



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

CERTIFICATION TEST REPORT

FOR

BLUETOOTH HEADSET

MODEL NUMBER: BackBeat GO

**FCC ID: AL8-BACKBEATGO
IC: 457A-BACKBEATGO**

REPORT NUMBER: 11U14168-1, Revision B

ISSUE DATE: January 12, 2012

Prepared for
**PLANTRONICS, INC.
345 ENCINAL STREET
SANTA CRUZ, CA 95060, U.S.A.**

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	01/03/12	Initial Issue	F. Ibrahim
A	01/09/12	Updated IC standard on report	A. Zaffar
B	01/12/12	Removed AV power sections and revised section 7.2.6 for conducted spurious low channel	F. Ibrahim

8.4. *WORST-CASE BELOW 1 GHz* 94

9. **AC POWER LINE CONDUCTED EMISSIONS** 100

10. **MAXIMUM PERMISSIBLE EXPOSURE** 104

11. **SETUP PHOTOS** 108

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PLANTRONICS, INC.
345 ENCINAL STREET
SANTA CRUZ, CA. 95060, U.S.A.

EUT DESCRIPTION: BLUETOOTH HEADSET

MODEL: BackBeat GO

SERIAL NUMBER: 445EF3001E86, 445EF3001E09, 445EF3001E0A,

DATE TESTED: DECEMBER 5-9, 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:



TOM CHEN
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

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 Bluetooth Headset.

The radio module is manufactured by CSR.

The manufacturer declares that they support AFH with a minimum of 20 channels, following the Bluetooth protocol to ensure compliance with the pseudo-hopping sequence and dwell time requirements of FCC 15.247.

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)
2402 - 2480	Basic GFSK	6.95	4.95
2402 - 2480	DQPSK	7.51	5.64

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB antenna, with a maximum gain of -1.8 dBi.

5.4. SOFTWARE AND FIRMWARE

Software and Firmware revision = P1D

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission 30-1000 MHz was performed with the EUT set to transmit at the channel with the highest output power as worst-case scenario.

Power line conducted emission was performed with the EUT connected to a charging adapter; the EUT can't operate while being charged.

Three orthogonal orientations were investigated to find worst-case orientation; it turned out to be Y orientation. Final radiated testing was performed with EUT in Y orientation.

5.6. DESCRIPTION OF TEST SETUP

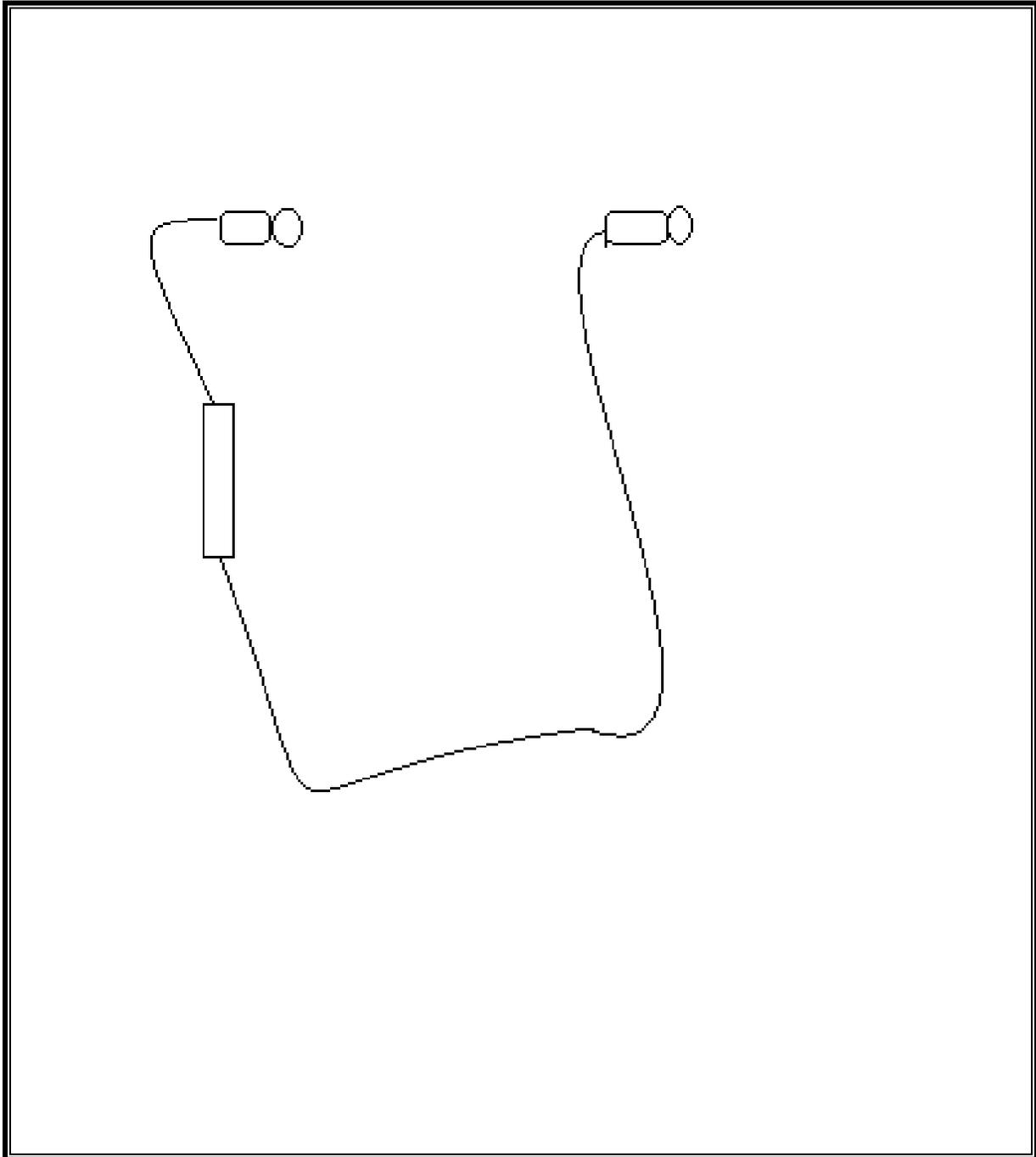
SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Plantronics	SSA-5W-05US050018P	82920-01	NA

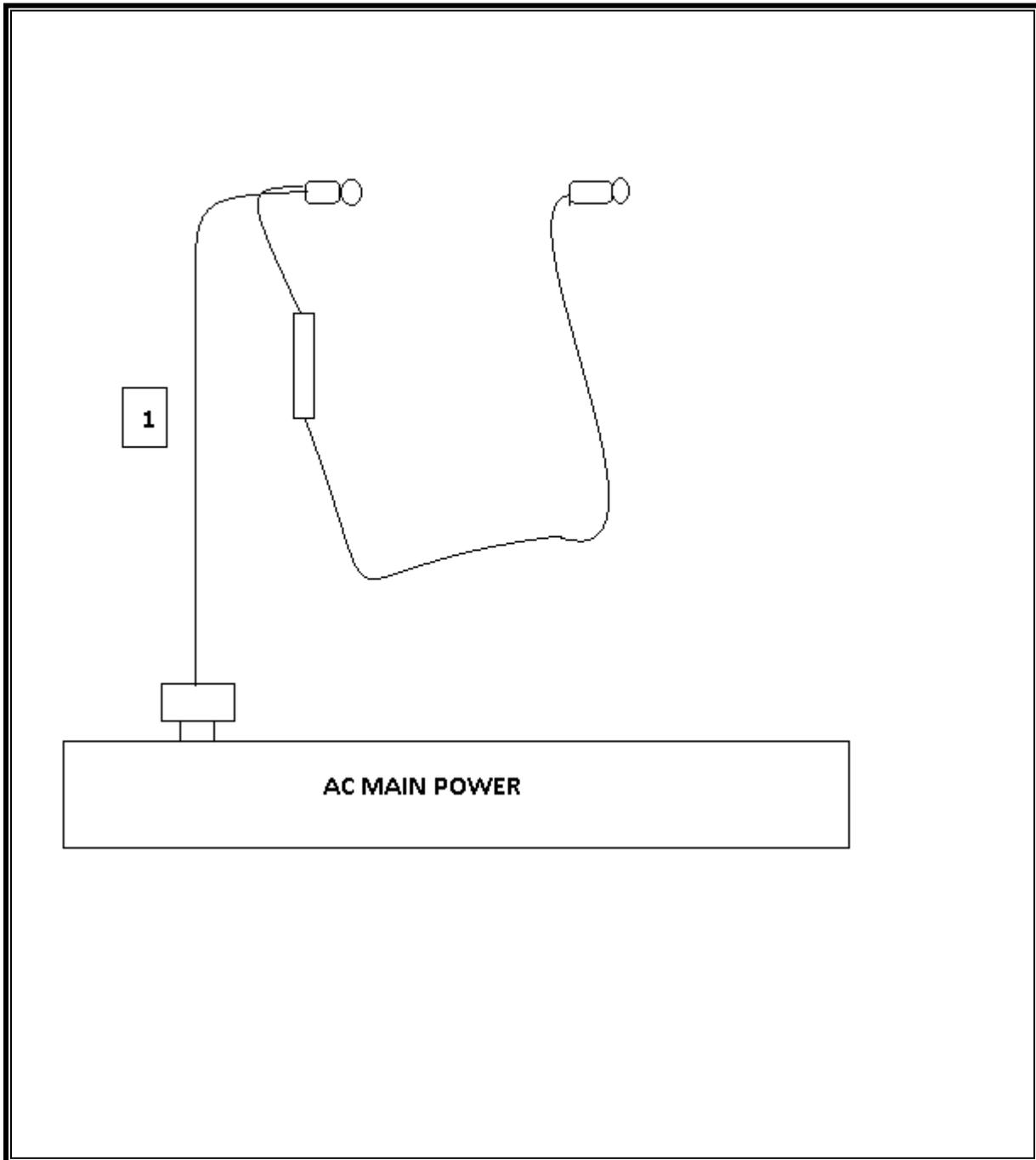
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	mini USB	Unshielded	2m	charging only

SETUP DIAGRAM FOR TESTS



IN CHARGING MODE



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01176	08/04/11	08/04/12
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01176	08/04/11	08/04/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	06/29/11	06/29/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/18/11	07/18/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	07/16/11	07/16/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	01/27/11	01/27/12
Power Meter	Agilent / HP	437B	CCS-154	07/29/11	10/29/12
Average Power Sensor	Agilent / HP	8481A	CCS-157	07/29/11	10/29/12
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	7/6/2011	7/6/2012
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/10/11	11/10/12
Horn Antenna, 26 GHz	ARA	MWH-1826/B	C00589	07/28/11	07/28/12

7. ANTENNA PORT TEST RESULTS

7.1. BASIC DATA RATE GFSK MODULATION

7.1.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

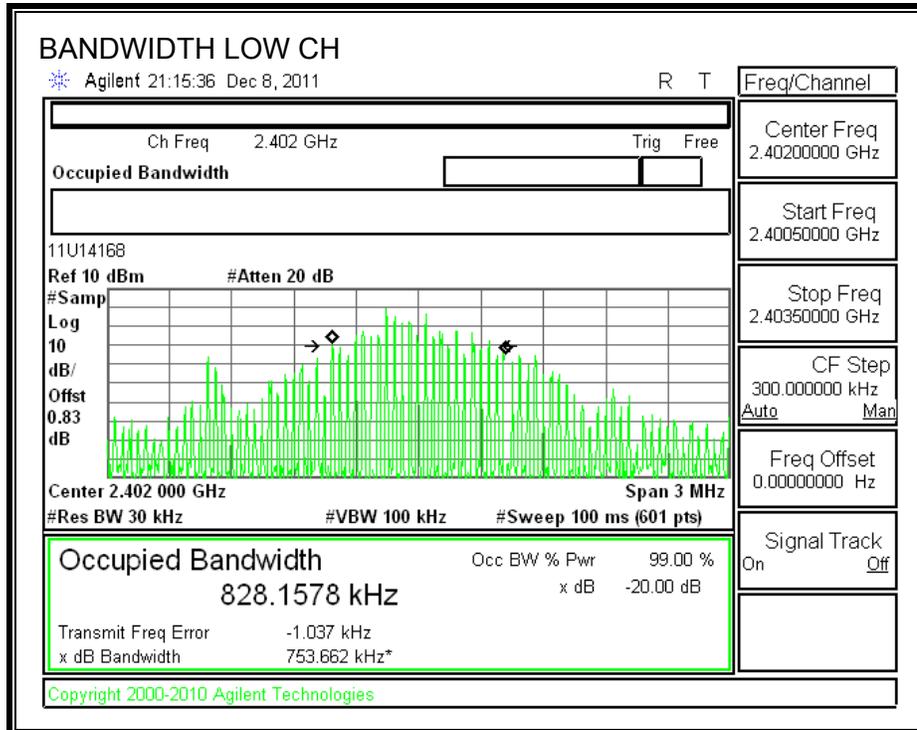
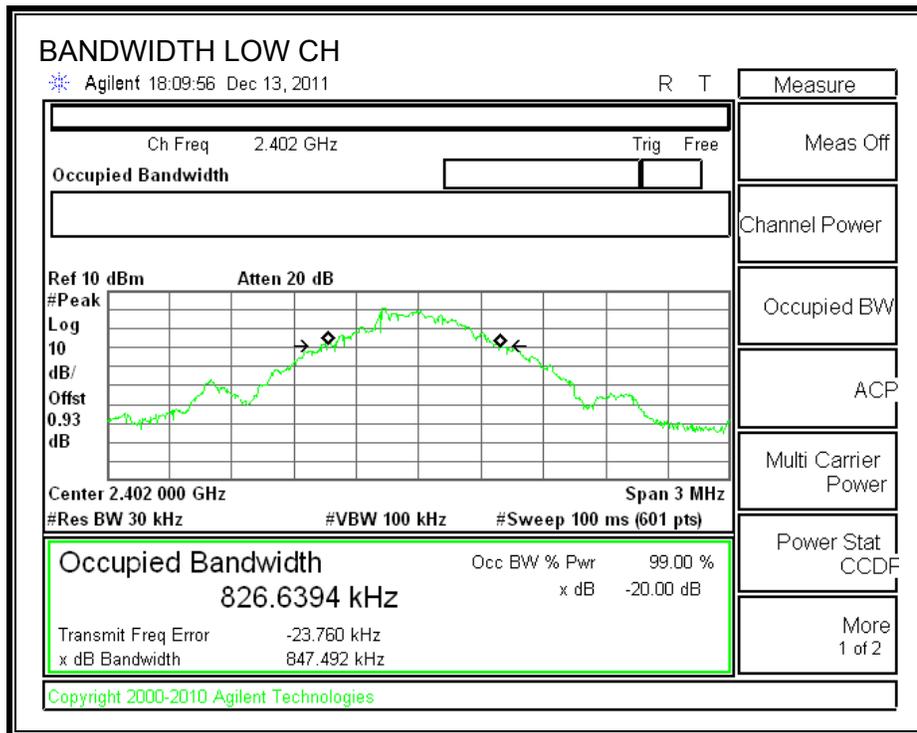
TEST PROCEDURE

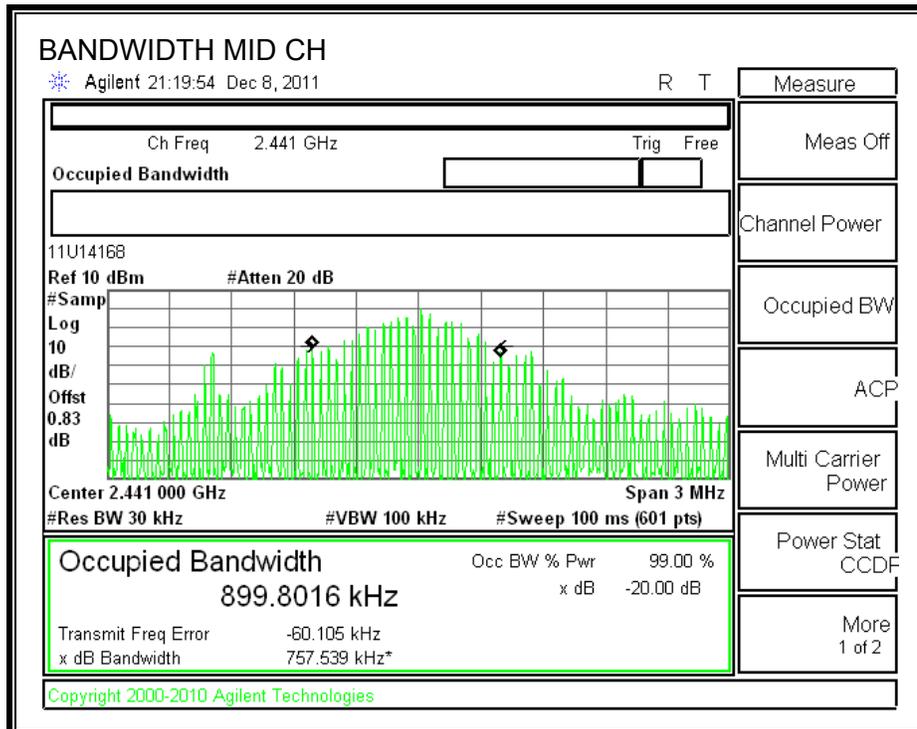
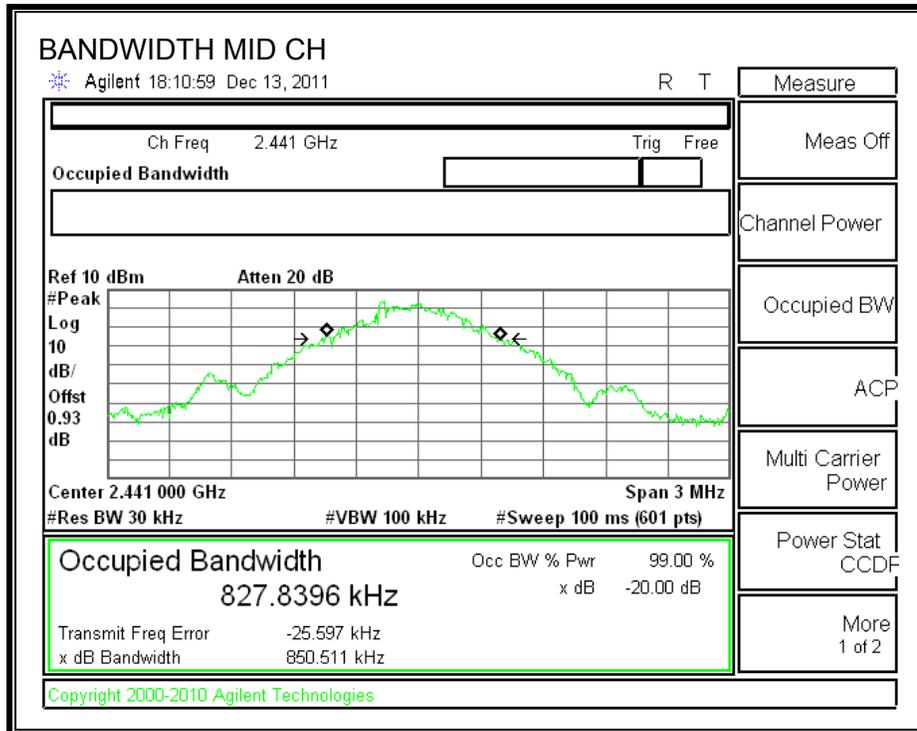
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled.

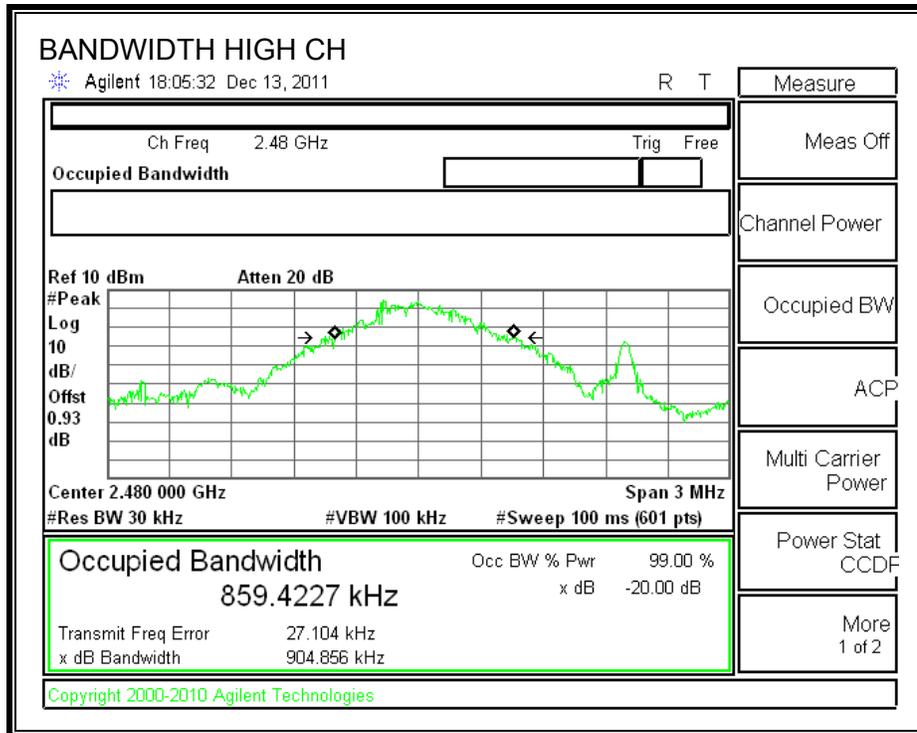
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	847.492	828.1578
Middle	2441	850.511	899.8016
High	2480	904.856	969.0564

20 dB AND 99% BANDWIDTH







7.1.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

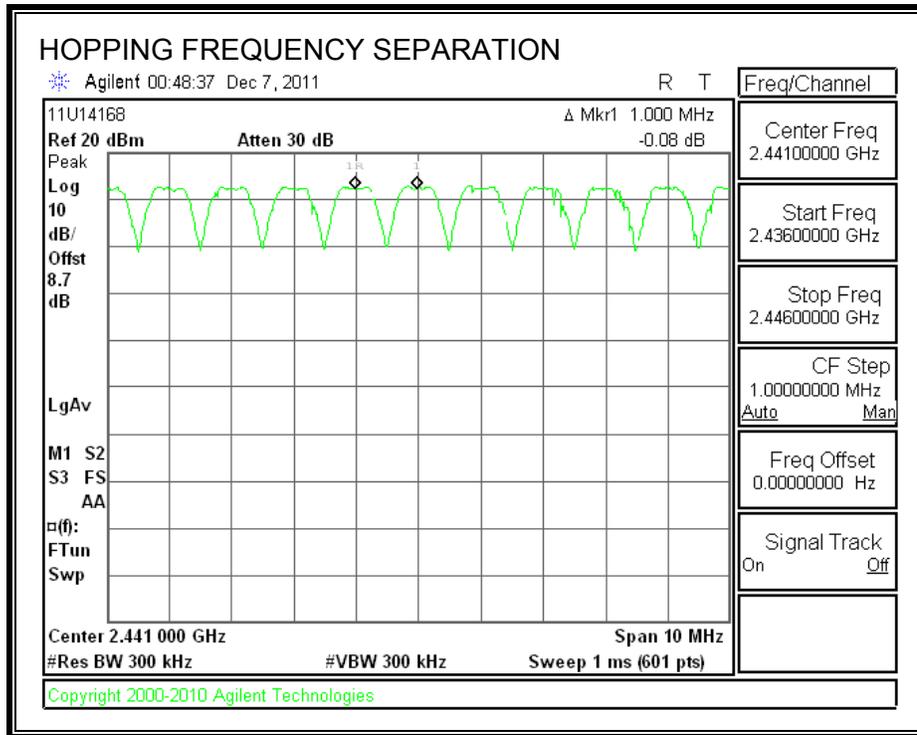
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

