



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

**802.11 B/G/N 1X1 HT20, + BT4.0 +BASIC RATES +HS+ GSM850/1900 &
WCDMA850MHZ BAR PHONE**

MODEL NUMBER: GT-S5312B

FCC ID: A3LGTS5312B

REPORT NUMBER: 13U14924-4

ISSUE DATE: APRIL 12, 2013

Prepared for

**SAMSUNG ELECTRONICS CO., LTD.
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
--		Initial Issue	

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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: 802.11 B/G/N 1X1 HT20, + BT4.0 +BASIC RATES +HS+
GSM850/1900 & WCDMA850MHZ BAR PHONE

MODEL: GT-S5312B

SERIAL NUMBER: KF-064-F (CONDUCTED) & KF-064-F (RADIATED)

DATE TESTED: APRIL 01 TO 11, 2013

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass

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.

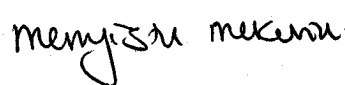
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this 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:

Tested By:



PHILIP KIM
WISE PROGRAM MANAGER
UL CCS



MENGISTU MEKURIA
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 bar-style cell phone featuring 802.11 b/g/n 1x1 HT20, + BT4.0 +basic rates +HS+ GSM850/1900 & WCDMA850MHz.

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	13.95	24.83
2402 - 2480	Enhanced 8PSK	14.14	25.94

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an F PCB antenna with a maximum gain of -5dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was REV 1.0 and the software was S5312B.010.

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, and Z, it was determined that the Y-orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y-orientation.

5.1. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Adapter	Samsung	GT-S5312B	SC1C401VS/A	n/a
Headphones	Samsung	GT-S5312B	n/a	n/a

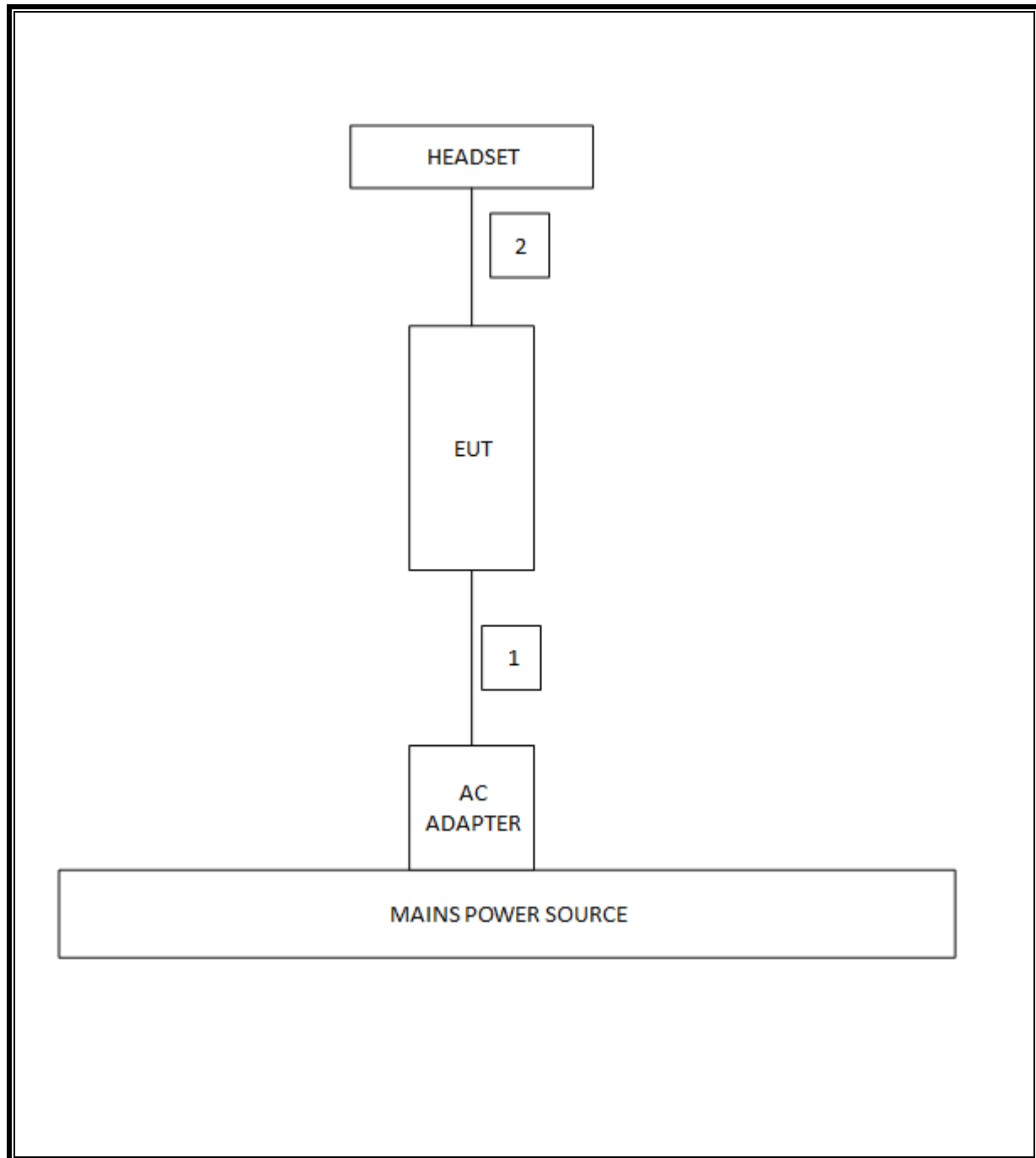
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB	Shielded	1.6m	N/A
2	Headset	1	Audio	Shielded	1.5m	N/A

TEST SETUP

The EUT is a stand-alone unit that was tested in the worst case orientation and configuration, where applicable, during the tests. Test software exercised the radio.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	Manufacturer	Model	Asset	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	3/22/2014
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01176	12/13/2013
CBT Bluetooth Tester	R & S	CBT	N/A	05/15/13
Antenna, Horn, 18 GHz	ETS	3117	C01022	2/21/2014
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/2013
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	2/21/2014
Power Sensor, 18 GHz	Agilent / HP	8481A	N02781	9/24/2013
Power Meter	Agilent / HP	437B	N/A	8/9/2013
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRM50702	N02685	CNR
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	41683
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/13
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/14

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.

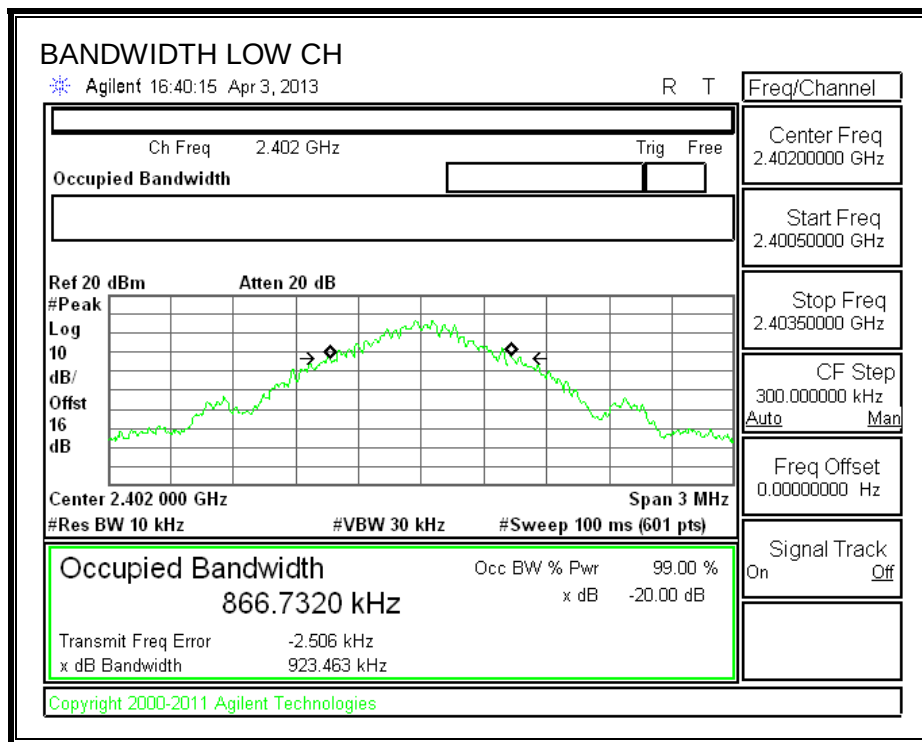
TEST PROCEDURE

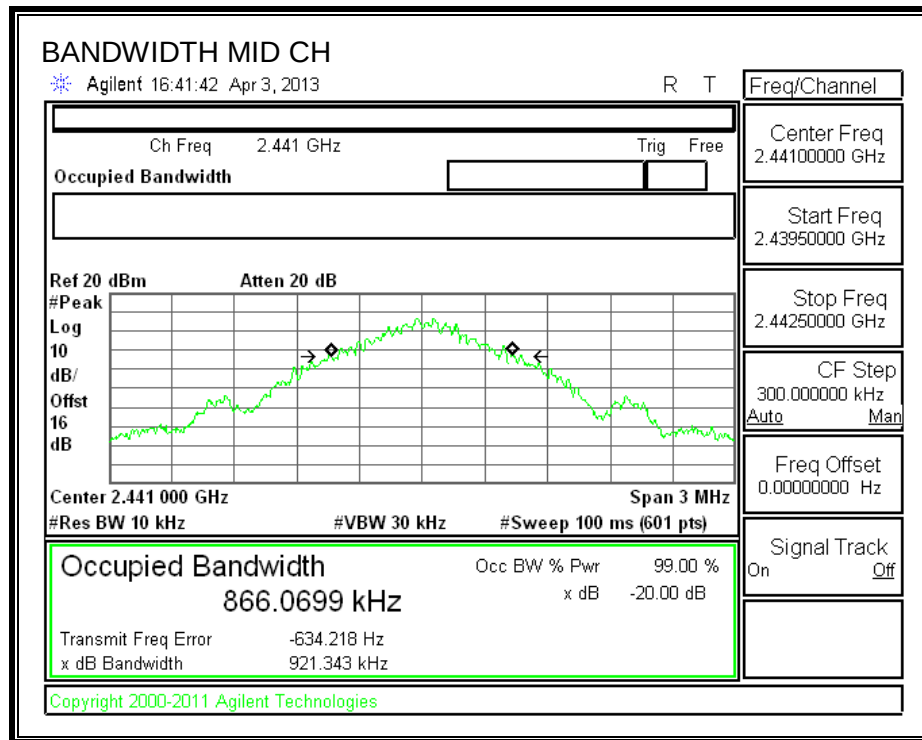
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled.

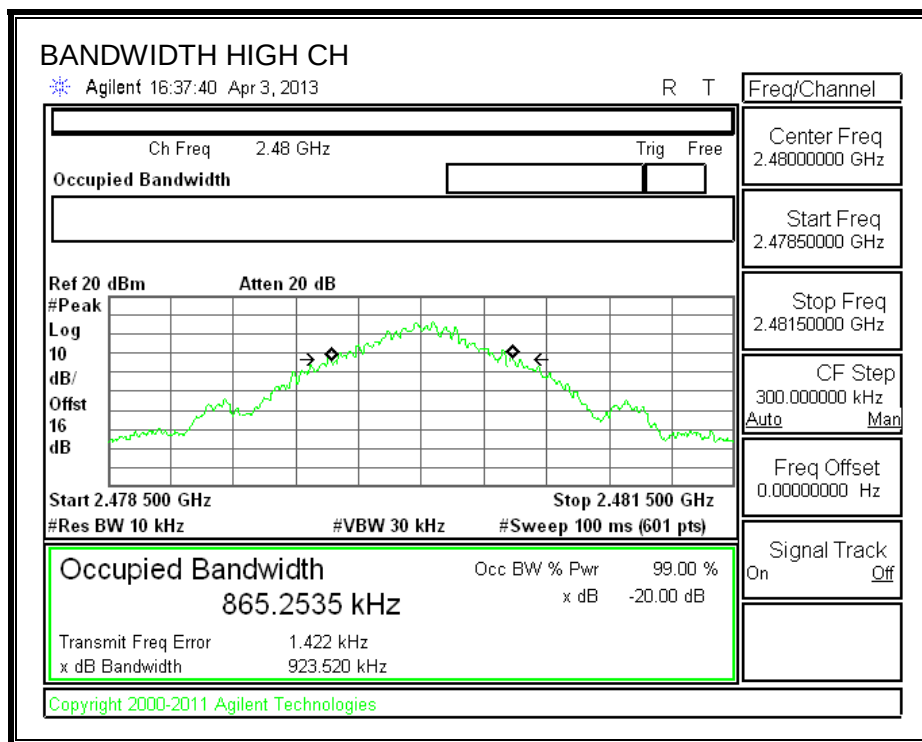
RESULTS:

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	923.463	894.810
Middle	2441	921.343	920.869
High	2480	923.520	954.504

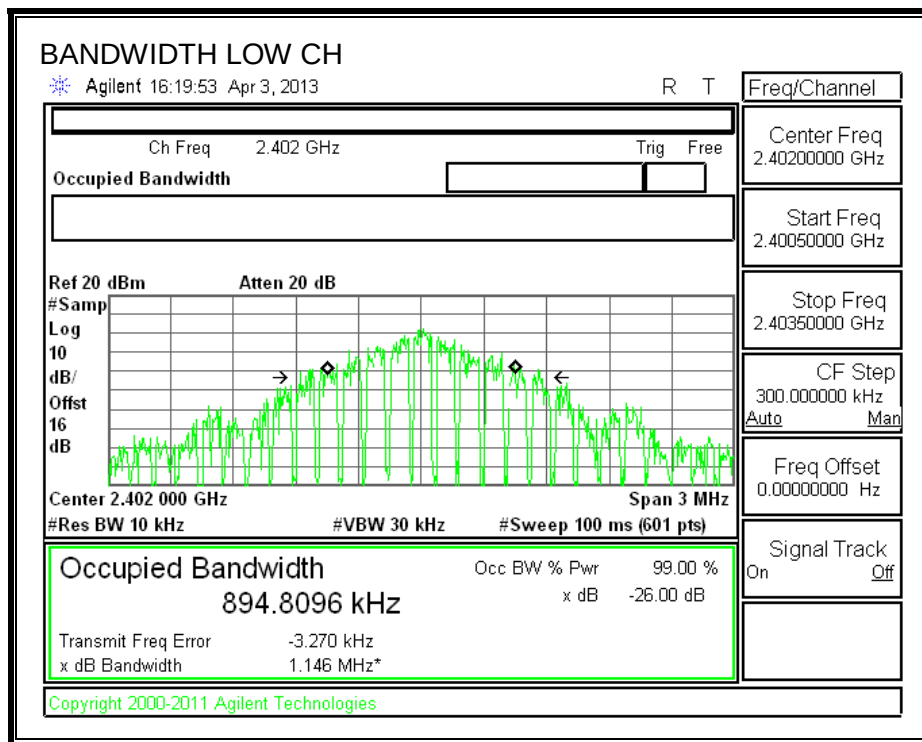
20 dB BANDWIDTH

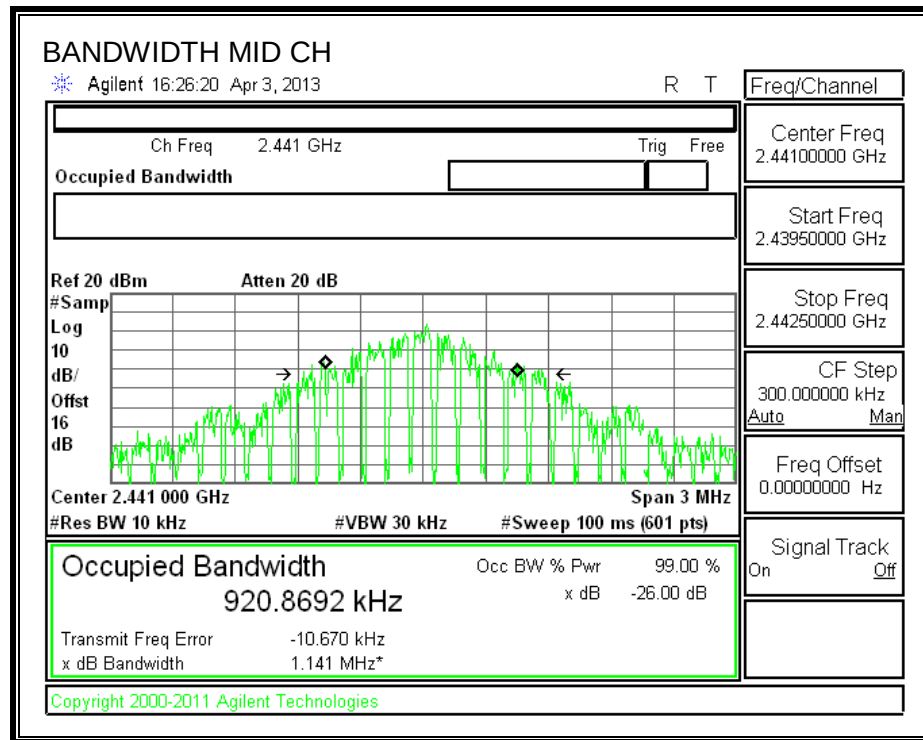


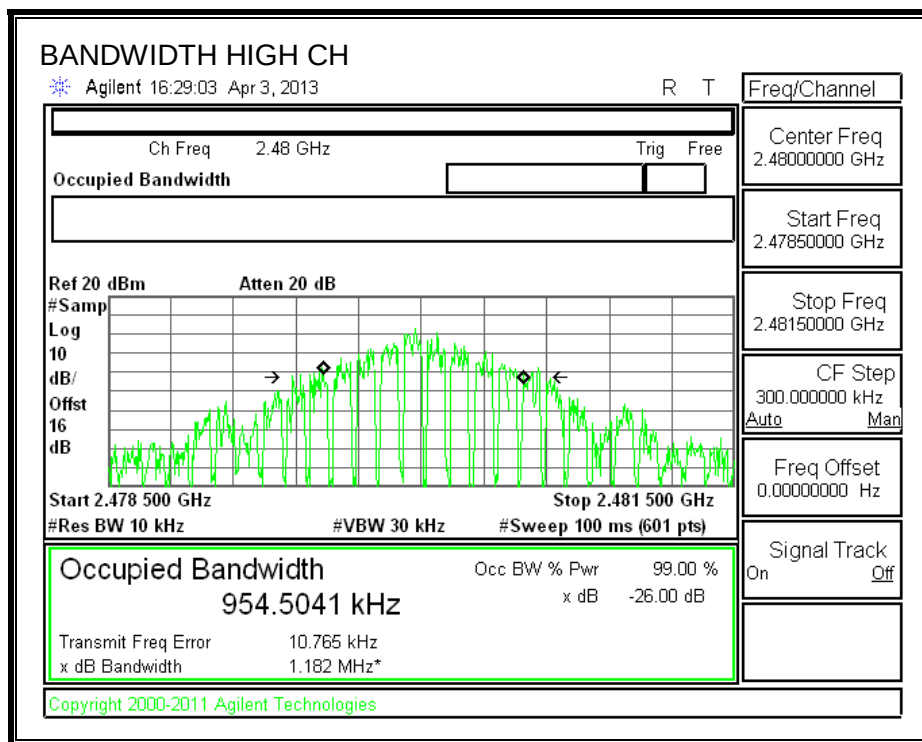




99% BANDWIDTH







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.

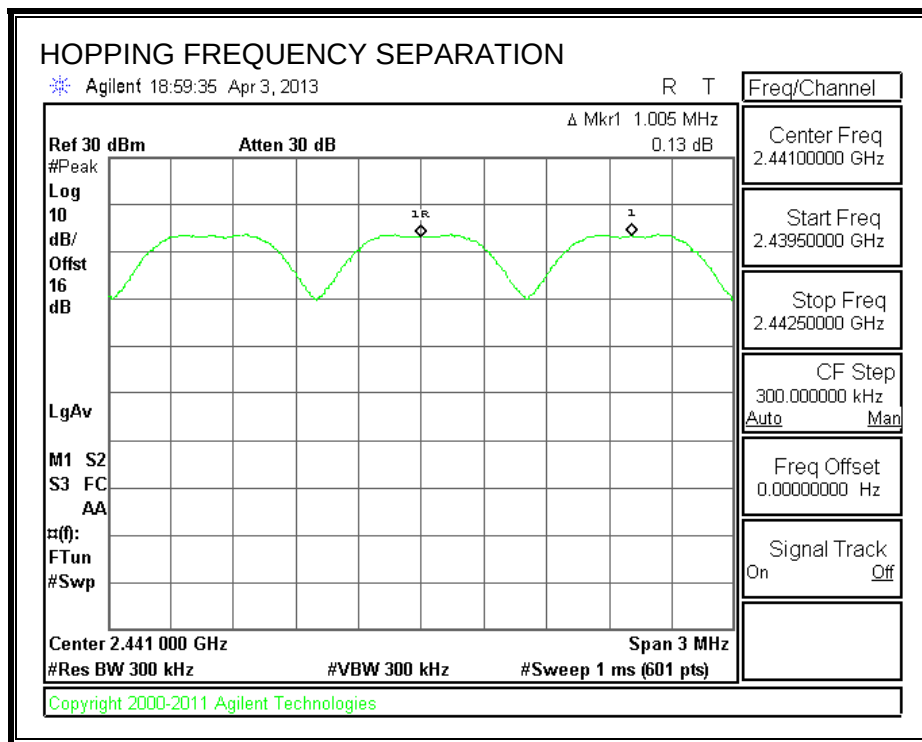
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

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

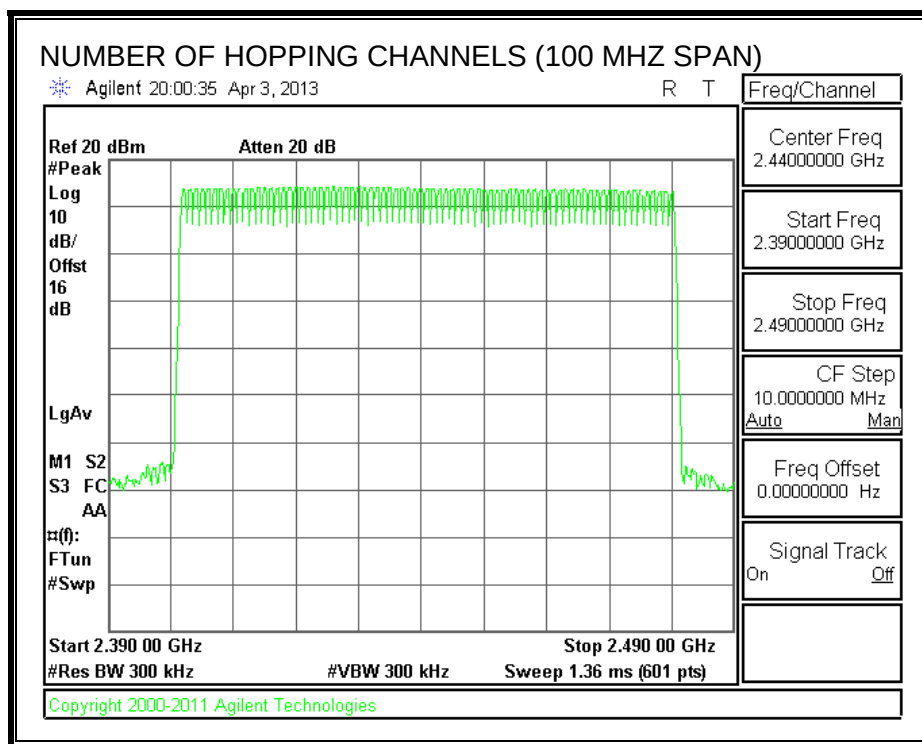
TEST PROCEDURE

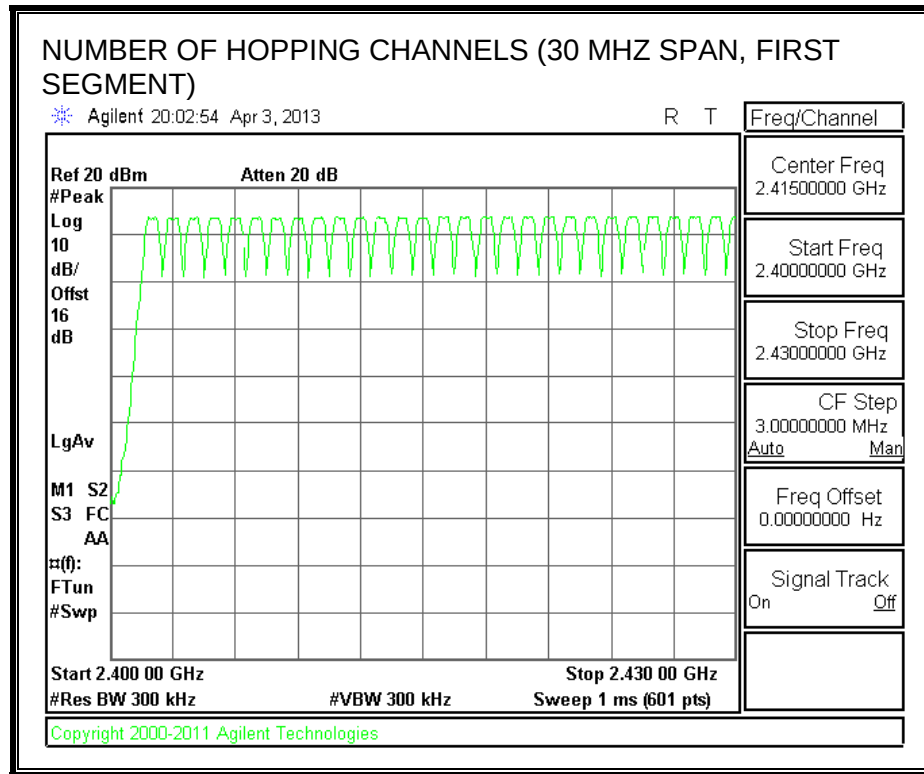
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

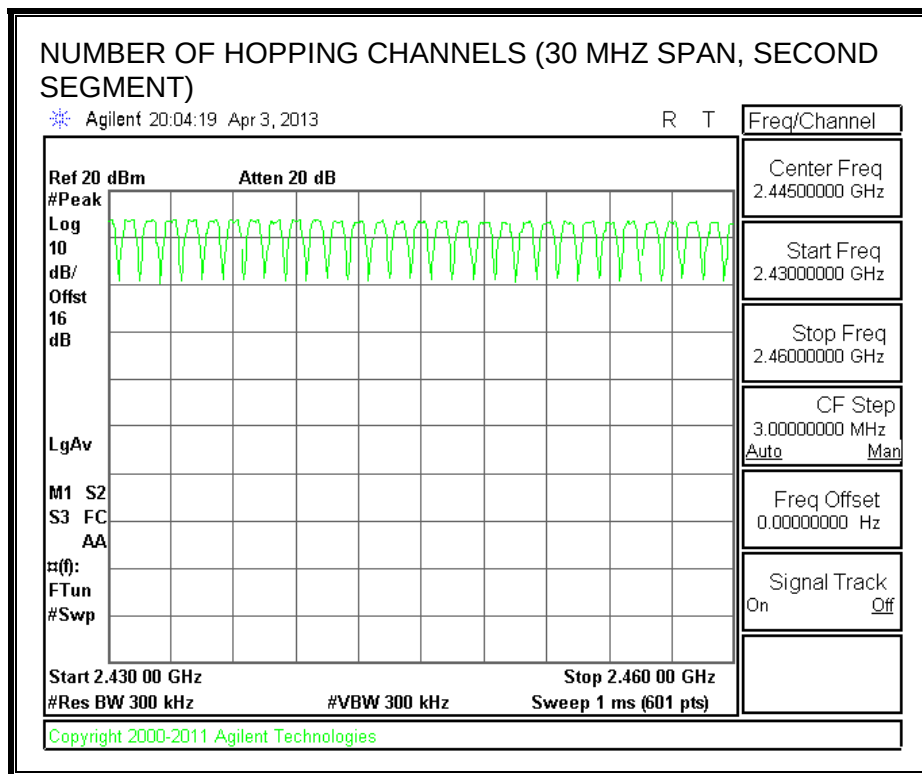
RESULTS

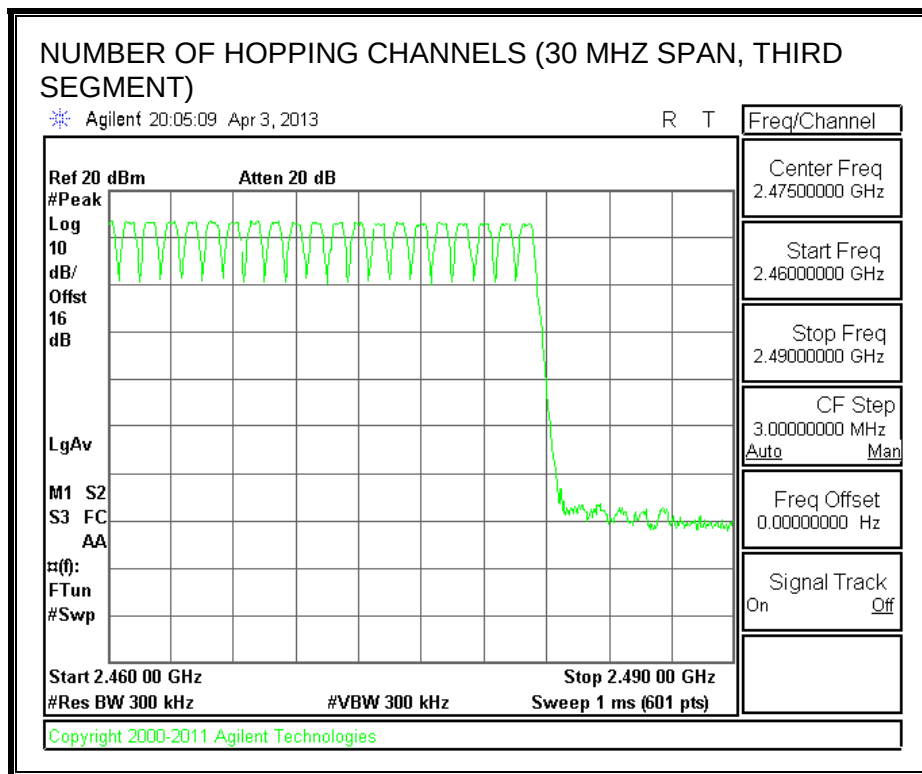
Normal Mode: 79 Channels observed.

