



**FCC CFR47 PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 ISSUE 8**

**CERTIFICATION TEST REPORT**

**GT-S6812I~802.11 b/g/n 1x1 HT20, + BT3.0+EDR  
+ GSM850/1900MHz BAR PHONE**

**MODEL NUMBER: GT-S6812I**

**FCC ID: A3LGTS6812I**

**REPORT NUMBER: 13I14835-2**

**ISSUE DATE: FEBRUARY 12, 2013**

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**NVLAP LAB CODE 200065-0**

Revision History

| Rev. | Issue Date | Revisions     | Revised By |
|------|------------|---------------|------------|
| --   | 02/11/13   | Initial Issue | T. LEE     |

## TABLE OF CONTENTS

|                                                   |           |
|---------------------------------------------------|-----------|
| <b>1. ATTESTATION OF TEST RESULTS .....</b>       | <b>4</b>  |
| <b>2. TEST METHODOLOGY .....</b>                  | <b>5</b>  |
| <b>3. FACILITIES AND ACCREDITATION .....</b>      | <b>5</b>  |
| <b>4. CALIBRATION AND UNCERTAINTY .....</b>       | <b>5</b>  |
| 4.1. MEASURING INSTRUMENT CALIBRATION .....       | 5         |
| 4.2. SAMPLE CALCULATION .....                     | 5         |
| 4.3. MEASUREMENT UNCERTAINTY .....                | 5         |
| <b>5. EQUIPMENT UNDER TEST .....</b>              | <b>6</b>  |
| 5.1. DESCRIPTION OF EUT .....                     | 6         |
| 5.2. MAXIMUM OUTPUT POWER .....                   | 6         |
| 5.3. DESCRIPTION OF AVAILABLE ANTENNAS .....      | 6         |
| 5.4. SOFTWARE AND FIRMWARE .....                  | 6         |
| 5.5. WORST-CASE CONFIGURATION AND MODE .....      | 6         |
| 5.6. DESCRIPTION OF TEST SETUP .....              | 7         |
| <b>6. TEST AND MEASUREMENT EQUIPMENT .....</b>    | <b>10</b> |
| <b>7. ANTENNA PORT TEST RESULTS .....</b>         | <b>11</b> |
| 7.1. 20 dB AND 99% BANDWIDTH .....                | 11        |
| 7.2. HOPPING FREQUENCY SEPARATION .....           | 18        |
| 7.3. NUMBER OF HOPPING CHANNELS .....             | 21        |
| 7.4. AVERAGE TIME OF OCCUPANCY .....              | 25        |
| 7.5. OUTPUT POWER .....                           | 35        |
| 7.6. AVERAGE POWER .....                          | 39        |
| 7.7. CONDUCTED SPURIOUS EMISSIONS .....           | 40        |
| <b>8. RADIATED TEST RESULTS .....</b>             | <b>53</b> |
| 8.1. LIMITS AND PROCEDURE .....                   | 53        |
| 8.2. TRANSMITTER ABOVE 1 GHz .....                | 54        |
| 8.2.1. BASIC DATA RATE GFSK MODULATION .....      | 54        |
| 8.2.2. BASIC DATA RATE QPSK MODULATION .....      | 64        |
| 8.2.3. ENHANCED DATA RATE 8PSK MODULATION .....   | 74        |
| 8.3. WORST-CASE BELOW 1 GHz .....                 | 84        |
| <b>9. AC POWER LINE CONDUCTED EMISSIONS .....</b> | <b>86</b> |
| <b>10. SETUP PHOTOS .....</b>                     | <b>90</b> |

## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
416, MAETAN 3-DONG, YEONGTONG-GU  
SUWON-CITY  
GYEONGGI, 443-742, SOUTH KOREA

**EUT DESCRIPTION:** GT-S6812i~802.11 b/g/n 1x1 HT20, BT3.0, EDR,  
GSM850/1900MHz BAR PHONE

**MODEL:** GT-S6812i

**SERIAL NUMBER:** S6812iZCAMA1

**DATE TESTED:** FEBRUARY 04 -12, 2013

| APPLICABLE STANDARDS                    |              |
|-----------------------------------------|--------------|
| STANDARD                                | TEST RESULTS |
| CFR 47 Part 15 Subpart C                | Pass         |
| INDUSTRY CANADA RSS-210 Issue 8 Annex 8 | Pass         |
| INDUSTRY CANADA RSS-GEN Issue 3         | Pass         |

UL CCS tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL CCS By:

Tested By:



TIM LEE  
WISE PROGRAM MANAGER  
UL CCS



CHIN PANG  
EMC ENGINEER  
UL CCS

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

## 3. FACILITIES AND ACCREDITATION

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

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

| PARAMETER                             | UNCERTAINTY |
|---------------------------------------|-------------|
| Conducted Disturbance, 0.15 to 30 MHz | 3.52 dB     |
| Radiated Disturbance, 30 to 1000 MHz  | 4.94 dB     |

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 802.11 b/g/n 1x1 HT20, BT3.0, EDR, GSM850/1900MHz BAR PHONE.

### 5.2. MAXIMUM OUTPUT POWER

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

| Frequency Range<br>(MHz) | Mode | Output Power<br>(dBm) | Output Power<br>(mW) |
|--------------------------|------|-----------------------|----------------------|
| 2402 - 2480              | GFSK | 8.37                  | 6.87                 |
| 2402 - 2480              | QPSK | 6.94                  | 4.94                 |
| 2402 - 2480              | 8PSK | 7.17                  | 5.21                 |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an antenna with a maximum peak gain of -3.8 dBi.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was S6812i.001

### 5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation without AC adapter was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation without AC adapter.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List |              |             |               |        |
|------------------------|--------------|-------------|---------------|--------|
| Description            | Manufacturer | Model       | Serial Number | FCC ID |
| AC Adapter             | Samsung      | ETA0U10EBE  | RT3C504AS/7-E | N/A    |
| Headset                | Samsung      | GH59-11129H | EHS61ASFWE    | N/A    |

### I/O CABLES (CONDUCTED SETUP)

| I/O Cable List |              |                      |                   |             |                  |         |
|----------------|--------------|----------------------|-------------------|-------------|------------------|---------|
| Cable No       | Port         | # of identical ports | Connector Type    | Cable Type  | Cable Length (m) | Remarks |
| 1              | AC           | 1                    | 115VAC            | Un-Shielded | 2                | N/A     |
| 2              | DC           | 1                    | USB               | Un-Shielded | 1                |         |
| 3              | Antenna Port | 1                    | Spectrum Analyzer | Un-Shielded | 1                |         |

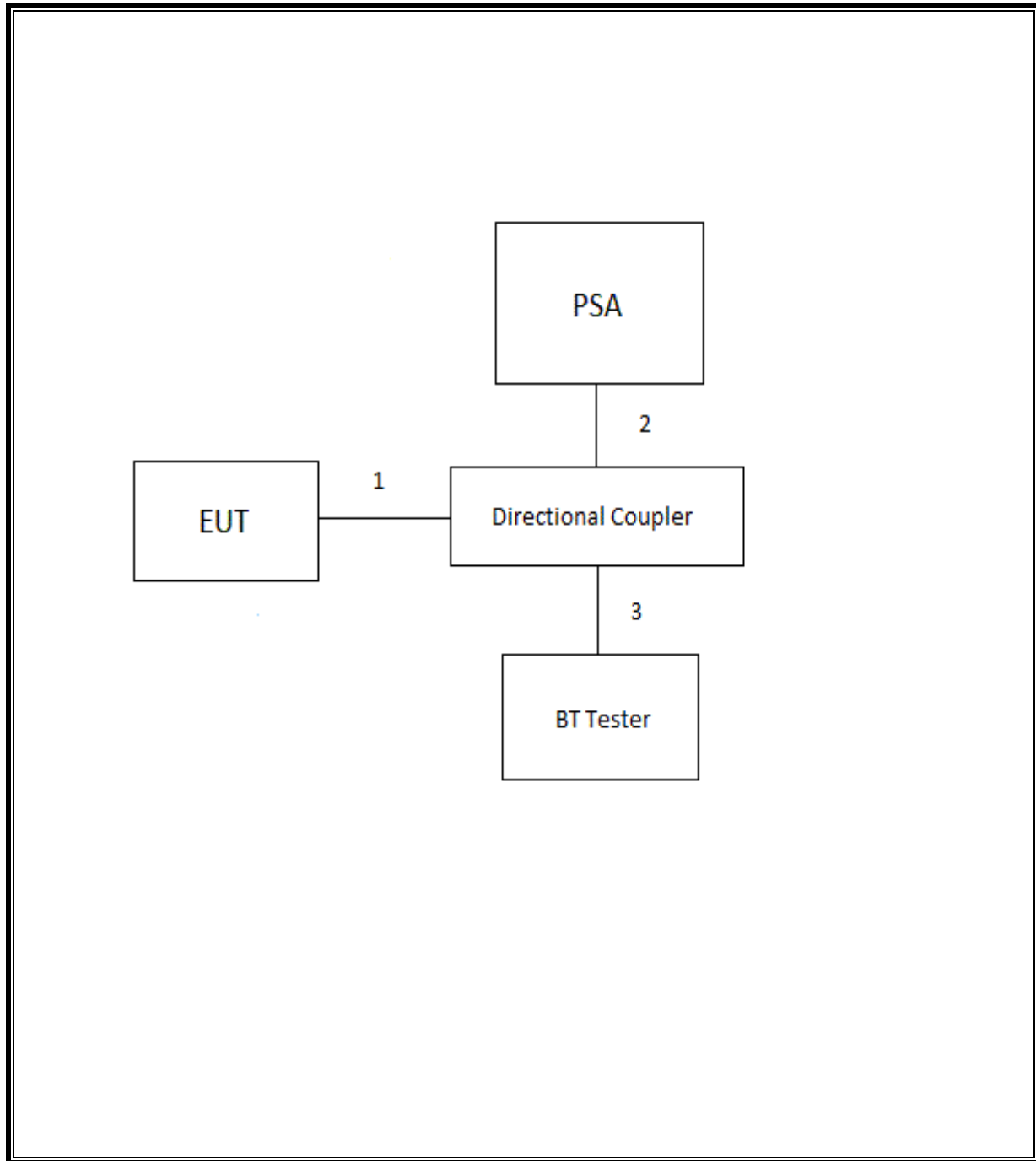
### I/O CABLES (RADIATED SETUP)

| I/O Cable List |       |                      |                |             |                  |         |
|----------------|-------|----------------------|----------------|-------------|------------------|---------|
| Cable No       | Port  | # of identical ports | Connector Type | Cable Type  | Cable Length (m) | Remarks |
| 1              | AC    | 1                    | 115VAC         | Un-Shielded | 2                | N/A     |
| 2              | DC    | 1                    | USB            | Un-Shielded | 1                | N/A     |
| 3              | Audio | 1                    | Headset        | Un-Shielded | 1                | N/A     |

### TEST SETUP

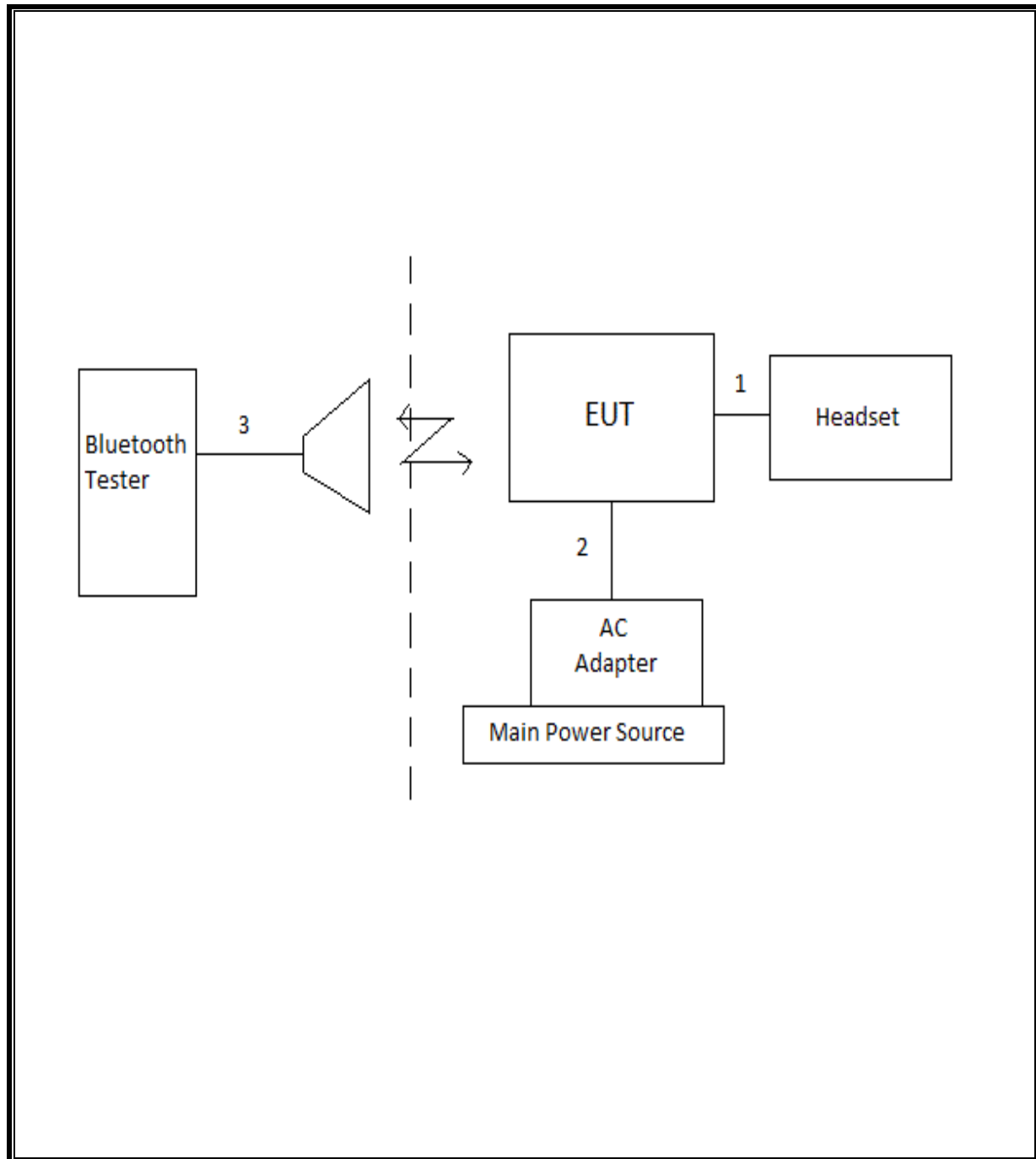
The EUT is with an AC adapter that was tested in the worst case orientation and configuration, where applicable, during the tests. Test software exercised the radio.

**SETUP DIAGRAM FOR CONDUCTED TESTS**





**SETUP DIAGRAM FOR RADIATED 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 Test Receiver, 30 MHz       | R & S          | ESHS 20     | N02396 | 08/08/12 | 08/08/13 |
| Preamplifier, 1300 MHz          | Agilent / HP   | 8447D       | C00580 | 01/28/13 | 01/28/14 |
| Antenna, Biconolog, 30MHz-1 GHz | Sunol Sciences | JB1         | C01011 | 03/23/12 | 03/23/13 |
| Spectrum Analyzer, 44 GHz       | Agilent / HP   | E4446A      | C00996 | 05/11/12 | 05/11/13 |
| Wideband Communication Test Set | R & S          | CMW 500     | None   | 06/28/12 | 06/28/13 |
| Peak Power Meter                | Agilent / HP   | E4416A      | C00963 | 12/13/12 | 12/13/13 |
| LISN, 30 MHz                    | FCC            | 50/250-25-2 | C00626 | 01/14/13 | 01/14/14 |
| EMI Test Receiver, 30 MHz       | R & S          | ESHS 20     | N02396 | 08/08/12 | 08/08/13 |
| Reject Filter, 2.4GHz           | Micro-Tronics  | BRM50702    | N02684 | CNR      | CNR      |
| Spectrum Analyzer, 44 GHz       | Agilent / HP   | E4446A      | C00986 | 03/22/12 | 03/22/13 |
| Preamplifier, 26.5 GHz          | Agilent / HP   | 8449B       | C01063 | 10/22/12 | 10/22/13 |
| Peak / Average Power Sensor     | Agilent / HP   | E9327A      | C00964 | 12/13/12 | 12/13/13 |
| CBT Bluetooth Tester            | R & S          | CBT         | None   | 05/15/12 | 05/15/13 |
| Antenna, Horn, 18GHz            | EMCO           | 3115        | C00783 | 10/25/12 | 10/25/13 |
| Antenna, Horn, 25.5 GHz         | ARA            | MWH-1826/B  | C00980 | 11/14/12 | 11/14/13 |

## 7. ANTENNA PORT TEST RESULTS

### 7.1. 20 dB AND 99% BANDWIDTH

#### LIMIT

None; for reporting purposes only.

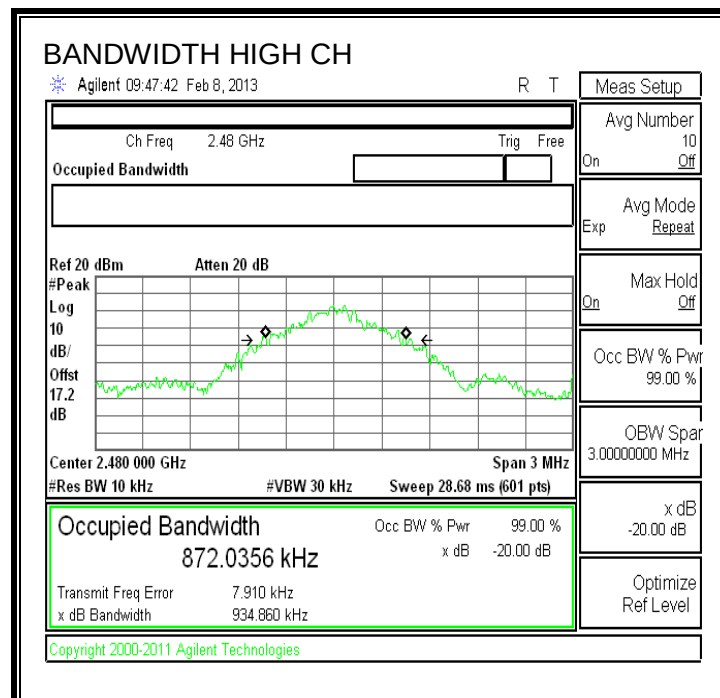
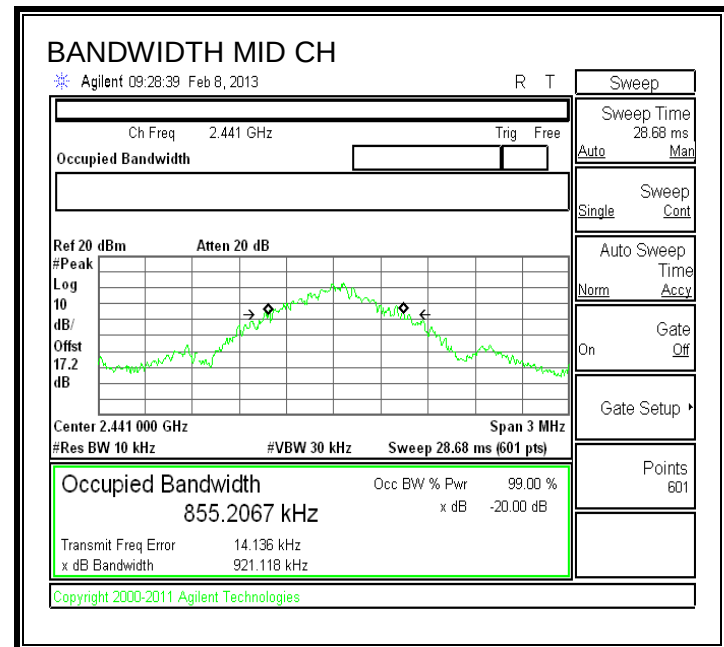
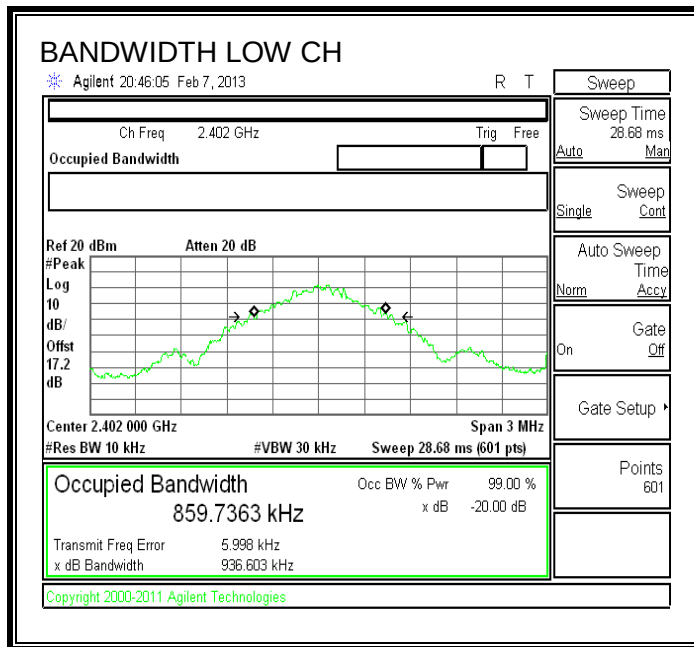
#### TEST PROCEDURE

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

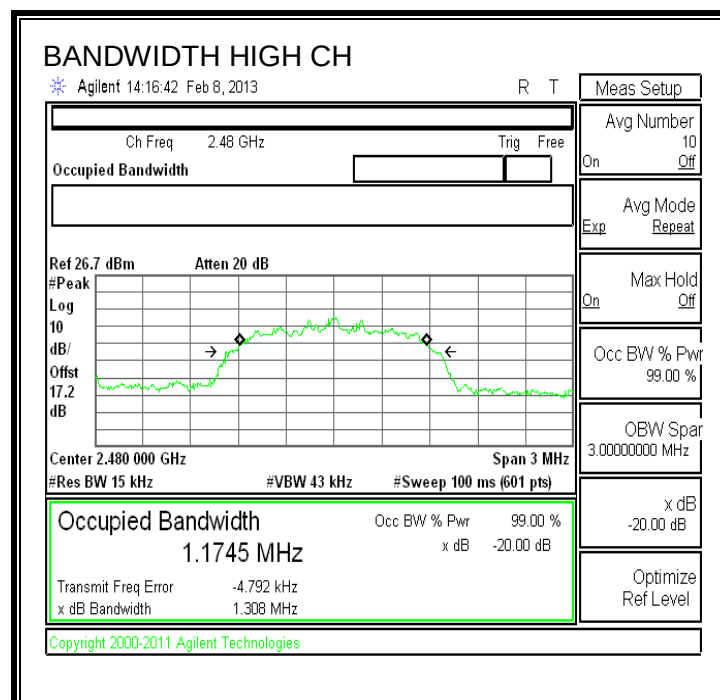
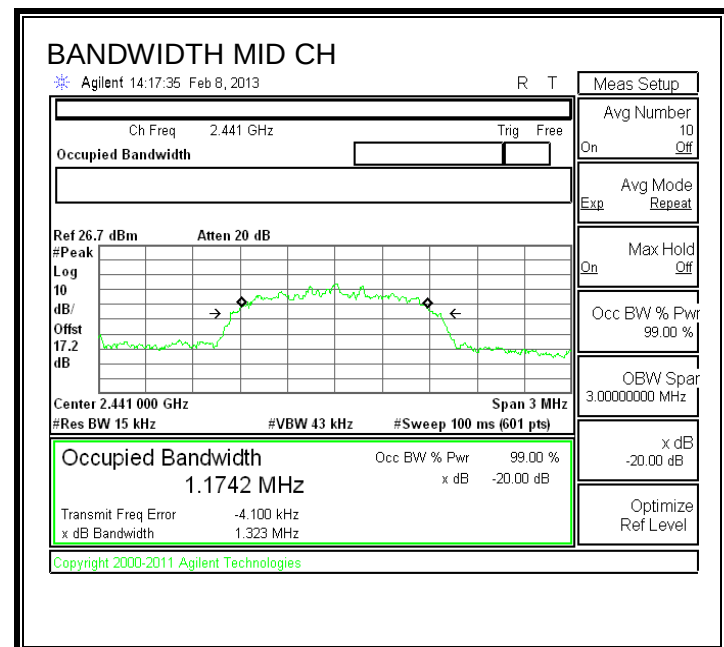
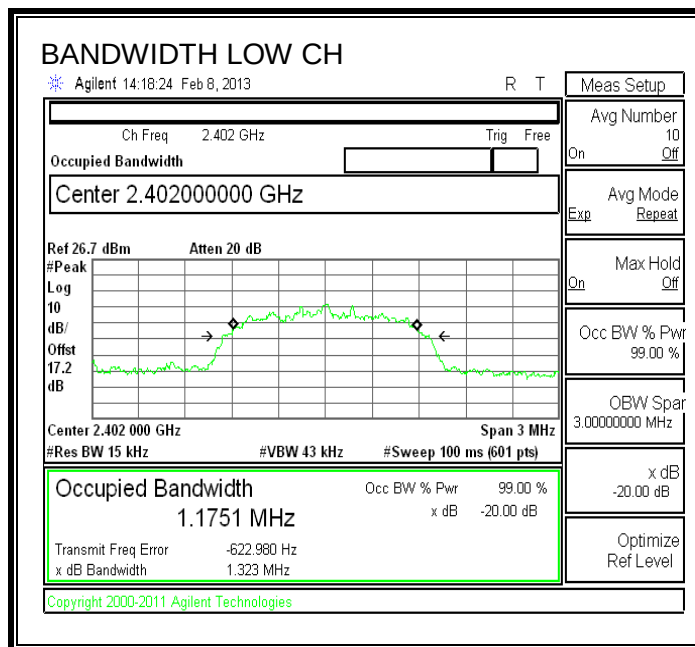
#### RESULTS

| Mode | Channel | Frequency<br>(MHz) | 20 dB Bandwidth<br>(kHz) | 99% Bandwidth<br>(kHz) |
|------|---------|--------------------|--------------------------|------------------------|
| GFSK | Low     | 2402               | 936.603                  | 832.0531               |
|      | Middle  | 2441               | 921.118                  | 827.8146               |
|      | High    | 2480               | 934.860                  | 832.0355               |
| QPSK | Low     | 2402               | 1323                     | 1192.6                 |
|      | Middle  | 2441               | 1323                     | 1164.7                 |
|      | High    | 2480               | 1308                     | 1189.2                 |
| 8PSK | Low     | 2402               | 1275                     | 1127.4                 |
|      | Middle  | 2441               | 1267                     | 1119.2                 |
|      | High    | 2480               | 1260                     | 1134.2                 |

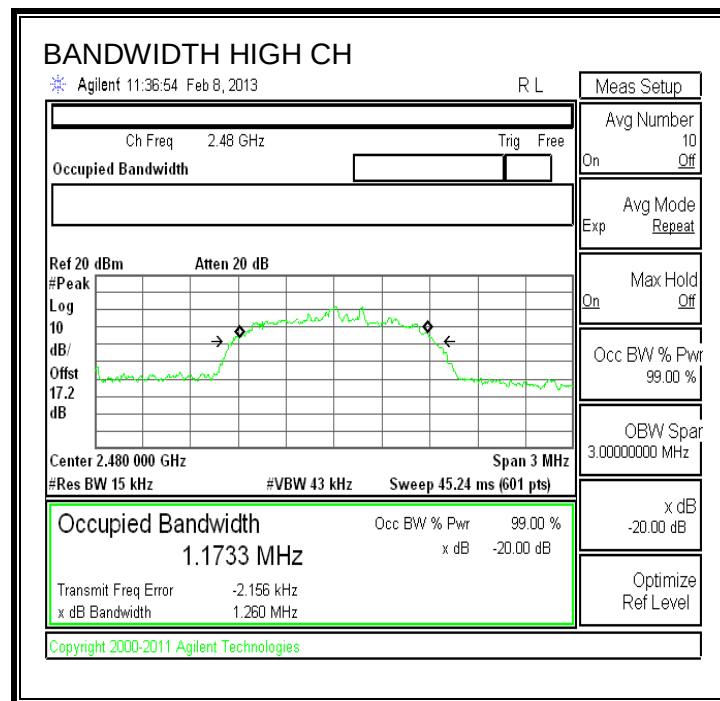
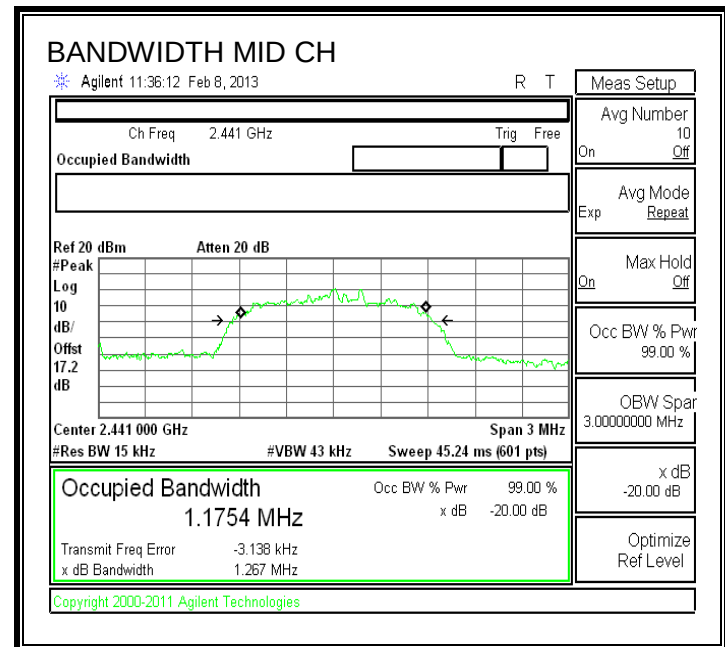
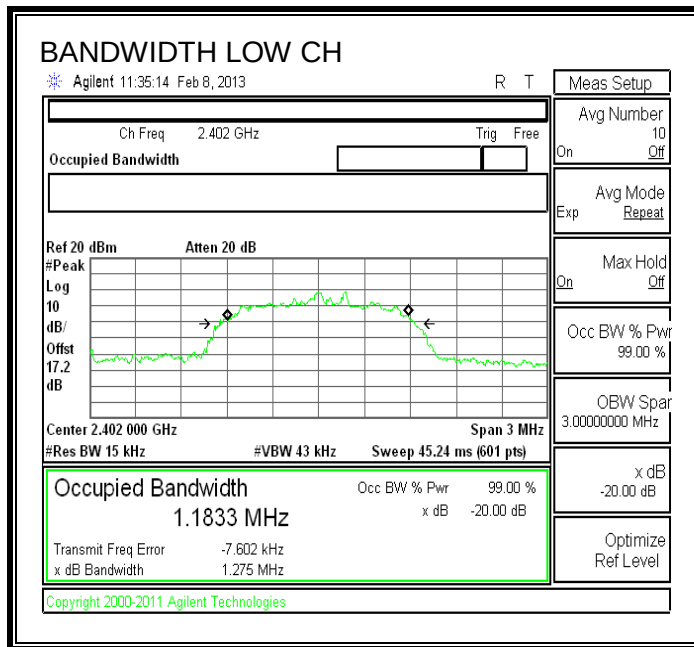
## 20 dB BANDWIDTH, GFSK



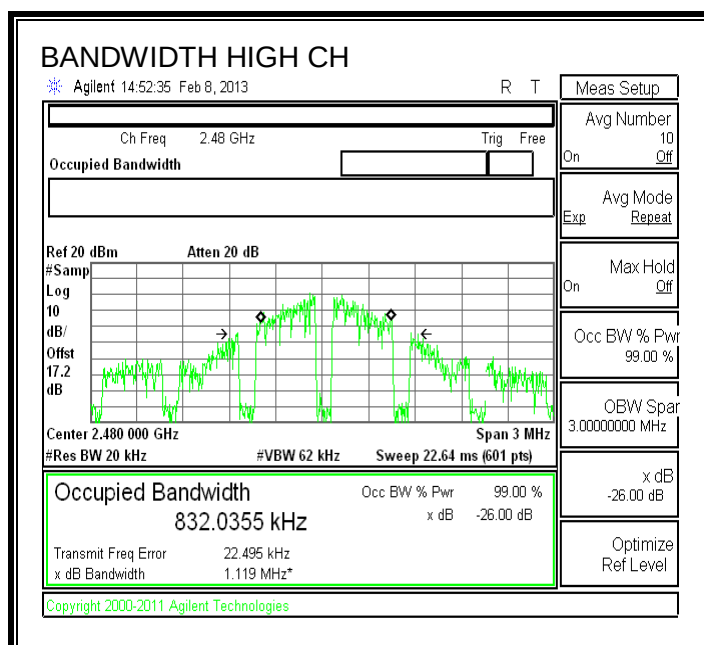
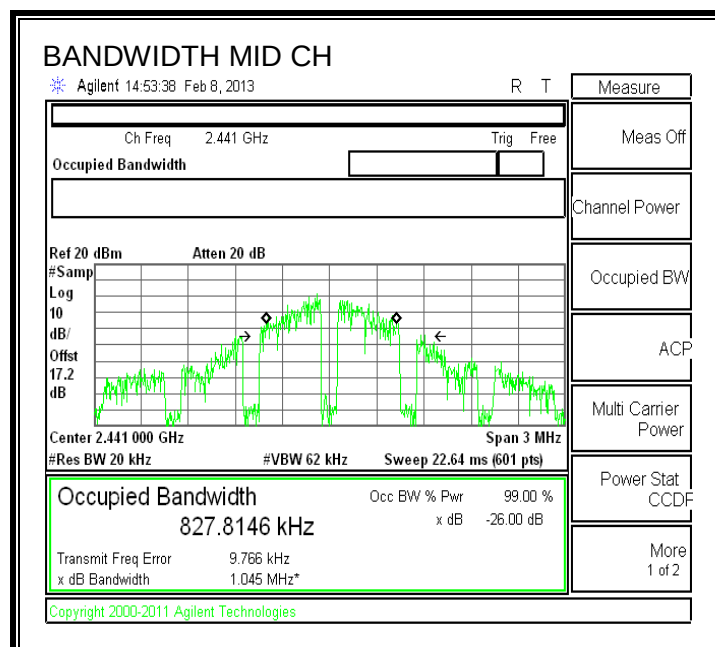
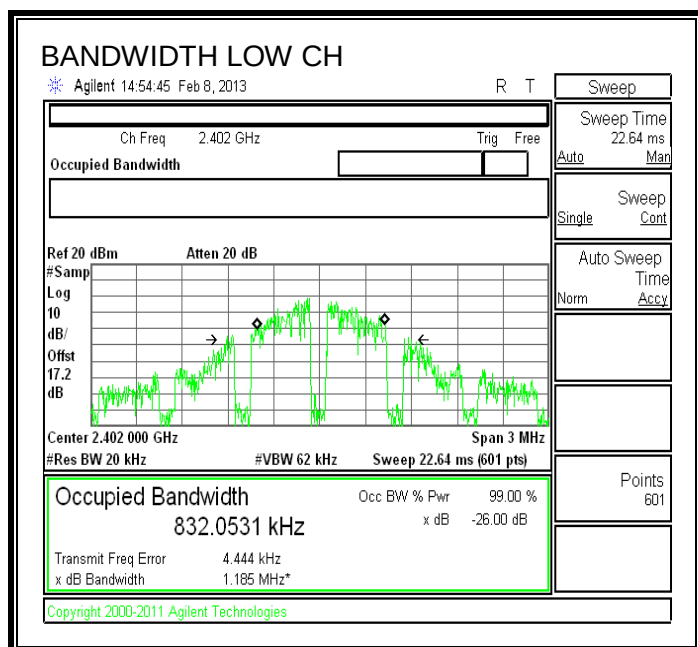
## 20 dB BANDWIDTH, QPSK



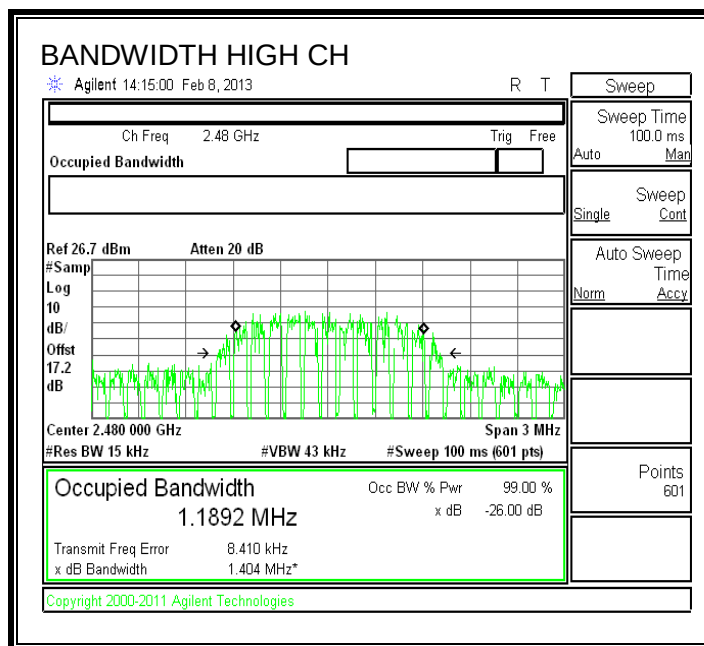
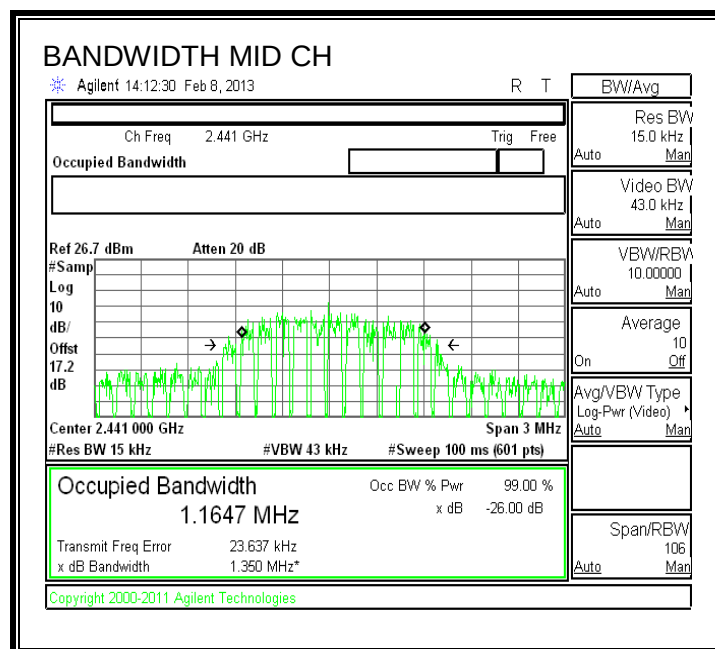
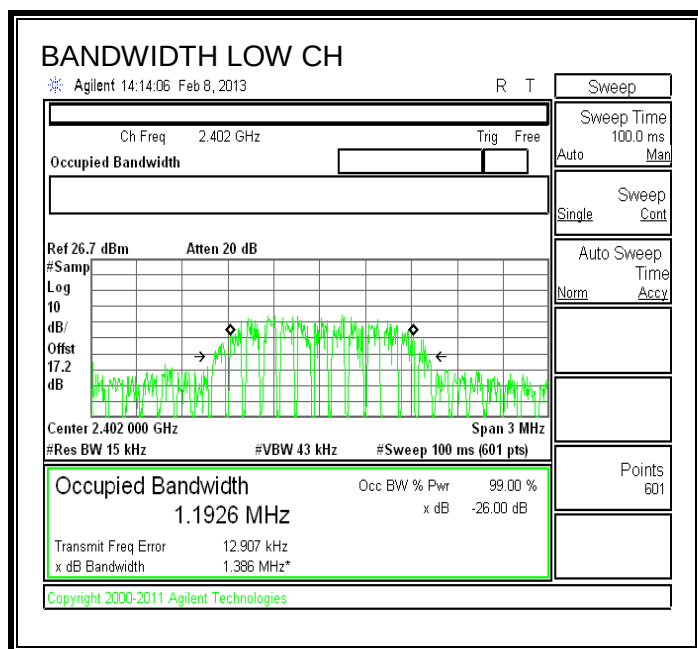
## 20 dB BANDWIDTH, 8PSK



**99% BANDWIDTH, GFSK**

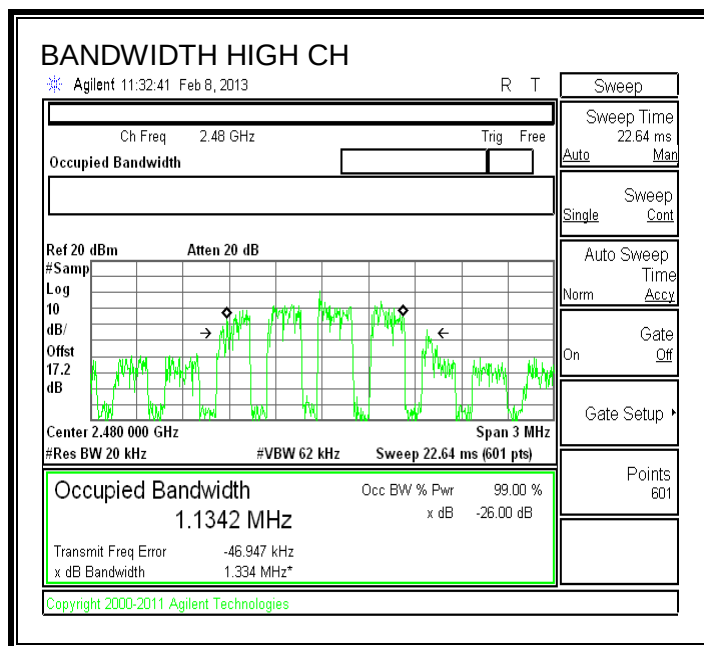
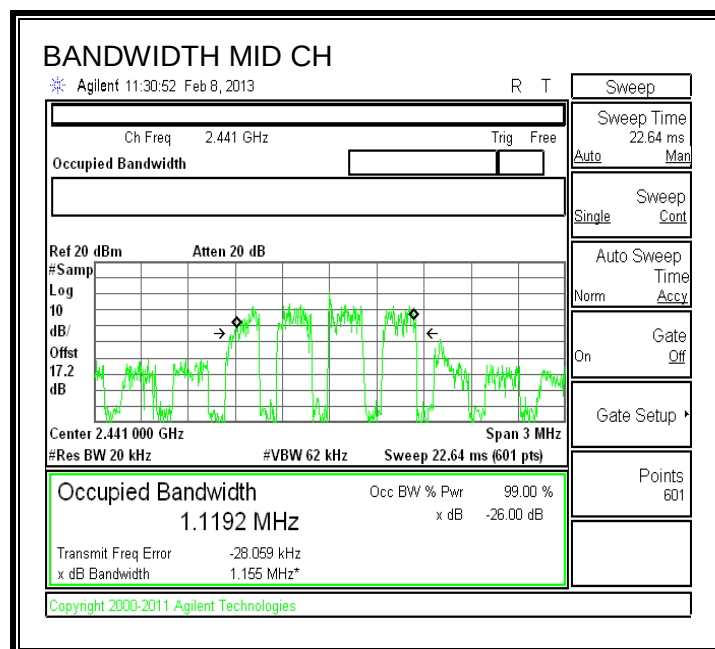
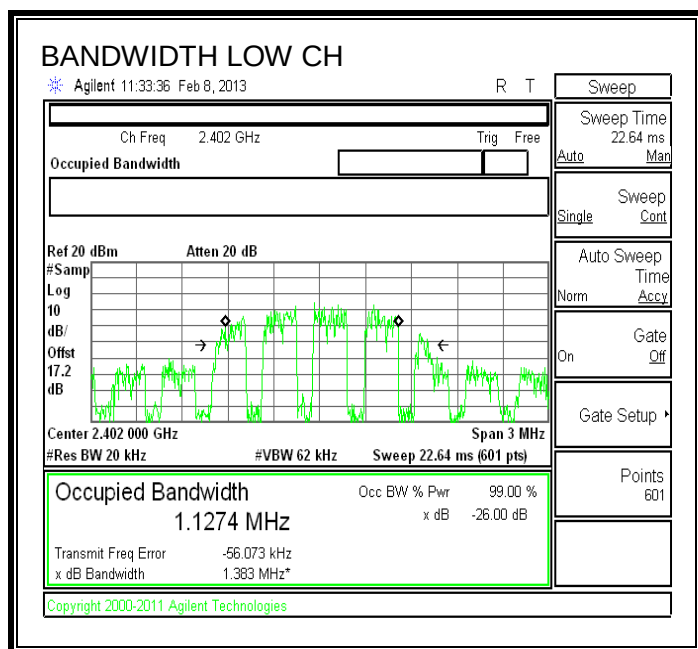


