



**FCC 47 CFR PART 15 SUBPART C**

**CERTIFICATION TEST REPORT  
FOR**

**GSM/WCDMA Phone + Bluetooth & WLAN (2.4GHz & 5GHz) and NFC**

**MODEL NUMBER: SM-N9008V**

**FCC ID: A3LSMN9008V**

**REPORT NUMBER: 13U16263-2, Revision A**

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*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

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	10/24/13	Initial Issue	P. Kim
A	11/21/13	Updated test date and the power in section 8.5 and 8.6	P. Kim

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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 A/B/G/N 1X1 HT20,+ BT4.0 (LE)+ GSM1900/WCDMA850  
& 1900MHz/ NFC BAR PHONE

**MODEL:** SM-N9008V

**SERIAL NUMBER:** FK-314-A, FK-314-C, FK-314-D, FK-314-E, FK-314-F & FK-314-G

**DATE TESTED:** OCTOBER 22 - NOVEMBER 21, 2013

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

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 Verification Services Inc. By:

Tested By:



PHILIP KIM  
WiSE PROGRAM MANAGER  
UL Verification Services Inc.

KIYA KEDIDA  
WiSE LAB TECHNICIAN  
UL Verification Services Inc.

## 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.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL Verification Services Inc. 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 GSM/WCDMA Phone Bluetooth, WLAN(2.4GHz & 5GHz) and NFC

### 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	9.96	9.91
2402 - 2480	Enhanced 8PSK	8.83	7.64

Note: GFSK, Pi/4-DQPSK, 8PSK average Power are all investigated, The GFSK & 8PSK Power are the worst case. Testing is based on this mode to showing compliance. For average power data please refer to section 8.6.

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -3.7 dBi.

### 5.4. SOFTWARE AND FIRMWARE

Software version was hltezm-eng 4.3 JSS15J.

The firmware used was N9008VZMEBMJ4.

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## 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 Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG	EP-TA10CBC	SE1D802AS/B-E	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

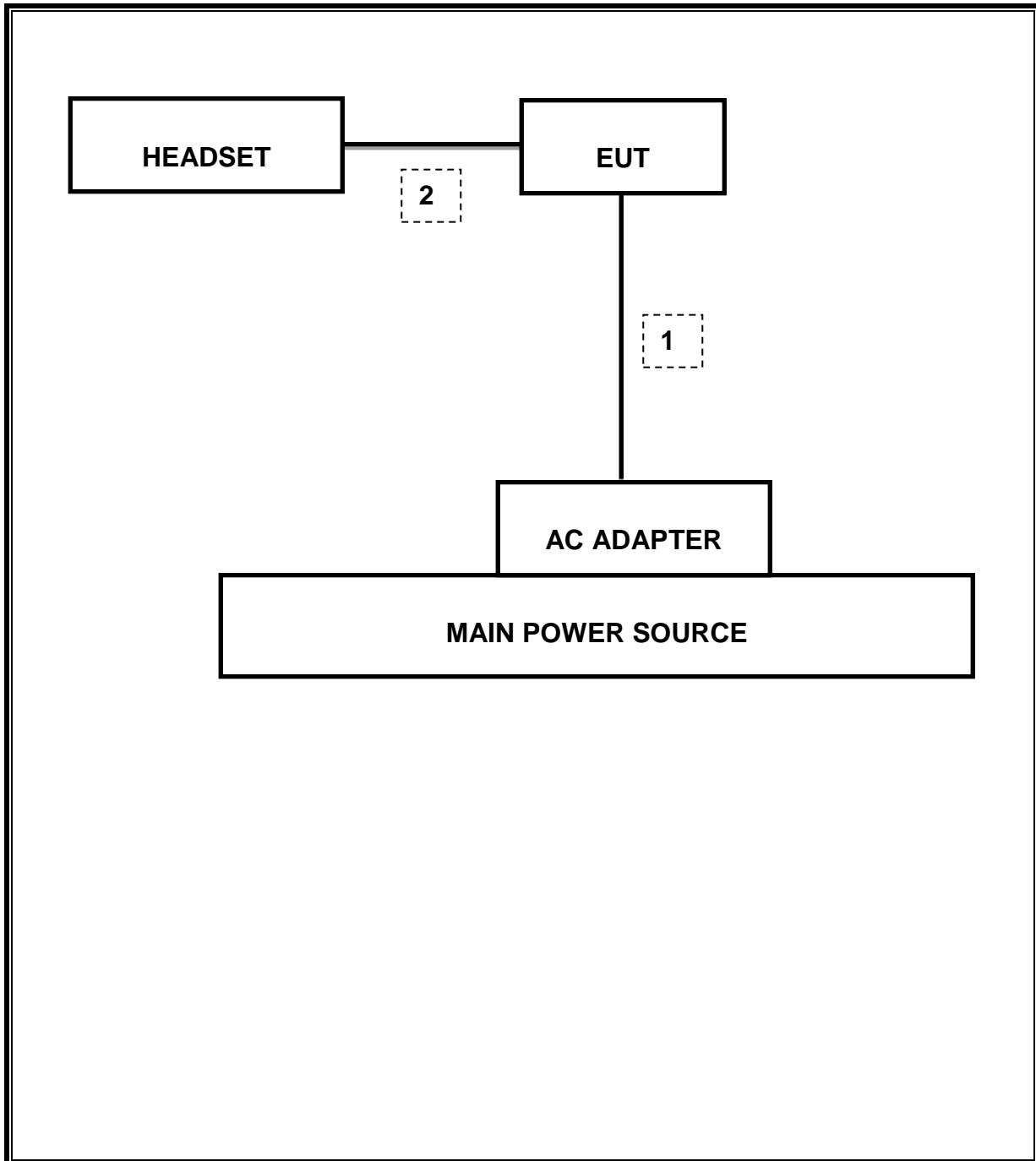
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

### TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests. EUT was set in the Hidden menu mode to enable BT communications.

**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	03/23/12	02/13/14
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/13	10/25/14
Antenna, Horn, 25.5 GHz	ARA	MWH-1826/B	C00980	11/14/12	11/14/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/13	01/28/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/13	10/22/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/12	12/20/13
CBT Bluetooth Tester	R & S	CBT	None	07/12/13	07/12/14
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/12	12/13/13
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/12	12/13/13
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/13	01/14/14
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR	CNR

## 7. SUMMARY TABLE

RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
RSS-GEN 4.6	Occupied Band width (99%)	N/A	Conducted	Pass	1.259MHz
RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-47.69dBm
RSS-210 A8.4	TX conducted output power	<21dBm		Pass	9.96dBm
RSS-210 A8.1(b)	Hopping frequency separation	> 25KHz		Pass	1MHz
RSS-210 A8.1(d)	Number of Hopping channels	More than 15 non-overlapping channels		Pass	79
RSS-210 A8.1(d)	Avg Time of Occupancy	< 0.4sec		Pass	0.377
RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	43.93dBuV
RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	39.43dBuV/m

## 8. ANTENNA PORT TEST RESULTS

### 8.1. 20 dB AND 99% BANDWIDTH

#### LIMIT

None; for reporting purposes only.

#### TEST PROCEDURE

DA 00-705: 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

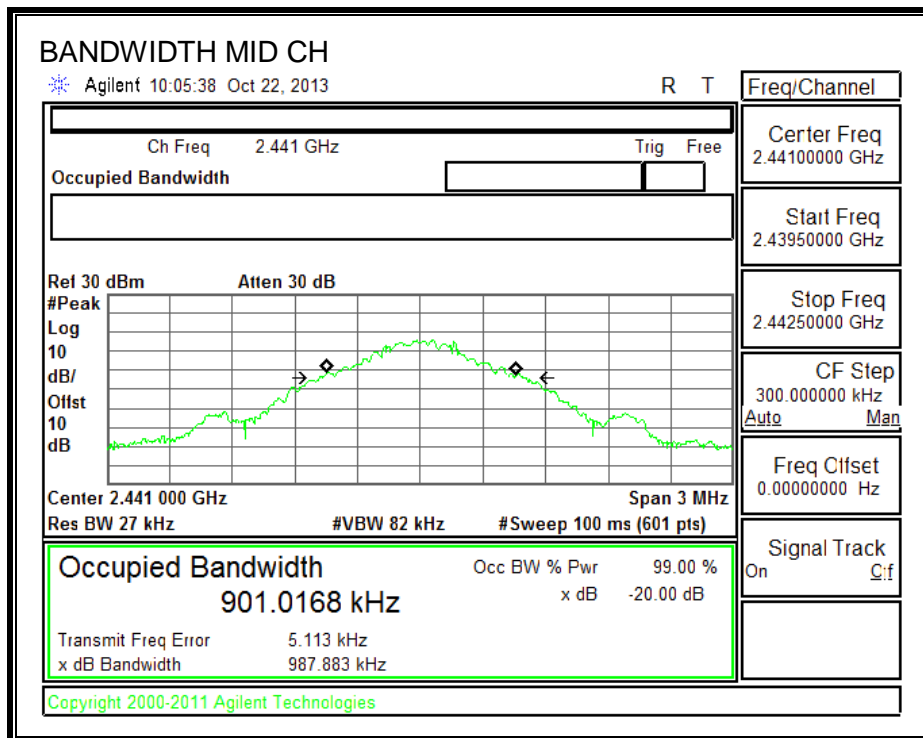
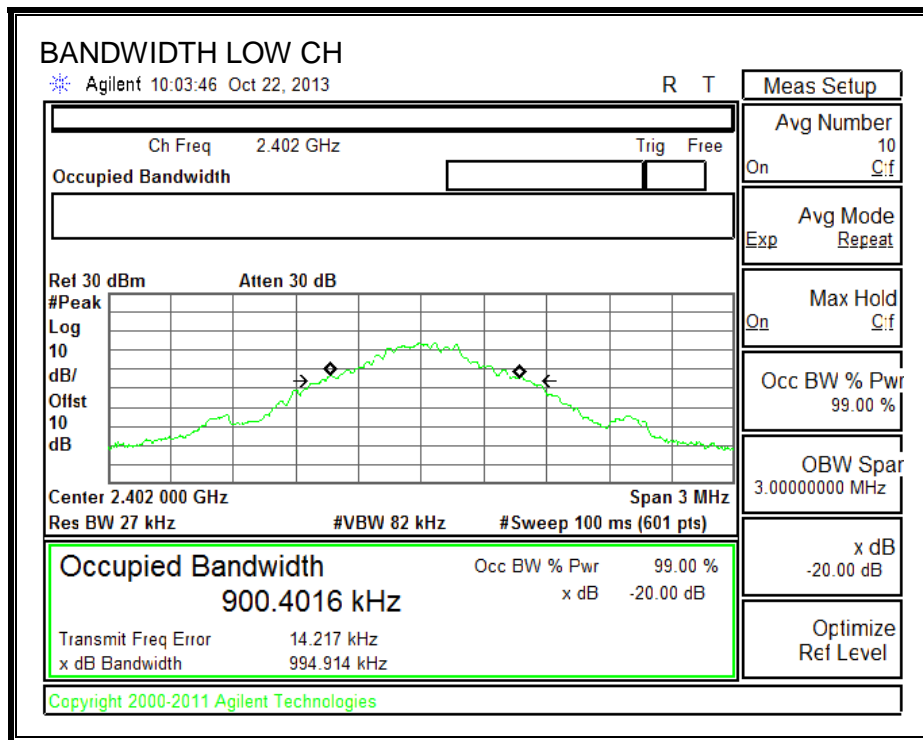
##### 8.1.1. BASIC DATA RATE GFSK MODULATION

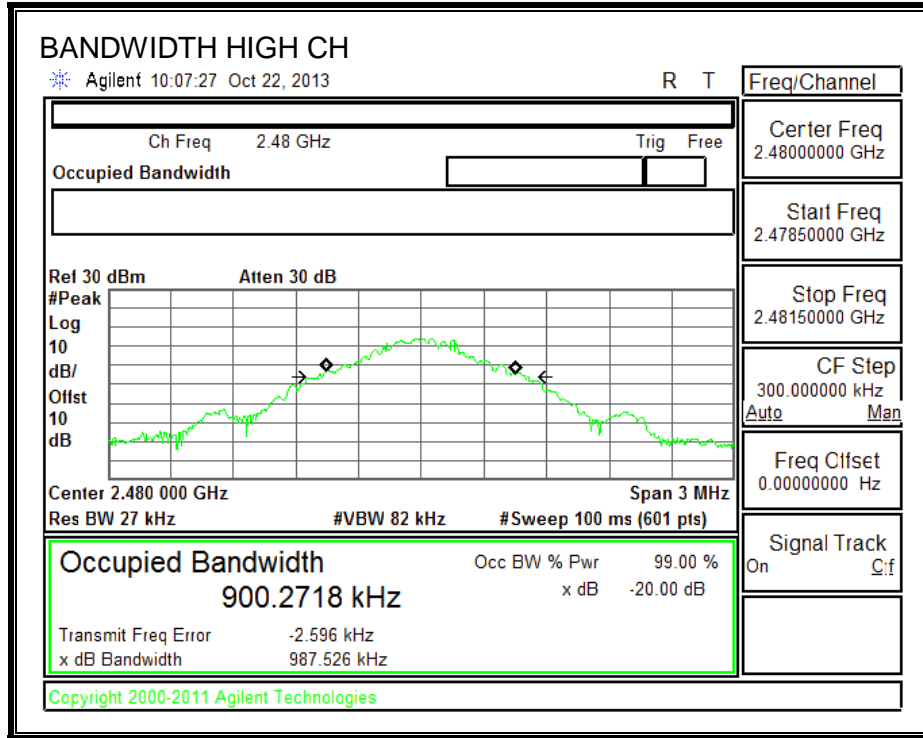
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.994	0.9
Middle	2441	0.987	0.9
High	2480	0.987	0.901
Worst		0.994	0.901

##### 8.1.1. ENHANCED DATA RATE 8PSK MODULATION

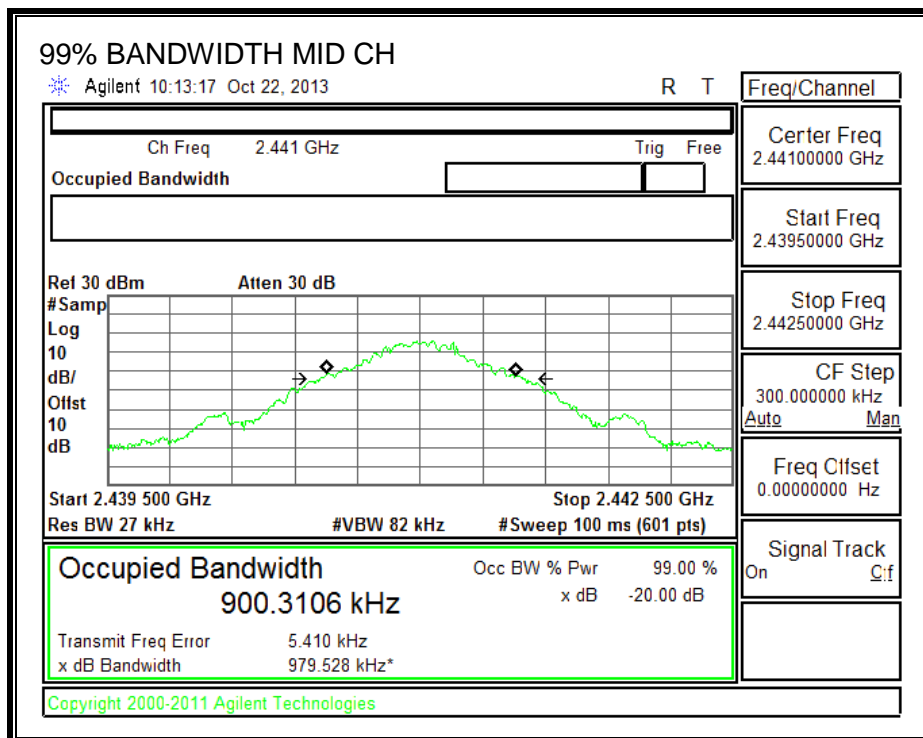
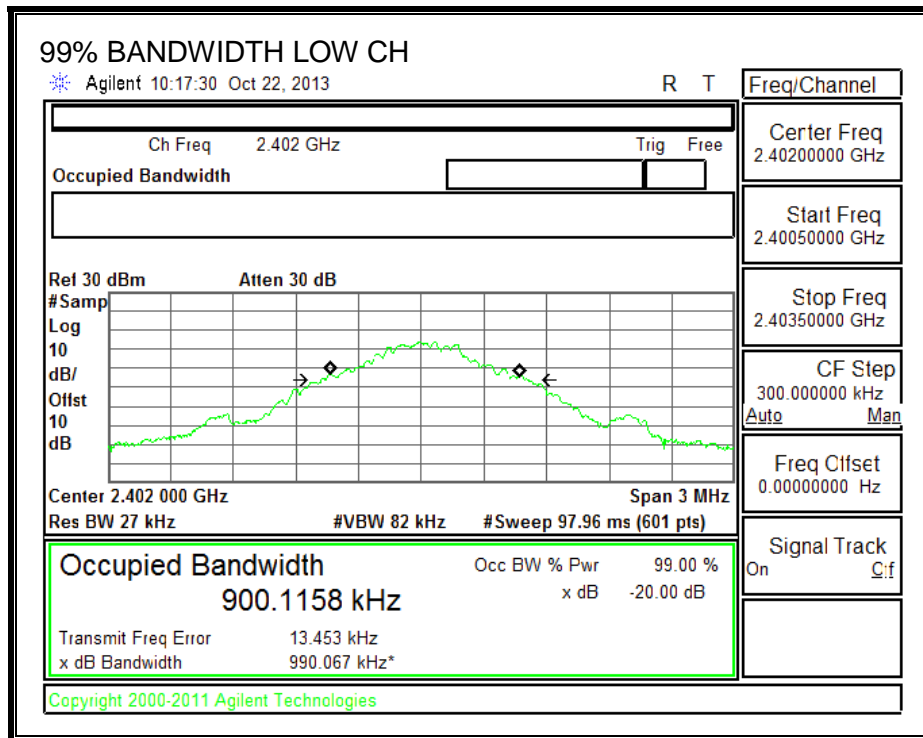
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.344	1.259
Middle	2441	1.345	1.173
High	2480	1.345	1.229
Worst		1.345	1.259

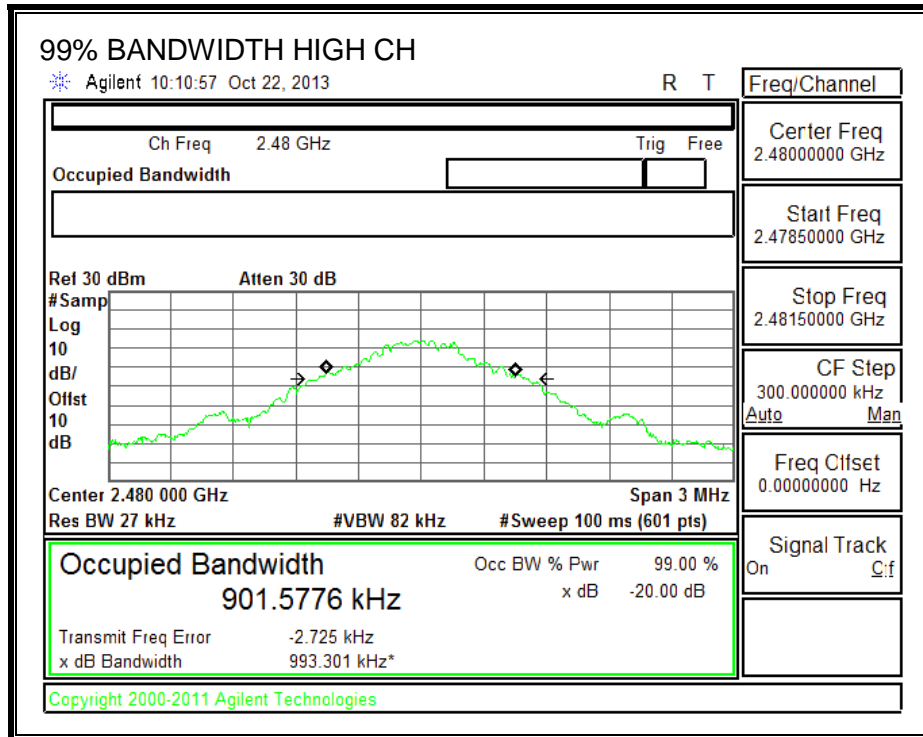
**GFSK 20 dB BANDWIDTH**



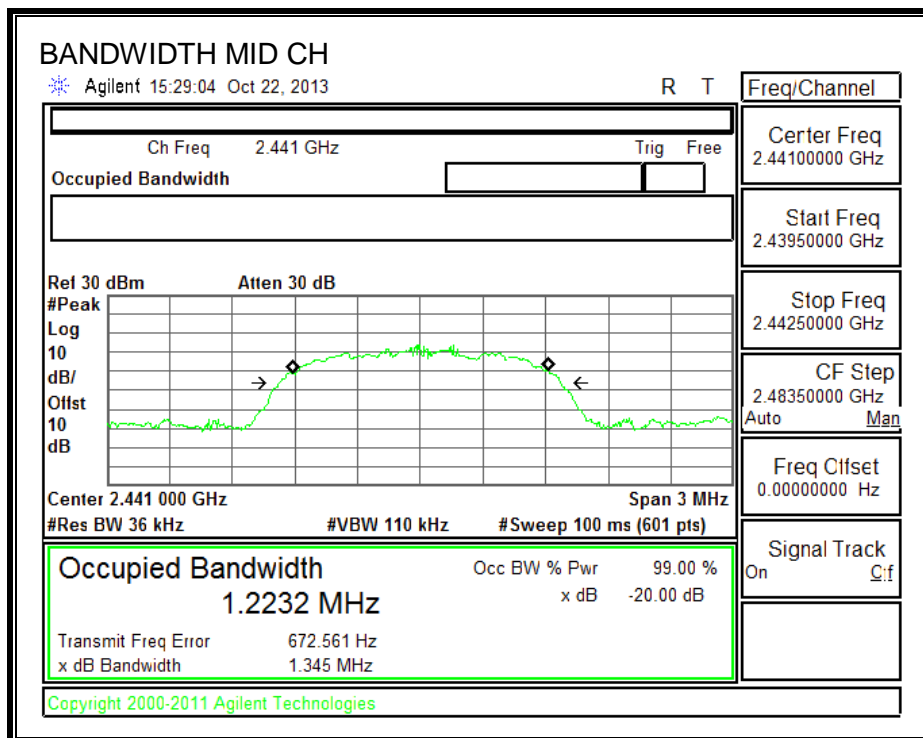
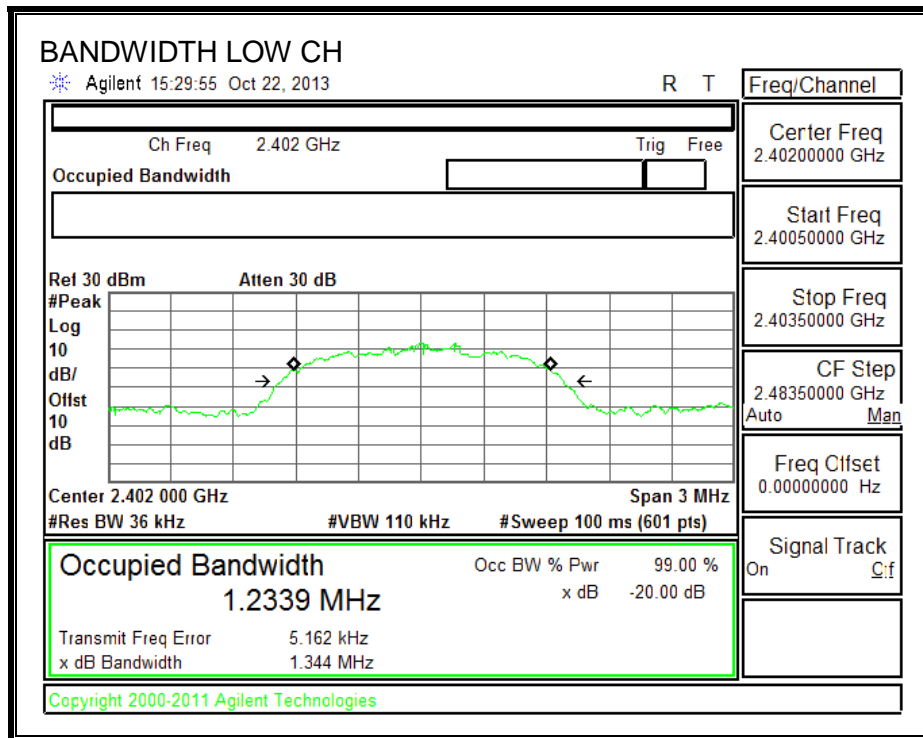


