



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

**BT3.0+HS,802.11BGN 1X1 HT20, GSM & WCDMA850/1900MHZ BAR PHONE
W/HOTSPOT,EDGE RX ONLY**

MODEL NUMBER: GT-S5300L

FCC ID: A3LGTS5300L

REPORT NUMBER: 12I14312-3

ISSUE DATE: MARCH 23, 2012

Prepared for

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416, MAETAN 3-DONG, YEONGTONG-GU
SUWON-CITY, GYEONGGI-DO 443-742, SOUTH KOREA**

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/13/12	Initial Issue	F. Ibrahim
A	03/23/12	Updated sections 7.1.3, 7.1.5, 7.2.3 and 7.2.5	F. Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
416, MAETAN 3-DONG, YEONGTONG-GU
SUWON-CITY, GYEONGGI-DO 443-742, SOUTH KOREA

EUT DESCRIPTION: BT3.0+HS,802.11BGN 1X1 HT20, GSM & WCDMA850/1900MHZ
BAR PHONE W/HOTSPOT,EDGE RX ONLY

MODEL: GT-S5300L

SERIAL NUMBER: WIFI RSE (RADIATED), FJ-054-D & FJ-066-D (CONDUCTED)

DATE TESTED: FEBRAURY 27- MARCH 12, 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:



FRANK IBRAHIM
EMC SUPERVISOR
UL CCS

Tested By:



STEVE AGUILAR
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

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

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 BT3.0+HS,802.11BGN 1X1 HT20, GSM & WCDMA850/1900MHZ BAR Phone W/HOTSPOT,EDGE RX ONLY

The radio module is manufactured by Samsung Electronics Co., Ltd.

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	10.49	11.19
2402 - 2480	Enhanced 8PSK	10.28	10.67

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of -3.4 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was BT Test Engineering Mode.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1 GHz and power line conducted emission tests were performed with the EUT transmitting at the channel with highest output power as worst-case scenario.

The fundamental frequency was investigated for the EUT in three orthogonal orientations X,Y, and Z (battery-operated), also for EUT with AC/DC adapter and with headset connected; it was found that the worst-case orientation among them was X orientation with AC/DC adapter and with headset. All final radiated emission testing was performed using the worst-case orientation.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	ETADU10JBS	SC2ZA19NS17E	DoC
Headset	Samsung	N/A	FS-066-A	N/A

I/O CABLES (CONDUCTED SETUP)

I/O CABLE LIST						
Cable No.	Port	#of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US AC	US 115V	--	Wall adapter
2	AC	1	AC	AC	1.5	Unshielded
3	DC	1	USB	DC	1,3	Unshielded
4	RF In/Out	1	SMA	--	0.1	--

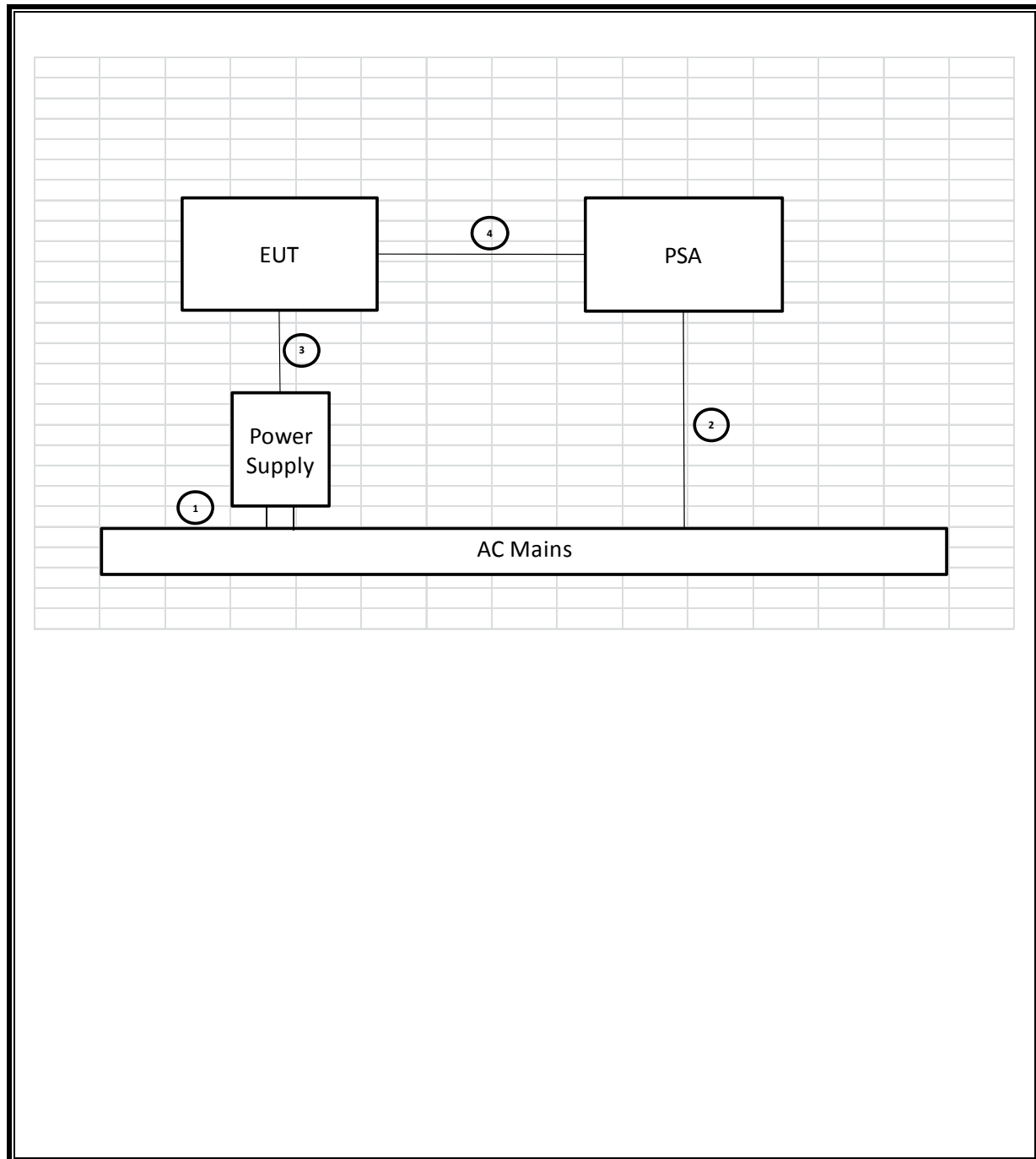
I/O CABLES (RADIATED SETUP)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	Mini USB	1	USB	shielded	1m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.2 m	Volume control attached

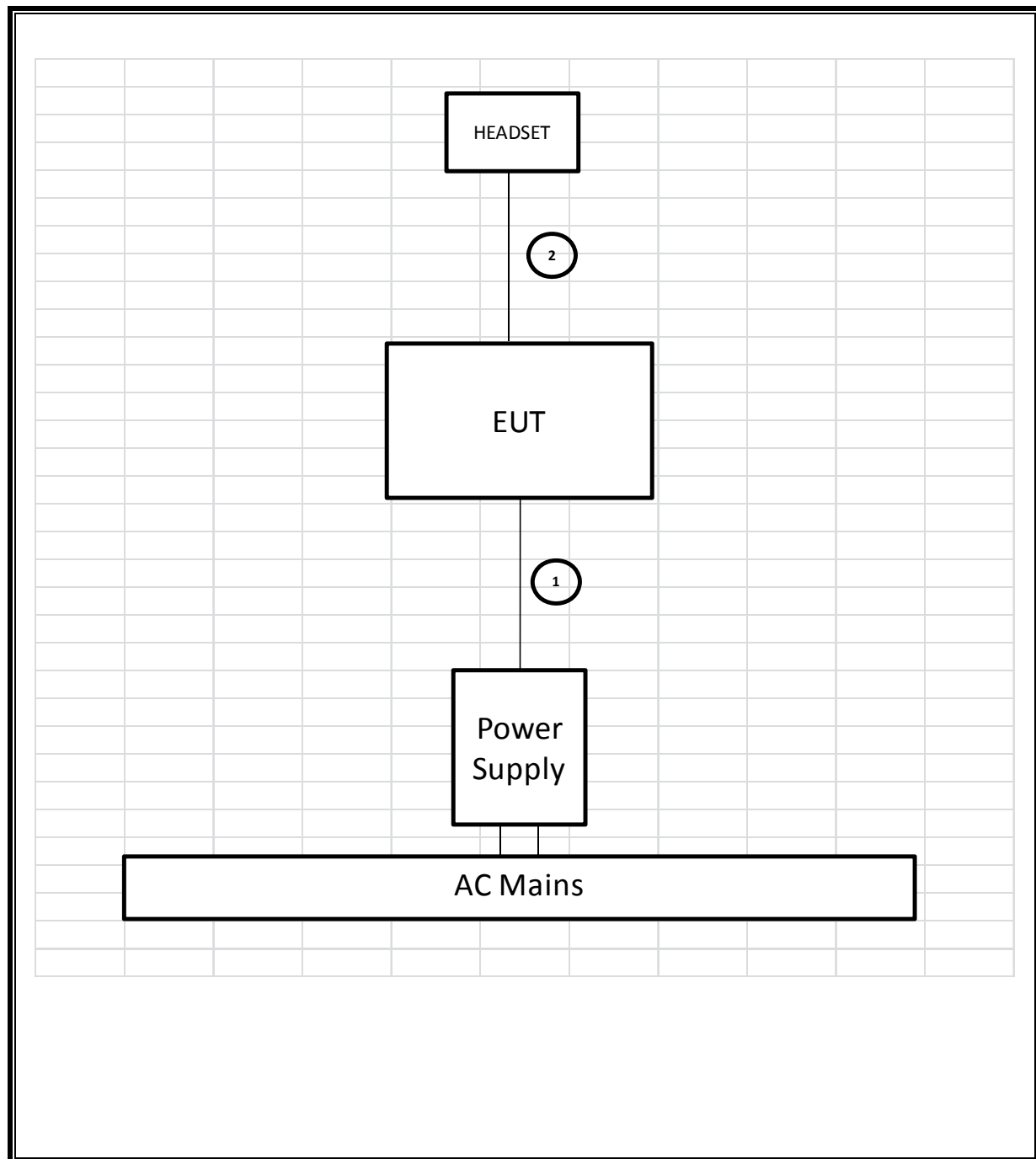
TEST SETUP

The EUT is standalone. Adapter and headset is attached as required by the test.
Test software loaded in the EUT is exercised for testing.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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, 44 GHz	Agilent / HP	E4446A	C01159	05/11/11	05/11/12
Power Meter	Agilent / HP	437B	—	07/28/11	07/28/12
Power Sensor, 18 GHz	Agilent / HP	8481A	N02782	07/29/11	07/29/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	12/17/10	03/17/12
Antenna, Bilog, 2 GHz	Sundt Sciences	JB1	C01016	07/16/11	07/16/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	11/11/11	11/11/12
Antenna, Horn, 18 GHz	EMCO	3115	C00783	06/29/11	06/29/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	07/12/11	07/12/12
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	02/16/12	02/16/13
Antenna, Horn, 18 GHz	EMCO	3115	C00945	10/06/11	10/06/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	07/12/11	07/12/12
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	07/28/11	07/28/12
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	07/06/11	07/06/12
LISN, 30 MHz	FCC	50/250-25-2	C00626	12/13/11	12/13/12

7. ANTENNA PORT TEST RESULTS

7.1. BASIC DATA RATE GFSK MODULATION

7.1.1. 20 dB BANDWIDTH

LIMIT

None; for reporting purposes only.

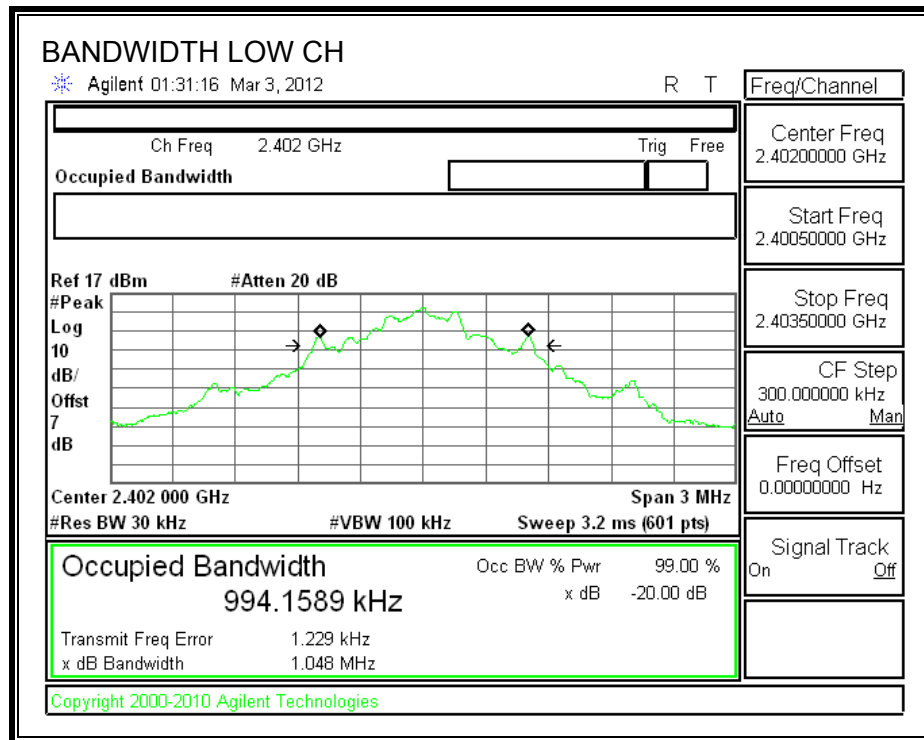
TEST PROCEDURE

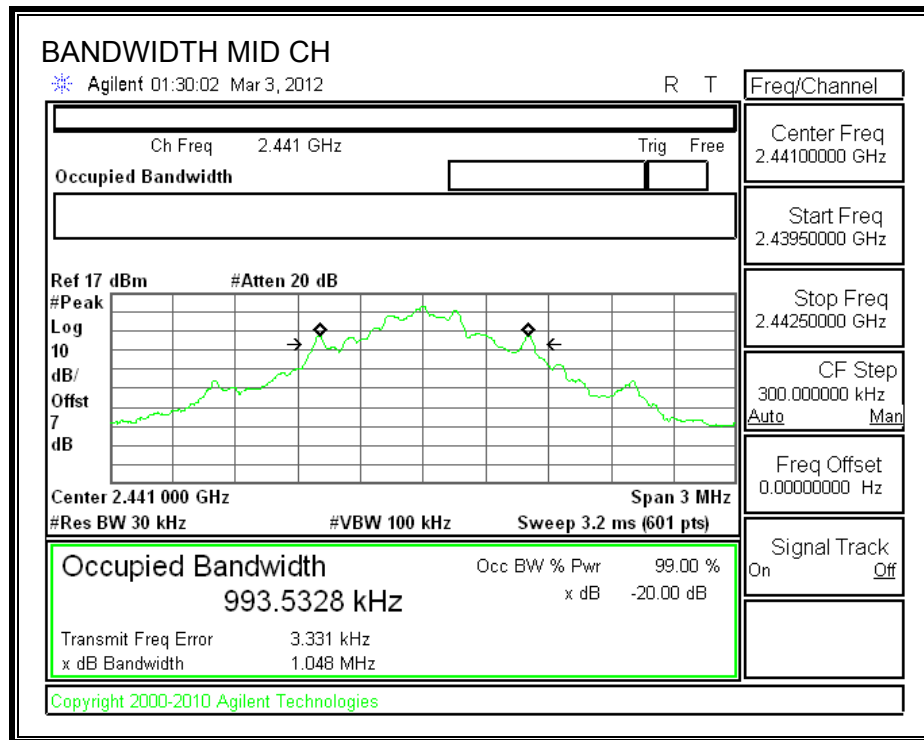
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled.

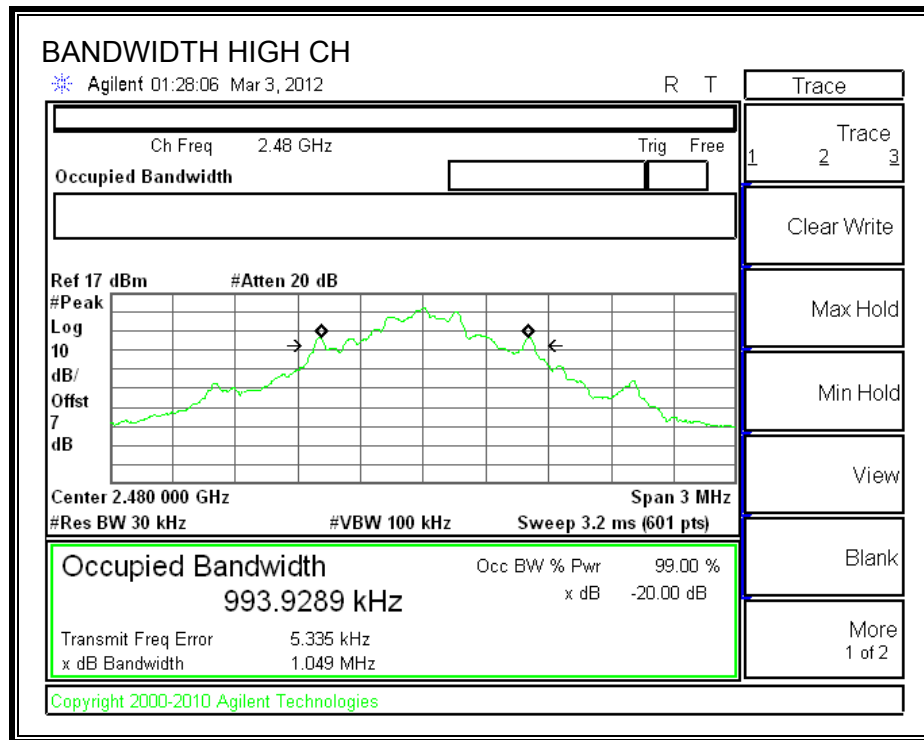
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	1.048
Middle	2441	1.048
High	2480	1.049

20 dB BANDWIDTH







7.1.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

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.

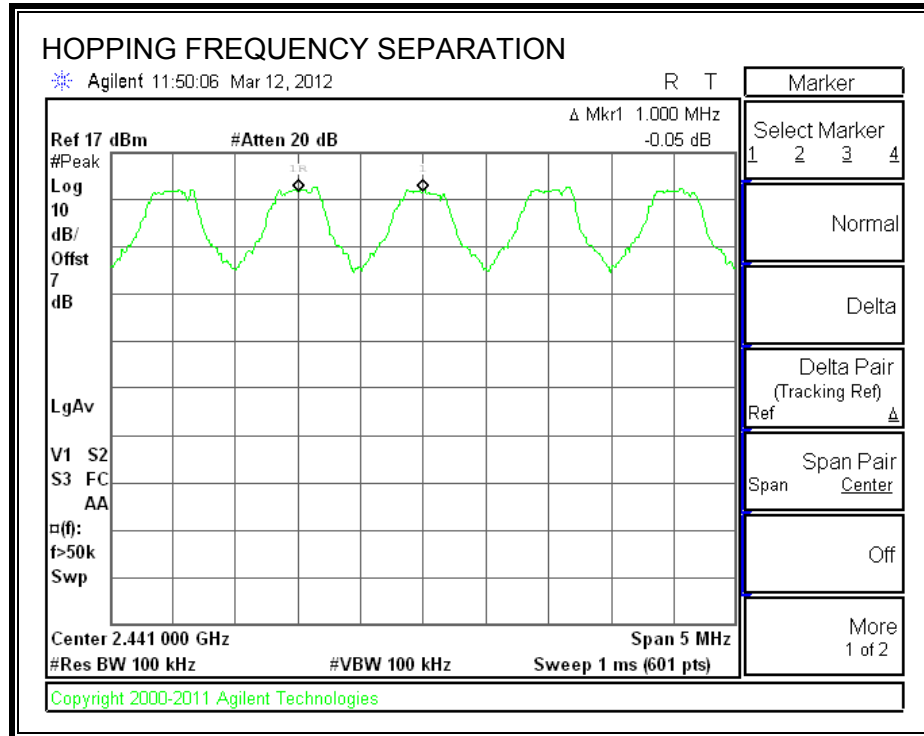
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 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)

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

TEST PROCEDURE

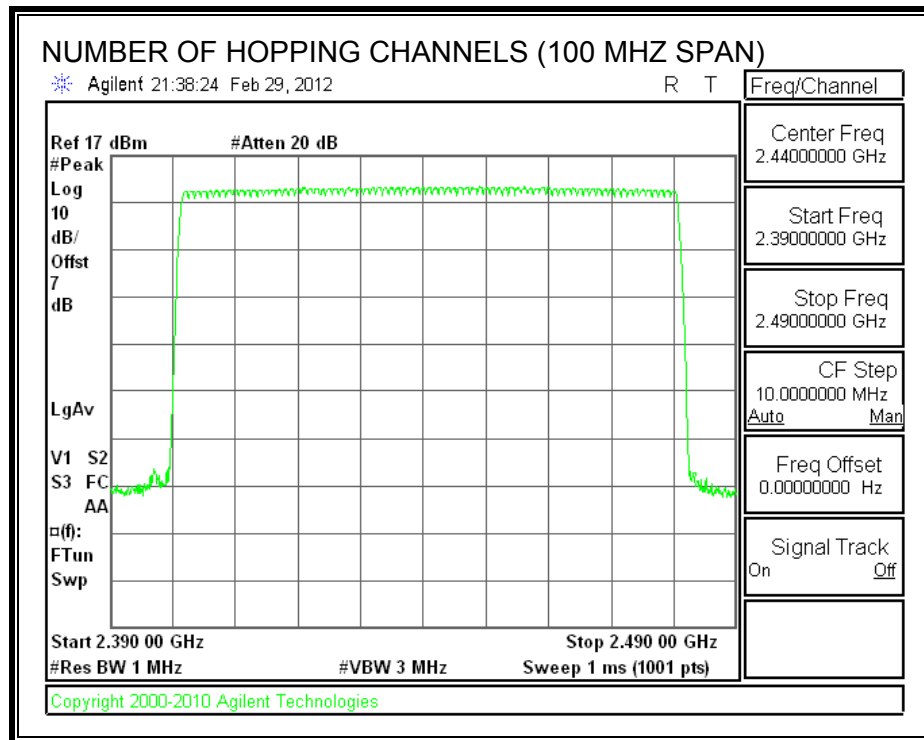
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