**99% BANDWIDTH, QPSK**





**99% BANDWIDTH, 8PSK**



## **7.2. HOPPING FREQUENCY SEPARATION**

### **LIMIT**

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

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

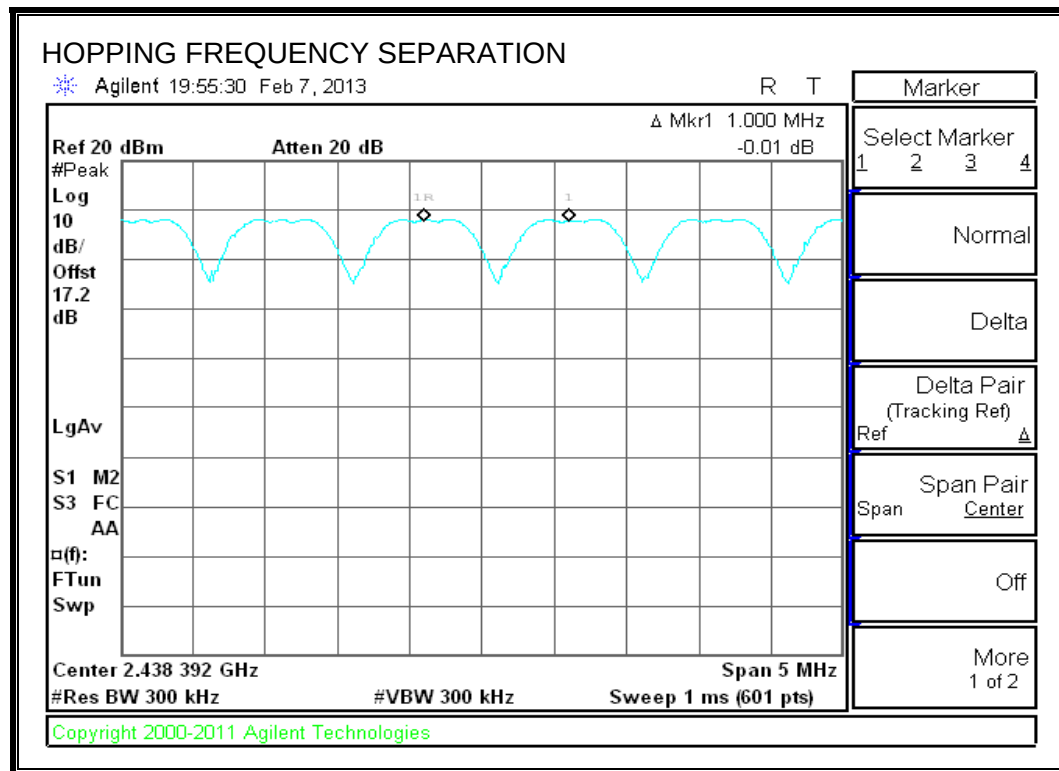
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

### **TEST PROCEDURE**

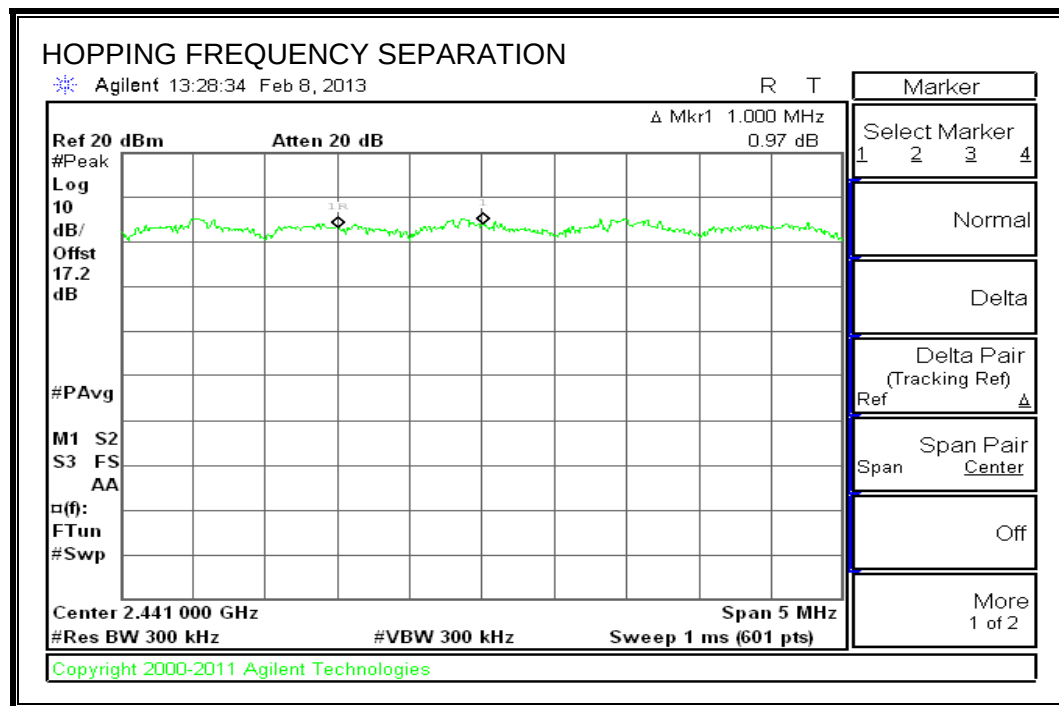
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

### **RESULTS**

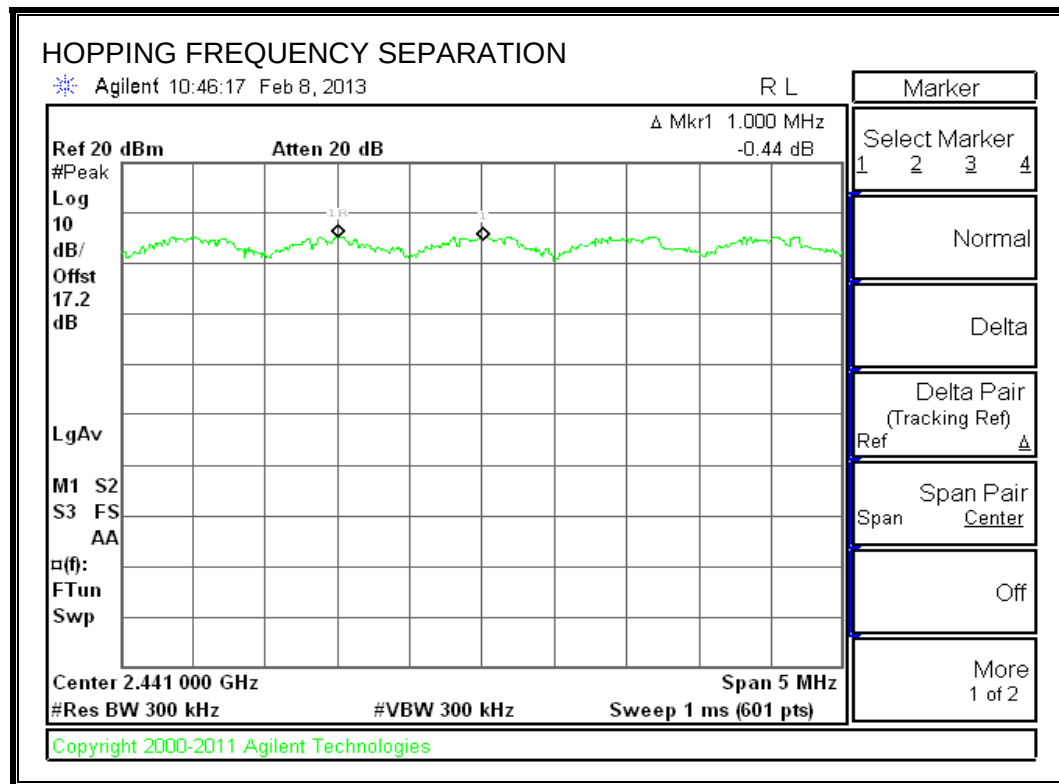
**HOPPING FREQUENCY SEPARATION, GFSK**



**HOPPING FREQUENCY SEPARATION, QPSK**



**HOPPING FREQUENCY SEPARATION, 8PSK**



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

#### **LIMIT**

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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

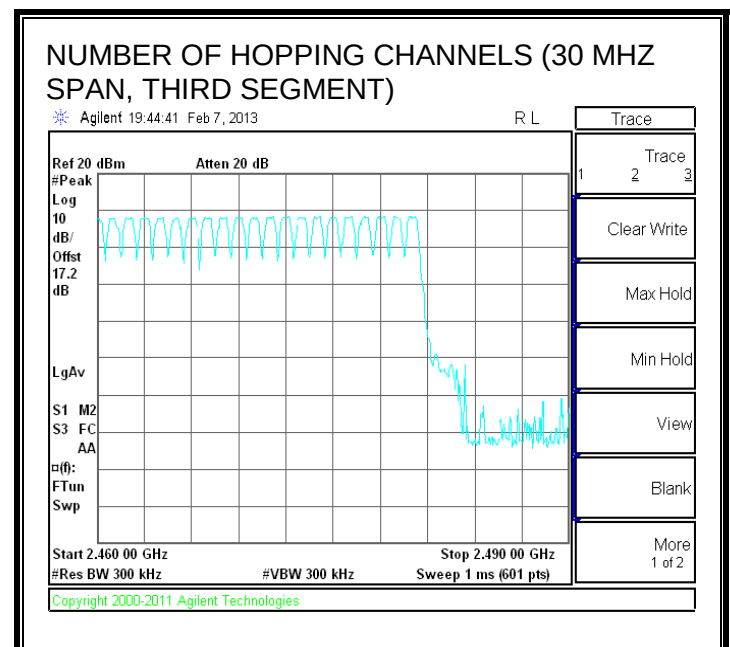
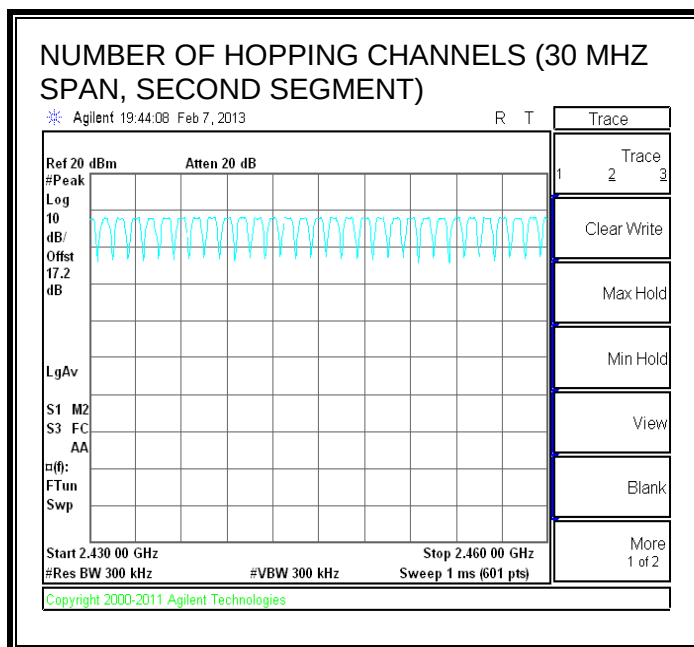
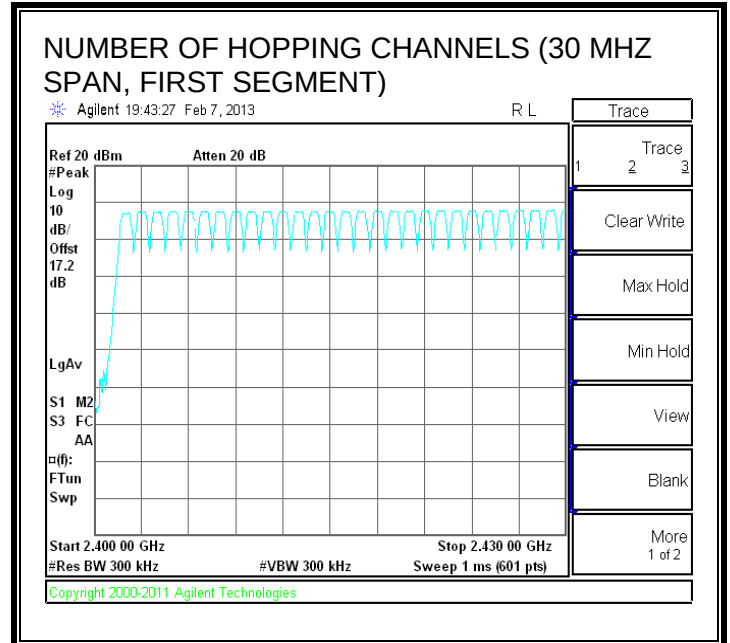
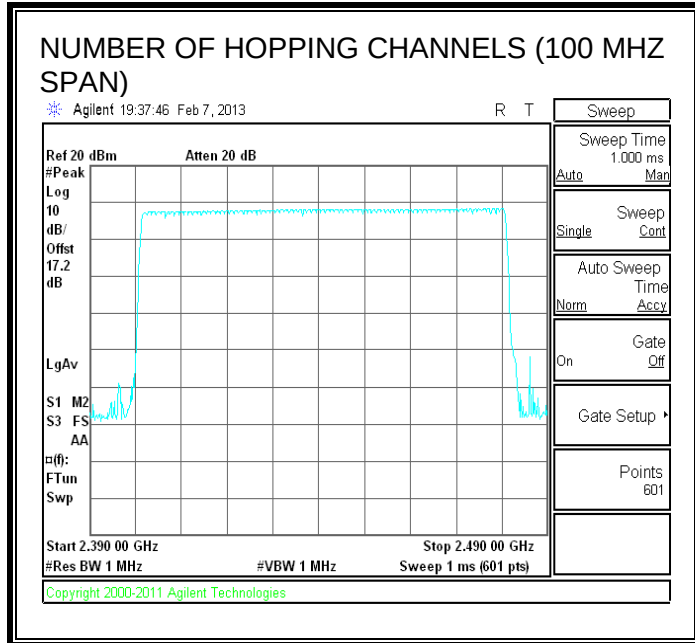
#### **TEST PROCEDURE**

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

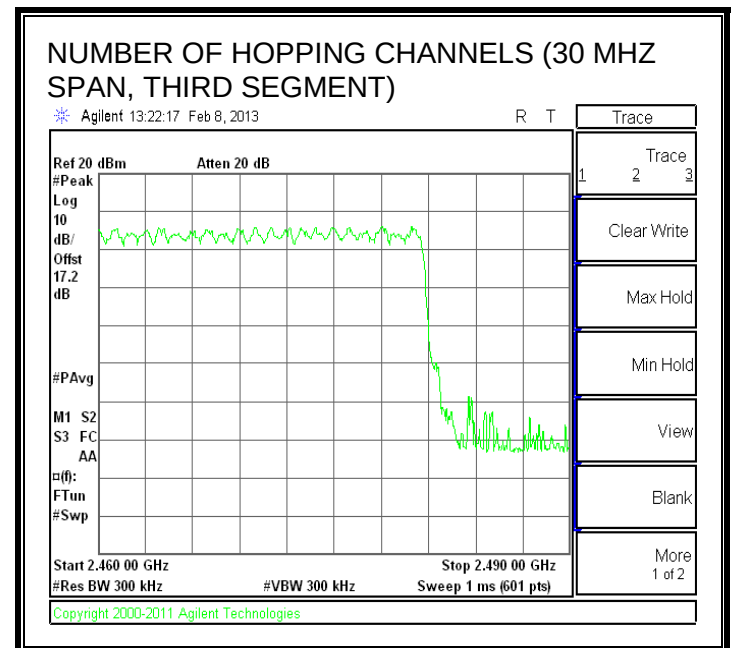
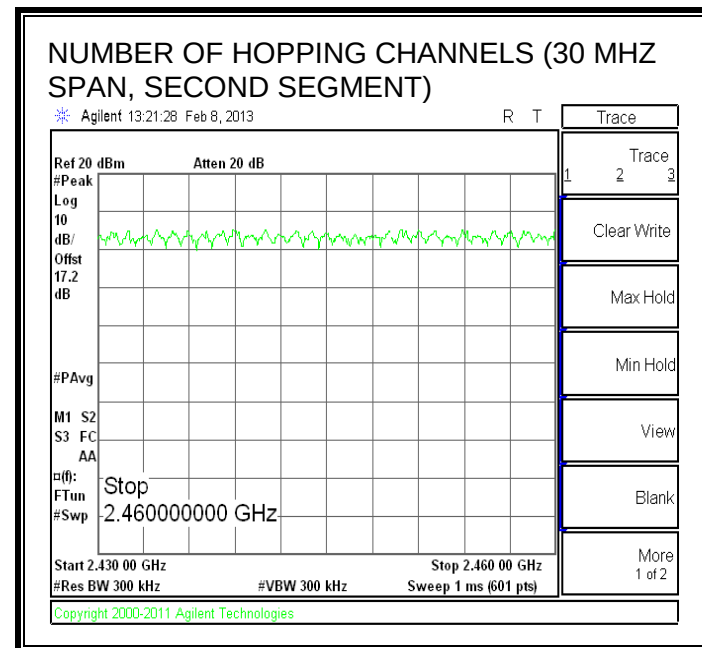
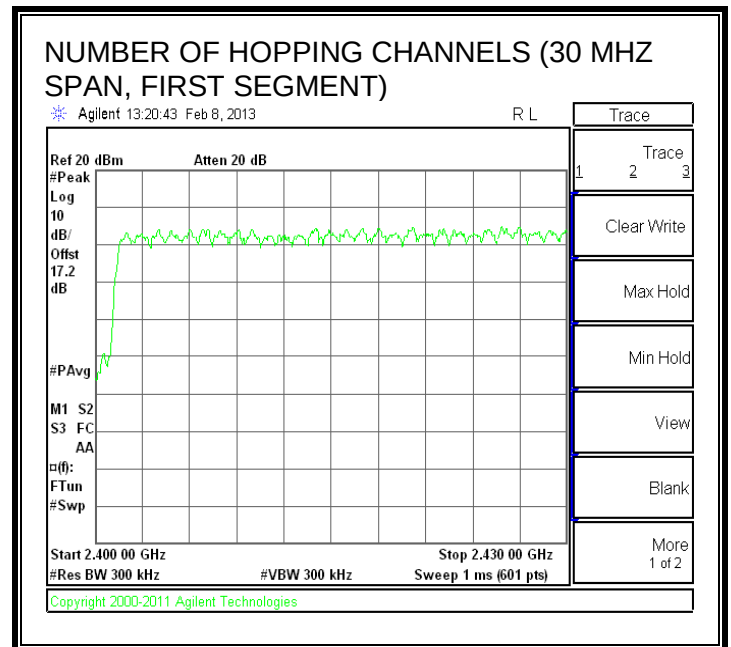
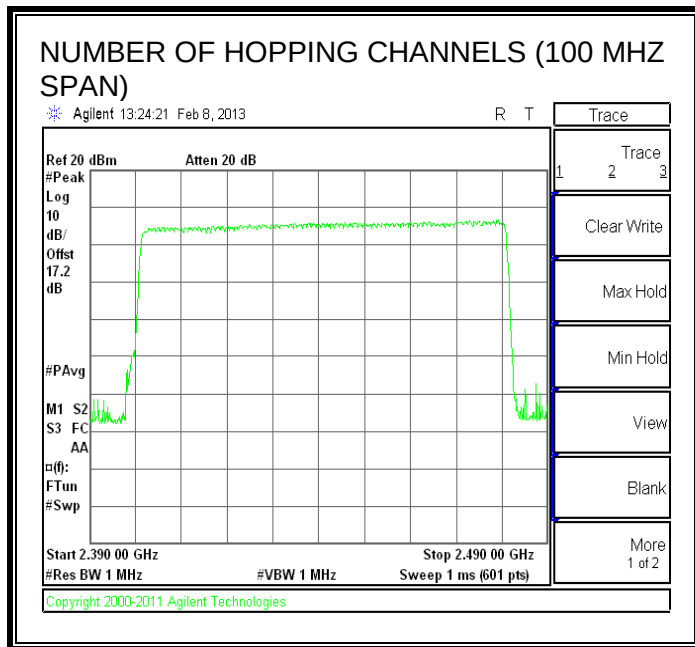
#### **RESULTS**

Normal Mode: 79 Channels observed.

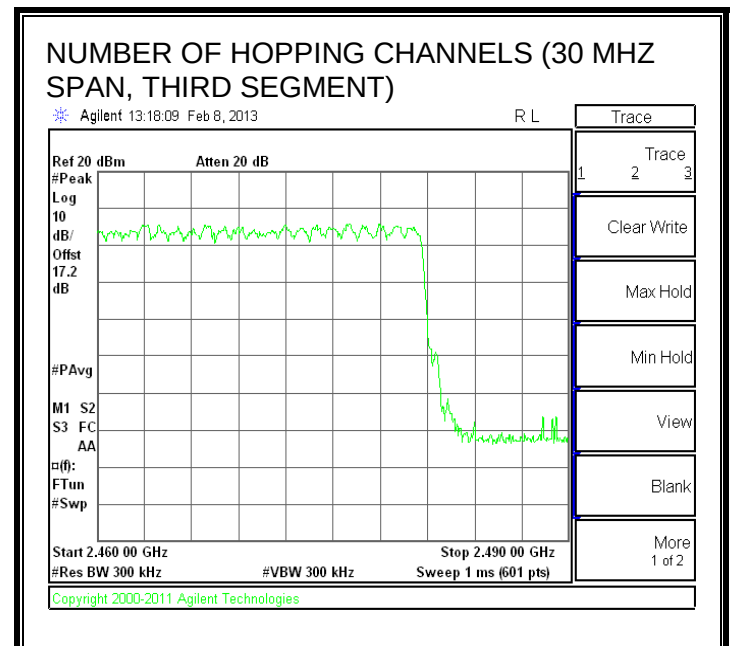
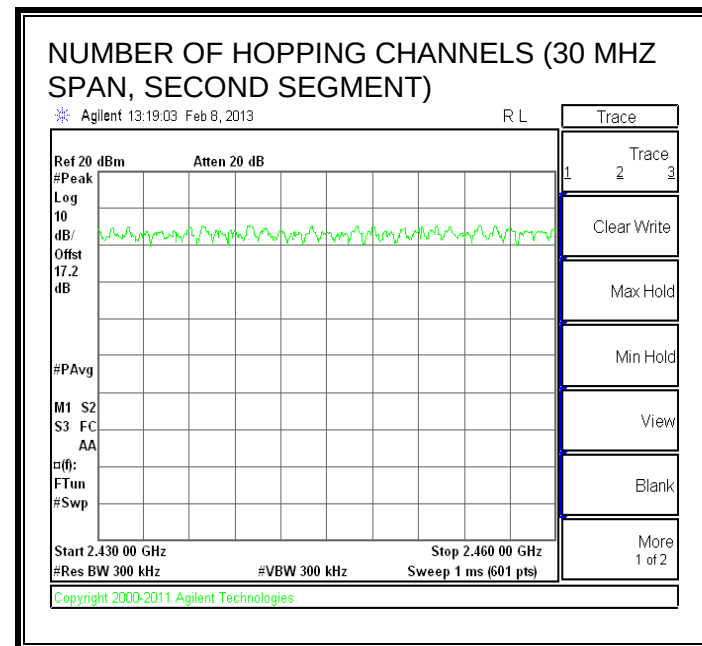
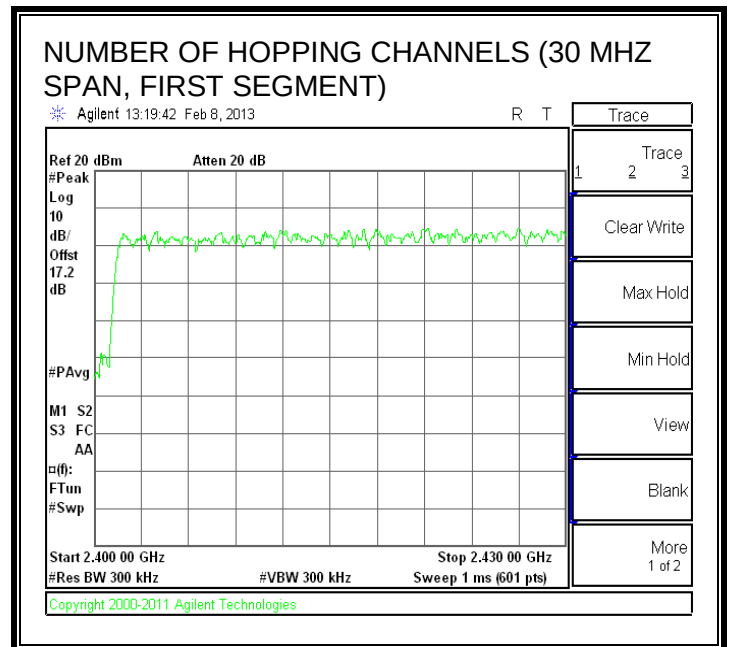
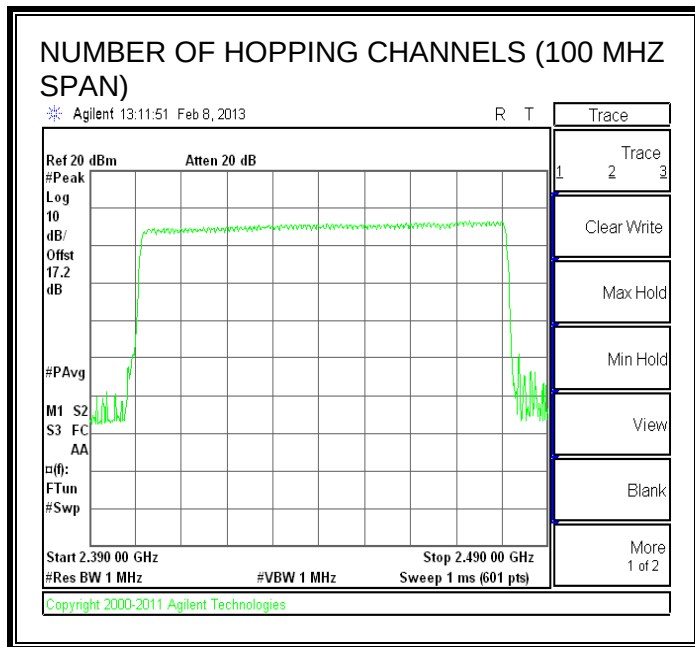
# NUMBER OF HOPPING CHANNELS, GFSK



# NUMBER OF HOPPING CHANNELS, QPSK



# NUMBER OF HOPPING CHANNELS, 8PSK





## 7.4. AVERAGE TIME OF OCCUPANCY

### LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### TEST PROCEDURE

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

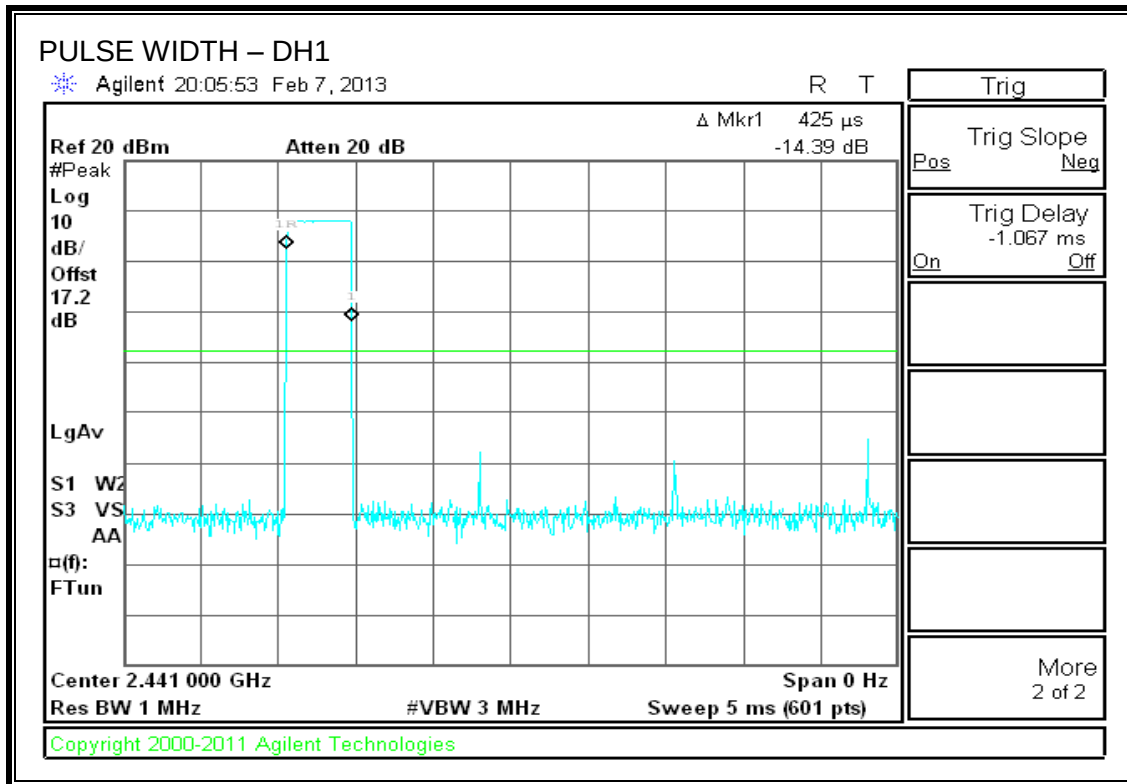
The average time of occupancy in the specified 31.6 second period (79 channels \* 0.4 s) is equal to  $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$ .

### RESULTS

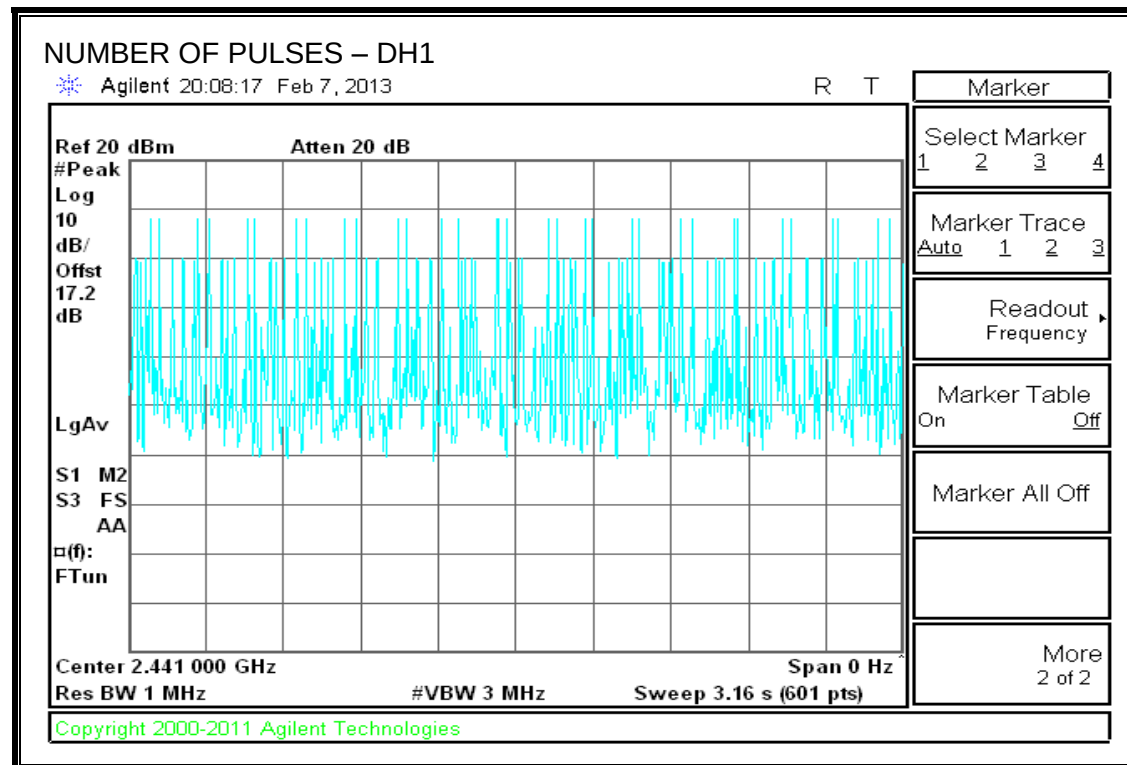
Time Of Occupancy =  $10 * \text{xx pulses} * \text{yy msec} = \text{zz msec}$

| Mode | DH Packet | Pulse Width (msec) | Number of Pulses in 3.16 seconds | Average Time of Occupancy | Limit (sec) | Margin (sec) |
|------|-----------|--------------------|----------------------------------|---------------------------|-------------|--------------|
| GFSK | DH1       | 0.425              | 32                               | 0.136                     | 0.4         | -0.264       |
|      | DH3       | 1.683              | 18                               | 0.303                     | 0.4         | -0.097       |
|      | DH5       | 2.933              | 12                               | 0.352                     | 0.4         | -0.048       |
| QPSK | 2-DH1     | 0.4167             | 31                               | 0.129                     | 0.4         | -0.271       |
|      | 2-DH3     | 1.667              | 15                               | 0.250                     | 0.4         | -0.150       |
|      | 2-DH5     | 2.928              | 9                                | 0.264                     | 0.4         | -0.136       |
| 8PSK | 3-DH1     | 0.425              | 32                               | 0.136                     | 0.4         | -0.264       |
|      | 3-DH3     | 1.65               | 16                               | 0.264                     | 0.4         | -0.136       |
|      | 3-DH5     | 2.933              | 11                               | 0.323                     | 0.4         | -0.077       |

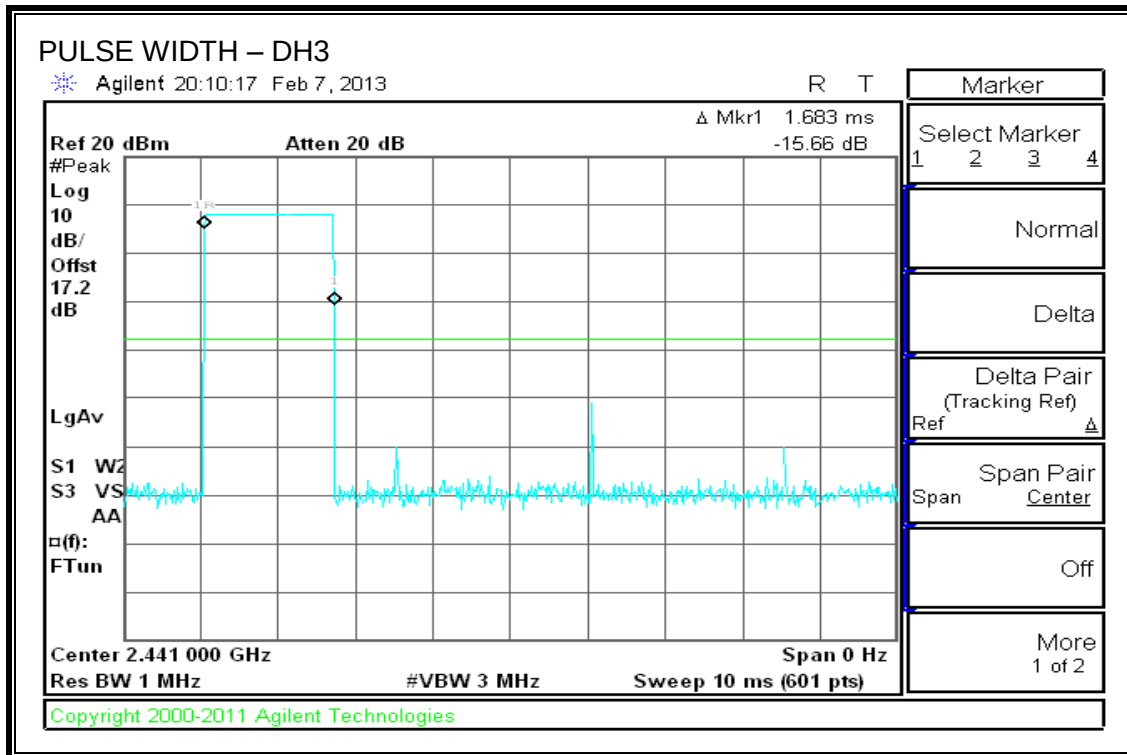
**GFSK, PULSE WIDTH - DH1**



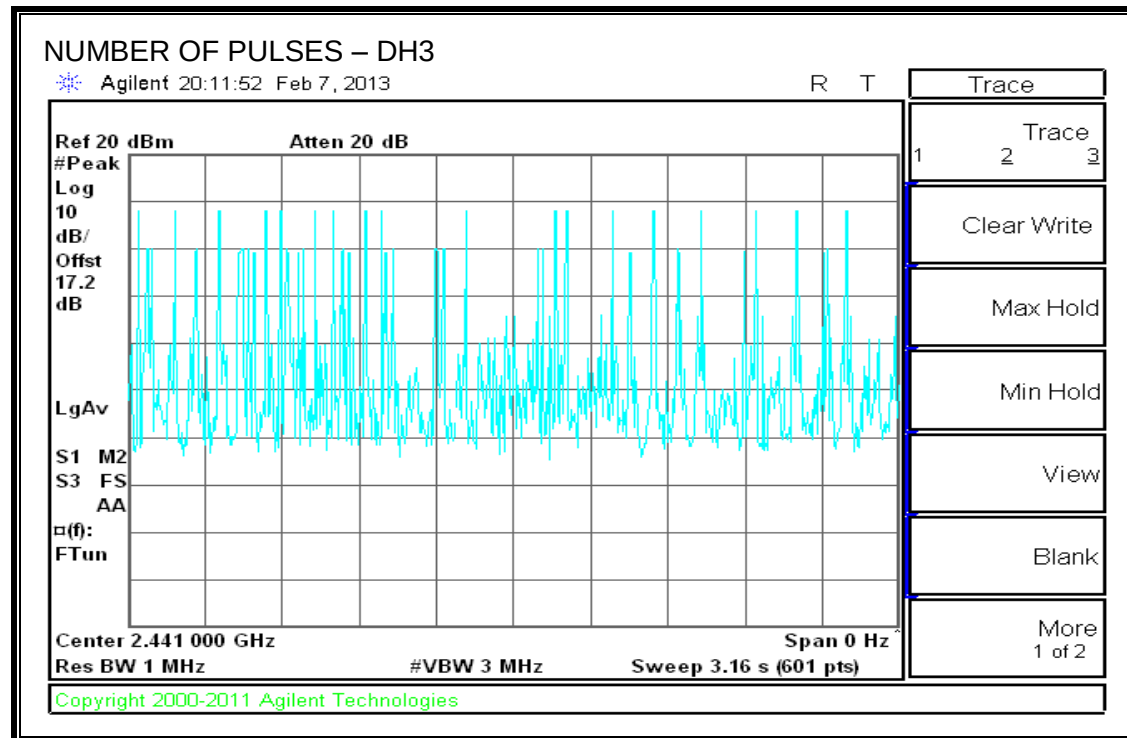
**GFSK, NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1**



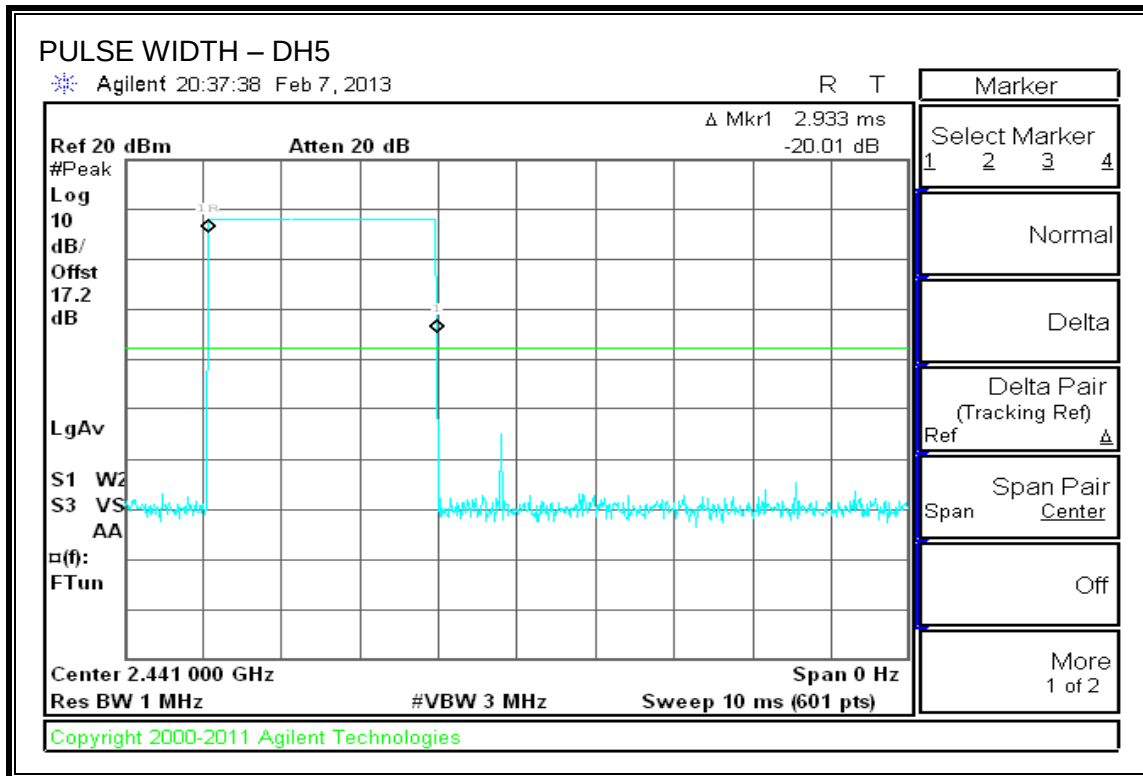
**GFSK, PULSE WIDTH – DH3**



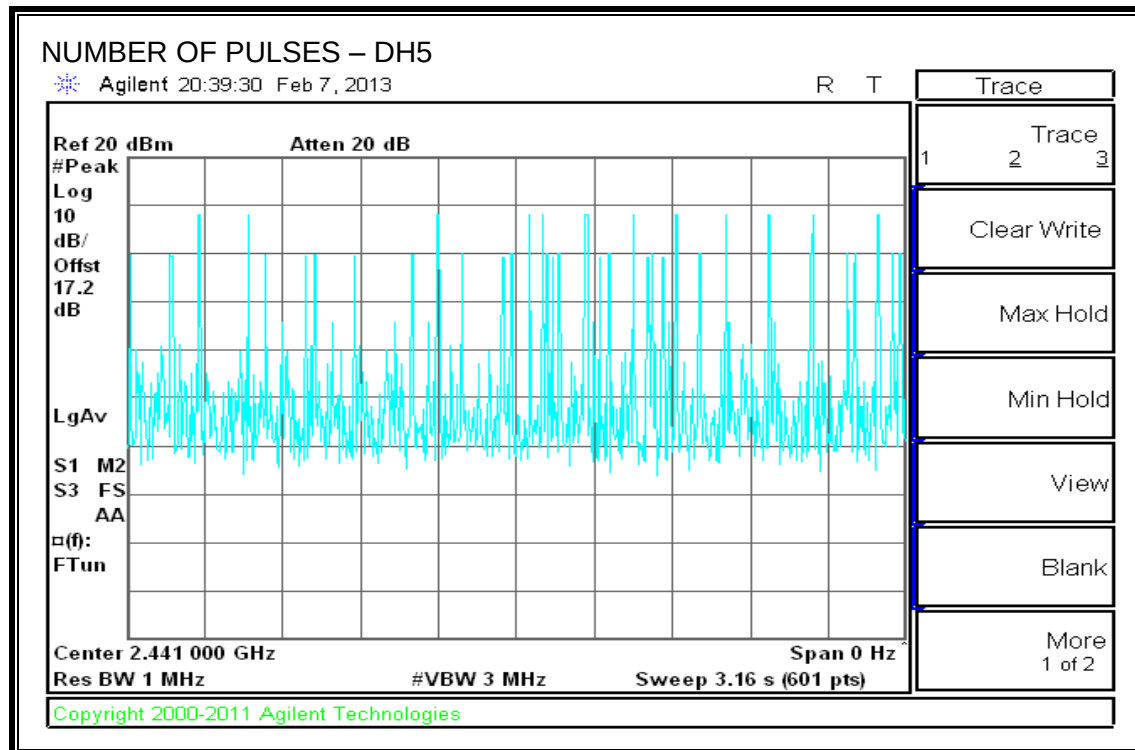
**GFSK, NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3**



