



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

BAR PHONE WITH 802.11b/g/n WLAN AND BLUETOOTH

MODEL NUMBER: GT-S5312L

FCC ID: A3LGTS5312L

REPORT NUMBER: 13U14925- 2, REVISION A

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Prepared for

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
	03/22/13	Initial issue	P. Kim
A	05/03/13	Correction on 8PSK 99% and 20dB data and Output Power Table on Section 5.2	C.Pang

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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: BAR PHONE WITH WLAN, 802.11b/g/n and Bluetooth

MODEL: GT-S5312L

SERIAL NUMBER: FK-065-C (EMISSION) AND FK-065-D (CONDUCTION)

DATE TESTED: APRIL 02 TO MAY 17, 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

DANNY VU
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:

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

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 802.11b/g/n WLAN, Bluetooth, GPS and 2.4 GHz mobile hotspot capability.

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	11.74	14.93
2402 - 2480	Enhanced 8PSK	11.74	14.93

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.5 and the software was S5312L.

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 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

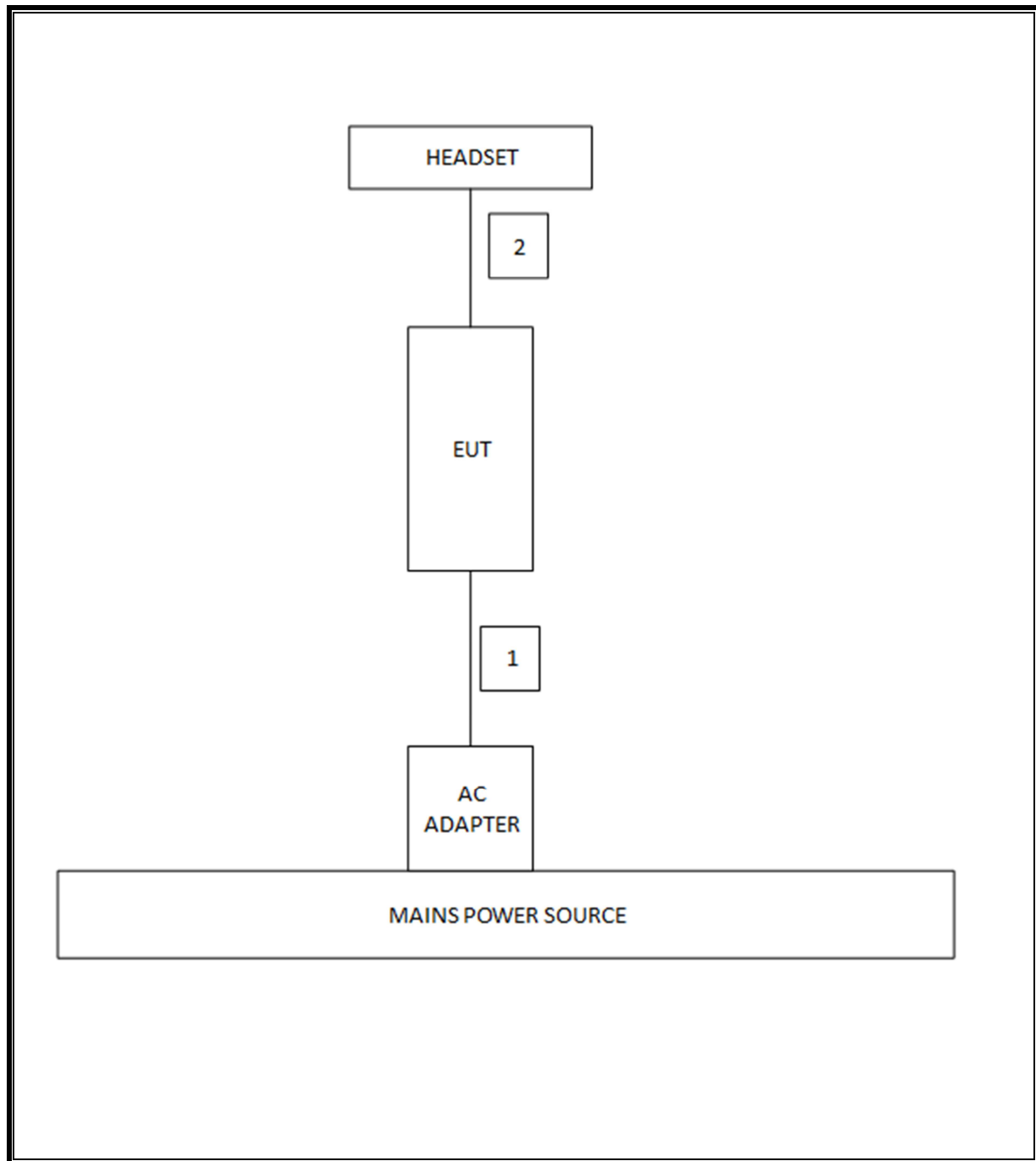
Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung Electronics	ETA0U80EBE	FK-065-A	DoC
Headset	Samsung Electronics	EHS61ASFWE	FK-065-B	DoC

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
Antenna, Horn, 18 GHz	EMCO	3115	C00872	09/20/13
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	07/28/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	10/21/13
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	10/21/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	02/21/14
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRC13192	N02683	CNR
Bilog 30-2000MHz	Sunol	JB1	C01071	07/26/13
Power meter	HP	437B	T226	06/25/13
Power Sensor	HP	8481A	T233	06/26/13
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	01/14/14
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	03/07/14

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.

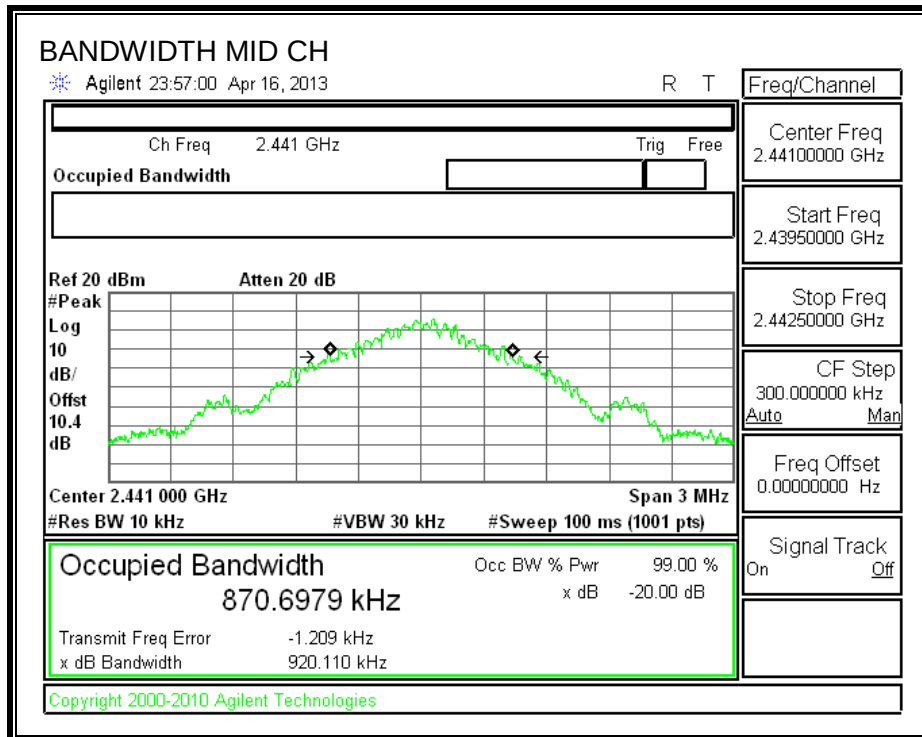
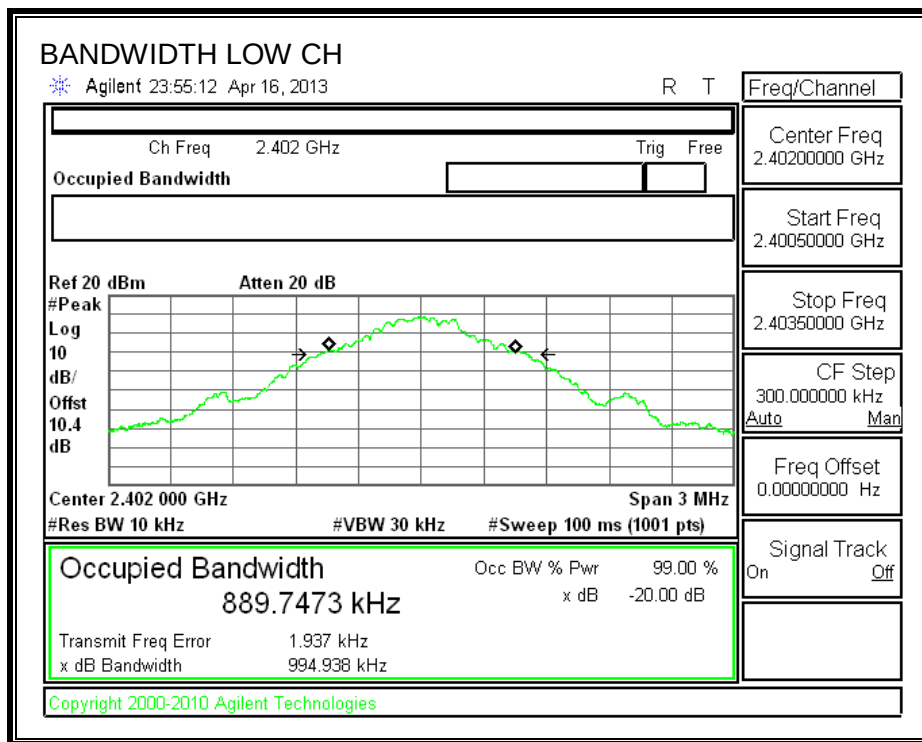
TEST PROCEDURE

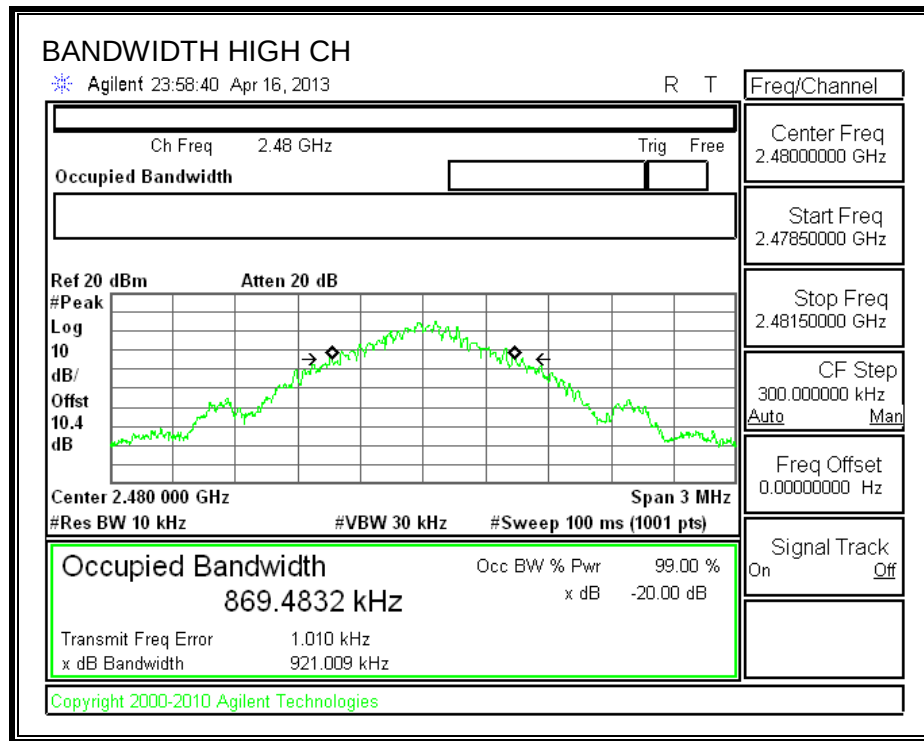
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled.

RESULTS:

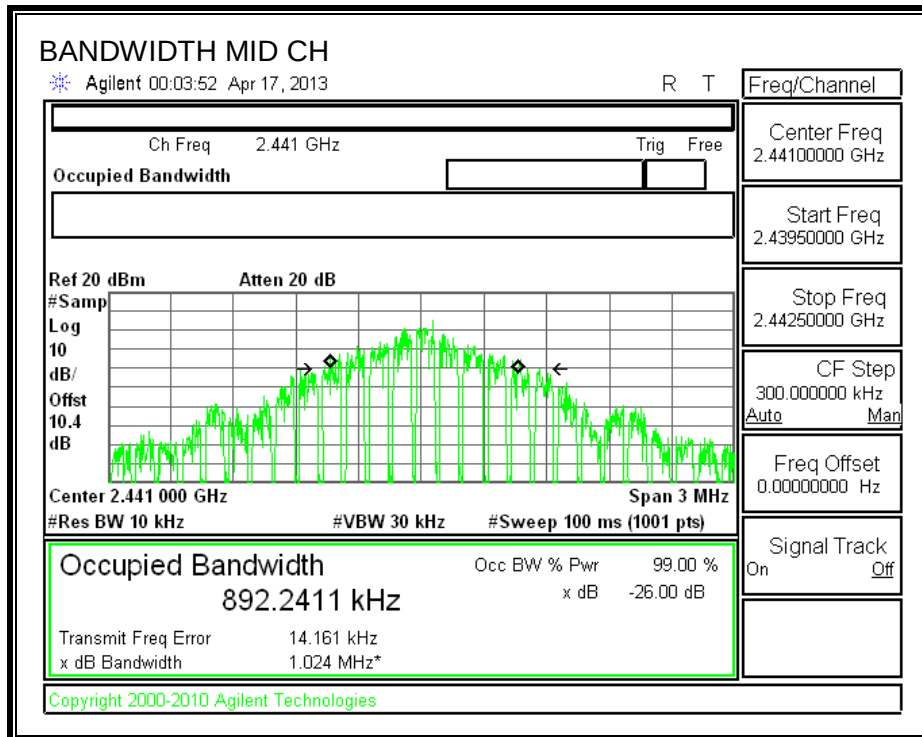
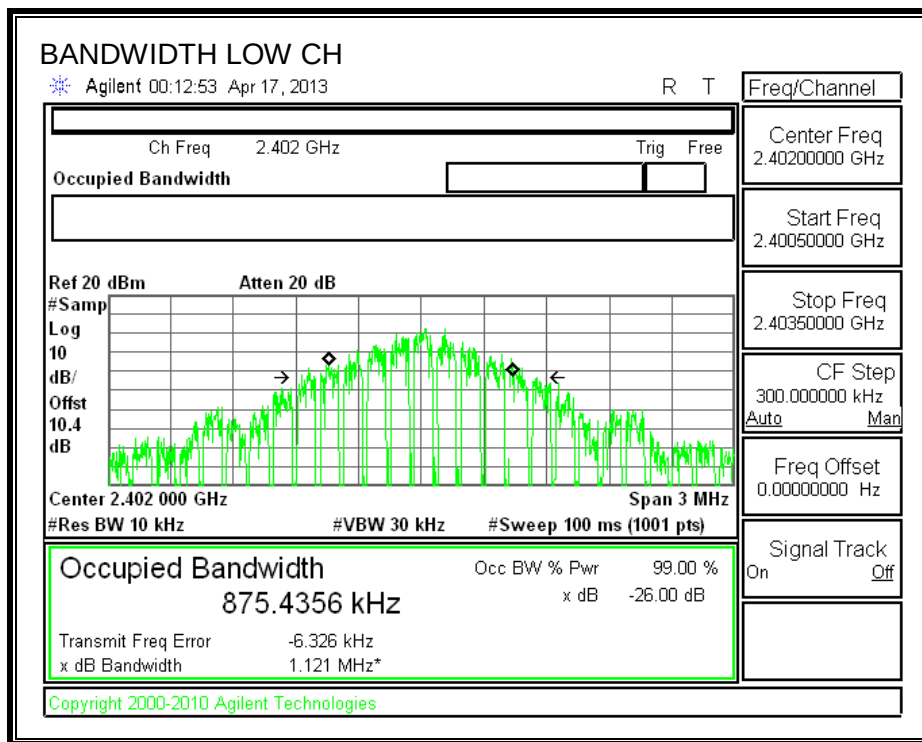
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	994.938	875.436
Middle	2441	920.110	892.241
High	2480	921.009	892.489

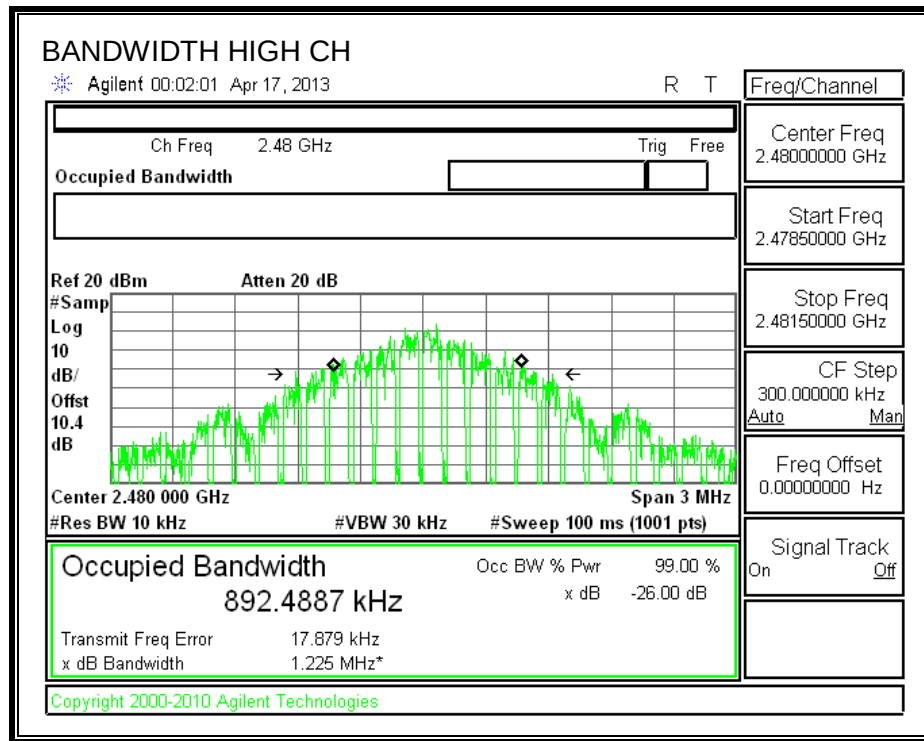
20 dB BANDWIDTH





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.

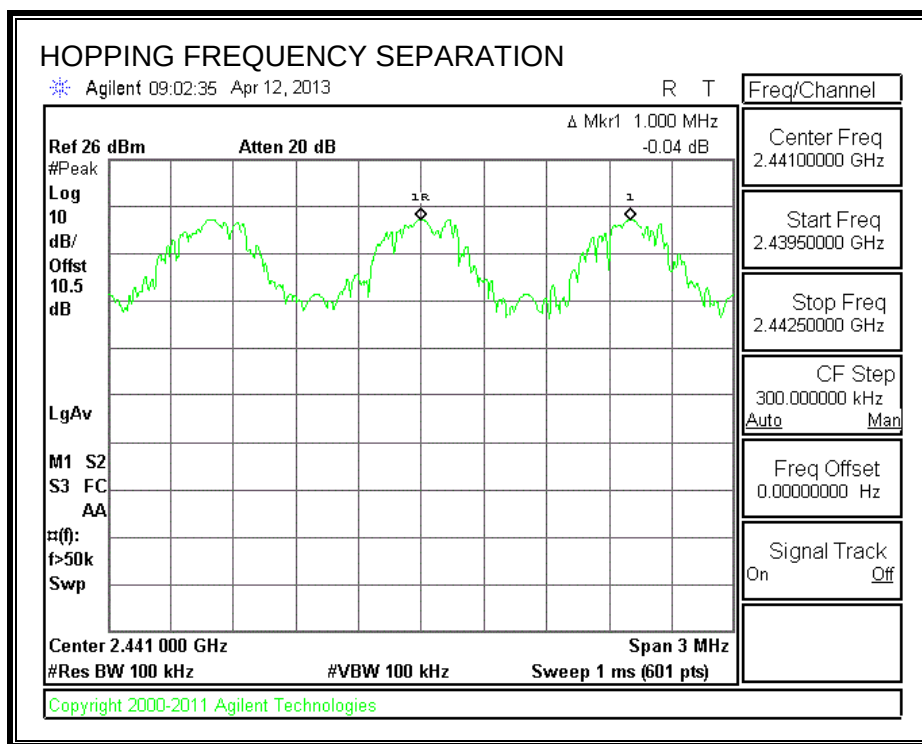
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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



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.

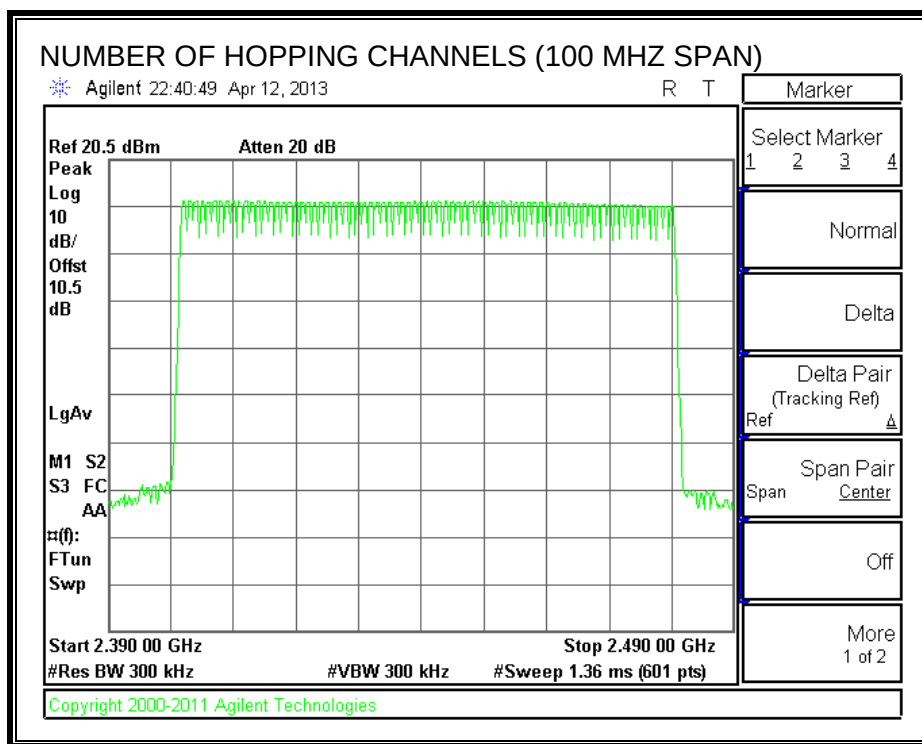
TEST PROCEDURE

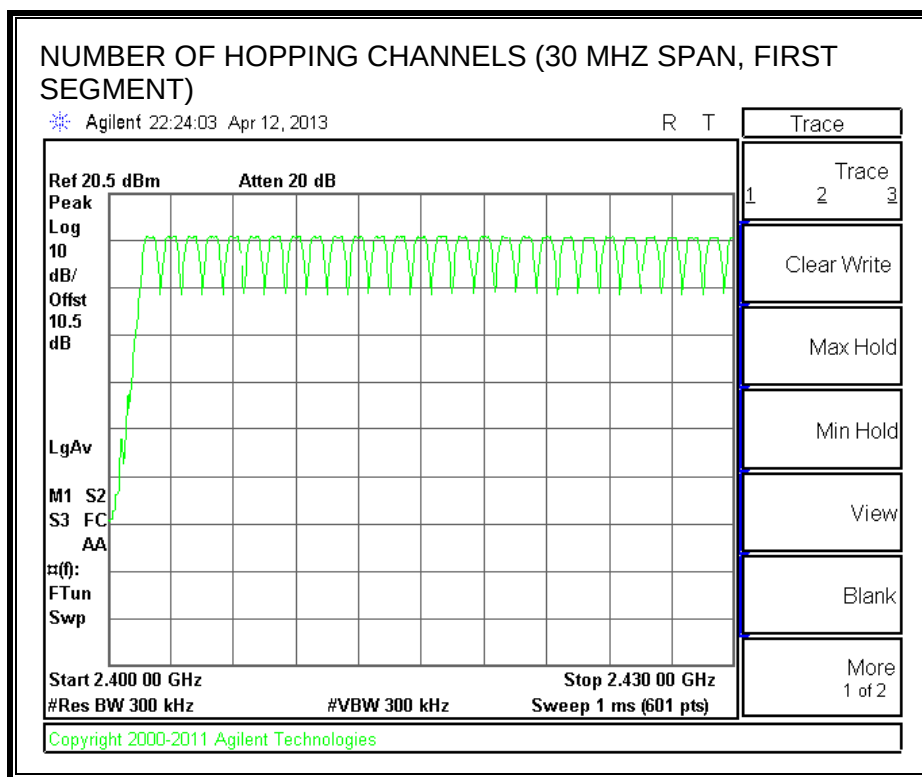
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

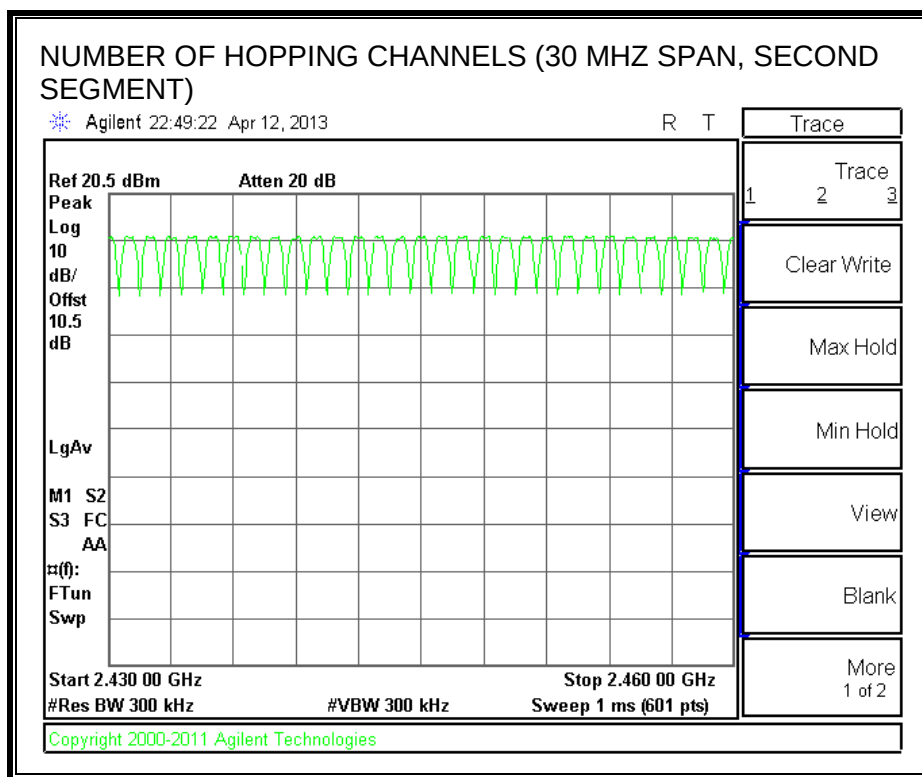
RESULTS

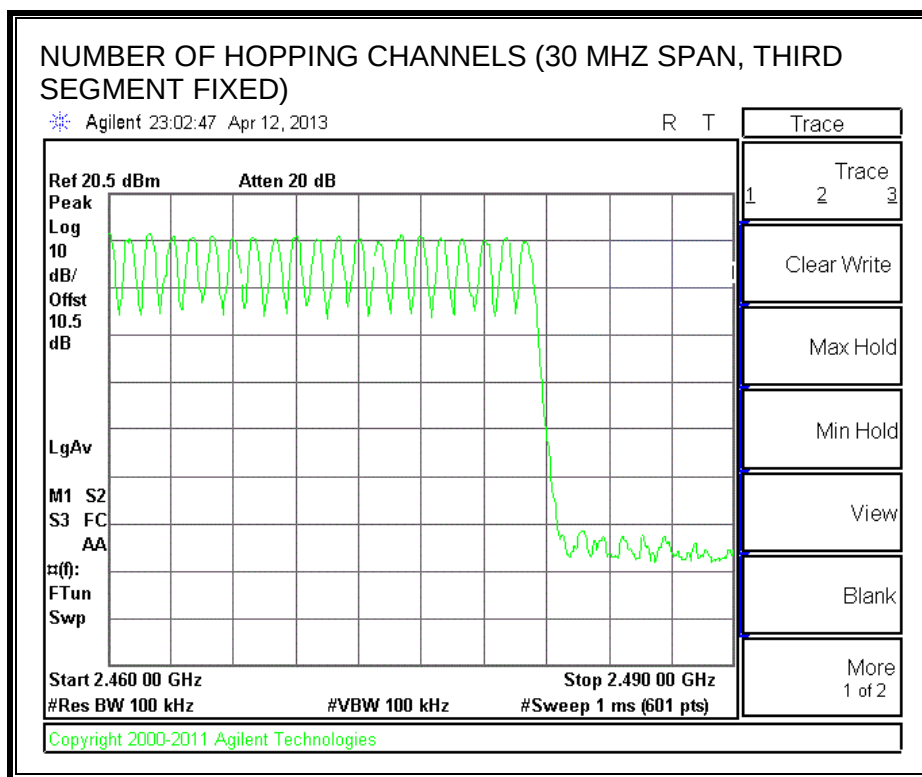
Normal Mode: 79 Channels observed.

