



**FCC CFR47 PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 ISSUE 7**

**CERTIFICATION TEST REPORT**

**FOR**

**BLUETOOTH TOUCHPAD REMOTE**

**MODEL NUMBER: VP4750**

**FCC ID: GT3FC006**

**IC: 3683A-FC006**

**REPORT NUMBER: 08J12252-1**

**ISSUE DATE: DECEMBER 04, 2008**

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**NVLAP LAB CODE 200065-0**

Revision History

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Rev.	Issue Date	Revisions	Revised By
--	12/04/2008	Initial Issue	F. Ibrahim

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SMK CORPORATION  
5-5 TOGOSHI 6-CHOME SHINAGAWA-KU  
TOKYO, 142-8511, JAPAN

**EUT DESCRIPTION:** BLUETOOTH TOUCHPAD REMOTE

**MODEL:** VP4750

**SERIAL NUMBER:** NO.1

**DATE TESTED:** NOVEMBER 19 - 26, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 2	Pass

Compliance Certification Services, Inc. (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 CCS based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

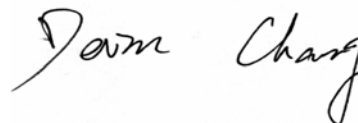
**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:



FRANK IBRAHIM  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

Tested By:



DEVIN CHANG  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

## 3. FACILITIES AND ACCREDITATION

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

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. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a Bluetooth transceiver (BLUETOOTH TOUCHPAD REMOTE).

The radio module is manufactured by SMK.

### 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	4.06	2.55
2402 - 2480	Enhanced 8PSK	1.90	1.55

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Dipole antenna, with a maximum gain of 2 dBi.

### 5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was RF Test Tool (ver.1.2.1B /m)

### 5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

The EUT is a portable device that has three orientations; therefore X, Y and Z orientations have been investigated. The worst case was found to be Y orientation.

## 5.6. DESCRIPTION OF TEST SETUP

### 5.6.1. SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
Laptop PC	HP	Pavillopn dv1000	CNF62007RV	DOC
AC Adaptor	HP	PP P009L	592C40ARGT2USB	DOC

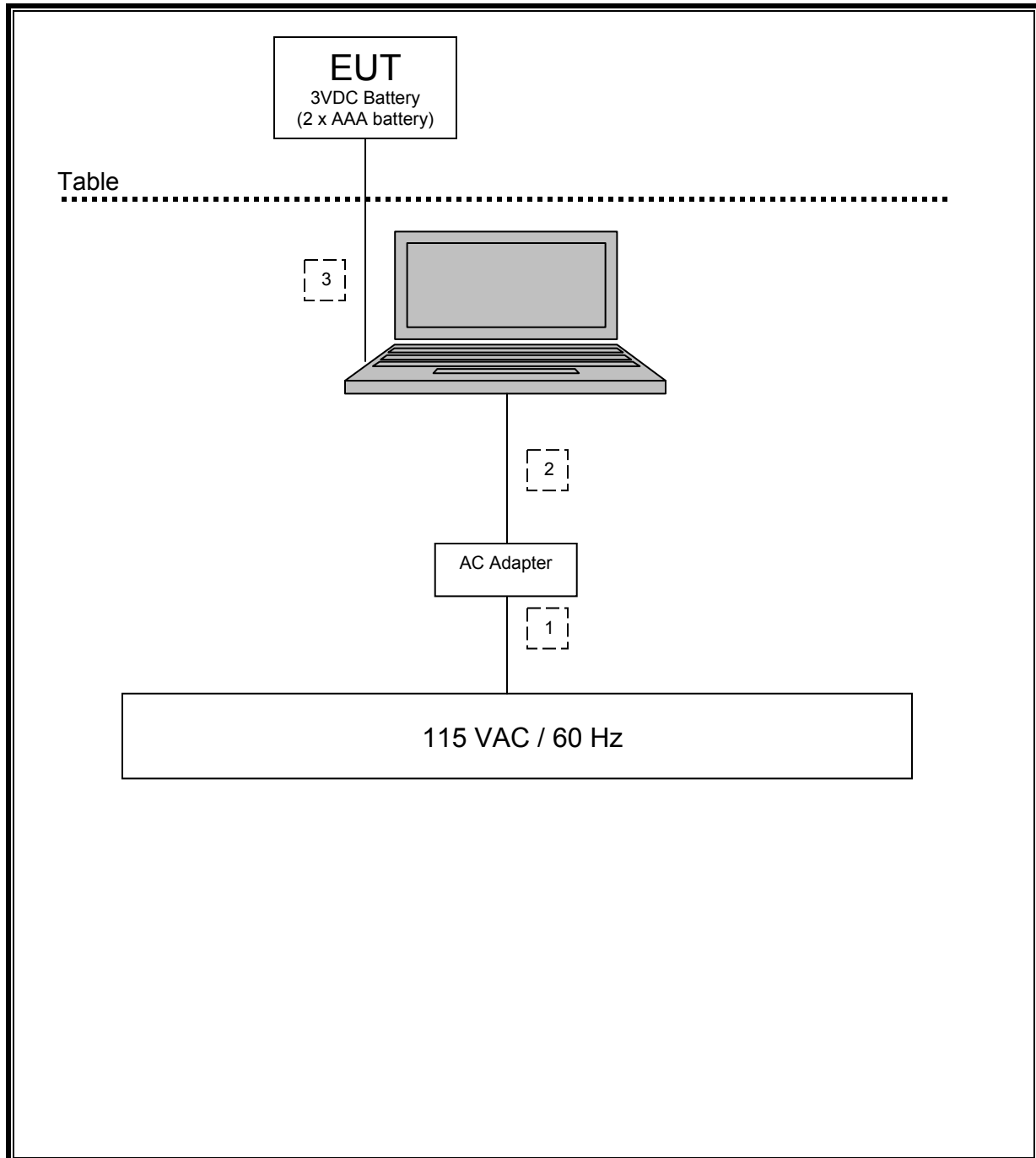
### 5.6.2. I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	US 115V	Un-shielded	1.8m	N/A
2	DC	1	DC	Un-shielded	1.8m	N/A
3	USB	1	3 pins connect	Un-shielded	0.1m	N/A

### 5.6.3. TEST SETUP

The EUT is connected to a laptop computer via USB cable, a test software was used to set up the EUT in TX or RX mode, and then laptop was removed from the test area.

**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, Horn, 18 GHz	EMCO	3115	C00945	04/22/08	04/22/09
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	09/27/07	11/27/08
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	02/11/08	02/11/09
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	04/08/08	10/08/09
Preamp, 1000MHz	Sonoma	310N	N02891	03/31/08	03/31/09
Spectrum Analyzer, 40 GHz	Agilent / HP	8564E	C00951	09/05/07	12/05/08
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	09/19/08	09/19/09
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	09/19/08	09/19/09
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	09/29/08	09/29/09
Power Meter	Agilent / HP	437B	N02778	11/04/08	08/04/10
Power Sensor, 18 GHz	Agilent / HP	8481A	N02782	04/22/08	10/22/09
2.4 GHz High Pass Filter	Micro Tronics	BRC13192	N02683	CNR	CNR
Highpass Filter, 4.0 GHz	Micro-Tronics	HPM13351	N02708	CNR	CNR
DC power supply	Agilent / HP	E3610A	CNR	CNR	CNR

## 7. ANTENNA PORT TEST RESULTS

### 7.1. 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

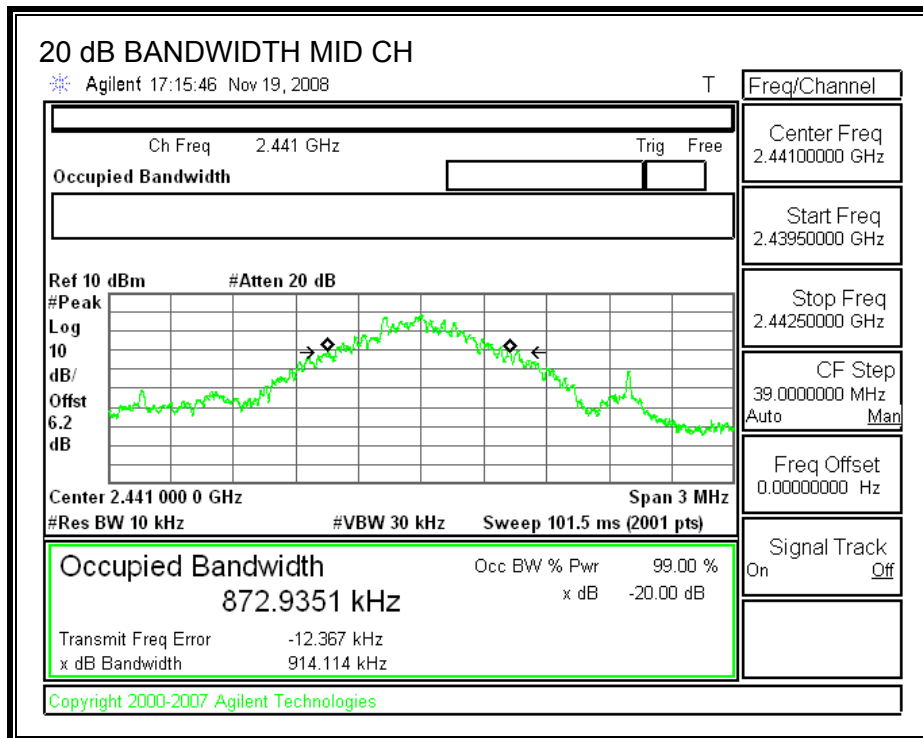
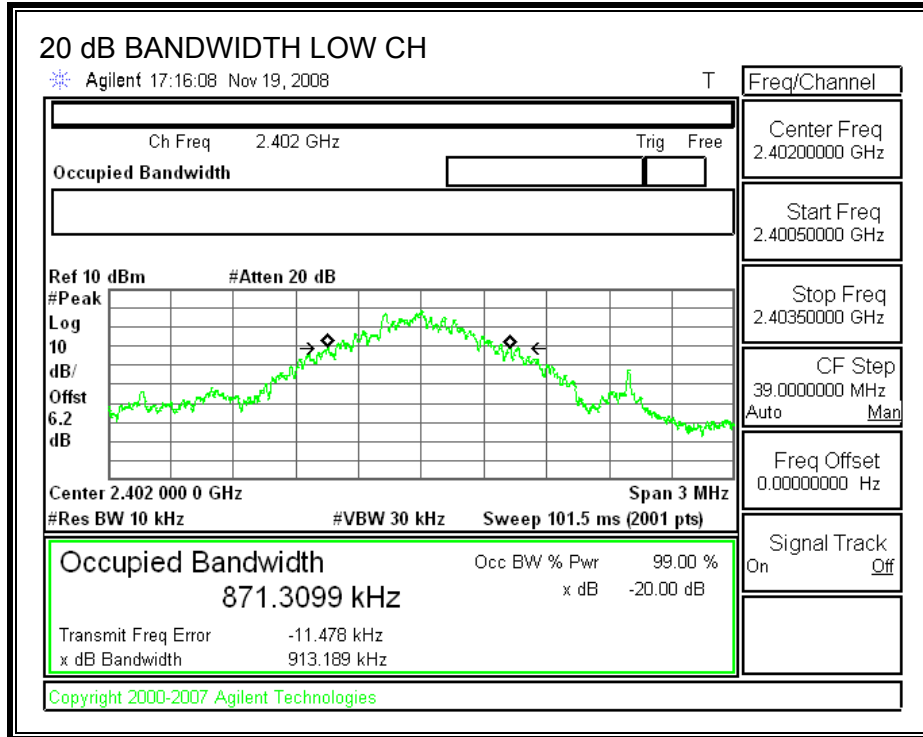
##### GFSK

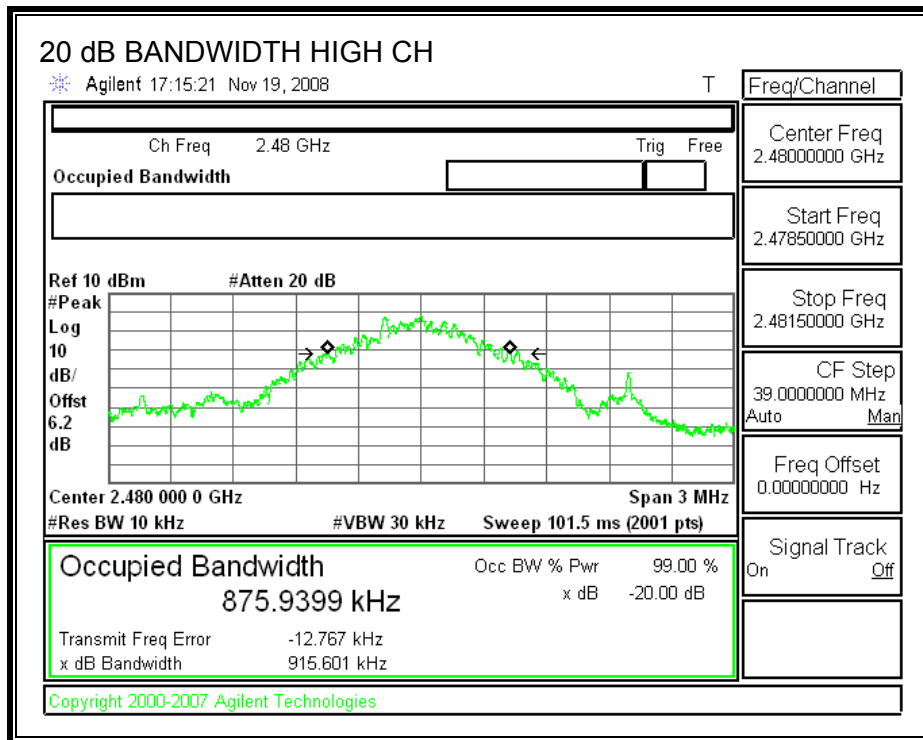
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	913.189	871.4399
Middle	2441	914.114	874.1724
High	2480	915.601	874.6067

##### 8PSK

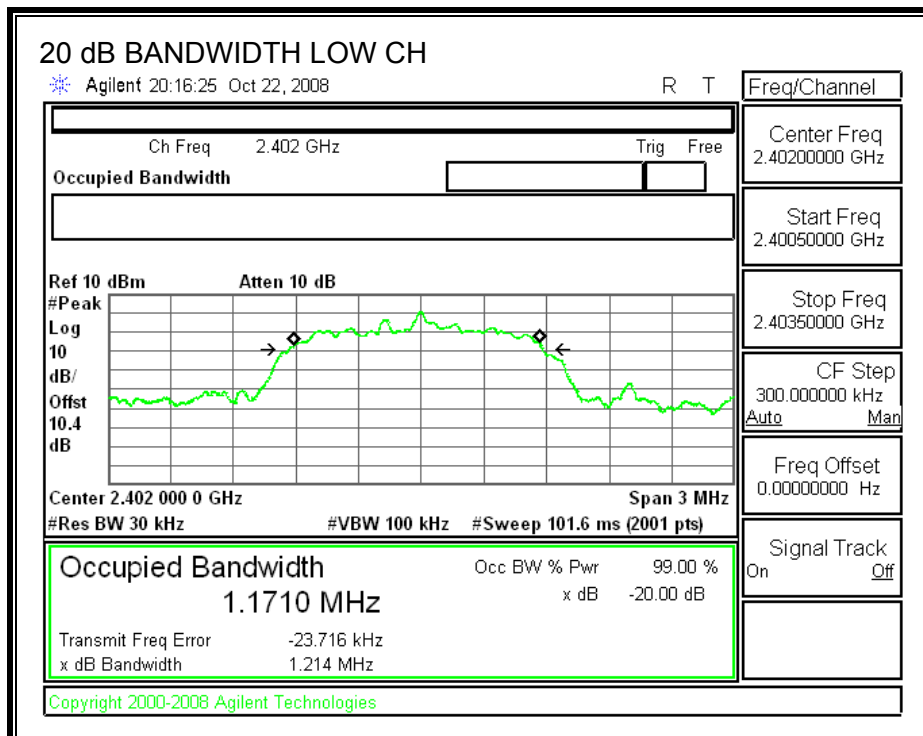
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1214	1152.3
Middle	2441	1221	1176.2
High	2480	1222	1149.7

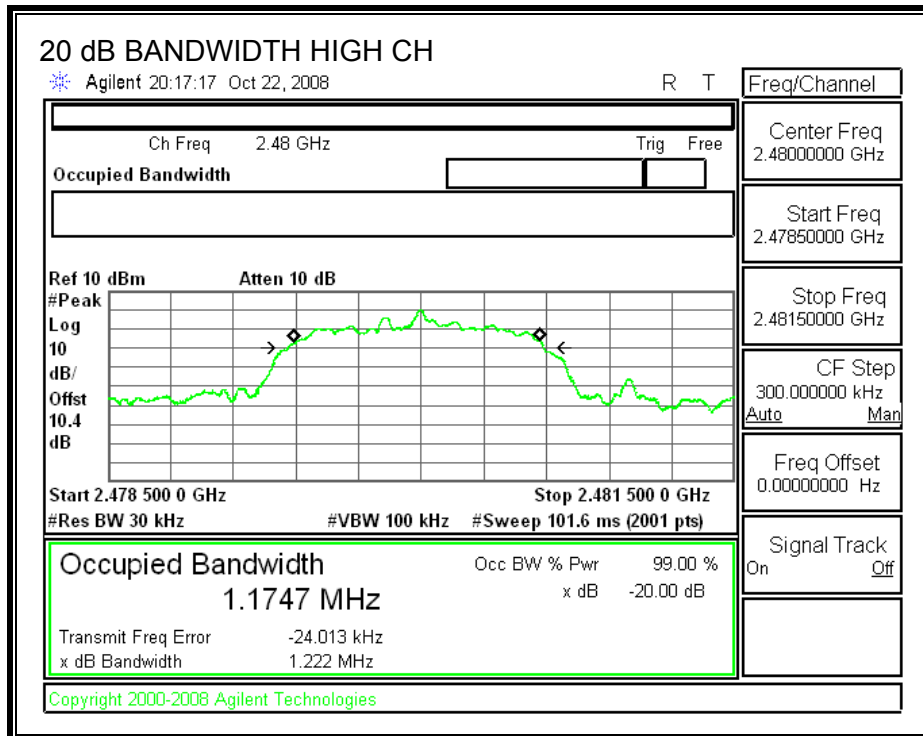
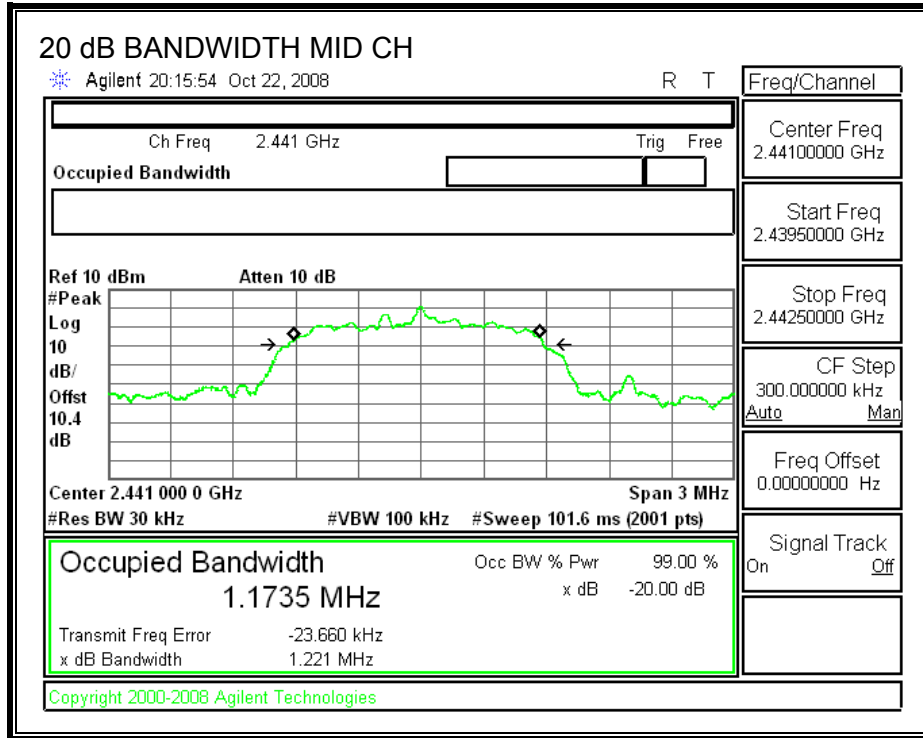
**20 dB BANDWIDTH**  
**GFSK**



