

Plot 7-64. Occupied Bandwidth Plot (NR Band n77 - 10MHz π/2 BPSK - Full RB - ANT F)



Plot 7-65. Occupied Bandwidth Plot (NR Band n77 - 10MHz QPSK - Full RB - ANT F)

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Plot 7-66. Occupied Bandwidth Plot (NR Band n77 - 10MHz 16-QAM - Full RB - ANT F)

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7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. 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 maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is $43 + 10 \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

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Test Notes

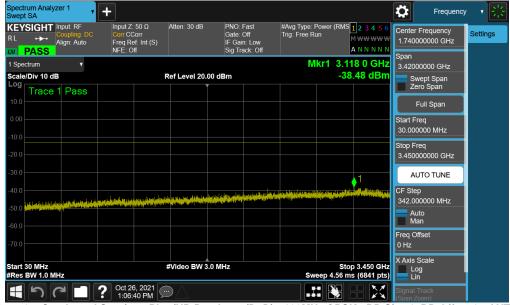
- 1. For 3700-3980 MHz operation, per 27.53(I)(2), in the 1 MHz bands immediately outside and adjacent to the frequency block, a minimum resolution bandwidth of either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz may be employed to demonstrate compliance with the out-of-band emissions limit. In the bands between 1 and 5 MHz removed from the frequency block the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
- 2. For 3450-3550 MHz operation, per 27.53(n)(2), in the 1 MHz bands immediately outside and adjacent to the frequency block, a minimum resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter, but limited to a maximum of 200 kHz, may be employed to demonstrate compliance with the out-of-band emissions limit. In the bands between 1 and 5 MHz removed from the frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as in Test Note #1 above.
- 3. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results were determined to occur with the DFT-s-OFDM transmission scheme. These results from this worst case configuration are reported in this section.

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assembly of contents thereof, please contact INFO@PCTEST.COM.



NR Band n77 (PC2) - DoD-Band - SRS-1 - ANT F



Plot 7-67. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - ANT F)



Plot 7-68. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - ANT F)

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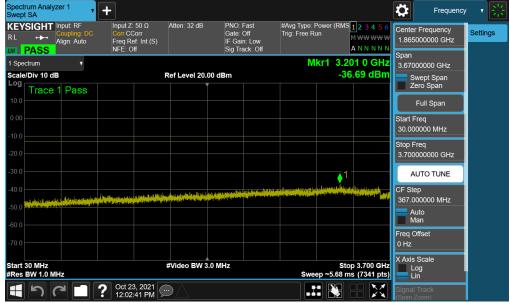


Plot 7-69. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - ANT F)

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NR Band n77 (PC2) - C-Band - SRS-1 - ANT F



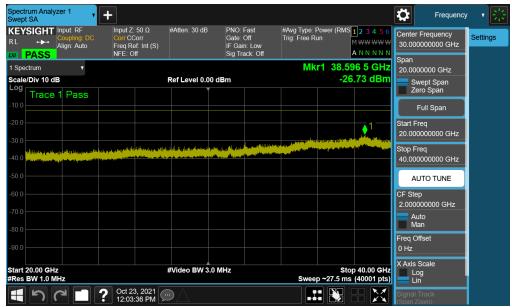
Plot 7-70. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT F)



Plot 7-71. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT F)

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Plot 7-72. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT F)



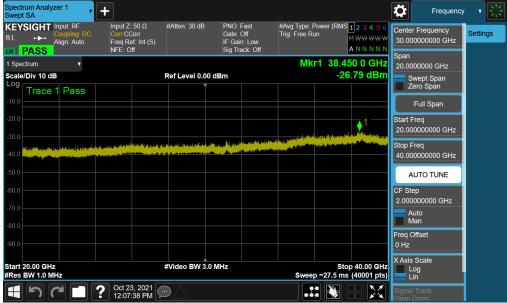
Plot 7-73. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT F)

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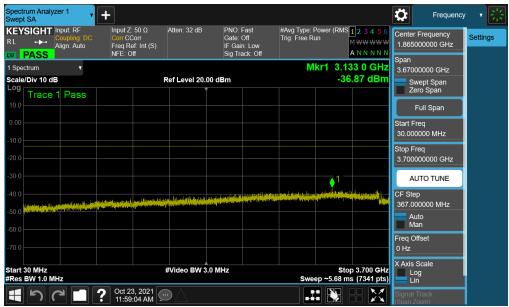
Plot 7-74. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT F)



