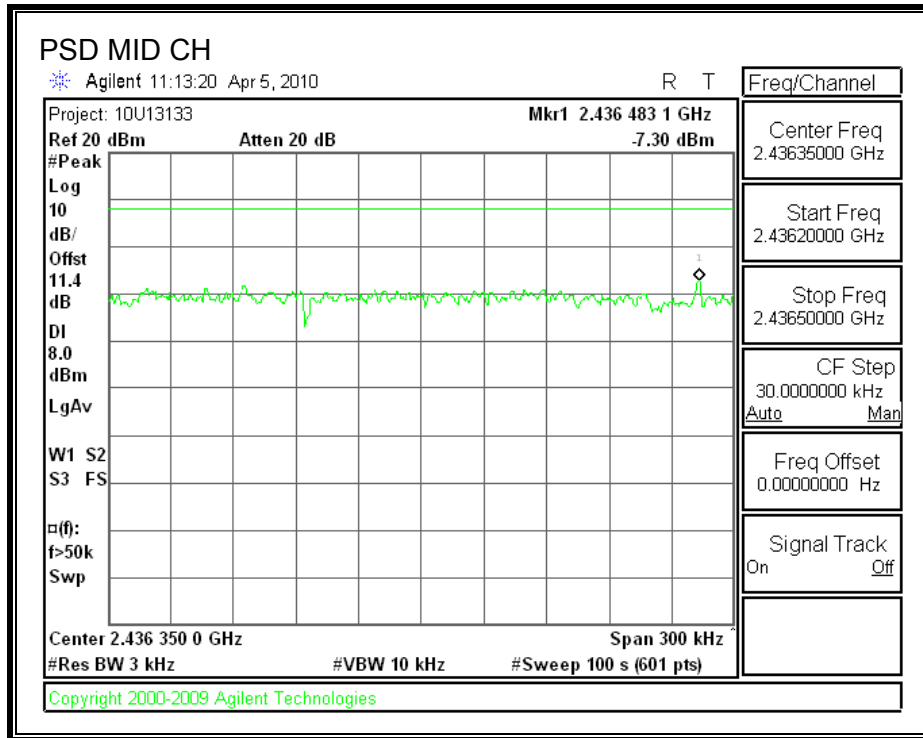
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

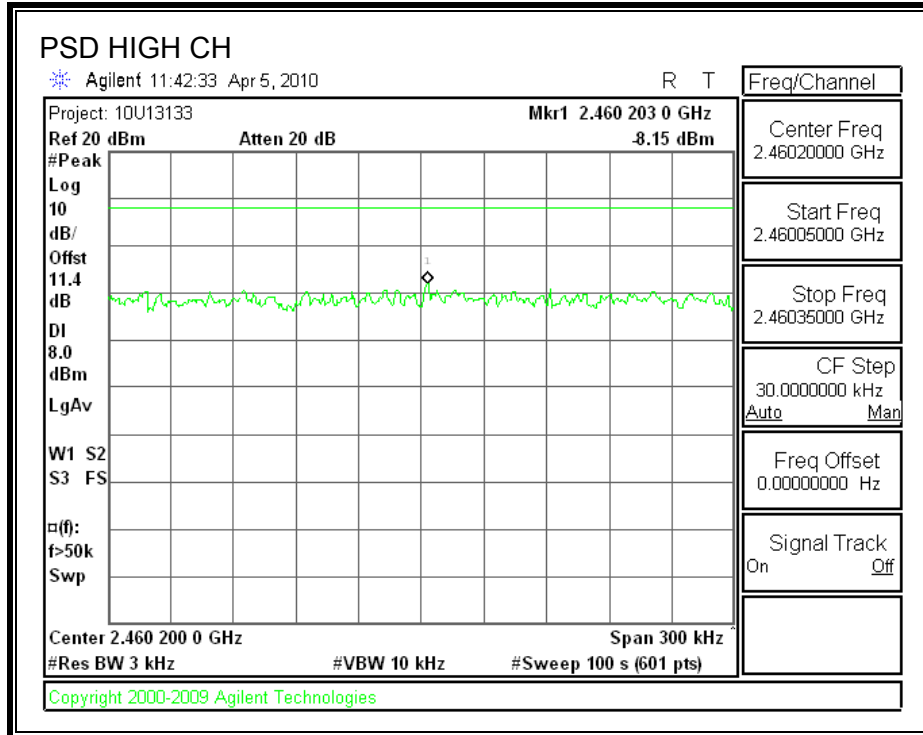
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.37	8	-17.37
Middle	2437	-7.30	8	-15.30
High	2462	-8.15	8	-16.15

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.

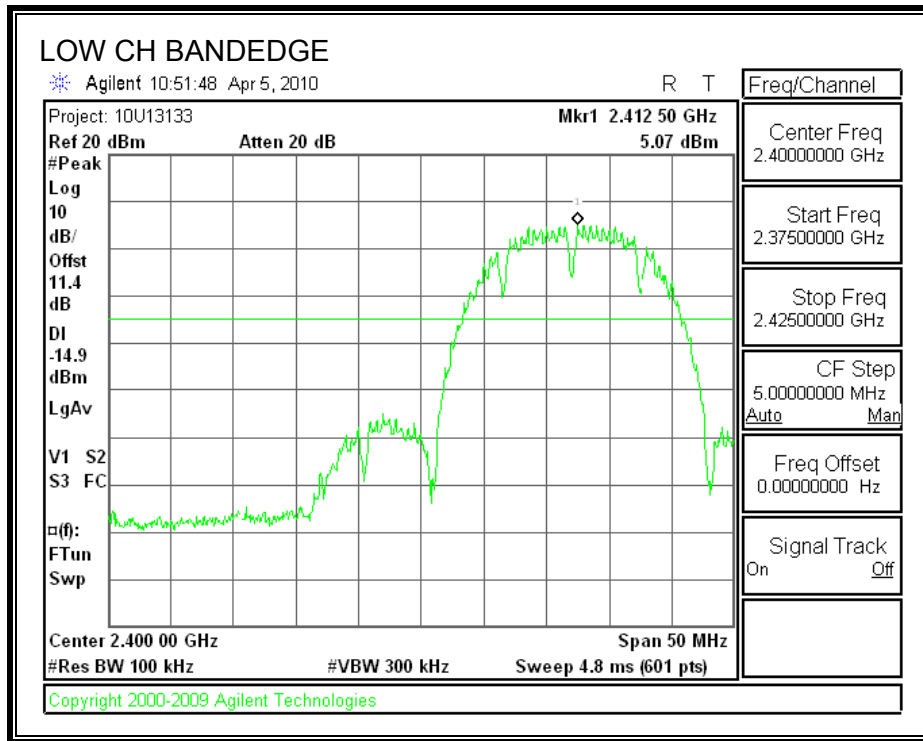
TEST PROCEDURE

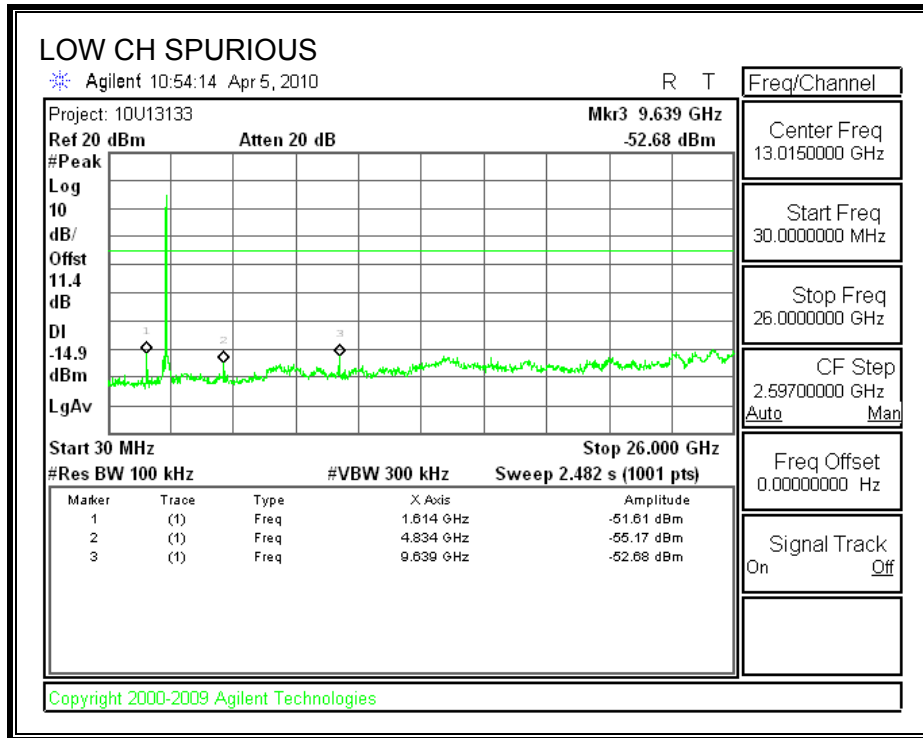
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

