FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

Bluetooth Module

MODEL NUMBER: BT12A

FCC ID: ACJ9TGBT12A

REPORT NUMBER: 12J14382-2

ISSUE DATE: May 23, 2012

Prepared for
PANASONIC CORPORATION OF NORTH AMERICA
ONE PANASONIC WAY, 4B-8
SECAUCUS, NEW JERSEY, 07094, USA

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	05/23/2012	Initial Issue	T. LEE

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PANASONIC CORPORATION OF NORTH AMERICA
ONE PANASONIC WAY, 4B-8
SECAUCUS, NEW JERSEY, 07094, USA

EUT DESCRIPTION: Bluetooth Module

MODEL: BT12A

SERIAL NUMBER: Conducted (000704b4506e), Radiated (000704b4505b)

DATE TESTED: May 3rd to 15th, 2012

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	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:

TIMOTHY K. LEE
EMC SUPERVISOR
UL CCS

Tested By:

STEVE AGUILAR
EMC TECHNICIAN
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:

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

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Bluetooth transceiver Model BT12A.

The radio module is manufactured by Panasonic.

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	16.34	43.05
2402 - 2480	Enhanced 8PSK	14.97	31.41

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Micro strip antenna, with a maximum gain of 2.01dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was A06.

The EUT driver software installed with the laptop as support equipment during testing was Toshiba Bluetooth Stack 9.x.

The test utility software used during testing was Blue suite , rev. 2.4.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Panasonic	CF-53	FM111MK2D1S2	--
Power Supply	Panasoinc	CF-AA5713AM1	5713AM112105301A	D of C
Laptop	Panasonic	CF-53	FM111MK2D1T	--
Power Supply	Panasoinc	CF-AA5713AM1	5713AM112105320A	D of C

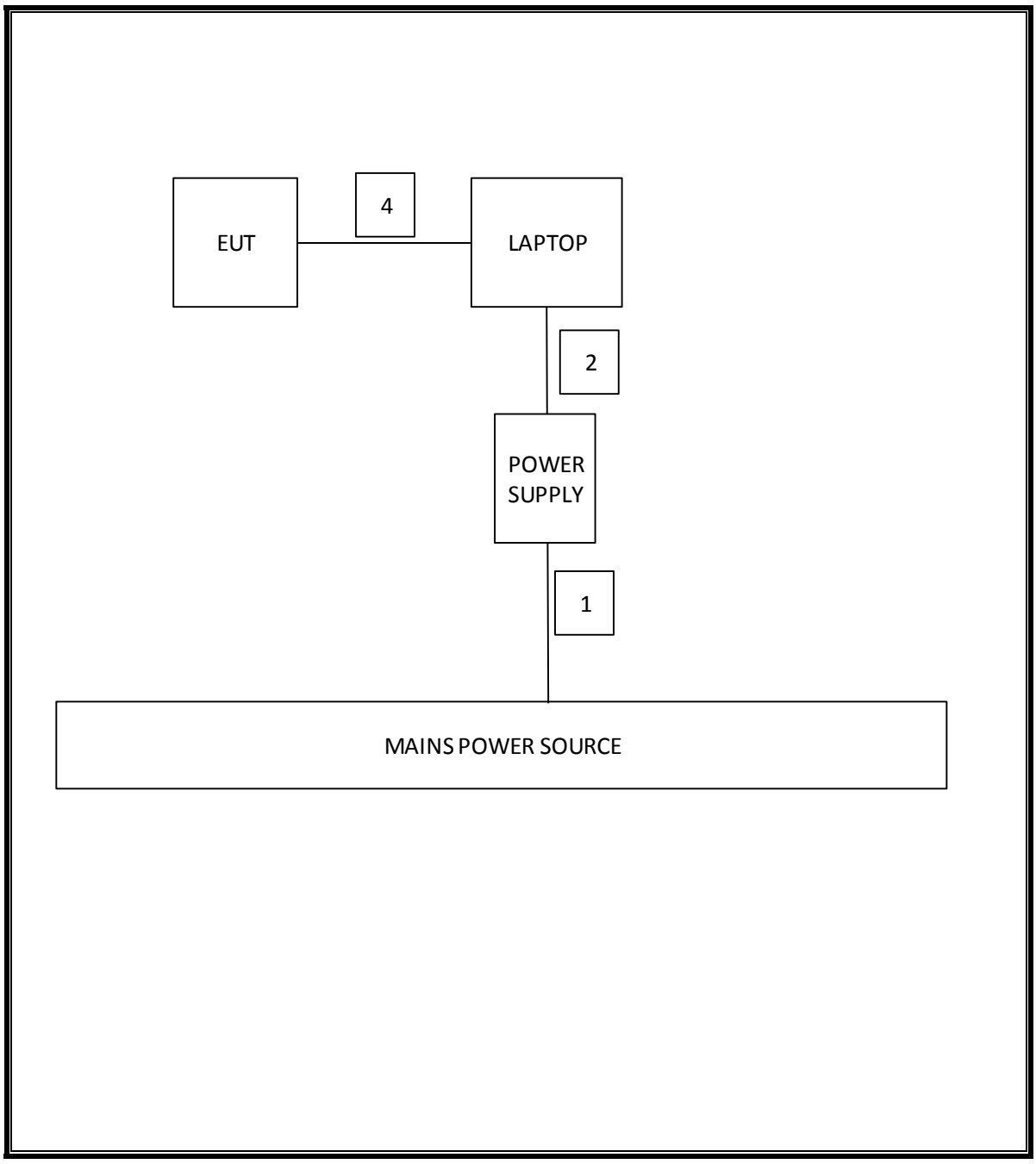
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	AC	Unsielded	1.7m	--
2	DC	1	DC	Shielded	1.7m	Ferrite on DC connector
4	I/O	1	I/O	Unshielded	16cm	Ribbon cable and 24 guage wire

TEST SETUP

The EUT is mounted externally via 22 gauge wire and a ribbon cable for testing.
Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**	**Cal Due**
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/2011	12/13/2012
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/2011	12/13/2012
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	2/16/2012	2/16/2013
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	3/22/2012	3/22/2013
Antenna, Horn, 18 GHz	EMCO	3115	C00945	10/6/2011	10/6/2012
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	7/12/2011	7/12/2012
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	7/28/2011	7/28/2012
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	11/11/2011	11/11/2012
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1		2/7/2012	2/7/2013
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	7/6/2011	7/6/2012
LISN, 30 MHz	FCC	50/250-25-2	C00626	12/13/2011	12/13/2012

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.

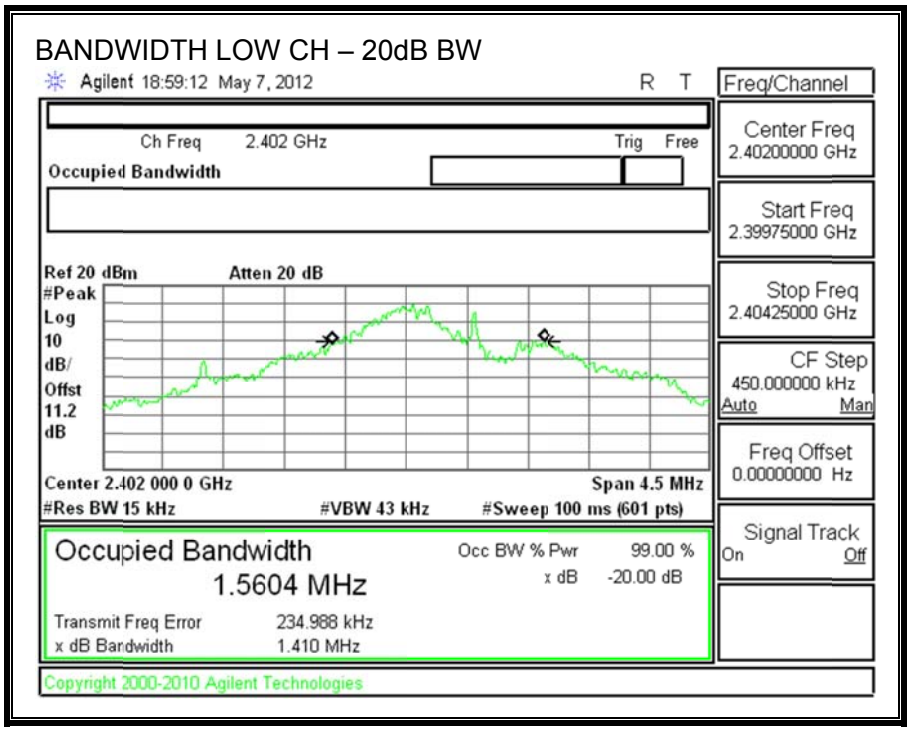
TEST PROCEDURE

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

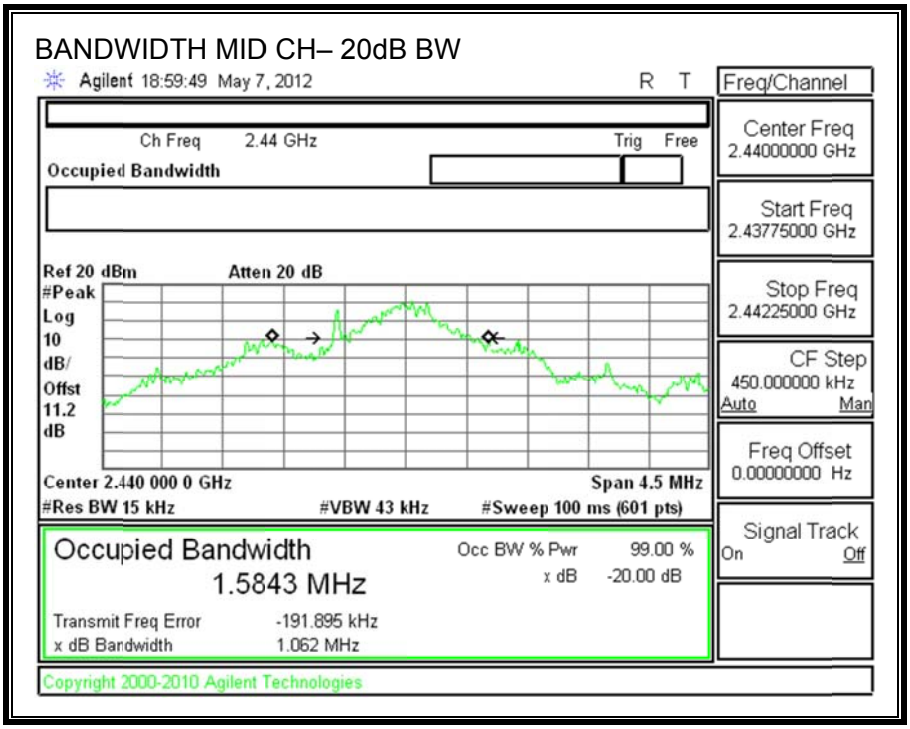
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1410	1525
Middle	2441	1062	1568
High	2480	1368	1577

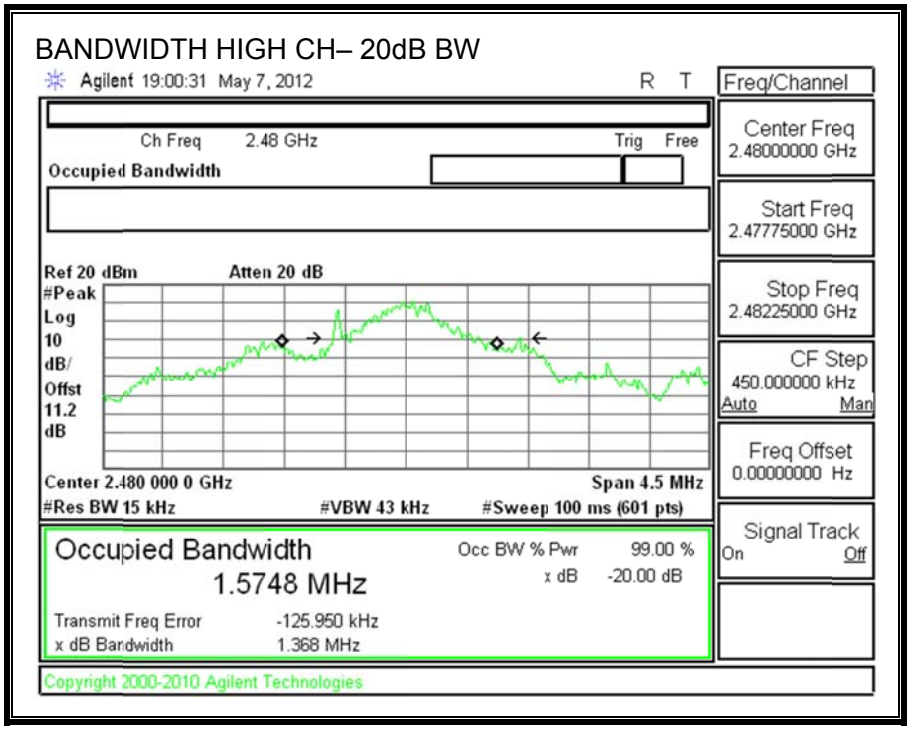
20 dB BANDWIDTH



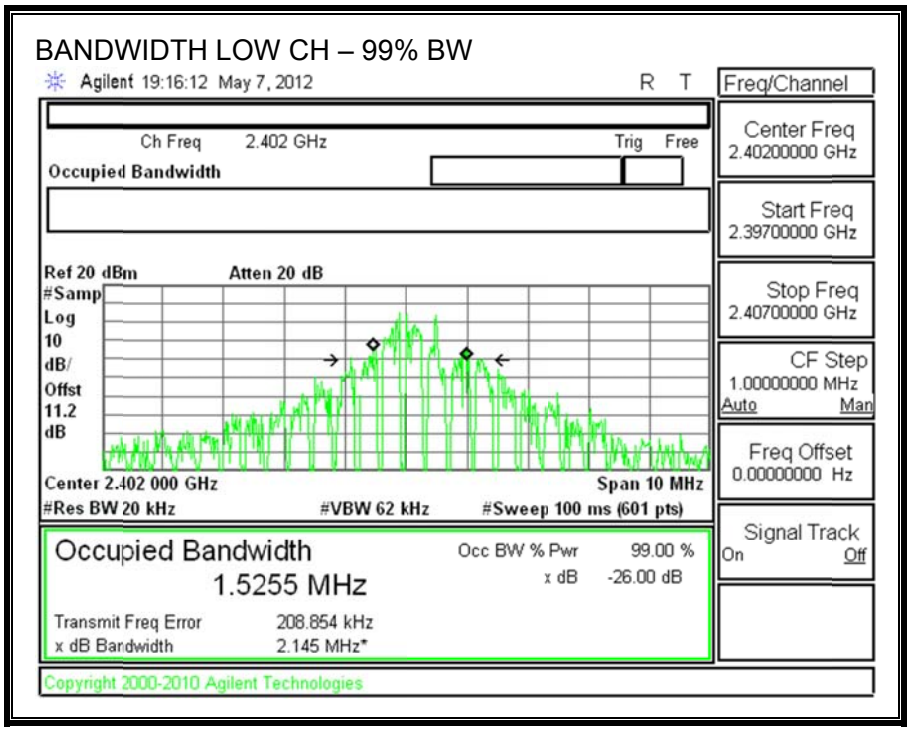
BANDWIDTH MID CH– 20dB BW



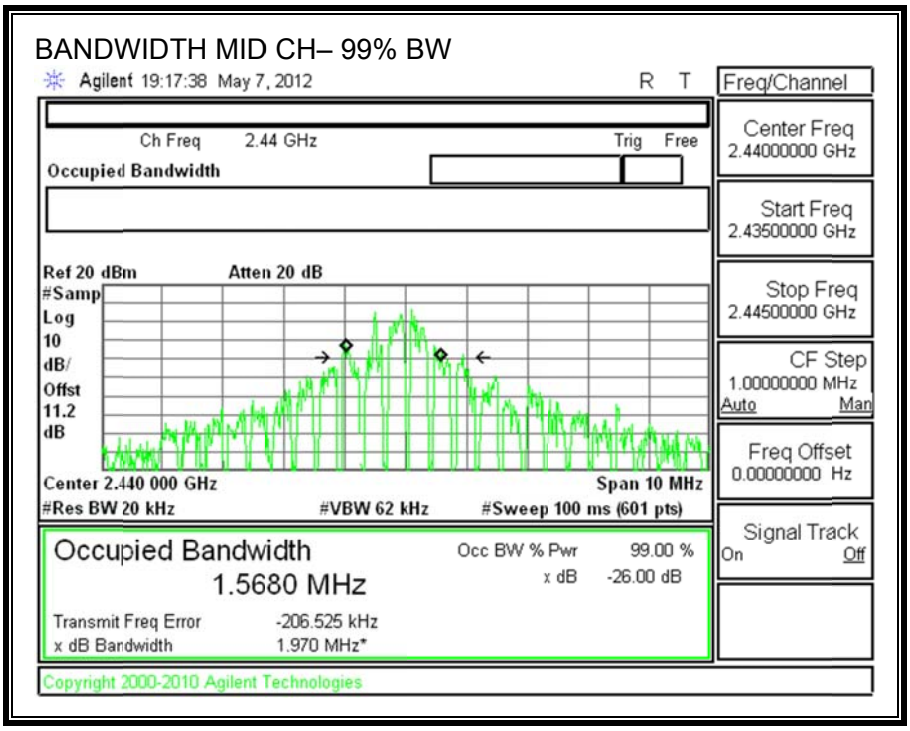
BANDWIDTH HIGH CH– 20dB BW



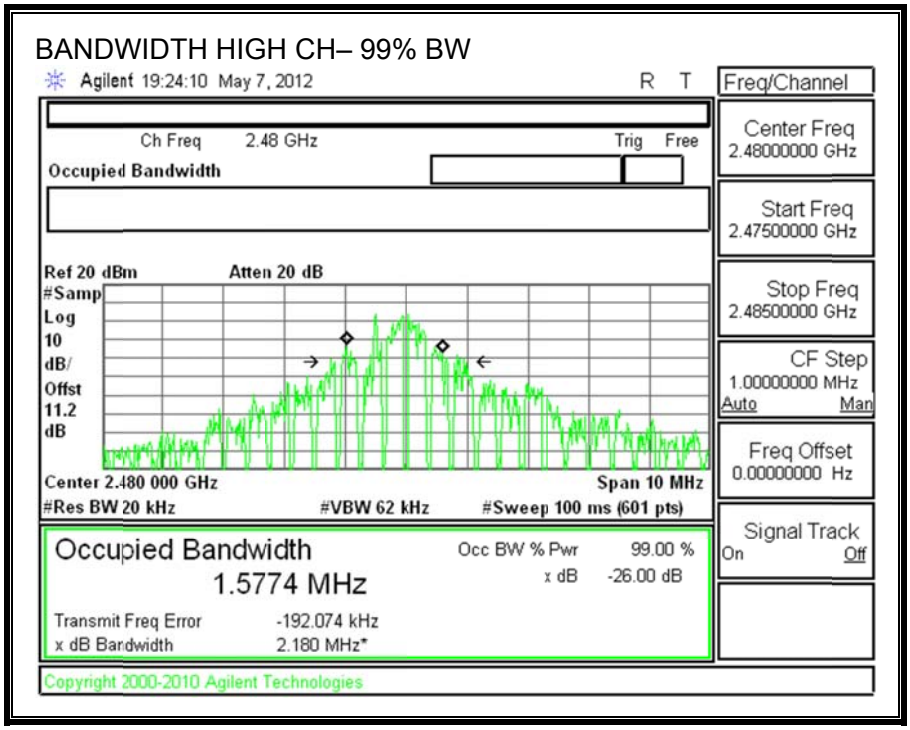
99% BANDWIDTH



BANDWIDTH MID CH– 99% BW



BANDWIDTH HIGH CH– 99% BW



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 hoping channel, whichever is greater.