Plot 7-75. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT F)

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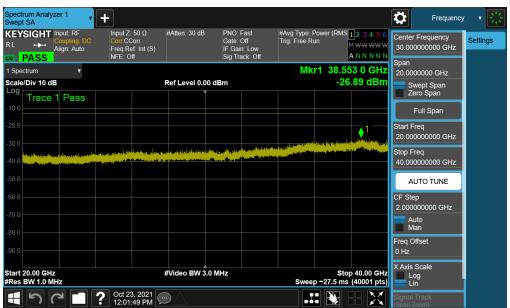
Plot 7-76. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT F)



Plot 7-77. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT F)

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Plot 7-78. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT F)

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NR Band n77 (PC2) - DoD-Band - SRS-2 - ANT C



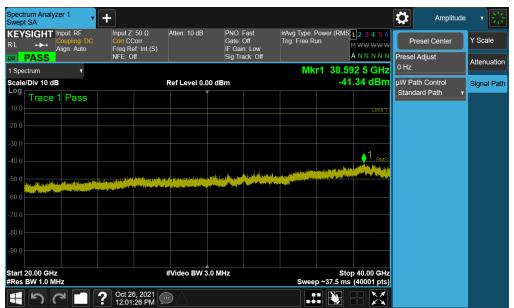
Plot 7-79. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT C)



Plot 7-80. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT C)

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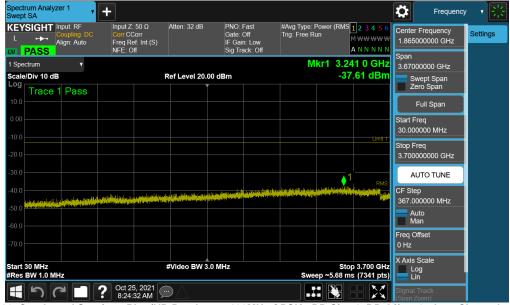
Plot 7-81. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT C)

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NR Band n77 (PC2) - C-Band - SRS-2 - ANT C



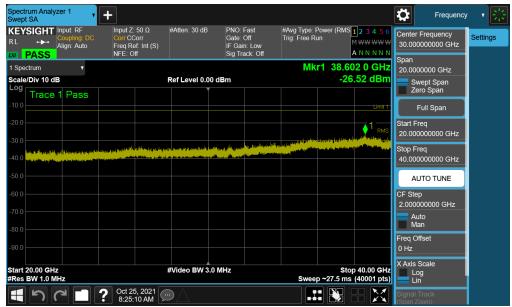
Plot 7-82. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT C)



Plot 7-83. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT C)

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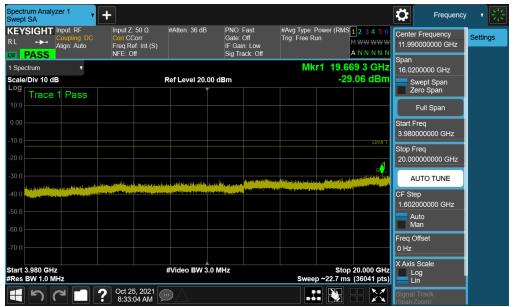
Plot 7-84. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT C)



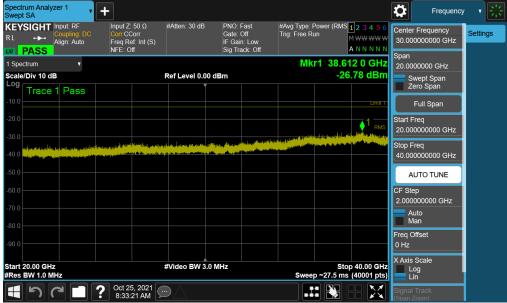
Plot 7-85. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT C)

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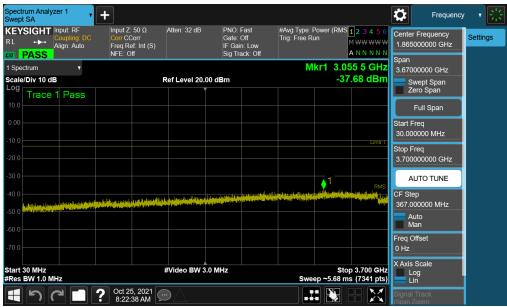
Plot 7-86. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT C)



Plot 7-87. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT C)

