



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

**FOR**

**BLUETOOTH TRANSCEIVER MODULE**

**MODEL NUMBER: BCM92046MD\_GEN**

**FCC ID: QDS-BRCM1033**

**IC: 4324A-BRCM1033**

**REPORT NUMBER: 07U11422-1, REVISION A**

**ISSUE DATE: DECEMBER 11, 2007**

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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>
--	12/06/07	Initial Issue	Hsin Fu Shih
A	12/11/07	Updated section 7.2.4 Average Time of Occupancy	Hsin Fu Shih

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** BROADCOM CORPORATION  
190 MATHILDA PLACE  
SUNNYVALE, CA 94086, USA

**EUT DESCRIPTION:** BLUETOOTH TRANSCEIVER MODULE

**MODEL:** BCM92046MD\_GEN

**SERIAL NUMBER:** CN-0RM948-13740-7B2-078-X00

**DATE TESTED:** NOVEMBER 28 - DECEMBER 5, 2007


APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	No Non-Compliance Noted
RSS-210 Issue 7 Annex 8 and RSS-GEN Issue 2	No Non-Compliance Noted

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. 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 Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services 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:

Tested By:



HSIN FU SHIH  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES



VIEN TRAN  
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
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 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 module.

The radio module is manufactured by Hong Fu Jin Precision Industry (Shenzhen) Co., Ltd.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	3.64	2.31
2402 - 2480	Enhanced 8PSK	6.07	4.05

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Multilayer Chip antenna, with a maximum gain of 3.5 dBi. Manufactured by Amotech, part #: ALA621C5

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was BCM\_BTDL, v1.7.1.

The EUT driver software installed in the host support equipment during testing was Broadcom, v. 1.0.1400.

The test utility software used during testing was BluetoothInstall, v1.0.0.6.

### 5.5. WORST-CASE CONFIGURATION AND MODE

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

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	HP	DV600	CNF6511956	DoC
AC Adapter	HP	PA-1650-20H	PPP009S	N/A

### I/O CABLES

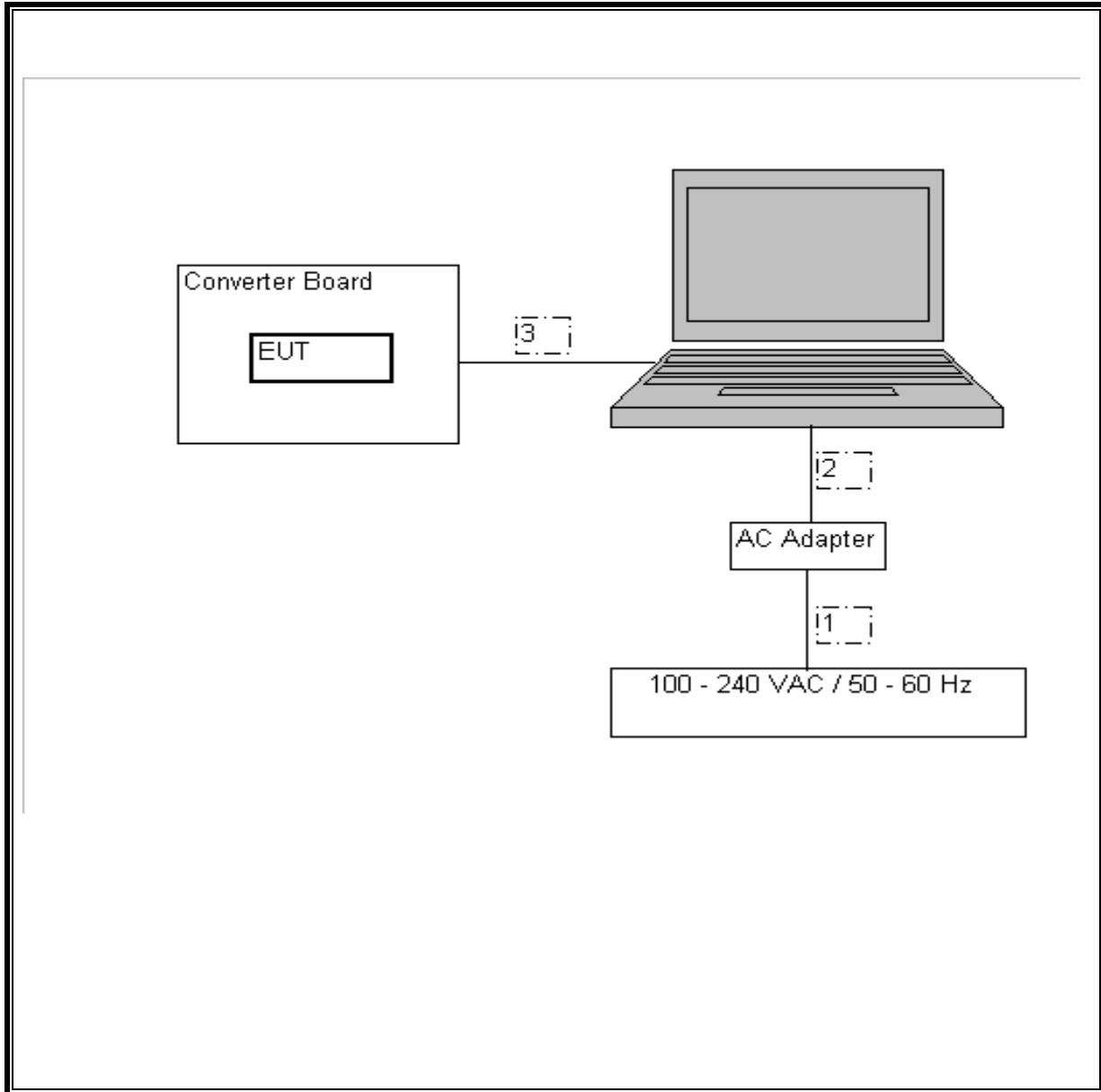
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	AC	Unshielded	1.2 m	N/A
2	DC	1	DC	Unshielded	1.2 m	N/A
3	USB	1	USB	Shielded	1.8m	N/A

### TEST SETUP

The EUT is installed in a host laptop computer via converter board during the tests. Test software exercised the radio card.



**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
EMI Receiver, 9 kHz ~ 2.9 GHz	Agilent / HP	8542E	3942A00286	6/12/2007	6/12/2008
RF Filter Section	Agilent / HP	85420E	3705A00256	6/12/2007	6/12/2008
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	8/13/2007	8/13/2008
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00931	8/16/2007	8/16/2008
Spectrum Analyzer 3 Hz ~ 44	Agilent / HP	E4446A	US42070220	8/14/2008	8/14/2008
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	8/15/2007	4/15/2008
2.4-2.5 GHz Reject Filter	Micro-Tronics	BRM50702	1	CNR	CNR
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	9/15/2007	9/15/2008
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	9/15/2007	9/15/2008
EMI Test Receiver	R & S	ESHS 20	827129/006	1/27/2007	1/27/2008
Power Meter	Agilent	E4416A	Broadcom	N/A	N/A
Power Sensor	Agilent	E9323A	Broadcom	N/A	N/A

## 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.

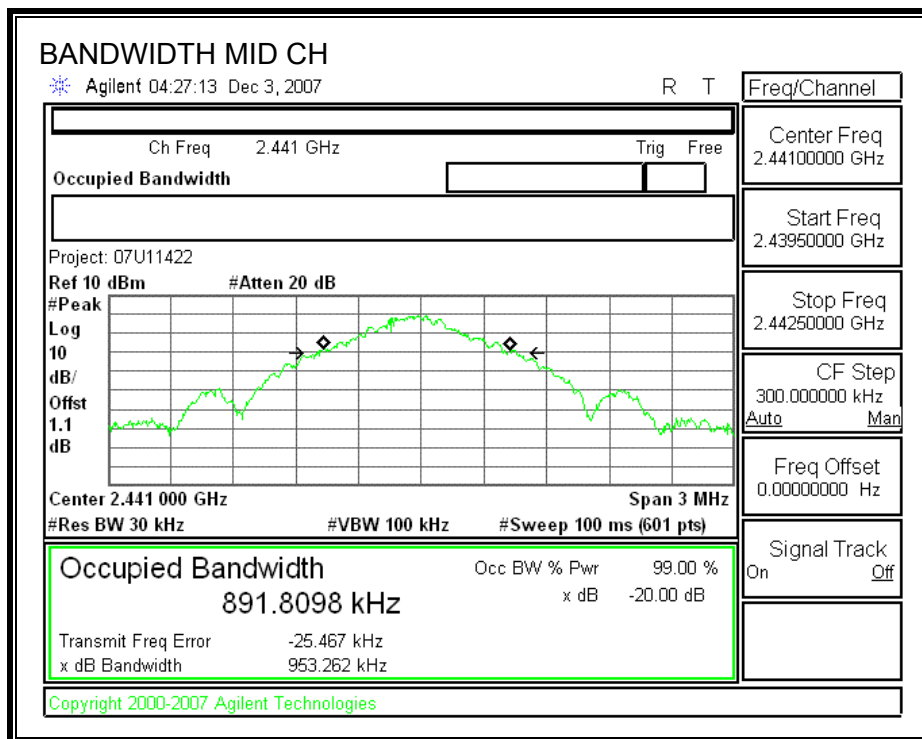
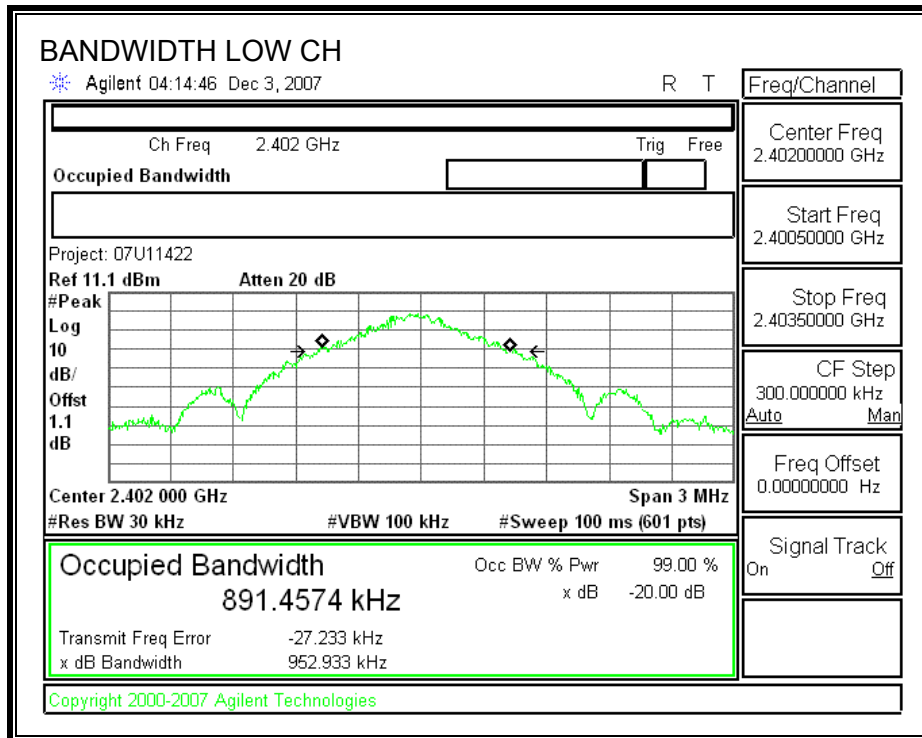
##### TEST PROCEDURE

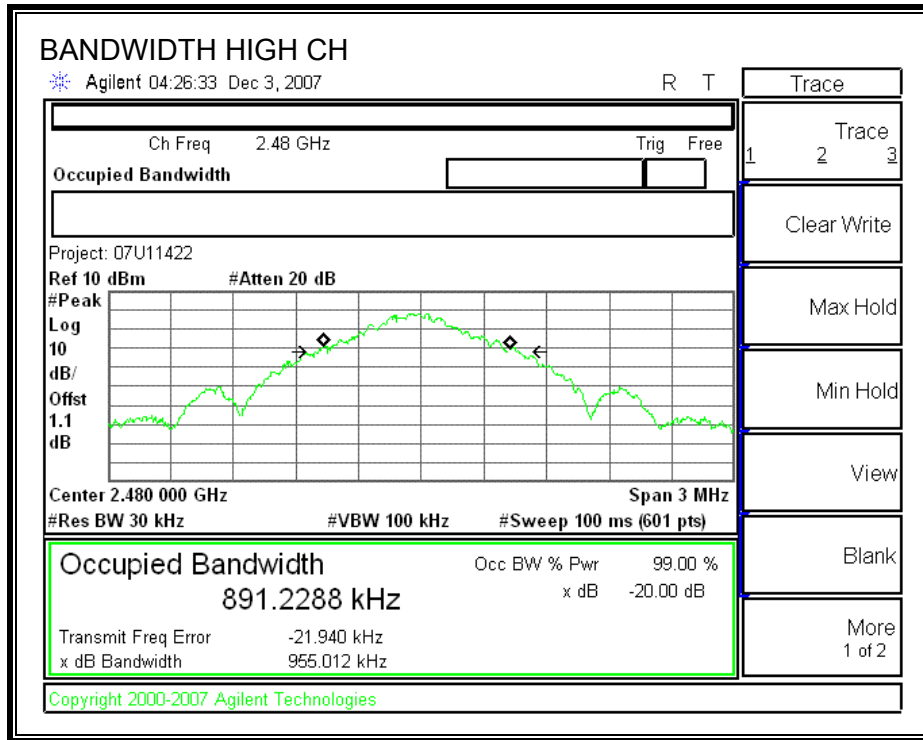
The transmitter output is connected to a spectrum analyzer. The RBW is set to  $\geq 1\%$  of the 20 dB bandwidth. The VBW is set to  $\geq$  RBW. The sweep time is coupled.

##### RESULTS

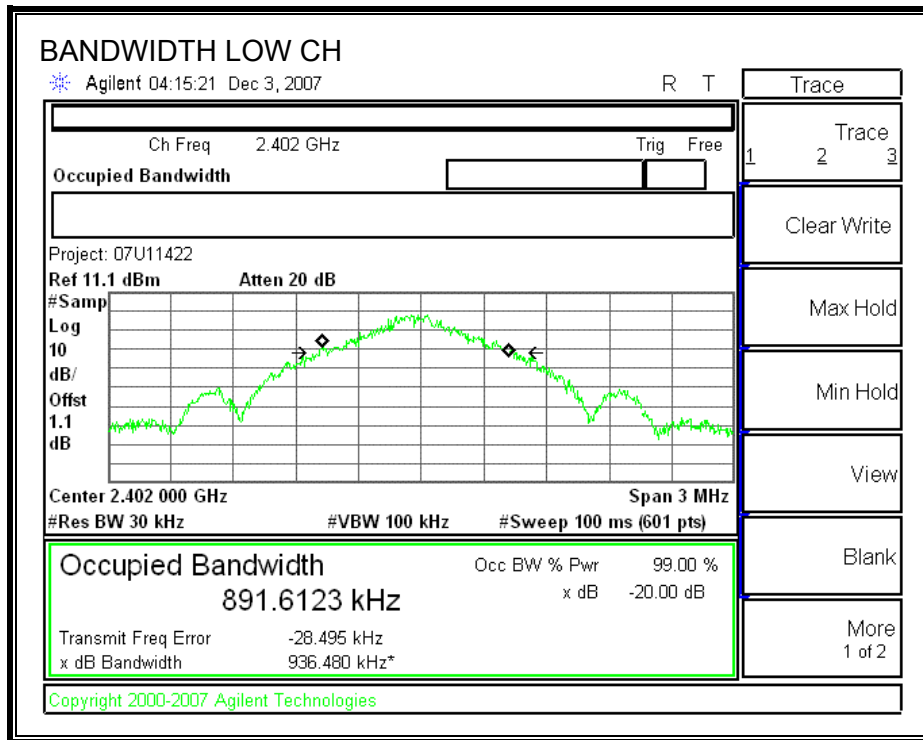
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	952.933	891.6123
Middle	2441	953.262	893.2659
High	2480	955.012	890.5358

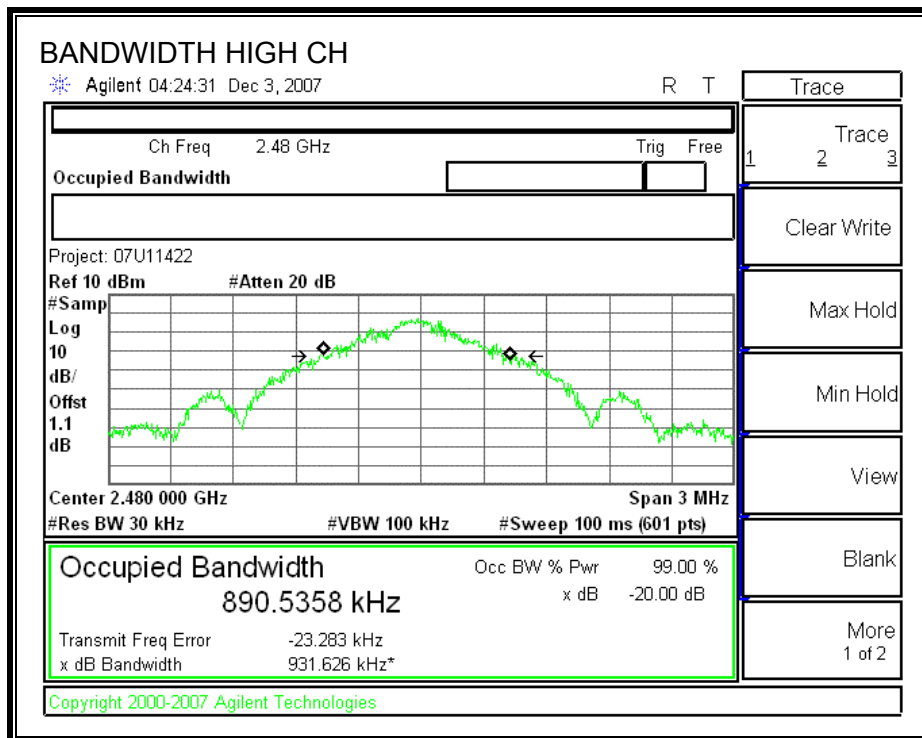
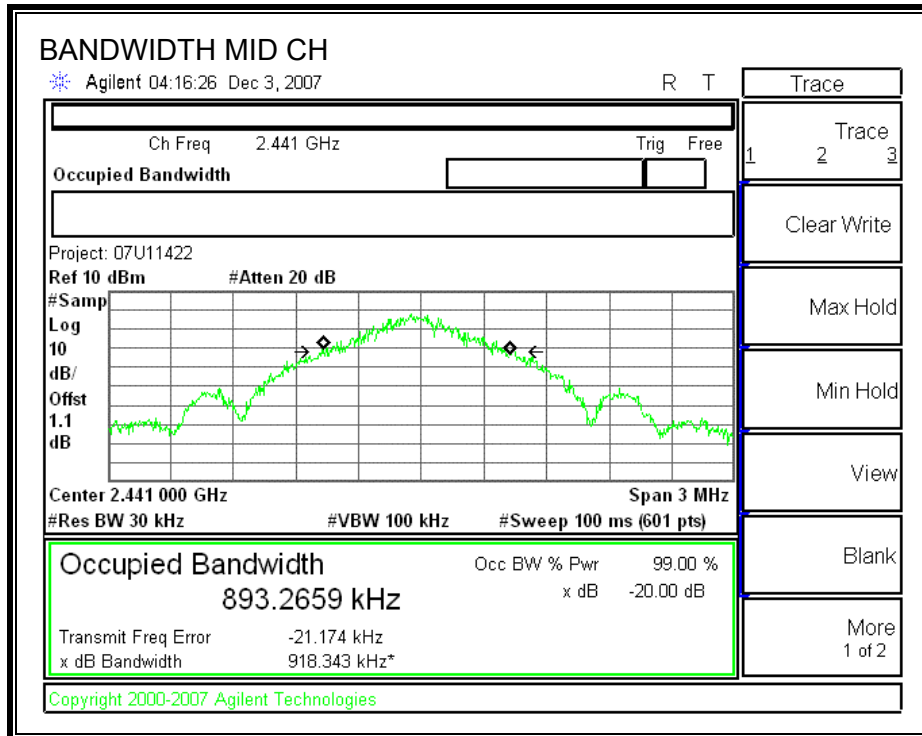
**20 dB BANDWIDTH**





**99% BANDWIDTH**





### 7.1.2. HOPPING FREQUENCY SEPARATION

#### LIMIT

FCC §15.247 (a) (1) & IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

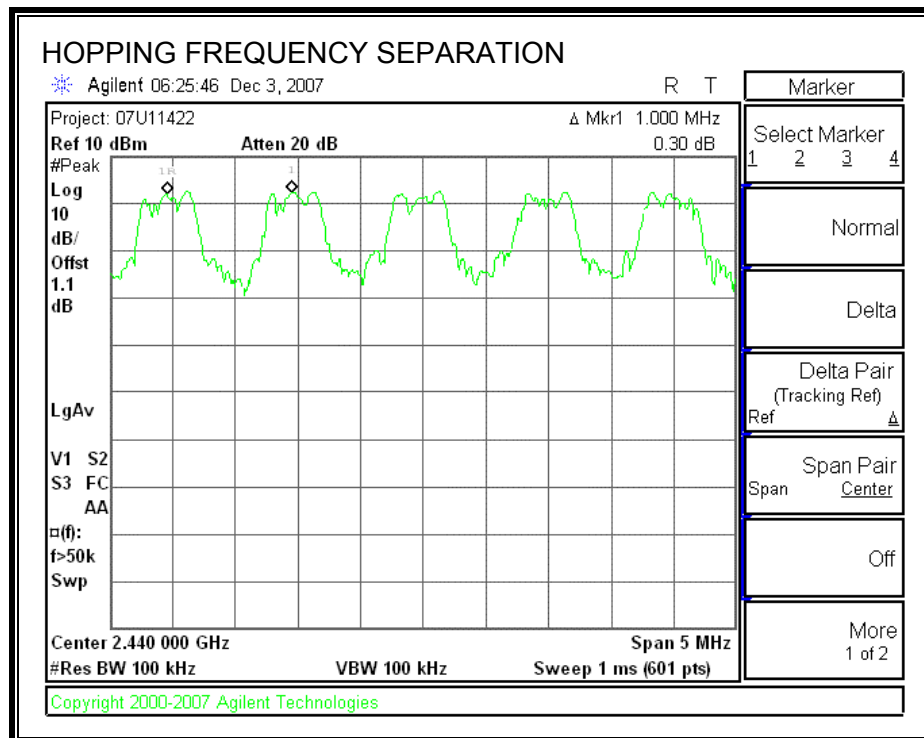
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

#### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

#### RESULTS

##### HOPPING FREQUENCY SEPARATION



### **7.1.3. NUMBER OF HOPPING CHANNELS**

#### **LIMIT**

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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

