**FCC CFR47 PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA Phone + Bluetooth &**
**WLAN (2.4GHz & 5GHz) and NFC**

**MODEL NUMBER: SM-N9008V**

**FCC ID: A3LSMN9008V**

**REPORT NUMBER: 13U16263-5, Revision A**
**ISSUE DATE: NOVEMBER 21, 2013**

*Prepared for*
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## Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| -- | 10/24/13 | Initial Issue | P. Kim |
| A | 11/21/13 | Update the test date; Update section 10.1 for DCCF plot; Update statement in section 9.4, 9.5. | P. Kim |

# TABLE OF CONTENTS

# 1. ATTESTATION OF TEST RESULTS

COMPANY NAME:

**EUT DESCRIPTION:** 802.11 A/B/G/N 1X1 HT20, + BT4.0 (LE) + GSM1900/WCDMA850 & 1900MHz/ NFC BAR PHONE

**MODEL:** SM-N9008V

**SERIAL NUMBER:** FK-314-A, FK-314-C, FK-314-D, FK-314-E, FK-314-F & FK-314-G

**DATE TESTED:** OCTOBER 16 - 24, 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.

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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, ANSI C63.10-2009.

# 3. FACILITIES AND ACCREDITATION

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

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

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

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

## 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

## 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 a GSM/WCDMA Phone Bluetooth, WLAN(2.4GHz & 5GHz) and NFC.

## 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|---|---|---|---|
| 2412 - 2462 | 802.11b | 19.72 | 93.76 |
| 2412 - 2462 | 802.11g | 21.6 | 144.54 |
| 2412 - 2462 | 802.11n HT20 | 21.1 | 128.82 |
| 5745-5825 | 802.11a | 18.95 | 78.52 |
| 5745-5825 | 802.11n HT20 | 18.97 | 78.89 |

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain -3.7dBi for 2.4GHz and -5.4dBi for 5.8GHz

## 5.4. SOFTWARE AND FIRMWARE

Software version was 3.4.0-1837616-eng.

The firmware used was N9008VZMEBMJ4.

## 5.5. WORST-CASE CONFIGURATION AND MODE

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

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

Based on the baseline scan, the worst-case data rates were which provide the highest duty cycle:

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

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

## 5.6. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| AC Adapter | SAMSUNG | EP-TA10CBC | N/A | N/A |
| Earphone | SAMSUNG | N/A | N/A | N/A |

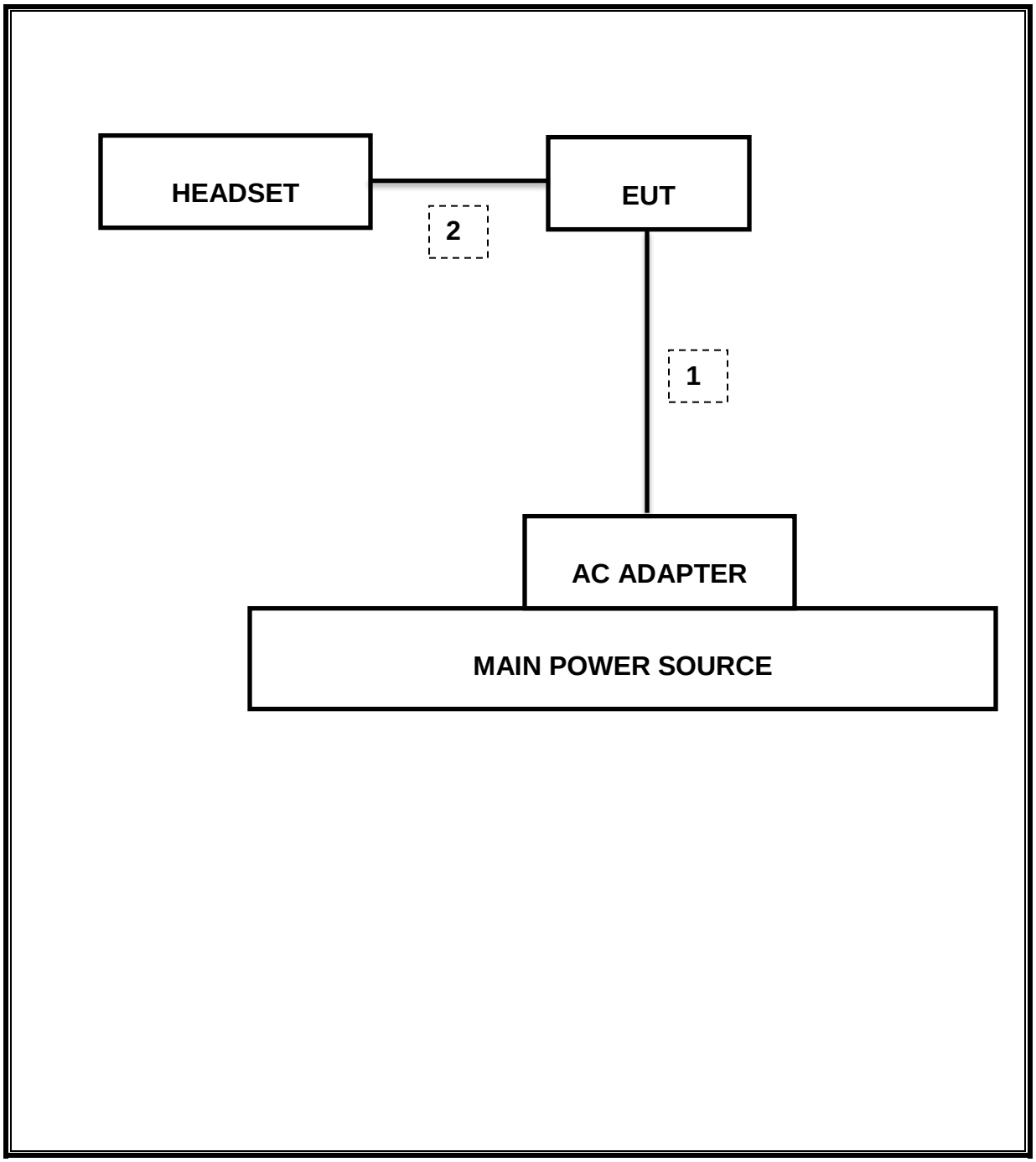
**I/O CABLES**

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

**TEST SETUP**

The EUT is a stand-alone unit during the tests. Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**



# 6. TEST AND MEASUREMENT EQUIPMENT

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

| Test Equipment List | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Asset** | **Cal Date** | **Cal Due** |
| Antenna, Biconolog, 30MHz-1 GHz | Sunol Sciences | JB1 | C01016 | 08/14/13 | 08/14/14 |
| Antenna, Horn, 18 GHz | ETS | 3117 | C01006 | 12/11/12 | 12/11/13 |
| Antenna, Horn, 25.5 GHz | ARA | MWH-1826/B | C00980 | 11/14/12 | 11/14/13 |
| Preamplifier, 1300 MHz | Agilent / HP | 8447D | C00885 | 01/16/13 | 01/16/14 |
| Preamplifier, 26.5 GHz | Agilent / HP | 8449B | C01063 | 10/22/12 | 10/22/14 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | E4446A | C01012 | 10/21/12 | 04/01/14 |
| PXA SIGNAL ANALYZER | Agilent / HP | N9030A | N/A | | 05/09/14 |
| EMI Test Receiver, 30 MHz | R & S | ESHS 20 | N02396 | 08/08/13 | 08/08/14 |
| LISN, 30 MHz | FCC | 50/250-25-2 | C00626 | 01/14/13 | 01/14/14 |
| Reject Filter, 2.4GHz | Micro-Tronics | BRM50702 | N02684 | CNR | CNR |

# 7. MEASUREMENT METHODS

KDB 558074 Measurement Procedure PK2 is used for power and PKPSD is used for power spectral density.

Unwanted emissions within Restricted Bands are measured using traditional radiated procedures.

# 8. SUMMARY TABLE

| FCC Part Section | RSS Section(s) | Test Description | Test Limit | Test Condition | Test Result | Worst Case |
|---|---|---|---|---|---|---|
| 15.247 (a)(2) | RSS-210 A8.2(a) | Occupied Band width (6dB) | >500KHz | Conducted | Pass | 9.15MHz |
| 2.1051, 15.247 (d) | RSS-210 A8.5 | Band Edge / Conducted Spurious Emission | -20dBc | | Pass | -37.62dBm |
| 15.247 | RSS-210 A8.4 | TX conducted output power | <30dBm | | Pass | 21.6dBm |
| 15.247 | RSS-210 A8.2 | PSD | <8dBm | | Pass | -5.32dBm |
| 15.207 (a) | RSS-GEN 7.2.2 | AC Power Line conducted emissions | Section 10 | Radiated | Pass | 25.91dBuV(AV) |
| 15.205, 15.209 | RSS-210 Clause 2.6, RSS-210 Clause 6 | Radiated Spurious Emission | < 54dBuV/m | | Pass | 51.096dBuV/m |

# 9. ANTENNA PORT TEST RESULTS

## 9.1. 6 dB BANDWIDTH

**LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

**TEST PROCEDURE**

Reference to KDB 558074 DTS Meas Guidance 8.0: The transmitter output is connected to a spectrum analyzer with the RBW set to 100KHz, the VBW >= 3 x RBW, peak detector and max hold.

**RESULTS**

### 9.1.1. 802.11b MODE IN THE 2.4 GHz BAND

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Low | 2412 | 9.20 | 0.5 |
| Mid | 2437 | 9.18 | 0.5 |
| High | 2462 | 9.15 | 0.5 |
| Worst | | 9.20 | |

### 9.1.2. 802.11g MODE IN THE 2.4 GHz BAND

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Low | 2412 | 16.46 | 0.5 |
| Mid | 2437 | 16.46 | 0.5 |
| High | 2462 | 16.46 | 0.5 |
| Worst | | 16.46 | |

### 9.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Low | 2412 | 17.52 | 0.5 |
| Mid | 2437 | 17.69 | 0.5 |
| High | 2462 | 17.69 | 0.5 |
| Worst | | 17.69 | |

### 9.1.1. 802.11a MODE IN THE 5.8 GHz BAND

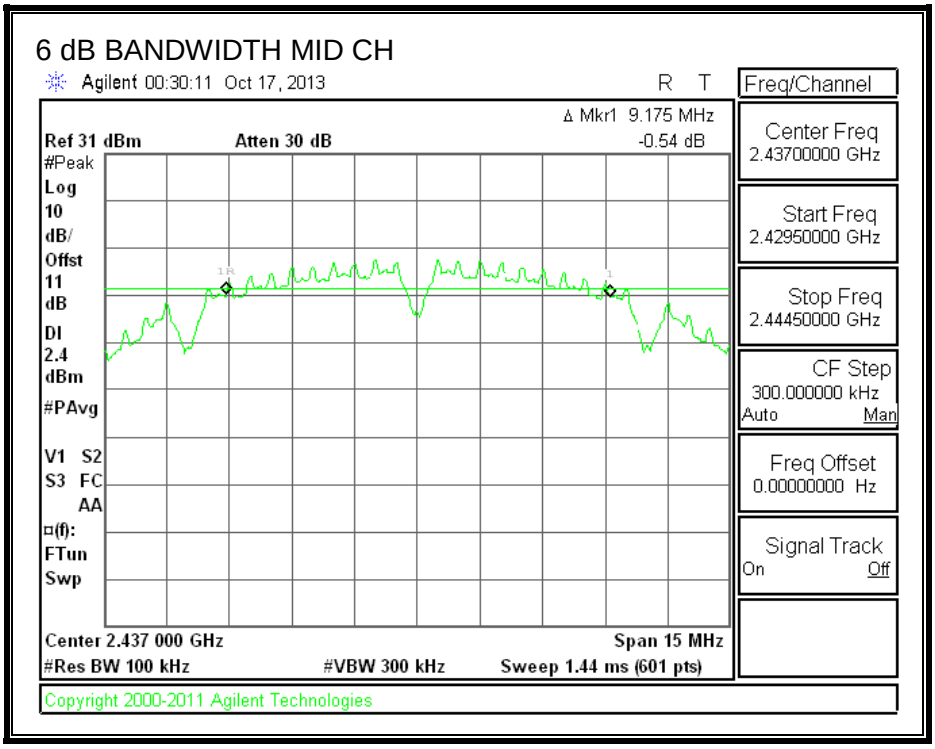
| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Low | 5745 | 16.420 | 0.5 |
| Mid | 5785 | 16.460 | 0.5 |
| High | 5825 | 16.500 | 0.5 |
| Worst | | 16.500 | |

### 9.1.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

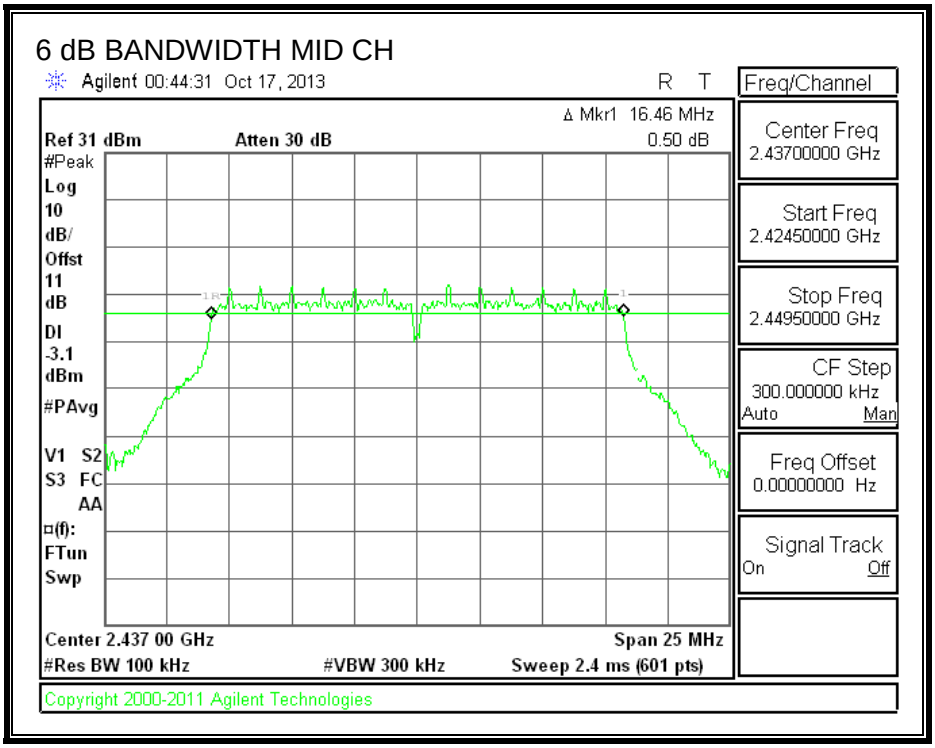
| | (MHz) | (MHz) | (MHz) |
|---|---|---|---|
| Low | 5745 | 17.700 | 0.5 |
| Mid | 5785 | 17.750 | 0.5 |
| High | 5825 | 17.750 | 0.5 |
| Worst | | 17.750 | |

### 9.1.3. Results

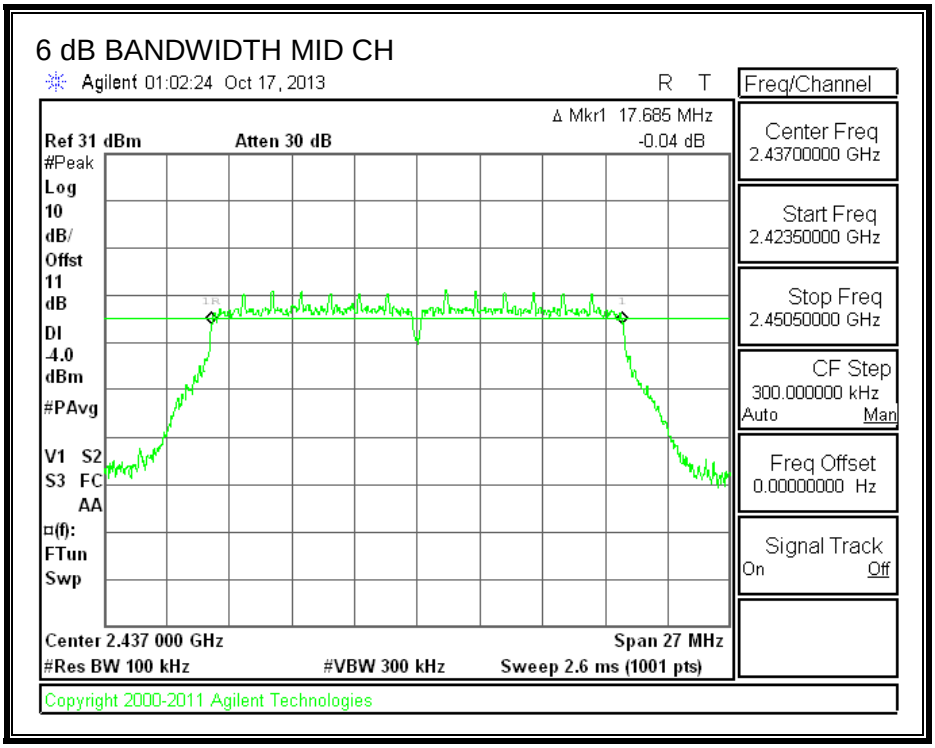
**2.4GHz 802.11b 6 dB BANDWIDTH**



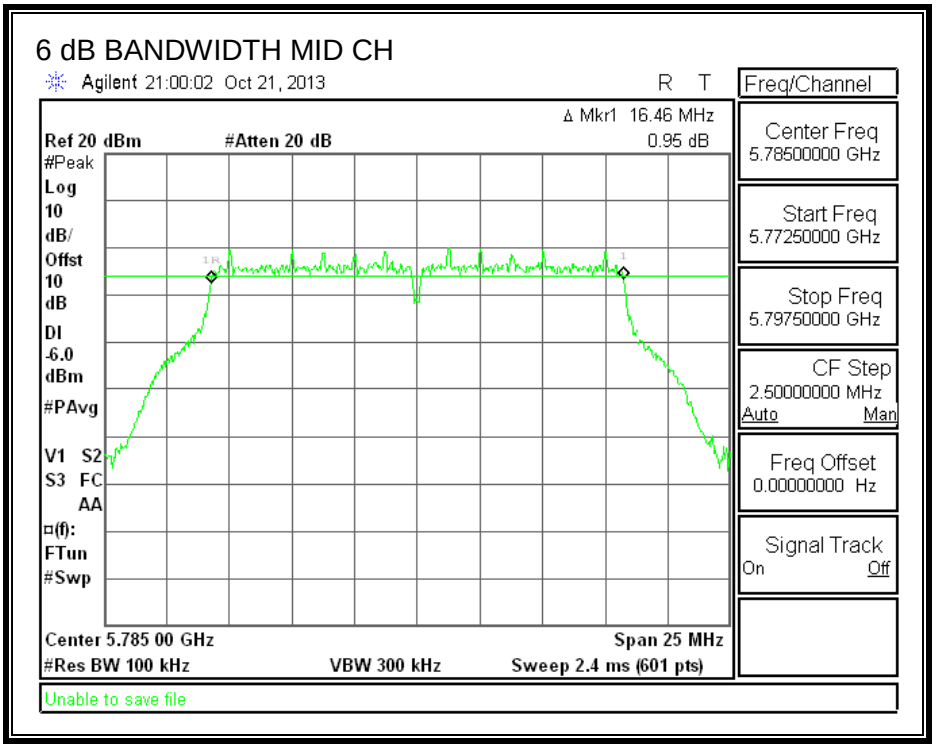

**2.4GHz 802.11g 6 dB BANDWIDTH**



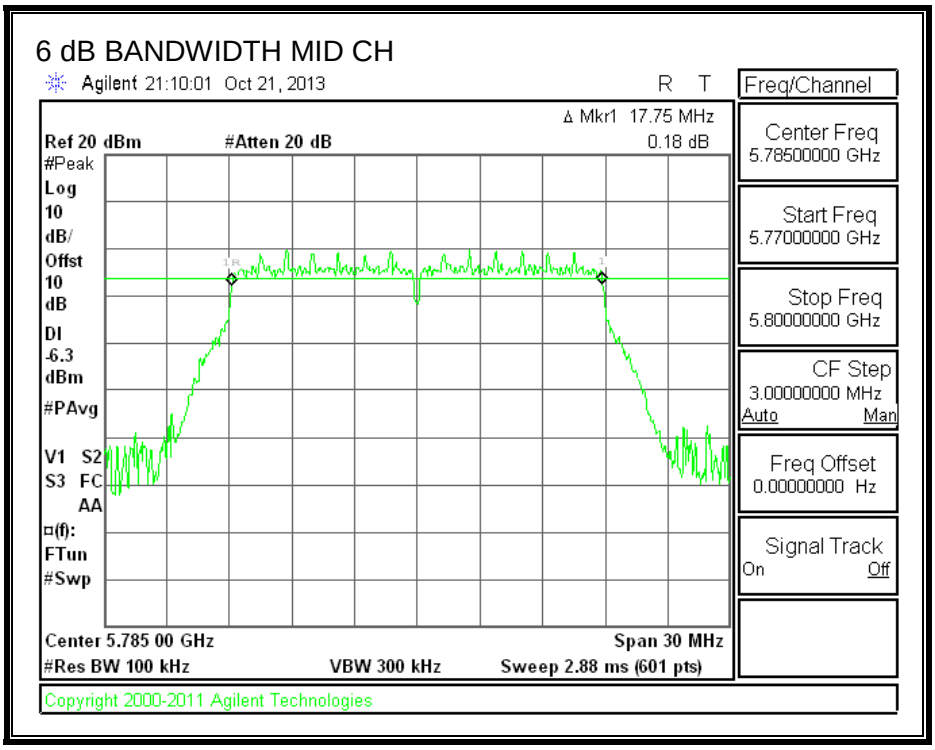
**2.4 GHz 802.11n 6 dB BANDWIDTH**




**5.8GHz 11a 6db BANDWIDTH**



**5.8GHz 11n HT20 6db BANDWIDTH**



## 9.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

### 9.2.1. 802.11b MODE IN THE 2.4 GHz BAND

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 2412 | 13.11 |
| Mid | 2437 | 13.05 |
| High | 2462 | 13.10 |
| Worst | | 13.11 |

### 9.2.1. 802.11g MODE IN THE 2.4 GHz BAND

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 2412 | 16.65 |
| Mid | 2437 | 16.63 |
| High | 2462 | 16.66 |
| Worst | | 16.66 |

### 9.2.1. 802.11n HT20 MODE IN THE 2.4 GHz BAND

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 2412 | 17.77 |
| Mid | 2437 | 17.77 |
| High | 2462 | 17.75 |
| Worst | | 17.77 |

### 9.2.2. 802.11a MODE IN THE 5.8 GHz BAND

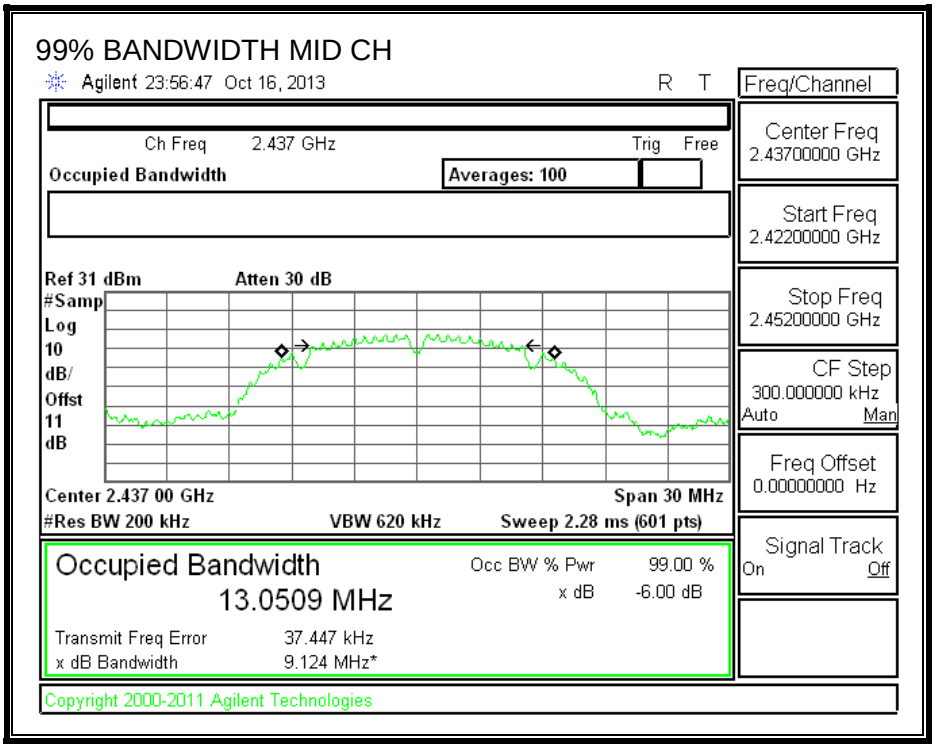
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5745 | 16.598 |
| Mid | 5785 | 16.652 |
| High | 5825 | 16.665 |
| Worst | | 16.665 |

### 9.2.3. 802.11n HT20 MODE IN THE 5.8 GHz BAND

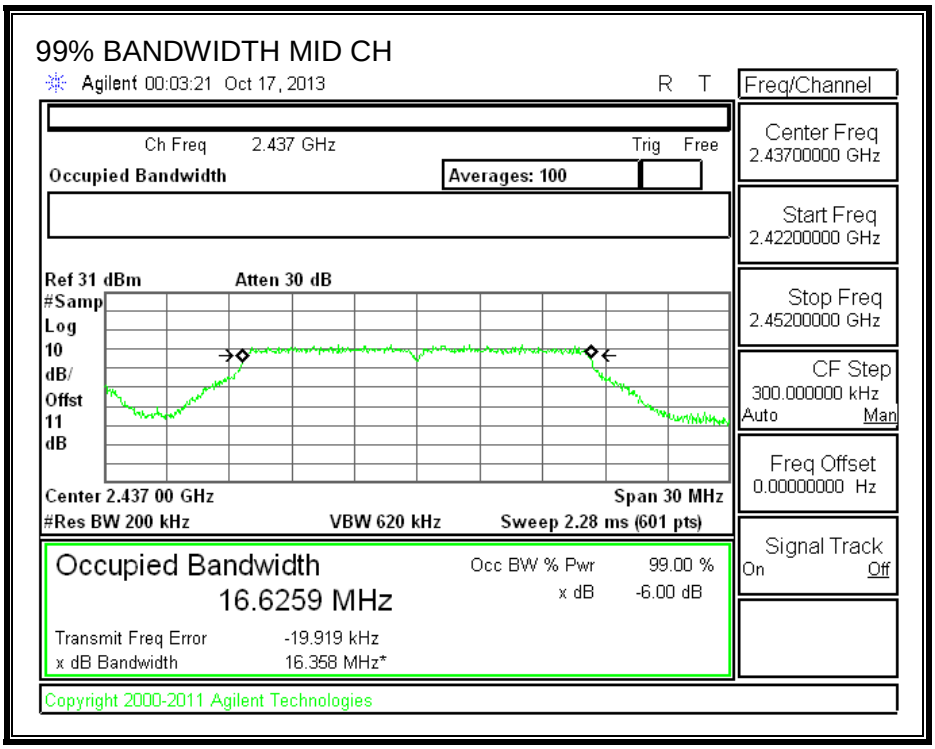
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5745 | 17.740 |
| Mid | 5785 | 17.769 |
| High | 5825 | 17.769 |
| Worst | | 17.769 |

## 9.2.4. Results

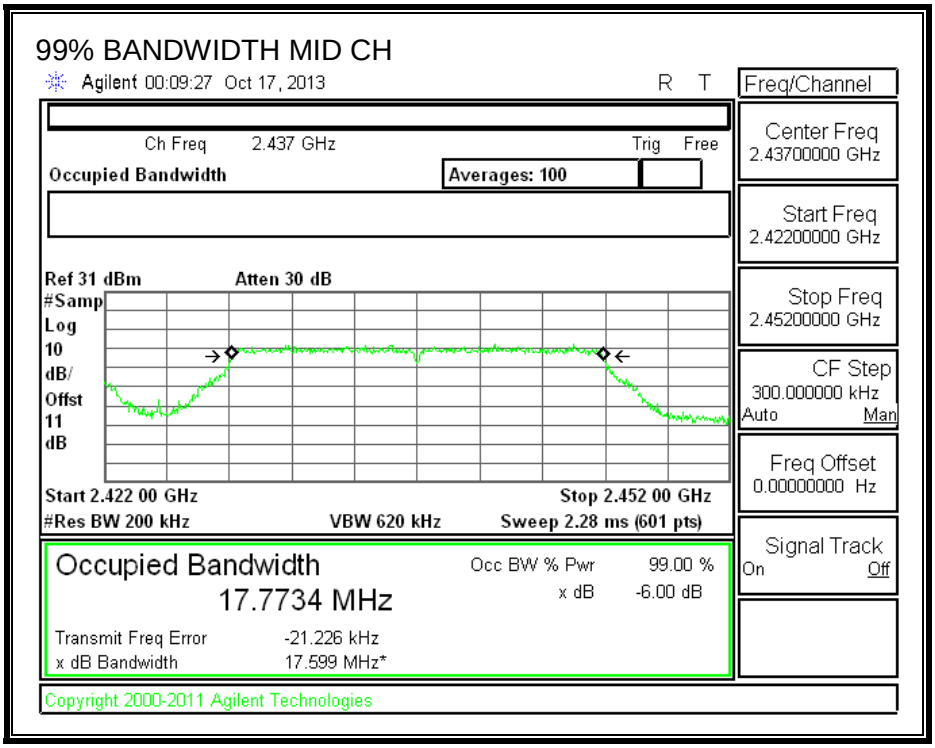
**2.4 GHz 802.11b 99% BANDWIDTH**



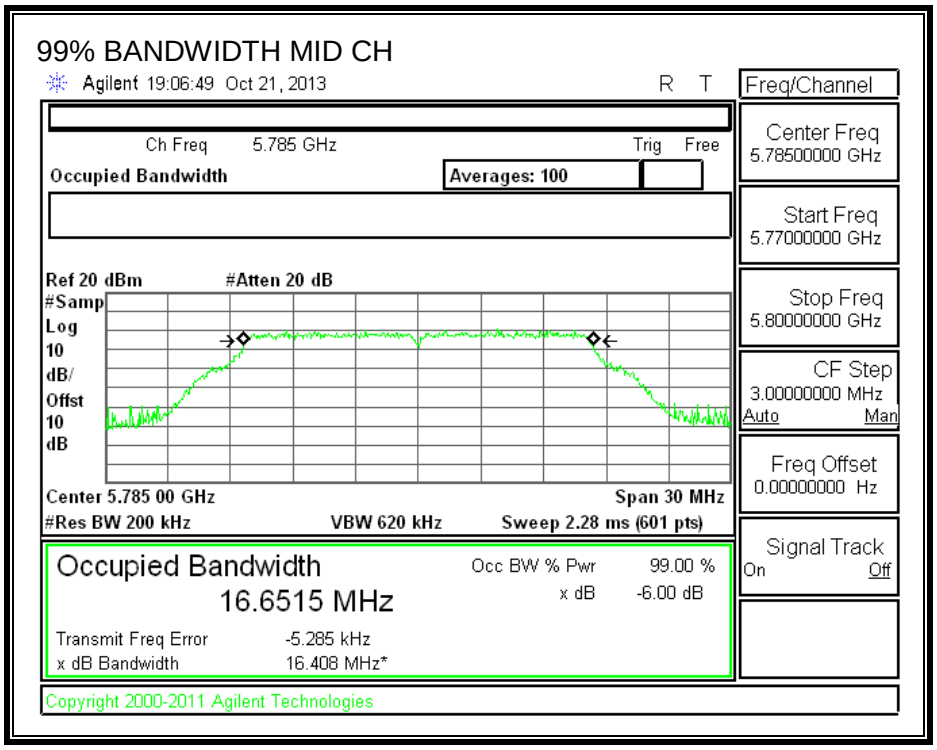

**2.4 GHz 802.11g 99% BANDWIDTH**



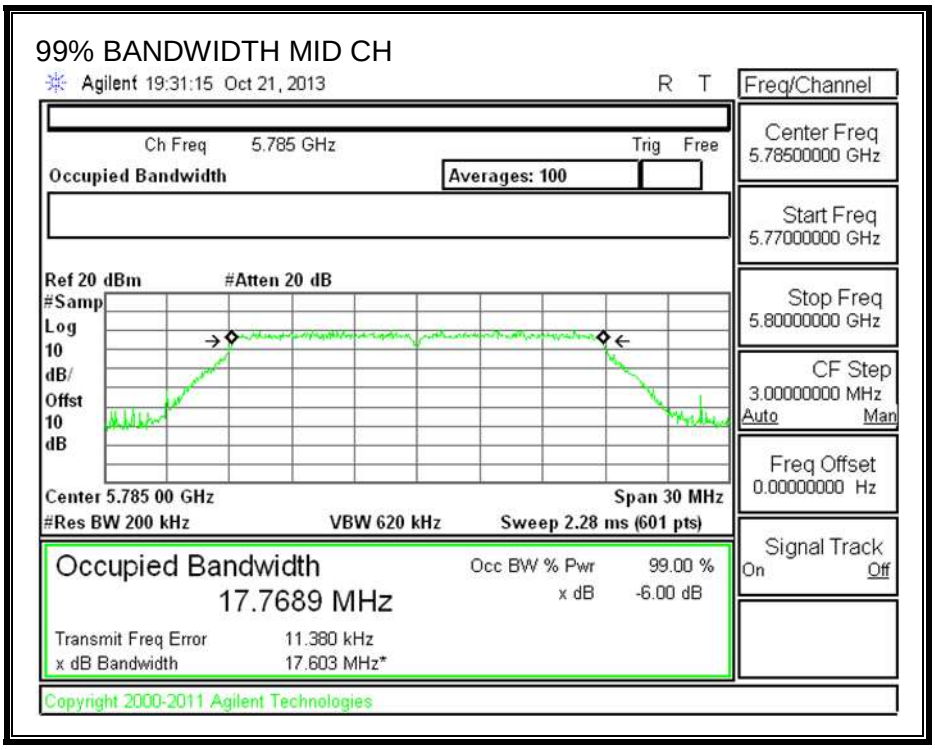
**2.4 GHz 802.11n 99% BANDWIDTH**




**5.8GHz 11a 99% BANDWIDTH**



**5.8GHz 11n HT20 99% BANDWIDTH**



## 9.3. AVERAGE POWER

**LIMITS**

None; for reporting purposes only.

**TEST PROCEDURE**

The transmitter output is connected to a power meter.

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

**RESULTS**

### 9.3.1. 802.11b MODE IN THE 2.4 GHz BAND

| Channel | Frequency (MHz) | Power (dBm) |
|---|---|---|
| Low | 2412 | 16.32 |
| Mid | 2437 | 16.57 |
| High | 2462 | 16.26 |

### 9.3.2. 802.11g MODE IN THE 2.4 GHz BAND

| Channel | Frequency (MHz) | Power (dBm) |
|---|---|---|
| Low | 2412 | 13.00 |
| Mid | 2437 | 13.25 |
| High | 2462 | 12.68 |

### 9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

| Channel | Frequency (MHz) | Power (dBm) |
|---|---|---|
| Low | 2412 | 12.00 |
| Mid | 2437 | 12.25 |
| High | 2462 | 11.80 |

### 9.3.4. 802.11a MODE IN THE 5.8 GHz BAND

| Channel | Frequency (MHz) | Avg Power (dBm) |
|---|---|---|
| Low | 5745 | 10.000 |
| Mid | 5785 | 10.000 |
| High | 5825 | 10.100 |
| Worst | | 10.100 |

### 9.3.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

| Channel | Frequency (MHz) | Avg Power (dBm) |
|---|---|---|
| Low | 5745 | 10.750 |
| Mid | 5785 | 10.600 |
| High | 5825 | 10.600 |
| Worst | | 10.750 |

## 9.4. OUTPUT POWER

**LIMITS**

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

Note: Using maximum peak output power method to show compliance, so no duty cycle factor applied.