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

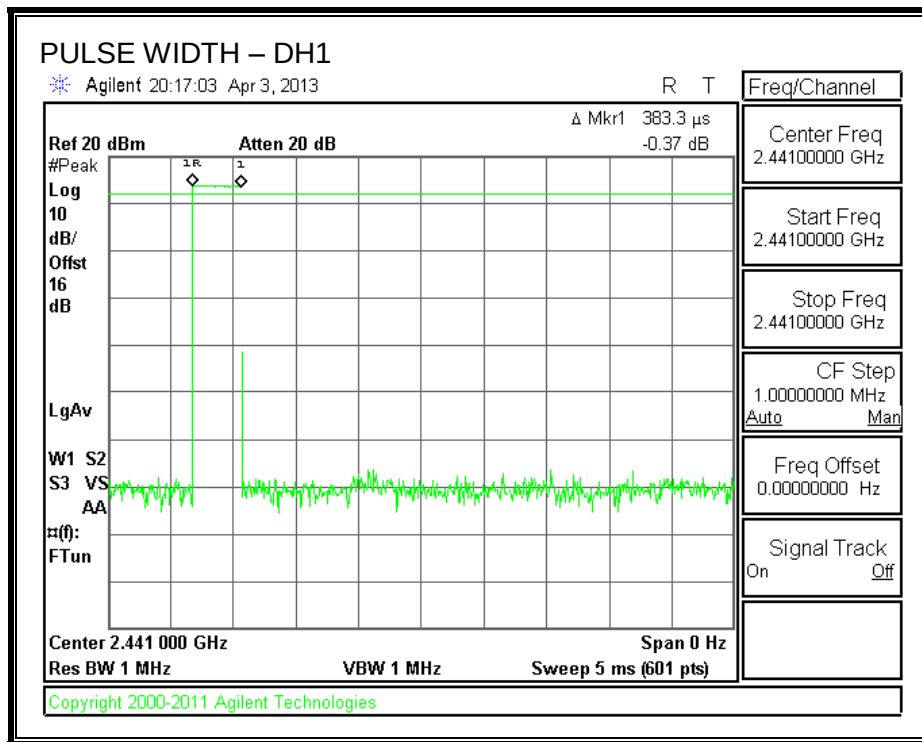
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

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

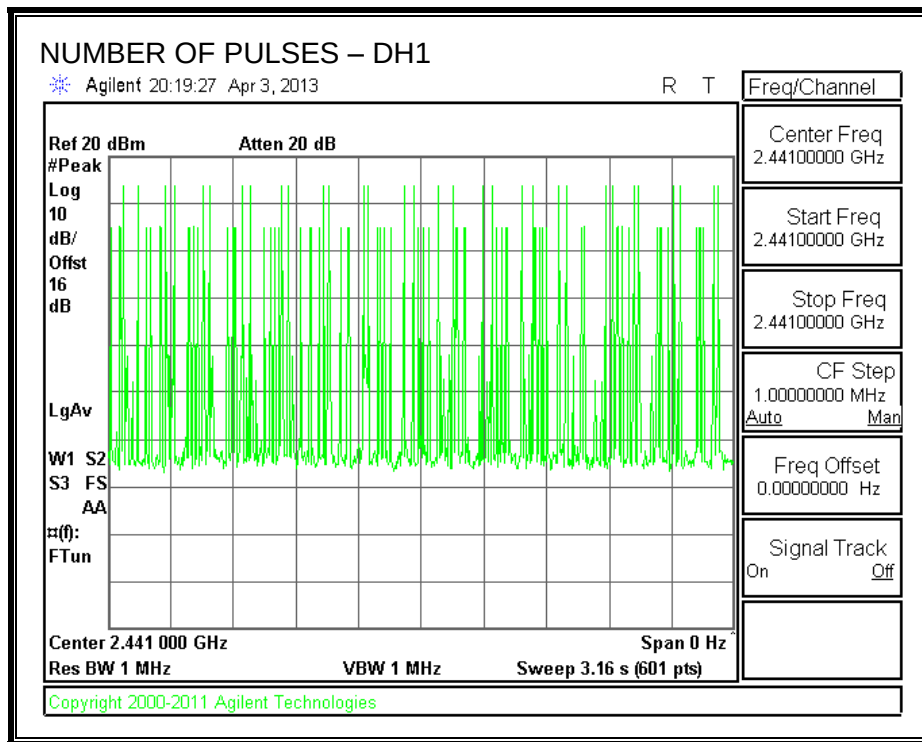
RESULTS

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.3833	32	0.123	0.4	-0.277
DH3	1.63	12	0.196	0.4	-0.204
DH5	2.892	7	0.202	0.4	-0.198

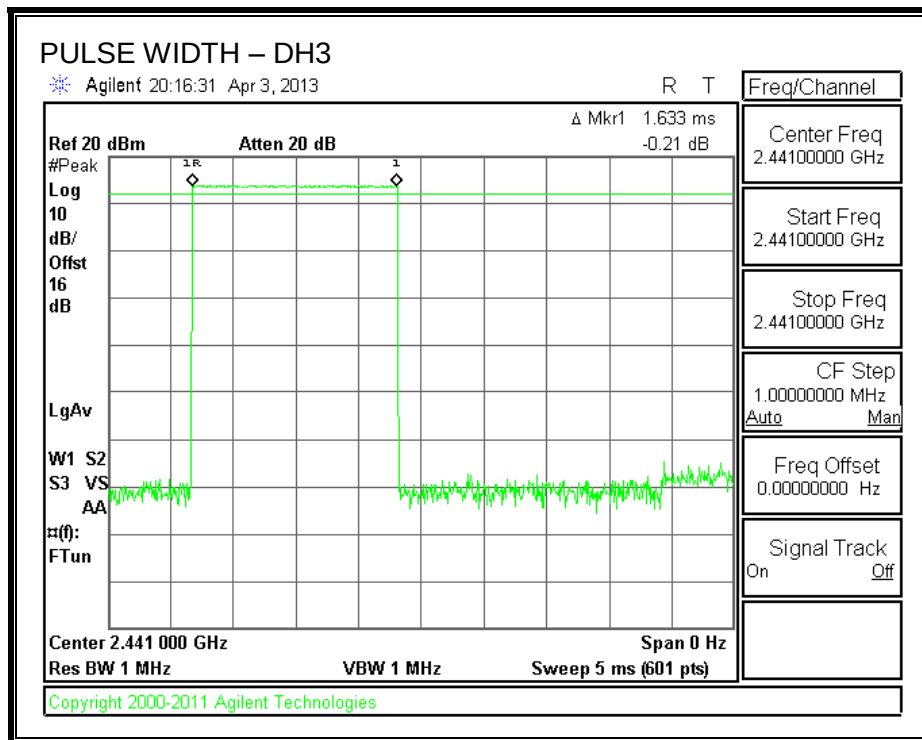
PULSE WIDTH - DH1



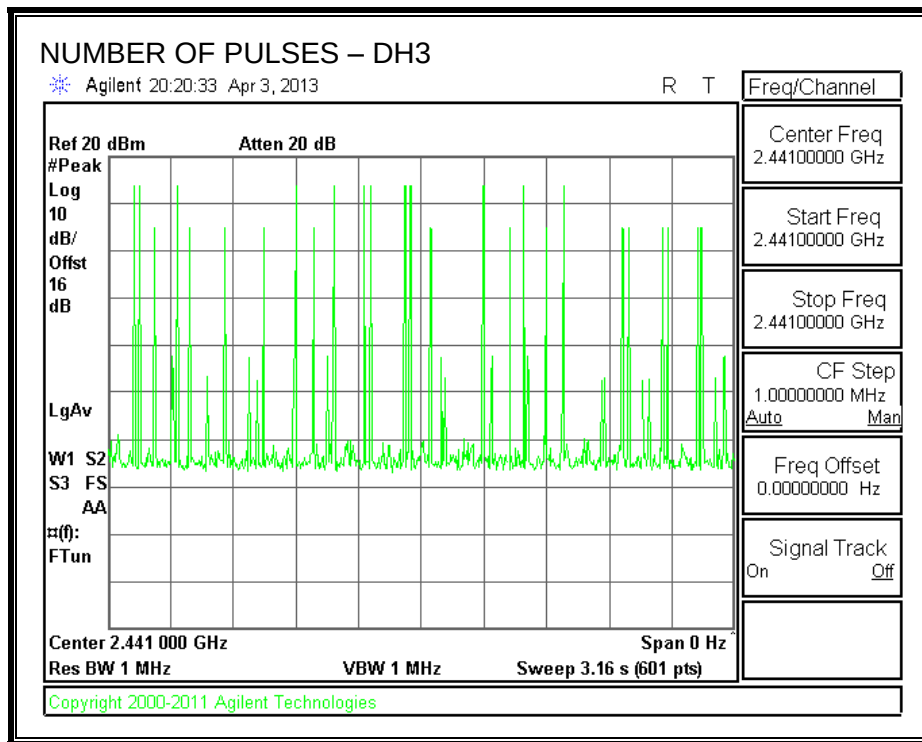
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



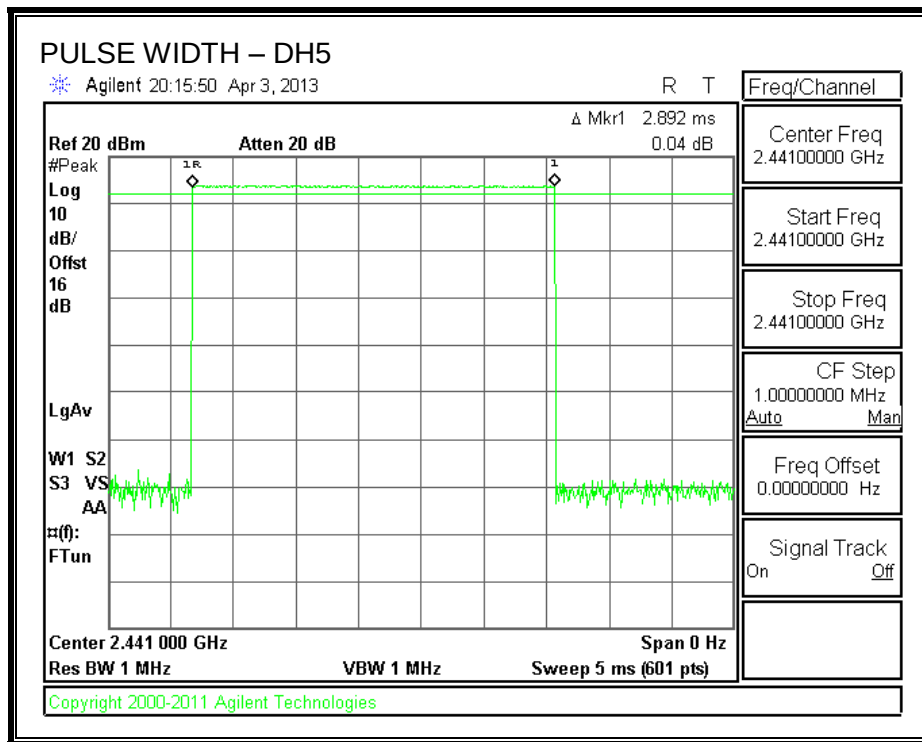
PULSE WIDTH – DH3



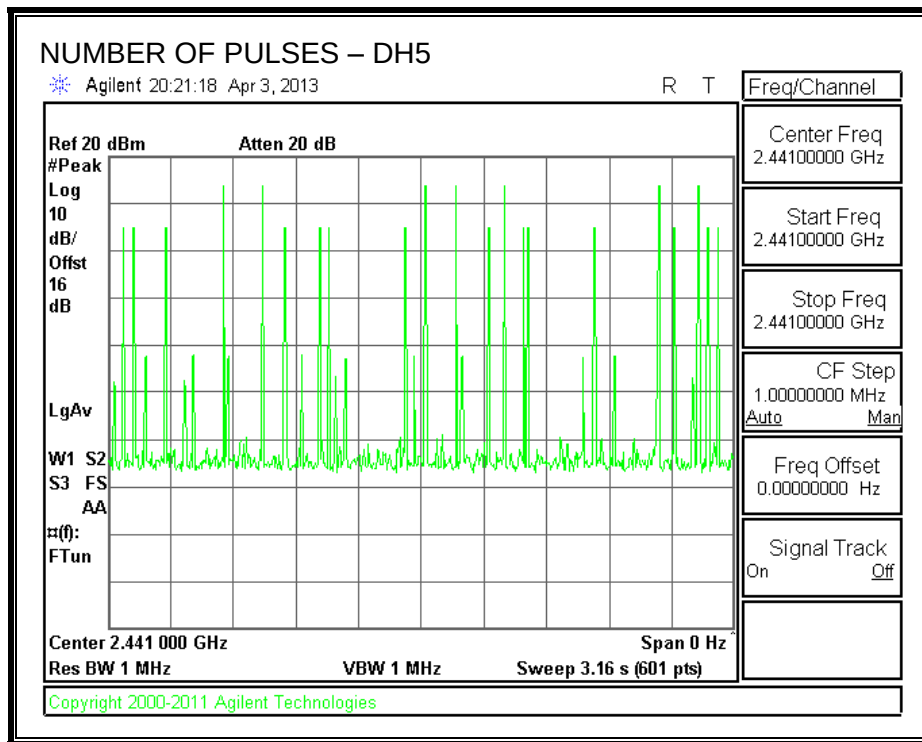
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



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 7 Clause A8.4

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

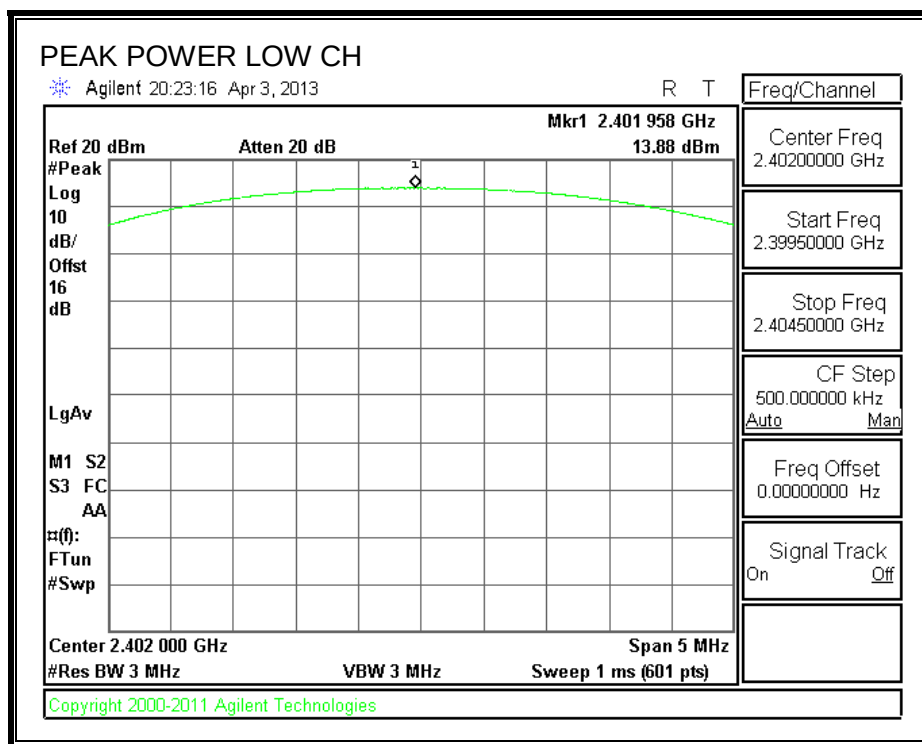
TEST PROCEDURE

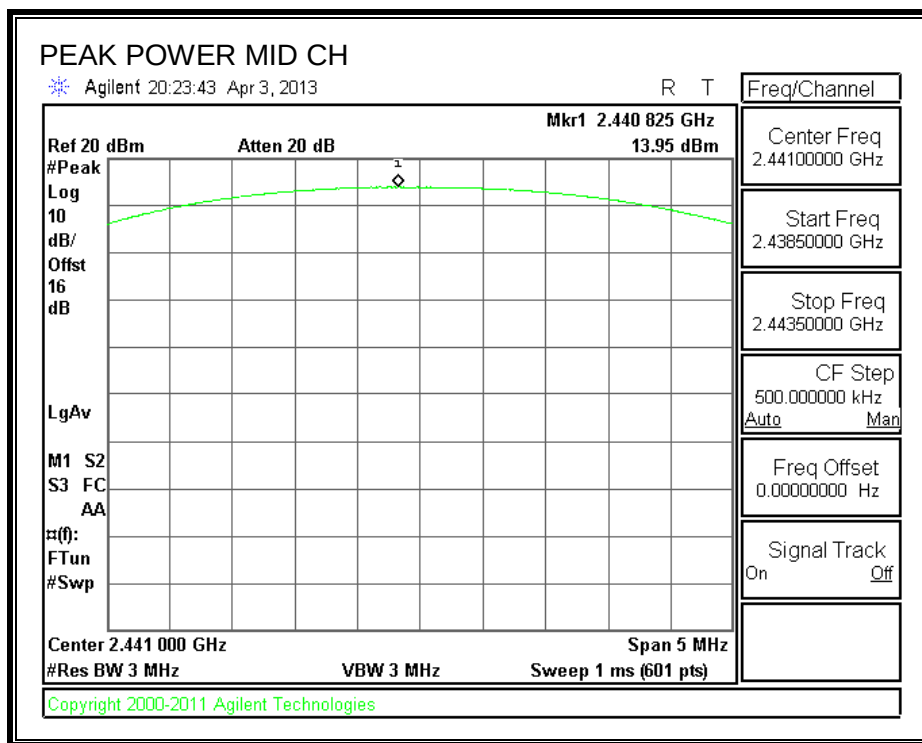
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

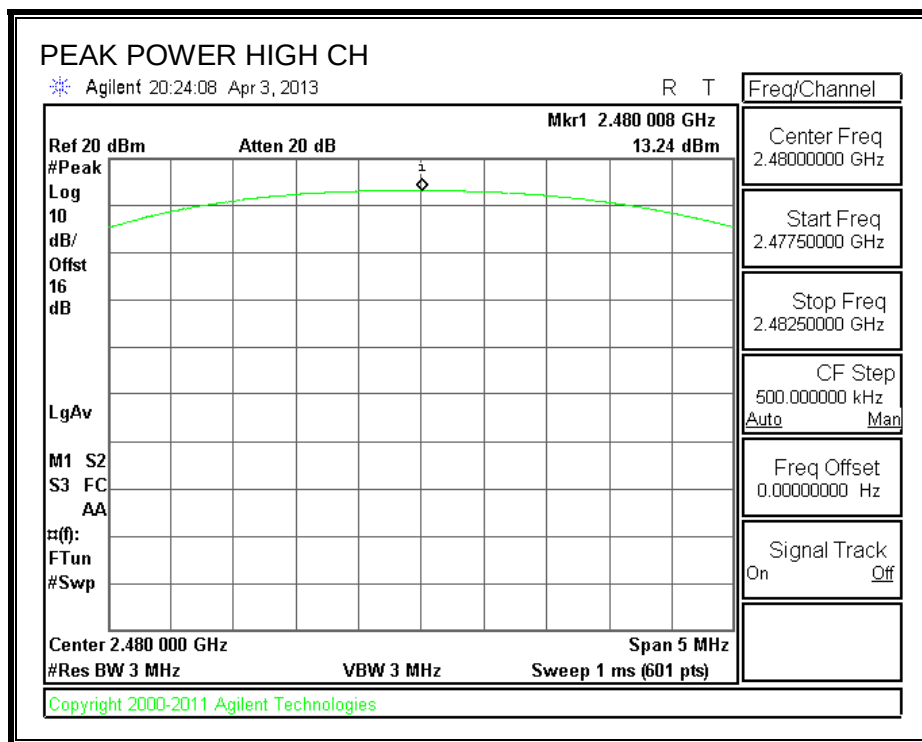
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	13.88	30	-16.12
Middle	2441	13.95	30	-16.05
High	2480	13.24	30	-16.76

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 16 dB (including 16 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	12.20
Middle	2441	12.60
High	2480	12.40

7.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

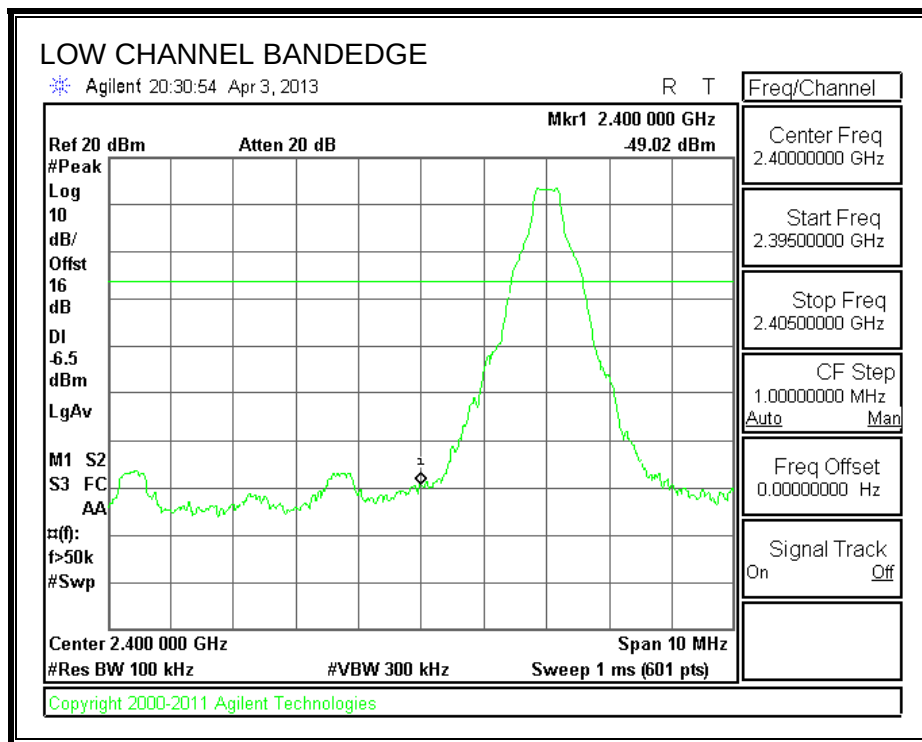
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

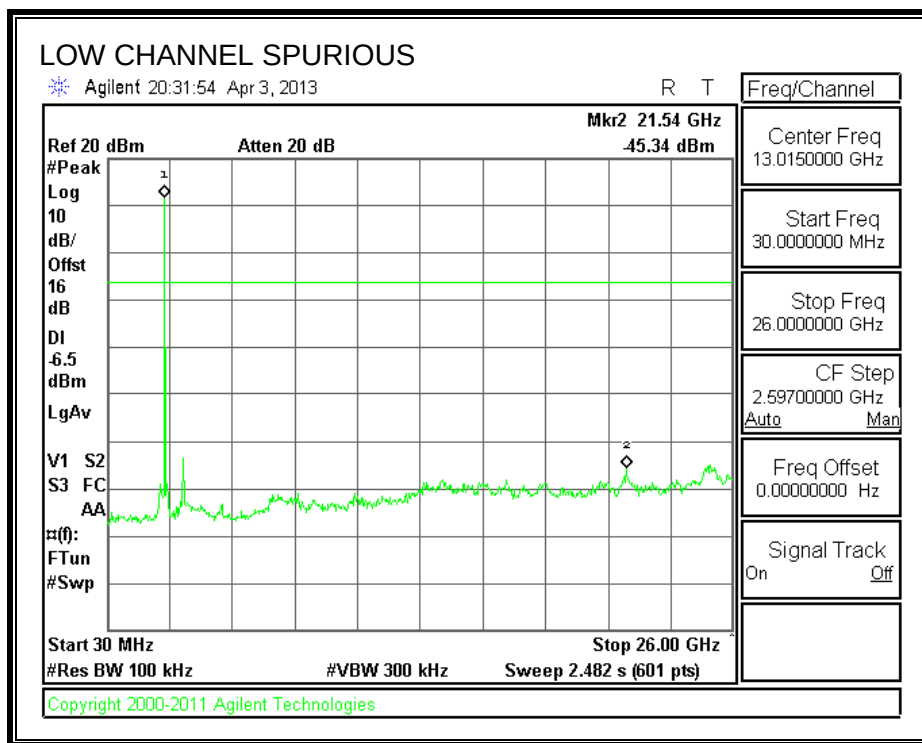
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