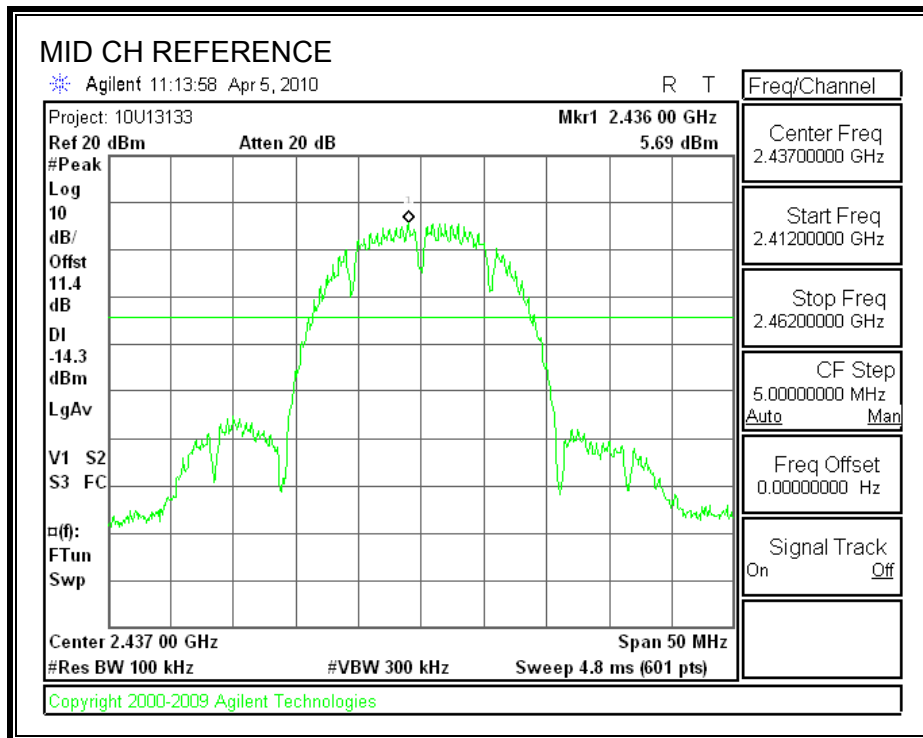
RESULTS

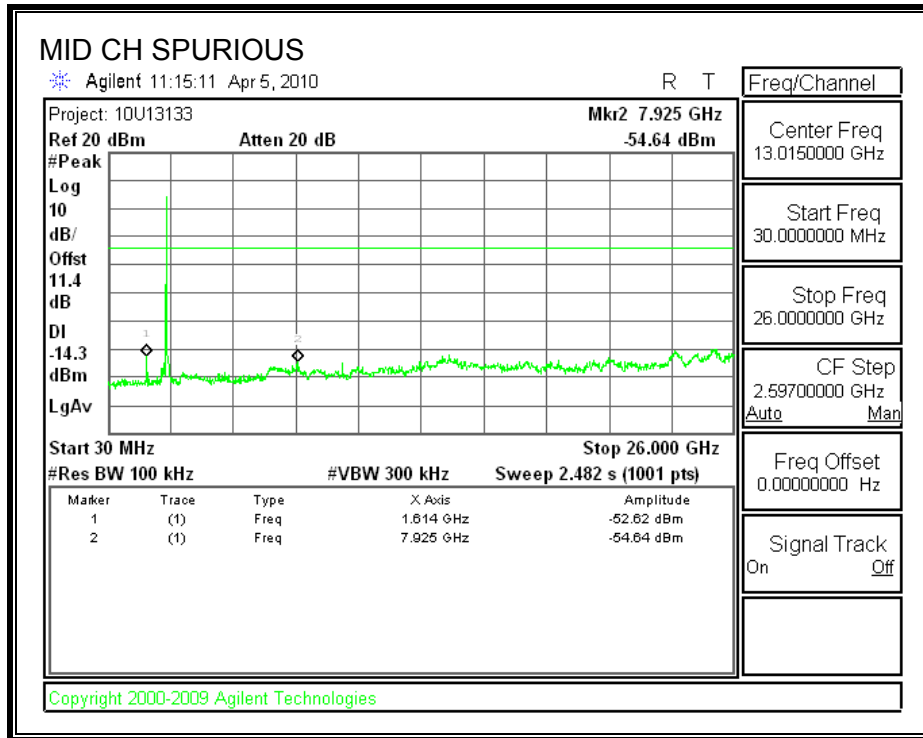
SPURIOUS EMISSIONS, LOW CHANNEL



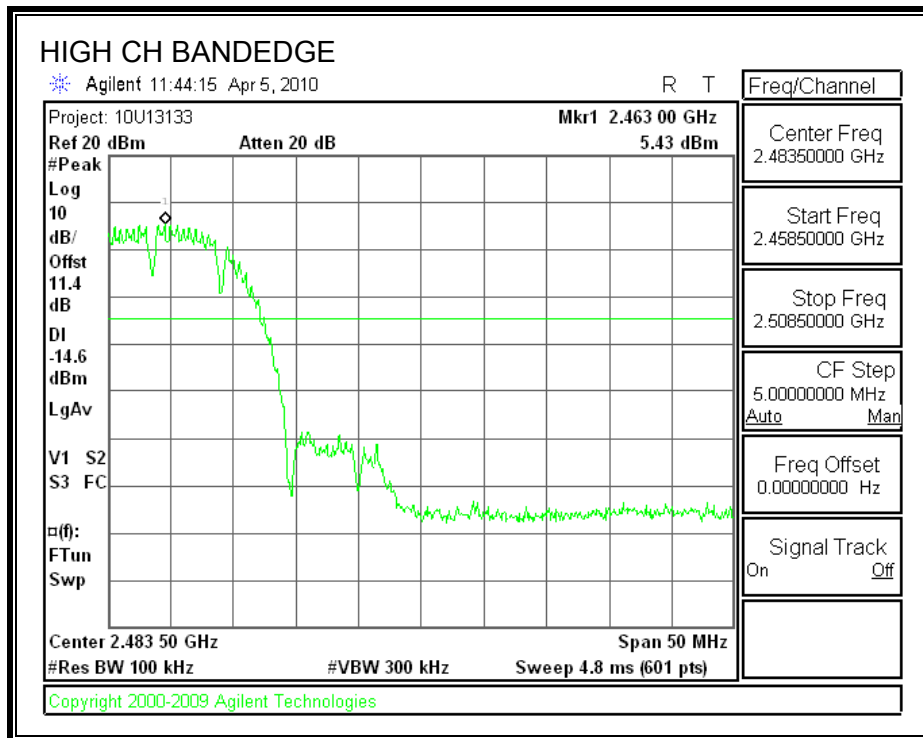


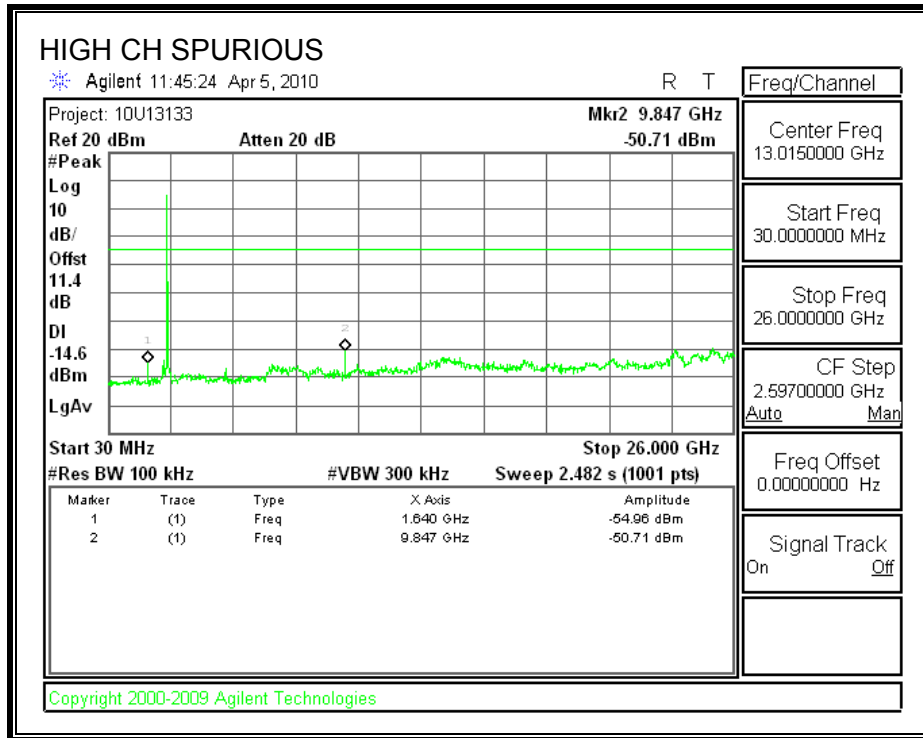
SPURIOUS EMISSIONS, MID CHANNEL





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.

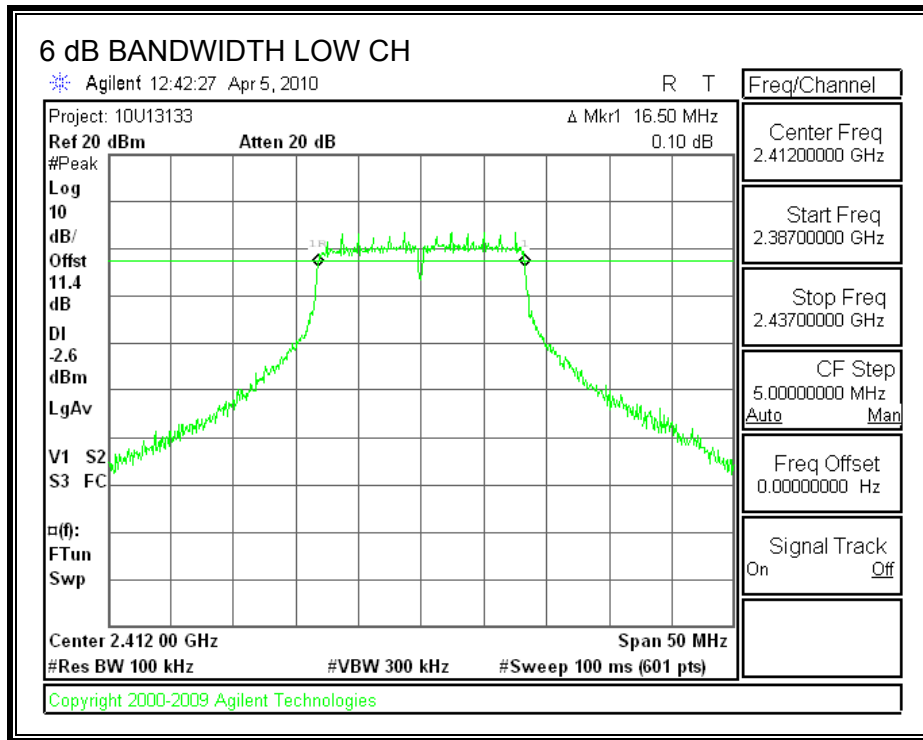
TEST PROCEDURE

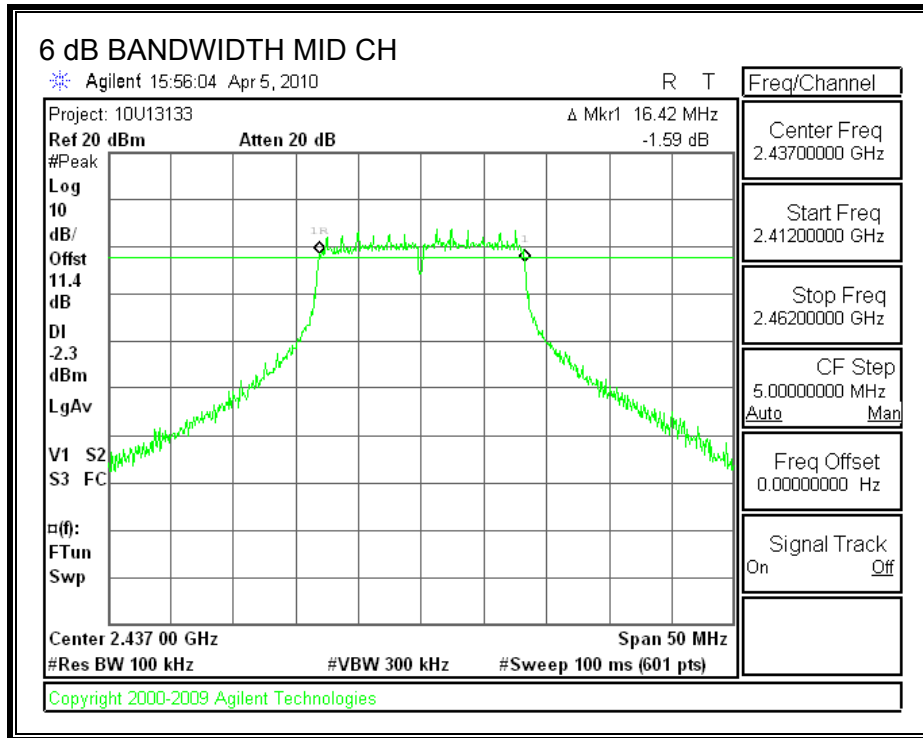
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

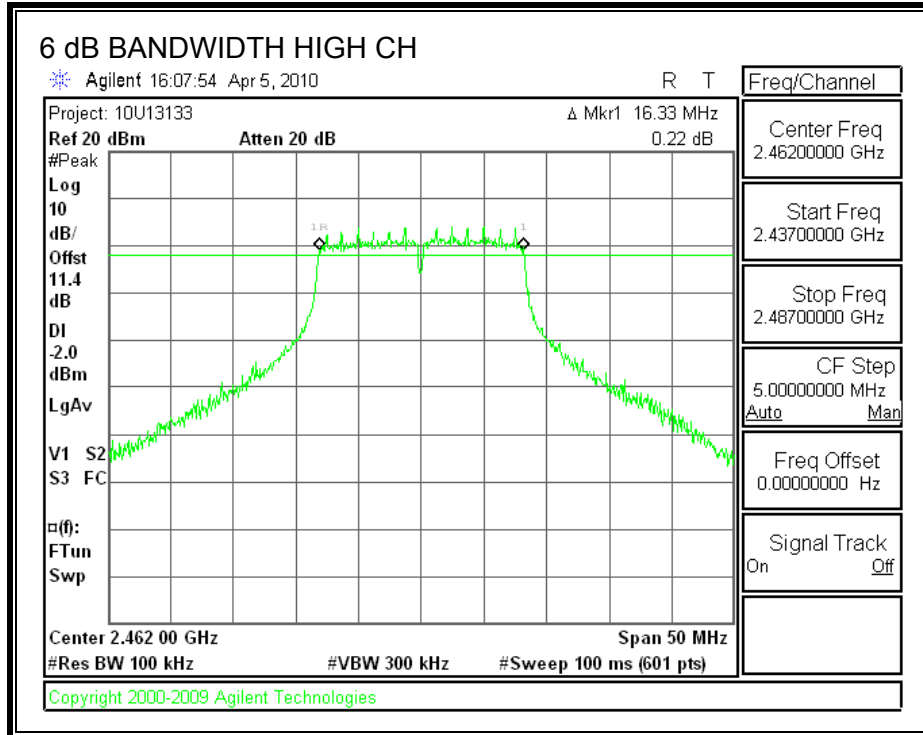
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.50	0.50
Middle	2437	16.42	0.50
High	2462	16.33	0.50

6 dB BANDWIDTH







7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

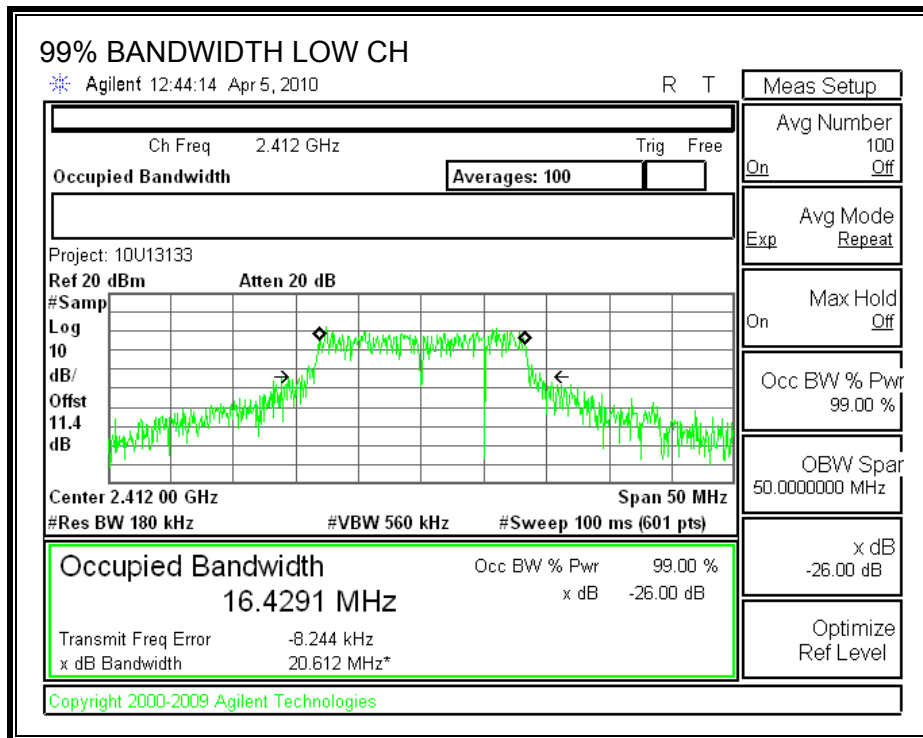
TEST PROCEDURE

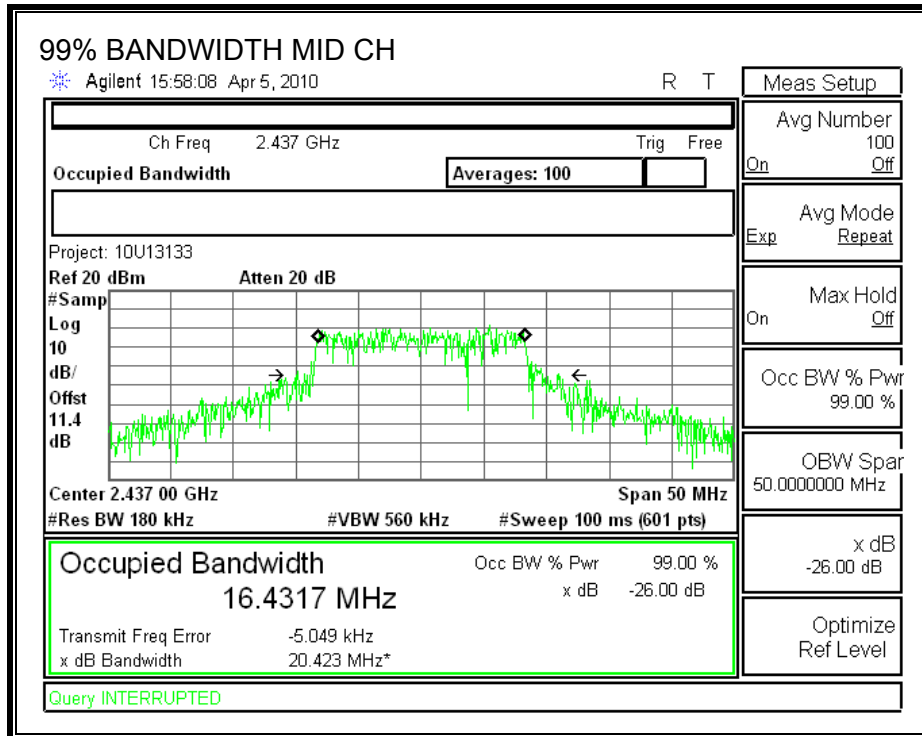
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

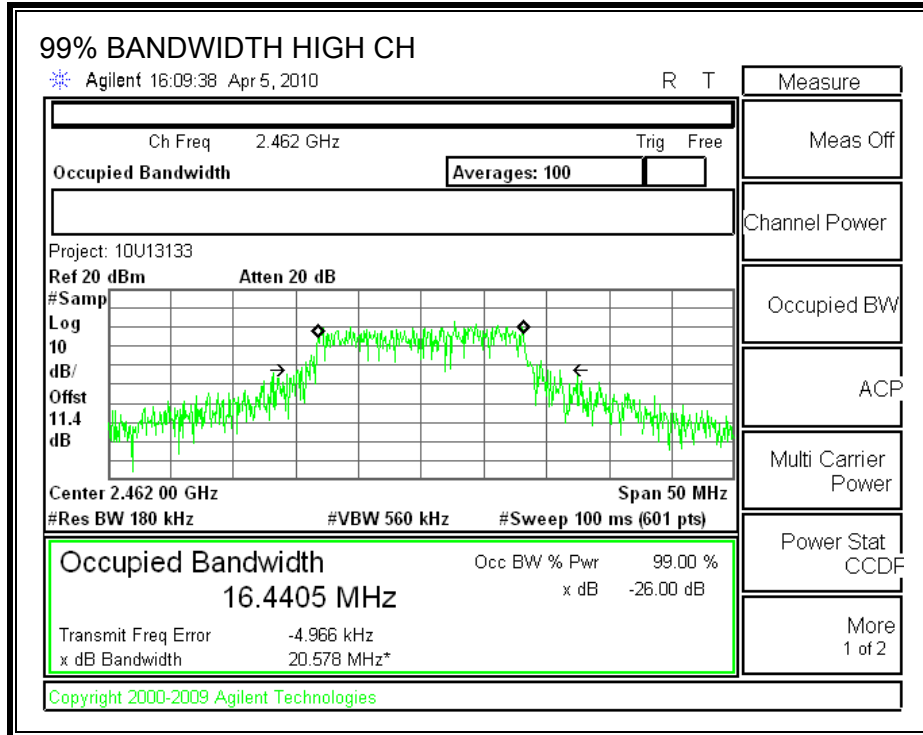
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.4291
Middle	2437	16.4317
High	2462	16.4405

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.