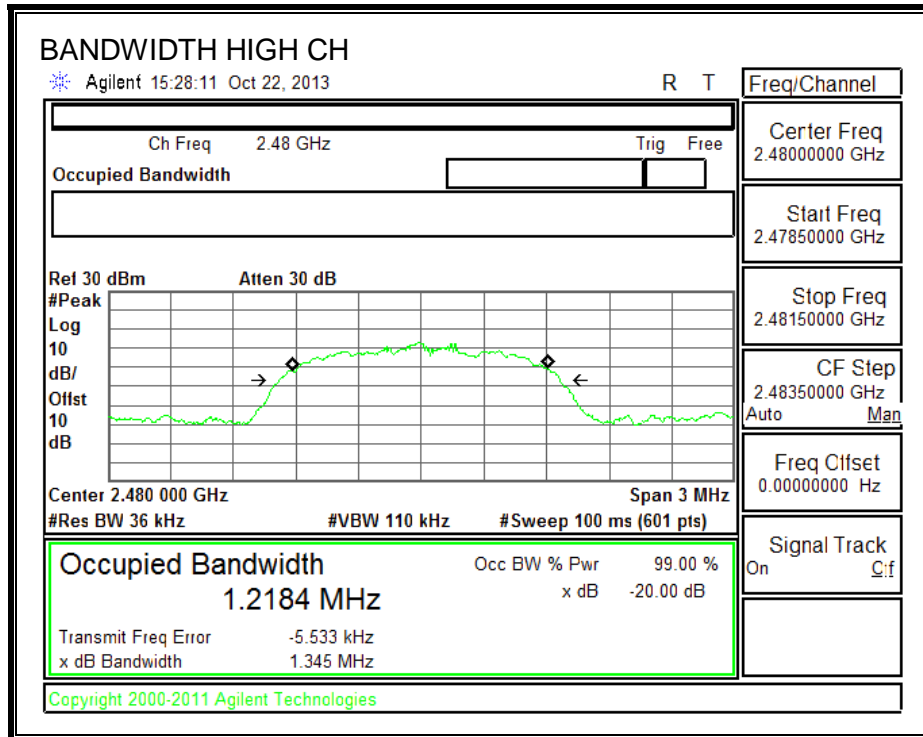
**GFSK 99% BANDWIDTH**



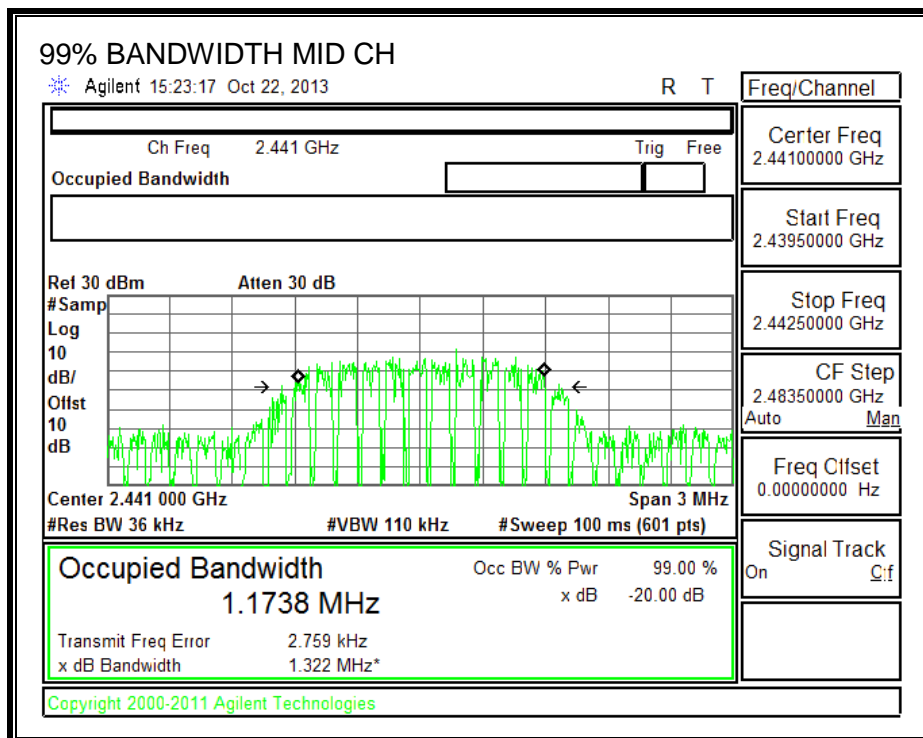
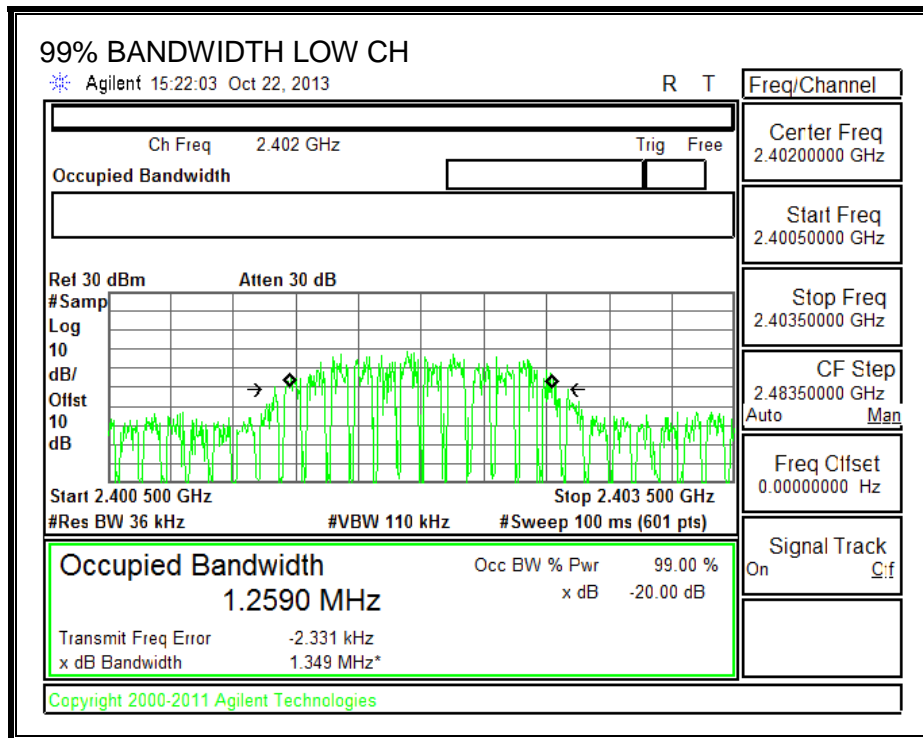


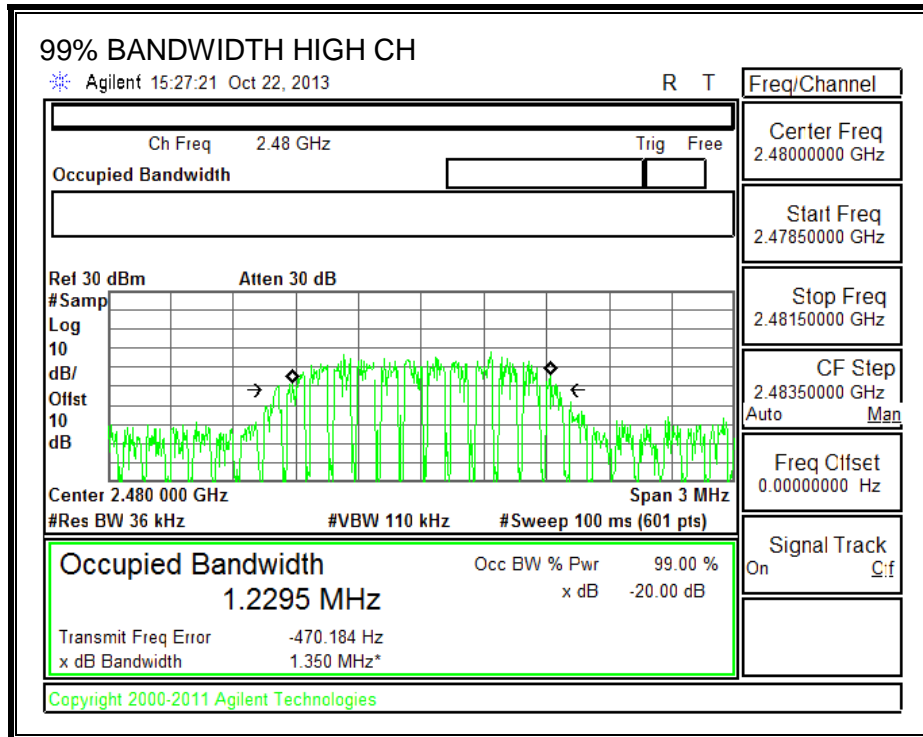
**8PSK 20 dB BANDWIDTH**





**QPSK 99% BANDWIDTH**





## **8.2. 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.

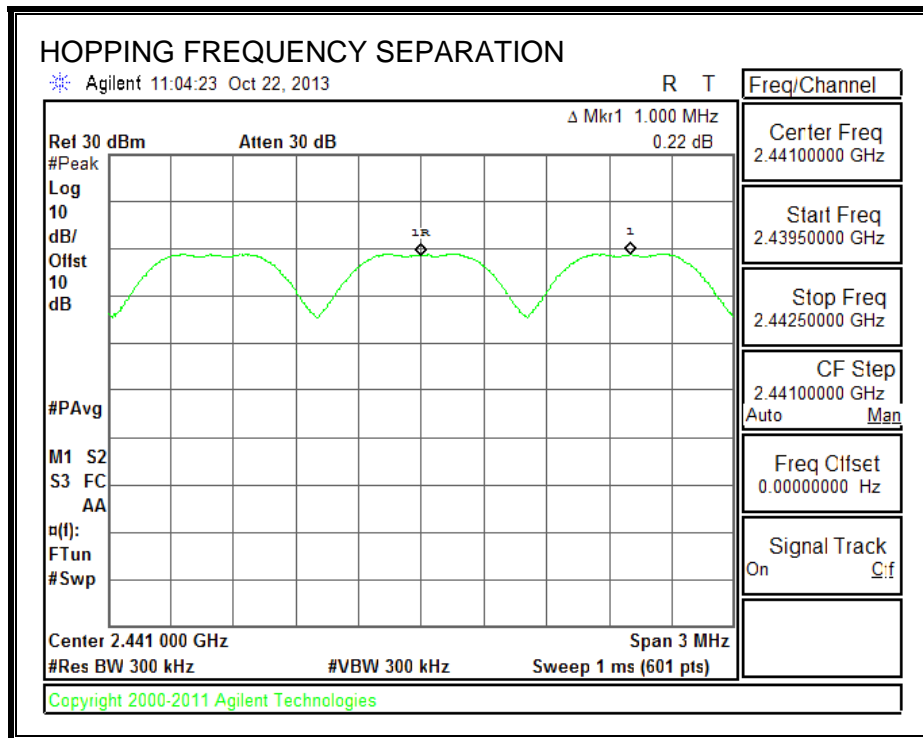
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

### **TEST PROCEDURE**

DA 00-705: 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**



### **8.3. 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.

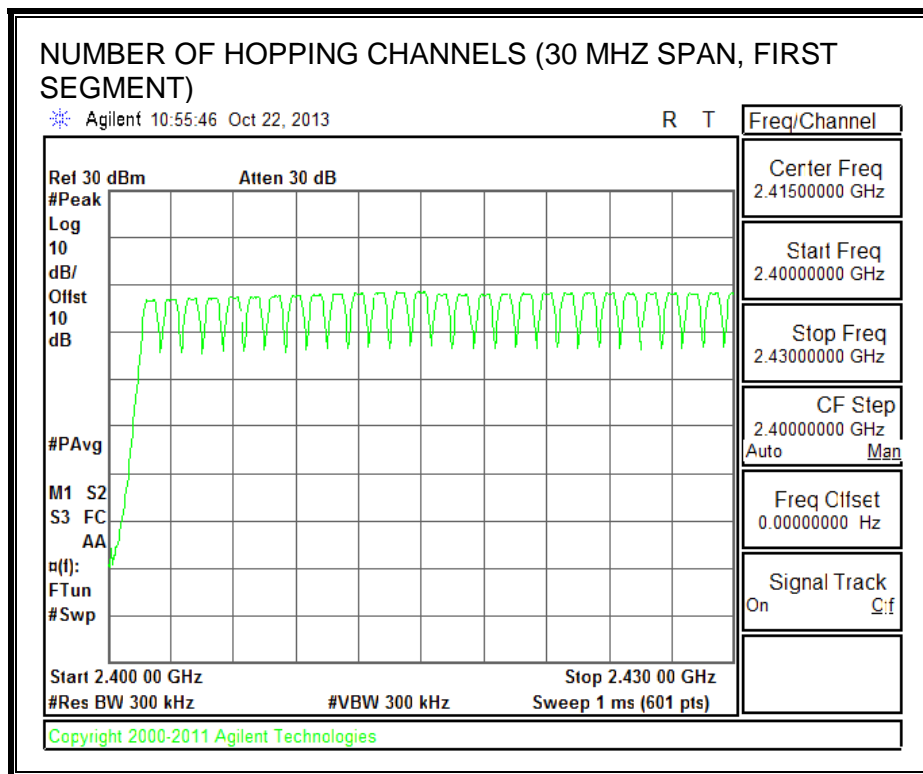
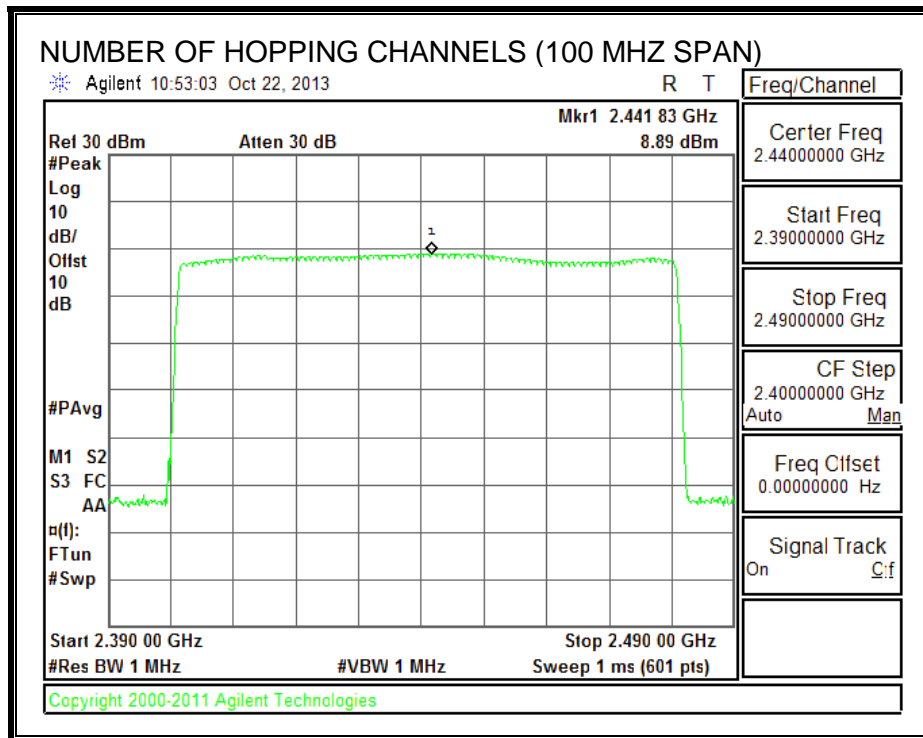
#### **TEST PROCEDURE**

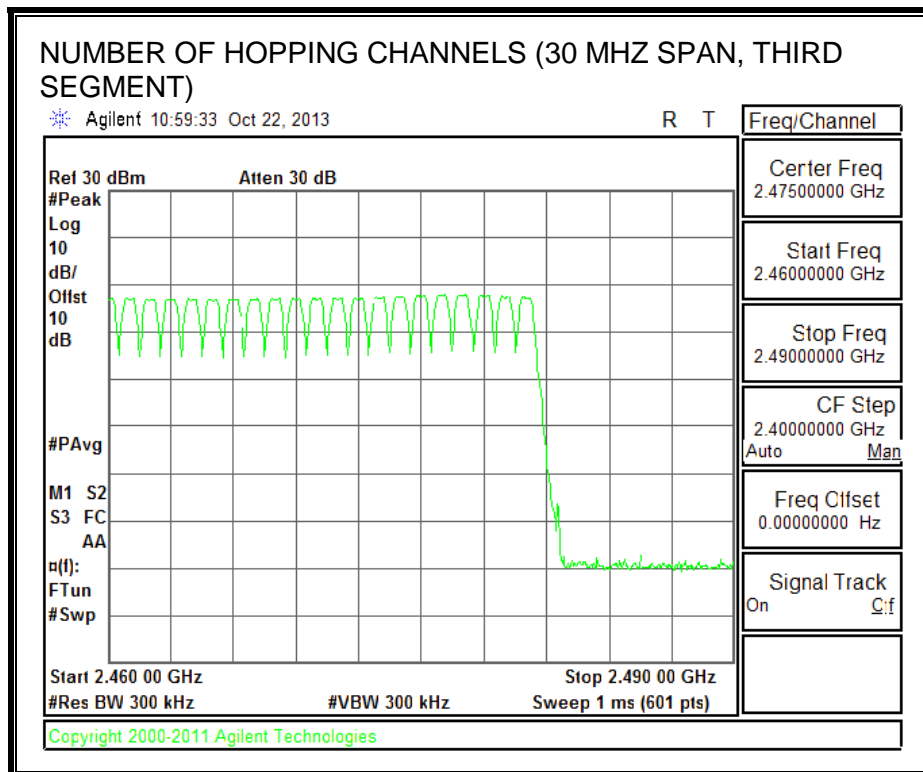
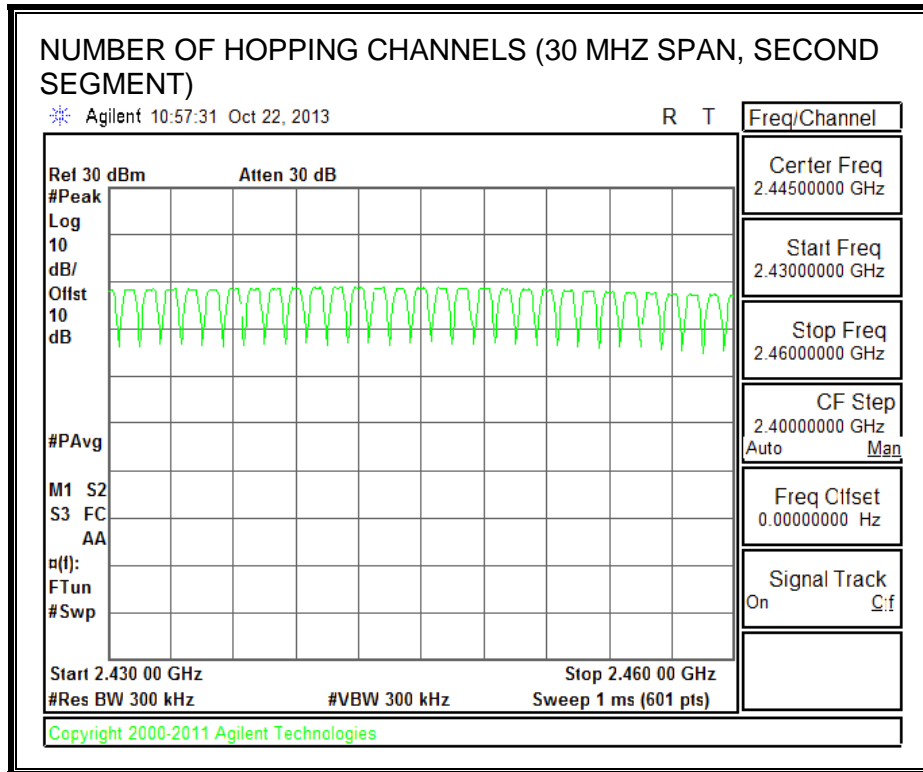
DA 00-705: The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

#### **RESULTS**

Normal Mode: 79 Channels observed.

**NUMBER OF HOPPING CHANNELS**





## 8.4. 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.

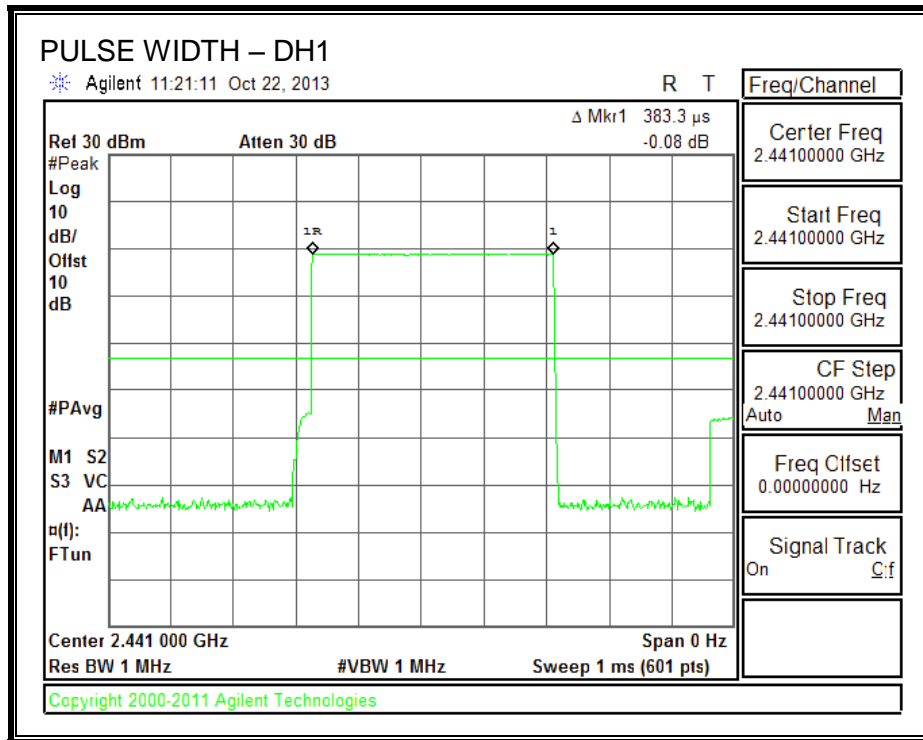
The average time of occupancy in the specified 31.6 second period (79 channels \* 0.4 s) is equal to  $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{ pulse width}$ .

For AFH mode, the average time of occupancy in the specified 8 second period (20 channels \* 0.4 seconds) is equal to  $10 * (\# \text{ of pulses in } 0.8 \text{ s}) * \text{ pulse width}$ .

