



**FCC 47 CFR PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n/ac, NFC & ANT+**

**FCC ID: PY7TM-0050**

**REPORT NUMBER: 14U17933- E2**

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Rev.	Date	Revisions	Revised By
--	8/28/14	Initial issue	P. Zhang

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SONY MOBILE COMMUNICATIONS, INC.  
**EUT DESCRIPTION:** GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n/ac, NFC & ANT+  
**SERIAL NUMBER:** CB5A20E0RY (Radiated), CB5A208FAY (Conducted)  
**DATE TESTED:** August 11-28, 2014

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.

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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009, 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 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
<input checked="" type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input checked="" type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input checked="" type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

## 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:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

## 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 26000 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/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n/ac, NFC & ANT+

### 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	4.17	2.61
2402 - 2480	Enhanced 8PSK	5.50	3.55

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 -1.9 dBi.

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

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Sony	EP880	3514W01 S08489 SEM 060	DoC
Earphone	Sony	MH410c	14071EB60060A84	DoC
MHL cable	Sony	N/A	N/A	N/A

### I/O CABLES

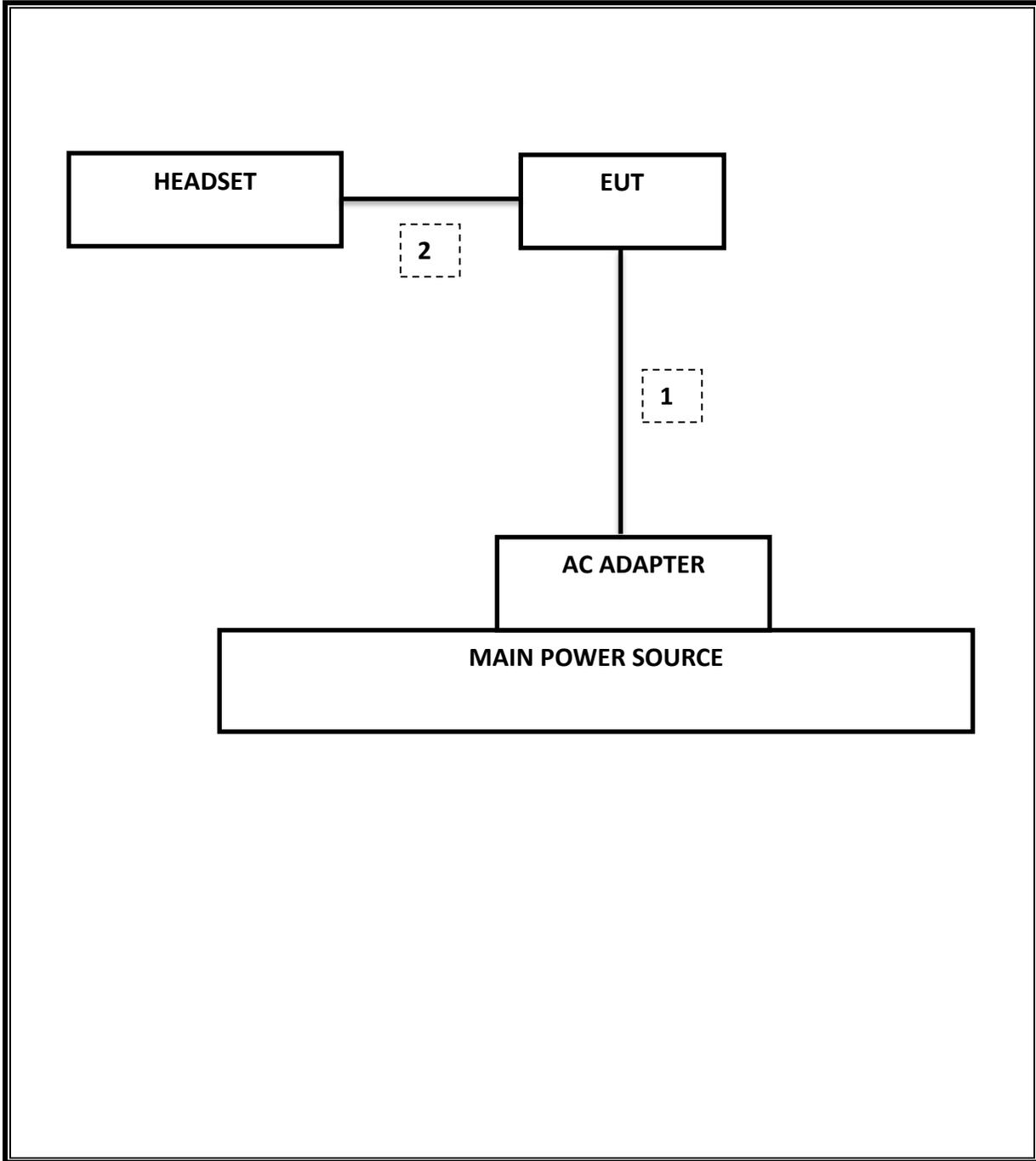
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

### 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 Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/15
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/14
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/14
CBT Bluetooth Tester	R & S	CBT	None	07/12/14
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/14
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/14
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/15
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/14
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/14

## 7. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
2.1049	RSS-GEN 4.6	Occupied Band width (99%)	N/A	Conducted	Pass	1.231MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-38.95 dBm
15.247 (b)(1)	RSS-210 A8.4	TX conducted output power	<21dBm		Pass	9.01 dBm
15.247 (a)(1)	RSS-210 A8.1(b)	Hopping frequency separation	> 25KHz		Pass	1 MHz
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Number of Hopping channels	More than 15 non-overlapping channels		Pass	79
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Avg Time of Occupancy	< 0.4sec		Pass	.375sec
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	31.19 dBuV(AV)
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	45.26 dBuV/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	0.928	0.87
Middle	2441	0.926	0.852
High	2480	0.926	0.874
Worst		0.928	0.874

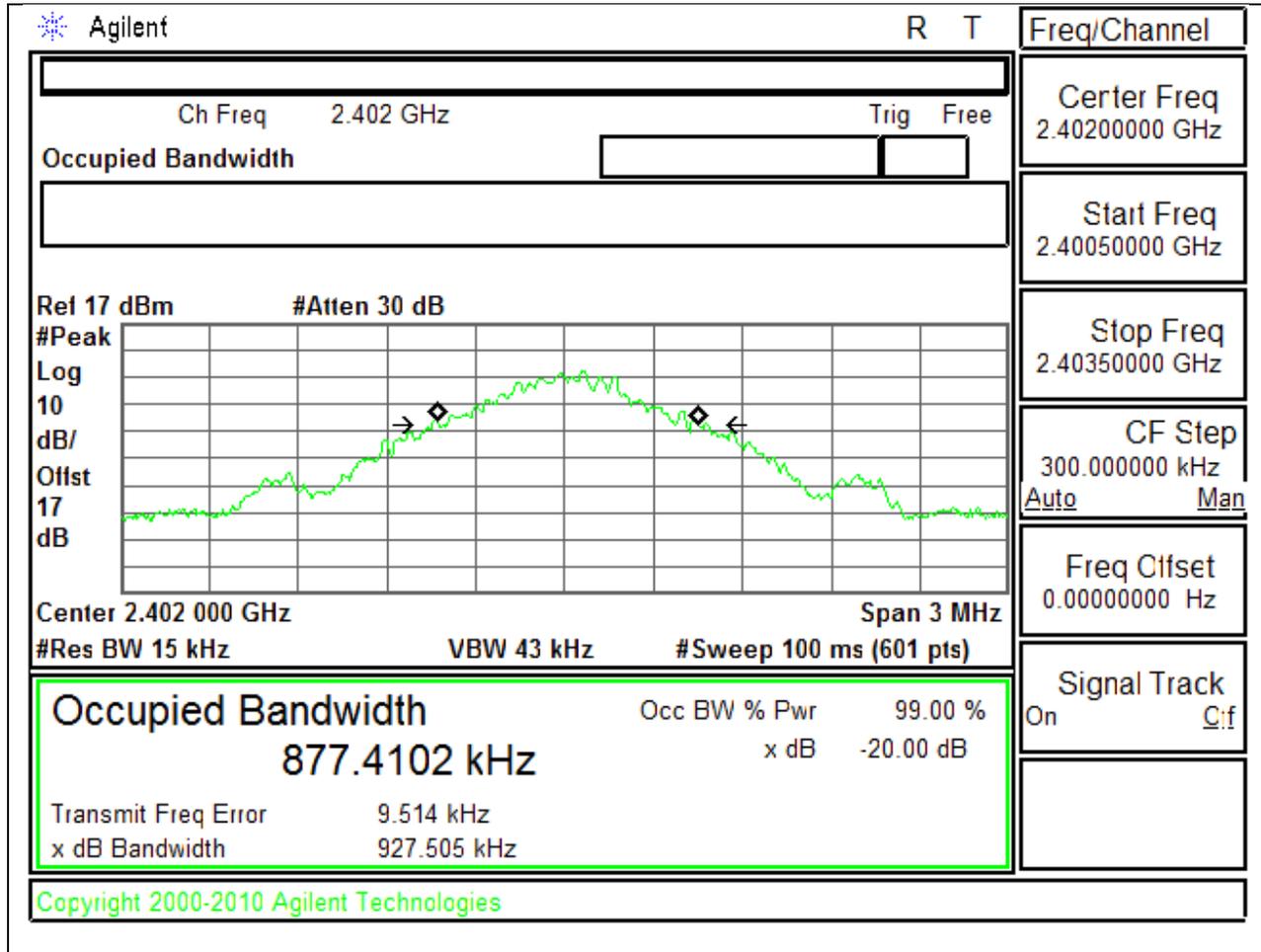
### 8.1.2. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.34	1.218
Middle	2441	1.341	1.191
High	2480	1.333	1.231
Worst		1.341	1.231