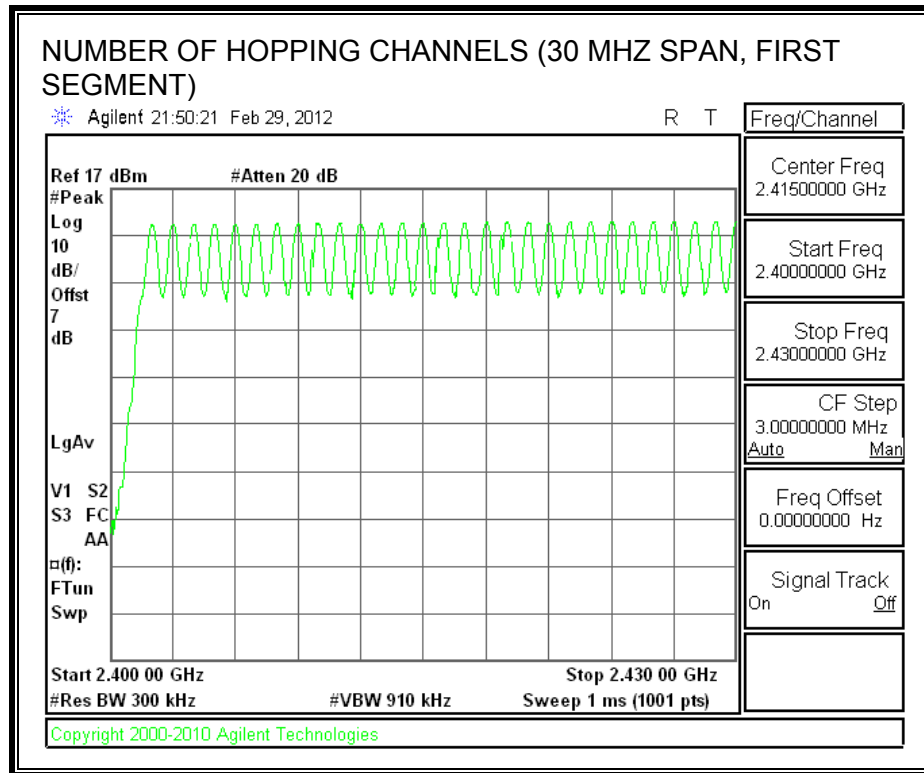
RESULTS

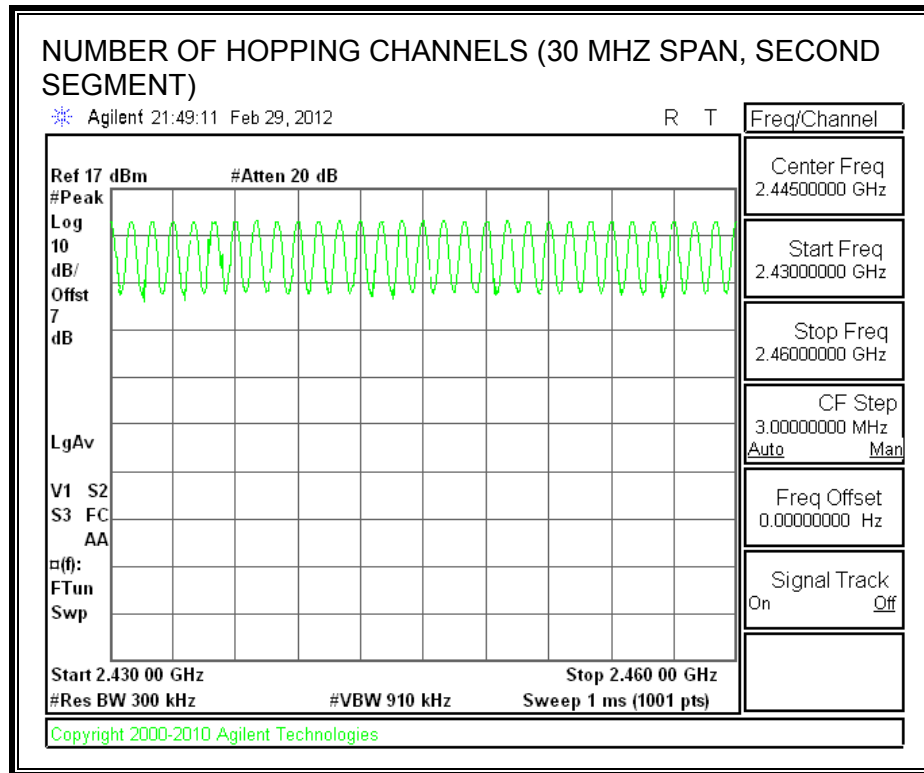
Normal mode: 79 Channels observed.

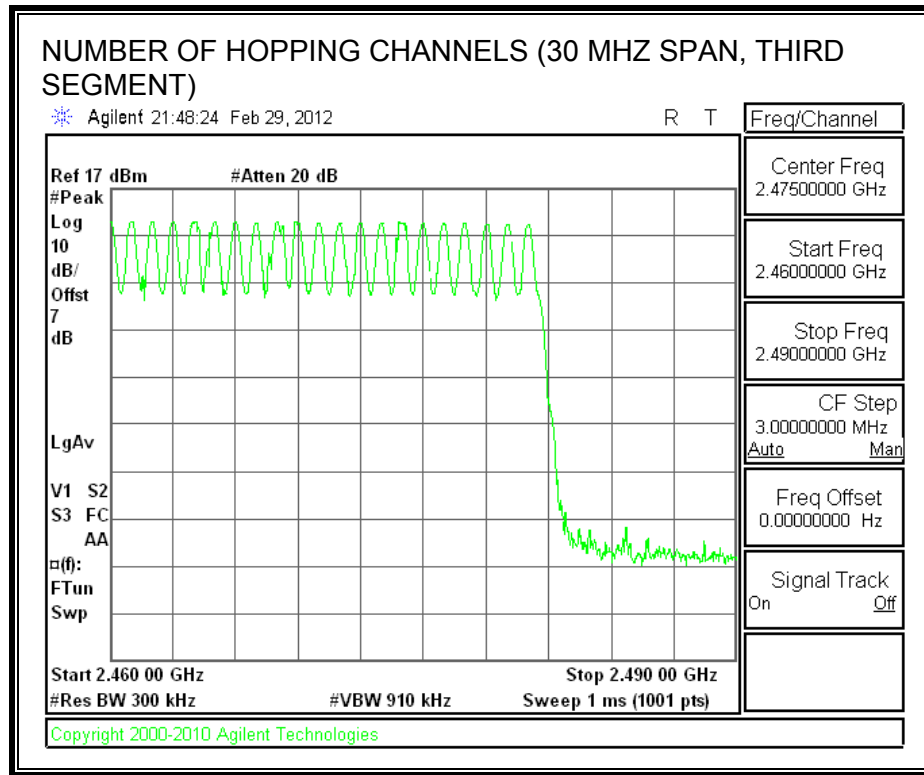
AFH mode: 79 channels as declared by the client.

NUMBER OF HOPPING CHANNELS (NORMAL MODE)









7.1.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

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 $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$.

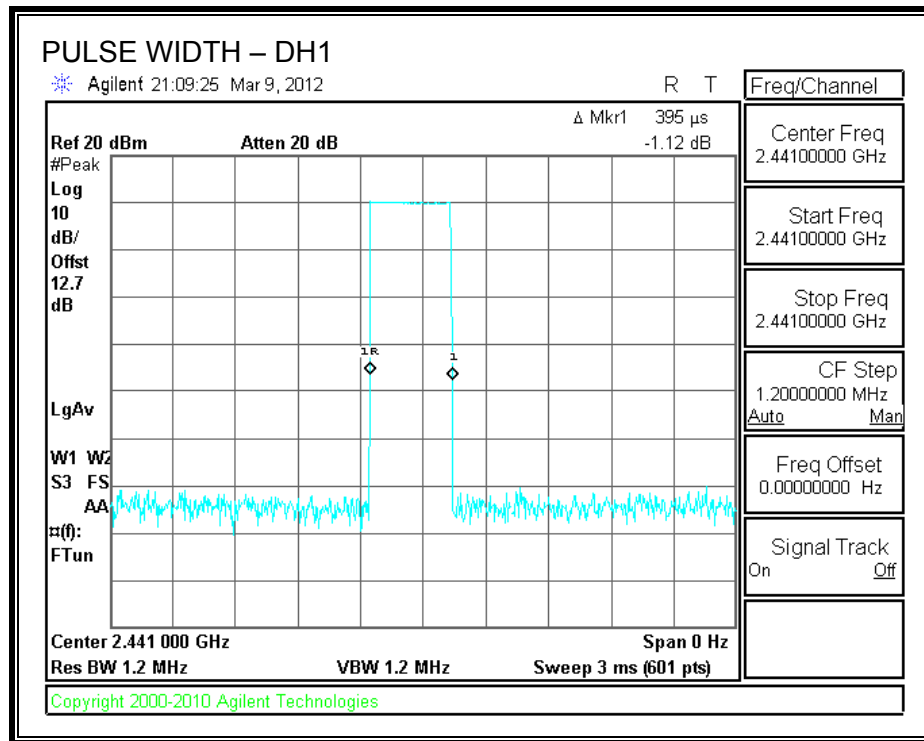
RESULTS

GFSK NORMAL Mode

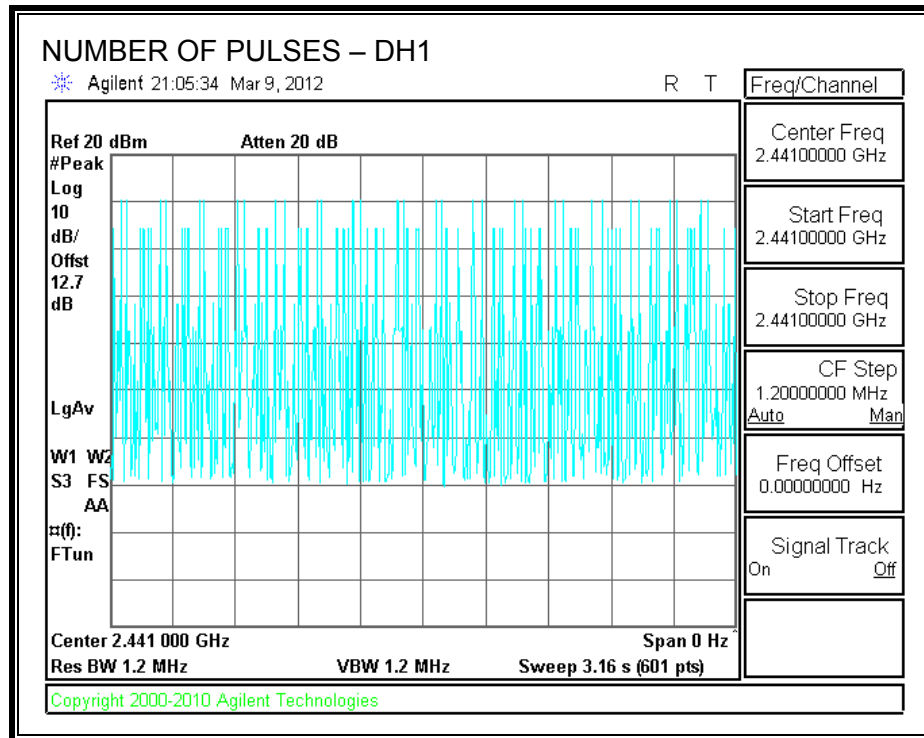
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.395	32	0.126	0.4	-0.274
DH3	1.642	17	0.279	0.4	-0.121
DH5	2.833	11	0.312	0.4	-0.088

NORMAL MODE

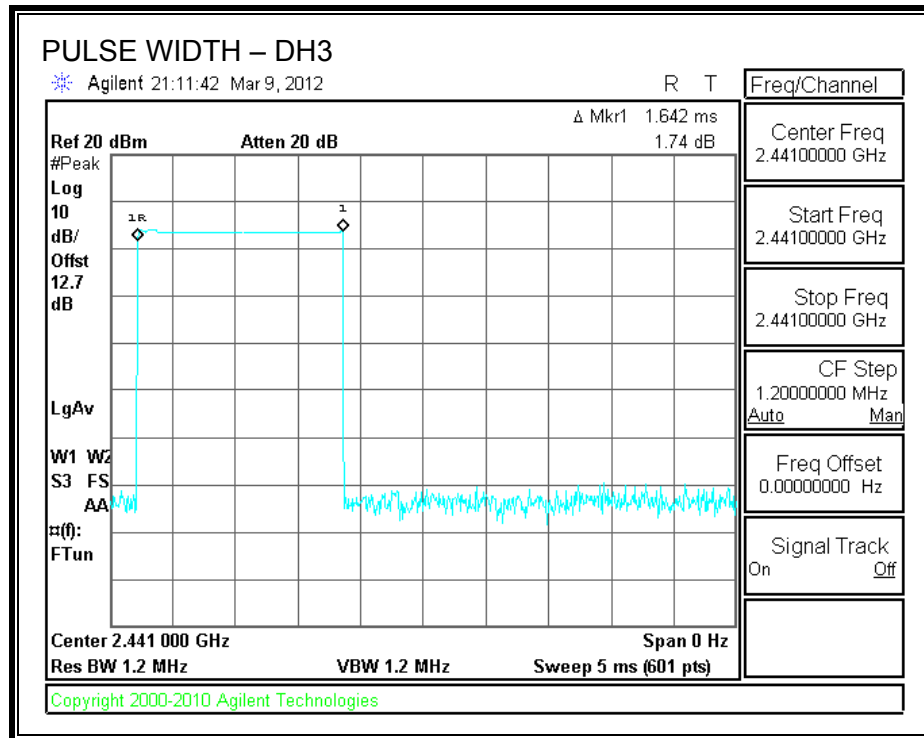
PULSE WIDTH - DH1



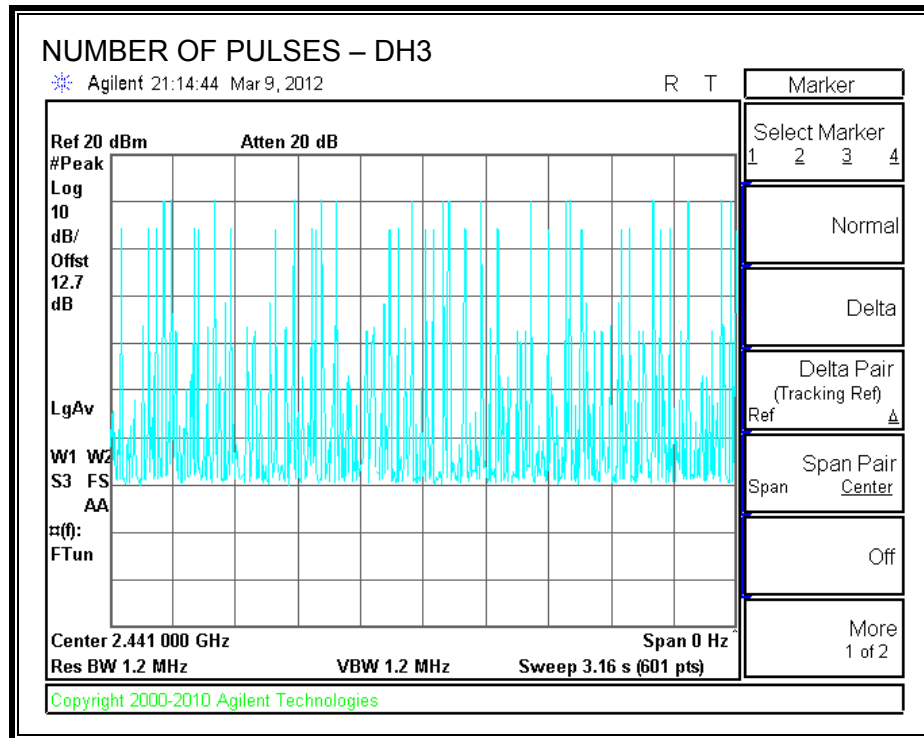
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



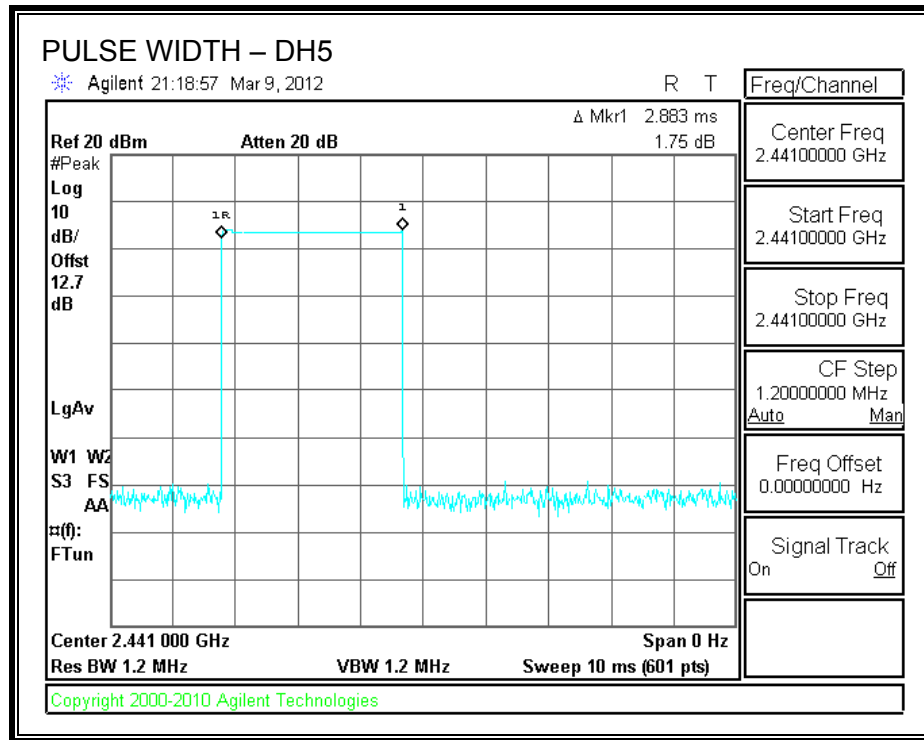
PULSE WIDTH – DH3



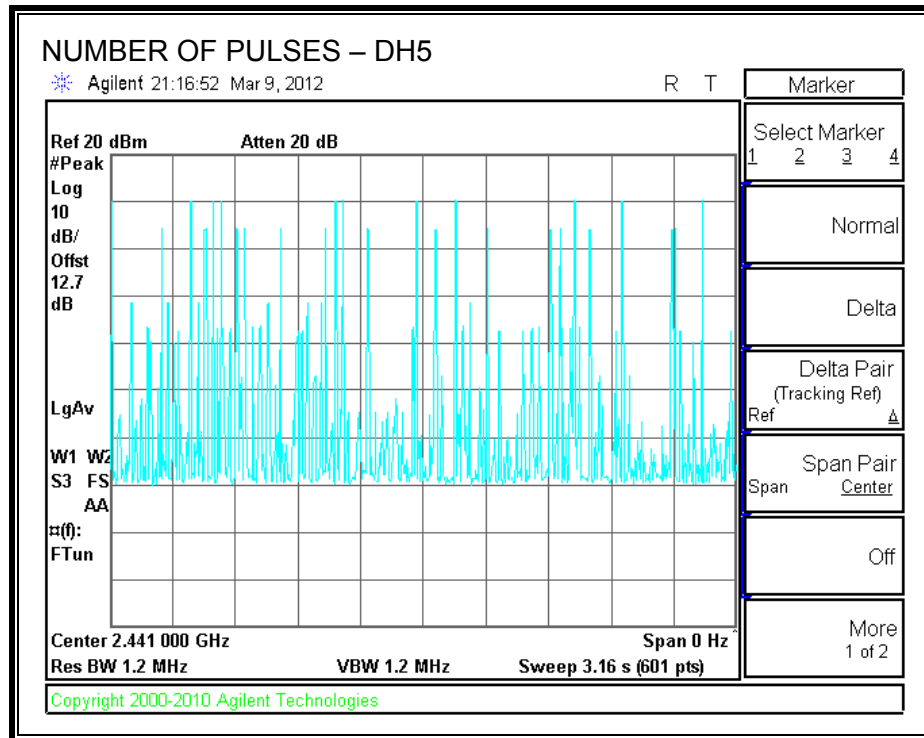
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



7.1.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

The maximum antenna gain is less than 6 dBi, therefore the limit is 20.97 dBm.

