# FCC 47 CFR PART 15 SUBPART C

# CERTIFICATION TEST REPORT

**FOR**

**Cellular Phone with Bluetooth and WLAN Radios**

**MODEL NUMBER: A1549**

**FCC ID: BCG-E2816A**

**REPORT NUMBER: 14U17673-E6, Revision C**

**ISSUE DATE: AUGUST 02, 2014**

*Prepared for*
**APPLE, INC.**
**1 INFINITE LOOP**
**CUPERTINO, CA 95014, U.S.A.**

*Prepared by*
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NVLAP LAB CODE 200065-0

## Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| -- | 7/17/14 | Initial Issue | F. deAnda |
| A | 7/23/14 | Update Product Description | M. Hua |
| B | 7/29/14 | Updated sections 5, 8, 9 and 10 | F. de Anda |
| C | 08/02/14 | Address TCB Questions | T. Lee |


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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** APPLE
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

**EUT DESCRIPTION:** Cellular Phone with Bluetooth and WLAN Radios

**MODEL:** A1549

**SERIAL NUMBER:** C39MQ0BVG332

**DATE TESTED:** APRIL 16 –JULY 08, 2014

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

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

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

Approved & Released For
UL Verification Services Inc. By:

FRANCISCO DE ANDA
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Tested By:

JOE VANG
EMC TECHNICIAN
UL VERIFICATION SERVICES INC.


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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB558074 and ANSI C63.10-2009

Per FCC guidance, radiated tests are performed for A1549 to ensure that there is no deviation in EM fields between Model A1549 and Model A1586.

# 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 |
|---|---|
| ☐ Chamber A | ☒ Chamber D |
| ☐ Chamber B | ☒ Chamber E |
| ☐ Chamber C | ☒ Chamber F |
| | ☐ Chamber G |
| | ☒ Chamber H |

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

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

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

## 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m


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## 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%.


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# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

Model A1549 is a mobile phone with multimedia functions (music, application support, and video), Cellular GSM/GPRS/EGPRS/CDMA2000/EVDO Rev.A/ EVDO Rev.B /WCDMA/HSPA+/DC-HSDPA/LTE FDD & Carrier Aggregation radio, IEEE 802.11a/b/g/n/ac radio, Bluetooth radio and NFC. The rechargeable battery is not user accessible.

## 5.2. MAXIMUM OUTPUT POWER

For Maximum output power data, refer to Model A1586 FCC WLAN DTS report.

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of -0.38 dBi.

## 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 7.16.121

The test utility software used during testing was wl 7.16 RC121.0.


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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 (Flatbed), Y (Landscape), Z (Portrait), it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X (Flatbed) orientation.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20mode: MCS0

Radiated emissions for EUT with antenna was performed and passed; therefore, antenna port spurious was not performed.

There are three vendors of the WiFi/Bluetooth radio modules: variant 1, variant 2 and variant 3 and they have the same mechanical outline, same on board antenna, matching circuit, antenna structure and same specification. Baseline testing was performed on all three variants to determine the worst case on all conducted power and radiated emissions.


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## 5.6. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| AC/DC adapter | Apple | A1401 | 60812 | NA |
| Earphone | Apple | NA | NA | NA |

**I/O CABLES (RADIATED ABOVE 1 GHZ)**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| Cable No | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| one used | | | | | | |

**I/O CABLES (BELOW 1GHZ & AC LINE CONDUCTED TESTS)**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| Cable No | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1 | AC | 1 | US115 | Un-Shielded | 80cm | NA |
| 2 | DC | 1 | USB | Un-Shielded | 1m | NA |
| 3 | Audio | 1 | Jack | Un-Shielded | 0.5m | NA |


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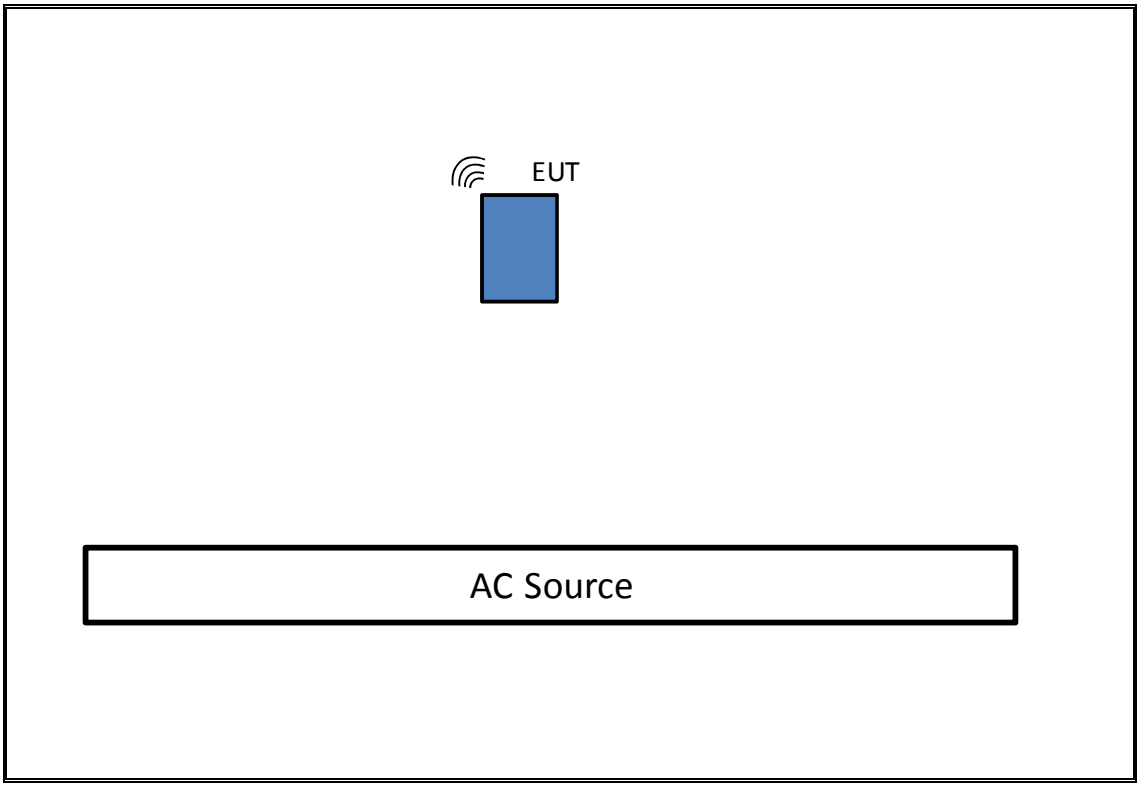
**TEST SETUP- RADIATED-ABOVE 1 GHZ**

The EUT was tested battery powered. Test software exercised the EUT.

**SETUP DIAGRAM**



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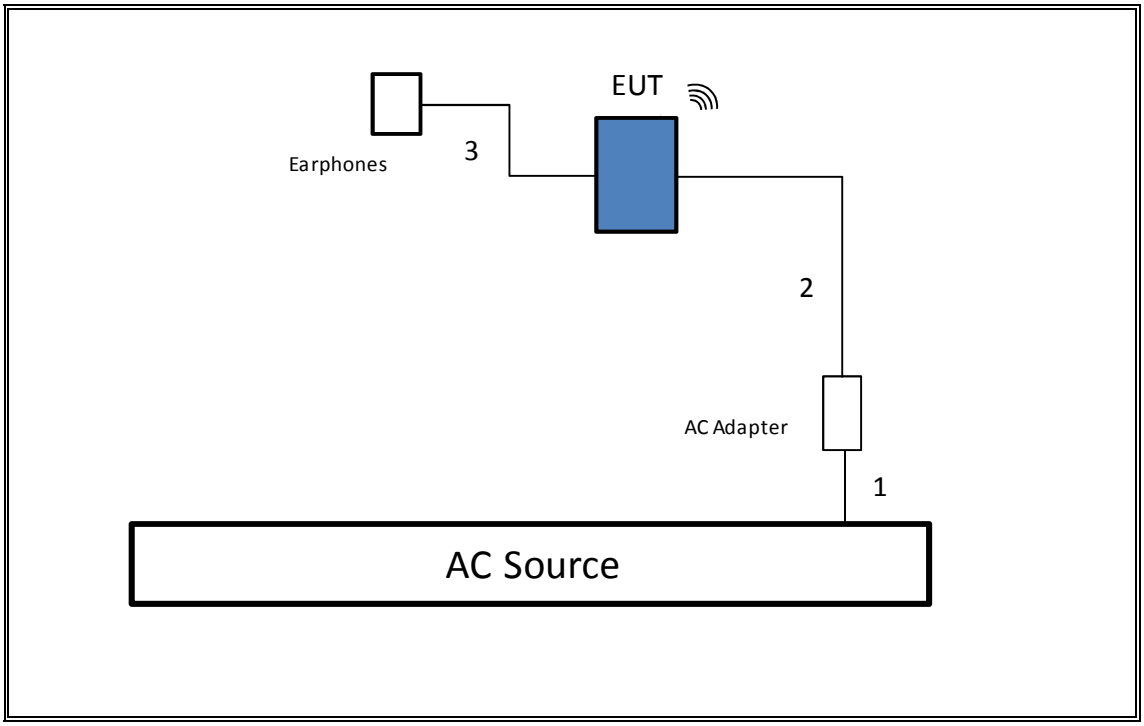
**TEST SETUP-** BELOW 1GHZ & AC LINE CONDUCTED TESTS

The EUT was tested with earphones connected and powered by AC adapter. Test software exercised the EUT.

**SETUP DIAGRAM**



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# 6. TEST AND MEASUREMENT EQUIPMENT

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

| TEST EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Asset** | **Cal Due** |
| Antenna, Horn, 18 GHz | ETS Lindgren | 3117 | F00131 | 02/18/15 |
| Antenna, Horn, 26.5 GHz | ARA | MWH-1826/B | C00589 | 11/28/14 |
| Peak / Average Power Sensor | Agilent / HP | N1911A | F00153 | 03/06/15 |
| Wideband Power Sensor | Agilent | N1921A | F00361 | 10/02/14 |
| Peak Power Meter | Agilent / HP | E9323A | F00025 | 04/03/15 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | N9030A | F00129 | 02/22/15 |
| Antenna, Bilog, 2 GHz | Sunol Sciences | JB1 | F00168 | 03/28/15 |
| Preamplifier, 1300 MHz | Sonoma | 310 | F00008 | 05/27/15 |
| Preamplifier, 26.5 GHz | Agilent / HP | 8449B | F00165 | 03/25/15 |
| EMI Test Receiver, 9 kHz-7 GHz | R & S | ESCI 7 | F00092 | 09/05/14 |
| LISN, 30 MHz | FCC | LISN-50/250-25-2 | C00626 | 01/14/15 |


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# 7. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r02, Section 8.1.

Output Power: KDB 558074 D01 v03r02, Section 9.1.2.

Power Spectral Density: KDB 558074 D01 v03r02, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r02, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r02, Section 12.0.

# 8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

**LIMITS**

None; for reporting purposes only.

**PROCEDURE**

KDB 789033 Zero-Span Spectrum Analyzer Method.

## 8.1. ON TIME AND DUTY CYCLE RESULTS

For on time and duty cycle data, refer to Model A1586 FCC WLAN DTS report.

# 9. ANTENNA PORT TEST RESULTS

For antenna port data, refer to Model A1586 FCC WLAN DTS report.


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# 10. RADIATED TEST RESULTS

## 10.1. 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 |
|---|---|---|
| 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.

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; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

The spectrum from 30 MHz to 40 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.

Per FCC guidance, radiated tests are performed to ensure there is no deviation in EM fields between Model A1549 and Model A1586.


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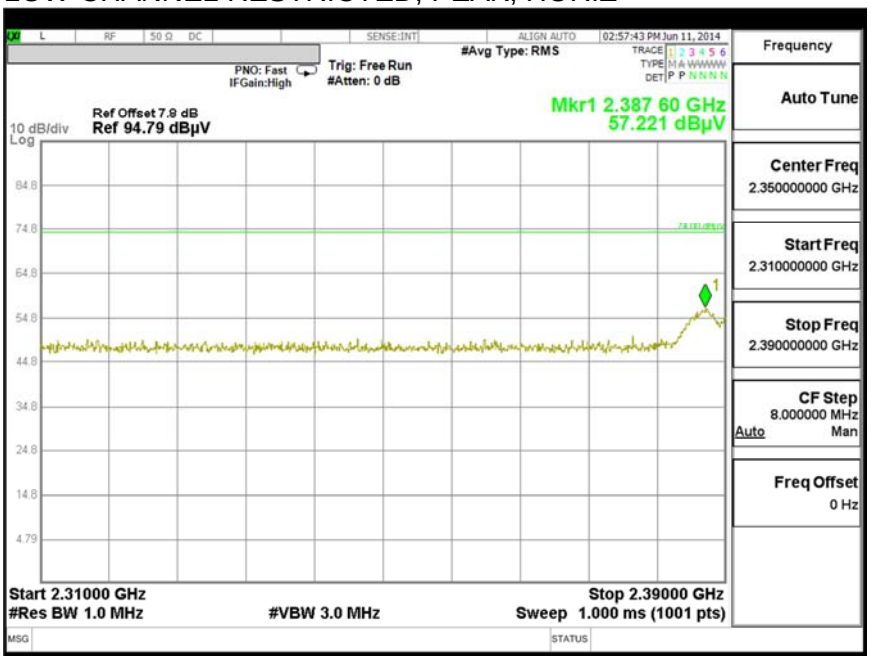
## 10.2. TX RADIATED ABOVE 1 GHz

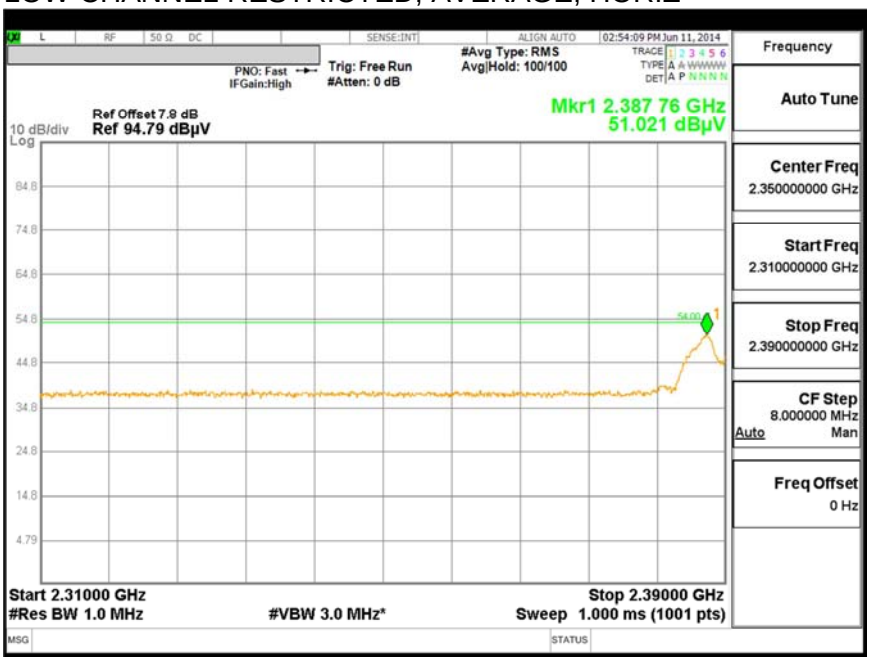
### 10.2.1. 802.11b 1Tx SISO MODE IN THE 2.4 GHz BAND

**RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 1)**

LOW CHANNEL RESTRICTED, PEAK, HORIZ




LOW CHANNEL RESTRICTED, AVERAGE, HORIZ





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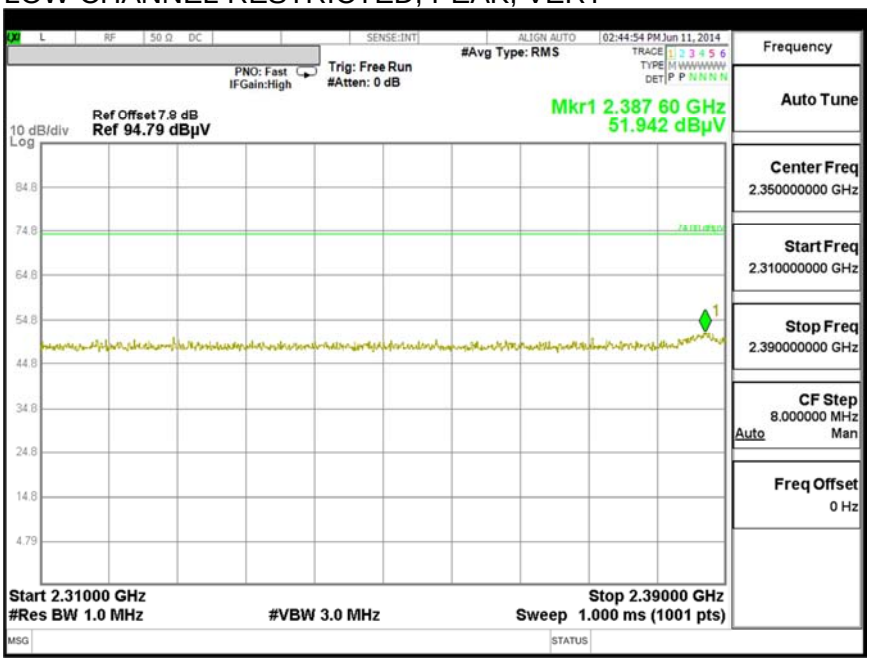
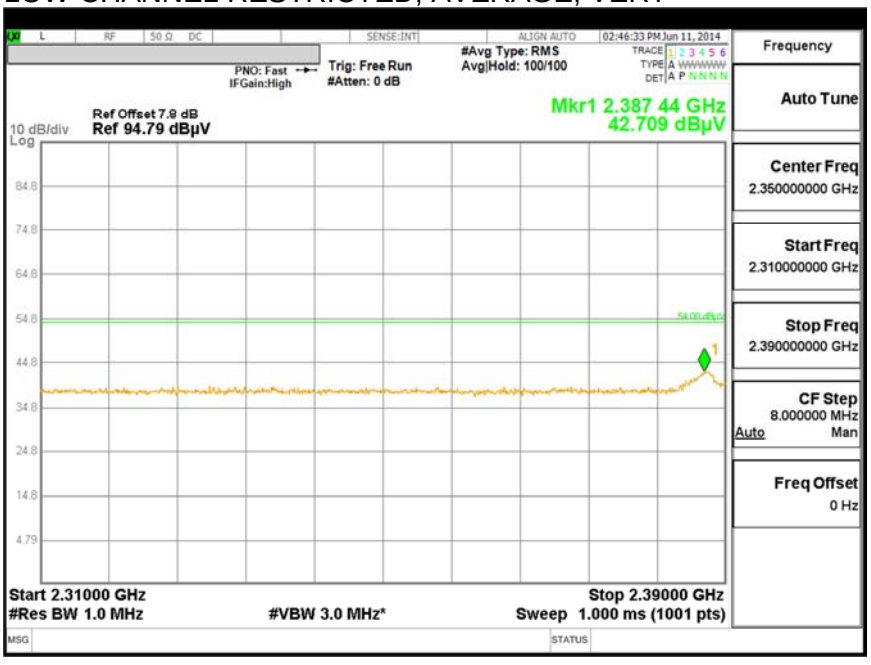
LOW CHANNEL RESTRICTED, PEAK, VERT




LOW CHANNEL RESTRICTED, AVERAGE, VERT





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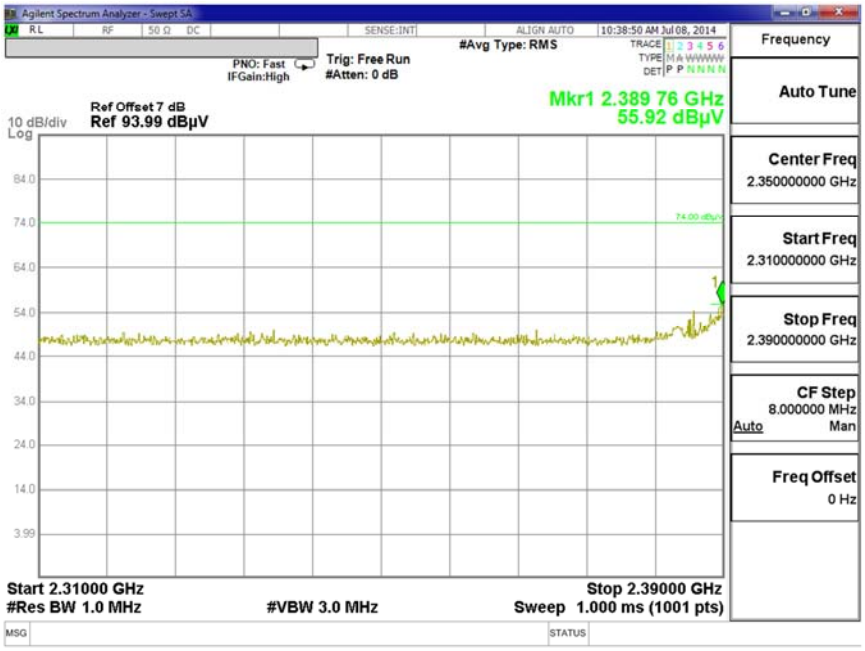
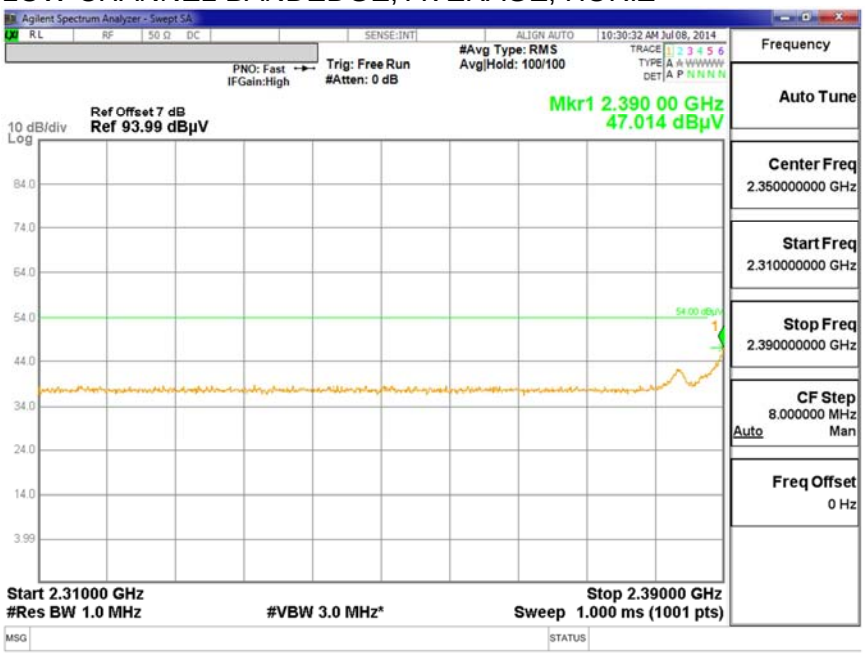
**RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 2)**

LOW CHANNEL BANDEDGE, PEAK, HORIZ




LOW CHANNEL BANDEDGE, AVERAGE, HORIZ







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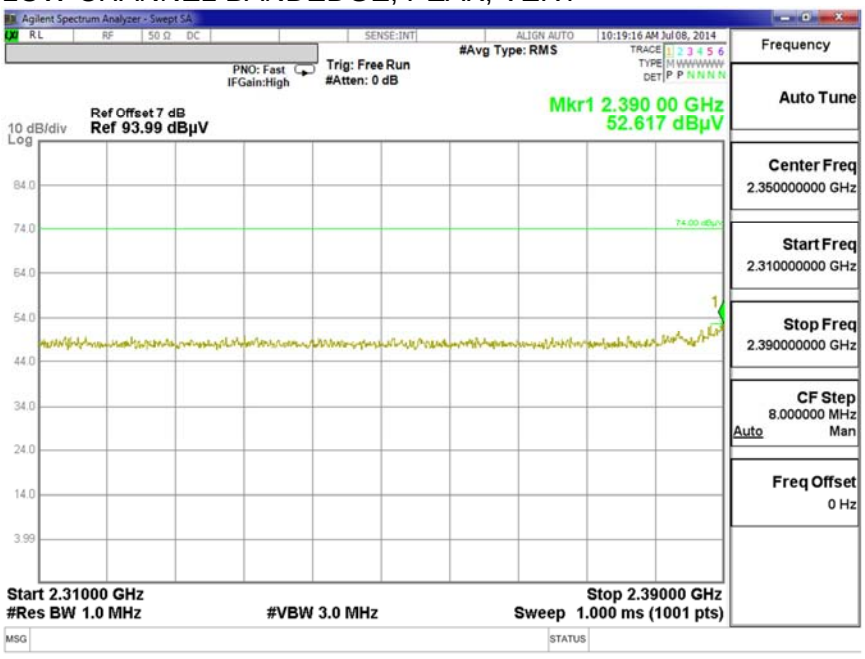
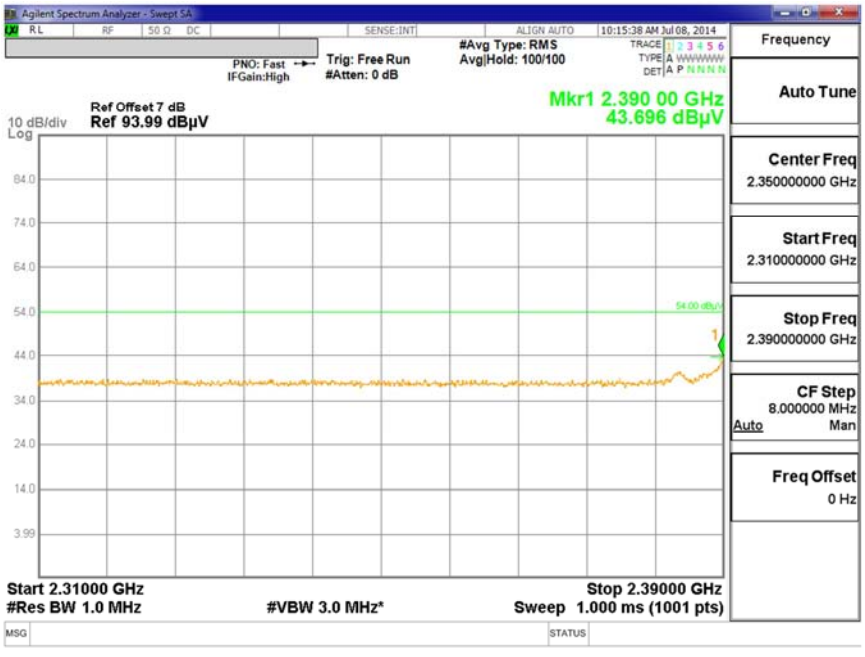
LOW CHANNEL BANDEDGE, PEAK, VERT




LOW CHANNEL BANDEDGE, AVERAGE, VERT





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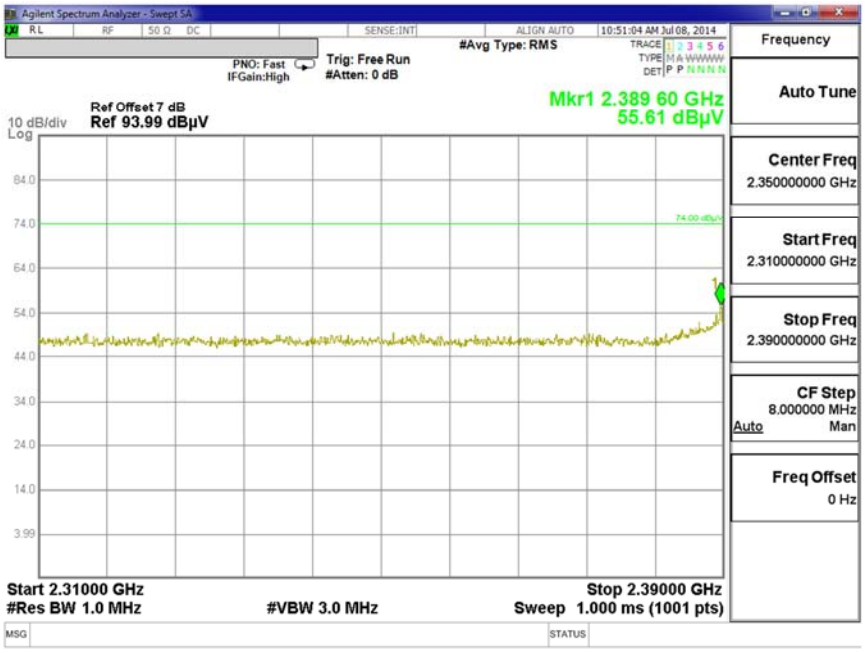
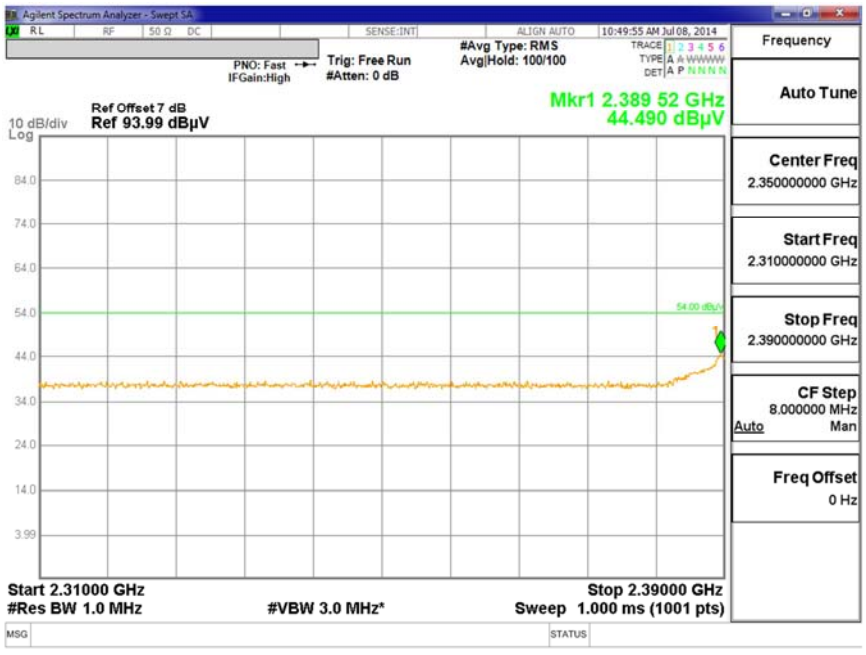
**RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 3)**