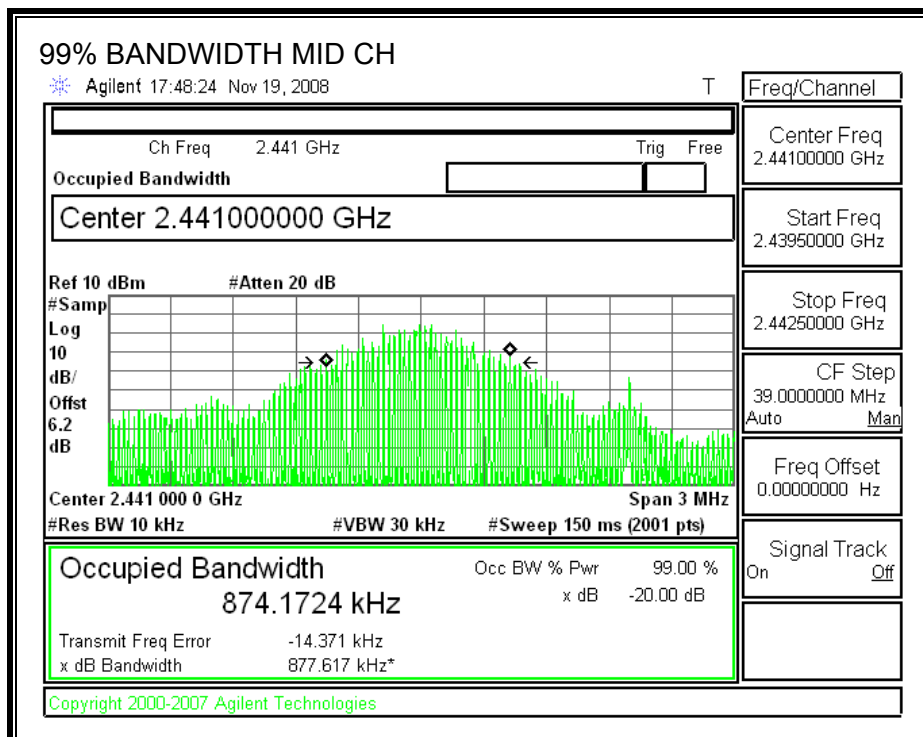
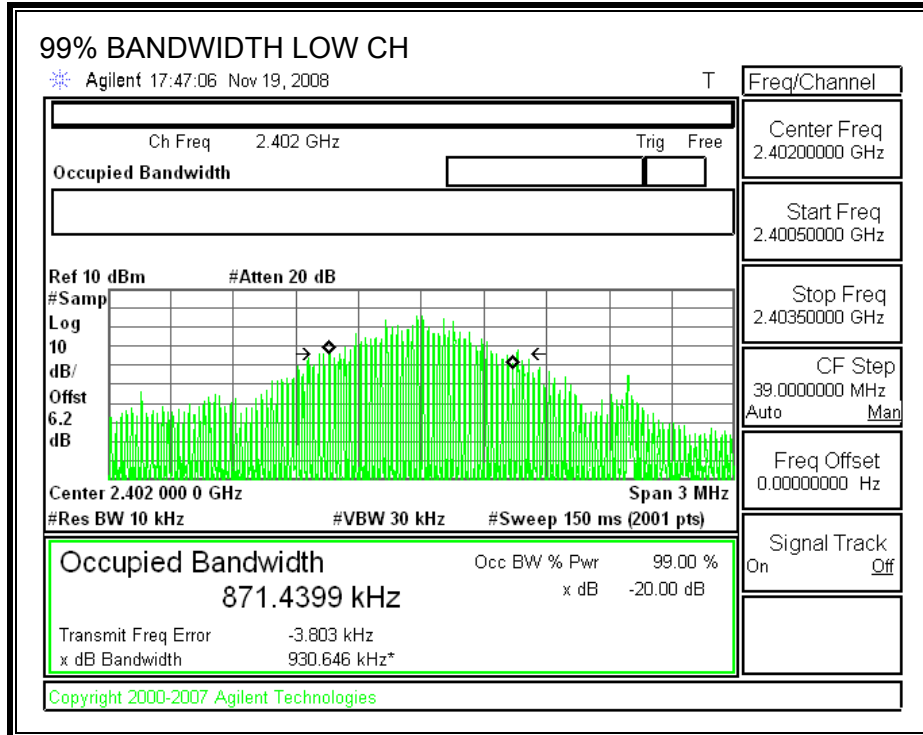


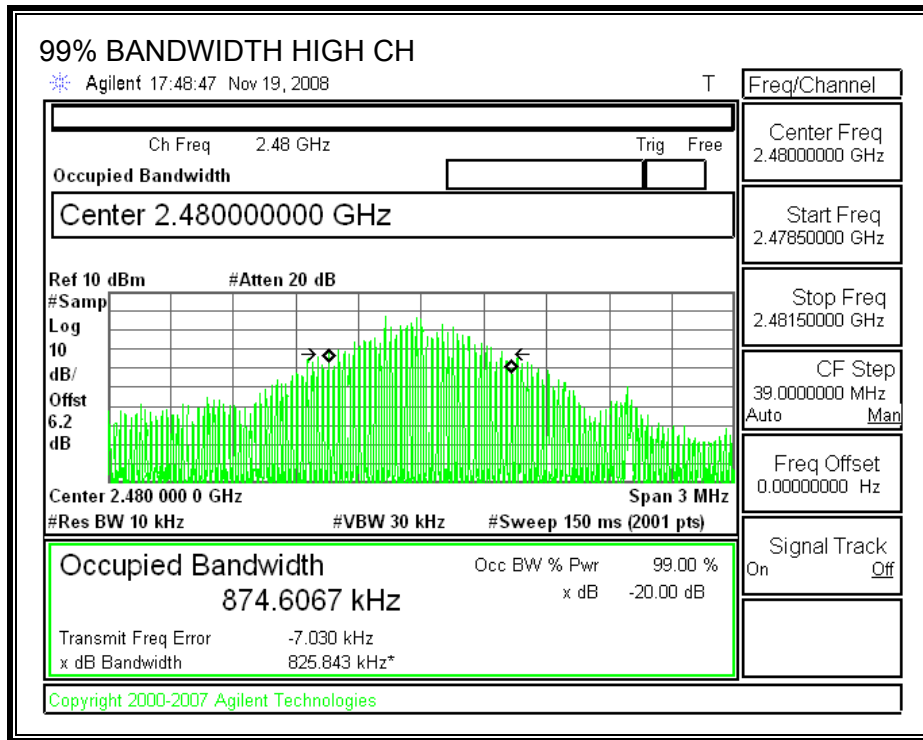
**8PSK**



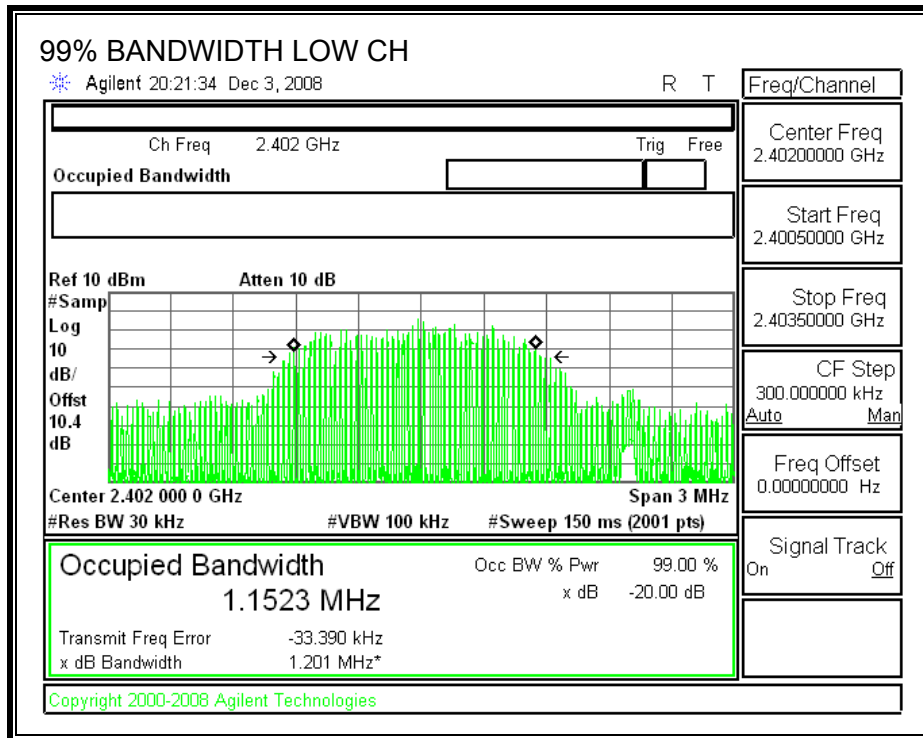


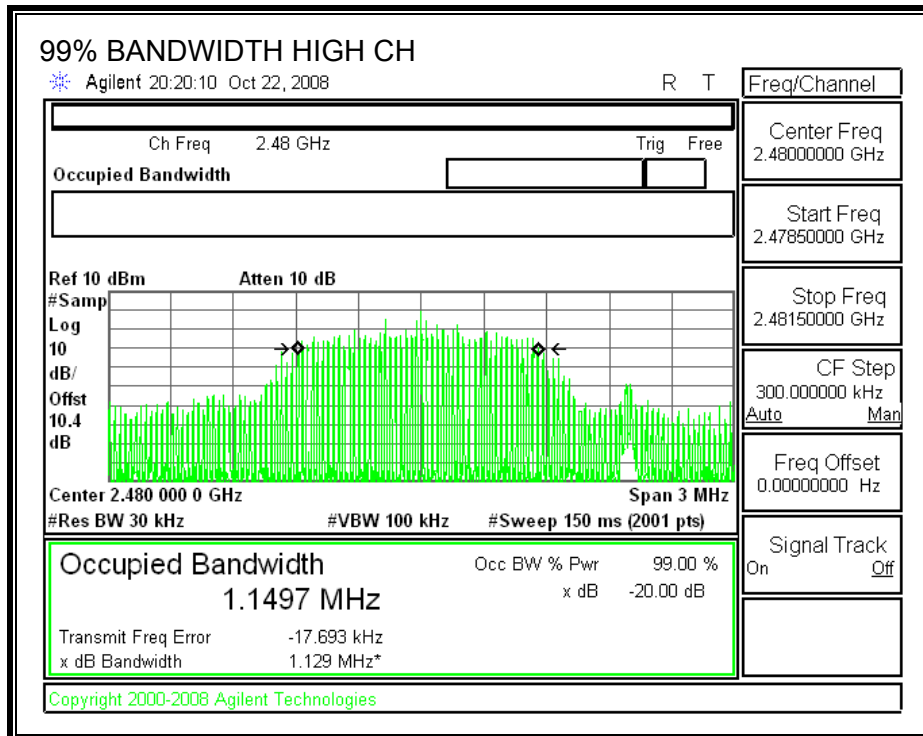
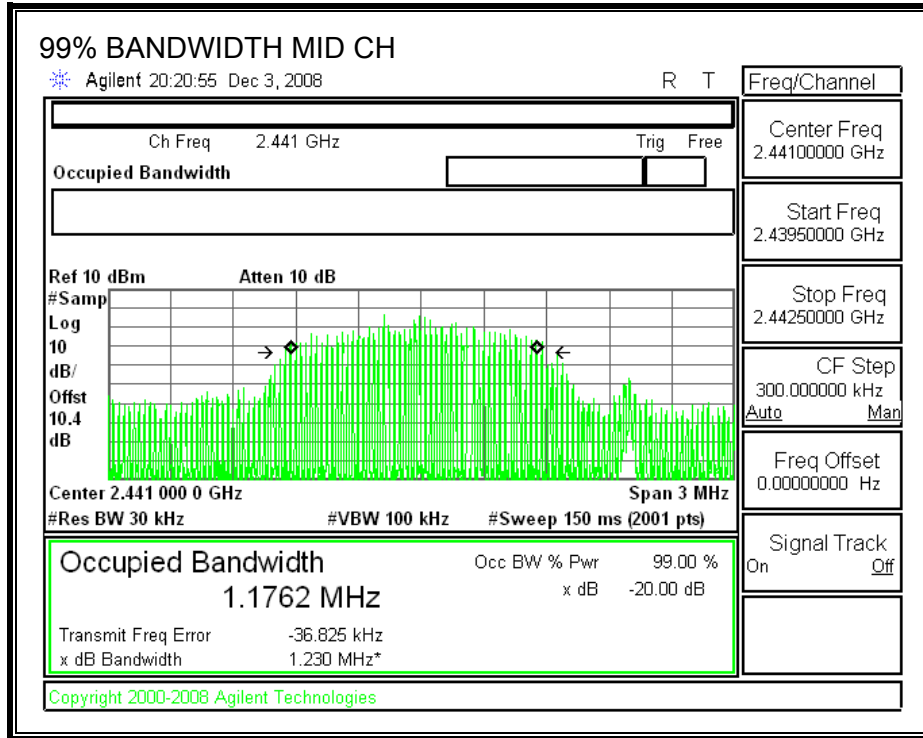
**99% BANDWIDTH**  
**GFSK**





**8PSK**







## **7.2. 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.

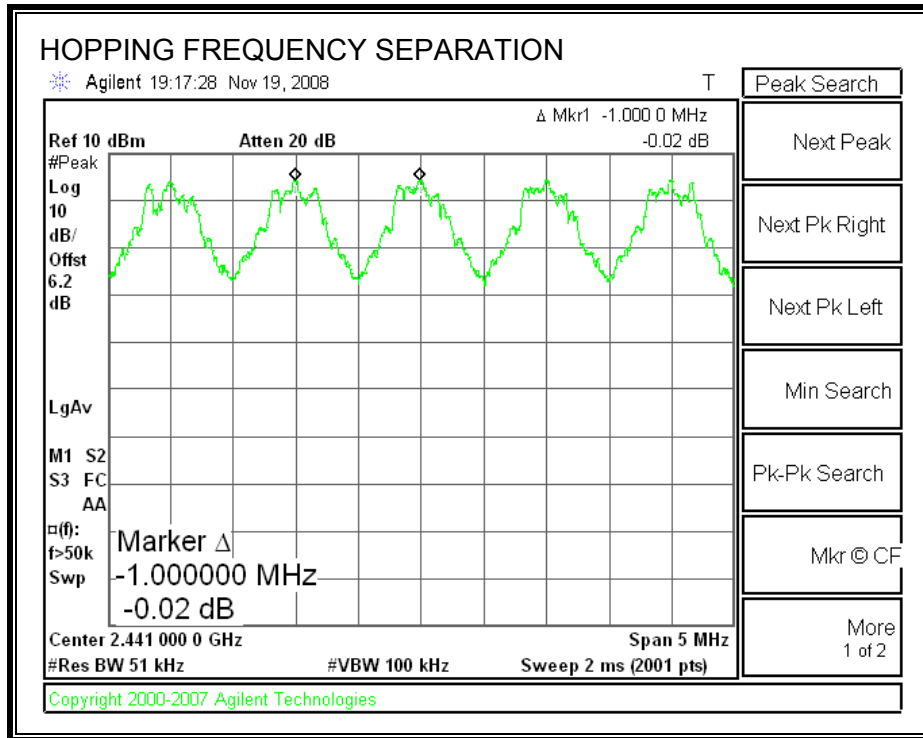
### **TEST PROCEDURE**

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.

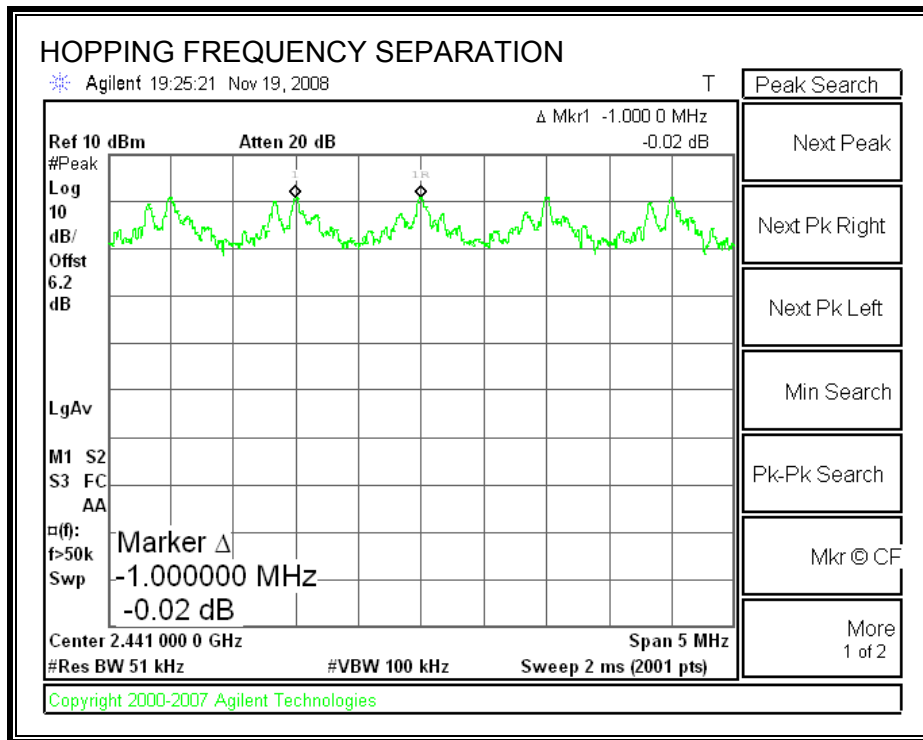
**RESULTS**

**HOPPING FREQUENCY SEPARATION**

**GFSK**



**8PSK**



### **7.3. NUMBER OF HOPPING CHANNELS**

#### **LIMIT**

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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

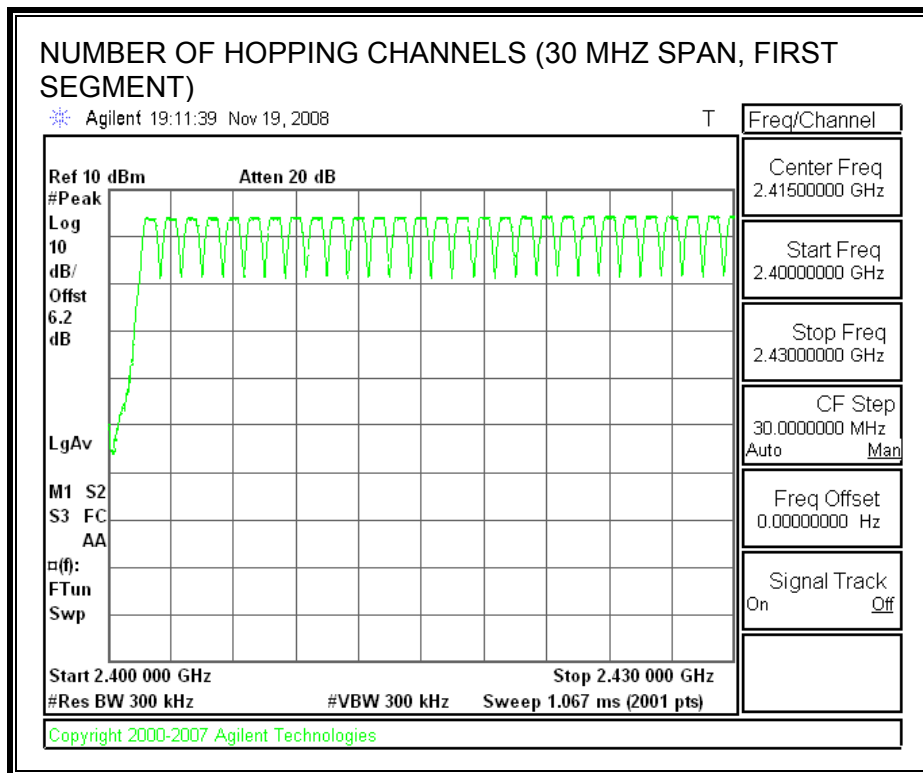
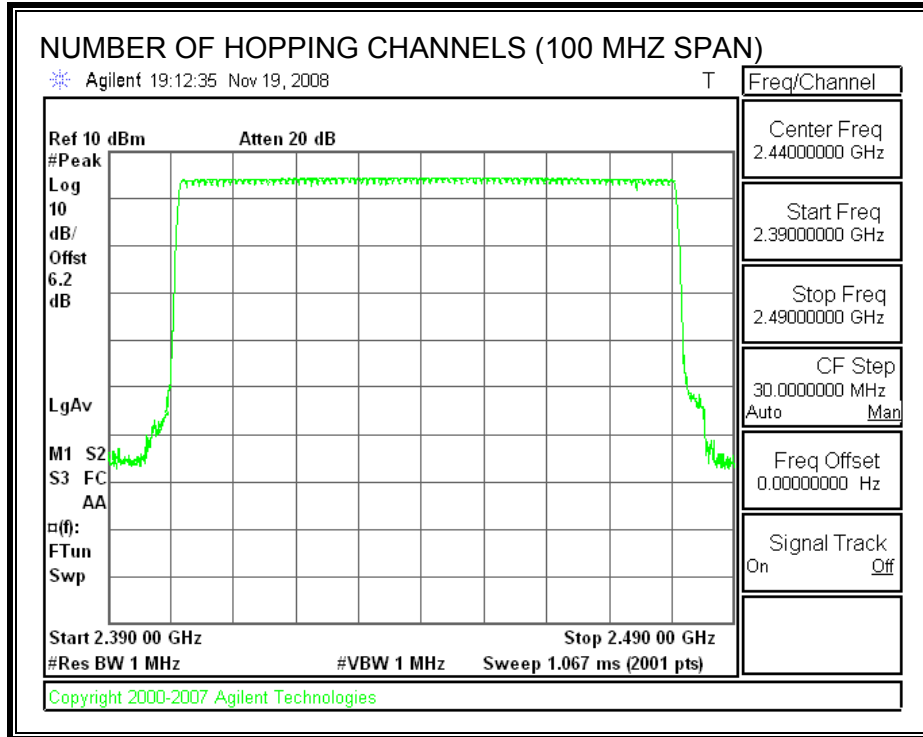
#### **TEST PROCEDURE**