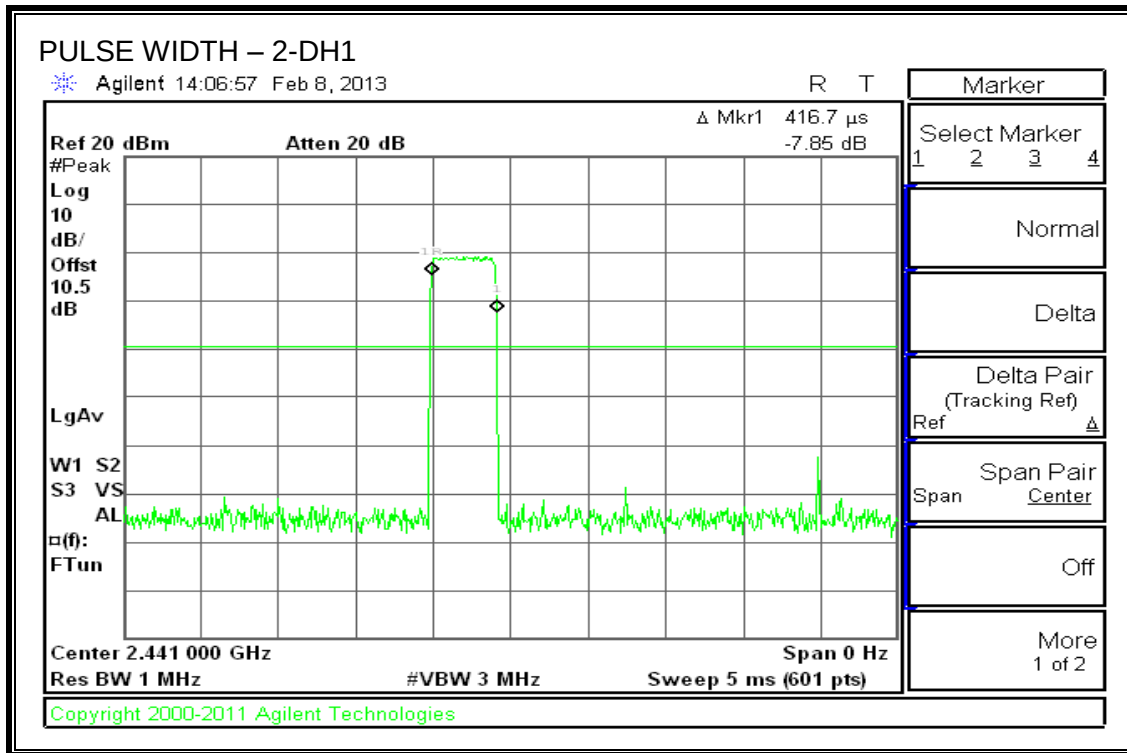
**GFSK, PULSE WIDTH – DH5**



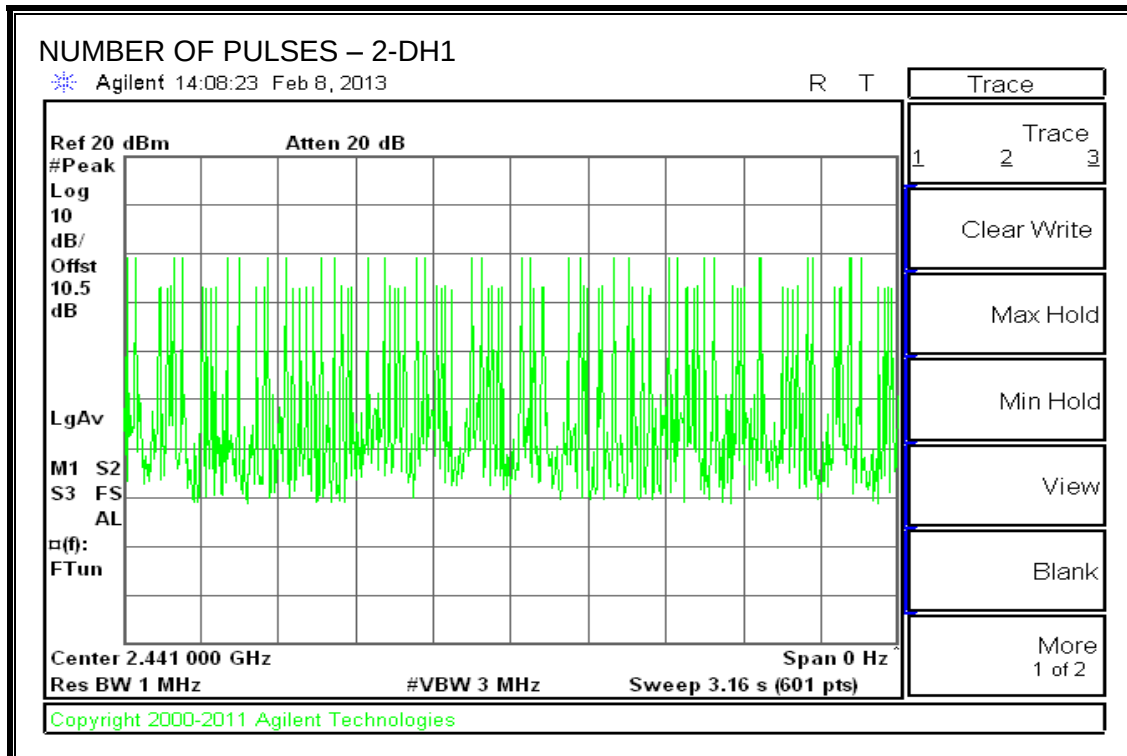
**GFSK, NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5**



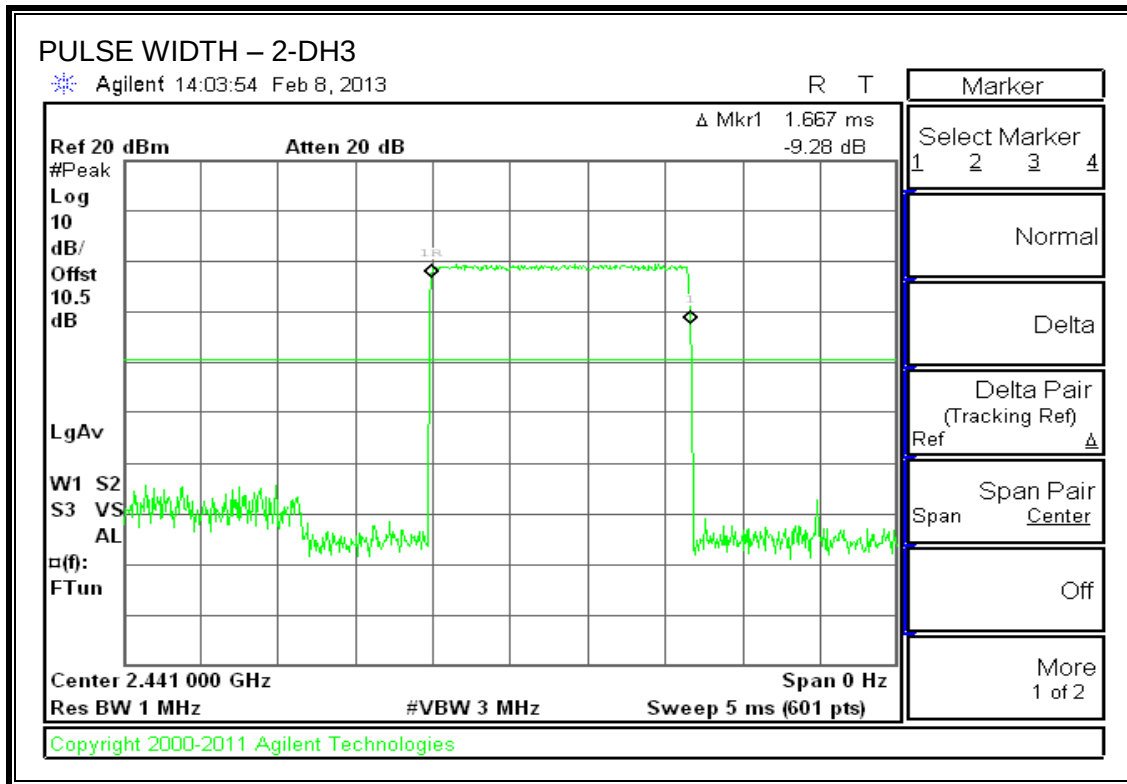
**QPSK, PULSE WIDTH – 2-DH1**



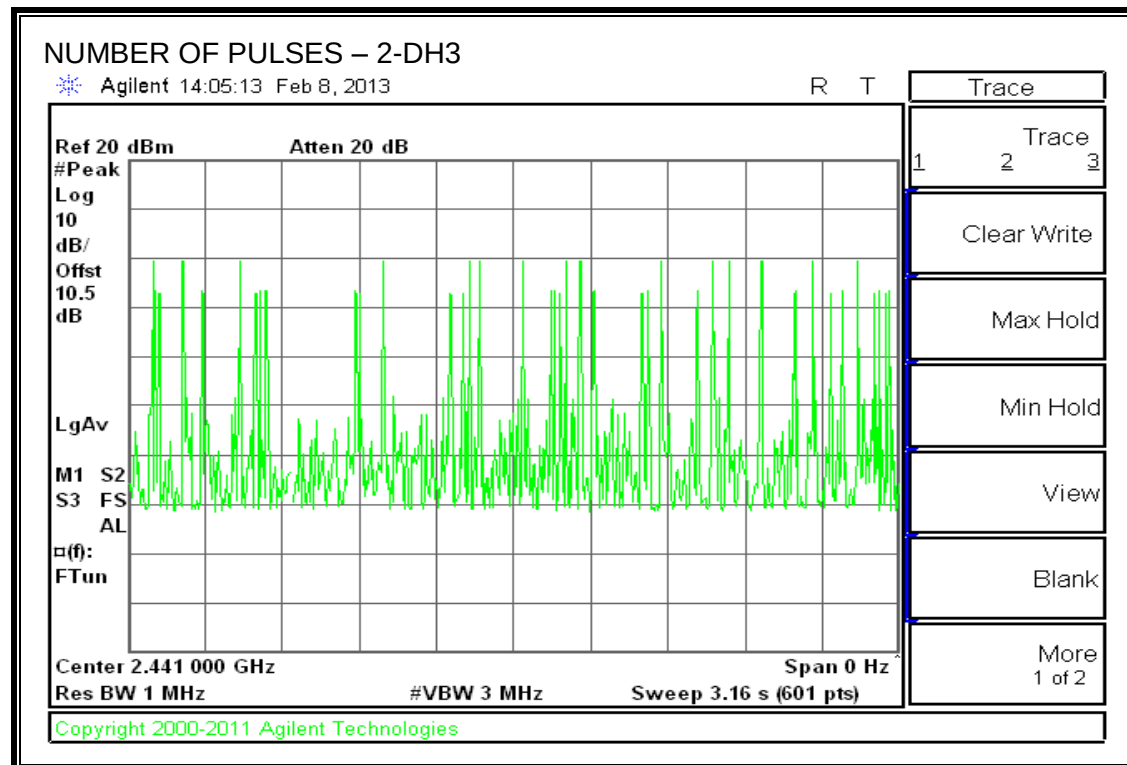
**QPSK, NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD –2- DH1**



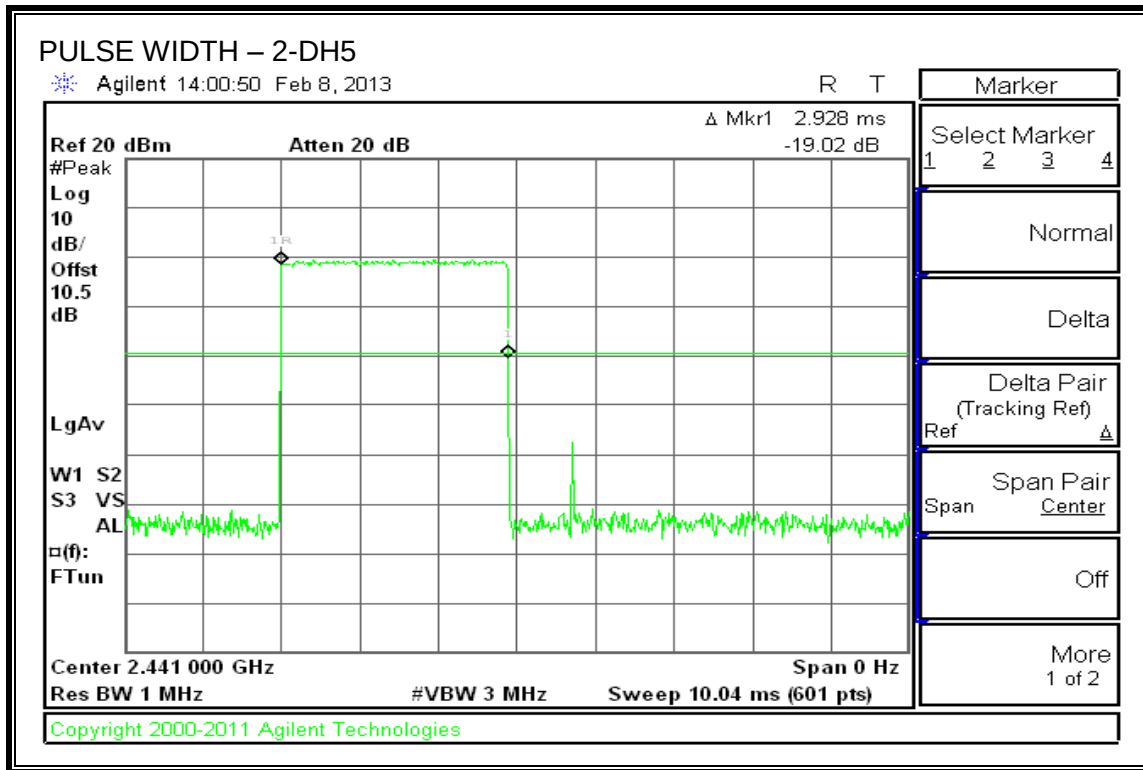
**QPSK, PULSE WIDTH – 2-DH3**



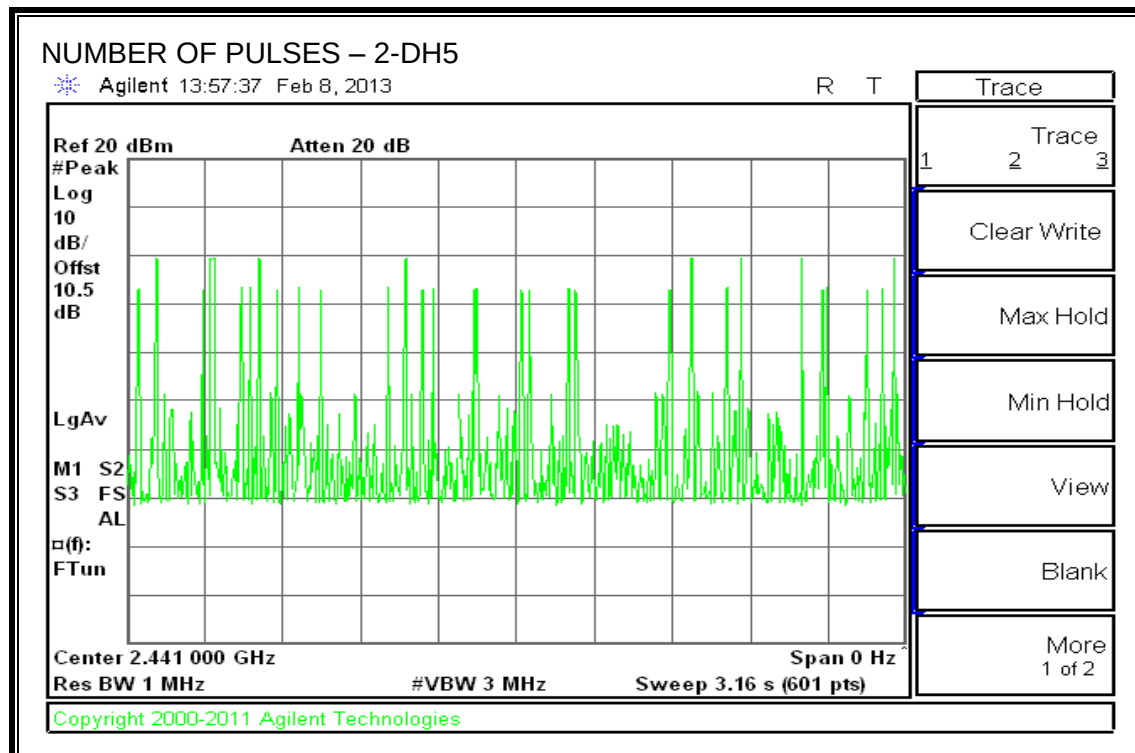
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 2-DH3**



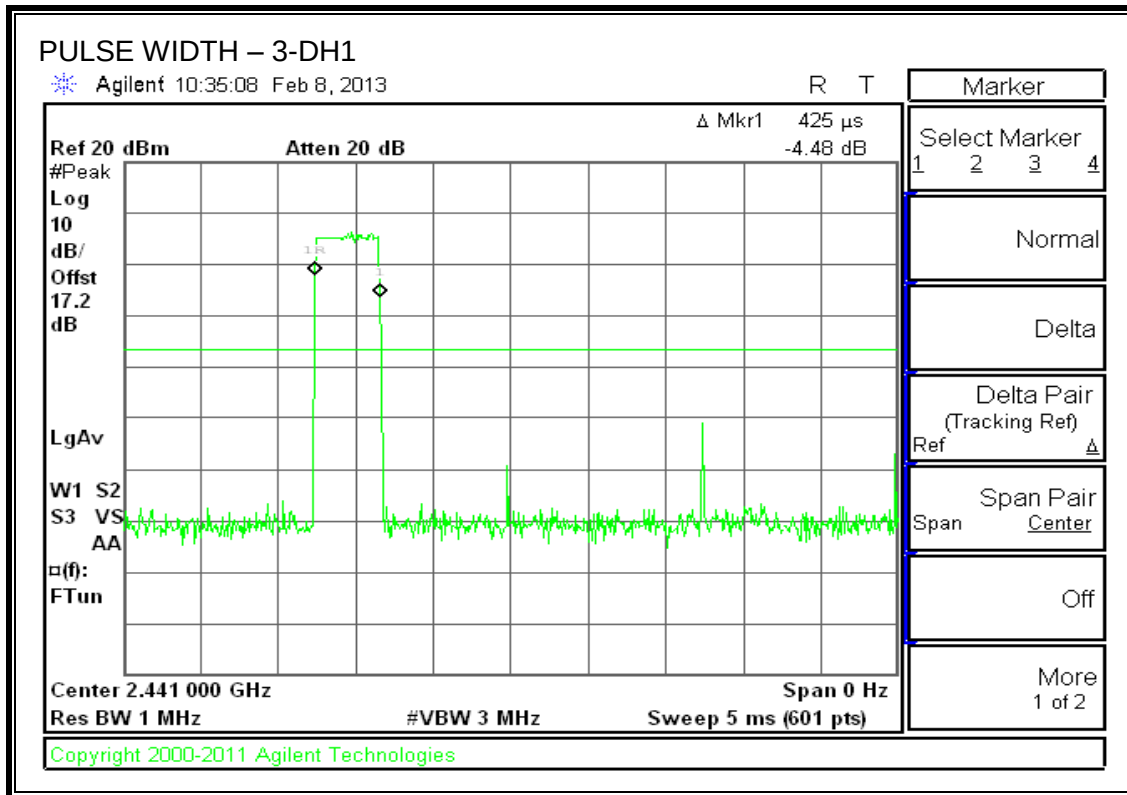
**QPSK, PULSE WIDTH – 2-DH5**



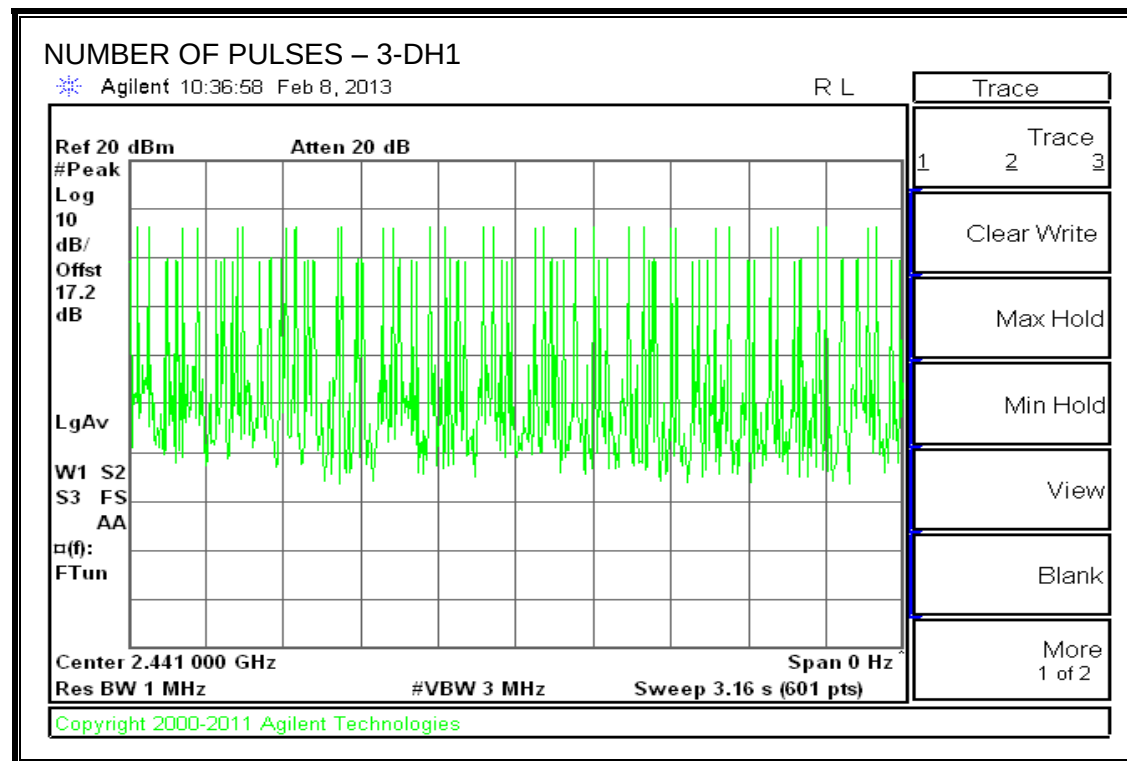
**QPSK, NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 2-DH5**



**8PSK, PULSE WIDTH – 3-DH1**

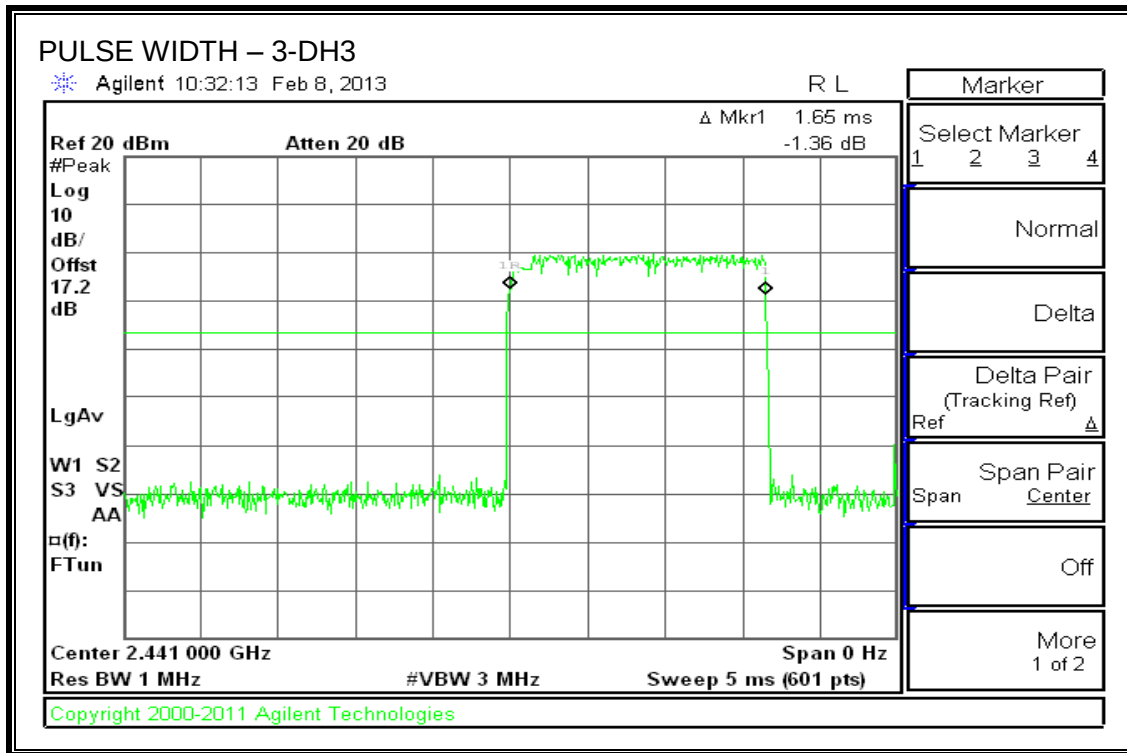


**8PSK, NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3-DH1**

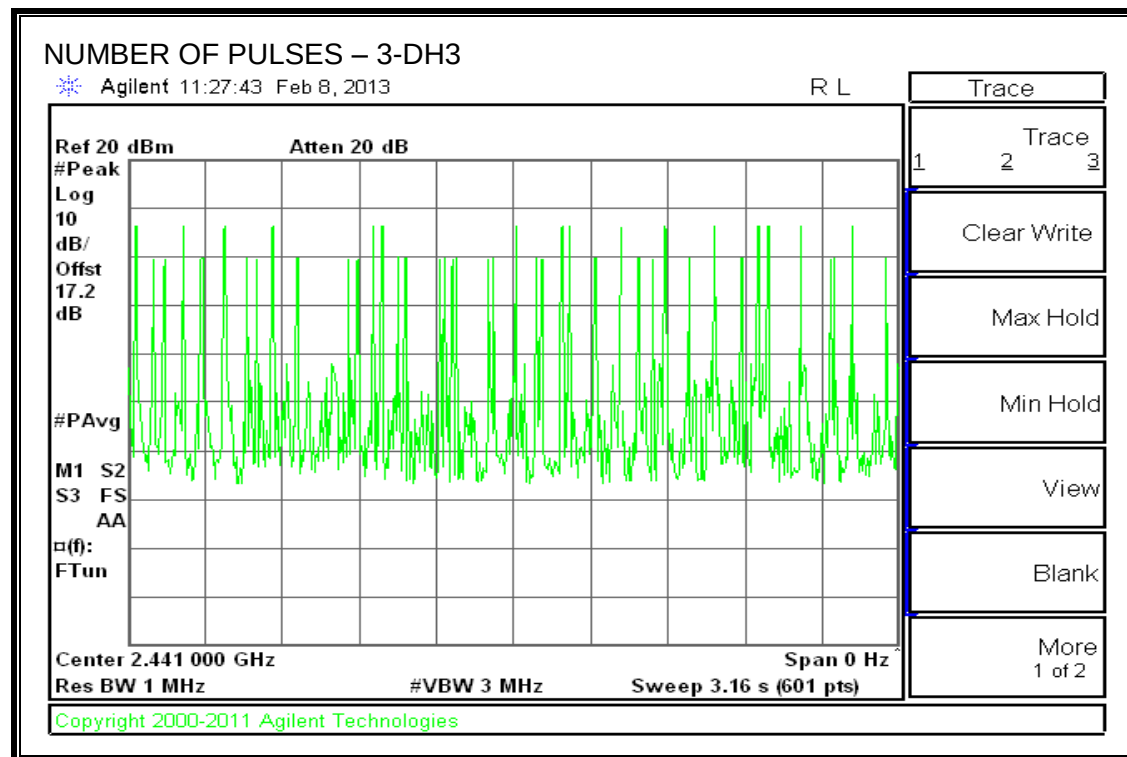




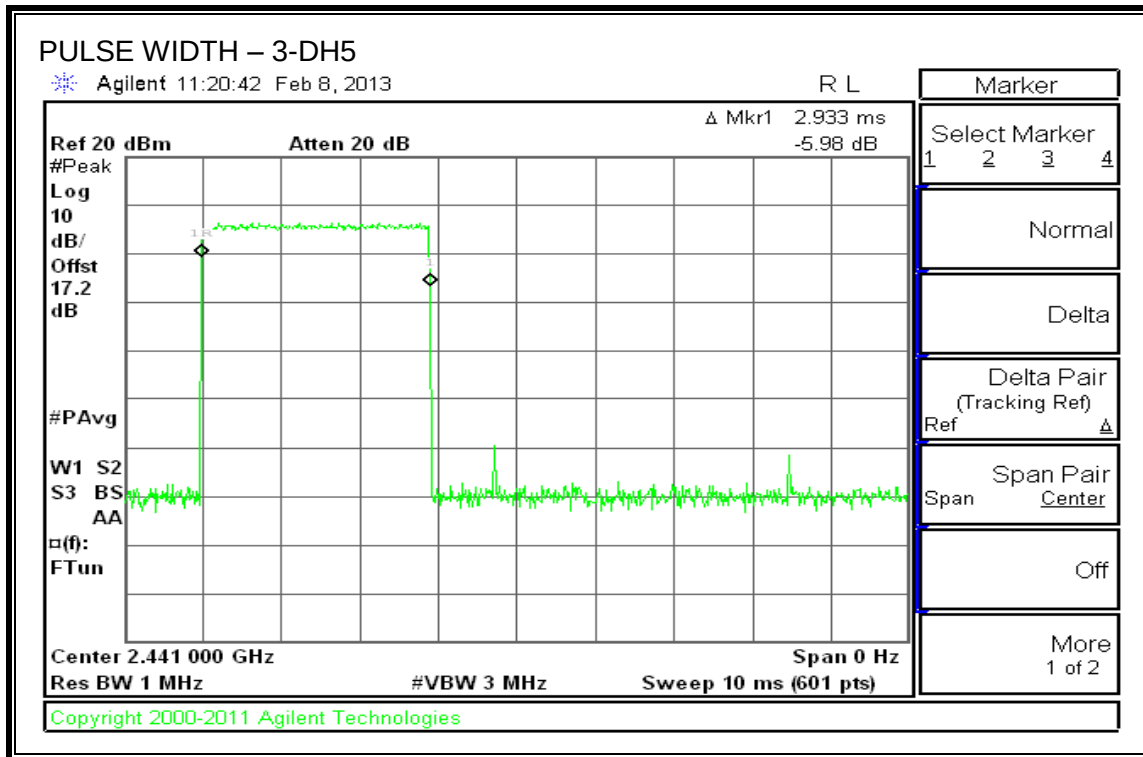
**8PSK, PULSE WIDTH -3- DH3**



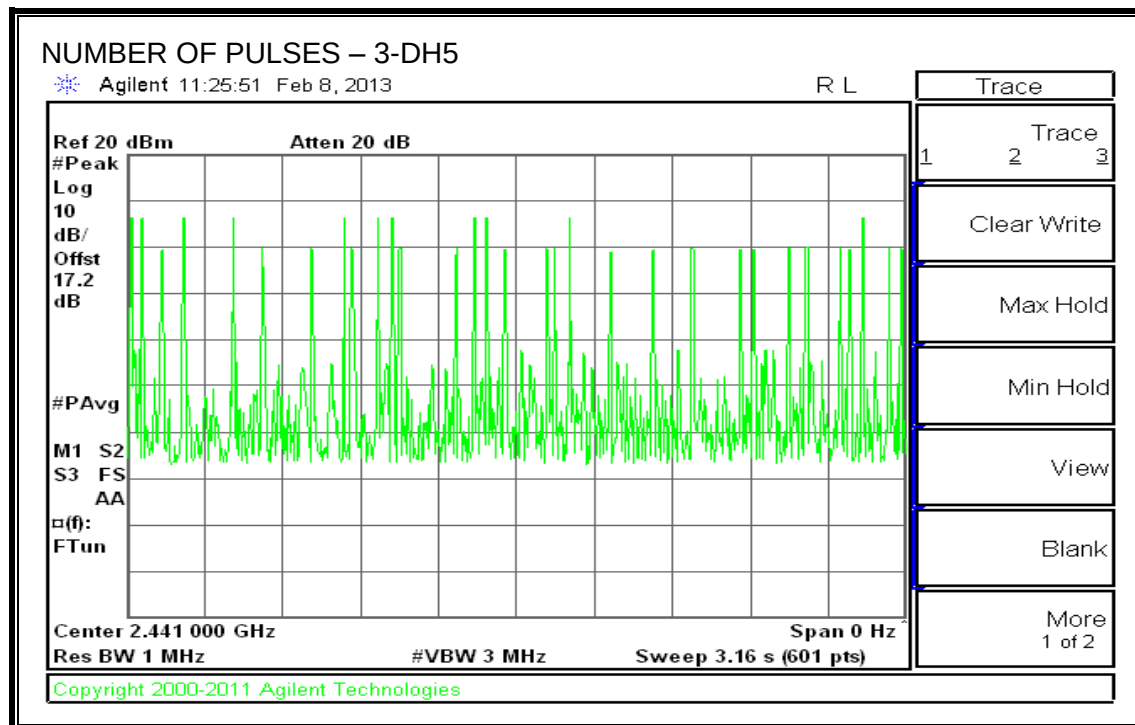
**8PSK, NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - 3-DH3**



**8PSK, PULSE WIDTH – 3-DH5**



**8PSK, NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3-DH5**



## 7.5. OUTPUT POWER

### LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

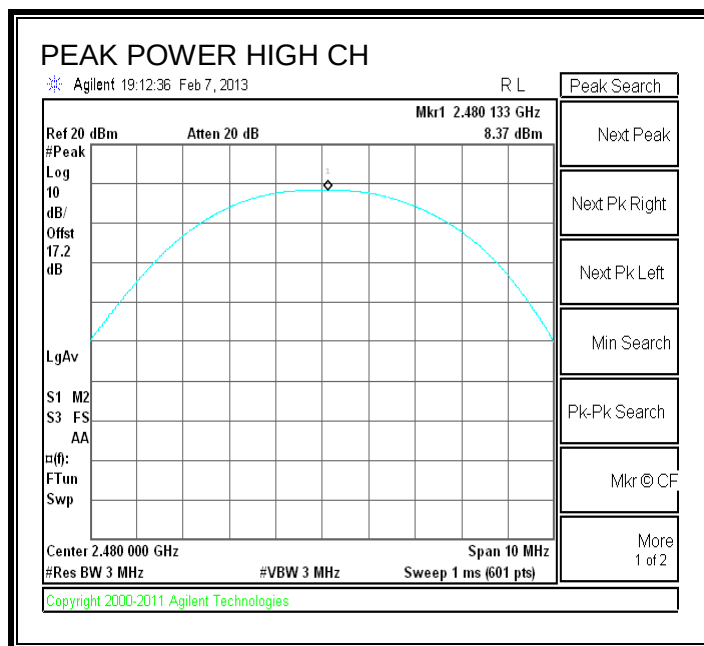
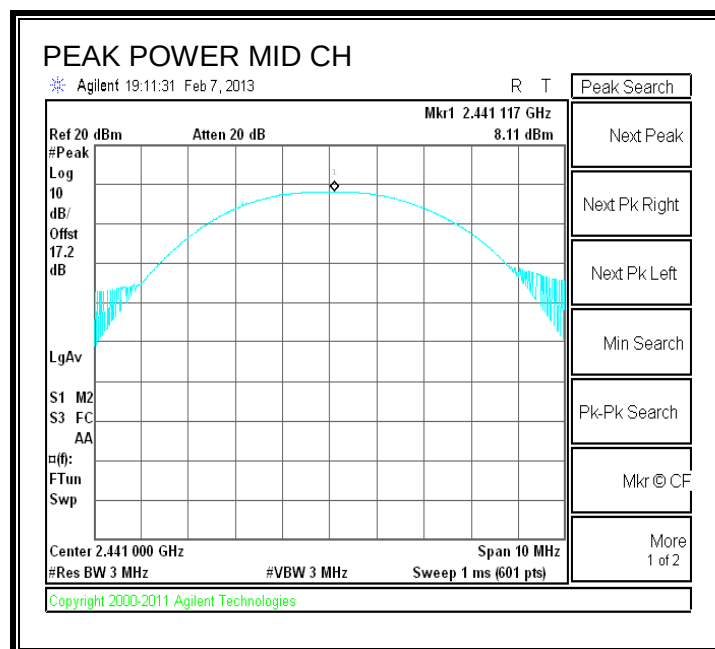
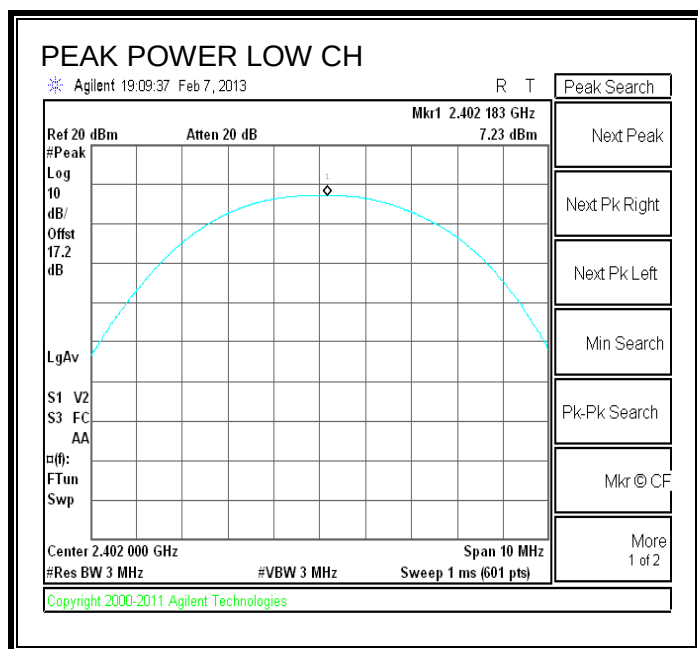
### TEST PROCEDURE

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

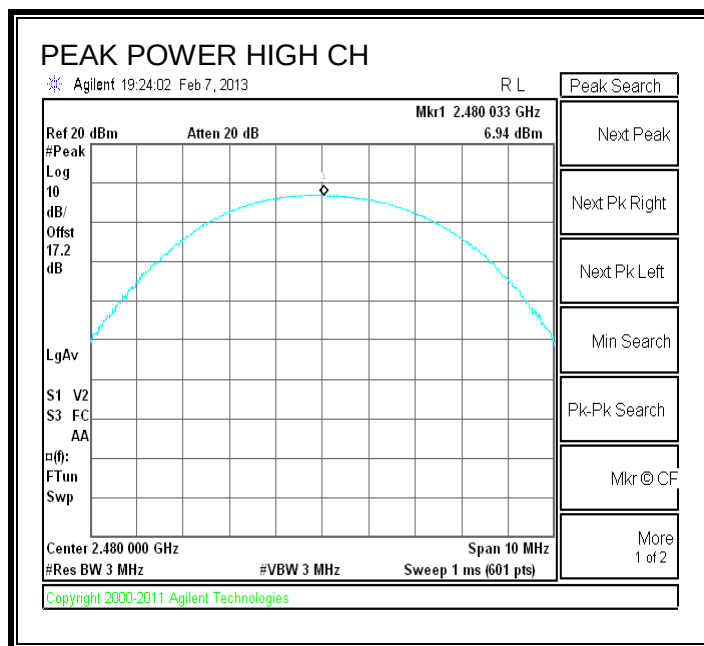
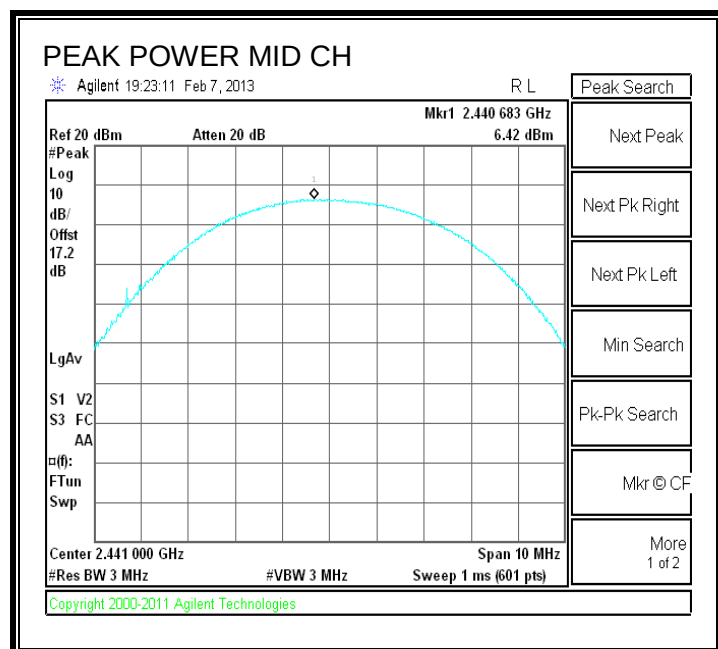
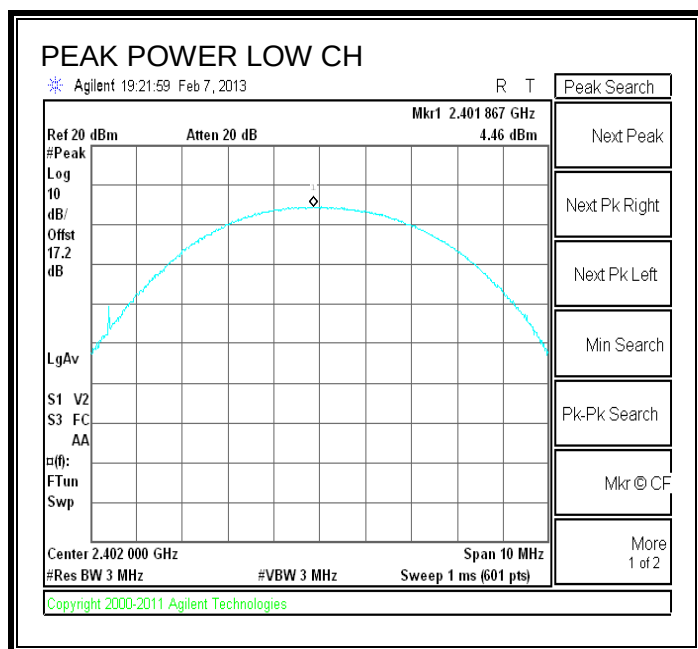
### RESULTS

| Mode | Channel | Frequency (MHz) | Output Power (dBm) | Limit (dBm) | Margin (dB) |
|------|---------|-----------------|--------------------|-------------|-------------|
| GFSK | Low     | 2402            | 7.23               | 30          | -22.77      |
|      | Middle  | 2441            | 8.11               | 30          | -21.89      |
|      | High    | 2480            | 8.37               | 30          | -21.63      |
| QPSK | Low     | 2402            | 4.46               | 30          | -25.54      |
|      | Middle  | 2441            | 6.42               | 30          | -23.58      |
|      | High    | 2480            | 6.94               | 30          | -23.06      |
| 8PSK | Low     | 2402            | 4.64               | 30          | -25.36      |
|      | Middle  | 2441            | 6.62               | 30          | -23.38      |
|      | High    | 2480            | 7.17               | 30          | -22.83      |

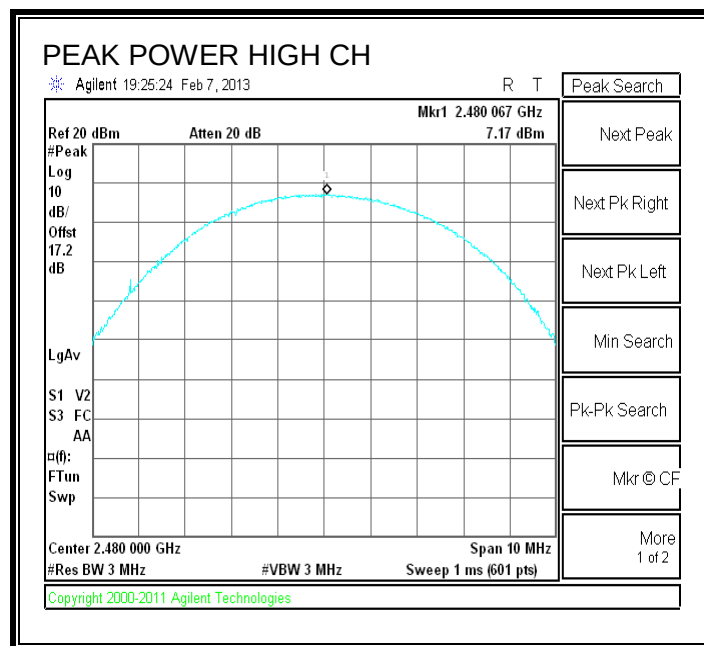
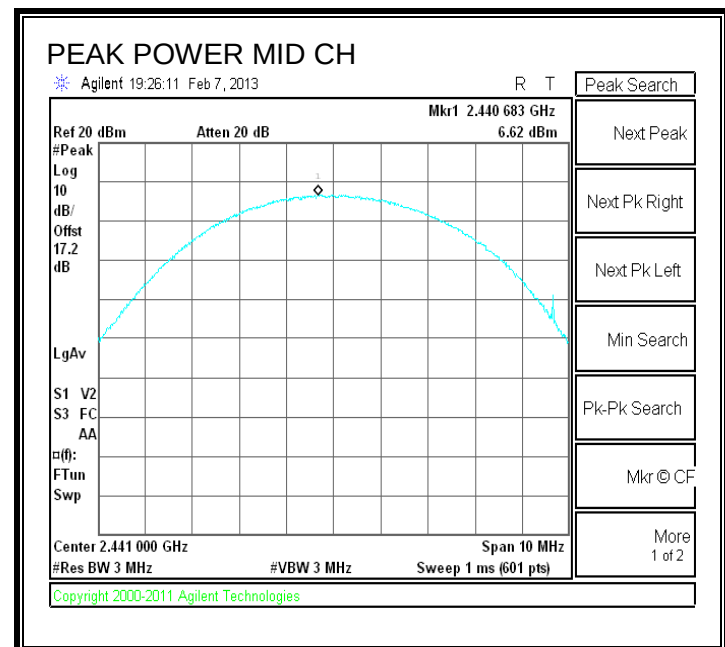
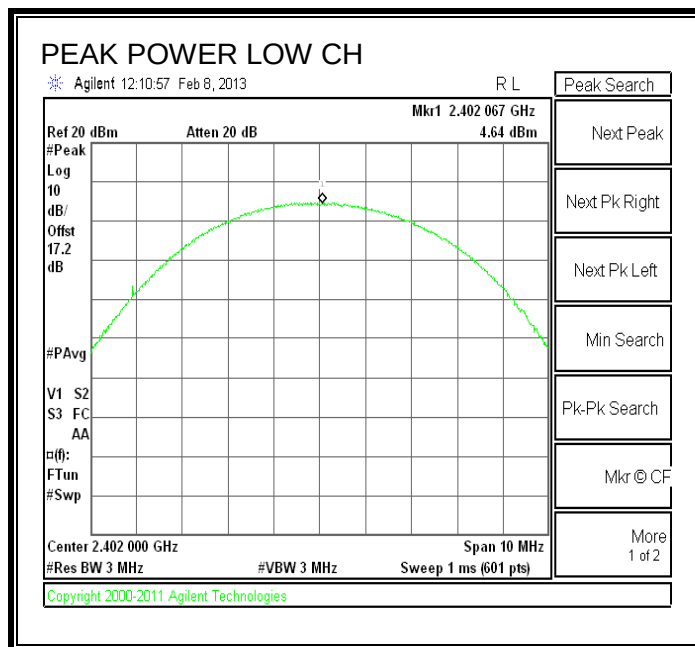
# **OUTPUT POWER, GFSK**