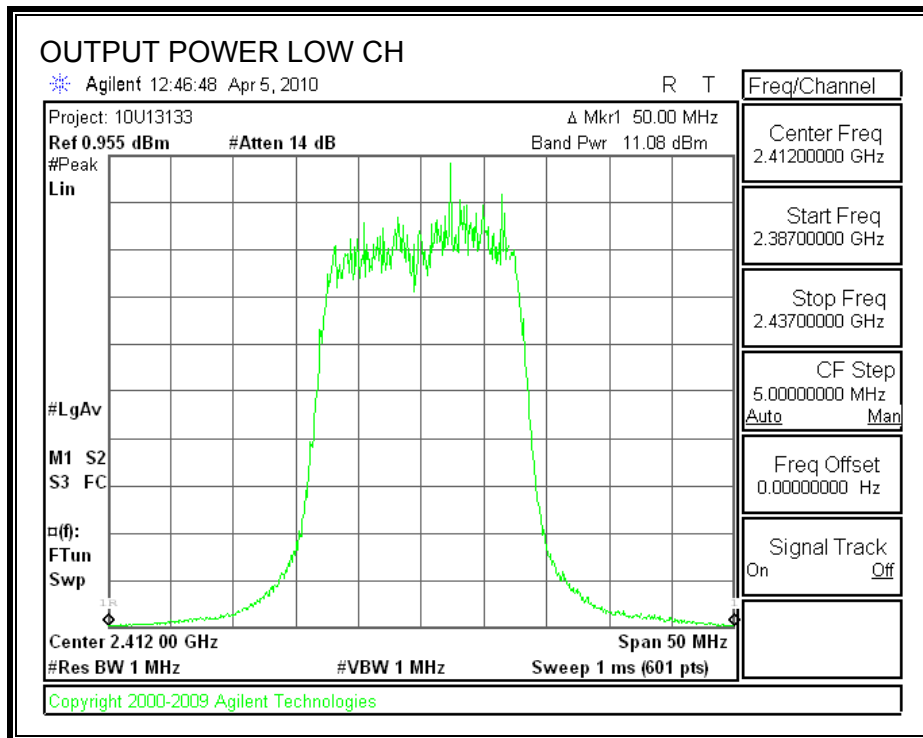
TEST PROCEDURE

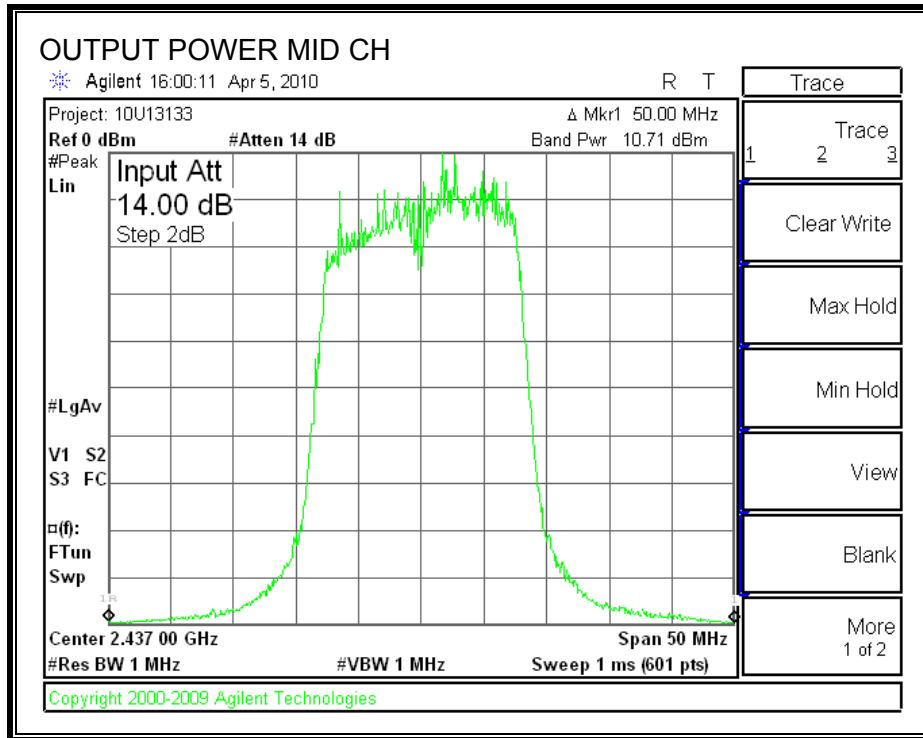
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

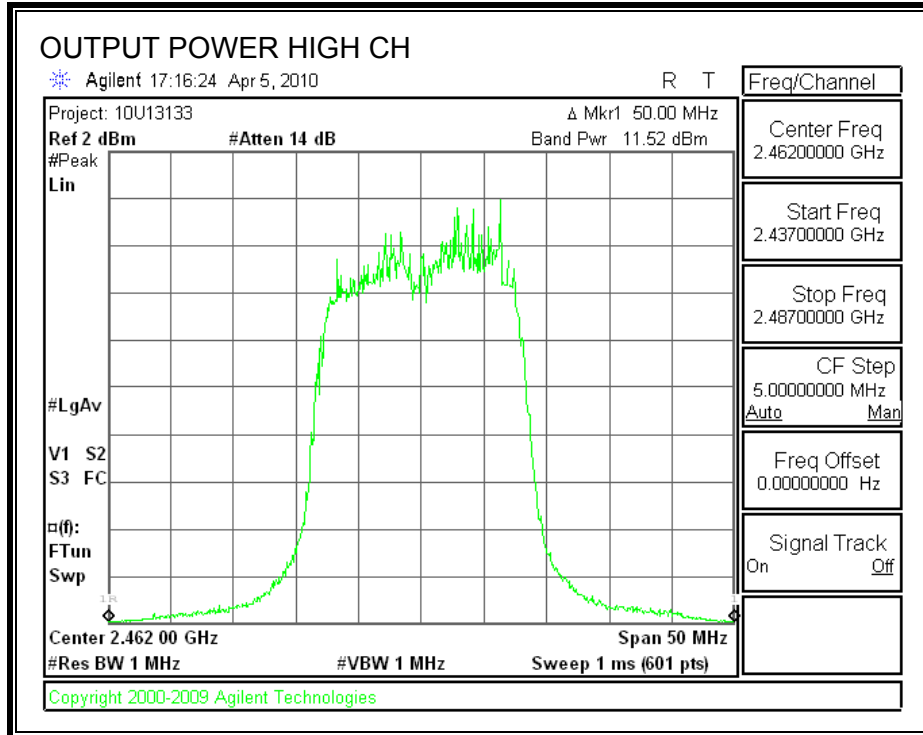
RESULTS

Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	11.08	11.4	22.48	30	-7.52
Middle	2437	10.71	11.4	22.11	30	-7.89
High	2462	11.52	11.4	22.92	30	-7.08

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 11.4 dB (including 10 dB pad and 1.4 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	15.00
Middle	2437	15.30
High	2462	15.40

7.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

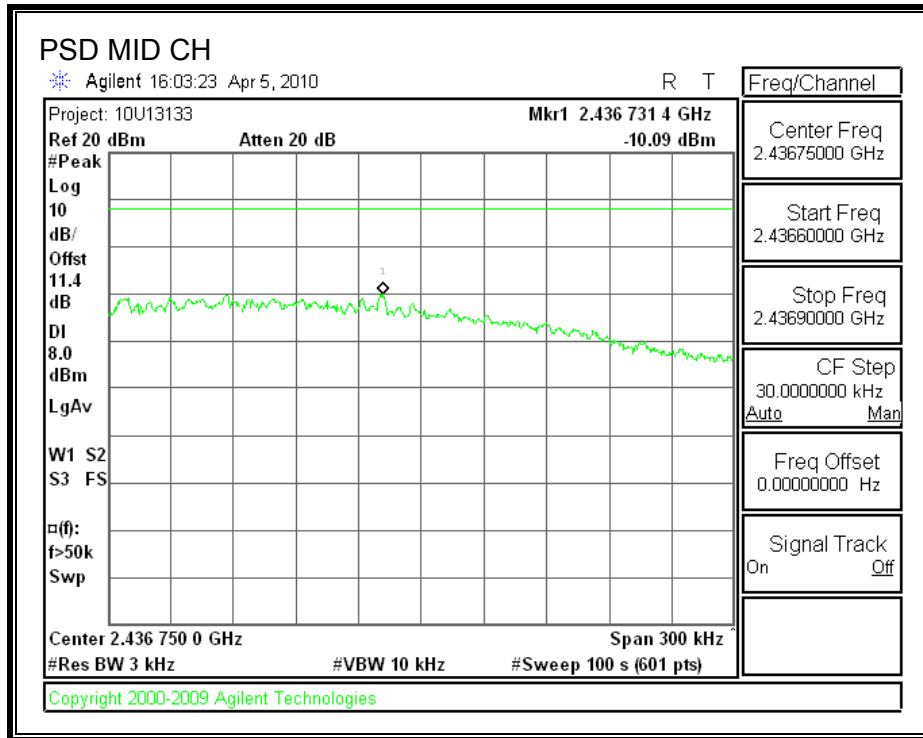
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

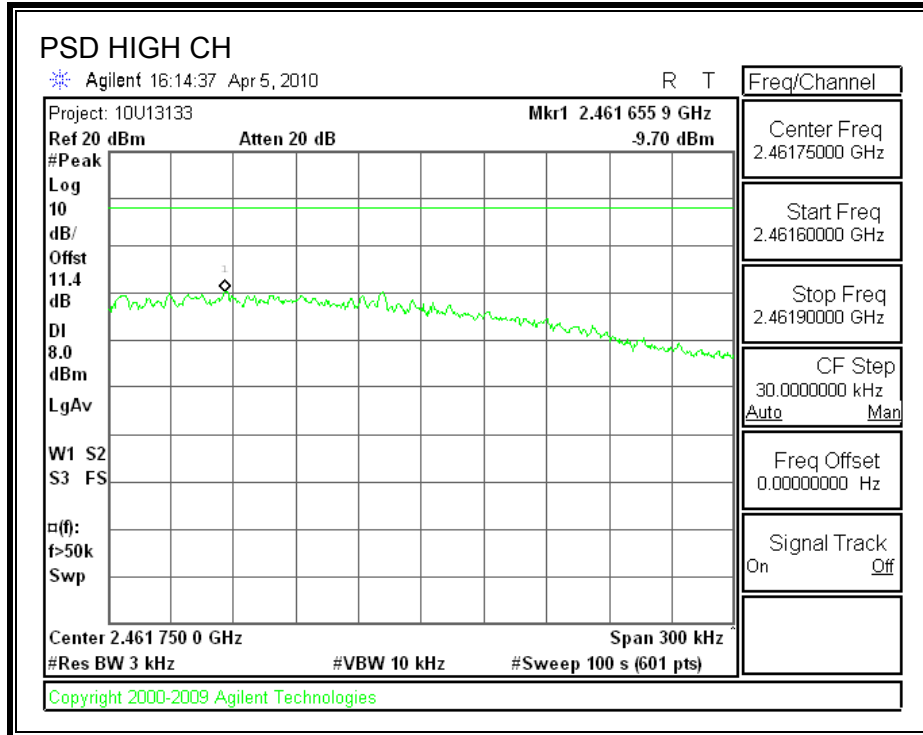
TEST PROCEDURE

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	-9.58	8	-17.58
Middle	2437	-10.09	8	-18.09
High	2462	-9.70	8	-17.70





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.