**RESULTS**

## 9.4.1. 802.11b MODE IN THE 2.4 GHz BAND

**Limits**

| Channel | Frequency (MHz) | Directional Gain (dBi) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Max Power (dBm) |
|---|---|---|---|---|---|---|
| Low | 2412 | -3.70 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | -3.70 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | -3.70 | 30.00 | 30 | 36 | 30.00 |

**Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|
| Low | 2412 | 19.33 | 19.33 | 30.00 | -10.67 |
| Mid | 2437 | 19.72 | 19.72 | 30.00 | -10.28 |
| High | 2462 | 19.33 | 19.33 | 30.00 | -10.67 |
| Worst | | | 19.72 | | |

## 9.4.2. 802.11g MODE IN THE 2.4 GHz BAND

**Limits**

| Channel | Frequency (MHz) | Directional Gain (dBi) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Max Power (dBm) |
|---|---|---|---|---|---|---|
| Low | 2412 | -3.70 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | -3.70 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | -3.70 | 30.00 | 30 | 36 | 30.00 |

**Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|
| Low | 2412 | 21.47 | 21.47 | 30.00 | -8.53 |
| Mid | 2437 | 21.60 | 21.60 | 30.00 | -8.40 |
| High | 2462 | 21.20 | 21.20 | 30.00 | -8.80 |
| Worst | | | 21.60 | | |

## 9.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

**Limits**

| Channel | Frequency (MHz) | Directional Gain (dBi) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Max Power (dBm) |
|---|---|---|---|---|---|---|
| Low | 2412 | -3.70 | 30.00 | 30 | 36 | 30.00 |
| Mid | 2437 | -3.70 | 30.00 | 30 | 36 | 30.00 |
| High | 2462 | -3.70 | 30.00 | 30 | 36 | 30.00 |

**Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|
| Low | 2412 | 20.54 | 20.54 | 30.00 | -9.46 |
| Mid | 2437 | 21.10 | 21.10 | 30.00 | -8.90 |
| High | 2462 | 20.57 | 20.57 | 30.00 | -9.43 |
| Worst | | | 21.10 | | |

## 9.4.1. 802.11a MODE IN THE 5.8 GHz BAND

**Limits**

| Channel | Frequency (MHz) | Directional Gain (dBi) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Max Power (dBm) |
|---|---|---|---|---|---|---|
| Low | 5745 | -5.40 | 30.00 | 30 | 36 | 30.00 |
| Mid | 5785 | -5.40 | 30.00 | 30 | 36 | 30.00 |
| High | 5825 | -5.40 | 30.00 | 30 | 36 | 30.00 |

**Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|
| Low | 5745 | 18.95 | 18.95 | 30.00 | -11.05 |
| Mid | 5785 | 18.58 | 18.58 | 30.00 | -11.42 |
| High | 5825 | 18.62 | 18.62 | 30.00 | -11.38 |
| Worst | | | 18.95 | | |

## 9.4.1. 802.11n HT20 MODE IN THE 5.8 GHz BAND

**Limits**

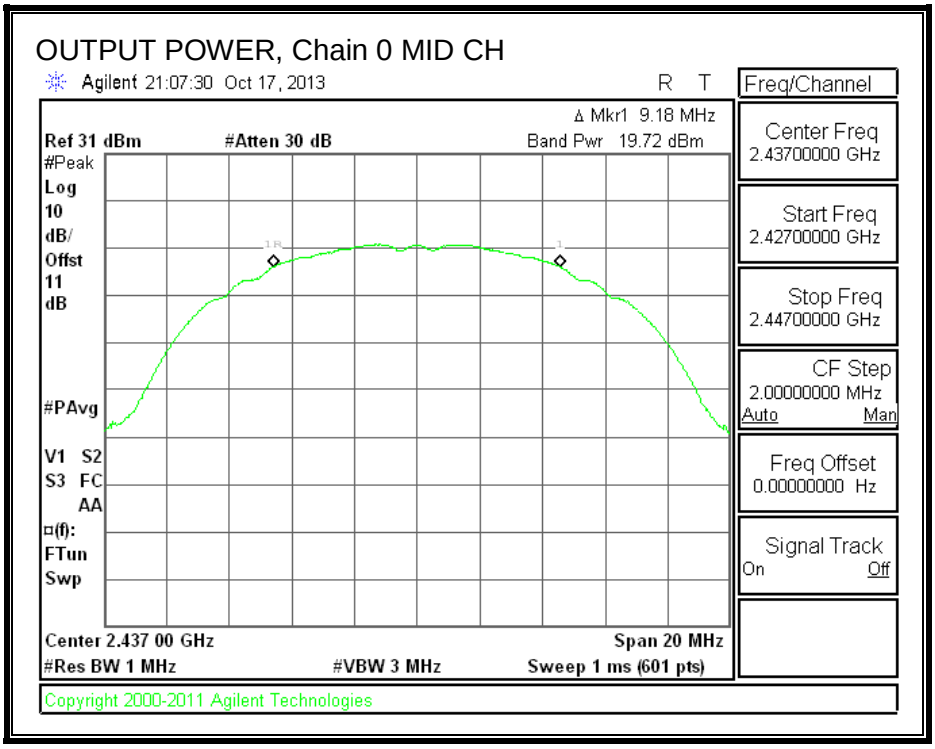
| Channel | Frequency (MHz) | Directional Gain (dBi) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Max Power (dBm) |
|---|---|---|---|---|---|---|
| Low | 5745 | -5.40 | 30.00 | 30 | 36 | 30.00 |
| Mid | 5785 | -5.40 | 30.00 | 30 | 36 | 30.00 |
| High | 5825 | -5.40 | 30.00 | 30 | 36 | 30.00 |

**Results**

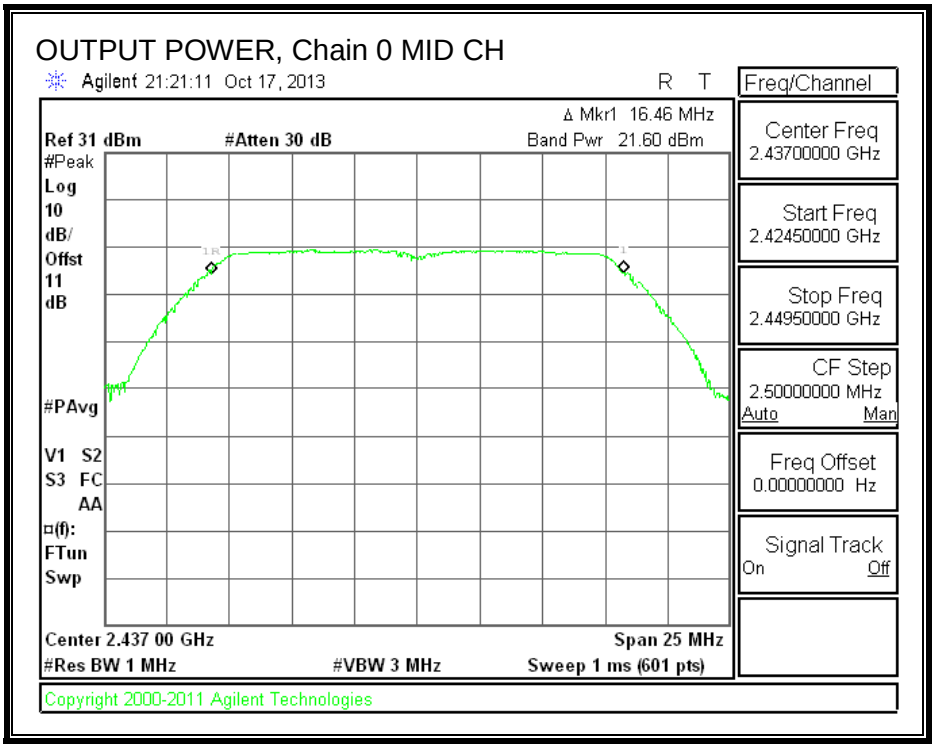
| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|
| Low | 5745 | 18.85 | 18.85 | 30.00 | -11.15 |
| Mid | 5785 | 18.55 | 18.55 | 30.00 | -11.45 |
| High | 5825 | 18.97 | 18.97 | 30.00 | -11.03 |
| Worst | | | 18.97 | | |

## 9.4.2. PLOTS

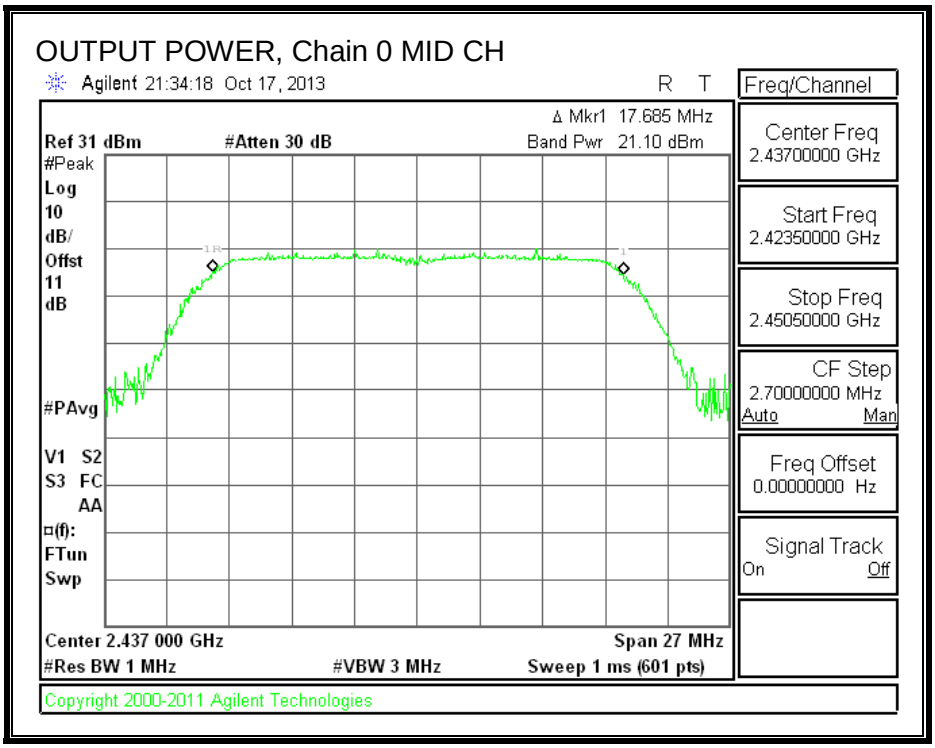
**2.4 GHz 802.11b OUTPUT POWER, Chain 0**



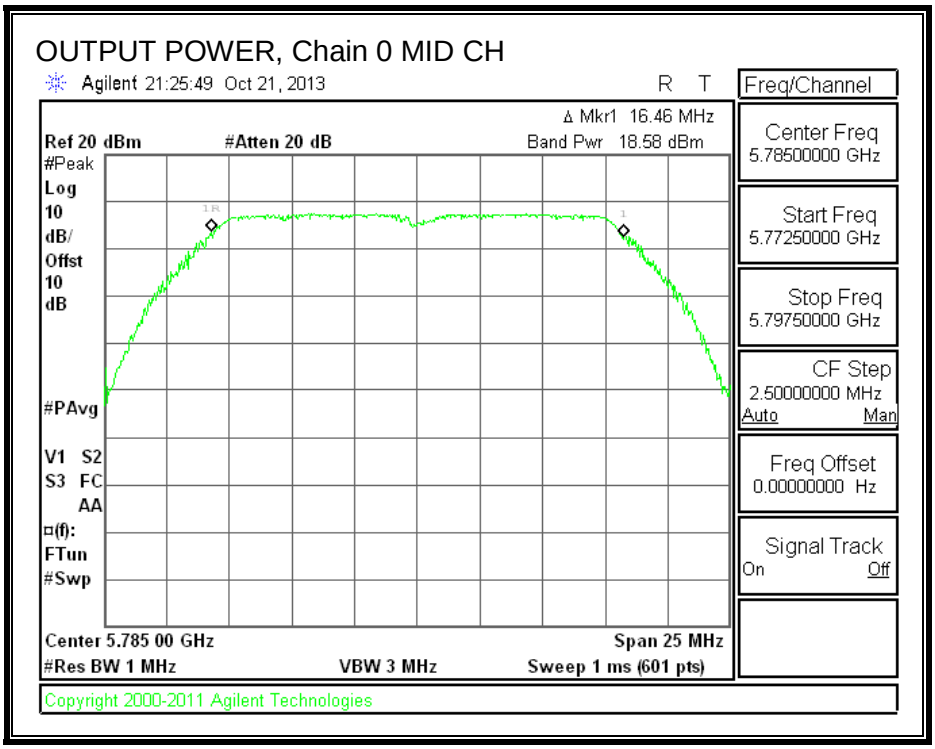

**2.4 GHz 802.11g OUTPUT POWER, Chain 0**



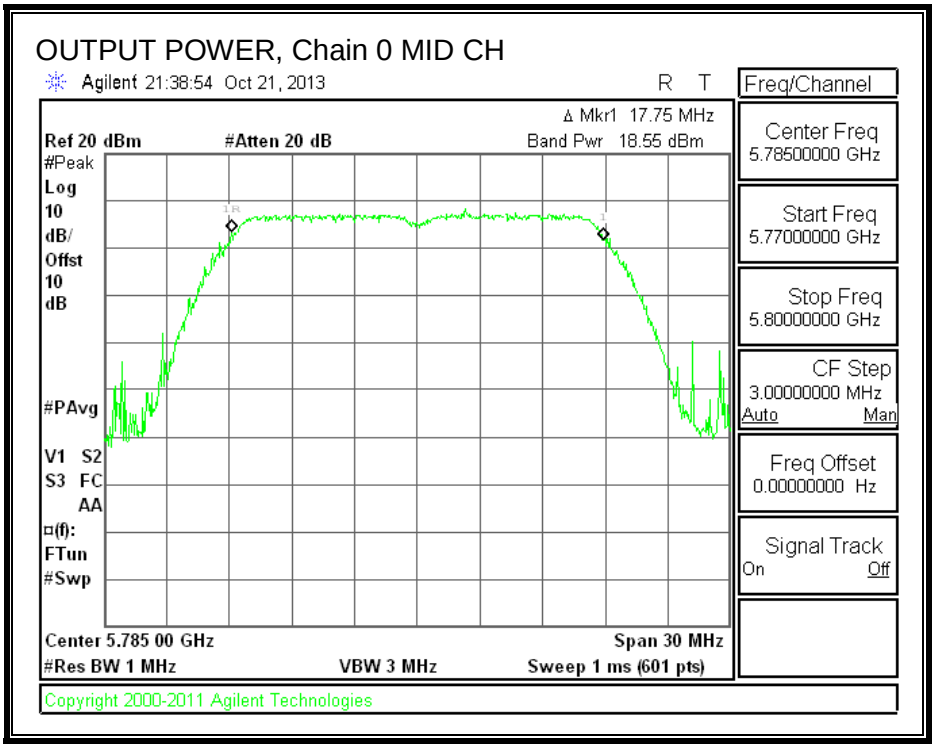
**2.4 GHz 802.11n OUTPUT POWER, Chain 0**




**802.11a 5.8GHz OUTPUT POWER, Chain 0**



**802.11n HT20 5.8GHz OUTPUT POWER, Chain 0**



## 9.5. PSD

**LIMITS**

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Note: Using PPSD method to showing compliance, so no duty cycle factor applied.

**RESULTS**

### 9.5.1. 802.11b MODE IN THE 2.4 GHz BAND

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2412 | -6.04 | 8.0 | -14.0 |
| Mid | 2437 | -6.29 | 8.0 | -14.3 |
| High | 2462 | -5.32 | 8.0 | -13.3 |

### 9.5.2. 802.11g MODE IN THE 2.4 GHz BAND

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2412 | -10.95 | 8.0 | -19.0 |
| Mid | 2437 | -10.59 | 8.0 | -18.6 |
| High | 2462 | -12.03 | 8.0 | -20.0 |

### 9.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2412 | -12.23 | 8.0 | -20.2 |
| Mid | 2437 | -12.31 | 8.0 | -20.3 |
| High | 2462 | -12.22 | 8.0 | -20.2 |

### 9.5.1. 802.11a MODE IN THE 5.8 GHz BAND

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 5745 | -13.73 | 8.0 | -21.7 |
| Mid | 5785 | -13.94 | 8.0 | -21.9 |
| High | 5825 | -14.70 | 8.0 | -22.7 |

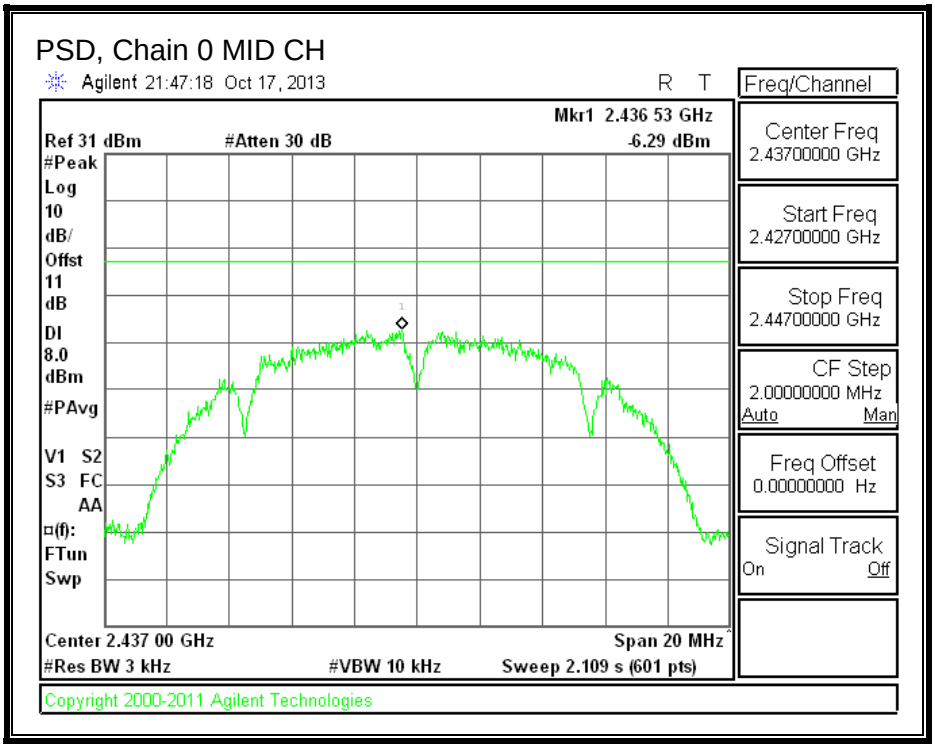
### 9.5.1. 802.11n HT20 MODE IN THE 5.8 GHz BAND

**PSD Results**

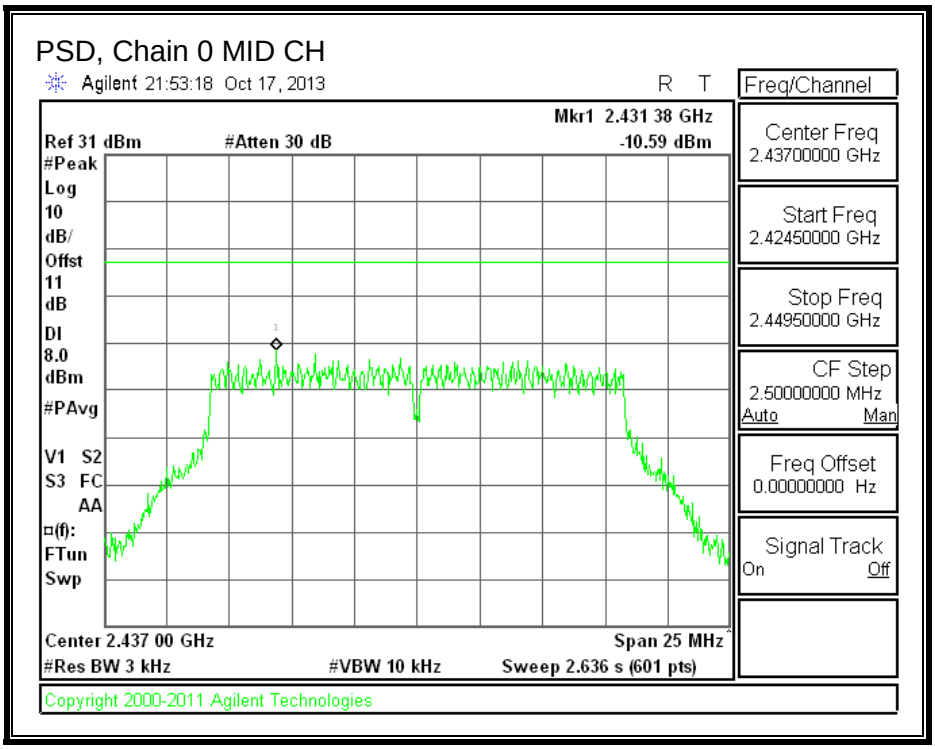
| Channel | Frequency (MHz) | Chain 0 Meas (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 5745 | -14.74 | 8.0 | -22.7 |
| Mid | 5785 | -14.78 | 8.0 | -22.8 |
| High | 5825 | -14.15 | 8.0 | -22.2 |

## 9.5.2. Results

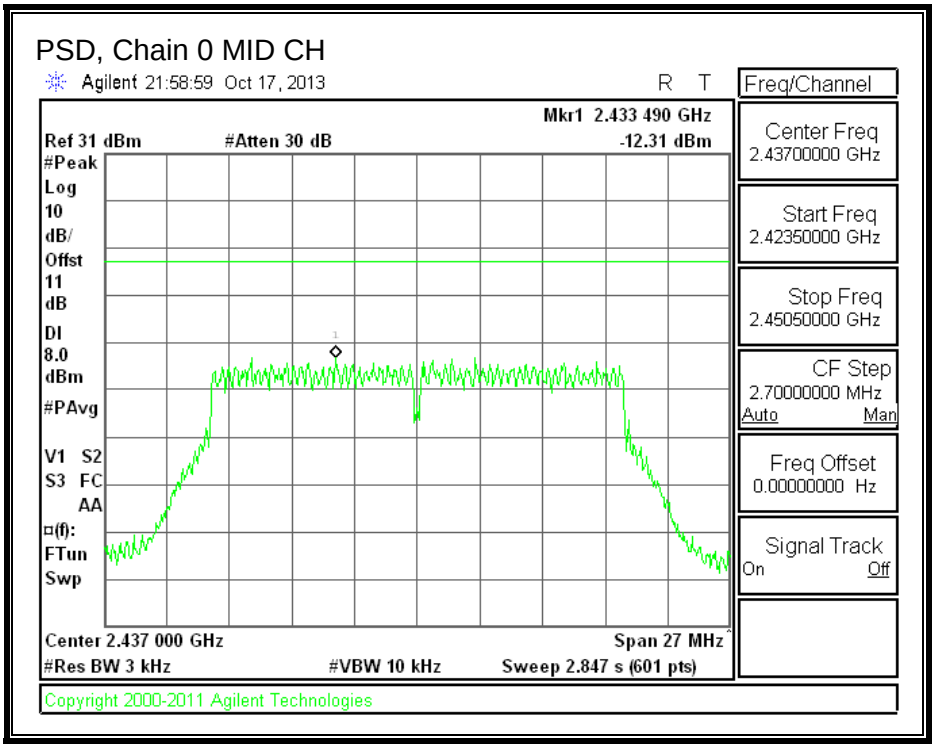
**2.4GHz 802.11b PSD, Chain 0**



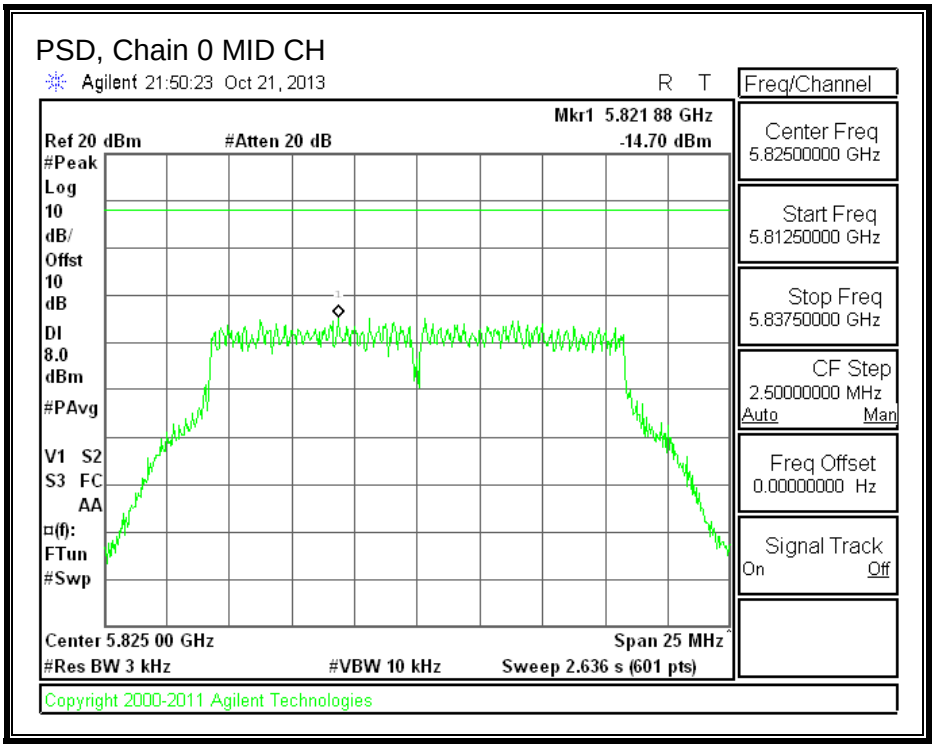

**2.4GHz 802.11g PSD, Chain 0**



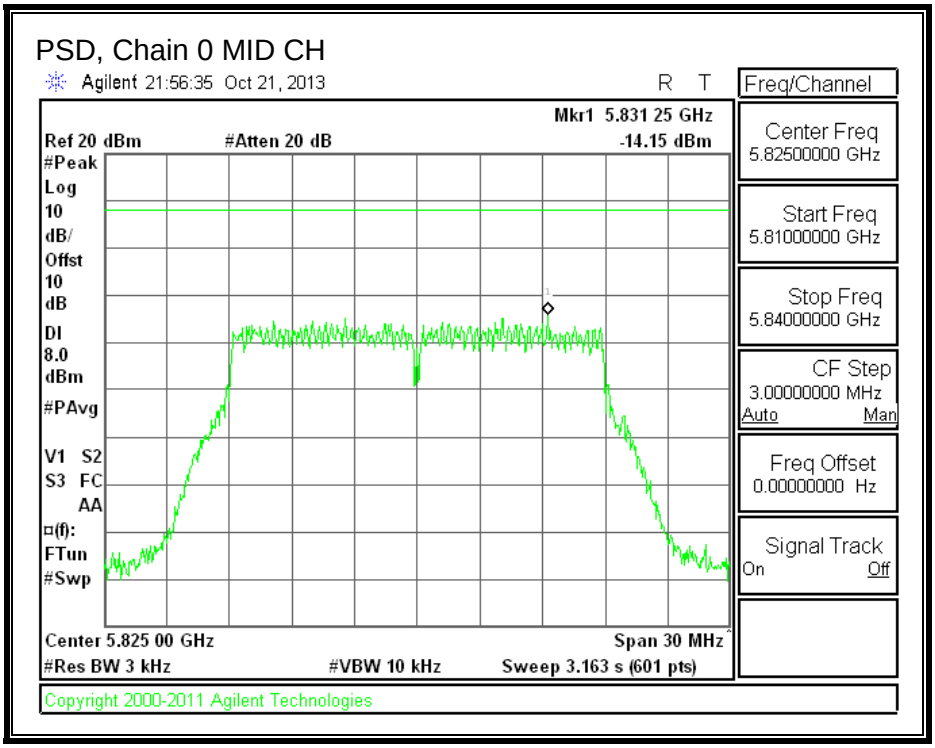
**2.4GHz 802.11n PSD, Chain 0**




**5.8GHz 802.11a PSD, Chain 0**



**802.11n HT20 PSD, Chain 0**



## 9.6. OUT-OF-BAND EMISSIONS

**LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

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

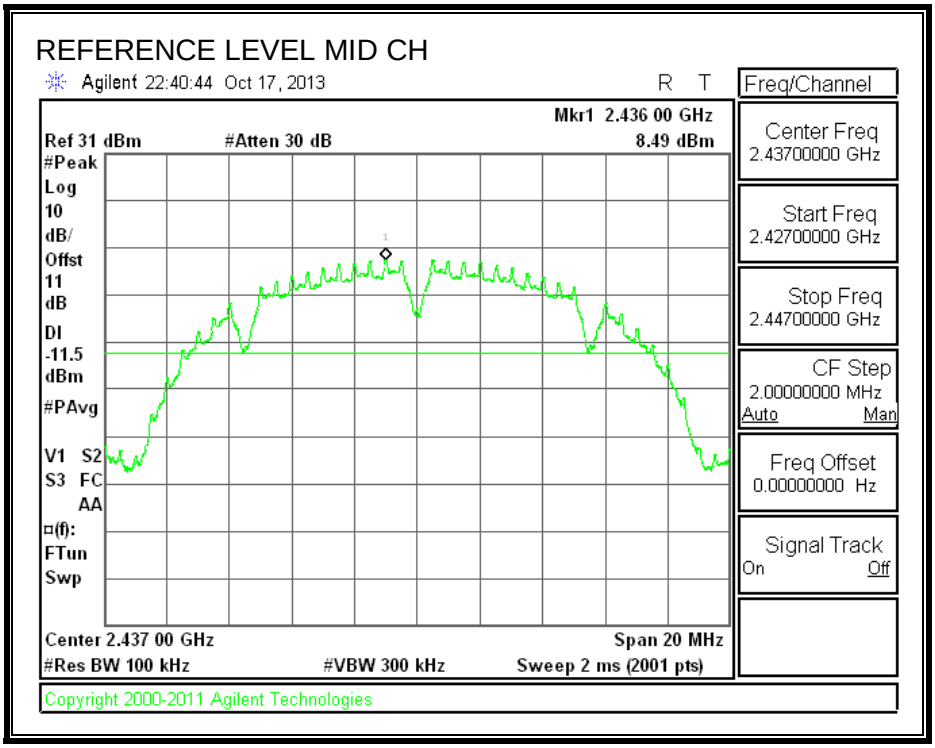
**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

