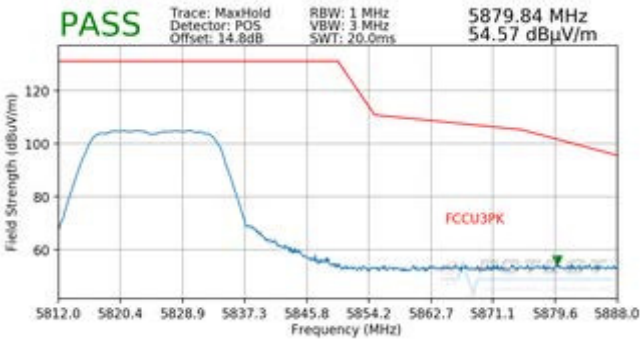
| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5825MHz |
| Channel: | 165 |




**Plot 7-95. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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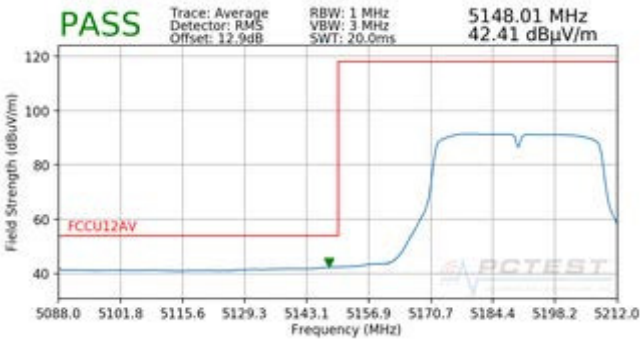
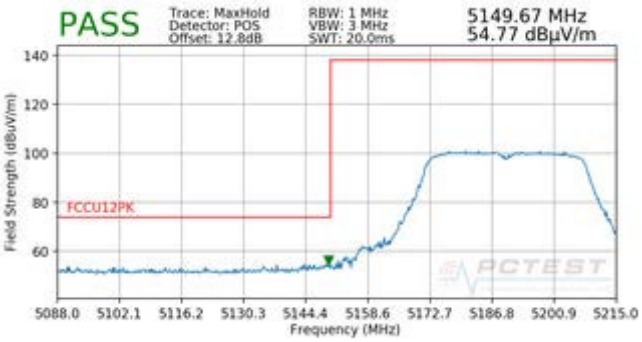
## 7.7.3 Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5190MHz |
| Channel: | 38 |

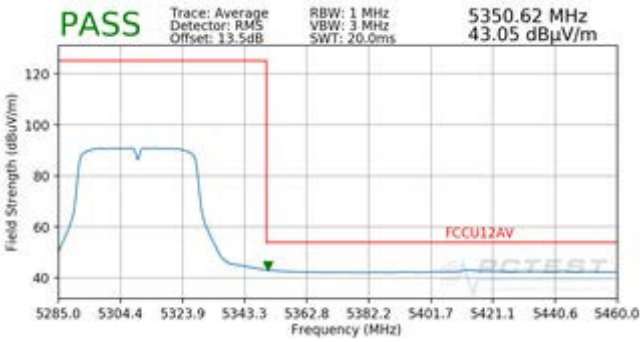



**Plot 7-96. Radiated Lower Band Edge Plot (Average – UNII Band 1)**

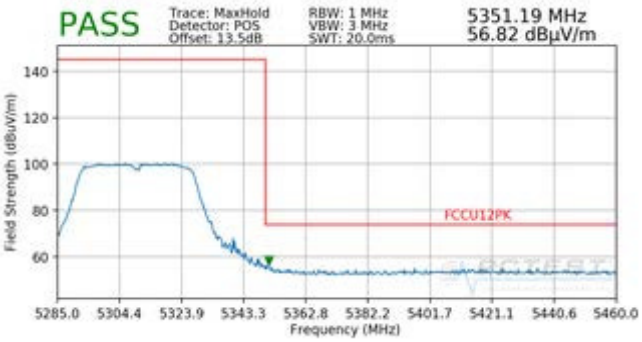



**Plot 7-97. Radiated Lower Band Edge Plot (Peak – UNII Band 1)**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5310MHz |
| Channel: | 62 |




**Plot 7-98. Radiated Upper Band Edge Plot (Average – UNII Band 2A)**




**Plot 7-99. Radiated Upper Band Edge Plot (Peak – UNII Band 2A)**



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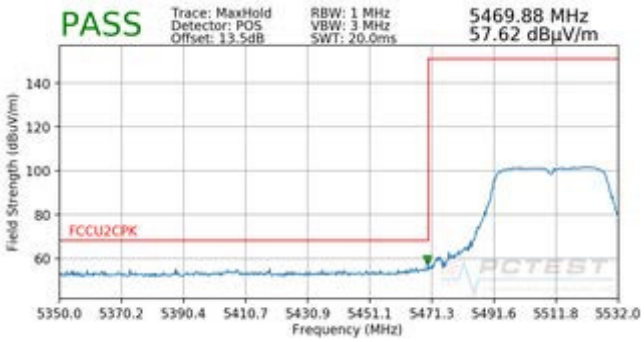
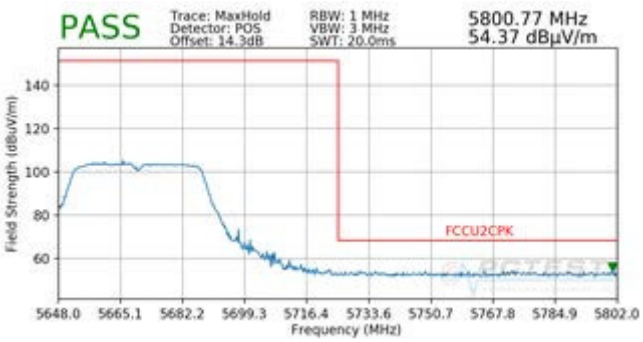
| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5510MHz |
| Channel: | 102 |