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

RESULTS

HOPPING FREQUENCY SEPARATION



7.1.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

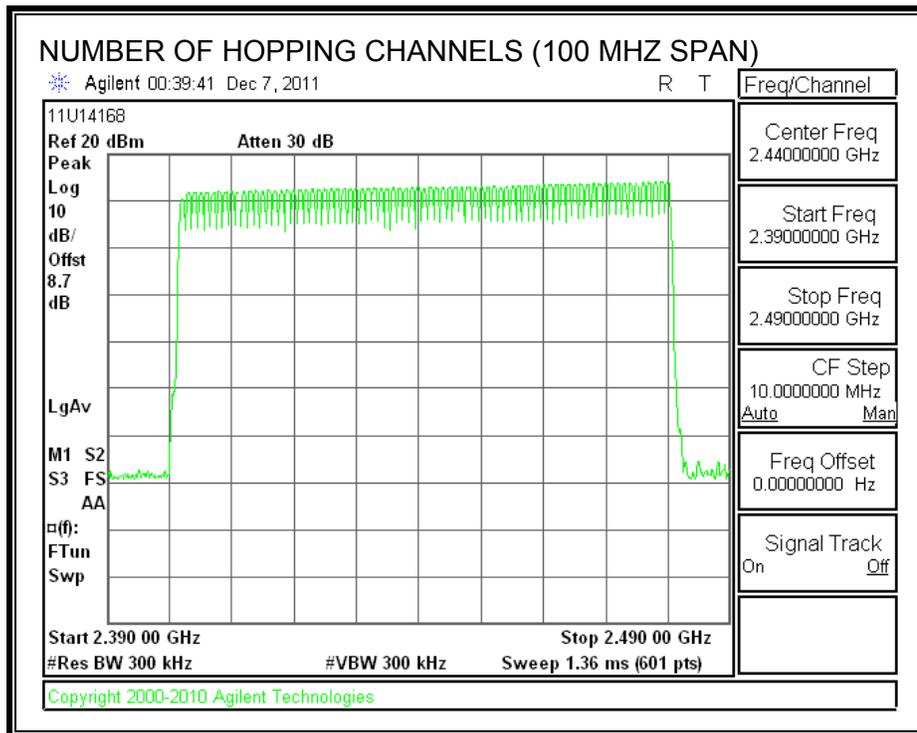
TEST PROCEDURE

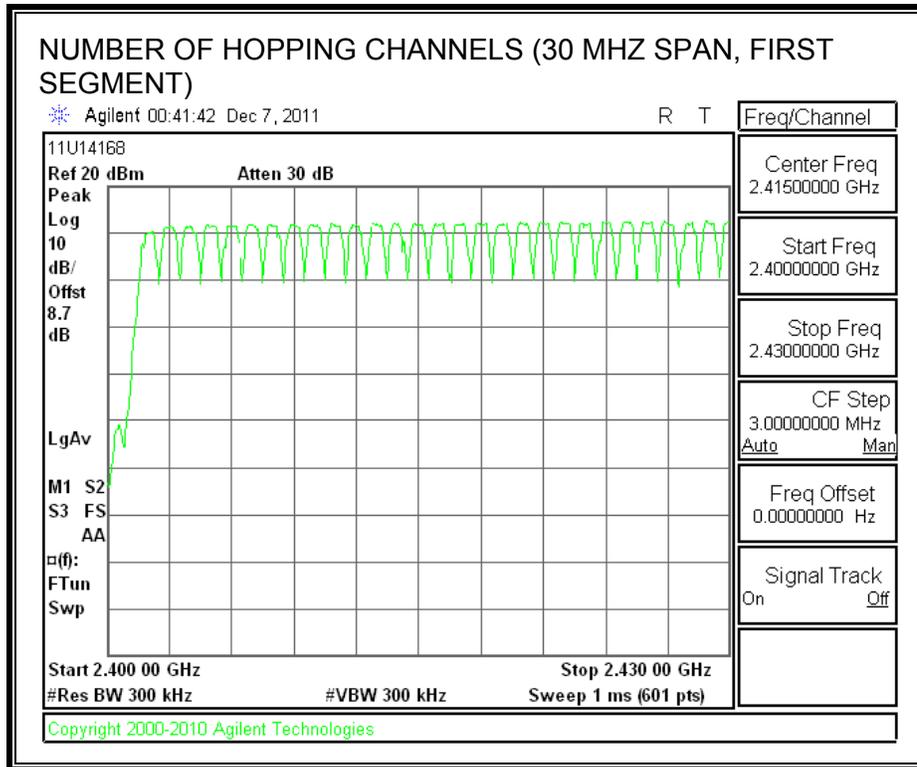
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

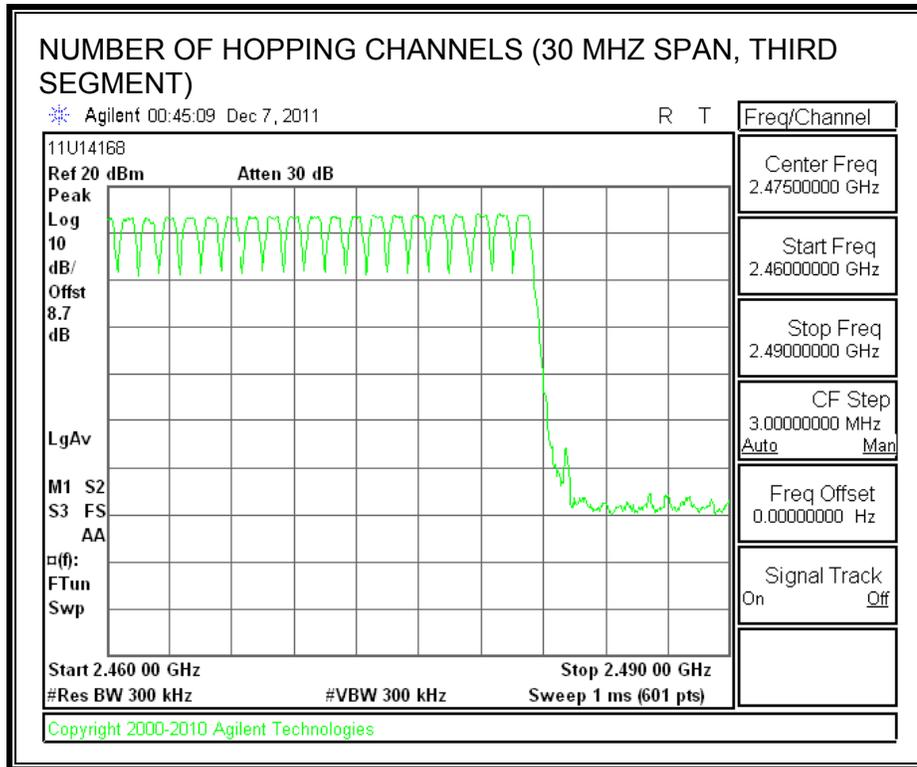
RESULTS

79 Channels observed.

NUMBER OF HOPPING CHANNELS







7.1.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{ pulse width}$.

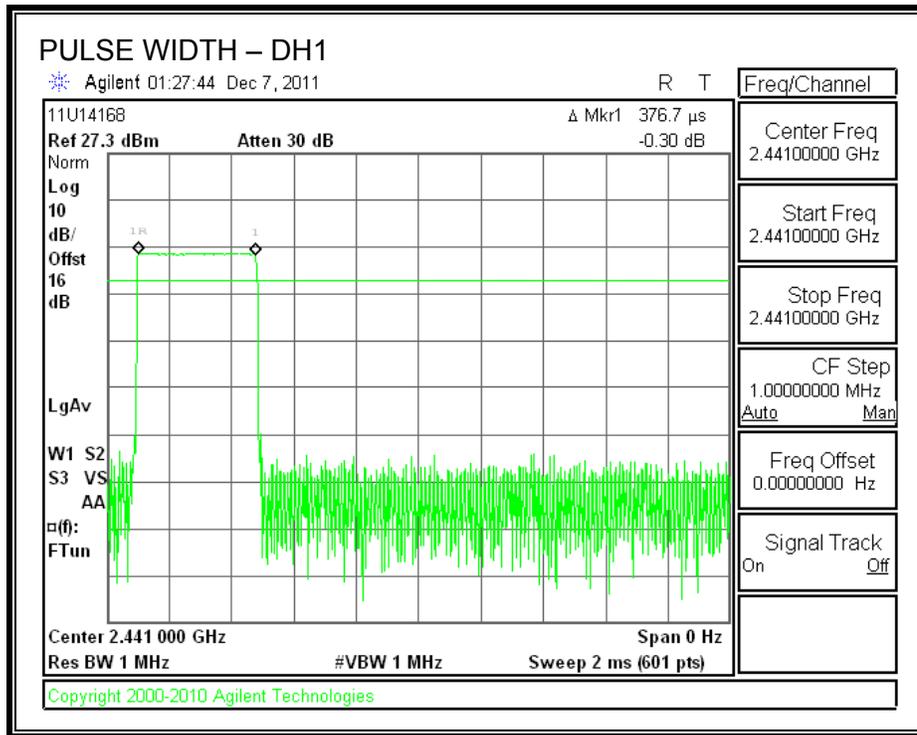
RESULTS

Time Of Occupancy = $10 * xx \text{ pulses} * yy \text{ msec} = zz \text{ msec}$

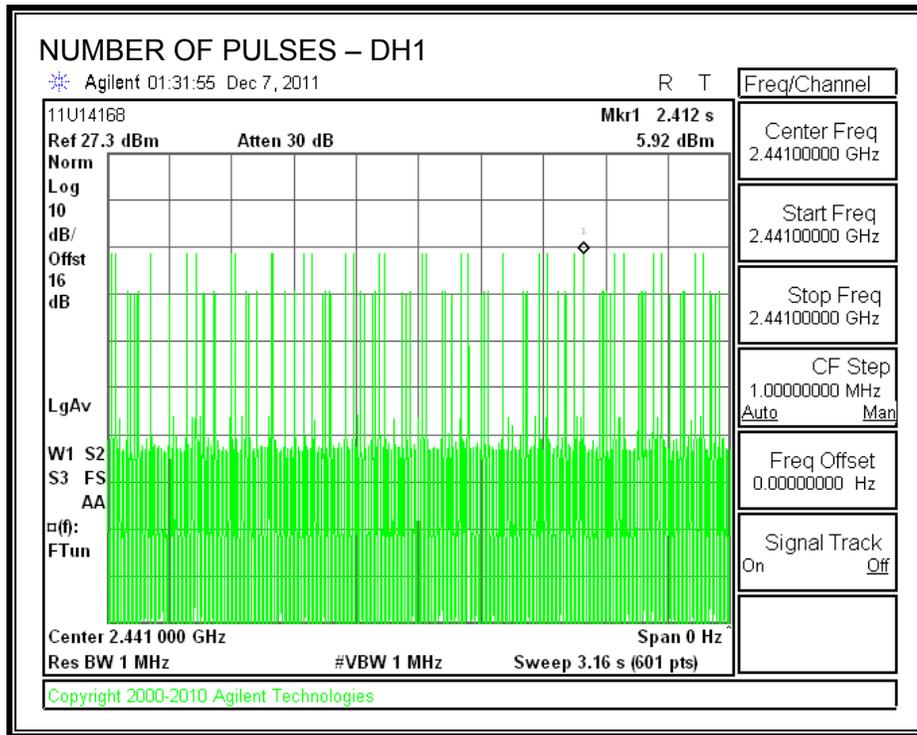
GFSK Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.3767	29	0.109	0.4	-0.291
DH3	1.642	14	0.230	0.4	-0.170
DH5	2.892	11	0.318	0.4	-0.082

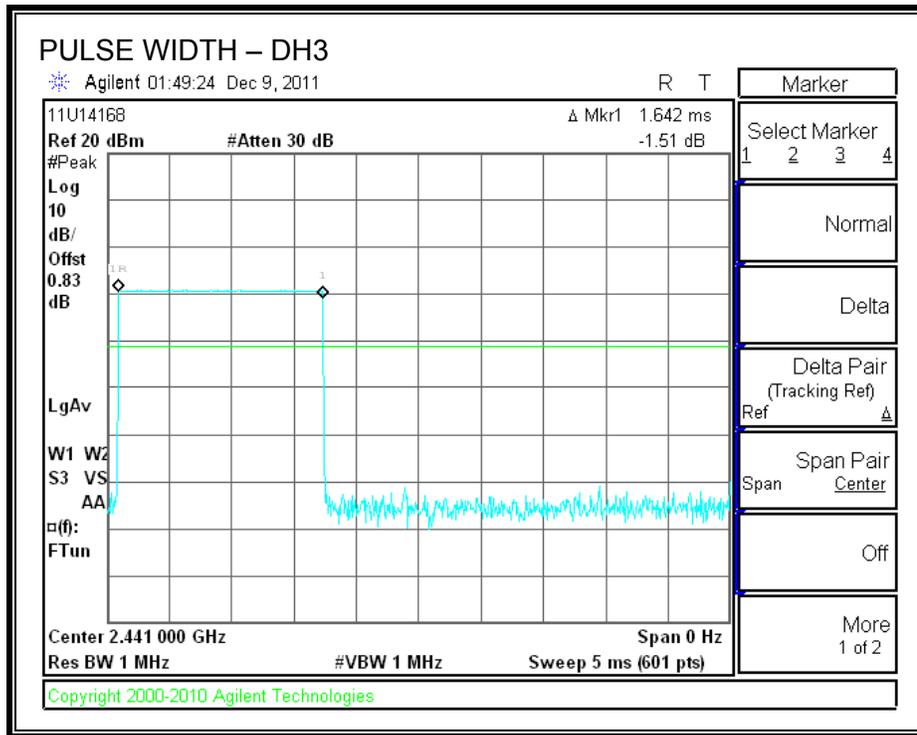
PULSE WIDTH – DH1



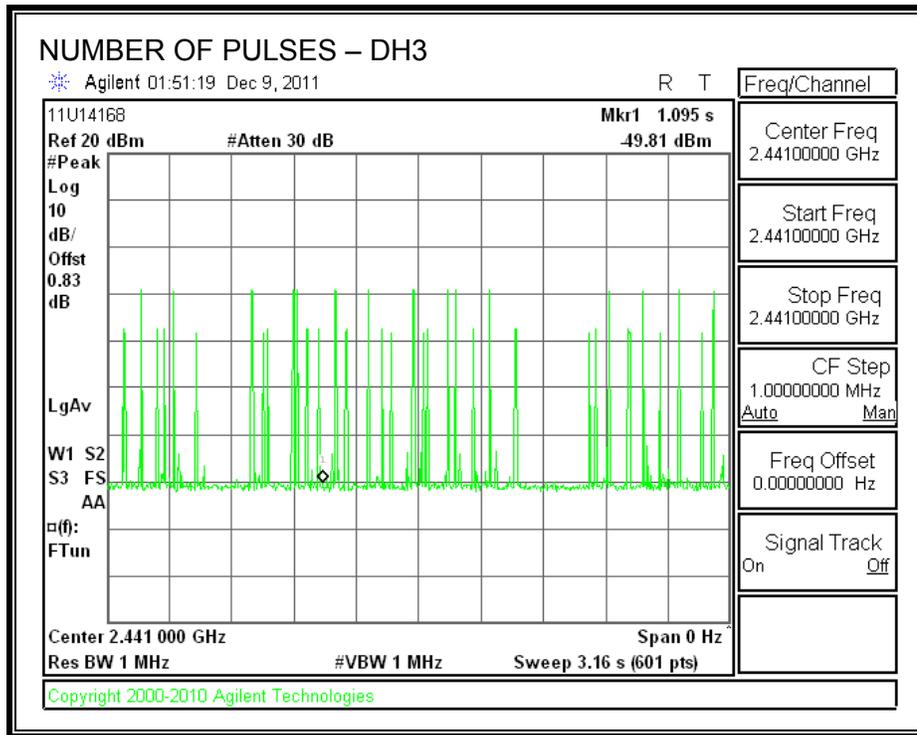
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



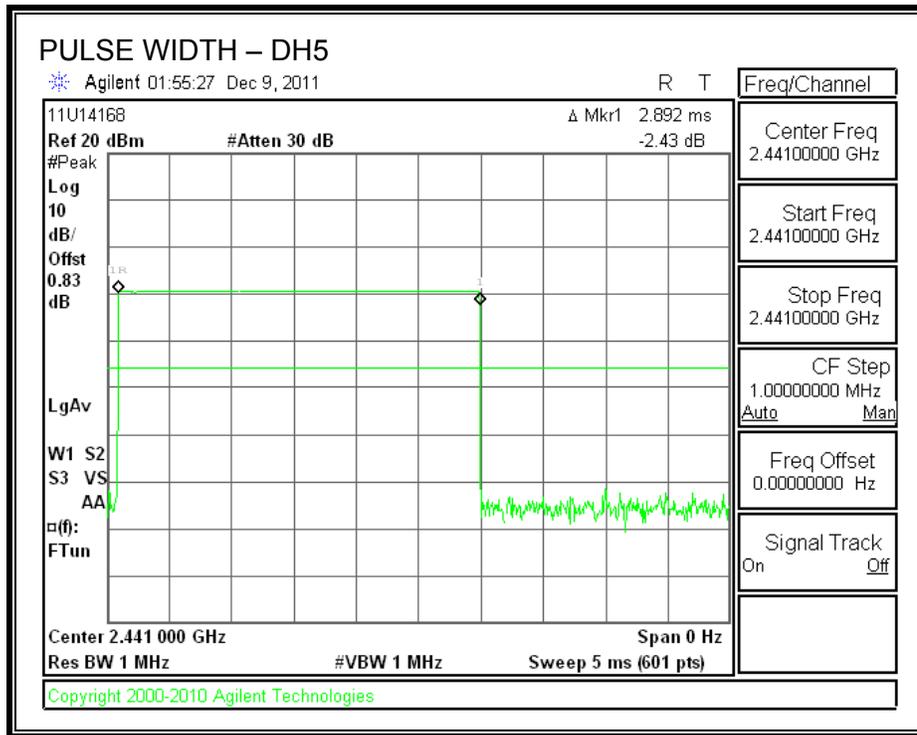
PULSE WIDTH – DH3



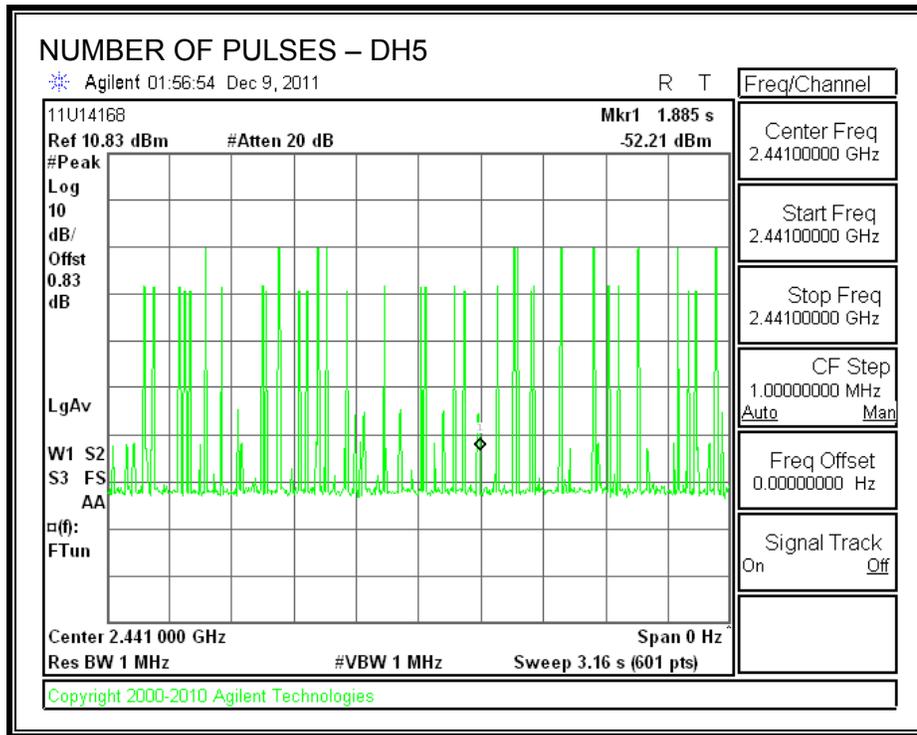
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



7.1.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 8 Clause A8.4

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

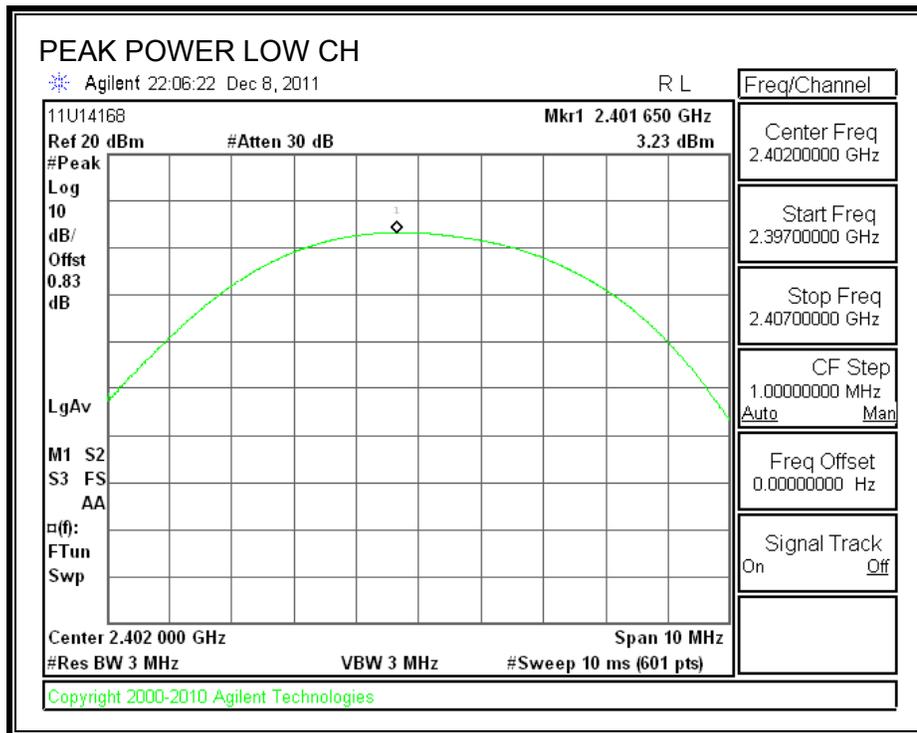
TEST PROCEDURE

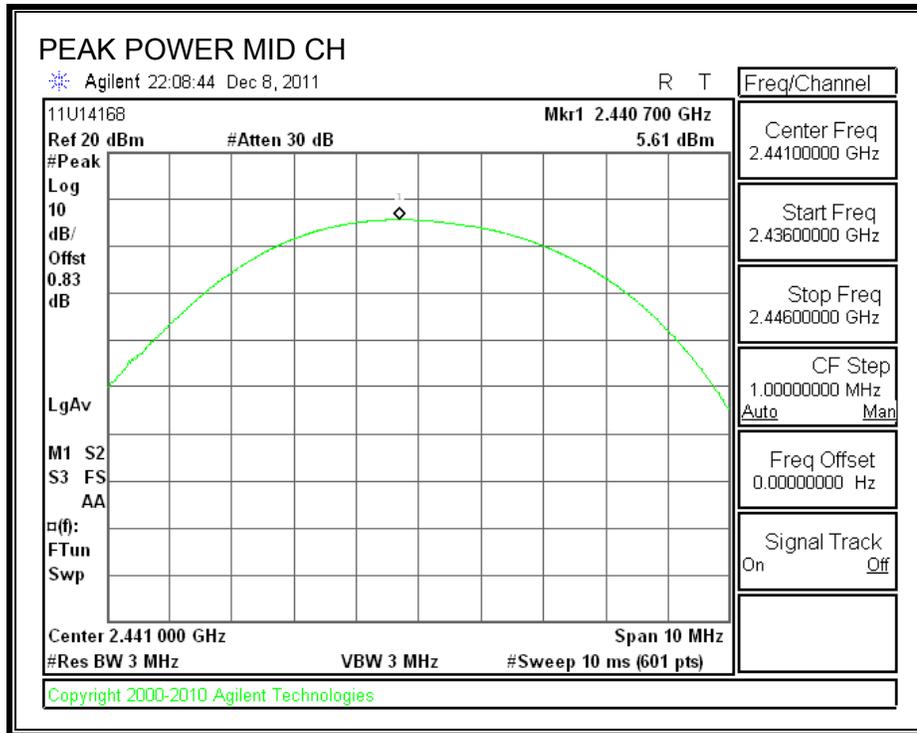
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