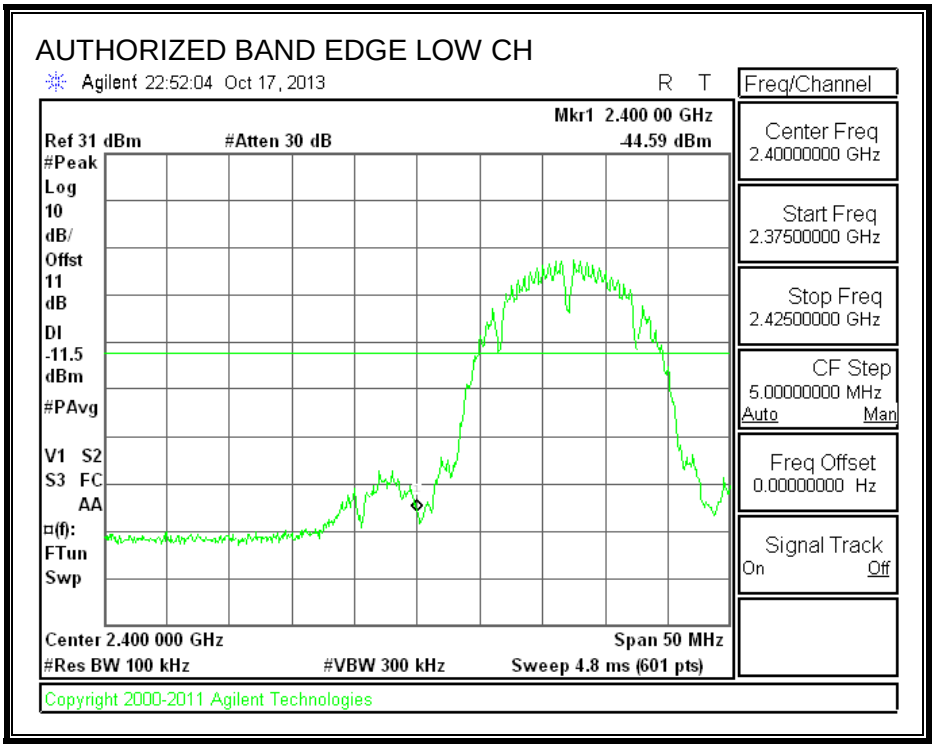
**RESULTS**

## 9.6.1. 802.11b MODE IN THE 2.4 GHz BAND

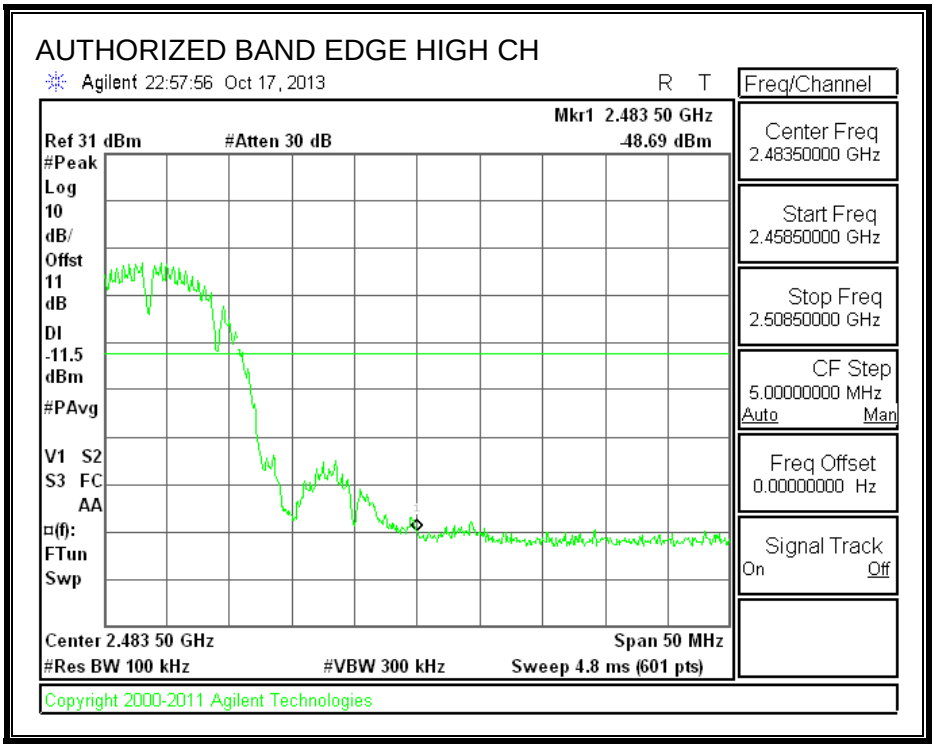
**IN-BAND REFERENCE LEVEL**



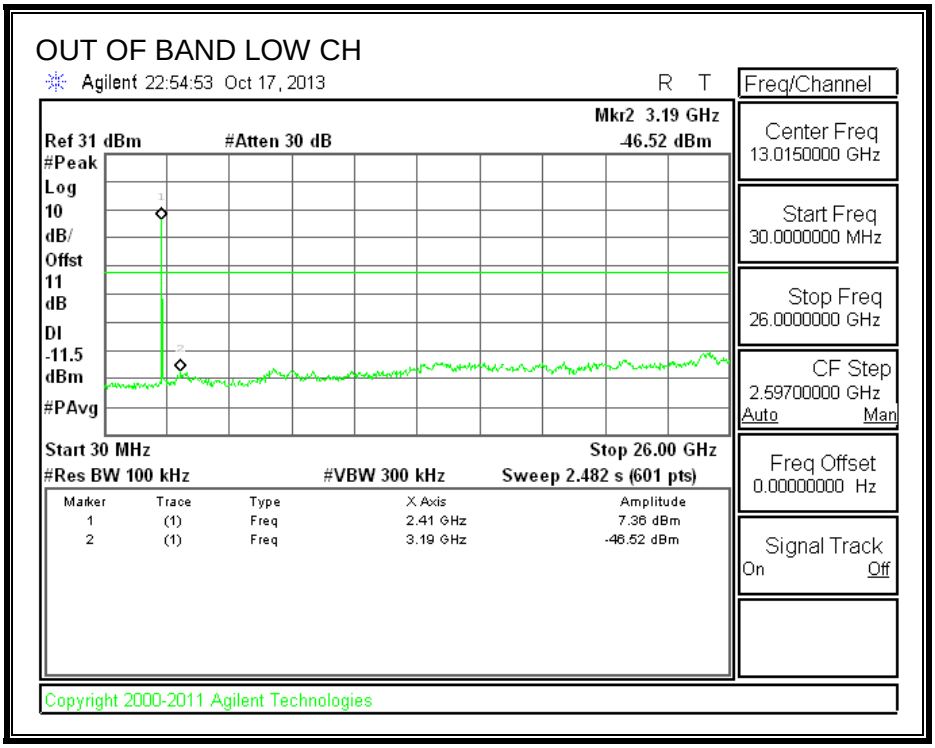
**LOW CHANNEL BANDEDGE**

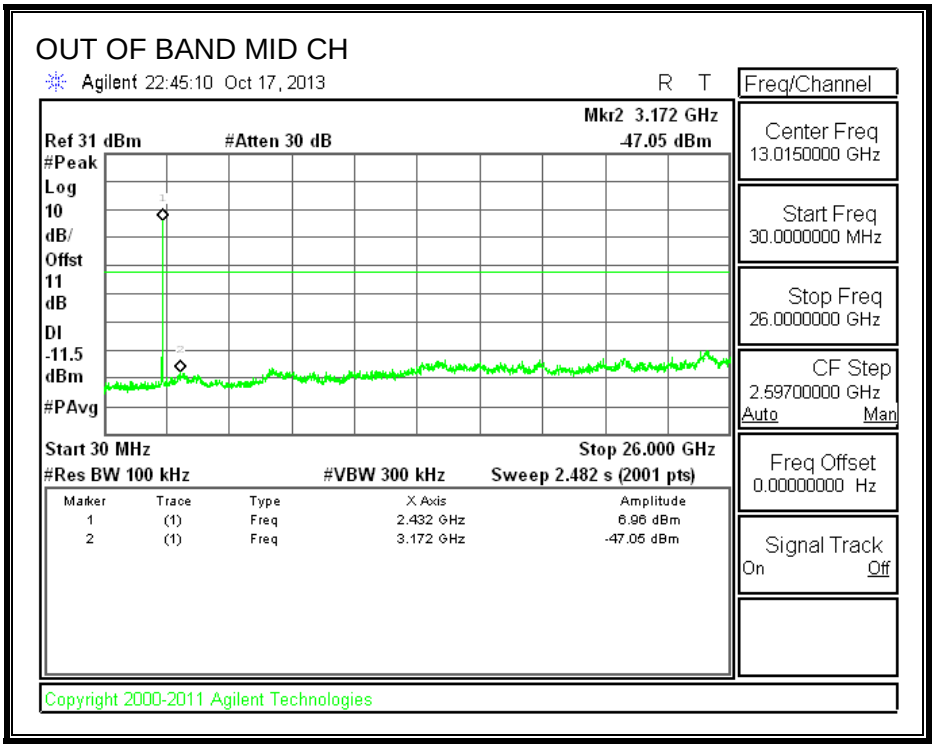


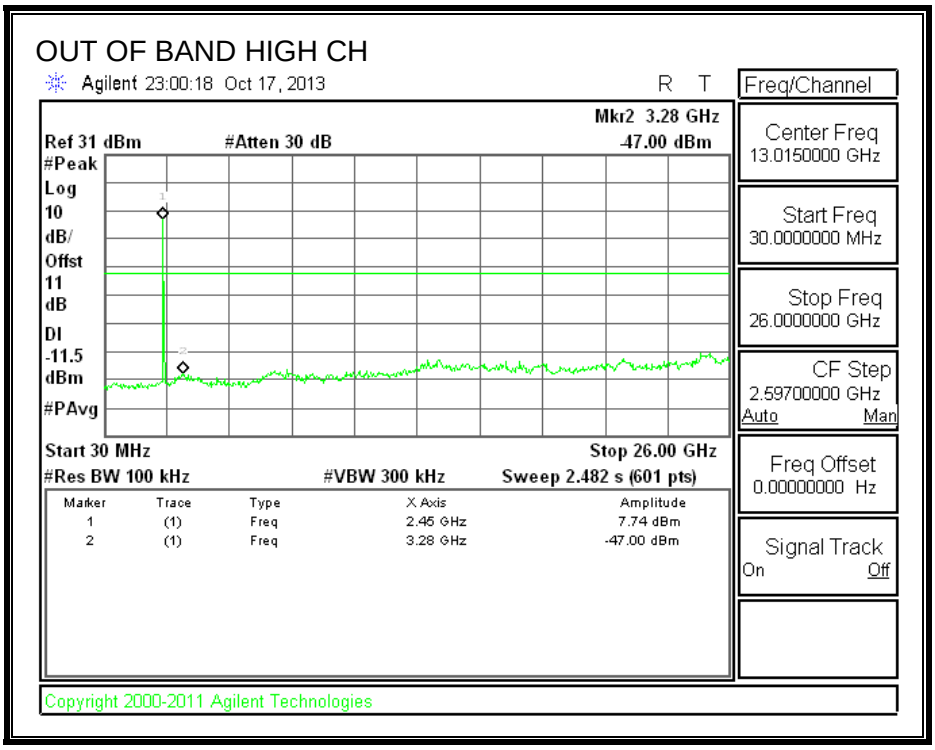

**HIGH CHANNEL BANDEDGE**



**OUT-OF-BAND EMISSIONS**

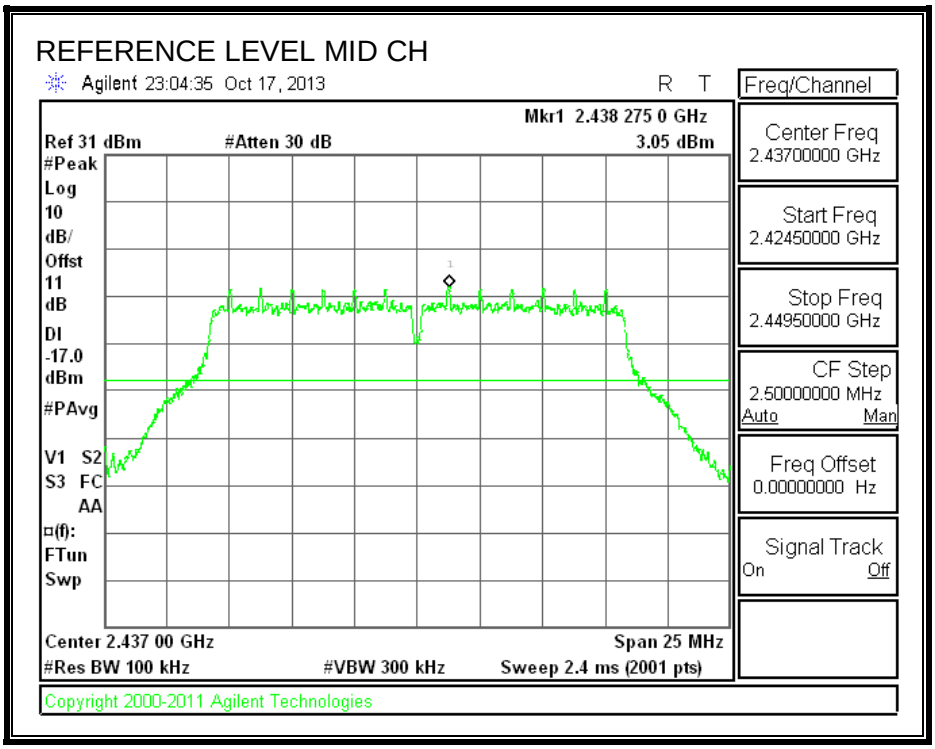


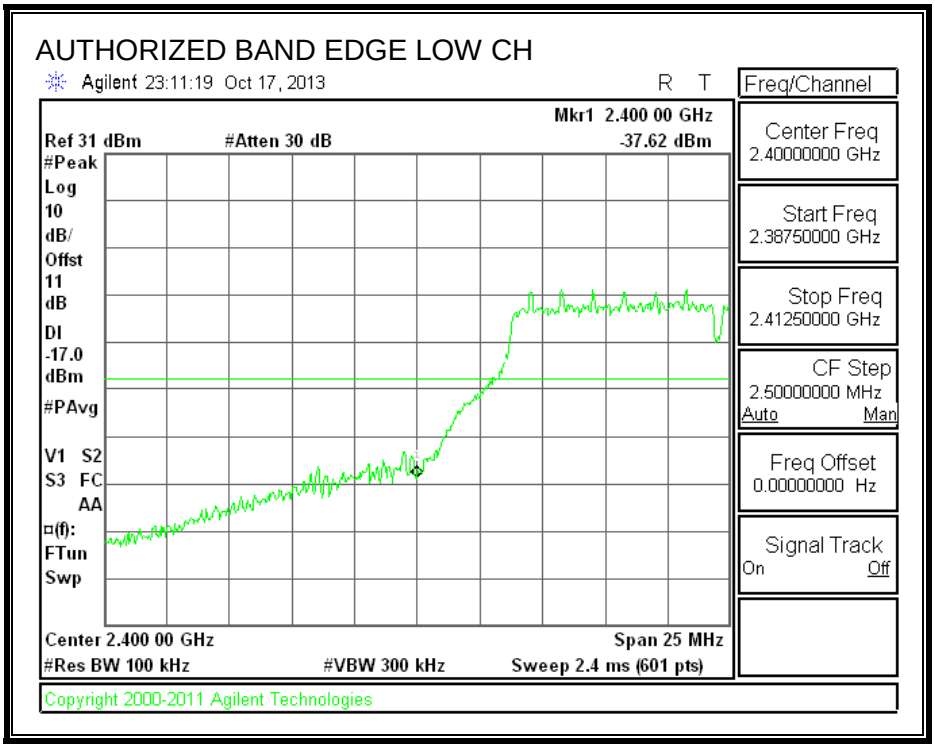


## 9.6.1. 802.11g MODE IN THE 2.4 GHz BAND

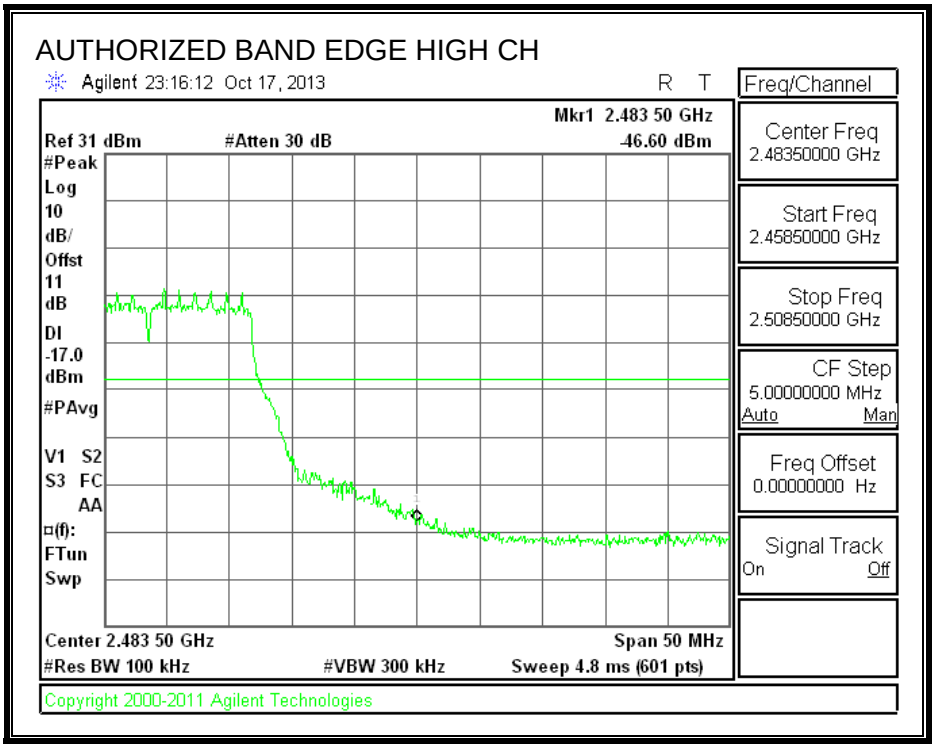
**IN-BAND REFERENCE LEVEL**



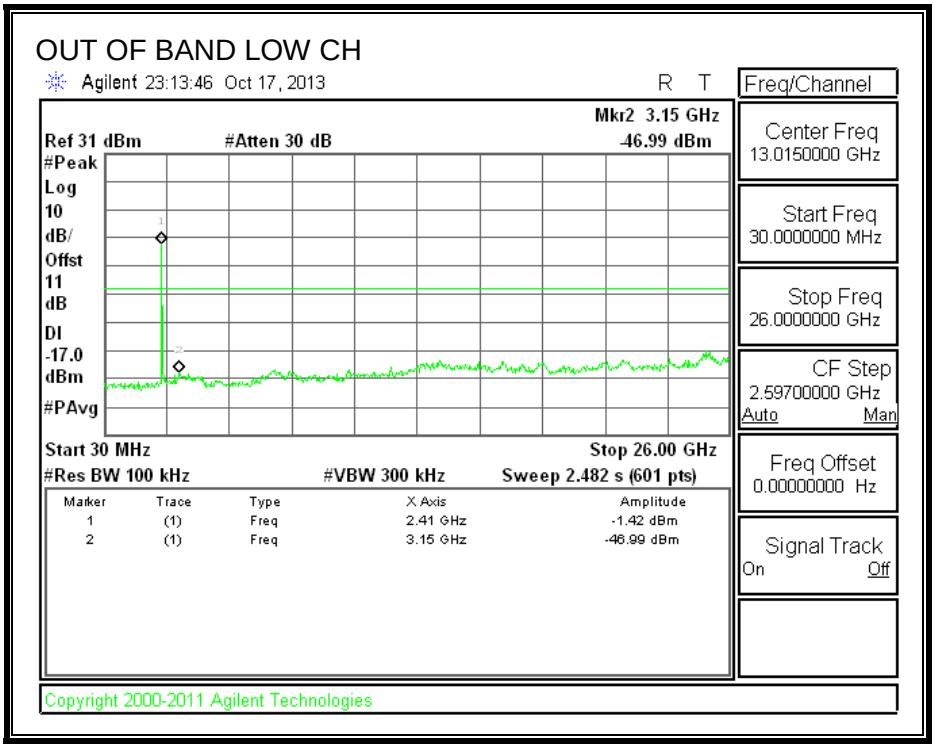
**LOW CHANNEL BANDEDGE**

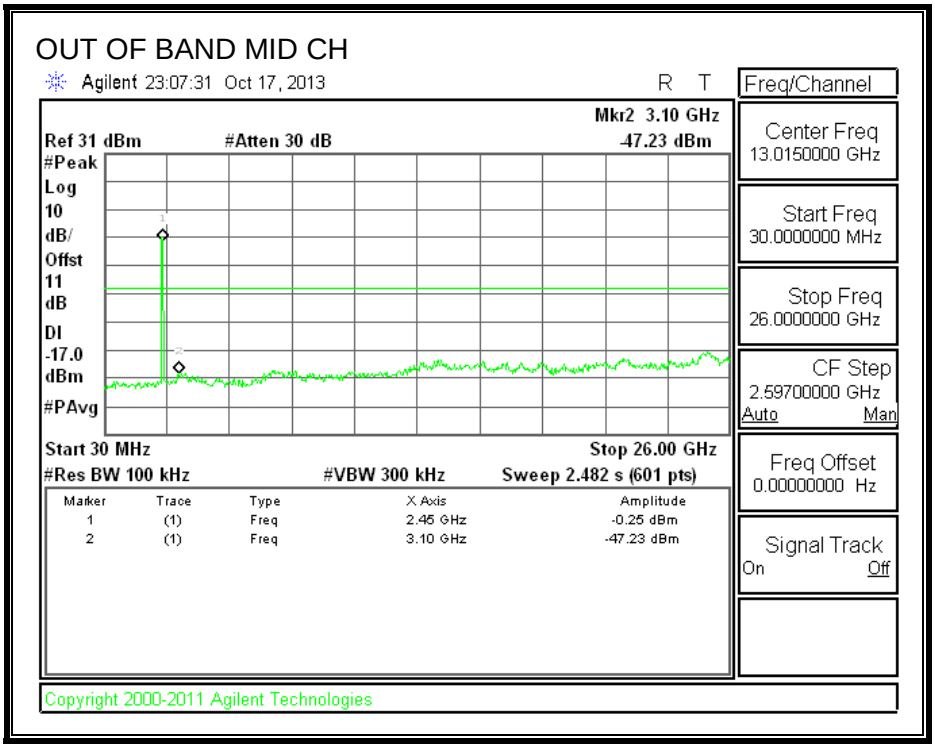


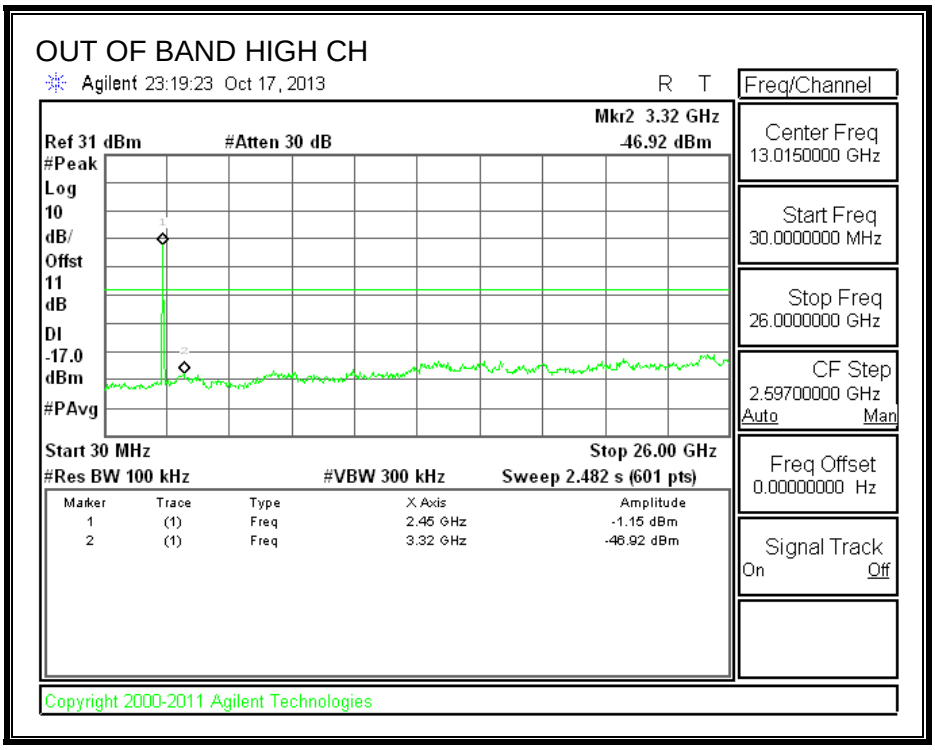

**HIGH CHANNEL BANDEDGE**



**OUT-OF-BAND EMISSIONS**

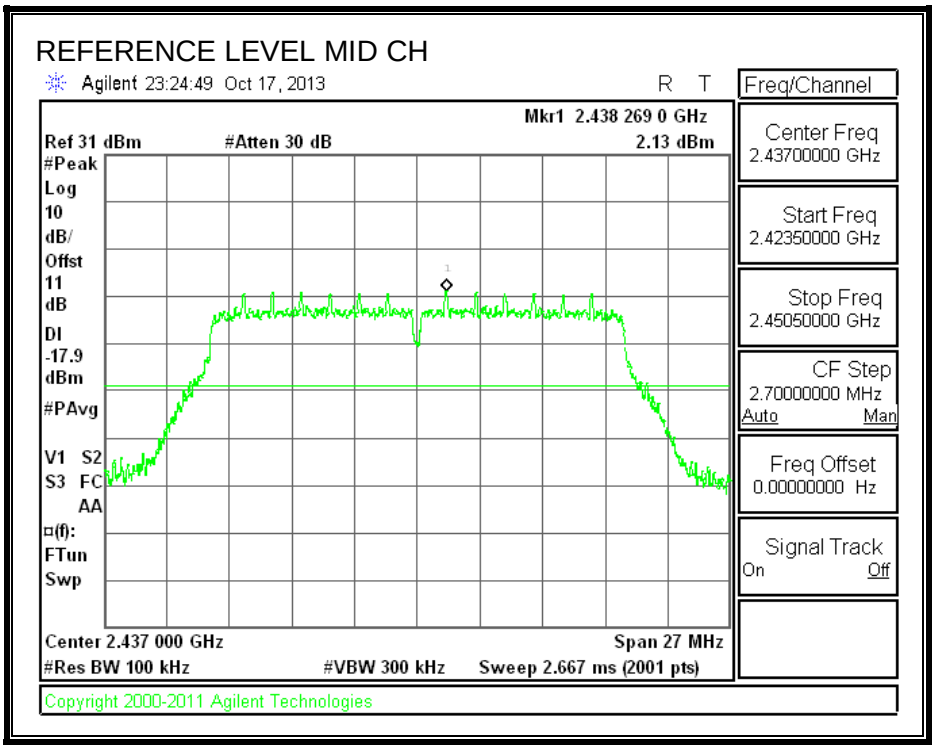


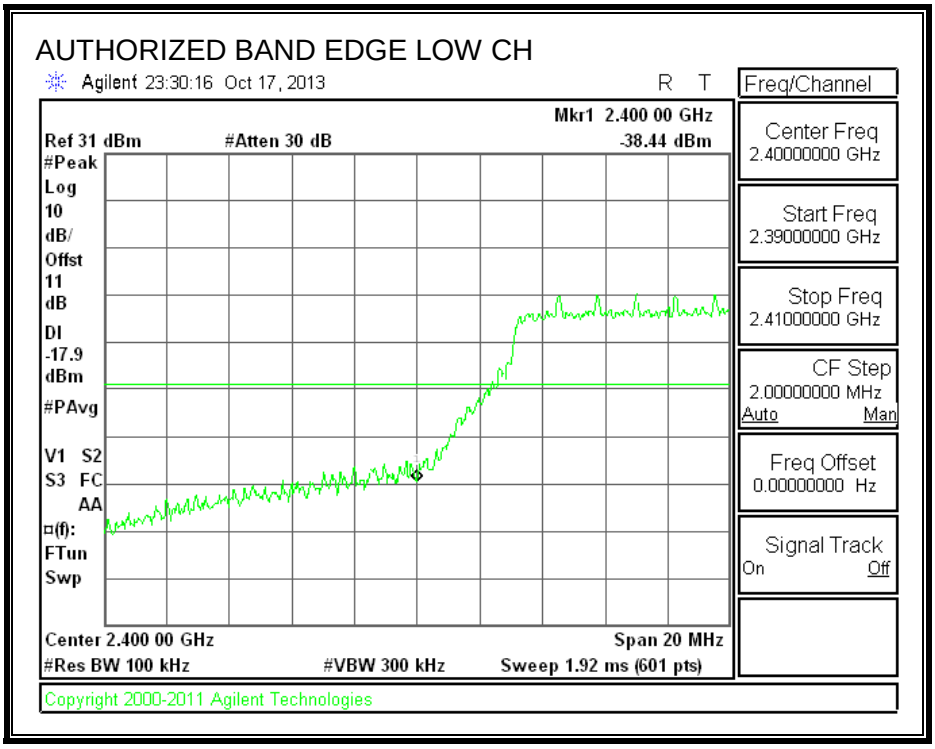


## 9.6.2. 802.11n MODE IN THE 2.4 GHz BAND

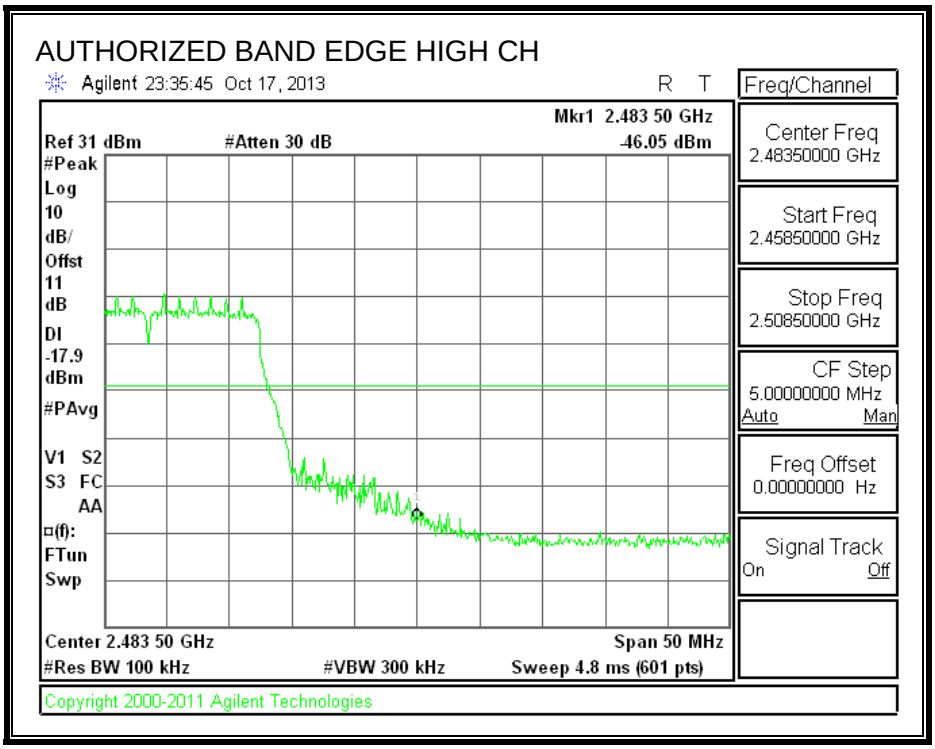
**IN-BAND REFERENCE LEVEL**



LOW CHANNEL BANDEDGE

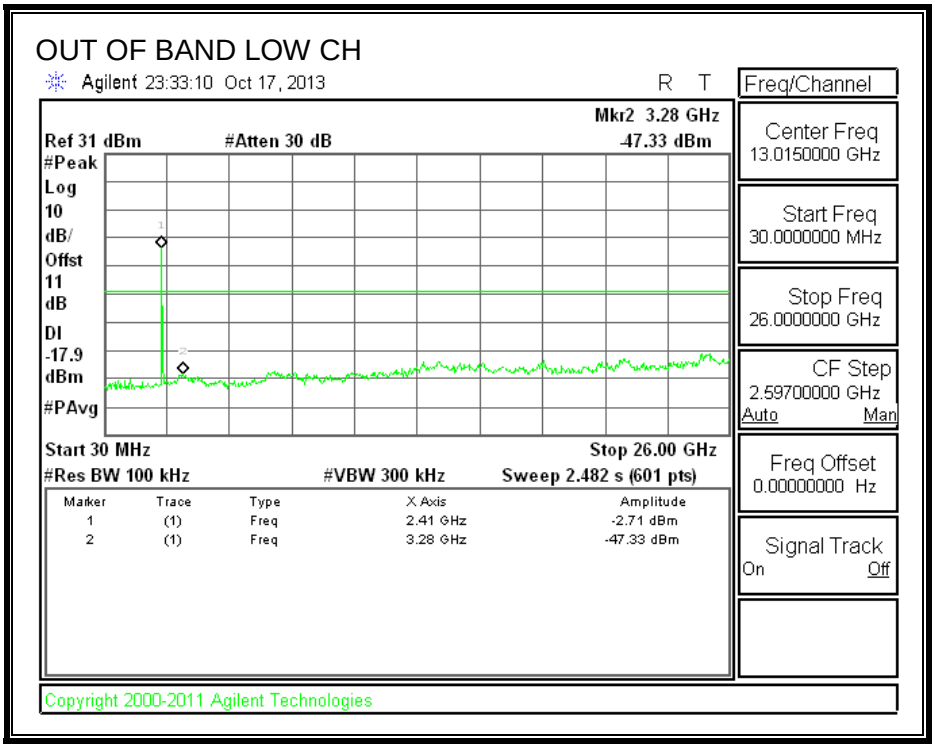



**HIGH CHANNEL BANDEDGE**

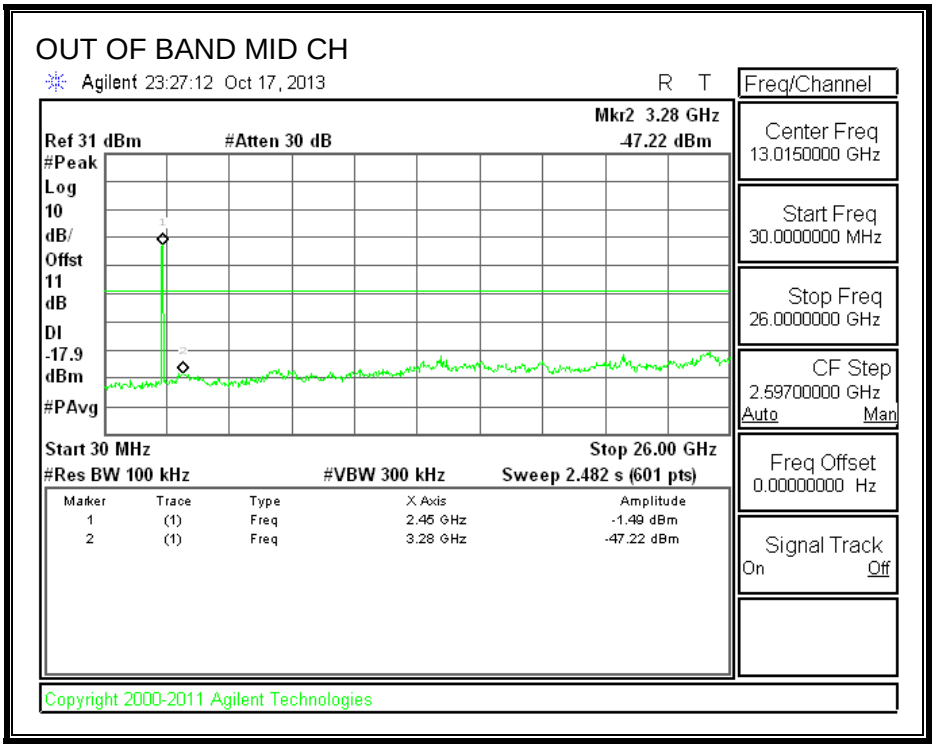


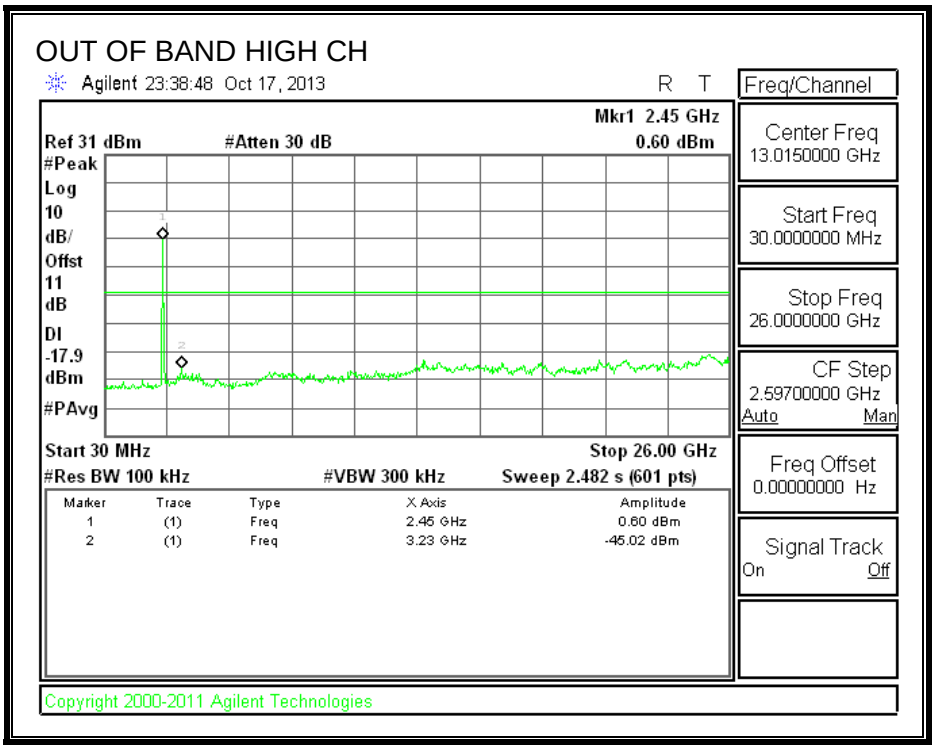
**OUT-OF-BAND EMISSIONS**

OUT OF BAND LOW CH



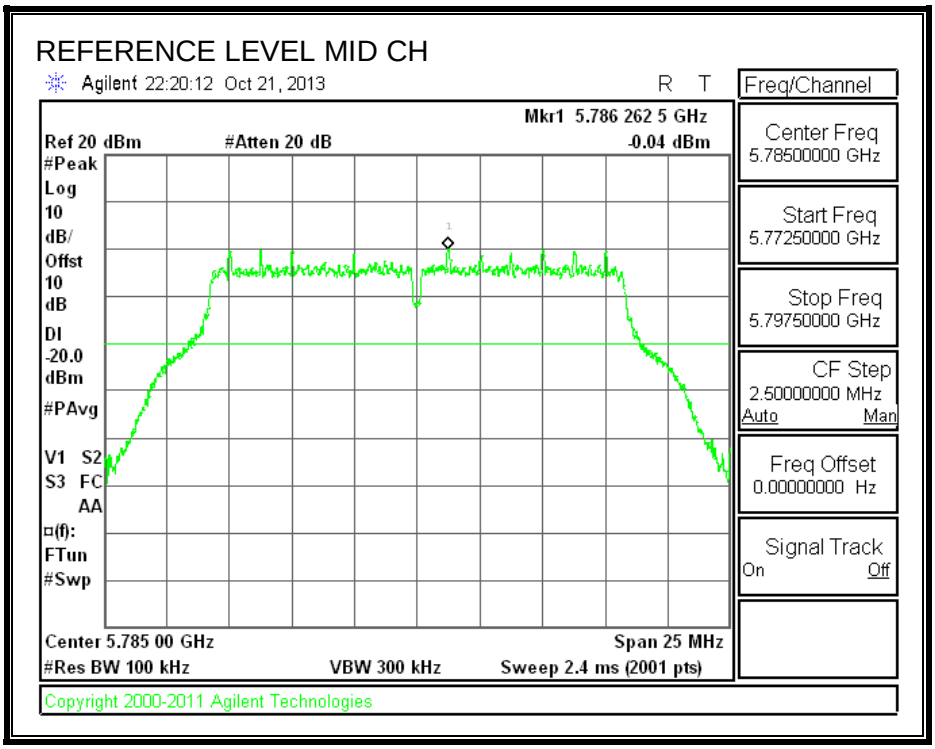

OUT OF BAND MID CH



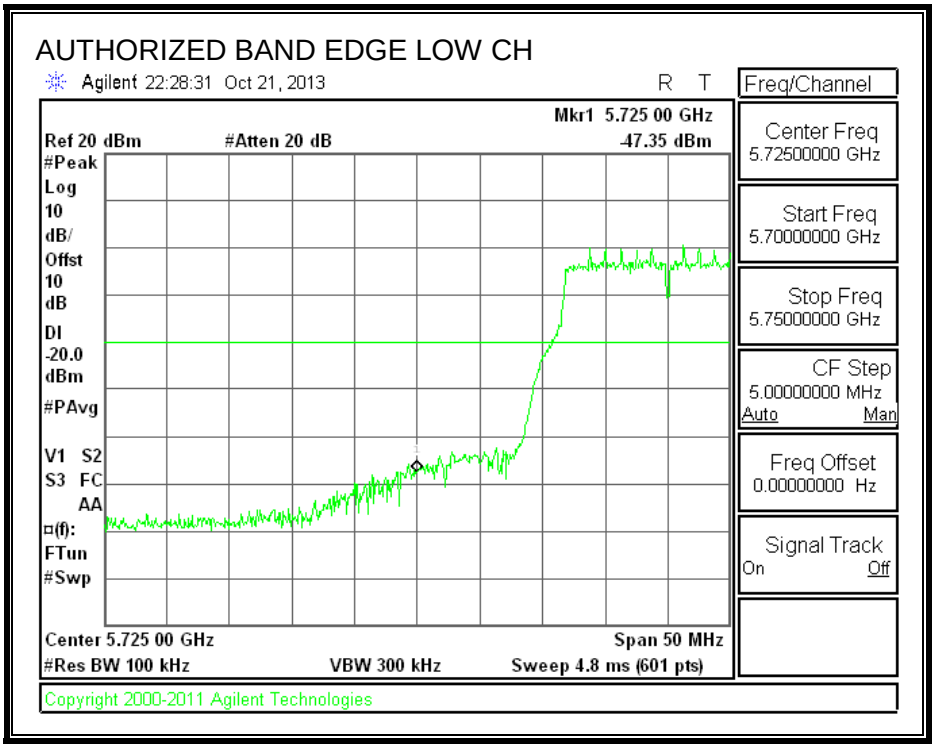


## 9.6.1. 802.11a MODE IN THE 5.8 GHz BAND

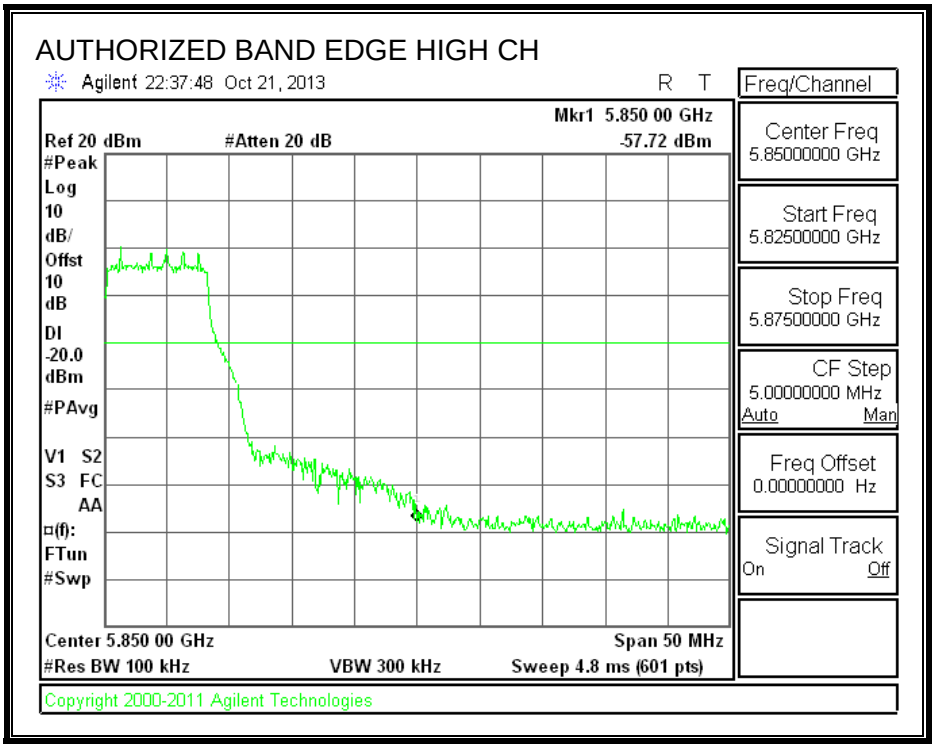