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

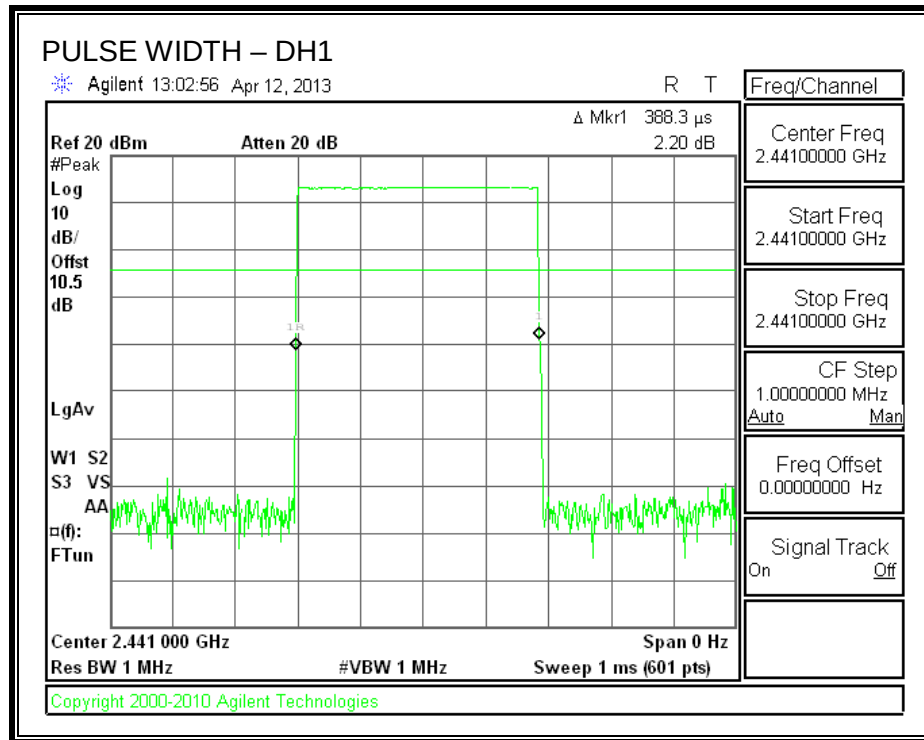
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

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

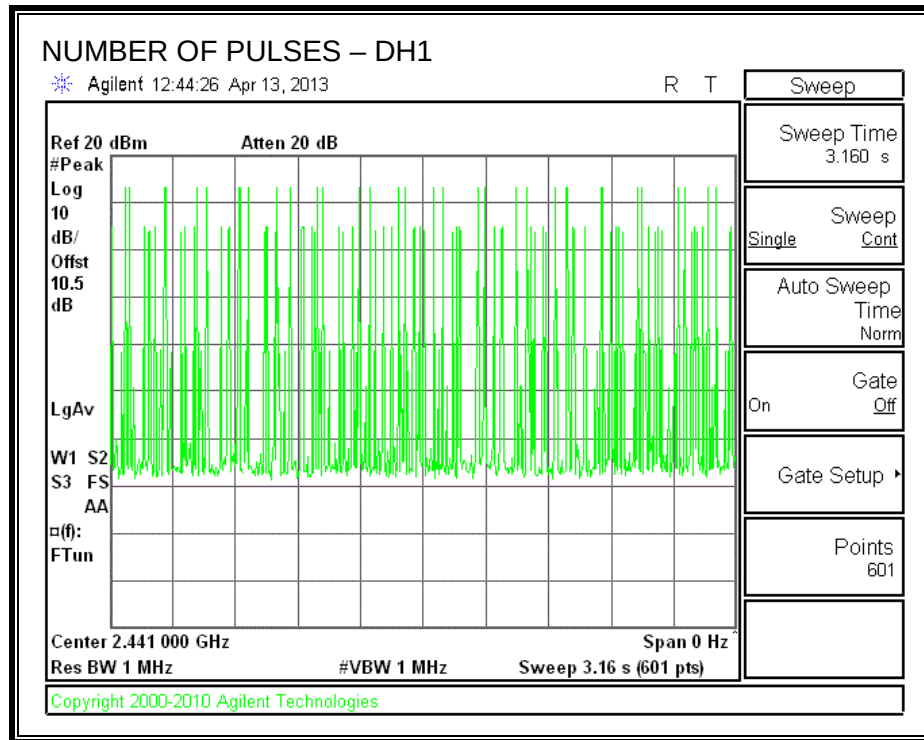
RESULTS

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	0.3883	29	0.113	0.4	-0.287
DH3	1.63	17	0.277	0.4	-0.123
DH5	2.88	6	0.173	0.4	-0.227

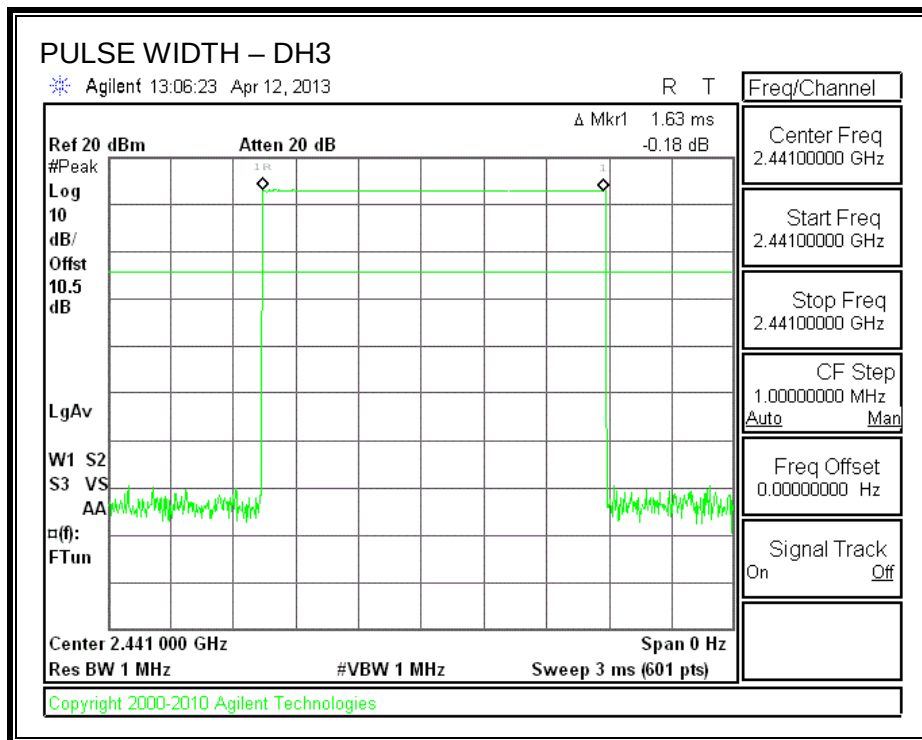
PULSE WIDTH - DH1



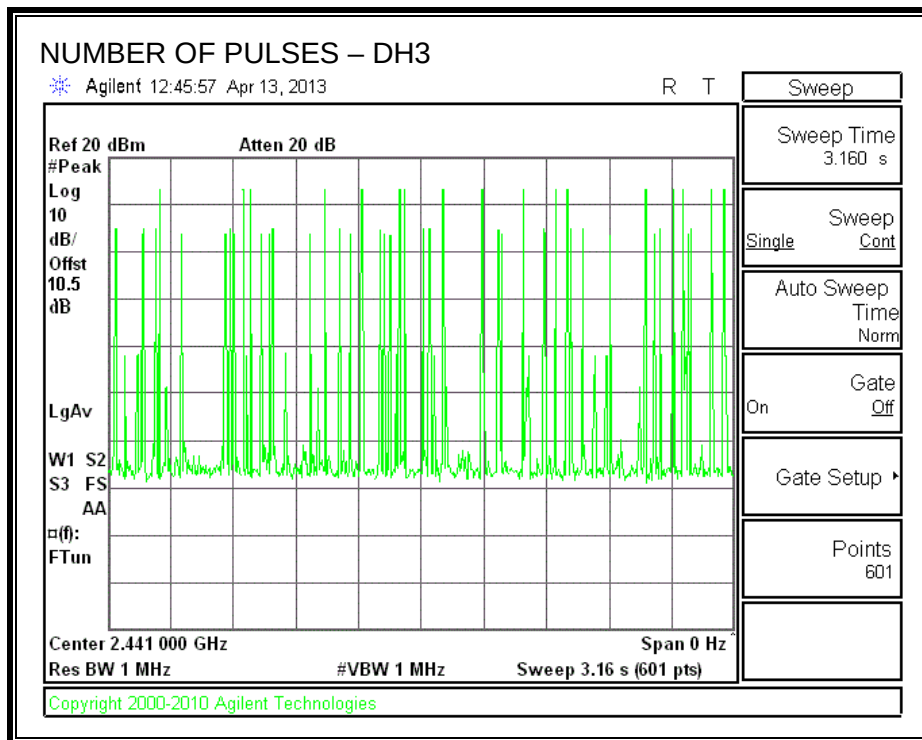
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



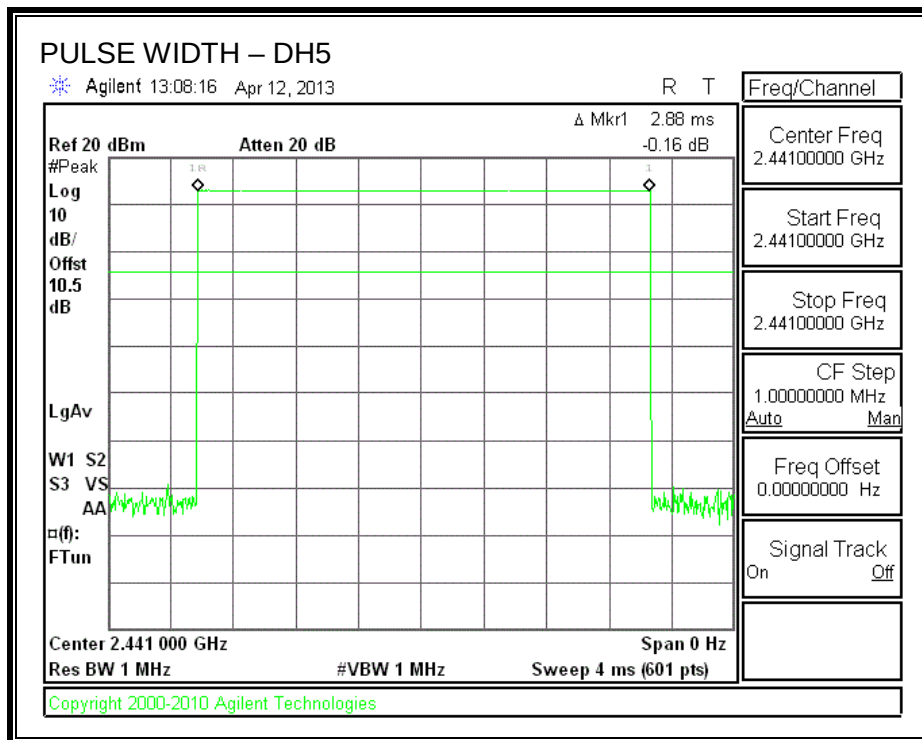
PULSE WIDTH – DH3



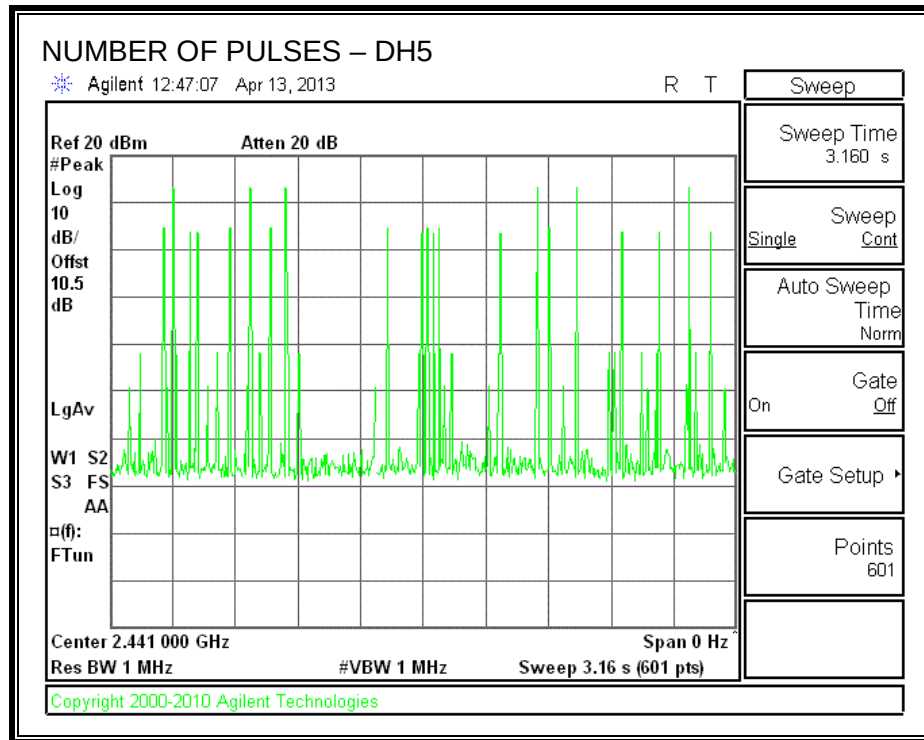
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



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.

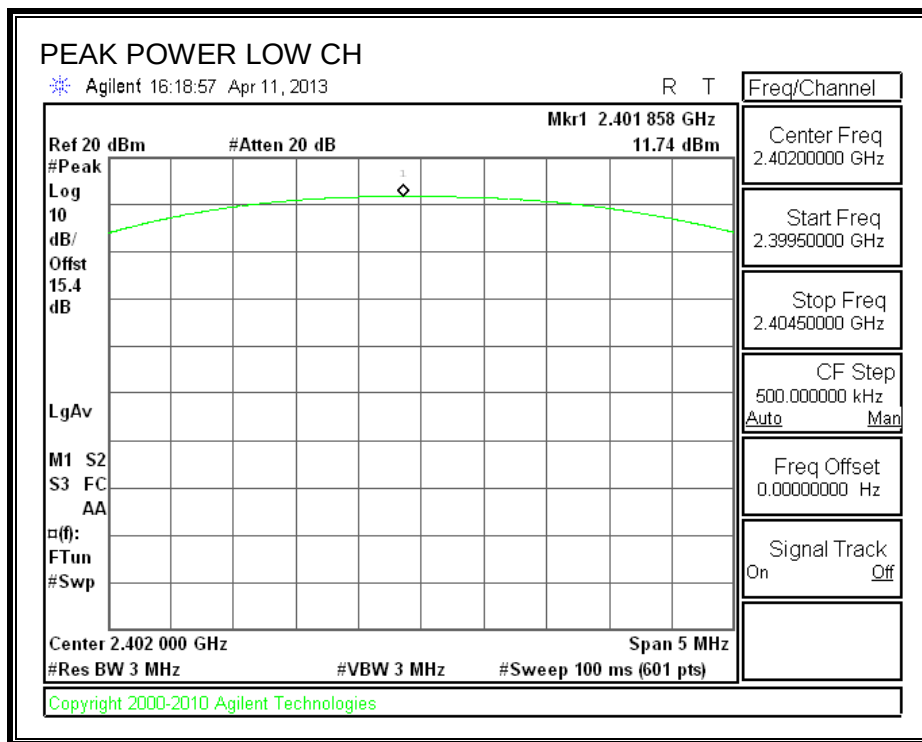
TEST PROCEDURE

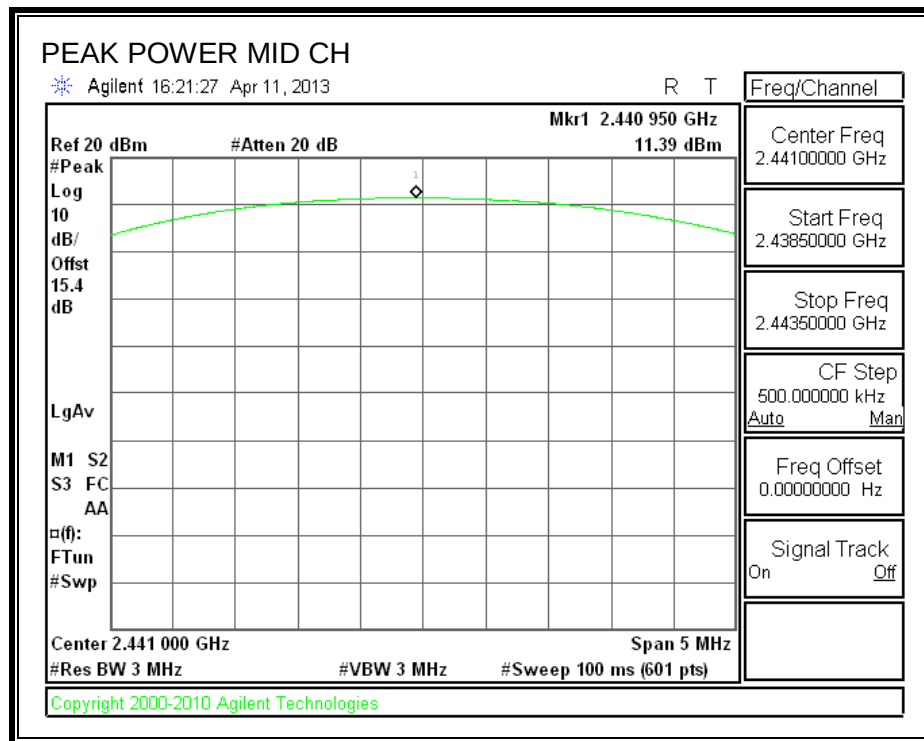
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

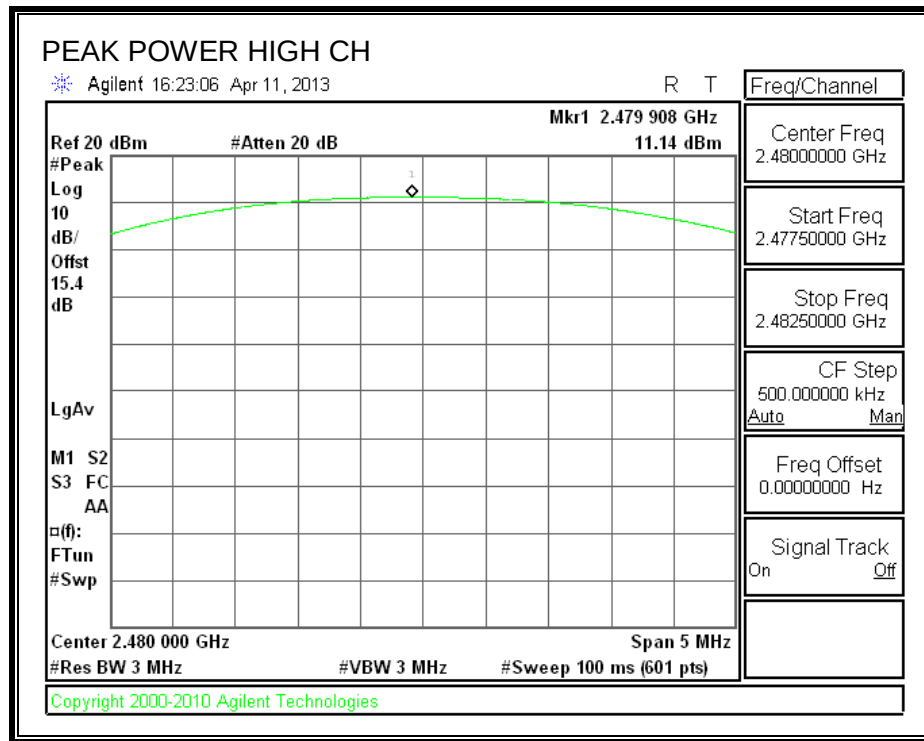
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.74	30	-18.26
Middle	2441	11.39	30	-18.61
High	2480	11.14	30	-18.86

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	12.30
Middle	2441	12.00
High	2480	12.00

7.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

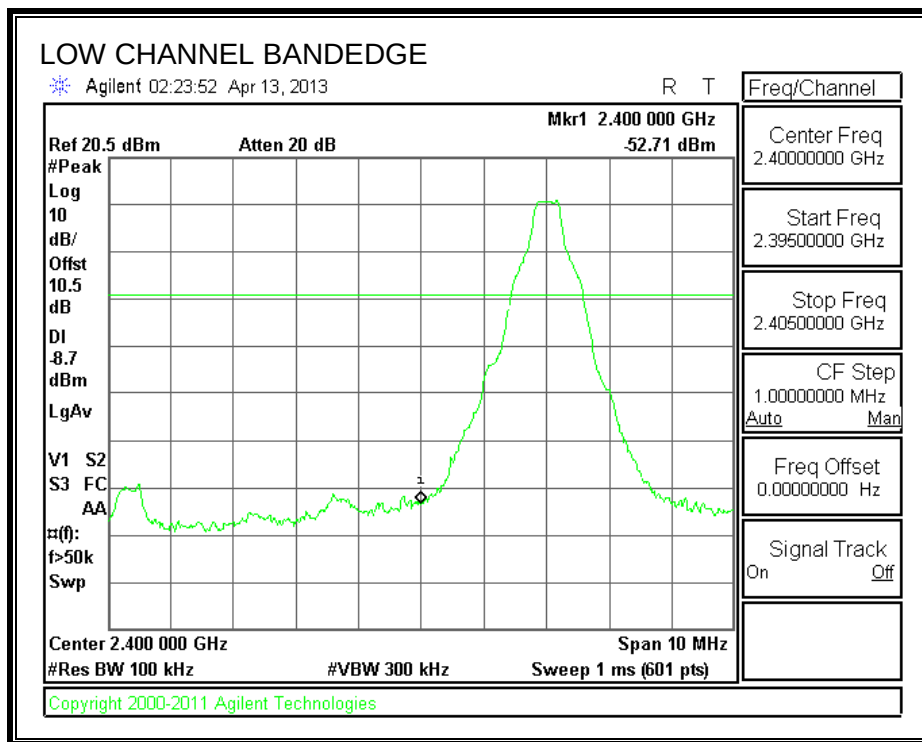
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

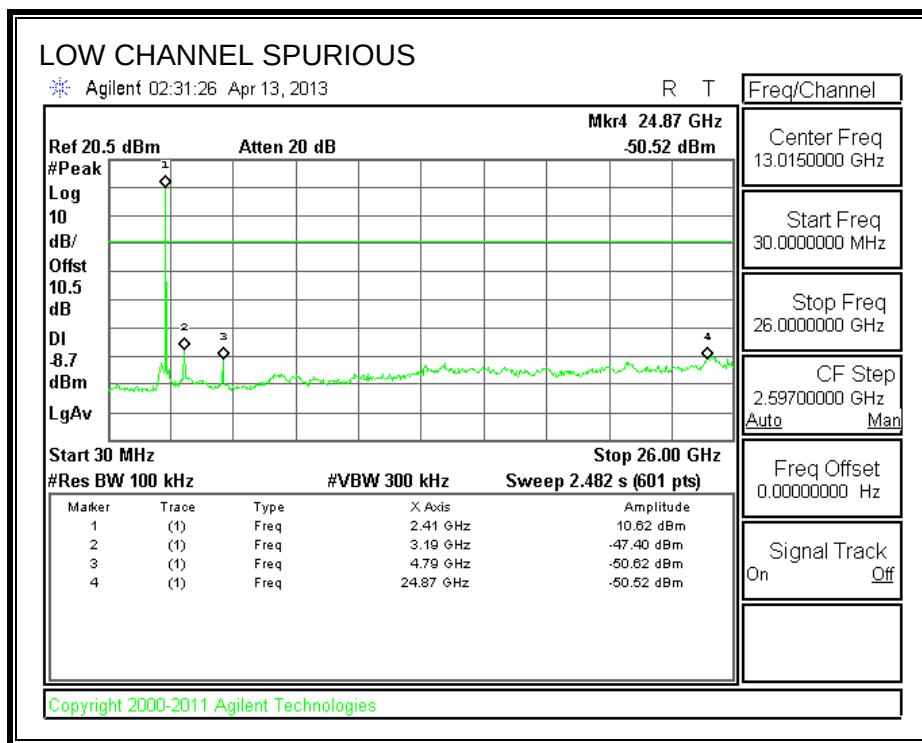
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