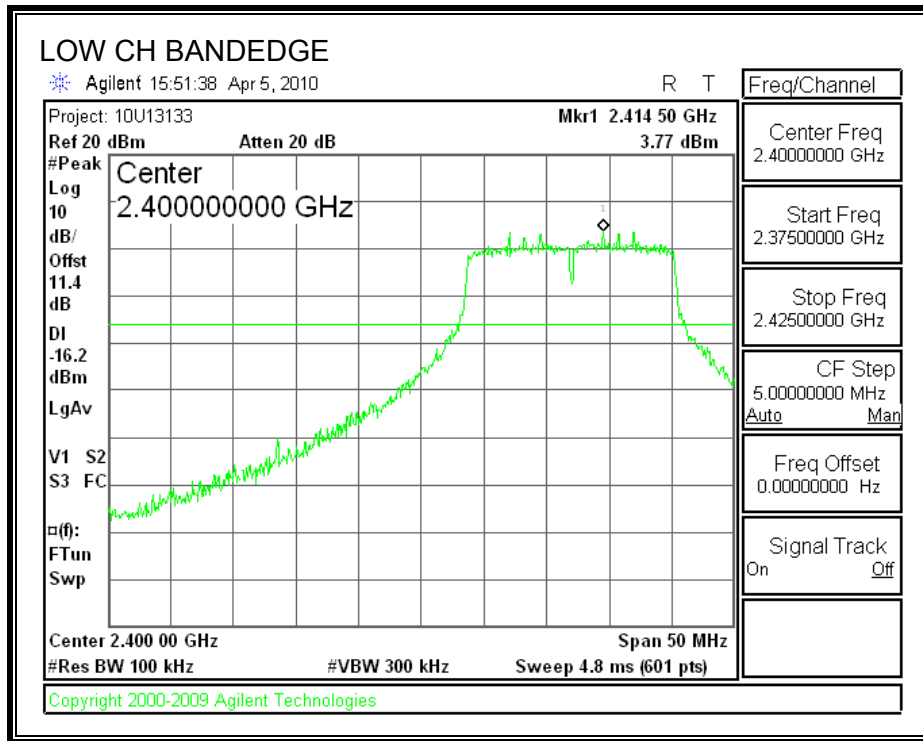
TEST PROCEDURE

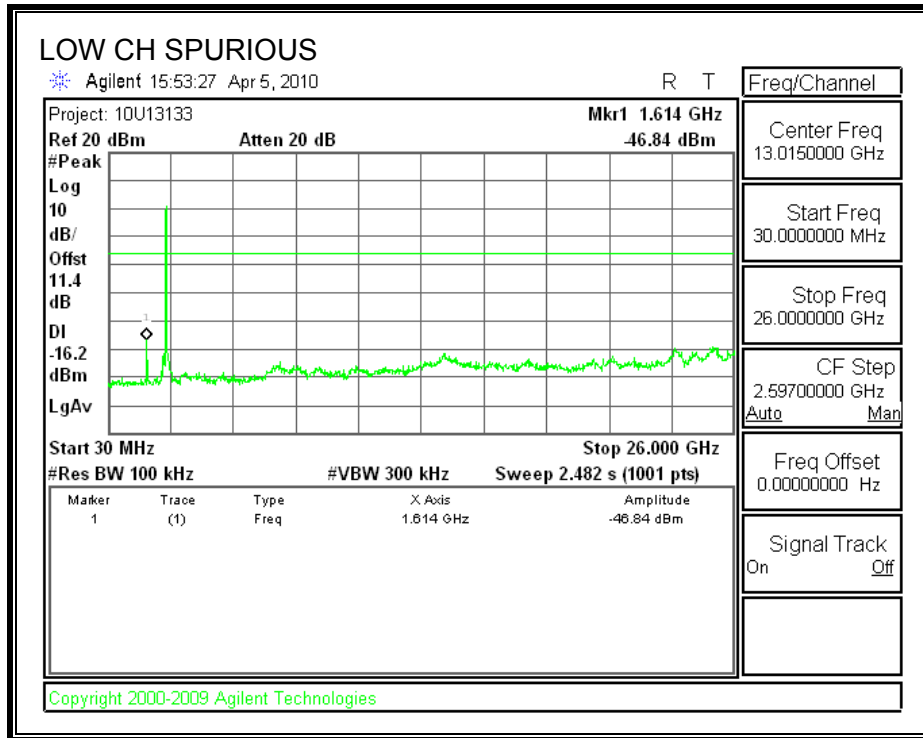
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

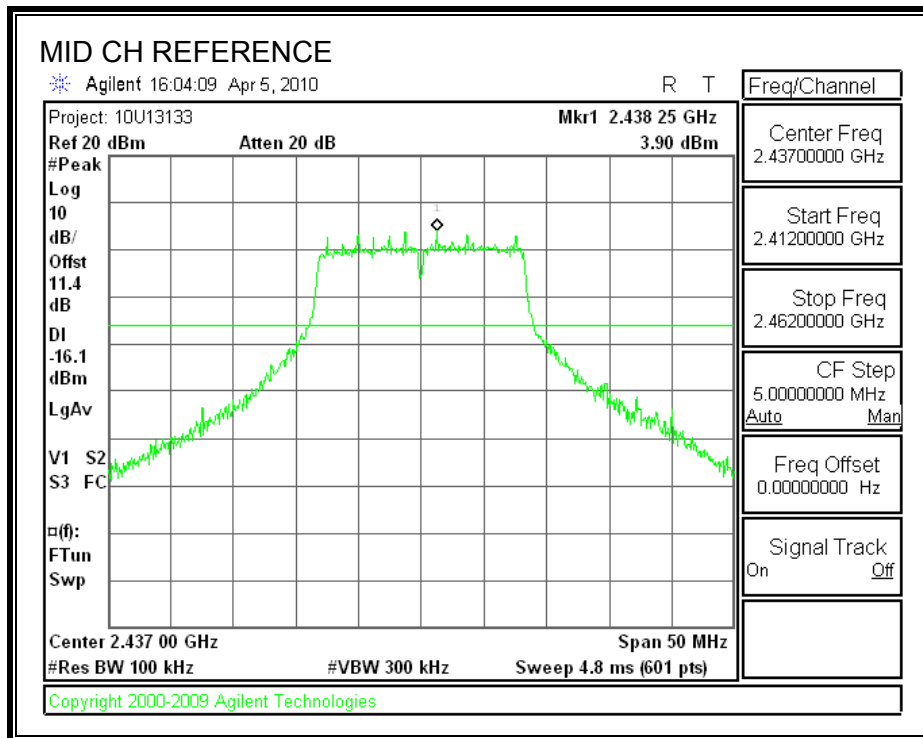
RESULTS

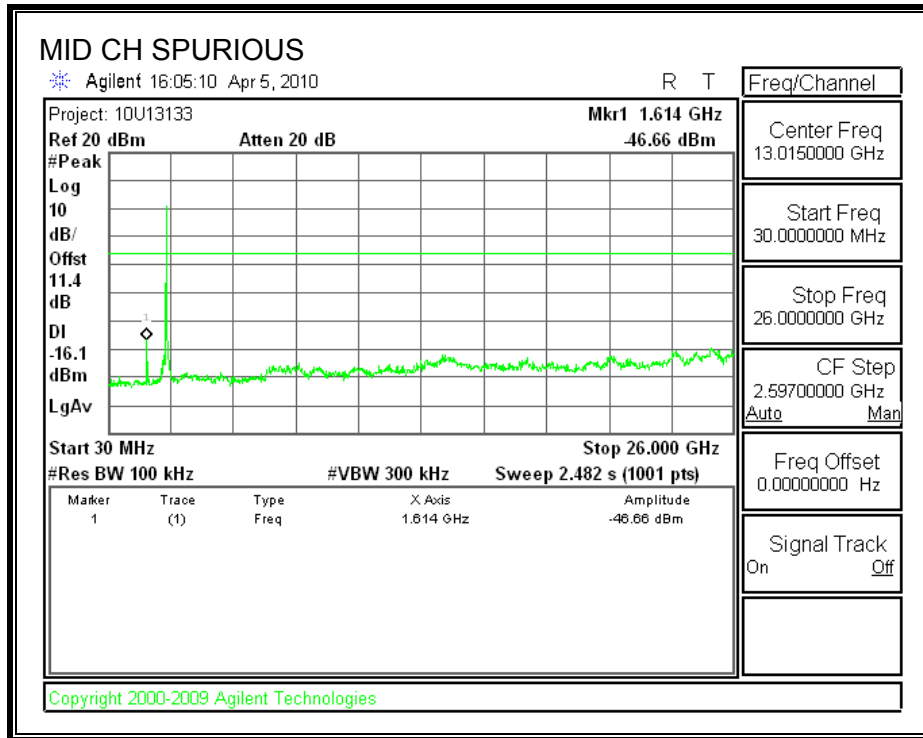
SPURIOUS EMISSIONS, LOW CHANNEL



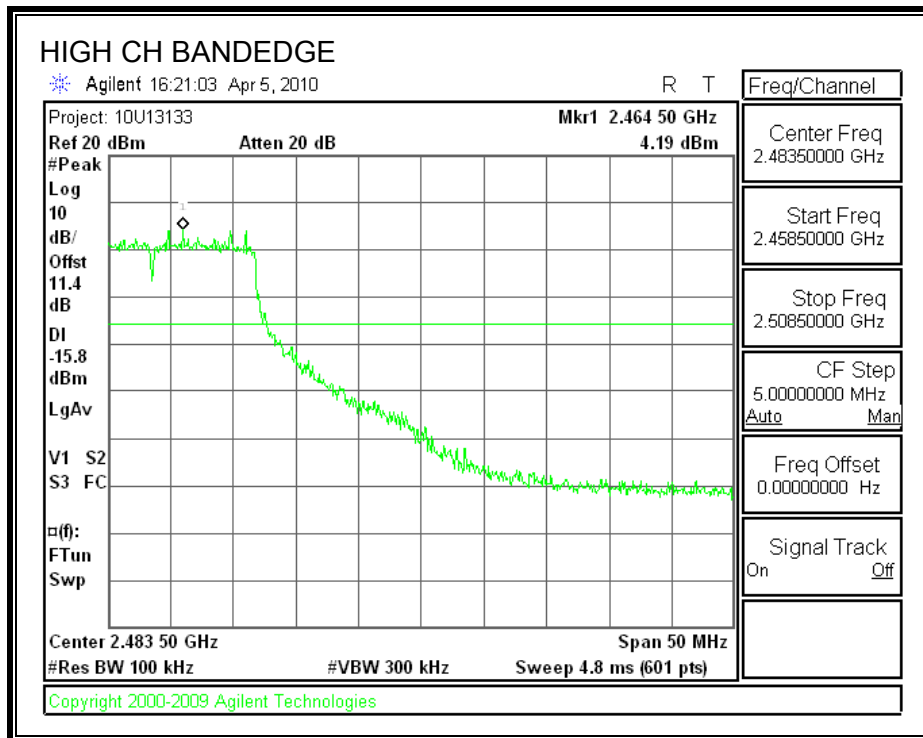


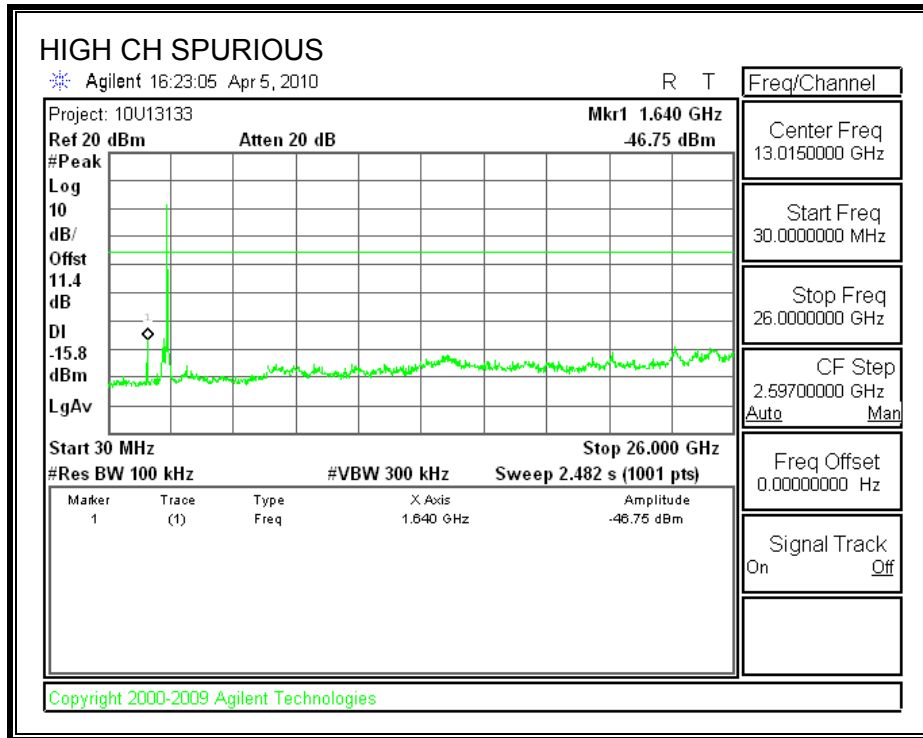
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





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.

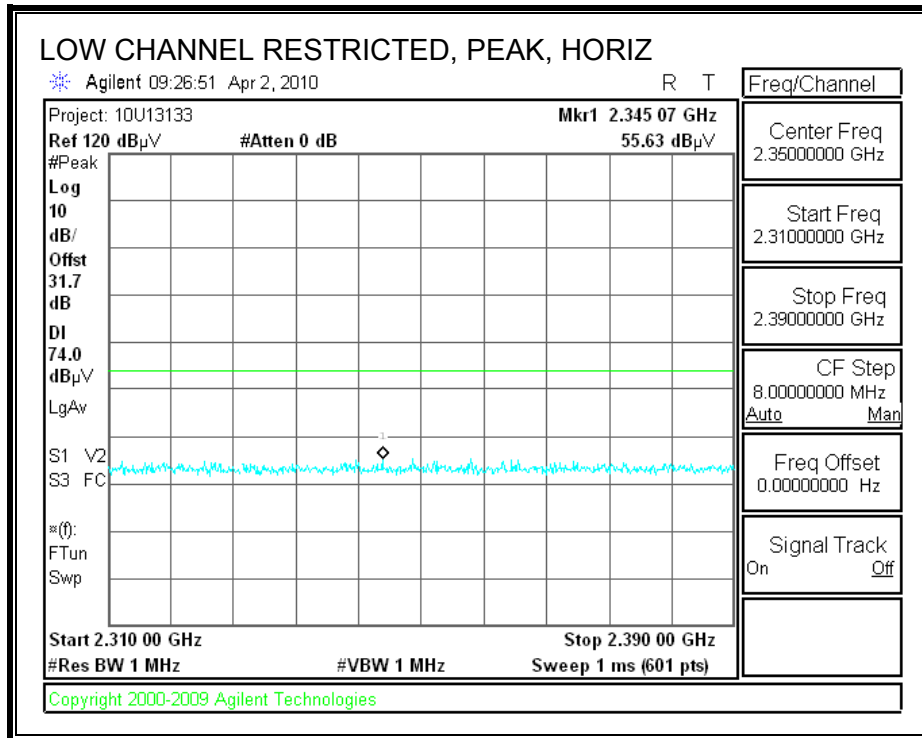
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

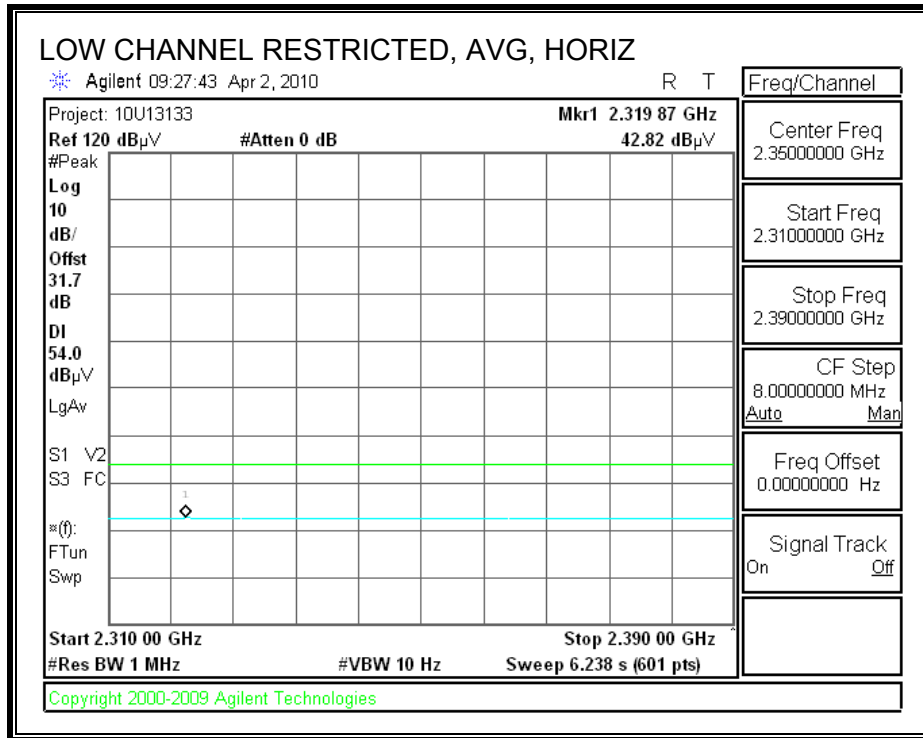
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

