



**FCC 47 CFR PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA/LTE Phone with BT, BLE, DTS/UNII a/b/g/n/ac & NFC**

**FCC ID: PY7-29752M**

**REPORT NUMBER: 16J23633A-E2V3**

**ISSUE DATE: 2016-08-18**

**Prepared for  
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4-12-3 HIGASHI-SHINAGAWA,  
SHINAGAWA -KU, TOKYO, 140-0002, JAPAN**

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NVLAP Lab code: 200246-0

Revision History

| Ver. | Issue Date | Revisions   | Revised By   |
|------|------------|---|--------------|
| 1    | 8/3/16     | Initial Issue   | Brian Kiewra |
| 2    | 2016-08-15 | Corrected maximum output power in section 5.2<br>Corrected 20dB BW data to agree with unit in section 7.1.1<br>Identified measurement procedure in section 2<br>Corrected standard reference in section 9<br>Corrected average measurement procedure in section 8.1<br>Update 1/B in table in section 7.1 | Brian Kiewra |
| 3    | 2016-08-18 | Included clarifying calculation for 1/Ton in Radiated procedure and throughout Radiated results.  | Brian Kiewra |

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SONY MOBILE COMMUNICATIONS, INC.  
4-12-3 HIGASHI-SHINAGAWA,  
SHINAGAWA -KU,TOKYO, 140-0002, JAPAN

**EUT DESCRIPTION:** GSM/WCDMA/LTE Phone with BT, BLE, DTS/UNII a/b/g/n/ac &  
NFC

**SERIAL NUMBER:** Conducted: CB512AP7SV, CB512AP7UK  
Radiated: CB512AP7SN

**DATE TESTED:** 2016-07-13 to 2016-08-02

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

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



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EMC Program Manager  
UL – Consumer Technology Division

Prepared By:



Brian T. Kiewra  
EMC Engineer  
UL – Consumer Technology Division

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Suite B, Perimeter Park Drive, Morrisville, NC 27560.

|                                    |
|------------------------------------|
| 12 Laboratory Dr., RTP, NC 27709   |
| <input type="checkbox"/> Chamber A |
| <input type="checkbox"/> Chamber C |

|   |
|---|
| 2800 Suite B Perimeter Park Dr.,<br>Morrisville, NC 27560 |
| <input type="checkbox"/> Chamber NORTH                    |
| <input checked="" type="checkbox"/> Chamber SOUTH         |

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at <http://www.nist.gov/nvlap/>

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

| PARAMETER                                | UNCERTAINTY |
|--|-------------|
| Conducted Disturbance, 0.15 to 30 MHz    | ±3.52 dB    |
| Radiated Disturbance, 9KHz to 30 MHz     | ±3.15 dB    |
| Radiated Disturbance, 30 to 1000 MHz     | ±5.36 dB    |
| Radiated Disturbance, 1000 to 18000 MHz  | ±4.32 dB    |
| Radiated Disturbance, 18000 to 26000 MHz | ±4.45 dB    |
| Radiated Disturbance, 26000 to 40000 MHz | ±5.24 dB    |

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone with BT, BLE, DTS/UNII a/b/g/n/ac & NFC

### 5.2. MAXIMUM OUTPUT POWER

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

| Frequency Range (MHz) | Mode          | Output Power (dBm) | Output Power (mW) |
|-----------------------|---------------|--------------------|-------------------|
| 2402 - 2480           | Basic GFSK    | 10.80              | 12.02             |
| 2402 - 2480           | DQPSK         | 9.40               | 8.71              |
| 2402 - 2480           | Enhanced 8PSK | 9.70               | 9.33              |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two integrated antennas, with the following maximum gains:

| Frequency Range (MHz) | Antenna Gain (dBi) |
|-----------------------|--------------------|
|                       | Ant 0 (Main)       |
| 2402 – 2480           | -6.2               |

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was SONY, s\_atp\_1\_600\_7\_9  
The test utility software used during testing was Tera Term ver 4.89 (SVN# 6182).

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## 5.5. WORST-CASE CONFIGURATION AND MODE

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

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that X-Axis orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X-Axis orientation.

**5.6. DESCRIPTION OF TEST SETUP**  
**SUPPORT EQUIPMENT**

| Support Equipment List |              |              |                 |        |
|------------------------|--------------|--------------|-----------------|--------|
| Description            | Manufacturer | Model        | Serial Number   | FCC ID |
| Desktop                | Lenovo       | ThinkCentre  | MG00ADEN        | NA     |
| Laptop                 | Lenovo       | T450         | RTP0116PC0A2UQT | NA     |
| Headphones             | Sony         | MH410x       | 12271A100010396 | NA     |
| PowerSupply            | Sony         | 1300-7146.1B | 5816W02400051   | NA     |

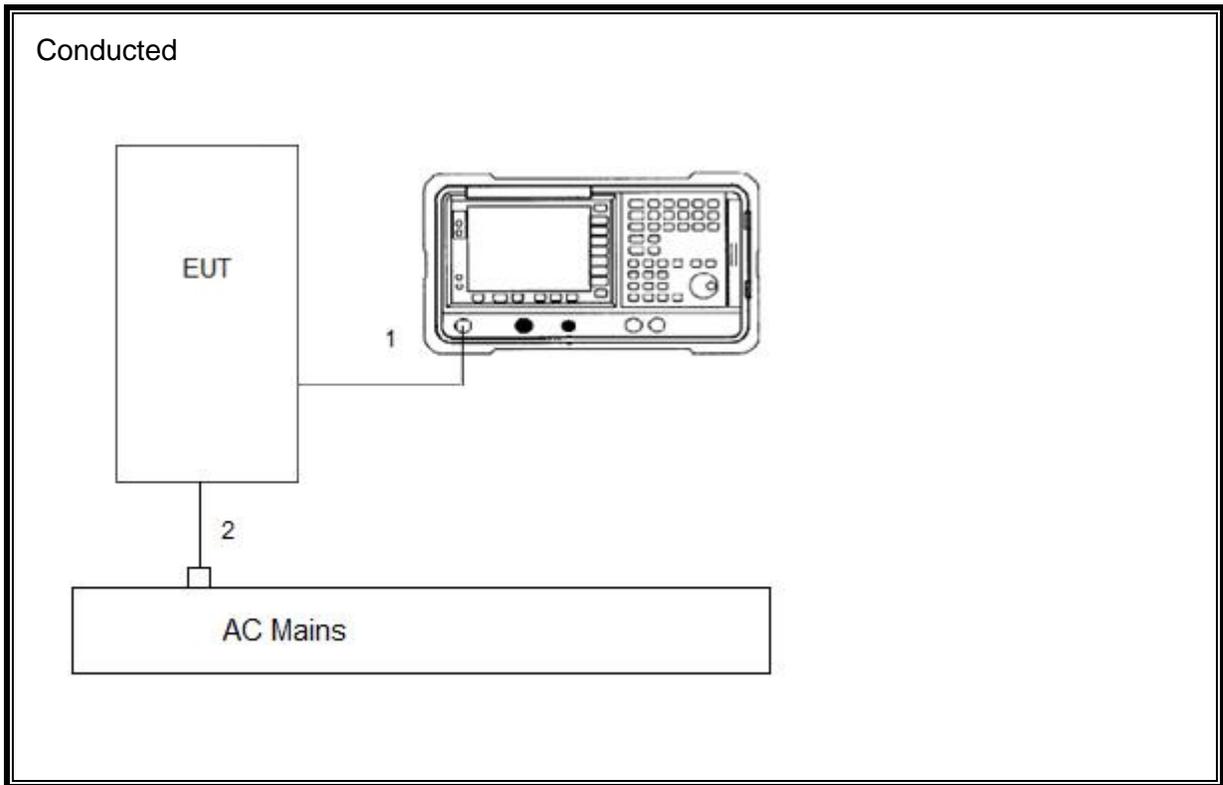
**I/O CABLES**

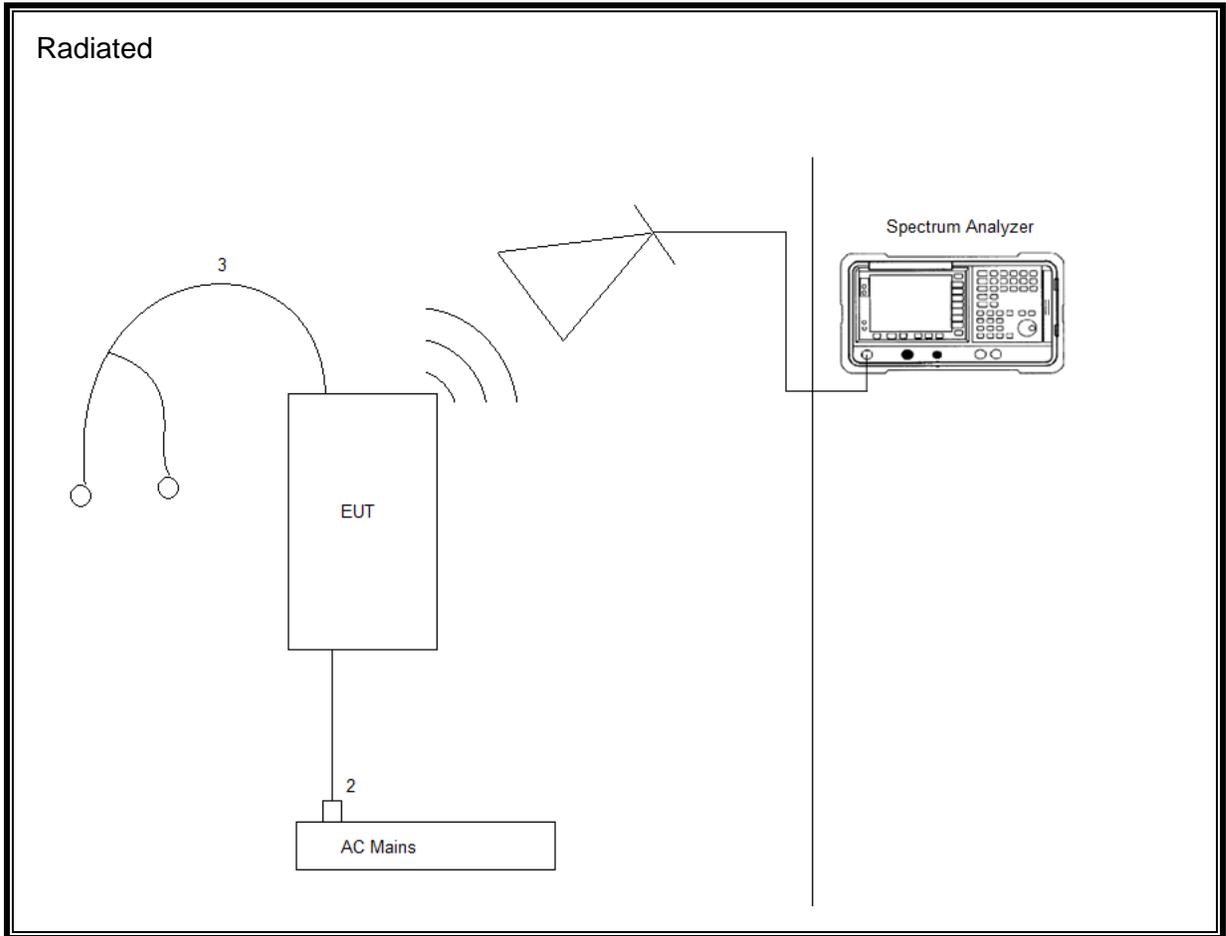
| I/O Cable List |              |                      |                |                  |           |
|----------------|--------------|----------------------|----------------|------------------|-----------|
| Cable No       | Port         | # of Identical ports | Connector Type | Cable Length (m) | Remarks   |
| 1              | Antenna Port | 1                    | RF             | <1m              | NA        |
| 2              | DC Mains     | 1                    | Mini-USB       | >1m              | NA        |
| 3              | Audio        | 1                    | 3.5mm          | >1m              | Headphone |

**TEST SETUP**

The EUT is setup as a standalone device. Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**





## 6. TEST AND MEASUREMENT EQUIPMENT

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

### Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

| Equip. ID             | Description                                       | Manufacturer          | Model Number | Last Cal.  | Next Cal.  |
|-----------------------|---|-----------------------|--------------|------------|------------|
|                       | <b>0.009-30MHz</b>                                | <b>(Loop Ant.)</b>    |              |            |            |
| AT0079                | Active Loop Antenna                               | ETS-Lindgren          | 6502         | 2015-12-08 | 2016-12-31 |
|                       | <b>30-1000 MHz</b>                                |                       |              |            |            |
| AT0074                | Hybrid Broadband Antenna                          | Sunol Sciences Corp.  | JB3          | 2016-06-07 | 2017-06-30 |
|                       | <b>1-18 GHz</b>                                   |                       |              |            |            |
| AT0069                | Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz | ETS Lindgren          | 3117         | 2016-03-07 | 2017-03-31 |
|                       | <b>18-40 GHz</b>                                  |                       |              |            |            |
| AT0076                | Horn Antenna, 18-26.5GHz                          | ARA                   | MWH-1826/B   | 2015-08-27 | 2016-08-31 |
| AT0077                | Horn Antenna, 26-40GHz                            | ARA                   | MWH-2640/B   | 2015-08-27 | 2016-08-31 |
|                       | <b>Gain-Loss Chains</b>                           |                       |              |            |            |
| S-SAC01               | Gain-loss string: 0.009-30MHz                     | Various               | Various      | 2015-10-07 | 2016-10-31 |
| S-SAC02               | Gain-loss string: 30-1000MHz                      | Various               | Various      | 2016-06-26 | 2017-06-30 |
| S-SAC03               | Gain-loss string: 1-18GHz                         | Various               | Various      | 2015-08-22 | 2016-08-31 |
| S-SAC04               | Gain-loss string: 18-40GHz                        | Various               | Various      | 2016-02-29 | 2017-02-28 |
|                       | <b>Receiver &amp; Software</b>                    |                       |              |            |            |
| SA0025                | Spectrum Analyzer                                 | Agilent               | N9030A       | 2016-03-17 | 2017-03-31 |
| SA0026 (18-40GHz RSE) | Spectrum Analyzer                                 | Agilent               | N9030A       | 2016-02-24 | 2017-02-28 |
| SOFTEMI               | EMI Software                                      | UL                    | Version 9.5  | NA         | NA         |
|                       | <b>Additional Equipment used</b>                  |                       |              |            |            |
| HI0078                | Temp/Humid/Pressure Meter                         | Springfield Precision | PreciseTemp  | 2016-06-13 | 2017-06-13 |

Test Equipment Used - Wireless Conducted Measurement Equipment

| Equipment ID | Description                              | Manufacturer           | Model Number | Last Cal.  | Next Cal.  |
|--------------|--|------------------------|--------------|------------|------------|
|              | <b>Conducted Room 1</b>                  |                        |              |            |            |
| 72822        | Spectrum Analyzer                        | Agilent Technologies   | E4446A       | 2015-09-02 | 2016-09-30 |
| PWM004       | RF Power Meter                           | Keysight Technologies  | N1911A       | 2016-06-22 | 2017-06-22 |
| PWS004       | Peak and Avg Power Sensor, 50MHz to 6GHz | Keysight Technologies  | E9323A       | 2016-06-22 | 2017-06-22 |
| HI0078       | Temp/Humid/Pressure Meter                | Springfield Precision  | PreciseTemp  | 2016-06-13 | 2017-06-13 |
| MM0167       | True RMS Multimeter                      | Agilent                | U1232A       | 2015-08-17 | 2016-08-31 |
| 76022        | DC Regulated Power Supply                | CircuitSpecialists.Com | CSI3005X5    | N/A        | N/A        |

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

| Equipment ID       | Description   | Manufacturer          | Model Number              | Last Cal.  | Next Cal.  |
|--------------------|---|-----------------------|---------------------------|------------|------------|
| CBL077             | Coax cable, RG223, N-male to BNC-male, 20-ft.                 | Pasternack            | PE3476-240                | 2016-06-15 | 2017-06-30 |
| HI0078             | Temp/Humid/Pressure Meter                                     | Springfield Precision | PreciseTemp               | 2016-06-13 | 2017-06-13 |
| LISN003            | LISN, 50-ohm/50-uH, 2-conductor, 25A                          | Fischer Custom Com.   | FCC-LISN-50-25-2-01-550V  | 2015-08-24 | 2016-08-31 |
| LISN008            | LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.) | Solar Electronics     | 8012-50-R-24-BNC          | 2015-09-03 | 2016-09-30 |
| MM0167             | Multi-meter   | Agilent               | U1232A                    | 2015-08-17 | 2016-08-31 |
| PRE0101521 (75141) | EMI Test Receiver 9kHz-7GHz                                   | Rohde & Schwarz       | ESCI 7                    | 2015-08-26 | 2016-08-31 |
| TL001              | Transient Limiter, 0.009-30MHz                                | Com-Power             | LIT-930A                  | 2016-06-09 | 2017-06-30 |
| PS214              | AC Power Source   | Elgar                 | CW2501M (s/n 1523A02396)  | NA         | NA         |
| PS215              | AC Power Source   | Elgar                 | CW2501M (s/n 1523A02397)  | NA         | NA         |
| SOFTEMI            | EMI Software  | UL                    | Version 9.5               | NA         | NA         |
|                    | <b>Miscellaneous (if needed)</b>                              |                       |                           |            |            |
| ATA220             | ISN for Unshielded Balanced Pairs                             | Teseq, Inc.           | ISN T8                    | 2015-08-24 | 2016-08-31 |
| TN0129             | ISN for Shielded Balanced Pairs                               | Teseq, Inc.           | ISN ST08                  | 2015-08-24 | 2016-08-31 |
| TN0145             | ISN for Cat-6 Unshielded Balanced Pairs                       | Teseq, Inc.           | ISN T8-Cat6               | 2015-08-25 | 2016-08-31 |
| CDECABLE001        | ANSI C63.4 1m extension cable.                                | UL                    | Per Annex B of ANSI C63.4 | 2016-06-04 | 2017-06-30 |

## 7. ANTENNA PORT TEST RESULTS

### 7.1. ON TIME AND DUTY CYCLE LIMITS

None; for reporting purposes only.

#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

#### TEST INFORMATION

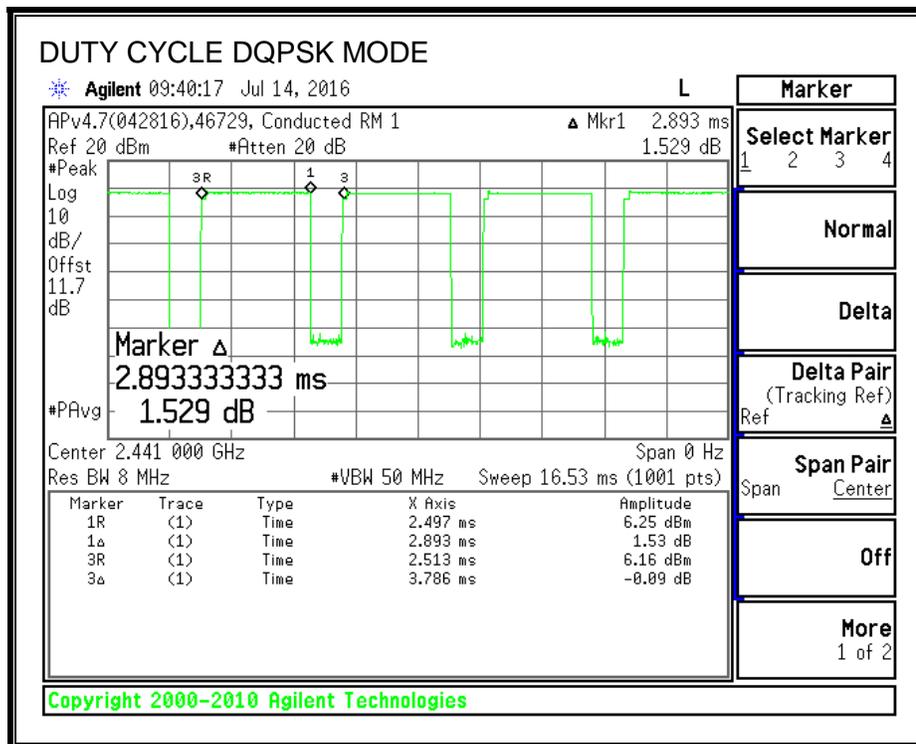
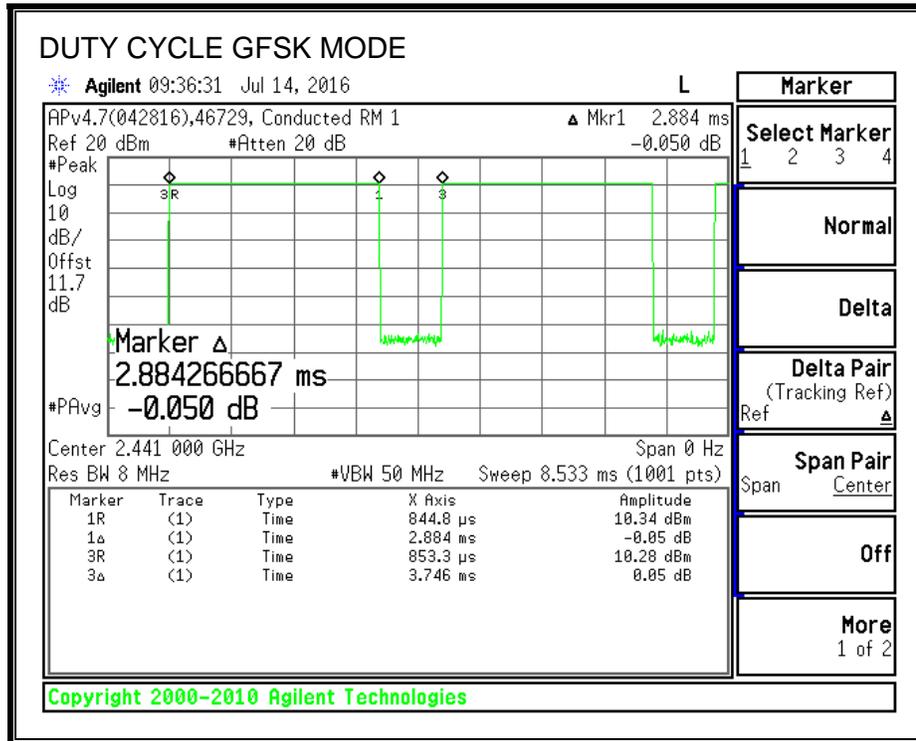
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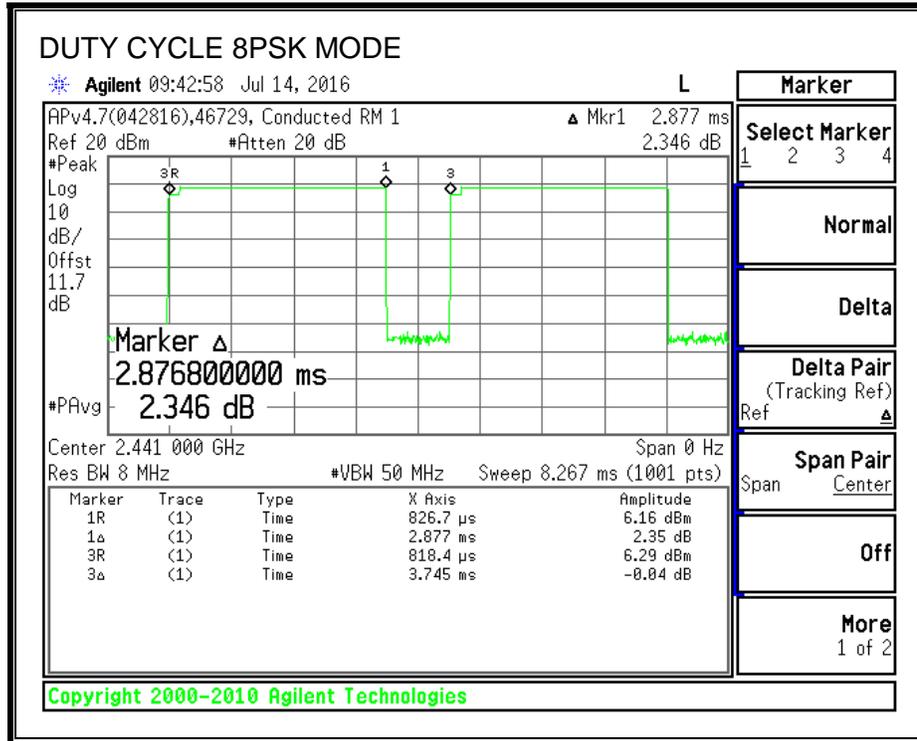
Tester: Ron Reichard

#### ON TIME AND DUTY CYCLE RESULTS

| Mode                              | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (kHz) |
|-----------------------------------|------------------|---------------|-----------------------|----------------|-----------------------------------|-----------------------|
| <b>2.4 GHz band (Hopping OFF)</b> |                  |               |                       |                |                                   |                       |
| Bluetooth GFSK                    | 2.884            | 3.746         | 0.770                 | 76.99%         | 2.27                              | 0.347                 |
| Bluetooth DQPSK                   | 2.893            | 3.786         | 0.764                 | 76.41%         | 2.34                              | 0.346                 |
| Bluetooth 8PSK                    | 2.877            | 3.745         | 0.768                 | 76.82%         | 2.29                              | 0.348                 |

**DUTY CYCLE PLOTS**  
**HOPPING OFF**





## 7.1. BASIC DATA RATE GFSK MODULATION

### 7.1.1. 20 dB 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.

#### Test Information

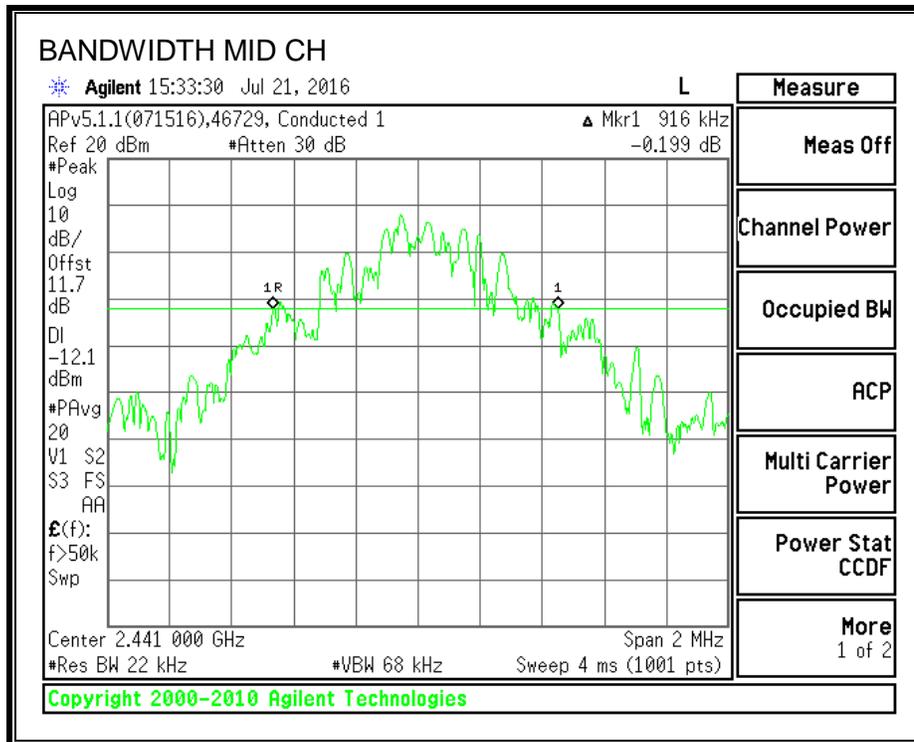
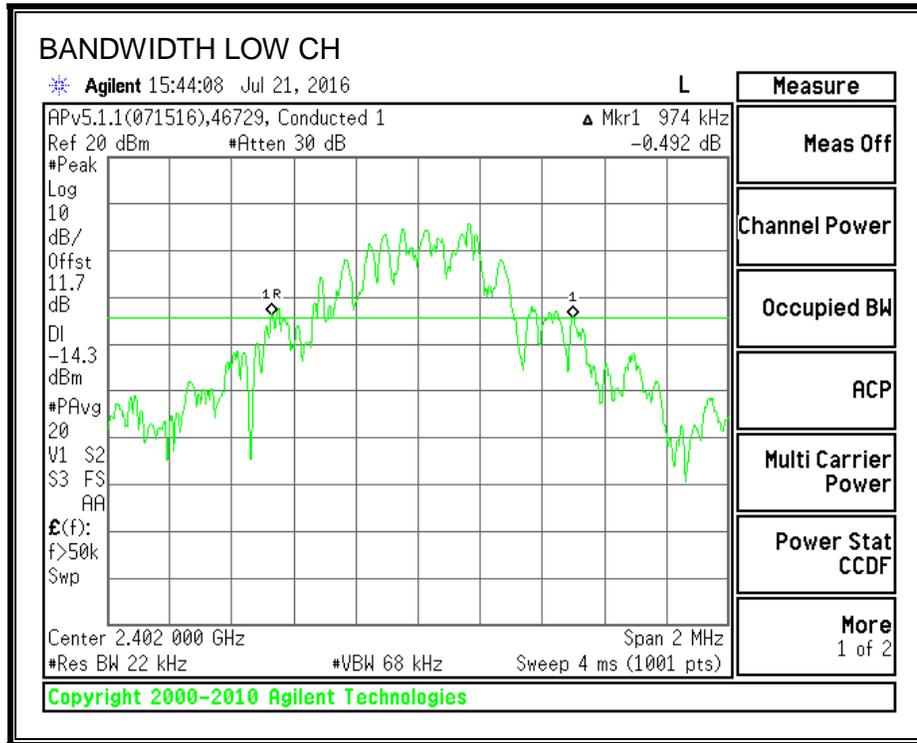
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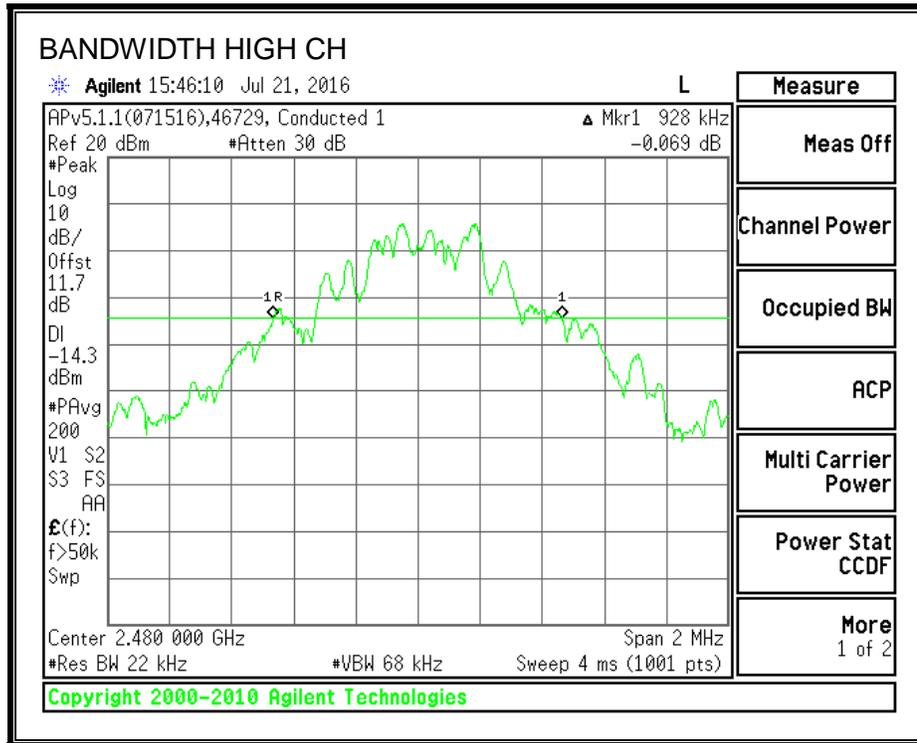
Tester: Ron Reichard

#### RESULTS

| Channel | Frequency<br>(MHz) | 20 dB Bandwidth<br>(kHz) |
|---------|--------------------|--------------------------|
| Low     | 2402               | 974                      |
| Middle  | 2441               | 916                      |
| High    | 2480               | 928                      |

**20 dB BANDWIDTH**





### 7.1.2. HOPPING FREQUENCY SEPARATION

#### LIMIT

FCC §15.247 (a) (1)

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.