**IN-BAND REFERENCE LEVEL**



**LOW CHANNEL BANDEDGE**

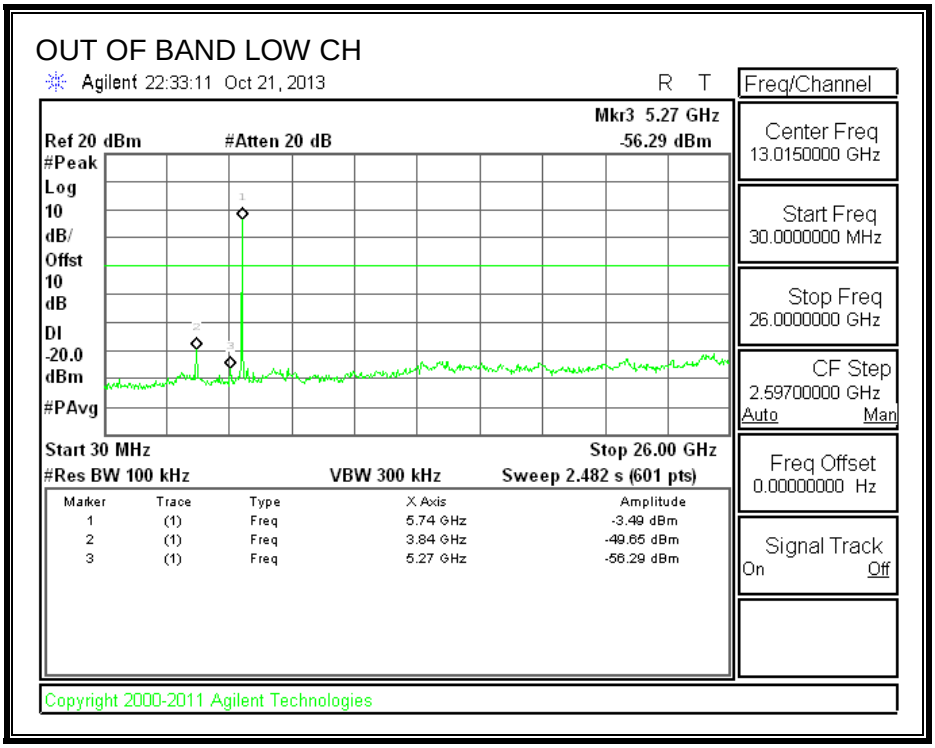



**HIGH CHANNEL BANDEDGE**

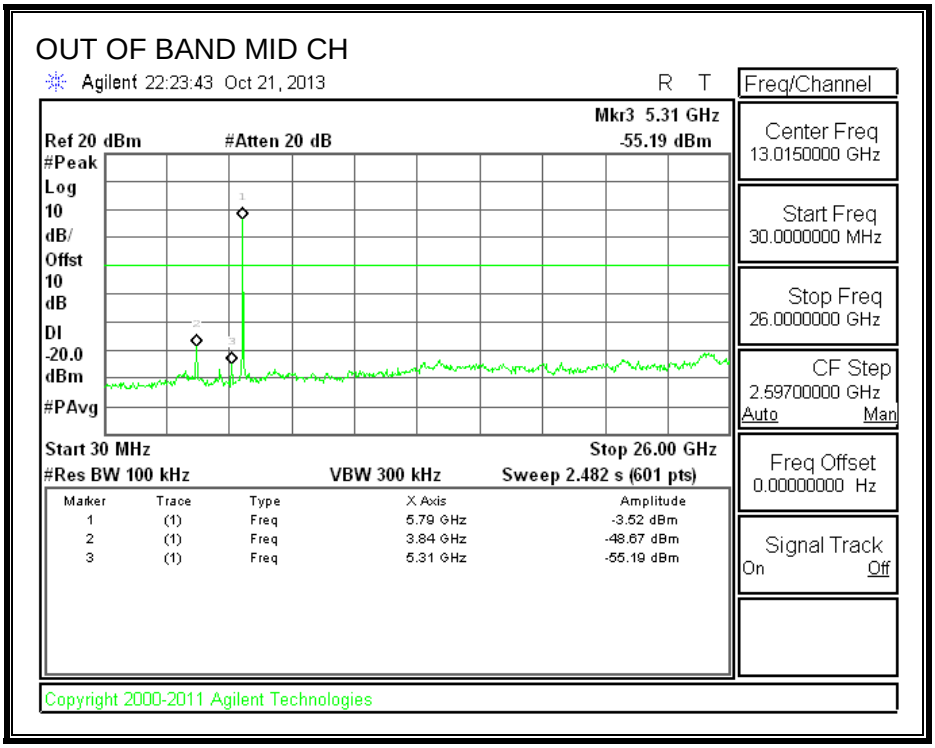


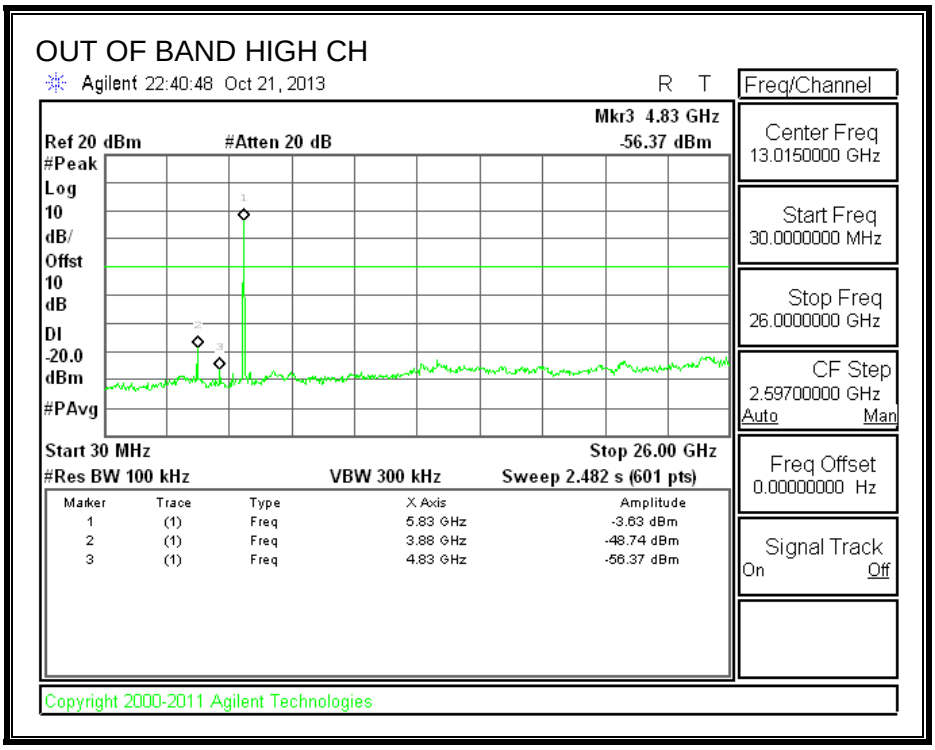
**OUT-OF-BAND EMISSIONS**

OUT OF BAND LOW CH



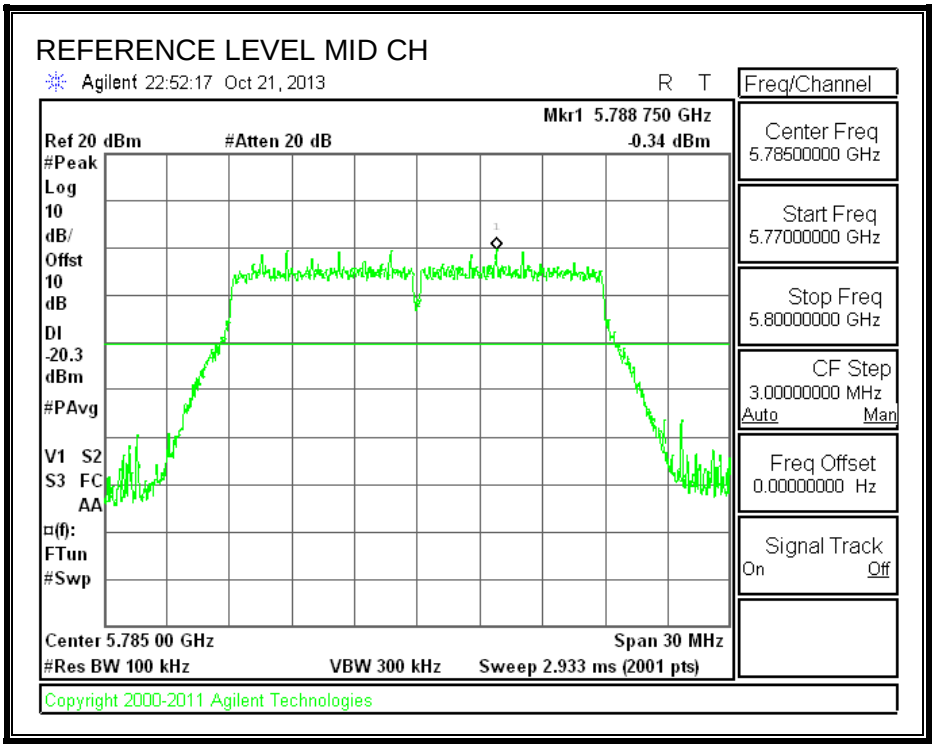

OUT OF BAND MID CH



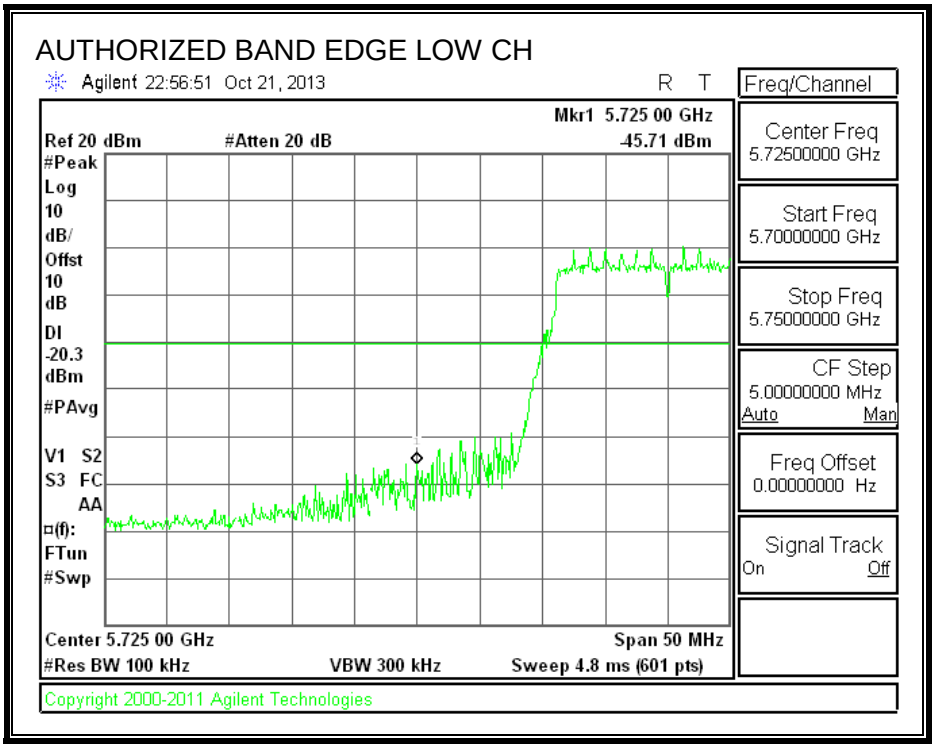


## 9.6.1. 802.11n HT20 MODE IN THE 5.8 GHz BAND

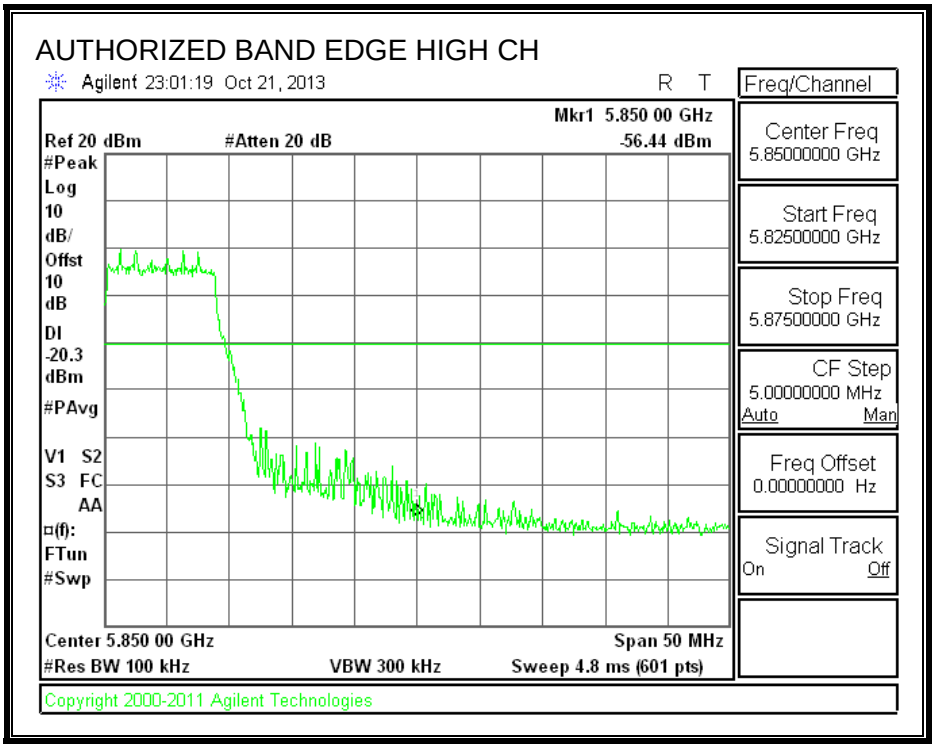
**IN-BAND REFERENCE LEVEL**



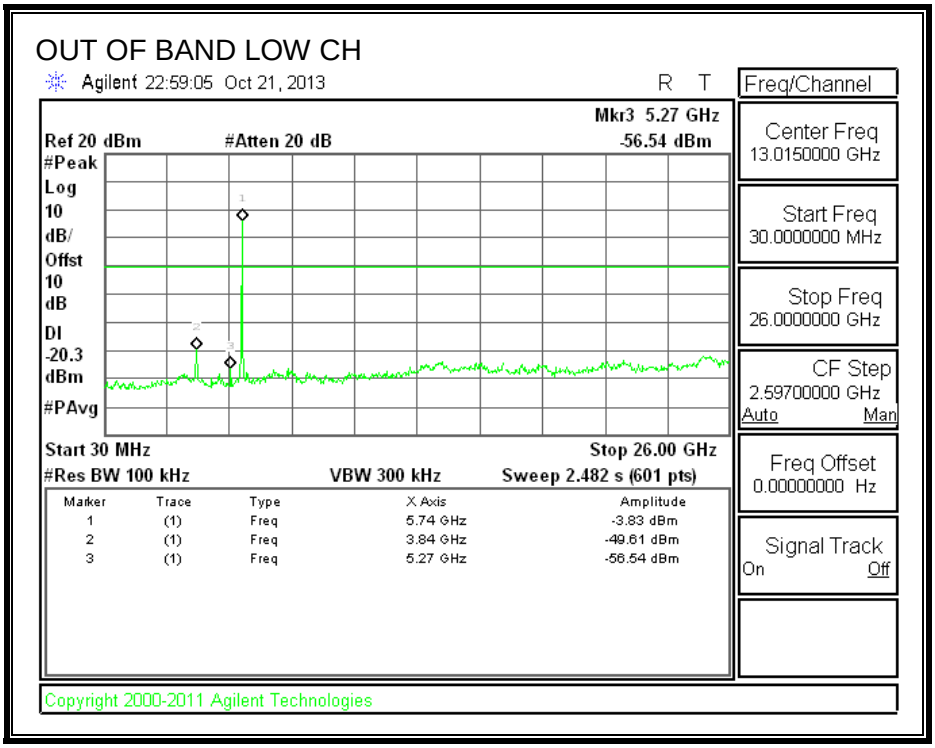
**LOW CHANNEL BANDEDGE**

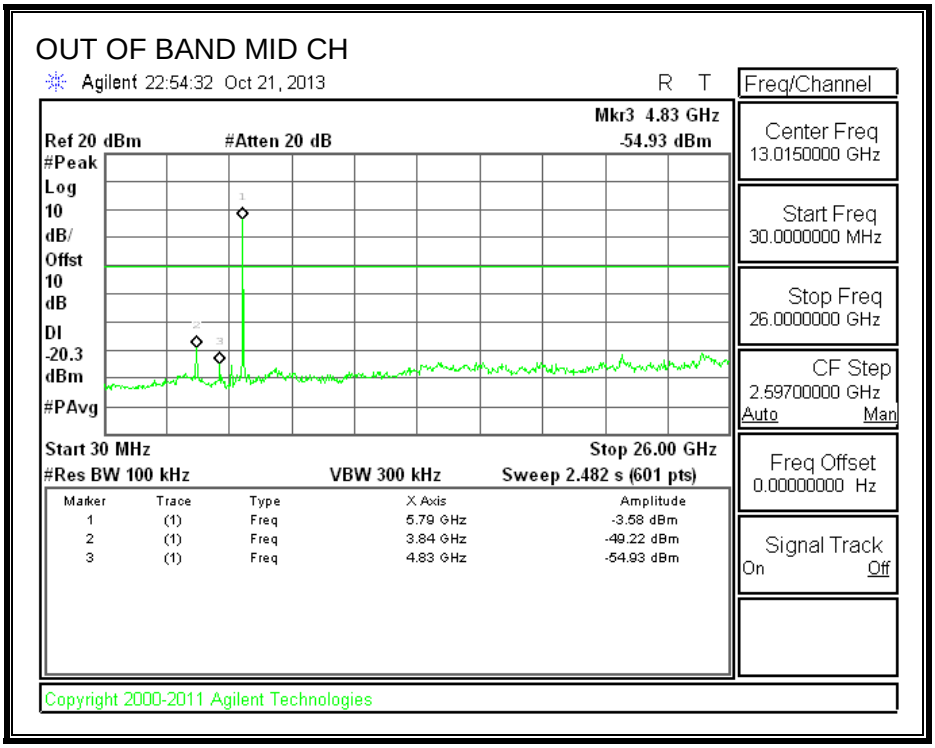


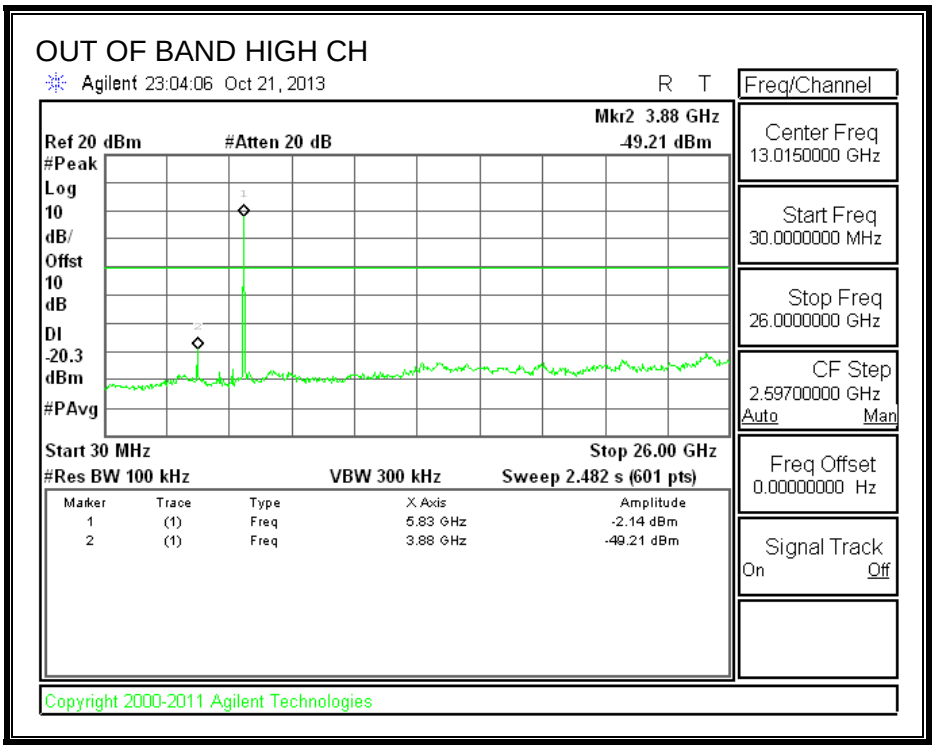

**HIGH CHANNEL BANDEDGE**



**OUT-OF-BAND EMISSIONS**





# 10. RADIATED TEST RESULTS

## 10.1. 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.

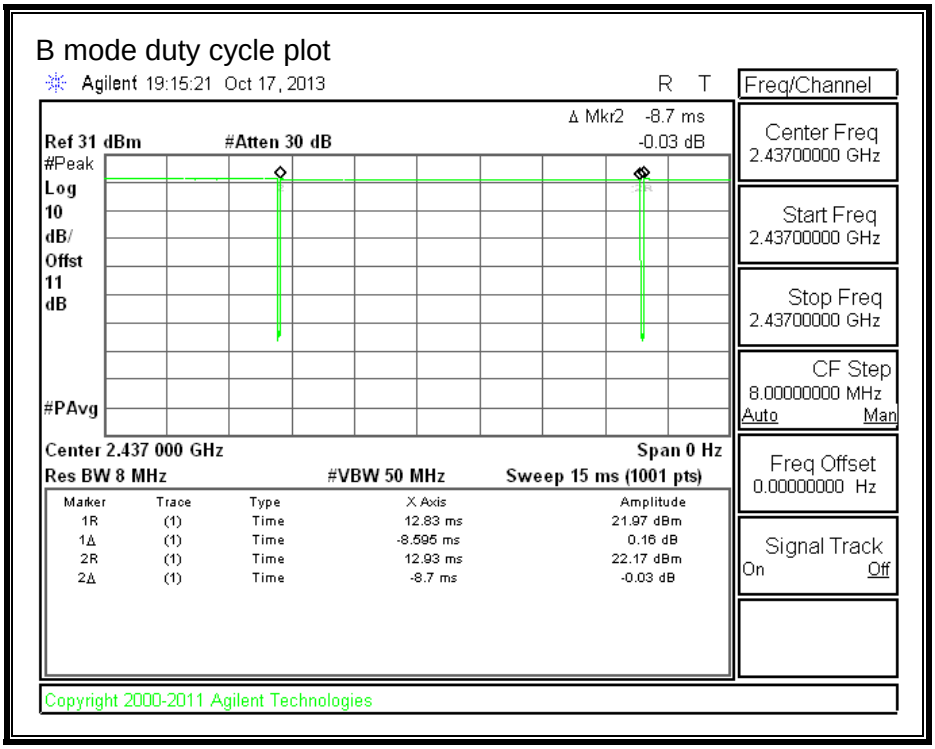
For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor= 10log (1/x). For this sample B mode DCCF = 0dB (99% duty cycle). G and N mode = 0.3 dB.

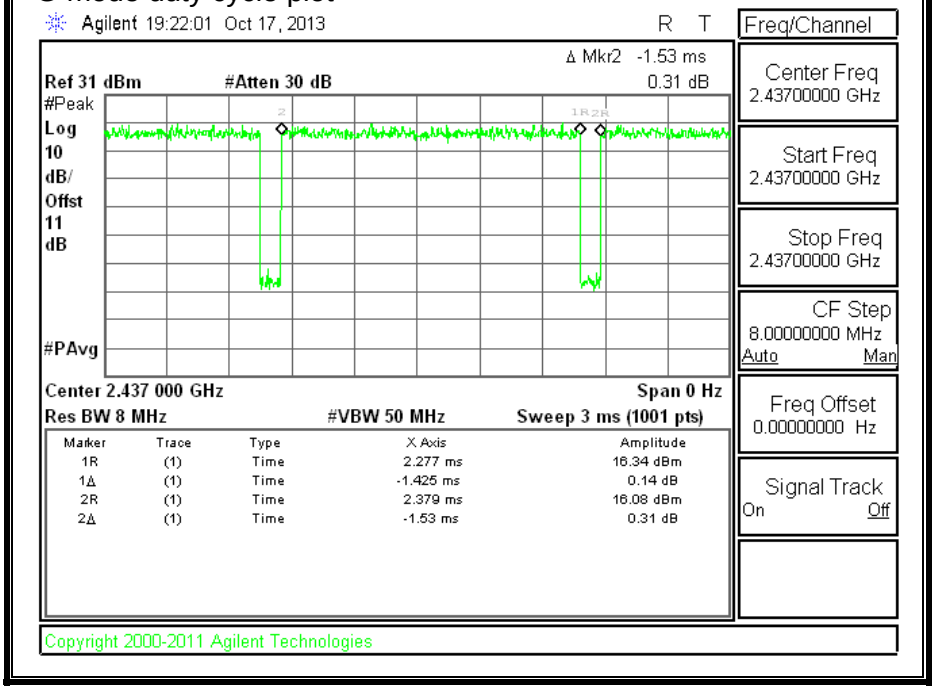
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

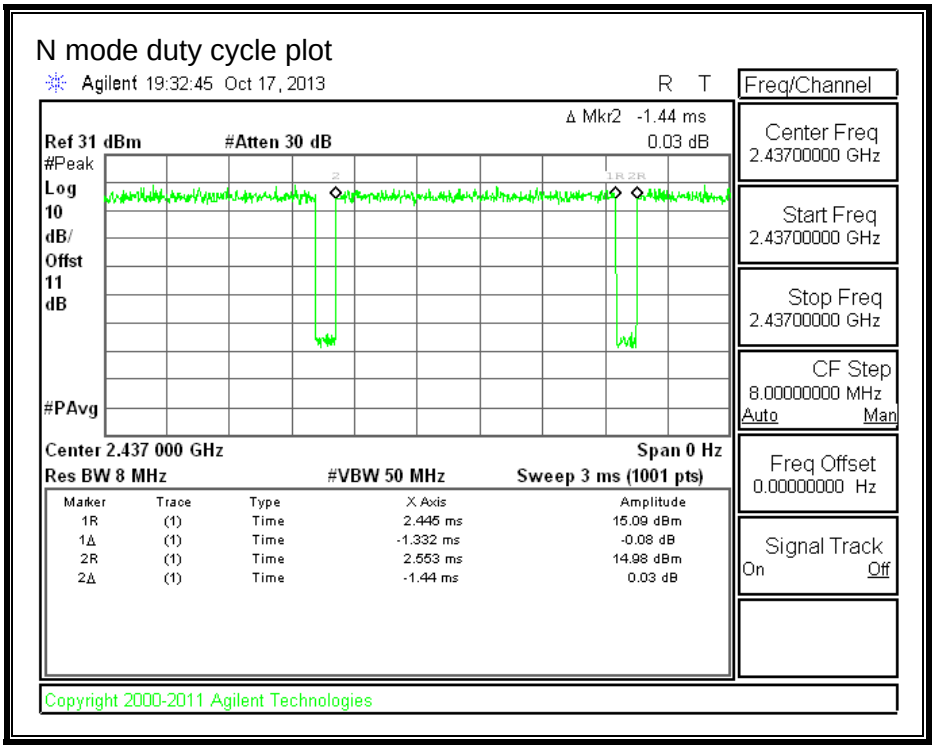
B mode duty cycle plot




G mode duty cycle plot



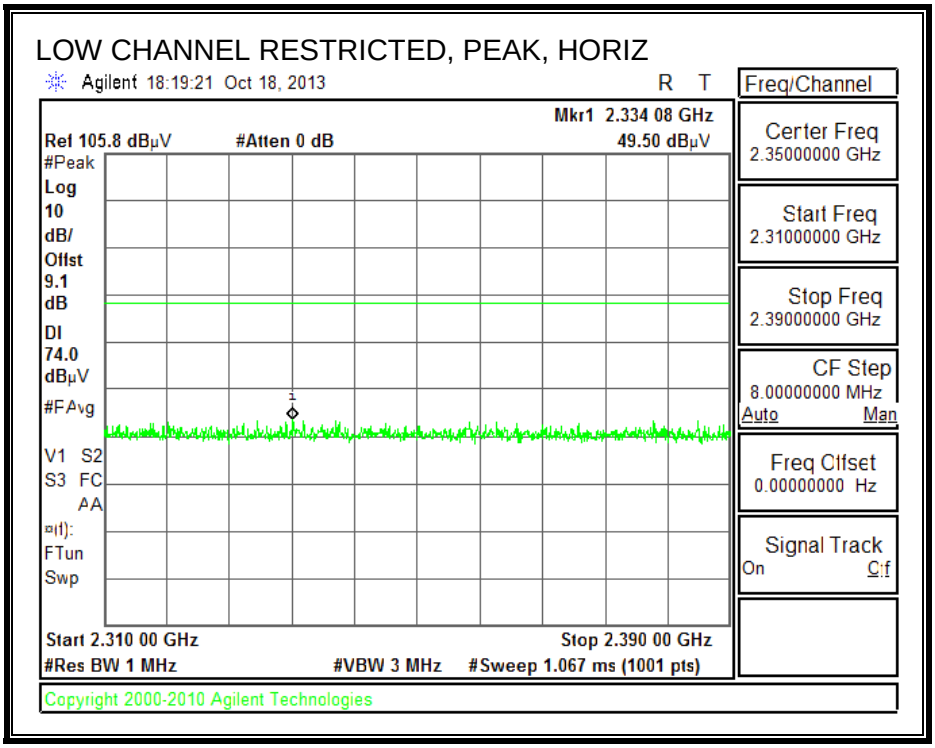
N mode duty cycle plot

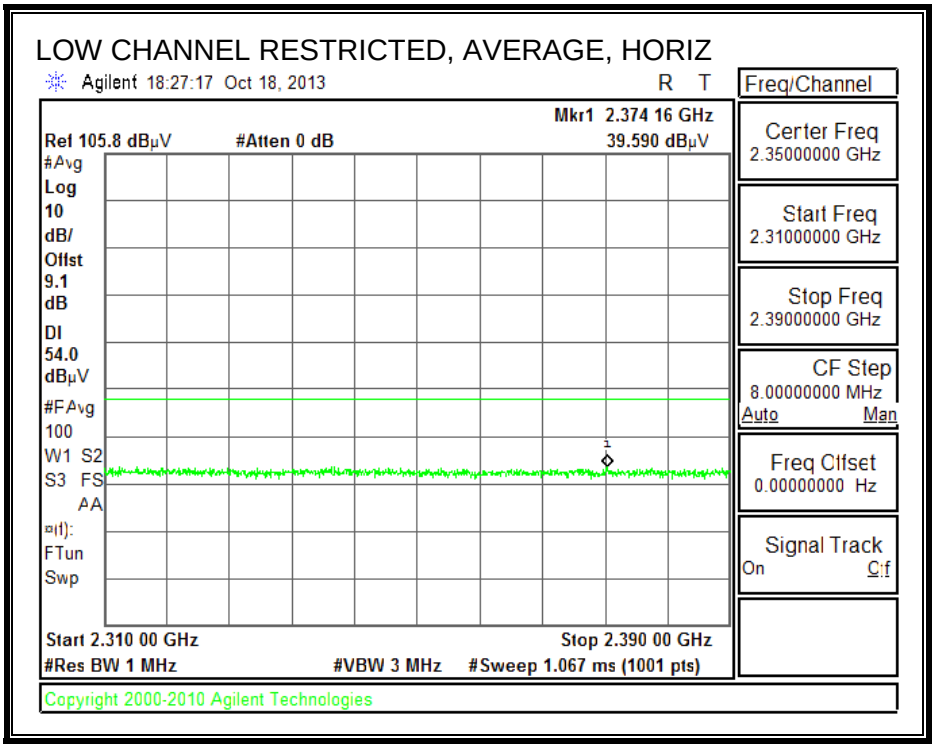


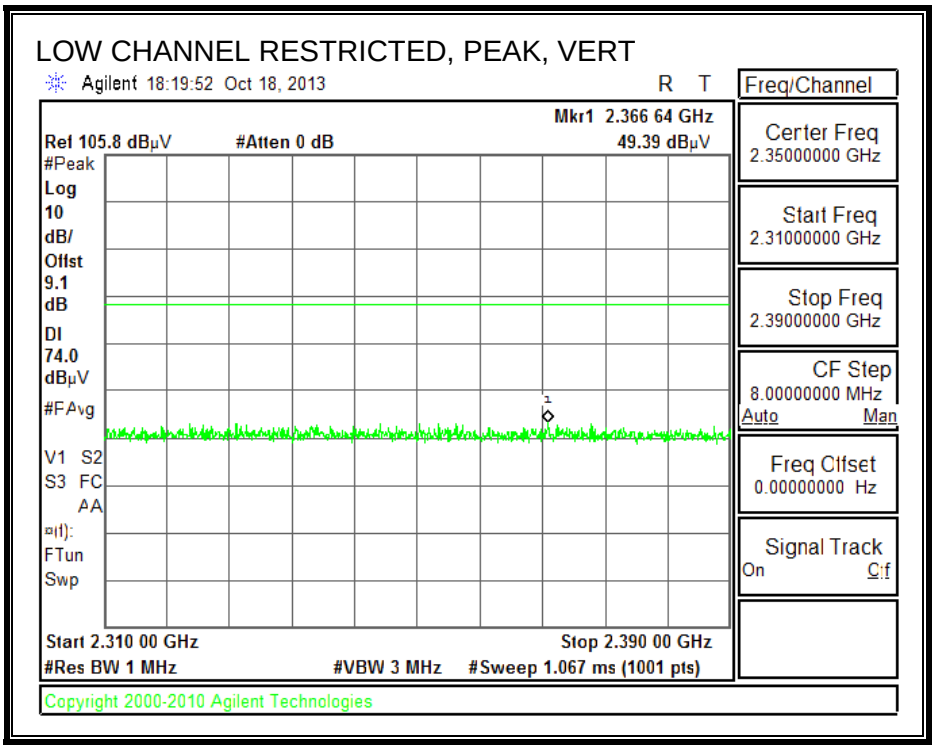
## 10.2. TRANSMITTER ABOVE 1 GHz

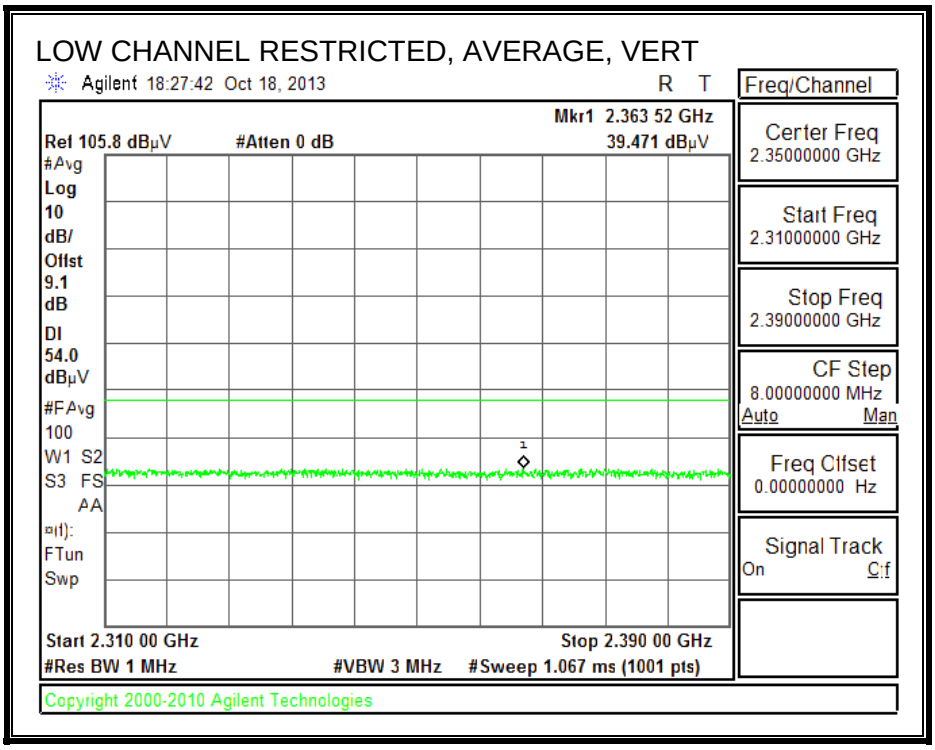
### 10.2.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