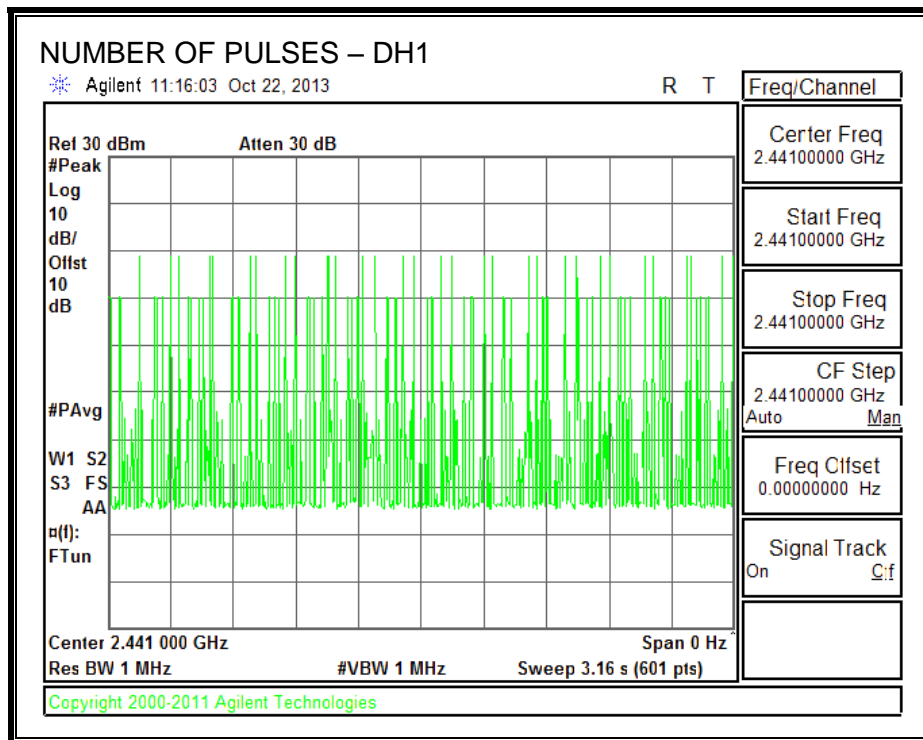
### RESULTS

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	0.383	26	0.100	0.4	-0.300
DH3	1.65	15	0.248	0.4	-0.153
DH5	2.9	13	0.377	0.4	-0.023

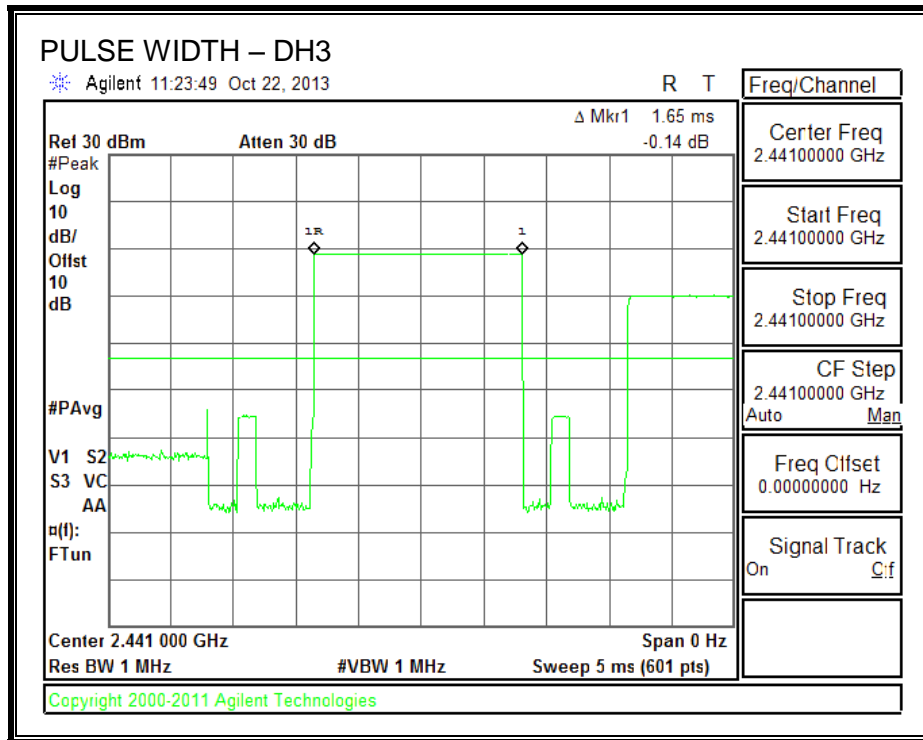
**PULSE WIDTH - DH1**



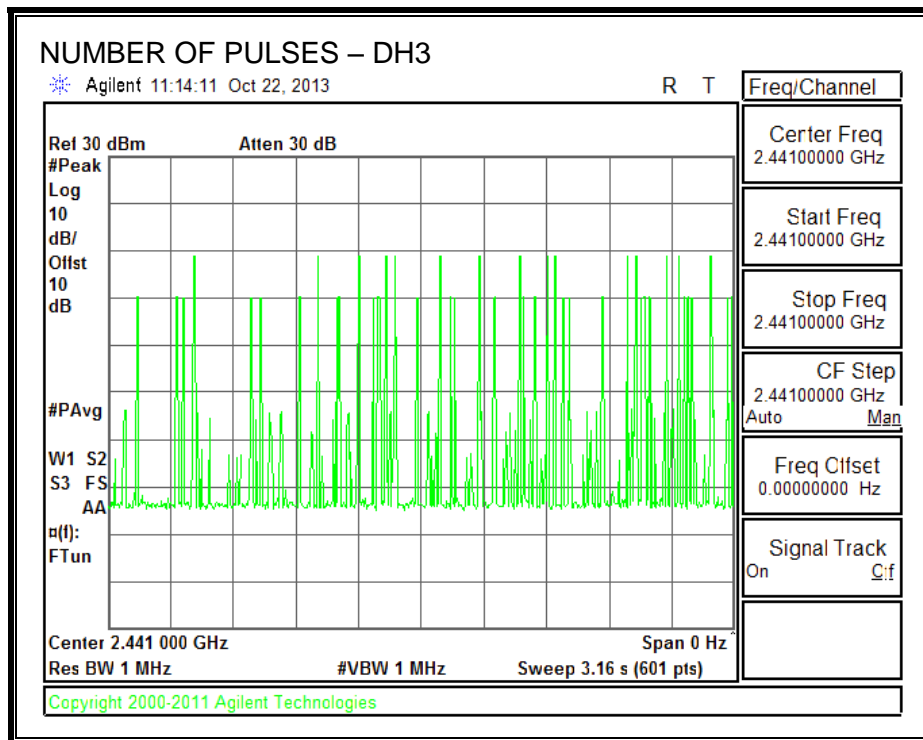
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH1**



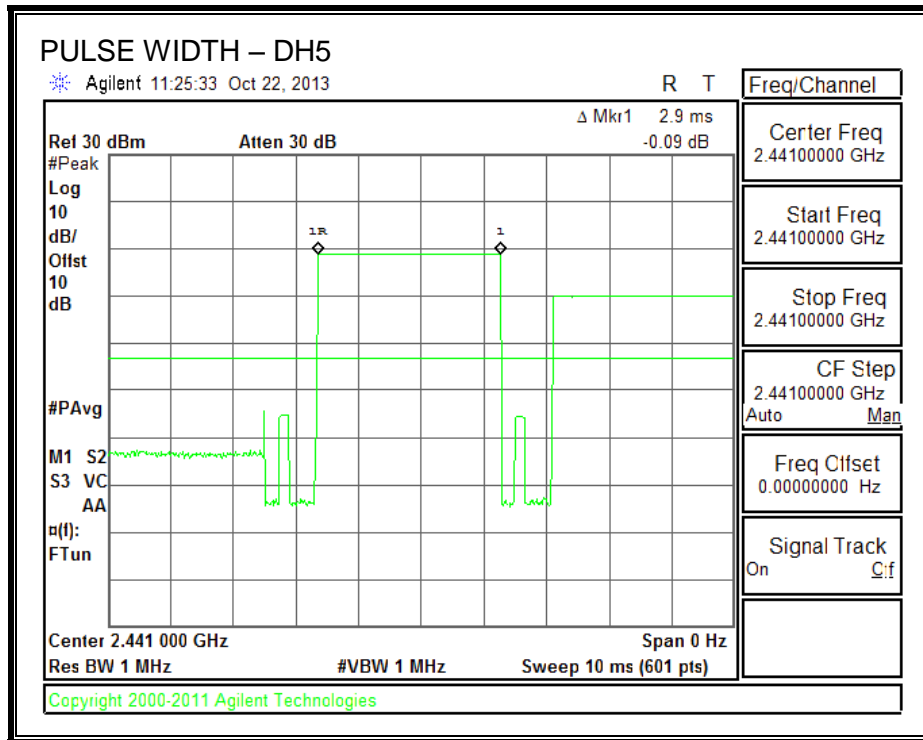
**PULSE WIDTH – DH3**



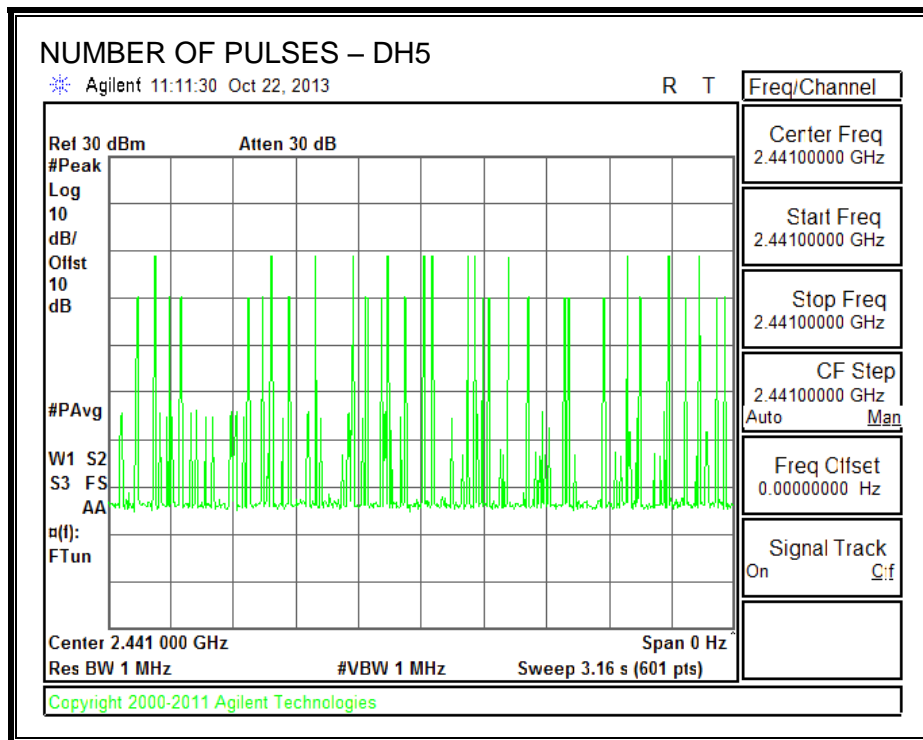
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3**



**PULSE WIDTH – DH5**



**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5**



## 8.5. OUTPUT POWER

### LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

### TEST PROCEDURE

DA 00-705: 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

Note: The peak power measurement result is the constant data.

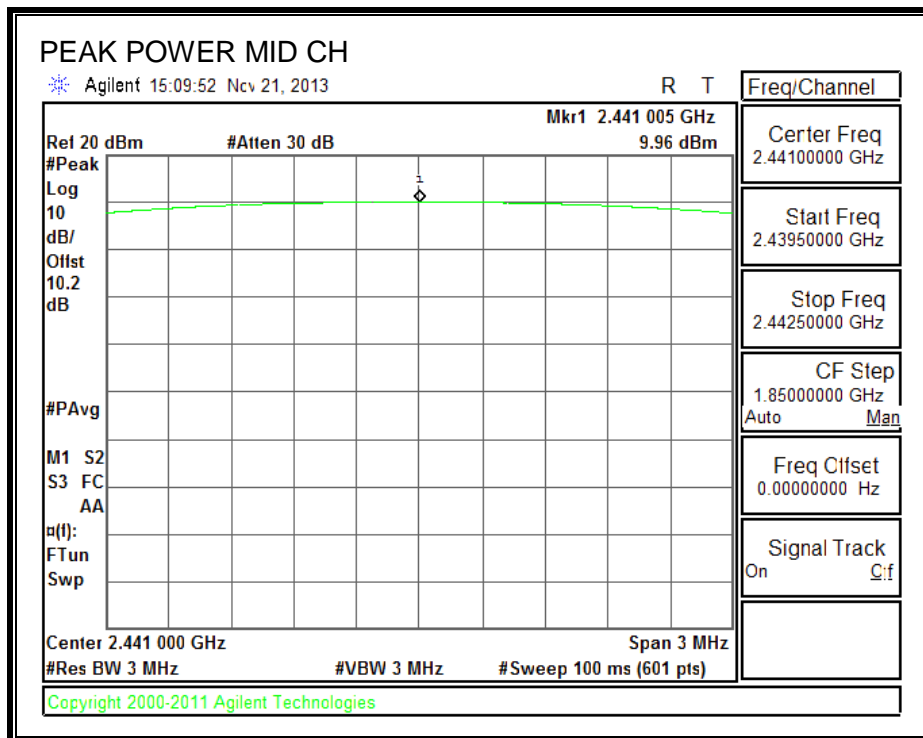
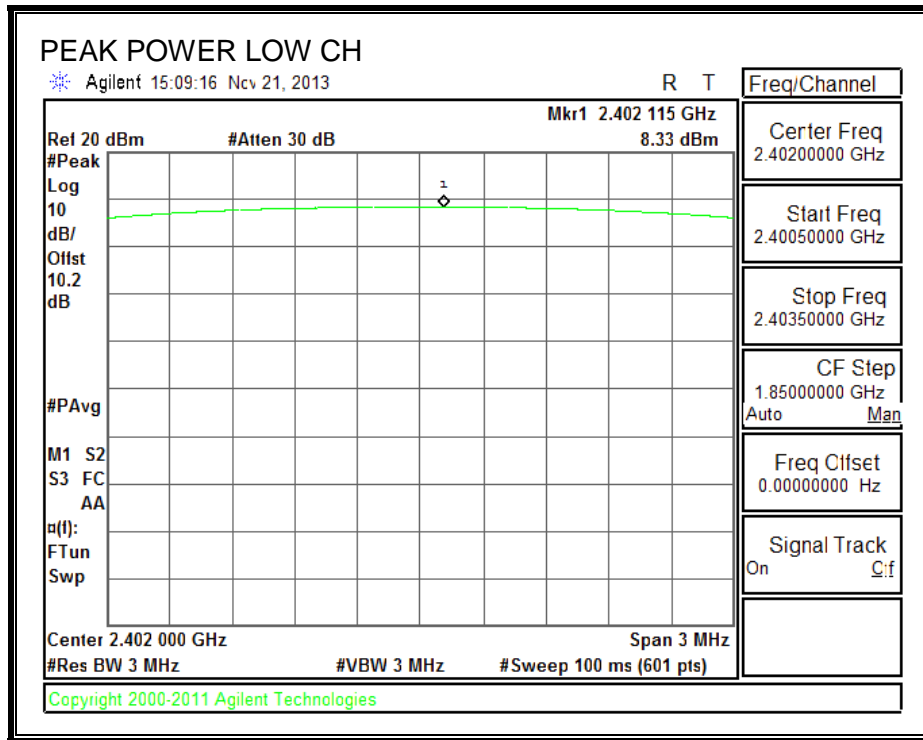
#### 8.5.1. BASIC DATA RATE GFSK MODULATION

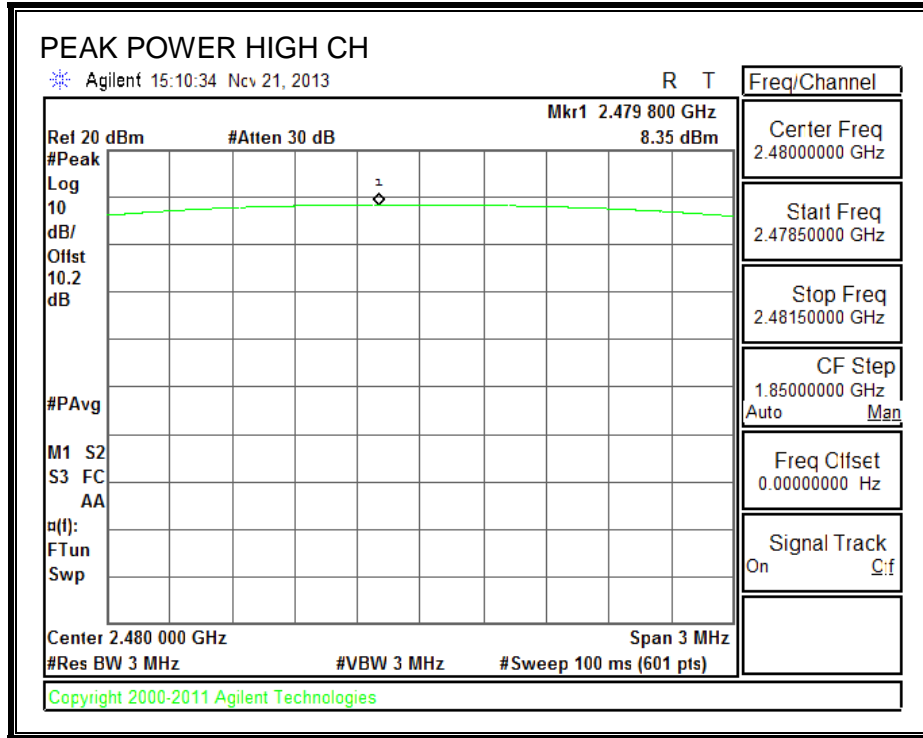
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	8.33	21	-12.67
Middle	2441	9.96	21	-11.04
High	2480	8.35	21	-12.65
Worst		9.96		-11.04

#### 8.5.2. ENHANCED DATA RATE 8PSK MODULATION

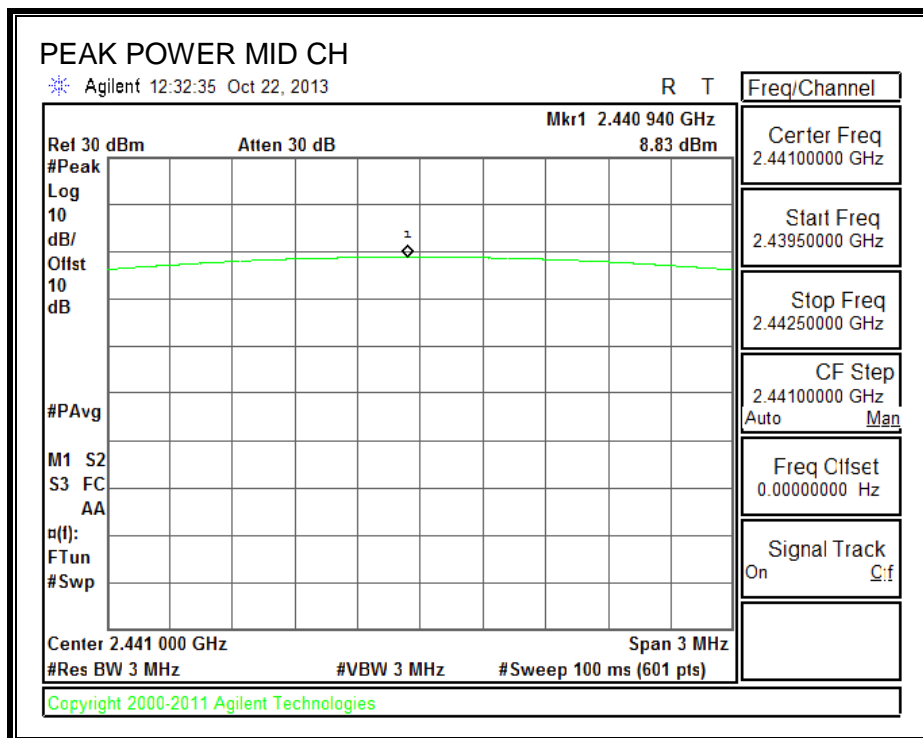
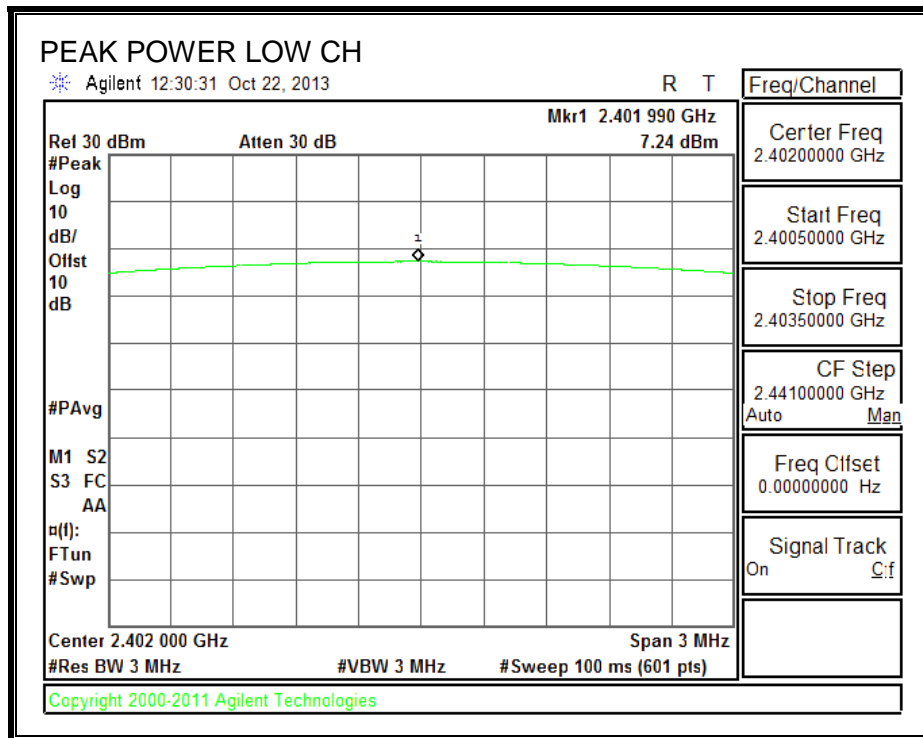
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	7.24	21	-13.76
Middle	2441	8.83	21	-12.17
High	2480	7.50	21	-13.50
Worst		8.83		-12.17

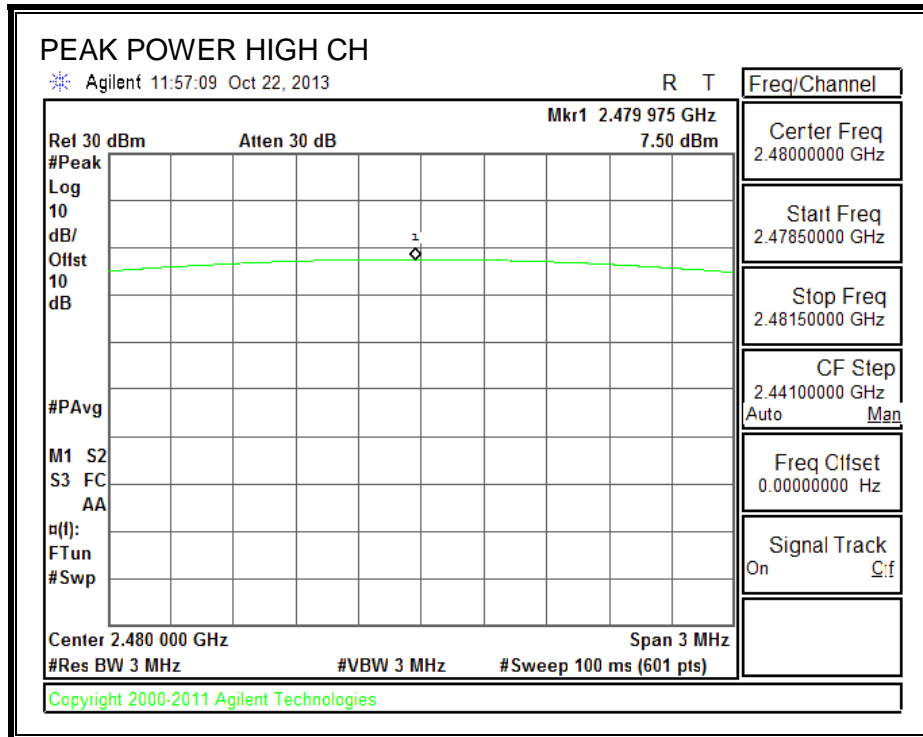
**GFSK OUTPUT POWER**





**8PSK OUTPUT POWER**





## 8.6. AVERAGE POWER

### LIMIT

None; for reporting purposes only.

### TEST PROCEDURE

DA 00-705: The transmitter output is connected to a power meter.