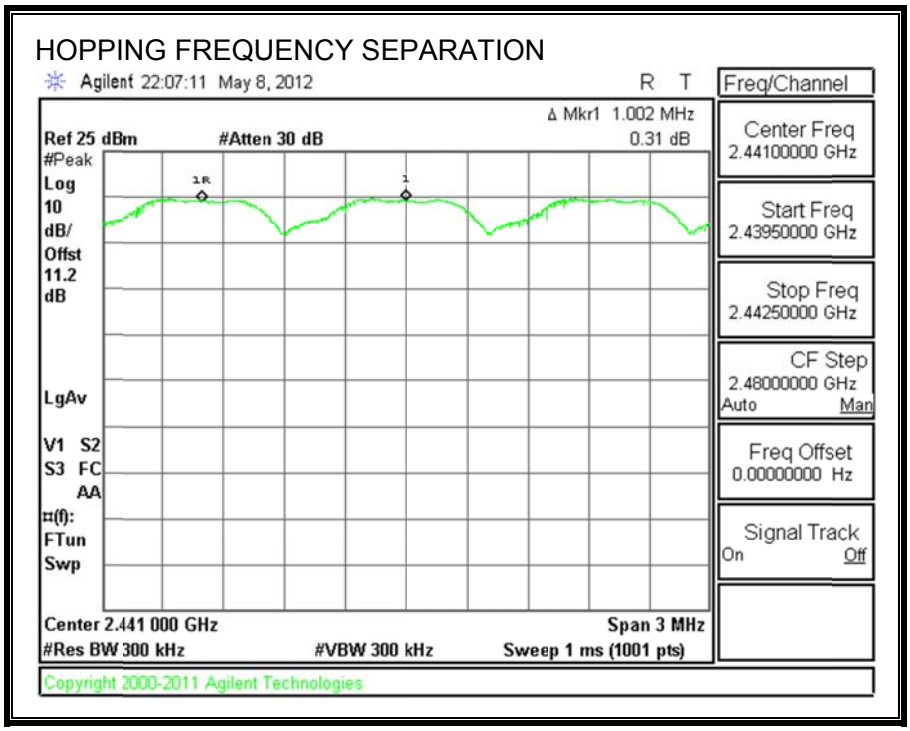
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

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

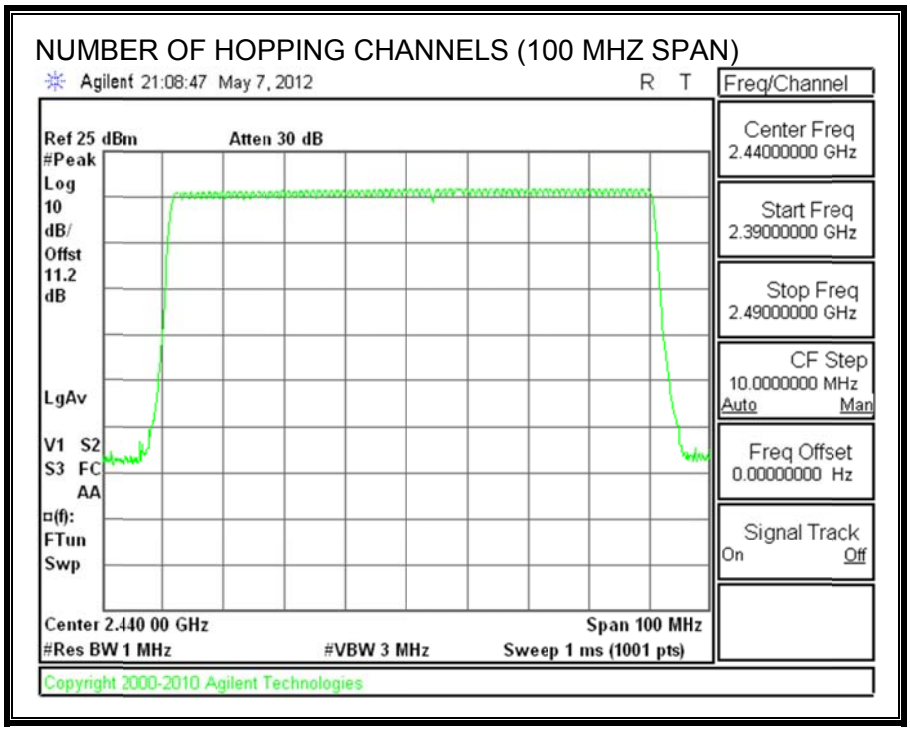
TEST PROCEDURE

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.

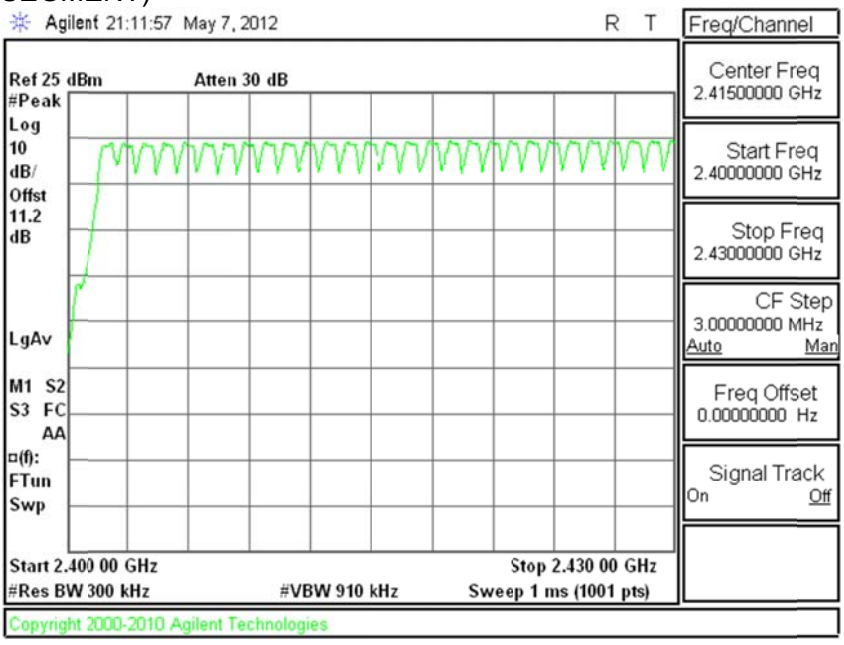
RESULTS

79 Channels observed.

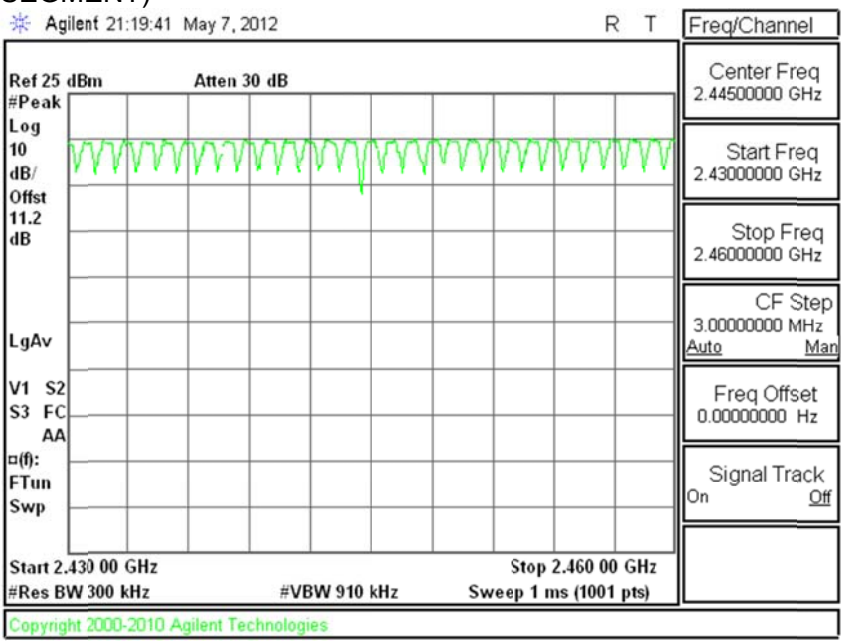
NUMBER OF HOPPING CHANNELS



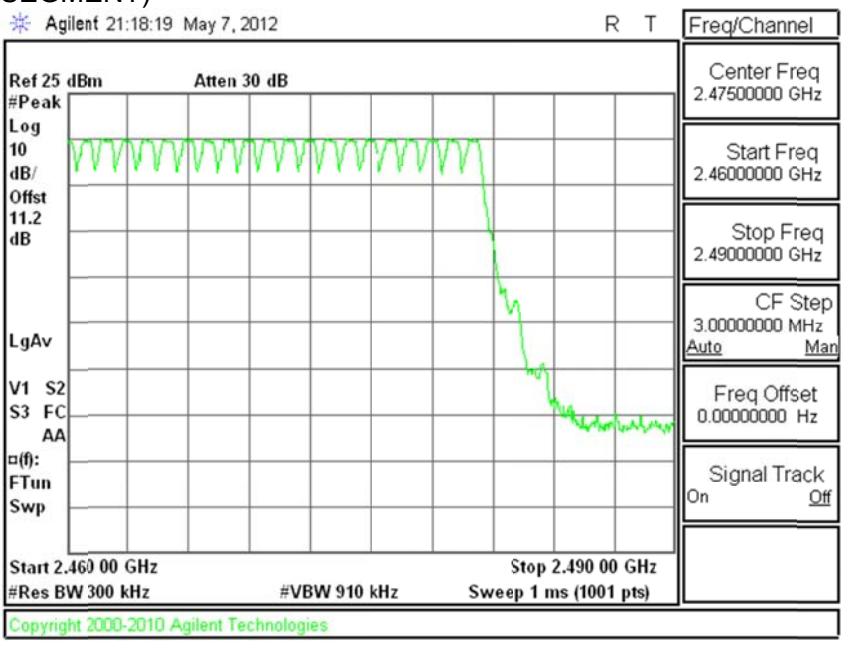
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



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.

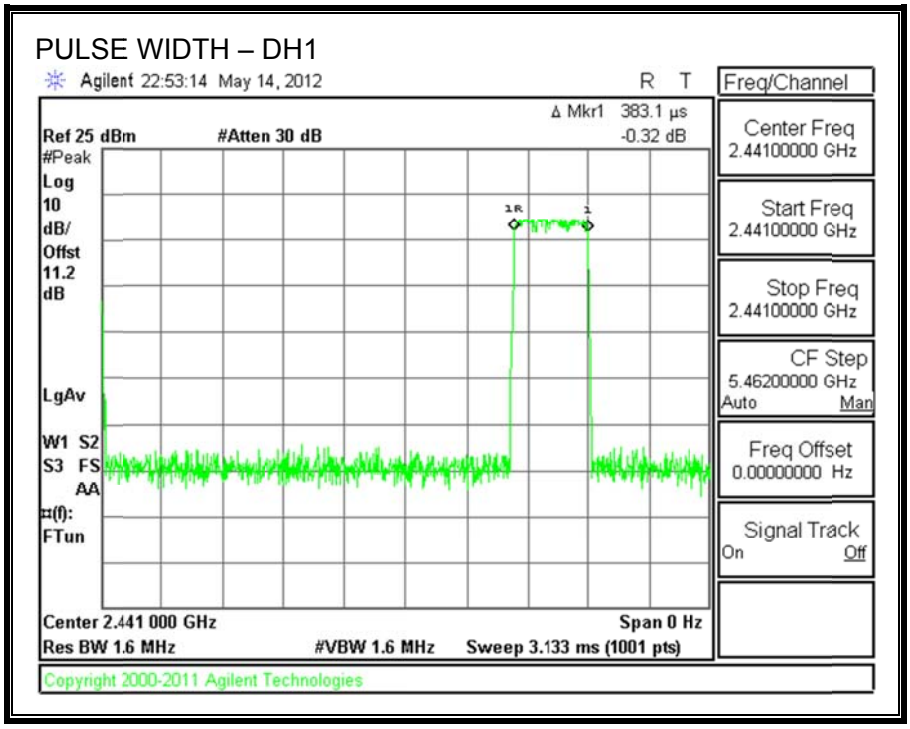
The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

RESULTS

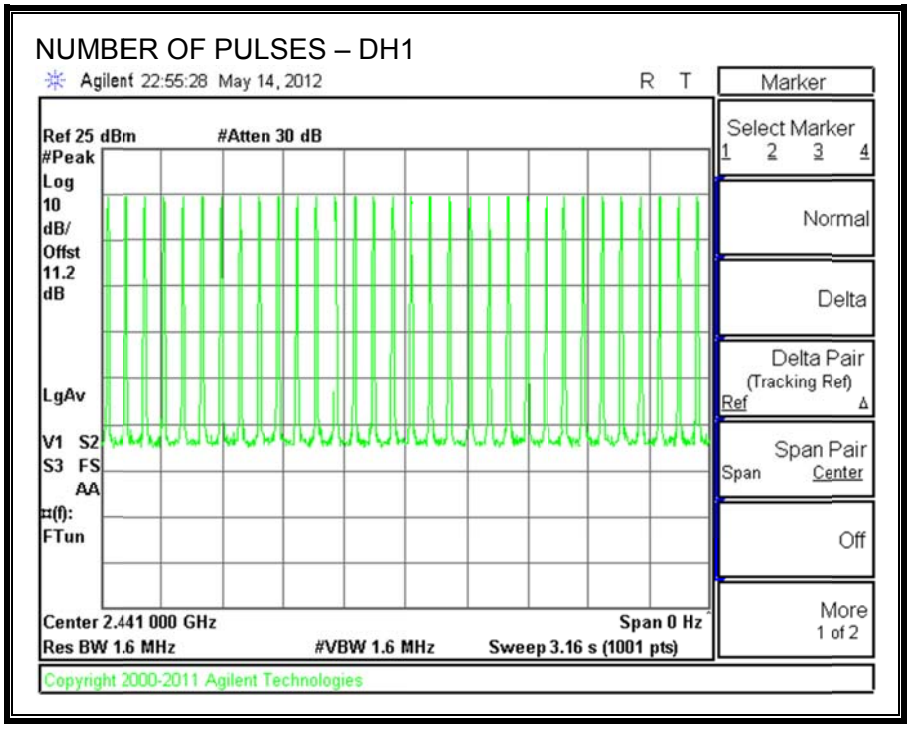
Time Of Occupancy = 10 * xx pulses * yy msec = zz msec

Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
0.838	32	0.268	0.4	-0.132
1.617	16	0.259	0.4	-0.141
2.847	11	0.313	0.4	-0.087

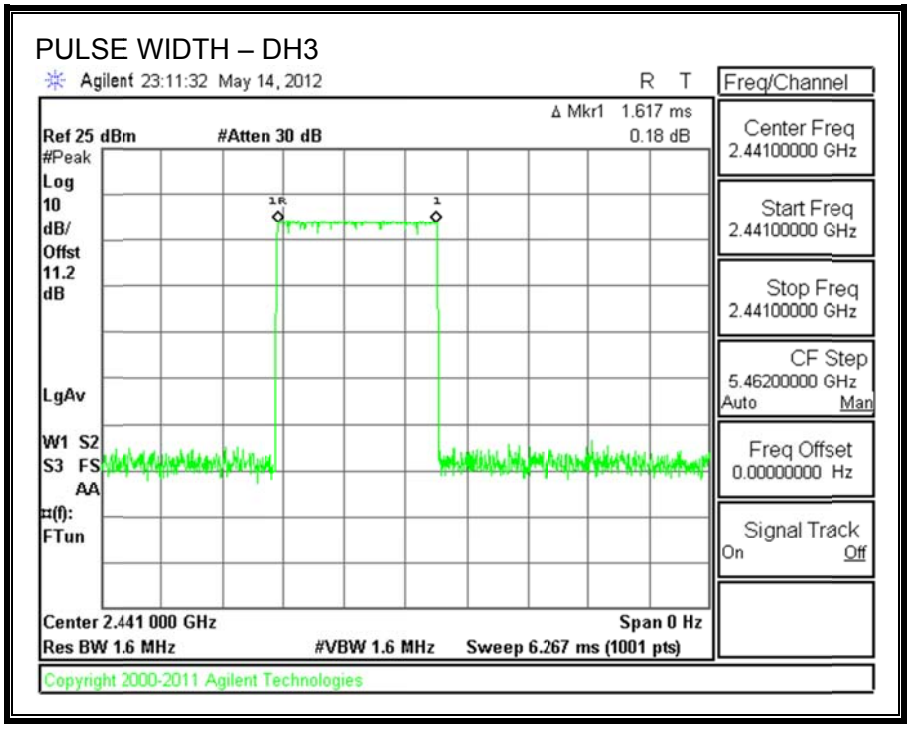
PULSE WIDTH - DH1



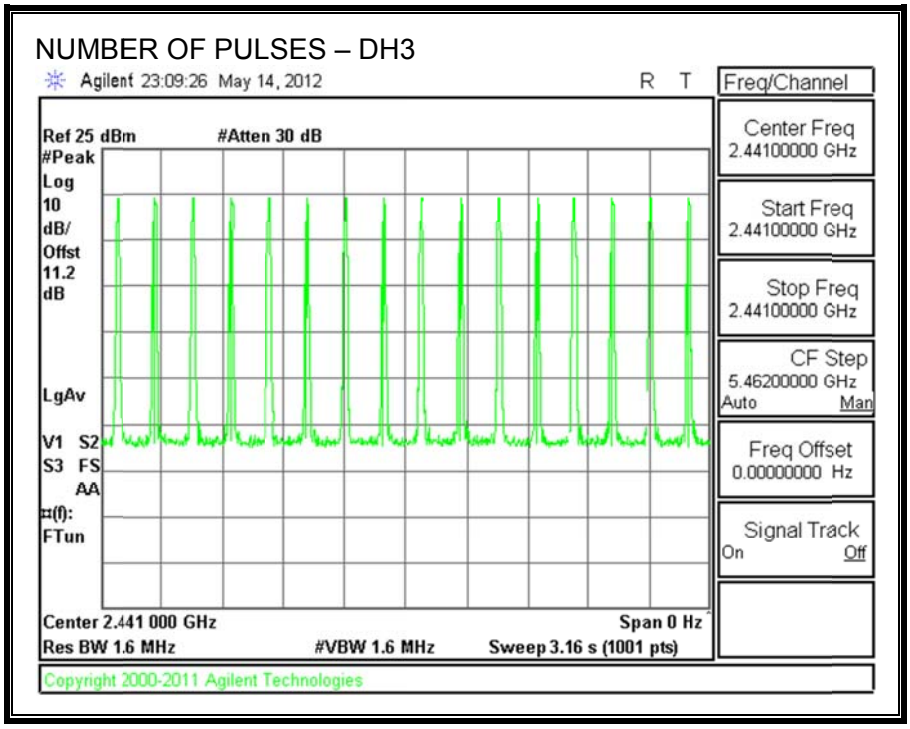
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



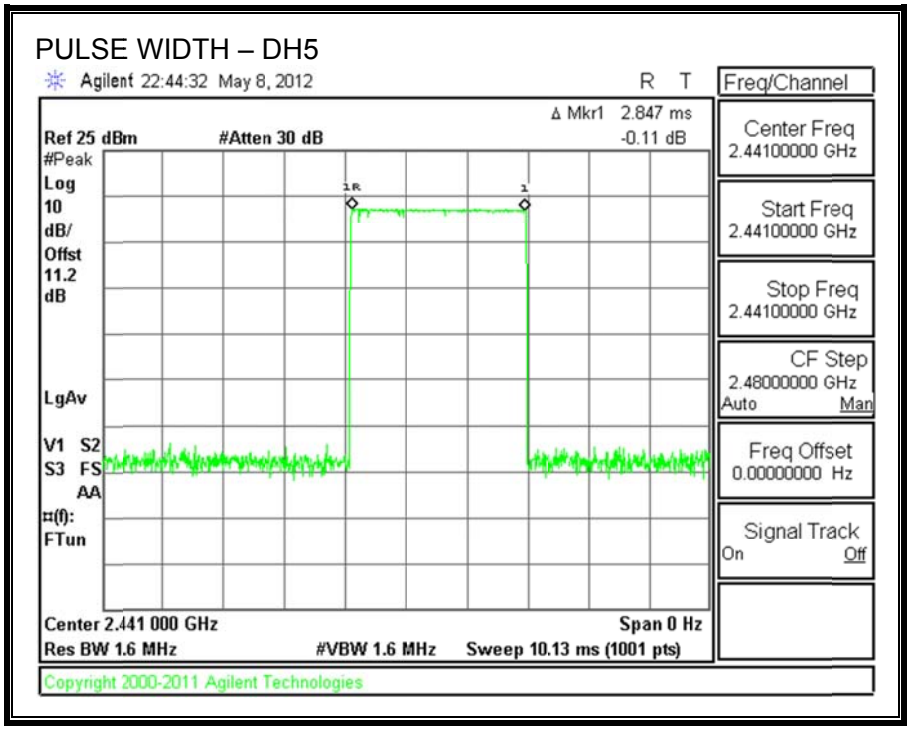
PULSE WIDTH – DH3



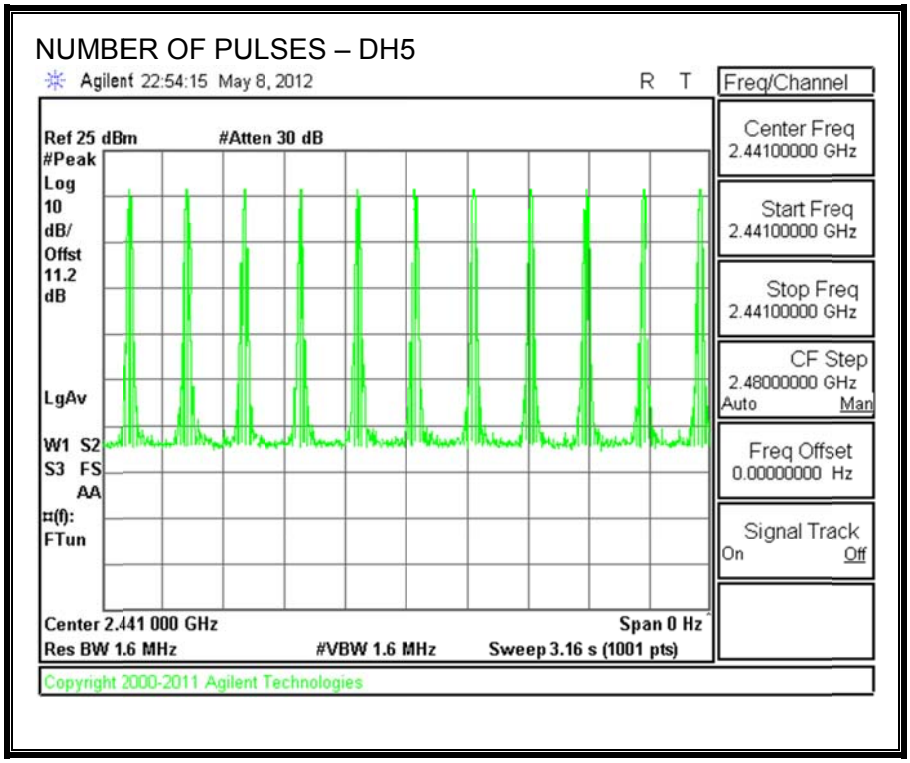
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5 gfsk



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



7.1.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 21 dBm.