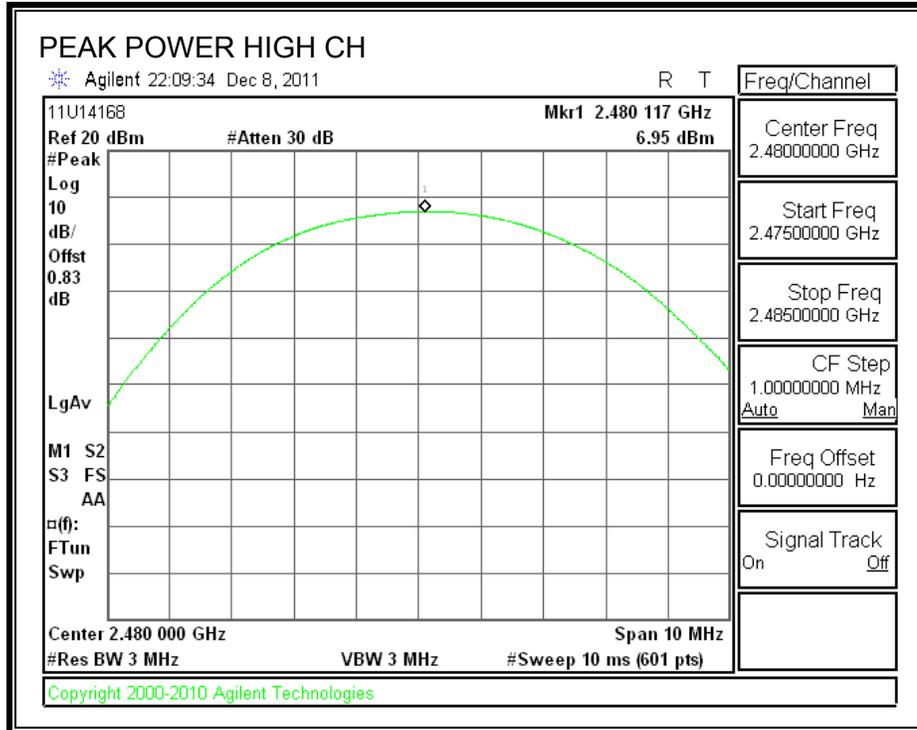
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.23	30	-26.77
Middle	2441	5.61	30	-24.39
High	2480	6.95	30	-23.05

OUTPUT POWER







7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

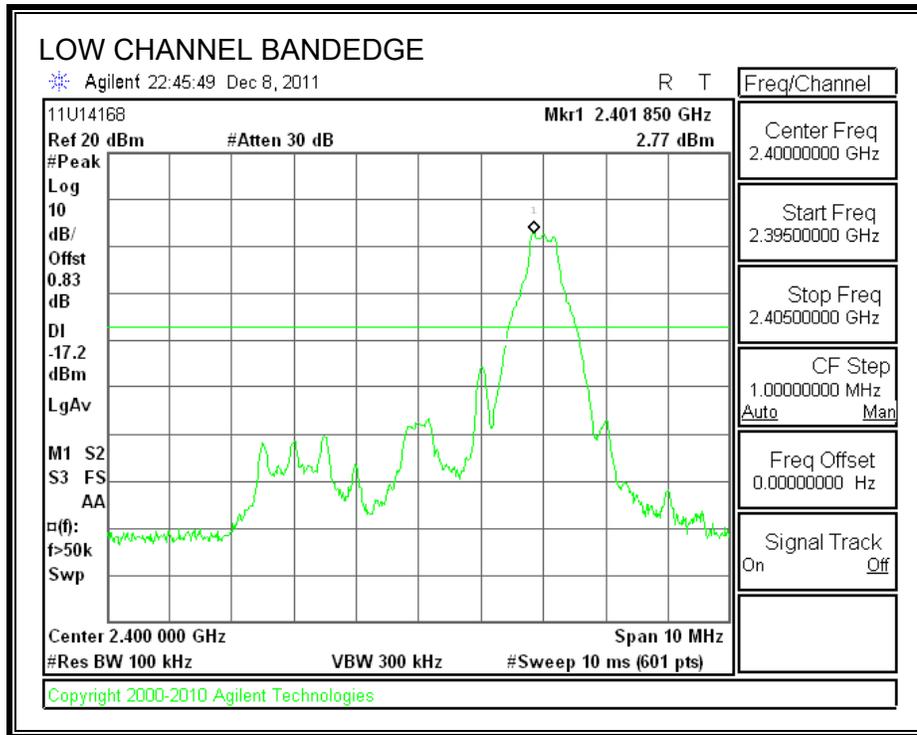
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

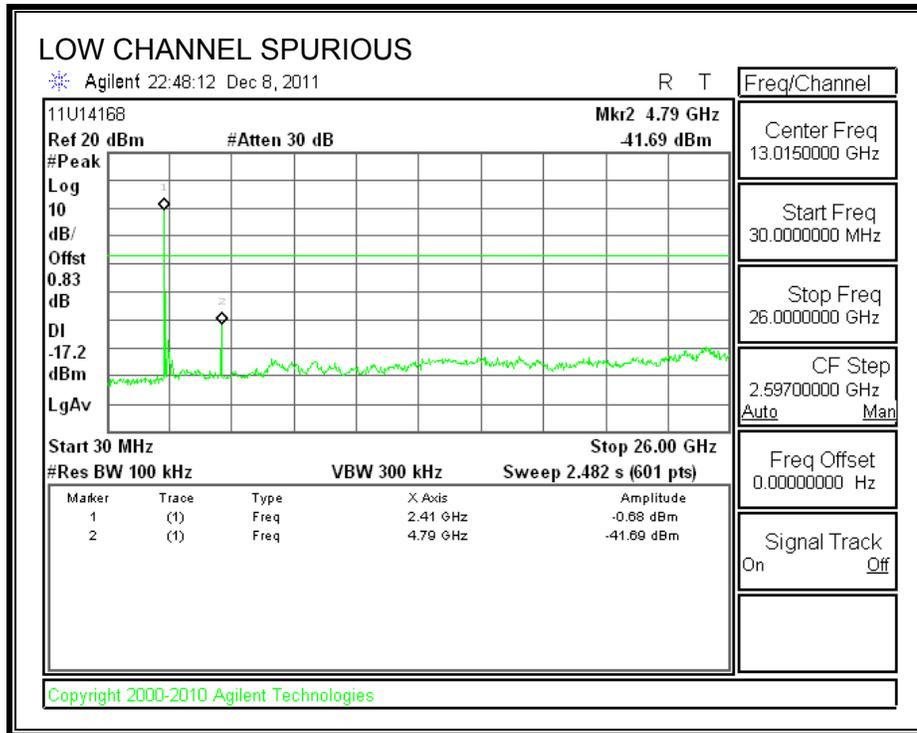
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

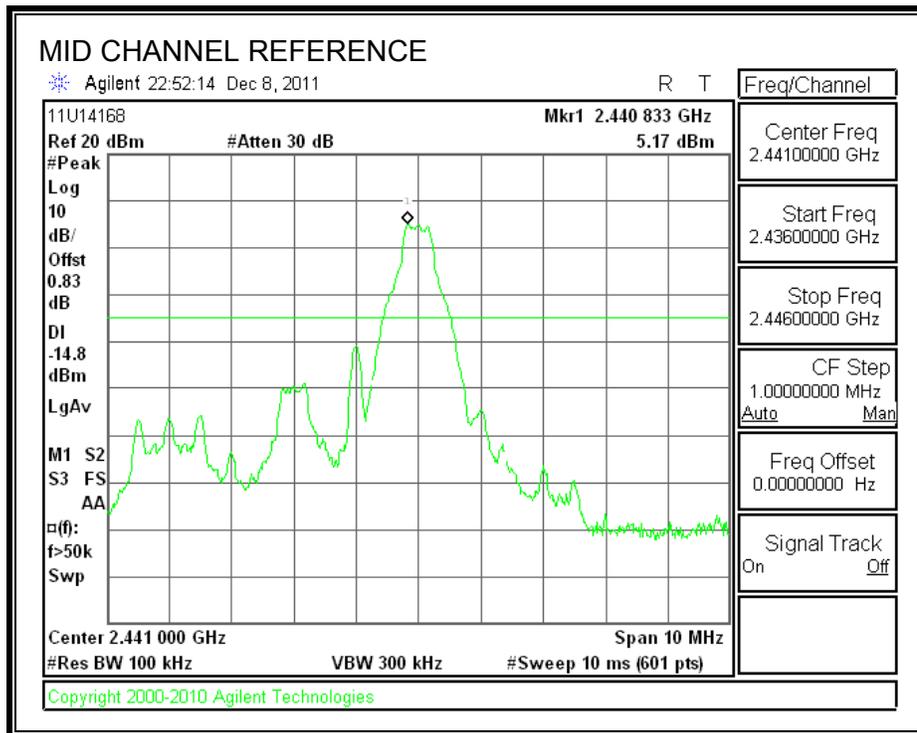
RESULTS

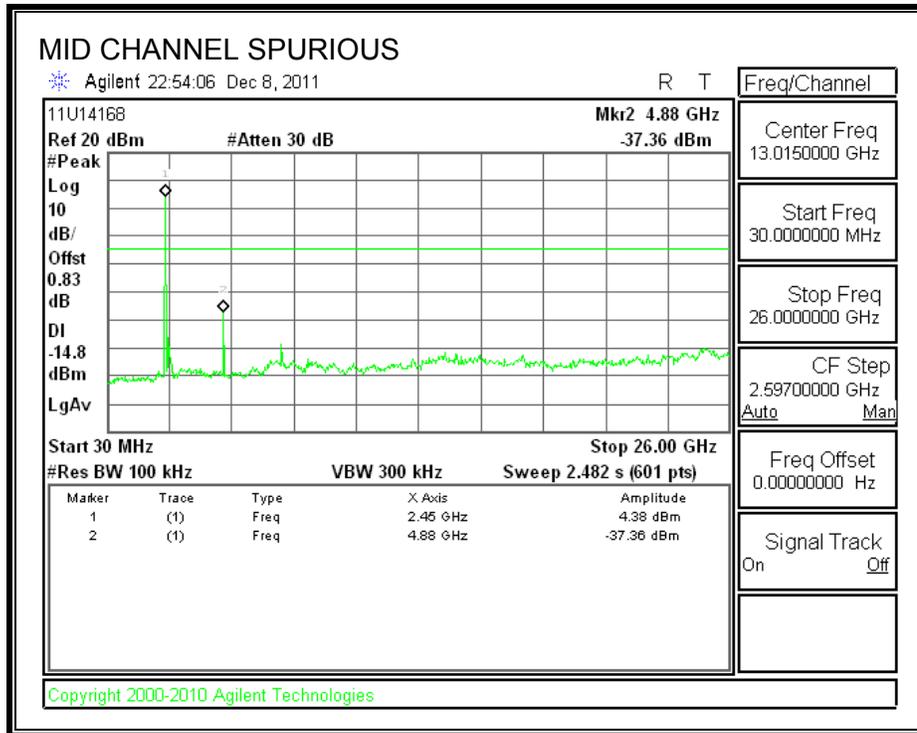
SPURIOUS EMISSIONS, LOW CHANNEL



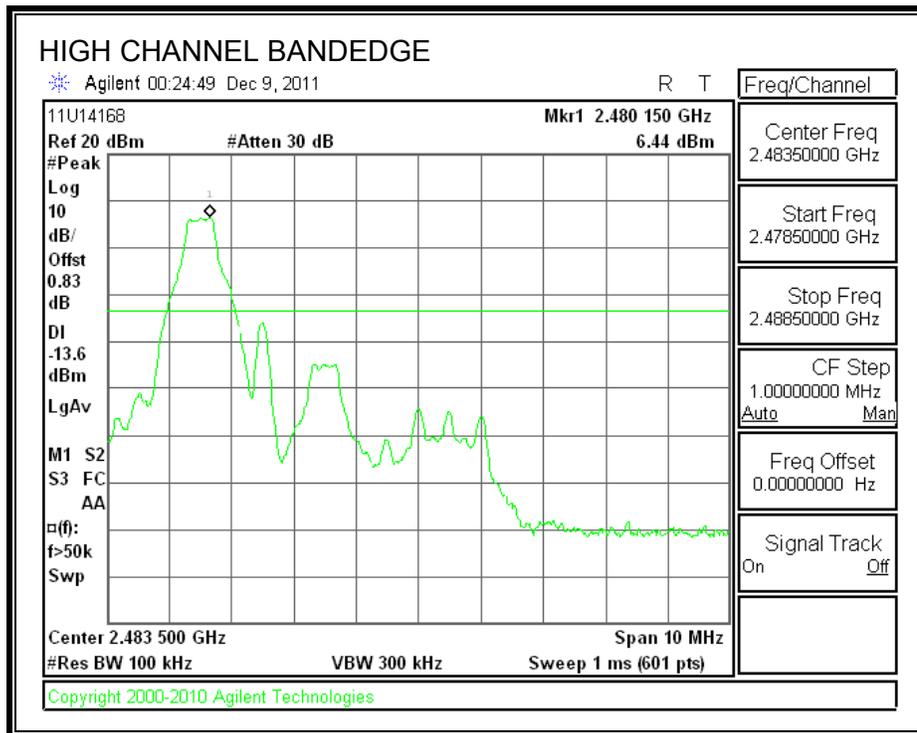


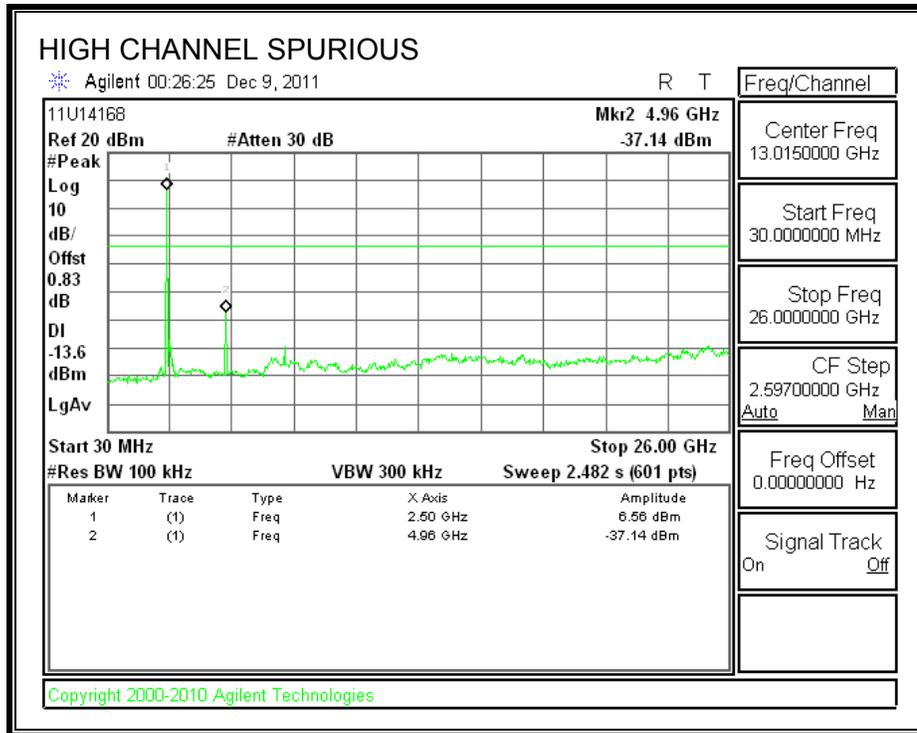
SPURIOUS EMISSIONS, MID CHANNEL



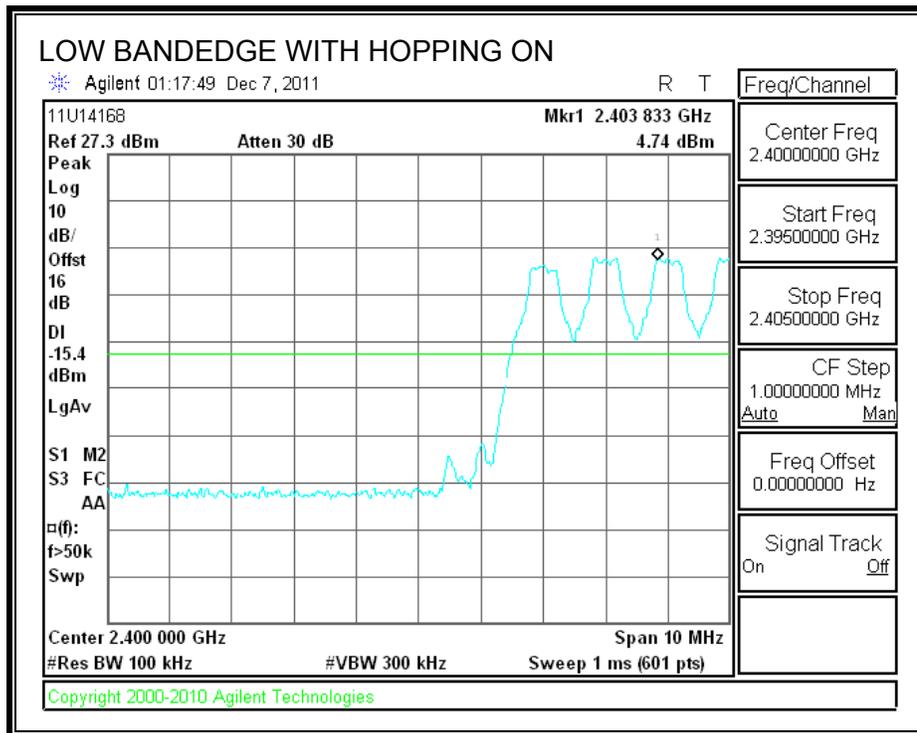


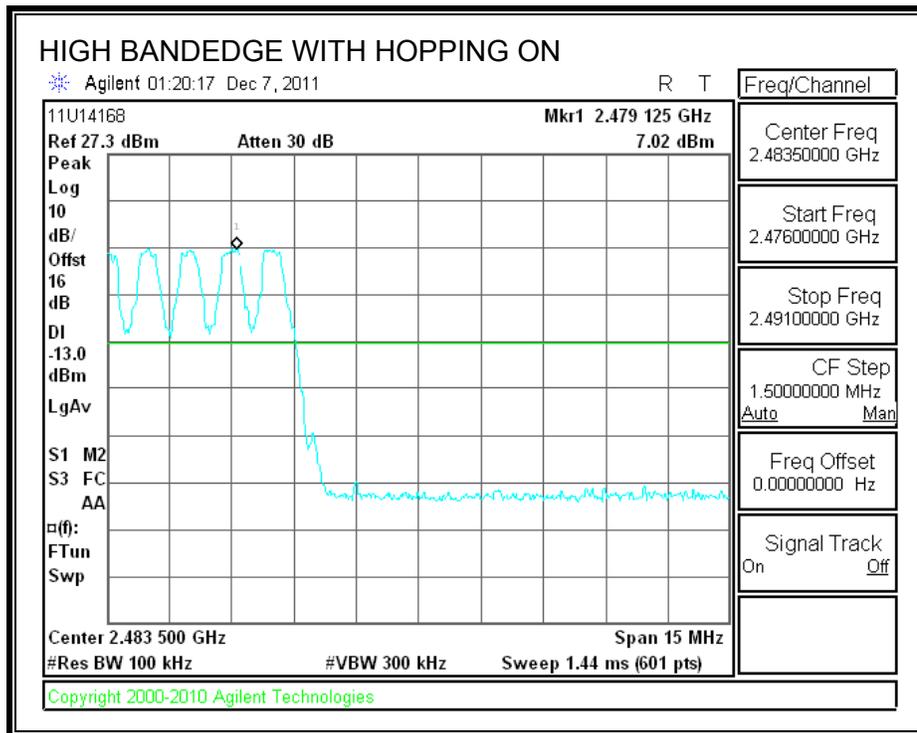
SPURIOUS EMISSIONS, HIGH CHANNEL





SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON





7.2. ENHANCED DATA RATE DQPSK MODULATION

7.2.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

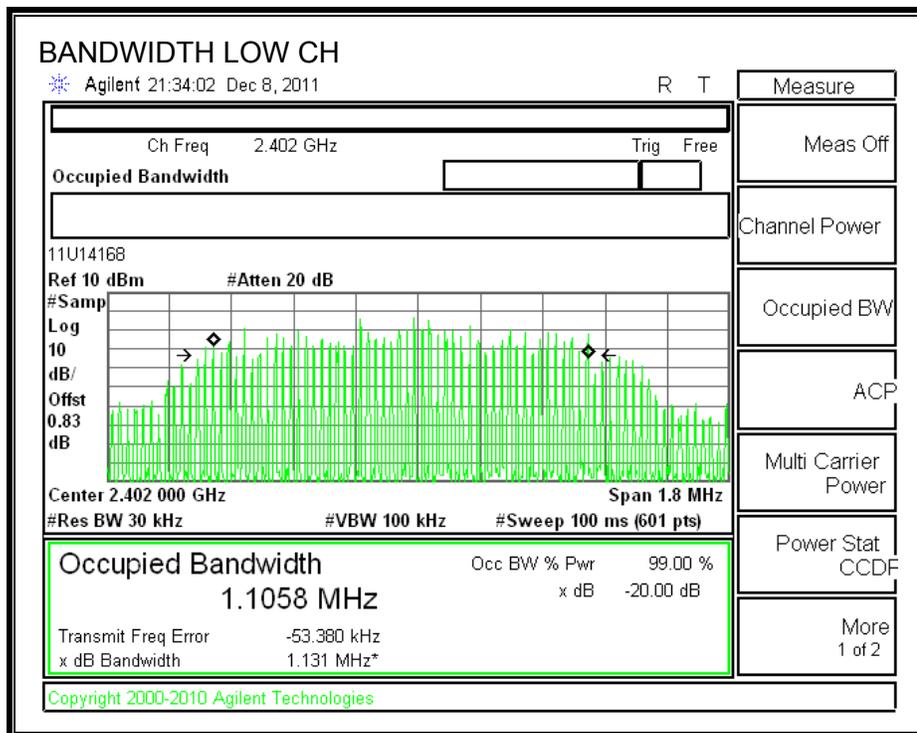
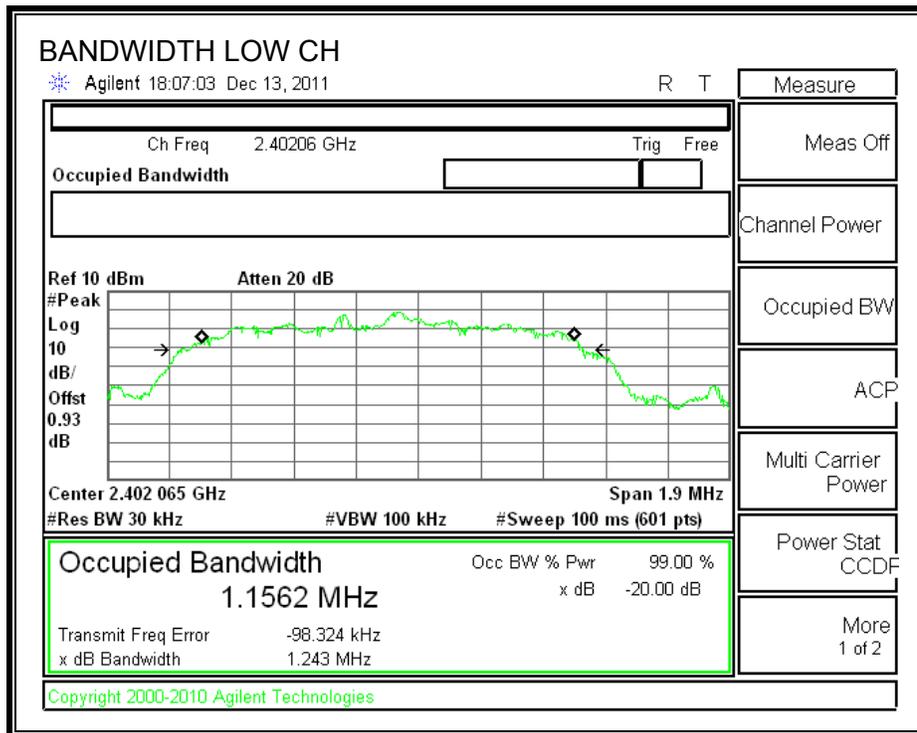
TEST PROCEDURE

