## 6.5 Conducted Emissions at the Band Edge

**§15.247(d)**

**Test Overview and Limit**

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. For the following out of band conducted spurious emissions plots at the band edge, the EUT was set at a data rate of 1Mbps for "b" mode, 6 Mbps for "g" mode, 6 Mbps for "a" mode, 6.5/7.2Mbps for 20MHz BW "n" mode, 13.5/15Mbps for 40MHz "n", and 29.3/32.5Mbps for 80MHz "ac" mode as these settings produced the worst-case emissions.

***The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the PSD procedure (Section 9.1).***

**Test Procedure Used**

KDB 558074 v03r01 – Section 11.3

**Test Settings**

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW = 100kHz
4. VBW = 1MHz
5. Detector = Peak
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = max hold
8. Sweep time = auto couple
9. The trace was allowed to stabilize

**Test Setup**

The EUT and measurement equipment were set up as shown in the diagram below.

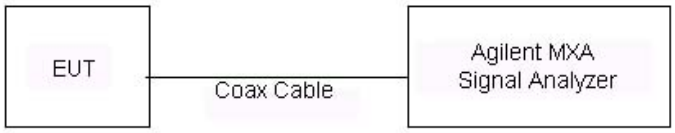


**Figure 6-5. Test Instrument & Measurement Setup**

**Test Notes**

None


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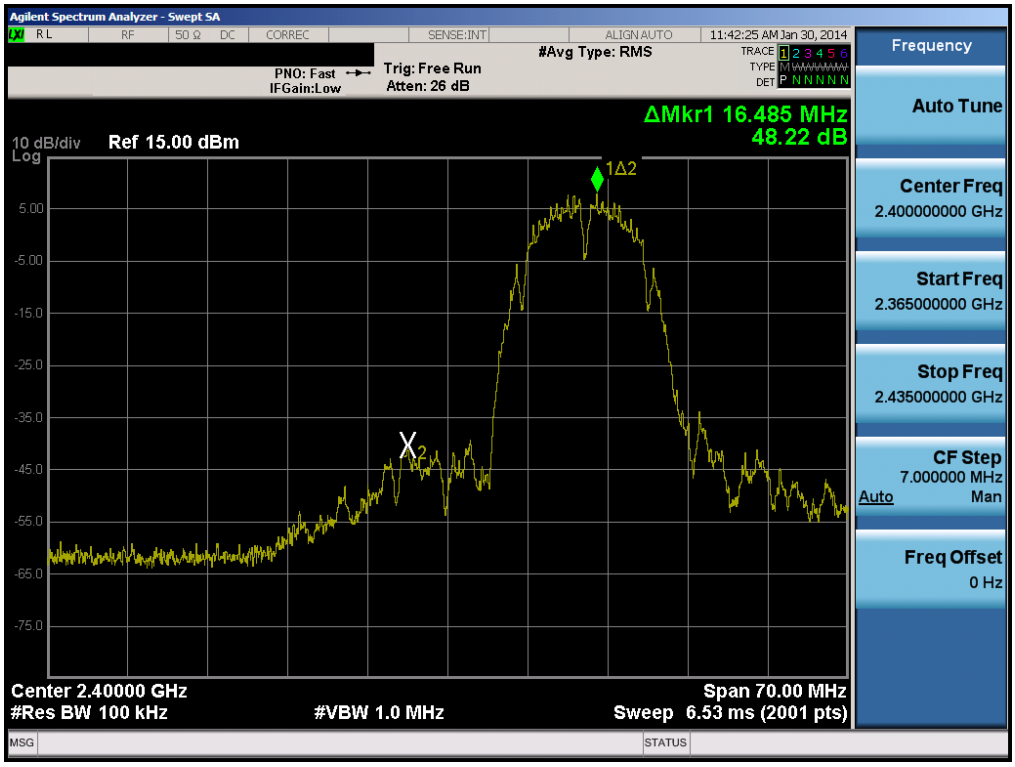
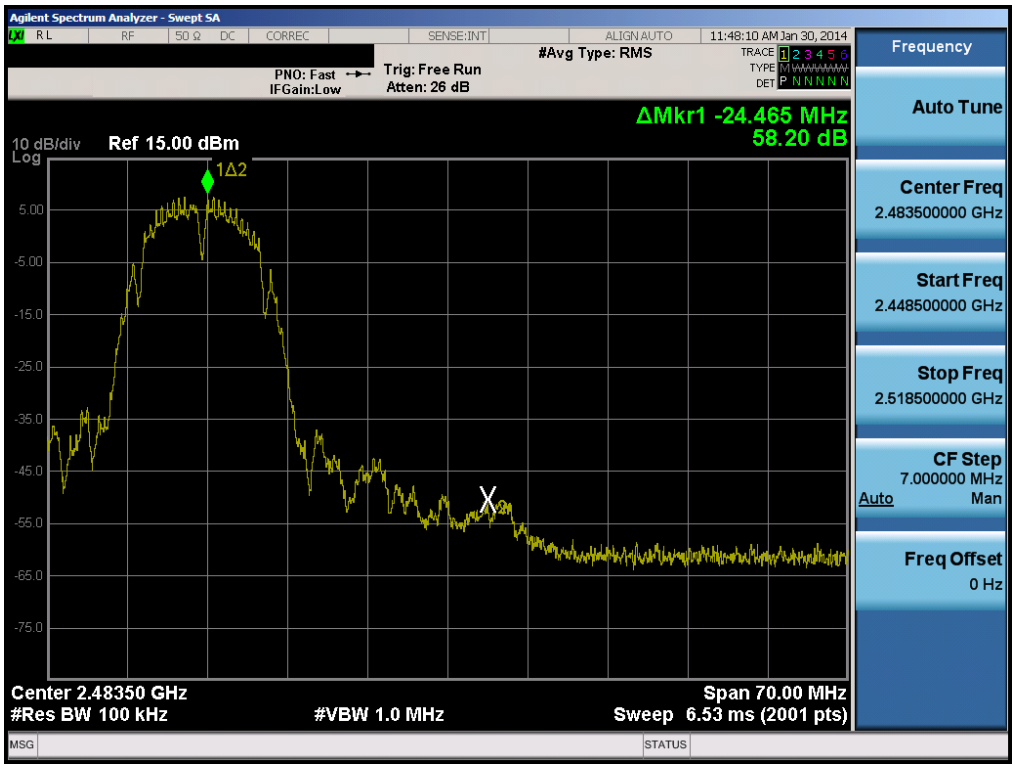
## Antenna-1 Conducted Emissions at the Band Edge




**Plot 6-73. Band Edge Plot (802.11b – Ch. 1)**




**Plot 6-74. Band Edge Plot (802.11b – Ch. 11)**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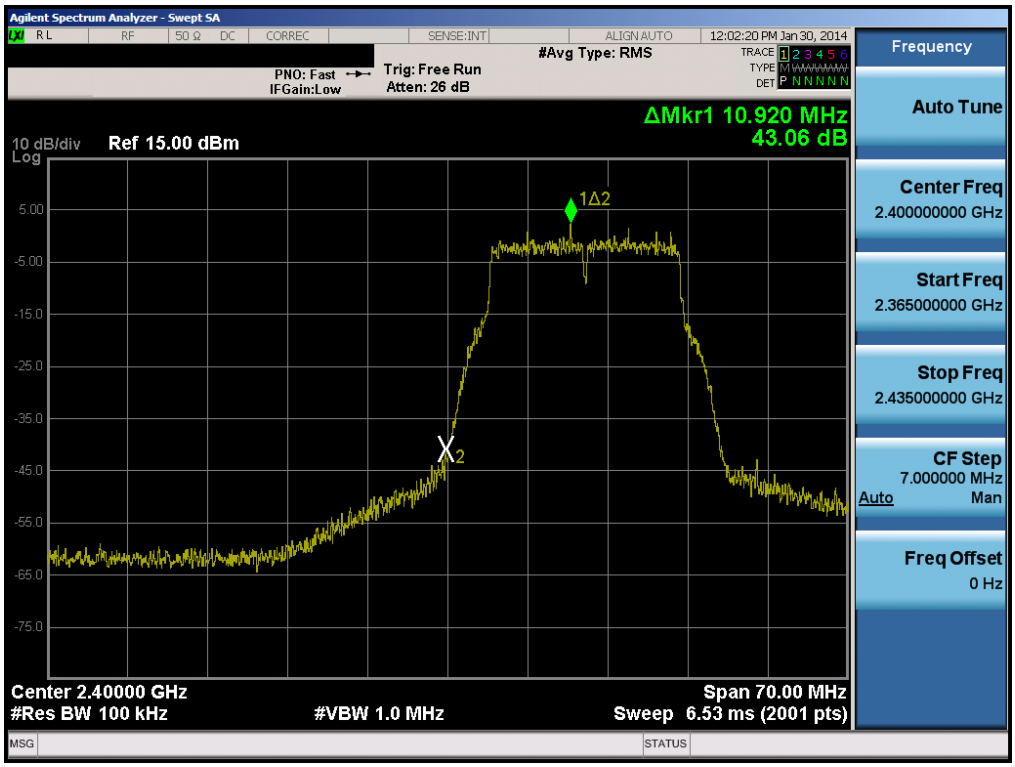
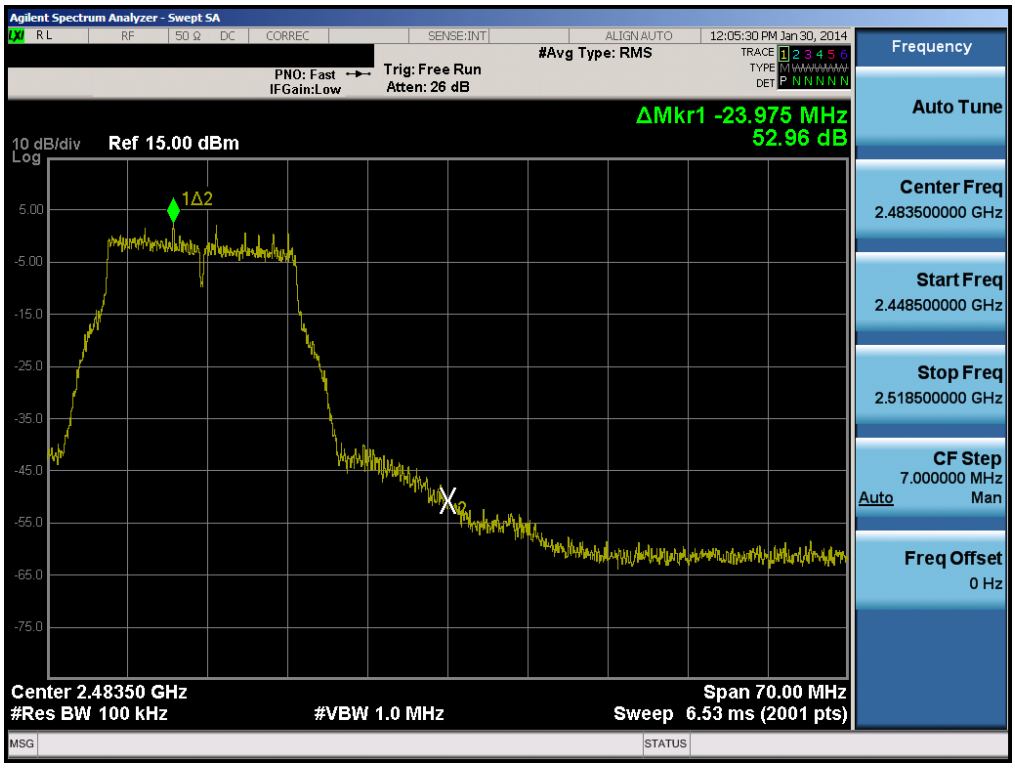



**Plot 6-75. Band Edge Plot (802.11g– Ch. 1)**




**Plot 6-76. Band Edge Plot (802.11g – Ch. 11)**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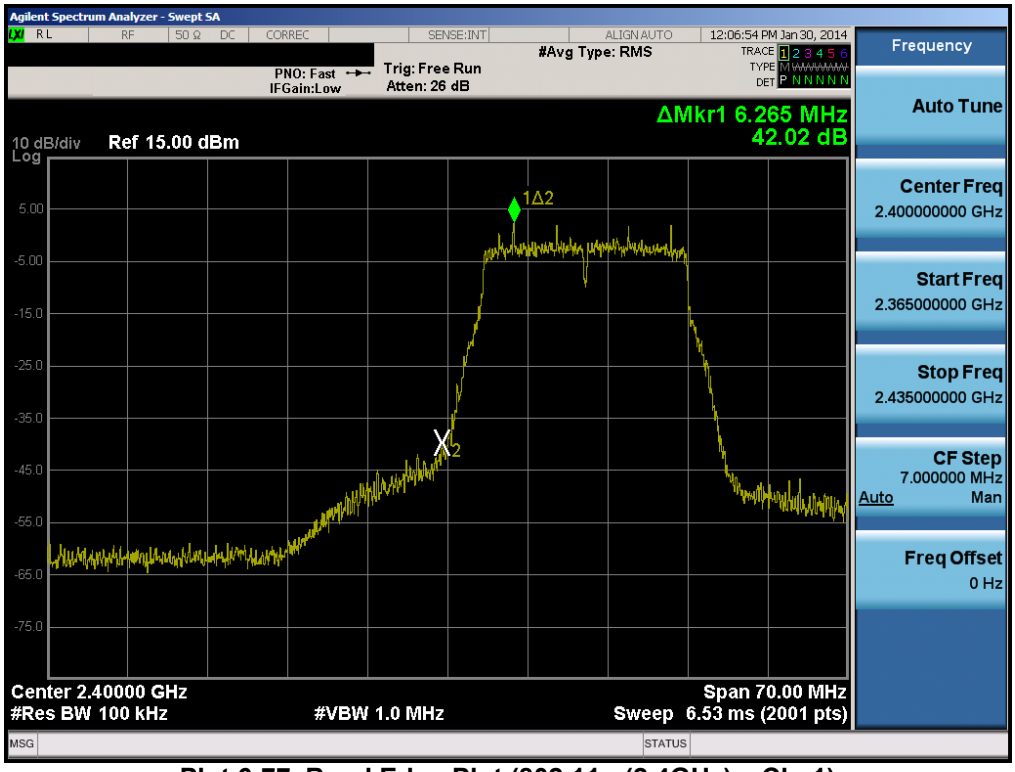
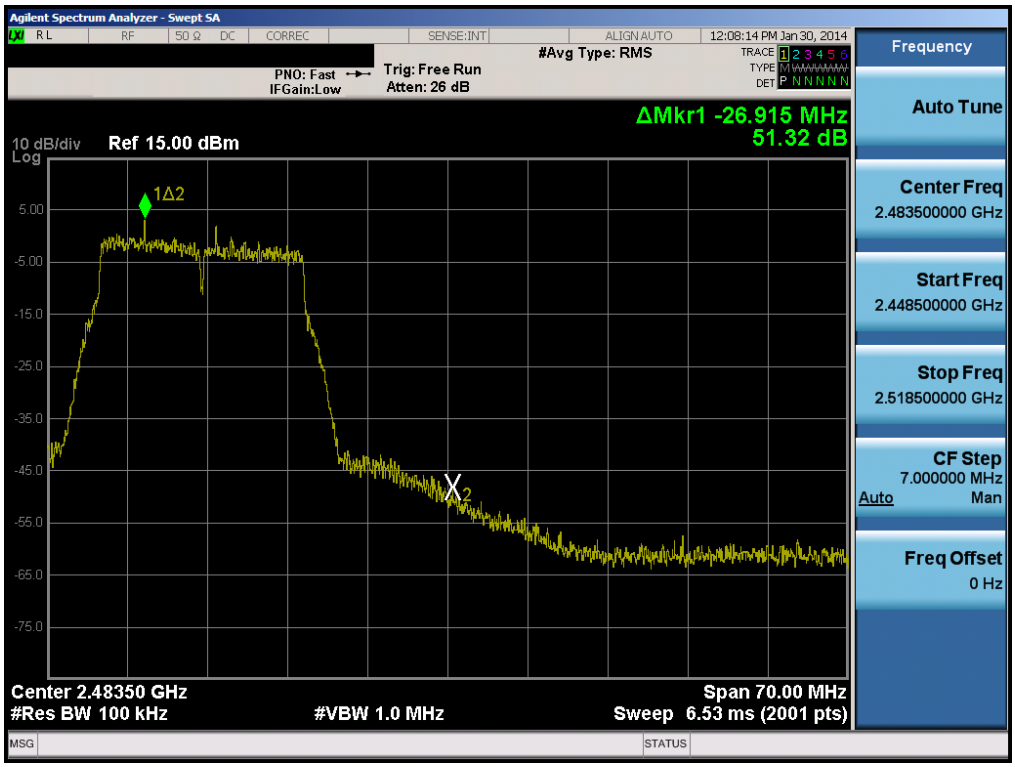



**Plot 6-77. Band Edge Plot (802.11n (2.4GHz) – Ch. 1)**




**Plot 6-78. Band Edge Plot (802.11n (2.4GHz) – Ch. 11)**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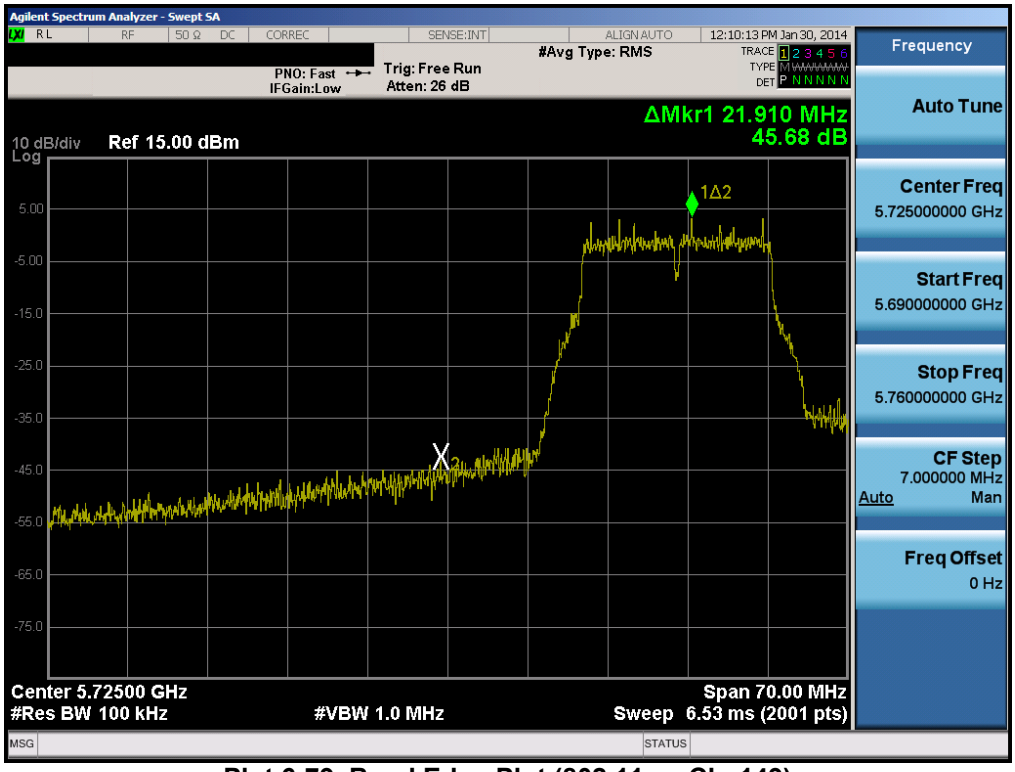
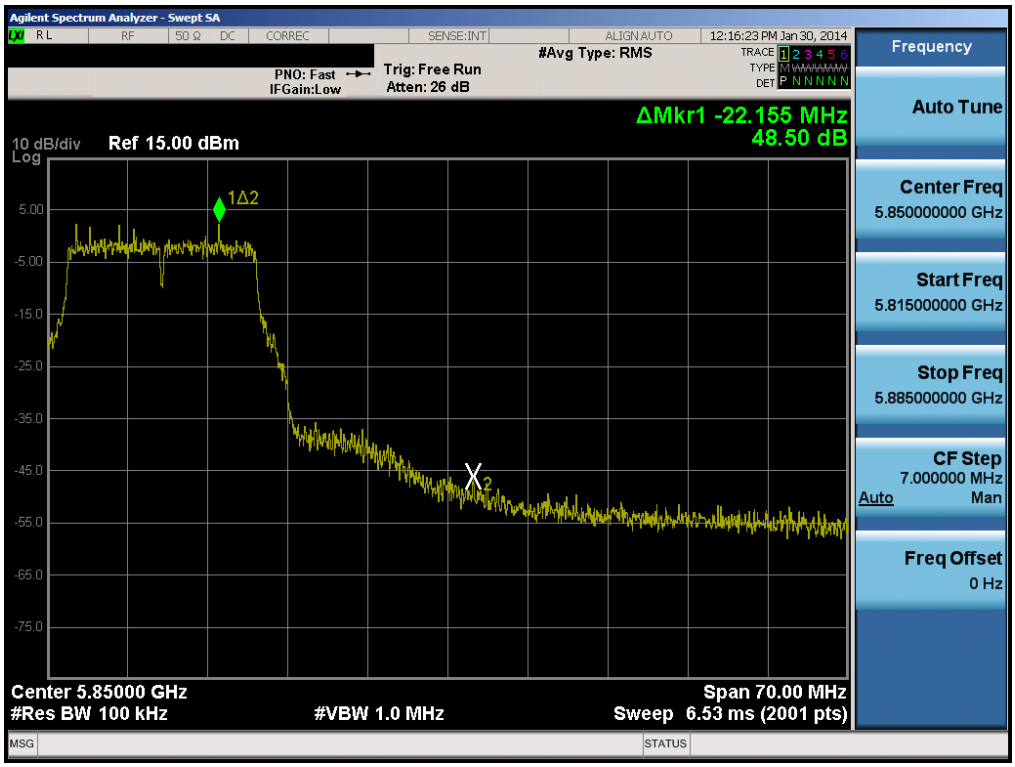



**Plot 6-79. Band Edge Plot (802.11a – Ch. 149)**




**Plot 6-80. Band Edge Plot (802.11a – Ch. 165)**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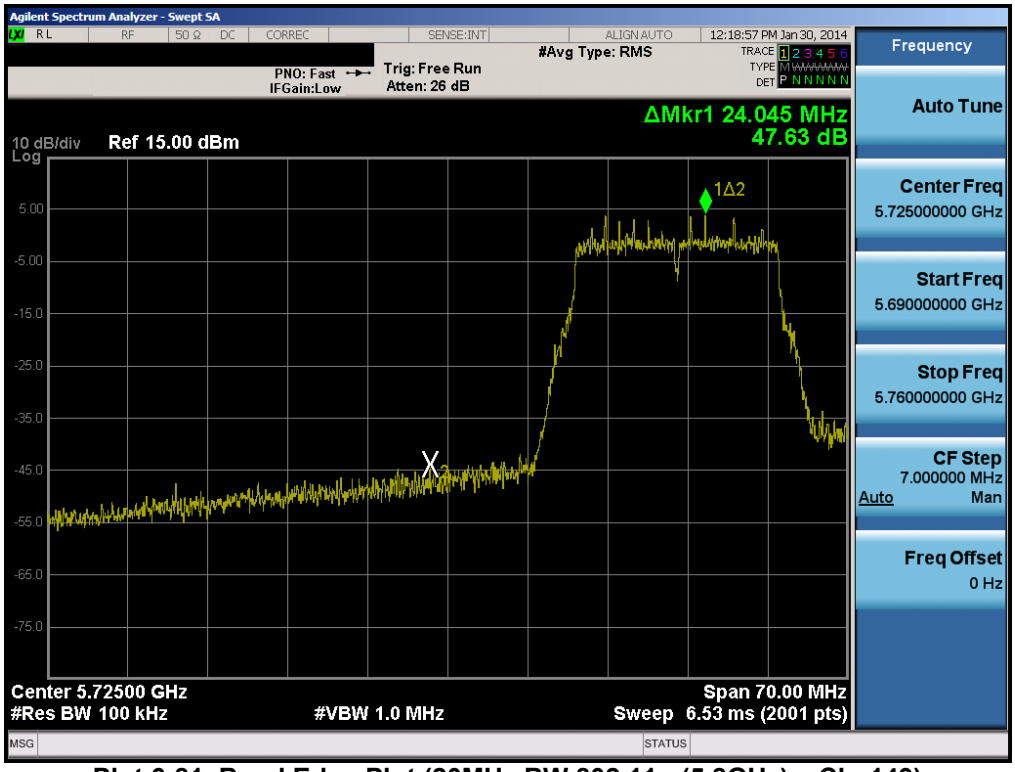
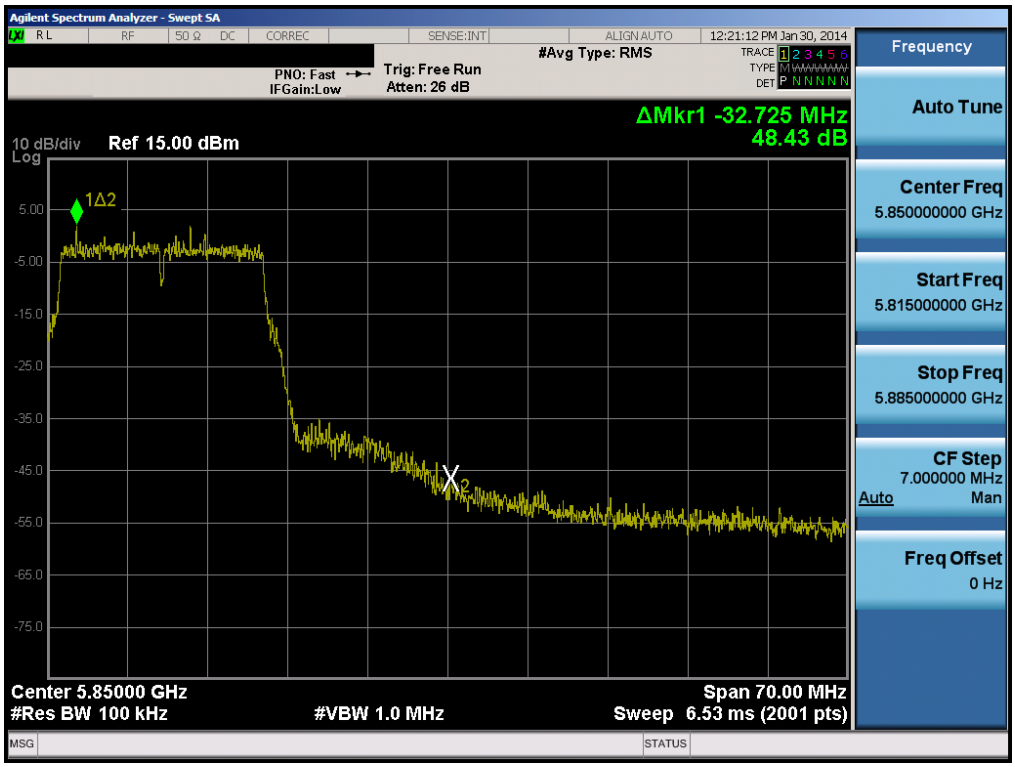