TEST PROCEDURE

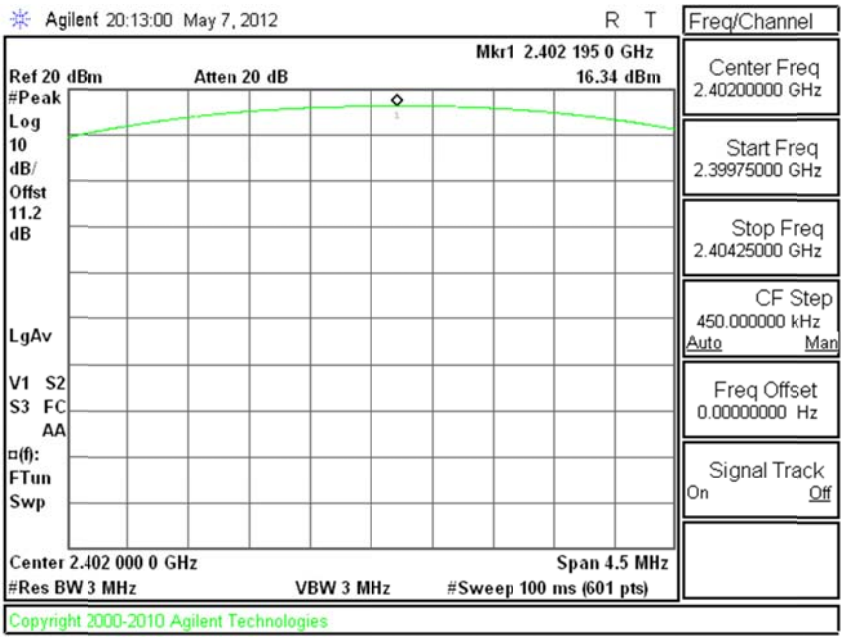
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

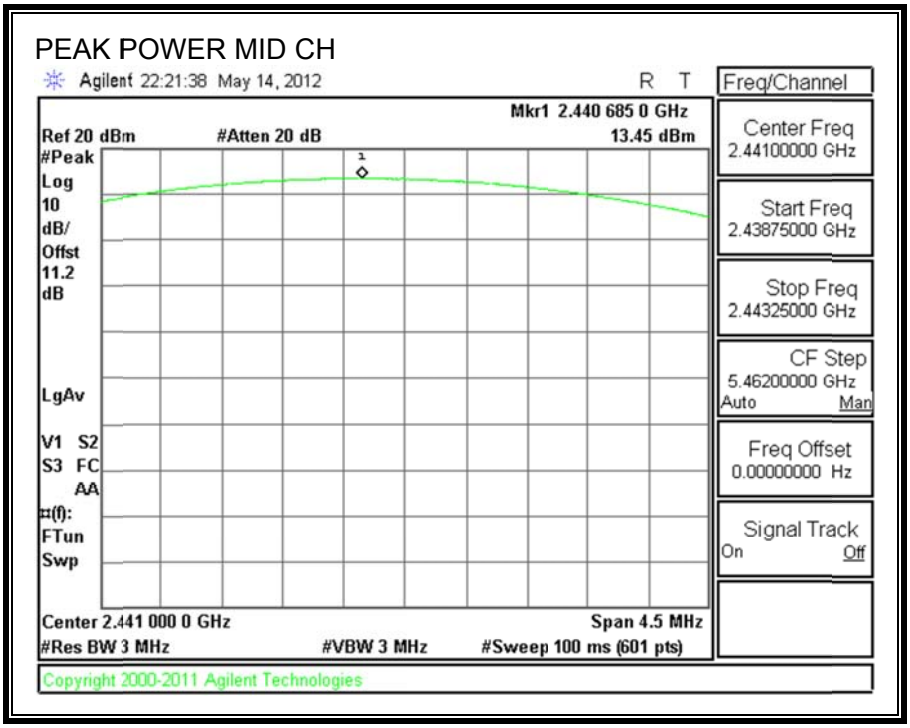
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	16.34	21	-4.66
Middle	2440	13.45	21	-7.55
High	2480	13.89	21	-7.11

OUTPUT POWER

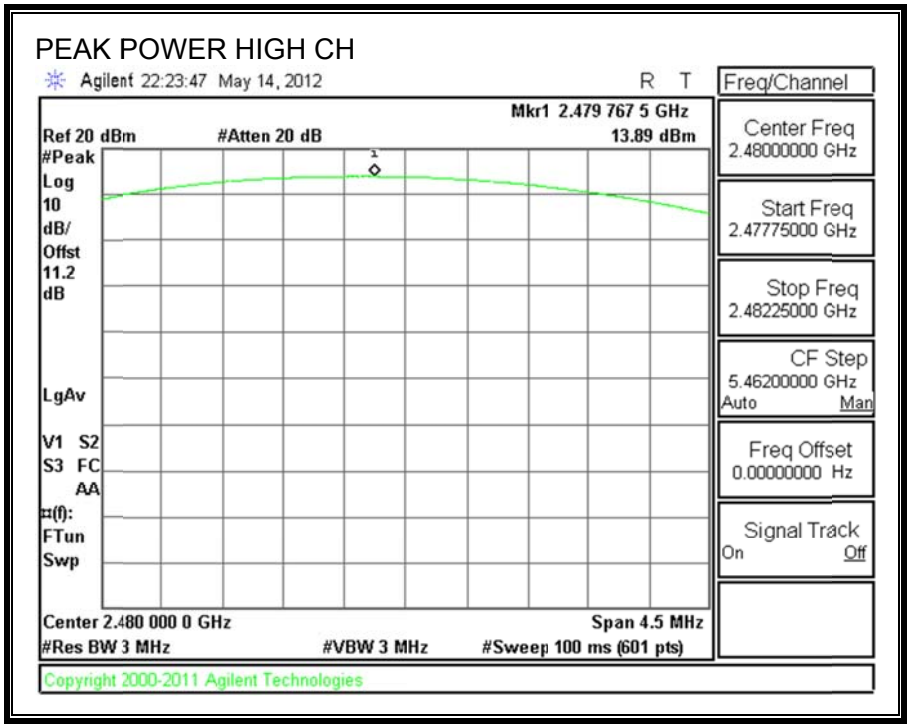
PEAK POWER LOW CH



PEAK POWER MID CH



PEAK POWER HIGH CH



7.1.6. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.2 dB (including 10.2 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	13.85
Middle	2441	12.10
High	2480	12.51

7.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

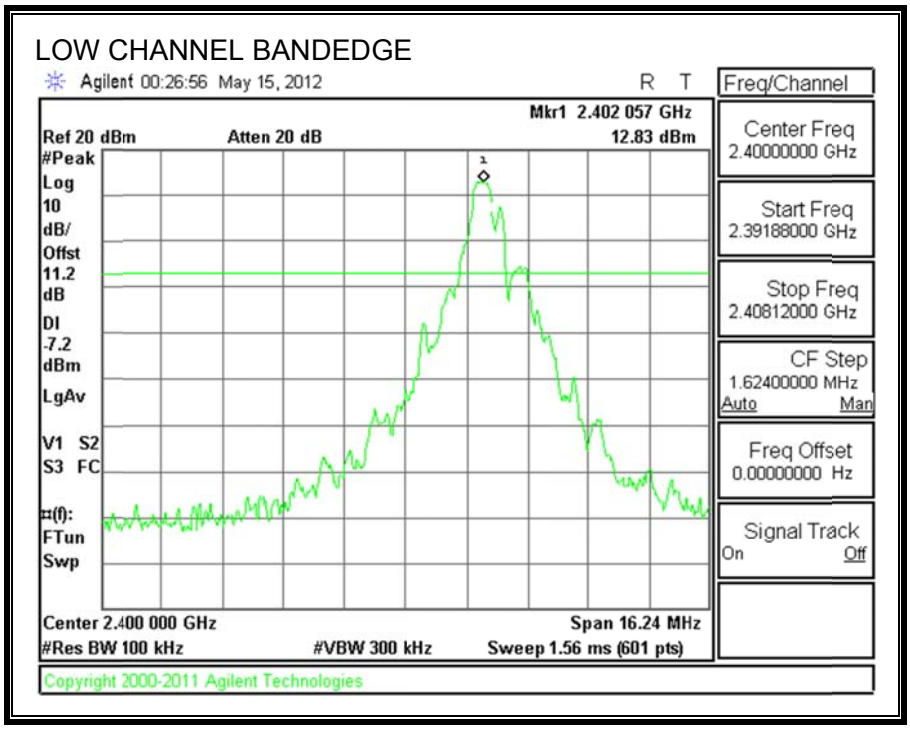
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

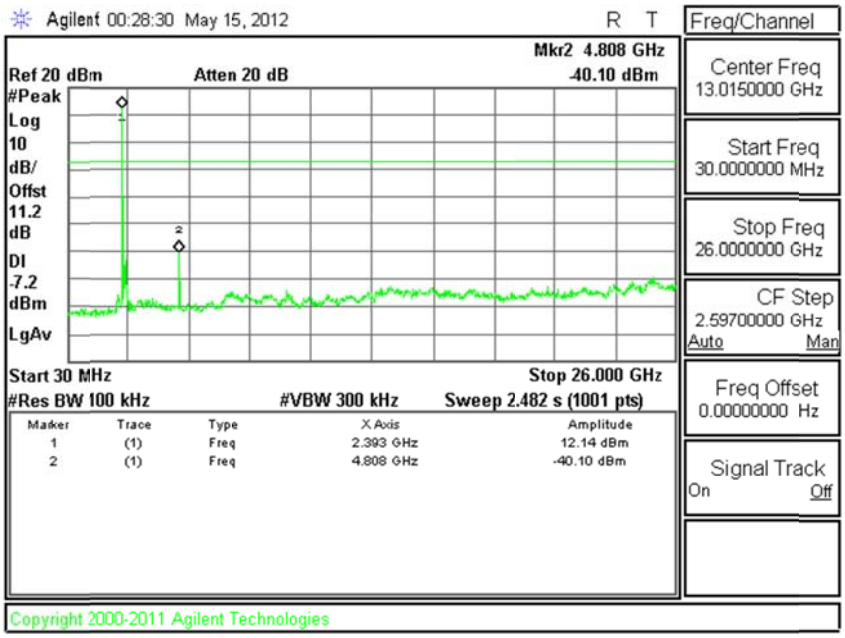
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