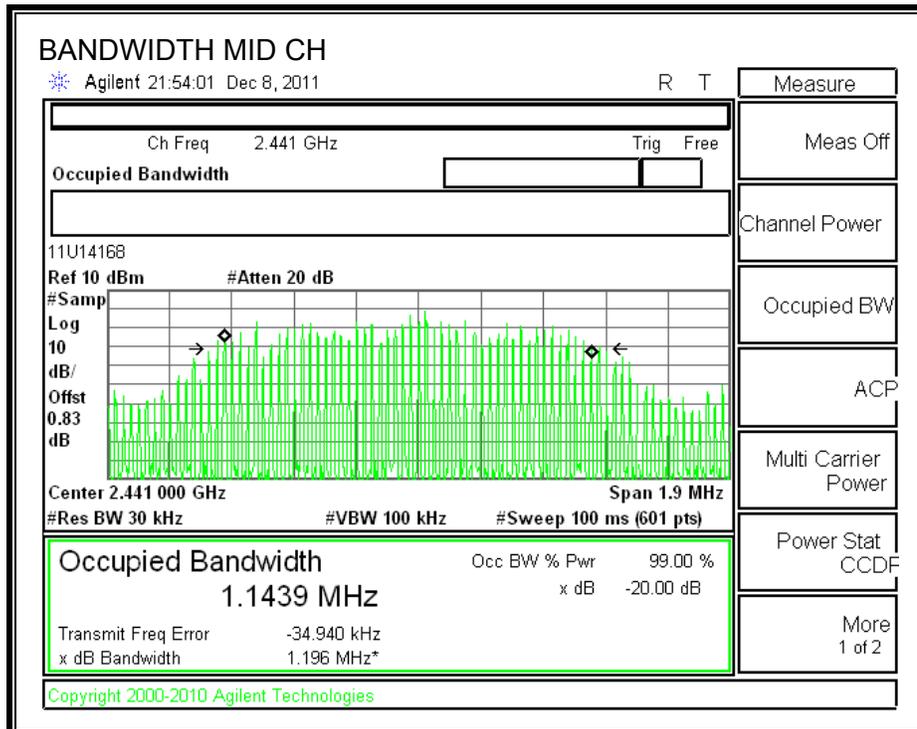
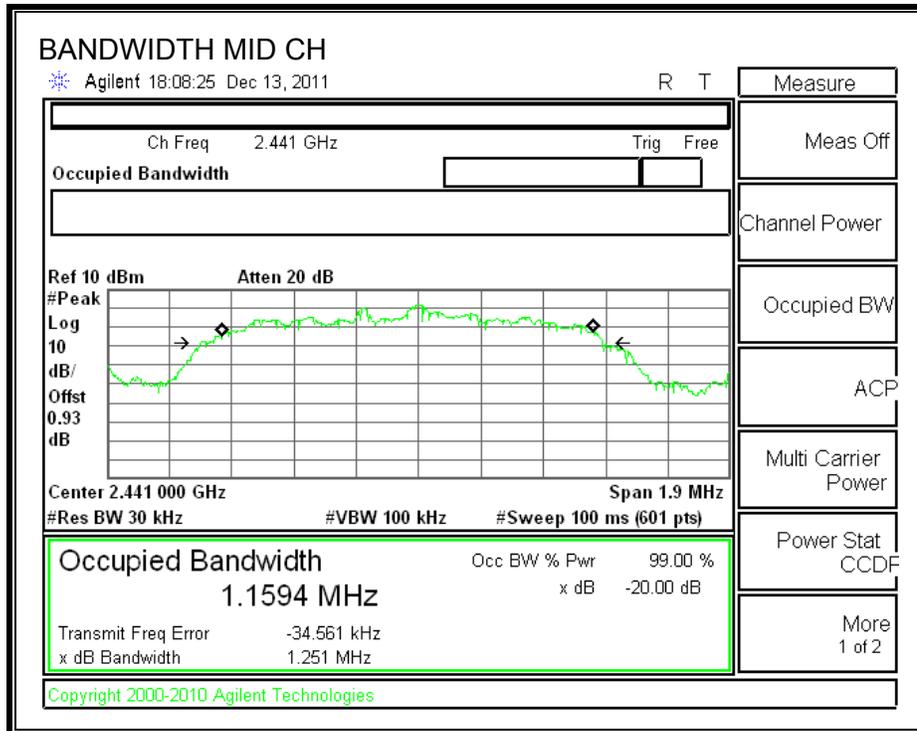
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled.

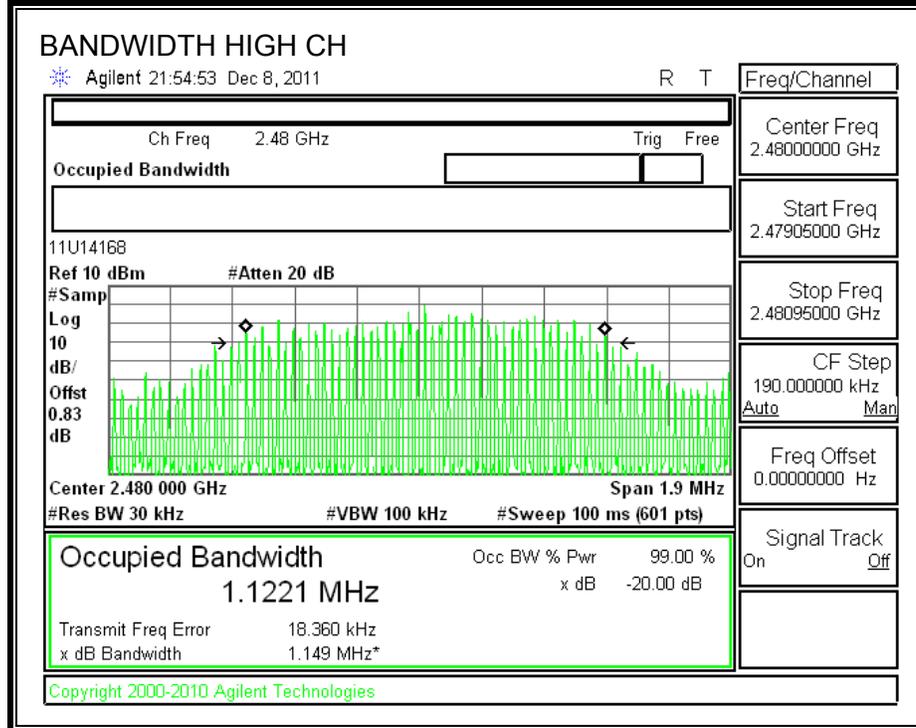
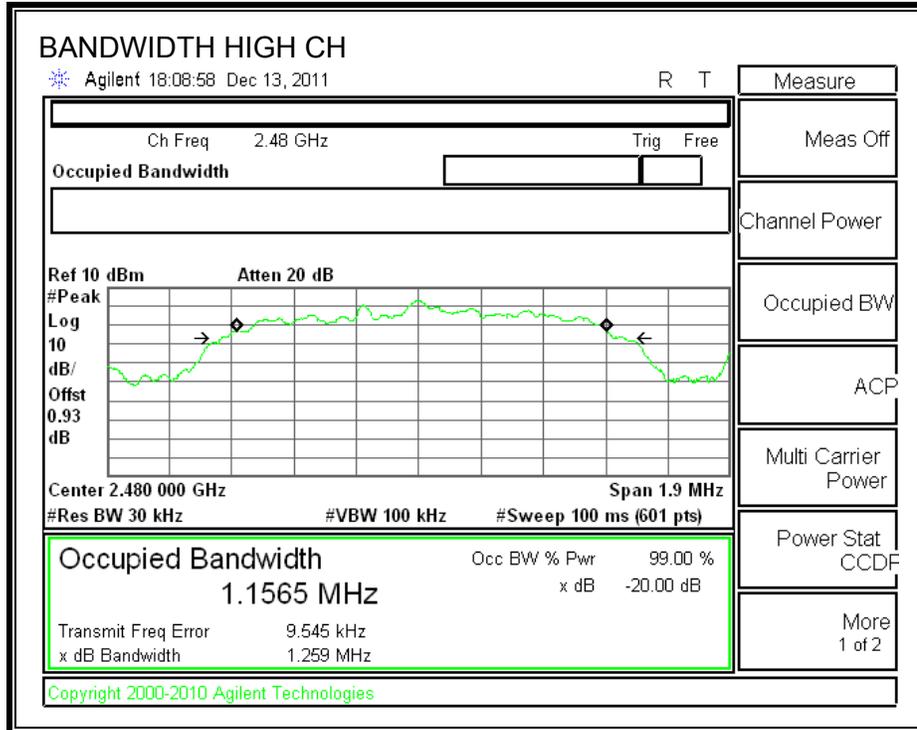
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1243	1105.8
Middle	2441	1251	1143.9
High	2480	1259	1122.1

20 dB AND 99% BANDWIDTH







7.2.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

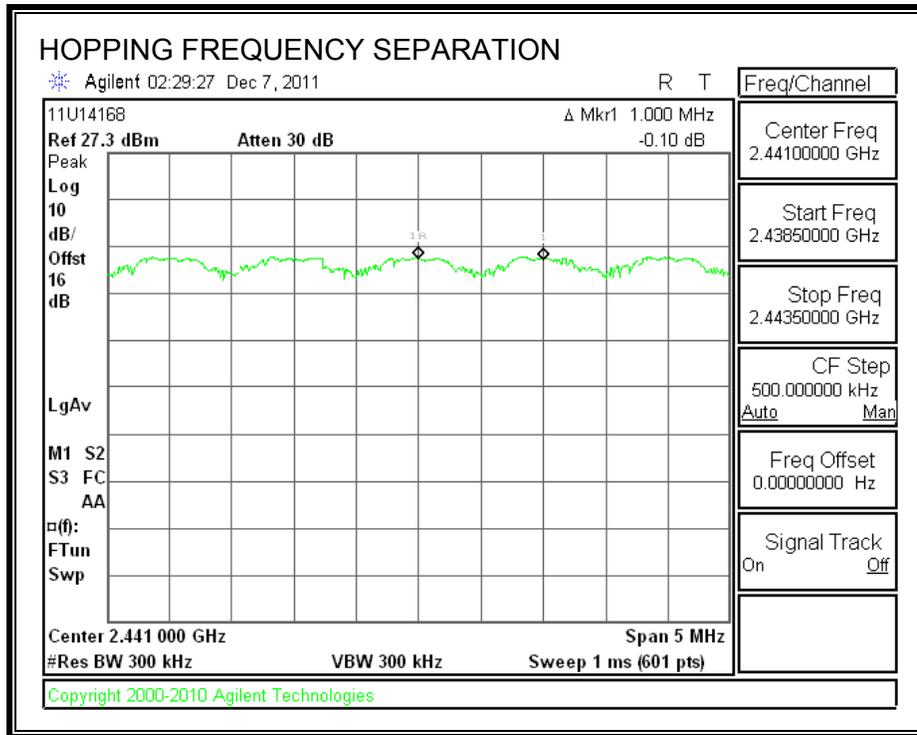
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

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

RESULTS

HOPPING FREQUENCY SEPARATION



7.2.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

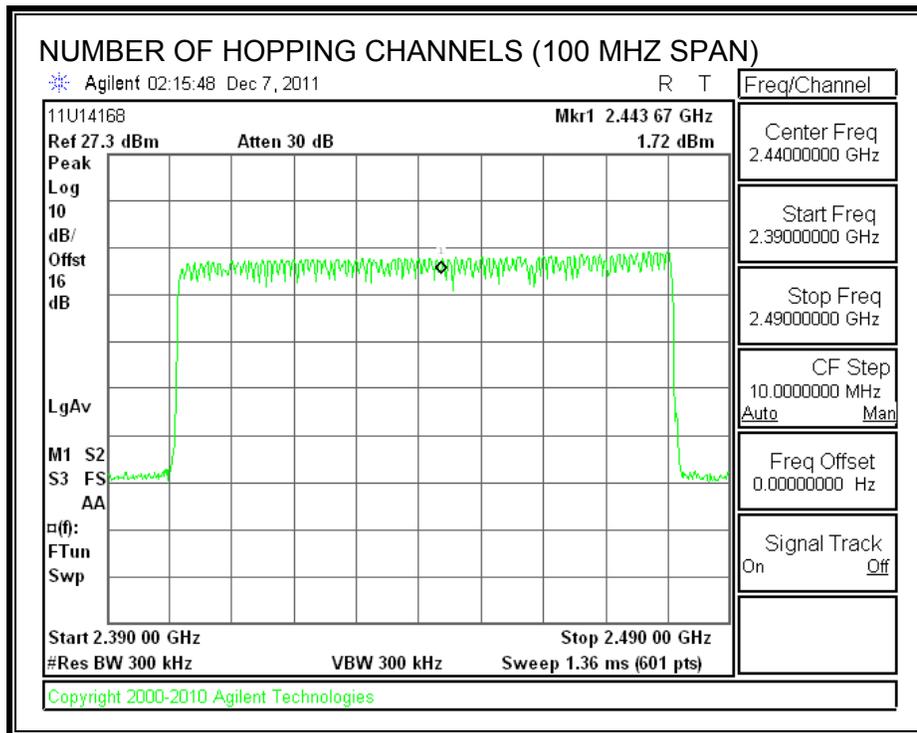
TEST PROCEDURE

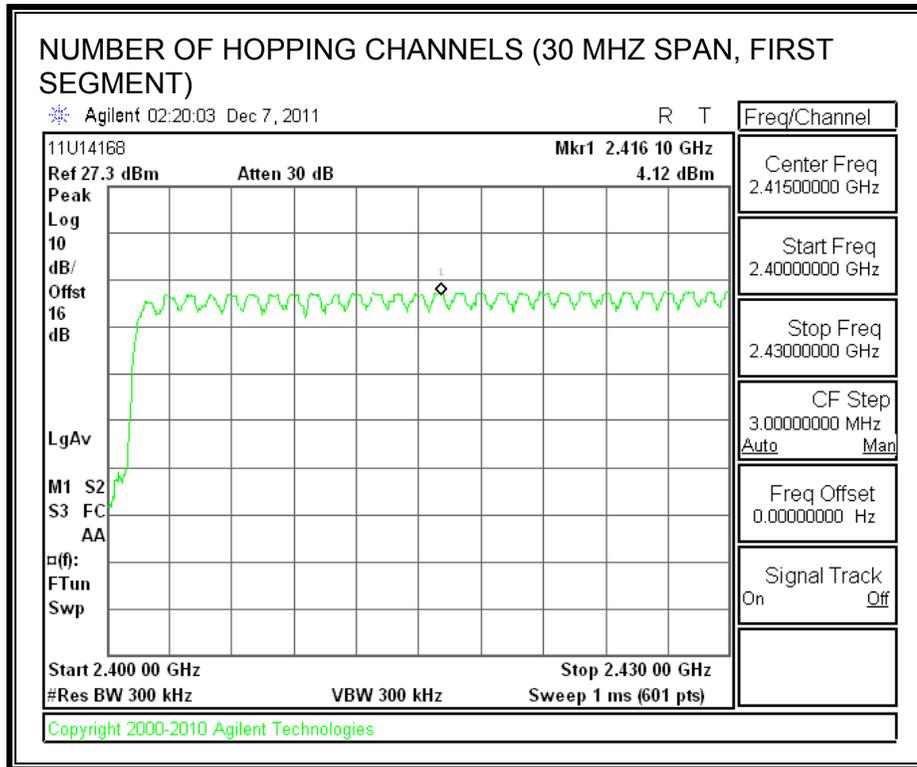
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

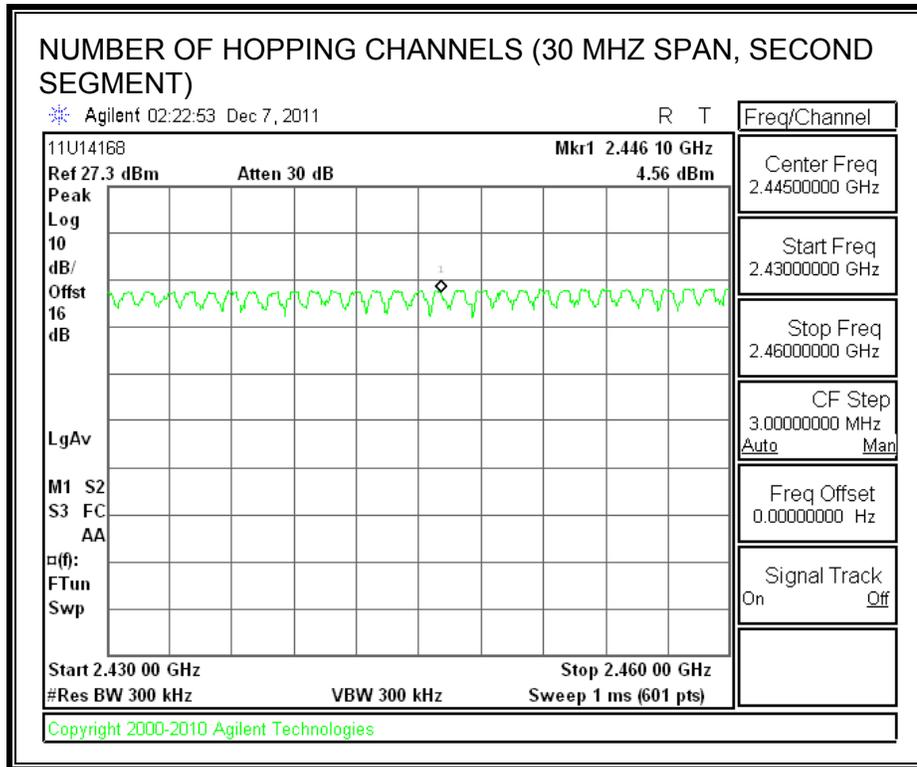
RESULTS

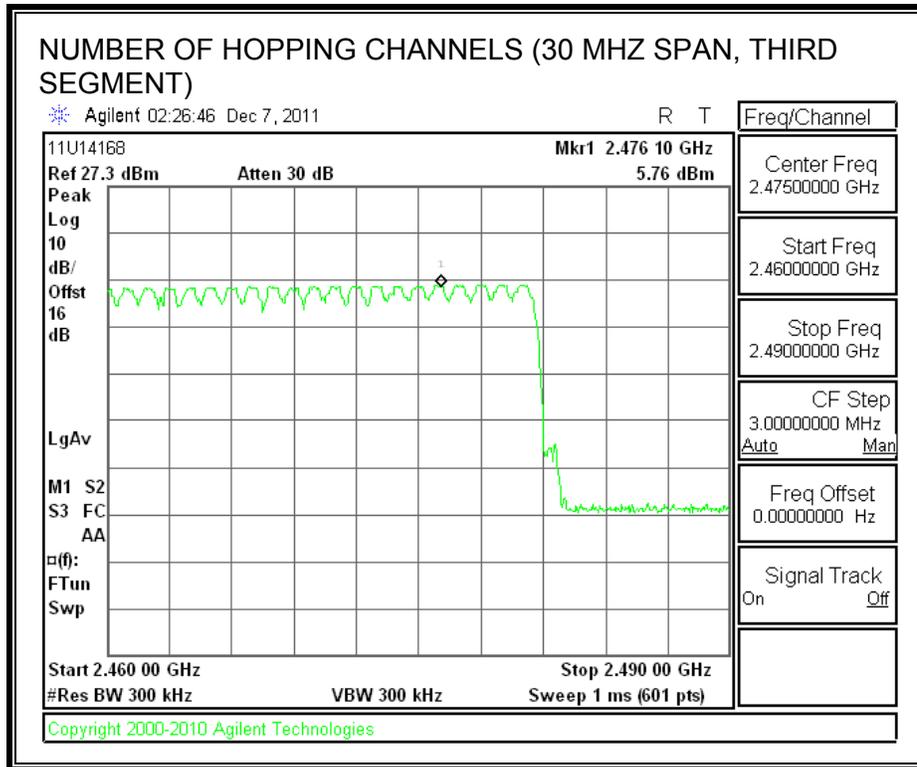
79 Channels observed.

NUMBER OF HOPPING CHANNELS









7.2.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{ pulse width}$.

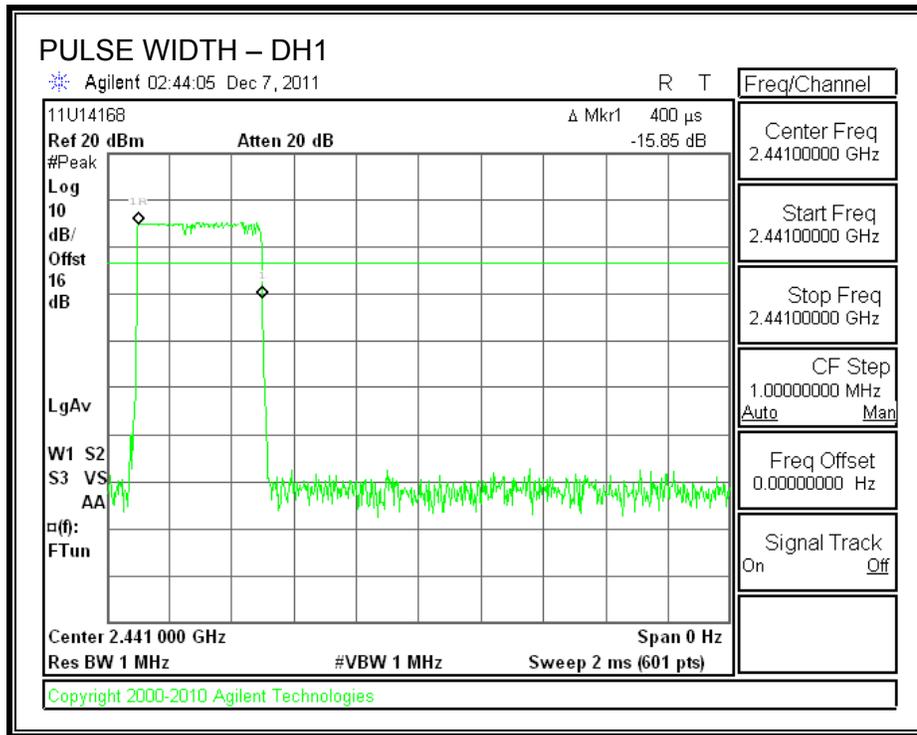
RESULTS

Time Of Occupancy = $10 * xx \text{ pulses} * yy \text{ msec} = zz \text{ msec}$

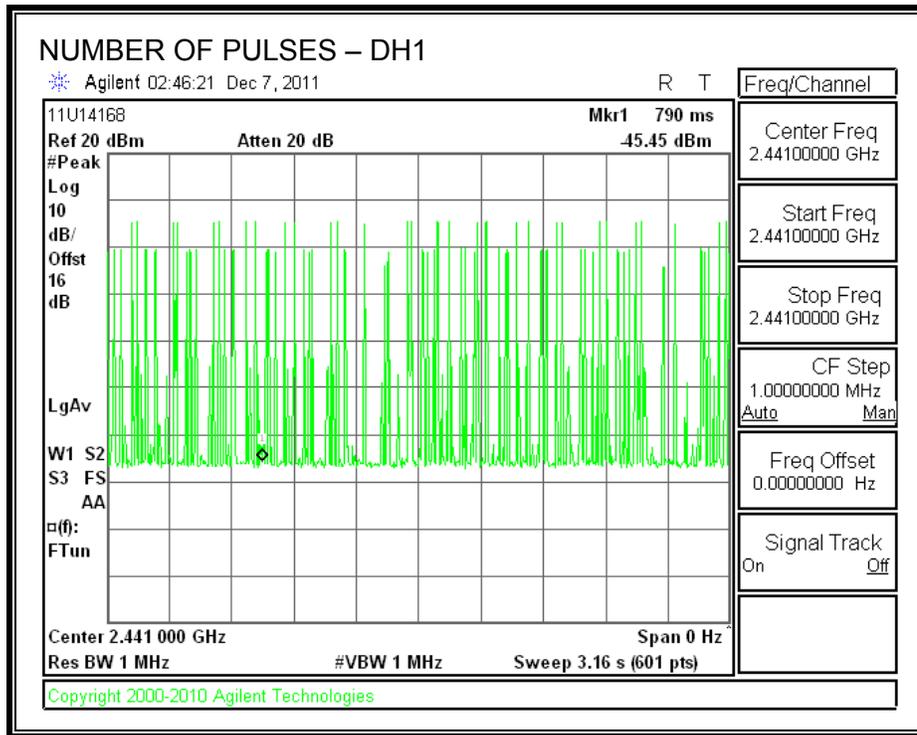
DQPSK Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.4	31	0.124	0.4	-0.276
DH3	1.655	12	0.199	0.4	-0.201
DH5	2.9	10	0.290	0.4	-0.110