#### **TEST PROCEDURE**

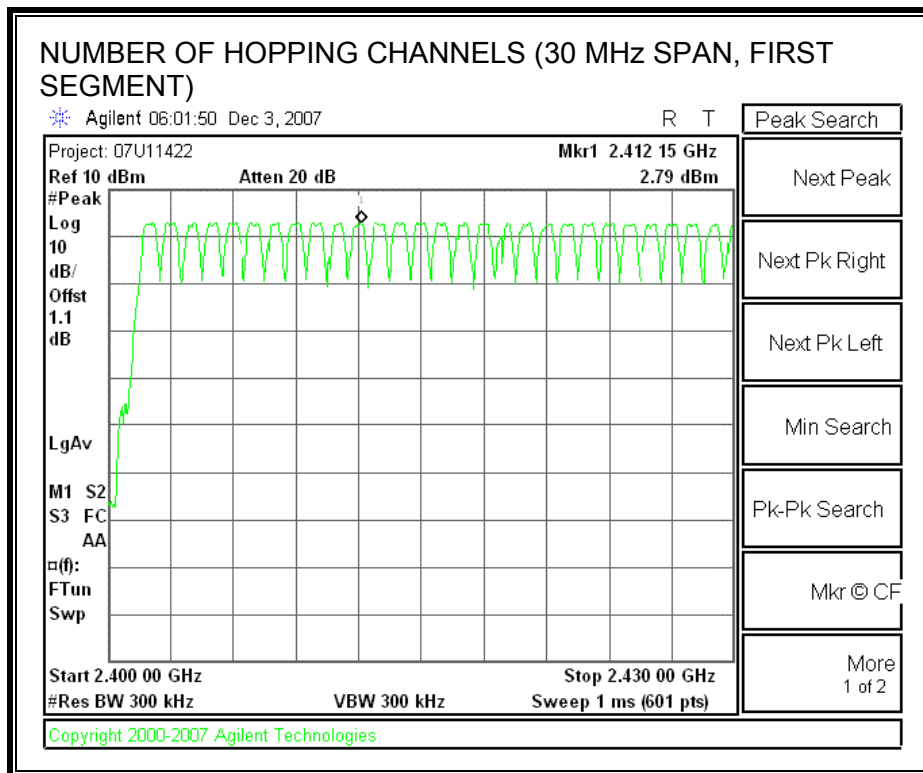
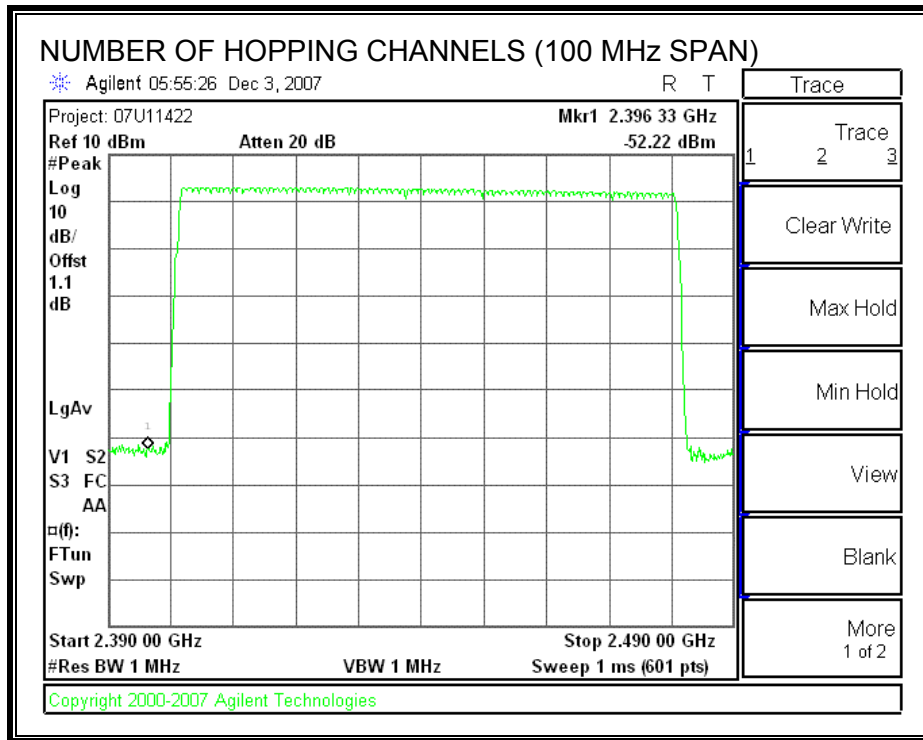
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

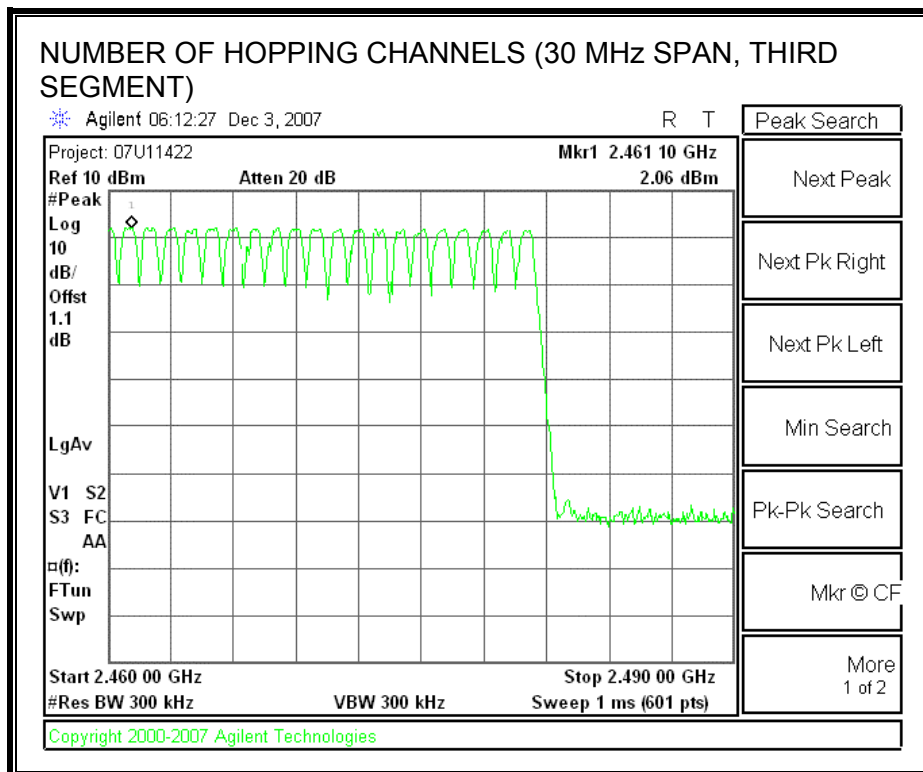
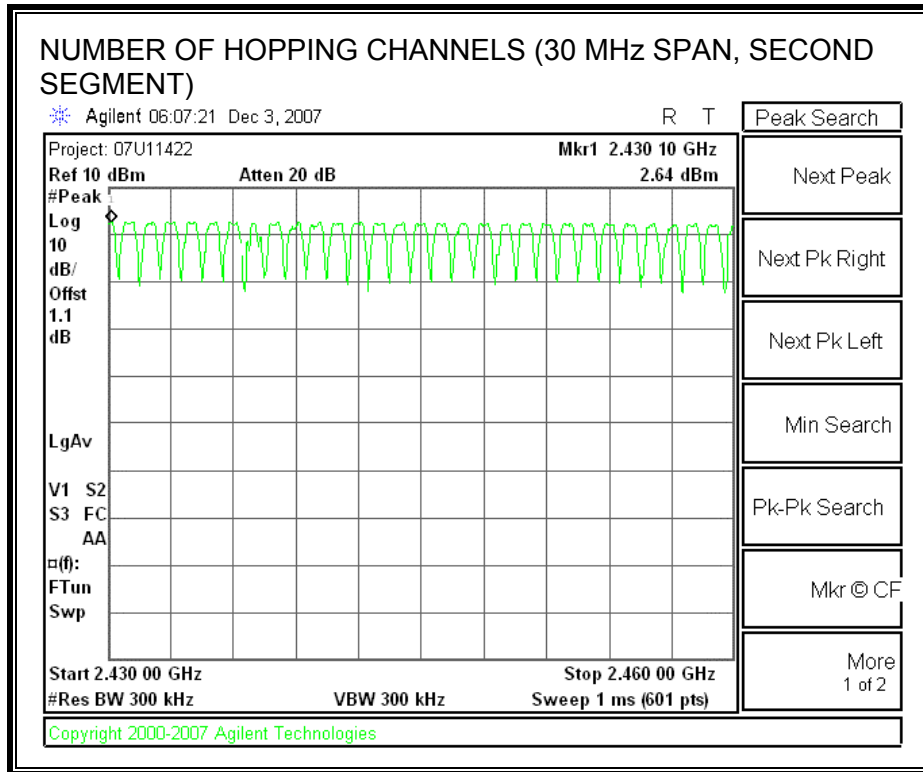
#### **RESULTS**

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

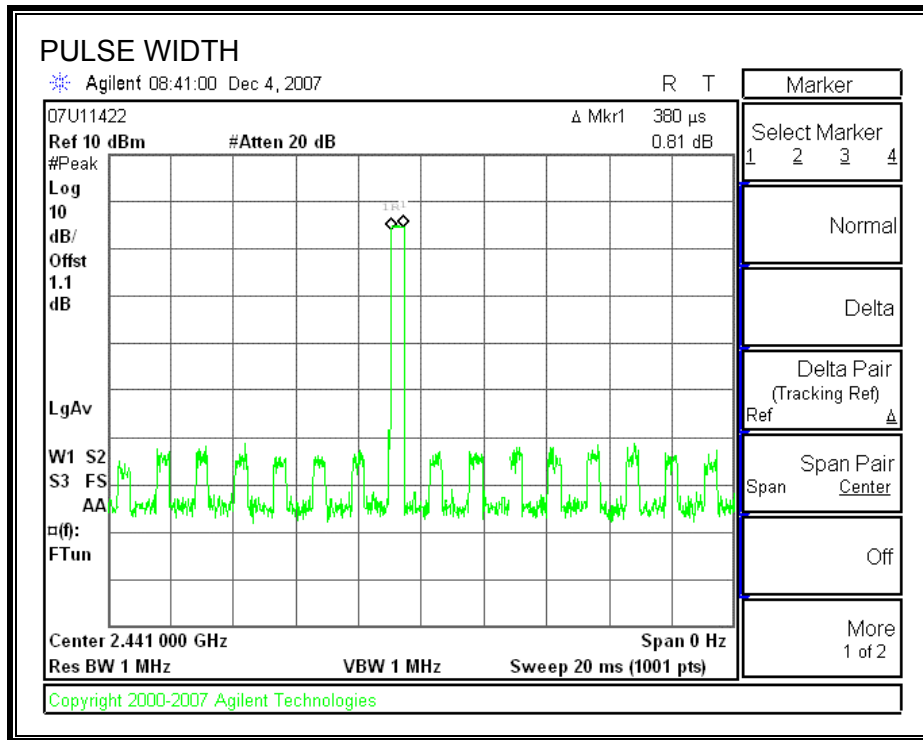
#### RESULTS

No non-compliance noted:

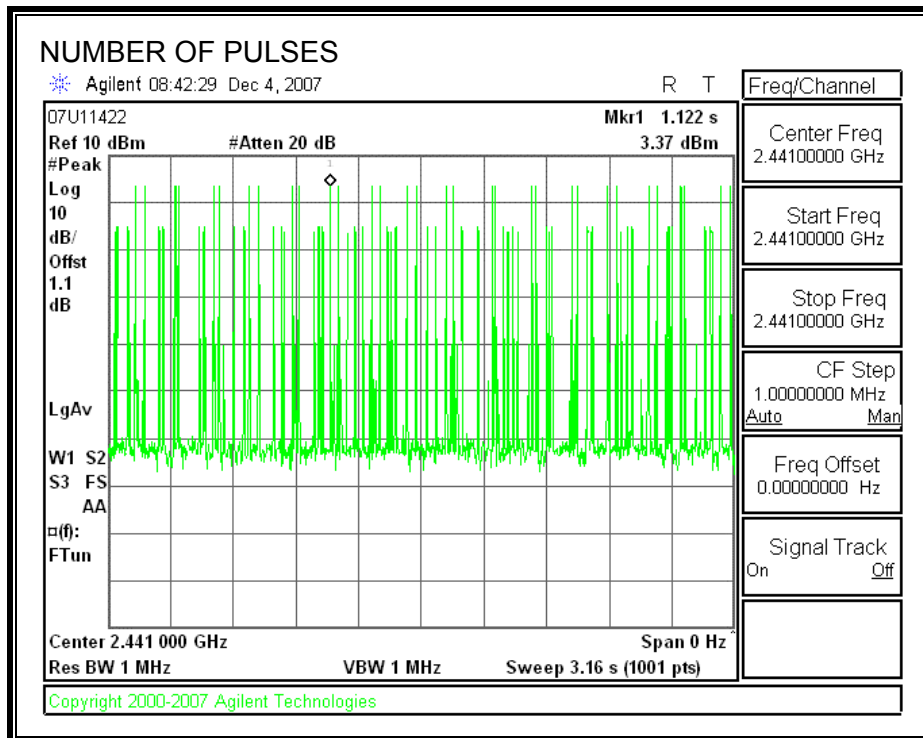
##### GFSK Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.38	32	0.122	0.4	0.278
DH3	1.60	17	0.272	0.4	0.128
DH5	2.88	13	0.374	0.4	0.026

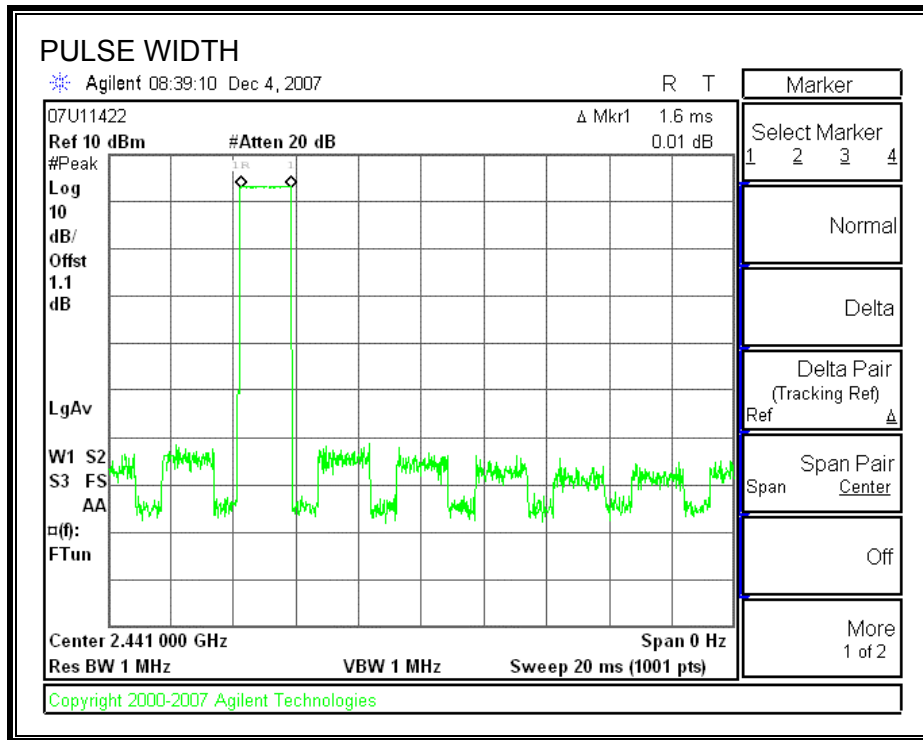
**FREQUENCY PACKET DH1**



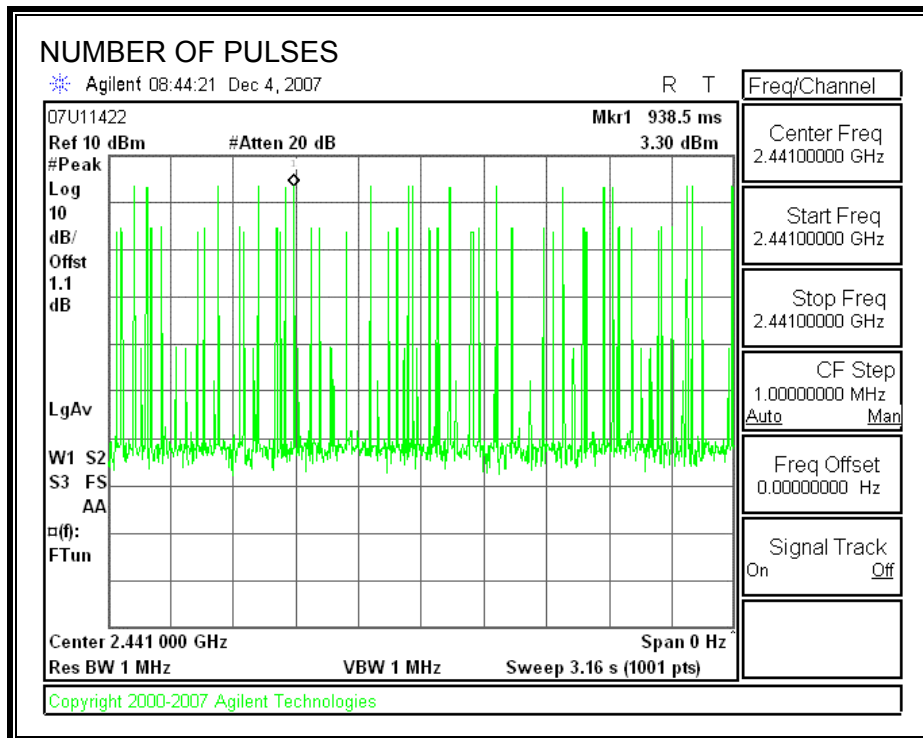
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD**



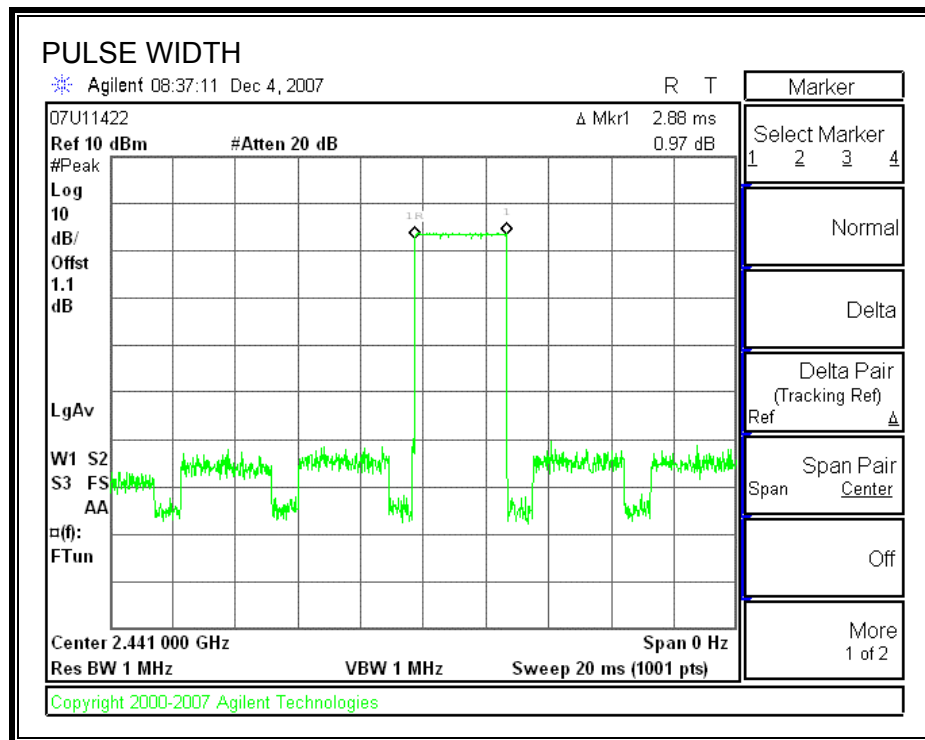
**FREQUENCY PACKET DH3**



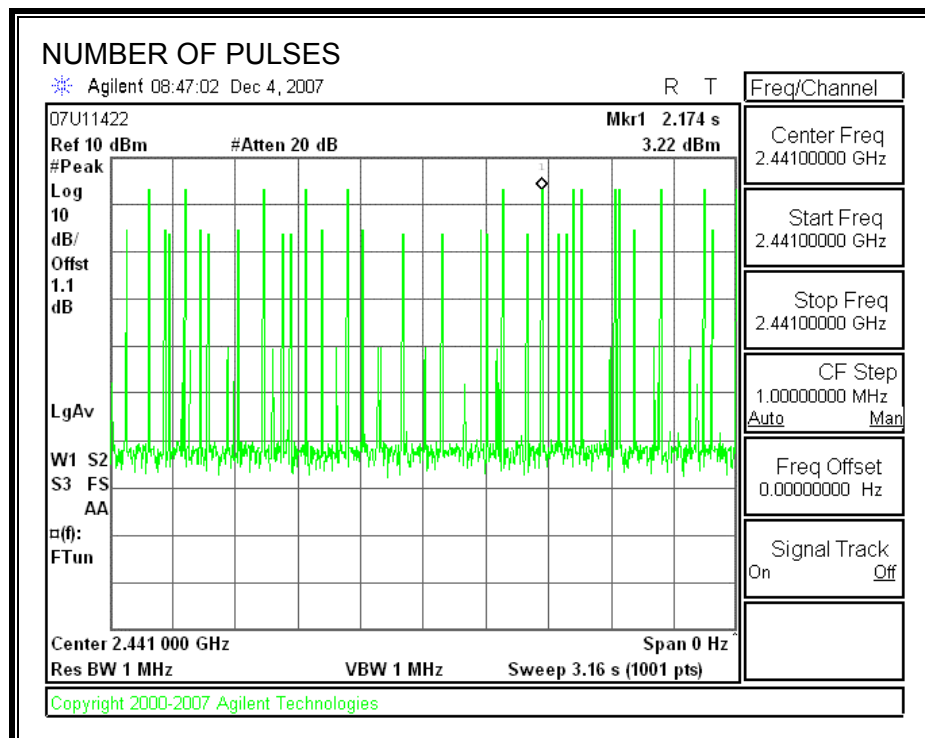
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD**



**FREQUENCY PACKET DH5**



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



### 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.

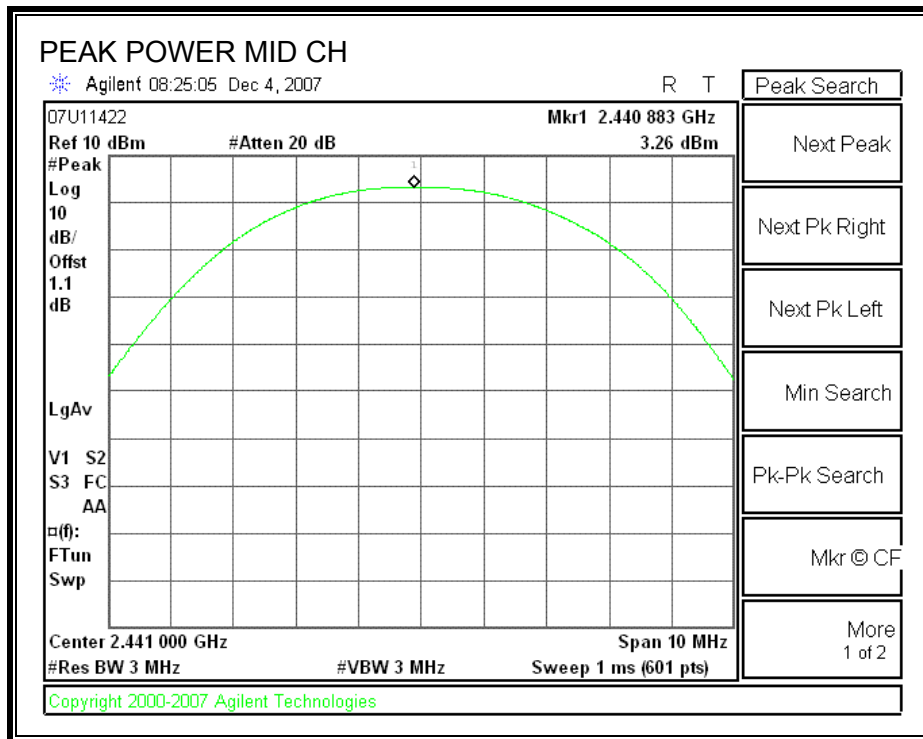
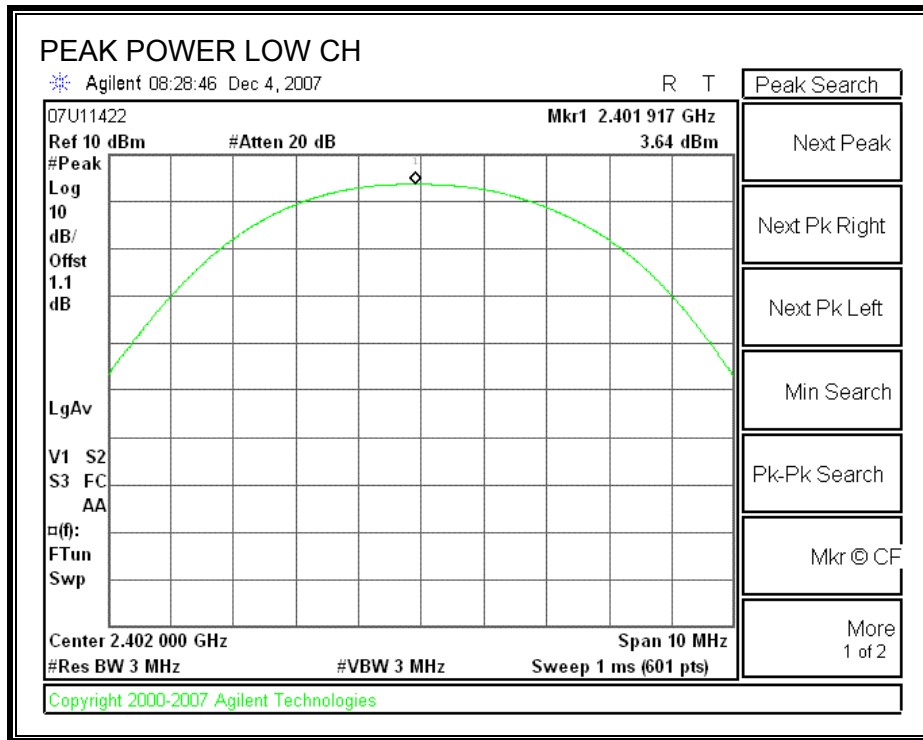
#### TEST PROCEDURE

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.