# **OUTPUT POWER, QPSK**



**OUTPUT POWER, 8PSK**



## 7.6. AVERAGE POWER

### LIMIT

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Mode | Channel | Frequency<br>(MHz) | Average Power<br>(dBm) |
|------|---------|--------------------|------------------------|
| GFSK | Low     | 2402               | 5.70                   |
|      | Middle  | 2441               | 6.90                   |
|      | High    | 2480               | 6.98                   |
| QPSK | Low     | 2402               | 2.80                   |
|      | Middle  | 2441               | 3.70                   |
|      | High    | 2480               | 4.10                   |
| 8PSK | Low     | 2402               | 0.50                   |
|      | Middle  | 2441               | 3.20                   |
|      | High    | 2480               | 3.80                   |

## **7.7. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

### **TEST PROCEDURE**

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

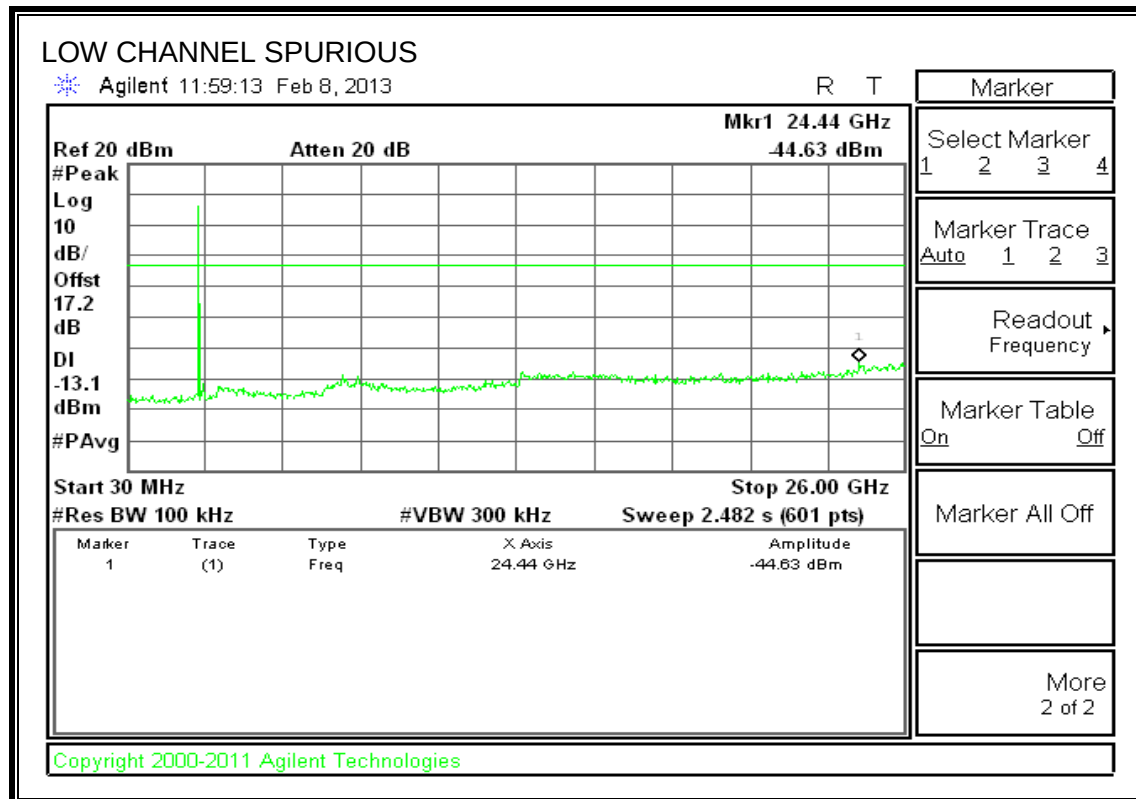
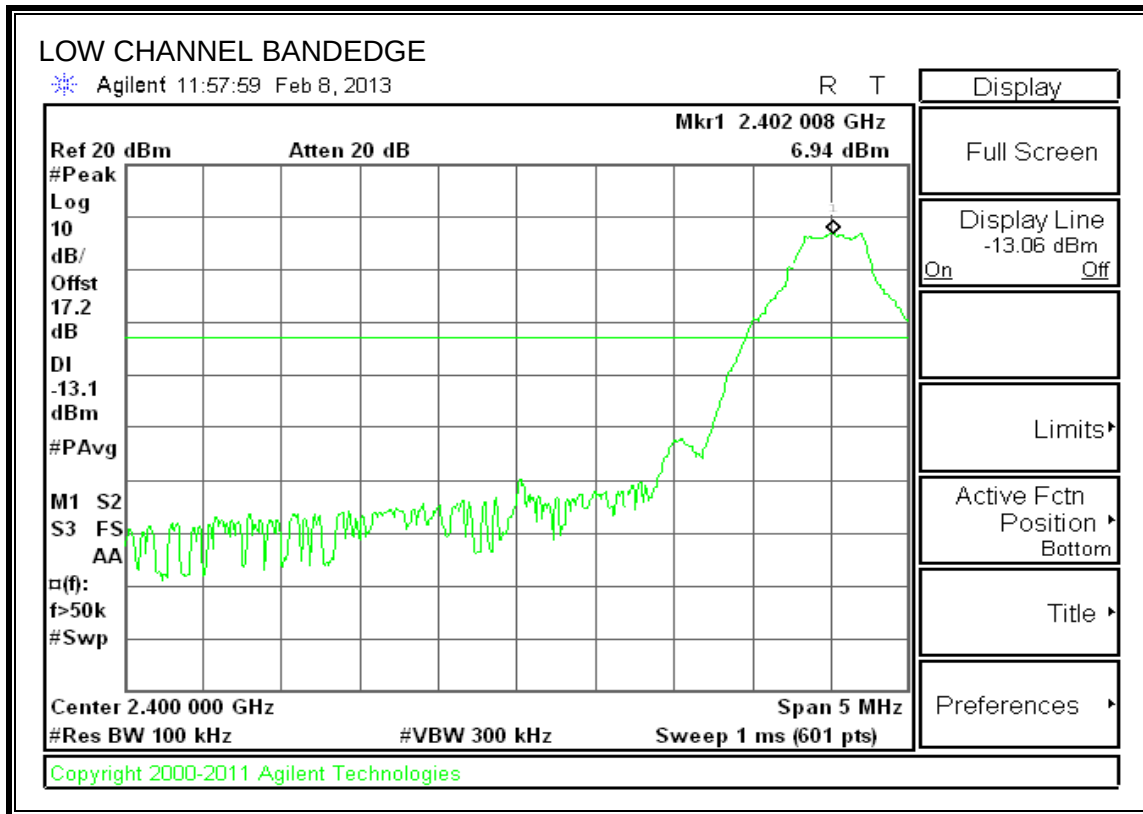
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

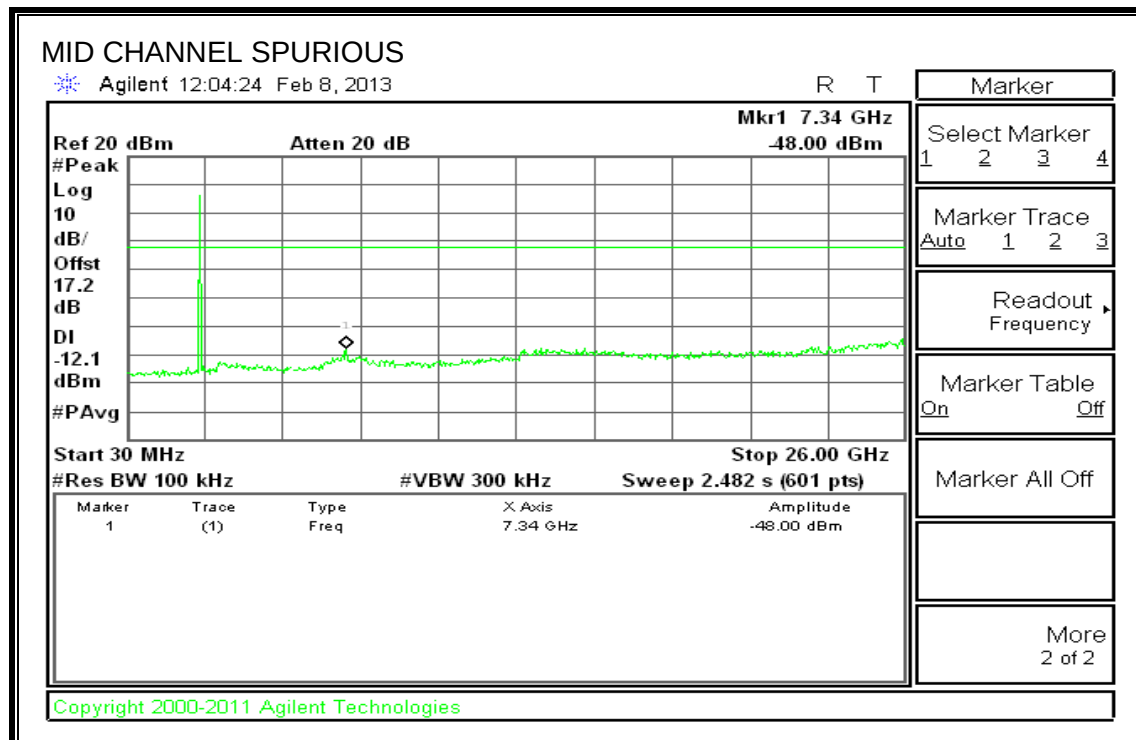
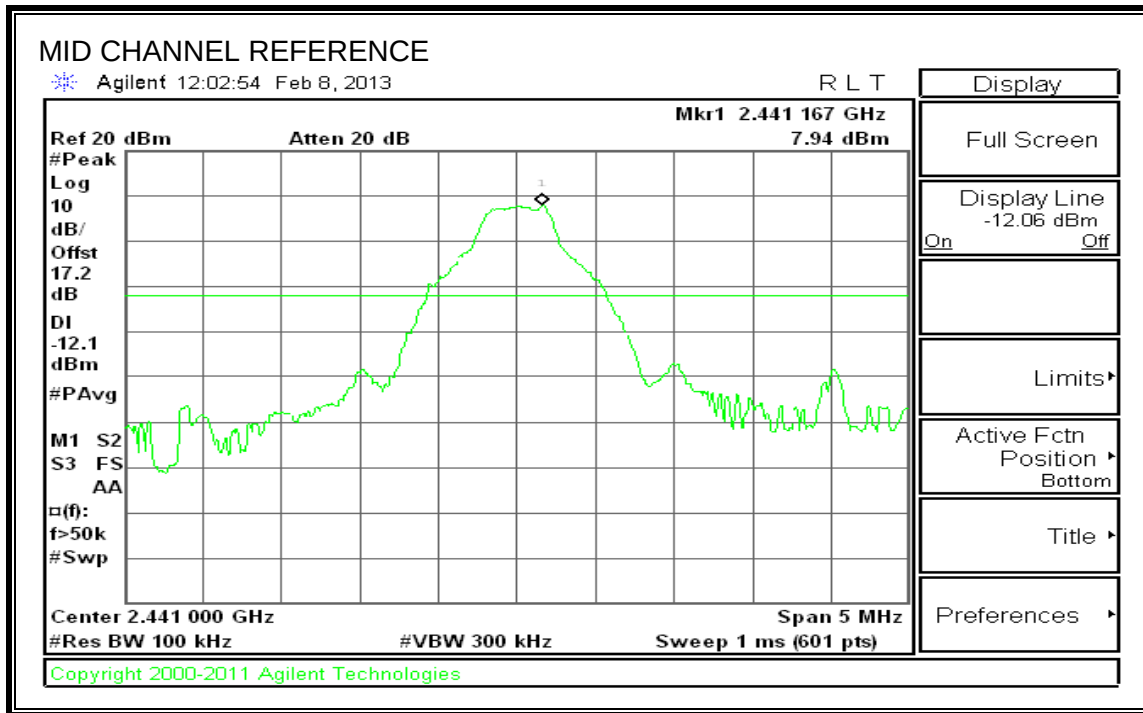
### **RESULTS**



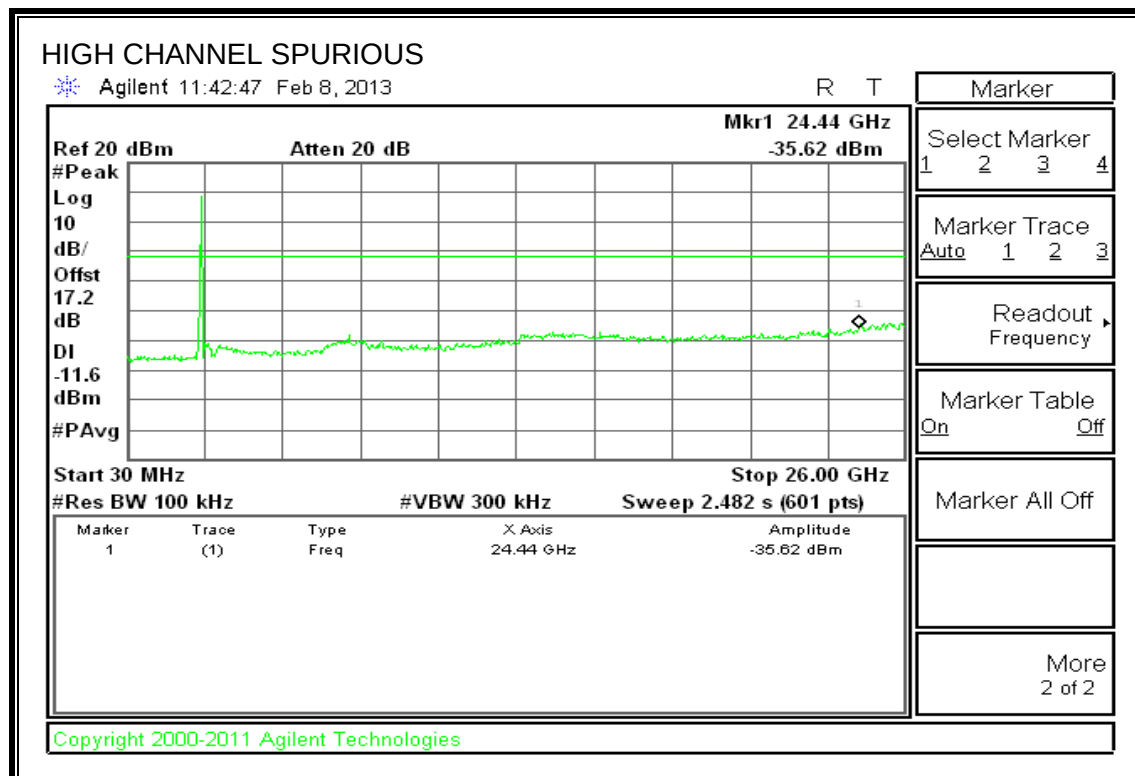
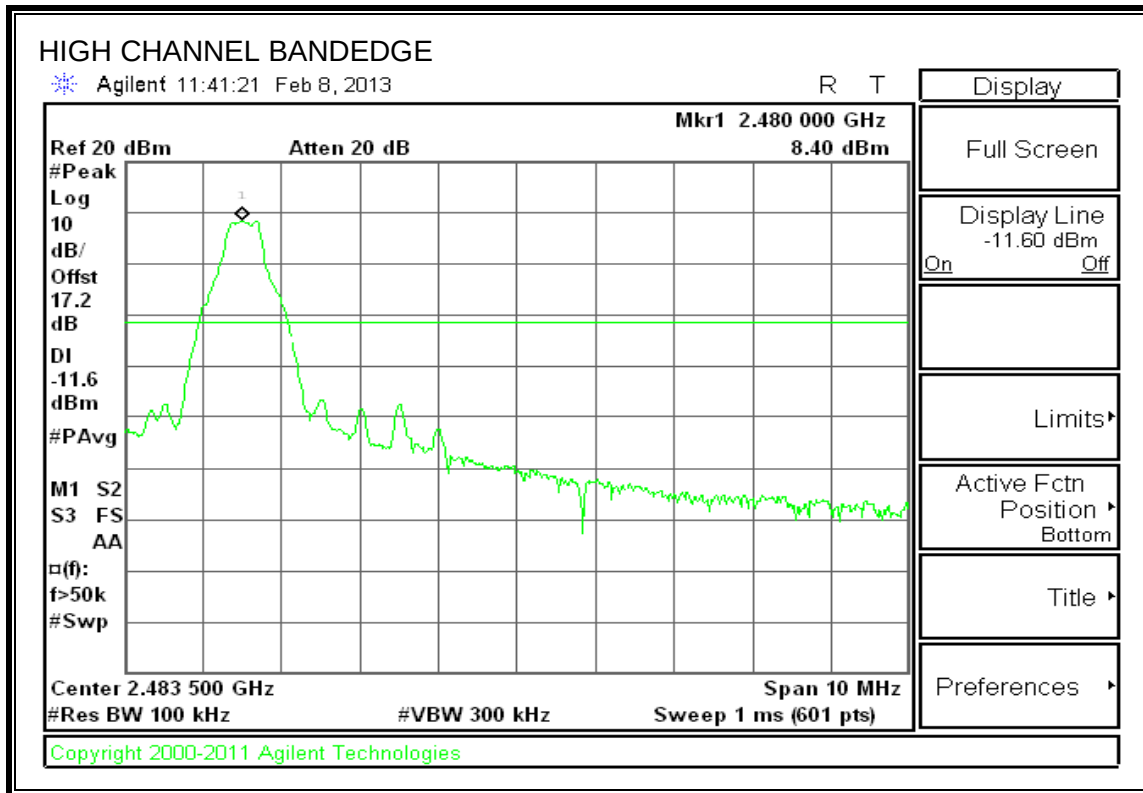
**GFSK, SPURIOUS EMISSIONS, LOW CHANNEL**



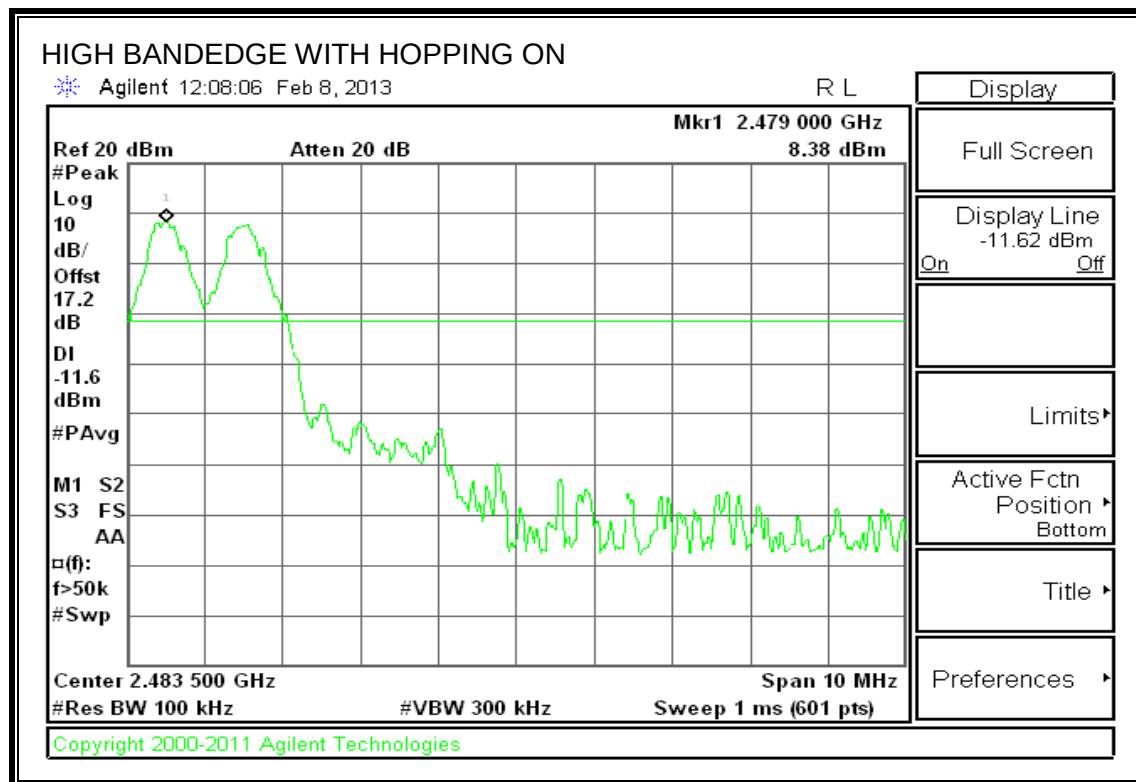
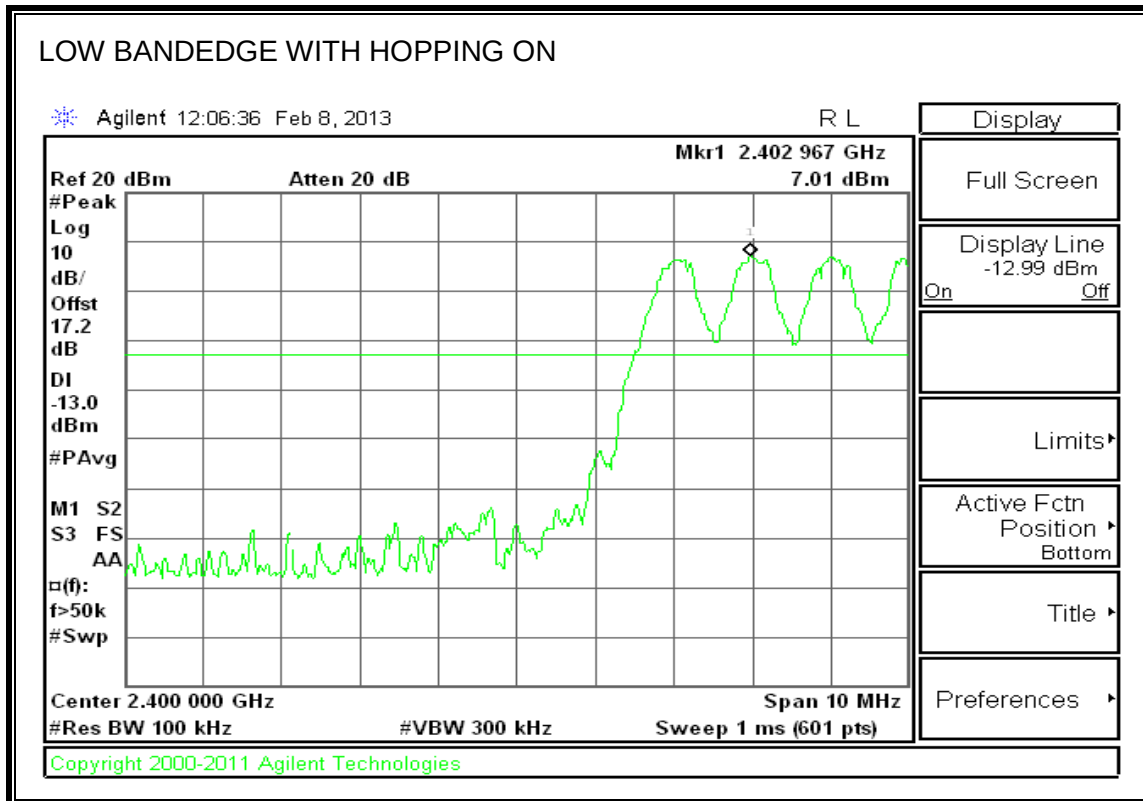
**GFSK, SPURIOUS EMISSIONS, MID CHANNEL**



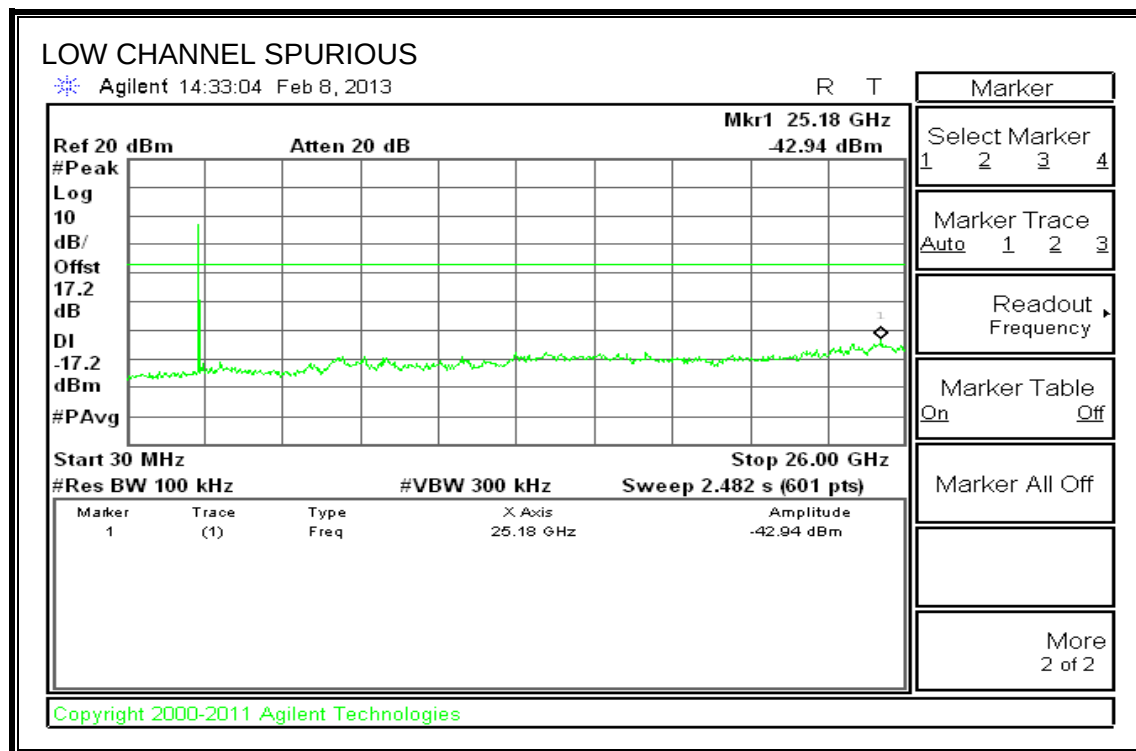
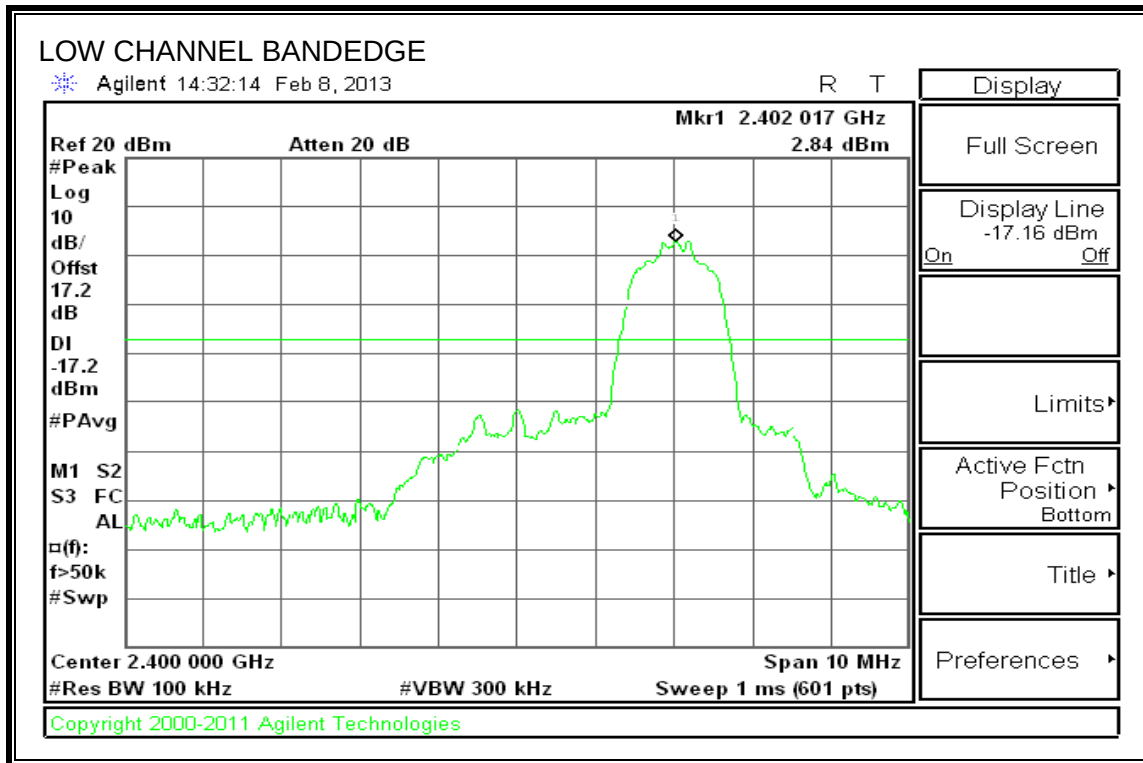
**GFSK, SPURIOUS EMISSIONS, HIGH CHANNEL**



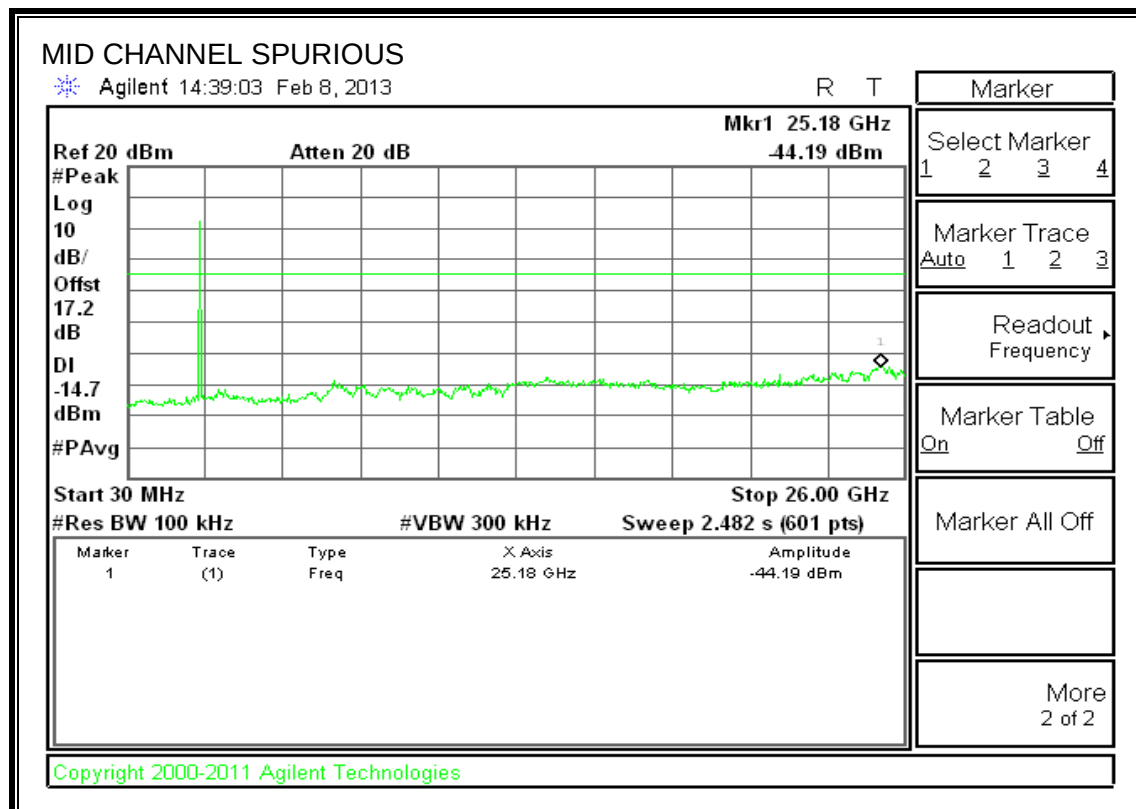
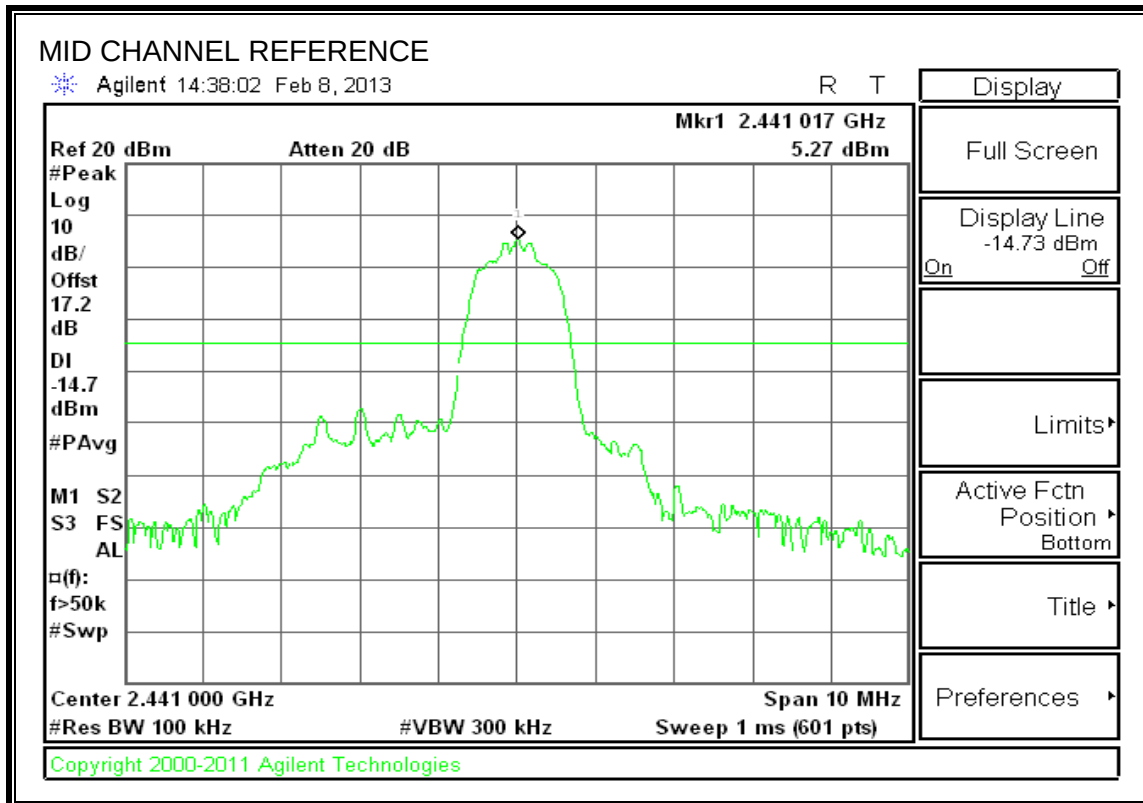
**GFSK, SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**



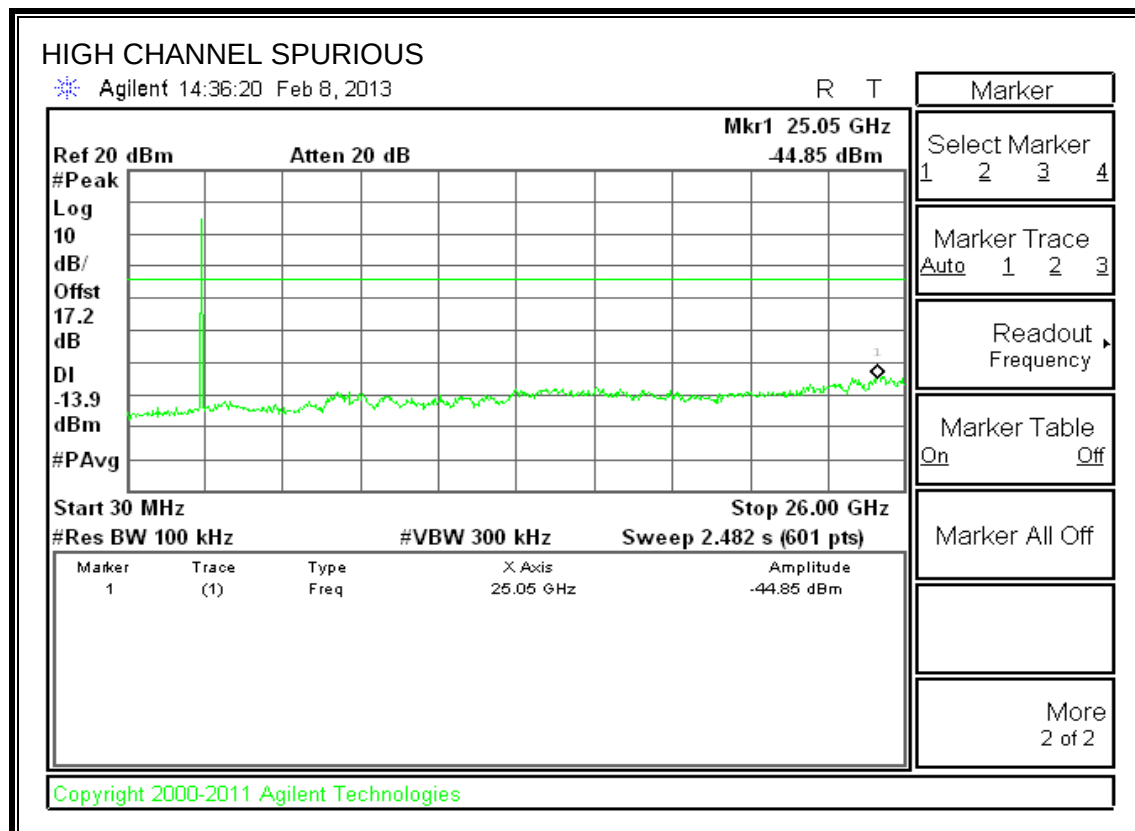
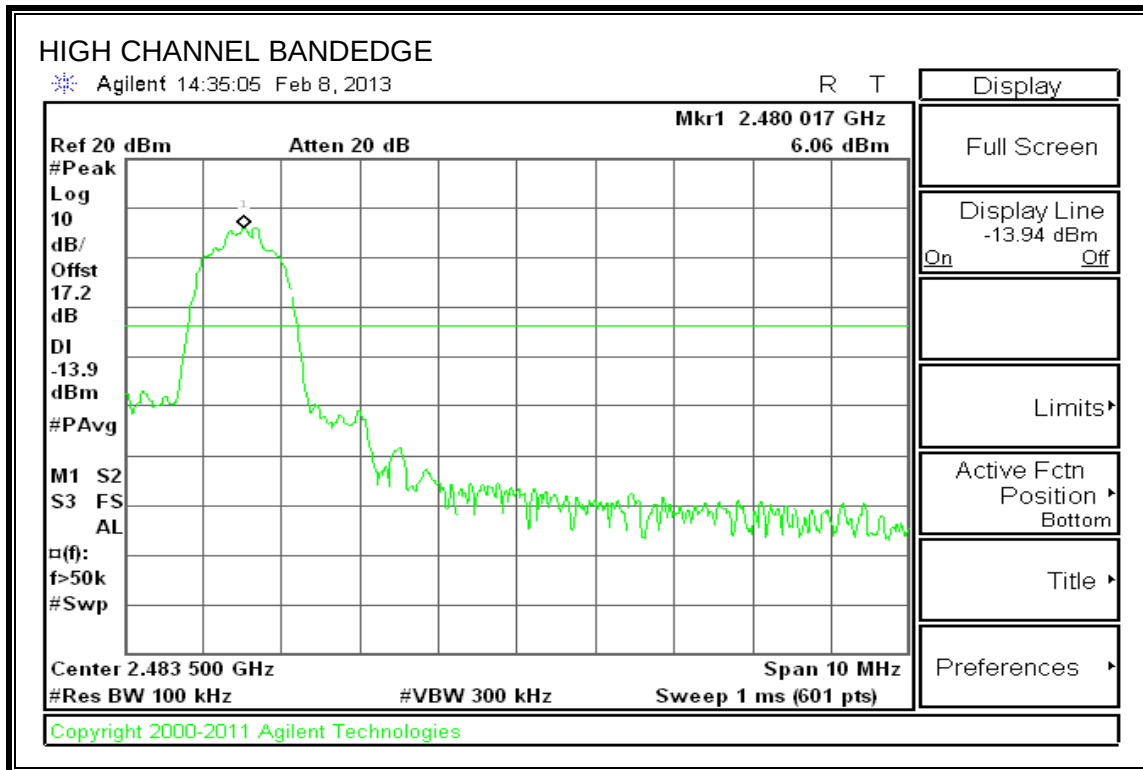
**QPSK, SPURIOUS EMISSIONS, LOW CHANNEL**



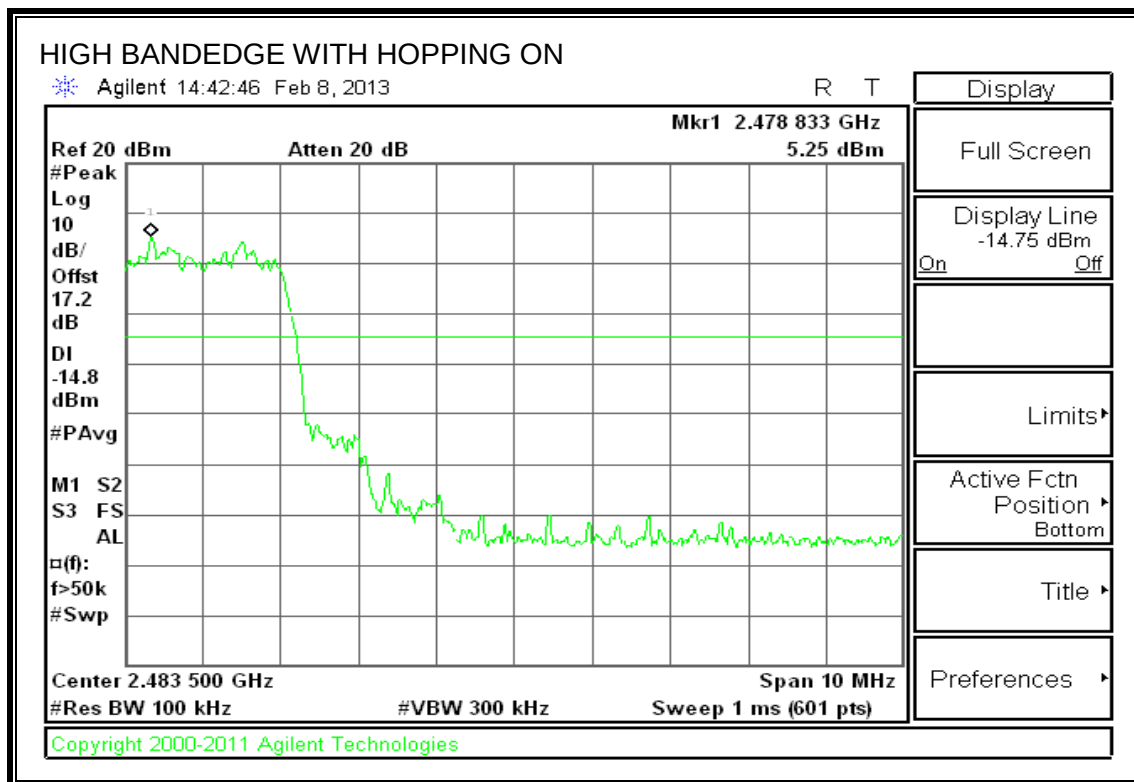
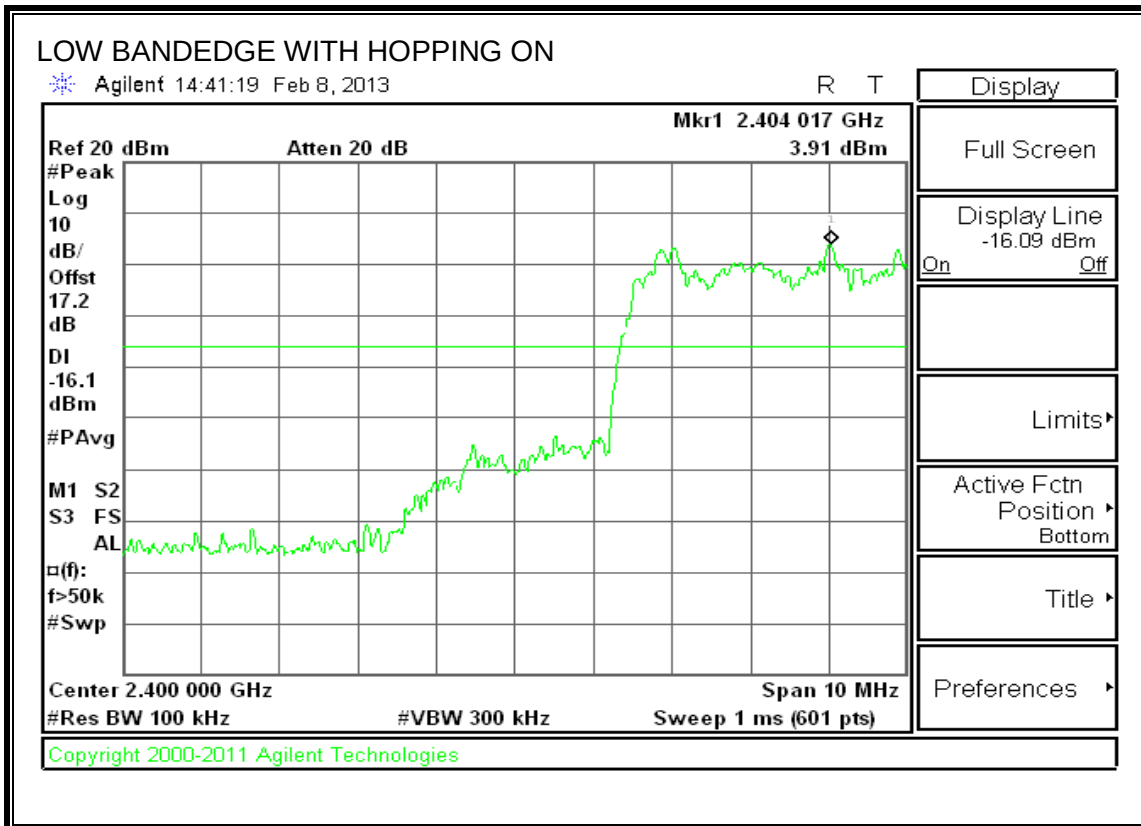
**QPSK, SPURIOUS EMISSIONS, MID CHANNEL**