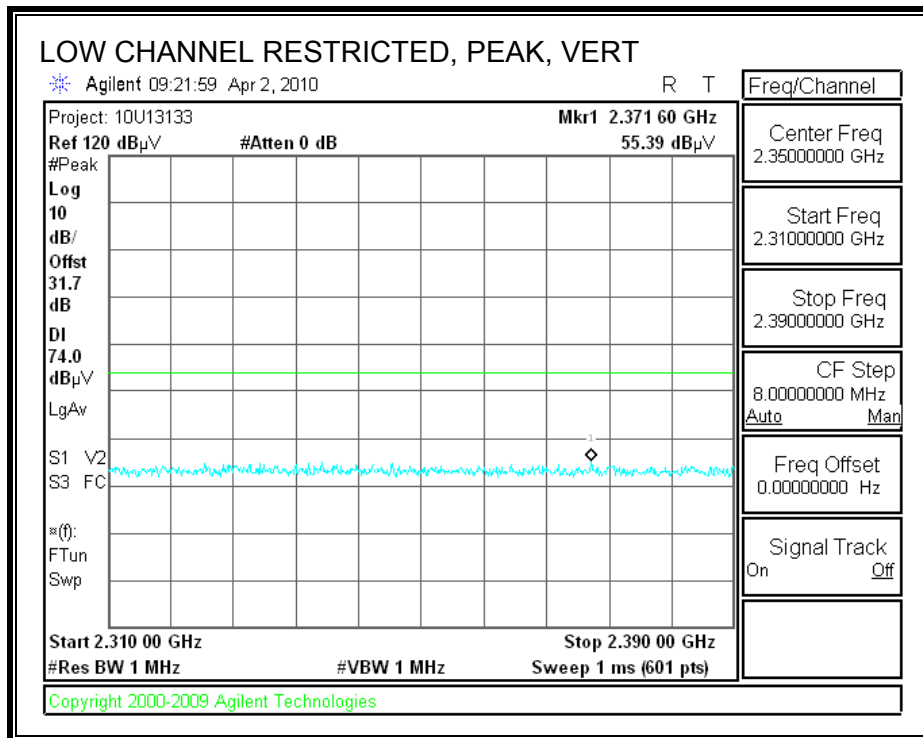
8.2.1. TX ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

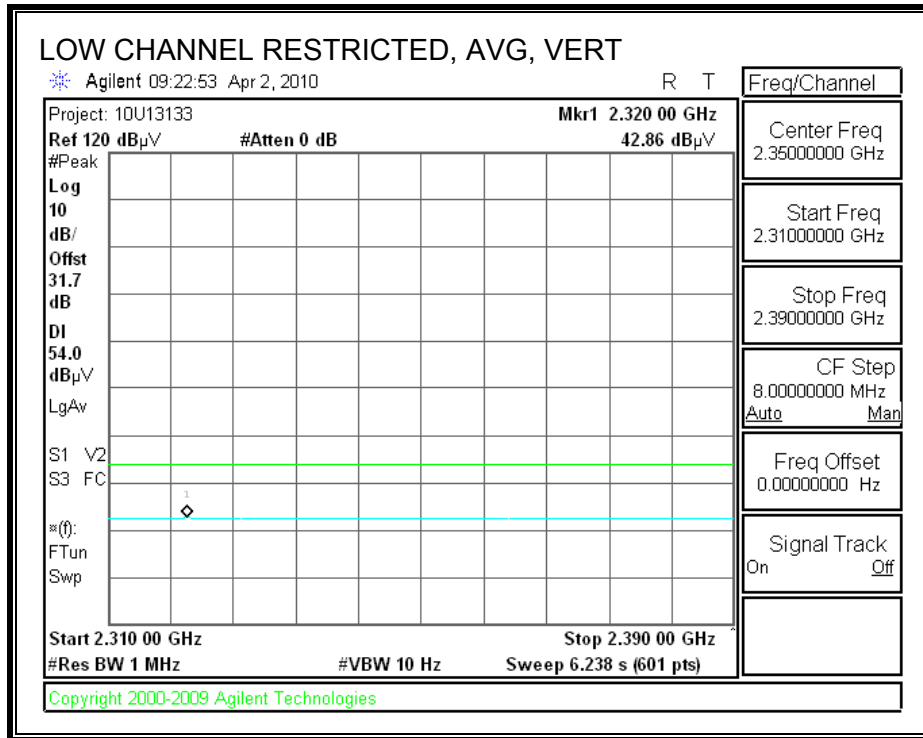
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



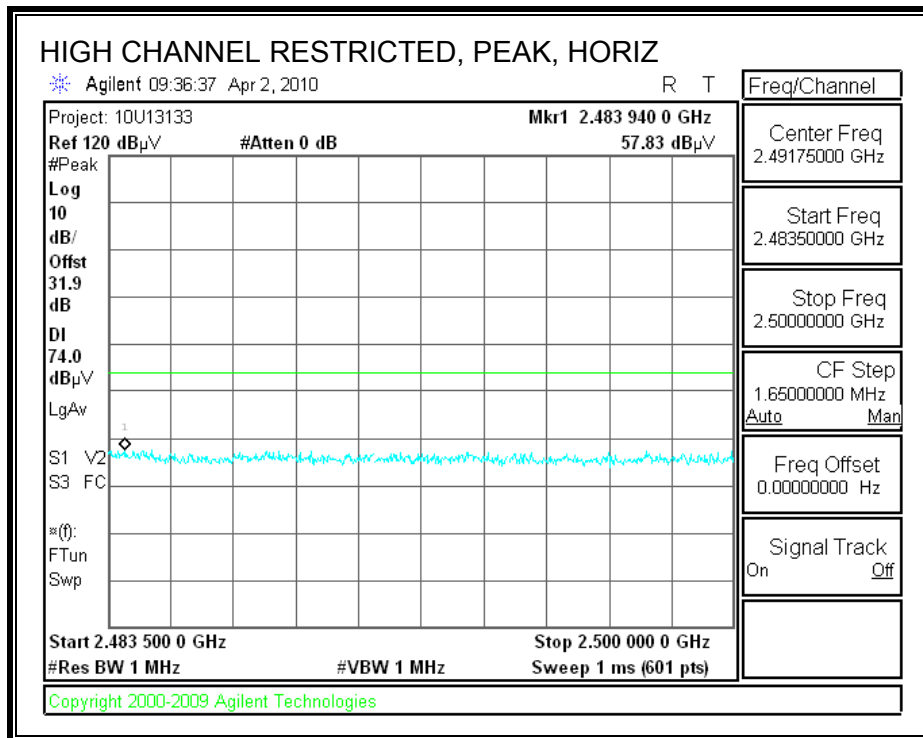


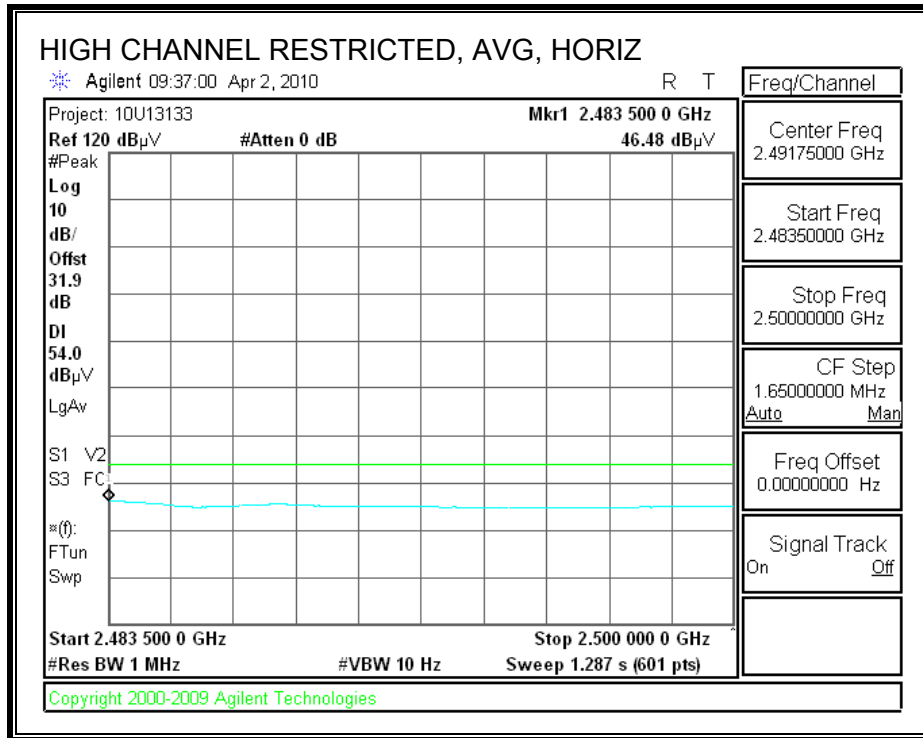
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



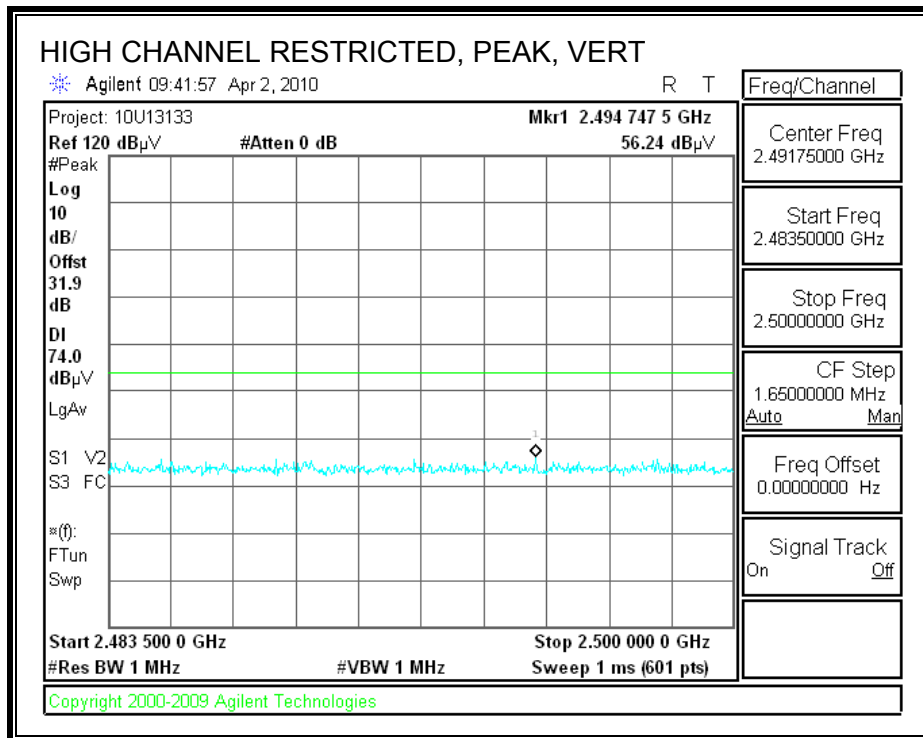


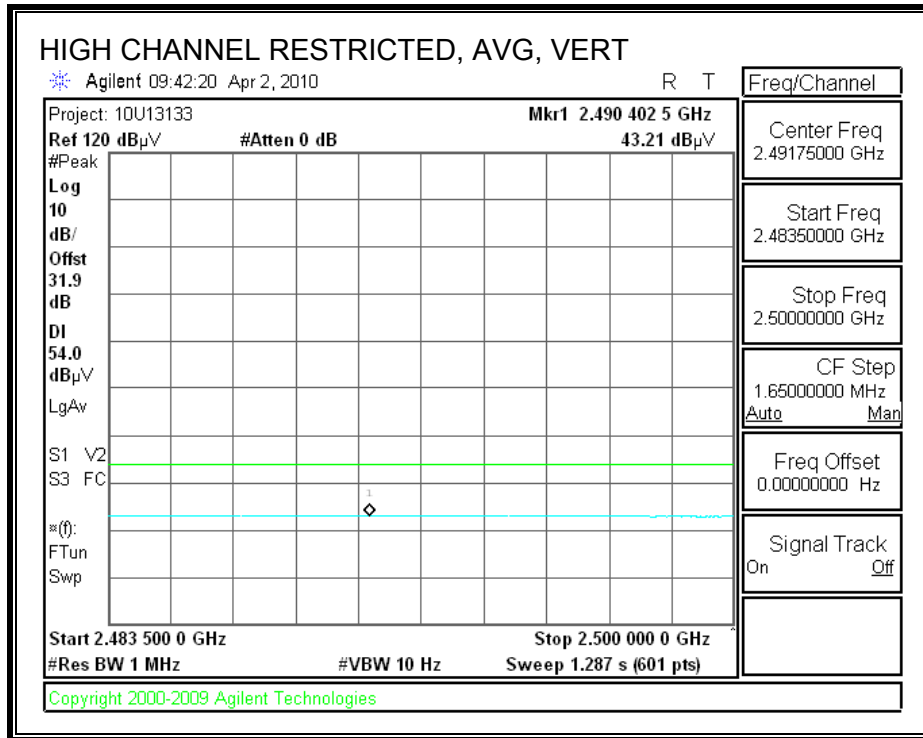
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