### RESULTS

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### 8.6.1. BASIC DATA RATE GFSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.10
Middle	2441	9.70
High	2480	8.00
Worst		9.70

#### 8.6.2. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	6.40
Middle	2441	7.30
High	2480	5.80
Worst		7.30

## 8.7. 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.

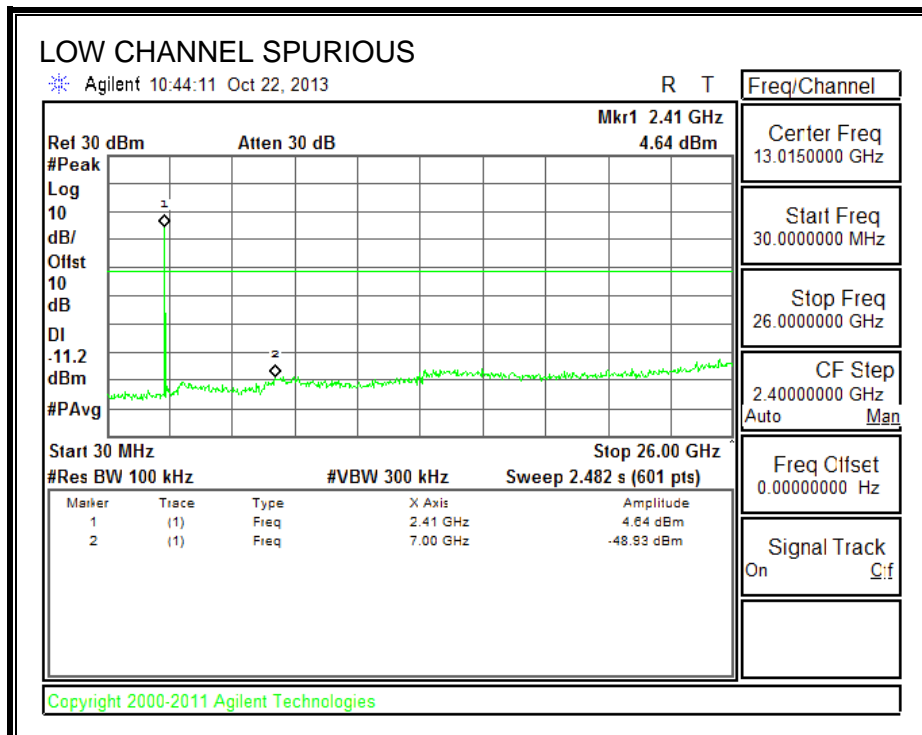
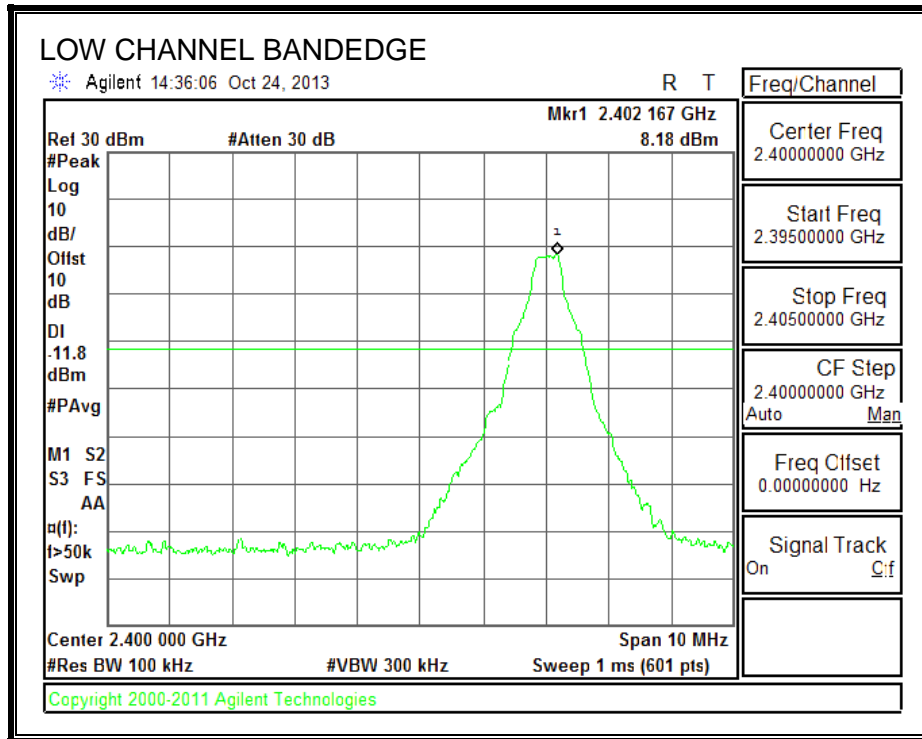
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

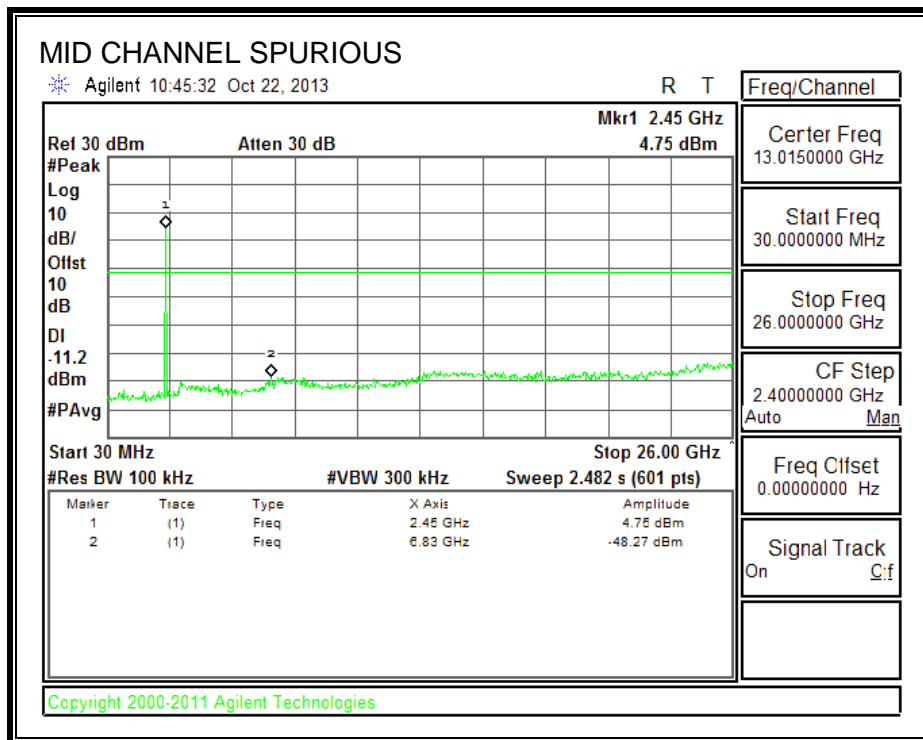
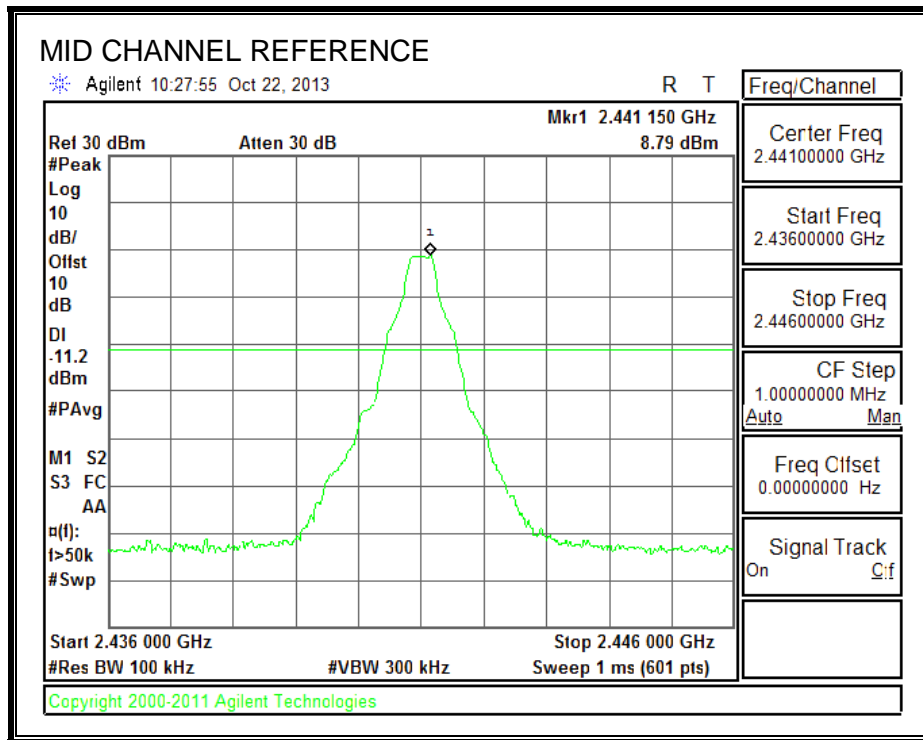
### RESULTS

### 8.7.1. BASIC DATA RATE GFSK MODULATION

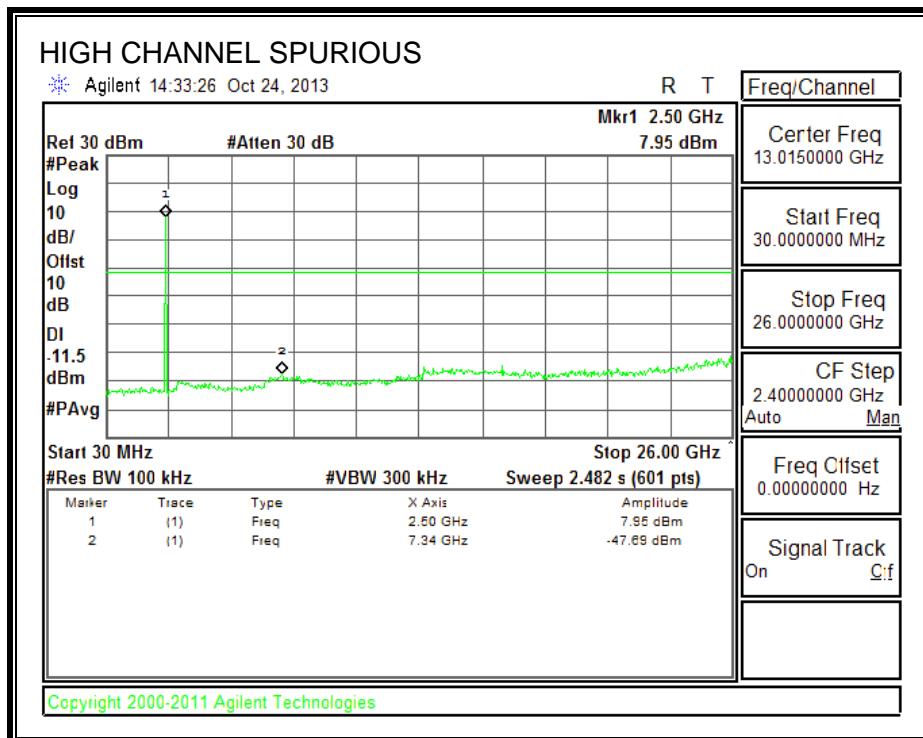
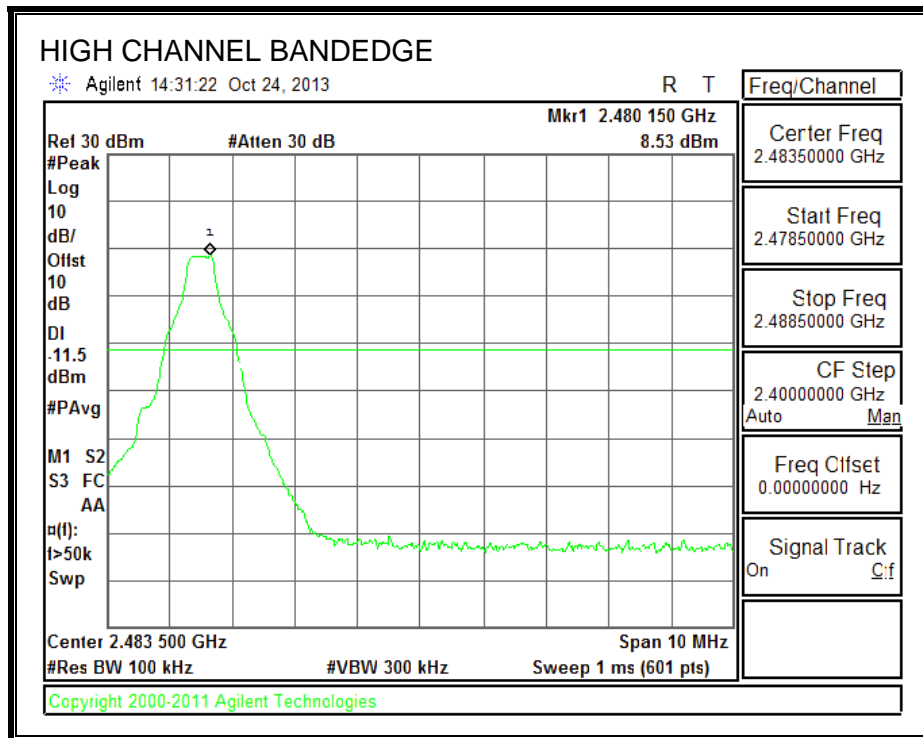
#### SPURIOUS EMISSIONS, LOW CHANNEL



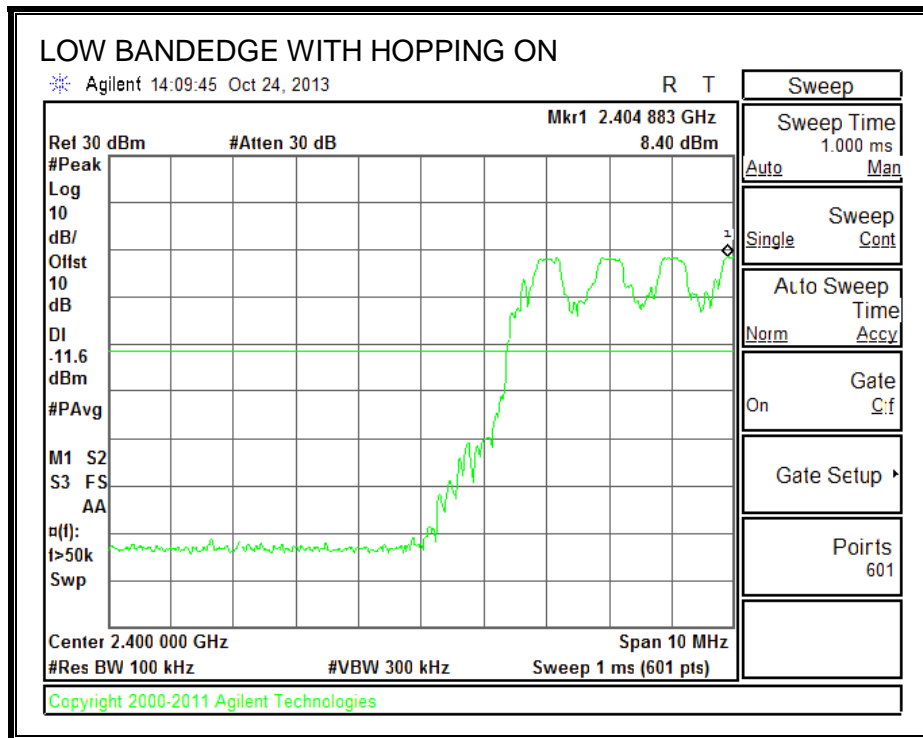
**SPURIOUS EMISSIONS, MID CHANNEL**

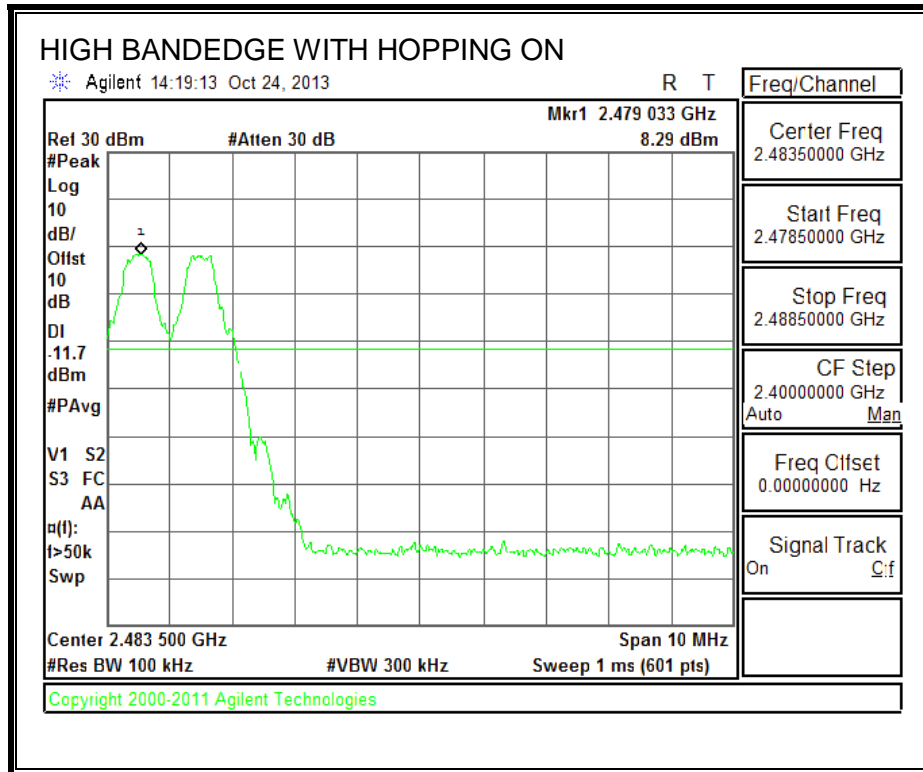


**SPURIOUS EMISSIONS, HIGH CHANNEL**



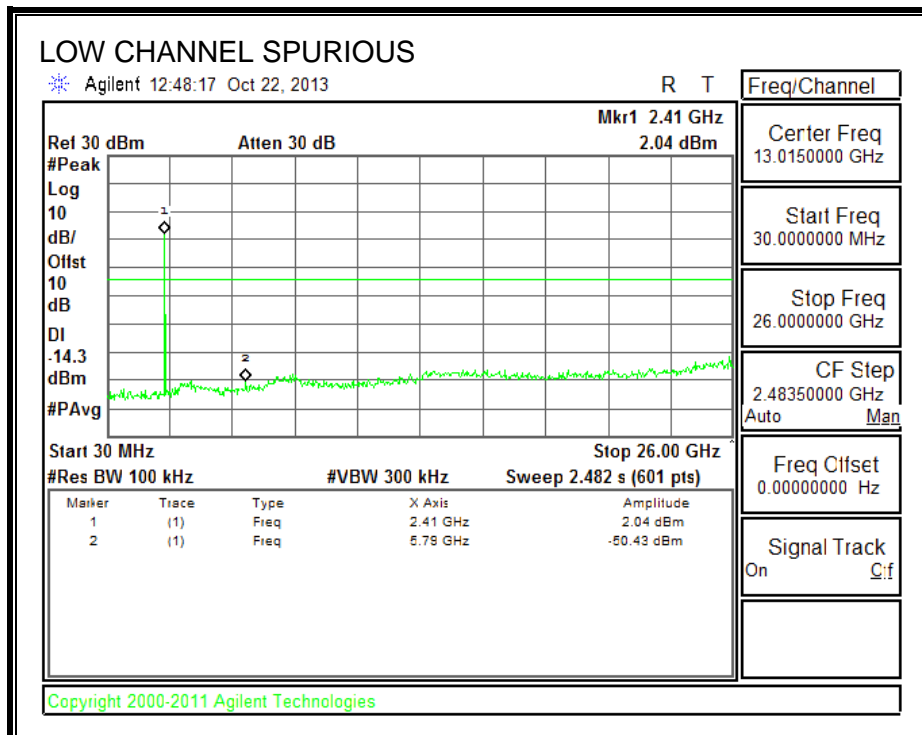
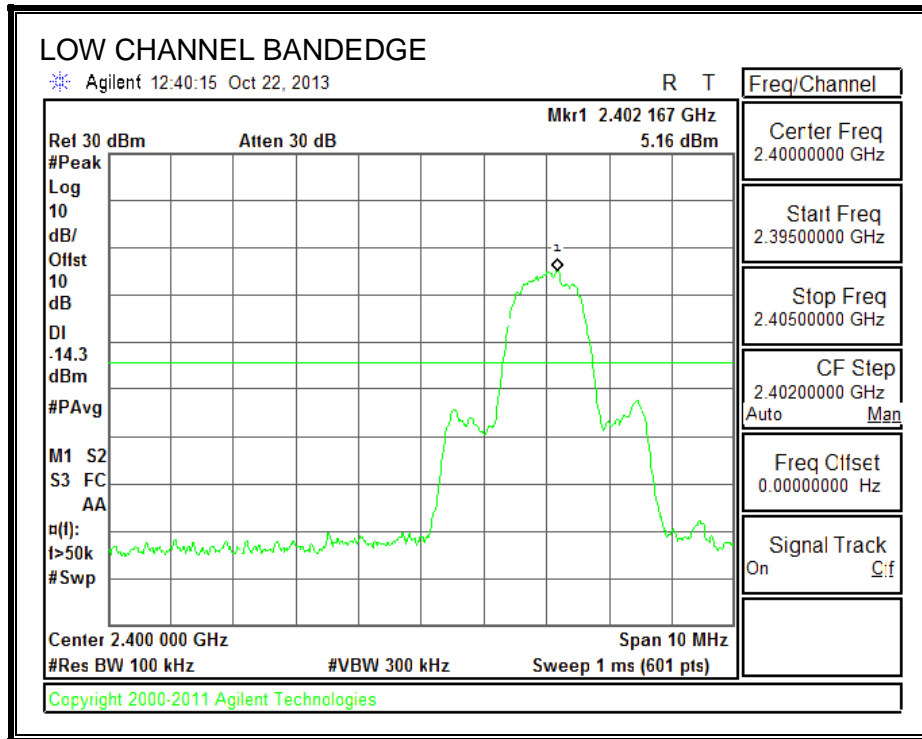
**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**



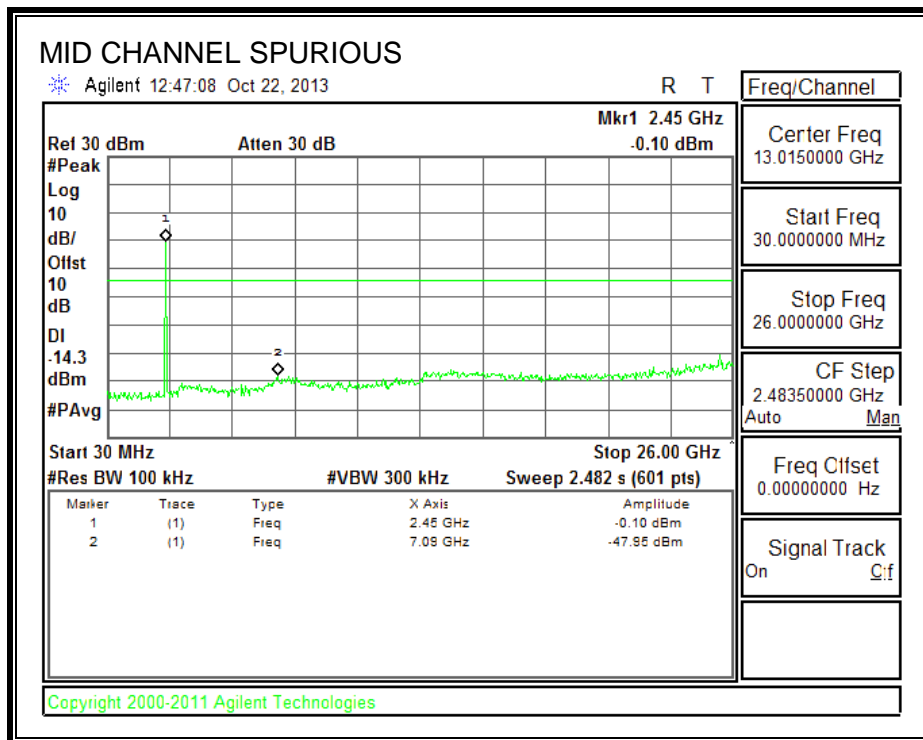
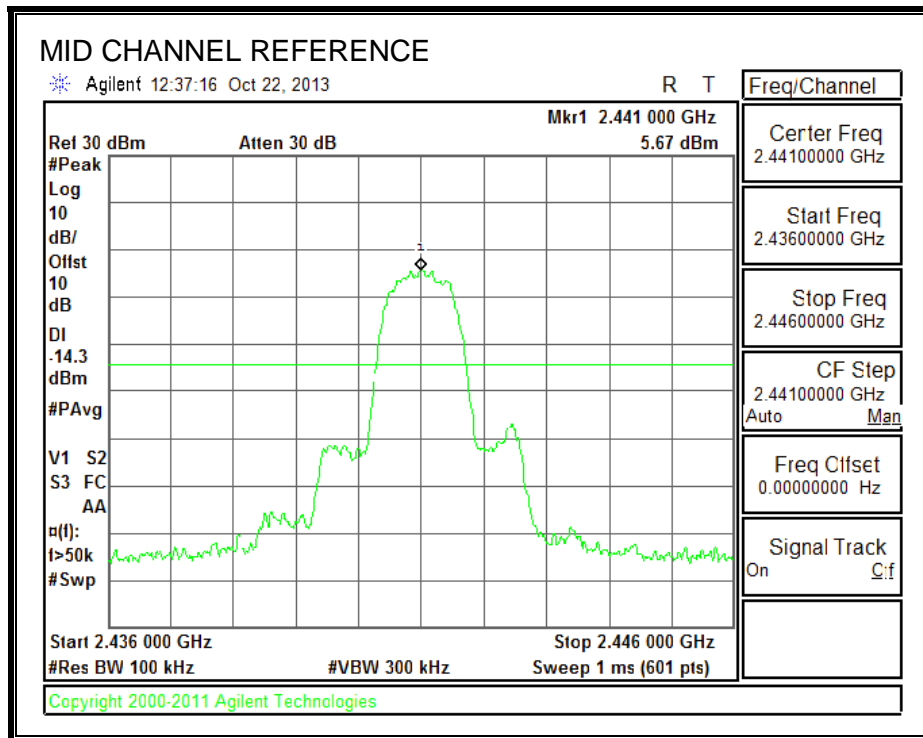