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

#### **RESULTS**

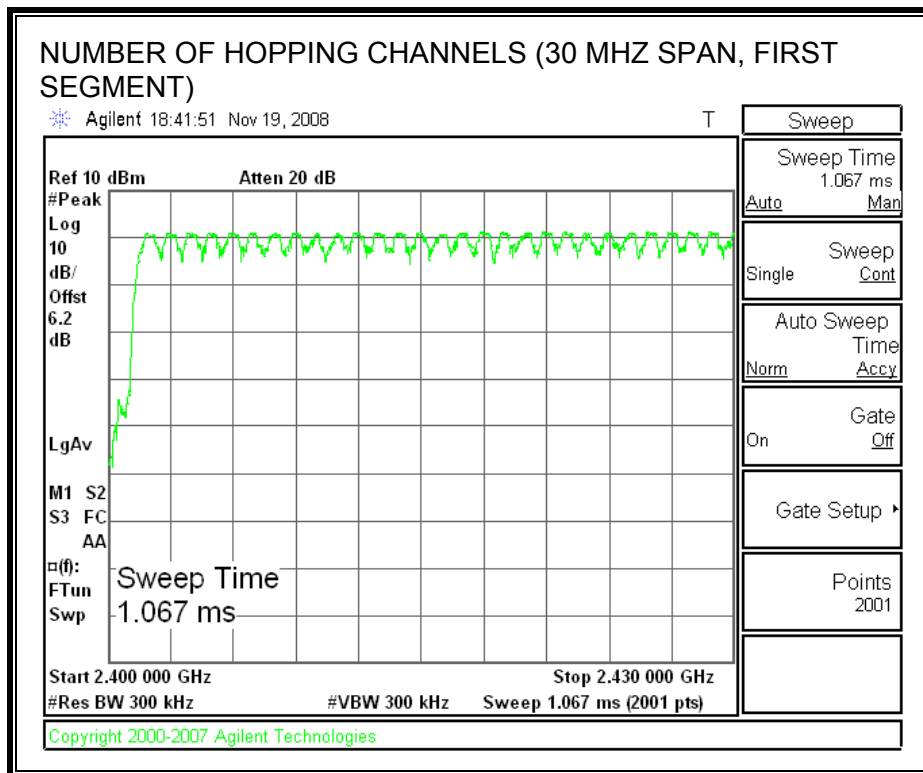
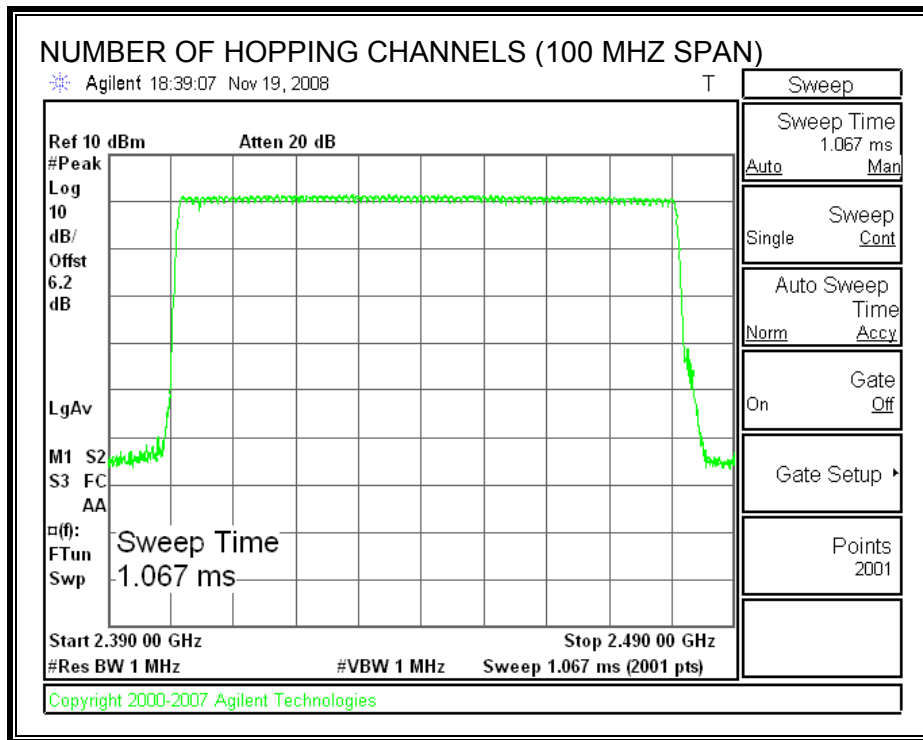
79 Channels observed.

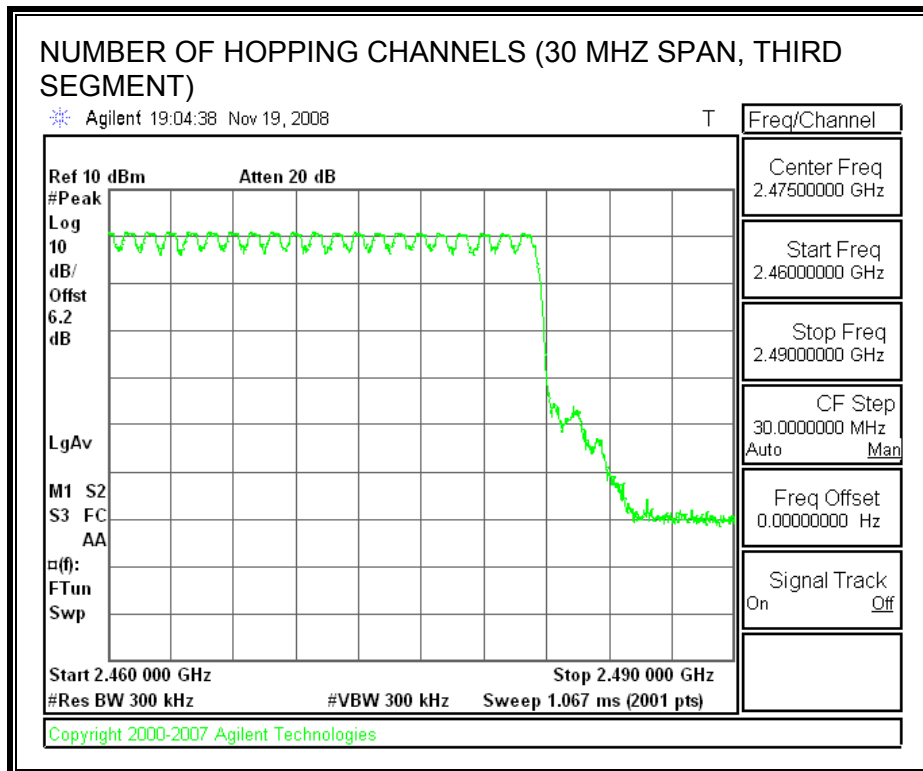
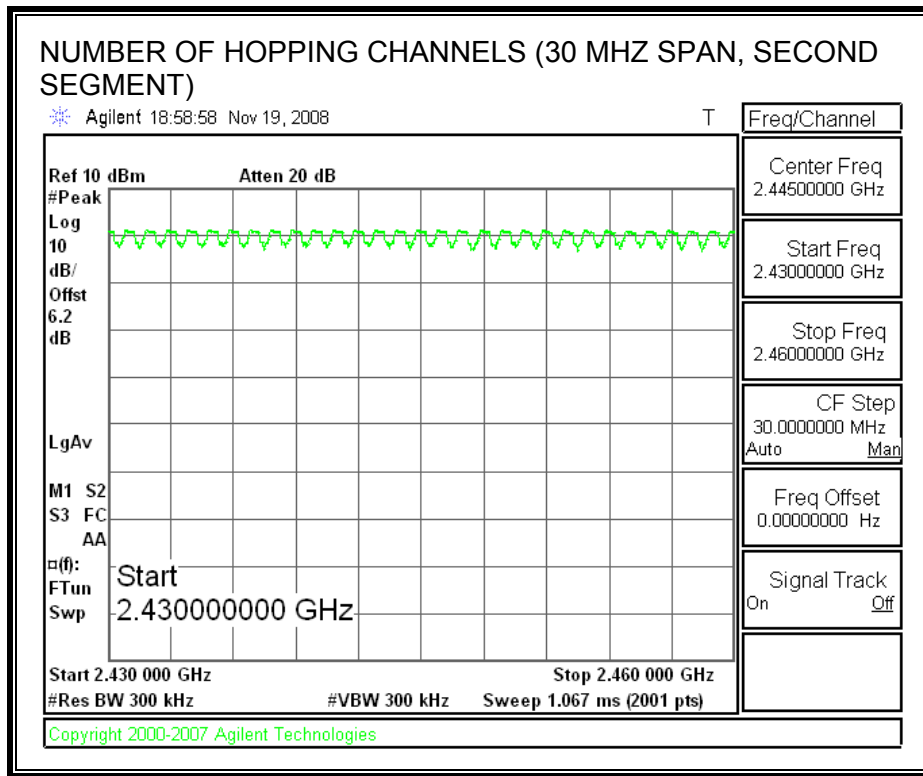
**NUMBER OF HOPPING CHANNELS**  
**GFSK**





**8PSK**







## 7.4. 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

#### GFSK Mode

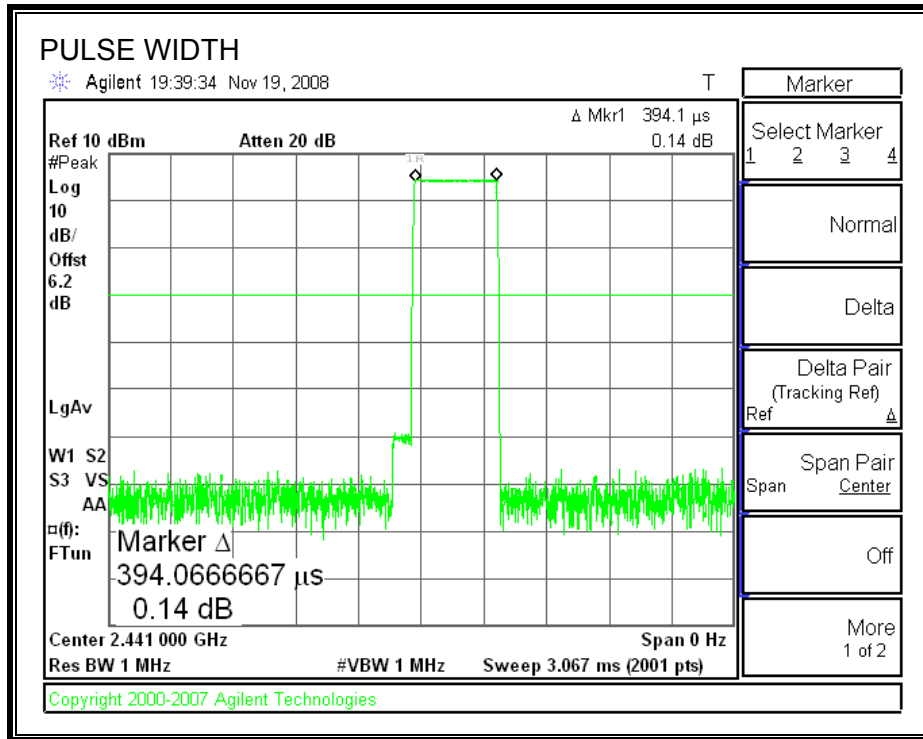
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.394	32	0.126	0.4	0.274

#### 8PSK Mode

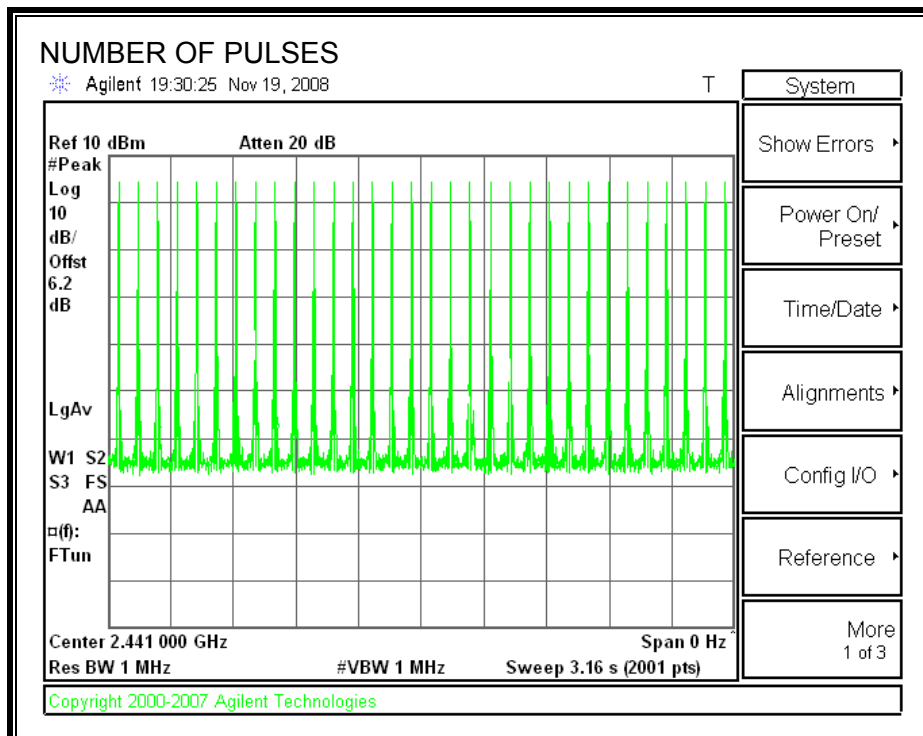
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
DH1	0.4	32	0.128	0.4	0.272