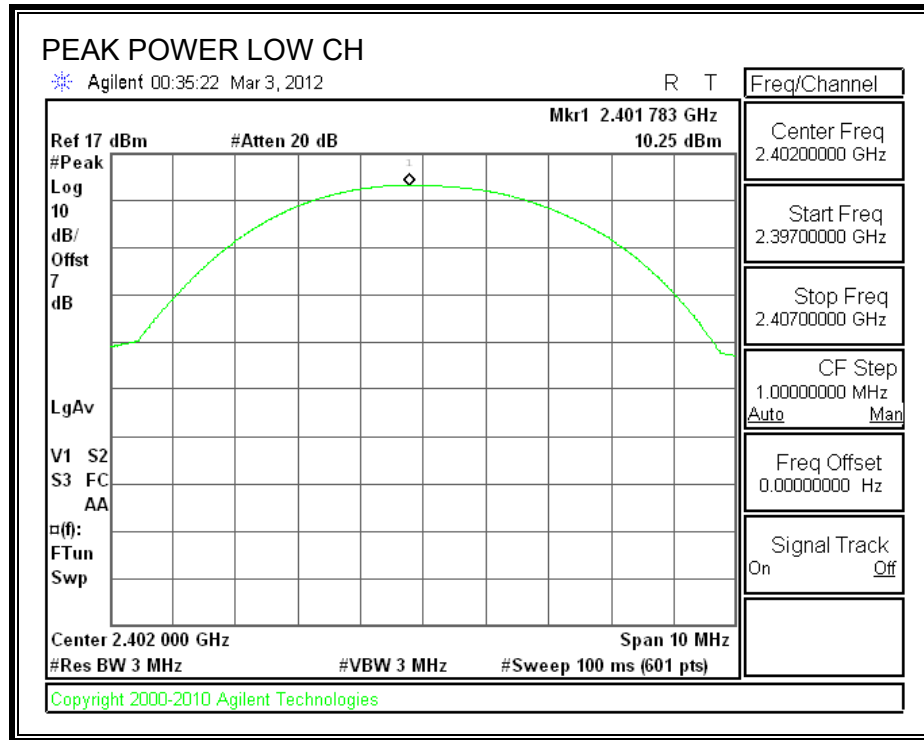
TEST PROCEDURE

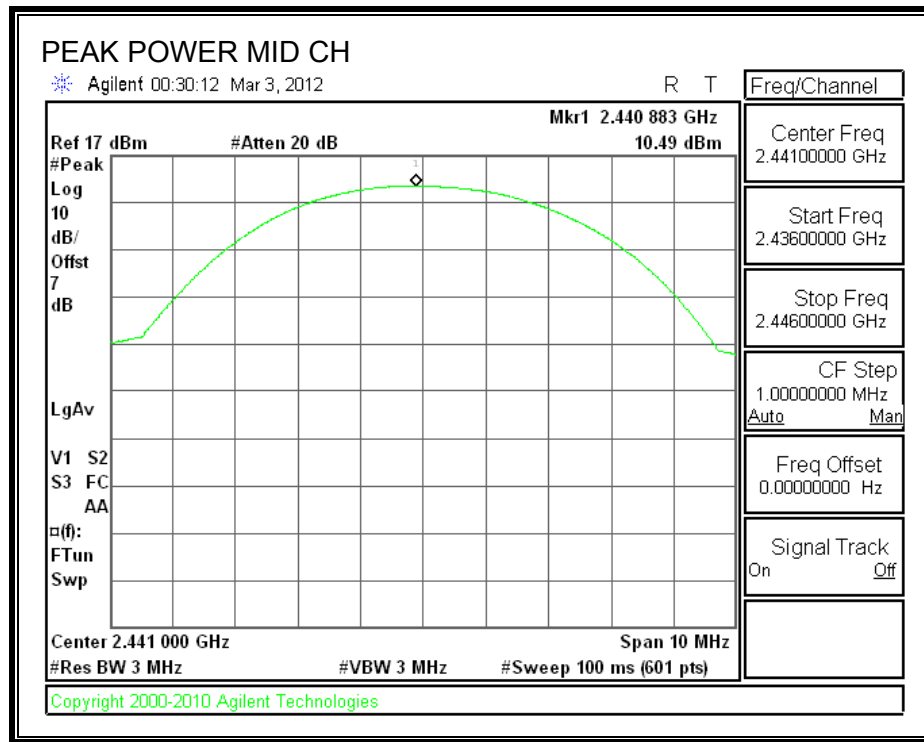
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

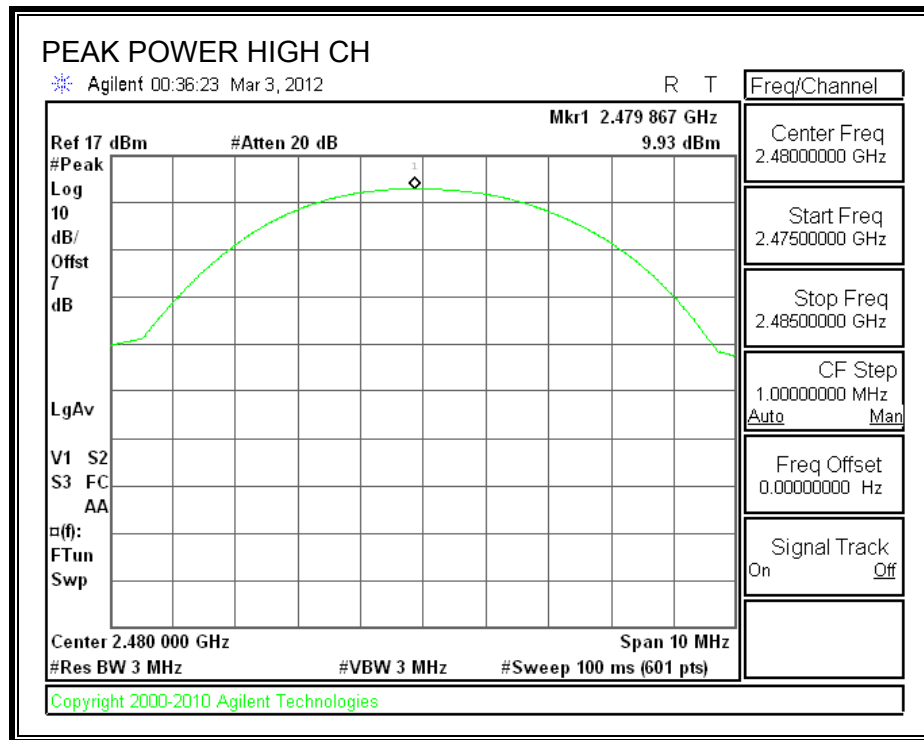
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	10.25	20.97	-10.72
Middle	2441	10.49	20.97	-10.48
High	2480	9.93	20.97	-11.04

OUTPUT POWER







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 7.0 dB (including 6.3 dB pad and 0.7 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	5.93
Middle	2441	6.32
High	2480	5.72

7.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

Limit = -20 dBc

TEST PROCEDURE

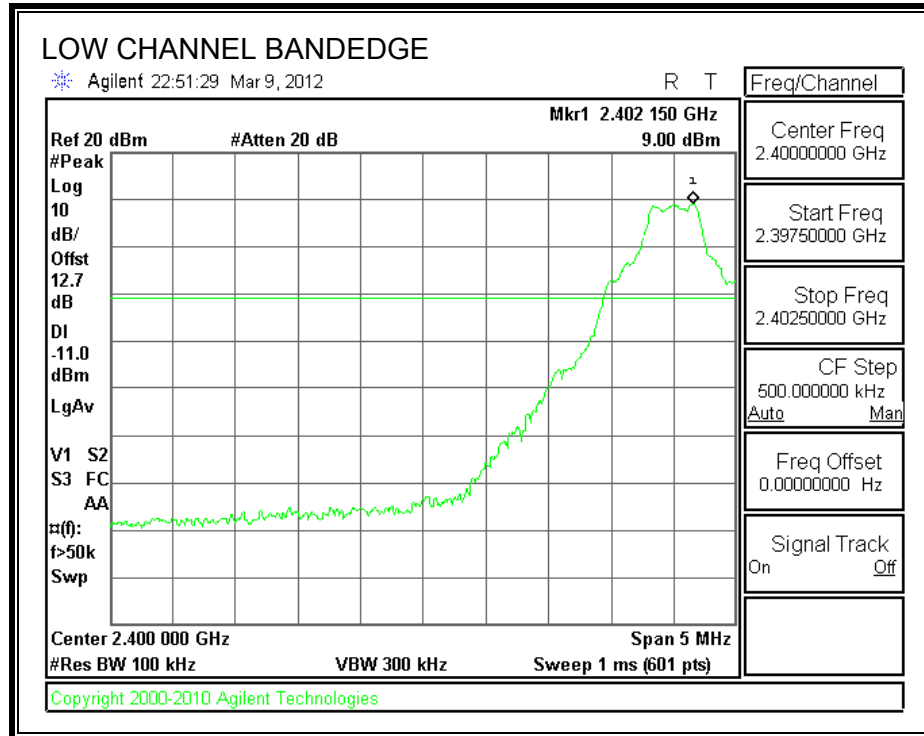
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

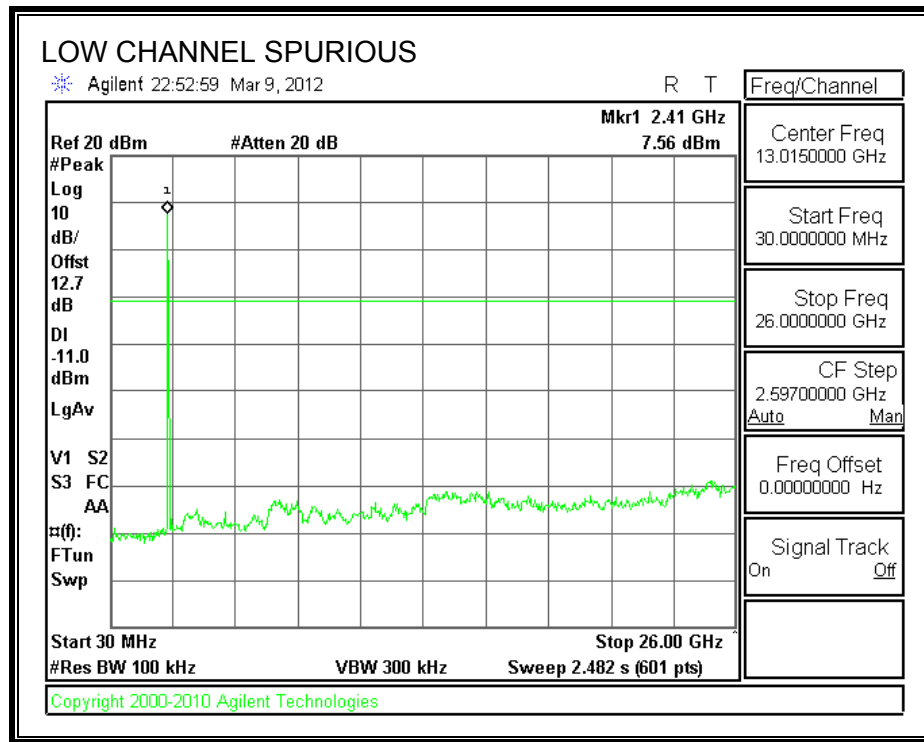
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

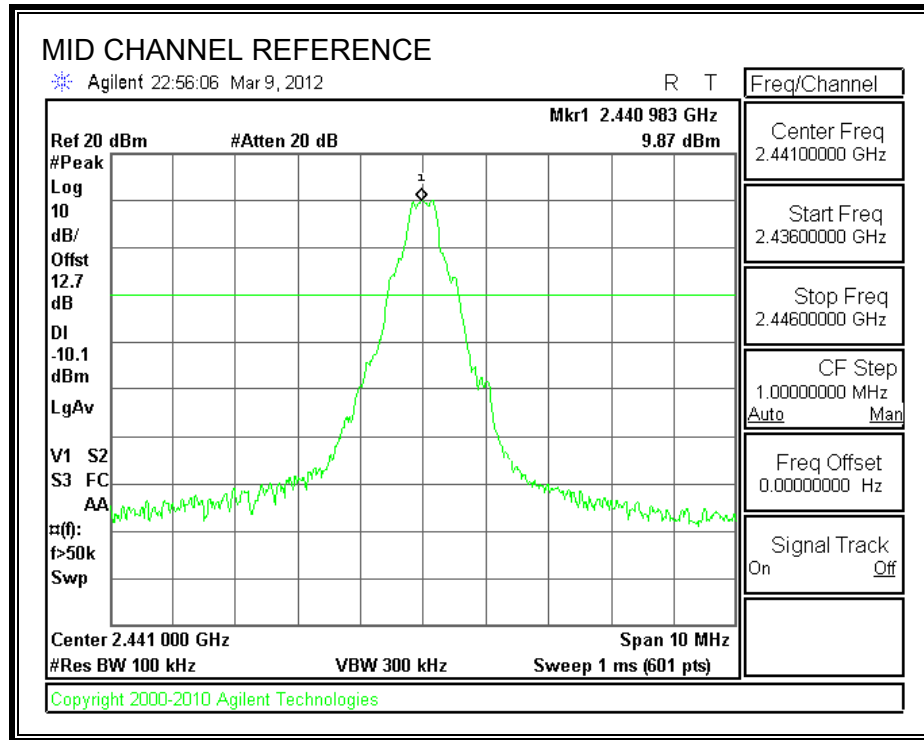
RESULTS

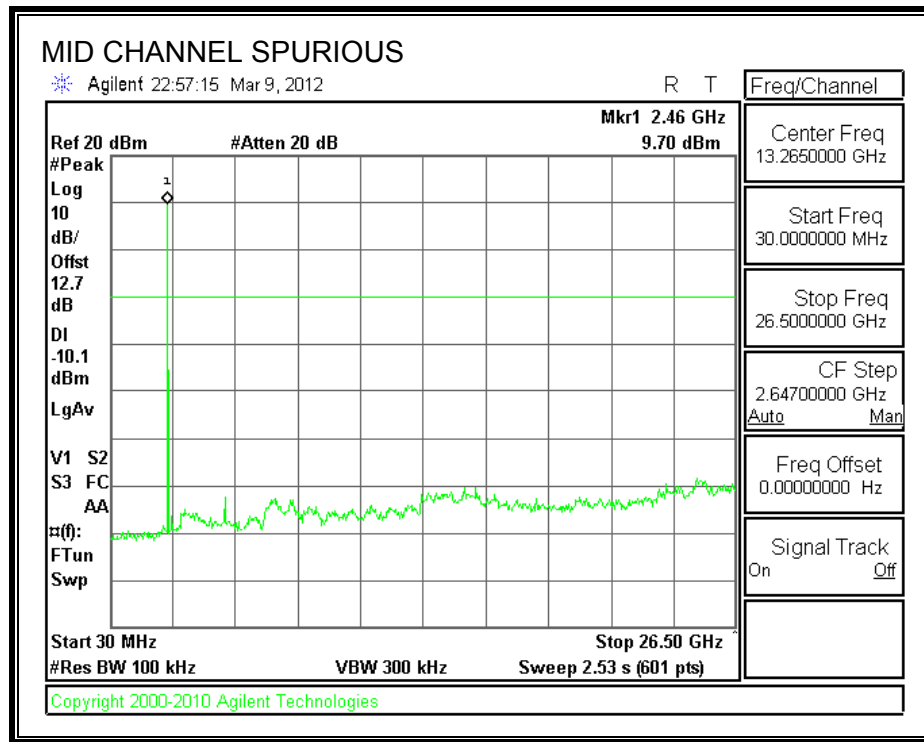
SPURIOUS EMISSIONS, LOW CHANNEL



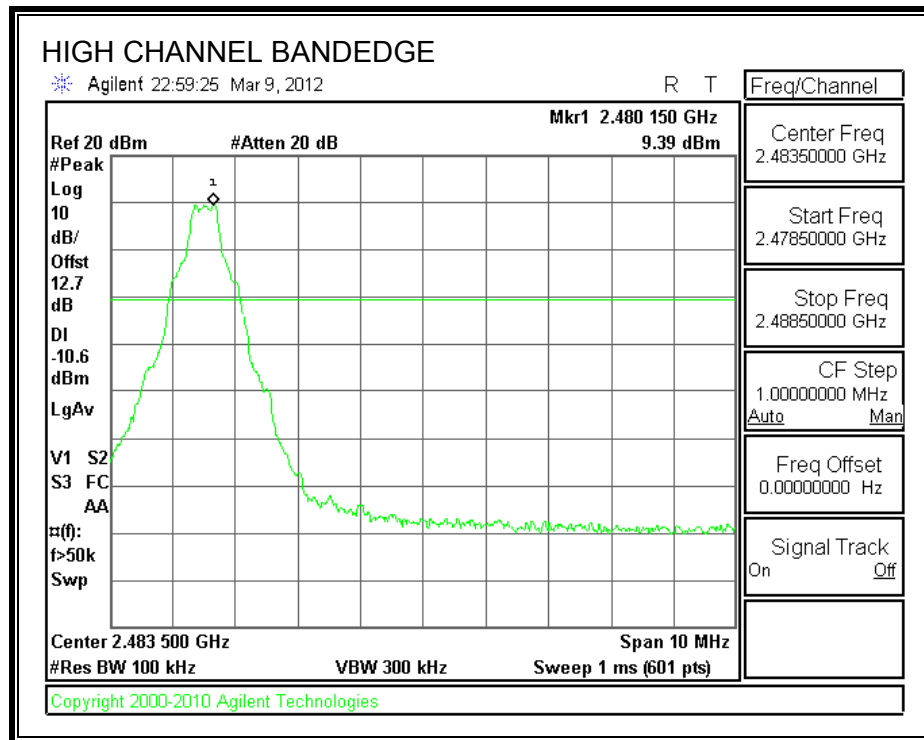


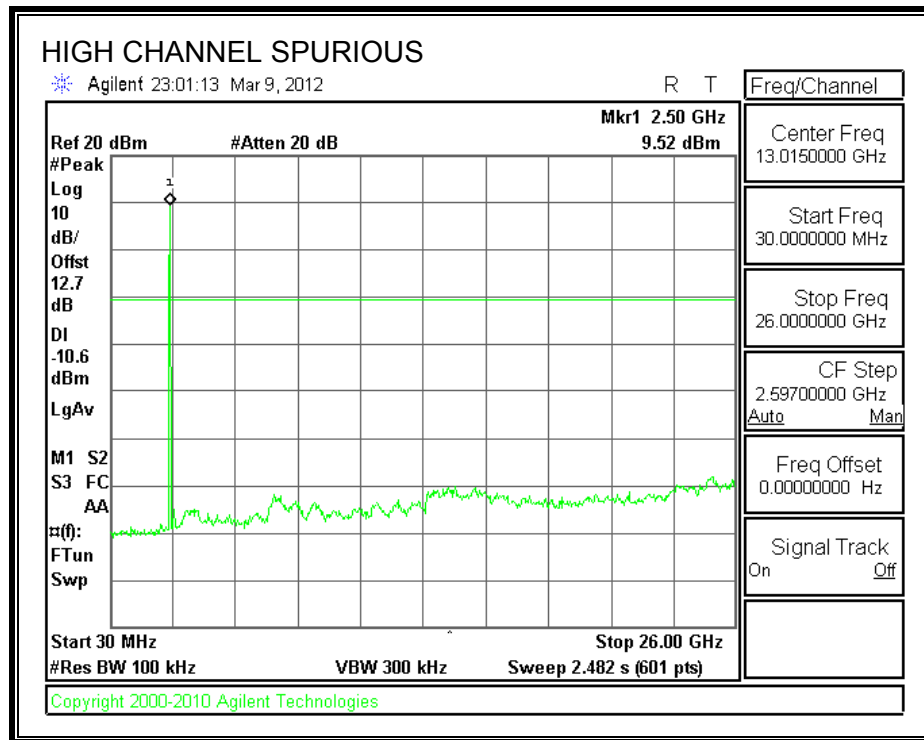
SPURIOUS EMISSIONS, MID CHANNEL



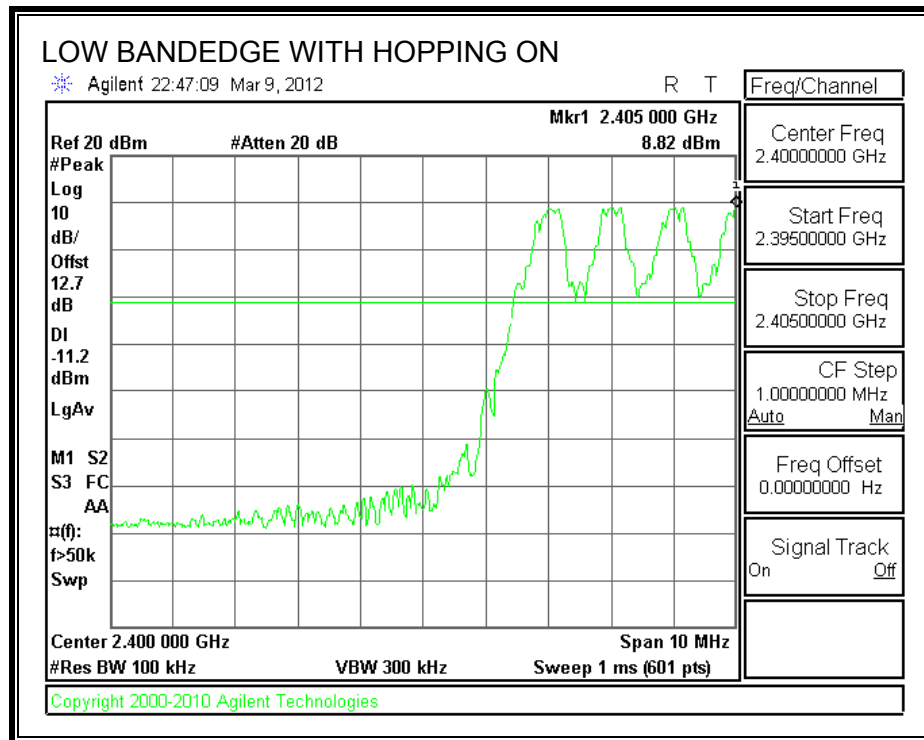


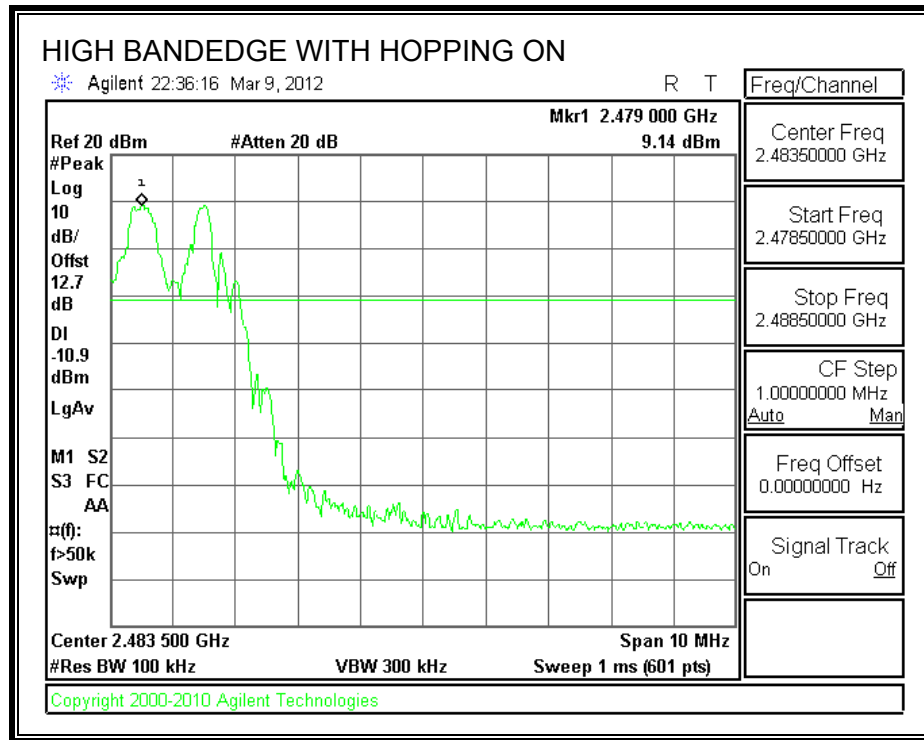
SPURIOUS EMISSIONS, HIGH CHANNEL





SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON





7.2. ENHANCED DATA RATE 8PSK MODULATION

7.2.1. 20 dB BANDWIDTH

LIMIT

None; for reporting purposes only.