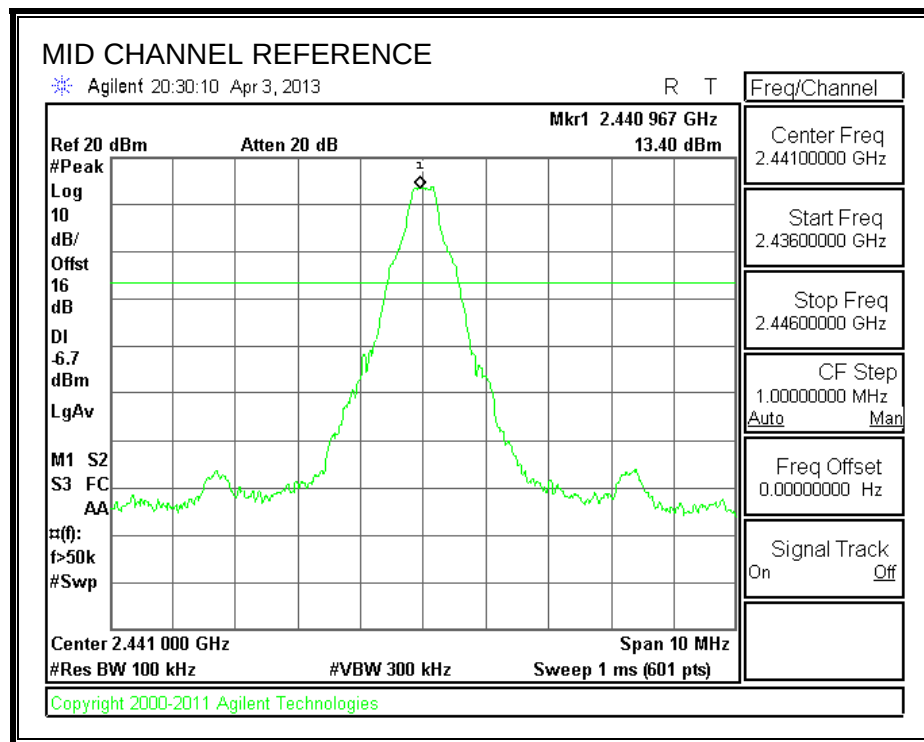
RESULTS

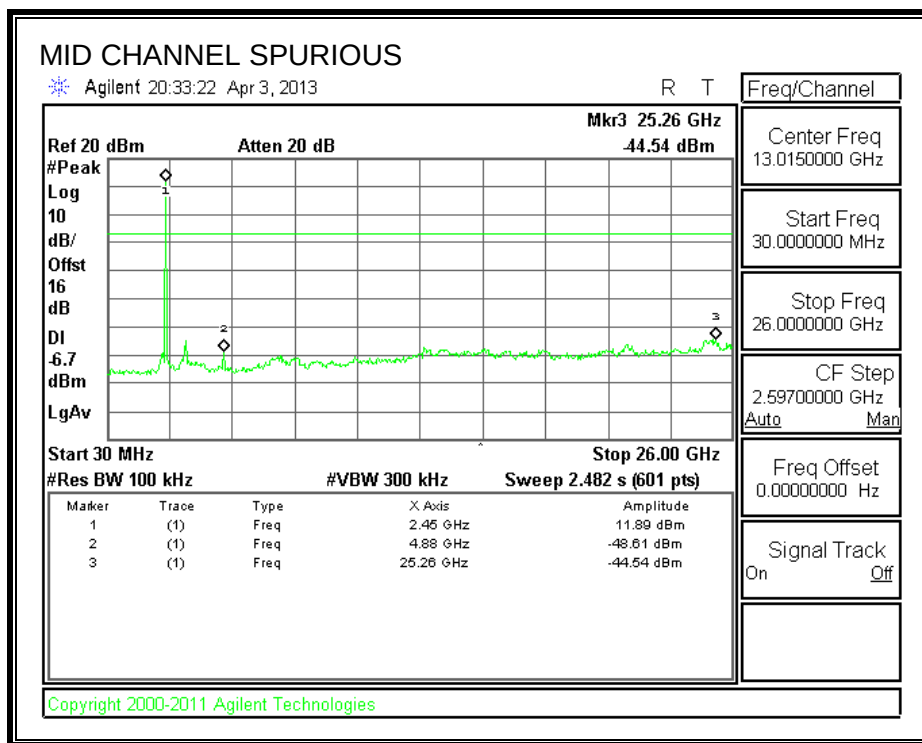
SPURIOUS EMISSIONS, LOW CHANNEL



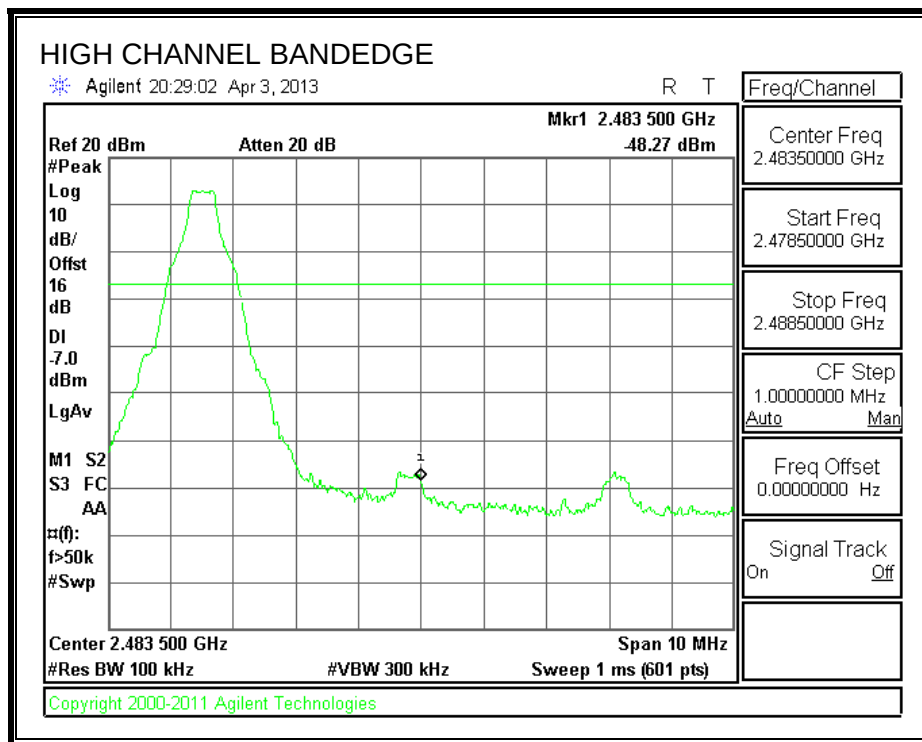


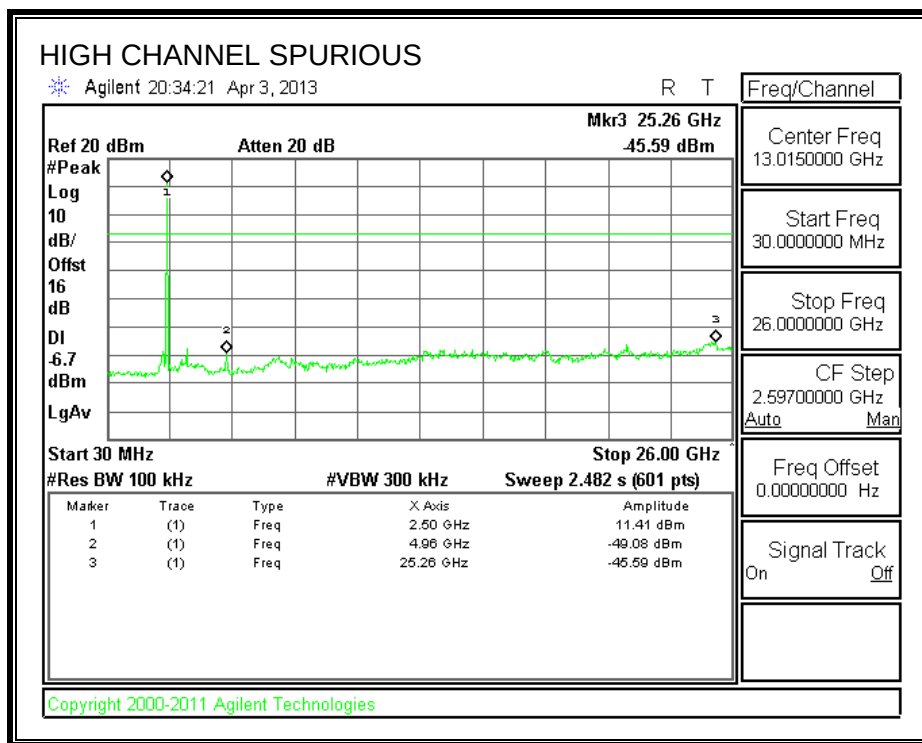
SPURIOUS EMISSIONS, MID CHANNEL



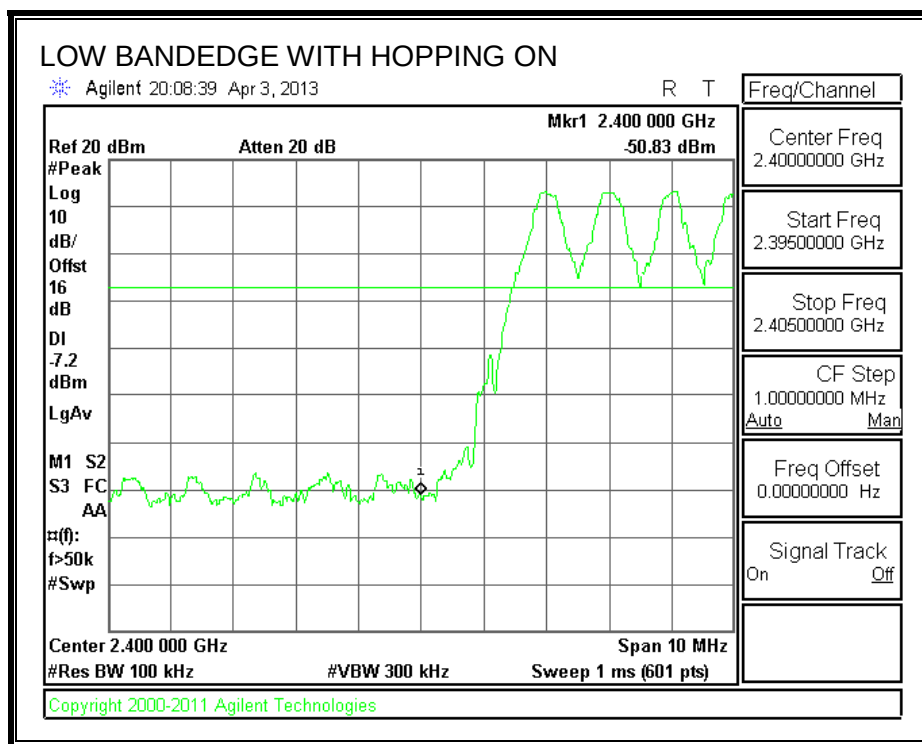


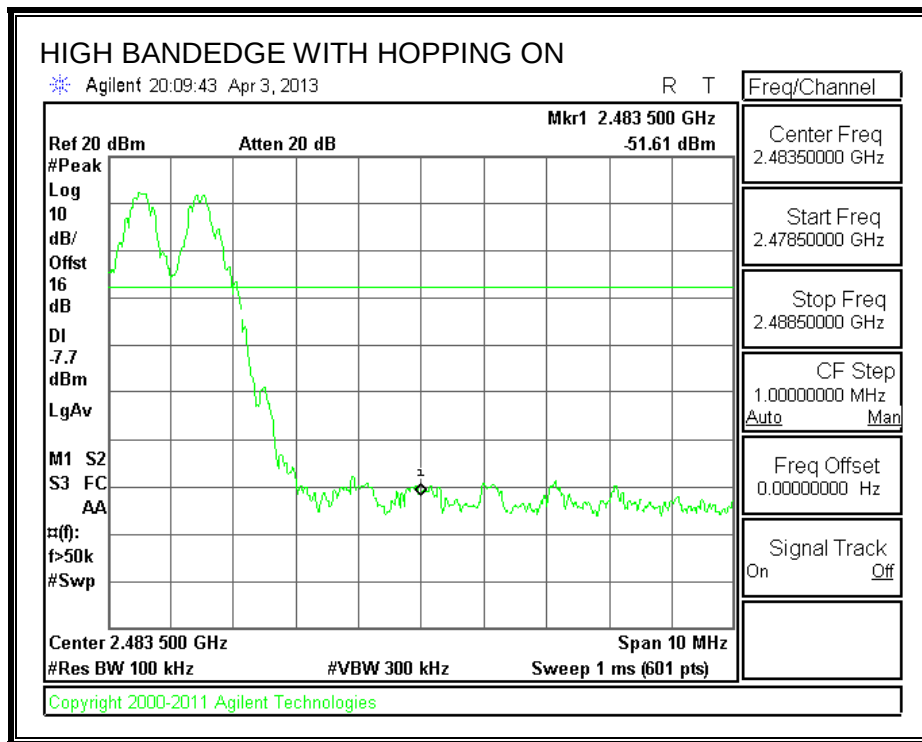
SPURIOUS EMISSIONS, HIGH CHANNEL





SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON





7.2. ENHANCED DATA RATE 8PSK MODULATION

7.2.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

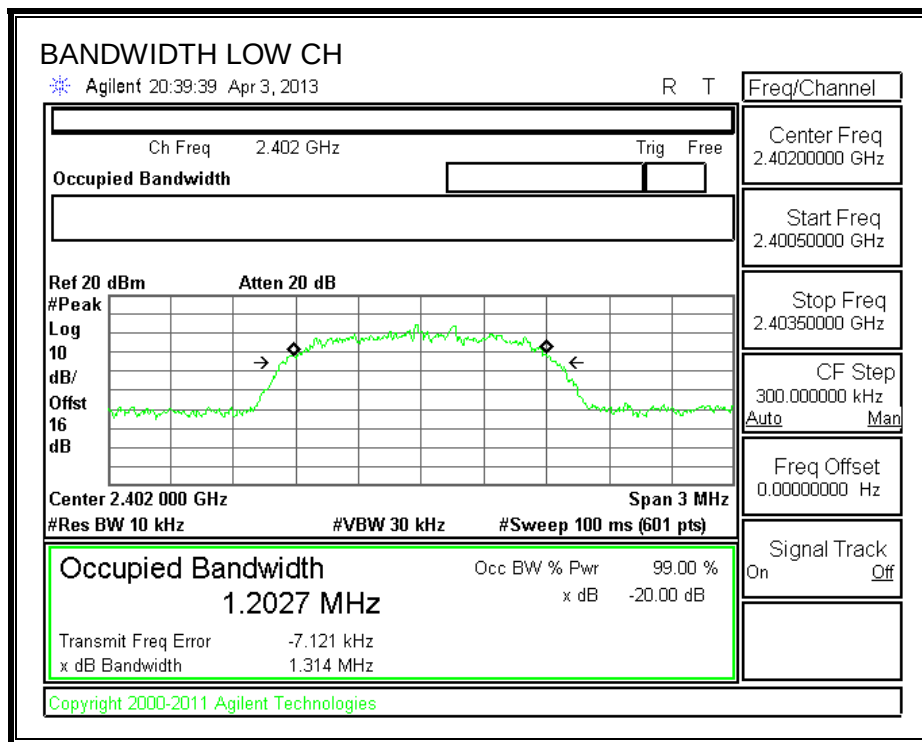
TEST PROCEDURE

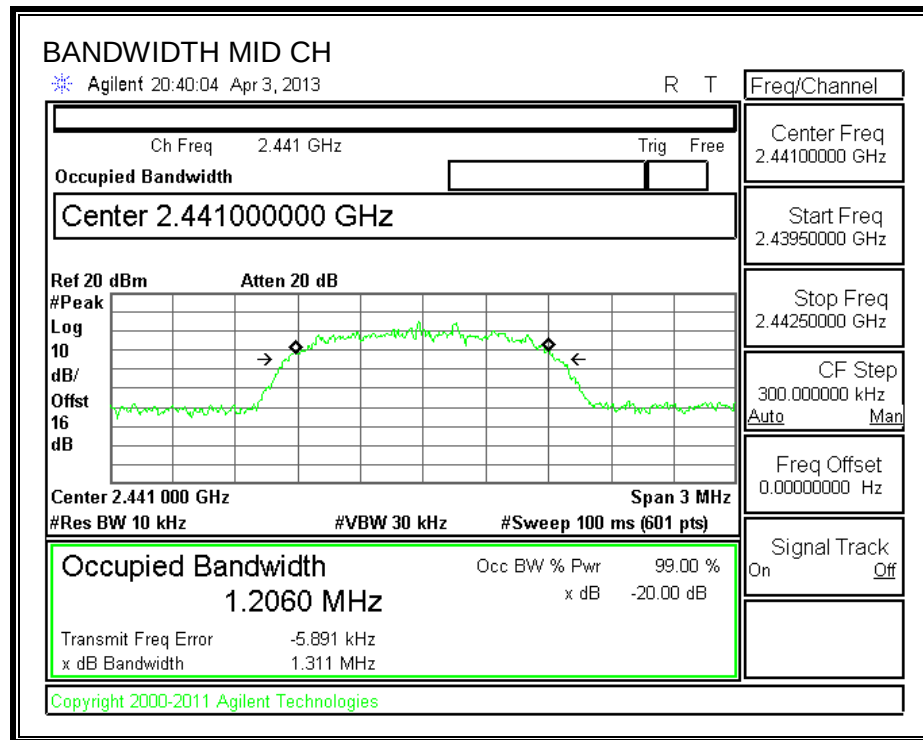
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled.

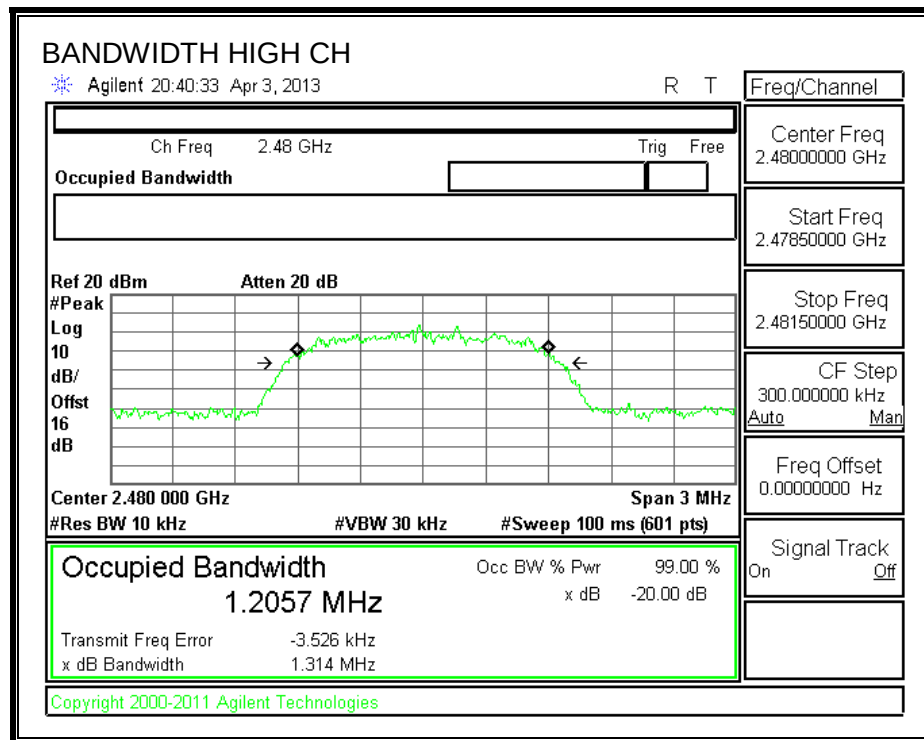
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1314.00	1211.50
Middle	2441	1311.00	1215.90
High	2480	1314.00	1215.20

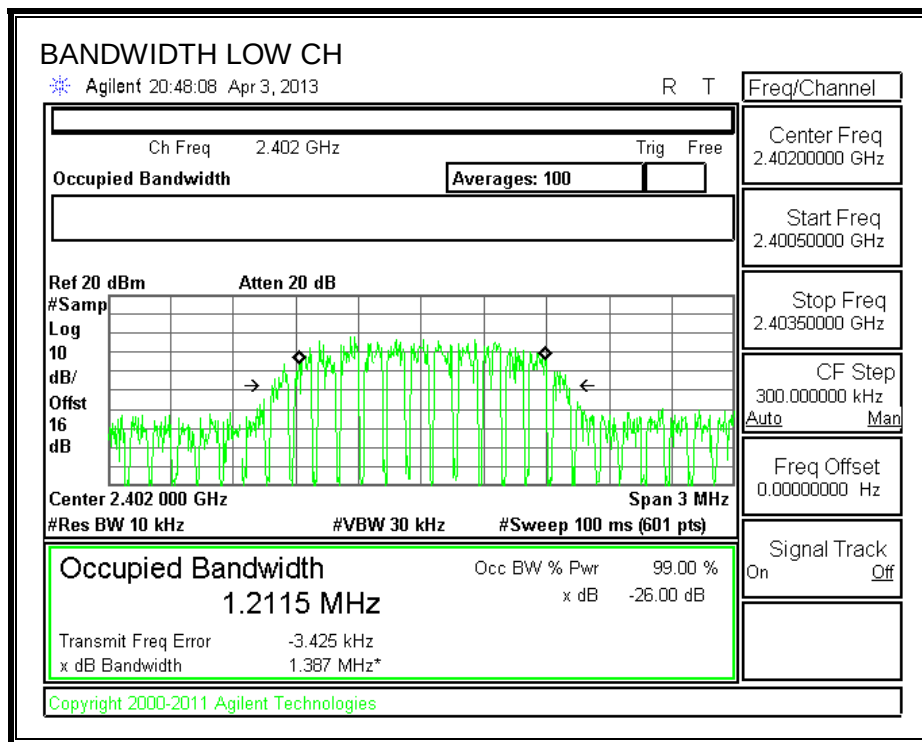
20 dB BANDWIDTH

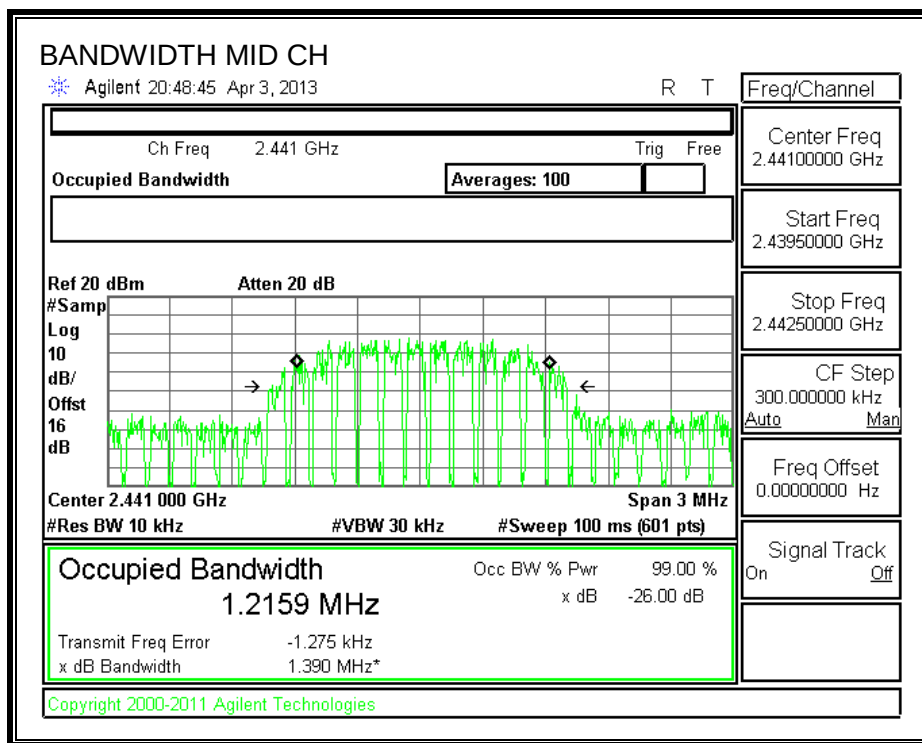


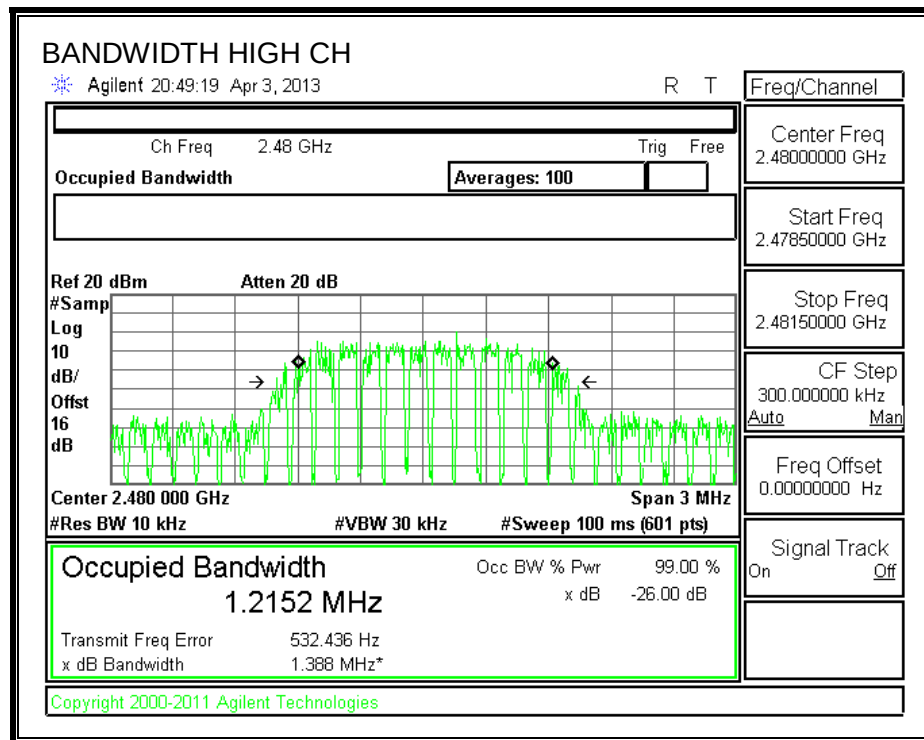




99% BANDWIDTH







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.