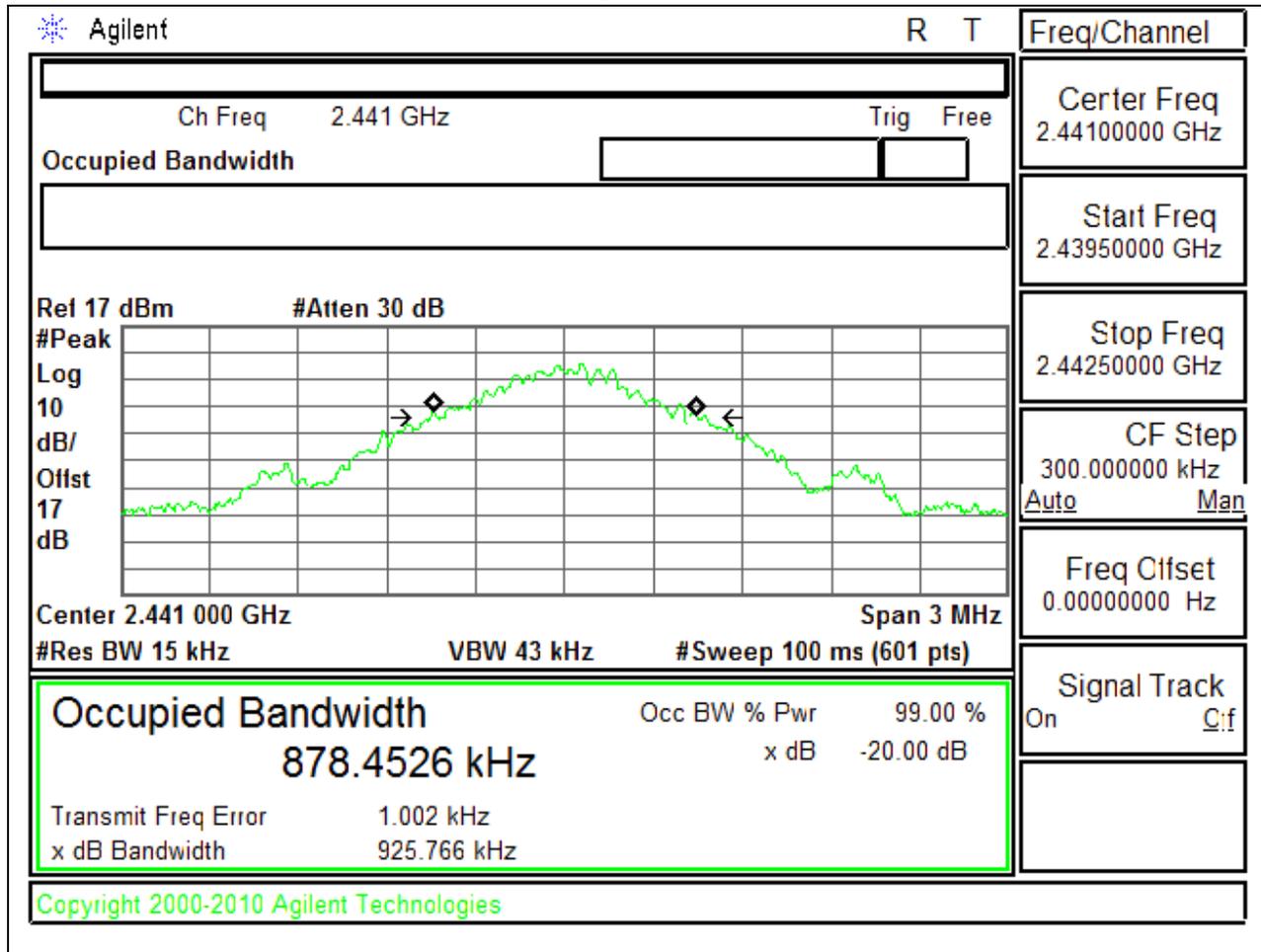
**20 dB AND 99% BANDWIDTH PLOTS**

**GFSK 20 dB BANDWIDTH**

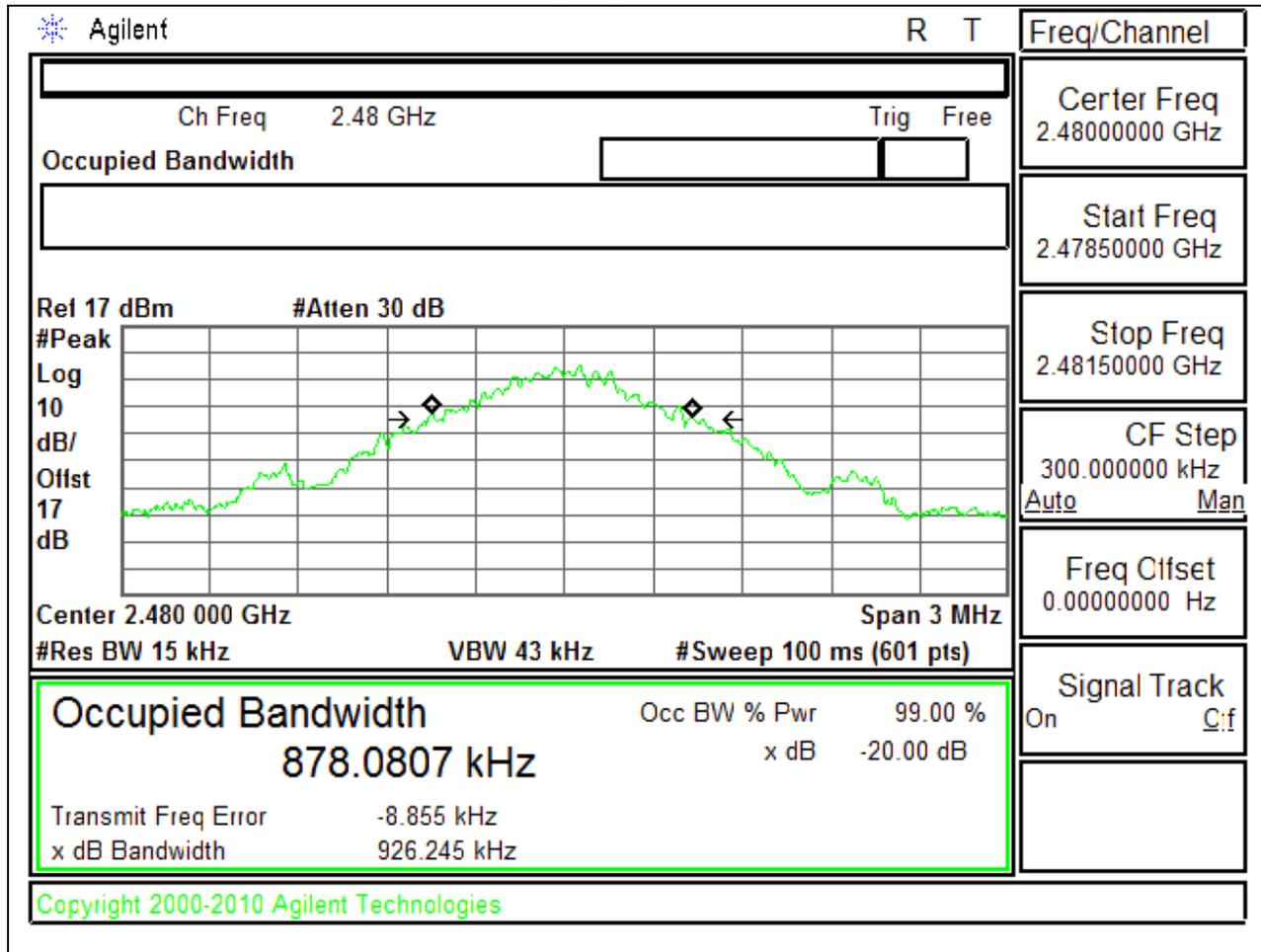
**LOW CHANNEL**



**MID CHANNEL**

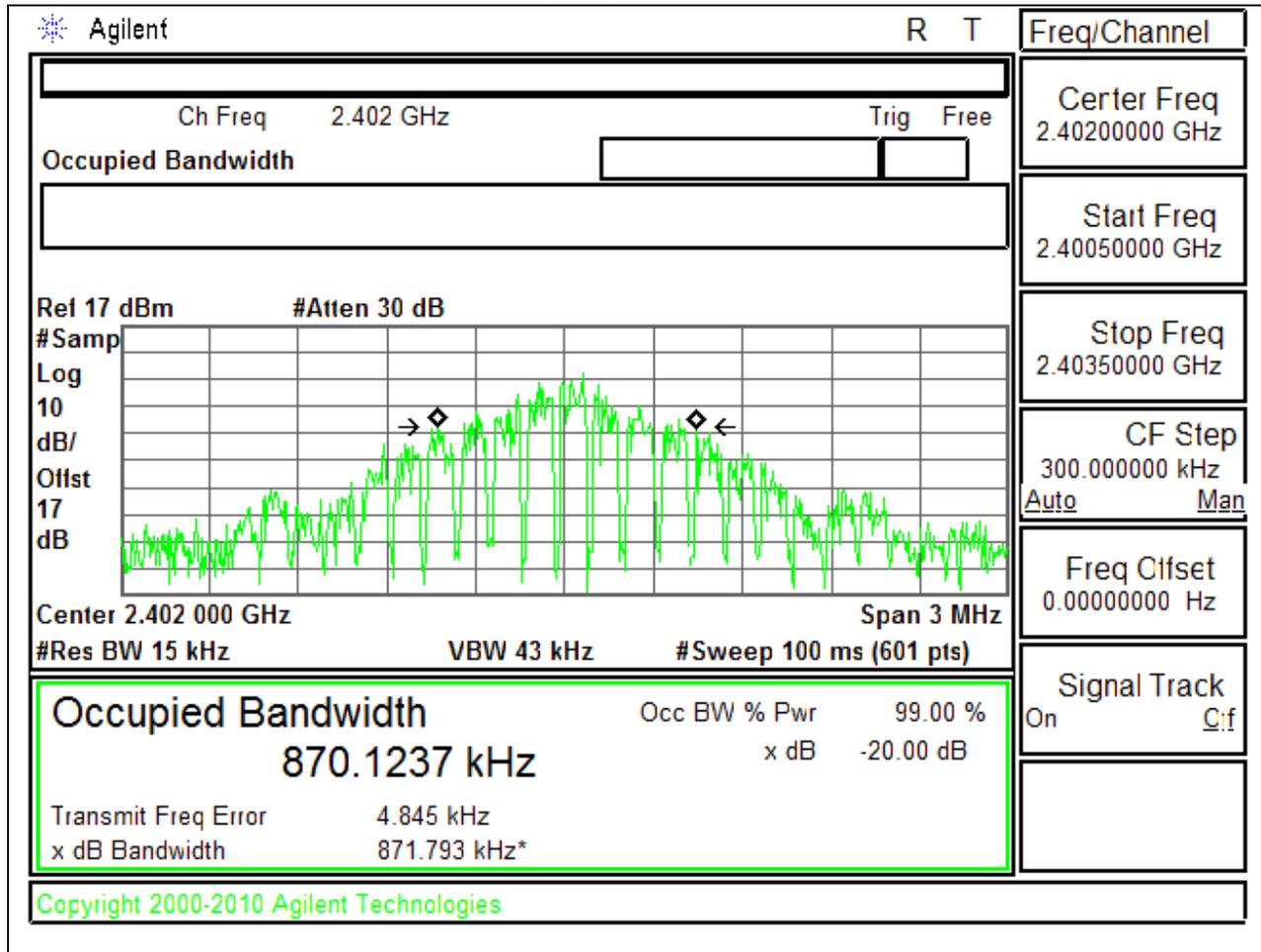


**HIGH CHANNEL**

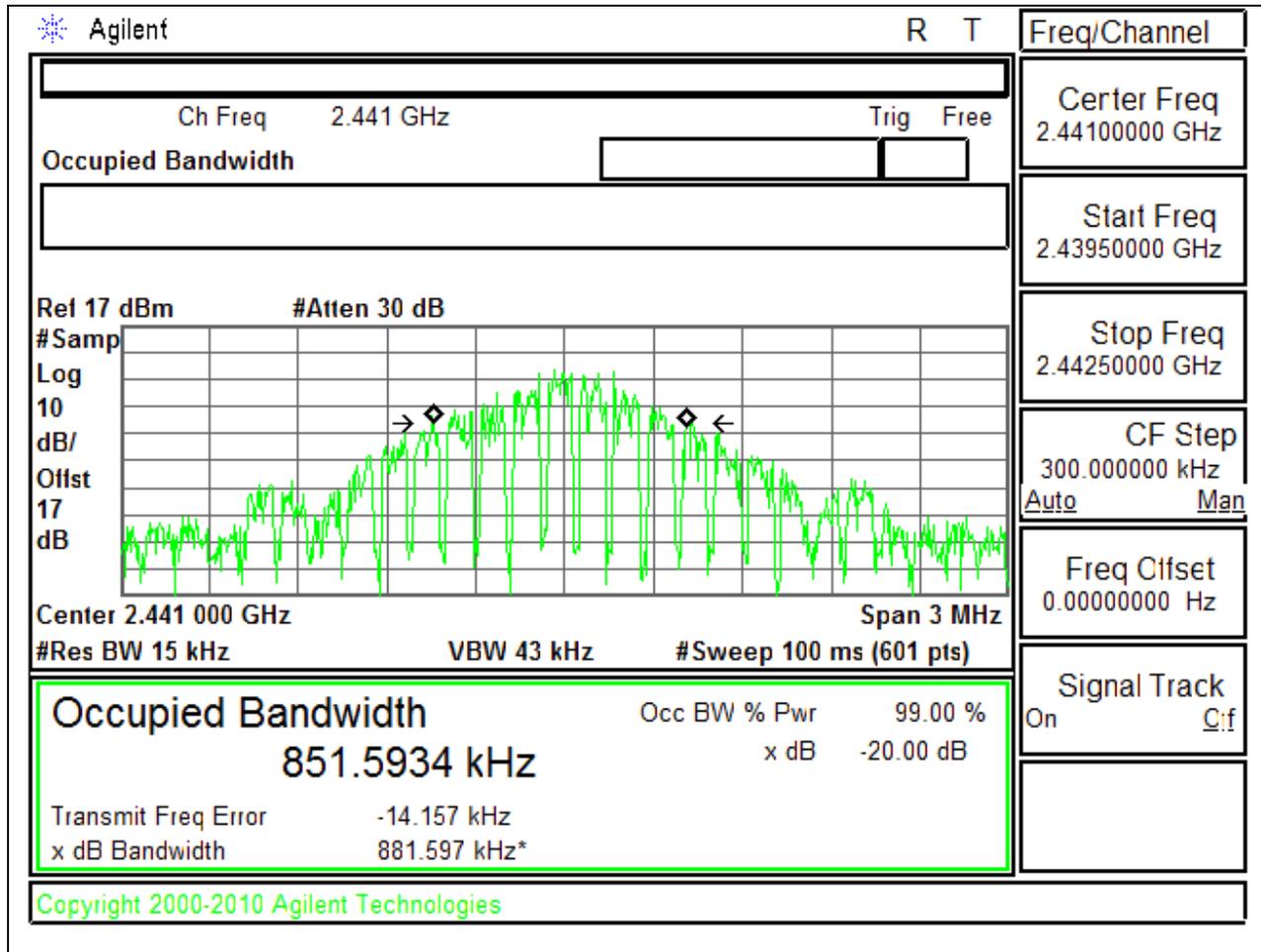


**GFSK 99% BANDWIDTH**

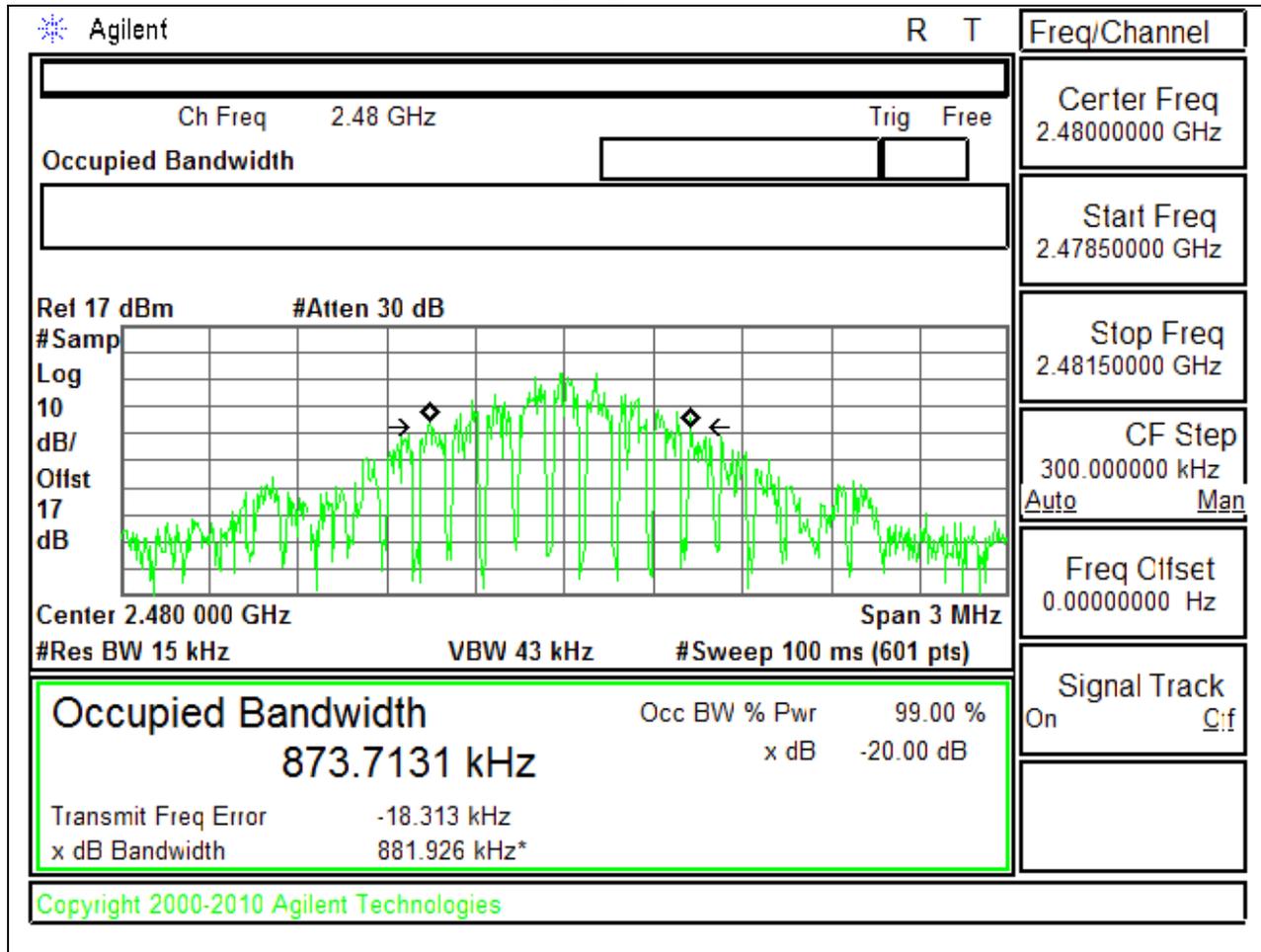
**LOW CHANNEL**



**MID CHANNEL**

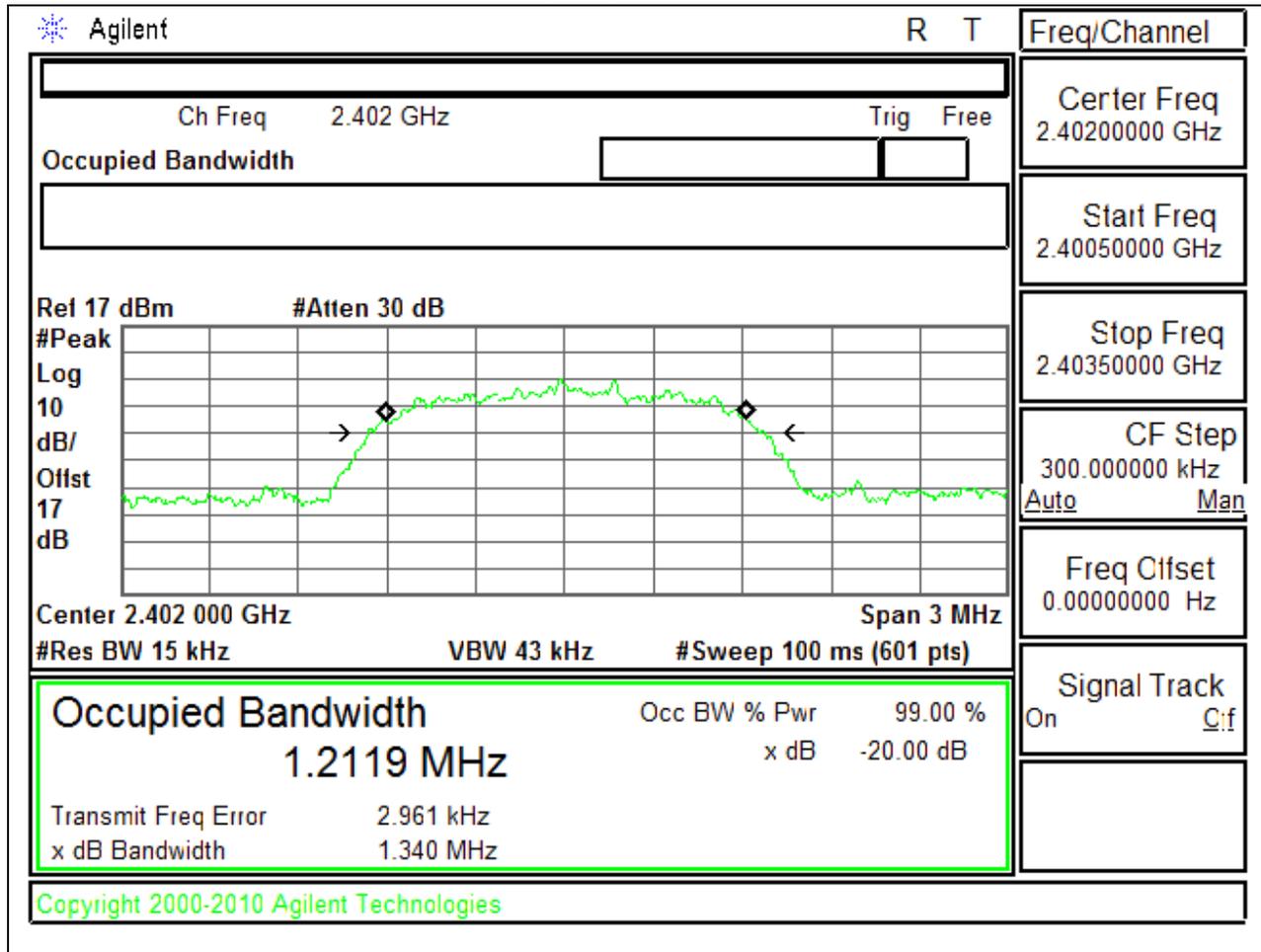


**HIGH CHANNEL**

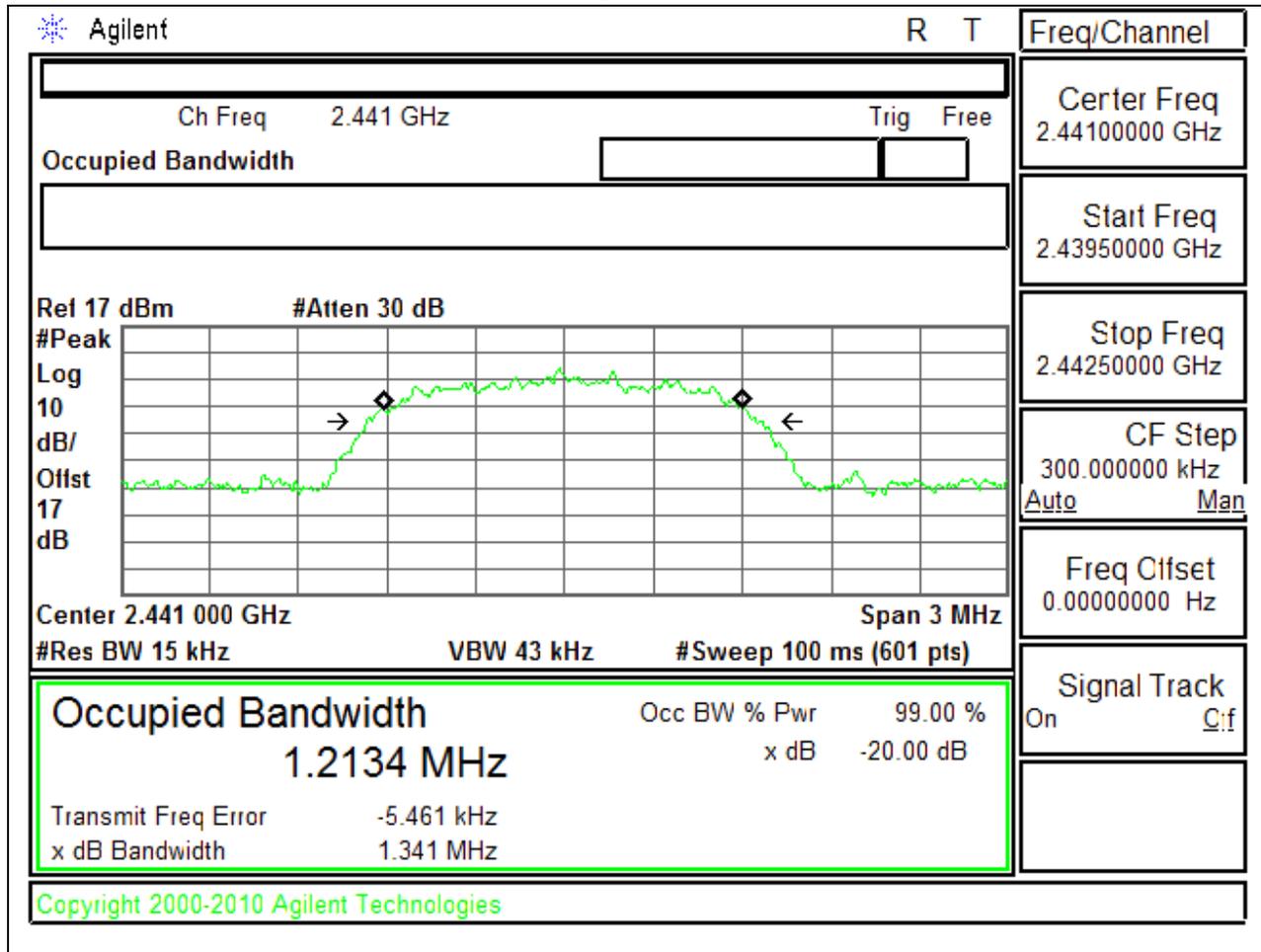


**8PSK 20 dB BANDWIDTH**

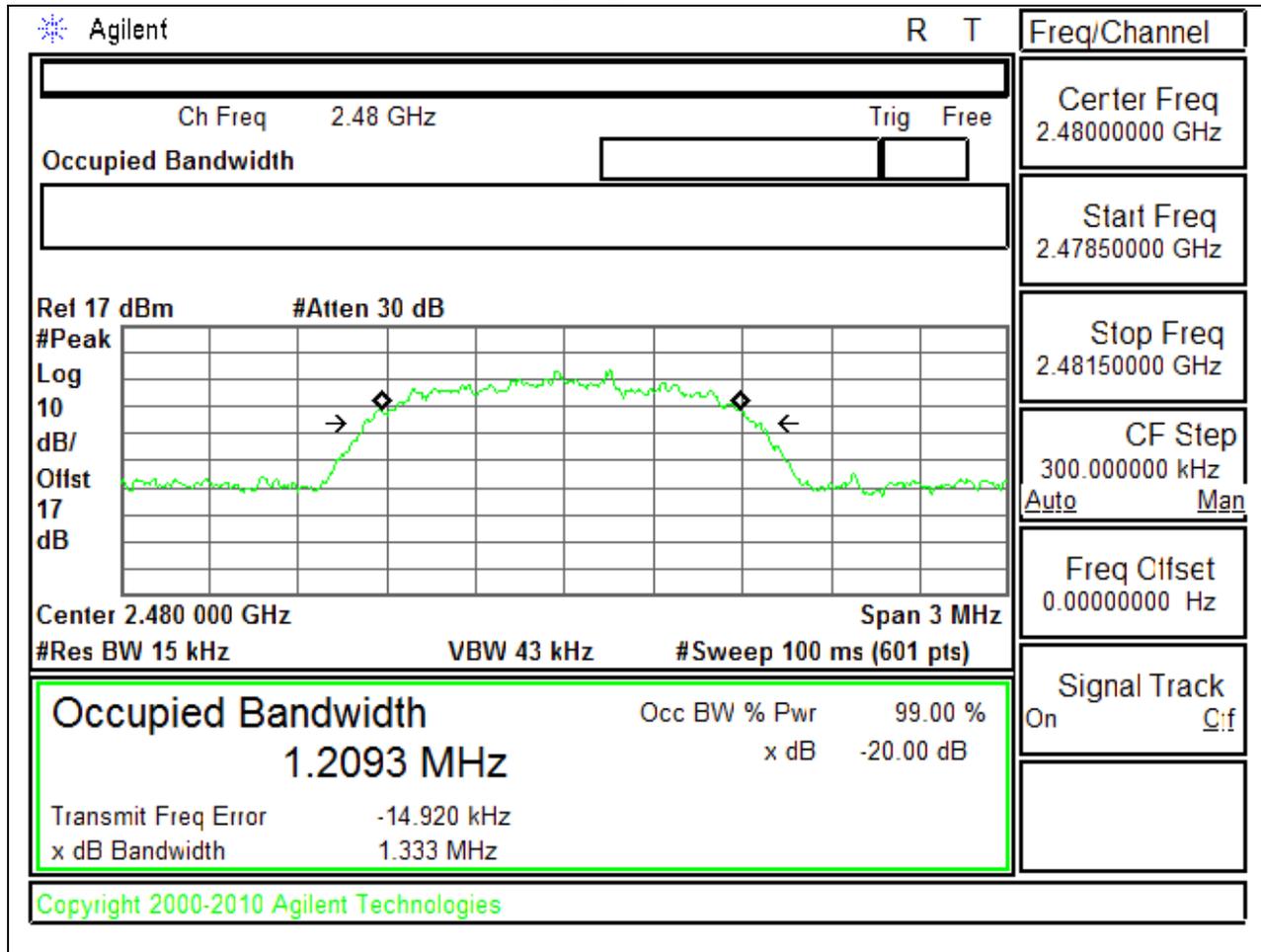
**LOW CHANNEL**



**MID CHANNEL**

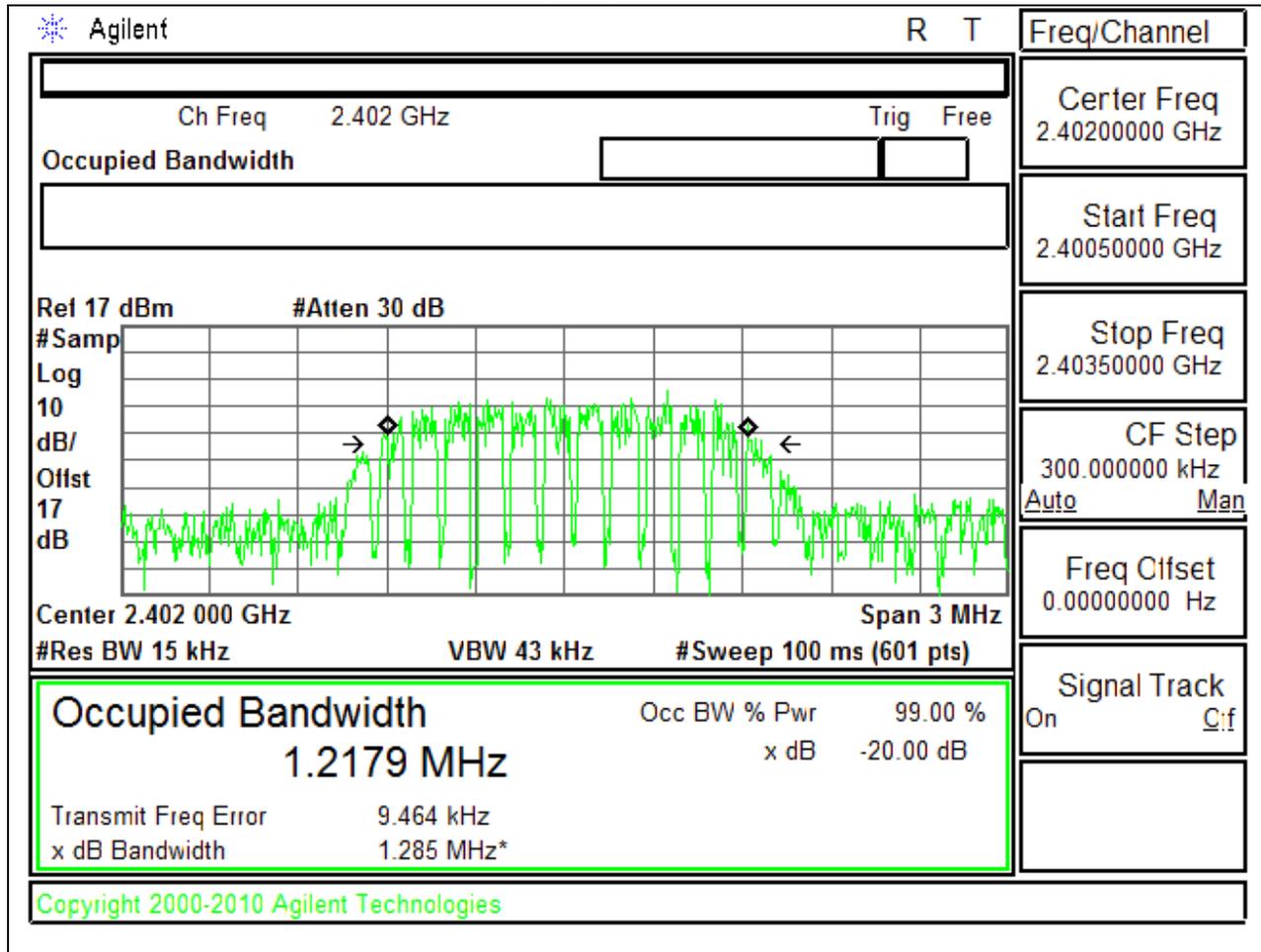


### HIGH CHANNEL

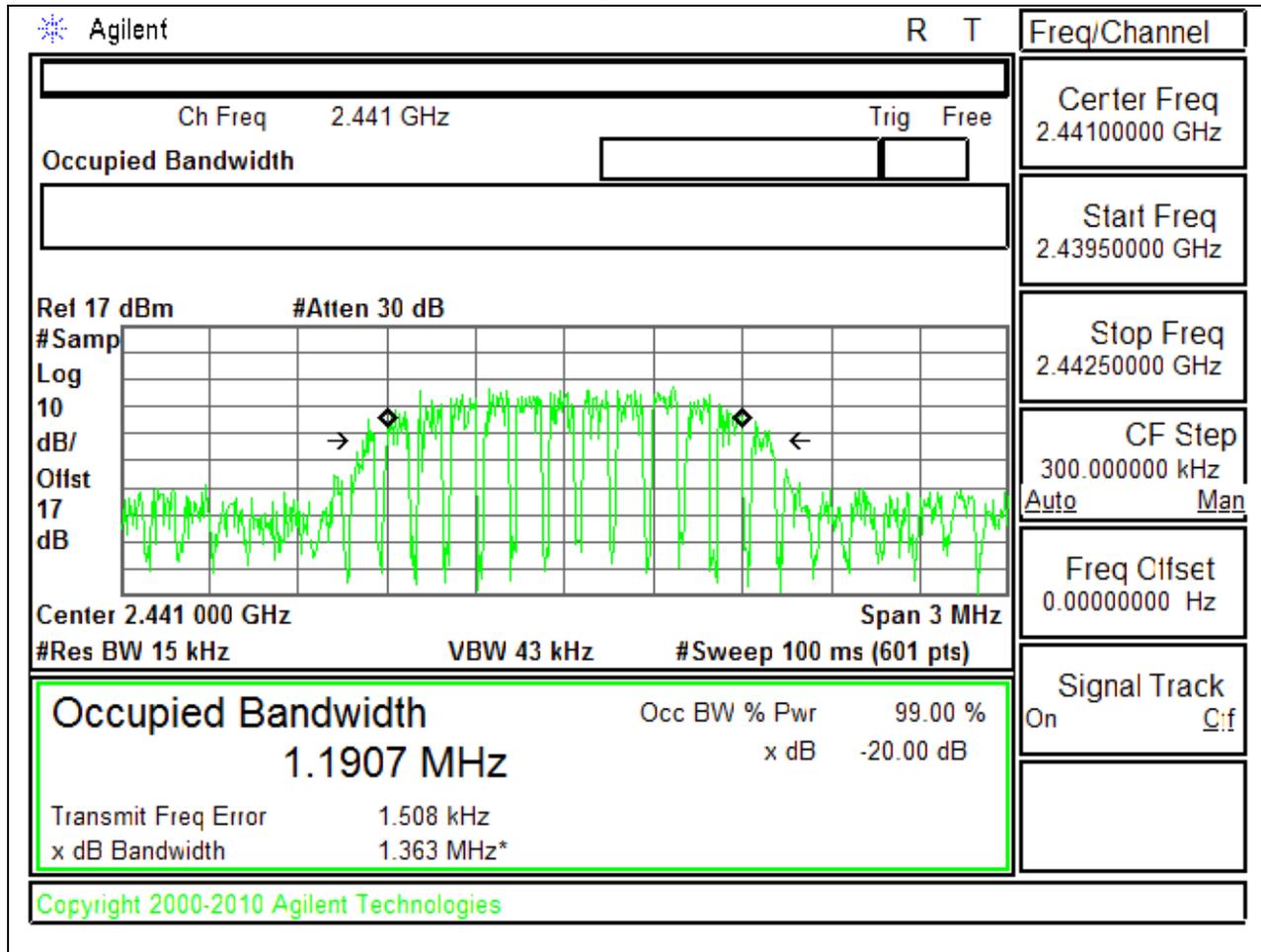


**8PSK 99% BANDWIDTH**

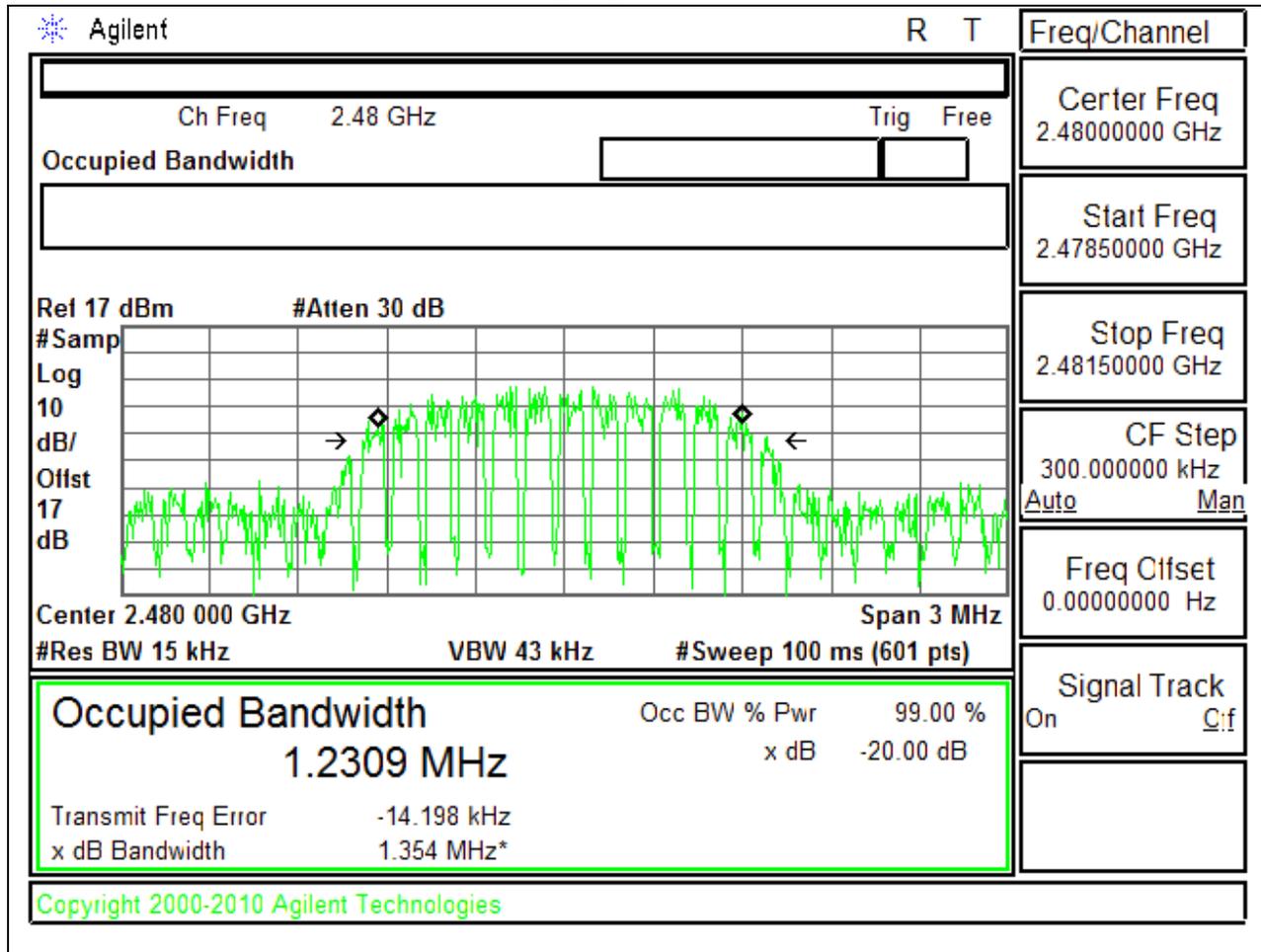
**LOW CHANNEL**



**MID CHANNEL**



**HIGH CHANNEL**



## **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.

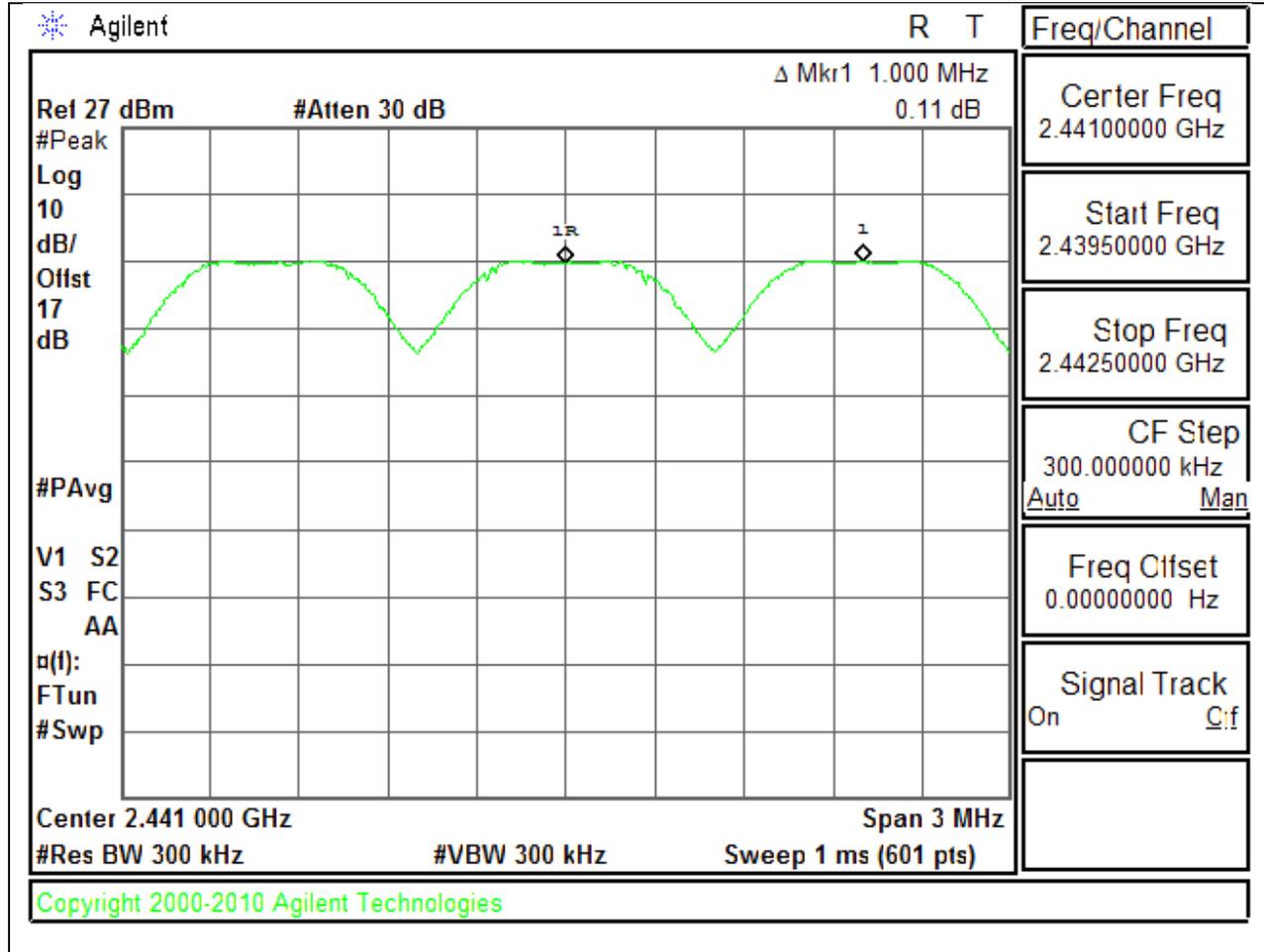
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

### **TEST PROCEDURE**

DA 00-705: The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

### **RESULTS**

**HOPPING FREQUENCY SEPARATION PLOT**



### **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**

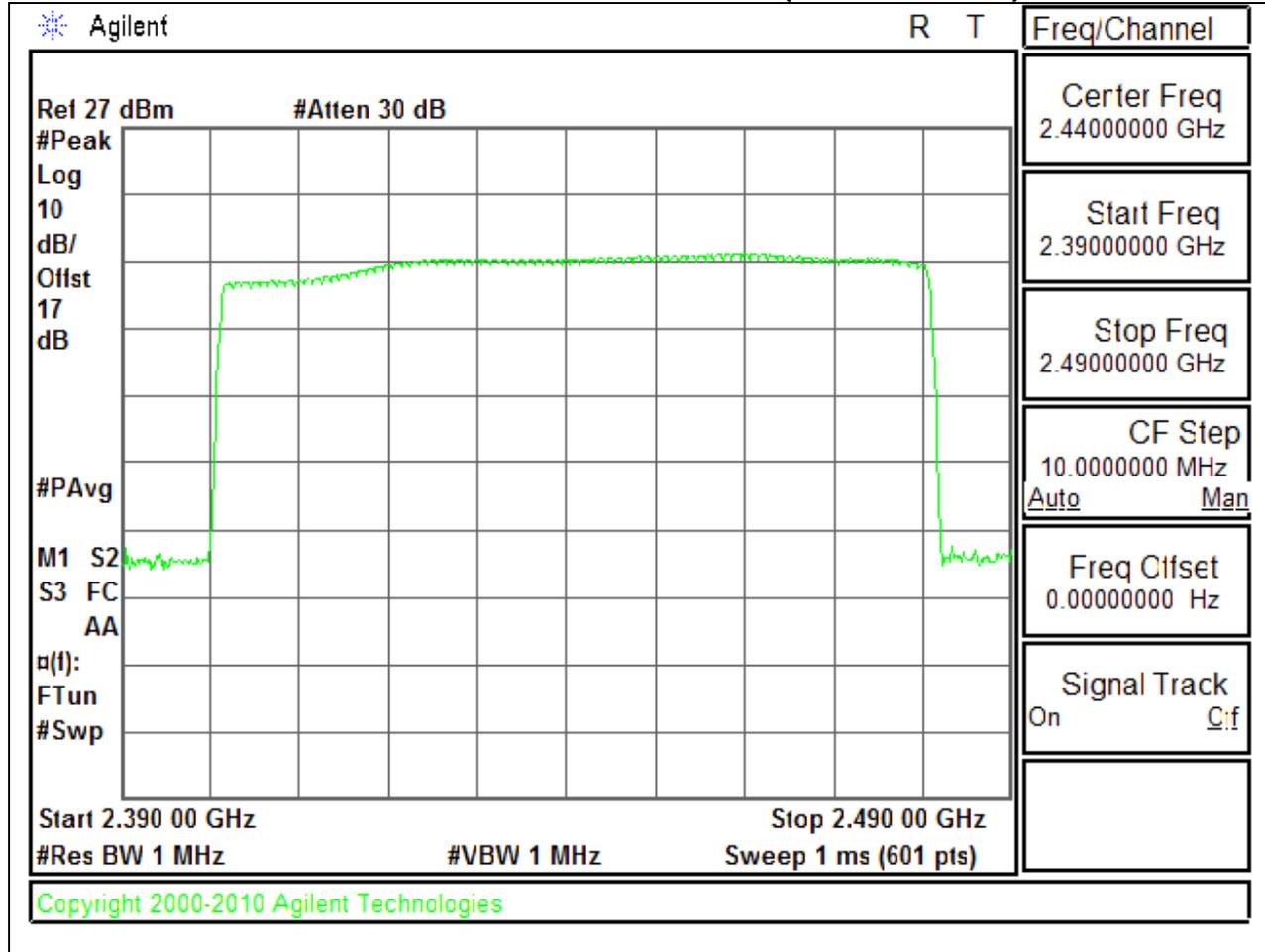
DA 00-705: The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

#### **RESULTS**

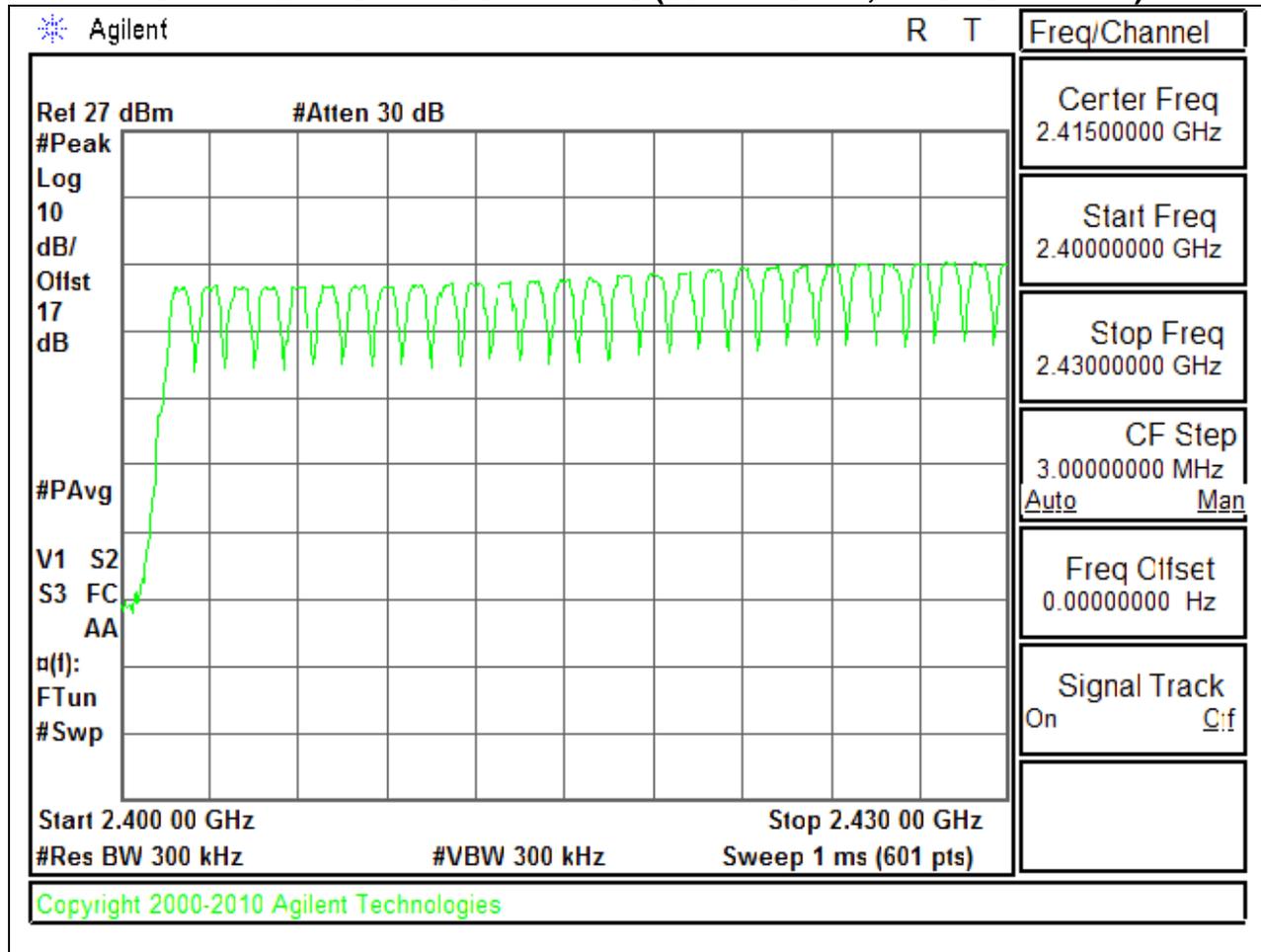
Normal Mode: 79 Channels observed.