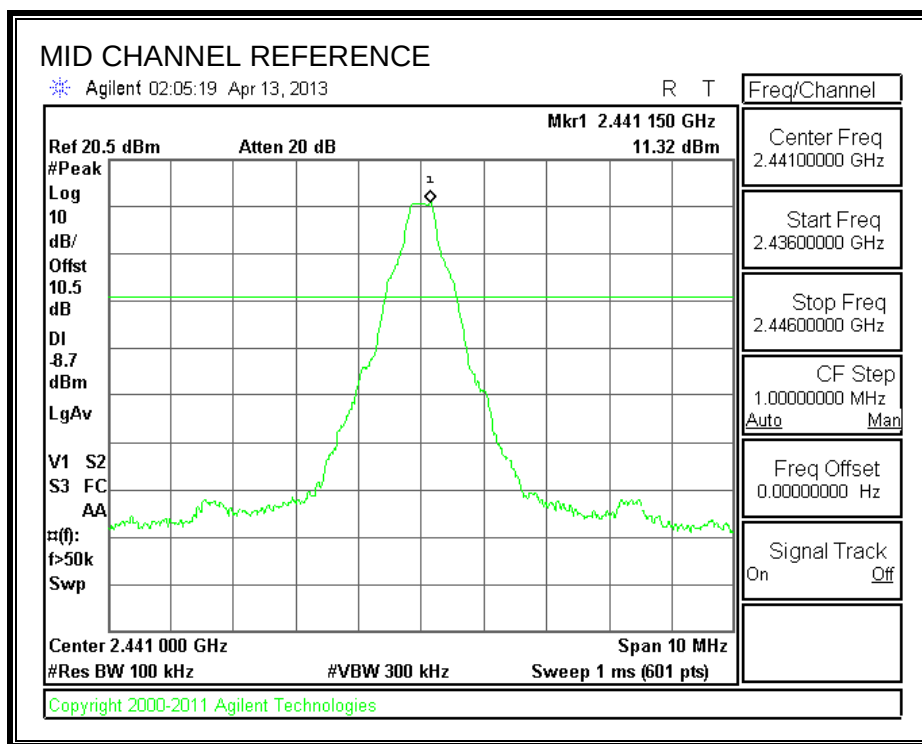
RESULTS

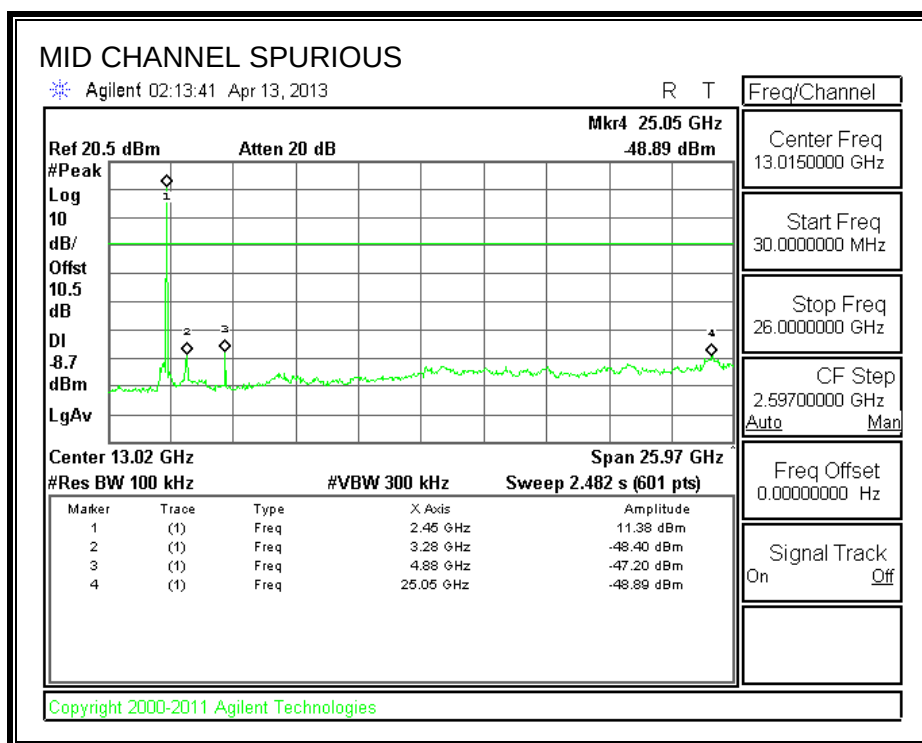
SPURIOUS EMISSIONS, LOW CHANNEL



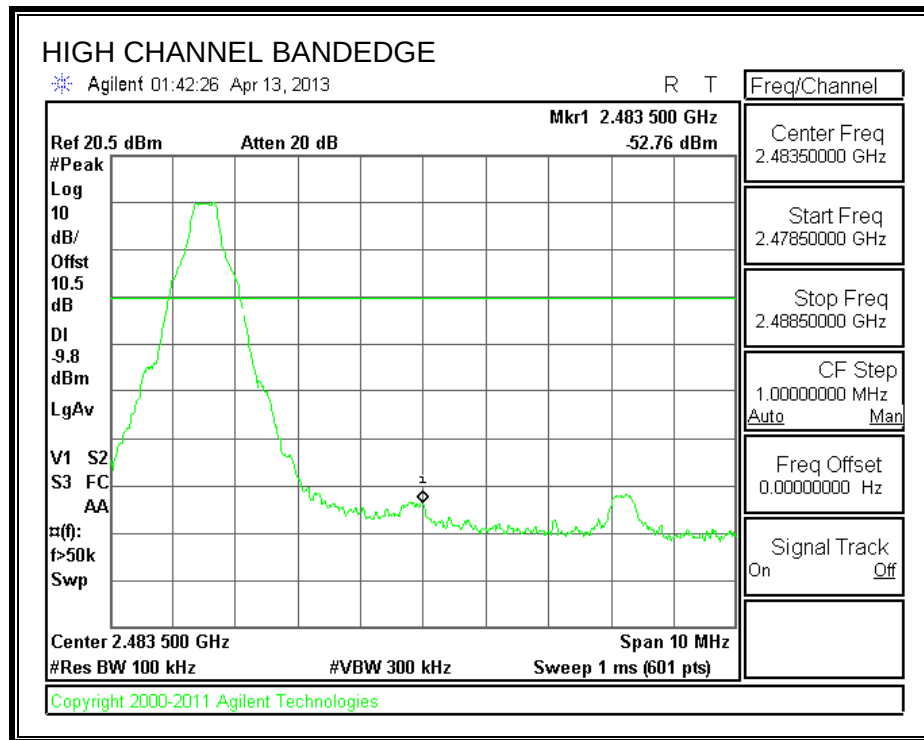


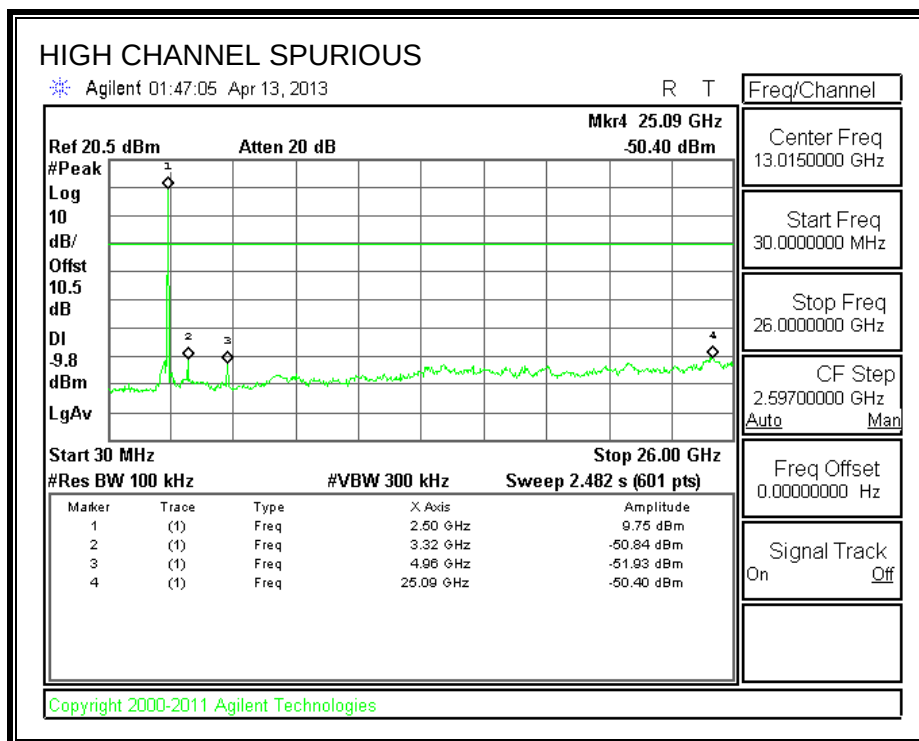
SPURIOUS EMISSIONS, MID CHANNEL



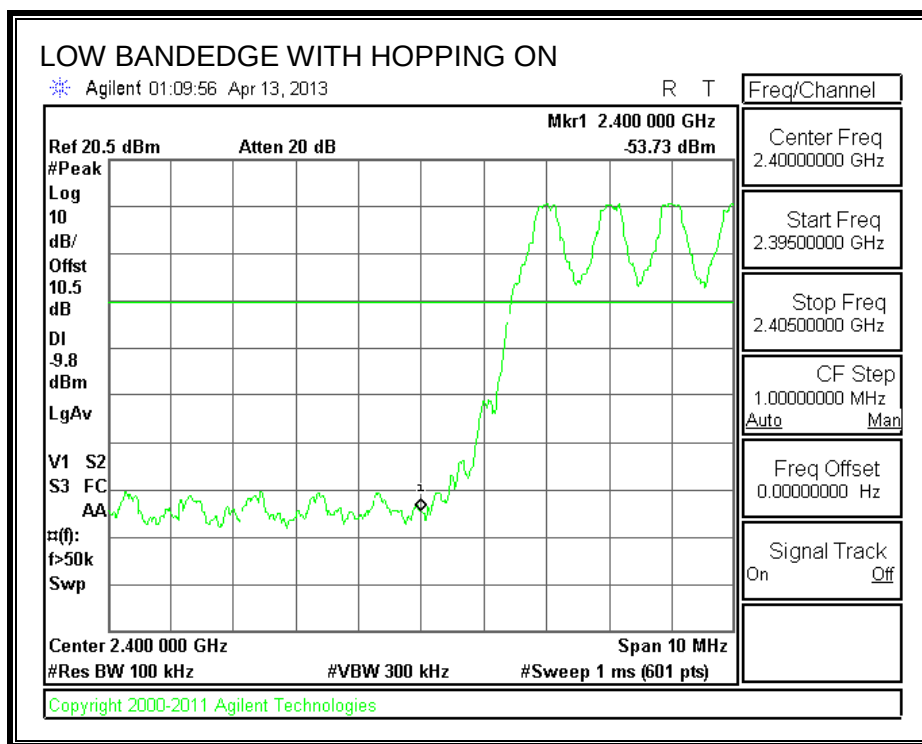


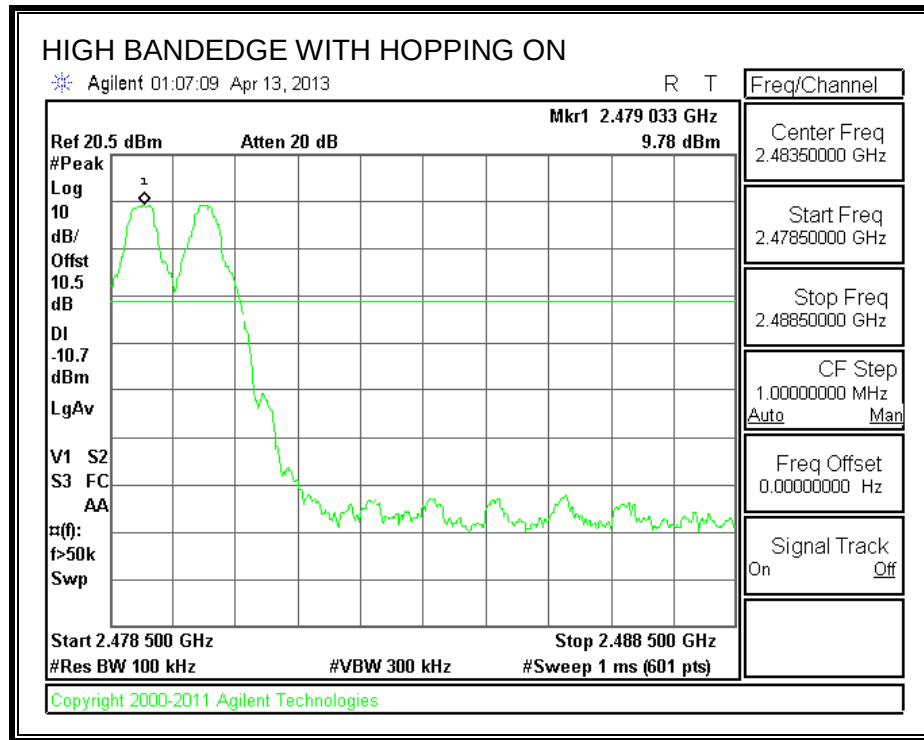
SPURIOUS EMISSIONS, HIGH CHANNEL





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.

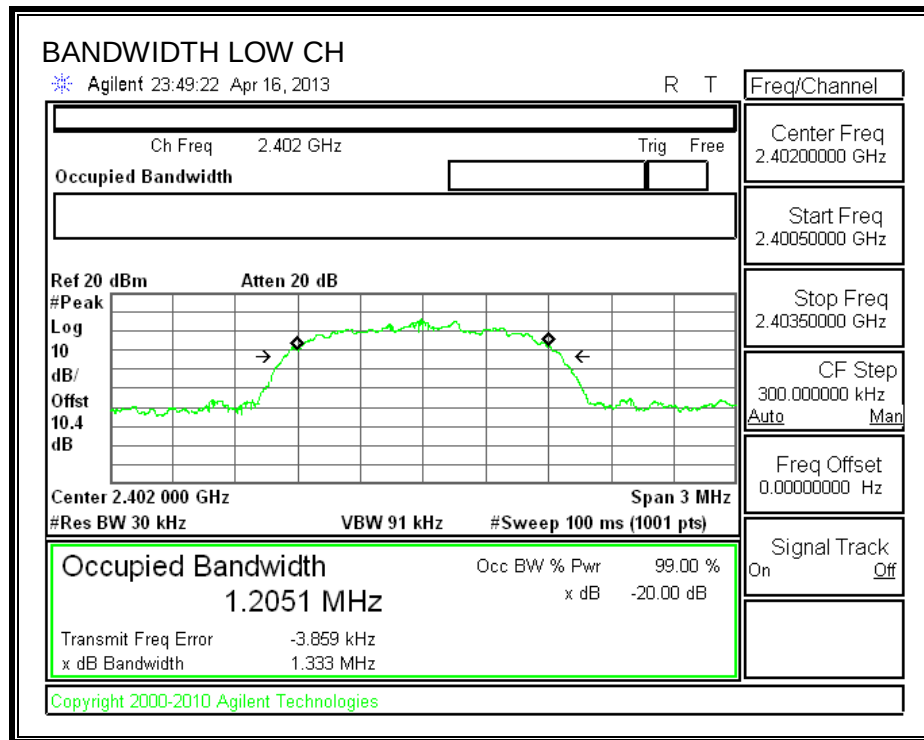
TEST PROCEDURE

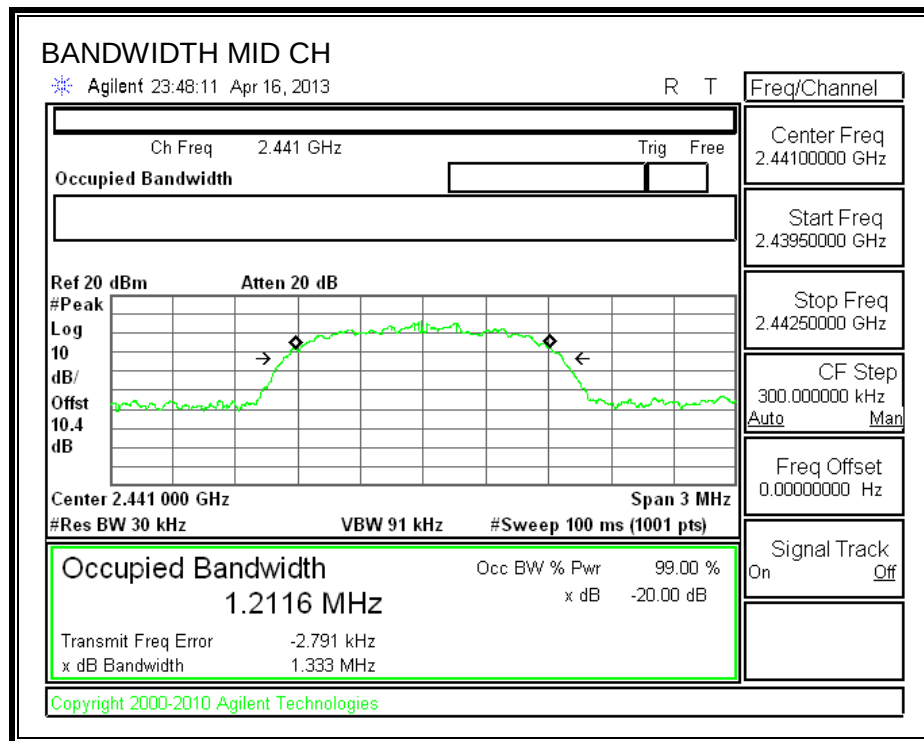
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled.

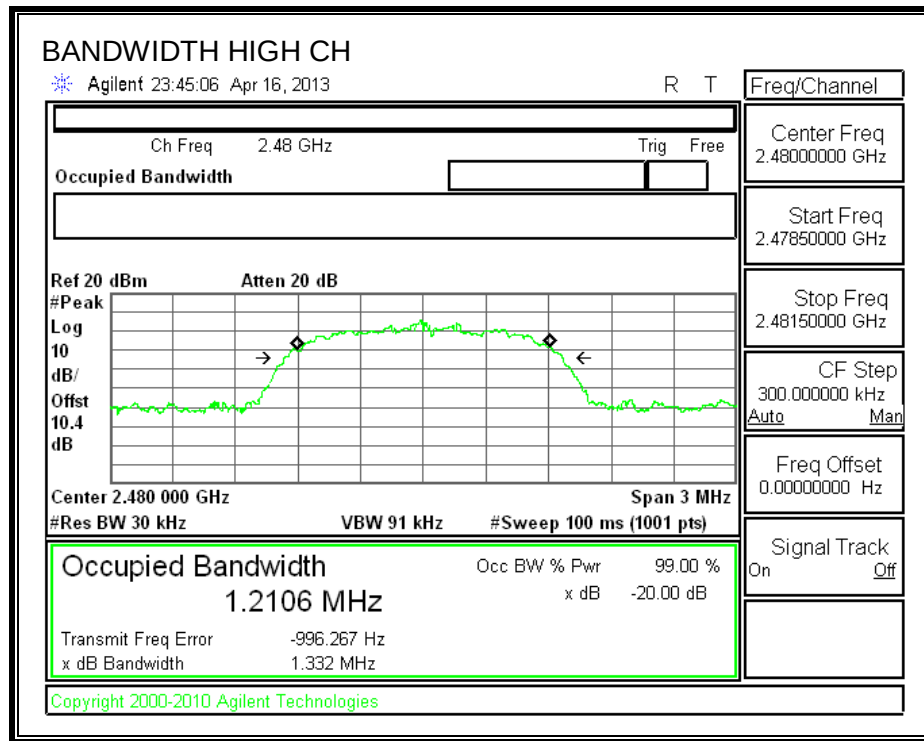
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.333	1.2293
Middle	2441	1.333	1.2287
High	2480	1.332	1.1978

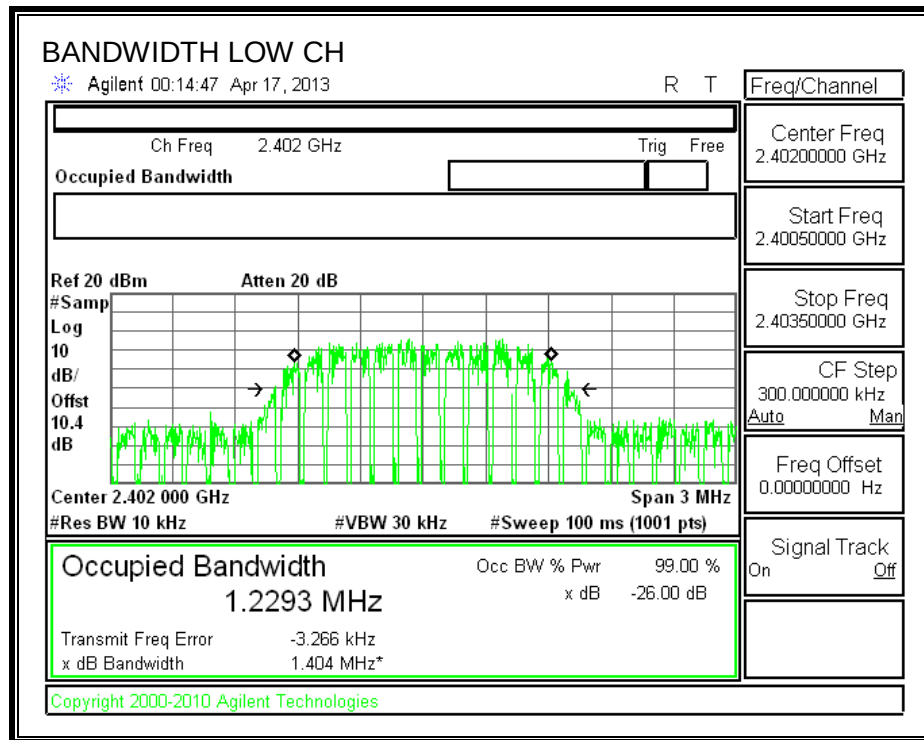
20 dB BANDWIDTH

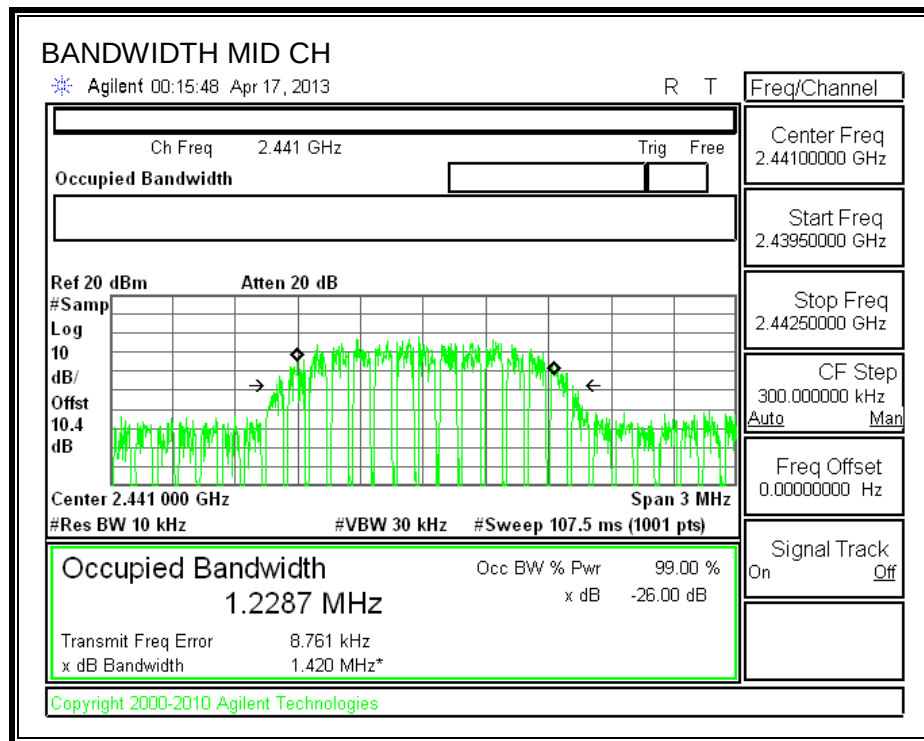


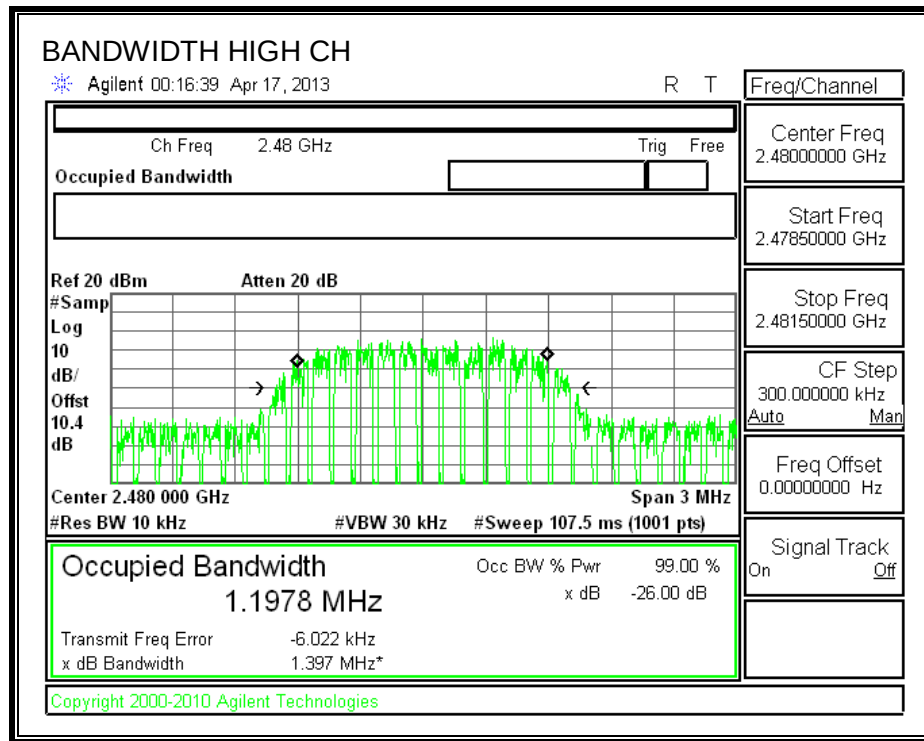




99% BANDWIDTH







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.

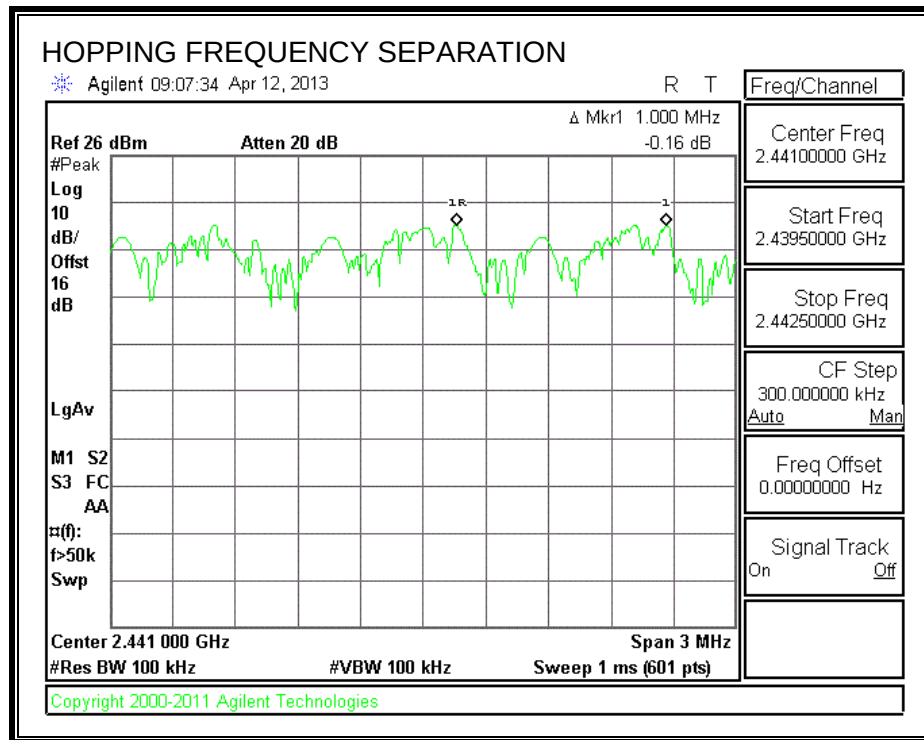
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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



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.