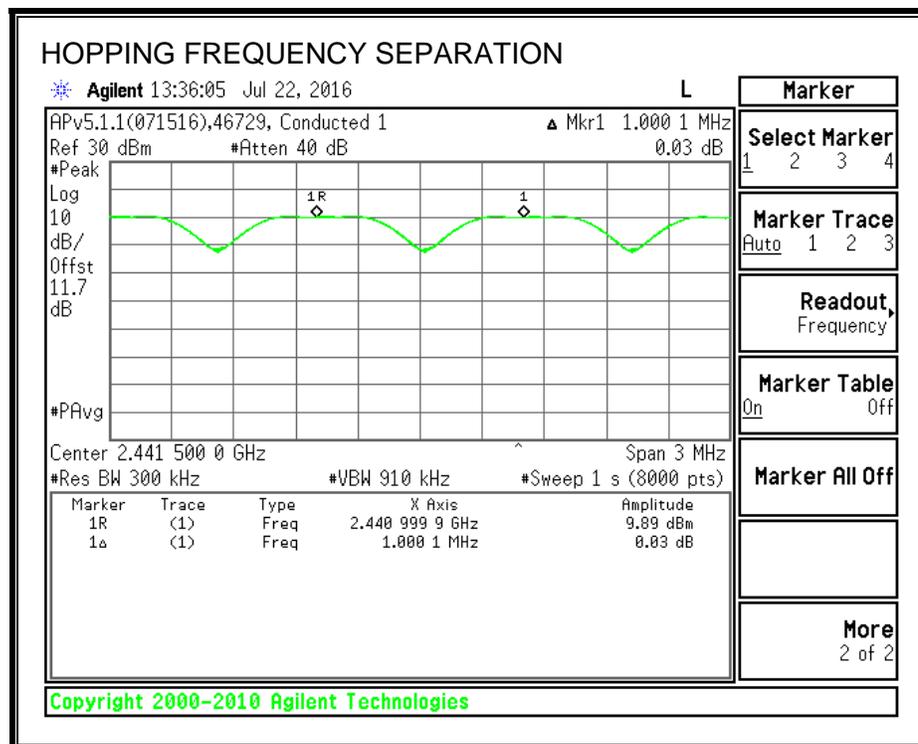
#### Test Information

Date: 2016-07-22

Tester: Ron Reichard

#### RESULTS

#### HOPPING FREQUENCY SEPARATION



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

#### **LIMIT**

FCC §15.247 (a) (1) (iii)

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.

#### **Test Information**

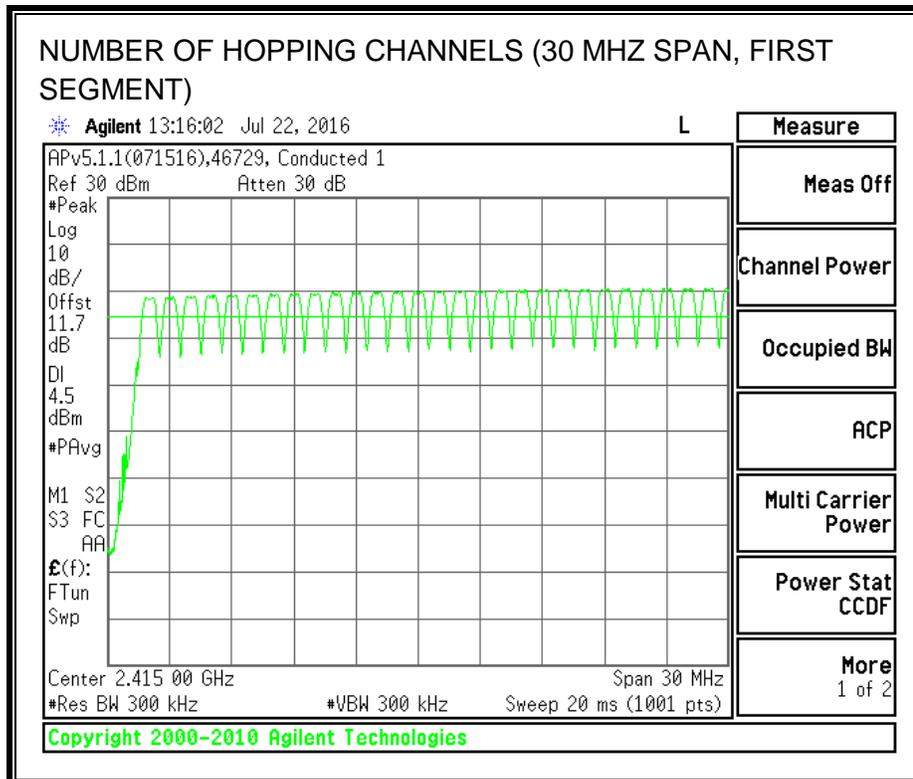
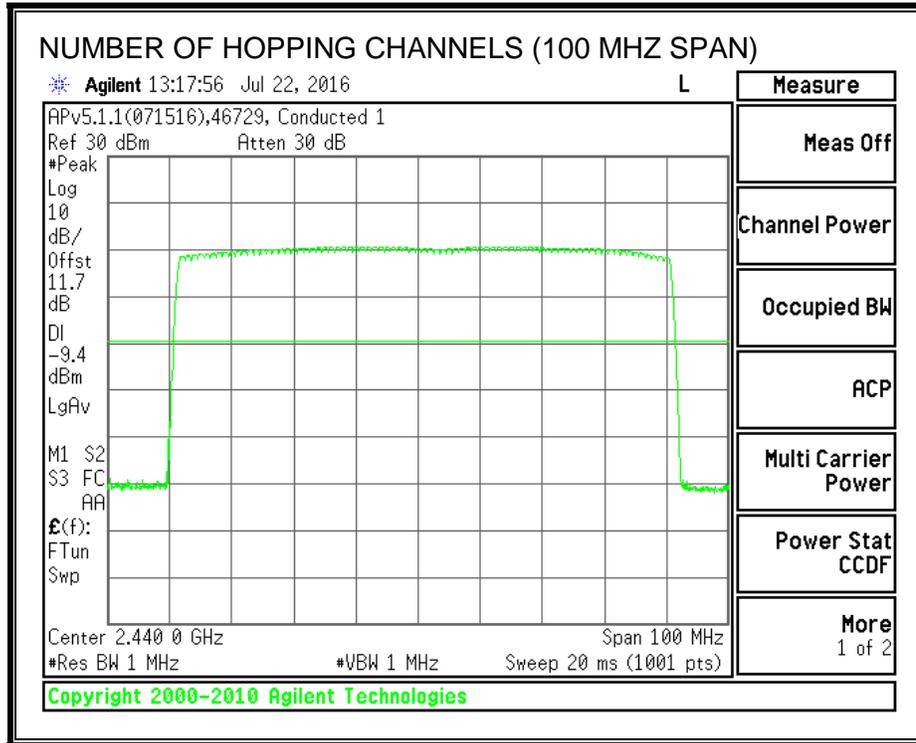
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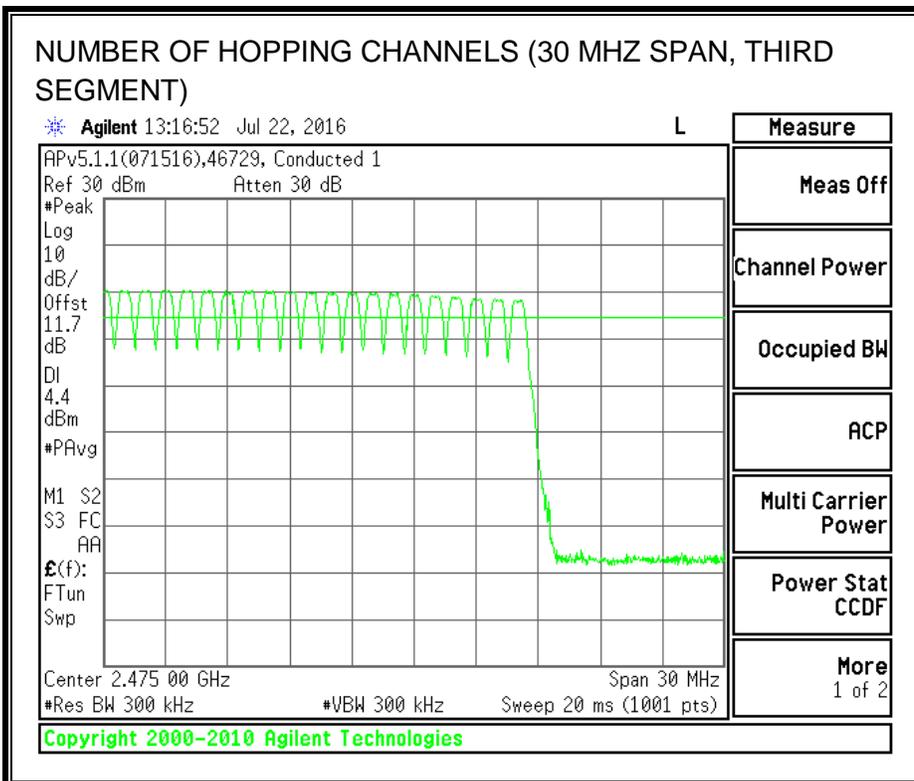
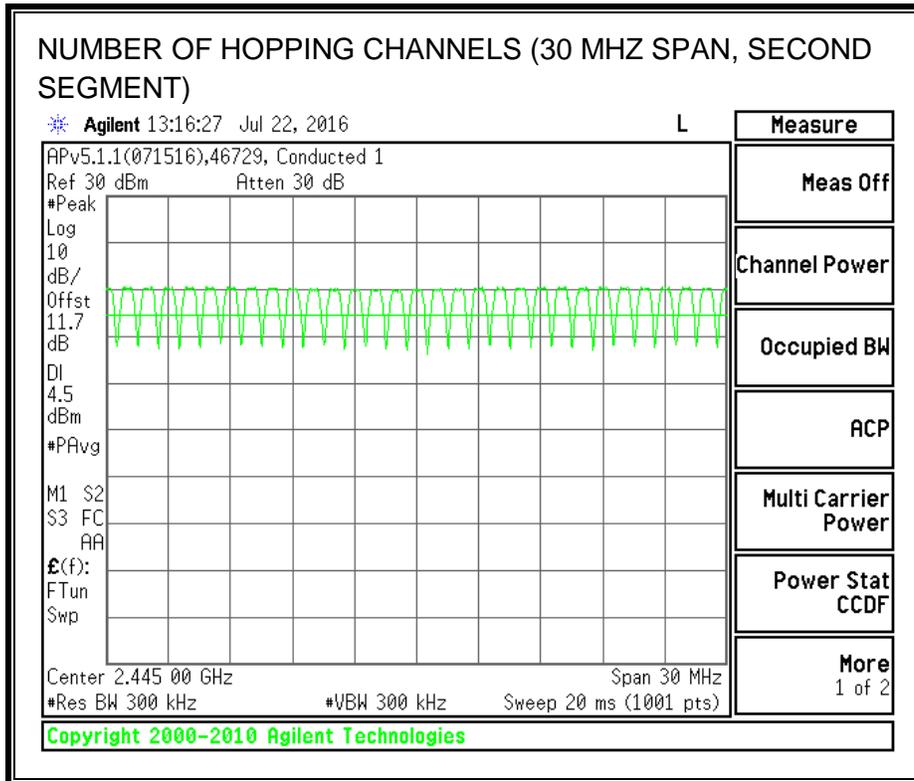
Tester: Ron Reichard

#### **RESULTS**

Normal Mode: 79 Channels observed.

**NUMBER OF HOPPING CHANNELS**





### 7.1.4. AVERAGE TIME OF OCCUPANCY

#### LIMIT

FCC §15.247 (a) (1) (iii)

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

#### TEST PROCEDURE

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

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

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

#### Test Information

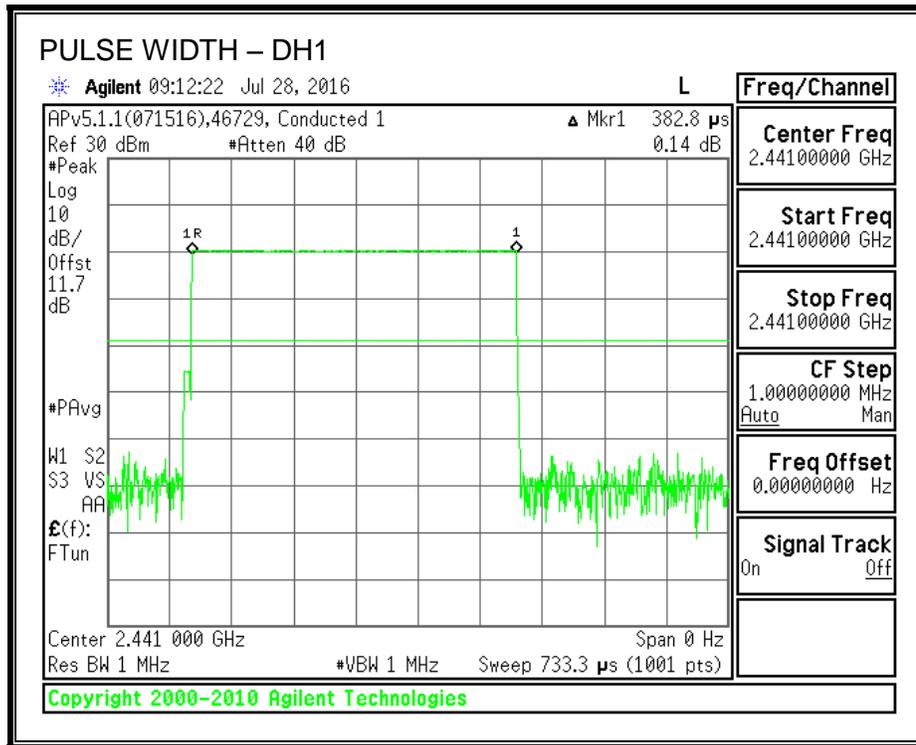
Date: 2016-07-28

Tester: Ron Reichard

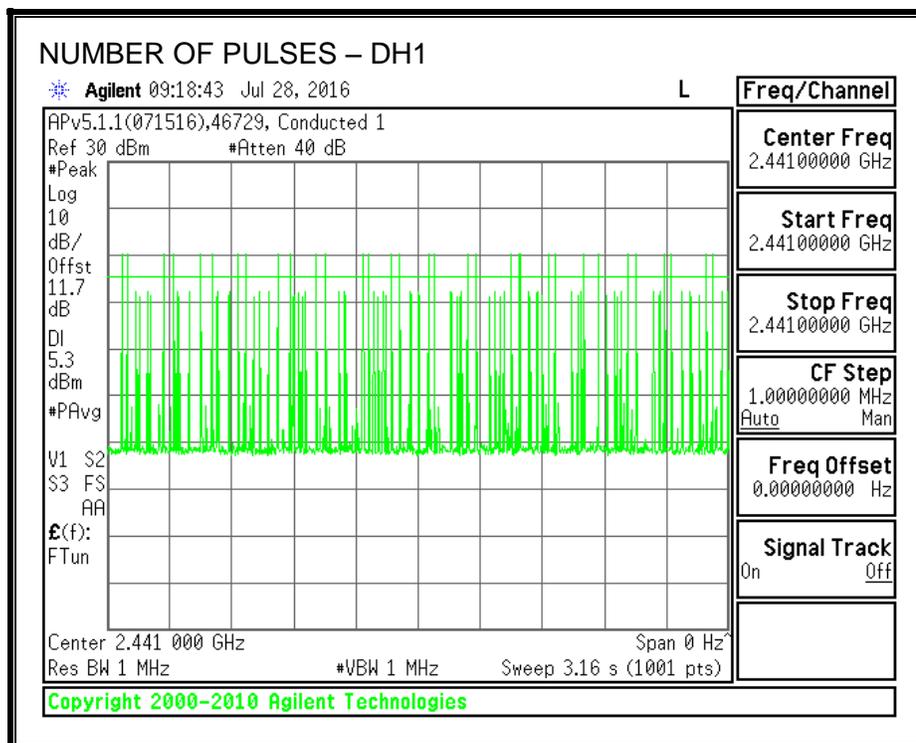
#### RESULTS

| DH Packet        | Pulse Width (msec) | Number of Pulses in 3.16 seconds | Average Time of Occupancy (sec) | Limit (sec) | Margin (sec) |
|------------------|--------------------|----------------------------------|---------------------------------|-------------|--------------|
| GFSK Normal Mode |                    |                                  |                                 |             |              |
| DH1              | 0.3828             | 32                               | 0.122                           | 0.4         | -0.278       |
| DH3              | 1.638              | 14                               | 0.229                           | 0.4         | -0.171       |
| DH5              | 2.888              | 13                               | 0.375                           | 0.4         | -0.025       |

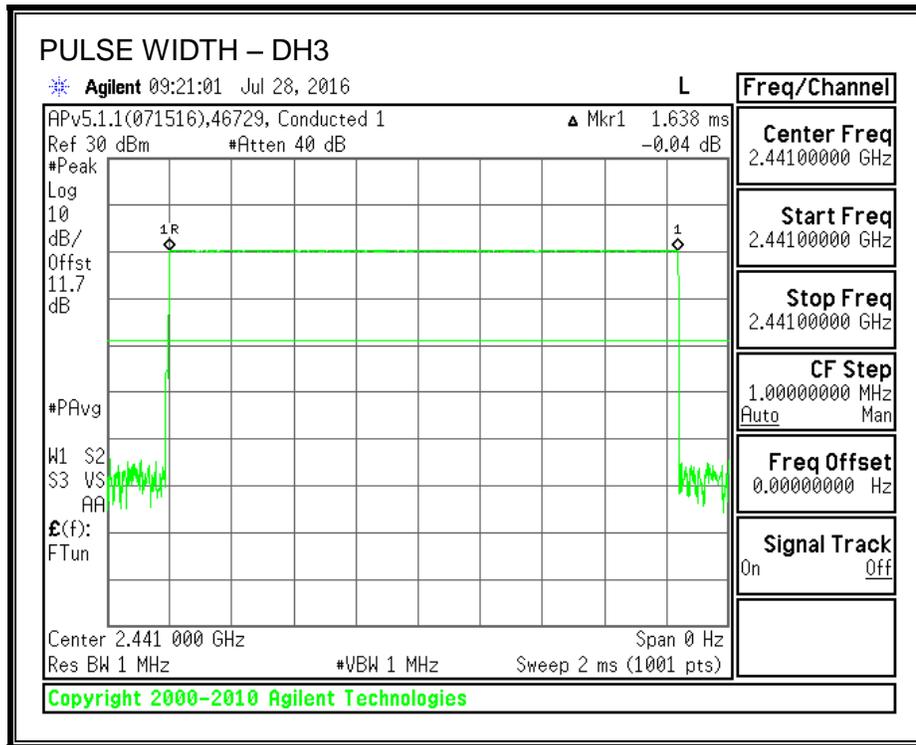
**PULSE WIDTH - DH1**



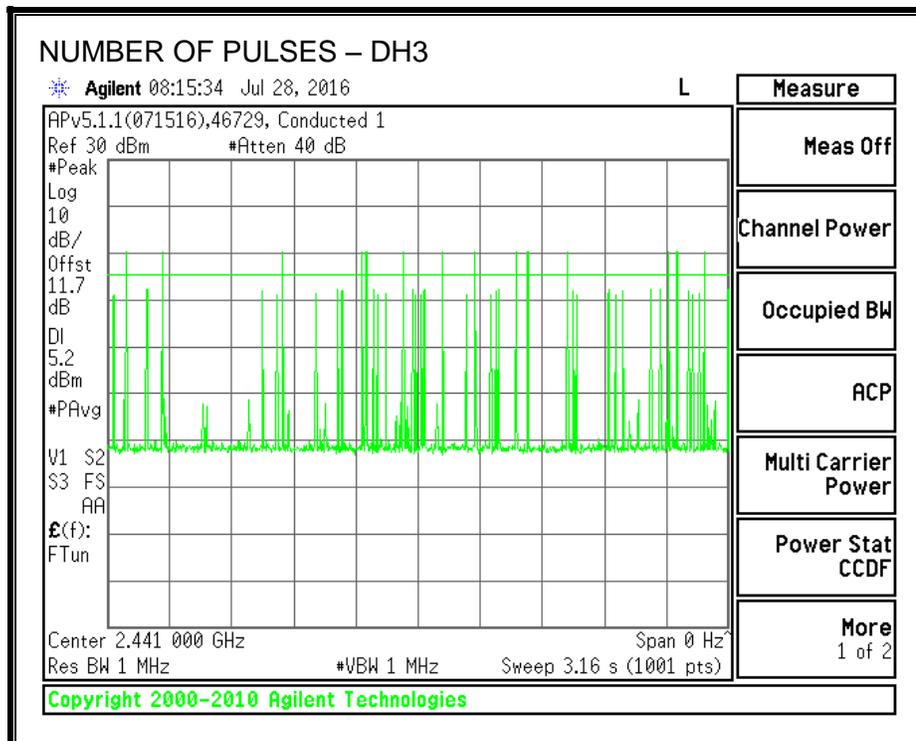
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH1**



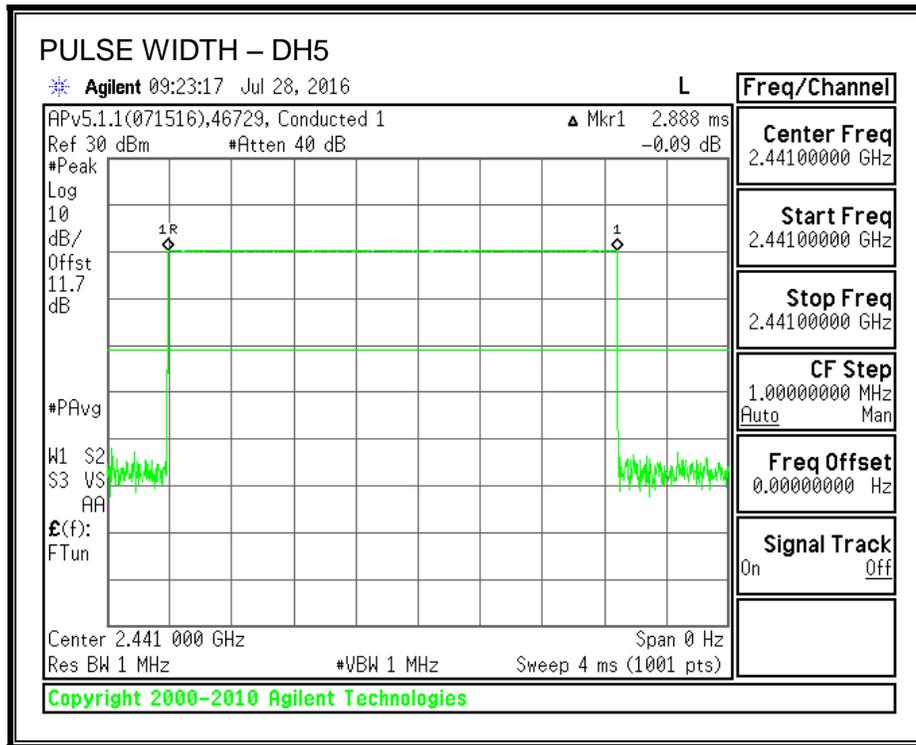
**PULSE WIDTH – DH3**



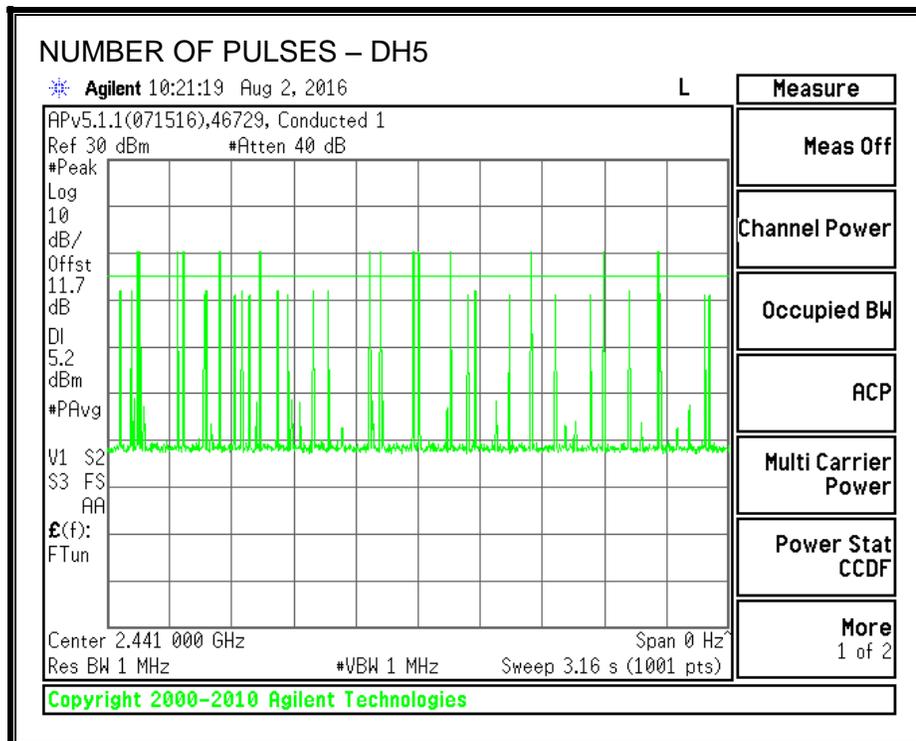
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3**



**PULSE WIDTH – DH5**



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



### 7.1.5. OUTPUT POWER

#### LIMIT

§15.247 (b) (1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### TEST INFORMATION

Date: 2016-07-29  
Tester: Ron Reichard

#### RESULTS

The cable assembly insertion loss of 11.7 dB (including 10 dB pad and 1.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Output Power (dBm) | Directional Gain (dBi) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------------|------------------------|-------------|-------------|
| Low     | 2402            | 9.00               | -6.20                  | 21          | -12.00      |
| Middle  | 2441            | 10.80              | -6.20                  | 21          | -10.20      |
| High    | 2480            | 8.70               | -6.20                  | 21          | -12.30      |

### 7.1.6. AVERAGE POWER

#### LIMIT

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### TEST INFORMATION

Date: 2016-07-29

Tester: Ron Reichard

#### RESULTS

The cable assembly insertion loss of 11.7 dB (including 10 dB pad and 1.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Average Power<br>(dBm) |
|---------|--------------------|------------------------|
| Low     | 2402               | 8.90                   |
| Middle  | 2441               | 10.60                  |
| High    | 2480               | 8.60                   |

## **7.1.7. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### **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.

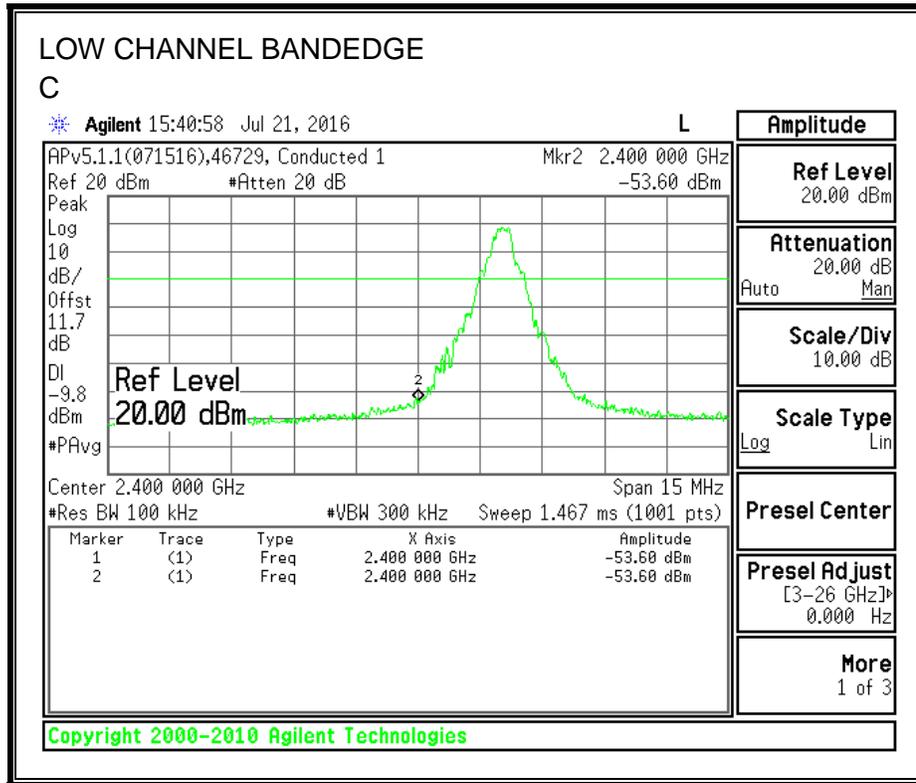
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

### **Test Information**

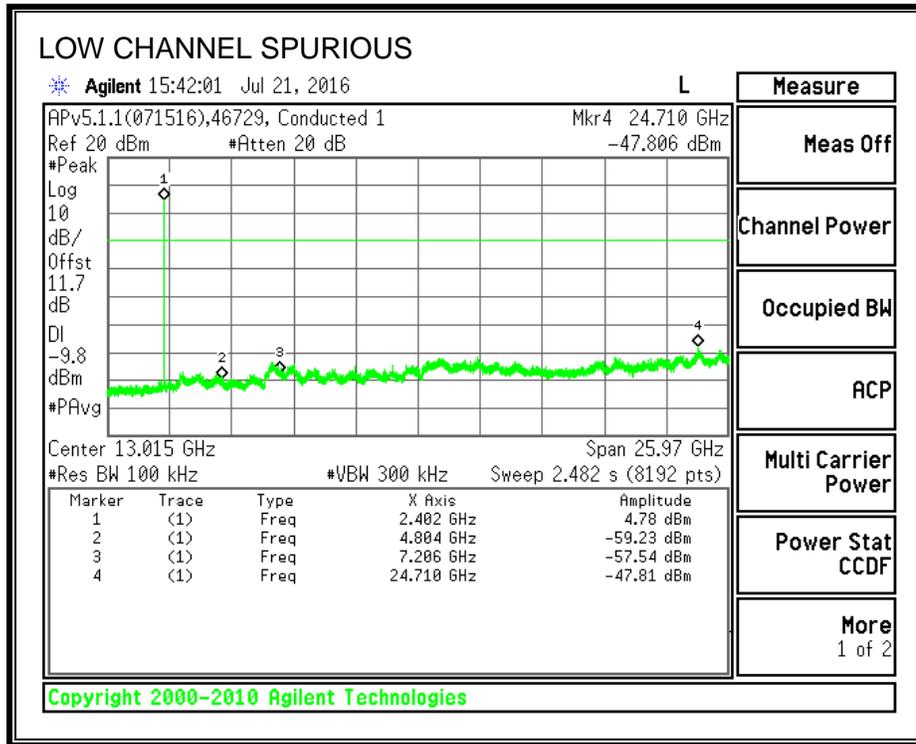
Date: 2016-07-21

Tester: Ron Reichard

**RESULTS**  
**SPURIOUS EMISSIONS, LOW CHANNEL**

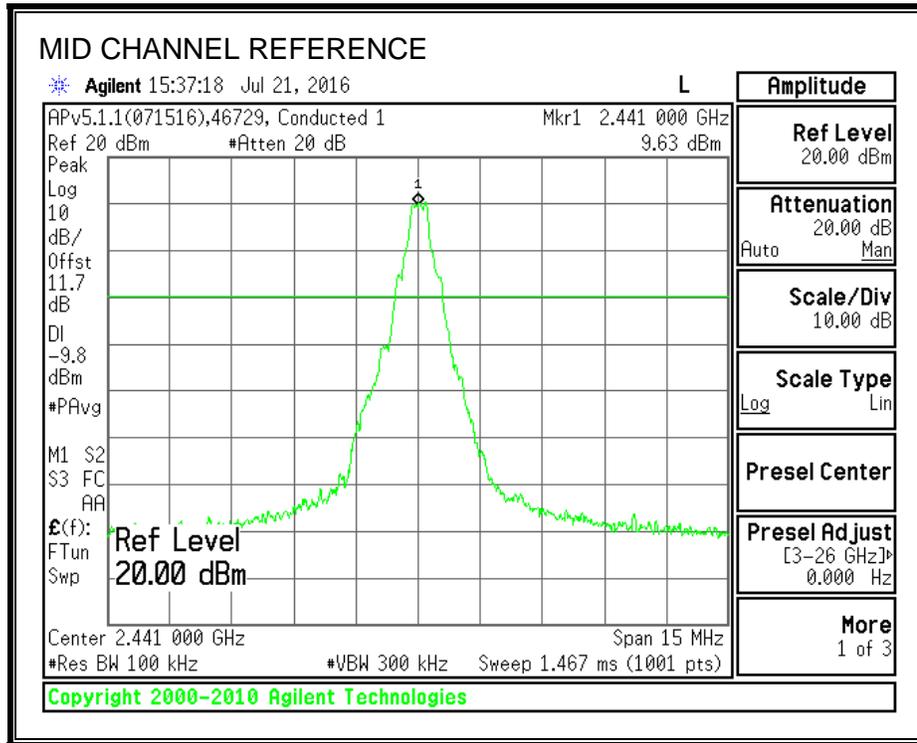


Note: Limit line should be -10.37 dBm, however margin is sufficient to be compliant.

