



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

802.11 a/b/g/n WLAN, BT 2.1 and RF4CE SATELLITE SETTOP BOX

MODEL NUMBER: ID:075

FCC ID: DKNCB1138

REPORT NUMBER: 13U16072-6 Revision A

ISSUE DATE: NOVEMBER 21, 2013

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NVLAP LAB CODE 200065-0

Revision History

| <u>Rev.</u> | <u>Issue Date</u> | <u>Revisions</u> | <u>Revised By</u> |
|-------------|-------------------|--------------------------------|-------------------|
| --- | 11/20/13 | Initial Issue | F. de Anda |
| A | 11/20/13 | Updated Duty cycle information | F. de Anda |

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: EHOSTAR CORPORATION
 90 INVERNESS CIRCLE EAST
 ENGLEWOOD, CO 80112, U.S.A

EUT DESCRIPTION: 802.11 a/b/g/n WLAN, BT 2.1 and RF4CE Satellite SetTop Box

MODEL: ID:075

SERIAL NUMBER: 200101R01292Y00107H (Conducted), 200101R01292Y0110H (Radiated)

DATE TESTED: SEPTEMBER 23 - NOVEMBER 15, 2013

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

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

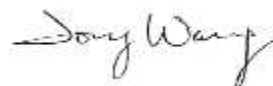
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section.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

Approved & Released For
 UL Verification Services Inc. By:



FRANCISCO DE ANDA
 WiSE Operations Manager
 UL Verification Services Inc.

Tested By:



TONY WANG
 WiSE Lab Technician
 UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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, 30 to 1000 MHz | ± 4.94 dB |

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11 a/b/g/n WLAN, BT 2.1 and RF4CE Satellite SetTop Box operates in the 2400-2483.5MHz, 5150-5250MHz and 5725-5825 bands.

5.2. MAXIMUM OUTPUT POWER

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

| | | | |
|-------------|---------------|------|------|
| 2402 - 2480 | Basic GFSK | 0.70 | 1.18 |
| 2402 - 2480 | Enhanced 8PSK | 3.55 | 2.26 |

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PiFA antenna, with a maximum gain as below table.

| Frequency (MHz) | Antenna Gain (dBi) |
|-----------------|--------------------|
| 2402 -2480 | 0.0 |

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was FCC Test Script version: SW0906 v.1.

The EUT driver software installed in the support equipment during testing was Broadcom BlueTool, rev. 1.6.4.

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports only one orientation; therefore, X orientation (Lay down) was investigated and is considered the worst case.

Worst-case data rates from the base line scans of output powers were:

GFSK: 1Mbps

8PSK: 3Mbps

The worst-case mode and channel used for 30-1000 MHz radiated and power line conducted emissions was in the blue tooth mode and channel with the highest output power.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| Support Equipment List | | | | |
|------------------------|--------------|------------|----------------|--------|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| Laptop | HP | 8570W | NA | DoC |
| AC Adapter | HP | HSTNN-DA25 | WBXYE0AAR3A168 | DoC |

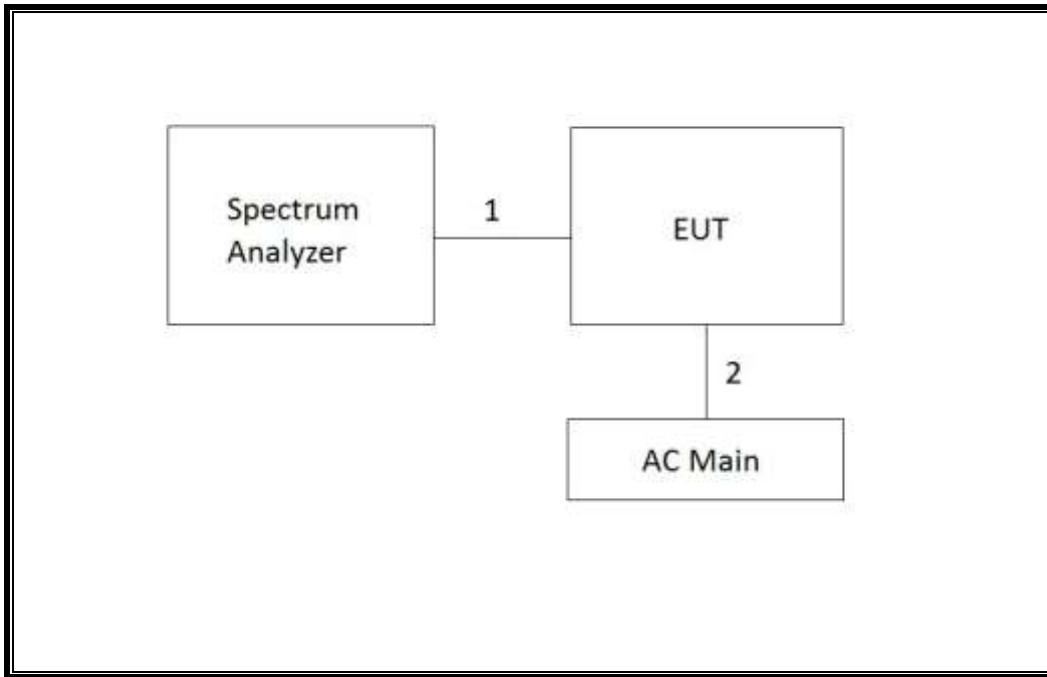
I/O CABLES (CONDUCTED TEST)

| I/O Cable List | | | | | | |
|----------------|---------|----------------------|----------------|-------------|------------------|----------------------|
| Cable No | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1 | Antenna | 1 | SMA | COAX | 0.1m | To Spectrum Analyzer |
| 2 | AC | 1 | AC | Un-Shielded | 1.5m | NA |

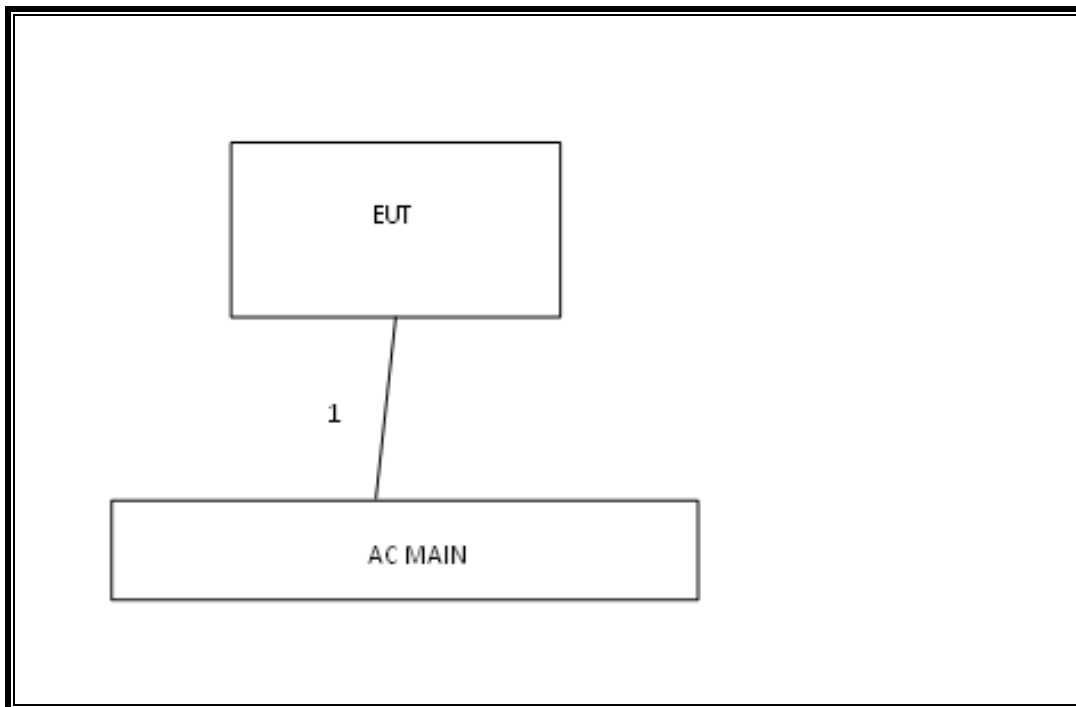
I/O CABLES (RADIATED TEST)

| I/O Cable List | | | | | | |
|----------------|------|----------------------|----------------|-------------|------------------|---------|
| Cable No | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1 | AC | 1 | AC | Un-Shielded | 1.5m | NA |

SETUP DIAGRAM FOR CONDUCTED TESTS



SETUP DIAGRAM FOR RADIATED TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

| Test Equipment List | | | | |
|-------------------------------------|----------------|------------------|--------|----------|
| Description | Manufacturer | Model | Asset | Cal Due |
| Horn Antenna 1-18GHz | ETS Lindgren | 3117 | F00132 | 02/19/14 |
| Preamplifier, 1300 MHz | Agilent / HP | 8447D | C00558 | 05/21/14 |
| Antenna, Biconolog, 30MHz-1 GHz | Sunol Sciences | JB3 | F00027 | 03/07/14 |
| LISN, 30 MHz | FCC | LISN-50/250-25-2 | N02625 | 01/14/14 |
| Peak / Average Power Sensor | Agilent / HP | E9323A | F00026 | 04/03/14 |
| P-Series single channel Power Meter | Agilent / HP | N1911A | F00153 | 04/05/14 |
| Spectrum Analyzer, 44GHz | Agilent | N9030A | F00129 | 02/22/14 |
| PreAmplifier, 1-26.5GHz | Agilent | 8449B | F00167 | 03/23/14 |
| Antenna, Horn, 26.5 GHz | ARA | SWH-28 | C01015 | 04/23/14 |
| EMI Test Receiver, 30 MHz | R & S | ESHS 20 | N02396 | 08/09/14 |

7. ANTENNA PORT TEST RESULTS

7.1. BASIC DATA RATE GFSK MODULATION

7.1.1. ON TIME, DUTY CYCLE

LIMITS

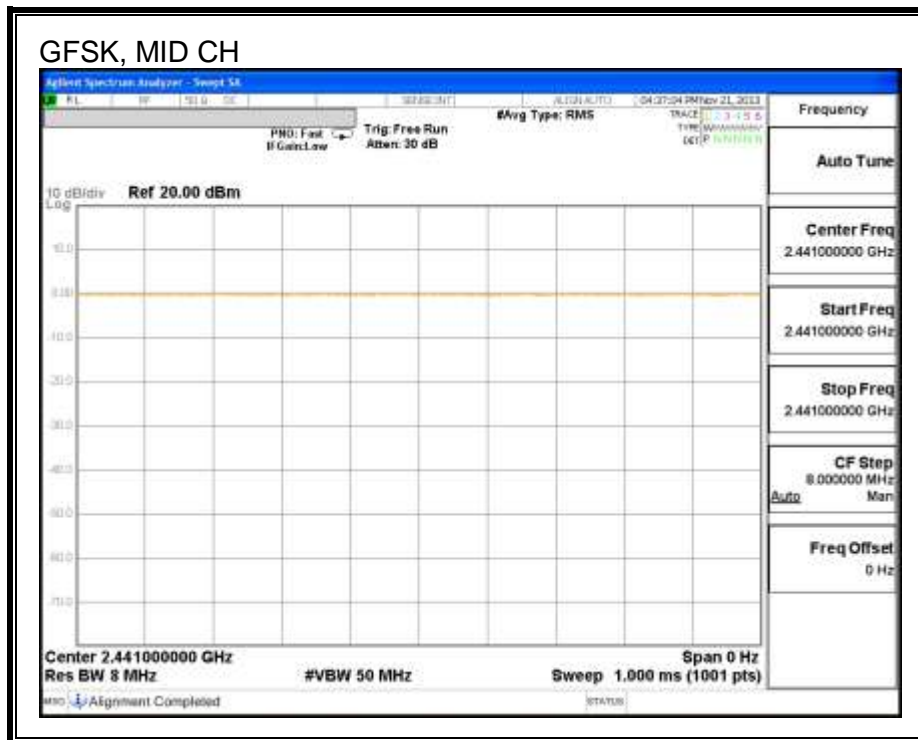
None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

RESULTS

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/T Minimum VBW (kHz) |
|----------------|------------------------|------------------|-----------------------------|----------------------|---|-----------------------------|
| 2.4 GHz | | | | | | |
| | 1.00 | 1.00 | 1.000 | 100.0% | 0.00 | 0.010 |



7.1.2. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

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

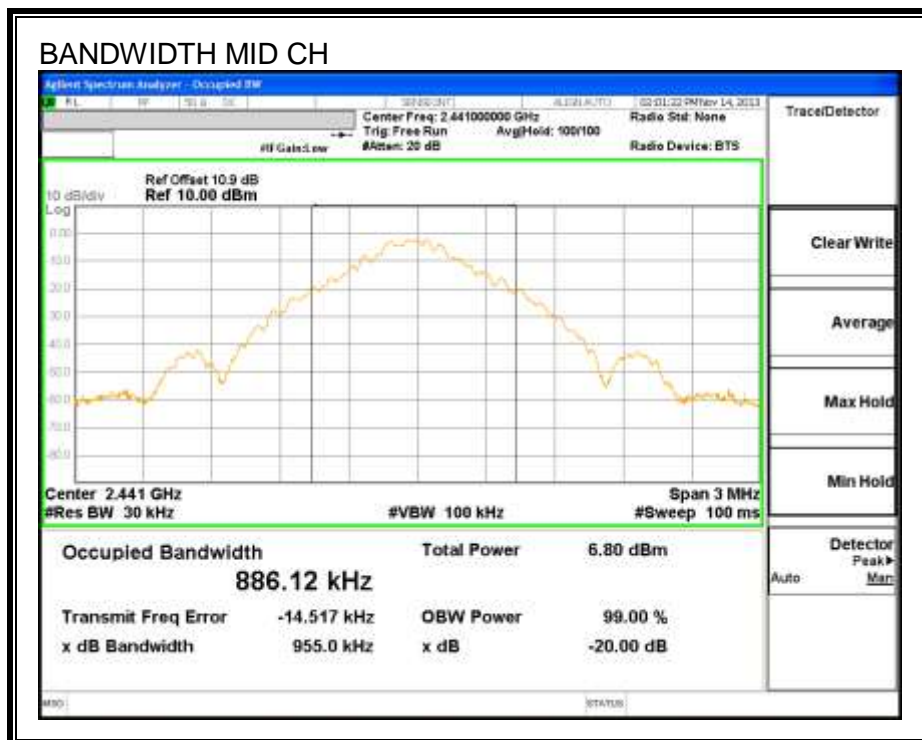
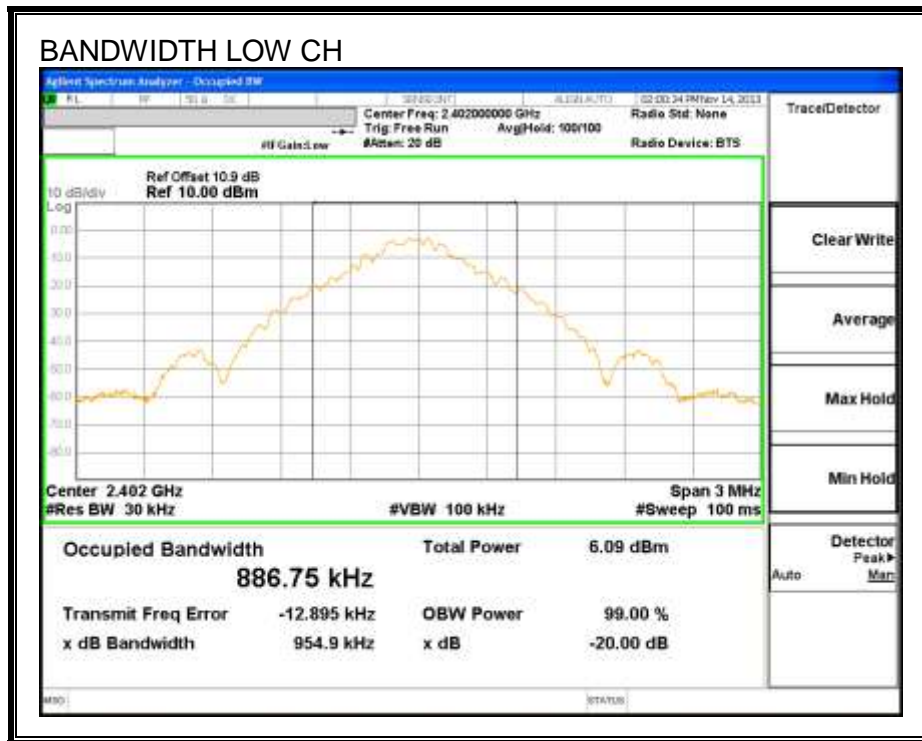
RESULTS

GFSK

| Channel | Frequency (MHz) | 20 dB Bandwidth (KHz) | 99% Bandwidth (KHz) |
|---------|--------------------|--------------------------|------------------------|
| Low | 2402 | 954.90 | 893.22 |
| Middle | 2441 | 955.00 | 866.35 |
| High | 2480 | 956.20 | 870.76 |

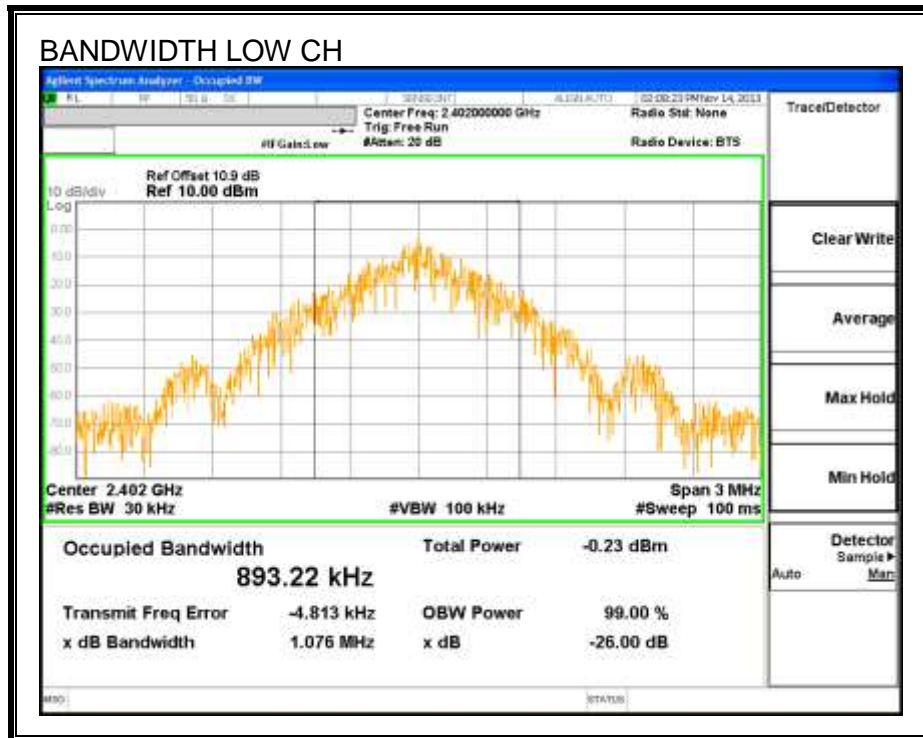
20 dB AND 99% BANDWIDTH

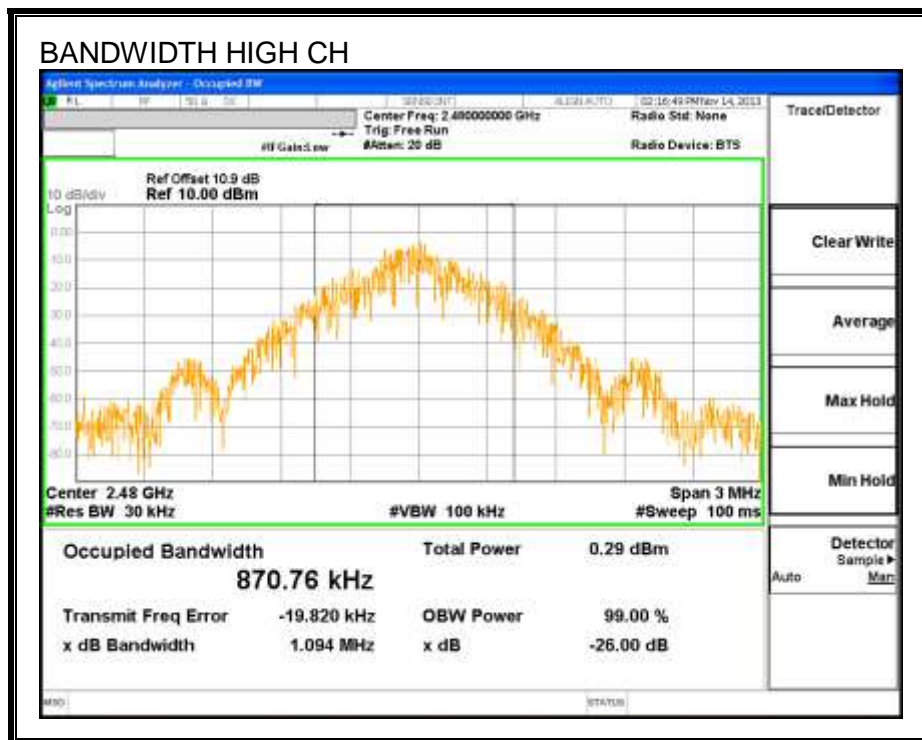
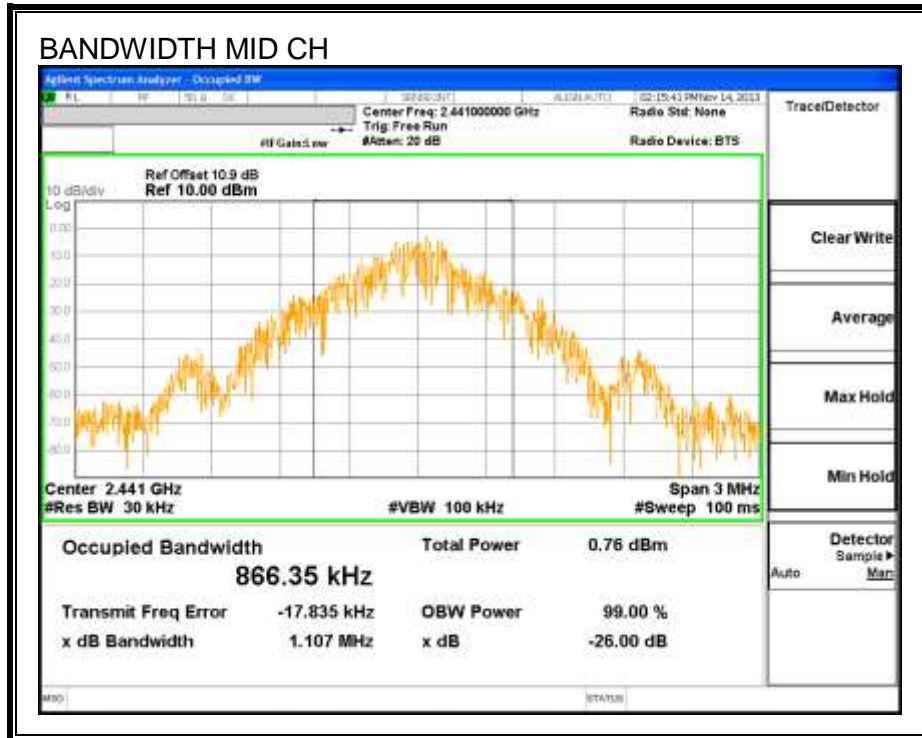
GFSK 20 dB BANDWIDTH





GFSK 99% BANDWIDTH





7.1.3. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

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

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

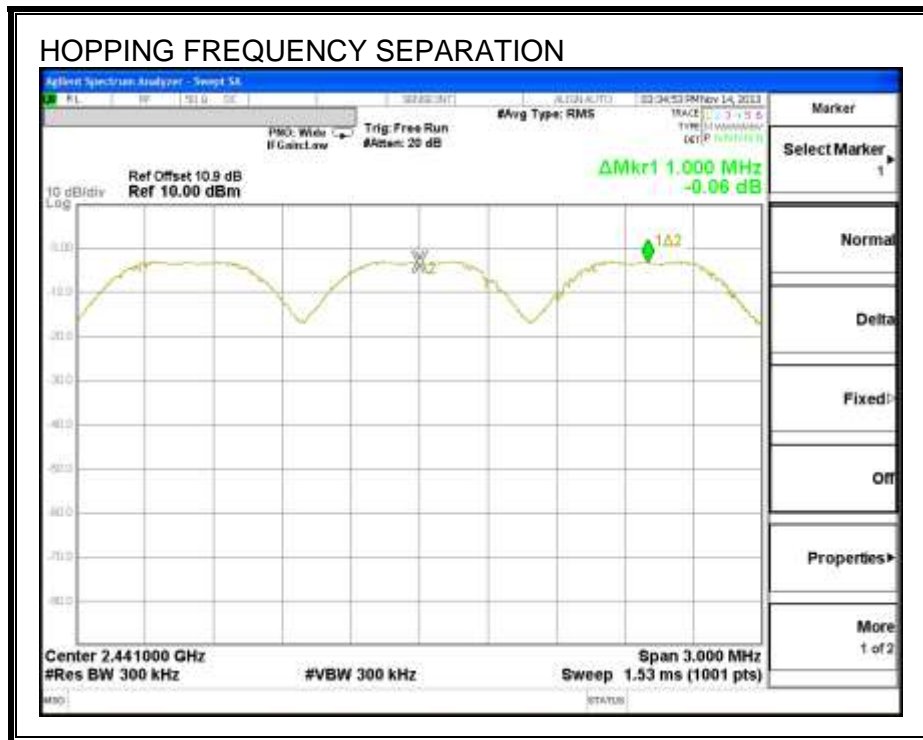
TEST PROCEDURE

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

RESULTS

HOPPING FREQUENCY SEPARATION

GFSK



7.1.4. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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

TEST PROCEDURE

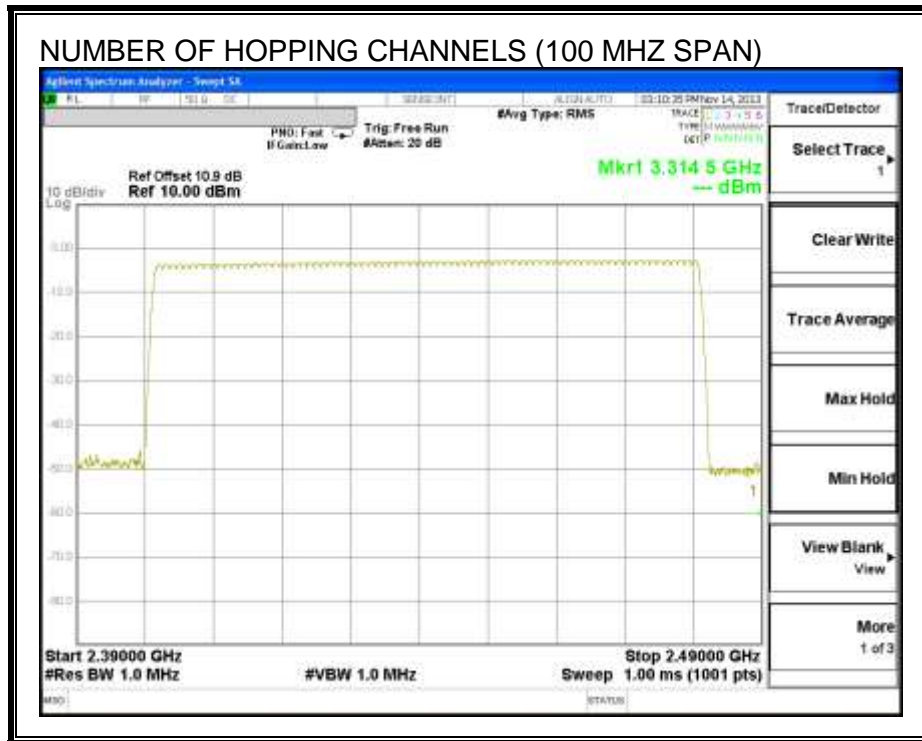
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

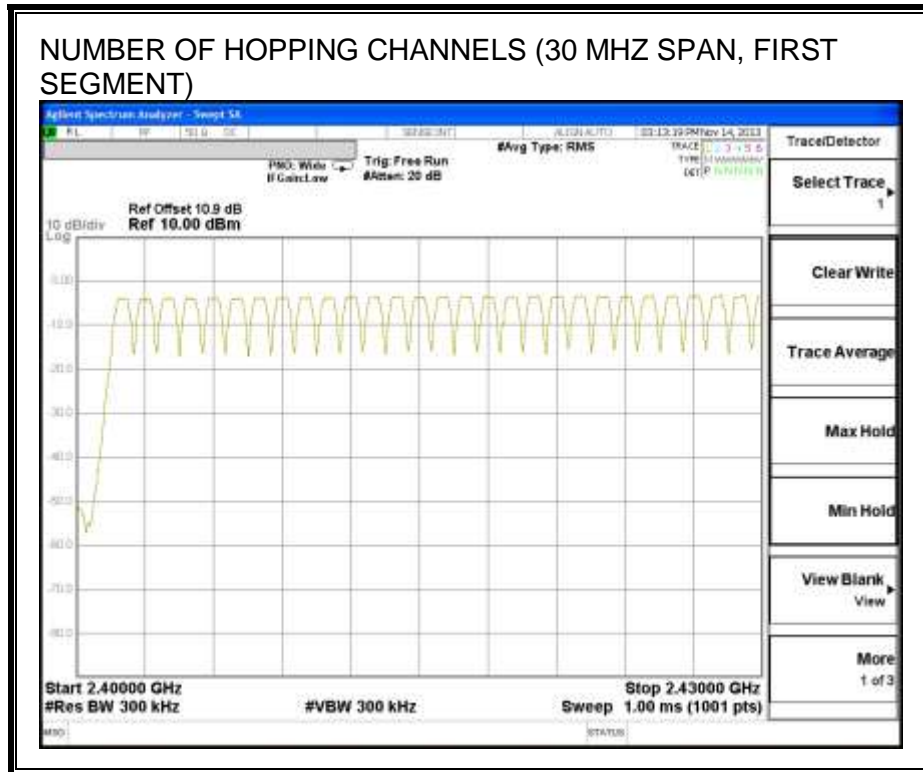
Normal Mode: 79 Channels observed.