**NUMBER OF HOPPING CHANNELS PLOTS**

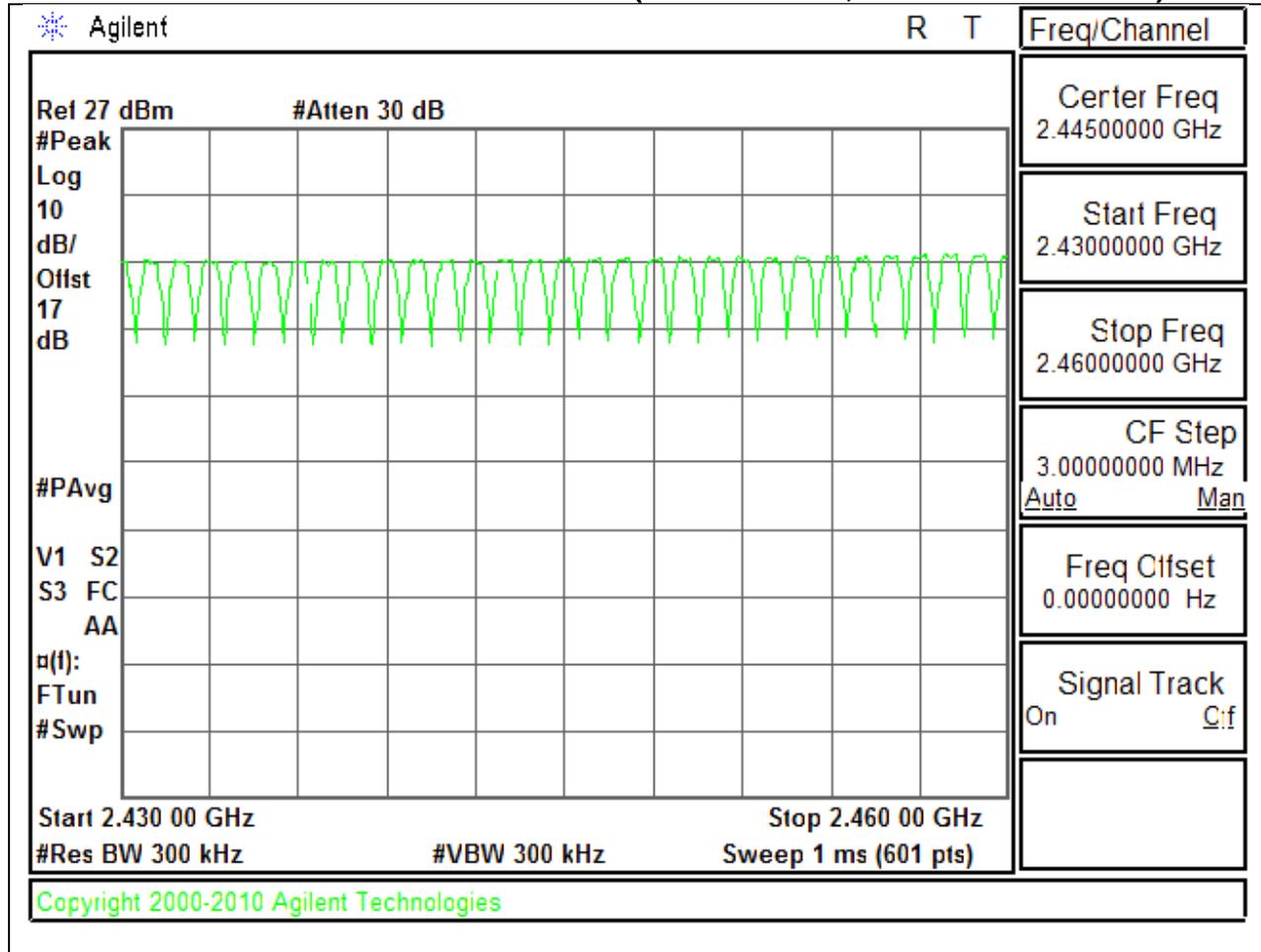
**NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)**



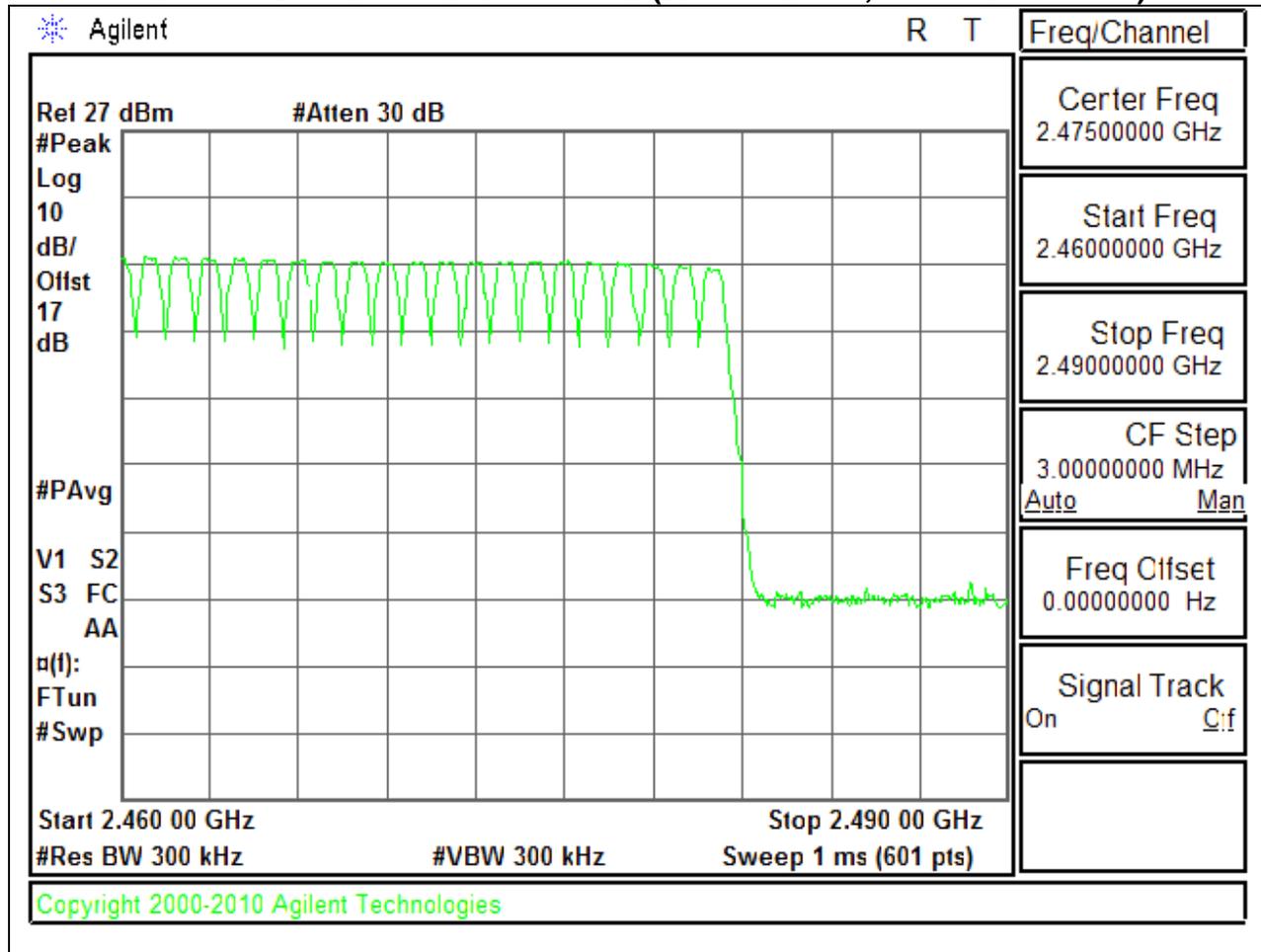
**NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)**



**NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)**



**NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)**



## **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.

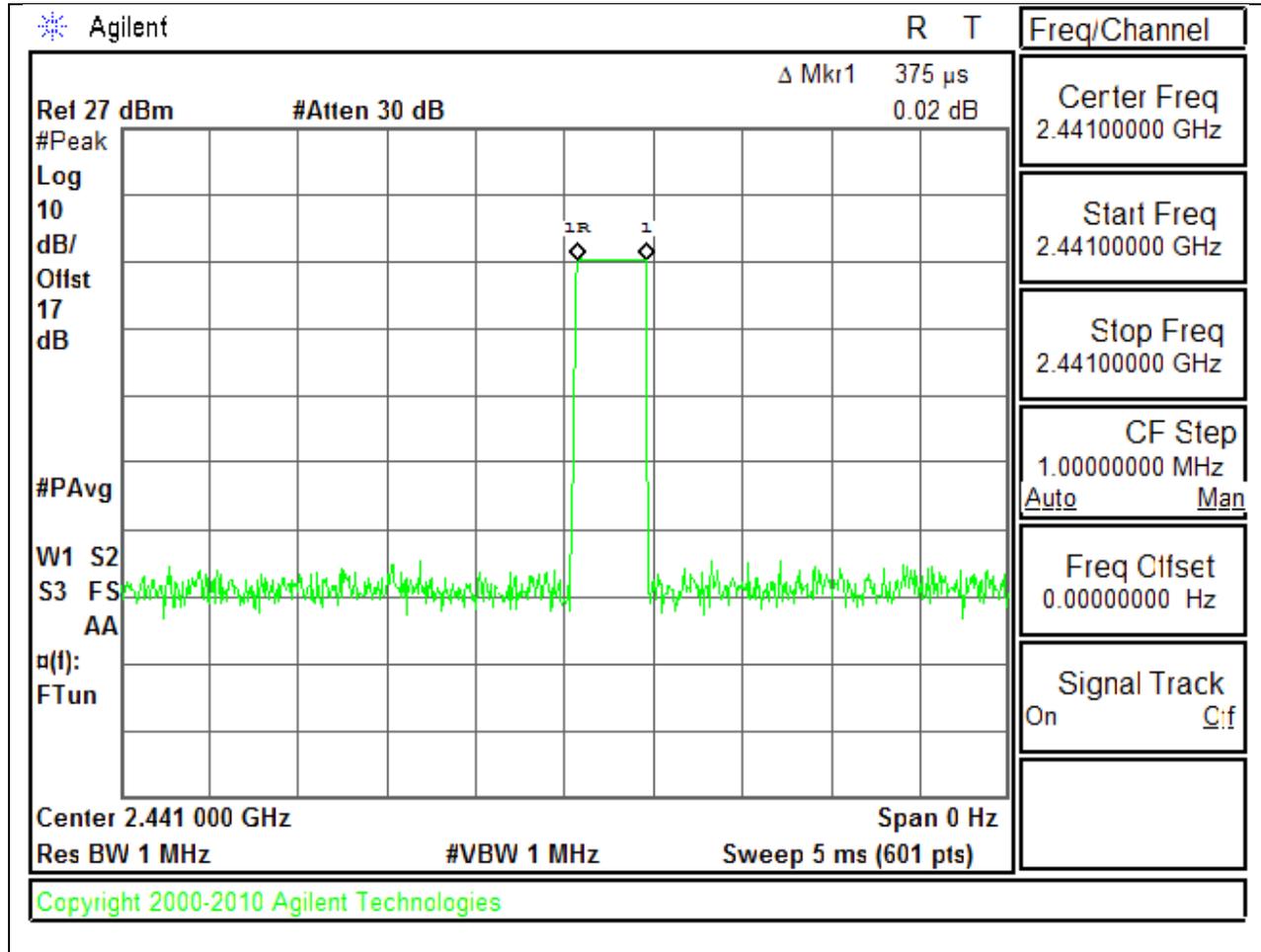
The average time of occupancy in the specified 31.6 second period (79 channels \* 0.4 s) is equal to  $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{ pulse width}$ .

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

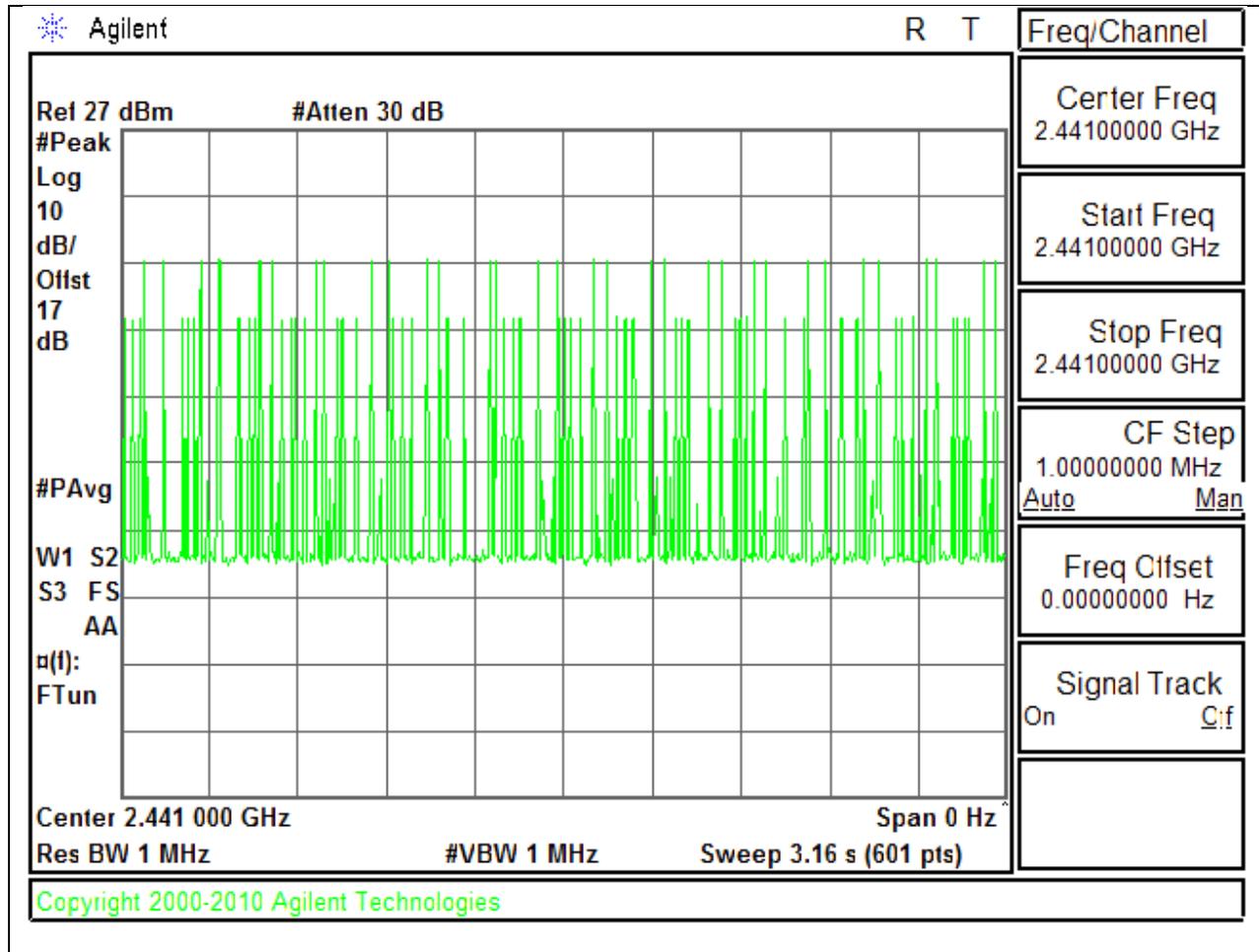
**RESULTS**

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	0.375	32	0.12	0.4	-0.28
DH3	1.642	22	0.36124	0.4	-0.03876
DH5	2.883	13	0.37479	0.4	-0.02521
DH Packet	Pulse Width (msec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.375	8	0.03	0.4	-0.37
DH3	1.642	5.5	0.09031	0.4	-0.30969
DH5	2.883	3.25	0.0936975	0.4	-0.3063

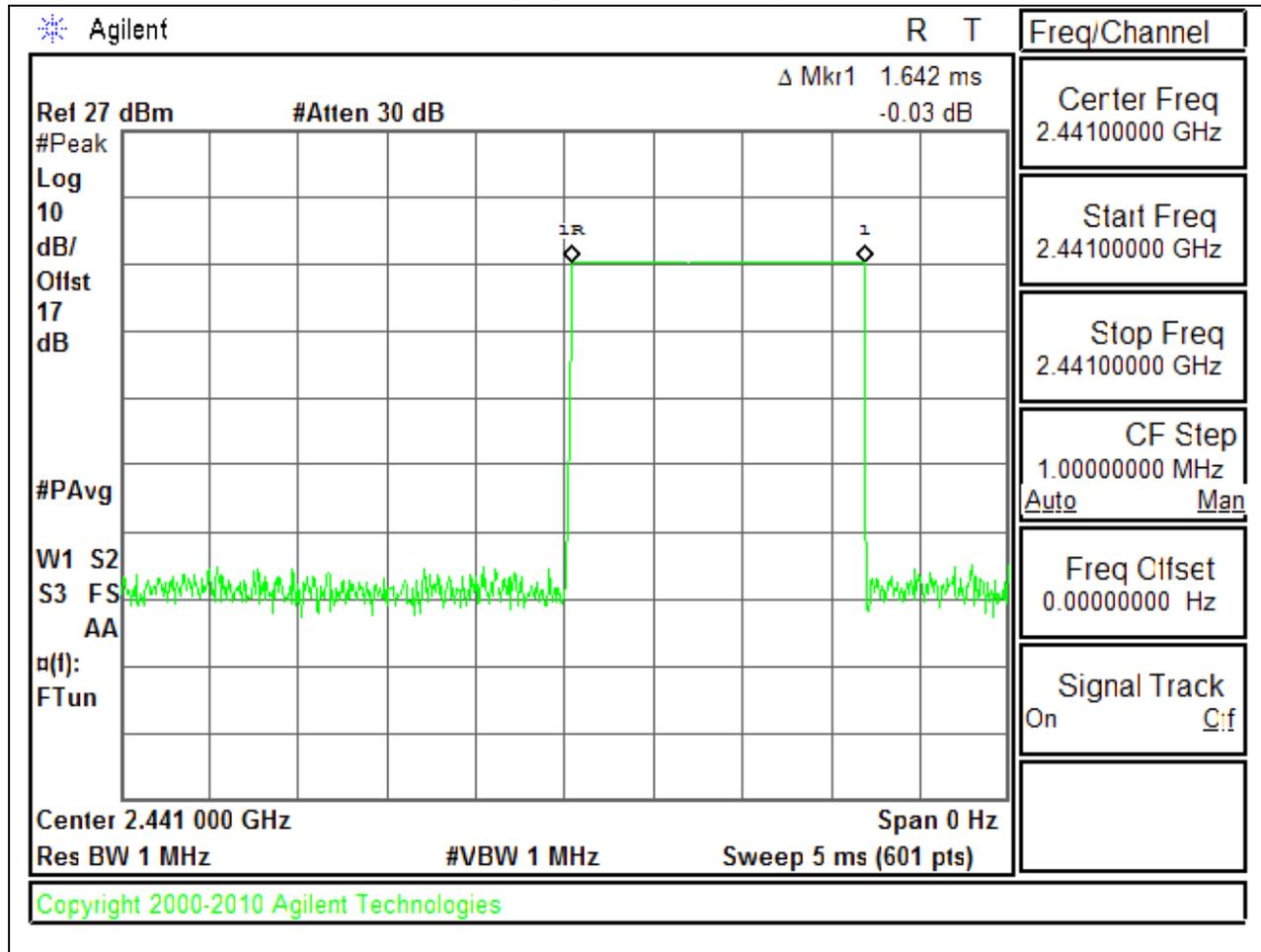
**PULSE WIDTH - DH1**



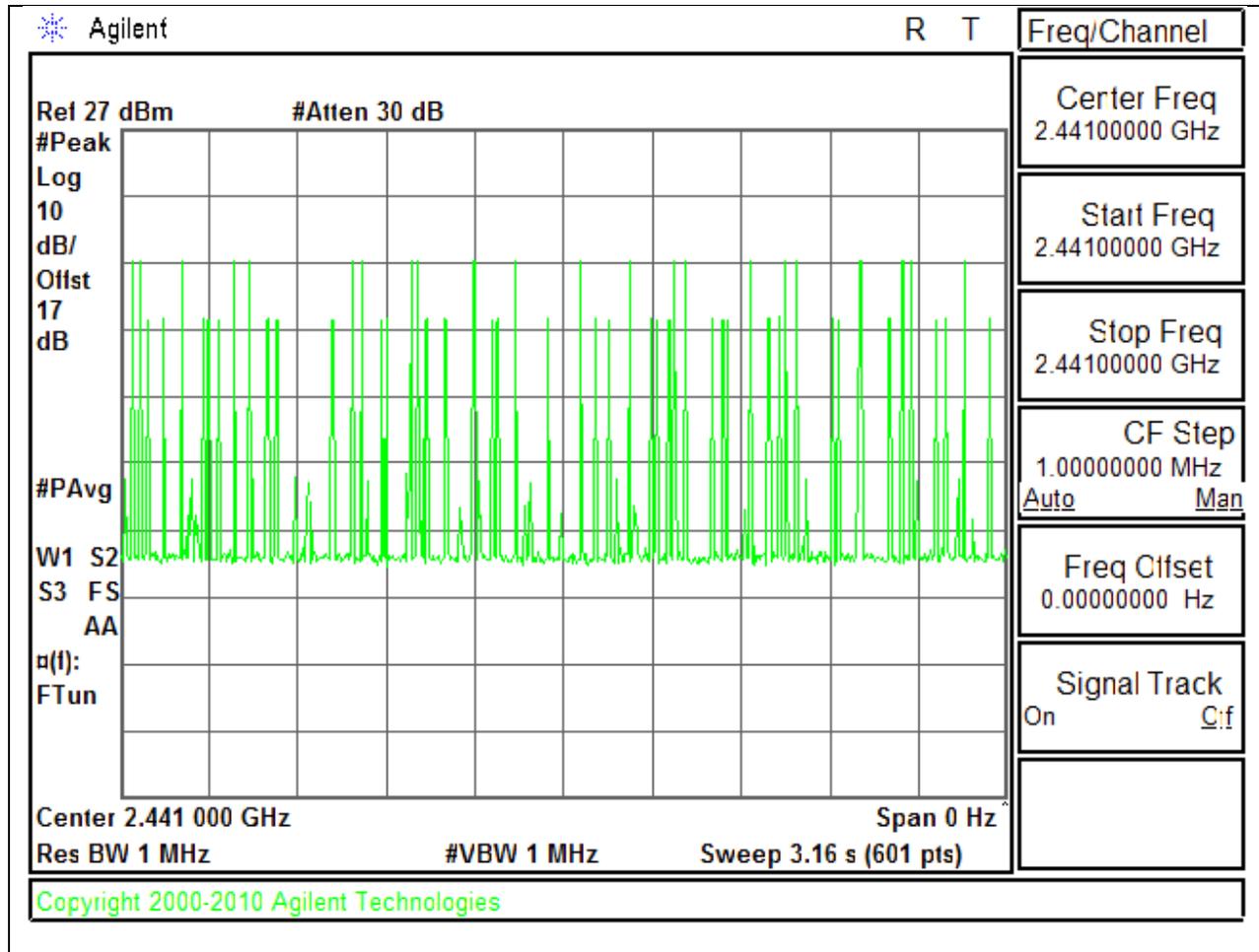
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH1**



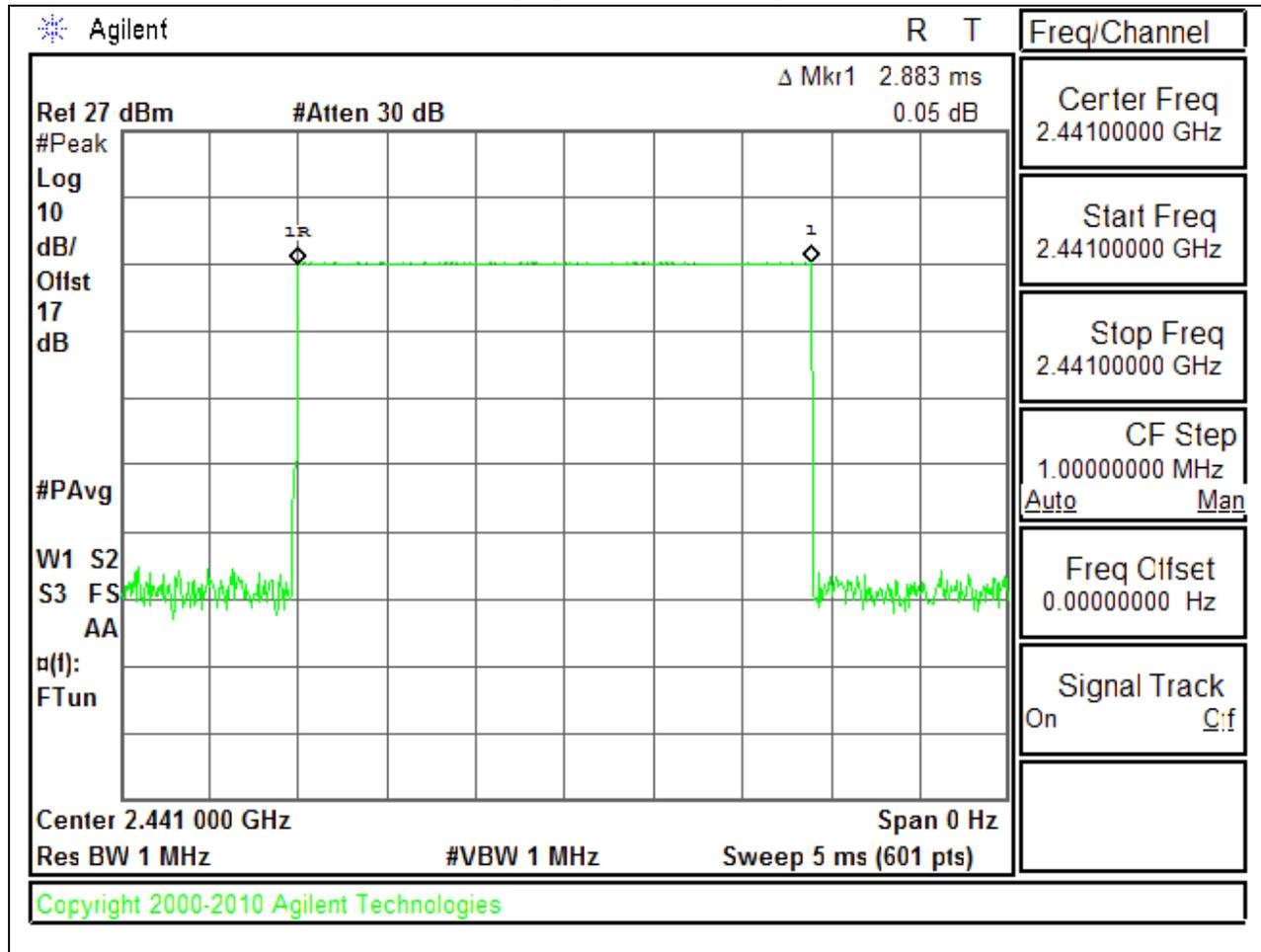
**PULSE WIDTH - DH3**



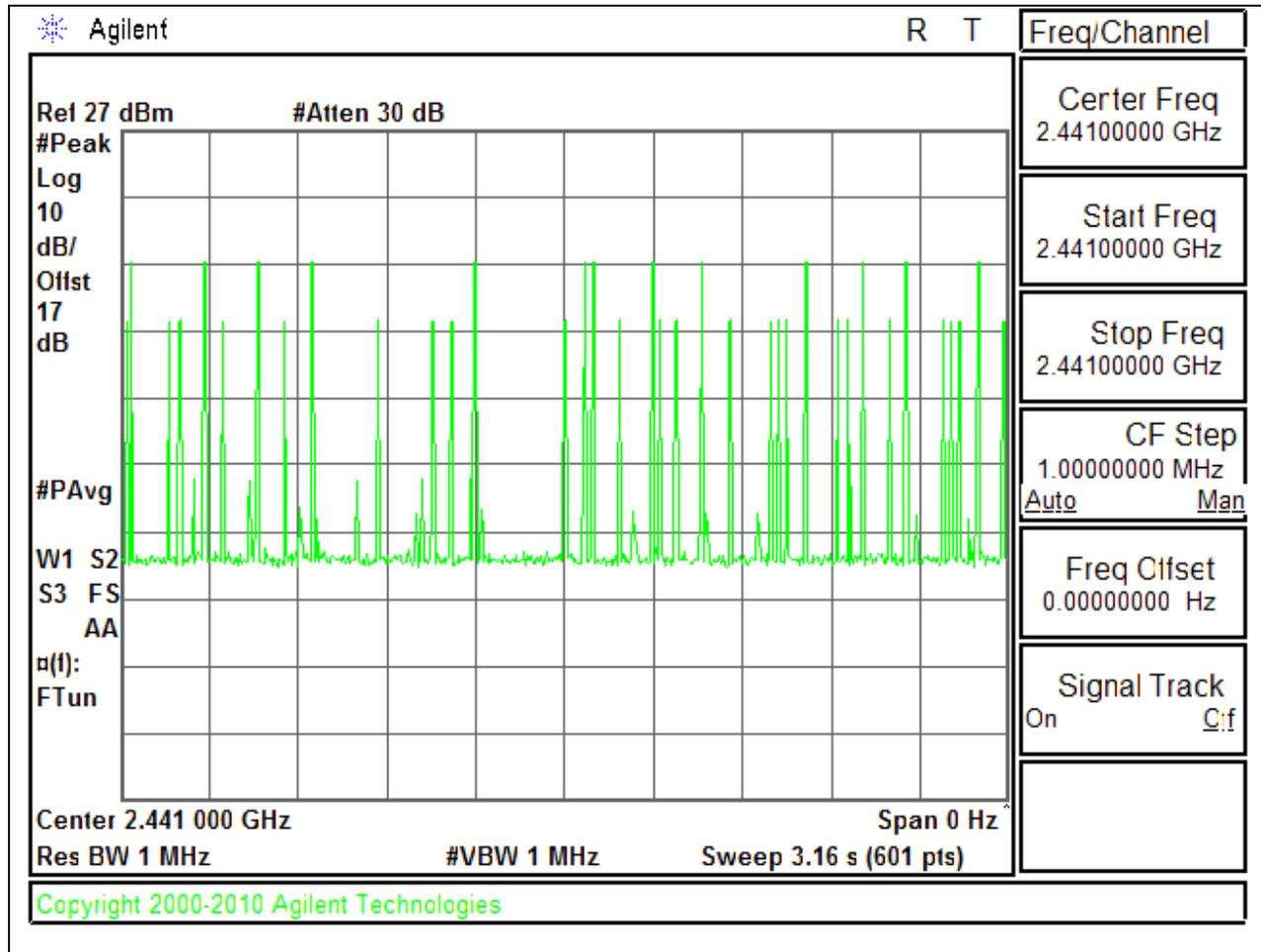
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH3**



**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

#### 8.5.1. BASIC DATA RATE GFSK MODULATION

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.64	21	-17.36
Middle	2441	7.27	21	-13.73
High	2480	6.41	21	-14.59
Worst		7.27		-13.73