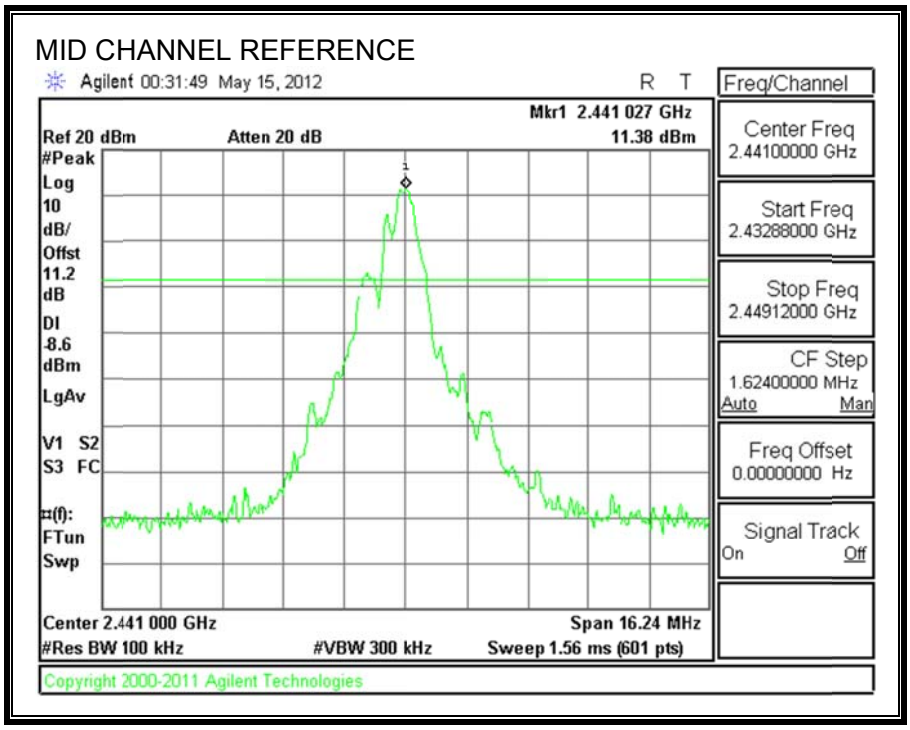
SPURIOUS EMISSIONS, LOW CHANNEL



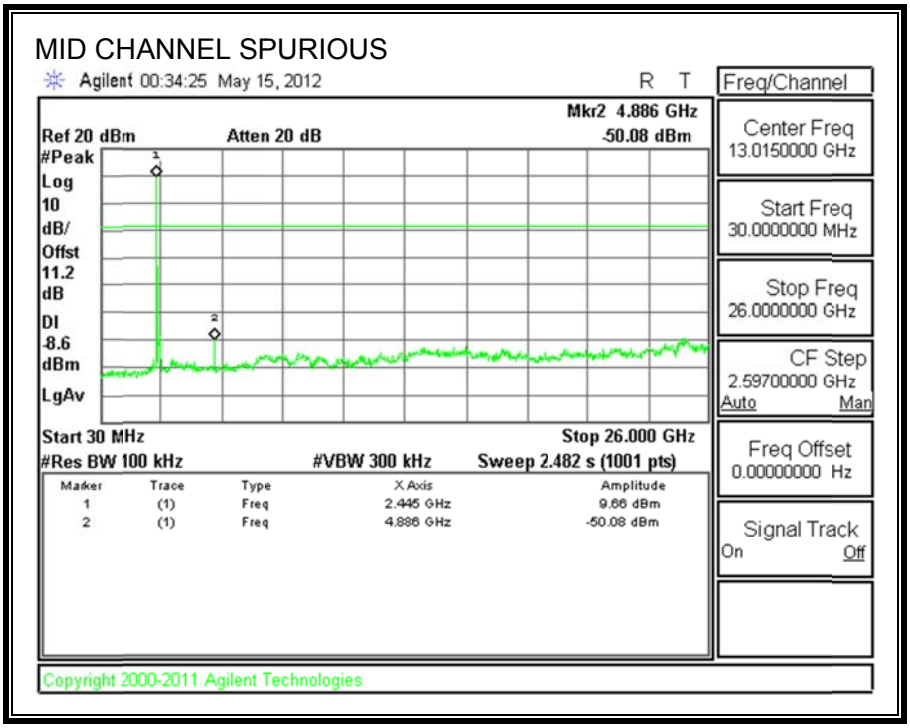
LOW CHANNEL SPURIOUS



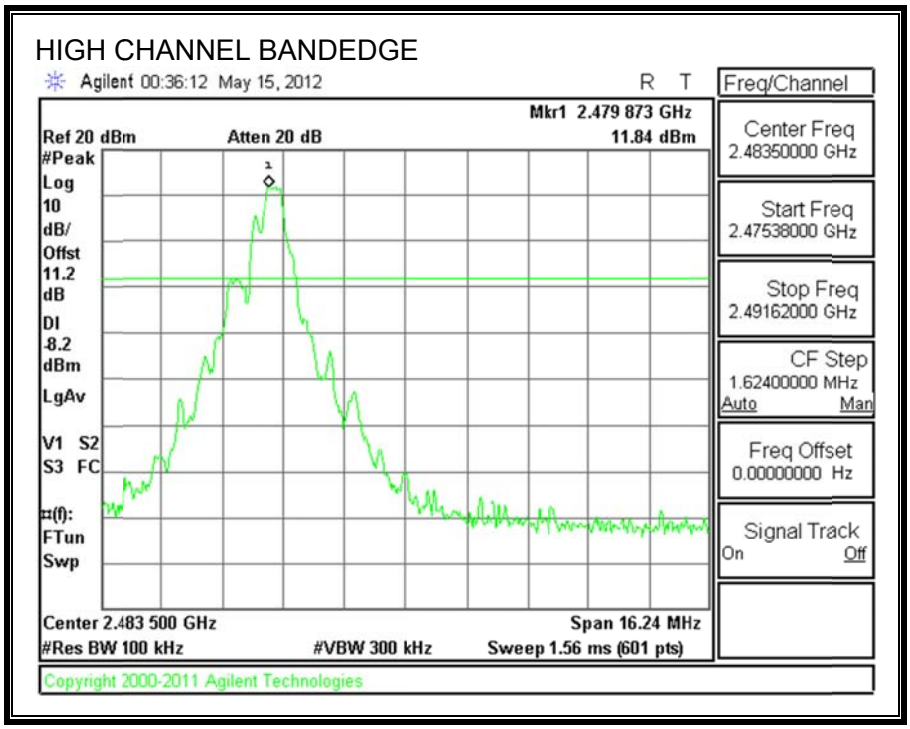
SPURIOUS EMISSIONS, MID CHANNEL



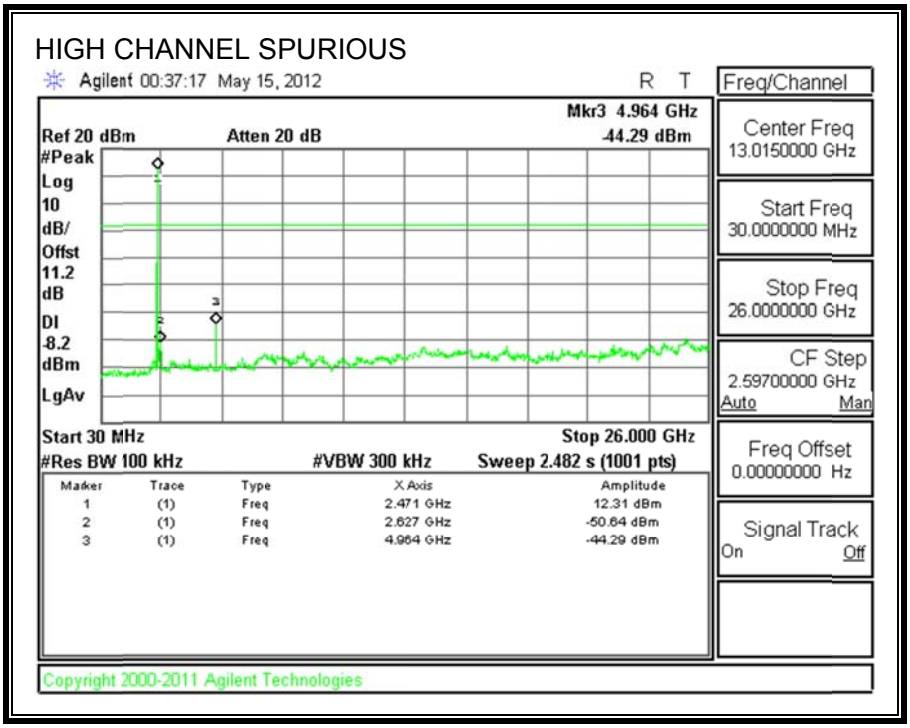
MID CHANNEL SPURIOUS



SPURIOUS EMISSIONS, HIGH CHANNEL

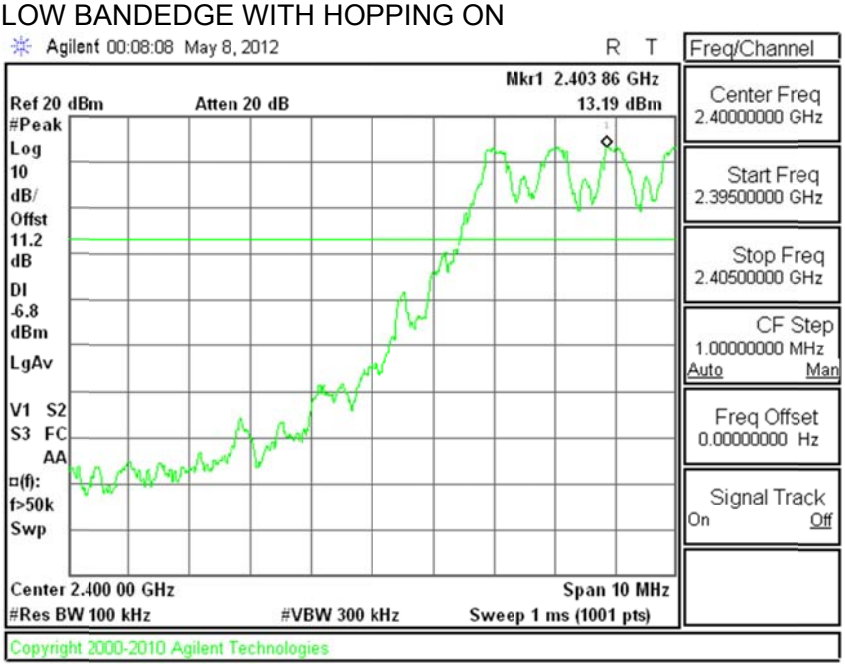


HIGH CHANNEL SPURIOUS

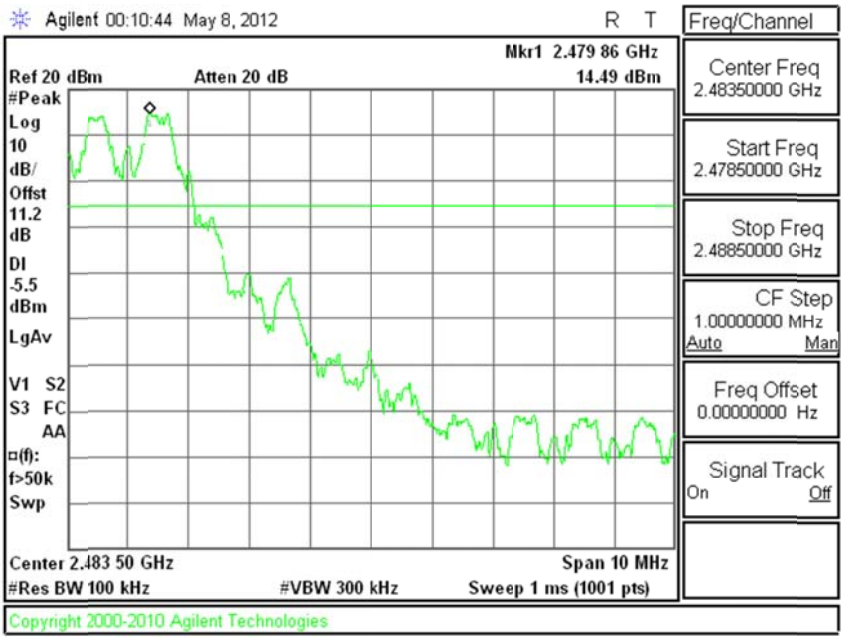


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



7.2. ENHANCED DATA RATE 8PSK MODULATION

7.2.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

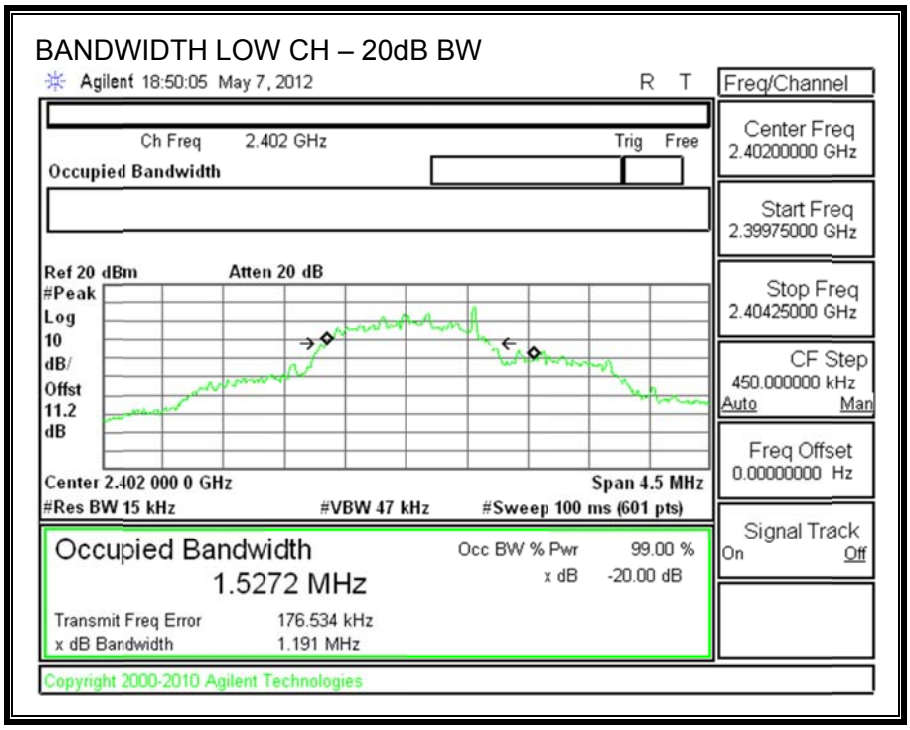
TEST PROCEDURE

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

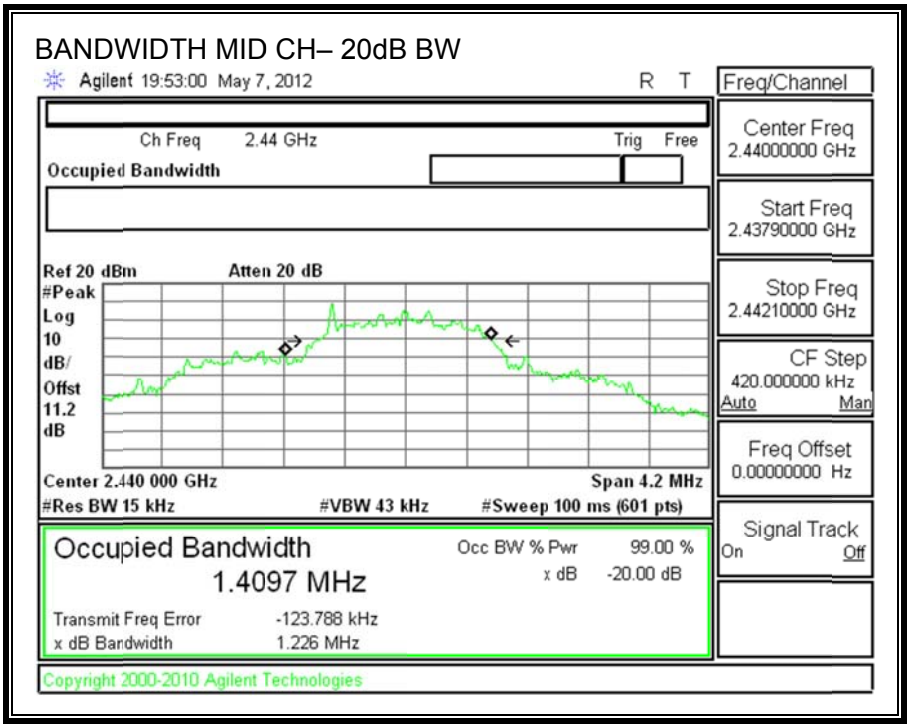
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1191	1501
Middle	2441	1226	1333
High	2480	1236	1225

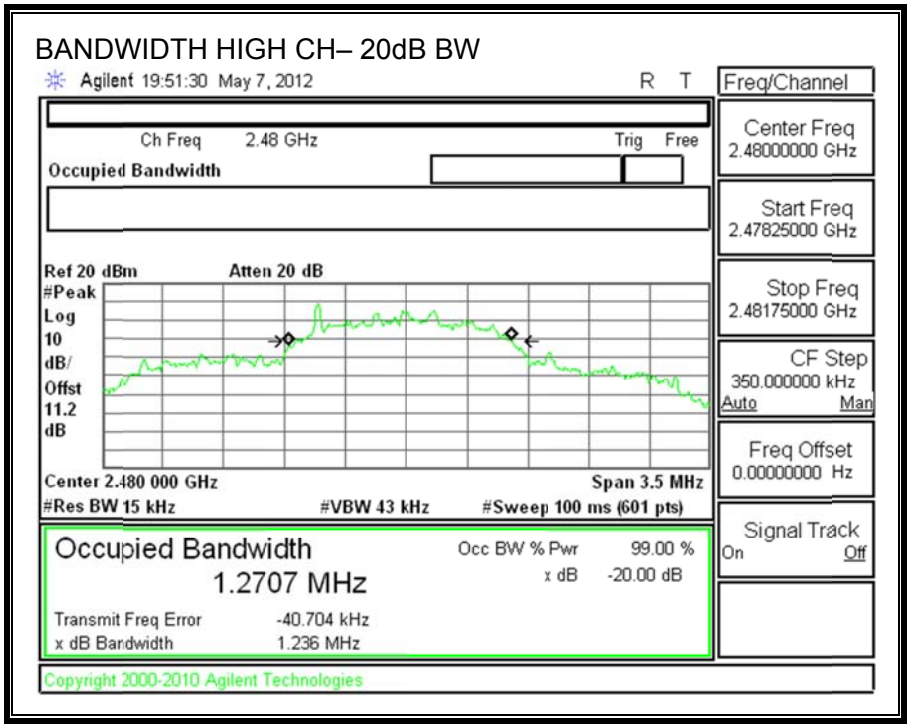
20 dB BANDWIDTH



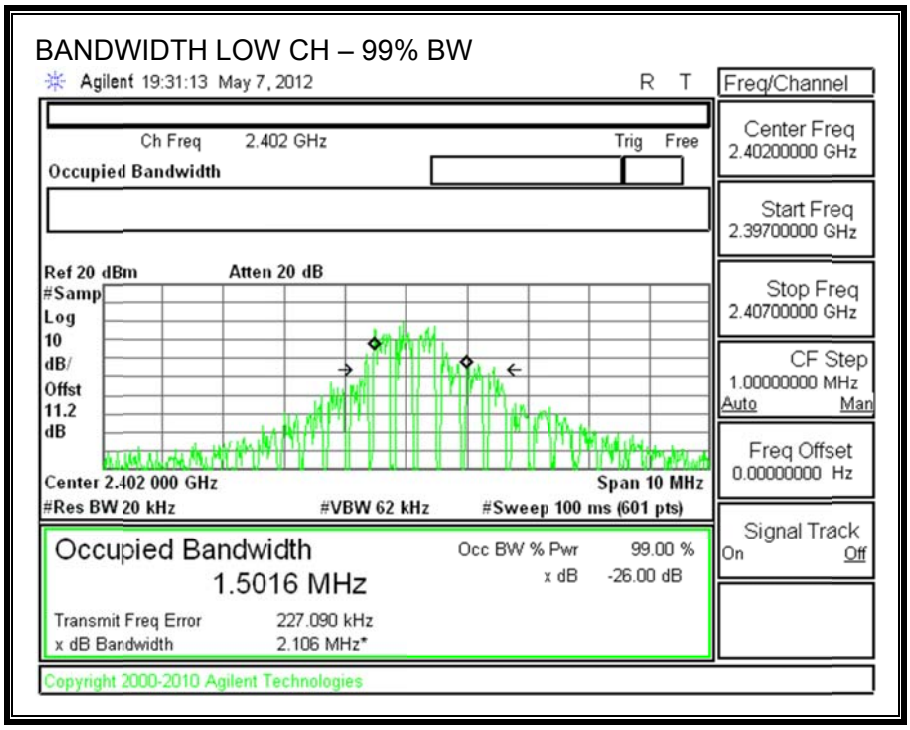
BANDWIDTH MID CH– 20dB BW



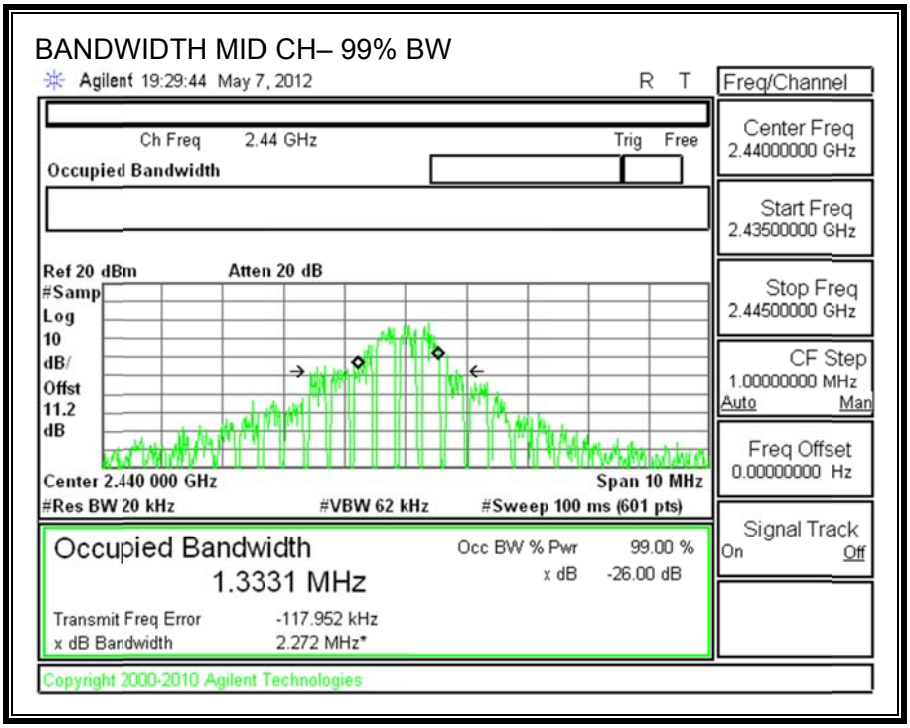
BANDWIDTH HIGH CH– 20dB BW



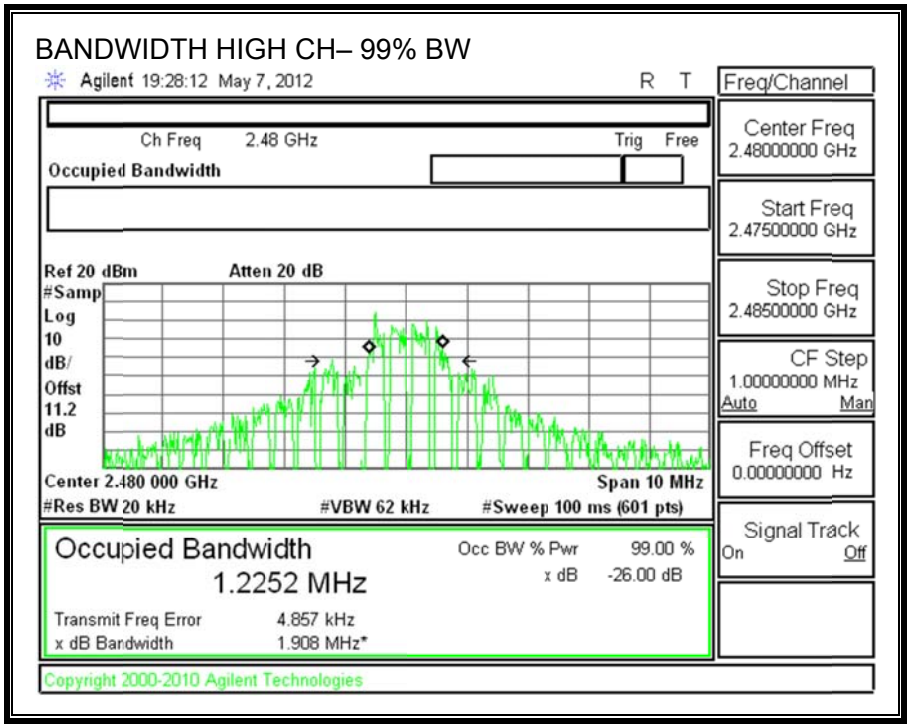
99% BANDWIDTH



BANDWIDTH MID CH– 99% BW



BANDWIDTH HIGH CH– 99% BW



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 hoping channel, whichever is greater.

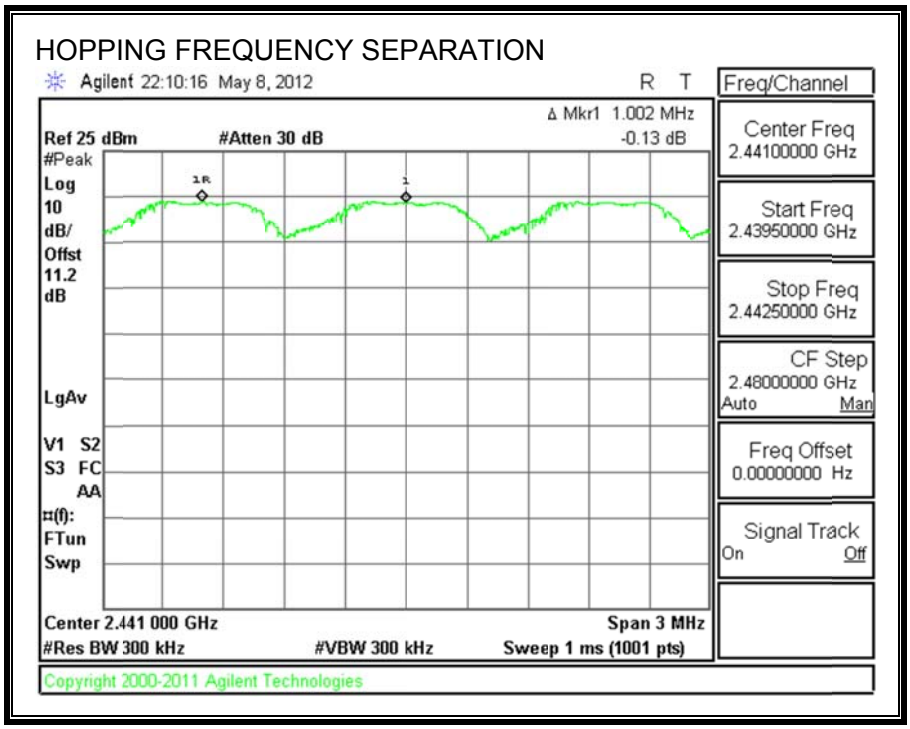
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

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

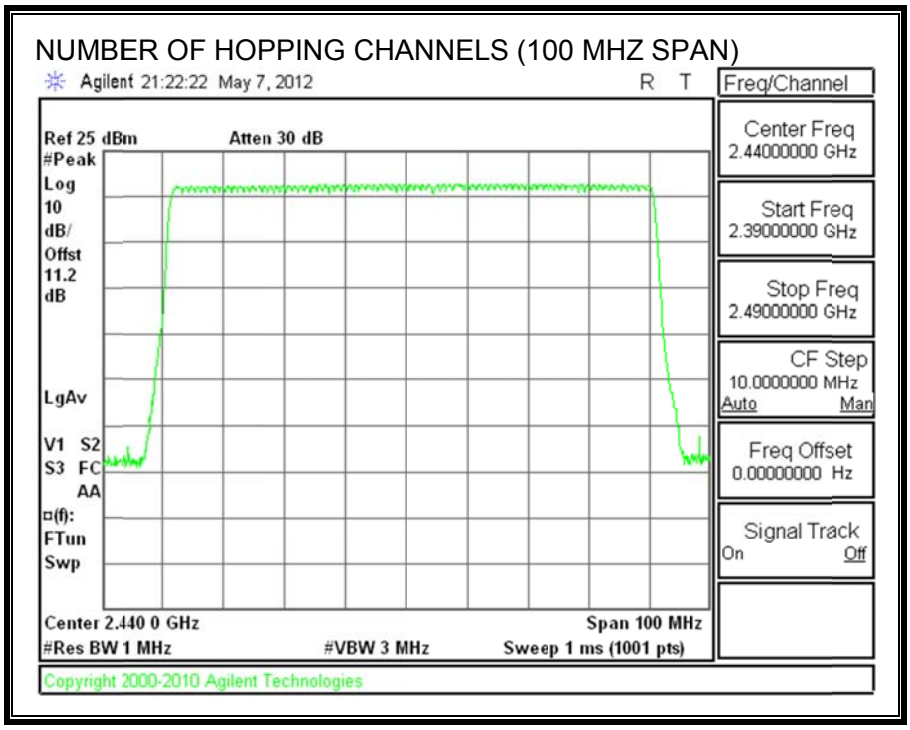
TEST PROCEDURE

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.

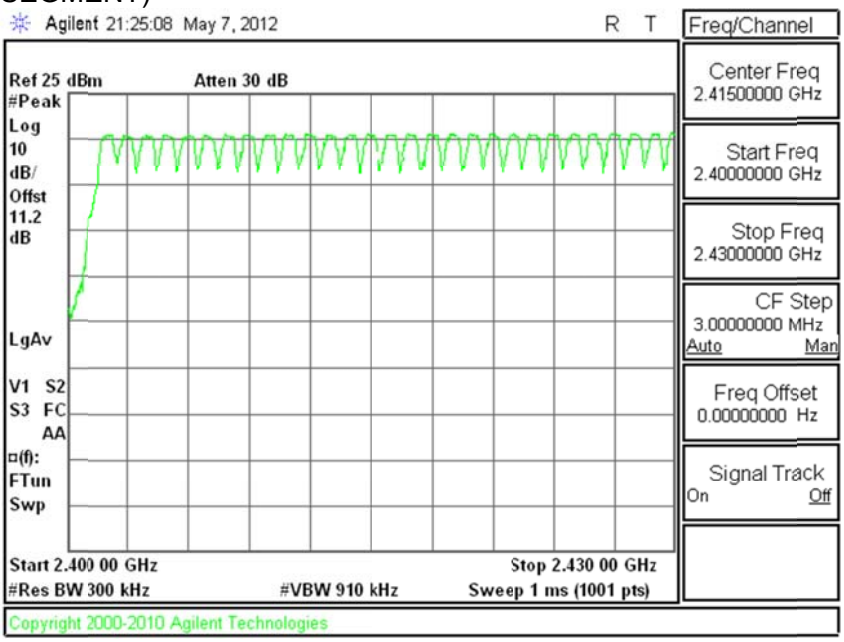
RESULTS

79 Channels observed.

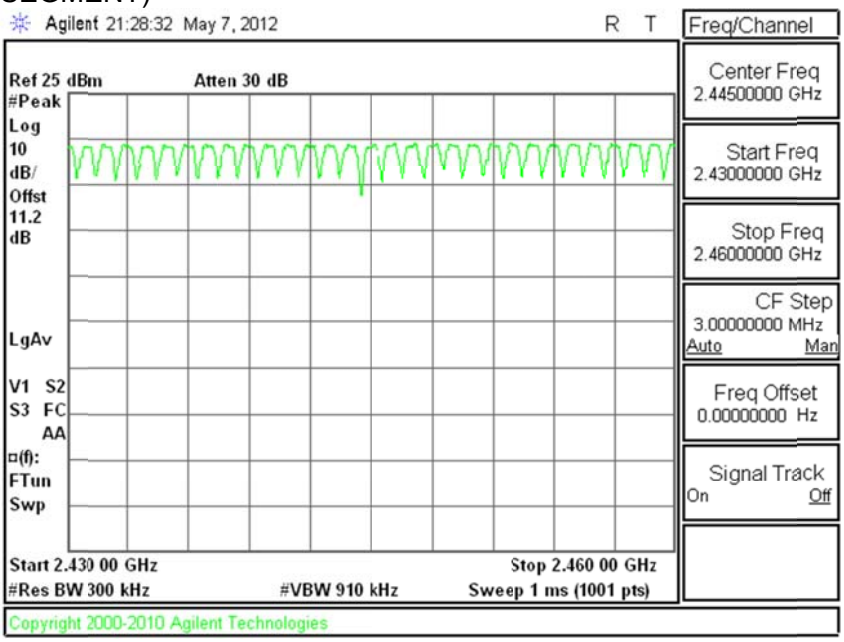
NUMBER OF HOPPING CHANNELS



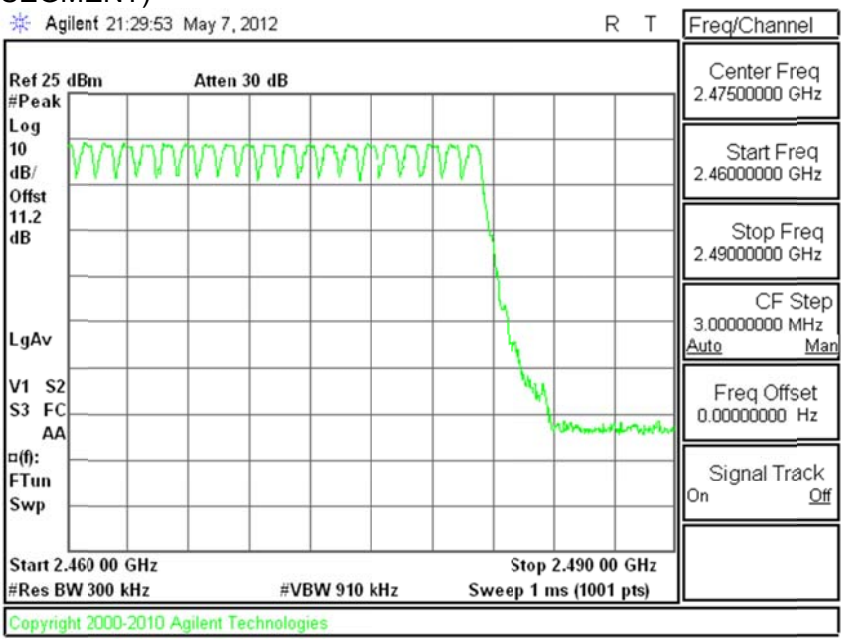
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



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 * (# of pulses in 3.16 s) * pulse width.