**Plot 6-81. Band Edge Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)**




**Plot 6-82. Band Edge Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)**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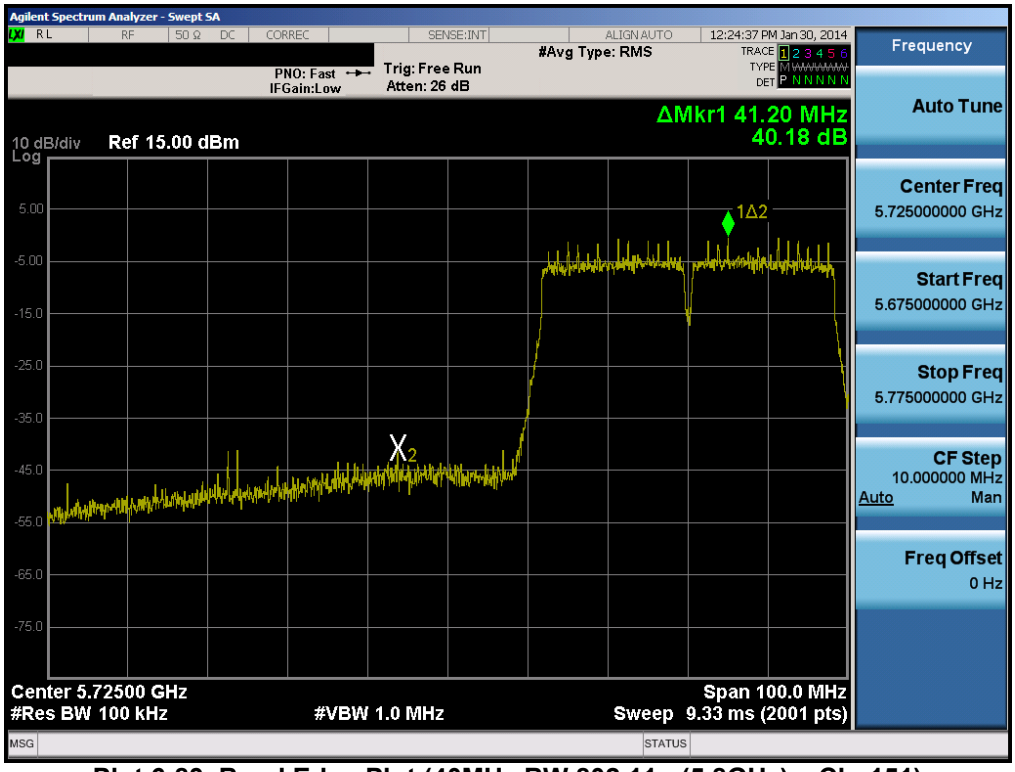
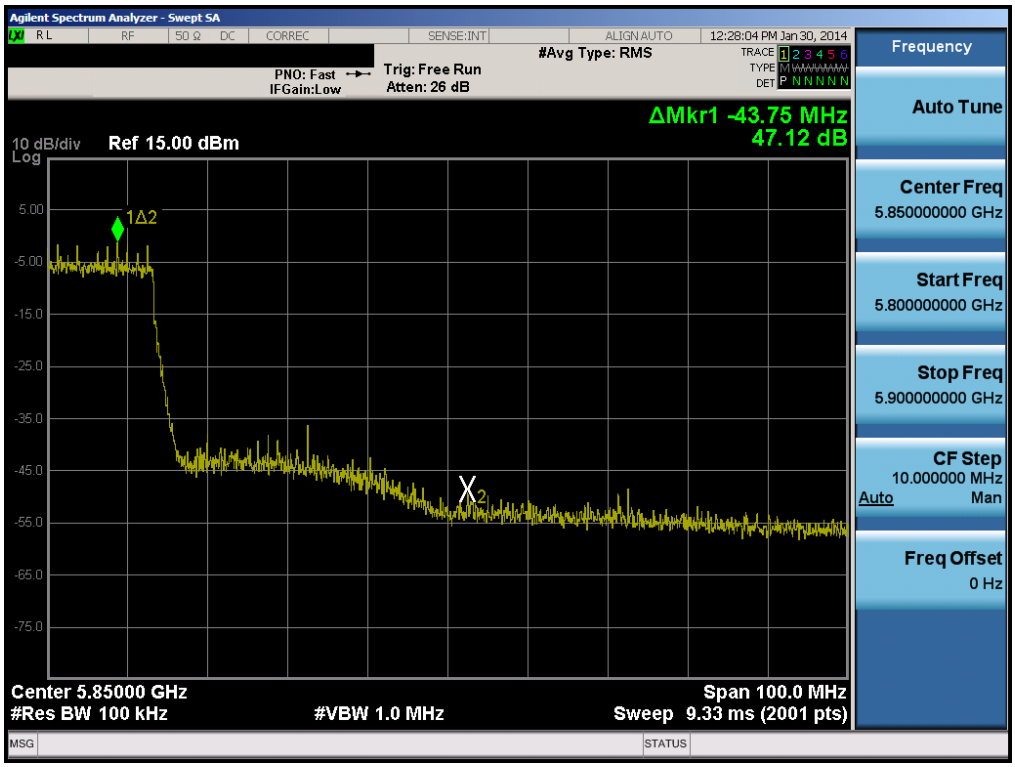



**Plot 6-83. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)**




**Plot 6-84. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)**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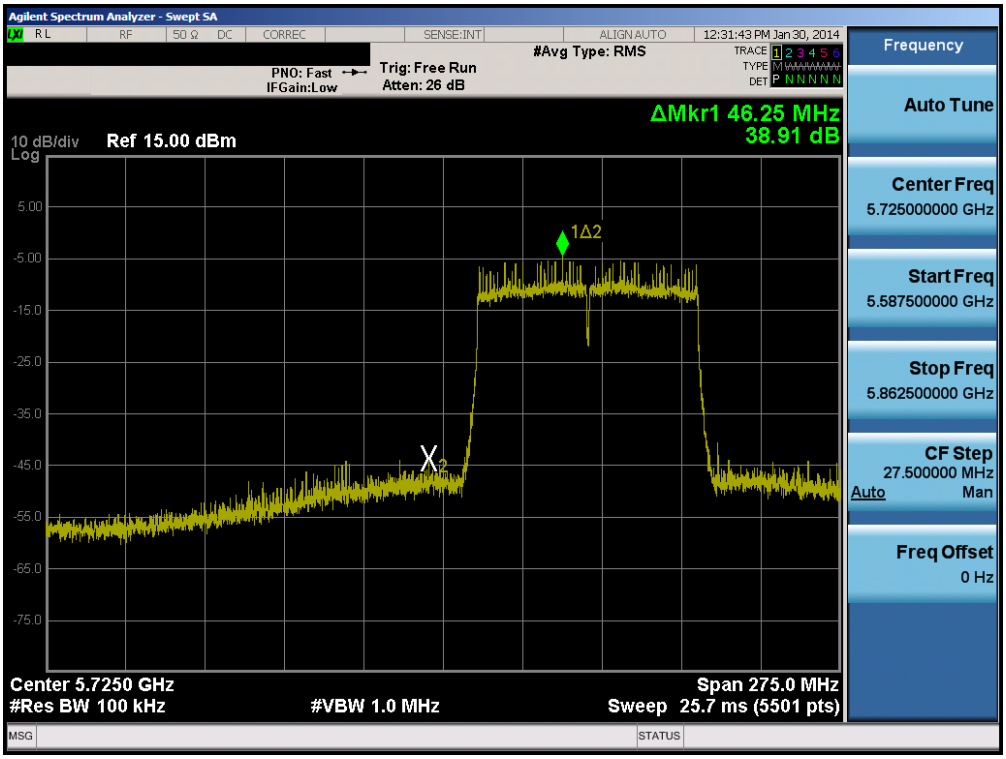
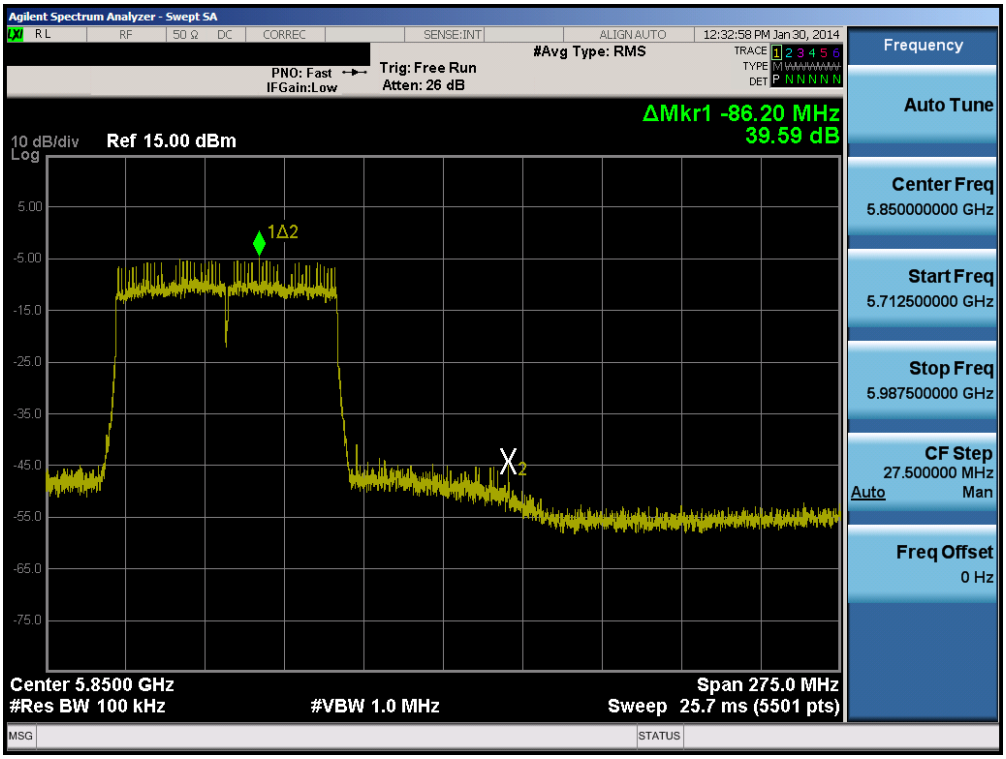



**Plot 6-85. Band Edge Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)**




**Plot 6-86. Band Edge Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)**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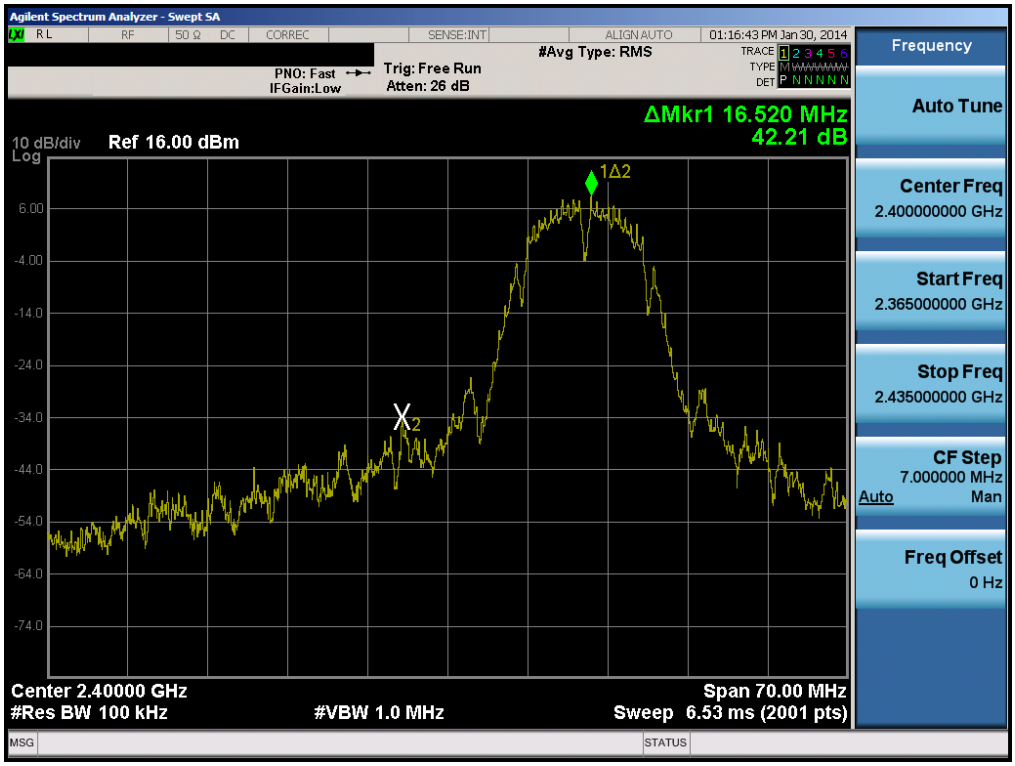
## Antenna-2 Conducted Emissions at the Band Edge




**Plot 6-87. Band Edge Plot (802.11b – Ch. 1)**

**Plot 6-88. Band Edge Plot (802.11b – Ch. 11)**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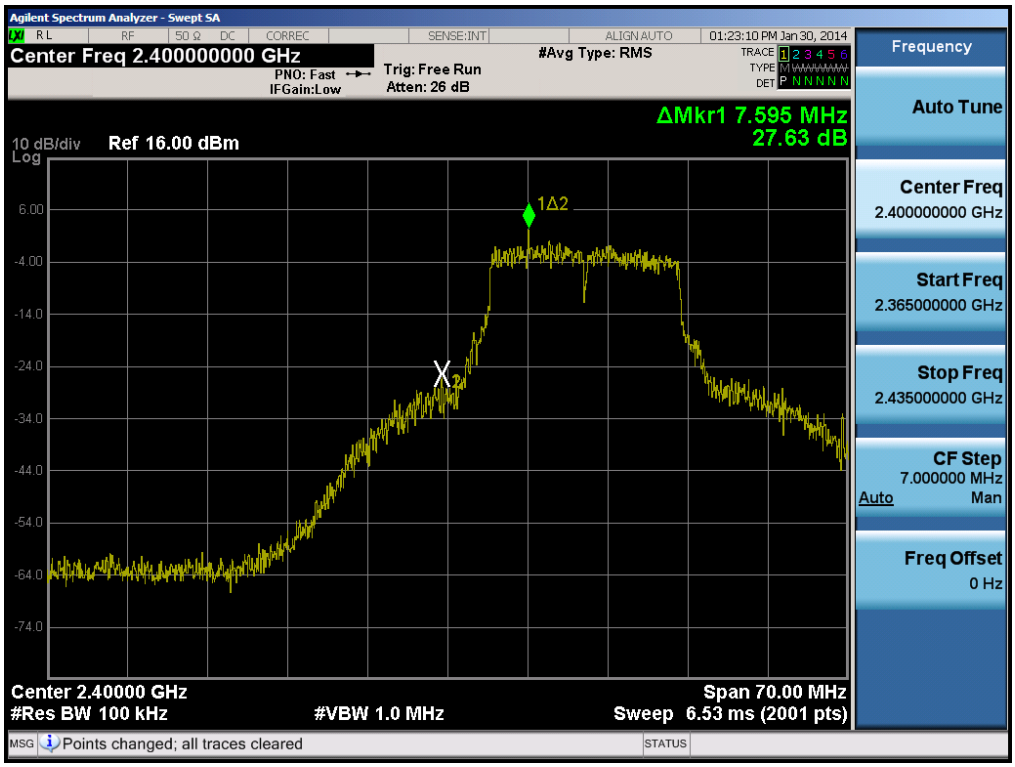
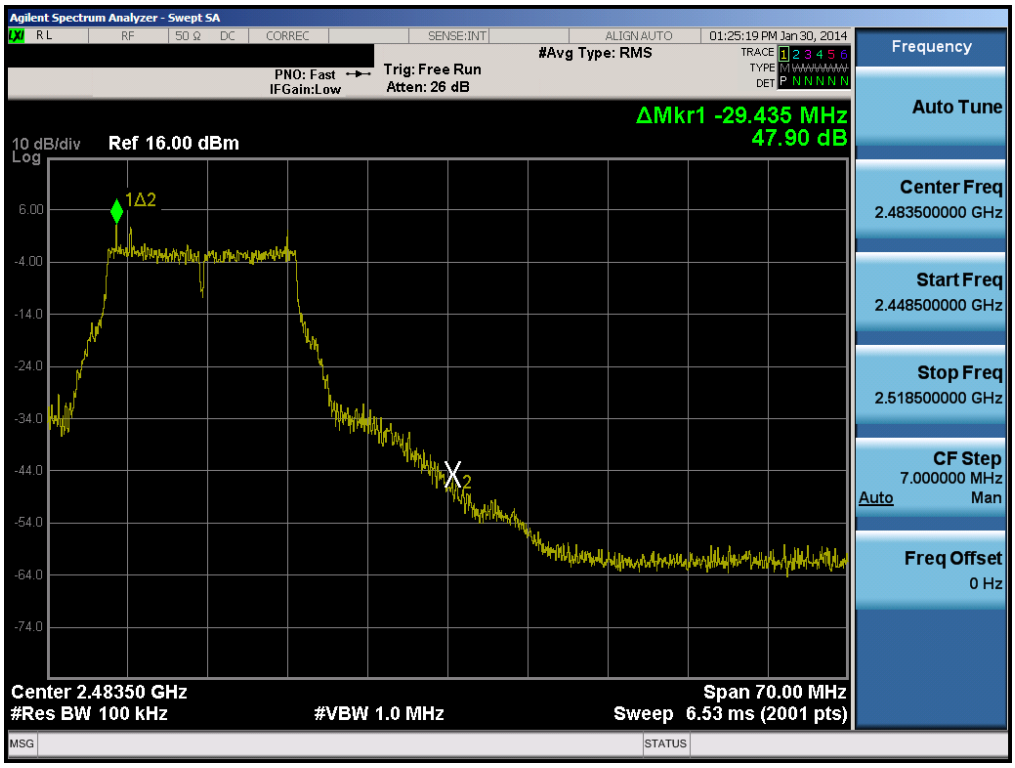



**Plot 6-89. Band Edge Plot (802.11g– Ch. 1)**




**Plot 6-90. Band Edge Plot (802.11g – Ch. 11)**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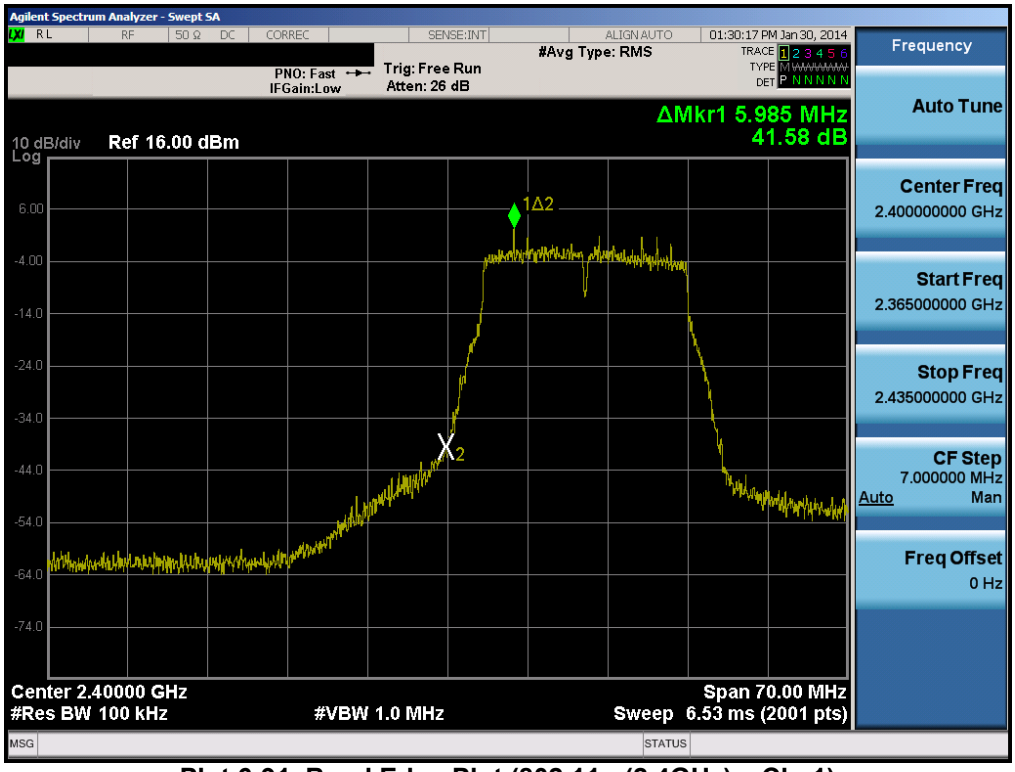
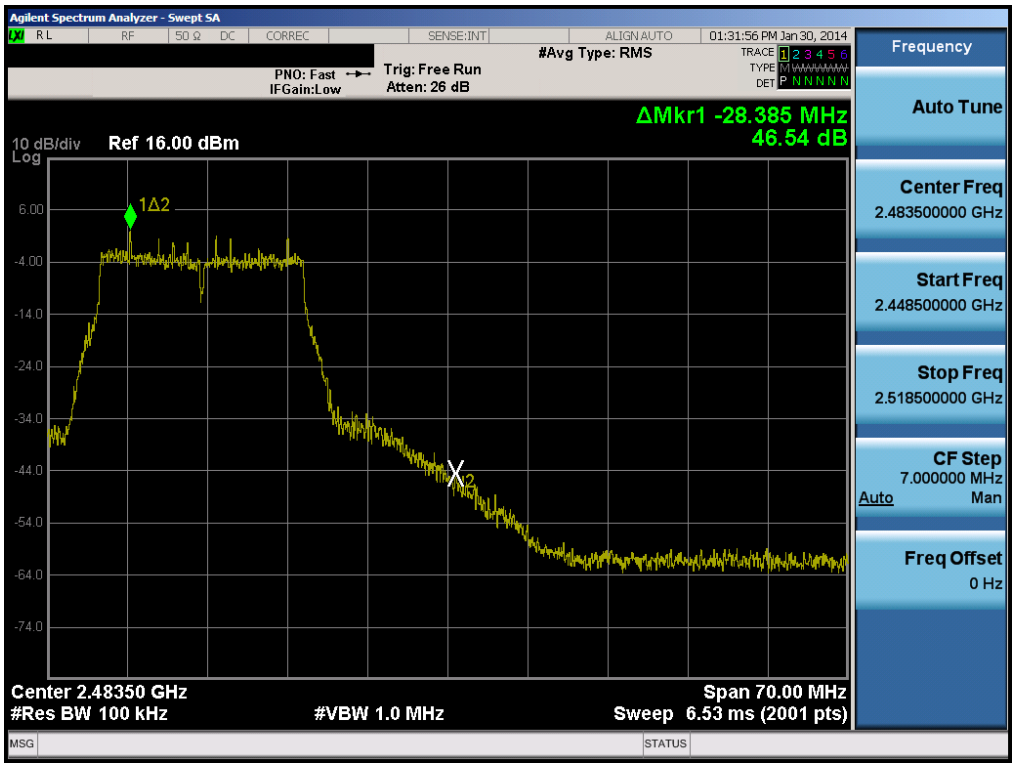



**Plot 6-91. Band Edge Plot (802.11n (2.4GHz) – Ch. 1)**




**Plot 6-92. Band Edge Plot (802.11n (2.4GHz) – Ch. 11)**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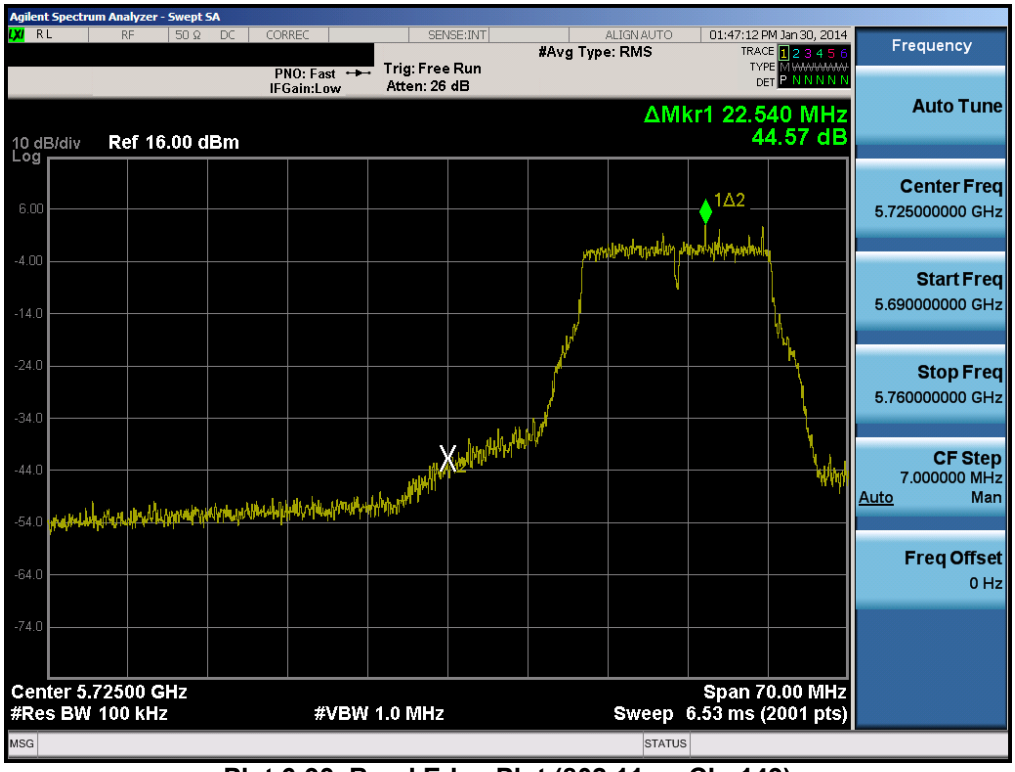
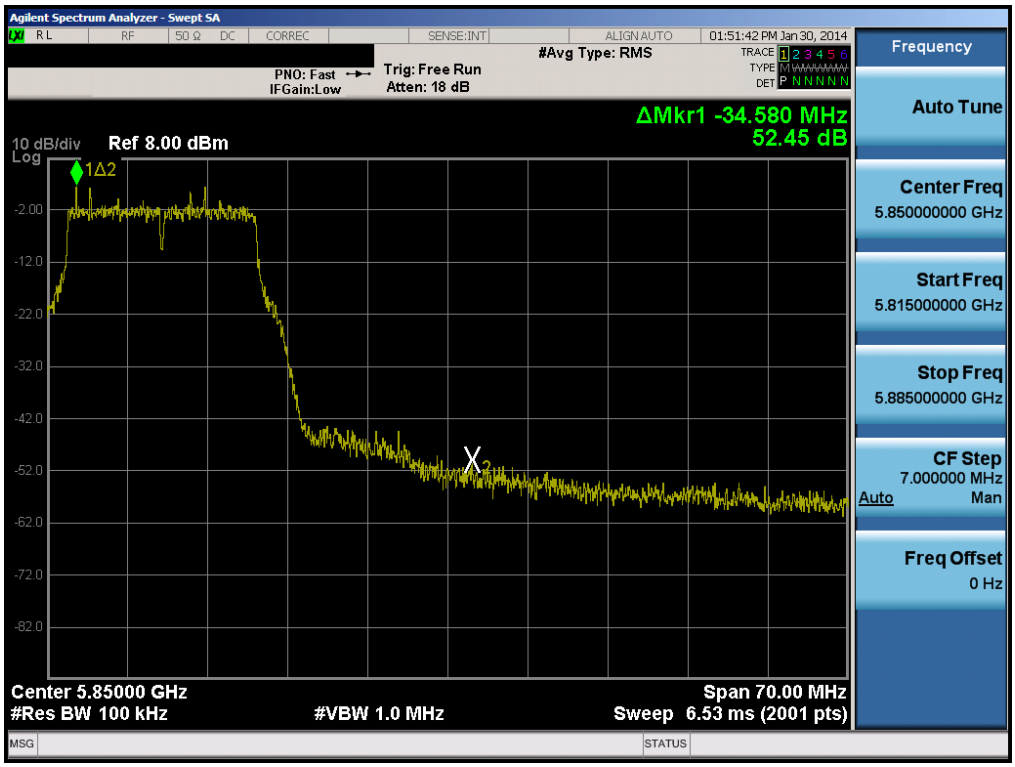