**Plot 7-100. Radiated Lower Band Edge Plot (Average – UNII Band 2C)**



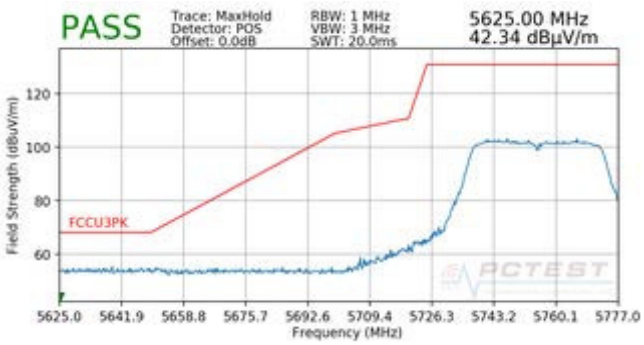

**Plot 7-101. Radiated Lower Band Edge Plot (Peak – UNII Band 2C)**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5670MHz |
| Channel: | 134 |




**Plot 7-102. Radiated Upper Band Edge Plot (Peak – UNII Band 2C)**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5755MHz |
| Channel: | 151 |




**Plot 7-103. Radiated Lower Band Edge Plot (Peak – UNII Band 3)**

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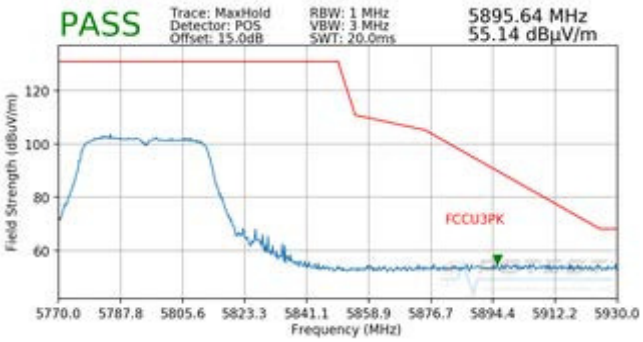
| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5795MHz |
| Channel: | 159 |




**Plot 7-104. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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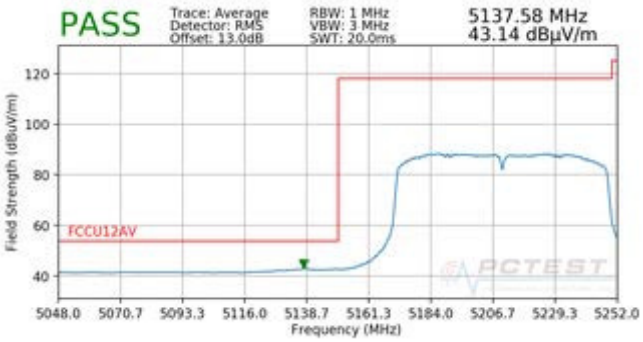
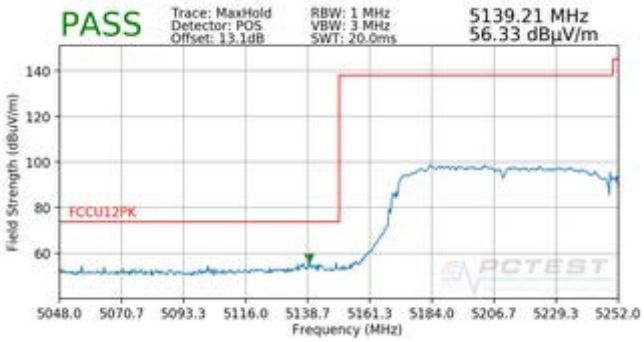
## 7.7.4 Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5210MHz |
| Channel: | 42 |

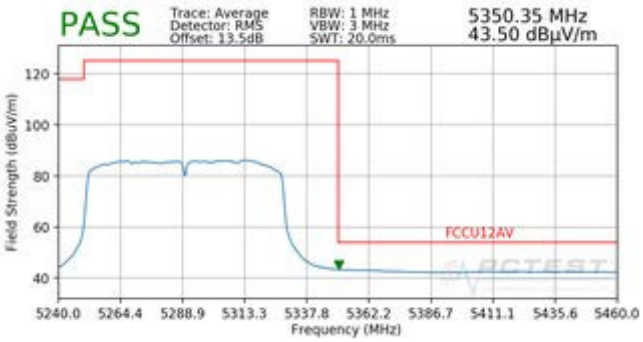



**Plot 7-105. Radiated Lower Band Edge Plot (Average – UNII Band 1)**

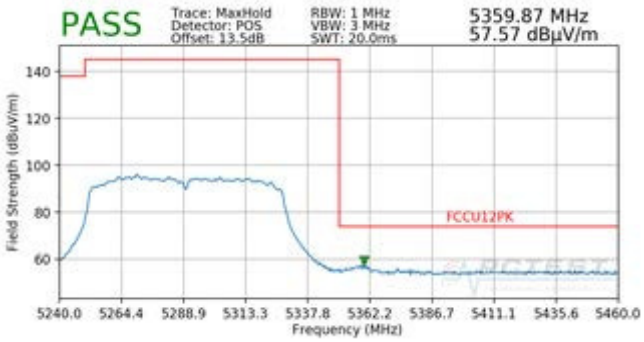



**Plot 7-106. Radiated Lower Band Edge Plot (Peak – UNII Band 1)**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5290MHz |
| Channel: | 58 |




**Plot 7-107. Radiated Upper Band Edge Plot (Average – UNII Band 2A)**




**Plot 7-108. Radiated Upper Band Edge Plot (Peak – UNII Band 2A)**

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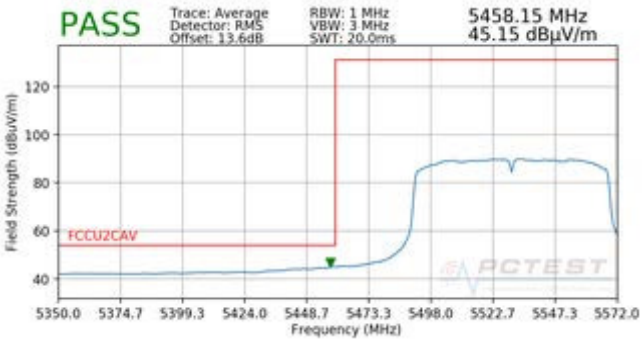
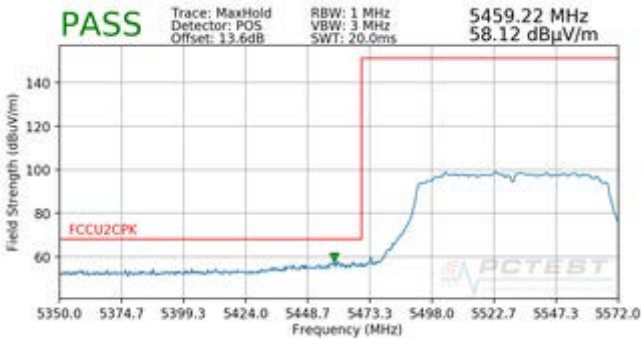
| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5530MHz |
| Channel: | 106 |