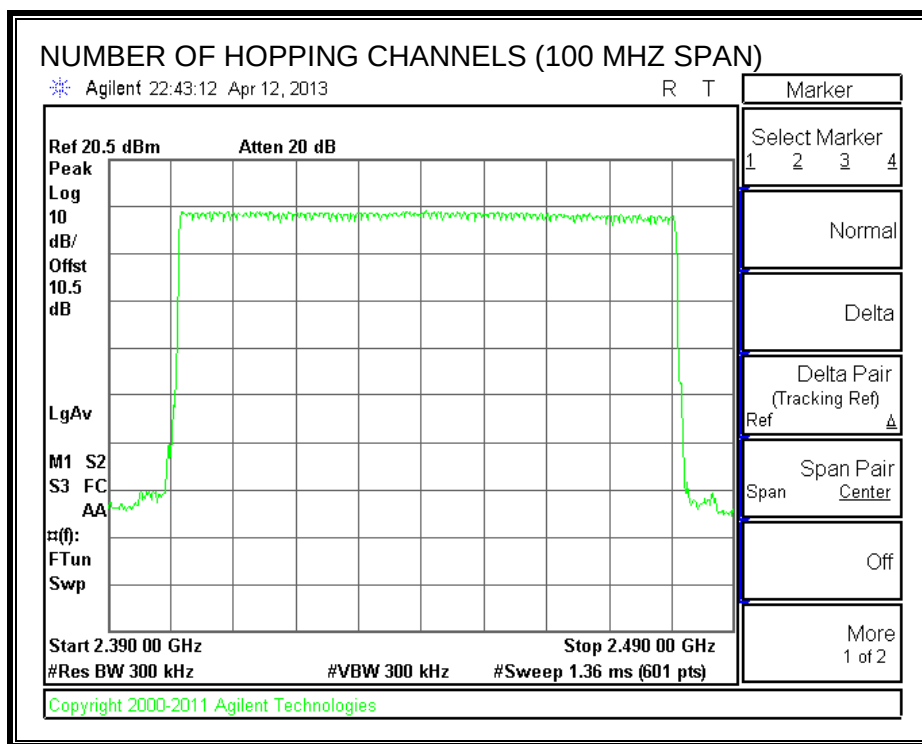
TEST PROCEDURE

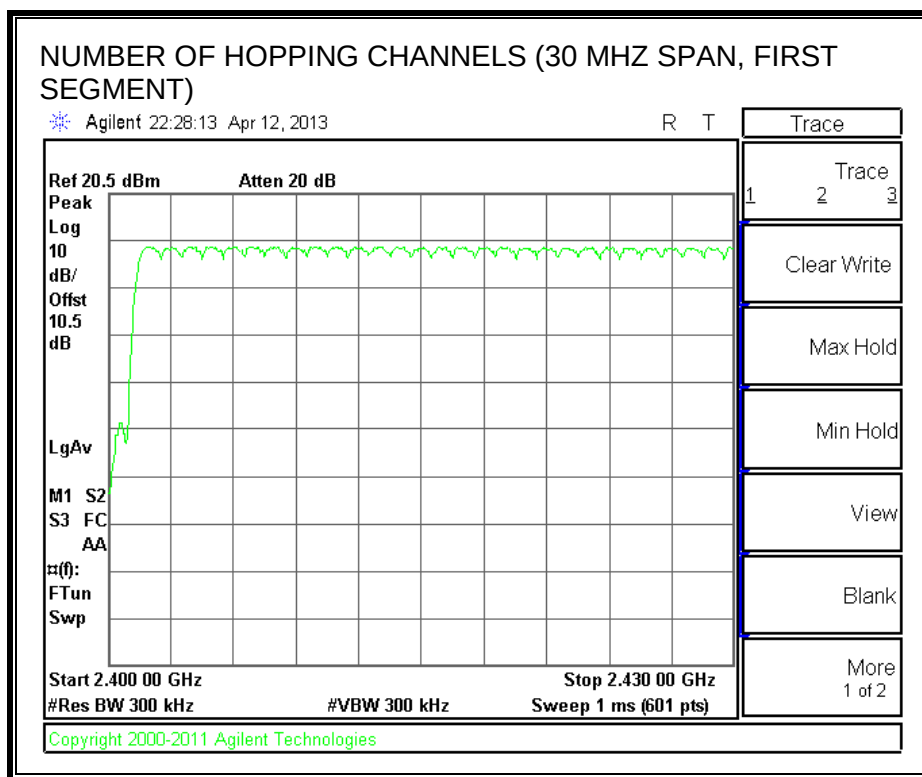
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

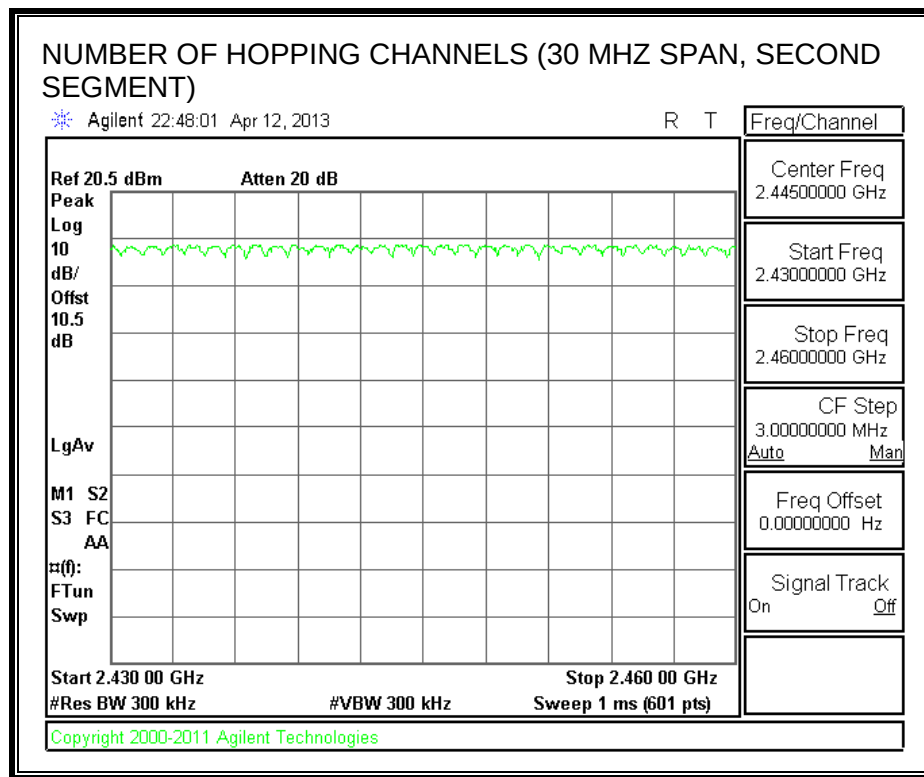
RESULTS

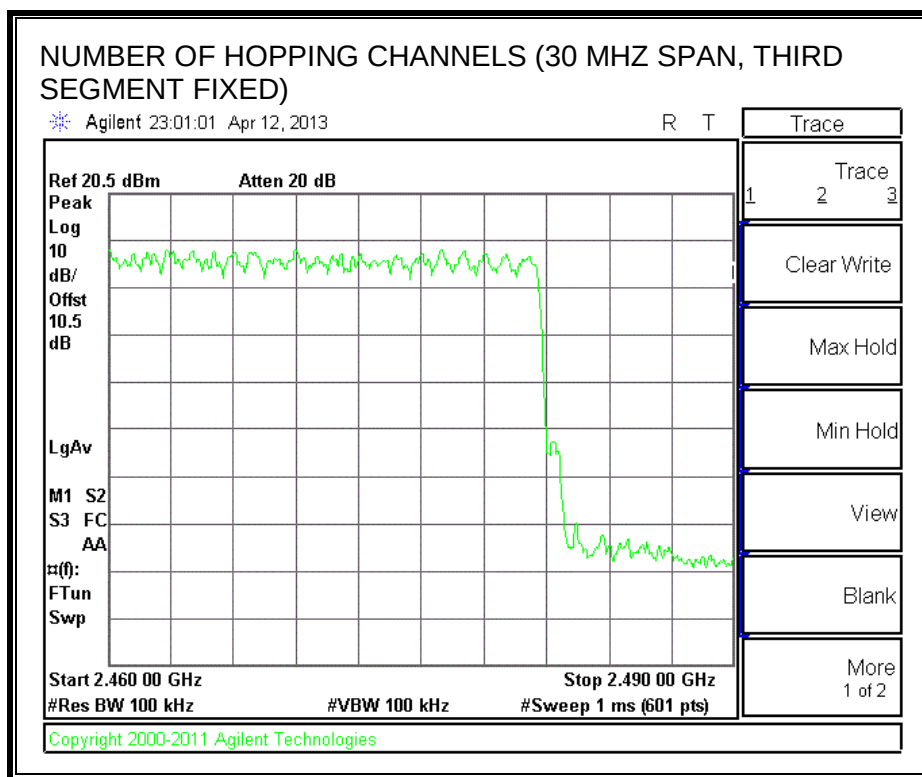
Normal Mode: 79 Channels observed.

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

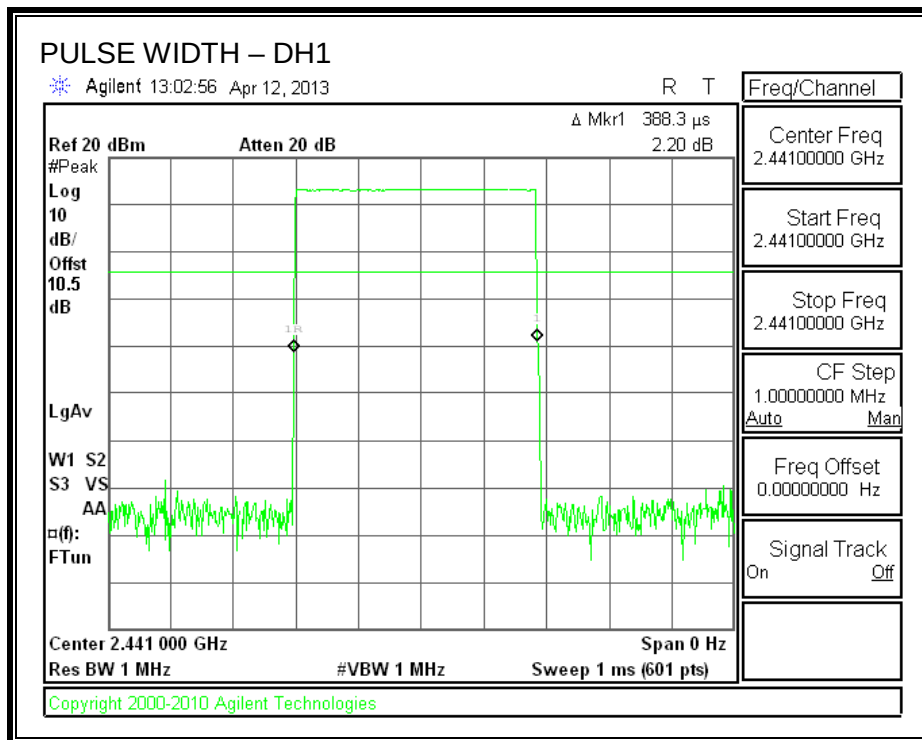
RESULTS

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

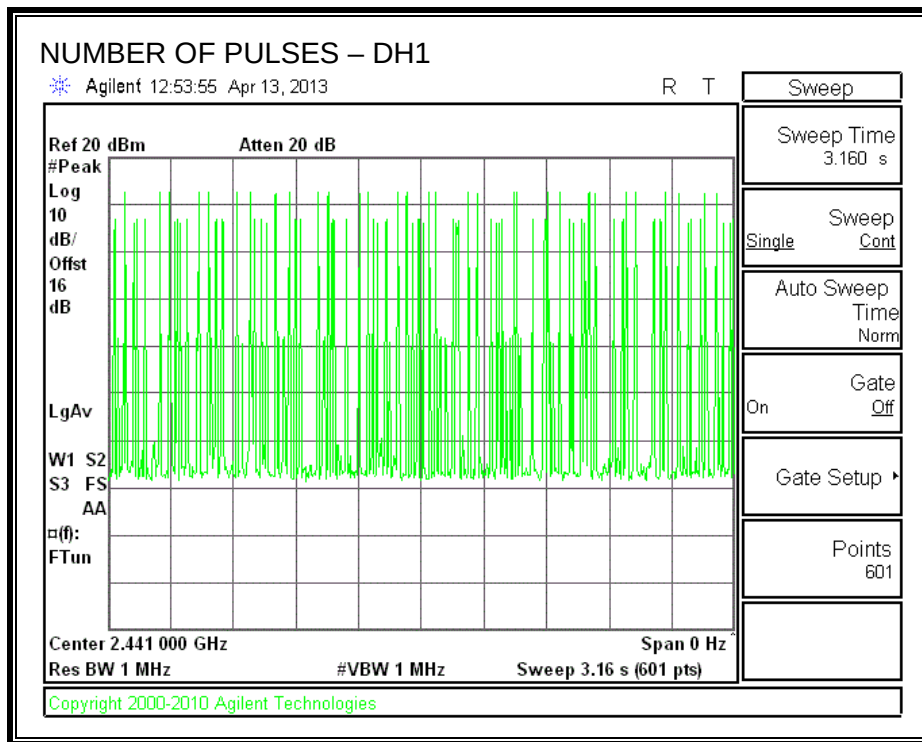
8PSK (EDR) Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.3883	29	0.113	0.4	-0.287
DH3	1.63	13	0.212	0.4	-0.188
DH5	2.9	6	0.174	0.4	-0.226

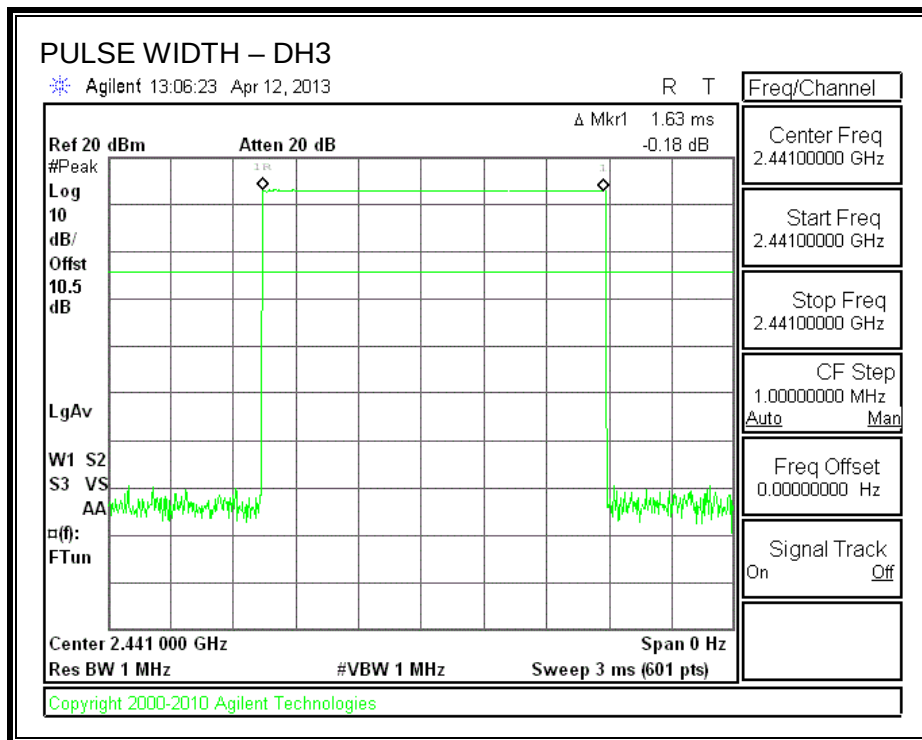
PULSE WIDTH - DH1



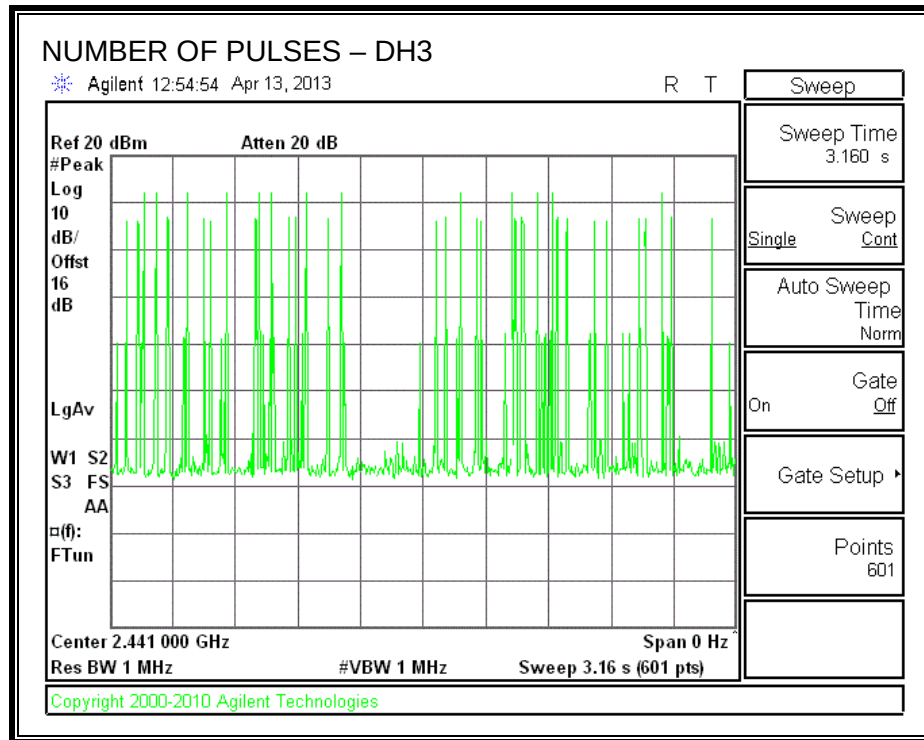
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



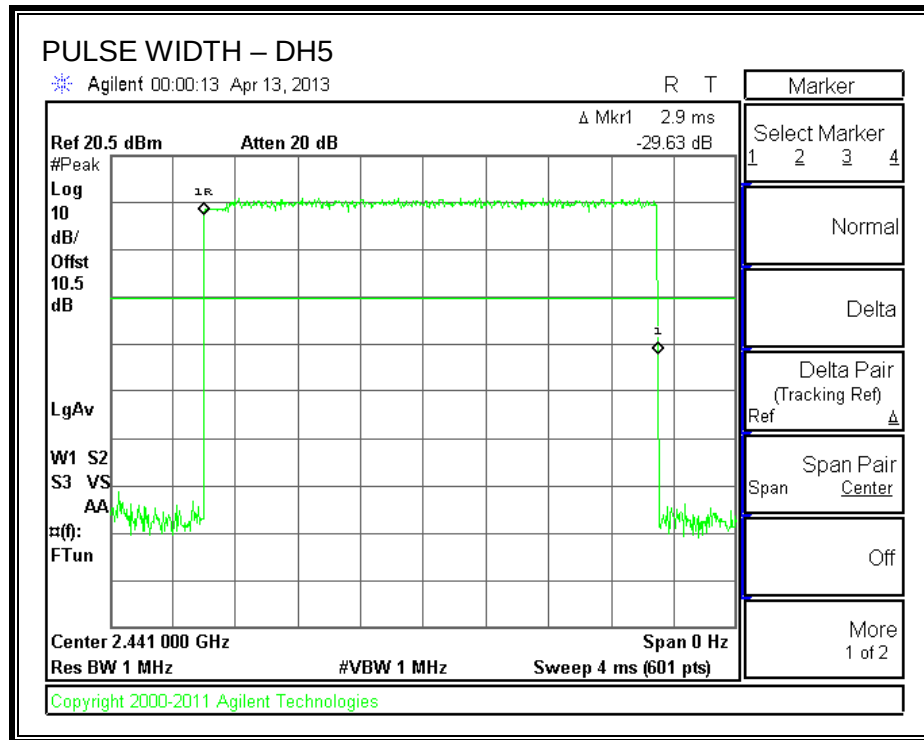
PULSE WIDTH – DH3



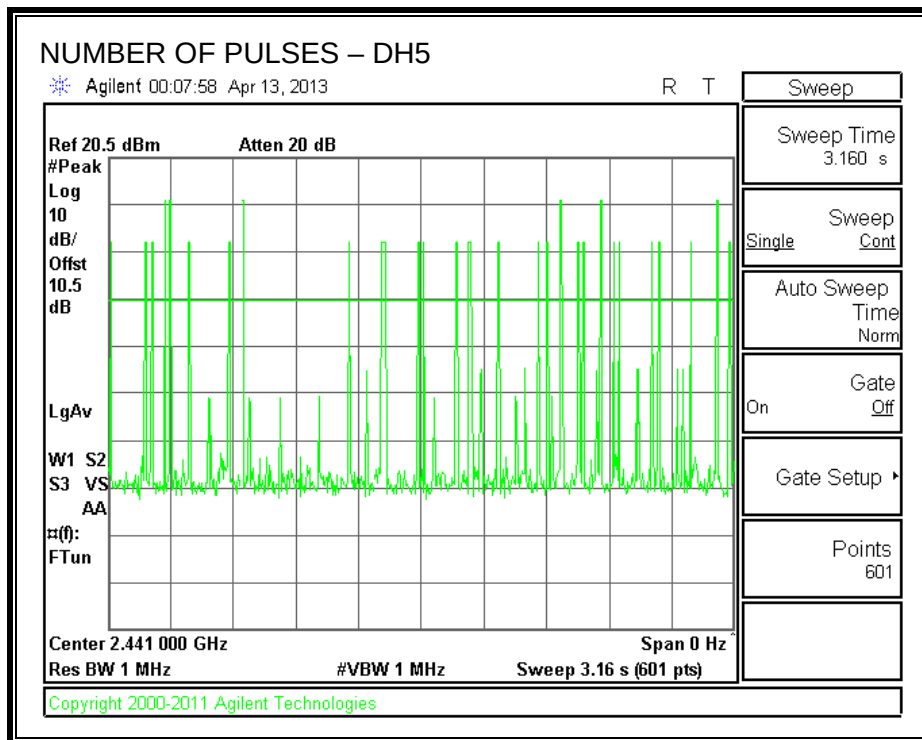
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



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	9.50
Middle	2441	9.50
High	2480	9.50

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.

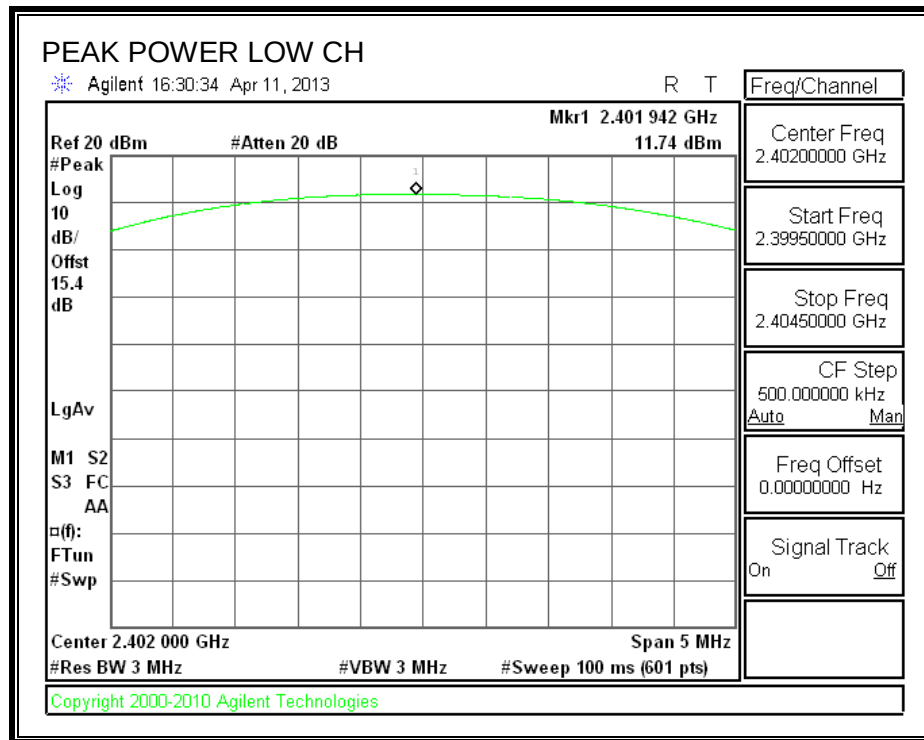
TEST PROCEDURE

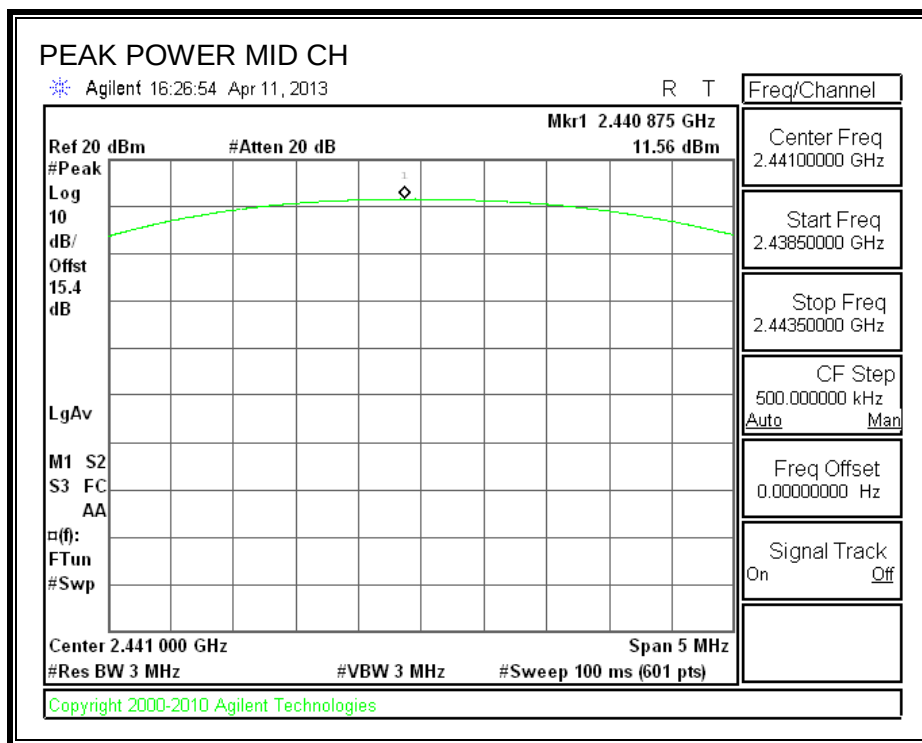
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

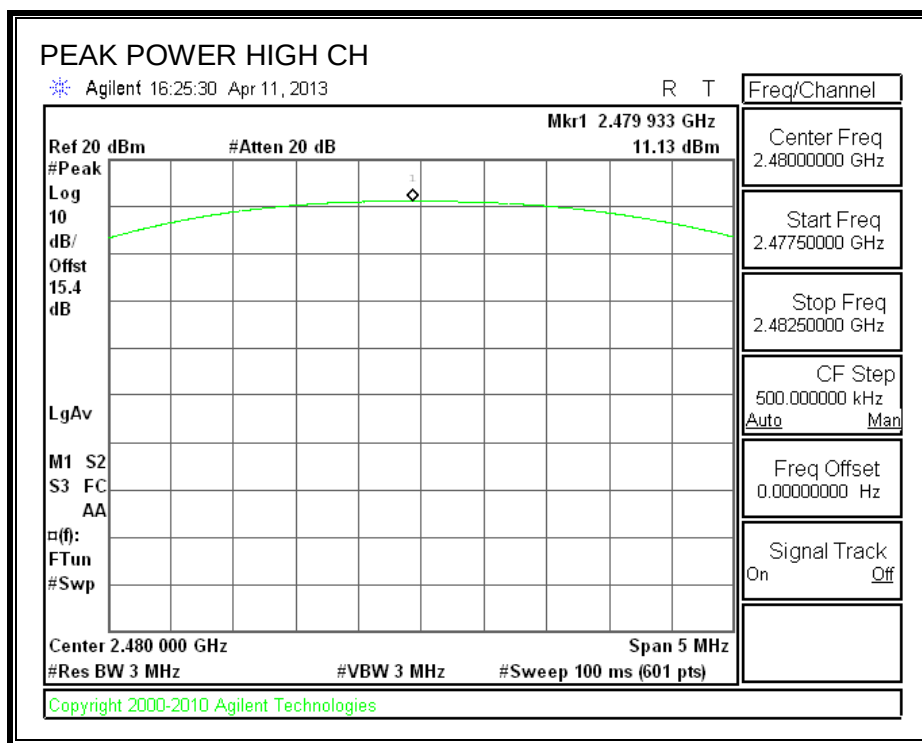
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.74	30	-18.26
Middle	2441	11.56	30	-18.44
High	2480	11.13	30	-18.87