**GFSK**

**PULSE WIDTH**

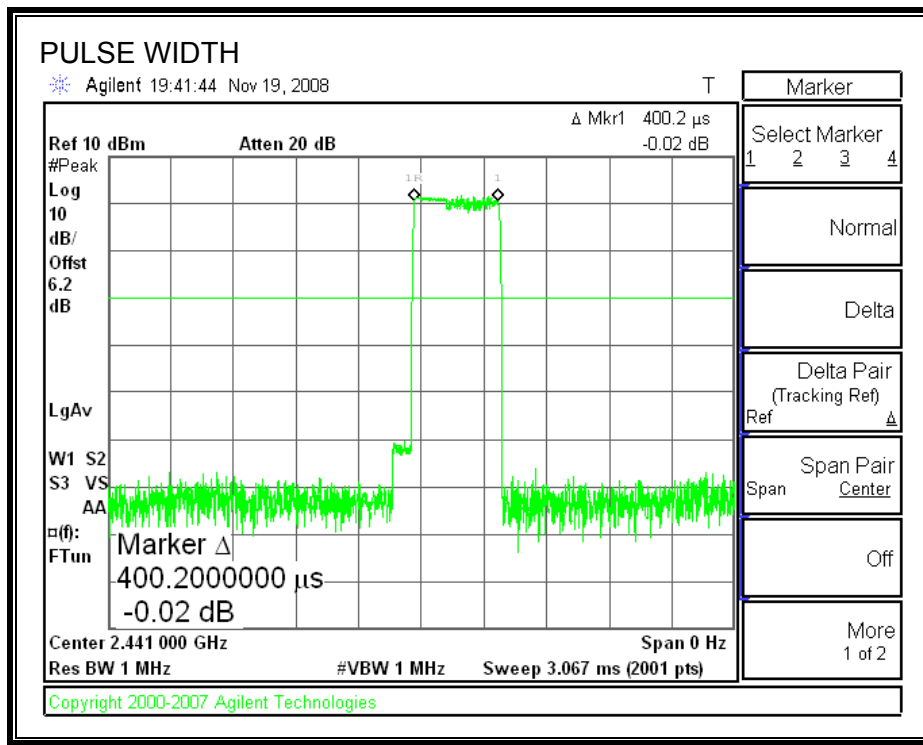


**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD**

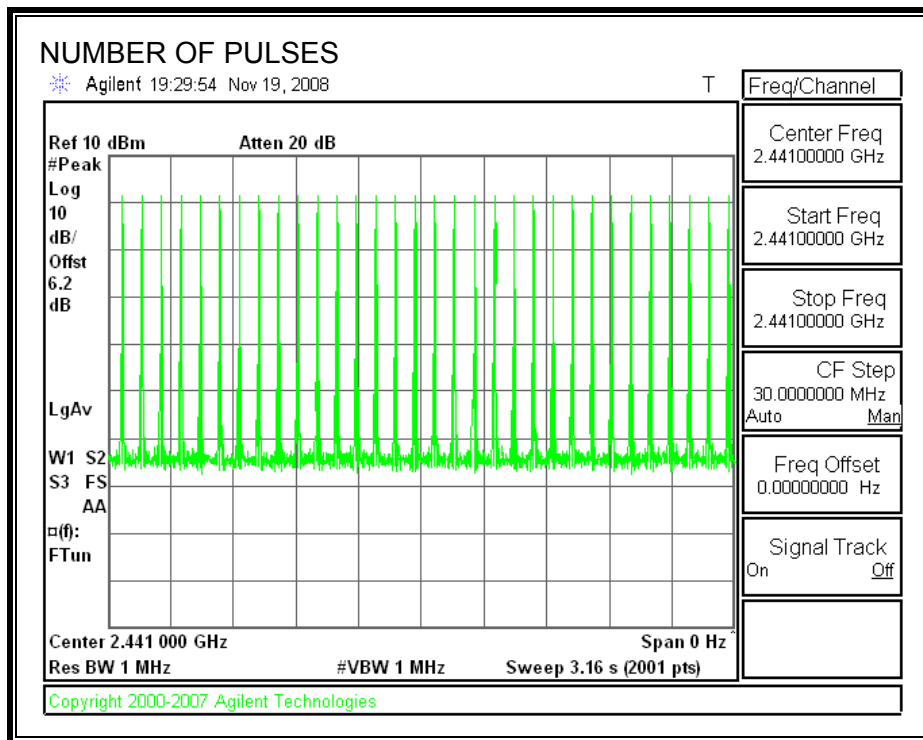


**8PSK**

**PULSE WIDTH**



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



## 7.5. 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

GFSK

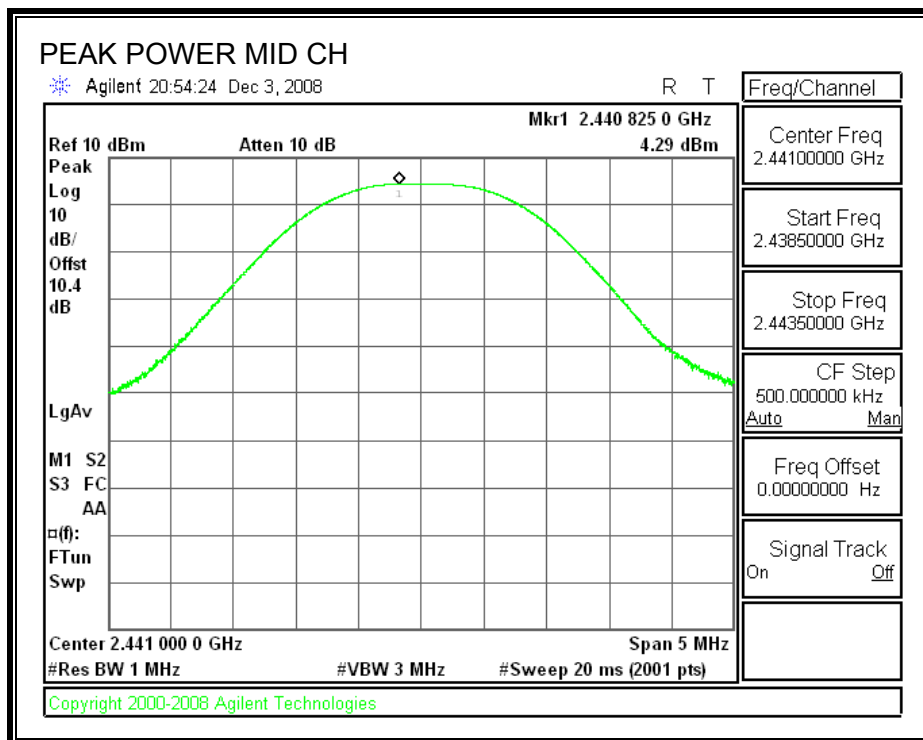
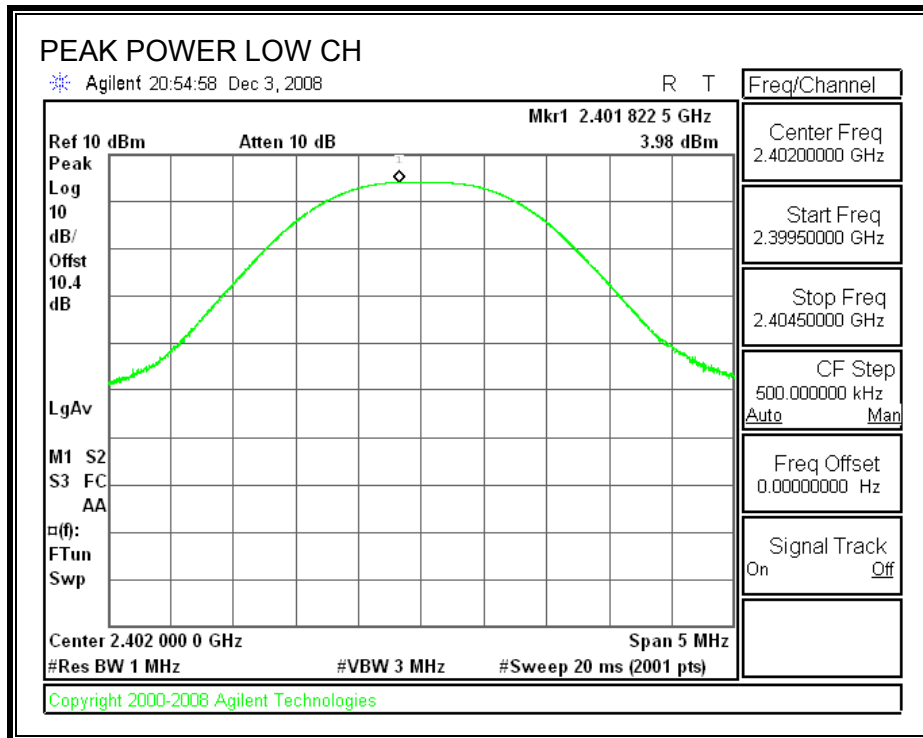
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.98	30	-26.02
Middle	2441	4.29	30	-25.71
High	2480	3.82	30	-26.18

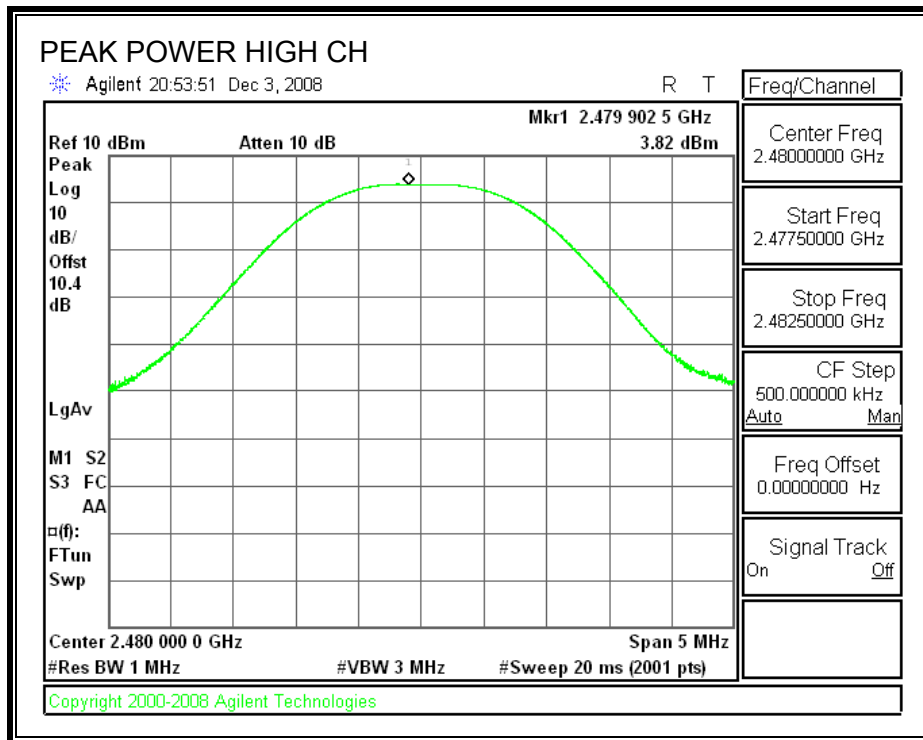
8PSK

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	1.76	30	-28.24
Middle	2441	1.89	30	-28.11
High	2480	1.31	30	-28.69

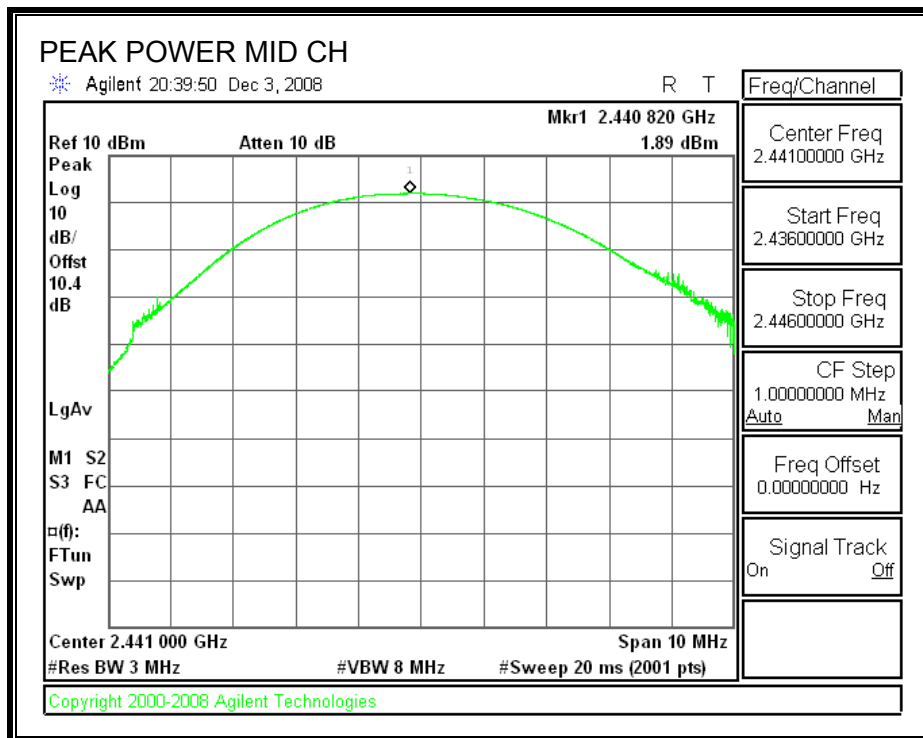
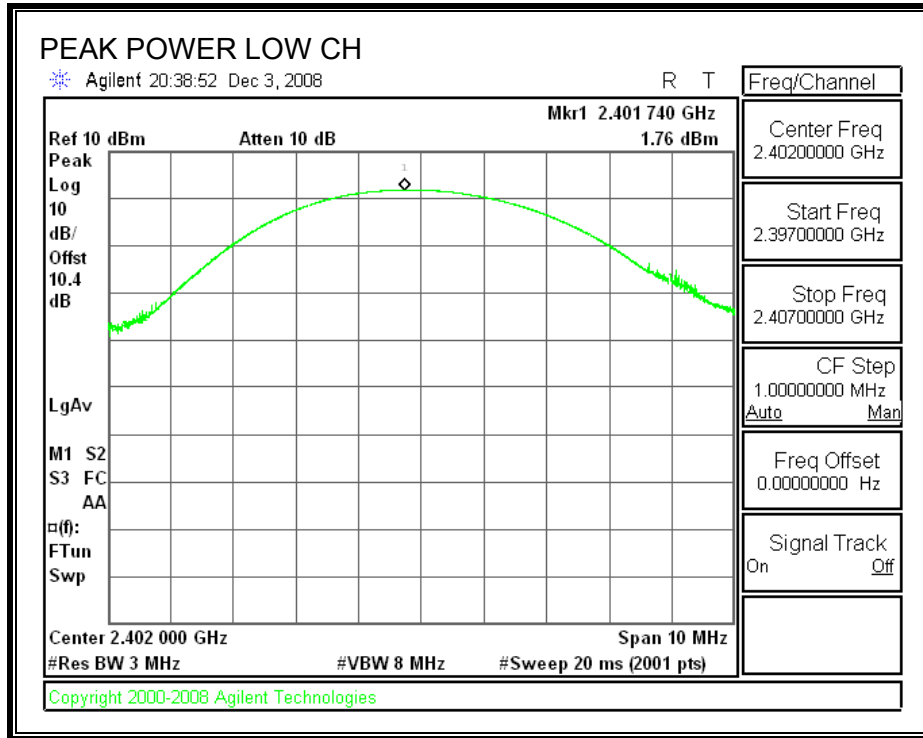
**OUTPUT POWER**

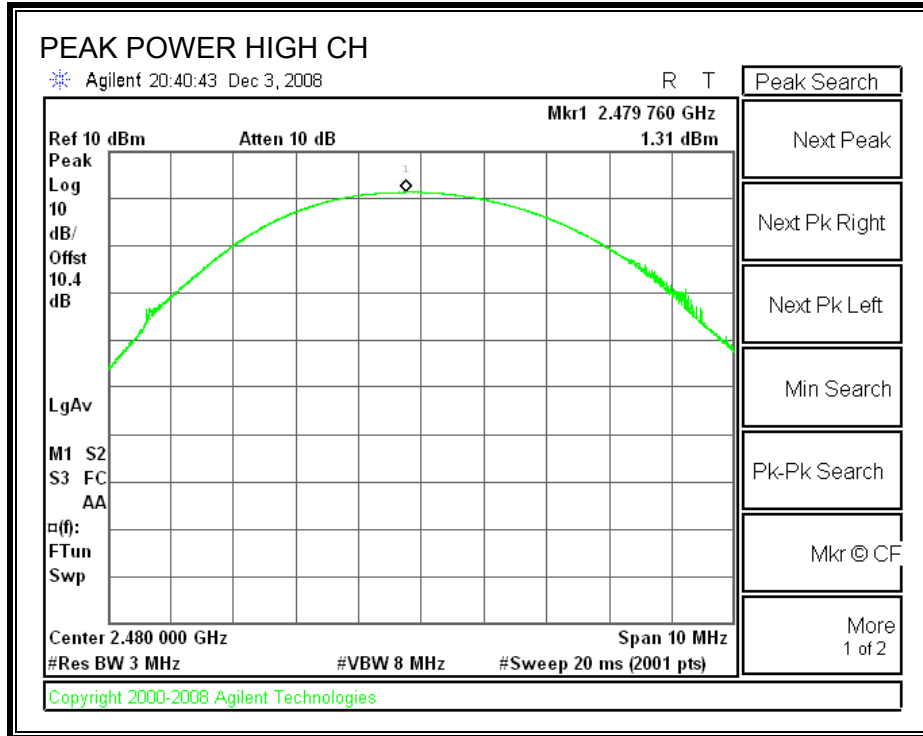
**GMSK**





**8PSK**







## 7.6. 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 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### GFSK

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	3.37
Middle	2441	3.72
High	2480	3.18

#### GFSK

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	-0.48
Middle	2441	-0.32
High	2480	-1.02

## **7.7. 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.

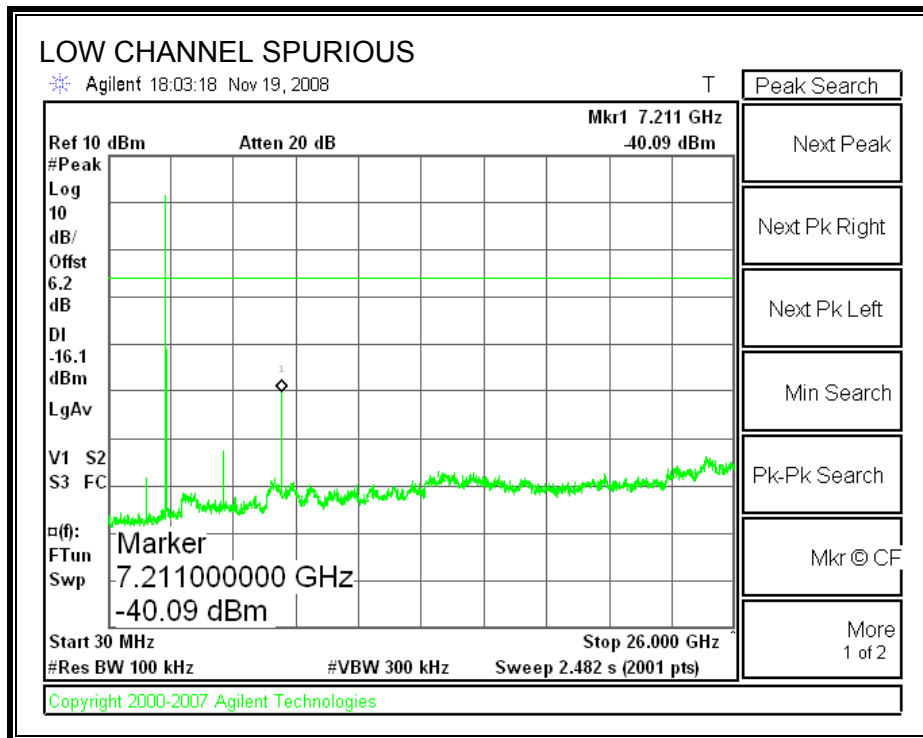
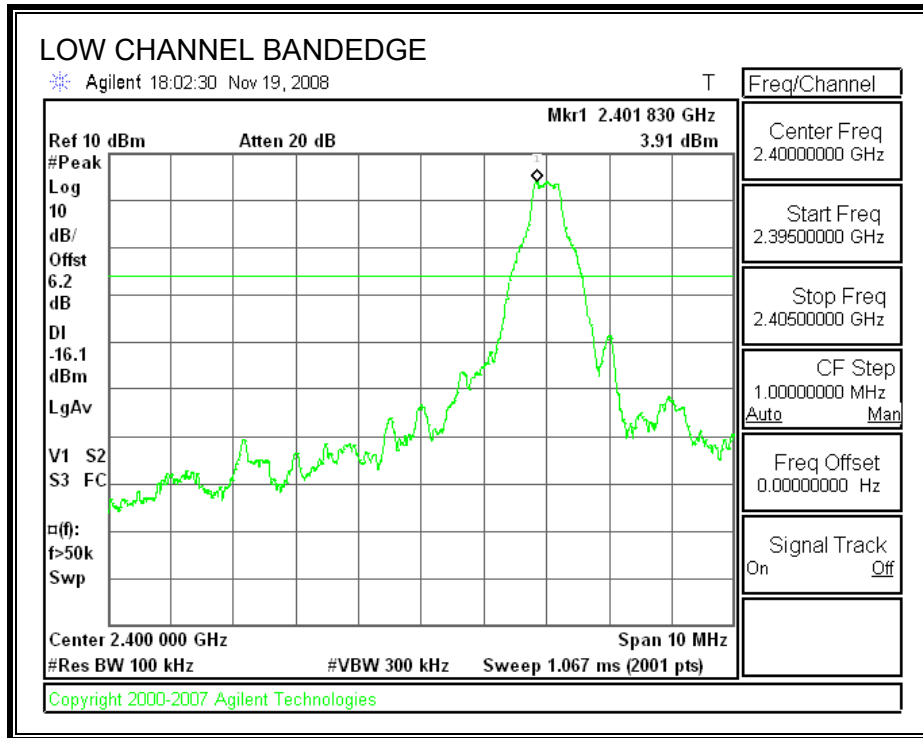
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

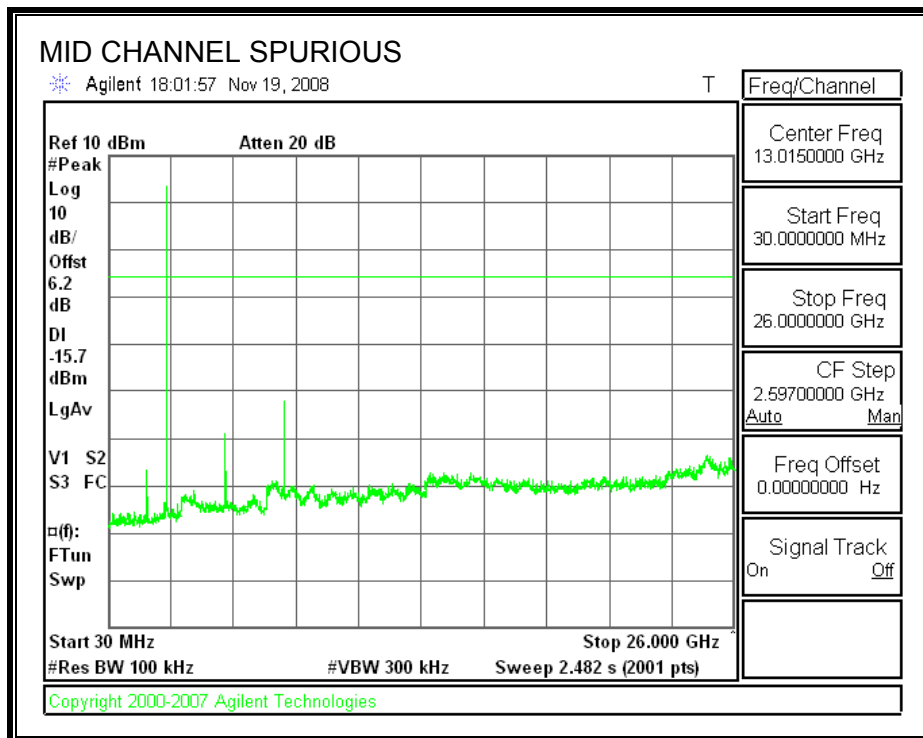
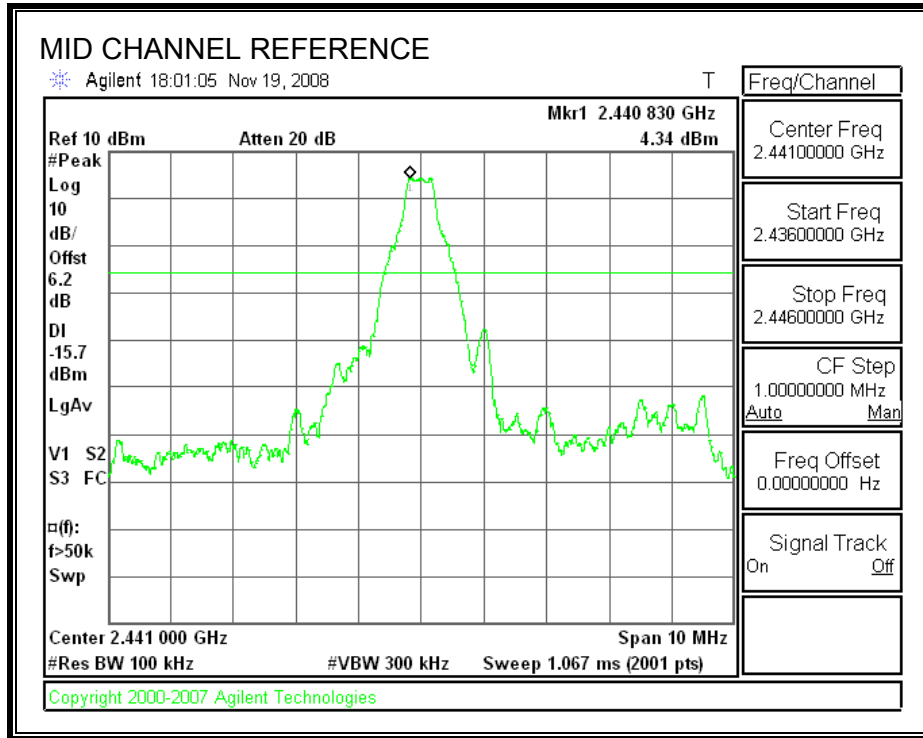
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