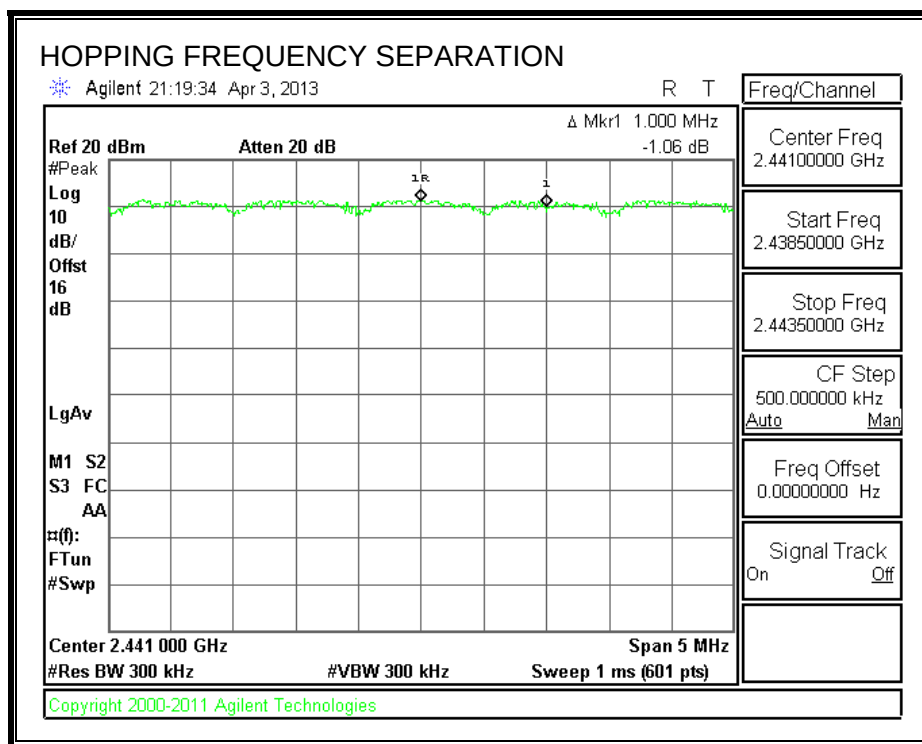
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

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

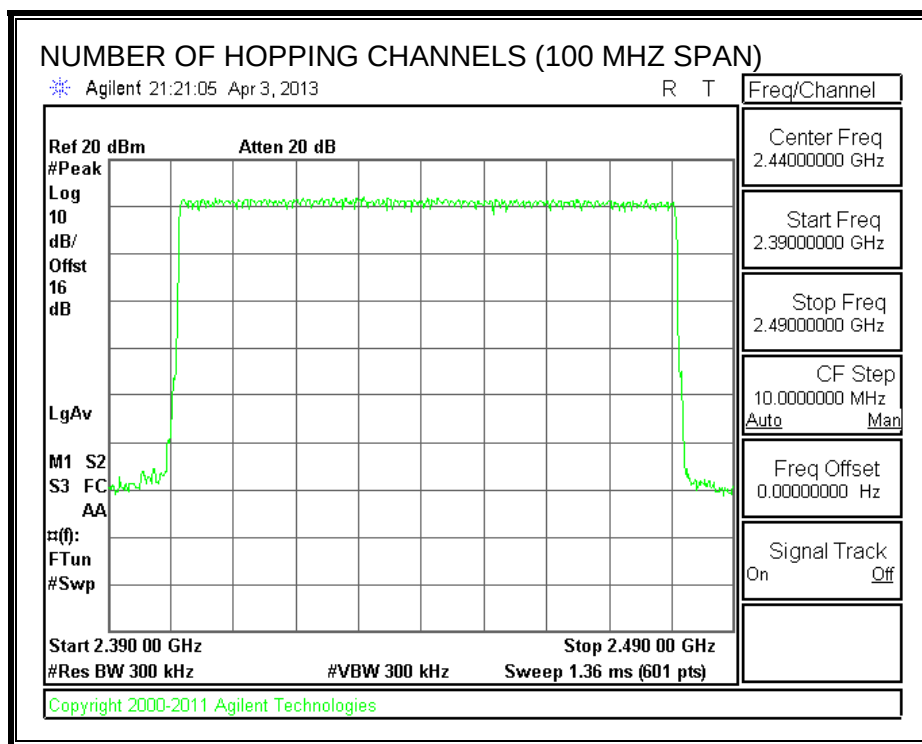
TEST PROCEDURE

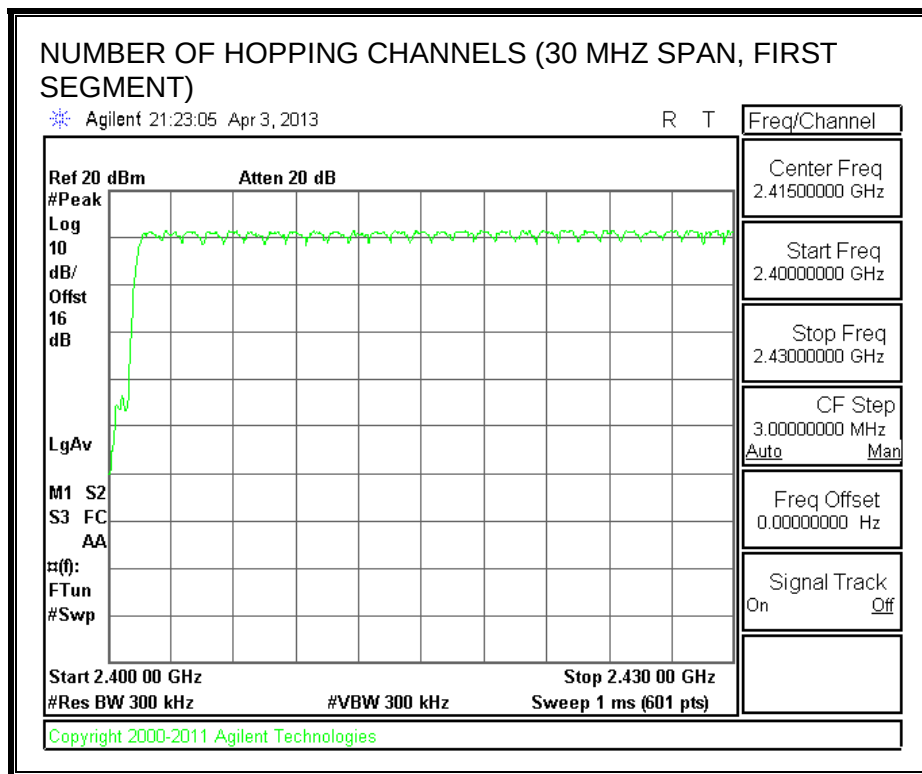
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

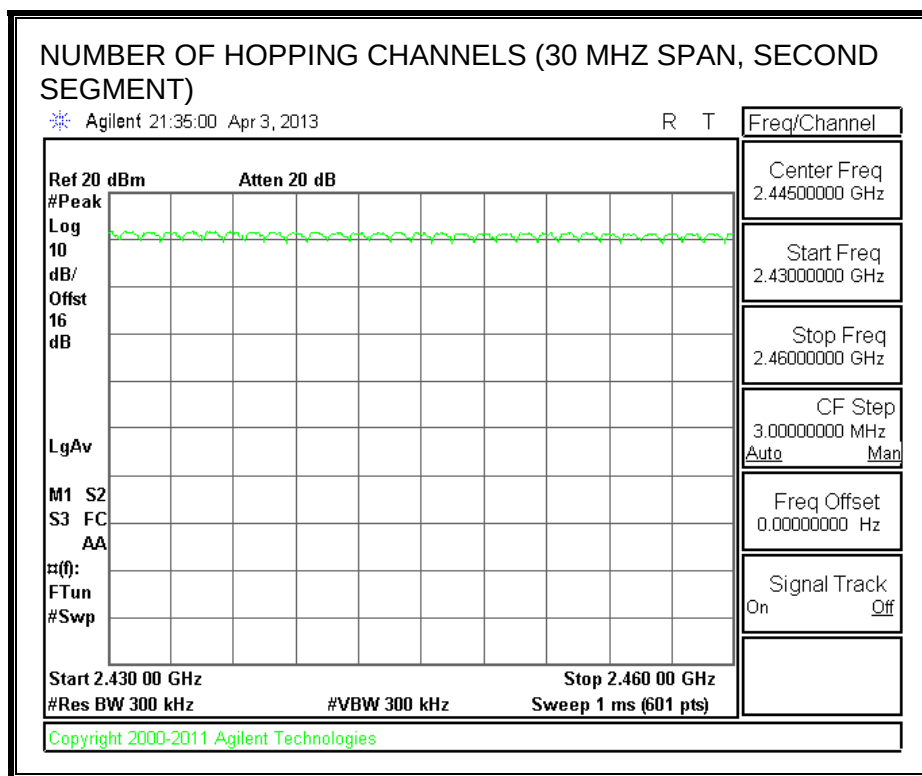
RESULTS

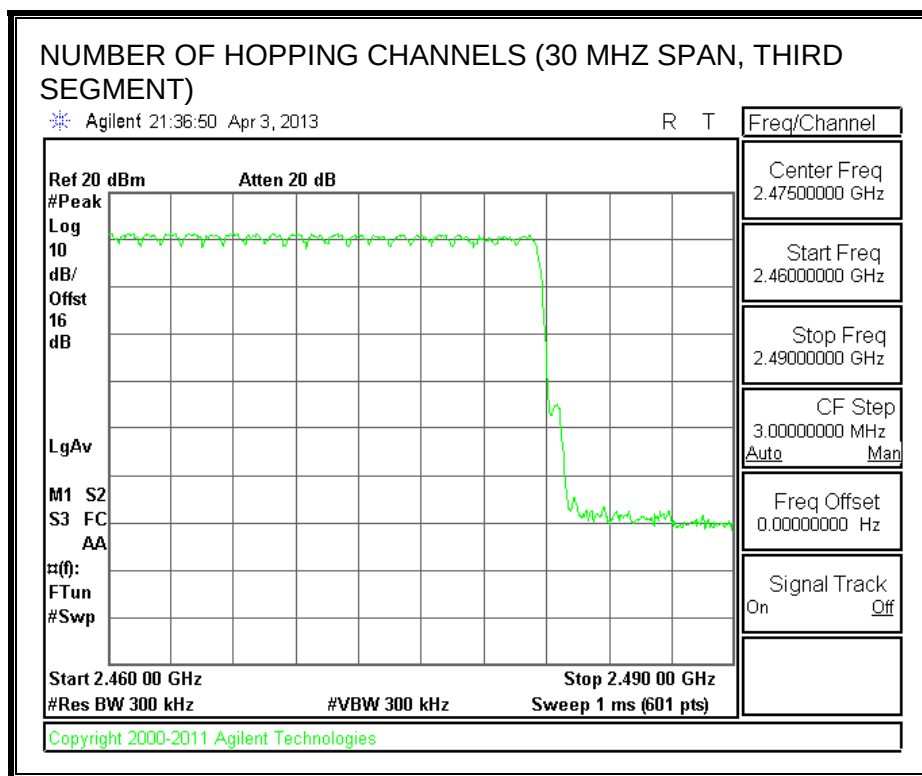
Normal Mode: 79 Channels observed.

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

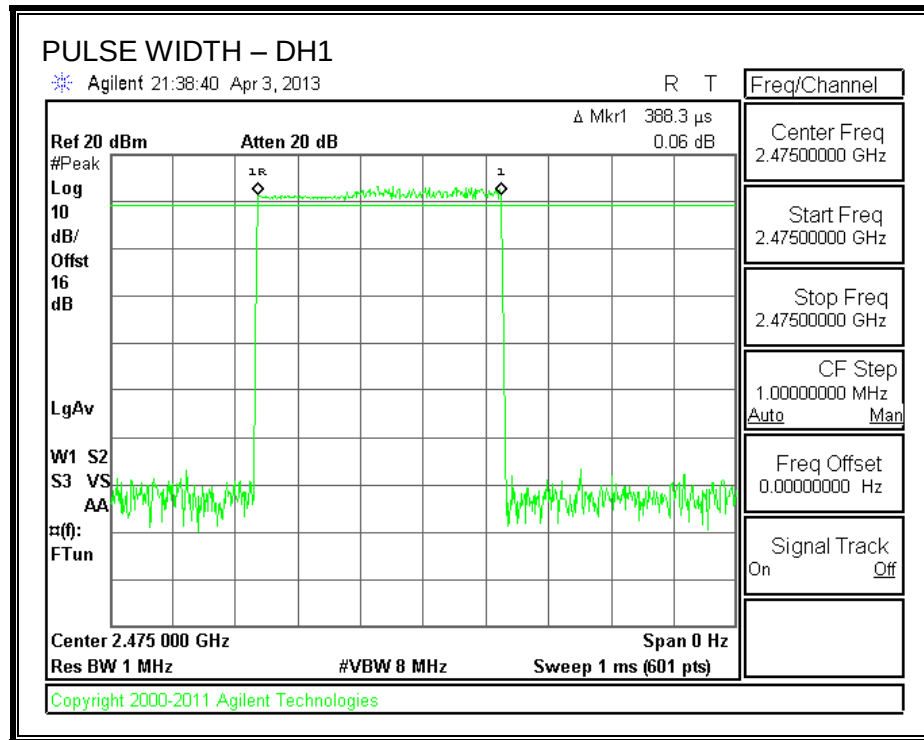
RESULTS

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

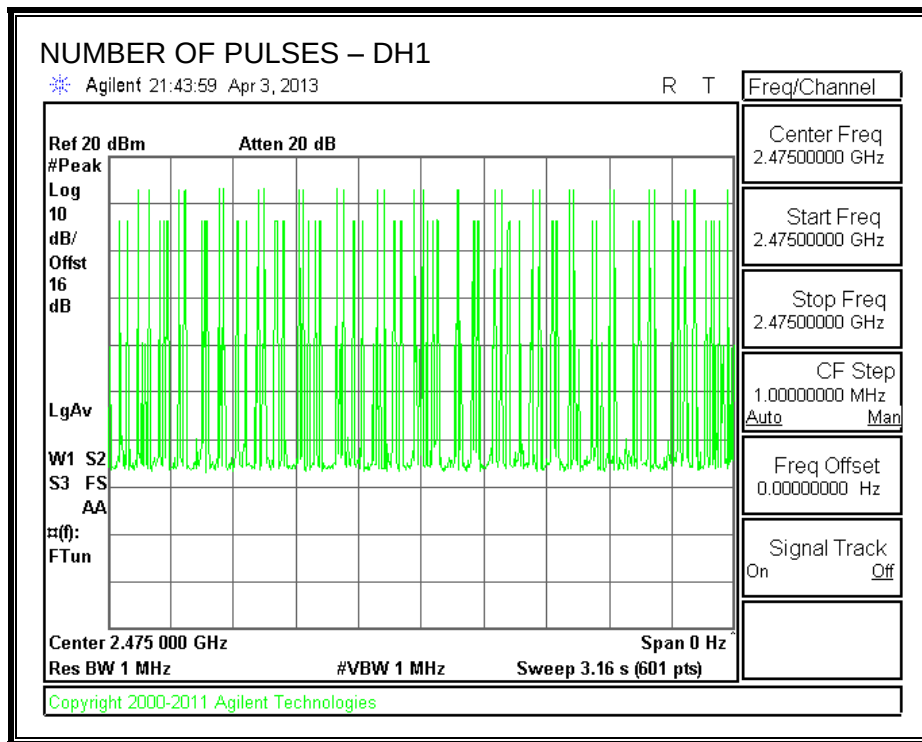
8PSK (EDR) Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.3883	31	0.120	0.4	-0.280
DH3	1.642	16	0.263	0.4	-0.137
DH5	2.892	9	0.260	0.4	-0.140

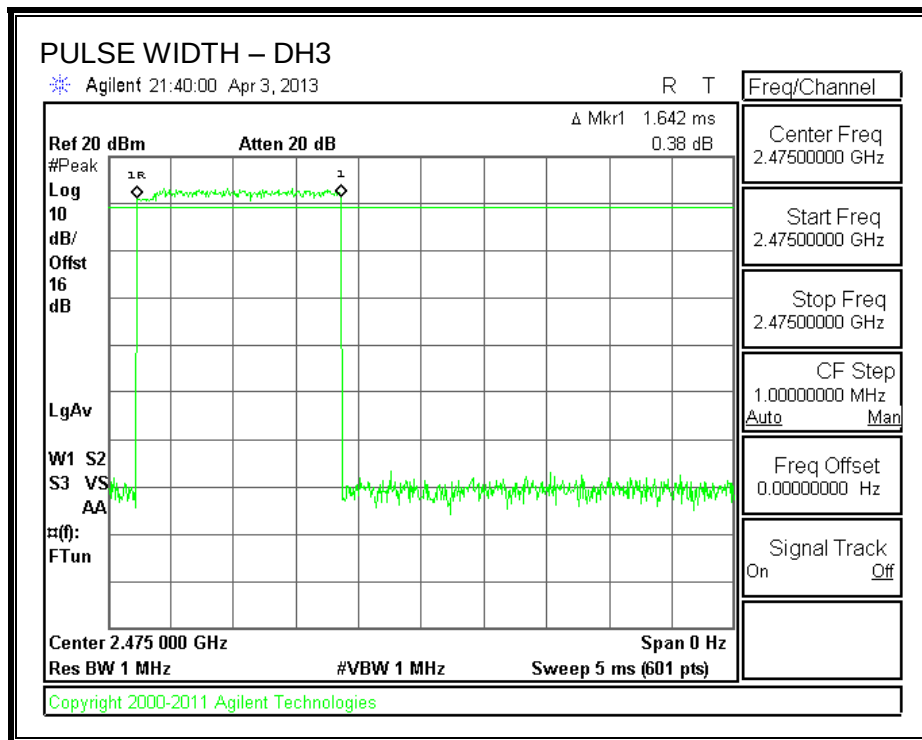
PULSE WIDTH - DH1



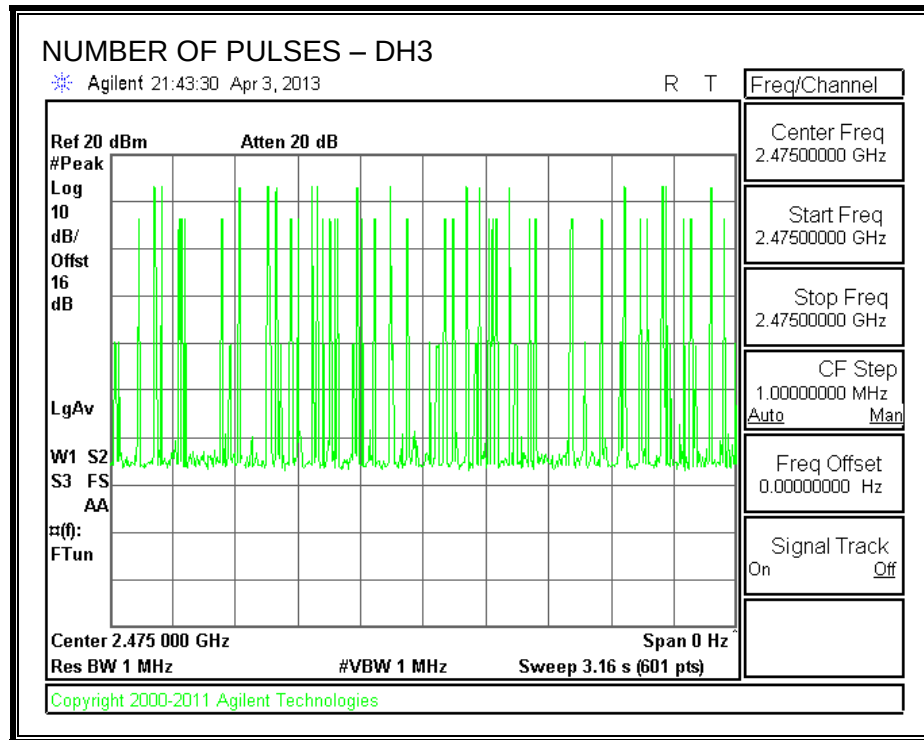
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



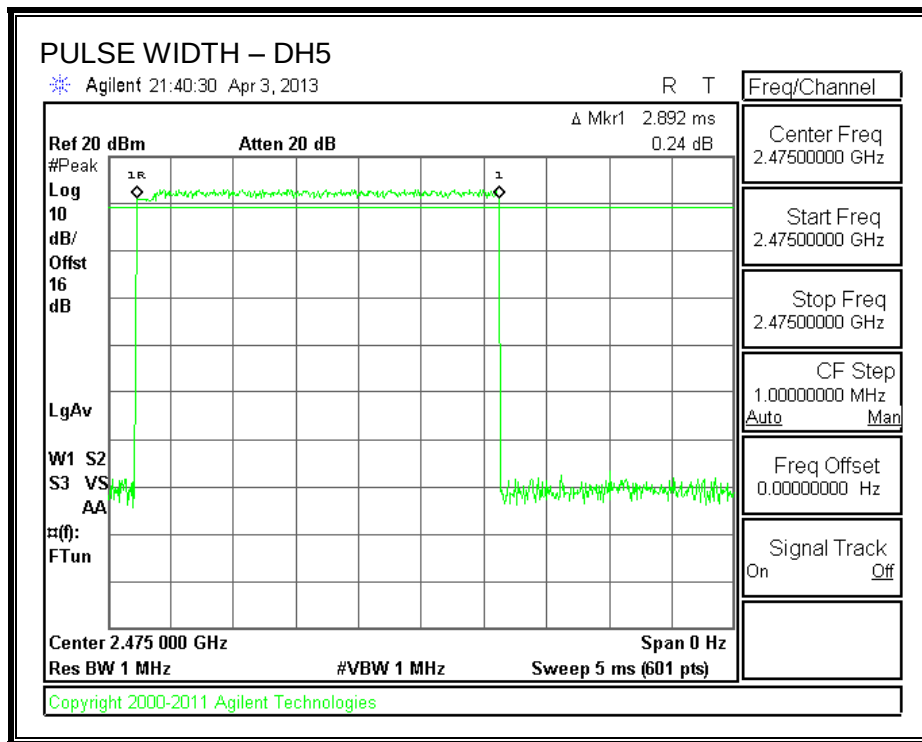
PULSE WIDTH – DH3



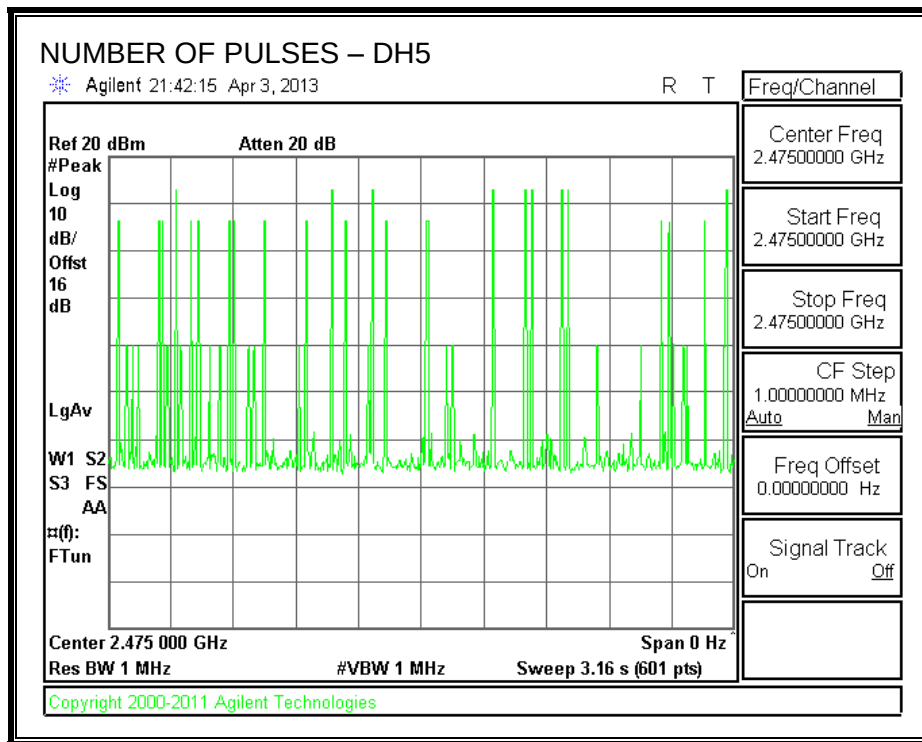
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



7.2.5. 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 16 dB (including 15 dB pad and 1dB 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	10.00
Middle	2441	10.50
High	2480	10.30

7.2.6. 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 30 dBm.

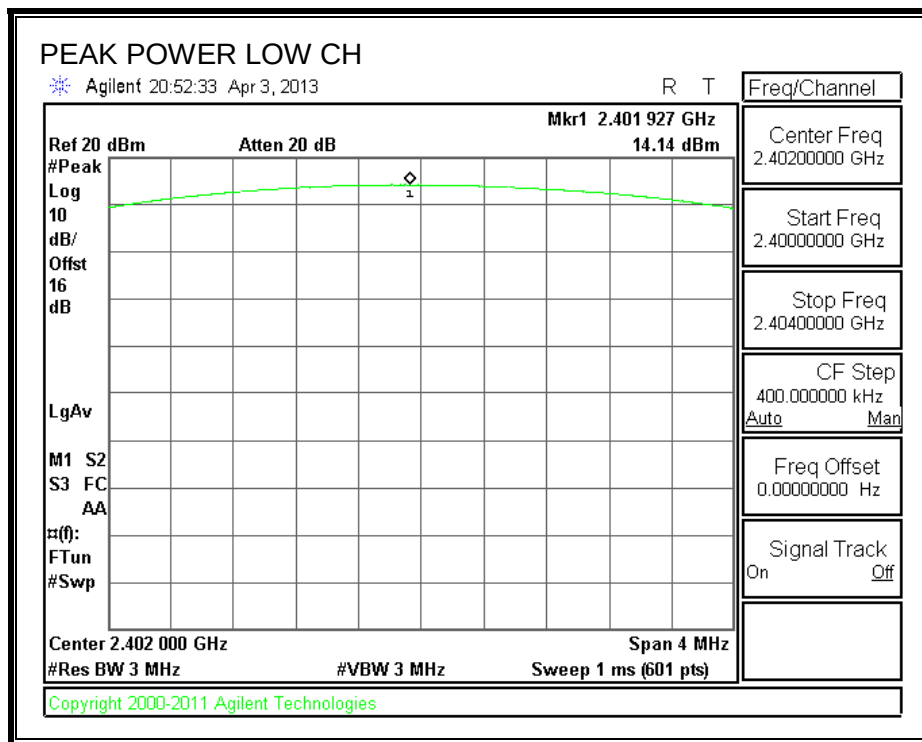
TEST PROCEDURE

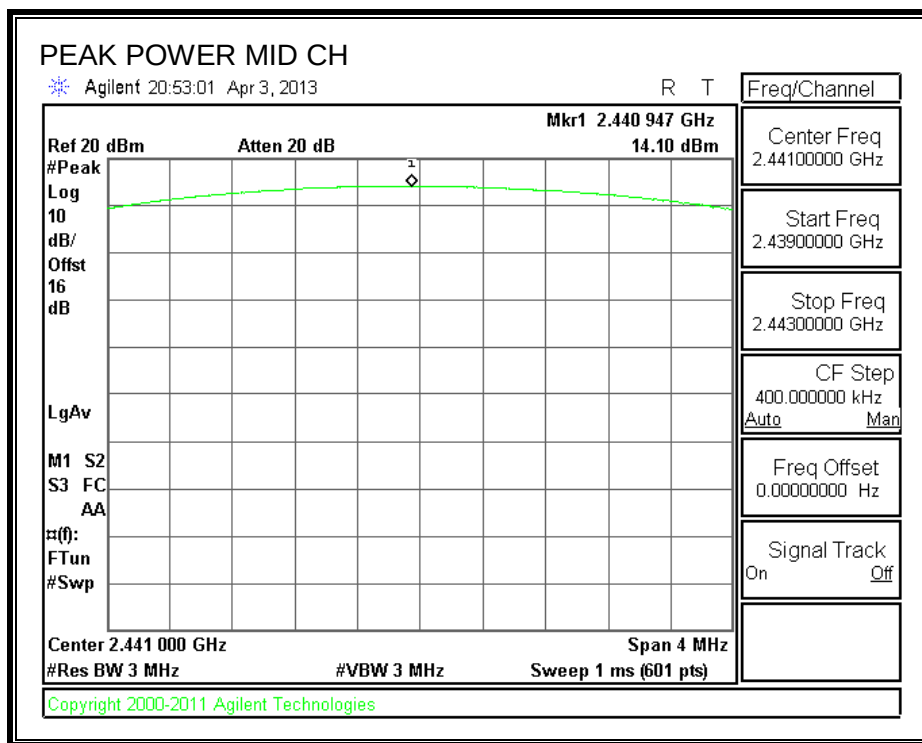
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

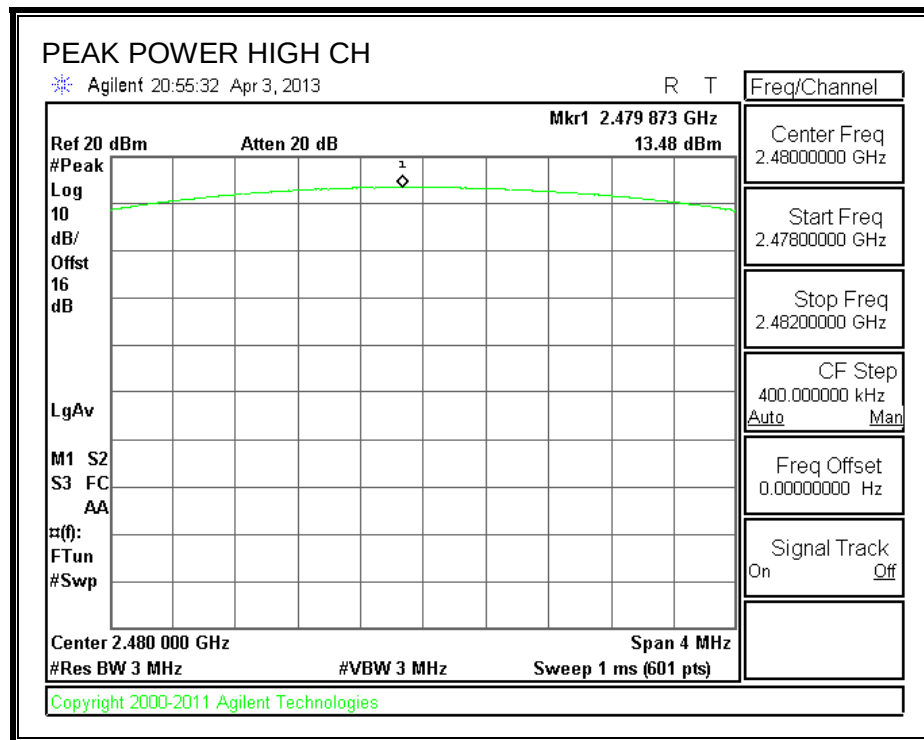
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.14	30	-15.86
Middle	2441	14.10	30	-15.90
High	2480	13.48	30	-16.52