GFSK

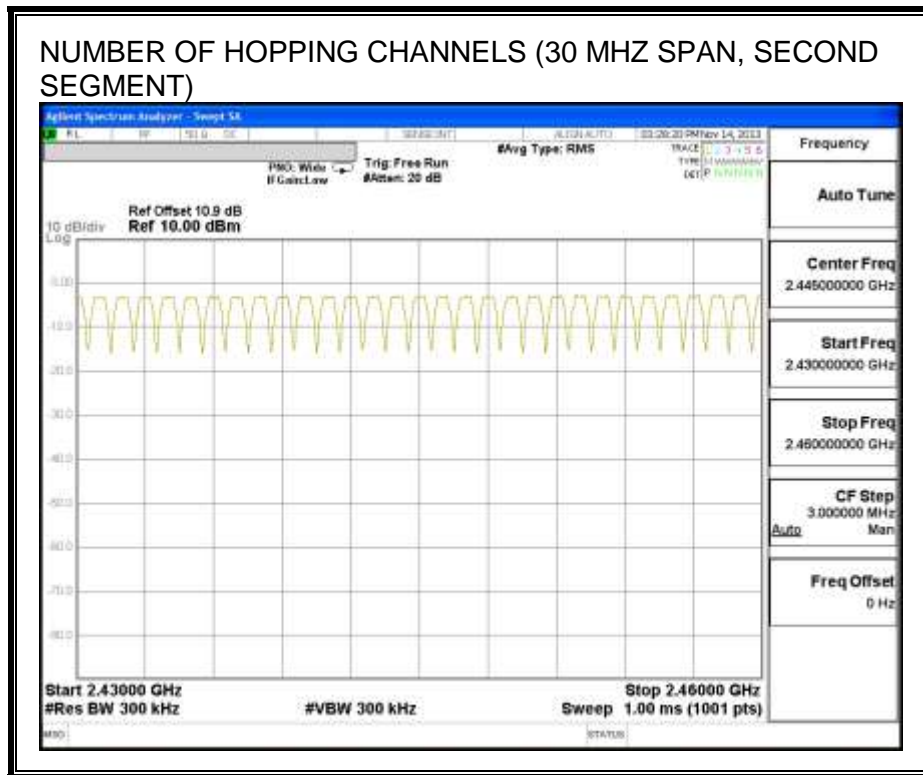
NUMBER OF HOPPING CHANNELS



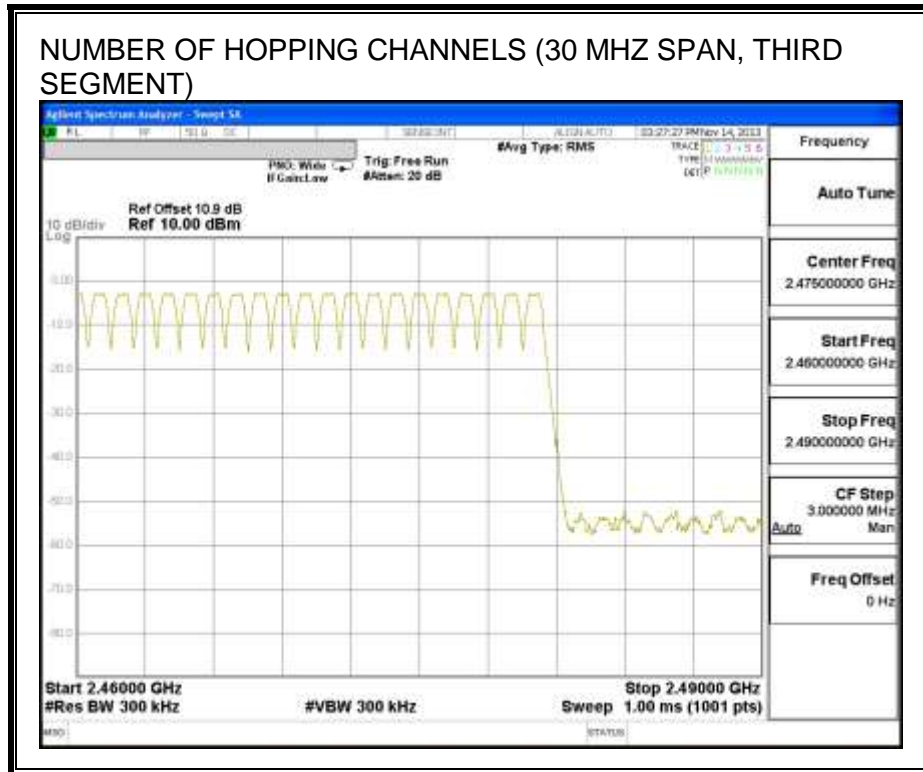
NUMBER OF HOPPING CHANNELS (30 MHz SPAN, FIRST SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHz SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHz SPAN, THIRD SEGMENT)



7.1.5. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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

TEST PROCEDURE

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

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

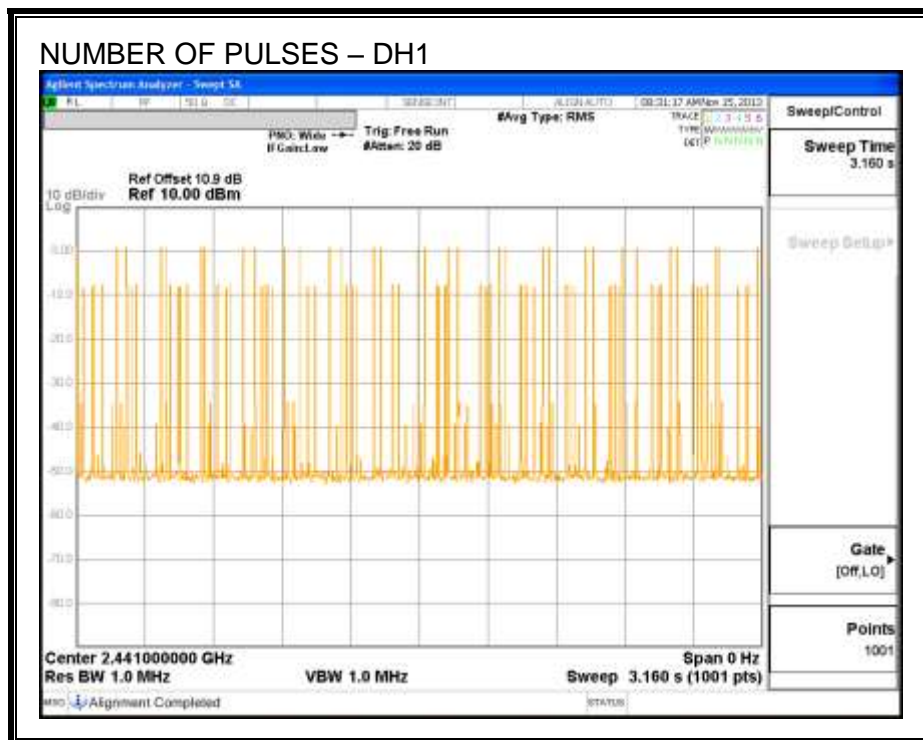
RESULTS

| DH Packet | Pulse Width (msec) | Number of Pulses in 3.16 seconds | Average Time of Occupancy (sec) | Limit (sec) | Margin (sec) |
|-----------|--------------------|----------------------------------|---------------------------------|-------------|--------------|
| GFSK Mode | | | | | |
| DH1 | 0.390 | 31 | 0.121 | 0.4 | -0.279 |
| DH3 | 1.658 | 15 | 0.249 | 0.4 | -0.151 |
| DH5 | 2.895 | 13 | 0.376 | 0.4 | -0.024 |

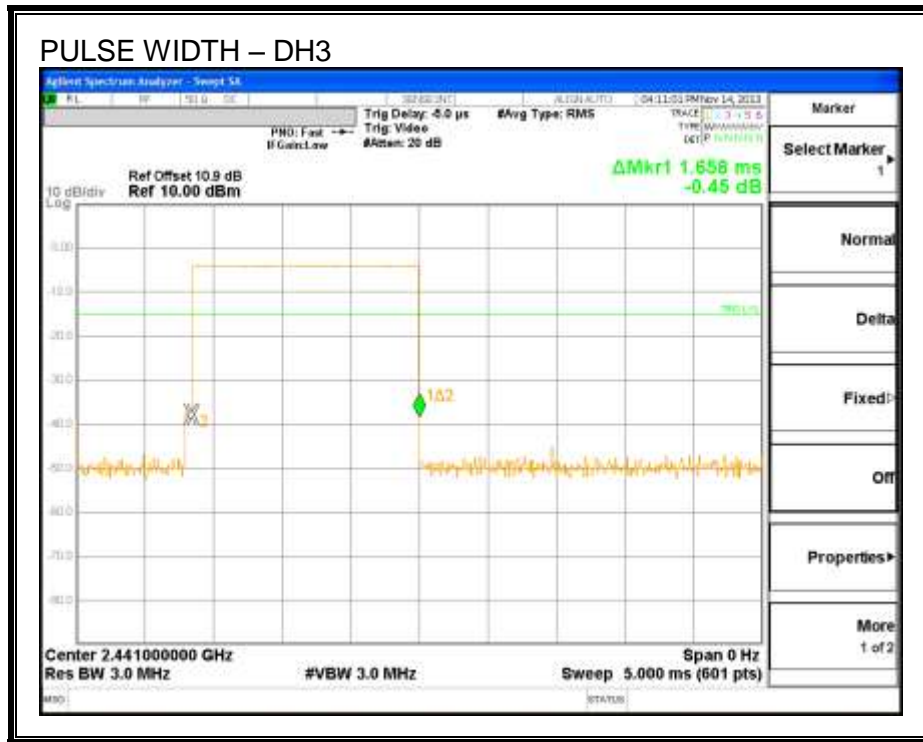
PULSE WIDTH - DH1



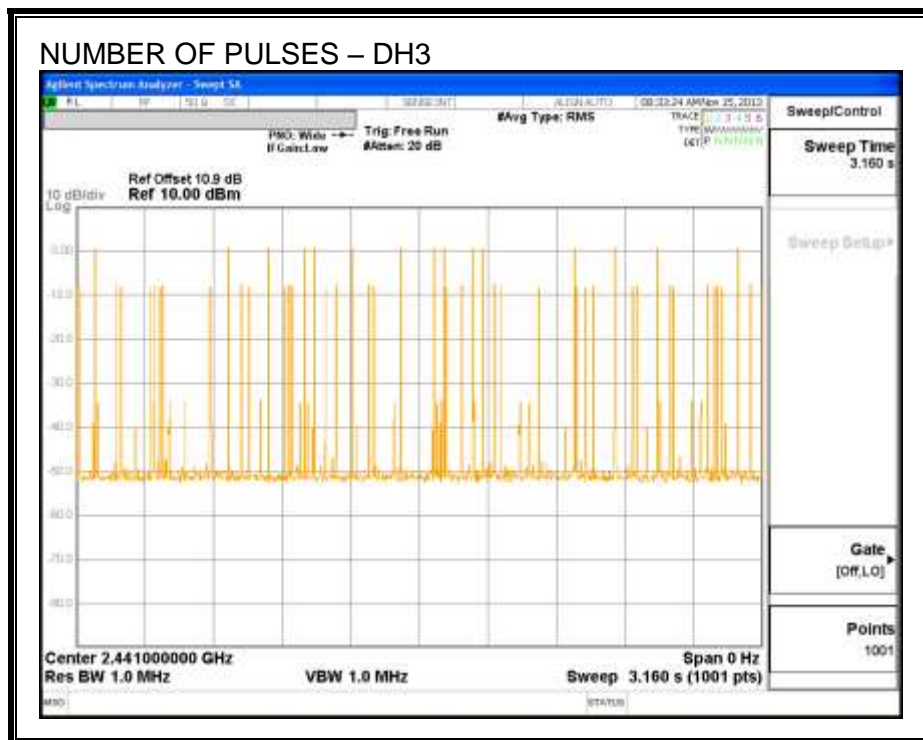
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH1



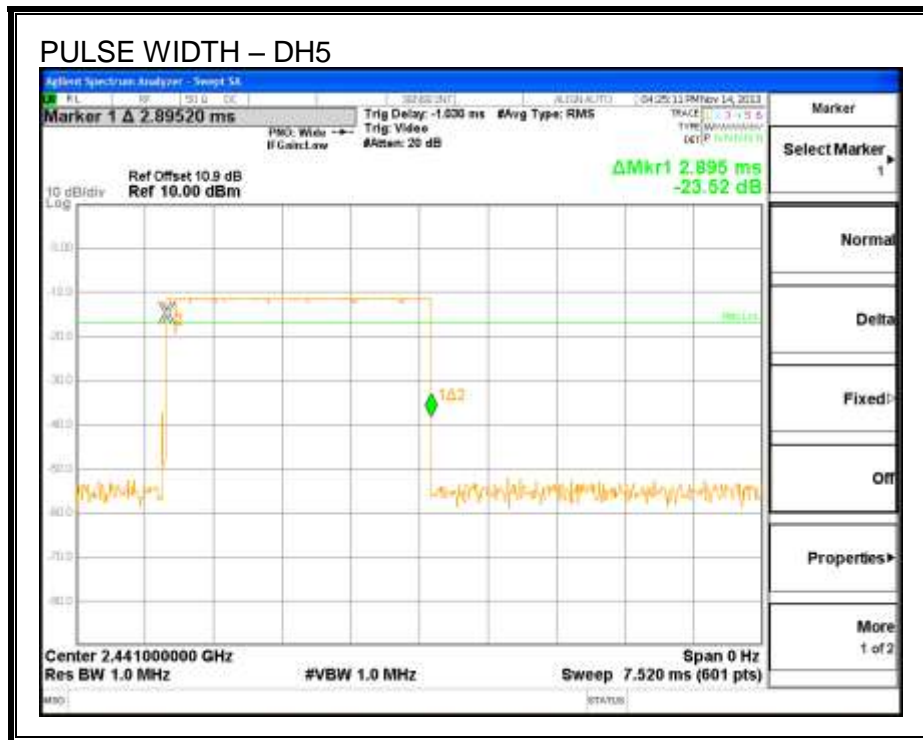
PULSE WIDTH – DH3



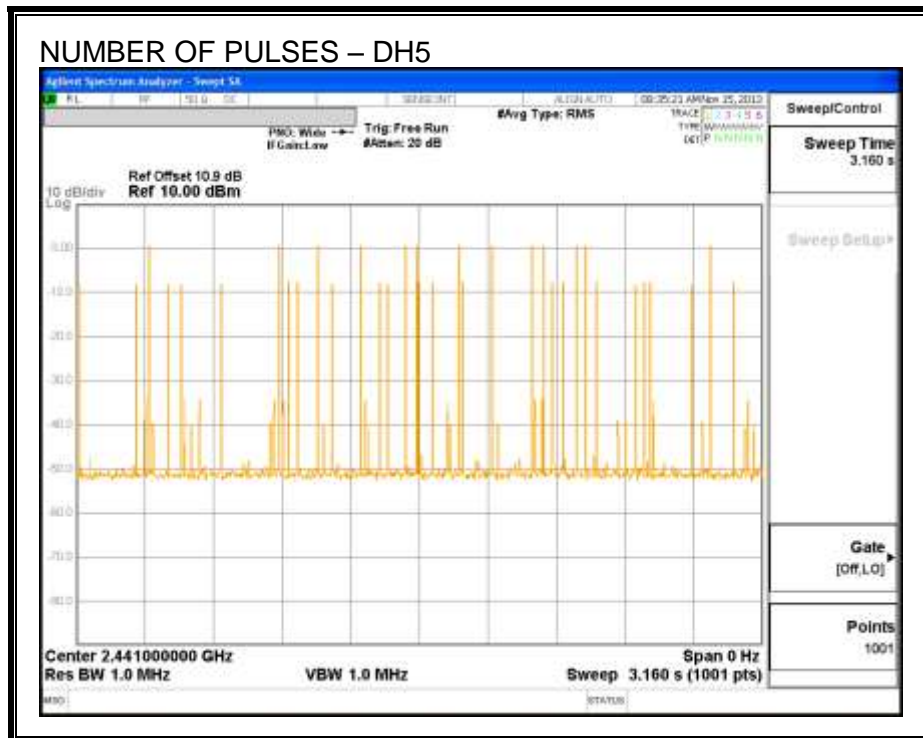
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



7.1.6. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

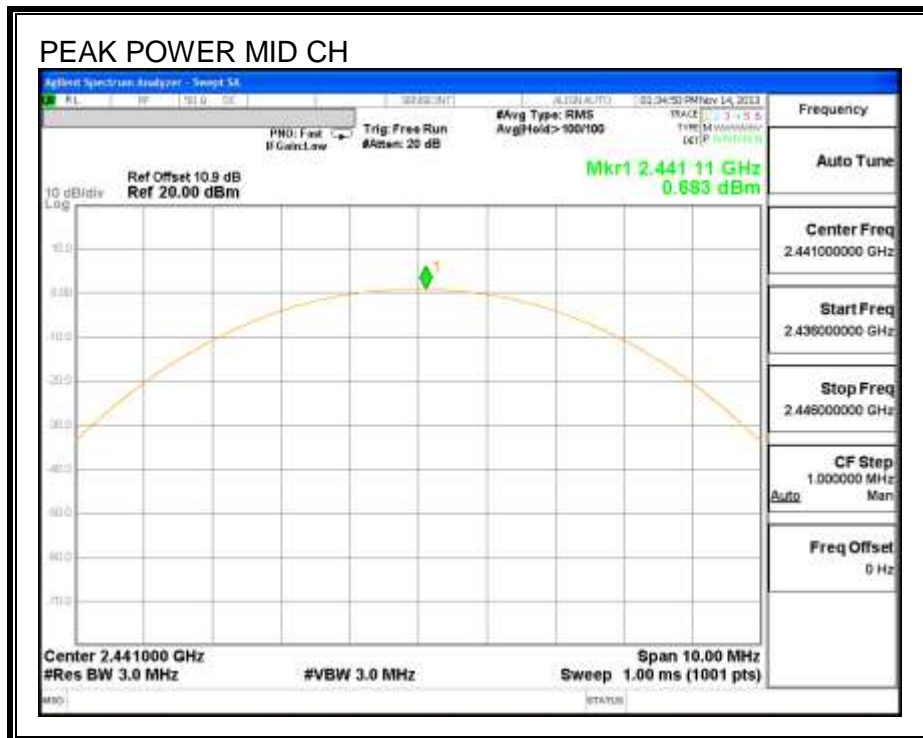
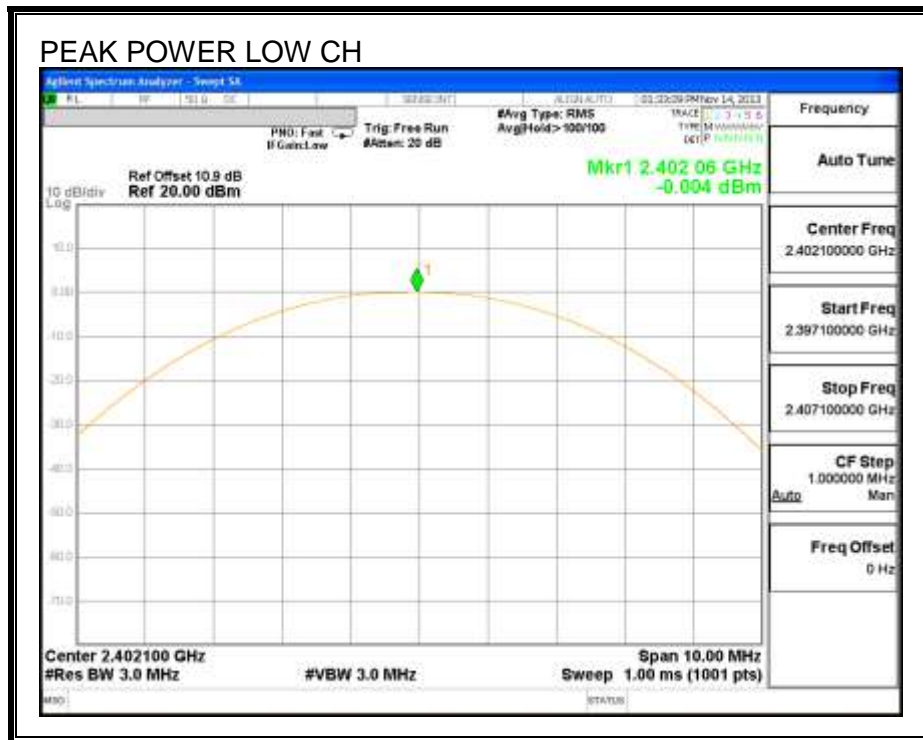
TEST PROCEDURE

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

RESULTS

| Channel | Frequency (MHz) | Output Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|-----------------------|----------------|----------------|
| Low | 2402 | 0.00 | 30 | -30.00 |
| Middle | 2441 | 0.68 | 30 | -29.32 |
| High | 2480 | 0.70 | 30 | -29.30 |

OUTPUT POWER



7.1.7. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.9 dB (including 10 dB pad and 0.9 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Average Power (dBm) |
|---------|--------------------|------------------------|
| Low | 2402 | -0.23 |
| Middle | 2441 | 0.39 |
| High | 2480 | 0.41 |

7.1.8. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

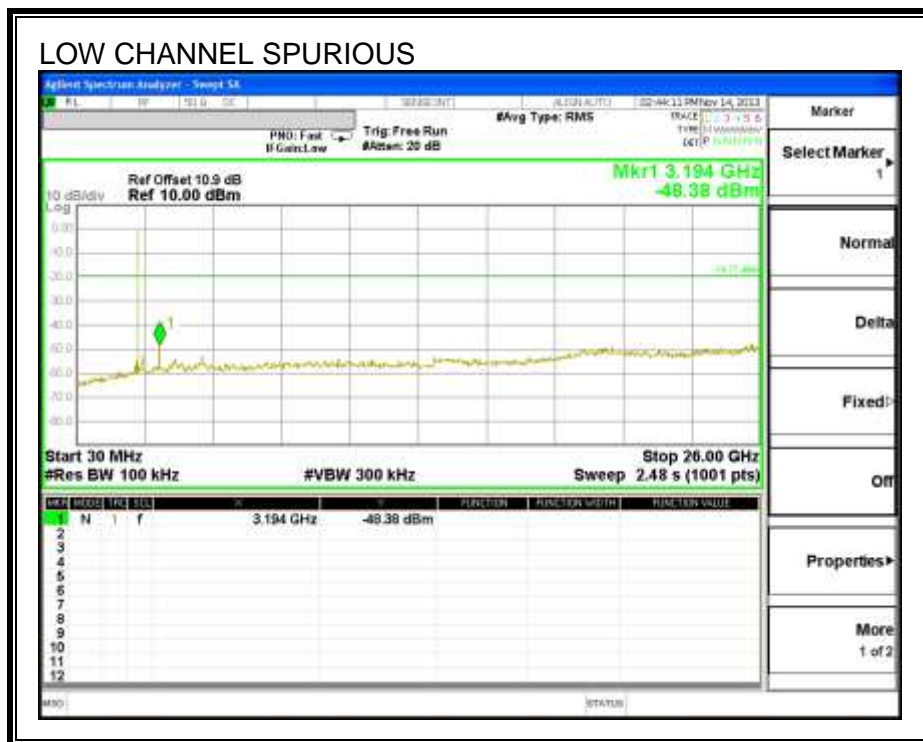
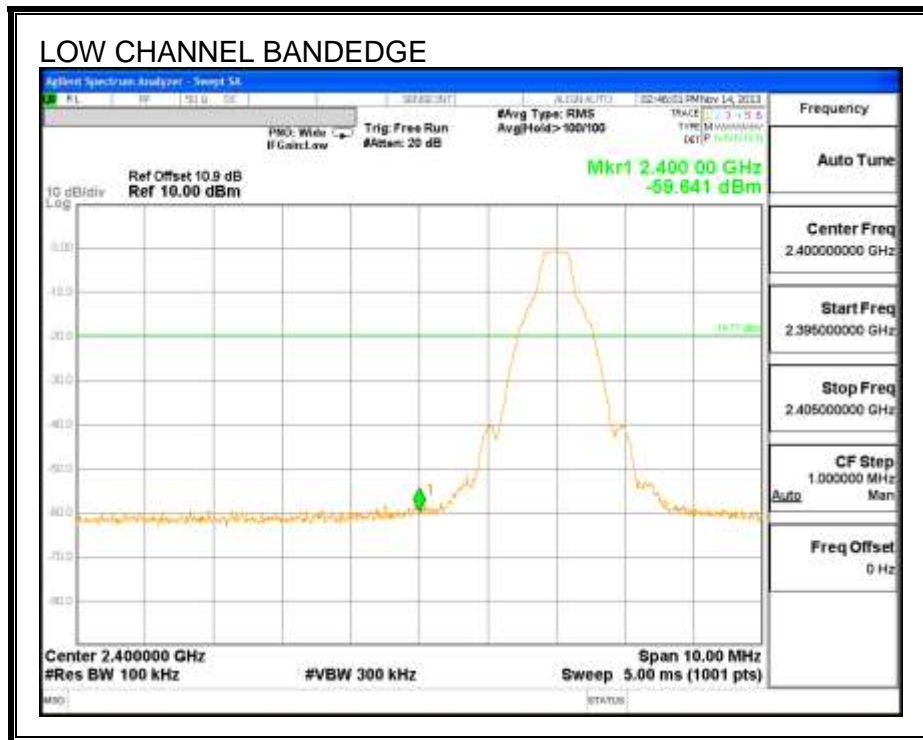
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

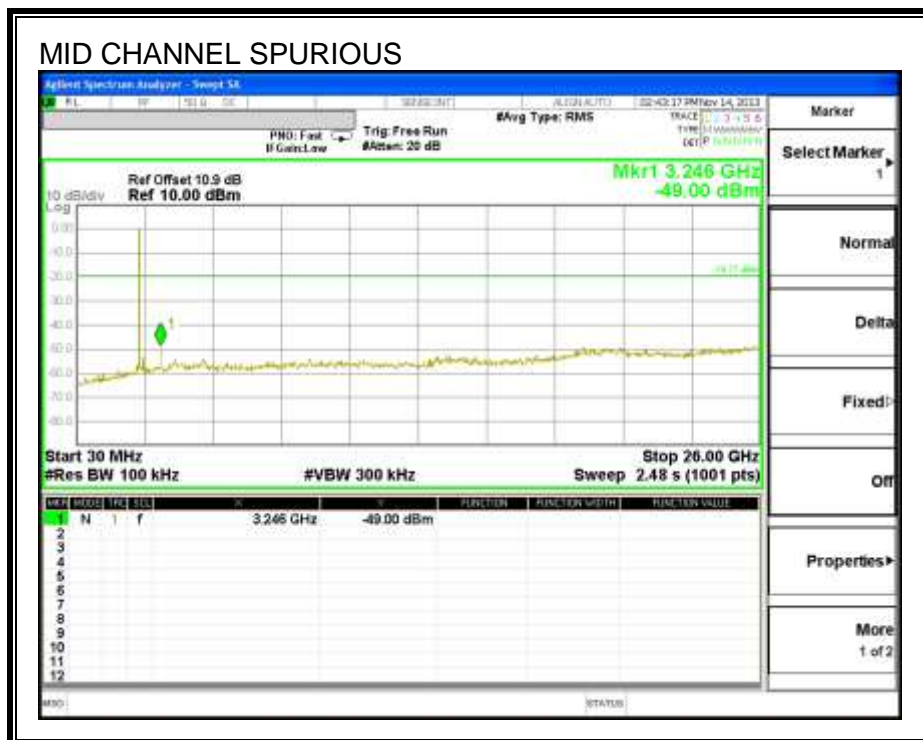
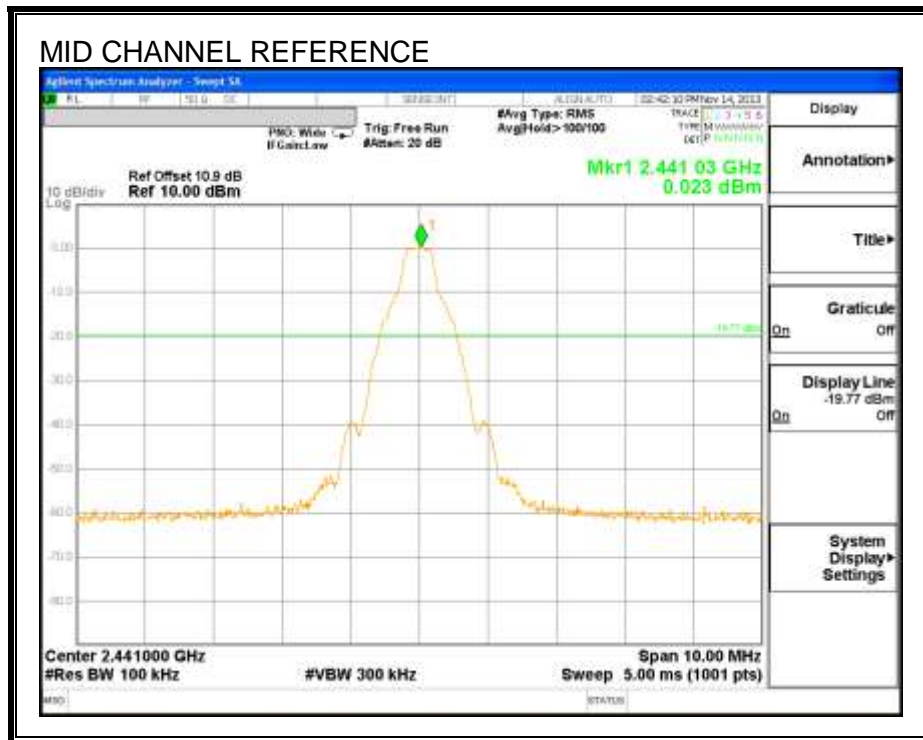
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