### 8.7.1. ENHANCED DATA RATE 8PSK MODULATION

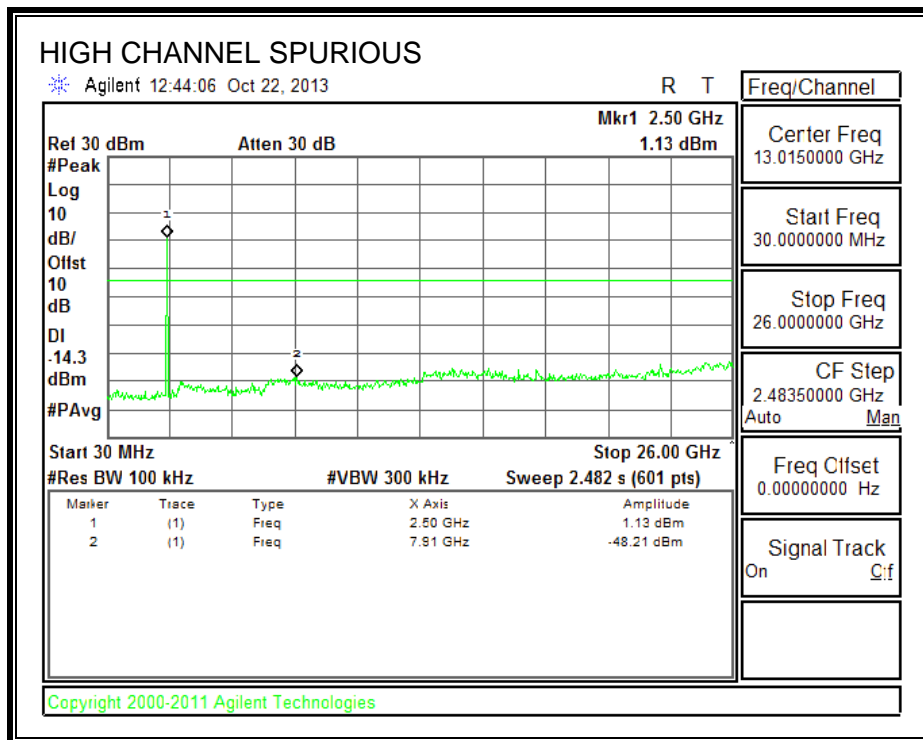
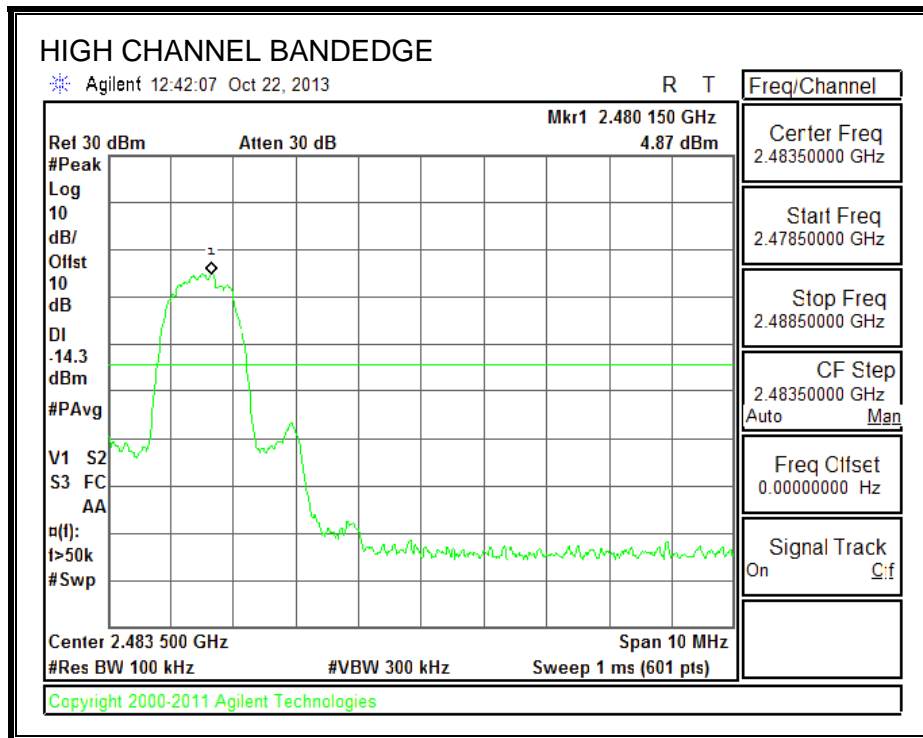
#### SPURIOUS EMISSIONS, LOW CHANNEL



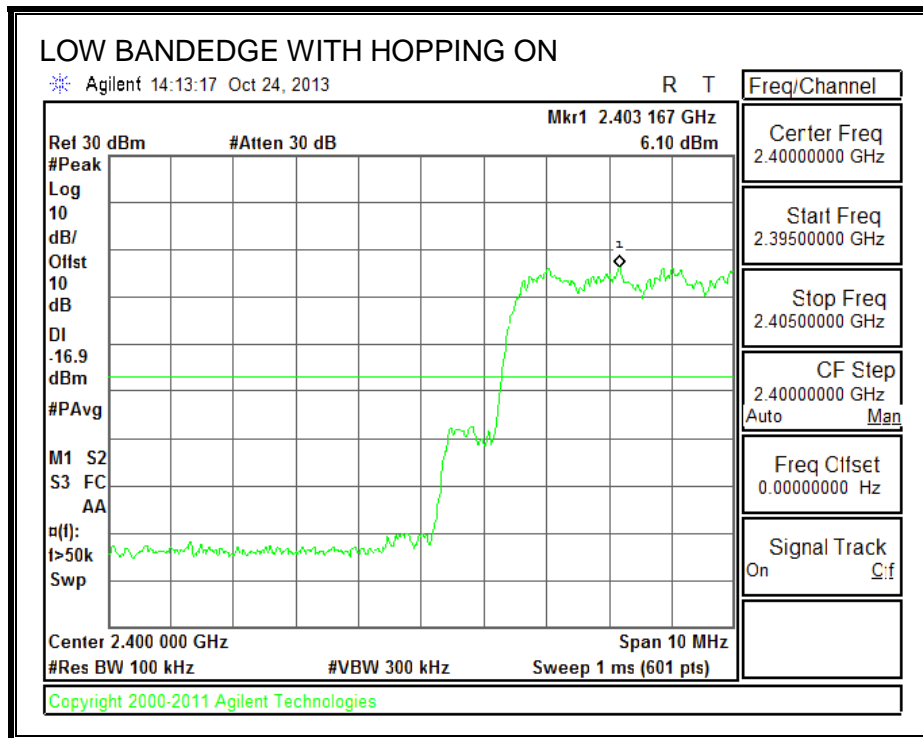
**SPURIOUS EMISSIONS, MID CHANNEL**

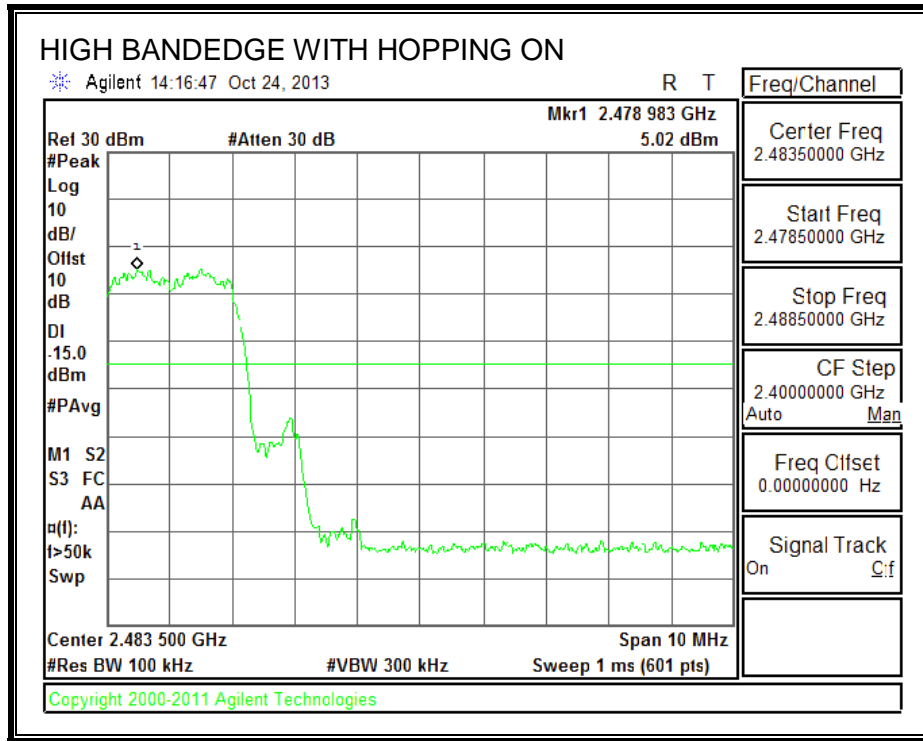


**SPURIOUS EMISSIONS, HIGH CHANNEL**



**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**





## 9. RADIATED TEST RESULTS

### 9.1. 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 1/T (on time) for average measurement. GFSK = 1/T = 360Hz.

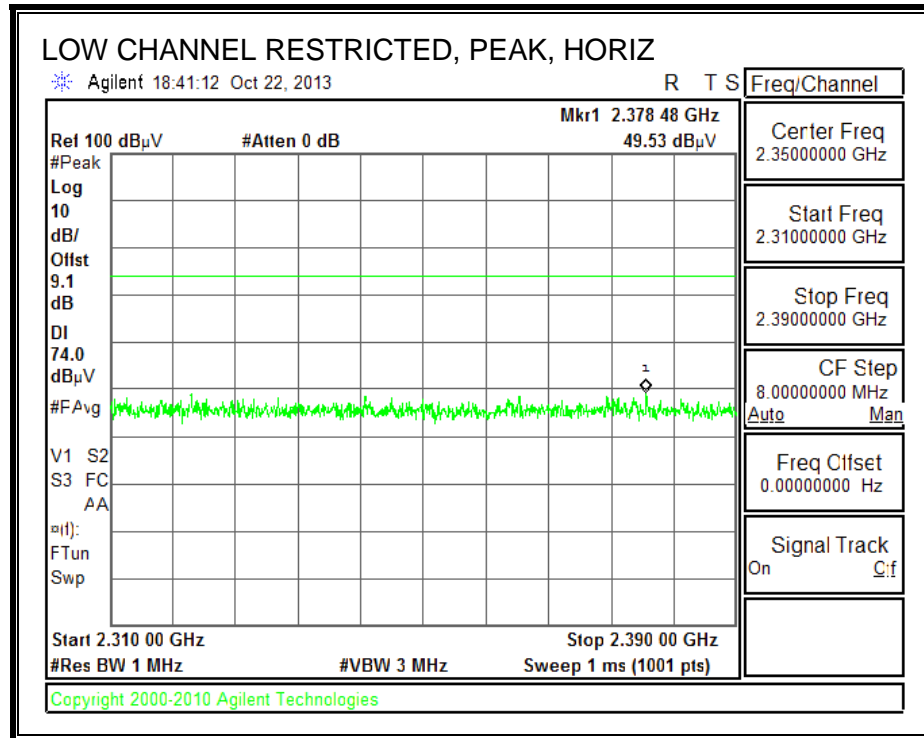
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

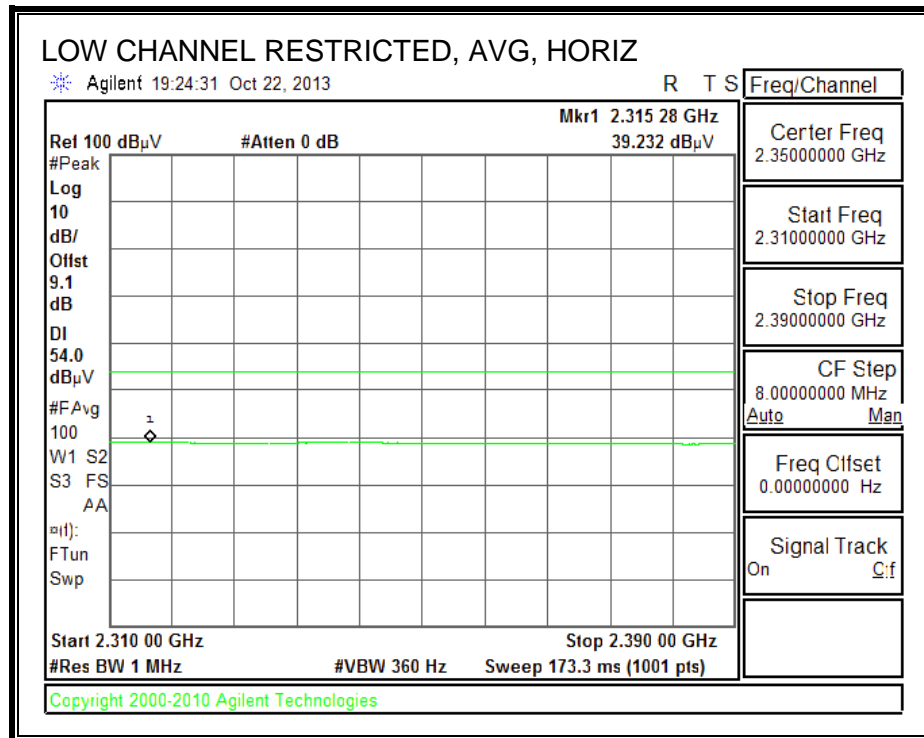
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

## 9.2. TRANSMITTER ABOVE 1 GHz

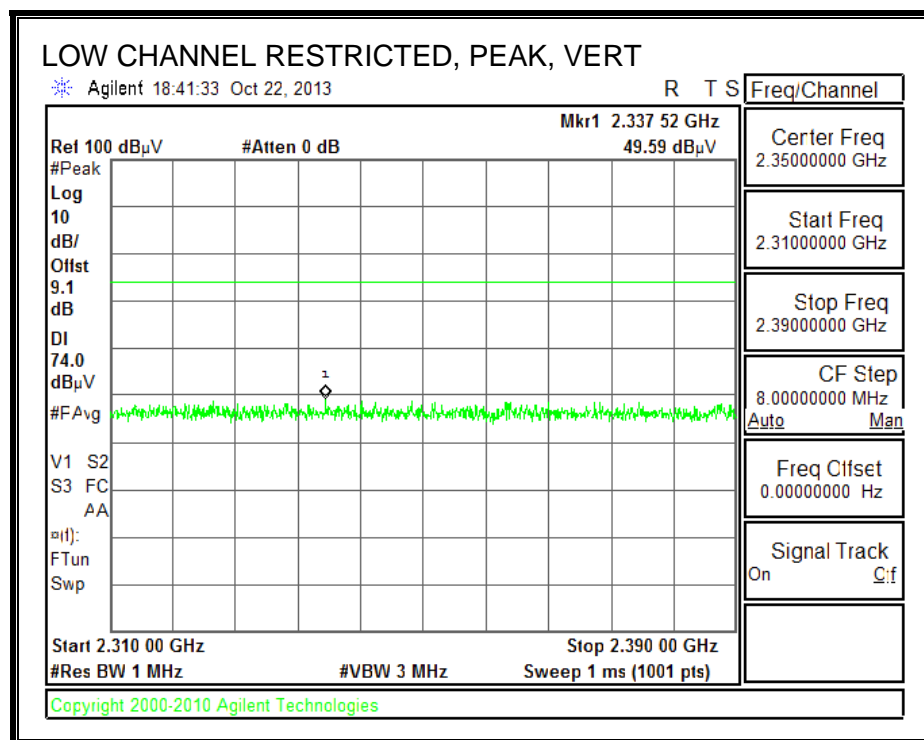
### 9.2.1. BASIC DATA RATE GFSK MODULATION

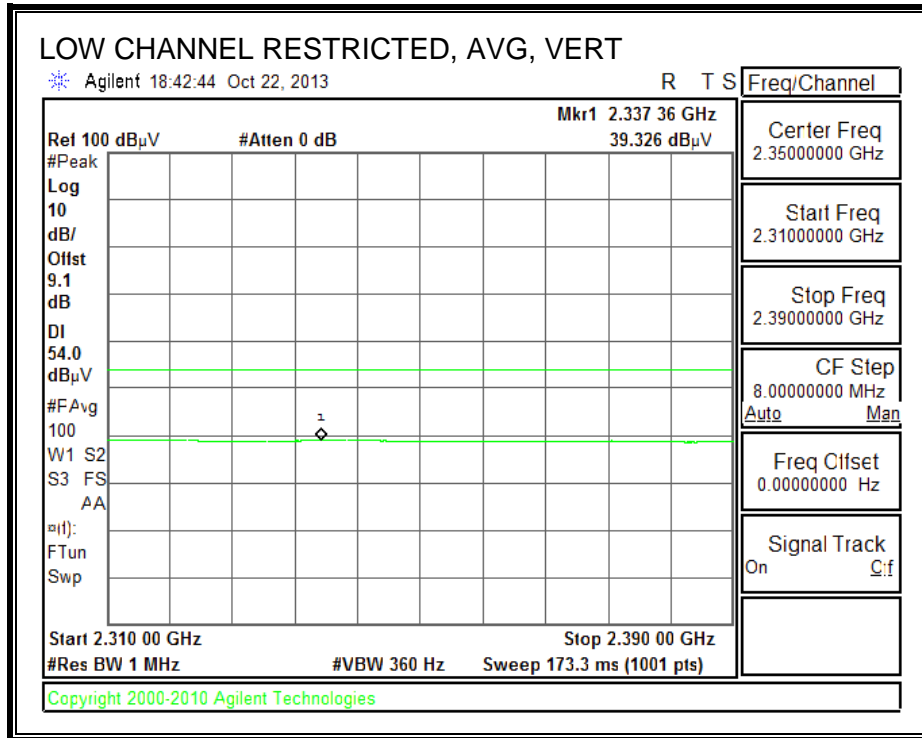
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



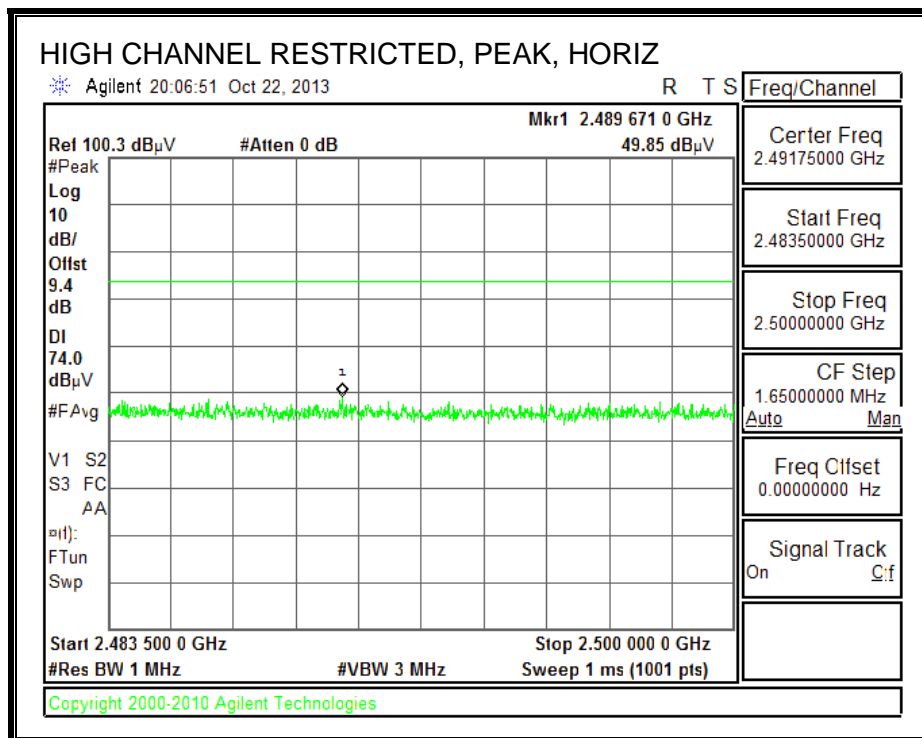


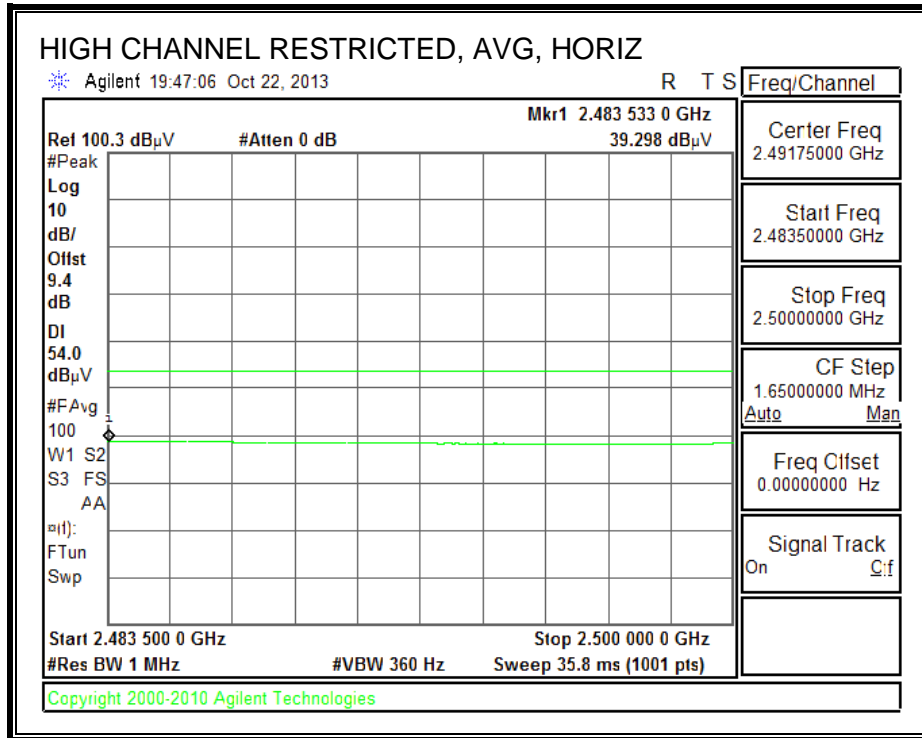
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