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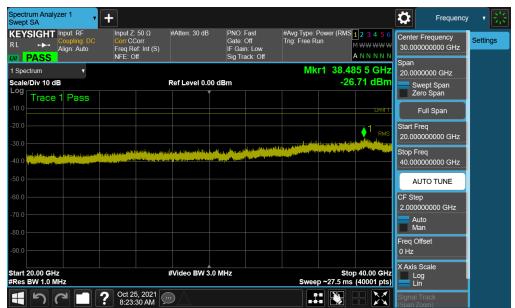
Plot 7-88. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT C)



Plot 7-89. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT C)

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Plot 7-90. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT C)

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NR Band n77 (PC2) - DoD-Band - SRS-3 - ANT K



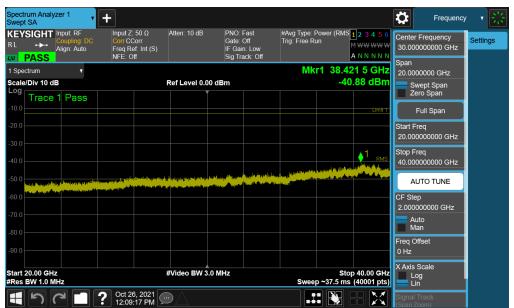
Plot 7-91. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT K)



Plot 7-92. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT K)

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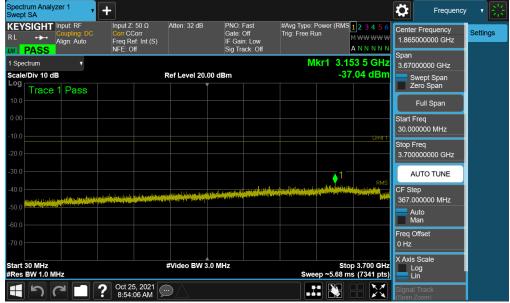
Plot 7-93. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT K)

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NR Band n77 (PC2) - C-Band - SRS-3 - ANT K



Plot 7-94. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT K)

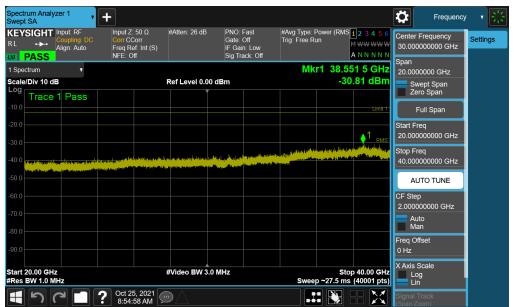


Plot 7-95. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT K)

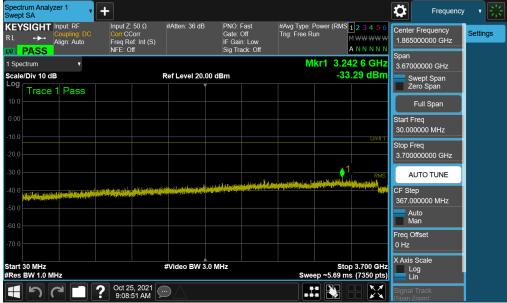
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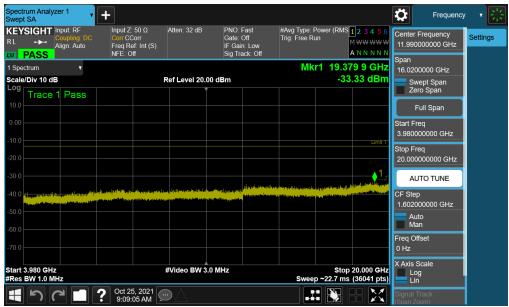
Plot 7-96. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT K)



Plot 7-97. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT K)

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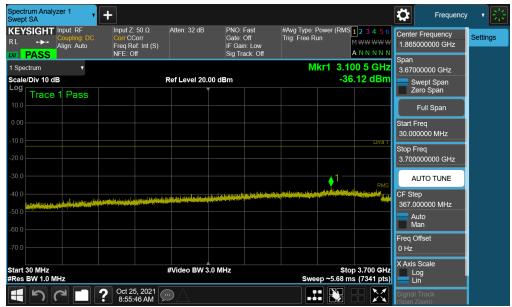
Plot 7-98. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT K)