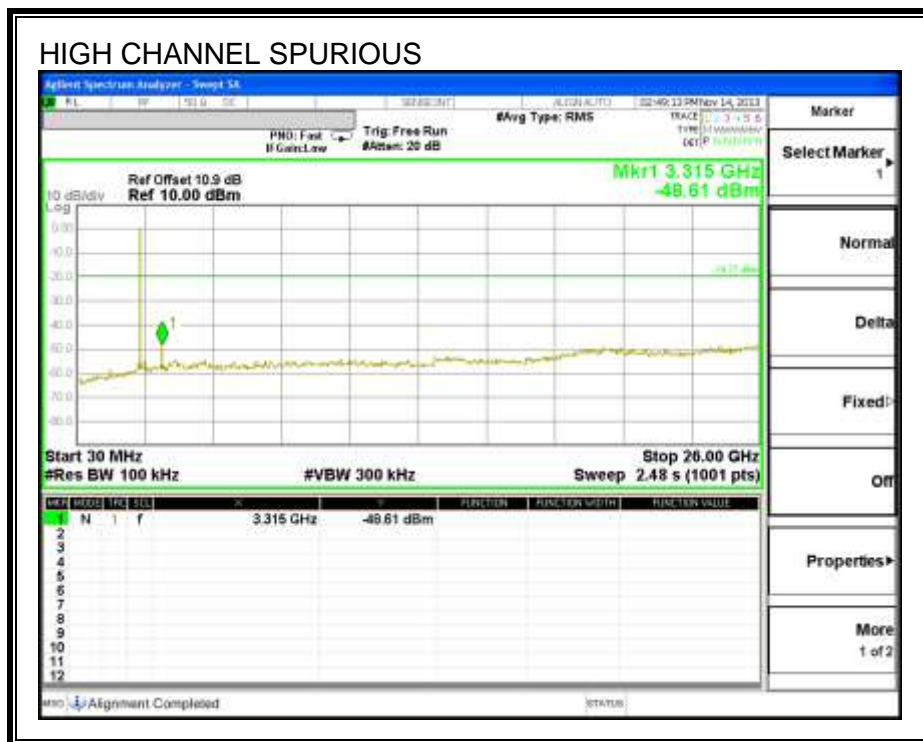
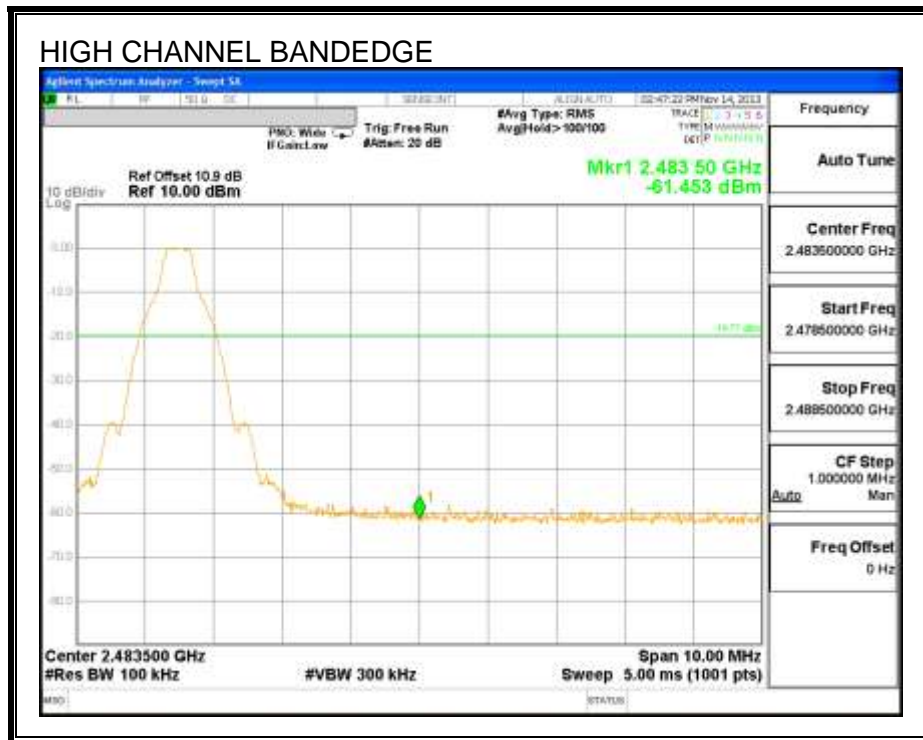
SPURIOUS EMISSIONS, LOW CHANNEL



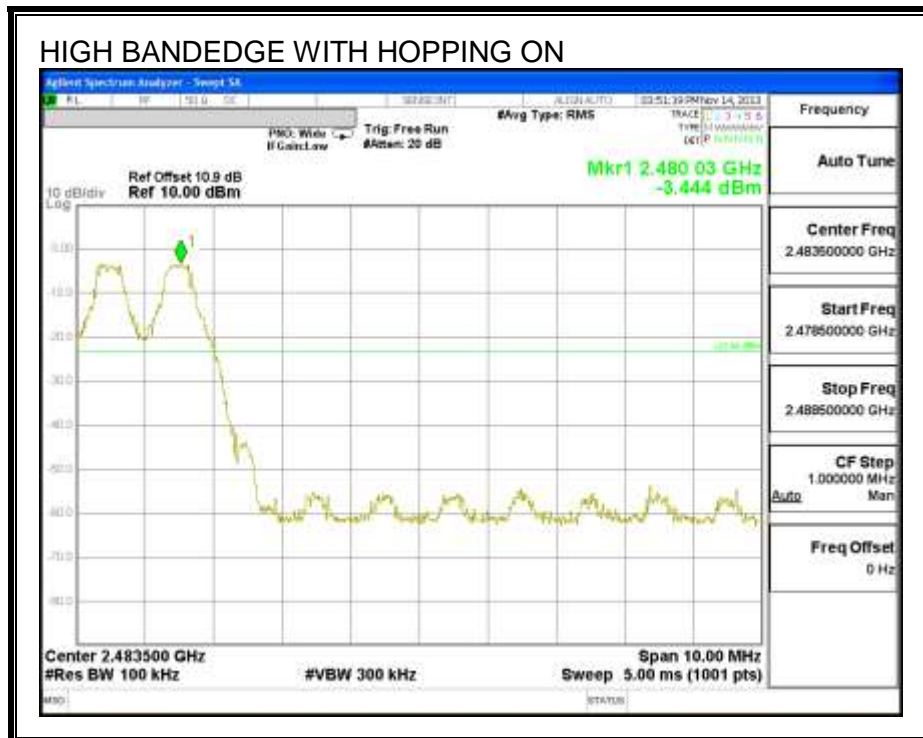
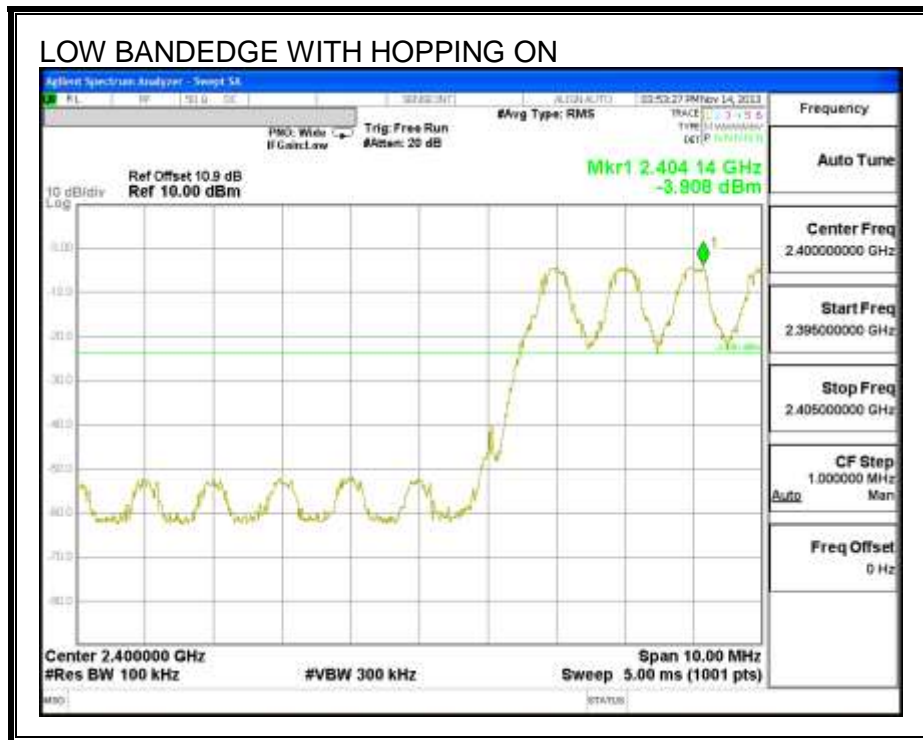
SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



SPURIOUS BANDEGE EMISSIONS WITH HOPPING ON



7.2. ENHANCED DATA RATE QPSK MODULATION

7.2.1. ON TIME, DUTY CYCLE

LIMITS

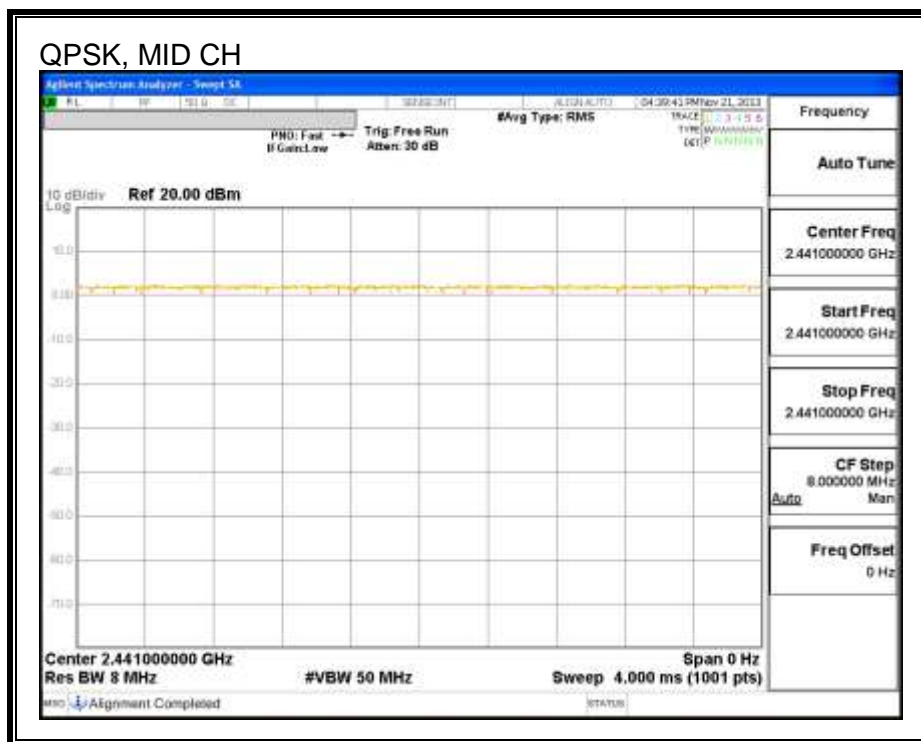
None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

RESULTS

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/T Minimum VBW (kHz) |
|----------------|------------------------|------------------|-----------------------------|----------------------|---|-----------------------------|
| 2.4 GHz | | | | | | |
| | 1.00 | 1.00 | 1.000 | 100.0% | 0.00 | 0.010 |



7.2.1. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

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.

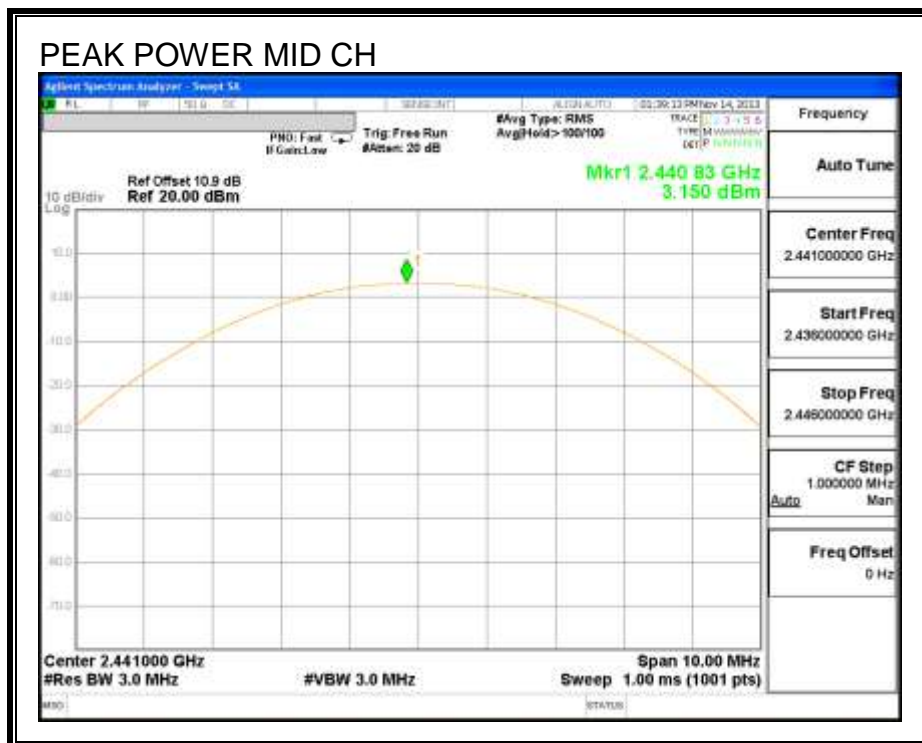
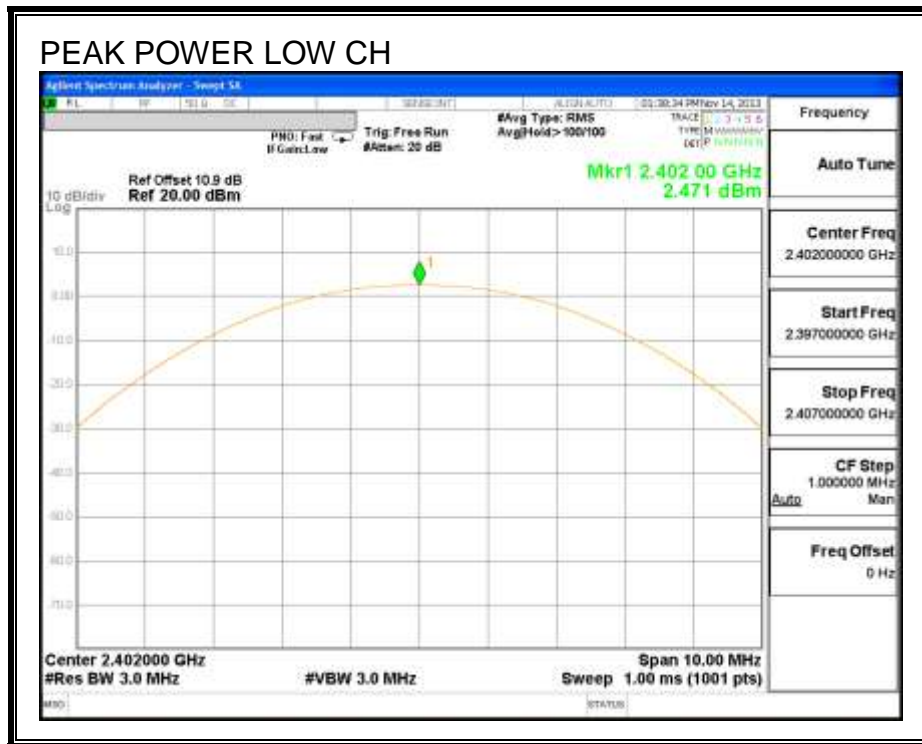
TEST PROCEDURE

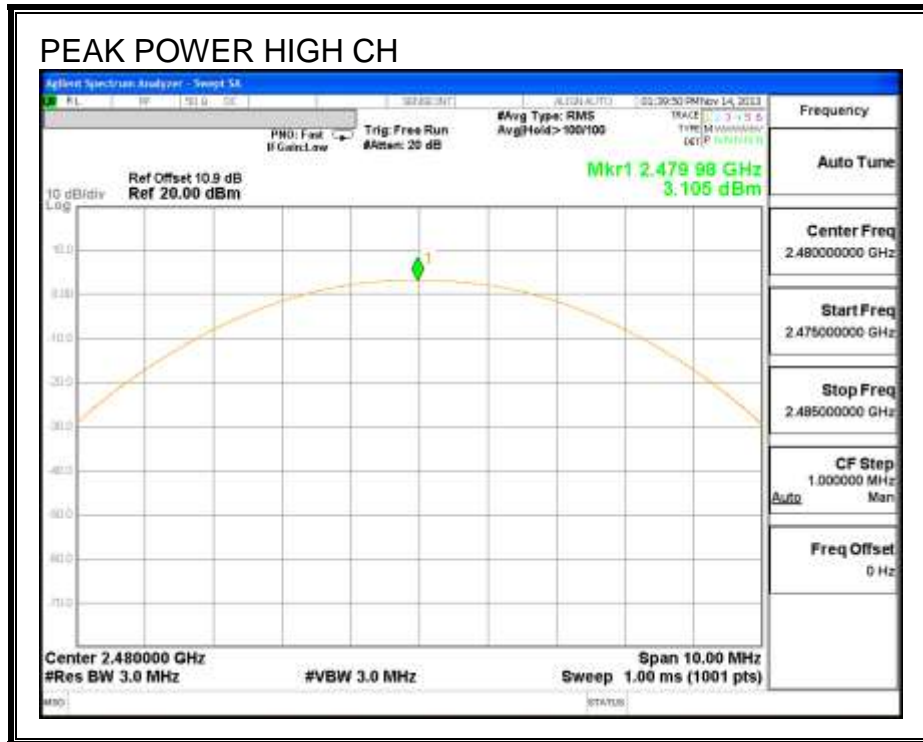
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

| Channel | Frequency (MHz) | Output Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------------|-------------|-------------|
| Low | 2402 | 2.47 | 20.97 | -18.50 |
| Middle | 2441 | 3.15 | 20.97 | -17.82 |
| High | 2480 | 3.11 | 20.97 | -17.86 |

OUTPUT POWER





7.2.2. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.9 dB (including 10 dB pad and 0.9 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Average Power (dBm) |
|---------|--------------------|------------------------|
| Low | 2402 | 0.10 |
| Middle | 2441 | 0.70 |
| High | 2480 | 0.72 |

7.3. ENHANCED DATA RATE 8PSK MODULATION

7.3.1. ON TIME, DUTY CYCLE

LIMITS

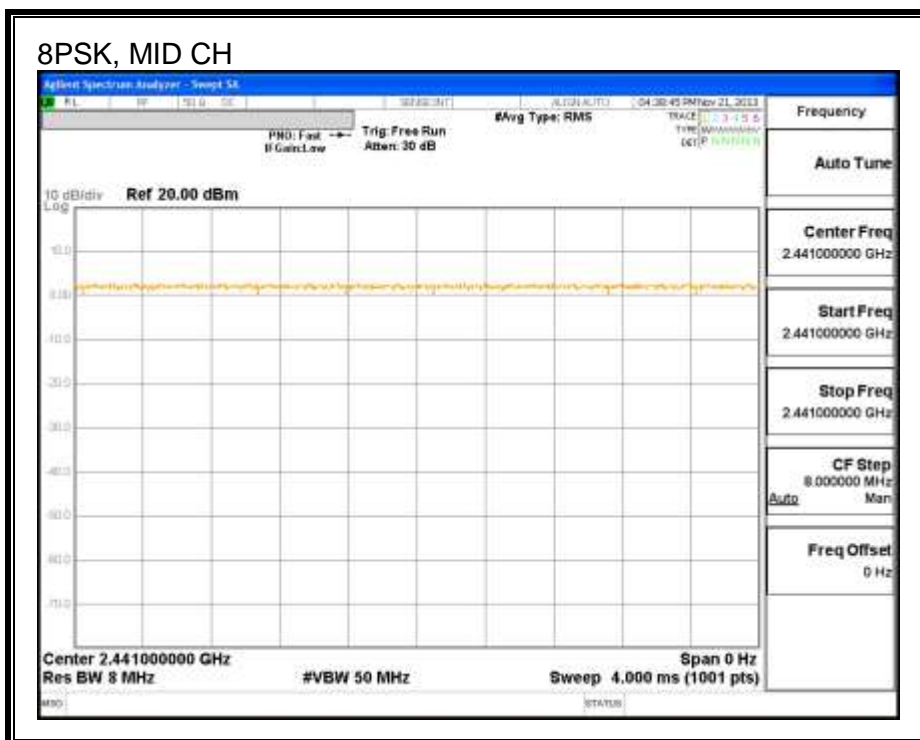
None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

RESULTS

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/T Minimum VBW (kHz) |
|----------------|------------------------|------------------|-----------------------------|----------------------|---|-----------------------------|
| 2.4 GHz | | | | | | |
| | 1.00 | 1.00 | 1.000 | 100.0% | 0.00 | 0.010 |



7.3.2. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

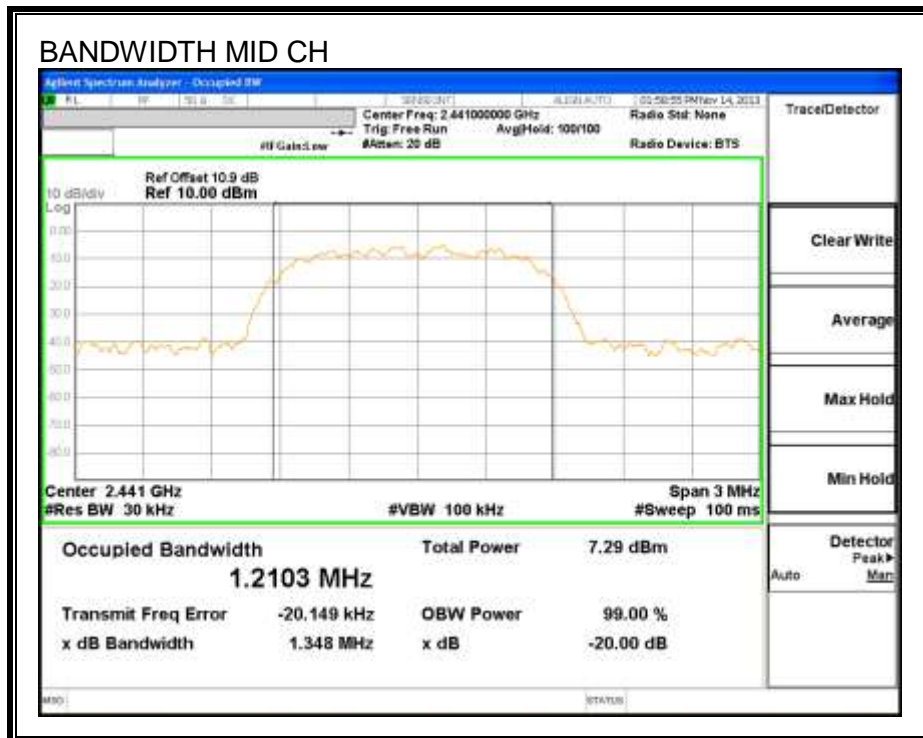
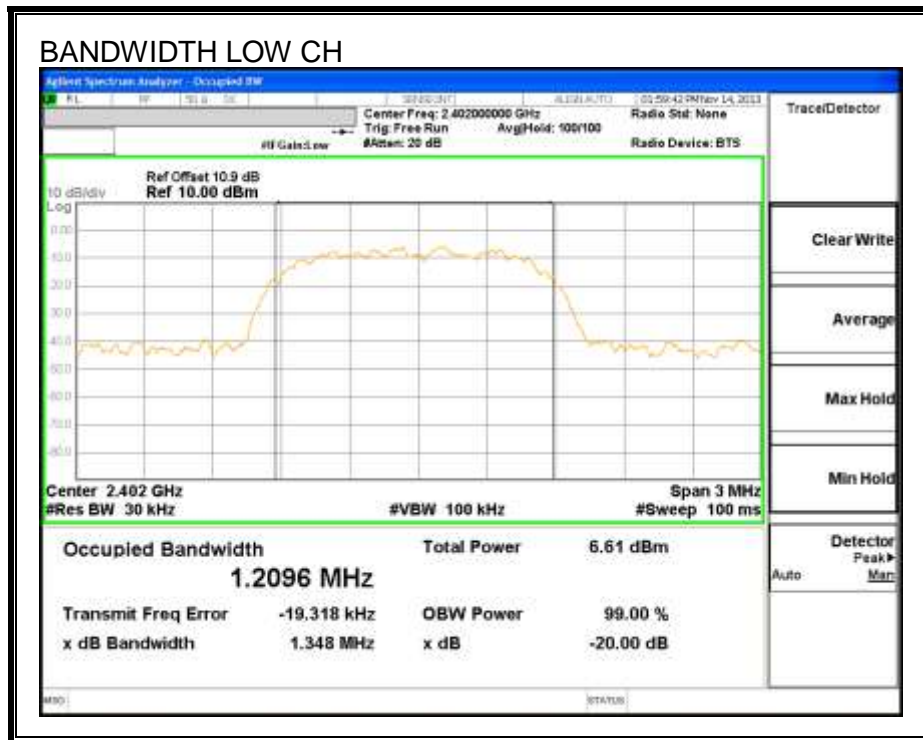
TEST PROCEDURE

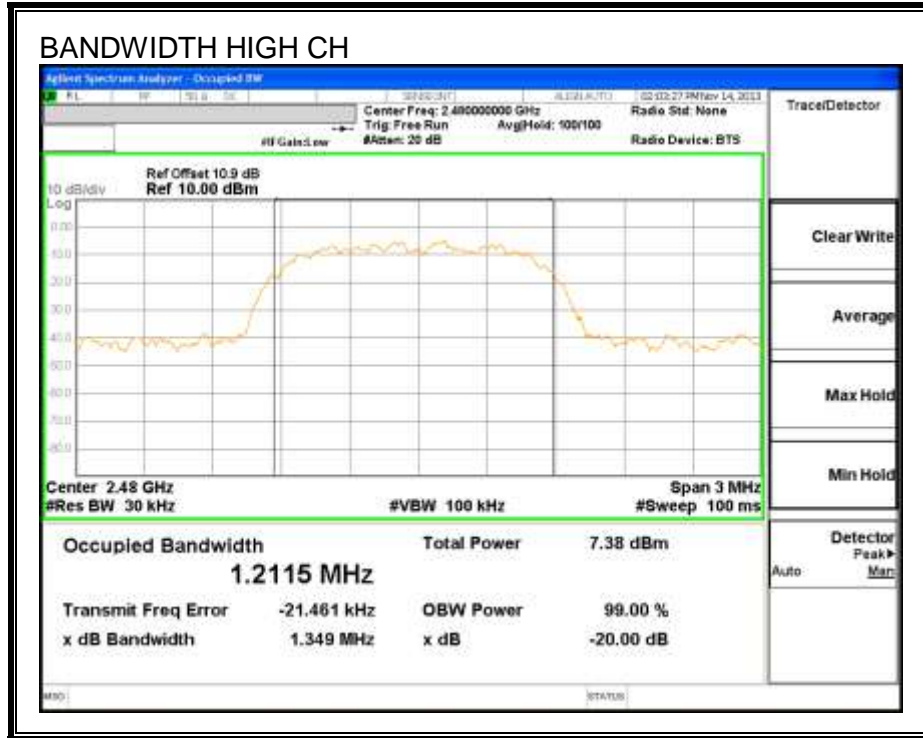
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled.