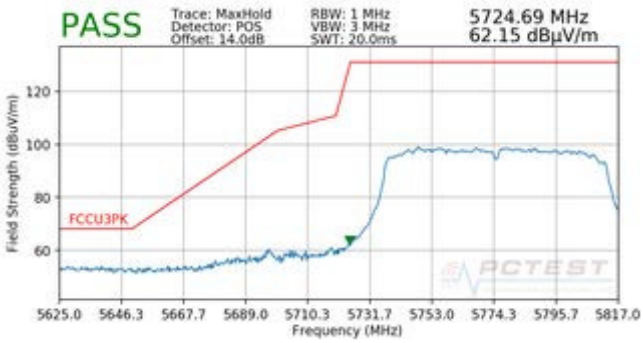



**Plot 7-109. Radiated Lower Band Edge Plot (Average – UNII Band 2C)**

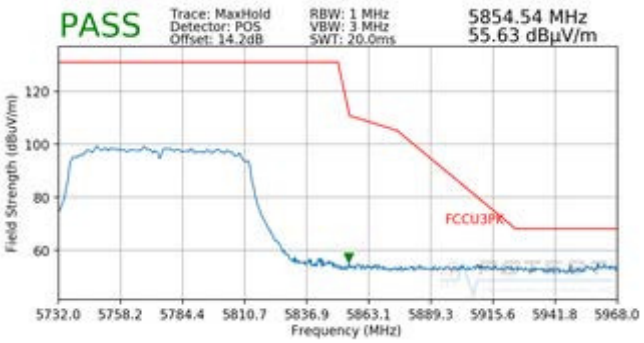



**Plot 7-110. Radiated Lower Band Edge Plot (Peak – UNII Band 2C)**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5775MHz |
| Channel: | 155 |




**Plot 7-111. Radiated Lower Band Edge Plot (Peak – UNII Band 3)**




**Plot 7-112. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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## 7.7 Radiated Spurious Emissions Measurements – Below 1GHz

**§15.209; RSS-Gen [8.9]**

### 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, 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 and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-22 per Section 15.209 and RSS-Gen (8.9).***

| 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 7-22. Radiated Limits**

### Test Procedures Used

ANSI C63.10-2013

### Test Settings

#### Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize



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## Test Setup

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

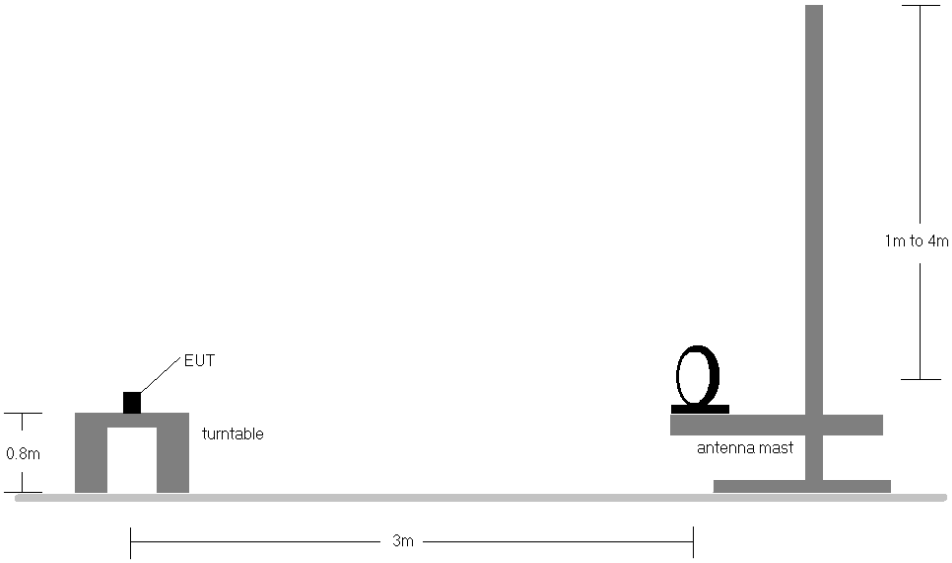


**Figure 7-6. Radiated Test Setup < 30MHz**

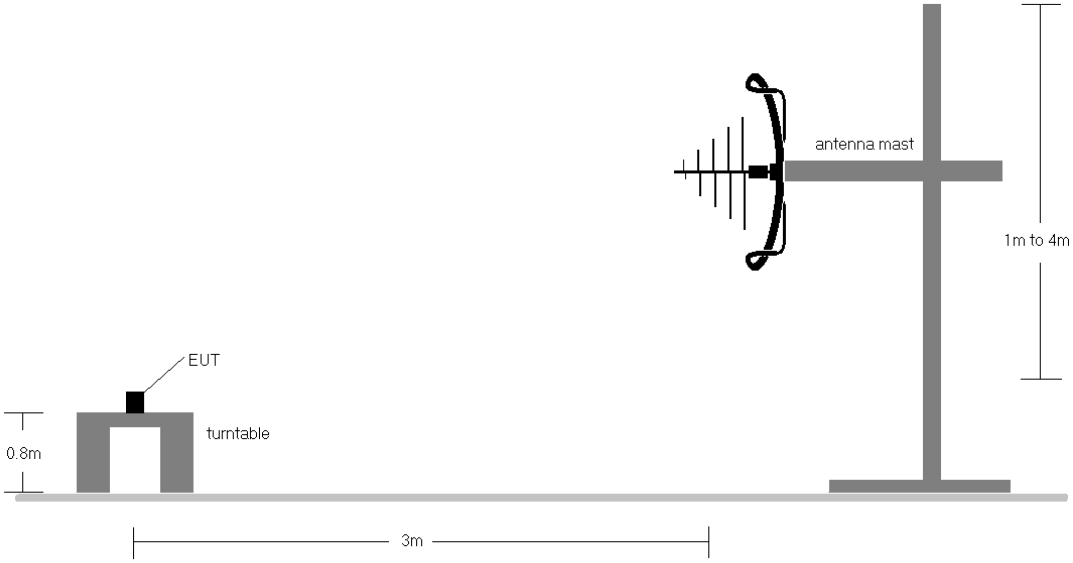


**Figure 7-7. Radiated Test Setup < 1GHz**




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## Test Notes

1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen (8.10) are below the limit shown in Table 7-22.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.