**Plot 6-93. Band Edge Plot (802.11a – Ch. 149)**




**Plot 6-94. Band Edge Plot (802.11a – Ch. 165)**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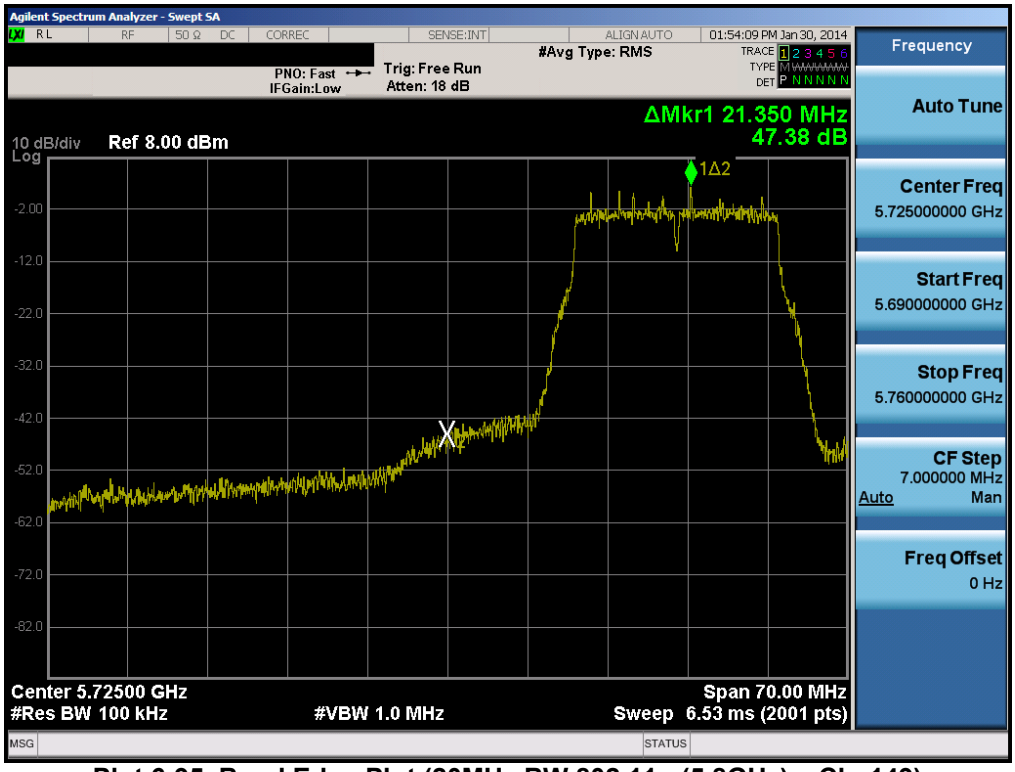
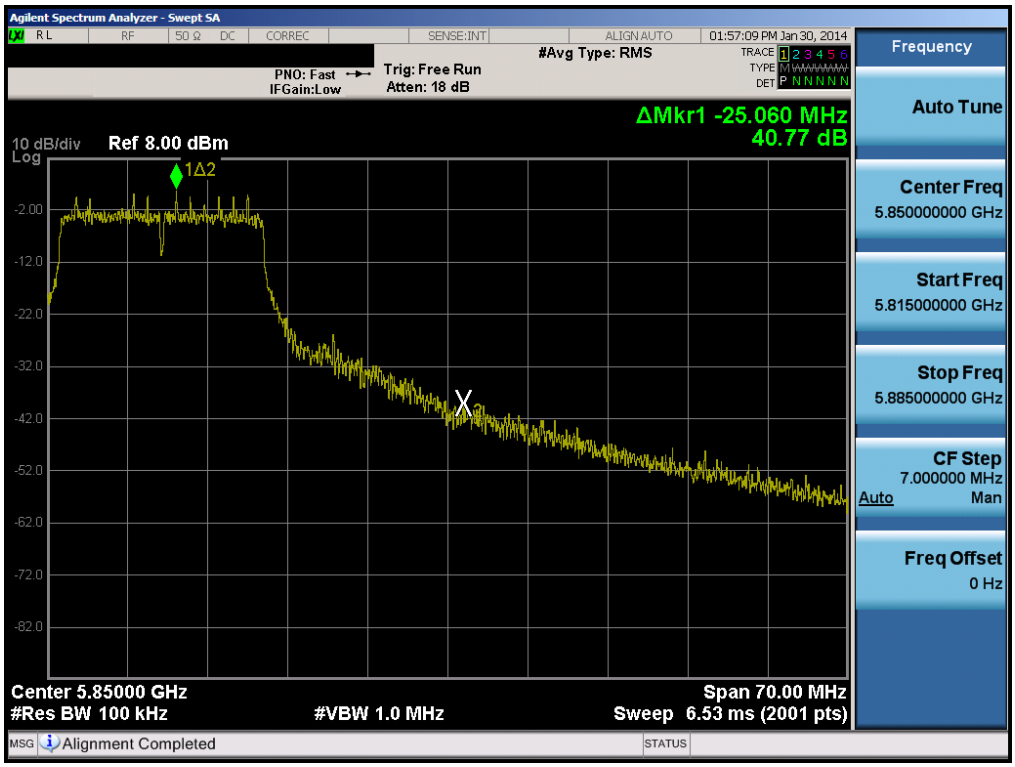



**Plot 6-95. Band Edge Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)**




**Plot 6-96. Band Edge Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)**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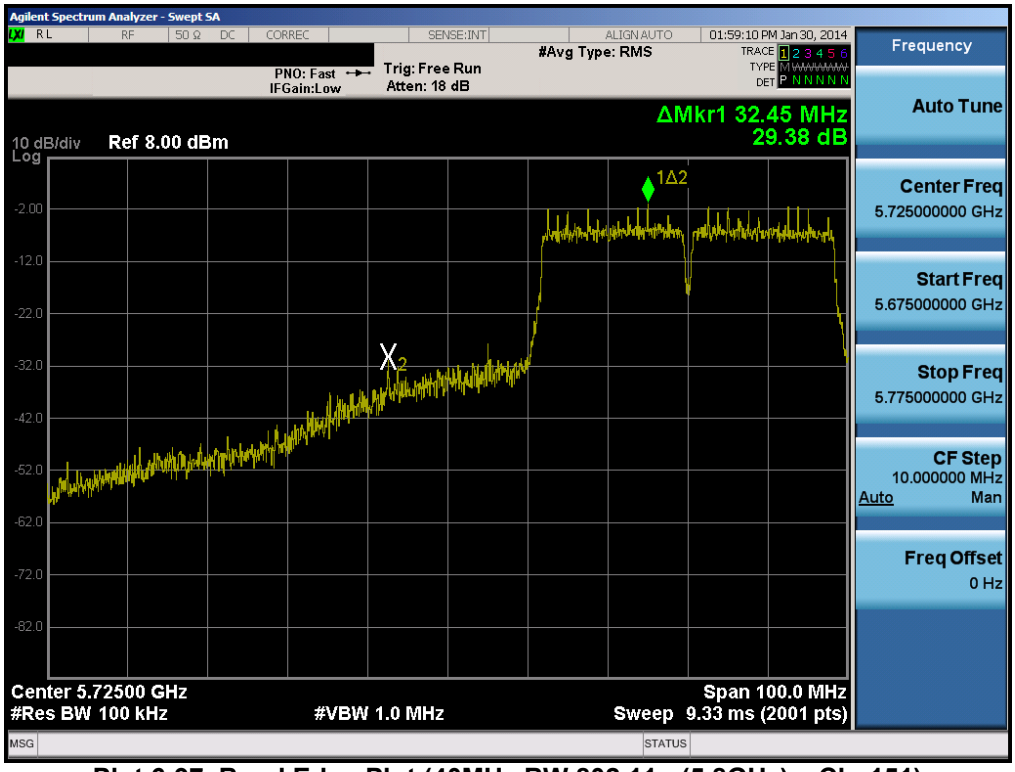
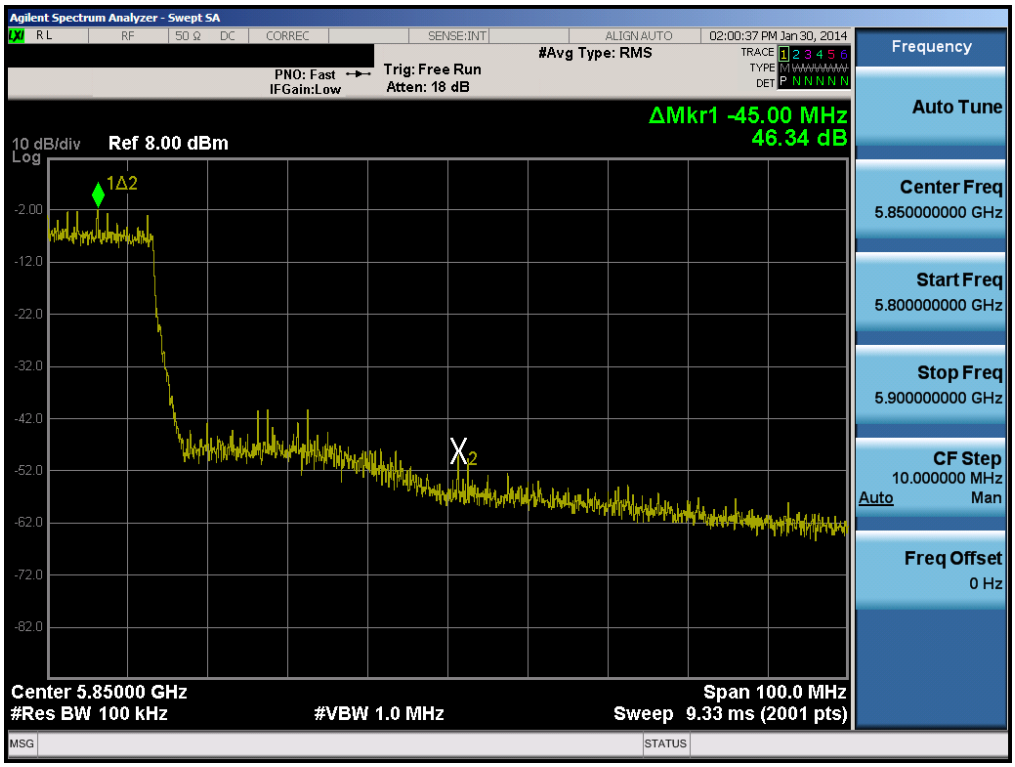



**Plot 6-97. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)**




**Plot 6-98. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)**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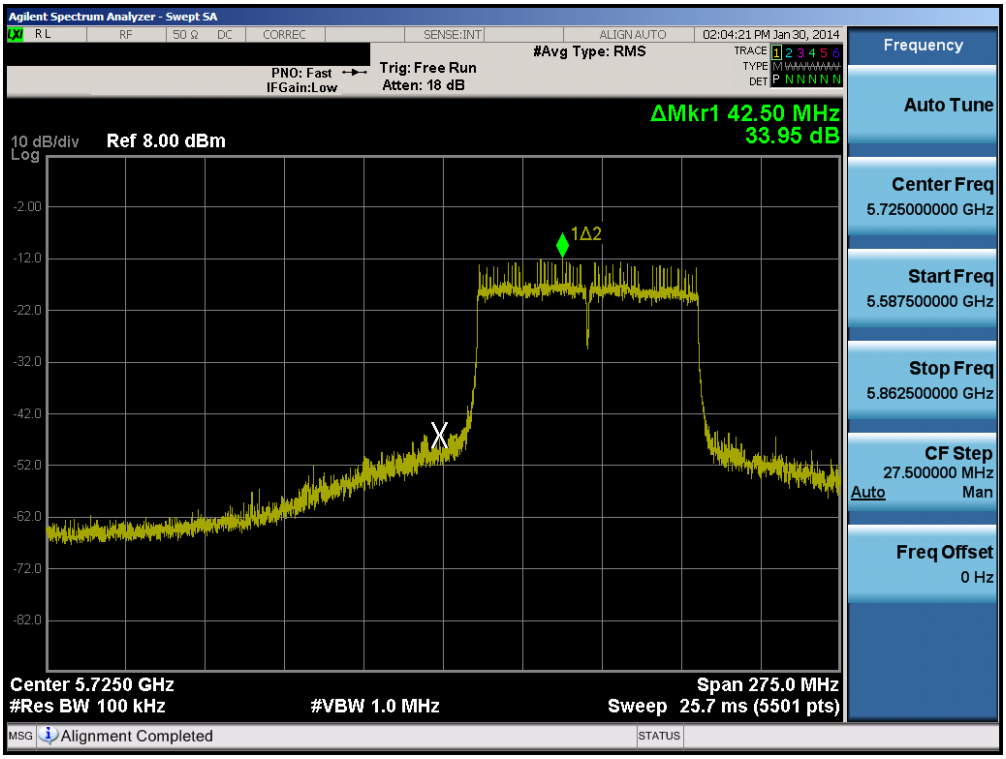
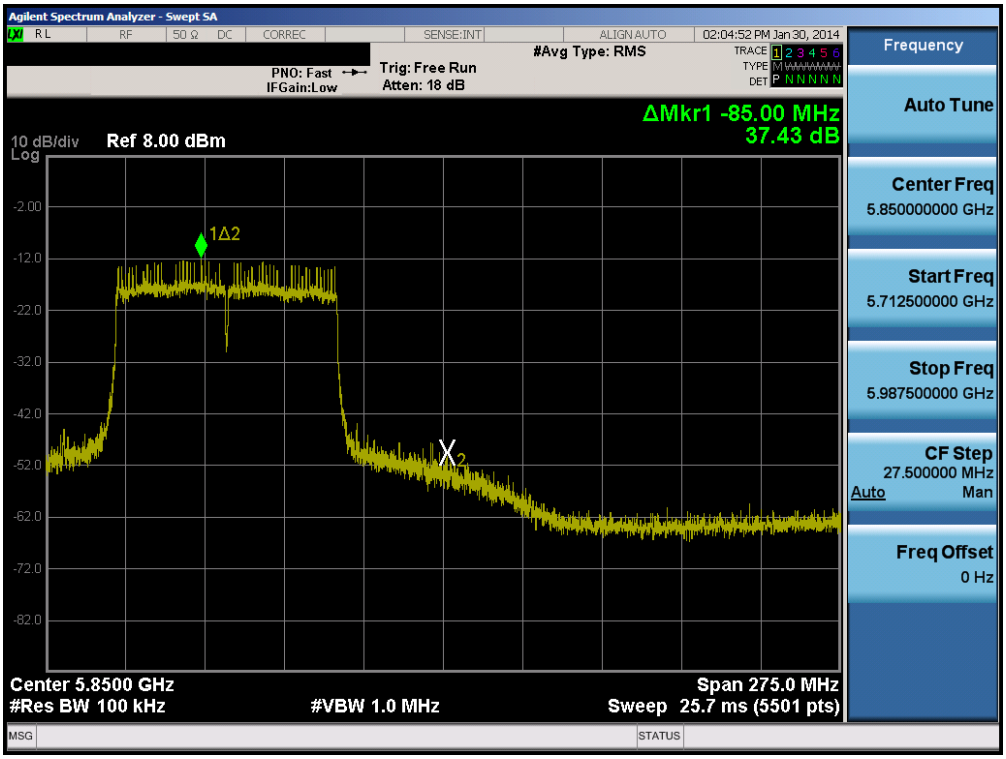



**Plot 6-99. Band Edge Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)**




**Plot 6-100. Band Edge Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)**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## 6.6 Conducted Spurious Emissions

**§15.247(d)**

**Test Overview and Limit**

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. For the following out of band conducted spurious emissions plots, the EUT was investigated in all available data rates for “b”, “g”, “a”, “n”, and “ac” modes. The worst case spurious emissions for the 2.4GHz band were found while transmitting in “b” mode at 1 Mbps and are shown in the plots below. The worst case spurious emissions for the 5.8GHz band were found while transmitting in “a” mode at 6 Mbps and are shown in the plots below.

***The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the procedure in Section 11.1 of KDB 558074 v03r01.***

**Test Procedure Used**

KDB 558074 v03r01 – Section 11.3

**Test Settings**

1. Start frequency was set to 30MHz and stop frequency was set to 25GHz for 2.4GHz frequencies and 40GHz for 5GHz frequencies (separated into two plots per channel)
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

**Test Setup**

The EUT and measurement equipment were set up as shown in the diagram below.

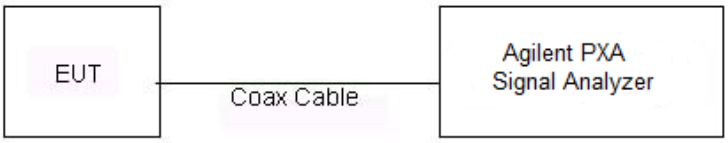


**Figure 6-6. Test Instrument & Measurement Setup**


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## Test Notes

1. RBW was set to 1MHz rather than 100kHz in order to increase the measurement speed.

2. The display line shown in the following plots denotes the limit at 20dB below the fundamental emission level measured in a 100kHz bandwidth. However, since the traces in the following plots are measured with a 1MHz RBW, the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1MHz bandwidth.

3. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present.

4. The proper limit for the out-of-band emissions is 20dB, however, since the plots below show an out of band emission of 30dB below the fundamental emission, they are still compliant.


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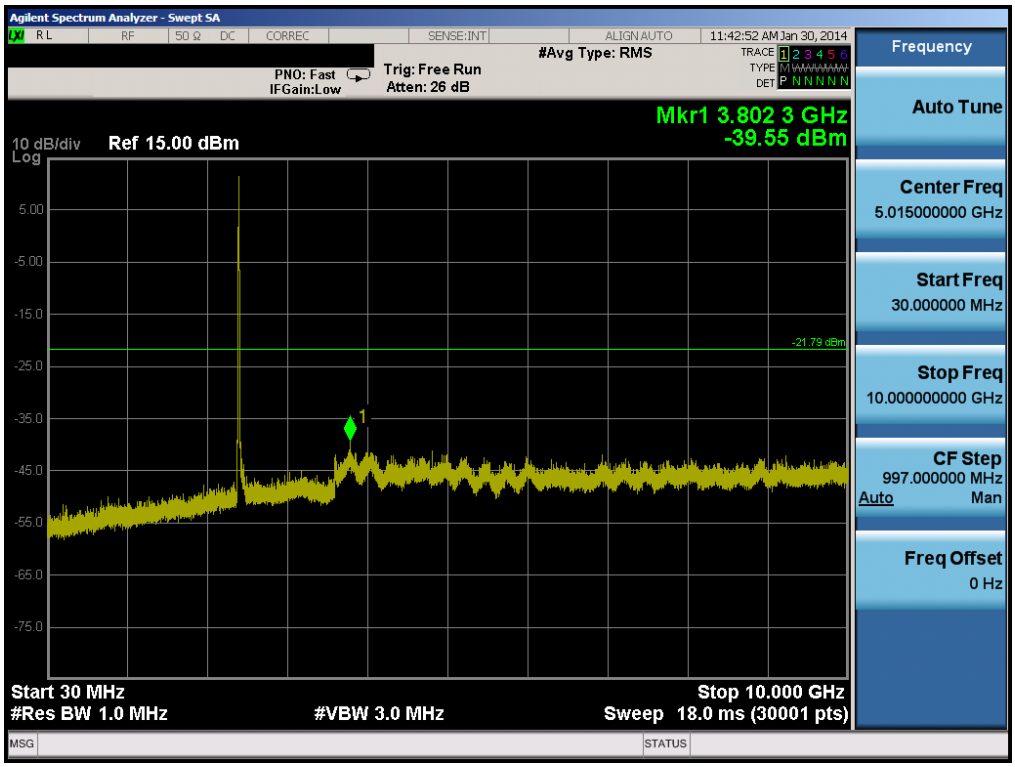
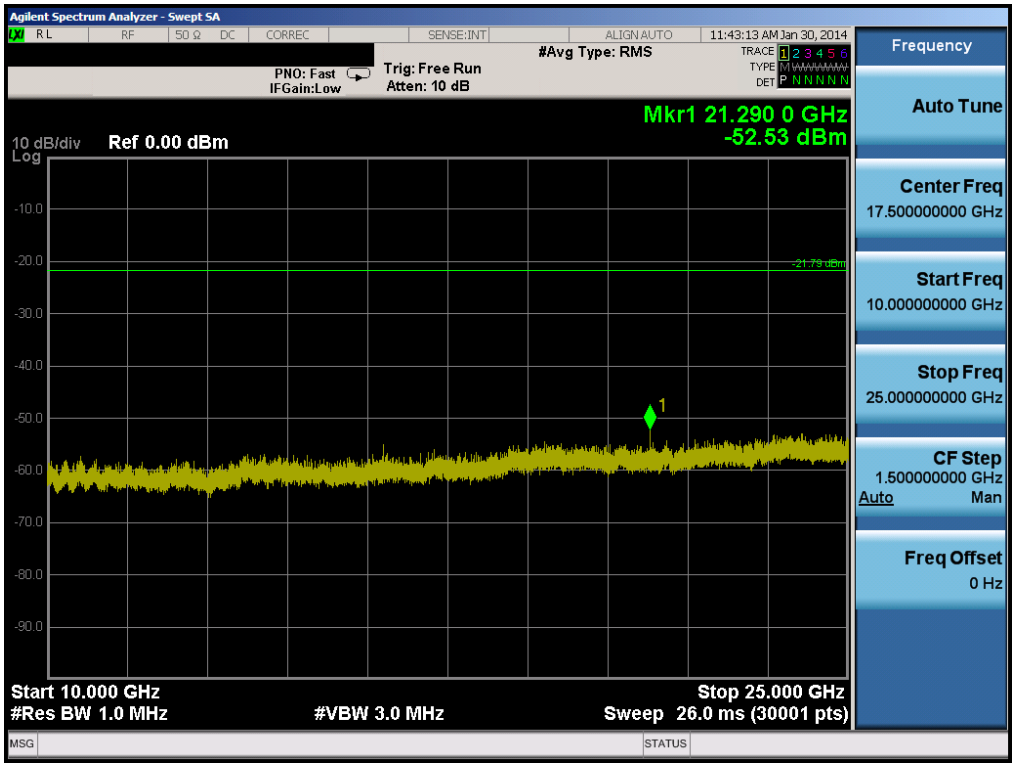
## Antenna-1 Conducted Spurious Emissions




**Plot 6-101. Conducted Spurious Plot (802.11b – Ch. 1)**




**Plot 6-102. Conducted Spurious Plot (802.11b – Ch. 1)**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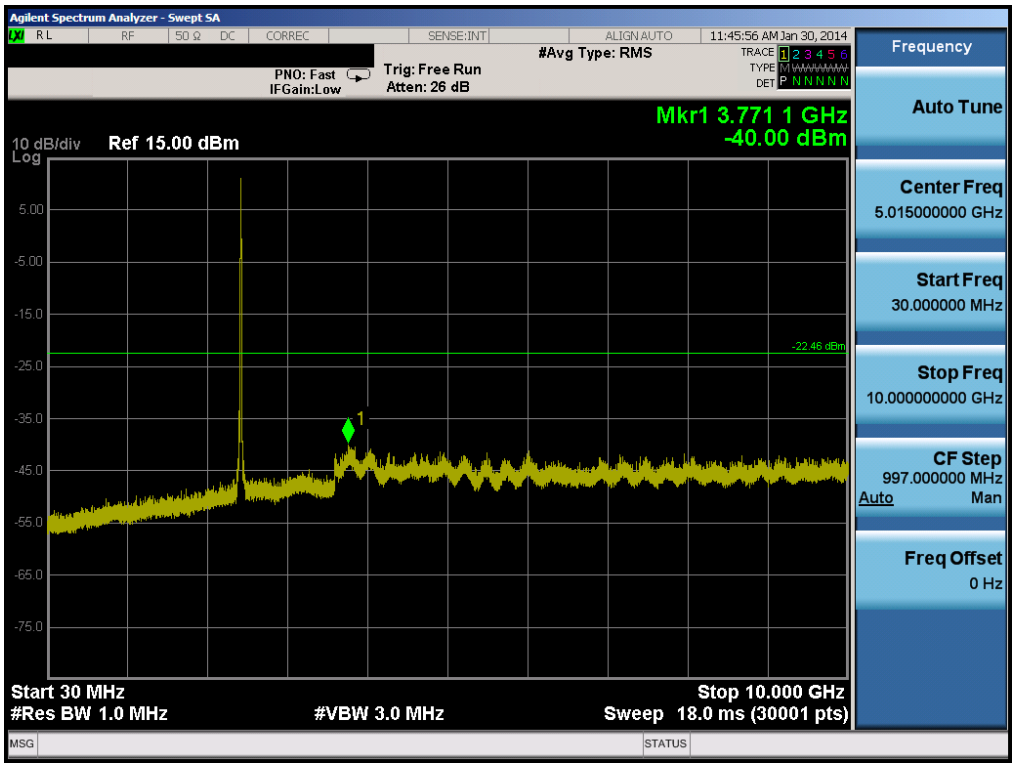
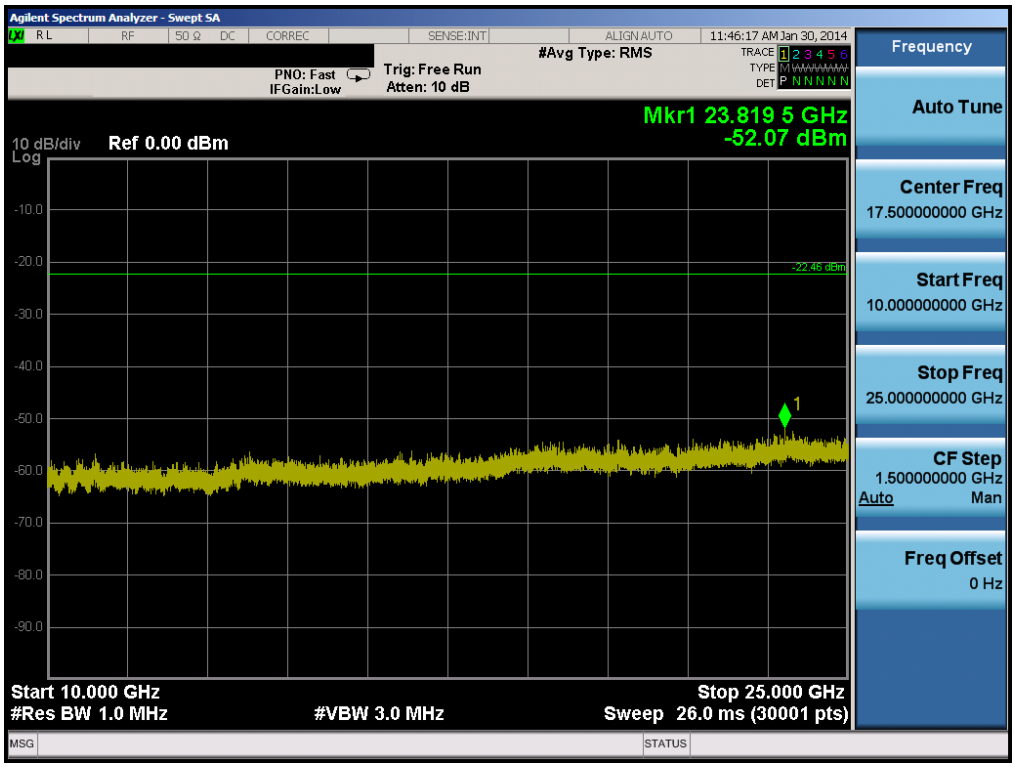