OUTPUT POWER







7.2.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

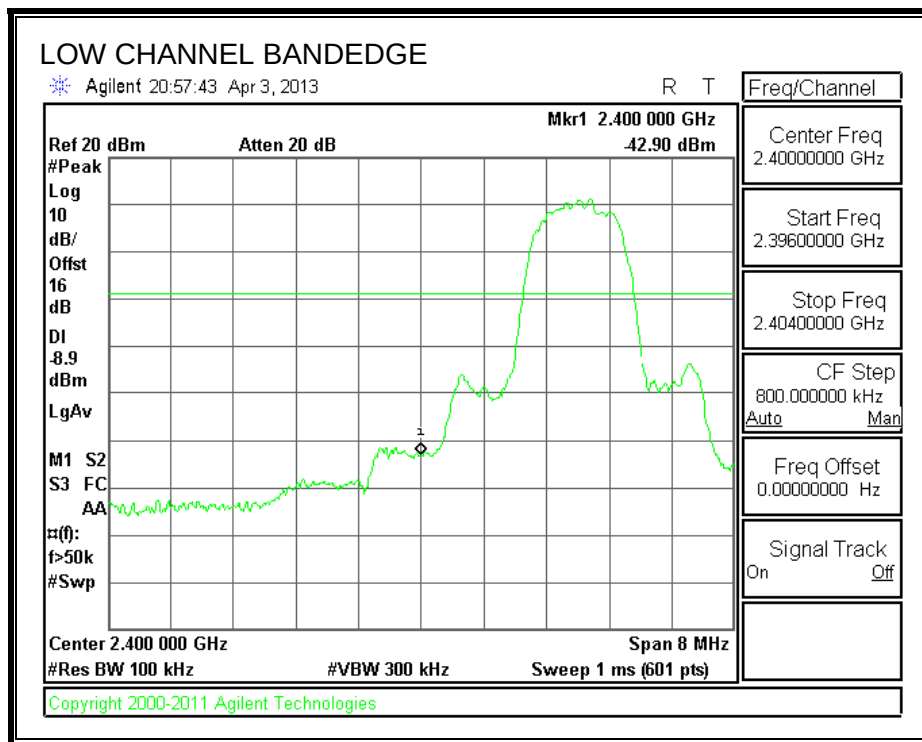
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

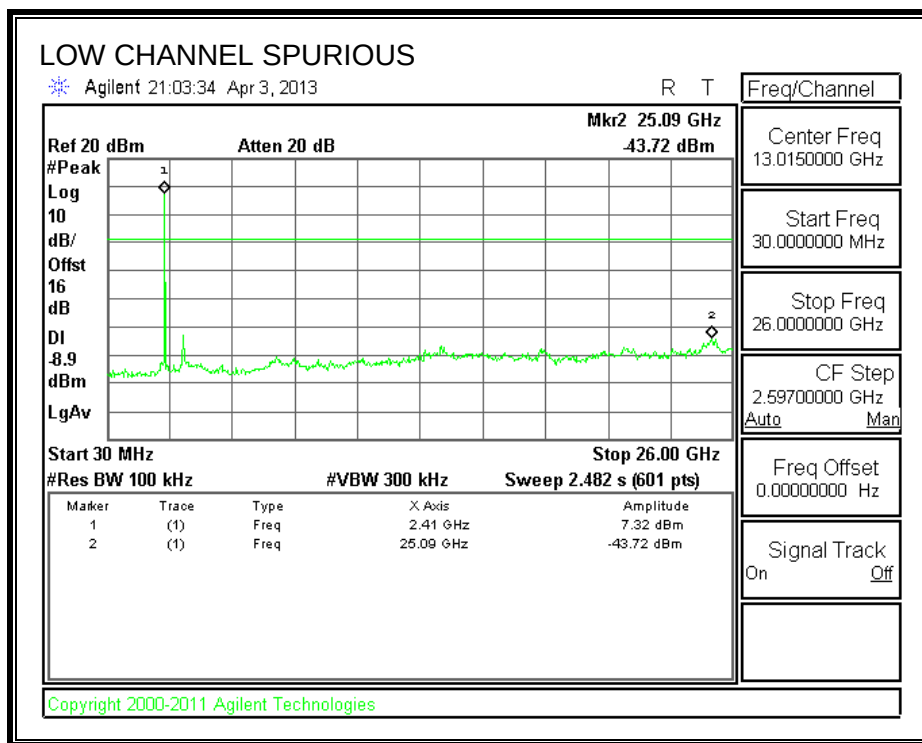
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

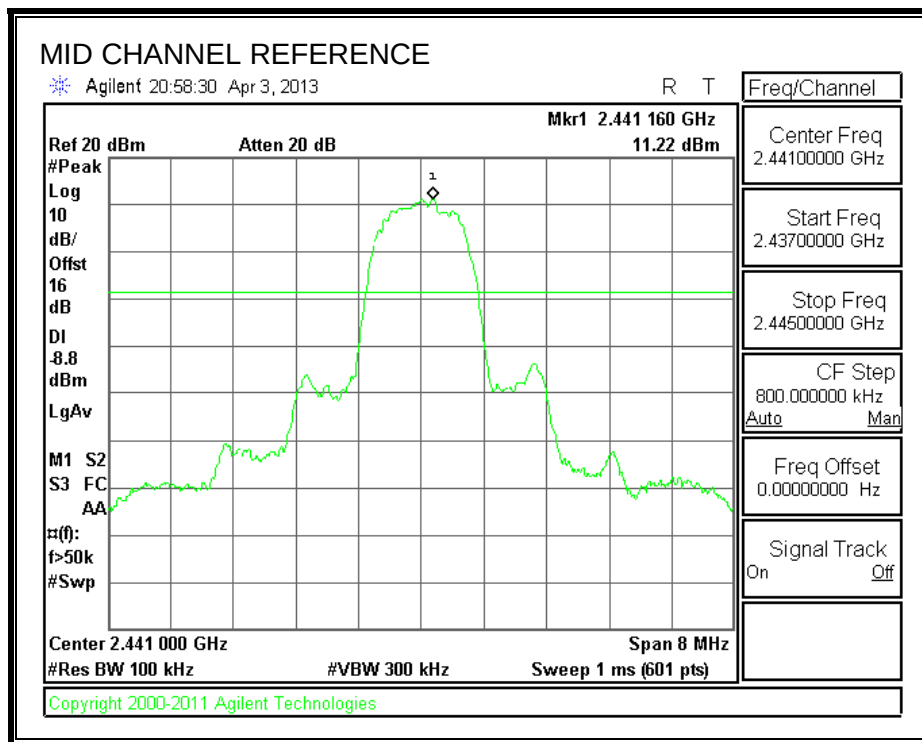
RESULTS

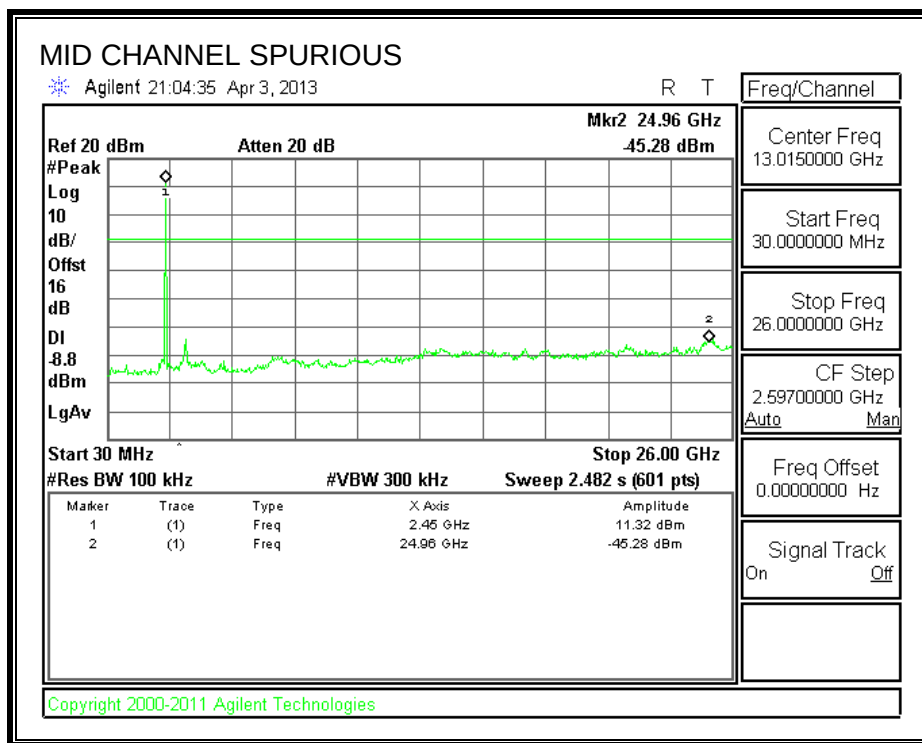
SPURIOUS EMISSIONS, LOW CHANNEL



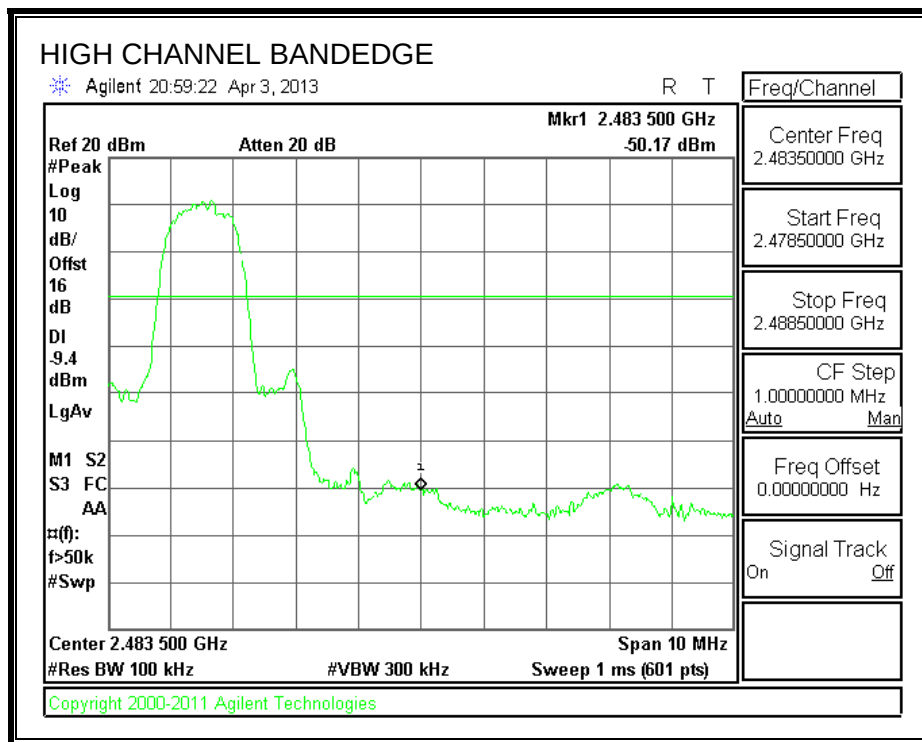


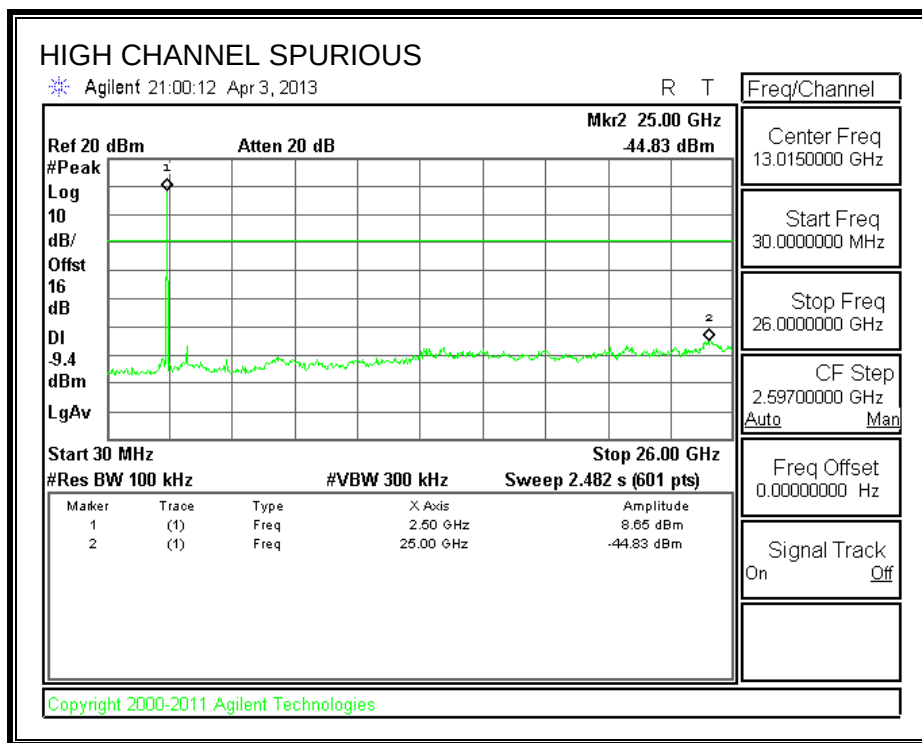
SPURIOUS EMISSIONS, MID CHANNEL



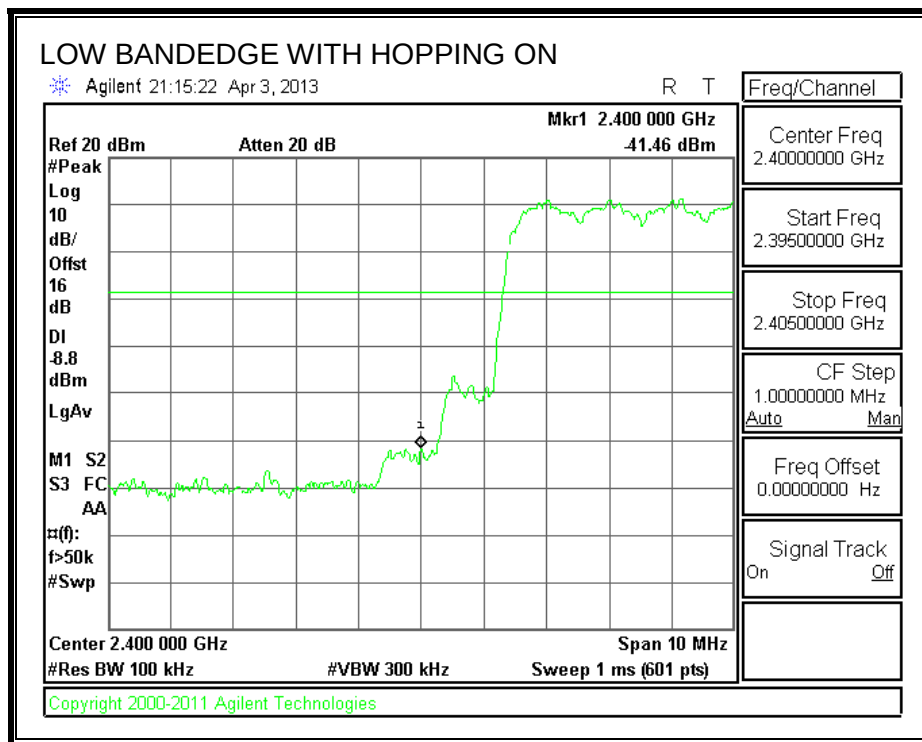


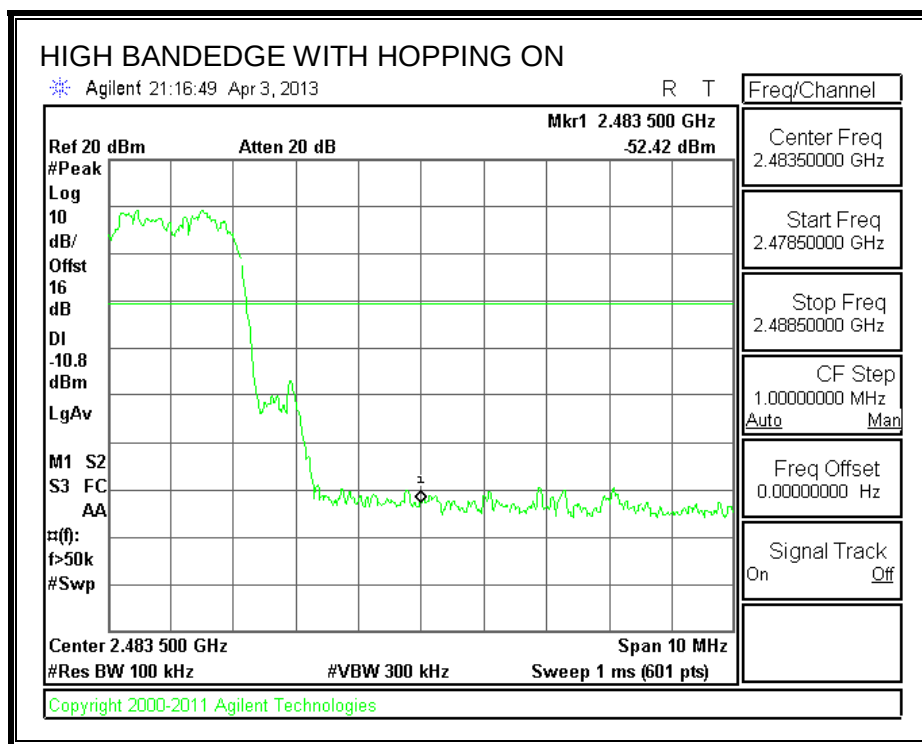
SPURIOUS EMISSIONS, HIGH CHANNEL





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.

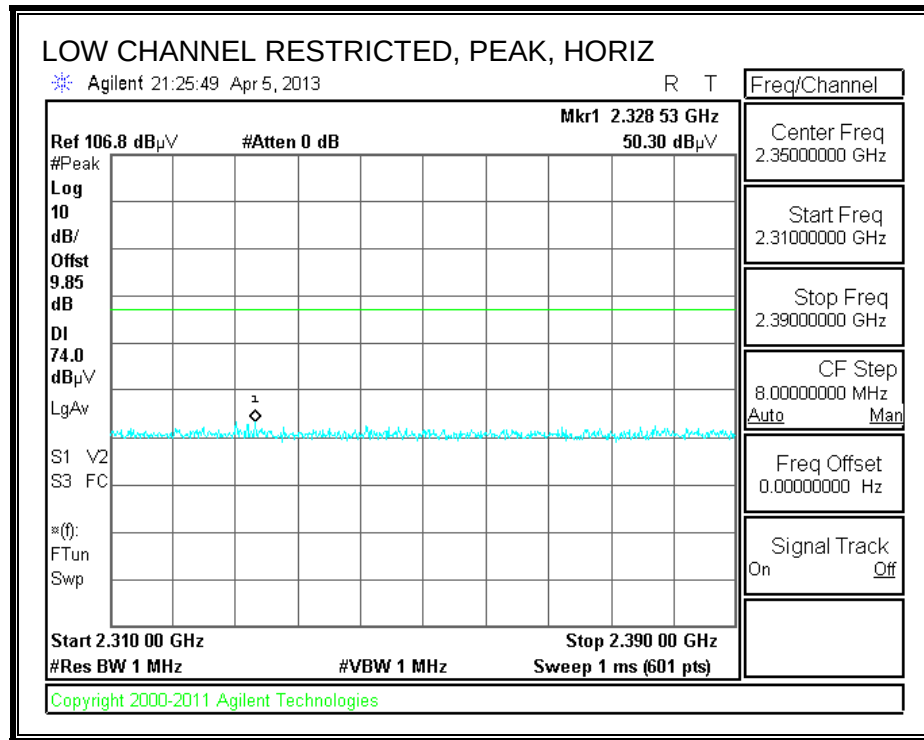
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

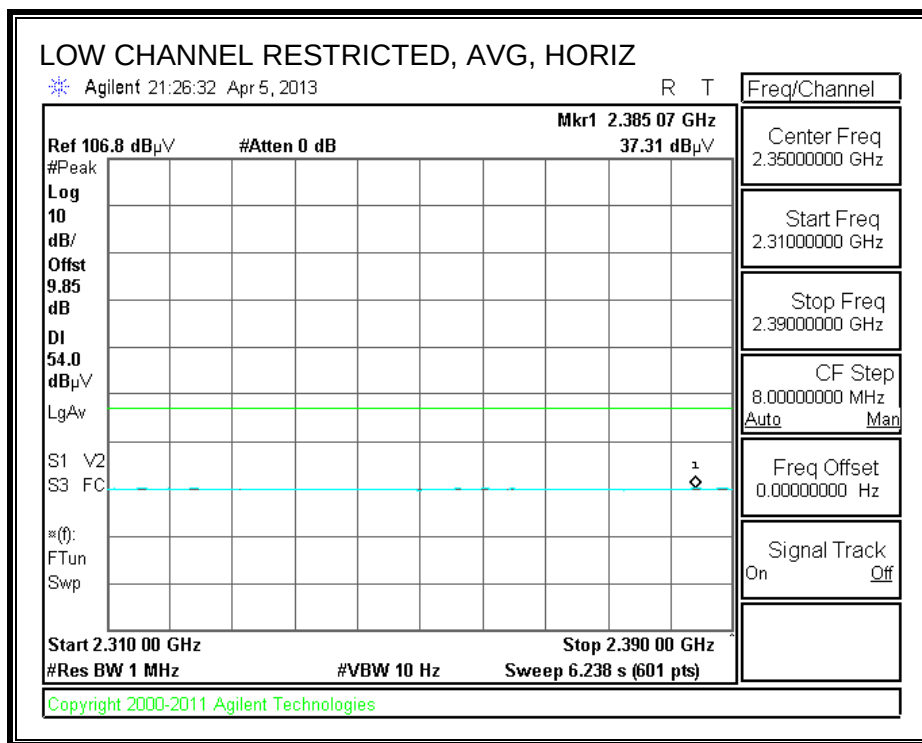
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

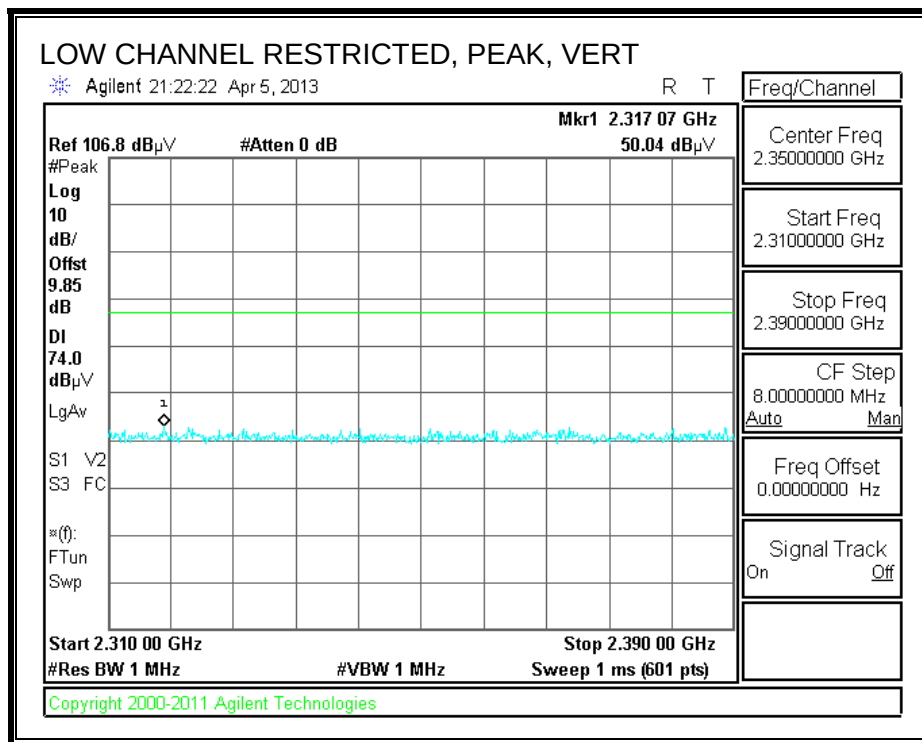
8.2.1. BASIC DATA RATE GFSK MODULATION

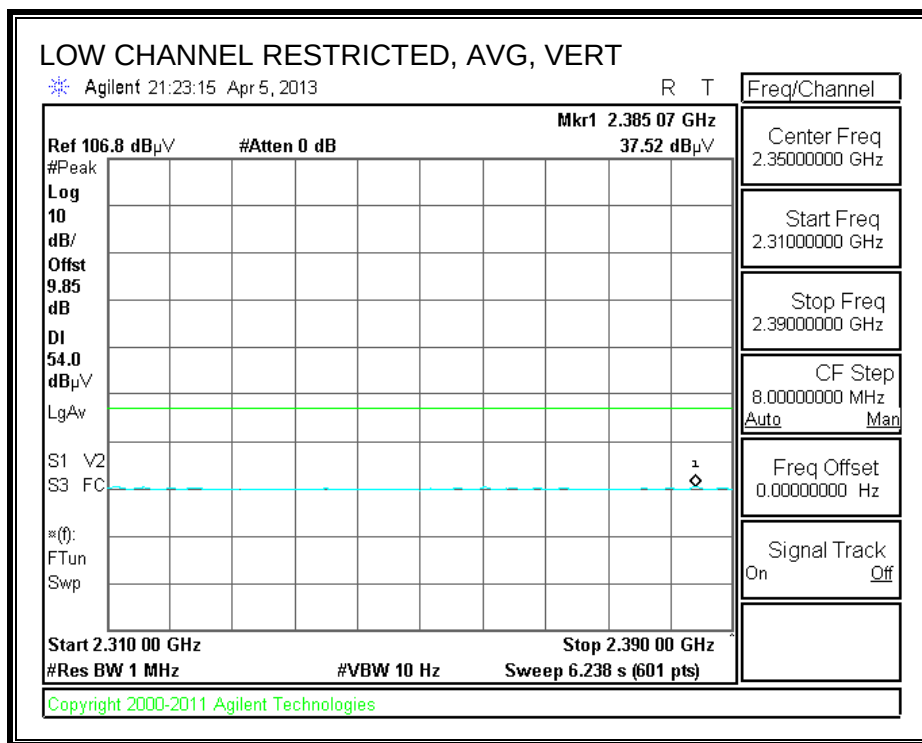
RESTRICTED BANDEGE (LOW CHANNEL, HORIZONTAL)