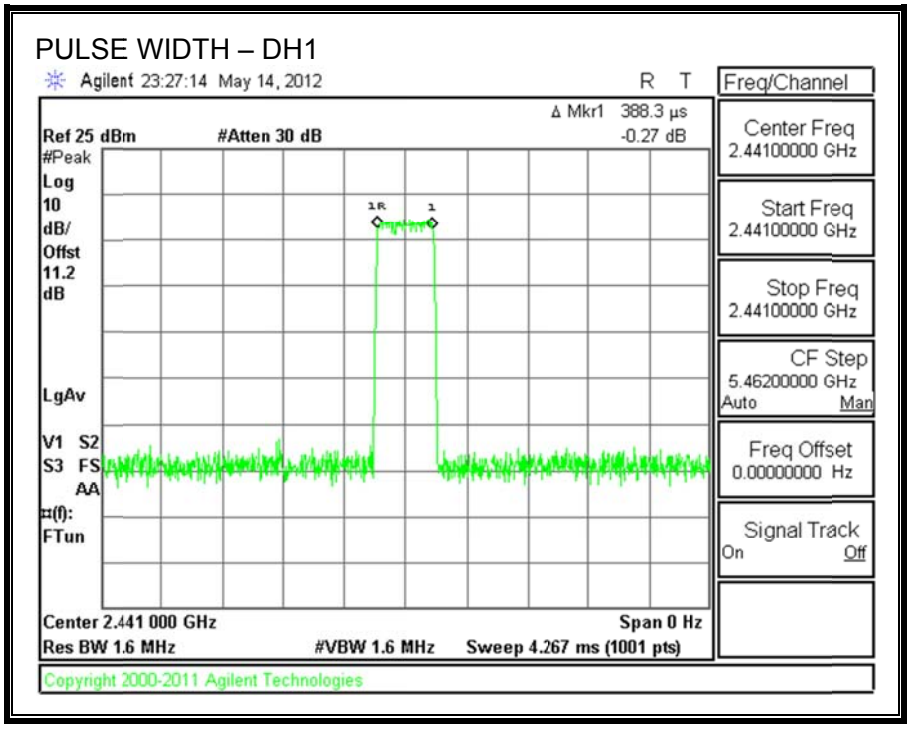
RESULTS

Time Of Occupancy = 10 * xx pulses * yy msec = zz msec

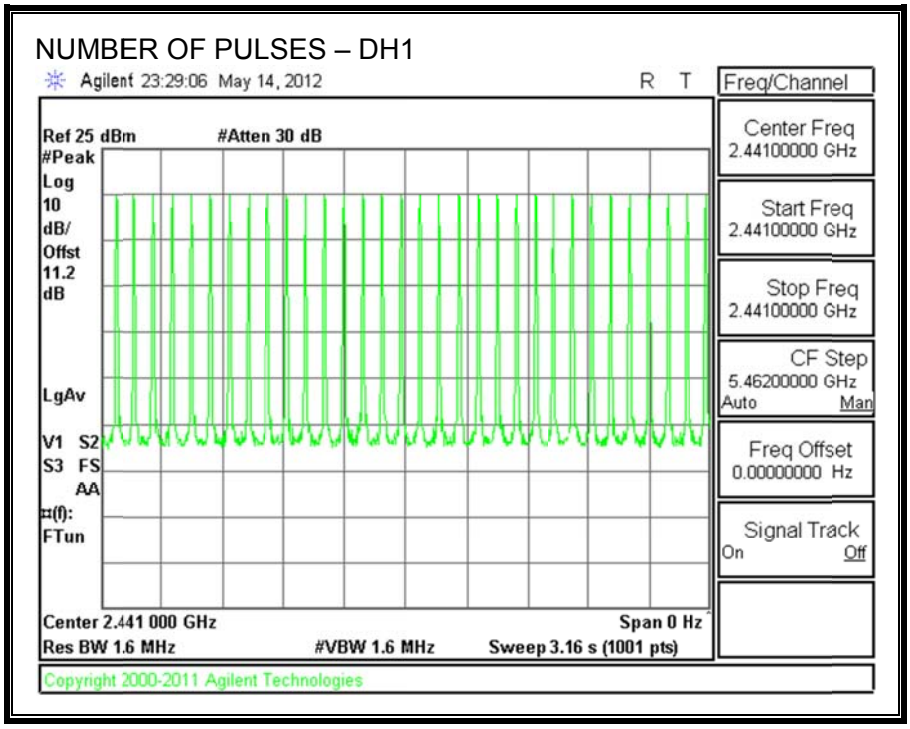
8PSK (EDR) Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.3883	32	0.124	0.4	-0.276
DH3	1.639	16	0.262	0.4	-0.138
DH5	2.86	11	0.315	0.4	-0.085

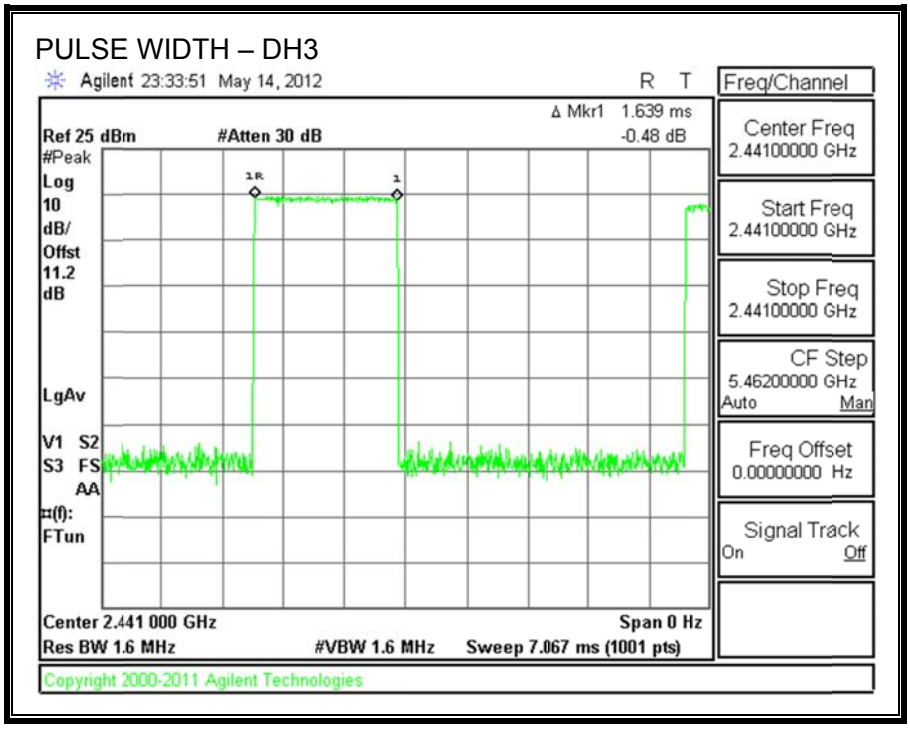
PULSE WIDTH - DH1



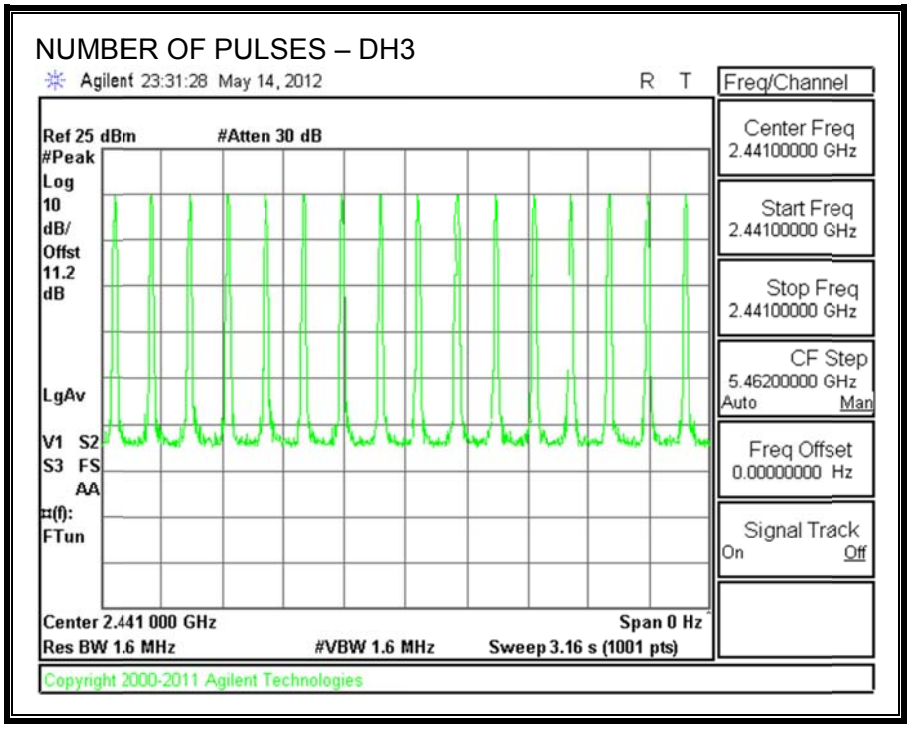
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



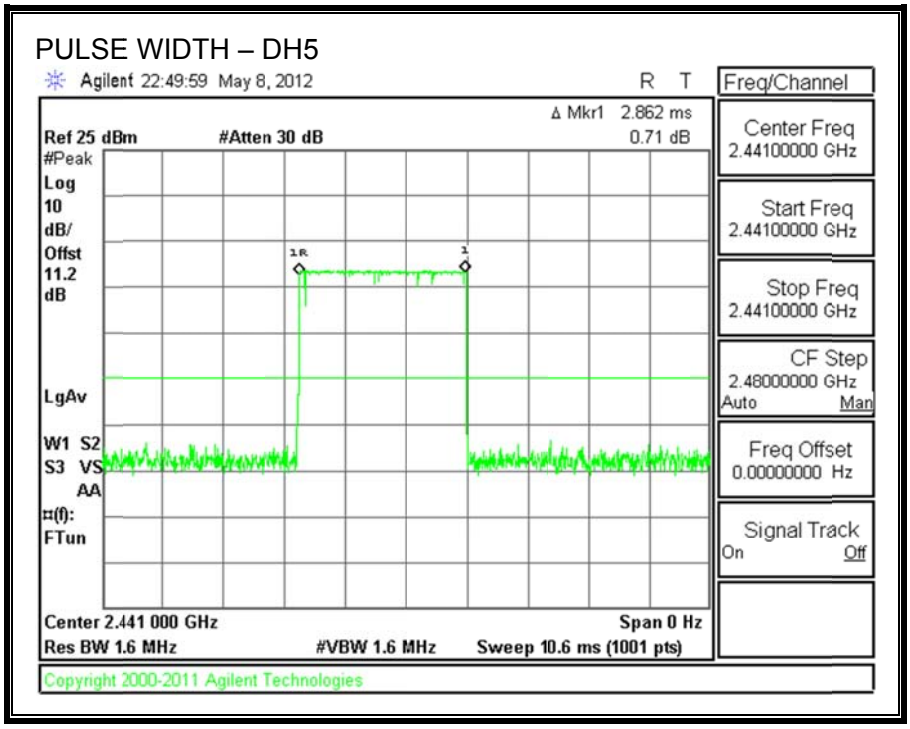
PULSE WIDTH – DH3



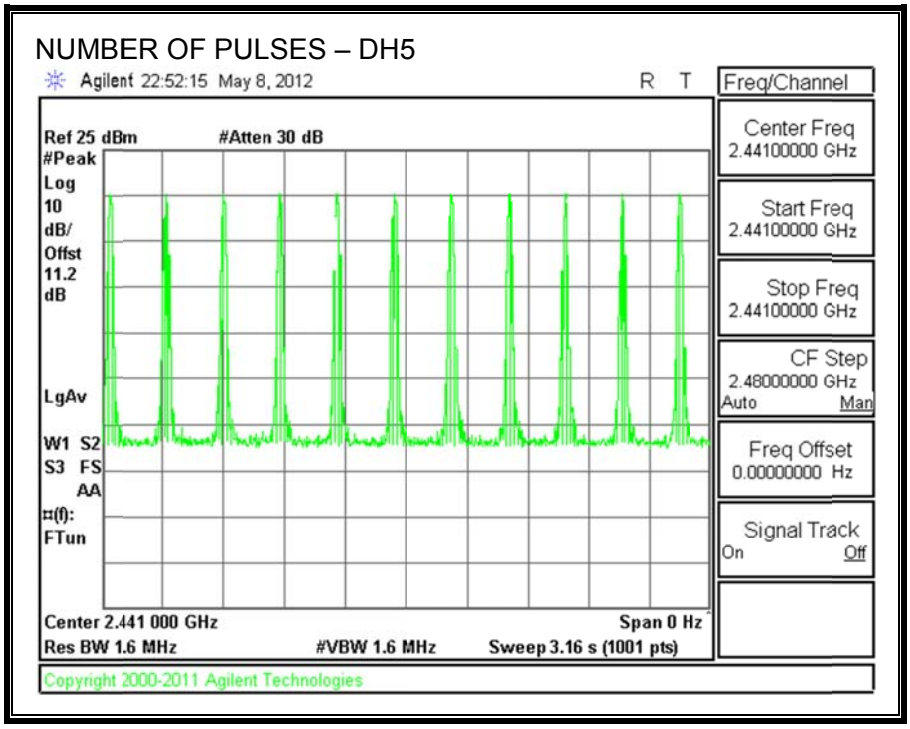
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



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 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 21 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.

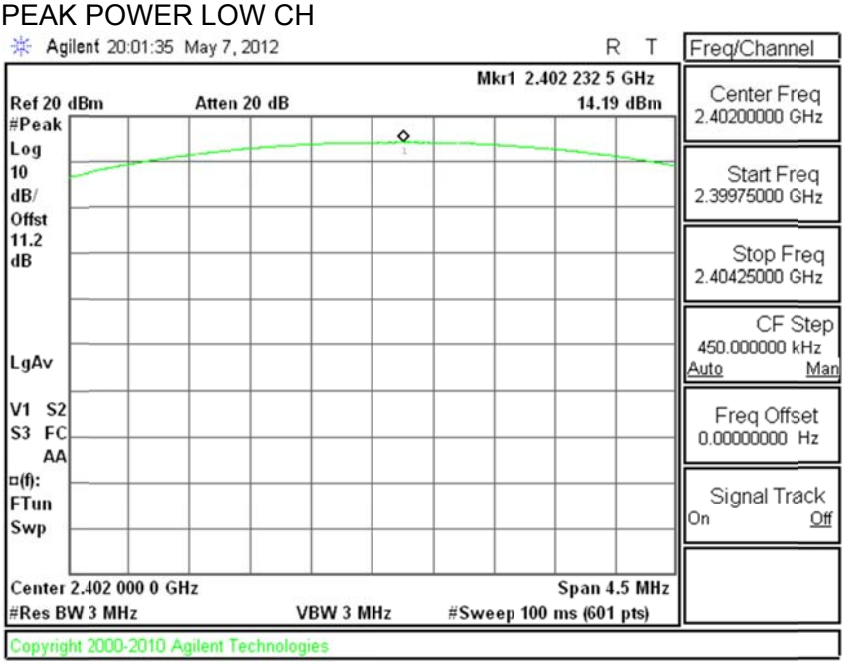
RESULTS

8psk

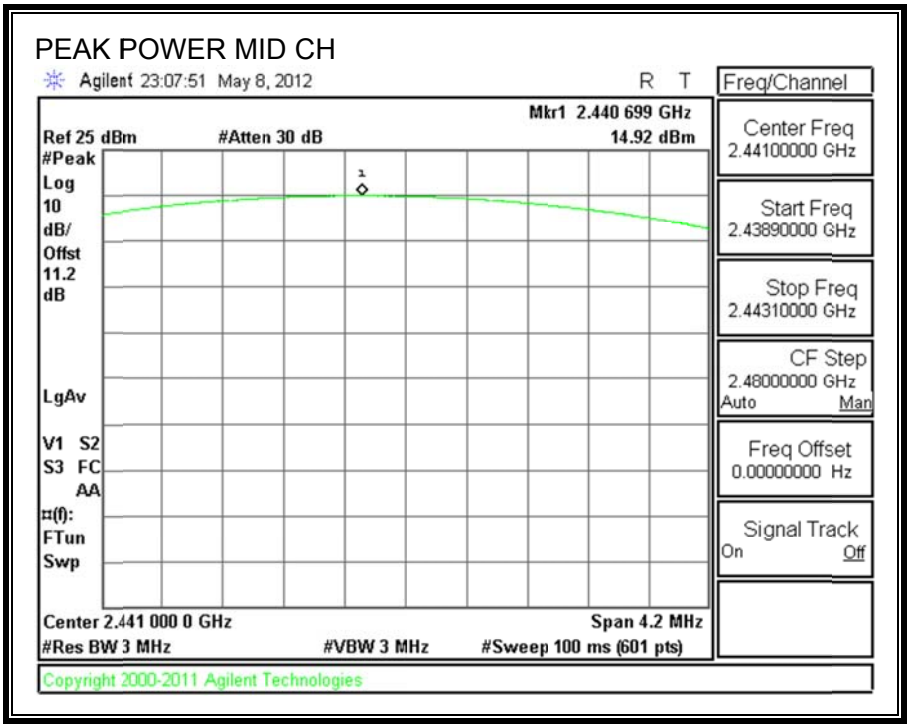
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.19	21	-6.81
Middle	2441	14.92	21	-6.08
High	2480	14.97	21	-6.03

OUTPUT POWER

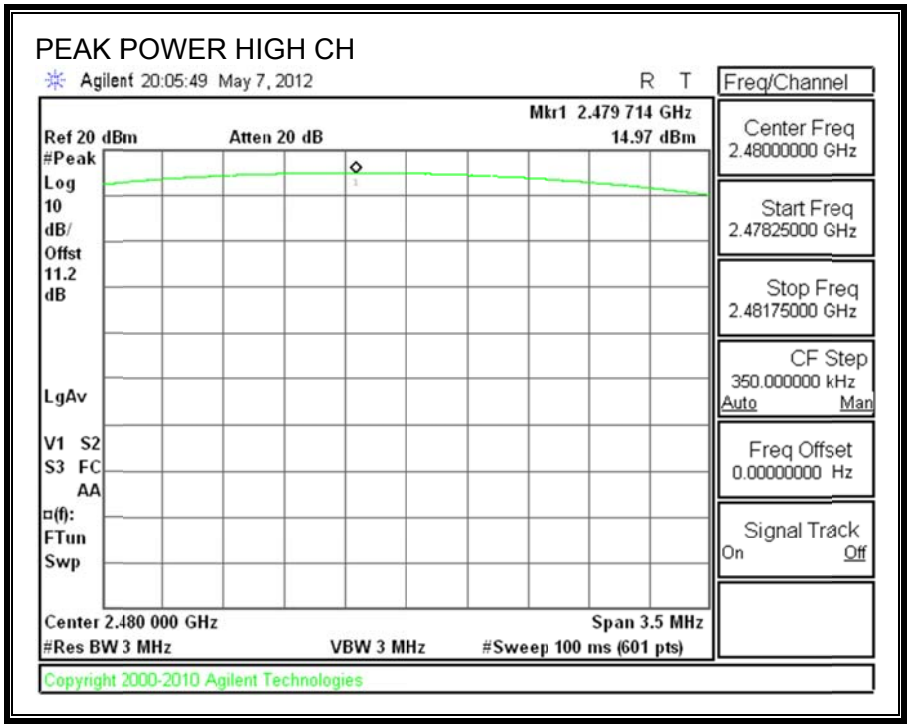
PEAK POWER LOW CH



PEAK POWER MID CH



PEAK POWER HIGH CH



7.2.6. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.2 dB (including 10.2 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	10.02
Middle	2441	10.77
High	2480	11.10