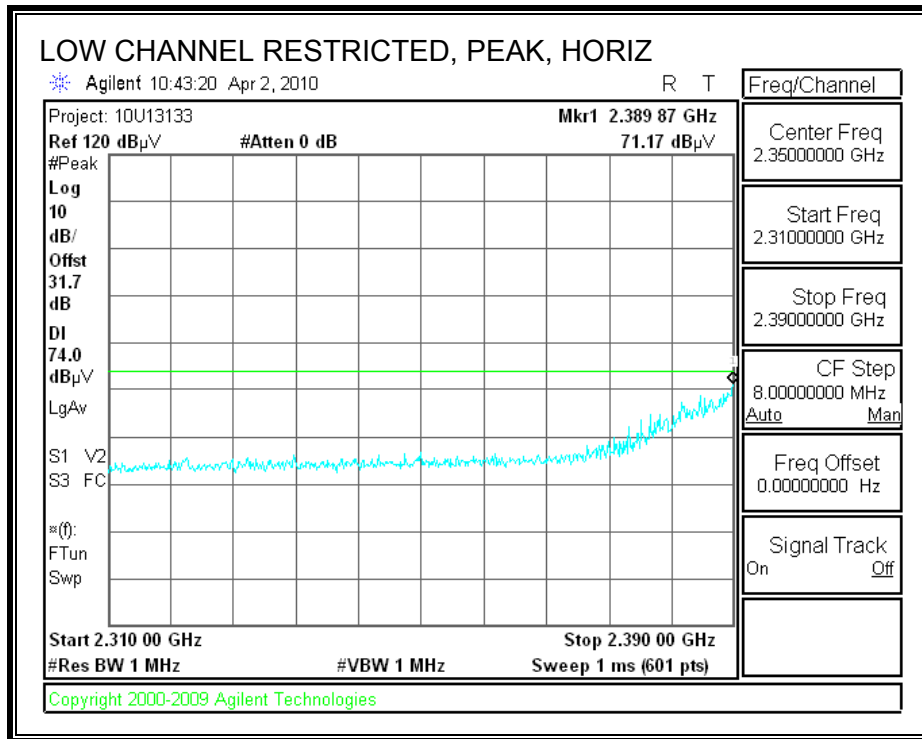


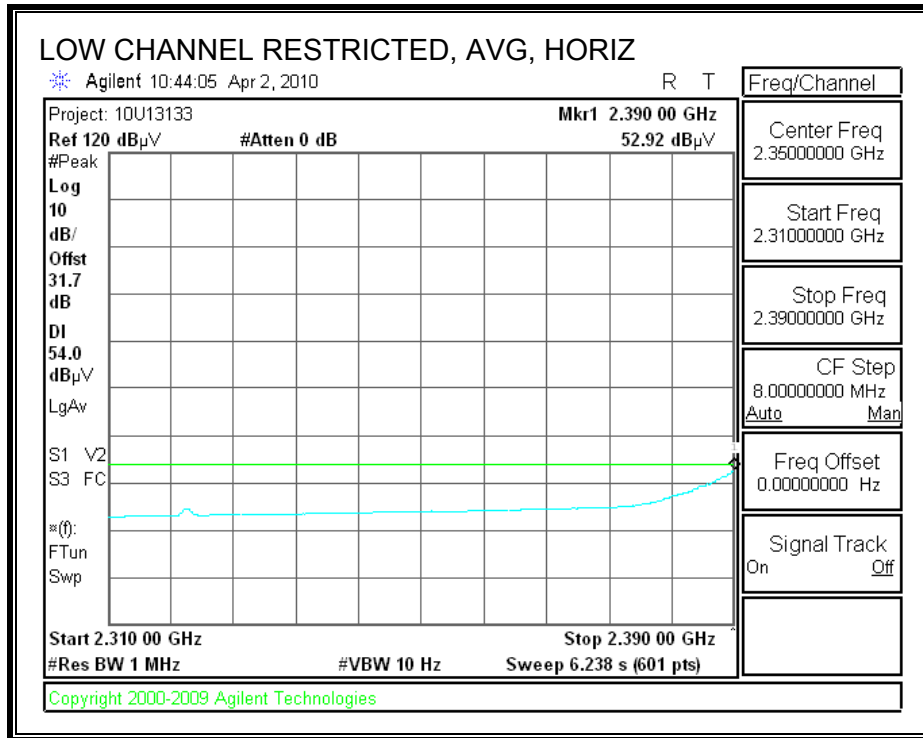
HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Tom Chen											
Date:		04/02/10											
Project #:		10U13133											
Company:		Primex Wireless											
EUT Description:		Synchronous Network System AC powered Dual Probe Temperature Sensor											
EUT M/N:		EUT only											
Test Target:		FCC 15.247											
Mode Oper:		TX mode Low / Mid / High CH											
f	Measurement Frequency			Amp	Preamp Gain			Average Field Strength Limit					
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Peak Field Strength Limit					
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Margin vs. Average Limit					
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Margin vs. Peak Limit					
CL	Cable Loss			HPF	High Pass Filter								
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
b mode 2462 MHz High CH													
4.924	3.0	45.0	33.1	5.9	-36.5	0.0	0.0	47.5	74.0	-26.5	H	P	
4.924	3.0	41.9	33.1	5.9	-36.5	0.0	0.0	44.4	54.0	-9.6	H	A	
7.386	3.0	37.9	35.4	7.3	-36.2	0.0	0.0	44.4	74.0	-29.6	H	P	
7.386	3.0	25.0	35.4	7.3	-36.2	0.0	0.0	31.5	54.0	-22.5	H	A	
4.924	3.0	50.1	33.1	5.9	-36.5	0.0	0.0	52.7	74.0	-21.3	V	P	
4.924	3.0	48.3	33.1	5.9	-36.5	0.0	0.0	50.9	54.0	-3.1	V	A	
7.386	3.0	37.6	35.4	7.3	-36.2	0.0	0.0	44.1	74.0	-29.9	V	P	
7.386	3.0	25.2	35.4	7.3	-36.2	0.0	0.0	31.7	54.0	-22.3	V	A	
b mode 2437 MHz Mid CH													
4.874	3.0	49.6	33.1	5.8	-36.5	0.0	0.0	52.0	74.0	-22.0	V	P	
4.874	3.0	47.6	33.1	5.8	-36.5	0.0	0.0	50.1	54.0	-3.9	V	A	
7.311	3.0	37.6	35.3	7.3	-36.2	0.0	0.0	44.0	74.0	-30.0	V	P	
7.311	3.0	25.4	35.3	7.3	-36.2	0.0	0.0	31.7	54.0	-22.3	V	A	
4.874	3.0	45.9	33.1	5.8	-36.5	0.0	0.0	48.4	74.0	-25.6	H	P	
4.874	3.0	43.0	33.1	5.8	-36.5	0.0	0.0	45.5	54.0	-8.5	H	A	
7.311	3.0	37.6	35.3	7.3	-36.2	0.0	0.0	44.0	74.0	-30.0	H	P	
7.311	3.0	25.4	35.3	7.3	-36.2	0.0	0.0	31.7	54.0	-22.3	H	A	
b mode 2412 MHz Low CH													
4.824	3.0	43.9	33.0	5.8	-36.5	0.0	0.0	46.3	74.0	-27.7	H	P	
4.824	3.0	38.7	33.0	5.8	-36.5	0.0	0.0	41.1	54.0	-12.9	H	A	
7.236	3.0	37.4	35.2	7.2	-36.2	0.0	0.0	43.6	74.0	-30.4	H	P	
7.236	3.0	25.1	35.2	7.2	-36.2	0.0	0.0	31.3	54.0	-22.7	H	A	
4.824	3.0	49.2	33.0	5.8	-36.5	0.0	0.0	51.6	74.0	-22.4	V	P	
4.824	3.0	46.9	33.0	5.8	-36.5	0.0	0.0	49.3	54.0	-4.7	V	A	
7.236	3.0	37.5	35.2	7.2	-36.2	0.0	0.0	43.6	74.0	-30.4	V	P	
7.236	3.0	25.1	35.2	7.2	-36.2	0.0	0.0	31.3	54.0	-22.7	V	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

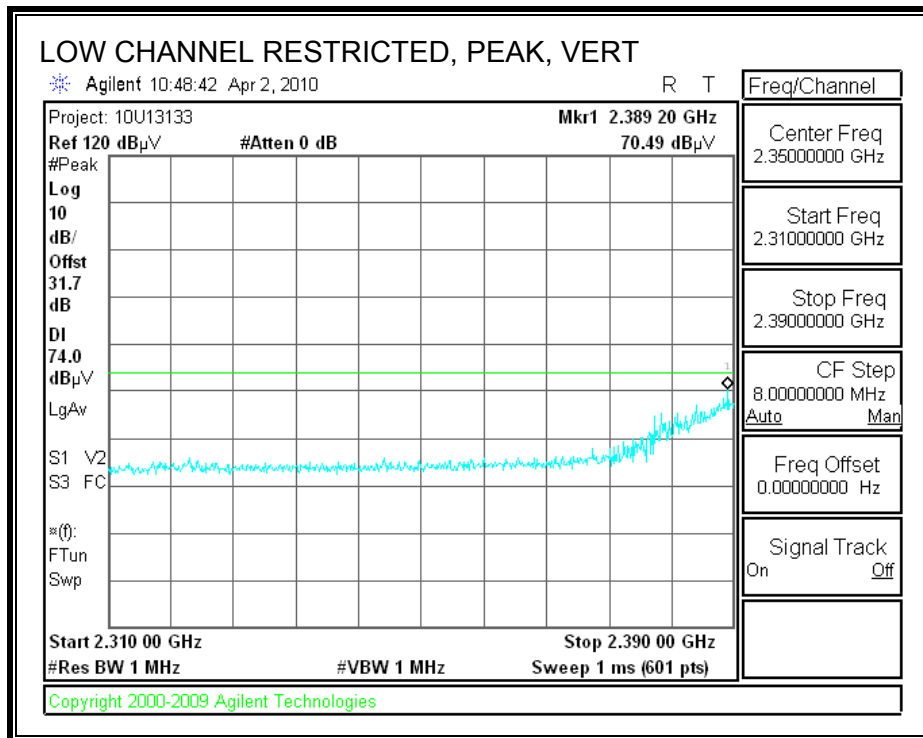
8.2.2. TX ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

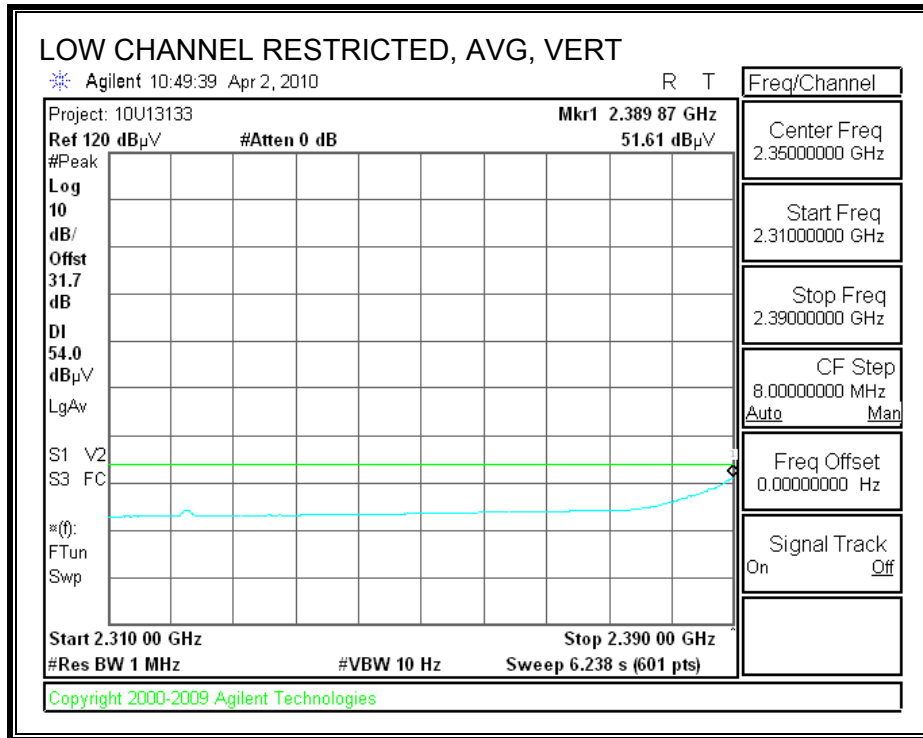
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



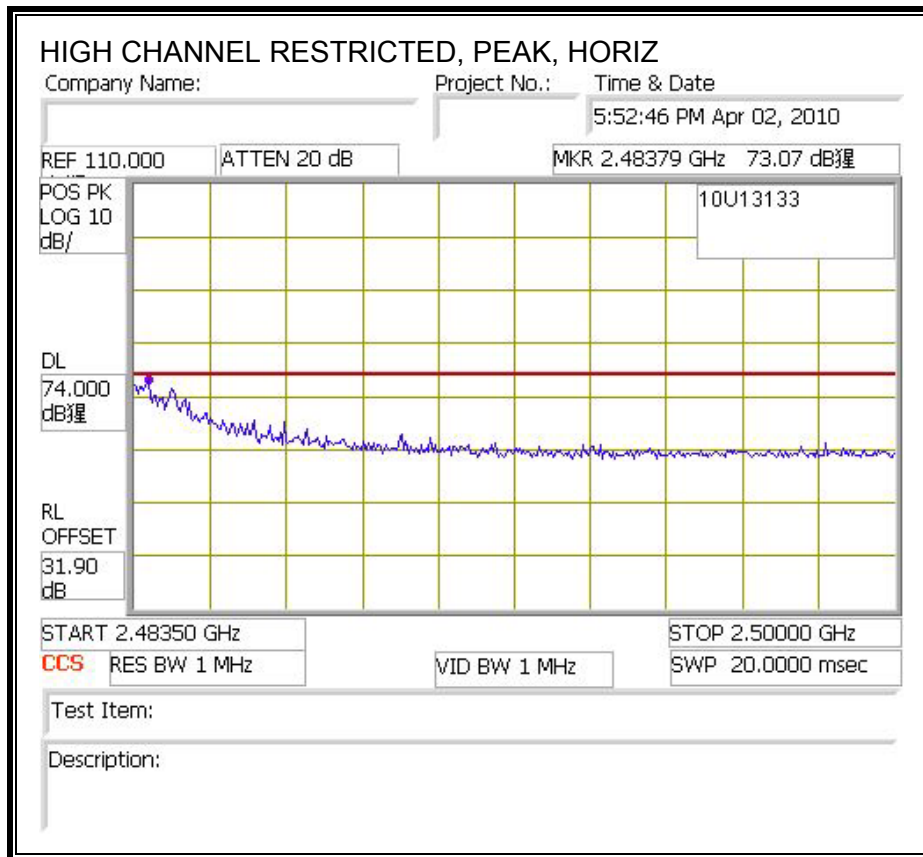


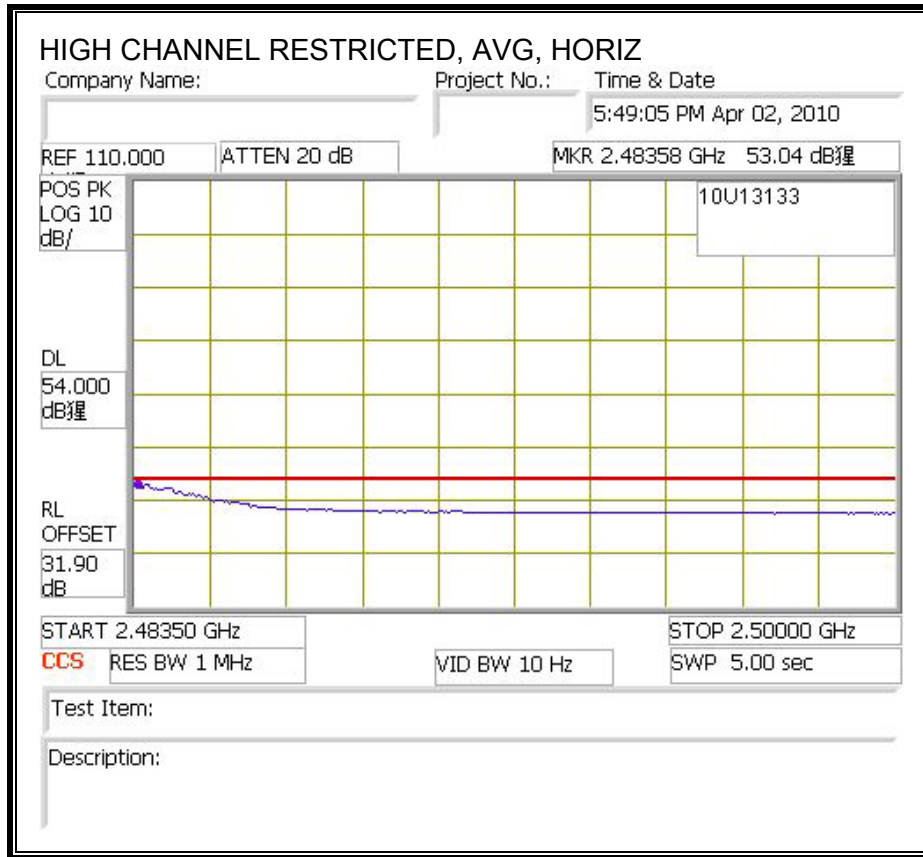
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