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

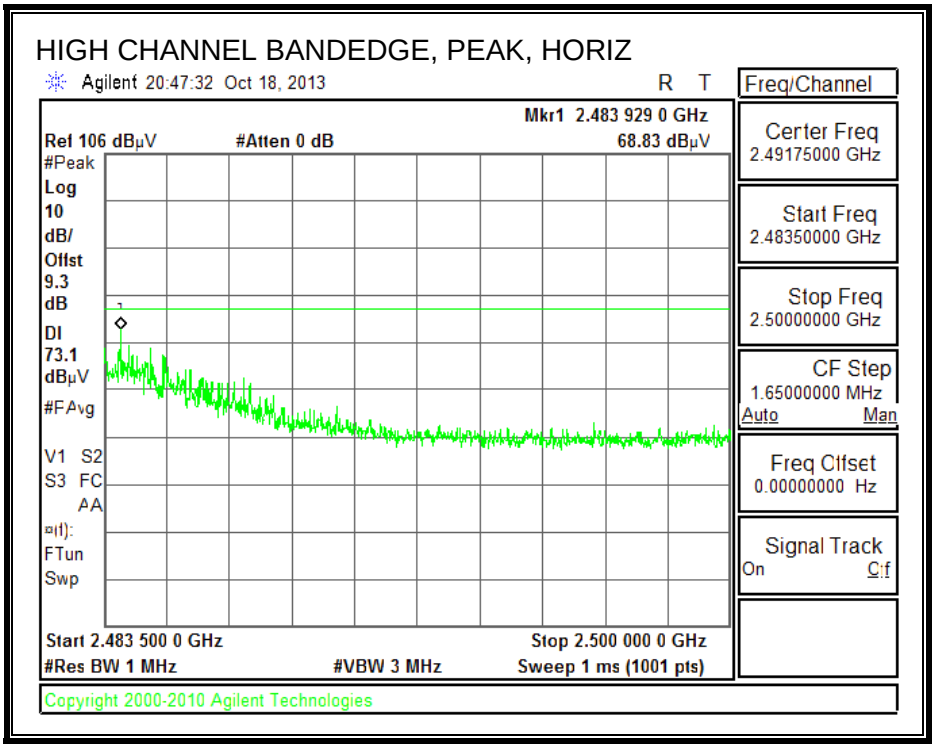


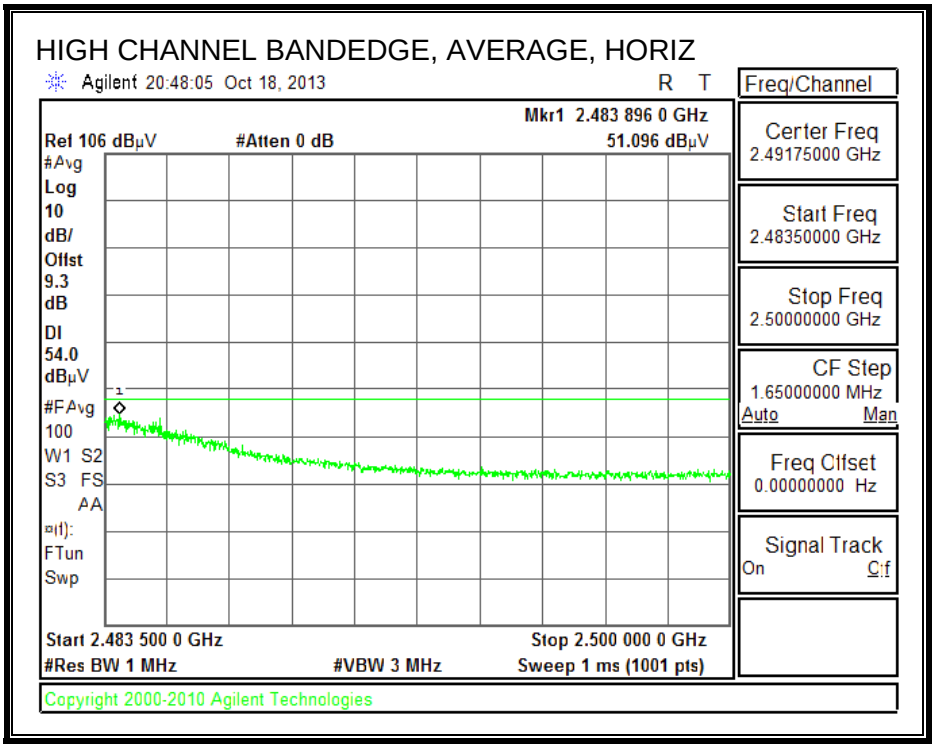




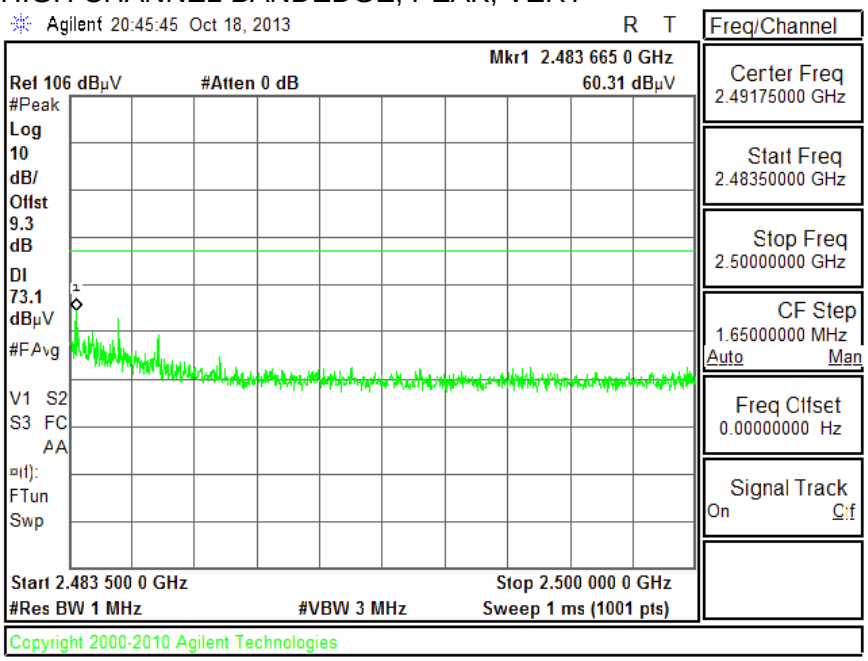



## AUTHORIZED BANDEDGE (HIGH CHANNEL)

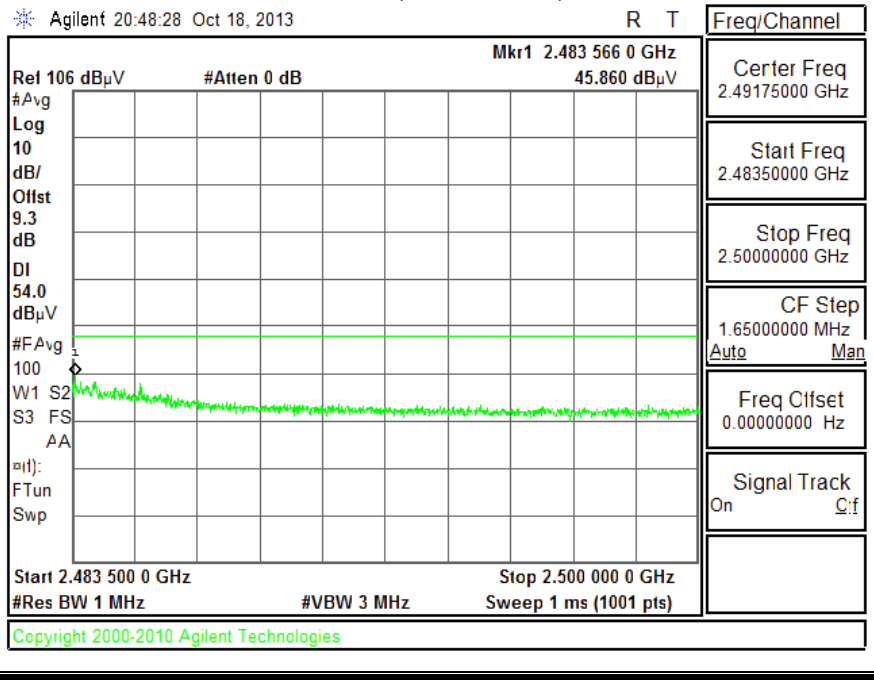


HIGH CHANNEL BANDEDGE, PEAK, VERT

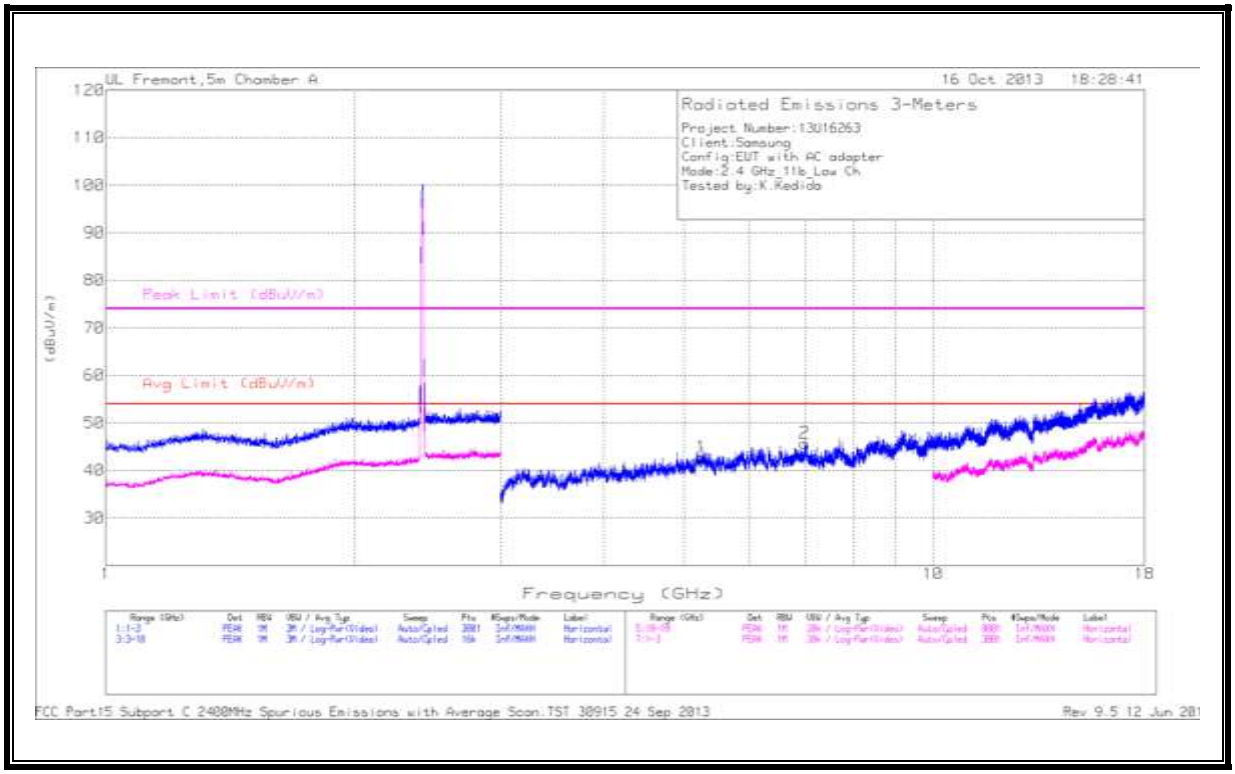



HIGH CHANNEL BANDEDGE, AVERAGE, VERT

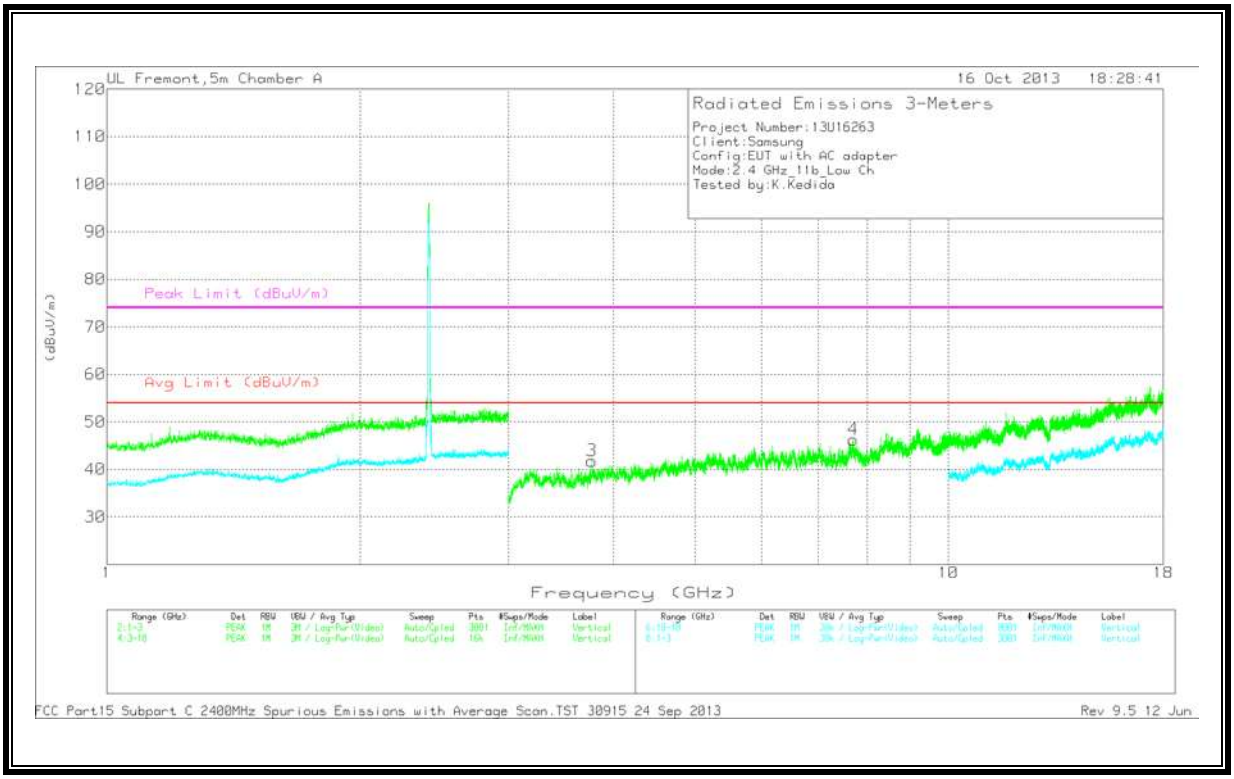


## HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



VERTICAL



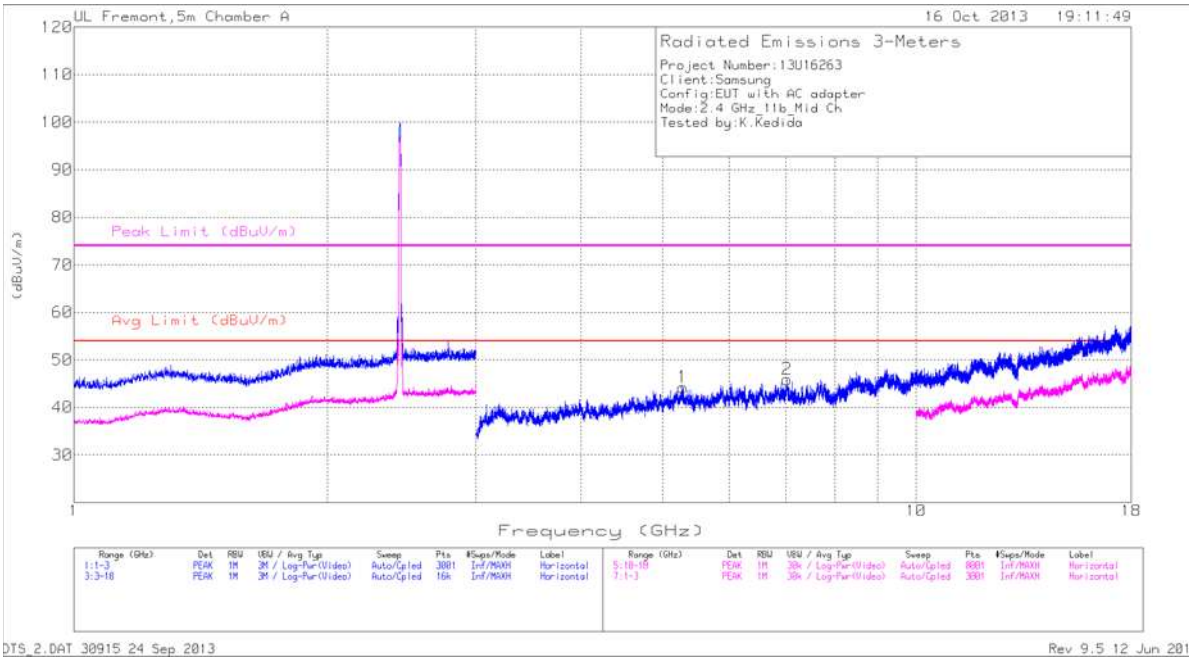
## LOW CHANNEL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.242 | 35.88 | PK | 34.2 | -27.3 | 42.78 | 53.97 | -11.19 | 74 | -31.22 | 0-360 | 200 | H |
| 2 | 6.994 | 36.77 | PK | 35.4 | -26.5 | 45.67 | 53.97 | -8.3 | 74 | -28.33 | 0-360 | 200 | H |
| 3 | 3.769 | 38.38 | PK | 33.4 | -30 | 41.78 | 53.97 | -12.19 | 74 | -32.22 | 0-360 | 200 | V |
| 4 | 7.712 | 35.68 | PK | 35.5 | -24.9 | 46.28 | 53.97 | -7.69 | 74 | -27.72 | 0-360 | 200 | V |

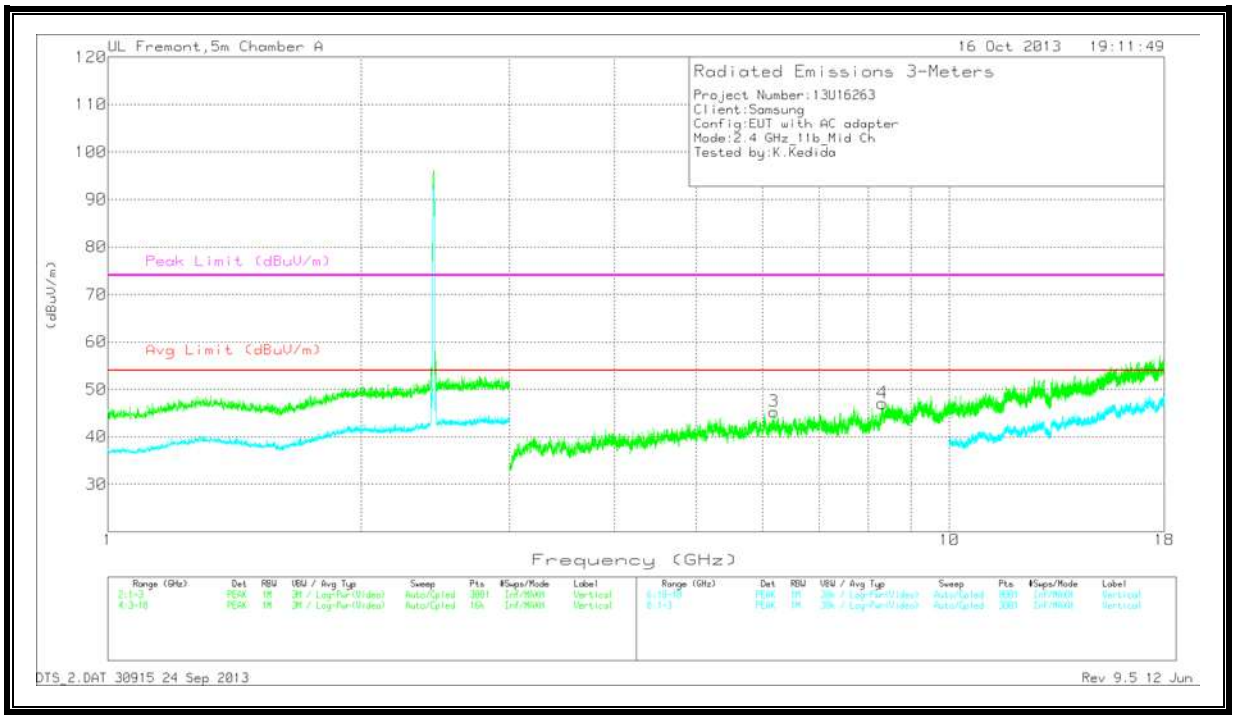
PK - Peak detector

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

MID CHANNEL
HORIZONTAL



VERTICAL



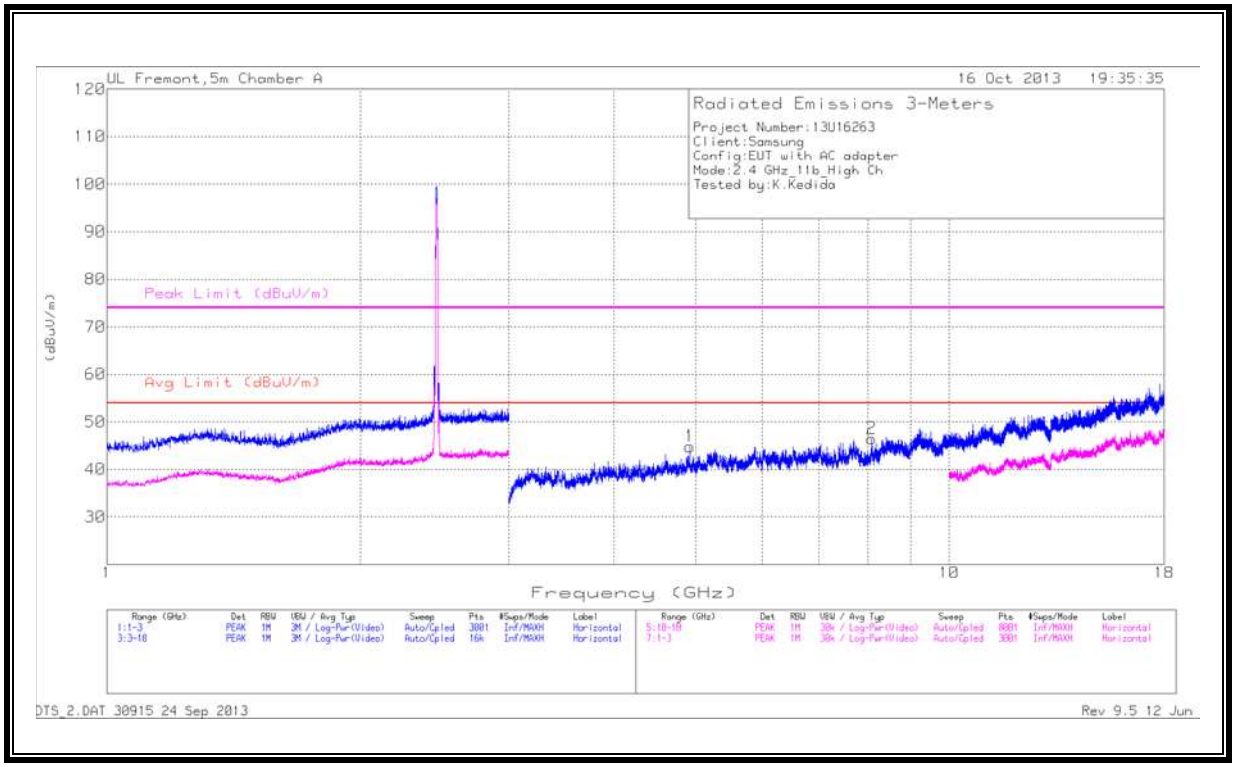
MID CHANNEL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.286 | 36.11 | PK | 34.3 | -26.2 | 44.21 | 53.97 | -9.76 | 74 | -29.79 | 0-360 | 100 | H |
| 2 | 7.026 | 35.39 | PK | 35.4 | -24.9 | 45.89 | 53.97 | -8.08 | 74 | -28.11 | 0-360 | 100 | H |
| 3 | 6.184 | 37.61 | PK | 35.4 | -27.7 | 45.31 | 53.97 | -8.66 | 74 | -28.69 | 0-360 | 100 | V |
| 4 | 8.322 | 36.07 | PK | 35.6 | -24.6 | 47.07 | 53.97 | -6.9 | 74 | -26.93 | 0-360 | 200 | V |

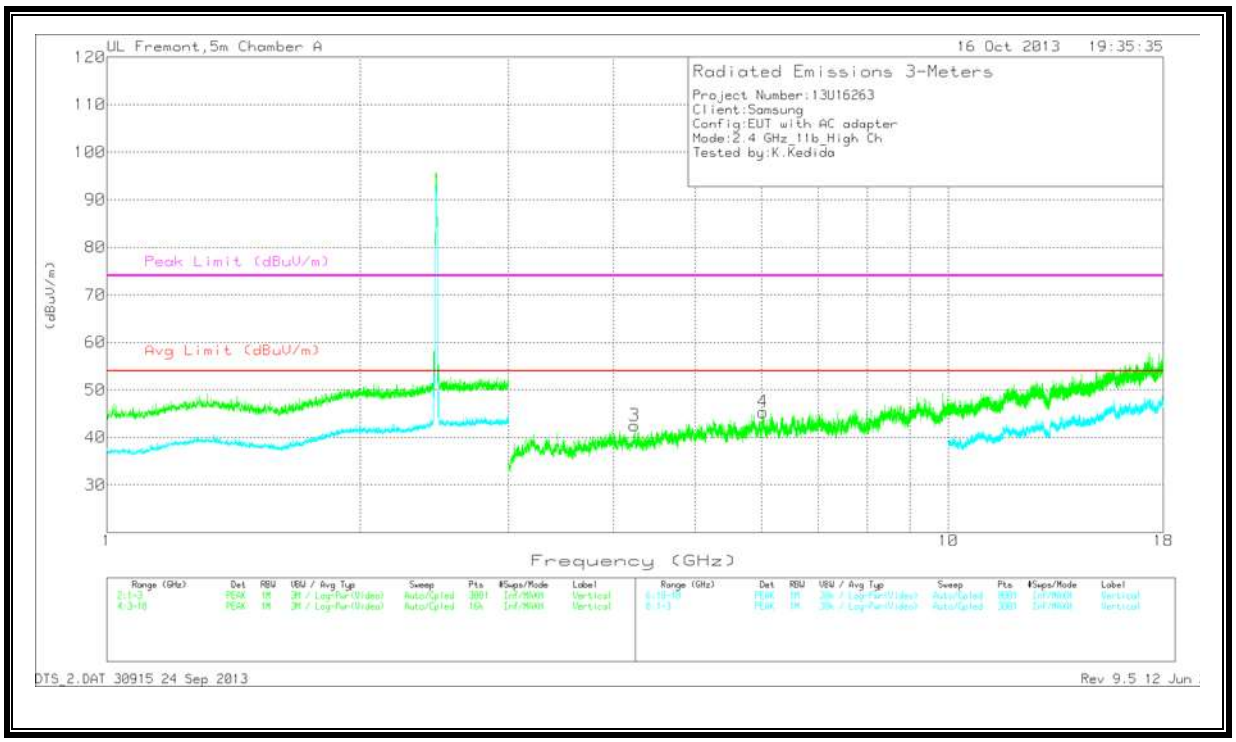
PK - Peak detector

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

HIGH CHANNEL
HORIZONTAL



VERTICAL



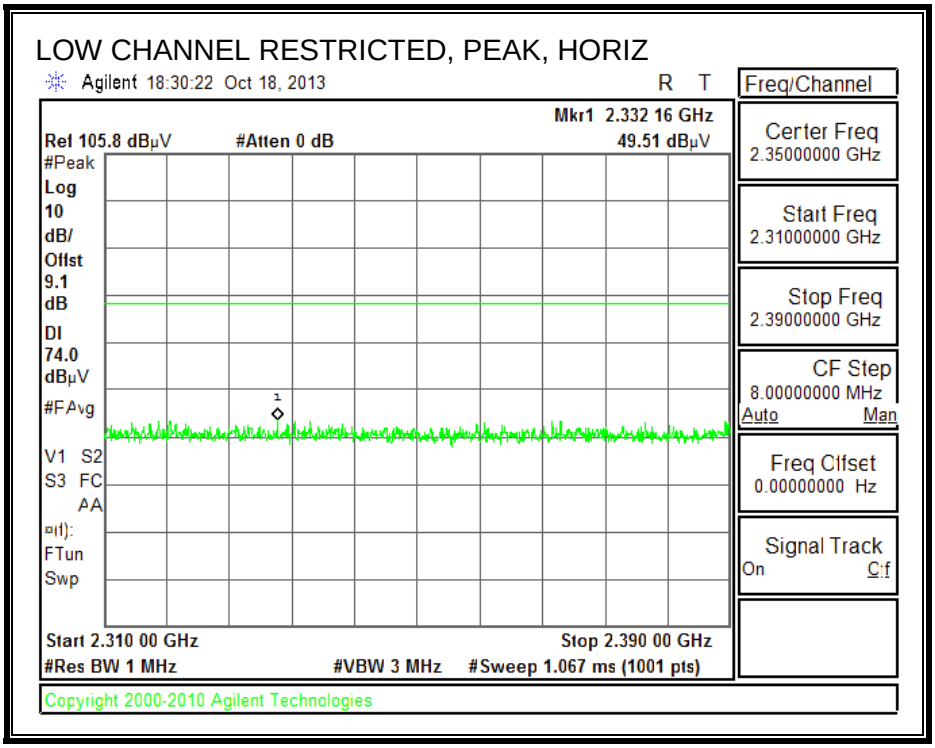
## HIGH CHANNEL DATA

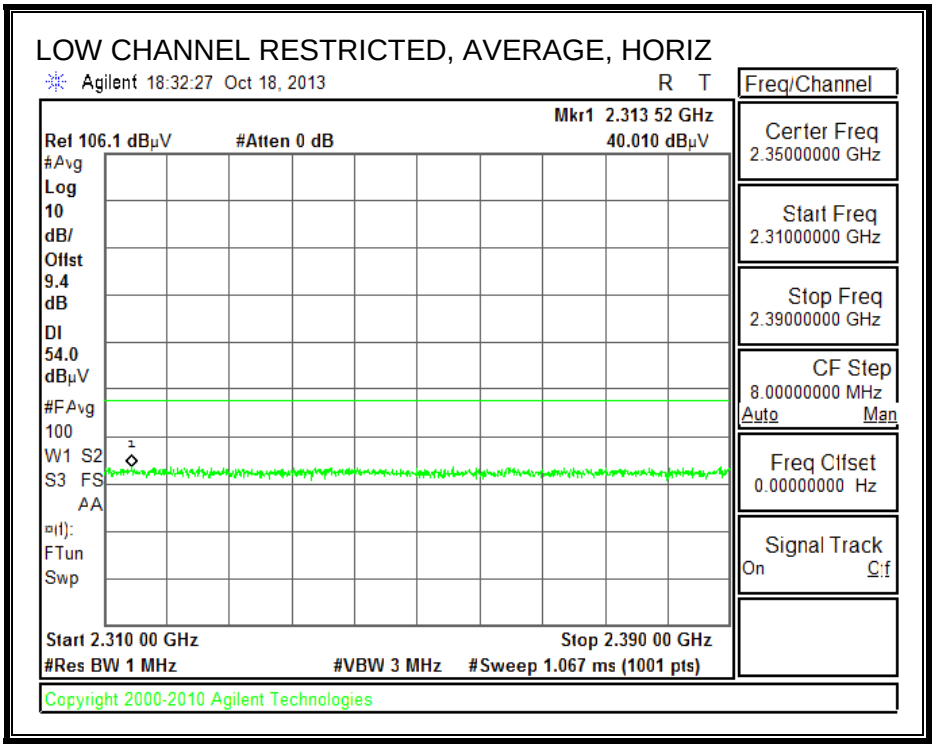
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.924 | 38.31 | PK | 34 | -27.5 | 44.81 | 53.97 | -9.16 | 74 | -29.19 | 0-360 | 100 | H |
| 2 | 8.09 | 34.17 | PK | 35.5 | -23.2 | 46.47 | 53.97 | -7.5 | 74 | -27.53 | 0-360 | 200 | H |
| 3 | 4.235 | 37.57 | PK | 33.5 | -28.6 | 42.47 | 53.97 | -11.5 | 74 | -31.53 | 0-360 | 100 | V |
| 4 | 6.017 | 37.25 | PK | 35.2 | -27.1 | 45.35 | 53.97 | -8.62 | 74 | -28.65 | 0-360 | 100 | V |

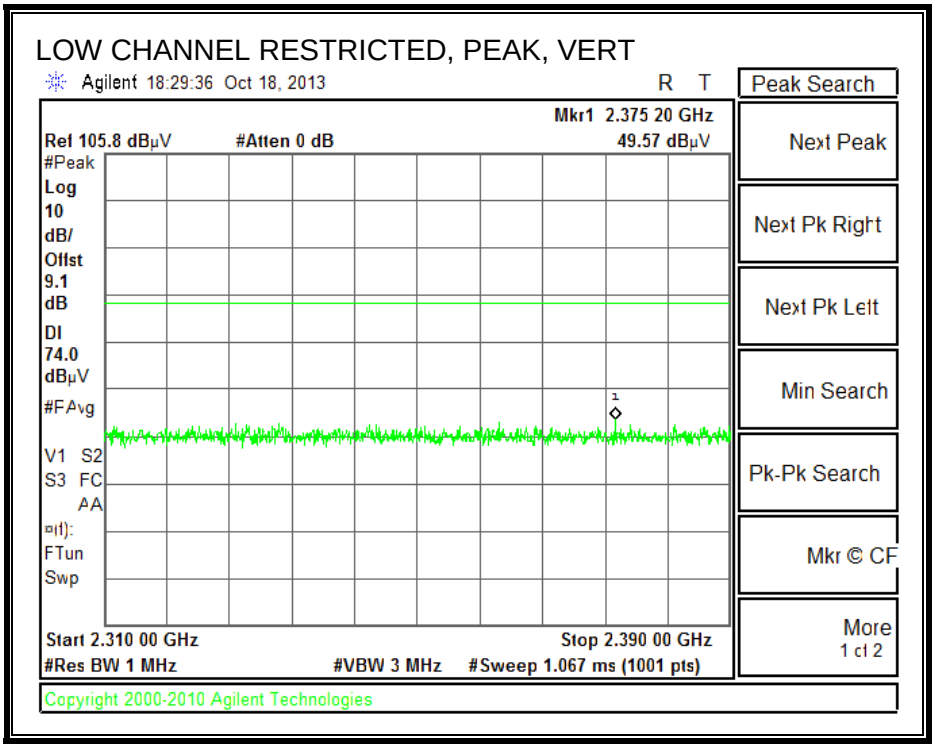
PK - Peak detector

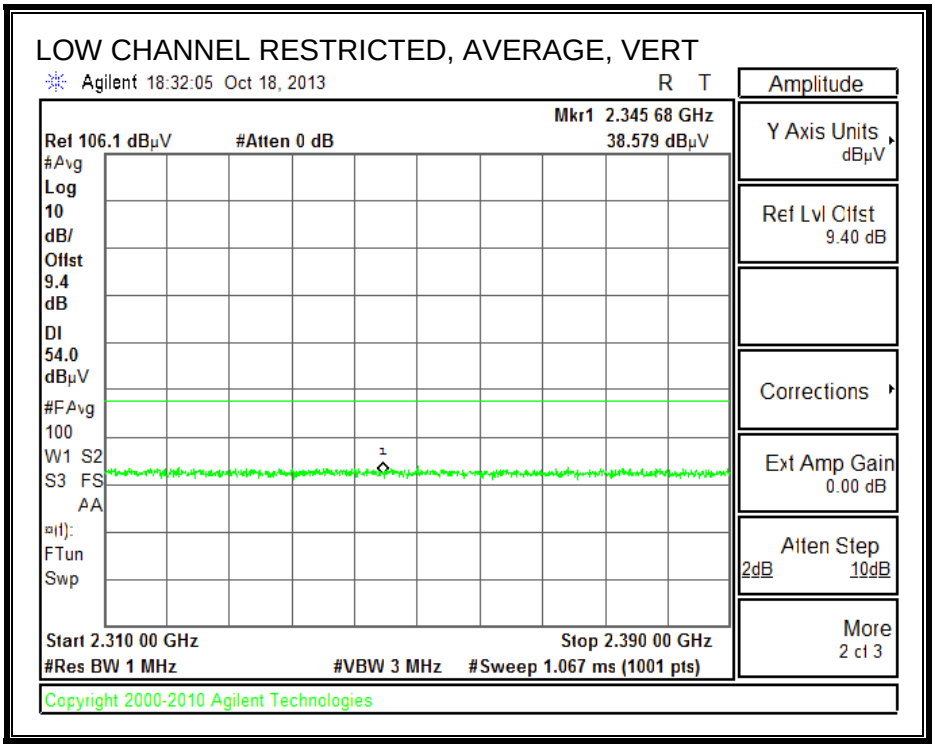
## 10.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