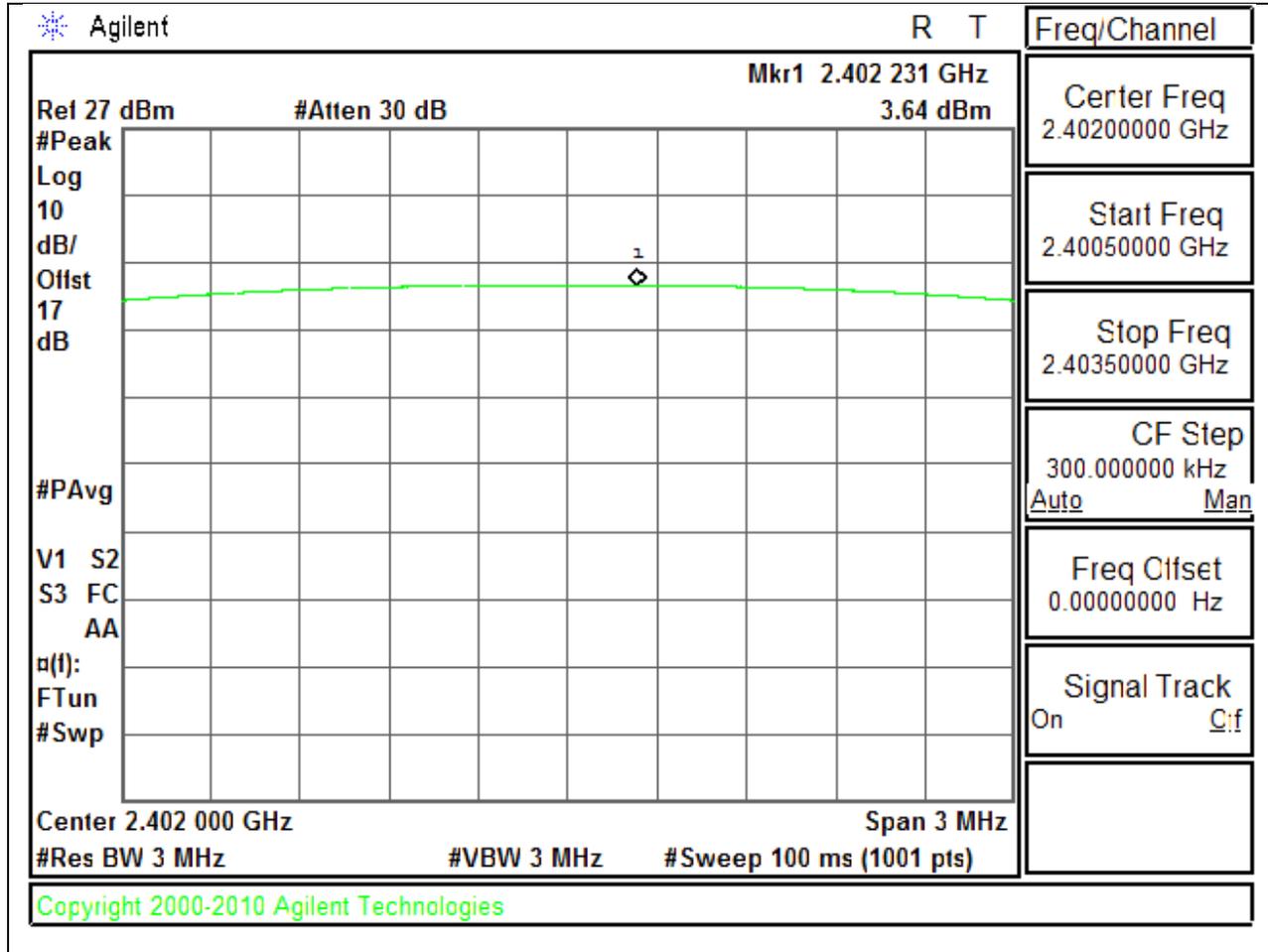
### 8.5.2. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.27	21	-15.73
Middle	2441	9.01	21	-11.99
High	2480	8.04	21	-12.96
Worst		9.01		-11.99

### 8.5.3. OUTPUT POWER PLOTS

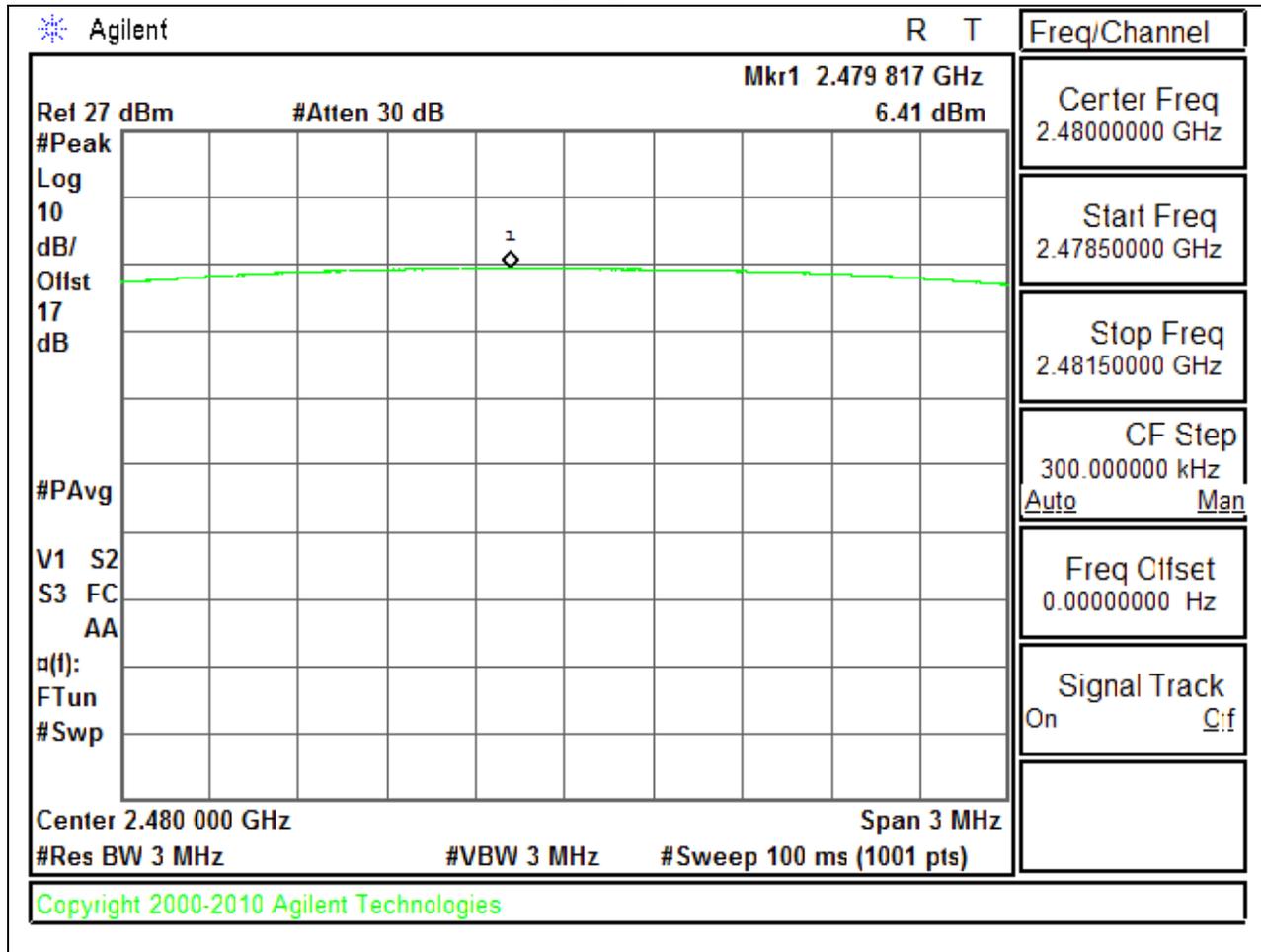
#### GFSK OUTPUT POWER

#### LOW CHANNEL



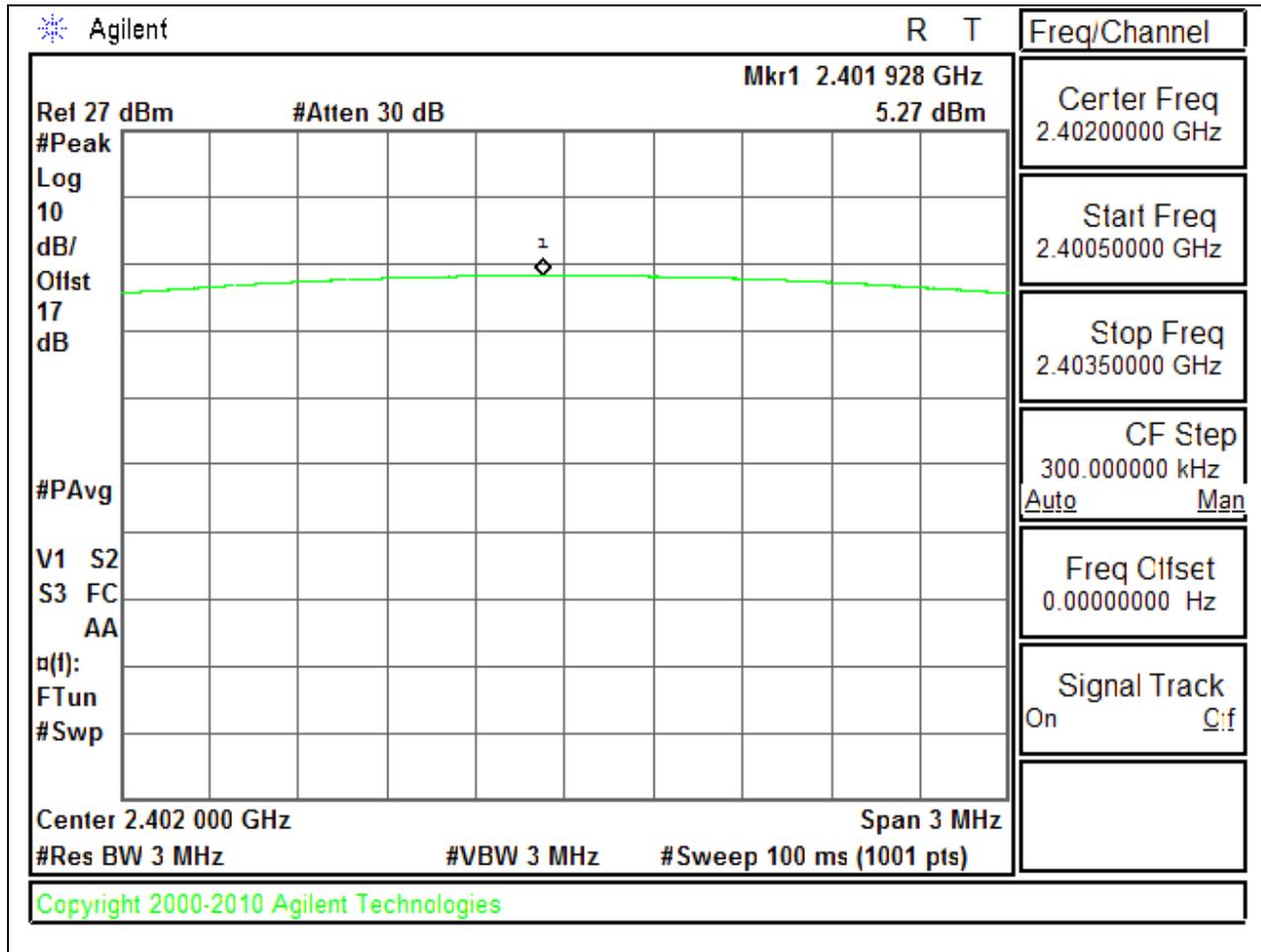


### HIGH CHANNEL



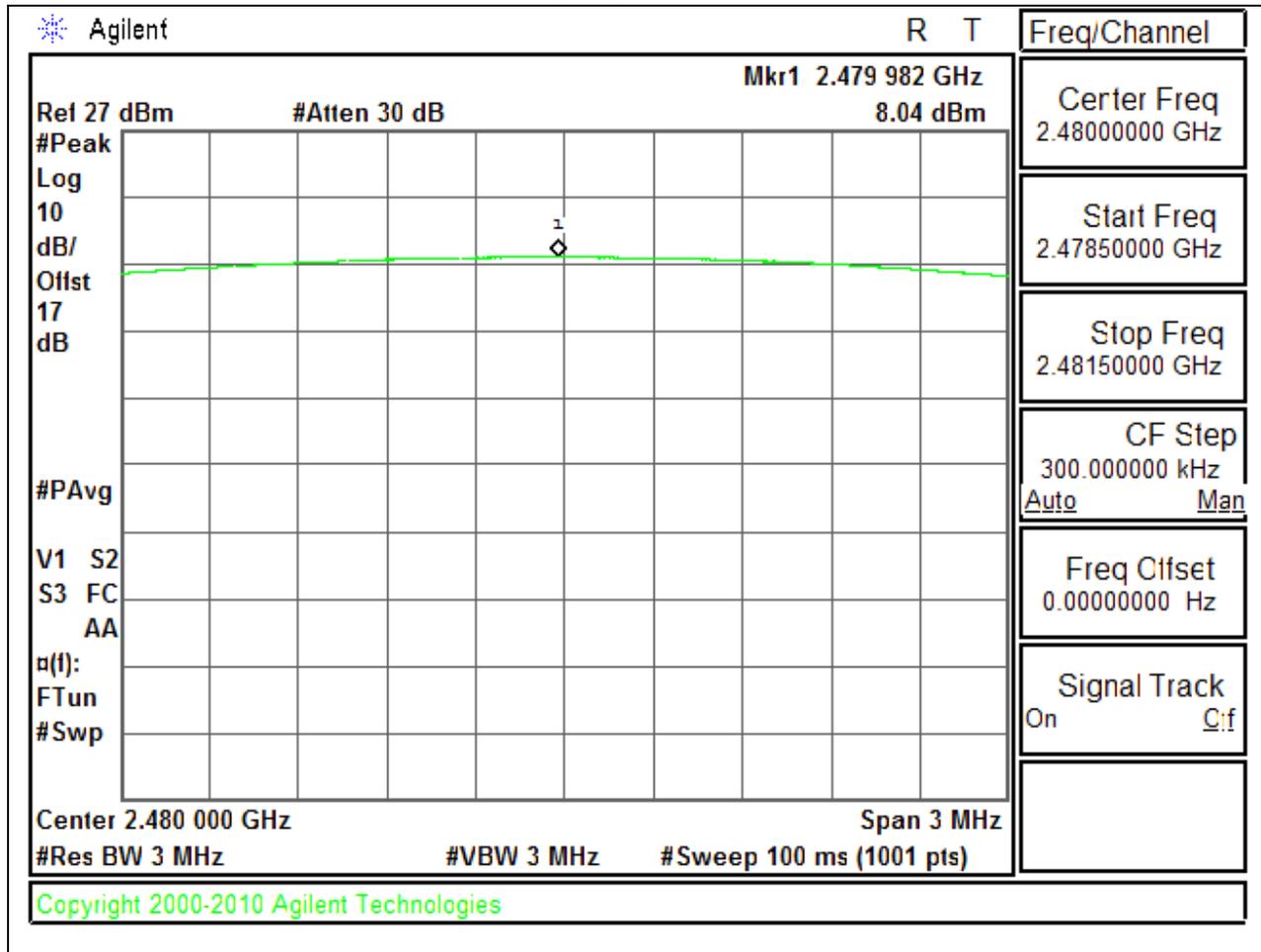
**8PSK OUTPUT POWER**

**LOW CHANNEL**





**HIGH CHANNEL**



## 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	3.3
Middle	2441	6.2
High	2480	4.8
Worst		6.2

#### 8.6.2. DATA RATE PI/4-DQPSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	6.00
Middle	2441	5.90
High	2480	4.30
Worst		6.00

### 8.6.3. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	3.4
Middle	2441	7.4
High	2480	6.5
Worst		7.4

## **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.

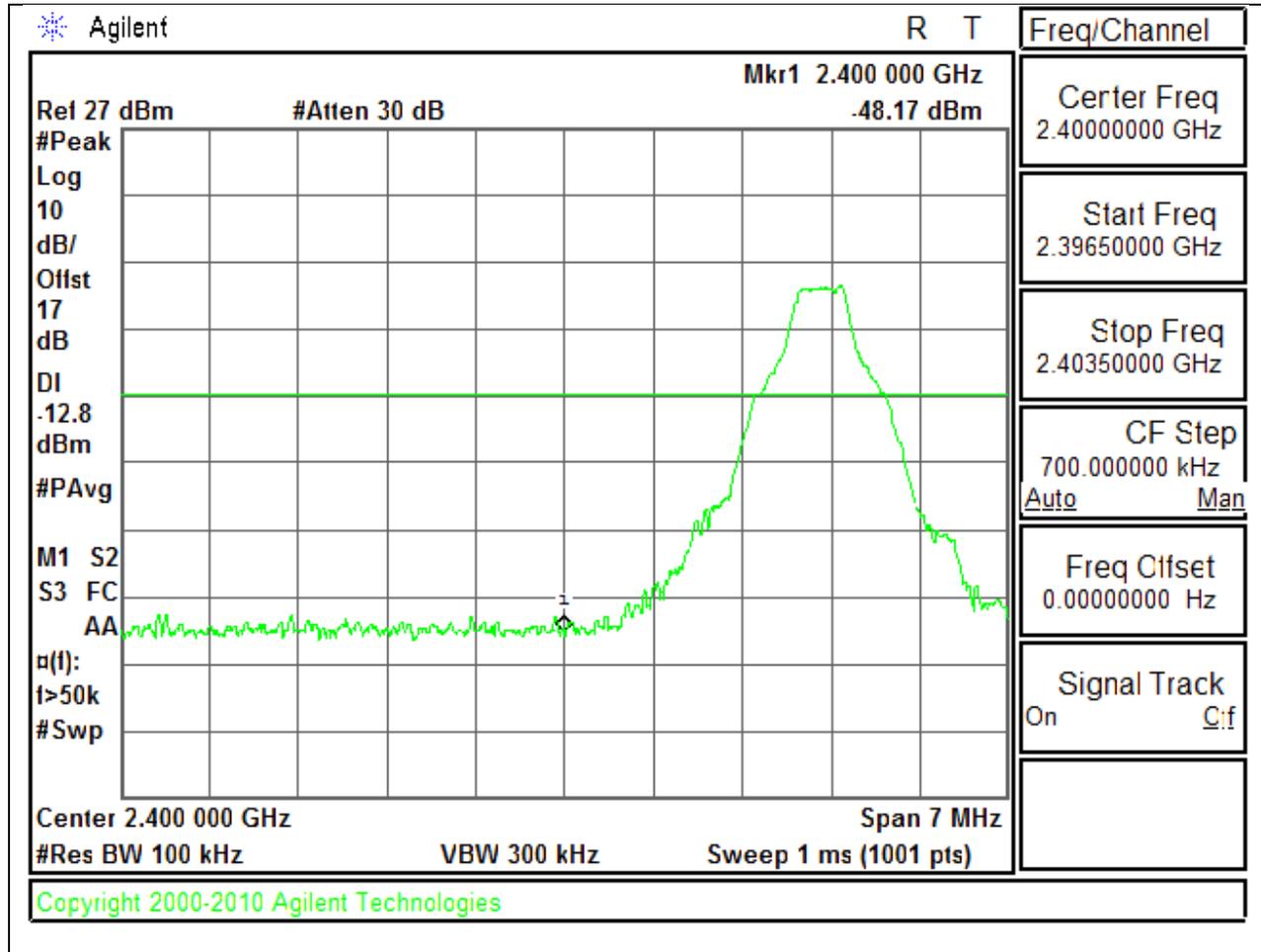
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

### **RESULTS**

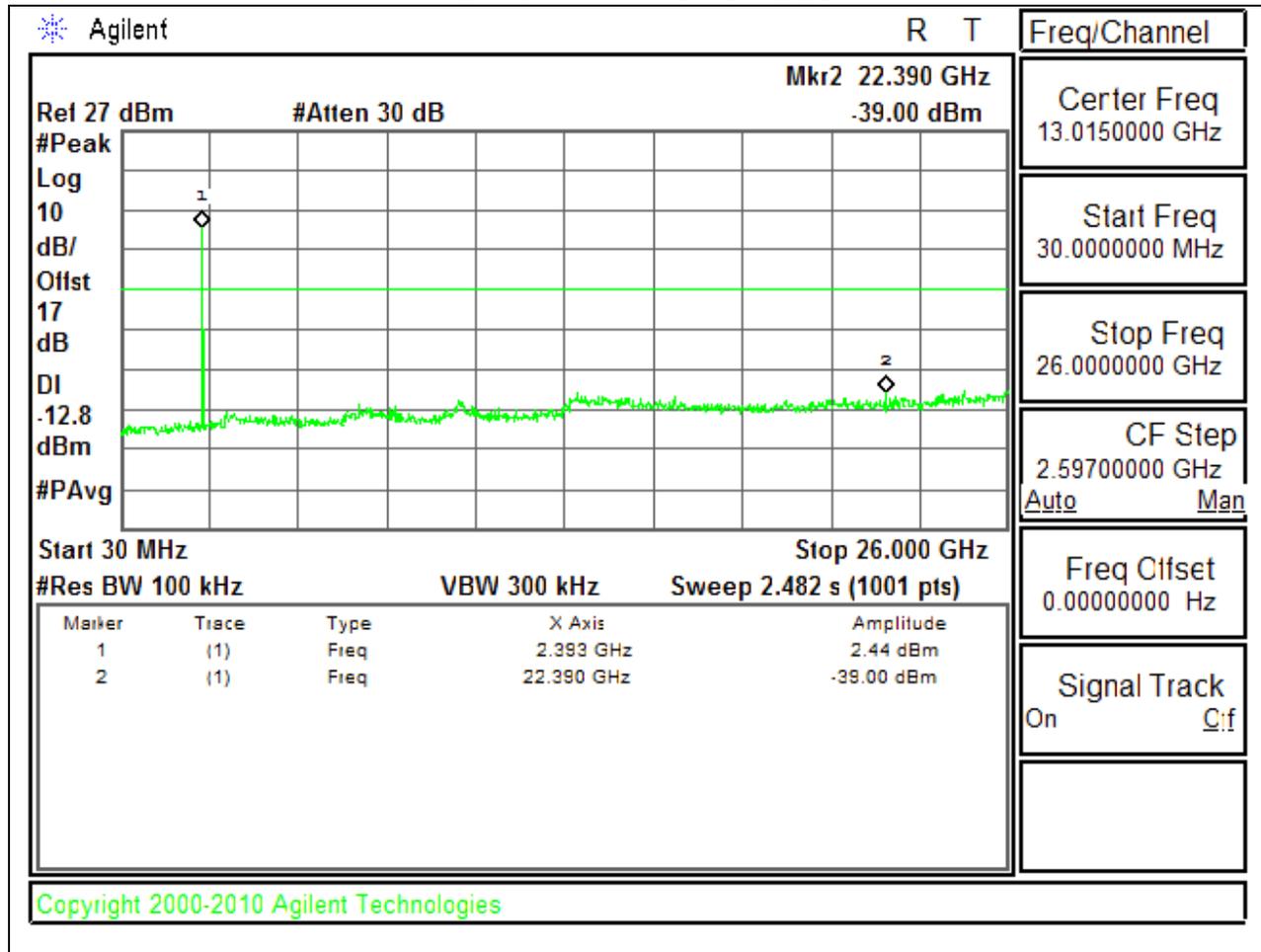
### 8.7.1. BASIC DATA RATE GFSK MODULATION