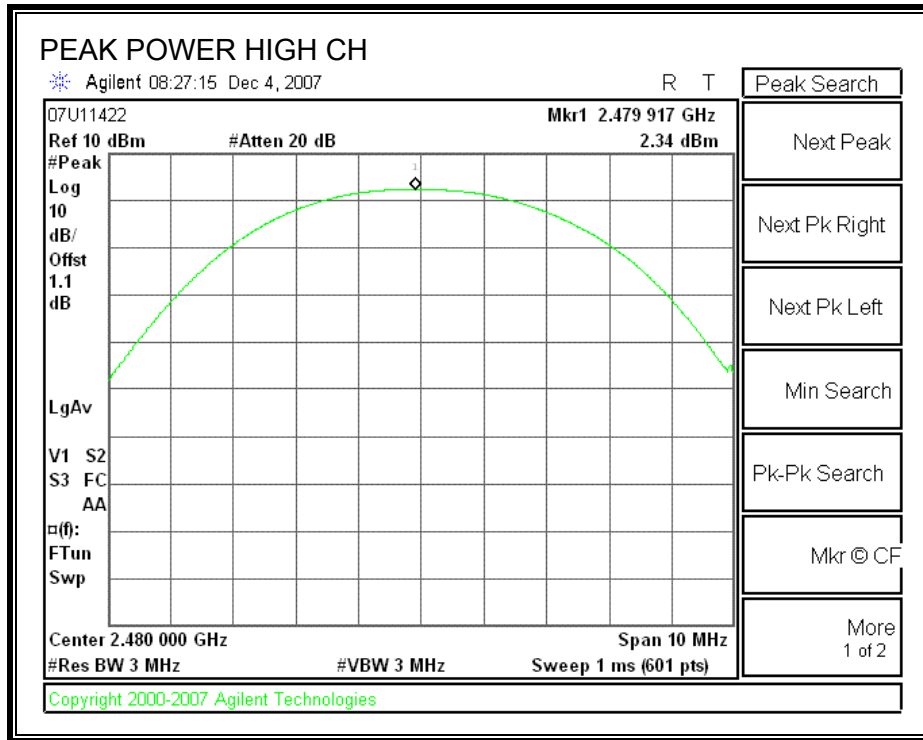
#### RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.64	30	-26.36
Middle	2441	3.26	30	-26.74
High	2480	2.34	30	-27.66

**OUTPUT POWER**







## **7.1.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

### **TEST PROCEDURE**

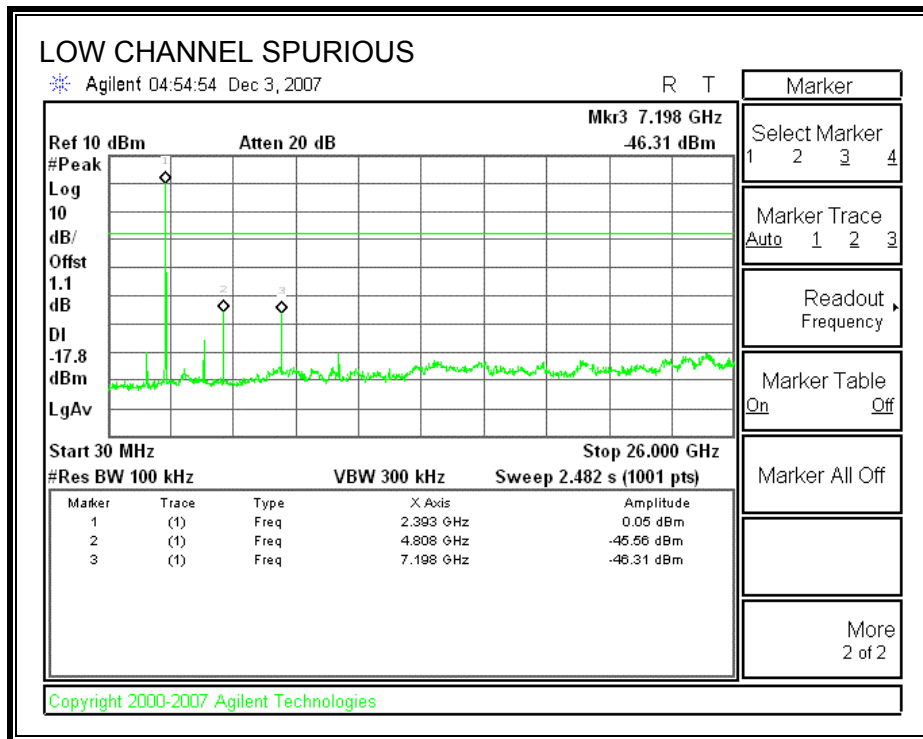
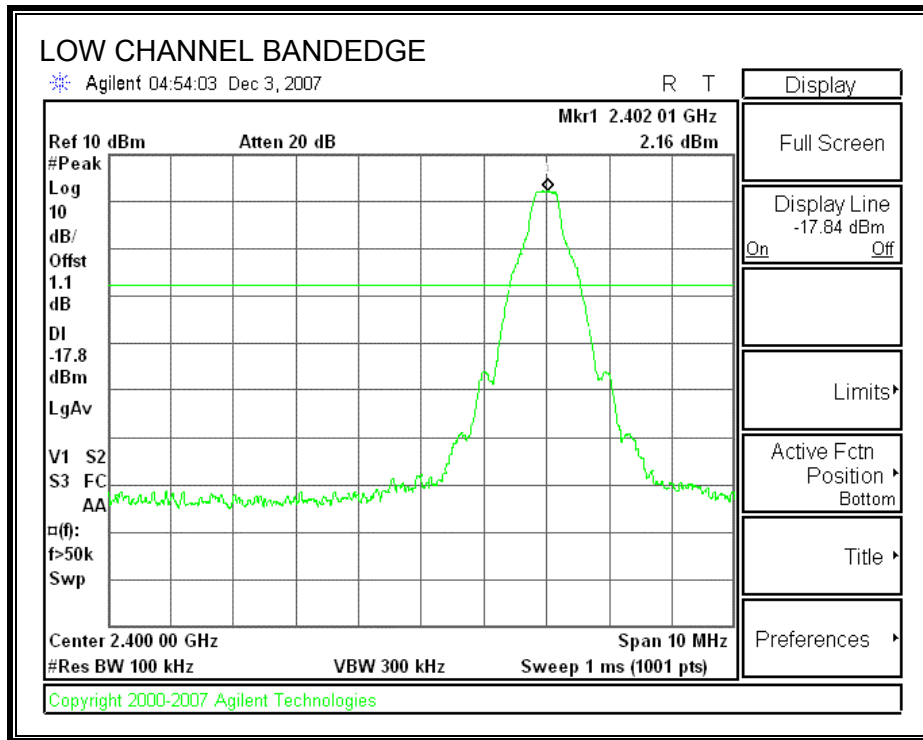
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

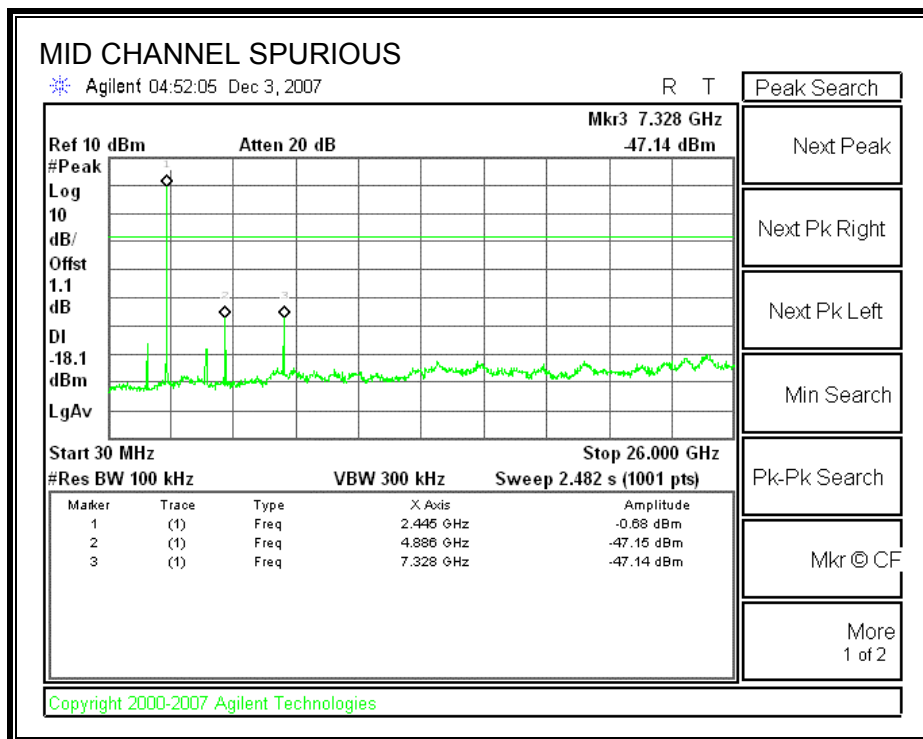
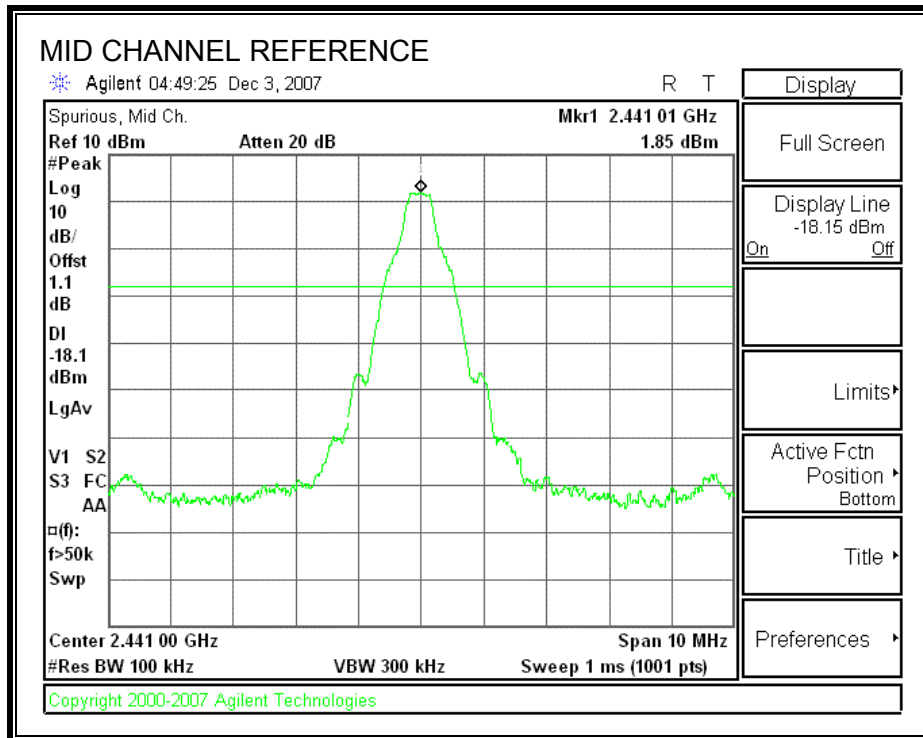
The band edges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

### **RESULTS**

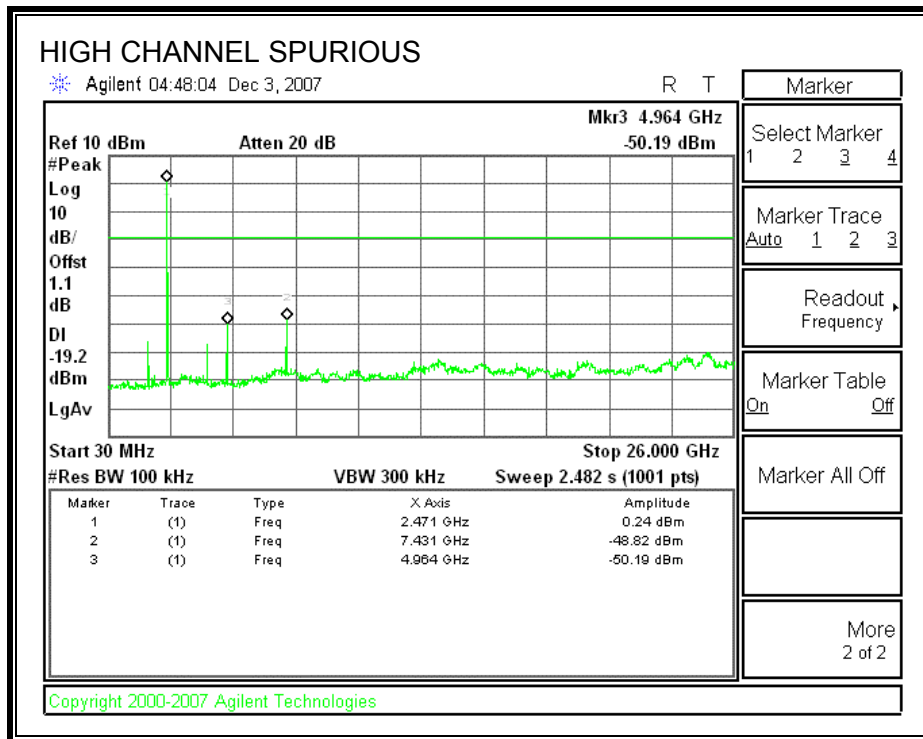
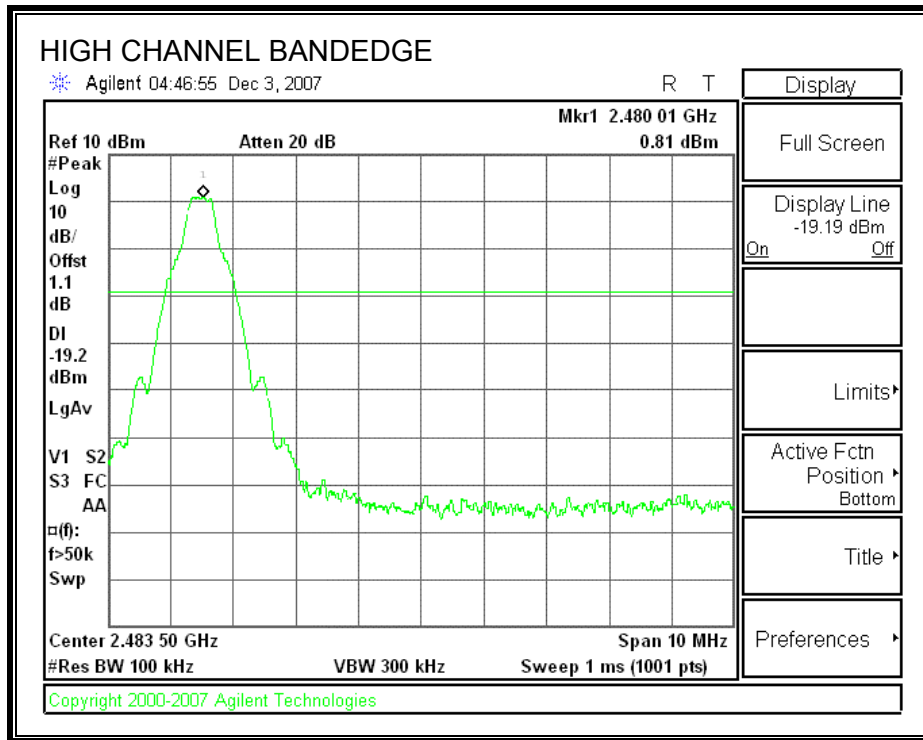
**SPURIOUS EMISSIONS, LOW CHANNEL**



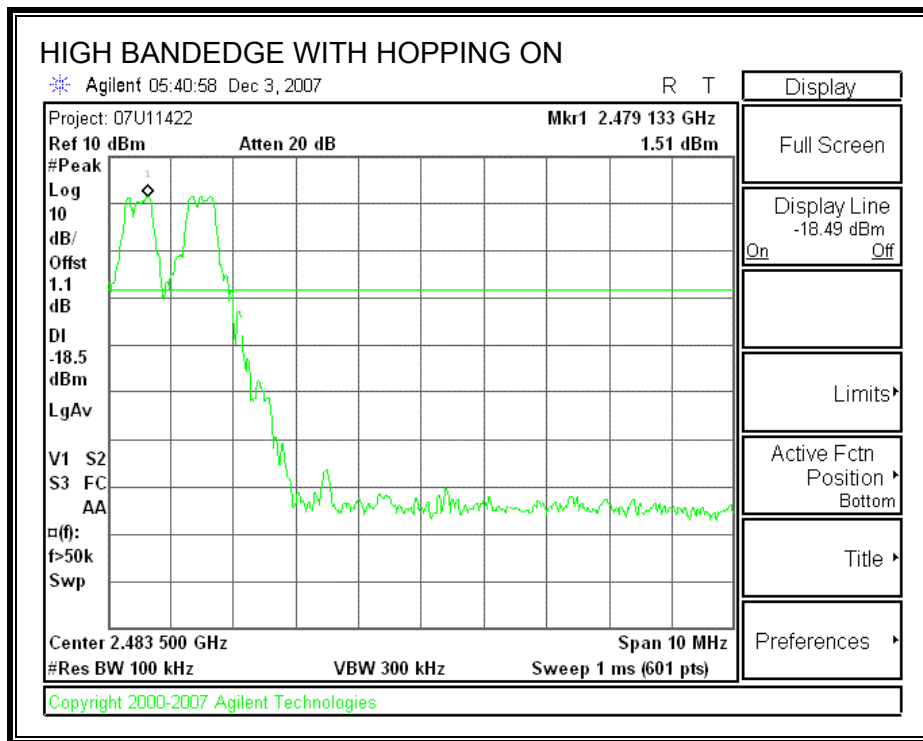
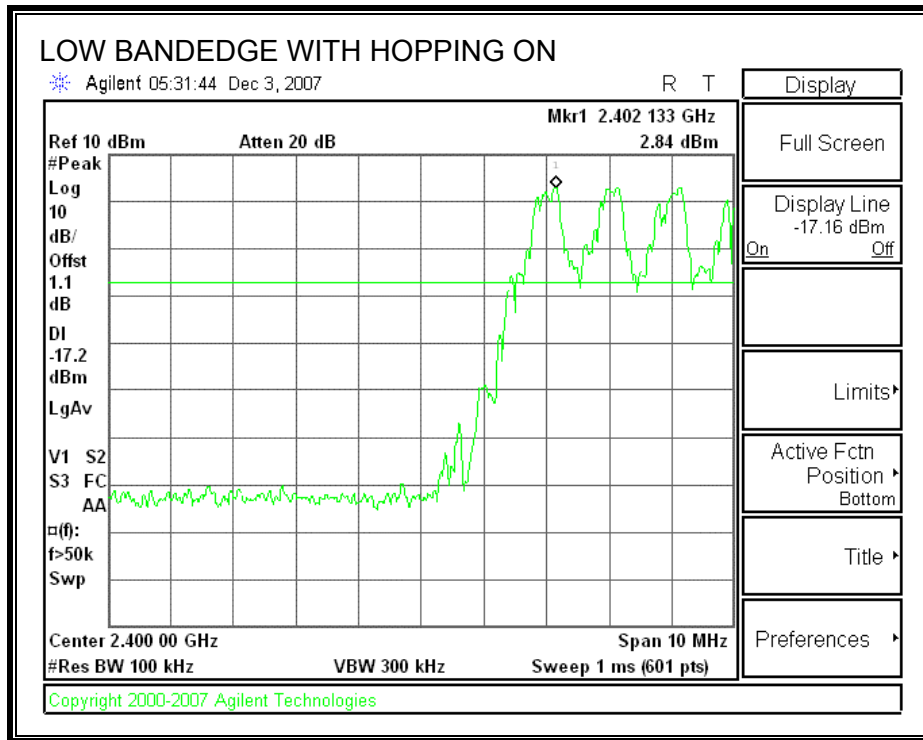
**SPURIOUS EMISSIONS, MID CHANNEL**