LOW CHANNEL RESTRICTED, PEAK, HORIZ




LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



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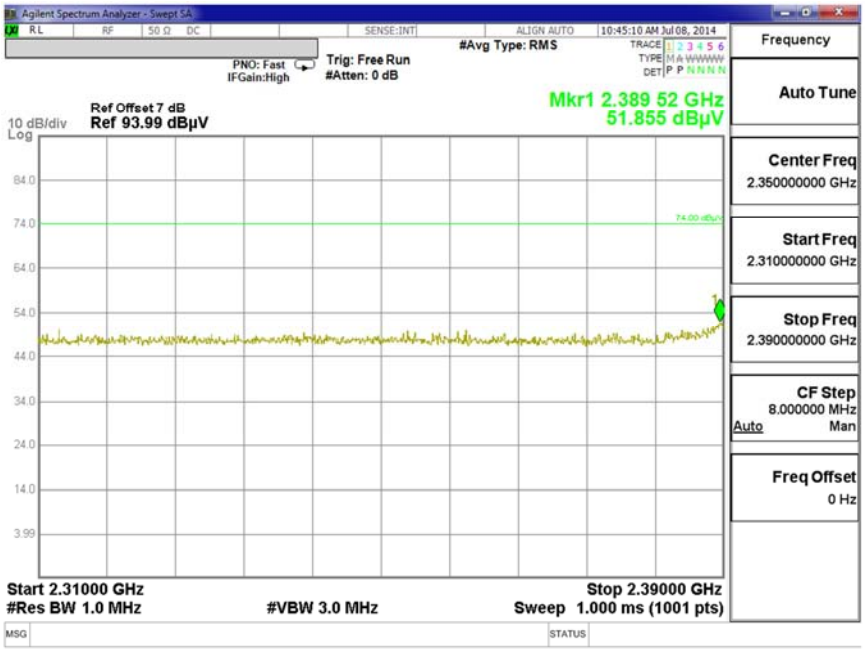
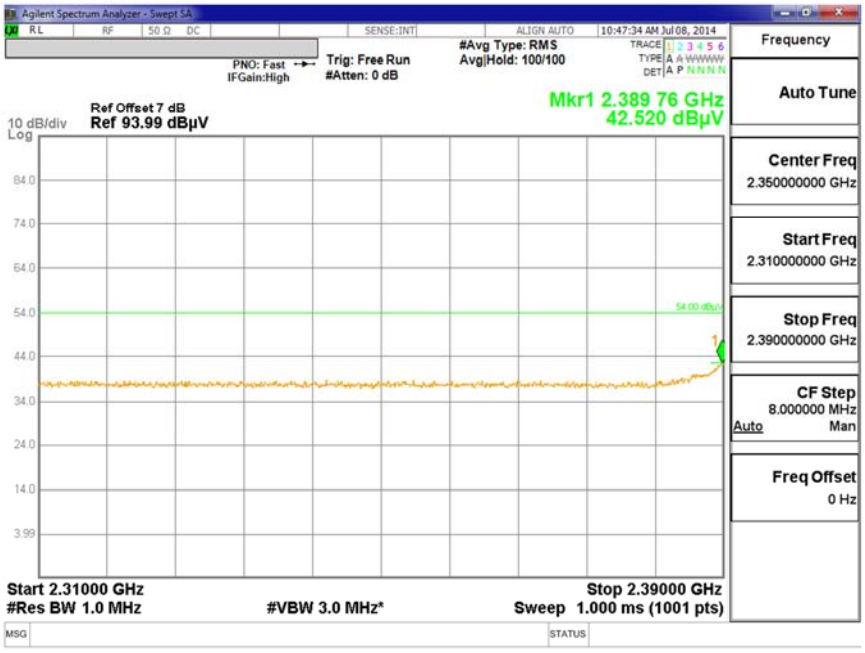
LOW CHANNEL RESTRICTED, PEAK, VERT




LOW CHANNEL RESTRICTED, AVERAGE, VERT



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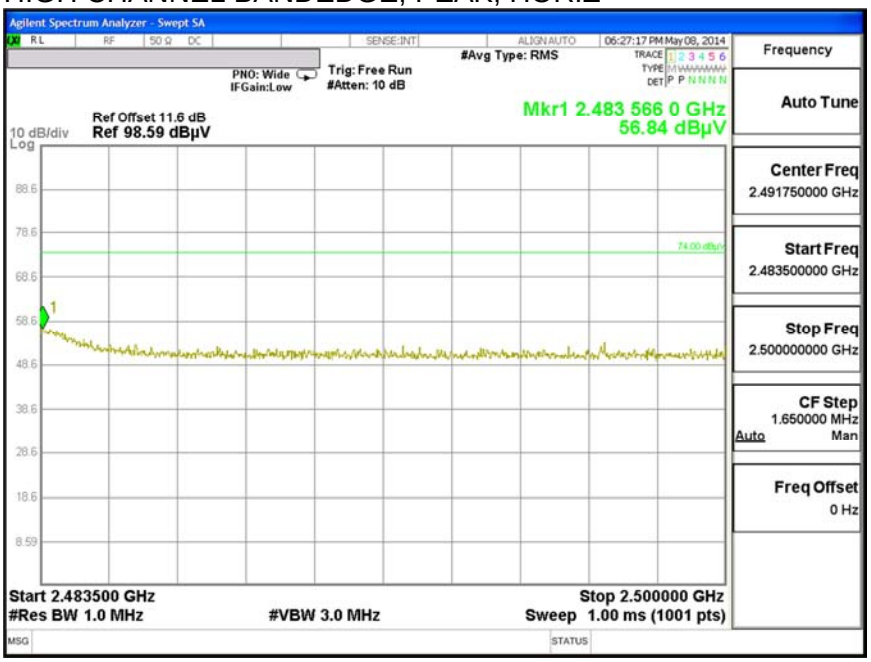
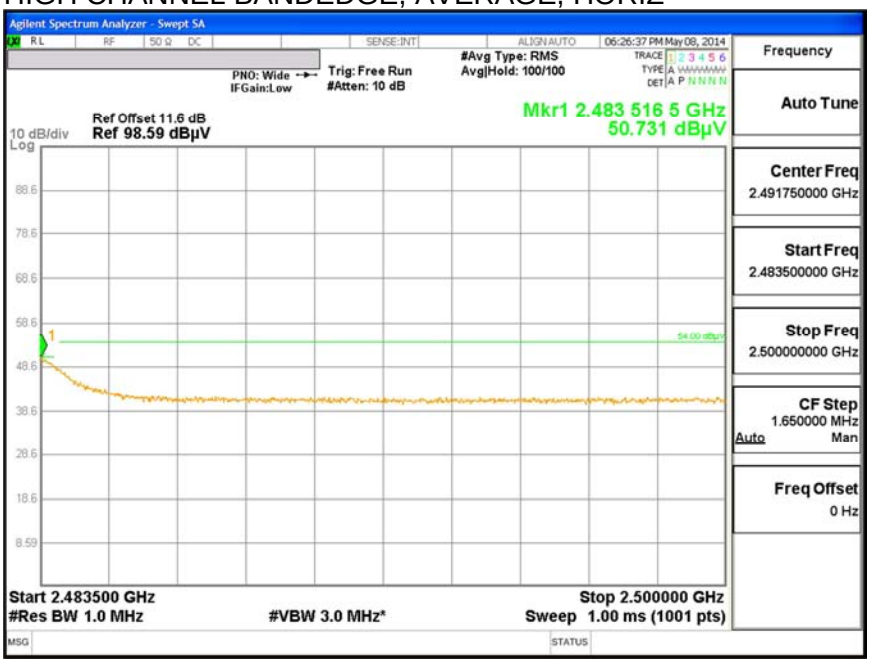
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 11)**

HIGH CHANNEL BANDEDGE, PEAK, HORIZ




HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ



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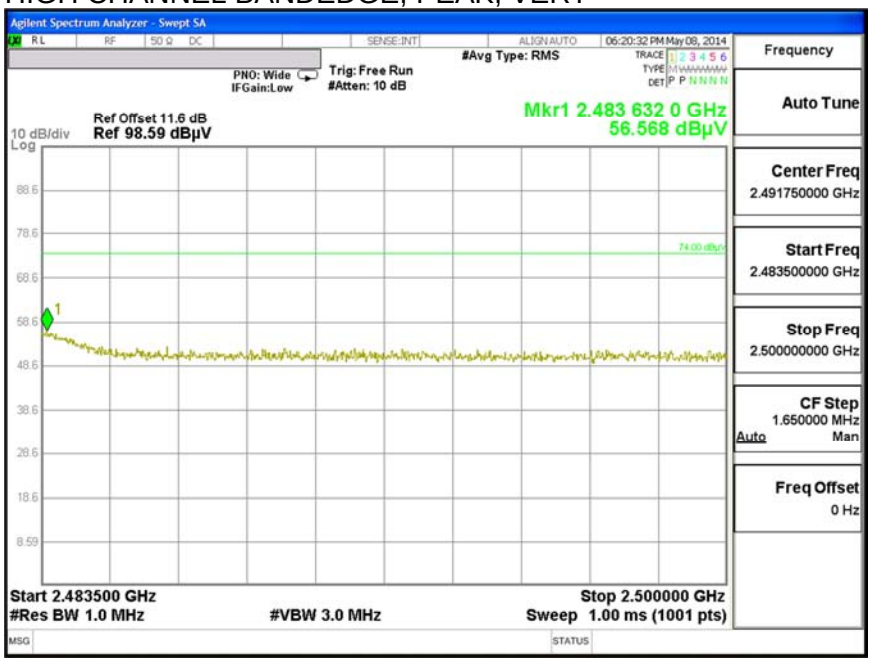
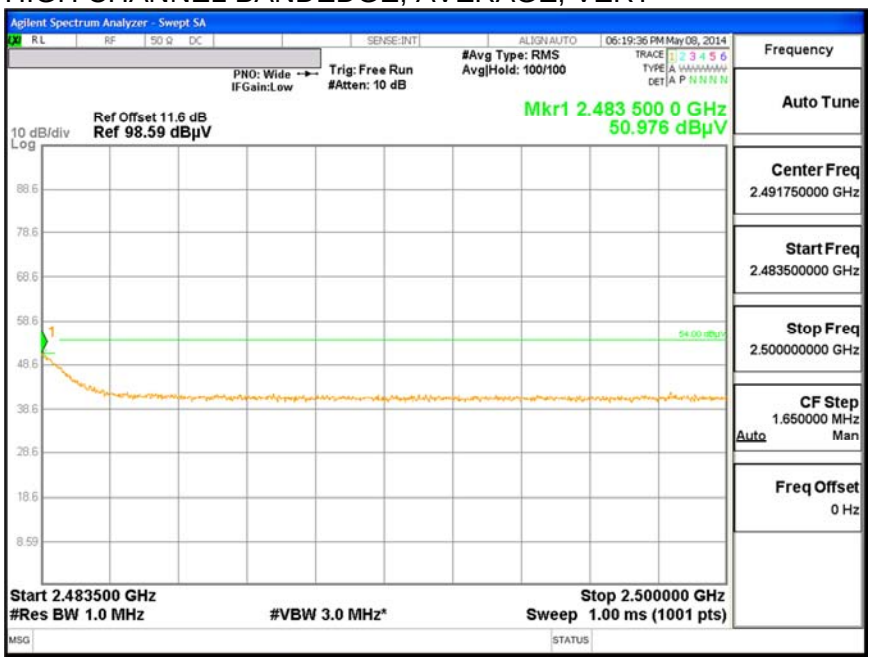
HIGH CHANNEL BANDEDGE, PEAK, VERT




HIGH CHANNEL BANDEDGE, AVERAGE, VERT





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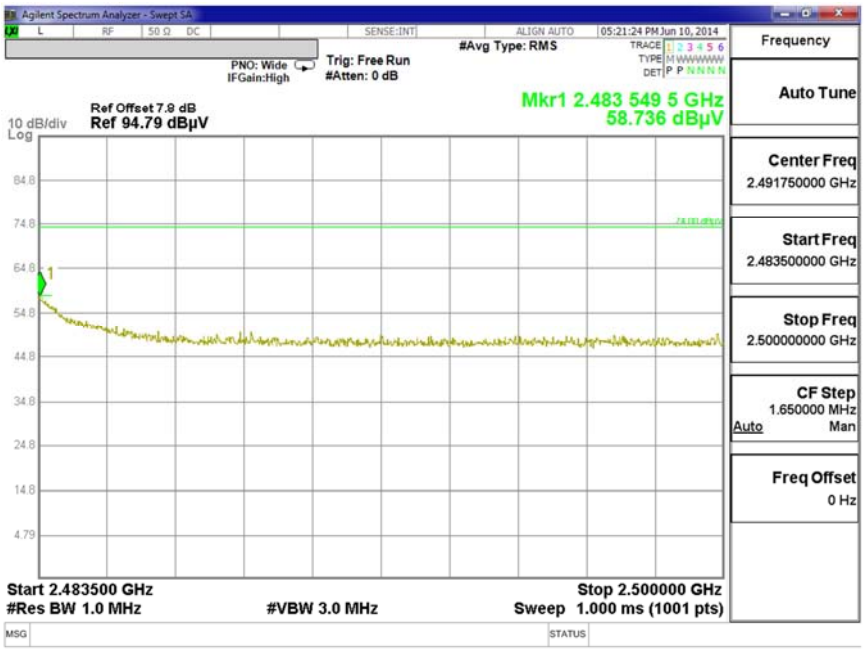
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 12)**

HIGH CHANNEL BANDEDGE, PEAK, HORIZ




HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ



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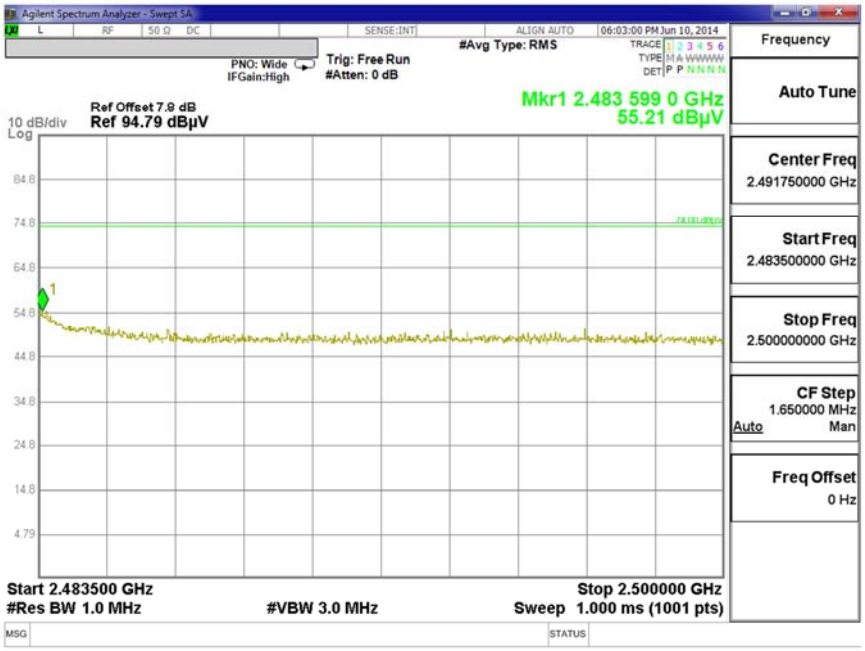
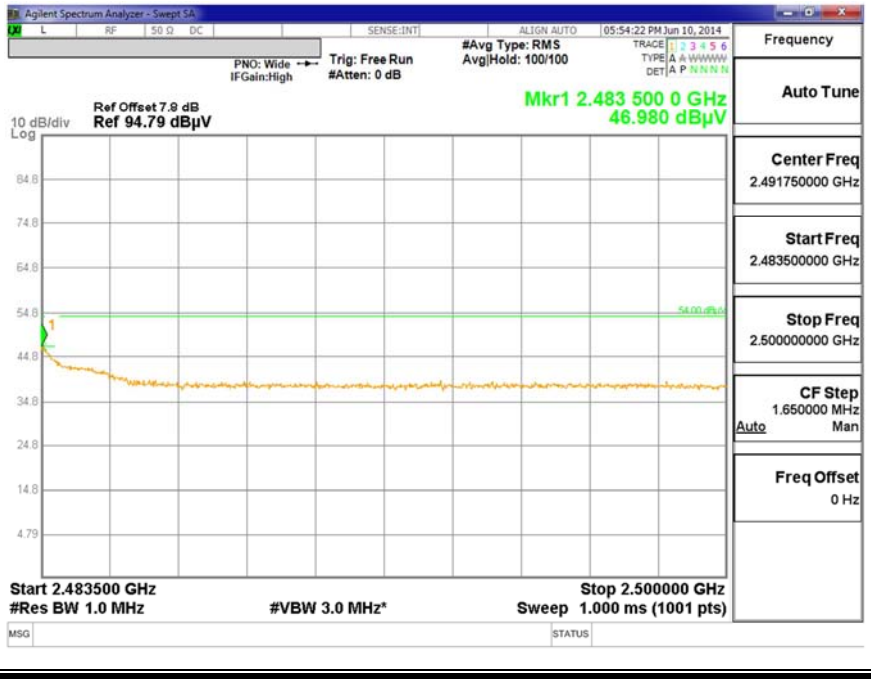
HIGH CHANNEL BANDEDGE, PEAK, VERT




HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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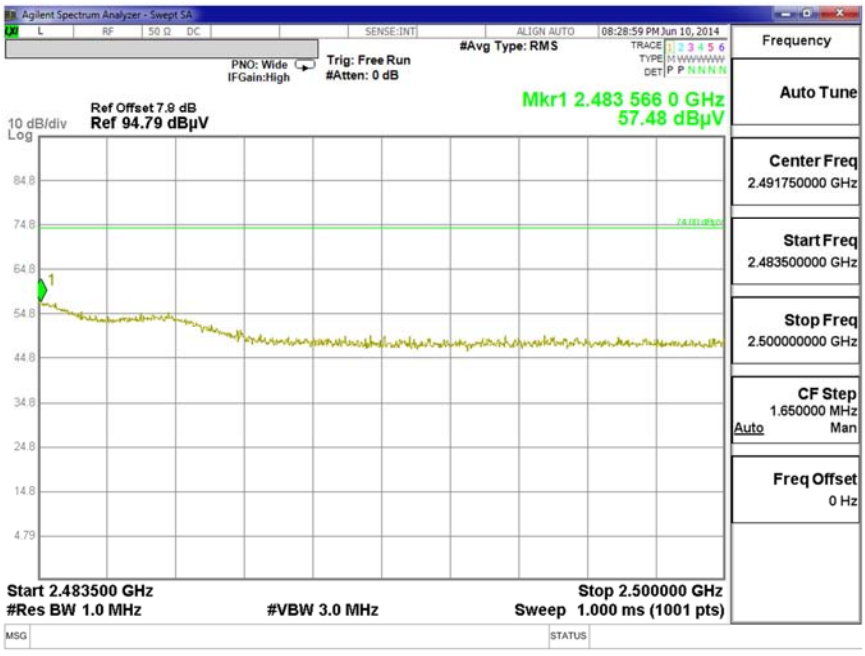
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 13)**

HIGH CHANNEL BANDEDGE, PEAK, HORIZ




HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ

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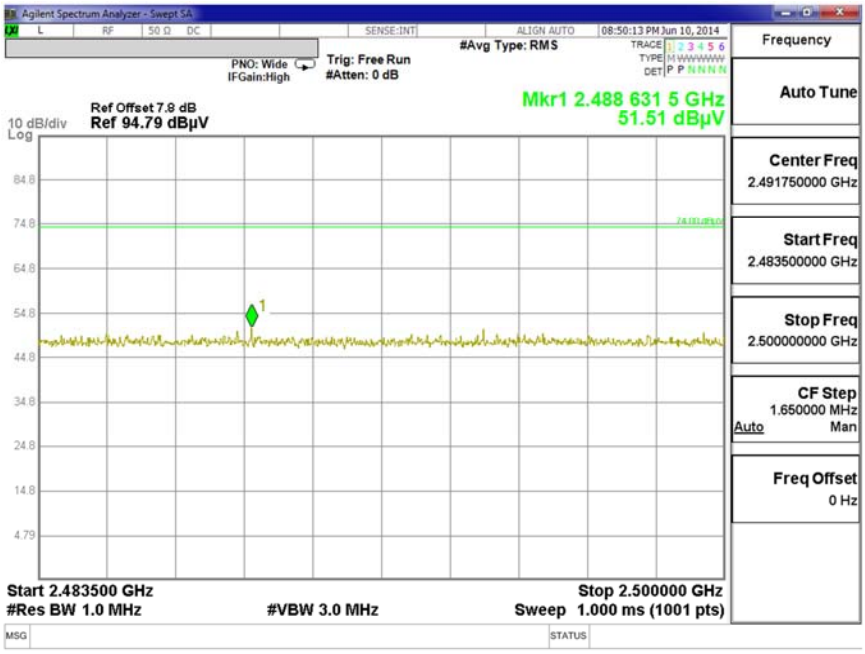
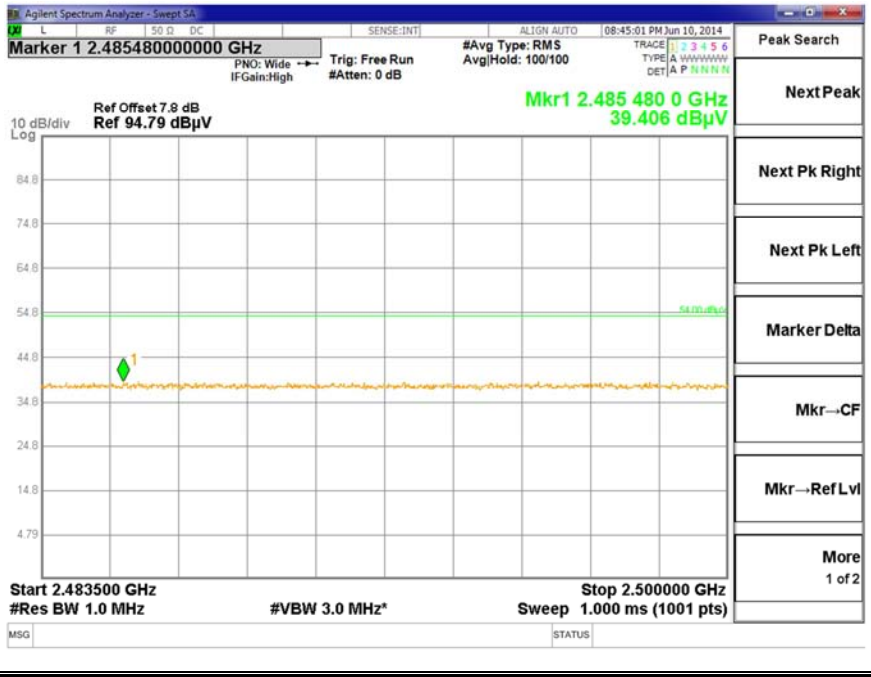
HIGH CHANNEL BANDEDGE, PEAK, VERT




HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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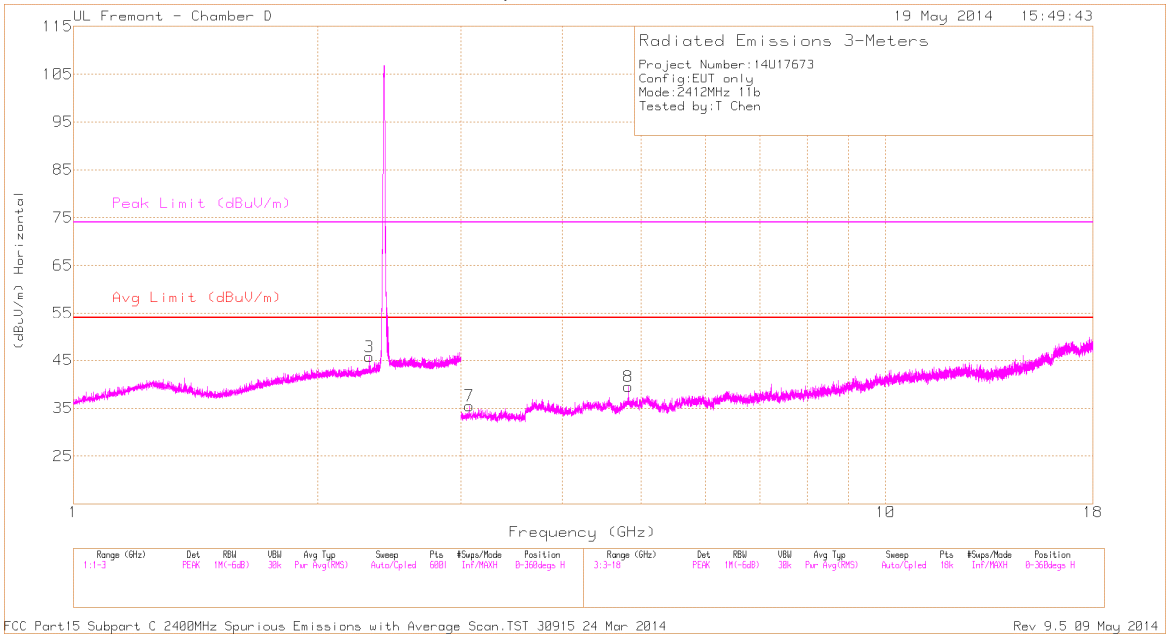
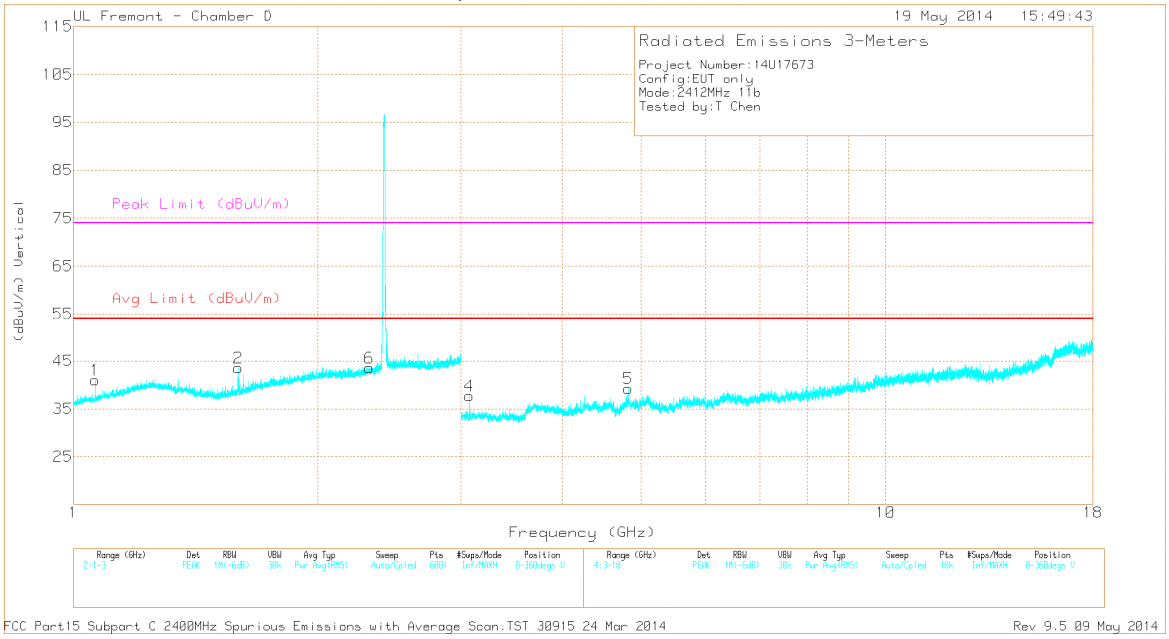
## LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT, CH1




LOW CHANNEL VERTICAL PLOT, CH1





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | * 2.312 | 41.22 | PK2 | 31 | -20.7 | 51.52 | - | - | 74 | -22.48 | 180 | 134 | H |
| | * 2.312 | 29.81 | MAv1 | 31 | -20.7 | 40.11 | 54 | -13.89 | - | - | 180 | 134 | H |
| | 2.309 | 41.96 | PK2 | 31 | -20.7 | 52.26 | - | - | - | - | 180 | 141 | H |
| | 2.309 | 29.74 | MAv1 | 31 | -20.7 | 40.04 | - | - | - | - | 180 | 141 | H |
| 1 | * 1.062 | 41.79 | PK2 | 27 | -22.4 | 46.39 | - | - | 74 | -27.61 | 180 | 185 | V |
| | * 1.062 | 30.56 | MAv1 | 27 | -22.4 | 35.16 | 54 | -18.84 | - | - | 180 | 185 | V |
| 2 | * 1.594 | 42.66 | PK2 | 27.8 | -21.7 | 48.76 | - | - | 74 | -25.24 | 232 | 202 | V |
| | * 1.594 | 30.11 | MAv1 | 27.9 | -21.7 | 36.31 | 54 | -17.69 | - | - | 232 | 202 | V |
| 6 | * 2.314 | 41.3 | PK2 | 31 | -20.7 | 51.6 | - | - | 74 | -22.4 | 232 | 150 | V |
| | * 2.314 | 29.8 | MAv1 | 31 | -20.7 | 40.1 | 54 | -13.9 | - | - | 232 | 150 | V |
| 8 | * 4.823 | 37.93 | PK2 | 33.5 | -26.7 | 44.73 | - | - | 74 | -29.27 | 8 | 100 | H |
| | * 4.823 | 27.14 | MAv1 | 33.5 | -26.7 | 33.94 | 54 | -20.06 | - | - | 8 | 100 | H |
| 5 | * 4.824 | 40.86 | PK2 | 33.5 | -26.7 | 47.66 | - | - | 74 | -26.34 | 111 | 299 | V |
| | * 4.824 | 33.8 | MAv1 | 33.5 | -26.7 | 40.6 | 54 | -13.4 | - | - | 111 | 299 | V |
| 7 | 3.072 | 41.2 | PK2 | 32.5 | -29 | 44.7 | - | - | - | - | 298 | 293 | H |
| 4 | 3.072 | 41.56 | PK2 | 32.5 | -29 | 45.06 | - | - | - | - | 147 | 201 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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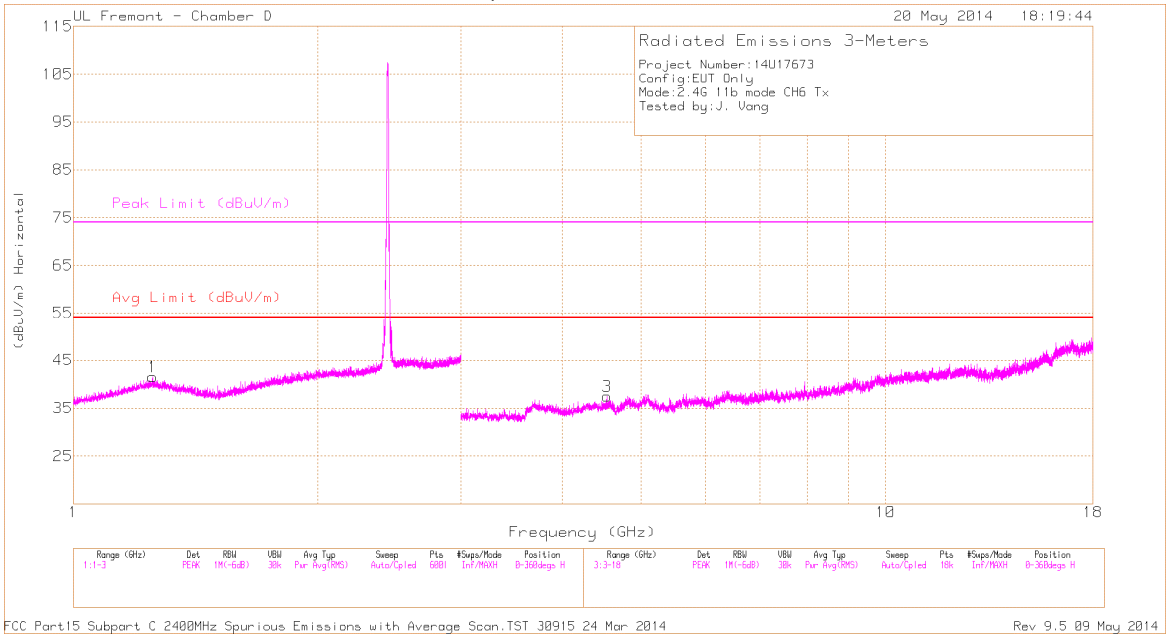
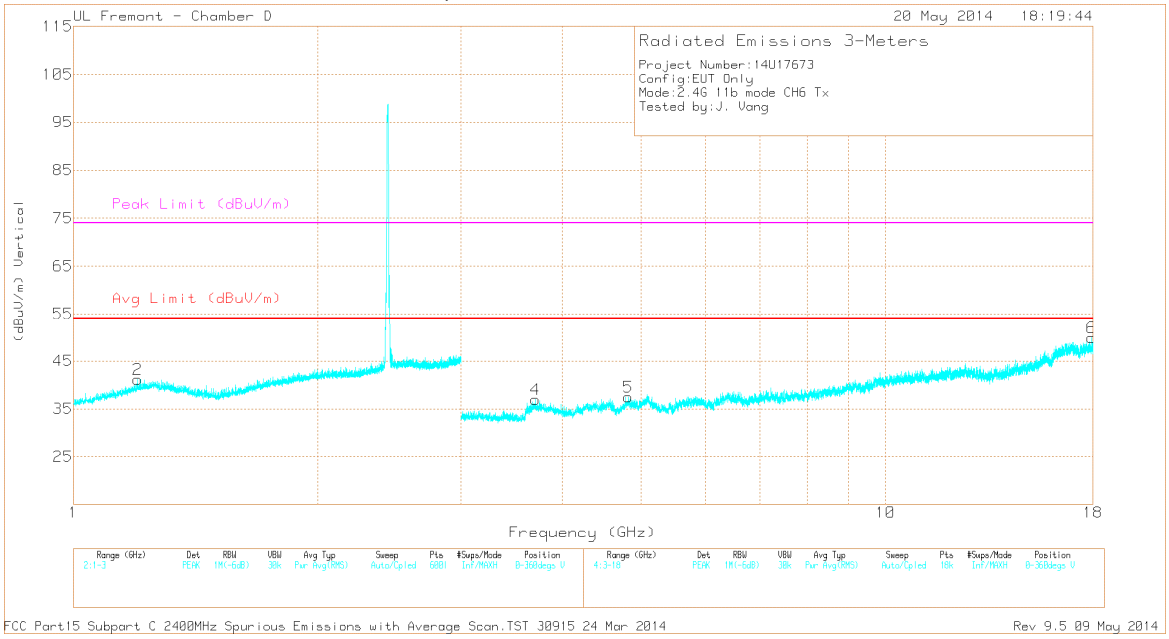
**MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS**