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

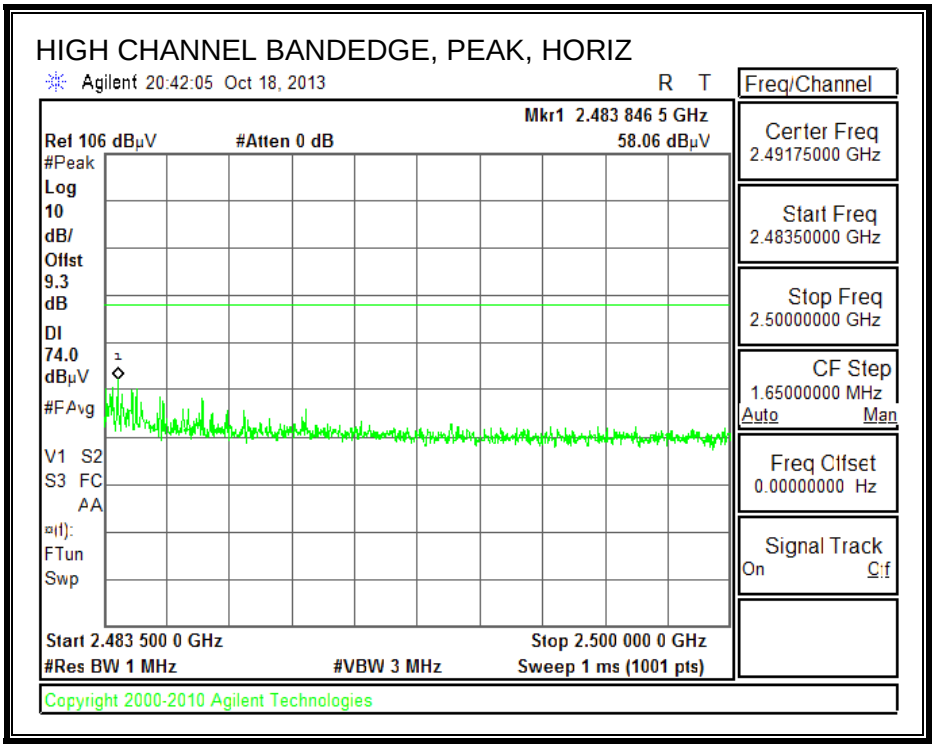


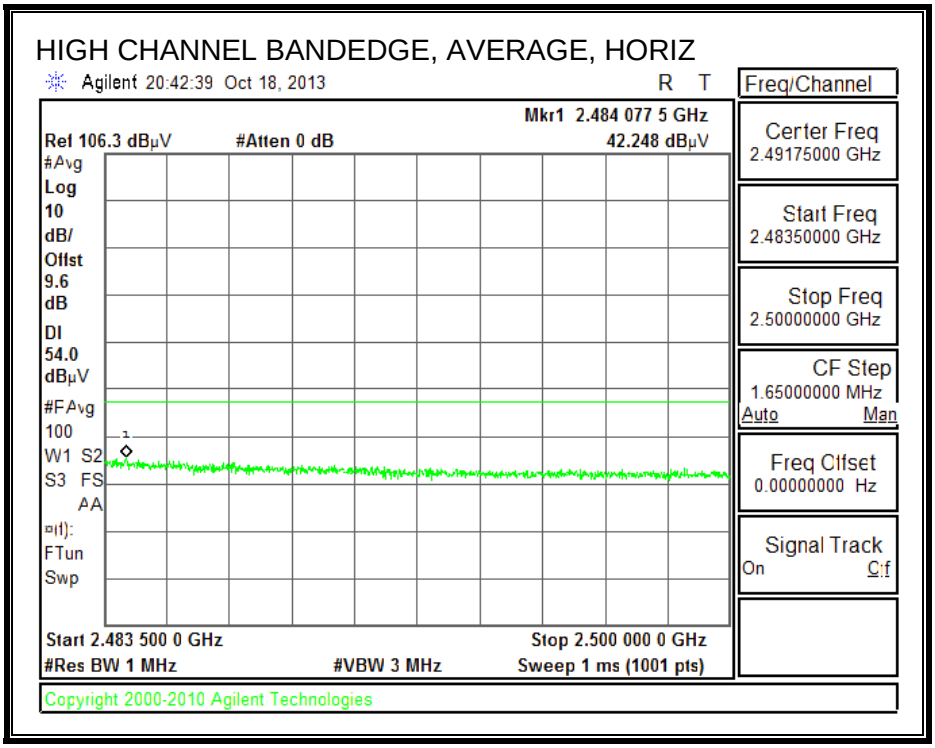





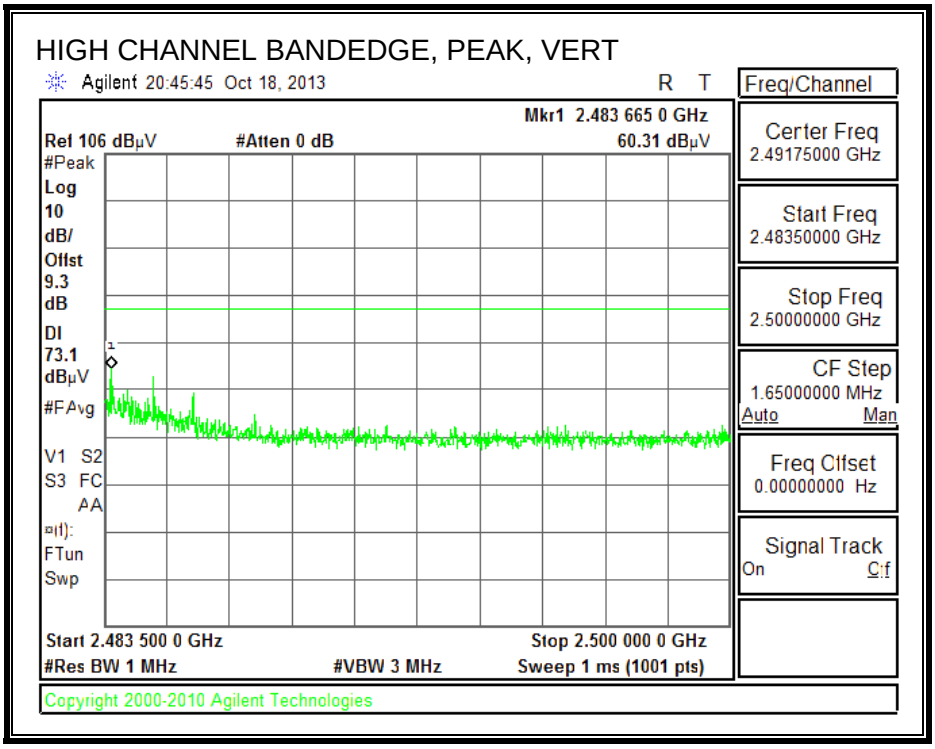



## AUTHORIZED BANDEDGE (HIGH CHANNEL)

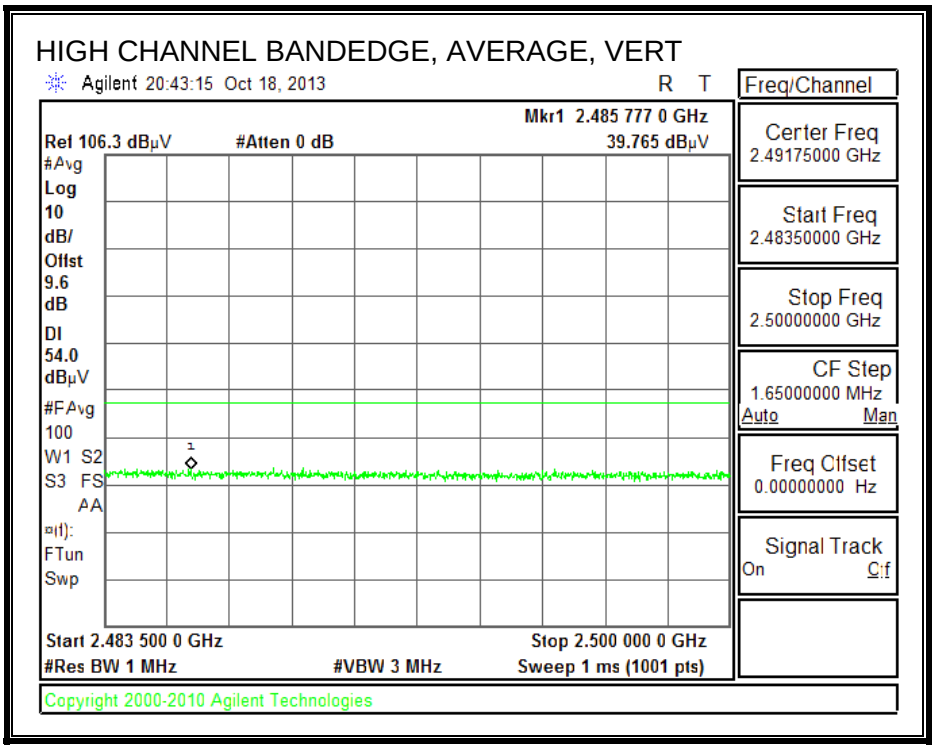


HIGH CHANNEL BANDEDGE, PEAK, VERT

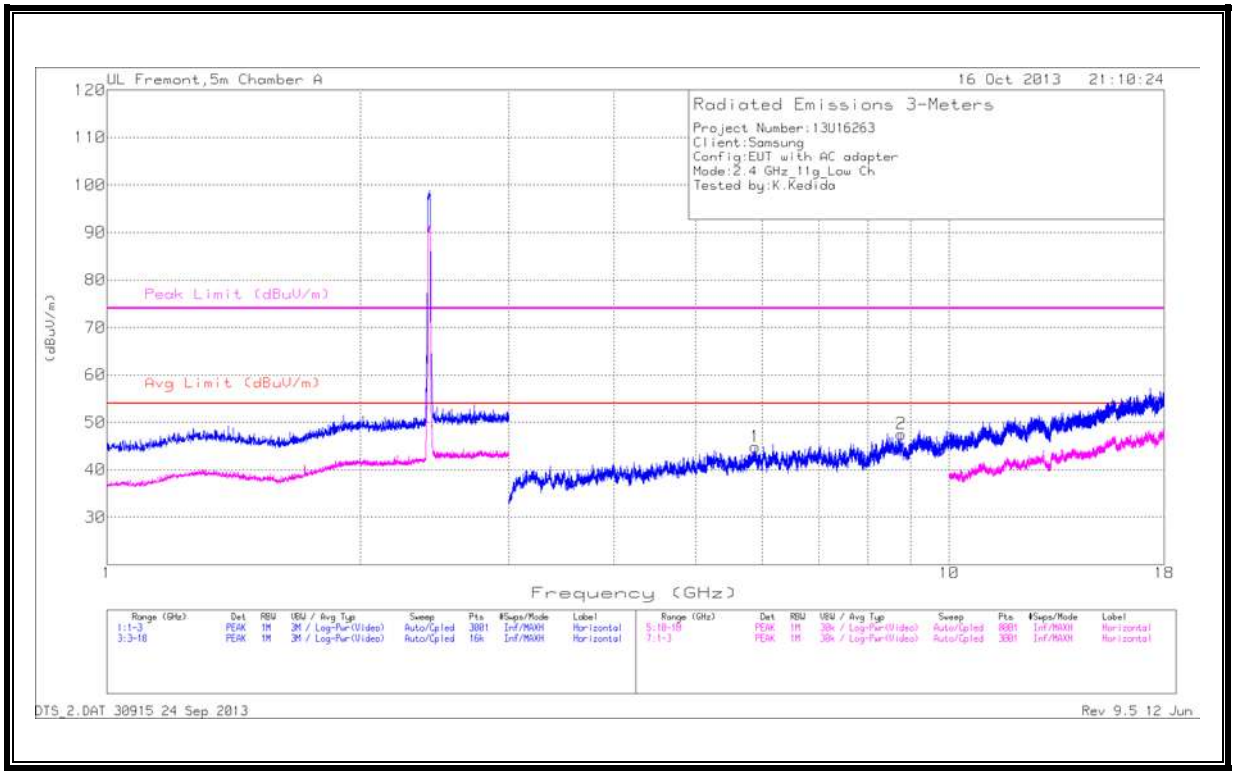



HIGH CHANNEL BANDEDGE, AVERAGE, VERT

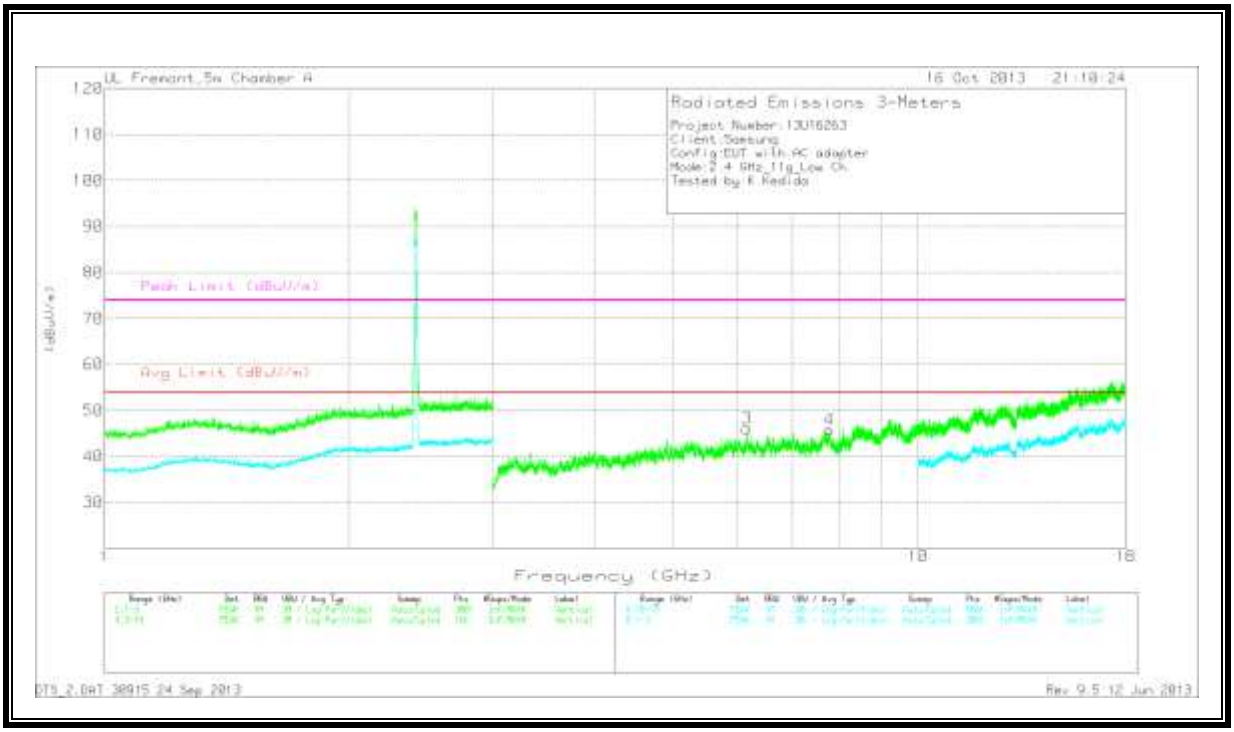


## HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



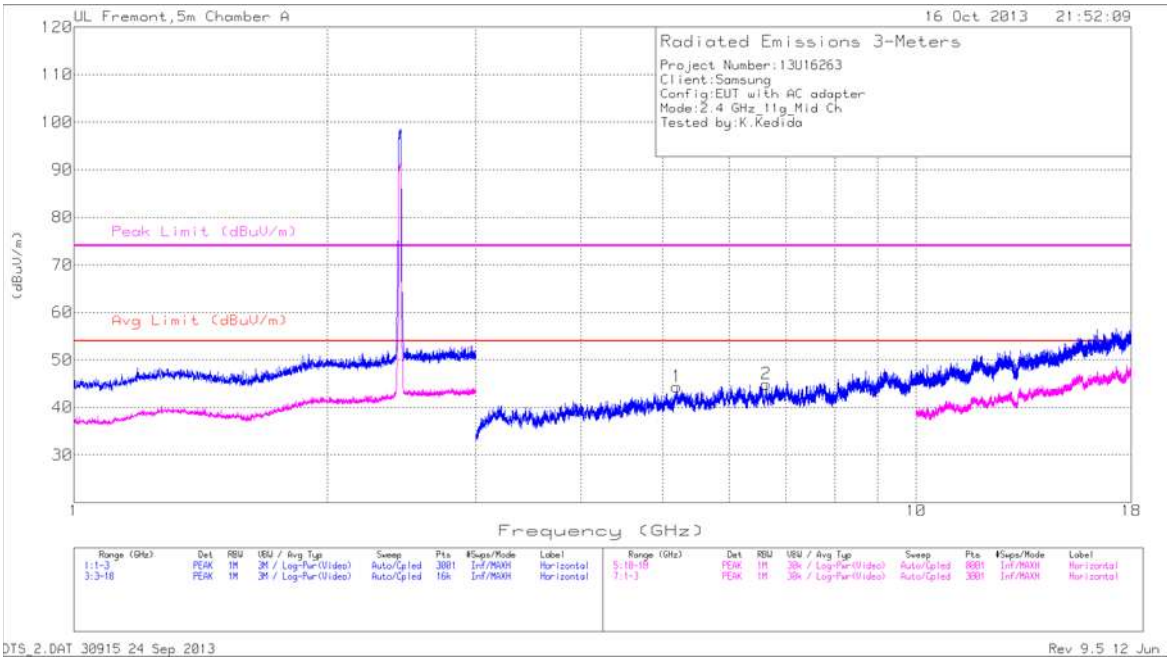
VERTICAL



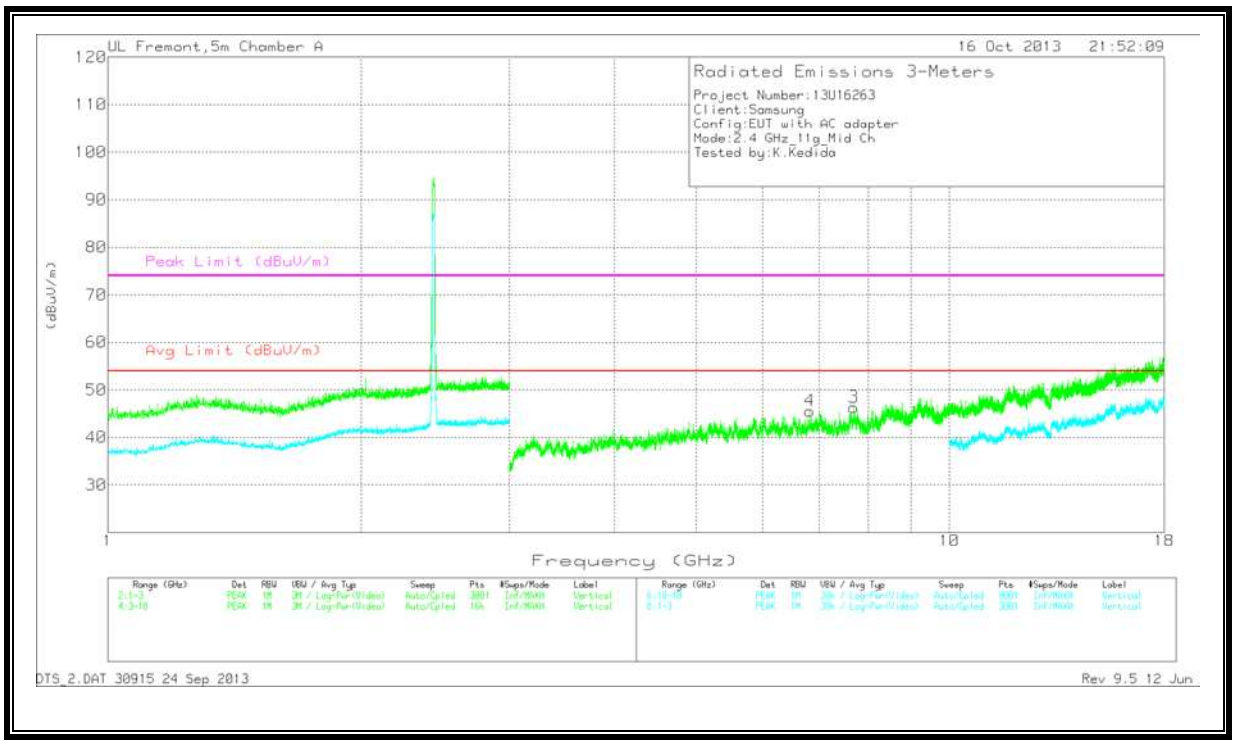
LOW CHANNEL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.886 | 36.32 | PK | 35.1 | -26.6 | 44.82 | 53.97 | -9.15 | 74 | -29.18 | 0-360 | 200 | H |
| 2 | 8.772 | 34.95 | PK | 35.8 | -23.2 | 47.55 | 53.97 | -6.42 | 74 | -26.45 | 0-360 | 100 | H |
| 3 | 6.161 | 38.54 | PK | 35.4 | -27.8 | 46.14 | 53.97 | -7.83 | 74 | -27.86 | 0-360 | 200 | V |
| 4 | 7.775 | 35.29 | PK | 35.5 | -25 | 45.79 | 53.97 | -8.18 | 74 | -28.21 | 0-360 | 100 | V |

MID CHANNEL
HORIZONTAL



VERTICAL

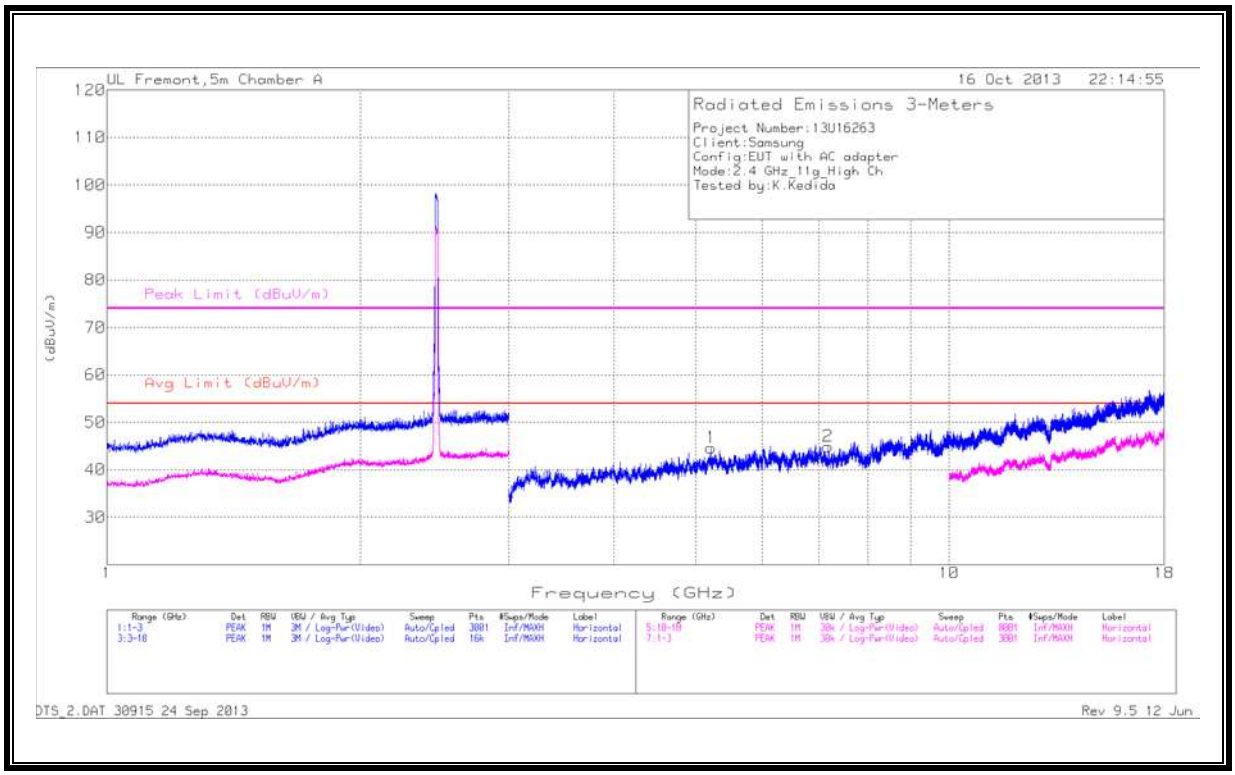


MID CHANNEL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.197 | 37.05 | PK | 34.2 | -26.9 | 44.35 | 53.97 | -9.62 | 74 | -29.65 | 0-360 | 100 | H |
| 2 | 6.64 | 35.2 | PK | 35.5 | -25.8 | 44.9 | 53.97 | -9.07 | 74 | -29.1 | 0-360 | 100 | H |
| 3 | 7.7 | 35.53 | PK | 35.5 | -24.7 | 46.33 | 53.97 | -7.64 | 74 | -27.67 | 0-360 | 200 | V |
| 4 | 6.822 | 37.18 | PK | 35.4 | -27 | 45.58 | 53.97 | -8.39 | 74 | -28.42 | 0-360 | 200 | V |

PK - Peak detector

HIGH CHANNEL
HORIZONTAL



VERTICAL

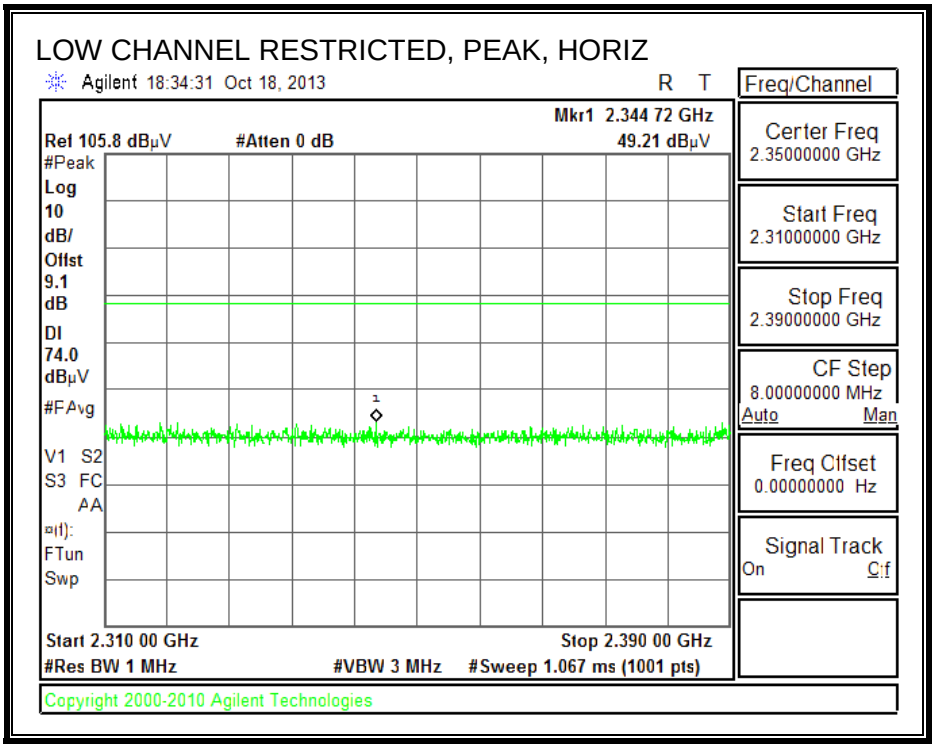
## HIGH CHANNEL DATA

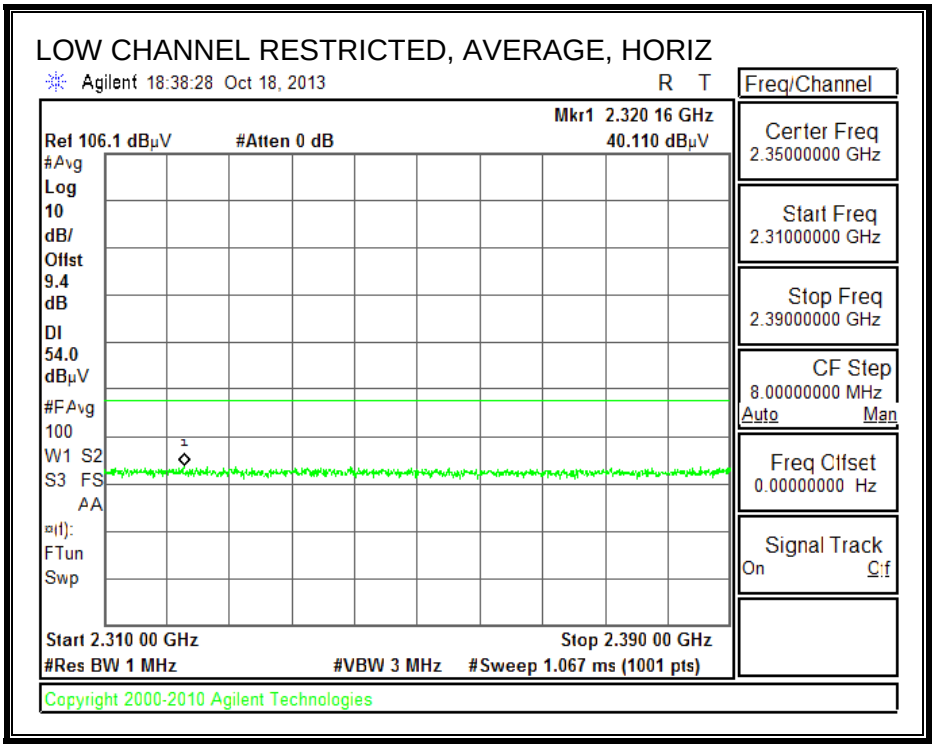
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.215 | 37.82 | PK | 34.2 | -27.4 | 44.62 | 53.97 | -9.35 | 74 | -29.38 | 0-360 | 100 | H |
| 2 | 7.18 | 36.51 | PK | 35.4 | -27 | 44.91 | 53.97 | -9.06 | 74 | -29.09 | 0-360 | 100 | H |
| 3 | 5.325 | 37.15 | PK | 34.3 | -28.4 | 43.05 | 53.97 | -10.92 | 74 | -30.95 | 0-360 | 200 | V |
| 4 | 6.522 | 37.31 | PK | 35.5 | -27.1 | 45.71 | 53.97 | -8.26 | 74 | -28.29 | 0-360 | 100 | V |

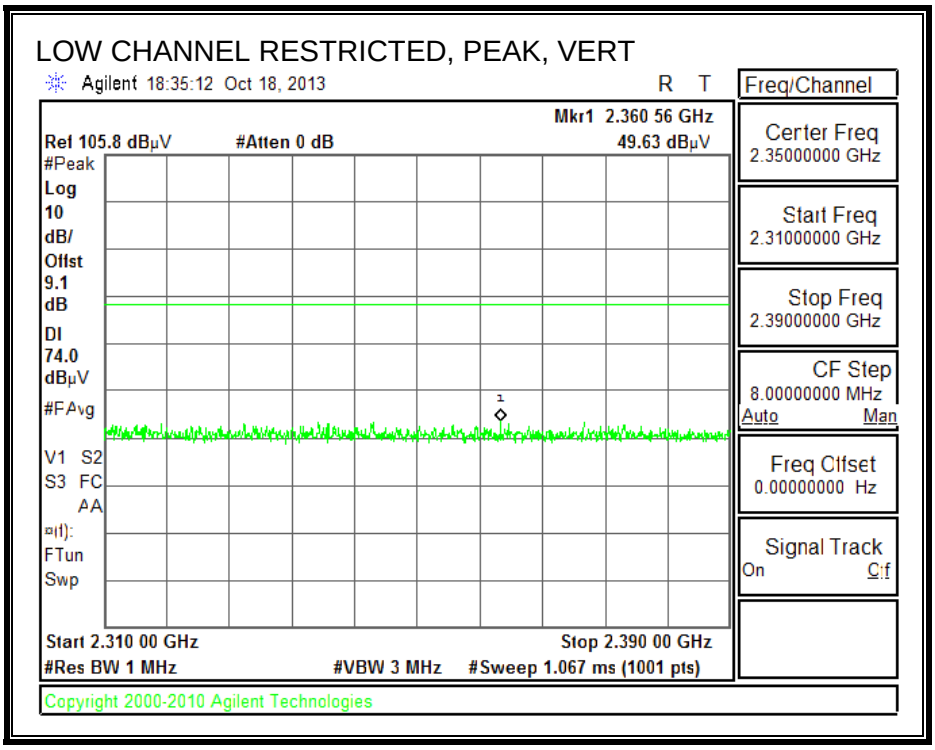
PK - Peak detector

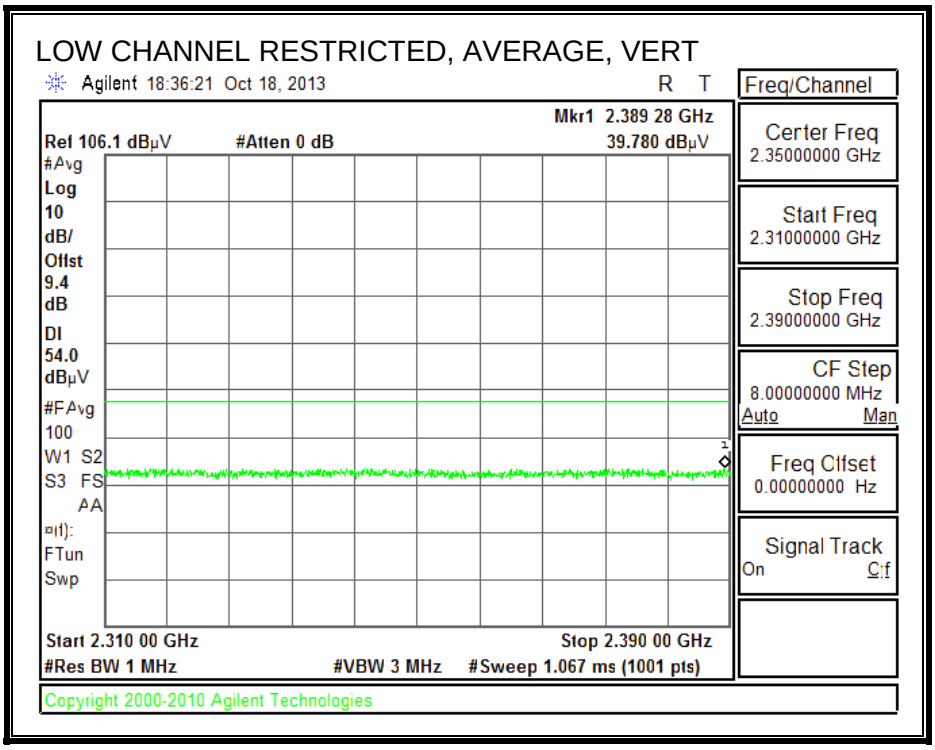
### 10.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