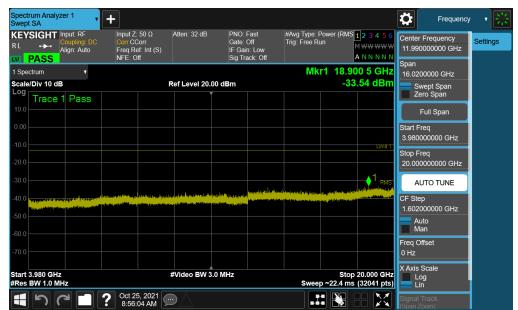
Plot 7-99. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT K)

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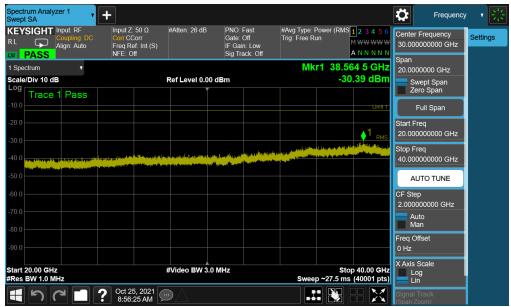
Plot 7-100. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT K)



Plot 7-101. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT K)

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Plot 7-102. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT K)

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NR Band n77 (PC2) - DoD-Band - SRS-4 - ANT D



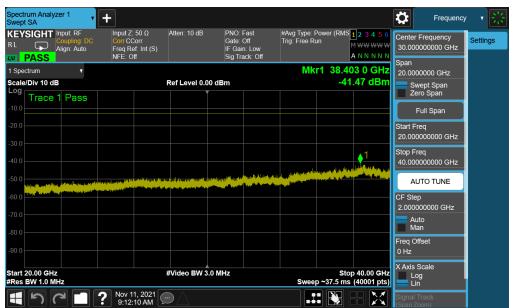
Plot 7-103. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT D)



Plot 7-104. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT D)

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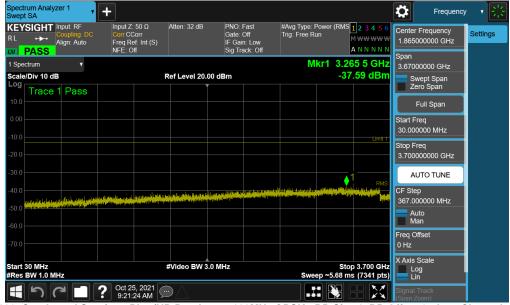


Plot 7-105. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT D)

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NR Band n77 (PC2) - C-Band - SRS-4 - ANT D



Plot 7-106. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT D)



Plot 7-107. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT D)

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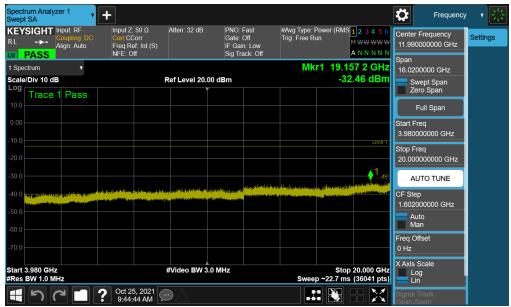
Plot 7-108. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - ANT D)



Plot 7-109. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT D)

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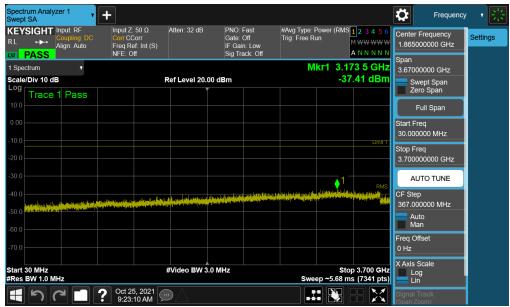
Plot 7-110. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT D)



Plot 7-111. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - ANT D)

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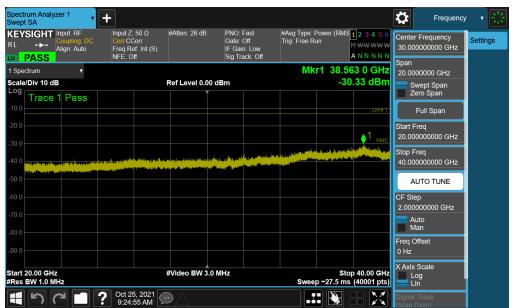
Plot 7-112. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT D)



Plot 7-113. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT D)

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Plot 7-114. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - ANT D)

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7.5 Band Edge Emissions at Antenna Terminal

Test Overview

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 maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is $43 + 10 \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