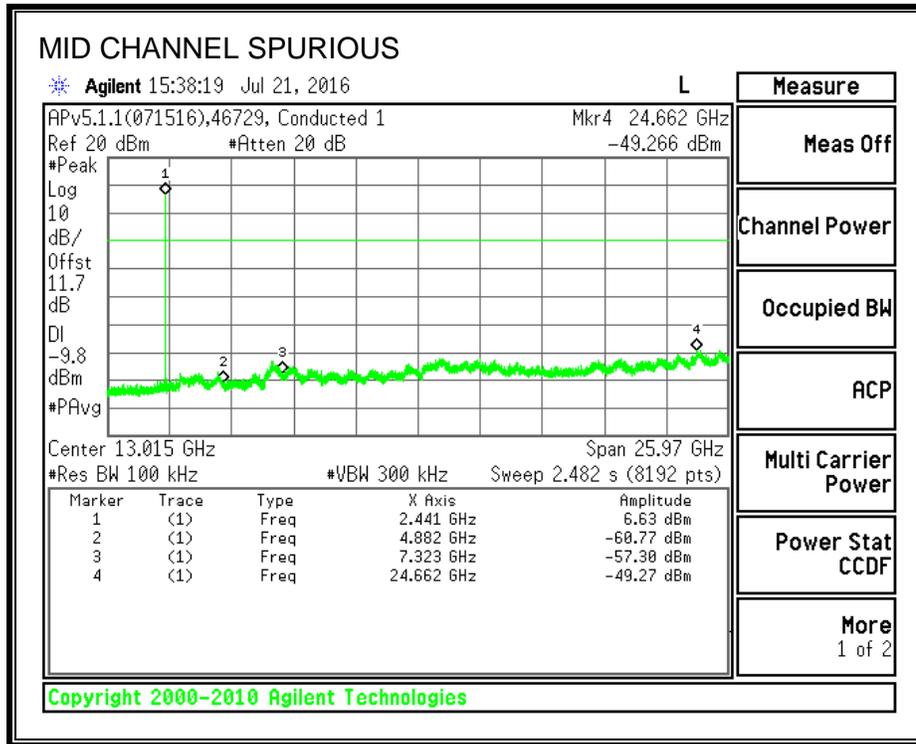


Note: Limit line should be -10.37 dBm, however margin is sufficient to be compliant.

**SPURIOUS EMISSIONS, MID CHANNEL**

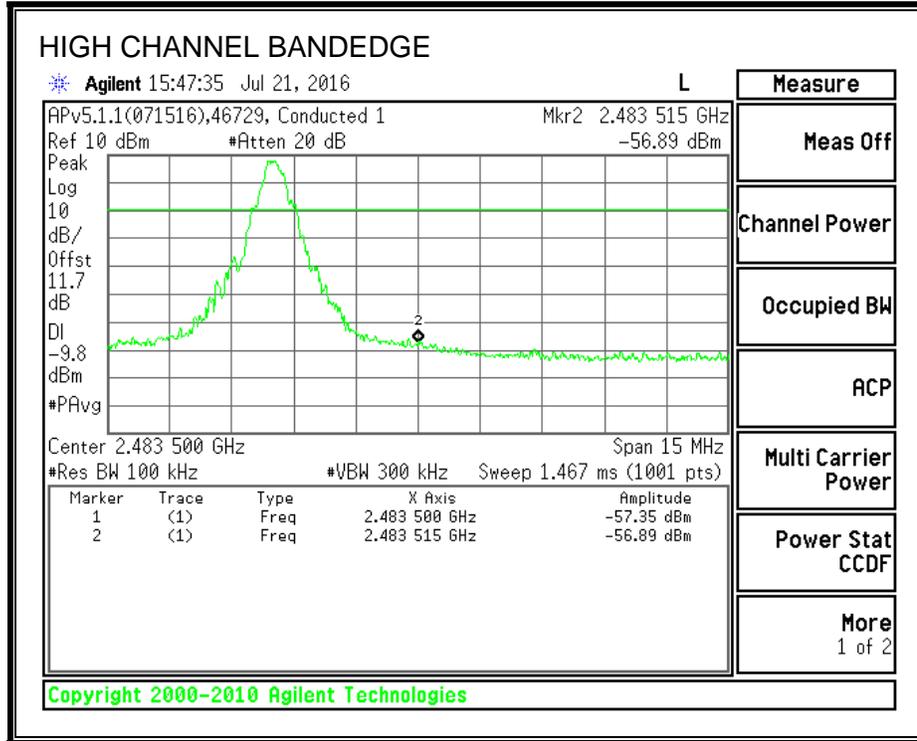


Note: Limit line should be -10.37dBm

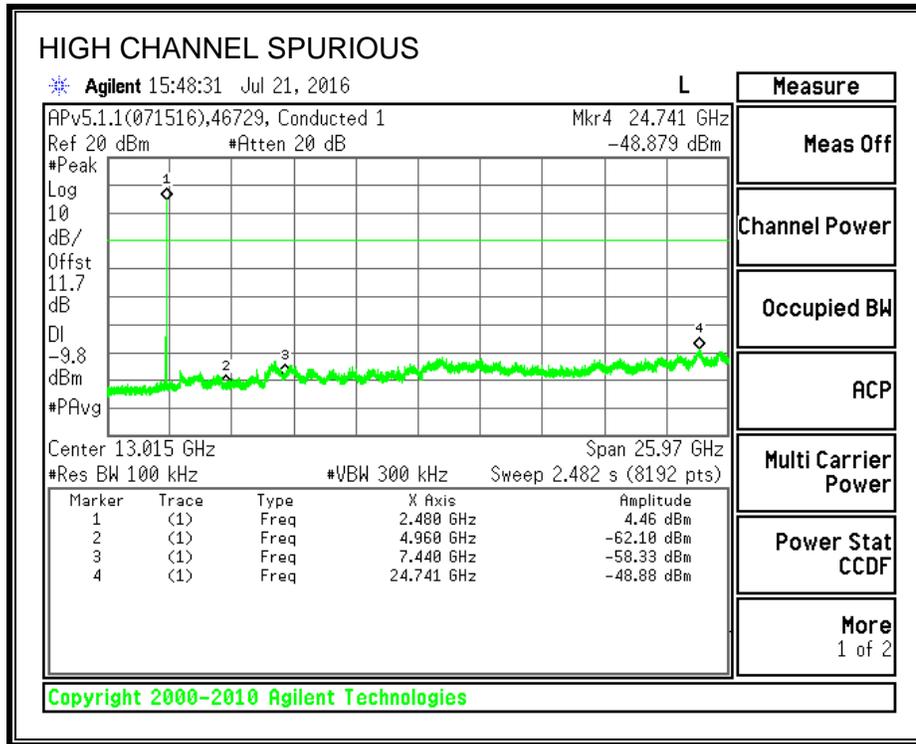


Note: Limit line should be -10.37 dBm, however margin is sufficient to be compliant.

**SPURIOUS EMISSIONS, HIGH CHANNEL**

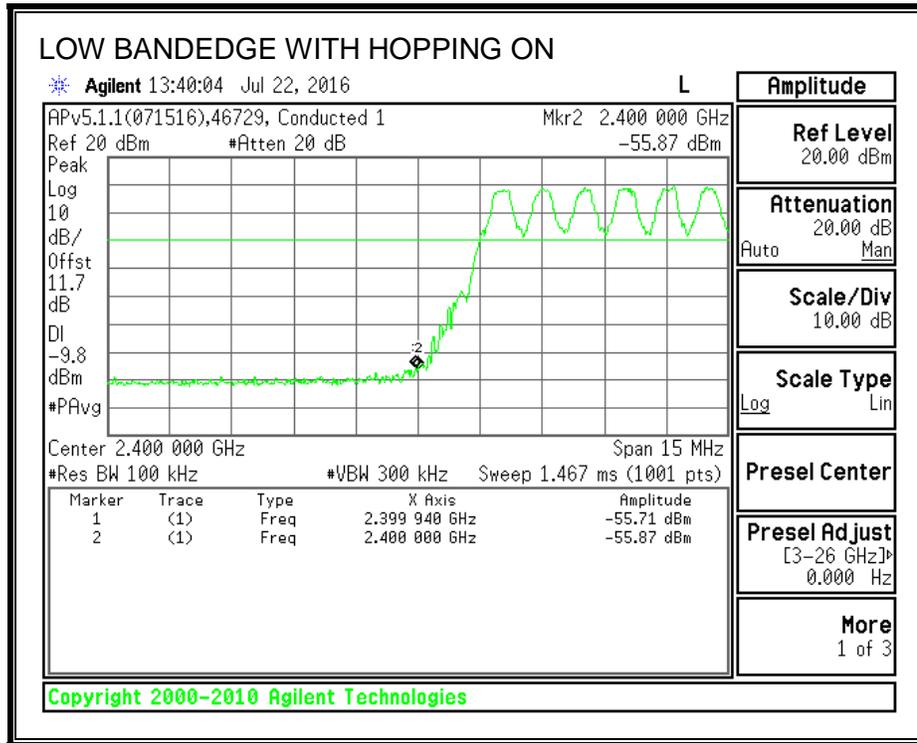


Note: Limit line should be -10.37 dBm, however margin is sufficient to be compliant.

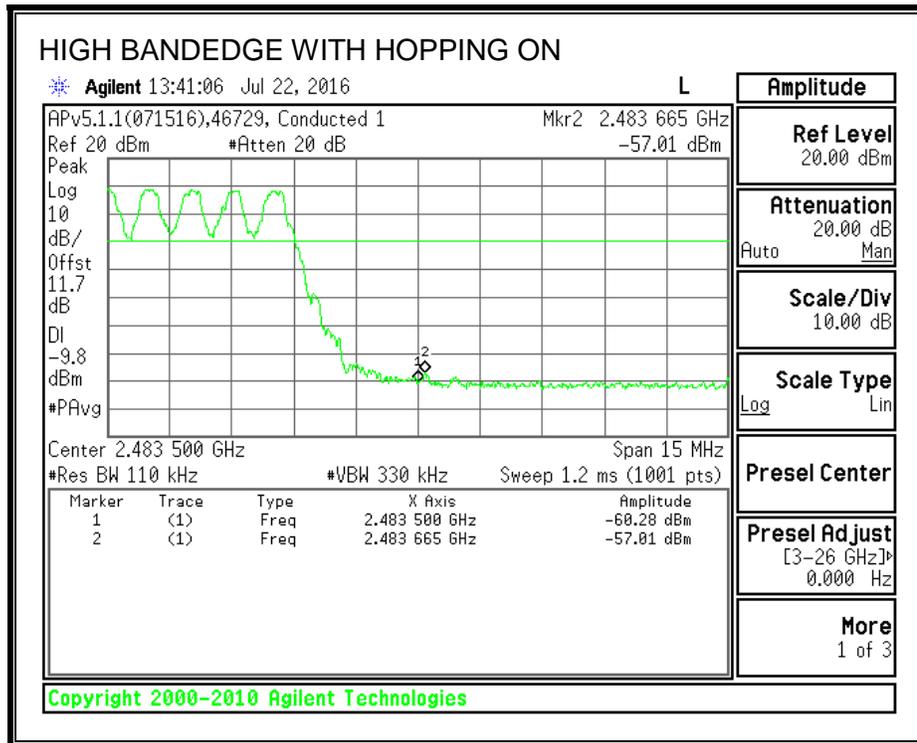


Note: Limit line should be -10.37 dBm, however margin is sufficient to be compliant.

**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**



Note: Limit line should be -10.37 dBm, however margin is sufficient to be compliant.



Note: Limit line should be -10.37 dBm, however margin is sufficient to be compliant.

## 7.2. ENHANCED DATA RATE QPSK MODULATION

### 7.2.1. 20 dB AND 99% BANDWIDTH

#### LIMIT

None; for reporting purposes only.

#### TEST PROCEDURE

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

#### Test Information

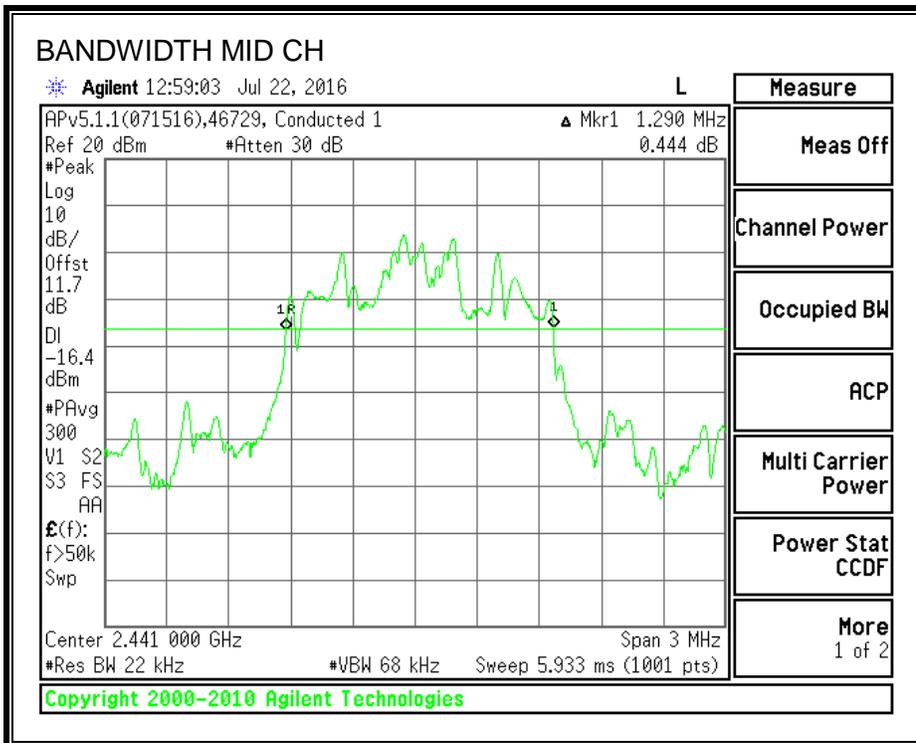
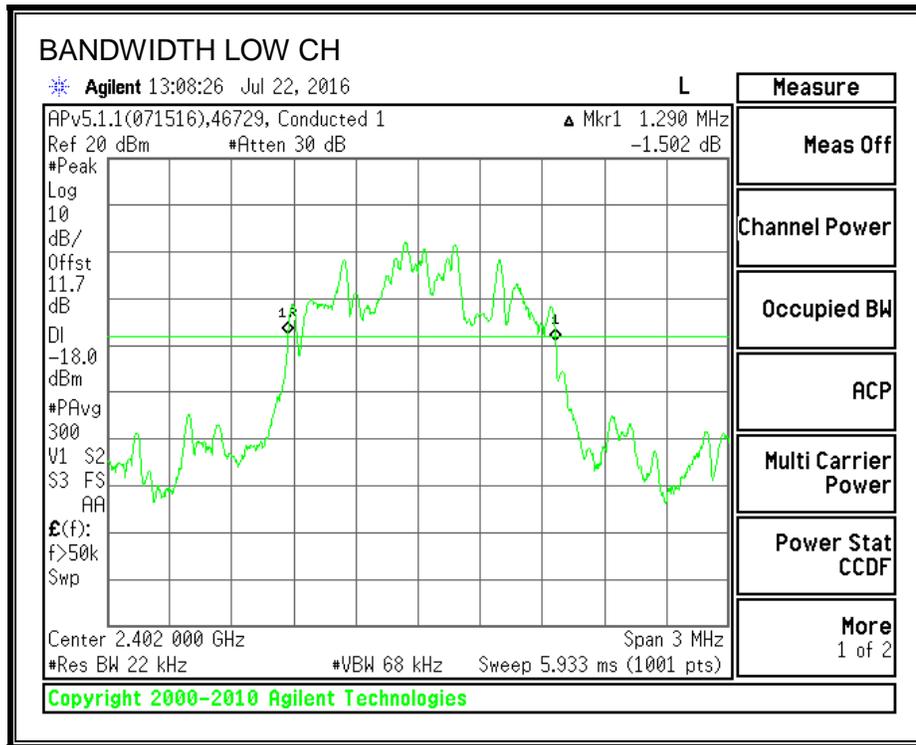
Date: 2016-07-22

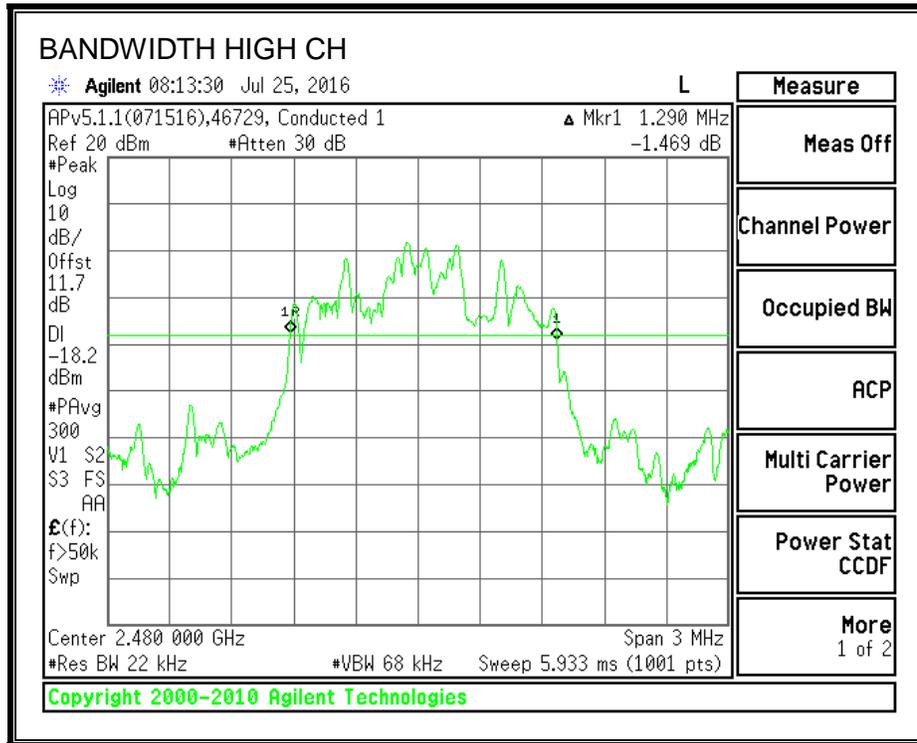
Tester: Ron Reichard

#### RESULTS

| Channel | Frequency<br>(MHz) | 20 dB Bandwidth<br>(kHz) |
|---------|--------------------|--------------------------|
| Low     | 2402               | 1290                     |
| Middle  | 2441               | 1290                     |
| High    | 2480               | 1290                     |

**20 dB BANDWIDTH**





## 7.2.2. HOPPING FREQUENCY SEPARATION

### LIMIT

FCC §15.247 (a) (1)

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.

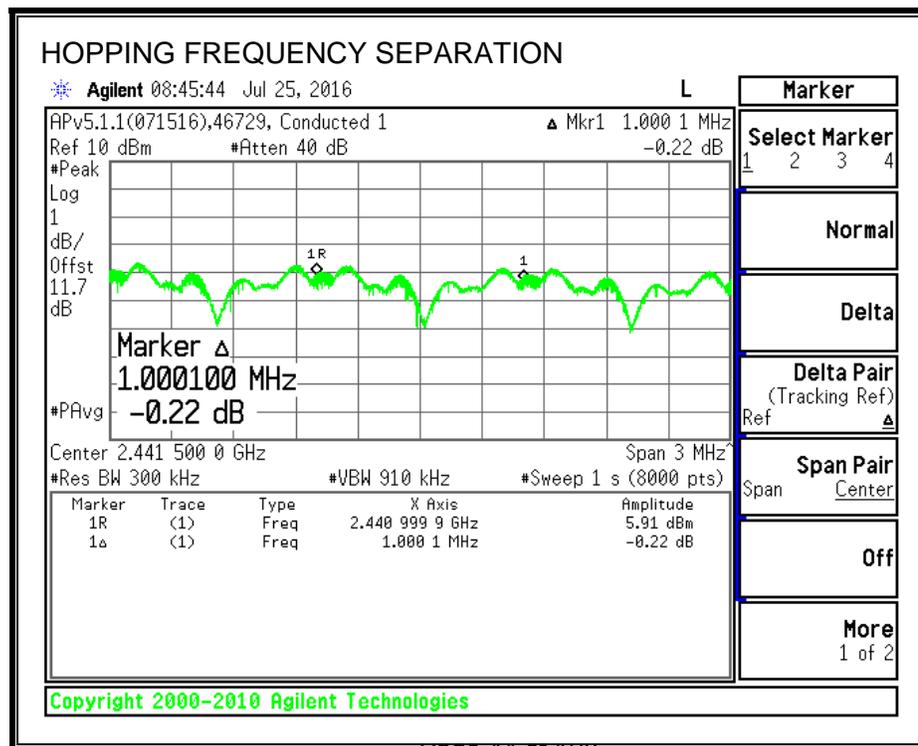
### Test Information

Date: 2016-07-25

Tester: Ron Reichard

### RESULTS

#### HOPPING FREQUENCY SEPARATION



### 7.2.3. NUMBER OF HOPPING CHANNELS

#### LIMIT

FCC §15.247 (a) (1) (iii)

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.

#### Test Information

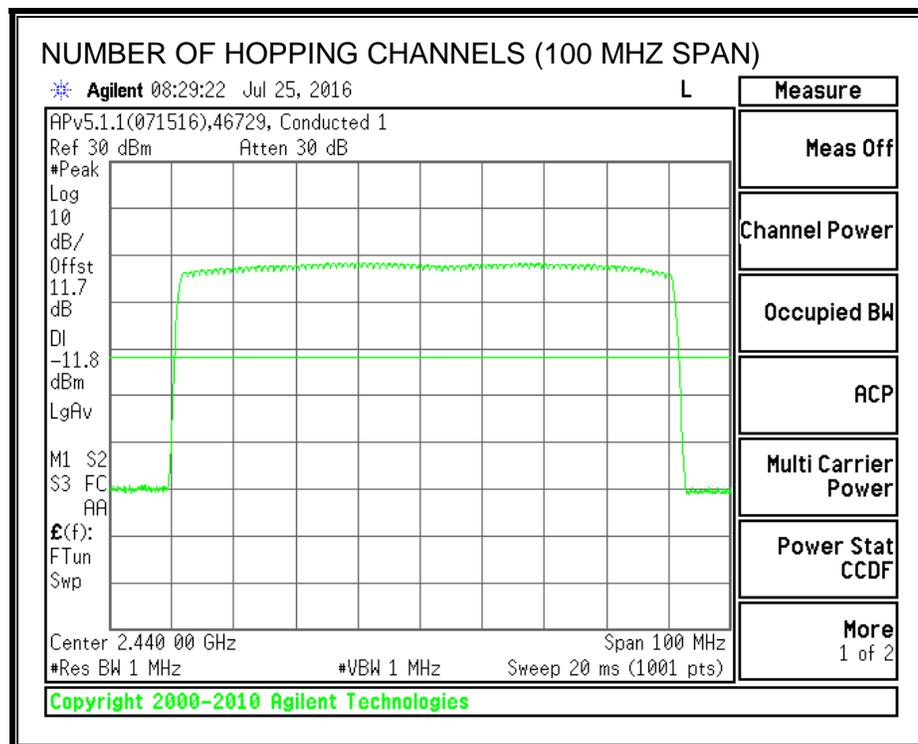
Date: 2016-07-25

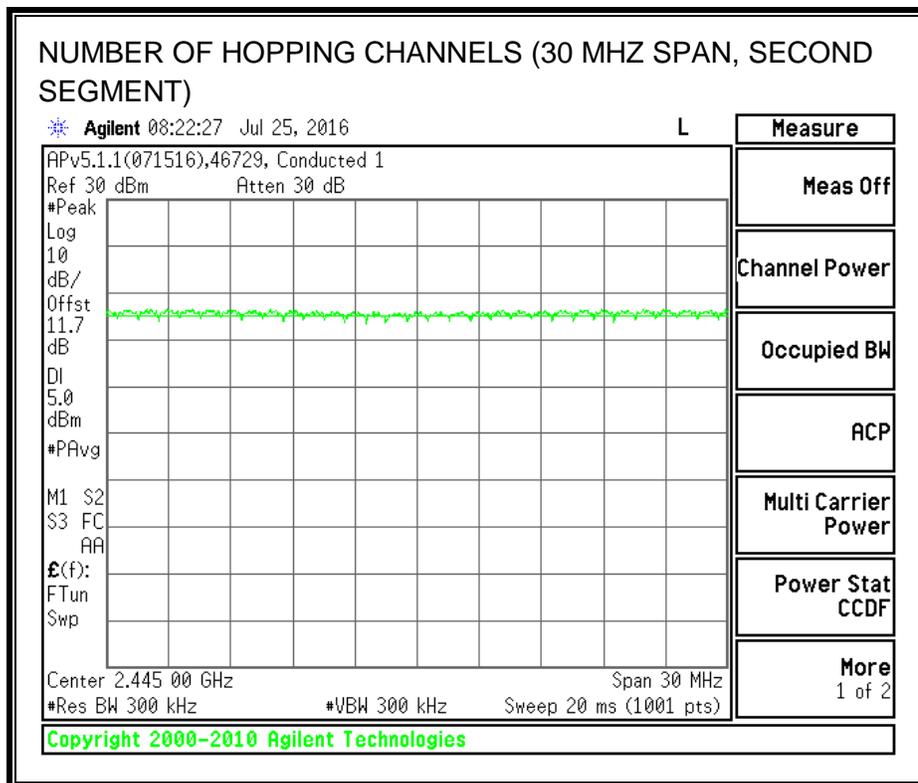
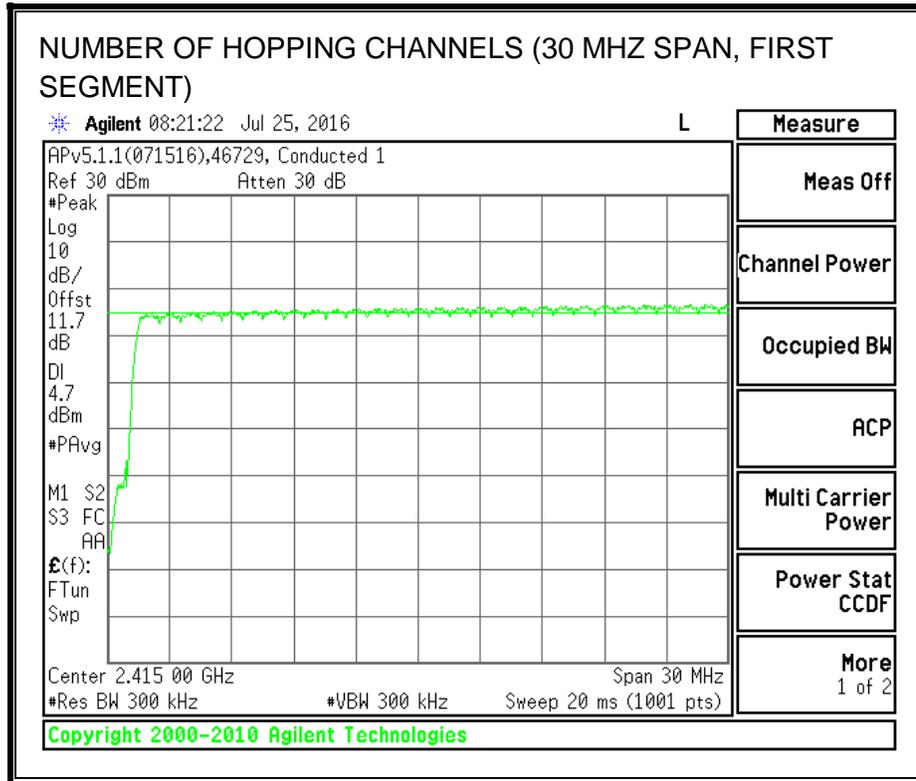
Tester: Ron Reichard

#### RESULTS

Normal Mode: 79 Channels observed.