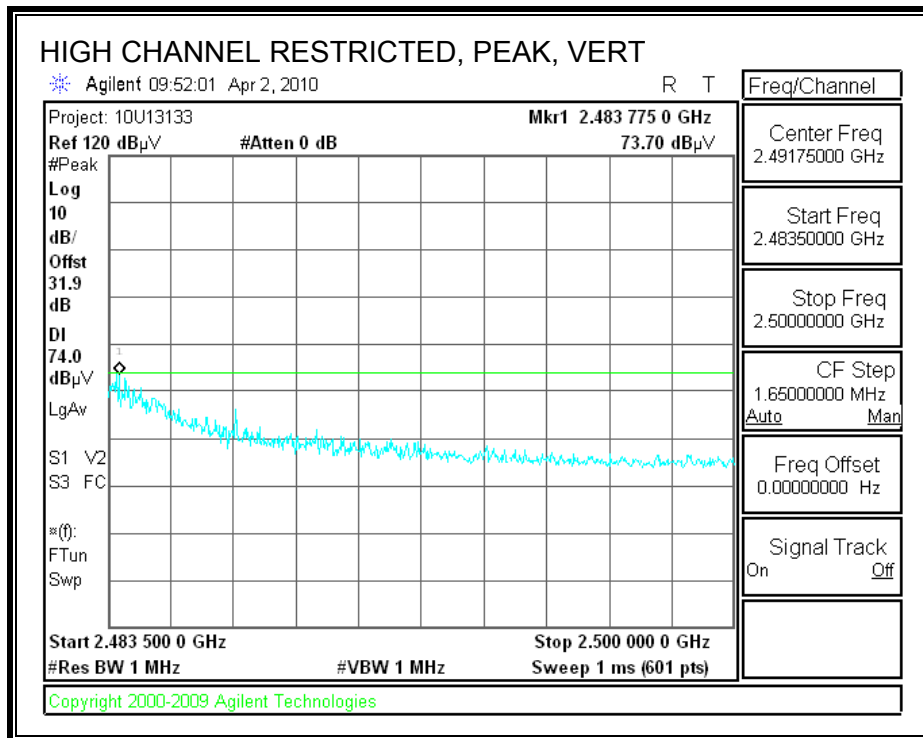


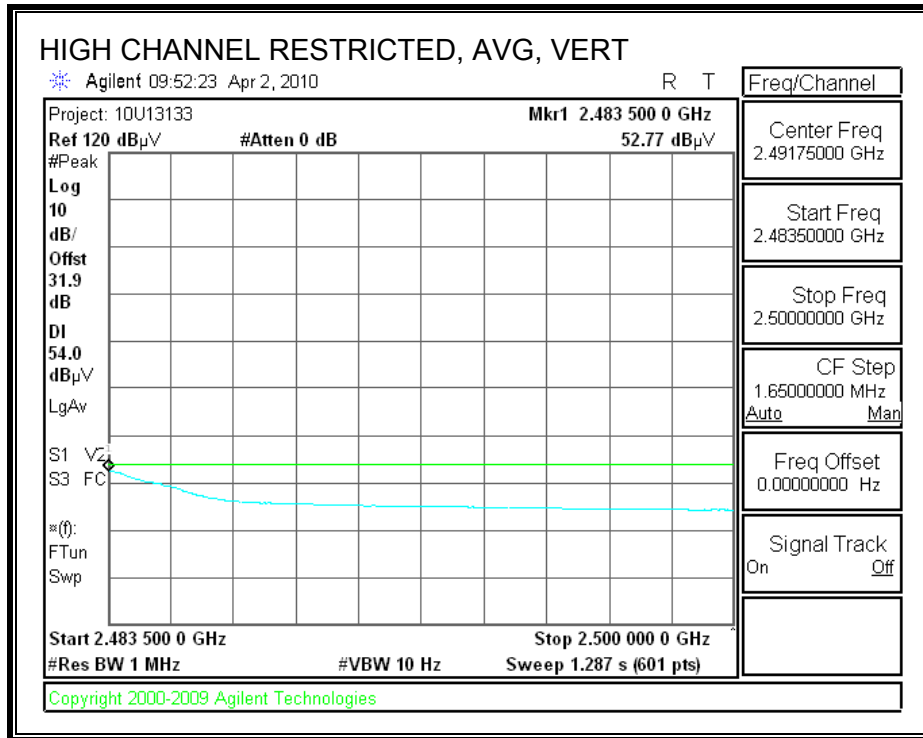
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

Date: 04/02/10
Project #: 10U13133
Company: Primex Wireless
EUT Description: Synchronous Network System AC powered Dual Probe Temperature Sensor
EUT M/N: EUT only
Test Target: FCC 15.247
Mode Oper: TX mode Low / Mid / High CH

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

f 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	Notes
g mode 2412 MHz Low CH													
4.824	3.0	39.4	33.0	5.8	-36.5	0.0	0.0	41.8	74.0	-32.2	V	P	
4.824	3.0	26.7	33.0	5.8	-36.5	0.0	0.0	29.1	54.0	-24.9	V	A	
7.236	3.0	38.4	35.2	7.2	-36.2	0.0	0.0	44.6	74.0	-29.4	V	P	
7.236	3.0	25.3	35.2	7.2	-36.2	0.0	0.0	31.5	54.0	-22.5	V	A	
9.648	3.0	37.0	37.4	8.5	-37.0	0.0	0.0	46.0	74.0	-28.0	V	P	
9.648	3.0	24.8	37.4	8.5	-37.0	0.0	0.0	33.8	54.0	-20.2	V	A	
4.824	3.0	38.9	33.0	5.8	-36.5	0.0	0.0	41.3	74.0	-32.7	H	P	
4.824	3.0	26.6	33.0	5.8	-36.5	0.0	0.0	29.0	54.0	-25.0	H	A	
7.236	3.0	37.7	35.2	7.2	-36.2	0.0	0.0	43.9	74.0	-30.1	H	P	
7.236	3.0	25.3	35.2	7.2	-36.2	0.0	0.0	31.5	54.0	-22.5	H	A	
9.648	3.0	36.8	37.4	8.5	-37.0	0.0	0.0	45.8	74.0	-28.2	H	P	
9.648	3.0	24.7	37.4	8.5	-37.0	0.0	0.0	33.7	54.0	-20.3	H	A	
g mode 2437 MHz Mid CH													
4.874	3.0	42.5	33.1	5.8	-36.5	0.0	0.0	45.0	74.0	-29.0	H	P	
4.874	3.0	29.7	33.1	5.8	-36.5	0.0	0.0	32.2	54.0	-21.8	H	A	
7.311	3.0	37.8	35.3	7.3	-36.2	0.0	0.0	44.2	74.0	-29.8	H	P	
7.311	3.0	25.3	35.3	7.3	-36.2	0.0	0.0	31.7	54.0	-22.3	H	A	
4.874	3.0	49.2	33.1	5.8	-36.5	0.0	0.0	51.7	74.0	-22.3	V	P	
4.874	3.0	36.4	33.1	5.8	-36.5	0.0	0.0	38.8	54.0	-15.2	V	A	
7.311	3.0	37.7	35.3	7.3	-36.2	0.0	0.0	44.0	74.0	-30.0	V	P	
7.311	3.0	25.3	35.3	7.3	-36.2	0.0	0.0	31.6	54.0	-22.4	V	A	
g mode 2462 MHz High CH													
4.924	3.0	45.5	33.1	5.9	-36.5	0.0	0.0	48.0	74.0	-26.0	V	P	
4.924	3.0	32.6	33.1	5.9	-36.5	0.0	0.0	35.2	54.0	-18.8	V	A	
7.386	3.0	38.0	35.4	7.3	-36.2	0.0	0.0	44.5	74.0	-29.5	V	P	
7.386	3.0	25.2	35.4	7.3	-36.2	0.0	0.0	31.7	54.0	-22.3	V	A	
4.924	3.0	40.7	33.1	5.9	-36.5	0.0	0.0	43.3	74.0	-30.7	H	P	
4.924	3.0	29.1	33.1	5.9	-36.5	0.0	0.0	31.7	54.0	-22.3	H	A	
7.386	3.0	37.4	35.4	7.3	-36.2	0.0	0.0	43.9	74.0	-30.1	H	P	
7.386	3.0	25.1	35.4	7.3	-36.2	0.0	0.0	31.6	54.0	-22.4	H	A	

Rev. 4.1.2.7

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

8.3. RECEIVER ABOVE 1 GHz

8.3.1. RECEIVER ABOVE 1 GHz IN THE 2.4 GHz BAND

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: Primex Wireless
 Project #: 10U13133
 Date: 40270.0
 Test Engineer: Tom Chen
 Configuration: EUT only
 Mode: Synchronous Network System AC powered Dual Probe Temperature Sensor

Test Equipment:

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			RX RSS 210

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
3' cable 22807700	12' cable 22807600	20' cable 22807500			Average Measurements RBW=1MHz ; VBW=10Hz

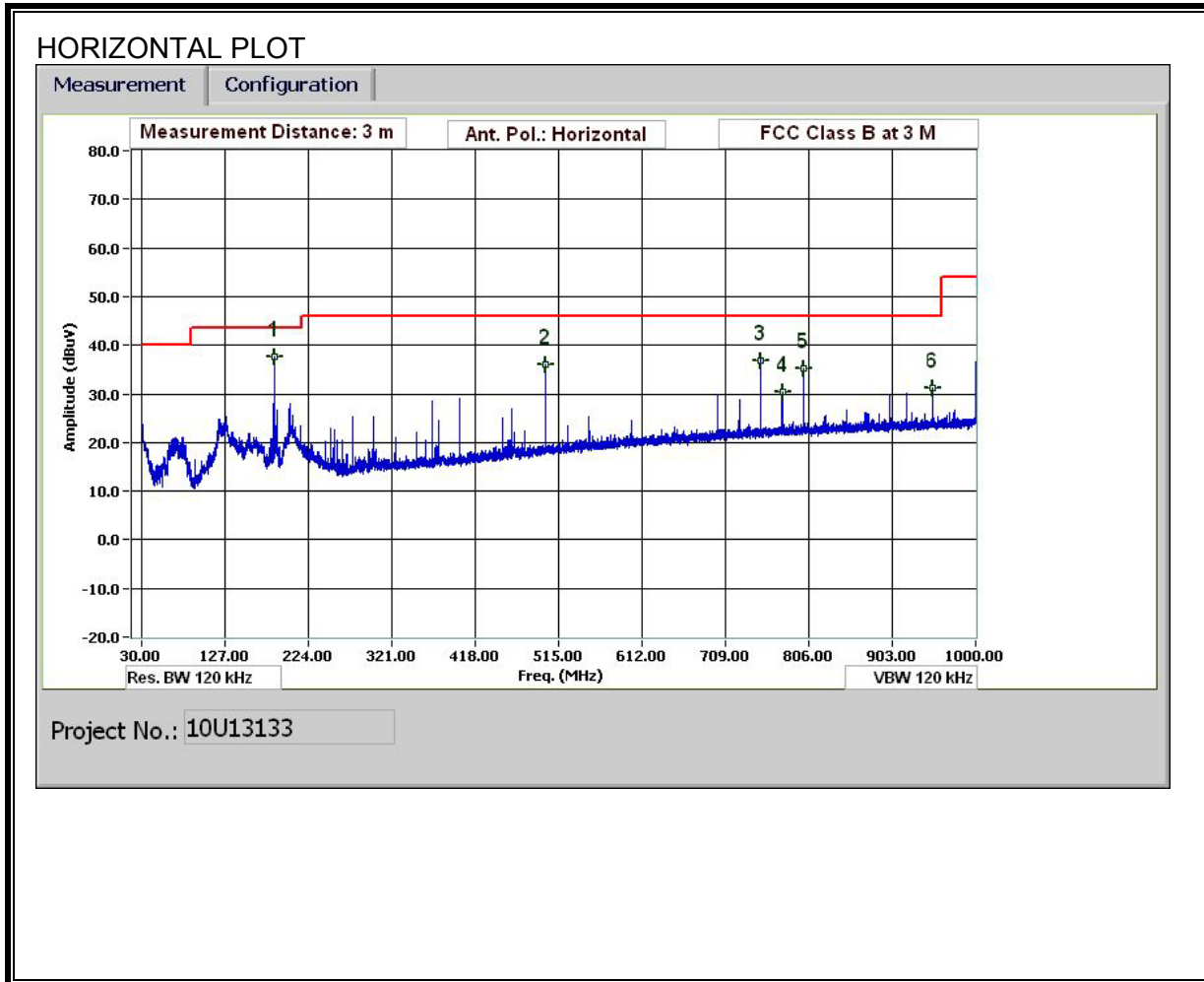
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.072	3.0	49.7	34.7	24.1	2.4	-39.4	0.0	0.0	36.9	21.9	74	54	-37.1	-32.1	V
1.500	3.0	47.5	31.6	25.5	2.9	-38.8	0.0	0.0	37.2	21.3	74	54	-36.8	-32.7	V
3.200	3.0	42.9	32.7	30.5	4.5	-37.2	0.0	0.0	40.6	30.5	74	54	-33.4	-23.5	V
1.250	3.0	48.7	34.2	24.7	2.7	-39.1	0.0	0.0	36.9	22.4	74	54	-37.1	-31.6	H
1.500	3.0	49.1	31.4	25.5	2.9	-38.8	0.0	0.0	38.8	21.1	74	54	-35.2	-32.9	H
3.070	3.0	42.7	31.3	30.2	4.4	-37.3	0.0	0.0	40.0	28.6	74	54	-34.0	-25.4	H