7.2.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

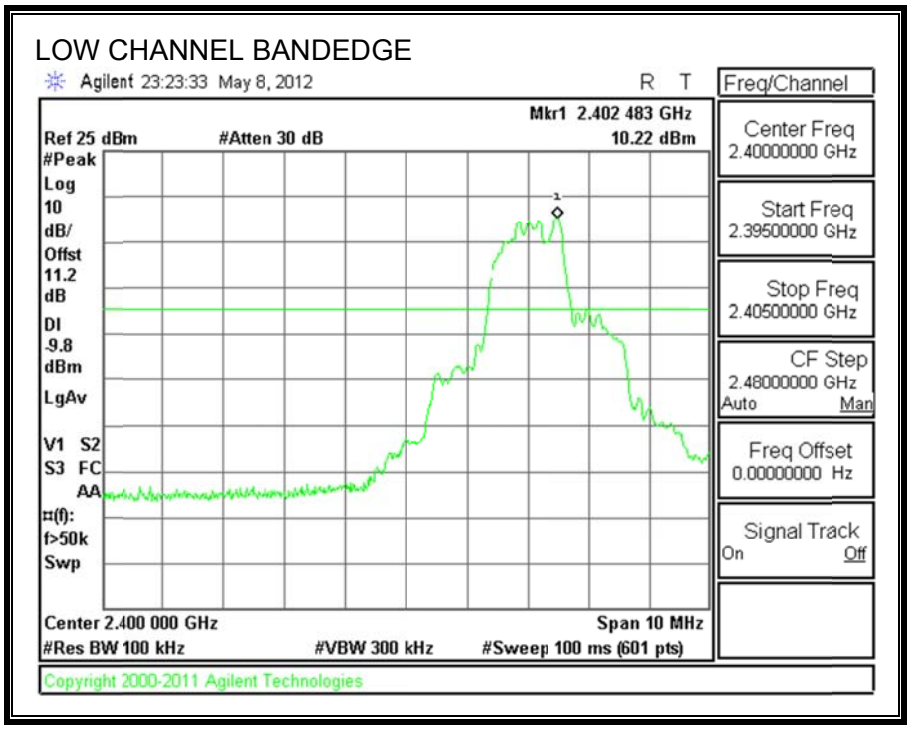
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

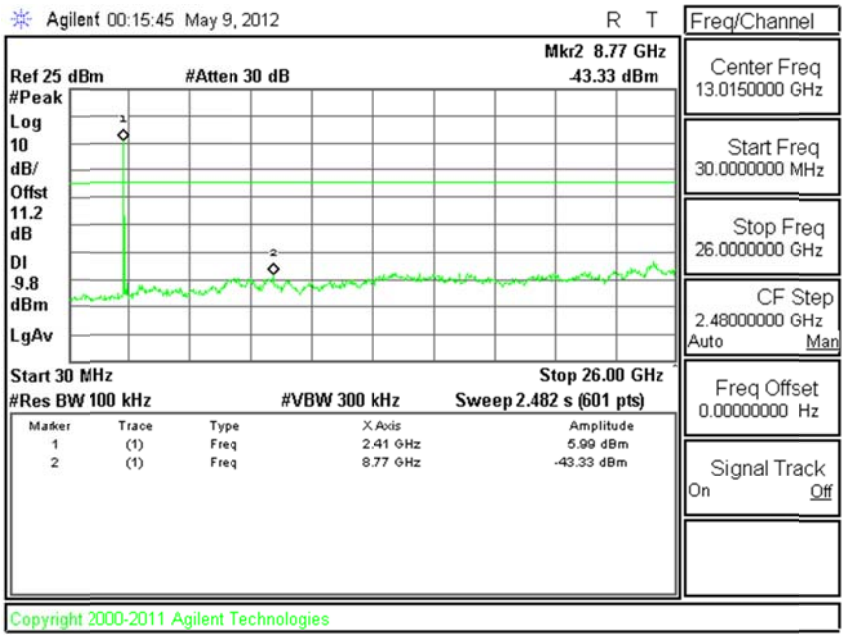
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

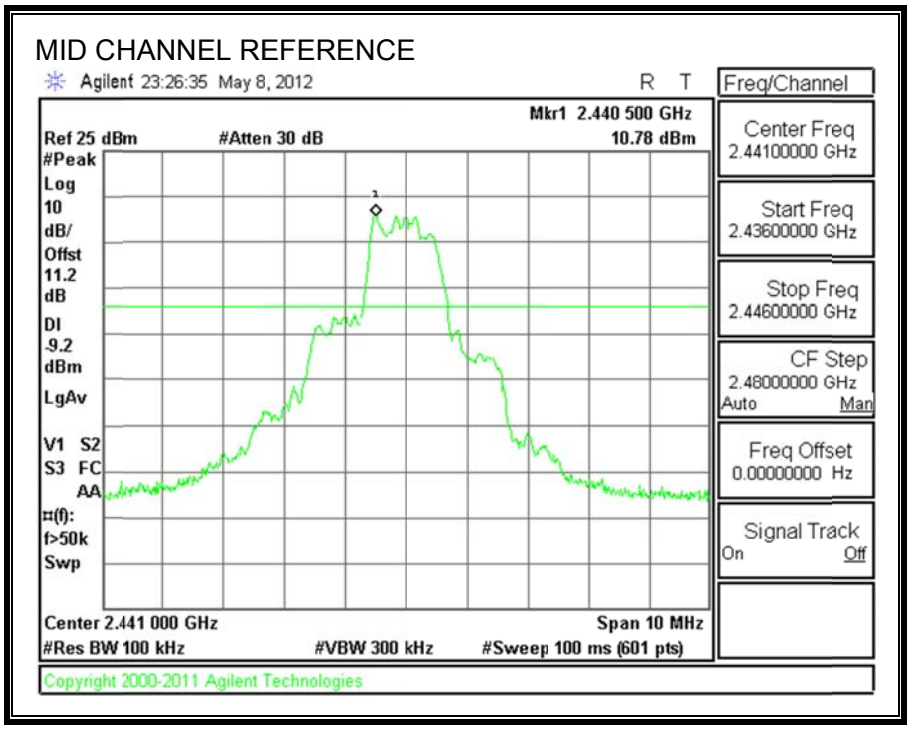
SPURIOUS EMISSIONS, LOW CHANNEL



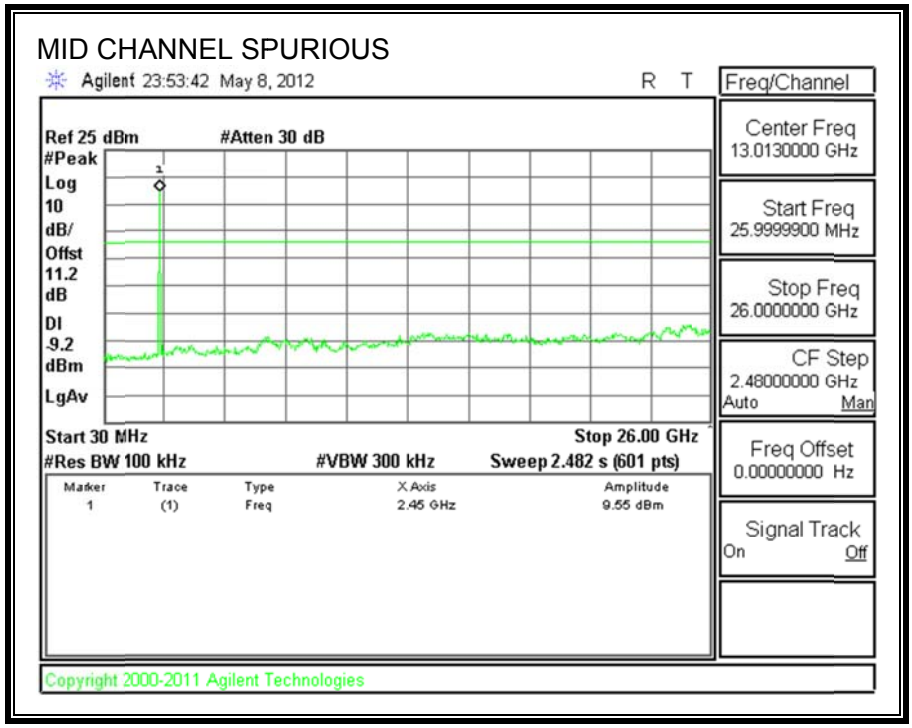
LOW CHANNEL SPURIOUS



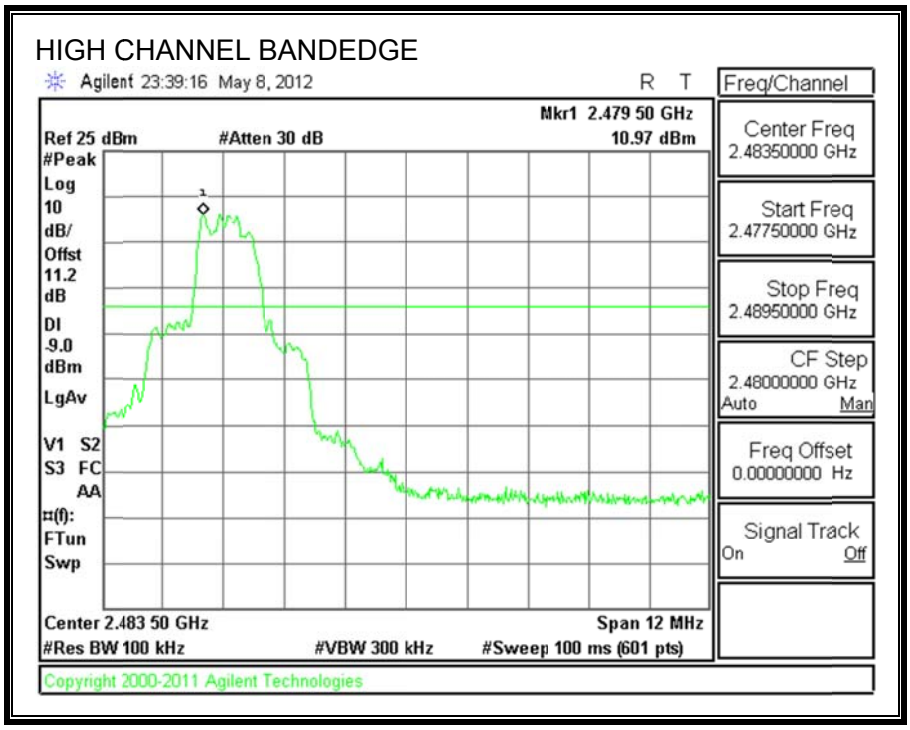
SPURIOUS EMISSIONS, MID CHANNEL



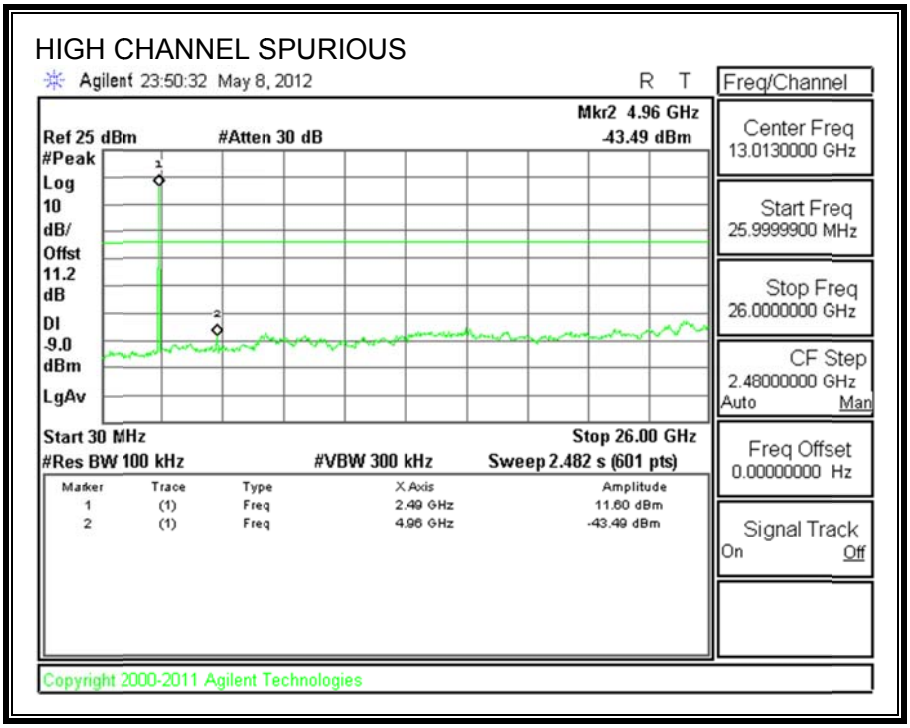
MID CHANNEL SPURIOUS



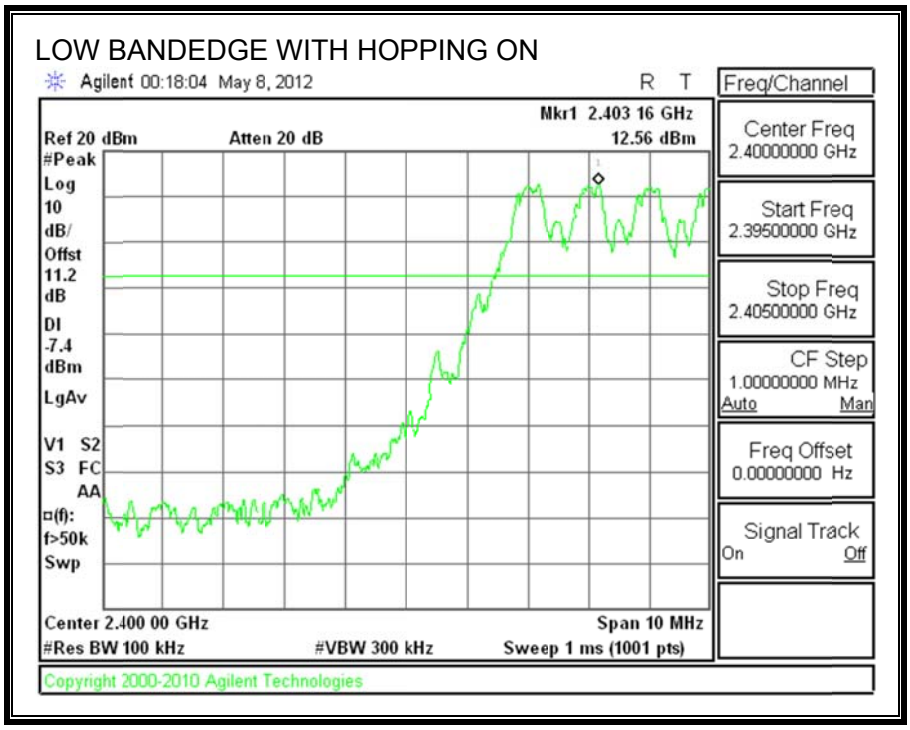
SPURIOUS EMISSIONS, HIGH CHANNEL



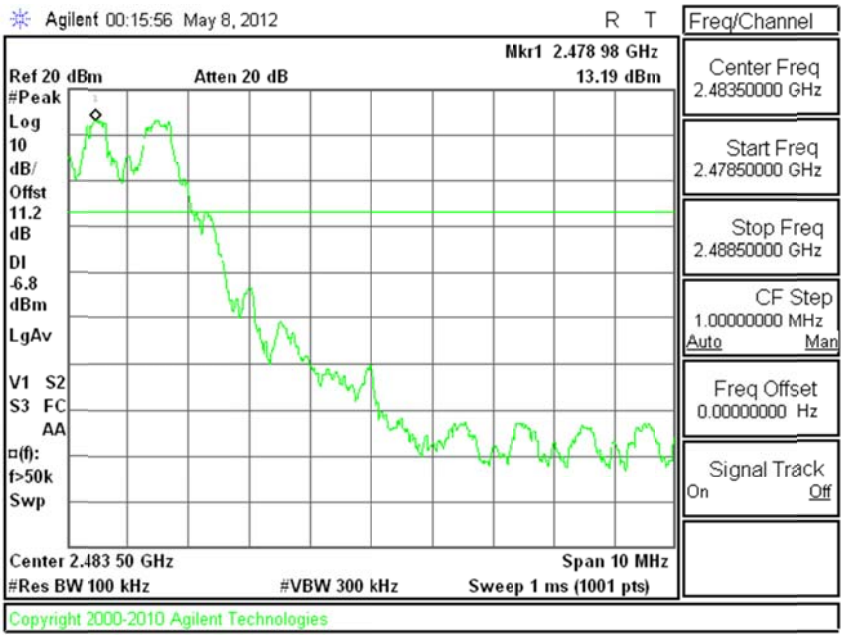
HIGH CHANNEL SPURIOUS



SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



HIGH BANDEDGE 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)

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.

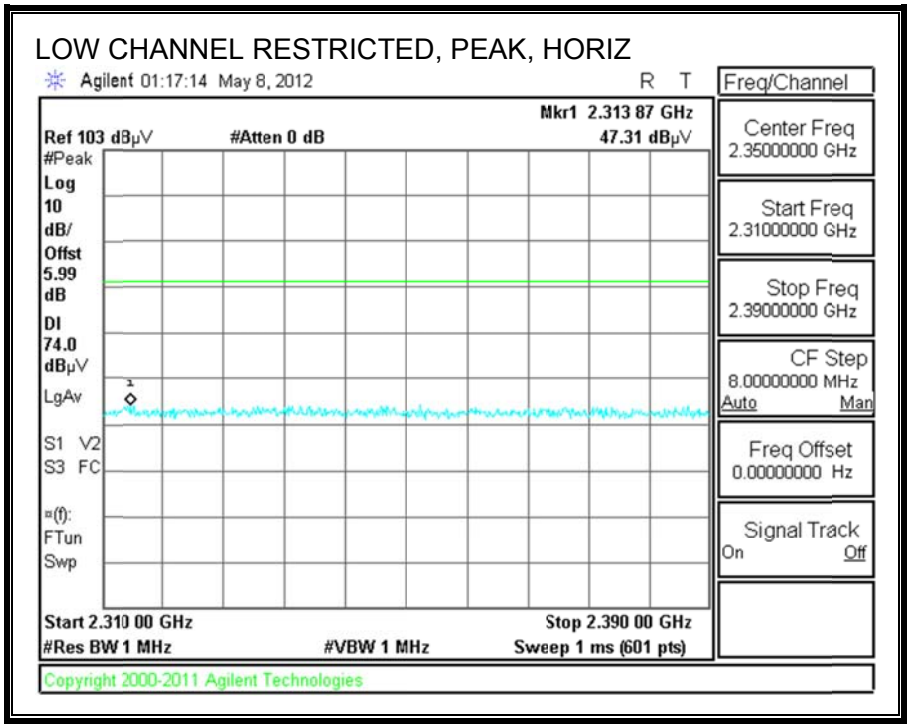
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

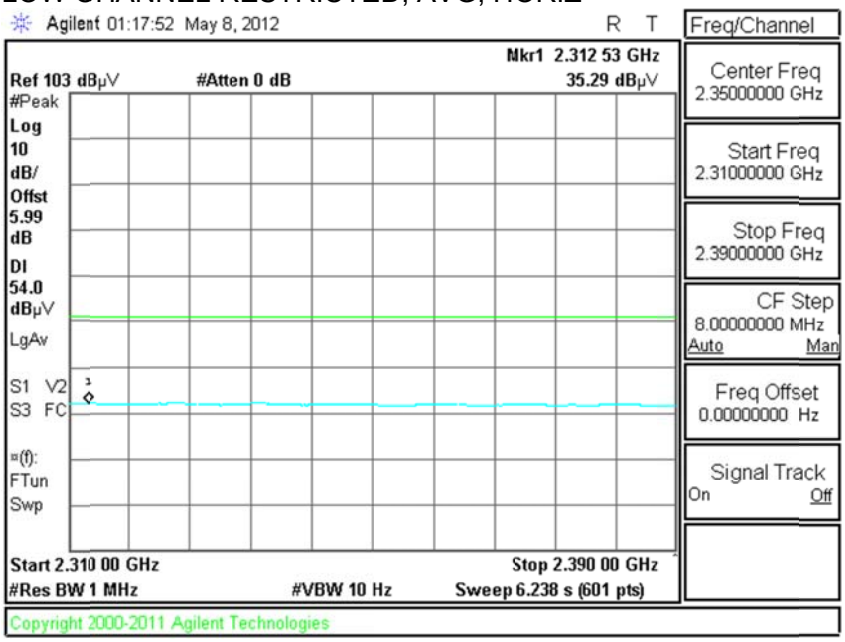
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. BASIC DATA RATE GFSK MODULATION

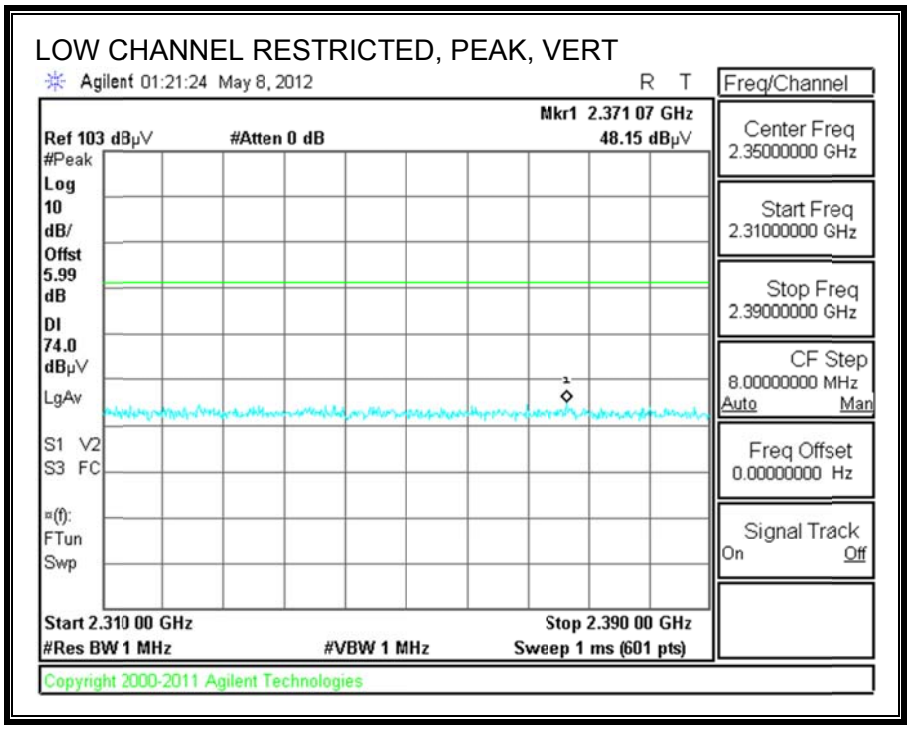
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