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 \geq 1% of the emission bandwidth
- 4. $VBW > 3 \times RBW$
- 5. Detector = RMS
- 6. Number of sweep points ≥ 2 x Span/RBW
- 7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 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 7-4. Test Instrument & Measurement Setup

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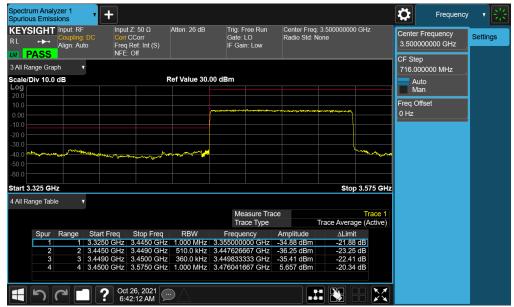
Test Notes

- 1. For 3700-3980 MHz operation, per 27.53(I)(2), in the 1 MHz bands immediately outside and adjacent to the frequency block, a minimum resolution bandwidth of either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz may be employed to demonstrate compliance with the out-of-band emissions limit. In the bands between 1 and 5 MHz removed from the frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
- 2. For 3450-3550 MHz operation, per 27.53(n)(2), in the 1 MHz bands immediately outside and adjacent to the frequency block, a minimum resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter, but limited to a maximum of 200 kHz, may be employed to demonstrate compliance with the out-of-band emissions limit. In the bands between 1 and 5 MHz removed from the frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as in Test Note #1 above.
- 3. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results were determined to occur with the CP-OFDM transmission scheme. These results from this worst case configuration are reported in this section.

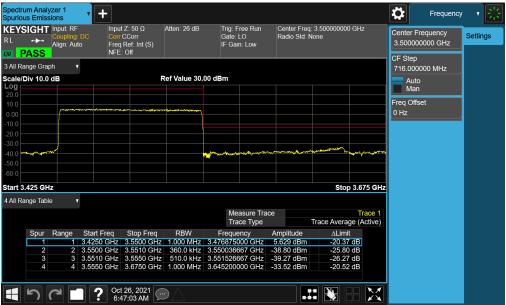
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NR Band n77 (PC2) - DoD-Band - SRS-1 - ANT F



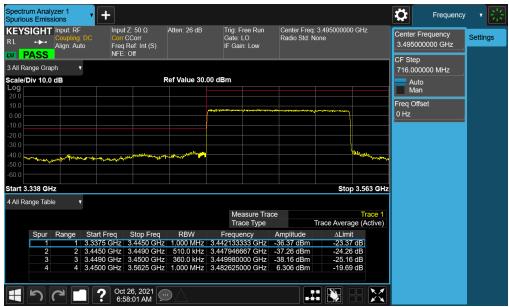
Plot 7-115. Lower ACP Plot (NR Band n77 (DoD) - 100MHz CP-OFDM-QPSK - Full RB - ANT F)



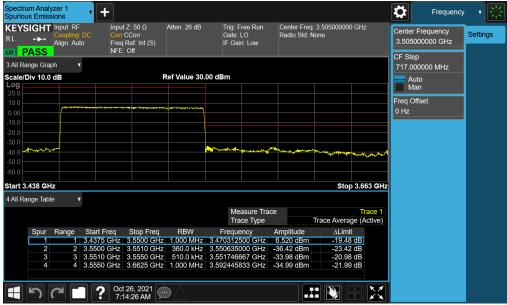
Plot 7-116. Upper ACP Plot (NR Band n77 (DoD) - 100MHz CP-OFDM-QPSK - Full RB - ANT F)

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Plot 7-117. Lower ACP Plot (NR Band n77 (DoD) - 90MHz CP-OFDM-QPSK - Full RB - ANT F)



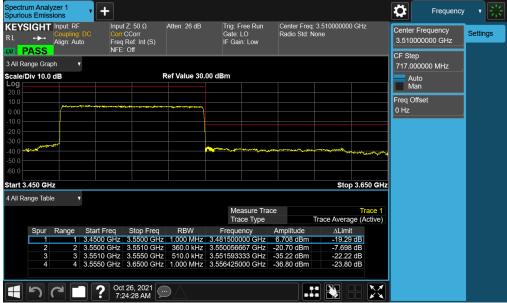
Plot 7-118. Upper ACP Plot (NR Band n77 (DoD) - 90MHz CP-OFDM-QPSK - Full RB - ANT F)