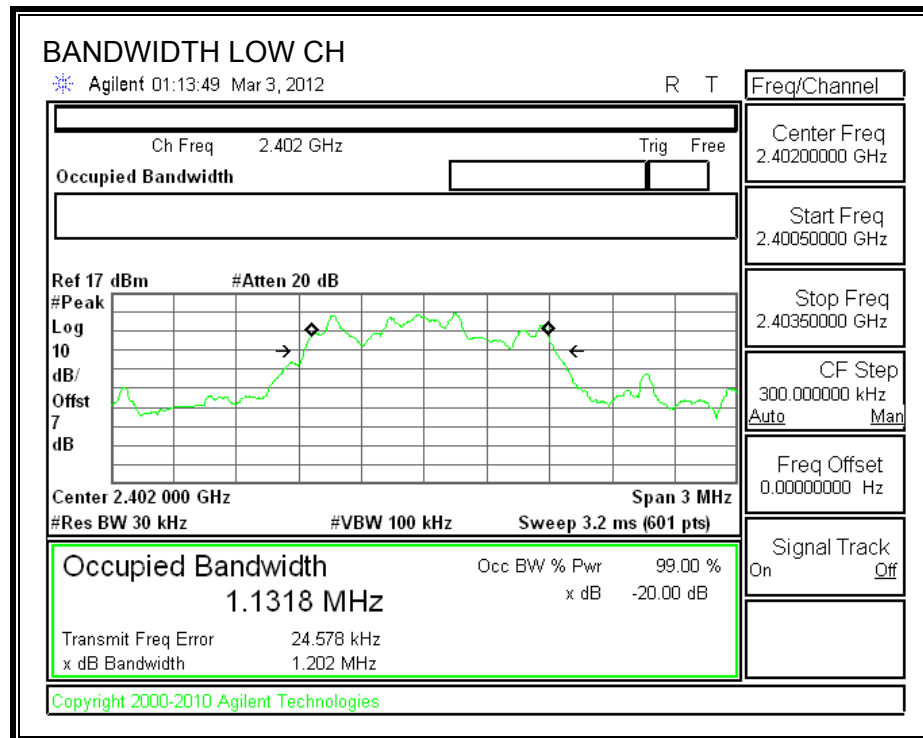
TEST PROCEDURE

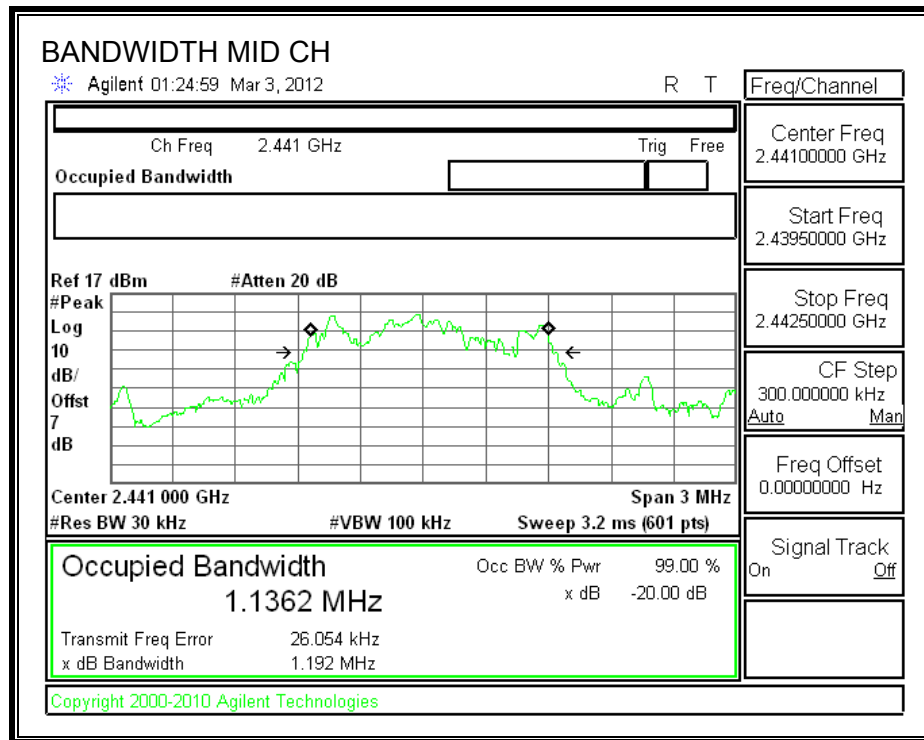
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled.

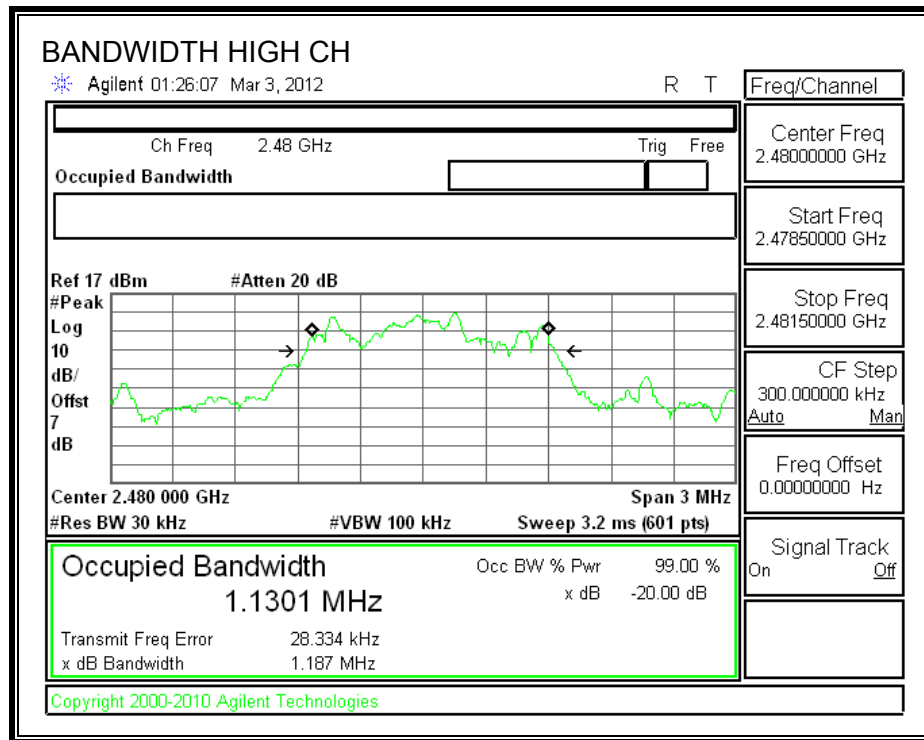
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	1.202
Middle	2441	1.192
High	2480	1.187

20 dB BANDWIDTH







7.2.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

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.

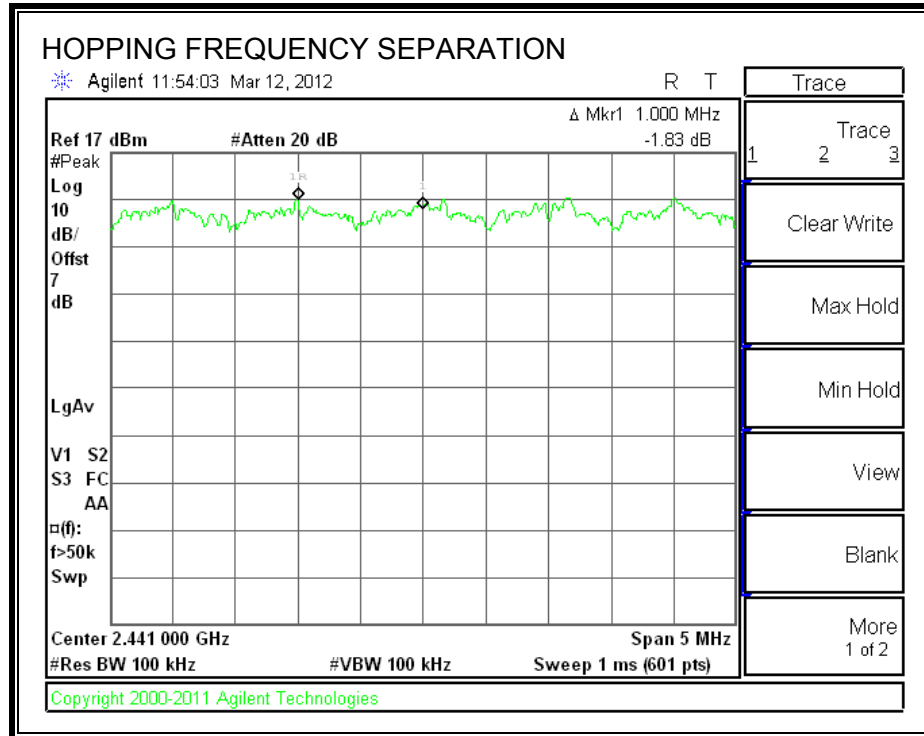
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 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)

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

TEST PROCEDURE

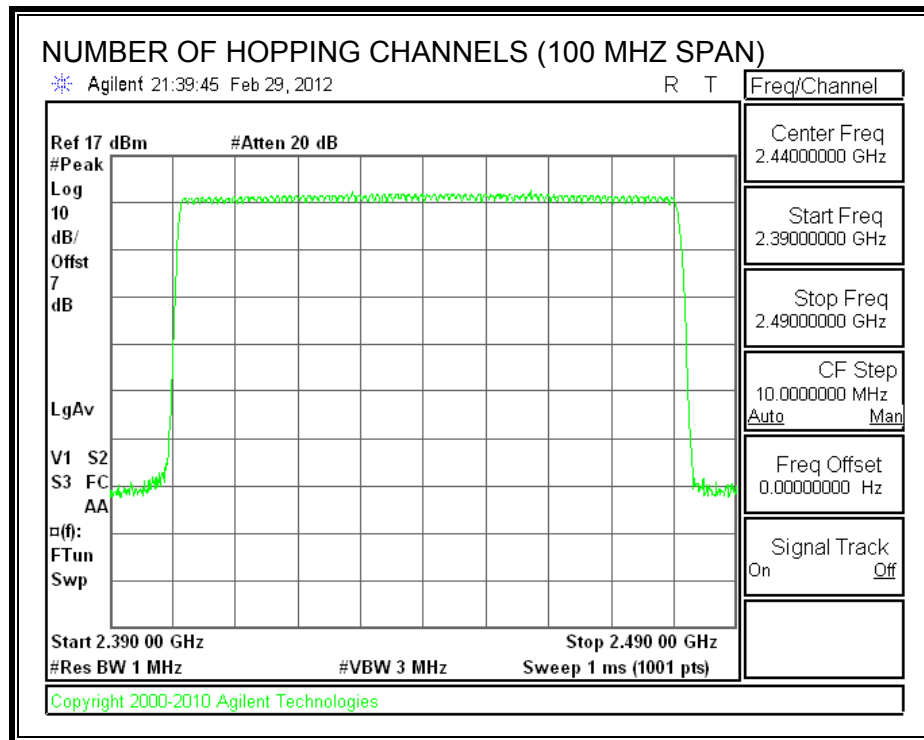
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

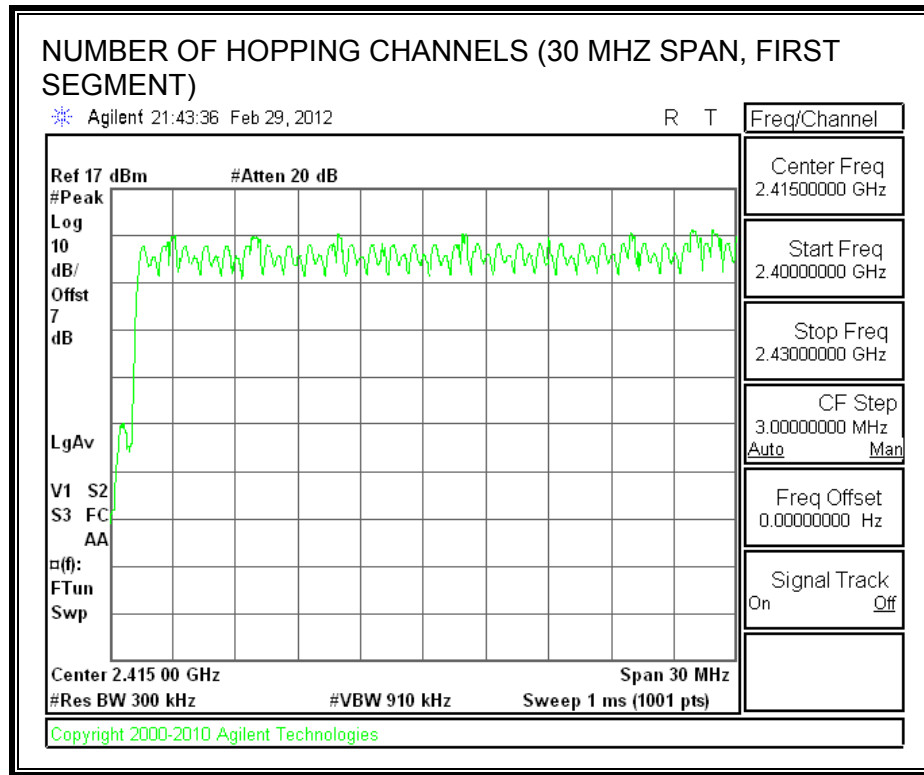
RESULTS

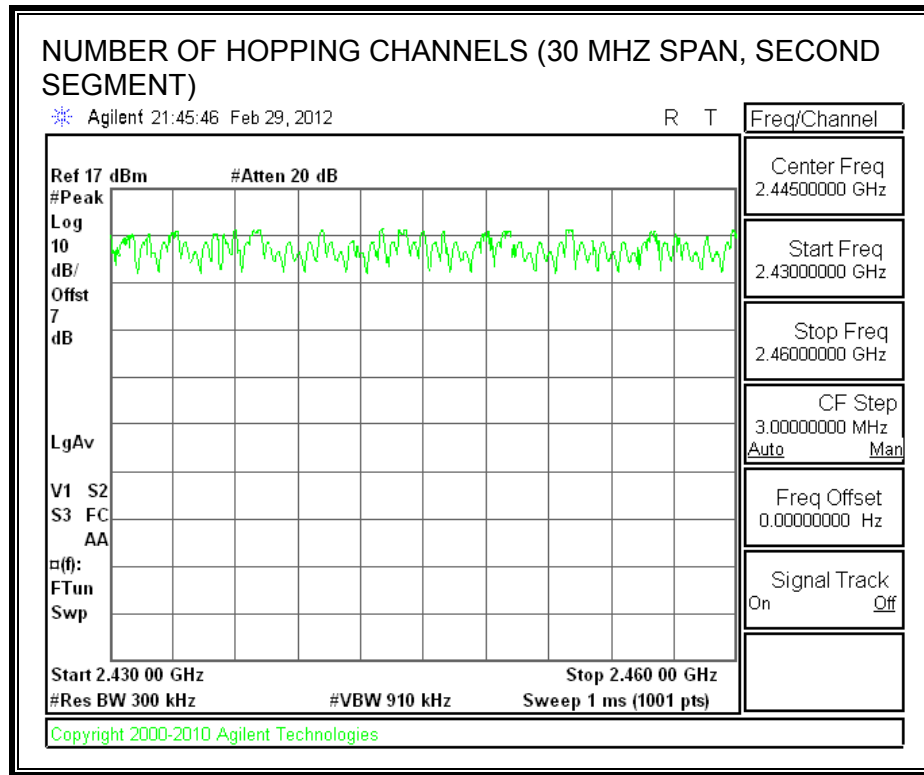
Normal mode: 79 Channels observed.

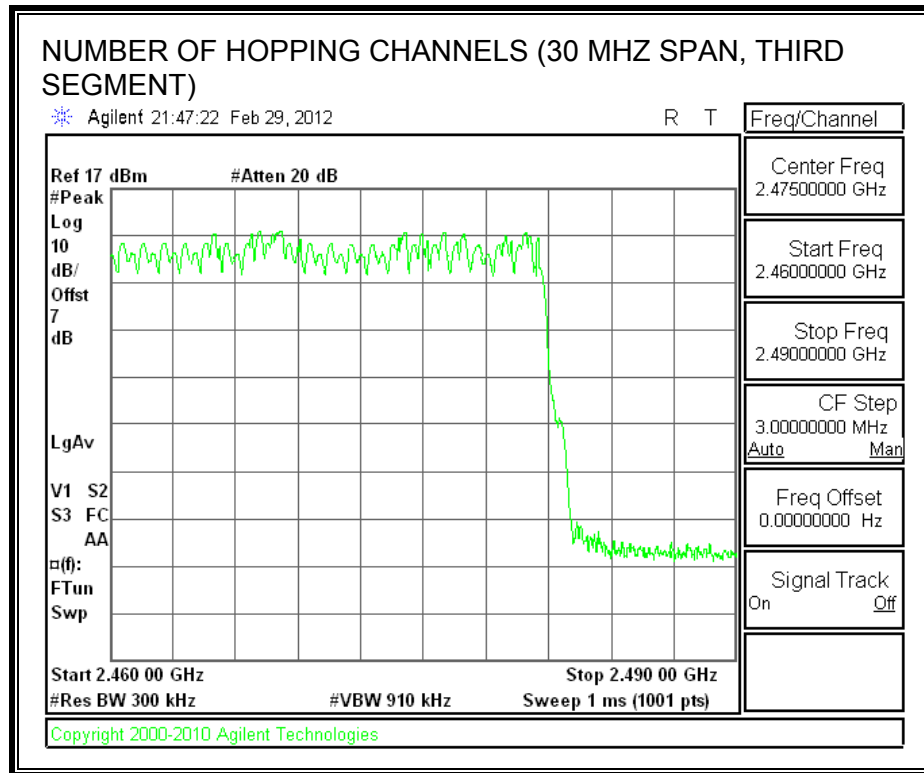
AFH mode: 79 channels as declared by the client.

NUMBER OF HOPPING CHANNELS (NORMAL MODE)









7.2.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

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 $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$.

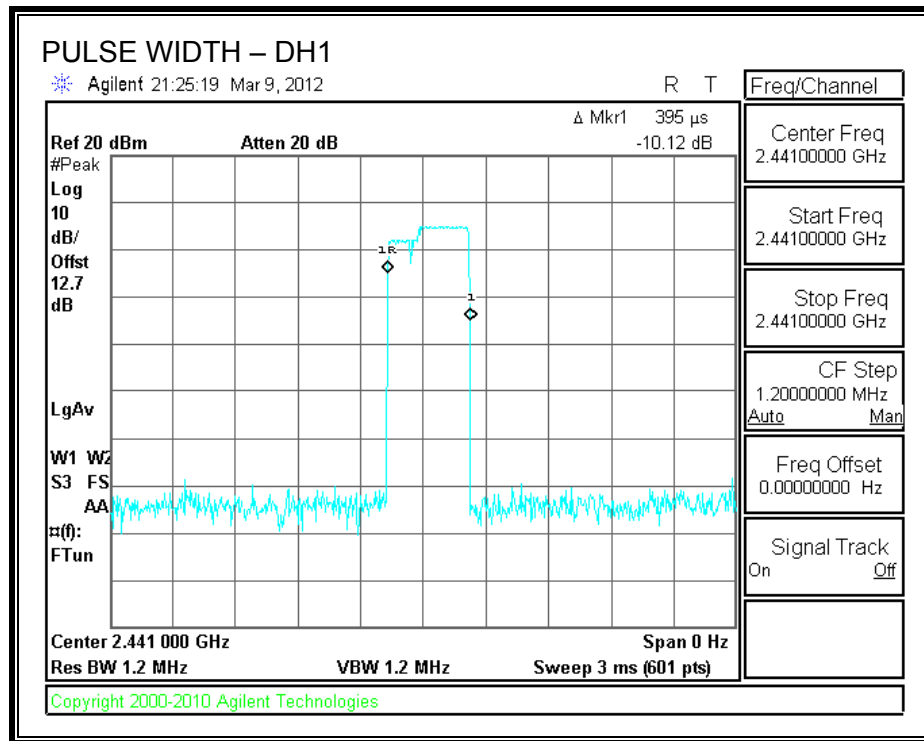
RESULTS

8PSK (EDR) Normal Mode

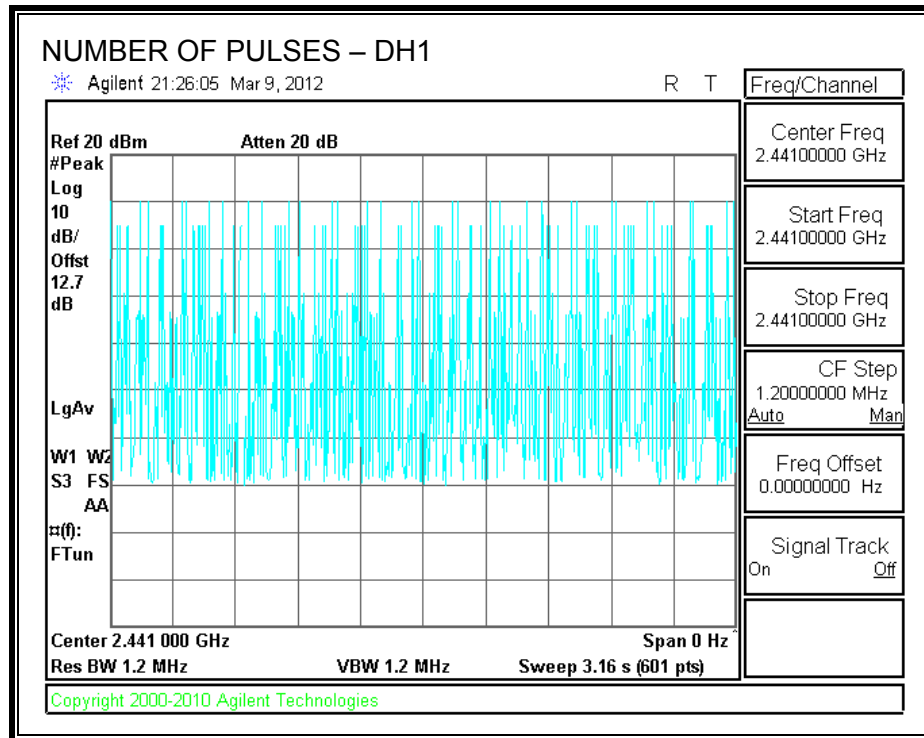
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.395	33	0.130	0.4	-0.270
DH3	1.65	13	0.215	0.4	-0.186
DH5	2.9	12	0.348	0.4	-0.052