OUTPUT POWER







7.2.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

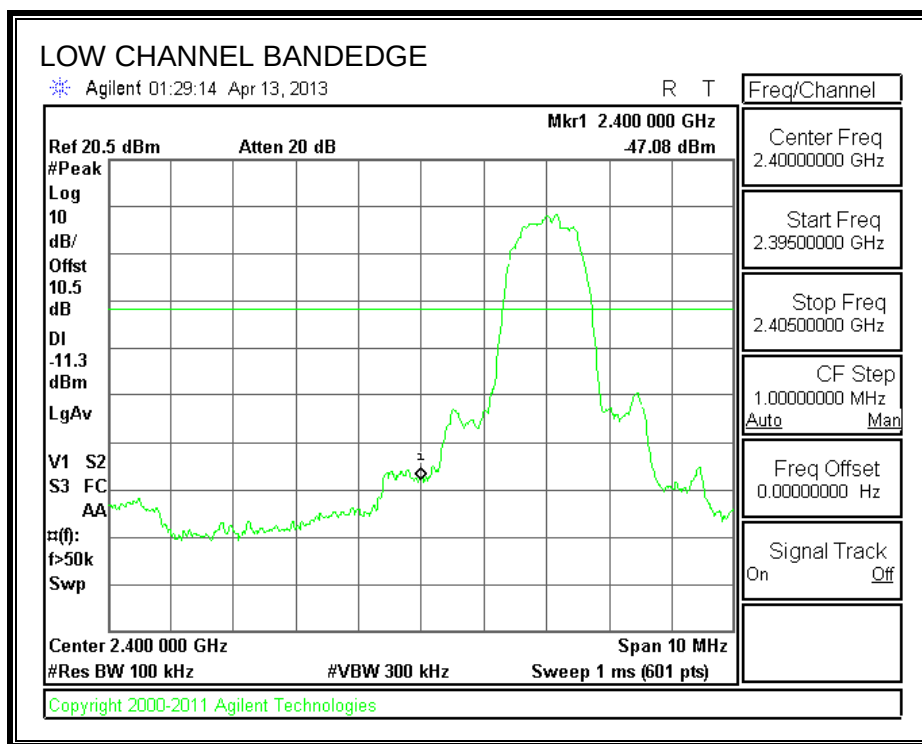
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

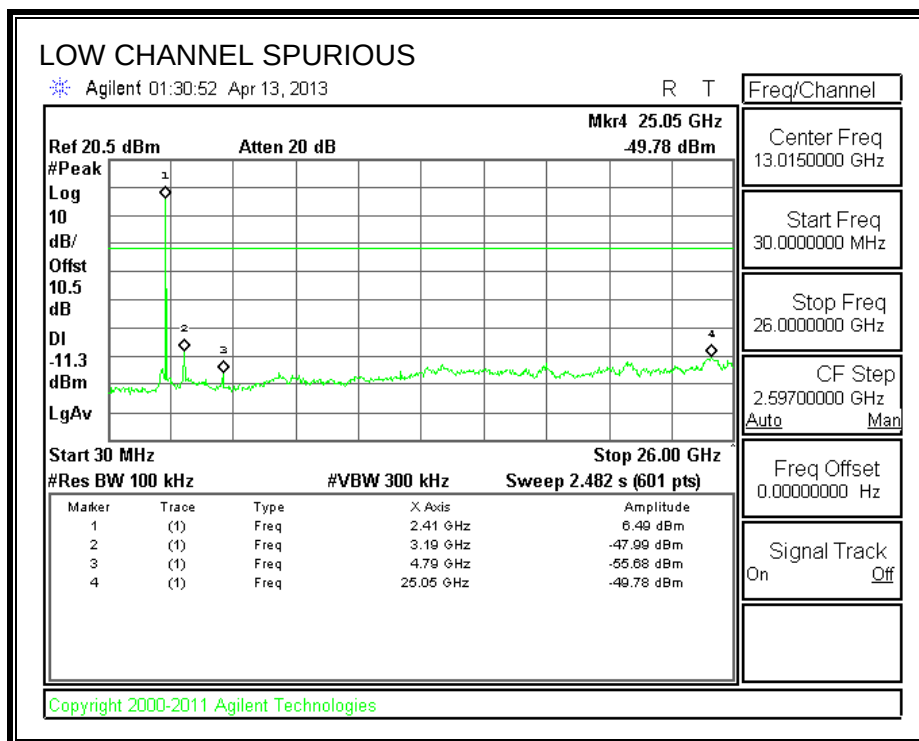
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

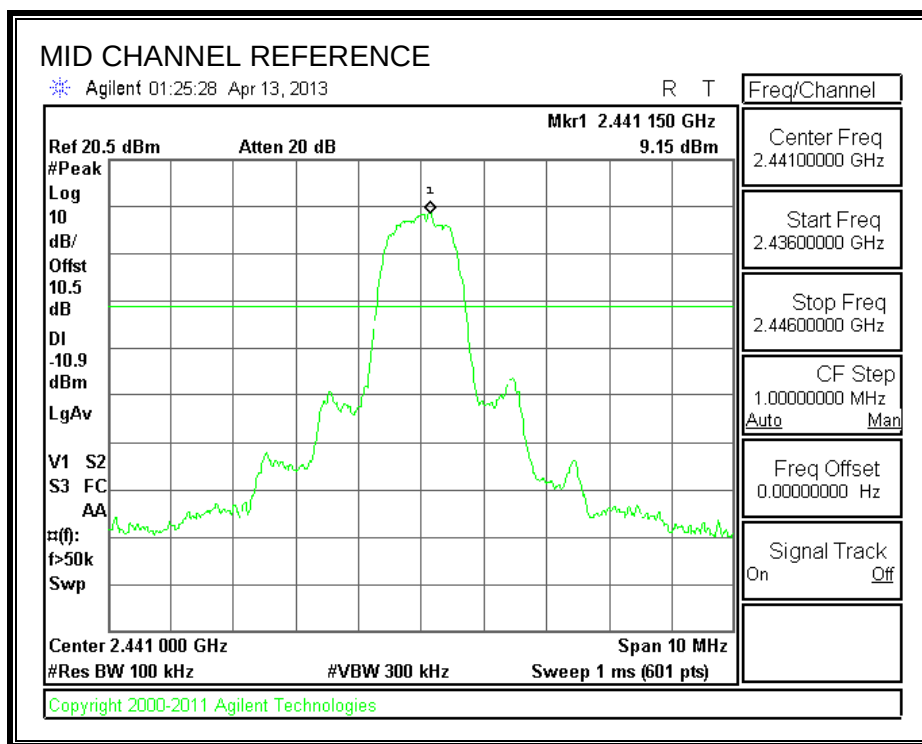
RESULTS

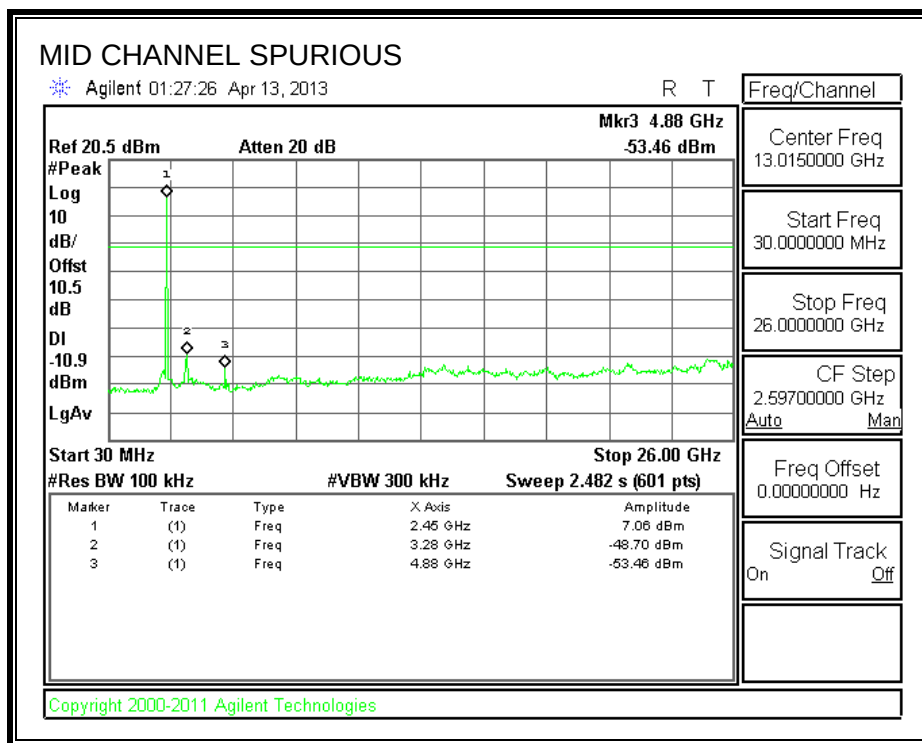
SPURIOUS EMISSIONS, LOW CHANNEL



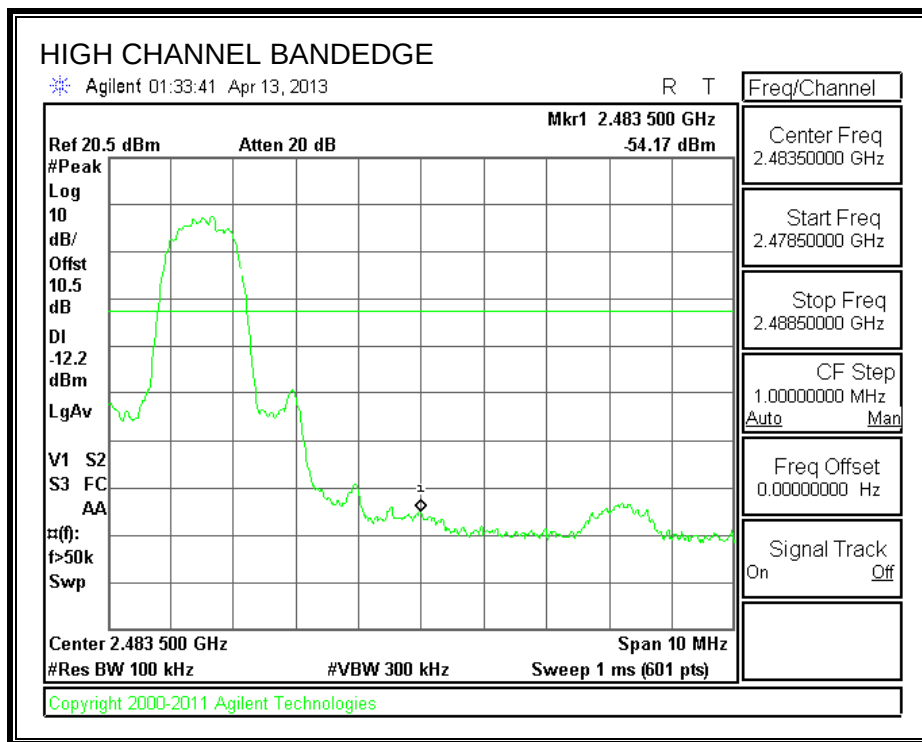


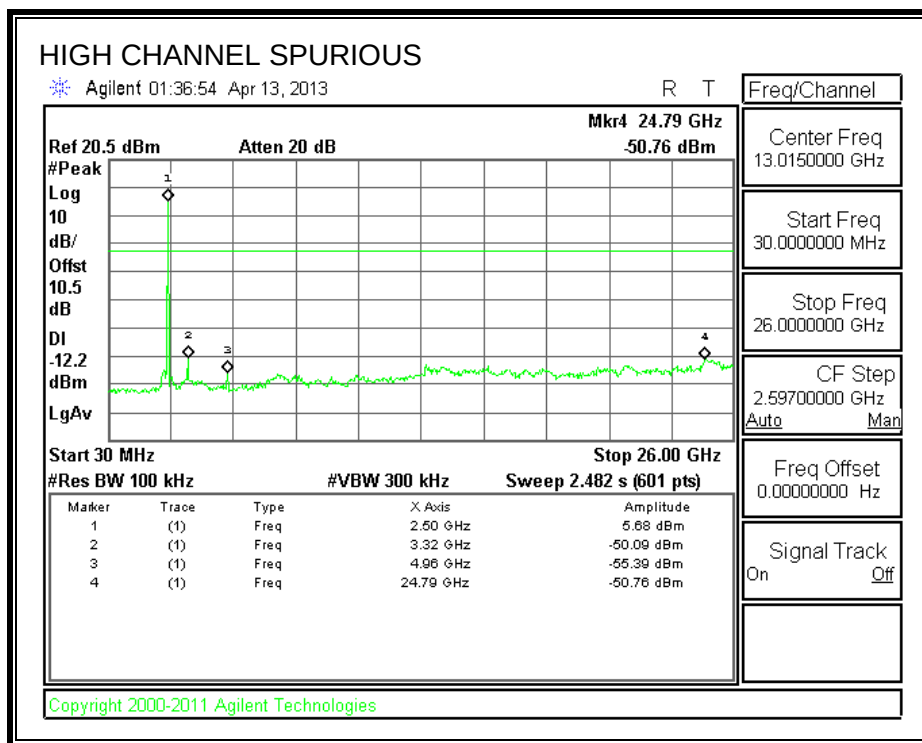
SPURIOUS EMISSIONS, MID CHANNEL



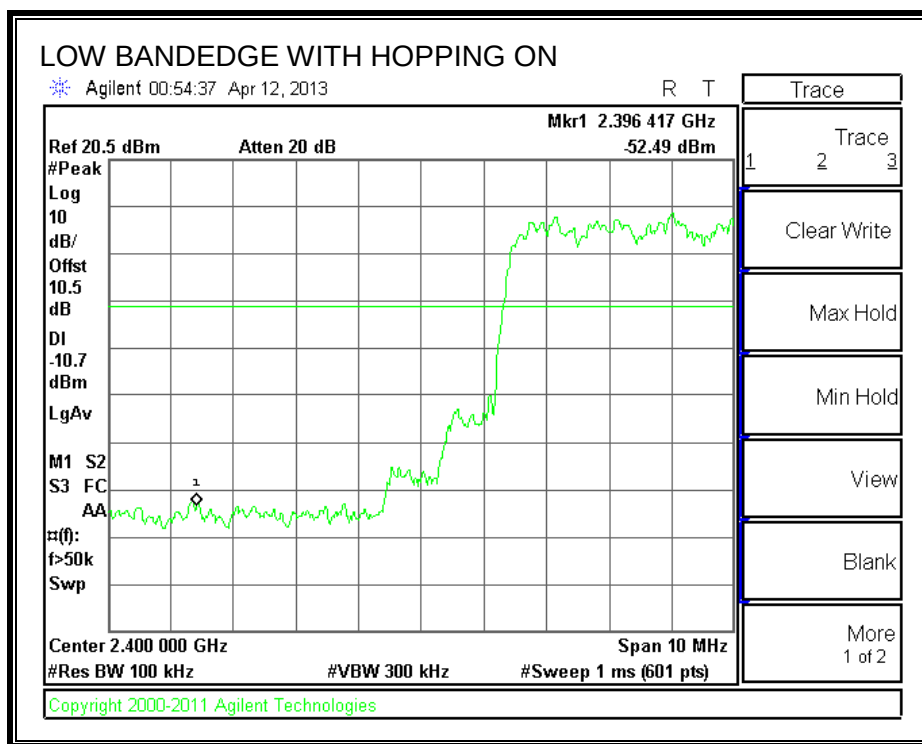


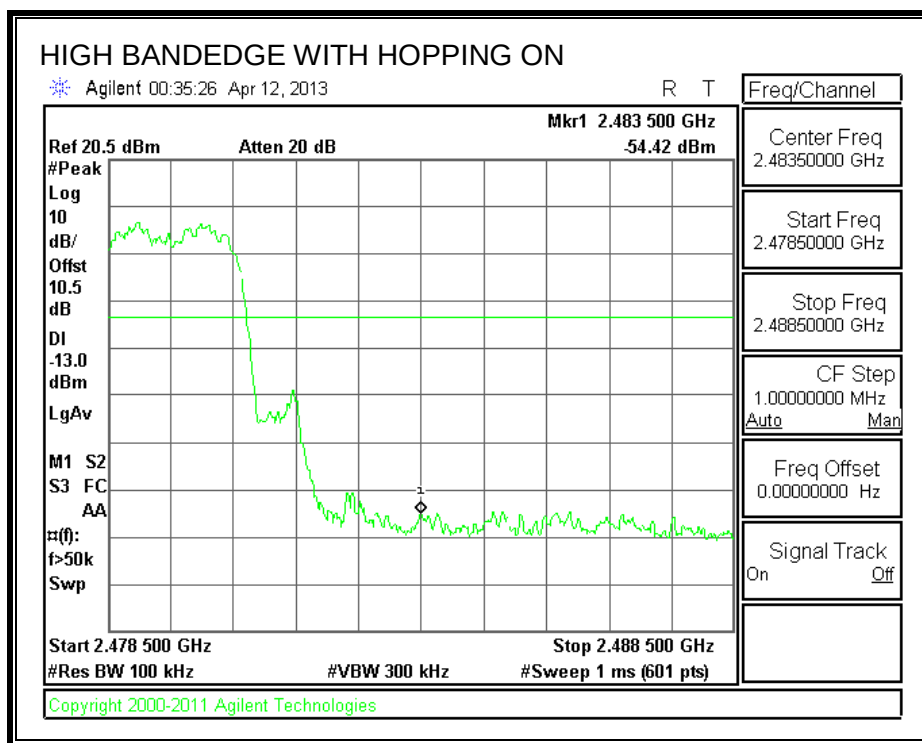
SPURIOUS EMISSIONS, HIGH CHANNEL





SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON





8. RADIATED TEST RESULTS

8.1.1. 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 ($\mu\text{V/m}$) at 3 m	Field Strength Limit (dB $\mu\text{V/m}$) 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.

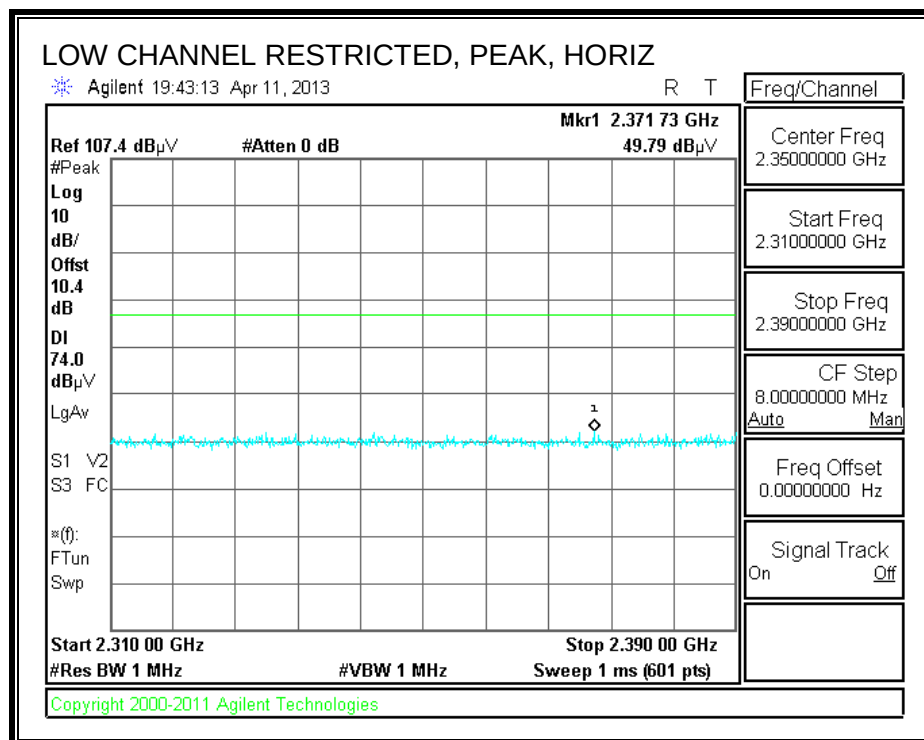
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

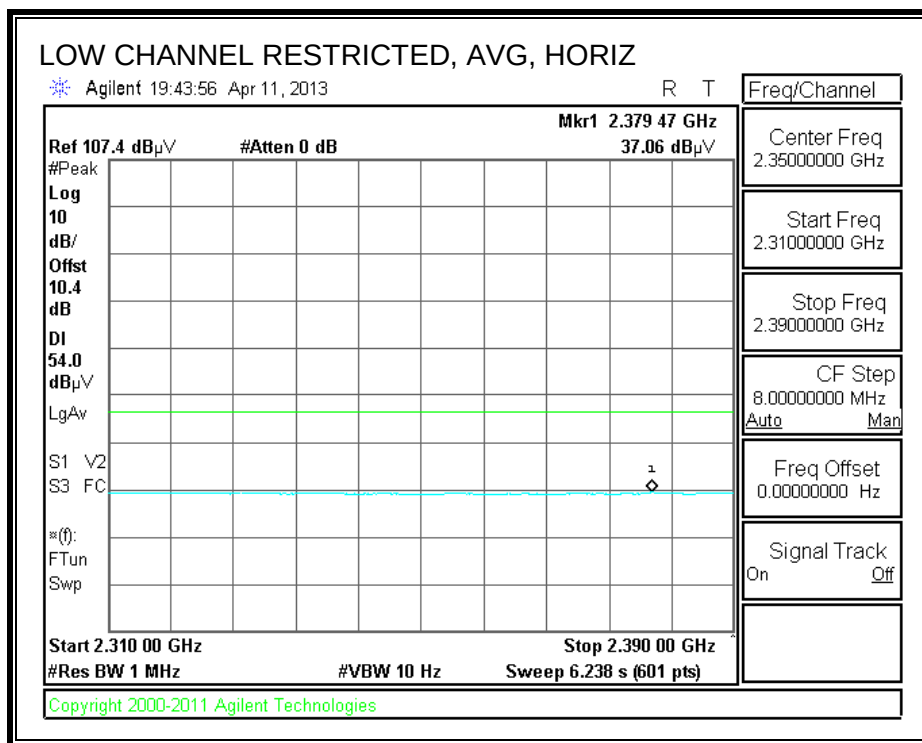
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

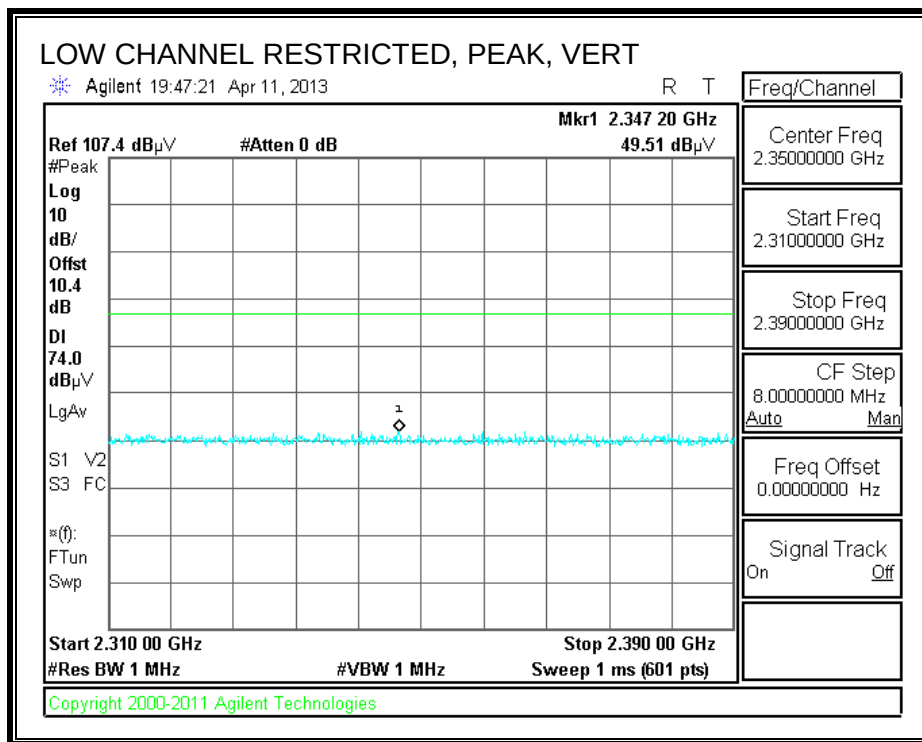
8.2.1. BASIC DATA RATE GFSK MODULATION

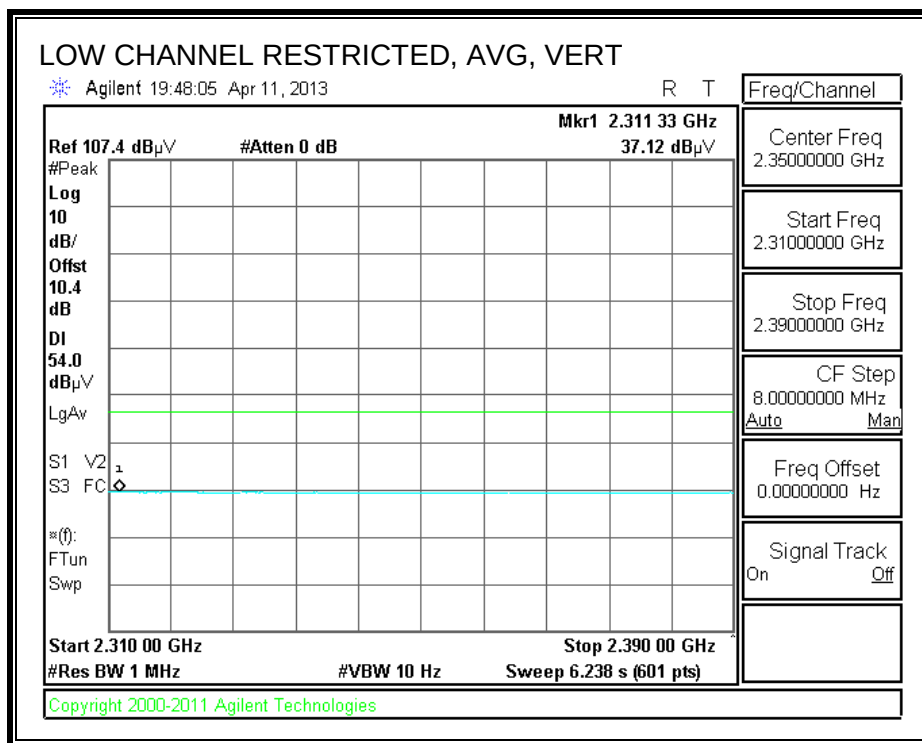
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