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

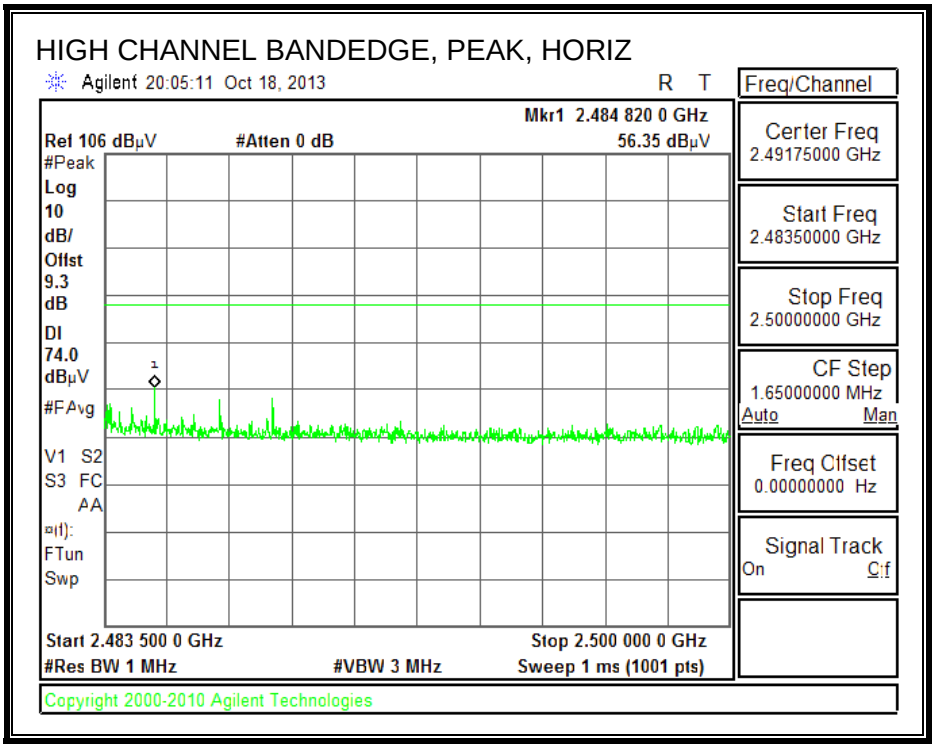


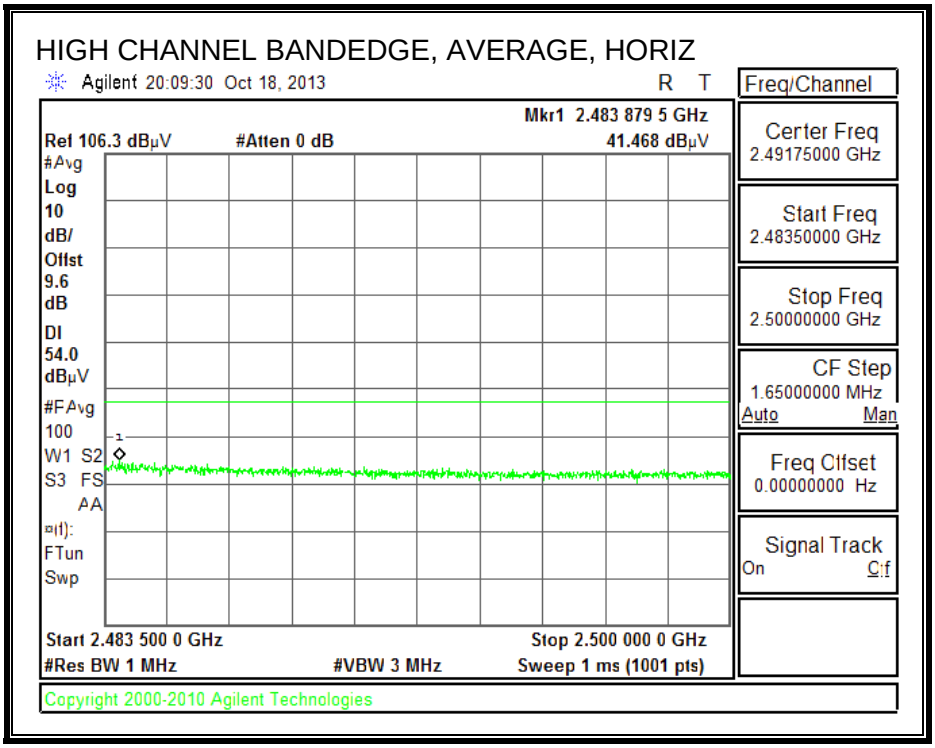





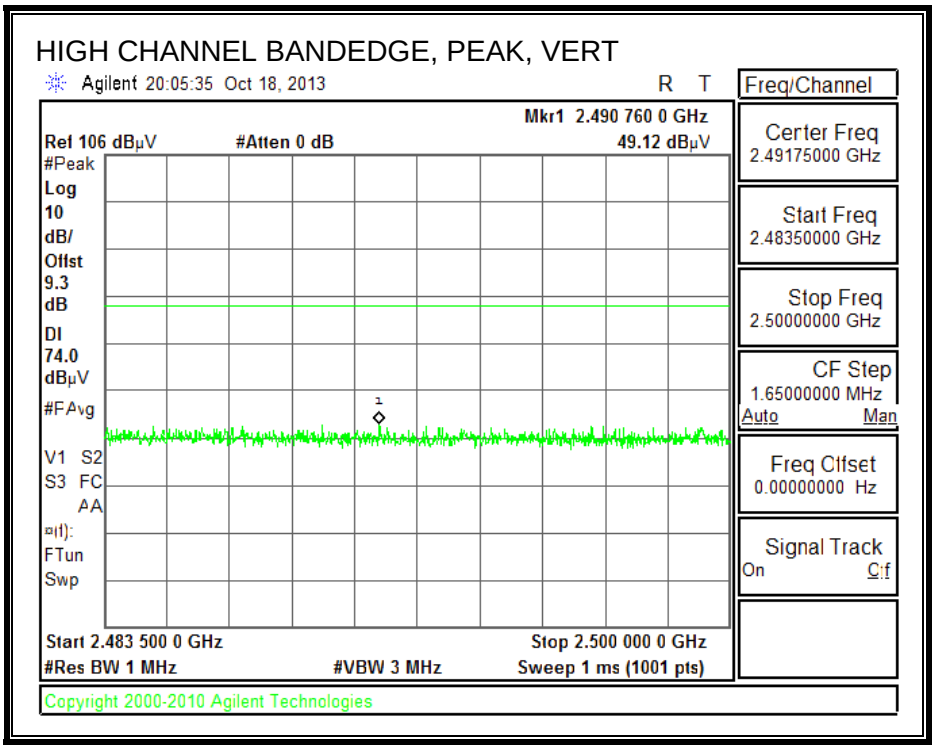



## AUTHORIZED BANDEDGE (HIGH CHANNEL)

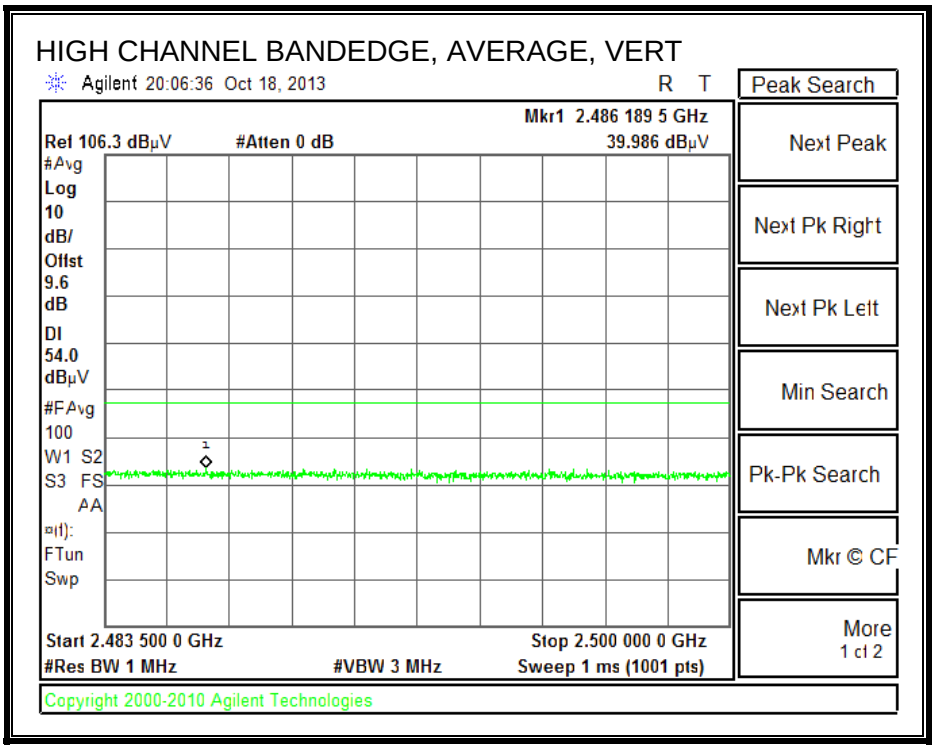


HIGH CHANNEL BANDEDGE, PEAK, VERT

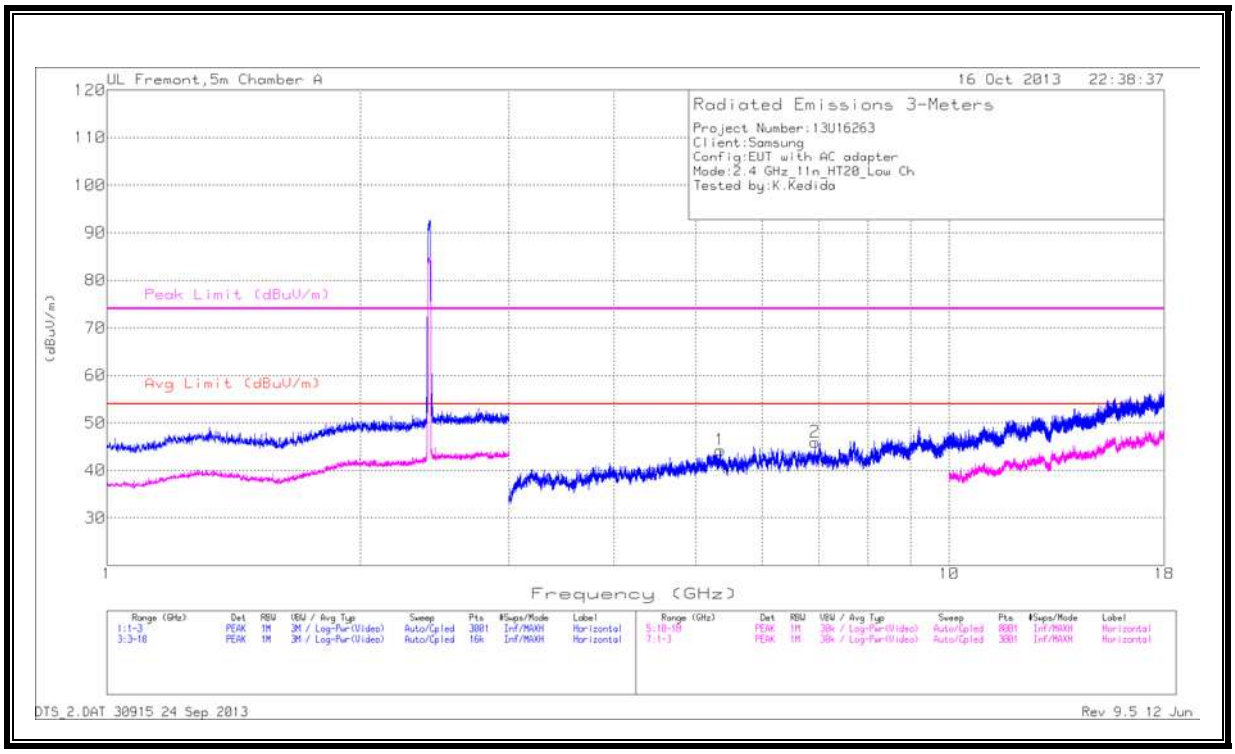



HIGH CHANNEL BANDEDGE, AVERAGE, VERT

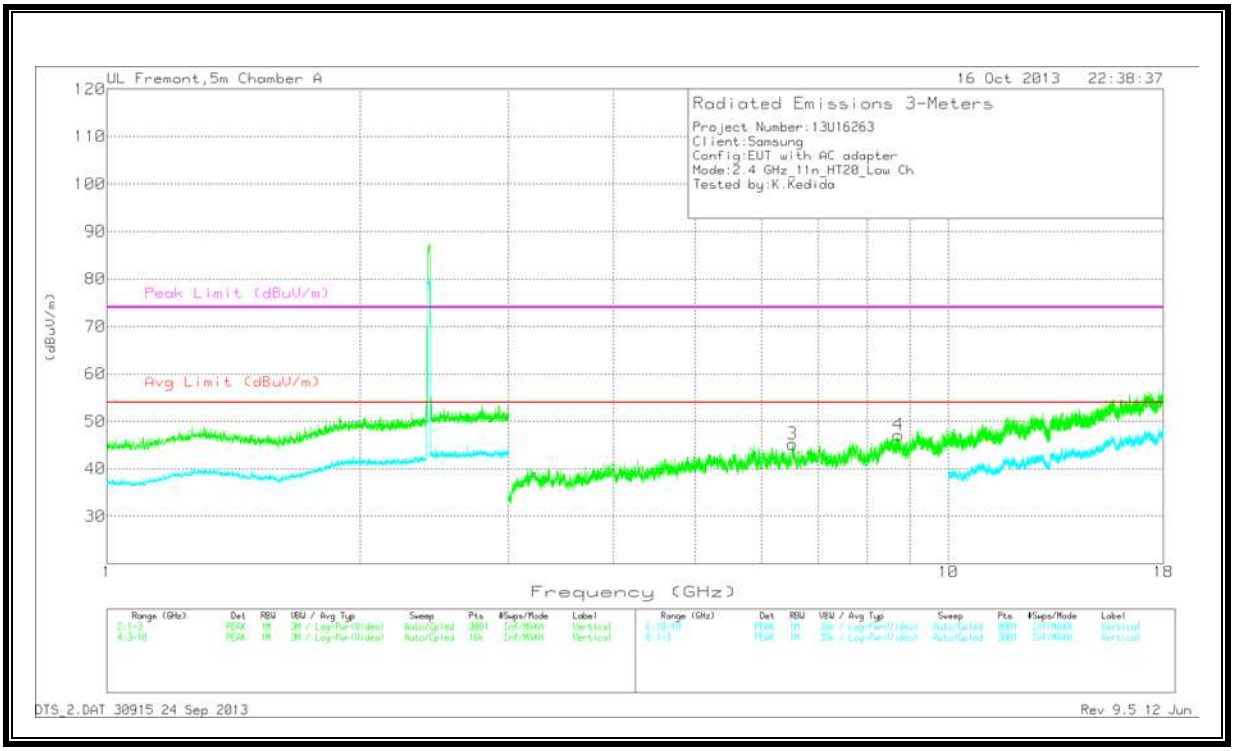


## HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



VERTICAL



LOW CHANNEL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.349 | 38.06 | PK | 34.3 | -28.1 | 44.26 | 53.97 | -9.71 | 74 | -29.74 | 0-360 | 200 | H |
| 2 | 6.931 | 37.14 | PK | 35.4 | -26.6 | 45.94 | 53.97 | -8.03 | 74 | -28.06 | 0-360 | 200 | H |
| 3 | 6.525 | 36.63 | PK | 35.5 | -26.9 | 45.23 | 53.97 | -8.74 | 74 | -28.77 | 0-360 | 100 | V |
| 4 | 8.717 | 35.62 | PK | 35.8 | -24.3 | 47.12 | 53.97 | -6.85 | 74 | -26.88 | 0-360 | 200 | V |

PK - Peak detector
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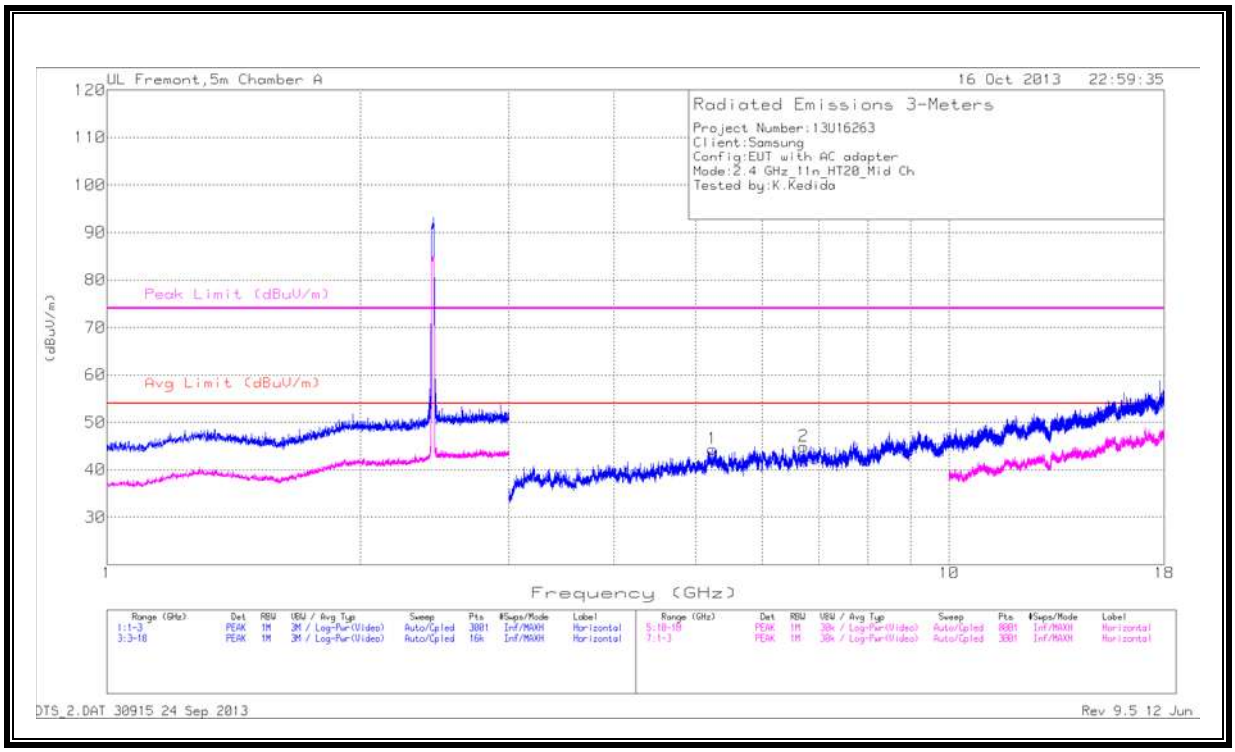
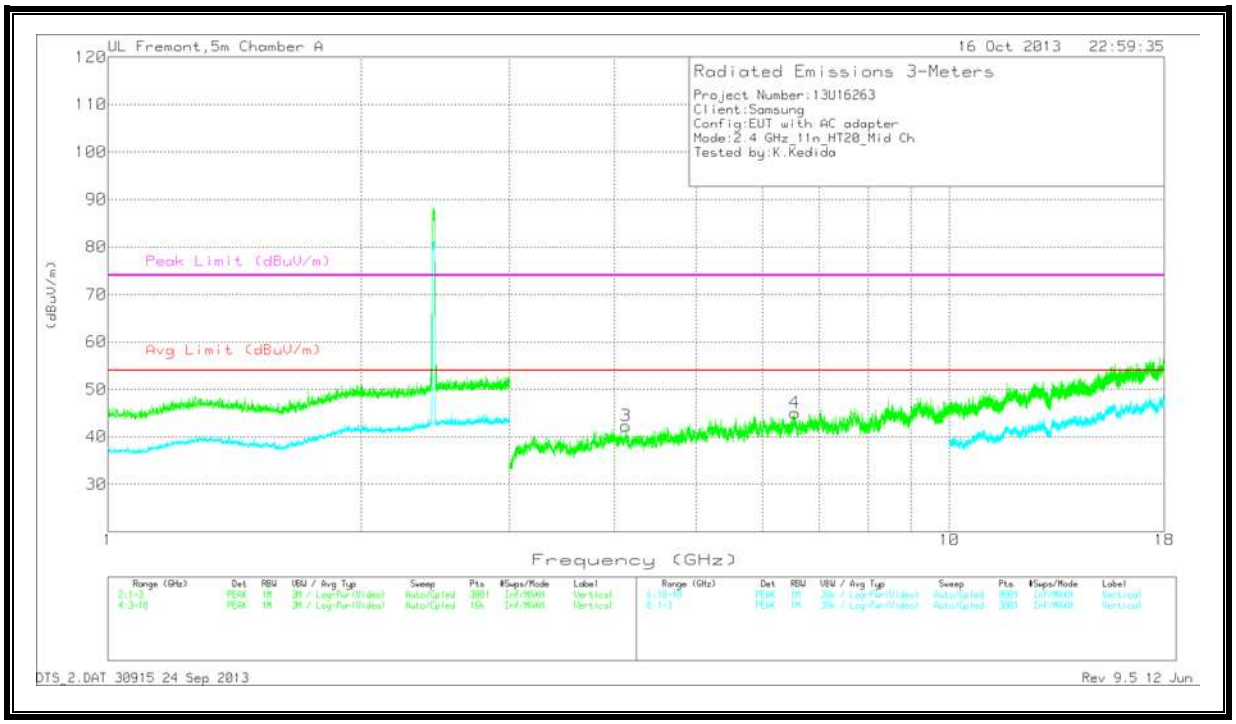
MID CHANNEL
HORIZONTAL



VERTICAL



MID CHANNEL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.238 | 37.59 | PK | 34.2 | -27.4 | 44.39 | 53.97 | -9.58 | 74 | -29.61 | 0-360 | 100 | H |
| 2 | 6.718 | 36.1 | PK | 35.4 | -26.6 | 44.9 | 53.97 | -9.07 | 74 | -29.1 | 0-360 | 100 | H |
| 3 | 4.126 | 37.68 | PK | 33.7 | -29.1 | 42.28 | 53.97 | -11.69 | 74 | -31.72 | 0-360 | 100 | V |
| 4 | 6.552 | 35.51 | PK | 35.5 | -26 | 45.01 | 53.97 | -8.96 | 74 | -28.99 | 0-360 | 100 | V |

PK - Peak detector
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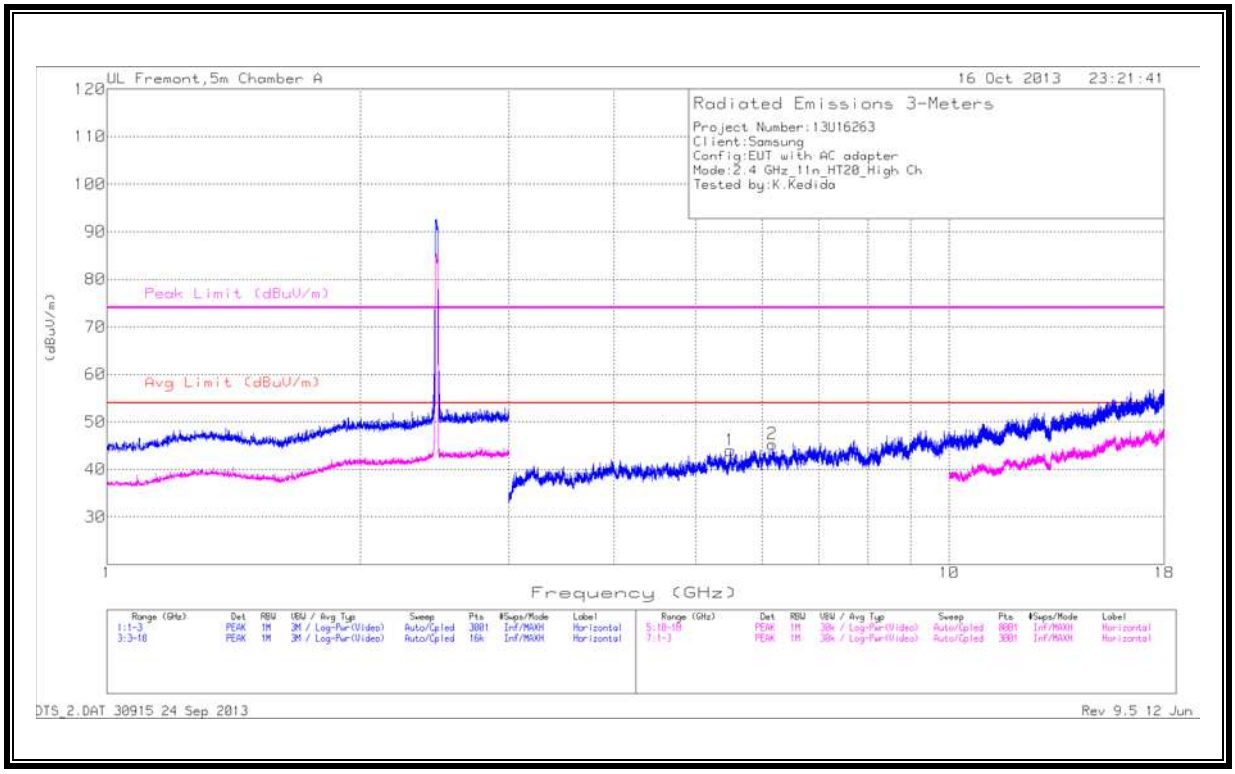
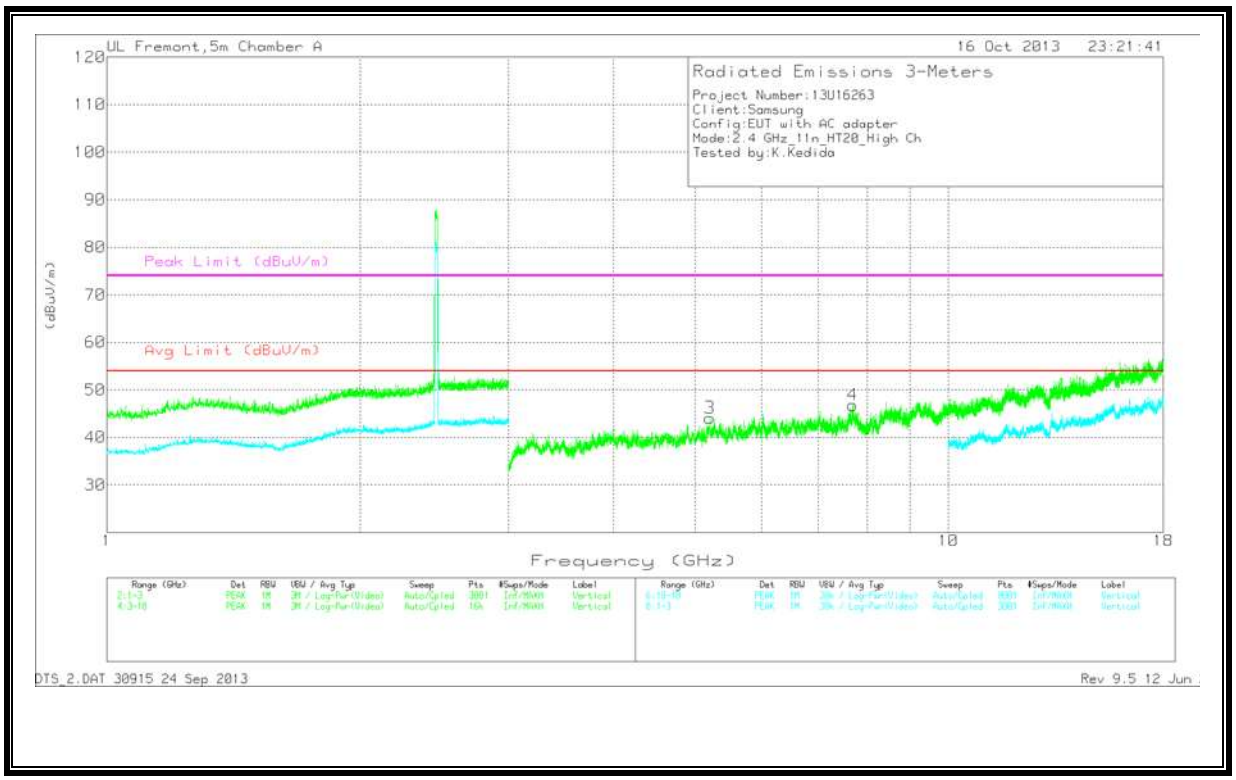
HIGH CHANNEL
HORIZONTAL



VERTICAL



## HIGH CHANNEL DATA

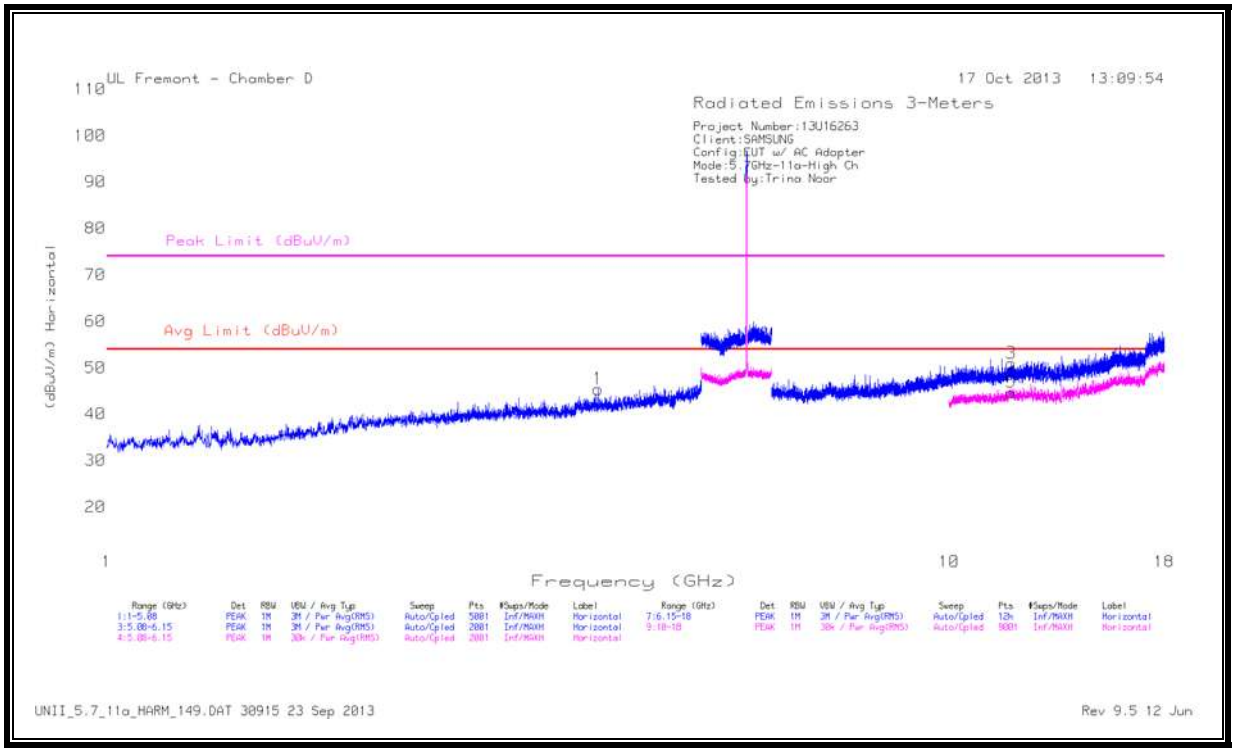
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.498 | 37.01 | PK | 34.4 | -27.4 | 44.01 | 53.97 | -9.96 | 74 | -29.99 | 0-360 | 200 | H |
| 2 | 6.169 | 37.52 | PK | 35.4 | -27.6 | 45.32 | 53.97 | -8.65 | 74 | -28.68 | 0-360 | 100 | H |
| 3 | 5.206 | 36.95 | PK | 34.2 | -27.1 | 44.05 | 53.97 | -9.92 | 74 | -29.95 | 0-360 | 200 | V |
| 4 | 7.698 | 35.98 | PK | 35.5 | -24.7 | 46.78 | 53.97 | -7.19 | 74 | -27.22 | 0-360 | 200 | V |

PK - Peak detector

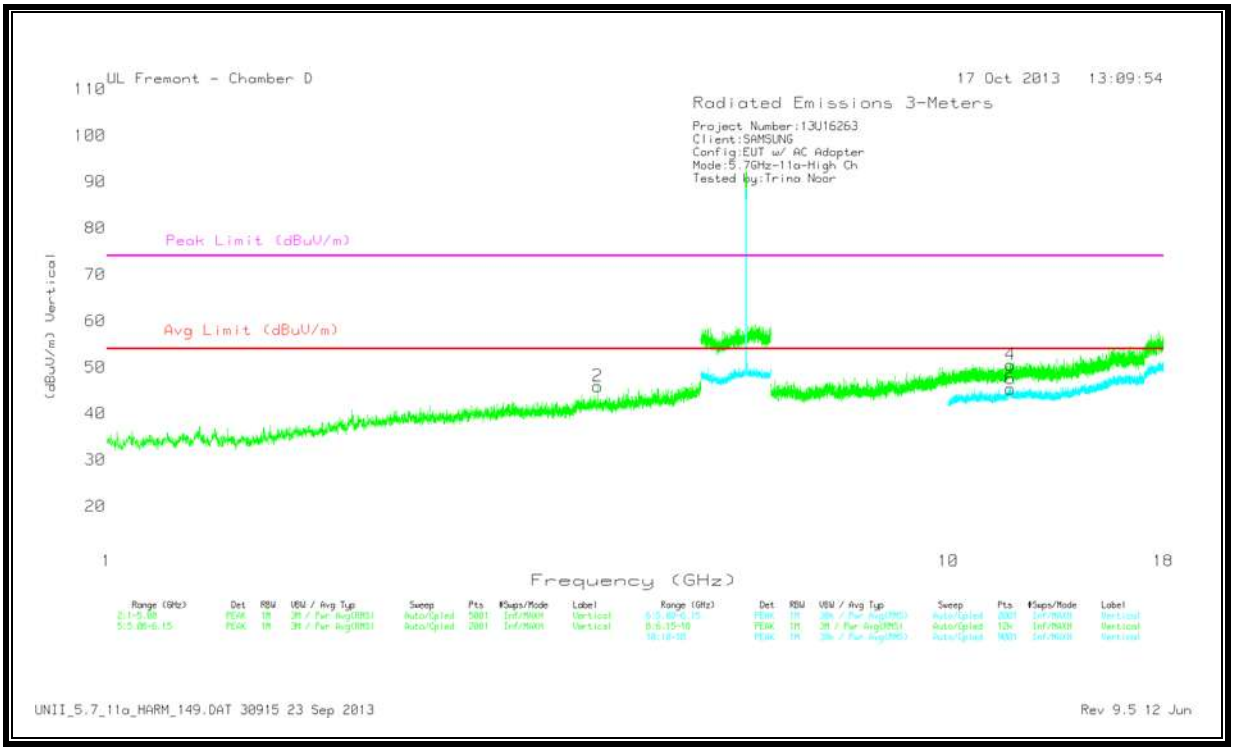
## 10.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL
HORIZONTAL



VERTICAL

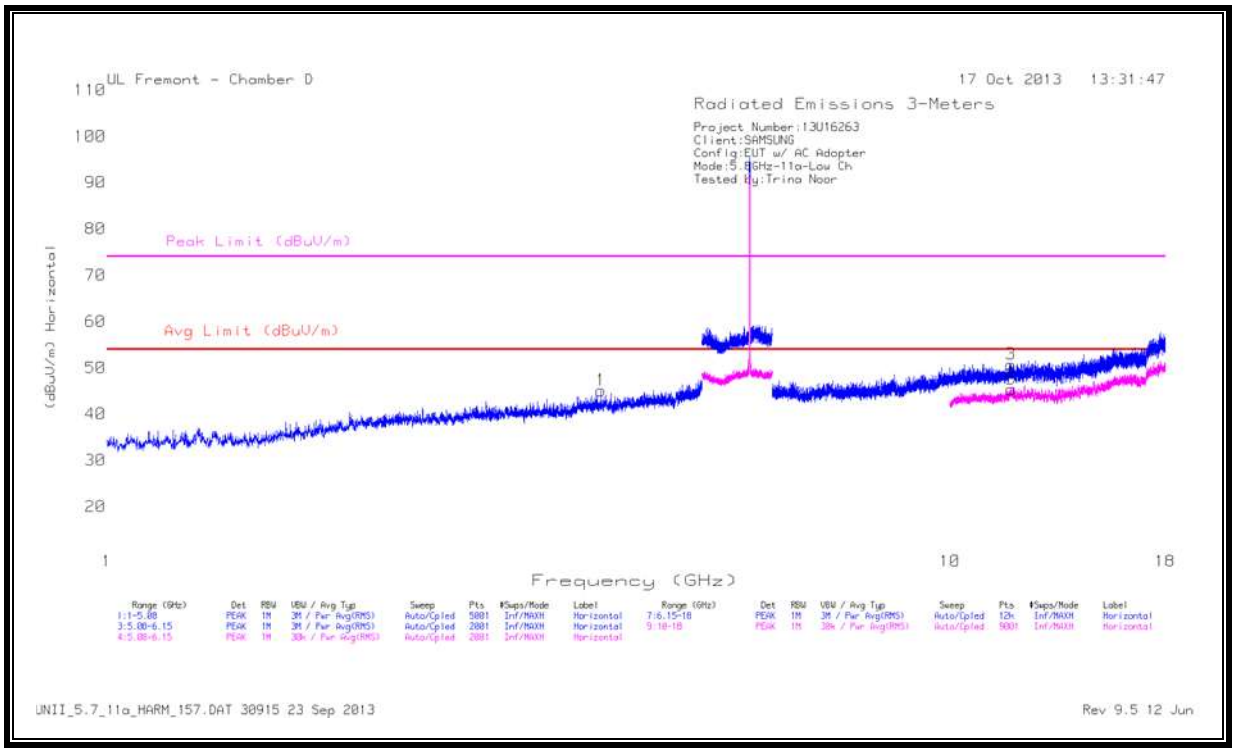


LOW CHANNEL DATA

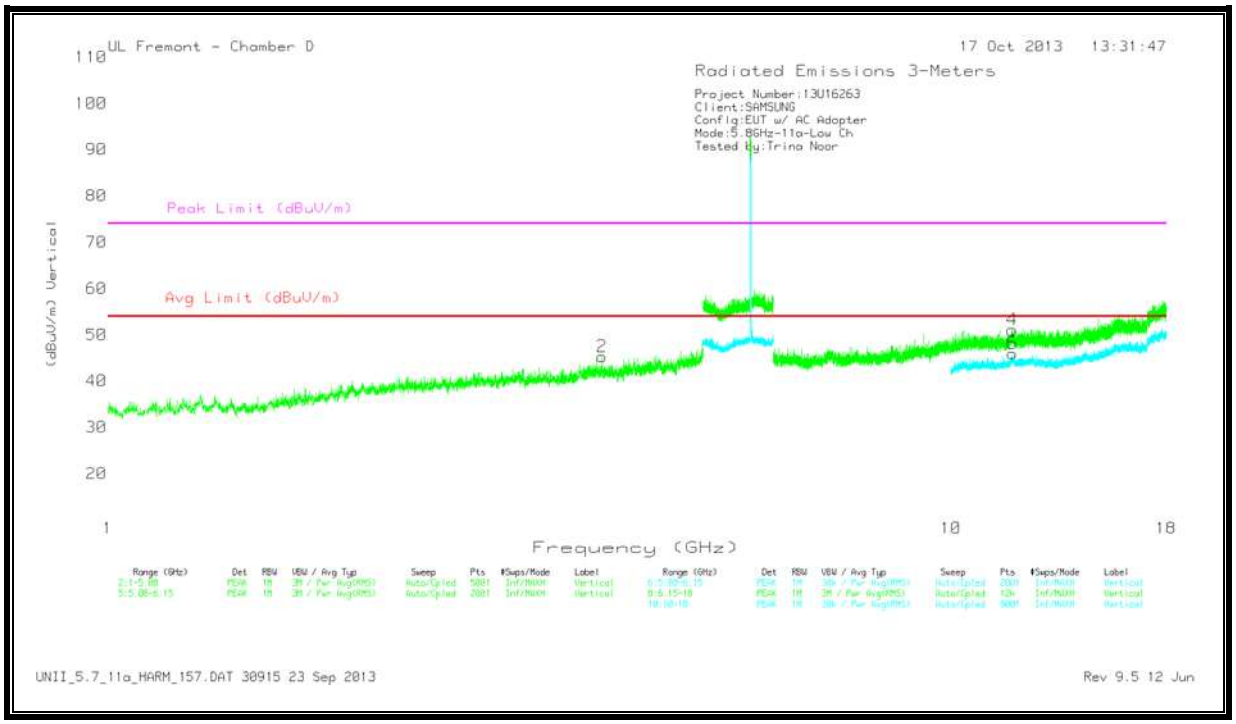
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T344 (db/m) | Amp/Cbl /Fltr/Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.831 | 40.77 | PK | 33.8 | -29.2 | 45.37 | 53.97 | -8.6 | 74 | -28.63 | 0-360 | 201 | H |
| 2 | 3.831 | 41.3 | PK | 33.8 | -29.2 | 45.9 | 53.97 | -8.07 | 74 | -28.1 | 0-360 | 201 | V |
| 3 | 11.852 | 33.6 | PK | 39 | -21.7 | 50.9 | 53.97 | -3.07 | 74 | -23.1 | 0-360 | 100 | H |
| 4 | 11.854 | 33.32 | PK | 39 | -21.8 | 50.52 | 53.97 | -3.45 | 74 | -23.48 | 0-360 | 100 | V |
| 5 | 11.846 | 27.12 | PK | 39 | -21.5 | 44.62 | 53.97 | -9.35 | 74 | -29.38 | 0-360 | 200 | H |
| 6 | 11.852 | 28.03 | PK | 39 | -21.7 | 45.33 | 53.97 | -8.64 | 74 | -28.67 | 0-360 | 100 | V |