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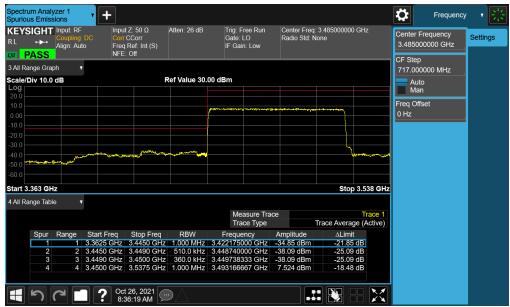
Plot 7-119. Lower ACP Plot (NR Band n77 (DoD) - 80MHz CP-OFDM-QPSK - Full RB - ANT F)



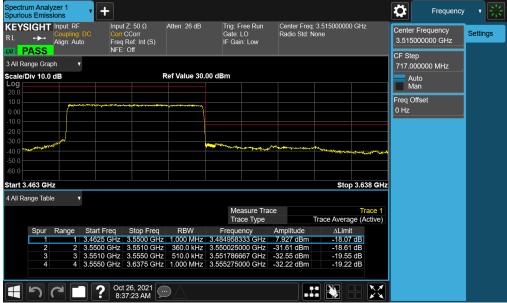
Plot 7-120. Upper ACP Plot (NR Band n77 (DoD) - 80MHz CP-OFDM-QPSK - Full RB - ANT F)

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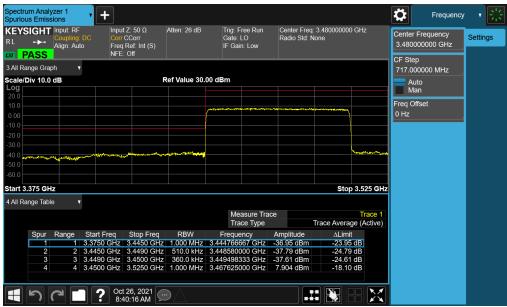
Plot 7-121. Lower ACP Plot (NR Band n77 (DoD) - 70MHz CP-OFDM-QPSK - Full RB - ANT F)



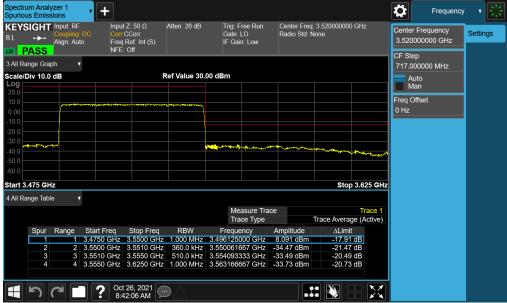
Plot 7-122. Upper ACP Plot (NR Band n77 (DoD) - 70MHz CP-OFDM-QPSK - Full RB - ANT F)

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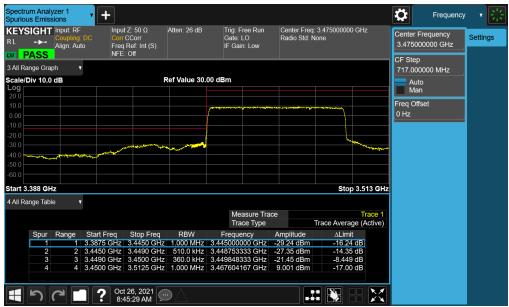
Plot 7-123. Lower ACP Plot (NR Band n77 (DoD) - 60MHz CP-OFDM-QPSK - Full RB - ANT F)



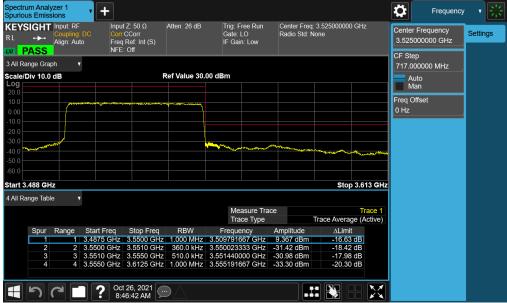
Plot 7-124. Upper ACP Plot (NR Band n77 (DoD) - 60MHz CP-OFDM-QPSK - Full RB - ANT F)

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Plot 7-125. Lower ACP Plot (NR Band n77 (DoD) - 50MHz CP-OFDM-QPSK - Full RB - ANT F)



Plot 7-126. Upper ACP Plot (NR Band n77 (DoD) - 50MHz CP-OFDM-QPSK - Full RB - ANT F)

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