#### NUMBER OF HOPPING CHANNELS







### 7.2.4. AVERAGE TIME OF OCCUPANCY

#### LIMIT

FCC §15.247 (a) (1) (iii)

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

#### Test Information

Date: 2016-07-28

Tester: Ron Reichard

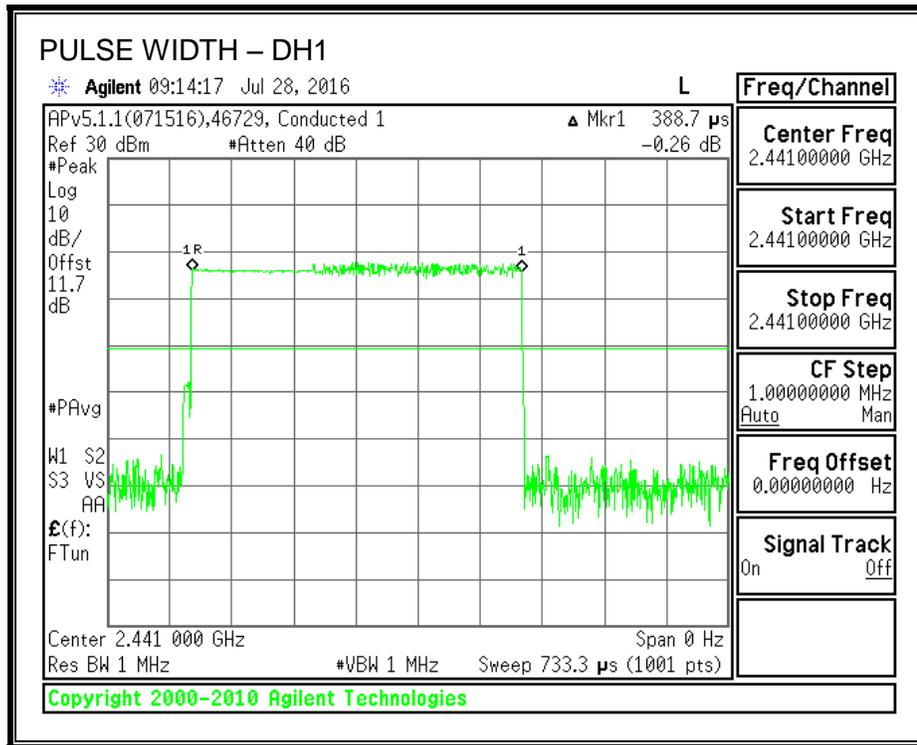
#### RESULTS

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

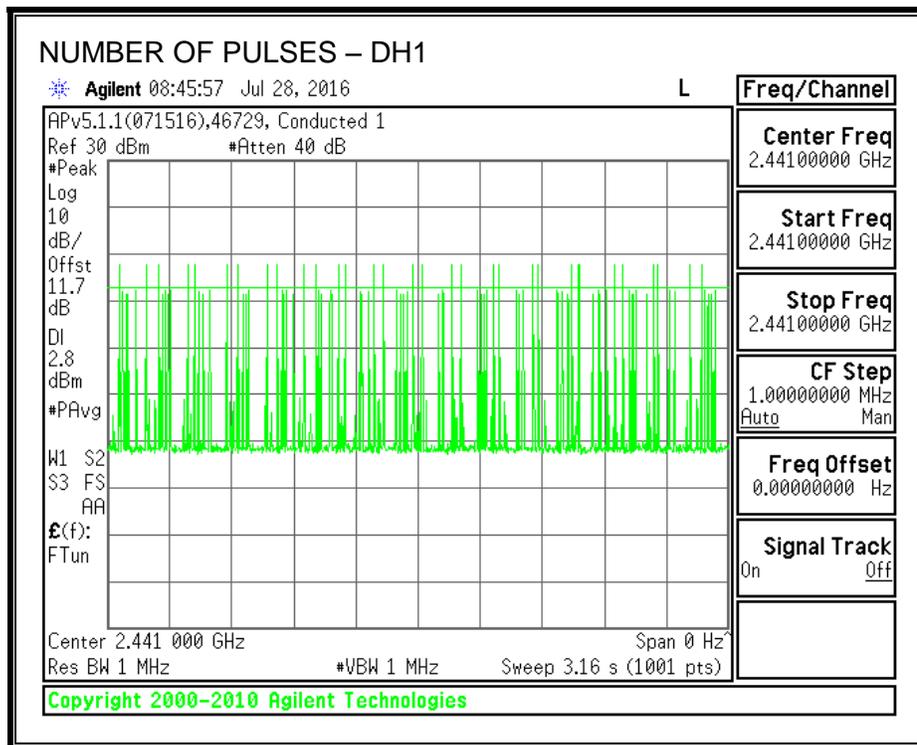
#### DQPSK Mode

| DH Packet | Pulse Width (msec) | Number of Pulses in 3.16 seconds | Average Time of (sec) | Limit (sec) | Margin (sec) |
|-----------|--------------------|----------------------------------|-----------------------|-------------|--------------|
| DH1       | 0.3887             | 31                               | 0.120                 | 0.4         | -0.280       |
| DH3       | 1.642              | 14                               | 0.230                 | 0.4         | -0.170       |
| DH5       | 2.888              | 9                                | 0.260                 | 0.4         | -0.140       |

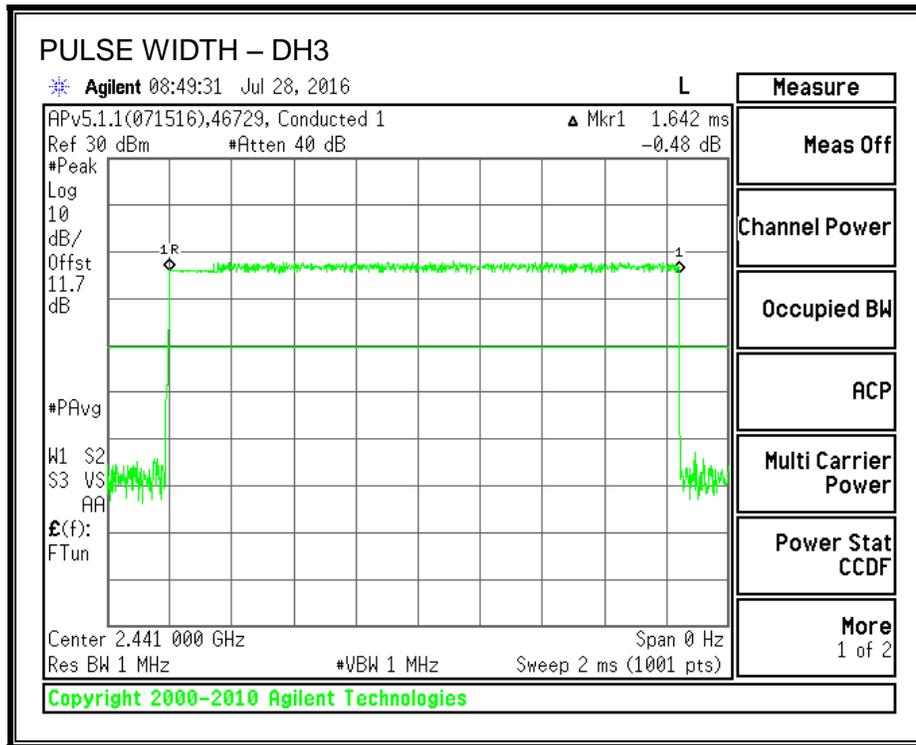
**PULSE WIDTH - DH1**



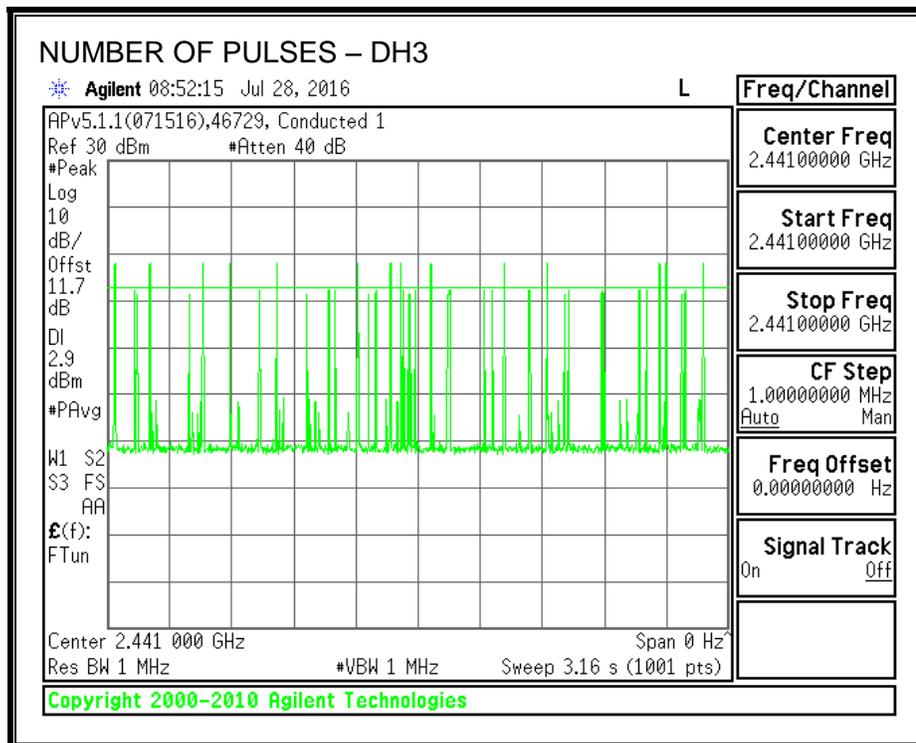
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH1**



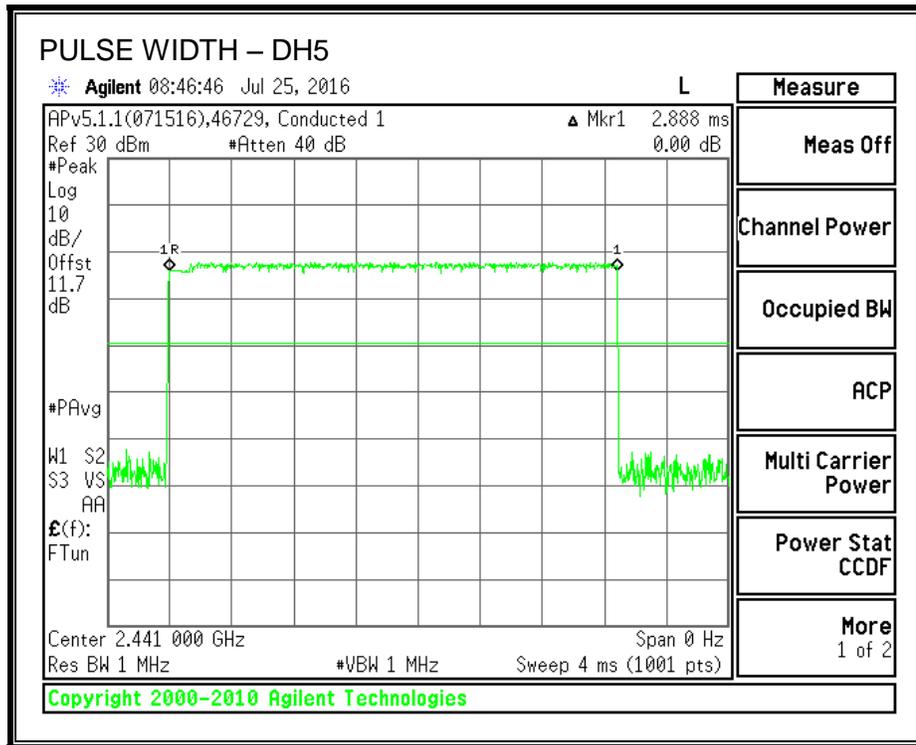
**PULSE WIDTH – DH3**



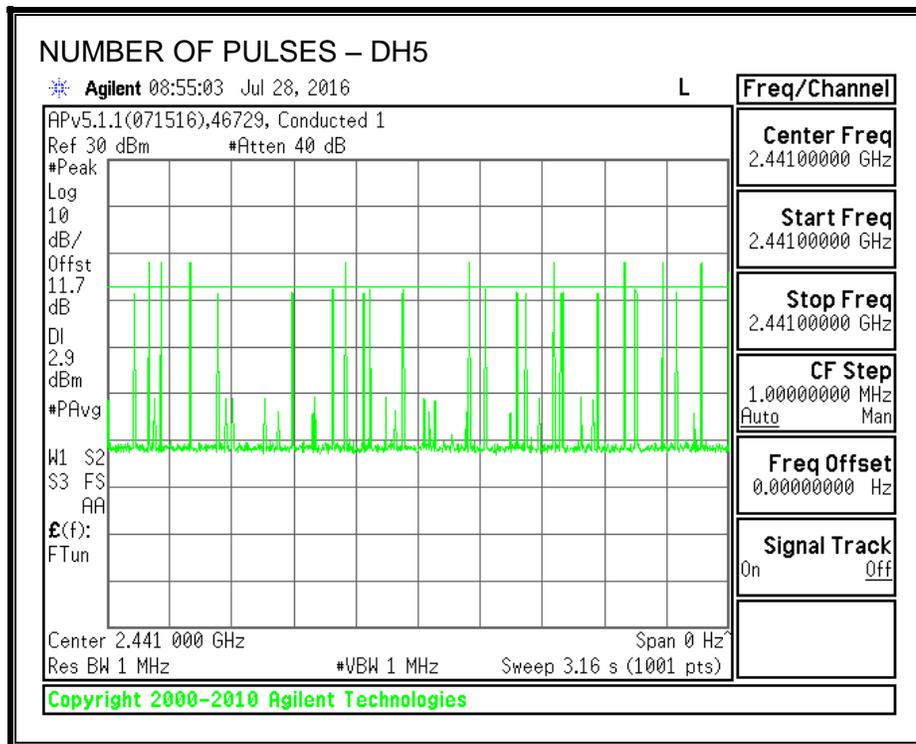
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3**



**PULSE WIDTH – DH5**



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



## 7.2.5. OUTPUT POWER

### LIMIT

§15.247 (b) (1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### TEST INFORMATION

Date: 2016-07-29

Tester: Ron Reichard

### RESULTS

The cable assembly insertion loss of 11.7 dB (including 10 dB pad and 1.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

### RESULTS

| Channel | Frequency (MHz) | Output Power (dBm) | Directional Gain (dBi) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------------|------------------------|-------------|-------------|
| Low     | 2402            | 7.80               | -6.20                  | 21          | -13.20      |
| Middle  | 2441            | 9.40               | -6.20                  | 21          | -11.60      |
| High    | 2480            | 7.40               | -6.20                  | 21          | -13.60      |

## 7.2.6. AVERAGE POWER

### LIMIT

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### TEST INFORMATION

Date: 2016-07-29

Tester: Ron Reichard

### RESULTS

The cable assembly insertion loss of 11.7 dB (including 10 dB pad and 1.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Average Power<br>(dBm) |
|---------|--------------------|------------------------|
| Low     | 2402               | 5.10                   |
| Middle  | 2441               | 6.80                   |
| High    | 2480               | 4.90                   |

## **7.2.7. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### **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.

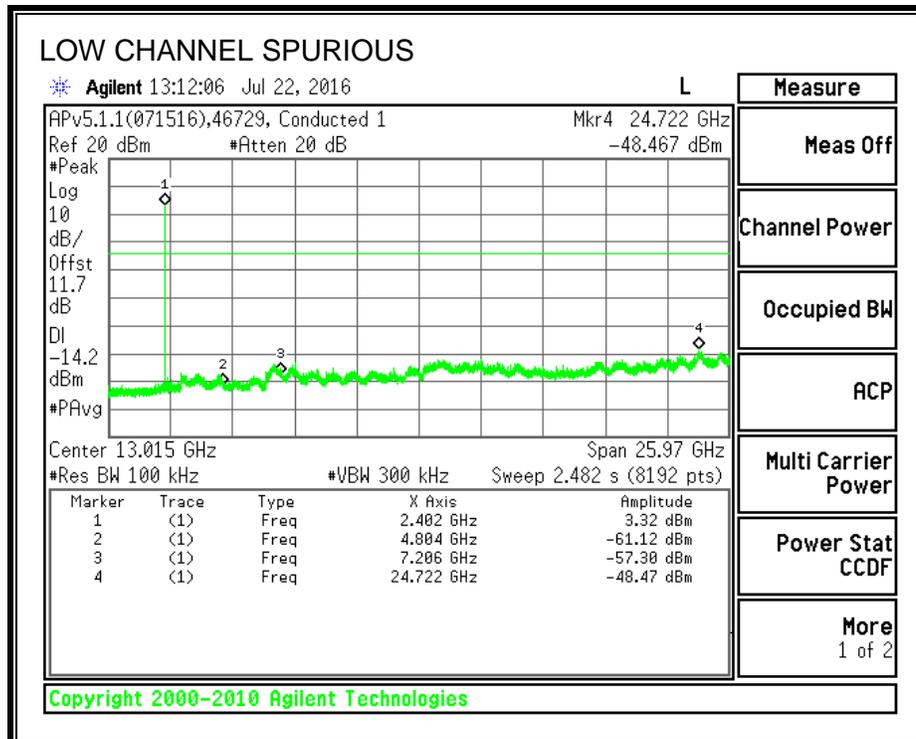
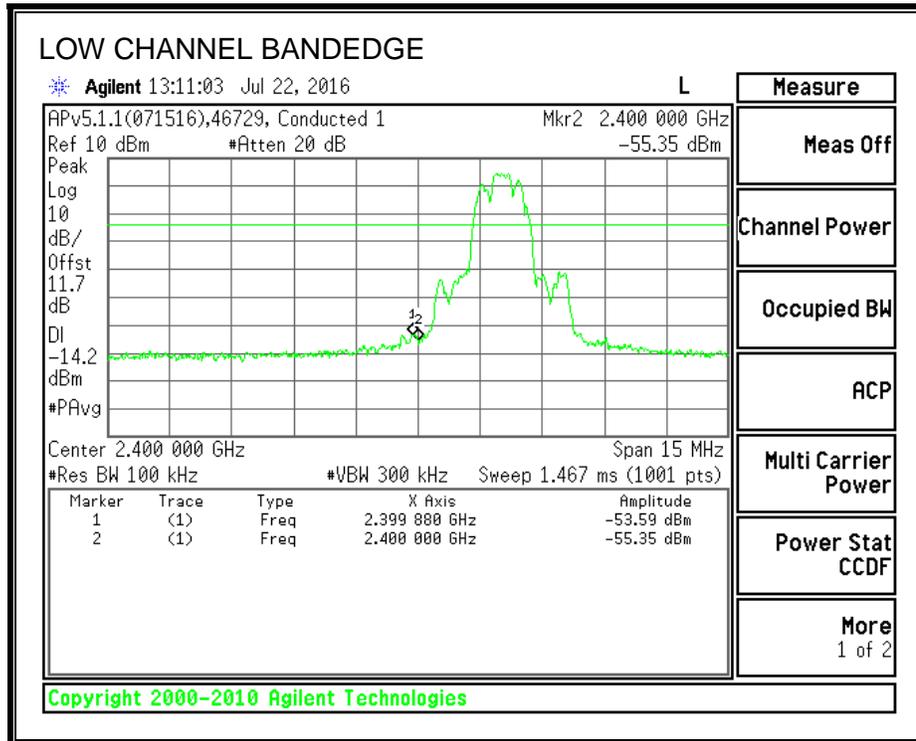
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

### **Test Information**

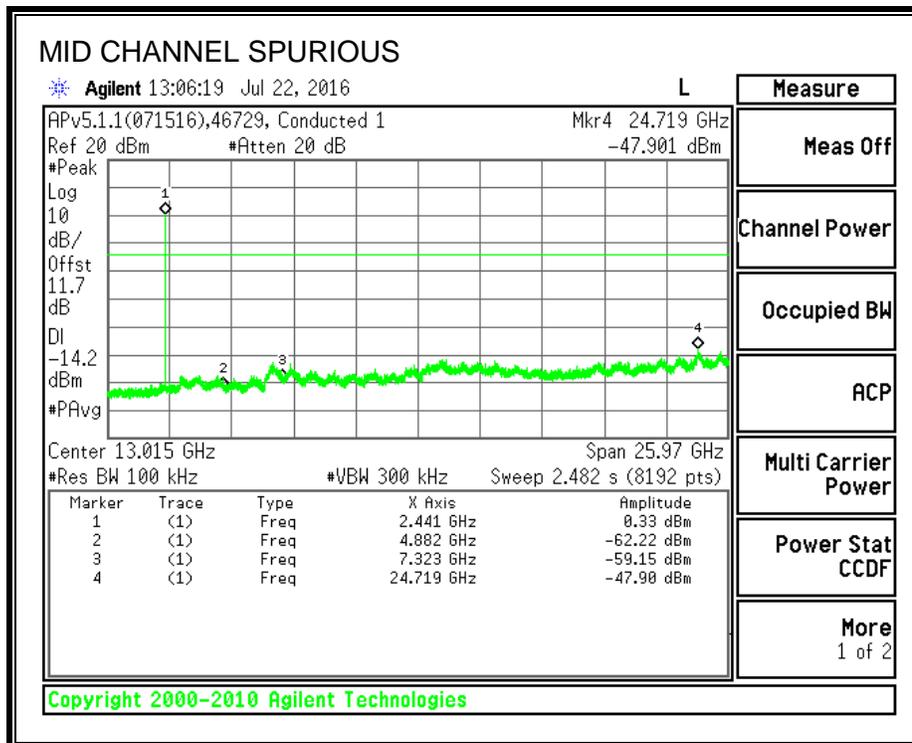
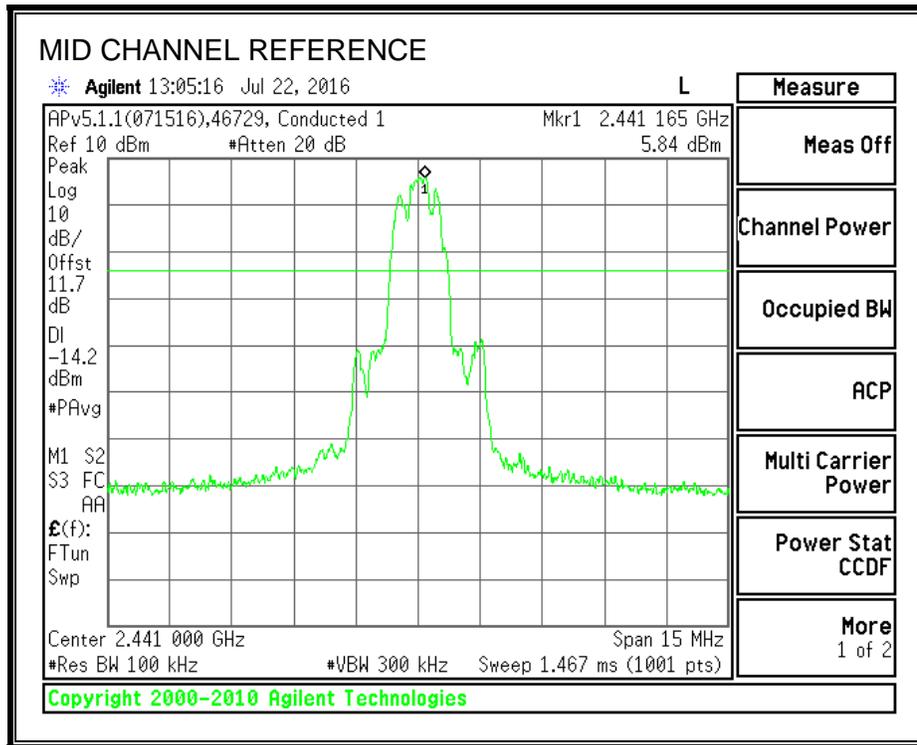
Date: 2016-07-22

Tester: Ron Reichard

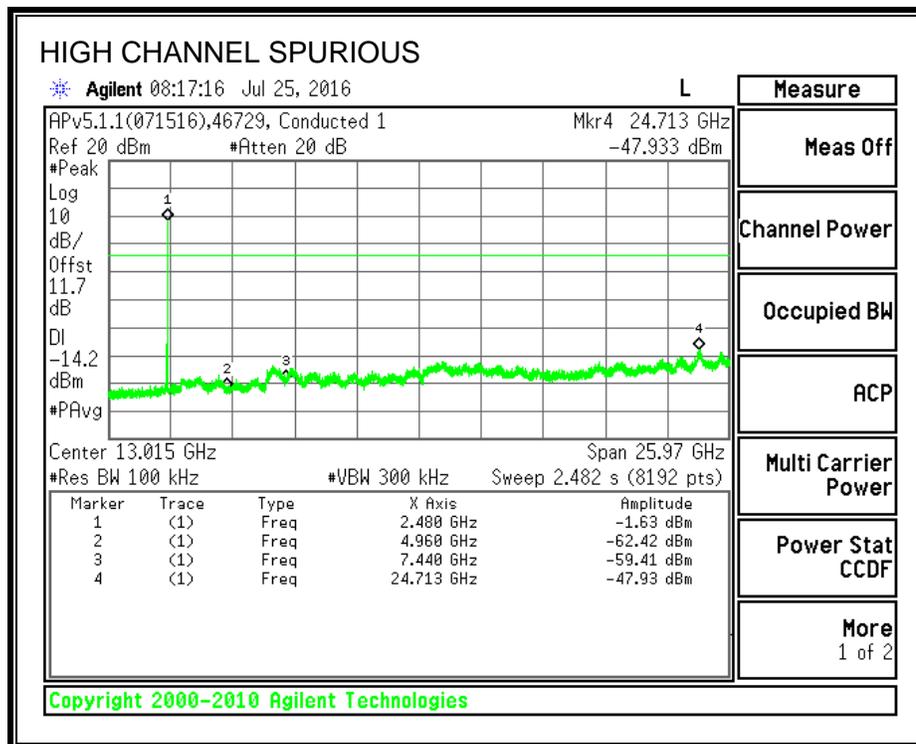
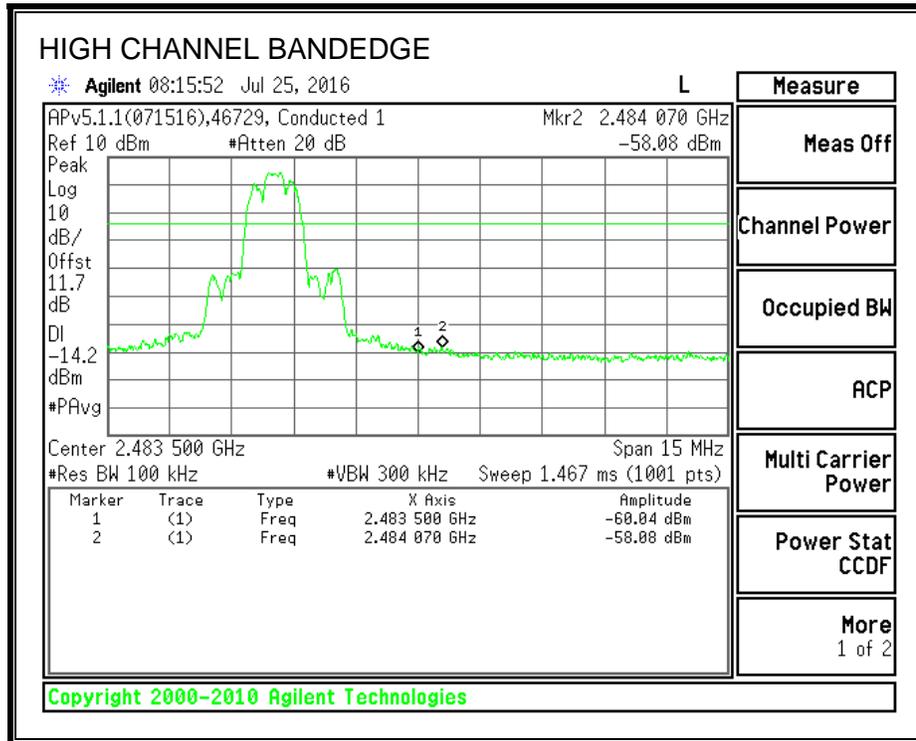
**RESULTS**  
**SPURIOUS EMISSIONS, LOW CHANNEL**



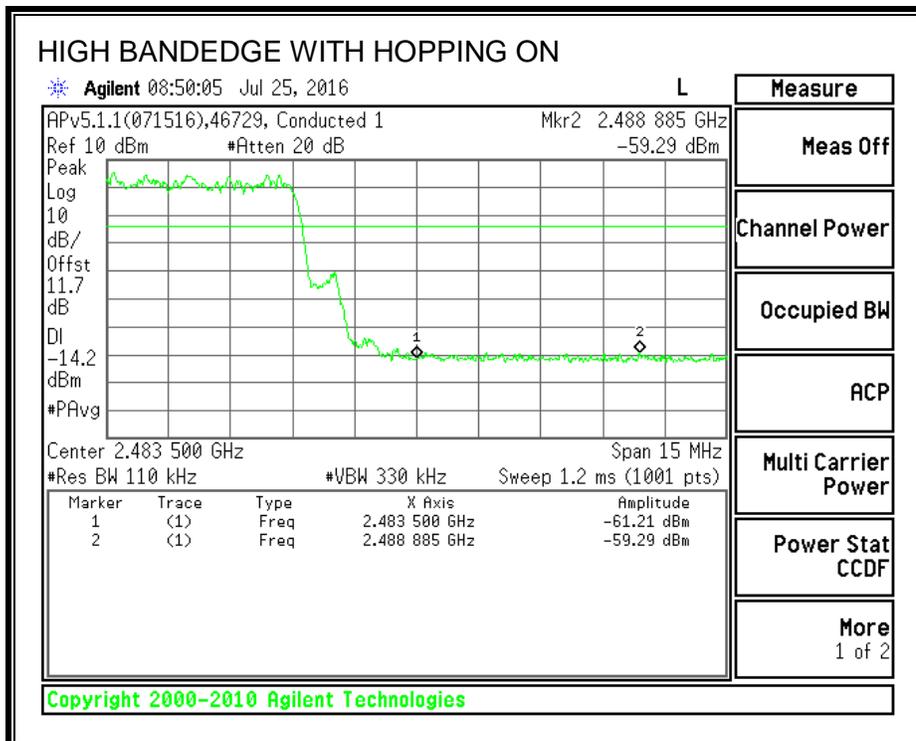
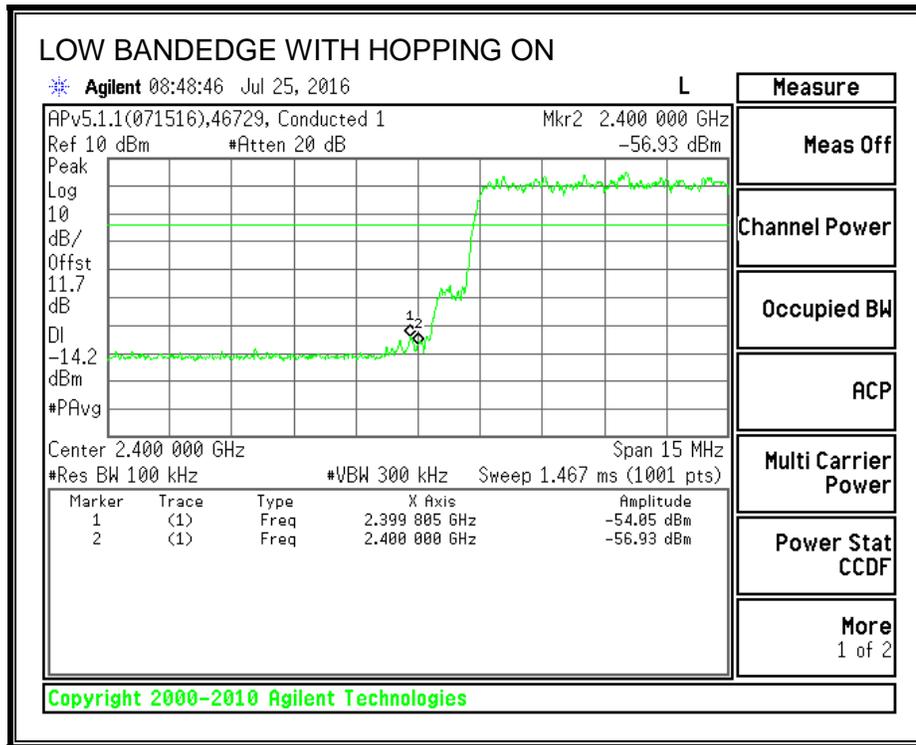
**SPURIOUS EMISSIONS, MID CHANNEL**