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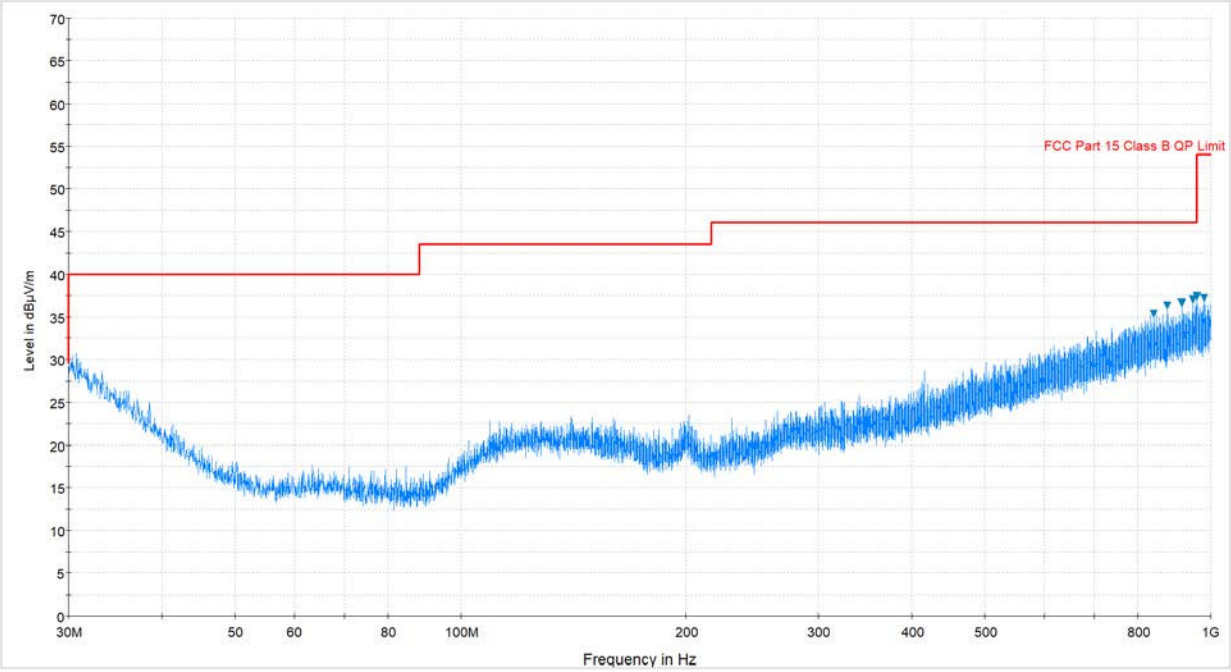
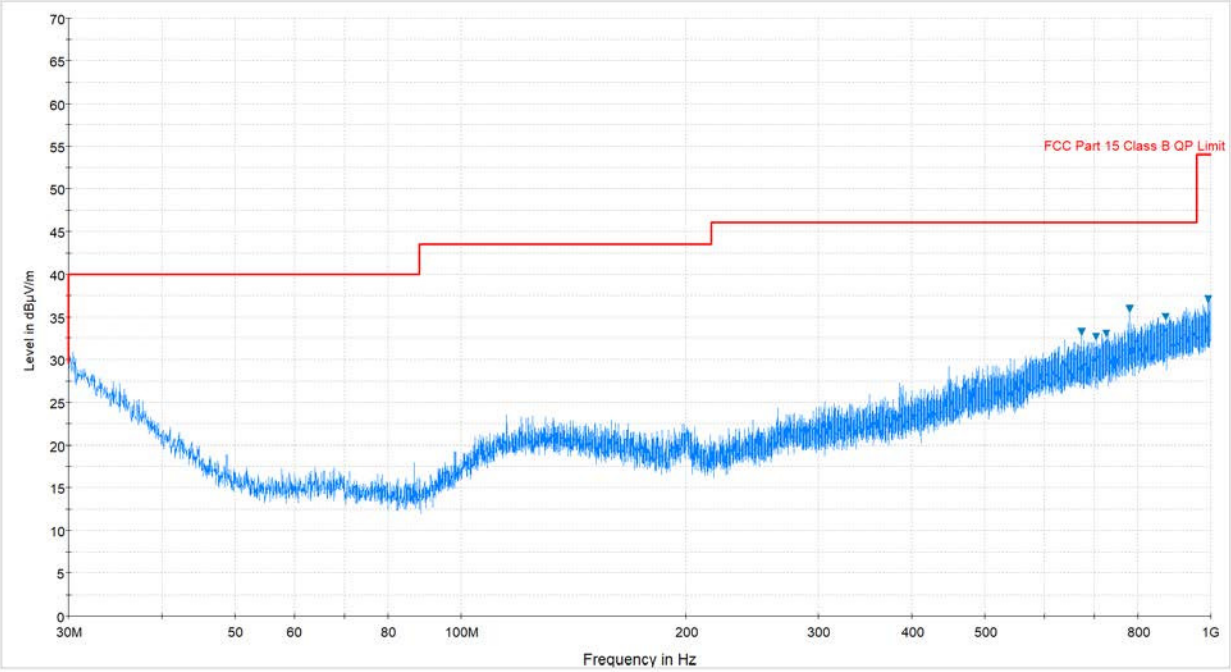
# Radiated Spurious Emissions Measurements (Below 1GHz)

**§15.209; RSS-Gen [8.9]**




**Plot 7-113. Radiated Spurious Plot below 1GHz (802.11a – U3 Ch. 157, Ant. Pol. H)**




**Plot 7-114. Radiated Spurious Plot below 1GHz (802.11a – U3 Ch. 157, Ant. Pol. V)**



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## 7.8 Line-Conducted Test Data

**§15.407; RSS-Gen [8.8]**

### Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

***All conducted emissions must not exceed the limits shown in the table below, per Section 15.207 and RSS-Gen (8.8).***

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

**Table 7-23. Conducted Limits**

*Decreases with the logarithm of the frequency.