MID CHANNEL HORIZONTAL PLOT, CH 6




MID CHANNEL VERTICAL PLOT, CH 6





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Flt r/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 | * 1.199 | 36.46 | PK2 | 28.9 | -22 | 43.36 | - | - | 74 | -30.64 | 4 | 202 | V |
| | * 1.199 | 29.91 | MAv1 | 28.9 | -22 | 36.81 | 54 | -17.19 | - | - | 4 | 202 | V |
| 1 | * 1.251 | 36.81 | PK2 | 29.6 | -22.1 | 44.31 | - | - | 74 | -29.69 | 62 | 202 | H |
| | * 1.251 | 29.89 | MAv1 | 29.6 | -22.1 | 37.39 | 54 | -16.61 | - | - | 62 | 202 | H |
| 6 | * 17.931 | 25.92 | PK2 | 41.4 | -17.5 | 49.82 | - | - | 74 | -24.18 | 66 | 202 | V |
| | * 17.931 | 22.69 | MAv1 | 41.4 | -17.5 | 46.59 | 54 | -7.41 | - | - | 66 | 202 | V |
| 4 | * 3.708 | 30.6 | PK2 | 32.6 | -27.9 | 35.3 | - | - | 74 | -38.7 | 66 | 202 | V |
| | * 3.708 | 27.35 | MAv1 | 32.6 | -27.9 | 32.05 | 54 | -21.95 | - | - | 66 | 202 | V |
| 3 | * 4.538 | 32.35 | PK2 | 33.5 | -26.4 | 39.45 | - | - | 74 | -34.55 | 66 | 202 | H |
| | * 4.538 | 25.86 | MAv1 | 33.5 | -26.5 | 32.86 | 54 | -21.14 | - | - | 66 | 202 | H |
| 5 | * 4.823 | 29.84 | PK2 | 33.5 | -26.7 | 36.64 | - | - | 74 | -37.36 | 66 | 202 | V |
| | * 4.823 | 26.74 | MAv1 | 33.5 | -26.7 | 33.54 | 54 | -20.46 | - | - | 66 | 202 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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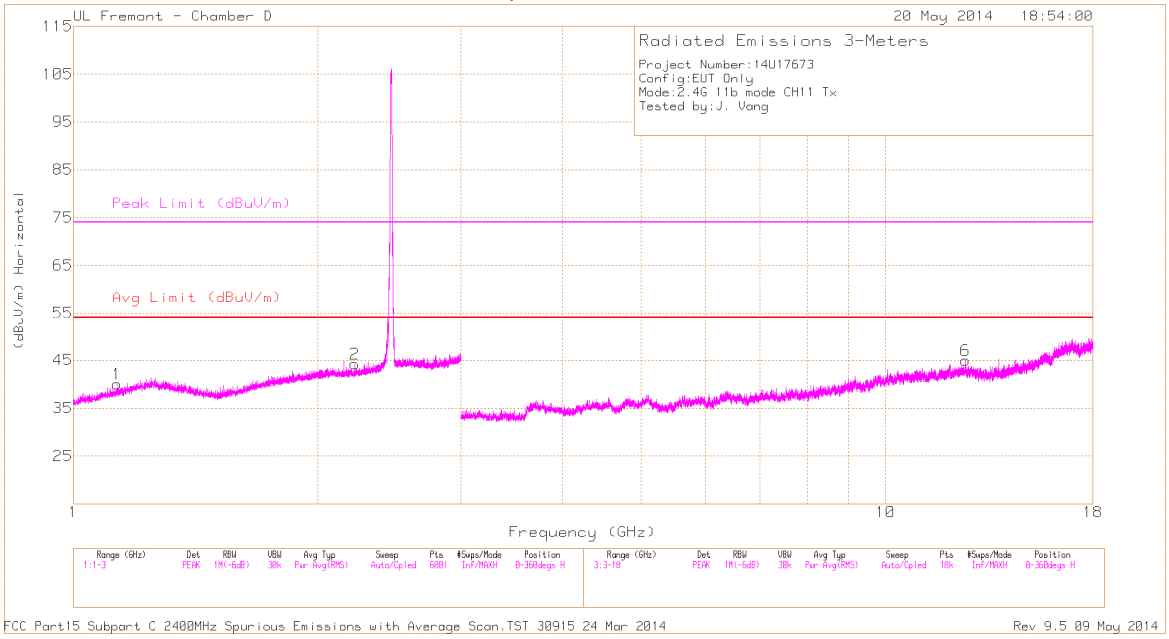
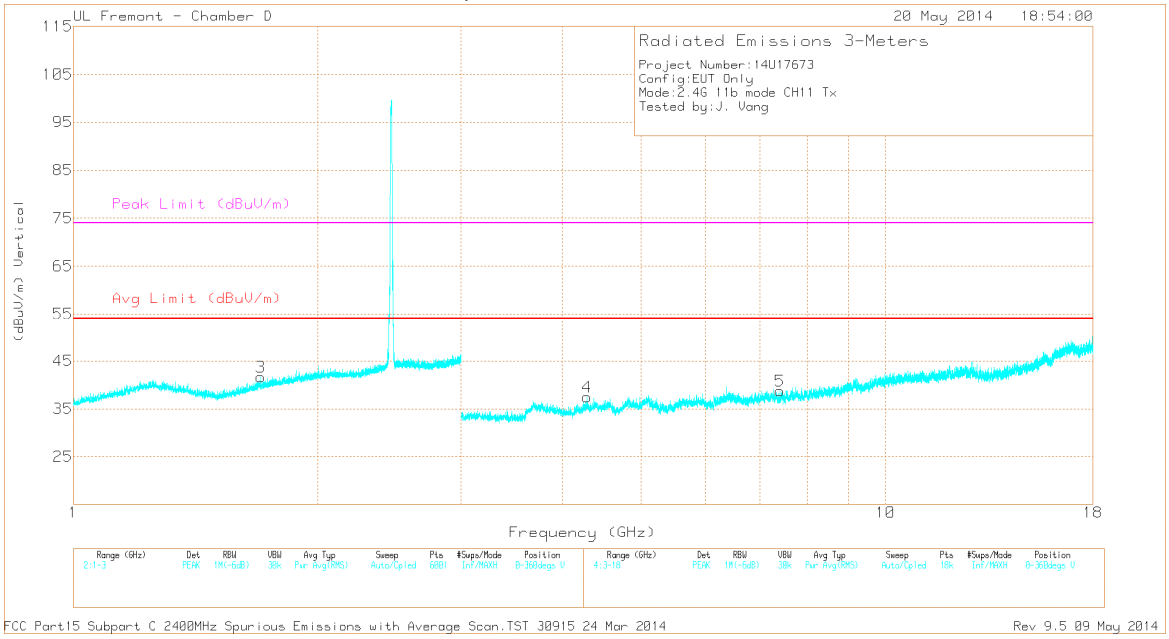
**HIGH CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

HIGH CHANNEL HORIZONTAL PLOT, CH 11




HIGH CHANNEL VERTICAL PLOT, CH 11





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/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 | * 1.133 | 36.35 | PK2 | 28 | -22.3 | 42.05 | - | - | 74 | -31.95 | 72 | 203 | H |
| | * 1.133 | 29.85 | MAv1 | 27.9 | -22.3 | 35.45 | 54 | -18.55 | - | - | 72 | 203 | H |
| 3 | * 1.7 | 36.14 | PK2 | 28.9 | -21.5 | 43.54 | - | - | 74 | -30.46 | 0 | 203 | V |
| | * 1.7 | 29.67 | MAv1 | 28.9 | -21.5 | 37.07 | 54 | -16.93 | - | - | 0 | 203 | V |
| 6 | * 12.537 | 29.73 | PK2 | 38.5 | -20.7 | 47.53 | - | - | 74 | -26.47 | 124 | 203 | H |
| | * 12.537 | 23.16 | MAv1 | 38.5 | -20.7 | 40.96 | 54 | -13.04 | - | - | 124 | 203 | H |
| 2 | * 2.22 | 36.15 | PK2 | 30.6 | -21 | 45.75 | - | - | 74 | -28.25 | 72 | 203 | H |
| | * 2.22 | 29.61 | MAv1 | 30.6 | -21 | 39.21 | 54 | -14.79 | - | - | 72 | 203 | H |
| 4 | * 4.288 | 33.01 | PK2 | 33 | -27.5 | 38.51 | - | - | 74 | -35.49 | 0 | 100 | V |
| | * 4.288 | 26.42 | MAv1 | 33 | -27.5 | 31.92 | 54 | -22.08 | - | - | 0 | 100 | V |
| 5 | * 7.405 | 31.1 | PK2 | 35.2 | -25.1 | 41.2 | - | - | 74 | -32.8 | 0 | 100 | V |
| | * 7.405 | 24.14 | MAv1 | 35.2 | -25 | 34.34 | 54 | -19.66 | - | - | 0 | 100 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



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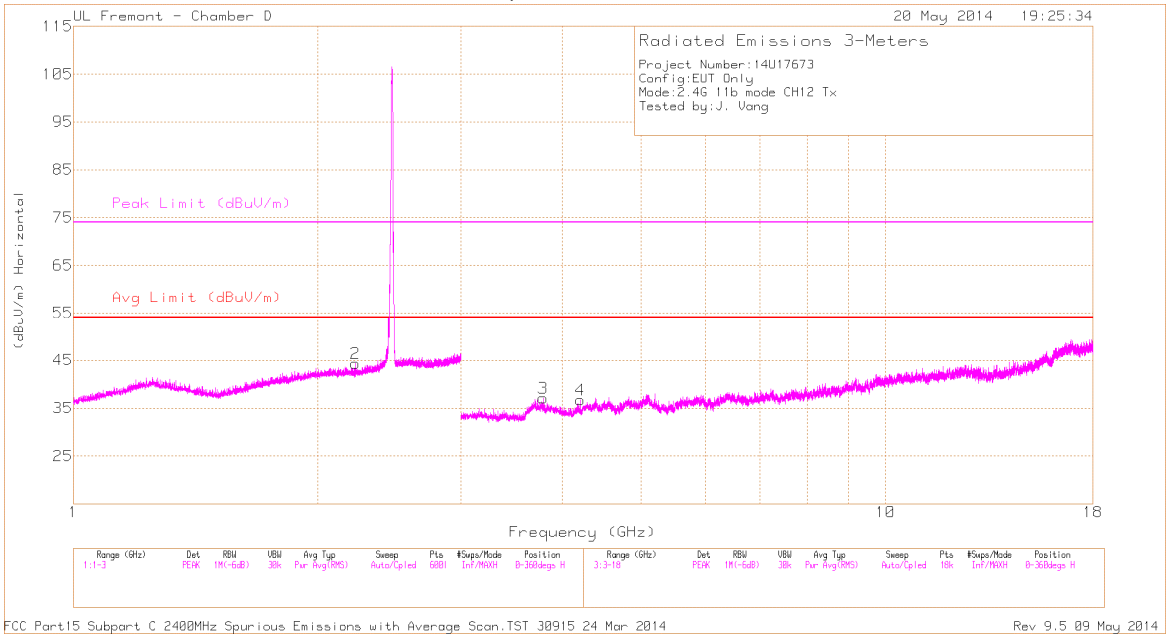
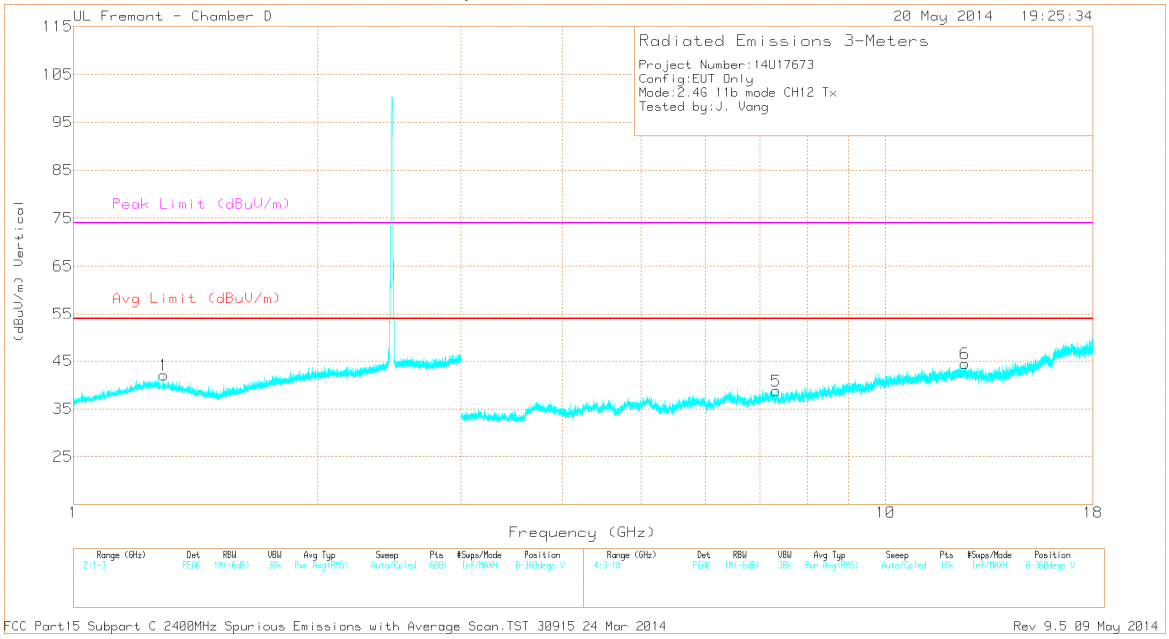
**HIGH CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

HIGH CHANNEL HORIZONTAL PLOT, CH 12




HIGH CHANNEL VERTICAL PLOT, CH 12





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/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 | * 1.291 | 36.3 | PK2 | 29.2 | -22 | 43.5 | - | - | 74 | -30.5 | 31 | 202 | V |
| | * 1.291 | 29.81 | MAv1 | 29.2 | -22 | 37.01 | 54 | -16.99 | - | - | 31 | 202 | V |
| 6 | * 12.517 | 29.42 | PK2 | 38.5 | -20.8 | 47.12 | - | - | 74 | -26.88 | 22 | 202 | V |
| | * 12.517 | 22.87 | MAv1 | 38.5 | -20.8 | 40.57 | 54 | -13.43 | - | - | 22 | 202 | V |
| 2 | * 2.225 | 35.78 | PK2 | 30.6 | -20.9 | 45.48 | - | - | 74 | -28.52 | 0 | 100 | H |
| | * 2.225 | 29.27 | MAv1 | 30.6 | -20.9 | 38.97 | 54 | -15.03 | - | - | 0 | 100 | H |
| 3 | * 3.788 | 33.87 | PK2 | 32.7 | -28.6 | 37.97 | - | - | 74 | -36.03 | 3 | 100 | H |
| | * 3.788 | 27.37 | MAv1 | 32.7 | -28.6 | 31.47 | 54 | -22.53 | - | - | 3 | 100 | H |
| 4 | * 4.205 | 33.4 | PK2 | 32.9 | -28.4 | 37.9 | - | - | 74 | -36.1 | 3 | 100 | H |
| | * 4.205 | 26.92 | MAv1 | 32.9 | -28.4 | 31.42 | 54 | -22.58 | - | - | 3 | 100 | H |
| 5 | * 7.337 | 31.69 | PK2 | 35.1 | -25.2 | 41.59 | - | - | 74 | -32.41 | 2 | 202 | V |
| | * 7.337 | 25.08 | MAv1 | 35.1 | -25.2 | 34.98 | 54 | -19.02 | - | - | 2 | 202 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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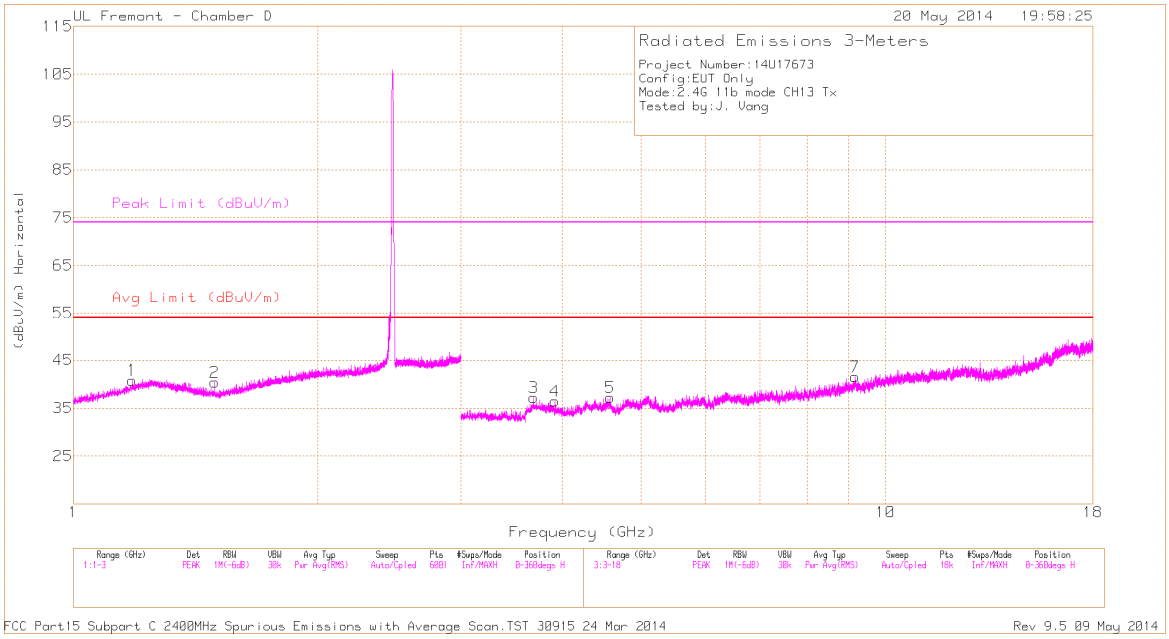
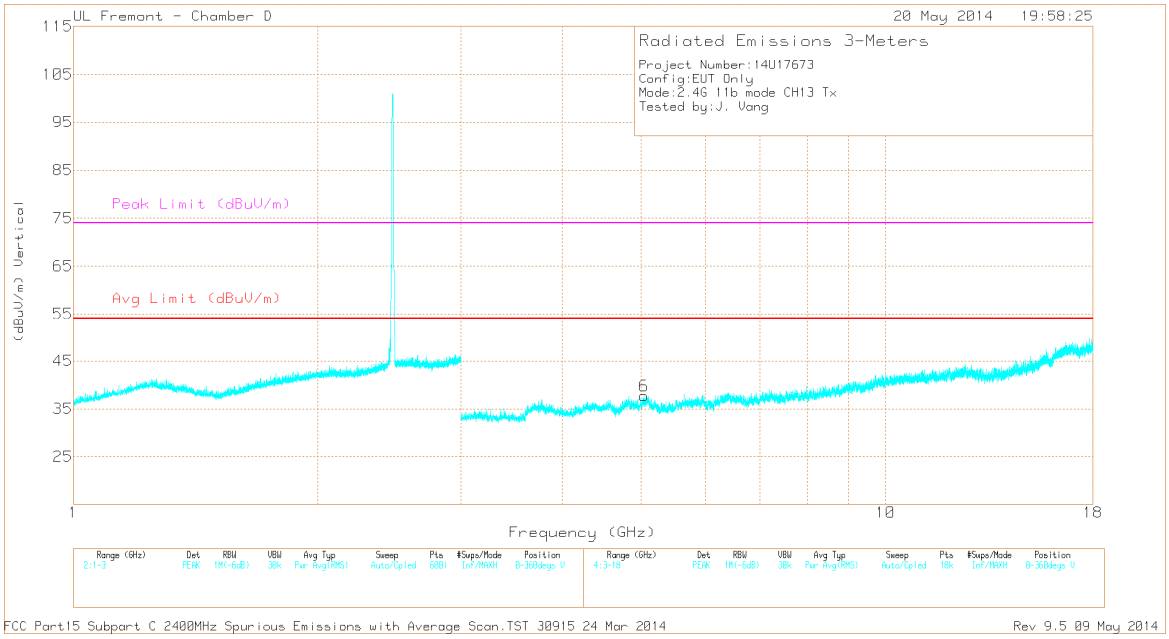
**HIGH CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

HIGH CHANNEL HORIZONTAL PLOT




HIGH CHANNEL VERTICAL PLOT





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/ Fltr/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 | * 1.181 | 36.27 | PK2 | 28.6 | -22 | 42.87 | - | - | 74 | -31.13 | 266 | 203 | H |
| | * 1.181 | 29.79 | MAv1 | 28.6 | -22 | 36.39 | 54 | -17.61 | - | - | 266 | 203 | H |
| 2 | * 1.492 | 36.2 | PK2 | 27 | -21.6 | 41.6 | - | - | 74 | -32.4 | 266 | 203 | H |
| | * 1.492 | 29.62 | MAv1 | 27 | -21.6 | 35.02 | 54 | -18.98 | - | - | 266 | 203 | H |
| 3 | * 3.688 | 33.34 | PK2 | 32.6 | -28 | 37.94 | - | - | 74 | -36.06 | 295 | 100 | H |
| | * 3.688 | 26.83 | MAv1 | 32.6 | -28 | 31.43 | 54 | -22.57 | - | - | 295 | 100 | H |
| 4 | * 3.919 | 33.5 | PK2 | 32.8 | -28.2 | 38.1 | - | - | 74 | -35.9 | 300 | 202 | H |
| | * 3.919 | 26.97 | MAv1 | 32.8 | -28.2 | 31.57 | 54 | -22.43 | - | - | 300 | 202 | H |
| 5 | * 4.578 | 33.2 | PK2 | 33.5 | -26.5 | 40.2 | - | - | 74 | -33.8 | 329 | 100 | H |
| | * 4.578 | 26.53 | MAv1 | 33.5 | -26.5 | 33.53 | 54 | -20.47 | - | - | 329 | 100 | H |
| 6 | * 5.038 | 33.06 | PK2 | 33.5 | -27.1 | 39.46 | - | - | 74 | -34.54 | 335 | 202 | V |
| | * 5.038 | 26.49 | MAv1 | 33.5 | -27.1 | 32.89 | 54 | -21.11 | - | - | 335 | 202 | V |
| 7 | * 9.18 | 29.78 | PK2 | 35.9 | -21.3 | 44.38 | - | - | 74 | -29.62 | 333 | 202 | H |
| | * 9.18 | 23.18 | MAv1 | 35.9 | -21.3 | 37.78 | 54 | -16.22 | - | - | 333 | 202 | H |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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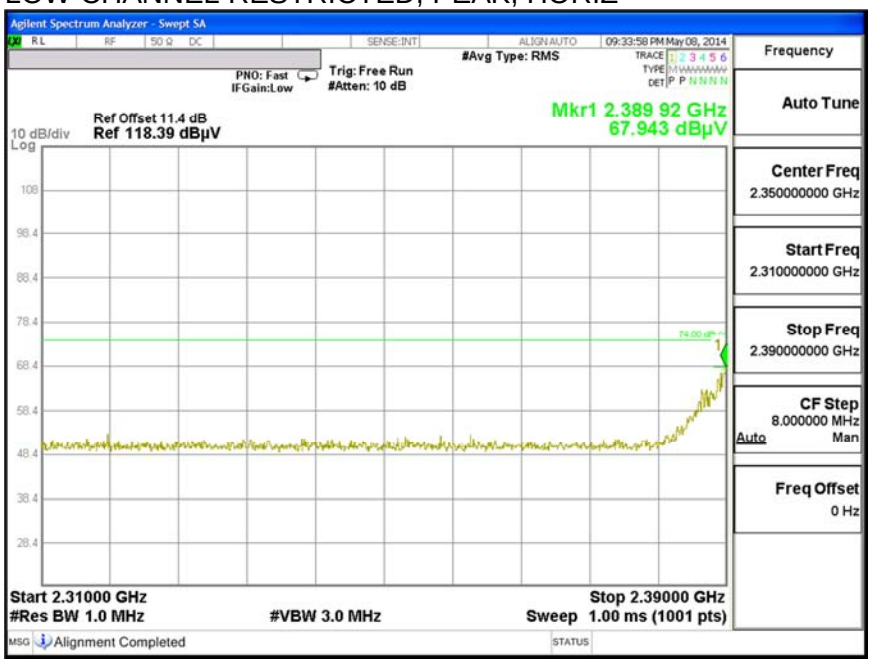
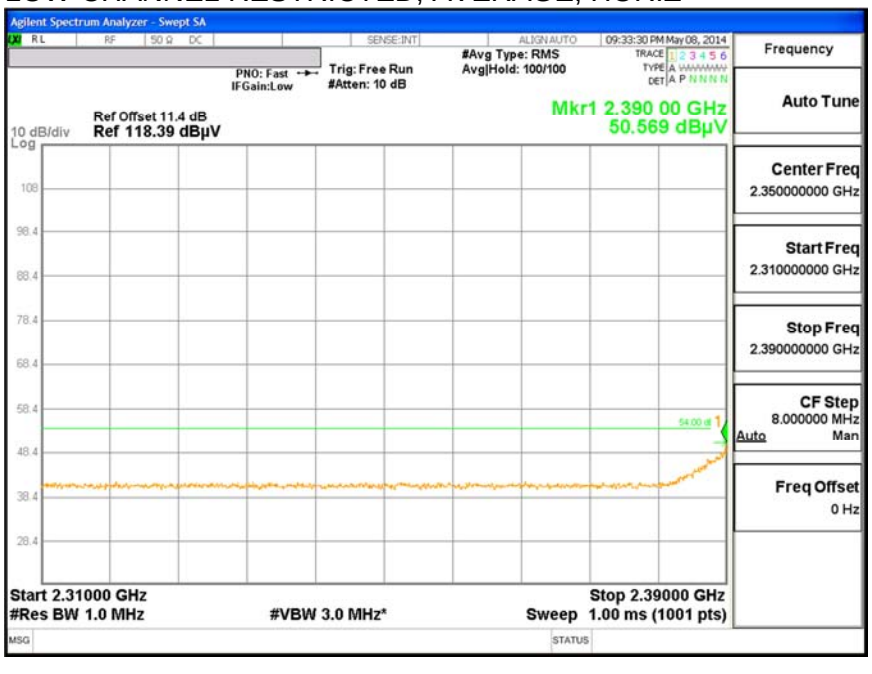
## 10.2.2. 802.11g 1Tx SISO MODE IN THE 2.4 GHz BAND

**RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 1)**

LOW CHANNEL RESTRICTED, PEAK, HORIZ




LOW CHANNEL RESTRICTED, AVERAGE, HORIZ





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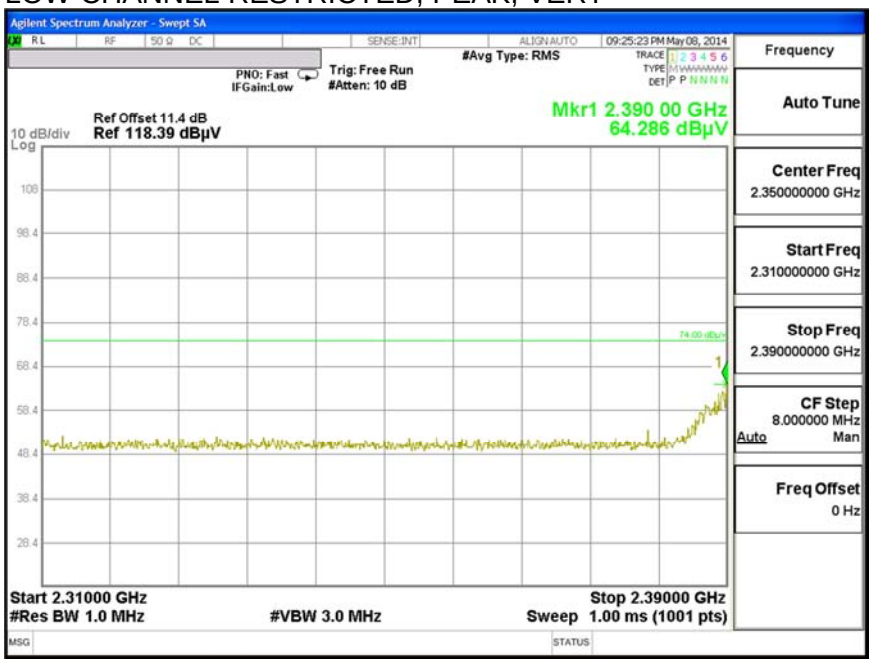
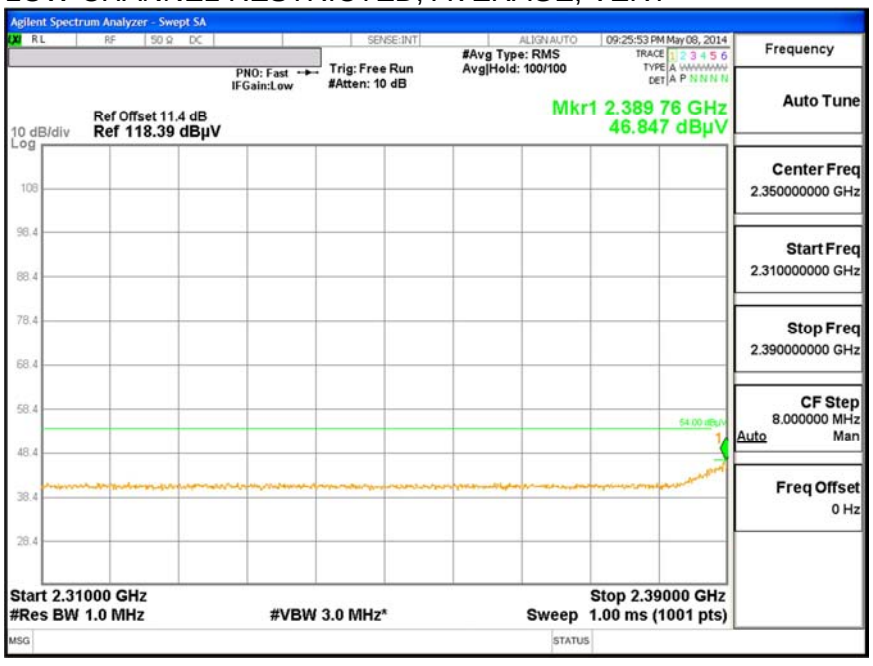
LOW CHANNEL RESTRICTED, PEAK, VERT