Rev. 07.22.09

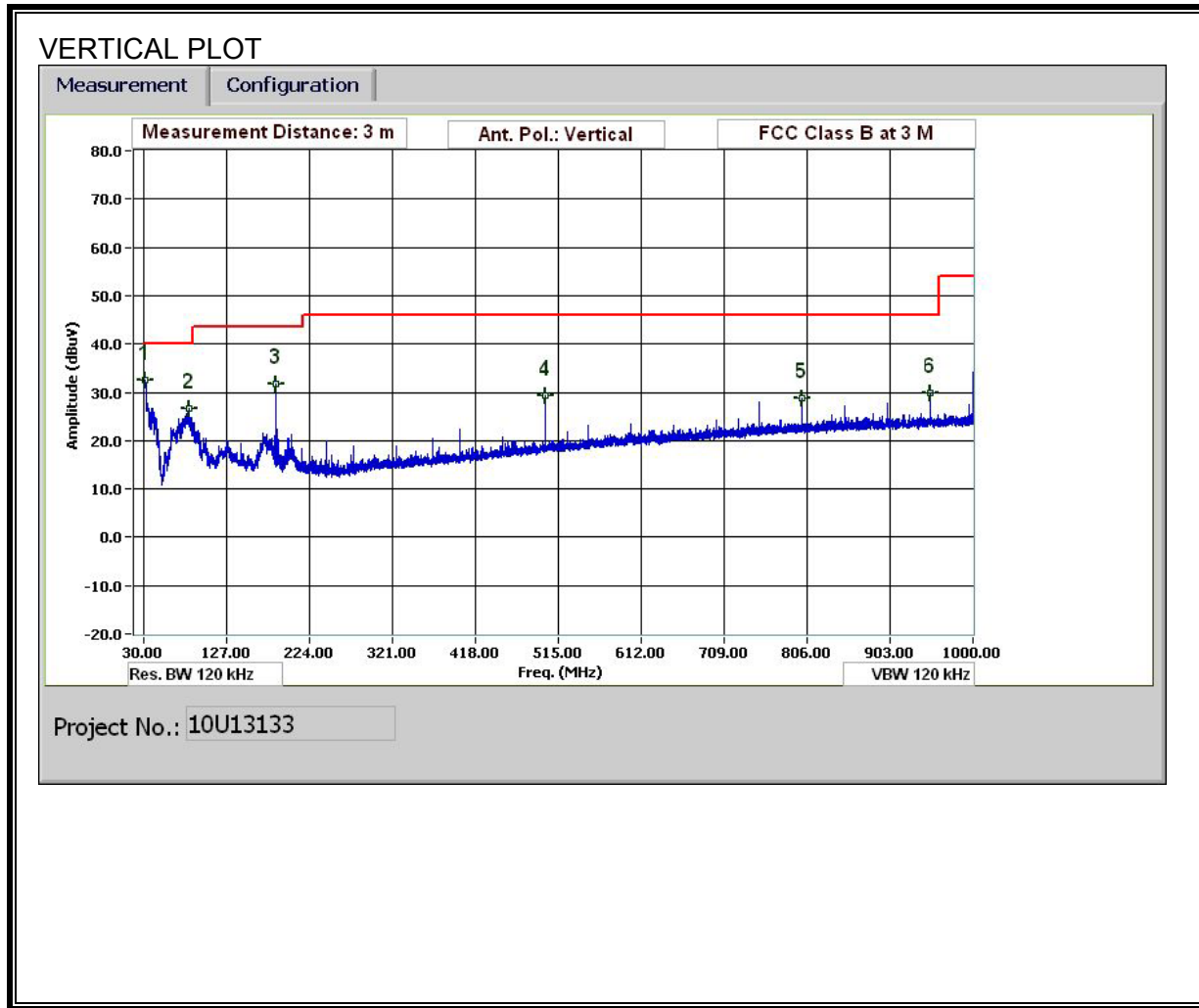
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

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

Test Engr: Tom Chen
 Date: 04/01/10
 Project #: 10U13133
 Company: Primex Wireless
 EUT Description: Wireless Dual Probe Temperature Sensor
 EUT M/N: EUT only
 Test Target: FCC Class B
 Mode Oper: Worst Case TX mode

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

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Horizontal													
183.966	3.0	53.6	11.2	1.2	28.2	0.0	0.0	37.7	43.5	-5.8	H	P	
500.059	3.0	45.1	16.7	2.0	27.8	0.0	0.0	36.1	46.0	-9.9	H	P	
750.150	3.0	41.3	20.3	2.5	27.3	0.0	0.0	36.8	46.0	-9.2	H	P	
775.111	3.0	34.7	20.6	2.6	27.4	0.0	0.0	30.5	46.0	-15.5	H	P	
800.072	3.0	39.0	21.0	2.6	27.5	0.0	0.0	35.1	46.0	-10.9	H	P	
950.078	3.0	33.9	22.2	2.9	27.9	0.0	0.0	31.1	46.0	-14.9	H	P	
Vertical													
32.160	3.0	41.4	19.2	0.5	28.4	0.0	0.0	32.7	40.0	-7.3	V	P	
83.042	3.0	46.7	7.4	0.8	28.3	0.0	0.0	26.6	40.0	-13.4	V	P	
183.966	3.0	47.5	11.2	1.2	28.2	0.0	0.0	31.7	43.5	-11.8	V	P	
500.059	3.0	38.3	16.7	2.0	27.8	0.0	0.0	29.2	46.0	-16.8	V	P	
800.072	3.0	32.8	21.0	2.6	27.5	0.0	0.0	28.9	46.0	-17.1	V	P	
950.078	3.0	32.8	22.2	2.9	27.9	0.0	0.0	30.0	46.0	-16.0	V	P	

Rev. 1.27.09

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

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

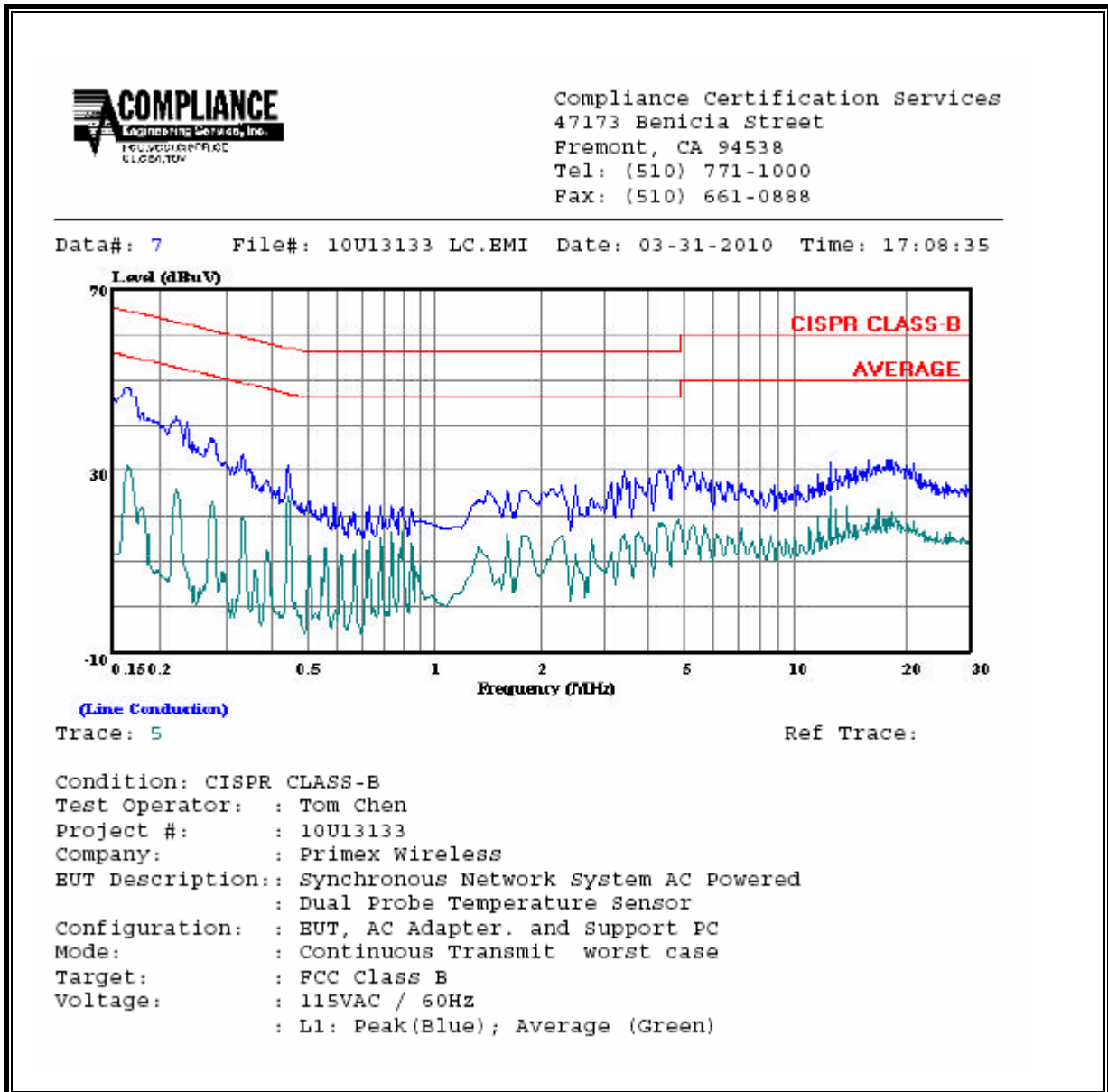
ANSI C63.4

RESULTS

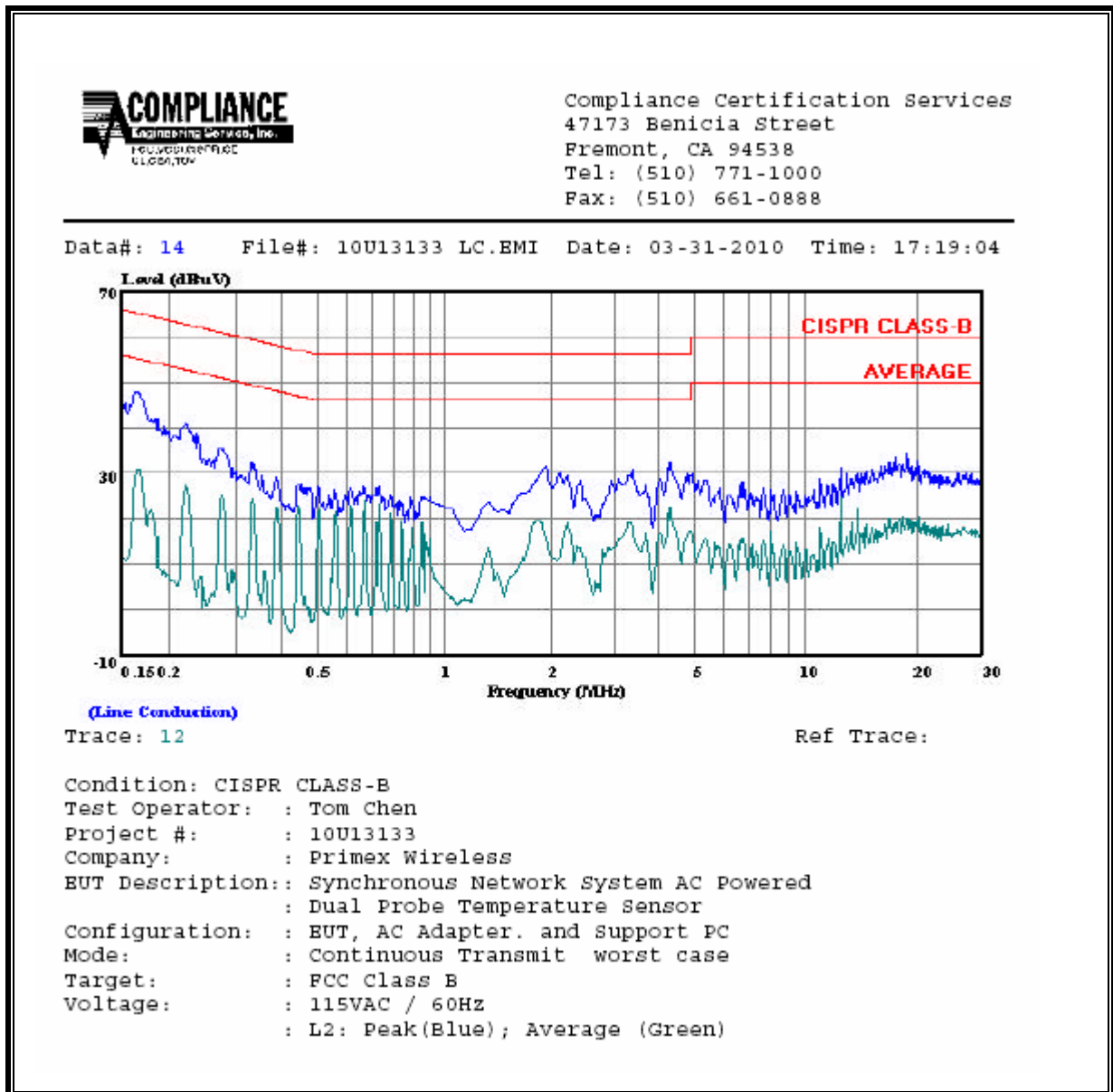
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Class	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.16	48.14	--	28.30	0.00	65.36	55.36	-17.22	-27.06	L1
0.22	41.23	--	25.29	0.00	62.78	52.78	-21.55	-27.49	L1
0.27	36.38	--	20.06	0.00	61.00	51.00	-24.62	-30.94	L1
0.17	47.77	--	30.93	0.00	65.16	55.16	-17.39	-24.23	L2
0.22	40.60	--	26.64	0.00	62.78	52.78	-22.18	-26.14	L2
0.28	35.49	--	24.89	0.00	60.85	50.85	-25.36	-25.96	L2
6 Worst Data									

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 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 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:

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

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:

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

where

D = Separation distance in m

EIRP = Equivalent Isotropic Radiated Power in W

S = Power density in W/m²

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

LIMITS

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

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

RESULTS

Band	Mode	Separation Distance (m)	Output Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m ²)	FCC Power Density (mW/cm ²)
2.4 GHz	WLAN	0.20	22.92	-1.20	0.30	0.030