#### SPURIOUS EMISSIONS, LOW CHANNEL

#### LOW CHANNEL BANDEDGE

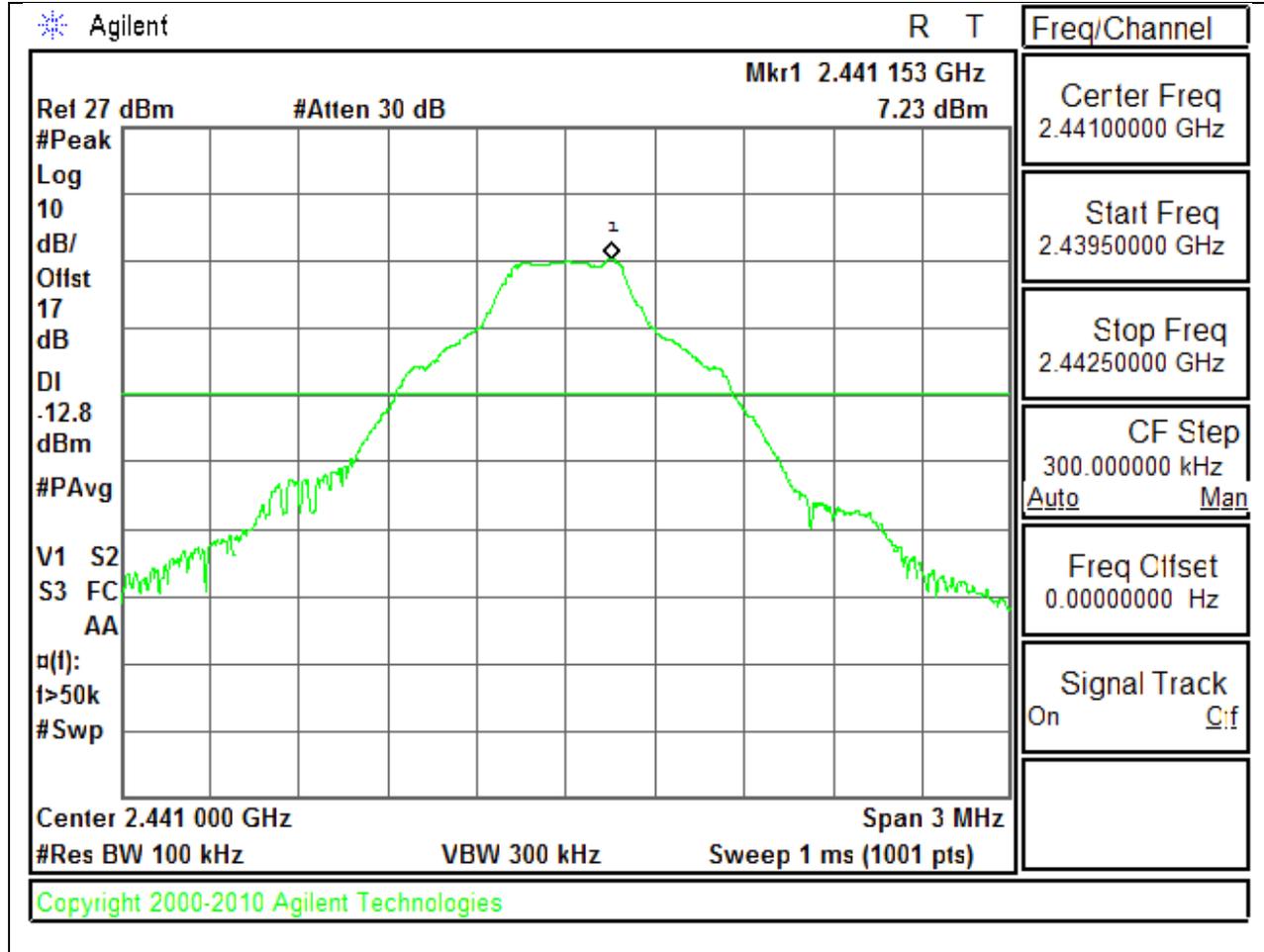


### LOW CHANNEL SPURIOUS

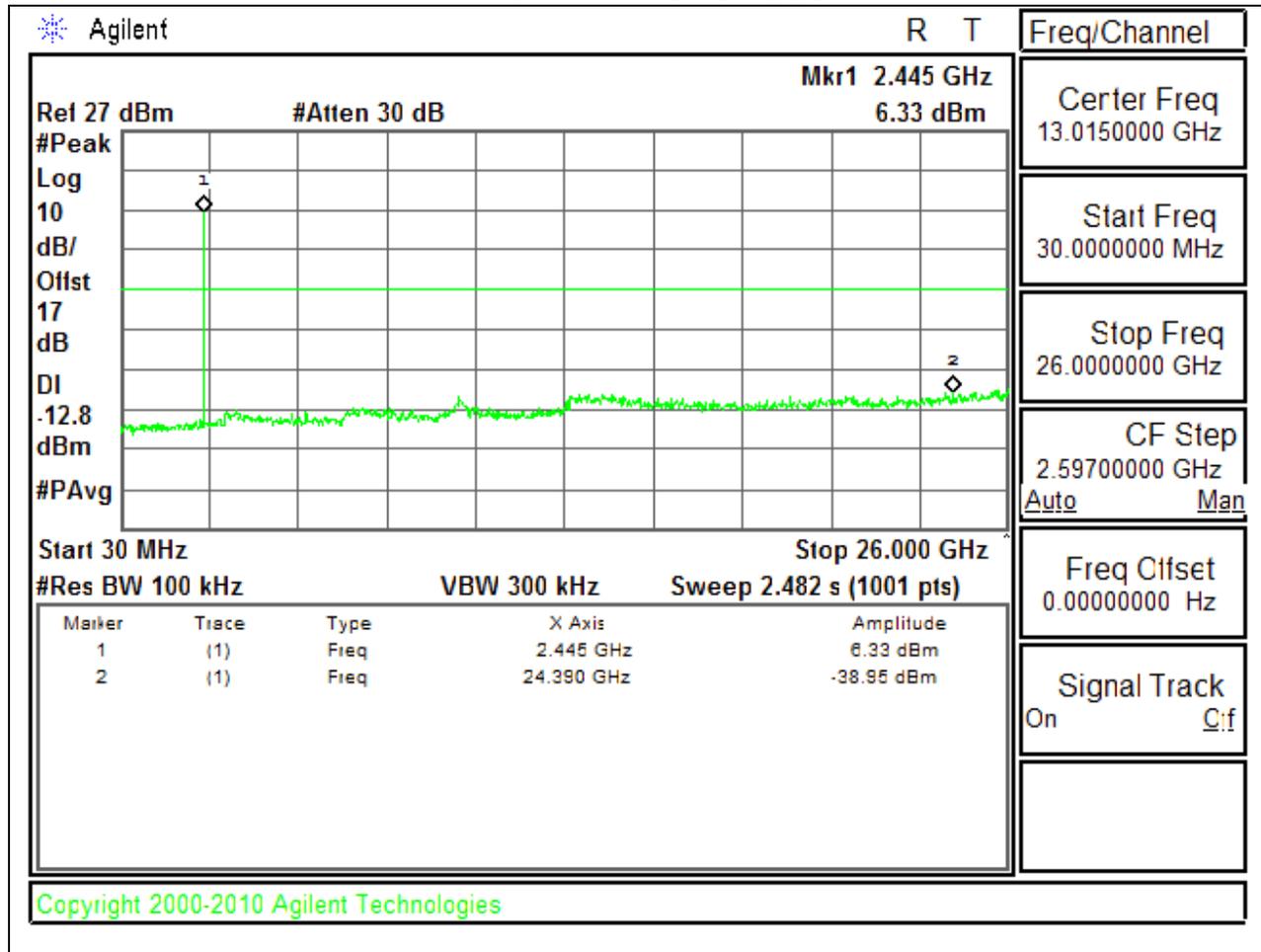


**SPURIOUS EMISSIONS, MID CHANNEL**

**MID CHANNEL BANDEDGE**

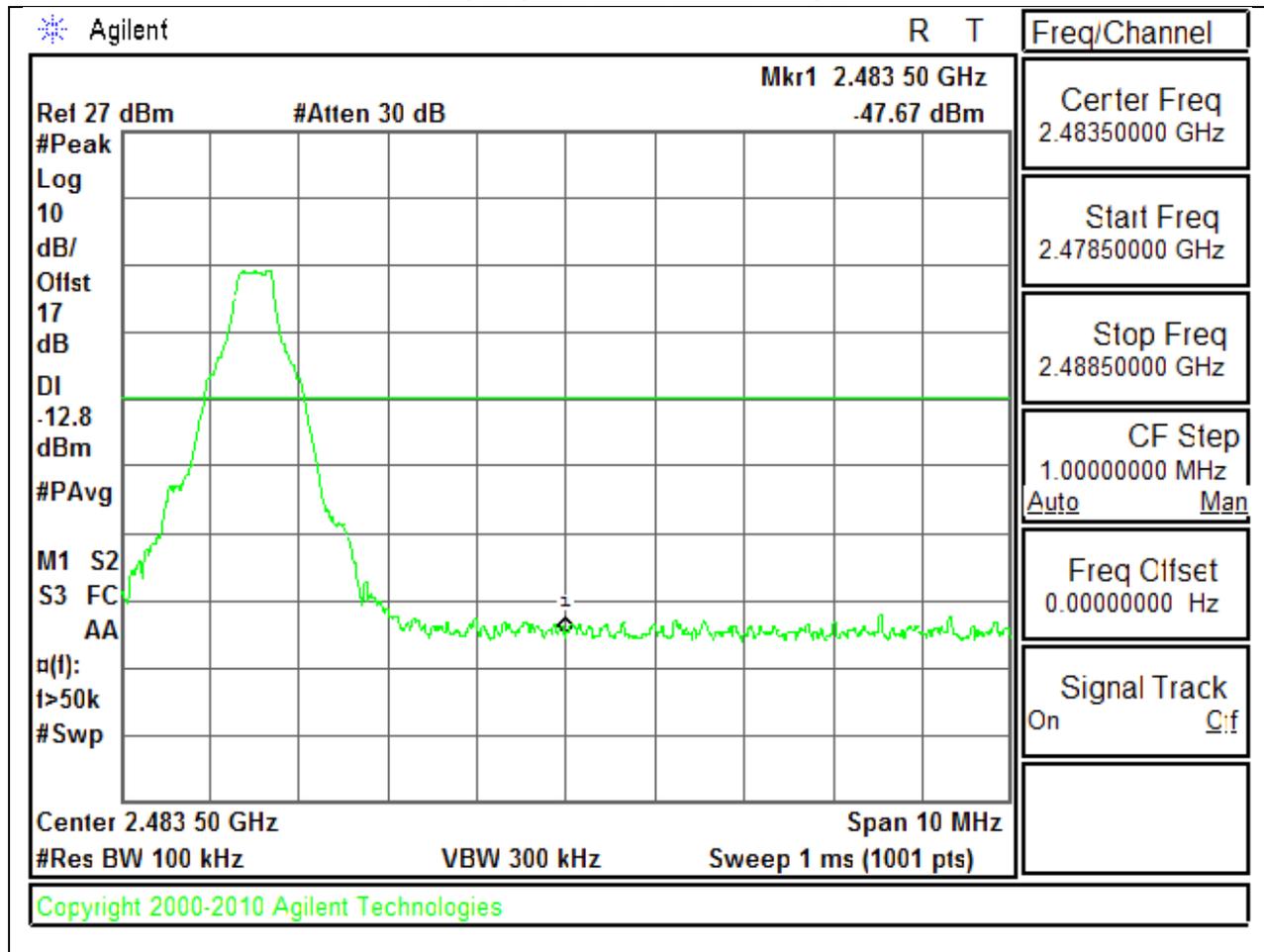


### MID CHANNEL SPURIOUS

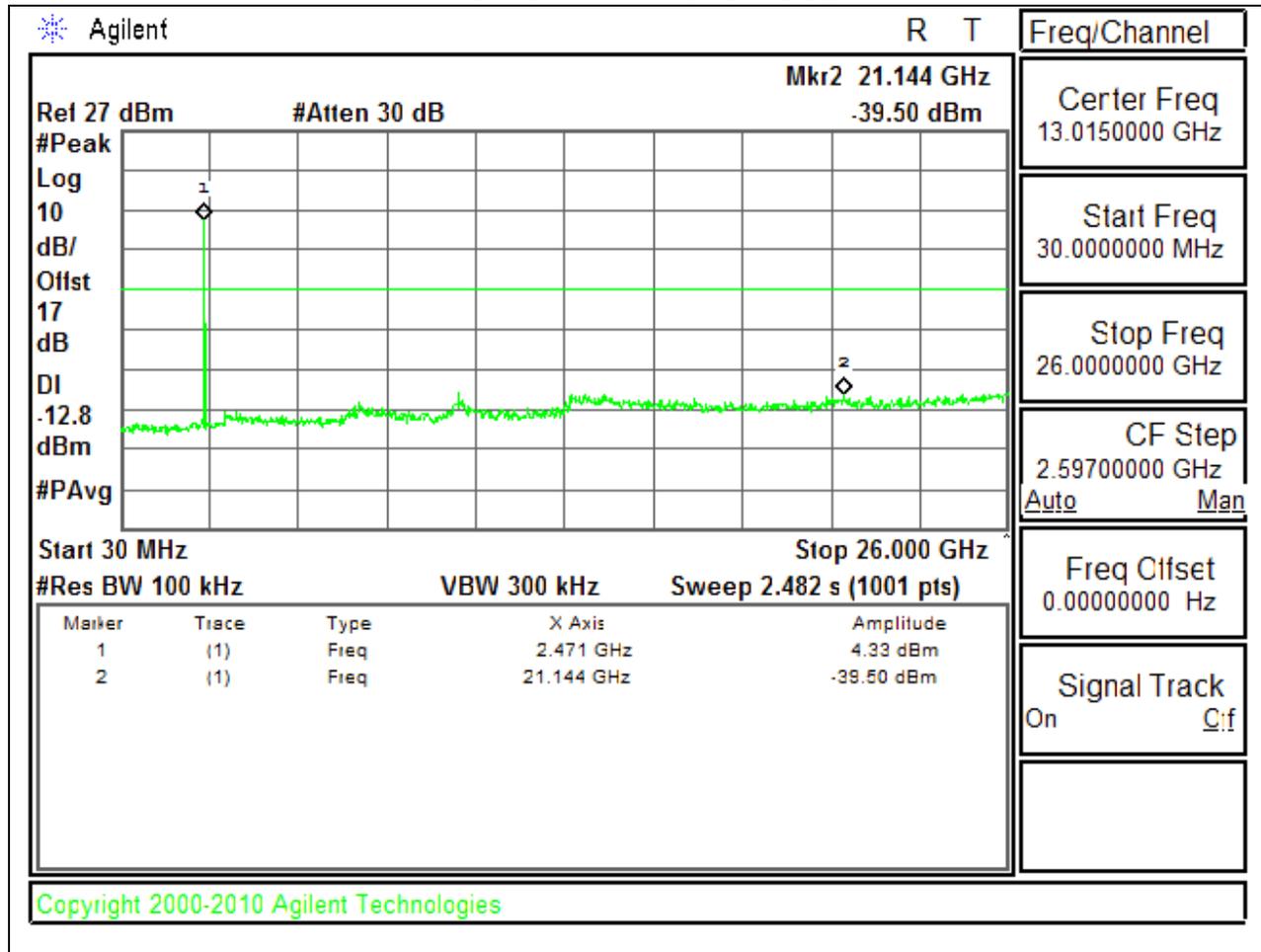


**SPURIOUS EMISSIONS, HIGH CHANNEL**

**HIGH CHANNEL BANDEDGE**

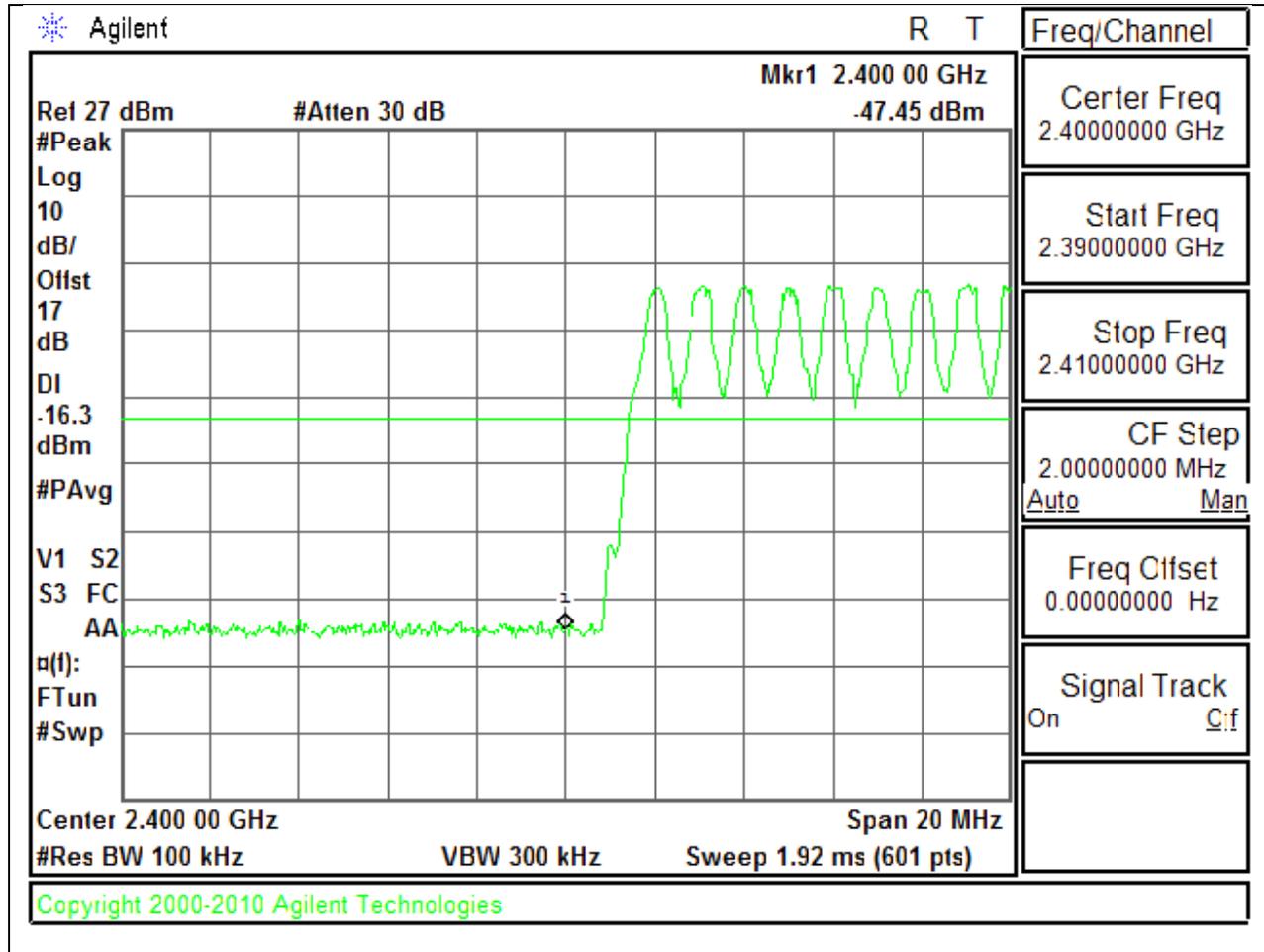


### HIGH CHANNEL SPURIOUS

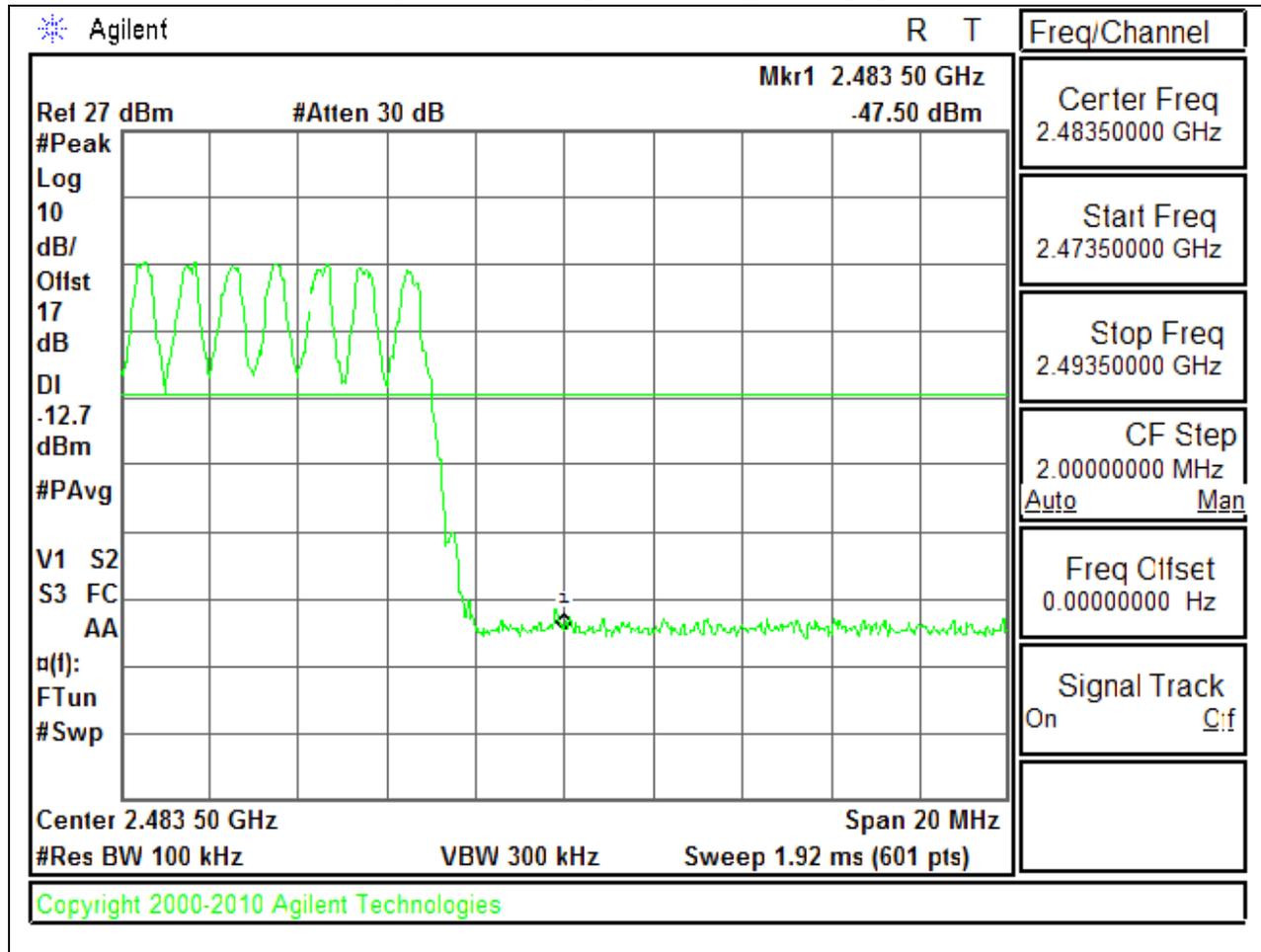


**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**

**LOW BANDEDGE WITH HOPPING ON**



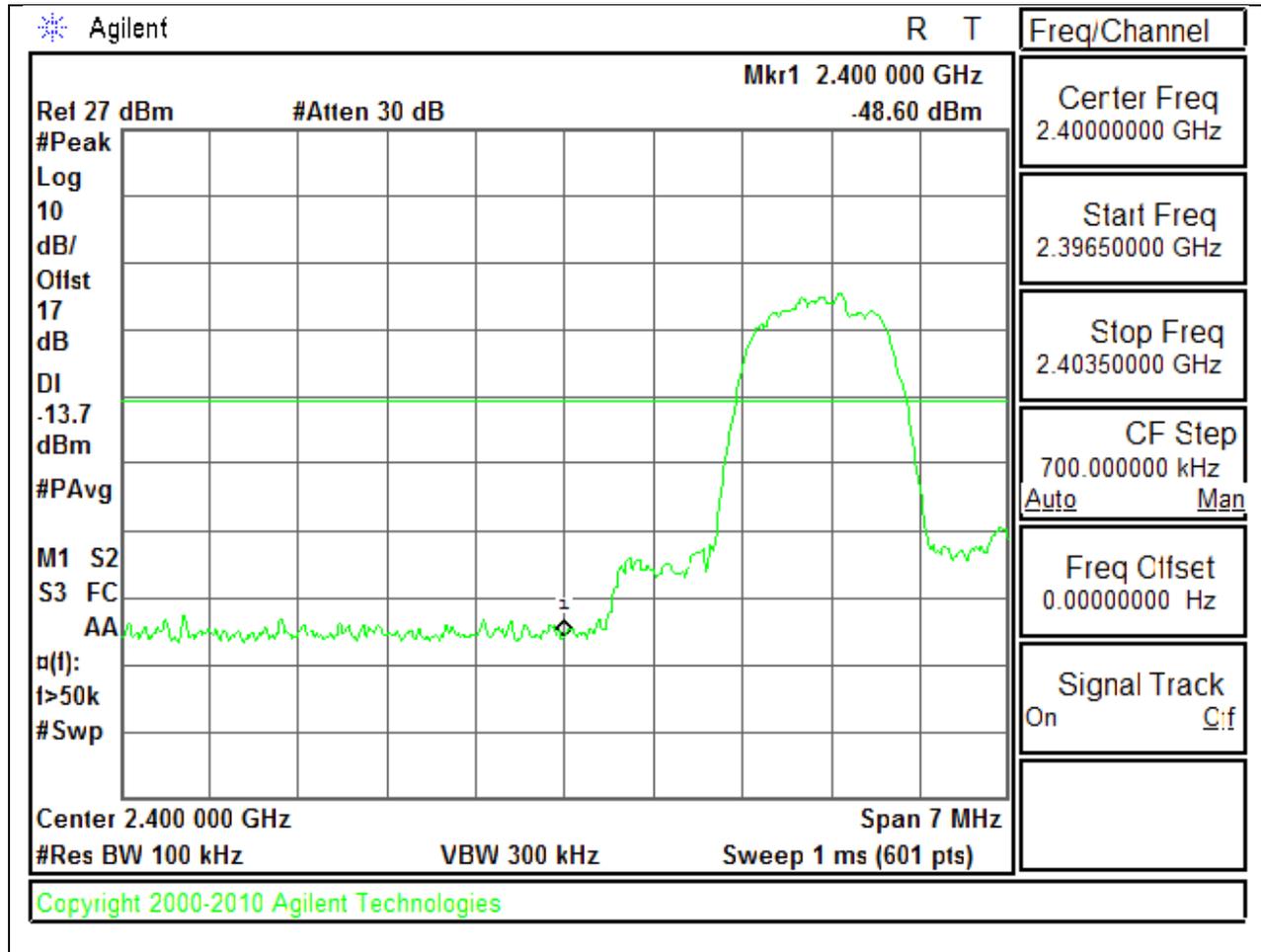
**HIGH BANDEDGE WITH HOPPING ON**



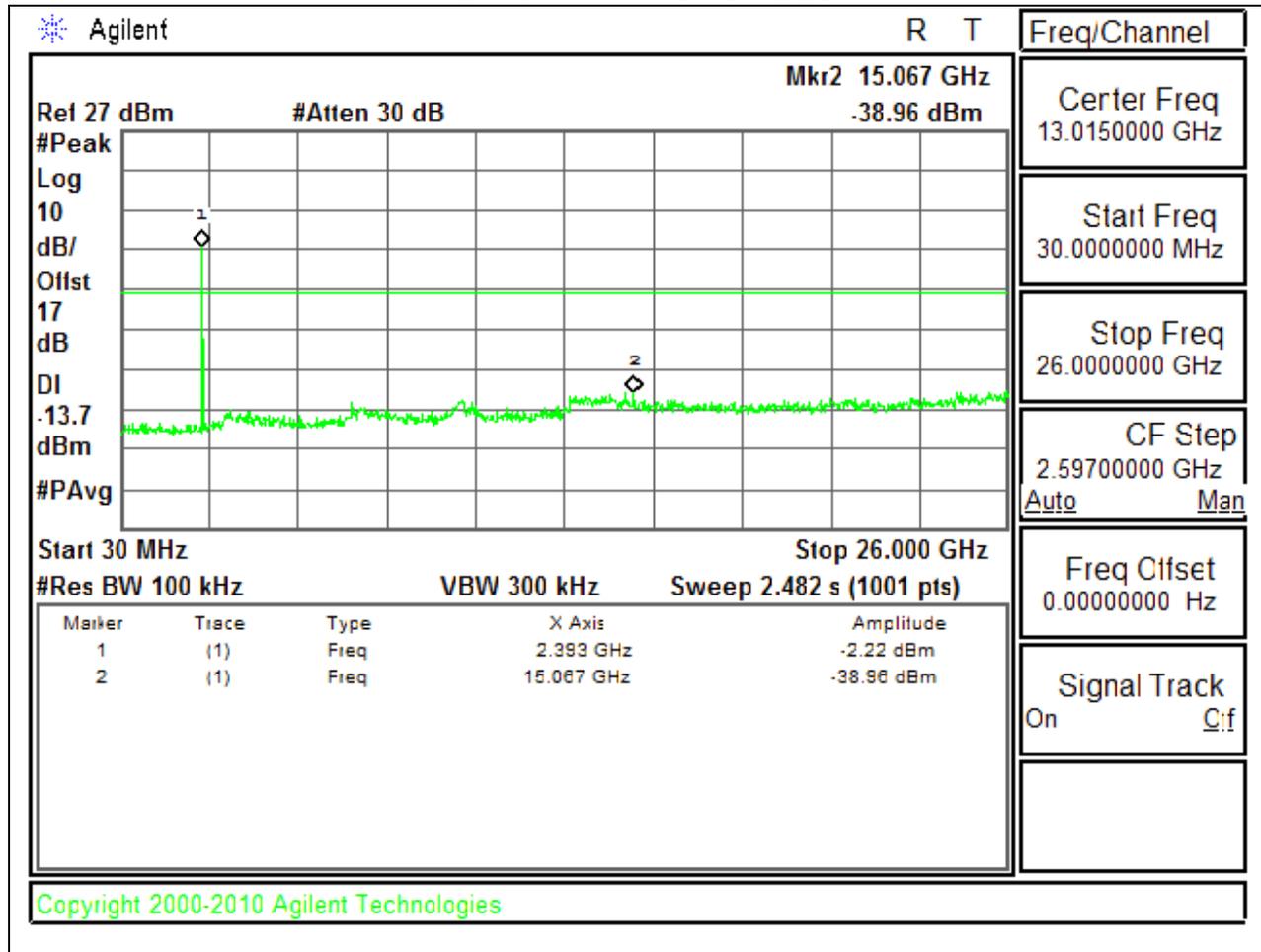
### ENHANCED DATA RATE 8PSK MODULATION

#### SPURIOUS EMISSIONS, LOW CHANNEL

#### LOW CHANNEL BANDEDGE

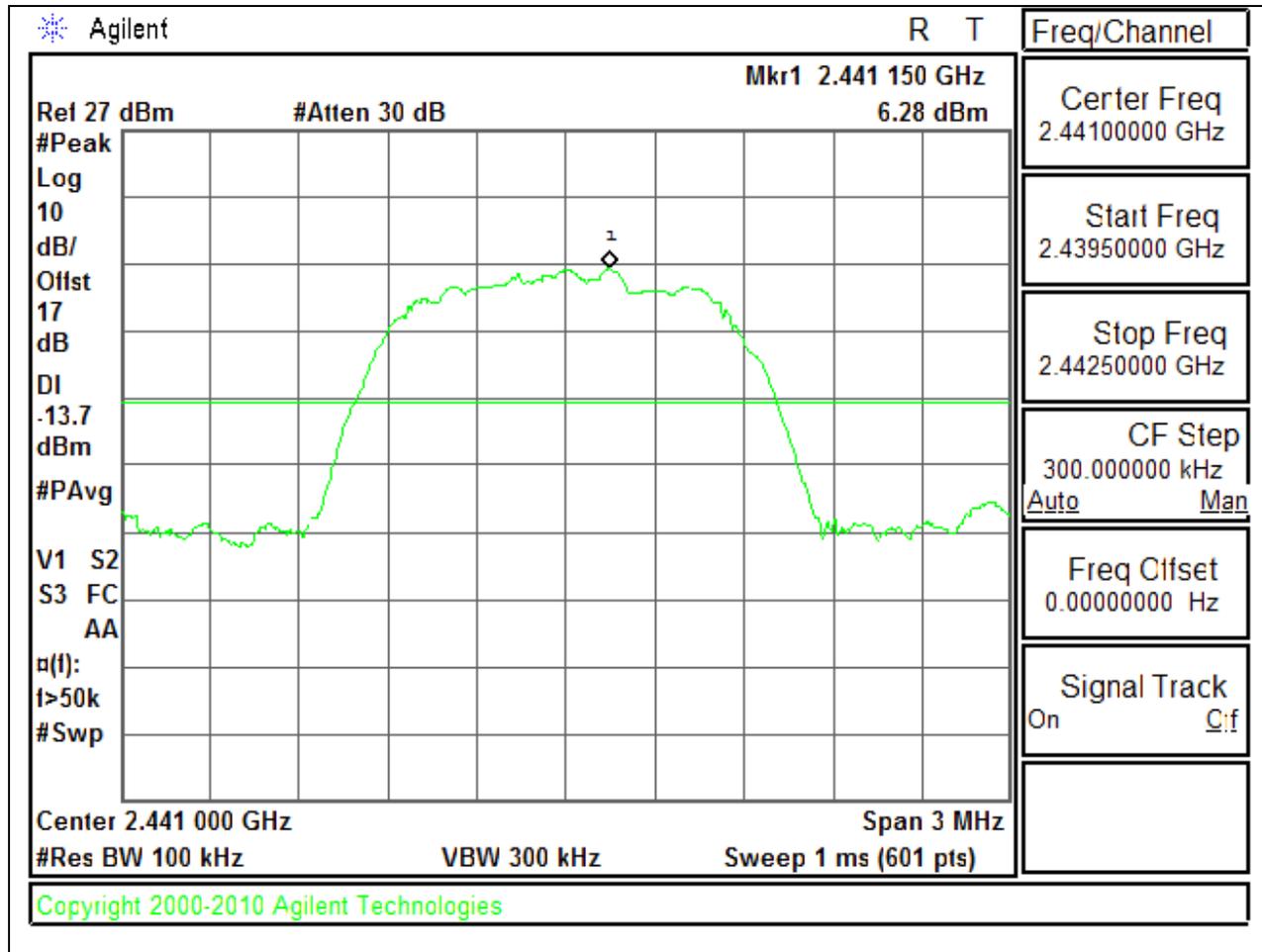


### LOW CHANNEL SPURIOUS

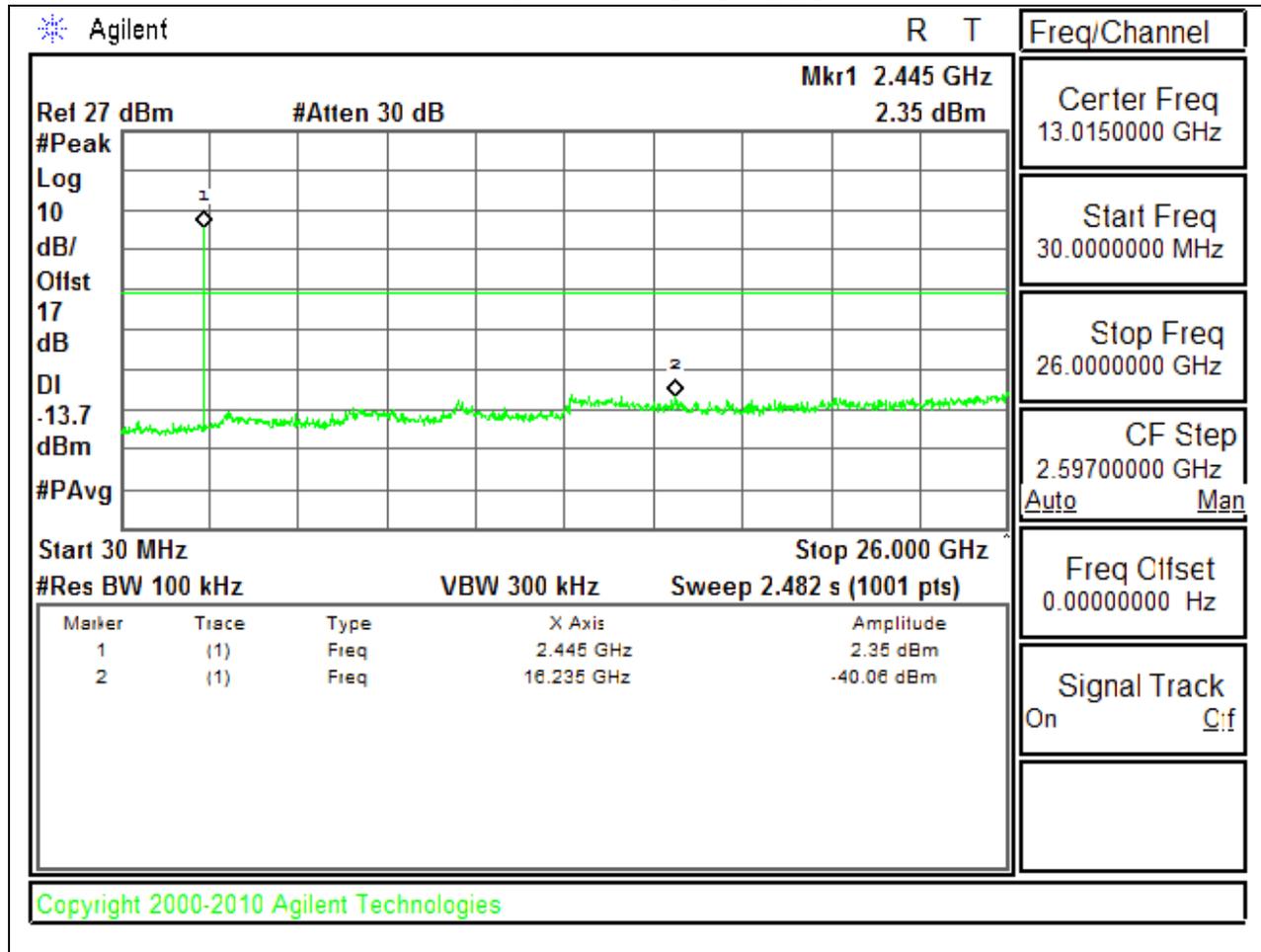


**SPURIOUS EMISSIONS, MID CHANNEL**

**MID CHANNEL BANDEDGE**

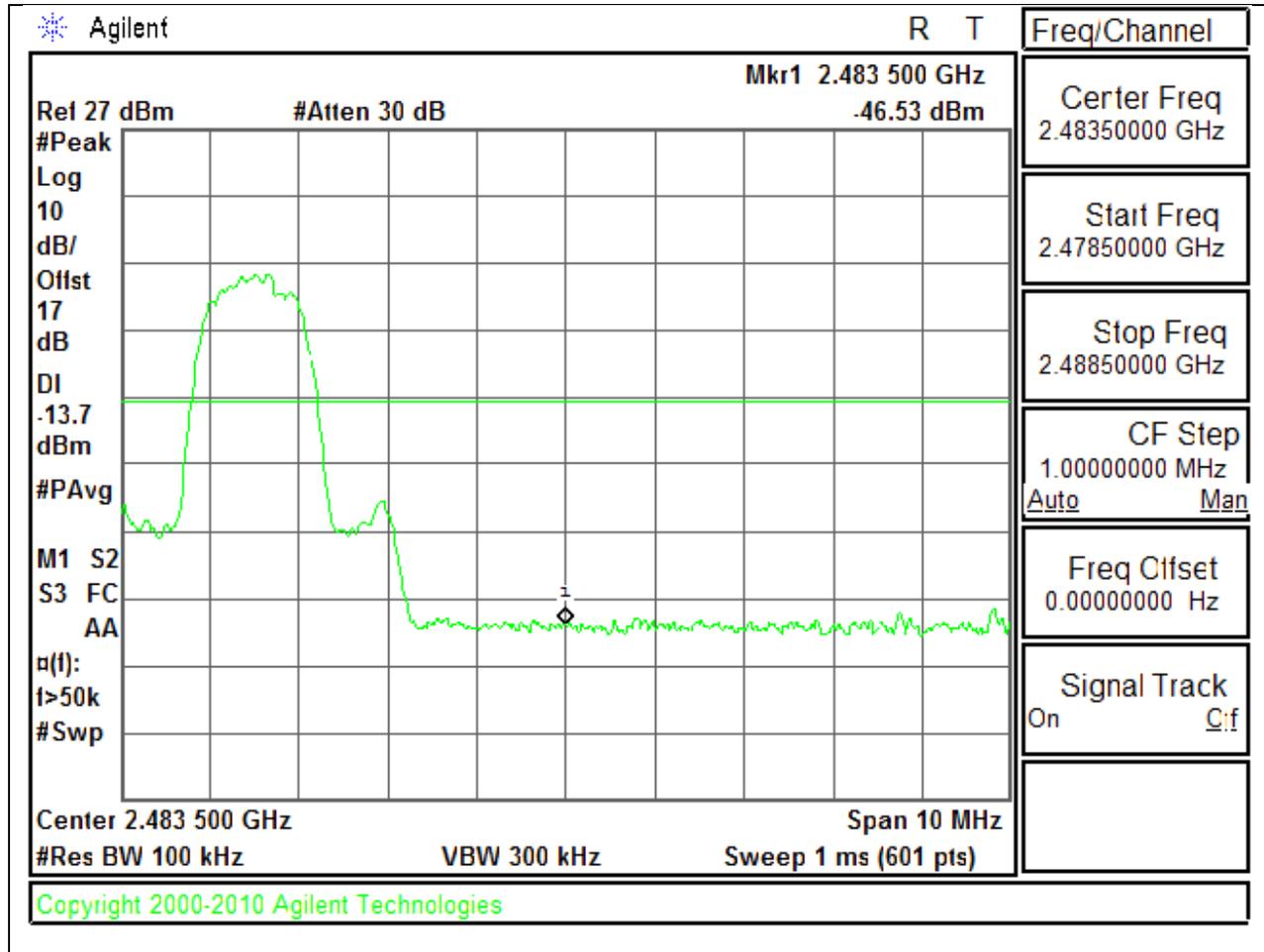


### MID CHANNEL SPURIOUS

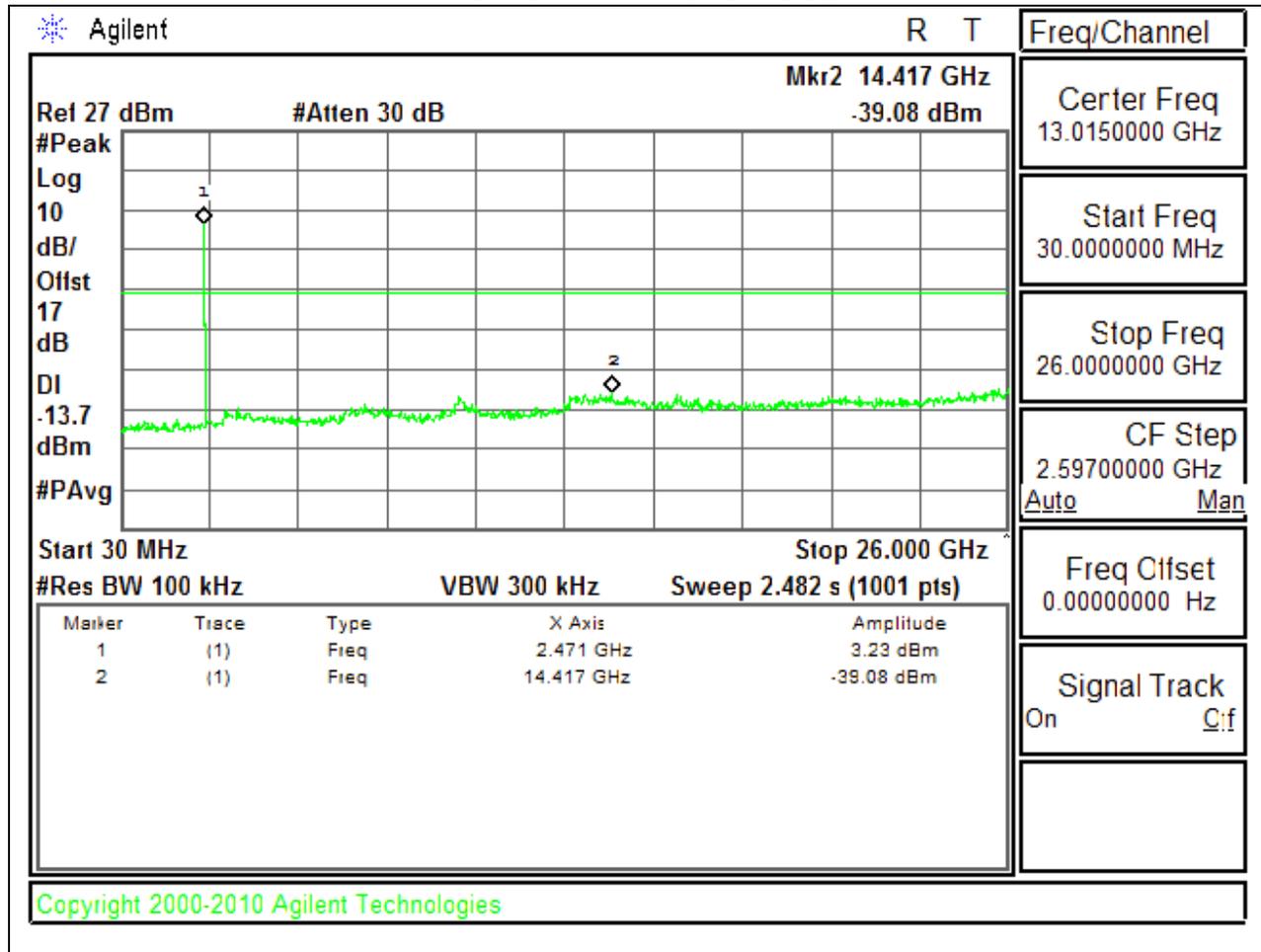


**SPURIOUS EMISSIONS, HIGH CHANNEL**

**HIGH CHANNEL BANDEDGE**

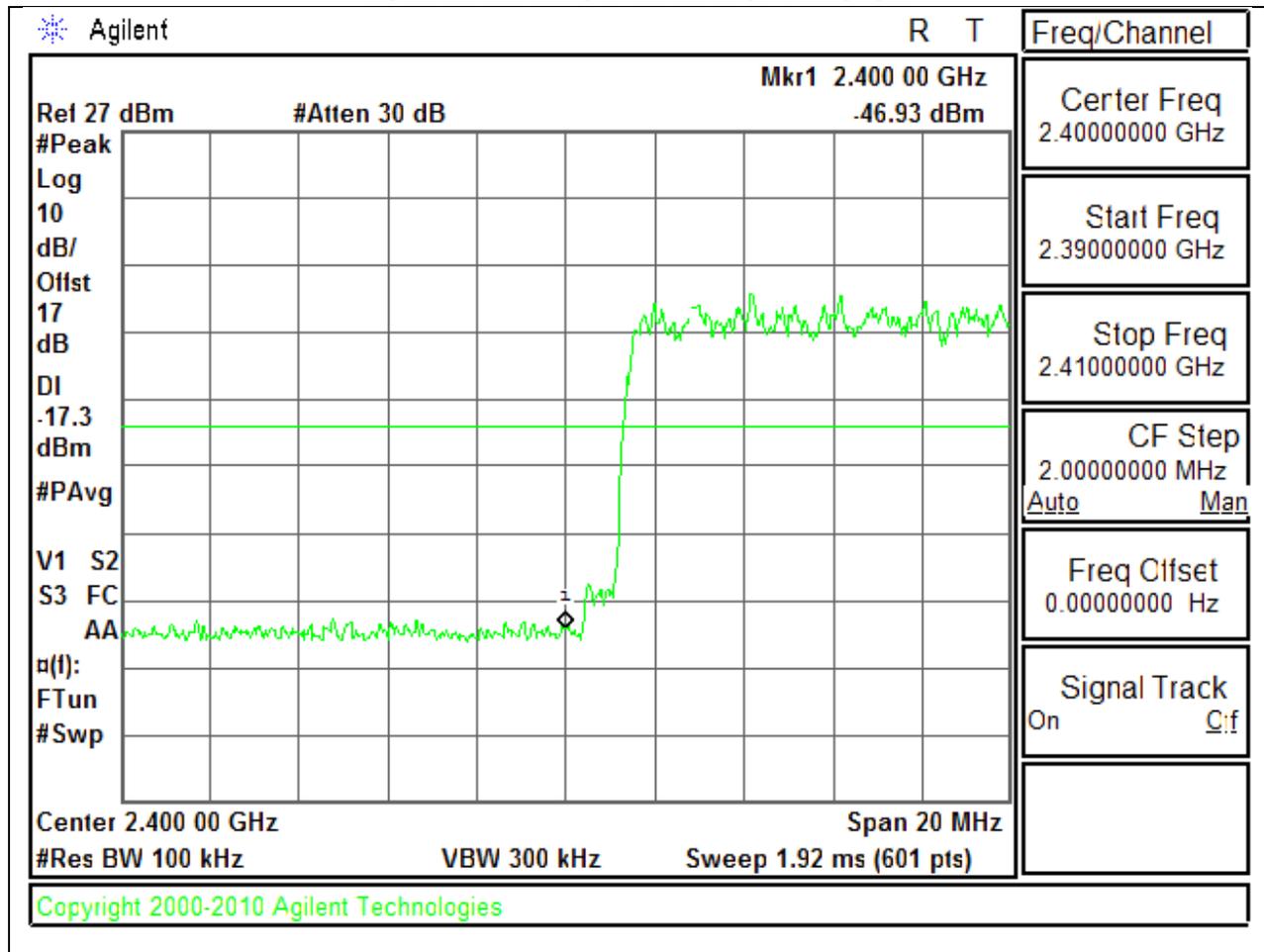


### HIGH CHANNEL SPURIOUS

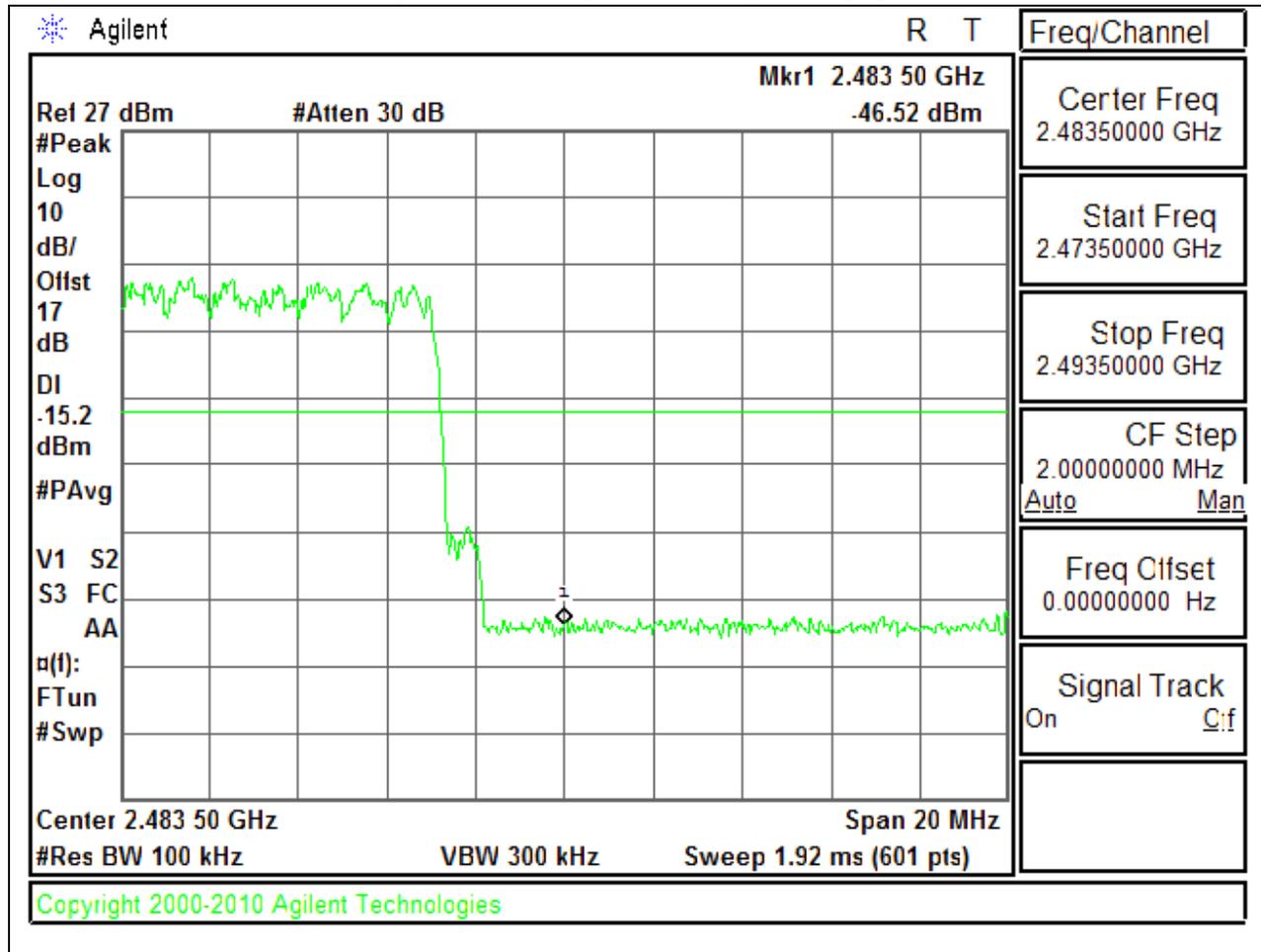


**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**

**LOW BANDEDGE WITH HOPPING ON**



### HIGH BANDEGE 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 ( $\mu\text{V}/\text{m}$ ) 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 band edge 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.

$$\text{GFSK} = 1/T = 1 / 0.0028\text{S} = 350\text{Hz}.$$

The spectrum from 1GHzHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

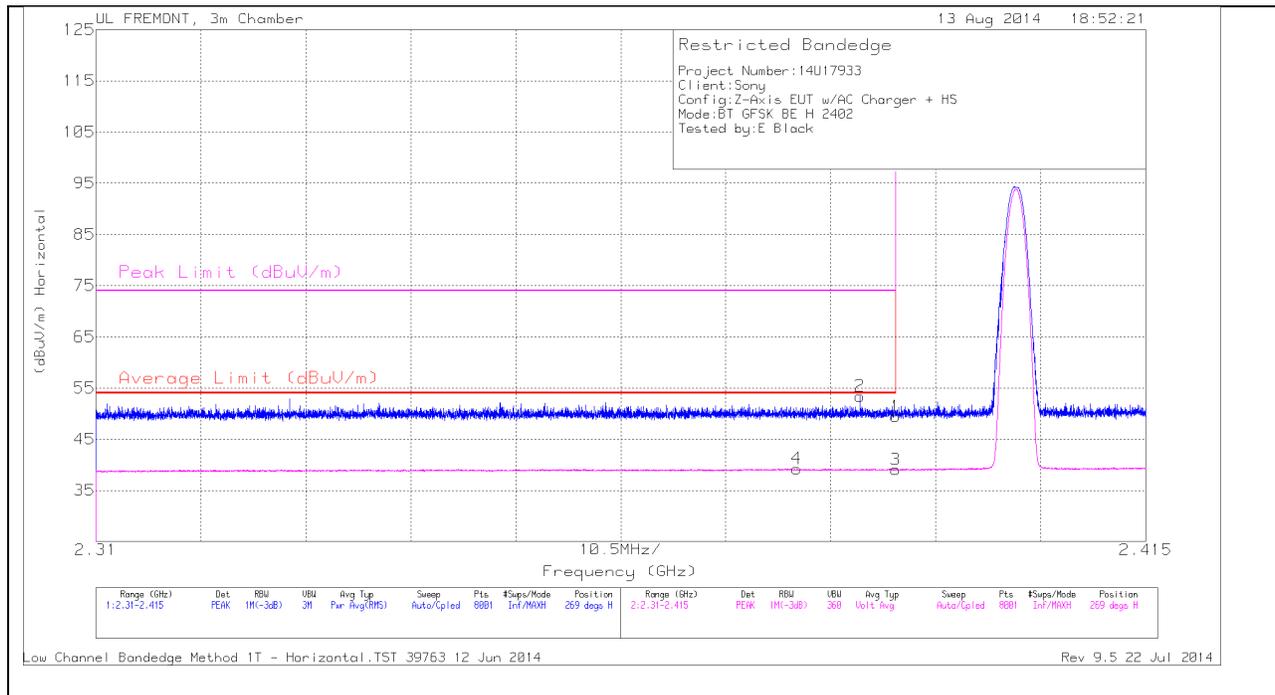
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