RESULTS

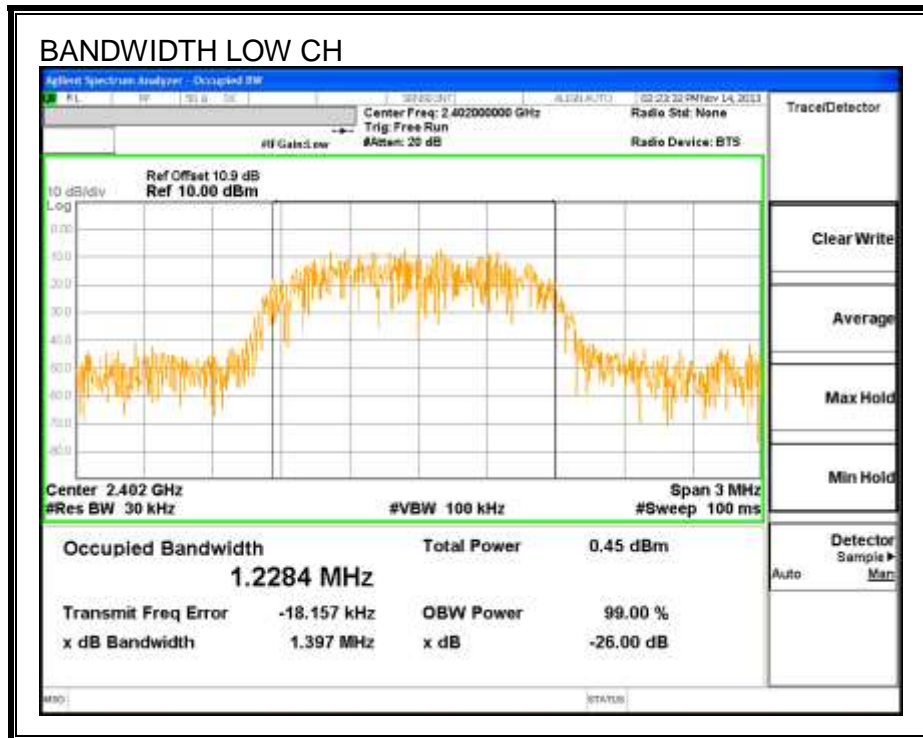
| Channel | Frequency (MHz) | 20 dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|---------|--------------------|--------------------------|------------------------|
| Low | 2402 | 1.3480 | 1.2284 |
| Middle | 2441 | 1.3480 | 1.2079 |
| High | 2480 | 1.3490 | 1.2307 |

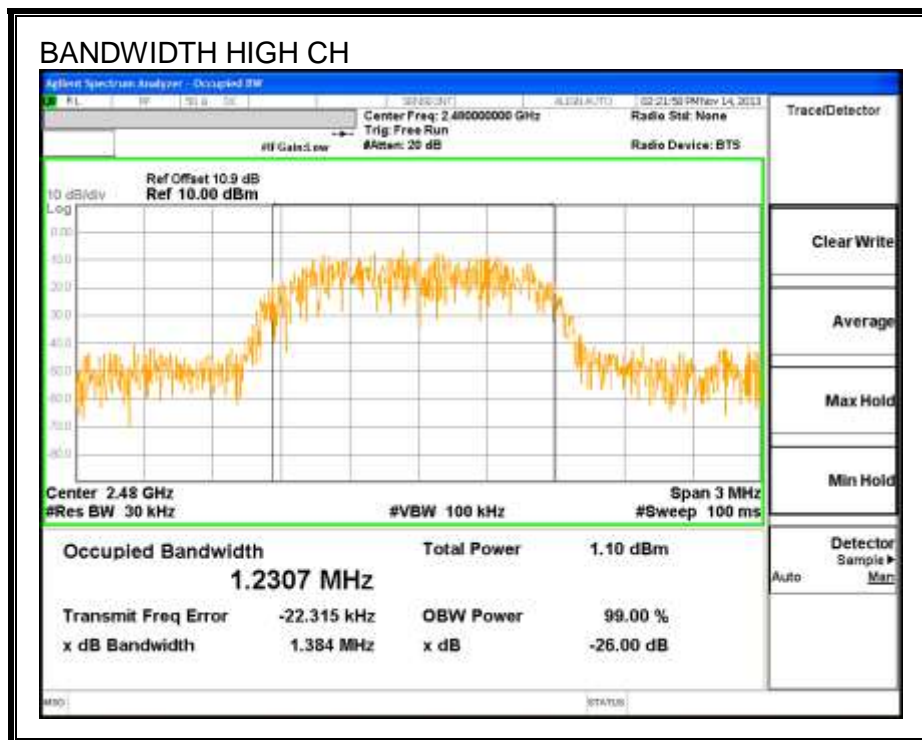
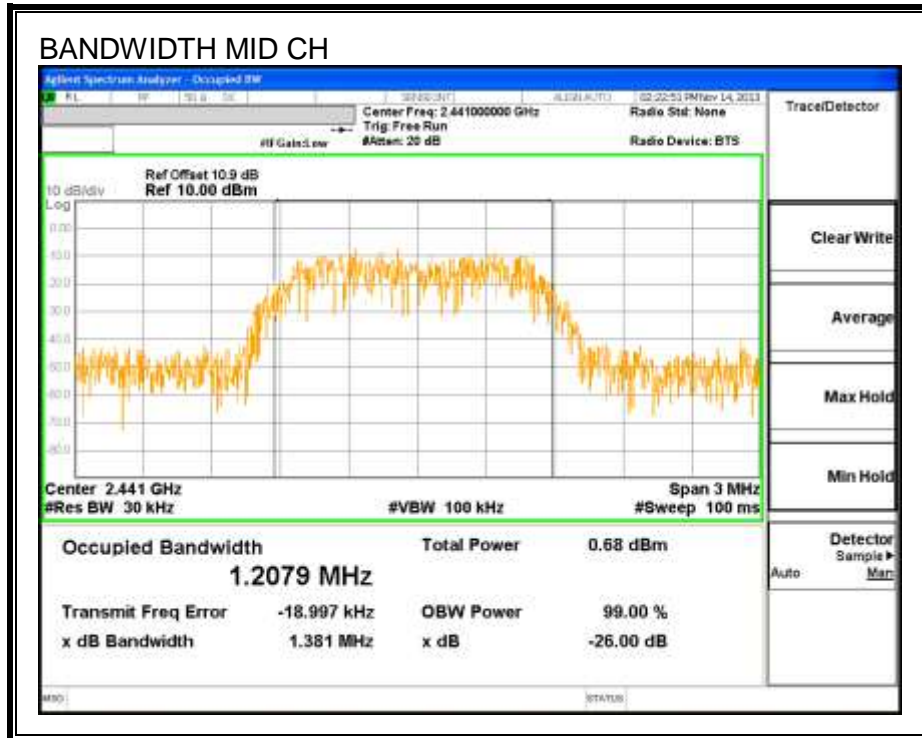
8PSK 20 dB BANDWIDTH





8PSK 99% BANDWIDTH





7.3.3. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

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

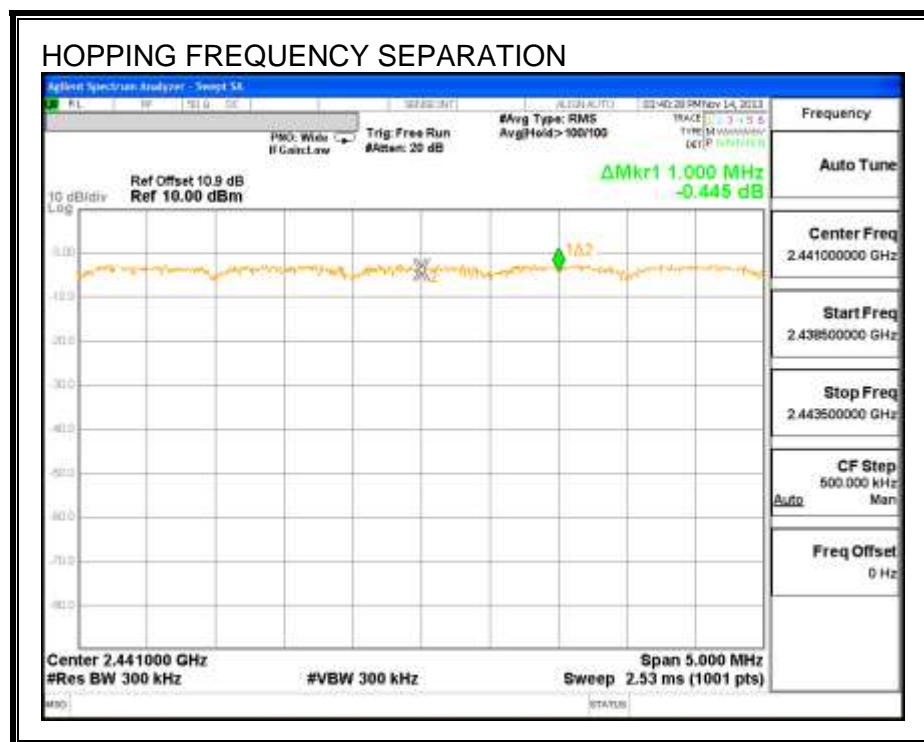
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

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

RESULTS

HOPPING FREQUENCY SEPARATION



7.3.4. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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

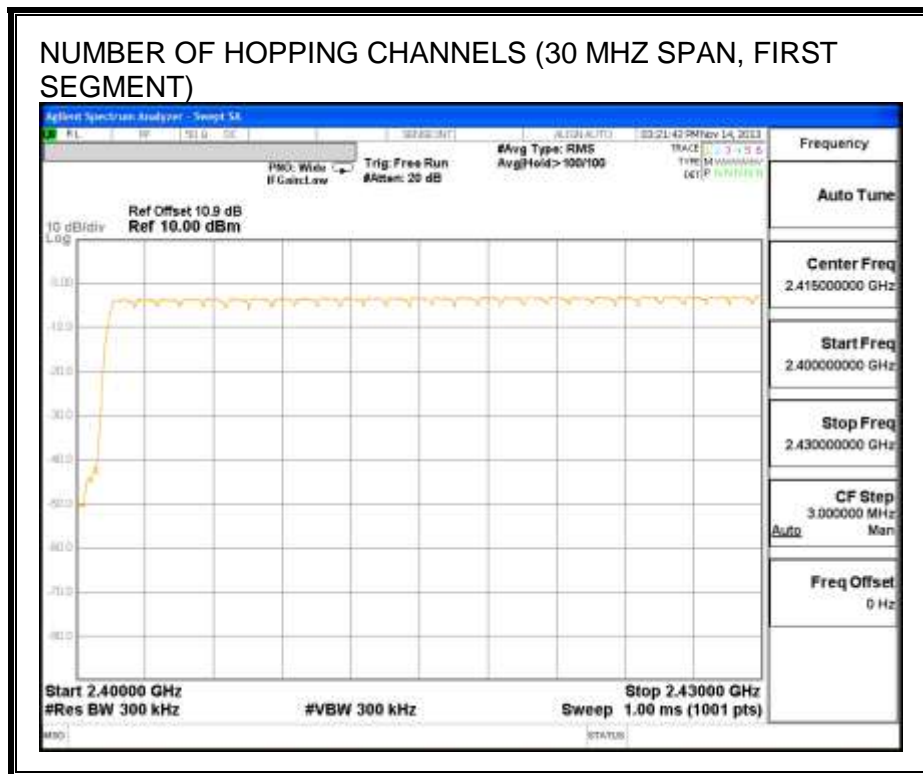
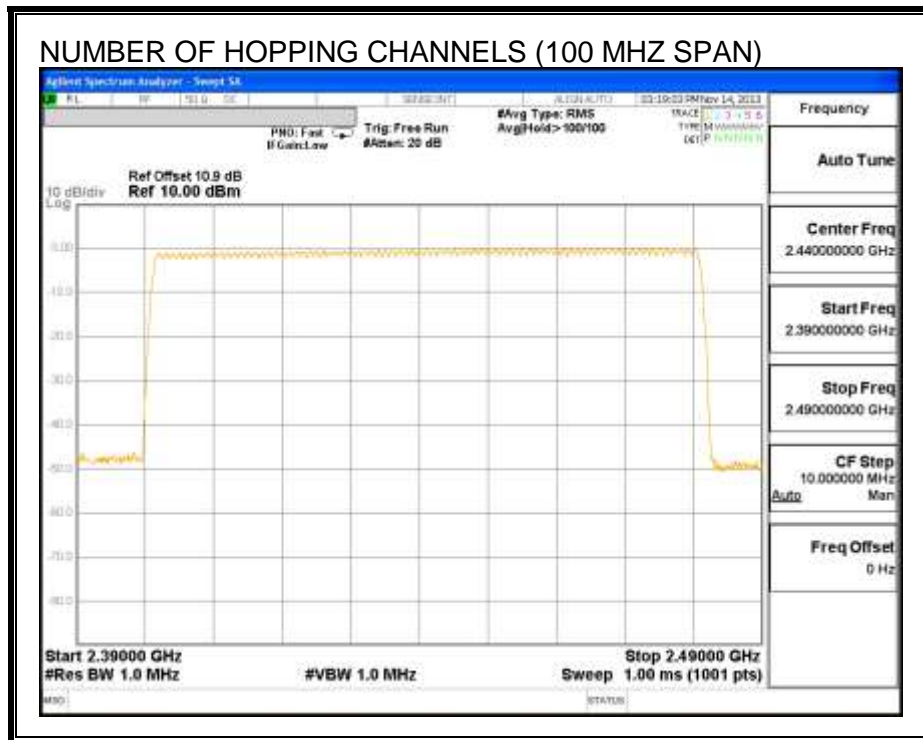
TEST PROCEDURE

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

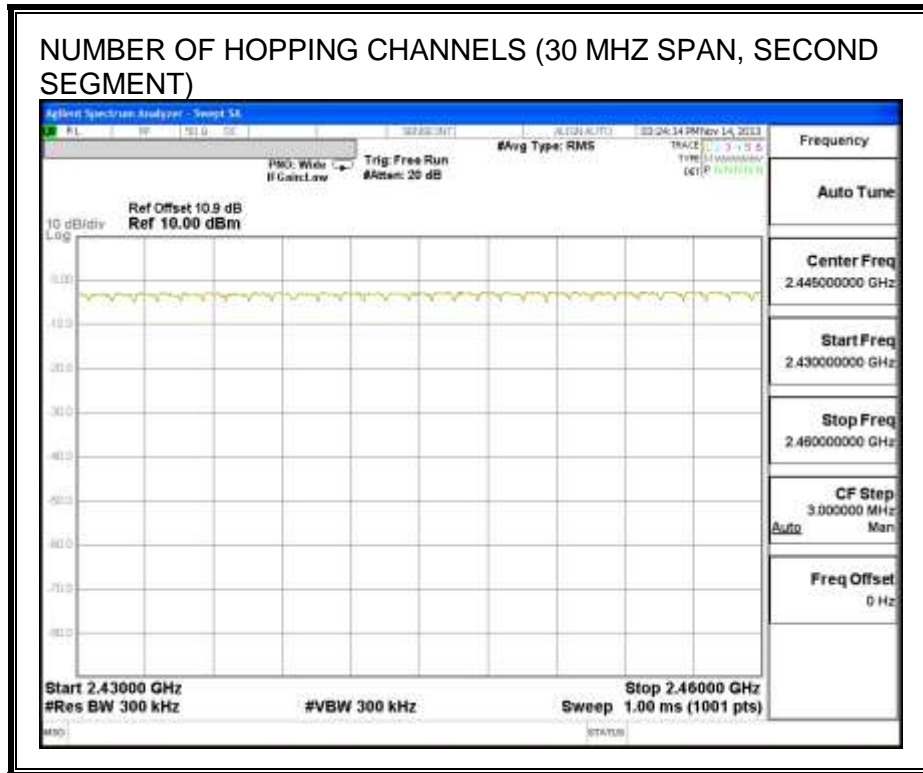
RESULTS

Normal Mode: 79 Channels observed.

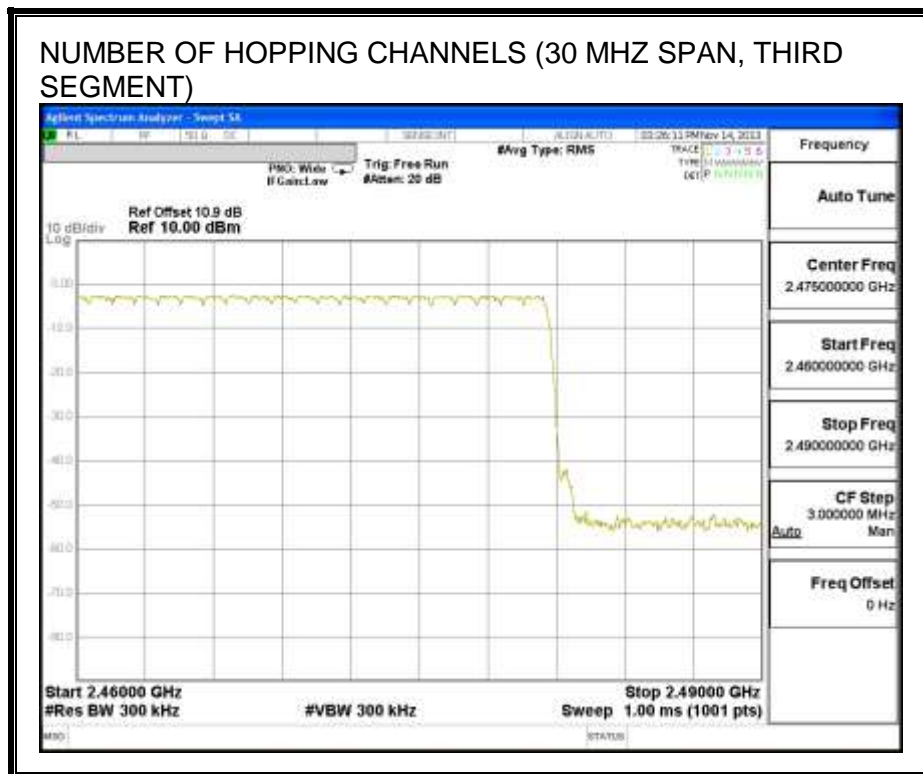
NUMBER OF HOPPING CHANNELS



NUMBER OF HOPPING CHANNELS (30 MHz SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHz SPAN, THIRD SEGMENT)



7.3.5. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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

TEST PROCEDURE

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

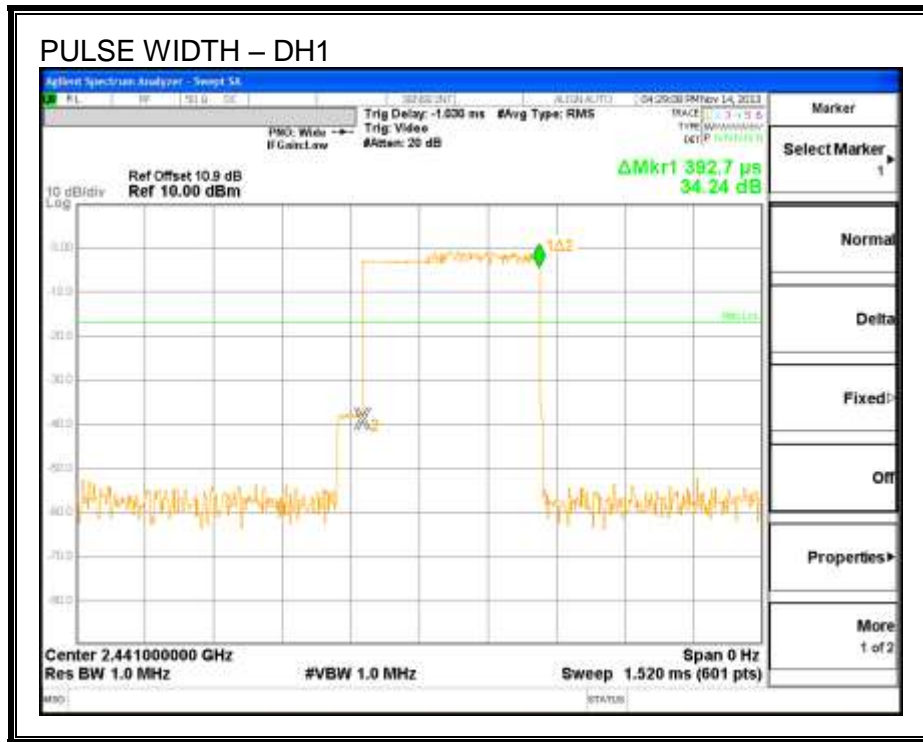
The average time of occupancy in the specified 3.16 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{ pulse width}$.

RESULTS

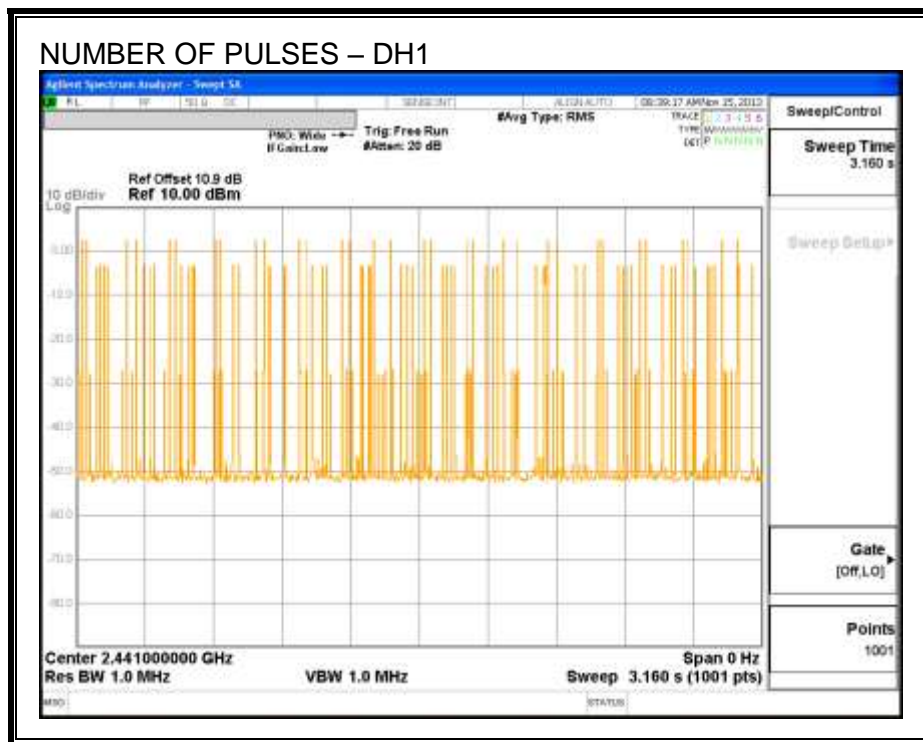
8PSK (EDR) Mode

| DH Packet | Pulse Width (msec) | Number of Pulses in 3.16 seconds | Average Time of (sec) | Limit (sec) | Margin (sec) |
|-----------|--------------------|----------------------------------|-----------------------|-------------|--------------|
| DH1 | 0.392 | 32 | 0.125 | 0.4 | -0.275 |
| DH3 | 1.650 | 17 | 0.281 | 0.4 | -0.120 |
| DH5 | 2.908 | 9 | 0.262 | 0.4 | -0.138 |

PULSE WIDTH - DH1



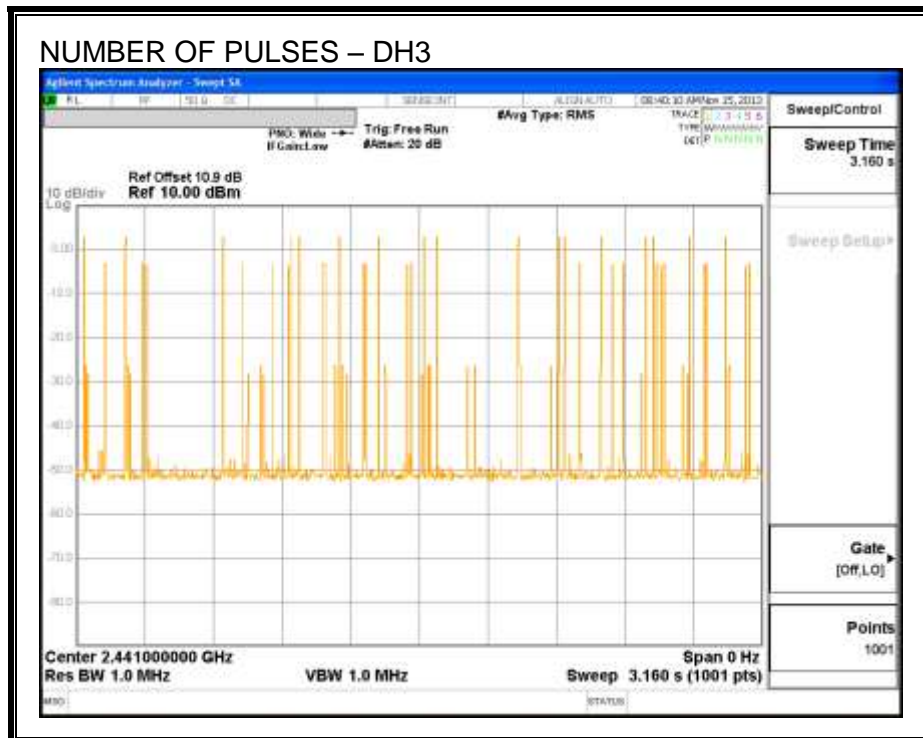
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



PULSE WIDTH – DH3



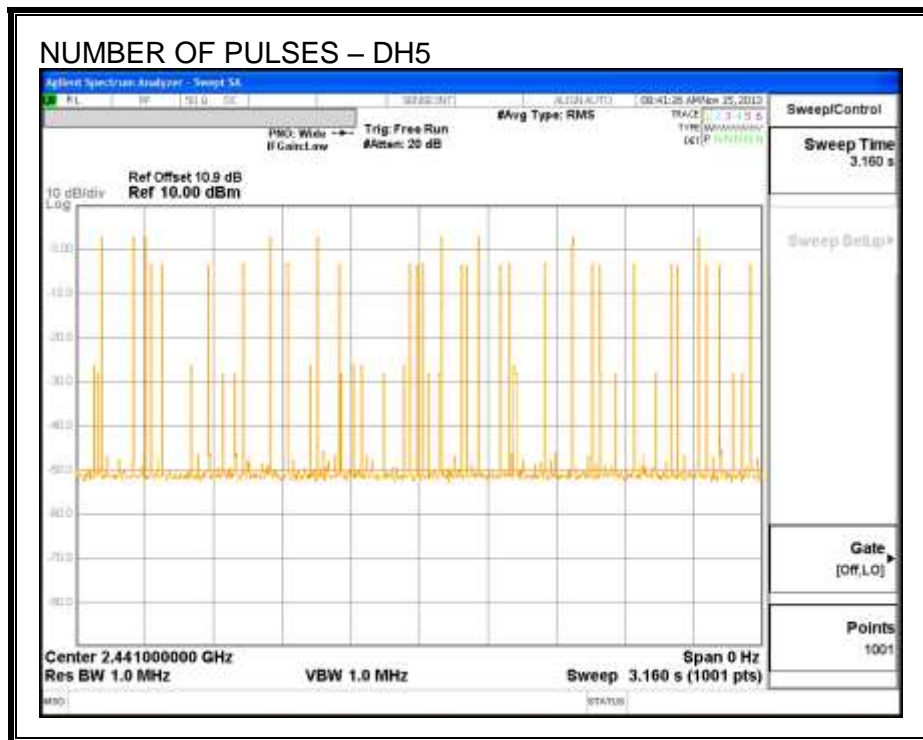
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



7.3.6. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

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.

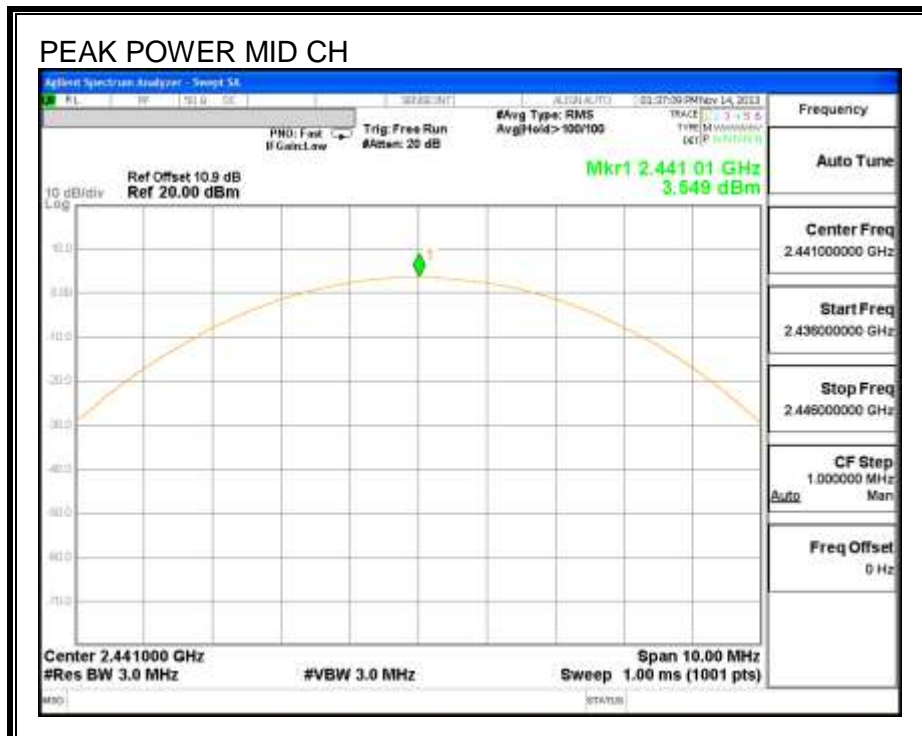
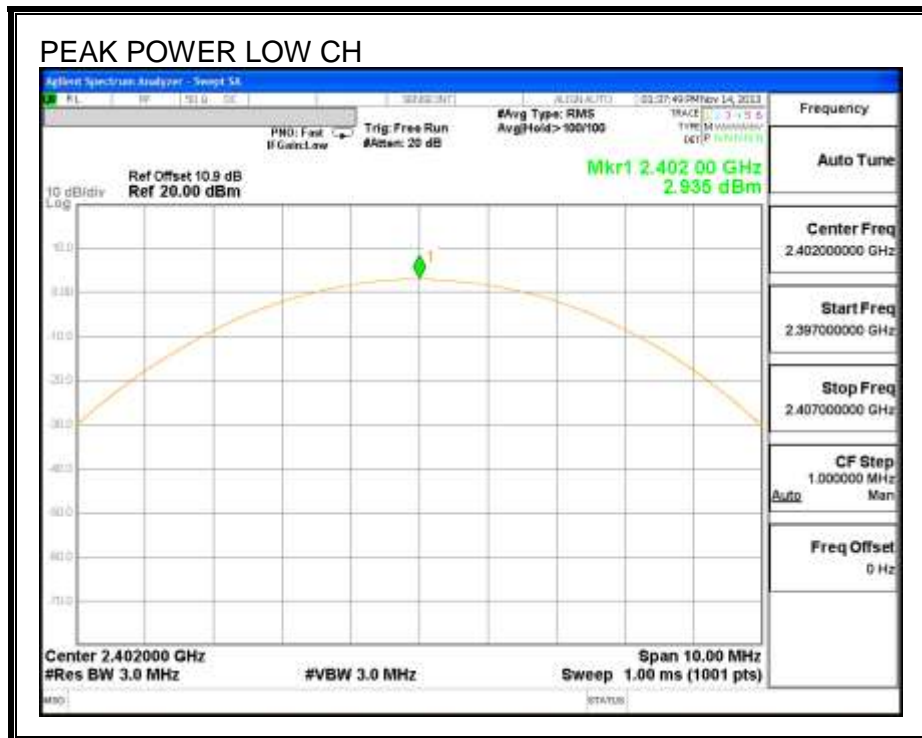
TEST PROCEDURE