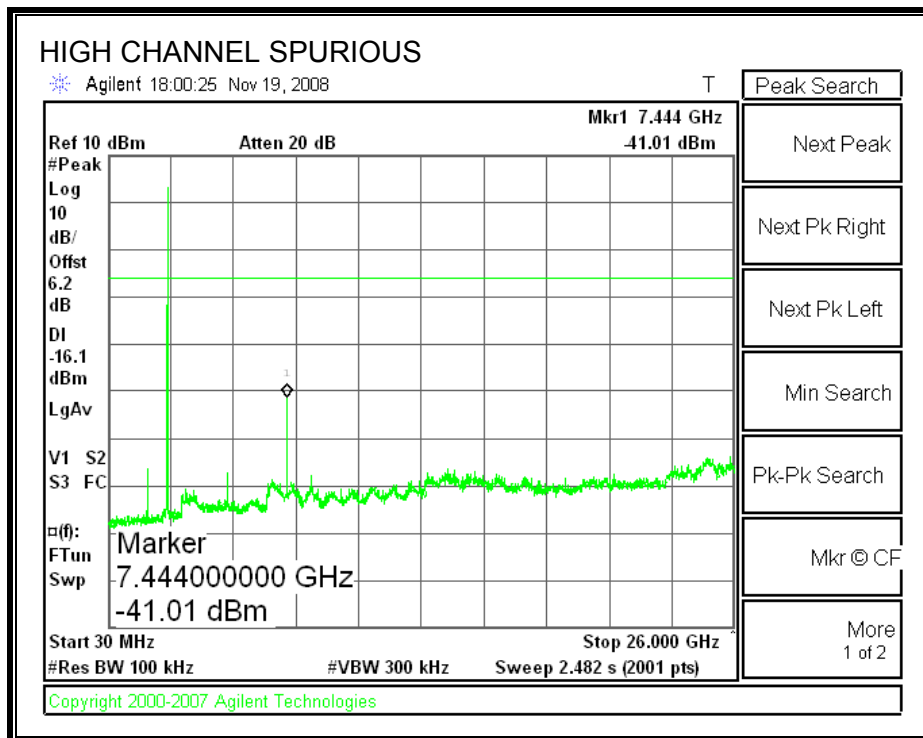
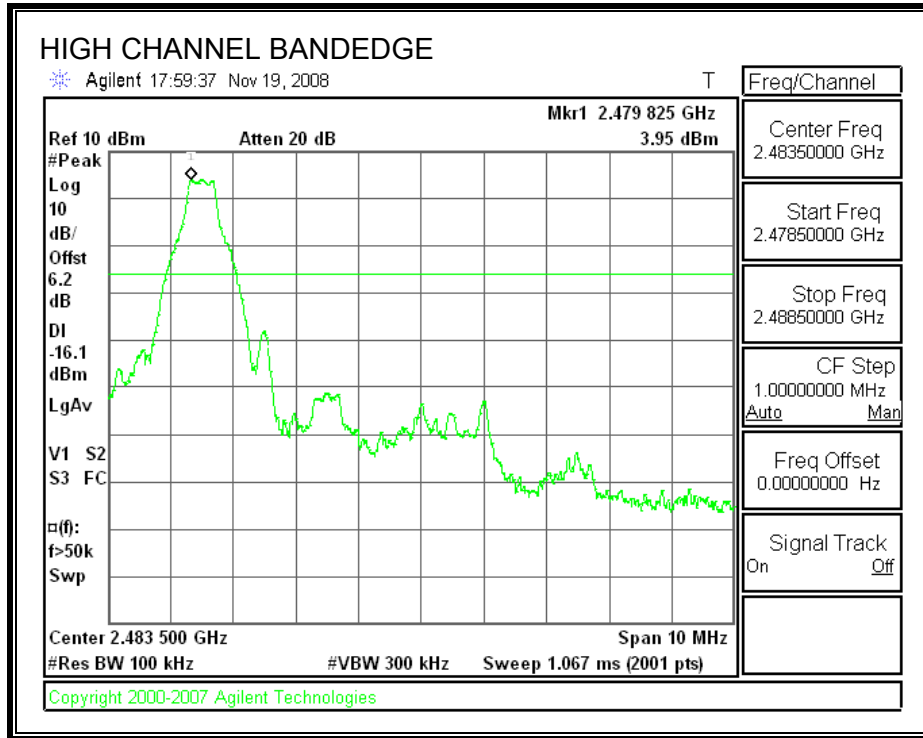
**RESULTS**

**SPURIOUS EMISSIONS**

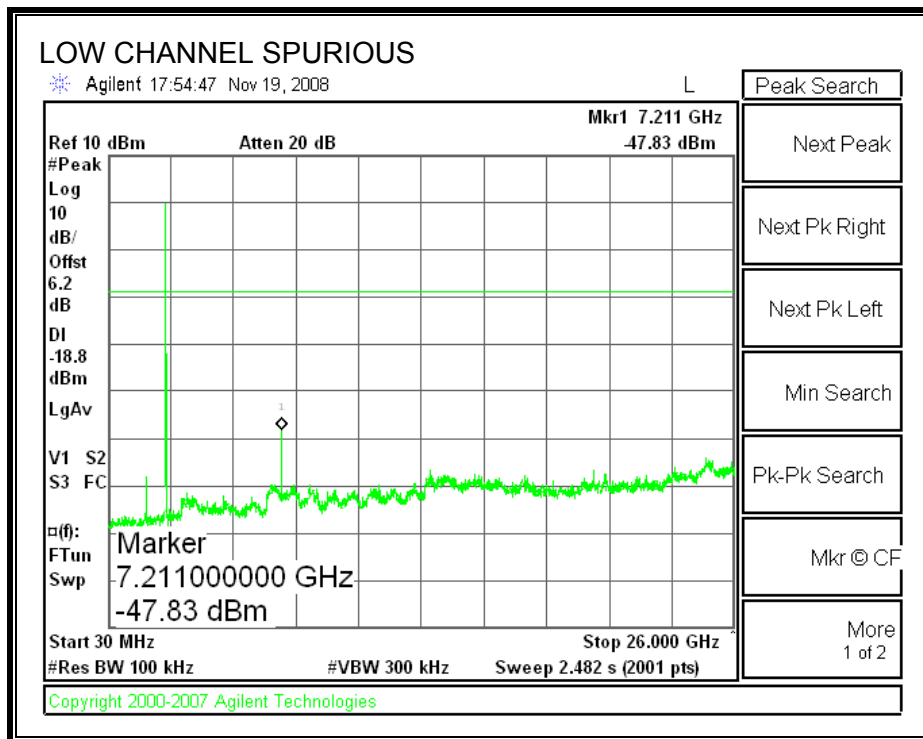
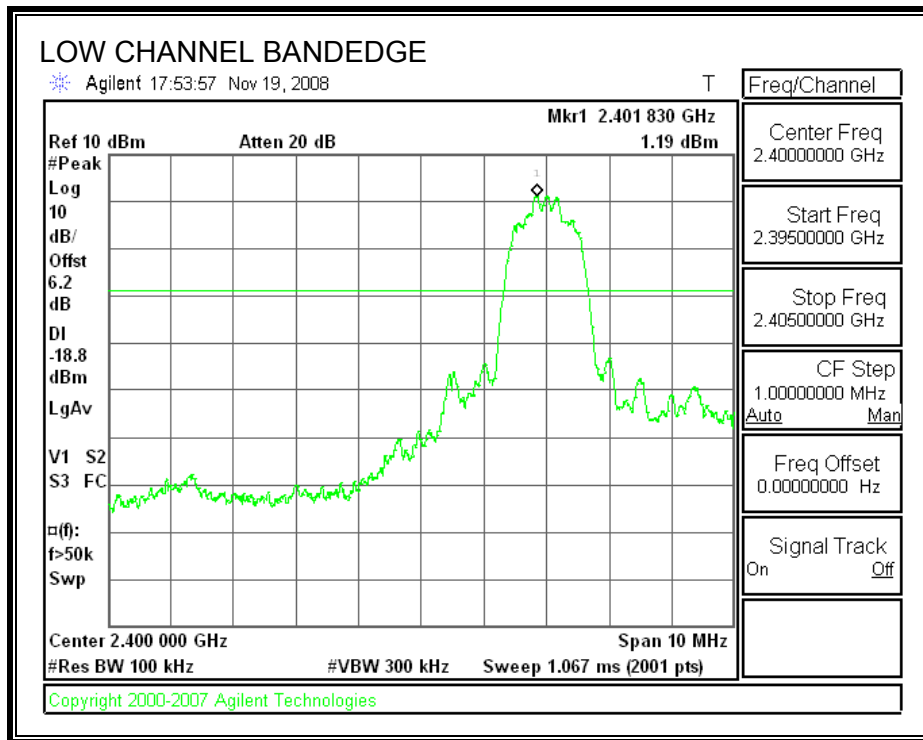
**GFSK**

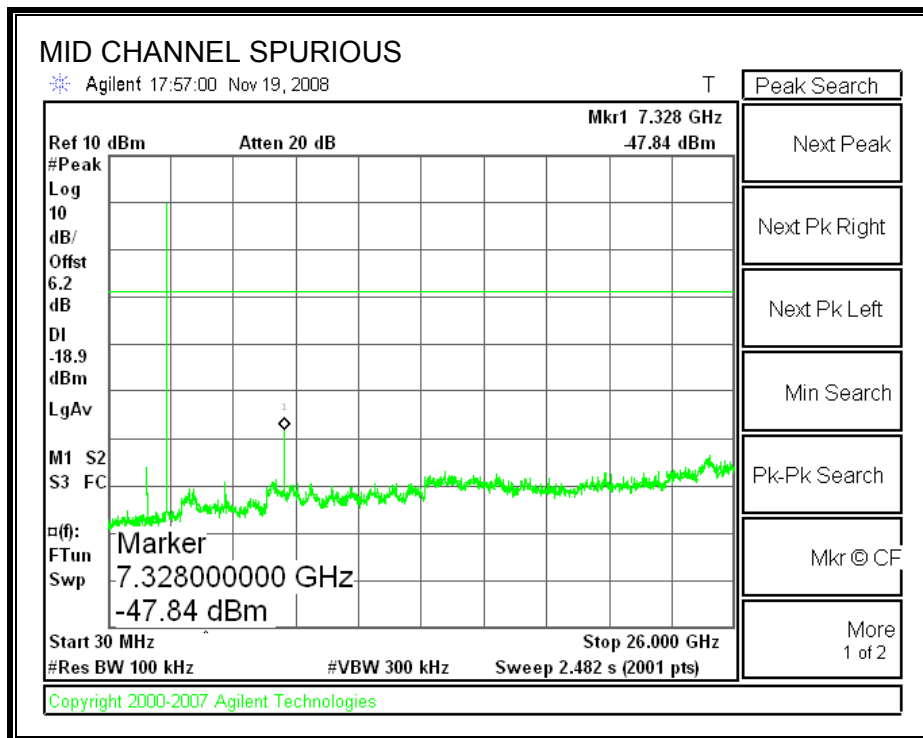
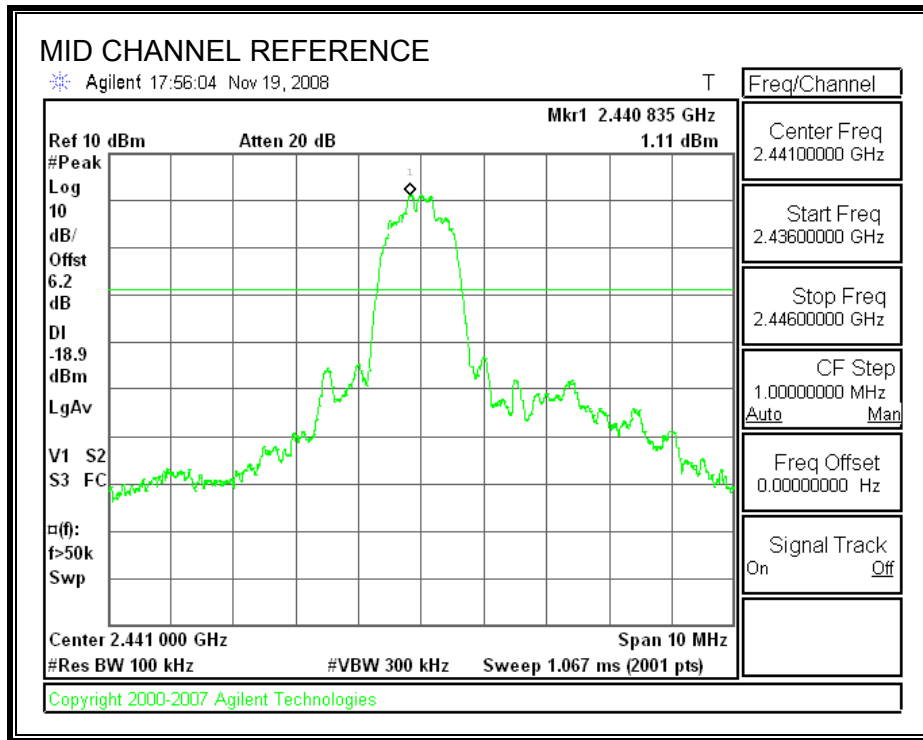


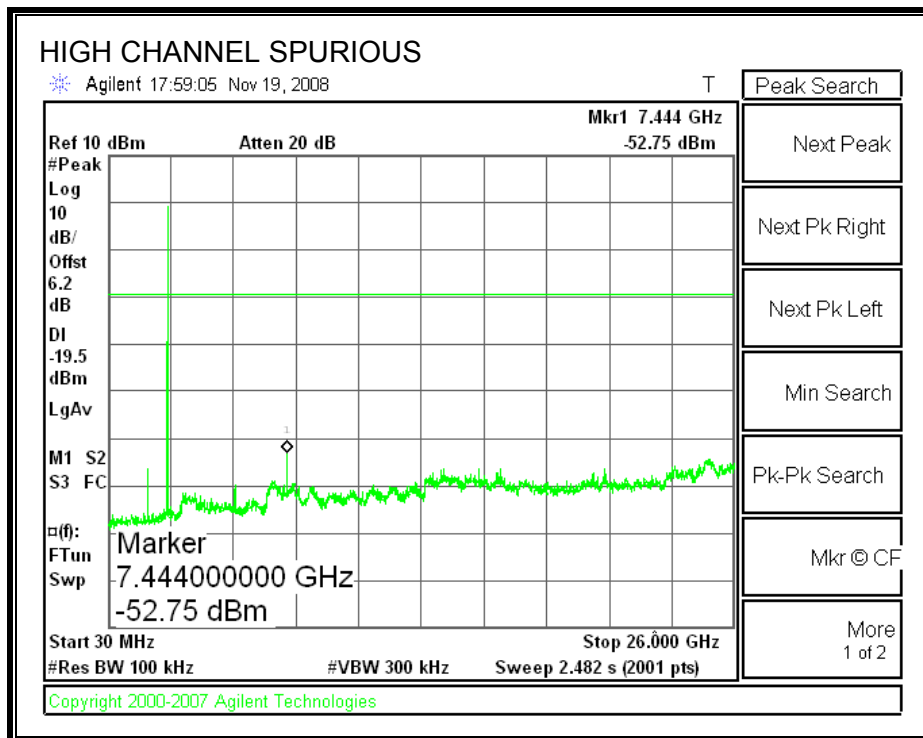
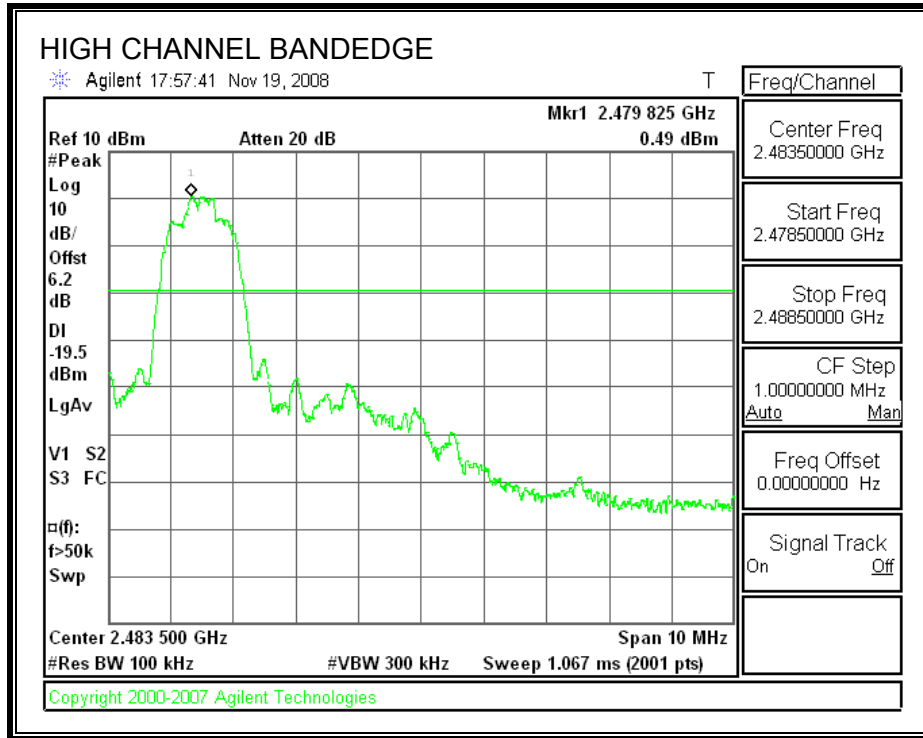