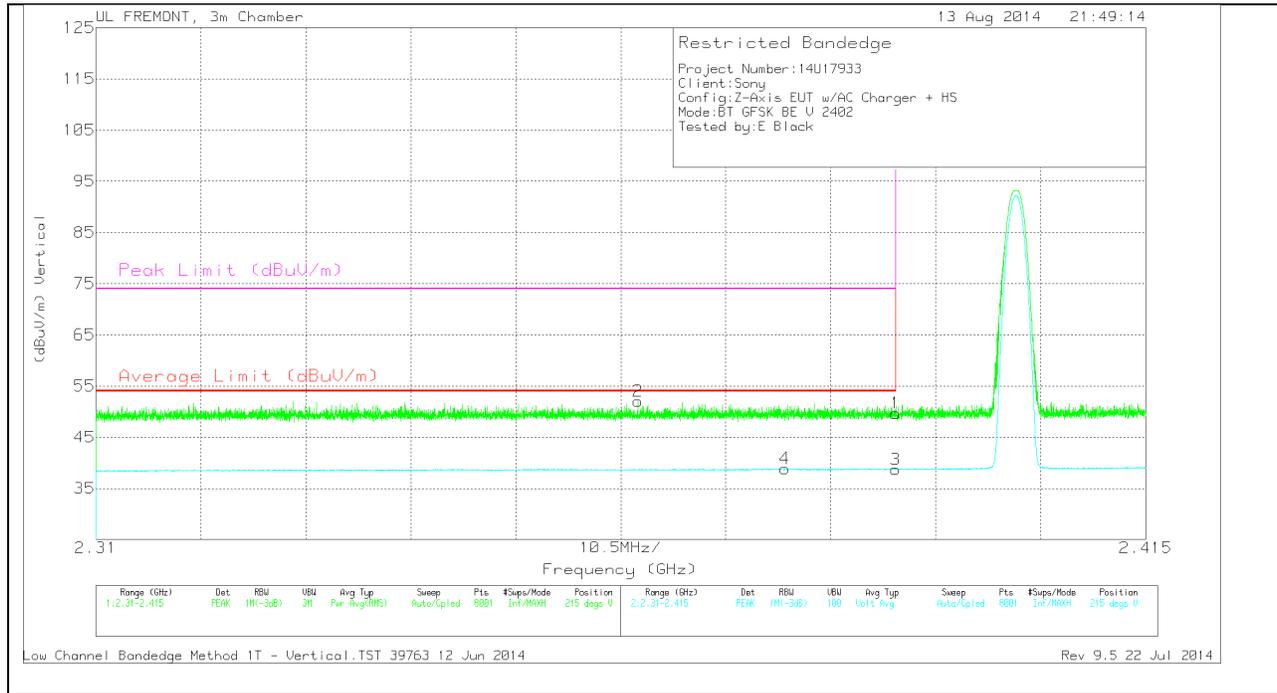
#### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Filt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.38	30.25	VB1T	32.1	-23.1	0	39.25	54	-14.75	-	-	269	108	H
2	2.386	44.43	PK	32.1	-23.1	0	53.43	-	-	74	-20.57	269	108	H
1	2.39	40.44	PK	32.1	-23.1	0	49.44	-	-	74	-24.56	269	108	H
3	2.39	30.06	VB1T	32.1	-23.1	0	39.06	54	-14.94	-	-	269	108	H

**VERTICAL PEAK AND AVERAGE PLOT**

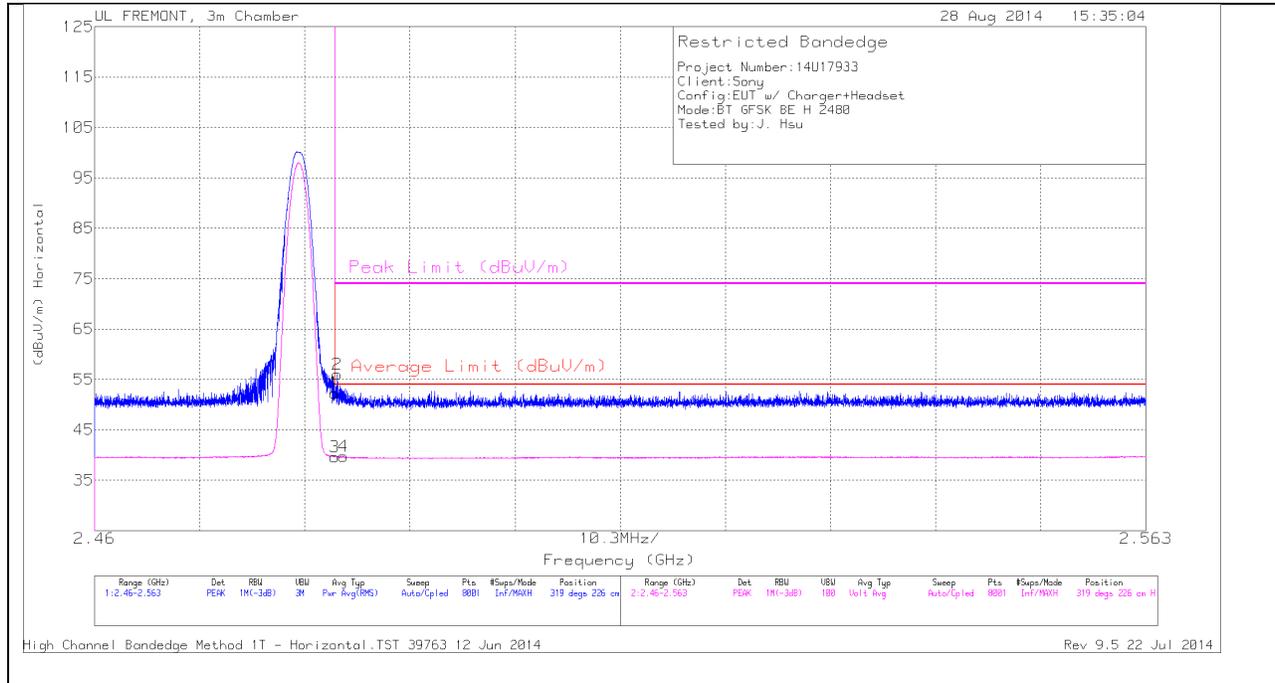


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/ Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.364	43.13	PK	32	-23.1	52.03	-	-	74	-21.97	215	191	V
4	2.379	29.87	VB1T	32.1	-23.1	38.87	54	-15.13	-	-	215	191	V
1	2.39	40.66	PK	32.1	-23.1	49.66	-	-	74	-24.34	215	191	V
3	2.39	29.72	VB1T	32.1	-23.1	38.72	54	-15.28	-	-	215	191	V

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

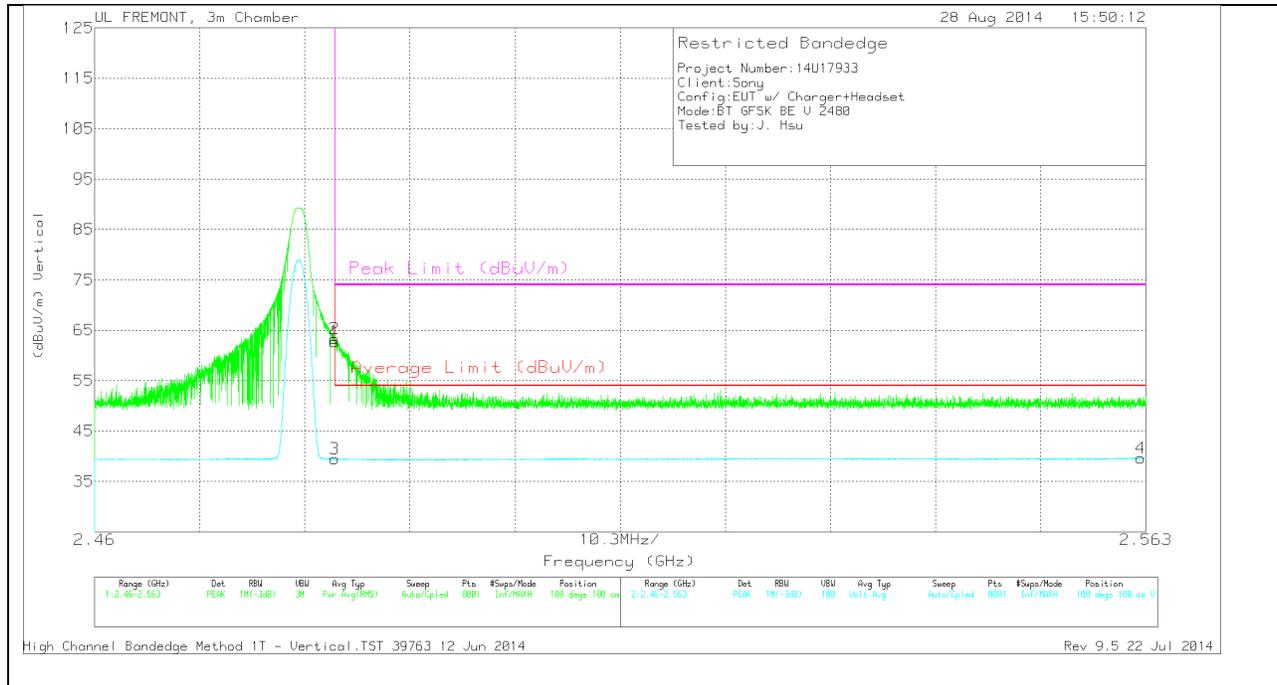
**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/ Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	42.84	PK	32.3	-22.8	52.34	-	-	74	-21.66	319	226	H
2	2.484	46.5	PK	32.3	-22.8	56	-	-	74	-18	319	226	H
3	2.484	30.15	VB1T	32.3	-22.8	39.65	54	-14.35	-	-	319	226	H
4	2.484	30.24	VB1T	32.3	-22.8	39.74	54	-14.26	-	-	319	226	H

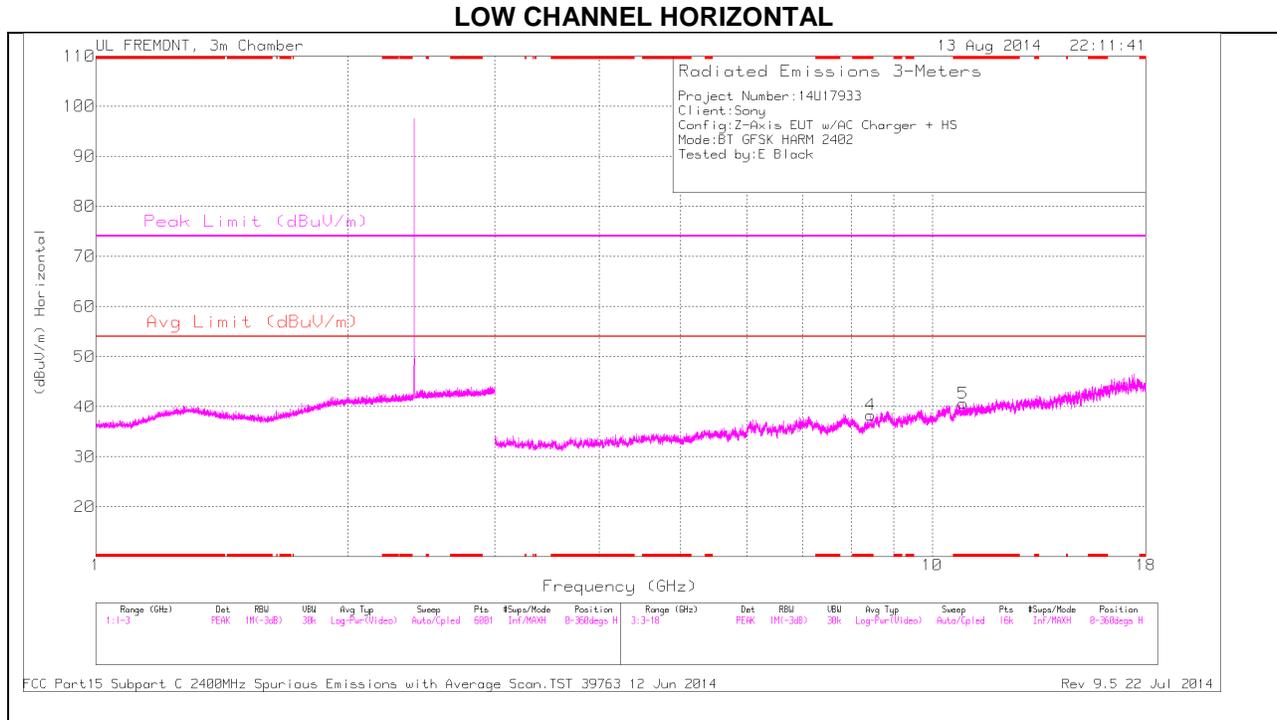
**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

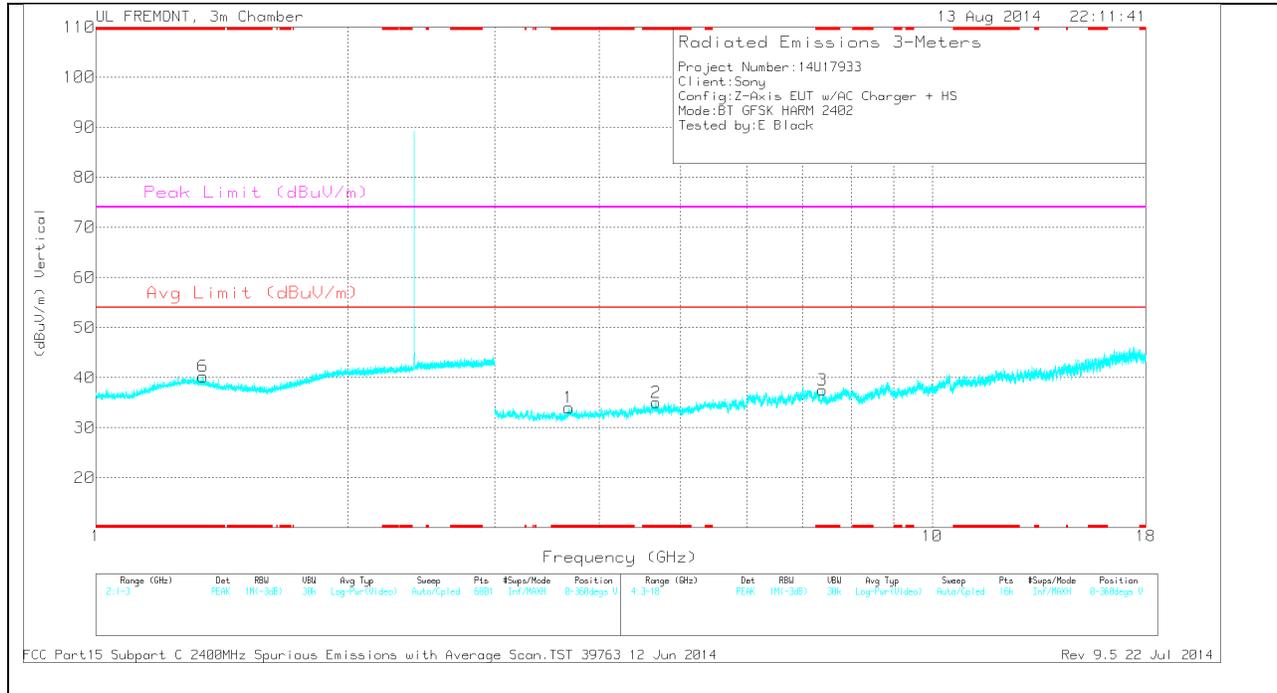
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	53.26	PK	32.3	-22.8	62.76	-	-	74	-11.24	108	100	V
2	2.484	53.83	PK	32.3	-22.8	63.33	-	-	74	-10.67	108	100	V
3	2.484	30.01	VB1T	32.3	-22.8	39.51	54	-14.49	-	-	108	100	V
4	2.563	29.96	VB1T	32.4	-22.7	39.66	54	-14.34	-	-	108	100	V

### HARMONICS AND SPURIOUS EMISSIONS



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 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**