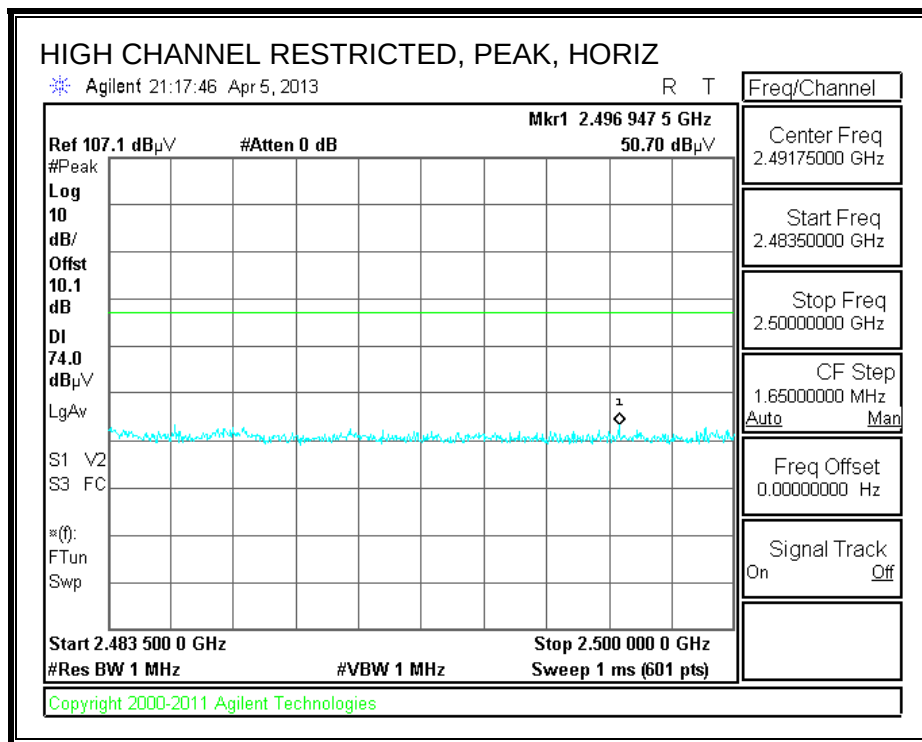


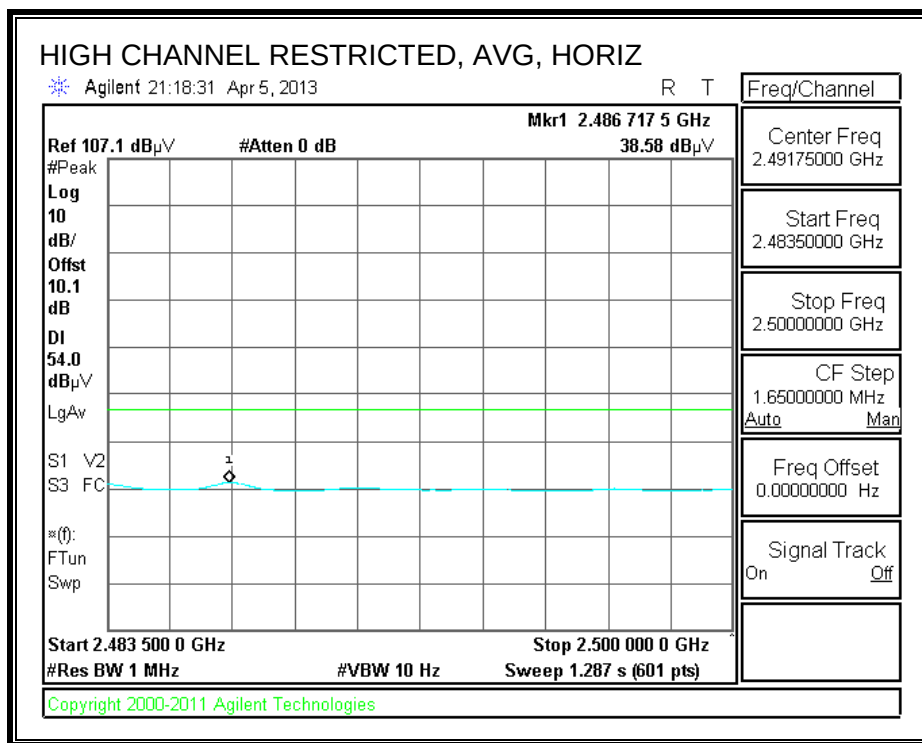
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



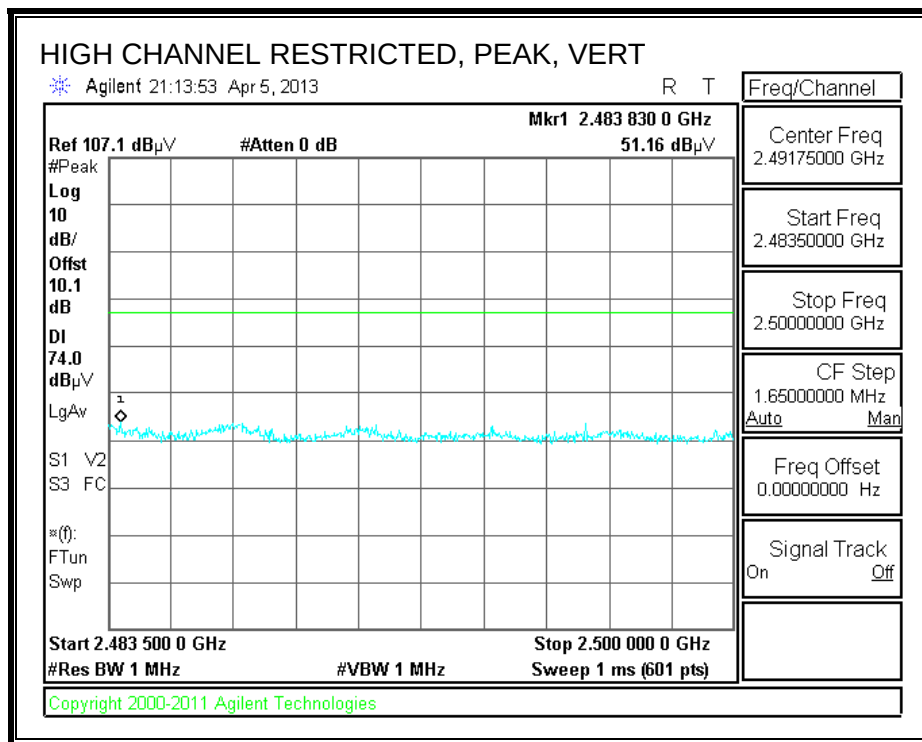


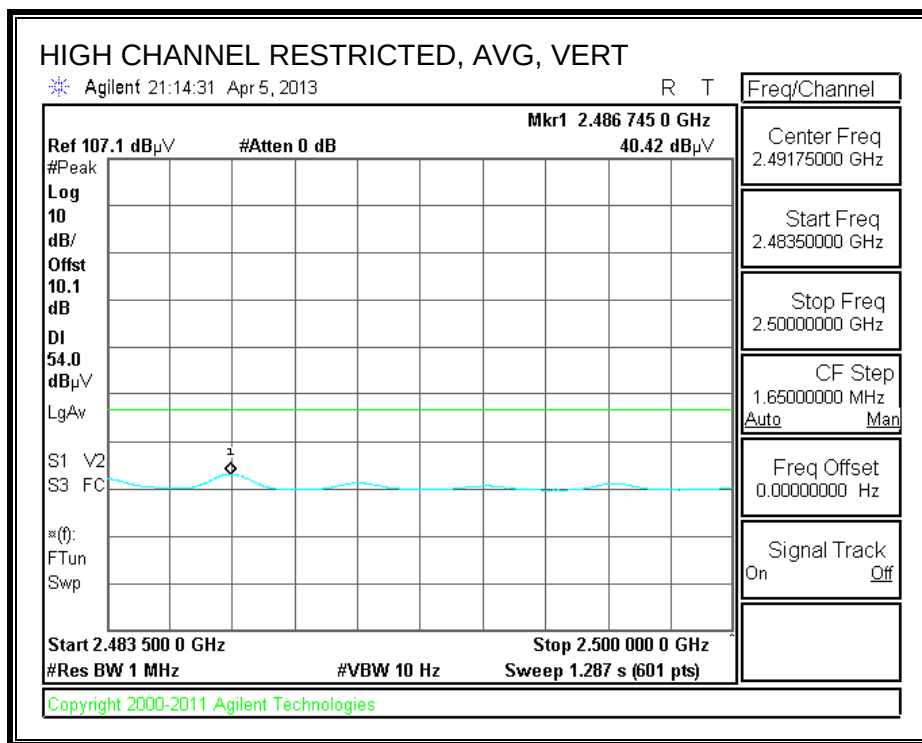
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



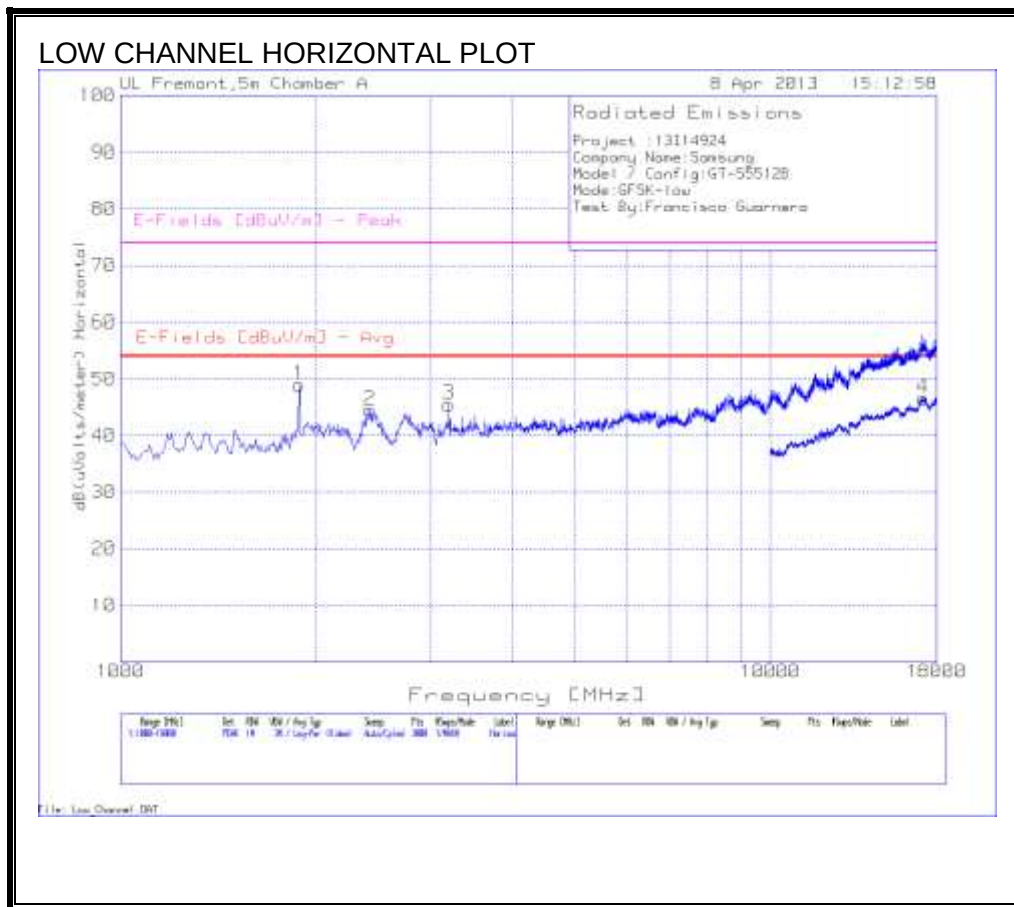


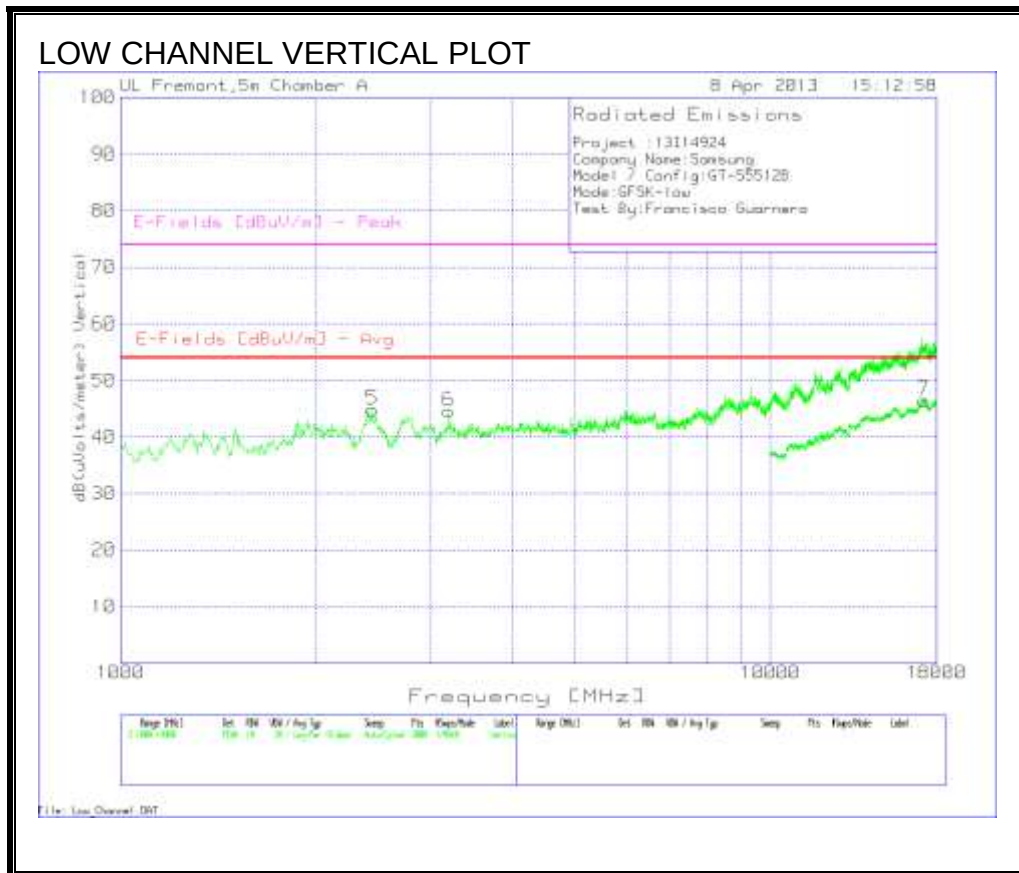
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





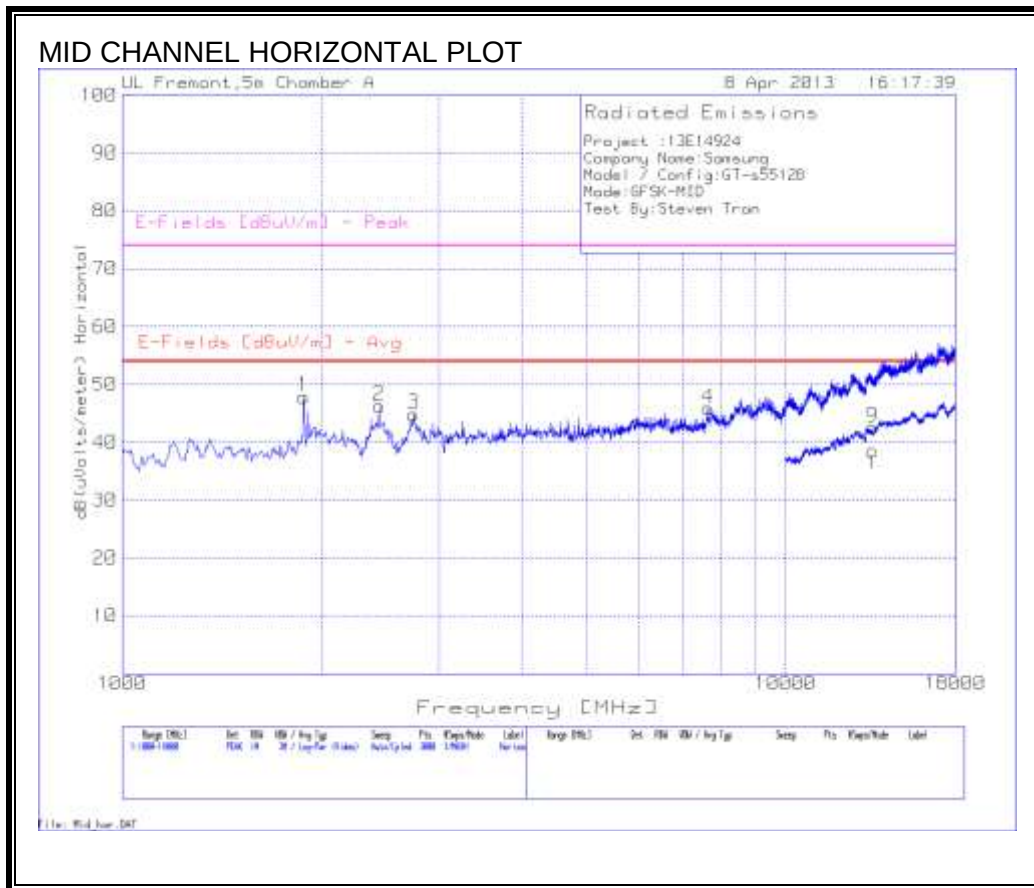
HARMONICS AND SPURIOUS EMISSIONS

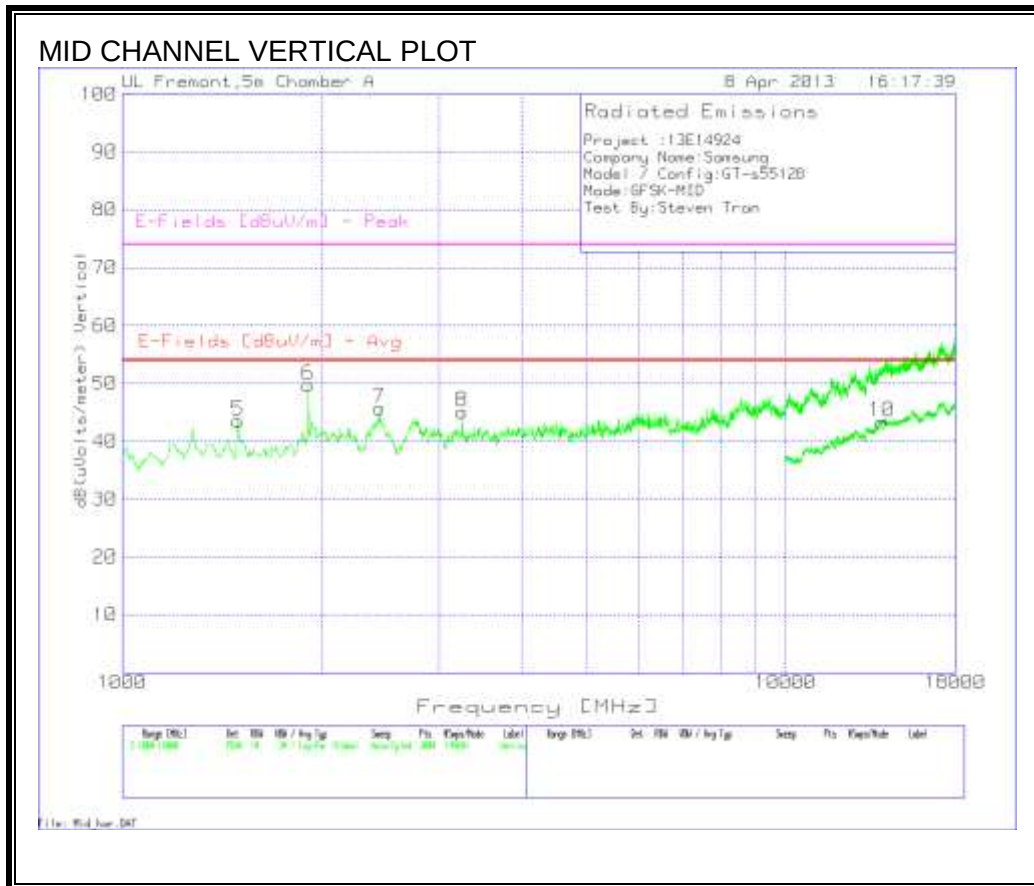




LOW CHANNEL HORIZONTAL AND VERTICAL DATA

Project :13114924															
Company Name:Samsung															
Model / Config:GT-S5512B															
Mode:GFSK-low															
Test By:Francisco Guarnero															
Marker No.	Test Frequency	Meter Reading	Detector	T136 Ant Factor [dB/m]	T144 Preamp Gain [dB]	Cable Factor [dB]	T160 BRF [dB]	dB(uVolts/ meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity	
Horizontal 1000 - 18000MHz															
1	1883.411	49.96	PK	31.5	-37.2	3.9	0.8	48.96	53.97	-5.01	74	-25.04	102	Horz	
2	2421.386	43.78	PK	32.2	-36.9	4.5	0.9	44.48	53.97	-9.49	74	-29.52	102	Horz	
3	3202.865	42.73	PK	33.6	-36.5	5.3	0.4	45.53	53.97	-8.44	74	-28.47	200	Horz	
Vertical 1000 - 18000MHz															
5	2444.037	43.96	PK	32.3	-36.9	4.5	0.9	44.76	53.97	-9.21	74	-29.24	100	Vert	
6	3202.865	41.81	PK	33.6	-36.5	5.3	0.4	44.61	53.97	-9.36	74	-29.39	200	Vert	
Horizontal 10000 - 18000MHz															
4	17184.408	25.29	PK	40.9	-34.3	14.1	0.5	46.49	53.97		74		100	Horz	
Vertical 10000 - 18000MHz															
7	17212.394	25.22	PK	40.9	-34.3	14.1	0.5	46.42	53.97	-7.55	74	-27.58	200	Vert	
PK - Peak detector															
QP - Quasi-Peak detector															
Av - Average detector															





MID CHANNEL HORIZONTAL AND VERTICAL DATA

Project :13E14924

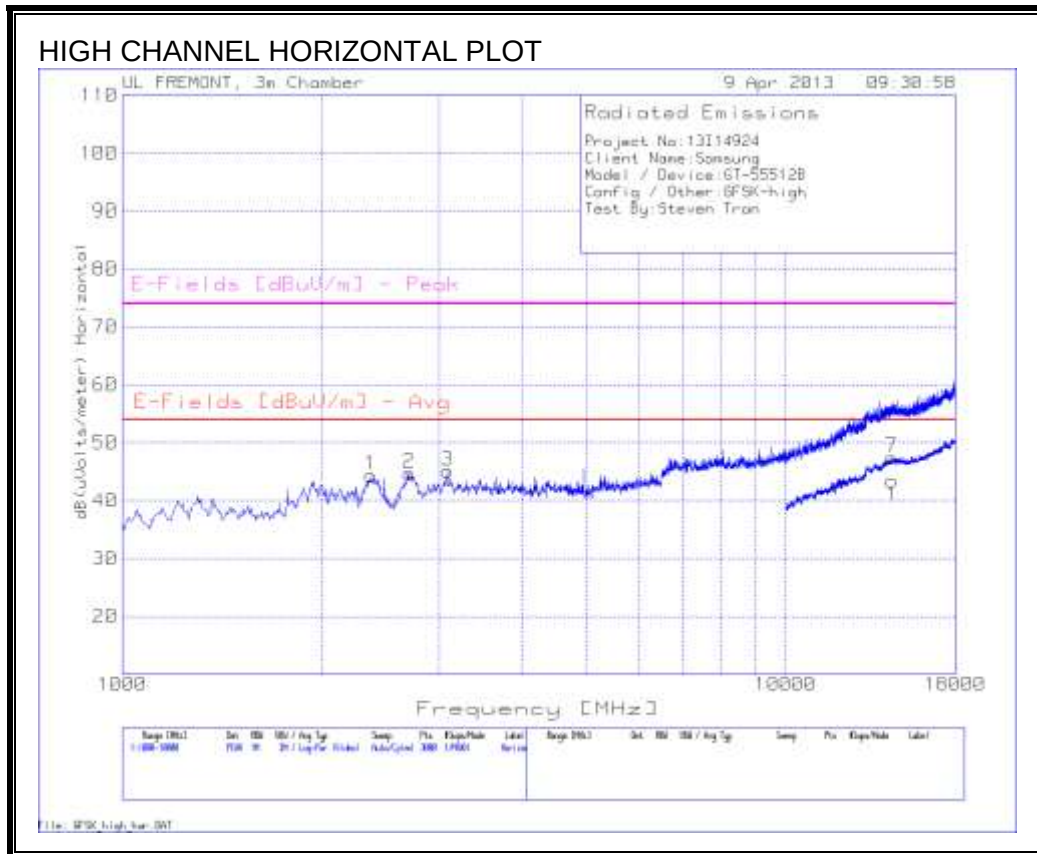
Company Name:Samsung

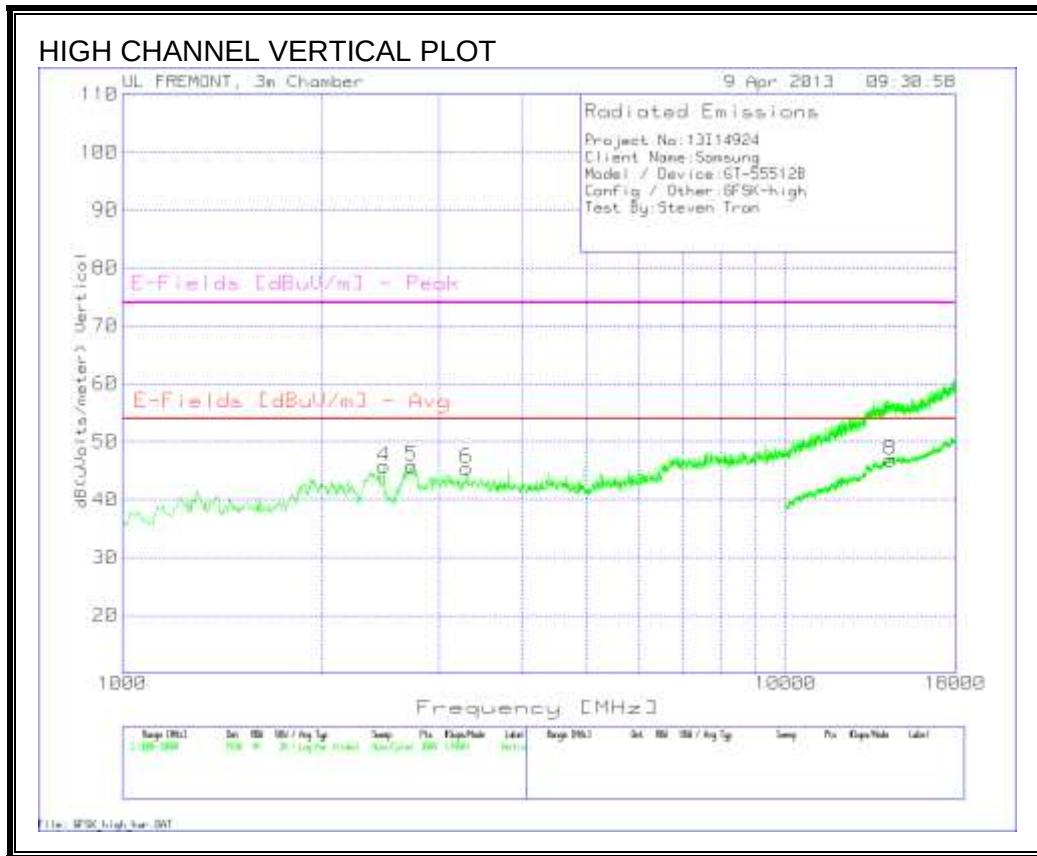
Model / Config:GT-s5512B

Mode:GFSK-MID

Test By:Steven Tran

Marker No.	Test Frequency	Meter Reading	Detector	T136 Ant Factor [dB/m]	T144 Preamp Gain [dB]	Cable Factor [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	1877.748	48.9	PK	31.4	-37.2	3.9	0.8	47.8	53.97	-6.17	74	-26.2	200	Horz
2	2438.374	45.46	PK	32.3	-36.9	4.5	0.9	46.26	53.97	-7.71	74	-27.74	200	Horz
3	2749.833	43.22	PK	32.7	-36.8	4.8	0.9	44.82	53.97	-9.15	74	-29.18	100	Horz
4	7636.909	36.91	PK	35.5	-35.8	8.9	0.3	45.81	53.97	-8.16	74	-28.19	200	Horz
Vertical 1000 - 18000MHz														
5	1492.672	48.33	PK	29	-37.8	3.5	0.5	43.53	53.97	-10.44	74	-30.47	200	Vert
6	1906.063	50.56	PK	31.7	-37.2	3.9	0.8	49.76	53.97	-4.21	74	-24.24	200	Vert
7	2438.374	44.99	PK	32.3	-36.9	4.5	0.9	45.79	53.97	-8.18	74	-28.21	200	Vert
8	3253.831	42.53	PK	33.2	-36.5	5.3	0.5	45.03	53.97	-8.94	74	-28.97	100	Vert
Horizontal 10000 - 18000MHz														
9	13518.241	25.01	PK	38.9	-33.9	12.2	0.4	42.61	-	-	-	-	200	Horz
Vertical 10000 - 18000MHz														
10	13962.019	25.39	PK	39.1	-33.8	12.4	0.3	43.39	53.97	-10.58	74	-30.61	100	Vert
PK - Peak detector														
Av - Average detector														