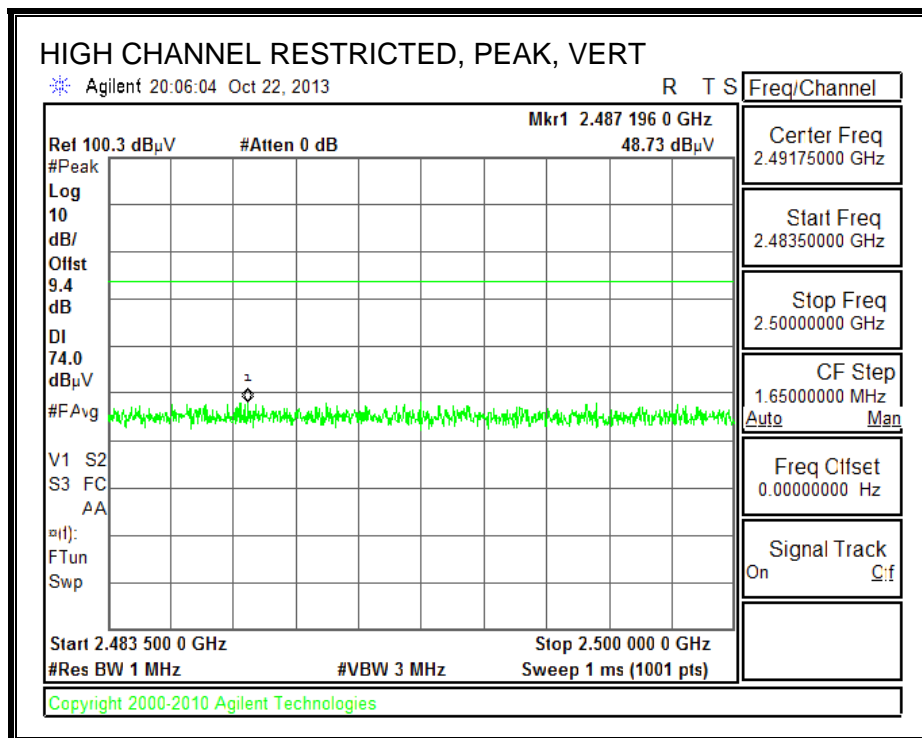


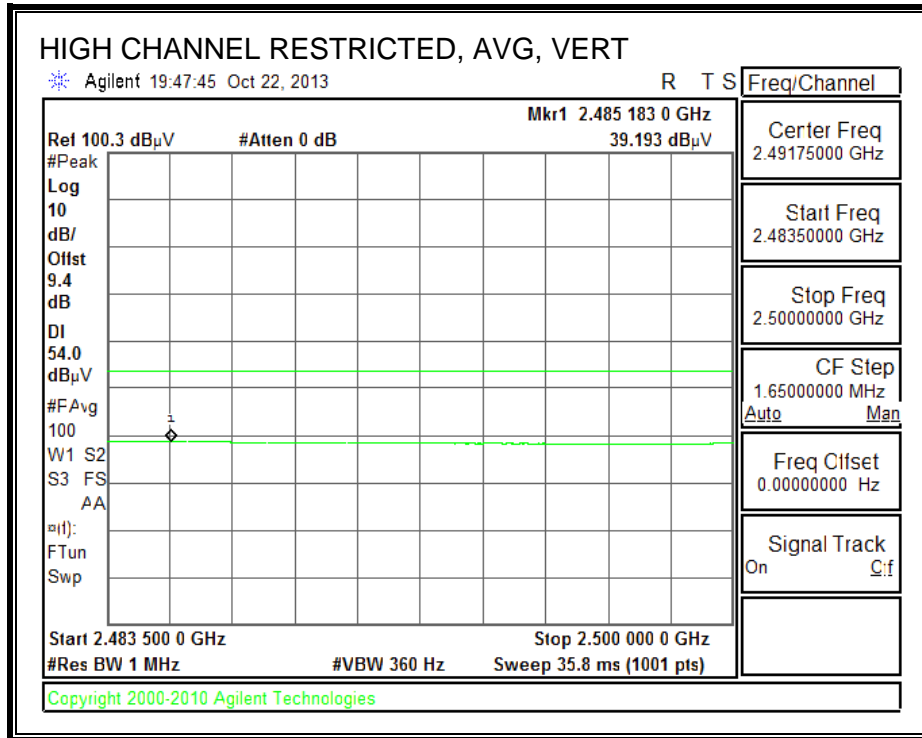
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





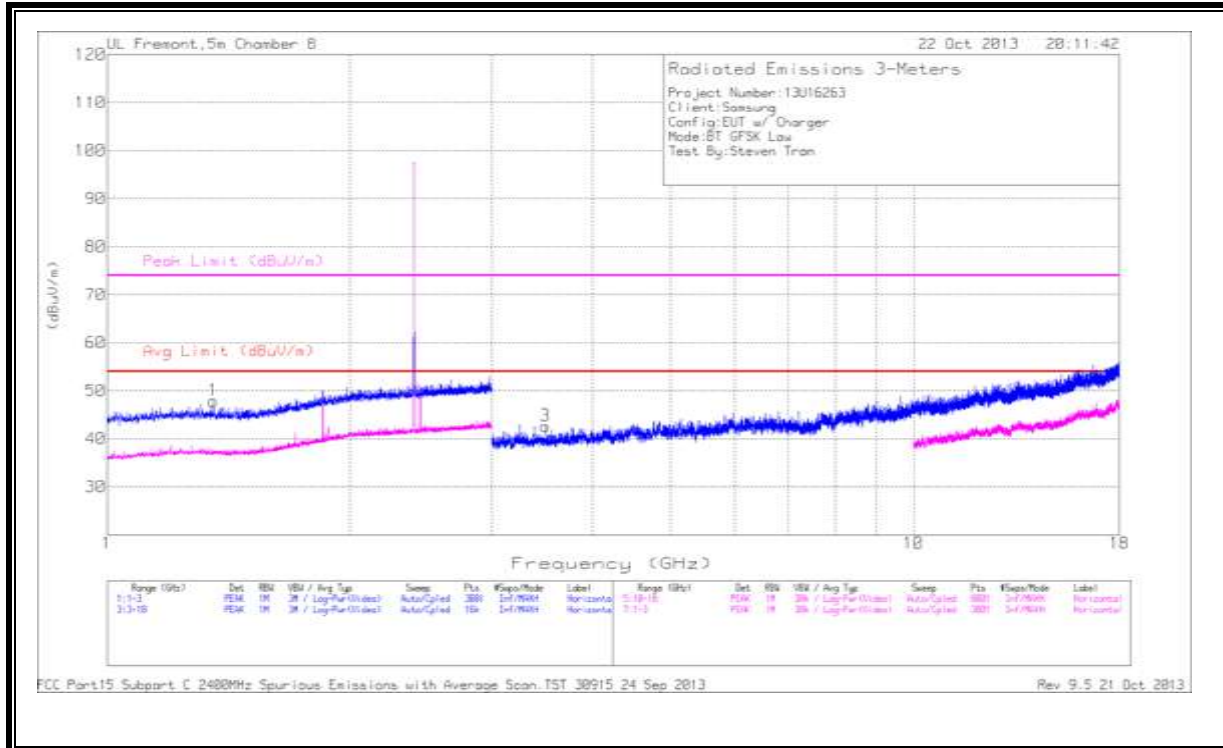
**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**





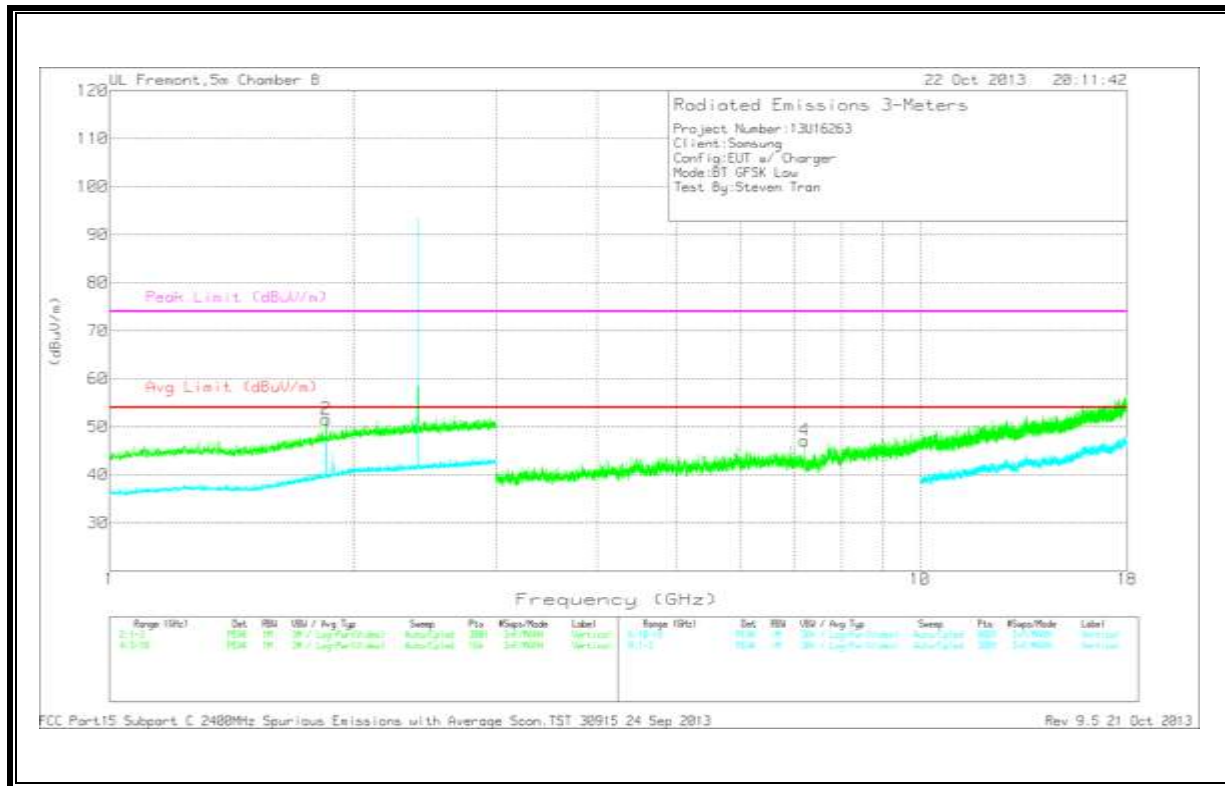
**HARMONICS AND SPURIOUS EMISSIONS**

LOW CHANNEL  
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



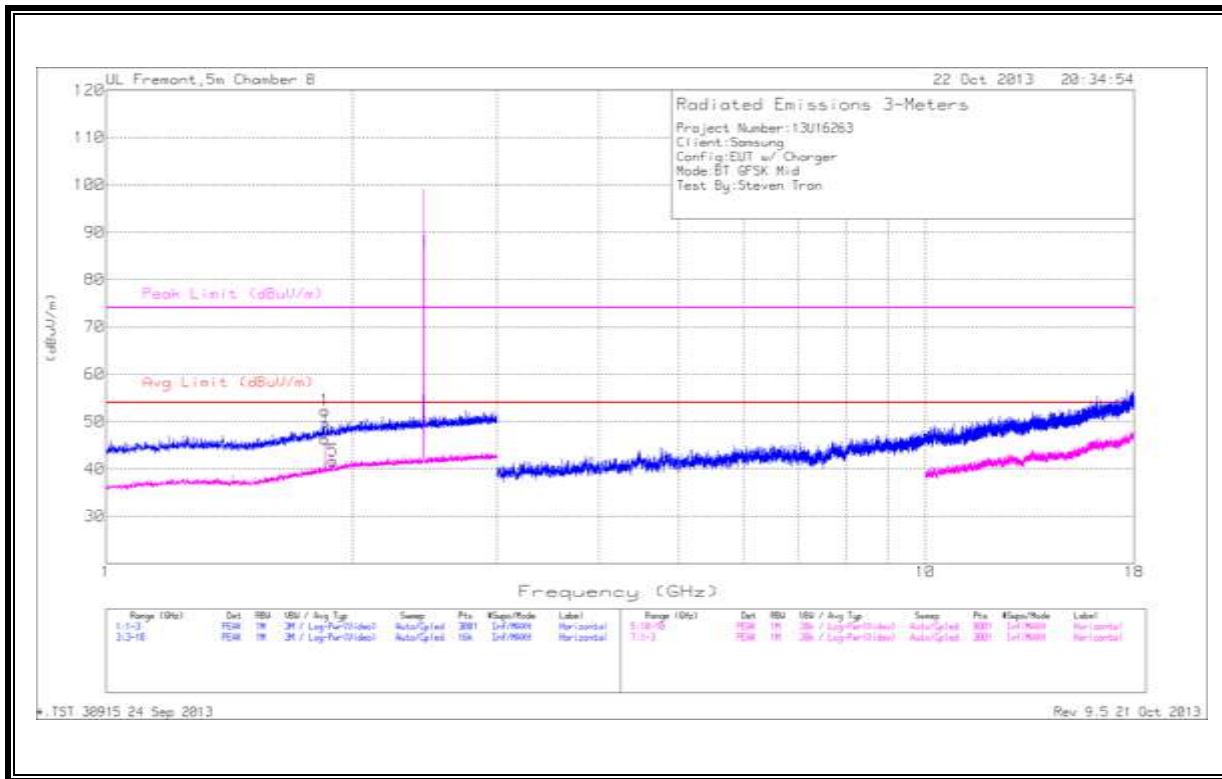
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.355	44.48	PK	28.4	-25	47.88	53.97	-6.09	74	-26.12	0-360	200	H
2	1.851	44.97	PK	30.8	-24.2	51.57	53.97	-2.4	74	-22.43	0-360	100	V
3	3.497	41.31	PK	33.2	-31.9	42.61	53.97	-11.36	74	-31.39	0-360	100	H
4	7.205	38.51	PK	35.8	-27.2	47.11	53.97	-6.86	74	-26.89	0-360	100	V
5	1.85	40.69	Avg	30.8	-24.2	47.29	53.97	-6.86	74	-26.89	0-360	100	V
6	1.881	37.9	Avg	31	-24.2	44.7	53.97	-6.68	74	-26.71	0-360	100	V

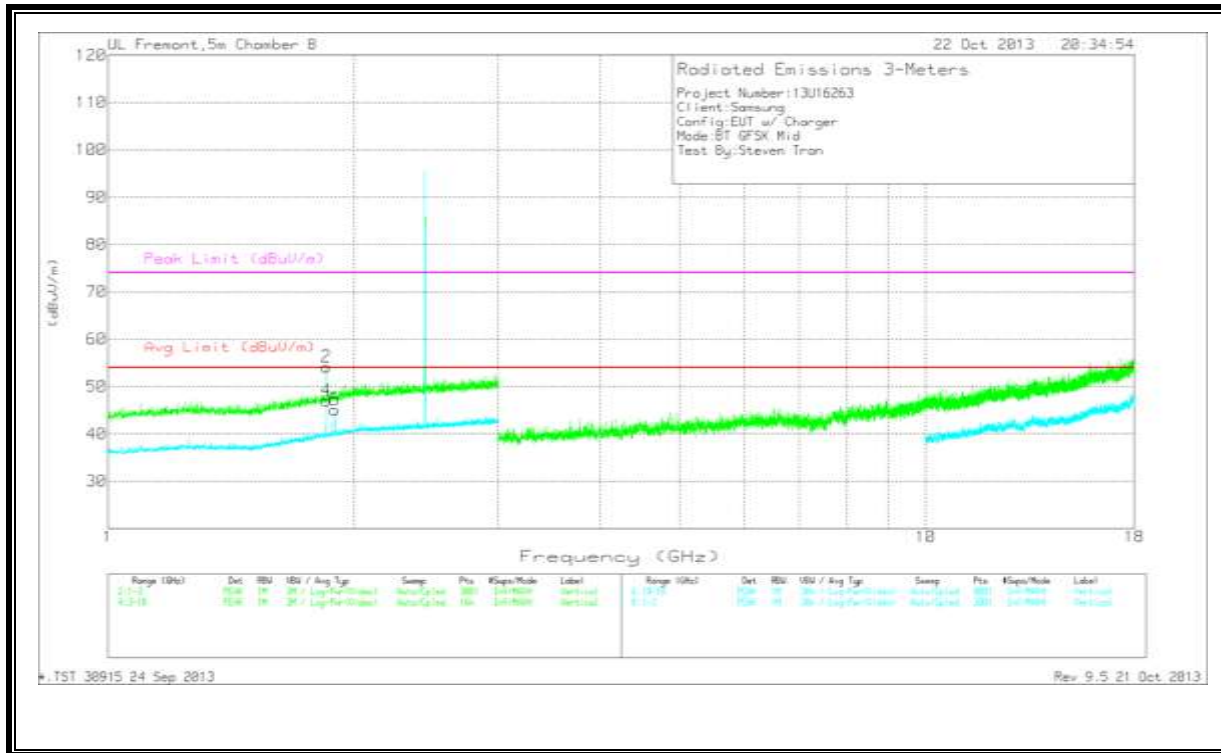
PK - Peak detector

MID CHANNEL  
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



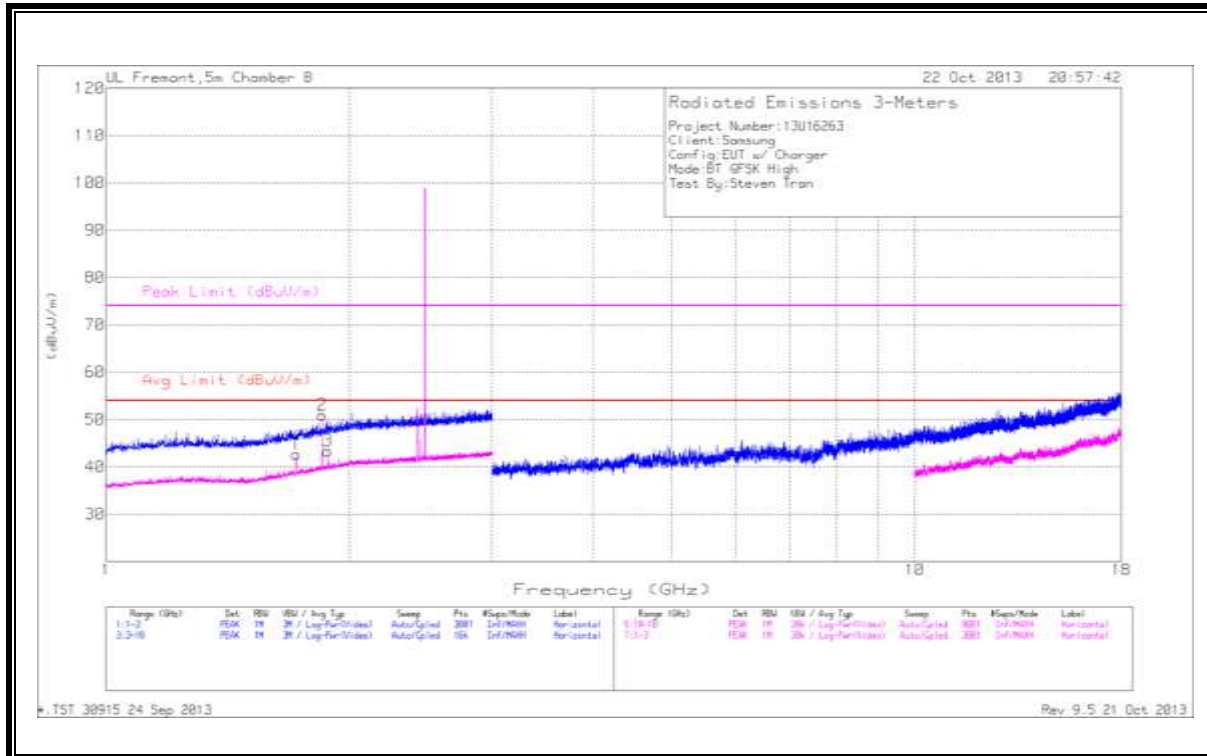
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.85	45.67	PK	30.8	-24.2	52.27	53.97	-1.7	74	-21.73	0-360	200	H
2	1.85	47.52	PK	30.8	-24.2	54.12	<b>53.97</b>	.15	74	-19.88	0-360	100	V
3	1.85	39.67	Avg	30.8	-24.2	46.27	<b>53.97</b>	-7.7	74	-27.73	0-360	100	H
5	1.894	34.66	Avg	31.1	-24.1	41.66	<b>53.97</b>	-12.31	74	-32.34	0-360	200	H
4	1.85	40.38	Avg	30.8	-24.2	46.98	<b>53.97</b>	-6.99	74	-27.02	0-360	200	V
6	1.893	38.11	Avg	31.1	-24.1	45.11	<b>53.97</b>	-8.86	74	-28.89	0-360	200	V

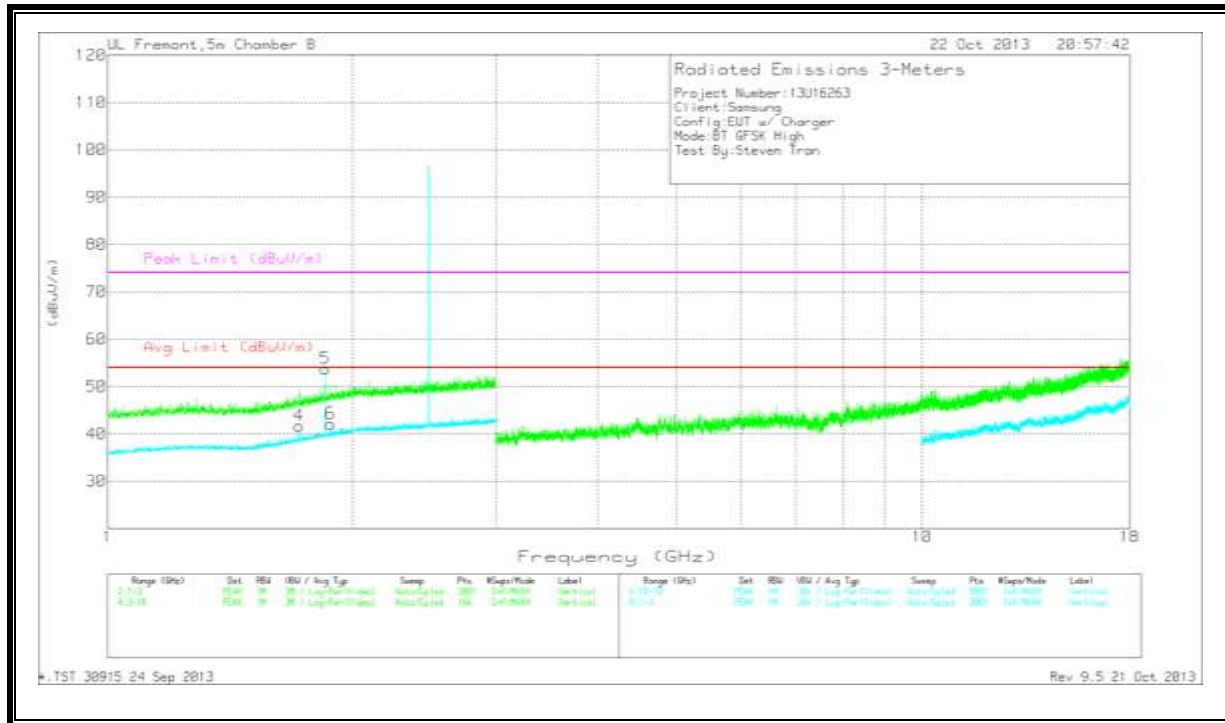
PK - Peak detector

HIGH CHANNEL  
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

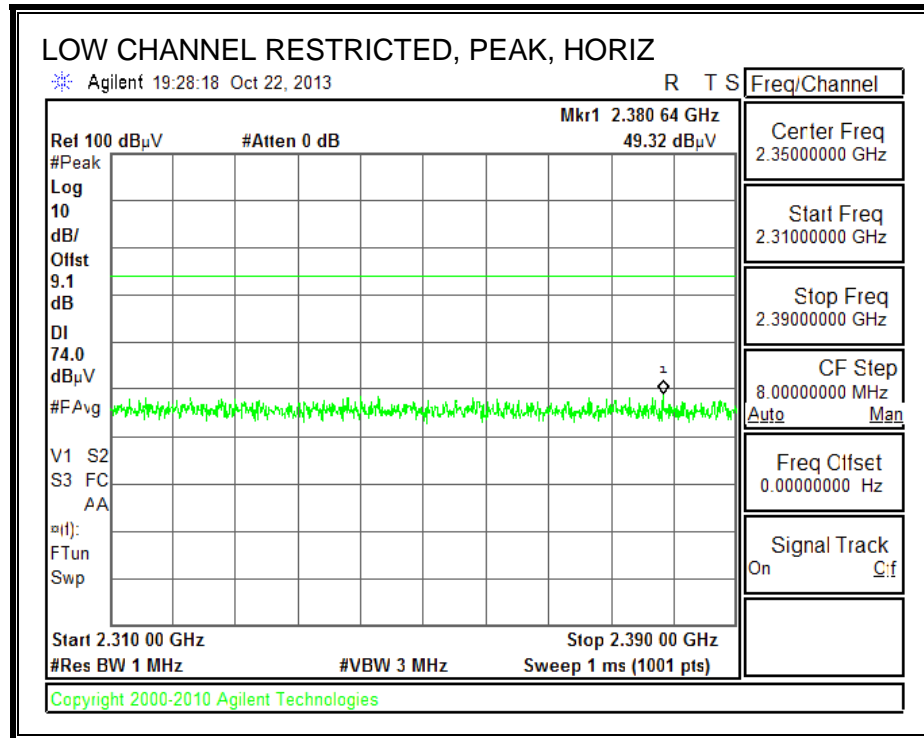
HIGH CHANNEL DATA

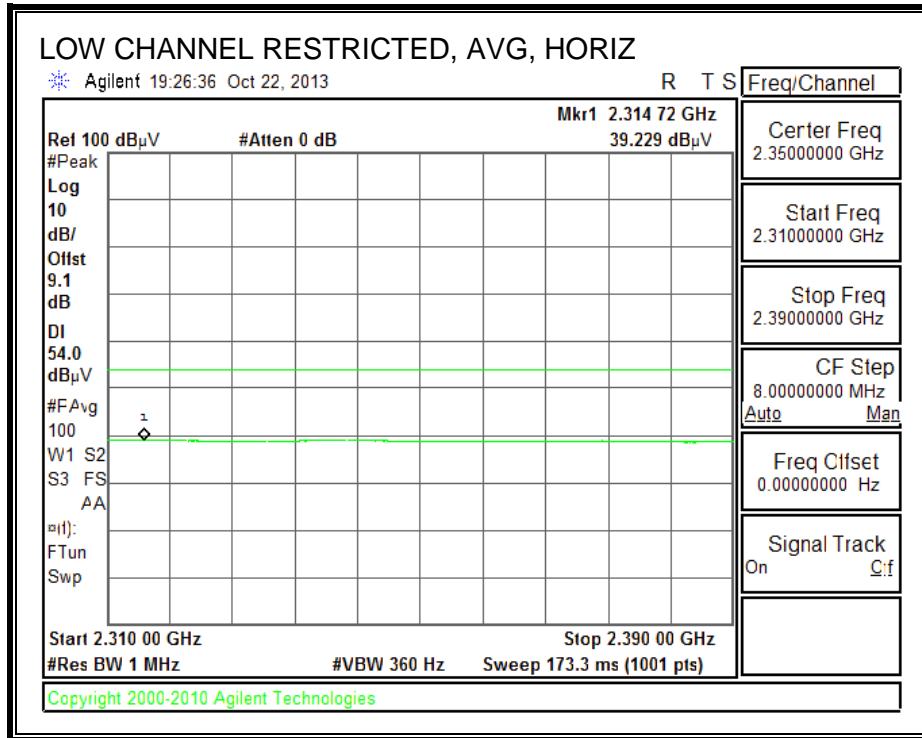
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.718	37.1	Avg	29.9	-24.3	42.7	54	-11.3	74	-31.3	0-360	100	H
2	1.85	44.32	Avg	30.8	-24.2	50.92	54	-3.08	74	-23.08	0-360	200	H
3	1.88	36.56	Avg	31	-24.2	43.36	54	-10.64	74	-30.64	0-360	200	H
4	1.719	36.1	Avg	29.9	-24.3	41.7	54	-12.3	74	-32.3	0-360	200	V
5	1.85	47.17	Avg	30.8	-24.2	53.77	54	-0.23	74	-20.23	0-360	200	V
6	1.88	35.33	Avg	31	-24.2	42.13	54	-11.87	74	-31.87	0-360	200	V