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 1.344	34.33	PK	29.7	-23.8	0	40.23	-	-	74	-33.77	0-360	100	V
5	* 10.892	28.54	PK	37.9	-25.8	0	40.64	-	-	74	-33.36	0-360	100	H
1	* 3.678	31.39	PK	33.2	-30.6	0	33.99	-	-	74	-40.01	0-360	100	V
2	* 4.673	31.61	PK	34.1	-30.7	0	35.01	-	-	74	-38.99	0-360	200	V
3	* 7.395	30.13	PK	35.7	-28.3	0	37.53	-	-	74	-36.47	0-360	200	V
4	* 8.441	29.74	PK	35.8	-27.2	0	38.34	-	-	74	-35.66	0-360	100	H

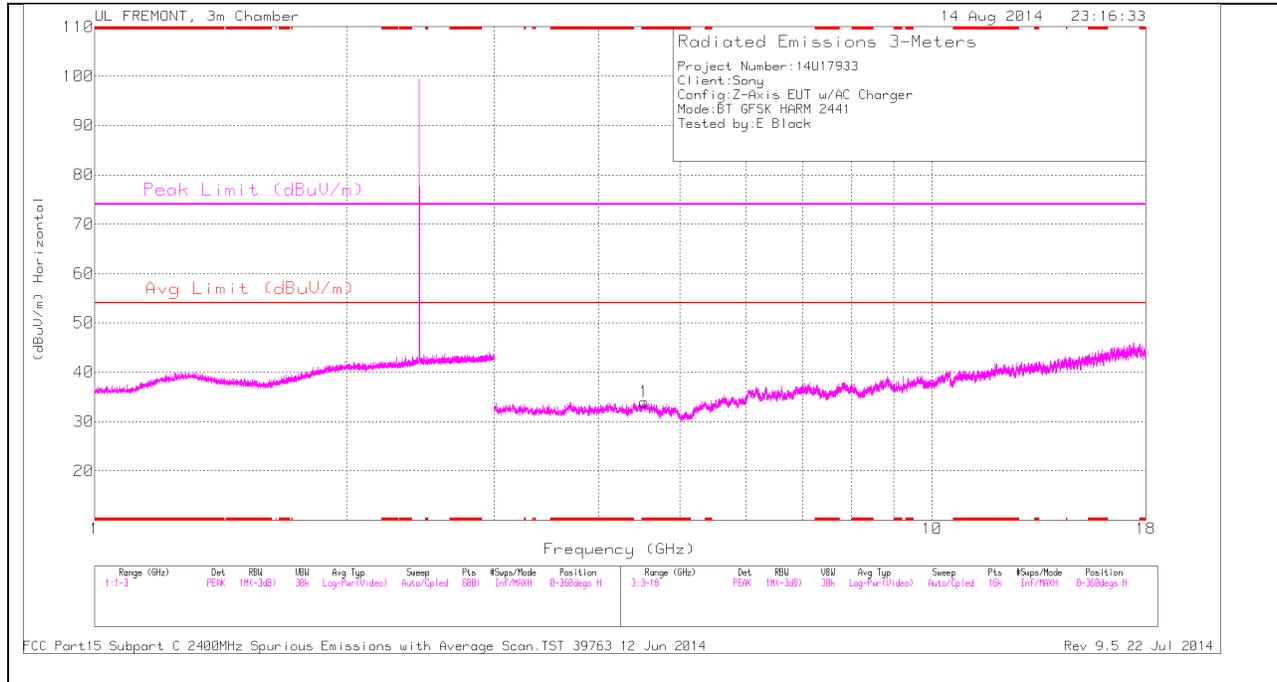
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/ Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.675	41.14	PK3	34.1	-30.7	0	44.54	-	-	74	-29.46	283	116	V
* 4.674	27.77	VB1T	34.1	-30.7	0	31.17	54	-22.83	-	-	283	116	V

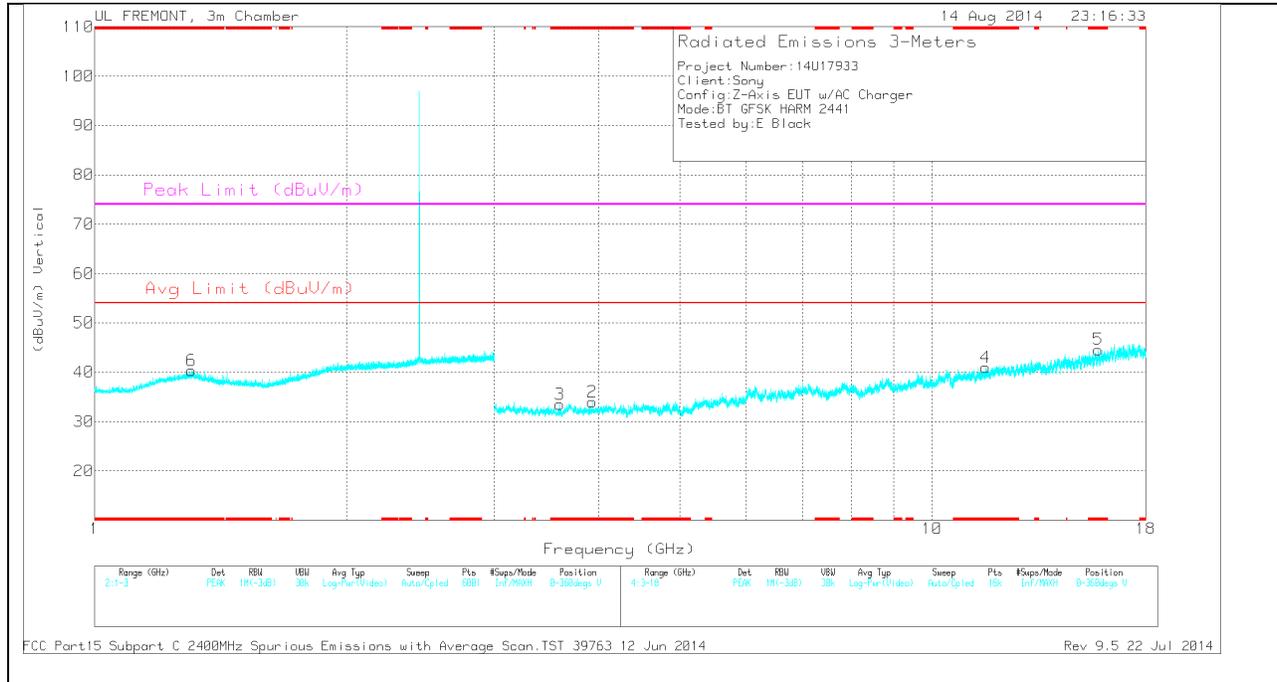
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**MID CHANNEL HORIZONTAL**



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

**MID CHANNEL 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**

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 1.306	33.97	PK	30.2	-23.8	0	40.37	-	-	74	-33.63	0-360	200	V
4	* 11.59	28.78	PK	38.4	-26.2	0	40.98	-	-	74	-33.02	0-360	100	V
5	* 15.795	30.7	PK	40.4	-26.5	0	44.6	-	-	74	-29.4	0-360	200	V
3	* 3.595	32.18	PK	33	-31.7	0	33.48	-	-	74	-40.52	0-360	100	V
2	* 3.928	31.86	PK	33.3	-31.2	0	33.96	-	-	74	-40.04	0-360	100	V
1	* 4.53	31.51	PK	34	-31.5	0	34.01	-	-	74	-39.99	0-360	200	H

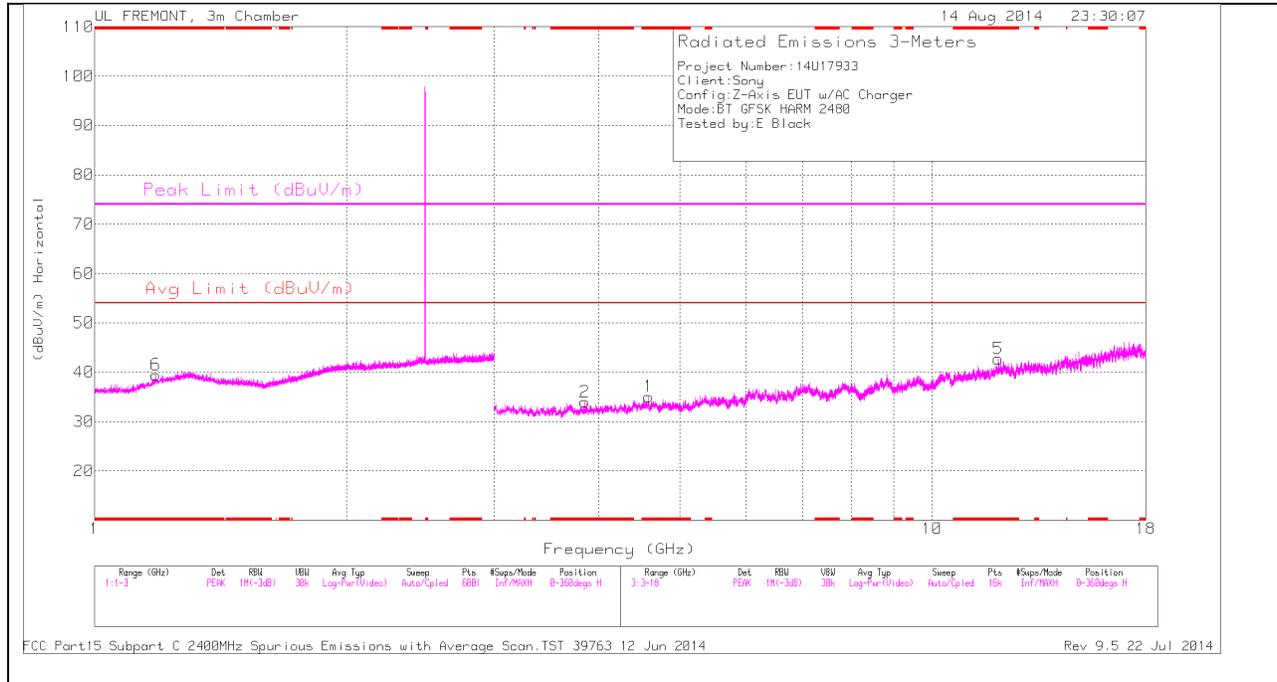
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/ Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.929	41.39	PK3	33.3	-31.2	0	43.49	-	-	74	-30.51	296	346	V
* 3.928	28.04	VB1T	33.3	-31.2	0	30.14	54	-23.86	-	-	296	346	V

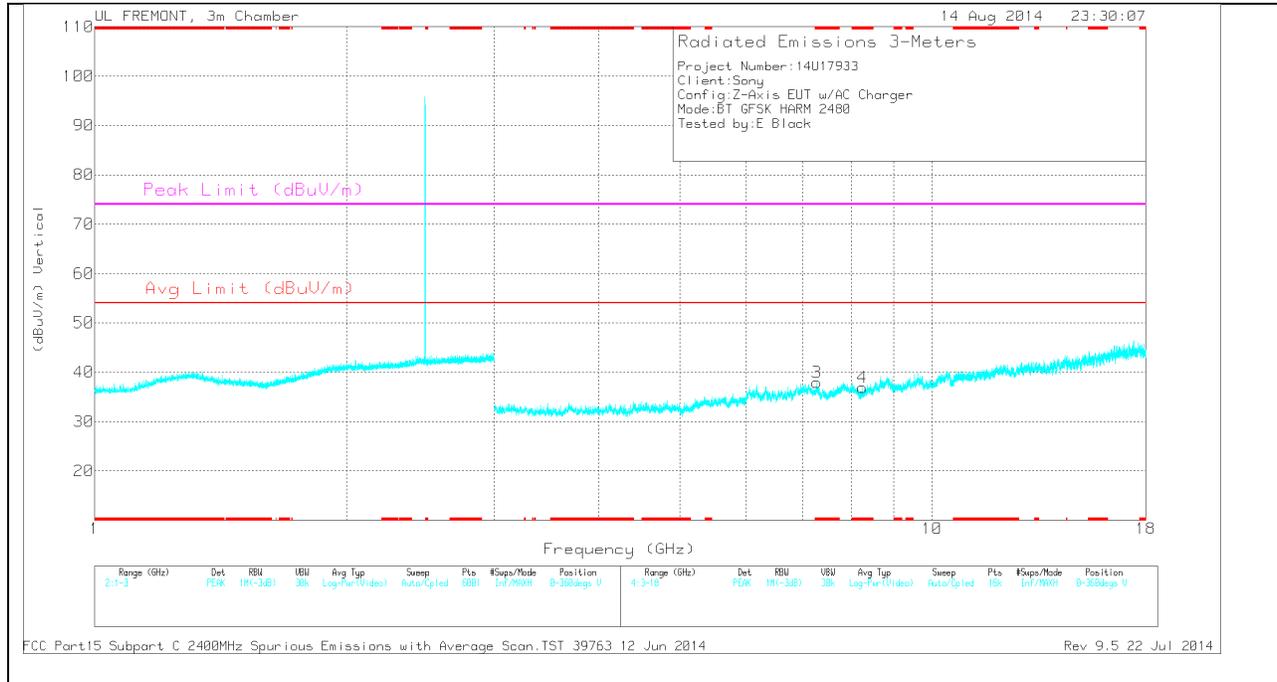
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**HIGH CHANNEL HORIZONTAL**



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

**HIGH CHANNEL 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**

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 1.182	34.42	PK	28.9	-23.8	0	39.52	-	-	74	-34.48	0-360	100	H
1	* 4.587	31.98	PK	34	-30.9	0	35.08	-	-	74	-38.92	0-360	100	H
2	* 3.847	32.05	PK	33.2	-31.2	0	34.05	-	-	74	-39.95	0-360	100	H
5	* 11.994	29.5	PK	39	-25.8	0	42.7	-	-	74	-31.3	0-360	100	H
3	* 7.283	31.46	PK	35.6	-29.1	0	37.96	-	-	74	-36.04	0-360	200	V
4	* 8.26	29.57	PK	35.8	-28.5	0	36.87	-	-	74	-37.13	0-360	200	V

PK - Peak detector

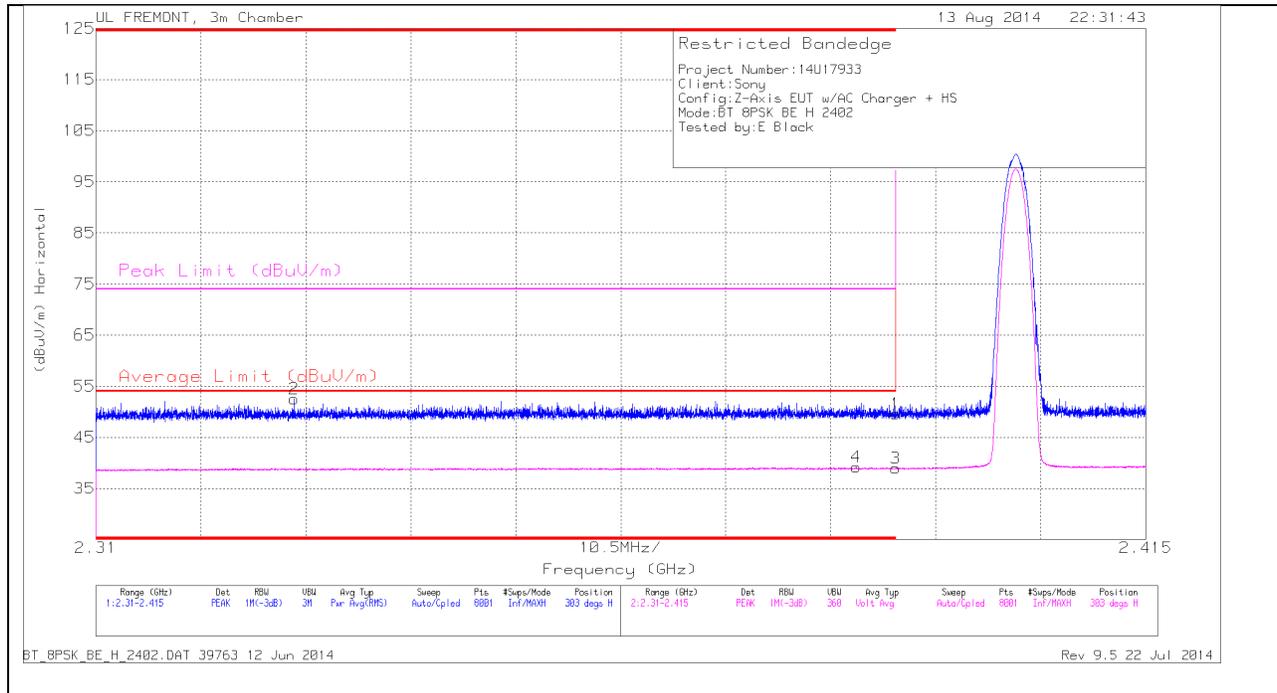
*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/ Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.846	40.5	PK3	33.2	-31.1	0	42.6	-	-	74	-31.4	82	108	H
* 3.849	27.86	VB1T	33.2	-31.1	0	29.96	54	-24.04	-	-	82	108	H

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## 9.2.2. ENHANCED DATA RATE 8PSK MODULATION RESTRICTED BANDEDGE (LOW CHANNEL)

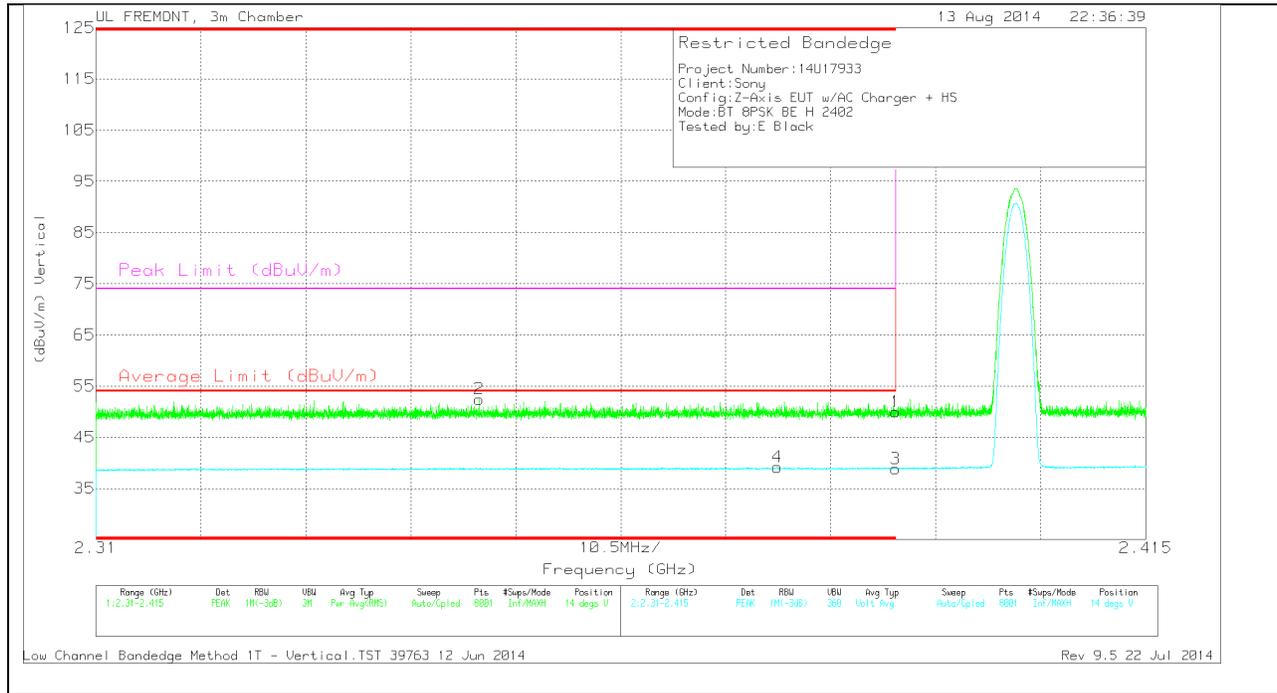
### HORIZONTAL PEAK AND AVERAGE PLOT



### HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.33	43.73	PK	31.9	-23.1	0	52.53	-	-	74	-21.47	303	115	H
4	* 2.386	30.2	VB1T	32.1	-23.1	0	39.2	54	-14.8	-	-	303	115	H
1	* 2.39	40.56	PK	32.1	-23.1	0	49.56	-	-	74	-24.44	303	115	H
3	* 2.39	29.97	VB1T	32.1	-23.1	0	38.97	54	-15.03	-	-	303	115	H

**VERTICAL PEAK AND AVERAGE PLOT**

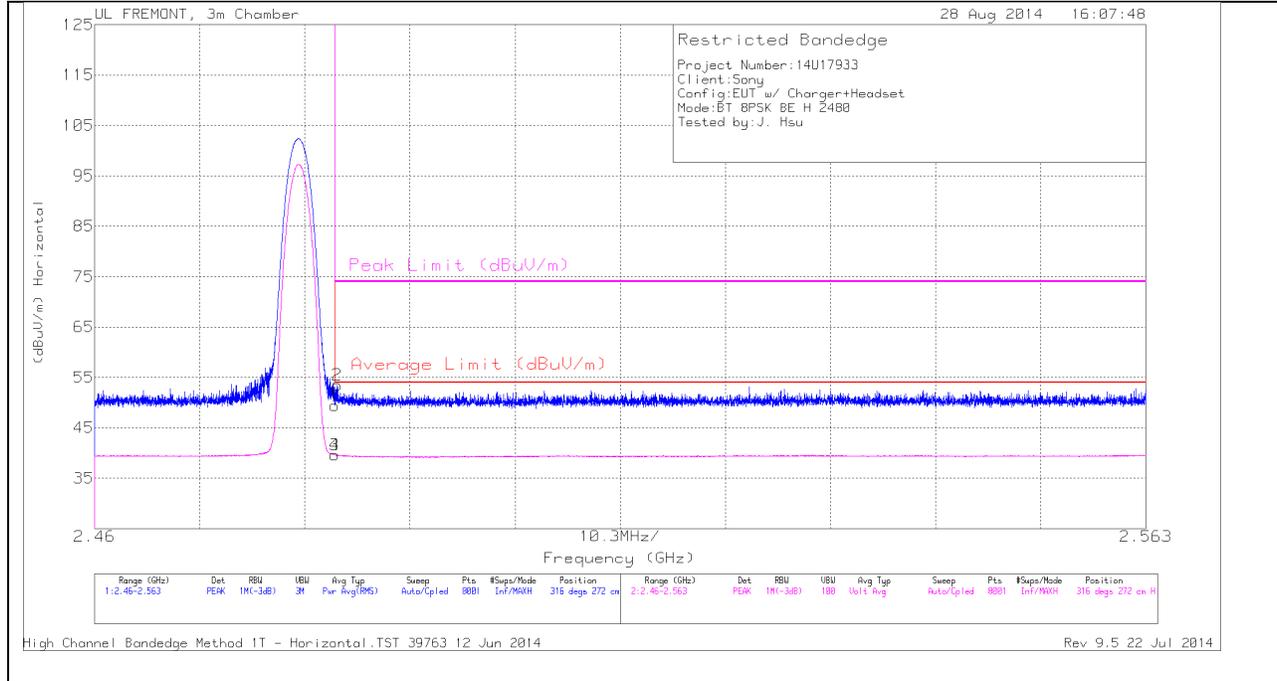


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fit r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.93	PK	32.1	-23.1	0	49.93	-	-	74	-24.07	14	100	V
2	* 2.348	43.66	PK	32	-23.2	0	52.46	-	-	74	-21.54	14	100	V
3	* 2.39	29.83	VB1T	32.1	-23.1	0	38.83	54	-15.17	-	-	14	100	V
4	* 2.378	30.17	VB1T	32.1	-23.1	0	39.17	54	-14.83	-	-	14	100	V

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

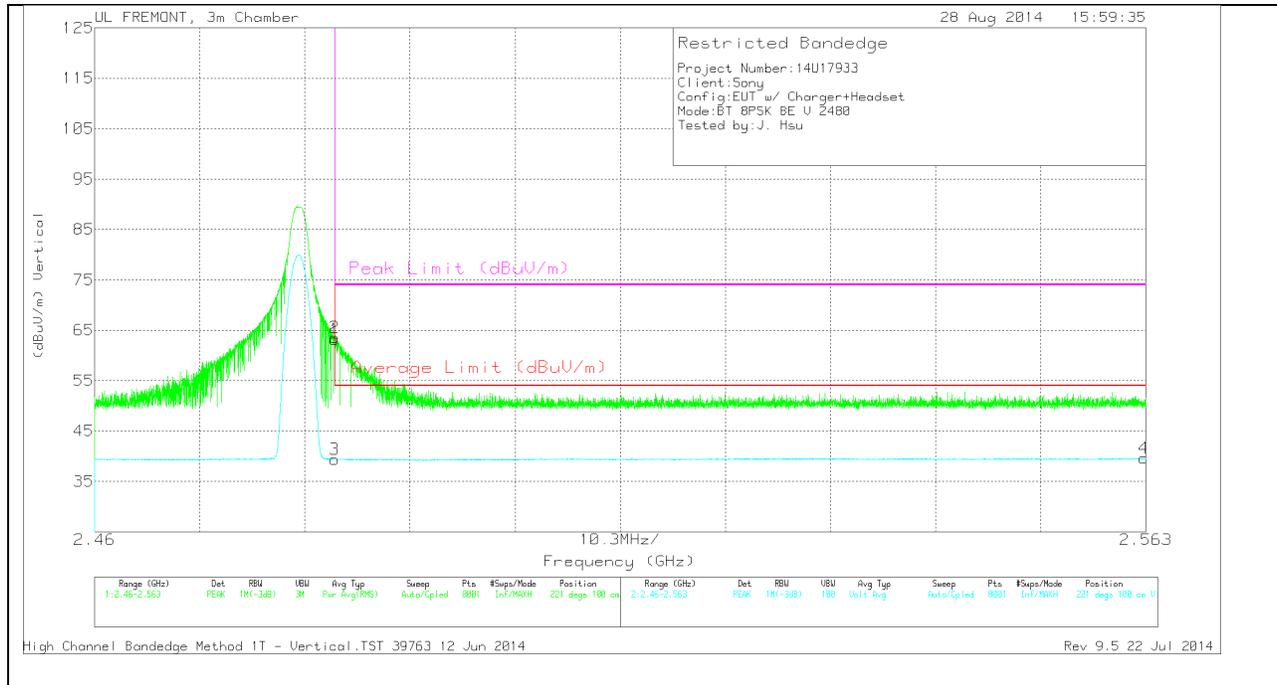
**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	39.93	PK	32.3	-22.8	49.43	-	-	74	-24.57	316	272	H
2	2.484	43.96	PK	32.3	-22.8	53.46	-	-	74	-20.54	316	272	H
3	2.484	30.1	VB1T	32.3	-22.8	39.6	54	-14.4	-	-	316	272	H
4	2.484	30.16	VB1T	32.3	-22.8	39.66	54	-14.34	-	-	316	272	H

**VERTICAL PEAK AND AVERAGE PLOT**

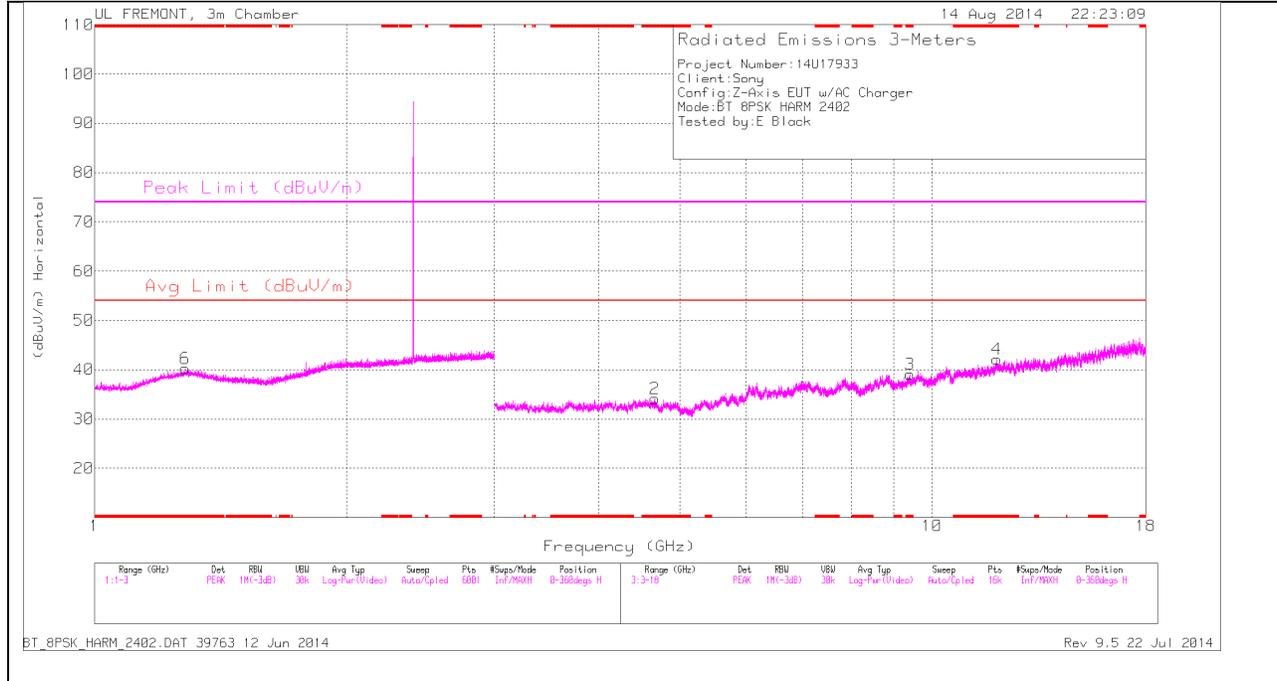


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	53.76	PK	32.3	-22.8	63.26	-	-	74	-10.74	221	100	V
2	2.484	54.08	PK	32.3	-22.8	63.58	-	-	74	-10.42	221	100	V
3	2.484	29.86	VB1T	32.3	-22.8	39.36	54	-14.64	-	-	221	100	V
4	2.563	29.89	VB1T	32.4	-22.7	39.59	54	-14.41	-	-	221	100	V

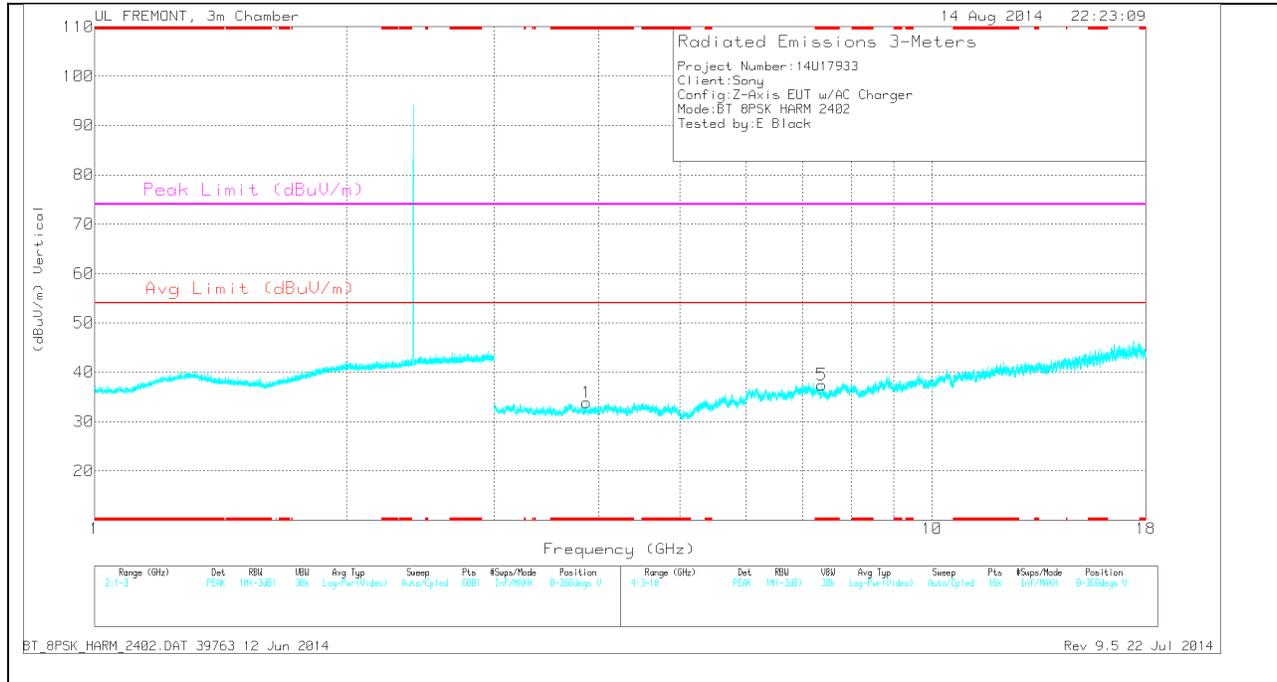
### HARMONICS AND SPURIOUS EMISSIONS

#### 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.

**LOW CHANNEL 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**

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 1.283	33.93	PK	30.1	-23.8	0	40.23	-	-	74	-33.77	0-360	200	H
2	* 4.668	30.85	PK	34.1	-30.8	0	34.15	-	-	74	-39.85	0-360	100	H
3	* 9.415	28.78	PK	36.4	-26.1	0	39.08	-	-	74	-34.92	0-360	100	H
4	* 11.956	29.08	PK	39	-26	0	42.08	-	-	74	-31.92	0-360	100	H
1	* 3.87	32.08	PK	33.2	-31.4	0	33.88	-	-	74	-40.12	0-360	200	V
5	* 7.383	30.09	PK	35.7	-28.3	0	37.49	-	-	74	-36.51	0-360	200	V