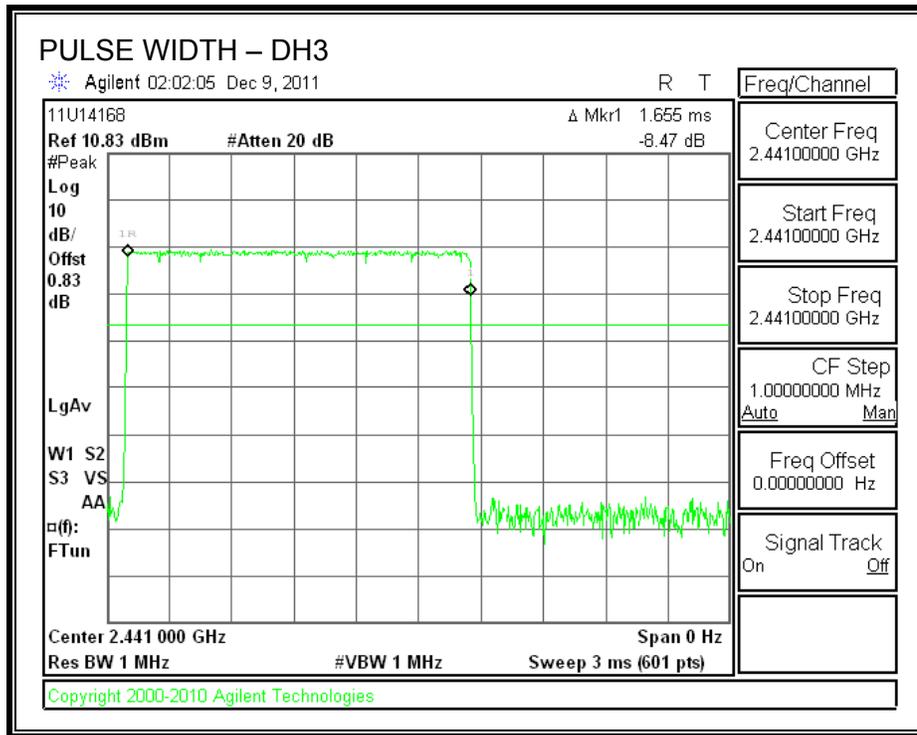
PULSE WIDTH – DH1



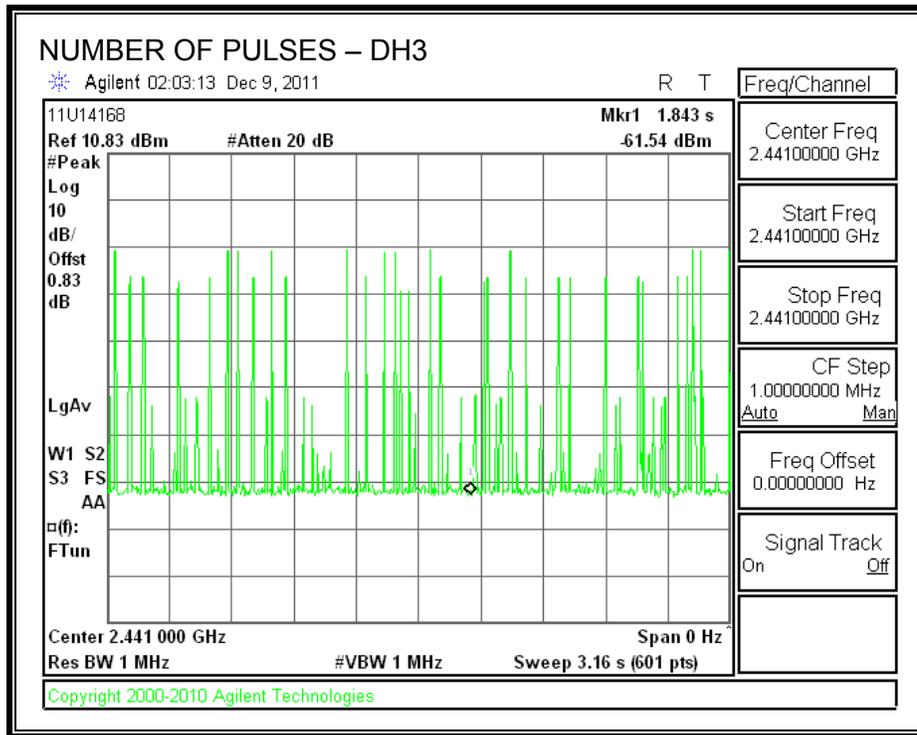
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



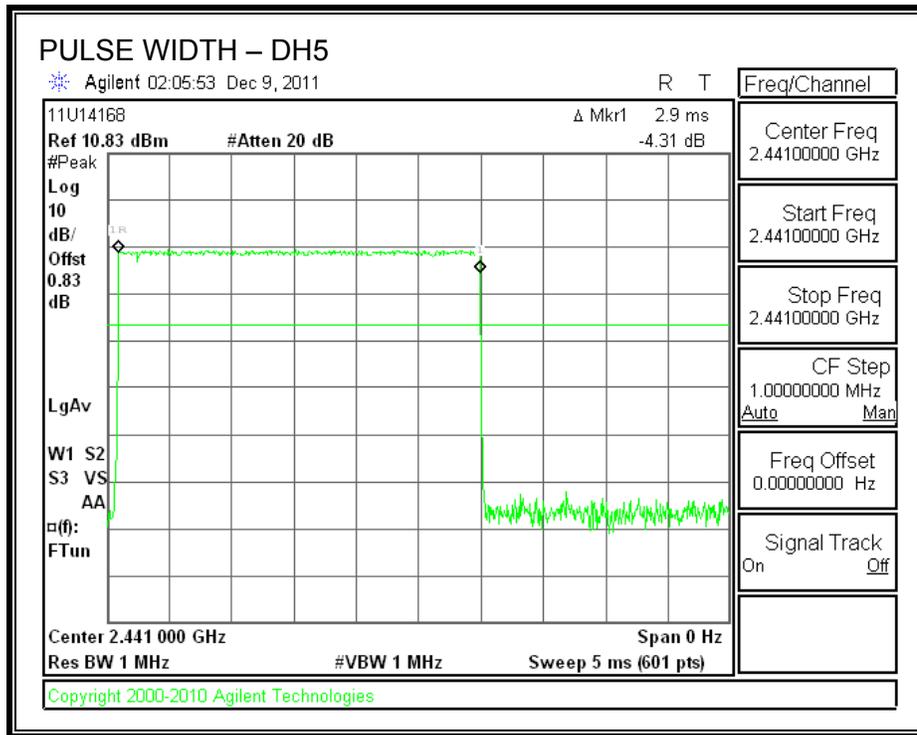
PULSE WIDTH – DH3



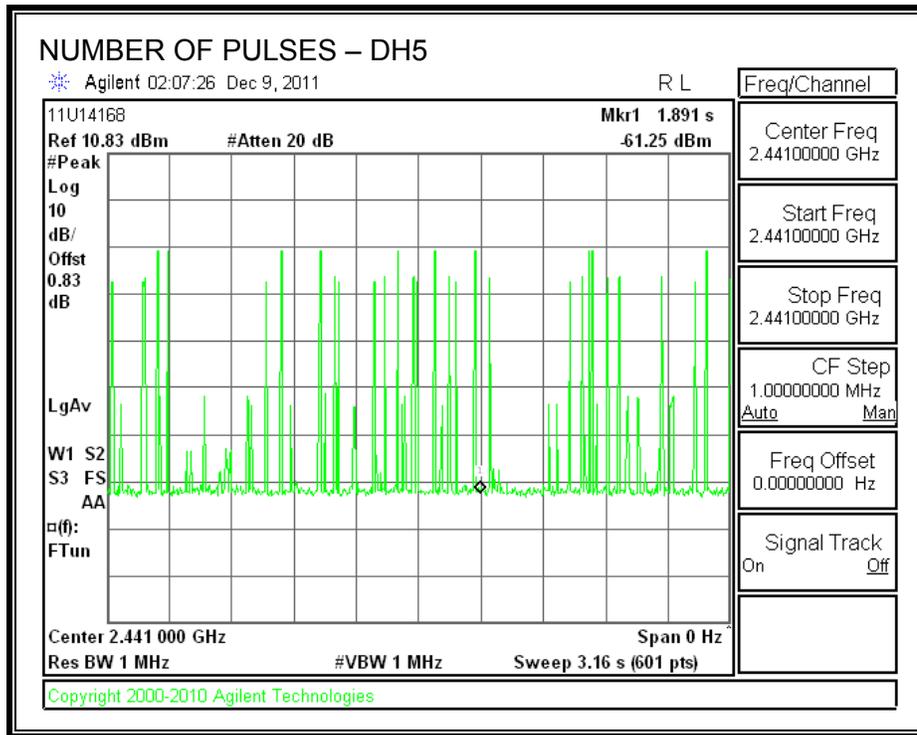
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



7.2.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 8 Clause A8.4

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

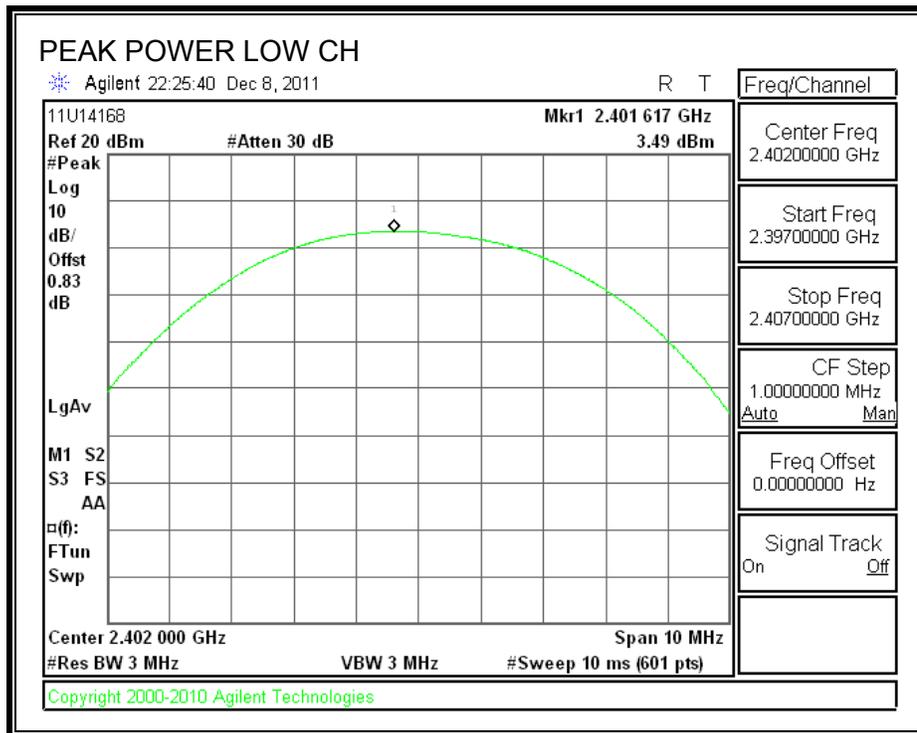
TEST PROCEDURE

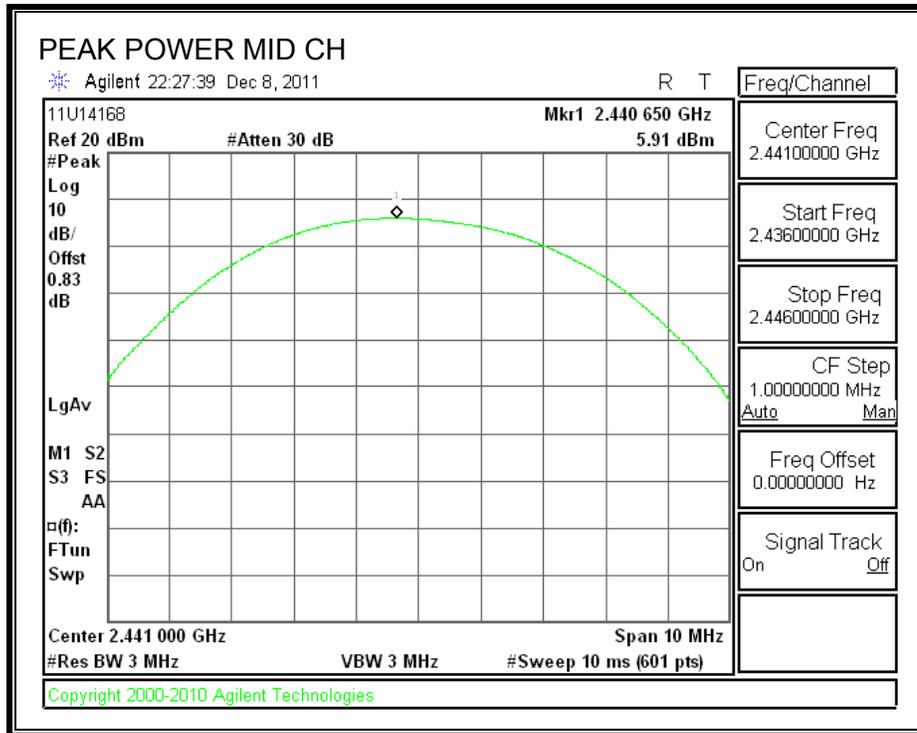
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

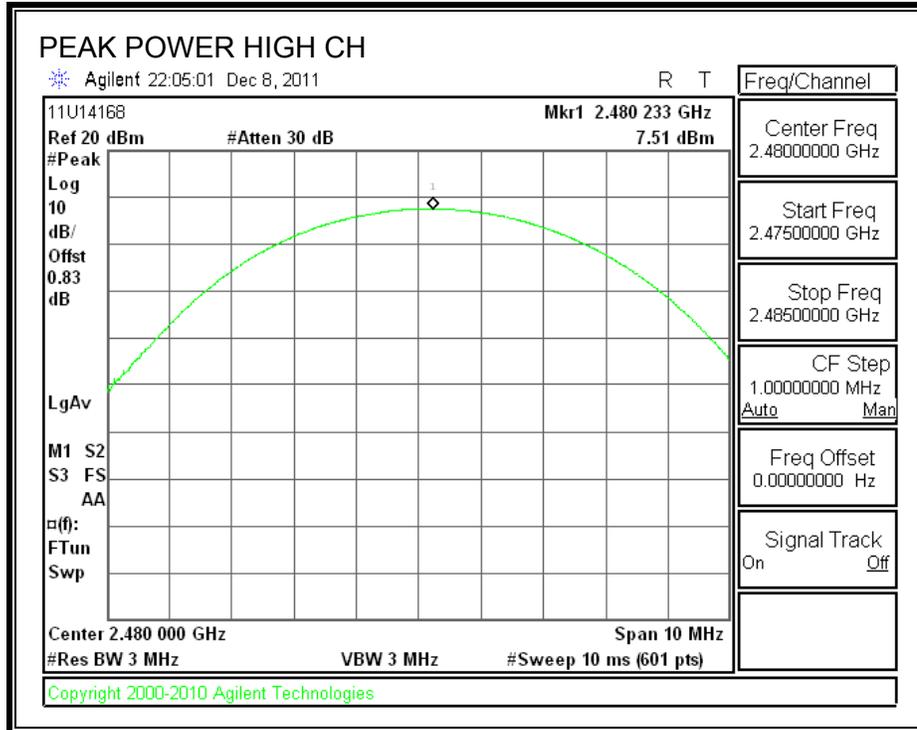
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.49	30	-26.51
Middle	2441	5.91	30	-24.09
High	2480	7.51	30	-22.49

OUTPUT POWER







7.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

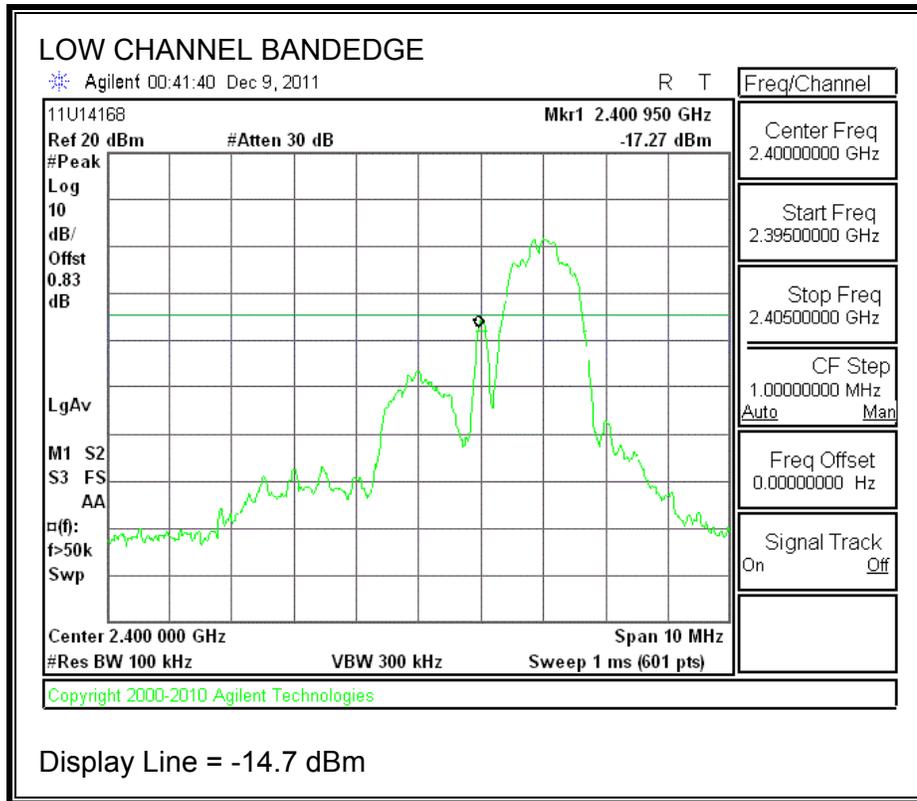
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

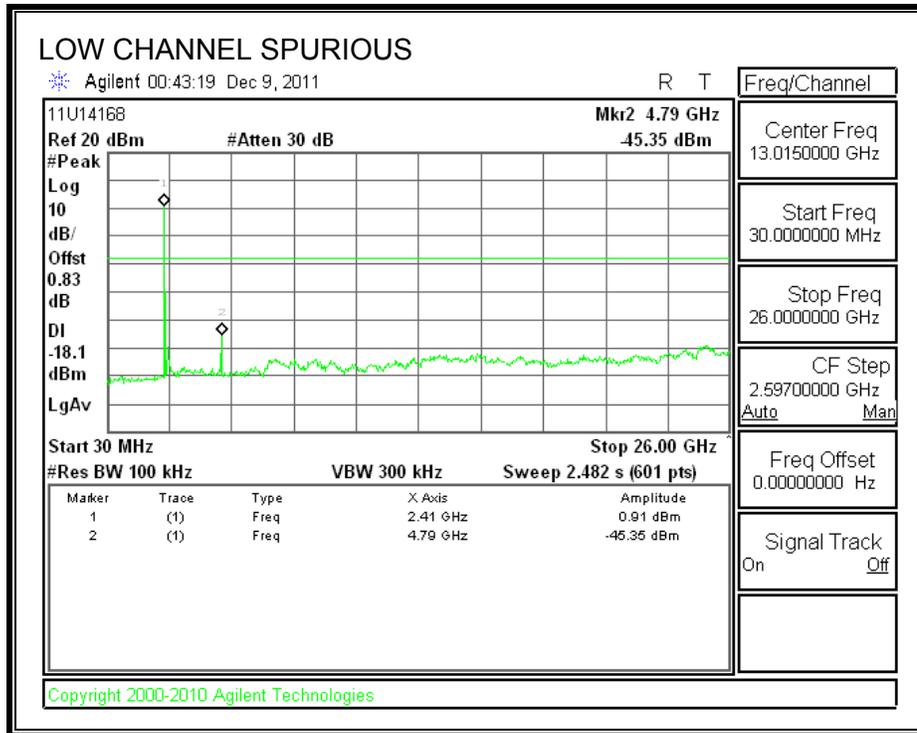
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