**Plot 6-103. Conducted Spurious Plot (802.11b – Ch. 6)**




**Plot 6-104. Conducted Spurious Plot (802.11b – Ch. 6)**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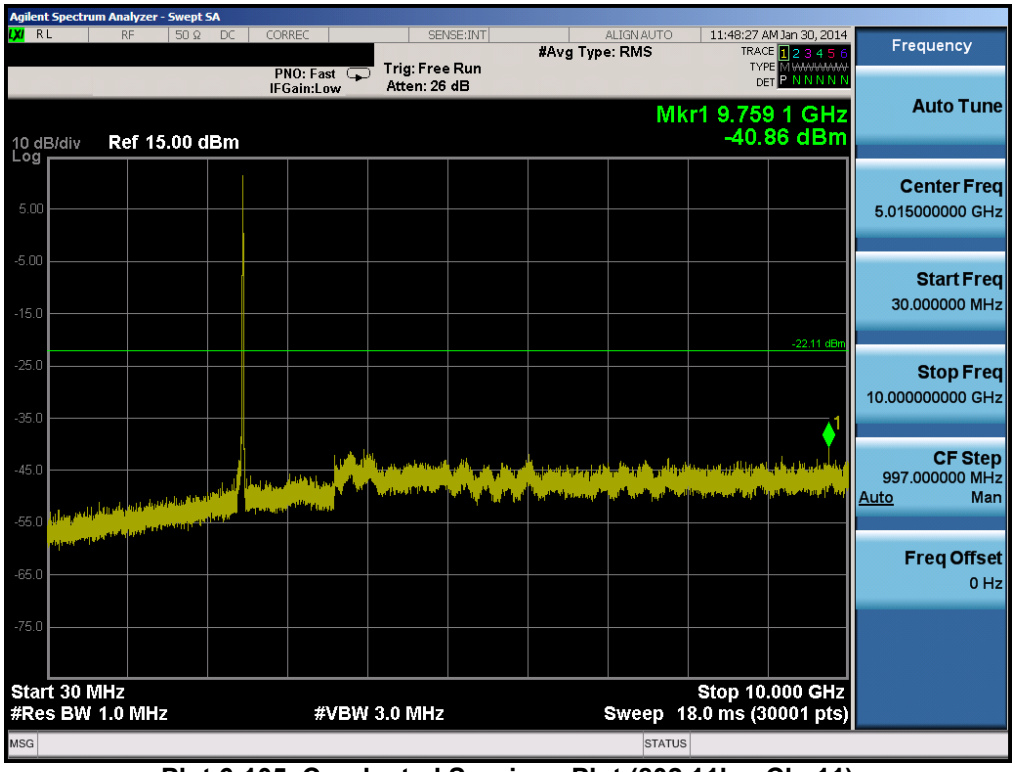
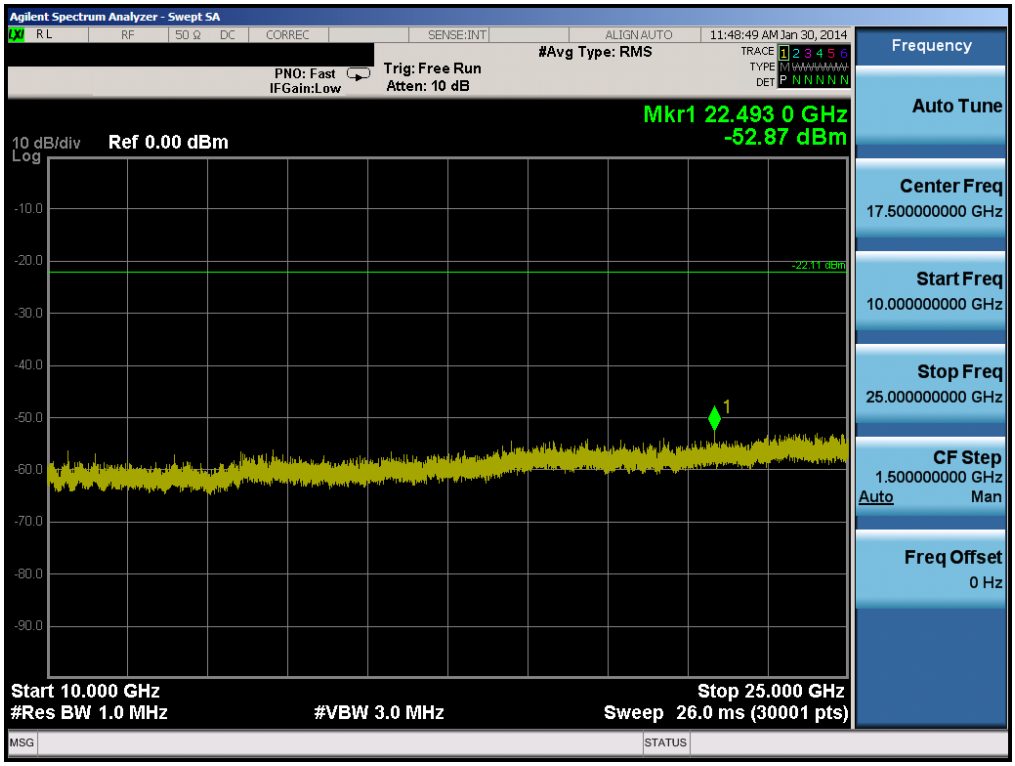



**Plot 6-105. Conducted Spurious Plot (802.11b – Ch. 11)**




**Plot 6-106. Conducted Spurious Plot (802.11b – Ch. 11)**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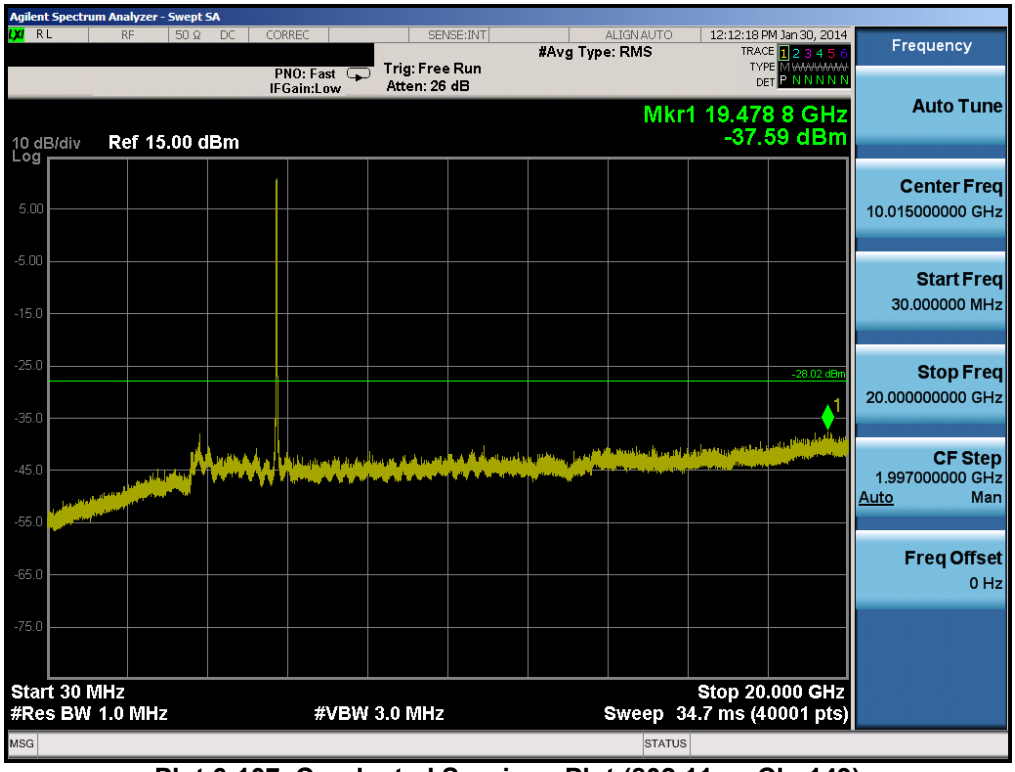
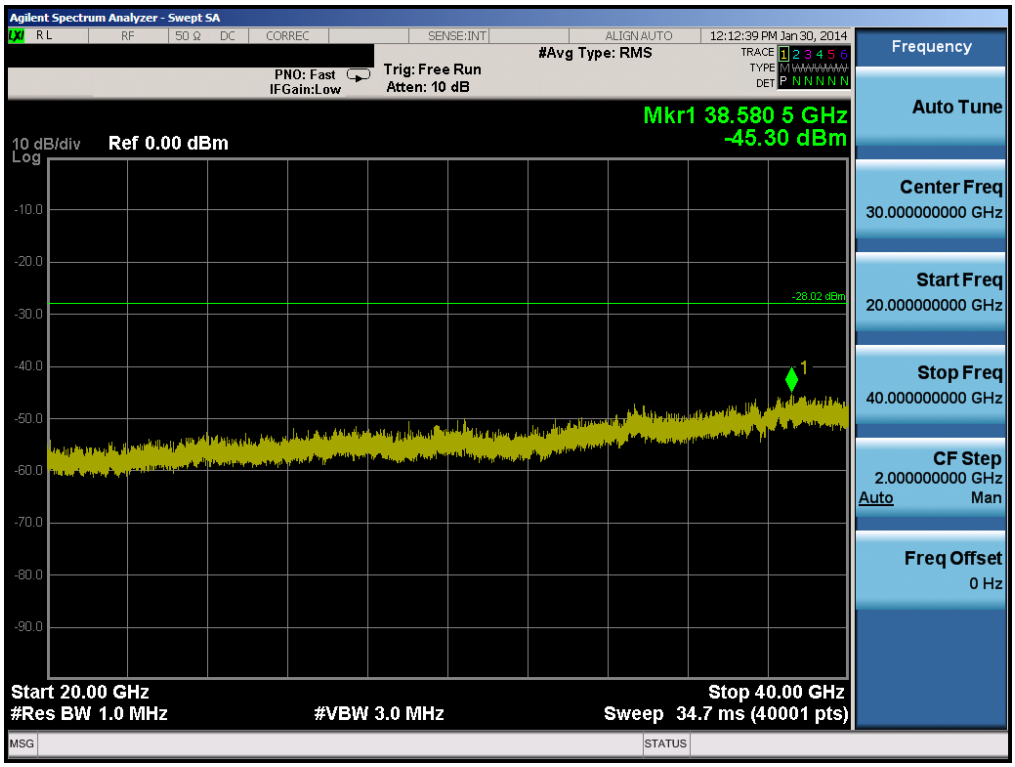



**Plot 6-107. Conducted Spurious Plot (802.11a – Ch. 149)**




**Plot 6-108. Conducted Spurious Plot (802.11a – Ch. 149)**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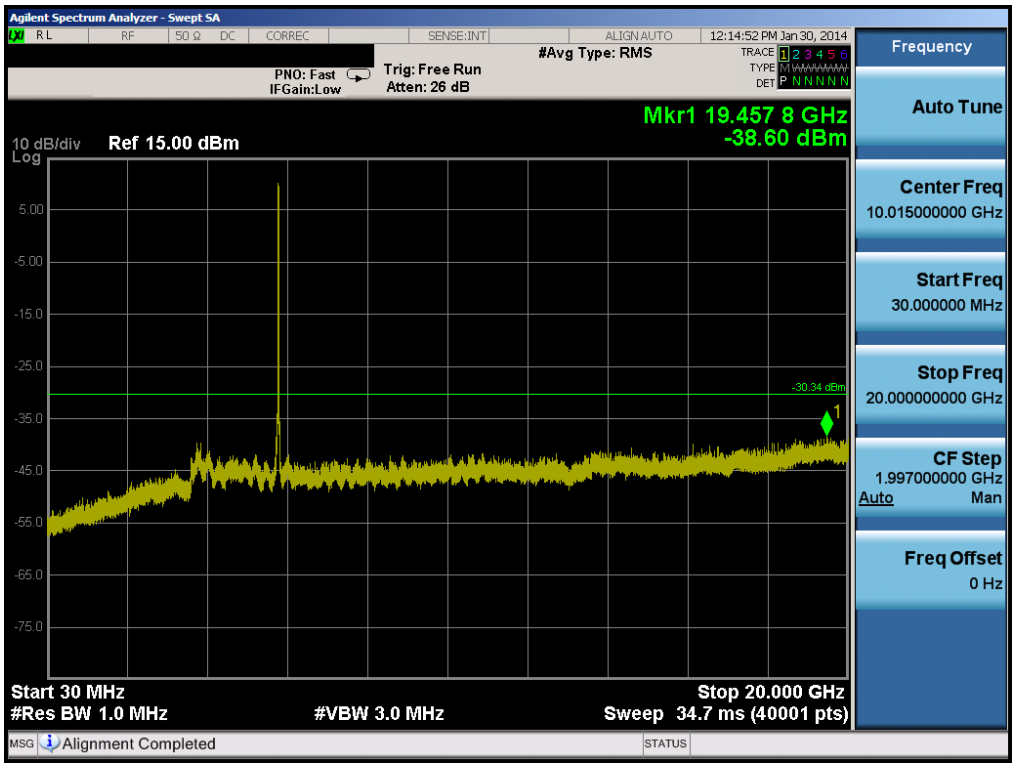
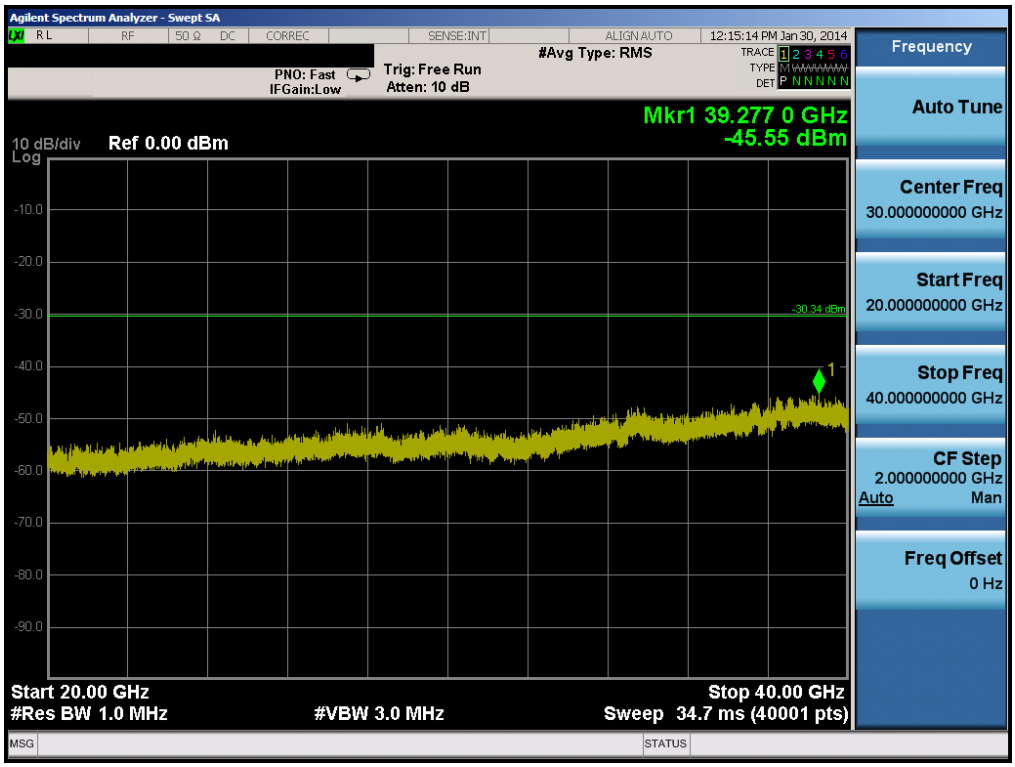



**Plot 6-109. Conducted Spurious Plot (802.11a – Ch. 157)**




**Plot 6-110. Conducted Spurious Plot (802.11a – Ch. 157)**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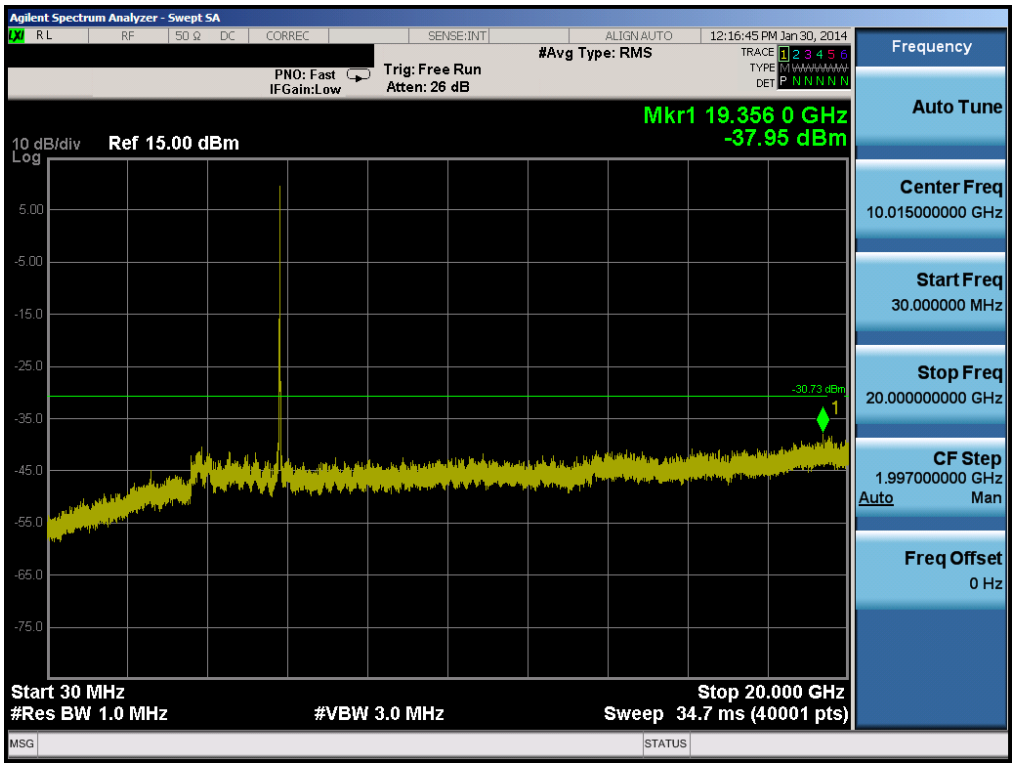
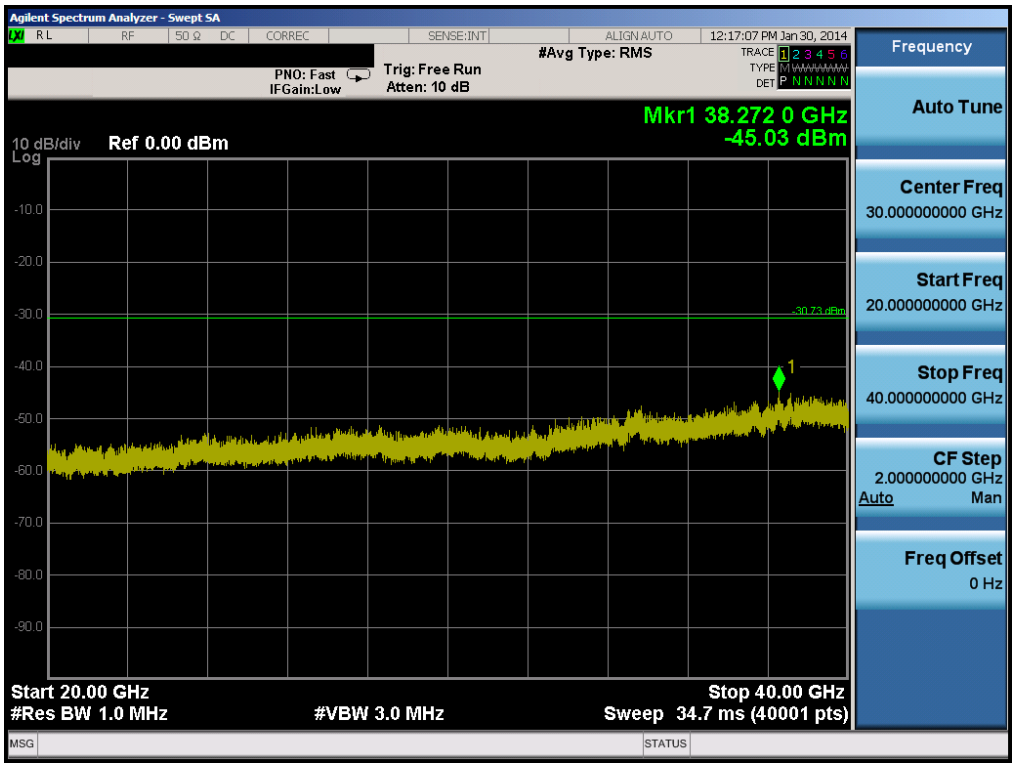



**Plot 6-111. Conducted Spurious Plot (802.11a – Ch. 165)**




**Plot 6-112. Conducted Spurious Plot (802.11a – Ch. 165)**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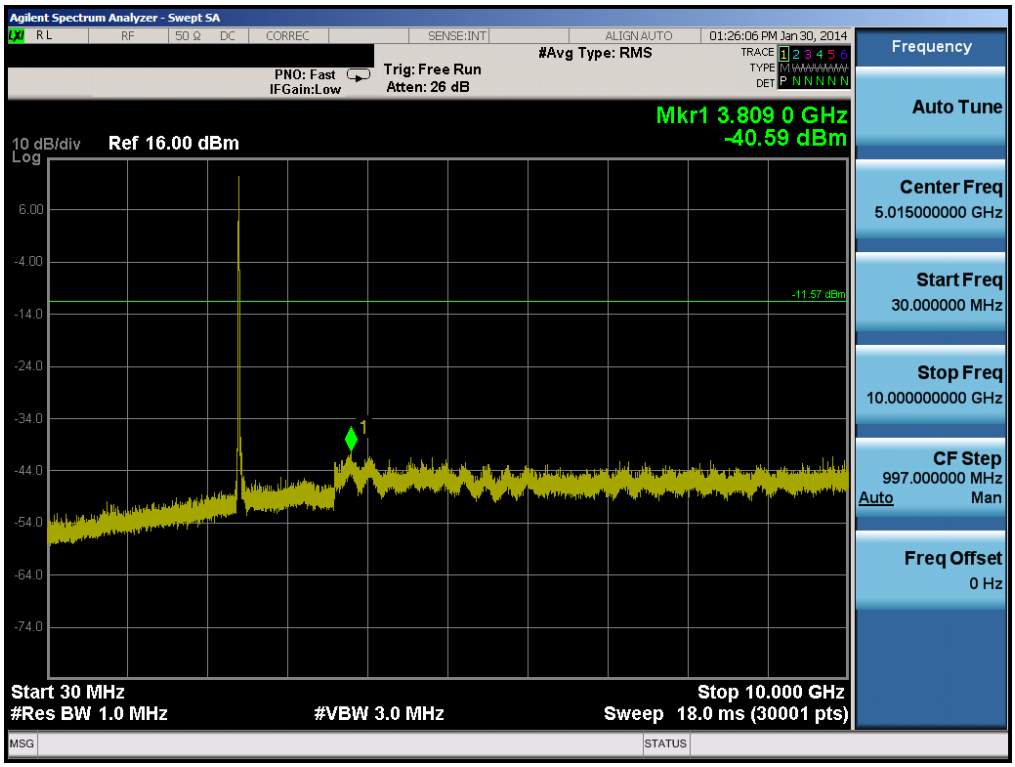
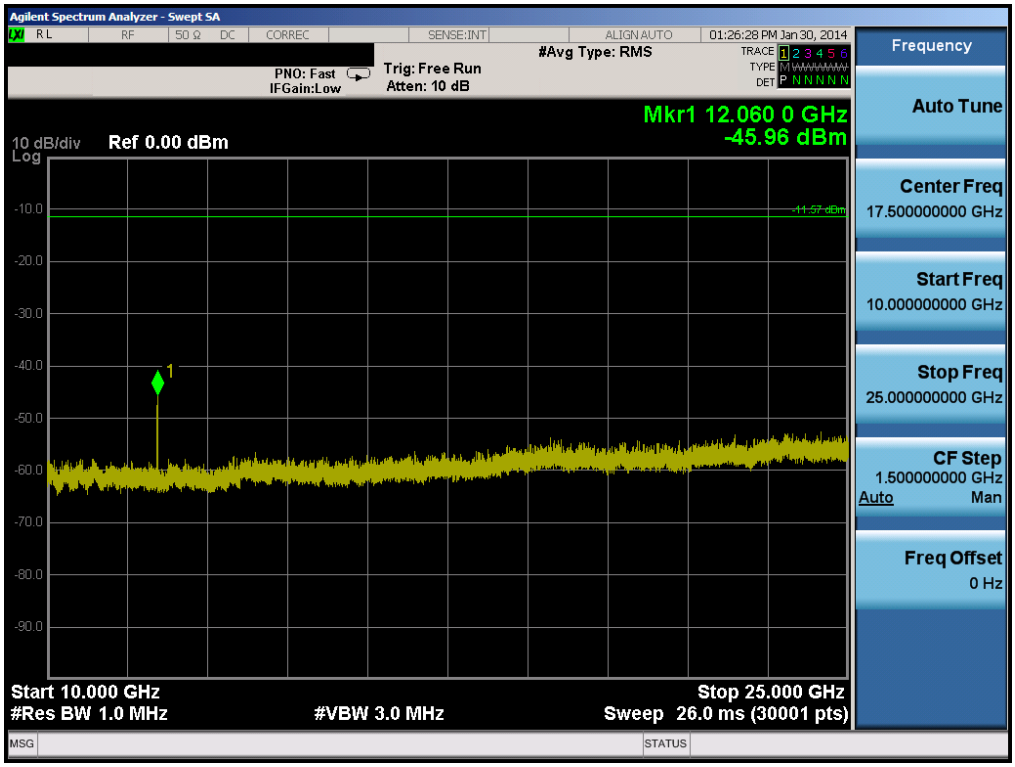
## Antenna-2 Conducted Spurious Emissions




Plot 6-113. Conducted Spurious Plot (802.11b – Ch. 1)




Plot 6-114. Conducted Spurious Plot (802.11b – Ch. 1)