LOW CHANNEL RESTRICTED, AVERAGE, VERT





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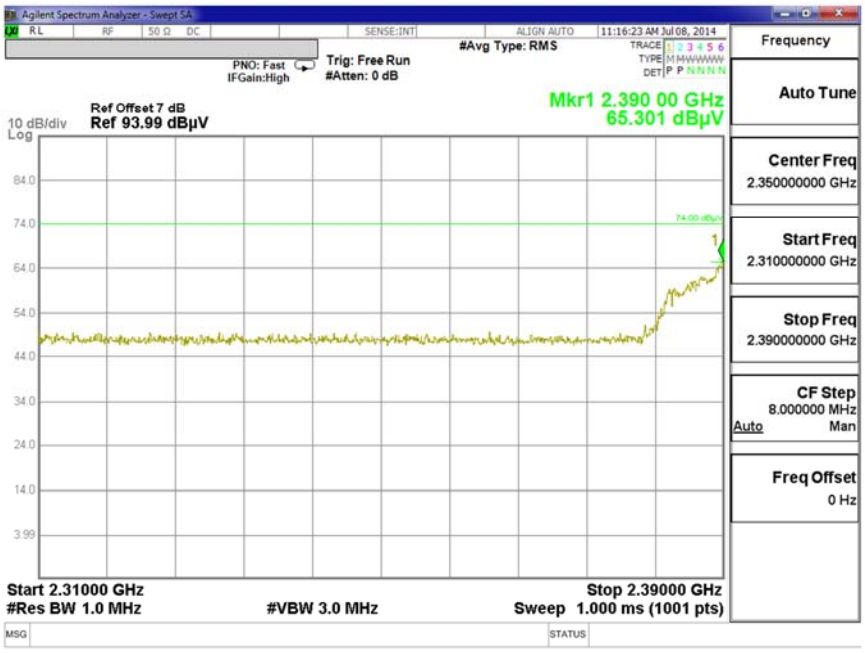
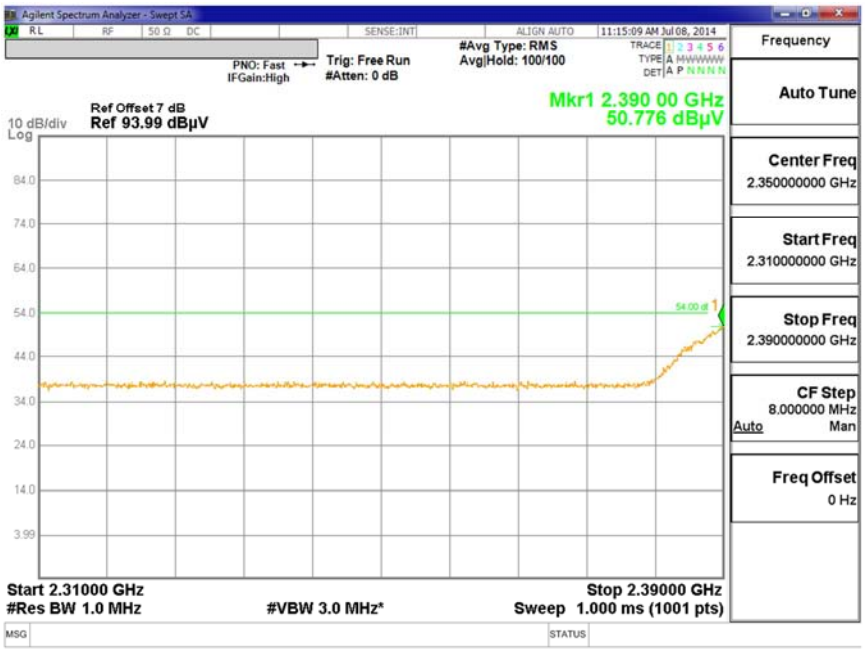
**RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 2)**

LOW CHANNEL BANDEDGE, PEAK, HORIZ




LOW CHANNEL BANDEDGE, AVERAGE, HORIZ





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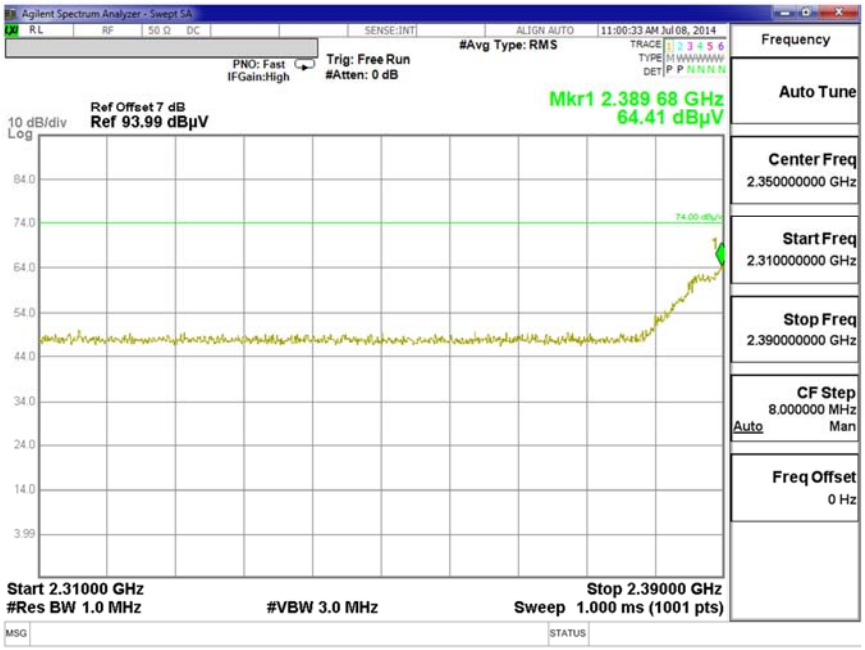
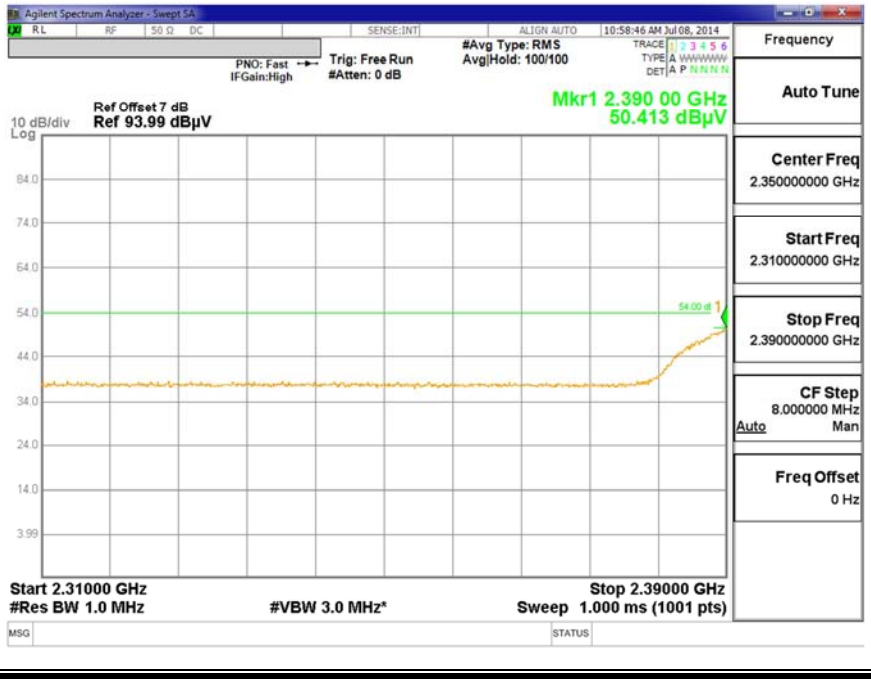
LOW CHANNEL BANDEDGE, PEAK, VERT




LOW CHANNEL BANDEDGE, AVERAGE, VERT



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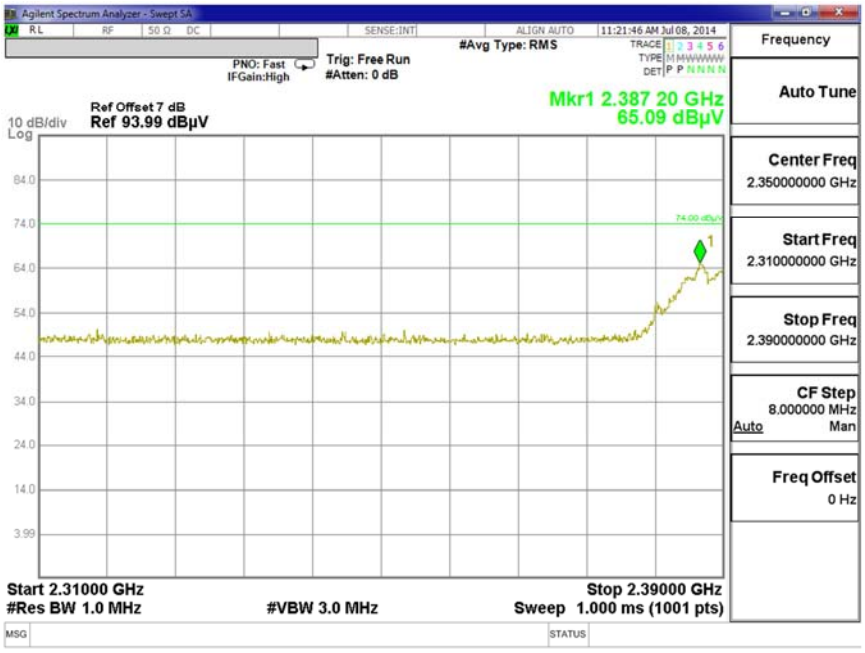
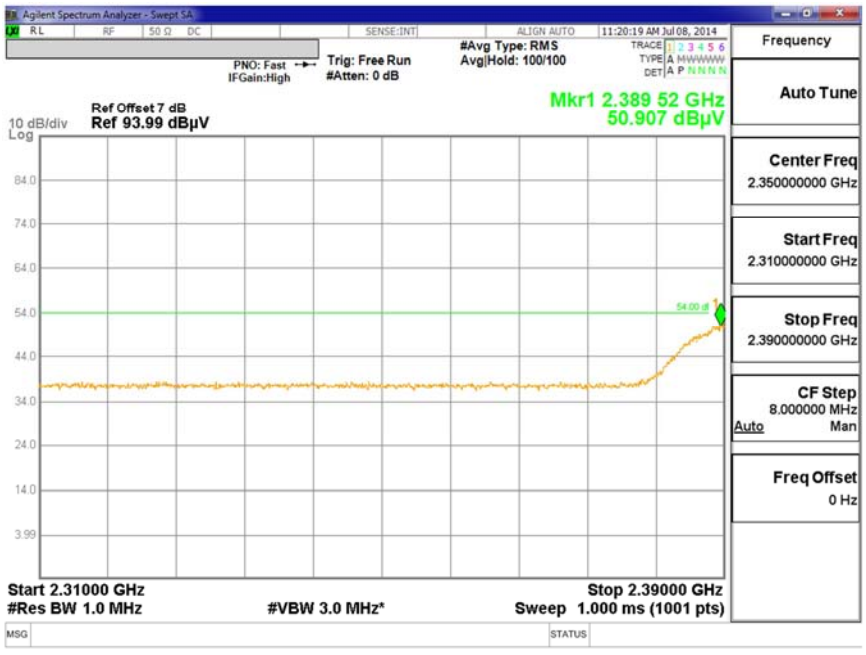
**RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 3)**

LOW CHANNEL RESTRICTED, PEAK, HORIZ




LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



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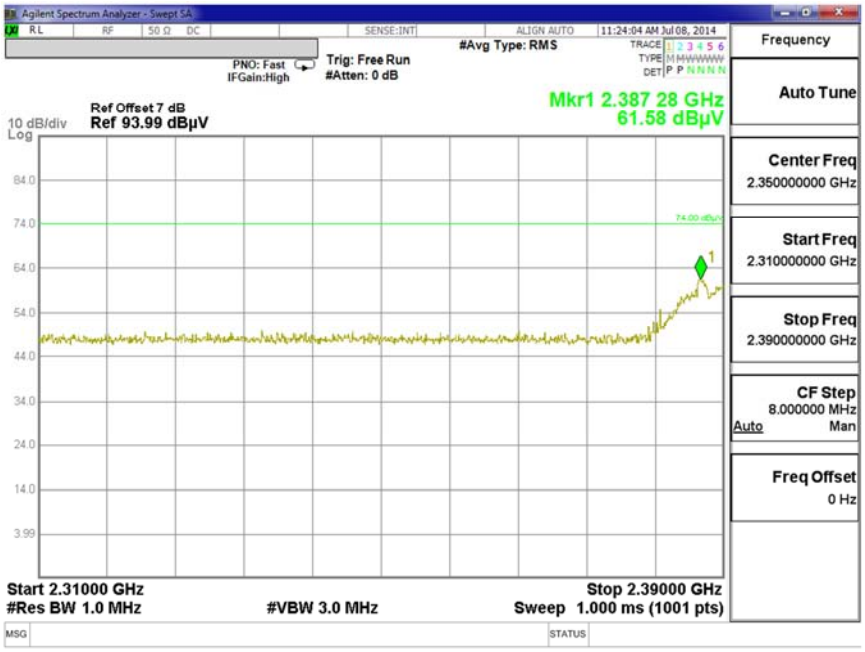
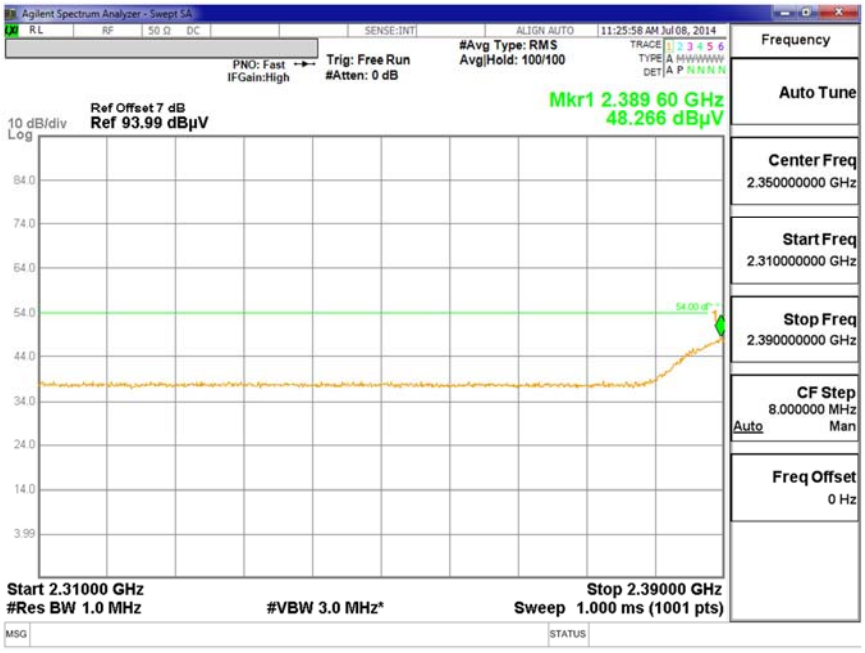
LOW CHANNEL RESTRICTED, PEAK, VERT




LOW CHANNEL RESTRICTED, AVERAGE, VERT





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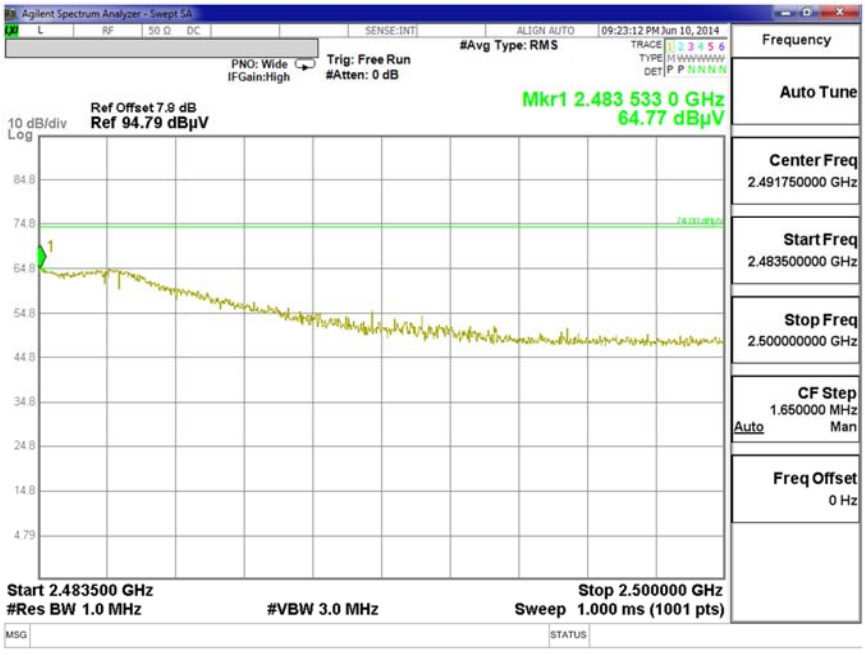
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 11)**

HIGH CHANNEL BANDEDGE, PEAK, HORIZ




HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ



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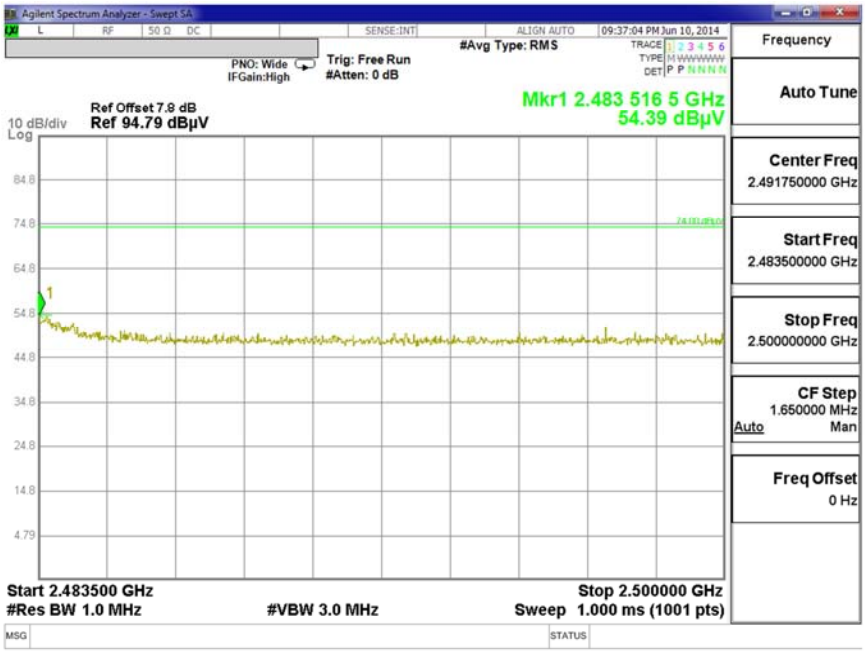
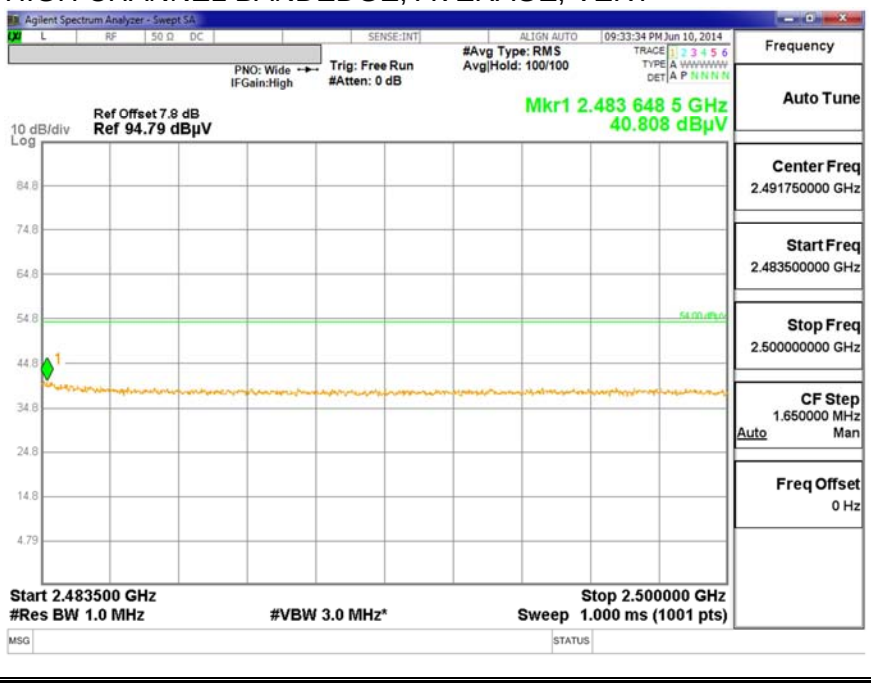
HIGH CHANNEL BANDEDGE, PEAK, VERT




HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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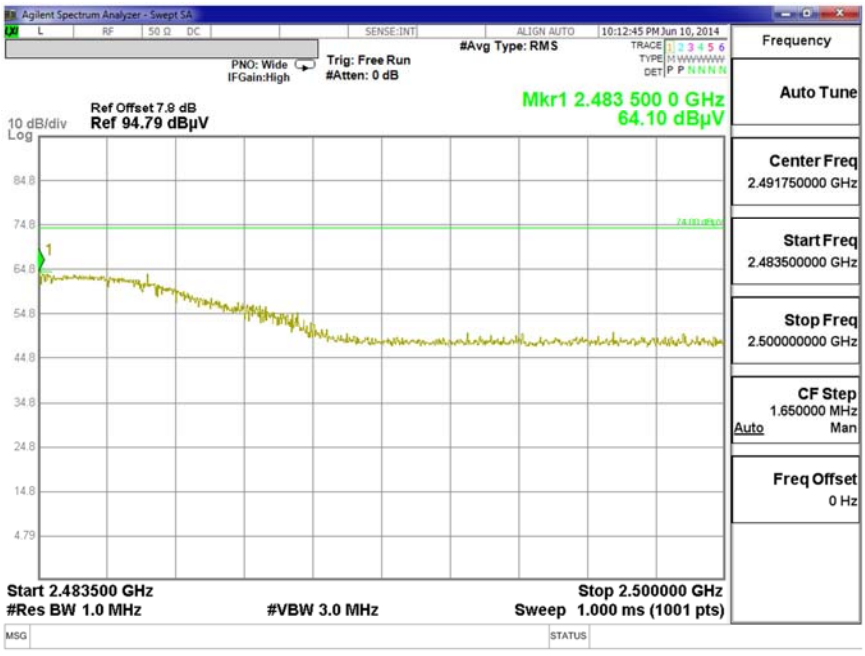
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 12)**

HIGH CHANNEL BANDEDGE, PEAK, HORIZ




HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ



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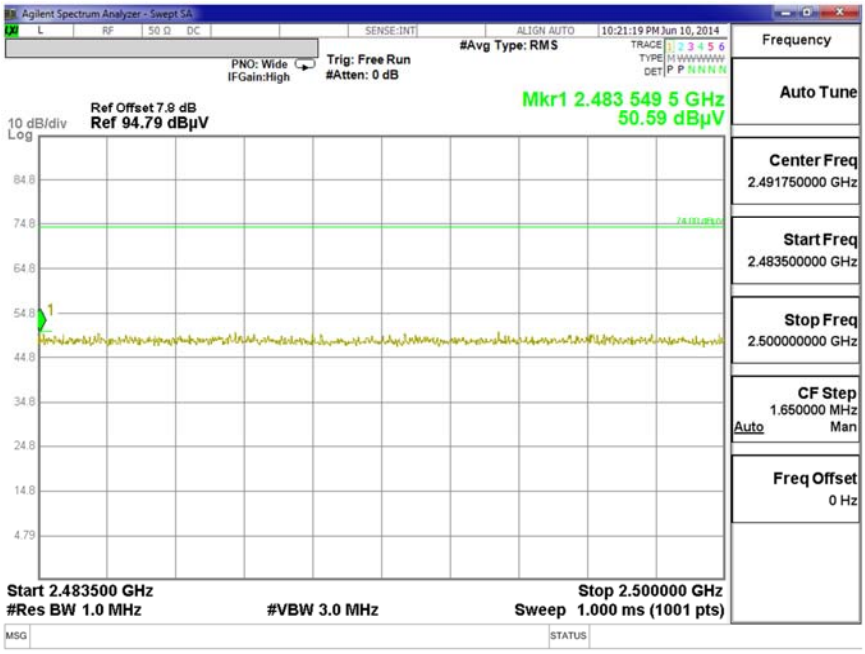
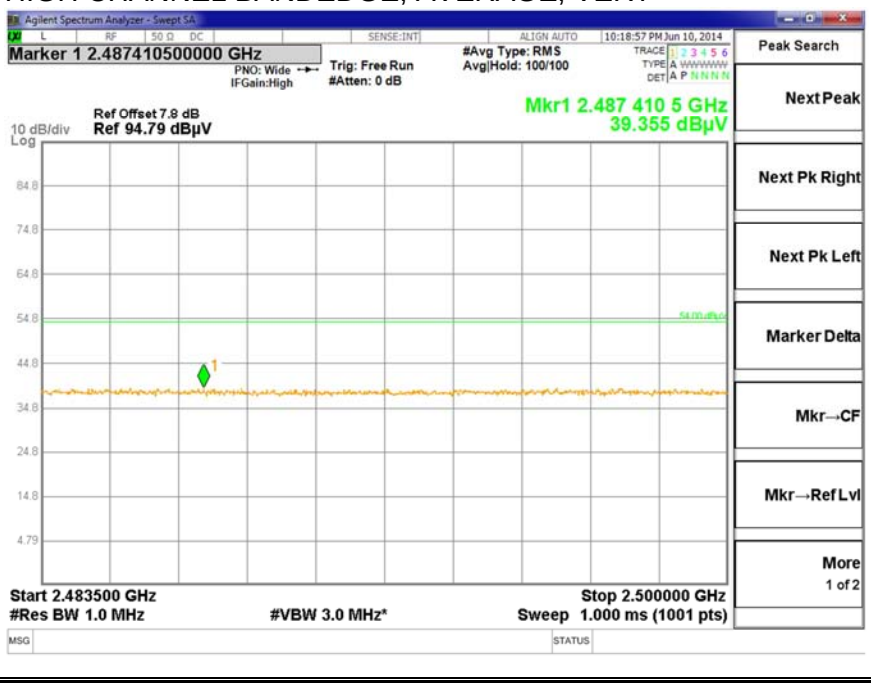
HIGH CHANNEL BANDEDGE, PEAK, VERT




HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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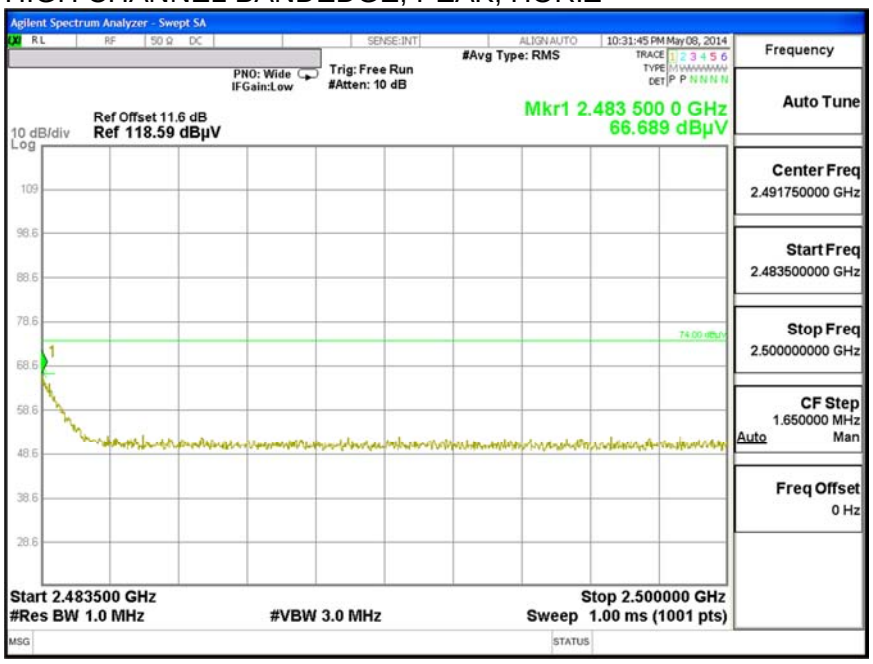
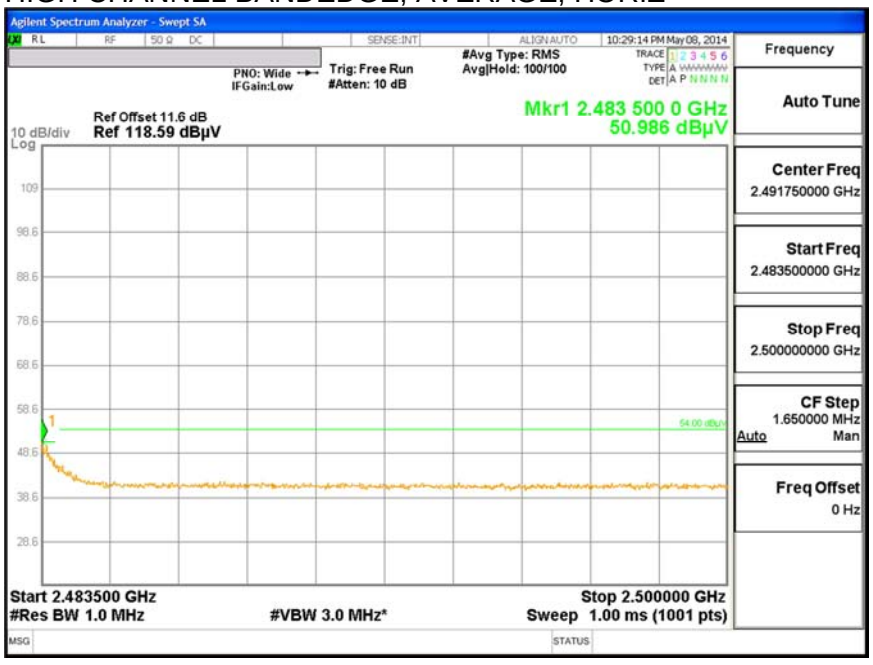
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 13)**

HIGH CHANNEL BANDEDGE, PEAK, HORIZ




HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ



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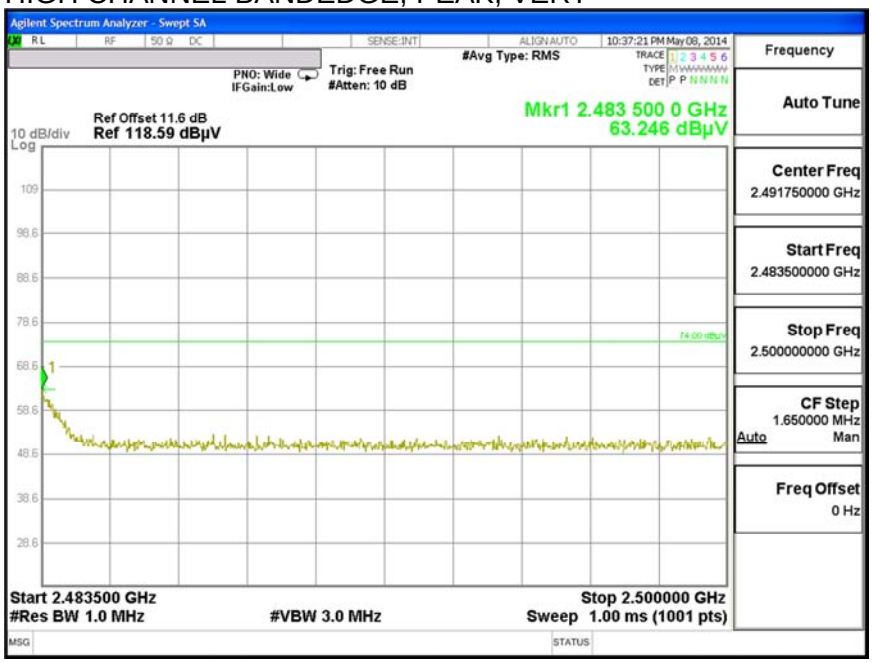
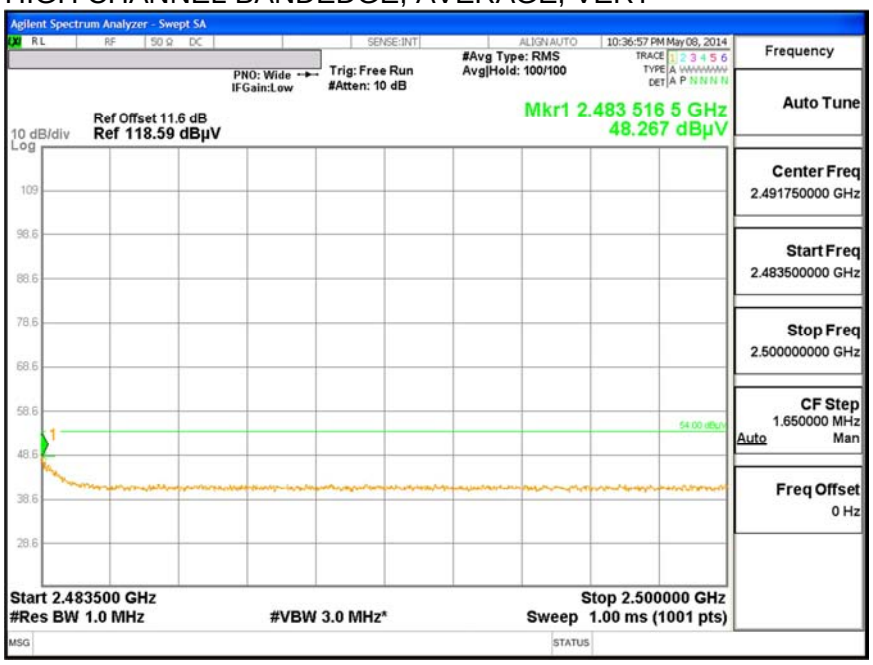
HIGH CHANNEL BANDEDGE, PEAK, VERT