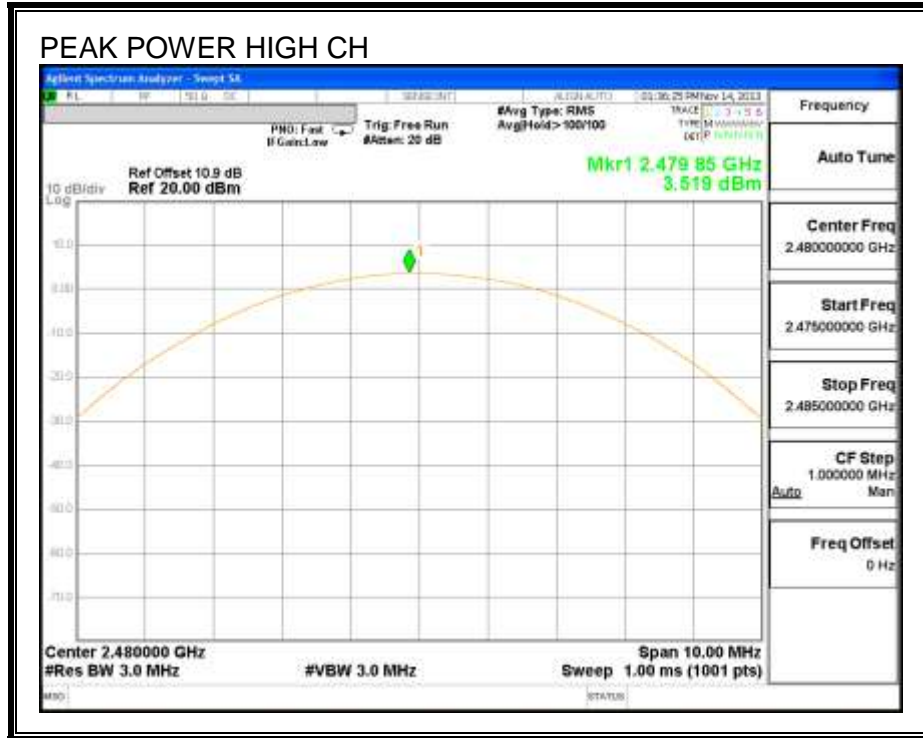
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

| Channel | Frequency (MHz) | Output Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|-----------------------|----------------|----------------|
| Low | 2402 | 2.935 | 20.97 | -18.03 |
| Middle | 2441 | 3.549 | 20.97 | -17.42 |
| High | 2480 | 3.519 | 20.97 | -17.45 |

OUTPUT POWER





7.3.7. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.9 dB (including 10 dB pad and 0.9 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Average Power (dBm) |
|---------|--------------------|------------------------|
| Low | 2402 | 0.10 |
| Middle | 2441 | 0.72 |
| High | 2480 | 0.74 |

7.3.8. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

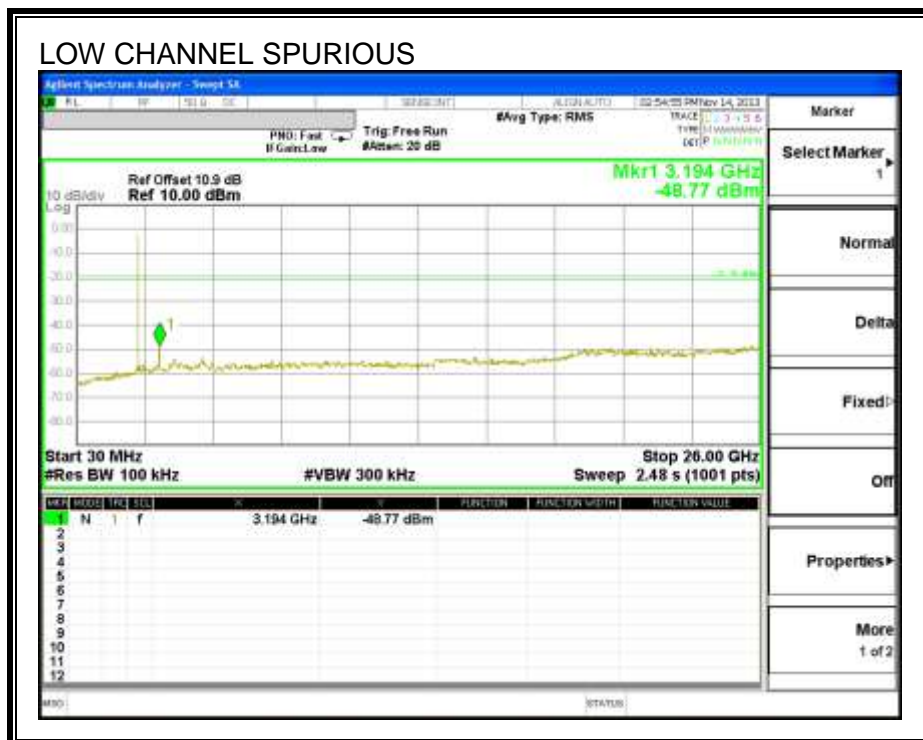
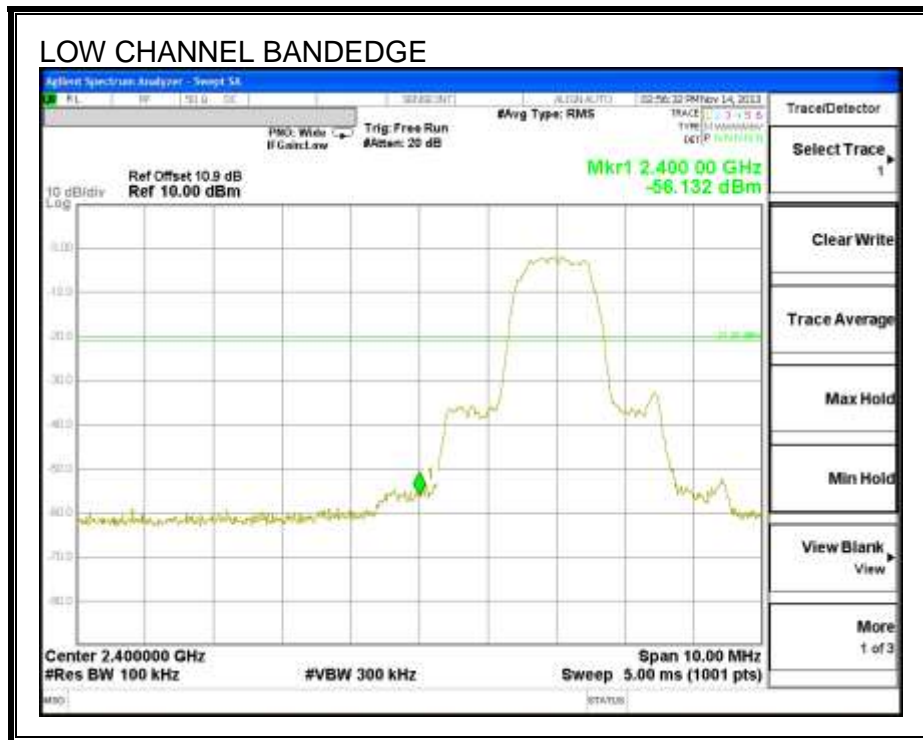
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

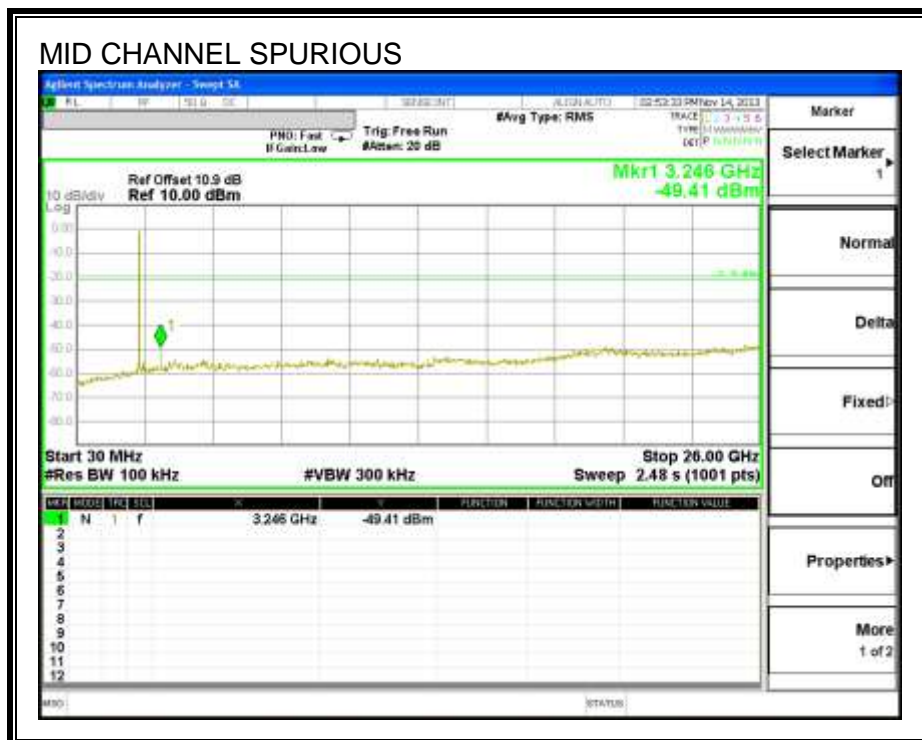
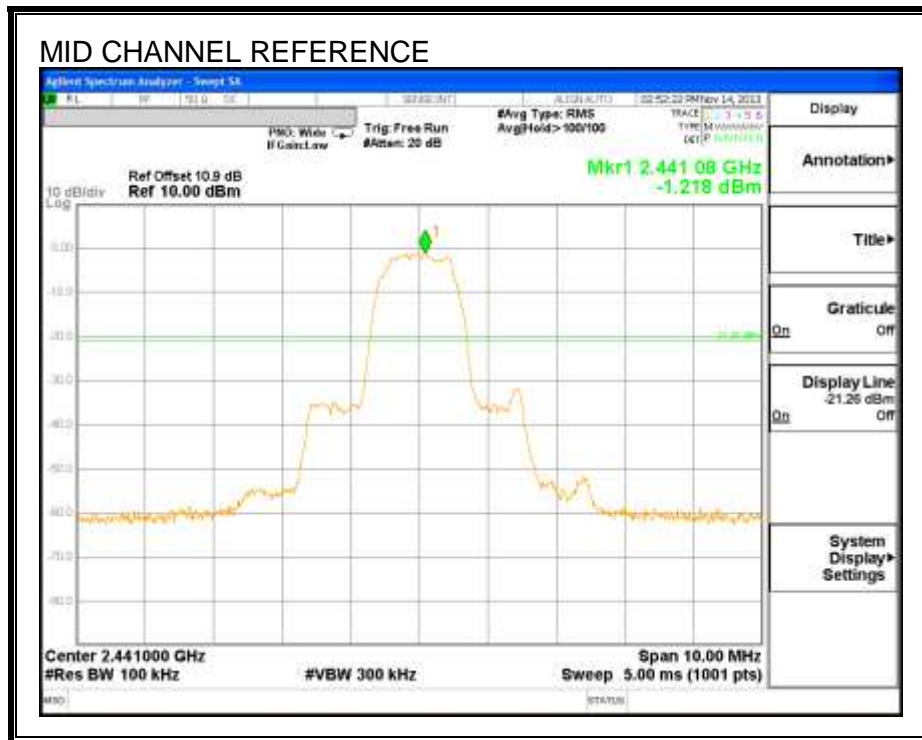
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

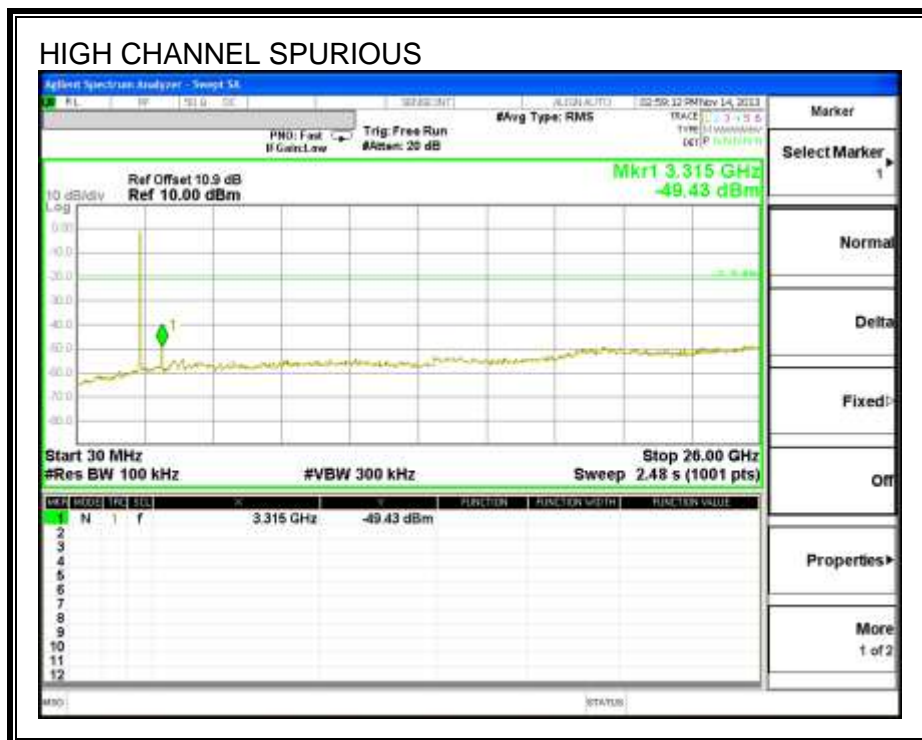
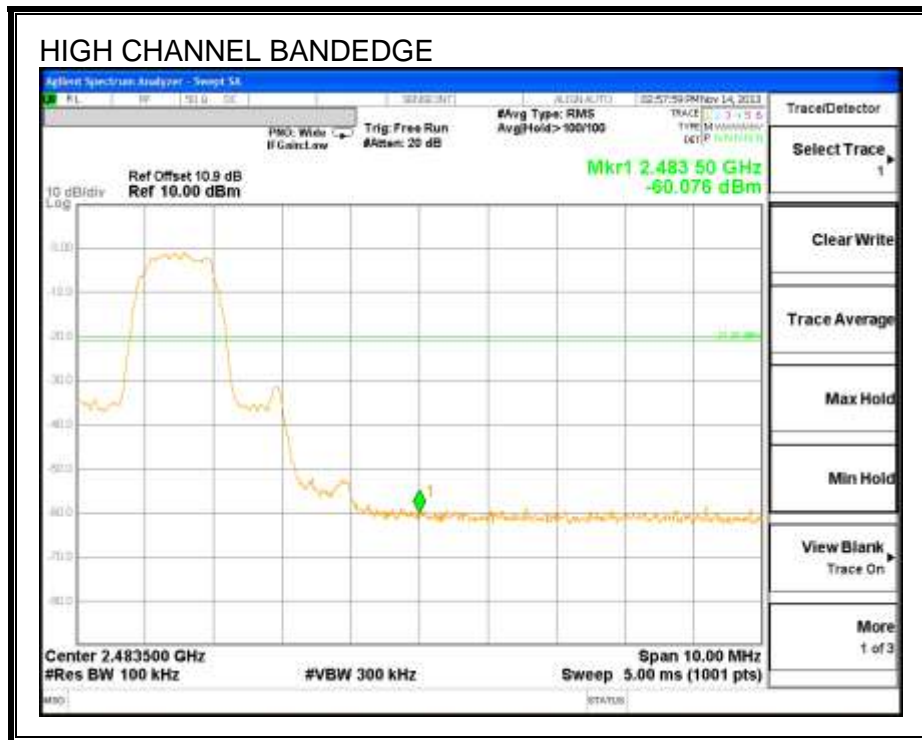
SPURIOUS EMISSIONS, LOW CHANNEL



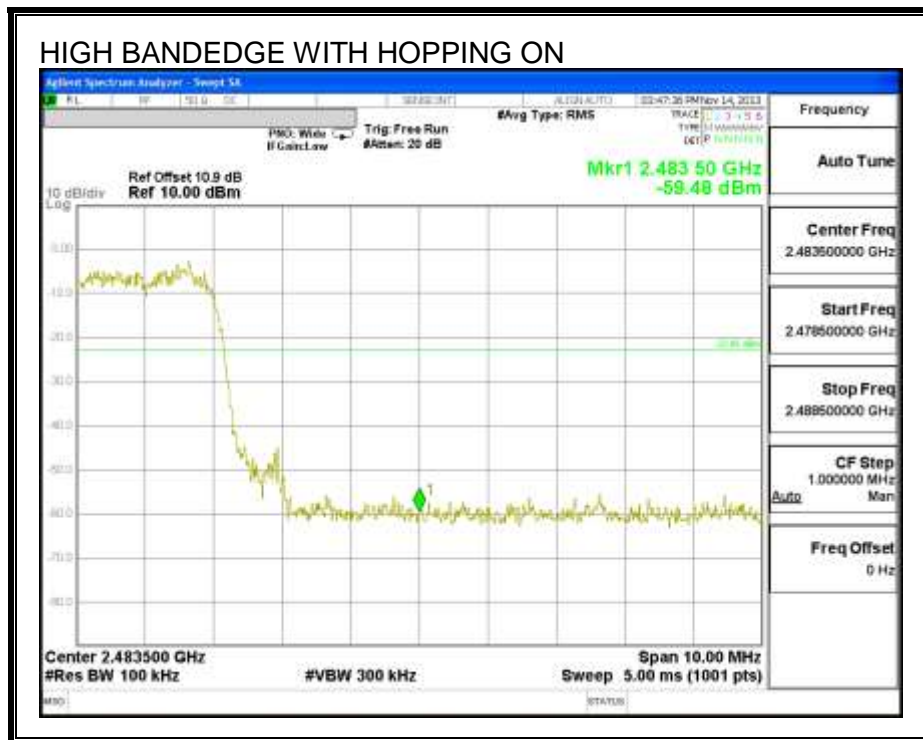
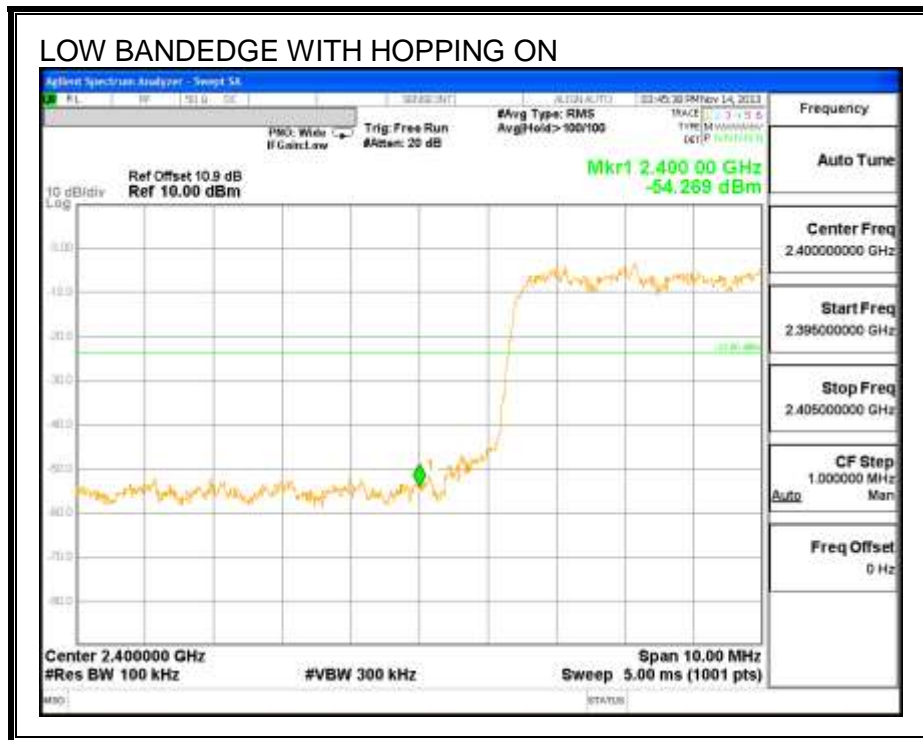
SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



SPURIOUS BANDEGE EMISSIONS WITH HOPPING ON



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

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

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

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

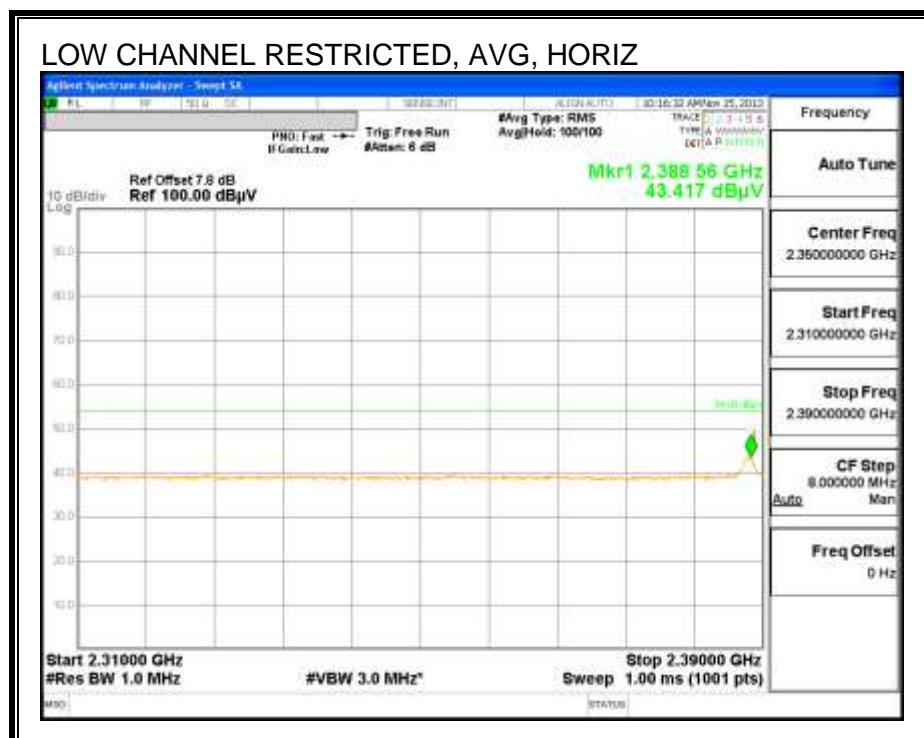
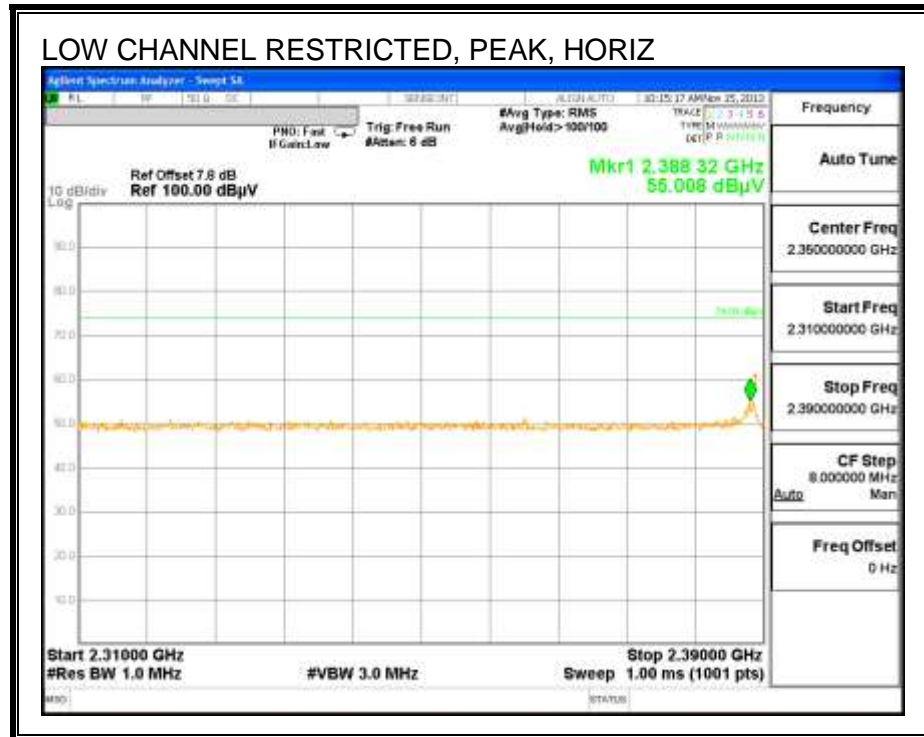
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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

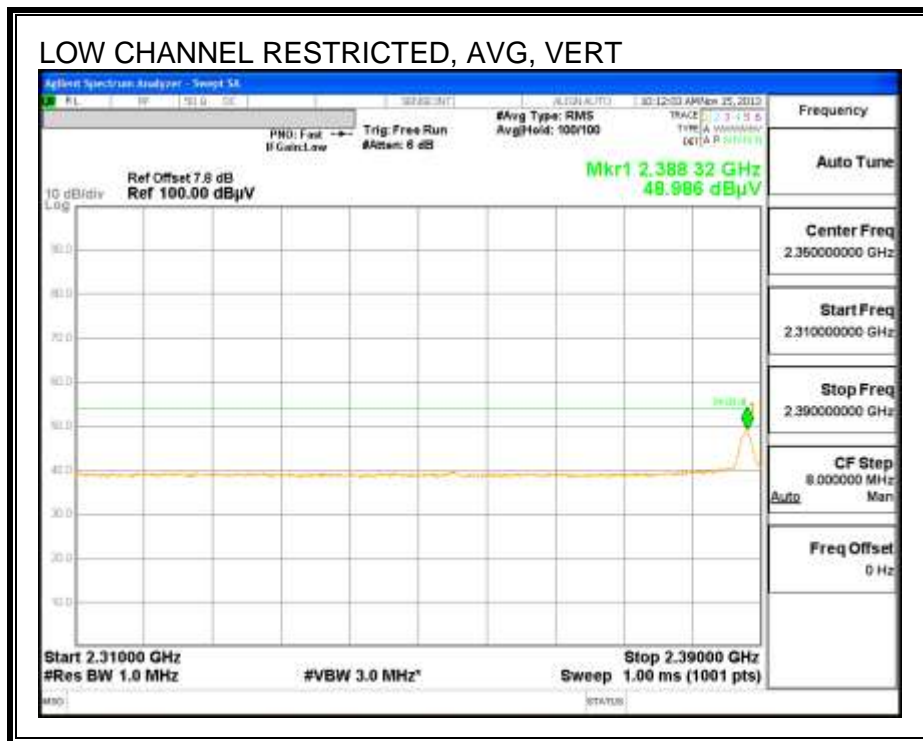
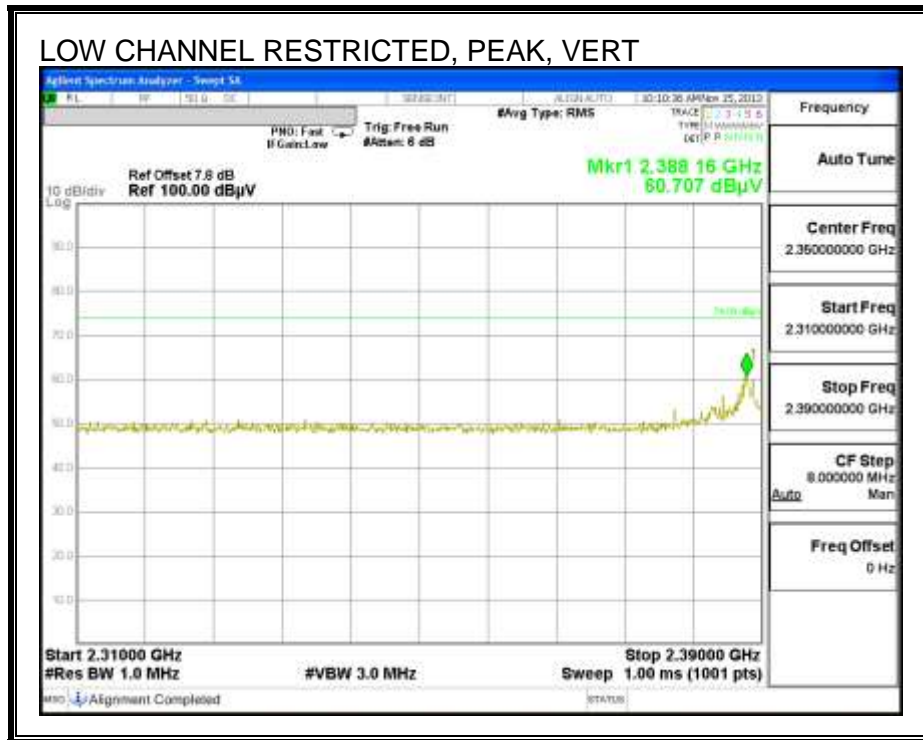
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. BASIC DATA RATE GFSK MODULATION