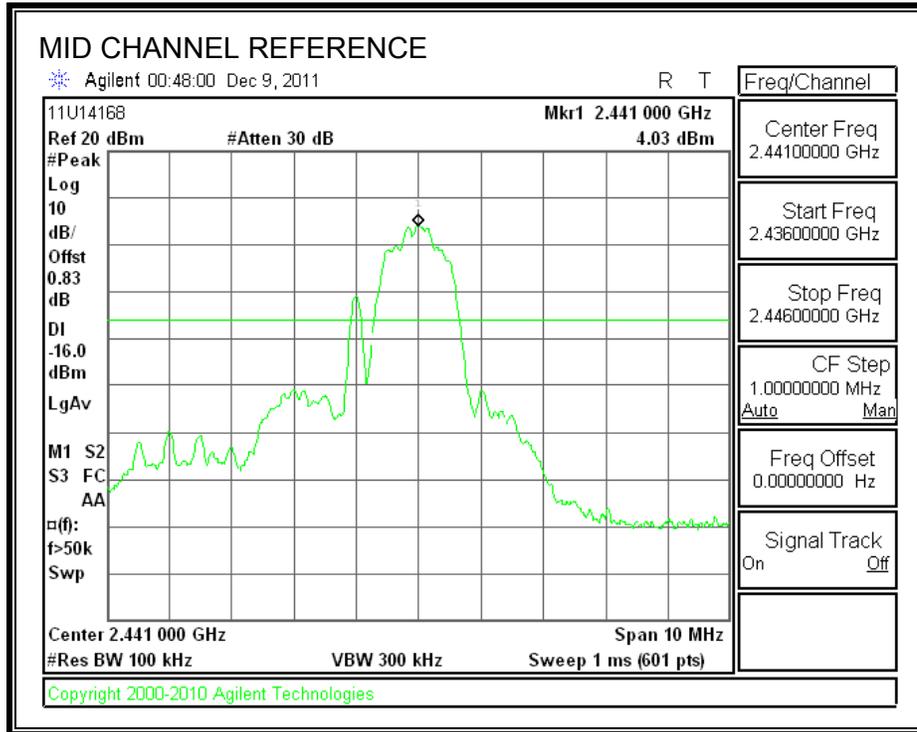
RESULTS

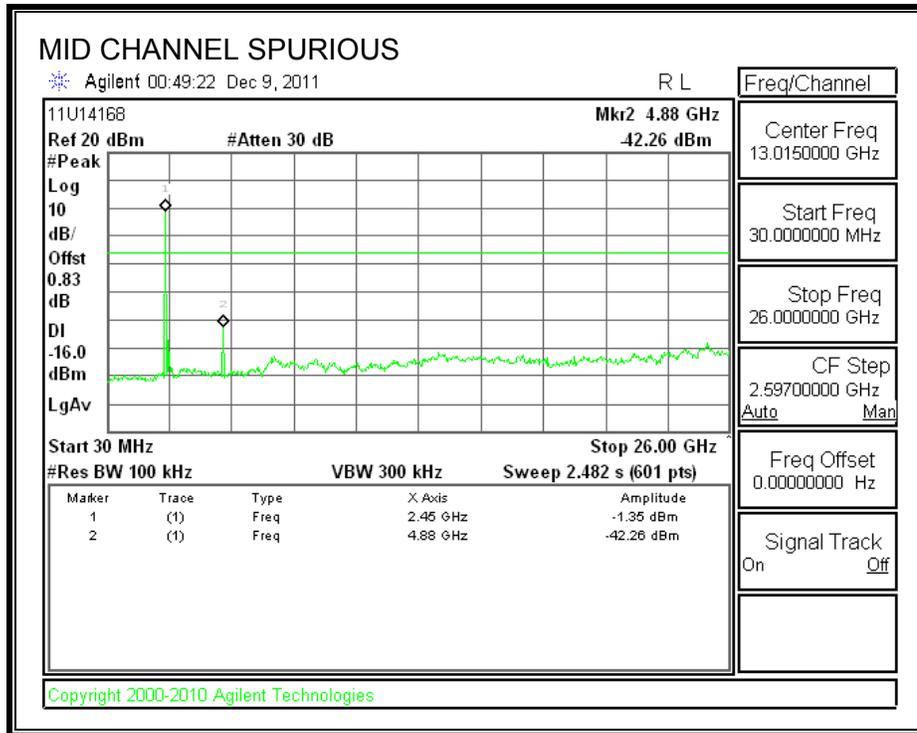
SPURIOUS EMISSIONS, LOW CHANNEL



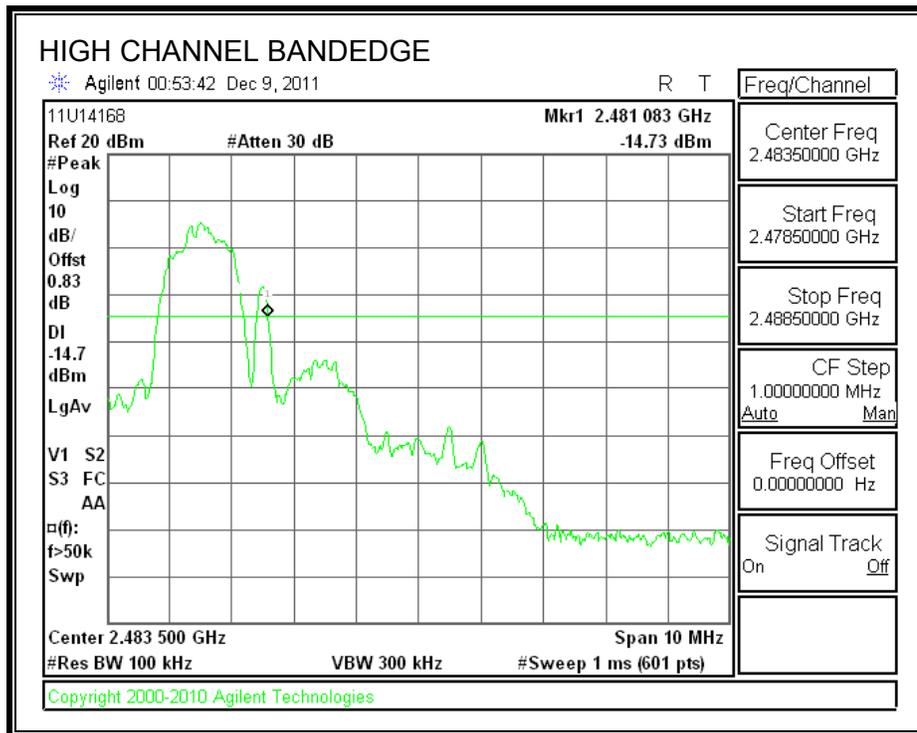


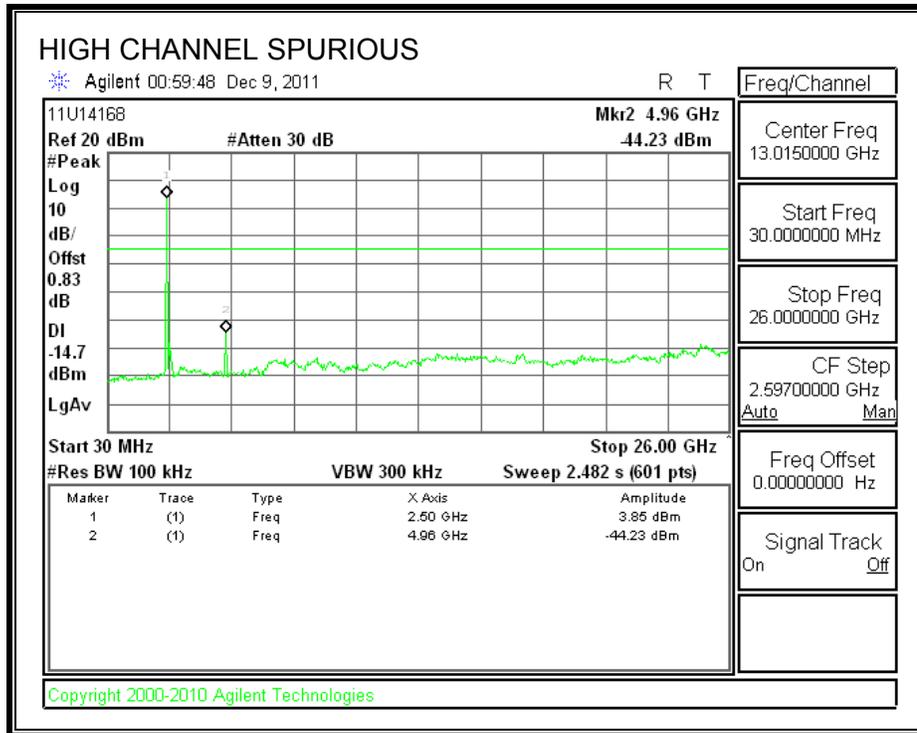
SPURIOUS EMISSIONS, MID CHANNEL



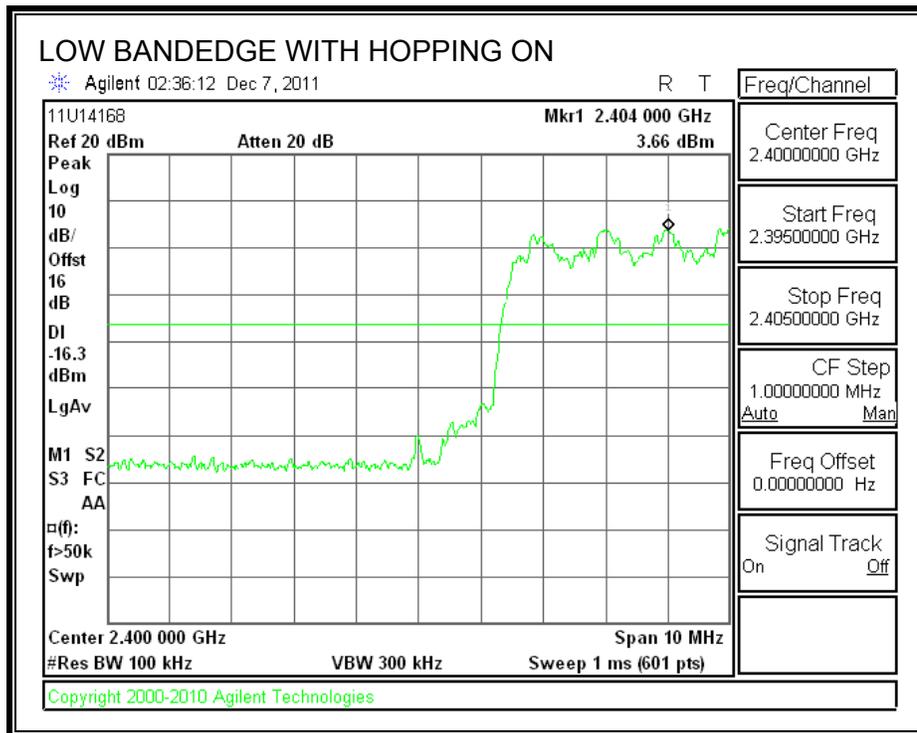


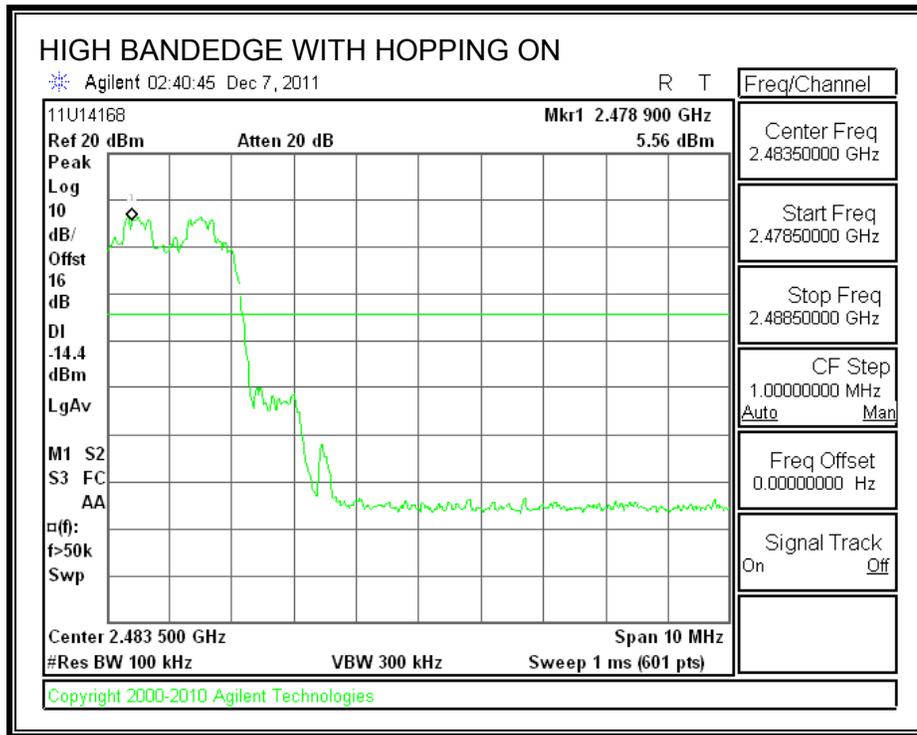
SPURIOUS EMISSIONS, HIGH CHANNEL





SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON





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.

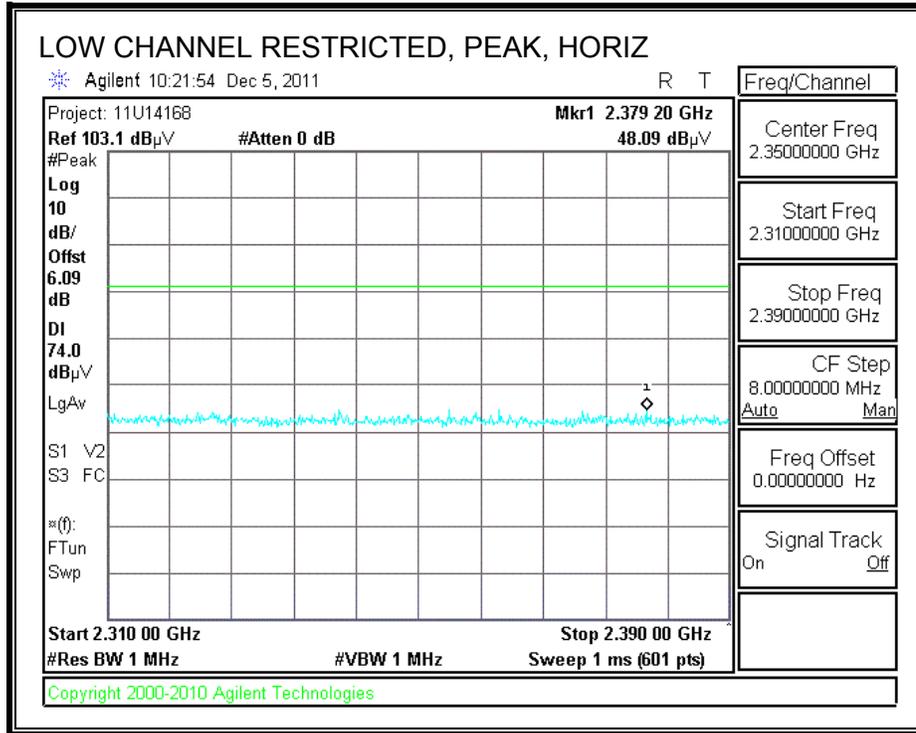
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

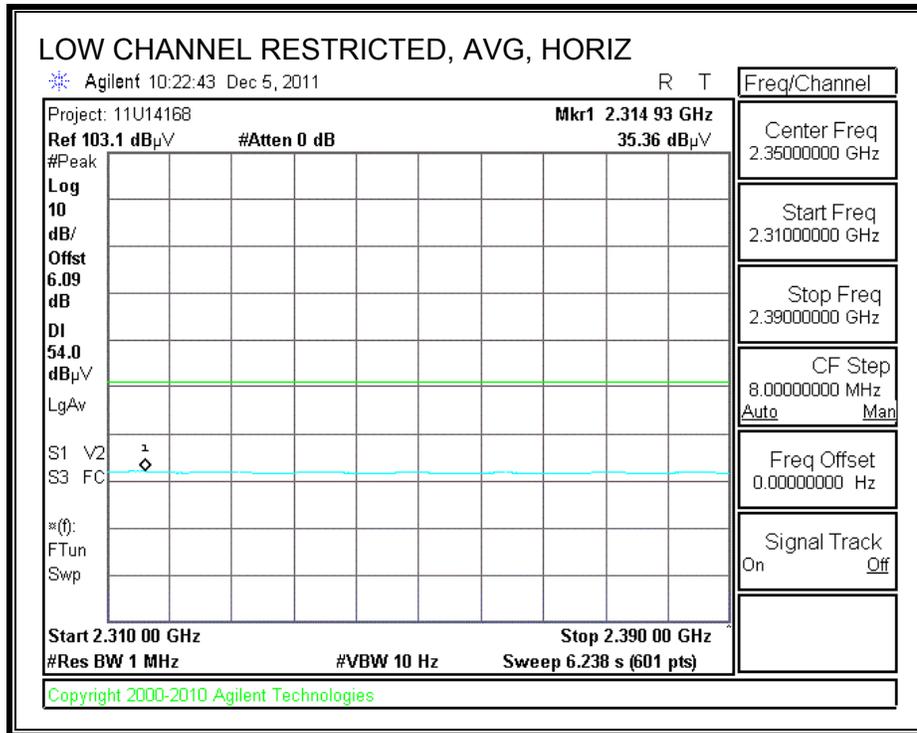
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

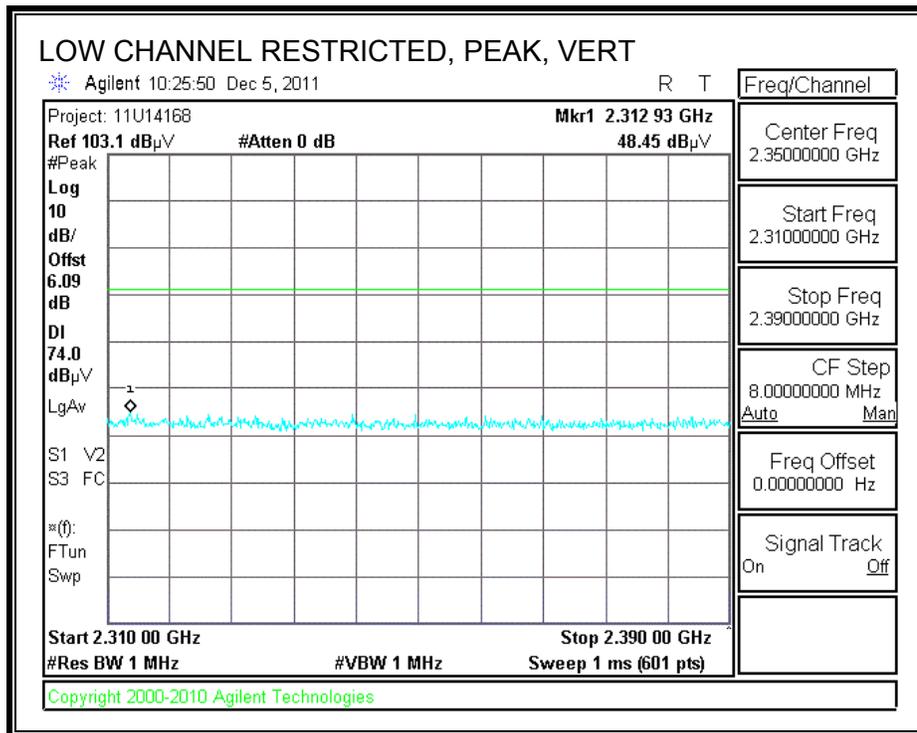
8.2.1. BASIC DATA RATE GFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

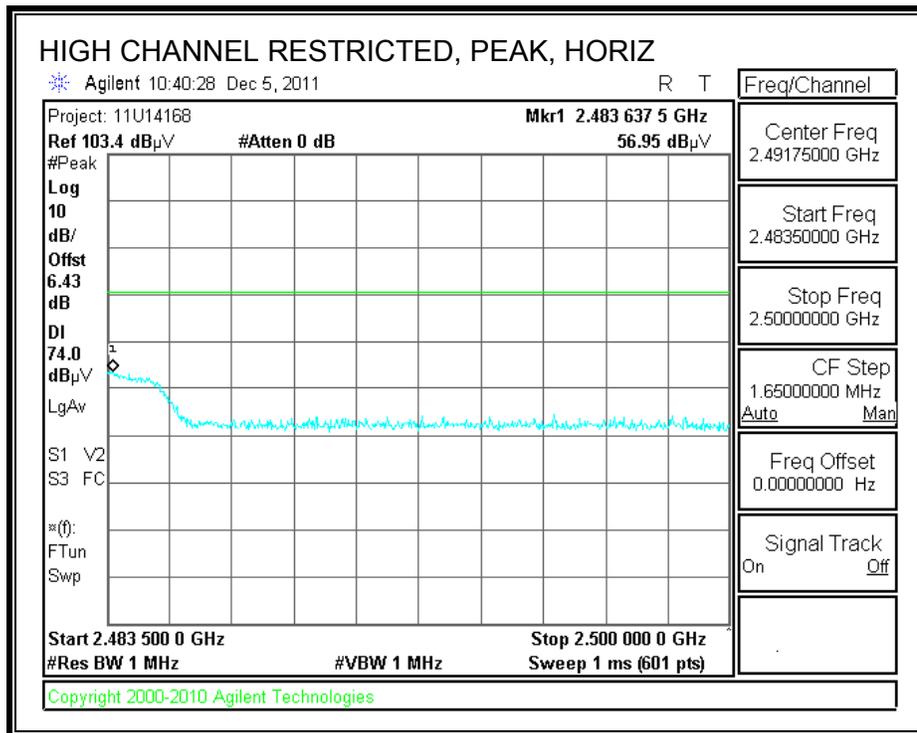


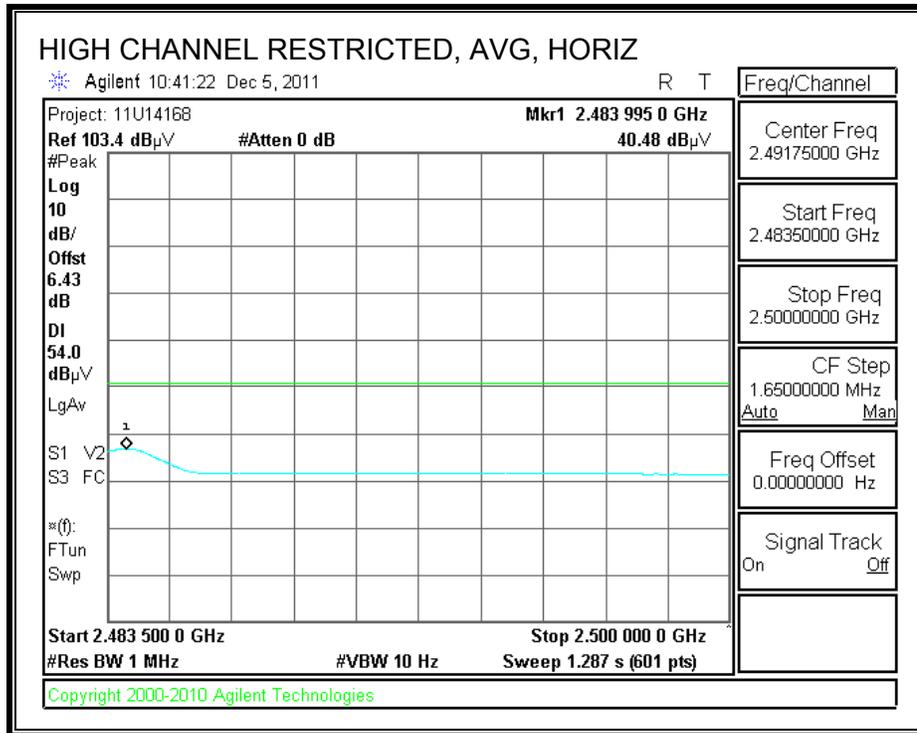


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

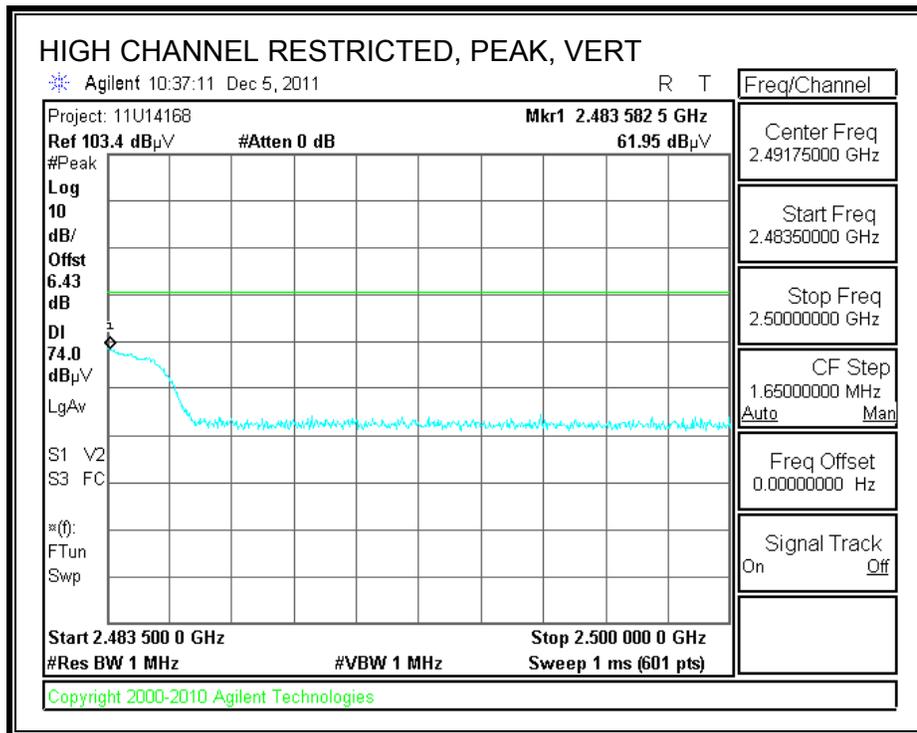


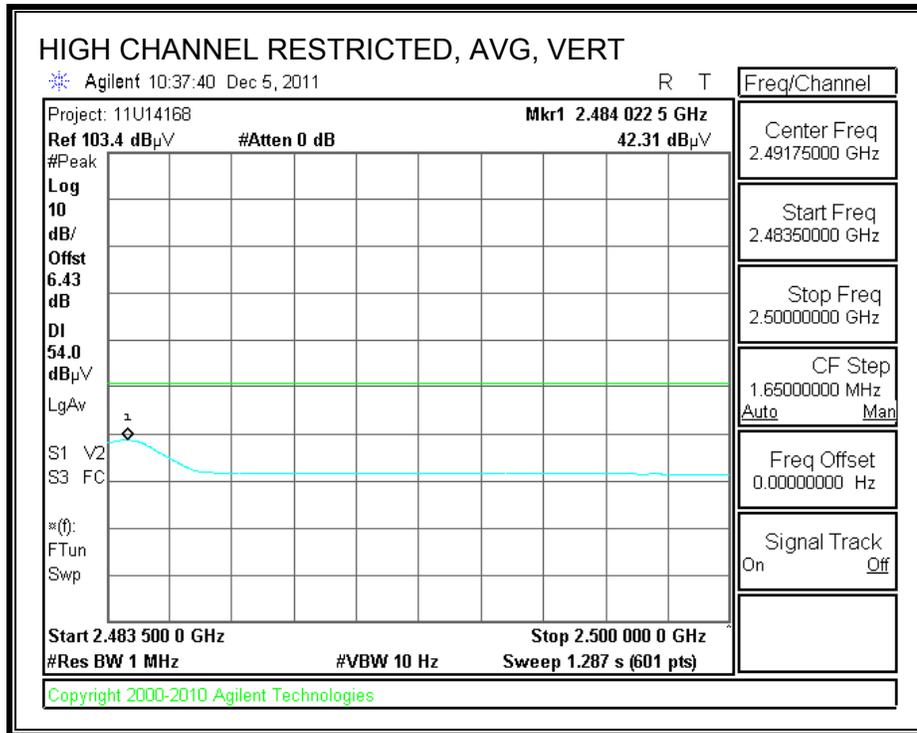
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