**QPSK, SPURIOUS EMISSIONS, HIGH CHANNEL**

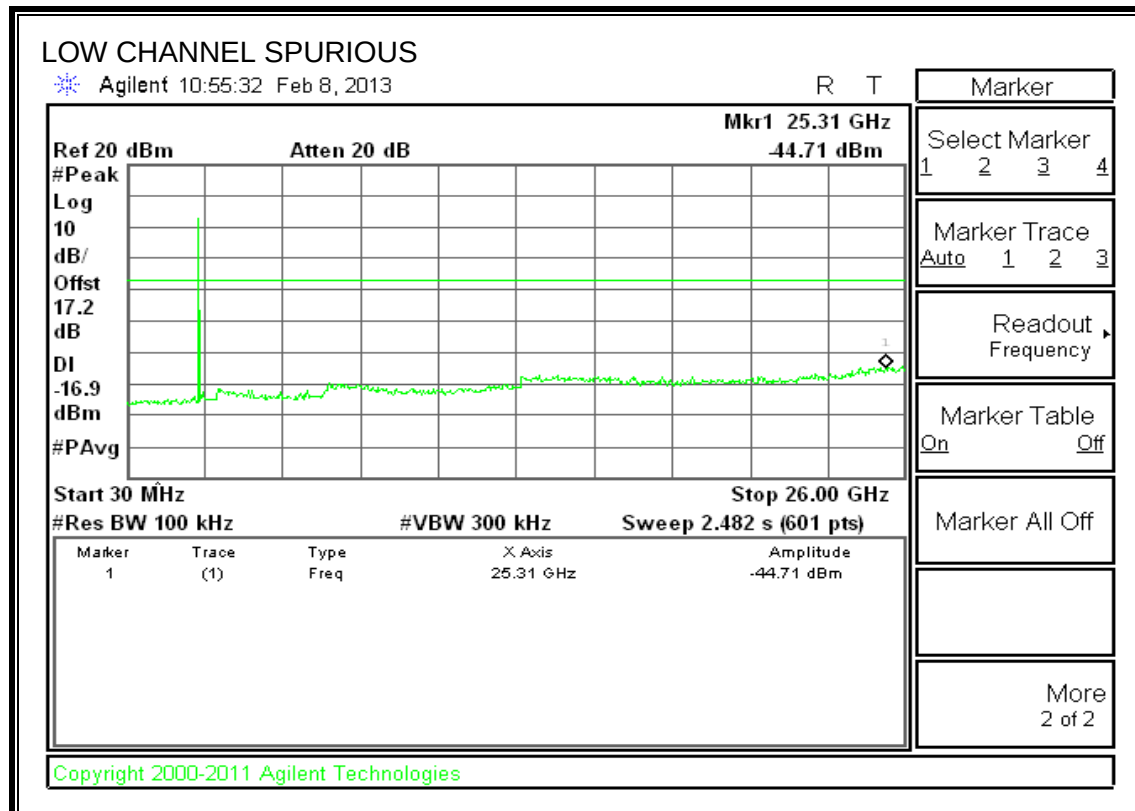
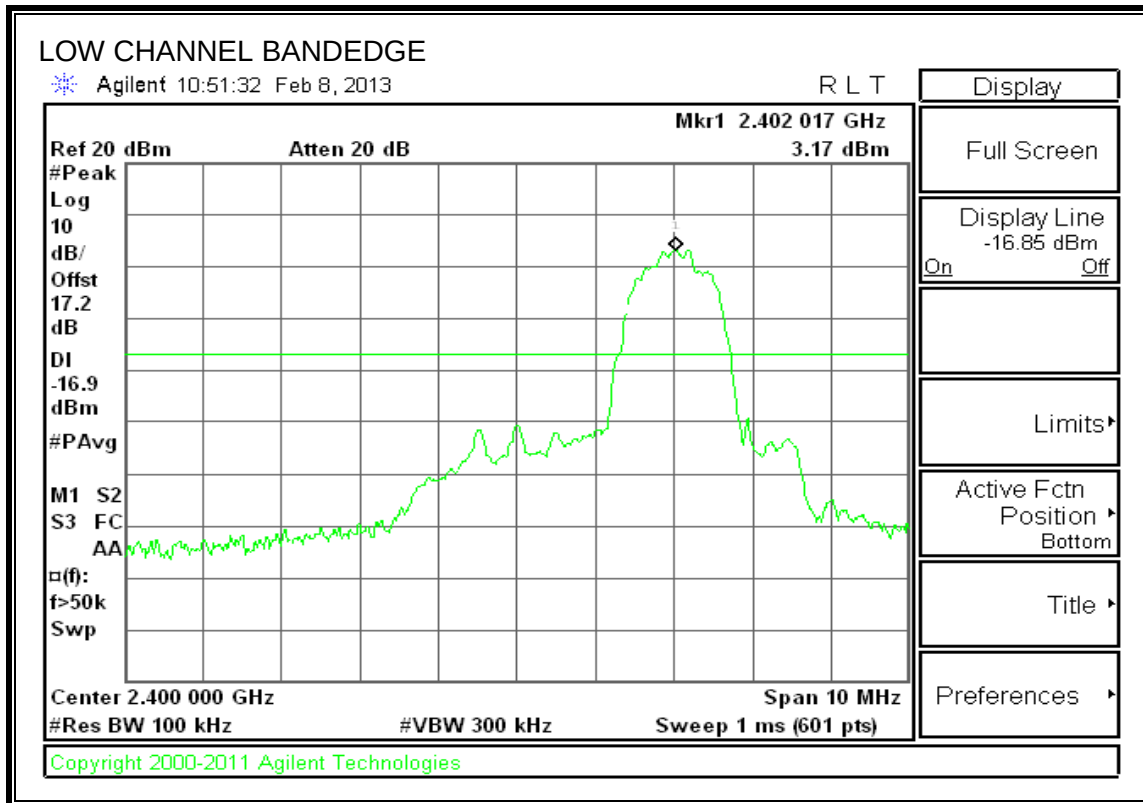


**QPSK, SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**

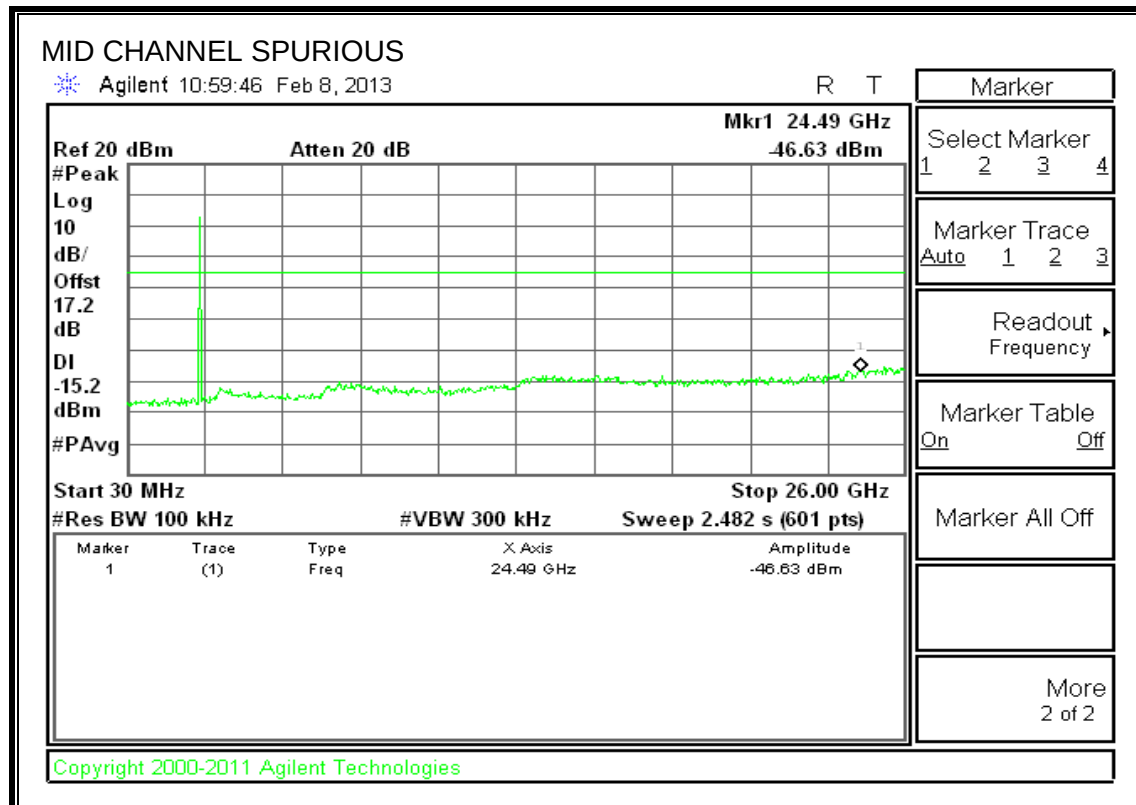
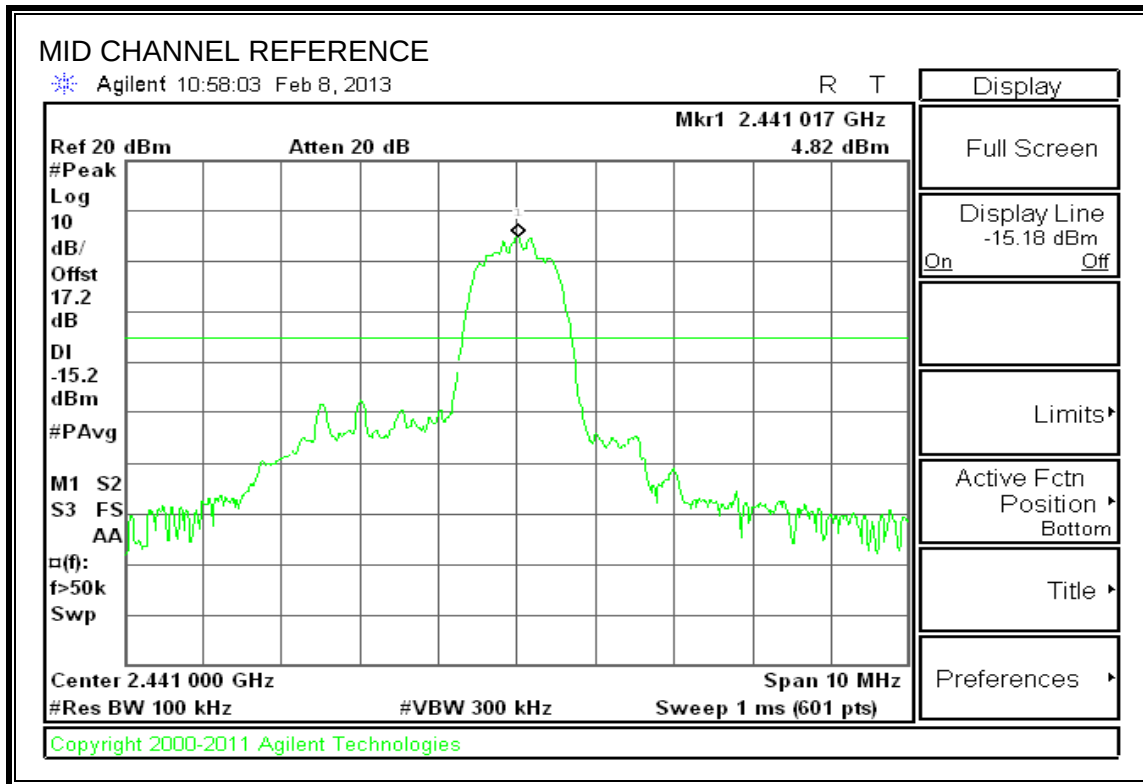




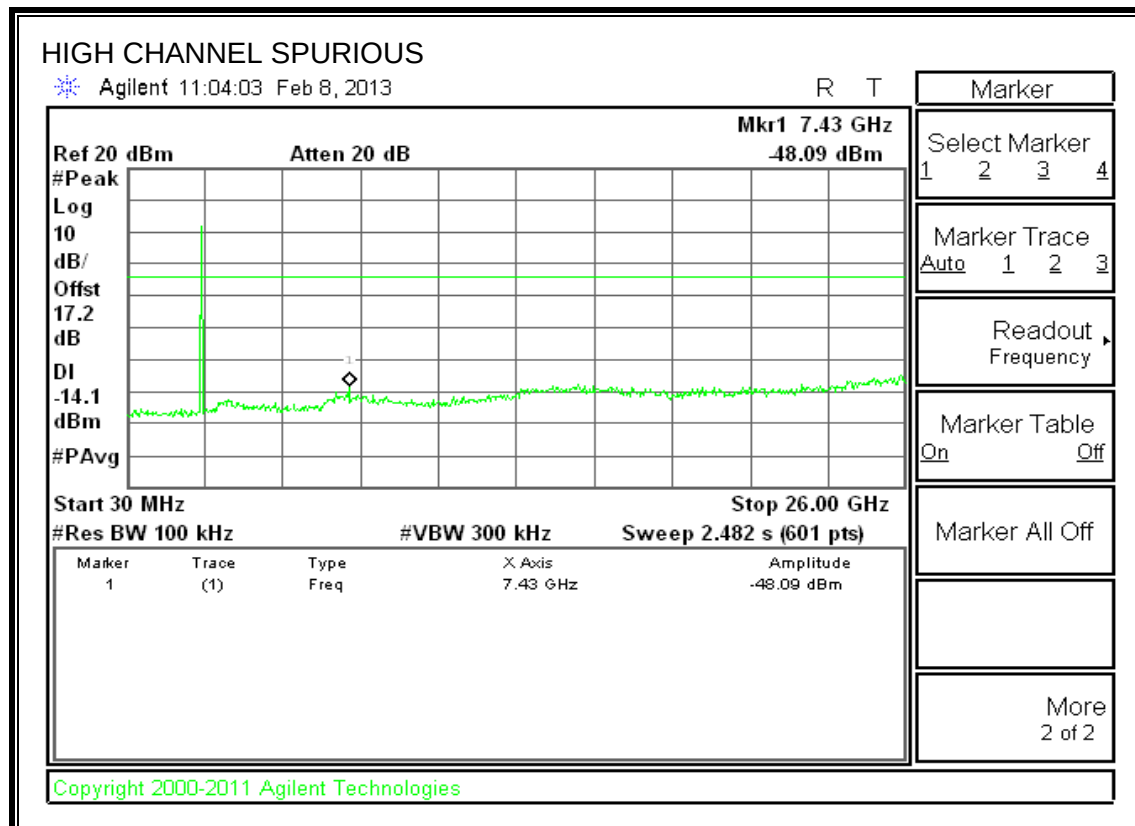
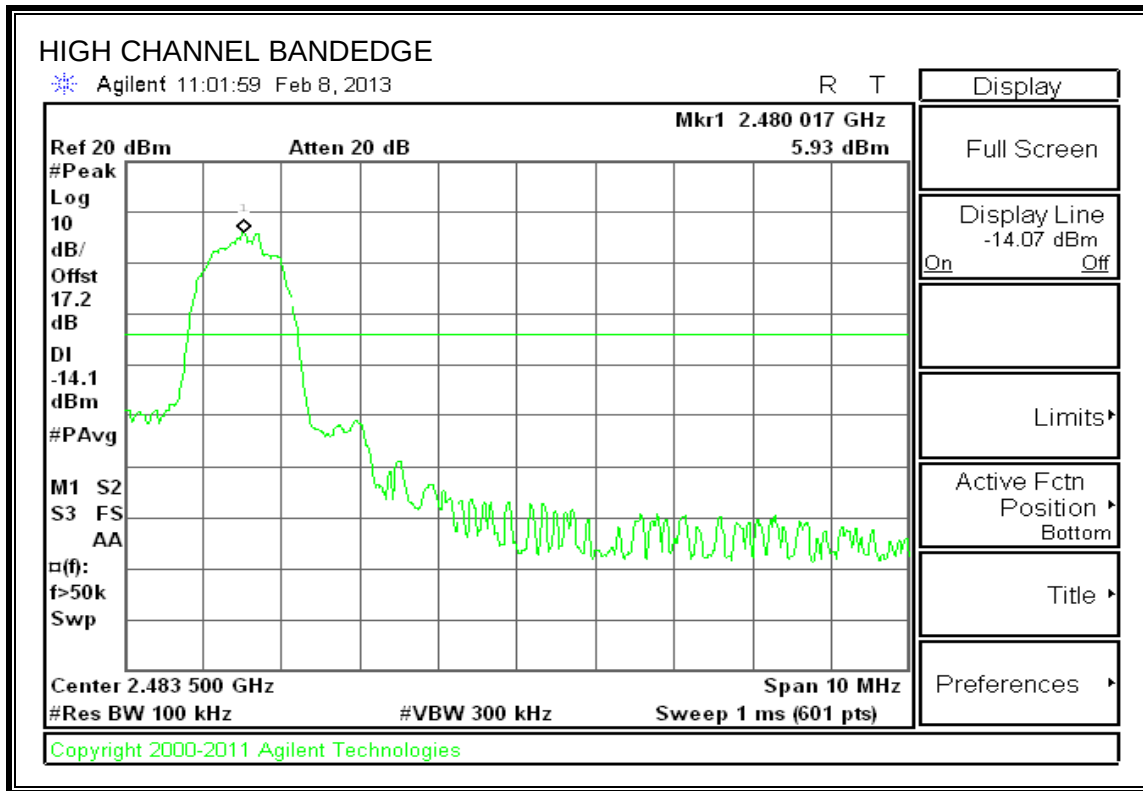
**8PSK, SPURIOUS EMISSIONS, LOW CHANNEL**



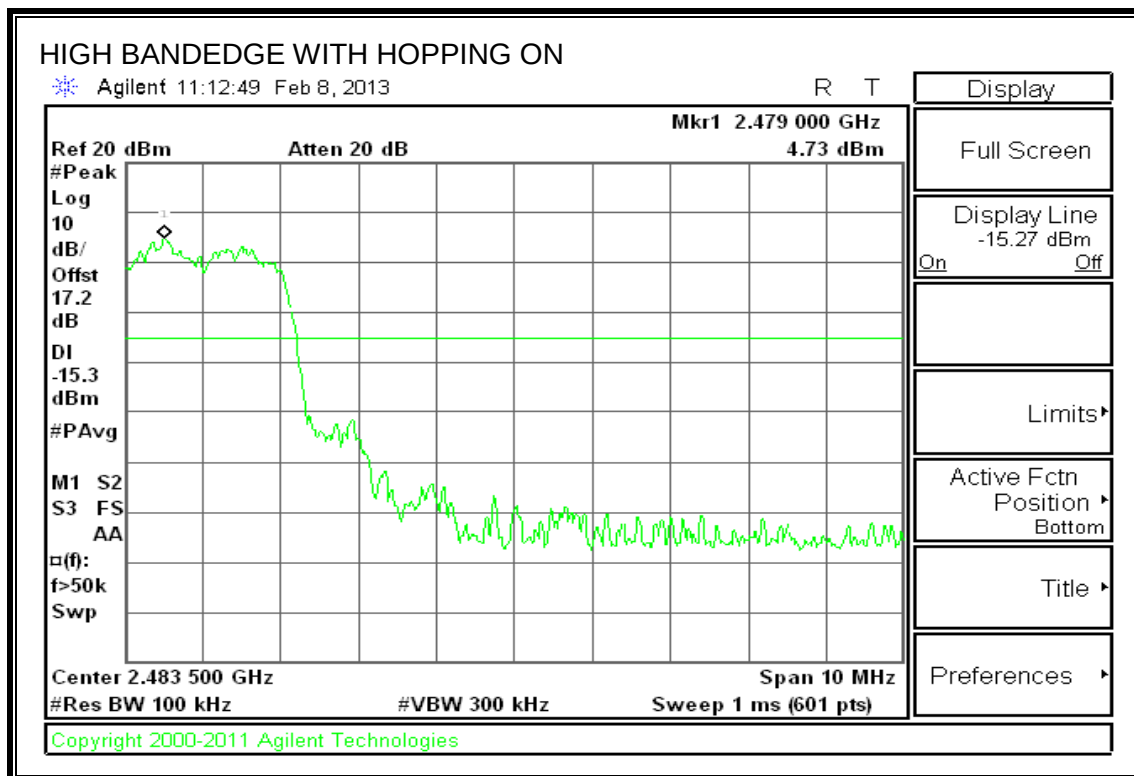
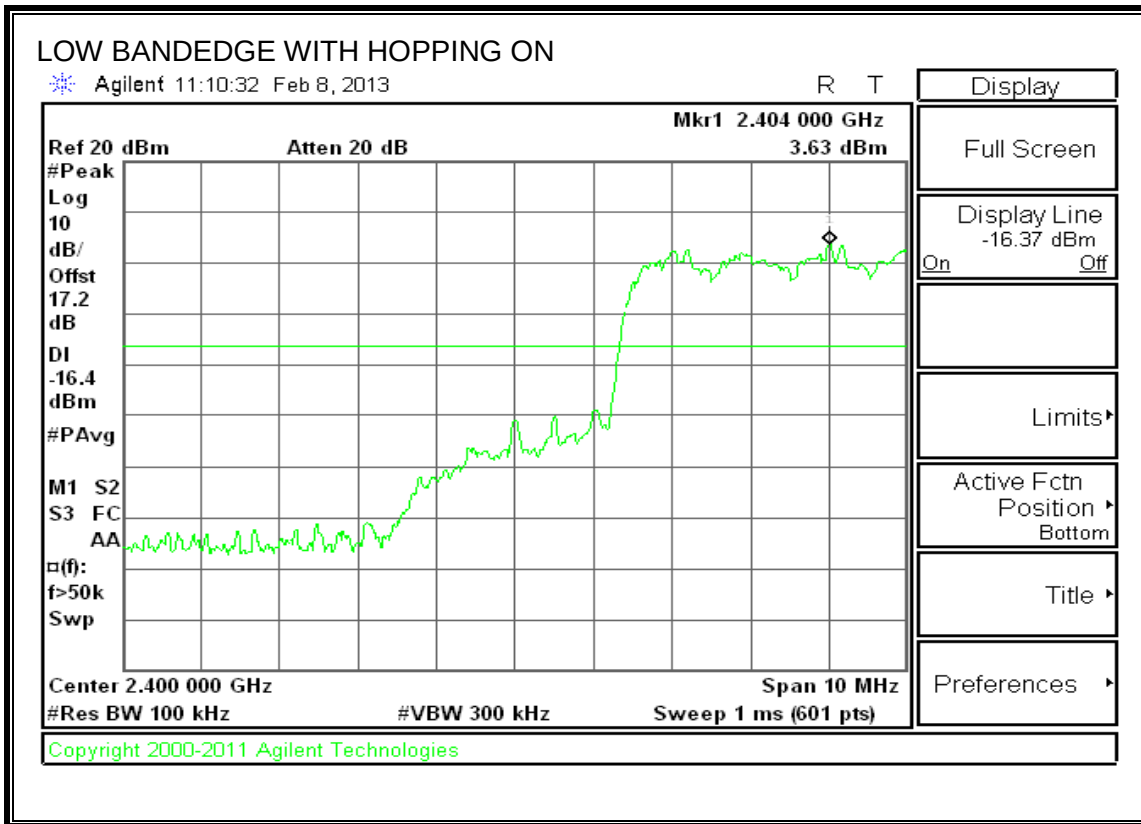
**8PSK, SPURIOUS EMISSIONS, MID CHANNEL**



**8PSK, SPURIOUS EMISSIONS, HIGH CHANNEL**



**8PSK, 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.

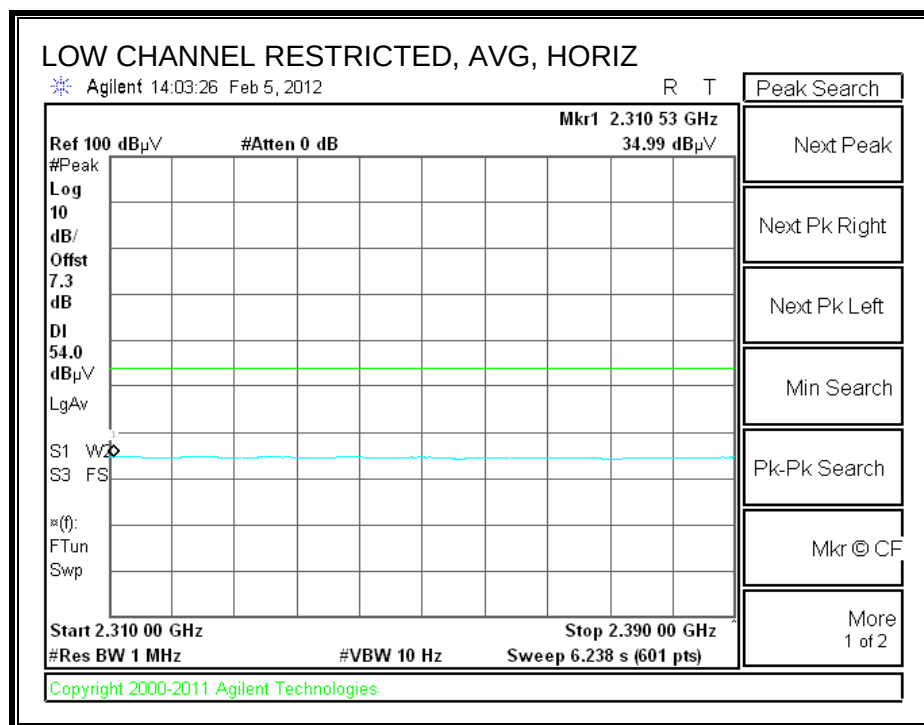
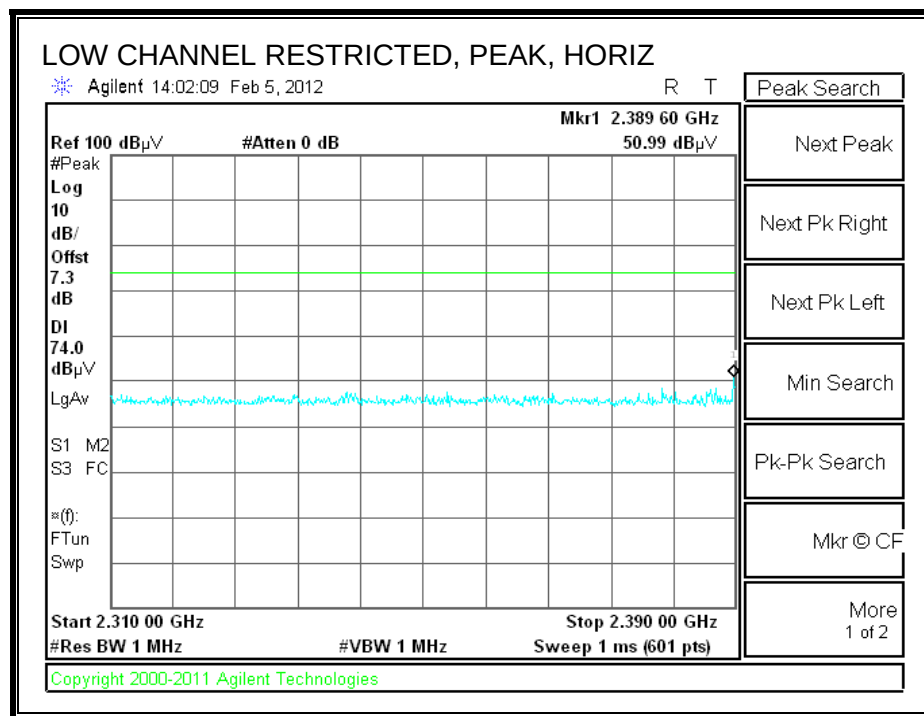
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

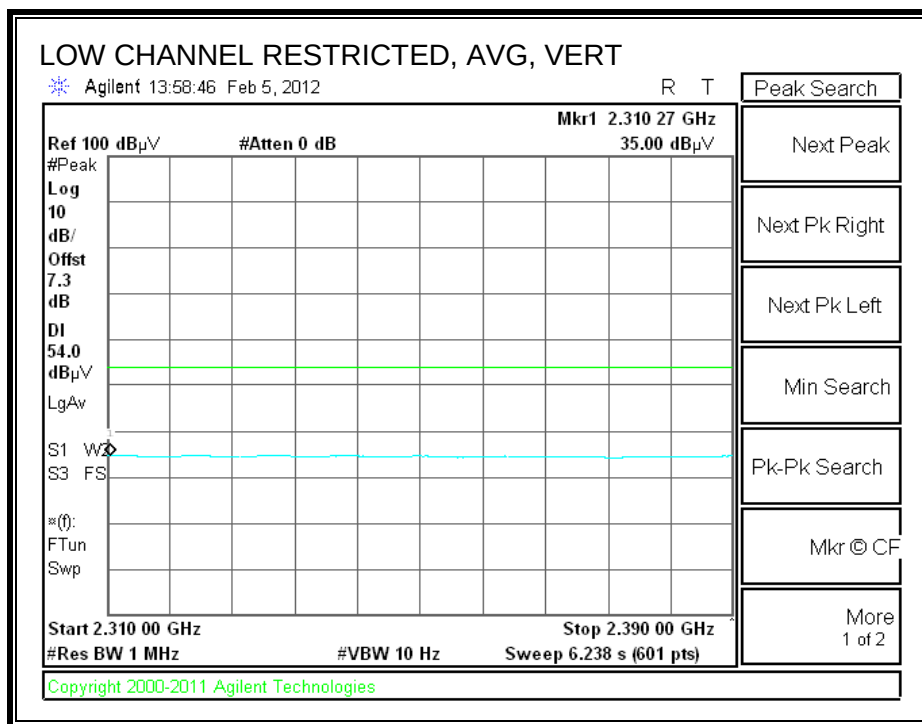
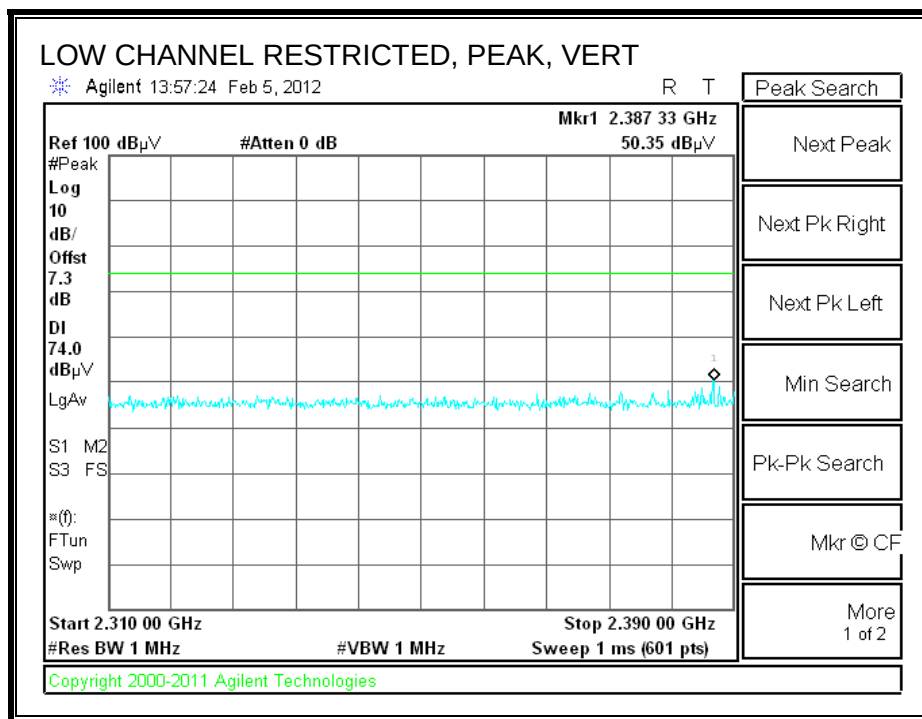
## 8.2. TRANSMITTER ABOVE 1 GHz

### 8.2.1. BASIC DATA RATE GFSK MODULATION

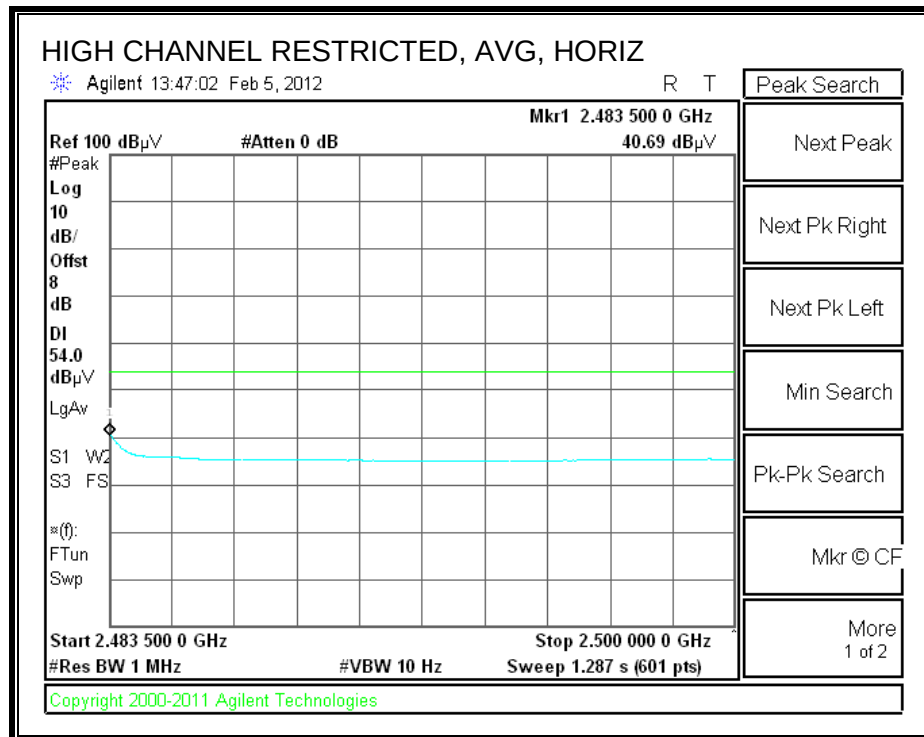
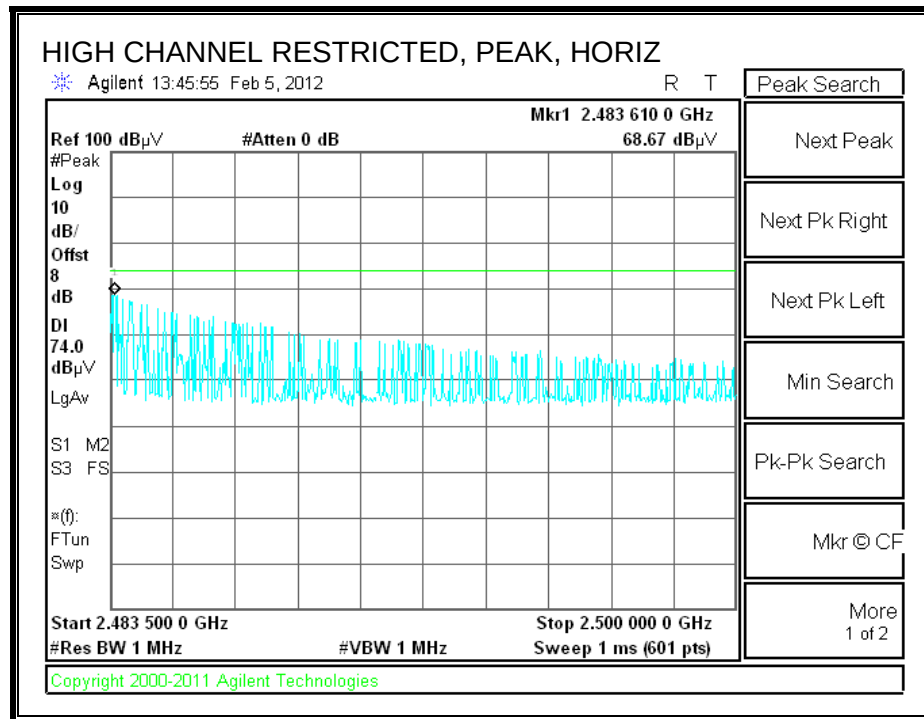
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



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

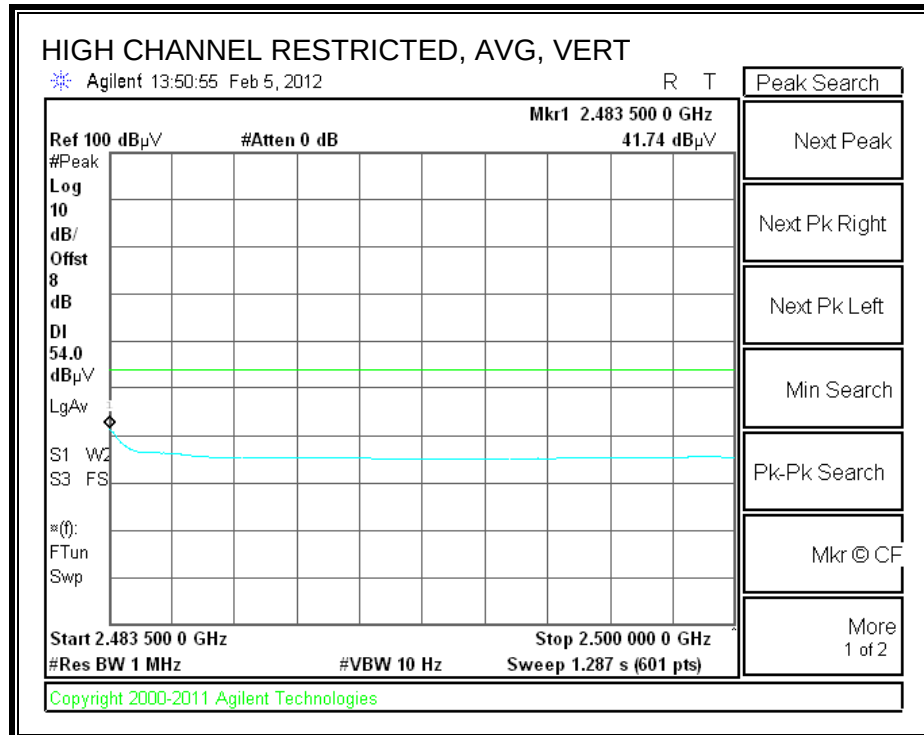
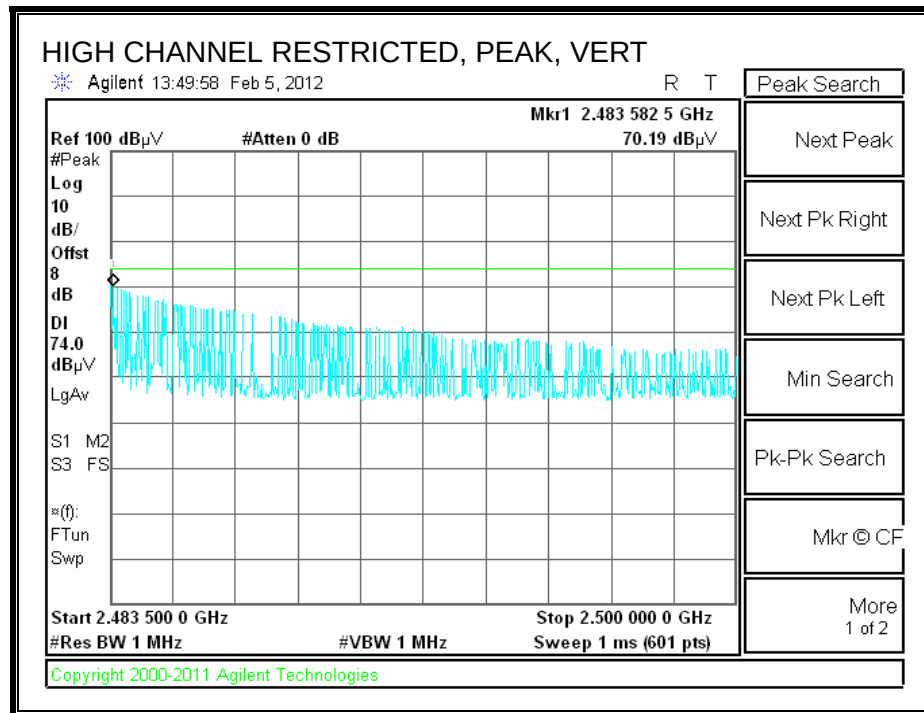


**RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)**



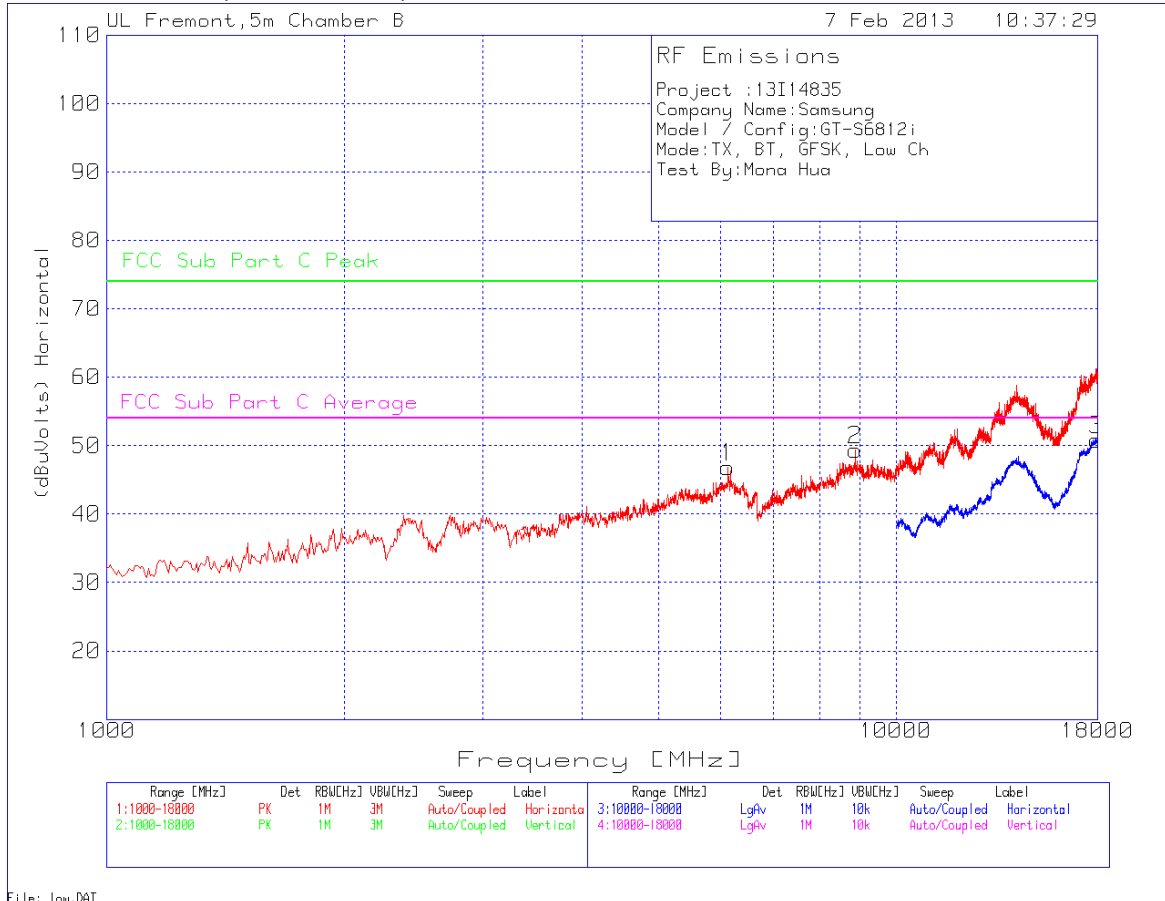


**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



# **HARMONICS AND SPURIOUS EMISSION**

## **LOW CHANNEL, HARMONIC, HORIZONTAL**

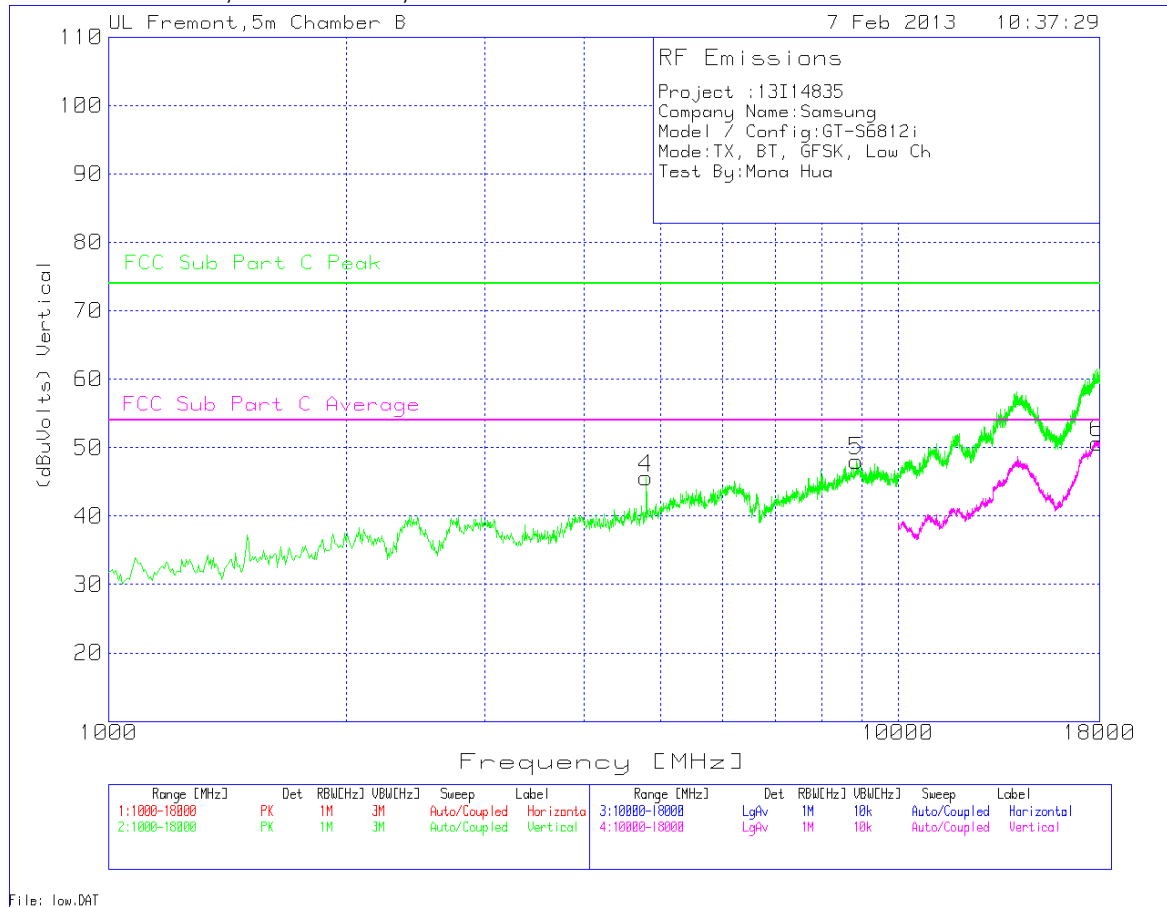


| Horizontal 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |              |        |              |       |             |          |
|----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|--------------|--------|--------------|-------|-------------|----------|
| Marker No.                 | Frequency (MHz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part |        | FCC Sub Part |       | Height [cm] | Polarity |
| 1                          | 6124.917        | 38.75                | PK       | 34.6                    | 8          | -35.5                 | 1           | 46.85      | 74           | -27.15 | 54           | -7.15 | 100         | Horz     |
| 2                          | 8882.745        | 37.17                | PK       | 37.4                    | 9.8        | -36                   | 1           | 49.37      | 74           | -24.63 | 54           | -4.63 | 100         | Horz     |

| Horizontal 10000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|-----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                  | Frequency (MHz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 3                           | 17968.016       | 23.71                | AV       | 46.3                    | 14.8       | -35                   | 1           | 50.81      | 74                  | -23.19 | 54                     | -3.19  | 100         | Horz     |

|                                |                  |          |                             |            |                           |             |            |                        |        |                           |        |                   |                |          |
|--------------------------------|------------------|----------|-----------------------------|------------|---------------------------|-------------|------------|------------------------|--------|---------------------------|--------|-------------------|----------------|----------|
| AVG Horizontal 1000 - 18000MHz |                  |          |                             |            |                           |             |            |                        |        |                           |        |                   |                |          |
| Frequency<br>(MHz)             | Meter<br>Reading | Detector | EMCO 31115 1-<br>18GHz [dB] | Cable [dB] | HP 8449B 1-<br>18GHz [dB] | Filter [dB] | (dBuVolts) | FCC Sub<br>Part C Peak | Margin | FCC Sub Part C<br>Average | Margin | Azimuth<br>[Degs] | Height<br>[cm] | Polarity |
| 8887.22                        | 26.73            | MAV1     | 37.4                        | 9.8        | -36                       | 1           | 38.93      | 74                     | -35.07 | 54                        | -15.07 | 1                 | 100            | Horz     |

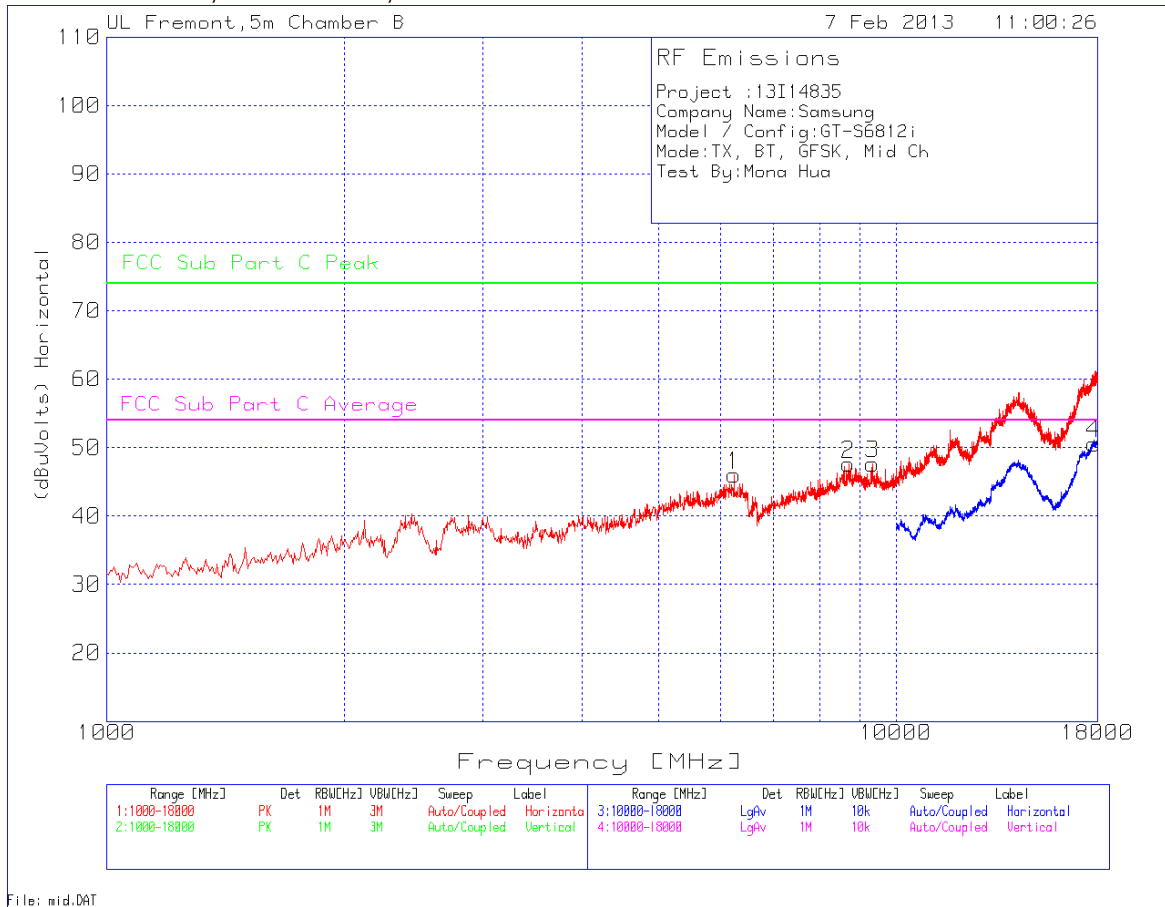
# LOW CHANNEL, HARMONIC, VERTICAL



| Vertical 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |        |                        |     |        |             |          |
|--------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|--------|------------------------|-----|--------|-------------|----------|
| Marker No.               | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak |        | Margin | FCC Sub Part C Average |     | Margin | Height [cm] | Polarity |
| 4                        | 4799.8          | 40.38                | PK       | 32.9                    | 7          | -35.7                 | 1           | 45.58      | 74                  | -28.42 | 54     | -8.42                  | 100 | Vert   |             |          |
| 5                        | 8860.093        | 35.87                | PK       | 37.4                    | 9.8        | -36                   | 1           | 48.07      | 74                  | -25.93 | 54     | -5.93                  | 200 | Vert   |             |          |

| Vertical 10000 - 18000MHz |           |               |          |               |       |             |        |            |              |        |              |        |        |          |
|---------------------------|-----------|---------------|----------|---------------|-------|-------------|--------|------------|--------------|--------|--------------|--------|--------|----------|
| Marker                    | Frequency | Meter Reading |          | EMCO 31115 1- | Cable | HP 8449B 1- | Filter |            | FCC Sub Part |        | FCC Sub Part |        | Height |          |
| No.                       | (Mhz)     | (dBuV)        | Detector | 18GHz (dB)    | (dB)  | 18GHz (dB)  | (dB)   | (dBuVolts) | C Peak       | Margin | C Average    | Margin | [cm]   | Polarity |
| 6                         | 17920.04  | 23.61         | AV       | 46.2          | 14.8  | -34.9       | 1      | 50.71      | 74           | -23.29 | 54           | -3.29  | 100    | Vert     |

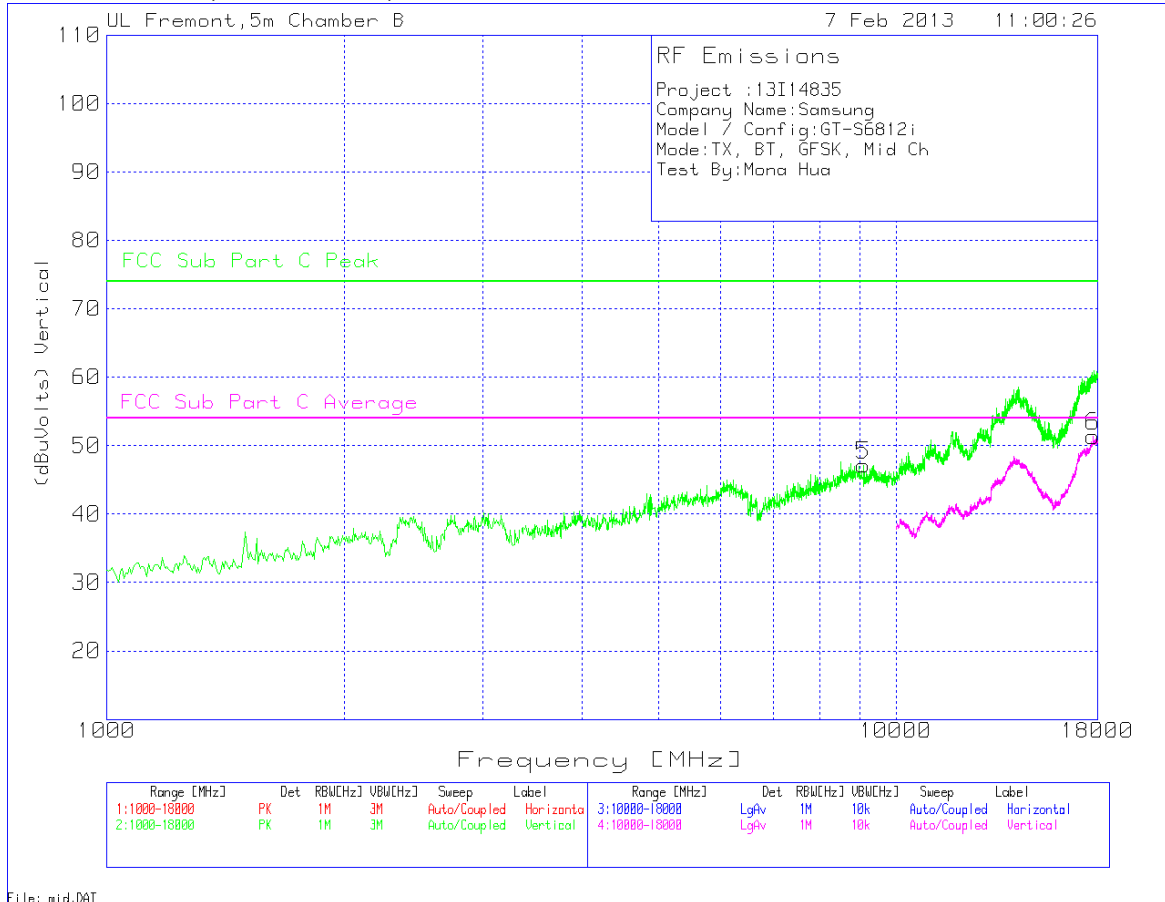
# MID CHANNEL, HARMONIC, HORIZONTAL



| Horizontal 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                 | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 1                          | 6238.175        | 37.78                | PK       | 34.6                    | 8.1        | -35.5                 | 1           | 45.98      | 74                  | -28.02 | 54                     | -8.02  | 200         | Horz     |
| 2                          | 8707.195        | 35.58                | PK       | 37.3                    | 9.7        | -36                   | 1           | 47.58      | 74                  | -26.42 | 54                     | -6.42  | 200         | Horz     |
| 3                          | 9335.776        | 35.2                 | PK       | 37.5                    | 10.1       | -36.2                 | 1           | 47.6       | 74                  | -26.4  | 54                     | -6.4   | 200         | Horz     |

| Horizontal 10000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|-----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                  | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 4                           | 17820.09        | 23.6                 | AV       | 46.1                    | 14.7       | -34.8                 | 1           | 50.6       | 74                  | -23.4  | 54                     | -3.4   | 100         | Horz     |

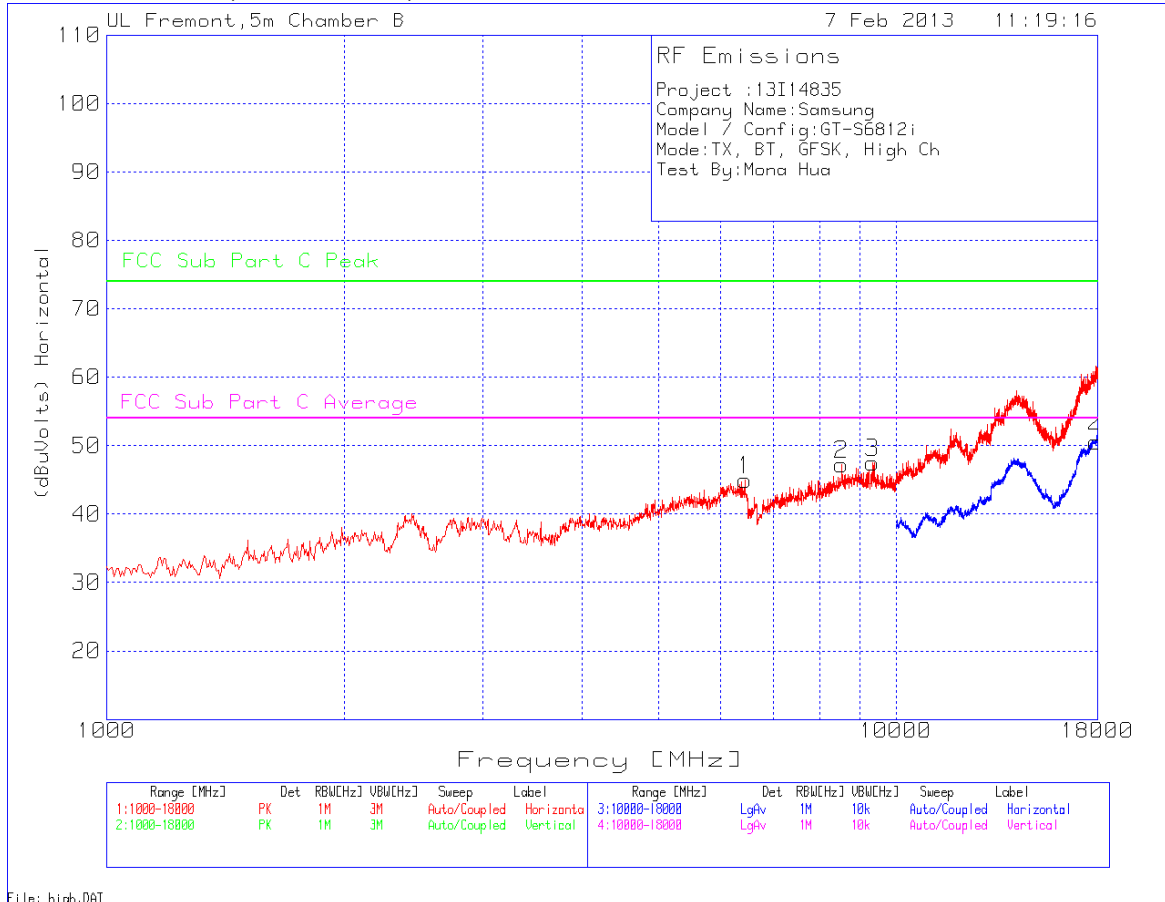
# MID CHANNEL, HARMONIC, VERTICAL



| Vertical 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |
|--------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|
| Marker No.               | Frequency (MHz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] |
| 5                        | 9092.272        | 34.97                | PK       | 37.3                    | 10         | -36.1                 | 1           | 47.17      | 74                  | -26.83 | 54                     | -6.83  | 200         |

| Vertical 10000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |
|---------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|
| Marker No.                | Frequency (MHz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] |
| 6                         | 17780.11        | 24.49                | AV       | 46                      | 14.7       | -34.8                 | 1           | 51.39      | 74                  | -22.61 | 54                     | -2.61  | 100         |

# HIGH CHANNEL, HARMONIC, HORIZONTAL

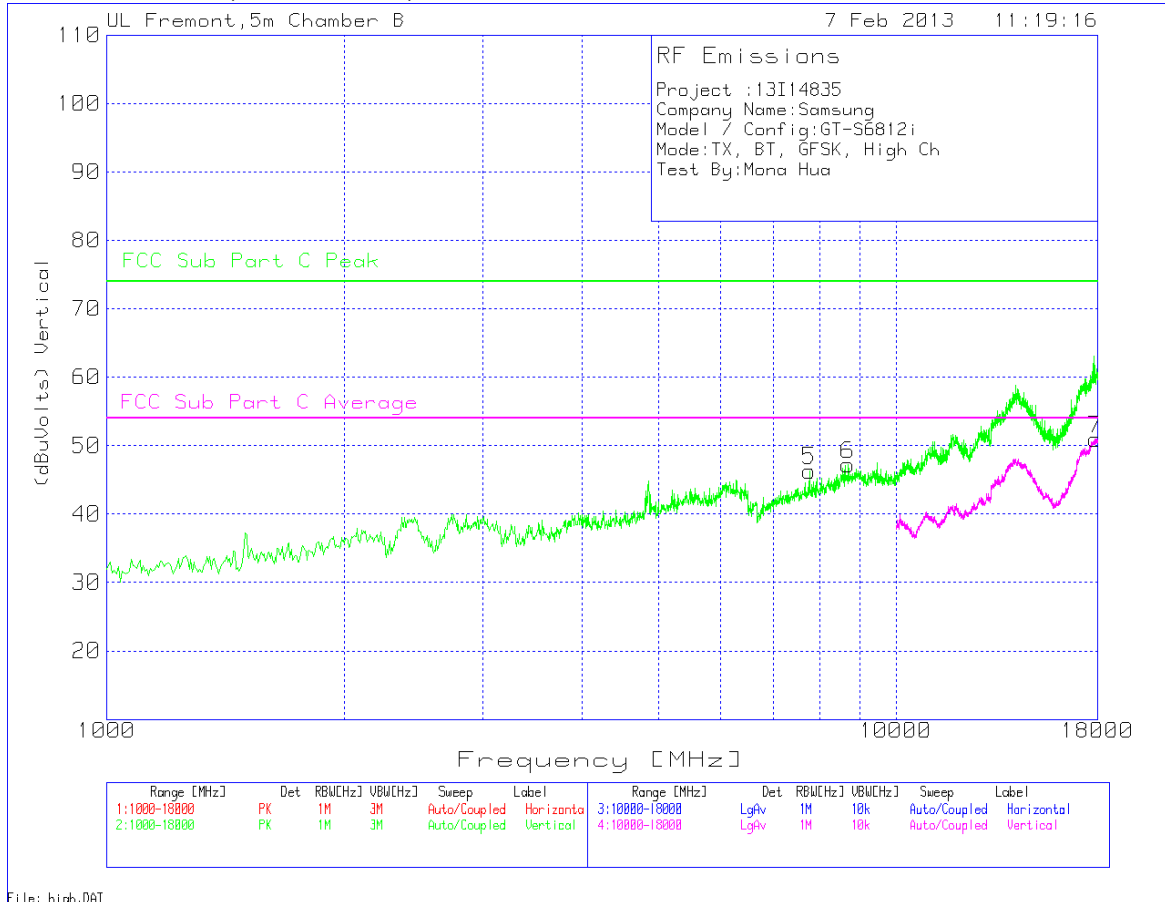


| Horizontal 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                 | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 84498 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 1                          | 6436.376        | 36.75                | PK       | 34.4                    | 8.3        | -35.5                 | 1           | 44.95      | 74                  | -29.05 | 54                     | -9.05  | 200         | Horz     |
| 2                          | 8542.971        | 35.47                | PK       | 37.2                    | 9.6        | -36                   | 1           | 47.27      | 74                  | -26.73 | 54                     | -6.73  | 200         | Horz     |
| 3                          | 9347.102        | 35.15                | PK       | 37.5                    | 10.1       | -36.2                 | 1           | 47.55      | 74                  | -26.45 | 54                     | -6.45  | 100         | Horz     |

| Horizontal 10000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|-----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                  | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 84498 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 4                           | 17928.036       | 23.49                | AV       | 46.2                    | 14.8       | -34.9                 | 1           | 50.59      | 74                  | -23.41 | 54                     | -3.41  | 100         | Horz     |

# HIGH CHANNEL, HARMONIC, VERTICAL



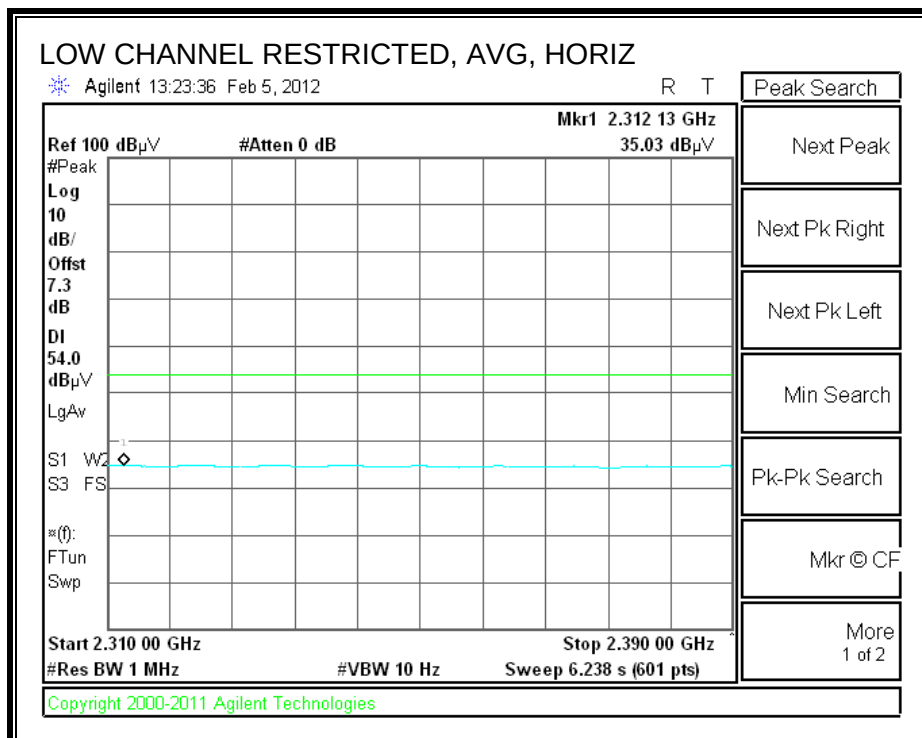
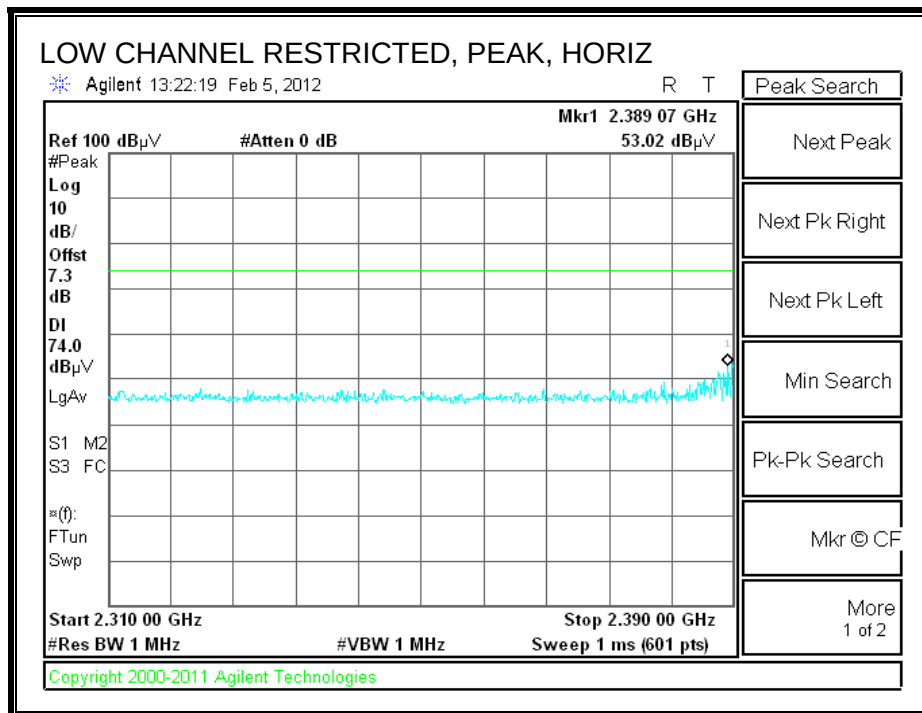
| Vertical 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|--------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.               | Frequency (MHz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 5                        | 7767.155        | 35.51                | PK       | 36.5                    | 9.1        | -35.8                 | 1           | 46.31      | 74                  | -27.69 | 54                     | -7.69  | 100         | Vert     |
| 6                        | 8690.207        | 35.19                | PK       | 37.3                    | 9.7        | -36                   | 1           | 47.19      | 74                  | -26.81 | 54                     | -6.81  | 200         | Vert     |

| Vertical 10000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|---------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 7                         | 17924.038       | 23.83                | AV       | 46.2                    | 14.8       | -34.9                 | 1           | 50.93      | 74                  | -23.07 | 54                     | -3.07  | 100         | Vert     |

There are no emissions from 18 GHz to 26 GHz.

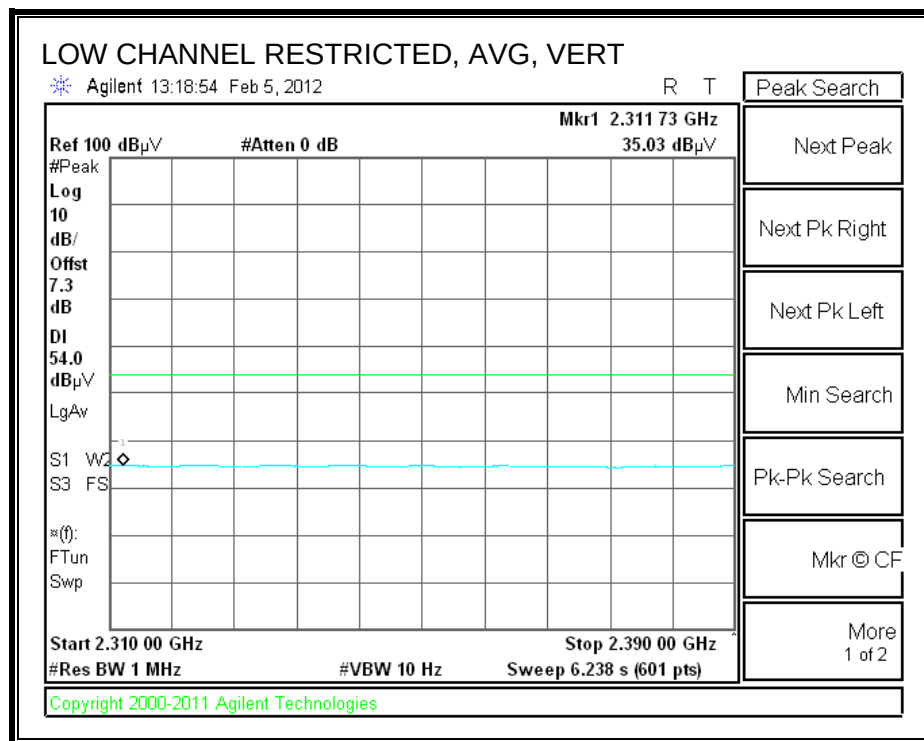
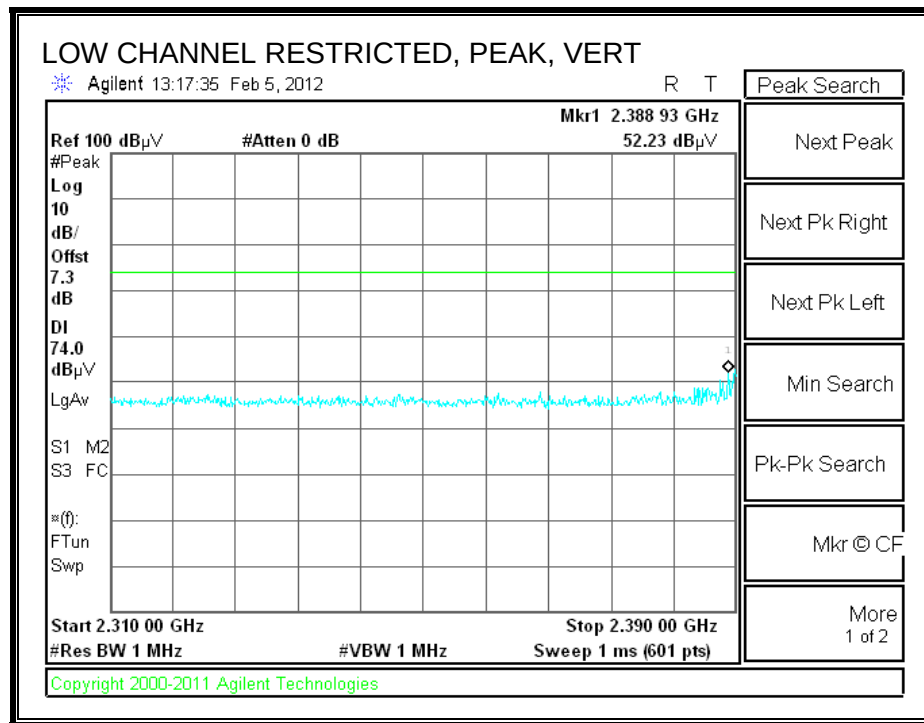
## 8.2.2. BASIC DATA RATE QPSK MODULATION

### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

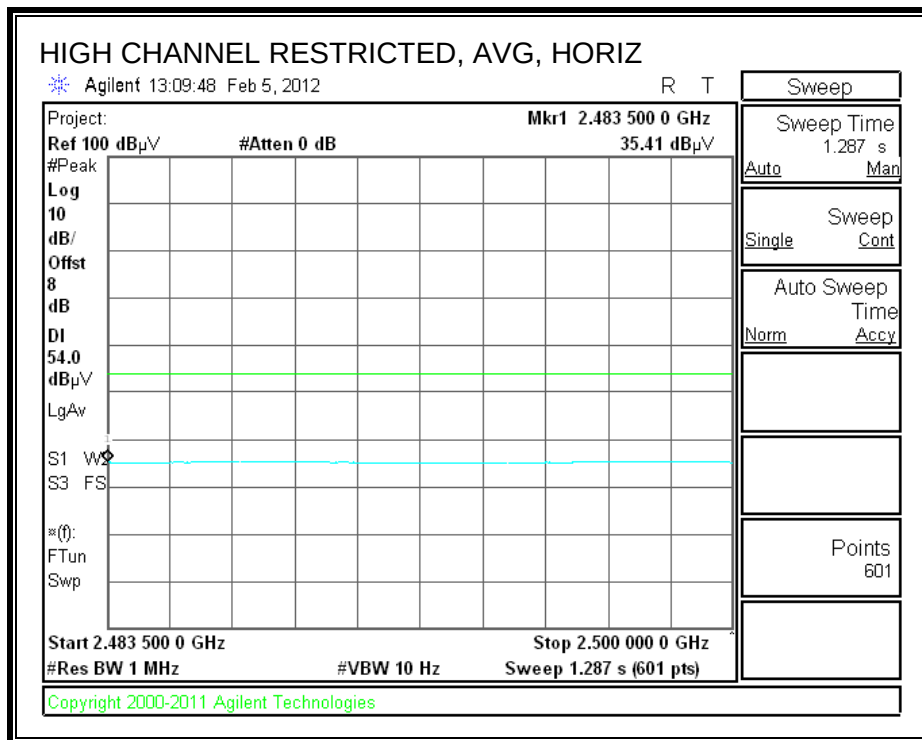
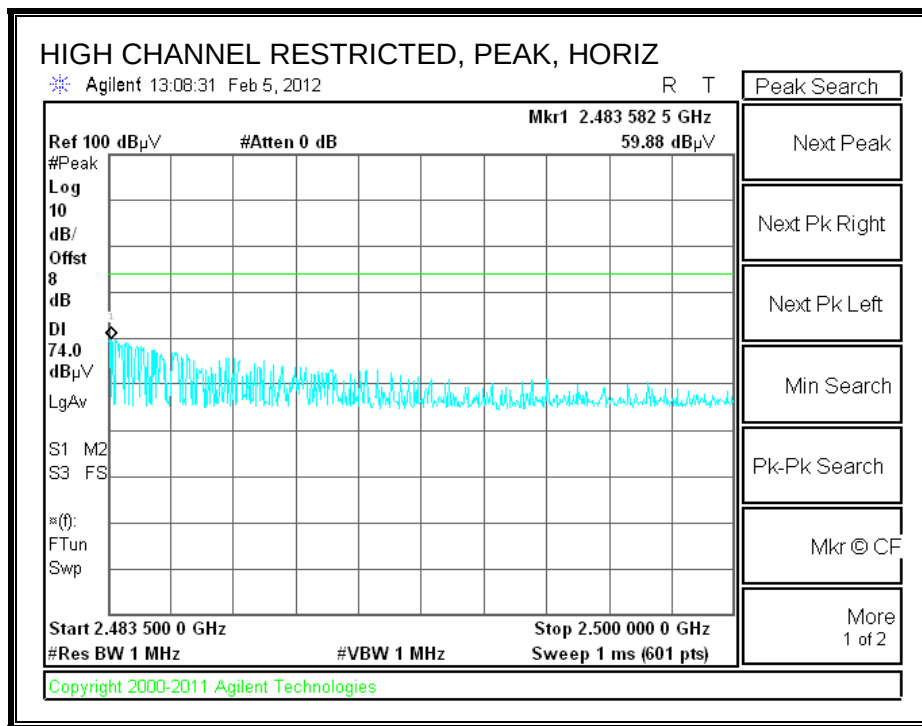




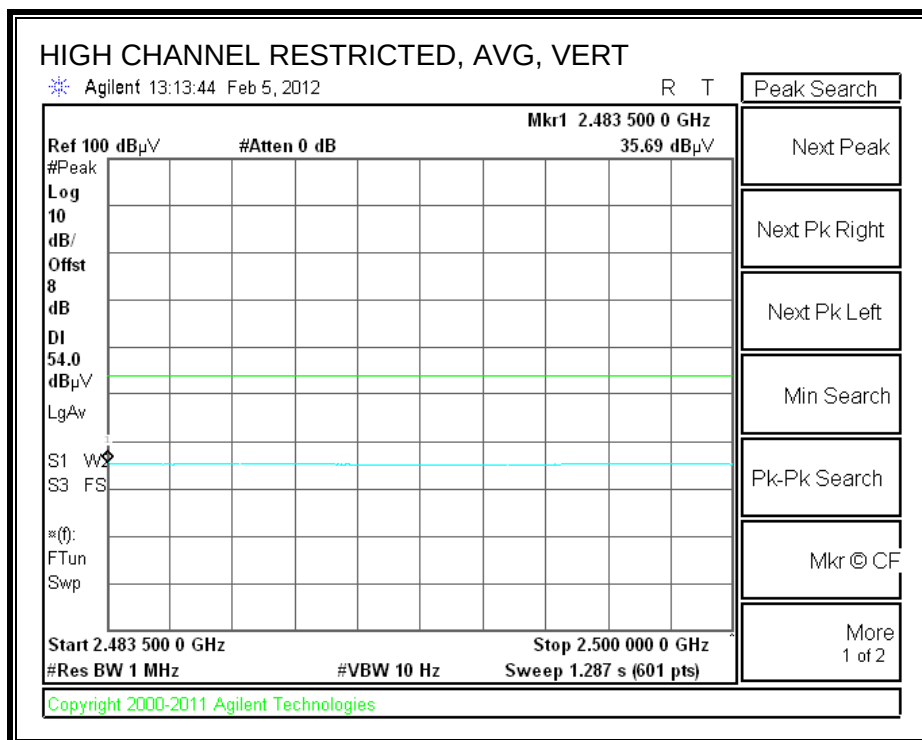
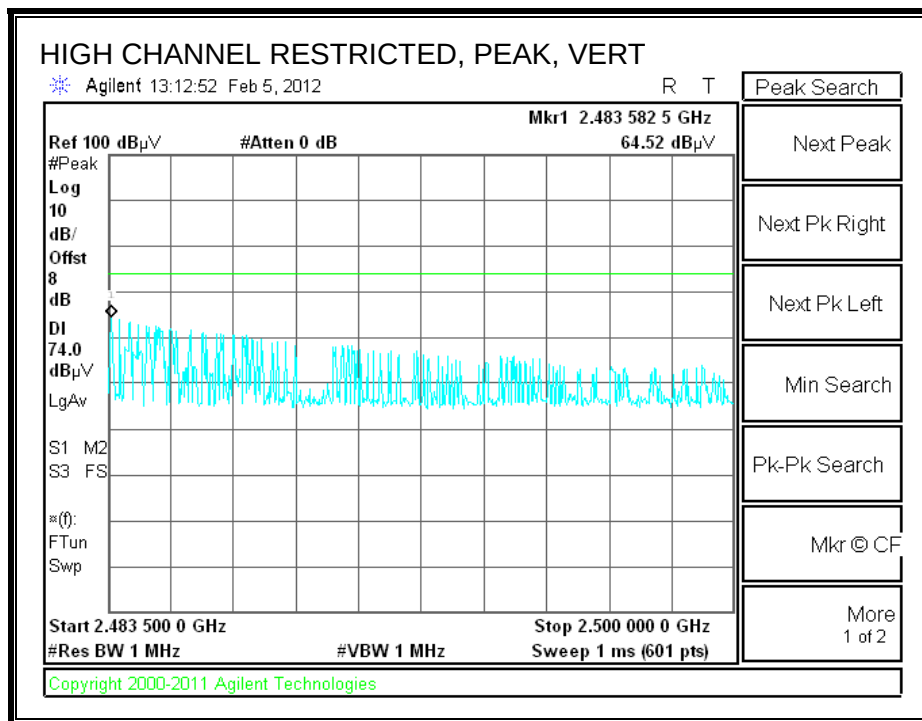
**RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)**