### Test Procedures Used

ANSI C63.10-2013, Section 6.2

### Test Settings

#### Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

#### Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize



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## Test Setup

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

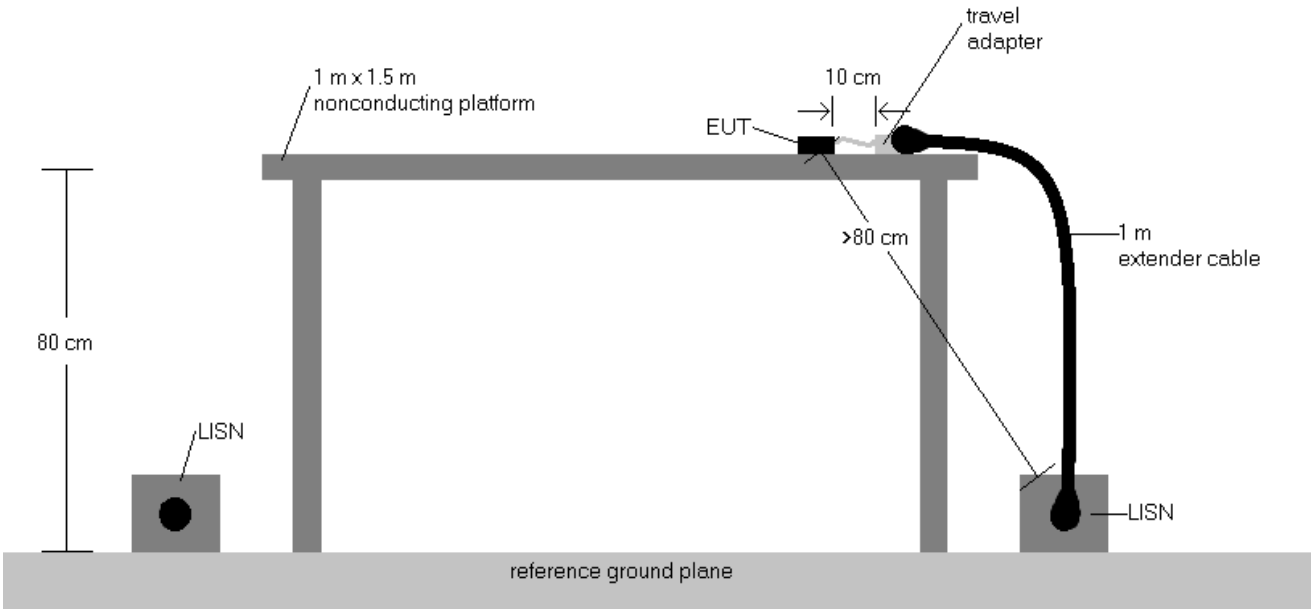


**Figure 7-8. Test Instrument & Measurement Setup**

## Test Notes

1. All modes of operation were investigated and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207 and RSS-Gen (8.8).
3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Corr. (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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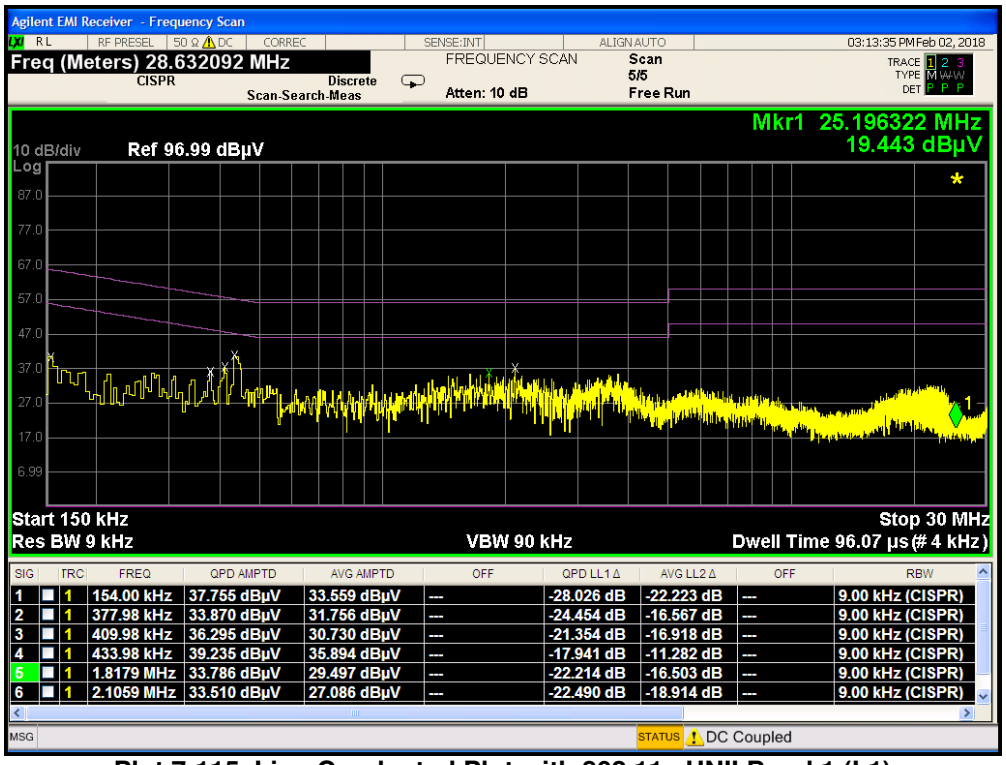
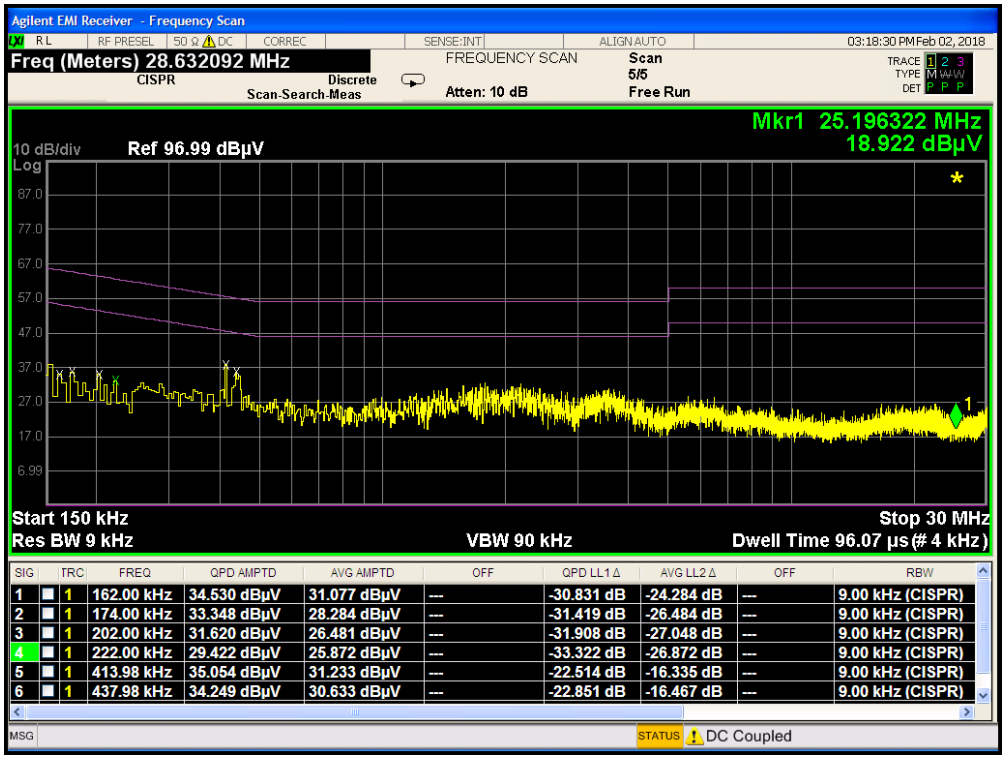