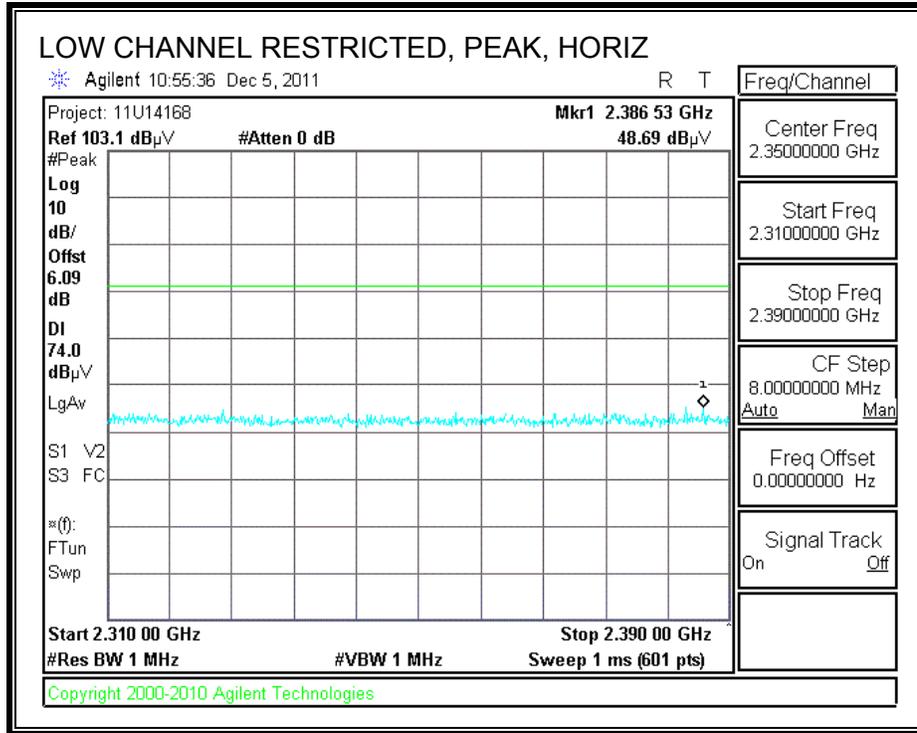


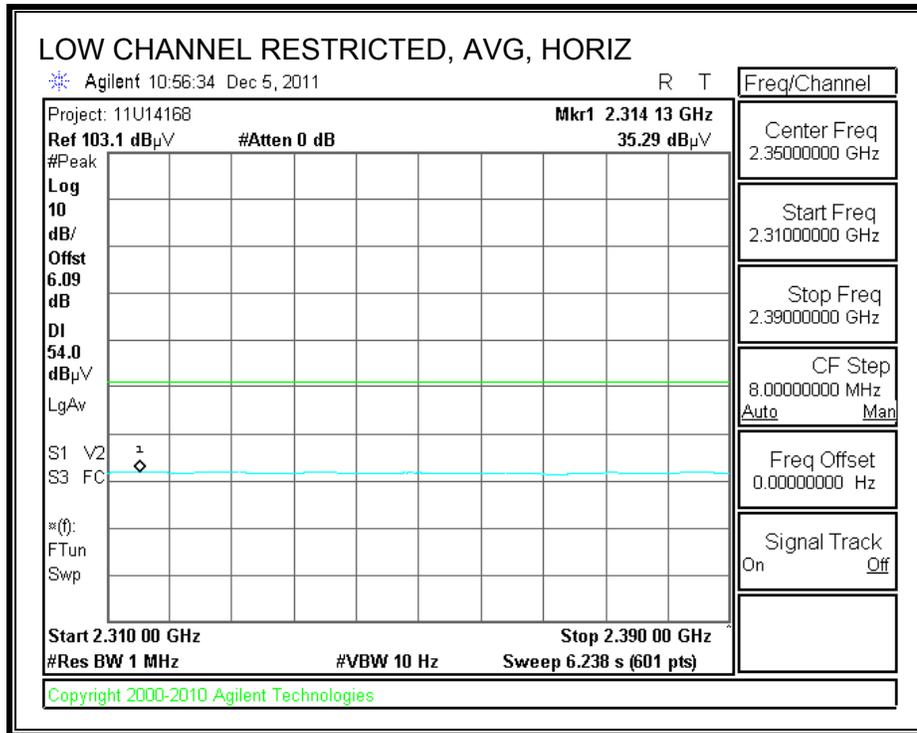
HARMONICS AND SPURIOUS EMISSIONS

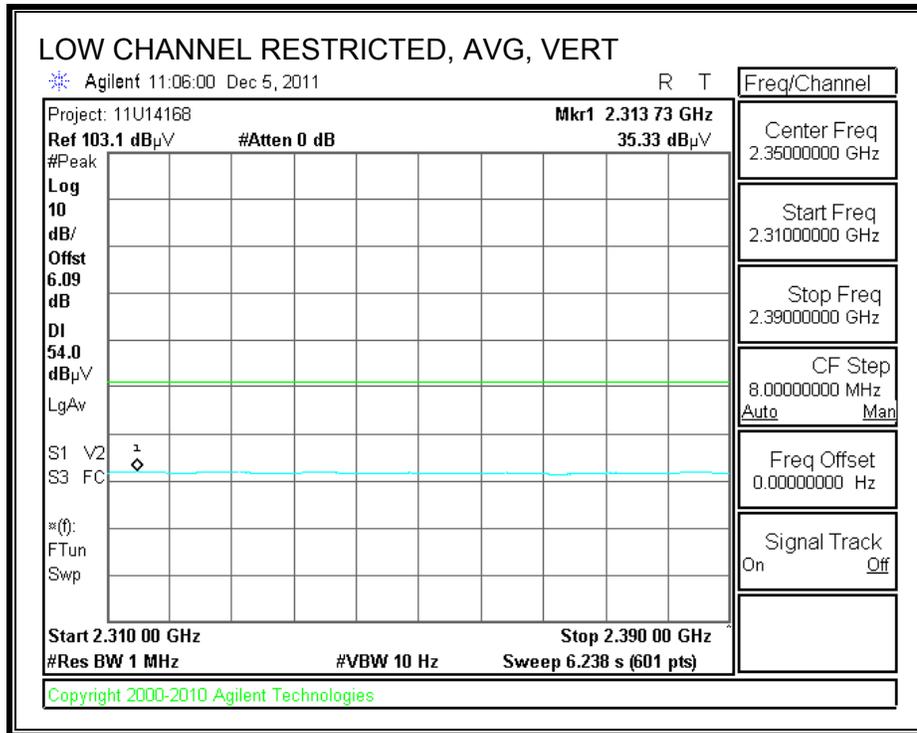
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Tom Chen											
Date:		12/05/11											
Project #:		11U14168											
Company:		Plantronics											
Test Target:		FCC Class B											
Mode Oper:		BT, GFSK mode TX worst Case											
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit									
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit									
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit									
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit									
CL	Cable Loss	HPF	High Pass Filter										
f	Dist	Read	AF	CL	Amp	D Corr	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	
2402 MHz GFSK													
4.804	3.0	47.7	33.1	5.8	-34.8	0.0	0.0	51.8	74.0	-22.3	H	P	
4.804	3.0	31.1	33.1	5.8	-34.8	0.0	0.0	35.2	54.0	-18.8	H	A	
4.804	3.0	45.7	33.1	5.8	-34.8	0.0	0.0	49.7	74.0	-24.3	V	P	
4.804	3.0	30.3	33.1	5.8	-34.8	0.0	0.0	34.3	54.0	-19.7	V	A	
2441 MHz GFSK													
4.882	3.0	50.0	33.2	5.8	-34.8	0.0	0.0	54.2	74.0	-19.8	V	P	
4.882	3.0	31.9	33.2	5.8	-34.8	0.0	0.0	36.1	54.0	-17.9	V	A	
4.882	3.0	50.4	33.2	5.8	-34.8	0.0	0.0	54.6	74.0	-19.4	H	P	
4.882	3.0	32.0	33.2	5.8	-34.8	0.0	0.0	36.2	54.0	-17.8	H	A	
7.323	3.0	36.1	36.3	7.3	-34.1	0.0	0.0	45.5	74.0	-28.5	H	P	
7.323	3.0	23.4	36.3	7.3	-34.1	0.0	0.0	32.9	54.0	-21.1	H	A	
2480 MHz GFSK													
4.960	3.0	51.9	33.2	5.9	-34.8	0.0	0.0	56.2	74.0	-17.8	H	P	
4.960	3.0	32.2	33.2	5.9	-34.8	0.0	0.0	36.5	54.0	-17.5	H	A	
7.440	3.0	35.7	36.5	7.3	-34.1	0.0	0.0	45.5	74.0	-28.5	H	P	
7.440	3.0	23.4	36.5	7.3	-34.1	0.0	0.0	33.2	54.0	-20.8	H	A	
2480 MHz GFSK													
4.960	3.0	50.2	33.2	5.9	-34.8	0.0	0.0	54.5	74.0	-19.5	V	P	
4.960	3.0	31.7	33.2	5.9	-34.8	0.0	0.0	36.0	54.0	-18.0	V	A	
7.440	3.0	35.5	36.5	7.3	-34.1	0.0	0.0	45.3	74.0	-28.7	V	P	
7.440	3.0	23.4	36.5	7.3	-34.1	0.0	0.0	33.2	54.0	-20.8	V	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

8.2.2. ENHANCED DATA RATE QPSK MODULATION

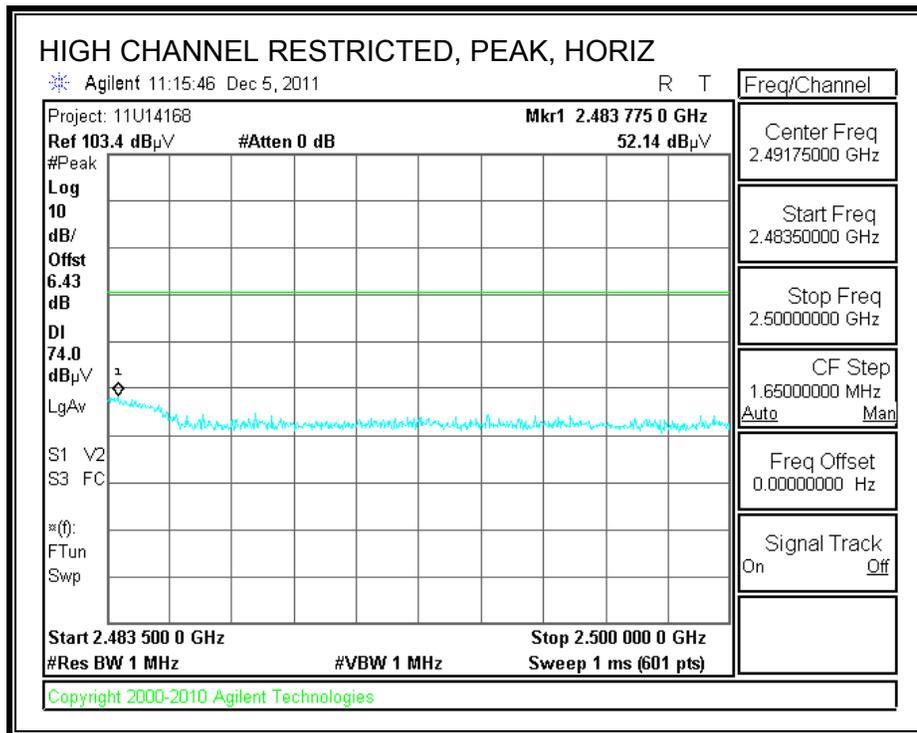
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

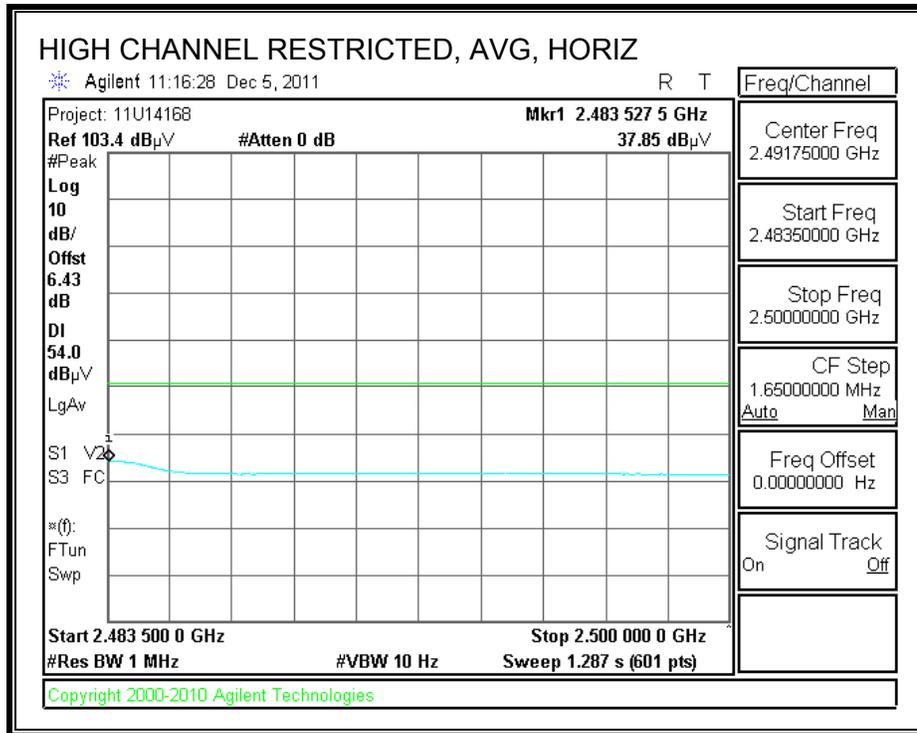




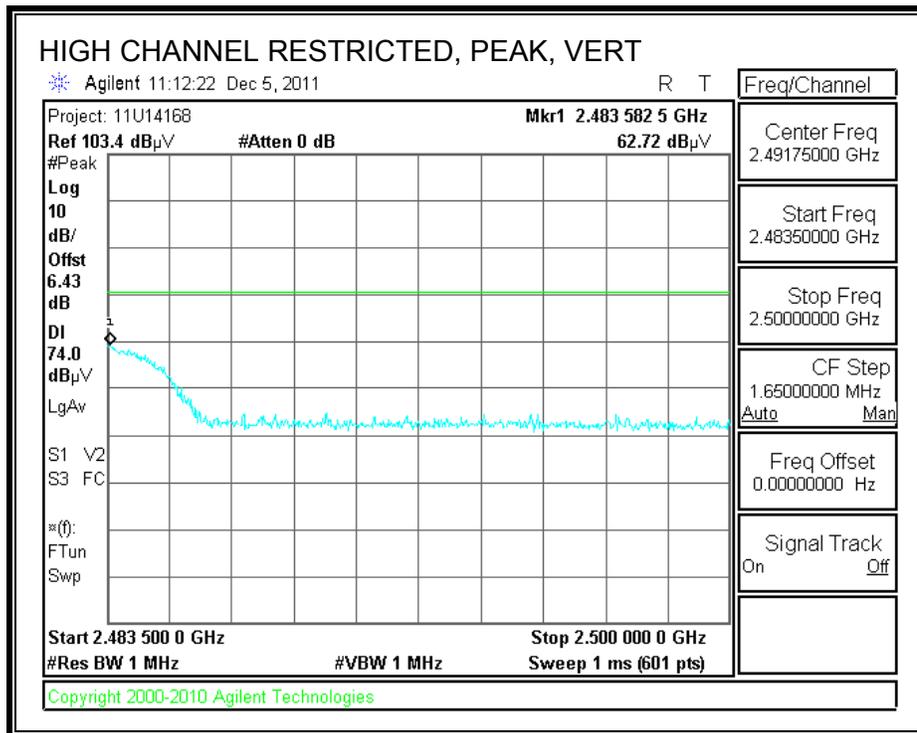


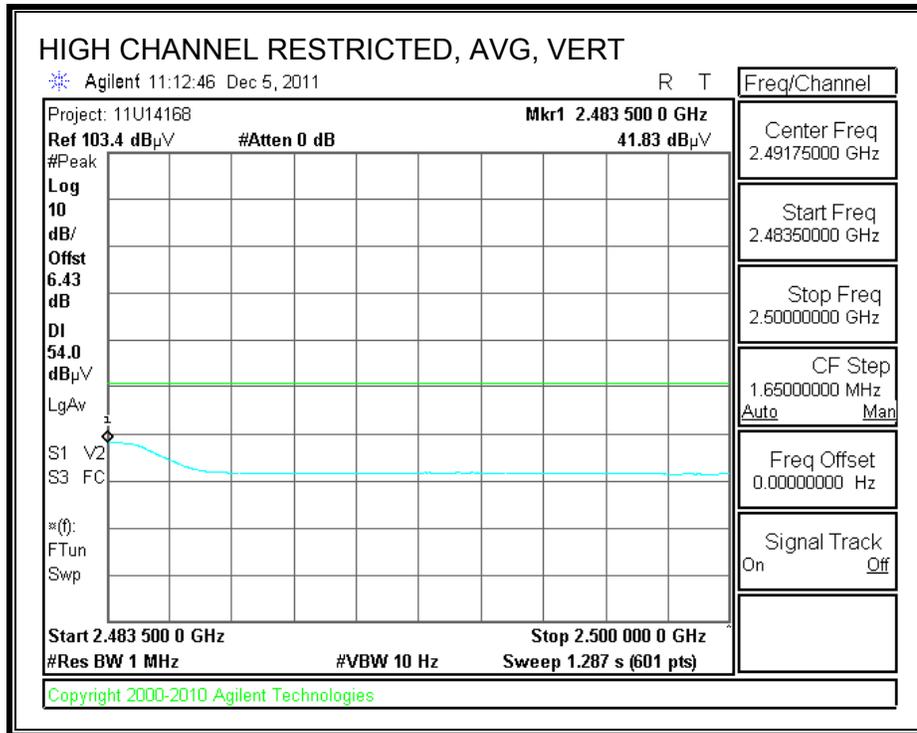
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Tom Chen											
Date:		12/05/11											
Project #:		11U14168											
Company:		Plantronics											
Test Target:		FCC Class B											
Mode Oper:		BT, DQPSK mode TX worst Case											
f	Measurement Frequency			Amp	Preamp Gain			Average Field Strength Limit					
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Peak Field Strength Limit					
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Margin vs. Average Limit					
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Margin vs. Peak Limit					
CL	Cable Loss			HPF	High Pass Filter								
f	Dist	Read	AF	CL	Amp	D Corr	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	
2402 MHz DQPSK													
4.804	3.0	40.5	33.1	5.8	-34.8	0.0	0.0	44.5	74.0	-29.5	V	P	
4.804	3.0	26.6	33.1	5.8	-34.8	0.0	0.0	30.7	54.0	-23.3	V	A	
4.804	3.0	44.4	33.1	5.8	-34.8	0.0	0.0	48.5	74.0	-25.5	H	P	
4.804	3.0	28.9	33.1	5.8	-34.8	0.0	0.0	32.9	54.0	-21.1	H	A	
2441 MHz DQPSK													
4.882	3.0	49.3	33.2	5.8	-34.8	0.0	0.0	53.5	74.0	-20.5	H	P	
4.882	3.0	30.8	33.2	5.8	-34.8	0.0	0.0	35.0	54.0	-19.0	H	A	
4.882	3.0	44.0	33.2	5.8	-34.8	0.0	0.0	48.2	74.0	-25.8	V	P	
4.882	3.0	28.8	33.2	5.8	-34.8	0.0	0.0	33.0	54.0	-21.0	V	A	
2480 MHz DQPSK													
4.960	3.0	46.1	33.2	5.9	-34.8	0.0	0.0	50.4	74.0	-23.6	V	P	
4.960	3.0	29.1	33.2	5.9	-34.8	0.0	0.0	33.4	54.0	-20.6	V	A	
7.440	3.0	35.6	36.5	7.3	-34.1	0.0	0.0	45.3	74.0	-28.7	V	P	
7.440	3.0	23.3	36.5	7.3	-34.1	0.0	0.0	33.0	54.0	-21.0	V	A	
2480 MHz DQPSK													
4.960	3.0	50.4	33.2	5.9	-34.8	0.0	0.0	54.7	74.0	-19.3	H	P	
4.960	3.0	30.9	33.2	5.9	-34.8	0.0	0.0	35.2	54.0	-18.8	H	A	
7.440	3.0	35.8	36.5	7.3	-34.1	0.0	0.0	45.6	74.0	-28.4	H	P	
7.440	3.0	23.2	36.5	7.3	-34.1	0.0	0.0	33.0	54.0	-21.0	H	A	
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 3m Chamber

Company: **Plantronics**
 Project #: **11U14168**
 Date: **12/5/2011**
 Test Engineer: **Tom Chen**
 Configuration: **EUT alone**
 Mode: **RX mode**

Test Equipment:

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

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter	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	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)
1.112	3.0	47.6	37.2	25.3	2.9	-37.6	0.0	0.0	38.1	27.7	74	54	-35.9	-26.3	V
3.940	3.0	42.0	29.3	32.4	6.1	-34.4	0.0	0.0	46.2	33.5	74	54	-27.8	-20.5	V
1.112	3.0	48.3	36.3	25.3	2.9	-37.6	0.0	0.0	38.8	26.8	74	54	-35.2	-27.2	H
2.560	3.0	44.3	36.7	29.0	4.7	-35.6	0.0	0.0	42.5	34.8	74	54	-31.5	-19.2	H

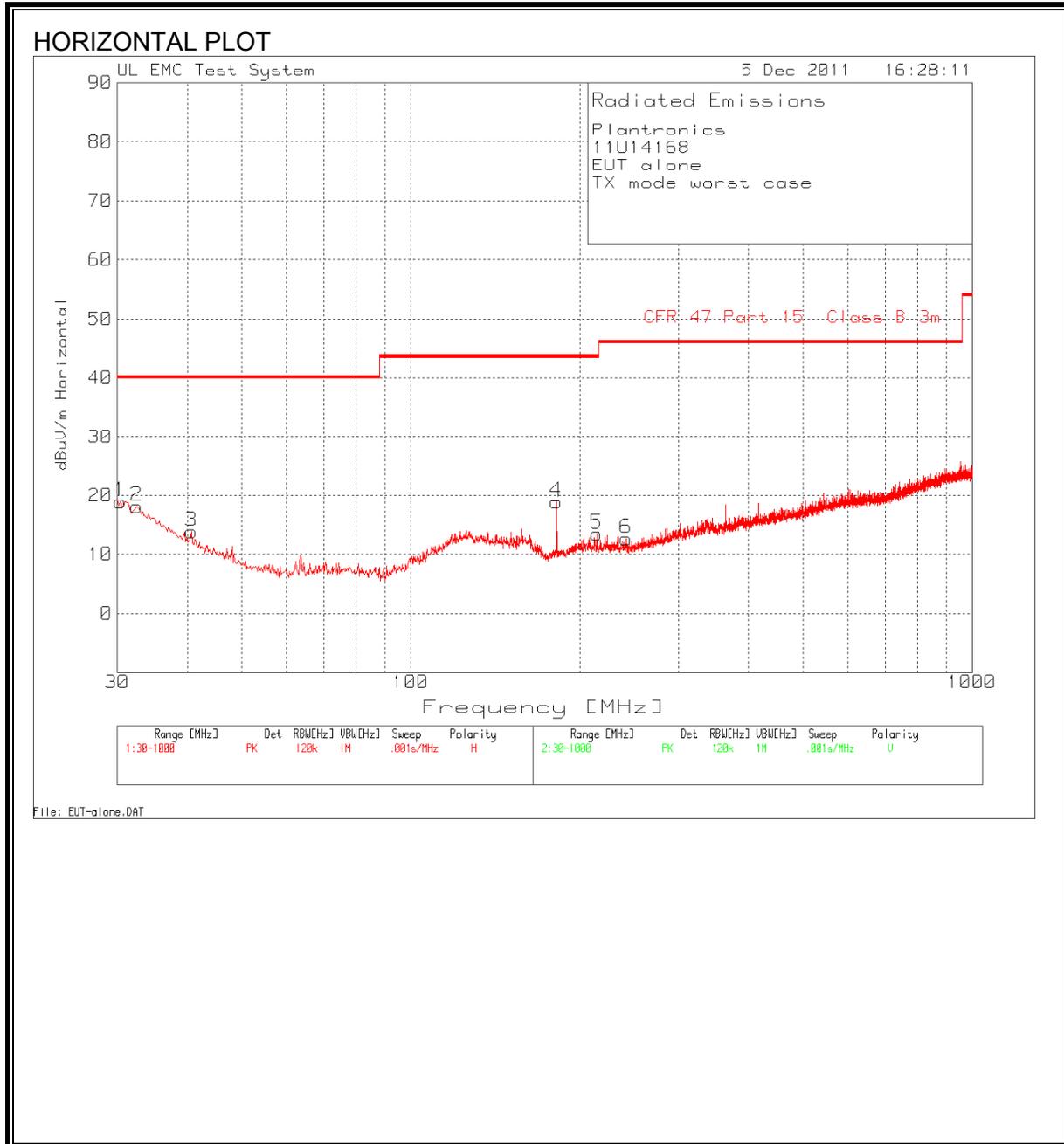
Note: No other emissions were detected above the system noise floor.
 Rev. 07.08.11