NORMAL MODE

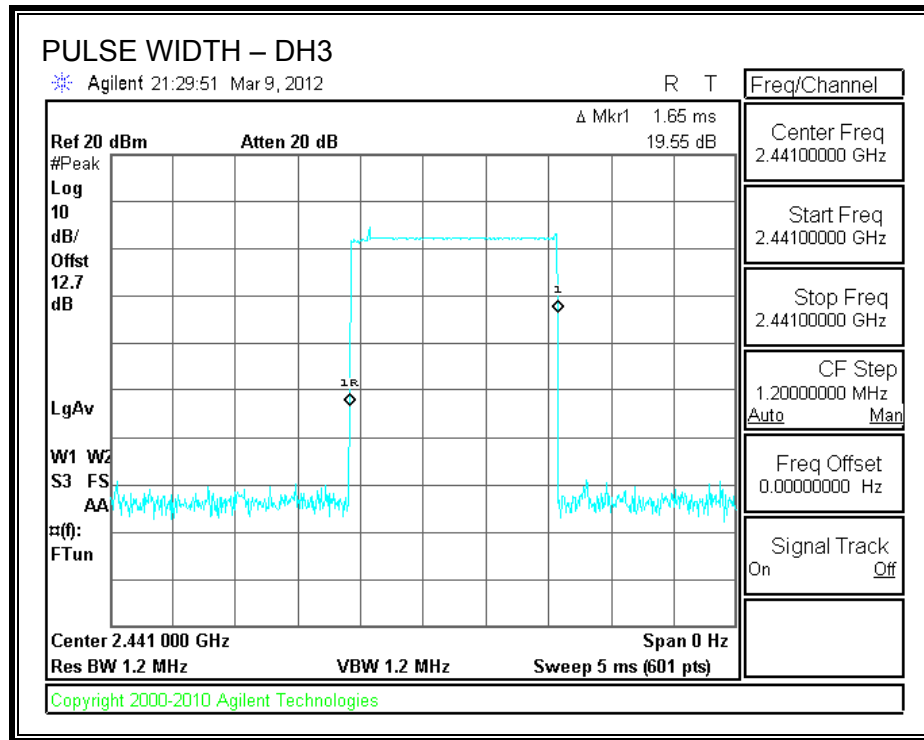
PULSE WIDTH - DH1



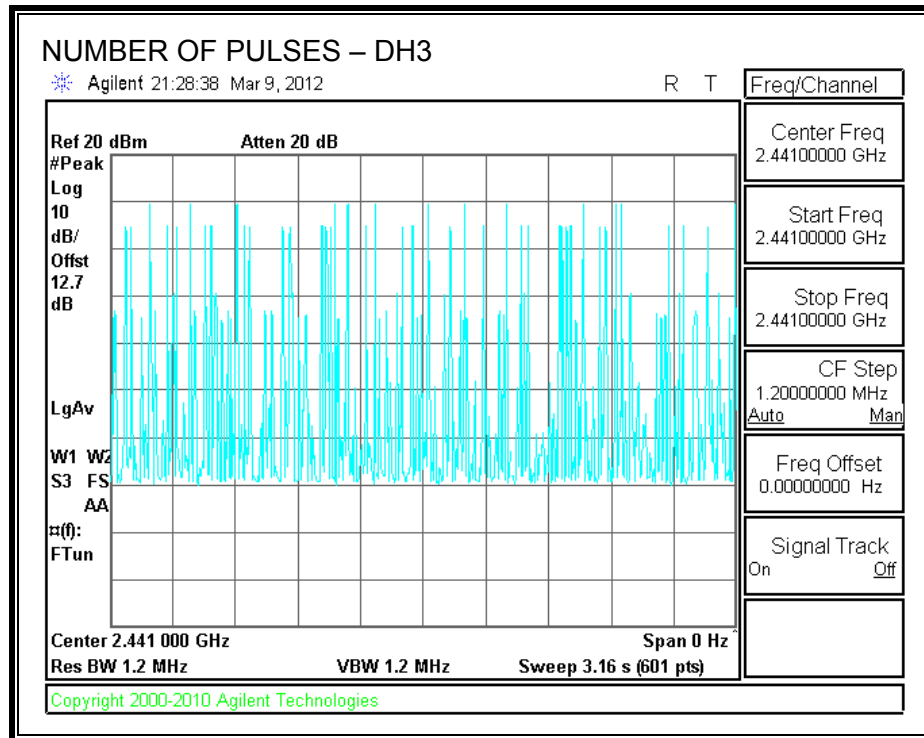
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



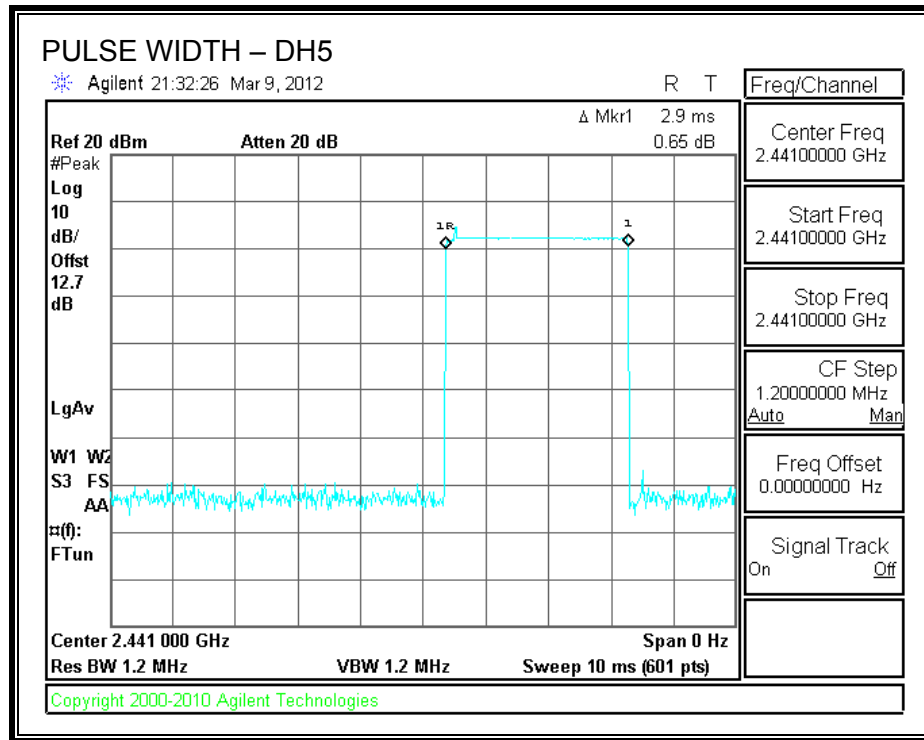
PULSE WIDTH – DH3



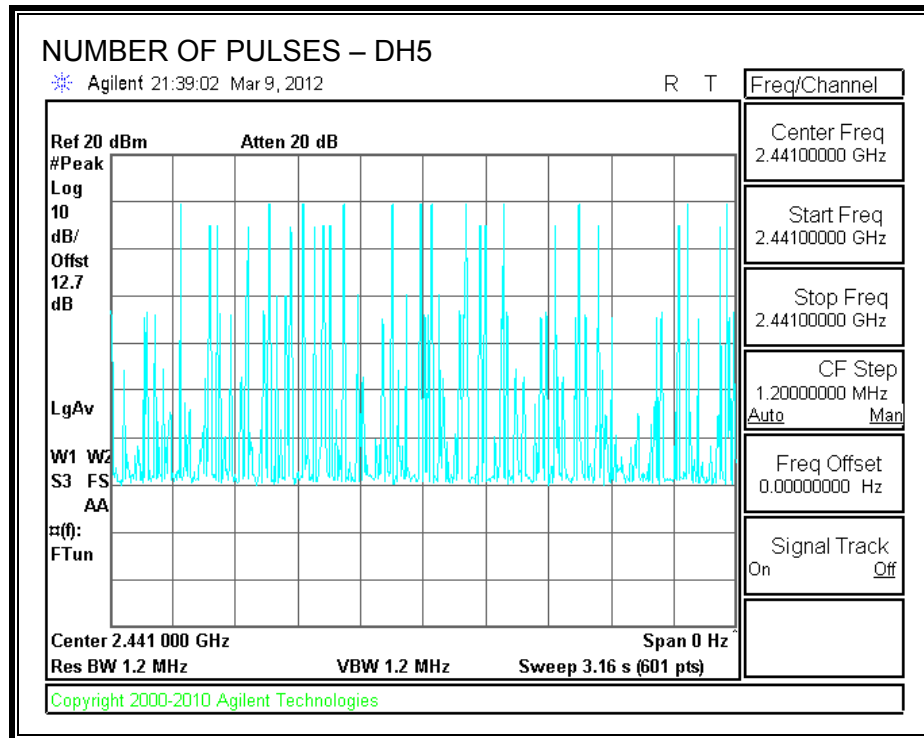
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



7.2.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

The maximum antenna gain is less than 6 dBi, therefore the limit is 20.97 dBm.

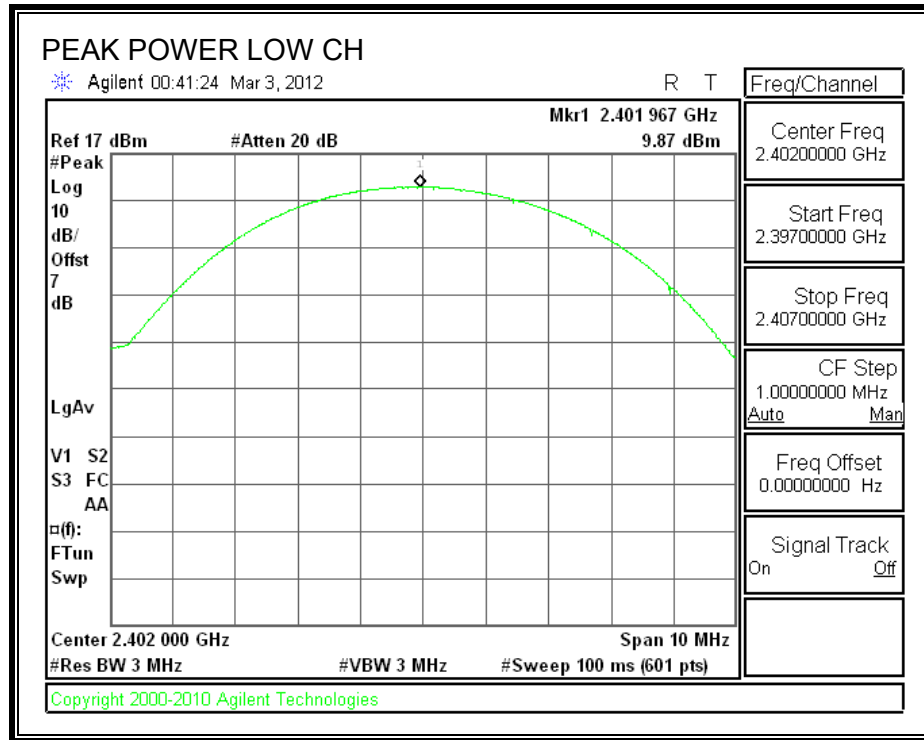
TEST PROCEDURE

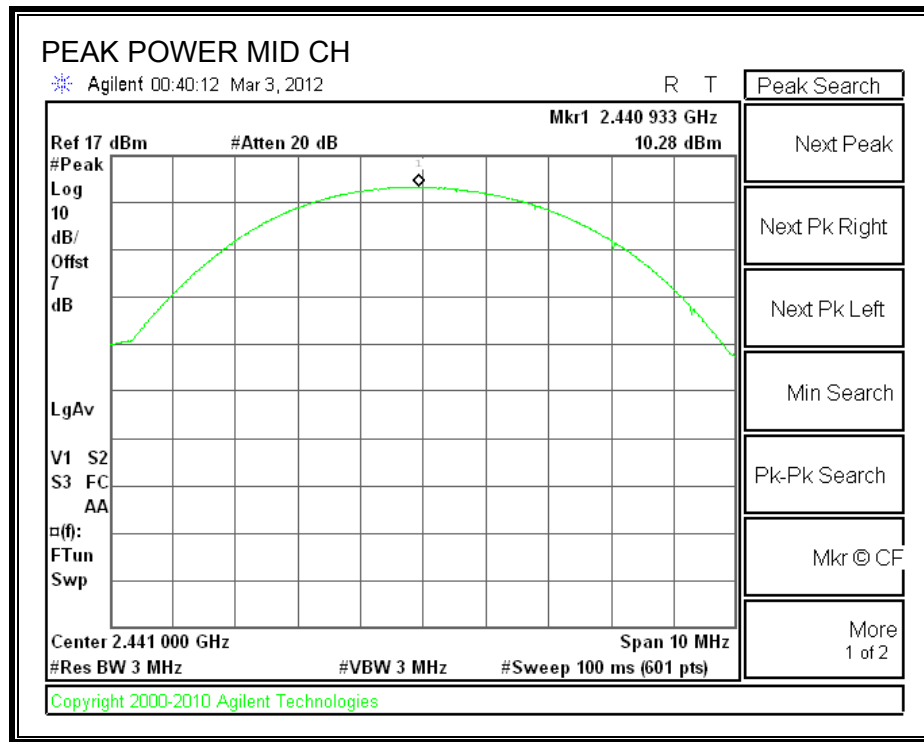
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

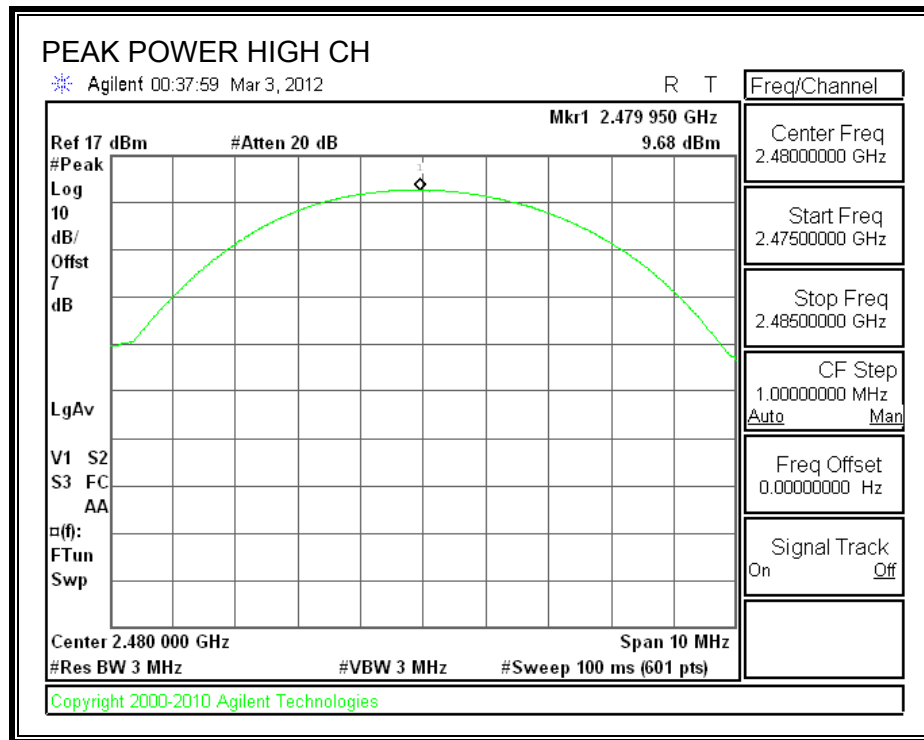
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	9.87	20.97	-11.10
Middle	2441	10.28	20.97	-10.69
High	2480	9.68	20.97	-11.29

OUTPUT POWER







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 7.0 dB (including 6.3 dB pad and 0.7 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	4.02
Middle	2441	4.41
High	2480	3.80

7.2.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

Limit = -20 dBc

TEST PROCEDURE

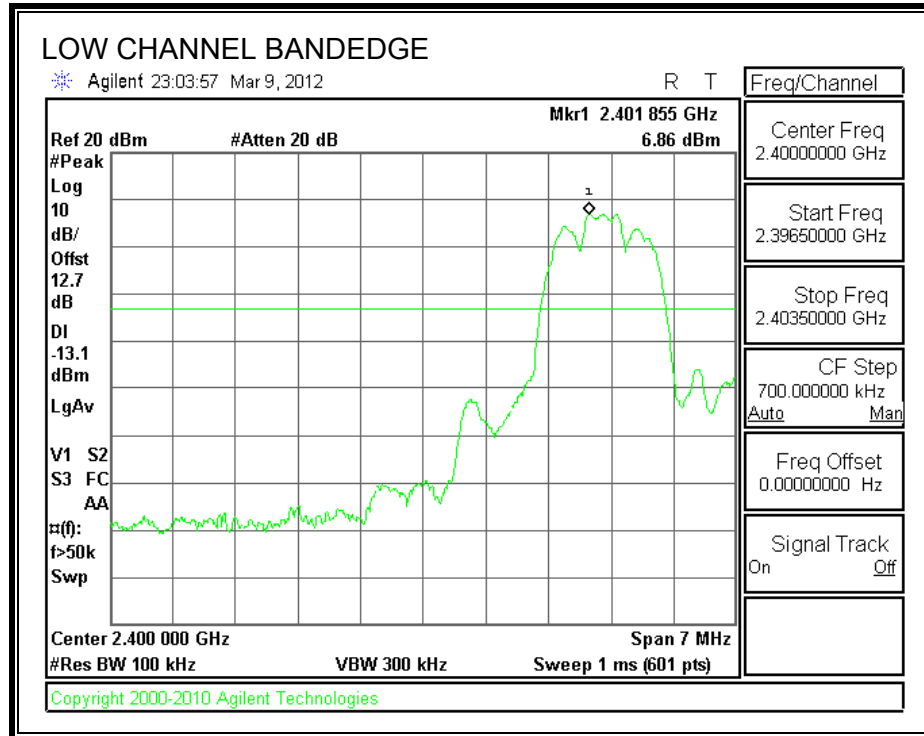
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

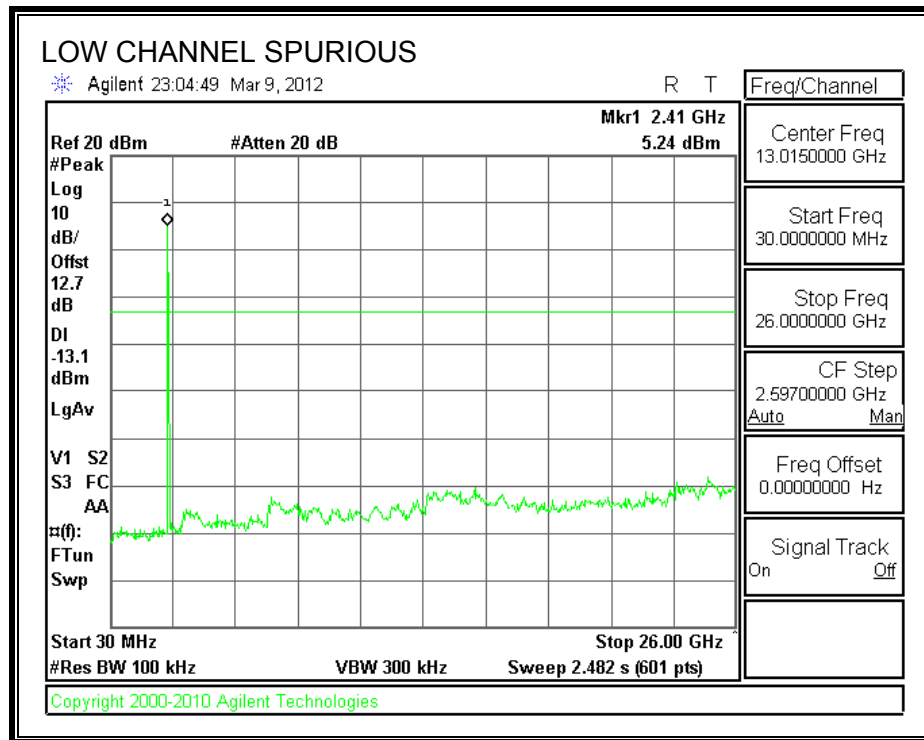
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