**SPURIOUS EMISSIONS, HIGH CHANNEL**



**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**



### 7.3. ENHANCED DATA RATE 8PSK MODULATION

#### 7.3.1. 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.

##### Test Information

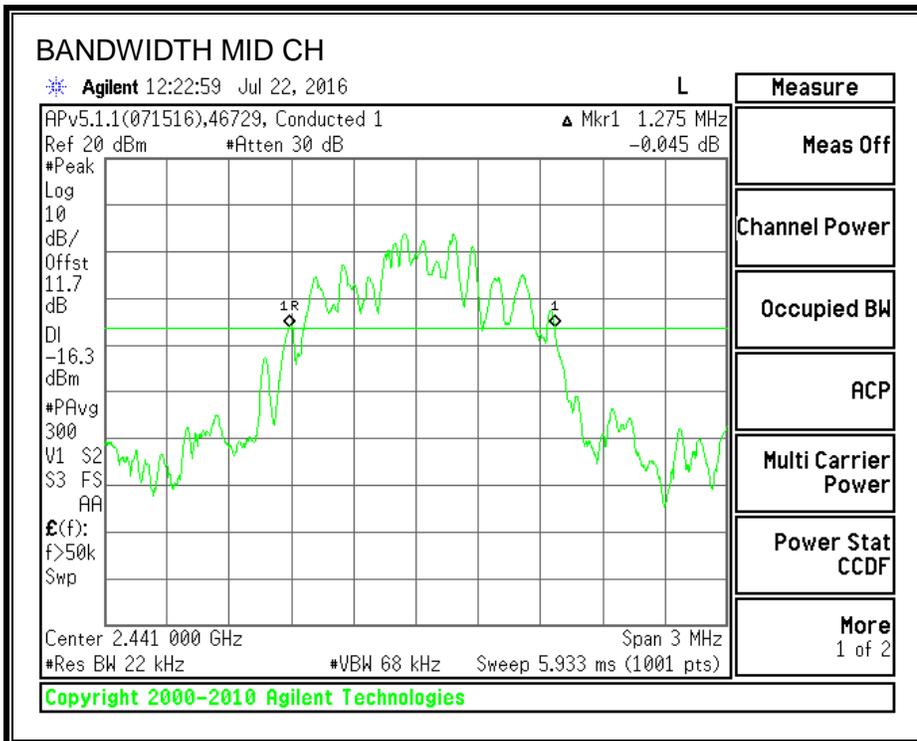
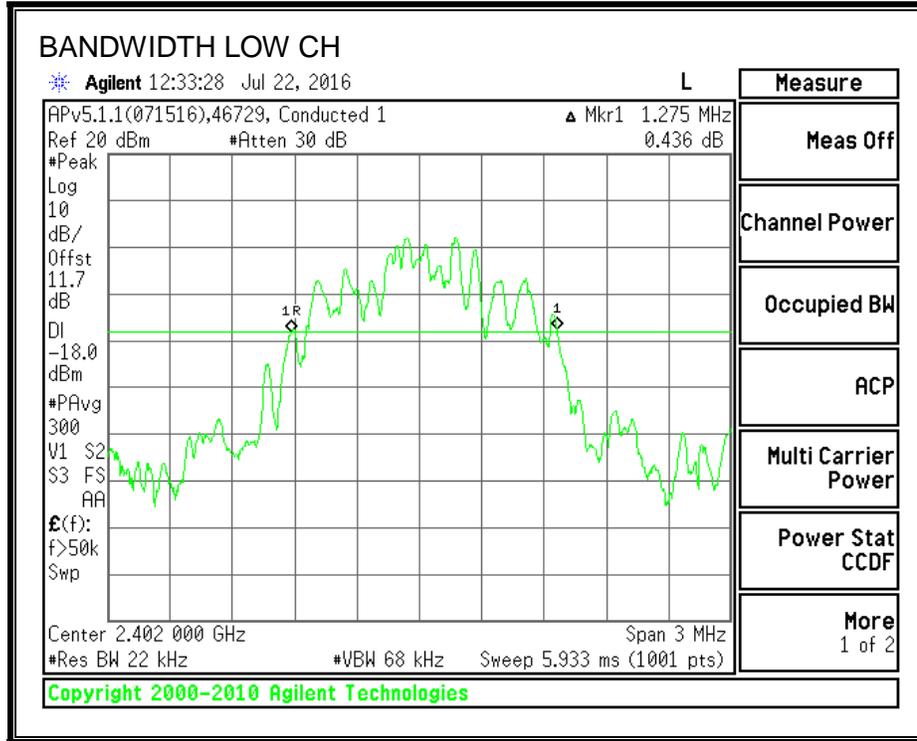
Date: 2016-07-22

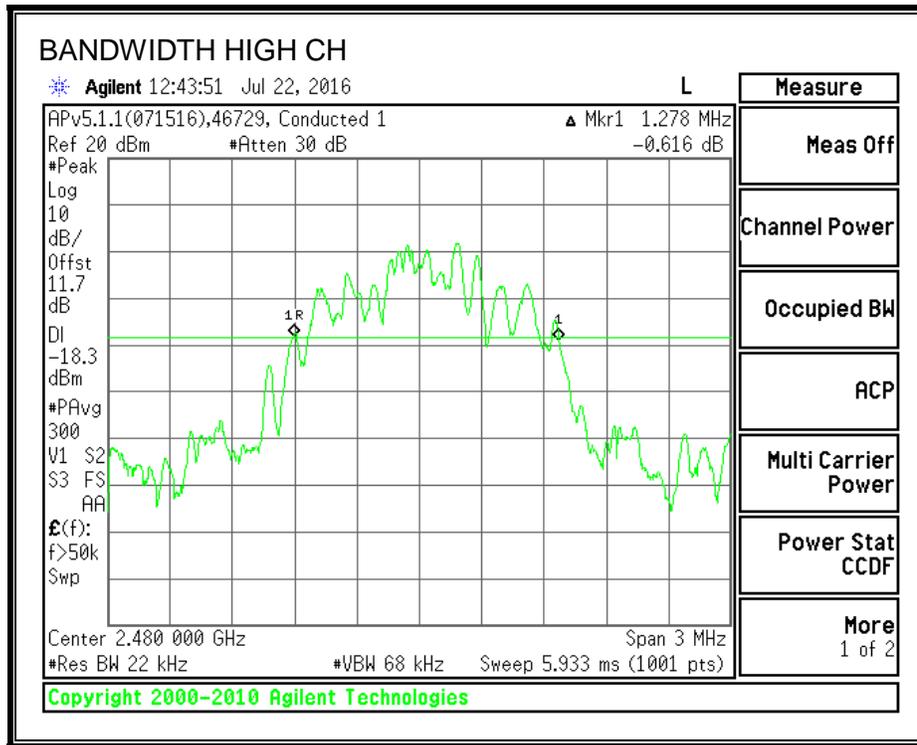
Tester: Ron Reichard

##### RESULTS

| Channel | Frequency<br>(MHz) | 20 dB Bandwidth<br>(kHz) |
|---------|--------------------|--------------------------|
| Low     | 2402               | 1275                     |
| Middle  | 2441               | 1275                     |
| High    | 2480               | 1278                     |

**20 dB AND 99% BANDWIDTH**





### **7.3.2. HOPPING FREQUENCY SEPARATION**

#### **LIMIT**

FCC §15.247 (a) (1)

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.

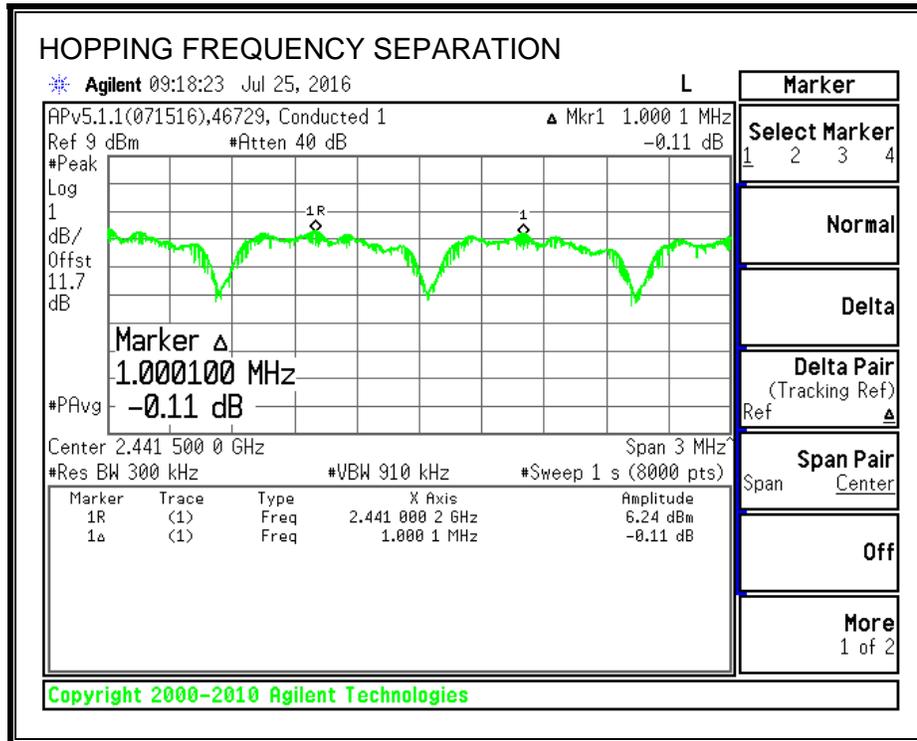
#### **Test Information**

Date: 2016-07-25

Tester: Ron Reichard

#### **RESULTS**

**HOPPING FREQUENCY SEPARATION**



---

### **7.3.3. NUMBER OF HOPPING CHANNELS**

#### **LIMIT**

FCC §15.247 (a) (1) (iii)

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.

#### **Test Information**

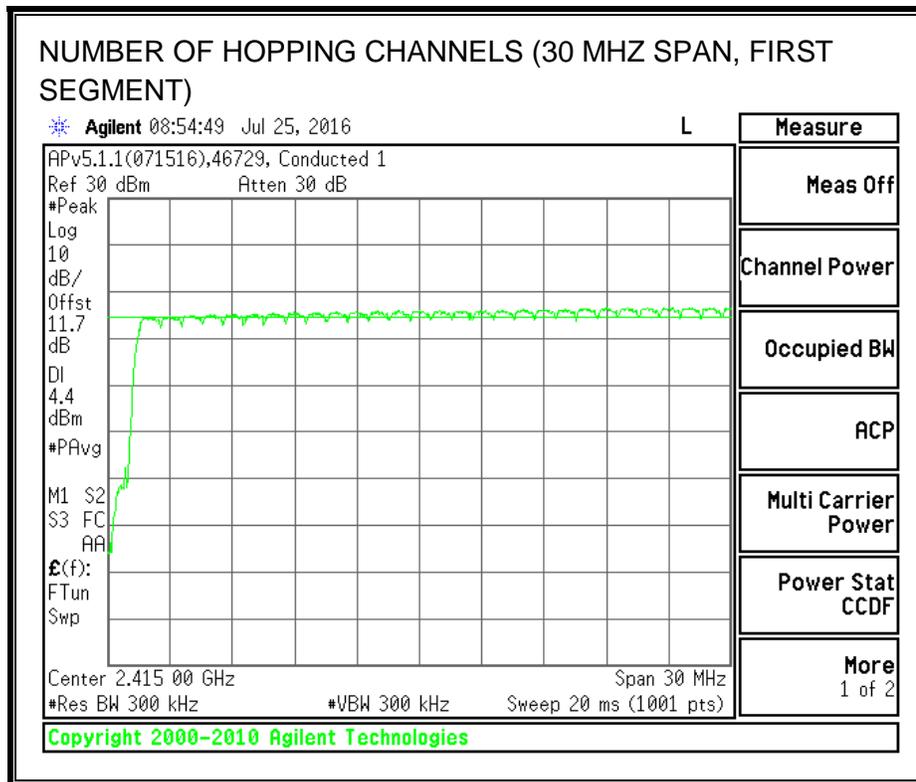
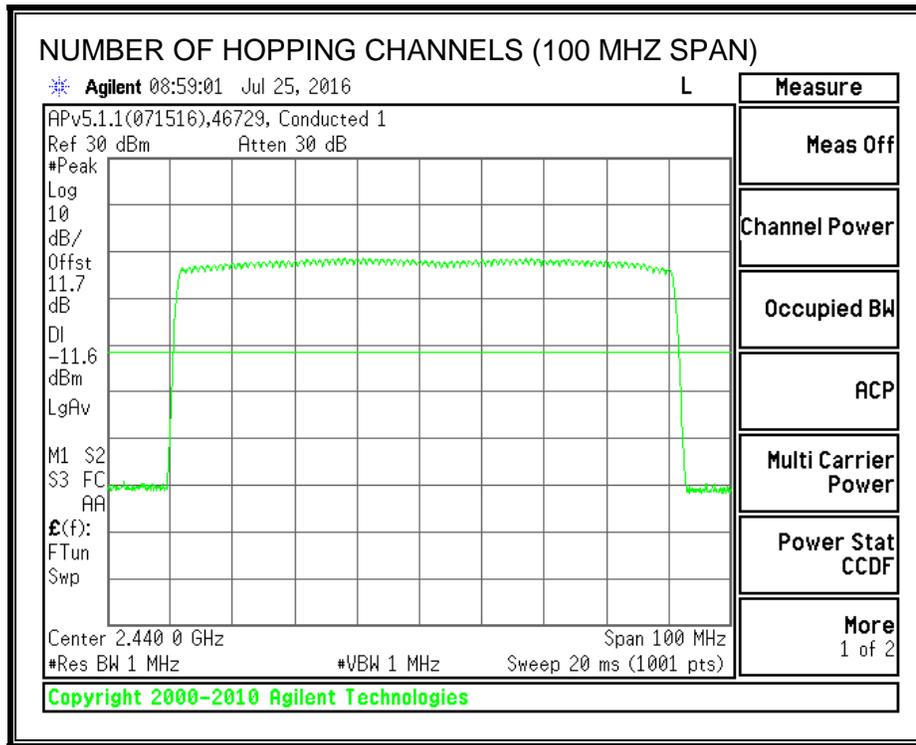
Date: 2016-07-25

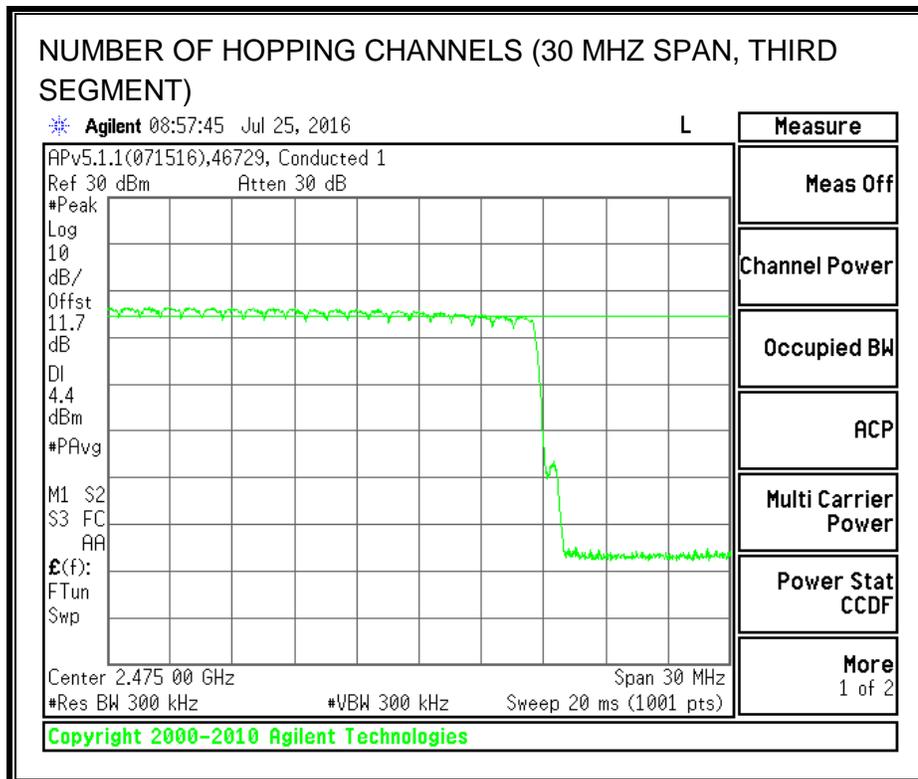
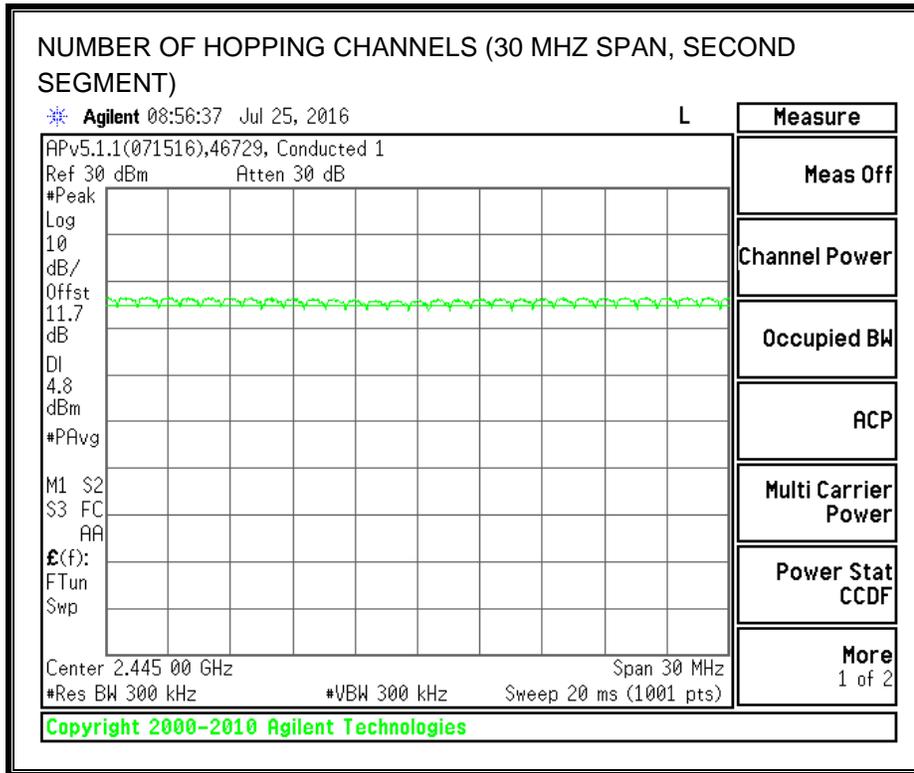
Tester: Ron Reichard

#### **RESULTS**

Normal Mode: 79 Channels observed.

**NUMBER OF HOPPING CHANNELS**





### 7.3.4. AVERAGE TIME OF OCCUPANCY

#### LIMIT

FCC §15.247 (a) (1) (iii)

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

#### Test Information

Date: 2016-07-25

Tester: Ron Reichard

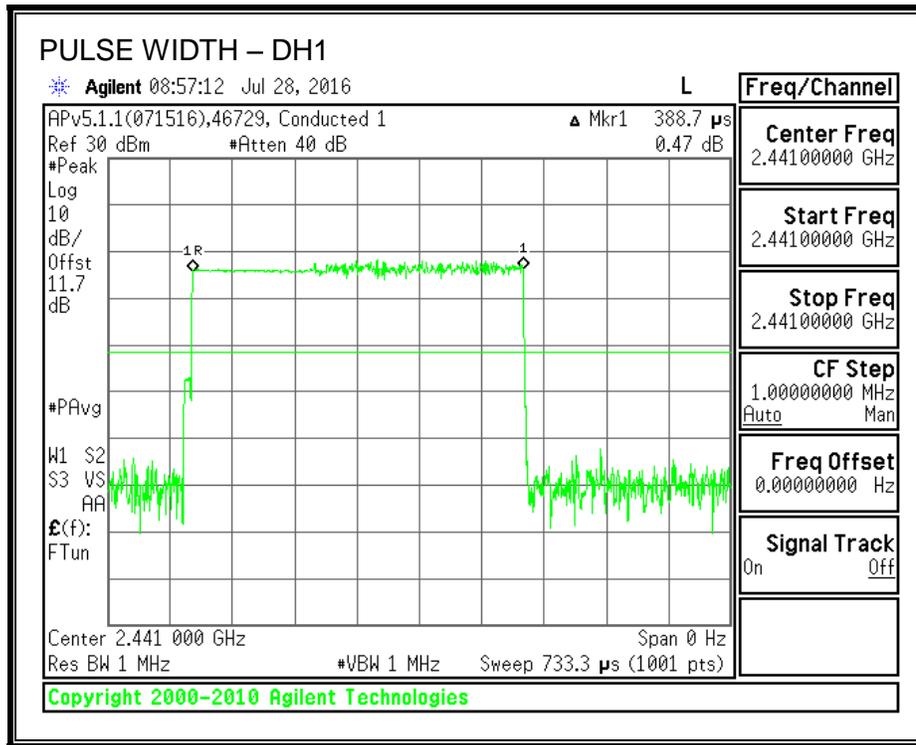
#### RESULTS

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

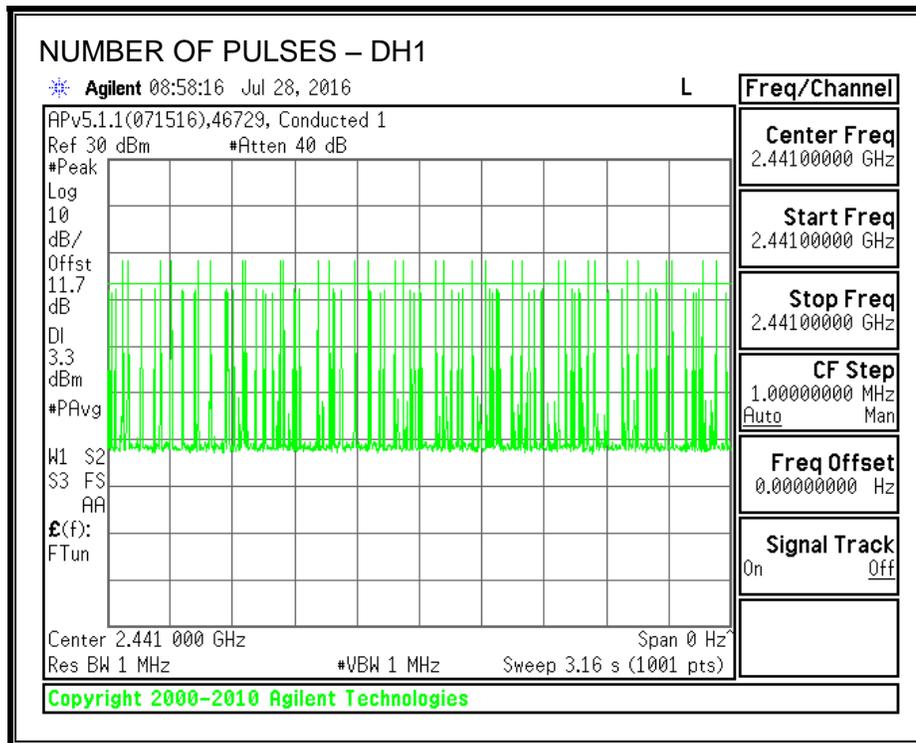
#### 8PSK (EDR) Mode

| DH Packet | Pulse Width (msec) | Number of Pulses in 3.16 seconds | Average Time of (sec) | Limit (sec) | Margin (sec) |
|-----------|--------------------|----------------------------------|-----------------------|-------------|--------------|
| DH1       | 0.3887             | 32                               | 0.124                 | 0.4         | -0.276       |
| DH3       | 1.638              | 17                               | 0.278                 | 0.4         | -0.122       |
| DH5       | 2.892              | 9                                | 0.260                 | 0.4         | -0.140       |

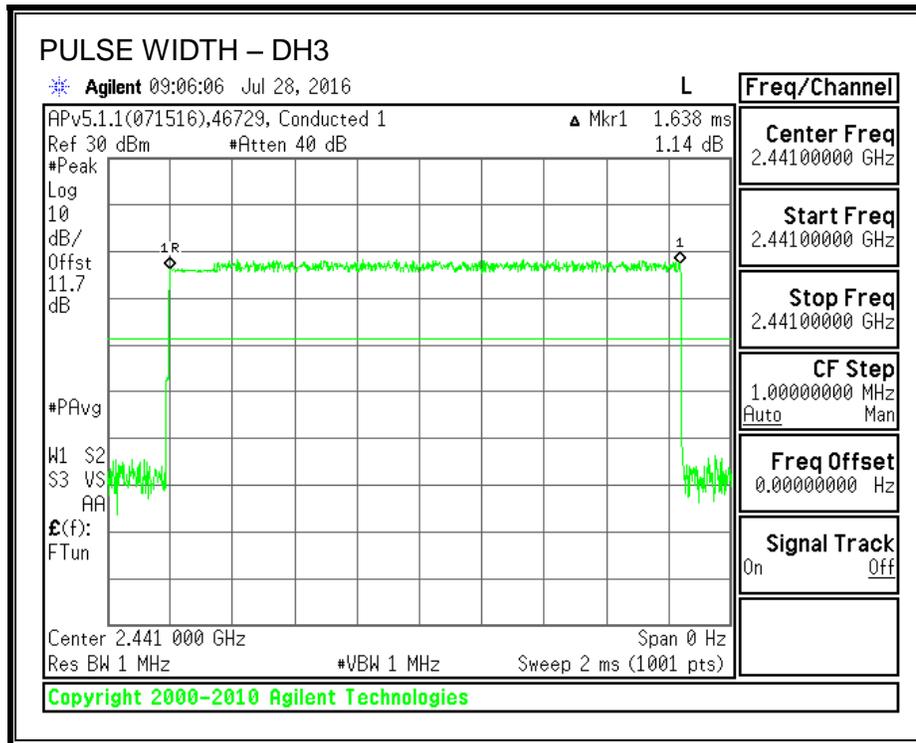
**PULSE WIDTH - DH1**



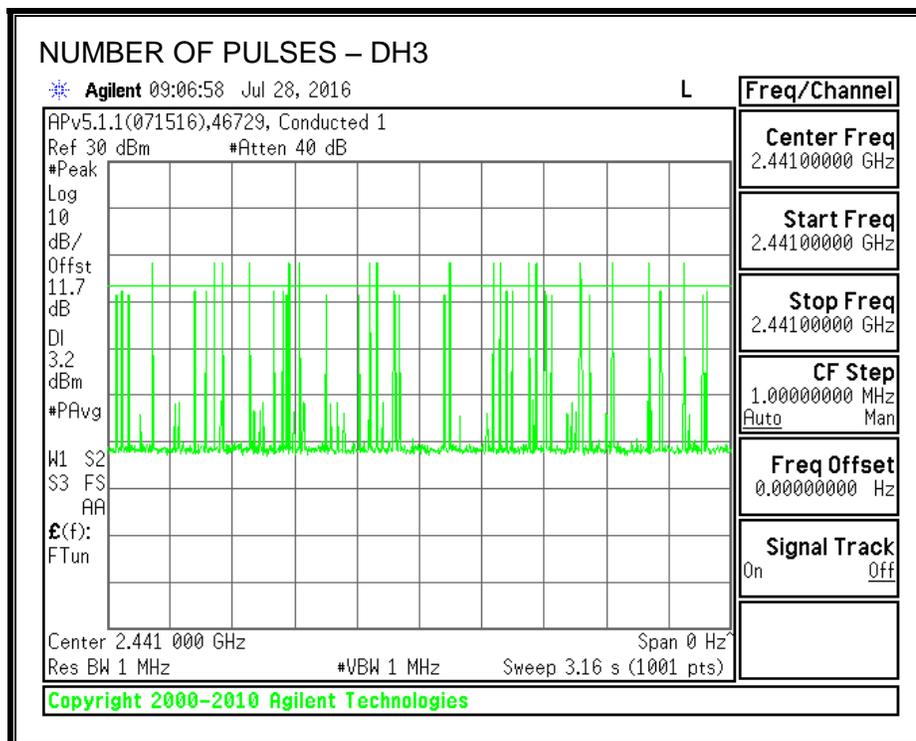
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1**



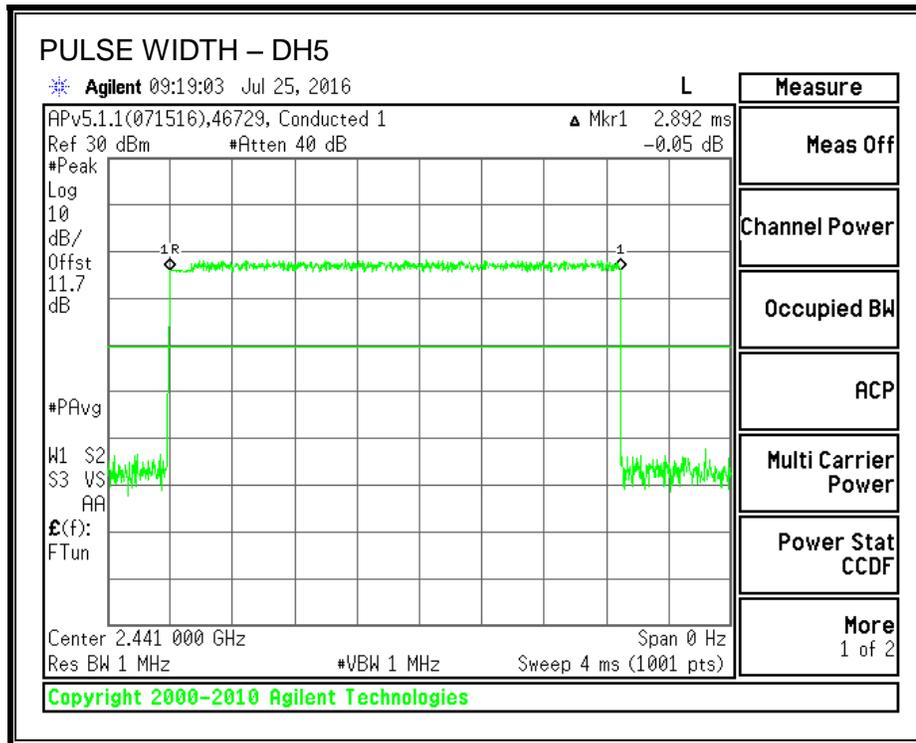
**PULSE WIDTH – DH3**



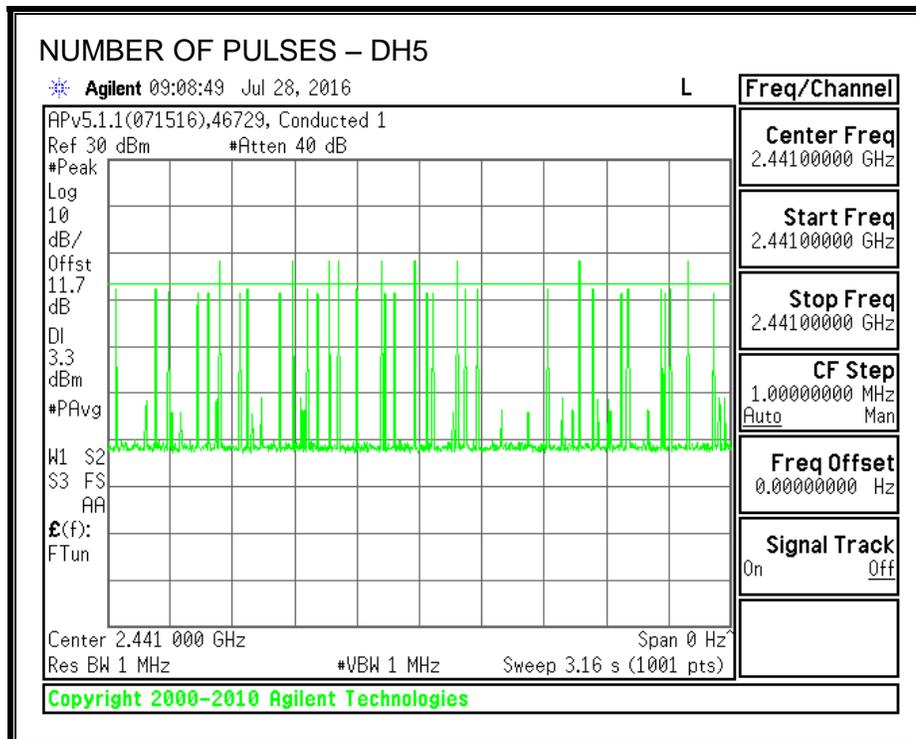
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3**