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	

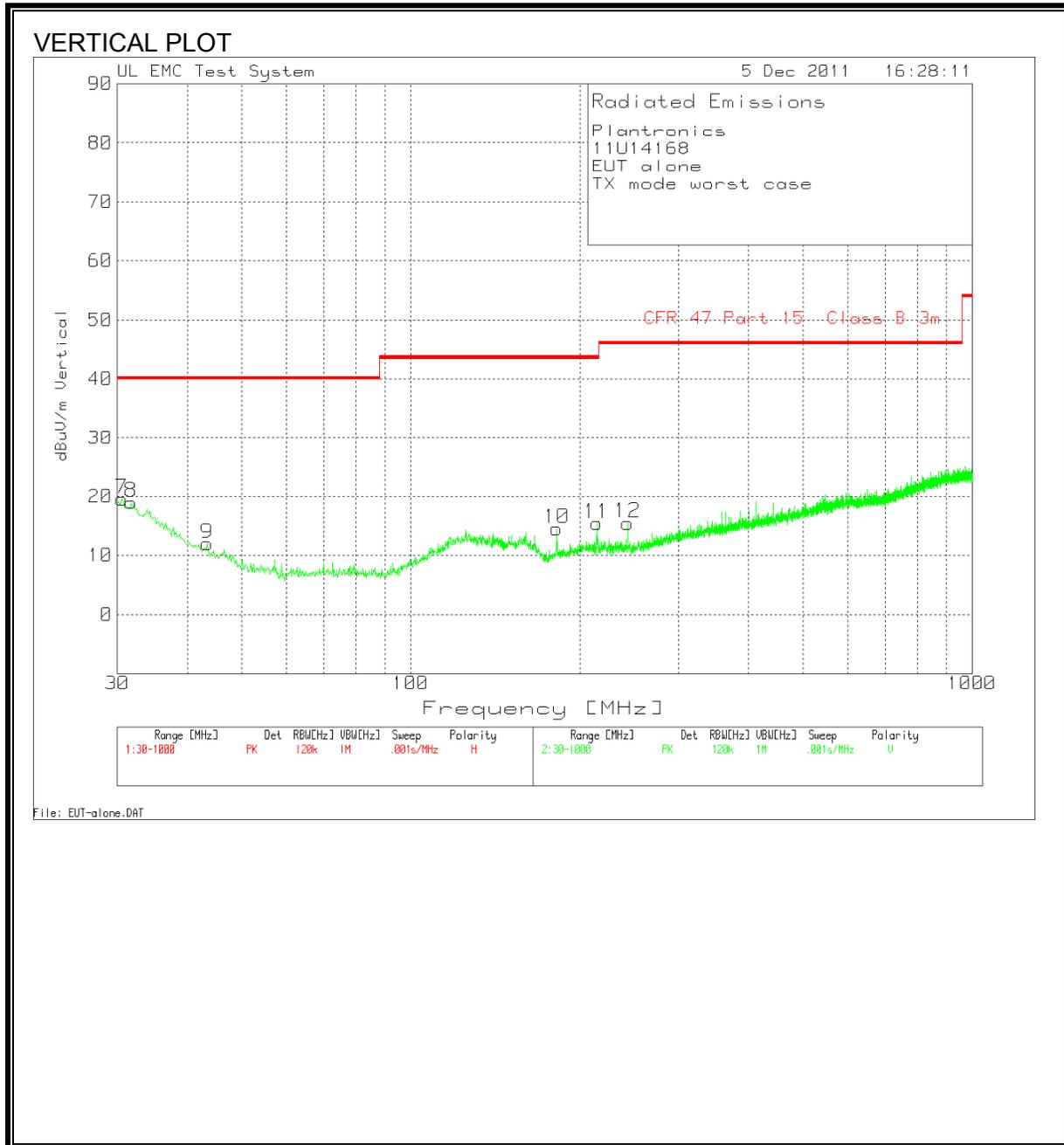
8.4. WORST-CASE BELOW 1 GHz

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

EUT standalone



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



HORIZONTAL AND VERTICAL DATA

Plantronics										
11U14168										
EUT alone										
TX mode worst case										

Horizontal 30 - 1000MHz

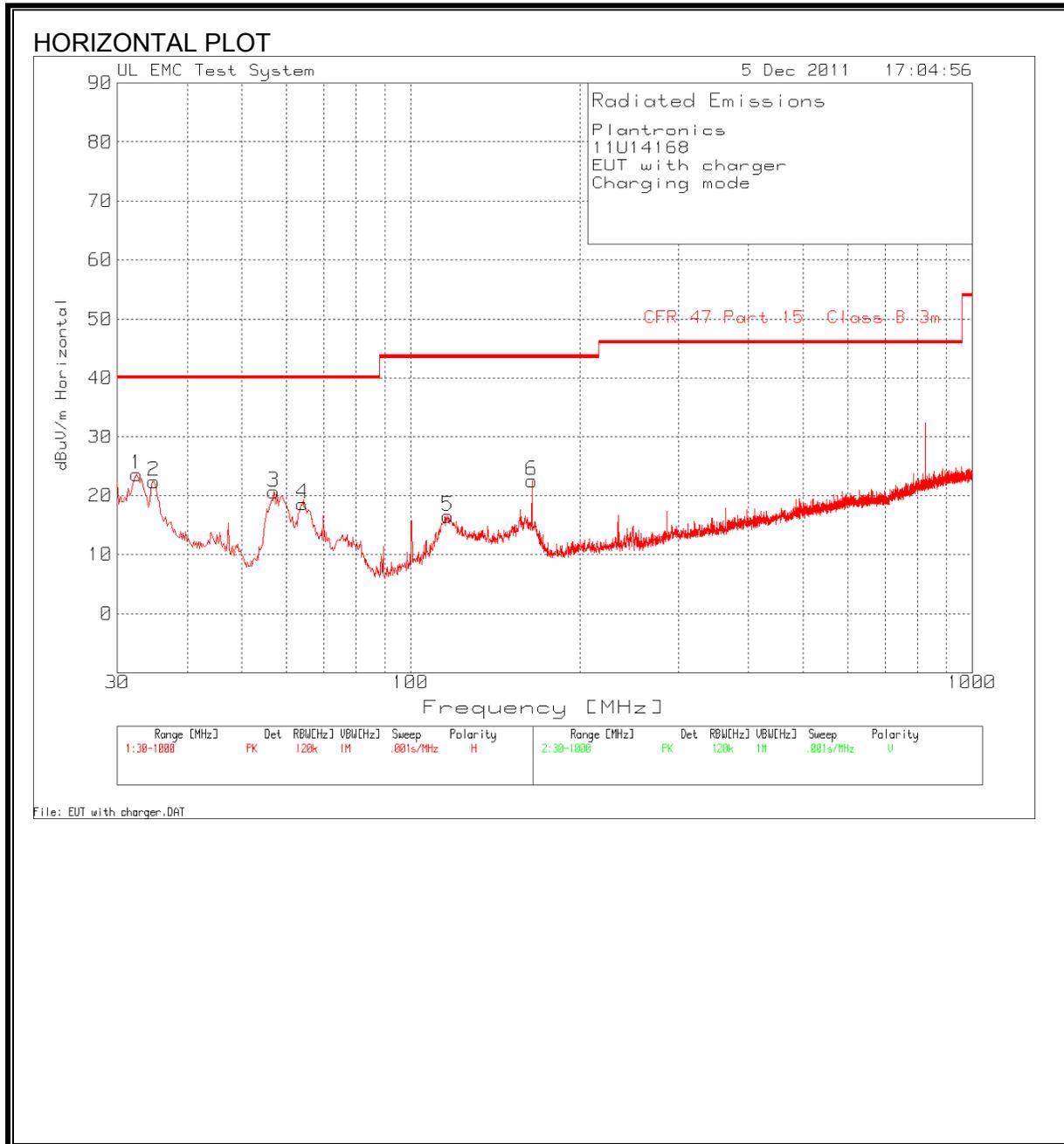
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Polarity
30.3877	26.82	PK	0.6	-28.3	19.8	18.92	40	-21.08	Horz
32.52	27.03	PK	0.6	-28.3	18.8	18.13	40	-21.87	Horz
40.6615	28.24	PK	0.7	-28.2	13.1	13.84	40	-26.16	Horz
181.7806	34.35	PK	1.3	-27.7	10.9	18.85	43.5	-24.65	Horz
214.5404	27.73	PK	1.4	-27.6	11.9	13.43	43.5	-30.07	Horz
241.8725	26.76	PK	1.6	-27.5	11.8	12.66	46	-33.34	Horz

Vertical 30 - 1000MHz

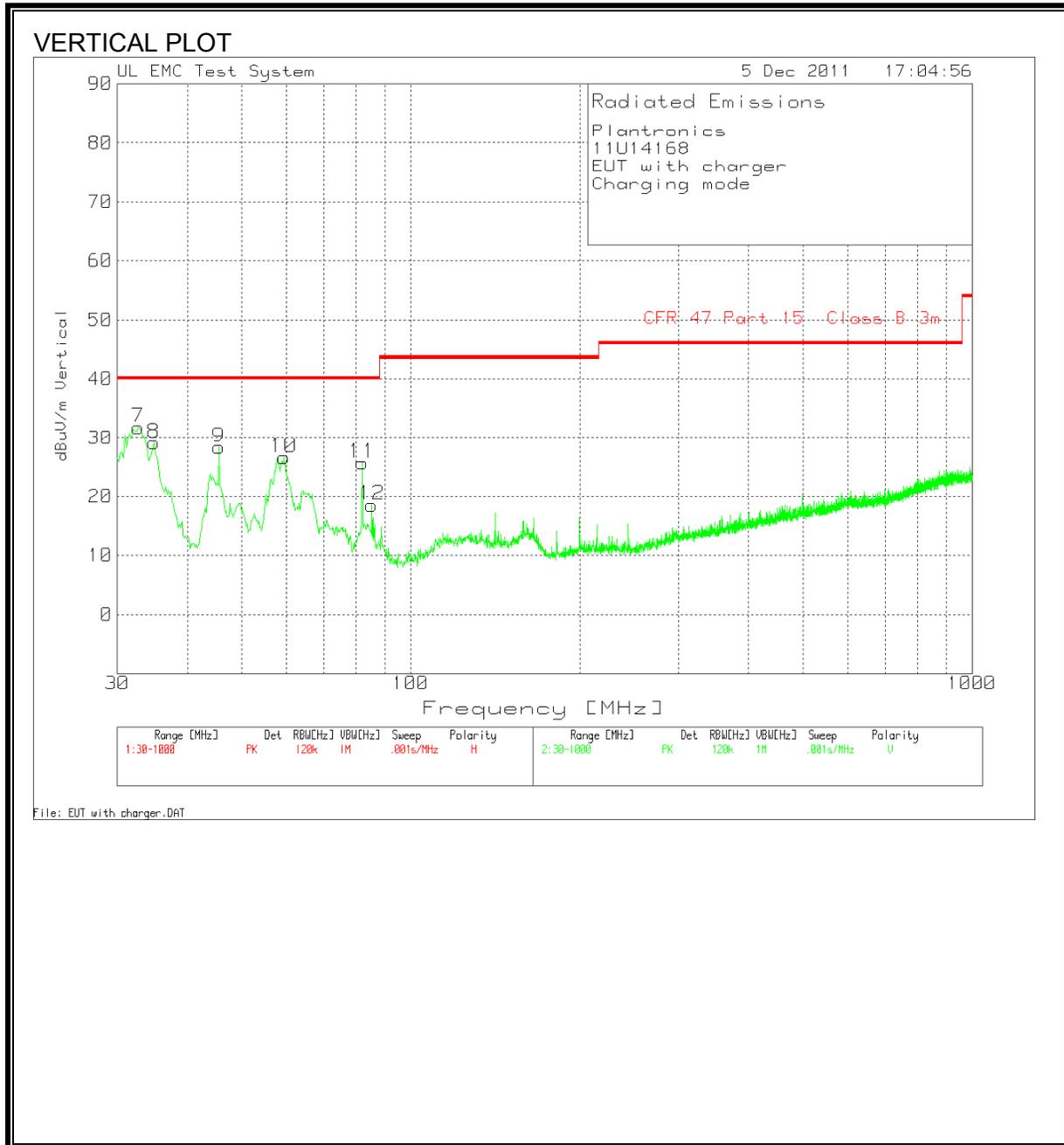
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Polarity
30.5815	27.56	PK	0.6	-28.3	19.7	19.56	40	-20.44	Vert
31.7446	27.57	PK	0.6	-28.3	19.1	18.97	40	-21.03	Vert
43.3753	27.18	PK	0.7	-28.2	12.3	11.98	40	-28.02	Vert
181.9744	30.06	PK	1.3	-27.7	10.9	14.56	43.5	-28.94	Vert
214.5404	29.71	PK	1.4	-27.6	11.9	15.41	43.5	-28.09	Vert
243.4233	29.59	PK	1.6	-27.5	11.8	15.49	46	-30.51	Vert

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

EUT with Charger



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



HORIZONTAL AND VERTICAL DATA

Plantronics										
11U14168										
EUT with charger										
Charging mode										

Horizontal 30 - 1000MHz

Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Polarity
32.52	32.45	PK	0.6	-28.3	18.8	23.55	40	-16.45	Horz
34.8461	32.47	PK	0.6	-28.3	17.6	22.37	40	-17.63	Horz
56.9444	39.69	PK	0.8	-28.2	8.3	20.59	40	-19.41	Horz
64.1167	37.86	PK	0.9	-28.2	8	18.56	40	-21.44	Horz
116.4548	30.57	PK	1.1	-28	12.8	16.47	43.5	-27.03	Horz
164.3345	36.56	PK	1.3	-27.8	12.4	22.46	43.5	-21.04	Horz

Vertical 30 - 1000MHz

Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Polarity
32.7138	40.77	PK	0.6	-28.3	18.7	31.77	40	-8.23	Vert
34.8461	39.18	PK	0.6	-28.3	17.6	29.08	40	-10.92	Vert
45.5076	44.31	PK	0.7	-28.2	11.5	28.31	40	-11.69	Vert
59.4644	45.95	PK	0.8	-28.2	8	26.55	40	-13.45	Vert
81.9504	44.92	PK	1	-28.1	7.8	25.62	40	-14.38	Vert
85.2458	38	PK	1	-28.1	7.6	18.5	40	-21.5	Vert

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

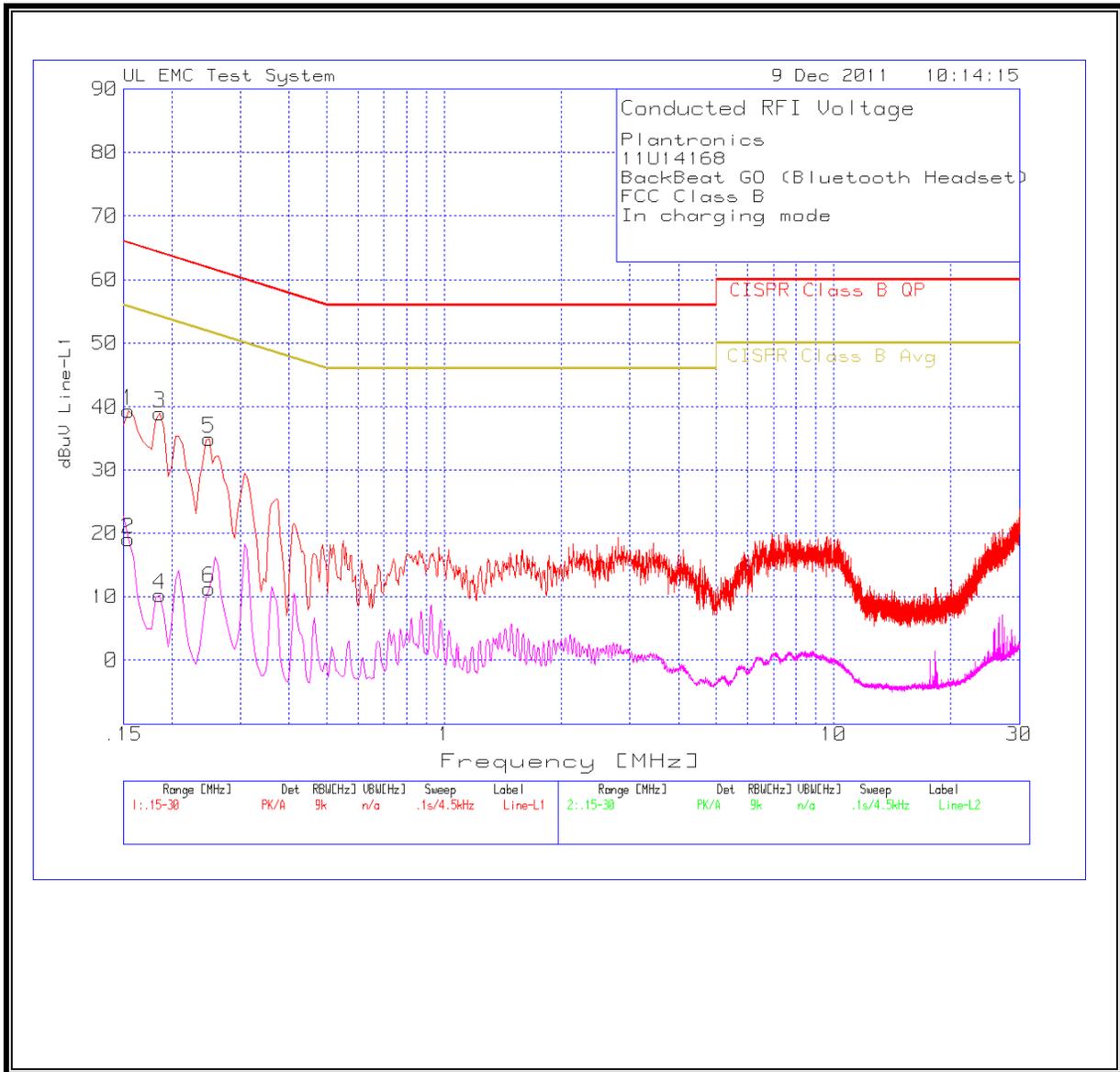
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

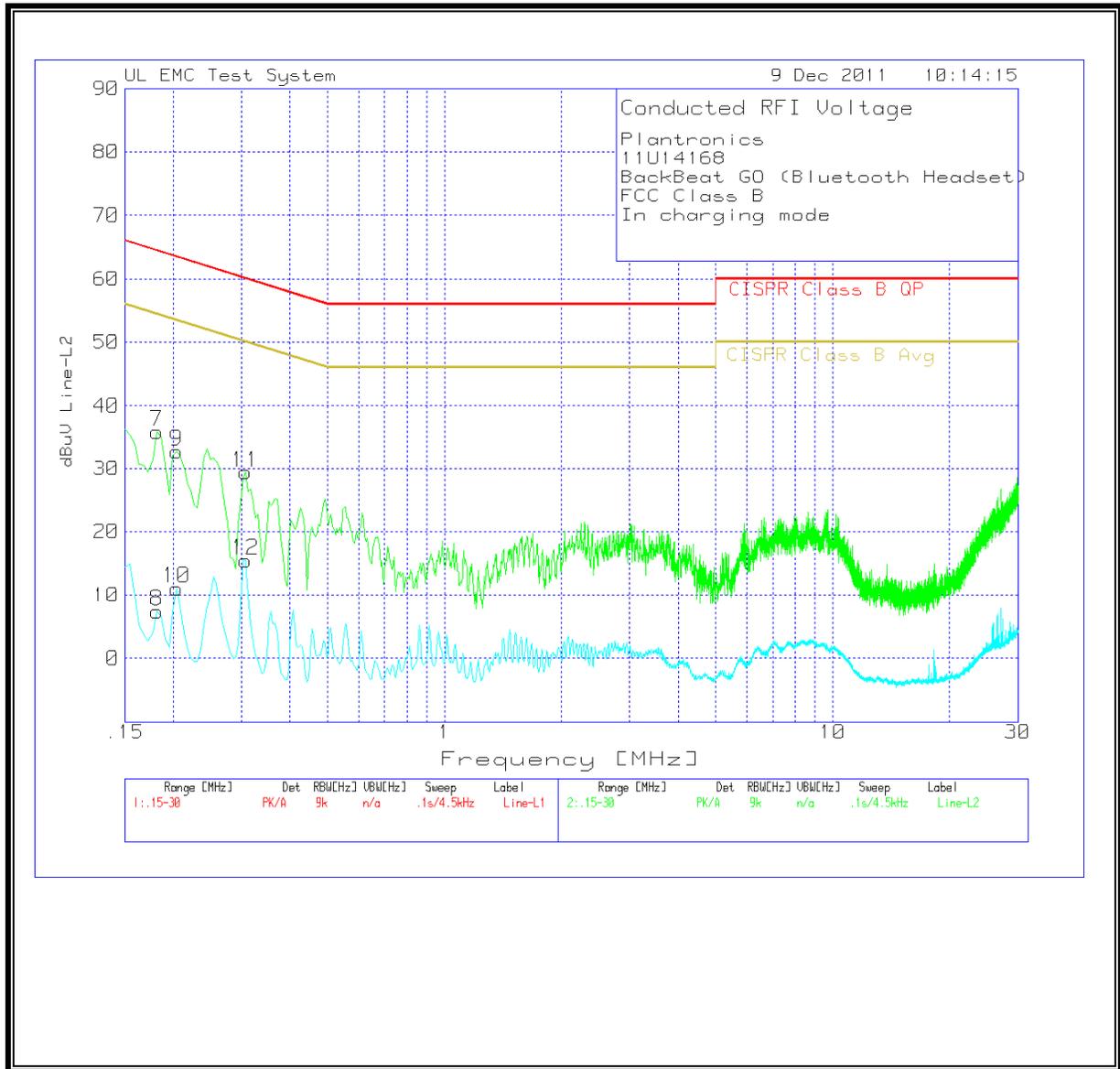
6 WORST EMISSIONS

Plantronics									
11U14168									
BackBeat GO (Bluetooth Headset)									
FCC Class B									
In charging mode									
Line-L1 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 Lisn & Path Loss L1. [dB]	dBuV	CISPR Class B QP	Margin	CISPR Class B Avg	Margin	
0.1545	37.75	PK	1.6	39.35	65.8	-26.45	55.8	-16.45	
0.1545	17.41	Av	1.6	19.01	65.8	-46.79	55.8	-36.79	
0.186	37.65	PK	1.3	38.95	64.2	-25.25	54.2	-15.25	
0.186	8.93	Av	1.3	10.23	64.2	-53.97	54.2	-43.97	
0.249	34.05	PK	0.9	34.95	61.8	-26.85	51.8	-16.85	
0.249	10.44	Av	0.9	11.34	61.8	-50.46	51.8	-40.46	
Line-L2 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 Lisn & Path Loss Data L2. [dB]	dBuV	CISPR Class B QP	Margin	CISPR Class B Avg	Margin	
0.1815	34.69	PK	1.2	35.89	64.4	-28.51	54.4	-18.51	
0.1815	6.22	Av	1.2	7.42	64.4	-56.98	54.4	-46.98	
0.204	31.75	PK	1	32.75	63.4	-30.65	53.4	-20.65	
0.204	9.99	Av	1	10.99	63.4	-52.41	53.4	-42.41	
0.3075	28.82	PK	0.6	29.42	60	-30.58	50	-20.58	
0.3075	14.8	Av	0.6	15.4	60	-44.6	50	-34.6	

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

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

$$\text{Total EIRP} = (P1 * G1) + (P2 * G2) + \dots + (Pn * Gn)$$

where

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

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

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 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 AV Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m ²)	FCC Power Density (mW/cm ²)
2.4 GHz	Bluetooth	0.20	0.80	-1.80	0.0016	0.0002