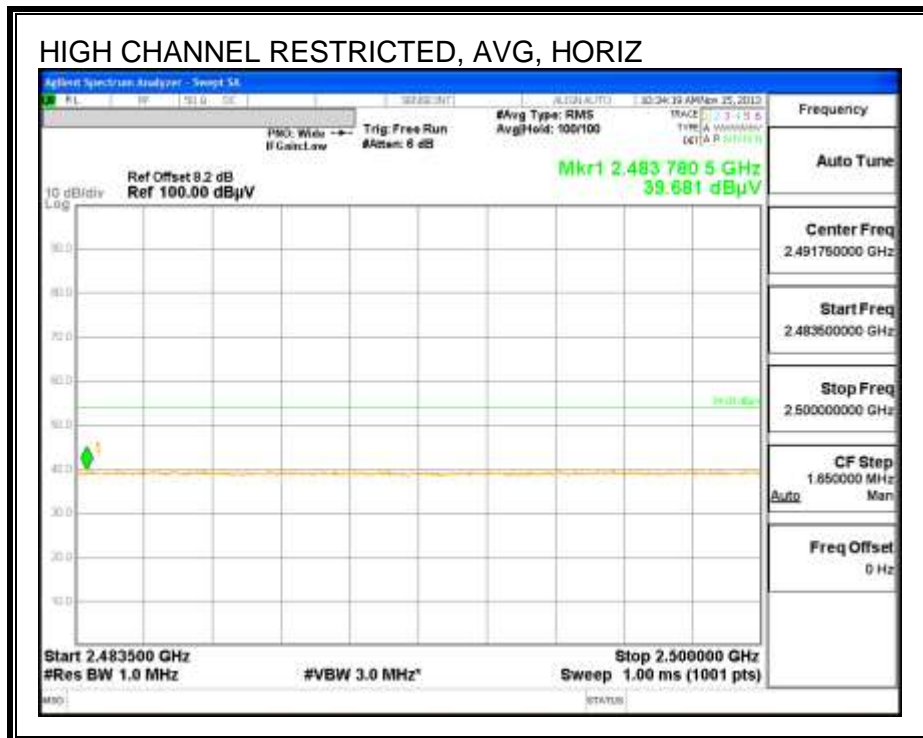
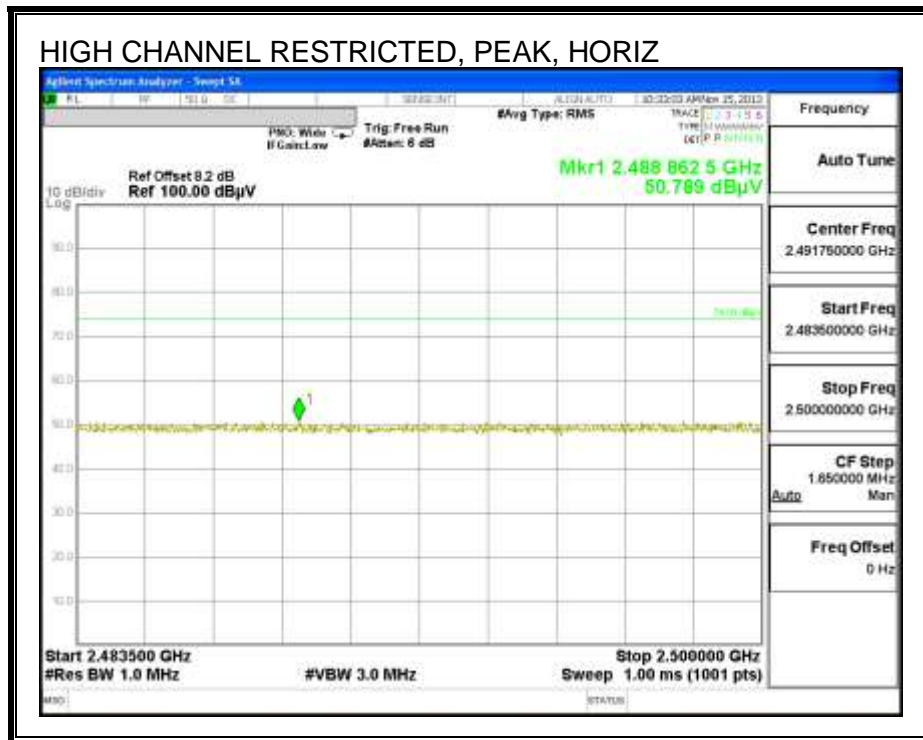
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



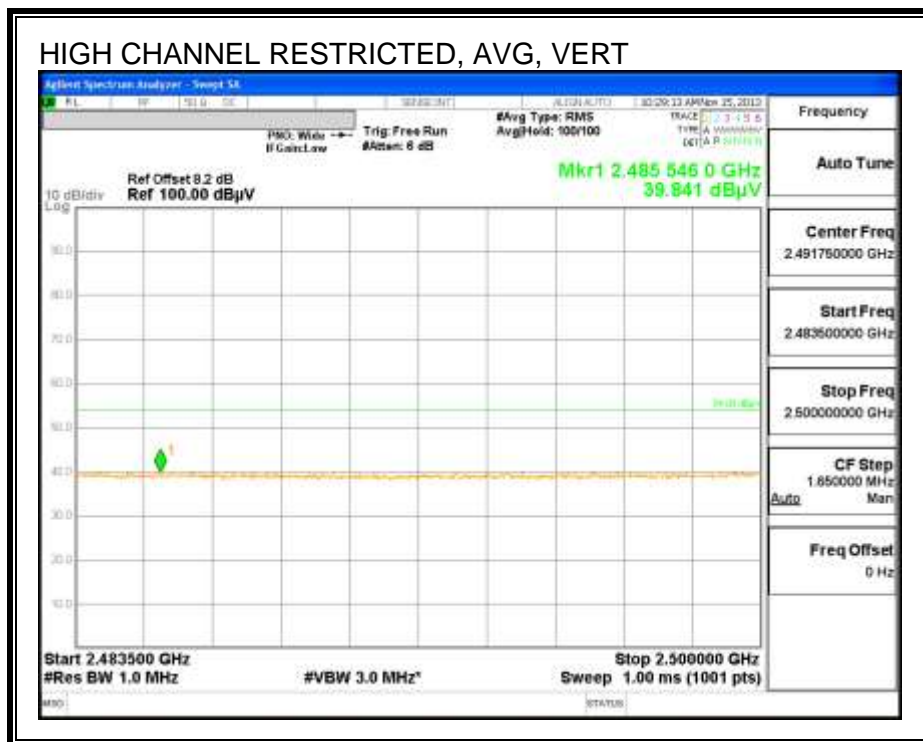
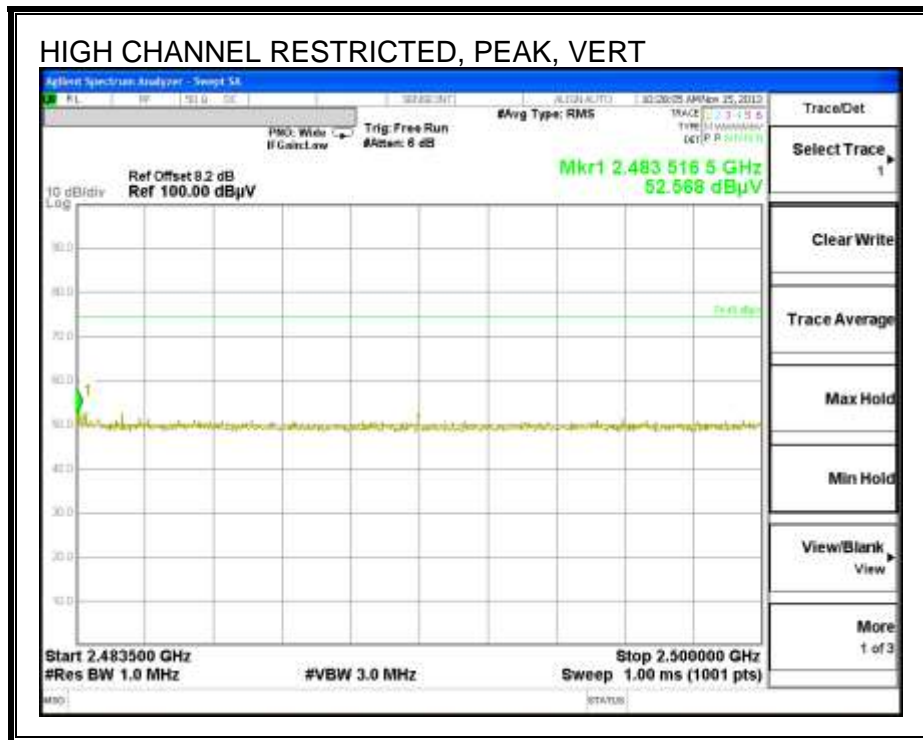
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



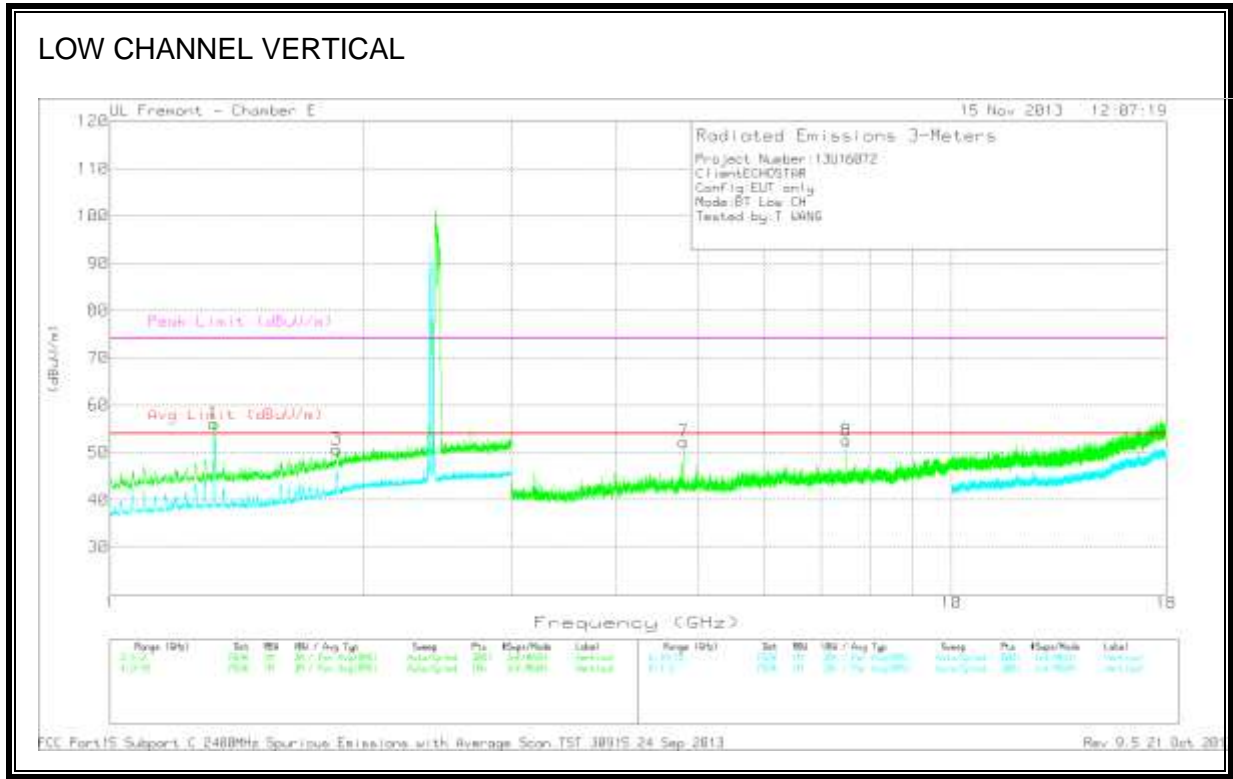
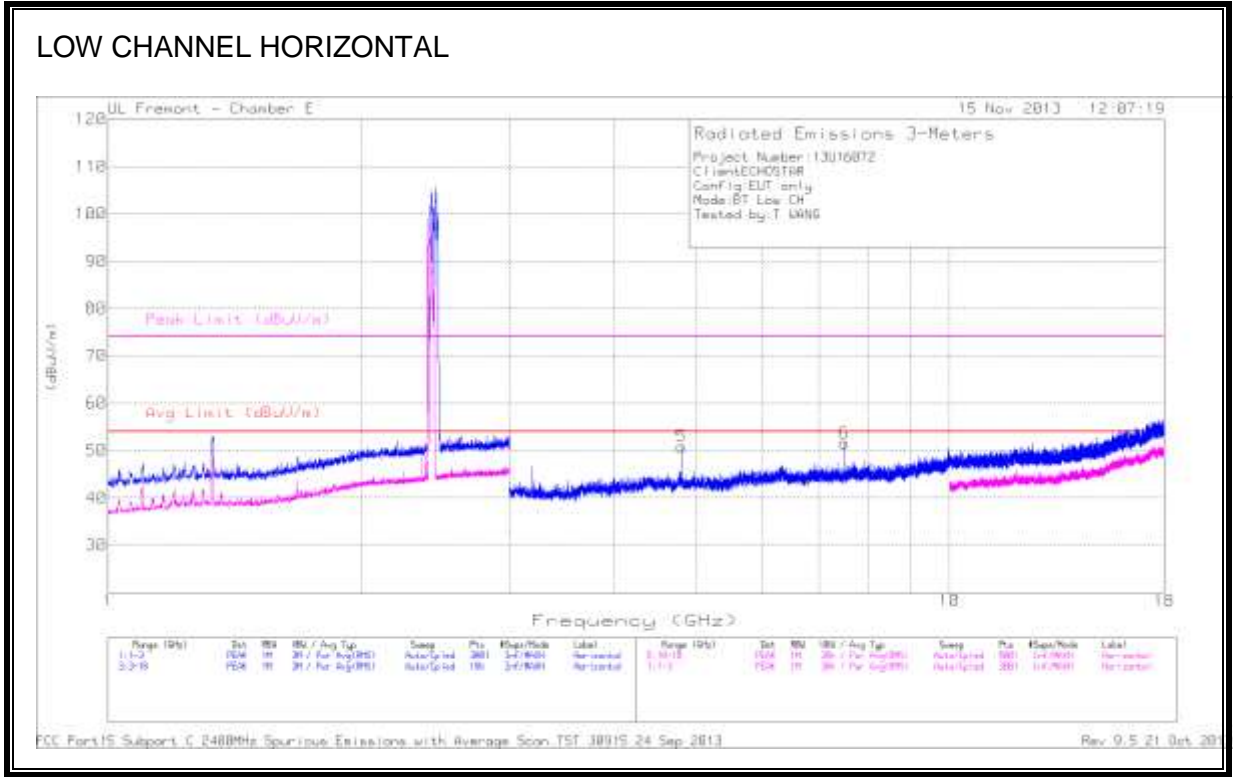
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS



Radiated Emissions

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T346 (dB/m) | Amp/Cbl/ 10dB Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|-------------------|----------------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 1 | * 1.329 | 53.93 | PK | 29.1 | -26.9 | 56.13 | - | - | 74 | -17.87 | 0-360 | 100 | V |
| 2 | * 1.327 | 50.42 | Avg | 29.1 | -26.9 | 52.62 | 53.97 | -1.35 | - | - | 0-360 | 100 | V |
| 3 | 1.859 | 45.3 | PK | 31.2 | -25.8 | 50.7 | - | - | 74 | -23.3 | 0-360 | 199 | V |
| 4 | 1.859 | 40.65 | Avg | 31.2 | -25.8 | 46.05 | 53.97 | -7.92 | - | - | 0-360 | 199 | V |

Avg - Video bandwidth < Resolution bandwidth

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T346 (dB/m) | Amp/Cbl/ 3GHz HPF | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|-------------------|----------------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 5 | * 4.805 | 47.36 | PK | 34.4 | -30.9 | 50.86 | - | - | 74 | -23.14 | 0-360 | 199 | H |
| 7 | * 4.805 | 48.73 | PK | 34.4 | -30.9 | 52.23 | - | - | 74 | -21.77 | 0-360 | 101 | V |
| 6 | * 7.501 | 44.06 | PK | 36.1 | -28.6 | 51.56 | - | - | 74 | -22.44 | 0-360 | 199 | H |
| 8 | * 7.501 | 45.03 | PK | 36.1 | -28.6 | 52.53 | - | - | 74 | -21.47 | 0-360 | 199 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

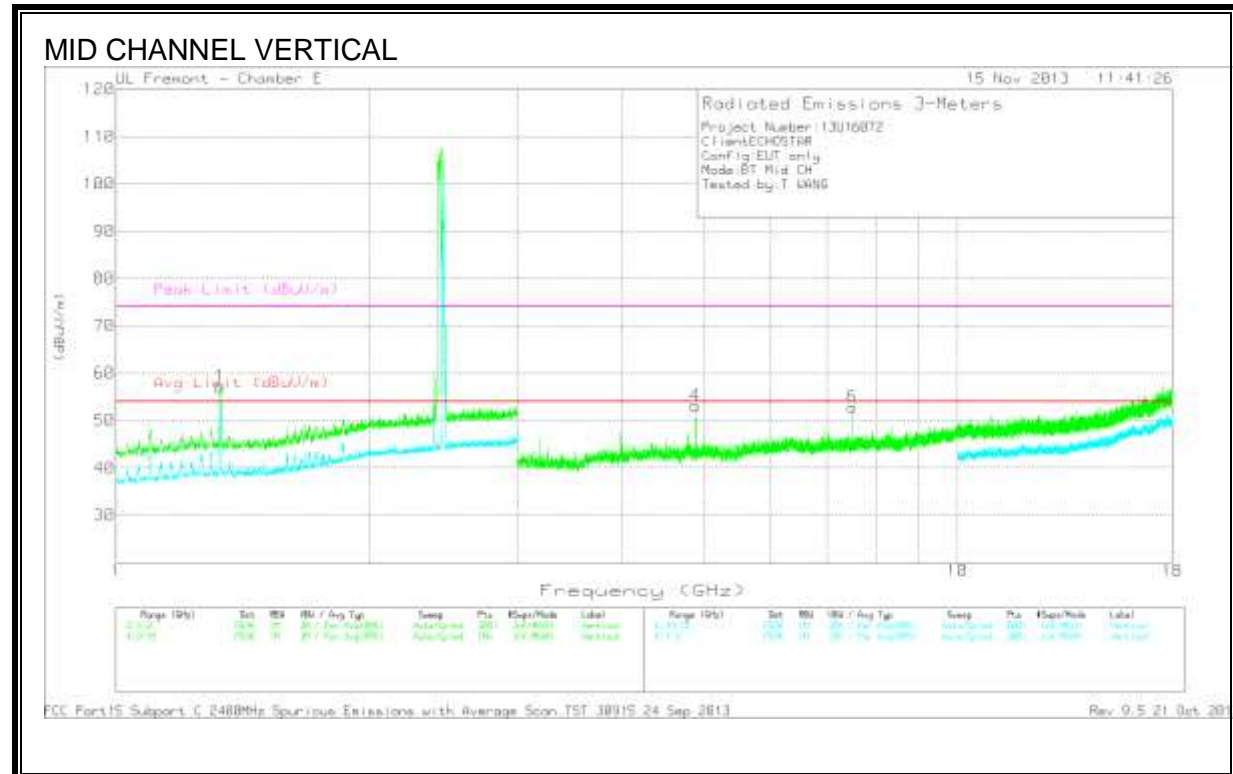
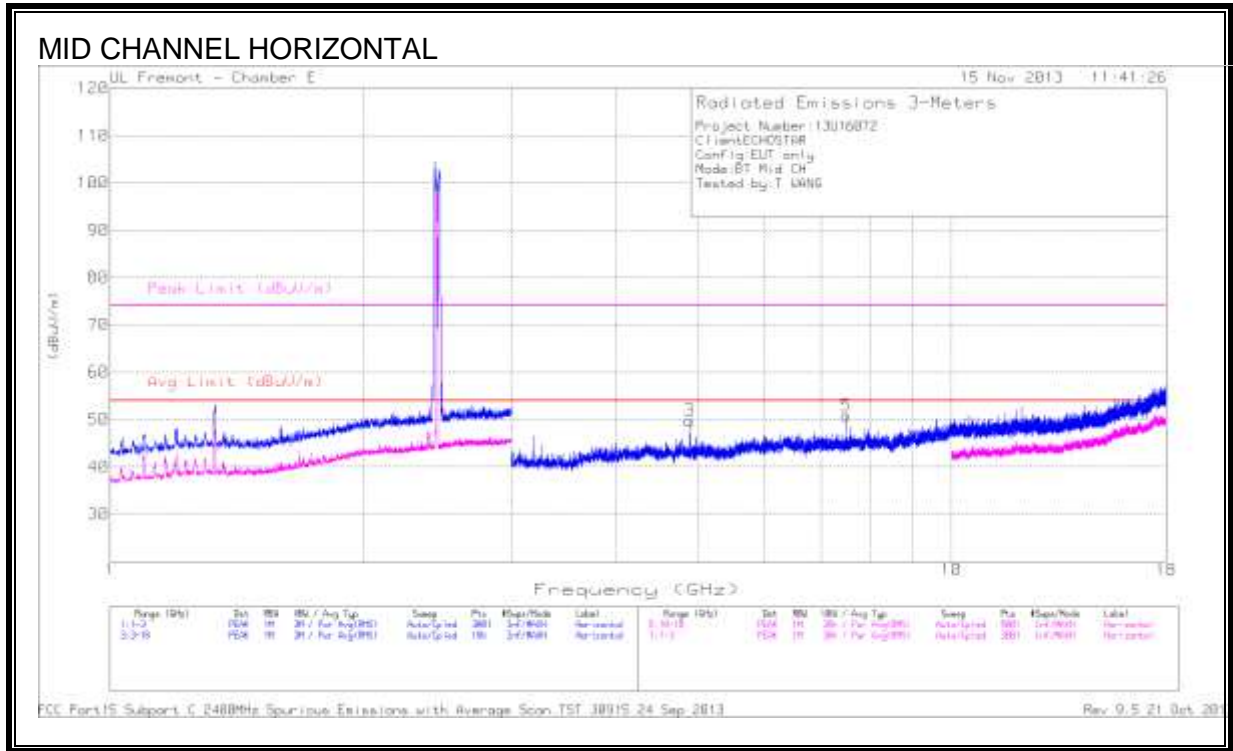
Avg - Video bandwidth < Resolution bandwidth

PK - Peak detector

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T346 (dB/m) | Amp/Cbl/1 0dB Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------------------|----------------------------|------|-------------------|----------------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| * 1.329 | 48.17 | MAv1 | 29.1 | -26.9 | 50.37 | 53.97 | -3.6 | - | - | 284 | 101 | V |

MAv1 - KDB558074 Option 1 Maximum RMS Average

FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 24 Sep 2013 Rev 9.5 21 Oct 2013



Radiated Emissions

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T346 (dB/m) | Amp/Cbl/ 10dB Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|-------------------|----------------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 1 | * 1.329 | 55.05 | PK | 29.1 | -26.9 | 57.25 | - | - | 74 | -16.75 | 0-360 | 101 | V |
| 2 | * 1.333 | 51.5 | Avg | 29.1 | -26.9 | 53.7 | 53.97 | -0.13 | - | - | 0-360 | 100 | V |

Avg - Video bandwidth < Resolution bandwidth

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T346 (dB/m) | Amp/Cbl/ 3GHz HPF | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|-------------------|----------------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 4 | * 4.882 | 49.77 | PK | 34.4 | -31 | 53.17 | - | - | 74 | -20.83 | 0-360 | 101 | V |
| 3 | * 4.883 | 46.34 | PK | 34.4 | -31 | 49.74 | - | - | 74 | -24.26 | 0-360 | 101 | H |
| 5 | * 7.501 | 43.32 | PK | 36.1 | -28.6 | 50.82 | - | - | 74 | -23.18 | 0-360 | 101 | H |
| 6 | * 7.501 | 45.35 | PK | 36.1 | -28.6 | 52.85 | - | - | 74 | -21.15 | 0-360 | 199 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

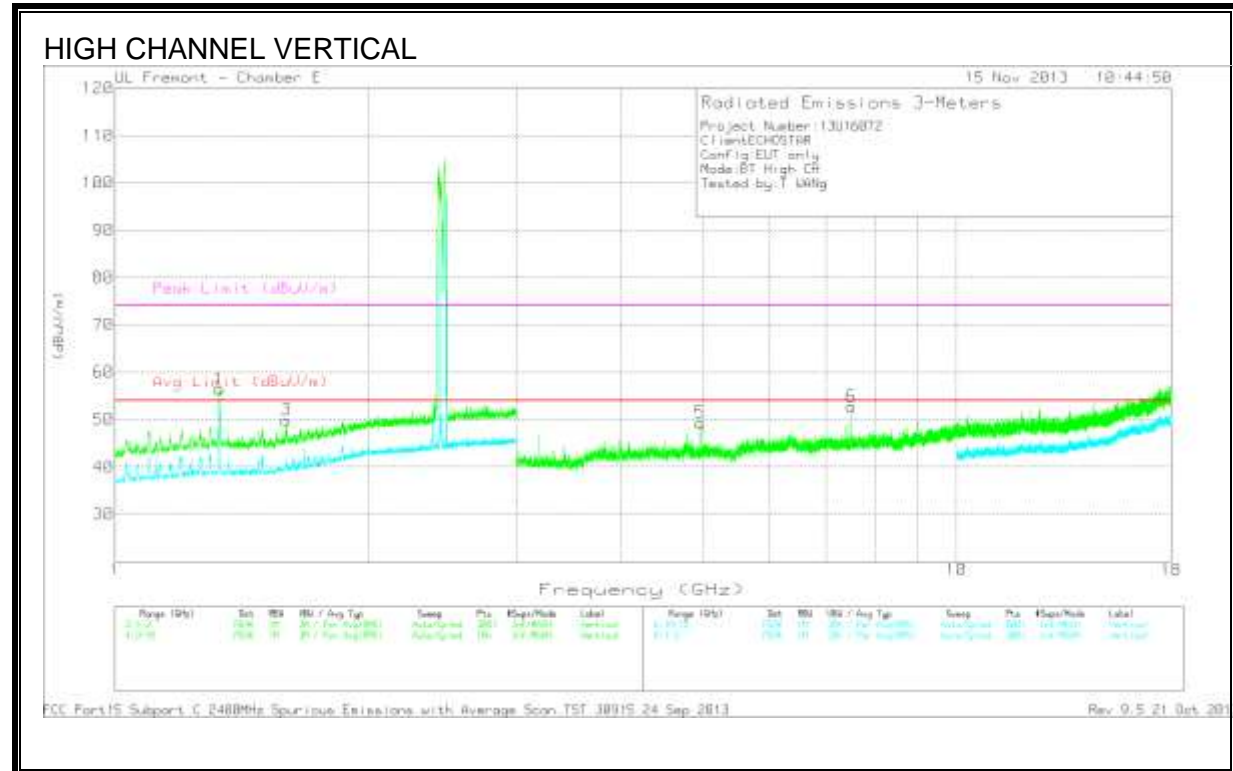
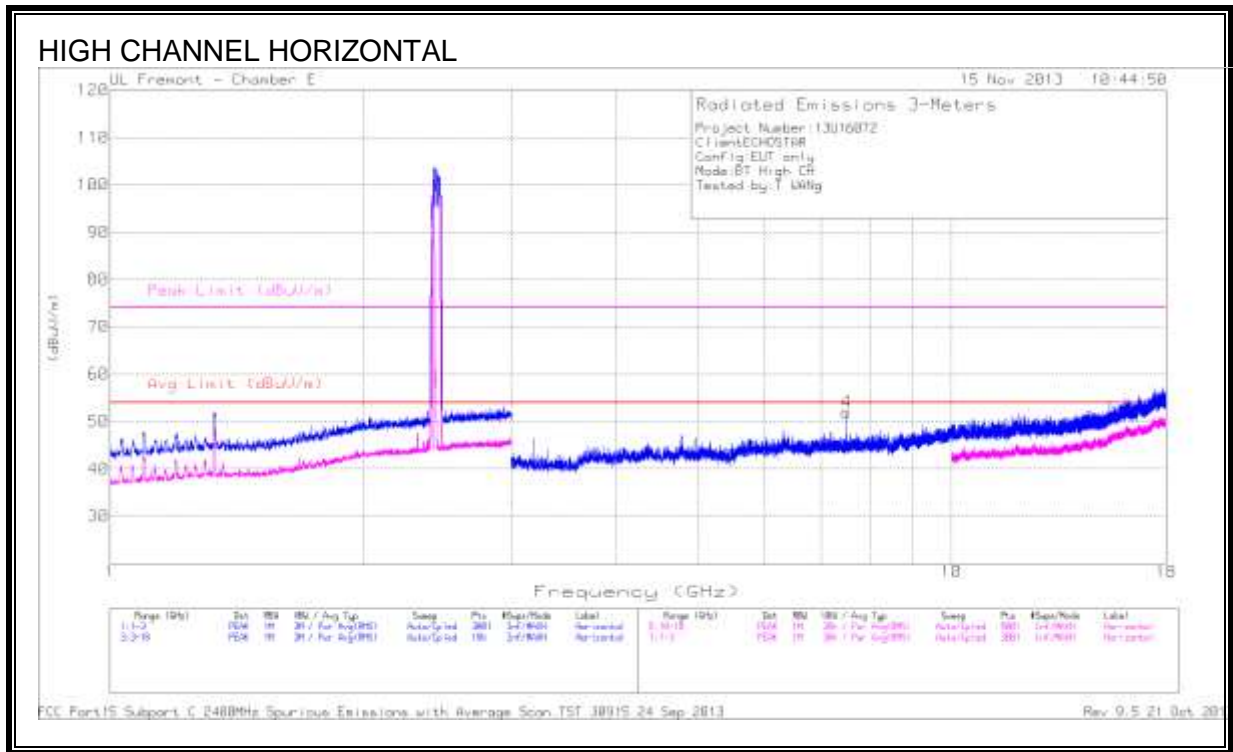
Avg - Video bandwidth < Resolution bandwidth

PK - Peak detector

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T346 (dB/m) | Amp/Cbl/1 0dB Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------------------|----------------------------|------|-------------------|----------------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| * 1.331 | 47.28 | MAv1 | 29.1 | -26.9 | 49.48 | 53.97 | -4.49 | - | - | 254 | 105 | V |

MAv1 - KDB558074 Option 1 Maximum RMS Average

FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 24 Sep 2013 Rev 9.5 21 Oct 2013



Radiated Emissions

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T346 (dB/m) | Amp/Cbl/ 10dB Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|-------------------|----------------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 1 | * 1.33 | 54.26 | PK | 29.1 | -26.9 | 56.46 | - | - | 74 | -17.54 | 0-360 | 100 | V |
| 3 | * 1.598 | 46.91 | PK | 29.5 | -26.5 | 49.91 | - | - | 74 | -24.09 | 0-360 | 100 | V |
| 2 | * 1.328 | 50.15 | Avg | 29.1 | -26.9 | 52.35 | 53.97 | -1.62 | - | - | 0-360 | 101 | V |