**PULSE WIDTH – DH5**



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



### 7.3.5. OUTPUT POWER

#### LIMIT

§15.247 (b) (1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### TEST INFORMATION

Date: 2016-07-29

Tester: Ron Reichard

#### RESULTS

The cable assembly insertion loss of 11.7 dB (including 10 dB pad and 1.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

| Channel | Frequency (MHz) | Output Power (dBm) | Directional Gain (dBi) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------------|------------------------|-------------|-------------|
| Low     | 2402            | 7.80               | -6.20                  | 21          | -13.20      |
| Middle  | 2441            | 9.70               | -6.20                  | 21          | -11.30      |
| High    | 2480            | 7.60               | -6.20                  | 21          | -13.40      |

### 7.3.6. AVERAGE POWER

#### LIMIT

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### TEST INFORMATION

Date: 2016-07-29

Tester: Ron Reichard

#### RESULTS

The cable assembly insertion loss of 11.7 dB (including 10 dB pad and 1.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Average Power<br>(dBm) |
|---------|--------------------|------------------------|
| Low     | 2402               | 5.10                   |
| Middle  | 2441               | 6.70                   |
| High    | 2480               | 4.80                   |

### **7.3.7. CONDUCTED SPURIOUS EMISSIONS**

#### **LIMITS**

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

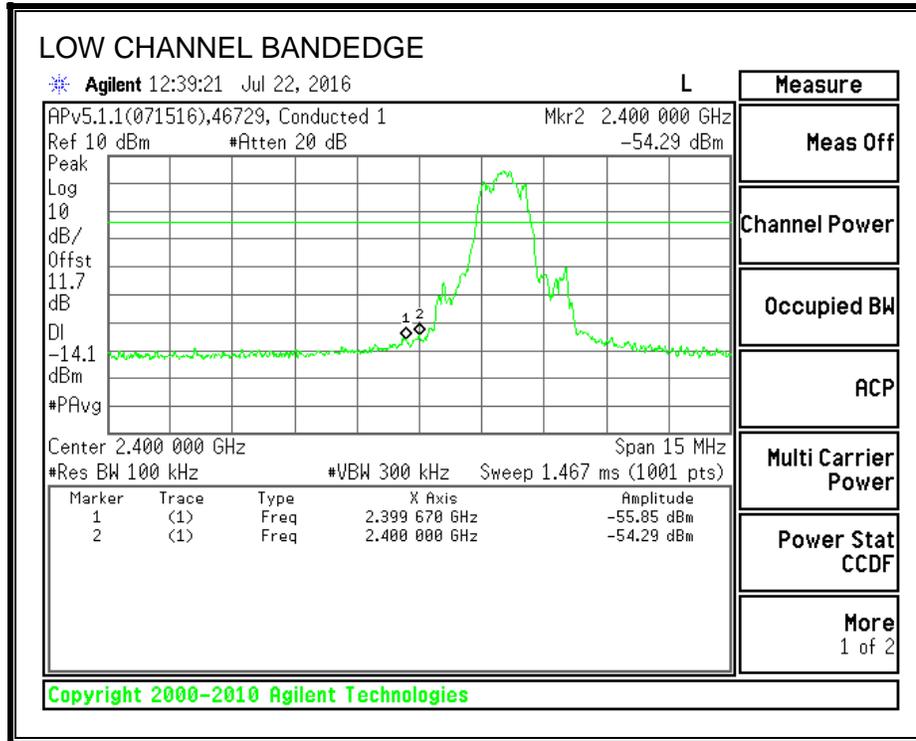
#### **TEST PROCEDURE**

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

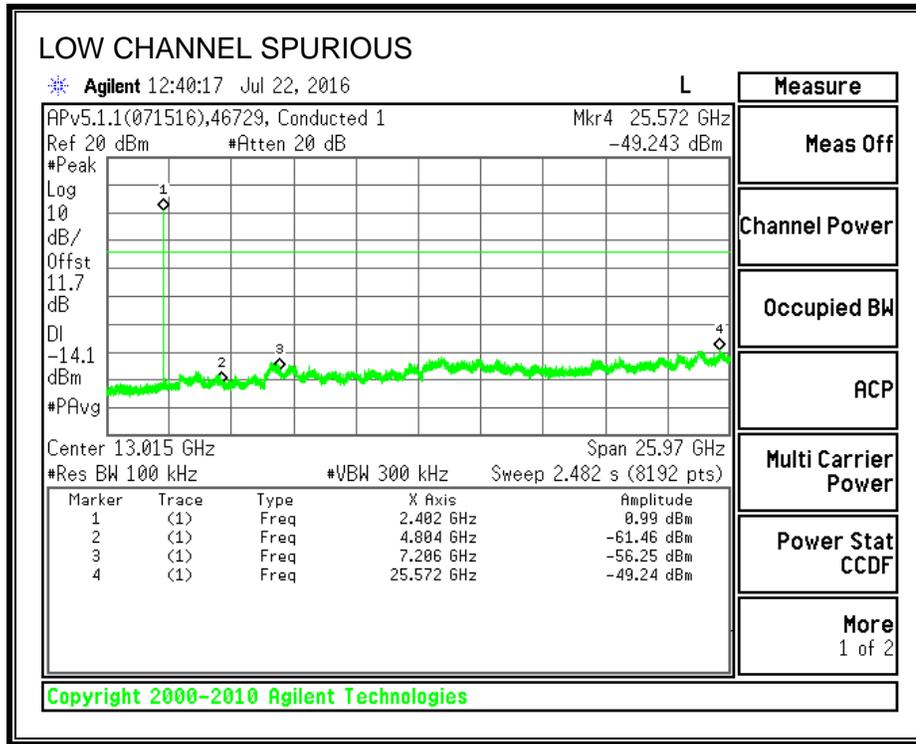
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

**RESULTS**  
**SPURIOUS EMISSIONS, LOW CHANNEL**

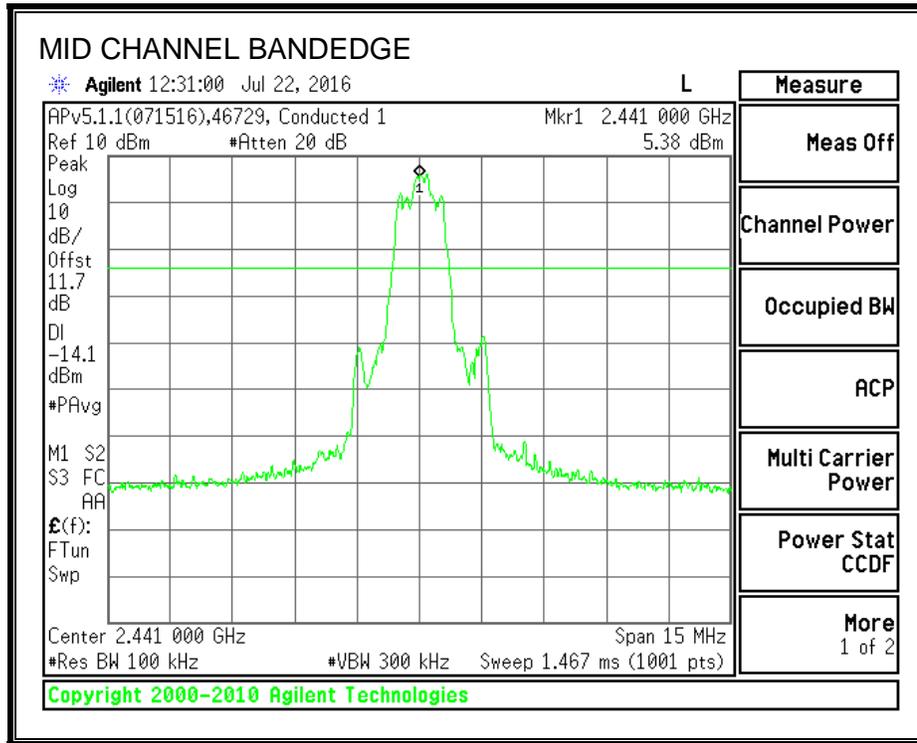


Note: Limit line should be -14.62 dBm , however margin is sufficient to be compliant.

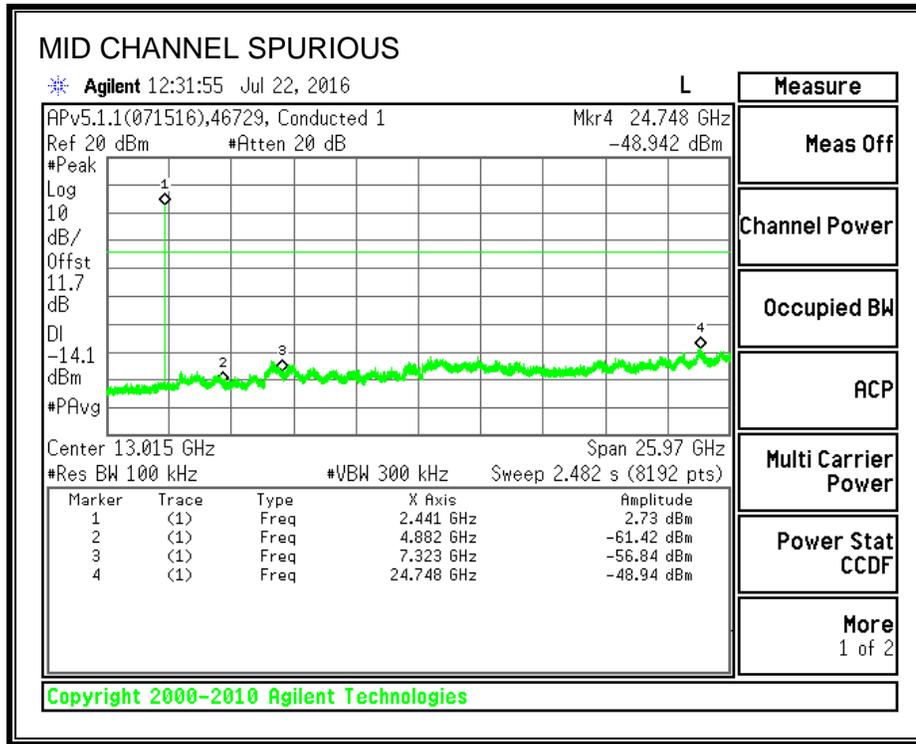


Note: Limit line should be -14.62 dBm , however margin is sufficient to be compliant.

**SPURIOUS EMISSIONS, MID CHANNEL**

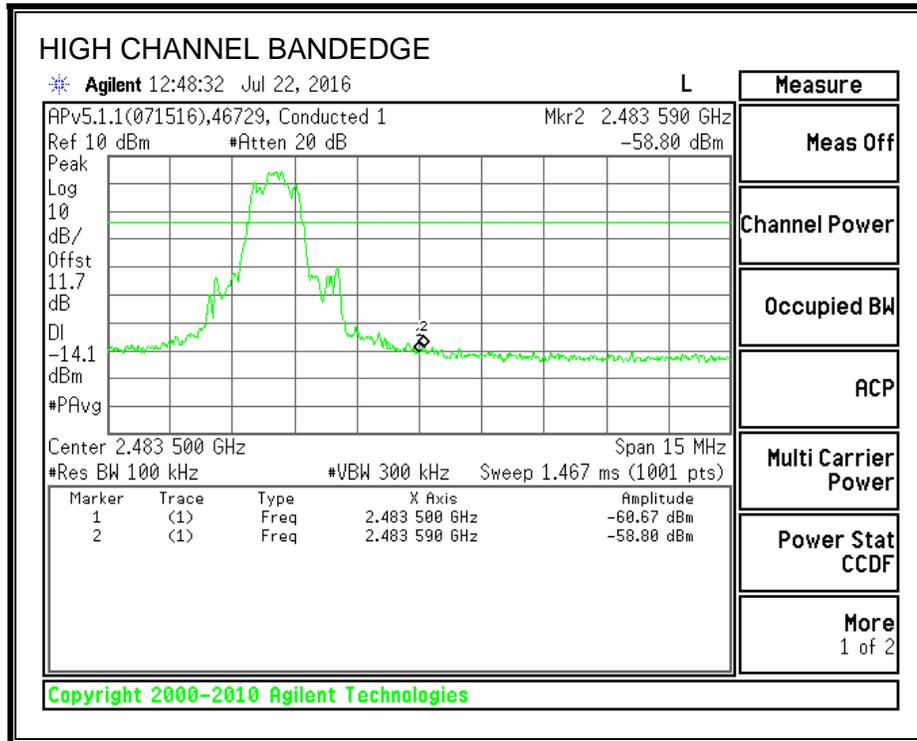


Note: Limit line should be -14.62 dBm

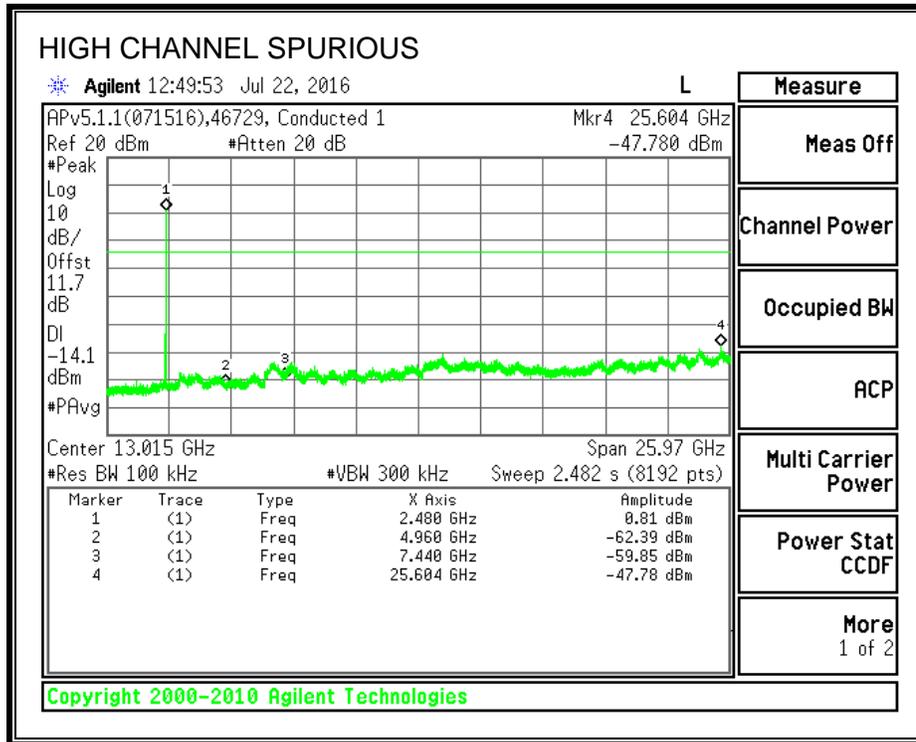


Note: Limit line should be -14.62 dBm , however margin is sufficient to be compliant.

**SPURIOUS EMISSIONS, HIGH CHANNEL**

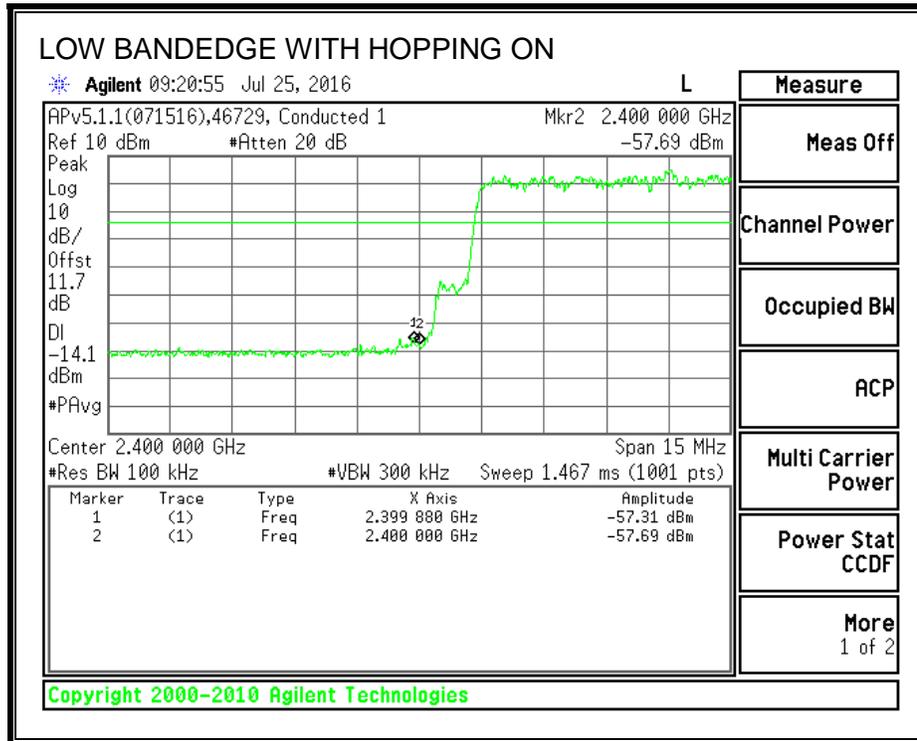


Note: Limit line should be -14.62 dBm , however margin is sufficient to be compliant.

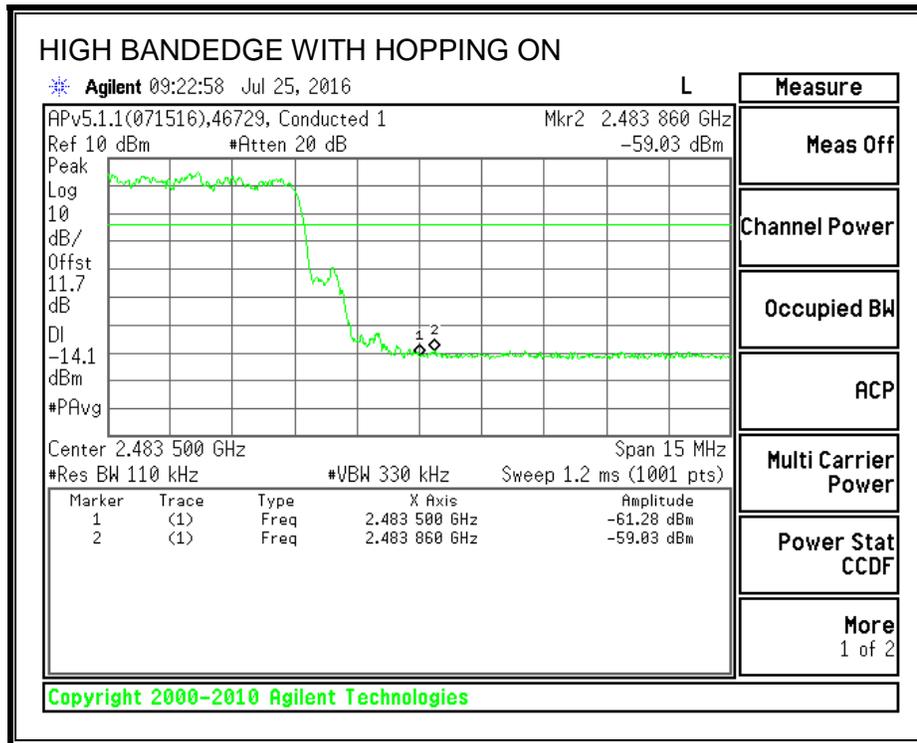


Note: Limit line should be -14.62 dBm , however margin is sufficient to be compliant.

**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**



Note: Limit line should be -14.62 dBm , however margin is sufficient to be compliant.



Note: Limit line should be -14.62 dBm , however margin is sufficient to be compliant.

## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE LIMITS

FCC §15.205 and §15.209

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|-----------------------|------------------------------------|--------------------------------------|
| 0.009-0.490           | 2400/F(kHz) @ 300 m                | -                                    |
| 0.490-1.705           | 24000/F(kHz) @ 30 m                | -                                    |
| 1.705 - 30            | 30 @ 30m                           | -                                    |
| 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 for below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements for the 30-1000 MHz range, 9 kHz for peak detection measurements or 9 kHz for quasi-peak detection measurements for the 0.15-30 MHz range and 200 Hz for peak detection measurements or 200 Hz for quasi-peak detection measurements for the 9 to 150 kHz range. Peak detection is used unless otherwise noted as quasi-peak.

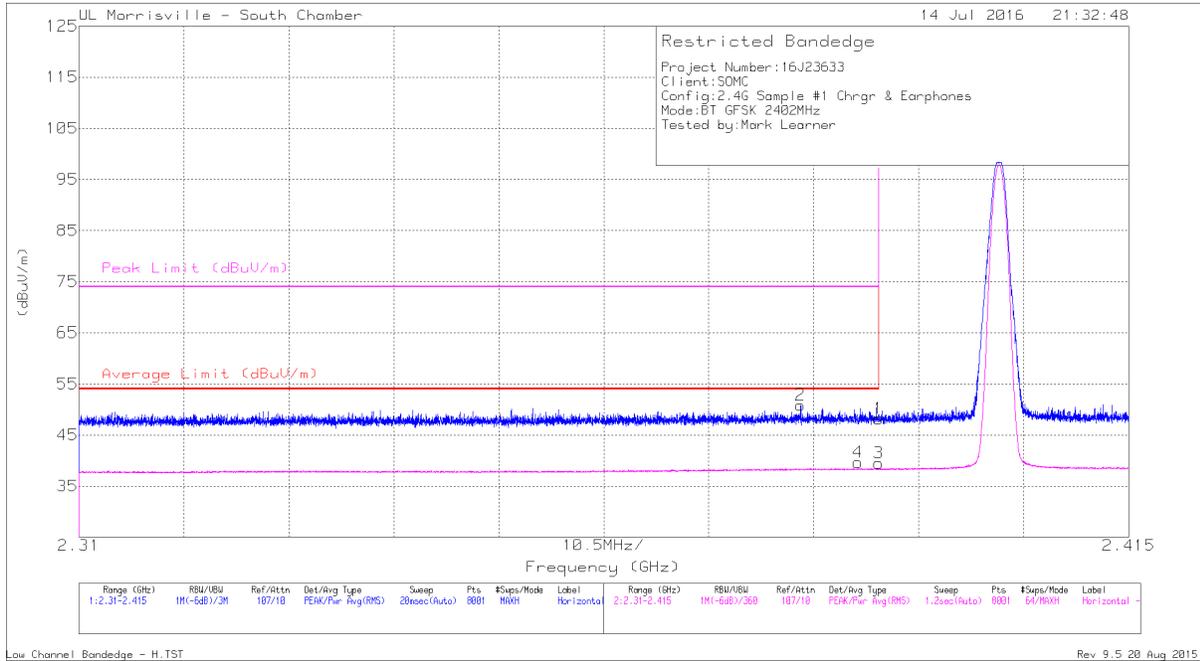
For peak measurements above 1 GHz, the resolution bandwidth is set to 1 MHz and the video bandwidth is set to 3 MHz. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The particular averaging method used for this test program was by measuring using a Peak detector with the resolution bandwidth set to 1MHz and a reduced video bandwidth, based on  $1/T_{on}$  where  $T_{on}$  is the transmit on time (calculated to approx. 2.9 ms).

The spectrum from 9 kHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable 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)



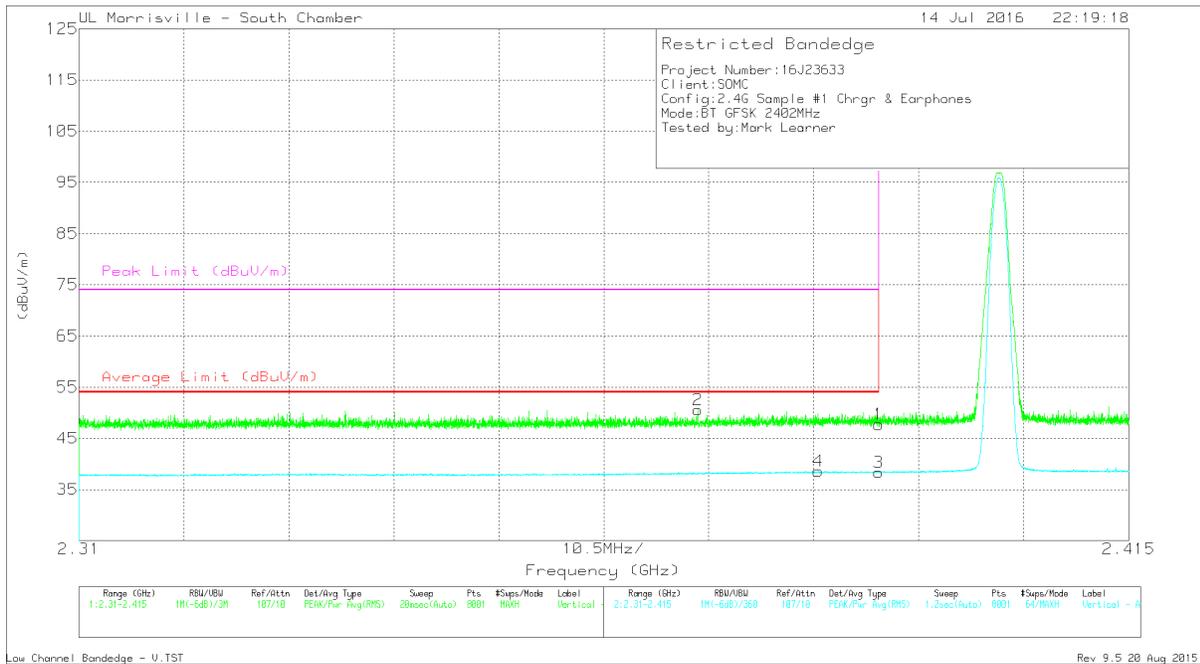
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|-------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 40.81                | Pk   | 32.2             | -24.8                   | 48.21                      | -                      | -           | 74                  | -25.79         | 346            | 375         | H        |
| 2      | * 2.382         | 43.45                | Pk   | 32.1             | -24.7                   | 50.85                      | -                      | -           | 74                  | -23.15         | 346            | 375         | H        |
| 3      | * 2.39          | 30.98                | V1TR | 32.2             | -24.8                   | 38.38                      | 54                     | -15.62      | -                   | -              | 346            | 375         | H        |
| 4      | * 2.388         | 31.11                | V1TR | 32.2             | -24.8                   | 38.51                      | 54                     | -15.49      | -                   | -              | 346            | 375         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

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



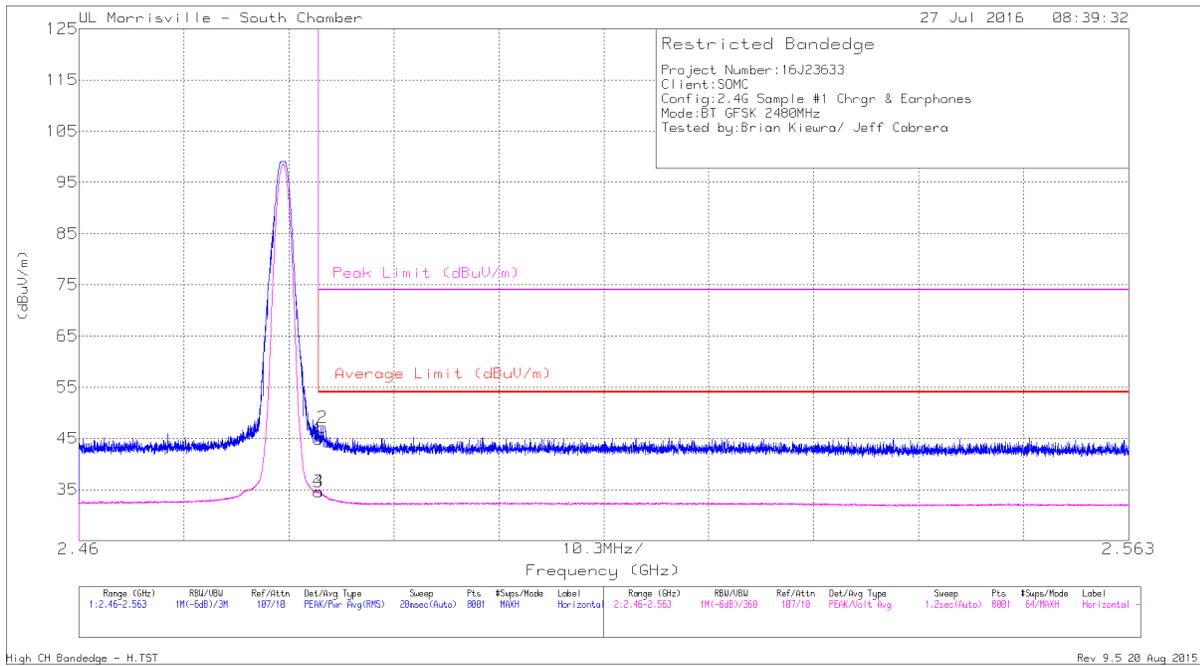
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Fitr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 40.32                | Pk   | 32.2             | -24.8                  | 47.72                      | -                      | -           | 74                  | -26.28         | 121            | 300         | V        |
| 2      | * 2.372         | 43.38                | Pk   | 32               | -24.8                  | 50.58                      | -                      | -           | 74                  | -23.42         | 121            | 300         | V        |
| 3      | * 2.39          | 30.95                | V1TR | 32.2             | -24.8                  | 38.35                      | 54                     | -15.65      | -                   | -              | 121            | 300         | V        |
| 4      | * 2.384         | 31.19                | V1TR | 32.1             | -24.7                  | 38.59                      | 54                     | -15.41      | -                   | -              | 121            | 300         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