**8PSK**

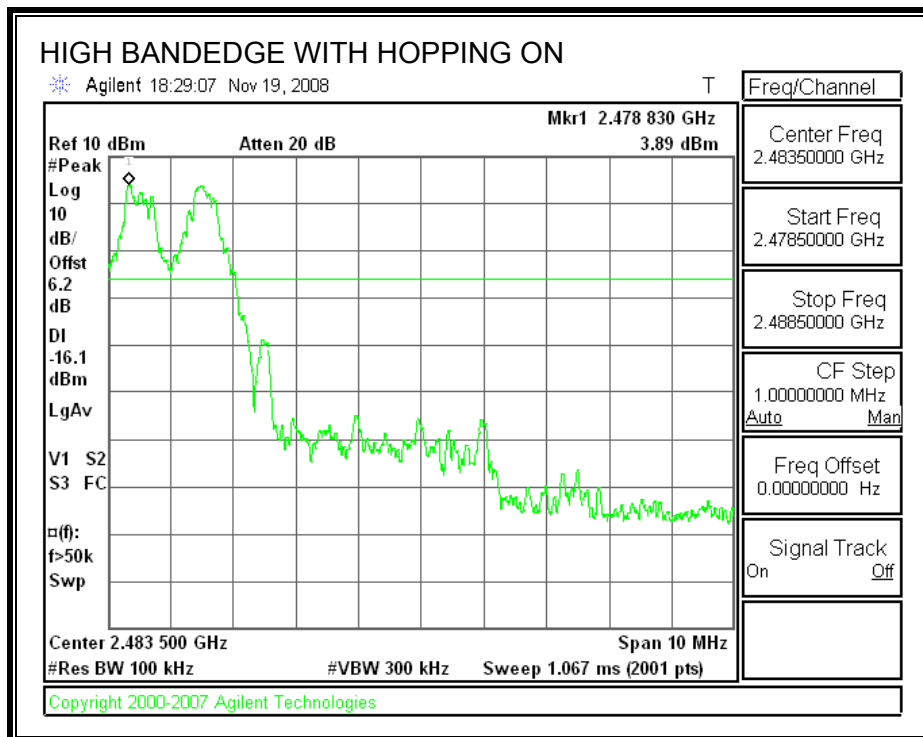
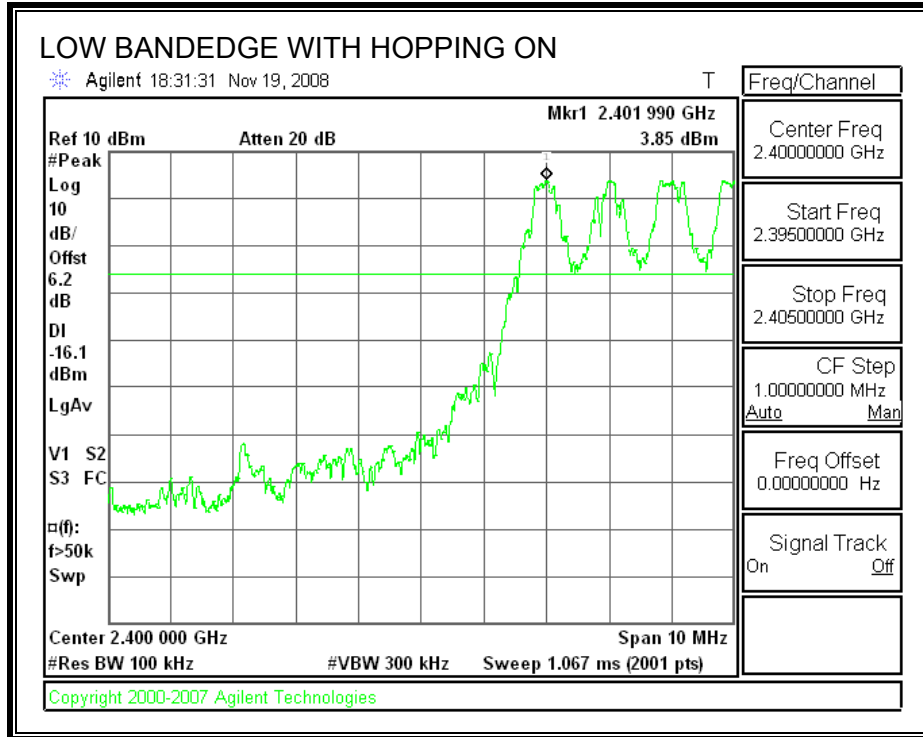




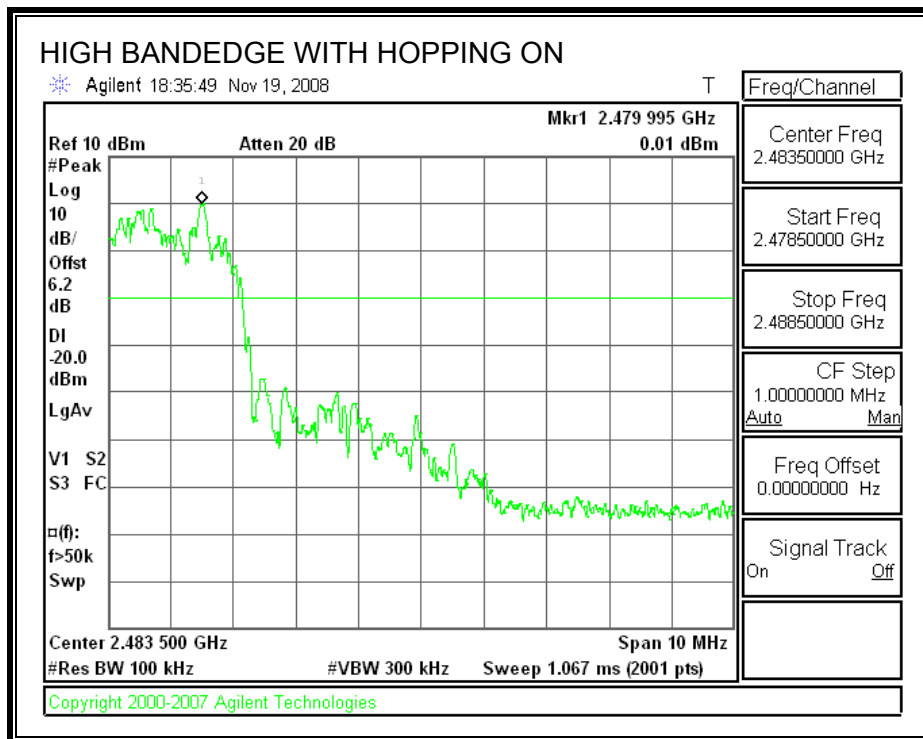
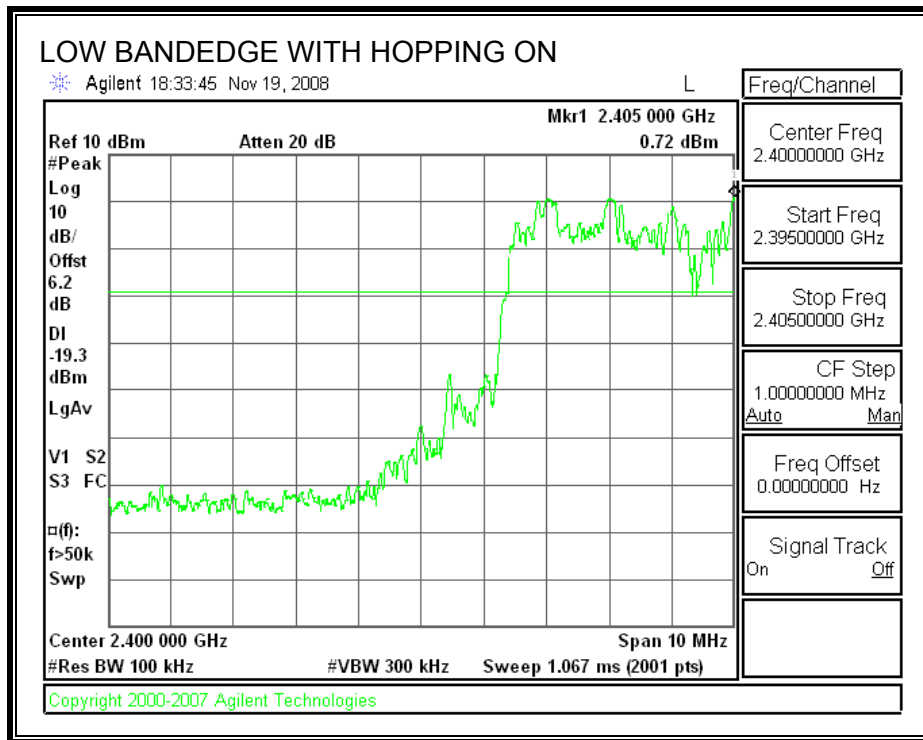




**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**  
**GFSK**



**8PSK**



## 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.

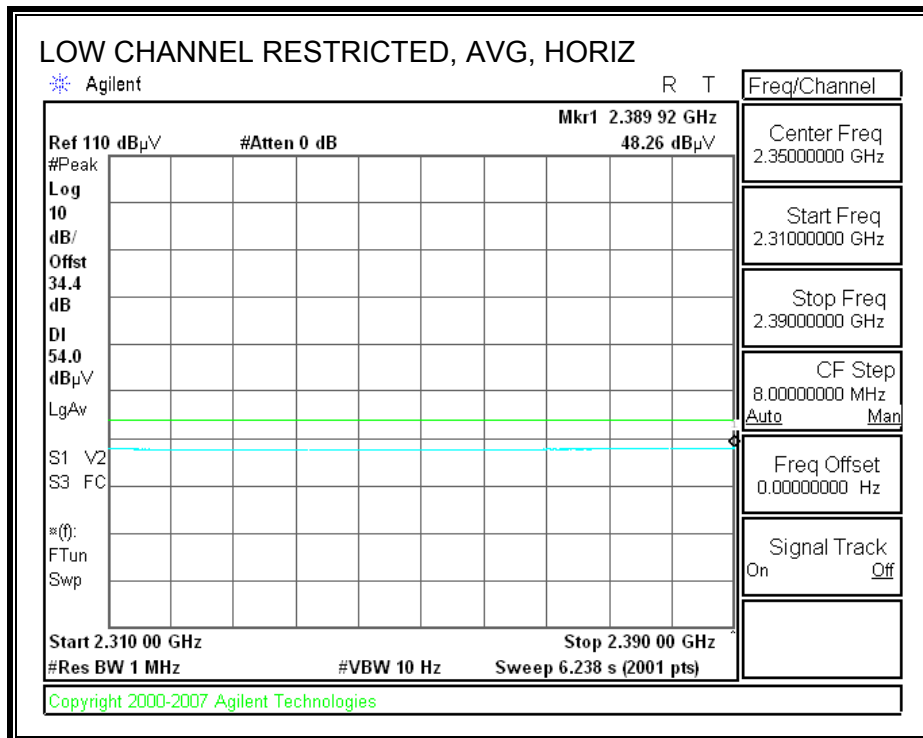
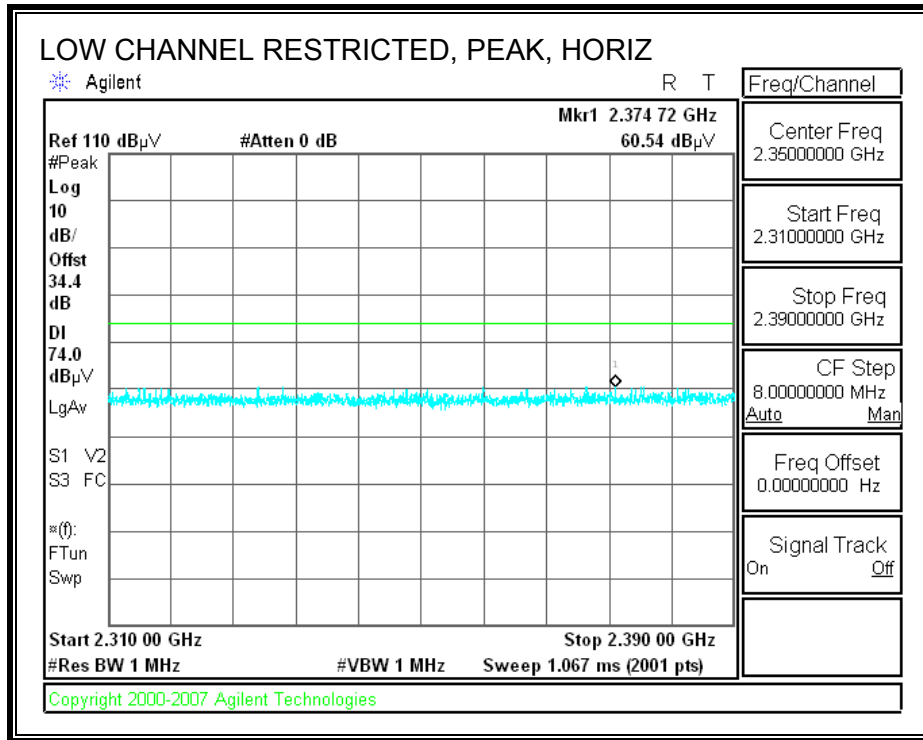
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

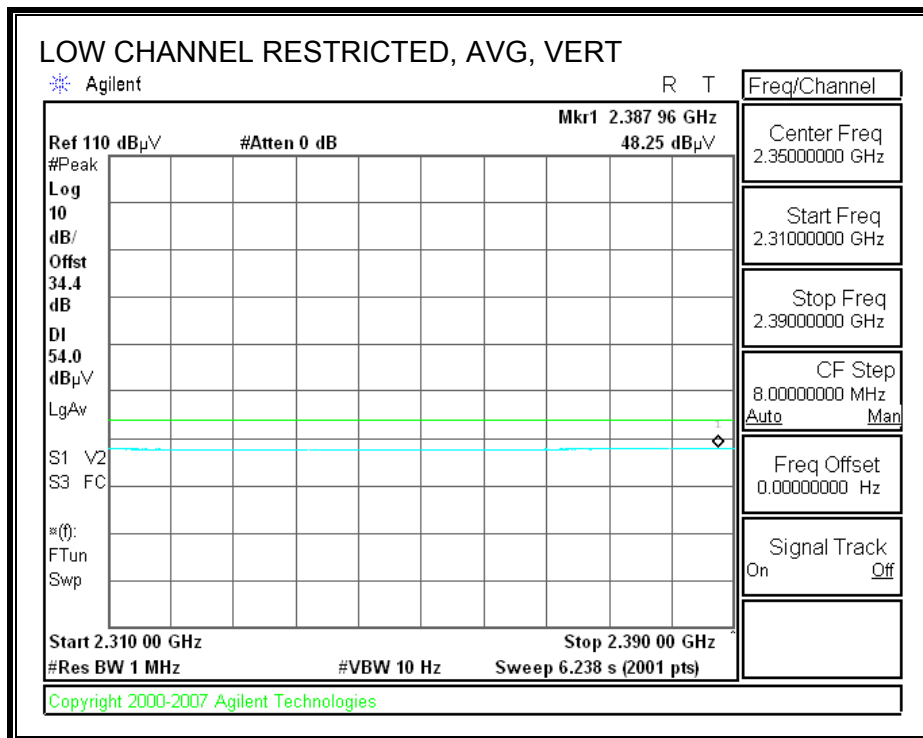
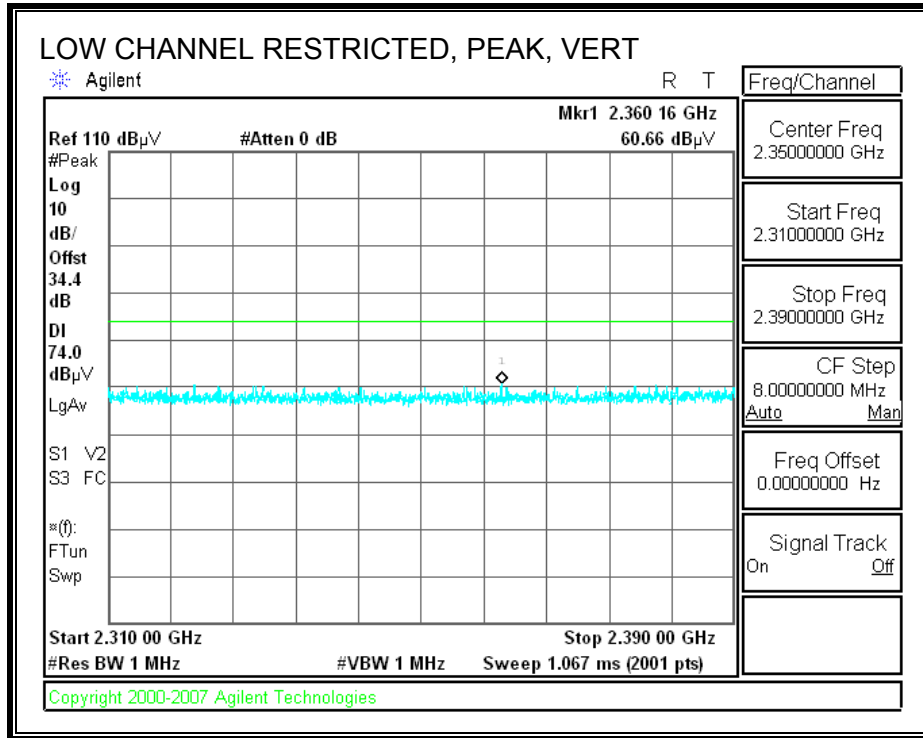
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

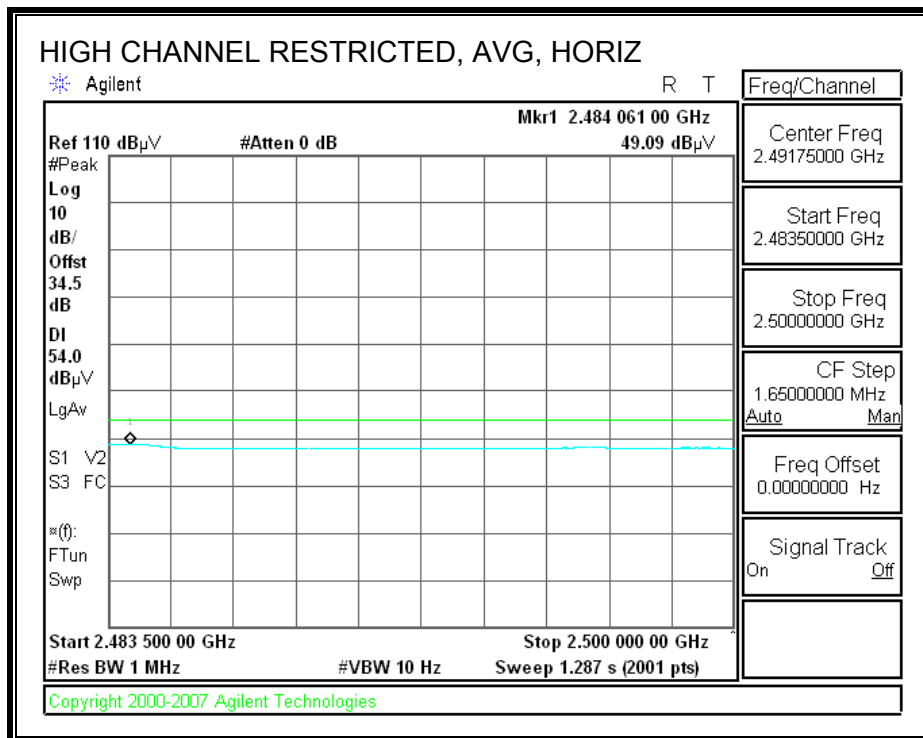
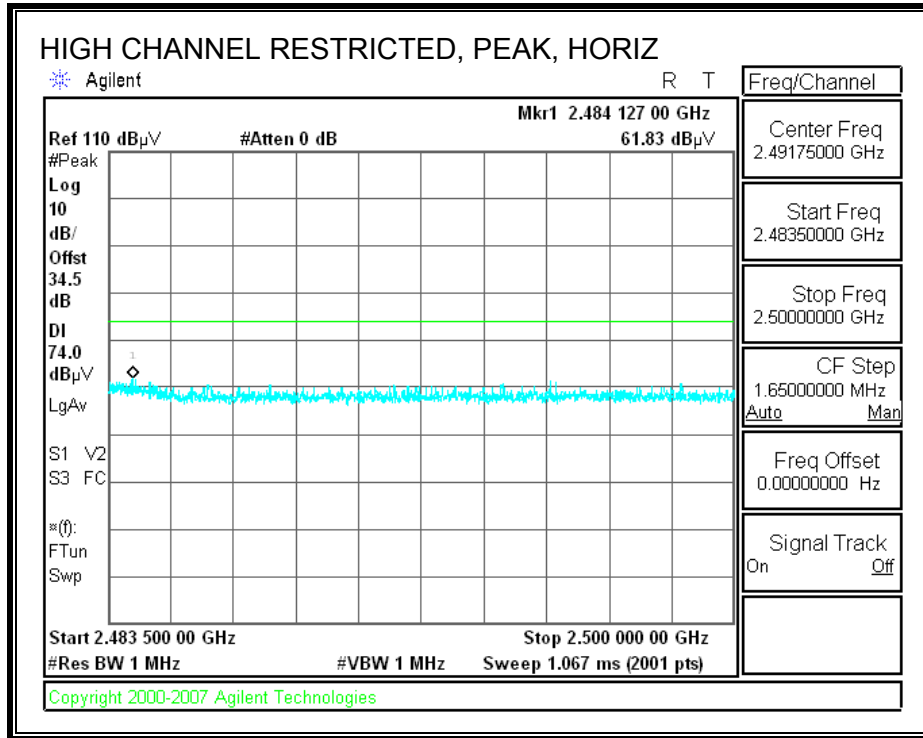
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