HIGH CHANNEL BANDEDGE, AVERAGE, VERT





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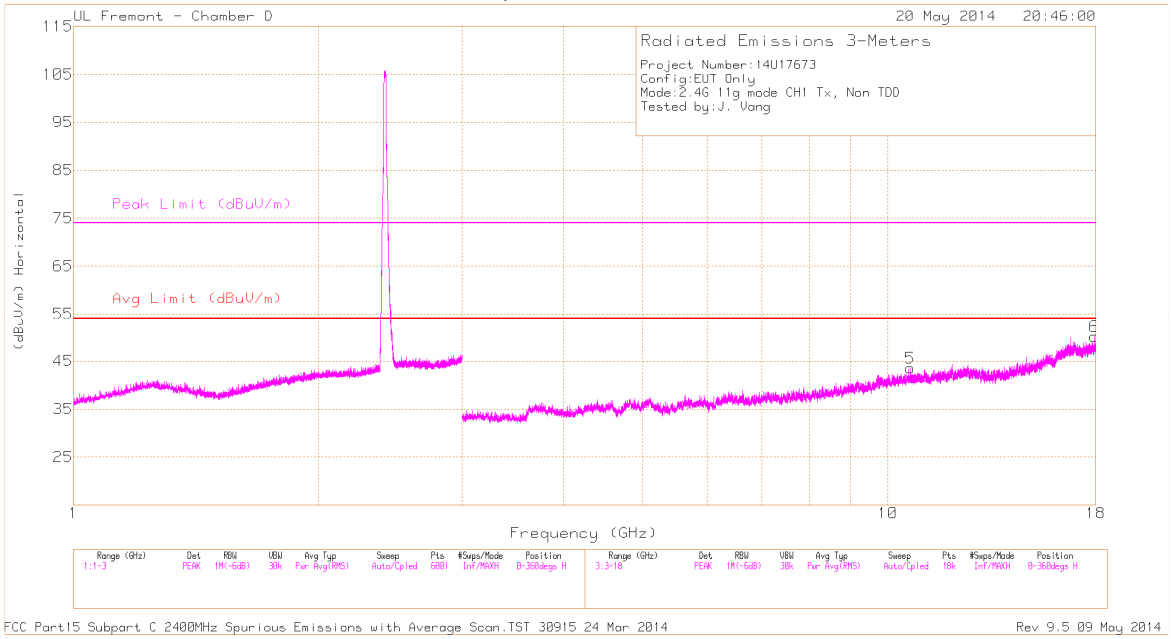
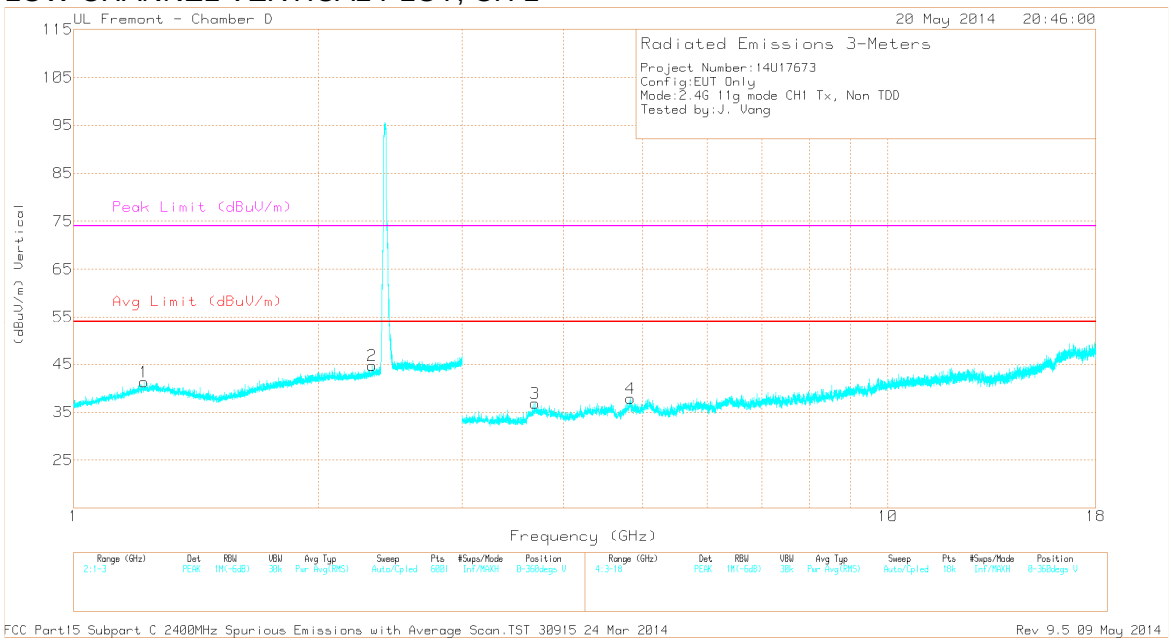
**LOW CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

LOW CHANNEL HORIZONTAL PLOT, CH 1




LOW CHANNEL VERTICAL PLOT, CH 1



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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 1.221 | 36.39 | PK2 | 29.2 | -22 | 0 | 43.59 | - | - | 74 | -30.41 | 306 | 100 | V |
| | * 1.221 | 29.92 | MAv1 | 29.2 | -22 | .1 | 37.22 | 54 | -16.78 | - | - | 306 | 100 | V |
| 5 | * 10.653 | 29.32 | PK2 | 37.3 | -20.9 | 0 | 45.72 | - | - | 74 | -28.28 | 340 | 202 | H |
| | * 10.653 | 22.71 | MAv1 | 37.3 | -20.9 | .1 | 39.21 | 54 | -14.79 | - | - | 340 | 202 | H |
| 6 | * 17.935 | 28.88 | PK2 | 41.4 | -17.4 | 0 | 52.88 | - | - | 74 | -21.12 | 340 | 202 | H |
| | * 17.935 | 22.19 | MAv1 | 41.4 | -17.3 | .1 | 46.39 | 54 | -7.61 | - | - | 340 | 202 | H |
| 2 | * 2.324 | 36.32 | PK2 | 31.1 | -20.7 | 0 | 46.72 | - | - | 74 | -27.28 | 330 | 202 | V |
| | * 2.324 | 29.67 | MAv1 | 31.1 | -20.7 | .1 | 40.17 | 54 | -13.83 | - | - | 330 | 202 | V |
| 3 | * 3.685 | 33.47 | PK2 | 32.6 | -28 | 0 | 38.07 | - | - | 74 | -35.93 | 347 | 100 | V |
| | * 3.685 | 26.94 | MAv1 | 32.6 | -28 | .1 | 31.64 | 54 | -22.36 | - | - | 347 | 100 | V |
| 4 | * 4.827 | 32.67 | PK2 | 33.5 | -26.7 | 0 | 39.47 | - | - | 74 | -34.53 | 347 | 100 | V |
| | * 4.827 | 26.1 | MAv1 | 33.5 | -26.7 | .1 | 33 | 54 | -21 | - | - | 347 | 100 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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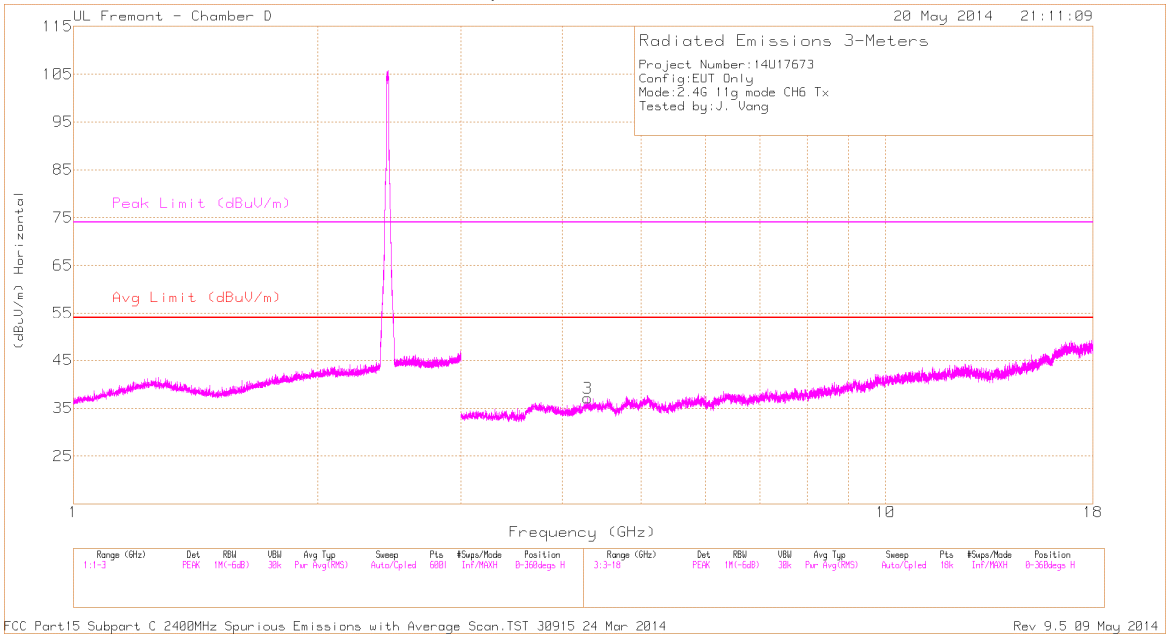
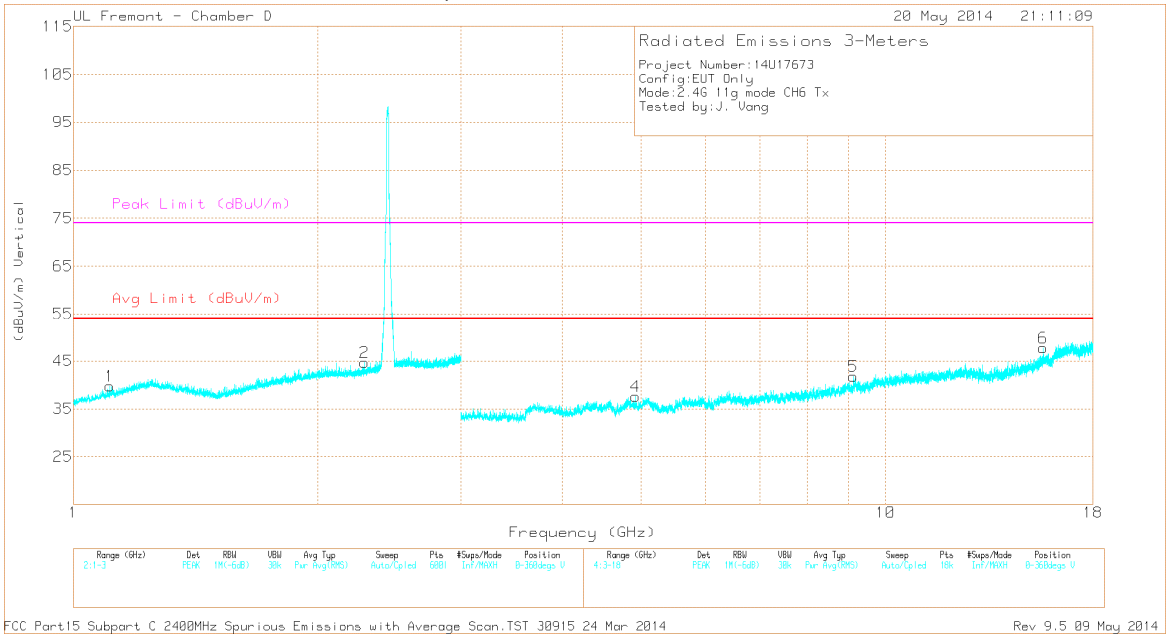
**MID CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

MID CHANNEL HORIZONTAL PLOT, CH 6




MID CHANNEL VERTICAL PLOT, CH 6



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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 1.108 | 36.47 | PK2 | 27.6 | -22.1 | 0 | 41.97 | - | - | 74 | -32.03 | 360 | 100 | V |
| | * 1.108 | 29.9 | MAv1 | 27.6 | -22.1 | .1 | 35.5 | 54 | -18.5 | - | - | 360 | 100 | V |
| 6 | * 15.627 | 30.17 | PK2 | 39.9 | -20.6 | 0 | 49.47 | - | - | 74 | -24.53 | 360 | 202 | V |
| | * 15.627 | 23.57 | MAv1 | 39.9 | -20.6 | .1 | 42.97 | 54 | -11.03 | - | - | 360 | 202 | V |
| 2 | * 2.281 | 36.24 | PK2 | 30.8 | -20.7 | 0 | 46.34 | - | - | 74 | -27.66 | 360 | 202 | V |
| | * 2.281 | 29.66 | MAv1 | 30.8 | -20.7 | .1 | 39.86 | 54 | -14.14 | - | - | 360 | 202 | V |
| 3 | * 4.295 | 32.87 | PK2 | 33 | -27.5 | 0 | 38.37 | - | - | 74 | -35.63 | 360 | 202 | H |
| | * 4.295 | 26.35 | MAv1 | 33 | -27.5 | .1 | 31.95 | 54 | -22.05 | - | - | 360 | 202 | H |
| 4 | * 4.924 | 33.18 | PK2 | 33.5 | -27.8 | 0 | 38.88 | - | - | 74 | -35.12 | 360 | 100 | V |
| | * 4.924 | 26.58 | MAv1 | 33.5 | -27.8 | .1 | 32.38 | 54 | -21.62 | - | - | 360 | 100 | V |
| 5 | * 9.122 | 29.6 | PK2 | 35.8 | -21.7 | 0 | 43.7 | - | - | 74 | -30.3 | 360 | 100 | V |
| | * 9.122 | 22.97 | MAv1 | 35.8 | -21.7 | .1 | 37.17 | 54 | -16.83 | - | - | 360 | 100 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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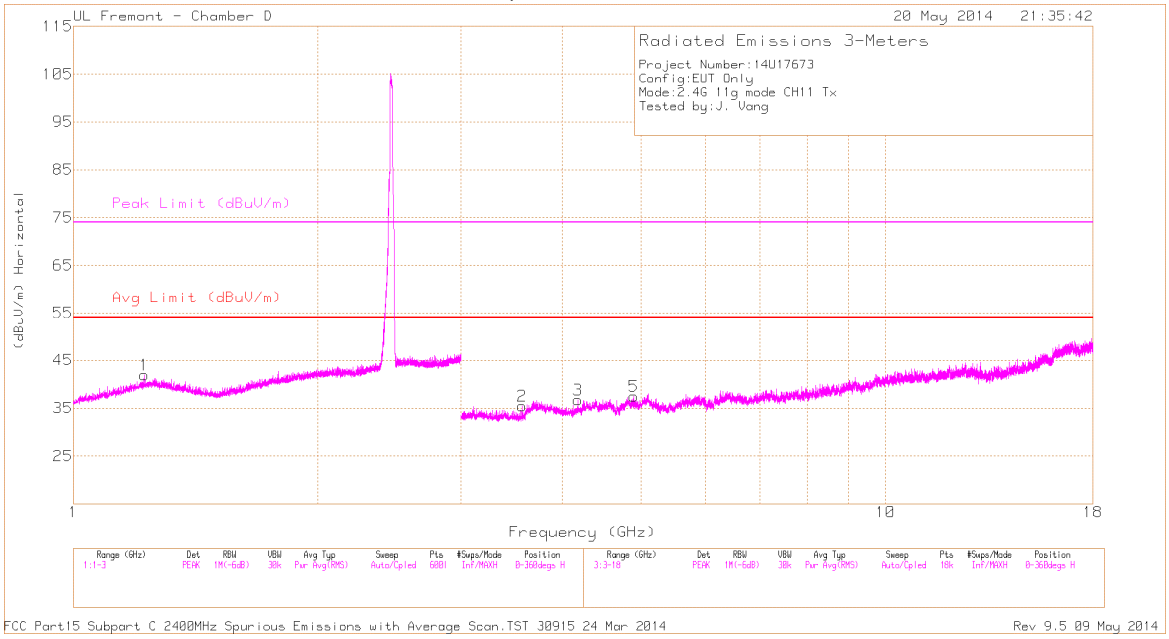
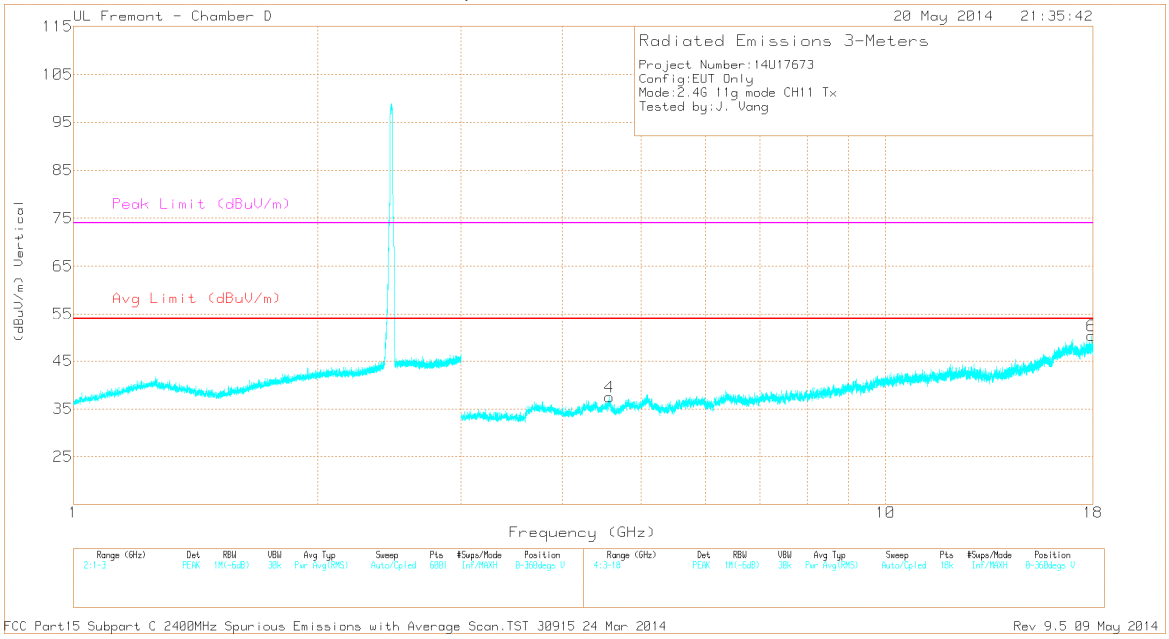
**HIGH CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

HIGH CHANNEL HORIZONTAL PLOT, CH11




HIGH CHANNEL VERTICAL PLOT, CH11





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 1.222 | 36.32 | PK2 | 29.2 | -22 | 0 | 43.52 | - | - | 74 | -30.48 | 360 | 100 | H |
| | * 1.222 | 29.83 | MAv1 | 29.2 | -22 | .1 | 37.13 | 54 | -16.87 | - | - | 360 | 100 | H |
| 6 | * 17.939 | 28.83 | PK2 | 41.4 | -17.4 | 0 | 52.83 | - | - | 74 | -21.17 | 333 | 100 | V |
| | * 17.939 | 22.27 | MAv1 | 41.4 | -17.5 | .1 | 46.27 | 54 | -7.73 | - | - | 333 | 100 | V |
| 2 | * 3.567 | 34.18 | PK2 | 32.4 | -29.1 | 0 | 37.48 | - | - | 74 | -36.52 | 360 | 202 | H |
| | * 3.567 | 27.6 | MAv1 | 32.4 | -29.1 | .1 | 31 | 54 | -23 | - | - | 360 | 202 | H |
| 3 | * 4.176 | 33.48 | PK2 | 32.9 | -28.2 | 0 | 38.18 | - | - | 74 | -35.82 | 360 | 100 | H |
| | * 4.176 | 26.95 | MAv1 | 32.9 | -28.2 | .1 | 31.75 | 54 | -22.25 | - | - | 360 | 100 | H |
| 4 | * 4.573 | 32.62 | PK2 | 33.5 | -26.4 | 0 | 39.72 | - | - | 74 | -34.28 | 333 | 100 | V |
| | * 4.573 | 26.1 | MAv1 | 33.5 | -26.4 | .1 | 33.3 | 54 | -20.7 | - | - | 333 | 100 | V |
| 5 | * 4.896 | 32.85 | PK2 | 33.5 | -27.4 | 0 | 38.95 | - | - | 74 | -35.05 | 334 | 202 | H |
| | * 4.896 | 26.31 | MAv1 | 33.5 | -27.4 | .1 | 32.51 | 54 | -21.49 | - | - | 334 | 202 | H |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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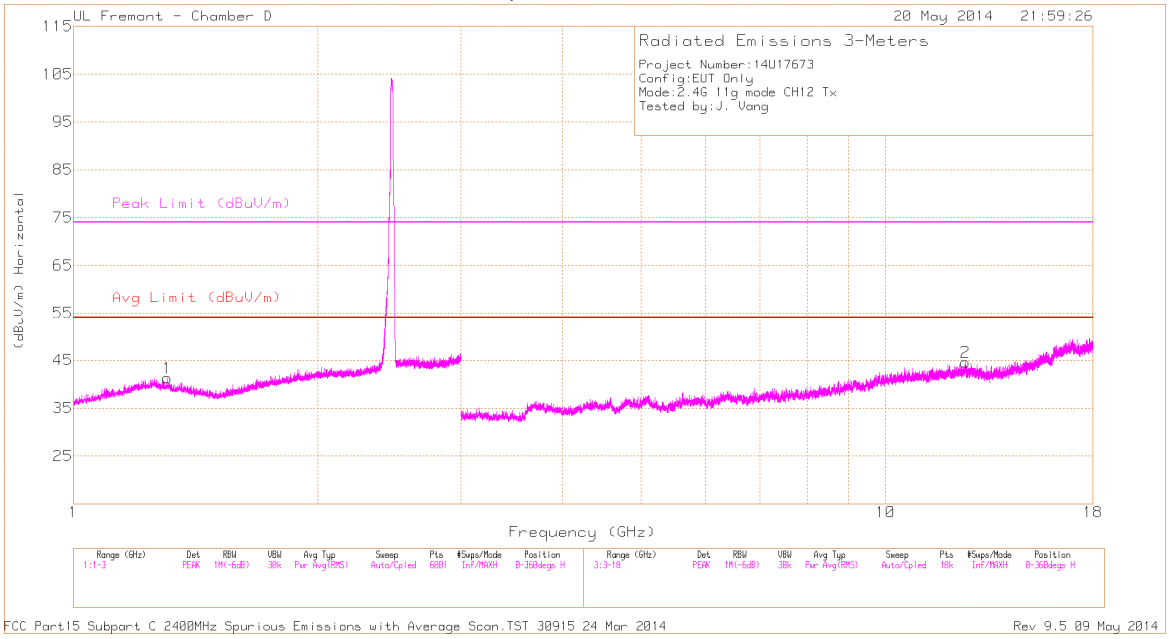
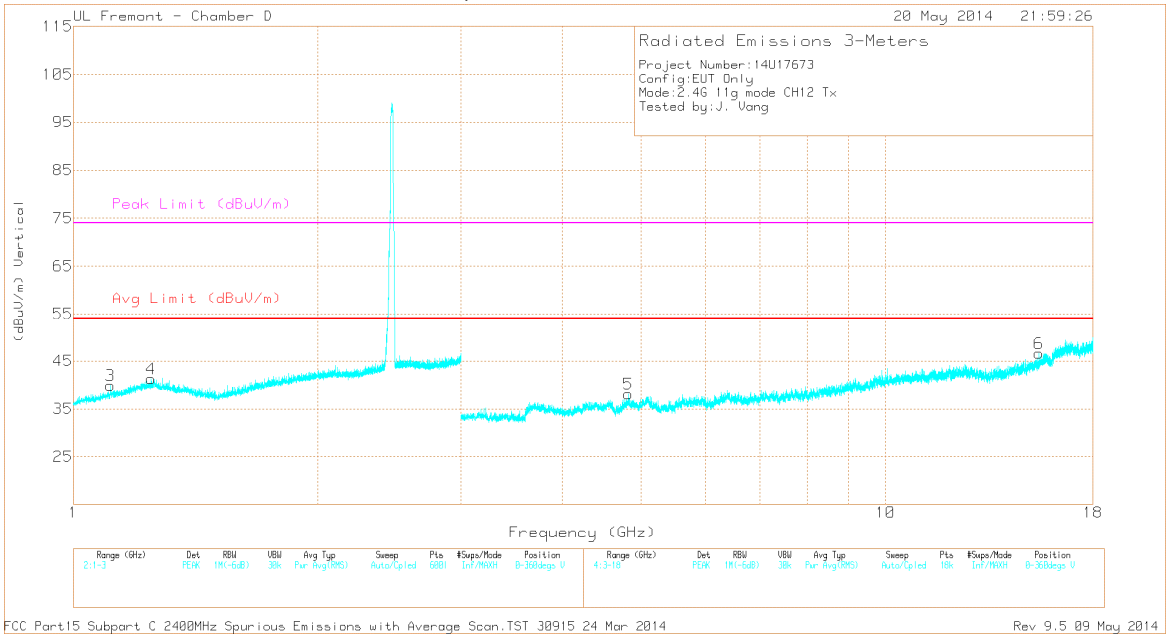
**HIGH CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

HIGH CHANNEL HORIZONTAL PLOT, CH 12




HIGH CHANNEL VERTICAL PLOT, CH 12





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/ Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | * 1.11 | 36.41 | PK2 | 27.6 | -22.1 | 0 | 41.91 | - | - | 74 | -32.09 | 360 | 202 | V |
| | * 1.11 | 29.92 | MAv1 | 27.6 | -22.1 | .1 | 35.52 | 54 | -18.48 | - | - | 360 | 202 | V |
| 4 | * 1.244 | 36.48 | PK2 | 29.5 | -22.1 | 0 | 43.88 | - | - | 74 | -30.12 | 360 | 202 | V |
| | * 1.244 | 29.93 | MAv1 | 29.5 | -22.1 | .1 | 37.43 | 54 | -16.57 | - | - | 360 | 202 | V |
| 1 | * 1.305 | 36.48 | PK2 | 29 | -21.9 | 0 | 43.58 | - | - | 74 | -30.42 | 329 | 100 | H |
| | * 1.305 | 29.9 | MAv1 | 29 | -21.9 | .1 | 37.1 | 54 | -16.9 | - | - | 329 | 100 | H |
| 2 | * 12.535 | 29.78 | PK2 | 38.5 | -20.7 | 0 | 47.58 | - | - | 74 | -26.42 | 356 | 100 | H |
| | * 12.535 | 23.26 | MAv1 | 38.5 | -20.7 | .1 | 41.16 | 54 | -12.84 | - | - | 356 | 100 | H |
| 6 | * 15.438 | 30.09 | PK2 | 39.6 | -21.6 | 0 | 48.09 | - | - | 74 | -25.91 | 330 | 100 | V |
| | * 15.438 | 23.52 | MAv1 | 39.5 | -21.6 | .1 | 41.52 | 54 | -12.48 | - | - | 330 | 100 | V |
| 5 | * 4.823 | 32.76 | PK2 | 33.5 | -26.7 | 0 | 39.56 | - | - | 74 | -34.44 | 360 | 100 | V |
| | * 4.823 | 26.27 | MAv1 | 33.5 | -26.7 | .1 | 33.17 | 54 | -20.83 | - | - | 360 | 100 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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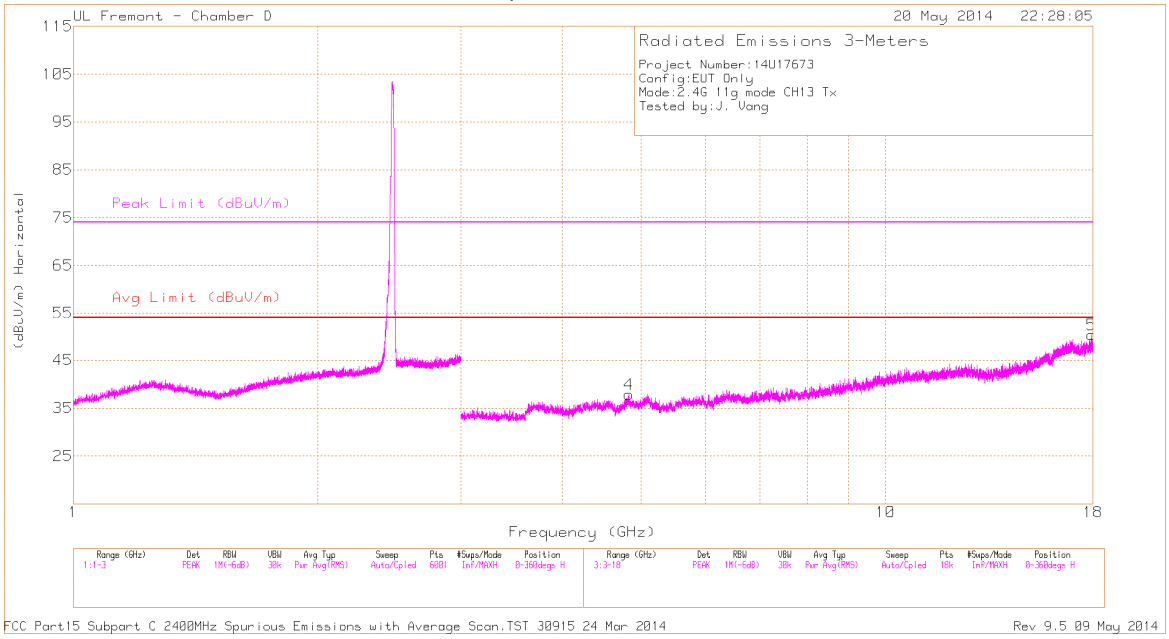
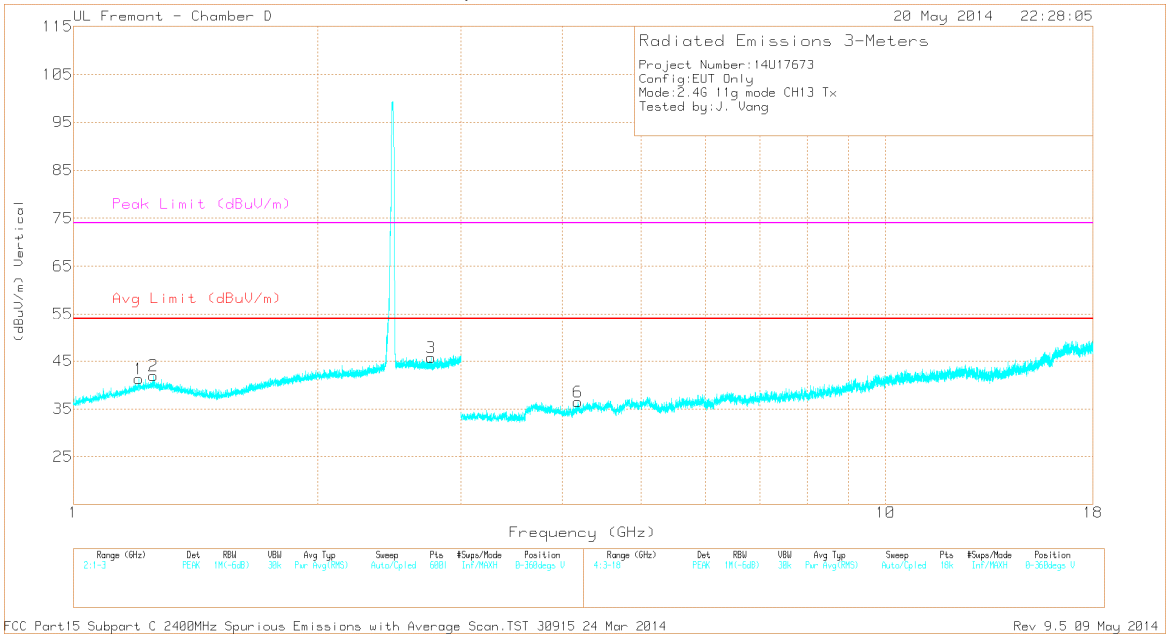
**HIGH CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