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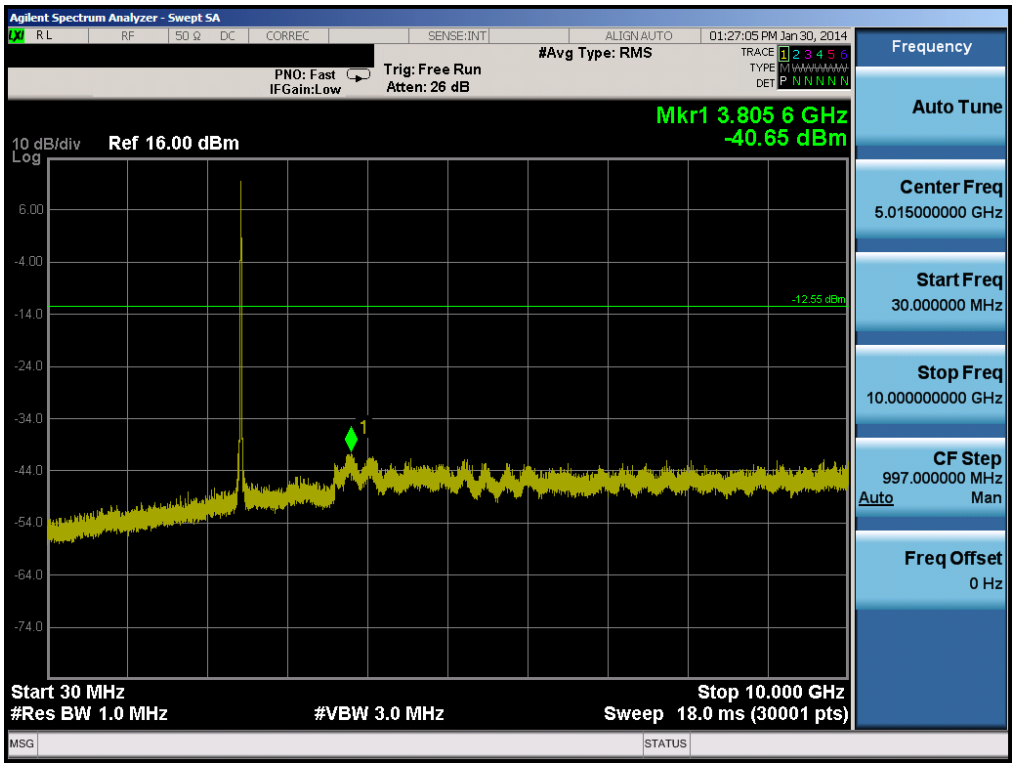
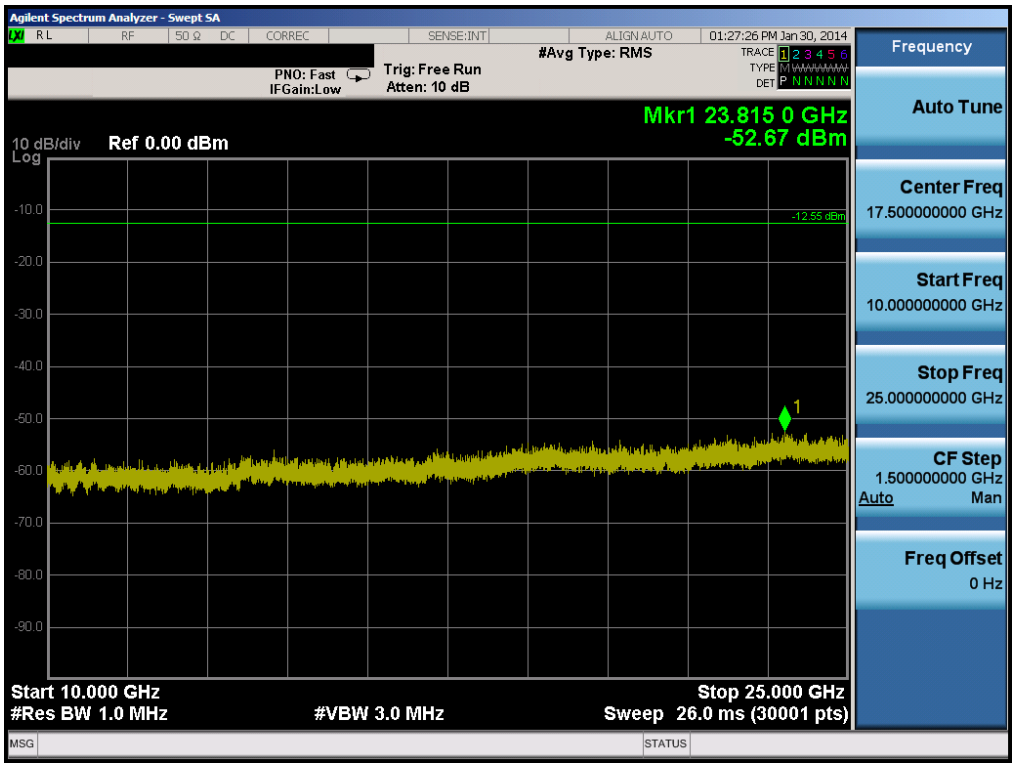



**Plot 6-115. Conducted Spurious Plot (802.11b – Ch. 6)**




**Plot 6-116. Conducted Spurious Plot (802.11b – Ch. 6)**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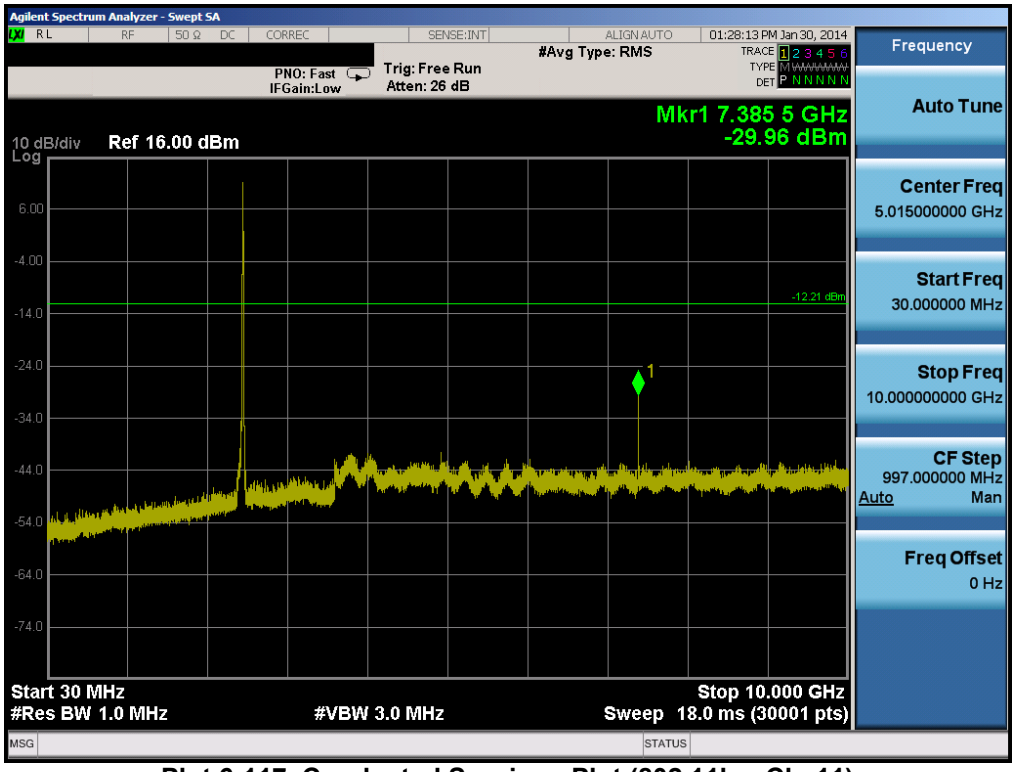
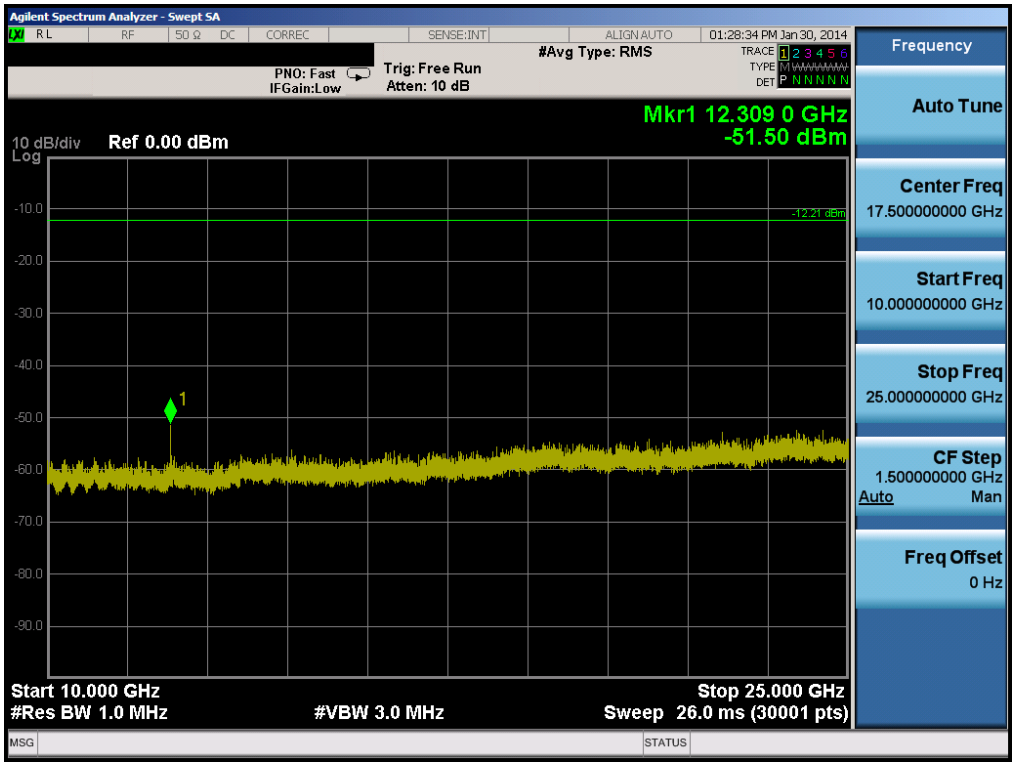



**Plot 6-117. Conducted Spurious Plot (802.11b – Ch. 11)**




**Plot 6-118. Conducted Spurious Plot (802.11b – Ch. 11)**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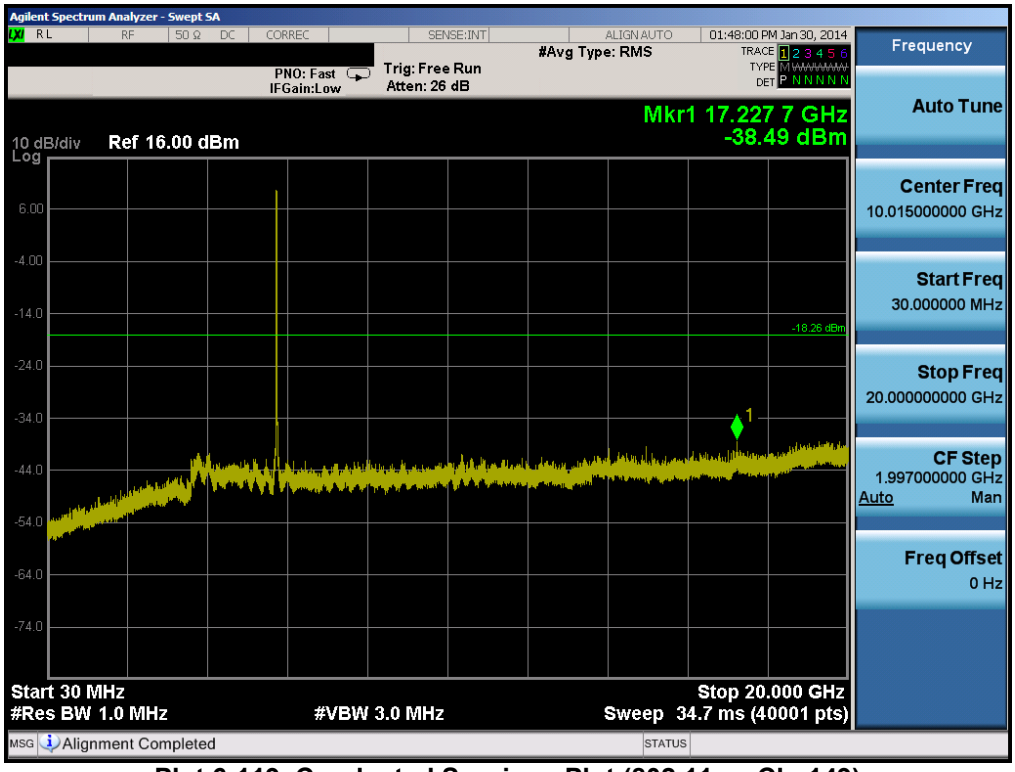
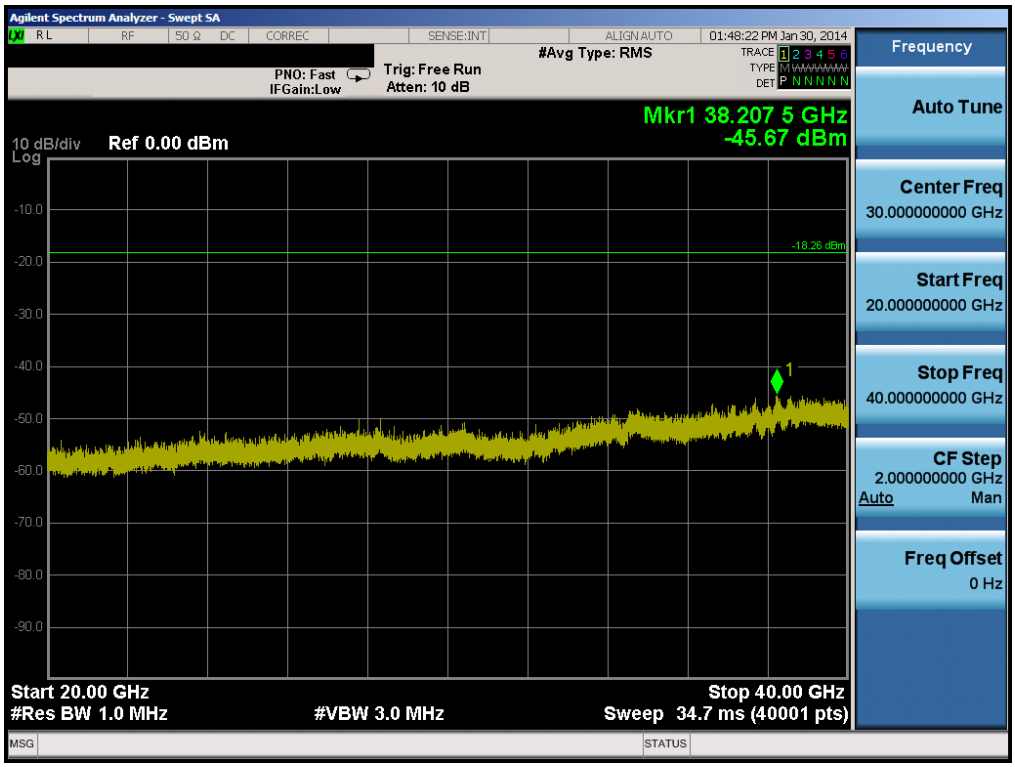



**Plot 6-119. Conducted Spurious Plot (802.11a – Ch. 149)**




**Plot 6-120. Conducted Spurious Plot (802.11a – Ch. 149)**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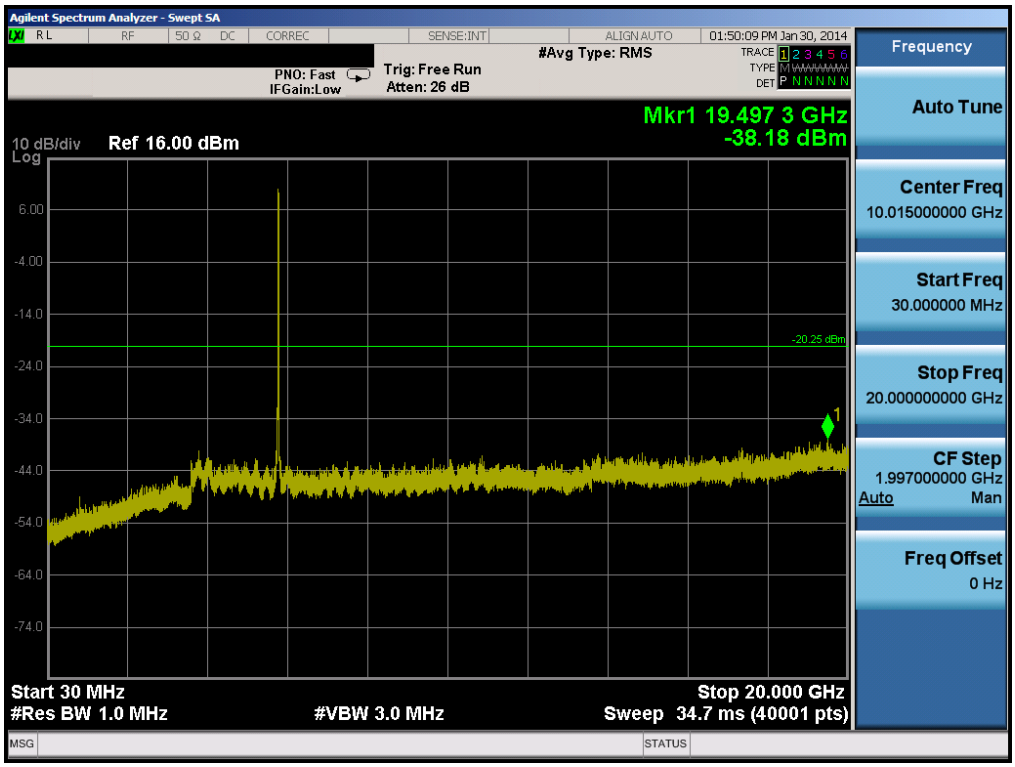
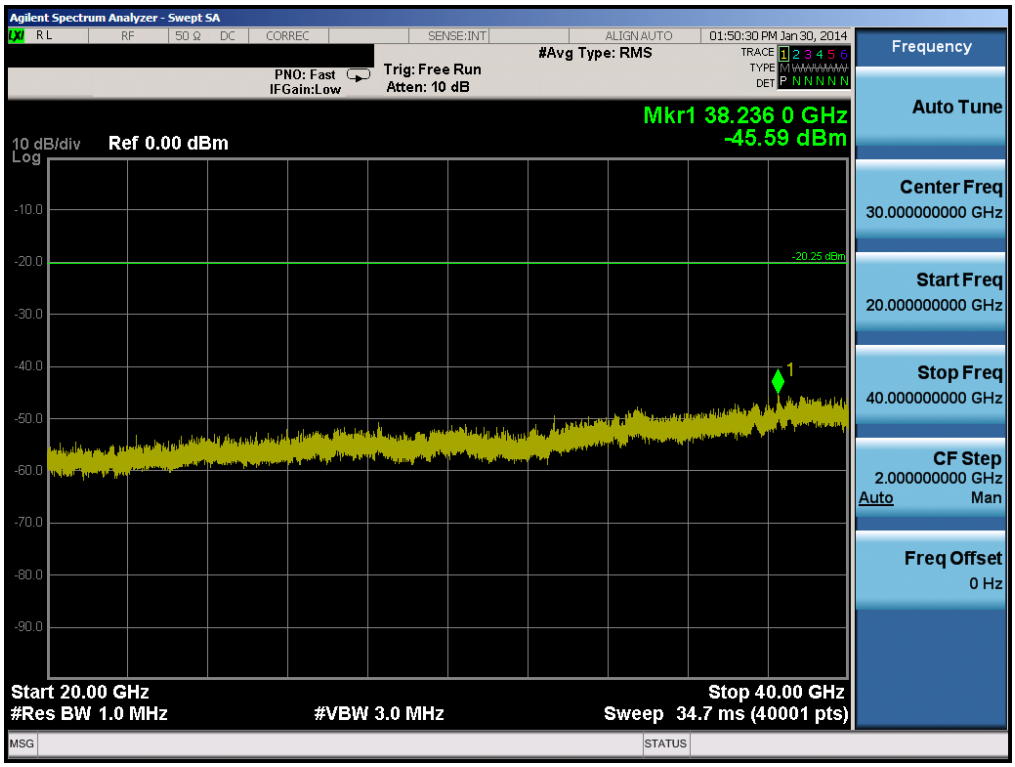



**Plot 6-121. Conducted Spurious Plot (802.11a – Ch. 157)**




**Plot 6-122. Conducted Spurious Plot (802.11a – Ch. 157)**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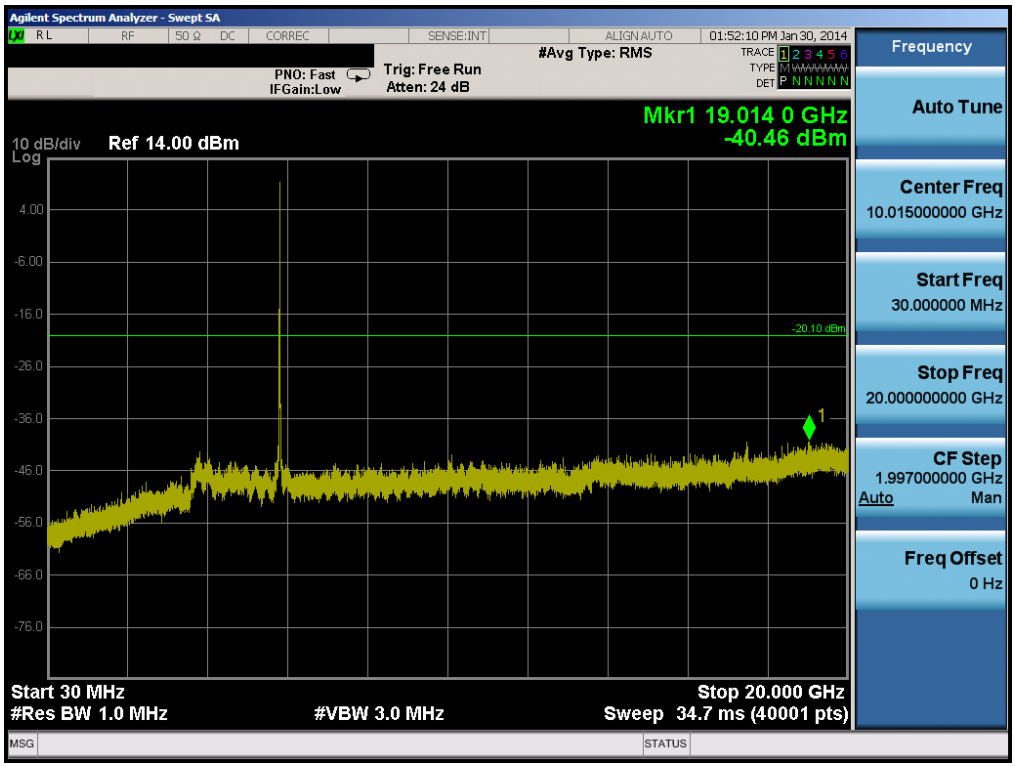
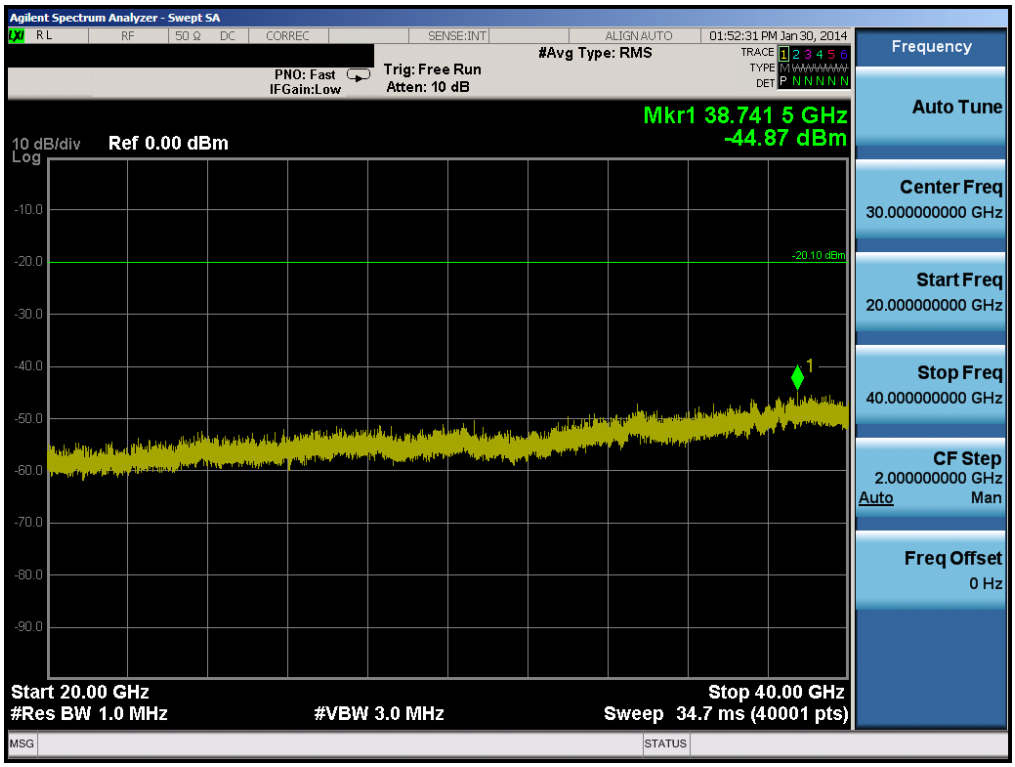



**Plot 6-123. Conducted Spurious Plot (802.11a – Ch. 165)**




**Plot 6-124. Conducted Spurious Plot (802.11a – Ch. 165)**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## 6.7 Radiated Spurious Emission Measurements

**§15.247(d) §15.205 & §15.209**

### Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

***All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 6-37 per Section 15.209.***

| Frequency | Field Strength [µV/m] | Measured Distance [Meters] |
|---|---|---|
| 0.009 – 0.490 MHz | 2400/F (kHz) | 300 |
| 0.490 – 1.705 MHz | 24000/F (kHz) | 30 |
| 1.705 – 30.00 MHz | 30 | 30 |
| 30.00 – 88.00 MHz | 100 | 3 |
| 88.00 – 216.0 MHz | 150 | 3 |
| 216.0 – 960.0 MHz | 200 | 3 |
| Above 960.0 MHz | 500 | 3 |

**Table 6-37. Radiated Limits**

### Test Procedures Used

KDB 558074 v03r01 – Section 12.2.5 (average power measurements)

KDB 558074 v03r01 – Section 12.2.4 (peak power measurements)

### Test Settings

#### Average Field Strength Measurements per Section 12.2.5.1 of KDB 558074 v03r01

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be ≥ 2 x span/RBW)
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces


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**Peak Field Strength Measurements per Section 12.2.4 of KDB 558074 v03r01**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Test Setup**

The EUT and measurement equipment were set up as shown in the diagram below.

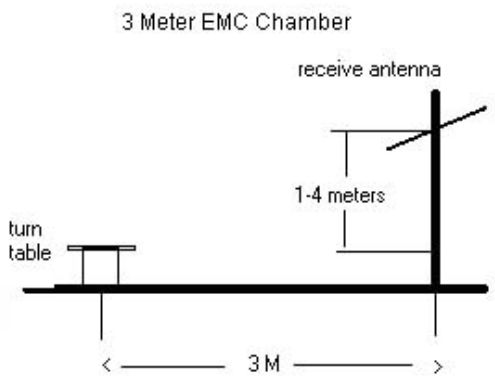


**Figure 6-7. Test Instrument & Measurement Setup**


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## Test Notes

1. The optional test procedures for antenna port conducted measurements of unwanted emissions per the guidance of KDB 558074 v03r01 were not used to evaluate this device for compliance to radiated limits. All radiated spurious emissions levels were measured in a radiated test setup.
2. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 6-10.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. The EUT is supplied with a new/fully-recharged battery. The battery for this model EB-BG900BBU contains an embedded NFC antenna.
5. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
6. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
7. Average levels at -135dBm and peak levels at -125dBm represent the analyzer noise floor and signify that no emission was detected.
8. Significant radiated spurious emissions levels were not found for MIMO test configurations.