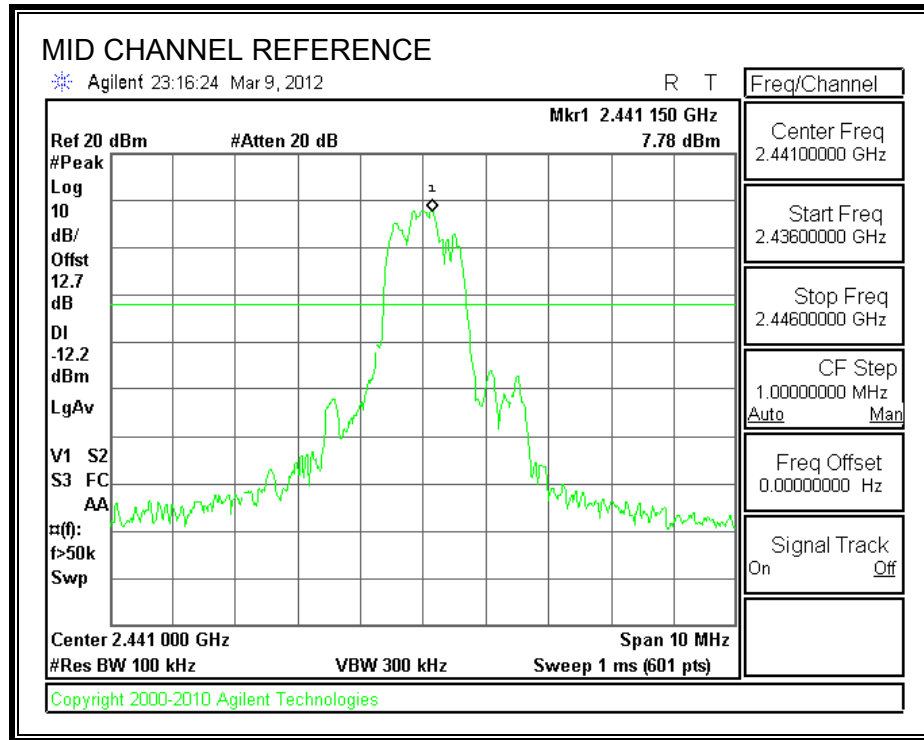
RESULTS

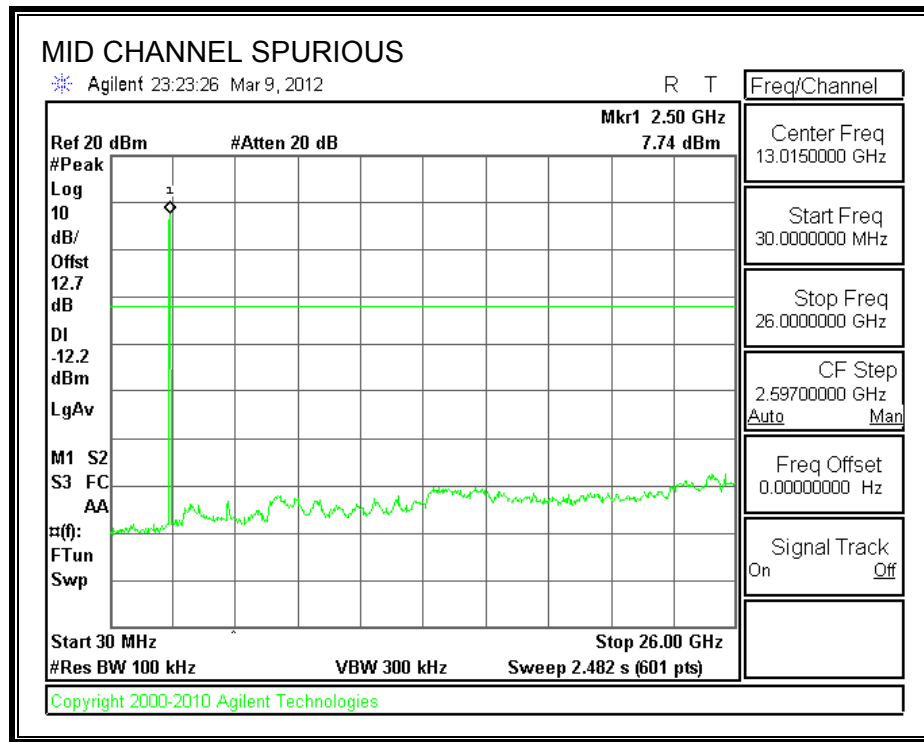
SPURIOUS EMISSIONS, LOW CHANNEL



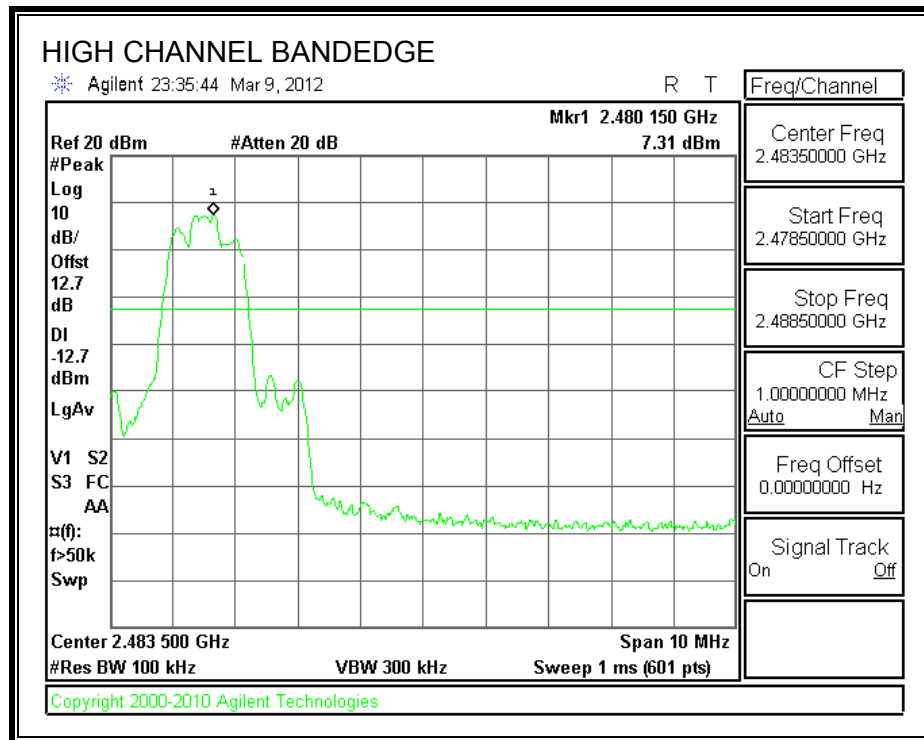


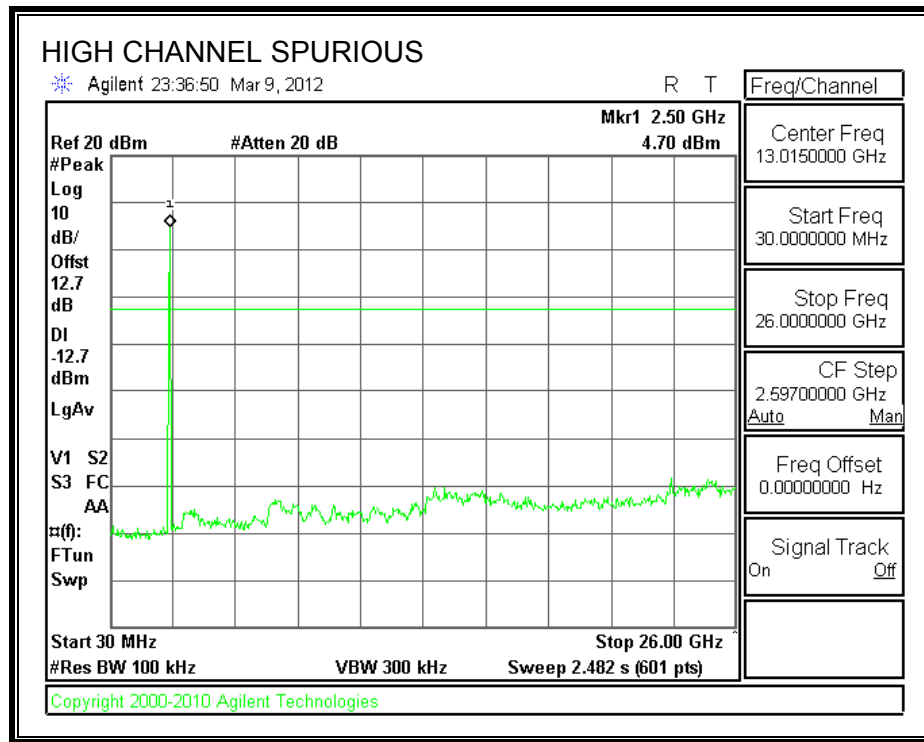
SPURIOUS EMISSIONS, MID CHANNEL



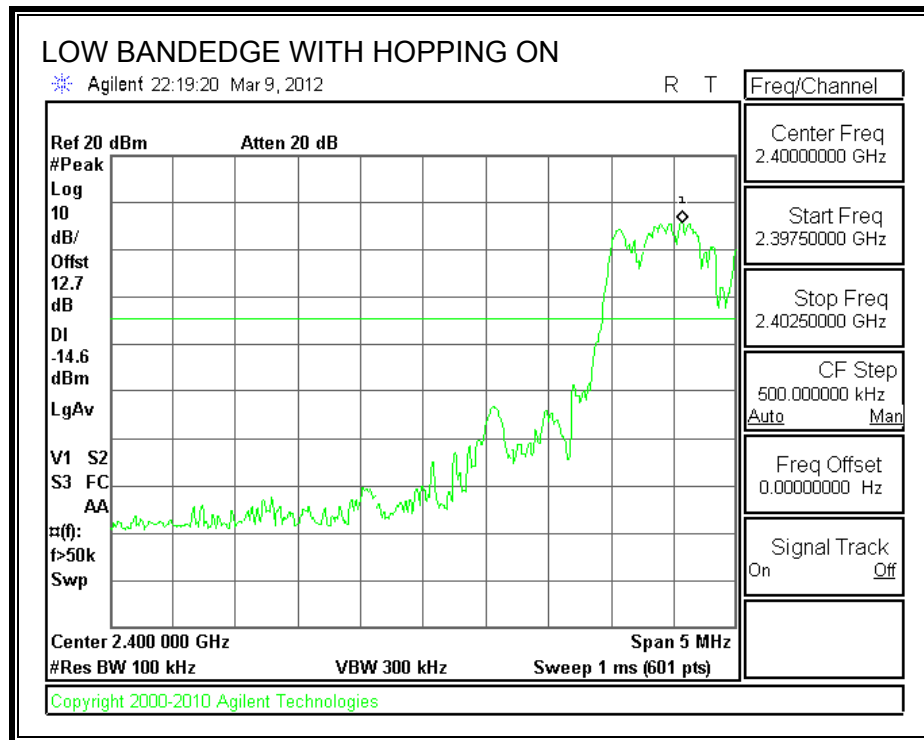


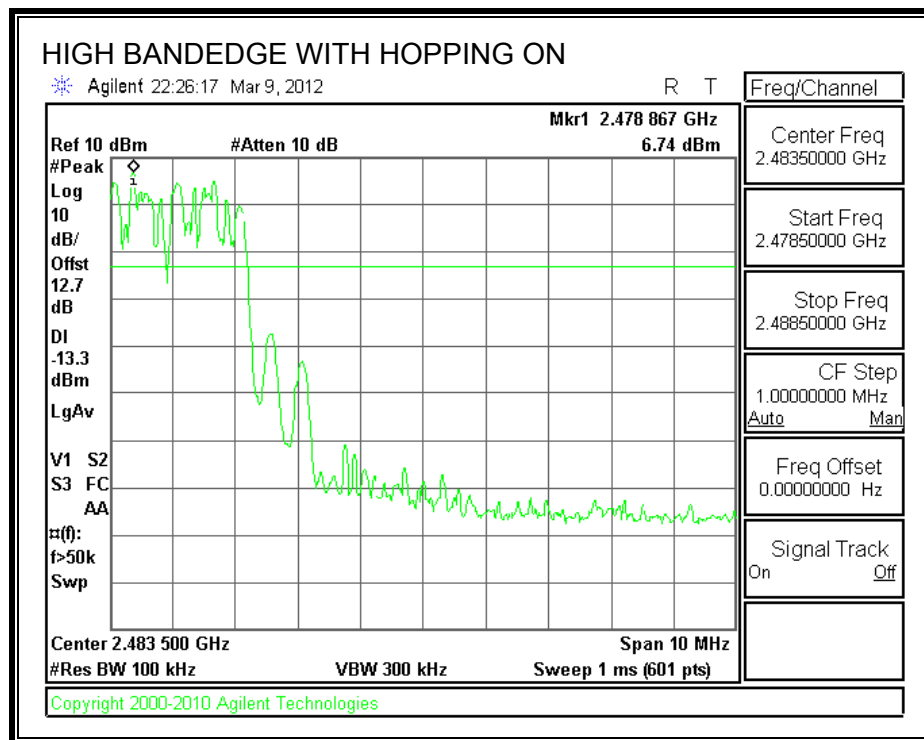
SPURIOUS EMISSIONS, HIGH CHANNEL





SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON





8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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.

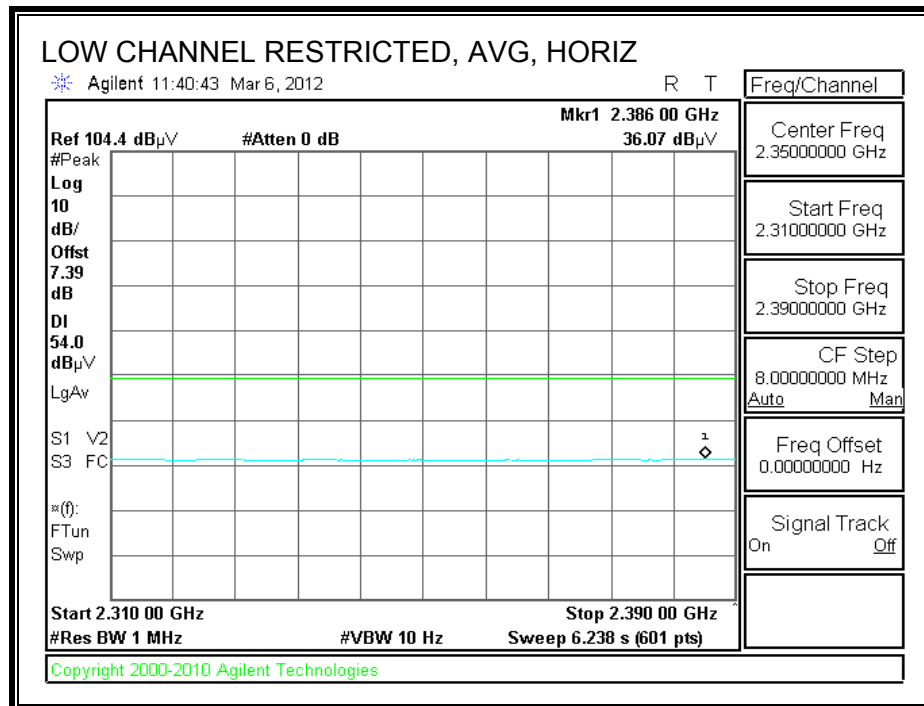
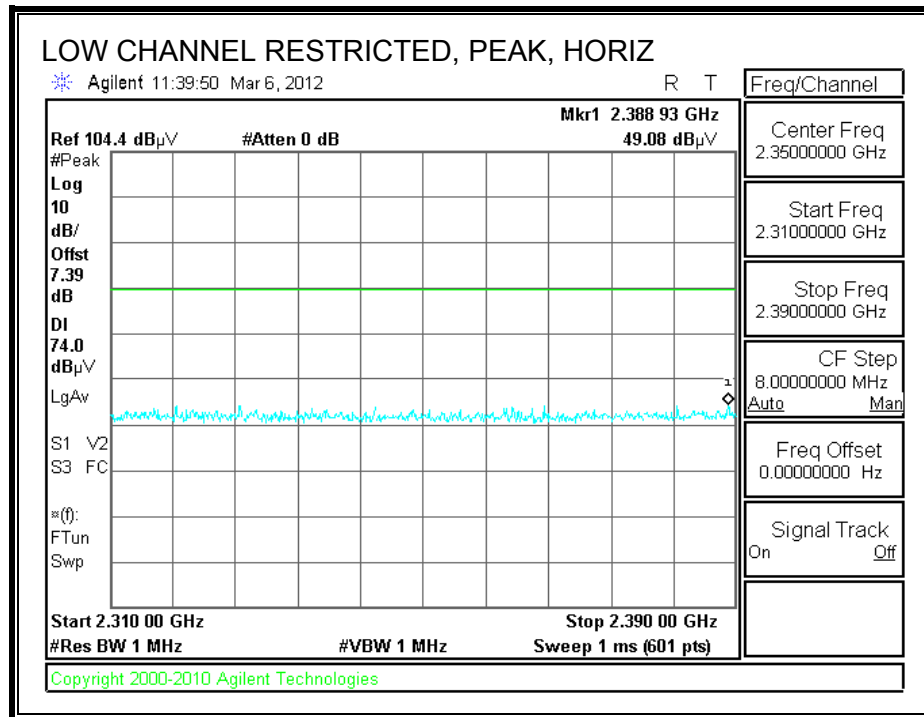
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

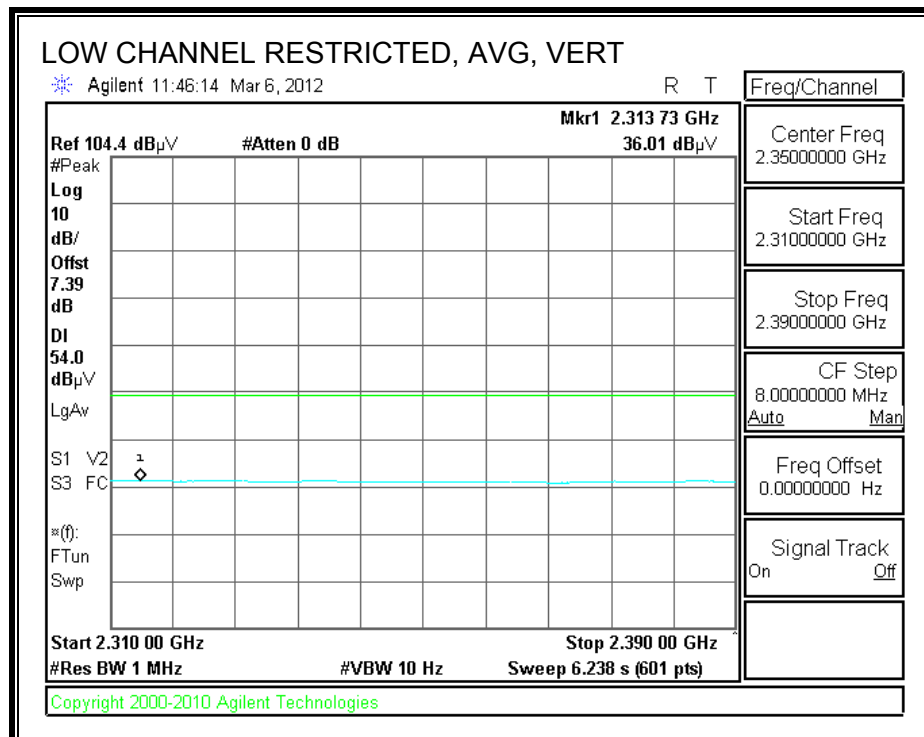
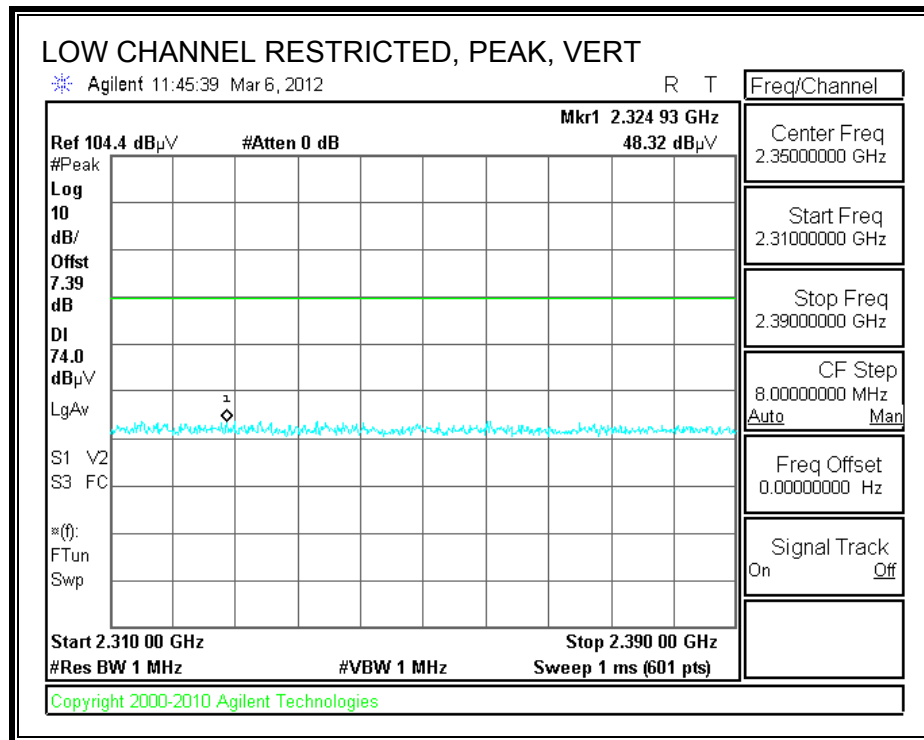
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. BASIC DATA RATE GFSK MODULATION

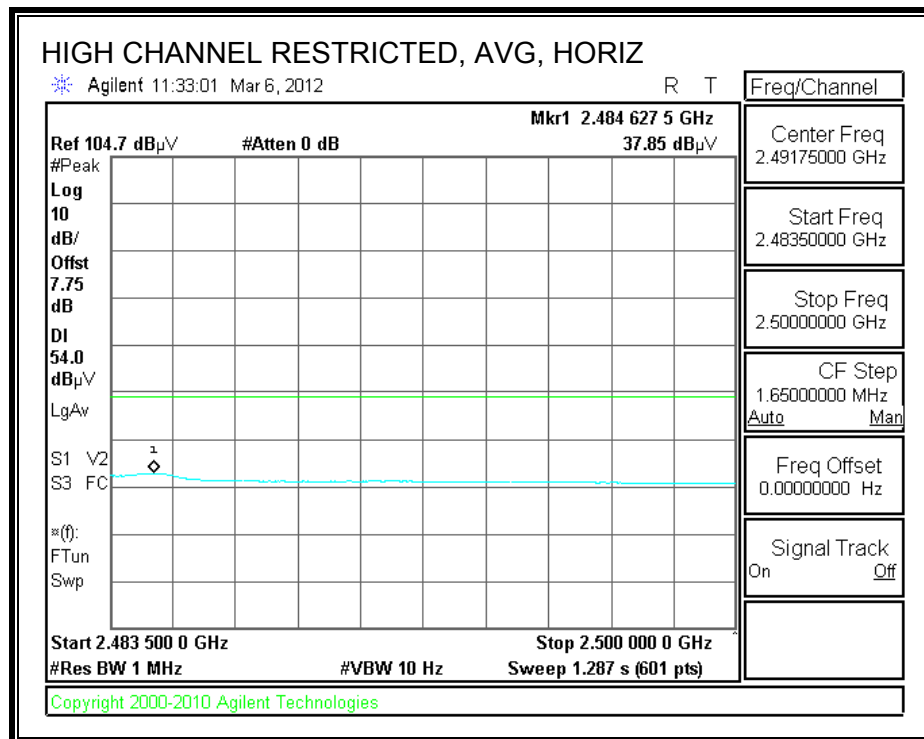
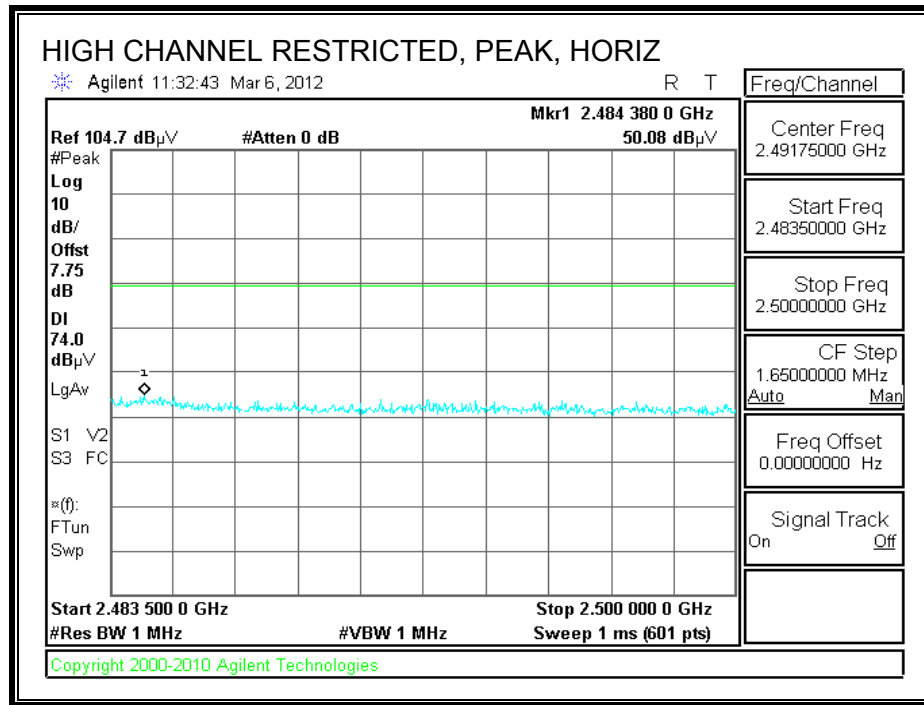
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