HIGH CHANNEL HORIZONTAL PLOT, CH 13




HIGH CHANNEL VERTICAL PLOT, CH 13





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/ Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 1.203 | 36.43 | PK2 | 28.9 | -22 | 0 | 43.33 | - | - | 74 | -30.67 | 350 | 202 | V |
| | * 1.203 | 29.91 | MAv1 | 28.9 | -22 | .1 | 36.91 | 54 | -17.09 | - | - | 350 | 202 | V |
| 2 | * 1.254 | 36.46 | PK2 | 29.6 | -22.1 | 0 | 43.96 | - | - | 74 | -30.04 | 356 | 100 | V |
| | * 1.254 | 29.93 | MAv1 | 29.6 | -22.1 | .1 | 37.53 | 54 | -16.47 | - | - | 356 | 100 | V |
| 5 | * 17.939 | 28.95 | PK2 | 41.4 | -17.4 | 0 | 52.95 | - | - | 74 | -21.05 | 360 | 202 | H |
| | * 17.939 | 22.37 | MAv1 | 41.4 | -17.4 | .1 | 46.47 | 54 | -7.53 | - | - | 360 | 202 | H |
| 3 | * 2.755 | 36.33 | PK2 | 31.5 | -20.2 | 0 | 47.63 | - | - | 74 | -26.37 | 356 | 100 | V |
| | * 2.755 | 29.76 | MAv1 | 31.5 | -20.2 | .1 | 41.16 | 54 | -12.84 | - | - | 356 | 100 | V |
| 6 | * 4.183 | 33.81 | PK2 | 32.9 | -28.3 | 0 | 38.41 | - | - | 74 | -35.59 | 360 | 100 | V |
| | * 4.183 | 27.25 | MAv1 | 32.9 | -28.3 | .1 | 31.95 | 54 | -22.05 | - | - | 360 | 100 | V |
| 4 | * 4.825 | 32.53 | PK2 | 33.5 | -26.7 | 0 | 39.33 | - | - | 74 | -34.67 | 360 | 202 | H |
| | * 4.825 | 26.14 | MAv1 | 33.5 | -26.7 | .1 | 33.04 | 54 | -20.96 | - | - | 360 | 202 | H |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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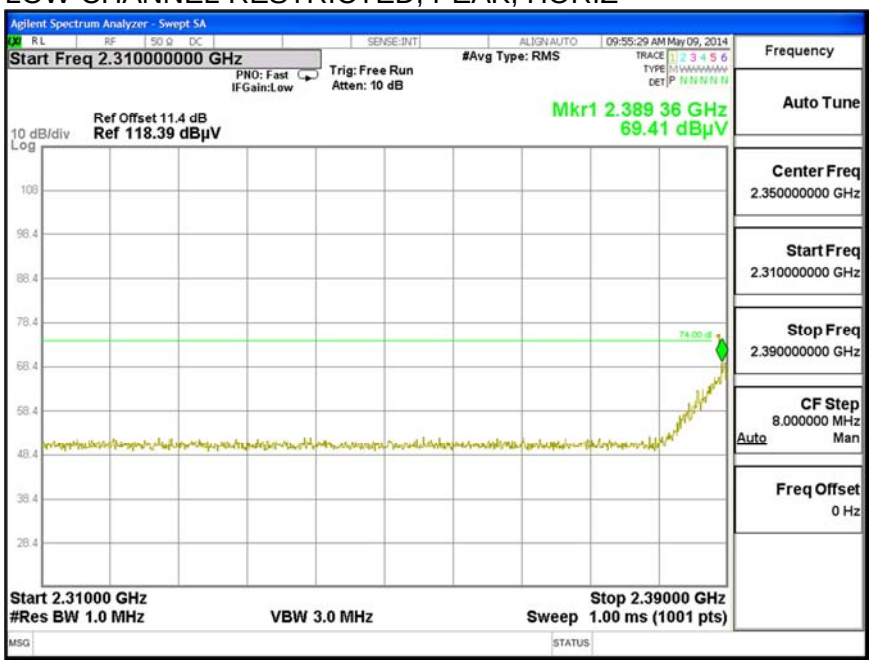
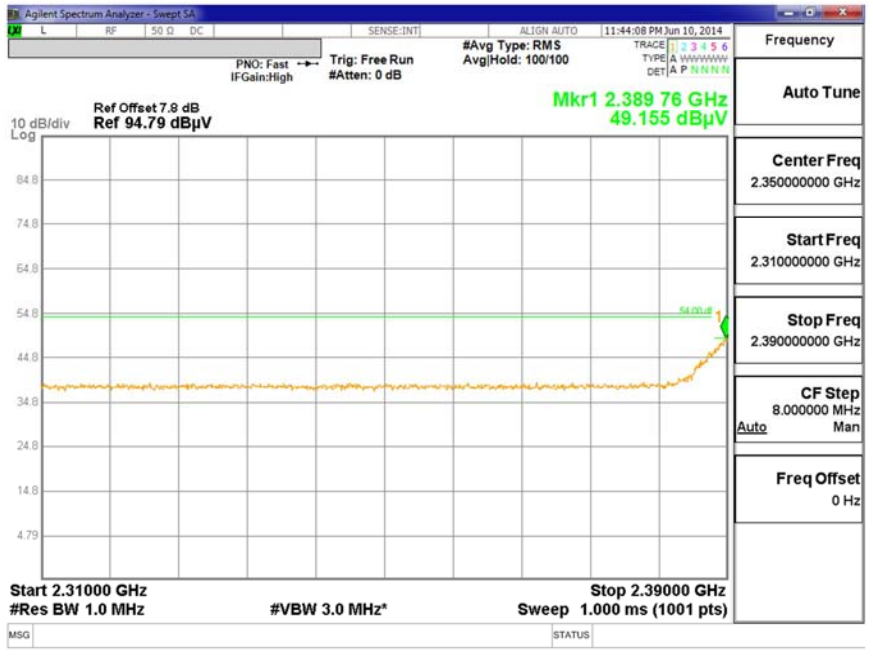
## 10.2.3. 802.11n HT20 1Tx SISO MODE IN THE 2.4 GHz BAND

**RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 1)**

LOW CHANNEL RESTRICTED, PEAK, HORIZ




LOW CHANNEL RESTRICTED, AVERAGE, HORIZ





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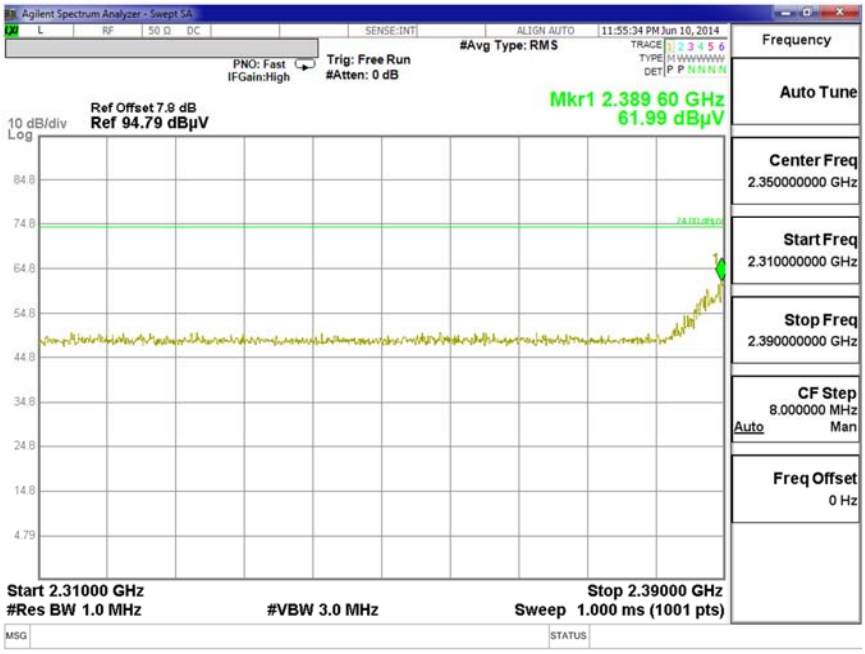
LOW CHANNEL RESTRICTED, PEAK, VERT




LOW CHANNEL RESTRICTED, AVERAGE, VERT

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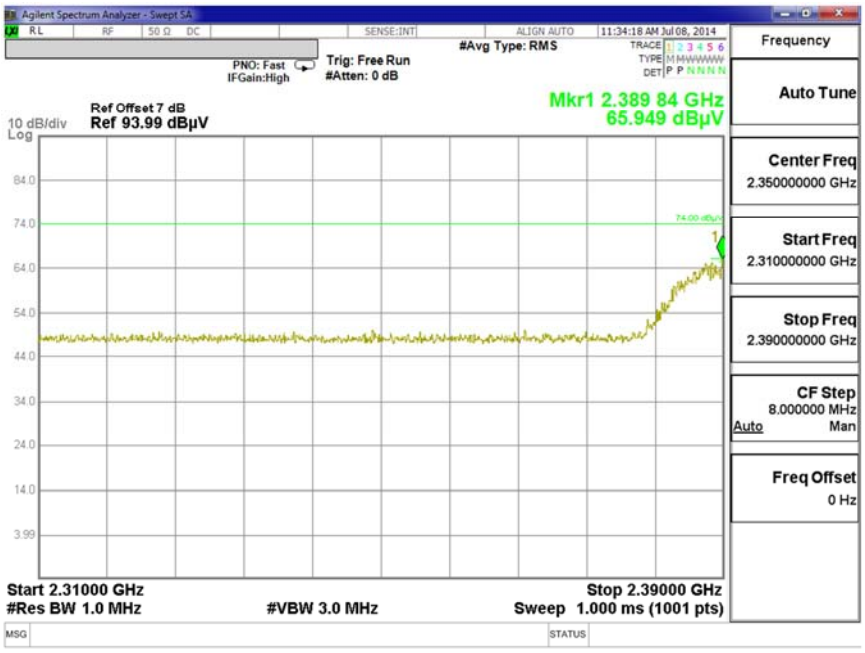
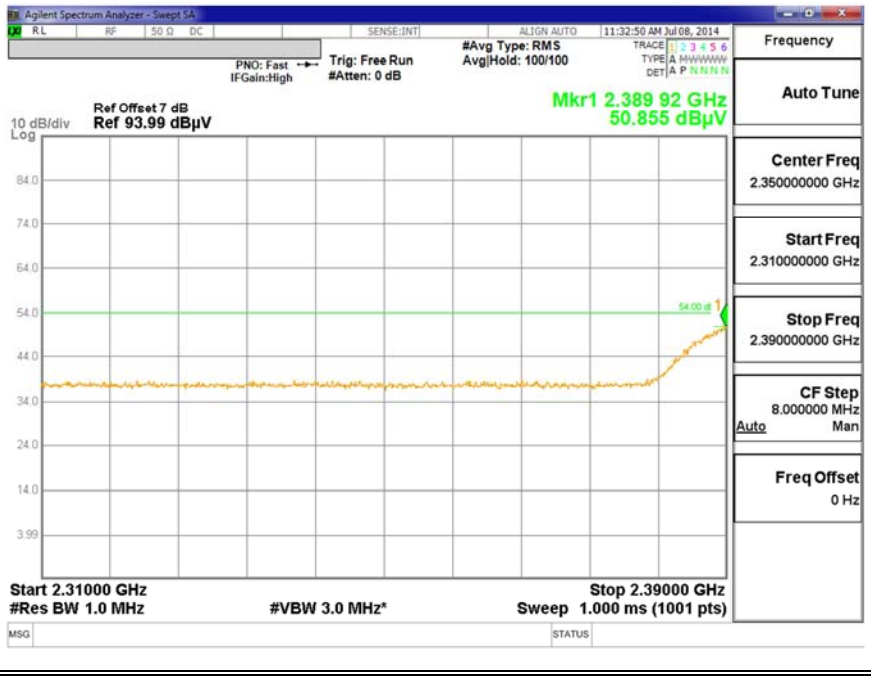
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 2)**

LOW CHANNEL BANDEDGE, PEAK, HORIZ




LOW CHANNEL BANDEDGE, AVERAGE, HORIZ





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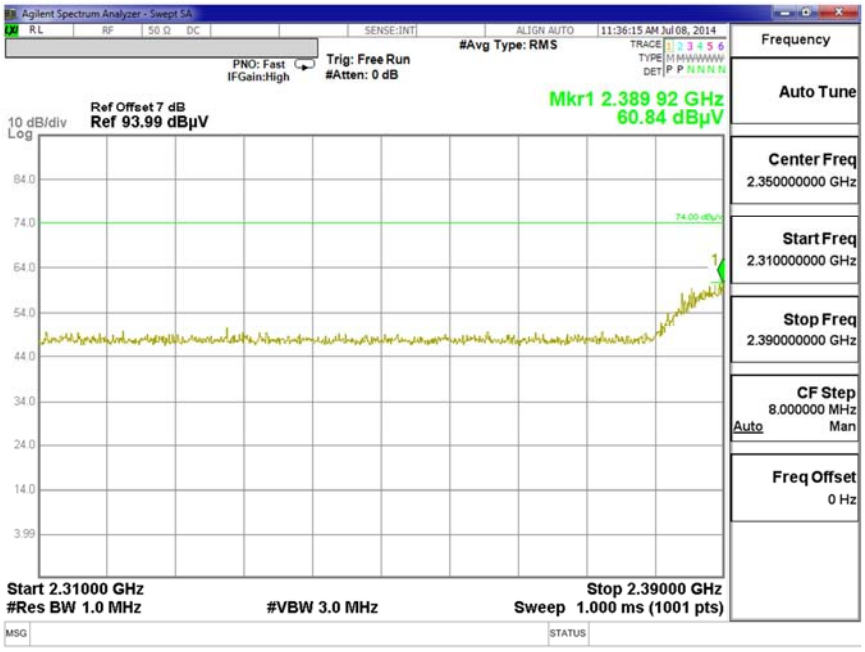
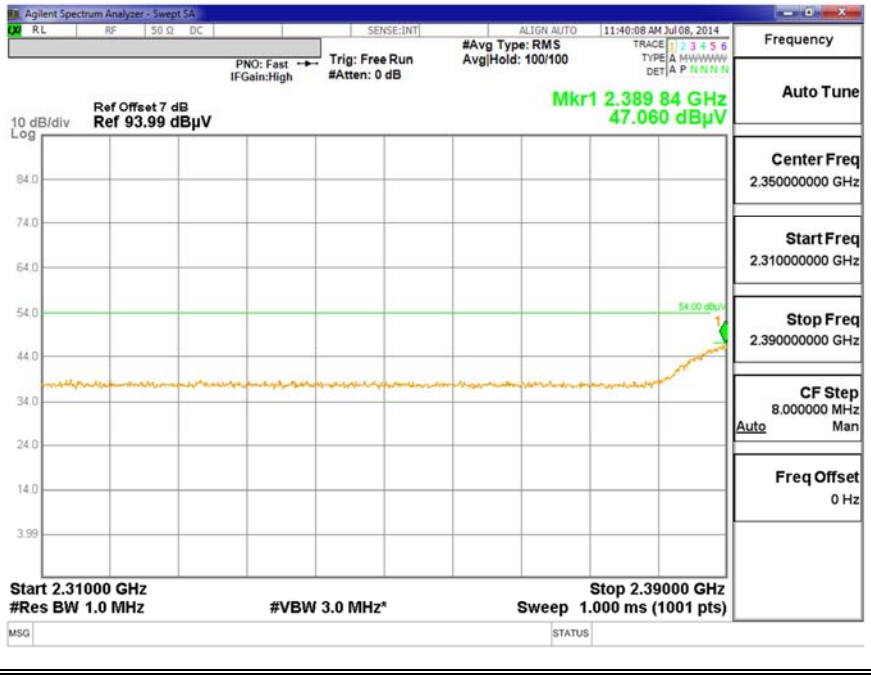
LOW CHANNEL BANDEDGE, PEAK, VERT




LOW CHANNEL BANDEDGE, AVERAGE, VERT



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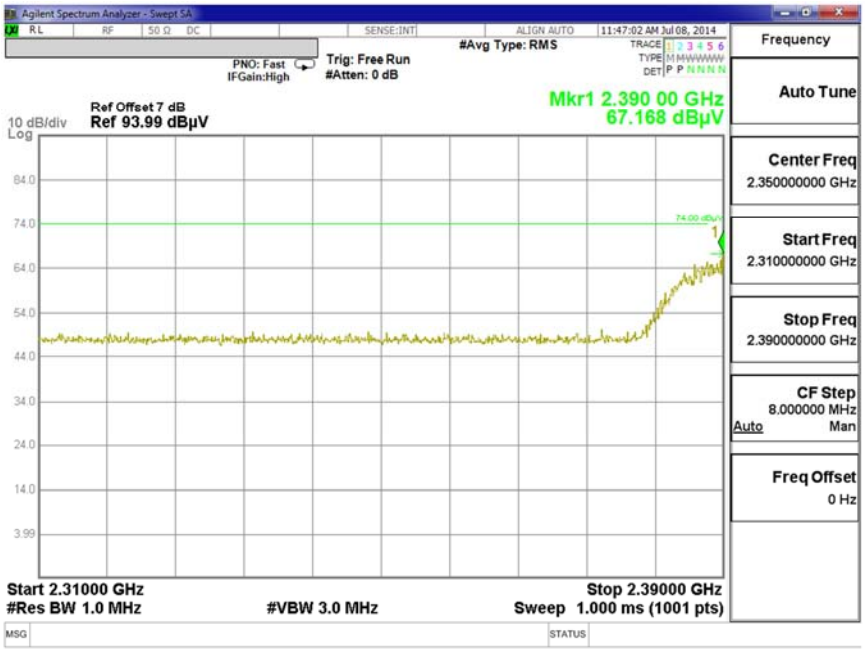
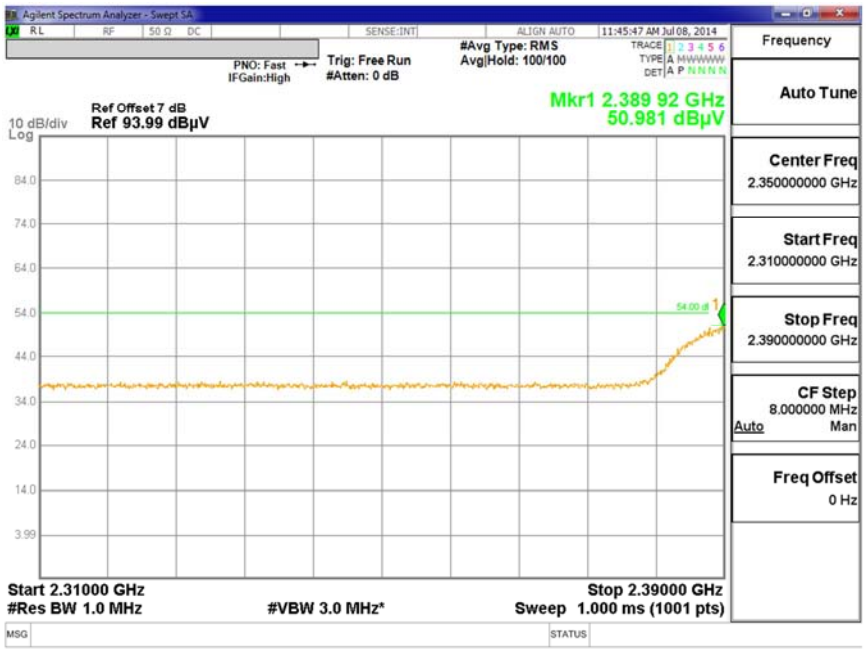
**RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 3)**

LOW CHANNEL RESTRICTED, PEAK, HORIZ




LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



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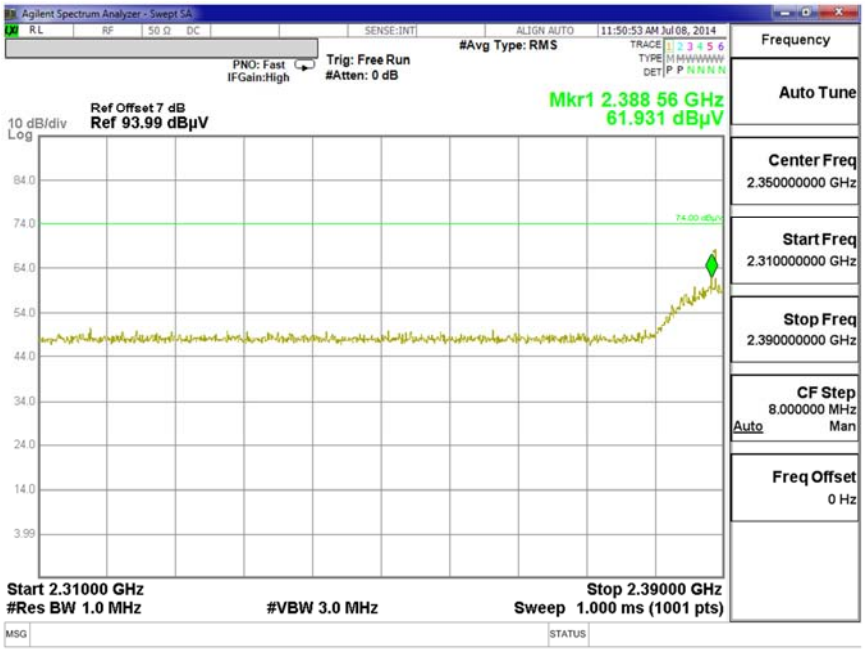
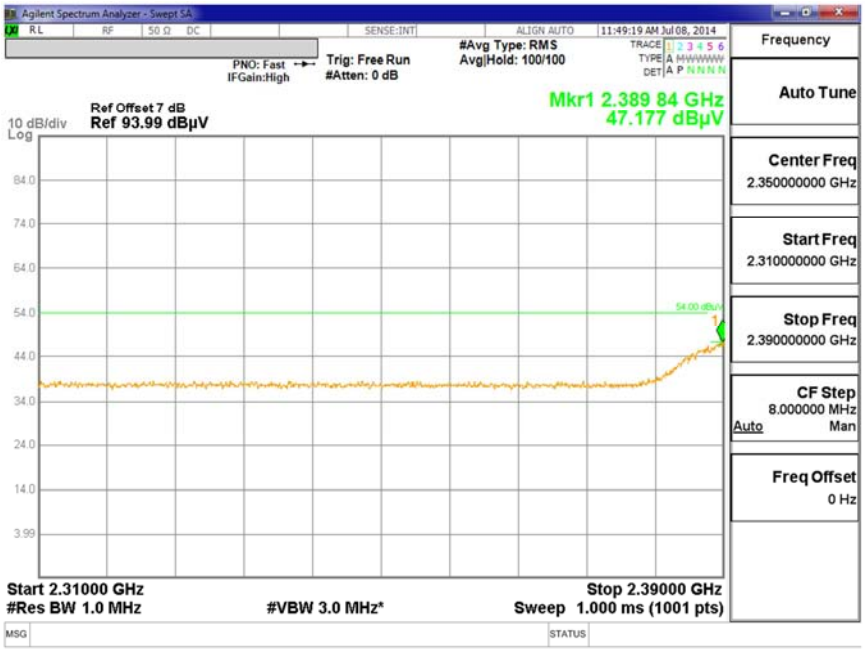
LOW CHANNEL RESTRICTED, PEAK, VERT




LOW CHANNEL RESTRICTED, AVERAGE, VERT





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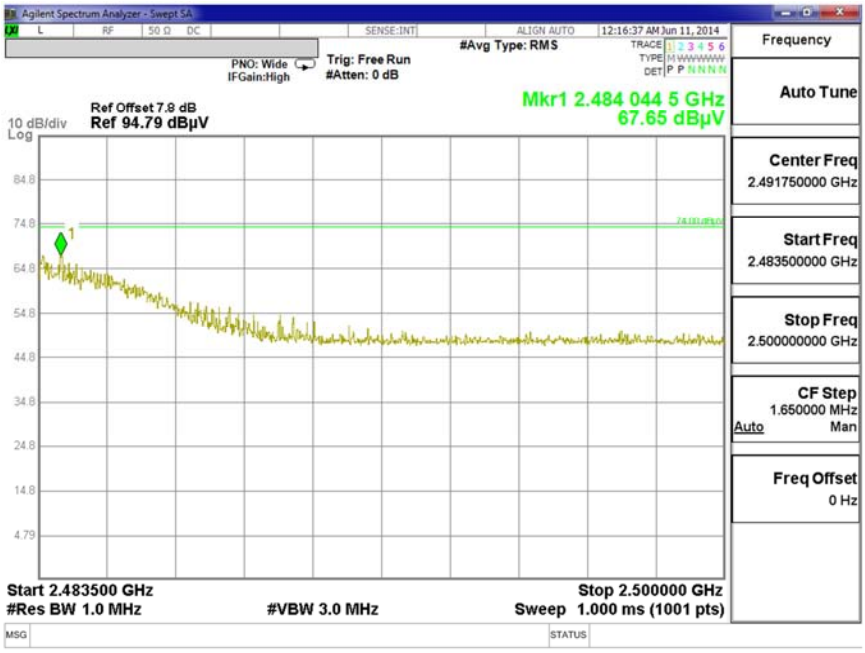
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 11)**

HIGH CHANNEL BANDEDGE, PEAK, HORIZ




HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ



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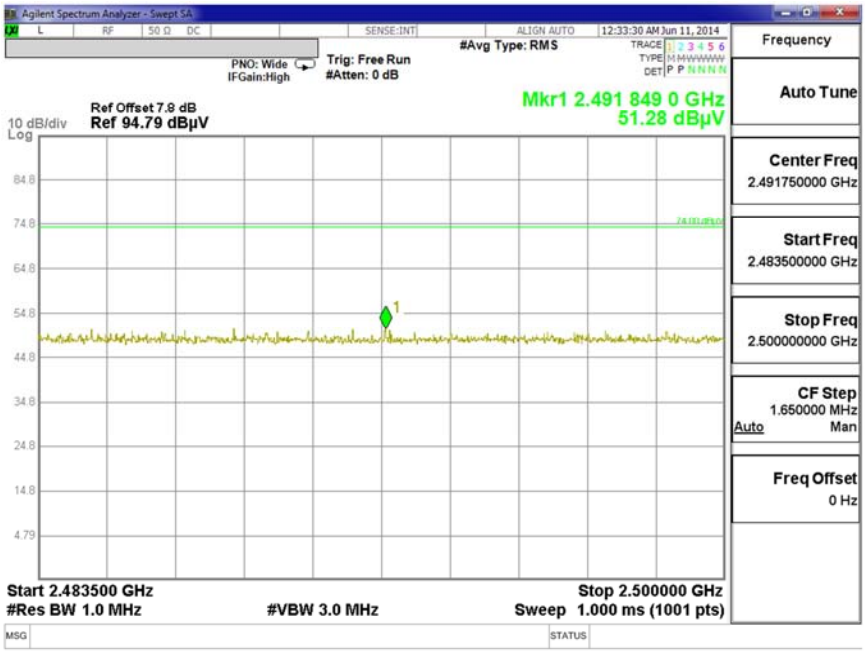
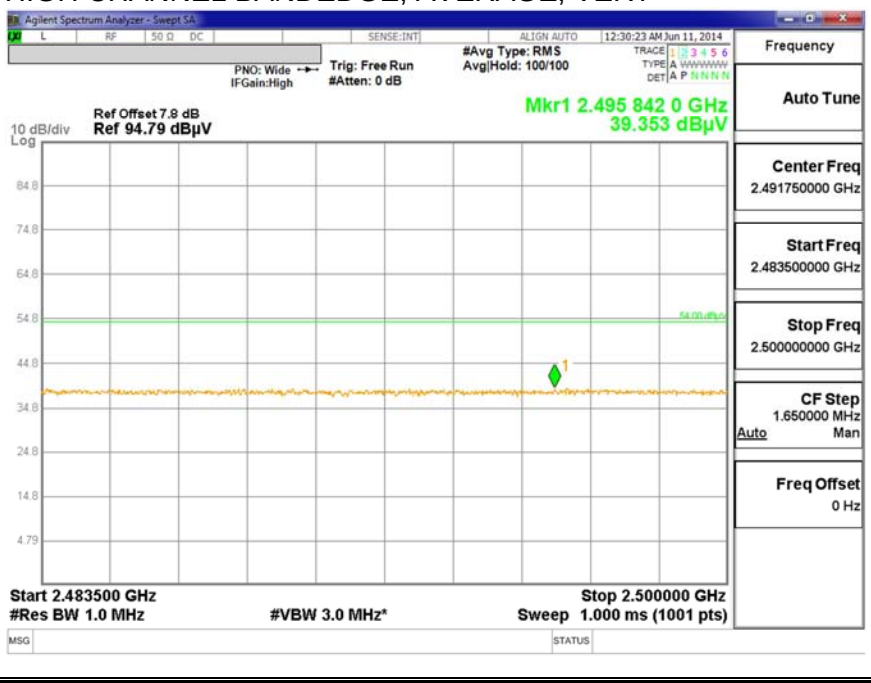
HIGH CHANNEL BANDEDGE, PEAK, VERT




HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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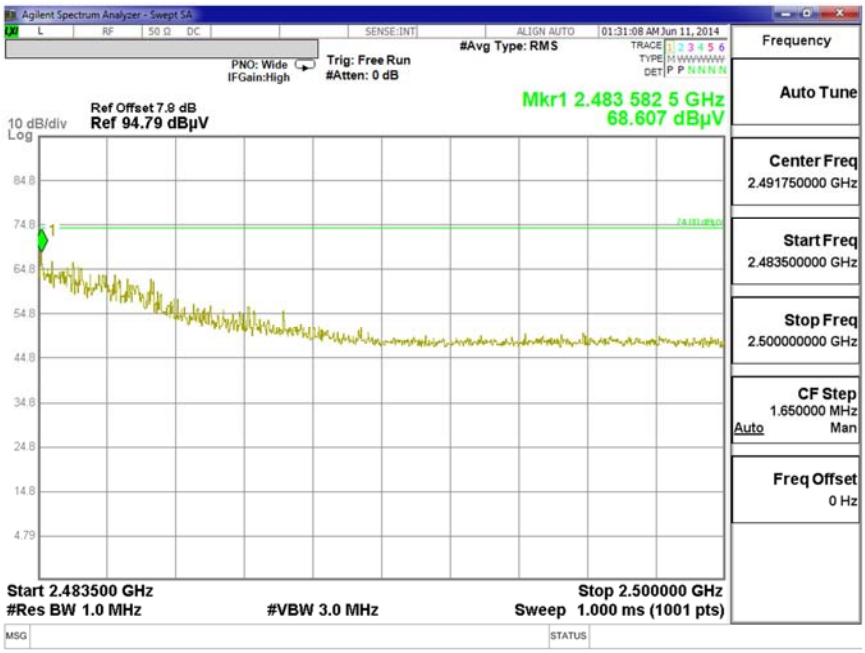
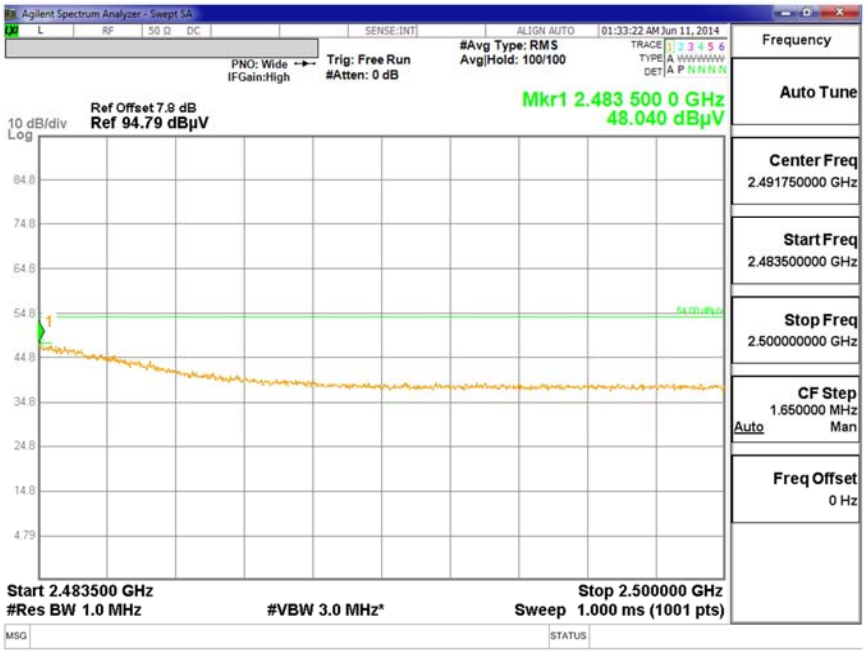
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 12)**