PK - Peak detector

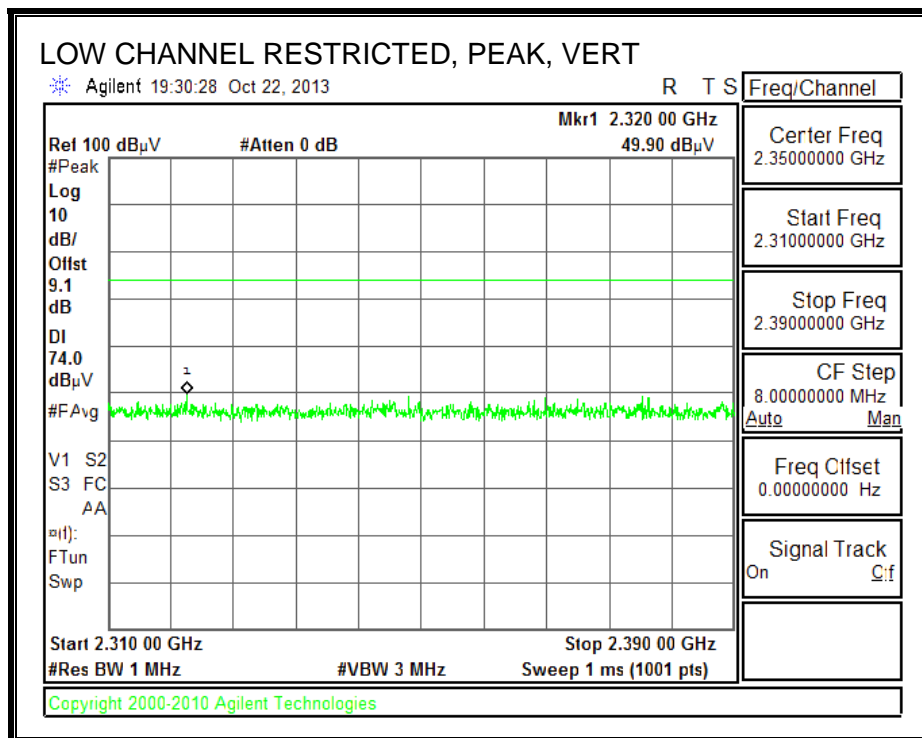
## 9.2.2. ENHANCED DATA RATE 8PSK MODULATION

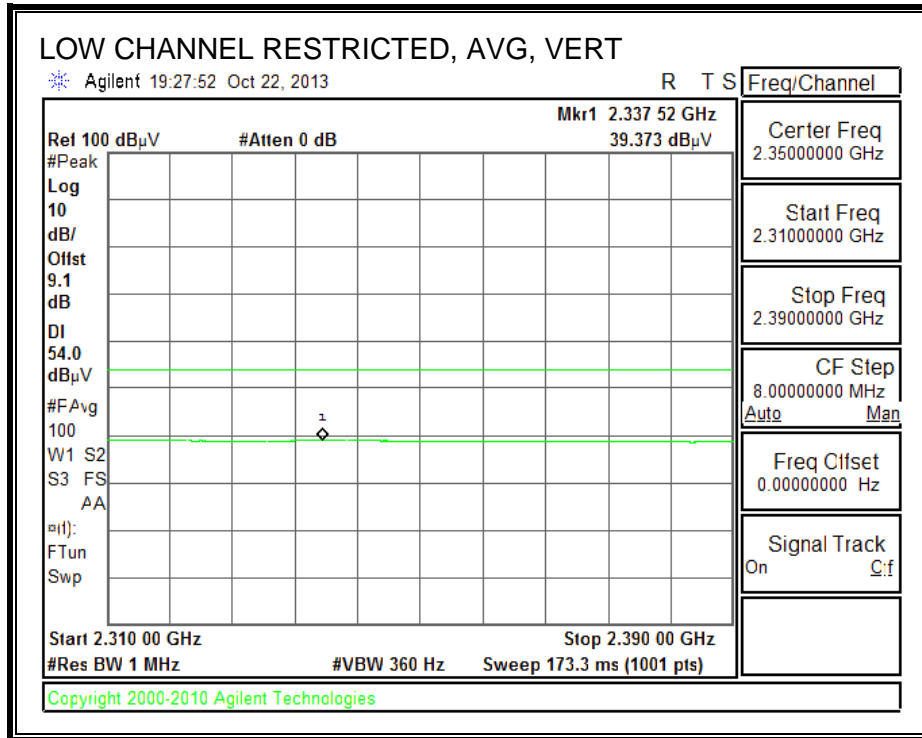
### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



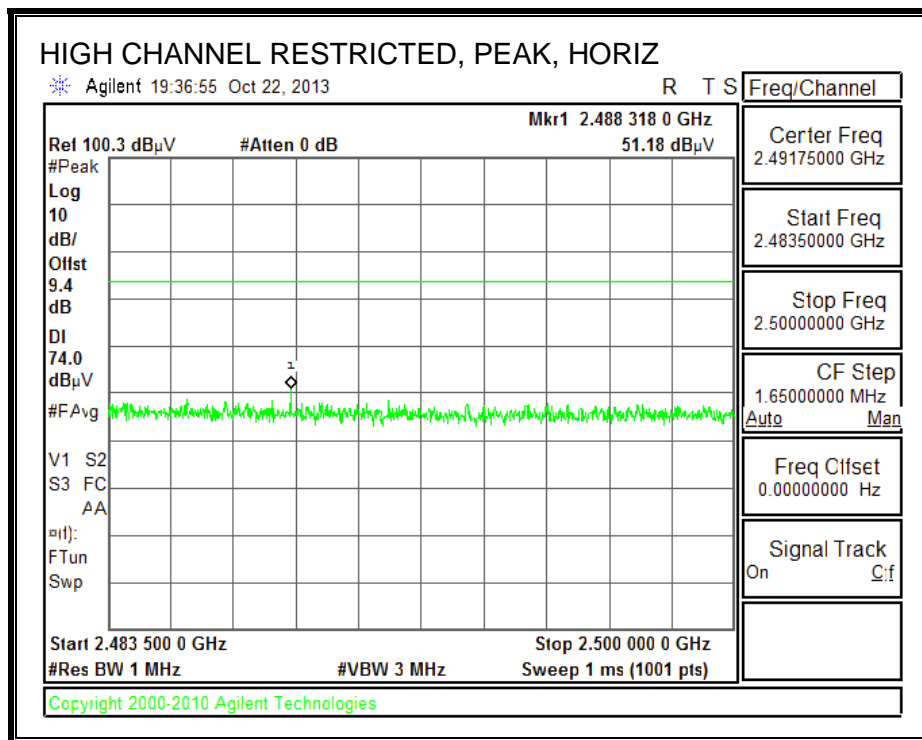


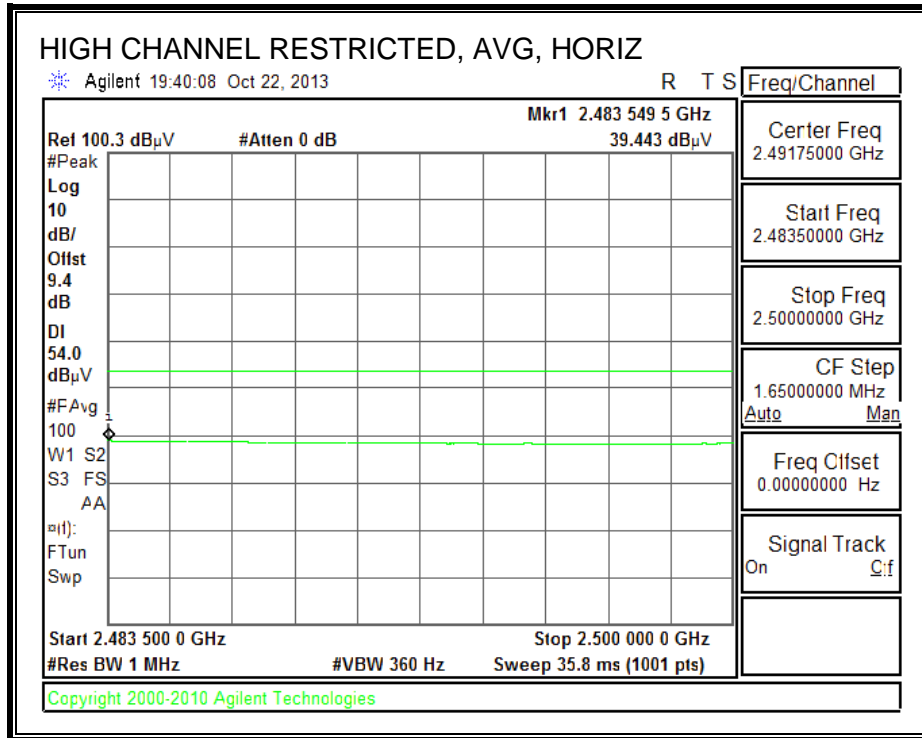
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



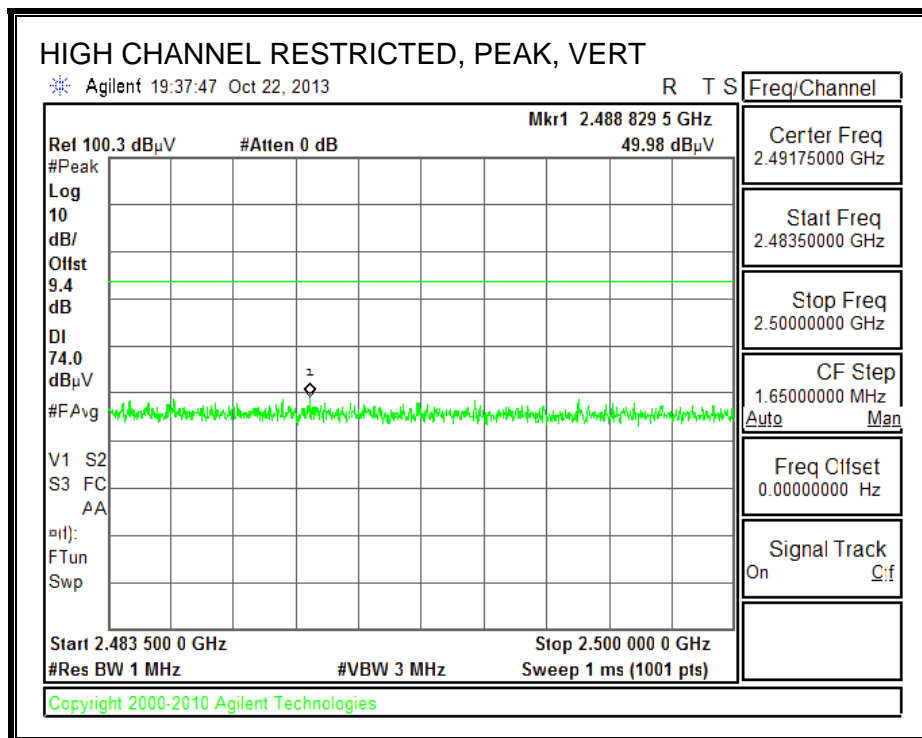


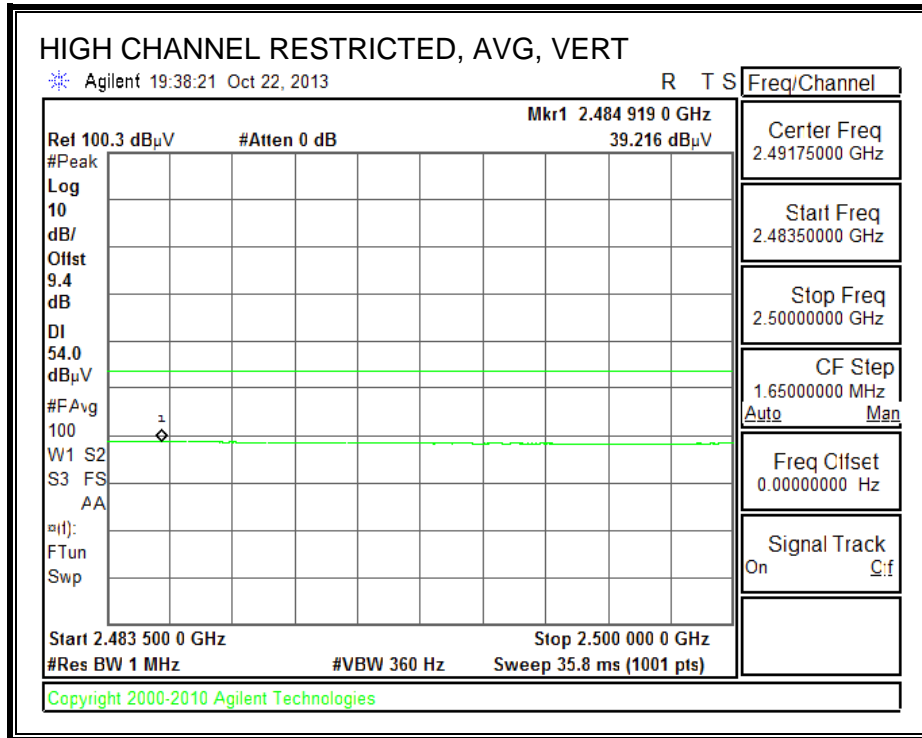
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





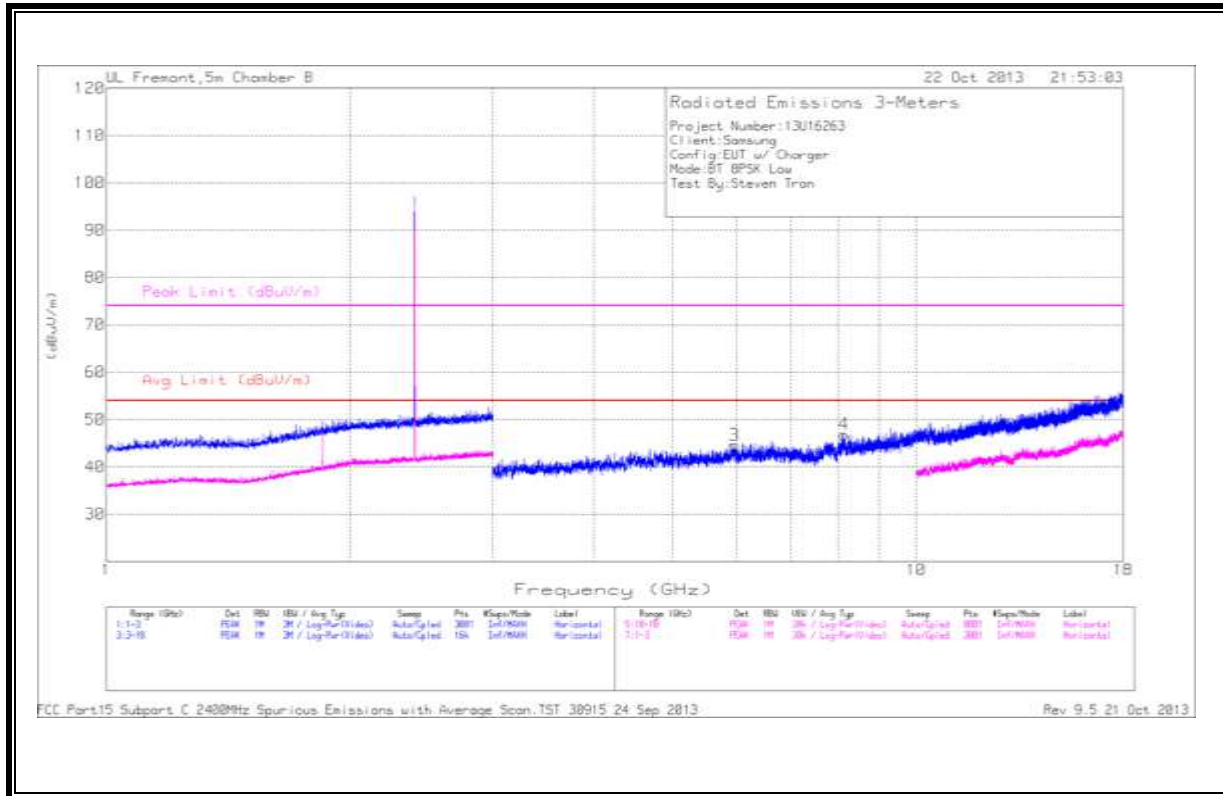
**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**





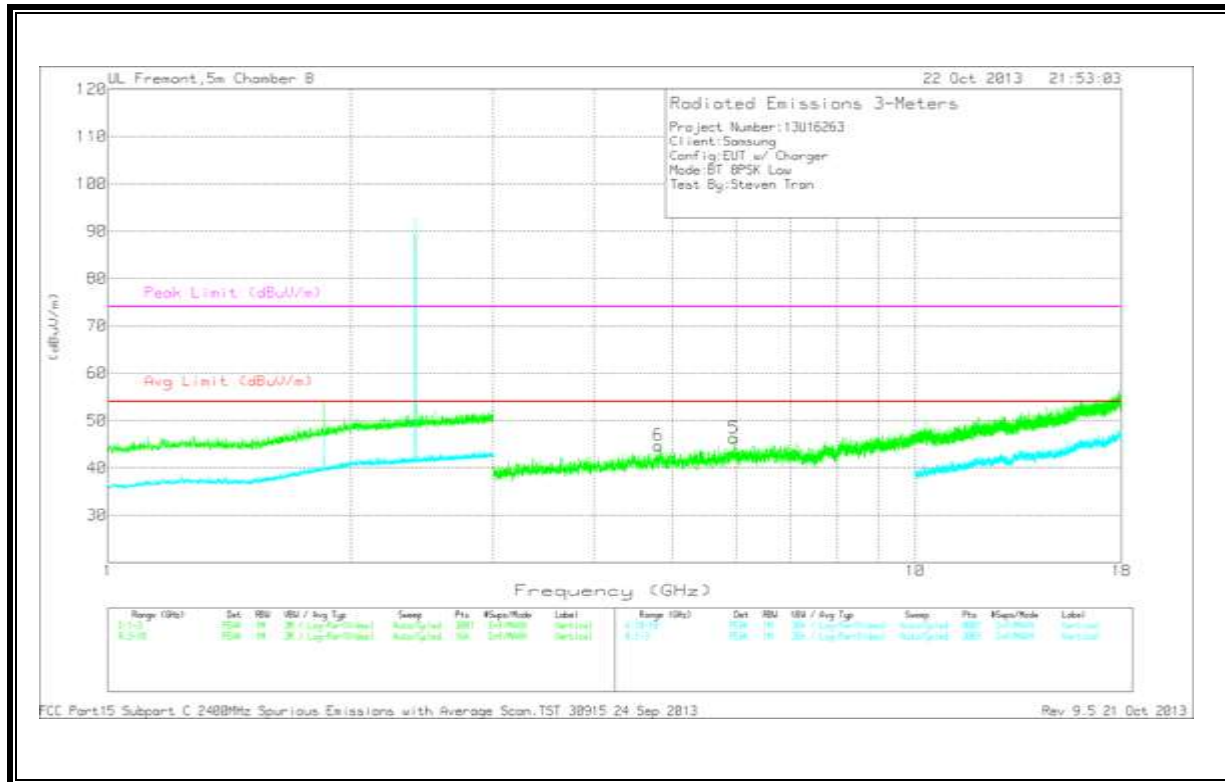
**HARMONICS AND SPURIOUS EMISSIONS**

LOW CHANNEL  
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



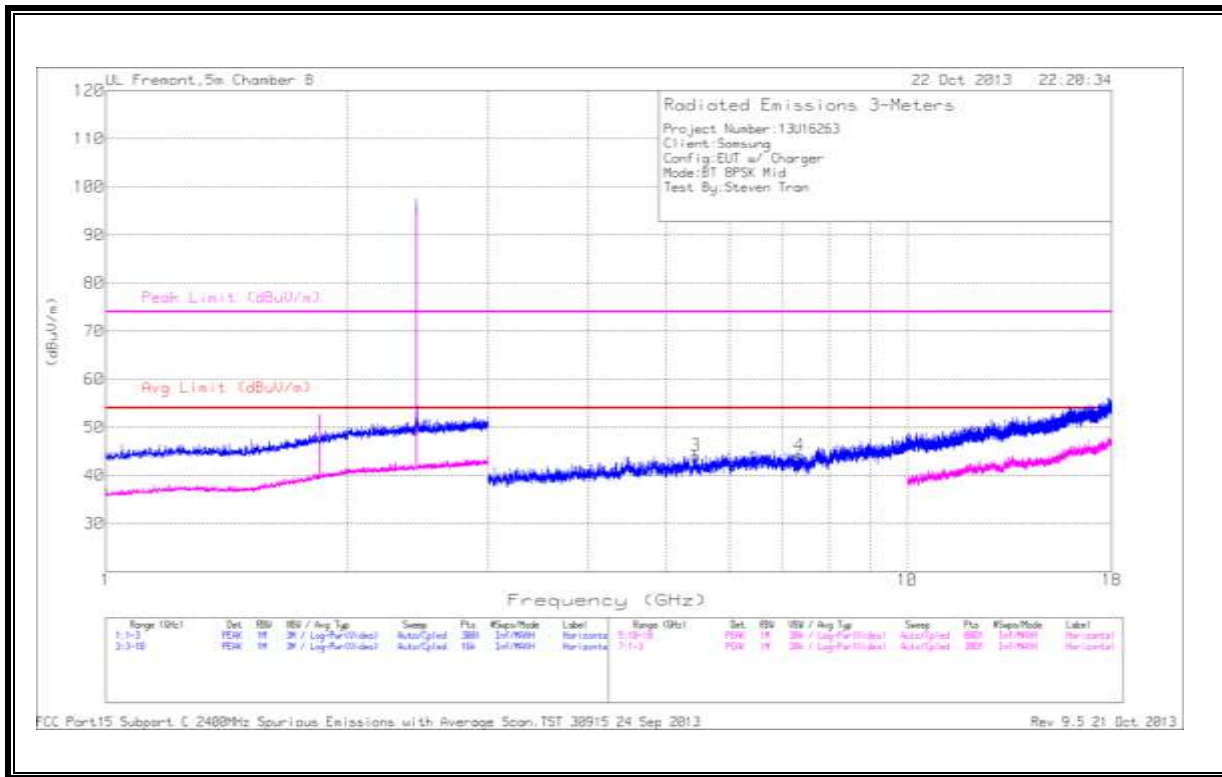
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.962	37.82	PK	35.8	-29.1	44.52	53.97	-9.45	74	-29.48	0-360	200	H
4	8.146	37.21	PK	36.1	-26.5	46.81	53.97	-7.16	74	-27.19	0-360	200	H
5	5.96	39.57	PK	35.8	-29.1	46.27	53.97	-7.7	74	-27.73	0-360	100	V
6	4.806	39.53	PK	34.7	-29.5	44.73	53.97	-9.24	74	-29.27	0-360	200	V
1	1.851	40.76	Avg	30.8	-24.2	47.36	54	-6.64	74	-26.64	0-360	100	H
2	1.85	41.08	Avg	30.8	-24.2	47.68	54	-6.32	74	-26.32	0-360	200	V