Avg - Video bandwidth < Resolution bandwidth

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T346 (dB/m) | Amp/Cbl/ 3GHz HPF | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|-------------------|----------------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 5 | * 4.96 | 45.66 | PK | 34.4 | -30.8 | 49.26 | - | - | 74 | -24.74 | 0-360 | 199 | V |
| 4 | * 7.501 | 44.46 | PK | 36.1 | -28.6 | 51.96 | - | - | 74 | -22.04 | 0-360 | 100 | H |
| 6 | * 7.501 | 45.24 | PK | 36.1 | -28.6 | 52.74 | - | - | 74 | -21.26 | 0-360 | 199 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

PK - Peak detector

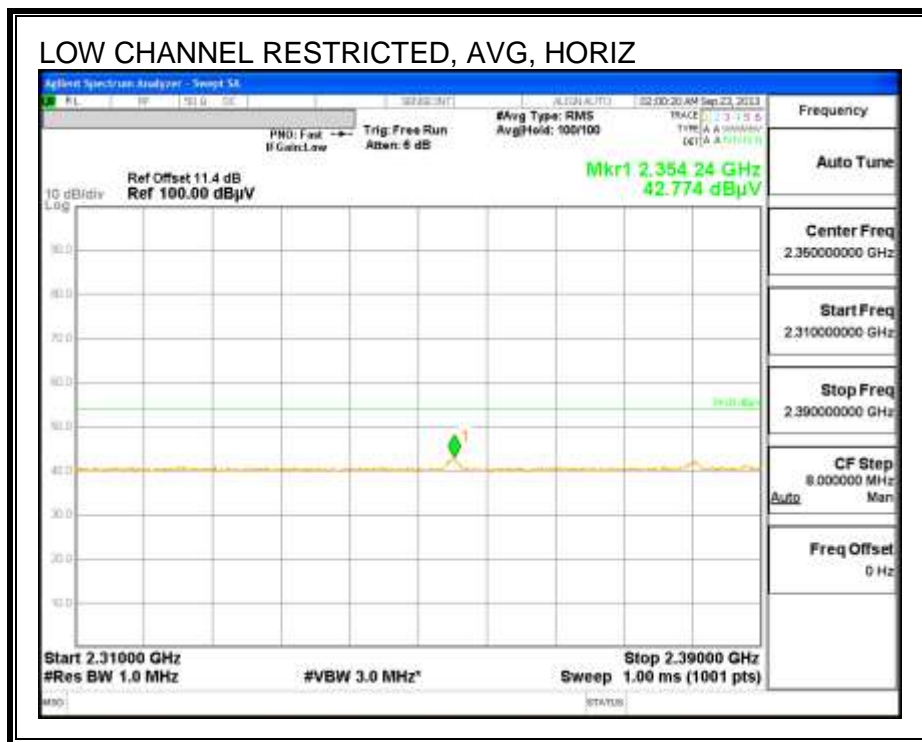
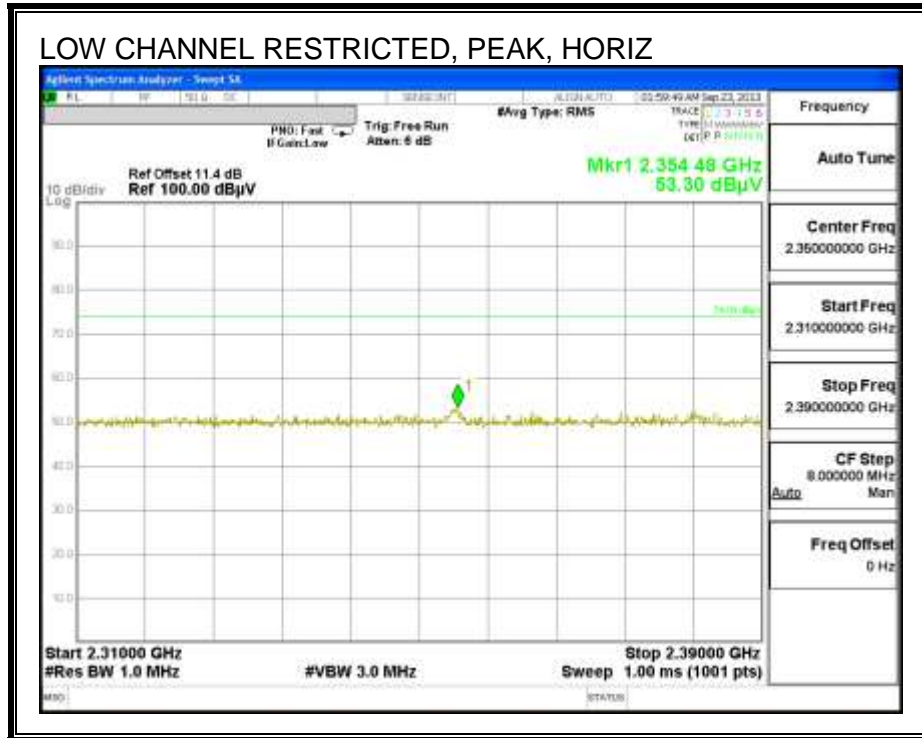
| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T346 (dB/m) | Amp/Cbl/1 0dB Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------------------|----------------------------|------|-------------------|----------------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| * 1.329 | 46.44 | MAv1 | 29.1 | -26.9 | 48.64 | 53.97 | -5.33 | - | - | 289 | 104 | V |

MAv1 - KDB558074 Option 1 Maximum RMS Average

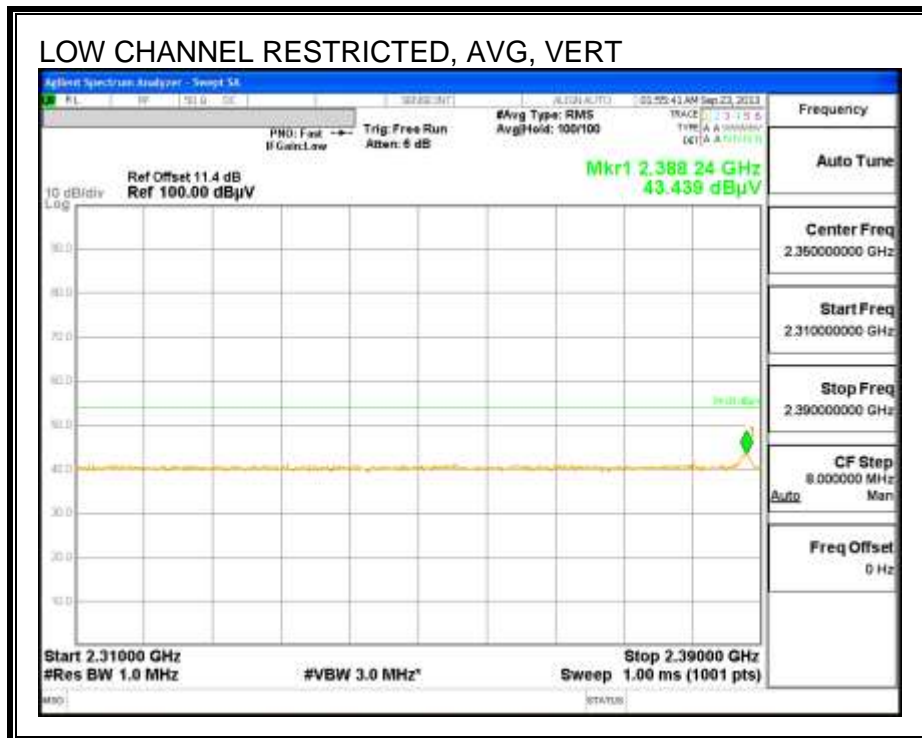
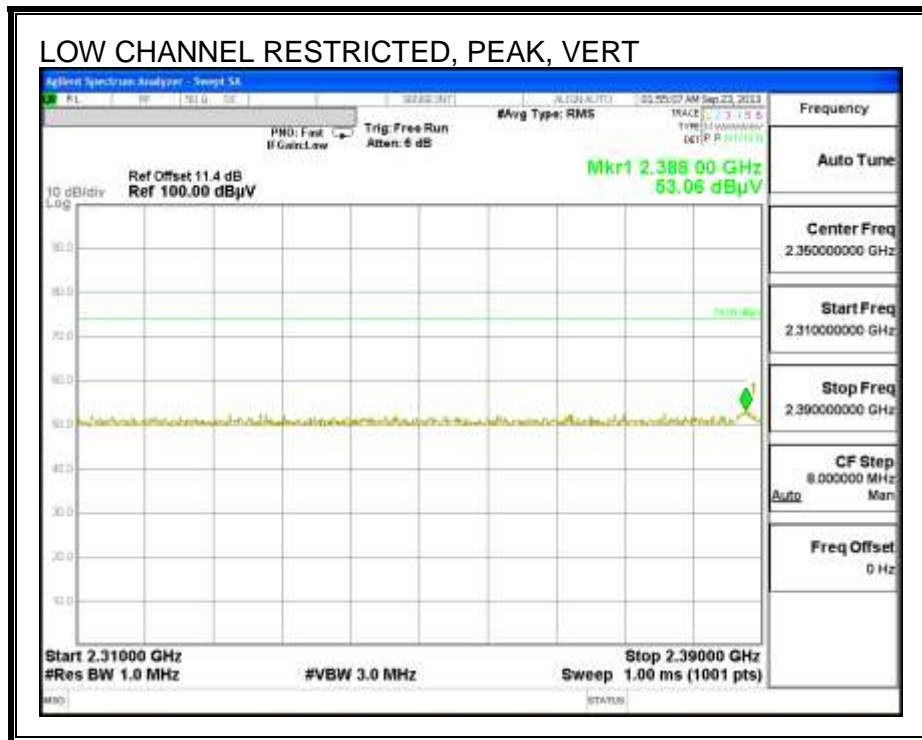
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 24 Sep 2013 Rev 9.5 21 Oct 2013

8.2.2. ENHANCED DATA RATE 8PSK MODULATION

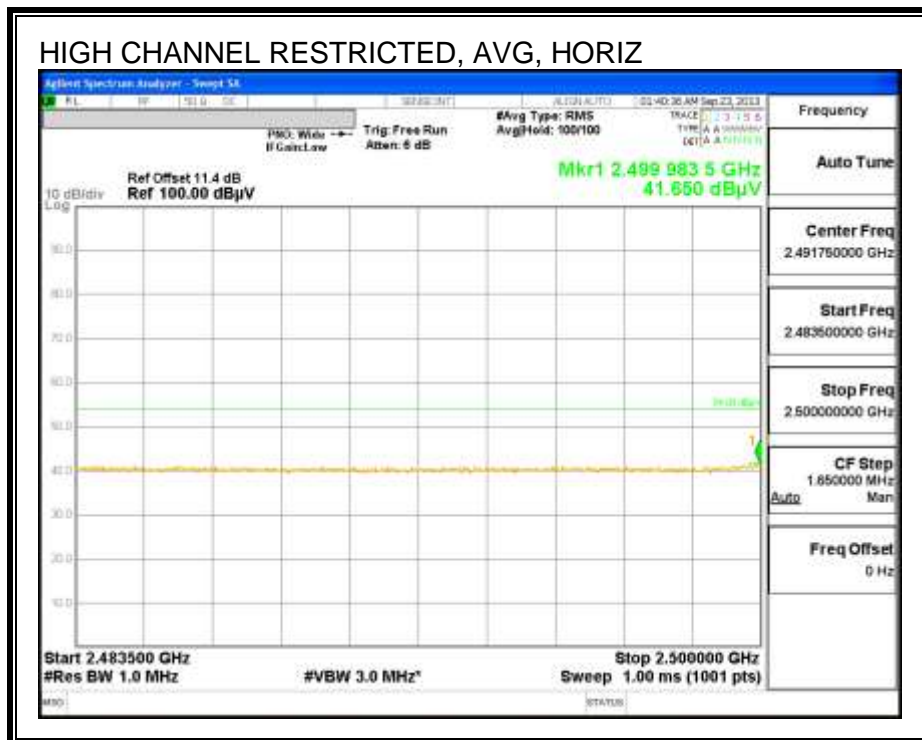
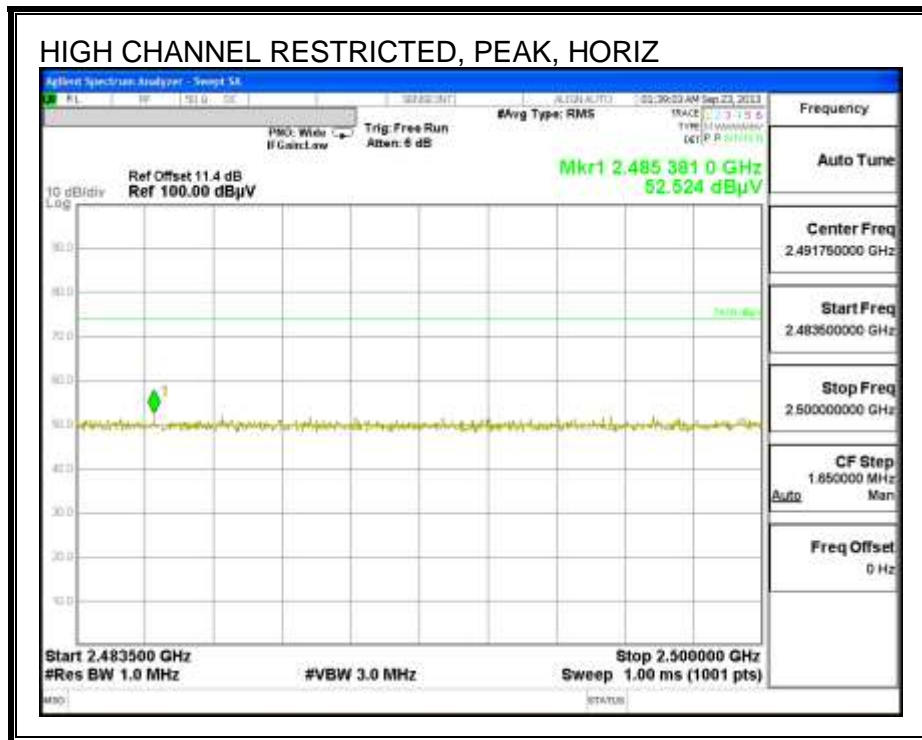
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



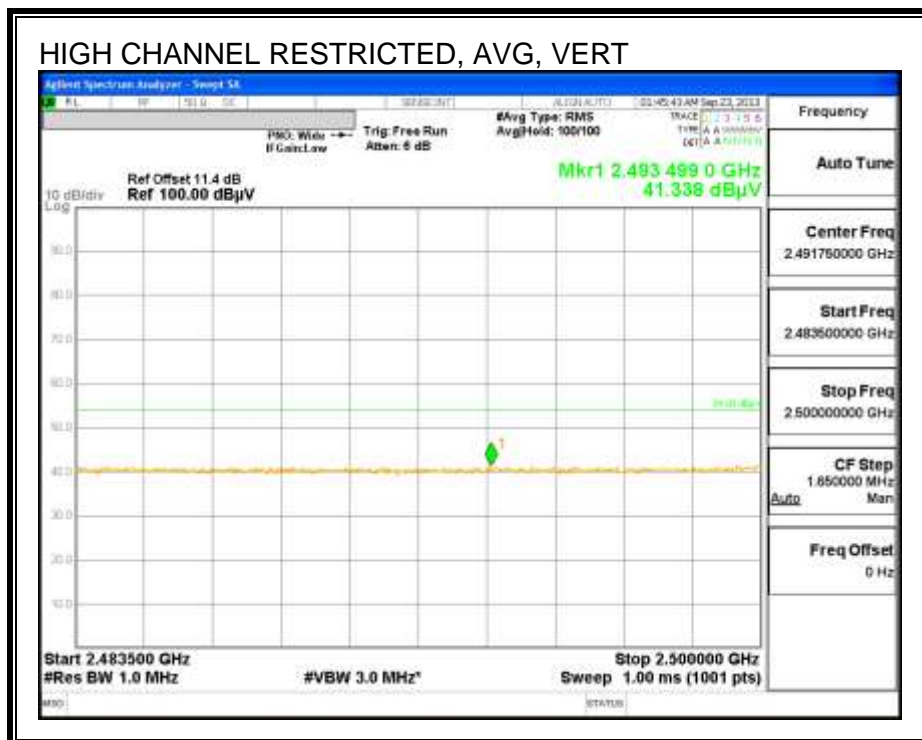
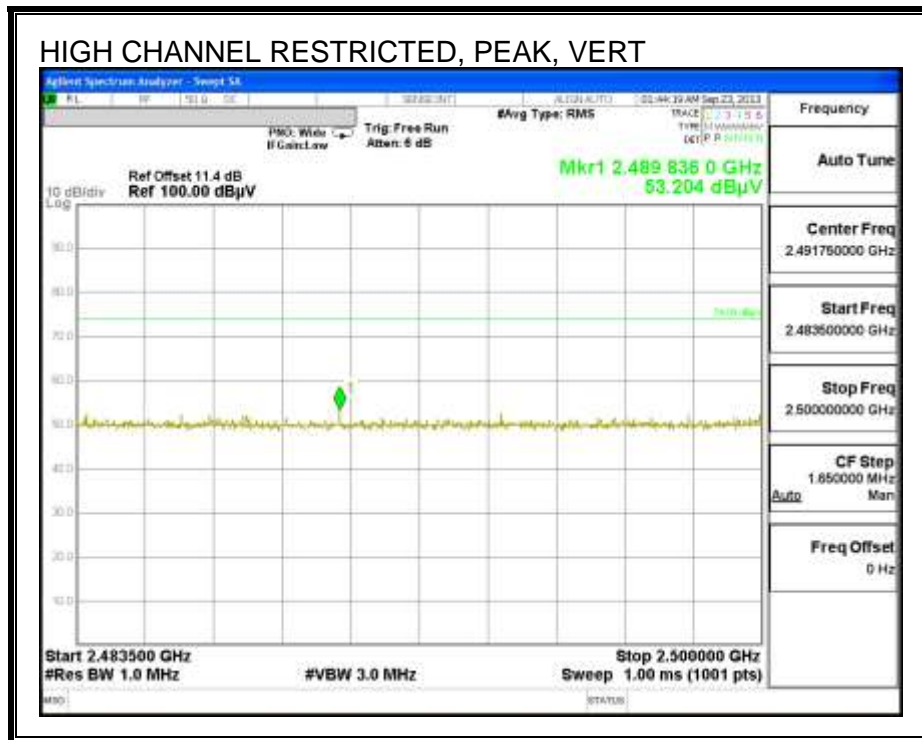
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



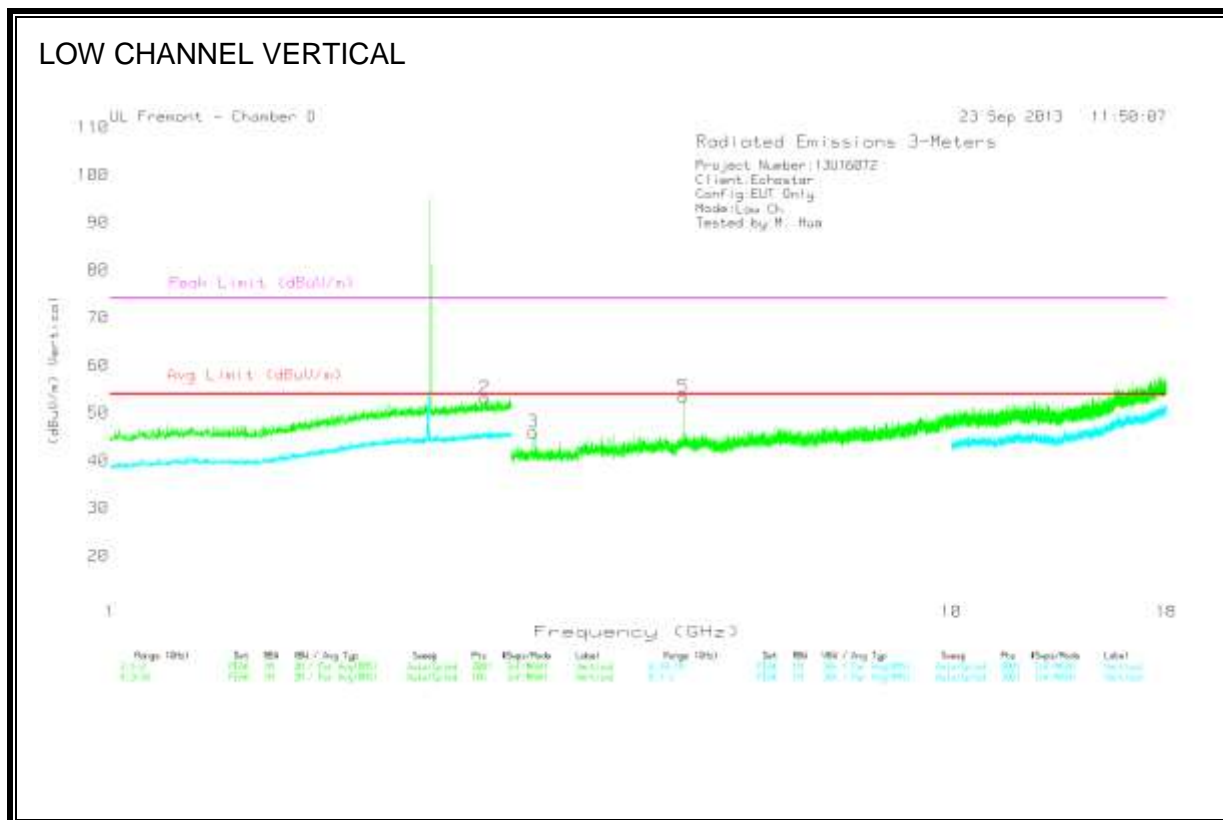
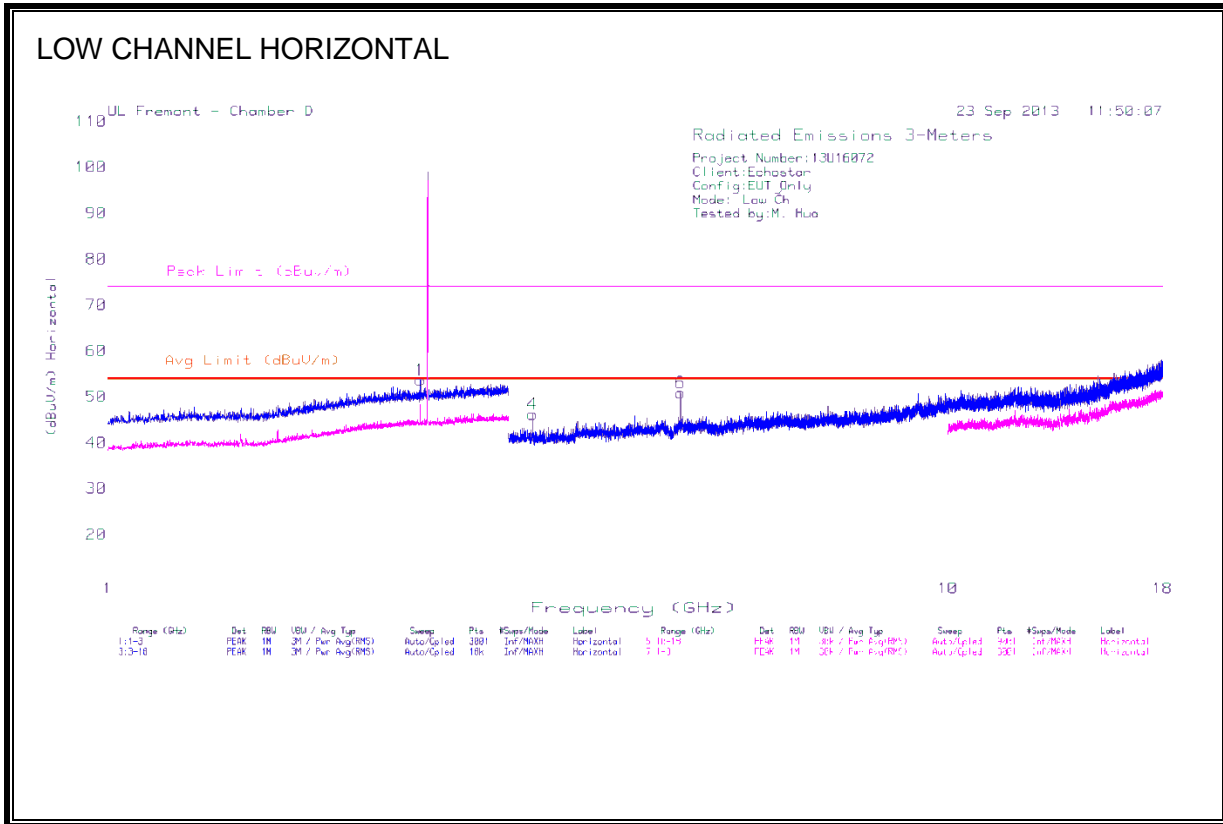
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS



Radiated Emissions

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T344 (db/m) | Amp/Cbl/ Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|-------------------|-----------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 1* | 2.355 | 42.44 | PK | 32.4 | -21.2 | 53.64 | - | - | 74 | -20.36 | 0-360 | 100 | H |
| 2* | 2.789 | 40.85 | PK | 32.9 | -20.6 | 53.15 | - | - | 74 | -20.85 | 0-360 | 200 | V |
| 3 | 3.185 | 41.63 | PK | 33.2 | -28.9 | 45.93 | - | - | - | - | 0-360 | 201 | V |
| 4 | 3.203 | 41.81 | PK | 33.3 | -28.9 | 46.21 | - | - | - | - | 0-360 | 100 | H |
| 5* | 4.805 | 46.52 | PK | 34.4 | -27.5 | 53.42 | - | - | 74 | -20.58 | 0-360 | 201 | V |
| 6* | 4.805 | 43.98 | PK | 34.4 | -27.5 | 50.88 | - | - | 74 | -23.12 | 0-360 | 201 | H |

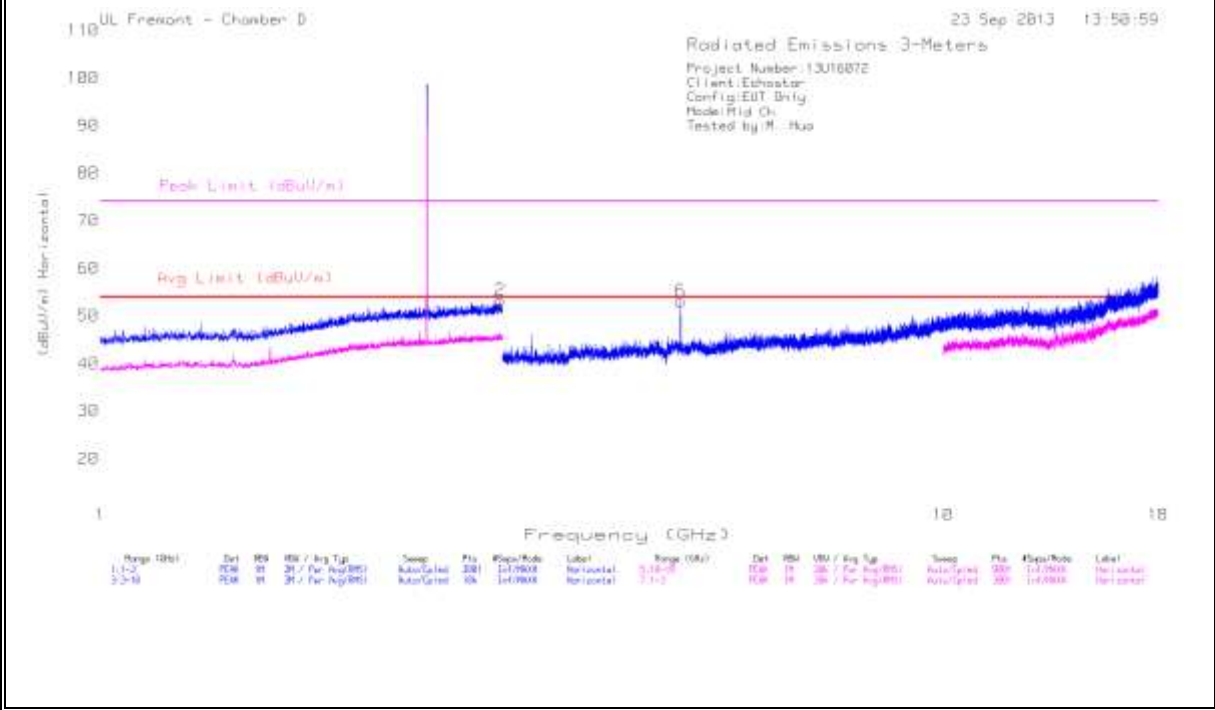
PK - Peak detector

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

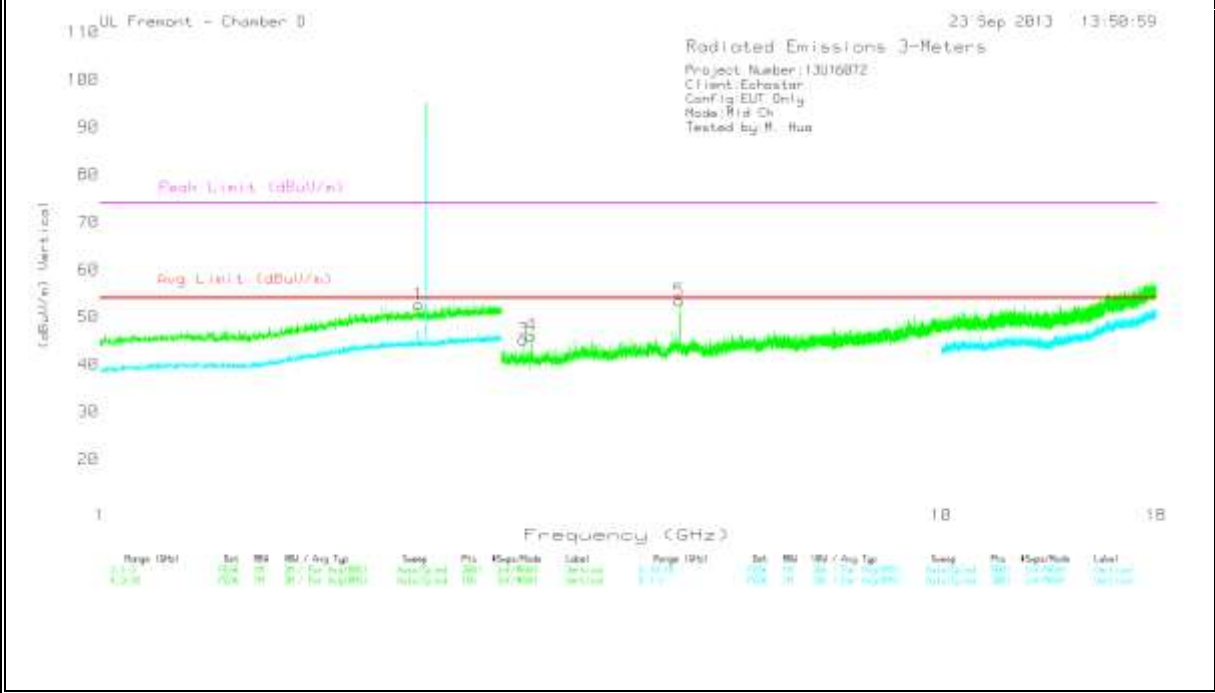
| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T344 (db/m) | Amp/Cbl/ Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------------------|----------------------------|------|-------------------|-----------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 2.359 | 29.31 | MAv1 | 32.4 | -21.2 | 40.51 | 53.97 | -13.46 | - | - | 32 | 152 | H |
| 2.785 | 29.24 | MAv1 | 32.9 | -20.6 | 41.54 | 53.97 | -12.43 | - | - | 152 | 112 | V |
| 4.804 | 38.63 | MAv1 | 34.4 | -27.6 | 45.43 | 53.97 | -8.54 | - | - | 10 | 391 | V |
| 4.804 | 39.4 | MAv1 | 34.4 | -27.6 | 46.2 | 53.97 | -7.77 | - | - | 311 | 278 | H |