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

MID CHANNEL
HORIZONTAL



VERTICAL

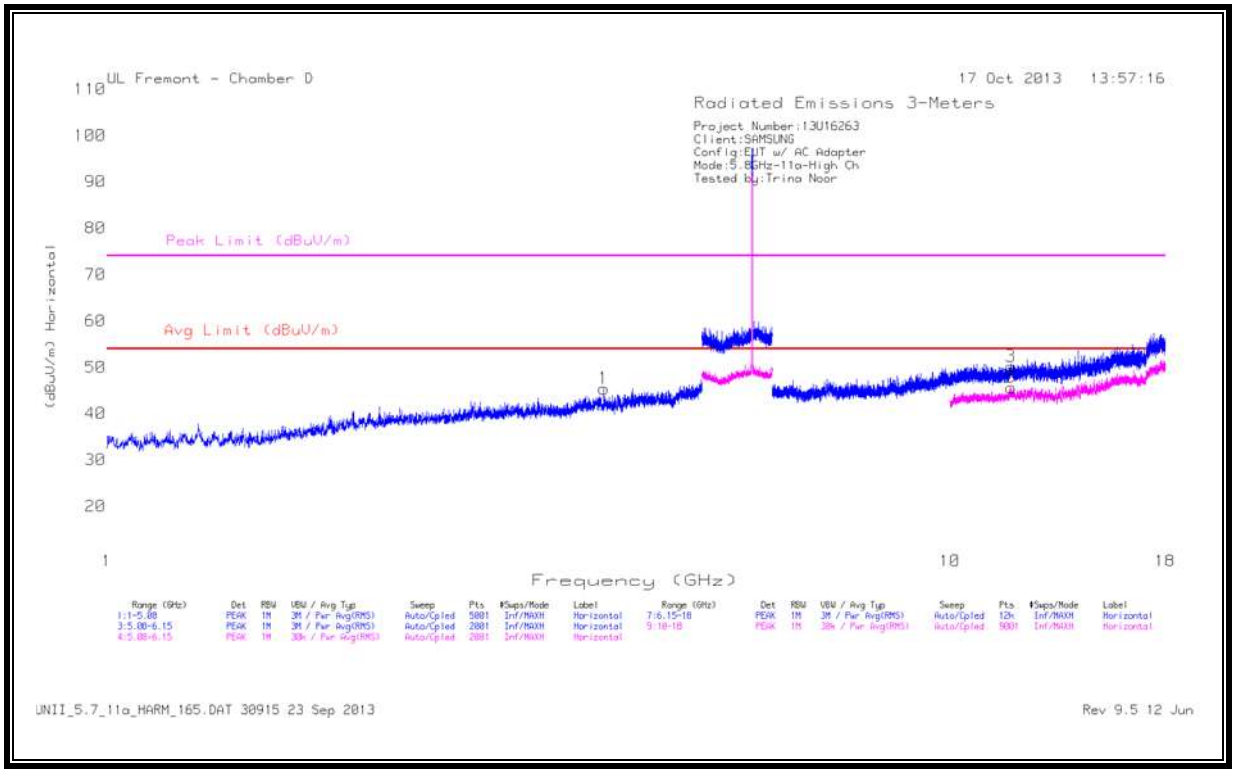


MID CHANNEL DATA

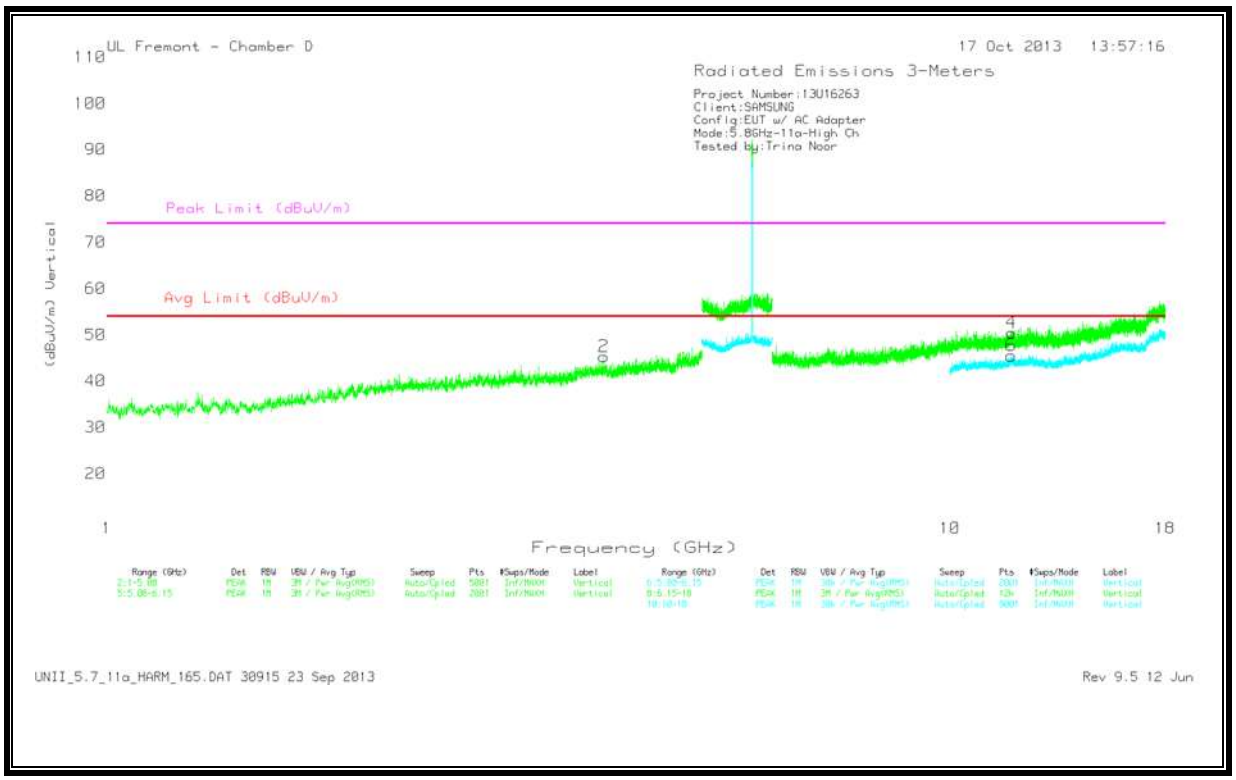
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T344 (db/m) | Amp/Cbl /Fltr/Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.858 | 40.39 | PK | 33.8 | -29.1 | 45.09 | 53.97 | -8.88 | 74 | -28.91 | 0-360 | 100 | H |
| 2 | 3.858 | 40.55 | PK | 33.8 | -29.1 | 45.25 | 53.97 | -8.72 | 74 | -28.75 | 0-360 | 100 | V |
| 3 | 11.813 | 33.22 | PK | 39 | -21.5 | 50.72 | 53.97 | -3.25 | 74 | -23.28 | 0-360 | 201 | H |
| 5 | 11.822 | 27.53 | PK | 39 | -21.2 | 45.33 | 53.97 | -8.64 | 74 | -28.67 | 0-360 | 100 | H |
| 6 | 11.828 | 28.05 | PK | 39 | -21.1 | 45.95 | 53.97 | -8.02 | 74 | -28.05 | 0-360 | 201 | V |

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

HIGH CHANNEL
HORIZONTAL



VERTICAL



## HIGH CHANNEL DATA

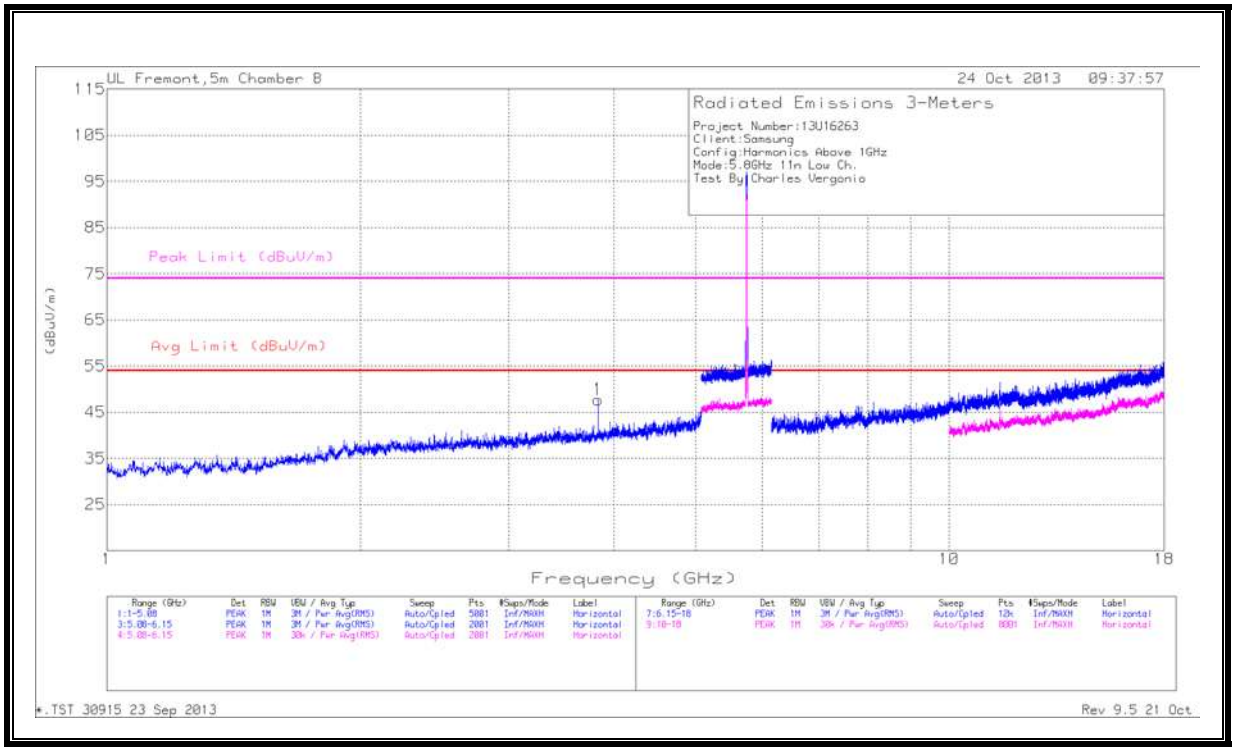
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T344 (db/m) | Amp/Cbl /Fltr/Pad | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.885 | 40.67 | PK | 33.8 | -29.1 | 45.37 | 53.97 | -8.6 | 74 | -28.63 | 0-360 | 100 | H |
| 2 | 3.885 | 40.58 | PK | 33.8 | -29.1 | 45.28 | 53.97 | -8.69 | 74 | -28.72 | 0-360 | 100 | V |
| 3 | 11.815 | 32.56 | PK | 39 | -21.4 | 50.16 | 53.97 | -3.81 | 74 | -23.84 | 0-360 | 201 | H |
| 4 | 11.827 | 32.52 | PK | 39 | -21.1 | 50.42 | 53.97 | -3.55 | 74 | -23.58 | 0-360 | 100 | V |
| 5 | 11.825 | 27.7 | PK | 39 | -21.1 | 45.6 | 53.97 | -8.37 | 74 | -28.4 | 0-360 | 201 | H |
| 6 | 11.825 | 27.6 | PK | 39 | -21.1 | 45.5 | 53.97 | -8.47 | 74 | -28.5 | 0-360 | 201 | V |

PK - Peak detector

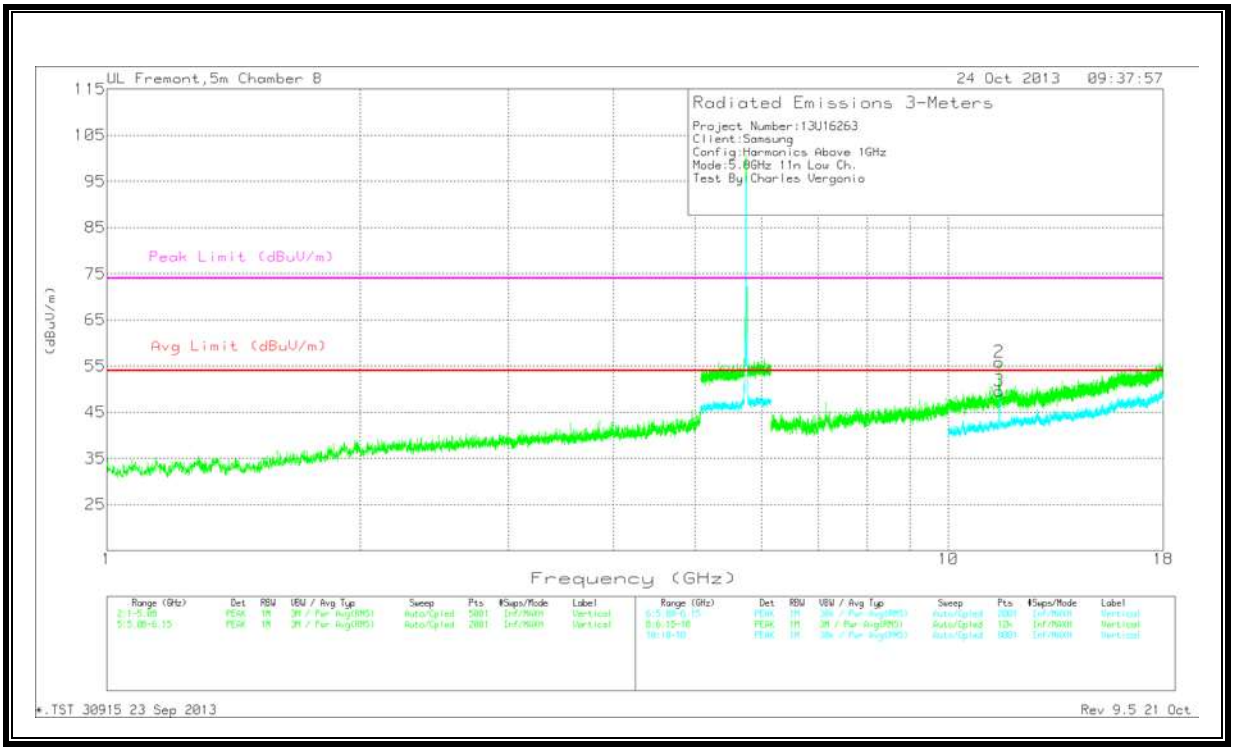
### 10.2.1. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL
HORIZONTAL



VERTICAL



LOW CHANNEL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T345 (dB/m) | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.83 | 45.46 | PK | 33.8 | -31.6 | 47.66 | 53.97 | -6.31 | 74 | -26.34 | 0-360 | 100 | H |
| 2 | 11.487 | 40.03 | PK | 38.7 | -22.9 | 55.83 | 53.97 | 1.86 | 74 | -18.17 | 0-360 | 100 | V |
| 3 | 11.49 | 33.81 | Avg | 38.7 | -22.9 | 49.61 | 53.97 | -4.33 | 74 | -24.39 | 0-360 | 100 | V |

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

Avg - Video bandwidth < Resolution bandwidth

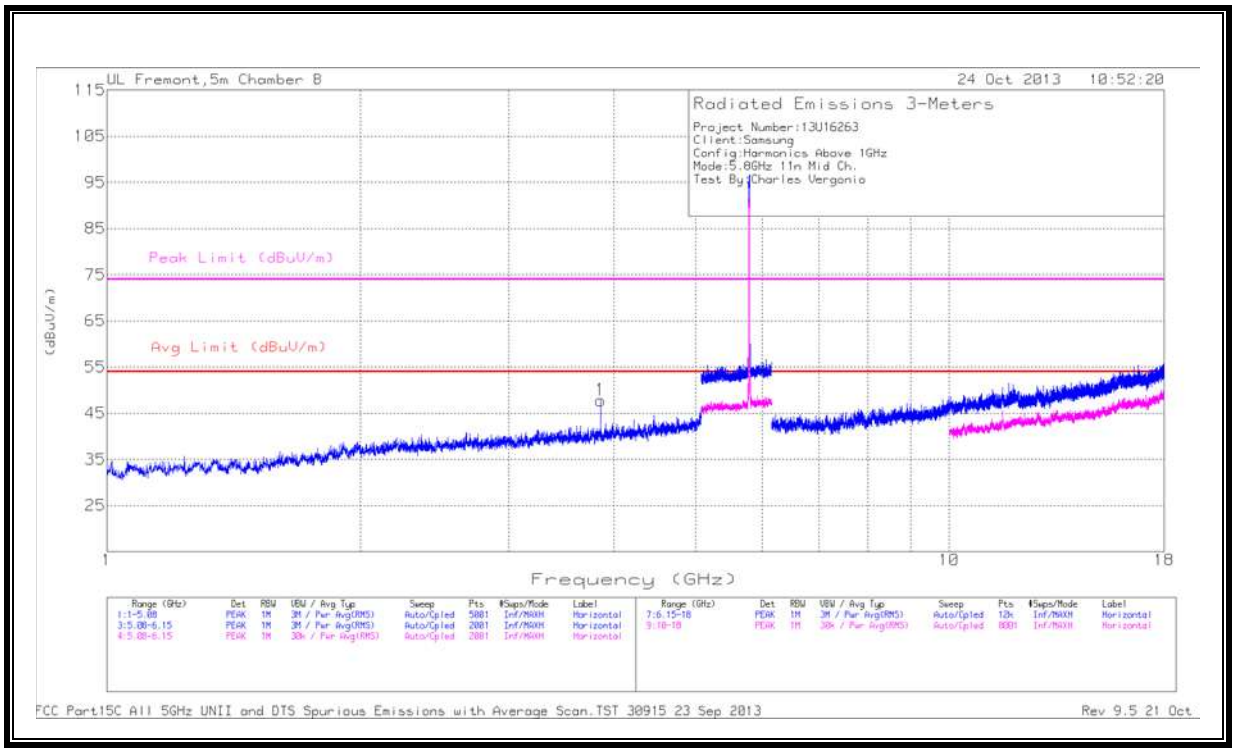
**Radiated Emissions**

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T345 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11.491 | 29.73 | MAv1 | 38.7 | -22.9 | 45.53 | 53.97 | -8.44 | 74 | -28.47 | 229 | 111 | V |
| 11.491 | 29.4 | AD1 | 38.7 | -22.9 | 45.2 | 53.97 | -8.77 | 74 | -28.8 | 229 | 111 | V |

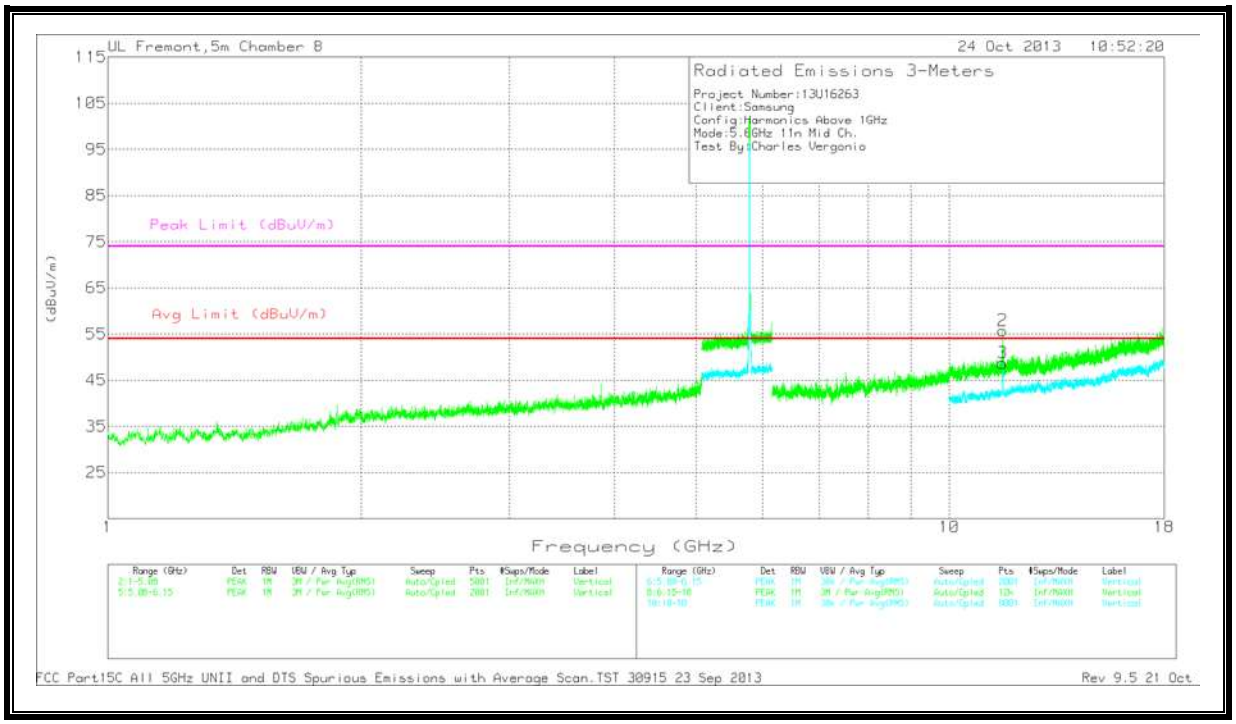
AD1 - KDB 789033 Method: AD Primary Power Average

MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL
HORIZONTAL



VERTICAL



MID CHANNEL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T345 (dB/m) | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.857 | 45.78 | PK | 33.8 | -31.8 | 47.78 | 53.97 | -6.19 | 74 | -26.22 | 0-360 | 100 | H |
| 2 | 11.571 | 39.49 | PK | 38.8 | -22.6 | 55.69 | 53.97 | 1.72 | 74 | -18.31 | 0-360 | 100 | V |
| 3 | 11.567 | 32.4 | Avg | 38.8 | -22.5 | 48.7 | 53.97 | -5.27 | 74 | -25.3 | 0-360 | 100 | V |

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

PK - Peak detector
Avg - Video bandwidth < Resolution bandwidth

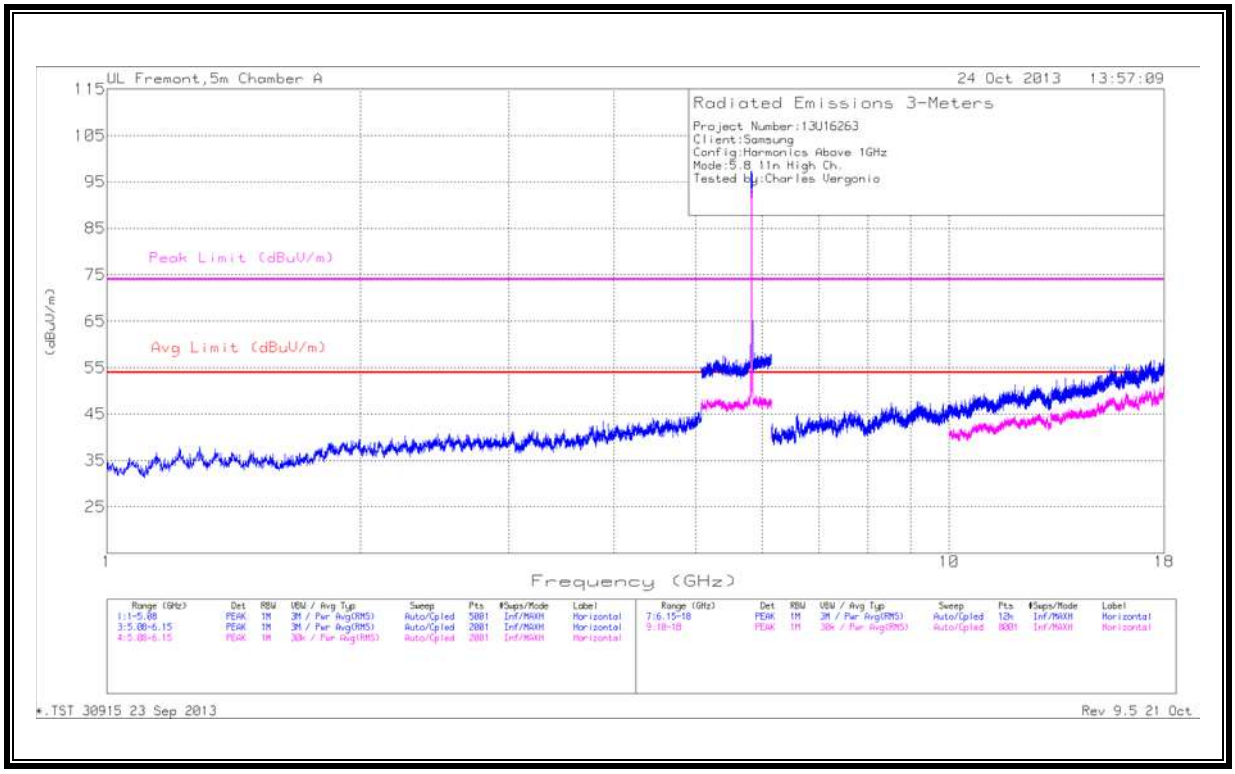
**Radiated Emissions**

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T345 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11.57 | 29.02 | AD1 | 38.8 | -22.6 | 45.22 | 53.97 | -8.75 | 74 | -28.78 | 206 | 112 | V |
| 11.57 | 29.29 | MAv1 | 38.8 | -22.6 | 45.49 | 53.97 | -8.48 | 74 | -28.51 | 206 | 112 | V |

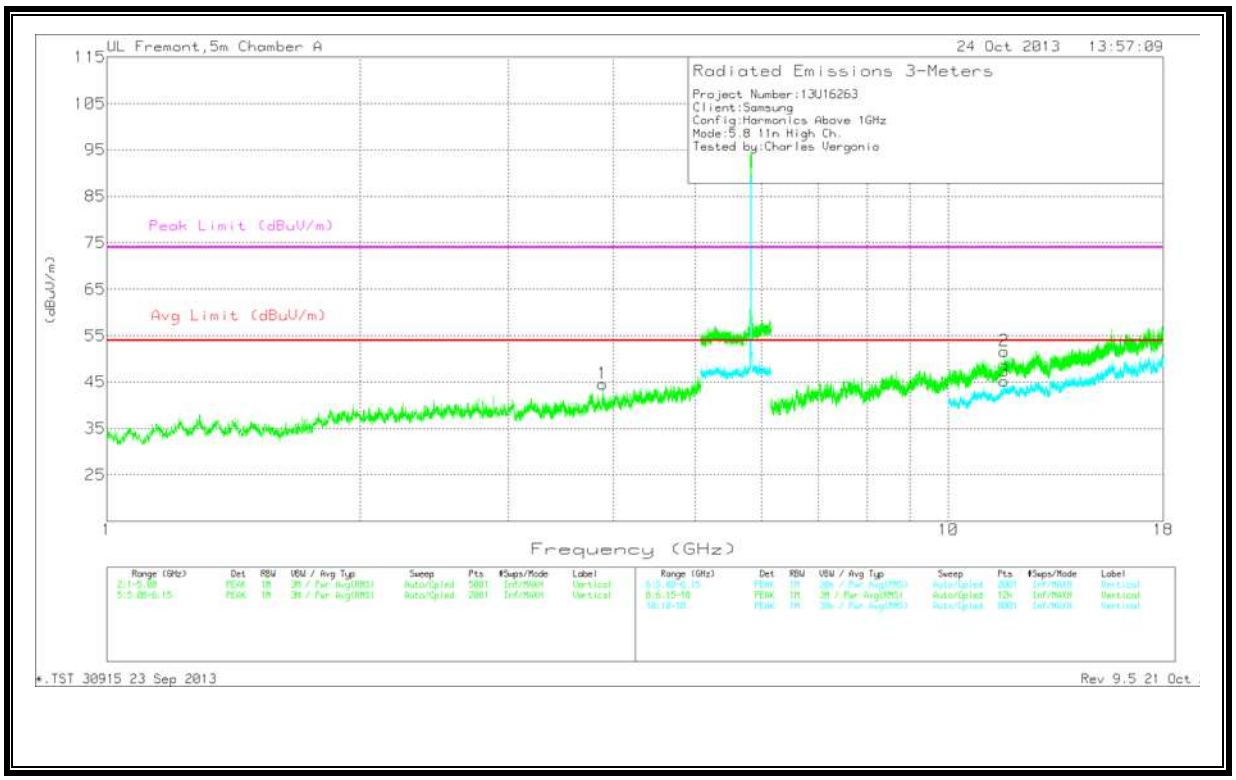
AD1 - KDB 789033 Method: AD Primary Power Average

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL
HORIZONTAL



VERTICAL



## HIGH CHANNEL DATA

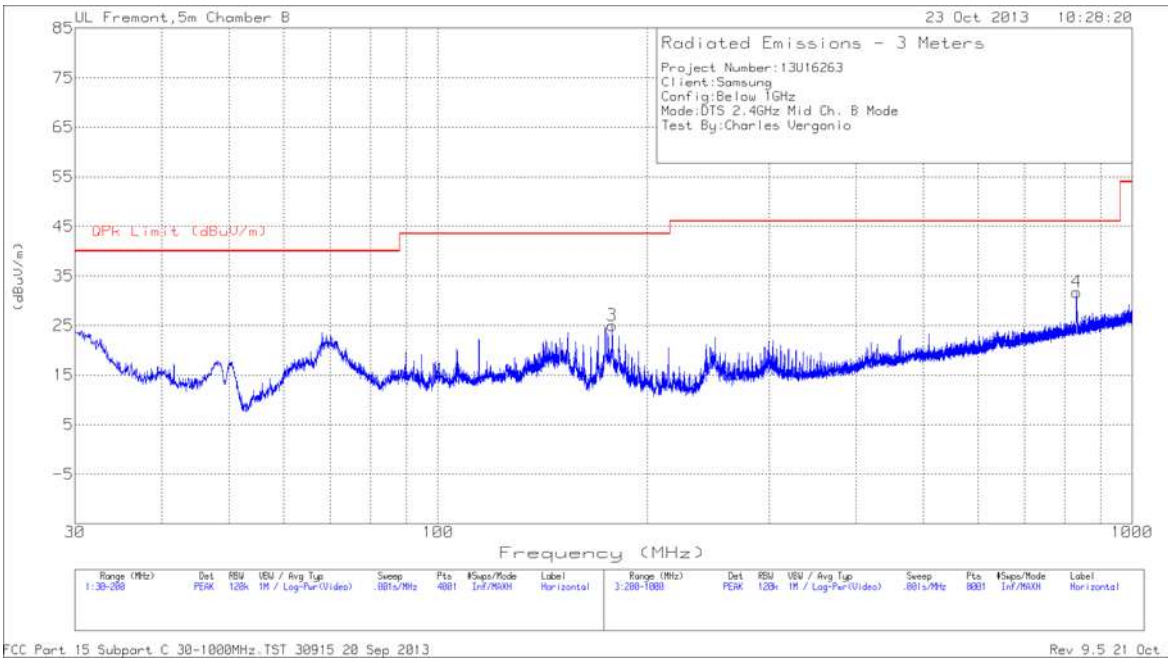
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl /Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.884 | 41.33 | PK | 33.7 | -30.4 | 44.63 | 53.97 | -9.34 | 74 | -29.37 | 0-360 | 100 | V |
| 2 | 11.65 | 35.07 | PK | 38.4 | -21.8 | 51.67 | 53.97 | -2.3 | 74 | -22.33 | 0-360 | 100 | V |
| 3 | 11.649 | 28.53 | Avg | 38.4 | -21.7 | 45.23 | 53.97 | -8.74 | 74 | -28.77 | 0-360 | 100 | V |

PK - Peak detector

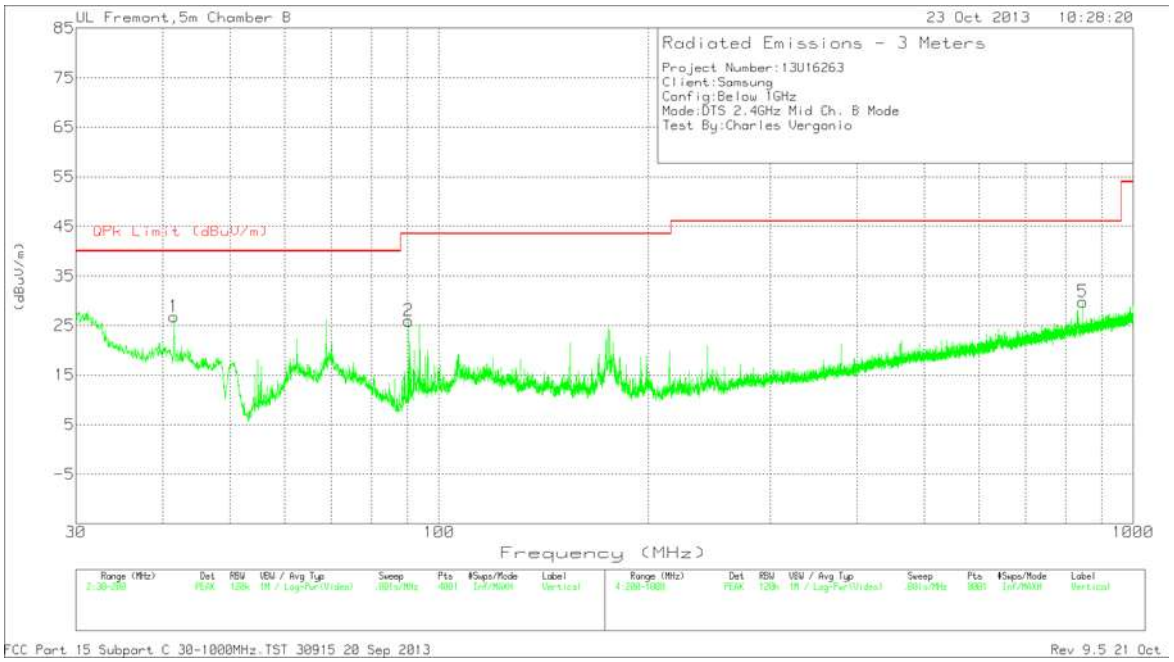
## 10.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



HORIZONTAL PLOT




**Below 1G Data**

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF T243 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 178.155 | 41.18 | PK | 11 | -27.2 | 24.98 | 43.52 | -18.54 | 0-360 | 100 | H |
| 1 | 41.5175 | 43.16 | PK | 12.3 | -28.7 | 26.76 | 40 | -13.24 | 0-360 | 100 | V |
| 2 | 90.3925 | 46.46 | PK | 7.6 | -28.1 | 25.96 | 43.52 | -17.56 | 0-360 | 100 | V |
| 4 | 832.6 | 33.75 | PK | 21.7 | -23.7 | 31.75 | 46.02 | -14.27 | 0-360 | 200 | H |
| 5 | 845.8 | 31.67 | PK | 21.7 | -23.6 | 29.77 | 46.02 | -16.25 | 0-360 | 200 | V |

# 11. AC POWER LINE CONDUCTED EMISSIONS

**LIMITS**

FCC §15.207 (a)

RSS-Gen 7.2.2

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

* Decreases with the logarithm of the frequency.

**TEST PROCEDURE**

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

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

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

**RESULTS**

**6 WORST EMISSIONS**

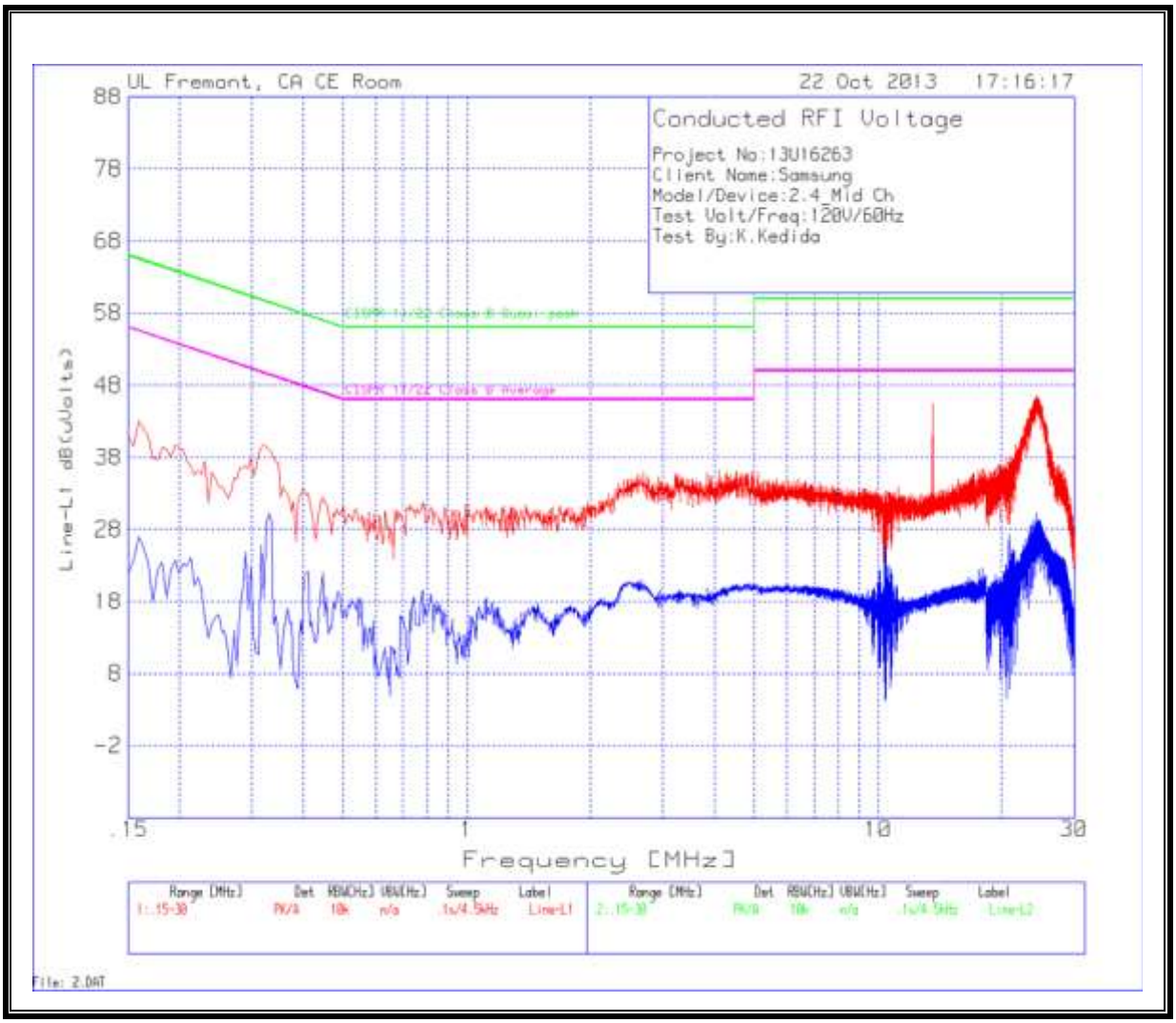
## Line-L1 .15 - 30MHz

| 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 | .321 | 39.63 | PK | .1 | 0 | 39.73 | 59.7 | -19.97 | - | - |
| 2 | .321 | 18.37 | Av | .1 | 0 | 18.47 | - | - | 49.7 | -31.23 |
| 3 | .402 | 33.54 | PK | .1 | 0 | 33.64 | 57.8 | -24.16 | - | - |
| 4 | .402 | 21.32 | Av | .1 | 0 | 21.42 | - | - | 47.8 | -26.38 |
| 5 | 2.598 | 35.48 | PK | .1 | .1 | 35.68 | 56 | -20.32 | - | - |
| 6 | 2.598 | 20.45 | Av | .1 | .1 | 20.65 | - | - | 46 | -25.35 |
| 7 | 4.6275 | 35.45 | PK | .1 | .1 | 35.65 | 56 | -20.35 | - | - |
| 8 | 4.6275 | 19.55 | Av | .1 | .1 | 19.75 | - | - | 46 | -26.25 |
| 9 | 24.153 | 45.54 | PK | .4 | .2 | 46.14 | 60 | -13.86 | - | - |
| 10 | 24.153 | 25.91 | Av | .4 | .2 | 26.51 | - | - | 50 | -23.49 |

# Line-L2 .15 - 30MHz

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | .33 | 38.38 | PK | .1 | 0 | 38.48 | 59.5 | -21.02 | - | - |
| 12 | .33 | 18.98 | Av | .1 | 0 | 19.08 | - | - | 49.5 | -30.42 |
| 13 | .88125 | 29.49 | PK | .1 | .1 | 29.69 | 56 | -26.31 | - | - |
| 14 | .88125 | 16.31 | Av | .1 | .1 | 16.51 | - | - | 46 | -29.49 |
| 15 | 2.364 | 31.52 | PK | .1 | .1 | 31.72 | 56 | -24.28 | - | - |
| 16 | 2.364 | 20.05 | Av | .1 | .1 | 20.25 | - | - | 46 | -25.75 |
| 17 | 4.785 | 30.07 | PK | .1 | .1 | 30.27 | 56 | -25.73 | - | - |
| 18 | 4.785 | 17.11 | Av | .1 | .1 | 17.31 | - | - | 46 | -28.69 |
| 19 | 24.3645 | 35.85 | PK | .4 | .2 | 36.45 | 60 | -23.55 | - | - |
| 20 | 24.3645 | 21.42 | Av | .4 | .2 | 22.02 | - | - | 50 | -27.98 |

**LINE 1 RESULTS**



**LINE 2 RESULTS**