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

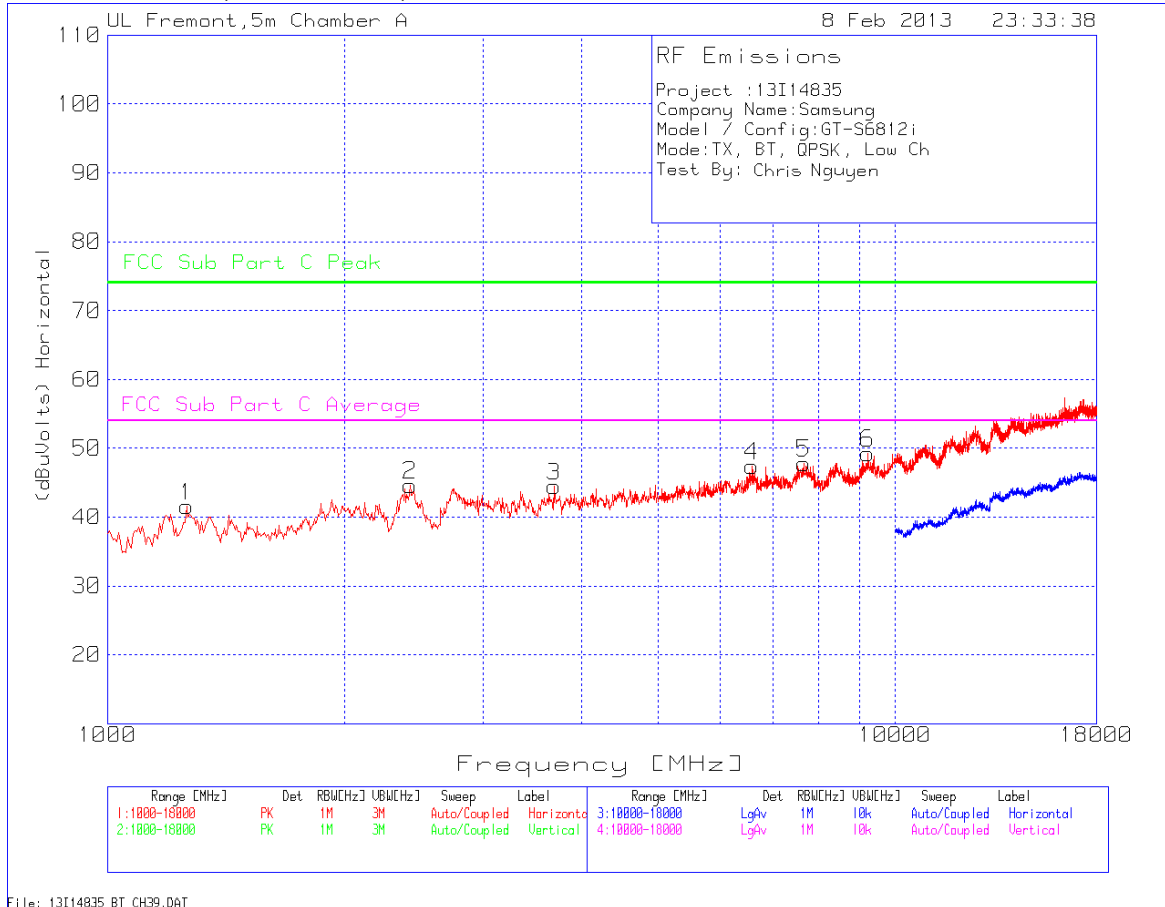


**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



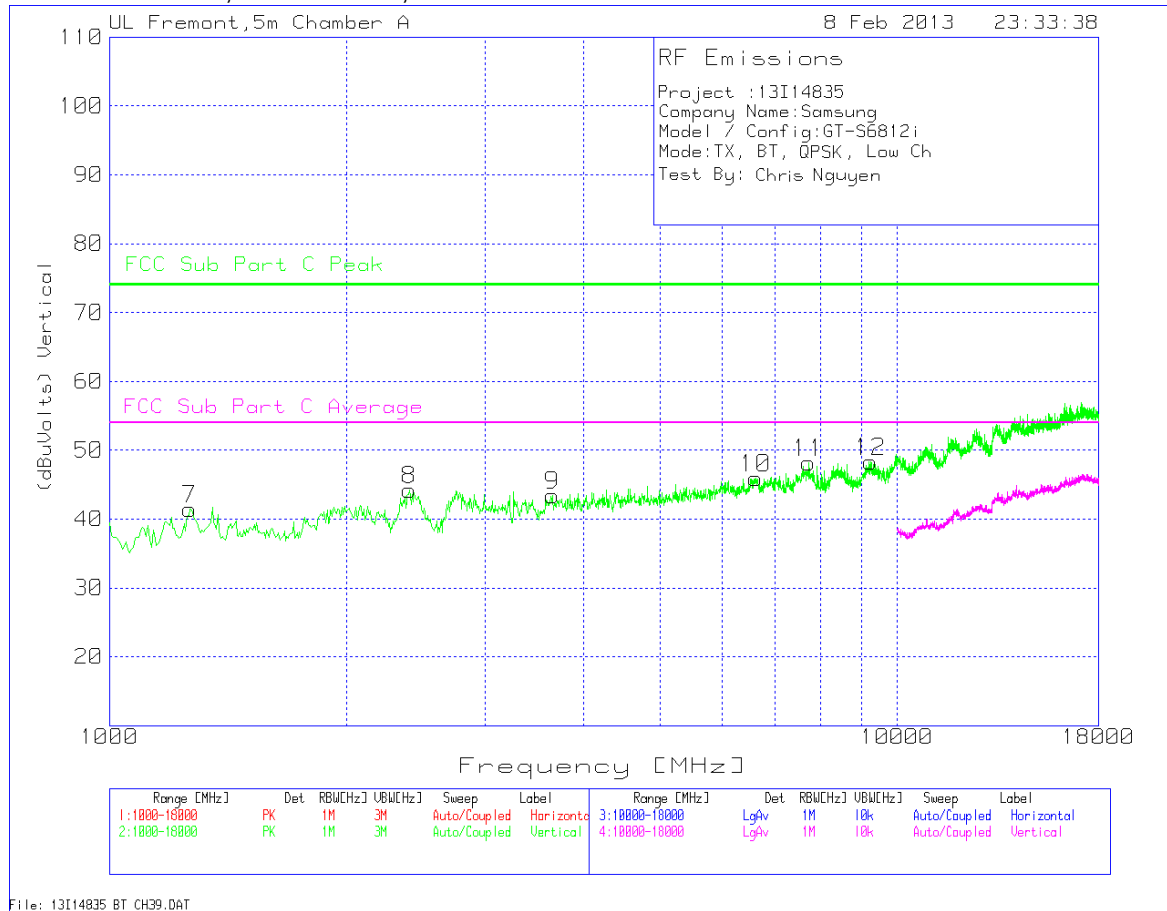
# **HARMONICS AND SPURIOUS EMISSIONS**

## **LOW CHANNEL, HARMONIC, HORIZONTAL**



| Horizontal 1000 - 18000MHz |                 |                      |          |                        |                  |                       |                   |                   |                            |            |                     |        |                        |
|----------------------------|-----------------|----------------------|----------|------------------------|------------------|-----------------------|-------------------|-------------------|----------------------------|------------|---------------------|--------|------------------------|
| Marker No.                 | Frequency (MHz) | Meter Reading (dBuV) | Detector | ETS Lindgren 3117 (dB) | 3ft 1-18GHz (dB) | HP 84498 1-18GHz (dB) | 25ft 1-18GHz (dB) | 12ft 1-18GHz (dB) | BRF 2.5GHz 1-18GHz NF (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average |
| 1                          | 1260.493        | 46.32                | PK       | 29.8                   | 0.3              | -38.4                 | 2                 | 1                 | 0.5                        | 41.52      | 74                  | -32.48 | 54                     |
| 2                          | 2421.386        | 44.41                | PK       | 32.2                   | 0.3              | -36.9                 | 2.8               | 1.3               | 0.5                        | 44.61      | 74                  | -29.39 | 54                     |
| 3                          | 3689.873        | 41.23                | PK       | 33.2                   | 0.4              | -36.2                 | 3.6               | 1.7               | 0.5                        | 44.43      | 74                  | -29.57 | 54                     |
| Horizontal 1000 - 18000MHz |                 |                      |          |                        |                  |                       |                   |                   |                            |            |                     |        |                        |
| Marker No.                 | Frequency (MHz) | Meter Reading (dBuV) | Detector | ETS Lindgren 3117 (dB) | 3ft 1-18GHz (dB) | HP 84498 1-18GHz (dB) | 25ft 1-18GHz (dB) | 12ft 1-18GHz (dB) | BRF 2.5GHz 1-18GHz NF (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average |
| 4                          | 6583.611        | 38.77                | AV       | 35.6                   | 0.6              | -35.6                 | 4.9               | 2.6               | 0.5                        | 47.37      | 74                  | -26.63 | 54                     |
| 5                          | 7648.235        | 38.42                | AV       | 35.8                   | 0.7              | -35.8                 | 5.4               | 2.8               | 0.5                        | 47.82      | 74                  | -26.18 | 54                     |
| 6                          | 9233.844        | 38.55                | AV       | 36.3                   | 0.8              | -36.1                 | 6.1               | 3.1               | 0.5                        | 49.25      | 74                  | -24.75 | 54                     |

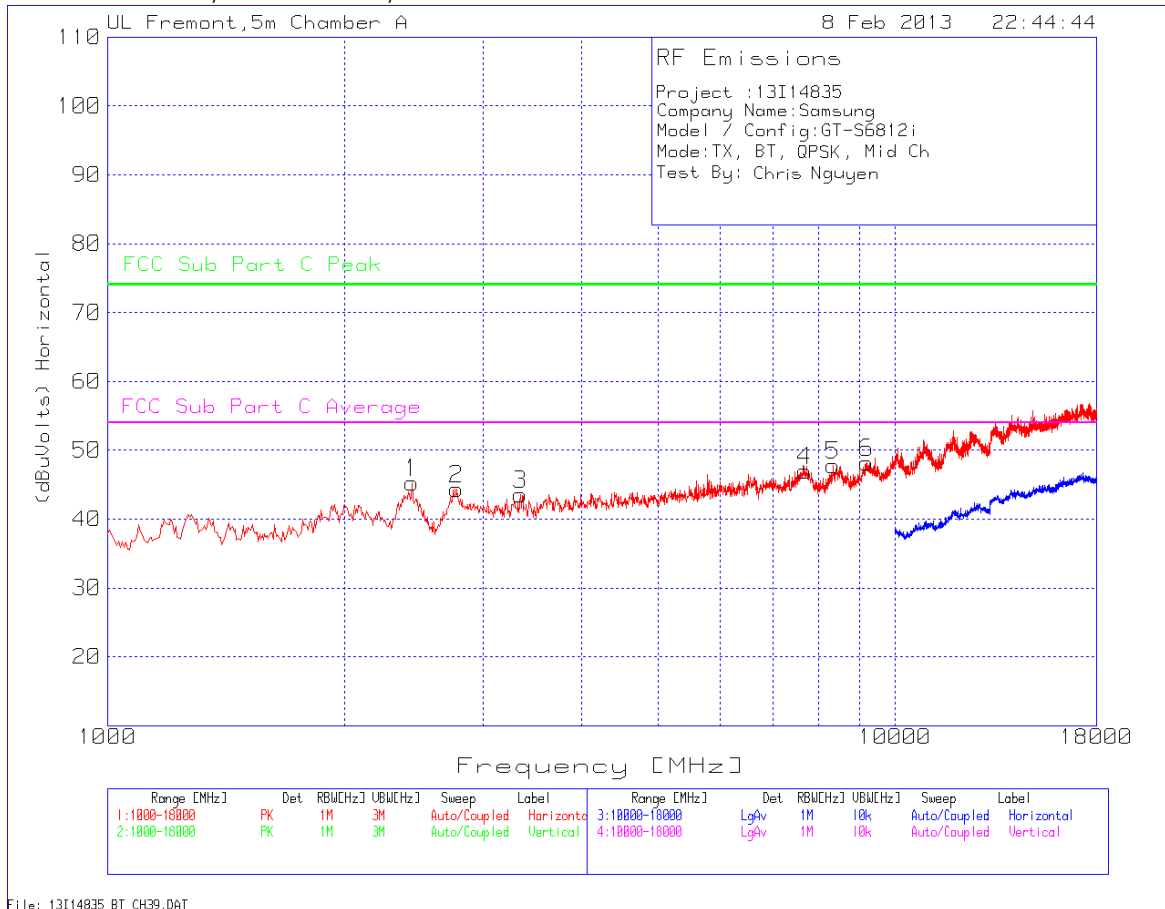
# LOW CHANNEL, HARMONIC, VERTICAL



| Vertical 1000 - 18000MHz |                 |                      |          |                        |                  |                       |                   |                   |                            |            |                     |        |                        |             |
|--------------------------|-----------------|----------------------|----------|------------------------|------------------|-----------------------|-------------------|-------------------|----------------------------|------------|---------------------|--------|------------------------|-------------|
| Marker No.               | Frequency (MHz) | Meter Reading (dBuV) | Detector | ETS Lindgren 3117 (dB) | 3ft 1-18GHz (dB) | HP 84498 1-18GHz (dB) | 25ft 1-18GHz (dB) | 12ft 1-18GHz (dB) | BRF 2.5GHz 1-18GHz NF (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Height [cm] |
| 7                        | 1266.156        | 46.11                | PK       | 29.9                   | 0.3              | -38.4                 | 2                 | 1                 | 0.5                        | 41.41      | 74                  | -32.59 | 54                     | 100         |
| 8                        | 2404.397        | 44.11                | PK       | 32.1                   | 0.3              | -36.9                 | 2.8               | 1.3               | 0.5                        | 44.21      | 74                  | -29.79 | 54                     | 100         |
| 9                        | 3650.233        | 40.34                | PK       | 33.1                   | 0.4              | -36.2                 | 3.6               | 1.7               | 0.5                        | 43.44      | 74                  | -30.56 | 54                     | 100         |

| Vertical 1000 - 18000MHz |                 |                      |          |                        |                  |                       |                   |                   |                            |            |                     |        |                        |             |
|--------------------------|-----------------|----------------------|----------|------------------------|------------------|-----------------------|-------------------|-------------------|----------------------------|------------|---------------------|--------|------------------------|-------------|
| Marker No.               | Frequency (MHz) | Meter Reading (dBuV) | Detector | ETS Lindgren 3117 (dB) | 3ft 1-18GHz (dB) | HP 84498 1-18GHz (dB) | 25ft 1-18GHz (dB) | 12ft 1-18GHz (dB) | BRF 2.5GHz 1-18GHz NF (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Height [cm] |
| 10                       | 6606.262        | 37.25                | AV       | 35.6                   | 0.7              | -35.6                 | 4.9               | 2.6               | 0.5                        | 45.95      | 74                  | -28.05 | 54                     | 200         |
| 11                       | 7716.189        | 38.79                | AV       | 35.8                   | 0.7              | -35.8                 | 5.4               | 2.8               | 0.5                        | 48.19      | 74                  | -25.81 | 54                     | 200         |
| 12                       | 9245.17         | 37.63                | AV       | 36.3                   | 0.8              | -36.1                 | 6.1               | 3.1               | 0.5                        | 48.33      | 74                  | -25.67 | 54                     | 100         |

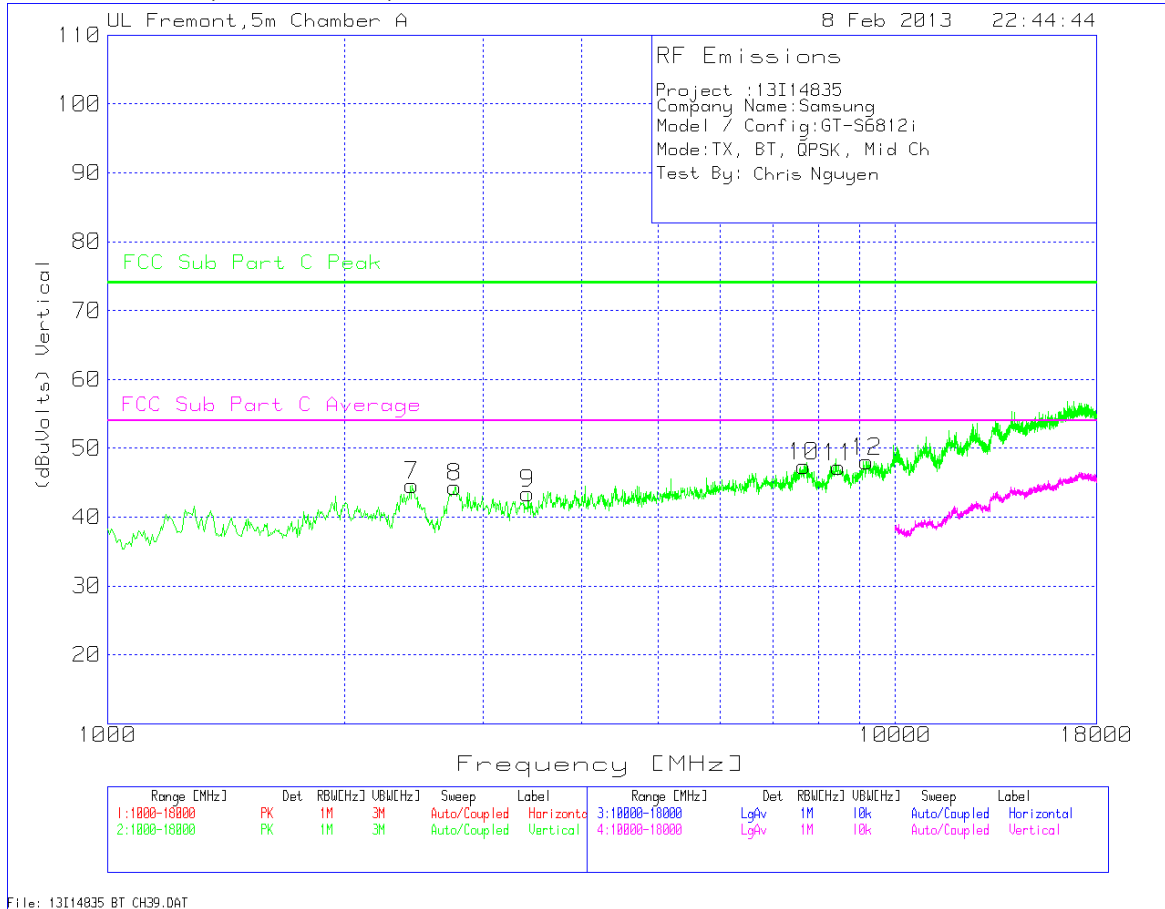
# MID CHANNEL, HARMONIC, HORIZONTAL



| Horizontal 1000 - 18000MHz |                 |                      |          |                        |                  |                       |                   |                   |                            |            |                     |        |                        |
|----------------------------|-----------------|----------------------|----------|------------------------|------------------|-----------------------|-------------------|-------------------|----------------------------|------------|---------------------|--------|------------------------|
| Marker No.                 | Frequency (MHz) | Meter Reading (dBuV) | Detector | ETS Lindgren 3117 (dB) | 3ft 1-18GHz (dB) | HP 8449B 1-18GHz (dB) | 25ft 1-18GHz (dB) | 12ft 1-18GHz (dB) | BRF 2.5GHz 1-18GHz NF (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average |
| 1                          | 2438.374        | 45.13                | PK       | 32.2                   | 0.3              | -36.9                 | 2.8               | 1.3               | 0.5                        | 45.33      | 74                  | -28.67 | 54                     |
| 2                          | 2778.148        | 43.14                | PK       | 32.7                   | 0.4              | -36.8                 | 3                 | 1.4               | 0.5                        | 44.34      | 74                  | -29.66 | 54                     |
| 3                          | 3344.437        | 41.11                | PK       | 32.9                   | 0.4              | -36.4                 | 3.4               | 1.6               | 0.5                        | 43.51      | 74                  | -30.49 | 54                     |

| Horizontal 1000 - 18000MHz |                 |                      |          |                        |                  |                       |                   |                   |                            |            |                     |        |                        |
|----------------------------|-----------------|----------------------|----------|------------------------|------------------|-----------------------|-------------------|-------------------|----------------------------|------------|---------------------|--------|------------------------|
| Marker No.                 | Frequency (MHz) | Meter Reading (dBuV) | Detector | ETS Lindgren 3117 (dB) | 3ft 1-18GHz (dB) | HP 8449B 1-18GHz (dB) | 25ft 1-18GHz (dB) | 12ft 1-18GHz (dB) | BRF 2.5GHz 1-18GHz NF (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average |
| 4                          | 7670.886        | 37.62                | AV       | 35.8                   | 0.7              | -35.8                 | 5.4               | 2.8               | 0.5                        | 47.02      | 74                  | -26.98 | 54                     |
| 5                          | 8339.107        | 38.15                | AV       | 35.8                   | 0.7              | -36                   | 5.7               | 2.9               | 0.5                        | 47.75      | 74                  | -26.25 | 54                     |
| 6                          | 9211.193        | 37.47                | AV       | 36.3                   | 0.8              | -36.1                 | 6.1               | 3.1               | 0.5                        | 48.17      | 74                  | -25.83 | 54                     |

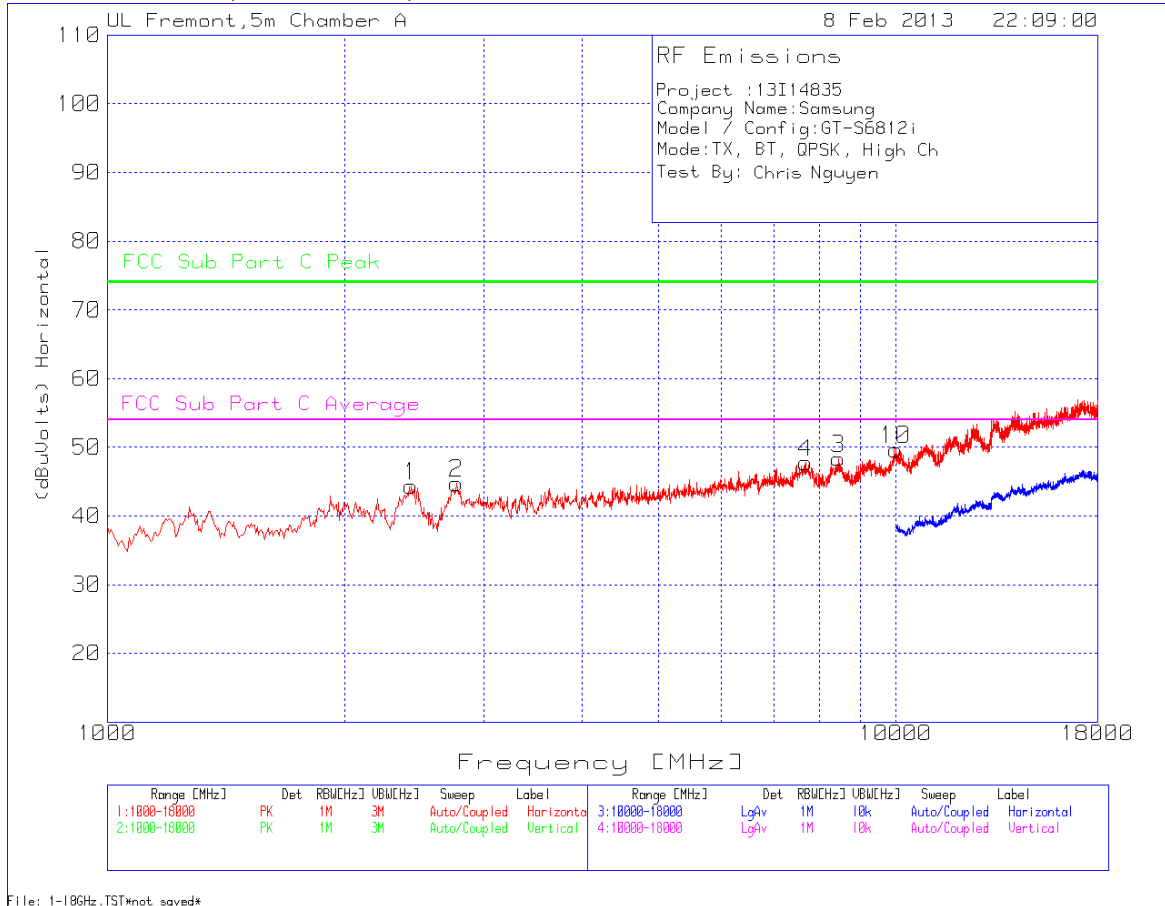
# MID CHANNEL, HARMONIC, VERTICAL



| Vertical 1000 - 18000MHz |           |               |          |              |             |                  |              |              |                       |            |              |        |                |        |        |          |
|--------------------------|-----------|---------------|----------|--------------|-------------|------------------|--------------|--------------|-----------------------|------------|--------------|--------|----------------|--------|--------|----------|
| Marker                   | Frequency | Meter Reading |          | ETS Lindgren | 3ft 1-18GHz | HP 84498 1-18GHz | 25ft 1-18GHz | 12ft 1-18GHz | BRF 2.5GHz 1-18GHz NF |            | FCC Sub Part |        | FCC Sub Part C |        | Height |          |
| No.                      | (Mhz)     | (dBuV)        | Detector | 3117 (dB)    | (dB)        | 18GHz (dB)       | (dB)         | (dB)         | (dB)                  | (dBuVolts) | C Peak       | Margin | Average        | Margin | [cm]   | Polarity |
| 7                        | 2438.374  | 44.47         | PK       | 32.2         | 0.3         | -36.9            | 2.8          | 1.3          | 0.5                   | 44.67      | 74           | -29.33 | 54             | -9.33  | 100    | Vert     |
| 8                        | 2761.159  | 43.14         | PK       | 32.7         | 0.4         | -36.8            | 3            | 1.4          | 0.5                   | 44.34      | 74           | -29.66 | 54             | -9.66  | 100    | Vert     |
| 9                        | 3418.055  | 41.04         | PK       | 32.9         | 0.4         | -36.4            | 3.4          | 1.6          | 0.5                   | 43.44      | 74           | -30.56 | 54             | -10.56 | 100    | Vert     |

| Vertical 1000 - 18000MHz |           |               |          |                        |                  |                       |            |                      |            |                     |        |                        |        |             |          |      |
|--------------------------|-----------|---------------|----------|------------------------|------------------|-----------------------|------------|----------------------|------------|---------------------|--------|------------------------|--------|-------------|----------|------|
| Marker                   | Frequency | Meter Reading |          |                        |                  |                       | 25ft 1-    |                      | BRF 2.5GHz |                     |        |                        |        |             |          |      |
| No.                      | (Mhz)     | (dBuV)        | Detector | ETS Lindgren 3117 (dB) | 3ft 1-18GHz (dB) | HP 84498 1-18GHz (dB) | 18GHz (dB) | 12ft 1-18GHz NF (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |      |
| 10                       | 7653.897  | 37.98         | AV       | 35.8                   | 0.7              | -35.8                 | 5.4        | 2.8                  | 0.5        | 47.38               | 74     | -26.62                 | 54     | -6.62       | 100      | Vert |
| 11                       | 8469.354  | 37.5          | AV       | 35.8                   | 0.7              | -36                   | 5.8        | 3                    | 0.5        | 47.3                | 74     | -26.7                  | 54     | -6.7        | 100      | Vert |
| 12                       | 9202.698  | 37.35         | AV       | 36.3                   | 0.8              | -36.1                 | 6.1        | 3.1                  | 0.5        | 48.05               | 74     | -25.95                 | 54     | -5.95       | 100      | Vert |

# HIGH CHANNEL, HARMONIC, HORIZONTAL

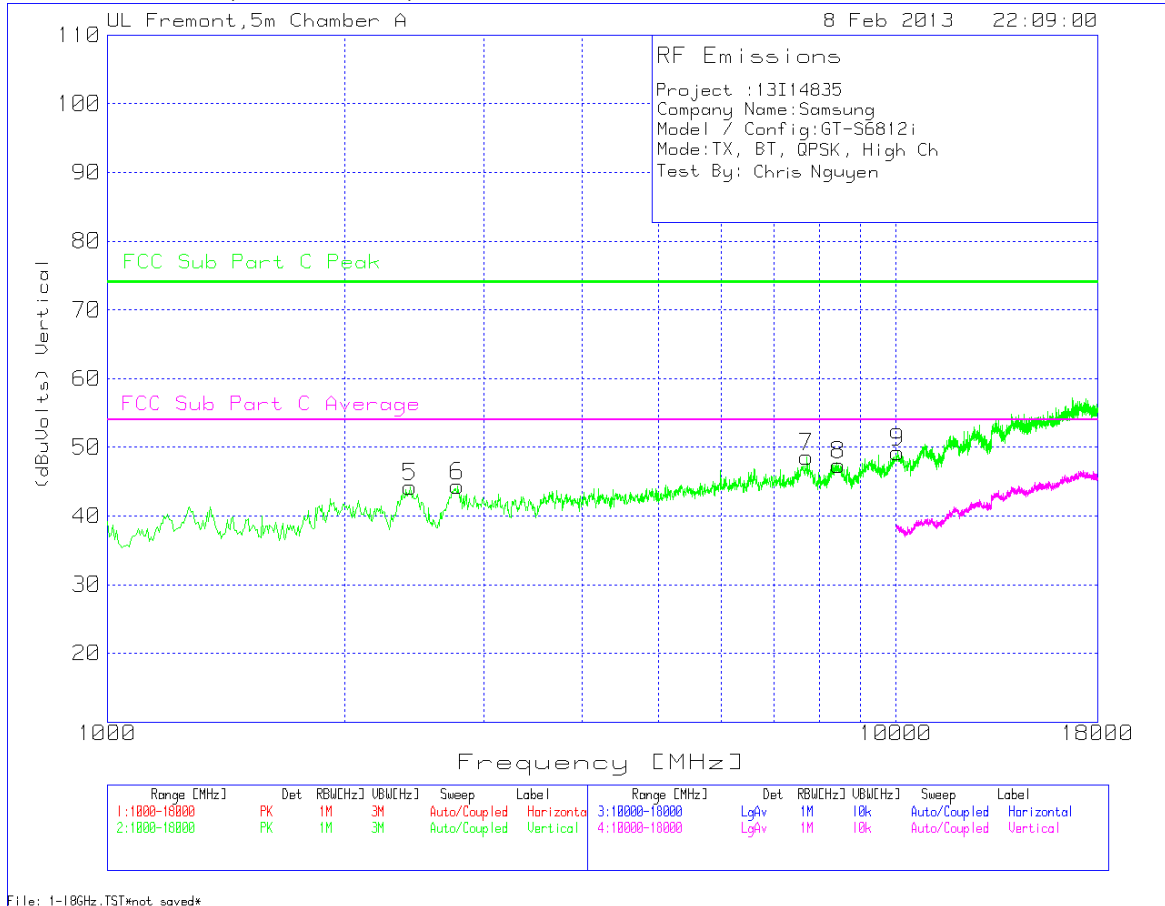


| Horizontal 1000 - 18000MHz |           |               |          |              |             |             |         |         |            |       |            |        |        |       |         |        |
|----------------------------|-----------|---------------|----------|--------------|-------------|-------------|---------|---------|------------|-------|------------|--------|--------|-------|---------|--------|
| Marker                     | Frequency | Meter Reading |          | ETS Lindgren | 3ft 1-18GHz | HP 8449B 1- | 25ft 1- |         | BRF 2.5GHz |       |            |        |        |       | FCC Sub |        |
| No.                        | (Mhz)     | (dBUV)        | Detector | 3117 (dB)    | (dB)        | 18GHz (dB)  | 18GHz   | 12ft 1- | 1-18GHz NF | (dB)  | (dBUVolts) | C Peak | Margin |       | Average | Margin |
| 1                          | 2427.049  | 44.16         | PK       | 32.2         | 0.3         | -36.9       | 2.8     | 1.3     | 0.5        | 44.36 | 74         | -29.64 | 54     | -9.64 | 200     | Horz   |
| 2                          | 2772.485  | 43.5          | PK       | 32.7         | 0.4         | -36.8       | 3       | 1.4     | 0.5        | 44.7  | 74         | -29.3  | 54     | -9.3  | 200     | Horz   |
| 3                          | 8458.028  | 38.59         | PK       | 35.8         | 0.7         | -36         | 5.8     | 3       | 0.5        | 48.39 | 74         | -25.61 | 54     | -5.61 | 200     | Horz   |

| Horizontal 1000 - 18000MHz |           |               |          |              |             |             |         |         |            |       |            |        |         |         |        |        |
|----------------------------|-----------|---------------|----------|--------------|-------------|-------------|---------|---------|------------|-------|------------|--------|---------|---------|--------|--------|
| Marker                     | Frequency | Meter Reading |          | ETS Lindgren | 3ft 1-18GHz | HP 8449B 1- | 25ft 1- |         | BRF 2.5GHz |       |            |        | FCC Sub |         |        |        |
| No.                        | (Mhz)     | (dBUV)        | Detector | 3117 (dB)    | (dB)        | 18GHz (dB)  | (dB)    | 12ft 1- | 1-18GHz NF | (dB)  | (dBUVolts) | C Peak | Margin  | Average | Margin | Height |
| 4                          | 7682.212  | 38.34         | AV       | 35.8         | 0.7         | -35.8       | 5.4     | 2.8     | 0.5        | 47.74 | 74         | -26.26 | 54      | -6.26   | 100    | Horz   |
| 10                         | 10003.997 | 38.23         | AV       | 37           | 0.8         | -36.4       | 6.3     | 3.2     | 0.5        | 49.63 | 74         | -24.37 | 54      | -4.37   | 100    | Horz   |



# HIGH CHANNEL, HARMONIC, VERTICAL



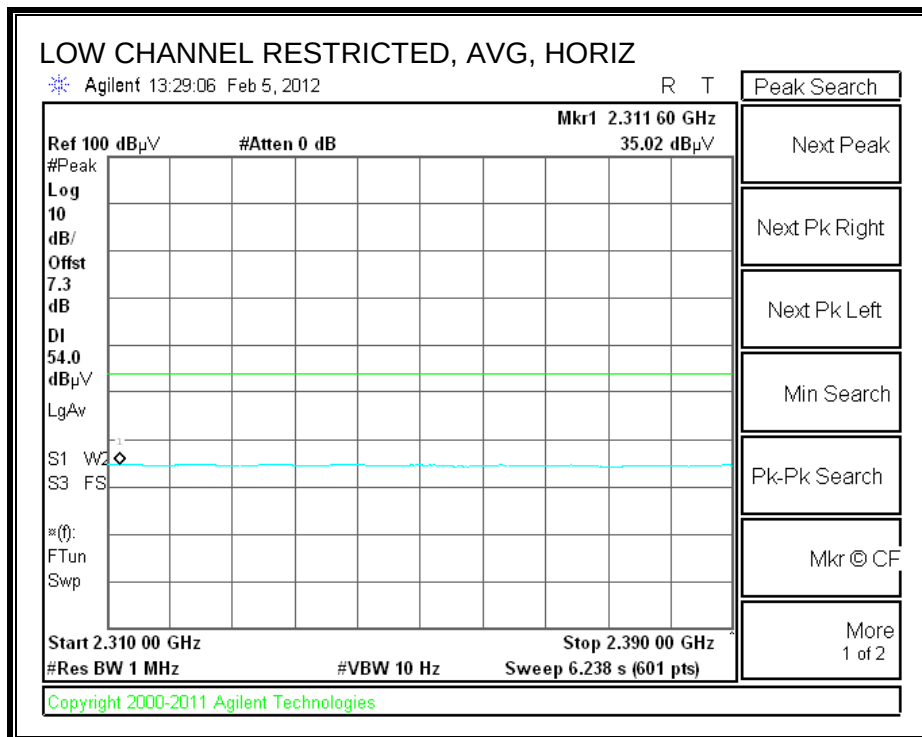
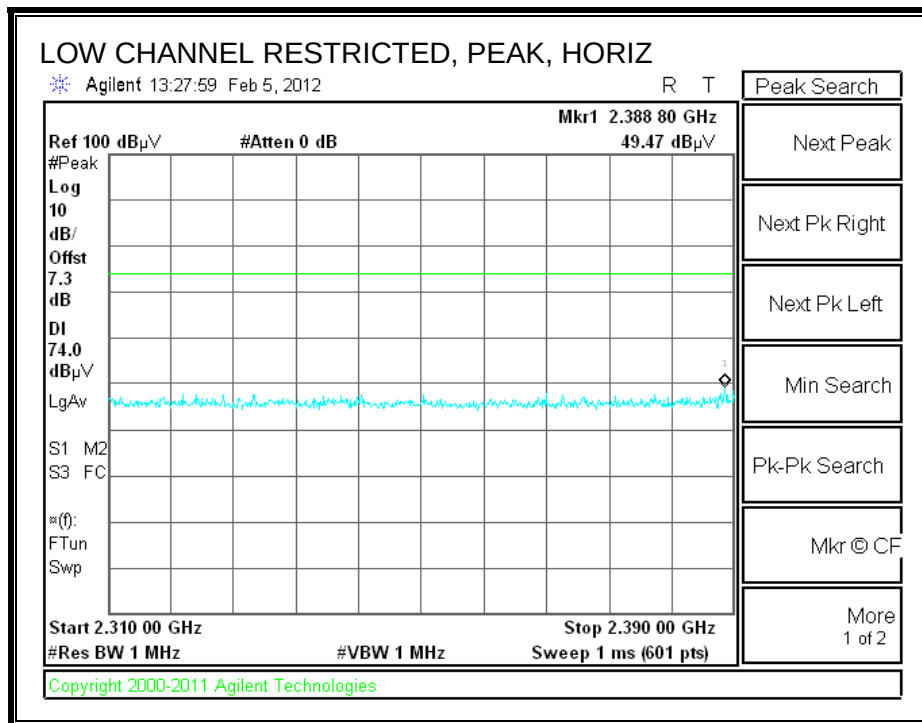
| Vertical 1000 - 18000MHz |                 |                      |          |                        |                  |                       |                   |                   |                            |            |                     |        |                        |
|--------------------------|-----------------|----------------------|----------|------------------------|------------------|-----------------------|-------------------|-------------------|----------------------------|------------|---------------------|--------|------------------------|
| Marker No.               | Frequency (Mhz) | Meter Reading (dBuV) | Detector | ETS Lindgren 3117 (dB) | 3ft 1-18GHz (dB) | HP 84498 1-18GHz (dB) | 25ft 1-18GHz (dB) | 12ft 1-18GHz (dB) | BRF 2.5GHz 1-18GHz NF (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average |
| 5                        | 2421.386        | 43.97                | PK       | 32.2                   | 0.3              | -36.9                 | 2.8               | 1.3               | 0.5                        | 44.17      | 74                  | -29.83 | 54                     |
| 6                        | 2783.811        | 43.14                | PK       | 32.7                   | 0.4              | -36.8                 | 3                 | 1.4               | 0.5                        | 44.34      | 74                  | -29.66 | 54                     |
| 7                        | 7710.526        | 39.21                | PK       | 35.8                   | 0.7              | -35.8                 | 5.4               | 2.8               | 0.5                        | 48.61      | 74                  | -25.39 | 54                     |

| Vertical 1000 - 18000MHz |                 |                      |          |                        |                  |                       |                   |                   |                            |            |                     |        |                        |
|--------------------------|-----------------|----------------------|----------|------------------------|------------------|-----------------------|-------------------|-------------------|----------------------------|------------|---------------------|--------|------------------------|
| Marker No.               | Frequency (Mhz) | Meter Reading (dBuV) | Detector | ETS Lindgren 3117 (dB) | 3ft 1-18GHz (dB) | HP 84498 1-18GHz (dB) | 25ft 1-18GHz (dB) | 12ft 1-18GHz (dB) | BRF 2.5GHz 1-18GHz NF (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average |
| 8                        | 8458.028        | 37.66                | AV       | 35.8                   | 0.7              | -36                   | 5.8               | 3                 | 0.5                        | 47.46      | 74                  | -26.54 | 54                     |
| 9                        | 10043.638       | 37.73                | AV       | 37                     | 0.8              | -36.3                 | 6.3               | 3.2               | 0.5                        | 49.23      | 74                  | -24.77 | 54                     |

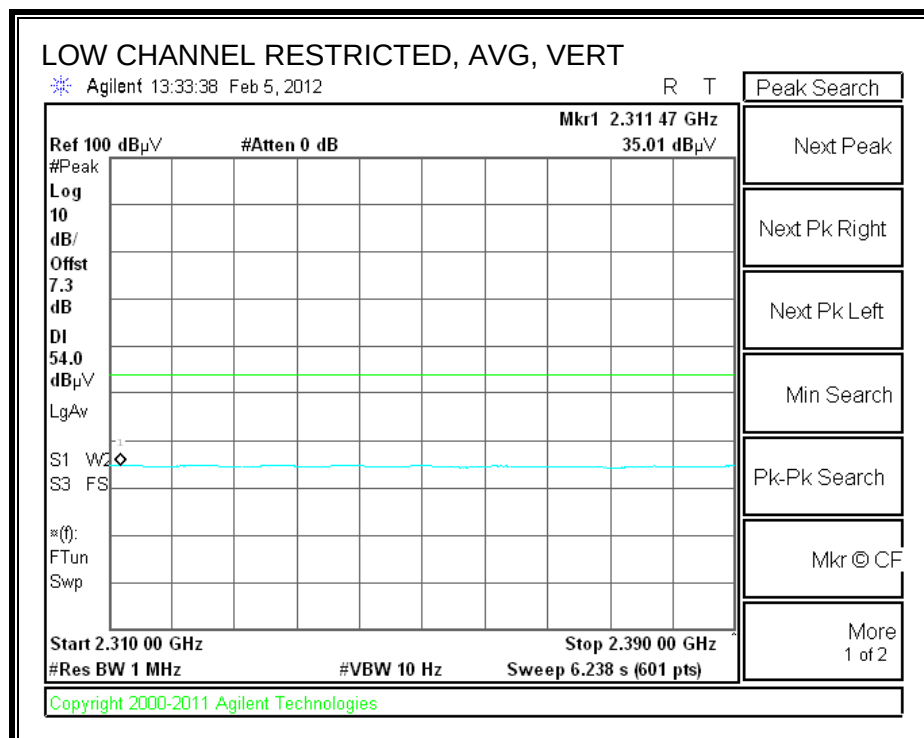
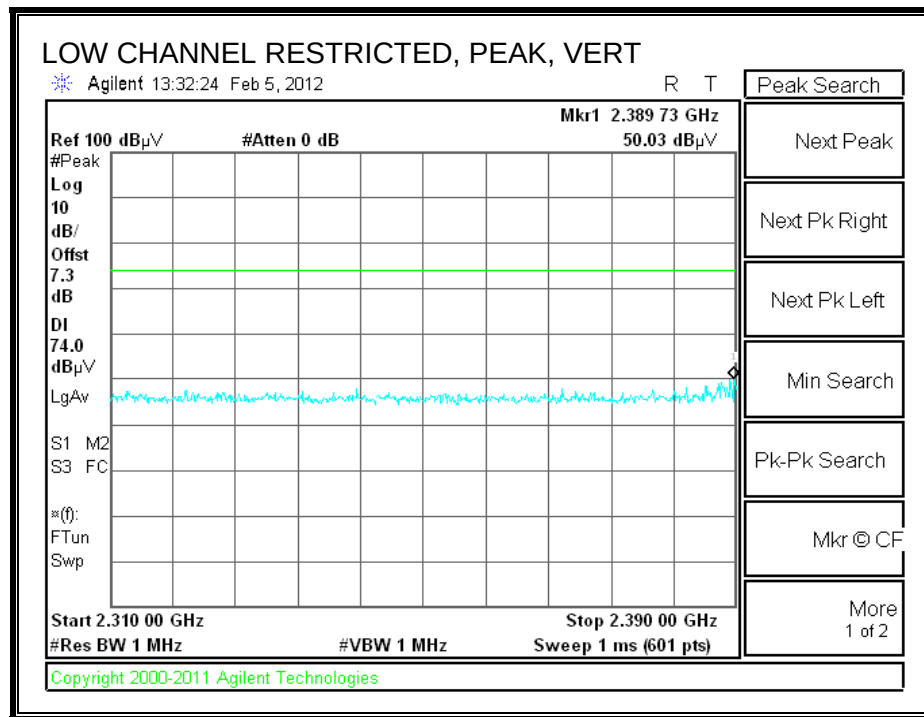
There are no emissions from 18 GHz to 26 GHz.