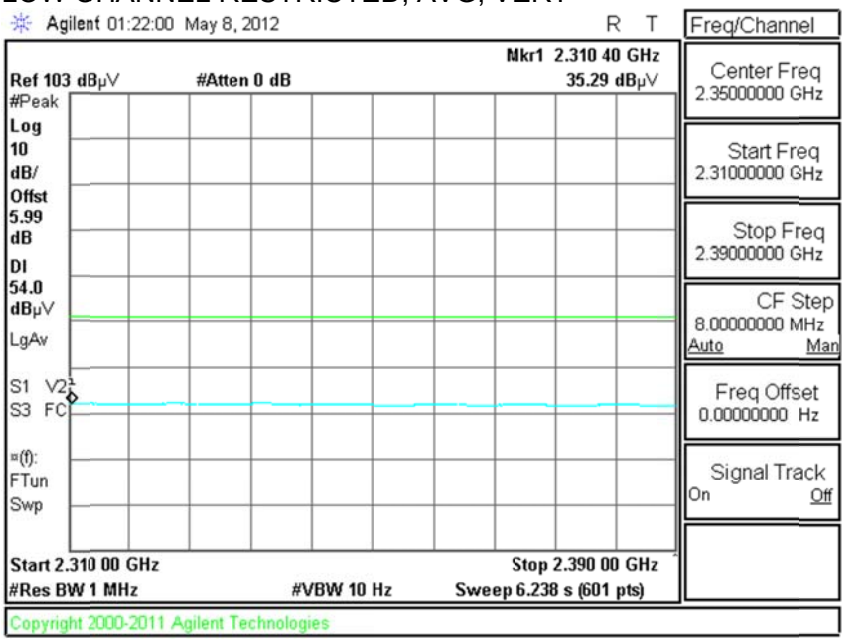
LOW CHANNEL RESTRICTED, AVG, HORIZ



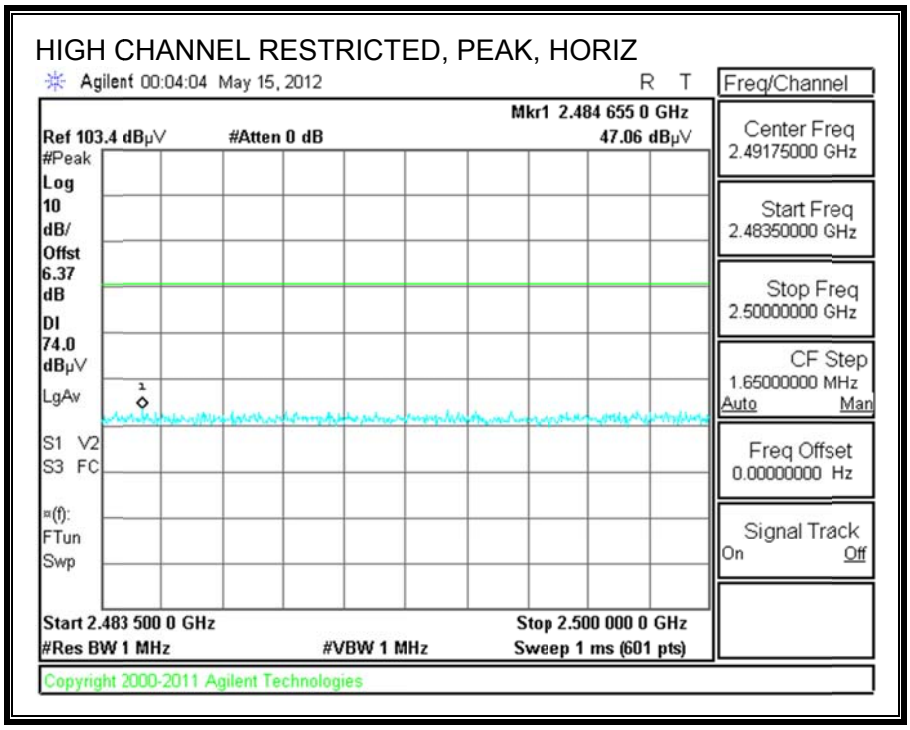
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



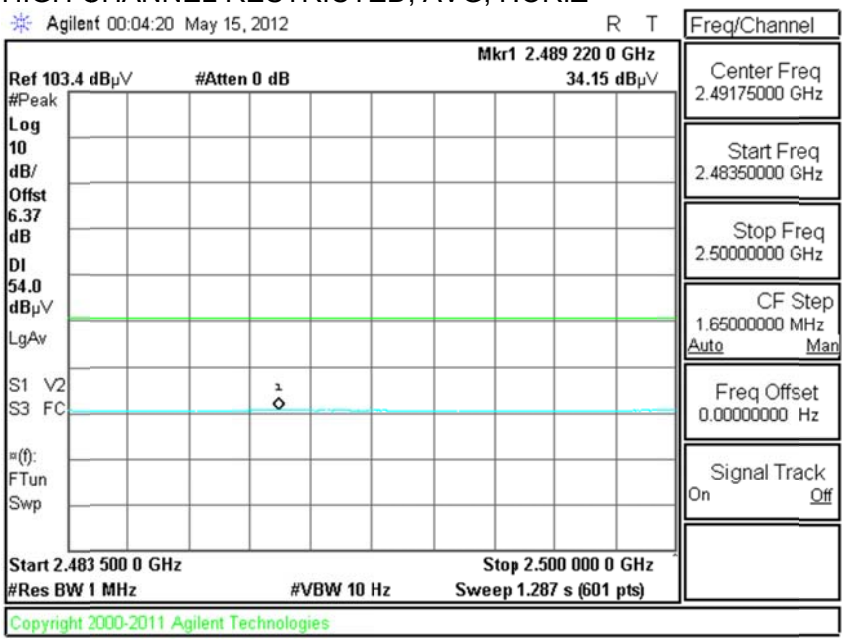
LOW CHANNEL RESTRICTED, AVG, VERT



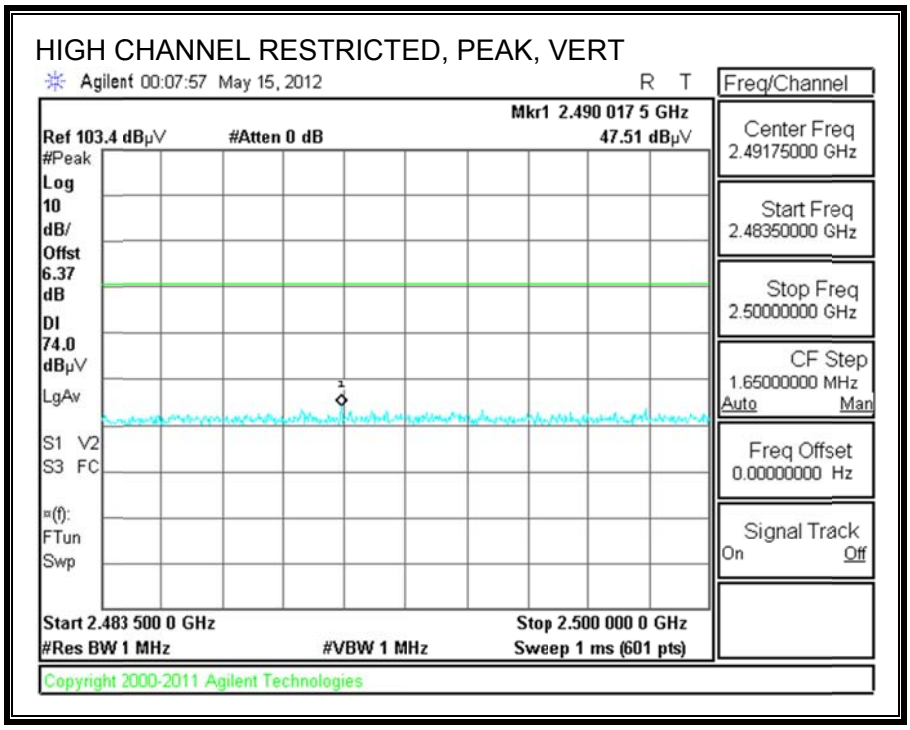
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



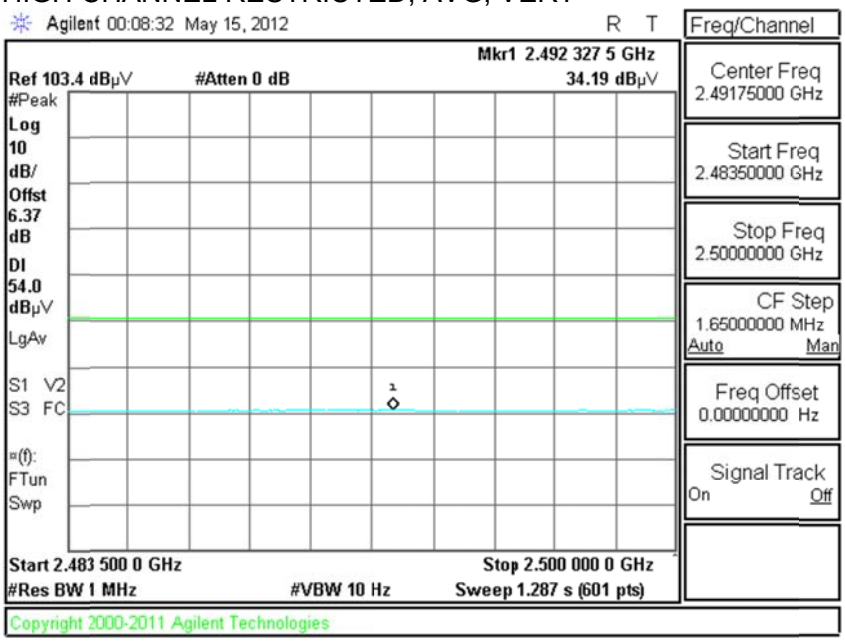
HIGH CHANNEL RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Panasonic
Project #: 12J14382
Date: 5/10/2012
Test Engineer: S.Aguilar
Configuration: EUT + Laptop + AC adapter
Mode: BT, GFSK

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

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

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

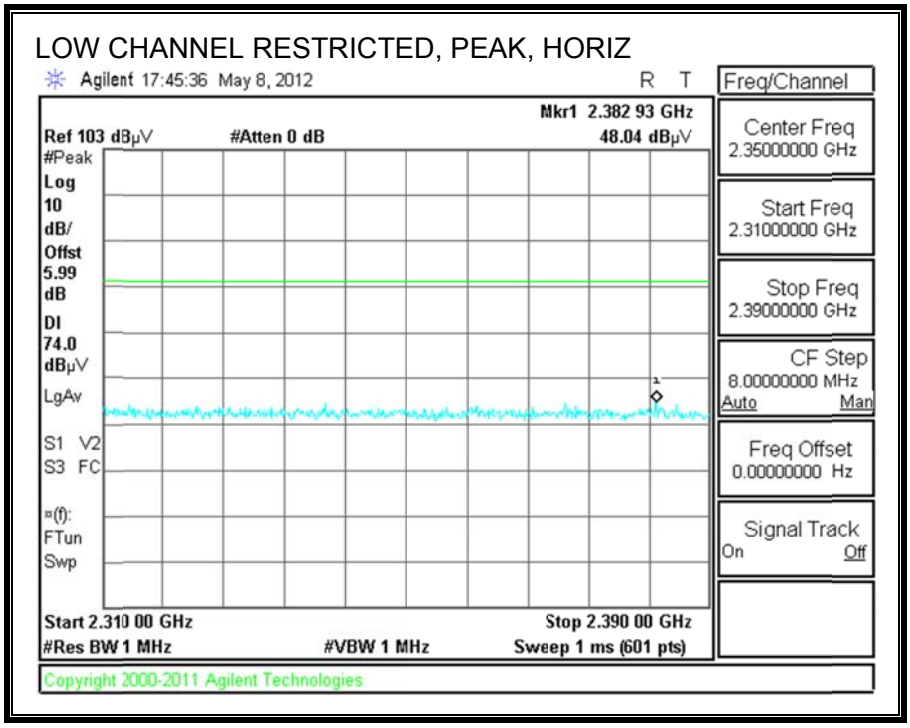
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel (2402 MHz)															
4.804	3.0	62.7	48.0	33.4	6.2	-35.5	0.0	0.0	66.8	52.1	74	54	-7.2	-1.9	H
4.804	3.0	57.0	43.3	33.4	6.2	-35.5	0.0	0.0	61.1	47.4	74	54	-12.9	-6.6	V
Mid Channel (2441 MHz)															
4.882	3.0	56.7	43.4	33.5	6.2	-35.5	0.0	0.0	61.0	47.7	74	54	-13.0	-6.3	H
4.882	3.0	53.9	41.1	33.5	6.2	-35.5	0.0	0.0	58.2	45.4	74	54	-15.8	-8.6	V
7.323	3.0	43.0	30.3	35.7	8.4	-35.4	0.0	0.0	51.7	38.9	74	54	-22.3	-15.1	H
7.323	3.0	40.8	28.3	35.7	8.4	-35.4	0.0	0.0	49.4	37.0	74	54	-24.6	-17.0	V
High Channel (2480 MHz)															
4.960	3.0	63.7	49.2	33.6	6.3	-35.5	0.0	0.0	68.1	53.6	74	54	-5.9	-0.4	H
4.960	3.0	58.0	44.6	33.6	6.3	-35.5	0.0	0.0	62.4	49.0	74	54	-11.6	-5.0	V
7.440	3.0	47.8	34.3	35.9	8.4	-35.5	0.0	0.0	56.7	43.2	74	54	-17.3	-10.8	H
7.440	3.0	47.8	34.3	35.9	8.4	-35.5	0.0	0.0	56.6	43.1	74	54	-17.4	-10.9	V

Rev. 11.10.11

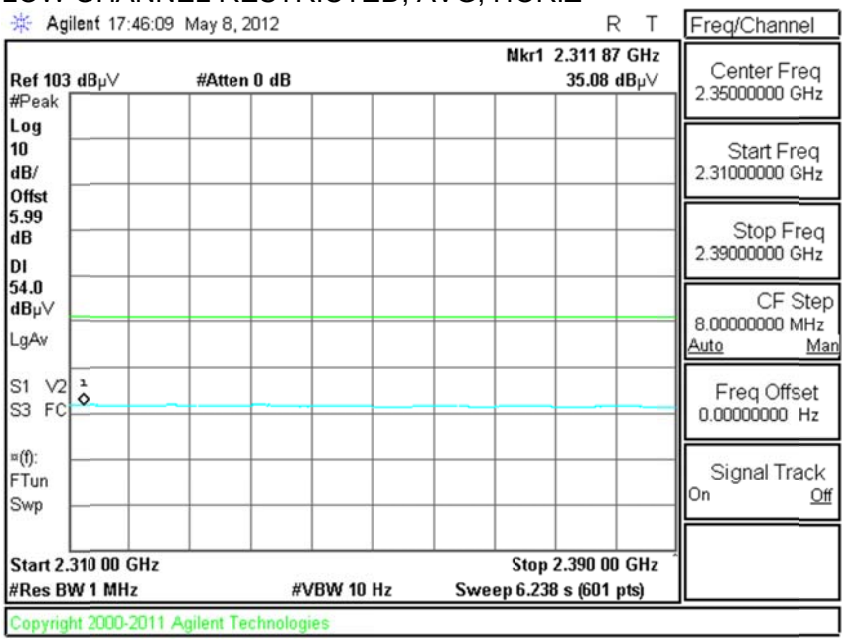
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

8.2.2. ENHANCED DATA RATE 8PSK MODULATION

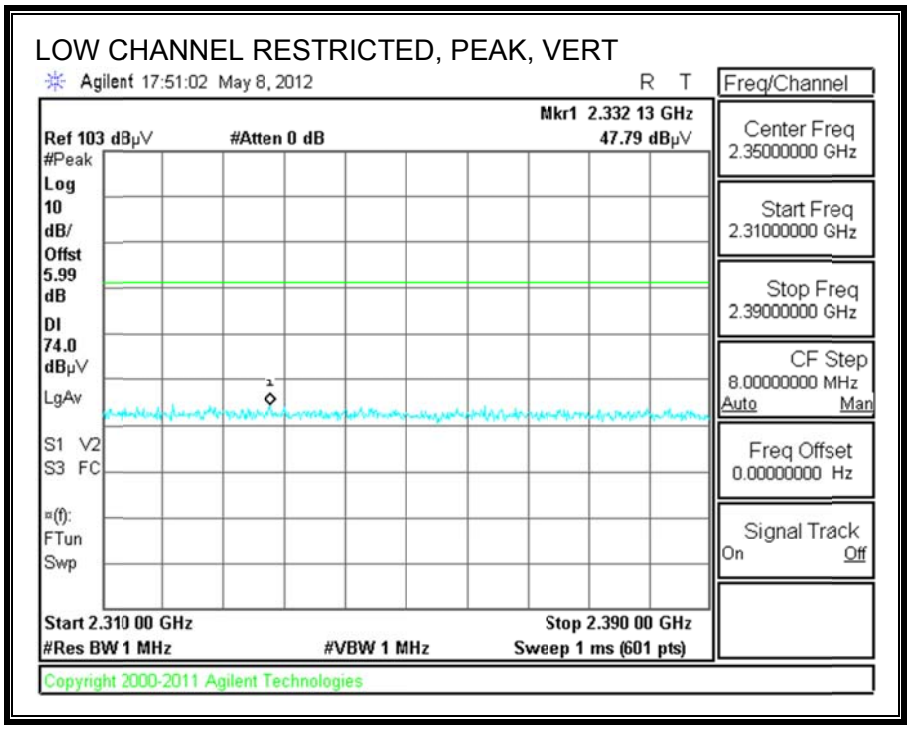
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



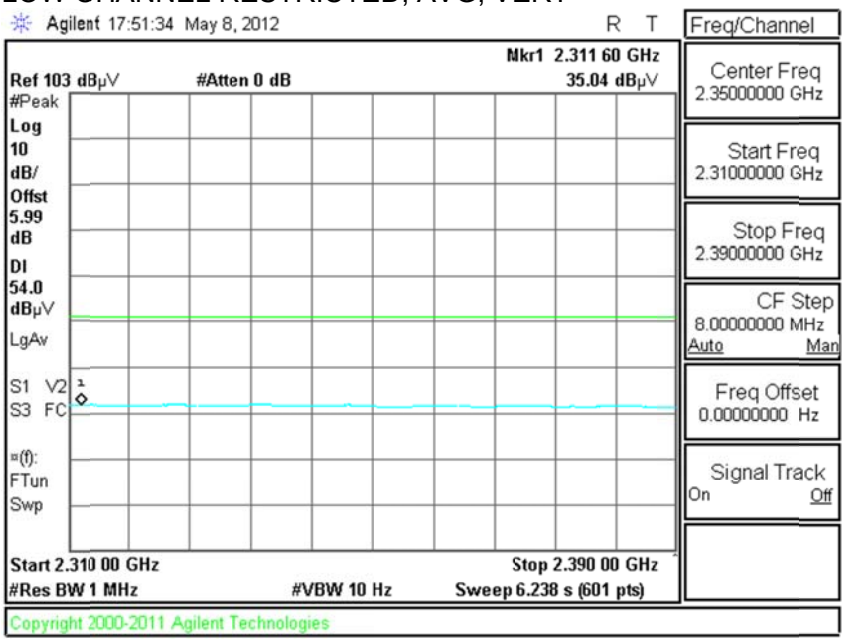
LOW CHANNEL RESTRICTED, AVG, HORIZ



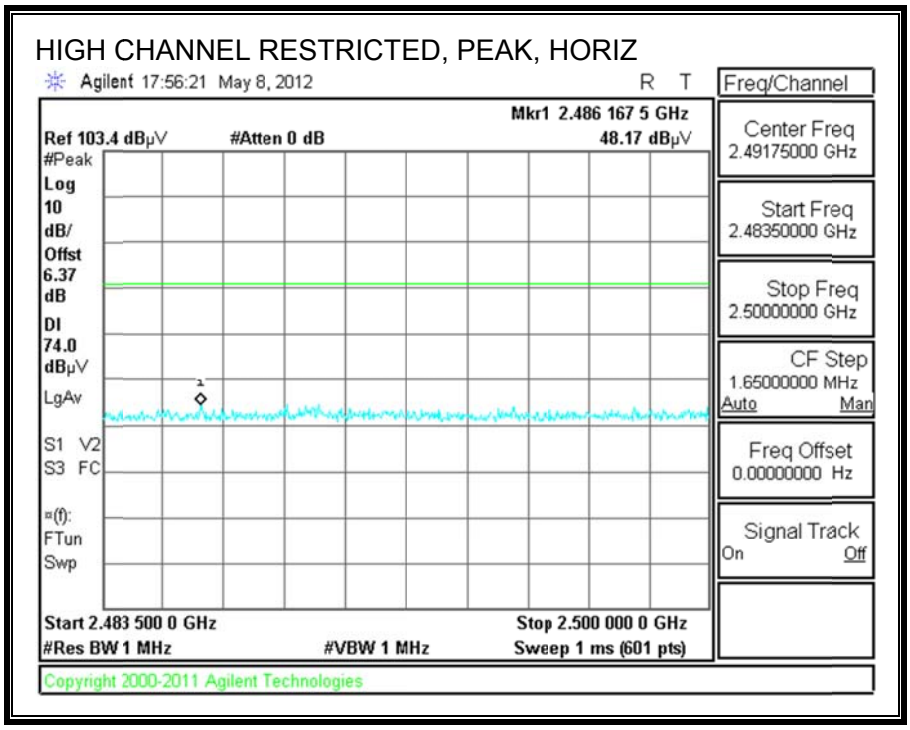
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