## Sample Calculations

### Determining Spurious Emissions Levels

- Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$
- AFCL $_{[dB/m]}$ = Antenna Factor $_{[dB/m]}$ + Cable Loss $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

### Radiated Band Edge Measurement Offset

- The amplitude offset shown in the radiated restricted band edge plots in Section 6.8 was calculated using the formula:
  Offset (dB) = (Antenna Factor + Cable Loss + 10 dB Attenuator) – Preamplifier Gain


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## Antenna-1 Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

Worst Case Mode: 802.11b
Worst Case Transfer Rate: 1 Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2412MHz
Channel: 01

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 4824.00 | -94.64 | Avg | H | 40.23 | 52.59 | 53.98 | -1.39 |
| 4824.00 | -91.08 | Peak | H | 40.23 | 56.15 | 73.98 | -17.83 |
| 12060.00 | -135.00 | Avg | H | 51.02 | 23.02 | 53.98 | -30.96 |
| 12060.00 | -125.00 | Peak | H | 51.02 | 33.02 | 73.98 | -40.96 |

**Table 6-38. Radiated Measurements**

Worst Case Mode: 802.11b
Worst Case Transfer Rate: 1 Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2437MHz
Channel: 06

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 4874.00 | -95.30 | Avg | H | 40.30 | 52.00 | 53.98 | -1.98 |
| 4874.00 | -91.54 | Peak | H | 40.30 | 55.76 | 73.98 | -18.22 |
| 7311.00 | -107.58 | Avg | H | 43.02 | 42.44 | 53.98 | -11.54 |
| 7311.00 | -97.68 | Peak | H | 43.02 | 52.34 | 73.98 | -21.64 |
| 12185.00 | -135.00 | Avg | H | 51.95 | 23.95 | 53.98 | -30.03 |
| 12185.00 | -125.00 | Peak | H | 51.95 | 33.95 | 73.98 | -40.03 |

**Table 6-39. Radiated Measurements**


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Worst Case Mode: 802.11b
Worst Case Transfer Rate: 1 Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2462MHz
Channel: 11

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 4924.00 | -99.26 | Avg | H | 40.35 | 48.09 | 53.98 | -5.89 |
| 4924.00 | -94.40 | Peak | H | 40.35 | 52.95 | 73.98 | -21.03 |
| 7386.00 | -135.00 | Avg | H | 42.97 | 14.97 | 53.98 | -39.01 |
| 7386.00 | -125.00 | Peak | H | 42.97 | 24.97 | 73.98 | -49.01 |
| 12310.00 | -135.00 | Avg | H | 52.84 | 24.84 | 53.98 | -29.14 |
| 12310.00 | -125.00 | Peak | H | 52.84 | 34.84 | 73.98 | -39.14 |

**Table 6-40. Radiated Measurements**

Worst Case Mode: 802.11b
Worst Case Transfer Rate: 1 Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2437MHz
Channel: 06

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 4874.00 | -96.21 | Avg | H | 40.30 | 51.09 | 53.98 | -2.89 |
| 4874.00 | -92.44 | Peak | H | 40.30 | 54.86 | 73.98 | -19.12 |
| 7311.00 | -135.00 | Avg | H | 43.02 | 15.02 | 53.98 | -38.96 |
| 7311.00 | -125.00 | Peak | H | 43.02 | 25.02 | 73.98 | -48.96 |
| 12185.00 | -135.00 | Avg | H | 51.95 | 23.95 | 53.98 | -30.03 |
| 12185.00 | -125.00 | Peak | H | 51.95 | 33.95 | 73.98 | -40.03 |

**Table 6-41. Radiated Measurements with WCC**


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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5745MHz
Channel: 149

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 11490.00 | -135.00 | Avg | H | 47.45 | 19.45 | 53.98 | -34.52 |
| 11490.00 | -125.00 | Peak | H | 47.45 | 29.45 | 73.98 | -44.52 |
| 22980.00 | -135.00 | Avg | H | 44.46 | 16.46 | 53.98 | -37.51 |
| 22980.00 | -125.00 | Peak | H | 44.46 | 26.46 | 73.98 | -47.51 |

**Table 6-42. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5785MHz
Channel: 157

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 11570.00 | -135.00 | Avg | H | 47.56 | 19.56 | 53.98 | -34.42 |
| 11570.00 | -125.00 | Peak | H | 47.56 | 29.56 | 73.98 | -44.42 |

**Table 6-43. Radiated Measurements**


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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5825MHz
Channel: 165

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 11650.00 | -135.00 | Avg | H | 47.85 | 19.85 | 53.98 | -34.13 |
| 11650.00 | -125.00 | Peak | H | 47.85 | 29.85 | 73.98 | -44.13 |

**Table 6-44. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5785MHz
Channel: 157

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 11570.00 | -135.00 | Avg | H | 47.56 | 19.56 | 53.98 | -34.42 |
| 11570.00 | -125.00 | Peak | H | 47.56 | 29.56 | 73.98 | -44.42 |

**Table 6-45. Radiated Measurements with WCC**


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## Antenna-2 Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

Worst Case Mode: 802.11b
Worst Case Transfer Rate: 1 Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2412MHz
Channel: 01

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 4824.00 | -102.43 | Avg | H | 40.23 | 44.80 | 53.98 | -9.18 |
| 4824.00 | -96.50 | Peak | H | 40.23 | 50.73 | 73.98 | -23.25 |
| 12060.00 | -135.00 | Avg | H | 51.02 | 23.02 | 53.98 | -30.96 |
| 12060.00 | -125.00 | Peak | H | 51.02 | 33.02 | 73.98 | -40.96 |

**Table 6-46. Radiated Measurements**

Worst Case Mode: 802.11b
Worst Case Transfer Rate: 1 Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2437MHz
Channel: 06

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 4874.00 | -110.83 | Avg | H | 40.30 | 36.47 | 53.98 | -17.51 |
| 4874.00 | -100.76 | Peak | H | 40.30 | 46.54 | 73.98 | -27.44 |
| 7311.00 | -135.00 | Avg | H | 43.02 | 15.02 | 53.98 | -38.96 |
| 7311.00 | -125.00 | Peak | H | 43.02 | 25.02 | 73.98 | -48.96 |
| 12185.00 | -135.00 | Avg | H | 51.95 | 23.95 | 53.98 | -30.03 |
| 12185.00 | -125.00 | Peak | H | 51.95 | 33.95 | 73.98 | -40.03 |

**Table 6-47. Radiated Measurements**


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Worst Case Mode: 802.11b
Worst Case Transfer Rate: 1 Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2462MHz
Channel: 11

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 4924.00 | -101.08 | Avg | H | 40.35 | 46.27 | 53.98 | -7.71 |
| 4924.00 | -96.32 | Peak | H | 40.35 | 51.03 | 73.98 | -22.95 |
| 7386.00 | -135.00 | Avg | H | 42.97 | 14.97 | 53.98 | -39.01 |
| 7386.00 | -125.00 | Peak | H | 42.97 | 24.97 | 73.98 | -49.01 |
| 12310.00 | -135.00 | Avg | H | 52.84 | 24.84 | 53.98 | -29.14 |
| 12310.00 | -125.00 | Peak | H | 52.84 | 34.84 | 73.98 | -39.14 |

**Table 6-48. Radiated Measurements**

Worst Case Mode: 802.11b
Worst Case Transfer Rate: 1 Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2462MHz
Channel: 11

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 4924.00 | -100.76 | Avg | H | 40.30 | 46.54 | 53.98 | -7.44 |
| 4924.00 | -95.34 | Peak | H | 40.30 | 51.96 | 73.98 | -22.02 |
| 7386.00 | -135.00 | Avg | H | 43.02 | 15.02 | 53.98 | -38.96 |
| 7386.00 | -125.00 | Peak | H | 43.02 | 25.02 | 73.98 | -48.96 |
| 12310.00 | -135.00 | Avg | H | 51.95 | 23.95 | 53.98 | -30.03 |
| 12310.00 | -125.00 | Peak | H | 51.95 | 33.95 | 73.98 | -40.03 |

**Table 6-49. Radiated Measurements with WCC**


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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5745MHz
Channel: 149

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 11490.00 | -135.00 | Avg | H | 47.45 | 19.45 | 53.98 | -34.52 |
| 11490.00 | -125.00 | Peak | H | 47.45 | 29.45 | 73.98 | -44.52 |
| 22980.00 | -135.00 | Avg | H | 44.46 | 16.46 | 53.98 | -37.51 |
| 22980.00 | -125.00 | Peak | H | 44.46 | 26.46 | 73.98 | -47.51 |

**Table 6-50. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5785MHz
Channel: 157

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 11570.00 | -135.00 | Avg | H | 47.56 | 19.56 | 53.98 | -34.42 |
| 11570.00 | -125.00 | Peak | H | 47.56 | 29.56 | 73.98 | -44.42 |

**Table 6-51. Radiated Measurements**


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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5825MHz
Channel: 165

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 11650.00 | -135.00 | Avg | H | 47.85 | 19.85 | 53.98 | -34.13 |
| 11650.00 | -125.00 | Peak | H | 47.85 | 29.85 | 73.98 | -44.13 |

**Table 6-52. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5785MHz
Channel: 157

| Frequency [MHz] | Analyzer Level [dBm] | Detector | Pol. [H/V] | AFCL [dB/m] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 11570.00 | -135.00 | Avg | H | 47.56 | 19.56 | 53.98 | -34.42 |
| 11570.00 | -125.00 | Peak | H | 47.56 | 29.56 | 73.98 | -44.42 |

**Table 6-53. Radiated Measurements with WCC**


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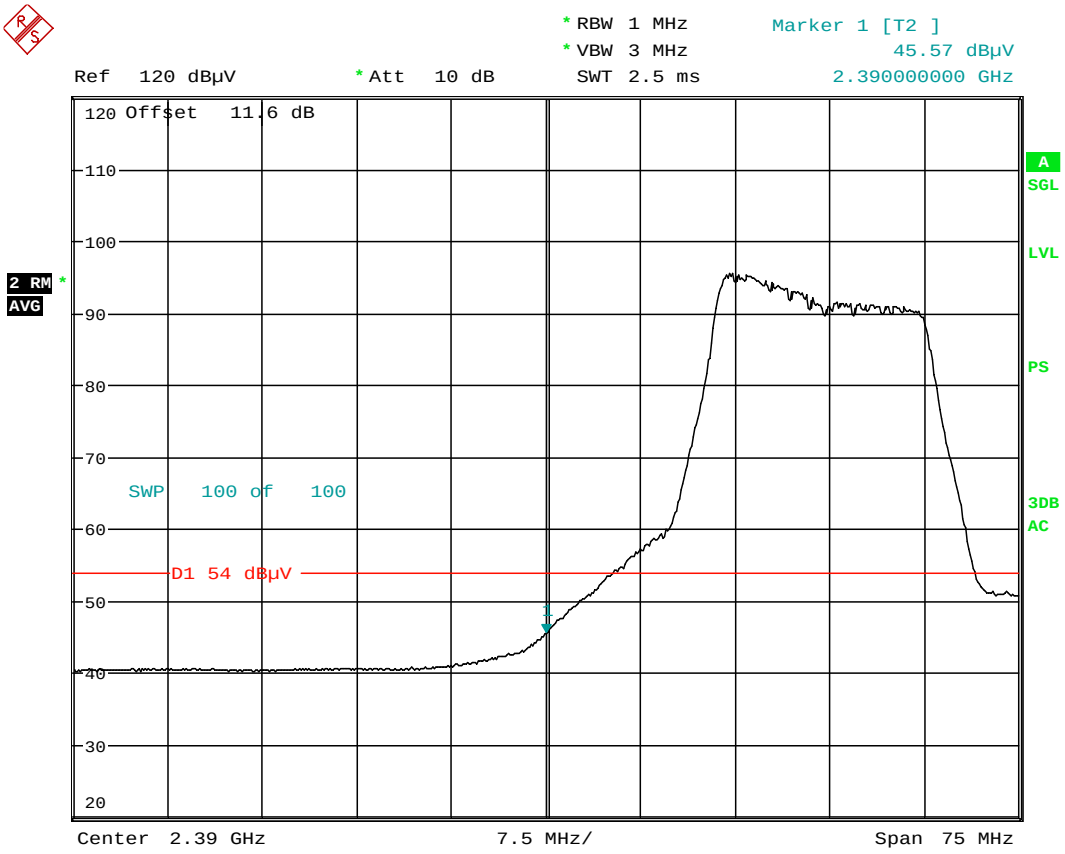
## 6.8 Radiated Restricted Band Edge Measurements

**§15.205 §15.209**

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

| | |
|---|---|
| Worst Case Mode: | 802.11g |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 2412MHz |
| Channel: | 1 |




Date: 3.FEB.2014 22:13:08

**Plot 6-125. Radiated Restricted Lower Band Edge Measurement (Average)**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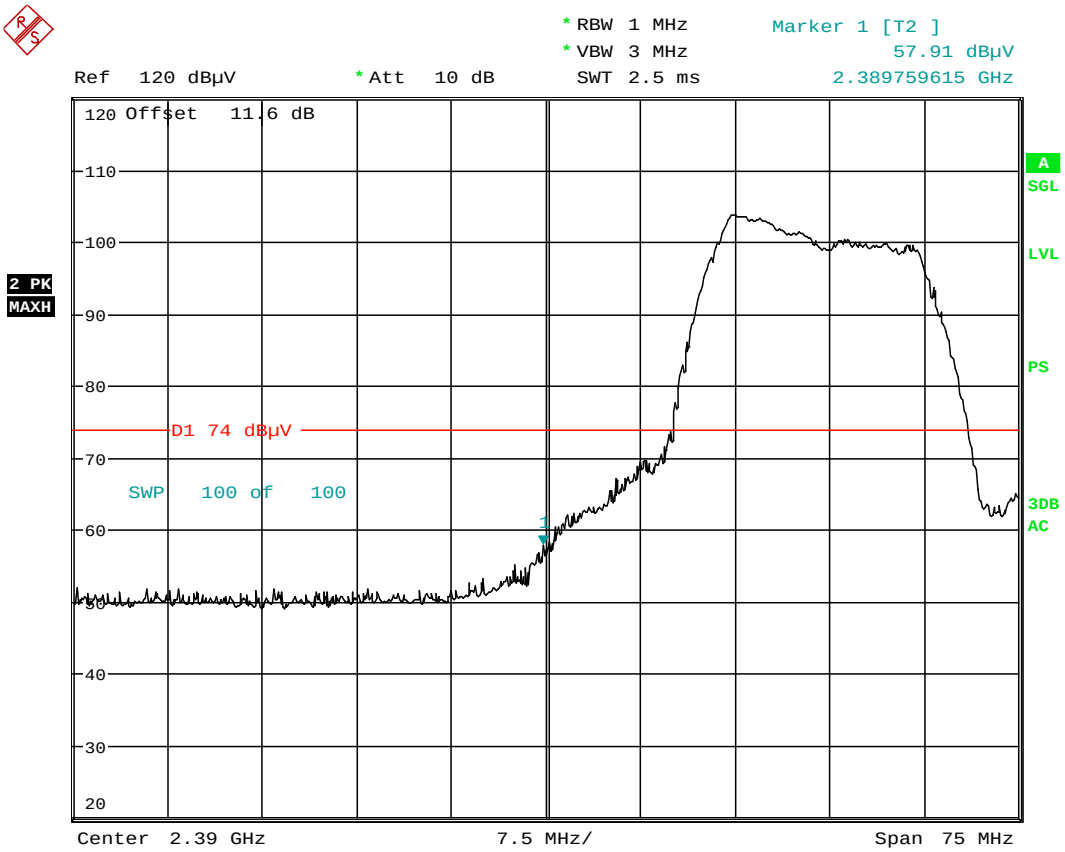
## Radiated Restricted Band Edge Measurements (Cont'd)
**§15.205 §15.209**




Date: 3.FEB.2014 22:14:02

**Plot 6-126. Radiated Restricted Lower Band Edge Measurement (Peak)**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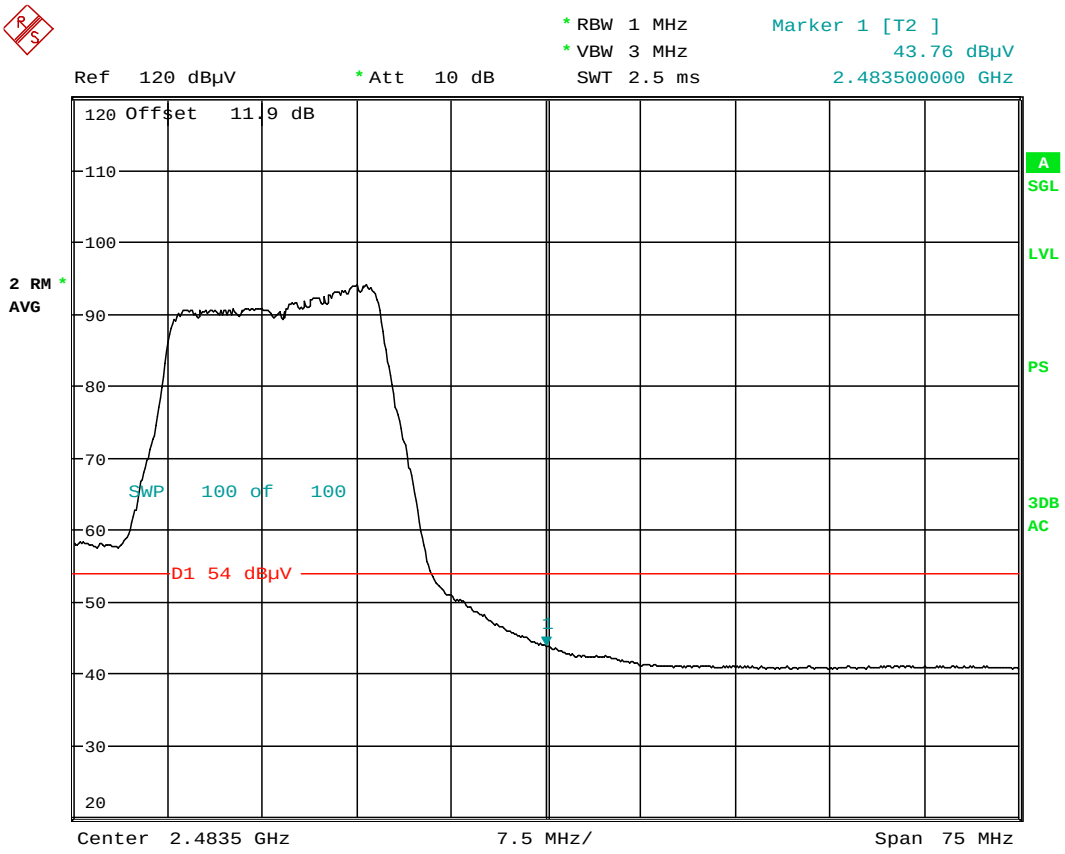
## Radiated Restricted Band Edge Measurements (Cont'd)
**§15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11g |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 2462MHz |
| Channel: | 11 |




Date: 3.FEB.2014 22:19:34

**Plot 6-127. Radiated Restricted Upper Band Edge Measurement (Average)**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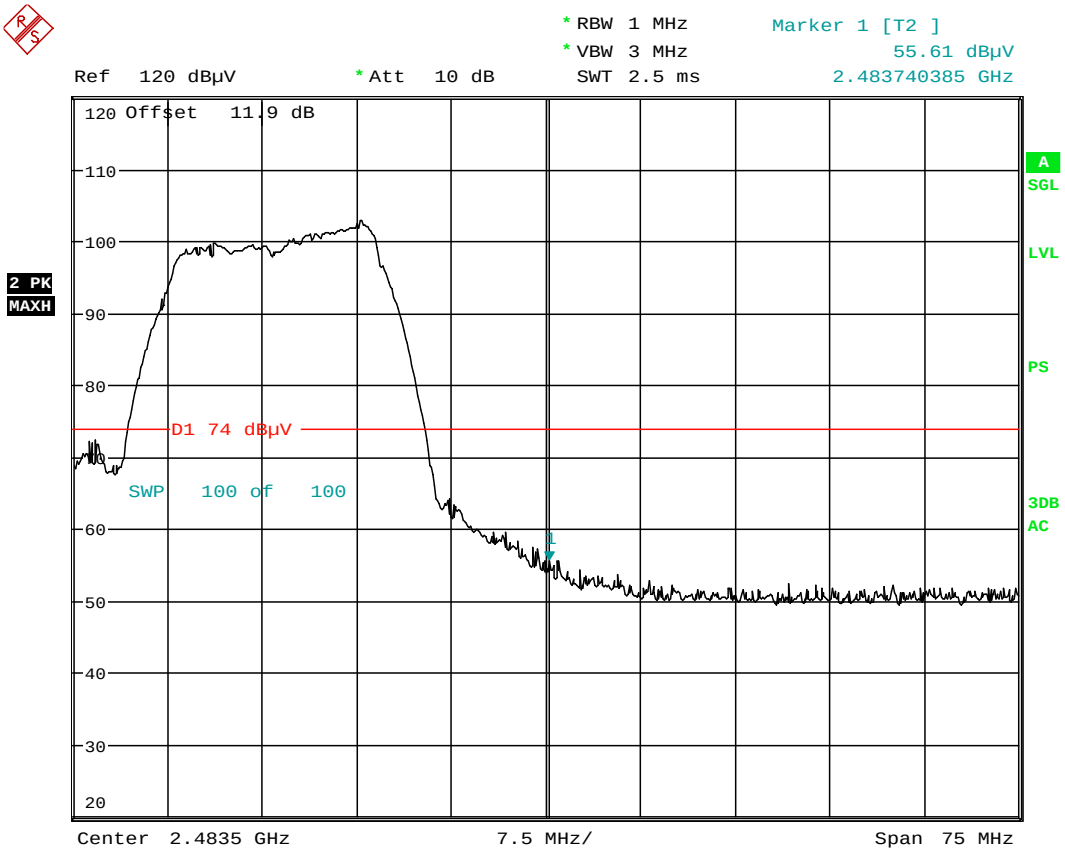
# Radiated Restricted Band Edge Measurements (Cont'd)

**§15.205 §15.209**




Date: 3.FEB.2014 22:20:07

**Plot 6-128. Radiated Restricted Upper Band Edge Measurement (Peak)**



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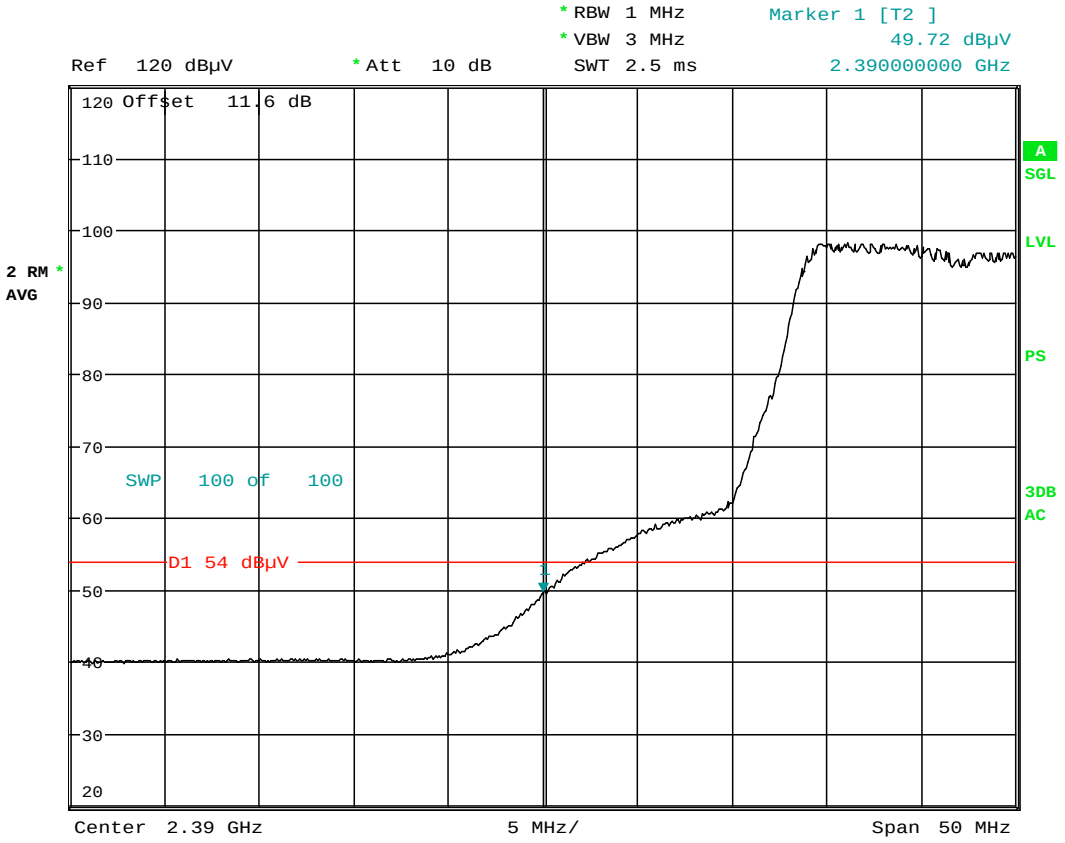
## Radiated Restricted Band Edge Measurements with WCC (Cont'd)

**§15.205 §15.209**

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

| | |
|---|---|
| Worst Case Mode: | 802.11g |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 2412MHz |
| Channel: | 1 |




Date: 15.FEB.2014 06:33:16

**Plot 6-129. Radiated Restricted Lower Band Edge Measurement with WCC (Average)**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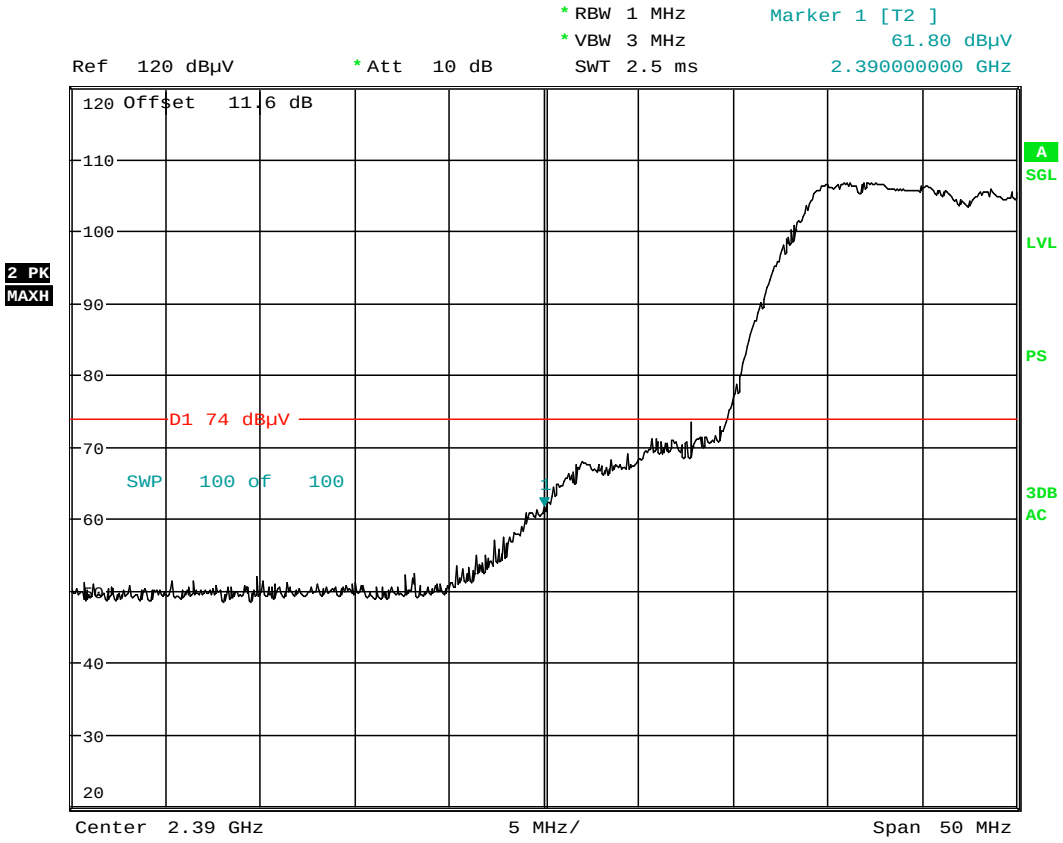
## Radiated Restricted Band Edge Measurements with WCC (Cont'd)
**§15.205 §15.209**