**SPURIOUS EMISSIONS, HIGH CHANNEL**



**SPURIOUS BANDEGE 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.

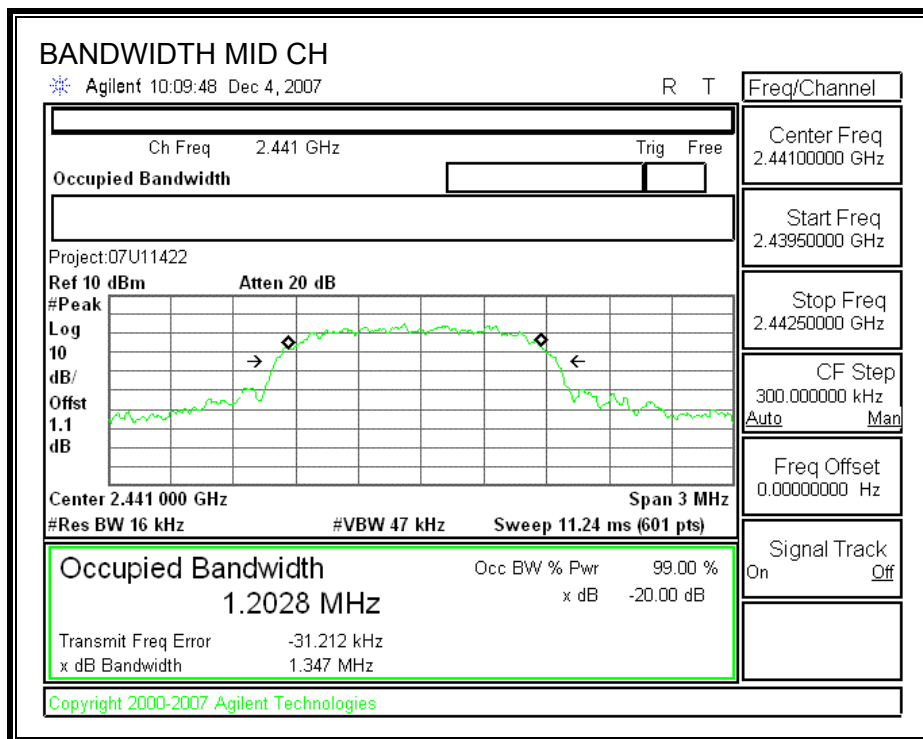
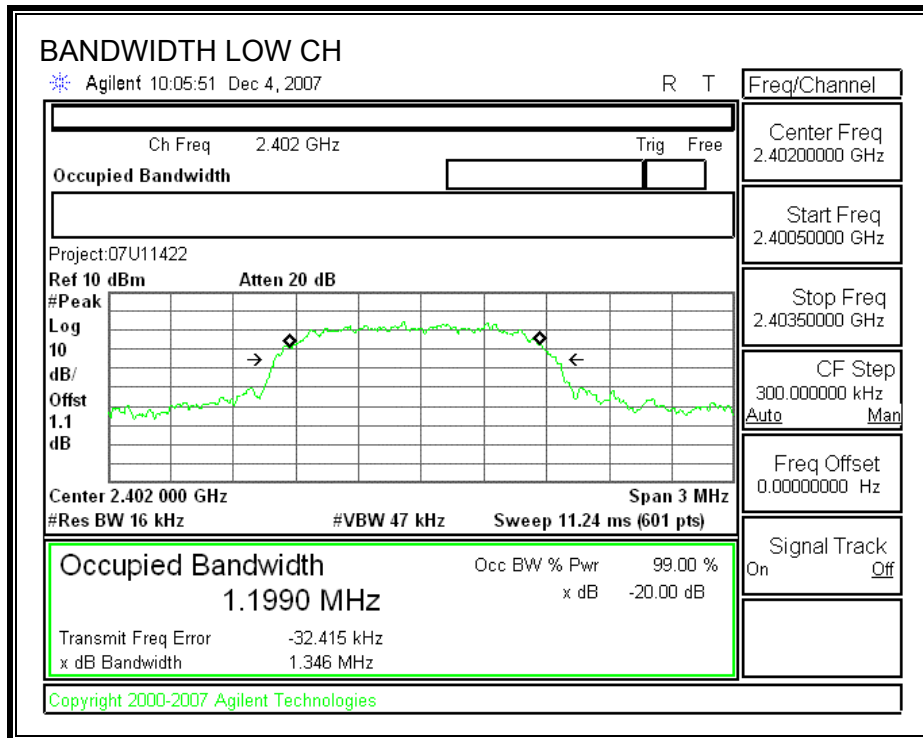
#### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% to 3% of the 20 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

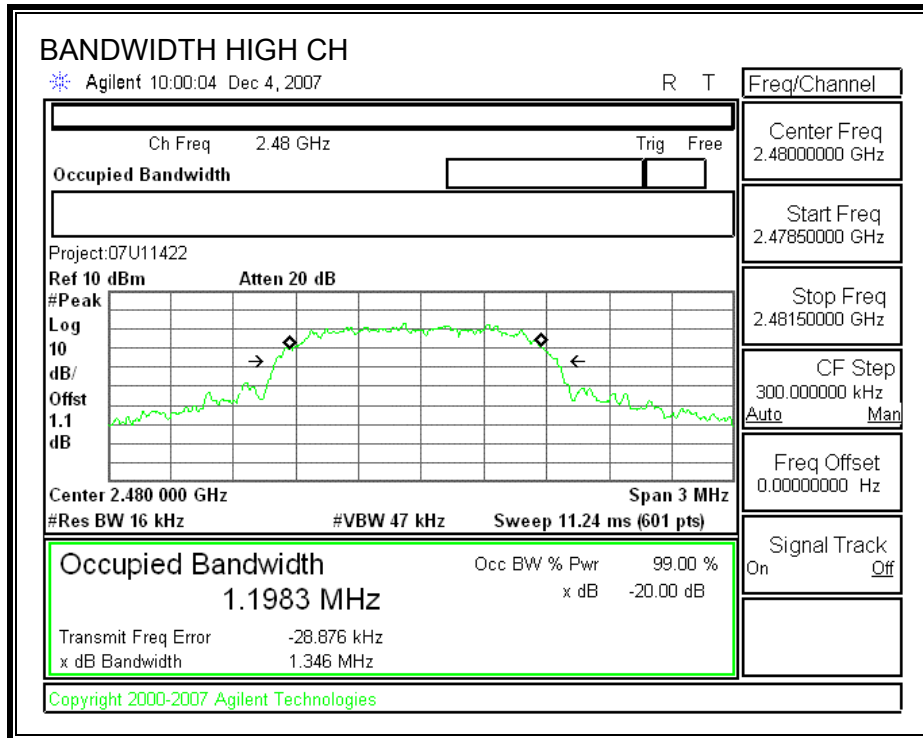
#### RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.1990	1.2149
Middle	2441	1.2028	1.2034
High	2480	1.1983	1.2156

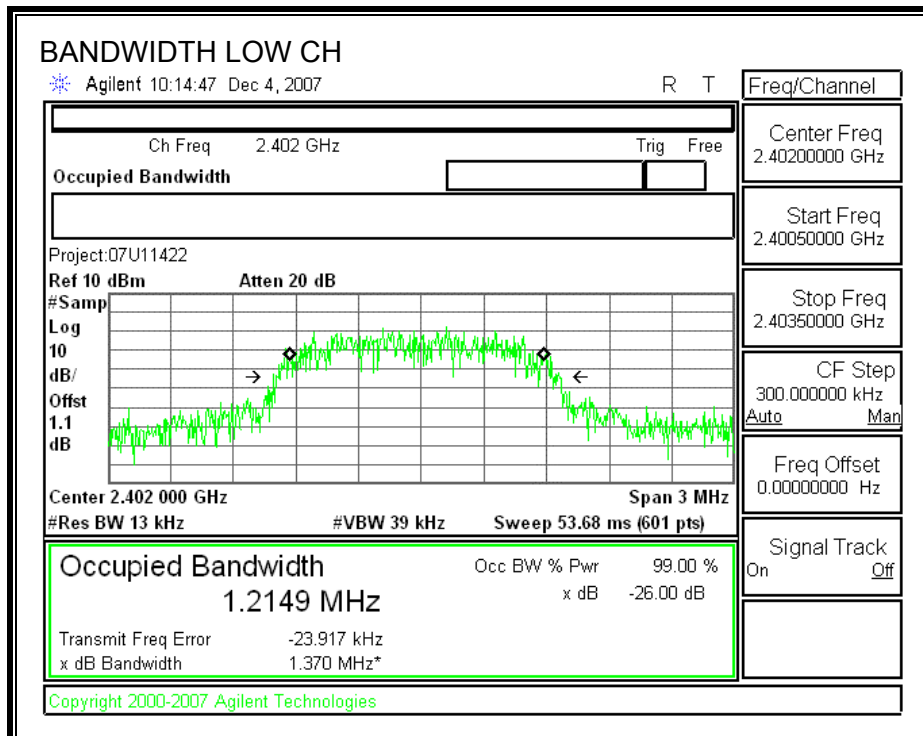
**20 dB BANDWIDTH**

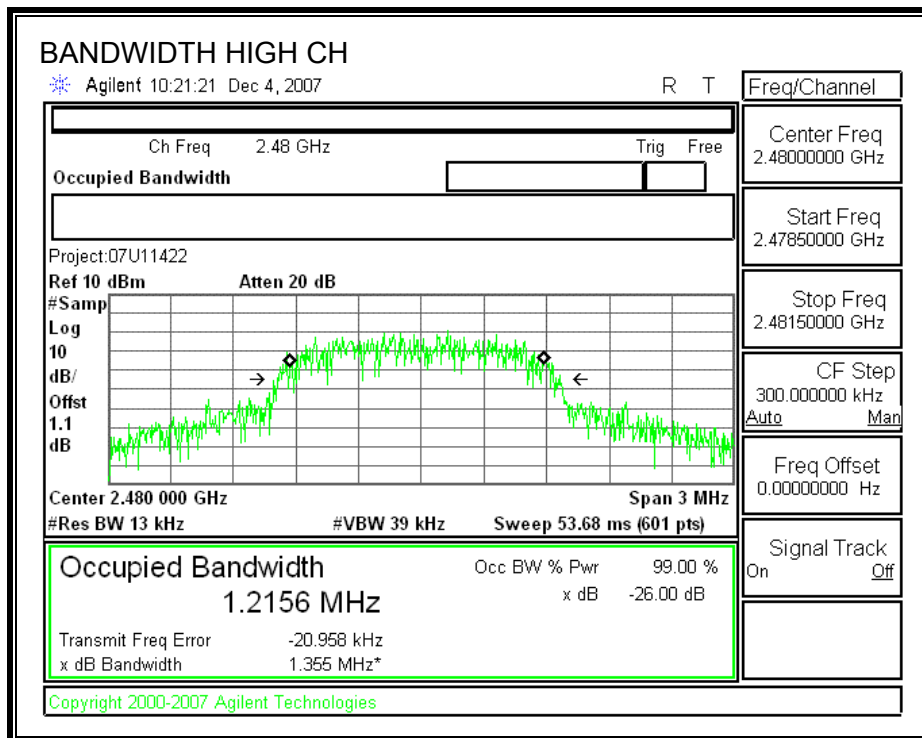
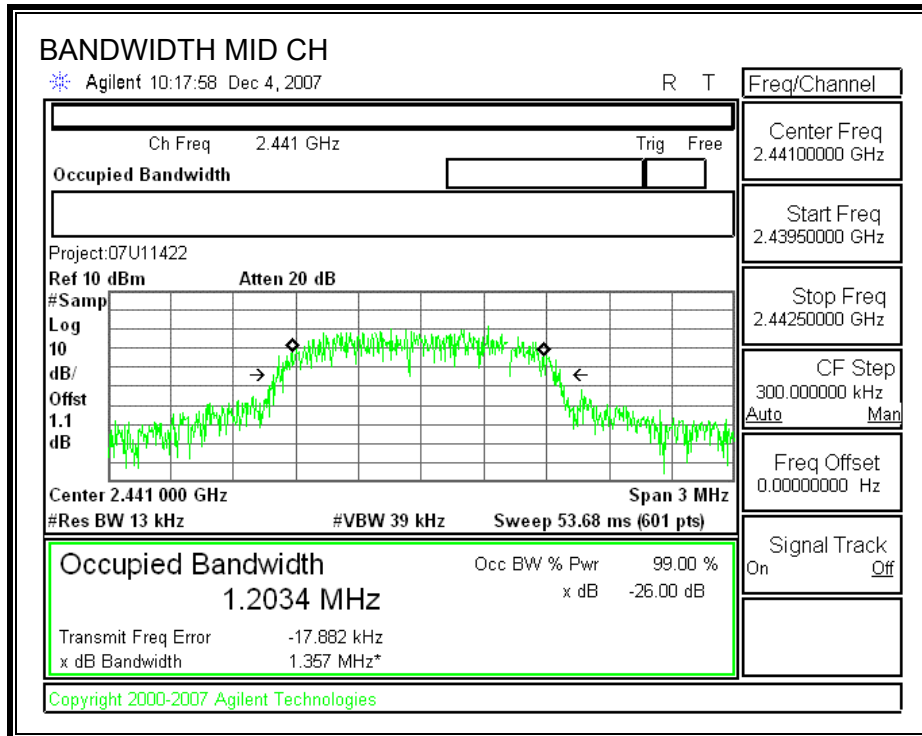






**99% BANDWIDTH**





## 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.

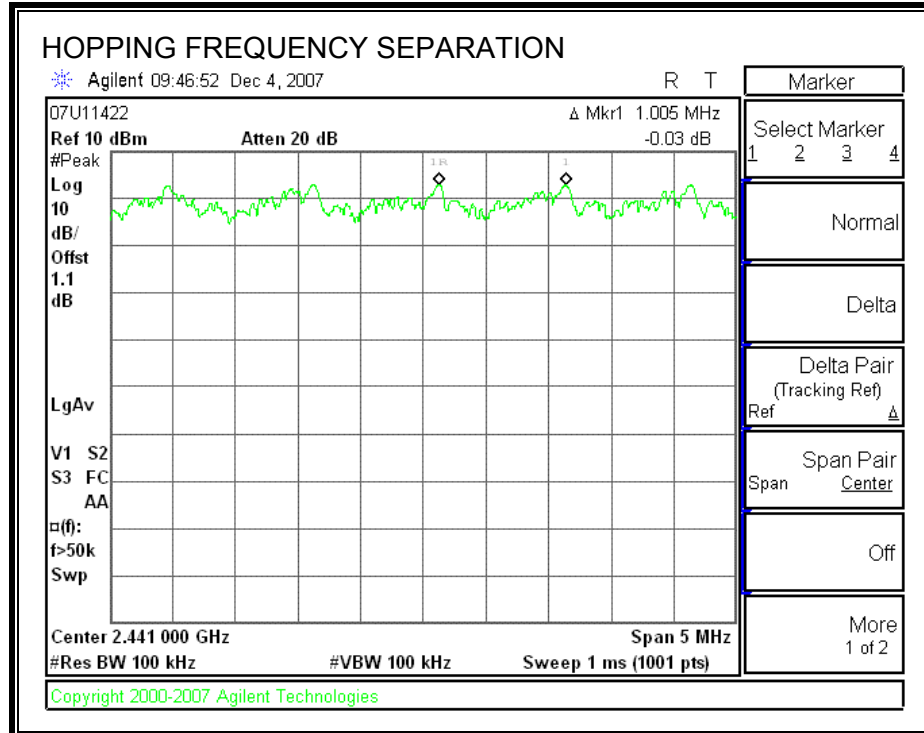
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

### RESULTS

#### HOPPING FREQUENCY SEPARATION



### **7.2.3. NUMBER OF HOPPING CHANNELS**

#### **LIMIT**

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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

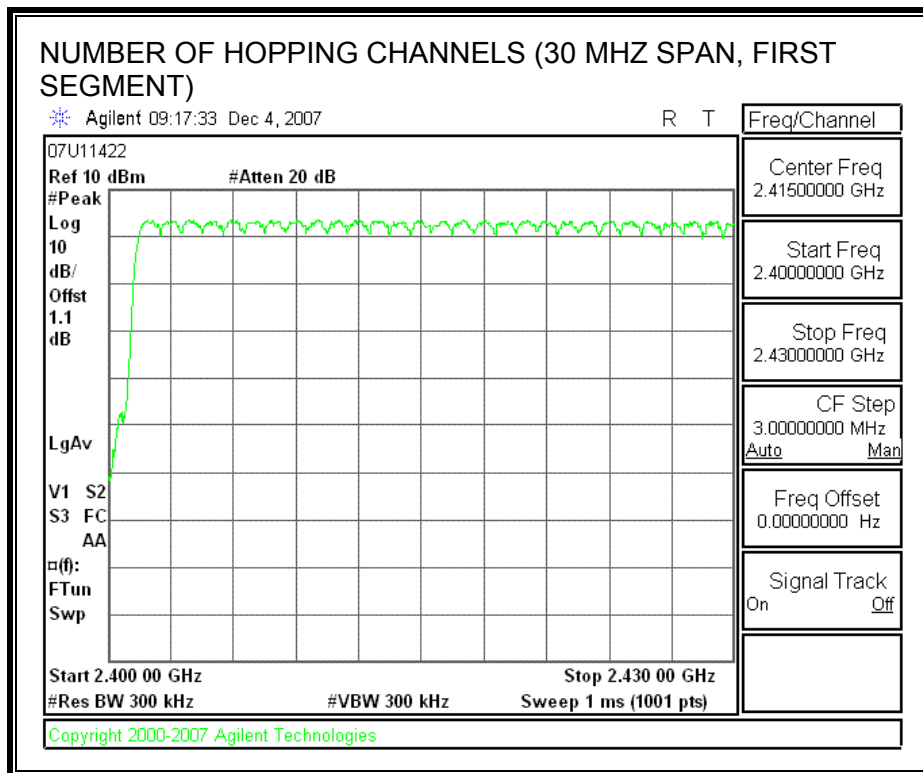
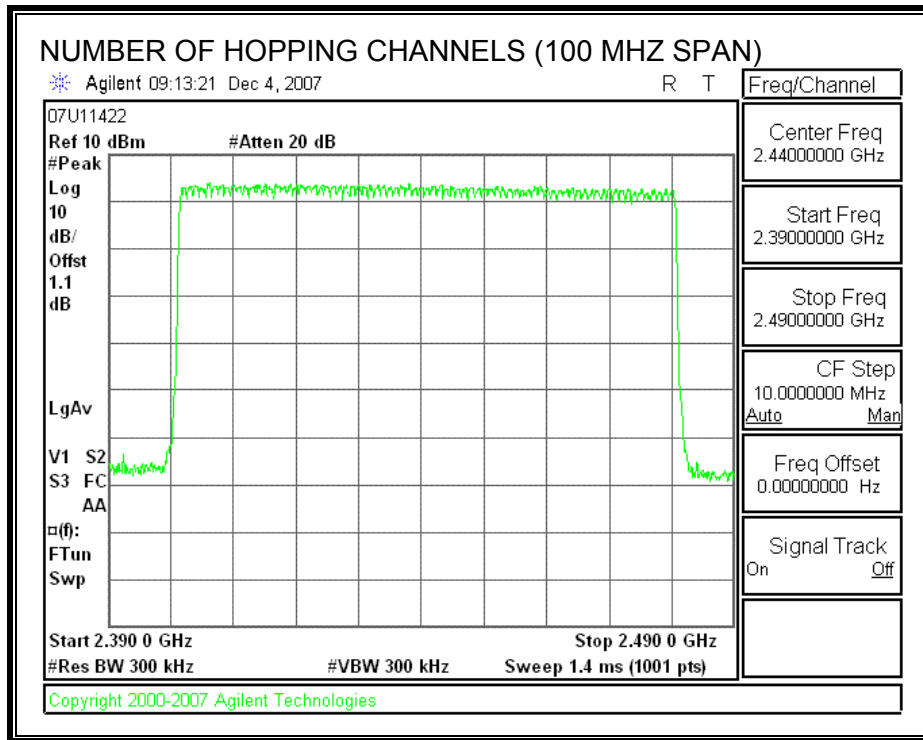
#### **TEST PROCEDURE**

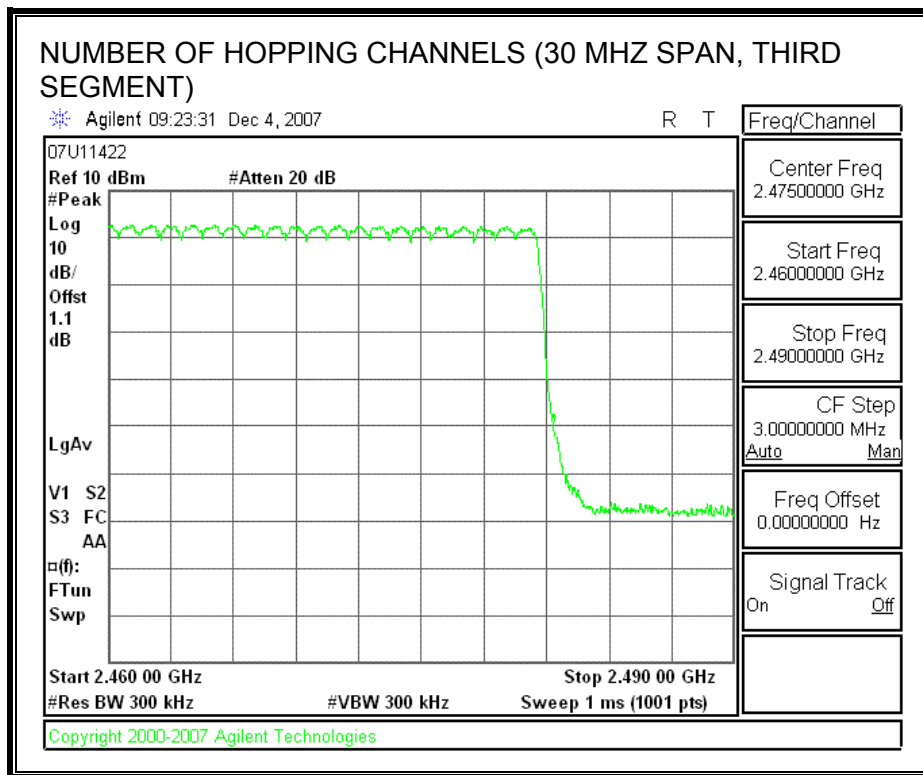
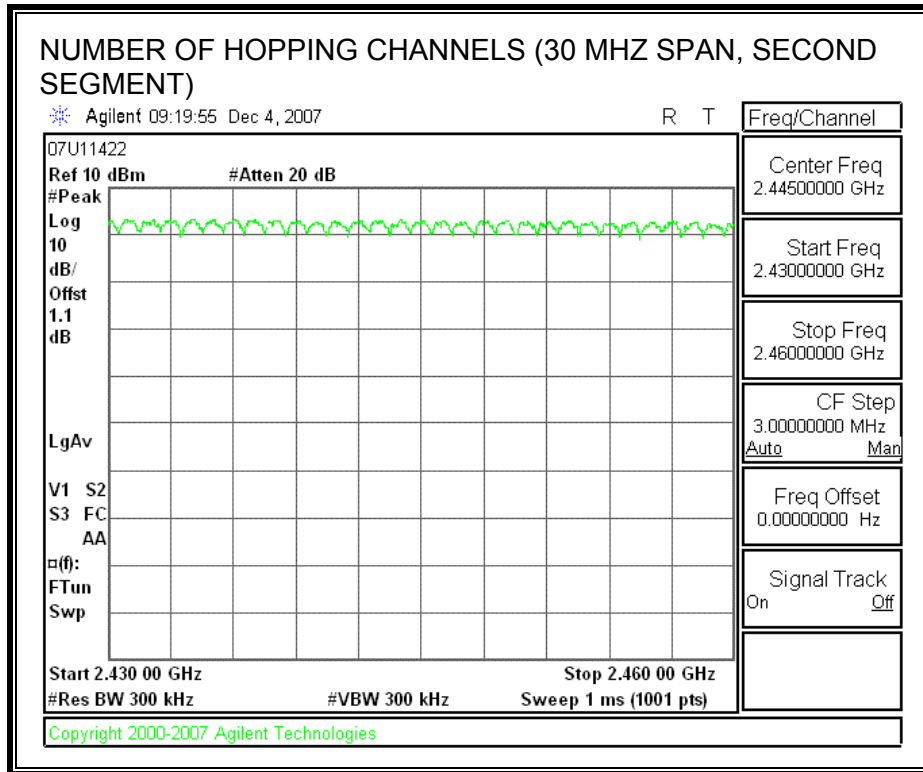
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

#### **RESULTS**

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.