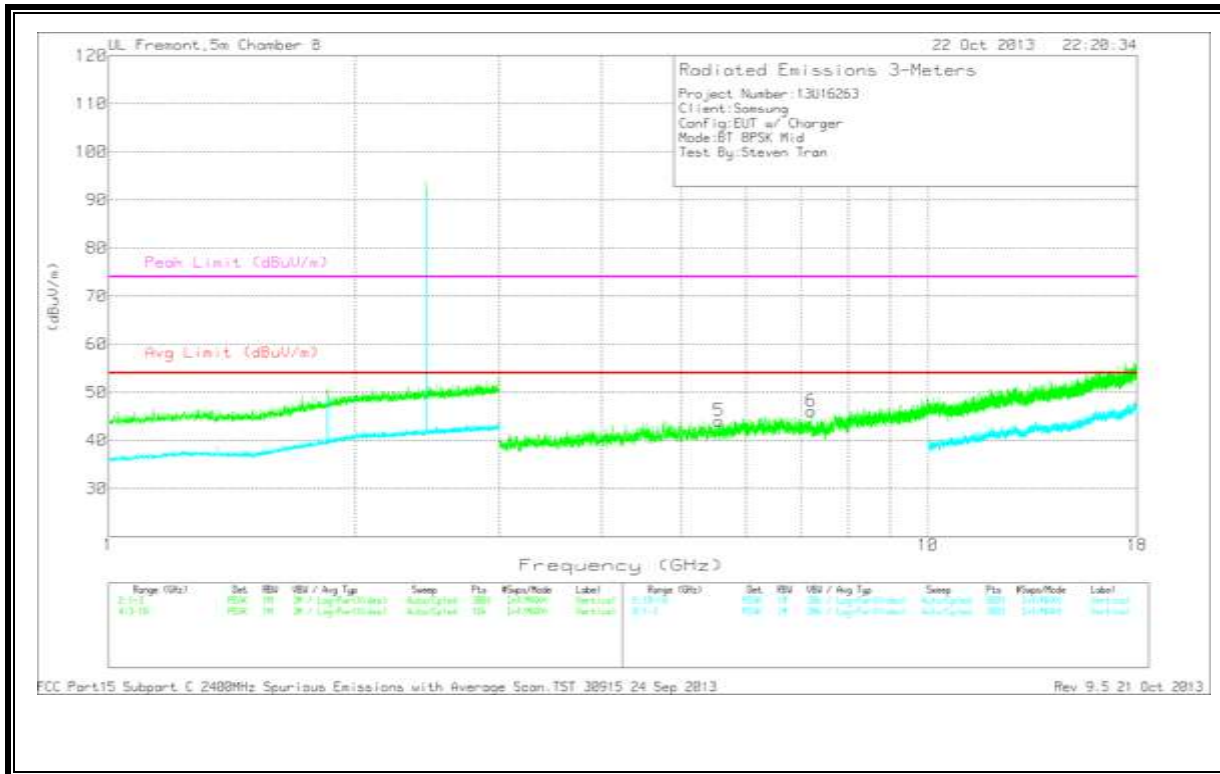
PK - Peak detector

MID CHANNEL  
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



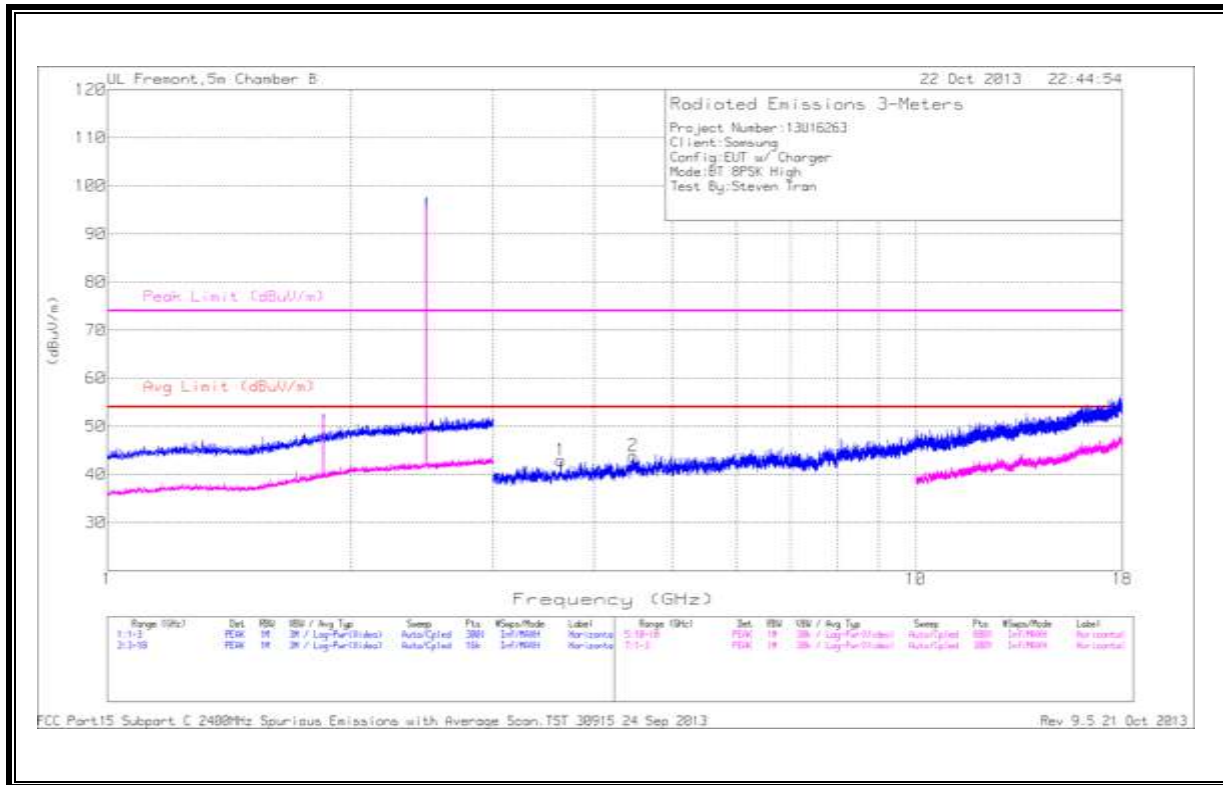
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.45	39.44	PK	34.9	-30.3	44.04	53.97	-9.93	74	-29.96	0-360	200	H
4	7.336	36.08	PK	35.9	-27.9	44.08	53.97	-9.89	74	-29.92	0-360	100	H
5	5.561	38.94	PK	35	-29.9	44.04	53.97	-9.93	74	-29.96	0-360	100	V
6	7.205	37.47	PK	35.8	-27.2	46.07	53.97	-7.9	74	-27.93	0-360	200	V
1	1.85	46.19	Avg	30.8	-24.2	52.79	54	-1.21	74	-21.21	0-360	200	H
2	1.85	42.85	Avg	30.8	-24.2	49.45	54	-4.55	74	-24.55	0-360	200	H

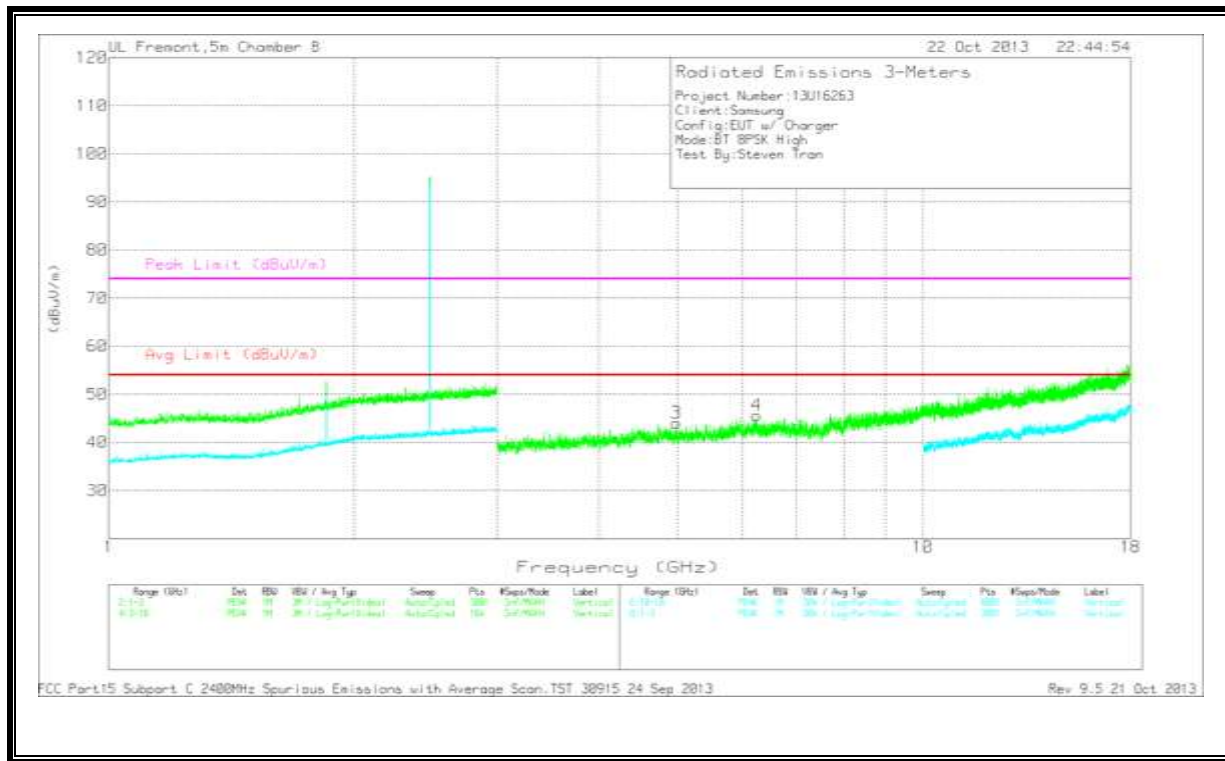
PK - Peak detector

HIGH CHANNEL  
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

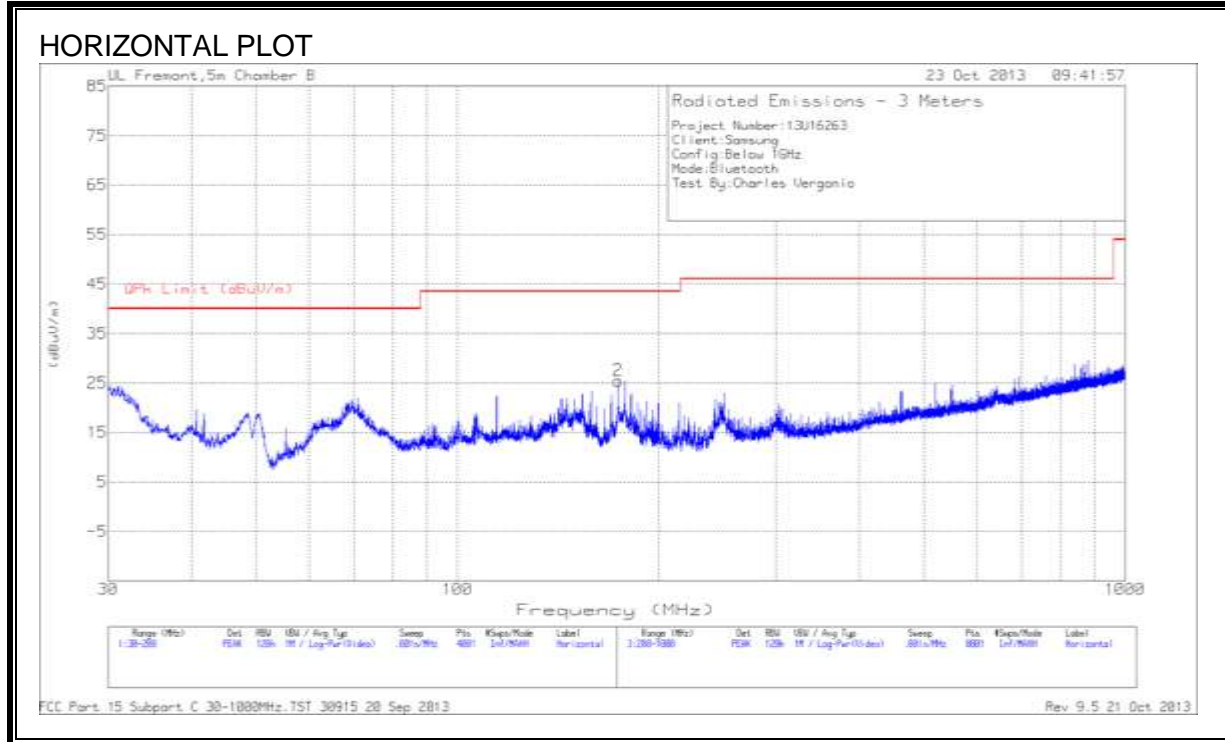
HIGH CHANNEL DATA

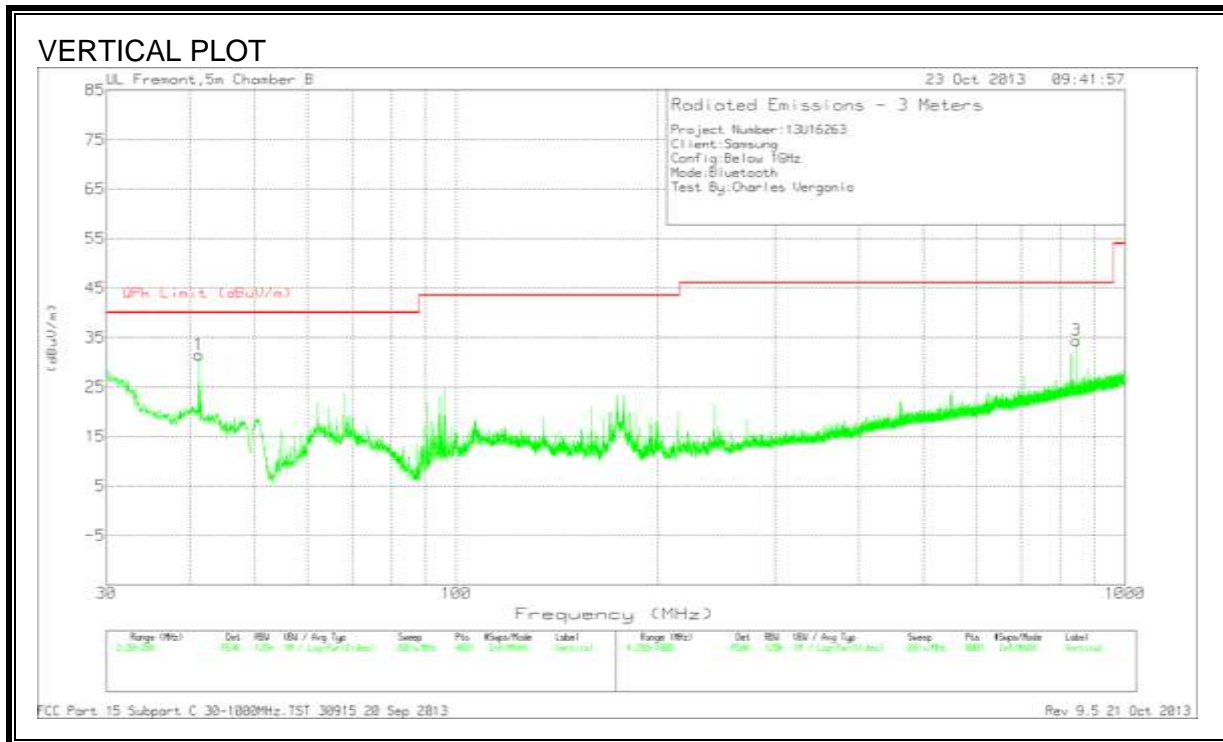
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.64	41.19	PK	33.5	-31.8	42.89	53.97	-11.08	74	-31.11	0-360	100	H
2	4.472	38.53	PK	34.5	-29.2	43.83	53.97	-10.14	74	-30.17	0-360	200	H
3	4.979	39.81	PK	34.6	-30.4	44.01	53.97	-9.96	74	-29.99	0-360	100	V
4	6.249	38.18	PK	36	-28.6	45.58	53.97	-8.39	74	-28.42	0-360	200	V
5	1.85	45.31	Avg	30.8	-24.2	51.91	53.97	-2.06	74	-22.09	0-360	200	H
6	1.85	42.94	Avg	30.8	-24.2	49.54	53.97	-4.43	74	-24.46	0-360	200	V

PK - Peak detector

### 9.3. WORST-CASE BELOW 1 GHz

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





DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl/Filtr/Pa d (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	174.075	41.35	PK	11.2	-27.1	25.45	43.52	-18.07	0-360	100	H
1	41.2625	47.66	PK	12.5	-28.7	31.46	40	-8.54	0-360	100	V
3	845.7	36.32	PK	21.7	-23.6	34.42	46.02	-11.6	0-360	200	V

PK - Peak detector

## 10. 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**

**Line-L1 .15 - 30MHz**

**Trace Markers**

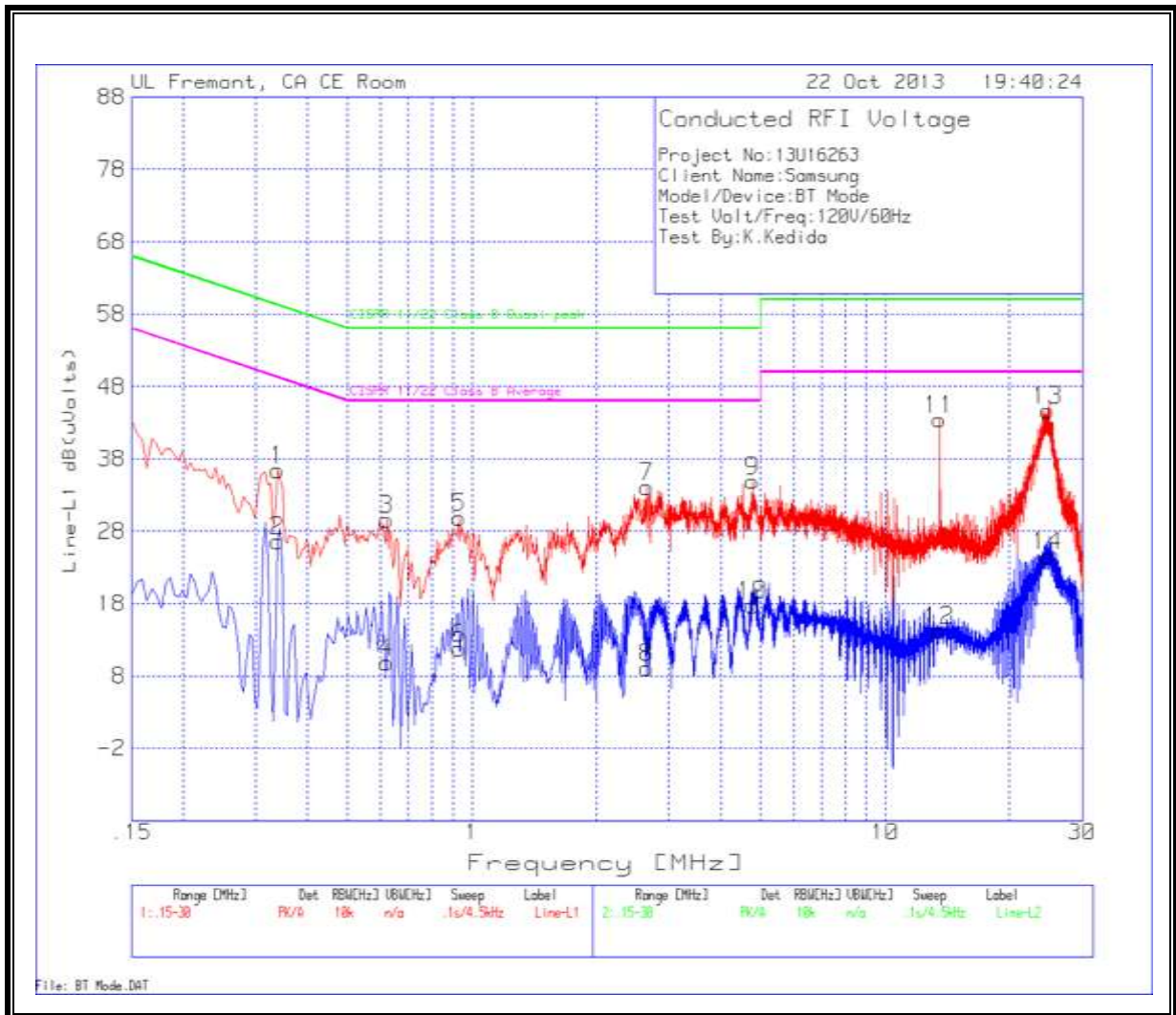
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
1	.339	36.31	PK	.1	0	36.41	59.2	-22.79	-	-
2	.339	26.52	Av	.1	0	26.62	-	-	49.2	-22.58
3	.6225	29.44	PK	.1	0	29.54	56	-26.46	-	-
4	.6225	9.82	Av	.1	0	9.92	-	-	46	-36.08
5	.933	29.77	PK	.1	0	29.87	56	-26.13	-	-
6	.933	11.74	Av	.1	0	11.84	-	-	46	-34.16
7	2.6565	33.86	PK	.1	.1	34.06	56	-21.94	-	-
8	2.6565	8.93	Av	.1	.1	9.13	-	-	46	-36.87
9	4.767	34.74	PK	.1	.1	34.94	56	-21.06	-	-
10	4.767	17.57	Av	.1	.1	17.77	-	-	46	-28.23
11	13.5555	43.05	PK	.2	.2	43.45	60	-16.55	-	-
12	13.5555	13.89	Av	.2	.2	14.29	-	-	50	-35.71
13	24.6975	43.93	PK	.4	.3	44.63	60	-15.37	-	-
14	24.6975	23.84	Av	.4	.3	24.54	-	-	50	-25.46

**Line-L2 .15 - 30MHz**

**Trace Markers**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
15	.339	35.62	PK	.1	0	35.72	59.2	-23.48	-	-
16	.339	25.86	Av	.1	0	25.96	-	-	49.2	-23.24
17	.933	26.96	PK	.1	0	27.06	56	-28.94	-	-
18	.933	17.52	Av	.1	0	17.62	-	-	46	-28.38
19	1.356	28.54	PK	.1	.1	28.74	56	-27.26	-	-
20	1.356	8.4	Av	.1	.1	8.6	-	-	46	-37.4
21	4.7535	27.68	PK	.1	.1	27.88	56	-28.12	-	-
22	4.7535	14.82	Av	.1	.1	15.02	-	-	46	-30.98
23	24.432	33.12	PK	.4	.2	33.72	60	-26.28	-	-
24	24.432	17.74	Av	.4	.2	18.34	-	-	50	-31.66

**LINE 1 RESULTS**



**LINE 2 RESULTS**