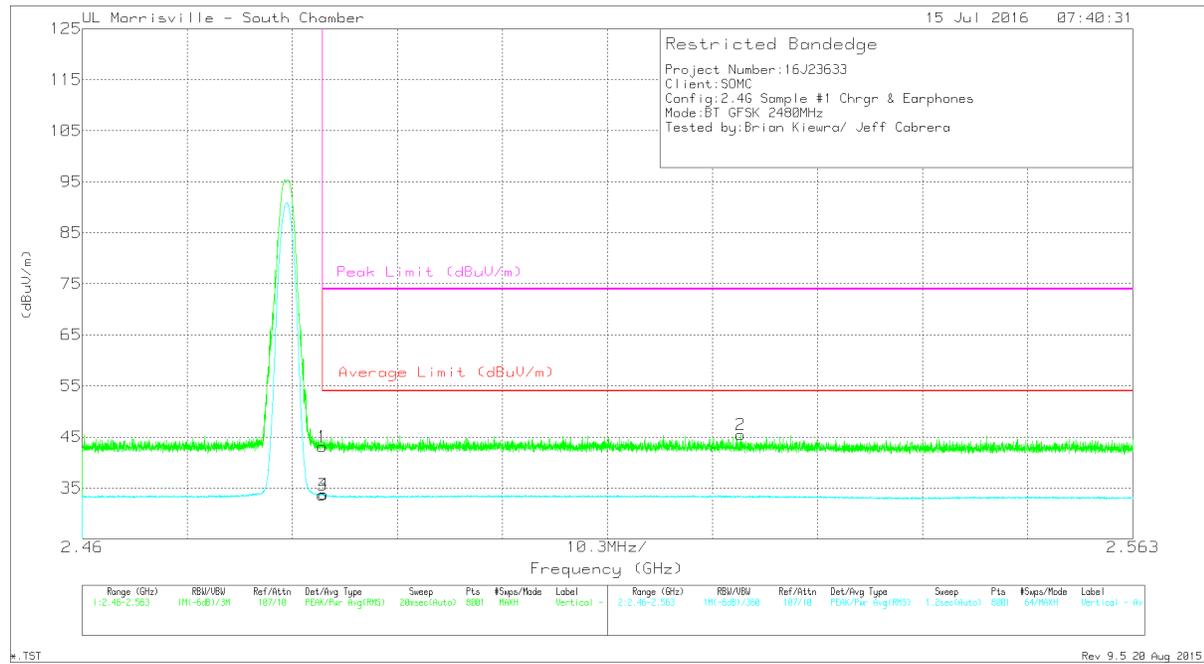
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl/Fitr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|-----------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.484         | 37.2                 | Pk   | 32.4             | -24.7                 | 44.9                       | -                      | -           | 74                  | -29.1          | 346            | 278         | H        |
| 2      | * 2.484         | 39.43                | Pk   | 32.4             | -24.7                 | 47.13                      | -                      | -           | 74                  | -26.87         | 346            | 278         | H        |
| 3      | * 2.484         | 26.9                 | V1TR | 32.4             | -24.7                 | 34.6                       | 54                     | -19.4       | -                   | -              | 346            | 278         | H        |
| 4      | * 2.484         | 26.92                | V1TR | 32.4             | -24.7                 | 34.62                      | 54                     | -19.38      | -                   | -              | 346            | 278         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

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



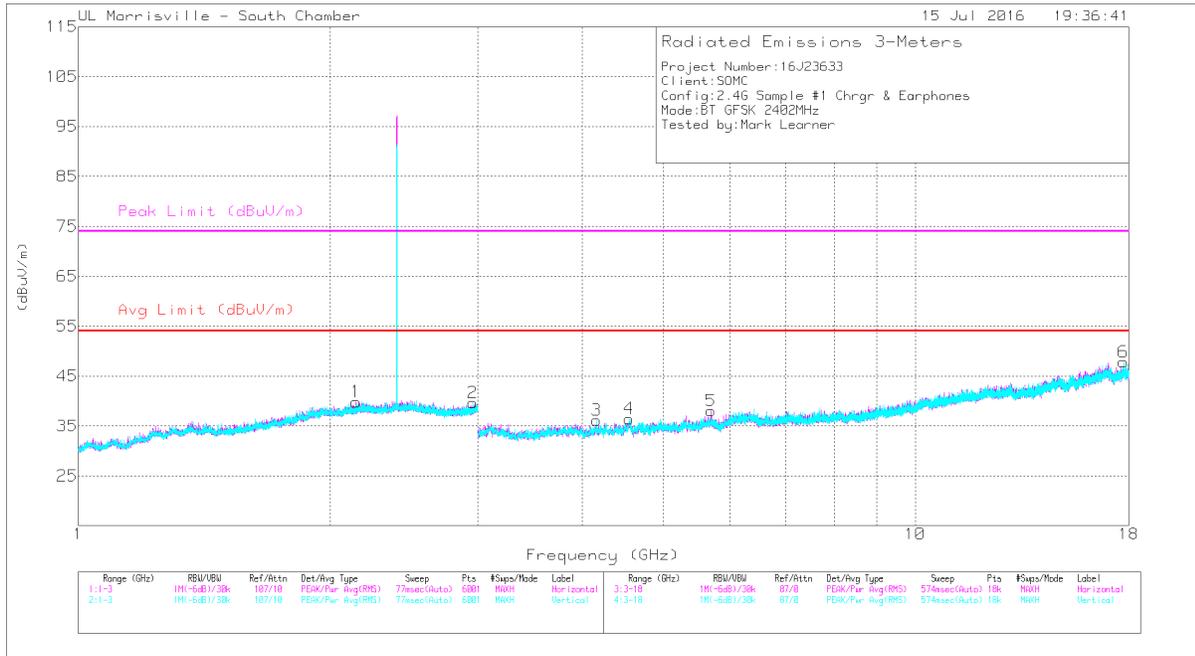
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Fitr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.484         | 35.35                | Pk   | 32.4             | -24.7                  | 43.05                      | -                      | -           | 74                  | -30.95         | 289            | 314         | V        |
| 2      | 2.525           | 37.84                | Pk   | 32.5             | -24.9                  | 45.44                      | -                      | -           | 74                  | -28.56         | 289            | 314         | V        |
| 3      | * 2.484         | 25.89                | V1TR | 32.4             | -24.7                  | 33.59                      | 54                     | -20.41      | -                   | -              | 289            | 314         | V        |
| 4      | * 2.484         | 26.04                | V1TR | 32.4             | -24.7                  | 33.74                      | 54                     | -20.26      | -                   | -              | 289            | 314         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

**HARMONICS AND SPURIOUS EMISSIONS**



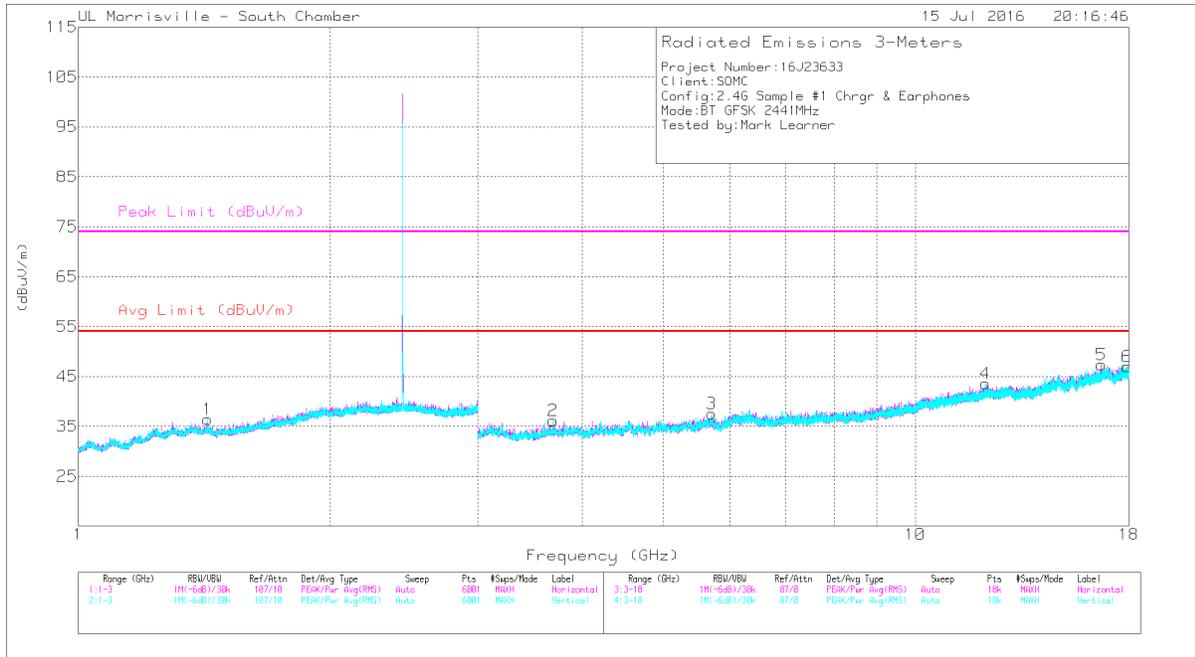
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cb/ Filt/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|-----------------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 3      | * 4.157         | 40.26                | PK-U | 33.4             | -32.2                 | 41.46                      | -                  | -           | 74                  | -32.54         | 0              | 102         | V        |
|        | * 4.157         | 28.91                | V1TR | 33.4             | -32.2                 | 30.11                      | 54                 | -23.89      | -                   | -              | 0              | 102         | V        |
| 4      | * 4.553         | 40.94                | PK-U | 34               | -32                   | 42.94                      | -                  | -           | 74                  | -31.06         | 0              | 198         | V        |
|        | * 4.552         | 28.99                | V1TR | 34               | -32                   | 30.99                      | 54                 | -23.01      | -                   | -              | 0              | 198         | V        |
| 6      | * 17.733        | 34.32                | PK-U | 41.2             | -22.5                 | 53.02                      | -                  | -           | 74                  | -20.98         | 0              | 104         | V        |
|        | * 17.733        | 23.53                | V1TR | 41.2             | -22.6                 | 42.13                      | 54                 | -11.87      | -                   | -              | 0              | 104         | V        |
| 1      | 2.148           | 31.46                | Pk   | 31.7             | -23.3                 | 39.86                      | -                  | -           | -                   | -              | 0-360          | 199         | H        |
| 2      | 2.961           | 33.19                | Pk   | 32.7             | -26.2                 | 39.69                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 5      | 5.698           | 33.67                | Pk   | 34.7             | -30.3                 | 38.07                      | -                  | -           | -                   | -              | 0-360          | 199         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK-U: Maximum Peak

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)



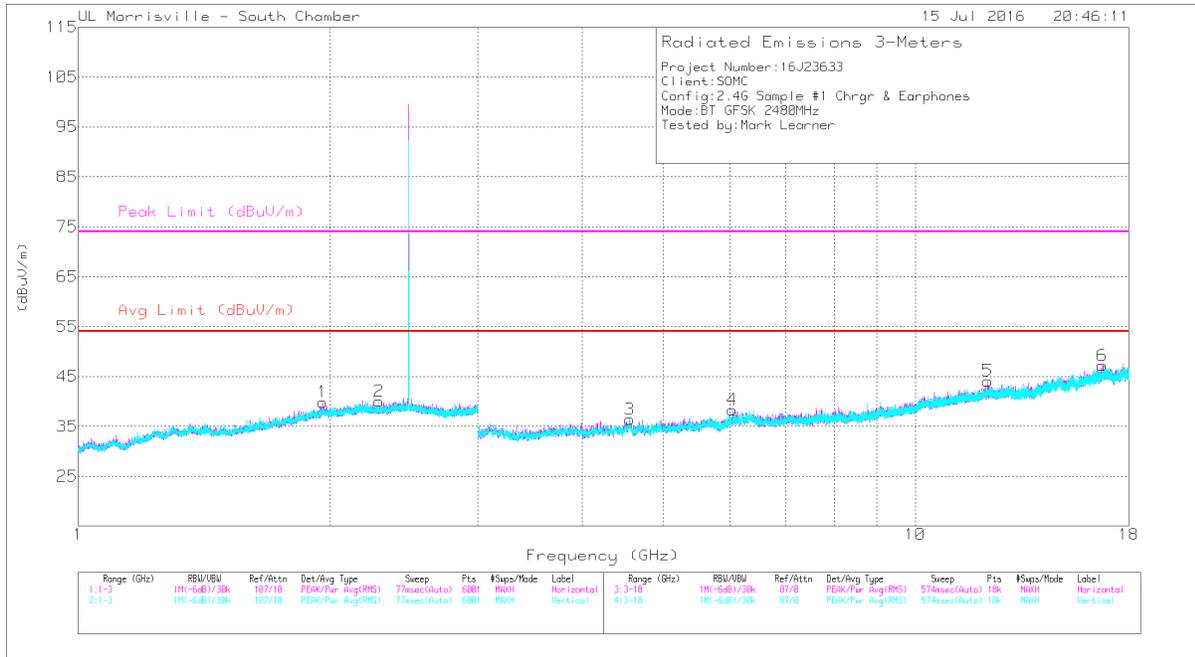
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|-------------------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 6      | * 17.909        | 33.68                | PK-U | 41.2             | -22.8                   | 52.08                      | -                  | -           | 74                  | -21.92         | 1              | 199         | H        |
|        | * 17.911        | 22.98                | V1TR | 41.2             | -22.8                   | 41.38                      | 54                 | -12.62      | -                   | -              | 1              | 199         | H        |
| 2      | * 3.692         | 41.46                | PK-U | 33.3             | -33.1                   | 41.66                      | -                  | -           | 74                  | -32.34         | 1              | 102         | V        |
|        | * 3.694         | 29.42                | V1TR | 33.4             | -33.1                   | 29.72                      | 54                 | -24.28      | -                   | -              | 1              | 102         | V        |
| 4      | * 12.146        | 34.58                | PK-U | 39               | -24.9                   | 48.68                      | -                  | -           | 74                  | -25.32         | 1              | 102         | V        |
|        | * 12.146        | 23.29                | V1TR | 39               | -24.9                   | 37.39                      | 54                 | -16.61      | -                   | -              | 1              | 102         | V        |
| 5      | 16.698          | 31.03                | PK   | 41.5             | -25.2                   | 47.33                      | -                  | -           | -                   | -              | 0-360          | 199         | H        |
| 1      | 1.427           | 30.83                | PK   | 28.5             | -22.9                   | 36.43                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 3      | 5.713           | 33.37                | PK   | 34.7             | -30.5                   | 37.57                      | -                  | -           | -                   | -              | 0-360          | 199         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

PK-U: Maximum Peak

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Ftr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|-----------------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 2      | * 2.288         | 36.51                | PK-U | 31.7             | -23.9                 | 44.31                      | -                  | -           | 74                  | -29.69         | 0              | 199         | V        |
|        | * 2.29          | 24.95                | V1TR | 31.7             | -23.8                 | 32.85                      | 54                 | -21.15      | -                   | -              | 0              | 199         | V        |
| 3      | * 4.563         | 40.31                | PK-U | 34               | -32.1                 | 42.21                      | -                  | -           | 74                  | -31.79         | 0              | 104         | H        |
|        | * 4.561         | 29.05                | V1TR | 34               | -32                   | 31.05                      | 54                 | -22.95      | -                   | -              | 0              | 104         | H        |
| 5      | * 12.207        | 34.52                | PK-U | 39               | -24.8                 | 48.72                      | -                  | -           | 74                  | -25.28         | 0              | 104         | H        |
|        | * 12.207        | 23.35                | V1TR | 39               | -24.8                 | 37.55                      | 54                 | -16.45      | -                   | -              | 0              | 104         | H        |
| 1      | 1.96            | 31.27                | Pk   | 31.2             | -22.6                 | 39.87                      | -                  | -           | -                   | -              | 0-360          | 102         | H        |
| 4      | 6.041           | 32.04                | Pk   | 35.1             | -28.8                 | 38.34                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |
| 6      | 16.728          | 30.89                | Pk   | 41.6             | -25.3                 | 47.19                      | -                  | -           | -                   | -              | 0-360          | 199         | H        |

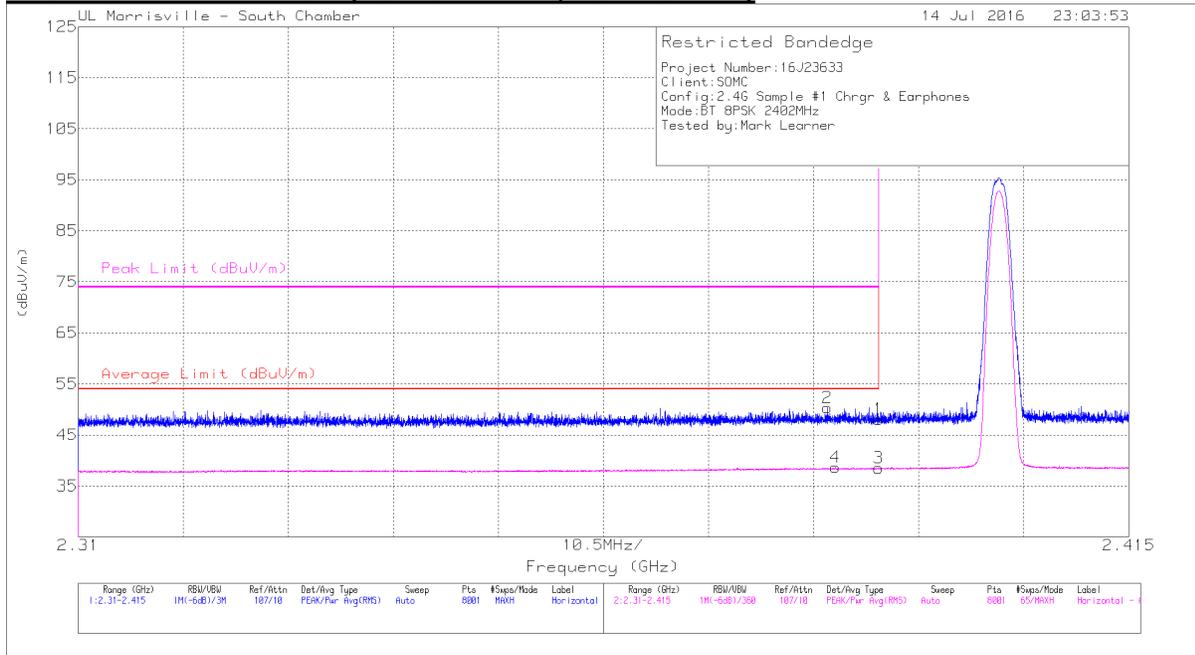
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK-U: Maximum Peak

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

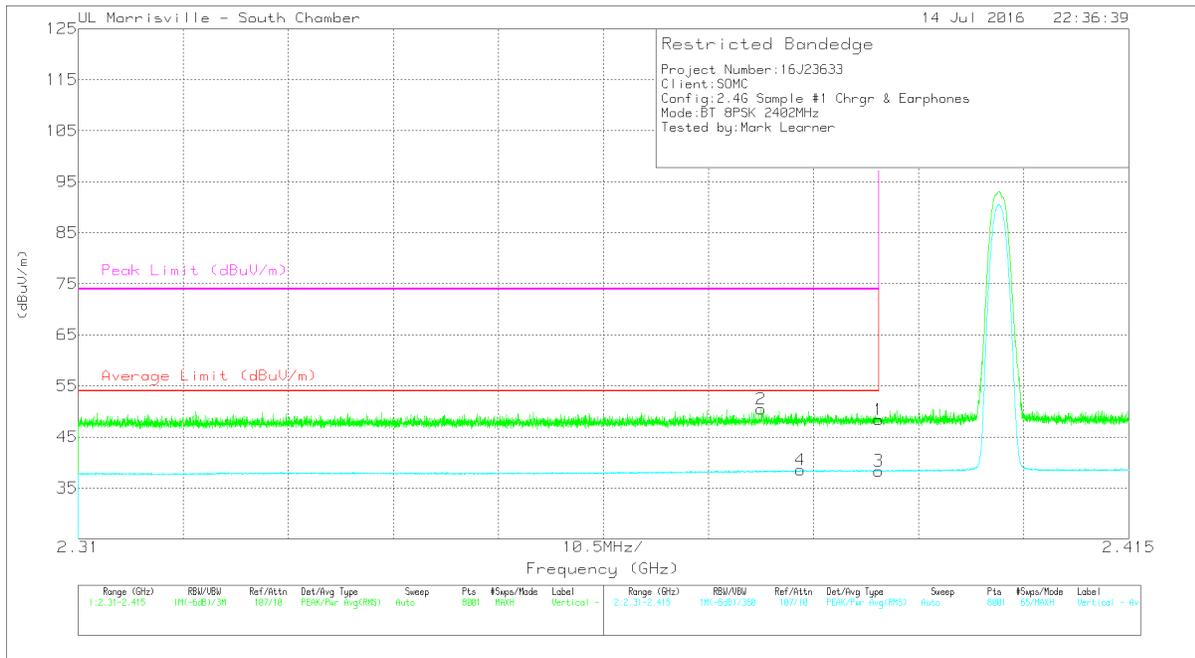
**8.2.2. ENHANCED DATA RATE 8PSK MODULATION  
 RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|-------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 40.66                | Pk   | 32.2             | -24.8                   | 48.06                      | -                      | -           | 74                  | -25.94         | 269            | 206         | H        |
| 2      | * 2.385         | 42.84                | Pk   | 32.2             | -24.7                   | 50.34                      | -                      | -           | 74                  | -23.66         | 269            | 206         | H        |
| 3      | * 2.39          | 31.1                 | V1TR | 32.2             | -24.8                   | 38.5                       | 54                     | -15.5       | -                   | -              | 269            | 206         | H        |
| 4      | * 2.386         | 31.15                | V1TR | 32.2             | -24.7                   | 38.65                      | 54                     | -15.35      | -                   | -              | 269            | 206         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

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



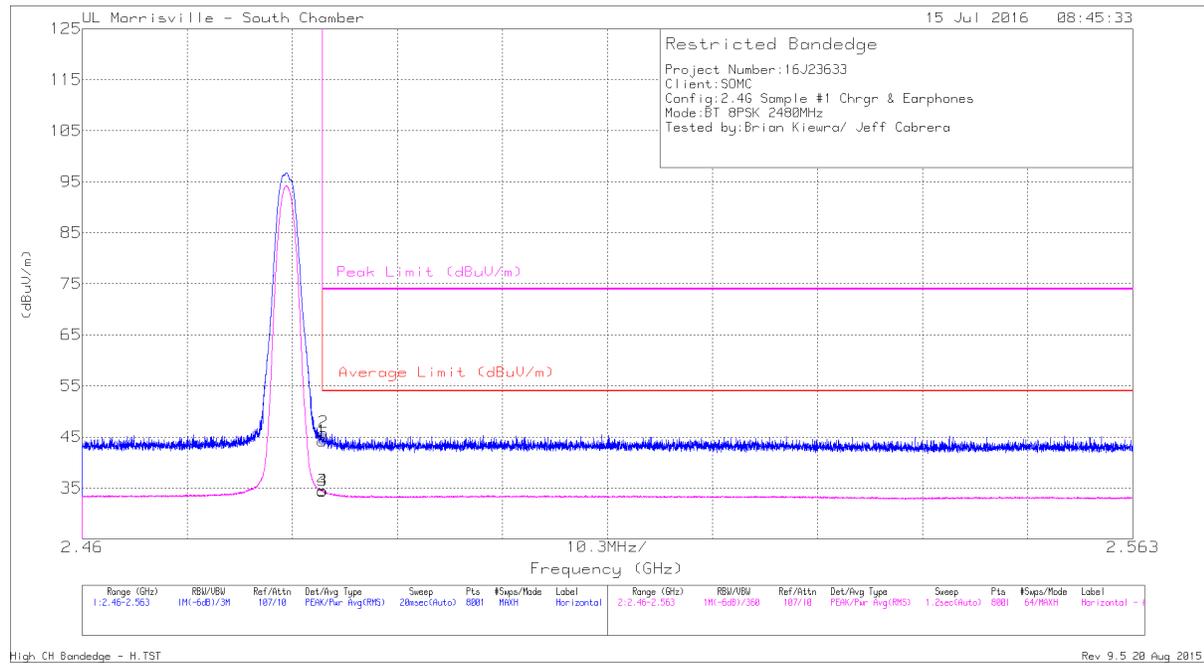
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarization |
|--------|-----------------|----------------------|------|------------------|-------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|--------------|
| 1      | * 2.39          | 40.96                | Pk   | 32.2             | -24.8                   | 48.36                      | -                      | -           | 74                  | -25.64         | 120            | 266         | V            |
| 2      | * 2.378         | 43.15                | Pk   | 32.1             | -24.8                   | 50.45                      | -                      | -           | 74                  | -23.55         | 120            | 266         | V            |
| 3      | * 2.39          | 30.94                | V1TR | 32.2             | -24.8                   | 38.34                      | 54                     | -15.66      | -                   | -              | 120            | 266         | V            |
| 4      | * 2.382         | 31.12                | V1TR | 32.1             | -24.7                   | 38.52                      | 54                     | -15.48      | -                   | -              | 120            | 266         | V            |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

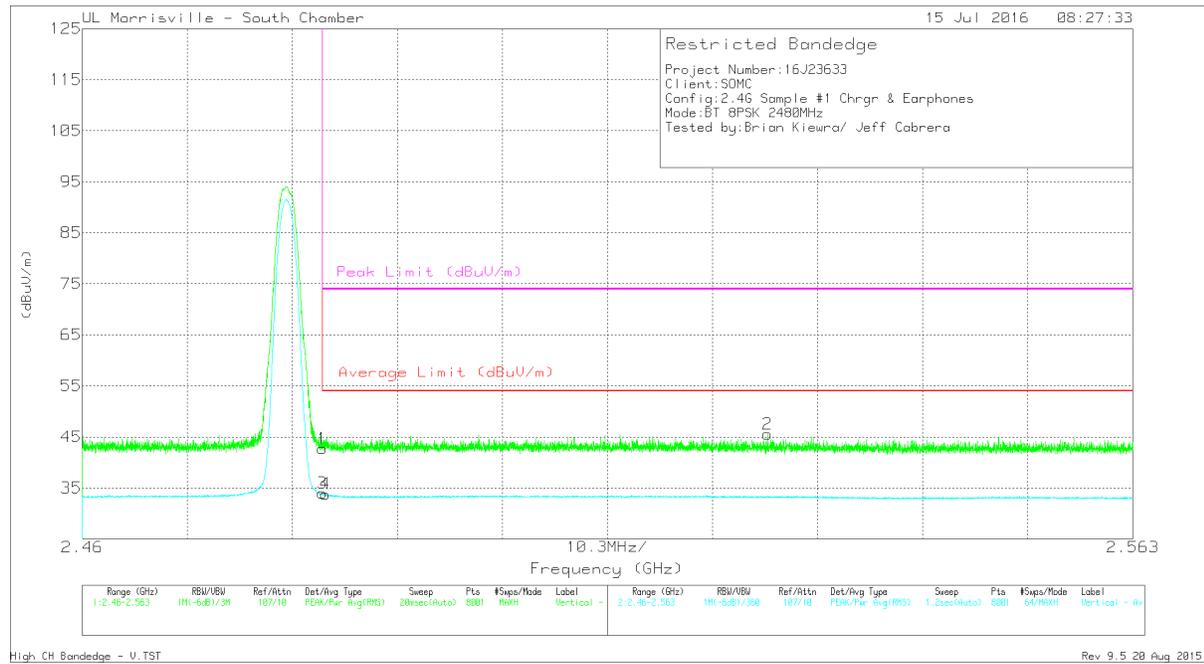
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Fitr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.484         | 36.48                | Pk   | 32.4             | -24.7                  | 44.18                      | -                      | -           | 74                  | -29.82         | 338            | 344         | H        |
| 2      | * 2.484         | 38.16                | Pk   | 32.4             | -24.7                  | 45.86                      | -                      | -           | 74                  | -28.14         | 338            | 344         | H        |
| 3      | * 2.484         | 26.73                | V1TR | 32.4             | -24.7                  | 34.43                      | 54                     | -19.57      | -                   | -              | 338            | 344         | H        |
| 4      | * 2.484         | 26.77                | V1TR | 32.4             | -24.7                  | 34.47                      | 54                     | -19.53      | -                   | -              | 338            | 344         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

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



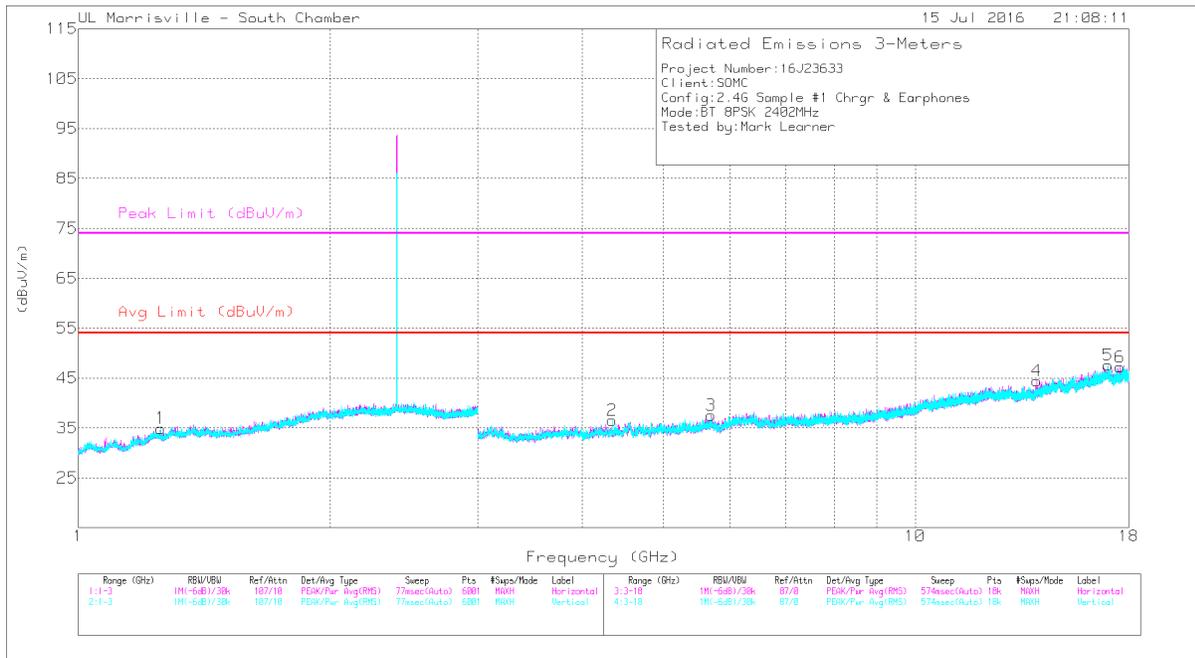
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Fitr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.484         | 34.99                | Pk   | 32.4             | -24.7                  | 42.69                      | -                      | -           | 74                  | -31.31         | 9              | 358         | V        |
| 2      | 2.527           | 37.96                | Pk   | 32.5             | -24.9                  | 45.56                      | -                      | -           | 74                  | -28.44         | 9              | 358         | V        |
| 3      | * 2.484         | 26.3                 | V1TR | 32.4             | -24.7                  | 34                         | 54                     | -20         | -                   | -              | 9              | 358         | V        |
| 4      | * 2.484         | 26.11                | V1TR | 32.4             | -24.7                  | 33.81                      | 54                     | -20.19      | -                   | -              | 9              | 358         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