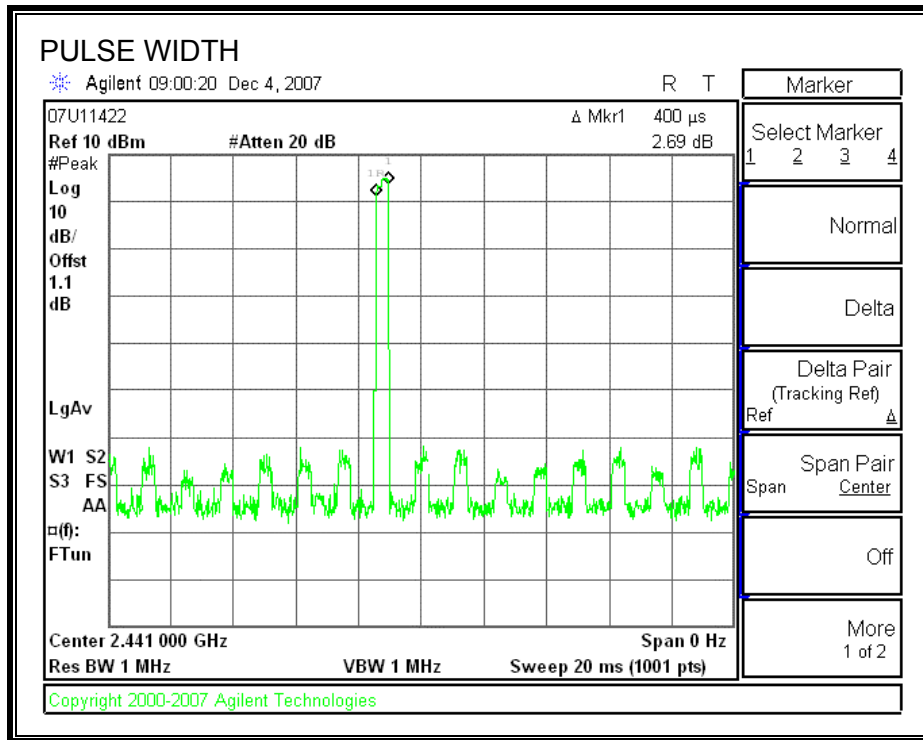
The average time of occupancy in the specified 31.6 second period (79 channels \* 0.4 s) is equal to  $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{ pulse width}$ .

#### RESULTS

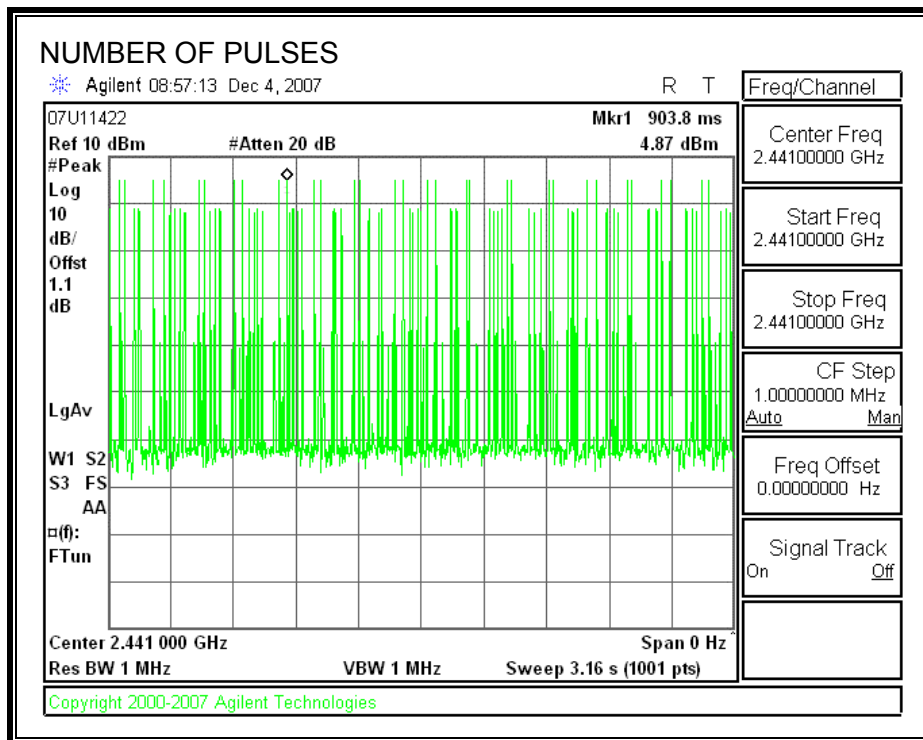
8PSK

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
DH1	0.40	32	0.128	0.4	0.272
DH3	1.64	18	0.295	0.4	0.105
DH5	2.88	9	0.259	0.4	0.141

**FREQUENCY PACKET DH1**

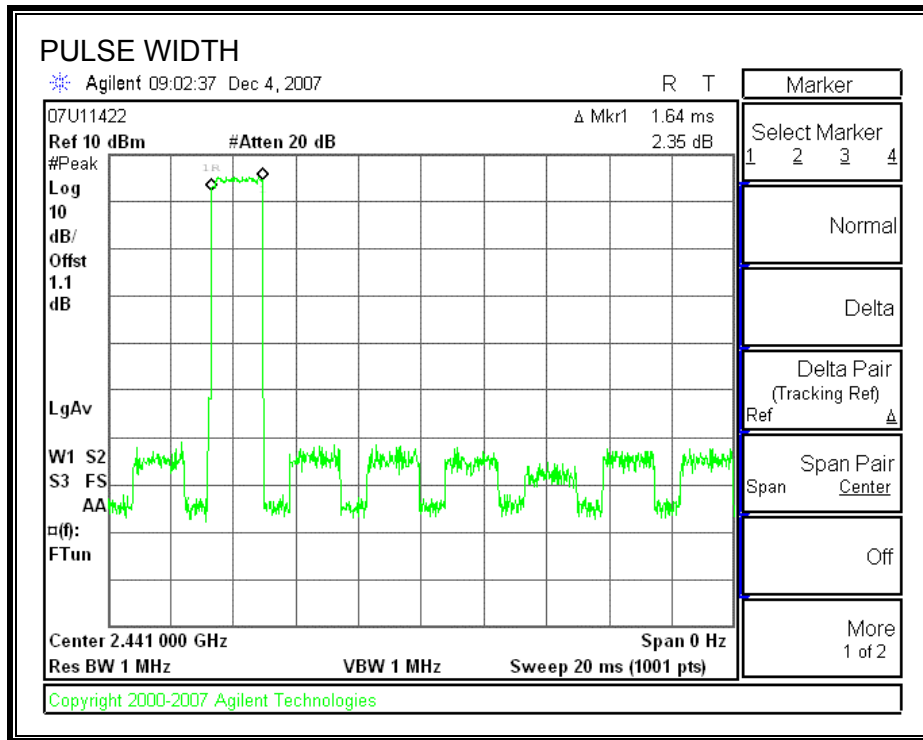


**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD**

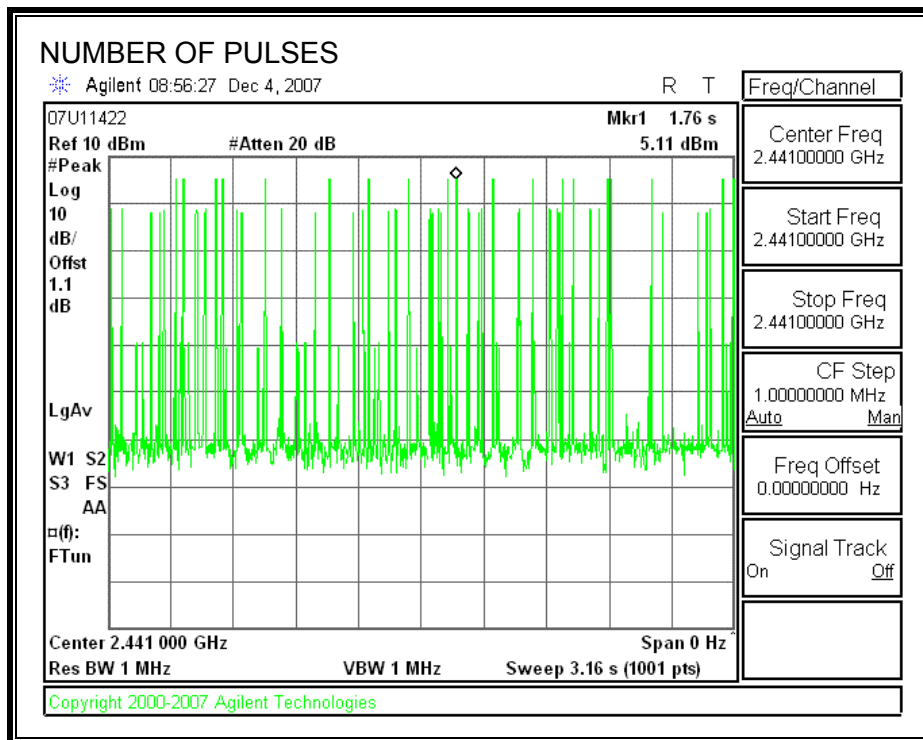




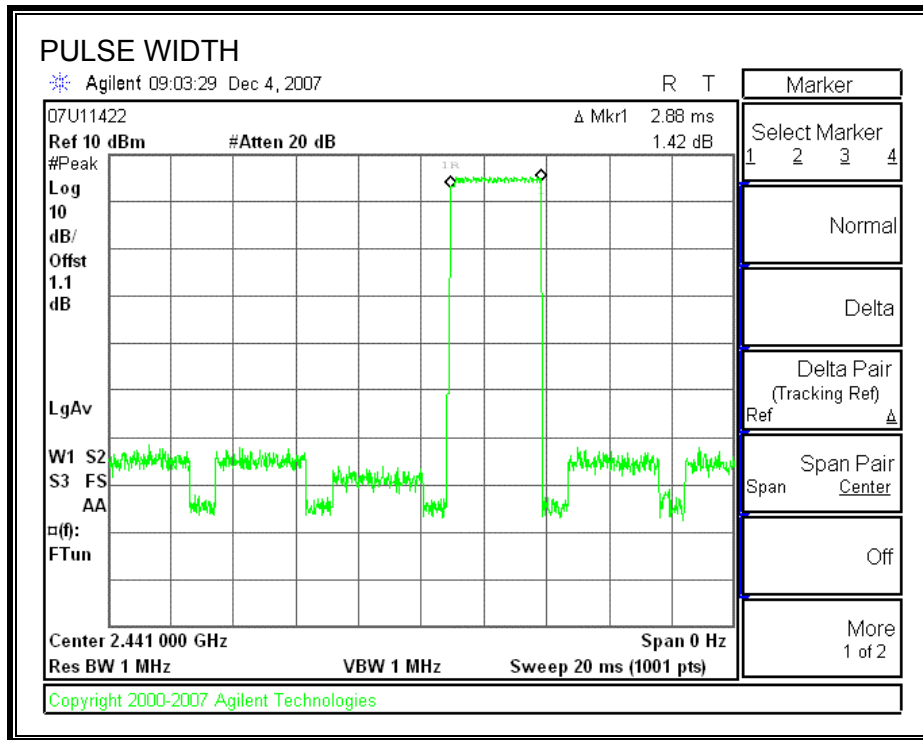
**FREQUENCY PACKET DH3**



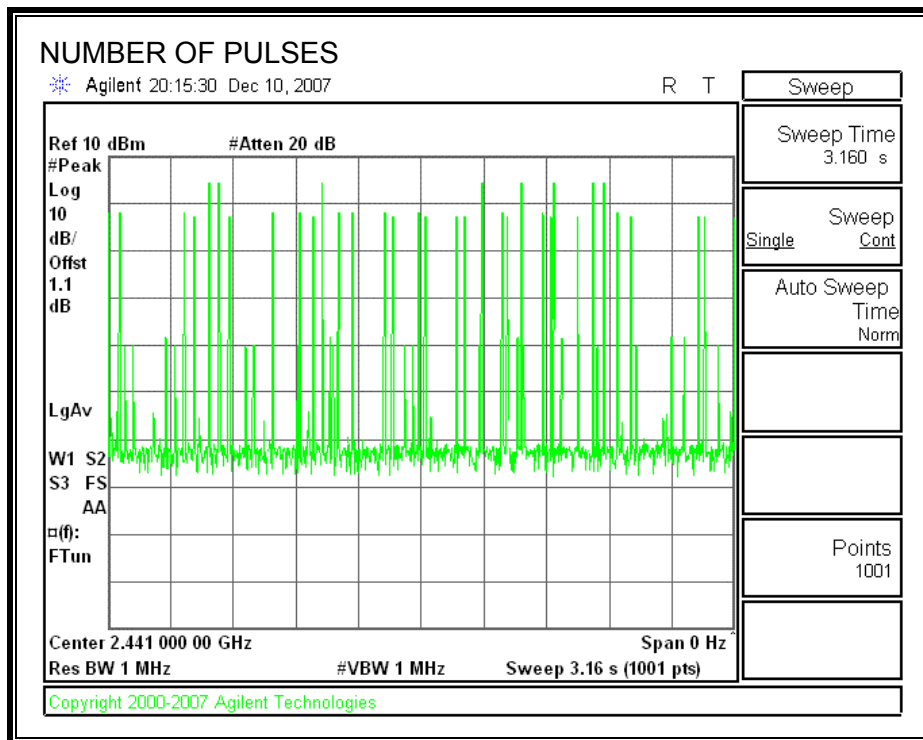
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD**



**FREQUENCY PACKET DH1**



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



## 7.2.5. OUTPUT POWER

### LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

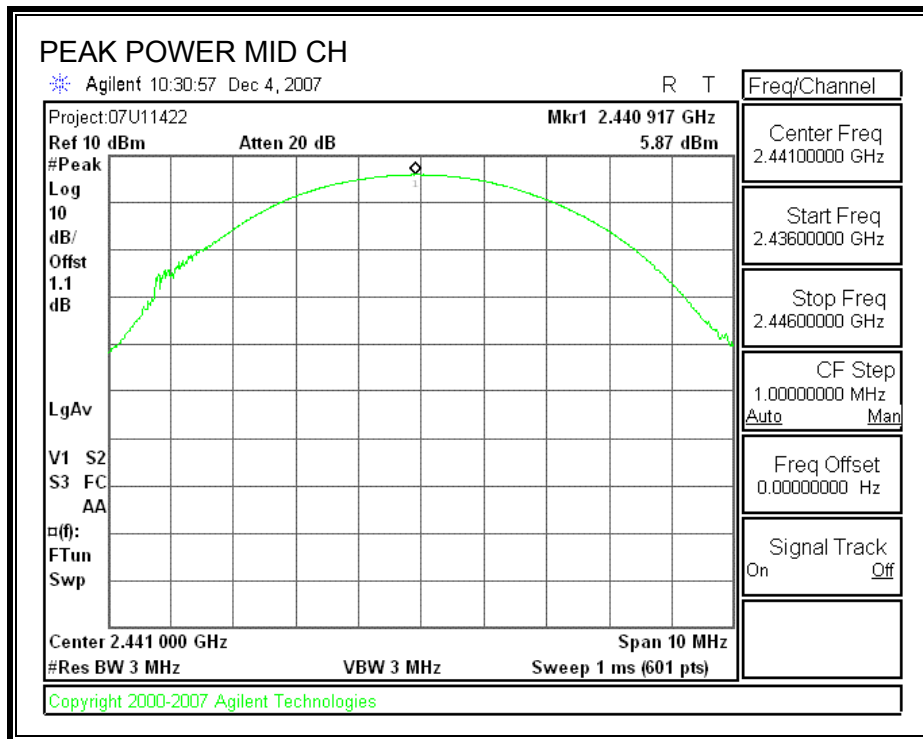
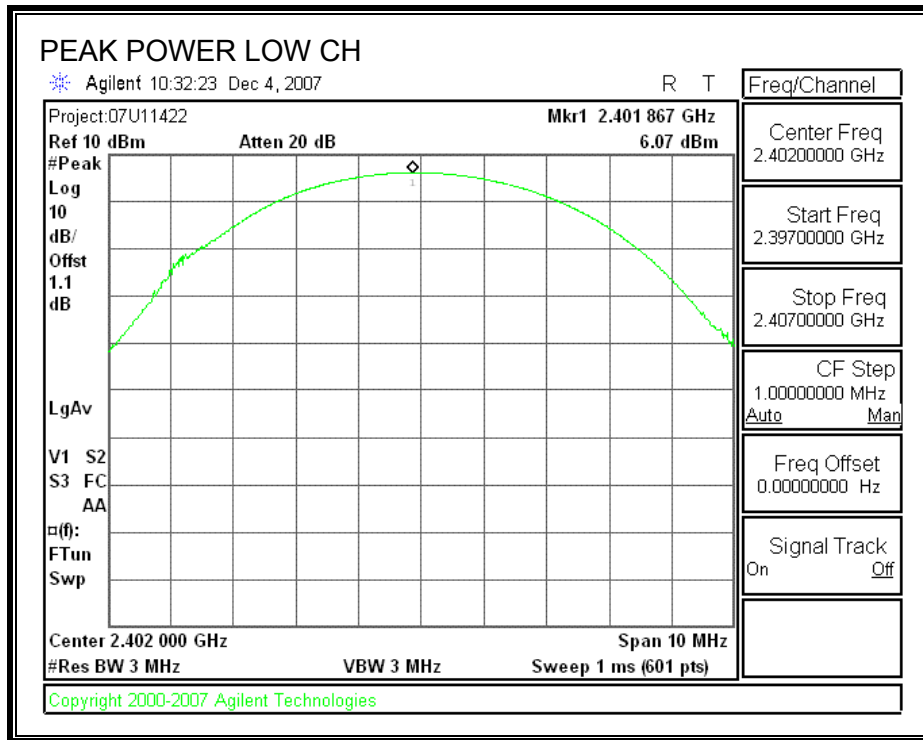
### TEST PROCEDURE

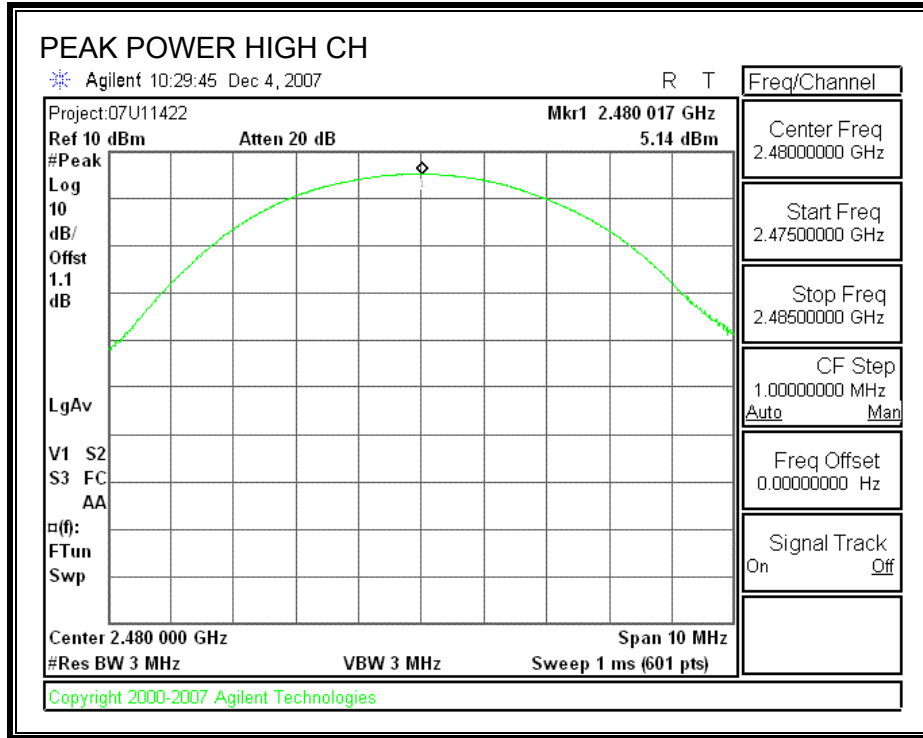
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

### RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	6.07	30	-23.93
Middle	2441	5.87	30	-24.13
High	2480	5.14	30	-24.86

**OUTPUT POWER**





## **7.2.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

### **TEST PROCEDURE**

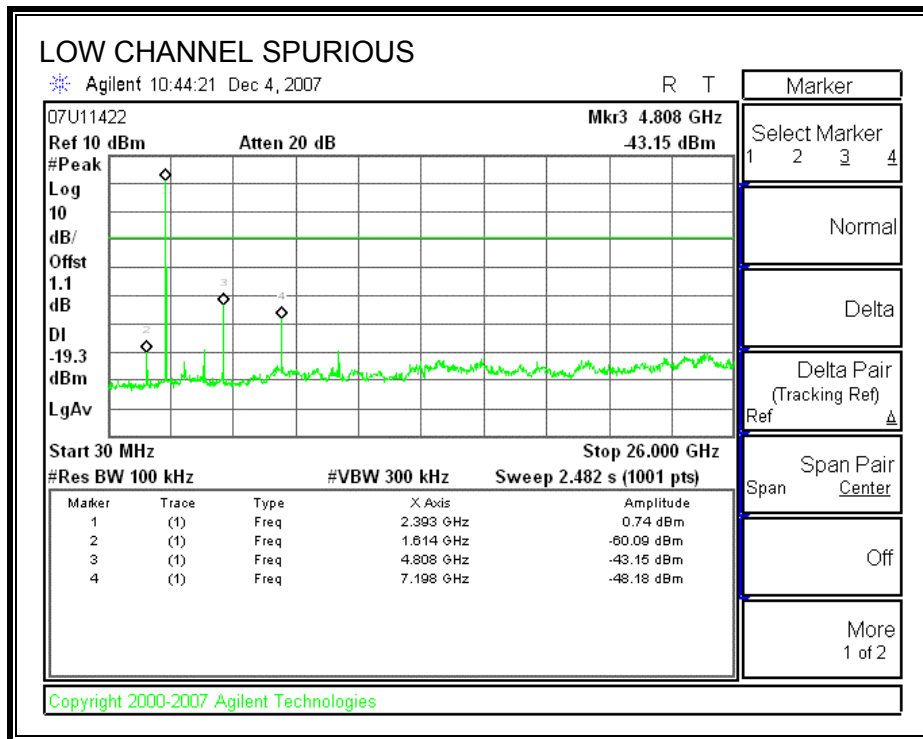
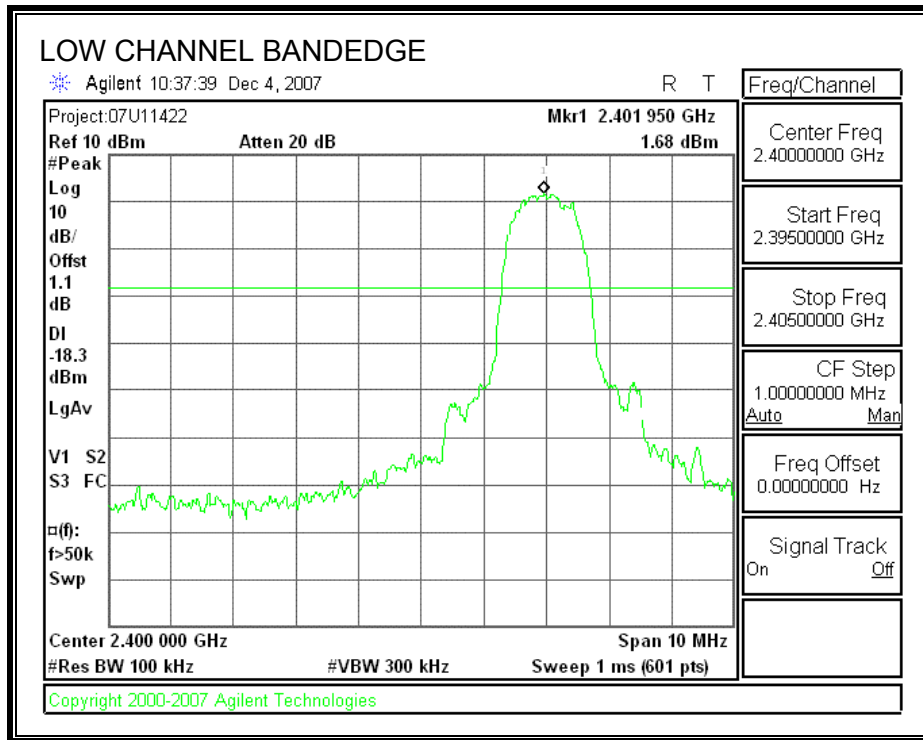
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