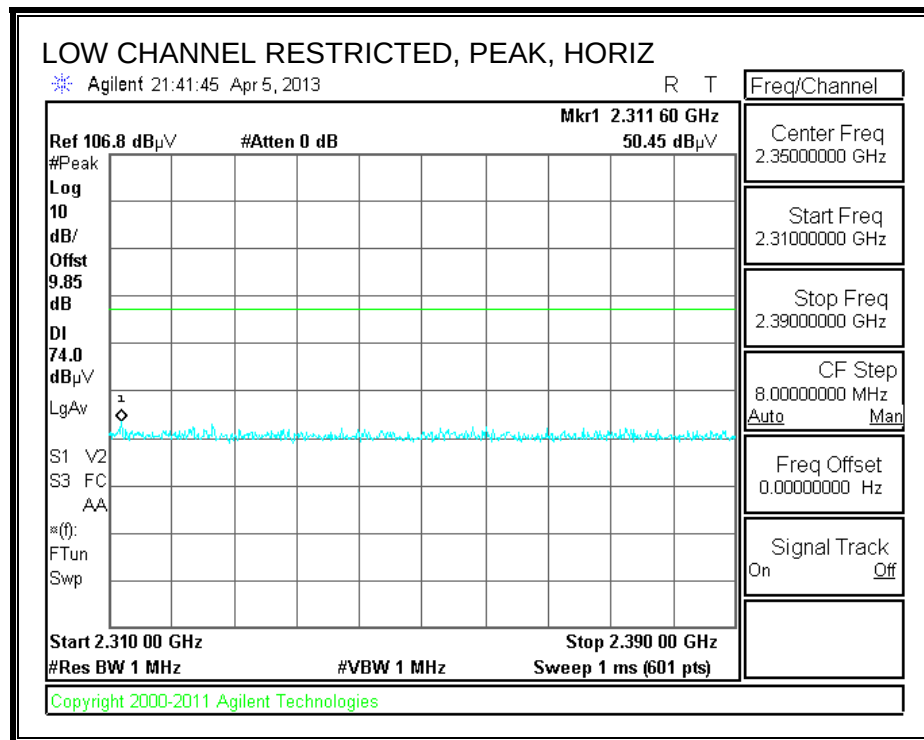
HIGH CHANNEL HORIZONTAL AND VERTICAL DATA

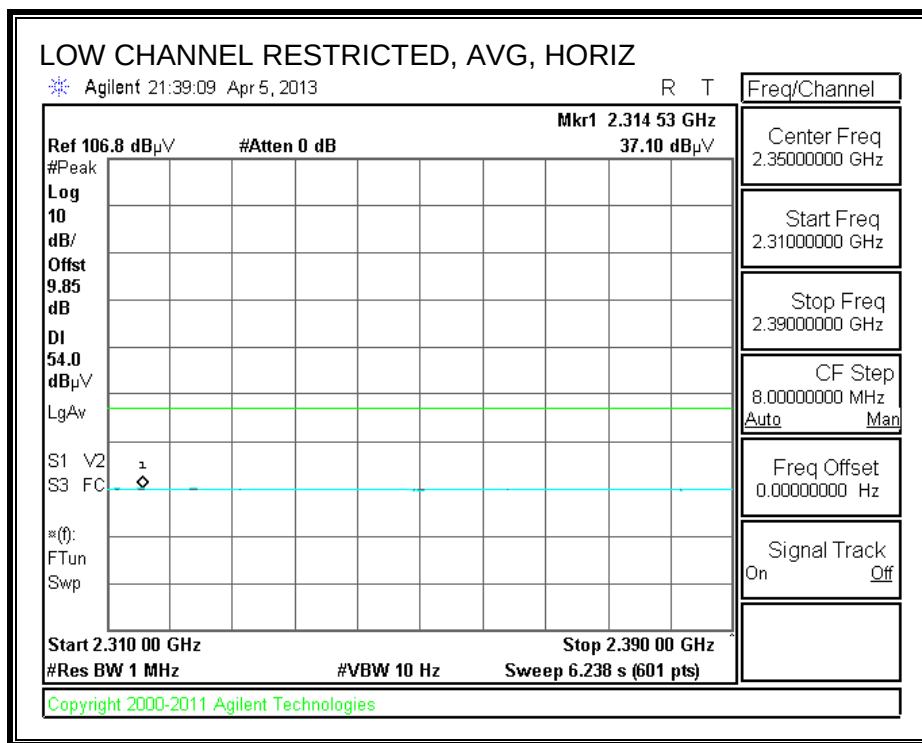
Project No:13114924													
Client Name:Samsung													
Model / Device:GT-55512B													
Config / Other:GFSK-high													
Test By:Steven Tran													

Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz													
1	2370.42	41.21	PK	32	-29.7	0.9	44.41	53.97	-9.56	74	-29.59		Horz
2	2704.53	40.26	PK	32.6	-29	0.9	44.76	53.97	-9.21	74	-29.24		Horz
3	3089.607	39.84	PK	33.1	-28.3	0.5	45.14	53.97	-8.83	74	-28.86		Horz
Vertical 1000 - 18000MHz													
4	2478.015	41.26	PK	32.3	-29.6	0.9	45.76	53.97	-8.21	74	-28.24		Vert
5	2727.182	40.48	PK	32.6	-29	0.9	45.88	53.97	-8.09	74	-28.12		Vert
6	3304.797	39.13	PK	32.9	-27.8	0.6	45.43	53.97	-8.54	74	-28.57		Vert
Horizontal 10000 - 18000MHz													
7	14461.769	22.85	PK	39.6	-15.9	0.4	47.35	53.97	-6.62	74	-26.65		Horz
Vertical 10000 - 18000MHz													
8	14381.809	22.54	PK	39.4	-15.8	0.4	46.94	53.97	-7.03	74	-27.06		Vert

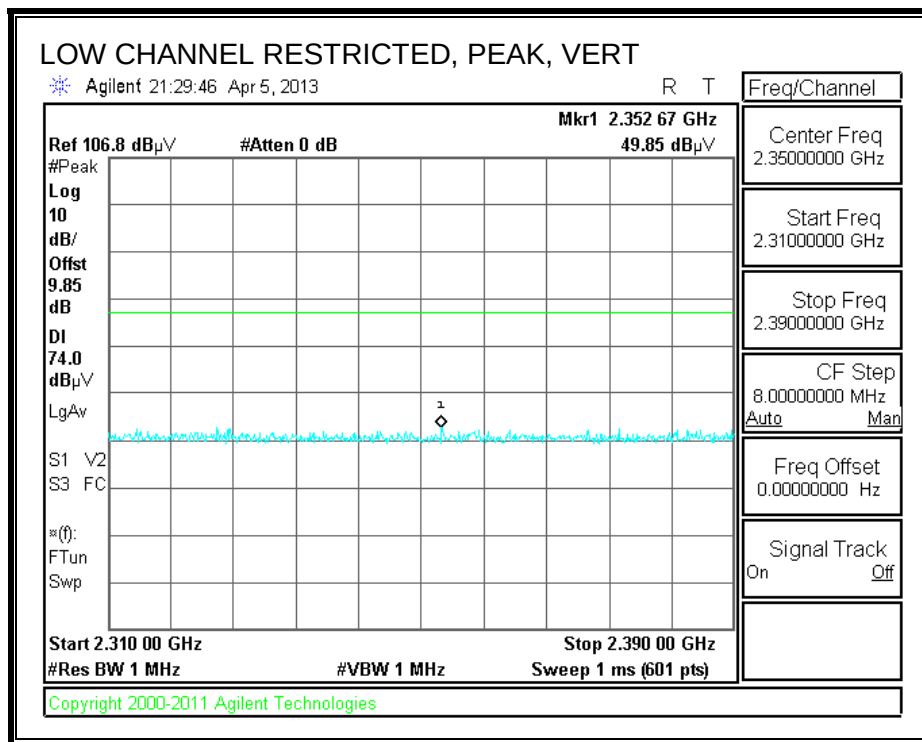
8.2.2. ENHANCED DATA RATE 8PSK MODULATION

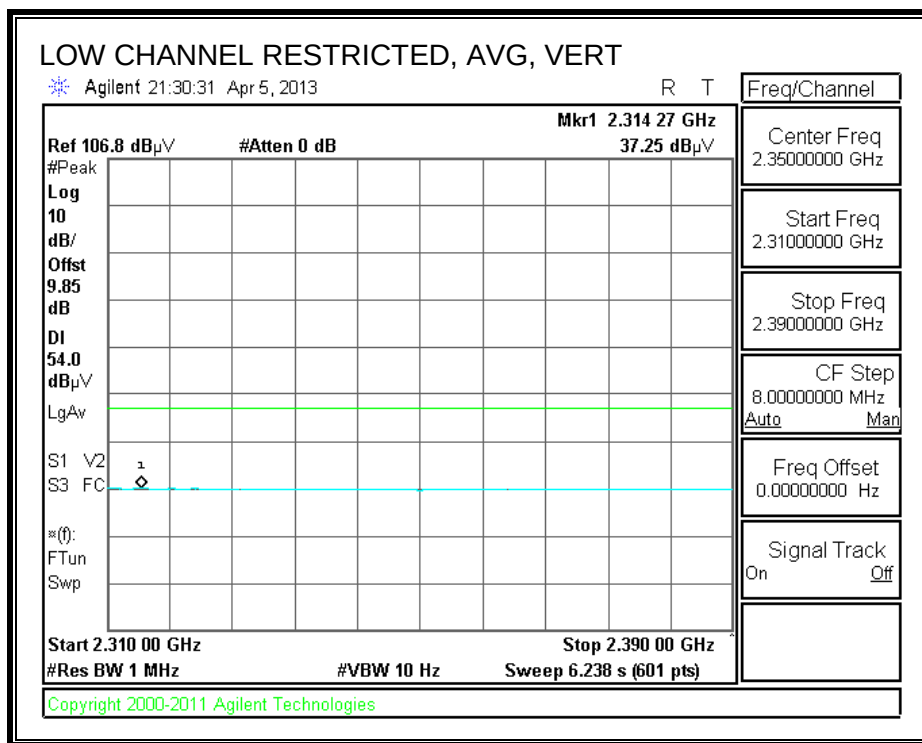
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



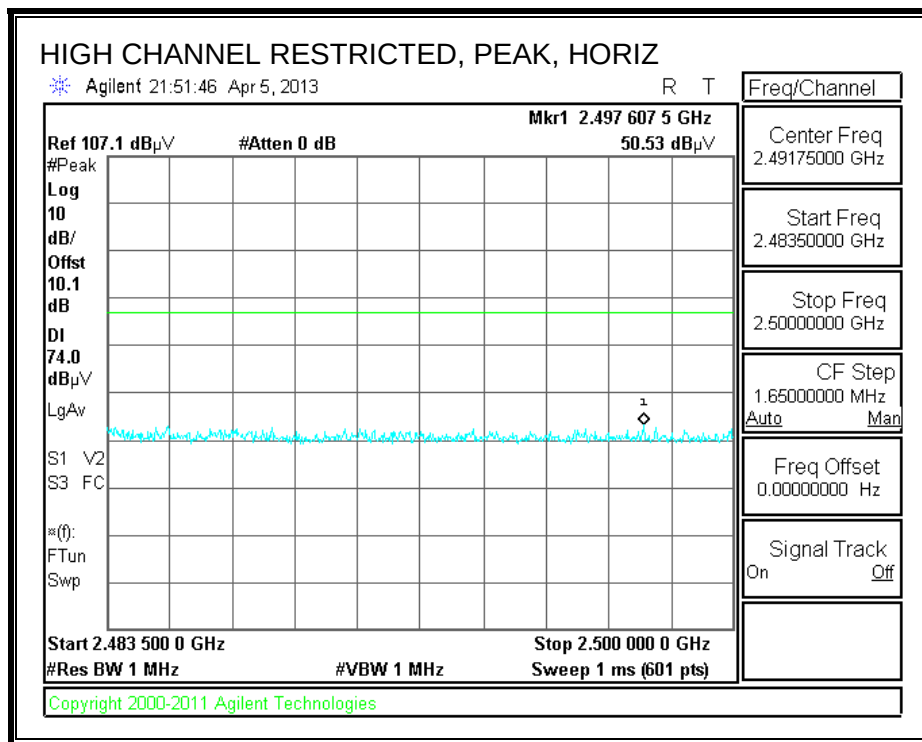


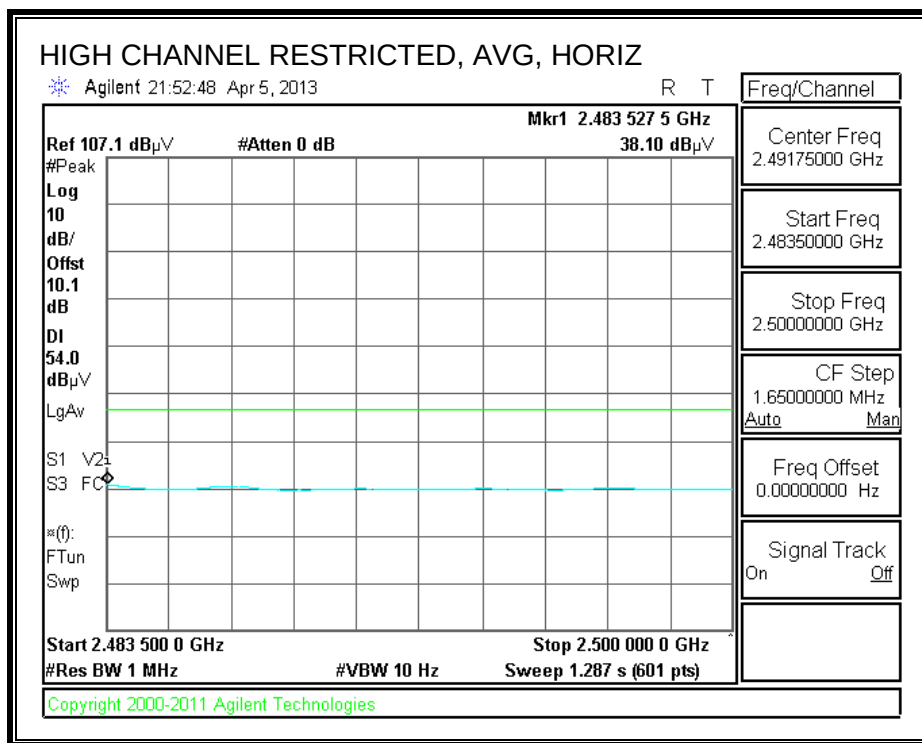
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



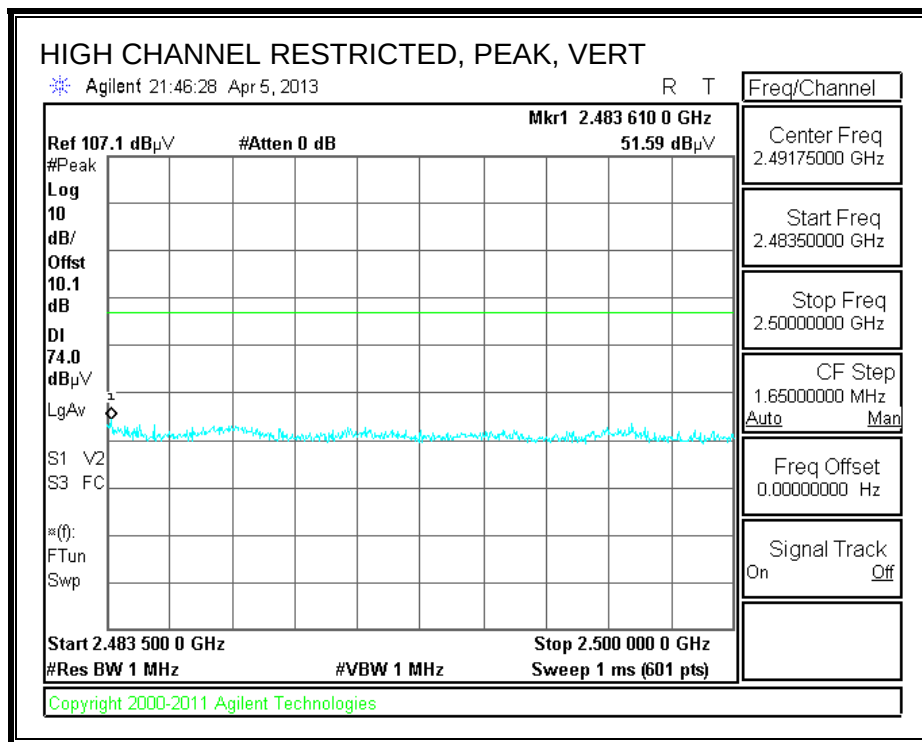


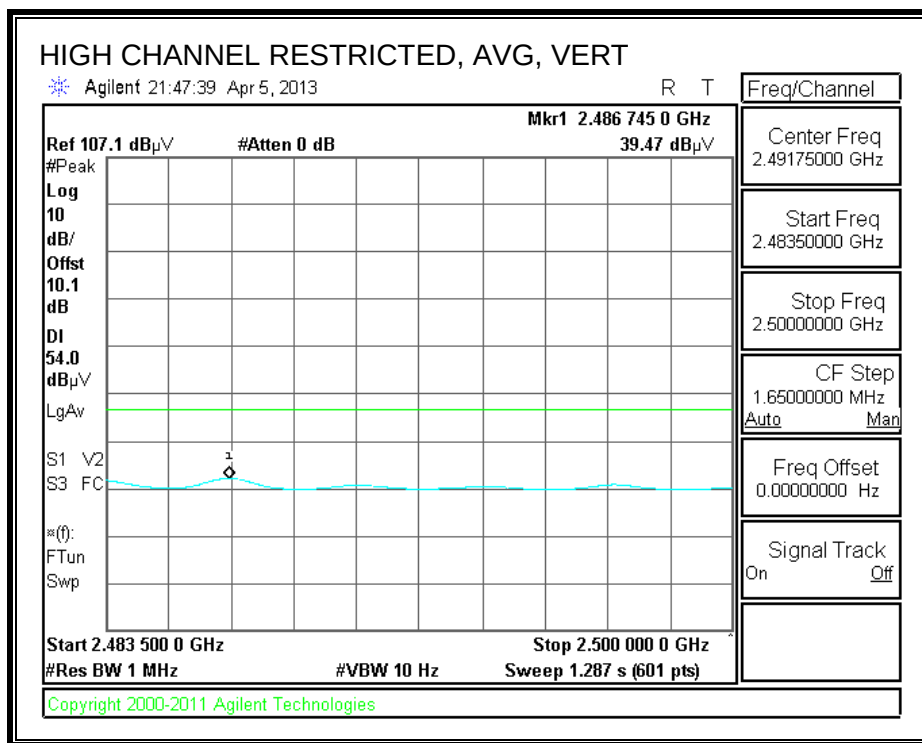
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



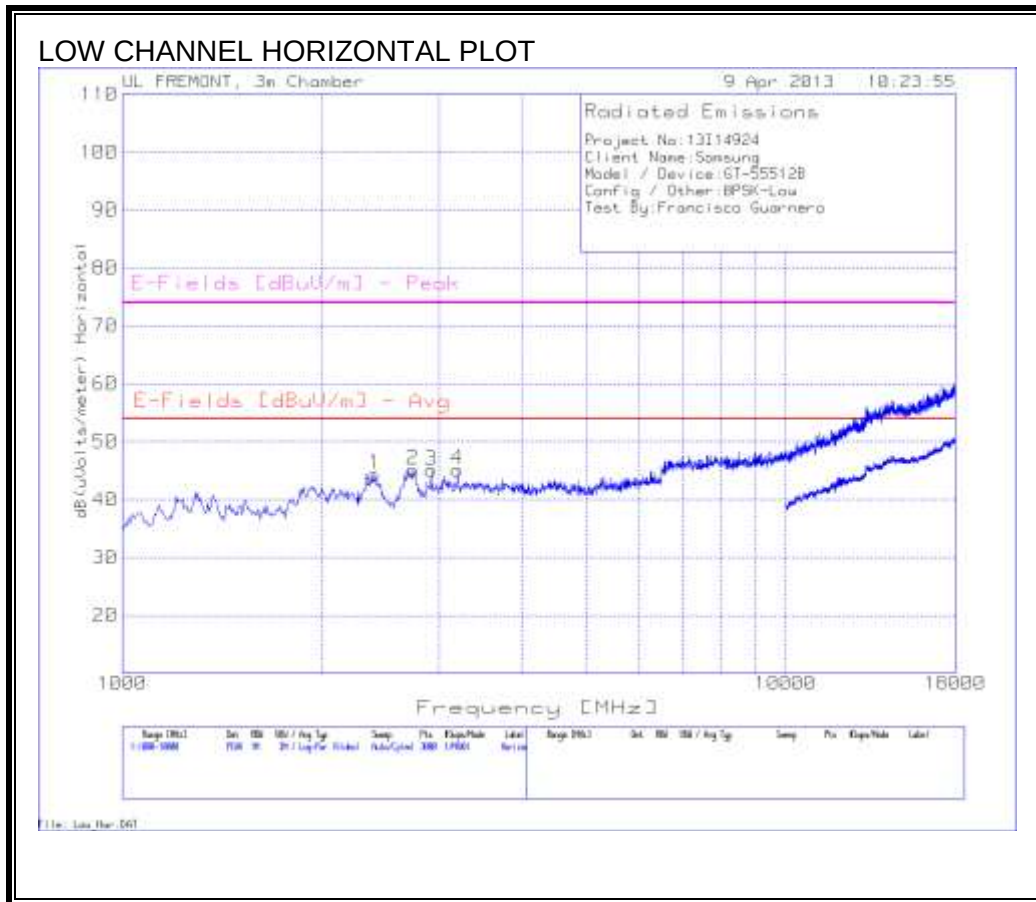


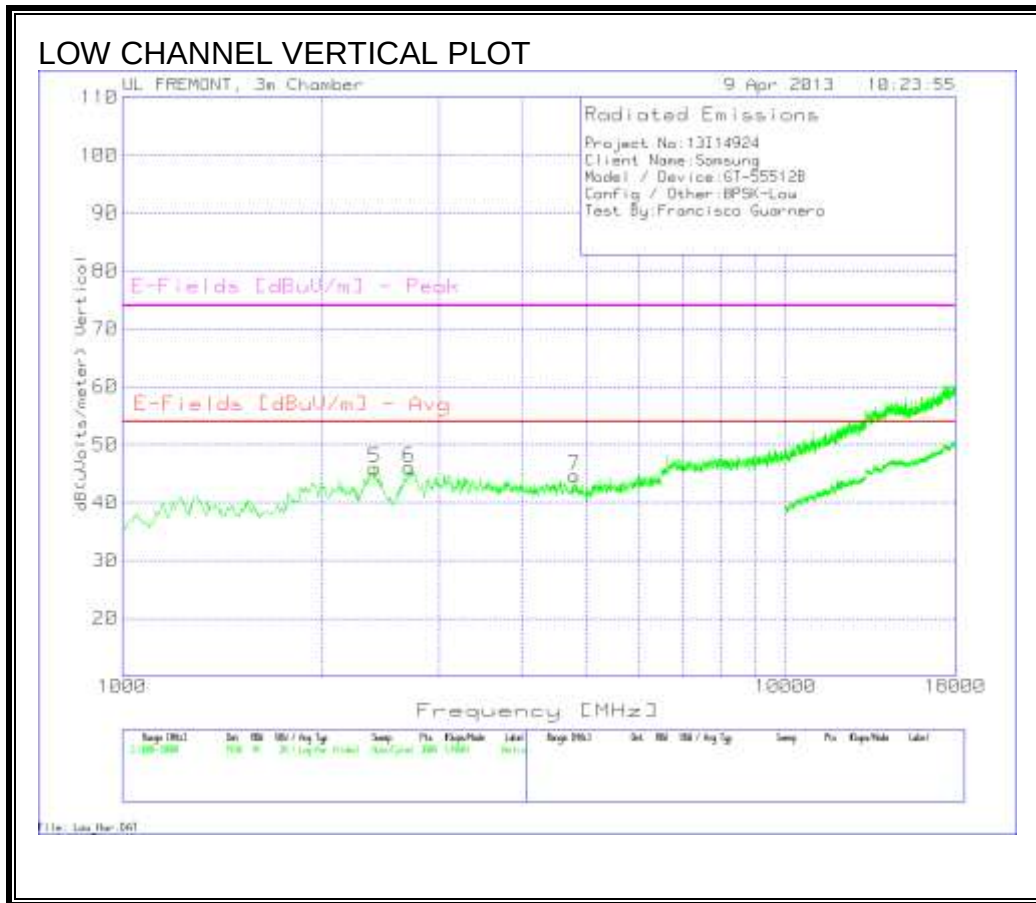
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