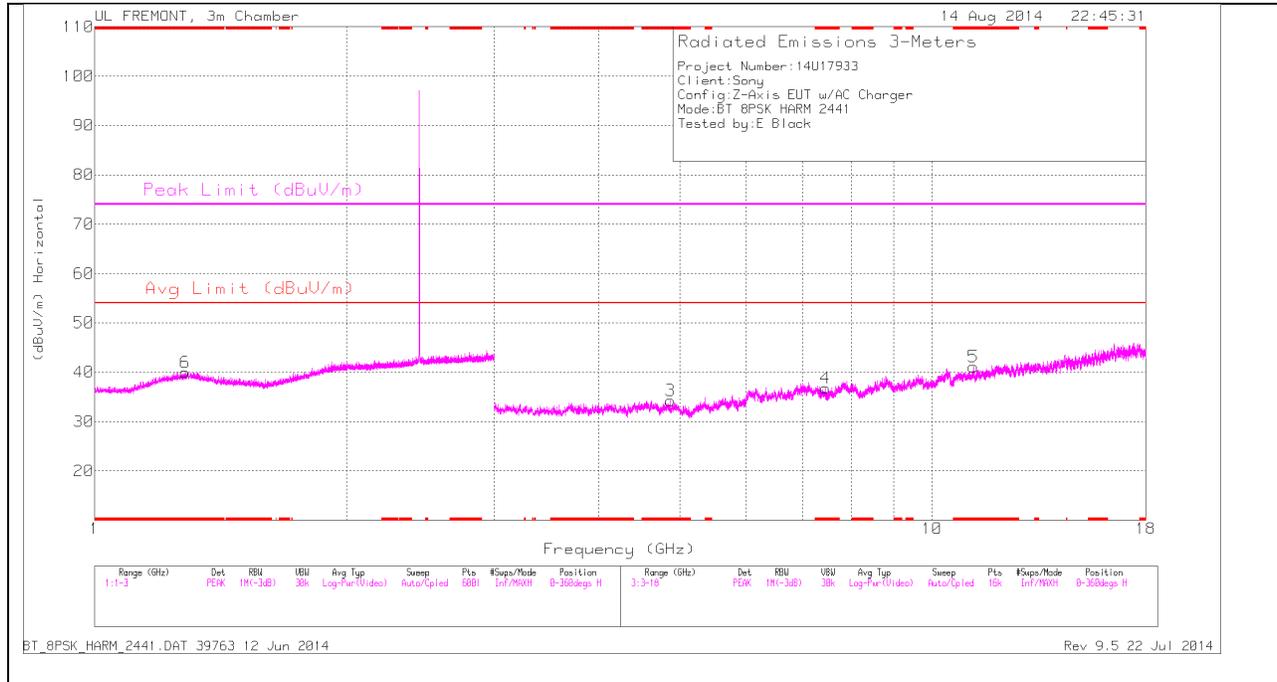
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.871	40.47	PK2	33.2	-31.4	0	42.27	-	-	74	-31.73	337	147	V
* 3.869	28.73	MAv1	33.2	-31.4	0	30.53	54	-23.47	-	-	337	147	V

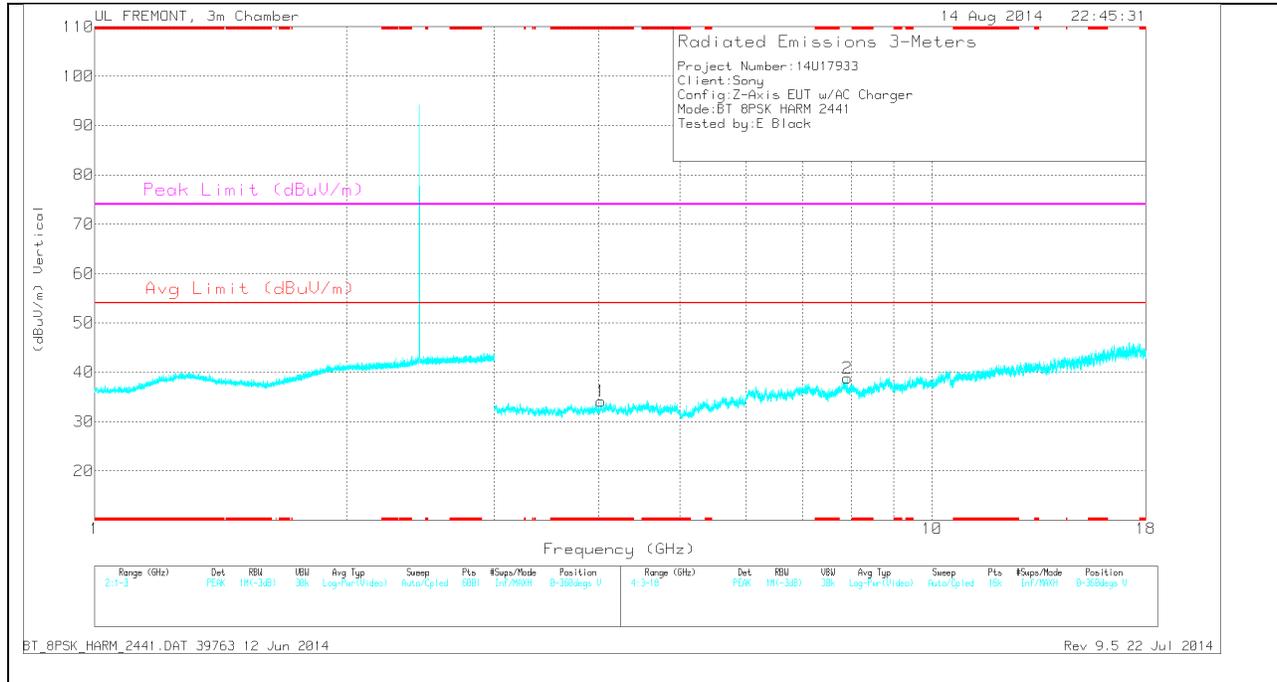
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

**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.

**MID CHANNEL 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**

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 1.283	33.72	PK	30.1	-23.8	0	40.02	-	-	74	-33.98	0-360	100	H
3	* 4.869	30.37	PK	34	-30.1	0	34.27	-	-	74	-39.73	0-360	200	H
4	* 7.456	30.15	PK	35.7	-29.1	0	36.75	-	-	74	-37.25	0-360	200	H
5	* 11.205	28.18	PK	37.9	-25	0	41.08	-	-	74	-32.92	0-360	200	H
1	* 4.025	32.26	PK	33.4	-31.5	0	34.16	-	-	74	-39.84	0-360	100	V
2	7.92	30.78	PK	35.8	-27.8	0	38.78	-	-	-	-	0-360	100	V

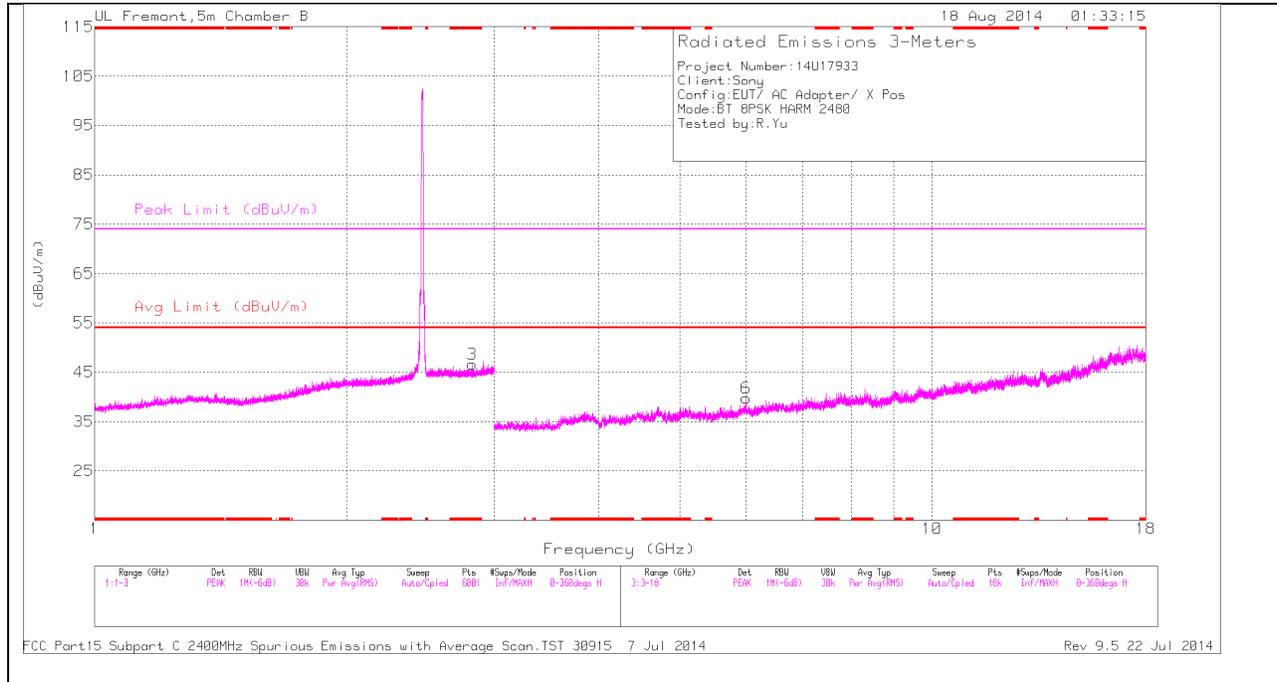
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cb/ Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 11.206	36.95	PK3	37.9	-25	0	49.85	-	-	74	-24.15	87	221	H
* 11.207	24.5	VB1T	37.9	-25	0	37.4	54	-16.6	-	-	87	221	H

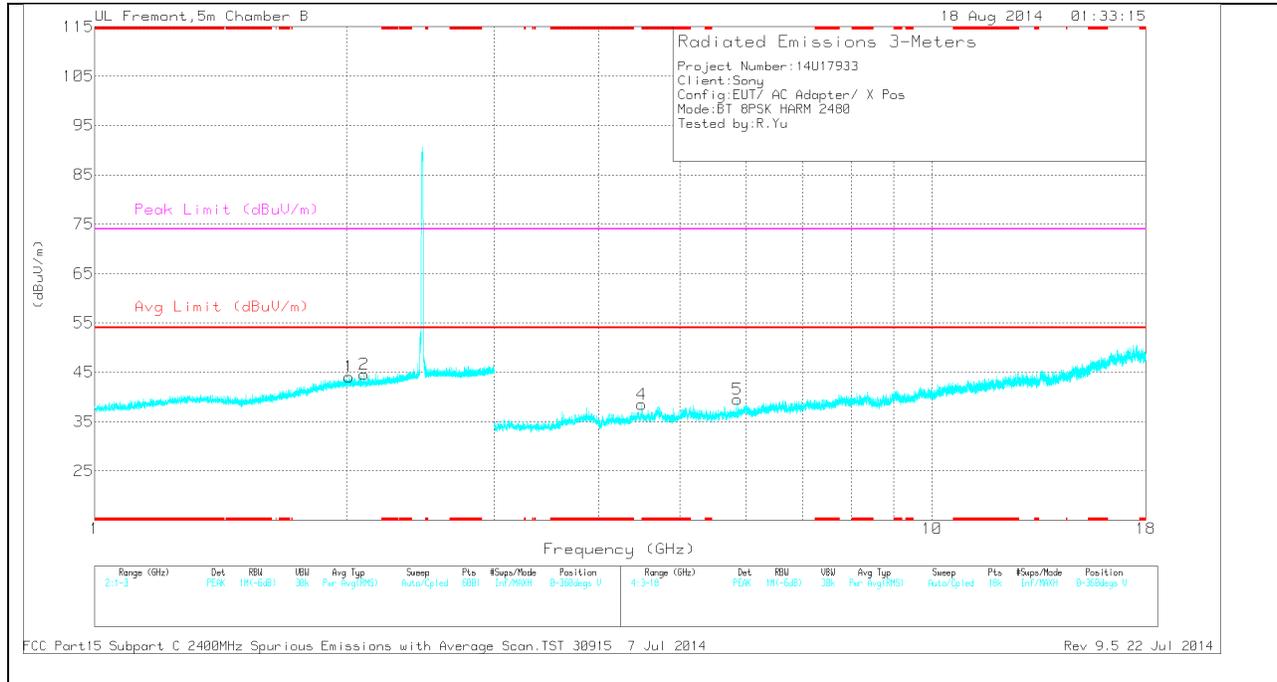
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

**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.

**HIGH CHANNEL 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**

*TRACE MARKERS*

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)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 2.825	36.18	PK	32.4	-22	46.58	-	-	74	-27.42	0-360	101	H
4	* 4.504	33.68	PK	34	-29.2	38.48	-	-	74	-35.52	0-360	101	V
1	2.012	35.89	PK	31.3	-23.1	44.09	-	-	-	-	0-360	101	V
2	2.097	36.26	PK	31.2	-22.9	44.56	-	-	-	-	0-360	101	V
5	5.854	34.16	PK	34.8	-29.4	39.56	-	-	-	-	0-360	101	V
6	5.994	33.14	PK	35.2	-28.6	39.74	-	-	-	-	0-360	199	H

PK - Peak detector

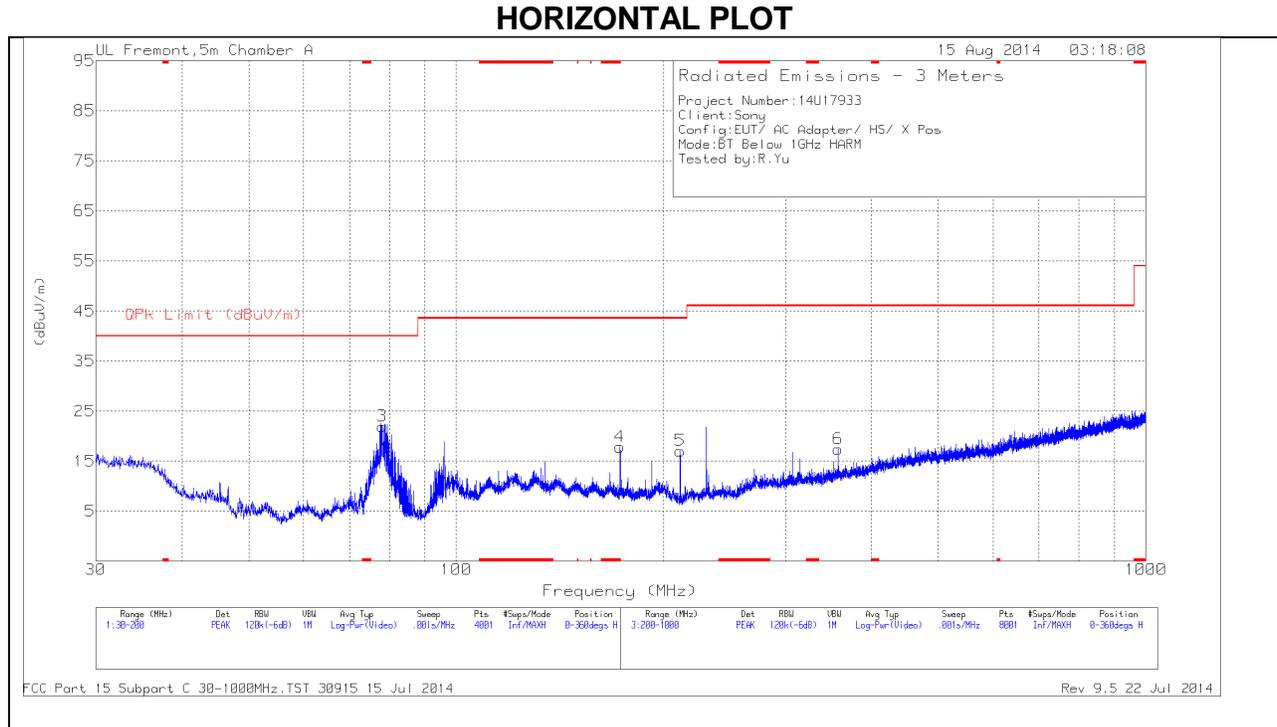
*RADIATED EMISSIONS*

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)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5.856	39.27	PK3	34.8	-29.4	44.67	-	-	-	-	1	100	V
5.856	27.14	VB1T	34.8	-29.4	32.54	-	-	-	-	1	100	V

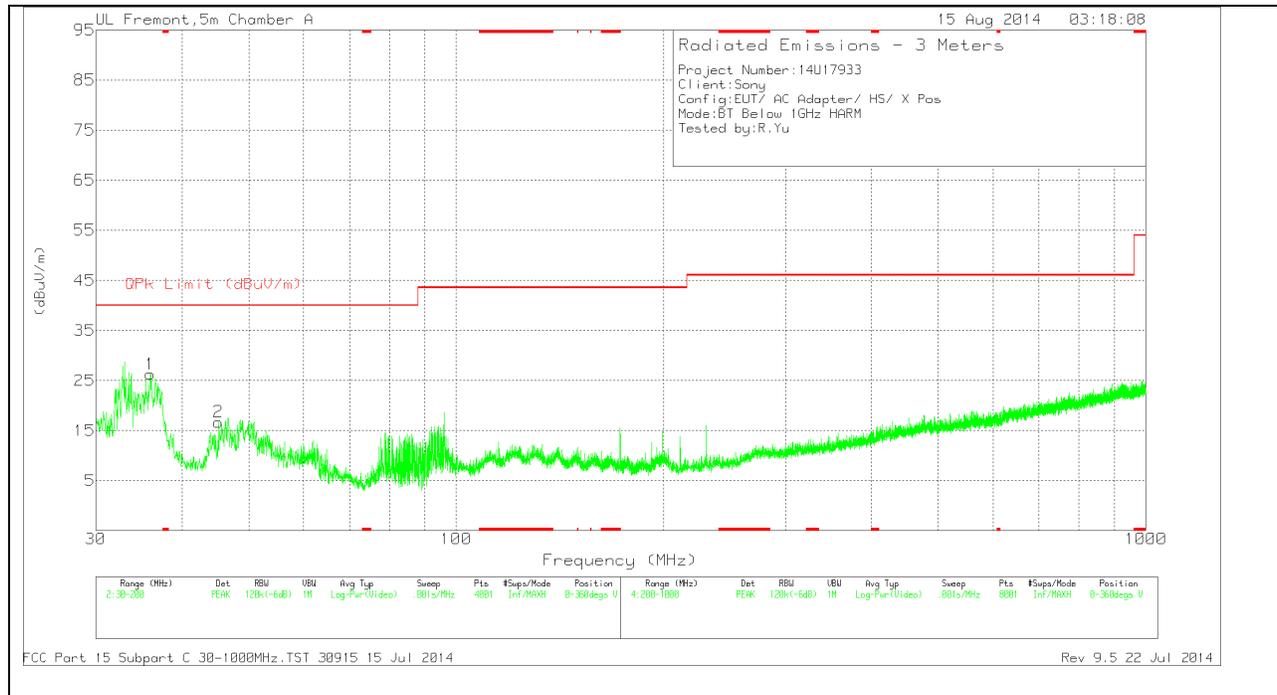
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### 9.3. WORST-CASE BELOW 1 GHz

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



### VERTICAL PLOT



### BELOW 1 GHz TABLE

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 172.8	36.17	PK	11.7	-30	17.87	43.52	-25.65	0-360	200	H
1	35.9925	40.07	PK	17.3	-31.1	26.27	40	-13.73	0-360	101	V
2	45.1725	36.92	PK	10.5	-30.7	16.72	40	-23.28	0-360	101	V
3	78.0675	44.66	PK	7.8	-30.5	21.96	40	-18.04	0-360	400	H
5	211.2	36.4	PK	10.5	-29.8	17.1	43.52	-26.42	0-360	101	H
6	357.9	31.77	PK	14.6	-28.9	17.47	46.02	-28.55	0-360	200	H

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.

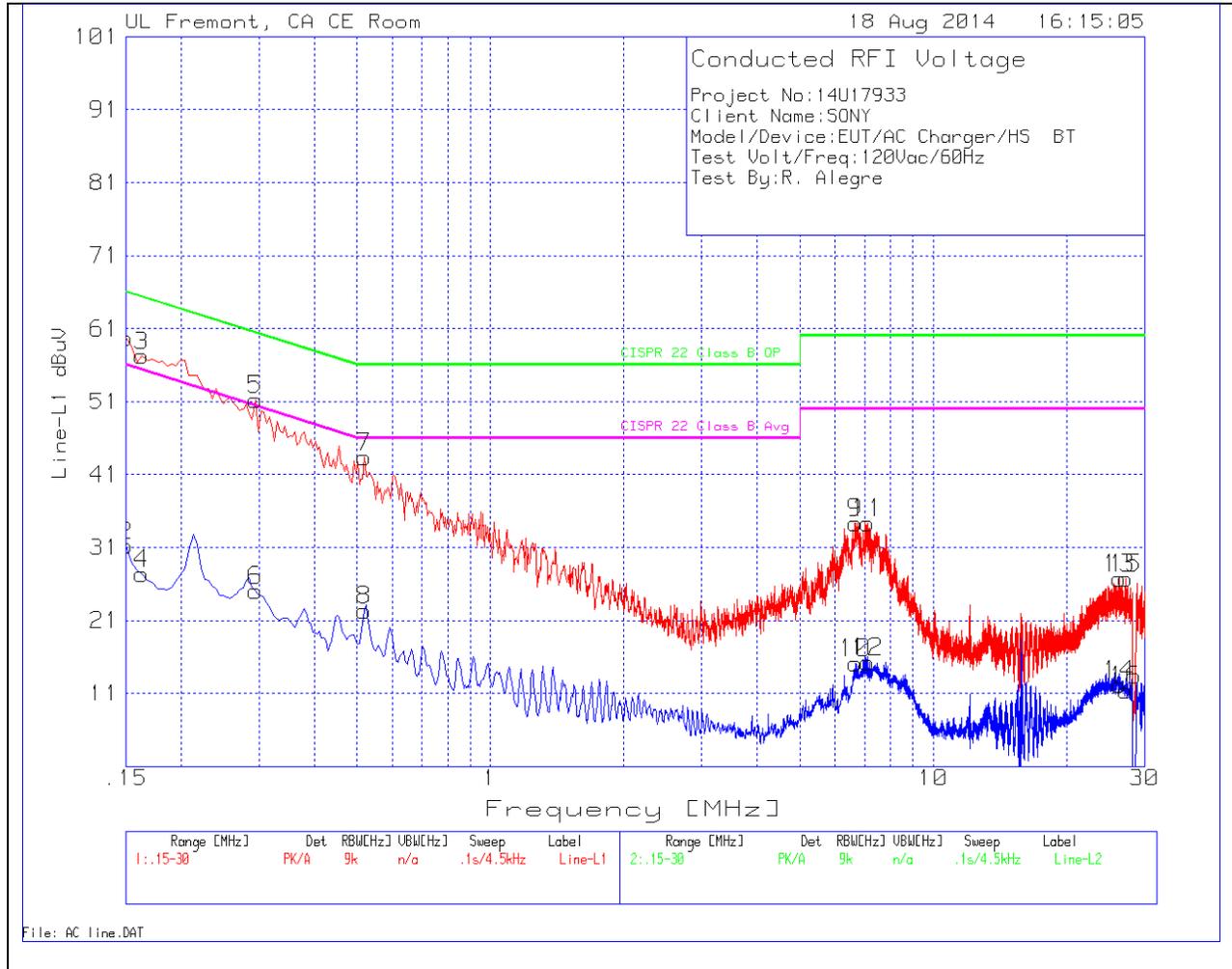
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

### RESULTS

**6 WORST EMISSIONS**

**LINE 1 PLOT**

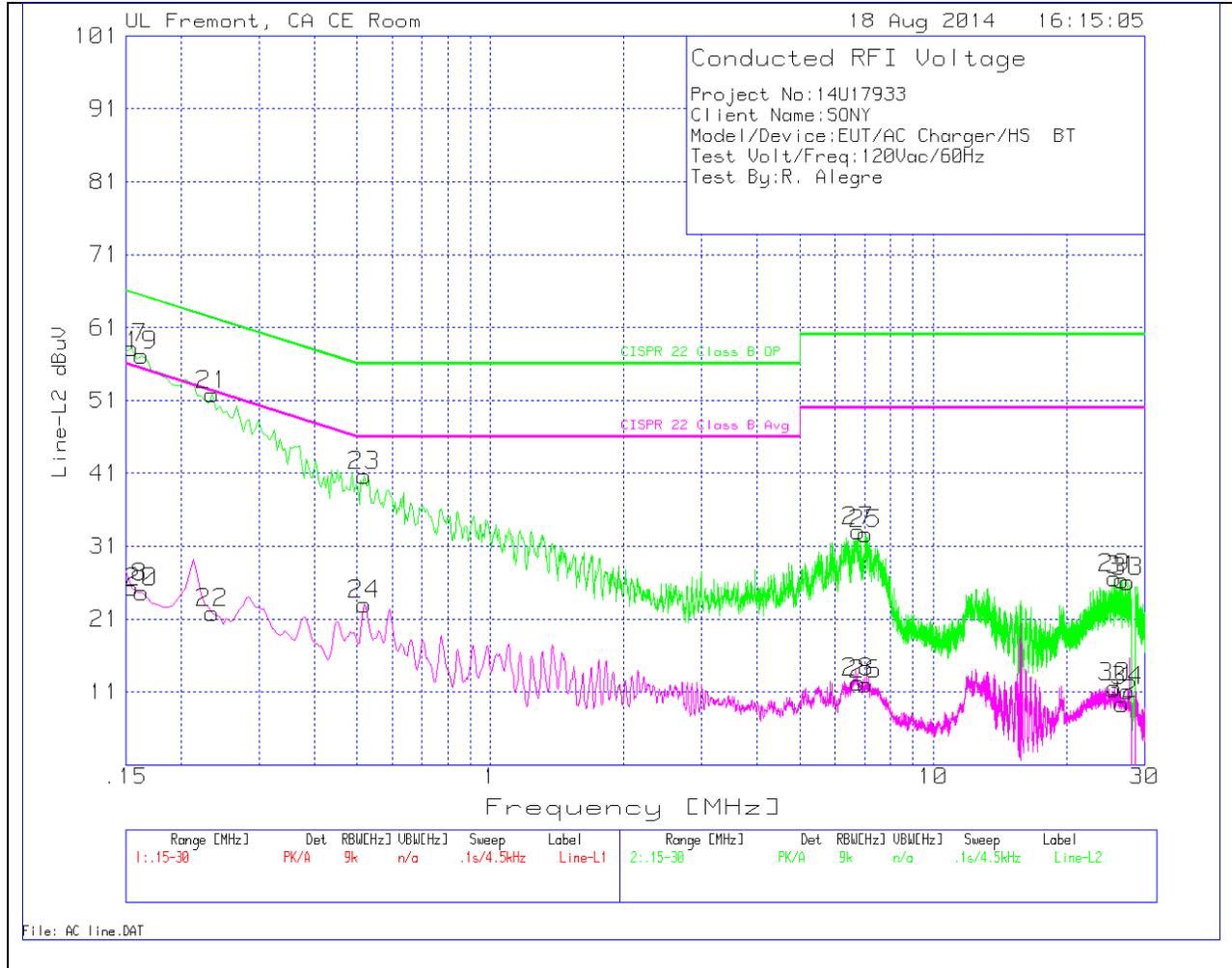


**LINE 1 RESULTS**

**Trace Markers**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.15	58.31	PK	1.4	0	59.71	66	-6.29	-	-
2	.15	29.79	Av	1.4	0	31.19	-	-	56	-24.81
3	.1635	56.03	PK	1.2	0	57.23	65.3	-8.07	-	-
4	.1635	26.18	Av	1.2	0	27.38	-	-	55.3	-27.92
5	.294	50.58	PK	.6	0	51.18	60.4	-9.22	-	-
6	.294	24.47	Av	.6	0	25.07	-	-	50.4	-25.33
7	.519	43.12	PK	.3	0	43.42	56	-12.58	-	-
8	.519	22.07	Av	.3	0	22.37	-	-	46	-23.63
9	6.684	34.03	PK	.2	.1	34.33	60	-25.67	-	-
10	6.684	14.88	Av	.2	.1	15.18	-	-	50	-34.82
11	7.098	34.09	PK	.2	.1	34.39	60	-25.61	-	-
12	7.098	14.99	Av	.2	.1	15.29	-	-	50	-34.71
13	26.3175	26.17	PK	.3	.3	26.77	60	-33.23	-	-
14	26.3175	11.56	Av	.3	.3	12.16	-	-	50	-37.84
15	27.1545	26.1	PK	.3	.3	26.7	60	-33.3	-	-
16	27.1545	10.83	Av	.3	.3	11.43	-	-	50	-38.57

**LINE 2 PLOT**



## LINE 2 RESULTS

### Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
17	.1545	56.83	PK	1.4	0	58.23	65.8	-7.57	-	-
18	.1545	23.97	Av	1.4	0	25.37	-	-	55.8	-30.43

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19	.1635	55.91	PK	1.3	0	57.21	65.3	-8.09	-	-
20	.1635	23.33	Av	1.3	0	24.63	-	-	55.3	-30.67
21	.2355	51.01	PK	.8	0	51.81	62.3	-10.49	-	-
22	.2355	21.04	Av	.8	0	21.84	-	-	52.3	-30.46
23	.519	40.32	PK	.4	0	40.72	56	-15.28	-	-
24	.519	22.59	Av	.4	0	22.99	-	-	46	-23.01
27	6.7605	32.76	PK	.2	.1	33.06	60	-26.94	-	-
28	6.7605	12.04	Av	.2	.1	12.34	-	-	50	-37.66
25	7.0485	32.34	PK	.2	.1	32.64	60	-27.36	-	-
26	7.0485	11.72	Av	.2	.1	12.02	-	-	50	-37.98
29	25.6155	26.07	PK	.3	.3	26.67	60	-33.33	-	-
30	25.6155	11.02	Av	.3	.3	11.62	-	-	50	-38.38
31	26.7315	25.75	PK	.3	.3	26.35	60	-33.65	-	-
32	26.7315	8.78	Av	.3	.3	9.38	-	-	50	-40.62
33	27.483	25.52	PK	.3	.3	26.12	60	-33.88	-	-
34	27.483	10.54	Av	.3	.3	11.14	-	-	50	-38.86

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