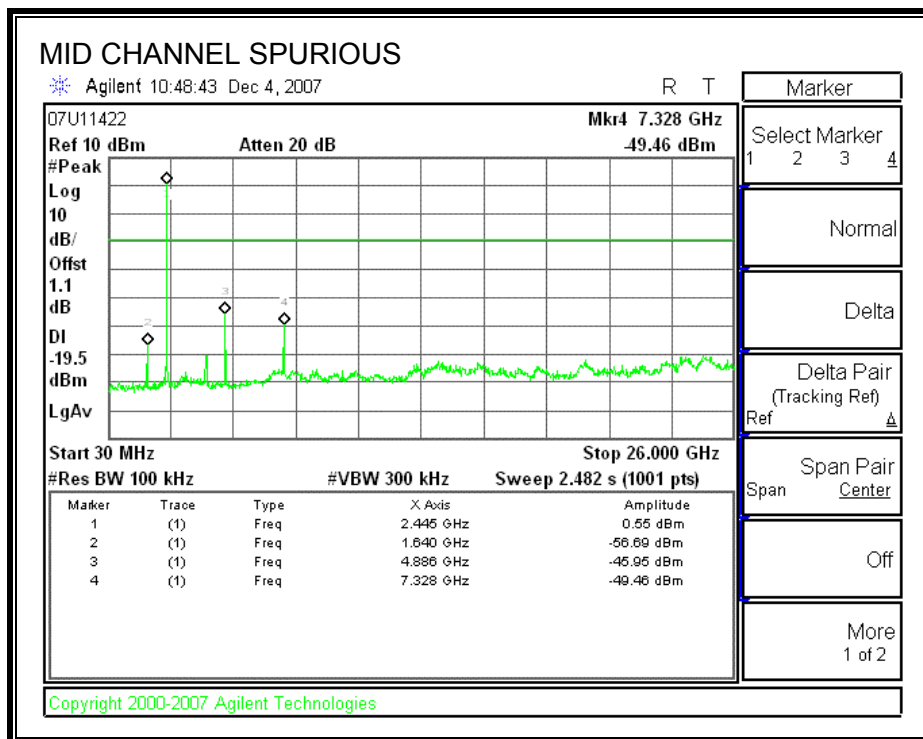
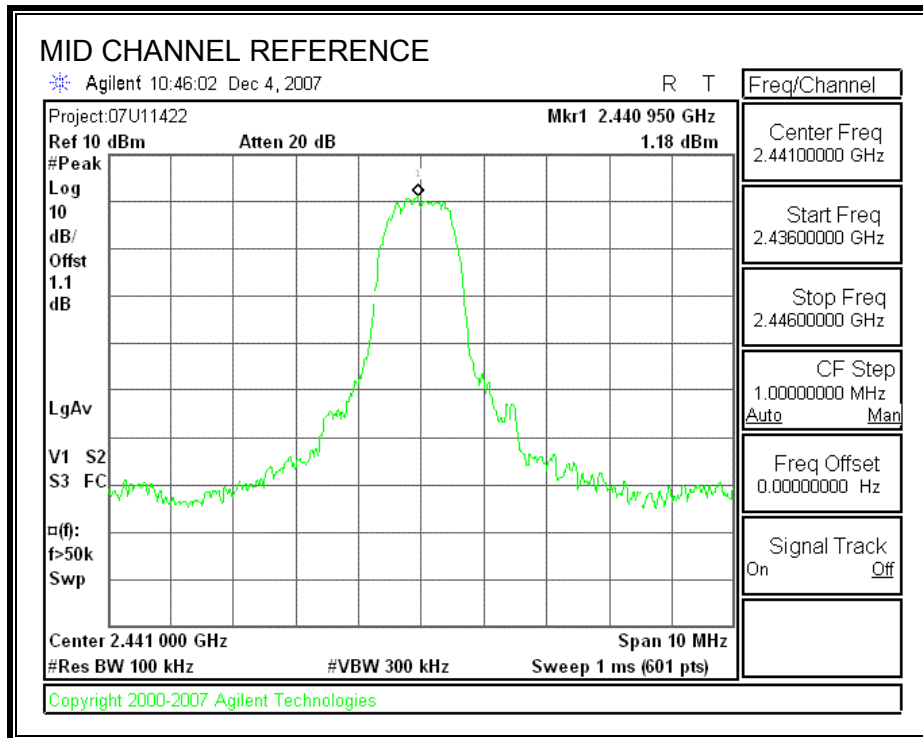
The band edges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

### **RESULTS**

**SPURIOUS EMISSIONS, LOW CHANNEL**

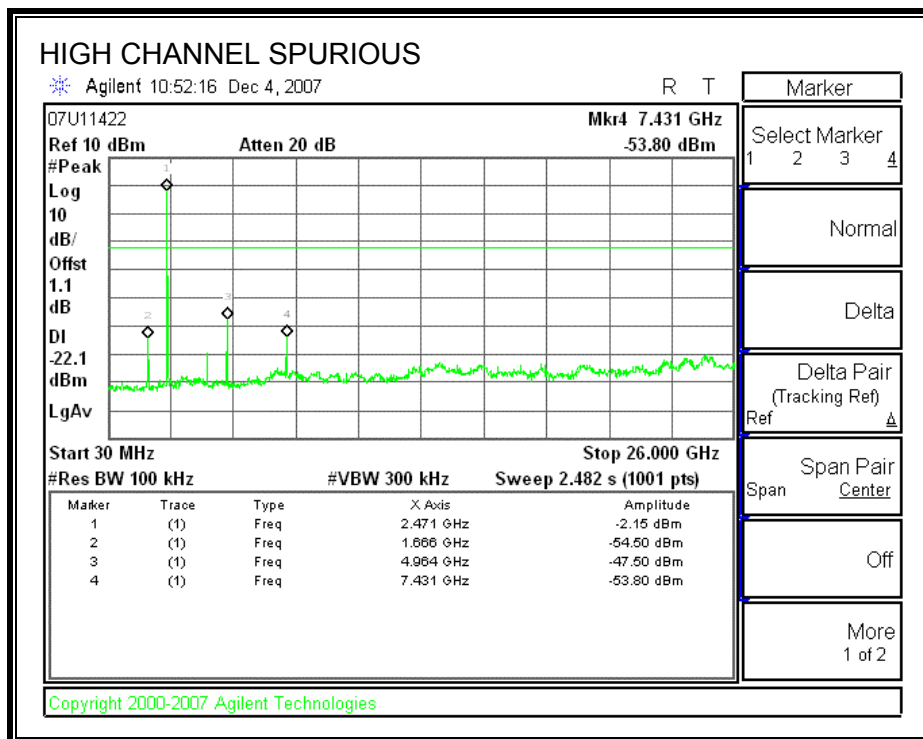
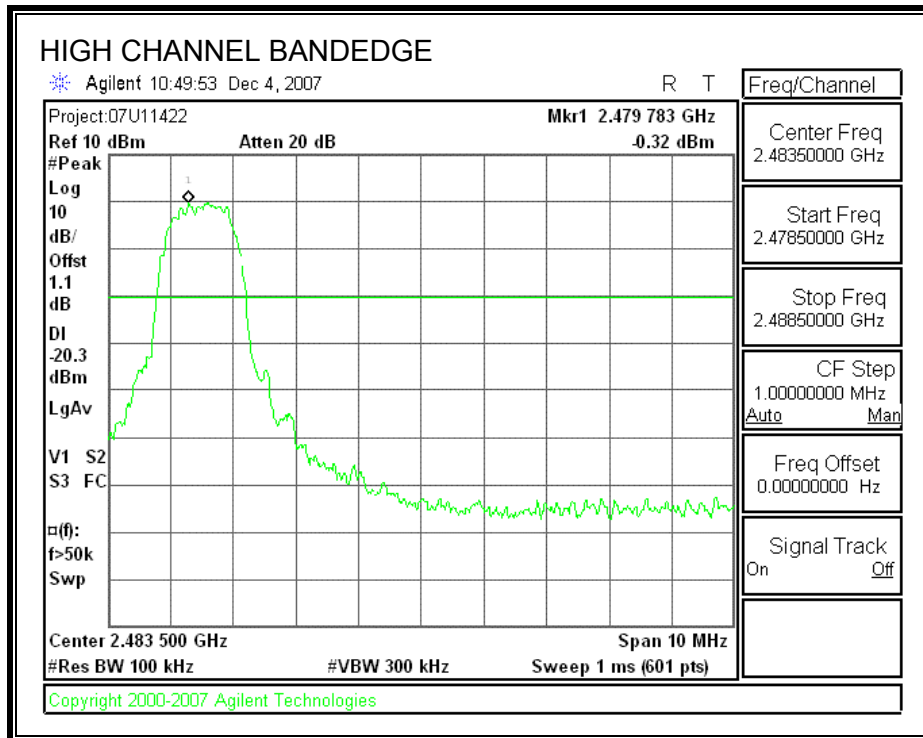


**SPURIOUS EMISSIONS, MID CHANNEL**

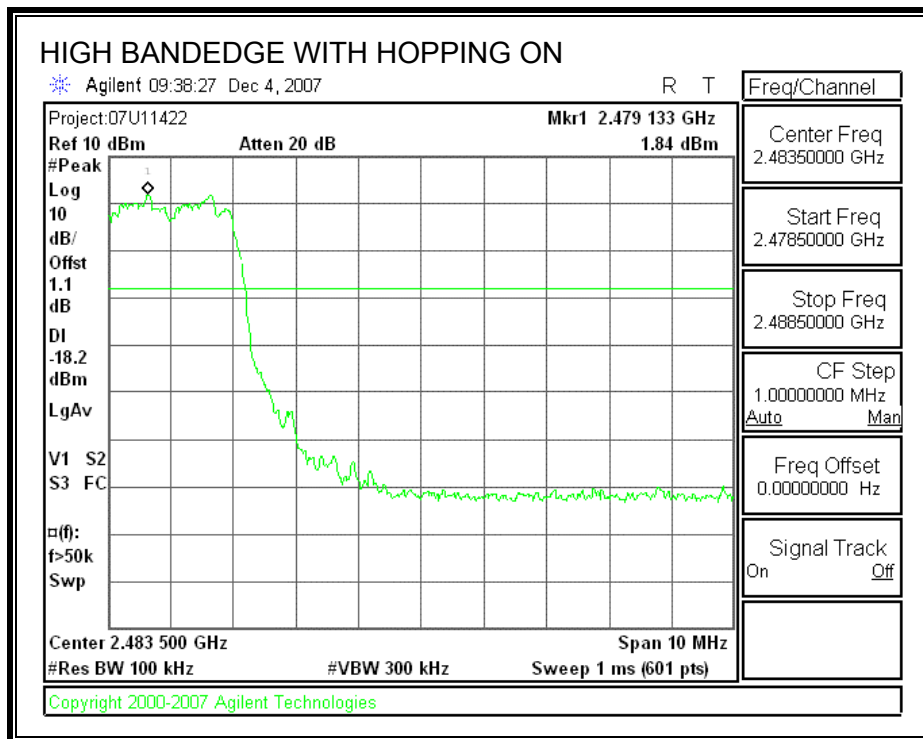
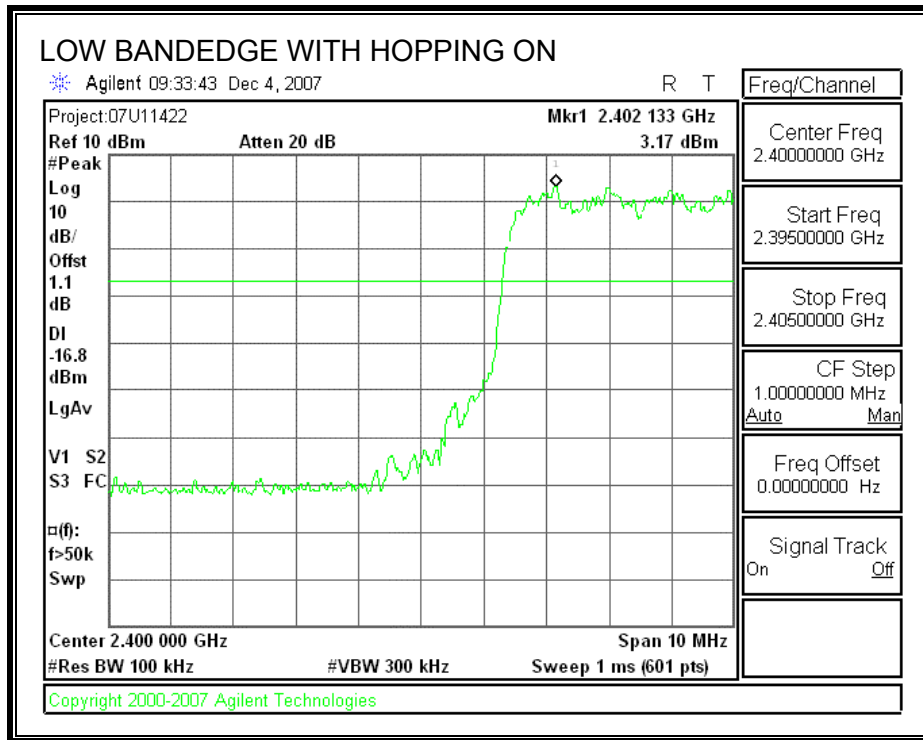




**SPURIOUS EMISSIONS, HIGH CHANNEL**



**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**



## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

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

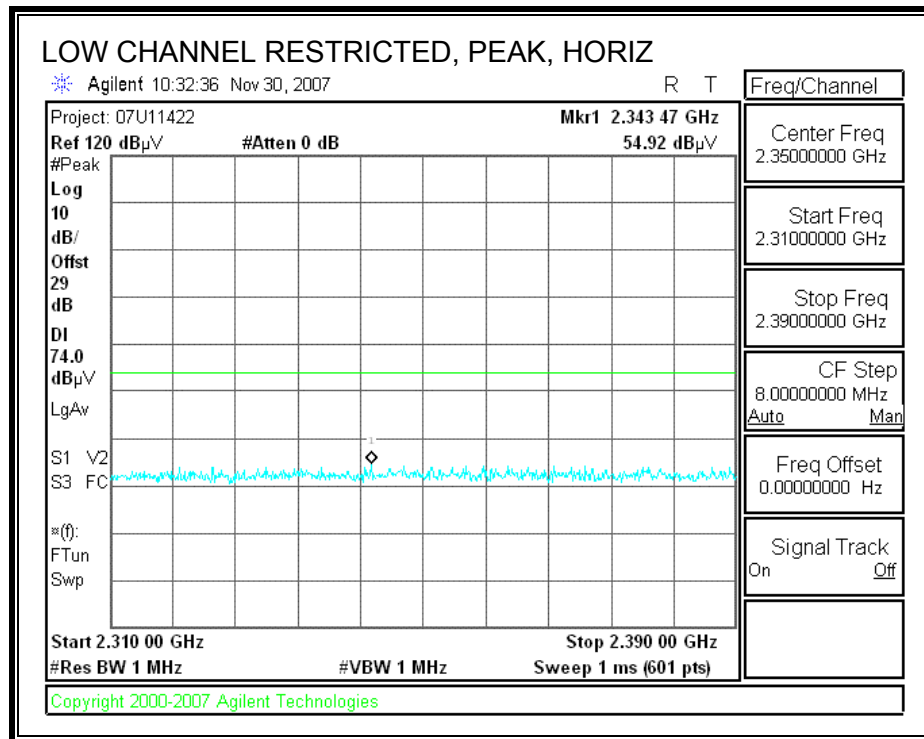
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

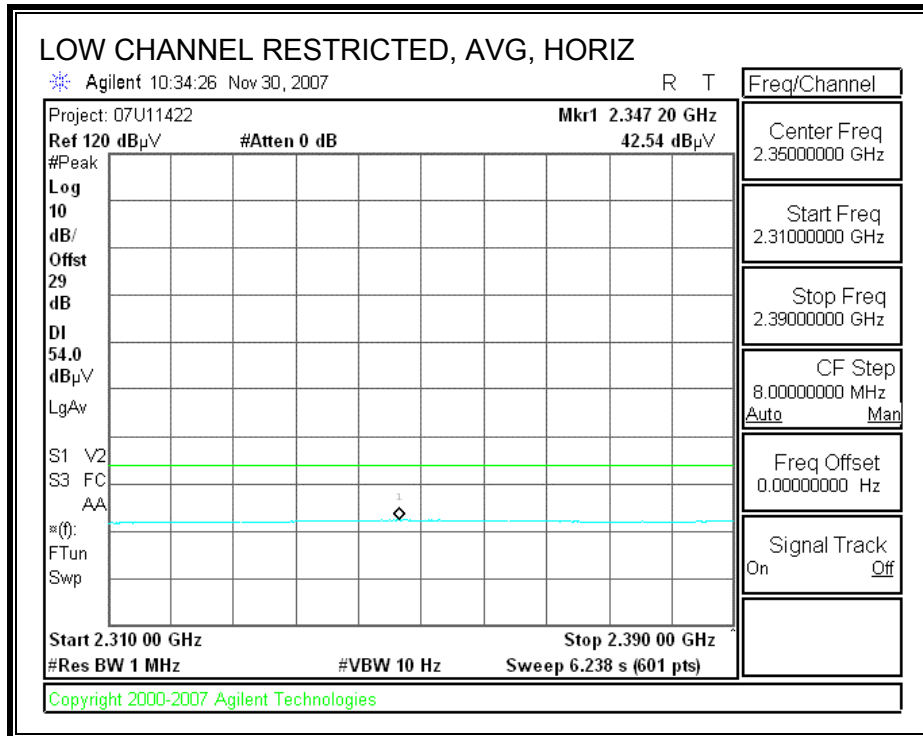
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

## 8.2. TRANSMITTER ABOVE 1 GHz

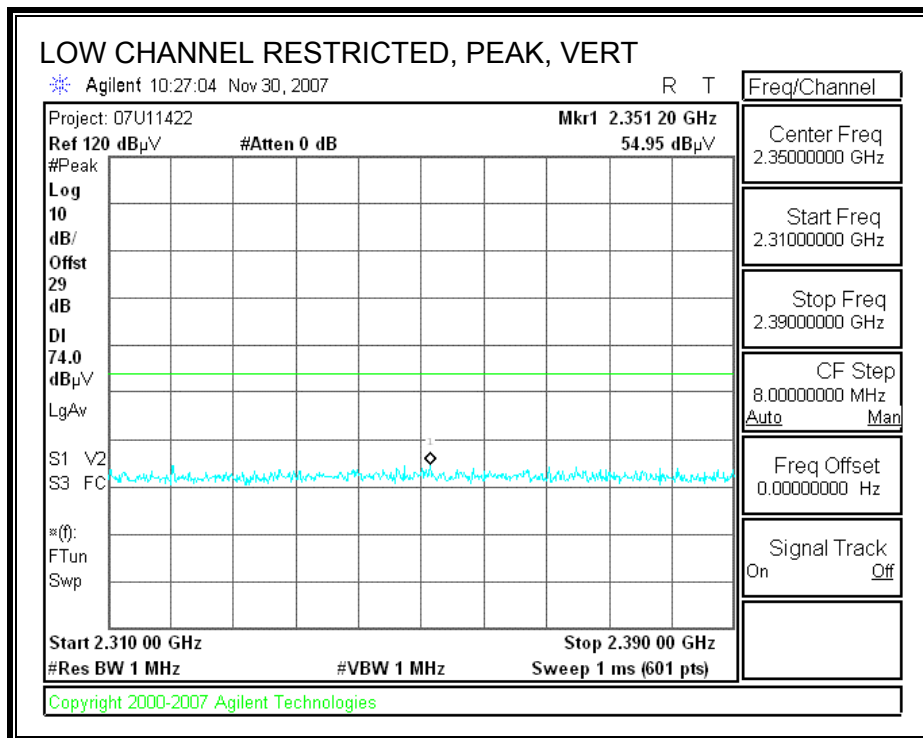
### 8.2.1. BASIC DATA RATE GFSK MODULATION

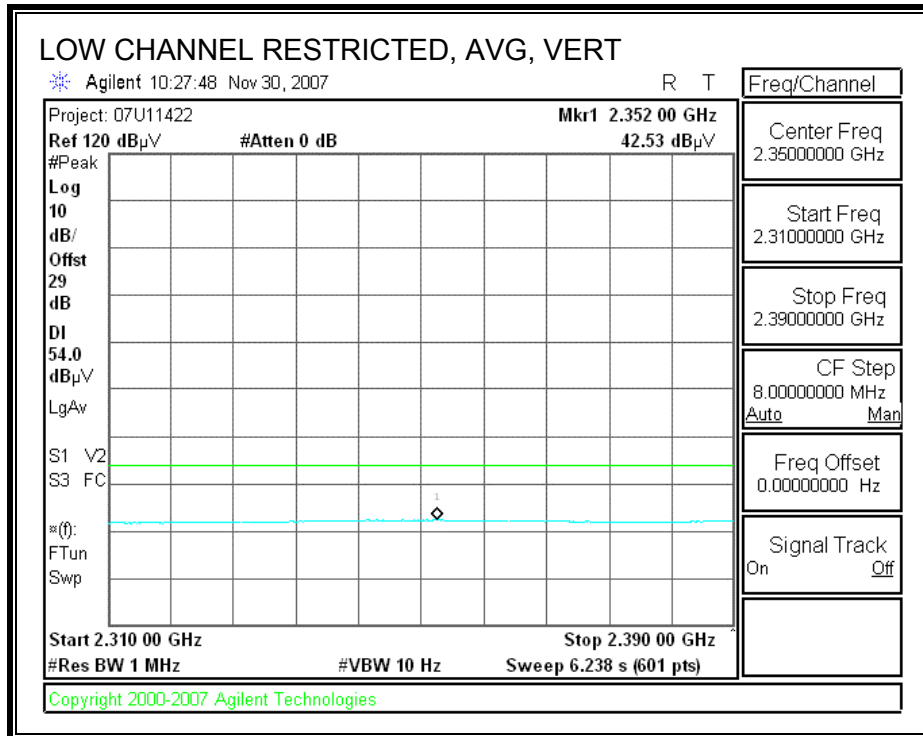
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