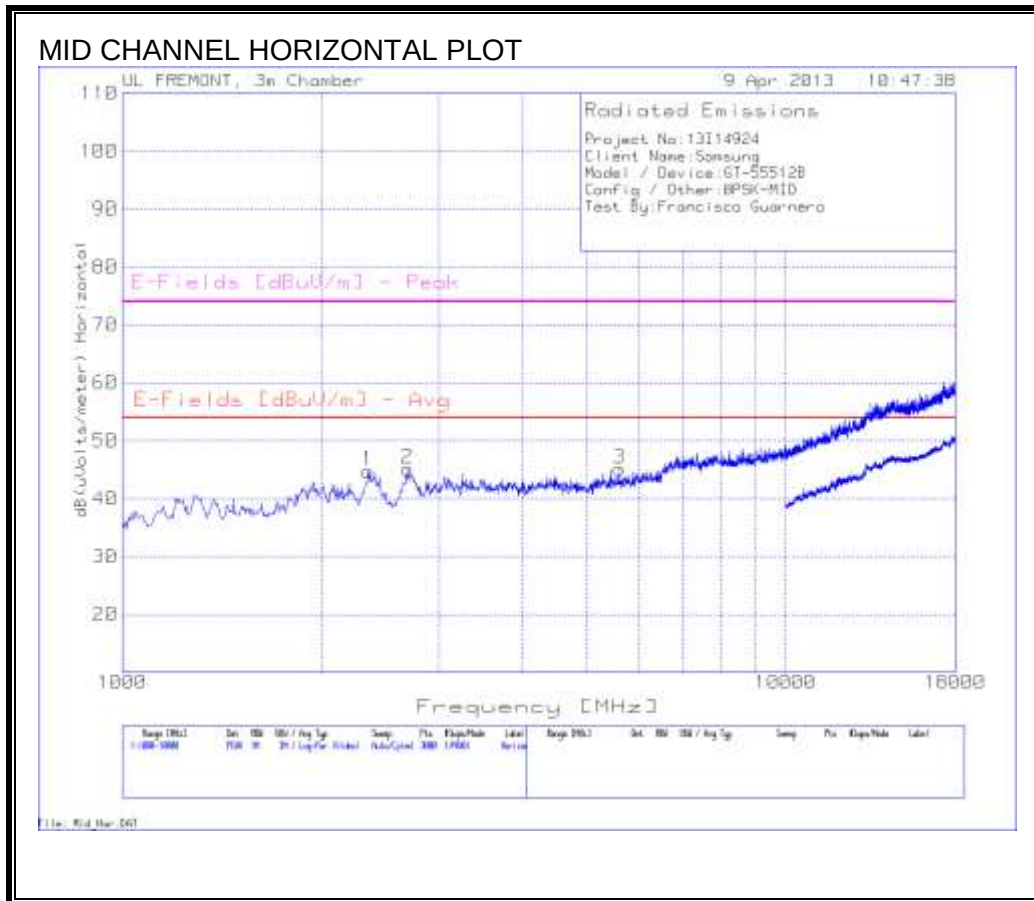
HARMONICS AND SPURIOUS EMISSIONS

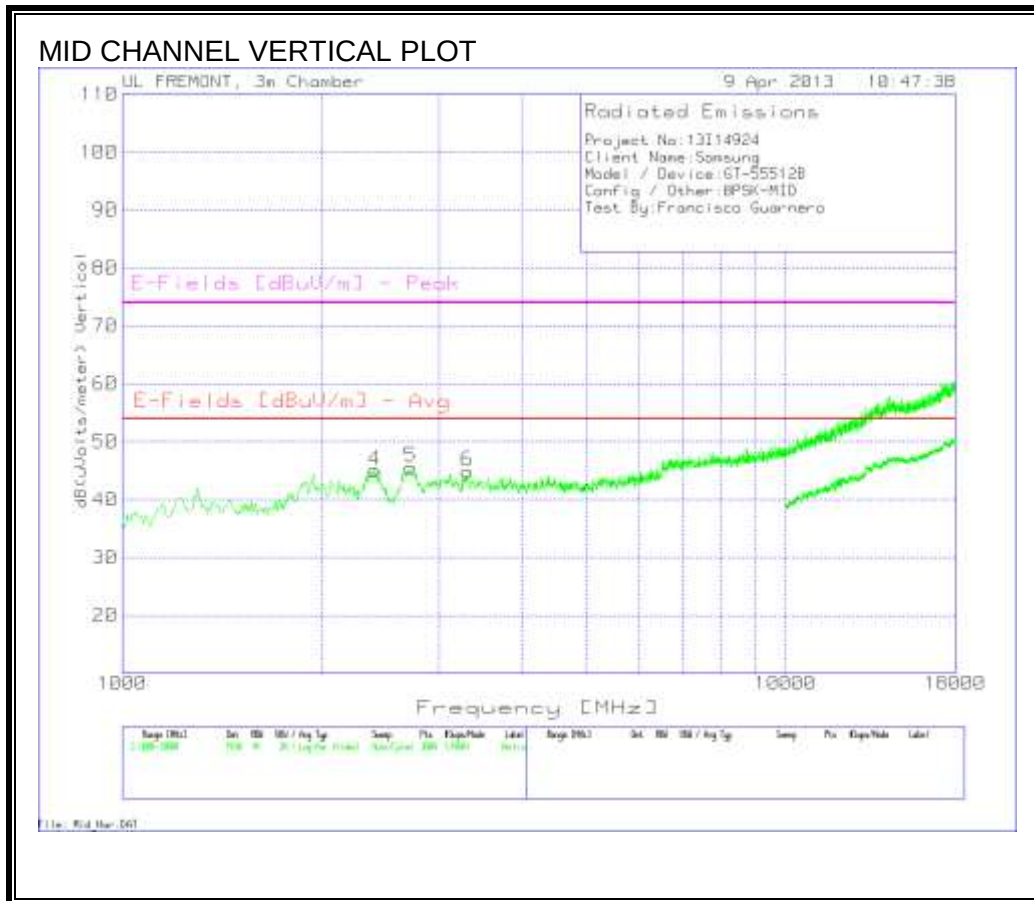




LOW CHANNEL HORIZONTAL AND VERTICAL DATA

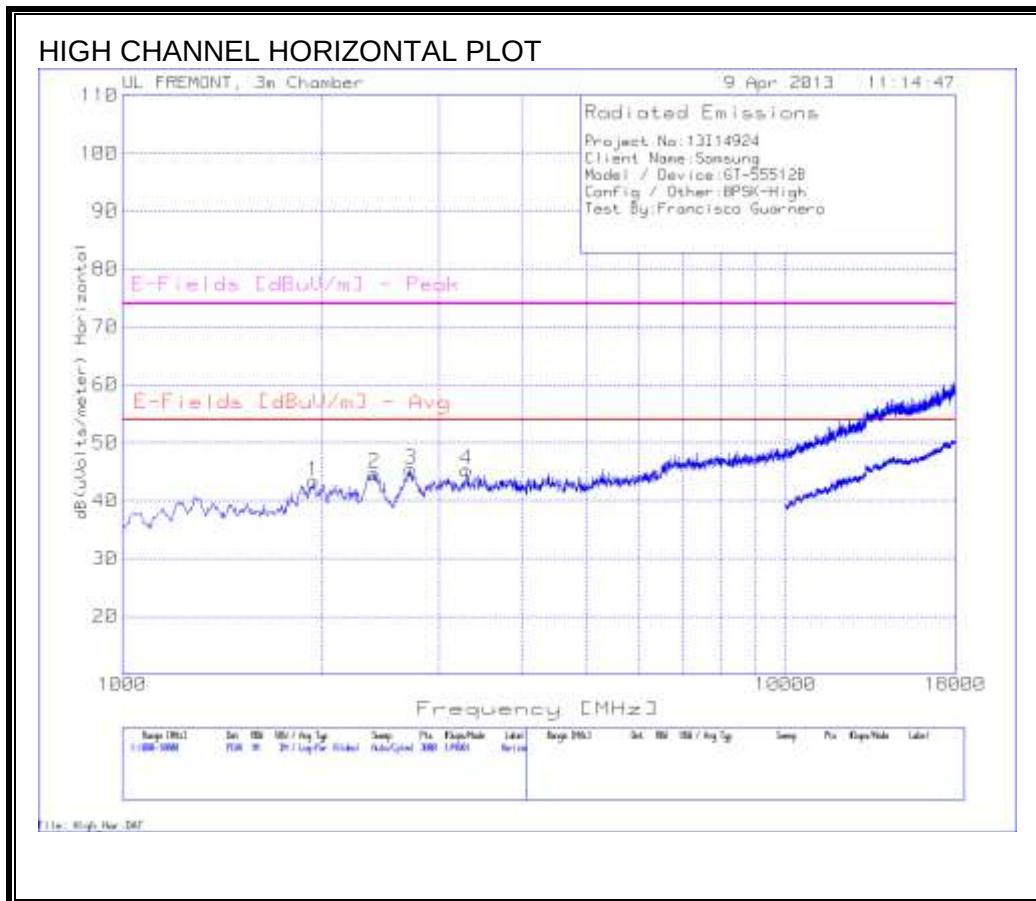
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz													
1	2398.734	41.13	PK	32.1	-29.7	0.9	44.43	53.97	-9.54	74	-29.57		Horz
2	2744.171	40.42	PK	32.7	-28.9	0.9	45.12	53.97	-8.85	74	-28.88		Horz
3	2919.72	40.1	PK	32.8	-28.7	0.9	45.1	53.97	-8.87	74	-28.9		Horz
4	3202.865	39.96	PK	32.9	-28.1	0.4	45.16	53.97	-8.81	74	-28.84		Horz
Vertical 1000 - 18000MHz													
5	2404.397	41.75	PK	32.1	-29.7	0.9	45.95	53.97	-8.02	74	-28.05		Vert
6	2710.193	40.73	PK	32.6	-29	0.9	46.13	53.97	-7.84	74	-27.87		Vert
7	4799.8	35.36	PK	34.1	-25.2	0.2	44.66	53.97	-9.31	74	-29.34		Vert
PK - Peak detector													
Av - Average detector													

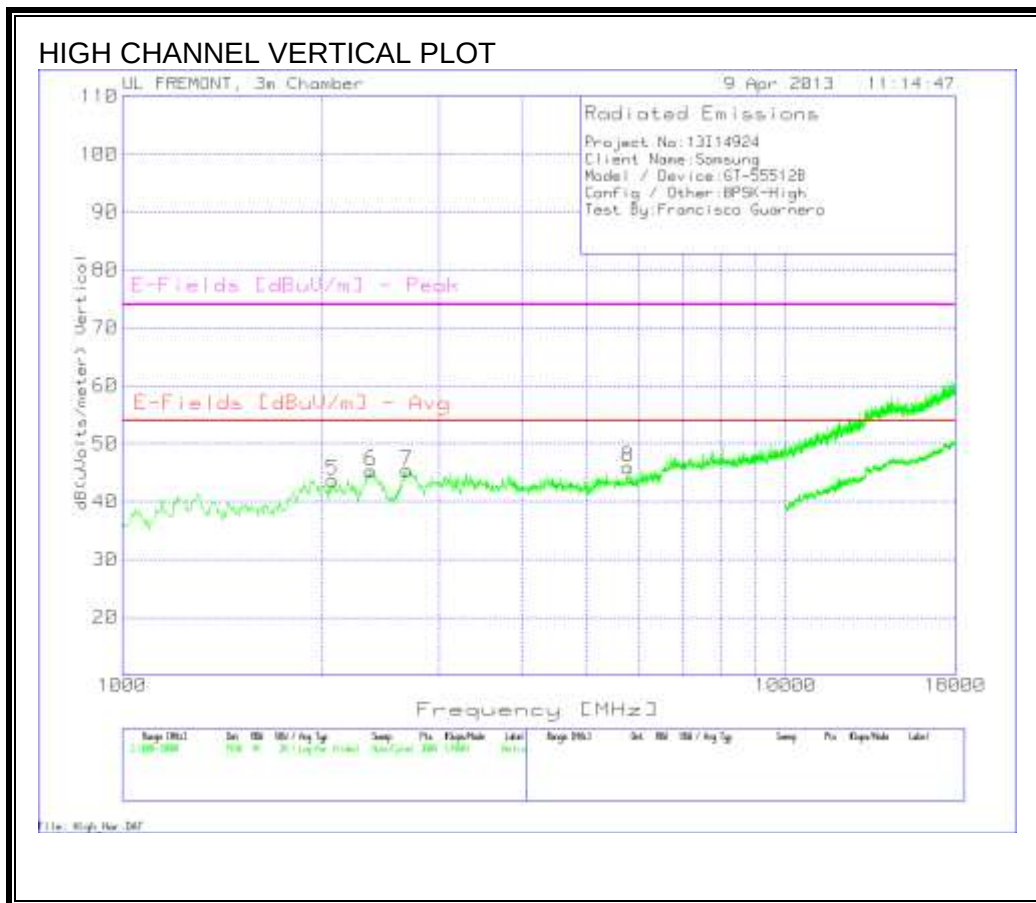




MID CHANNEL HORIZONTAL AND VERTICAL DATA I

Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/Cable Loss [dB]	T160 BRF [dB]	dB(uVolts/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz													
1	2347.768	41.62	PK	32	-29.7	0.9	44.82	53.97	-9.15	74	-29.18		Horz
2	2693.205	40.69	PK	32.6	-29	0.9	45.19	53.97	-8.78	74	-28.81		Horz
3	5609.594	34.7	PK	34.7	-24.4	0.2	45.2	53.97	-8.77	74	-28.8		Horz
Vertical 1000 - 18000MHz													
4	2404.397	40.9	PK	32.1	-29.7	0.9	45.1	53.97	-8.87	74	-28.9		Vert
5	2721.519	40.11	PK	32.6	-29	0.9	45.51	53.97	-8.46	74	-28.49		Vert
6	3310.46	38.58	PK	32.9	-27.8	0.6	44.88	53.97	-9.09	74	-29.12		Vert
PK - Peak detector													
Av - Average detector													



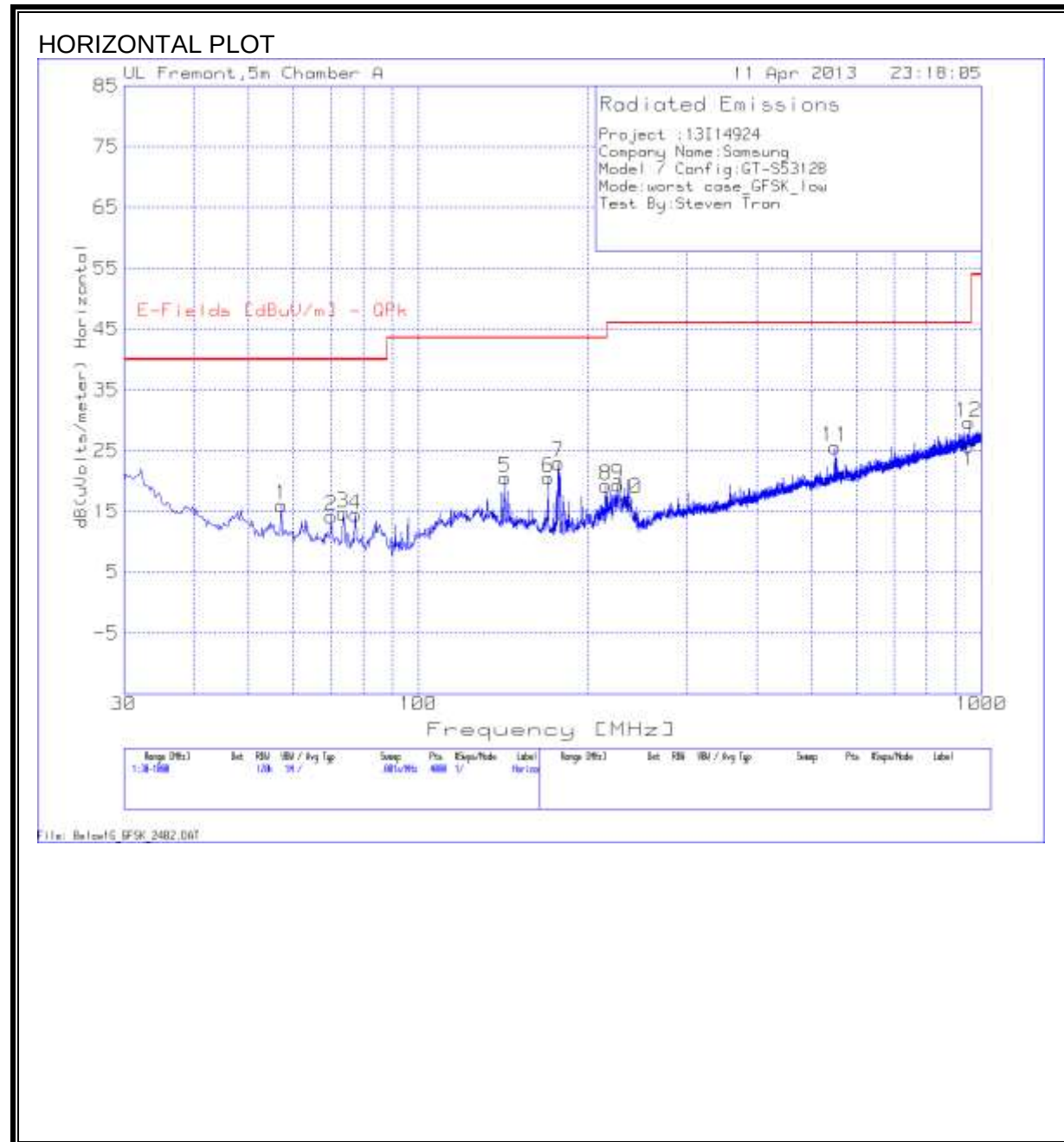


HIGH CHANNEL HORIZONTAL AND VERTICAL DATA

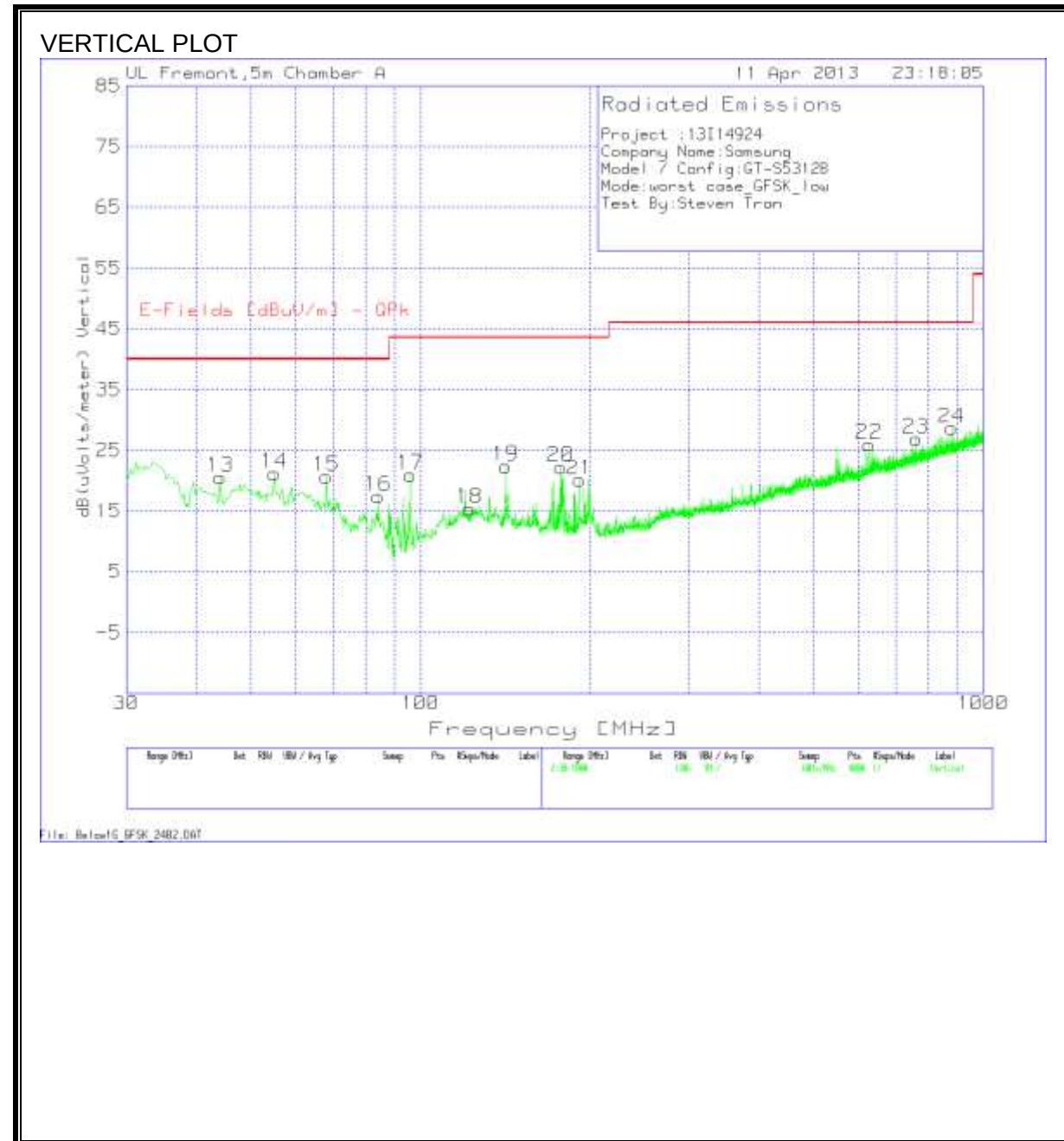
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz													
1	1940.04	41.77	PK	31.4	-30.8	0.9	43.27	53.97	-10.7	74	-30.73		Horz
2	2398.734	41.52	PK	32.1	-29.7	0.9	44.82	53.97	-9.15	74	-29.18		Horz
3	2721.519	40.95	PK	32.6	-29	0.9	45.45	53.97	-8.52	74	-28.55		Horz
4	3304.797	39.62	PK	32.9	-27.8	0.6	45.32	53.97	-8.65	74	-28.68		Horz
Vertical 1000 - 18000MHz													
5	2075.949	40.81	PK	31.5	-30.4	0.9	43.71	53.97	-10.26	74	-30.29		Vert
6	2370.42	41.25	PK	32	-29.7	0.9	45.35	53.97	-8.62	74	-28.65		Vert
7	2681.879	40.03	PK	32.6	-29	0.9	45.43	53.97	-8.54	74	-28.57		Vert
8	5779.48	34.94	PK	34.9	-24.3	0.2	45.94	53.97	-8.03	74	-28.06		Vert
PK - Peak detector													
Av - Average detector													

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 AND VERTICAL DATA

Project :13I14924

Company Name:Samsung

Model / Config:GT-S5312B

Mode:worst case_GFSK_low

Test By:Steven Tran

Marker No.	Test Frequency	Meter Reading	Detector	T243 Antenna Factor dB/m	T10 preamp/ Cable loss [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - QPk	Margin (dB)	Height [cm]	Polarity
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Horizontal 30 - 1000MHz

1	57.1396	37.93	PK	6.9	-28.8	16.03	40	-23.97	400	Horz
2	69.9825	35.04	PK	7.9	-28.7	14.24	40	-25.76	100	Horz
3	73.6173	35.54	PK	7.9	-28.7	14.74	40	-25.26	100	Horz
4	77.4944	35.36	PK	7.7	-28.6	14.46	40	-25.54	100	Horz
5	142.678	35.72	PK	12.7	-27.9	20.52	43.52	-23	300	Horz
6	170.06	36.52	PK	11.5	-27.5	20.52	43.52	-23	300	Horz
7	177.3295	39.4	PK	11.1	-27.5	23	43.52	-20.52	300	Horz
8	215.1312	35.8	PK	10.5	-27.1	19.2	43.52	-24.32	200	Horz
9	225.7932	35.66	PK	10.8	-27.1	19.36	46.02	-26.66	100	Horz
10	236.6975	32.6	PK	11.4	-26.9	17.1	46.02	-28.92	100	Horz
11	550.015	33.59	PK	18.3	-26.3	25.59	46.02	-20.43	200	Horz
12	949.5978	30.66	PK	22.7	-23.7	29.66	46.02	-16.36	100	Horz

Marker No.	Test Frequency	Meter Reading	Detector	T243 Antenna Factor dB/m	T10 preamp/ Cable loss [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - QPk	Margin (dB)	Height [cm]	Polarity
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Vertical 30 - 1000MHz

13	44.0545	38.98	PK	10.5	-28.9	20.58	40	-19.42	200	Vert
14	54.9588	43.23	PK	6.8	-28.8	21.23	40	-18.77	200	Vert
15	68.044	41.54	PK	7.8	-28.7	20.64	40	-19.36	200	Vert
16	84.037	38.78	PK	7.2	-28.6	17.38	40	-22.62	200	Vert
17	95.9106	40.47	PK	8.9	-28.4	20.97	43.52	-22.55	200	Vert
18	122.0809	29.5	PK	14	-28.1	15.4	43.52	-28.12	200	Vert
19	141.951	37.53	PK	12.7	-27.9	22.33	43.52	-21.19	200	Vert
20	177.5718	38.74	PK	11	-27.5	22.24	43.52	-21.28	200	Vert
21	191.8686	36.09	PK	11.3	-27.3	20.09	43.52	-23.43	200	Vert
22	628.0415	32.53	PK	19.3	-25.9	25.93	46.02	-20.09	200	Vert
23	760.1049	31.22	PK	20.8	-25.1	26.92	46.02	-19.1	200	Vert
24	880.0525	30.83	PK	22	-24.2	28.63	46.02	-17.39	300	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.

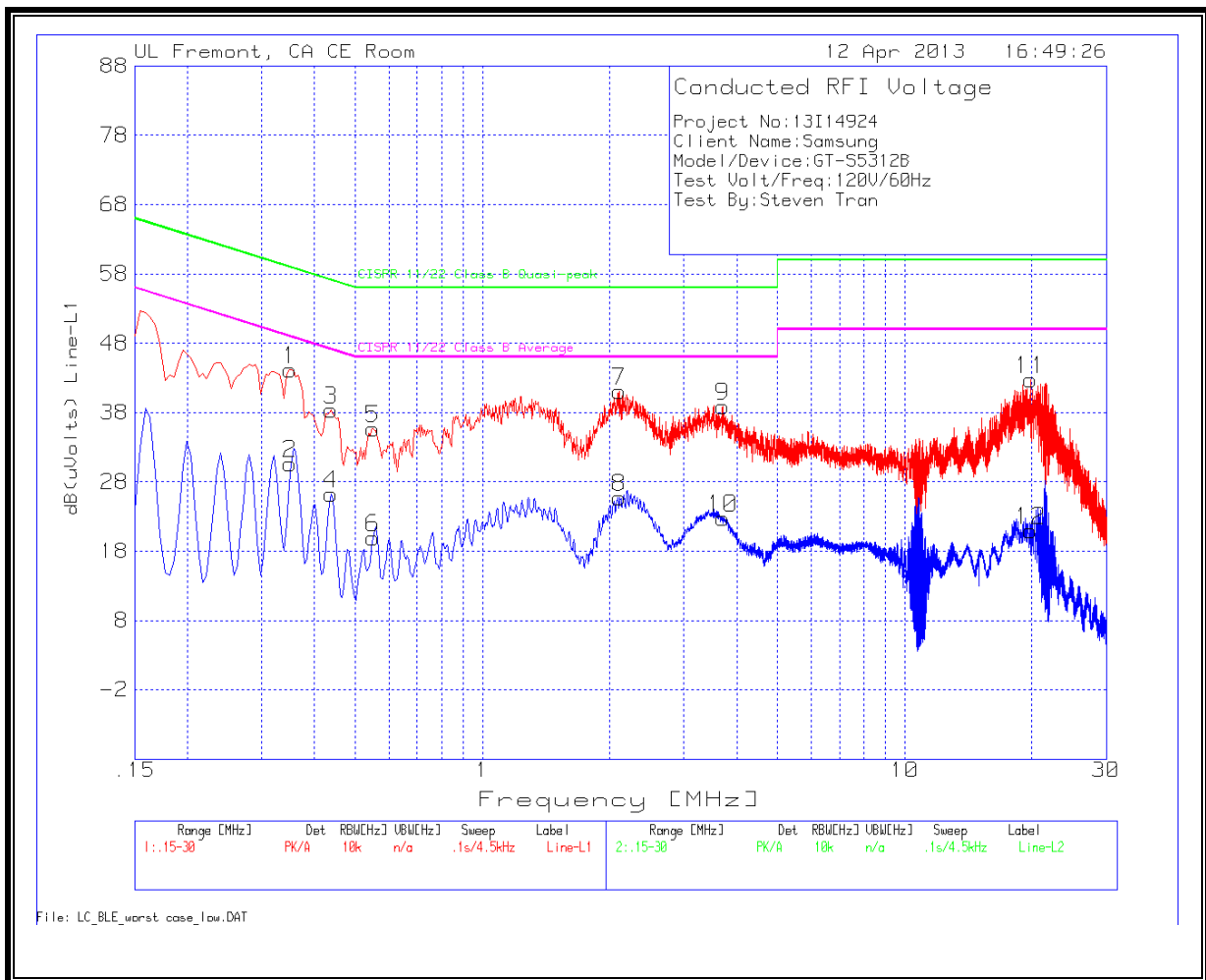
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

Project No:13I14924									
Client Name:Samsung									
Model/Device:GT-S5312B									
Test Volt/Freq:120V/60Hz									
Test By:Steven Tran									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin	CISPR 11/22 Class B Average	Margin
Line-L1 .15 - 30MHz									
0.35025	44.01	PK	0.1	0	44.11	59	-14.89	-	-
0.35025	30.48	Av	0.1	0	30.58	-	-	49	-18.42
0.438	38.29	PK	0.1	0	38.39	57.1	-18.71	-	-
0.438	26.2	Av	0.1	0	26.3	-	-	47.1	-20.8
0.5505	35.53	PK	0.1	0	35.63	56	-20.37	-	-
0.5505	19.83	Av	0.1	0	19.93	-	-	46	-26.07
2.112	40.87	PK	0.1	0.1	41.07	56	-14.93	-	-
2.112	25.56	Av	0.1	0.1	25.76	-	-	46	-20.24
3.705	38.69	PK	0.1	0.1	38.89	56	-17.11	-	-
3.705	22.54	Av	0.1	0.1	22.74	-	-	46	-23.26
19.8375	42.29	PK	0.3	0.2	42.79	60	-17.21	-	-
19.8375	20.41	Av	0.3	0.2	20.91	-	-	50	-29.09
Test Frequency	Meter Reading	Detector	T24 IL L2.TXT (dB)	LC Cables 2&3.TXT (dB)	dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin	CISPR 11/22 Class B Average	Margin
Line-L2 .15 - 30MHz									
0.33	45.39	PK	0.1	0	45.49	59.5	-14.01	-	-
0.33	33.57	Av	0.1	0	33.67	-	-	49.5	-15.83
0.4155	38.77	PK	0.1	0	38.87	57.5	-18.63	-	-
0.4155	21.94	Av	0.1	0	22.04	-	-	47.5	-25.46
1.23	37.83	PK	0.1	0.1	38.03	56	-17.97	-	-
1.23	20.86	Av	0.1	0.1	21.06	-	-	46	-24.94
4.1955	37.59	PK	0.1	0.1	37.79	56	-18.21	-	-
4.1955	21.06	Av	0.1	0.1	21.26	-	-	46	-24.74
6.5625	30.77	PK	0.1	0.1	30.97	60	-29.03	-	-
6.5625	15.72	Av	0.1	0.1	15.92	-	-	50	-34.08
18.033	30.43	PK	0.2	0.2	30.83	60	-29.17	-	-
18.033	12.1	Av	0.2	0.2	12.5	-	-	50	-37.5

LINE 1 RESULTS



LINE 2 RESULTS