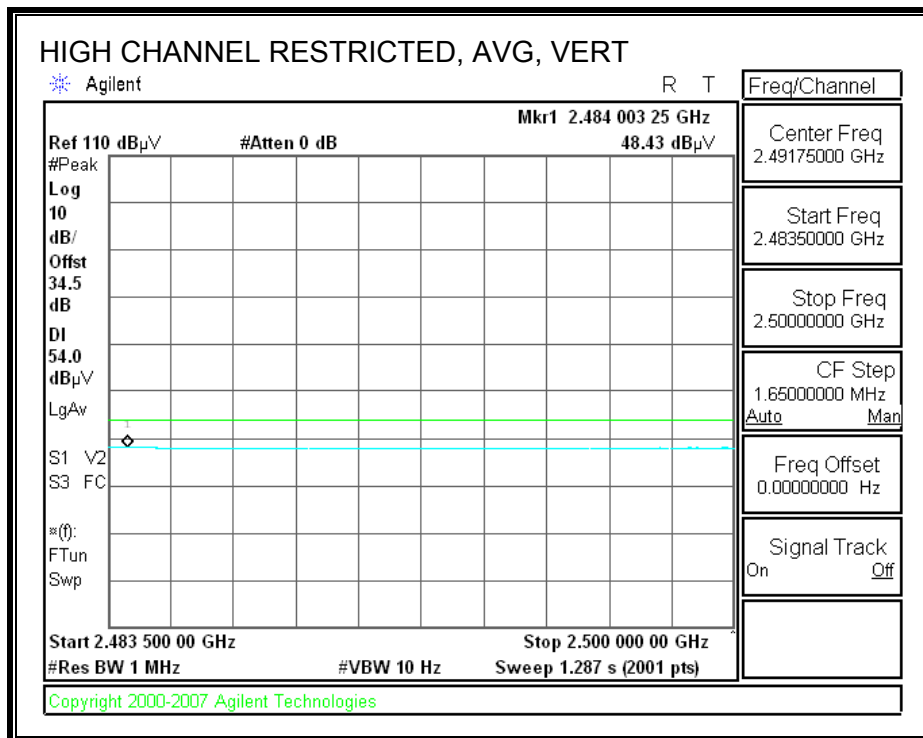
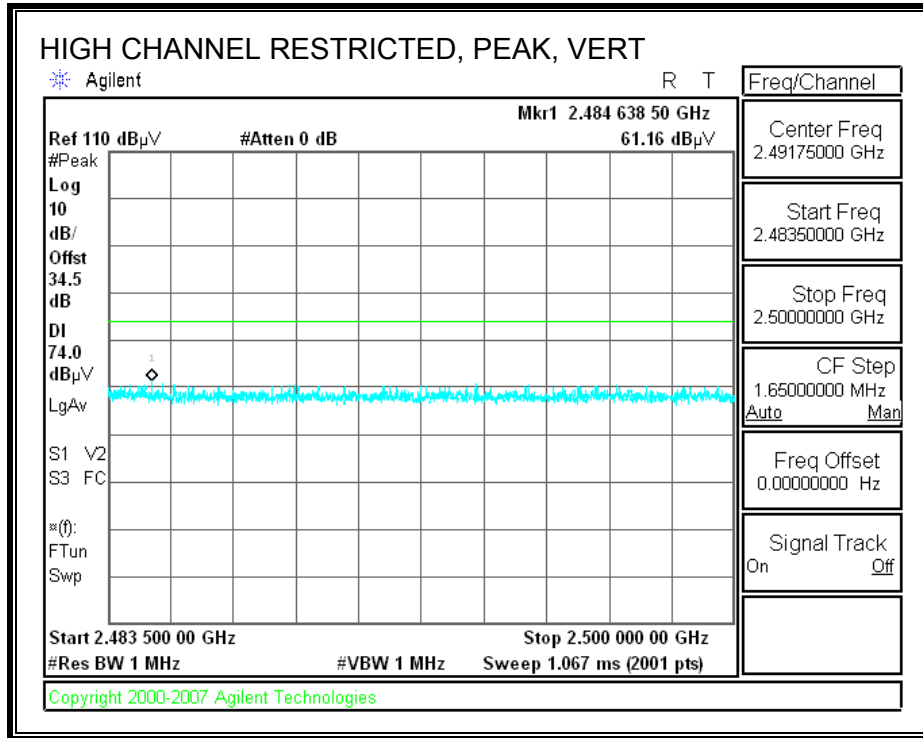
## 8.2. TRANSMITTER ABOVE 1 GHz

### GFSK RESTRICTED BANDEDGE

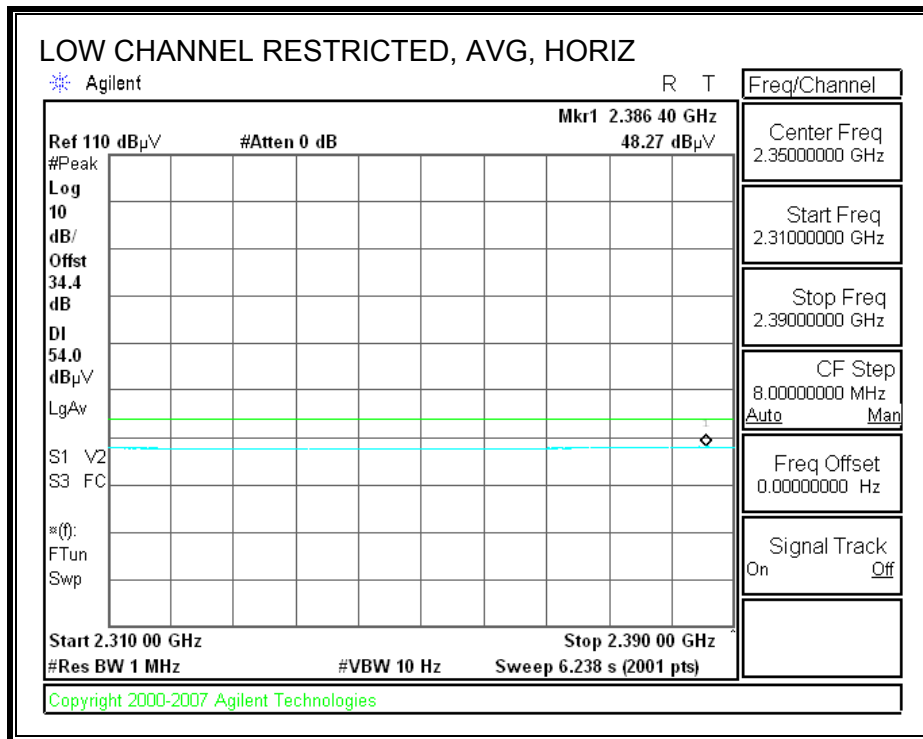
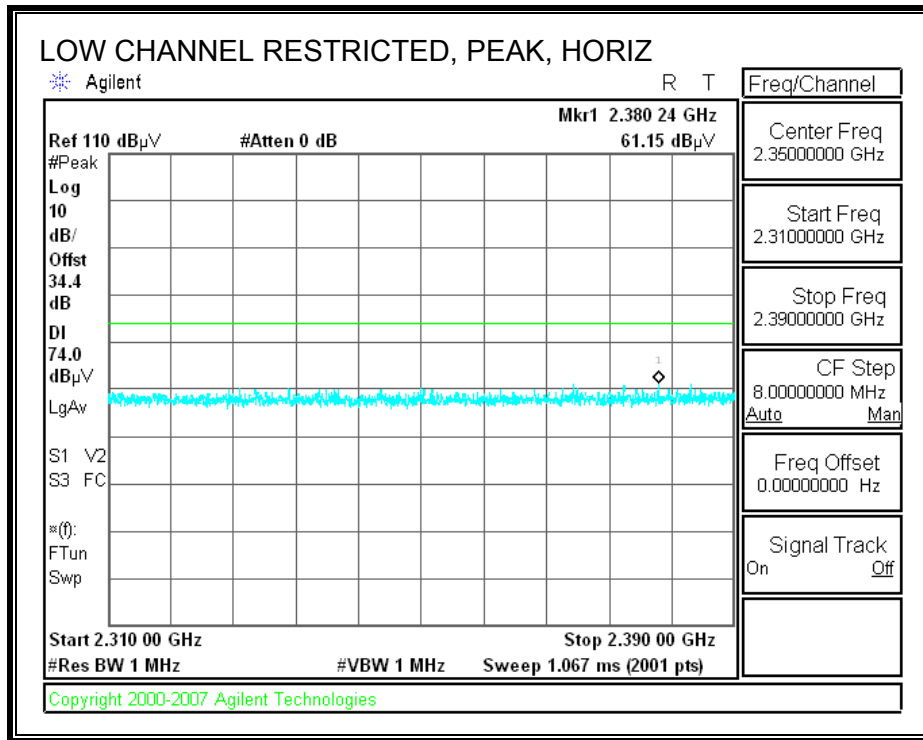




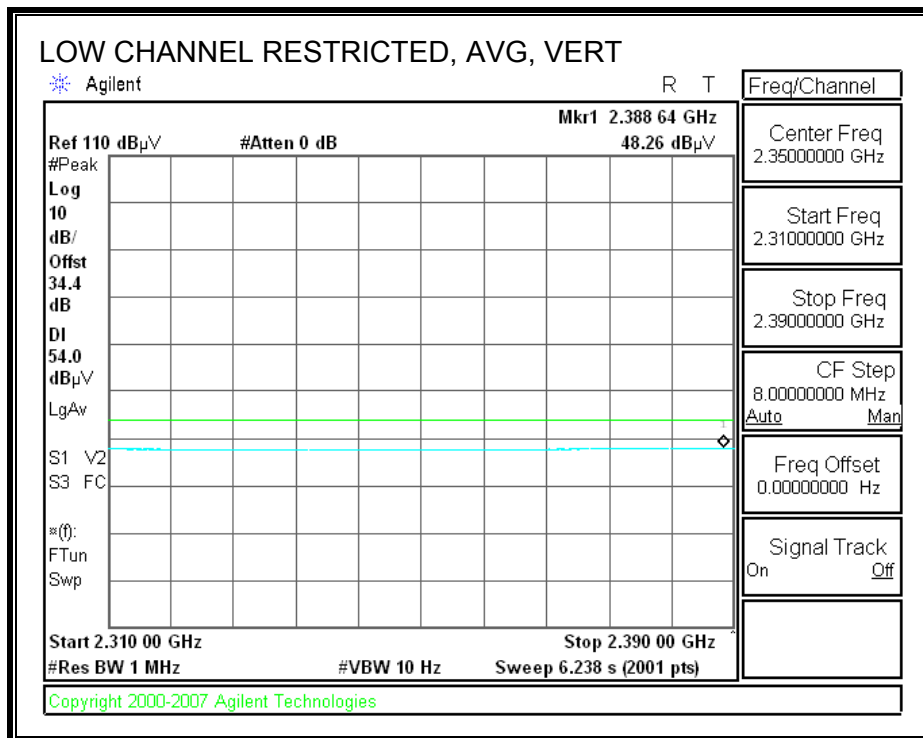
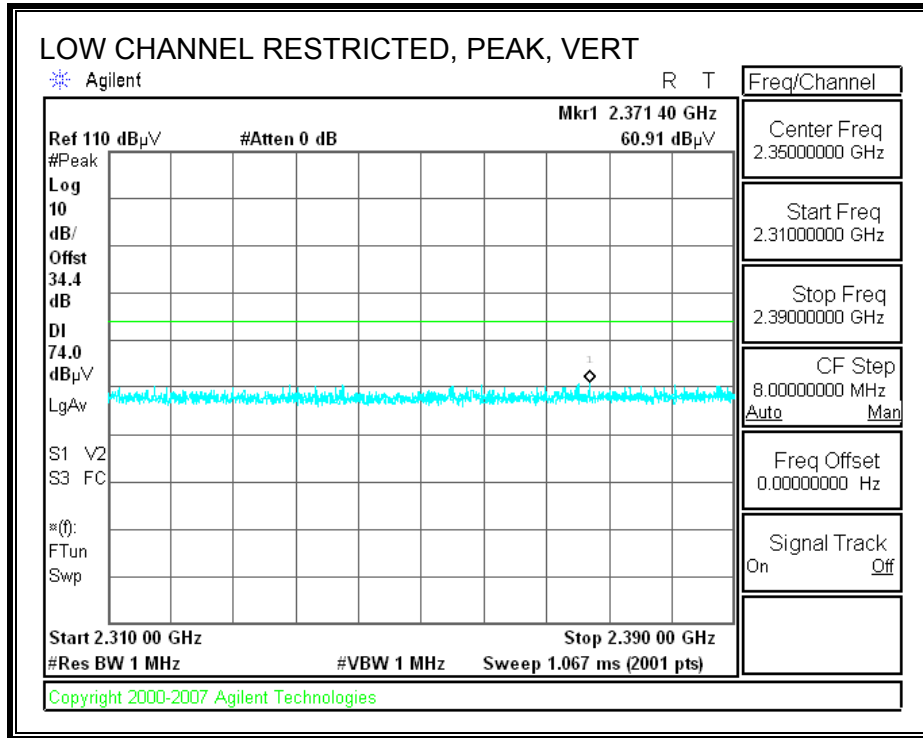


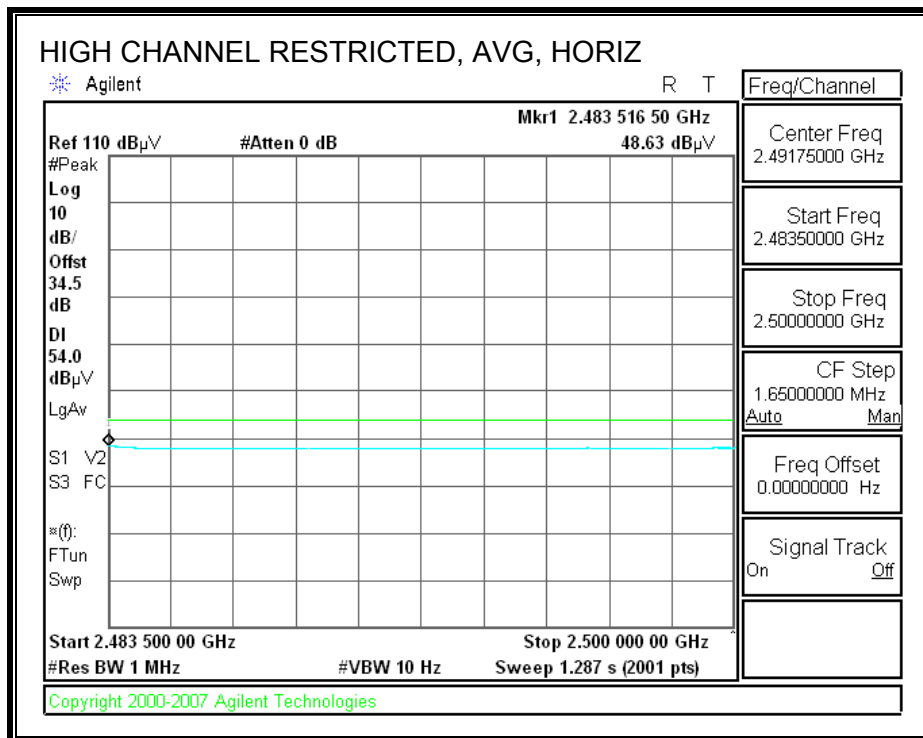
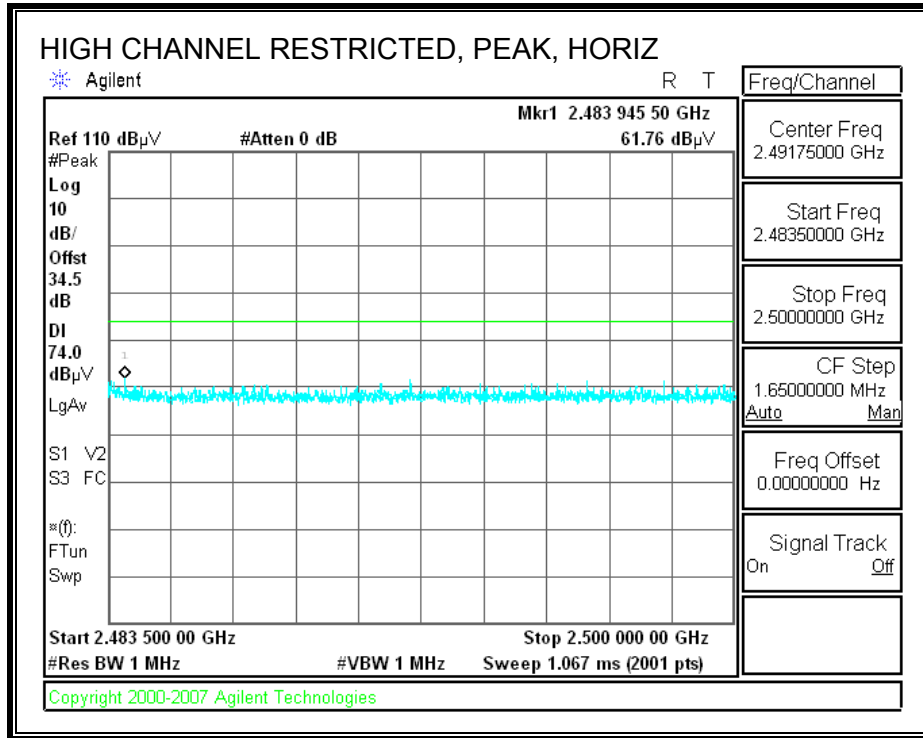


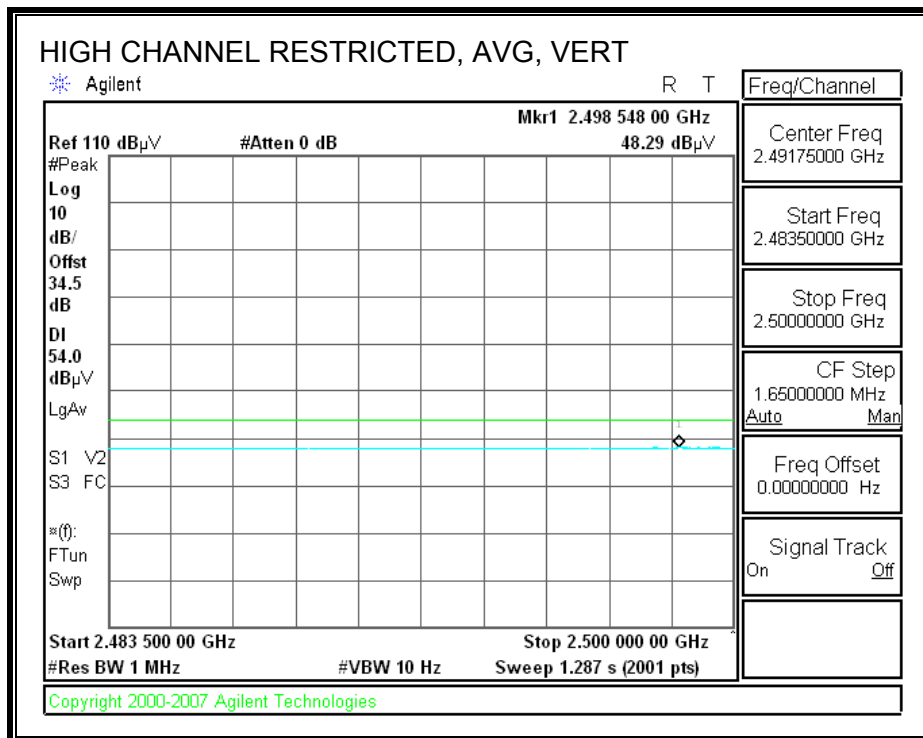
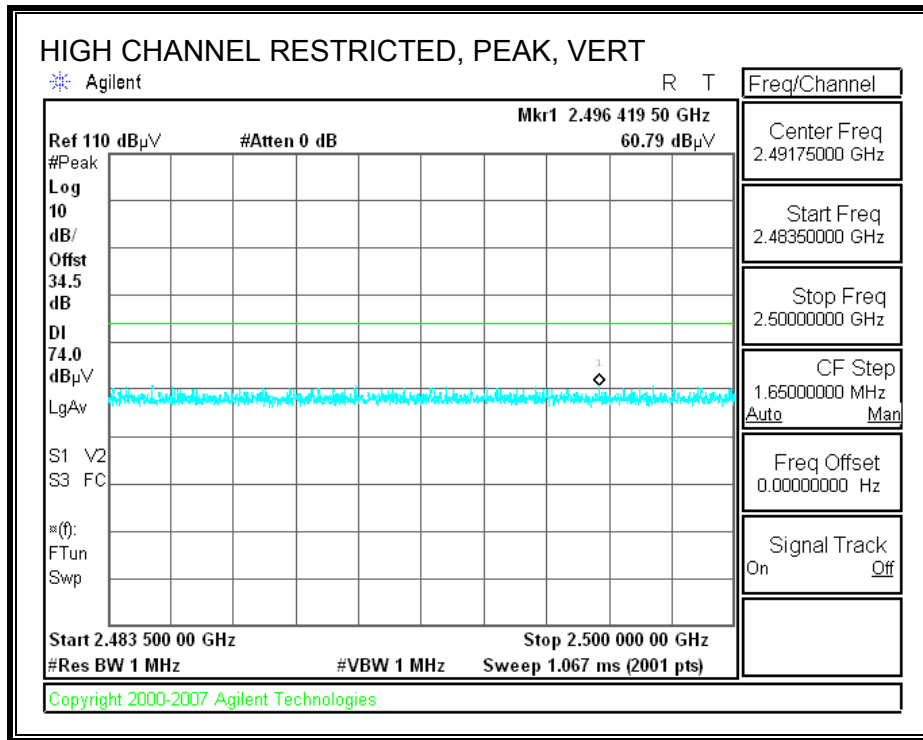
**8PSK RESTRICTED BANDEDGE**