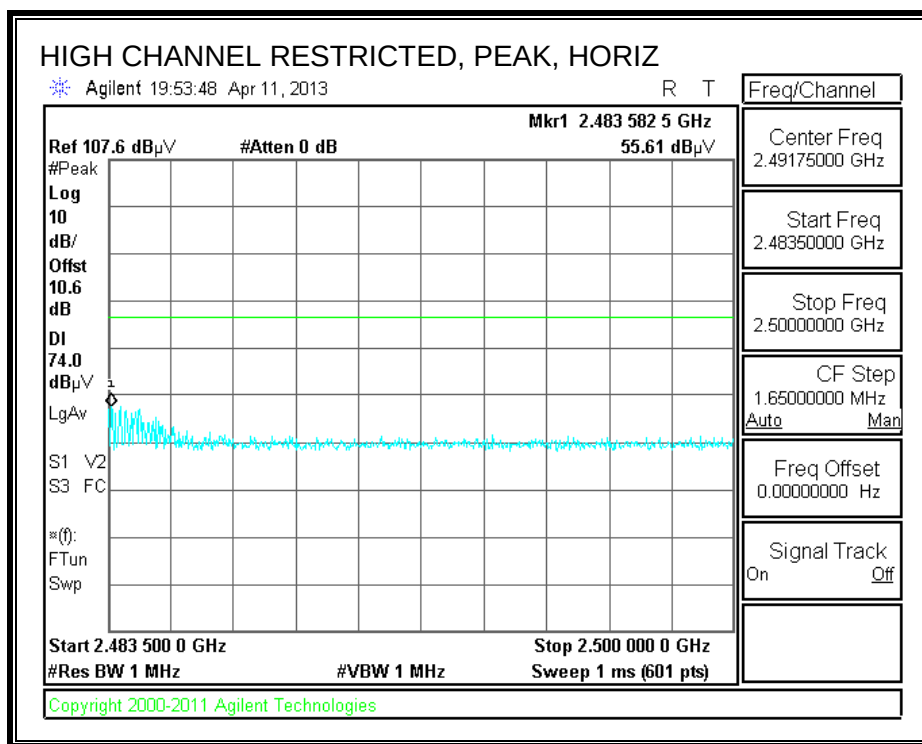


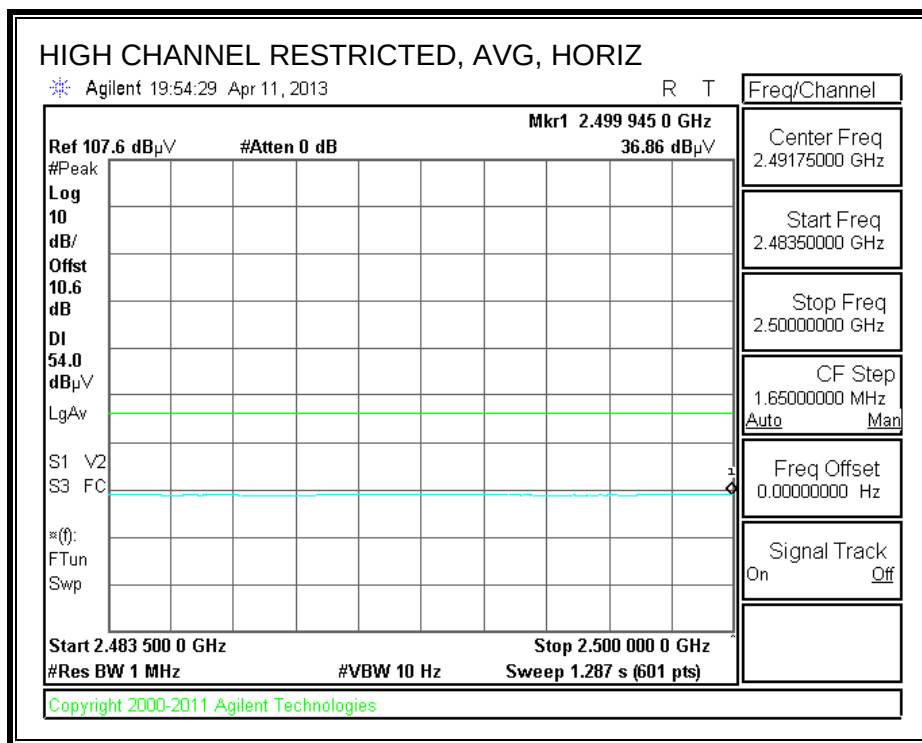
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



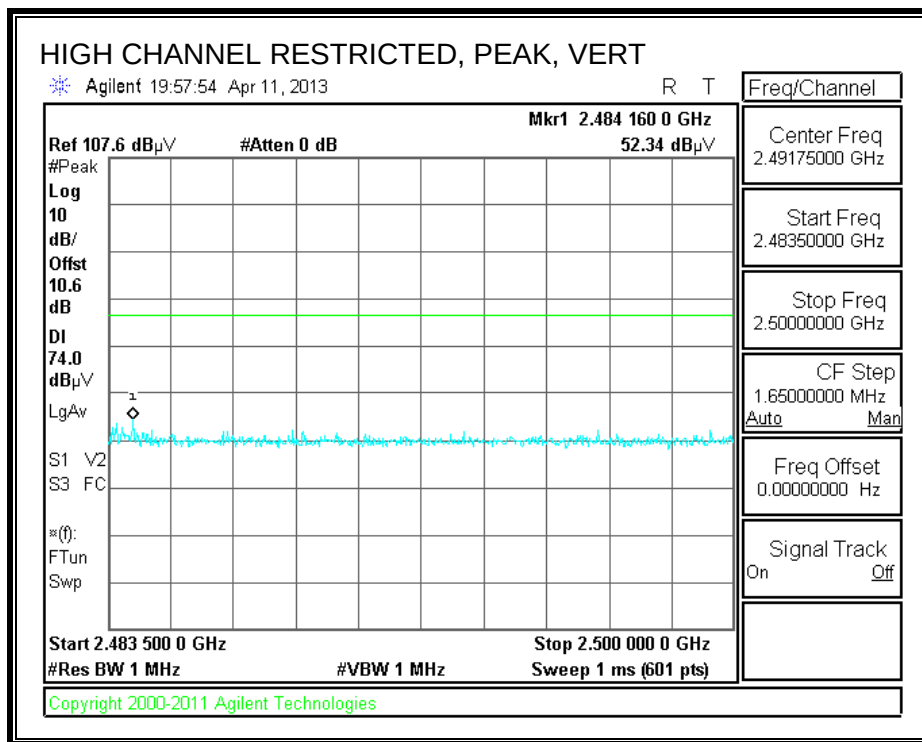


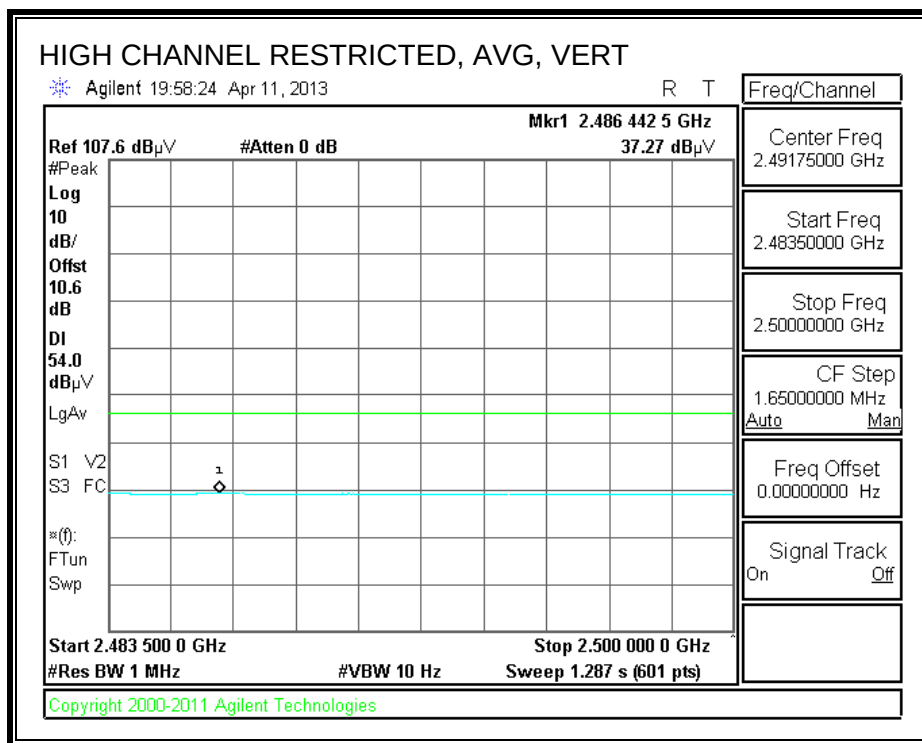
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



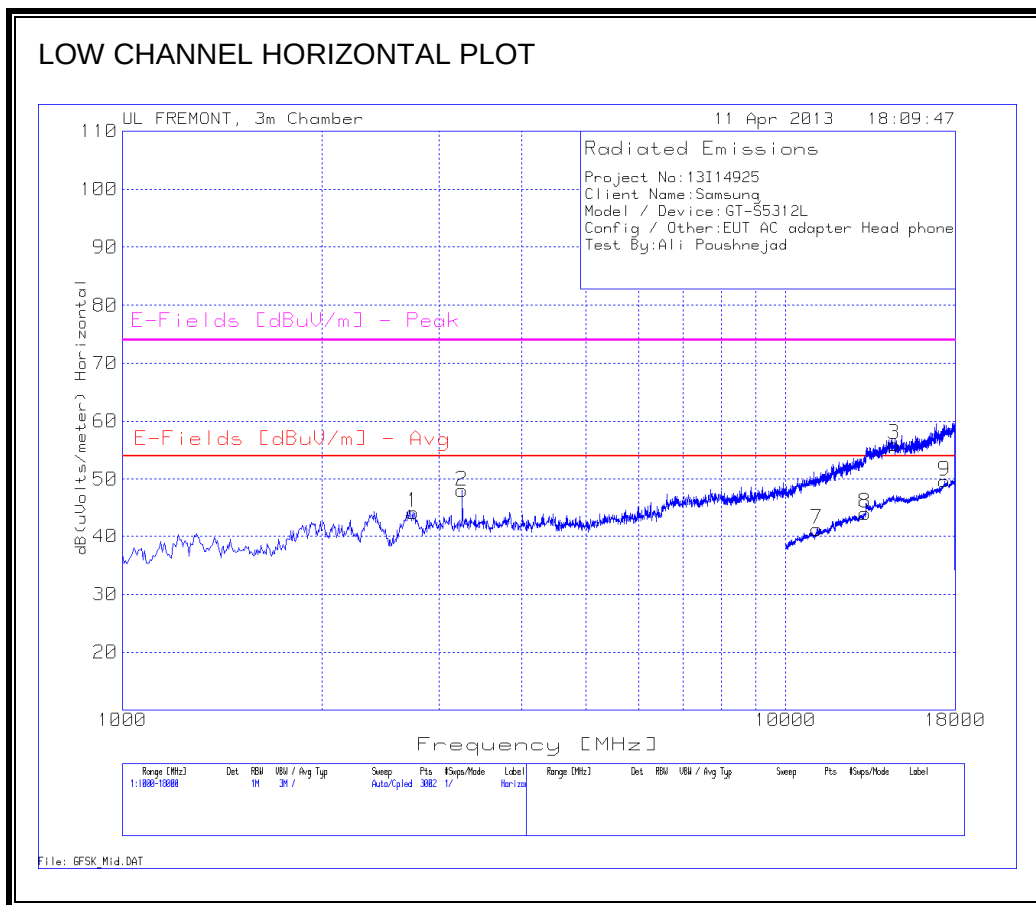


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

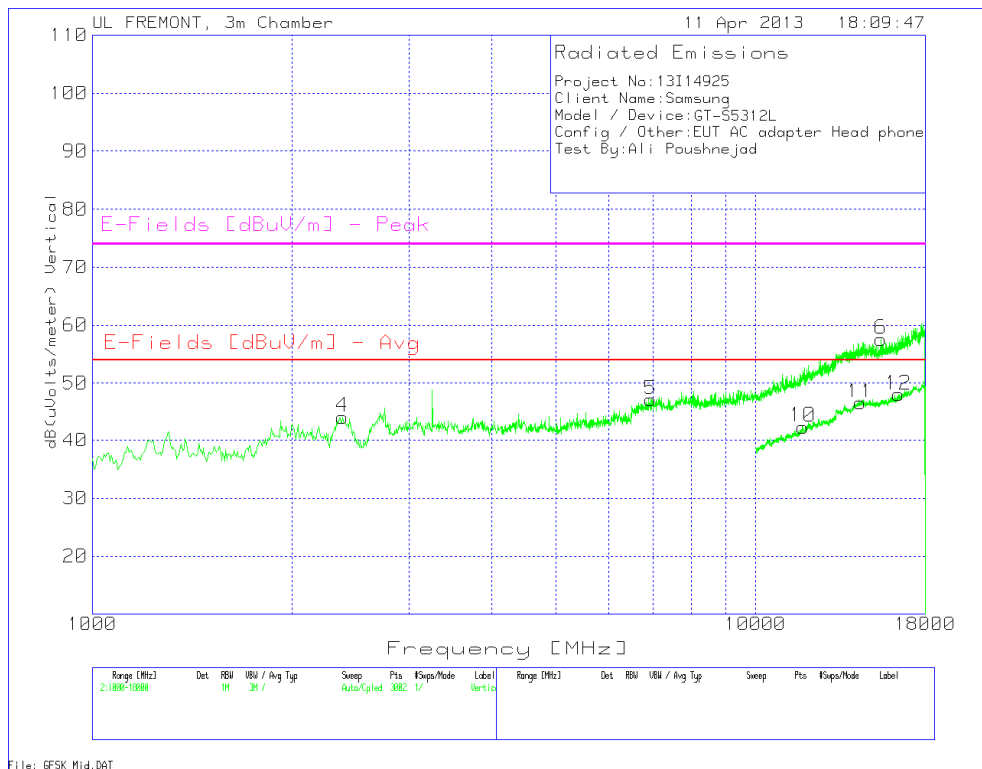




HARMONICS AND SPURIOUS EMISSIONS



LOW CHANNEL VERTICAL PLOT



Low Channel

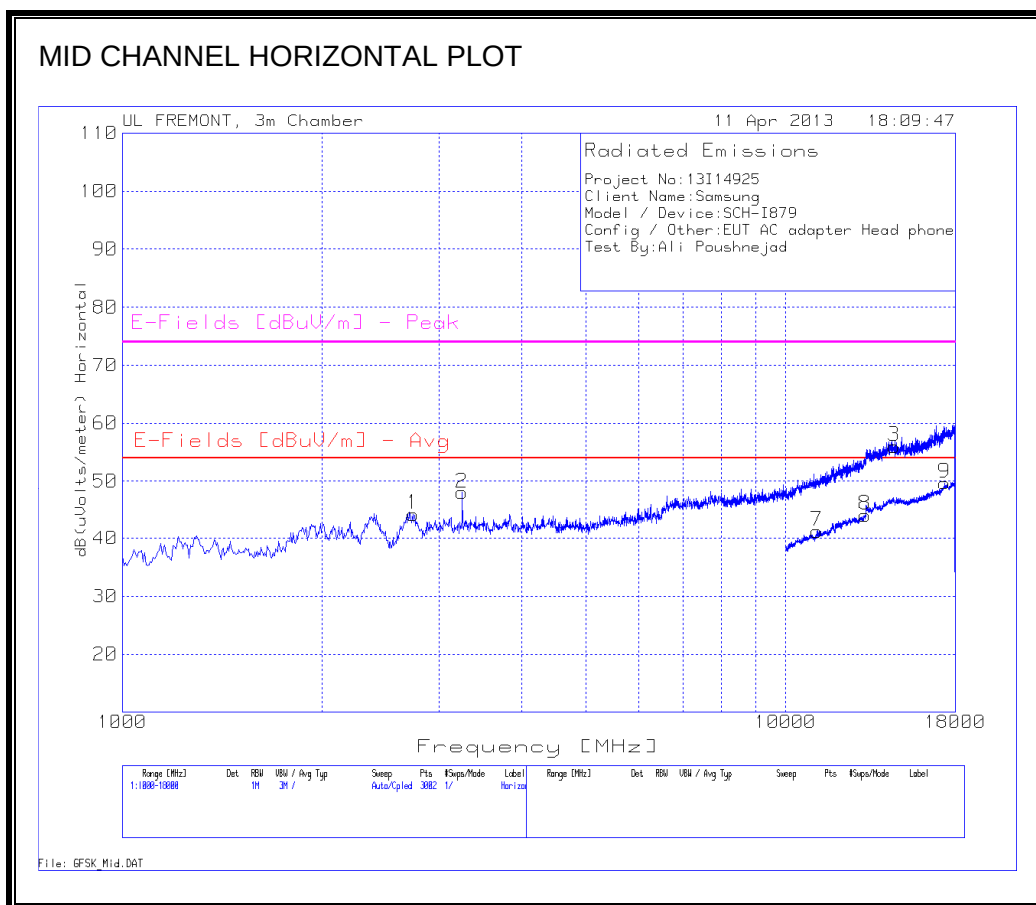
Project No:13I14925											
Client Name:Samsung											
Model / Device:GT-S5312L											
Config / Other:EUT AC adapter Head phone											
Test By:Ali Poushnejad											

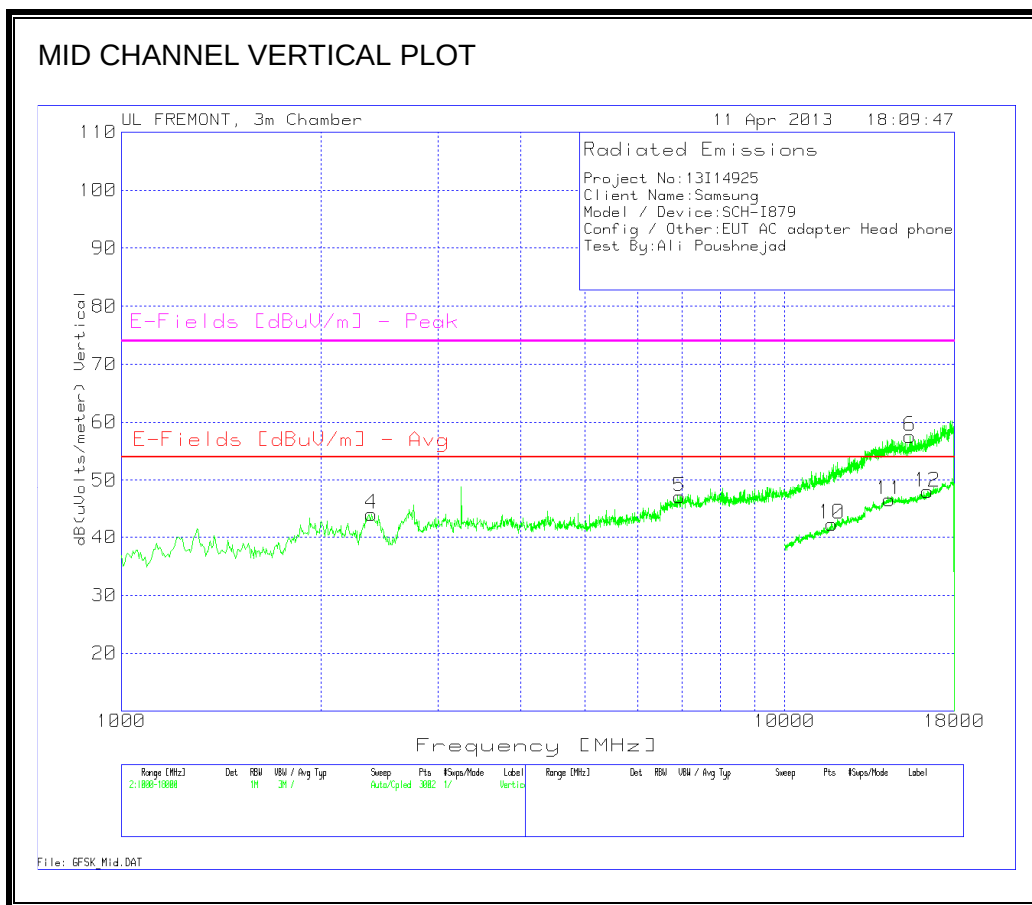
Horizontal 1000 - 18000MHz											
Marker No.	Test Frequency (MHz)	Meter Reading(d BuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
1	3202.865	42.47	PK	32.9	-28.1	0.4	47.67	-	-	74	-26.33
2	7308.461	33.77	PK	35.6	-23	0.3	46.67	-	-	74	-27.33
3	14375.75	33.34	PK	39.4	-15.8	0.4	57.34	-	-	74	-16.66

Vertical 1000 - 18000MHz											
Marker No.	Test Frequency (MHz)	Meter Reading(d BuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
4	2738.508	39.43	PK	32.7	-28.9	0.9	44.13	-	-	74	-29.87
5	7727.515	34.05	PK	35.8	-22.7	0.2	47.35	-	-	74	-26.65
6	15610.26	32.83	PK	40.4	-16.6	0.3	56.93	-	-	74	-17.07

Horizontal 10000 - 18000MHz											
Marker No.	Test Frequency (MHz)	Meter Reading(d BuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
7	10999.5	21.87	PK	37.9	-19.8	0.6	40.57	-	-	74	-33.43
8	13306.347	21.96	PK	39.2	-16.7	0.4	44.86	-	-	74	-29.14
9	17348.326	21.56	PK	41.3	-14.3	0.4	48.96	-	-	74	-25.04

Vertical 10000 - 18000MHz											
Marker No.	Test Frequency (MHz)	Meter Reading(d BuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
10	11811.094	21.31	PK	38.9	-19.1	0.7	41.81	-	-	74	-32.19
11	13670.165	22.51	PK	38.8	-16.1	0.4	45.61	-	-	74	-28.39
12	17884.058	21.5	PK	41.5	-13.9	0.6	49.7	-	-	74	-24.3





Mid Channel

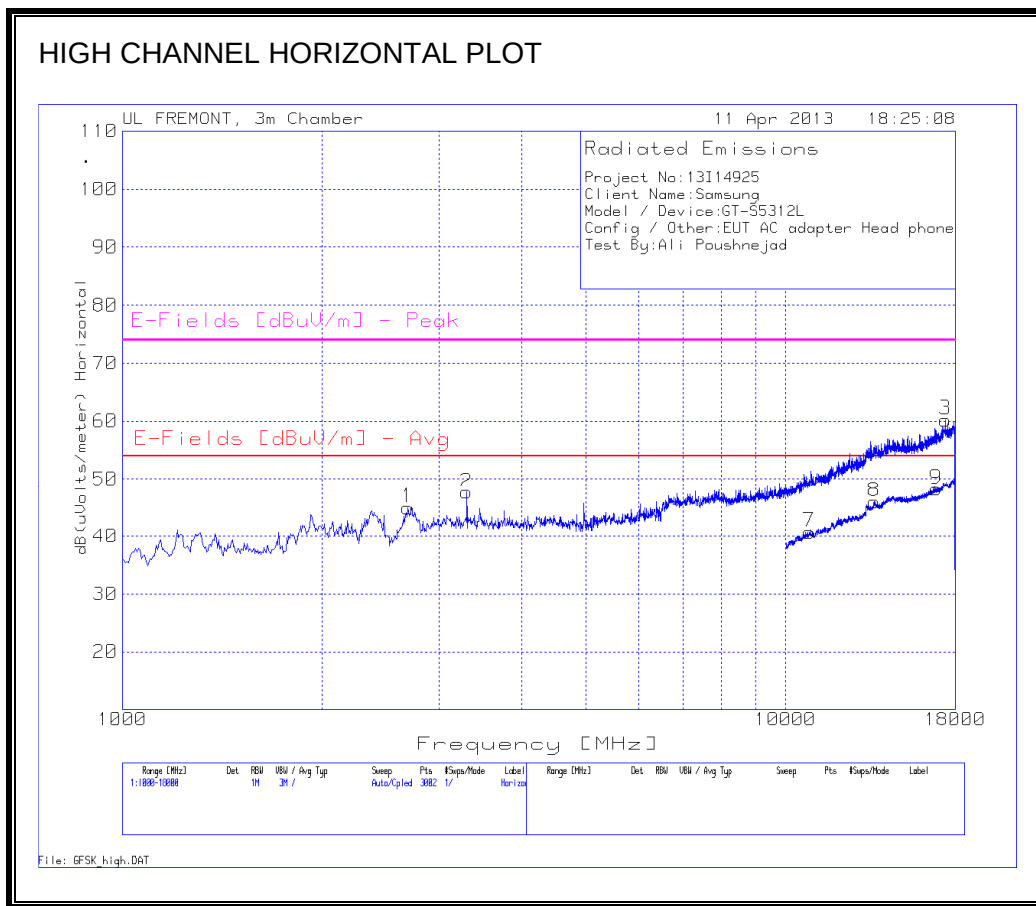
Project No:13I14925											
Client Name:Samsung											
Model / Device:GT-S5312L											
Config / Other:EUT AC adapter Head phone											
Test By:Ali Poushnejad											

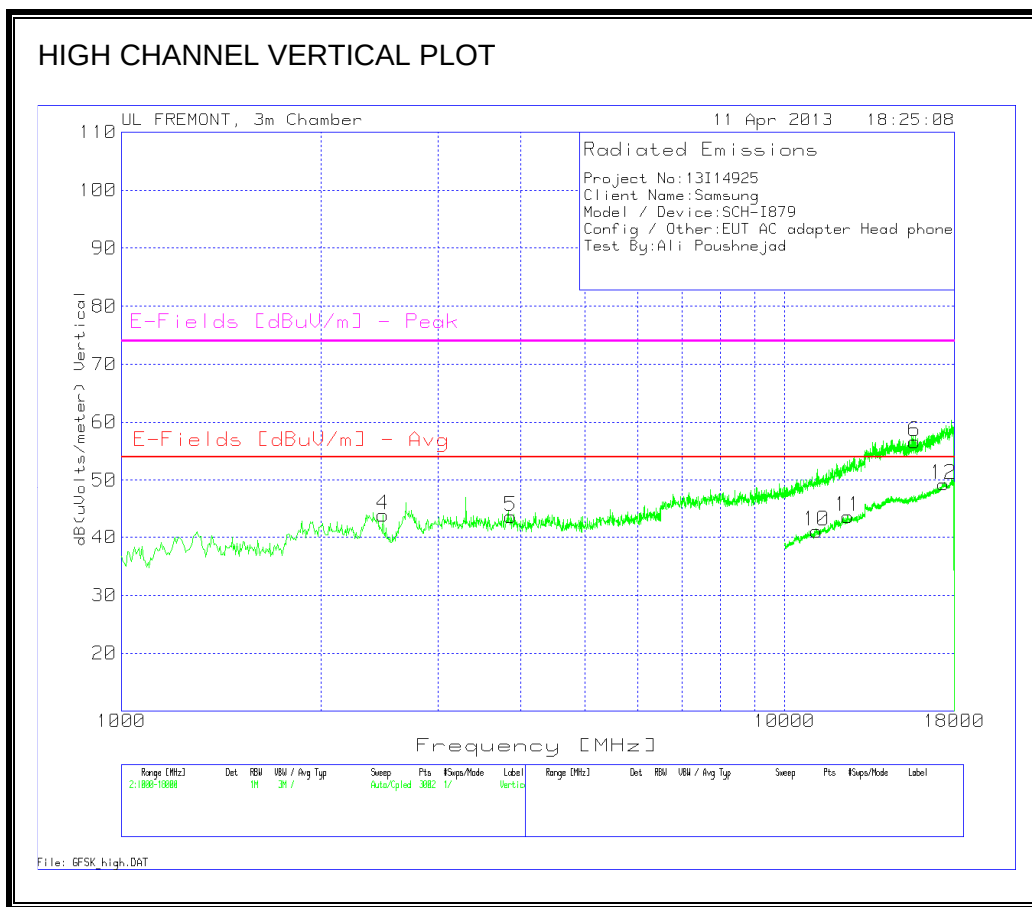
Horizontal 1000 - 18000MHz											
Marker No.	Test Frequency(MHz)	Meter Reading(dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
1	2744.171	39.37	PK	32.7	-28.9	0.9	44.07	-	-	74	-29.93
2	3253.831	42.49	PK	32.9	-27.9	0.5	47.99	-	-	74	-26.01
3	14556.96	31.84	PK	39.7	-16	0.4	55.94	-	-	74	-18.06