MAv1 - KDB558074 v02 10.2.3.2/8.2.1 Option 1 Maximum RMS Average

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



Radiated Emissions

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T344 (db/m) | Amp/Cbl/ Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|--------------------|----------------------------|-----|-------------------|-----------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 1* | 2.39 | 41.32 | PK | 32.4 | -21.1 | 52.62 | - | - | 74 | -21.38 | 0-360 | 201 | V |
| 2 | 2.983 | 40.46 | PK | 33.1 | -20.3 | 53.26 | - | - | - | - | 0-360 | 100 | H |
| 3 | 3.185 | 40.95 | PK | 33.2 | -28.9 | 45.25 | - | - | - | - | 0-360 | 100 | V |
| 4 | 3.255 | 42.07 | PK | 33.3 | -29.3 | 46.07 | - | - | - | - | 0-360 | 201 | V |
| 5* | 4.882 | 46.38 | PK | 34.3 | -27.3 | 53.38 | - | - | 74 | -20.62 | 0-360 | 201 | V |
| 6* | 4.883 | 46.08 | PK | 34.3 | -27.3 | 53.08 | - | - | 74 | -20.92 | 0-360 | 201 | H |

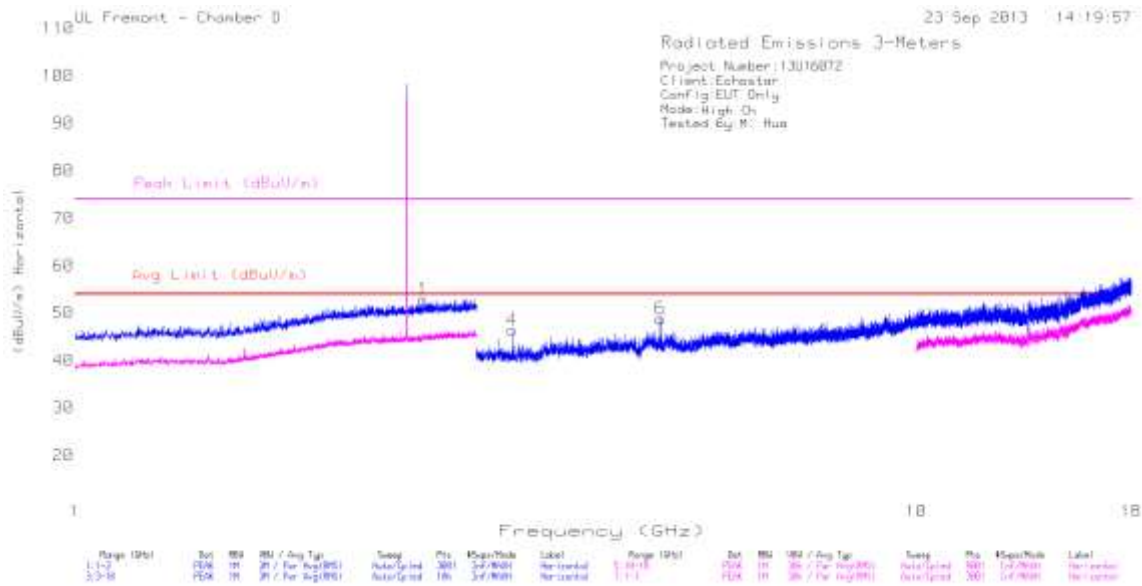
PK - Peak detector

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

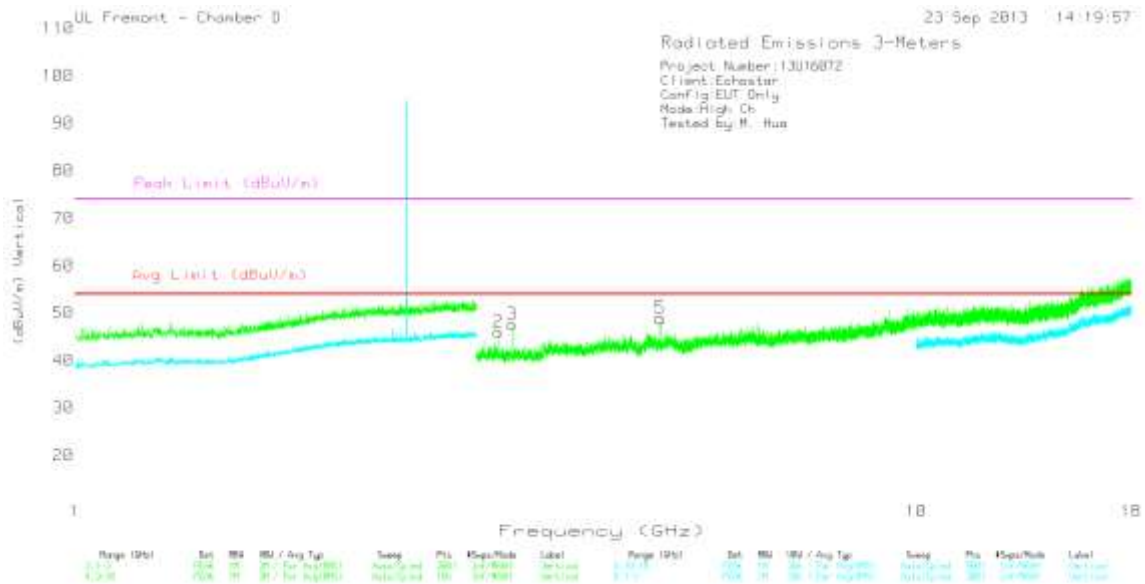
| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T344 (db/m) | Amp/Cbl/ Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------------------|----------------------------|------|-------------------|-----------------|----------------------------------|-----------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 2.388 | 30.68 | MAv1 | 32.4 | -21.1 | 41.98 | 53.97 | -11.99 | - | - | 93 | 179 | V |
| 2.979 | 29.26 | MAv1 | 33.1 | -20.4 | 41.96 | 53.97 | -12.01 | - | - | 311 | 160 | H |
| 4.882 | 41.43 | MAv1 | 34.3 | -27.3 | 48.43 | 53.97 | -5.54 | - | - | 327 | 180 | V |
| 4.882 | 38.62 | MAv1 | 34.3 | -27.3 | 45.62 | 53.97 | -8.35 | - | - | 333 | 113 | H |

MAv1 - KDB558074 v02 10.2.3.2/8.2.1 Option 1 Maximum RMS Average

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Radiated Emissions

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T344 (db/m) | Amp/Cbl/ Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|--------------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1 | 2.591 | 40.95 | PK | 32.6 | -20.7 | 52.85 | - | - | - | - | 0-360 | 100 | H |
| 2 | 3.185 | 41.69 | PK | 33.2 | -28.9 | 45.99 | - | - | - | - | 0-360 | 201 | V |
| 3 | 3.307 | 43.77 | PK | 33.3 | -29.5 | 47.57 | - | - | - | - | 0-360 | 201 | V |
| 4 | 3.307 | 42.57 | PK | 33.3 | -29.5 | 46.37 | - | - | - | - | 0-360 | 201 | H |
| 5* | 4.961 | 43.16 | PK | 34.3 | -28.6 | 48.86 | - | - | 74 | -25.14 | 0-360 | 201 | V |
| 6* | 4.961 | 43.12 | PK | 34.3 | -28.6 | 48.82 | - | - | 74 | -25.18 | 0-360 | 100 | H |

PK - Peak detector

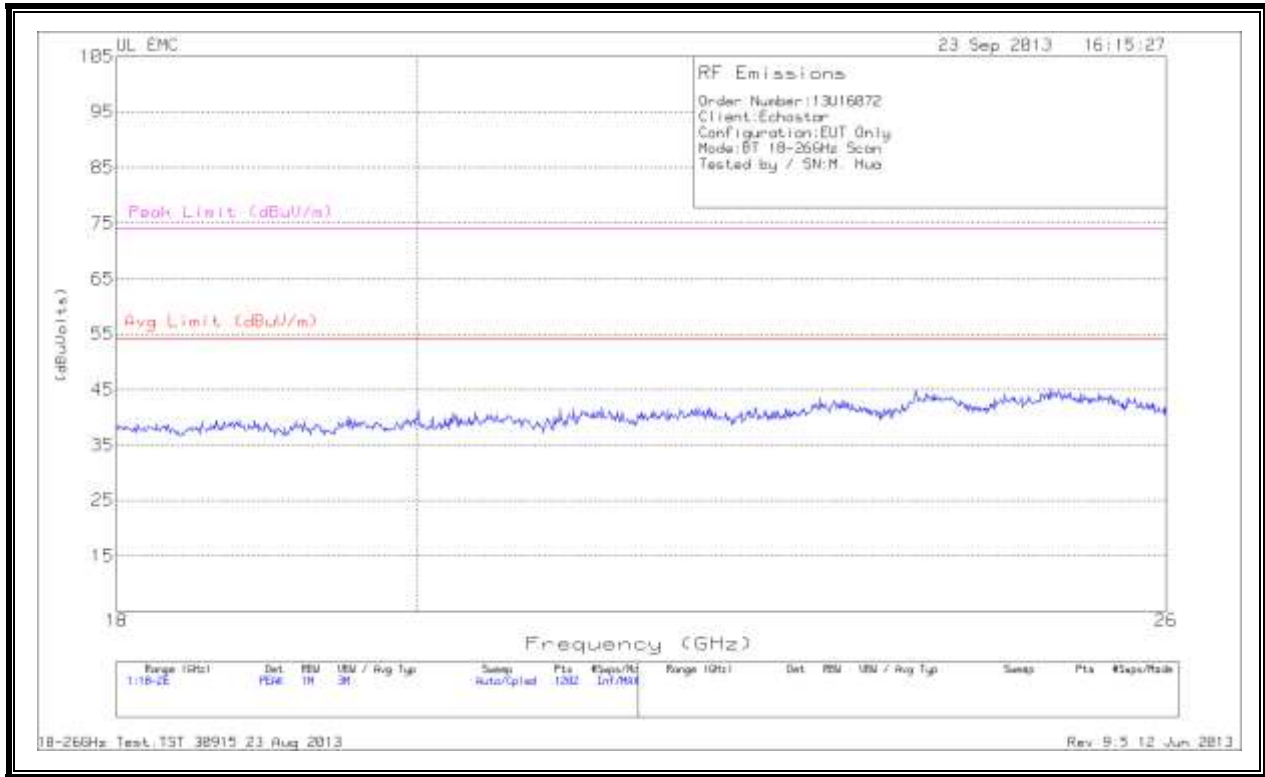
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

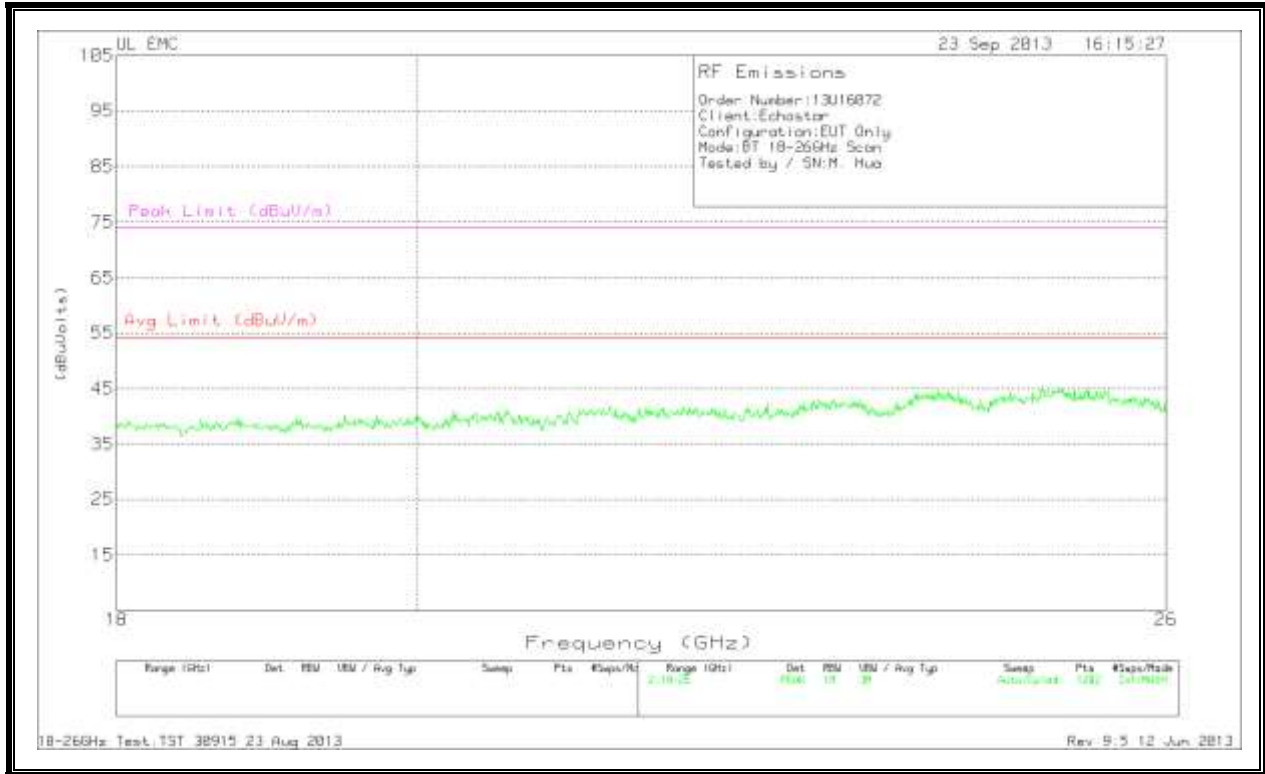
| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T344 (db/m) | Amp/Cbl/ Fltr/Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|-----------------|----------------------|------|----------------|-------------------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 4.96 | 38.75 | MAv1 | 34.3 | -28.6 | 44.45 | 53.97 | -9.52 | - | - | 320 | 132 | V |
| 4.96 | 29.12 | MAv1 | 34.3 | -28.6 | 34.82 | 53.97 | -19.15 | - | - | 78 | 108 | H |

MAv1 - KDB558074 v02 10.2.3.2/8.2.1 Option 1 Maximum RMS Average

8.3. WORST-CASE ABOVE 18 GHz

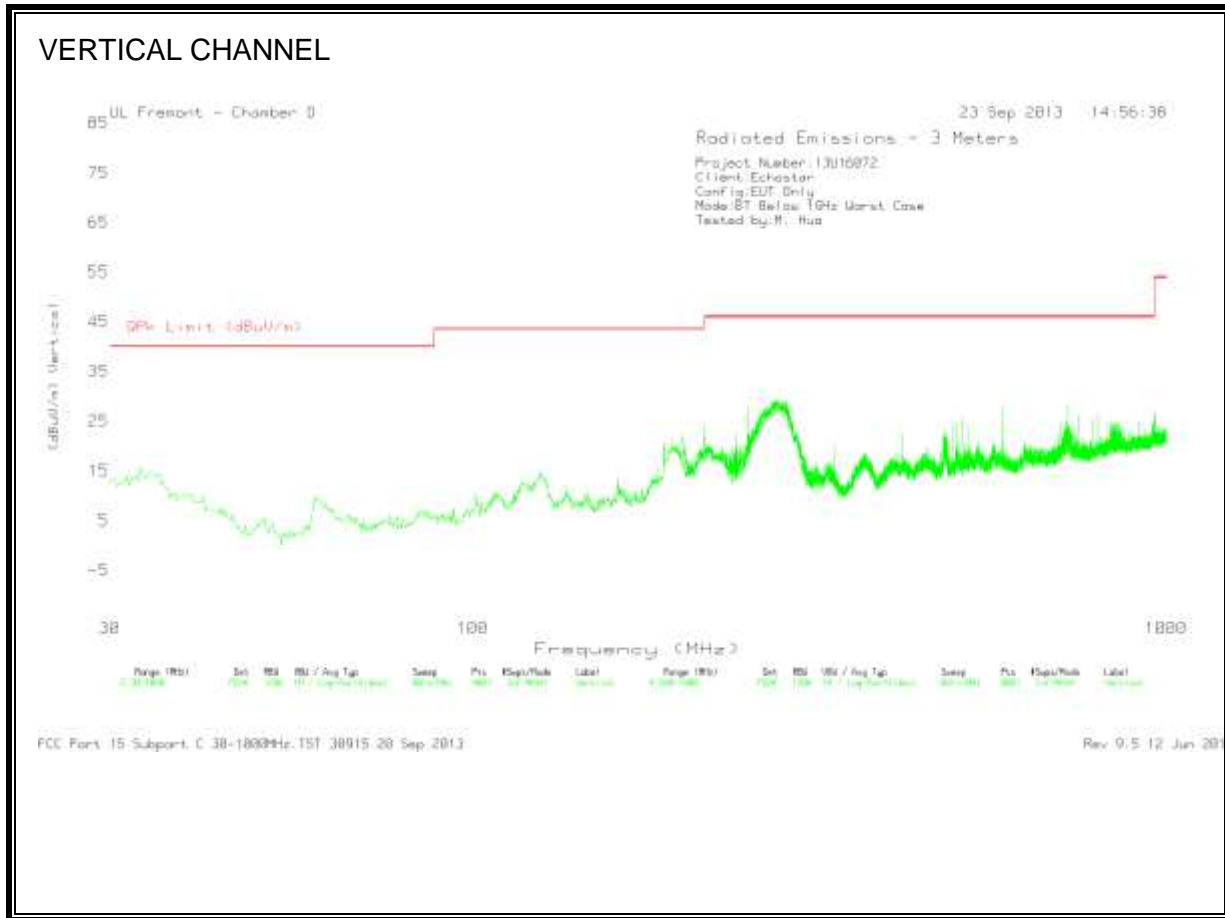
SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)





Note: There were no emissions detected above system noise floor.

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



SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, DATA)**Radiated Emissions**

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF T407 dB/m | Amp/Cbl (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------|--------------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 1 | 189.08 | 53.95 | PK | 11.4 | -31.1 | 34.25 | 43.52 | -9.27 | 0-360 | 99 | H |
| 2 | 249.22 | 57.14 | PK | 11.5 | -30.9 | 37.74 | 46.02 | -8.28 | 0-360 | 99 | H |
| 3 | 283.4125 | 56.58 | PK | 13.4 | -30.8 | 39.18 | 46.02 | -6.84 | 0-360 | 99 | H |
| 4 | 508.4525 | 42.43 | PK | 17.8 | -30.3 | 29.93 | 46.02 | -16.09 | 0-360 | 200 | H |
| 5 | 719.9125 | 41.1 | PK | 20.2 | -30 | 31.3 | 46.02 | -14.72 | 0-360 | 99 | H |

FCC Part 15 Subpart C 30-1000MHz.TST 30915 20 Sep 2013 Rev 9.5 12 Jun 2013

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

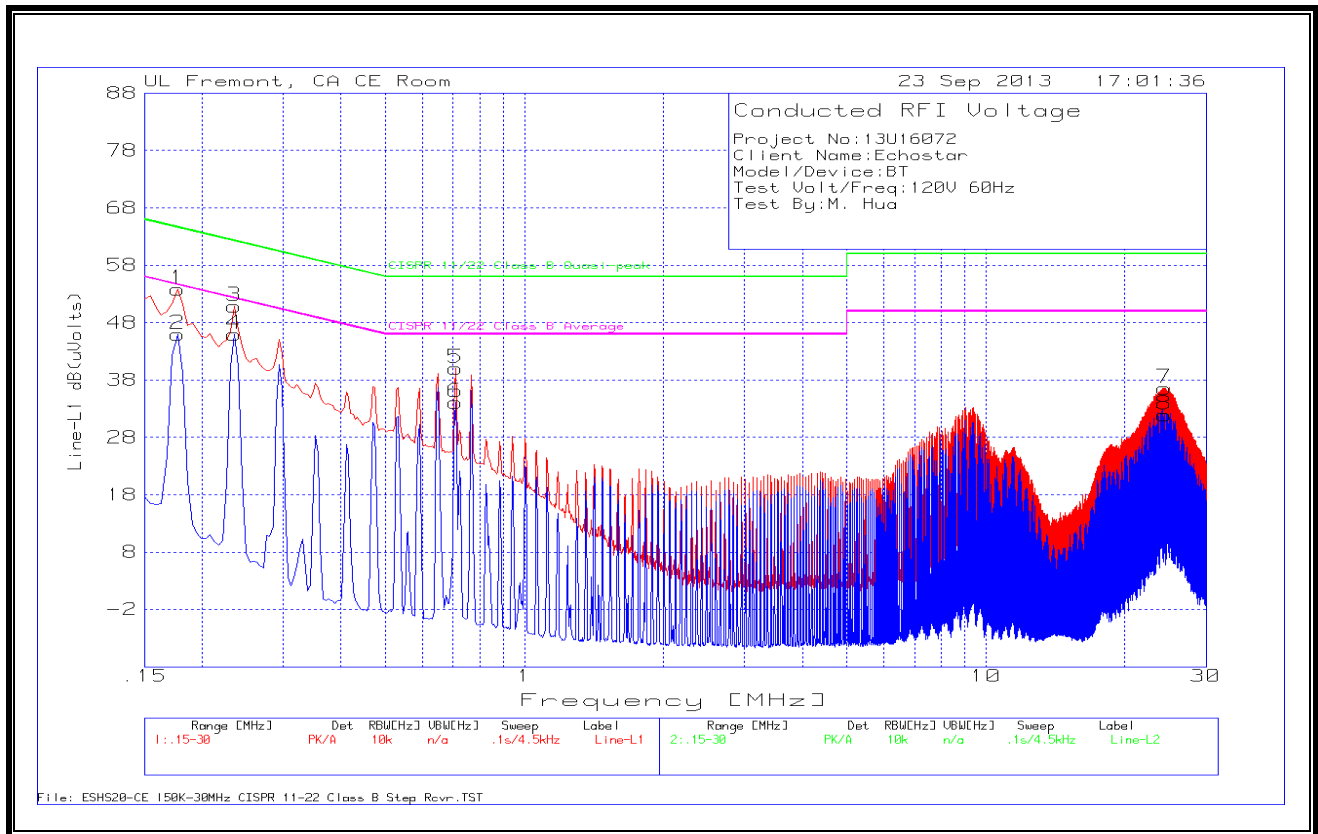
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

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

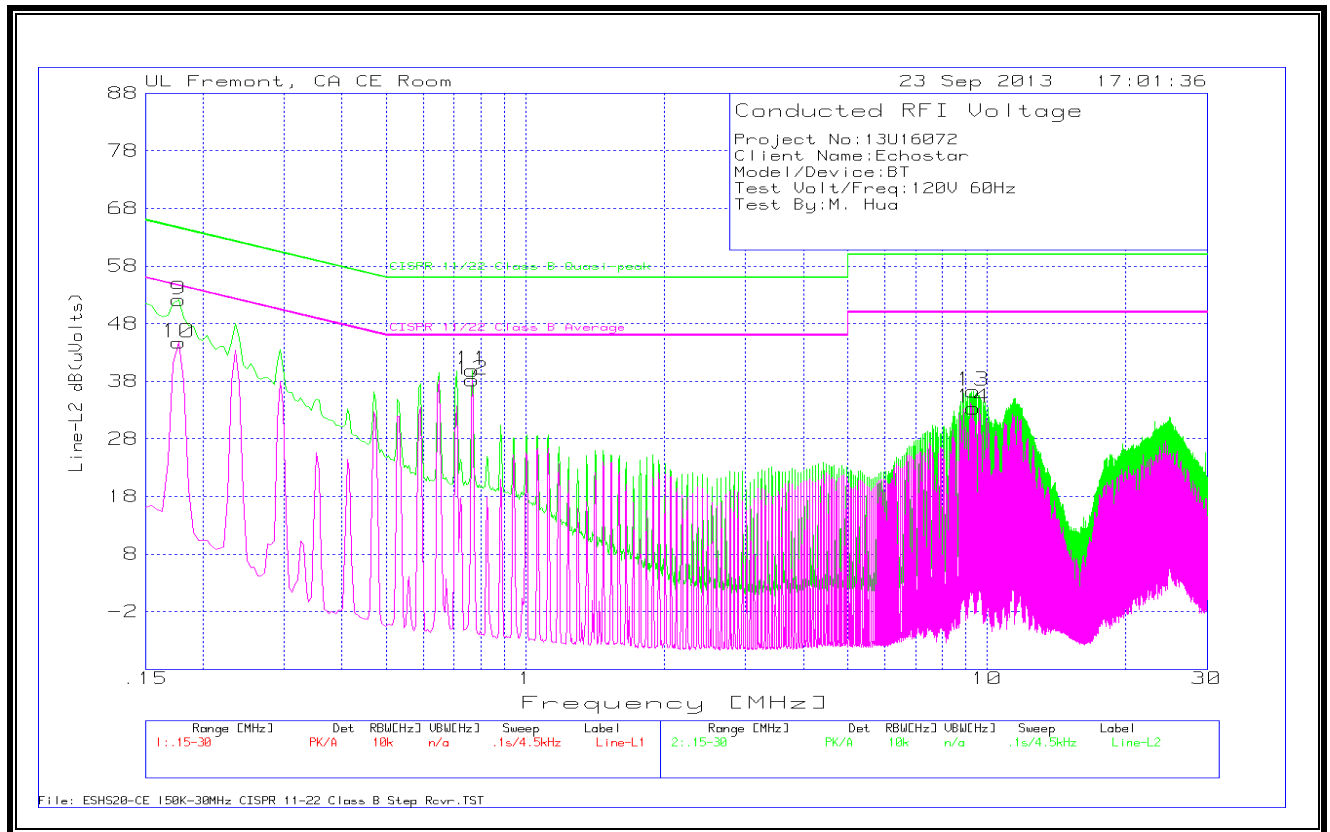
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

LINE 1 RESULTS



LINE 2 RESULTS



Line-L1 .15 - 30MHz

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | T24 IL L1 (dB) | LC Cables 1&3 (dB) | Corrected Reading dB(uVolts) | CISPR 11/22 Class B Quasi-peak | Margin to Limit (dB) | CISPR 11/22 Class B Average | Margin to Limit (dB) |
|--------|-----------------|----------------------|-----|----------------|--------------------|------------------------------|--------------------------------|----------------------|-----------------------------|----------------------|
| 1 | .177 | 53.76 | PK | .1 | 0 | 53.86 | 64.6 | -10.74 | - | - |
| 2 | .177 | 45.84 | Av | .1 | 0 | 45.94 | - | - | 54.6 | -8.66 |
| 3 | .2355 | 50.76 | PK | .1 | 0 | 50.86 | 62.3 | -11.44 | - | - |
| 4 | .2355 | 45.82 | Av | .1 | 0 | 45.92 | - | - | 52.3 | -6.38 |
| 5 | .708 | 39.92 | PK | .1 | 0 | 40.02 | 56 | -15.98 | - | - |
| 6 | .708 | 34.04 | Av | .1 | 0 | 34.14 | - | - | 46 | -11.86 |
| 7 | 24.3735 | 35.95 | PK | .4 | .2 | 36.55 | 60 | -23.45 | - | - |
| 8 | 24.3735 | 31.37 | Av | .4 | .2 | 31.97 | - | - | 50 | -18.03 |

PK - Peak detector
 Av - average detection

Line-L2 .15 - 30MHz

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | T24 IL L2 (dB) | LC Cables 2&3 (dB) | Corrected Reading dB(uVolts) | CISPR 11/22 Class B Quasi-peak | Margin to Limit (dB) | CISPR 11/22 Class B Average | Margin to Limit (dB) |
|--------|-----------------|----------------------|-----|----------------|--------------------|------------------------------|--------------------------------|----------------------|-----------------------------|----------------------|
| 9 | .177 | 51.99 | PK | .1 | 0 | 52.09 | 64.6 | -12.51 | - | - |
| 10 | .177 | 44.64 | Av | .1 | 0 | 44.74 | - | - | 54.6 | -9.86 |
| 11 | .7665 | 39.79 | PK | .1 | 0 | 39.89 | 56 | -16.11 | - | - |
| 12 | .7665 | 38.17 | Av | .1 | 0 | 38.27 | - | - | 46 | -7.73 |
| 13 | 9.3255 | 36.1 | PK | .1 | .1 | 36.3 | 60 | -23.7 | - | - |
| 14 | 9.3255 | 33.1 | Av | .1 | .1 | 33.3 | - | - | 50 | -16.7 |

PK - Peak detector
 Av - average detection