**GFSK HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement																
Compliance Certification Services, Fremont 5m Chamber																
Test Engr:		Devin Chang														
Date:		11/22/08														
Project #:		08J12252														
Company:		SMK														
EUT Description:		EUT only Sample #1														
EUT M/N:		VP4750														
Mode Oper:		Tx mode / GFSK														
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit												
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit												
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit												
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit												
CL	Cable Loss	HPF	High Pass Filter													
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes	
<b>2402MHz</b>																
4.804	3.0	60.2	33.7	3.5	-34.8	0.0	0.0	62.6	74.0	-11.4	V	P	117.8	132.1		
4.804	3.0	35.5	33.7	3.5	-34.8	0.0	0.0	37.9	54.0	-16.1	V	A	117.8	132.1		
4.804	3.0	60.1	33.7	3.5	-34.8	0.0	0.0	62.4	74.0	-11.6	H	P	158.7	57.1		
4.804	3.0	35.5	33.7	3.5	-34.8	0.0	0.0	37.8	54.0	-16.2	H	A	158.7	57.1		
<b>2441MHz</b>																
4.882	3.0	58.7	33.7	3.6	-34.9	0.0	0.0	61.2	74.0	-12.8	V	P	100.9	53.3		
4.882	3.0	34.9	33.7	3.6	-34.9	0.0	0.0	37.4	54.0	-16.6	V	A	100.9	53.3		
7.323	3.0	41.9	35.2	4.4	-34.7	0.0	0.0	46.8	74.0	-27.2	V	P	100.0	7.5		
7.323	3.0	28.0	35.2	4.4	-34.7	0.0	0.0	32.9	54.0	-21.1	V	A	100.0	7.5		
4.882	3.0	59.7	33.7	3.6	-34.9	0.0	0.0	62.1	74.0	-11.9	H	P	157.0	354.8		
4.882	3.0	35.3	33.7	3.6	-34.9	0.0	0.0	37.8	54.0	-16.2	H	A	157.0	354.8		
7.323	3.0	40.4	35.2	4.4	-34.7	0.0	0.0	45.4	74.0	-28.6	H	P	115.5	311.0		
7.323	3.0	26.7	35.2	4.4	-34.7	0.0	0.0	31.6	54.0	-22.4	H	A	115.5	311.0		
<b>2480MHz</b>																
4.960	3.0	61.6	33.8	3.6	-34.9	0.0	0.0	64.1	74.0	-9.9	V	P	100.8	356.0		
4.960	3.0	34.3	33.8	3.6	-34.9	0.0	0.0	36.9	54.0	-17.2	V	A	100.8	356.0		
7.440	3.0	39.8	35.2	4.5	-34.6	0.0	0.0	44.8	74.0	-29.2	V	P	100.3	339.2		
7.440	3.0	26.5	35.2	4.5	-34.6	0.0	0.0	31.5	54.0	-22.5	V	A	100.3	339.2		
4.960	3.0	61.2	33.8	3.6	-34.9	0.0	0.0	63.7	74.0	-10.3	H	P	169.2	42.0		
4.960	3.0	34.1	33.8	3.6	-34.9	0.0	0.0	36.6	54.0	-17.4	H	A	169.2	42.0		
7.440	3.0	39.1	35.2	4.5	-34.6	0.0	0.0	44.1	74.0	-29.9	H	P	182.0	296.7		
7.440	3.0	25.6	35.2	4.5	-34.6	0.0	0.0	30.6	54.0	-23.4	H	A	182.0	296.7		
Rev. 4.1.2.7																
Note: No other emissions were detected above the system noise floor.																

**8PSK HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement																
Compliance Certification Services, Fremont 5m Chamber																
Test Engr:		Devin Chang														
Date:		11/22/08														
Project #:		08J12252														
Company:		SMK														
EUT Description:		EUT only Sample #1														
EUT M/N:		VP4750														
Mode Oper:		Tx mode / 8PSK														
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit												
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit												
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit												
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit												
CL	Cable Loss	HPF	High Pass Filter													
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes	
<b>2402MHz</b>																
4.804	3.0	52.6	33.7	3.5	-34.8	0.0	0.0	54.9	74.0	-19.1	V	P	182.7	296.9		
4.804	3.0	30.8	33.7	3.5	-34.8	0.0	0.0	33.1	54.0	-20.9	V	A	182.7	296.9		
4.804	3.0	51.9	33.7	3.5	-34.8	0.0	0.0	54.2	74.0	-19.8	H	P	158.0	348.3		
4.804	3.0	30.5	33.7	3.5	-34.8	0.0	0.0	32.8	54.0	-21.2	H	A	158.0	348.3		
<b>2441MHz</b>																
4.882	3.0	54.6	33.7	3.6	-34.9	0.0	0.0	57.1	74.0	-16.9	V	P	101.0	52.9		
4.882	3.0	31.3	33.7	3.6	-34.9	0.0	0.0	33.8	54.0	-20.2	V	A	101.0	52.9		
7.323	3.0	37.9	35.2	4.4	-34.7	0.0	0.0	42.8	74.0	-31.2	V	P	135.8	261.1		
7.323	3.0	24.5	35.2	4.4	-34.7	0.0	0.0	29.4	54.0	-24.6	V	A	135.8	261.1		
4.882	3.0	54.9	33.7	3.6	-34.9	0.0	0.0	57.4	74.0	-16.6	H	P	147.7	0.0		
4.882	3.0	31.6	33.7	3.6	-34.9	0.0	0.0	34.1	54.0	-19.9	H	A	147.7	0.0		
7.323	3.0	37.5	35.2	4.4	-34.7	0.0	0.0	42.4	74.0	-31.6	H	P	101.5	253.6		
7.323	3.0	24.5	35.2	4.4	-34.7	0.0	0.0	29.4	54.0	-24.6	H	A	101.5	253.6		
<b>2480MHz</b>																
4.960	3.0	55.7	33.8	3.6	-34.9	0.0	0.0	58.2	74.0	-15.8	V	P	100.0	356.0		
4.960	3.0	30.3	33.8	3.6	-34.9	0.0	0.0	32.8	54.0	-21.2	V	A	100.0	356.0		
7.440	3.0	38.3	35.2	4.5	-34.6	0.0	0.0	43.3	74.0	-30.7	V	P	135.0	165.5		
7.440	3.0	25.3	35.2	4.5	-34.6	0.0	0.0	30.4	54.0	-23.6	V	A	135.0	165.5		
4.960	3.0	53.2	33.8	3.6	-34.9	0.0	0.0	55.7	74.0	-18.3	H	P	170.7	42.8		
4.960	3.0	29.3	33.8	3.6	-34.9	0.0	0.0	31.8	54.0	-22.2	H	A	170.7	42.8		
7.440	3.0	38.3	35.2	4.5	-34.6	0.0	0.0	43.4	74.0	-30.6	H	P	100.1	260.1		
7.440	3.0	25.3	35.2	4.5	-34.6	0.0	0.0	30.3	54.0	-23.7	H	A	100.1	260.1		
Rev. 4.1.2.7																
Note: No other emissions were detected above the system noise floor.																

**8.3. RECEIVER ABOVE 1 GHz**  
**GFSK**

High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Test Engr:		Devin Chang															
Date:		11/22/08															
Project #:		08J12252															
Company:		SMK															
EUT Description:		EUT only Sample #1															
EUT M/N:		VP4750															
Mode Oper:		Rx mode /GFSK															
f	Measurement Frequency	Amp	Preamp Gain														Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters														Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m														Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength														Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter														
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes		
<b>2402MHz</b>																	
1.600	3.0	48.5	30.0	2.6	-35.7	0.0	0.0	45.4	74.0	-28.6	V	P	133.8	80.1			
1.600	3.0	40.7	30.0	2.6	-35.7	0.0	0.0	37.6	54.0	-16.4	V	A	133.8	80.1			
1.600	3.0	52.9	30.0	2.6	-35.7	0.0	0.0	49.8	74.0	-24.2	H	P	100.7	312.4			
1.600	3.0	50.1	30.0	2.6	-35.7	0.0	0.0	47.1	54.0	-6.9	H	A	100.7	312.4			
<b>2441MHz</b>																	
1.626	3.0	51.2	30.1	2.6	-35.7	0.0	0.0	48.2	74.0	-25.8	V	P	125.5	355.7			
1.626	3.0	46.6	30.1	2.6	-35.7	0.0	0.0	43.7	54.0	-10.3	V	A	125.5	355.7			
1.626	3.0	52.8	30.1	2.6	-35.7	0.0	0.0	49.8	74.0	-24.2	H	P	100.0	313.9			
1.626	3.0	49.8	30.1	2.6	-35.7	0.0	0.0	46.8	54.0	-7.2	H	A	100.0	313.9			
<b>2480MHz</b>																	
1.652	3.0	50.9	30.2	2.6	-35.7	0.0	0.0	48.1	74.0	-25.9	V	P	170.3	55.4			
1.652	3.0	47.6	30.2	2.6	-35.7	0.0	0.0	44.8	54.0	-9.2	V	A	170.3	55.4			
1.652	3.0	49.7	30.2	2.6	-35.7	0.0	0.0	46.9	74.0	-27.1	H	P	106.7	135.8			
1.652	3.0	45.8	30.2	2.6	-35.7	0.0	0.0	42.9	54.0	-11.1	H	A	106.7	135.8			
Rev. 4.1.2.7																	
Note: No other emissions were detected above the system noise floor.																	

**8PSK**

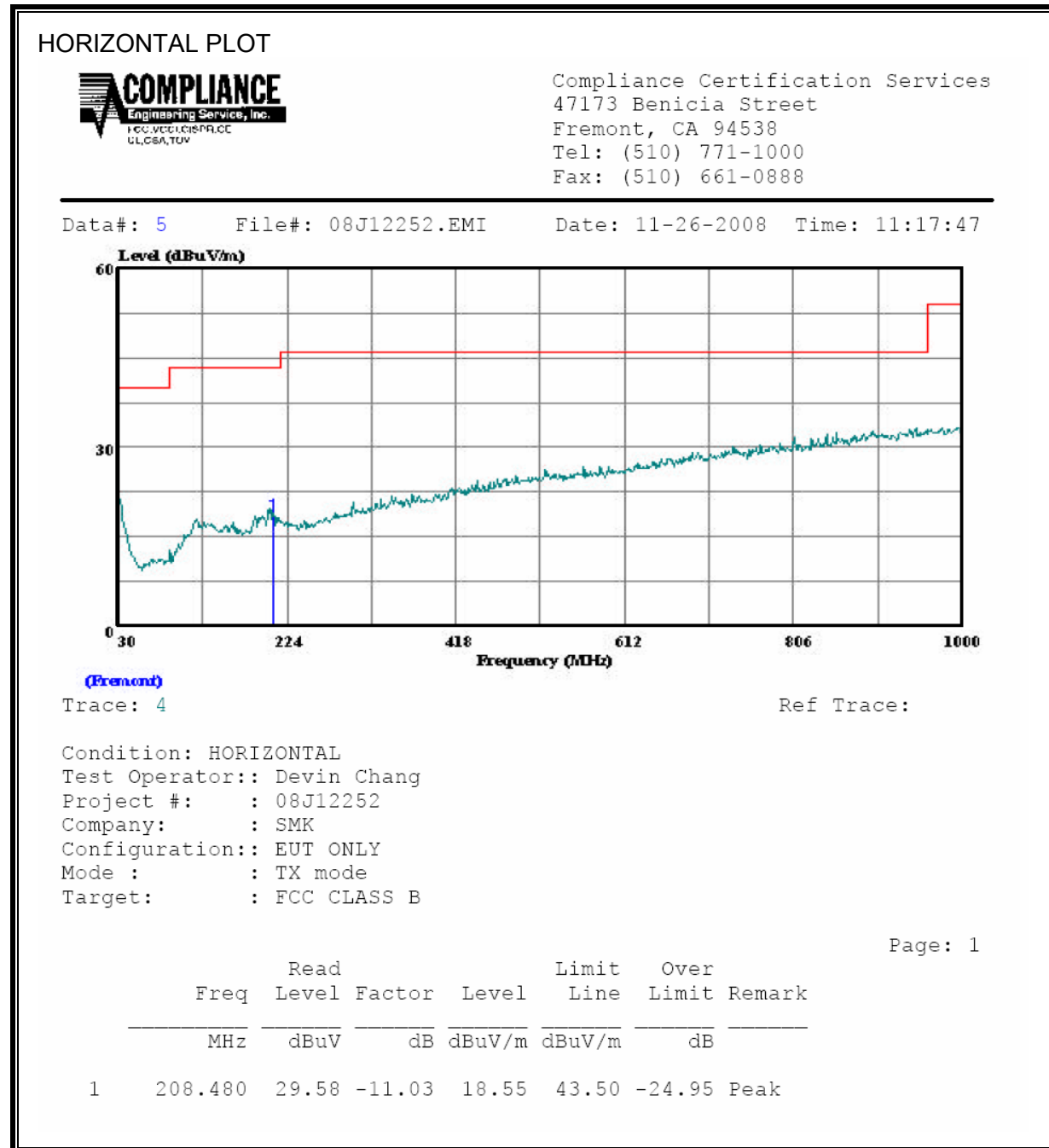
High Frequency Measurement																
Compliance Certification Services, Fremont 5m Chamber																
Test Engr:		Devin Chang														
Date:		11/22/08														
Project #:		08J12252														
Company:		SMK														
EUT Description:		EUT only Sample #1														
EUT M/N:		VP4750														
Mode Oper:		Rx mode 8PSK														
f	Measurement Frequency			Amp	Preamp Gain			Average Field Strength Limit								
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Peak Field Strength Limit								
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Margin vs. Average Limit								
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Margin vs. Peak Limit								
CL	Cable Loss			HPF	High Pass Filter											
f	Dist	Read	AF	CL	Amp	D Corr	Filtr	Corr.	Limit	Margin	Ant. Pol.	Det.	Ant.High	Table Angle	Notes	
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	cm	Degree		
<b>2402MHz</b>																
1.600	3.0	47.6	30.0	2.6	-35.7	0.0	0.0	44.6	74.0	-29.4	V	P	177.5	81.7		
1.600	3.0	41.5	30.0	2.6	-35.7	0.0	0.0	38.4	54.0	-15.6	V	A	177.5	81.7		
1.600	3.0	52.5	30.0	2.6	-35.7	0.0	0.0	49.5	74.0	-24.5	H	P	100.0	314.3		
1.600	3.0	50.0	30.0	2.6	-35.7	0.0	0.0	46.9	54.0	-7.1	H	A	100.0	314.3		
<b>2441MHz</b>																
1.626	3.0	49.1	30.1	2.6	-35.7	0.0	0.0	46.1	74.0	-27.9	V	P	130.9	77.4		
1.626	3.0	44.0	30.1	2.6	-35.7	0.0	0.0	41.1	54.0	-12.9	V	A	130.9	77.4		
1.626	3.0	53.0	30.1	2.6	-35.7	0.0	0.0	50.1	74.0	-23.9	H	P	101.4	316.9		
1.626	3.0	49.1	30.1	2.6	-35.7	0.0	0.0	46.2	54.0	-7.8	H	A	101.4	316.9		
<b>2480MHz</b>																
1.652	3.0	50.9	30.2	2.6	-35.7	0.0	0.0	48.1	74.0	-25.9	V	P	123.7	352.7		
1.652	3.0	47.2	30.2	2.6	-35.7	0.0	0.0	44.3	54.0	-9.7	V	A	123.7	352.7		
1.652	3.0	52.0	30.2	2.6	-35.7	0.0	0.0	49.2	74.0	-24.8	H	P	100.2	323.5		
1.652	3.0	48.9	30.2	2.6	-35.7	0.0	0.0	46.1	54.0	-7.9	H	A	100.2	323.5		

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

### 8.4. WORST-CASE BELOW 1 GHz

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





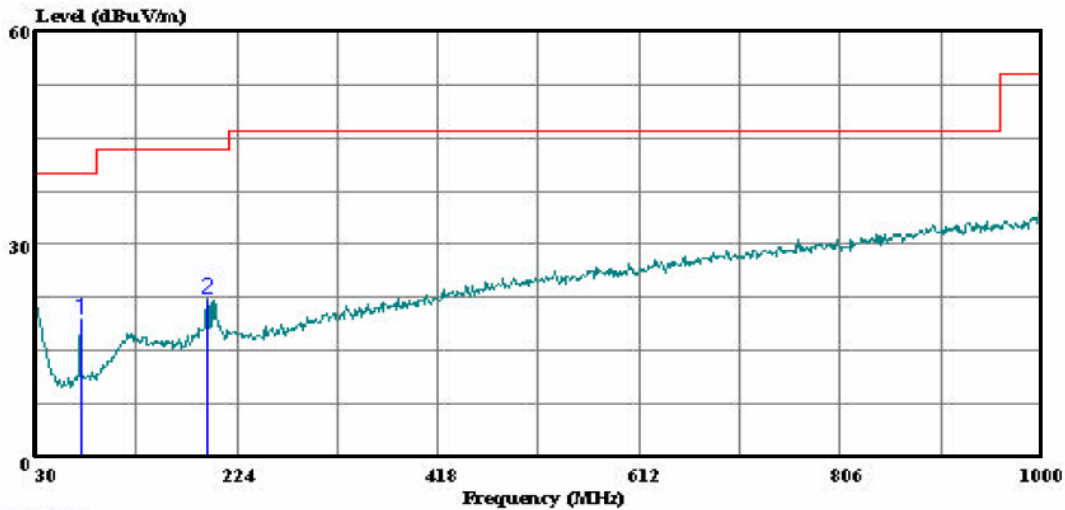
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT



Compliance Certification Services  
 47173 Benicia Street  
 Fremont, CA 94538  
 Tel: (510) 771-1000  
 Fax: (510) 661-0888

Data#: 3 File#: 08J12252.EMI Date: 11-26-2008 Time: 11:07:23



(Fremont)

Trace: 2

Ref Trace:

Condition: VERTICAL  
 Test Operator:: Devin Chang  
 Project #: : 08J12252  
 Company: : SMK  
 Configuration:: EUT ONLY  
 Mode : : TX mode  
 Target: : FCC CLASS B

Page: 1

	Freq	Read	Limit	Over		
	MHz	Level	Factor	Level	Line	
		dBuV	dB	dBuV/m	dBuV/m	
1	73.650	36.83	-17.43	19.40	40.00	-20.60 Peak
2	195.870	33.00	-10.71	22.29	43.50	-21.21 Peak

## 9. MAXIMUM PERMISSIBLE EXPOSURE

### FCC RULES

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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

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

f = frequency in MHz

\* = Plane-wave equivalent power density

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

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

**IC RULES**

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

**Table 5  
 Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)**

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

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

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

**CALCULATIONS**

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

where

- E = Field Strength in Volts/meter
- P = Power in Watts
- G = Numeric antenna gain
- d = Distance in meters
- S = Power Density in milliwatts/square centimeter

Combining equations, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

$$d = 0.282 * 10^{((P + G) / 20)} / \sqrt{S}$$

where

- d = MPE distance in cm
- P = Power in dBm
- G = Antenna Gain in dBi
- S = Power Density Limit in mW/cm<sup>2</sup>

Rearranging terms to calculate the power density at a specific distance yields

$$S = 0.0795 * 10^{((P + G) / 10)} / (d^2)$$

The power density in units of mW/cm<sup>2</sup> is converted to units of W/m<sup>2</sup> by multiplying by a factor of 10.

**LIMITS**

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm<sup>2</sup>

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m<sup>2</sup>

**RESULTS**

Mode	Band	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	FCC Power Density (mW/cm <sup>2</sup> )	IC Power Density (W/m <sup>2</sup> )
GFSK	2.4 GHz	20.0	4.06	2.00	0.0008	0.0080
8PSK	2.4 GHz	20.0	1.90	2.00	0.0005	0.0049