Vertical 1000 - 18000MHz											
Marker No.	Test Frequency(MHz)	Meter Reading(dBuV)	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)
4	2381.746	40.68	PK	32.1	-29.7	0.9	43.98	-	-	74	-30.02
5	6946.036	34.36	PK	35.6	-23.2	0.3	47.06	-	-	74	-26.94
6	15446.04	33.37	PK	40.2	-16.4	0.4	57.57	-	-	74	-16.43

Horizontal 10000 - 18000MHz											
Marker No.	Test Frequency(MHz)	Meter Reading(dBuV)	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)
7	11147.43	22.35	PK	37.9	-19.6	0.6	41.25	-	-	74	-32.75
8	13170.42	21.31	PK	39	-16.8	0.5	44.01	-	-	74	-29.99
9	17348.33	22.23	PK	41.3	-14.3	0.4	49.63	-	-	74	-24.37

Vertical 10000 - 18000MHz											
Marker No.	Test Frequency(MHz)	Meter Reading(dBuV)	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)
10	11771.11	22.01	PK	38.8	-19.1	0.5	42.21	-	-	74	-31.79
11	14385.81	22.41	PK	39.5	-15.8	0.4	46.51	-	-	74	-27.49
12	16408.8	22.49	PK	41	-16	0.4	47.89	-	-	74	-26.11





High Channel

Project No:13I14925											
Client Name:Samsung											
Model / Device:SCH-I879											
Config / Other:EUT AC adapter Head phone											
Test By:Ali Poushnejad											

Horizontal 1000 - 18000MHz											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
1	2693.205	40.34	PK	32.6	-29	0.9	44.84	53.97	-9.13	74	-29.16
2	3304.797	41.91	PK	32.9	-27.8	0.6	47.61	53.97	-6.36	74	-26.39
3	17416.722	32.62	PK	41.3	-14.3	0.6	60.22	53.97	6.25	74	-13.78

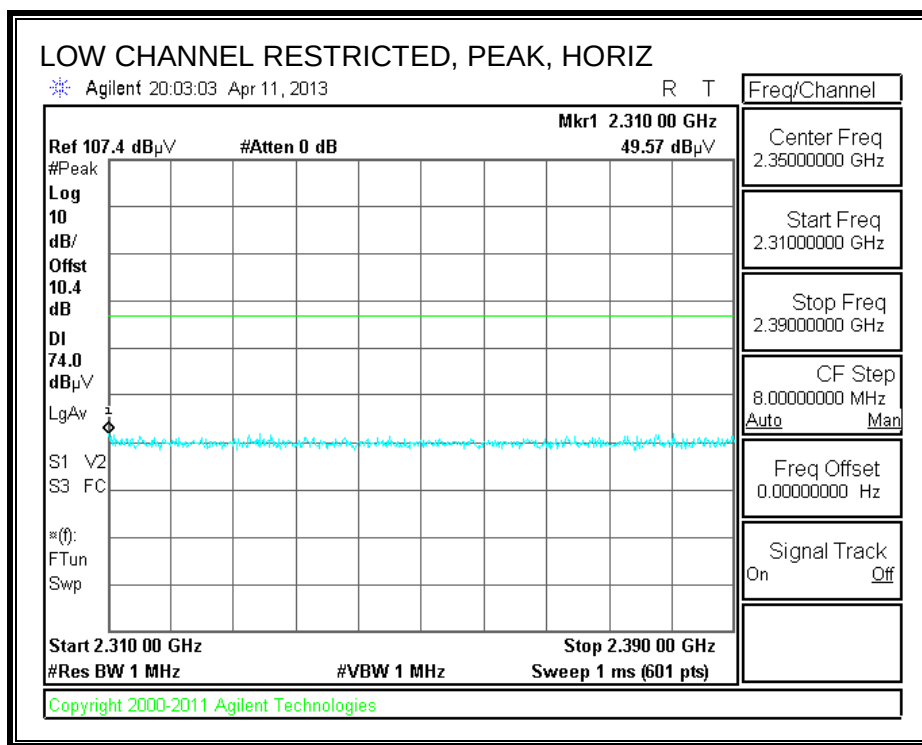
Vertical 1000 - 18000MHz											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
4	2478.015	40.29	PK	32.3	-29.6	0.9	43.89	53.97	-10.08	74	-30.11
5	3865.423	36.59	PK	33.2	-26.5	0.3	43.59	53.97	-10.38	74	-30.41
6	15689.54	32.44	PK	40.4	-16.5	0.3	56.64	53.97	2.67	74	-17.36

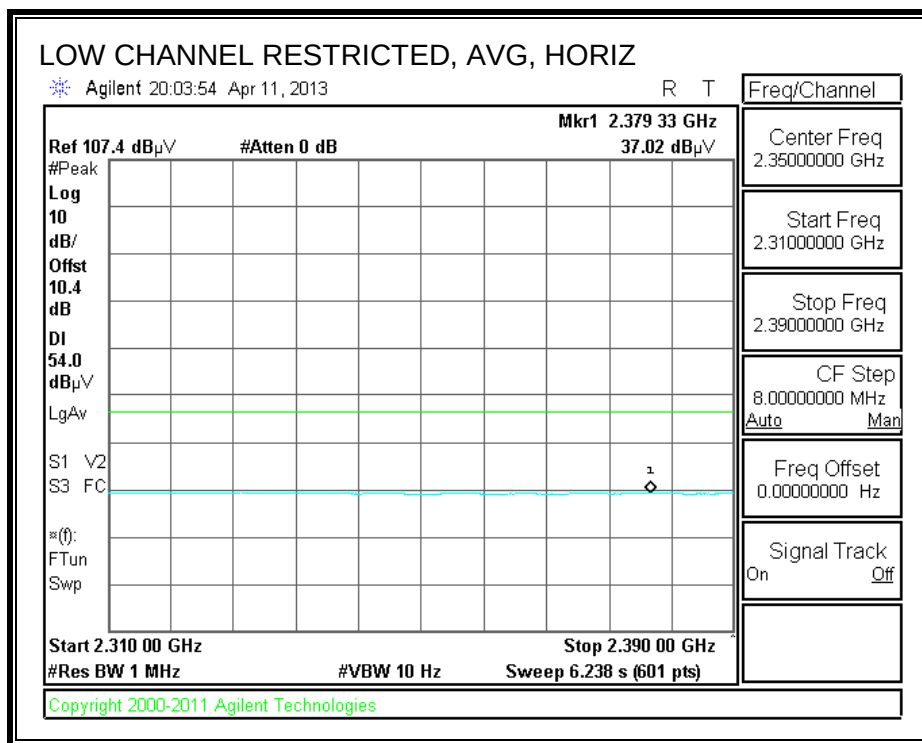
Horizontal 10000 - 18000MHz											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
7	10839.58	22.27	PK	37.9	-20.1	0.6	40.67	53.97	-13.3	74	-33.33
8	13598.201	22.82	PK	38.9	-16.1	0.4	46.02	53.97	-7.95	74	-27.98
9	16864.568	21.69	PK	41.1	-15	0.4	48.19	53.97	-5.78	74	-25.81

Vertical 10000 - 18000MHz											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
10	11163.418	22.12	PK	37.9	-19.6	0.6	41.02	53.97	-12.95	74	-32.98
11	12458.771	22.28	PK	39.1	-18.4	0.6	43.58	53.97	-10.39	74	-30.42
12	17364.318	21.75	PK	41.3	-14.3	0.5	49.25	53.97	-4.72	74	-24.75

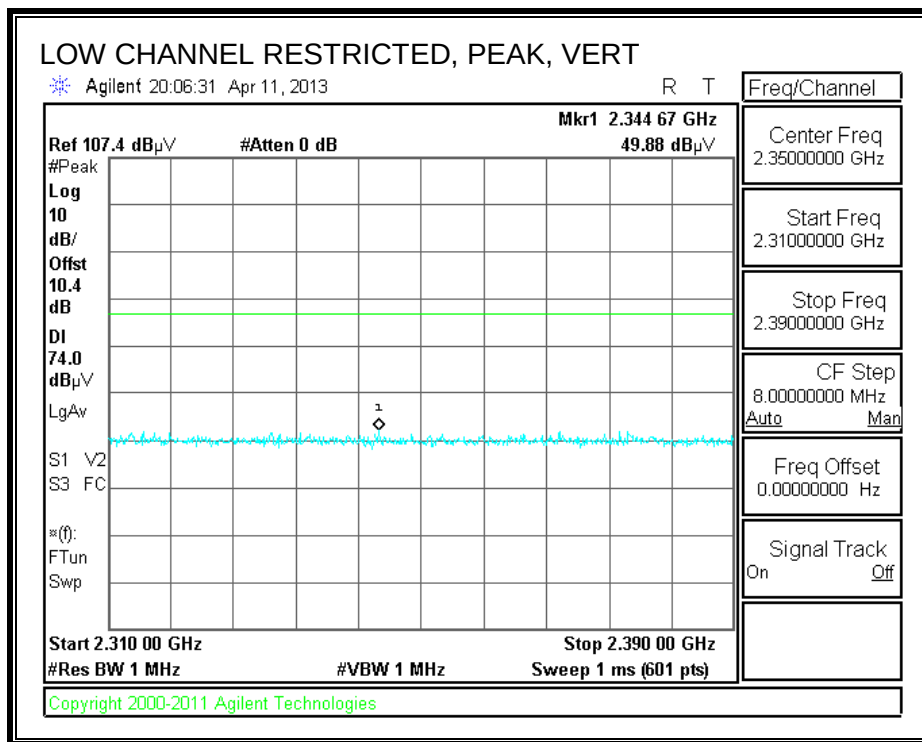
8.2.2. ENHANCED DATA RATE 8PSK MODULATION

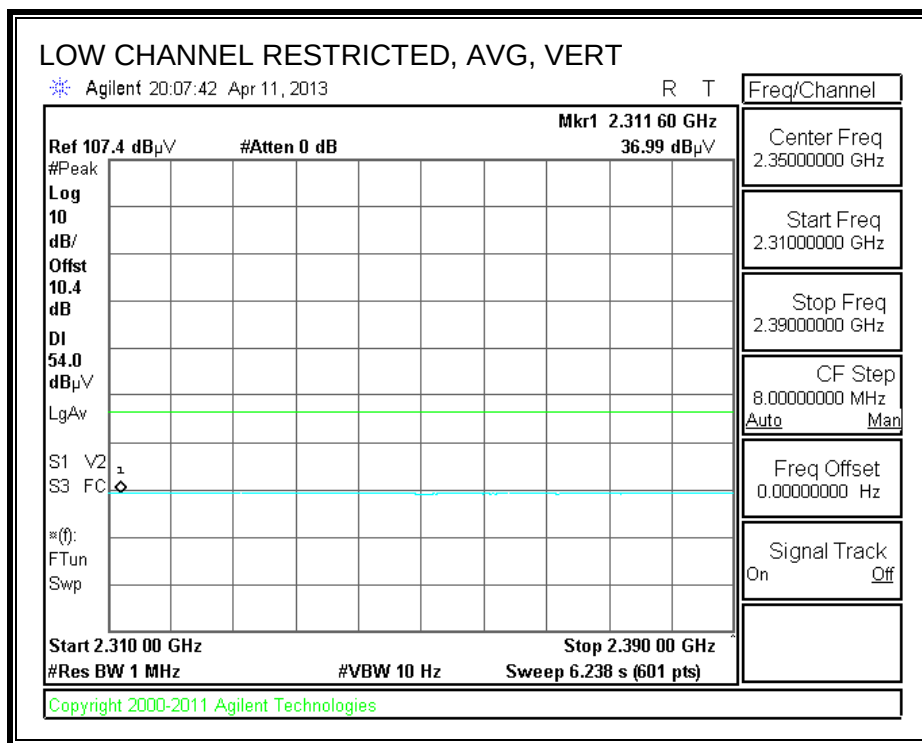
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



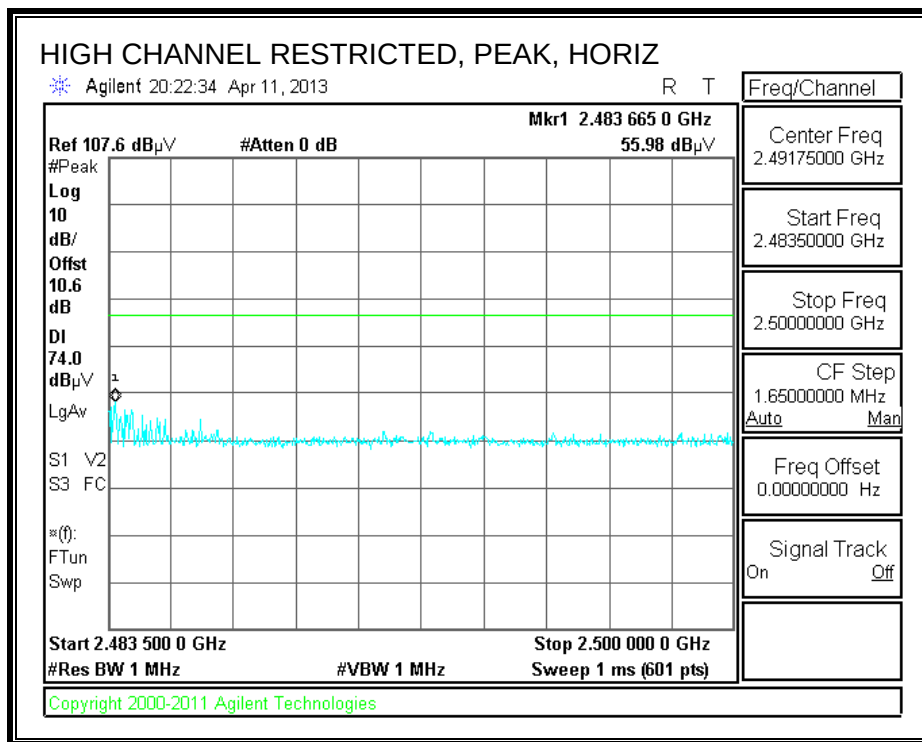


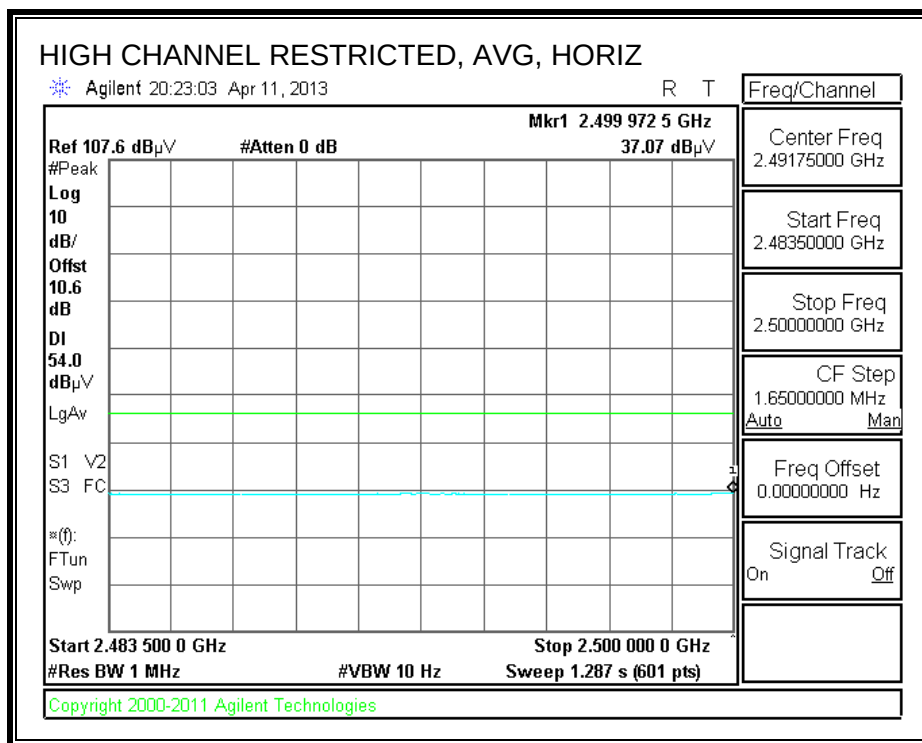
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



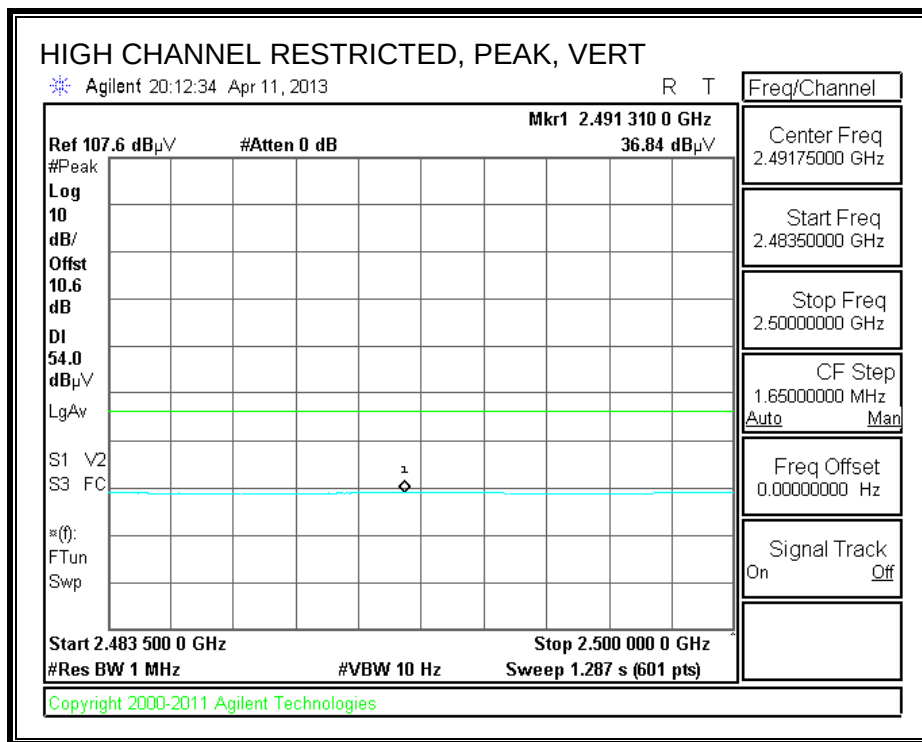


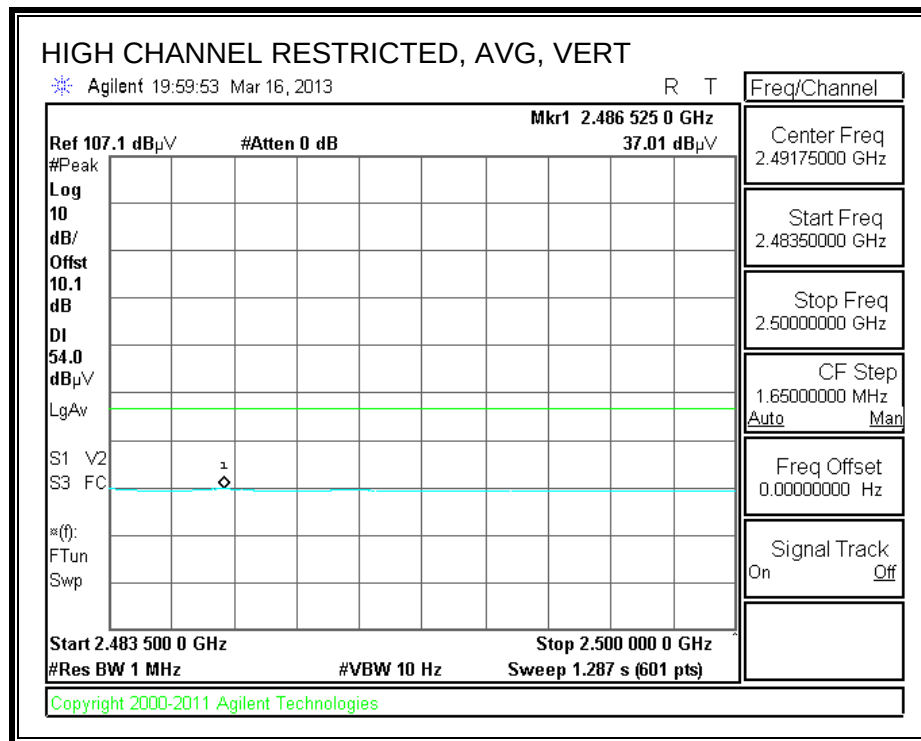
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



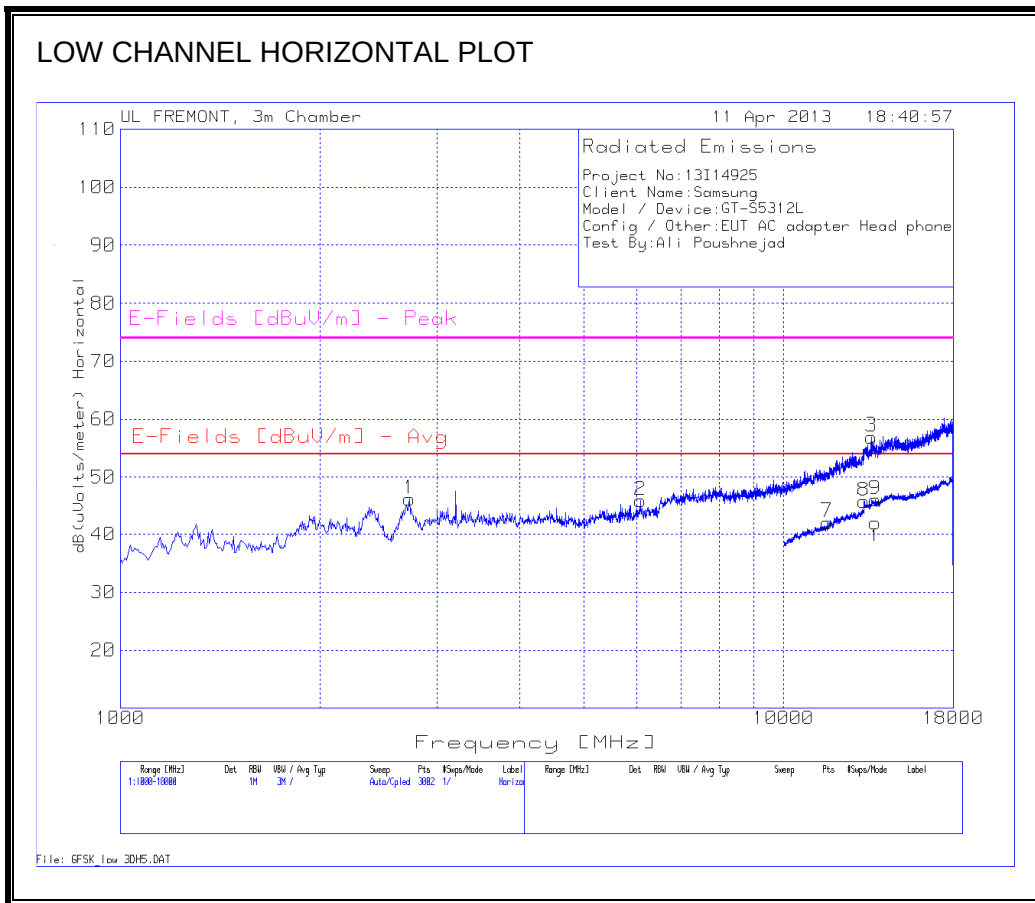


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

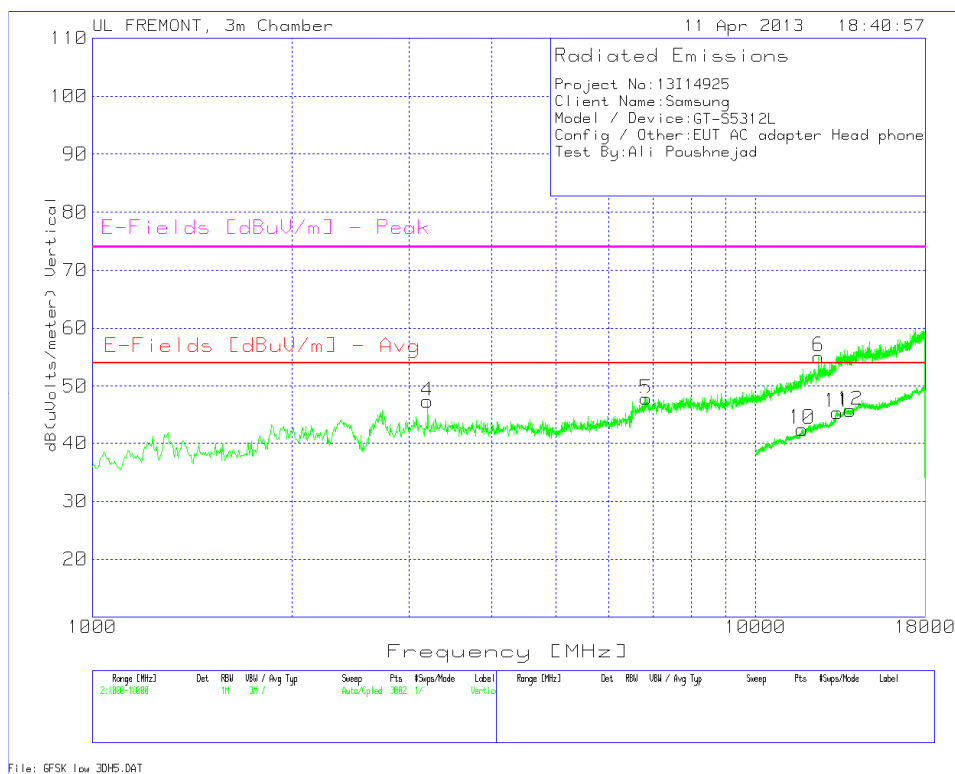




HARMONICS AND SPURIOUS EMISSIONS



LOW CHANNEL VERTICAL PLOT



Low Channel

Project No:1314925													
Client Name:Samsung													
Model / Device:SCH-I879													
Config / Other:EUT AC adapter Head phone													
Test By:Ali Poushnejad													

Horizontal 1000 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
1	2727.182	41.65	PK	32.6	-29	0.9	46.15	54	-7.85	74	-27.85		
2	6079.614	34.32	PK	35.3	-24	0.2	45.82	54	-8.18	74	-28.18		
3	13565.956	33.87	PK	38.9	-16.2	0.4	56.97	54	2.97	74	-17.03		

Vertical 1000 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
4	3202.865	42.06	PK	32.9	-28.1	0.4	47.26	54	-6.74	74	-26.74		
5	6844.104	35.04	PK	35.6	-23.2	0.3	47.74	54	-6.26	74	-26.26		
6	12439.041	33.97	PK	39.1	-18.4	0.4	55.07	54	1.07	74	-18.93		