**HARMONICS AND SPURIOUS EMISSIONS**



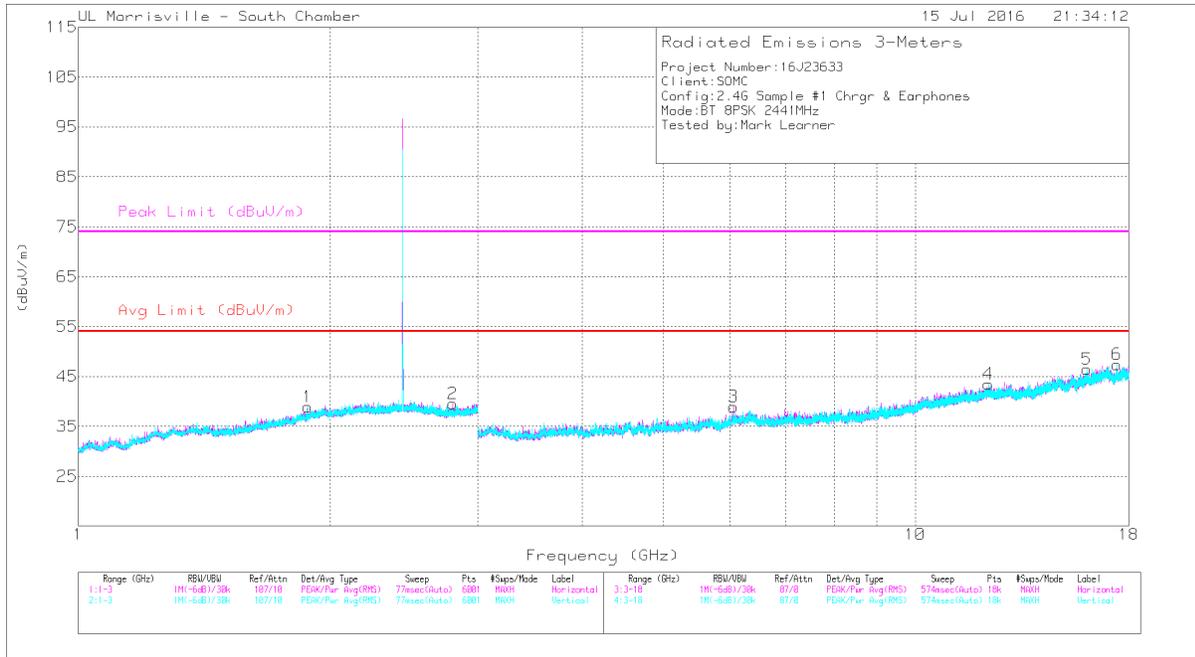
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|-------------------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 1.253         | 35.24                | PK-U | 28.7             | -23.6                   | 40.34                      | -                  | -           | 74                  | -33.66         | 1              | 198         | V        |
|        | * 1.253         | 23.56                | V1TR | 28.7             | -23.6                   | 28.66                      | 54                 | -25.34      | -                   | -              | 1              | 198         | V        |
| 2      | * 4.342         | 40.42                | PK-U | 33.6             | -32.9                   | 41.12                      | -                  | -           | 74                  | -32.88         | 1              | 198         | V        |
|        | * 4.342         | 28.96                | V1TR | 33.6             | -32.9                   | 29.66                      | 54                 | -24.34      | -                   | -              | 1              | 198         | V        |
| 3      | 5.702           | 33.23                | Pk   | 34.7             | -30.4                   | 37.53                      | -                  | -           | -                   | -              | 0-360          | 199         | H        |
| 4      | 13.983          | 30.93                | Pk   | 38.9             | -25.4                   | 44.43                      | -                  | -           | -                   | -              | 0-360          | 199         | H        |
| 5      | 16.992          | 30.97                | Pk   | 41.5             | -24.9                   | 47.57                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |
| 6      | 17.565          | 29.4                 | Pk   | 41.2             | -23.4                   | 47.2                       | -                  | -           | -                   | -              | 0-360          | 102         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK-U: Maximum Peak

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)



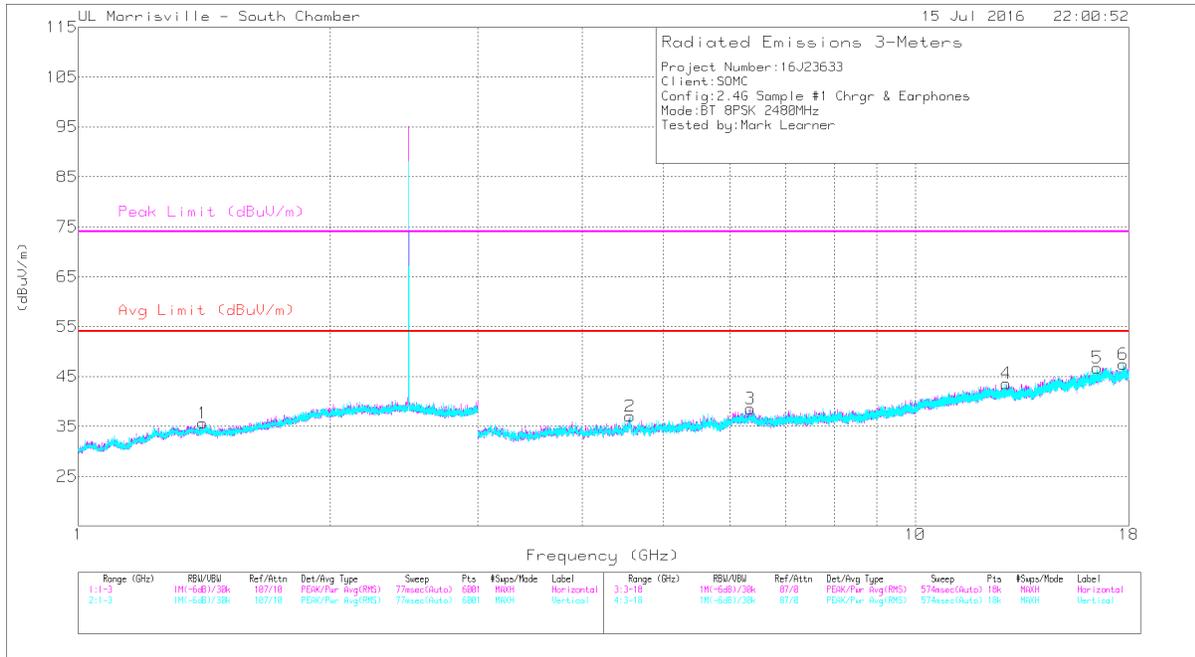
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Fitr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|------------------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
|        | * 2.801         | 38.22                | PK-U | 32.5             | -26.1                  | 44.62                      | -                  | -           | 74                  | -29.38         | 0              | 102         | H        |
|        | * 2.803         | 25.91                | V1TR | 32.5             | -26.1                  | 32.31                      | 54                 | -21.69      | -                   | -              | 0              | 102         | H        |
|        | * 12.232        | 34.57                | PK-U | 39               | -24.9                  | 48.67                      | -                  | -           | 74                  | -25.33         | 0              | 102         | V        |
|        | * 12.233        | 23.47                | V1TR | 39               | -24.9                  | 37.57                      | 54                 | -16.43      | -                   | -              | 0              | 102         | V        |
|        | * 16.039        | 35.94                | PK-U | 40.6             | -24.9                  | 51.64                      | -                  | -           | 74                  | -22.36         | 0              | 102         | V        |
|        | * 16.038        | 24.54                | V1TR | 40.6             | -24.9                  | 40.24                      | 54                 | -13.76      | -                   | -              | 0              | 102         | V        |
| 3      | 6.069           | 32.48                | Pk   | 35.3             | -28.8                  | 38.98                      | -                  | -           | -                   | -              | 0-360          | 199         | H        |
| 1      | 1.88            | 30.79                | Pk   | 30.7             | -22.6                  | 38.89                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 6      | 17.428          | 30.21                | Pk   | 41.2             | -24                    | 47.41                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK-U: Maximum Peak

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0069 (dB/m) | Amp/Cbl /Fitr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|------------------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 1.406         | 35.47                | PK-U | 28.7             | -23                    | 41.17                      | -                  | -           | 74                  | -32.83         | 0              | 102         | H        |
|        | * 1.409         | 23.85                | V1TR | 28.7             | -23                    | 29.55                      | 54                 | -24.45      | -                   | -              | 0              | 102         | H        |
| 2      | * 4.563         | 40.37                | PK-U | 34               | -32.1                  | 42.27                      | -                  | -           | 74                  | -31.73         | 0              | 198         | V        |
|        | * 4.563         | 29.02                | V1TR | 34               | -32.1                  | 30.92                      | 54                 | -23.08      | -                   | -              | 0              | 198         | V        |
| 6      | * 17.732        | 34.65                | PK-U | 41.2             | -22.6                  | 53.25                      | -                  | -           | 74                  | -20.75         | 0              | 198         | V        |
|        | * 17.729        | 23.57                | V1TR | 41.2             | -22.7                  | 42.07                      | 54                 | -11.93      | -                   | -              | 0              | 198         | V        |
| 3      | 6.355           | 32.05                | Pk   | 35.5             | -29                    | 38.55                      | -                  | -           | -                   | -              | 0-360          | 102         | H        |
| 4      | 12.84           | 29.81                | Pk   | 39.3             | -25.5                  | 43.61                      | -                  | -           | -                   | -              | 0-360          | 199         | V        |
| 5      | 16.499          | 29.65                | Pk   | 41.2             | -24.1                  | 46.75                      | -                  | -           | -                   | -              | 0-360          | 199         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

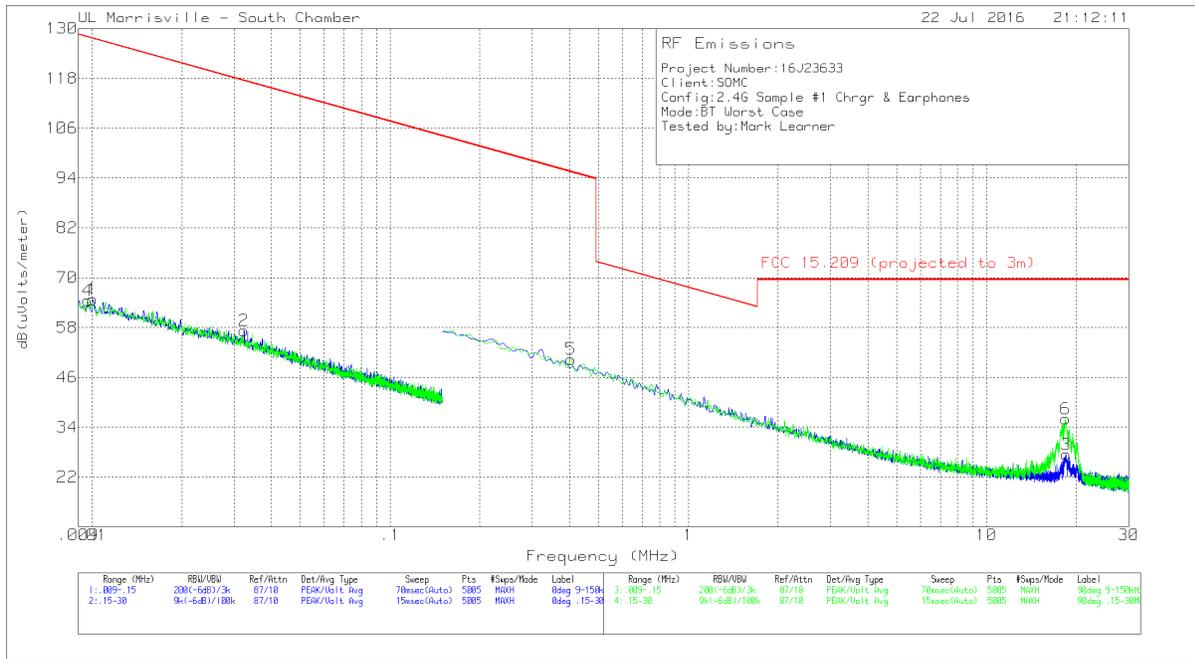
Pk - Peak detector

PK-U: Maximum Peak

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

### 8.3. WORST-CASE BELOW 1 GHz SPURIOUS EMISSIONS 9kHz to 30MHz (WORST-CASE CONFIGURATION)

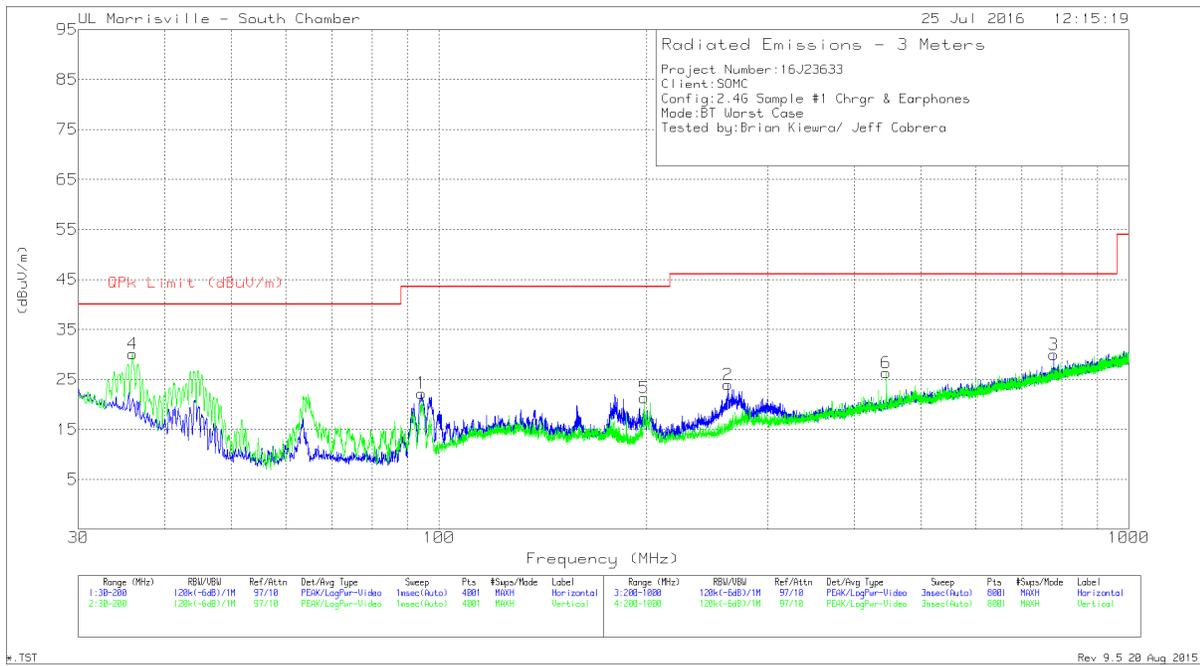
**Note:** All measurements were made at a test distance of 3 m. The limits in the plots and tabular data are the FCC/IC limits extrapolated from the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to the measurement distance to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40\*Log (specification distance / test distance).



| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AT0079 AF (dB/m) | Cbl (dB) | Corrected Reading dB(uVolts/meter) | FCC 15.209 (projected to 3m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|------------------|----------|------------------------------------|------------------------------|-------------|----------------|
| 1      | .01006          | 45.64                | Pk  | 19               | .1       | 64.74                              | 127.55                       | -62.81      | 0-360          |
| 2      | .03238          | 43.22                | Pk  | 13.9             | .1       | 57.22                              | 117.4                        | -60.18      | 0-360          |
| 3      | 18.49238        | 16.6                 | Pk  | 10.1             | .7       | 27.4                               | 69.54                        | -42.14      | 0-360          |
| 4      | .00967          | 45.17                | Pk  | 19.2             | .1       | 64.47                              | 127.89                       | -63.42      | 0-360          |
| 5      | .40351          | 38.38                | Pk  | 11.9             | .1       | 50.38                              | 95.49                        | -45.11      | 0-360          |
| 6      | 18.39097        | 25.16                | Pk  | 10.1             | .7       | 35.96                              | 69.54                        | -33.58      | 0-360          |

Pk - Peak detector

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



| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AT0074 AF (dB/m) | Amp/Cbl (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|--------------|--------------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 2      | * 263.0235      | 30.57                | Qp  | 17.2             | -29.8        | 0            | 17.97                      | 46.02              | -28.05      | 86             | 105         | H        |
| 1      | 94.2813         | 40.64                | Pk  | 12.6             | -31          | 0            | 22.24                      | 43.52              | -21.28      | 0-360          | 199         | H        |
| 3      | 778.6           | 32.19                | Pk  | 25.9             | -28.1        | 0            | 29.99                      | 46.02              | -16.03      | 0-360          | 199         | H        |
| 4      | 35.95           | 40.39                | Pk  | 21.4             | -31.7        | 0            | 30.09                      | 40                 | -9.91       | 0-360          | 102         | V        |
| 5      | 198.3           | 34.21                | Pk  | 17.3             | -30.2        | 0            | 21.31                      | 43.52              | -22.21      | 0-360          | 102         | V        |
| 6      | 445.1           | 34.2                 | Pk  | 21.1             | -29          | 0            | 26.3                       | 46.02              | -19.72      | 0-360          | 102         | V        |

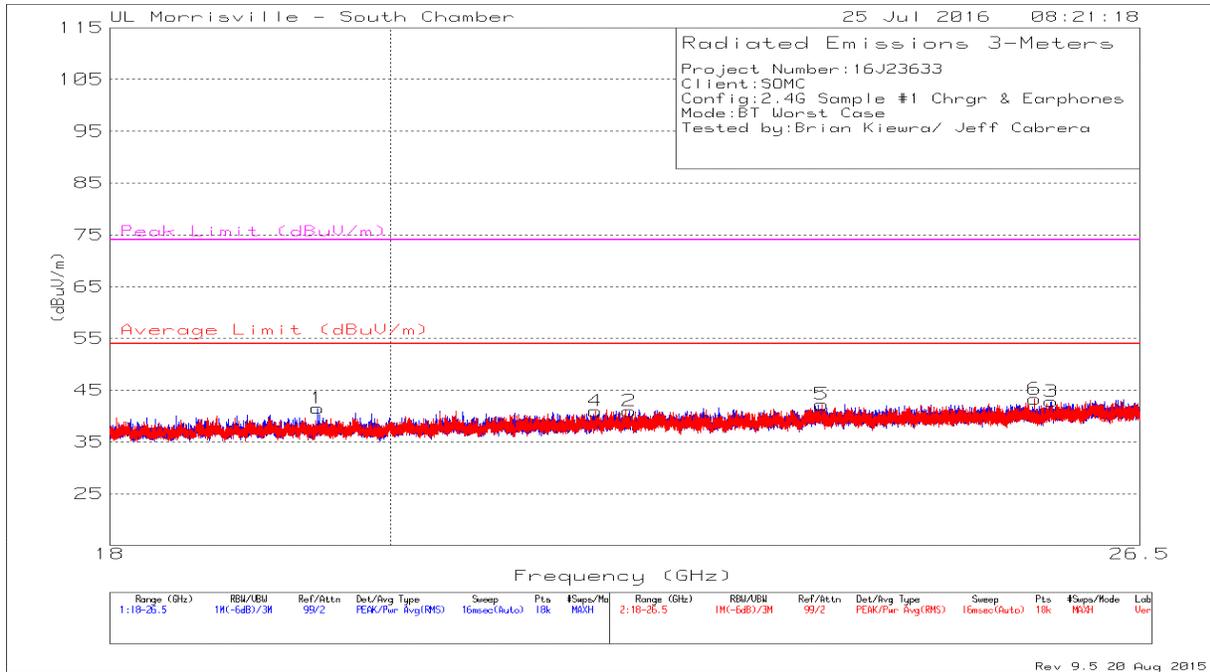
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

### 8.4. WORST-CASE ABOVE 18GHz

#### SPURIOUS EMISSIONS 18 to 26 GHz (WORST-CASE CONFIGURATION)



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF AT0076 (dB/m) | Amp/Cbl (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------|--------------|----------------------------|------------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1      | * 19.462        | 46.93                | PK-U | 32.9             | -40.5        | 39.33                      | 54                     | -14.67      | 74                  | -34.67      | 302            | 299         | H        |
|        | * 19.461        | 35.64                | V1TR | 32.9             | -40.5        | 28.04                      | 54                     | -25.96      | 74                  | -45.96      | 302            | 299         | H        |
| 2      | 21.878          | 47.29                | Pk   | 33.6             | -39.9        | 40.99                      | 54                     | -13.01      | 74                  | -33.01      | 0-360          | 199         | H        |
| 3      | 25.637          | 46.04                | Pk   | 34.7             | -37.9        | 42.84                      | 54                     | -11.16      | 74                  | -31.16      | 0-360          | 199         | H        |
| 4      | 21.602          | 47.38                | Pk   | 33.6             | -40          | 40.98                      | 54                     | -13.02      | 74                  | -33.02      | 0-360          | 299         | V        |
| 5      | 23.521          | 46.87                | Pk   | 34.4             | -39          | 42.27                      | 54                     | -11.73      | 74                  | -31.73      | 0-360          | 102         | V        |
| 6      | 25.477          | 46.88                | Pk   | 34.5             | -38.1        | 43.28                      | 54                     | -10.72      | 74                  | -30.72      | 0-360          | 252         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK-U: Maximum Peak

V1TR: VB=1/Ton, Ton is packet duration (0.0029s or 360 Hz)

## 9. AC POWER LINE CONDUCTED EMISSIONS LIMITS

FCC §15.207 (a)

| Frequency of Emission (MHz) | Conducted Limit (dBuV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-peak             | Average   |
| 0.15-0.5                    | 66 to 56*              | 56 to 46* |
| 0.5-5                       | 56                     | 46        |
| 5-30                        | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

### TEST PROCEDURE

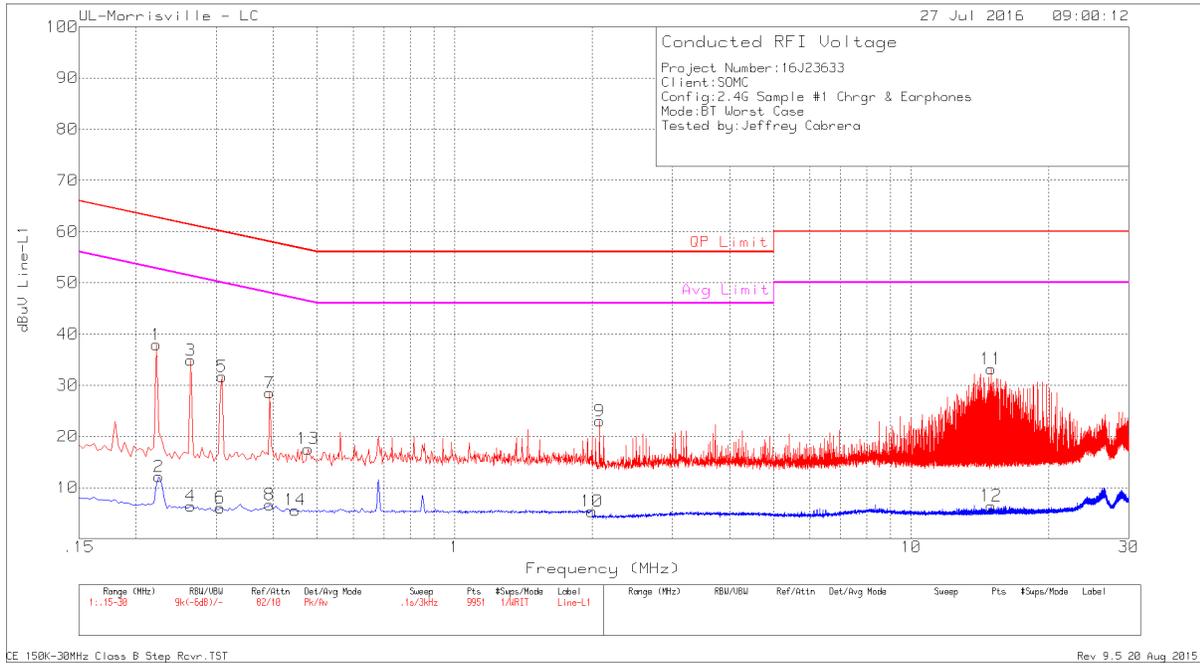
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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

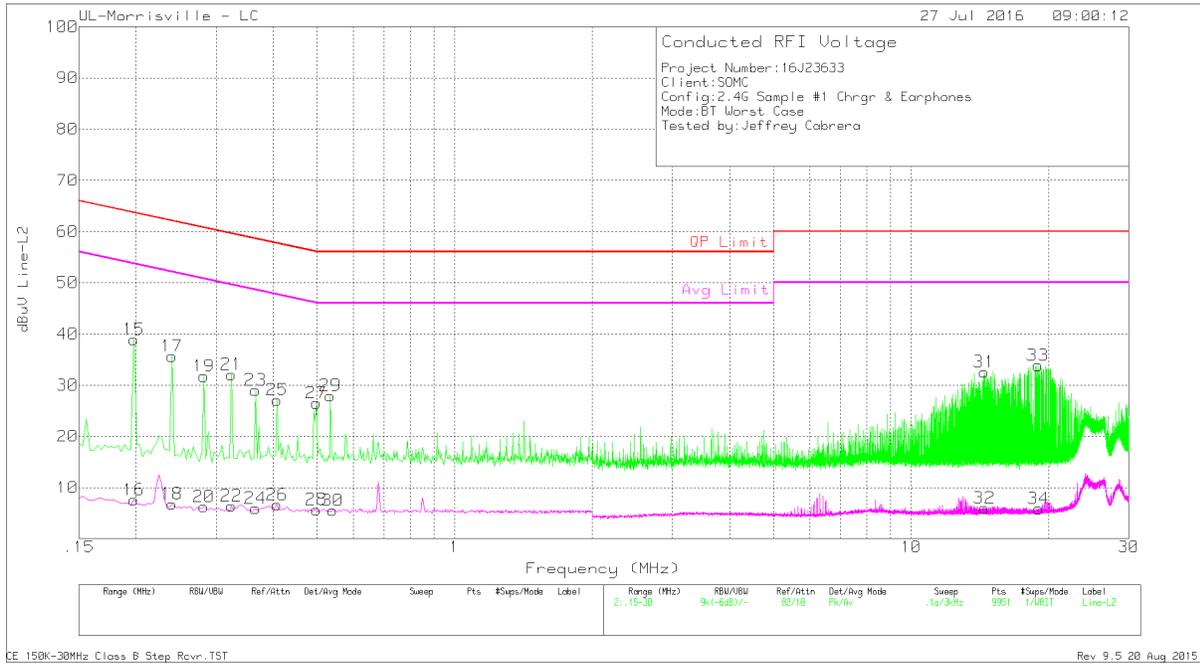
**LINE 1 RESULTS**



| Range 1: Line-L1 .15 - 30MHz |                 |                      |     |               |                 |                        |          |             |           |             |
|------------------------------|-----------------|----------------------|-----|---------------|-----------------|------------------------|----------|-------------|-----------|-------------|
| Marker                       | Frequency (MHz) | Meter Reading (dBuV) | Det | LISN VCF [dB] | Cb/Limiter (dB) | Corrected Reading dBuV | QP Limit | Margin (dB) | Avg Limit | Margin (dB) |
| 1                            | .222            | 27.78                | Pk  | .1            | 10              | 37.88                  | 62.74    | -24.86      | -         | -           |
| 2                            | .225            | 2.02                 | Av  | .1            | 10              | 12.12                  | -        | -           | 52.63     | -40.51      |
| 3                            | .264            | 24.73                | Pk  | .1            | 10              | 34.83                  | 61.3     | -26.47      | -         | -           |
| 4                            | .264            | -3.71                | Av  | .1            | 10              | 6.39                   | -        | -           | 51.3      | -44.91      |
| 5                            | .309            | 21.58                | Pk  | .1            | 10              | 31.68                  | 60       | -28.32      | -         | -           |
| 6                            | .306            | -4.04                | Av  | .1            | 10              | 6.06                   | -        | -           | 50.08     | -44.02      |
| 7                            | .393            | 18.4                 | Pk  | .1            | 10              | 28.5                   | 58       | -29.5       | -         | -           |
| 8                            | .393            | -3.45                | Av  | .1            | 10              | 6.65                   | -        | -           | 48        | -41.35      |
| 9                            | 2.076           | 12.79                | Pk  | .1            | 10.1            | 22.99                  | 56       | -33.01      | -         | -           |
| 10                           | 1.998           | -4.83                | Av  | .1            | 10.1            | 5.37                   | -        | -           | 46        | -40.63      |
| 11                           | 14.982          | 22.56                | Pk  | .2            | 10.4            | 33.16                  | 60       | -26.84      | -         | -           |
| 12                           | 14.982          | -4.18                | Av  | .2            | 10.4            | 6.42                   | -        | -           | 50        | -43.58      |
| 13                           | .477            | 7.46                 | Pk  | .1            | 10              | 17.56                  | 56.39    | -38.83      | -         | -           |
| 14                           | .447            | -4.51                | Av  | .1            | 10              | 5.59                   | -        | -           | 46.93     | -41.34      |

Pk - Peak detector  
 Av - Average detection

**LINE 2 RESULTS**



| Range 2: Line-L2 .15 - 30MHz |                 |                      |     |               |                  |                        |          |             |           |             |
|------------------------------|-----------------|----------------------|-----|---------------|------------------|------------------------|----------|-------------|-----------|-------------|
| Marker                       | Frequency (MHz) | Meter Reading (dBuV) | Det | LISN VCF [dB] | Cbl/Limiter (dB) | Corrected Reading dBuV | QP Limit | Margin (dB) | Avg Limit | Margin (dB) |
| 15                           | .198            | 28.81                | Pk  | .1            | 10               | 38.91                  | 63.69    | -24.78      | -         | -           |
| 16                           | .198            | -2.5                 | Av  | .1            | 10               | 7.6                    | -        | -           | 53.69     | -46.09      |
| 17                           | .24             | 25.57                | Pk  | .1            | 10               | 35.67                  | 62.1     | -26.43      | -         | -           |
| 18                           | .24             | -3.32                | Av  | .1            | 10               | 6.78                   | -        | -           | 52.1      | -45.32      |
| 19                           | .282            | 21.65                | Pk  | .1            | 10               | 31.75                  | 60.76    | -29.01      | -         | -           |
| 20                           | .282            | -3.84                | Av  | .1            | 10               | 6.26                   | -        | -           | 50.76     | -44.5       |
| 21                           | .324            | 21.98                | Pk  | .1            | 10               | 32.08                  | 59.6     | -27.52      | -         | -           |
| 22                           | .324            | -3.69                | Av  | .1            | 10               | 6.41                   | -        | -           | 49.6      | -43.19      |
| 23                           | .366            | 18.91                | Pk  | .1            | 10               | 29.01                  | 58.59    | -29.58      | -         | -           |
| 24                           | .366            | -4.16                | Av  | .1            | 10               | 5.94                   | -        | -           | 48.59     | -42.65      |
| 25                           | .408            | 16.99                | Pk  | .1            | 10               | 27.09                  | 57.69    | -30.6       | -         | -           |
| 26                           | .408            | -3.47                | Av  | .1            | 10               | 6.63                   | -        | -           | 47.69     | -41.06      |
| 27                           | .498            | 16.41                | Pk  | .1            | 10               | 26.51                  | 56.03    | -29.52      | -         | -           |
| 28                           | .498            | -4.4                 | Av  | .1            | 10               | 5.7                    | -        | -           | 46.03     | -40.33      |
| 29                           | .534            | 17.93                | Pk  | 0             | 10               | 27.93                  | 56       | -28.07      | -         | -           |
| 30                           | .54             | -4.48                | Av  | 0             | 10               | 5.52                   | -        | -           | 46        | -40.48      |
| 31                           | 14.481          | 22.05                | Pk  | .1            | 10.4             | 32.55                  | 60       | -27.45      | -         | -           |
| 32                           | 14.481          | -4.53                | Av  | .1            | 10.4             | 5.97                   | -        | -           | 50        | -44.03      |
| 33                           | 18.96           | 23.13                | Pk  | .2            | 10.5             | 33.83                  | 60       | -26.17      | -         | -           |
| 34                           | 19.038          | -4.85                | Av  | .2            | 10.5             | 5.85                   | -        | -           | 50        | -44.15      |

Pk - Peak detector  
 Av - Average detection