**Plot 7-115. Line Conducted Plot with 802.11a UNII Band 1 (L1)**




**Plot 7-116. Line Conducted Plot with 802.11a UNII Band 1 (N)**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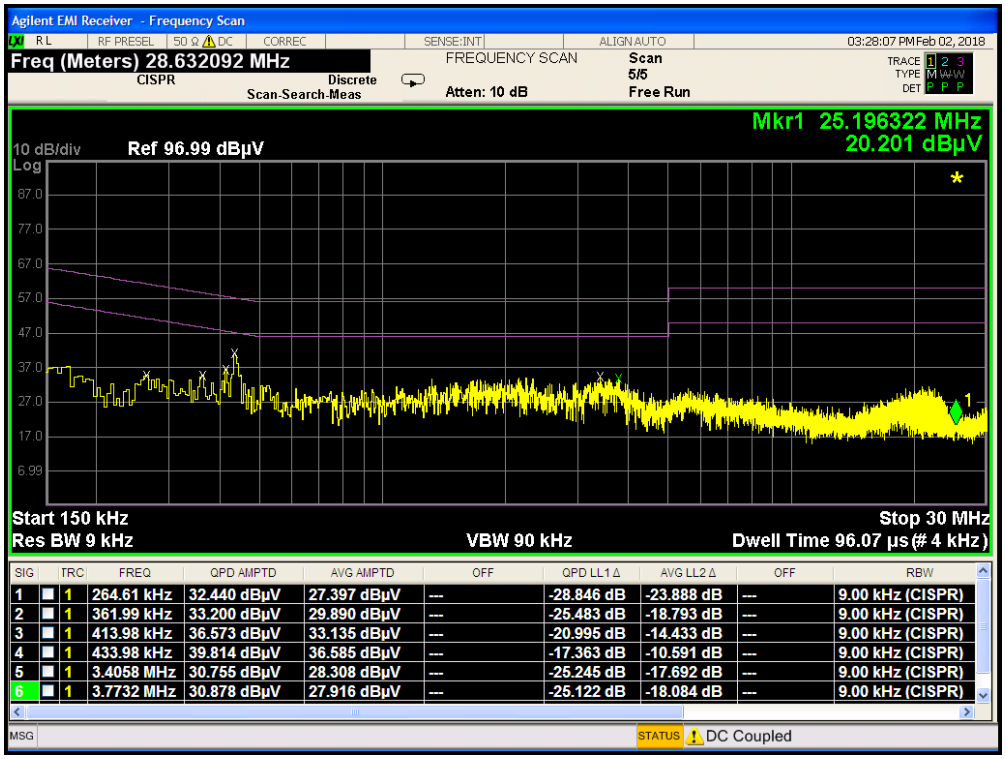
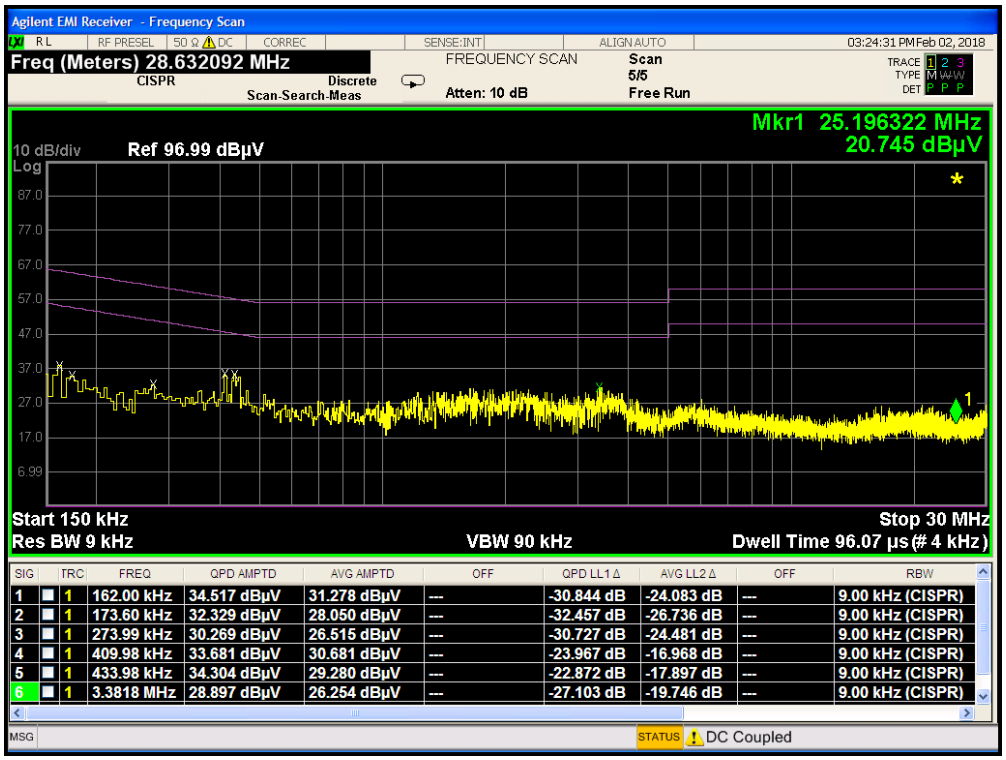