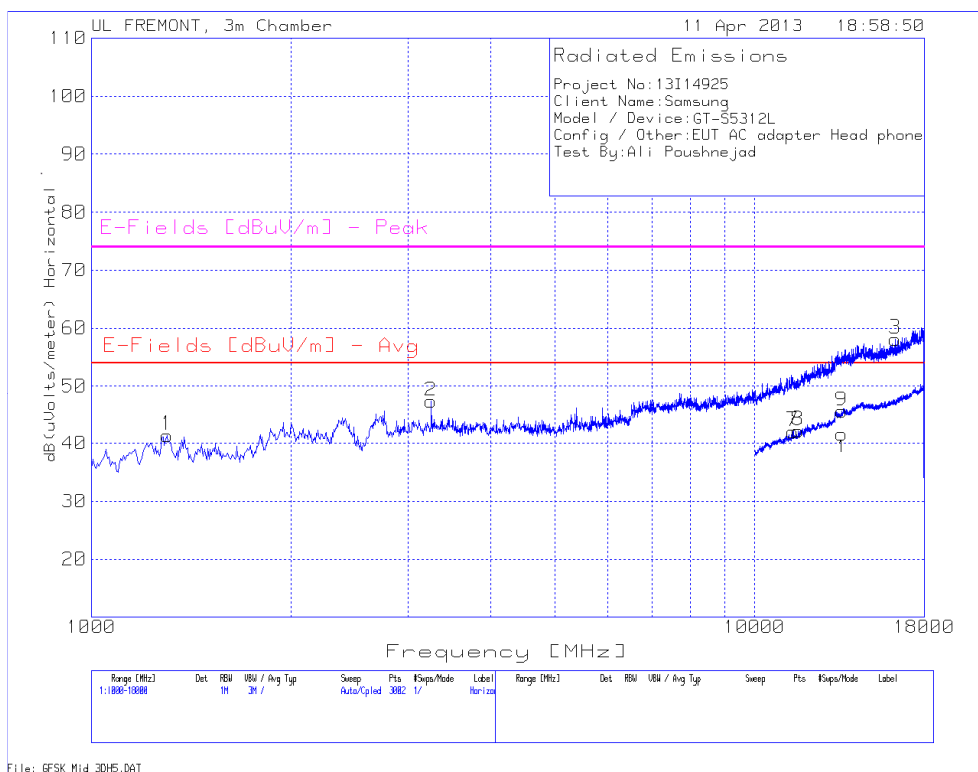
Horizontal 10000 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
7	11627.186	22.12	PK	38.5	-19.3	0.7	42.02	54	-11.98	74	-31.98		
8	13210.395	22.84	PK	39.1	-16.7	0.4	45.64	54	-8.36	74	-28.36		
9	13738.131	22.74	PK	38.8	-16	0.4	45.94	54	-8.06	74	-28.06		

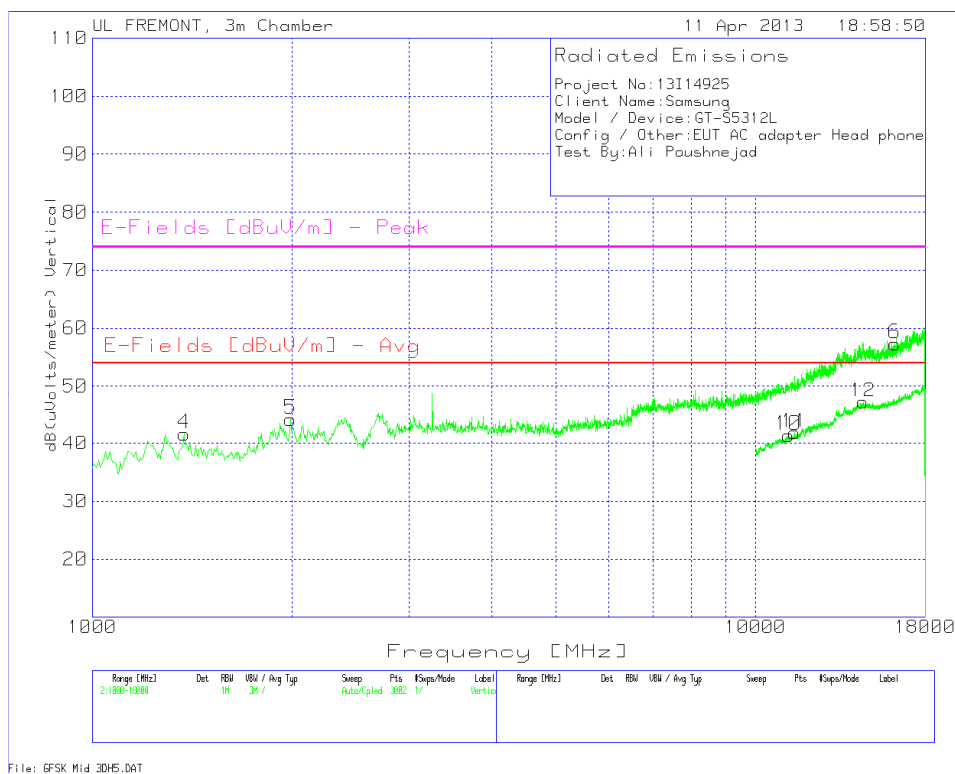
Vertical 10000 - 18000MHz

Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
10	11755.122	22	PK	38.8	-19.1	0.7	42.4	54	-11.6	74	-31.6		
11	13274.363	22.53	PK	39.1	-16.7	0.4	45.33	54	-8.67	74	-28.67		
12	13894.053	22.4	PK	38.8	-15.9	0.4	45.7	54	-8.3	74	-28.3		

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



Mid Channel

Project No:13114925

Client Name:Samsung

Model / Device:GT-S5312L

Config / Other:EUT AC adapter Head phone

Test By:Ali Poushnejad

Horizontal 1000 - 18000MHz

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)
1	1300.133	43.59	PK	30.2	-32.9	0.4	41.29	-	-	74	-32.71
2	3253.831	41.8	PK	32.9	-27.9	0.5	47.3	-	-	74	-26.7
3	16306.795	33.19	PK	40.9	-16.3	0.3	58.09	-	-	74	-15.91

Vertical 1000 - 18000MHz

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)
4	1373.751	44.42	PK	29.4	-32.6	0.4	41.62	-	-	74	-32.38
5	1991.006	42.27	PK	31.6	-30.7	0.9	44.07	-	-	74	-29.93
6	16199.201	32.55	PK	40.6	-16.2	0.4	57.35	-	-	74	-16.65

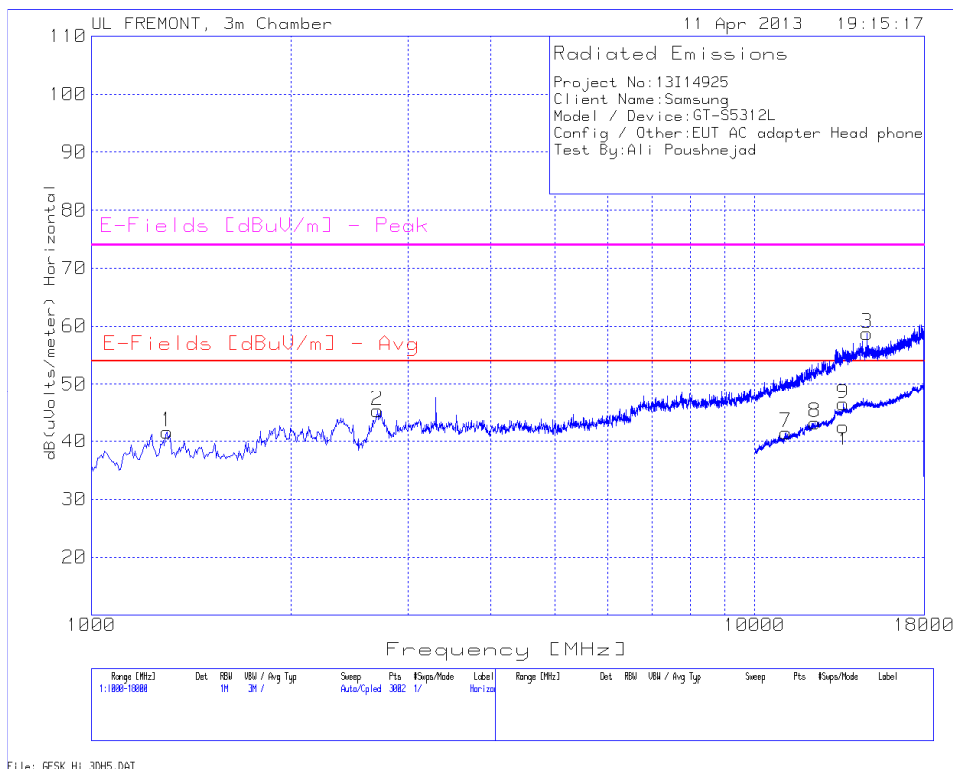
Horizontal 10000 - 18000MHz

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)
7	11411.294	22.66	PK	38.1	-19.4	0.7	42.06	-	-	74	-31.94
8	11639.18	22.48	PK	38.5	-19.3	0.5	42.18	-	-	74	-31.82
9	13538.231	22.55	PK	38.9	-16.3	0.4	45.55	-	-	74	-28.45

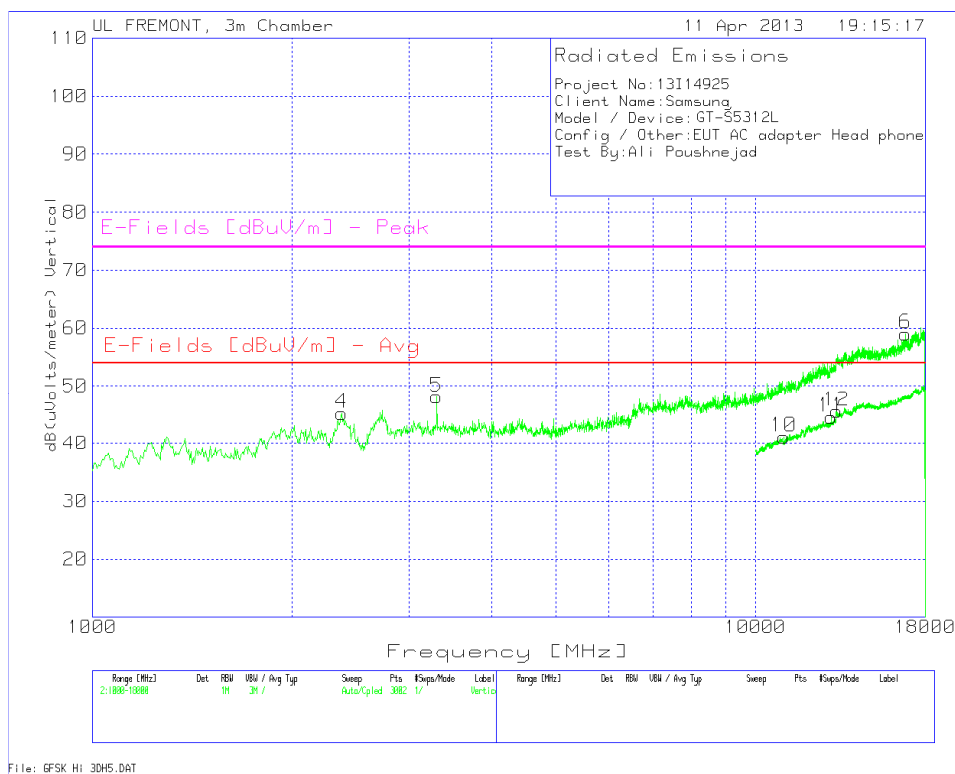
Vertical 10000 - 18000MHz

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)
10	11191.404	22.31	PK	37.9	-19.6	0.7	41.31	-	-	74	-32.69
11	11455.272	22.4	PK	38.2	-19.4	0.6	41.8	-	-	74	-32.2
12	14509.745	23.12	PK	39.6	-16	0.4	47.12	-	-	74	-26.88

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



Project No:	13\14925
Client Name:	Samsung
Model / Device:	SCH-I879
Config / Other:	EUT AC adapter Head phone
Test By:	Ali Poushnejad

Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(μV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
1	1300.133	43.85	PK	30.2	-32.9	0.4	41.55	54	-12.45	74	-32.45		
2	2698.867	40.74	PK	32.6	-29	0.9	45.24	54	-8.76	74	-28.76		
3	14772.152	34.71	PK	39.7	-16	0.4	58.81	54	4.81	74	-15.19		

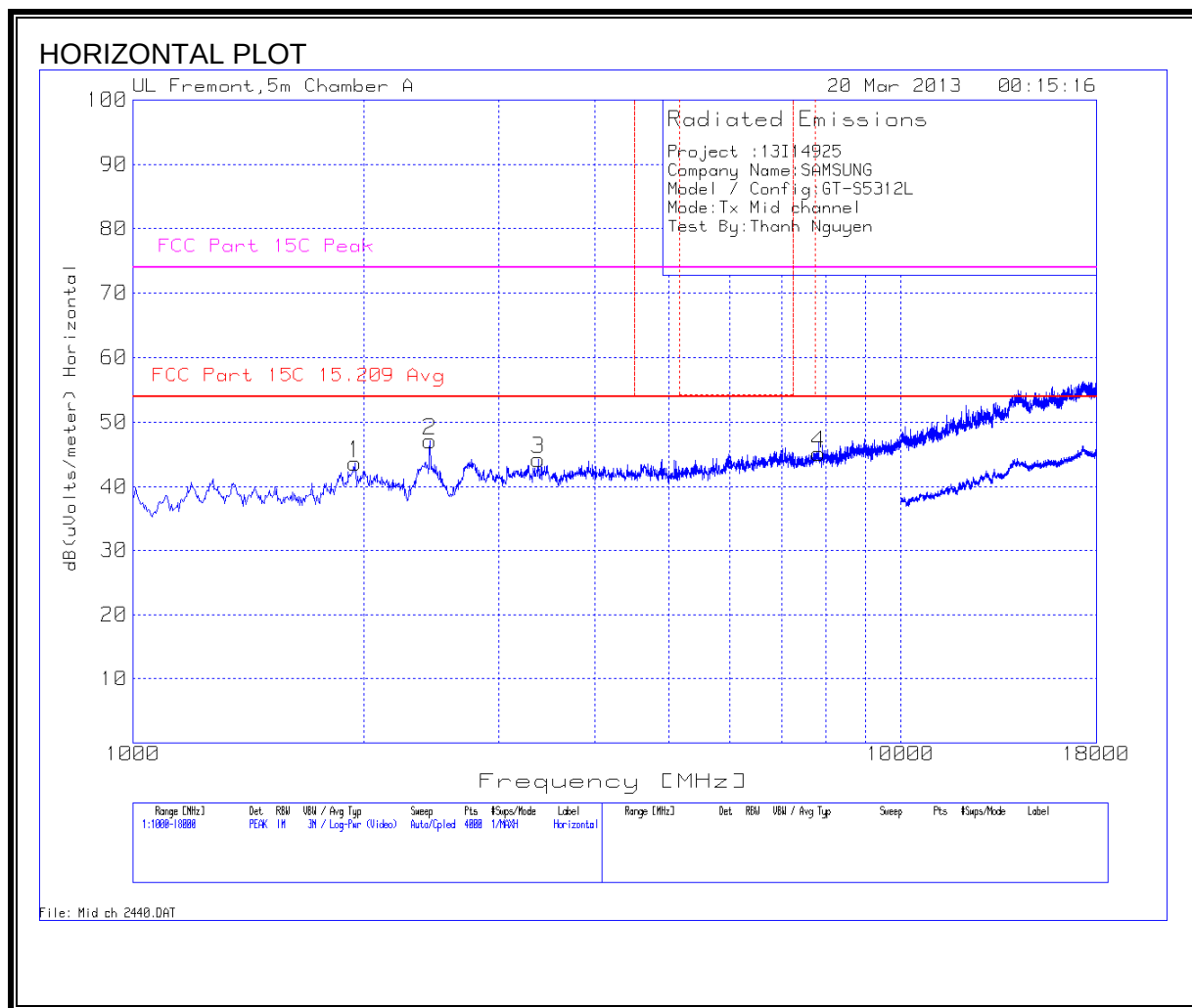
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(μV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
4	2376.083	42.01	PK	32	-29.7	0.9	45.21	54	-8.79	74	-28.79		
5	3304.797	42.36	PK	32.9	-27.8	0.6	48.06	54	-5.94	74	-25.94		
6	16793.804	32.56	PK	41.1	-15.1	0.5	59.06	54	5.06	74	-14.94		

Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(μV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
7	11155.422	22.5	PK	37.9	-19.6	0.7	41.5	54	-12.5	74	-32.5		
8	12318.841	22.35	PK	39	-18.6	0.4	43.15	54	-10.85	74	-30.85		
9	13602.199	23.27	PK	38.9	-16.1	0.4	46.47	54	-7.53	74	-27.53		

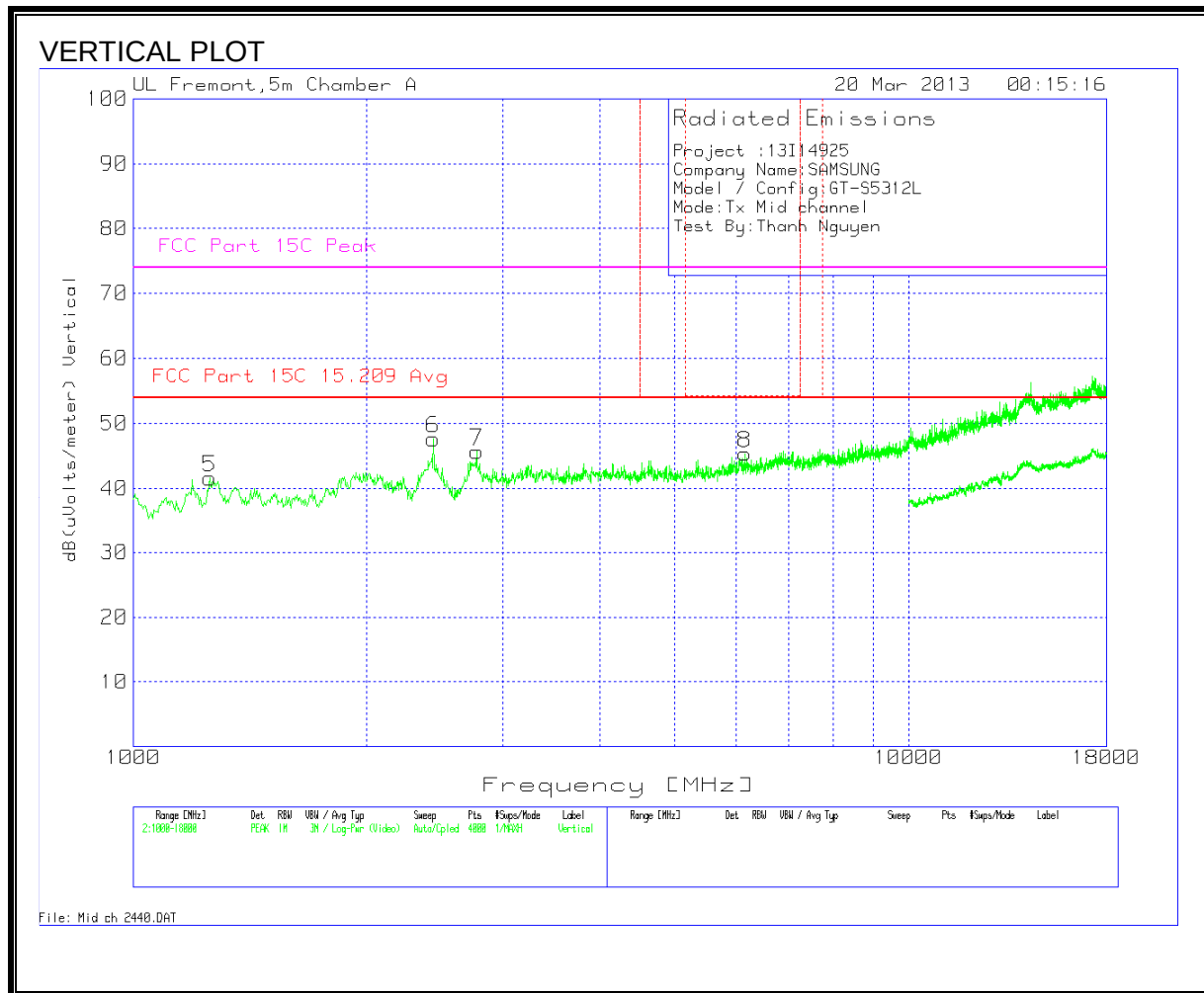
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(μV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
10	11015.492	22.39	PK	37.9	-19.8	0.6	41.09	54	-12.91	74	-32.91		
11	12986.507	22.07	PK	39.1	-17.1	0.4	44.47	54	-9.53	74	-29.53		
12	13230.385	22.76	PK	39.1	-16.7	0.4	45.56	54	-8.44	74	-28.44		

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)



Project :13I14925										
Company Name:SAMSUNG										
Model / Config:GT-S5312L										
Mode:Tx worst case										
Test By:Thanh Nguyen										
Horizontal 30 - 1000MHz										
Marker No.	Test Frequency	Meter Reading	Detector	T185 Antenna Factor	T64 preamp/ cable loss loop	dB(uV/s/meter)	Part 15C 15.209 3m	Margin	Height [cm]	Polarity
1	71.4364	35.43	PK	8.1	-27.2	16.33	40	-23.67	300	Horz
2	87.1871	37.02	PK	7.6	-27.2	17.42	40	-22.58	200	Horz
3	157.4594	37.57	PK	12.2	-26.6	23.17	43.5	-20.33	100	Horz
4	305.2735	33.78	PK	13.5	-25.8	21.48	46	-24.52	200	Horz
Vertical 30 - 1000MHz										
Marker No.	Test Frequency	Meter Reading	Detector	T185 Antenna Factor	T64 preamp/ cable loss loop	dB(uV/s/meter)	Part 15C 15.209 3m	Margin	Height [cm]	Polarity
5	30	29.69	PK	21	-27.7	22.99	40	-17.01	400	Vert
6	62.713	37.59	PK	7.4	-27.3	17.69	40	-22.31	400	Vert
7	157.4594	33.5	PK	12.2	-26.6	19.1	43.5	-24.4	200	Vert
8	198.8958	33.45	PK	12.1	-26.2	19.35	43.5	-24.15	200	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.

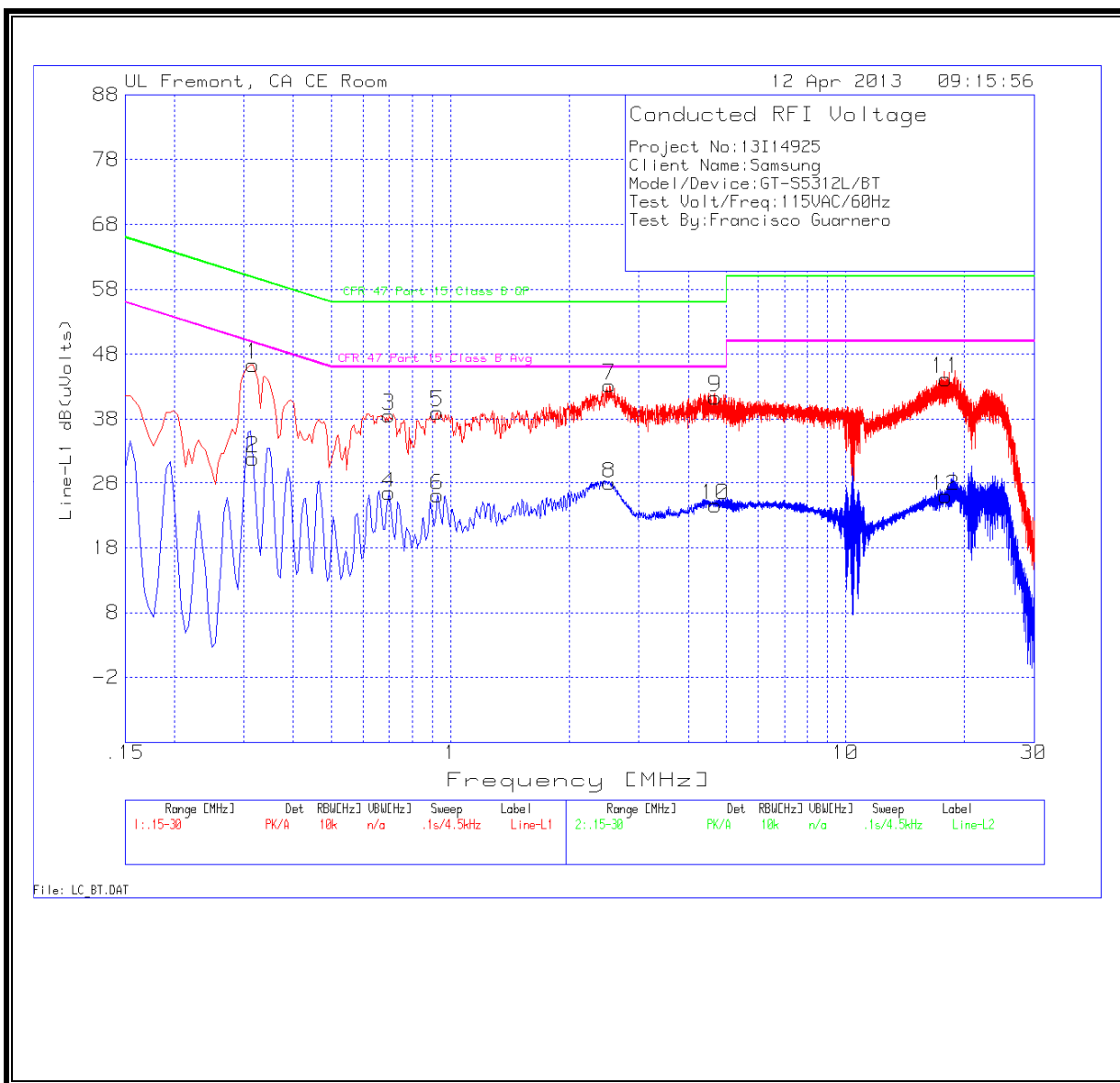
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

Project No:13I14925									
Client Name:SAMSUNG									
Model/Device:GT-S5312L									
Test Volt/Freq:115V/ 60Hz									
Test By:Thanh Nguyen									
Line-L1 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.1545	50.29	PK	0.1	0	50.39	65.8	-15.41	-	-
0.1545	31.67	Av	0.1	0	31.77	-	-	55.8	-24.03
0.357	45.27	PK	0.1	0	45.37	58.8	-13.43	-	-
0.357	34.83	Av	0.1	0	34.93	-	-	48.8	-13.87
2.103	41.9	PK	0.1	0.1	42.1	56	-13.9	-	-
2.103	26.09	Av	0.1	0.1	26.29	-	-	46	-19.71
0.8205	37.1	PK	0.1	0	37.2	56	-18.8	-	-
0.8205	19.5	Av	0.1	0	19.6	-	-	46	-26.4
Line-L2 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.2895	42.48	PK	0.1	0	42.58	60.5	-17.92	-	-
0.2895	19.61	Av	0.1	0	19.71	-	-	50.5	-30.79
2.0715	39.78	PK	0.1	0.1	39.98	56	-16.02	-	-
2.0715	24.53	Av	0.1	0.1	24.73	-	-	46	-21.27
20.8095	43.2	PK	0.3	0.2	43.7	60	-16.3	-	-
20.8095	19.38	Av	0.3	0.2	19.88	-	-	50	-30.12

LINE 1 RESULTS



LINE 2 RESULTS