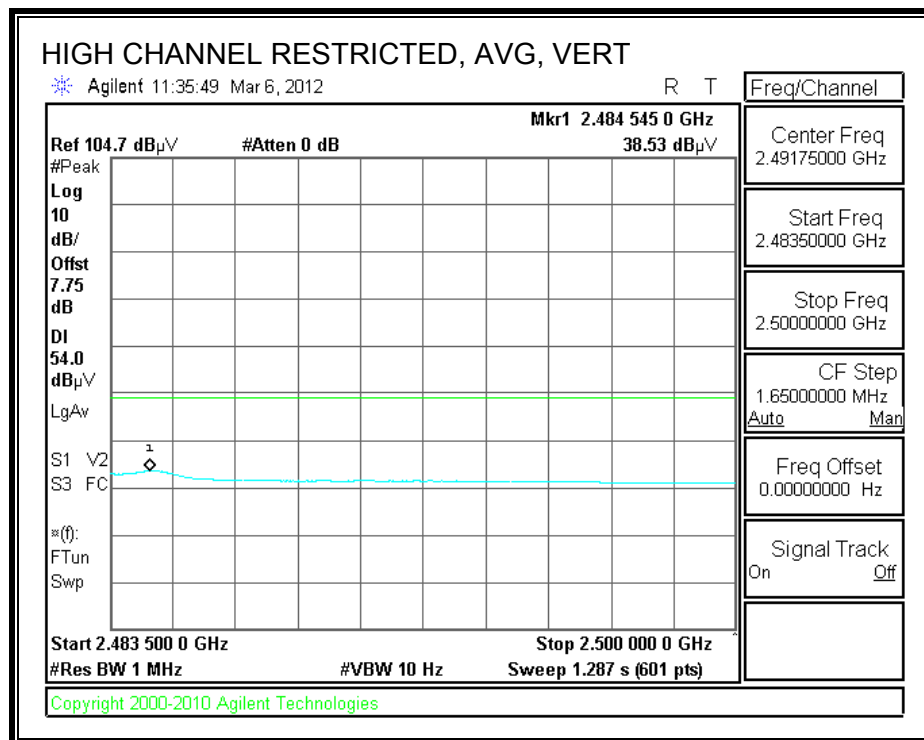
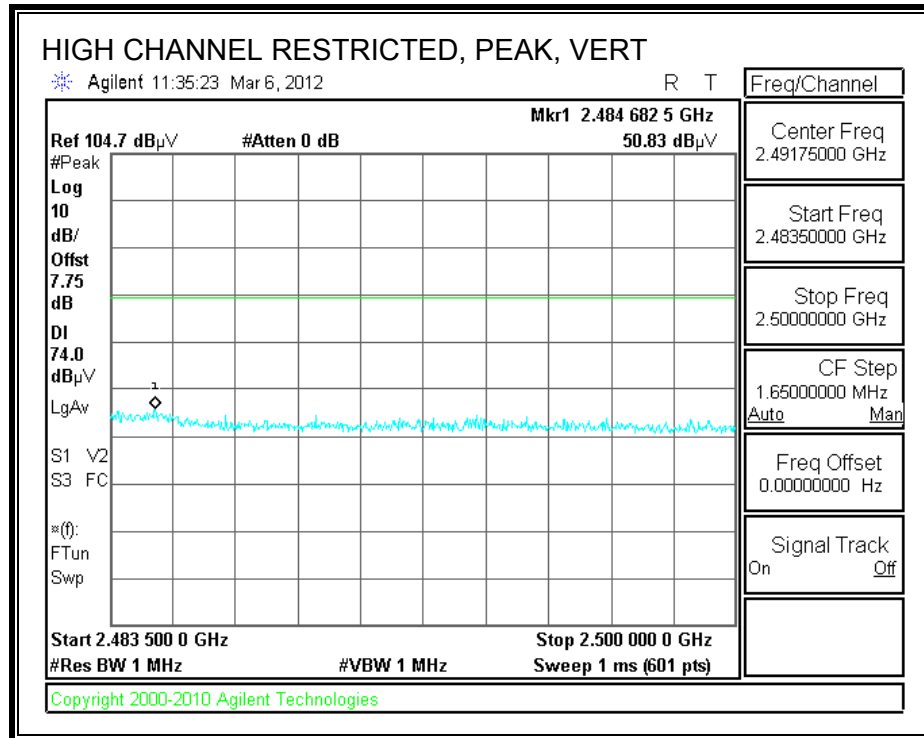
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

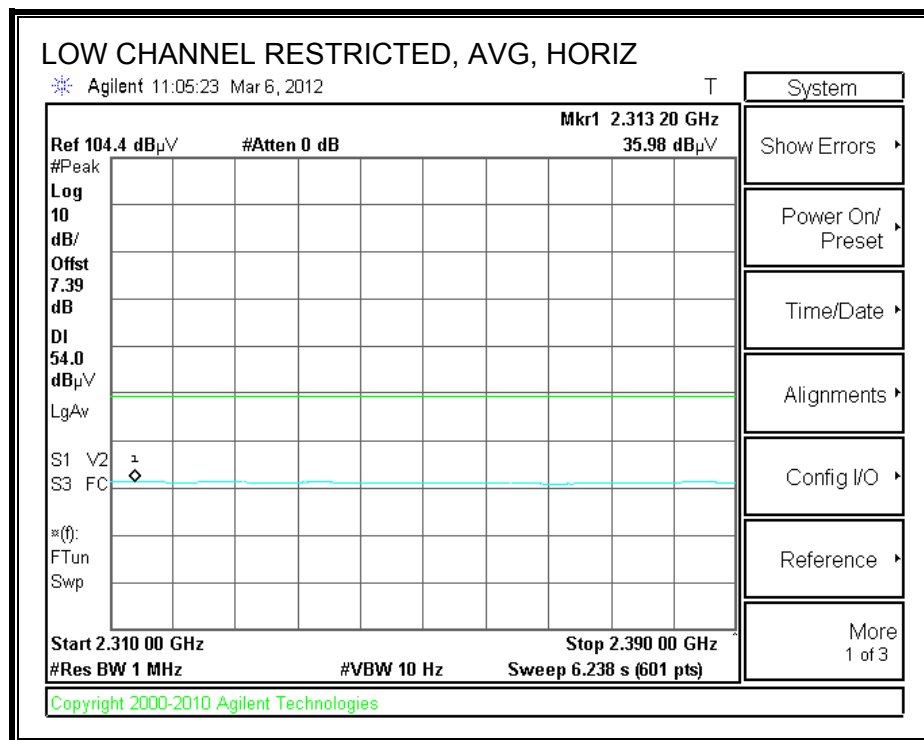
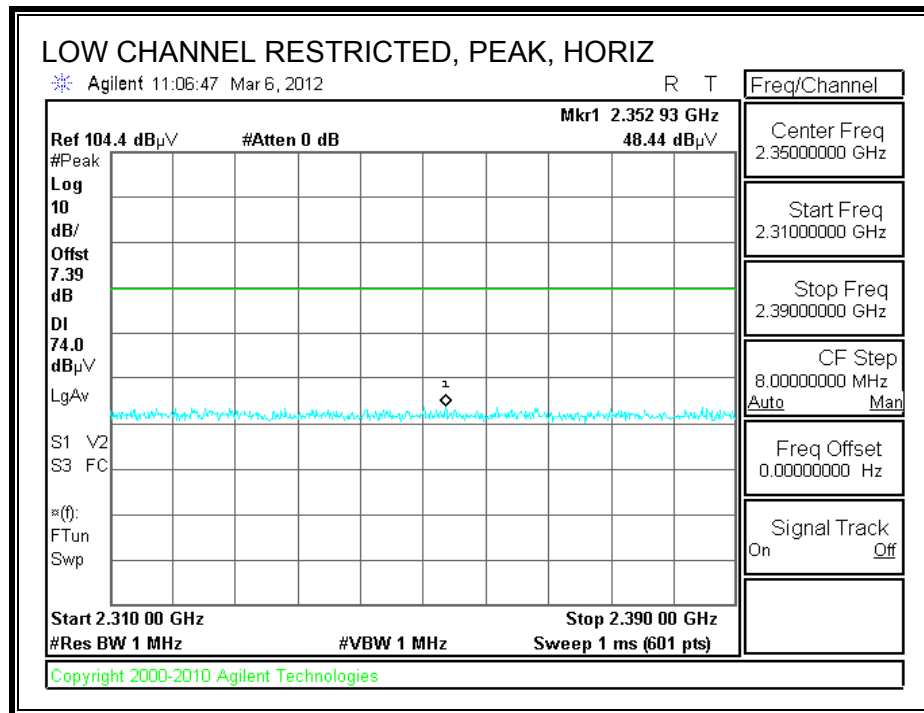


HARMONICS AND SPURIOUS EMISSIONS

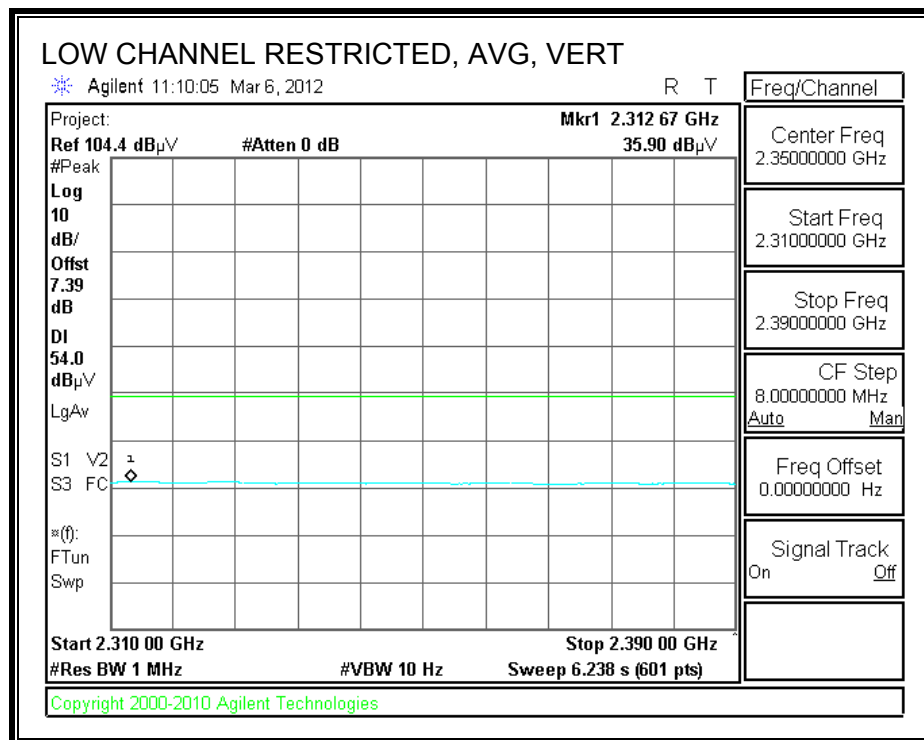
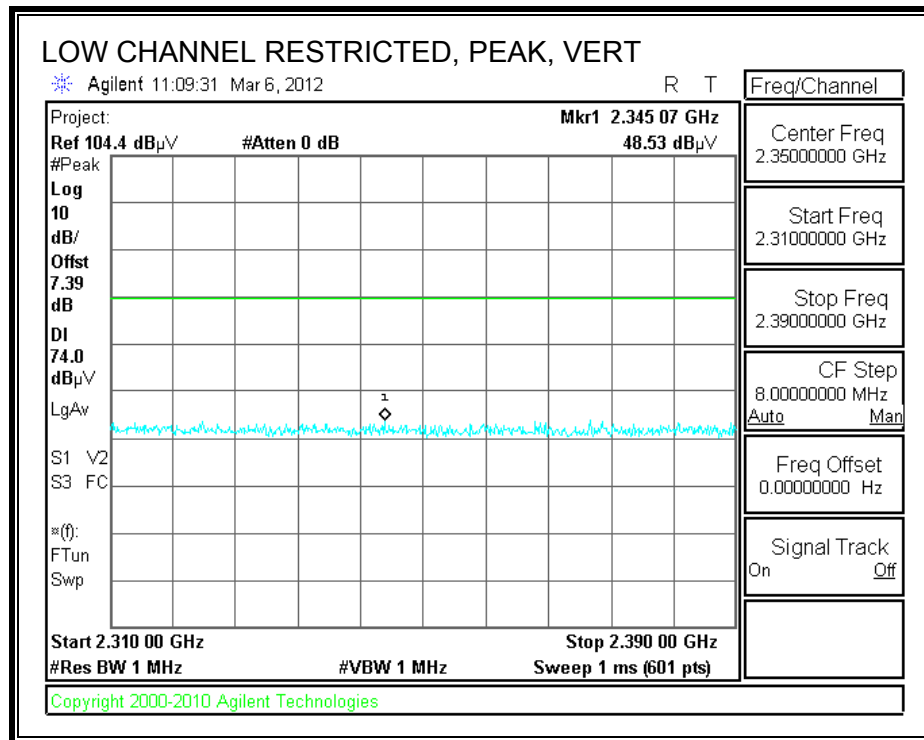
High Frequency Measurement Compliance Certification Services, Fremont 3m Chamber													
Test Engr:		Vien Tran											
Date:		03/06/12											
Company:		Samsung											
Test Target:		FCC 15.247											
Mode Oper:		TX GFSK Mode											
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit								
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit								
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit								
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit								
CL	Cable Loss	HPF	High Pass Filter										
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
CHANNEL 0, 2402MHz													
4.804	3.0	38.6	33.1	6.8	-34.1	0.0	0.0	44.4	74.0	-29.6	V	P	
4.804	3.0	26.5	33.1	6.8	-34.1	0.0	0.0	32.3	54.0	-21.7	V	A	
4.804	3.0	36.6	33.1	6.8	-34.1	0.0	0.0	42.4	74.0	-31.6	H	P	
4.804	3.0	24.5	33.1	6.8	-34.1	0.0	0.0	30.3	54.0	-23.7	H	A	
CHANNEL 39, 2441MHz													
4.882	3.0	38.9	33.2	6.8	-34.0	0.0	0.0	44.8	74.0	-29.2	V	P	
4.882	3.0	27.5	33.2	6.8	-34.0	0.0	0.0	33.4	54.0	-20.6	V	A	
7.323	3.0	35.5	36.3	9.1	-33.1	0.0	0.0	47.8	74.0	-26.2	V	P	
7.323	3.0	22.8	36.3	9.1	-33.1	0.0	0.0	35.1	54.0	-18.9	V	A	
4.882	3.0	37.7	33.2	6.8	-34.0	0.0	0.0	43.6	74.0	-30.4	H	P	
4.882	3.0	25.2	33.2	6.8	-34.0	0.0	0.0	31.1	54.0	-22.9	H	A	
7.323	3.0	35.2	36.3	9.1	-33.1	0.0	0.0	47.5	74.0	-26.5	H	P	
7.323	3.0	22.8	36.3	9.1	-33.1	0.0	0.0	35.1	54.0	-18.9	H	A	
CHANNEL 78, 2480MHz													
4.960	3.0	37.0	33.2	6.9	-34.0	0.0	0.0	43.0	74.0	-31.0	V	P	
4.960	3.0	24.7	33.2	6.9	-34.0	0.0	0.0	30.8	54.0	-23.2	V	A	
7.440	3.0	35.4	36.5	9.1	-33.0	0.0	0.0	48.0	74.0	-26.0	V	P	
7.440	3.0	23.0	36.5	9.1	-33.0	0.0	0.0	35.5	54.0	-18.5	V	A	
4.960	3.0	37.3	33.2	6.9	-34.0	0.0	0.0	43.3	74.0	-30.7	H	P	
4.960	3.0	24.7	33.2	6.9	-34.0	0.0	0.0	30.8	54.0	-23.2	H	A	
7.440	3.0	35.2	36.5	9.1	-33.0	0.0	0.0	47.8	74.0	-26.2	H	P	
7.440	3.0	23.0	36.5	9.1	-33.0	0.0	0.0	35.6	54.0	-18.4	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

8.2.2. ENHANCED DATA RATE 8PSK MODULATION

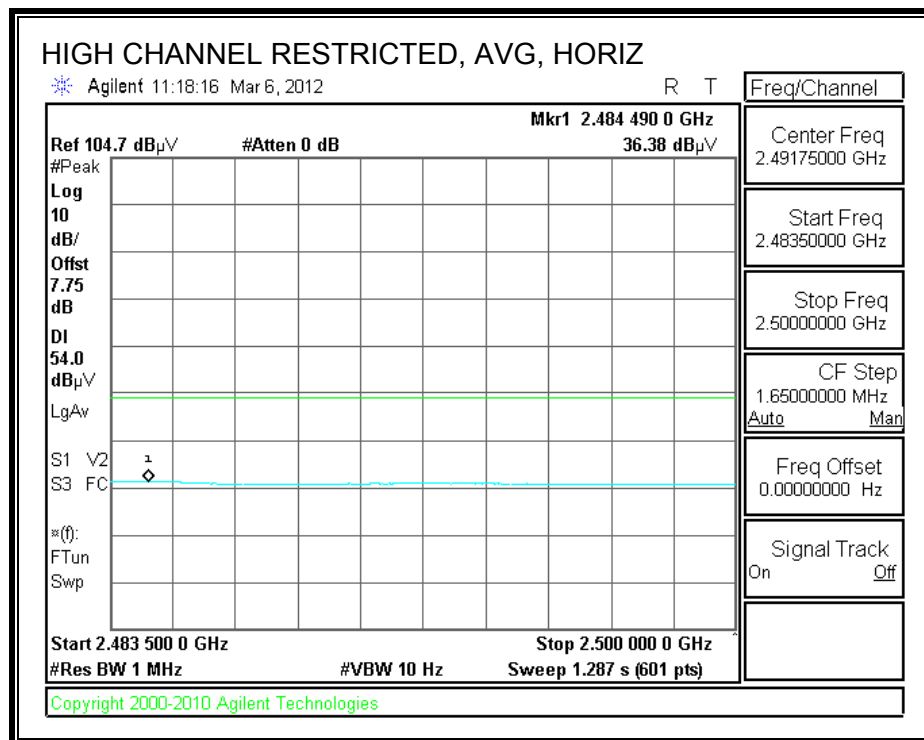
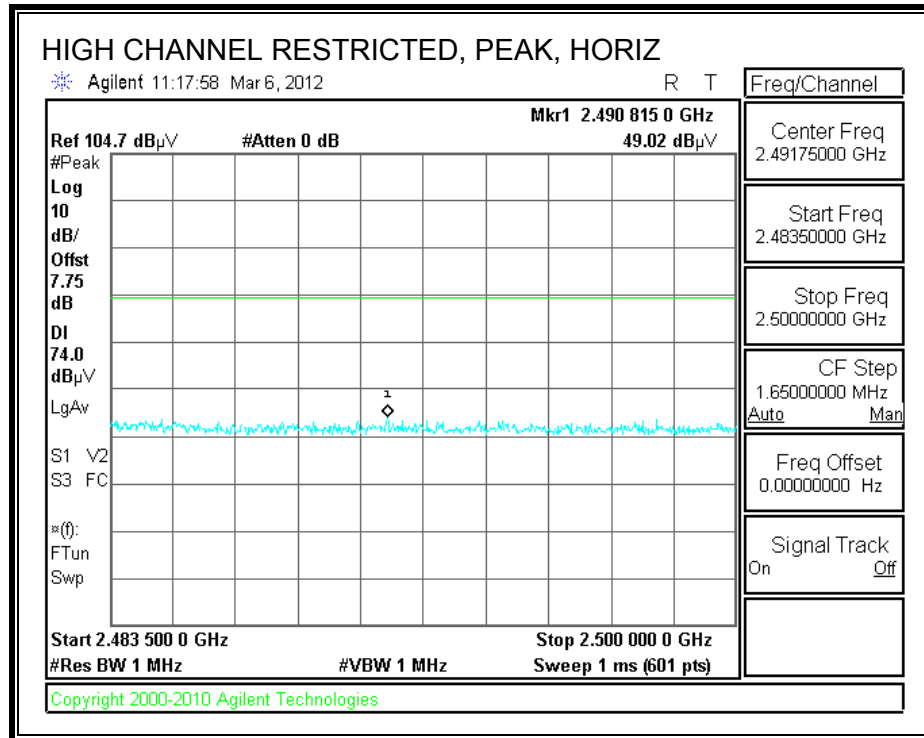
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



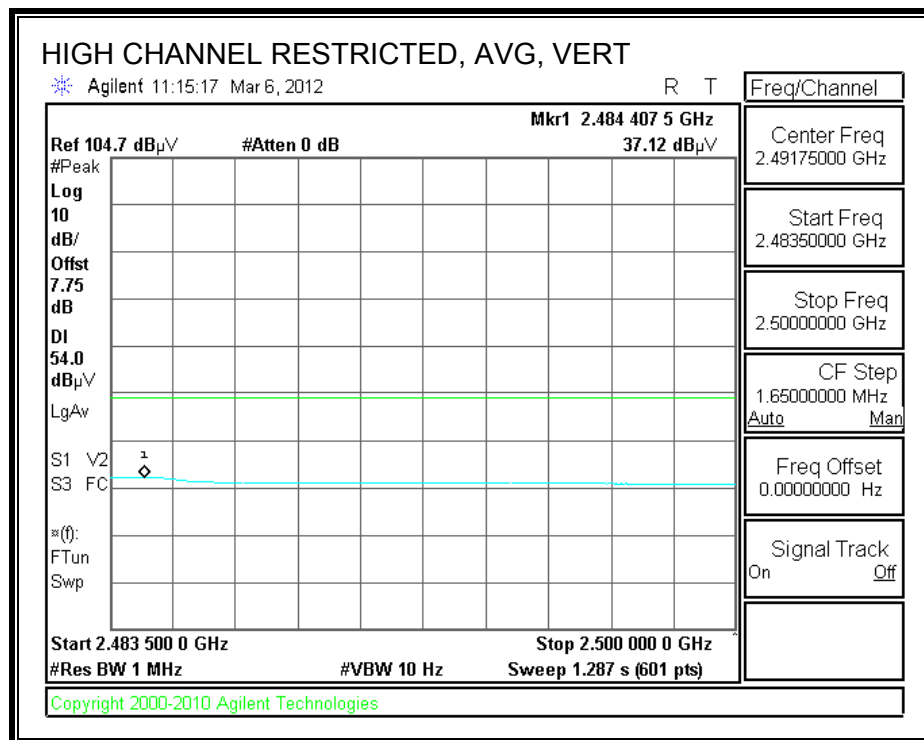
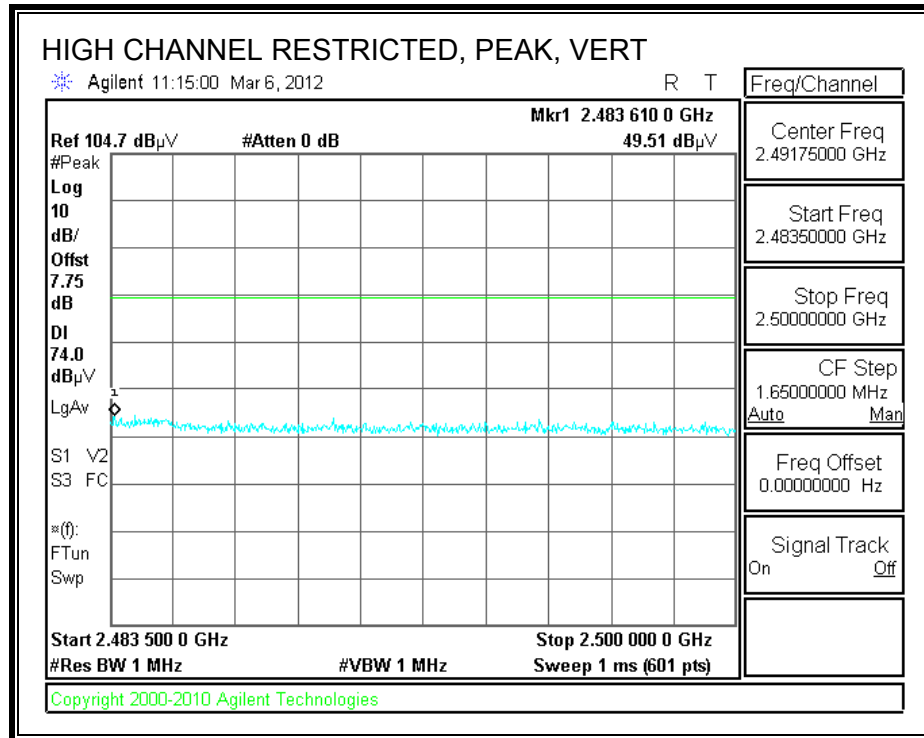
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