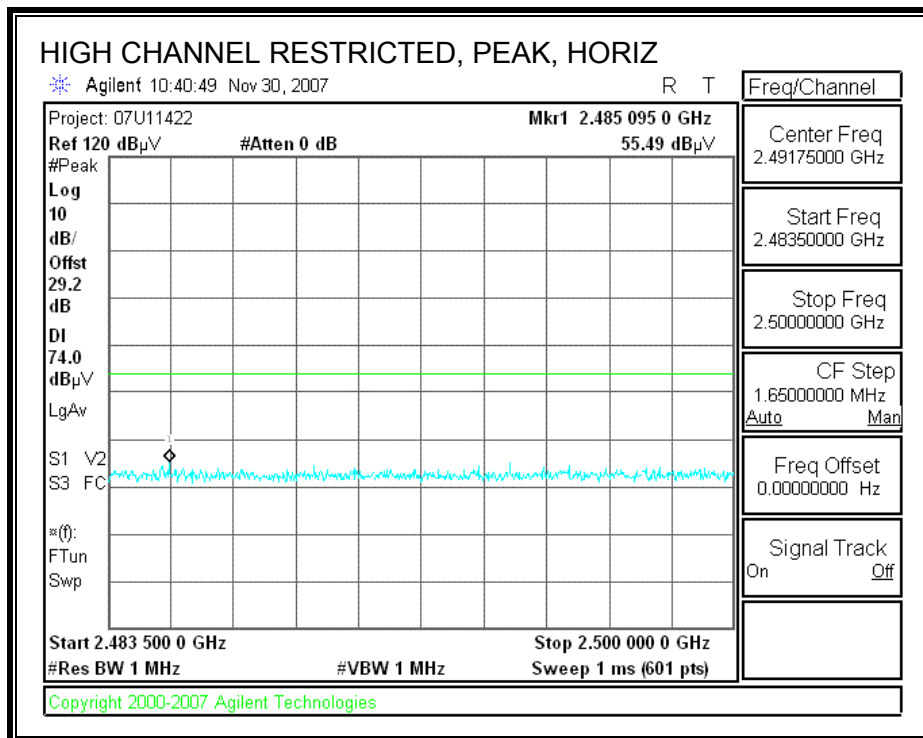


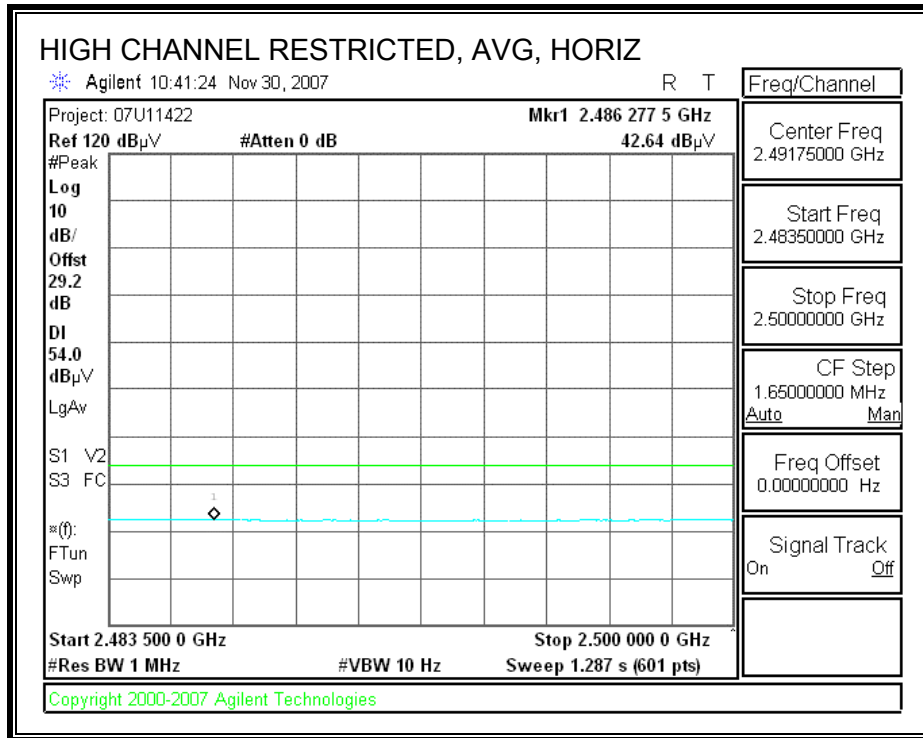
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



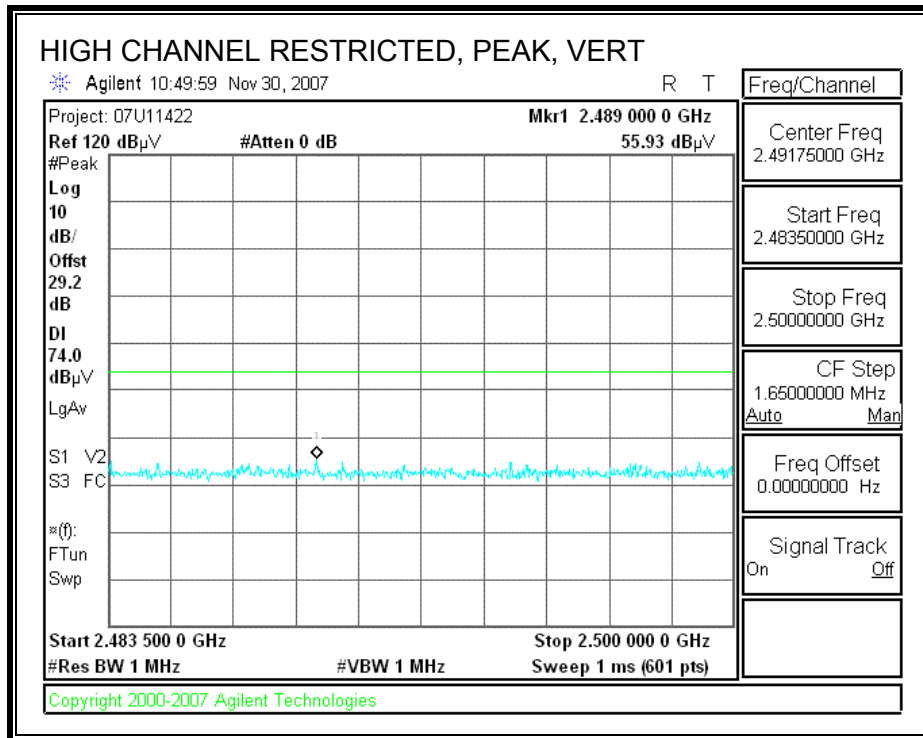


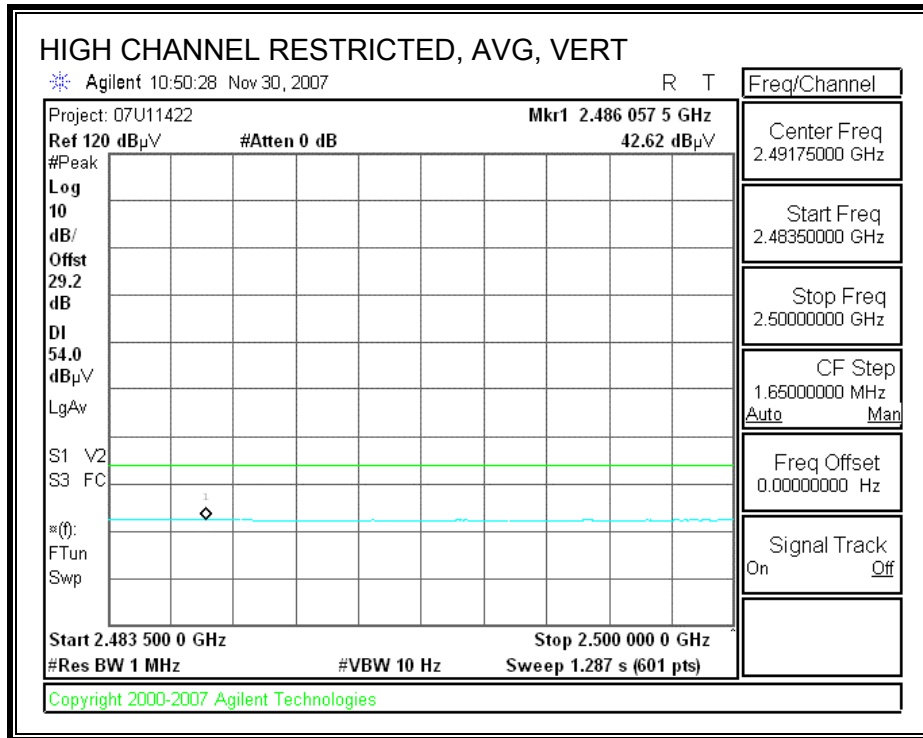
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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







**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Company: Broadcom Corp.  
 Project #: 07U11422  
 Date: 11/30/2007  
 Test Engineer: William Zhuang  
 Configuration: EUT w/ Laptop  
 Mode: Tx On, GFSK

Average margin with dwell time correction factor added (-11.03dB)

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T34 HP 8449B			FCC 15.209

Hi Frequency Cables

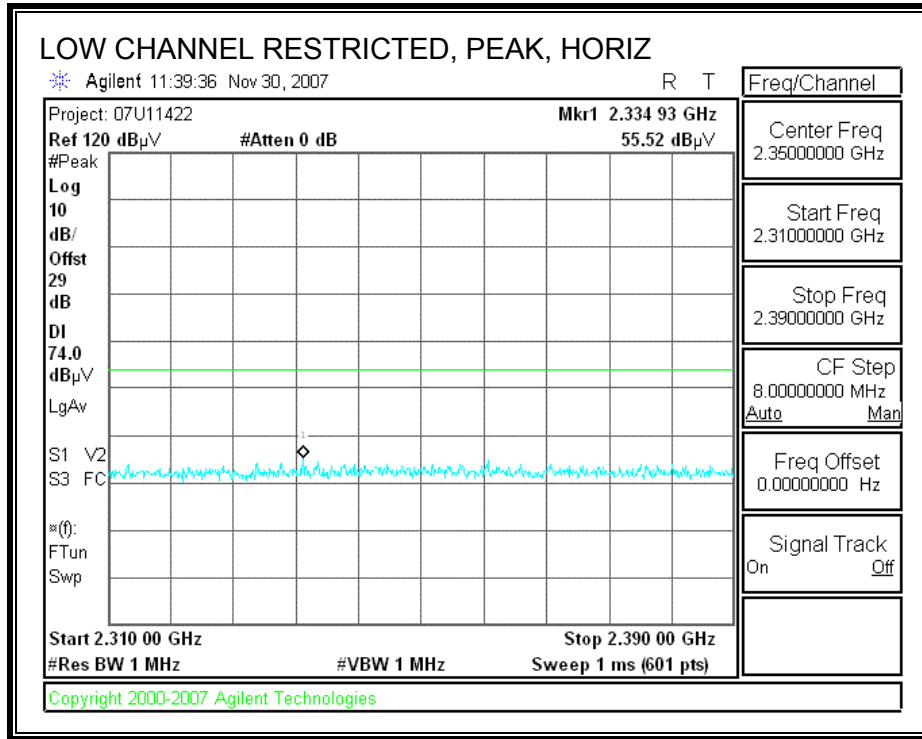
2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
Sunny 177079004		C.5m Chamber	HPF_4.0GHz		Average Measurements RBW=1MHz ; VBW=10Hz

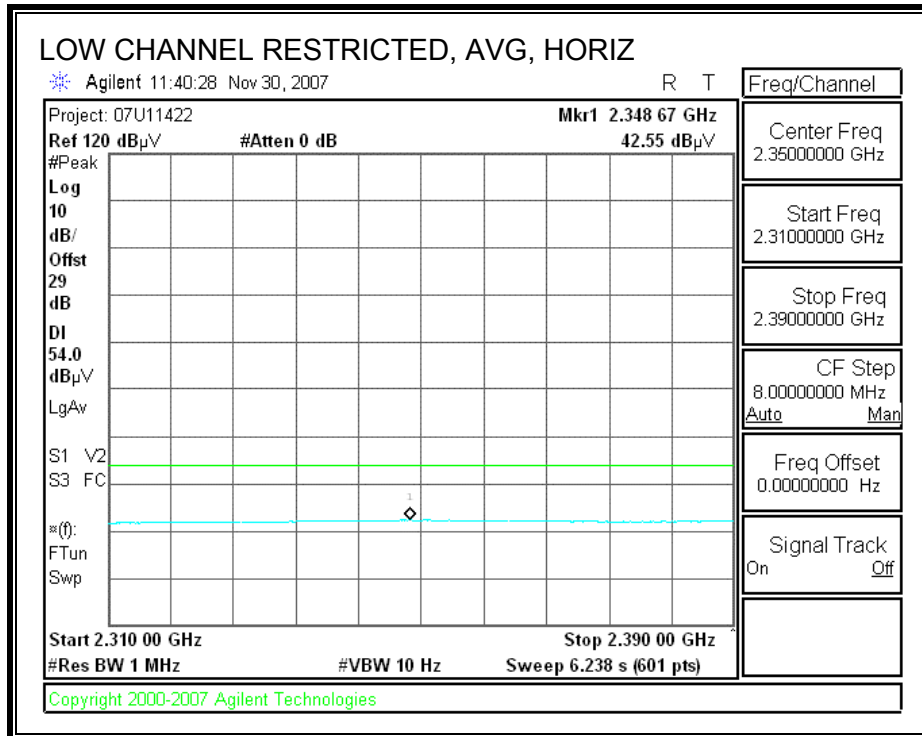
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filt dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Ch. 2402MHz</b>															
4.804	3.0	52.7	50.1	33.1	0.8	-34.8	-11.1	0.6	52.4	38.8	74	54	-21.6	-15.2	V
7.206	3.0	50.0	45.8	35.1	0.9	-34.2	-11.1	0.6	52.5	37.3	74	54	-21.5	-16.7	V
9.608	3.0	43.6	33.2	36.6	1.0	-33.7	-11.1	0.8	48.4	26.9	74	54	-25.6	-25.6	V
4.804	3.0	57.2	54.1	33.1	0.8	-34.8	-11.1	0.6	56.9	42.7	74	54	-17.1	-11.3	H
7.206	3.0	51.8	47.8	35.1	0.9	-34.2	-11.1	0.6	54.4	39.3	74	54	-19.6	-14.7	H
9.608	3.0	44.6	36.5	36.6	1.0	-33.7	-11.1	0.8	49.4	30.2	74	54	-24.6	-23.8	H
<b>Mid Ch. 2441MHz</b>															
4.882	3.0	51.9	48.7	33.2	0.8	-34.8	-11.1	0.6	51.7	37.5	74	54	-22.3	-16.5	V
7.323	3.0	48.3	43.3	35.2	0.9	-34.1	-11.1	0.6	51.0	34.9	74	54	-23.0	-19.1	V
9.764	3.0	41.1	29.1	36.7	1.0	-33.3	-11.1	0.8	46.3	23.3	74	54	-27.7	-27.7	V
4.882	3.0	50.7	47.4	33.2	0.8	-34.8	-11.1	0.6	50.6	36.1	74	54	-23.4	-17.9	H
7.323	3.0	49.6	44.5	35.2	0.9	-34.1	-11.1	0.6	52.3	36.1	74	54	-21.7	-17.9	H
9.764	3.0	43.1	31.2	36.7	1.0	-33.3	-11.1	0.8	48.3	25.4	74	54	-25.7	-25.7	H
<b>High Ch. 2480MHz</b>															
4.960	3.0	46.6	39.9	33.3	0.8	-34.8	-11.1	0.6	46.5	28.8	74	54	-27.5	-25.2	V
7.440	3.0	47.5	40.0	35.4	0.9	-34.1	-11.1	0.6	50.4	31.8	74	54	-23.6	-22.2	V
9.920	3.0	42.0	30.5	36.7	1.0	-32.9	-11.1	0.8	47.7	25.1	74	54	-26.3	-26.3	V
4.960	3.0	49.5	45.4	33.3	0.8	-34.8	-11.1	0.6	49.4	34.2	74	54	-24.6	-19.8	H
7.440	3.0	47.5	41.3	35.4	0.9	-34.1	-11.1	0.6	50.3	33.1	74	54	-23.7	-20.9	H
9.920	3.0	42.0	30.5	36.7	1.0	-32.9	-11.1	0.8	47.7	25.1	74	54	-26.3	-26.3	H

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

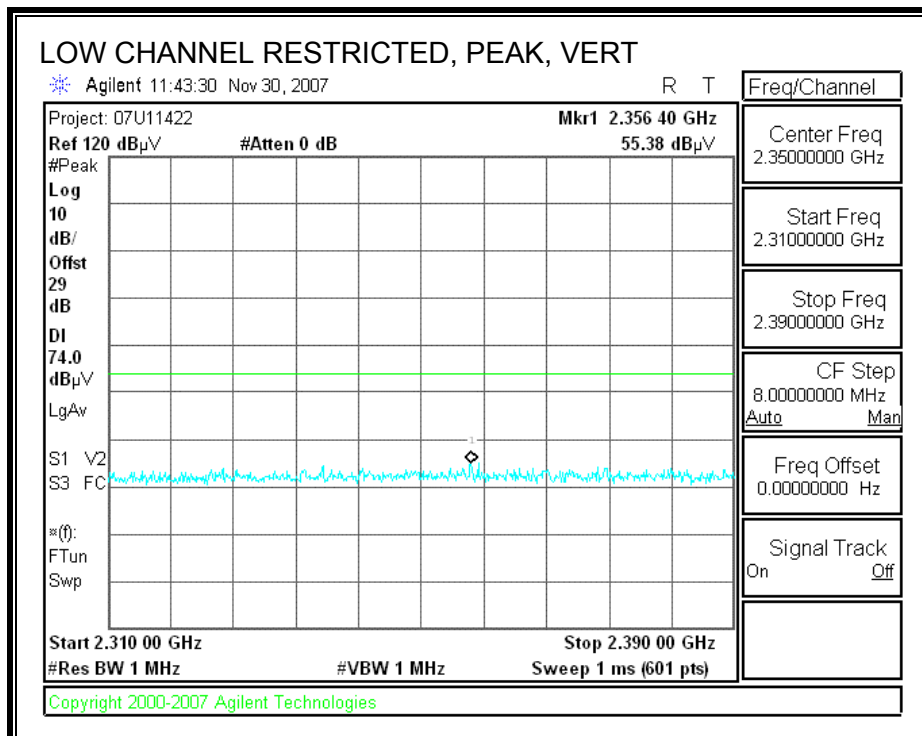
### 8.2.2. ENHANCED DATA RATE 8PSK MODULATION

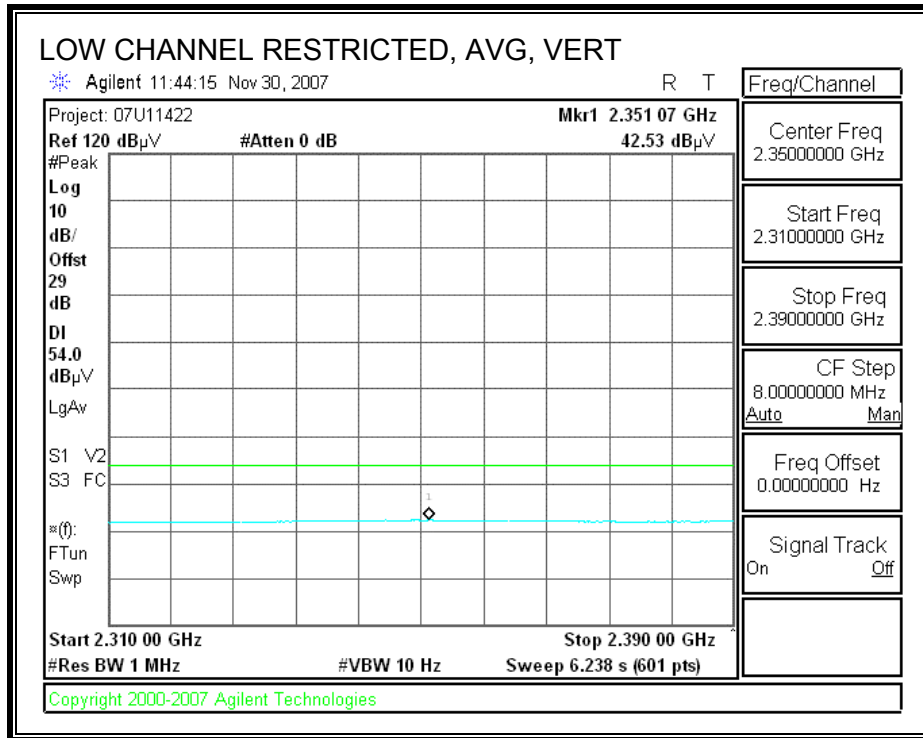
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



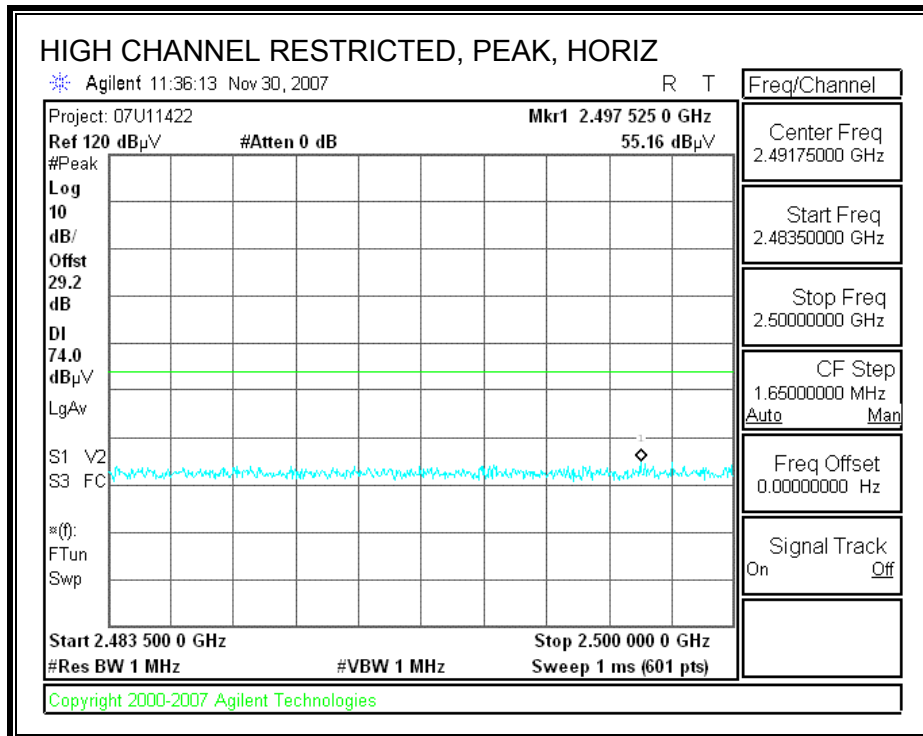


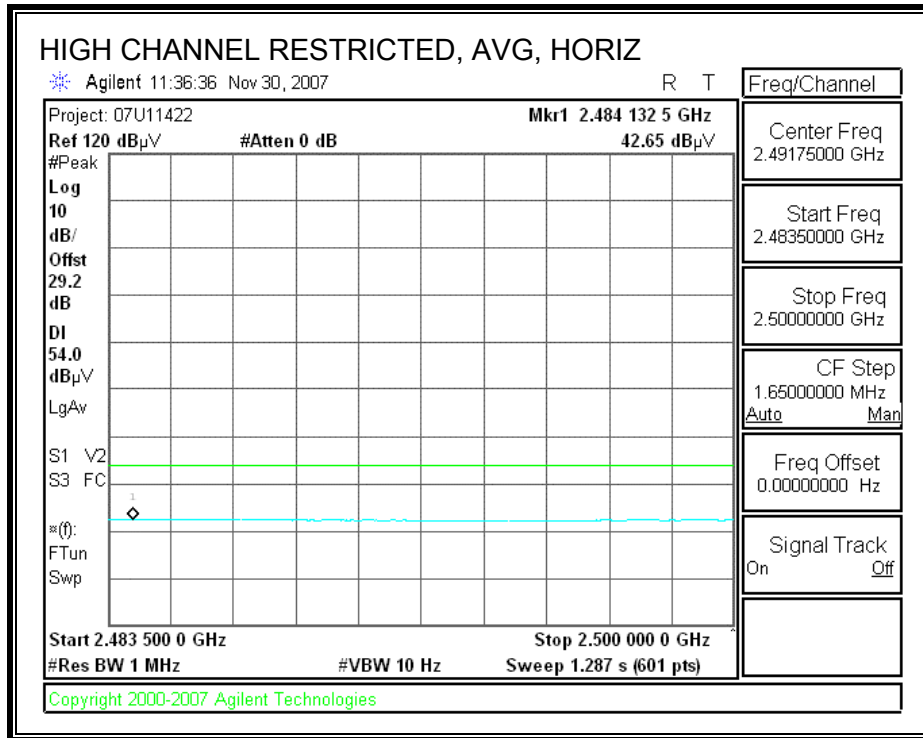
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