Date: 15.FEB.2014 06:34:05

**Plot 6-130. Radiated Restricted Lower Band Edge Measurement with WCC Peak)**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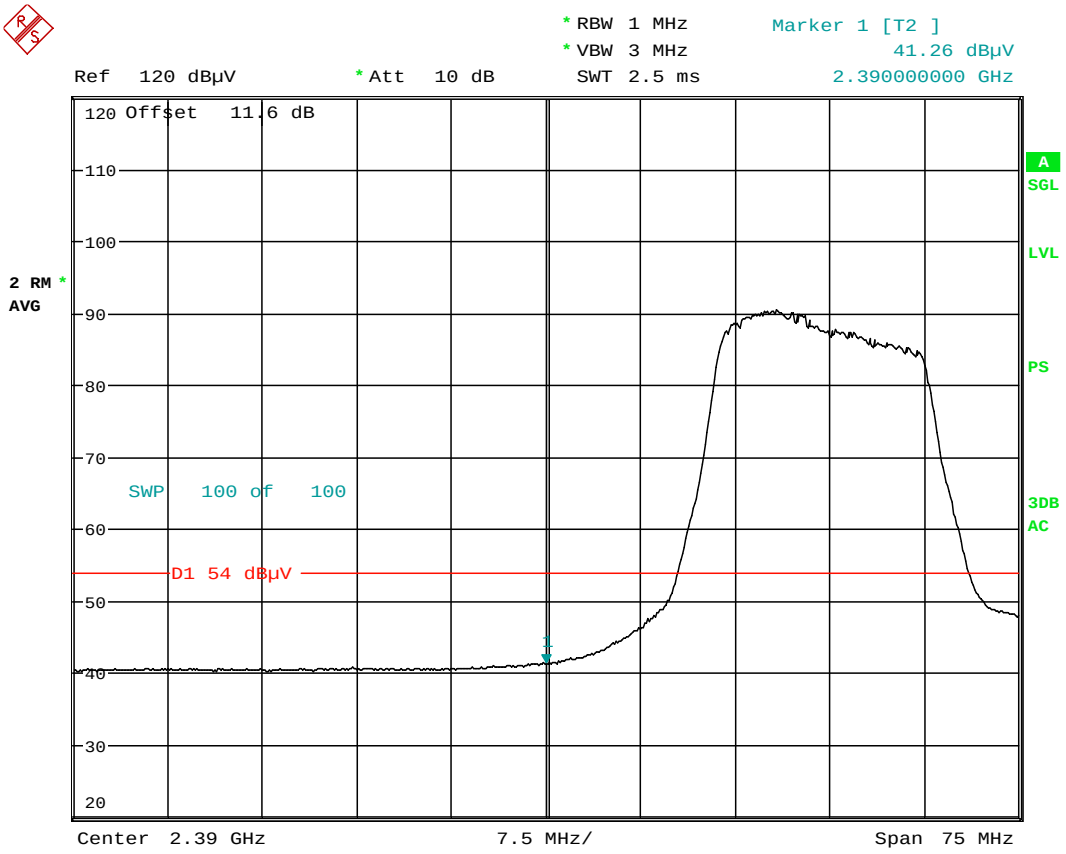
## 6.9 Antenna-2 Radiated Restricted Band Edge Measurements

**§15.205 §15.209**

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

| | |
|---|---|
| Worst Case Mode: | 802.11g |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 2412MHz |
| Channel: | 1 |




Date: 3.FEB.2014 22:33:03

**Plot 6-131. Radiated Restricted Lower Band Edge Measurement (Average)**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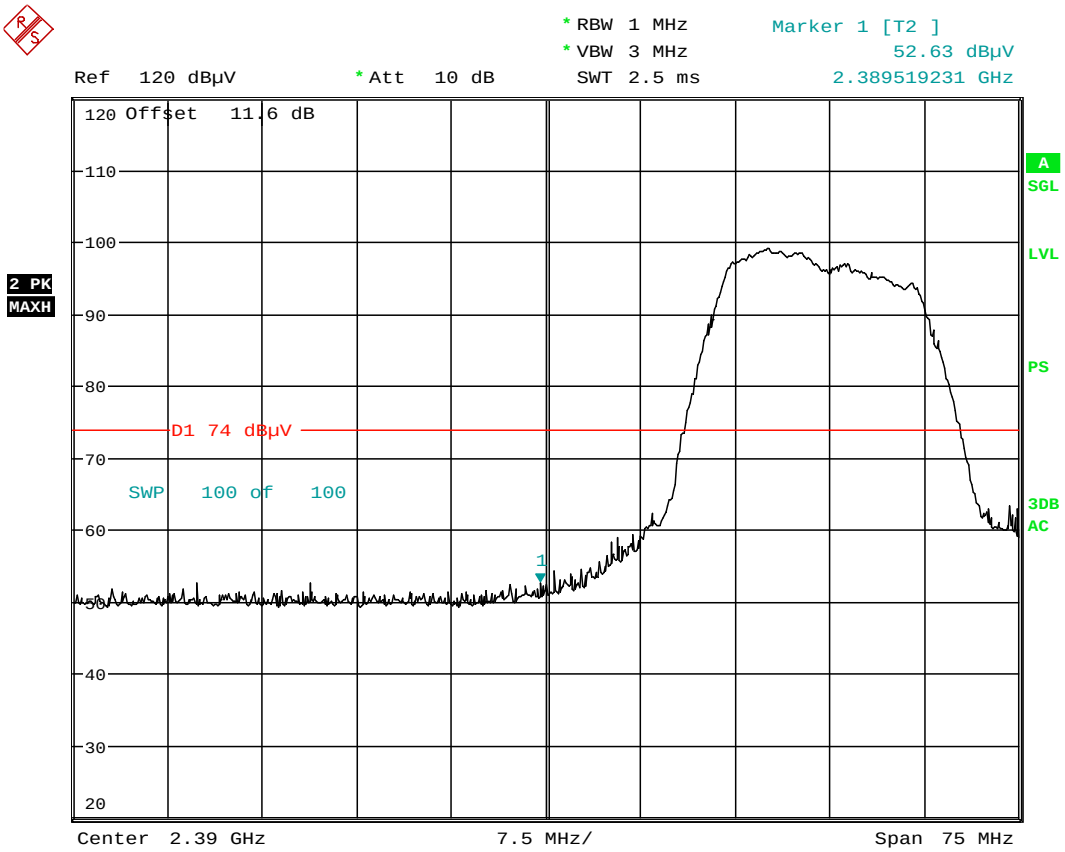
# Radiated Restricted Band Edge Measurements (Cont'd)

**§15.205 §15.209**




Date: 3.FEB.2014 22:33:40

**Plot 6-132. Radiated Restricted Lower Band Edge Measurement (Peak)**



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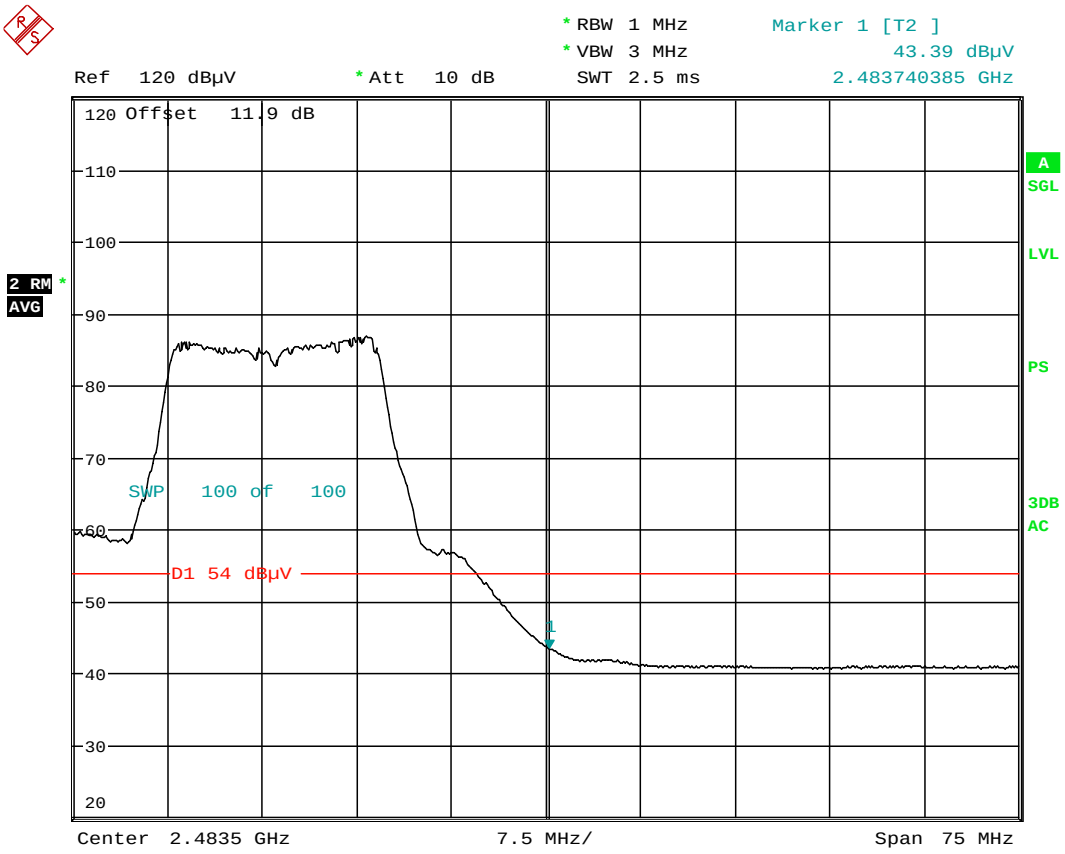
## Radiated Restricted Band Edge Measurements (Cont'd)
**§15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11g |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 2462MHz |
| Channel: | 11 |




Date: 3.FEB.2014 22:26:06

**Plot 6-133. Radiated Restricted Upper Band Edge Measurement (Average)**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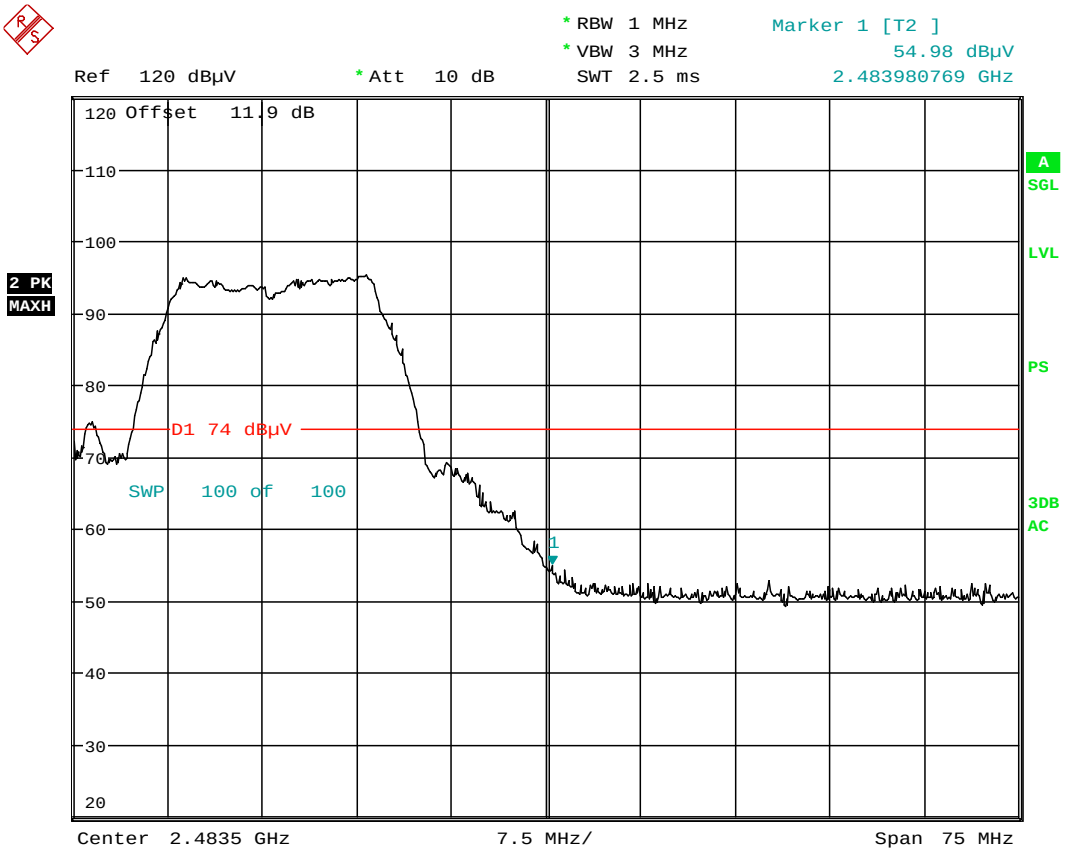
# Radiated Restricted Band Edge Measurements (Cont'd)

**§15.205 §15.209**




Date: 3.FEB.2014 22:26:41

**Plot 6-134. Radiated Restricted Upper Band Edge Measurement (Peak)**



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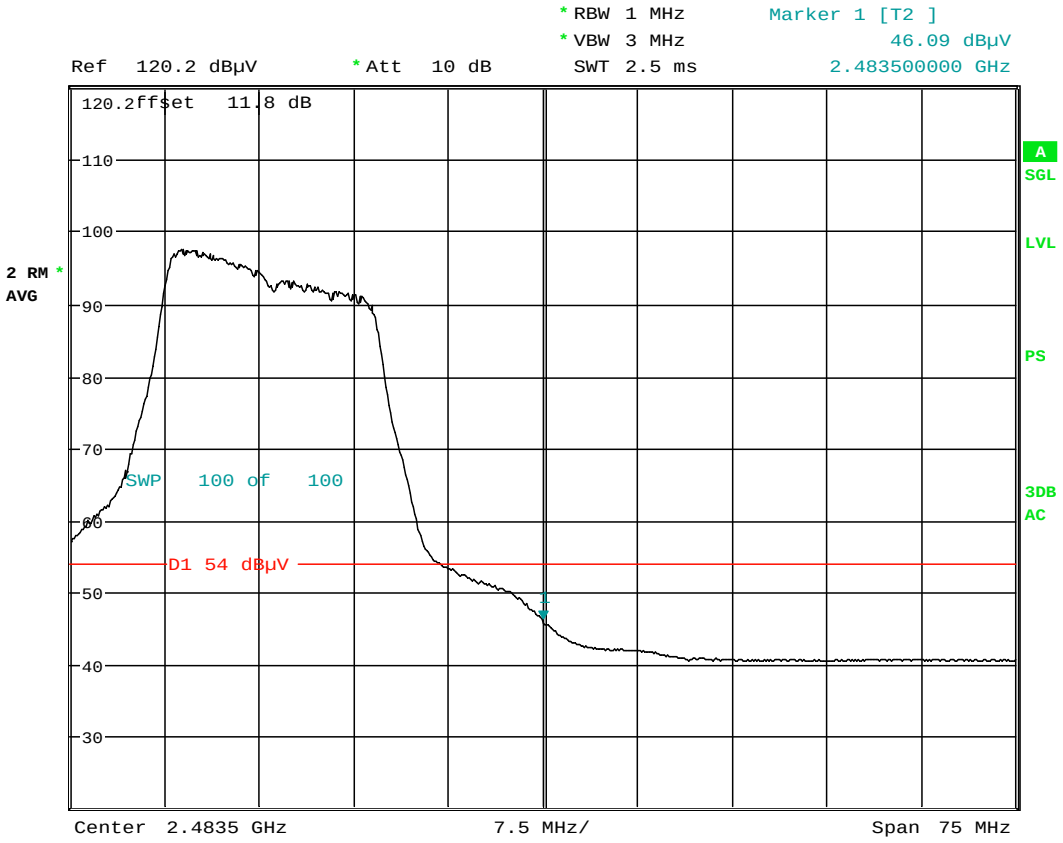
## Radiated Restricted Band Edge Measurements with WCC (Cont'd)
**§15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11g |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 2462MHz |
| Channel: | 11 |




Date: 15.FEB.2014 06:40:48

**Plot 6-135. Radiated Restricted Upper Band Edge Measurement with WCC (Average)**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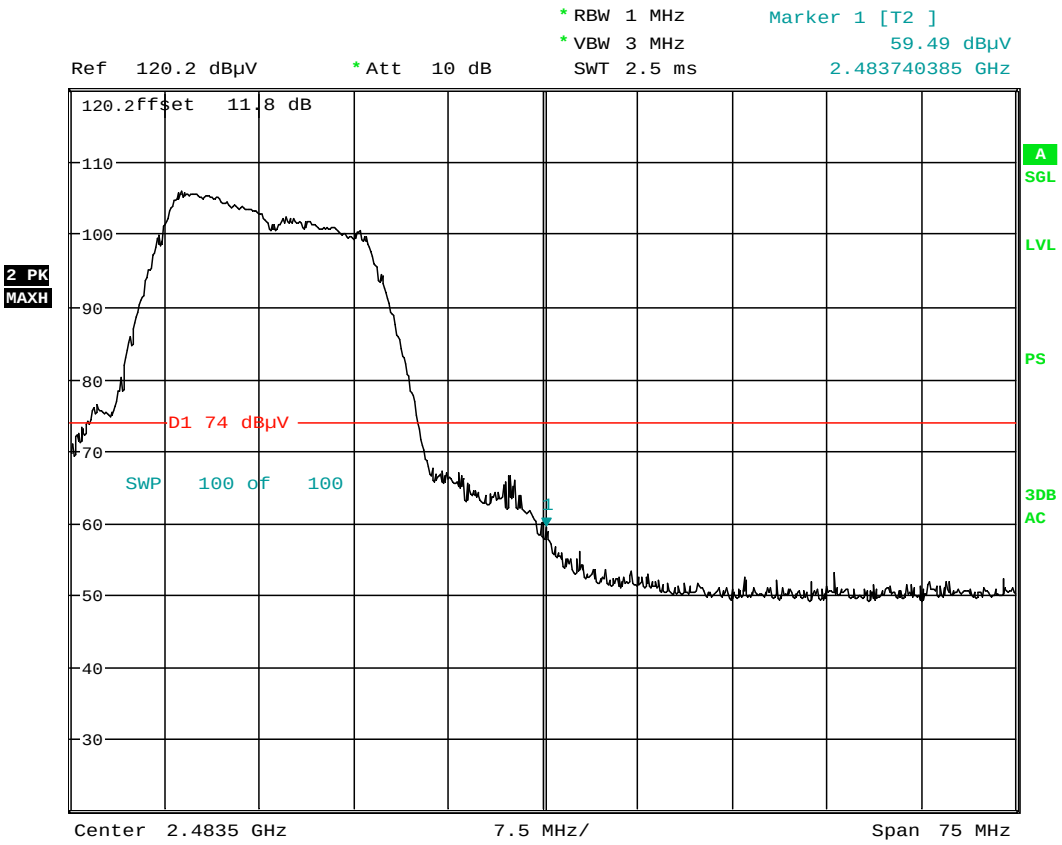
## Radiated Restricted Band Edge Measurements with WCC (Cont'd)
**§15.205 §15.209**




Date: 15.FEB.2014 06:41:44

**Plot 6-136. Radiated Restricted Upper Band Edge Measurement with WCC (Peak)**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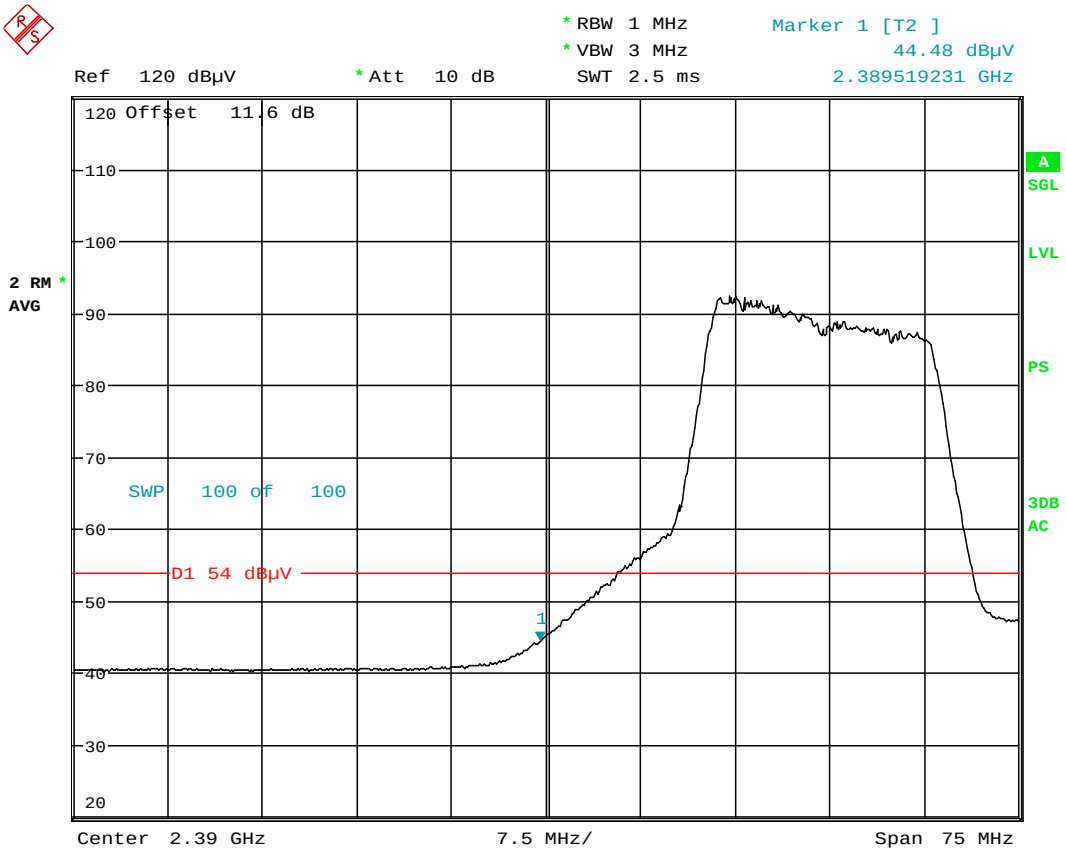
## 6.10 MIMO Radiated Restricted Band Edge Measurements

**§15.205 §15.209**

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

| | |
|---|---|
| Worst Case Mode: | 802.11n |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 2412MHz |
| Channel: | 1 |




Date: 3.FEB.2014 22:39:00

**Plot 6-137. Radiated Restricted Lower Band Edge Measurement (Average)**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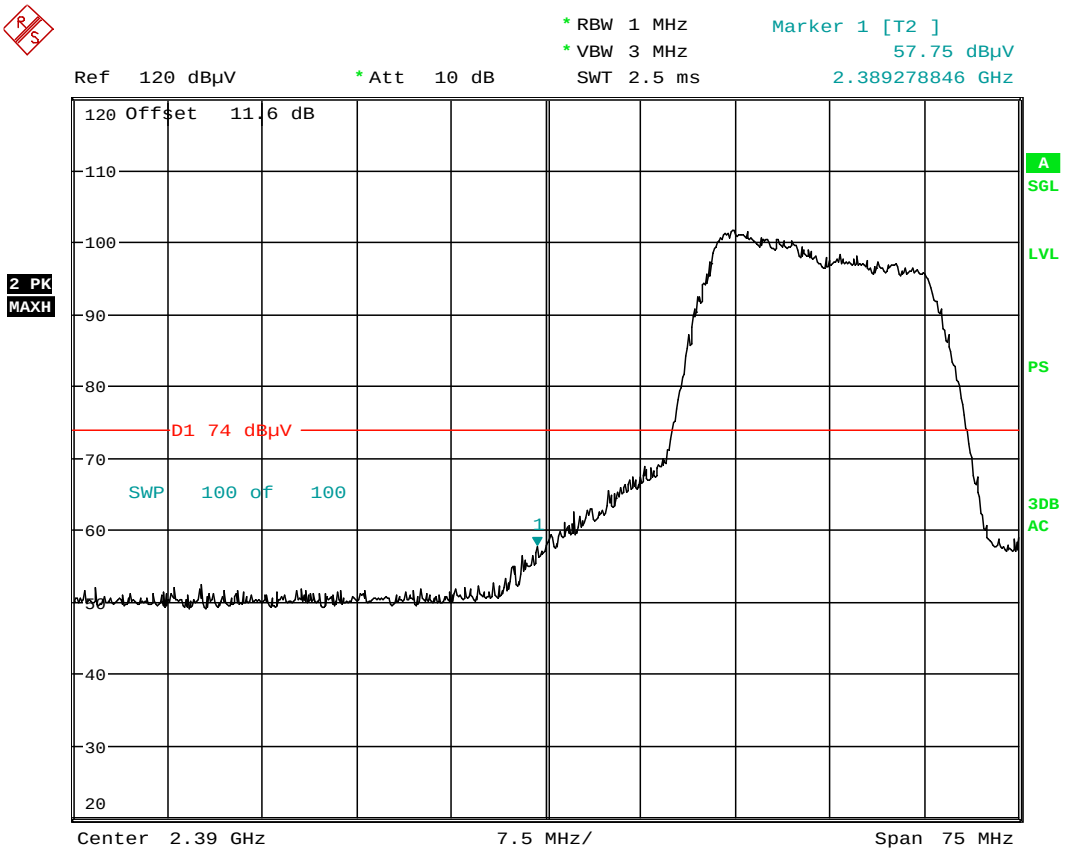
# Radiated Restricted Band Edge Measurements (Cont'd)