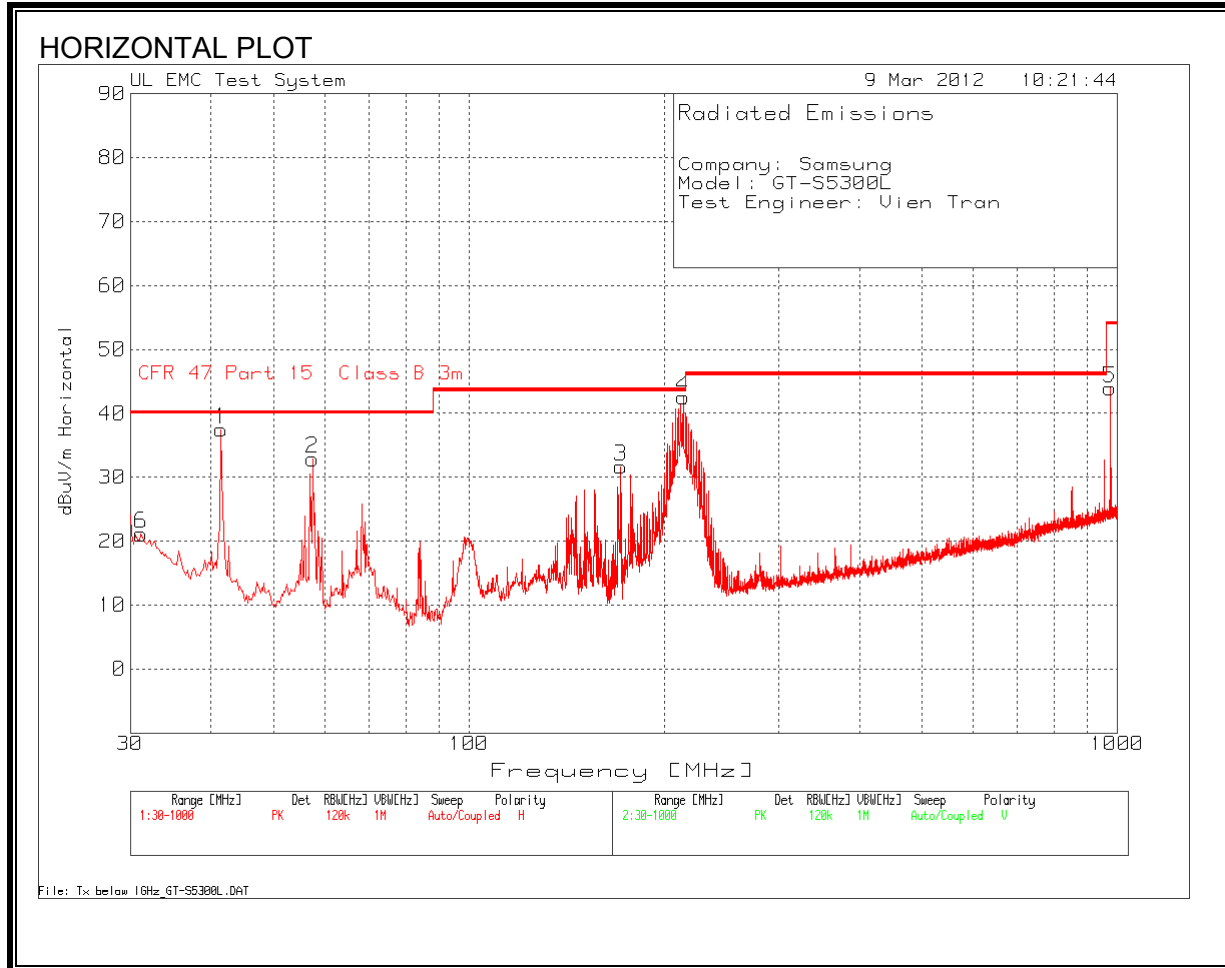


HARMONICS AND SPURIOUS EMISSIONS

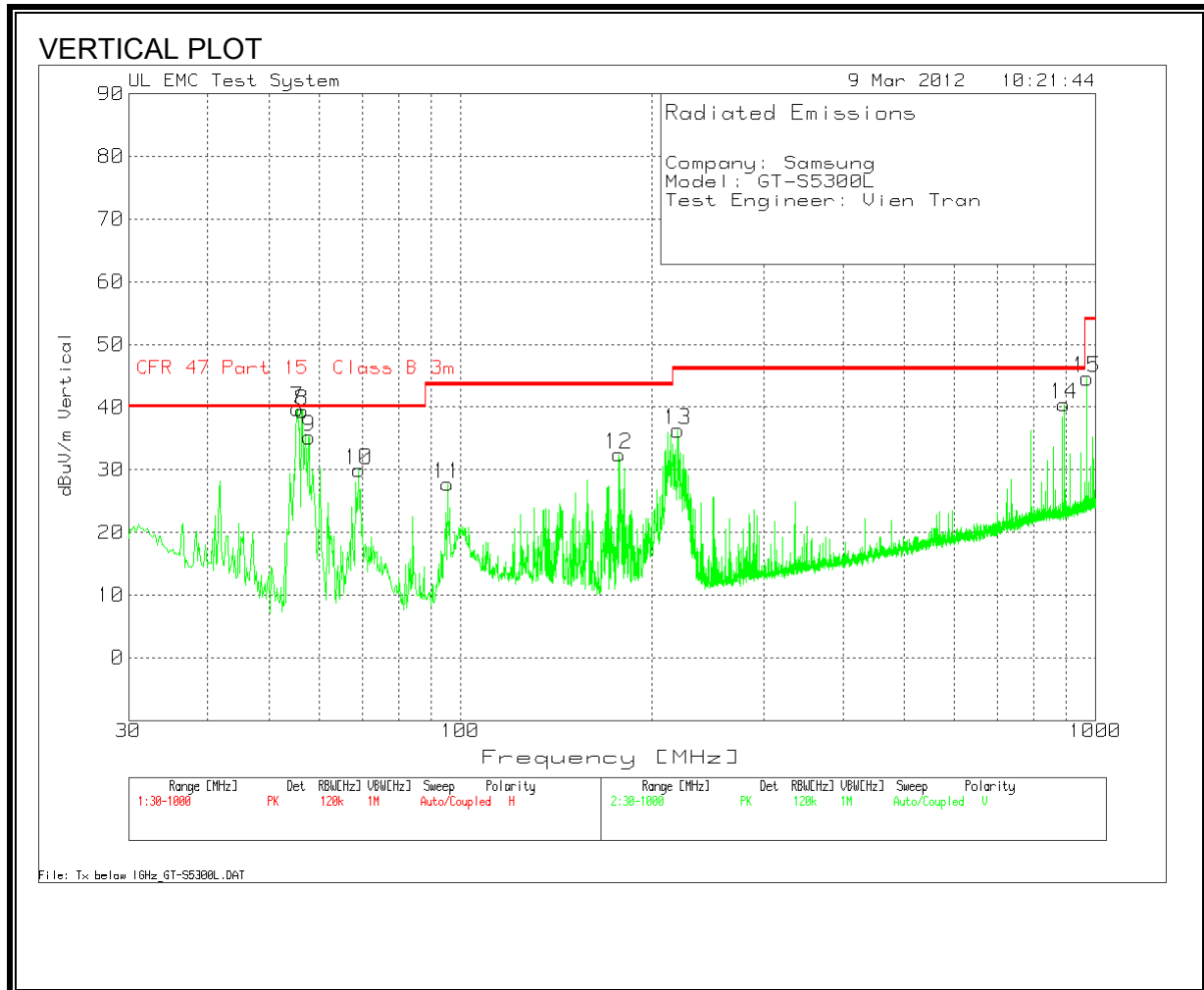
High Frequency Measurement Compliance Certification Services, Fremont 3m Chamber													
Test Engr:		Vien Tran											
Date:		03/06/12											
Company:		Samsung											
Test Target:		FCC 15.247											
Mode Oper:		TX 8PSK Mode											
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit									
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit									
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit									
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit									
CL	Cable Loss	HPF	High Pass Filter										
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
CHANNEL 0, 2402MHz													
4.804	3.0	39.8	33.1	6.8	-34.1	0.0	0.0	45.6	74.0	-28.4	V	P	
4.804	3.0	27.5	33.1	6.8	-34.1	0.0	0.0	33.3	54.0	-20.7	V	A	
4.804	3.0	37.6	33.1	6.8	-34.1	0.0	0.0	43.5	74.0	-30.5	H	P	
4.804	3.0	25.9	33.1	6.8	-34.1	0.0	0.0	31.7	54.0	-22.3	H	A	
CHANNEL 39, 2441MHz													
4.882	3.0	40.3	33.2	6.8	-34.0	0.0	0.0	46.2	74.0	-27.8	V	P	
4.882	3.0	28.9	33.2	6.8	-34.0	0.0	0.0	34.8	54.0	-19.2	V	A	
7.323	3.0	36.9	36.3	9.1	-33.1	0.0	0.0	49.2	74.0	-24.8	V	P	
7.323	3.0	24.2	36.3	9.1	-33.1	0.0	0.0	36.5	54.0	-17.5	V	A	
4.882	3.0	39.1	33.2	6.8	-34.0	0.0	0.0	45.0	74.0	-29.0	H	P	
4.882	3.0	26.6	33.2	6.8	-34.0	0.0	0.0	32.5	54.0	-21.5	H	A	
7.323	3.0	36.6	36.3	9.1	-33.1	0.0	0.0	48.9	74.0	-25.1	H	P	
7.323	3.0	24.2	36.3	9.1	-33.1	0.0	0.0	36.5	54.0	-17.5	H	A	
CHANNEL 78, 2480MHz													
4.960	3.0	38.6	33.2	6.9	-34.0	0.0	0.0	44.7	74.0	-29.3	V	P	
4.960	3.0	26.3	33.2	6.9	-34.0	0.0	0.0	32.4	54.0	-21.6	V	A	
7.440	3.0	37.1	36.5	9.1	-33.0	0.0	0.0	49.6	74.0	-24.4	V	P	
7.440	3.0	24.6	36.5	9.1	-33.0	0.0	0.0	37.1	54.0	-16.9	V	A	
4.960	3.0	38.9	33.2	6.9	-34.0	0.0	0.0	45.0	74.0	-29.0	H	P	
4.960	3.0	26.3	33.2	6.9	-34.0	0.0	0.0	32.4	54.0	-21.6	H	A	
7.440	3.0	36.9	36.5	9.1	-33.0	0.0	0.0	49.4	74.0	-24.6	H	P	
7.440	3.0	24.7	36.5	9.1	-33.0	0.0	0.0	37.2	54.0	-16.8	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

8.3. WORST-CASE BELOW 1 GHz

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



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



HORIZONTAL & VERTICAL DATA

COMPANY: SAMSUNG						TEST ENGINEER: VIEN TRAN					
PROJECT NUMBER: 12I14312						DATE TESTED: 03/09/2012					
Range 1 30 - 1000MHz - HORIZONTAL											
Test Frequency	Meter Reading	Detector	25MHz-1Ghz Chamber B Amp [dB]	T130 Bilog Factors. TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity		
30	36.93	PK	-29.3	20.4	28.03	40	-11.97	100	Horz		
41.8245	43.01	PK	-29.2	13.0	26.81	40	-13.19	300	Horz		
54.8122	46.82	PK	-29.0	7.9	25.72	40	-14.28	100	Horz		
96.295	51.9	PK	-28.6	9.1	32.40	43.5	-11.10	200	Horz		
179.4544	45.47	PK	-27.8	10.8	28.47	43.5	-15.03	100	Horz		
252.3401	47.97	PK	-27.2	11.9	32.67	46	-13.33	100	Horz		
823.6011	36.41	PK	-25.3	21.1	32.21	46	-13.79	300	Horz		
956.9664	41.25	PK	-24.4	22.1	38.95	46	-7.05	100	Horz		
972.2802	34.86	PK	-24.3	22.3	32.86	54	-21.14	200	Horz		
Range 2 30 - 1000MHz - VERTICAL											
Test Frequency	Meter Reading	Detector	25MHz-1Ghz Chamber B Amp [dB]	T130 Bilog Factors. TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity		
31.3569	36.57	PK	-29.3	19.7	26.97	40	-13.03	100	Horz		
39.3046	43.41	PK	-29.2	14.6	28.81	40	-11.19	100	Horz		
41.6307	48.57	PK	-29.2	13.1	32.47	40	-7.53	300	Horz		
57.7198	56.78	PK	-29.0	7.9	35.68	40	-4.32	100	Horz		
84.0827	53.5	PK	-28.7	7.5	32.3	40	-7.70	100	Horz		
90.8673	49.78	PK	-28.6	7.7	28.88	43.5	-14.62	100	Horz		
142.0424	44.32	PK	-28.1	13.1	29.32	43.5	-14.18	100	Horz		
180.2298	48.06	PK	-27.7	10.9	31.26	43.5	-12.24	100	Horz		
813.3273	45.00	PK	-25.4	21.1	40.70	46	-5.30	100	Horz		
951.3449	46.04	PK	-24.5	22.1	43.64	46	-2.36	100	Horz		
990.3078	35.75	PK	-24.2	22.5	34.05	54	-19.95	100	Horz		
PK - Peak detector											
QP - Quasi-Peak detector											
LnAv - Linear Average detector											
LgAv - Log Average detector											
Av - Average detector											
CAV - CISPR Average detector											
RMS - RMS detection											
CRMS - CISPR RMS detection											

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.

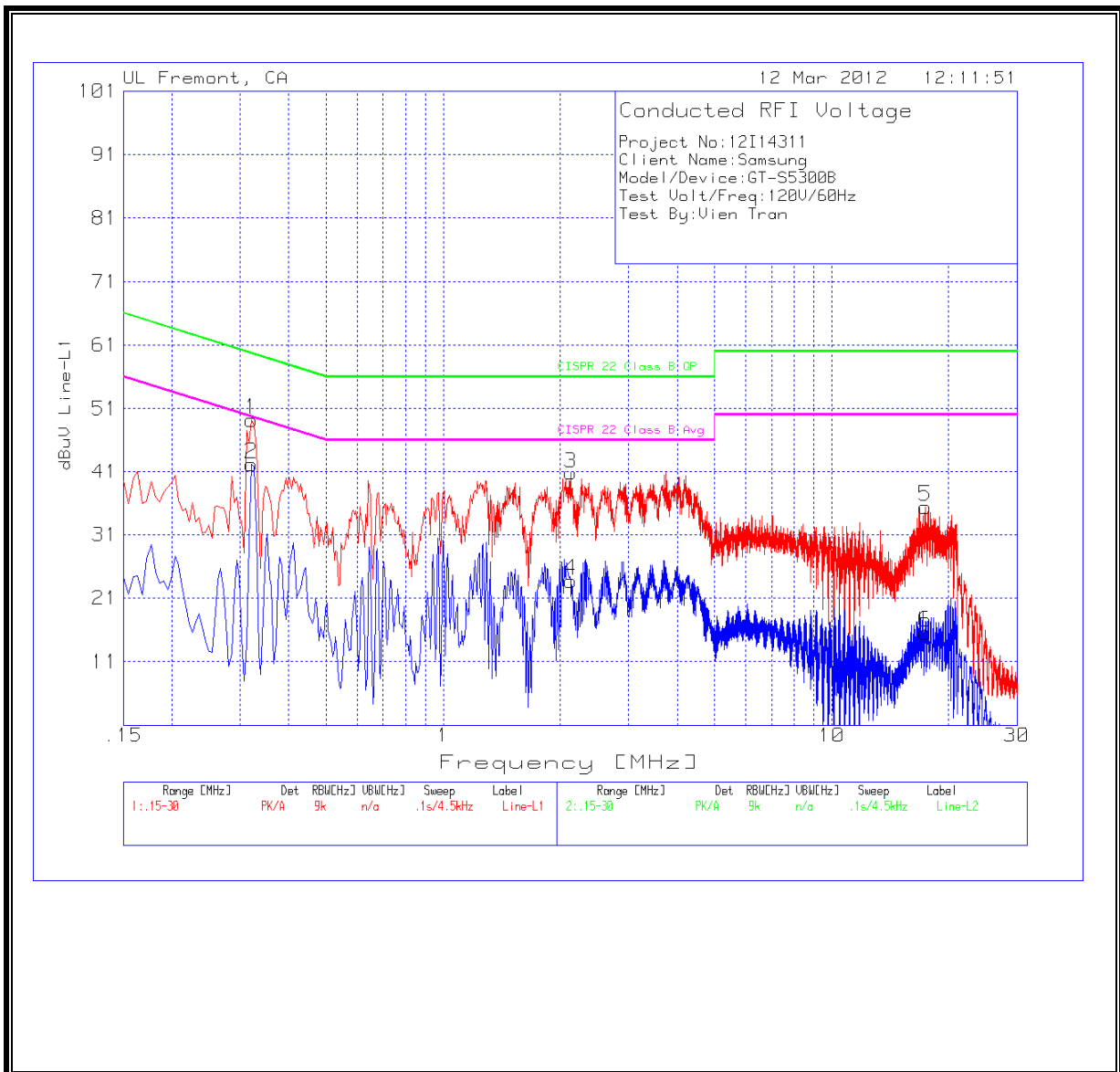
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

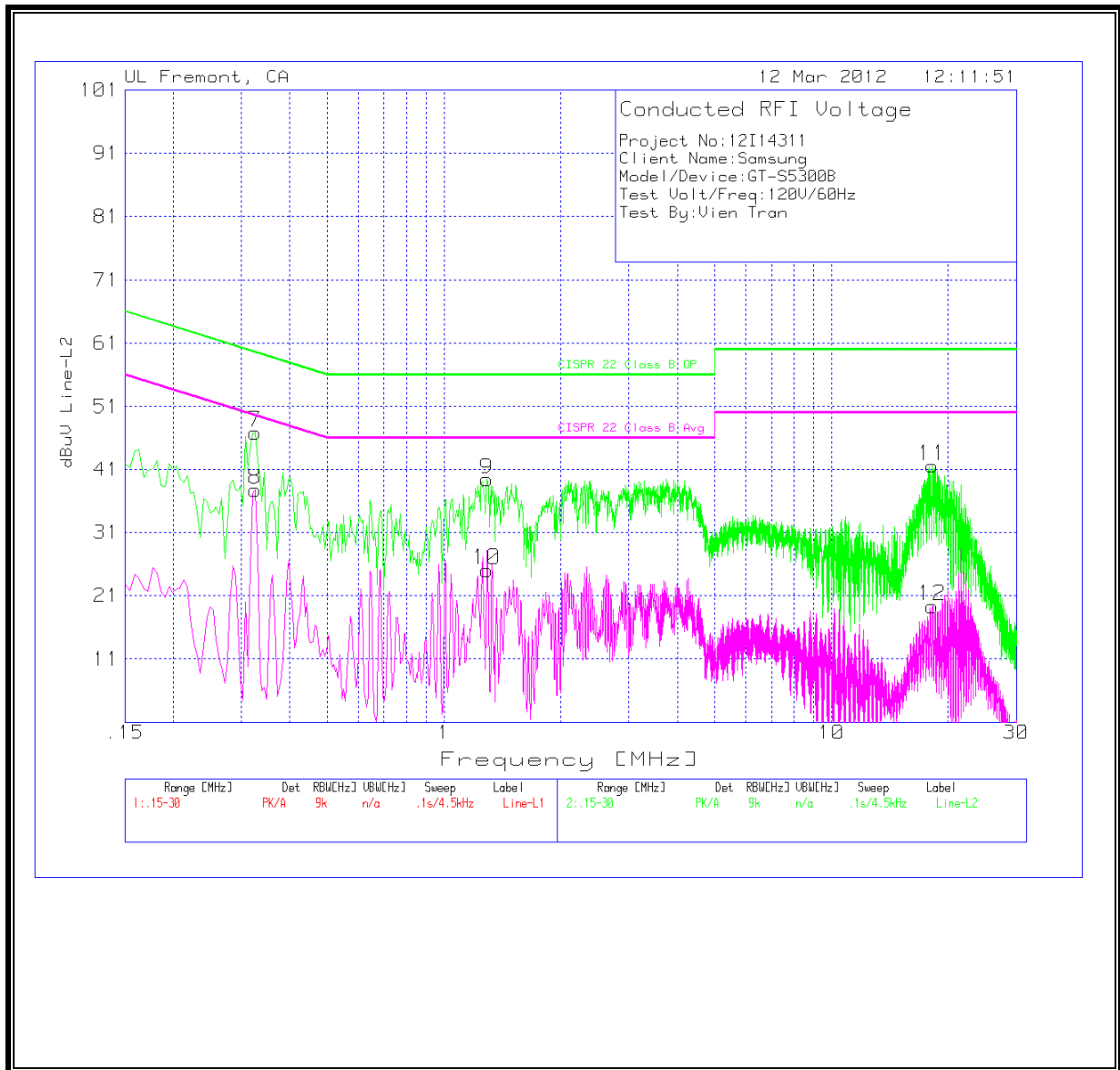
6 WORST EMISSIONS

Project No:12I14311			Test Engineer: Vien Tran						
Client Name:Samsung			Date: 03/12/2012						
Model/Device:GT-S5300B									
Test Volt/Freq:120V/60Hz									
Line-L1 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT [dB]	LC Cables 1&3.TXT [dB]	Corrected dBuV	CISPR 22 Class B QP	Margin	CISPR 22 Class B QP	Margin
0.321	49.08	PK	0.1	0	49.18	59.70	-10.52	-	-
0.321	42.15	Av	0.1	0	42.25	-	-	49.70	-7.45
2.1255	40.55	PK	0.1	0.1	40.75	56.00	-15.25	-	-
2.1255	23.57	Av	0.1	0.1	23.77	-	-	46.00	-22.23
17.43	34.99	PK	0.2	0.2	35.39	60.00	-24.61	-	-
17.43	15.23	Av	0.2	0.2	15.63	-	-	50.00	-34.37
Line-L2 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT [dB]	LC Cables 1&3.TXT [dB]	Corrected dBuV	CISPR 22 Class B QP	Margin	CISPR 22 Class B QP	Margin
0.3255	46.76	PK	0.1	0	46.86	59.60	-12.74	-	-
0.3255	37.58	Av	0.1	0	37.68	-	-	49.60	-11.92
1.2885	39.20	PK	0.1	0.1	39.40	56.00	-16.60	-	-
1.2885	24.79	Av	0.1	0.1	24.99	-	-	46.00	-21.01
18.2355	41.18	PK	0.2	0.2	41.58	60.00	-18.42	-	-
18.2355	18.90	Av	0.2	0.2	19.30	-	-	50.00	-30.70
PK - Peak detector									
QP - Quasi-Peak detector									
LnAv - Linear Average detector									
LgAv - Log Average detector									
Av - Average detector									
CAV - CISPR Average detector									
RMS - RMS detection									
CRMS - CISPR RMS detection									

LINE 1 RESULTS



LINE 2 RESULTS



10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Ex-
posed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m ²)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

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

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

EQUATIONS

Power density is given by:

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

where

S = Power density in W/m²

EIRP = Equivalent Isotropic Radiated Power in W

D = Separation distance in m

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

Distance is given by:

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

where

D = Separation distance in m

EIRP = Equivalent Isotropic Radiated Power in W

S = Power density in W/m²

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

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

where

P_x = Power of transmitter x

G_x = Numeric gain of antenna x

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

RESULTS

Band	Mode	Separation Distance (m)	Output AV Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m²)	FCC Power Density (mW/cm²)
2.4 GHz	Bluetooth	0.20	6.32	-3.40	0.004	0.0004