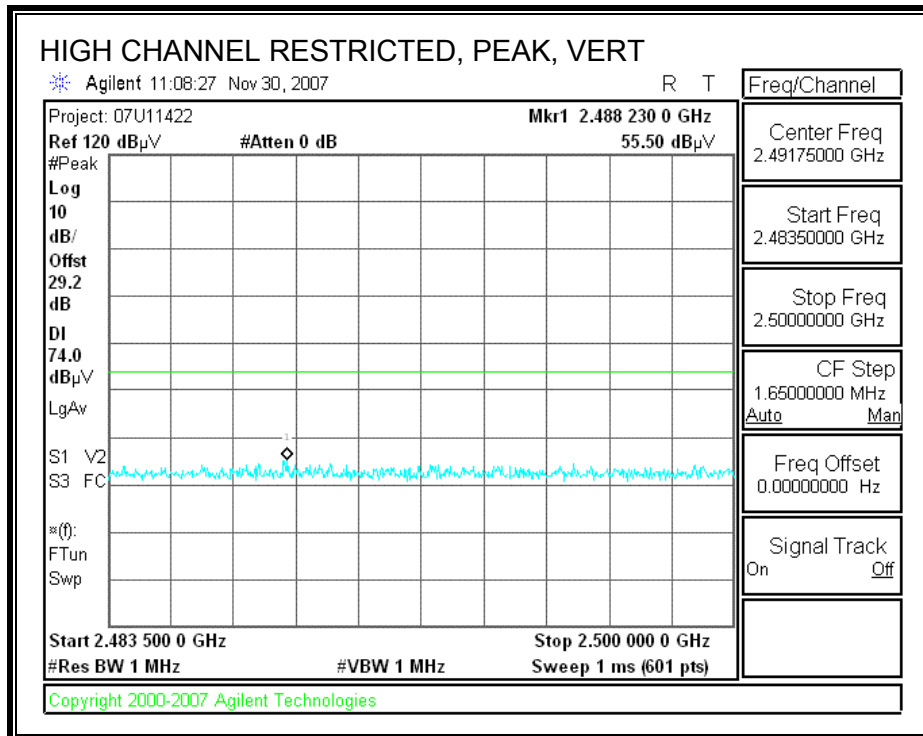


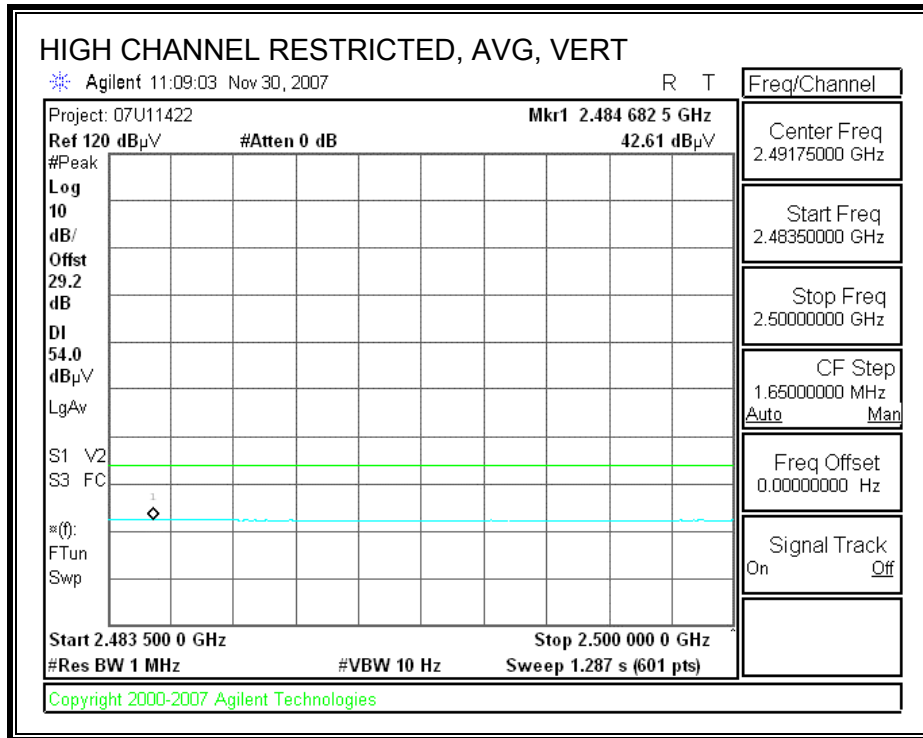
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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





**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Company: Broadcom Corp.  
 Project #: 07U11422  
 Date: 11/30/2007  
 Test Engineer: William Zhuang  
 Configuration: EUT w/ Laptop  
 Mode: Tx On, 8PSK

Average margin with dwell time correction factor added (-11.03dB)

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T34 HP 8449B			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz
Sunny 177079004		C.5m Chamber	HPF_4.0GHz		

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filt dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Ch. 2402MHz</b>															
4.804	3.0	56.7	44.3	33.1	0.8	-34.8	-11.1	0.6	56.4	33.0	74	54	-17.6	-17.6	V
7.206	3.0	57.1	44.9	35.1	0.9	-34.2	-11.1	0.6	59.6	36.3	74	54	-14.4	-14.4	V
9.608	3.0	48.2	35.7	36.6	1.0	-33.7	-11.1	0.8	53.0	29.4	74	54	-21.0	-21.0	V
4.804	3.0	63.1	51.3	33.1	0.8	-34.8	-11.1	0.6	62.8	40.0	74	54	-11.2	-11.2	H
7.206	3.0	59.4	47.5	35.1	0.9	-34.2	-11.1	0.6	61.9	39.0	74	54	-12.1	-12.1	H
9.608	3.0	49.5	37.5	36.6	1.0	-33.7	-11.1	0.8	54.3	31.2	74	54	-19.7	-19.7	H
<b>Mid Ch. 2441MHz</b>															
4.882	3.0	52.3	44.6	33.2	0.8	-34.8	-11.1	0.6	52.2	33.4	74	54	-21.8	-20.6	V
7.323	3.0	57.1	44.9	35.2	0.9	-34.1	-11.1	0.6	59.8	36.5	74	54	-14.2	-14.2	V
9.764	3.0	46.3	33.1	36.7	1.0	-33.3	-11.1	0.8	51.6	27.3	74	54	-22.4	-22.4	V
4.882	3.0	55.9	47.4	33.2	0.8	-34.8	-11.1	0.6	55.8	36.2	74	54	-18.2	-17.8	H
7.323	3.0	56.5	44.4	35.2	0.9	-34.1	-11.1	0.6	59.2	36.0	74	54	-14.8	-14.8	H
9.764	3.0	48.4	35.2	36.7	1.0	-33.3	-11.1	0.8	53.6	29.3	74	54	-20.4	-20.4	H
<b>High Ch. 2480MHz</b>															
4.960	3.0	47.4	39.7	33.3	0.8	-34.8	-11.1	0.6	47.4	28.6	74	54	-26.6	-25.4	V
7.440	3.0	55.3	41.7	35.4	0.9	-34.1	-11.1	0.6	58.2	33.5	74	54	-15.8	-15.8	V
9.920	3.0	45.2	31.2	36.7	1.0	-32.9	-11.1	0.8	50.9	25.8	74	54	-23.1	-23.1	V
4.960	3.0	49.6	41.7	33.3	0.8	-34.8	-11.1	0.6	49.5	30.6	74	54	-24.5	-23.4	H
7.440	3.0	55.7	42.4	35.4	0.9	-34.1	-11.1	0.6	58.6	34.2	74	54	-15.4	-15.4	H
9.920	3.0	46.0	31.7	36.7	1.0	-32.9	-11.1	0.8	51.7	26.3	74	54	-22.3	-22.3	H

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

### 8.3. RECEIVER ABOVE 1 GHz

#### 8.3.1. RECEIVER ABOVE 1 GHz

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Company: Broadcom  
 Project #: 07U11433  
 Date: 11/30/2007  
 Test Engineer: Vien Tran  
 Configuration: EUT on extended card with 3.5dBi Chip antenna  
 Mode: Rx Mode

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T145 Agilent 3008A005			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
		B-5m Chamber	HPF_4.0GHz		Average Measurements RBW=1MHz ; VBW=10Hz

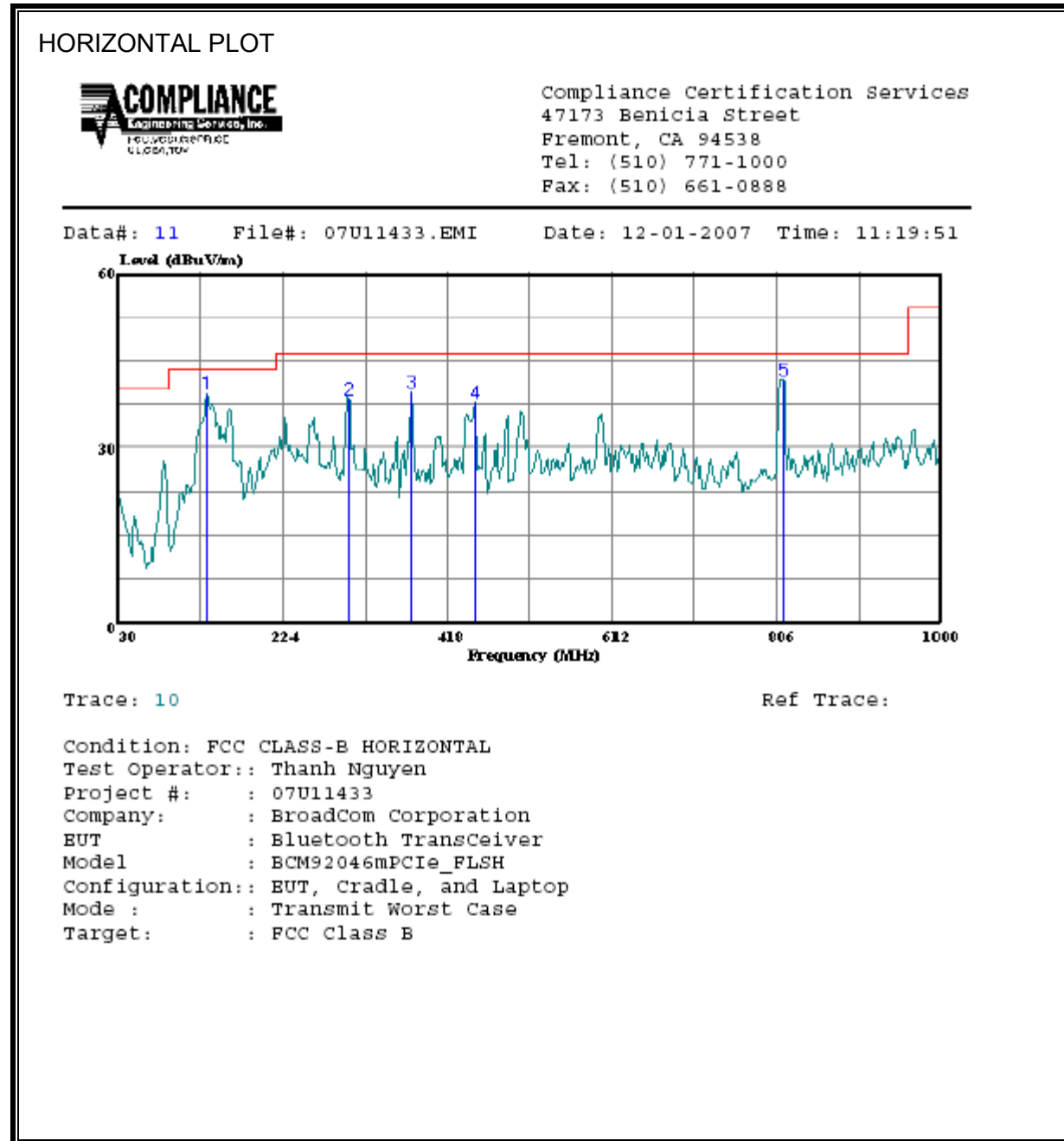
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>MID CHANNEL, 2437 MHz</b>															
1.711	3.0	53.3	35.3	27.2	4.2	-35.6	0.0	0.0	49.0	31.0	74	54	-25.0	-23.0	Y
2.405	3.0	54.6	38.2	28.6	5.1	-35.1	0.0	0.0	53.2	36.7	74	54	-20.8	-17.3	Y
1.711	3.0	51.4	33.8	29.9	4.2	-35.6	0.0	0.0	49.8	32.2	74	54	-24.2	-21.8	H
2.405	3.0	52.4	35.0	28.6	5.1	-35.1	0.0	0.0	50.9	33.5	74	54	-23.1	-20.5	H
No other emissions were detected above system noise floor															

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		



### 8.4. WORST-CASE BELOW 1 GHz

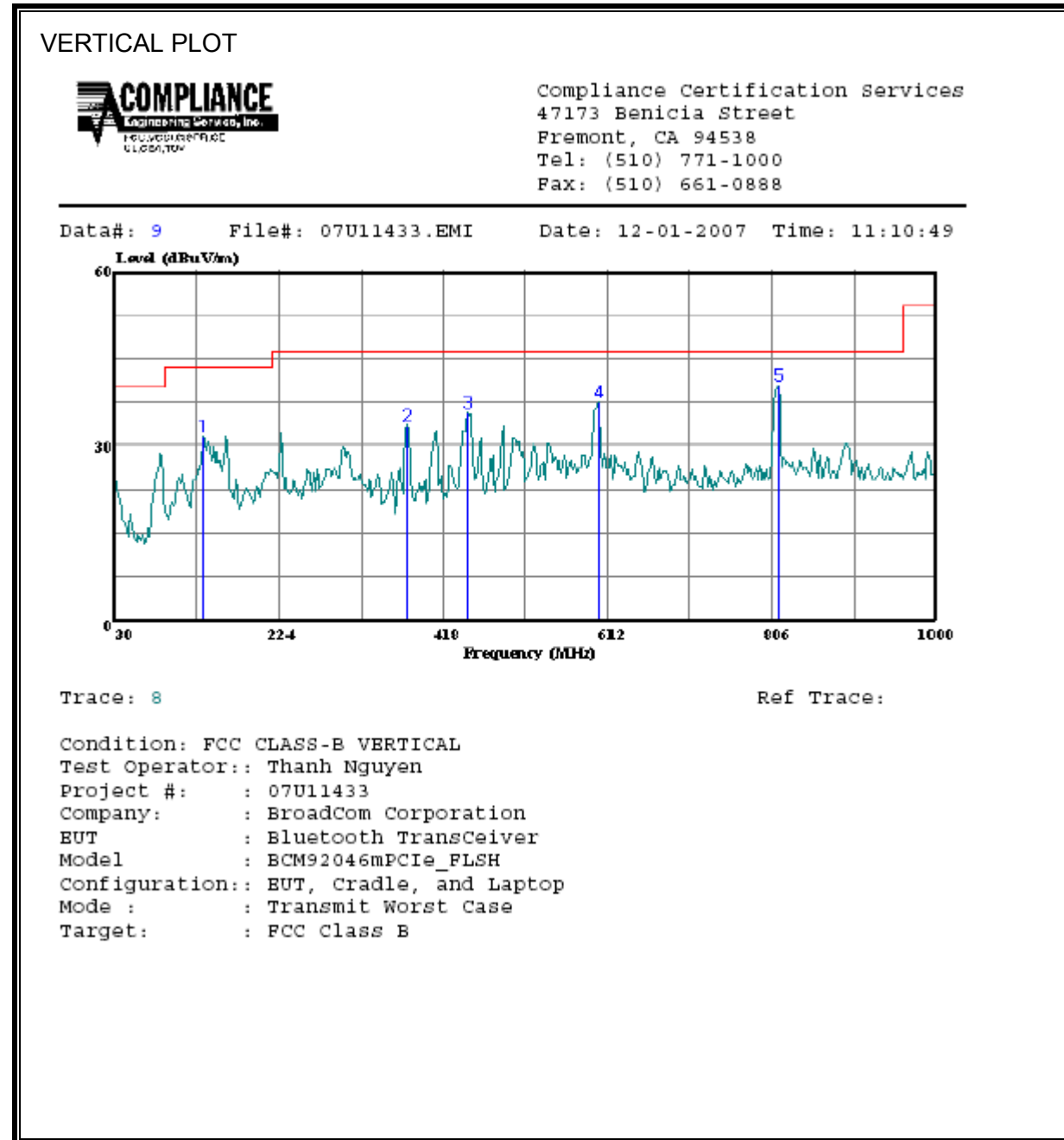
#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



HORIZONTAL DATA

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV/m	dB	dBuV/m	dB	
1	134.760	52.48	39.32	-13.16	43.50	-4.18	Peak
2	302.570	50.41	38.20	-12.21	46.00	-7.80	Peak
3	376.290	49.95	39.53	-10.42	46.00	-6.47	Peak
4	450.980	46.05	37.54	-8.51	46.00	-8.46	Peak
5	813.760	43.51	41.50	-2.01	46.00	-4.50	Peak

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



VERTICAL DATA

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV/m	dB	dBuV/m	dB	
1	135.730	44.69	31.52	-13.17	43.50	-11.98	Peak
2	375.320	43.68	33.25	-10.43	46.00	-12.75	Peak
3	447.100	44.10	35.47	-8.63	46.00	-10.53	Peak
4	601.330	42.89	37.52	-5.37	46.00	-8.48	Peak
5	812.790	42.20	40.18	-2.02	46.00	-5.82	Peak

## 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.

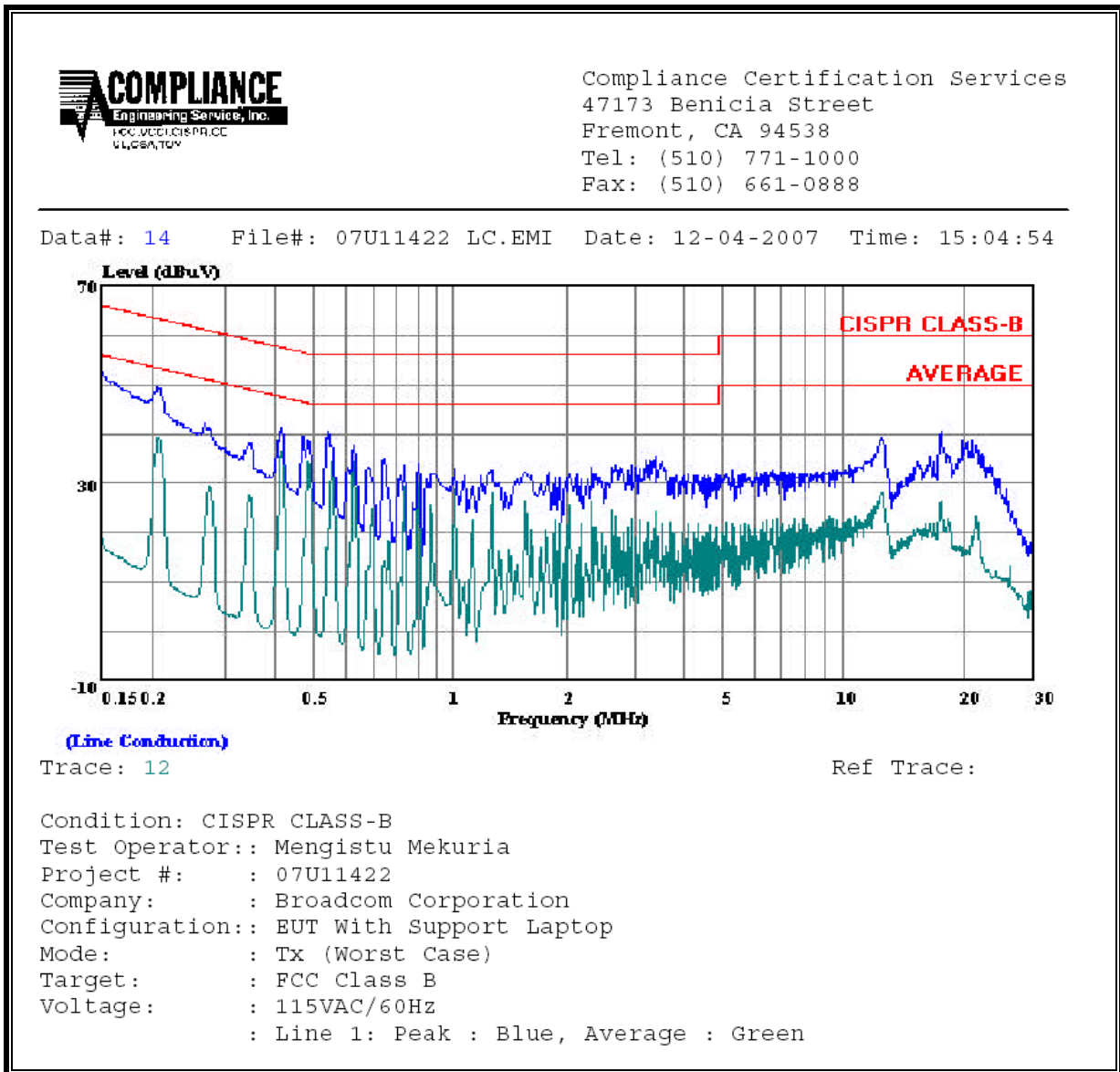
Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

#### 6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN_B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.21	49.00	--	39.25	0.00	63.41	53.41	-14.41	-14.16	L1
0.54	42.02	--	34.46	0.00	56.00	46.00	-13.98	-11.54	L1
17.66	50.00	--	26.50	0.00	60.00	50.00	-10.00	-23.50	L1
0.21	49.00	--	38.65	0.00	63.41	53.41	-14.41	-14.76	L2
0.54	42.02	--	33.75	0.00	56.00	46.00	-13.98	-12.25	L2
17.57	50.00	--	34.23	0.00	60.00	50.00	-10.00	-15.77	L2
6 Worst Data									

**LINE 1 RESULTS**



**LINE 2 RESULTS**