HIGH CHANNEL BANDEDGE, PEAK, HORIZ




HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ





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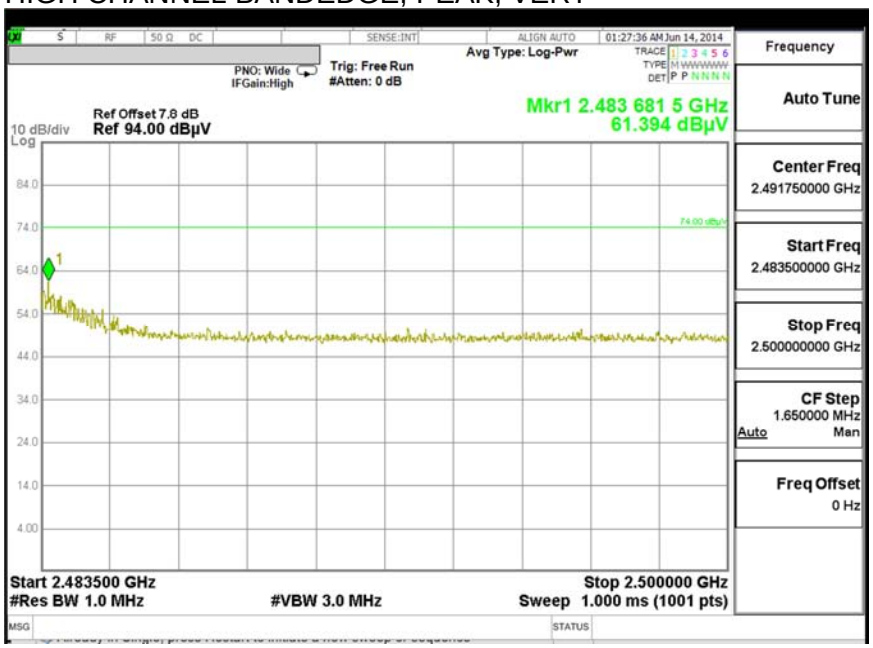
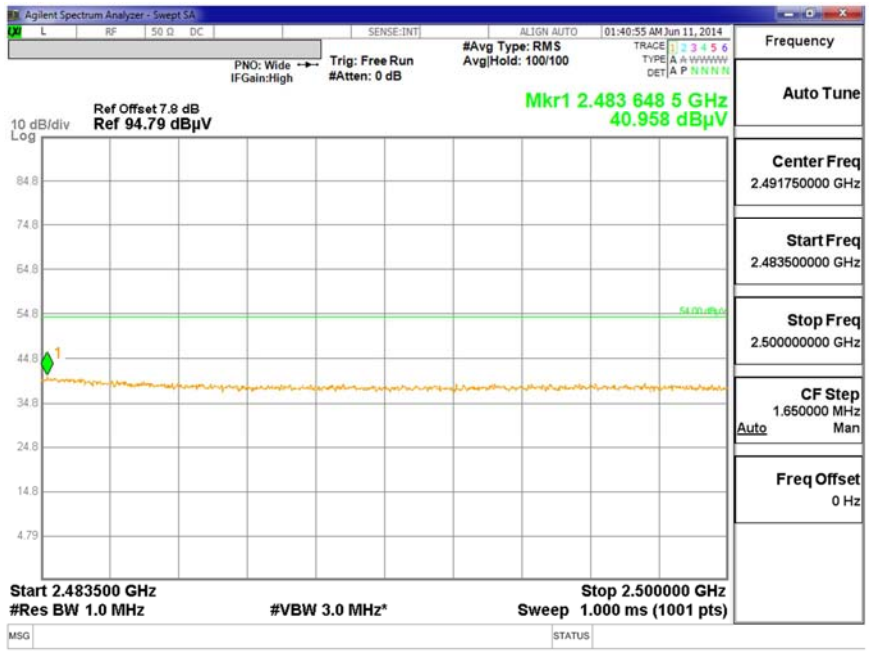
HIGH CHANNEL BANDEDGE, PEAK, VERT




HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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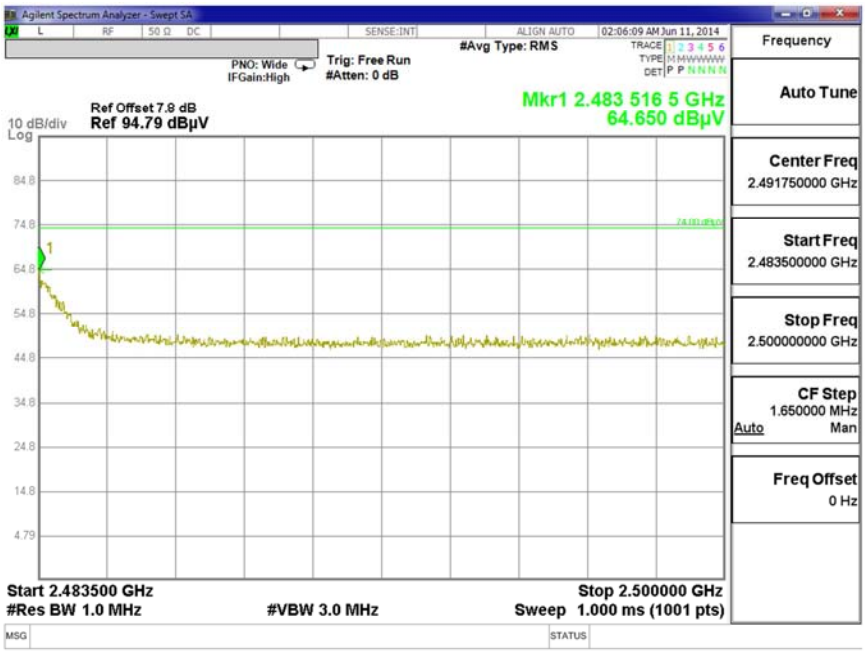
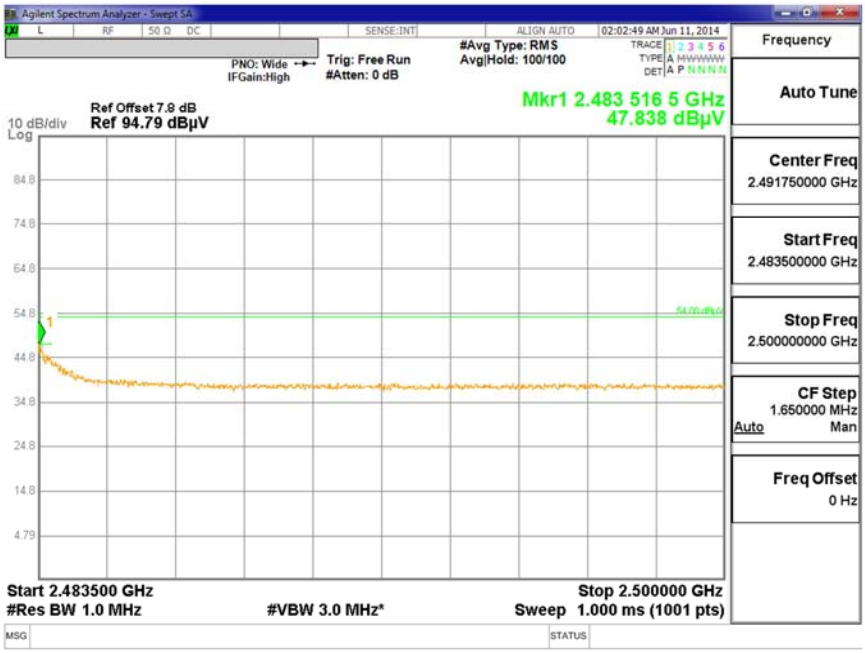
**RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 13)**

HIGH CHANNEL BANDEDGE, PEAK, HORIZ




HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ



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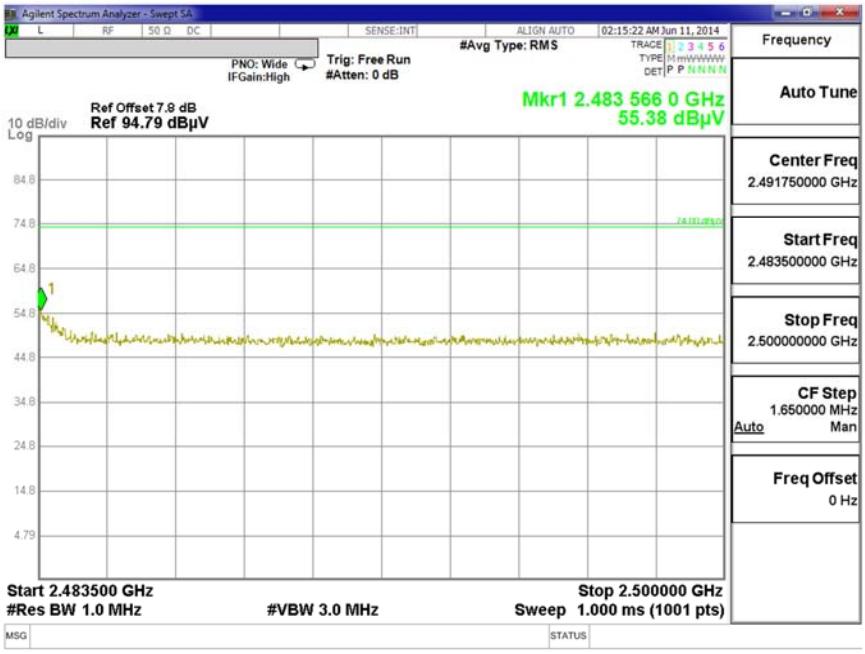
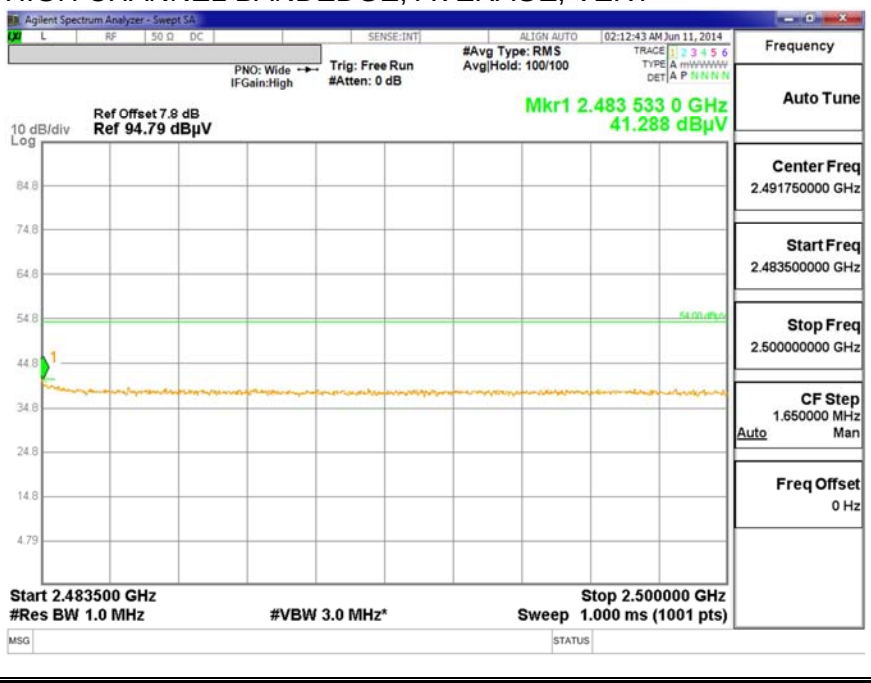
HIGH CHANNEL BANDEDGE, PEAK, VERT




HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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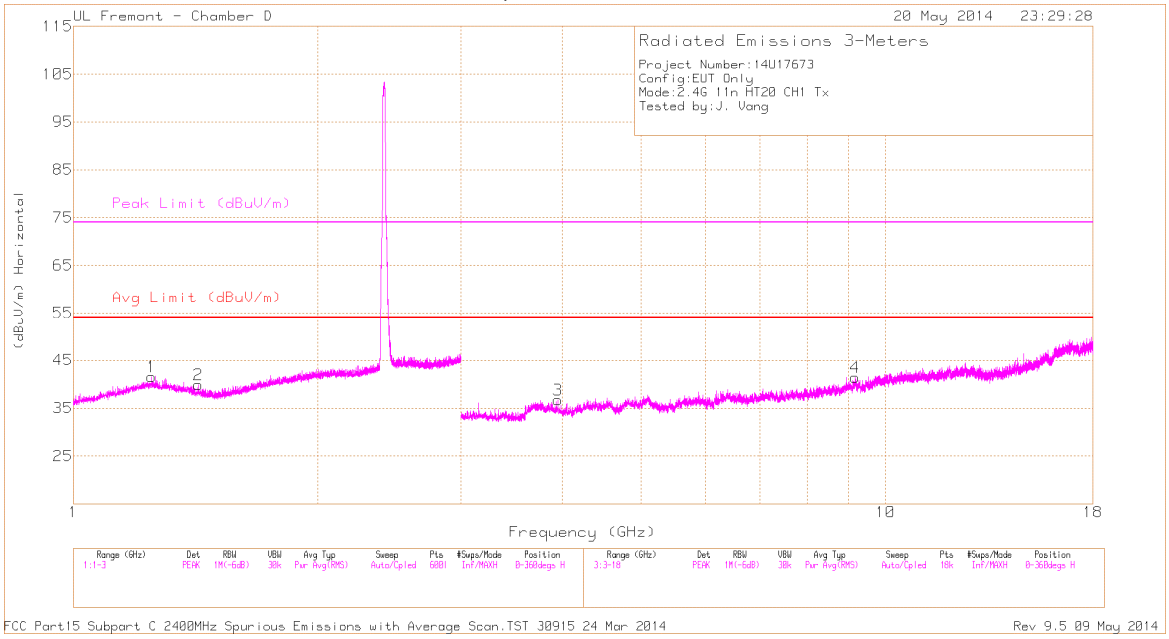
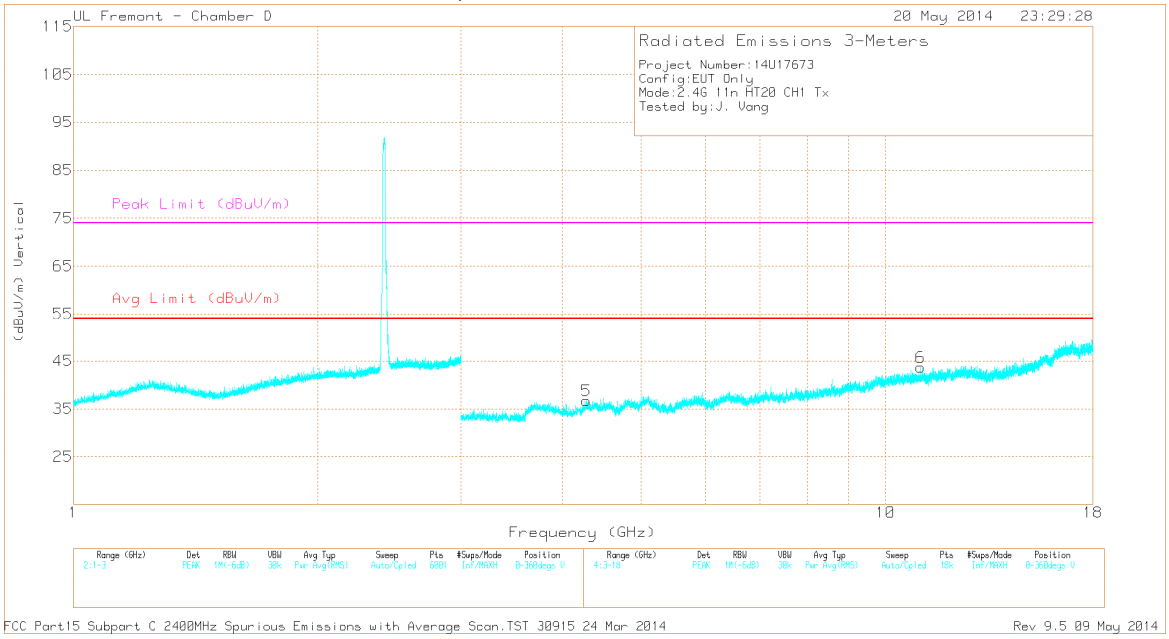
**LOW CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

LOW CHANNEL HORIZONTAL PLOT, CH 1




LOW CHANNEL VERTICAL PLOT, CH 1



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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr /Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 1.248 | 36.36 | PK2 | 29.6 | -22.1 | 0 | 43.86 | - | - | 74 | -30.14 | 30 | 202 | H |
| | * 1.248 | 29.85 | MAv1 | 29.6 | -22.1 | .1 | 37.45 | 54 | -16.55 | - | - | 30 | 202 | H |
| 2 | * 1.425 | 36.3 | PK2 | 27.7 | -21.8 | 0 | 42.2 | - | - | 74 | -31.8 | 1 | 100 | H |
| | * 1.425 | 29.75 | MAv1 | 27.7 | -21.7 | .1 | 35.85 | 54 | -18.15 | - | - | 1 | 100 | H |
| 3 | * 3.952 | 33.66 | PK2 | 32.9 | -28.2 | 0 | 38.36 | - | - | 74 | -35.64 | 5 | 202 | H |
| | * 3.951 | 27.09 | MAv1 | 32.9 | -28.2 | .1 | 31.89 | 54 | -22.11 | - | - | 5 | 202 | H |
| 4 | * 9.17 | 29.92 | PK2 | 35.9 | -21.3 | 0 | 44.52 | - | - | 74 | -29.48 | 5 | 202 | H |
| | * 9.171 | 23.36 | MAv1 | 35.9 | -21.3 | .1 | 38.06 | 54 | -15.94 | - | - | 5 | 202 | H |
| 5 | * 4.279 | 30.27 | PK2 | 33 | -27.5 | 0 | 35.77 | - | - | 74 | -38.23 | 5 | 202 | V |
| | * 4.278 | 26.99 | MAv1 | 33 | -27.5 | .1 | 32.59 | 54 | -21.41 | - | - | 5 | 202 | V |
| 6 | * 11.046 | 29.48 | PK2 | 37.5 | -21.6 | 0 | 45.38 | - | - | 74 | -28.62 | 2 | 100 | V |
| | * 11.047 | 22.96 | MAv1 | 37.5 | -21.6 | .1 | 38.96 | 54 | -15.04 | - | - | 2 | 100 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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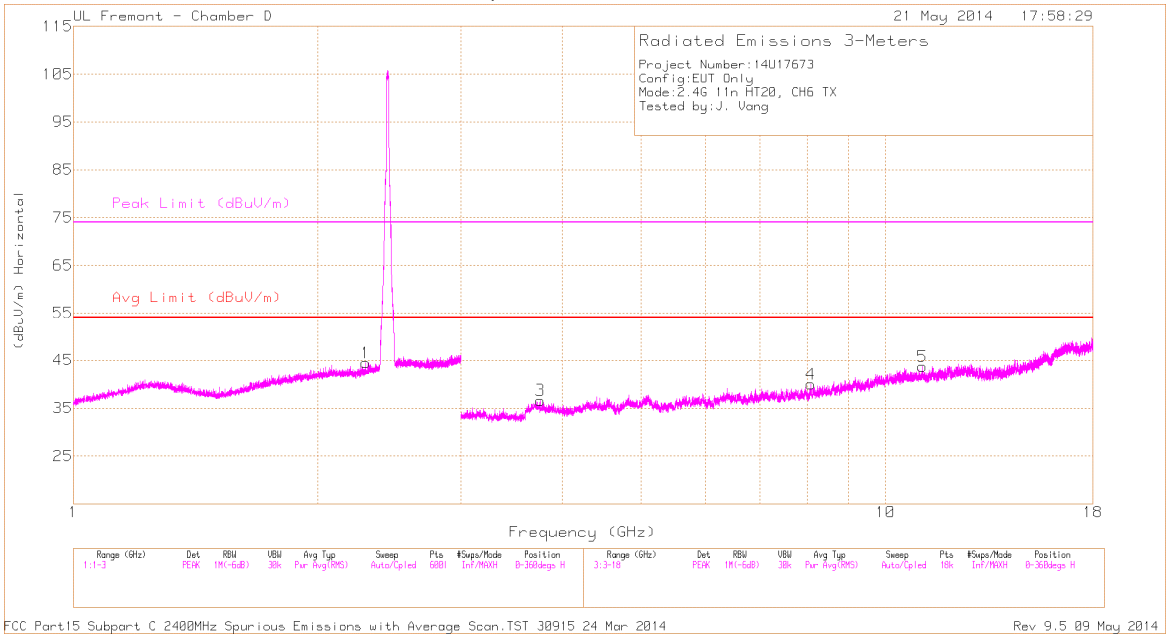
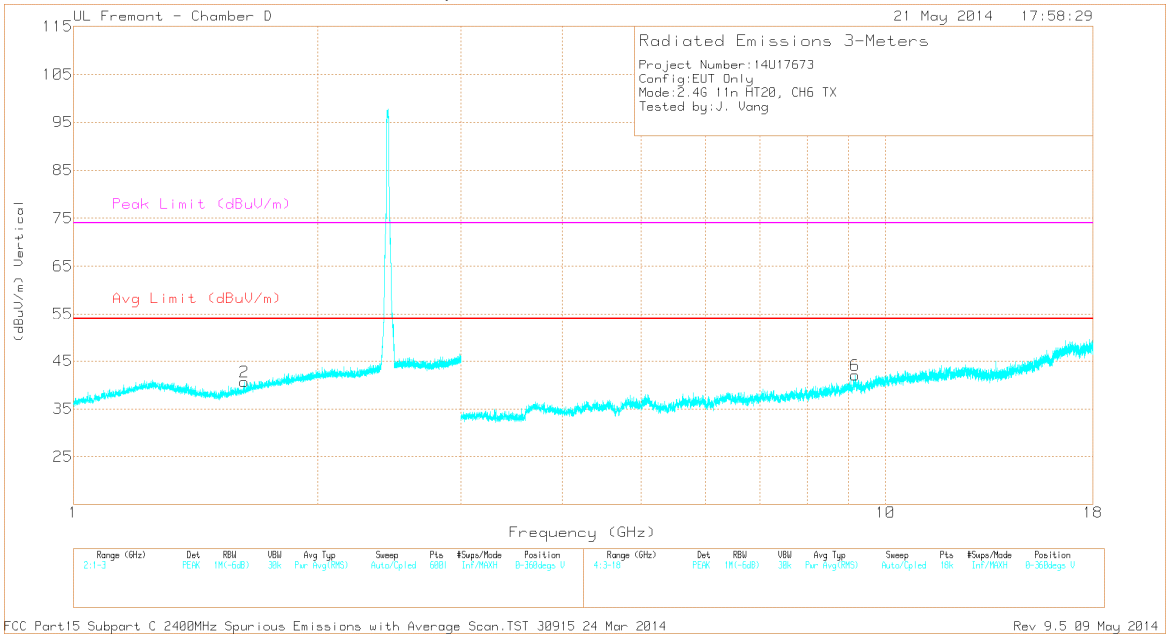
**MID CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

MID CHANNEL HORIZONTAL PLOT, CH 6




MID CHANNEL VERTICAL PLOT, CH 6





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/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 | * 1.622 | 36.26 | PK2 | 28.1 | -21.6 | 42.76 | - | - | 74 | -31.24 | 0 | 100 | V |
| | * 1.623 | 29.69 | MAv1 | 28.1 | -21.6 | 36.19 | 54 | -17.81 | - | - | 0 | 100 | V |
| 5 | * 11.093 | 29.94 | PK2 | 37.5 | -20.9 | 46.54 | - | - | 74 | -27.46 | 0 | 202 | H |
| | * 11.093 | 23.3 | MAv1 | 37.5 | -20.9 | 39.9 | 54 | -14.1 | - | - | 0 | 202 | H |
| 1 | * 2.289 | 36.03 | PK2 | 30.8 | -20.8 | 46.03 | - | - | 74 | -27.97 | 0 | 202 | H |
| | * 2.289 | 29.66 | MAv1 | 30.9 | -20.8 | 39.76 | 54 | -14.24 | - | - | 0 | 202 | H |
| 3 | * 3.76 | 33.56 | PK2 | 32.7 | -28.4 | 37.86 | - | - | 74 | -36.14 | 0 | 202 | H |
| | * 3.76 | 27.06 | MAv1 | 32.7 | -28.4 | 31.36 | 54 | -22.64 | - | - | 0 | 202 | H |
| 4 | * 8.087 | 31.35 | PK2 | 35.3 | -24.2 | 42.45 | - | - | 74 | -31.55 | 15 | 100 | H |
| | * 8.088 | 24.8 | MAv1 | 35.3 | -24.2 | 35.9 | 54 | -18.1 | - | - | 15 | 100 | H |
| 6 | * 9.167 | 27.25 | PK2 | 35.9 | -21.5 | 41.65 | - | - | 74 | -32.35 | 0 | 202 | V |
| | * 9.166 | 24.11 | MAv1 | 35.9 | -21.6 | 38.41 | 54 | -15.59 | - | - | 0 | 202 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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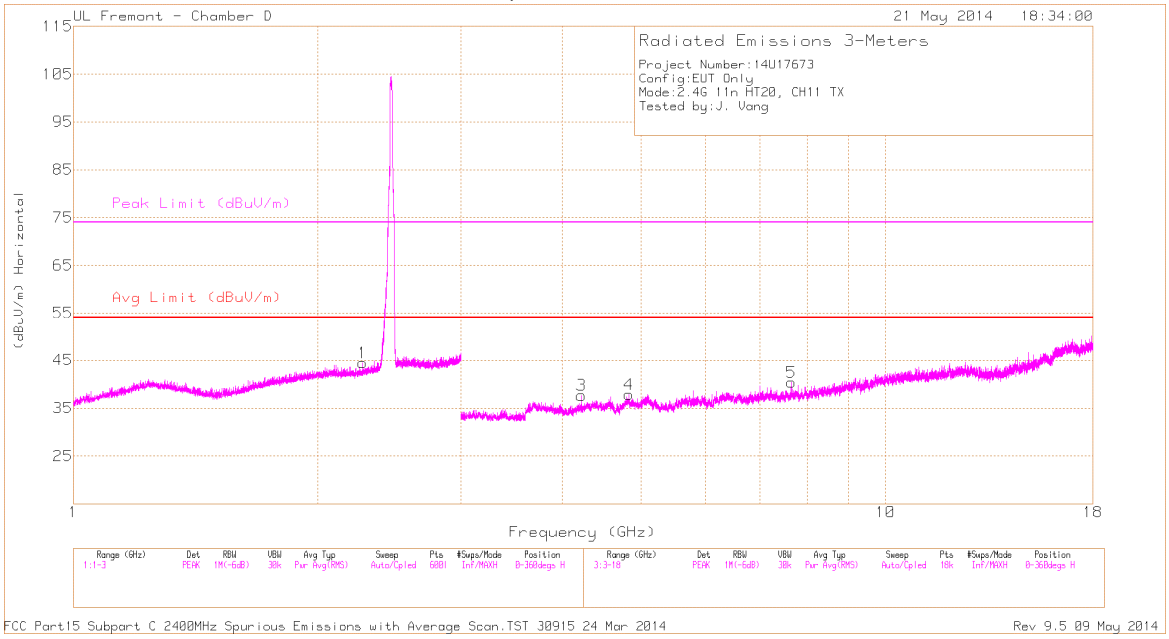
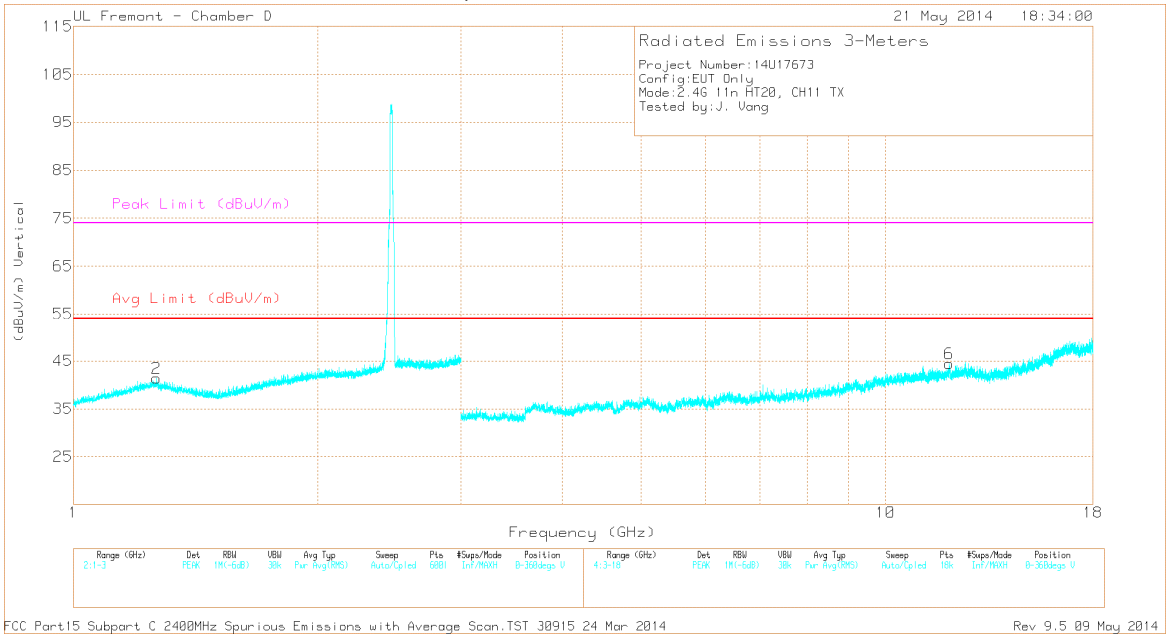
**HIGH CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

HIGH CHANNEL HORIZONTAL PLOT, CH 11




HIGH CHANNEL VERTICAL PLOT, CH 11





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/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 | * 1.266 | 36.47 | PK2 | 29.4 | -22 | 43.87 | - | - | 74 | -30.13 | 10 | 100 | V |
| | * 1.266 | 29.94 | MAv1 | 29.4 | -22 | 37.34 | 54 | -16.66 | - | - | 10 | 100 | V |
| 6 | * 11.983 | 26.91 | PK2 | 38.2 | -20.7 | 44.41 | - | - | 74 | -29.59 | 0 | 100 | V |
| | * 11.981 | 23.74 | MAv1 | 38.2 | -20.7 | 41.24 | 54 | -12.76 | - | - | 0 | 100 | V |
| 1 | * 2.271 | 36.26 | PK2 | 30.7 | -20.7 | 46.26 | - | - | 74 | -27.74 | 23 | 100 | H |
| | * 2.271 | 29.71 | MAv1 | 30.7 | -20.7 | 39.71 | 54 | -14.29 | - | - | 23 | 100 | H |
| 3 | * 4.22 | 33.15 | PK2 | 32.9 | -28.4 | 37.65 | - | - | 74 | -36.35 | 0 | 100 | H |
| | * 4.219 | 26.58 | MAv1 | 32.9 | -28.4 | 31.08 | 54 | -22.92 | - | - | 0 | 100 | H |
| 4 | * 4.826 | 32.68 | PK2 | 33.5 | -26.7 | 39.48 | - | - | 74 | -34.52 | 0 | 100 | H |
| | * 4.827 | 26.13 | MAv1 | 33.5 | -26.7 | 32.93 | 54 | -21.07 | - | - | 0 | 100 | H |
| 5 | * 7.65 | 31.66 | PK2 | 35.1 | -24.7 | 42.06 | - | - | 74 | -31.94 | 0 | 100 | H |
| | * 7.65 | 25.11 | MAv1 | 35.1 | -24.7 | 35.51 | 54 | -18.49 | - | - | 0 | 100 | H |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