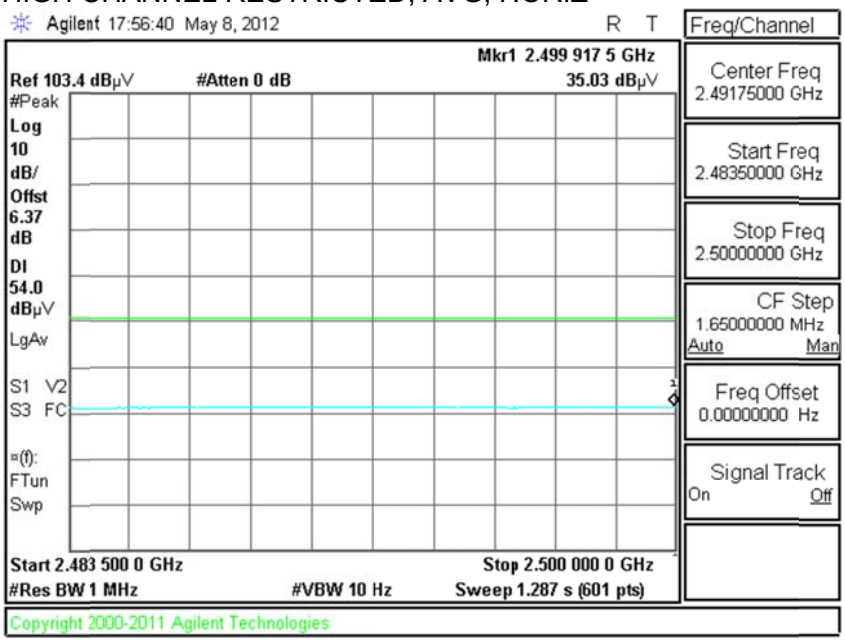
LOW CHANNEL RESTRICTED, AVG, VERT



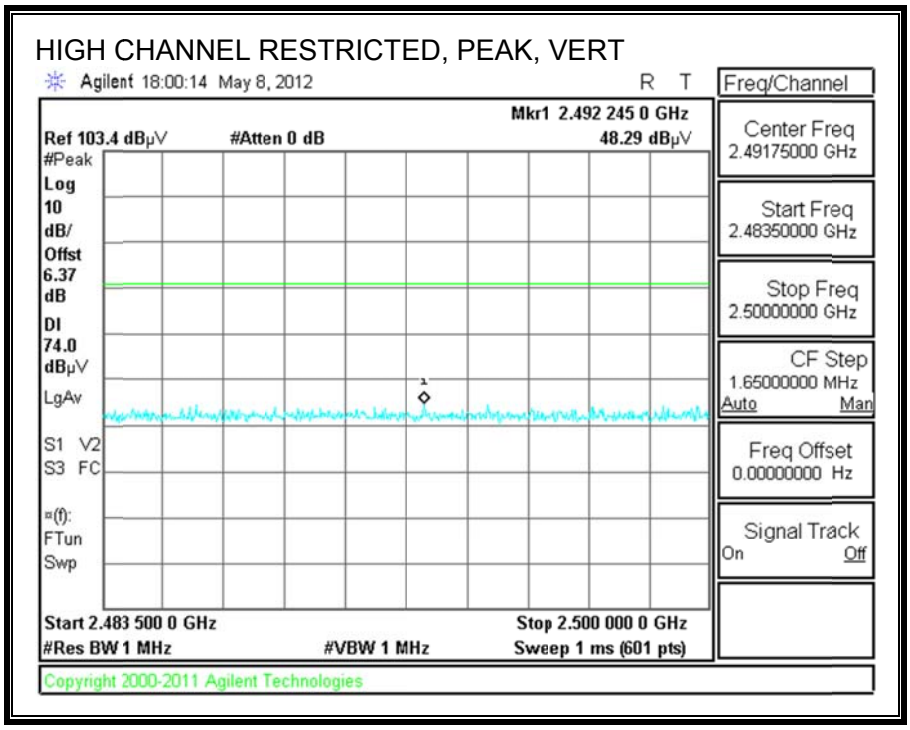
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



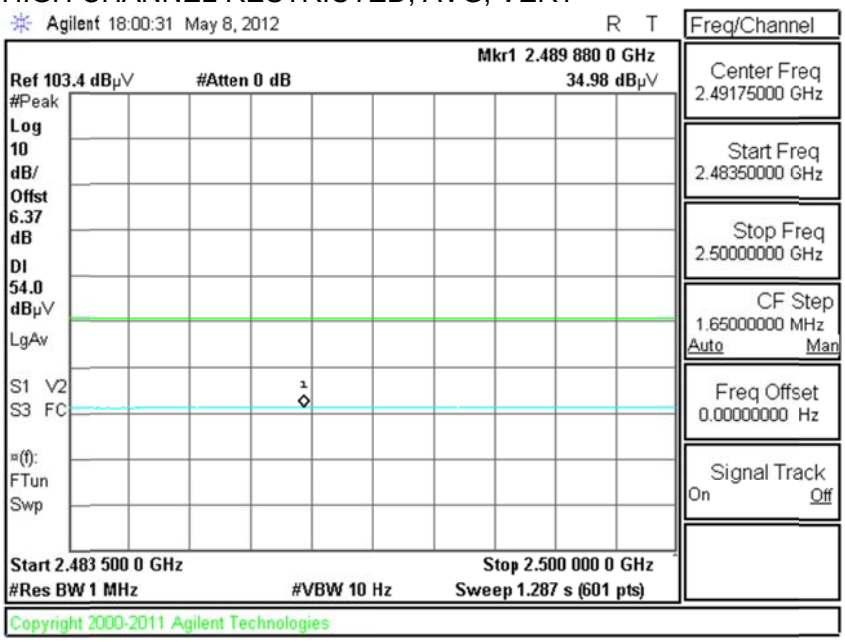
HIGH CHANNEL RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber-A

Company:	Panasonic
Project #:	12J14382 ..
Date:	5/8/2012
Test Engineer:	S.Aguilar
Configuration:	EU + Laptop + AC adapter
Mode:	BT, 8PSK

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931		T89; ARA 18-26GHz; S/N:1049	FCC 15.209

Hi Frequency Cables

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

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

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel (2402 MHz)															
4.804	3.0	52.8	38.1	33.4	6.2	-35.5	0.0	0.0	56.9	42.2	74	54	-17.1	-11.8	H
4.804	3.0	48.0	34.3	33.4	6.2	-35.5	0.0	0.0	52.1	38.4	74	54	-21.9	-15.6	V
Mid Channel (2441 MHz)															
4.882	3.0	58.5	42.1	33.5	6.2	-35.5	0.0	0.0	62.8	46.3	74	54	-11.2	-7.7	H
4.882	3.0	53.8	38.4	33.5	6.2	-35.5	0.0	0.0	58.1	42.6	74	54	-15.9	-11.4	V
7.323	3.0	43.5	28.8	35.7	8.4	-35.4	0.0	0.0	52.2	37.4	74	54	-21.8	-16.6	H
7.323	3.0	41.0	27.2	35.7	8.4	-35.4	0.0	0.0	49.7	35.9	74	54	-24.3	-18.1	V
High Channel (2480 MHz)															
4.960	3.0	61.9	45.4	33.6	6.3	-35.5	0.0	0.0	66.3	49.8	74	54	-7.7	-4.2	H
4.960	3.0	55.4	40.3	33.6	6.3	-35.5	0.0	0.0	59.8	44.7	74	54	-14.2	-9.3	V
7.440	3.0	48.8	33.2	35.9	8.4	-35.5	0.0	0.0	57.7	42.1	74	54	-16.3	-11.9	H
7.440	3.0	47.6	32.3	35.9	8.4	-35.5	0.0	0.0	56.4	41.2	74	54	-17.6	-12.8	V

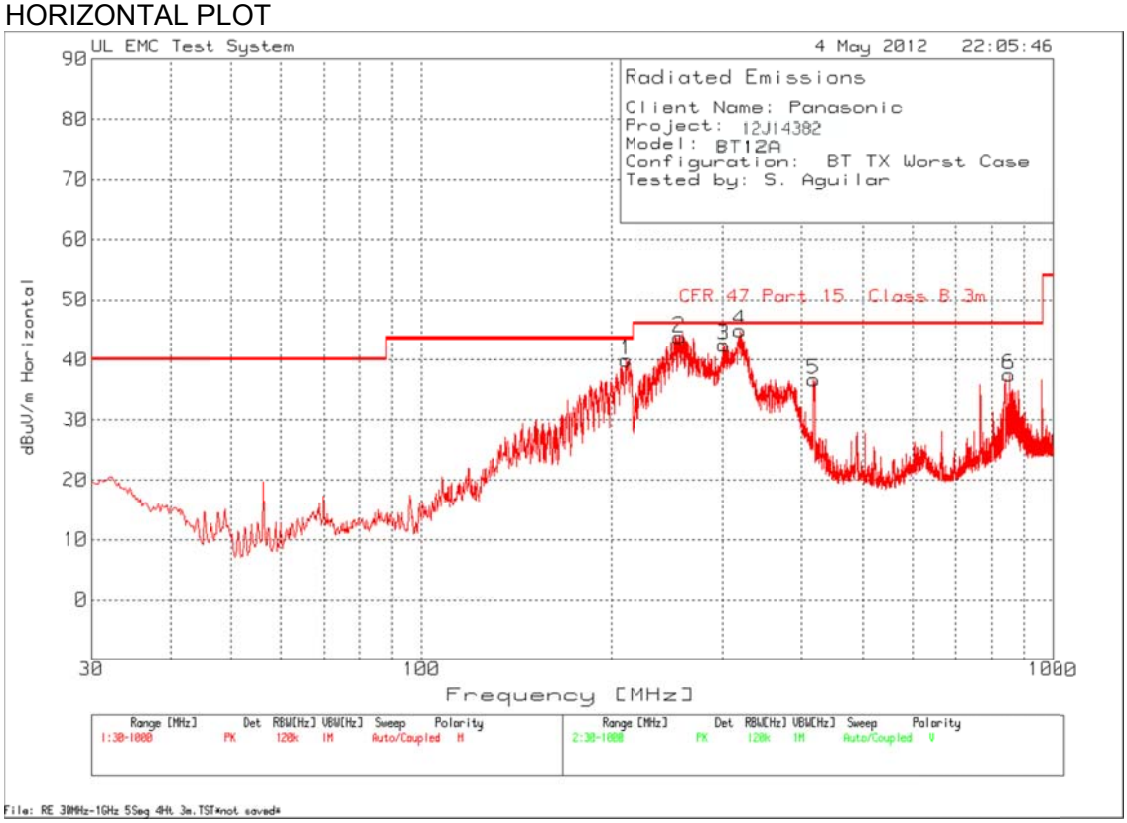
Rev. 11.10.11

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		

8.3. WORST-CASE BELOW 1 GHz

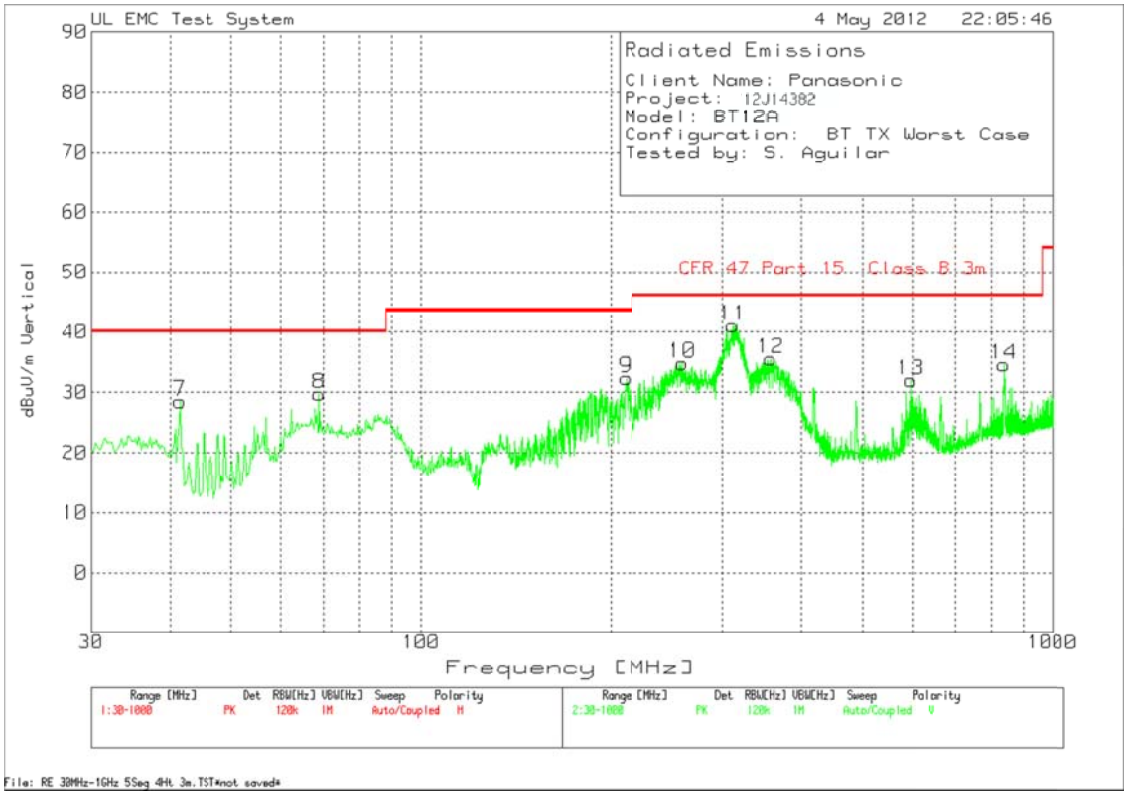
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

VERTICAL PLOT



VERTICAL DATA

HORIZONTAL AND VERTICAL DATA

Project:	12J14382 ..
Client Name:	Panasoinic
Model/Device	BT12A
Configuraiton:	BT TX Mode - Worst case
Date:	4/30/2012
Tested by:	S.Aguilar

Test Frequency [MHz]	Meter Reading [dB(µV)]	Detector	Pre Amp Factor [dB]	Antenna Factor [dB/m]	Corrected [dB(µV/m)]	Class B PK limit [dB(µV/m)]	Margin [dB]	Height [cm]	Polarity
Range 1 30 - 1000MHz (Horizontal)									
210.6635	55.49	PK	-27.5	12	39.99	43.5	-3.51	101	Horz
210.4047	52.76	QP	-27.5	12	37.26	43.5	-6.24	84	Horz
256.4109	58.88	PK	-27.1	12	43.78	46	-2.22	101	Horz
255.7369	55.79	QP	-27.1	12	40.69	46	-5.31	54	Horz
301.3829	56.01	PK	-26.8	13.3	42.51	46	-3.49	101	Horz
300.5478	46.99	QP	-26.8	13.3	33.49	46	-12.51	189	Horz
319.7982	58.12	PK	-26.8	13.6	44.92	46	-1.08	101	Horz
319.2537	46.65	QP	-26.8	13.6	33.45	46	-12.55	177	Horz
418.2714	48.2	PK	-26.9	15.4	36.7	46	-9.3	101	Horz
851.1271	41.22	PK	-25	21.3	37.52	46	-8.48	101	Horz
Range 2 30 - 1000MHz (Vertical)									
41.4369	44.54	PK	-29.2	13.2	28.54	40	-11.46	100	Vert
68.9628	50.42	PK	-28.9	8.2	29.72	40	-10.28	100	Vert
211.245	47.87	PK	-27.5	12	32.37	43.5	-11.13	200	Vert
259.7062	49.82	PK	-27.1	12.1	34.82	46	-11.18	100	Vert
312.0444	54.34	PK	-26.8	13.5	41.04	46	-4.96	200	Vert
358.1795	48.05	PK	-26.8	14.3	35.55	46	-10.45	200	Vert

PK - Peak detector
QP - Quasi-peak detector

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

Company Name:	Panasonic
Project:	12J14382
Date:	5/5/2012
Configuraiton:	EUT + Laptop
Mode:	TX Mode BT , Worst case
Tested by:	S. Aguilar

Line-L1 .15 - 30MHz

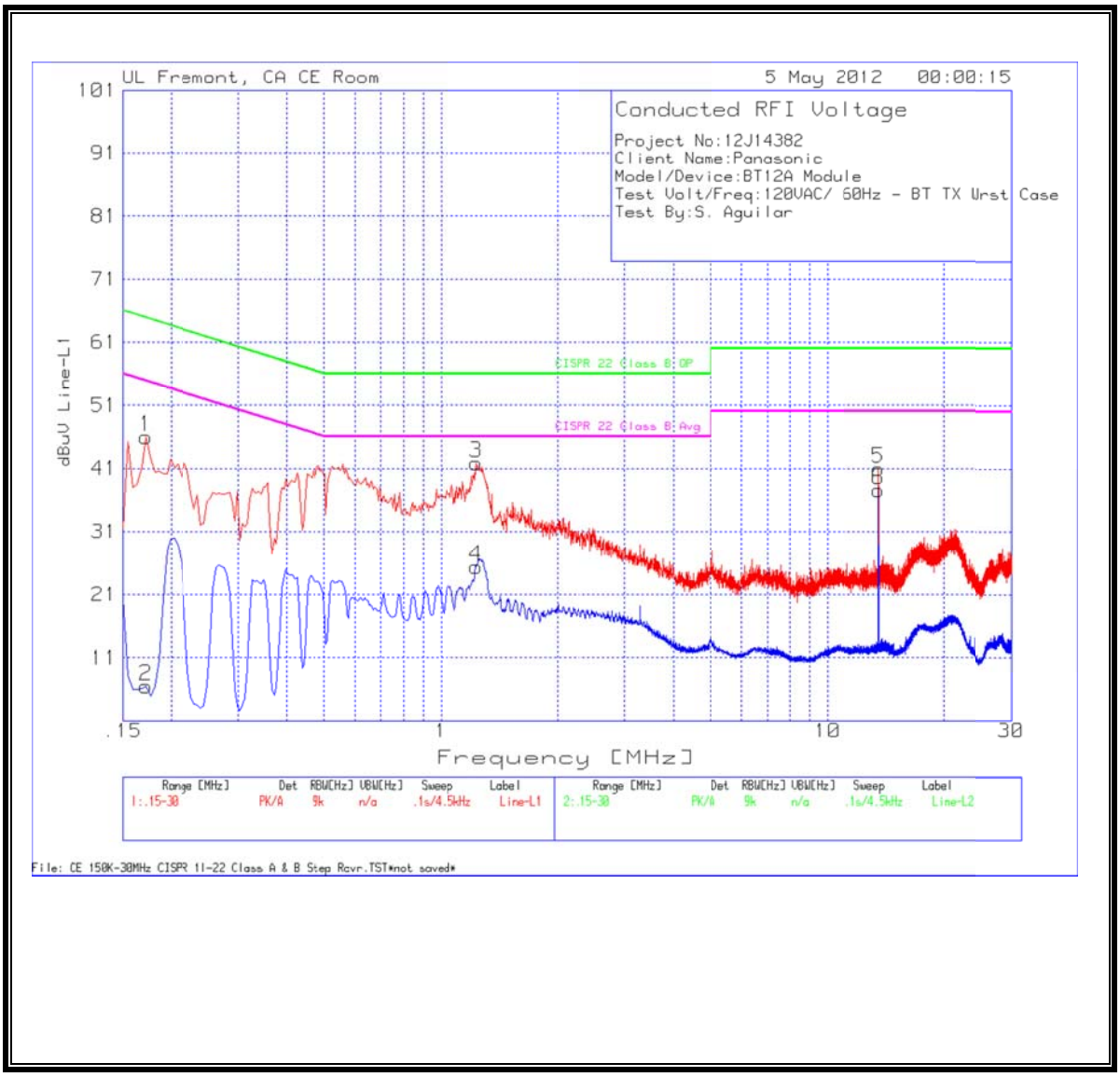
Test Frequency [MHz]	Meter Reading [dBuV]	Detector Type	LISN [dB]	Cables [dB]	Corrected [dB(uV)]	Class B QP Limit	QP Margin	Class B Av Limit [dB(uV)]	Av Margin [dB]
0.1725	45.92	PK	0.1	0	46.02	64.8	-18.78	-	-
0.1725	6.44	Av	0.1	0	6.54	-	-	54.8	-48.26
1.2345	41.59	PK	0.1	0.1	41.79	56	-14.21	-	-
1.2345	25.25	Av	0.1	0.1	25.45	-	-	46	-20.55
13.56	40.57	PK	0.2	0.2	40.97	60	-19.03	-	-
13.56	37.16	Av	0.2	0.2	37.56	-	-	50	-12.44

Line-L2 .15 - 30MHz

Test Frequency [MHz]	Meter Reading [dBuV]	Detector Type	LISN [dB]	Cables [dB]	Corrected [dB(uV)]	Class B QP Limit	QP Margin	Class B Av Limit [dB(uV)]	Av Margin [dB]
0.1545	41.39	PK	0.1	0	41.49	65.8	-24.31	-	-
0.1545	7.03	Av	0.1	0	7.13	-	-	55.8	-48.67
1.2615	32.02	PK	0.1	0.1	32.22	56	-23.78	-	-
1.2615	16.34	Av	0.1	0.1	16.54	-	-	46	-29.46
13.56	40.72	PK	0.2	0.2	41.12	60	-18.88	-	-
13.56	23.09	Av	0.2	0.2	23.49	-	-	50	-26.51

PK - Peak detector
QP - Quasi-Peak detector
Av - Average detector

LINE 1 RESULTS



LINE 2 RESULTS