**§15.205 §15.209**




Date: 3.FEB.2014 22:39:26

**Plot 6-138. Radiated Restricted Lower Band Edge Measurement (Peak)**



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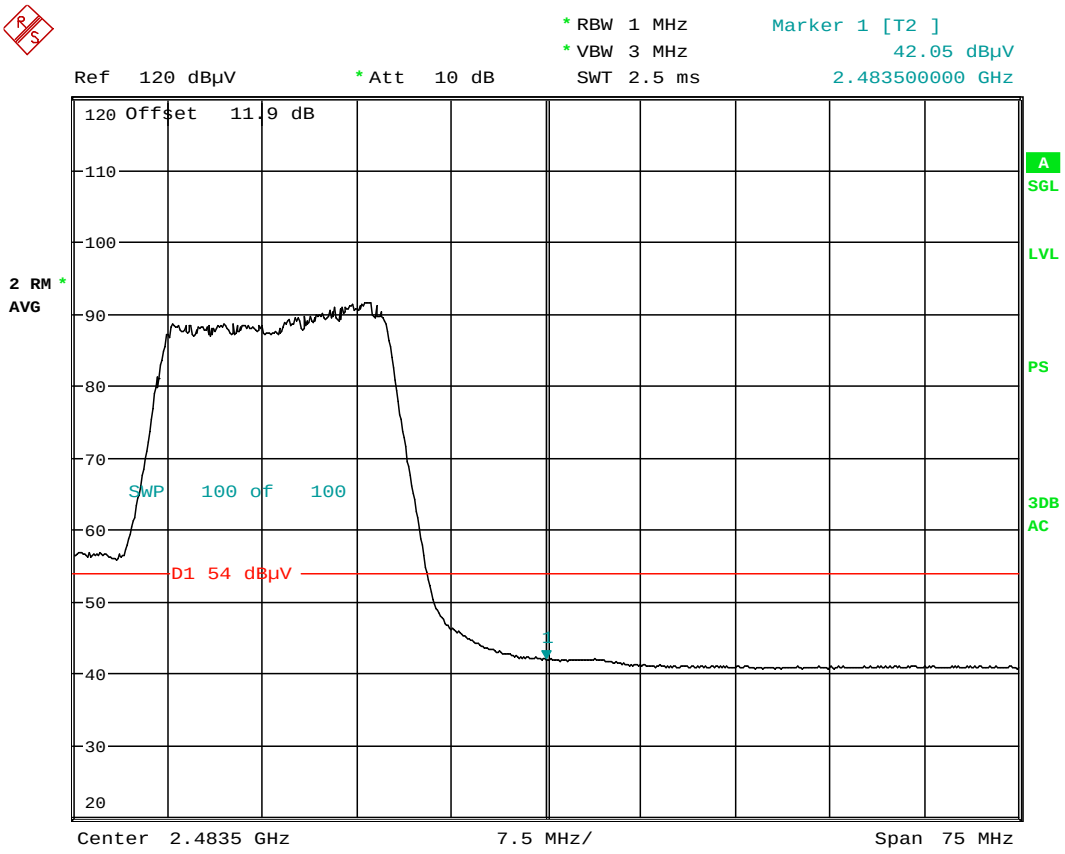
## Radiated Restricted Band Edge Measurements (Cont'd)
**§15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 2462MHz |
| Channel: | 11 |




Date: 3.FEB.2014 22:43:50

**Plot 6-139. Radiated Restricted Upper Band Edge Measurement (Average)**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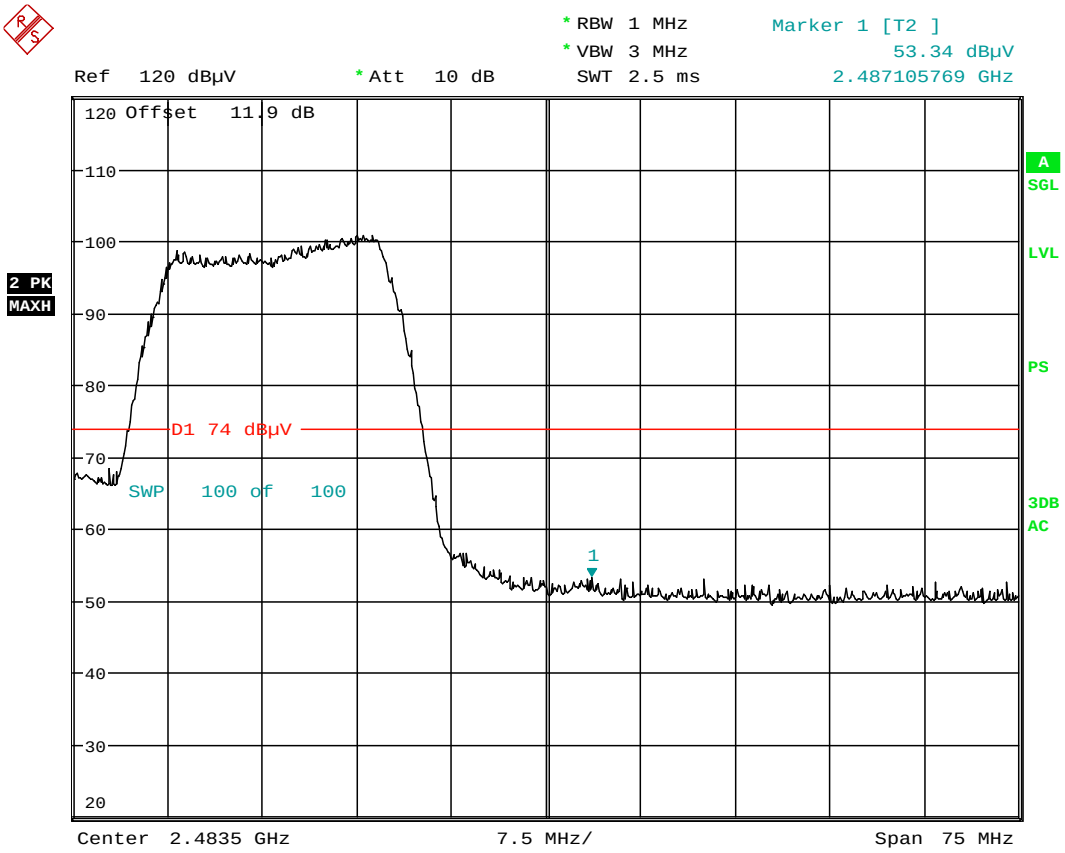
# Radiated Restricted Band Edge Measurements (Cont'd)

**§15.205 §15.209**




Date: 3.FEB.2014 22:44:18

**Plot 6-140. Radiated Restricted Upper Band Edge Measurement (Peak)**



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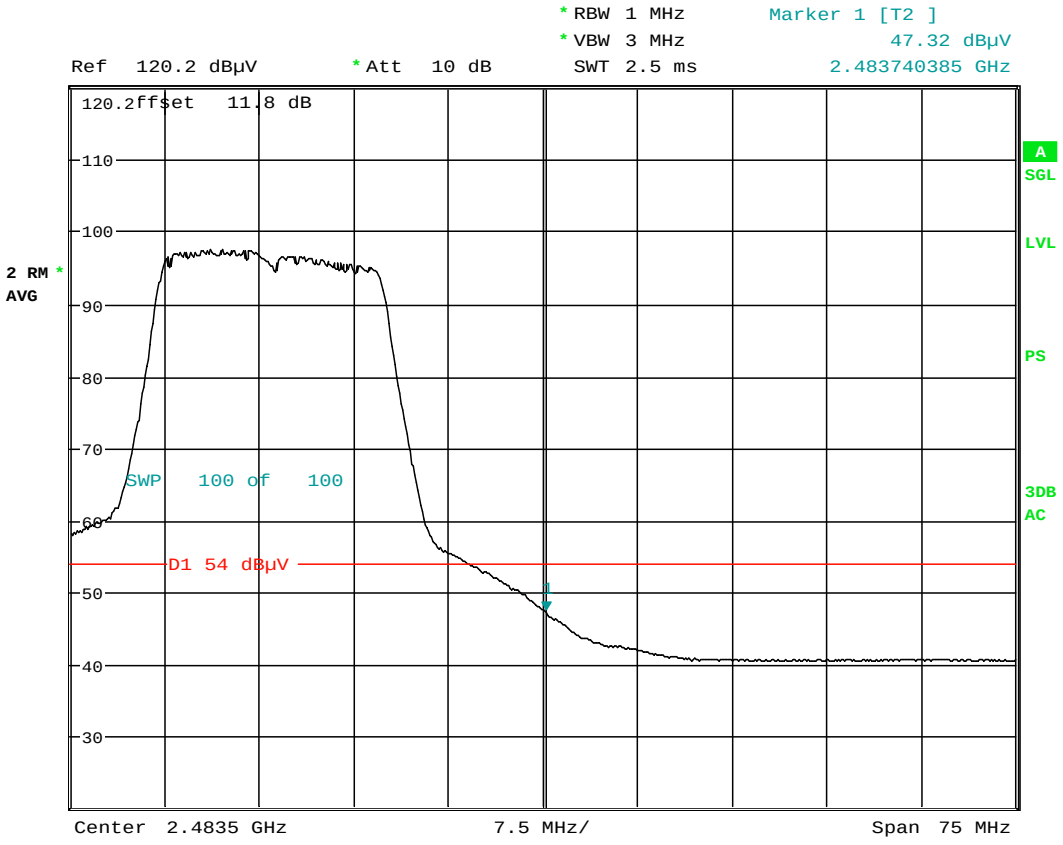
## Radiated Restricted Band Edge Measurements with WCC (Cont'd)
**§15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 2462MHz |
| Channel: | 11 |




Date: 15.FEB.2014 06:59:30

**Plot 6-141. Radiated Restricted Upper Band Edge Measurement with WCC (Average)**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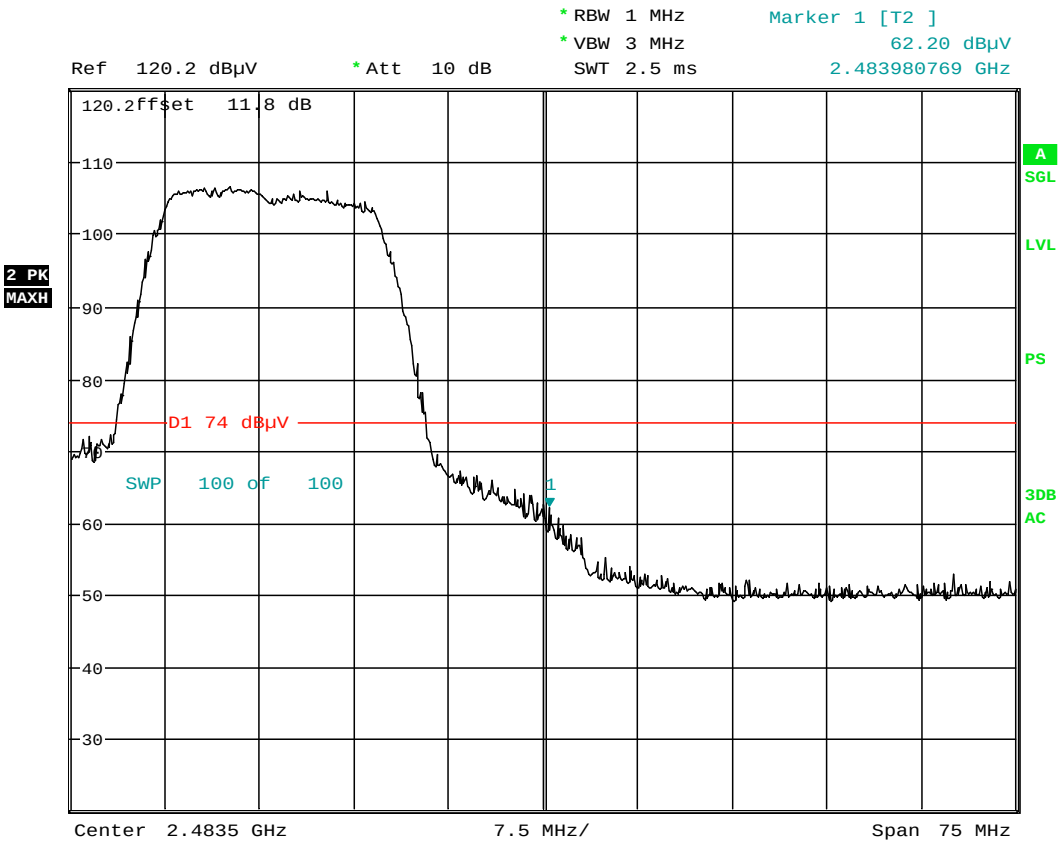
# Radiated Restricted Band Edge Measurements with WCC (Cont'd)

**§15.205 §15.209**




Date: 15.FEB.2014 07:00:28

**Plot 6-142. Radiated Restricted Upper Band Edge Measurement with WCC (Peak)**



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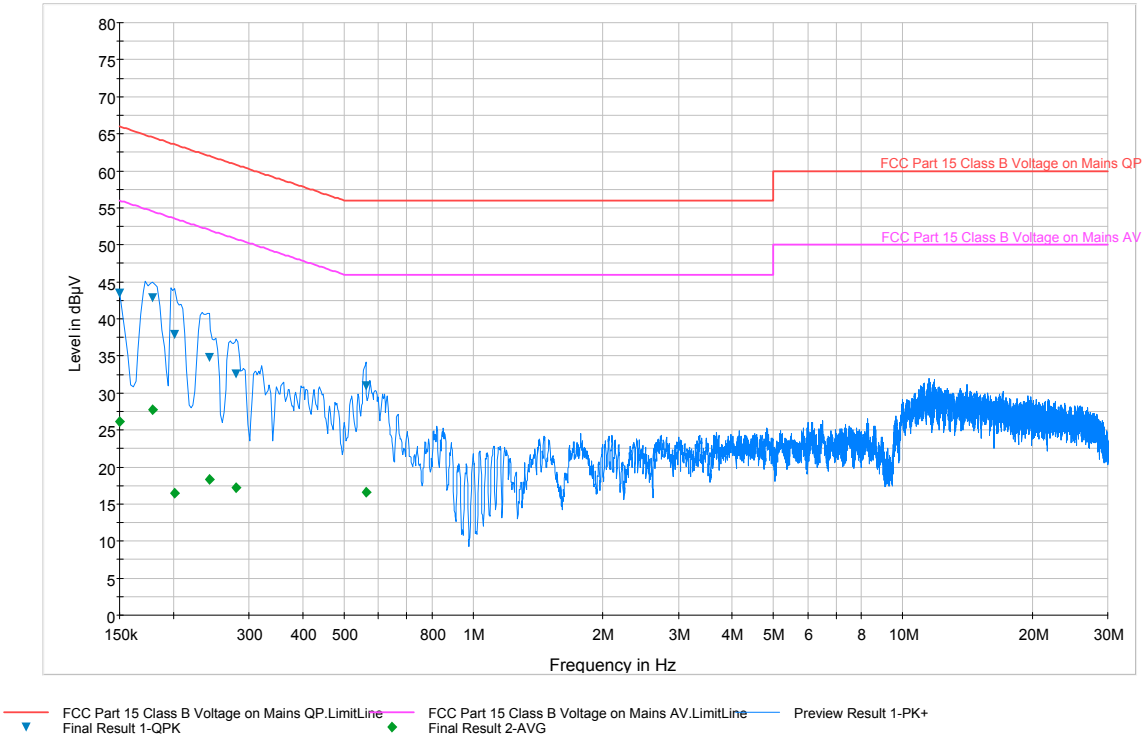
## 6.11 Line-Conducted Test Data

**§15.207**




**Plot 6-143. Line Conducted Plot with 802.11b (L1)**

| Frequency MHz | Line | Corr. dB | QuasiPeak dBµV | Limit dBµV | Margin dB | Average dBµV | Limit dBµV | Margin dB |
|---|---|---|---|---|---|---|---|---|
| 0.150 | L1 | 0.2 | 43.50 | 66.00 | 22.50 | 26.10 | 56.00 | 29.90 |
| 0.179 | L1 | 0.2 | 42.80 | 64.50 | 21.70 | 27.70 | 54.50 | 26.80 |
| 0.202 | L1 | 0.2 | 37.90 | 63.50 | 25.60 | 16.40 | 53.50 | 37.10 |
| 0.242 | L1 | 0.1 | 34.80 | 62.00 | 27.30 | 18.30 | 52.00 | 33.70 |
| 0.281 | L1 | 0.1 | 32.60 | 60.80 | 28.20 | 17.30 | 50.80 | 33.50 |
| 0.562 | L1 | 0.1 | 31.00 | 56.00 | 25.00 | 16.60 | 46.00 | 29.40 |

**Table 6-54. Line Conducted Data with 802.11b (L1)**

**Notes:**

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11b mode using 1Mbps on Channel 6. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
5. Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.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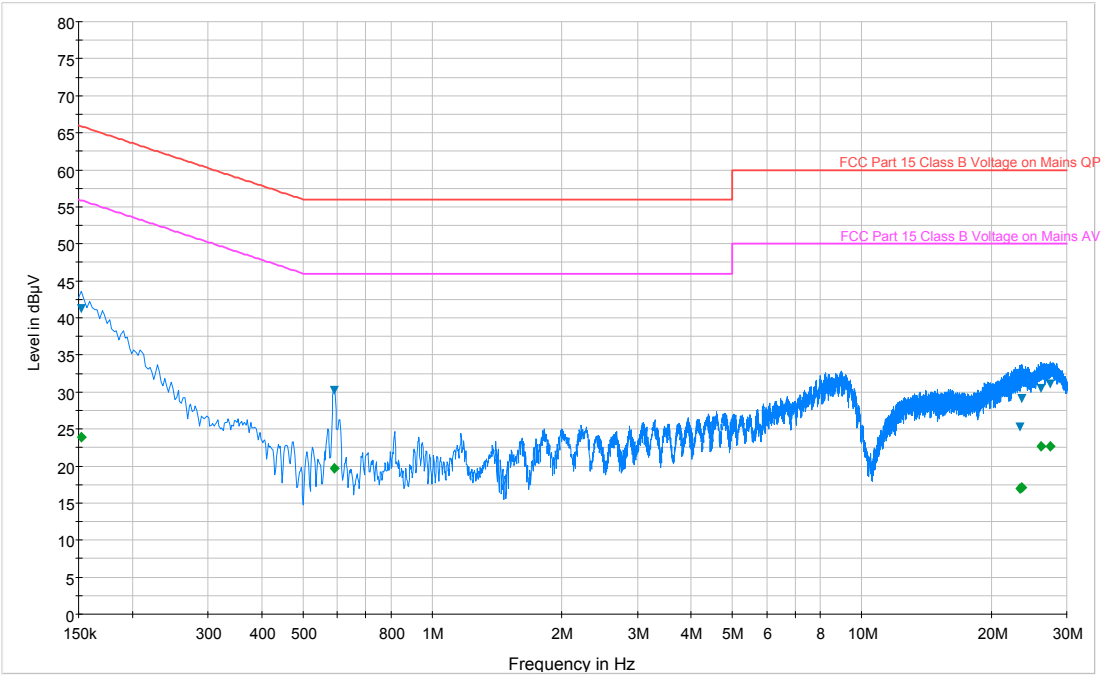
# Line-Conducted Test Data (Cont'd)

**§15.207**




**Plot 6-144. Line Conducted Plot with 802.11b (N)**

| Frequency MHz | Line | Corr. dB | QuasiPeak dBµV | Limit dBµV | Margin dB | Average dBµV | Limit dBµV | Margin dB |
|---|---|---|---|---|---|---|---|---|
| 0.152 | N | 0.3 | 41.30 | 65.90 | 24.60 | 23.90 | 55.90 | 31.90 |
| 0.591 | N | 0.1 | 30.20 | 56.00 | 25.80 | 19.70 | 46.00 | 26.30 |
| 23.352 | N | 0.8 | 25.30 | 60.00 | 34.70 | 16.90 | 50.00 | 33.10 |
| 23.618 | N | 0.8 | 29.20 | 60.00 | 30.80 | 17.10 | 50.00 | 32.90 |
| 26.198 | N | 0.8 | 30.50 | 60.00 | 29.50 | 22.70 | 50.00 | 27.30 |
| 27.472 | N | 0.9 | 31.10 | 60.00 | 28.90 | 22.70 | 50.00 | 27.30 |

**Table 6-55. Line Conducted Data with 802.11b (N)**

**Notes:**

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11b mode using 1Mbps on Channel 6. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
5. Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.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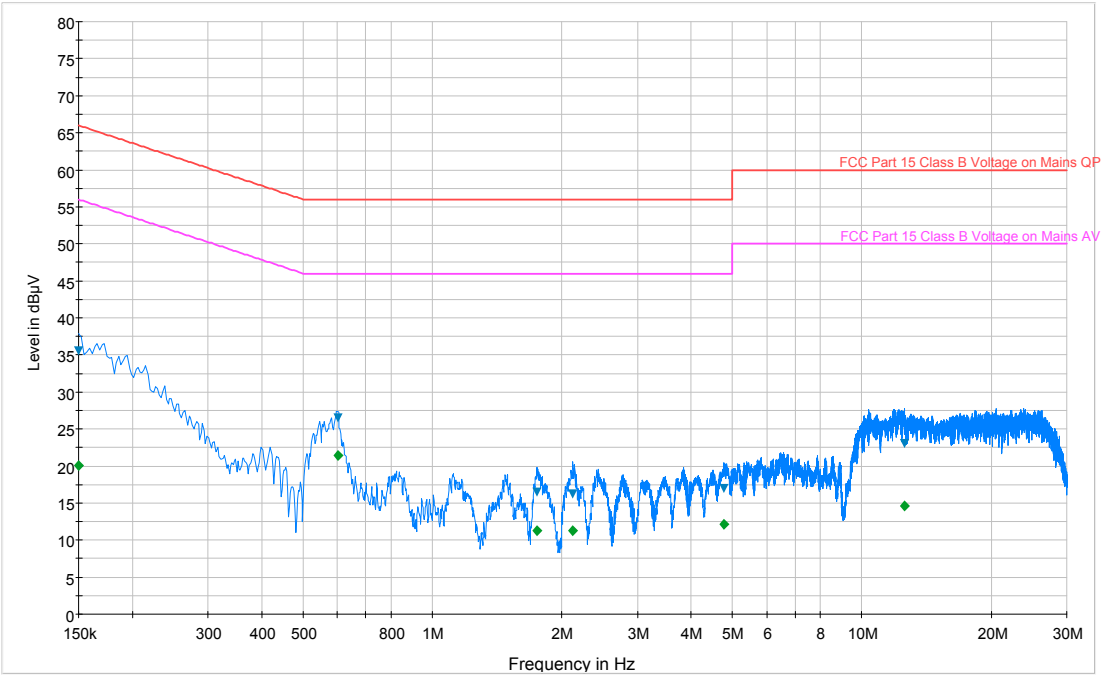
# Line-Conducted Test Data (Cont'd)

**§15.207**




**Plot 6-145. Line Conducted Plot with 802.11a (L1)**

| Frequency MHz | Line | Corr. dB | QuasiPeak dBµV | Limit dBµV | Margin dB | Average dBµV | Limit dBµV | Margin dB |
|---|---|---|---|---|---|---|---|---|
| 0.150 | L1 | 0.2 | 35.60 | 66.00 | 30.40 | 20.00 | 56.00 | 36.00 |
| 0.602 | L1 | 0.1 | 26.40 | 56.00 | 29.60 | 21.50 | 46.00 | 24.50 |
| 1.750 | L1 | 0.1 | 16.50 | 56.00 | 39.50 | 11.30 | 46.00 | 34.70 |
| 2.121 | L1 | 0.1 | 16.20 | 56.00 | 39.80 | 11.30 | 46.00 | 34.70 |
| 4.774 | L1 | 0.2 | 16.90 | 56.00 | 39.10 | 12.10 | 46.00 | 33.90 |
| 12.545 | L1 | 0.4 | 23.00 | 60.00 | 37.00 | 14.60 | 50.00 | 35.40 |

**Table 6-56. Line Conducted Data with 802.11a (L1)**

**Notes:**

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 6Mbps on Channel 157. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
5. Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.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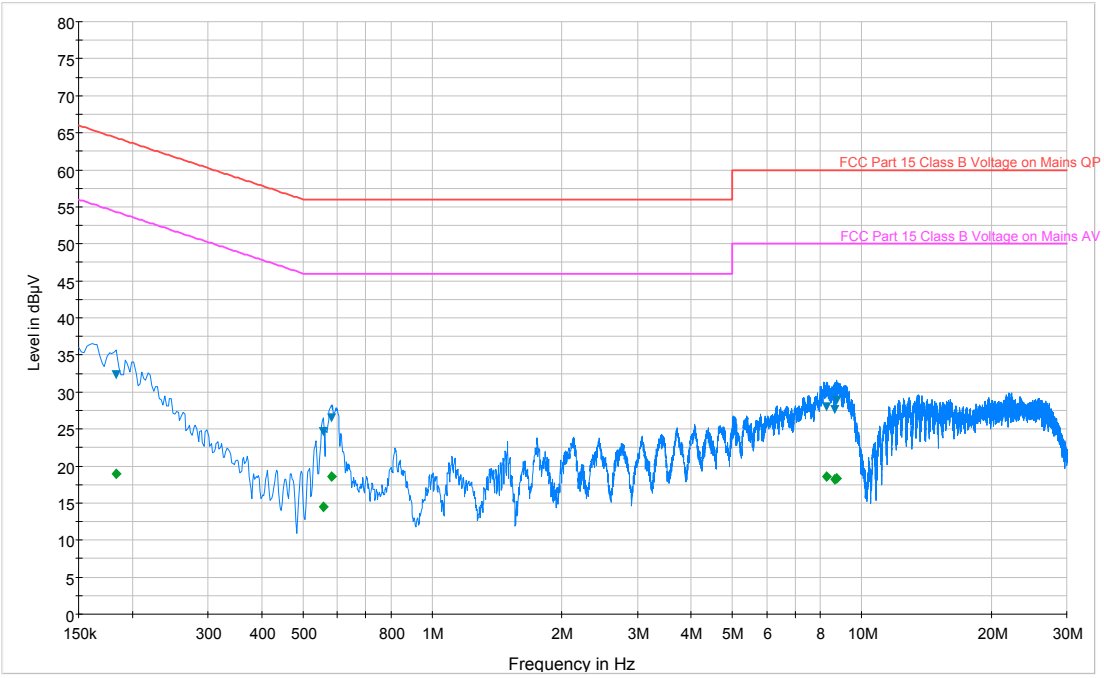
# Line-Conducted Test Data (Cont'd)

**§15.207**




**Plot 6-146. Line Conducted Plot with 802.11a (N)**

| Frequency MHz | Line | Corr. dB | QuasiPeak dBµV | Limit dBµV | Margin dB | Average dBµV | Limit dBµV | Margin dB |
|---|---|---|---|---|---|---|---|---|
| 0.184 | N | 0.2 | 32.30 | 64.30 | 32.00 | 19.00 | 54.30 | 35.40 |
| 0.557 | N | 0.1 | 24.60 | 56.00 | 31.40 | 14.50 | 46.00 | 31.50 |
| 0.582 | N | 0.1 | 26.50 | 56.00 | 29.50 | 18.60 | 46.00 | 27.40 |
| 8.297 | N | 0.3 | 28.00 | 60.00 | 32.00 | 18.50 | 50.00 | 31.50 |
| 8.644 | N | 0.3 | 27.60 | 60.00 | 32.40 | 18.20 | 50.00 | 31.80 |
| 8.723 | N | 0.3 | 28.90 | 60.00 | 31.10 | 18.30 | 50.00 | 31.70 |

**Table 6-57. Line Conducted Data with 802.11a (N)**

**Notes:**

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 6Mbps on Channel 157. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
5. Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.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# 7.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG900R4** is in compliance with Part 15C of the FCC Rules.


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