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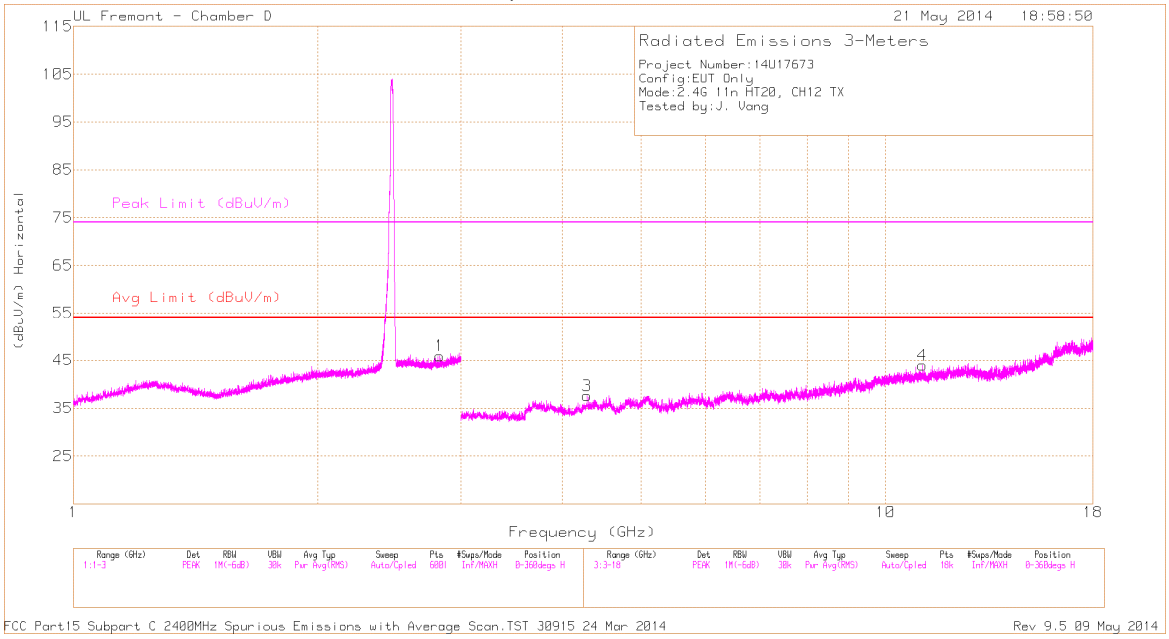
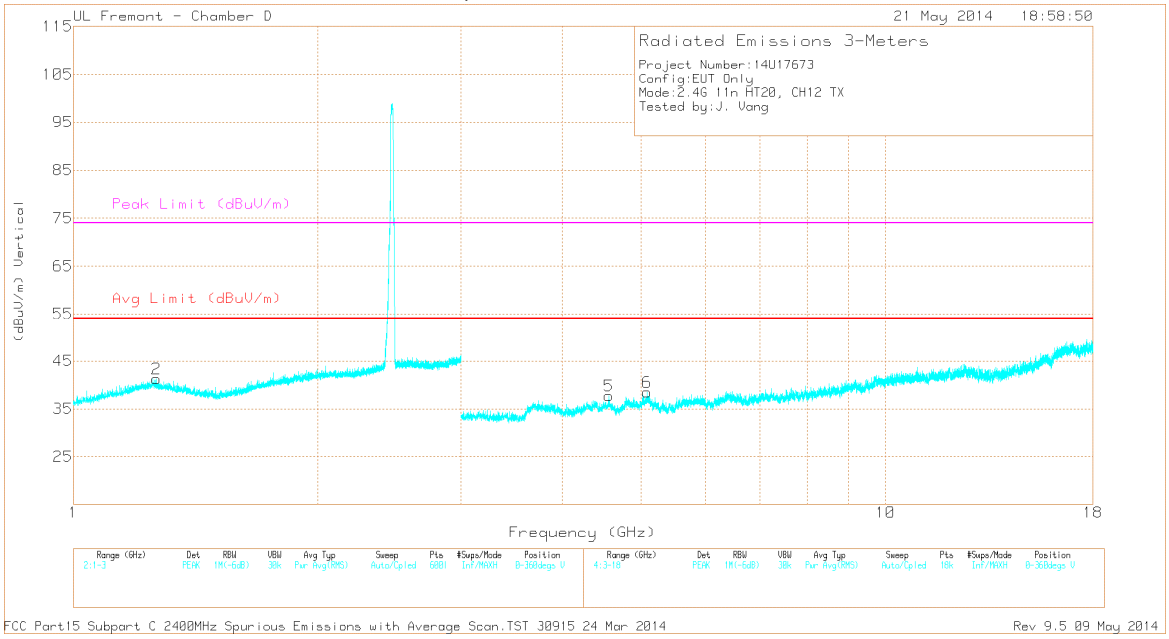
**HIGH CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

HIGH CHANNEL HORIZONTAL PLOT, CH 12




HIGH CHANNEL VERTICAL PLOT, CH 12





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Fltr/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 | * 1.266 | 36.53 | PK2 | 29.4 | -22 | 43.93 | - | - | 74 | -30.07 | 0 | 100 | V |
| | * 1.265 | 29.93 | MAv1 | 29.4 | -22 | 37.33 | 54 | -16.67 | - | - | 0 | 100 | V |
| 4 | * 11.093 | 29.92 | PK2 | 37.5 | -20.9 | 46.52 | - | - | 74 | -27.48 | 0 | 202 | H |
| | * 11.093 | 23.22 | MAv1 | 37.5 | -20.9 | 39.82 | 54 | -14.18 | - | - | 0 | 202 | H |
| 1 | * 2.824 | 35.99 | PK2 | 31.8 | -19.9 | 47.89 | - | - | 74 | -26.11 | 24 | 100 | H |
| | * 2.825 | 29.49 | MAv1 | 31.8 | -19.9 | 41.39 | 54 | -12.61 | - | - | 24 | 100 | H |
| 3 | * 4.289 | 33.22 | PK2 | 33 | -27.5 | 38.72 | - | - | 74 | -35.28 | 0 | 202 | H |
| | * 4.289 | 26.71 | MAv1 | 33 | -27.5 | 32.21 | 54 | -21.79 | - | - | 0 | 202 | H |
| 5 | * 4.567 | 32.83 | PK2 | 33.5 | -26.4 | 39.93 | - | - | 74 | -34.07 | 0 | 202 | V |
| | * 4.567 | 26.23 | MAv1 | 33.5 | -26.4 | 33.33 | 54 | -20.67 | - | - | 0 | 202 | V |
| 6 | * 5.084 | 32.69 | PK2 | 33.6 | -26.1 | 40.19 | - | - | 74 | -33.81 | 0 | 202 | V |
| | * 5.084 | 26.1 | MAv1 | 33.6 | -26.1 | 33.6 | 54 | -20.4 | - | - | 0 | 202 | V |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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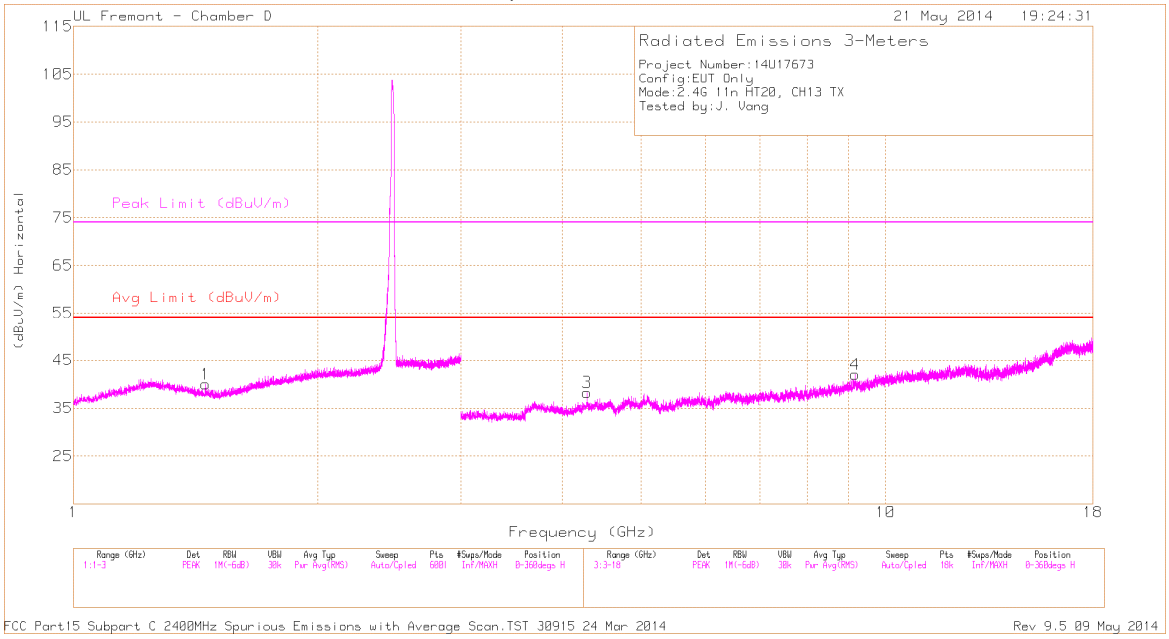
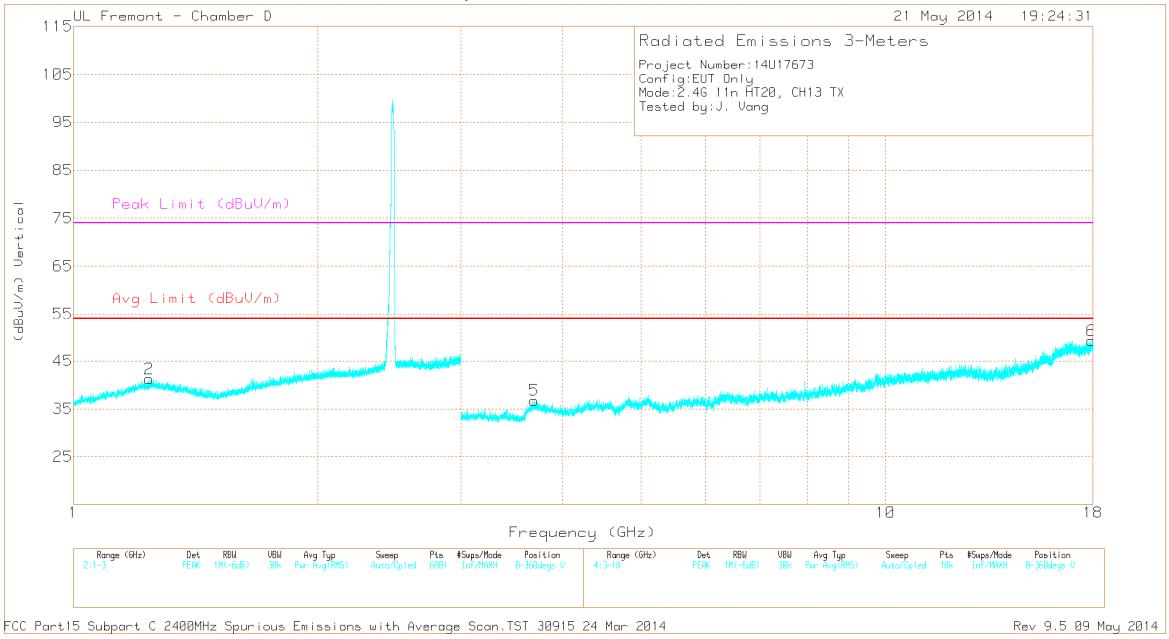
**HIGH CHANNEL, HARMONICS AND SPURIOUS EMISSIONS**

HIGH CHANNEL HORIZONTAL PLOT, CH 13




HIGH CHANNEL VERTICAL PLOT, CH 13





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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T712 (dB/m) | Amp/Cbl/Flt r/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 | * 1.24 | 34.31 | PK2 | 29.5 | -22.1 | 41.71 | - | - | 74 | -32.29 | 0 | 202 | V |
| | * 1.24 | 30.33 | MAv1 | 29.5 | -22.1 | 37.73 | 54 | -16.27 | - | - | 0 | 202 | V |
| 1 | * 1.455 | 36.24 | PK2 | 27.4 | -21.7 | 41.94 | - | - | 74 | -32.06 | 0 | 100 | H |
| | * 1.455 | 29.7 | MAv1 | 27.4 | -21.7 | 35.4 | 54 | -18.6 | - | - | 0 | 100 | H |
| 6 | * 17.932 | 28.56 | PK2 | 41.4 | -17.5 | 52.46 | - | - | 74 | -21.54 | 4 | 202 | V |
| | * 17.932 | 22.03 | MAv1 | 41.4 | -17.5 | 45.93 | 54 | -8.07 | - | - | 4 | 202 | V |
| 5 | * 3.696 | 33.46 | PK2 | 32.6 | -27.9 | 38.16 | - | - | 74 | -35.84 | 0 | 100 | V |
| | * 3.695 | 26.98 | MAv1 | 32.6 | -27.9 | 31.68 | 54 | -22.32 | - | - | 0 | 100 | V |
| 3 | * 4.288 | 33.08 | PK2 | 33 | -27.5 | 38.58 | - | - | 74 | -35.42 | 0 | 202 | H |
| | * 4.288 | 26.57 | MAv1 | 33 | -27.5 | 32.07 | 54 | -21.93 | - | - | 0 | 202 | H |
| 4 | * 9.176 | 29.7 | PK2 | 35.9 | -21.3 | 44.3 | - | - | 74 | -29.7 | 0 | 202 | H |
| | * 9.174 | 23.17 | MAv1 | 35.9 | -21.3 | 37.77 | 54 | -16.23 | - | - | 0 | 202 | H |

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average


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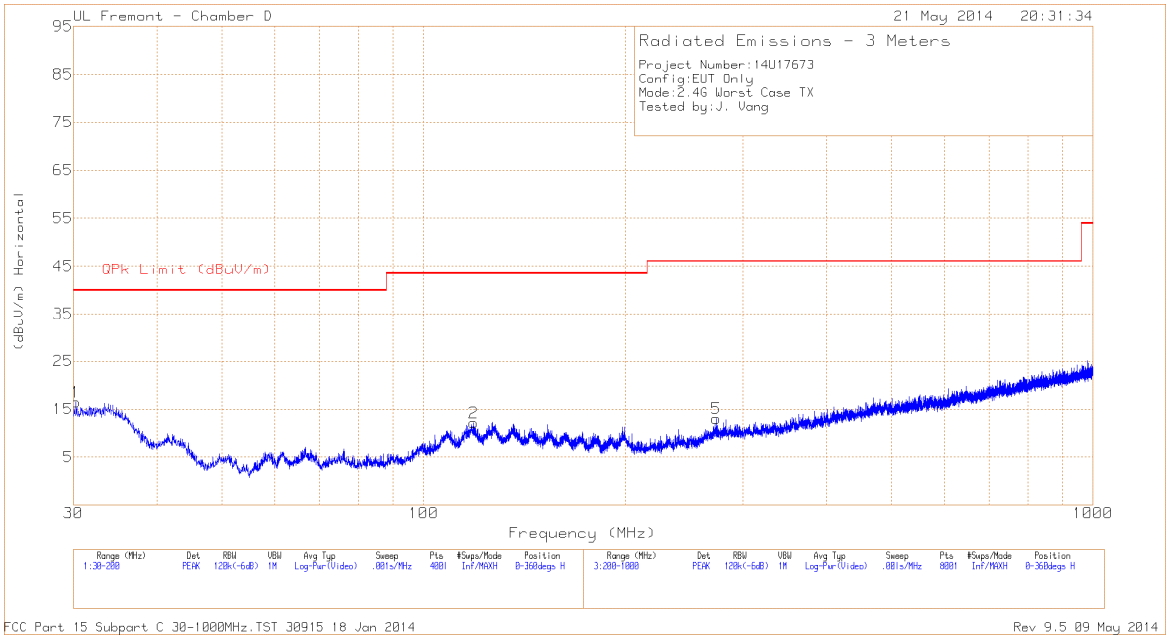
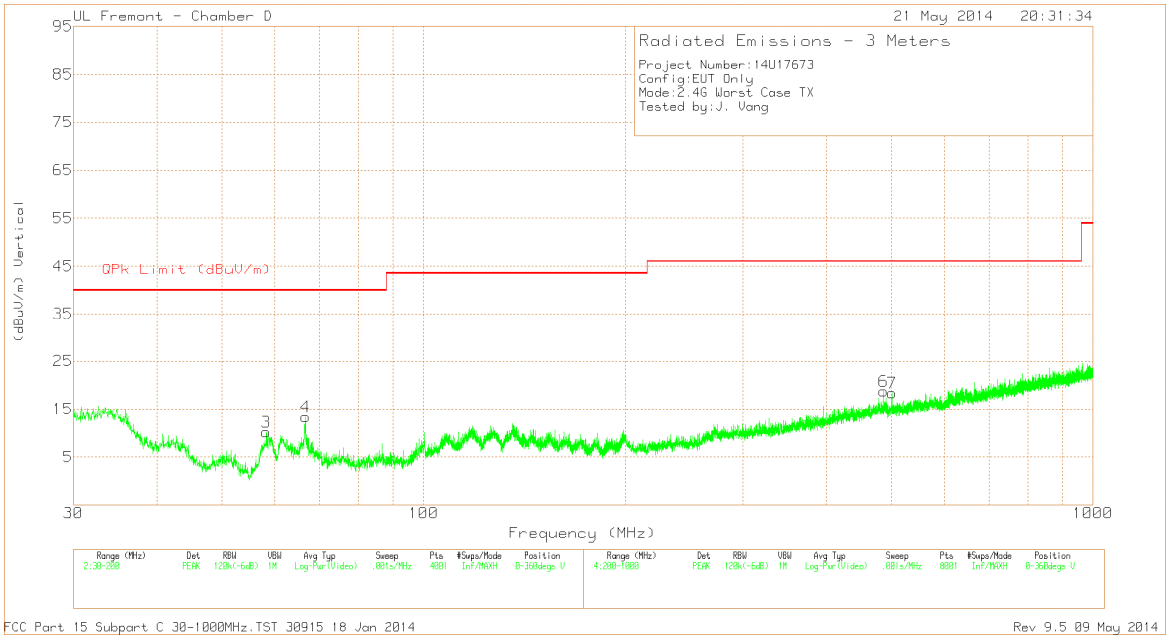
## 10.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT




VERTICAL PLOT



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## DATA

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Hybrid | Amp/Cbl (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | * 118.74 | 29.44 | PK | 13.7 | -31 | 12.14 | 43.52 | -31.38 | 0-360 | 98 | H |
| 5 | * 273.8 | 30.12 | PK | 13.4 | -30.5 | 13.02 | 46.02 | -33 | 0-360 | 100 | H |
| 1 | 30.255 | 26.83 | PK | 21.3 | -31.7 | 16.43 | 40 | -23.57 | 0-360 | 201 | H |
| 3 | 58.2625 | 34.33 | PK | 7.5 | -31.6 | 10.23 | 40 | -29.77 | 0-360 | 100 | V |
| 4 | 66.635 | 36.79 | PK | 8.2 | -31.6 | 13.39 | 40 | -26.61 | 0-360 | 100 | V |
| 6 | 486.8 | 30.7 | PK | 17.7 | -29.7 | 18.7 | 46.02 | -27.32 | 0-360 | 100 | V |
| 7 | 501.1 | 30.59 | PK | 17.4 | -29.6 | 18.39 | 46.02 | -27.63 | 0-360 | 100 | V |

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

PK - Peak detector



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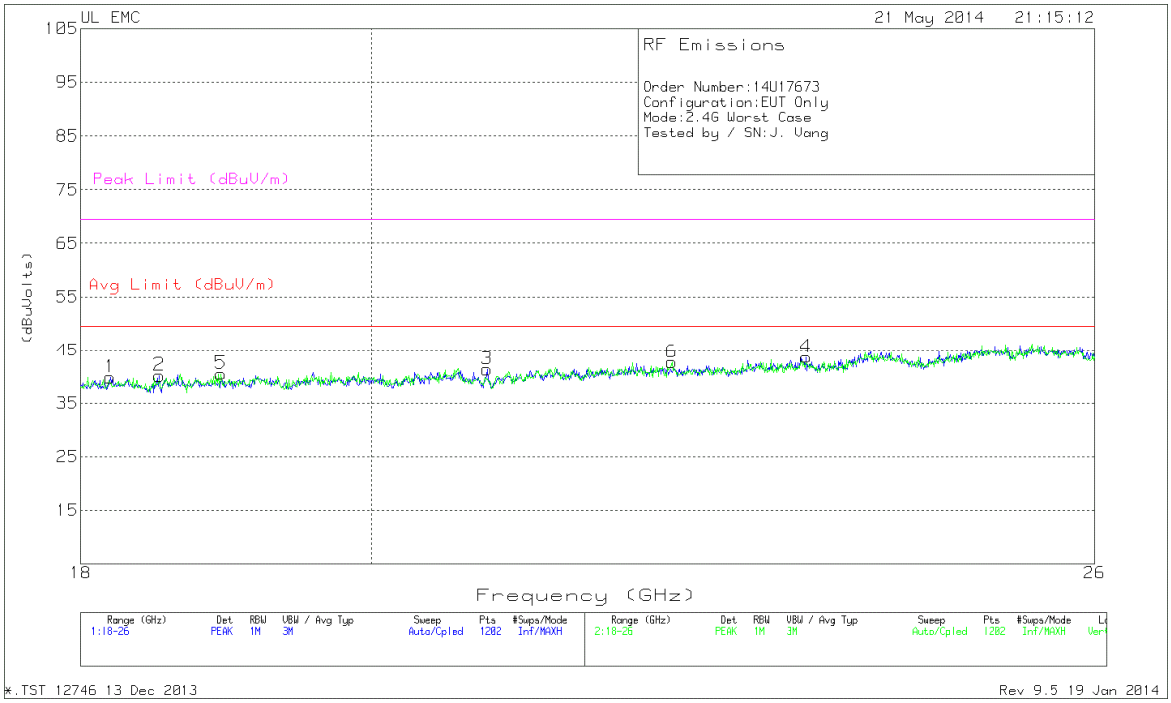
## 10.4. WORST-CASE ABOVE 18 to 26 GHz

**SPURIOUS EMISSIONS 18000 TO 26000 MHz (WORST-CASE CONFIGURATION)**

HORIZONTAL & VERTICAL PLOT



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## DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T89 (dB/m) | Amp/Cbl (dB) | Dist Corr (dB) | Corrected Reading (dBuVolts) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 18.193 | 41.73 | PK | 32.3 | -24.7 | -9.5 | 39.8 | 49.5 | -9.66 | 69.5 | -29.6 |
| 2 | 18.52 | 41.87 | PK | 32.4 | -24.6 | -9.5 | 40.1 | 49.5 | -9.33 | 69.5 | -29.3 |
| 3 | 20.858 | 41.83 | PK | 32.9 | -23.9 | -9.5 | 41.3 | 49.5 | -8.16 | 69.5 | -28.1 |
| 4 | 23.415 | 42.97 | PK | 33.5 | -23.3 | -9.5 | 43.6 | 49.5 | -5.83 | 69.5 | -25.8 |
| 5 | 18.939 | 42.1 | PK | 32.5 | -24.6 | -9.5 | 40.5 | 49.5 | -9 | 69.5 | -29 |
| 6 | 22.303 | 42.07 | PK | 33.2 | -23.1 | -9.5 | 42.6 | 49.5 | -6.83 | 69.5 | -26.8 |

PK - Peak detector



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# 11. 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 C63.4.

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.


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## RESULTS

## 6 WORST EMISSIONS

Line-L1 .15 - 30MHz

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | T24 IL L1 (dB) | LC Cables 1&3 (dB) | Corrected Reading dBuV | CISPR 22 Class B QP | Margin to Limit (dB) | CISPR 22 Class B Avg | Margin to Limit (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .1635 | 40.44 | PK | 1.2 | 0 | 41.64 | 65.3 | -23.66 | - | - |
| 2 | .1635 | 17.61 | Av | 1.2 | 0 | 18.81 | - | - | 55.3 | -36.49 |
| 3 | .762 | 42.04 | PK | .3 | 0 | 42.34 | 56 | -13.66 | - | - |
| 4 | .762 | 26.65 | Av | .3 | 0 | 26.95 | - | - | 46 | -19.05 |
| 5 | 5.1855 | 30.99 | PK | .2 | .1 | 31.29 | 60 | -28.71 | - | - |
| 6 | 5.1855 | 20.5 | Av | .2 | .1 | 20.8 | - | - | 50 | -29.2 |

Line-L2 .15 - 30MHz

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | T24 IL L2 (dB) | LC Cables 2&3 (dB) | Corrected Reading dBuV | CISPR 22 Class B QP | Margin to Limit (dB) | CISPR 22 Class B Avg | Margin to Limit (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | .1635 | 39.89 | PK | 1.3 | 0 | 41.19 | 65.3 | -24.11 | - | - |
| 8 | .1635 | 18.15 | Av | 1.3 | 0 | 19.45 | - | - | 55.3 | -35.85 |
| 9 | .7665 | 41.17 | PK | .3 | 0 | 41.47 | 56 | -14.53 | - | - |
| 10 | .7665 | 26.44 | Av | .3 | 0 | 26.74 | - | - | 46 | -19.26 |
| 11 | 6.0855 | 30.22 | PK | .2 | .1 | 30.52 | 60 | -29.48 | - | - |
| 12 | 6.0855 | 19.32 | Av | .2 | .1 | 19.62 | - | - | 50 | -30.38 |

PK - Peak detector

Av - average detection



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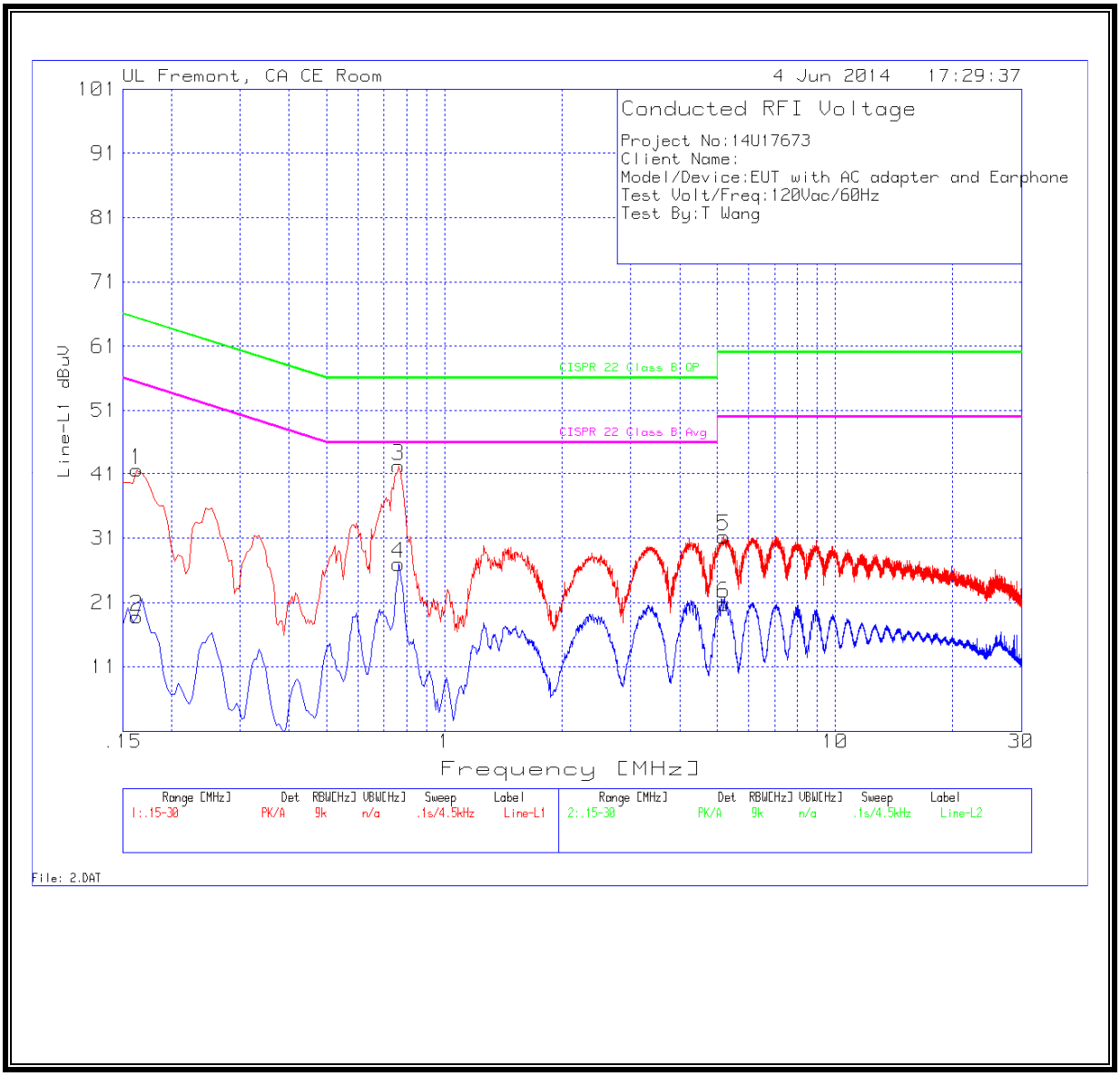
**LINE 1 RESULTS**



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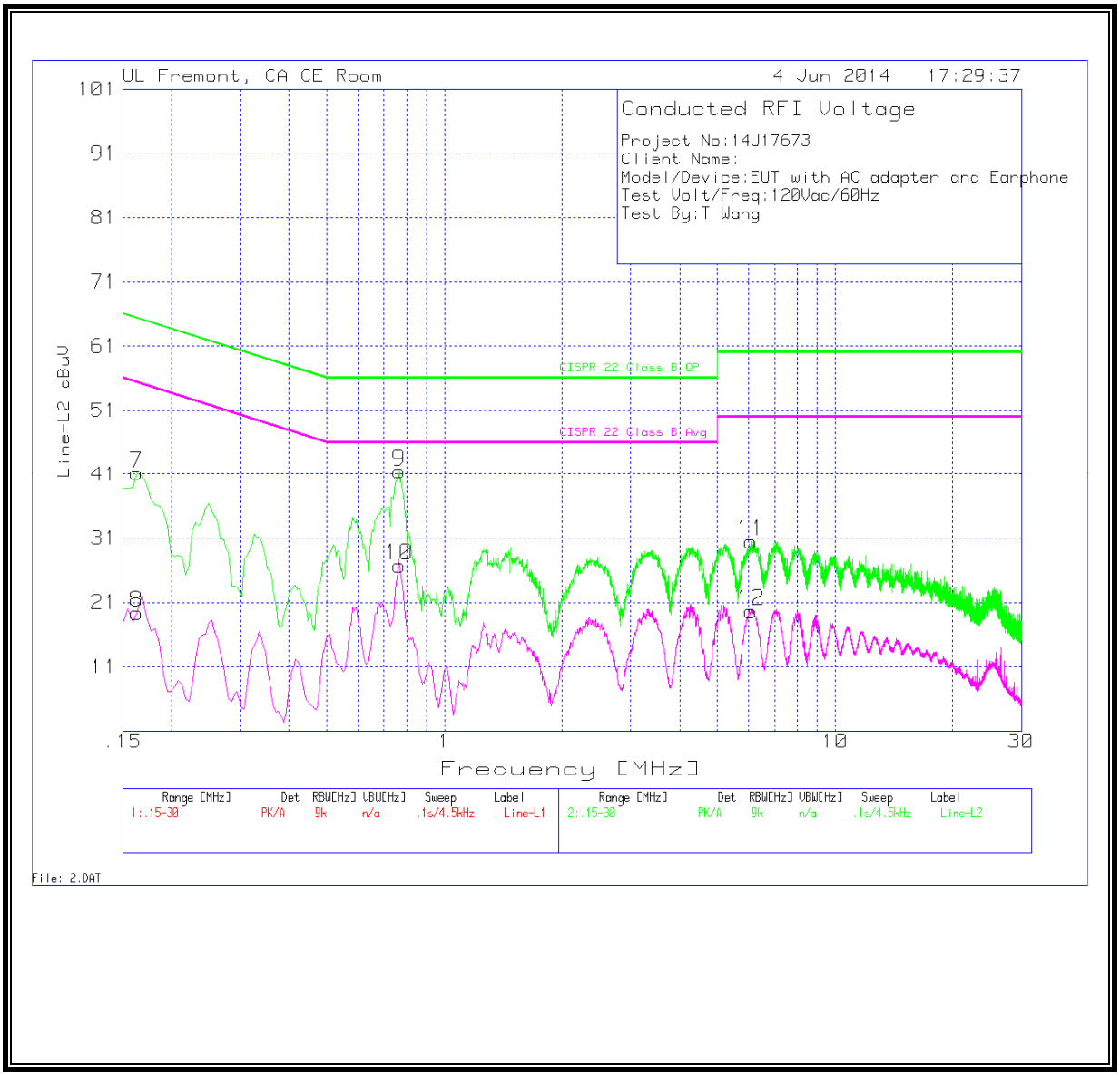
**LINE 2 RESULTS**



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