### 8.2.3. ENHANCED DATA RATE 8PSK MODULATION

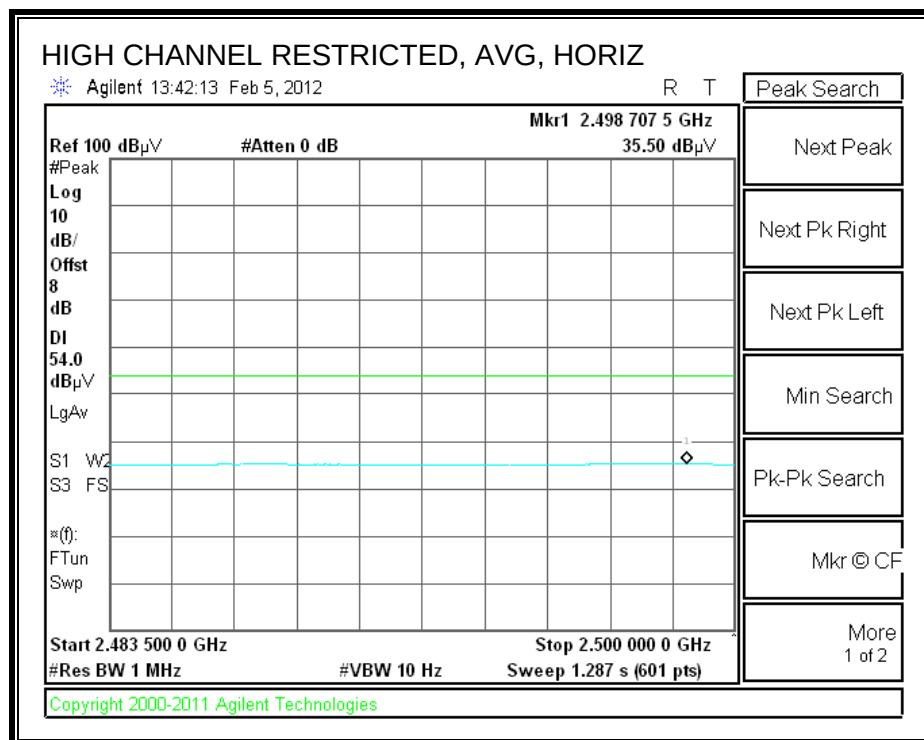
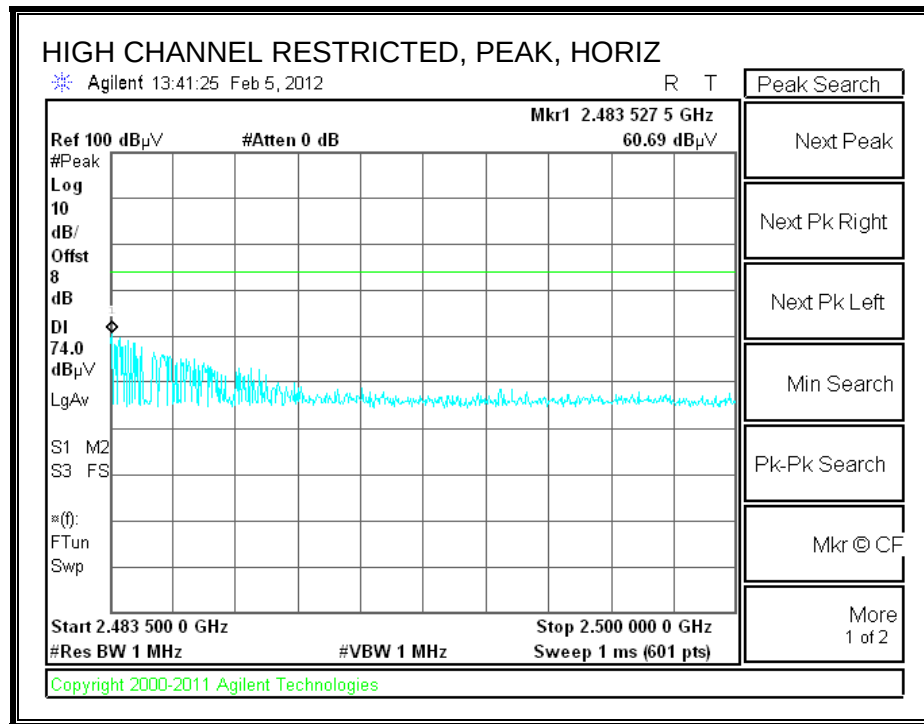
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



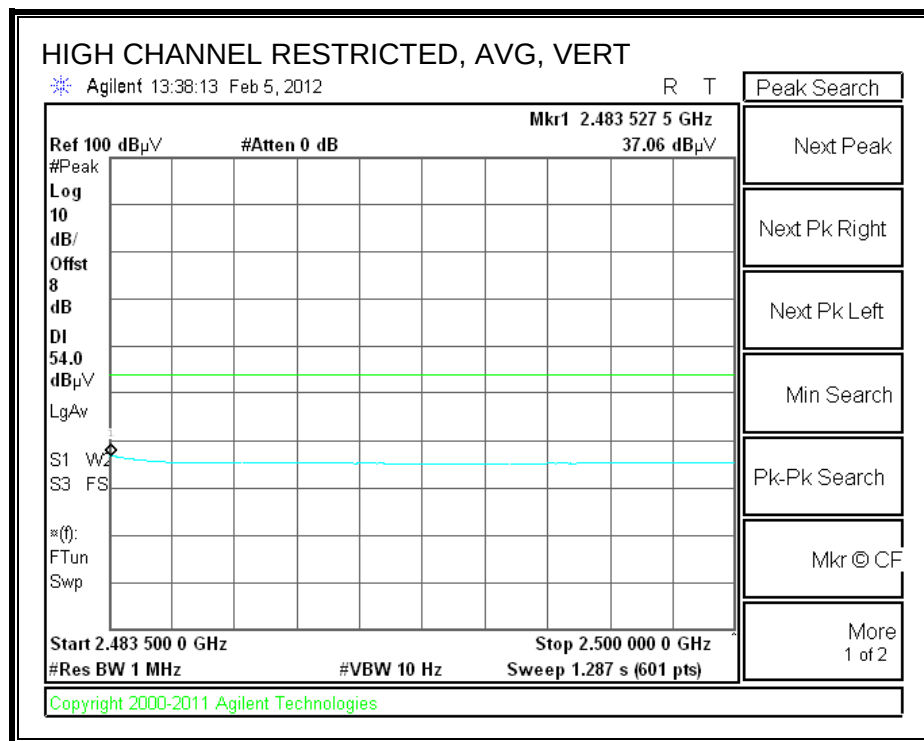
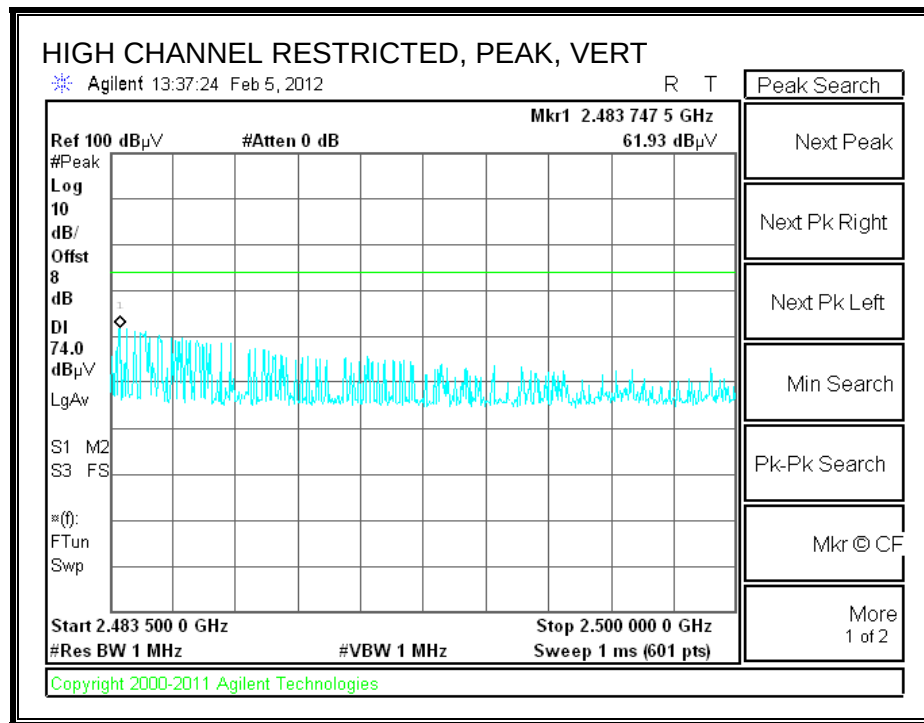
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



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

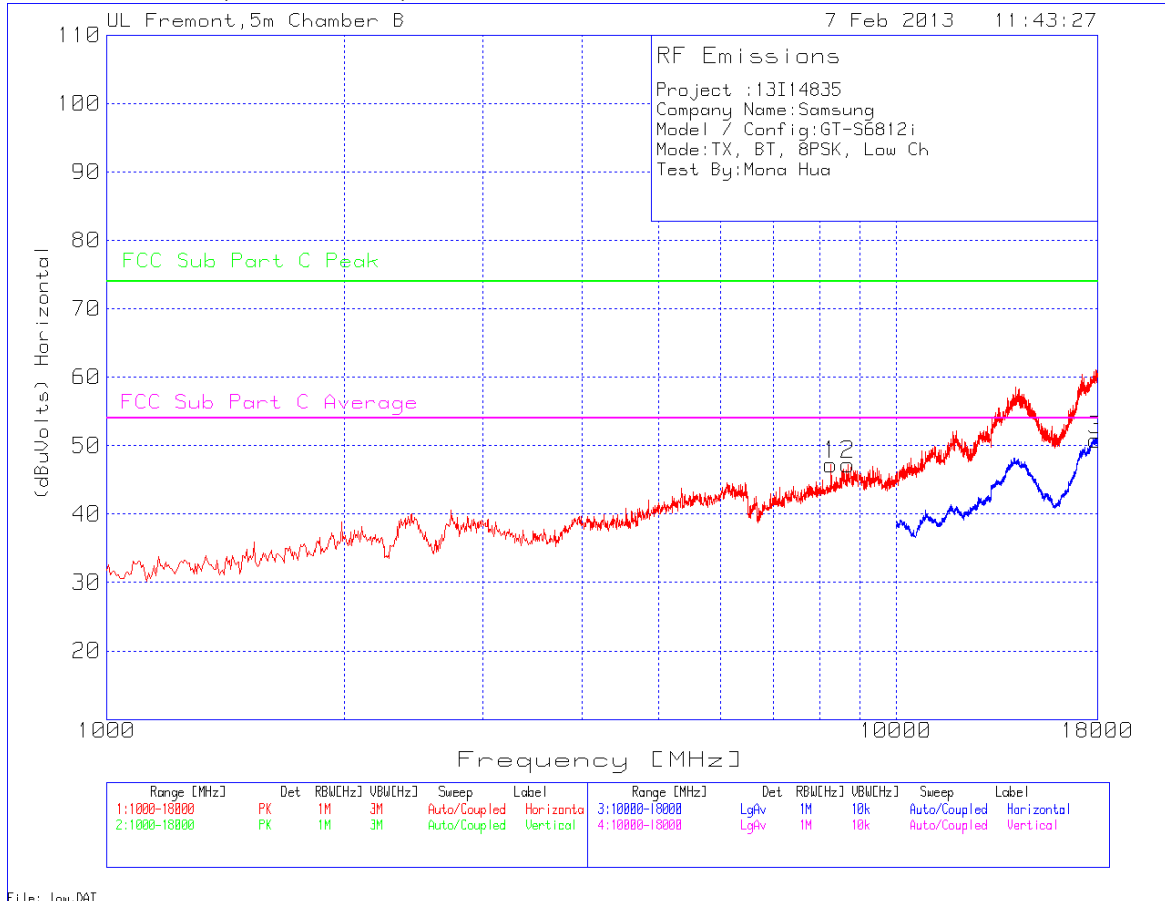


**RESTRICTED BANEDGE (HIGH CHANNEL, VERTICAL)**



# **HARMONICS AND SPURIOUS EMISSIONS**

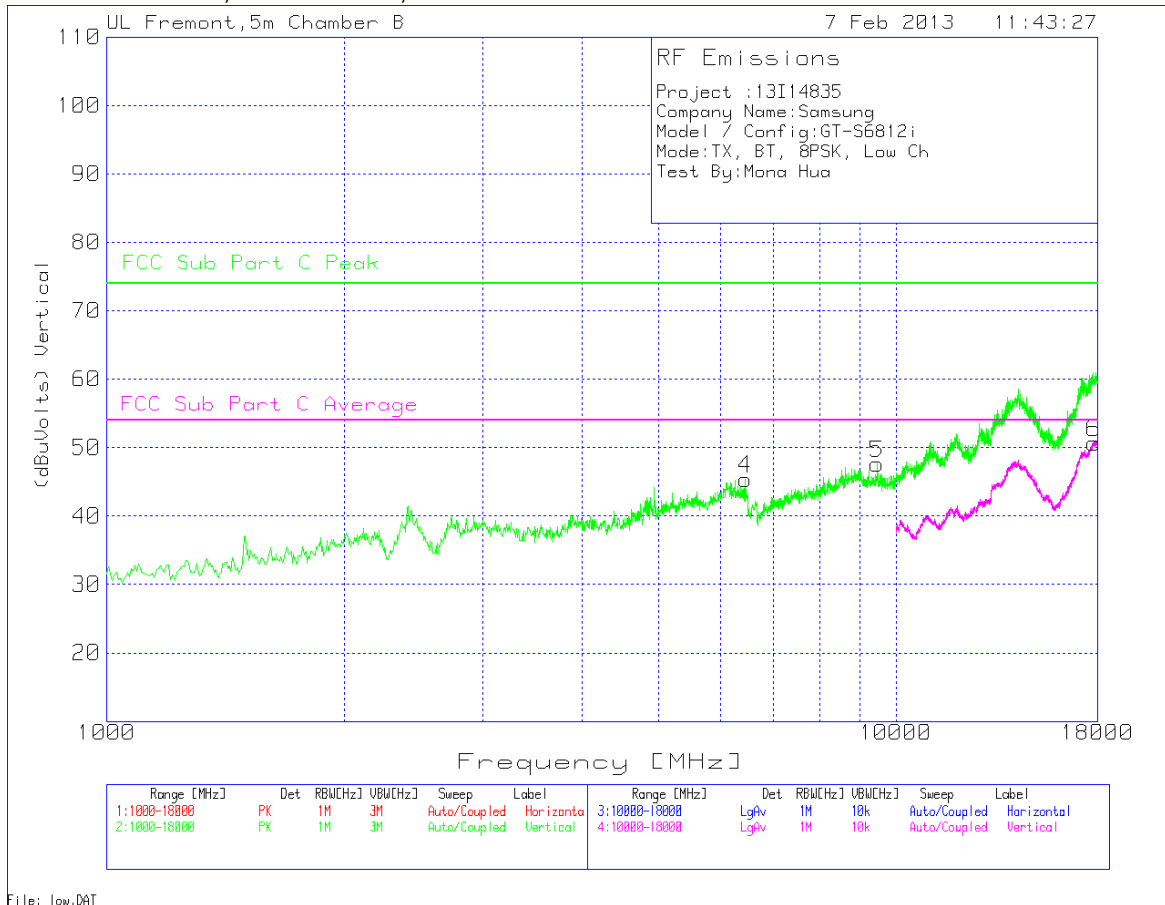
## **LOW CHANNEL, HARMONIC, HORIZONTAL**



| Horizontal 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                 | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 1                          | 8276.815        | 35.56                | PK       | 37.1                    | 9.5        | -35.9                 | 1           | 47.26      | 74                  | -26.74 | 54                     | -6.74  | 200         | Horz     |
| 2                          | 8690.207        | 35.23                | PK       | 37.3                    | 9.7        | -36                   | 1           | 47.23      | 74                  | -26.77 | 54                     | -6.77  | 200         | Horz     |

| Horizontal 10000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|-----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                  | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 3                           | 17928.036       | 23.75                | AV       | 46.2                    | 14.8       | -34.9                 | 1           | 50.85      | 74                  | -23.15 | 54                     | -3.15  | 100         | Horz     |

# LOW CHANNEL, HARMONIC, VERTICAL

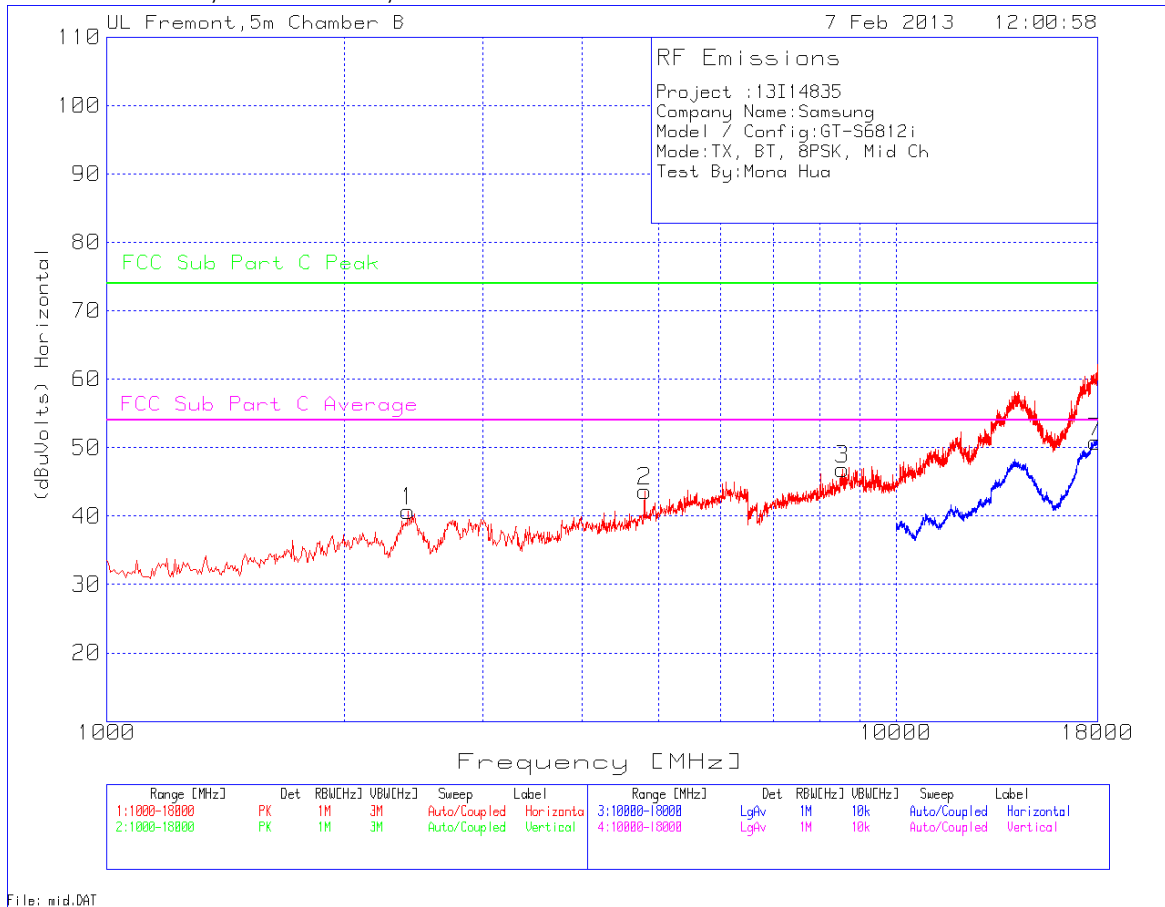


| Vertical 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|--------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.               | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 4                        | 6447.702        | 37.18                | PK       | 34.4                    | 8.3        | -35.5                 | 1           | 45.38      | 74                  | -28.62 | 54                     | -8.62  | 200         | Vert     |
| 5                        | 9466.023        | 35.1                 | PK       | 37.5                    | 10.2       | -36.2                 | 1           | 47.6       | 74                  | -26.4  | 54                     | -6.4   | 100         | Vert     |

| Vertical 10000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|---------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 6                         | 17824.088       | 23.68                | AV       | 46.1                    | 14.7       | -34.8                 | 1           | 50.68      | 74                  | -23.32 | 54                     | -3.32  | 100         | Vert     |

# MID CHANNEL, HARMONIC, HORIZONTAL

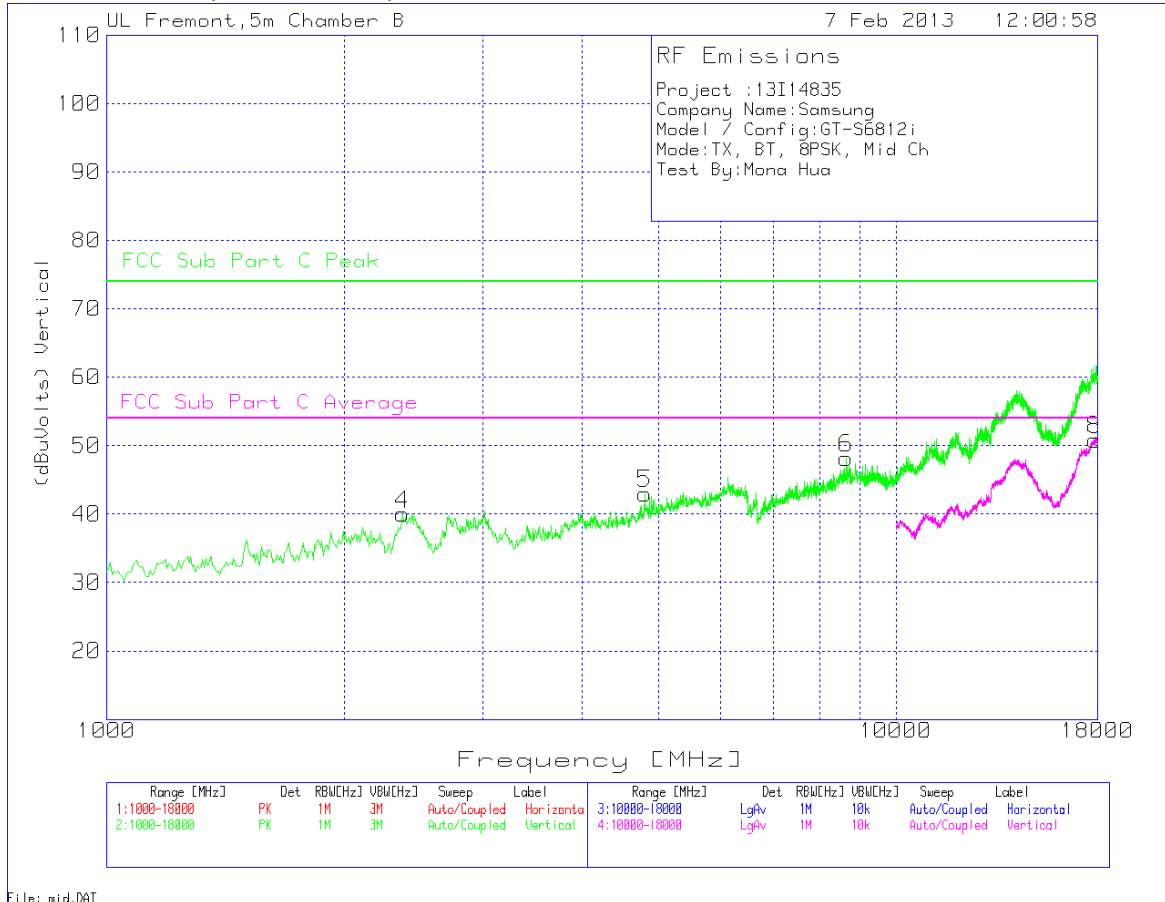


| Horizontal 1000 - 18000MHz |                 |                      |          |                          |            |                        |             |            |                     |        |                        |        |             |
|----------------------------|-----------------|----------------------|----------|--------------------------|------------|------------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|
| Marker No.                 | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1- 18GHz (dB) | Cable (dB) | HP 8449B 1- 18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] |
| 1                          | 2410.06         | 42.94                | PK       | 28.6                     | 4.6        | -36.9                  | 1.5         | 40.74      | 74                  | -33.26 | 54                     | -13.26 | 100         |
| 2                          | 4805.463        | 38.45                | PK       | 32.9                     | 7          | -35.7                  | 1           | 43.65      | 74                  | -30.35 | 54                     | -10.35 | 100         |
| 3                          | 8548.634        | 35.03                | PK       | 37.2                     | 9.6        | -36                    | 1           | 46.83      | 74                  | -27.17 | 54                     | -7.17  | 200         |

| Horizontal 10000 - 18000MHz |                 |                      |          |                          |            |                        |             |            |                     |        |                        |        |             |
|-----------------------------|-----------------|----------------------|----------|--------------------------|------------|------------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|
| Marker No.                  | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1- 18GHz (dB) | Cable (dB) | HP 8449B 1- 18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] |
| 7                           | 17928.036       | 23.79                | AV       | 46.2                     | 14.8       | -34.9                  | 1           | 50.89      | 74                  | -23.11 | 54                     | -3.11  | 100         |



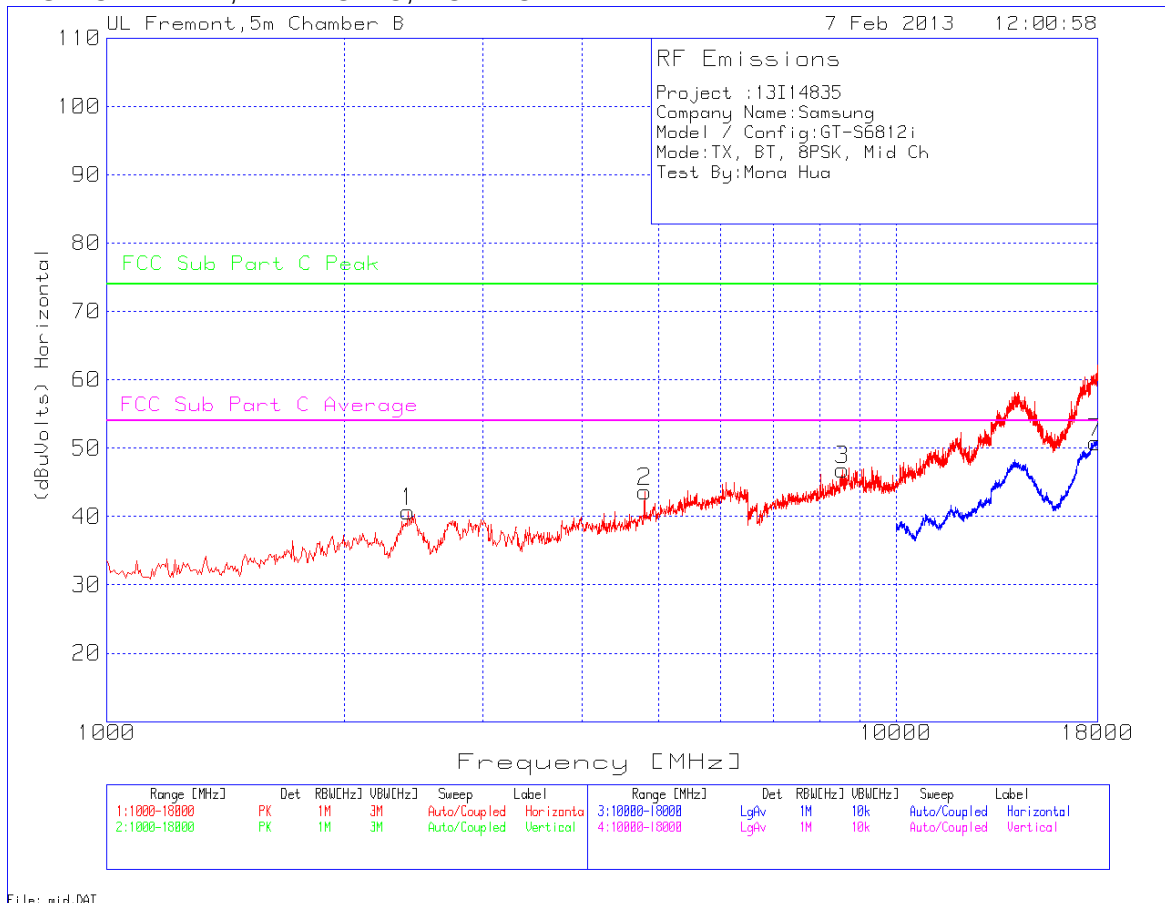
# MID CHANNEL, HARMONIC, VERTICAL



| Vertical 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|--------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.               | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 8449B 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 4                        | 2370.42         | 42.39                | PK       | 28.4                    | 4.6        | -36.9                 | 1.5         | 39.99      | 74                  | -34.01 | 54                     | -14.01 | 200         | Vert     |
| 5                        | 4805.463        | 37.75                | PK       | 32.9                    | 7          | -35.7                 | 1           | 42.95      | 74                  | -31.05 | 54                     | -11.05 | 100         | Vert     |
| 6                        | 8656.229        | 36.31                | PK       | 37.2                    | 9.7        | -36                   | 1           | 48.21      | 74                  | -25.79 | 54                     | -5.79  | 100         | Vert     |

| Vertical 10000 - 18000MHz |                 |                      |          |                          |            |                        |             |            |                     |        |                        |        |             |          |
|---------------------------|-----------------|----------------------|----------|--------------------------|------------|------------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                | Frequency (Mhz) | Meter Reading (dBUV) | Detector | EMCO 31115 1- 18GHz (dB) | Cable (dB) | HP 8449B 1- 18GHz (dB) | Filter (dB) | (dBUVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 8                         | 17876.062       | 23.73                | AV       | 46.2                     | 14.8       | -34.9                  | 1           | 50.83      | 74                  | -23.17 | 54                     | -3.17  | 100         | Vert     |

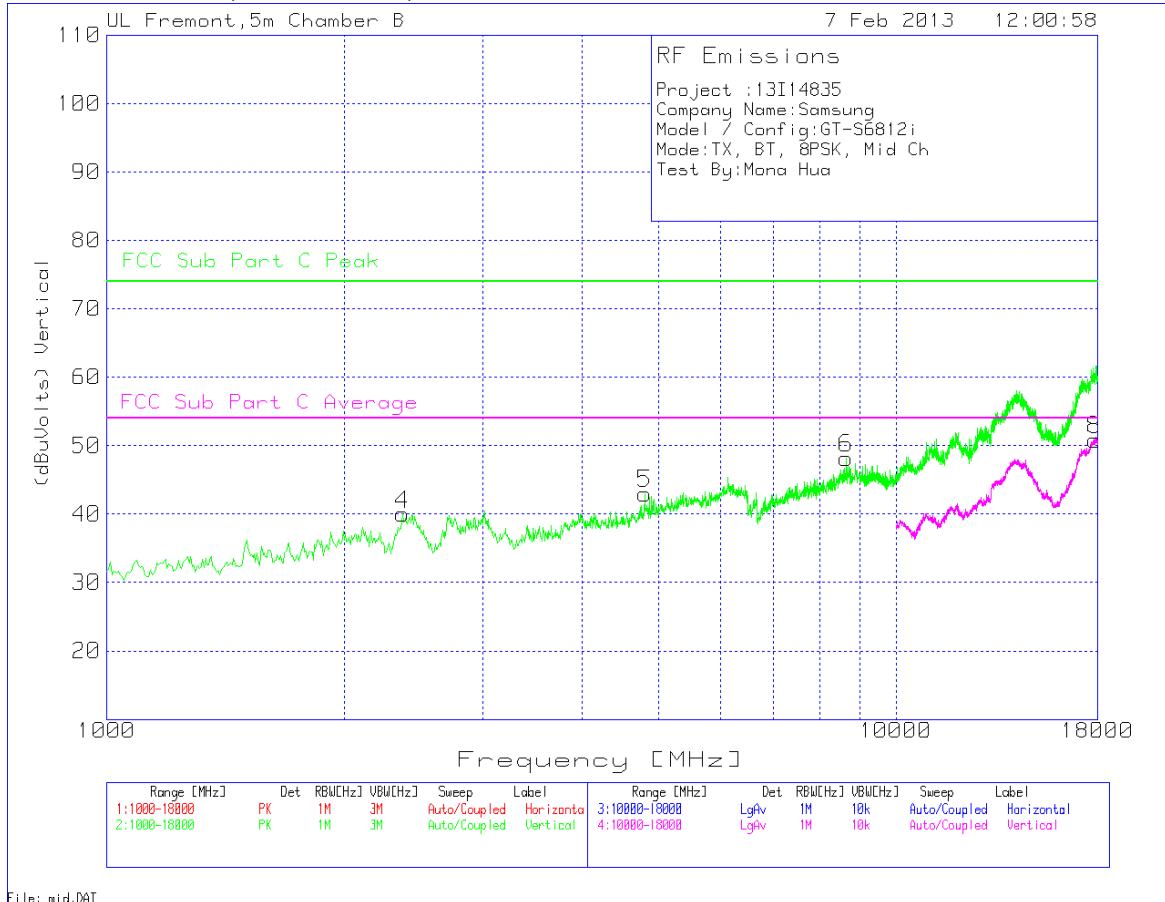
# HIGH CHANNEL, HARMONIC, HORIZONTAL



| Horizontal 1000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                 | Frequency (MHz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 84498 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 1                          | 2455.363        | 42.62                | PK       | 28.6                    | 4.7        | -36.9                 | 1.5         | 40.52      | 74                  | -33.48 | 54                     | -13.48 | 100         | Horz     |
| 2                          | 5592.605        | 36.53                | PK       | 34                      | 7.7        | -35.5                 | 1           | 43.73      | 74                  | -30.27 | 54                     | -10.27 | 200         | Horz     |
| 3                          | 9432.045        | 34.81                | PK       | 37.5                    | 10.1       | -36.2                 | 1           | 47.21      | 74                  | -26.79 | 54                     | -6.79  | 200         | Horz     |

| Horizontal 10000 - 18000MHz |                 |                      |          |                         |            |                       |             |            |                     |        |                        |        |             |          |
|-----------------------------|-----------------|----------------------|----------|-------------------------|------------|-----------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|----------|
| Marker No.                  | Frequency (MHz) | Meter Reading (dBuV) | Detector | EMCO 31115 1-18GHz (dB) | Cable (dB) | HP 84498 1-18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] | Polarity |
| 4                           | 17952.024       | 23.64                | AV       | 46.3                    | 14.8       | -35                   | 1           | 50.74      | 74                  | -23.26 | 54                     | -3.26  | 100         | Horz     |

# HIGH CHANNEL, HARMONIC, VERTICAL



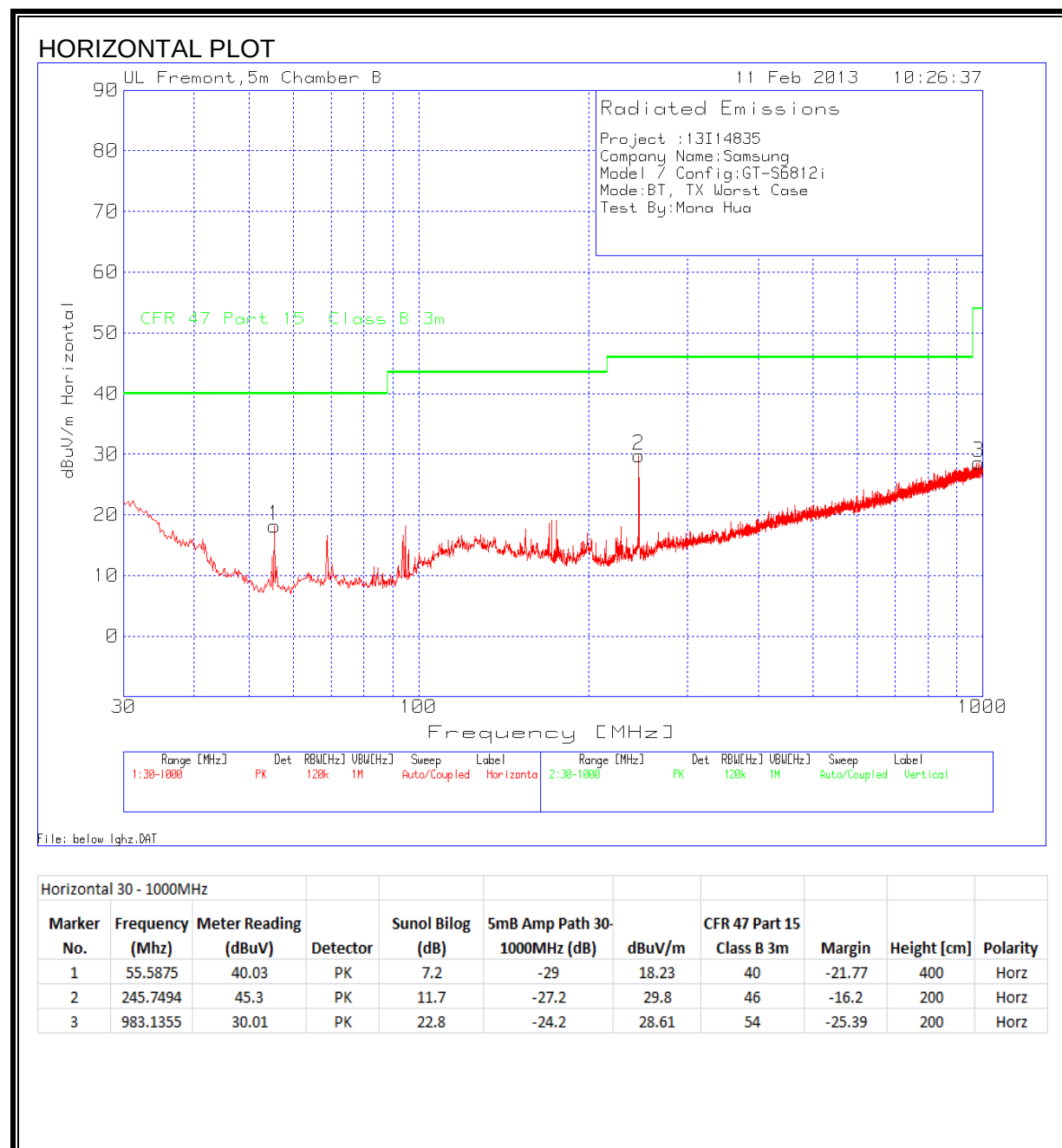
| Vertical 1000 - 18000MHz |                 |                      |          |                          |            |                        |             |            |                     |        |                        |        |             |
|--------------------------|-----------------|----------------------|----------|--------------------------|------------|------------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|
| Marker No.               | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1- 18GHz (dB) | Cable (dB) | HP 8449B 1- 18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] |
| 5                        | 1883.411        | 48.61                | PK       | 27.4                     | 4.1        | -37.3                  | 0.9         | 43.71      | 74                  | -30.29 | 54                     | -10.29 | 200         |
| 6                        | 9313.125        | 35.59                | PK       | 37.5                     | 10.1       | -36.2                  | 1           | 47.99      | 74                  | -26.01 | 54                     | -6.01  | 200         |

| Vertical 10000 - 18000MHz |                 |                      |          |                          |            |                        |             |            |                     |        |                        |        |             |
|---------------------------|-----------------|----------------------|----------|--------------------------|------------|------------------------|-------------|------------|---------------------|--------|------------------------|--------|-------------|
| Marker No.                | Frequency (Mhz) | Meter Reading (dBuV) | Detector | EMCO 31115 1- 18GHz (dB) | Cable (dB) | HP 8449B 1- 18GHz (dB) | Filter (dB) | (dBuVolts) | FCC Sub Part C Peak | Margin | FCC Sub Part C Average | Margin | Height [cm] |
| 7                         | 17912.044       | 23.77                | AV       | 46.2                     | 14.8       | -34.9                  | 1           | 50.87      | 74                  | -23.13 | 54                     | -3.13  | 100         |

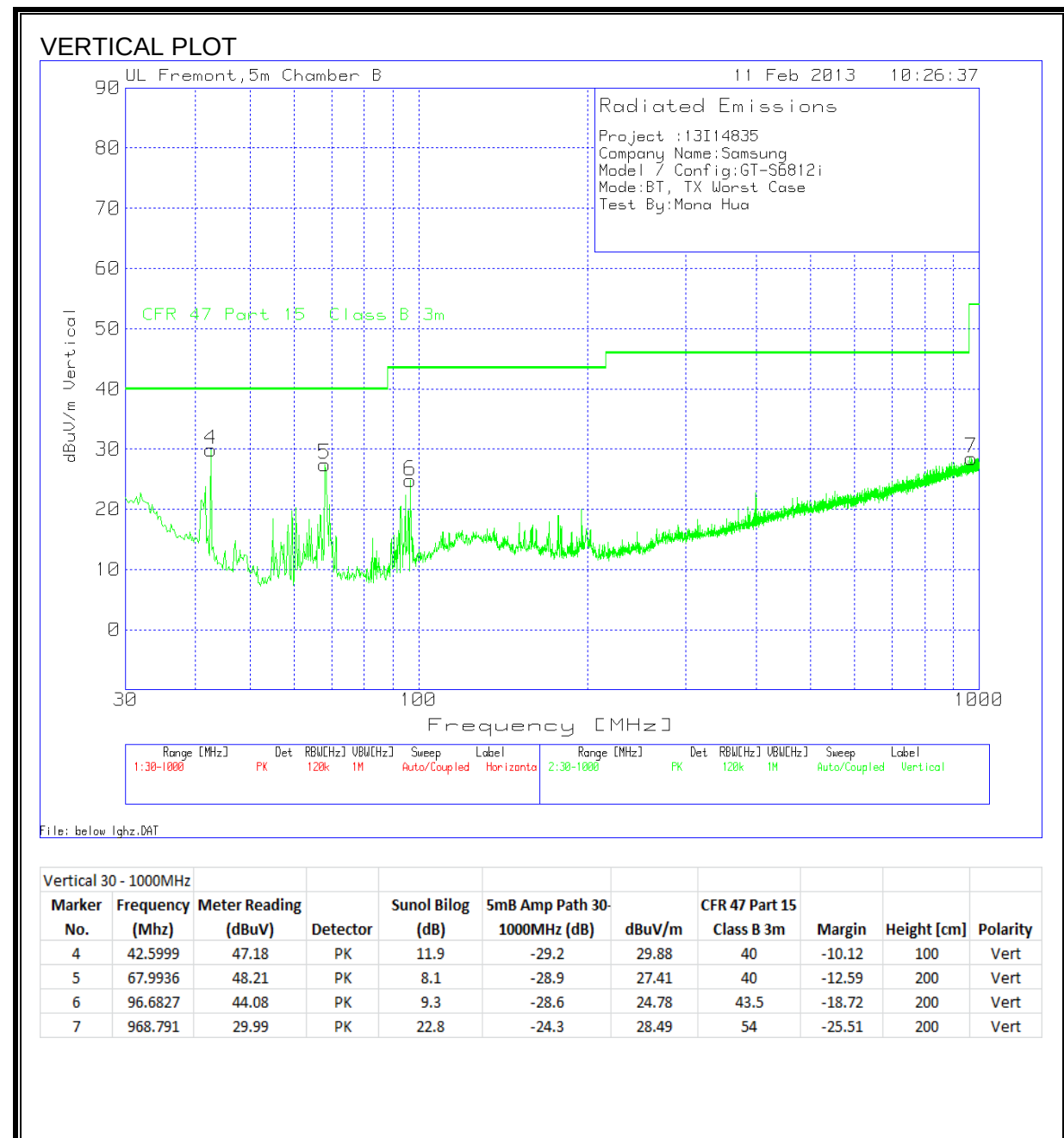
There are no emissions from 18 GHz to 26 GHz.

### 8.3. WORST-CASE BELOW 1 GHz

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



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



## 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 <sup>*</sup>  | 56 to 46 <sup>*</sup> |
| 0.5-5                       | 56                     | 46                    |
| 5-30                        | 60                     | 50                    |

<sup>\*</sup> Decreases with the logarithm of the frequency.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

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

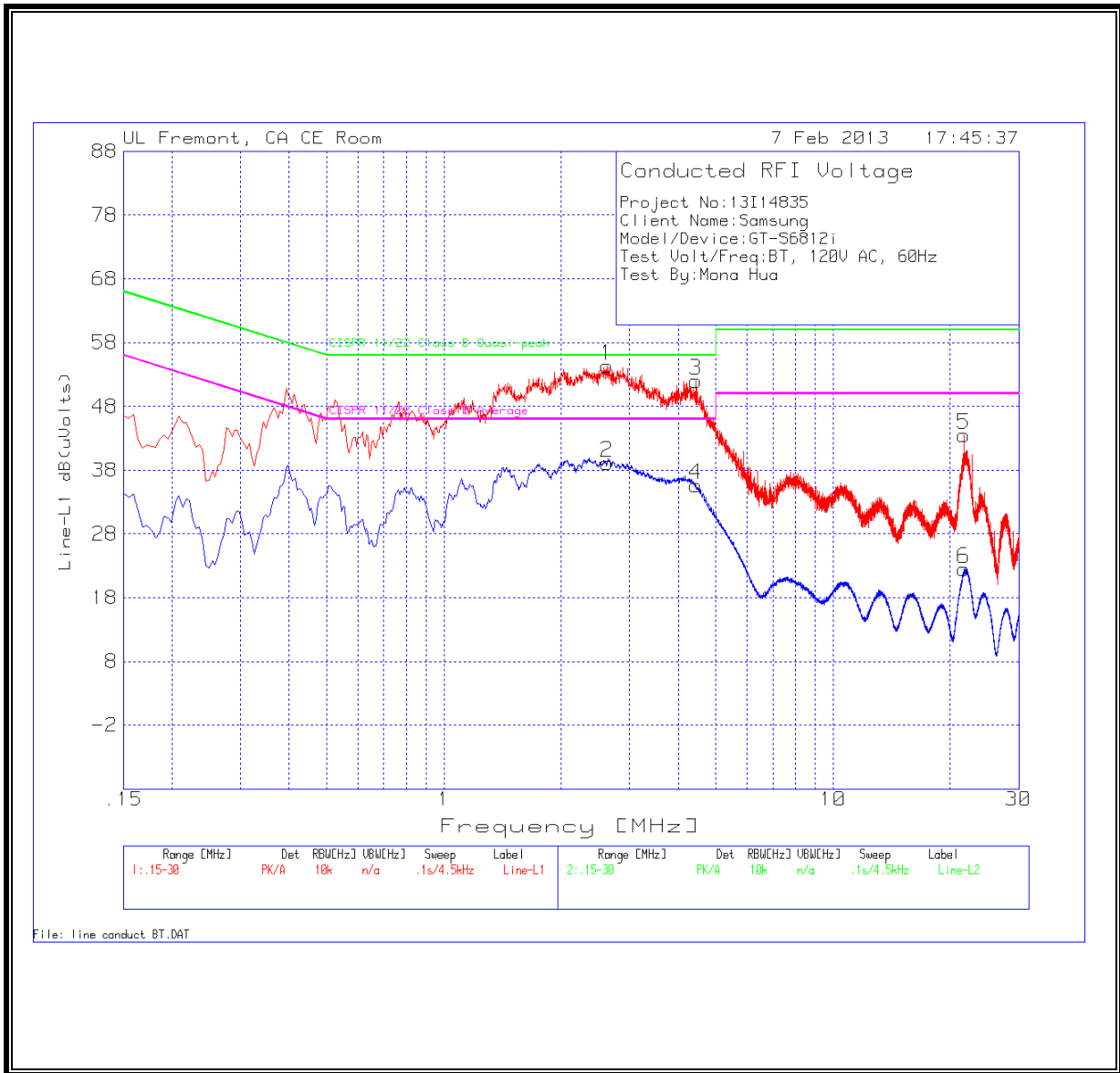
Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

## 6 WORST EMISSIONS

| Line-L1 .15 - 30MHz |               |          |                |                    |            |                                |        |                             |        |
|---------------------|---------------|----------|----------------|--------------------|------------|--------------------------------|--------|-----------------------------|--------|
| Frequency (Ghz)     | Meter Reading | Detector | T24 IL L2 (dB) | LC Cables 2&3 (dB) | dB(uVolts) | CISPR 11/22 Class B Quasi-peak | Margin | CISPR 11/22 Class B Average | Margin |
| 2.6205              | 54.15         | PK       | 0.1            | 0.1                | 54.35      | 56                             | -1.65  | -                           | -      |
| 2.6205              | 38.89         | Av       | 0.1            | 0.1                | 39.09      | -                              | -      | 46                          | -6.91  |
| 4.4295              | 51.78         | PK       | 0.1            | 0.1                | 51.98      | 56                             | -4.02  | -                           | -      |
| 4.4295              | 35.48         | Av       | 0.1            | 0.1                | 35.68      | -                              | -      | 46                          | -10.32 |
| 21.6825             | 42.98         | PK       | 0.3            | 0.2                | 43.48      | 60                             | -16.52 | -                           | -      |
| 21.6825             | 22.06         | Av       | 0.3            | 0.2                | 22.56      | -                              | -      | 50                          | -27.44 |
| Line-L2 .15 - 30MHz |               |          |                |                    |            |                                |        |                             |        |
| Frequency (Ghz)     | Meter Reading | Detector | T24 IL L2 (dB) | LC Cables 2&3 (dB) | dB(uVolts) | CISPR 11/22 Class B Quasi-peak | Margin | CISPR 11/22 Class B Average | Margin |
| 2.9265              | 51.47         | PK       | 0.1            | 0.1                | 51.67      | 56                             | -4.33  | -                           | -      |
| 2.9265              | 34.28         | Av       | 0.1            | 0.1                | 34.48      | -                              | -      | 46                          | -11.52 |
| 4.272               | 49.49         | PK       | 0.1            | 0.1                | 49.69      | 56                             | -6.31  | -                           | -      |
| 4.272               | 30.91         | Av       | 0.1            | 0.1                | 31.11      | -                              | -      | 46                          | -14.89 |
| 29.085              | 29.64         | PK       | 0.5            | 0.3                | 30.44      | 60                             | -29.56 | -                           | -      |
| 29.085              | 9.72          | Av       | 0.5            | 0.3                | 10.52      | -                              | -      | 50                          | -39.48 |

**LINE 1 RESULTS**





**LINE 2 RESULTS**