**Plot 7-117. Line Conducted Plot with 802.11a UNII Band 2A (L1)**




**Plot 7-118. Line Conducted Plot with 802.11a UNII Band 2A (N)**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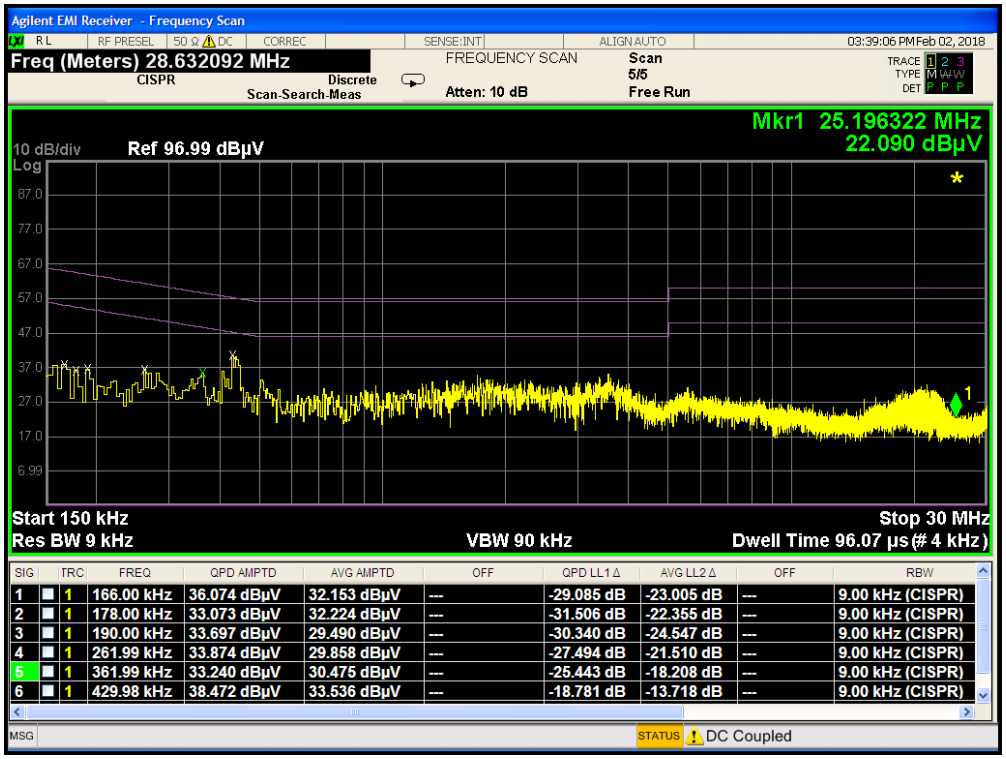
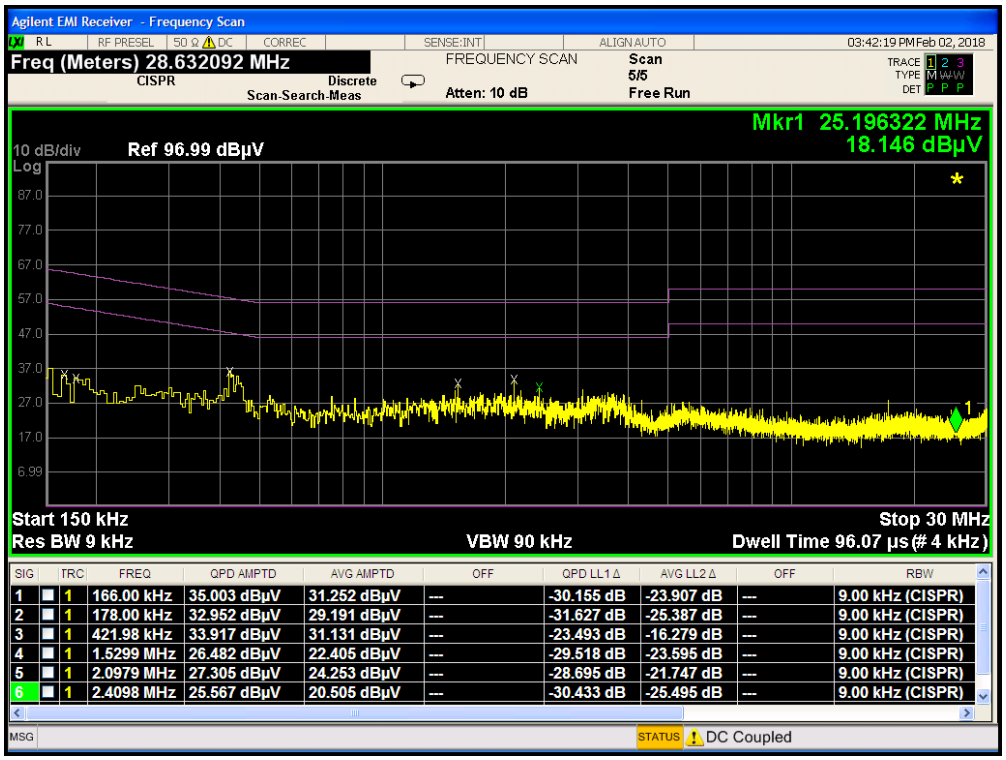



| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 166.00 kHz | 36.074 dBµV | 32.153 dBµV | --- | -29.085 dB | -23.005 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 178.00 kHz | 33.073 dBµV | 32.224 dBµV | --- | -31.506 dB | -22.355 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 190.00 kHz | 33.697 dBµV | 29.490 dBµV | --- | -30.340 dB | -24.547 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 261.99 kHz | 33.874 dBµV | 29.858 dBµV | --- | -27.494 dB | -21.510 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 361.99 kHz | 33.240 dBµV | 30.475 dBµV | --- | -25.443 dB | -18.208 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 429.98 kHz | 38.472 dBµV | 33.536 dBµV | --- | -18.781 dB | -13.718 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-119. Line Conducted Plot with 802.11a UNII Band 2C (L1)**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 166.00 kHz | 35.003 dBµV | 31.252 dBµV | --- | -30.155 dB | -23.907 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 178.00 kHz | 32.952 dBµV | 29.191 dBµV | --- | -31.627 dB | -25.387 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 421.98 kHz | 33.917 dBµV | 31.131 dBµV | --- | -23.493 dB | -16.279 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 1.5299 MHz | 26.482 dBµV | 22.405 dBµV | --- | -29.518 dB | -23.595 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 2.0979 MHz | 27.305 dBµV | 24.253 dBµV | --- | -28.695 dB | -21.747 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 2.4098 MHz | 25.567 dBµV | 20.505 dBµV | --- | -30.433 dB | -25.495 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-120. Line Conducted Plot with 802.11a UNII Band 2C (N)**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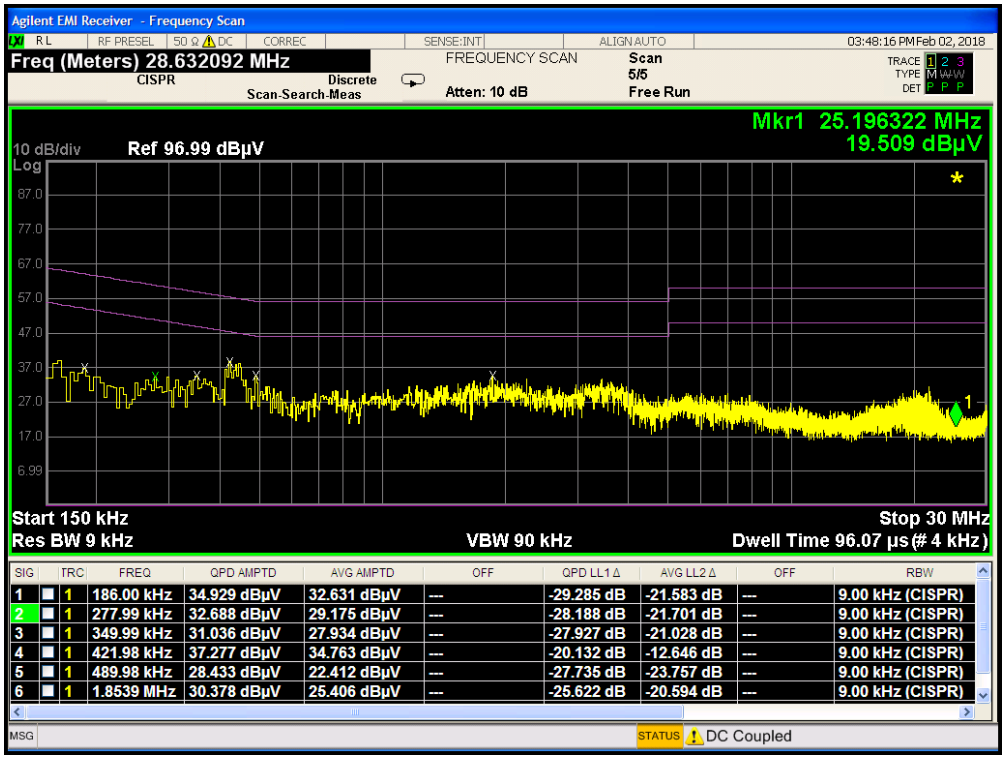
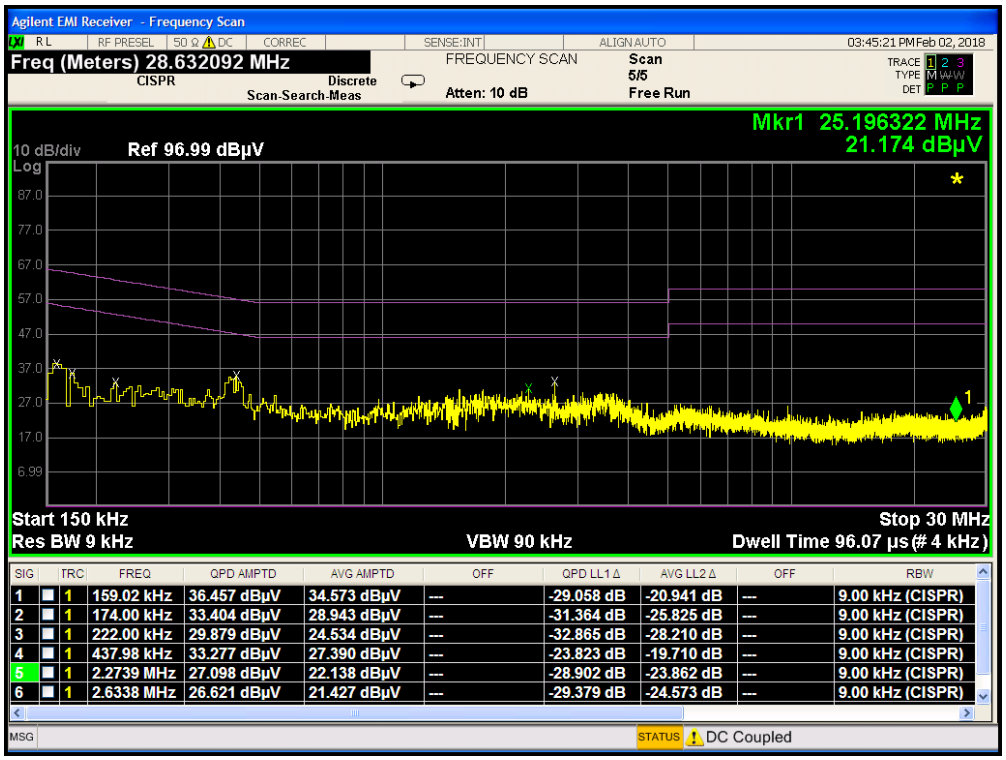



**Plot 7-121. Line Conducted Plot with 802.11a UNII Band 3 (L1)**




**Plot 7-122. Line Conducted Plot with 802.11a UNII Band 3 (N)**

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# 8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFX410UM** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules.




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