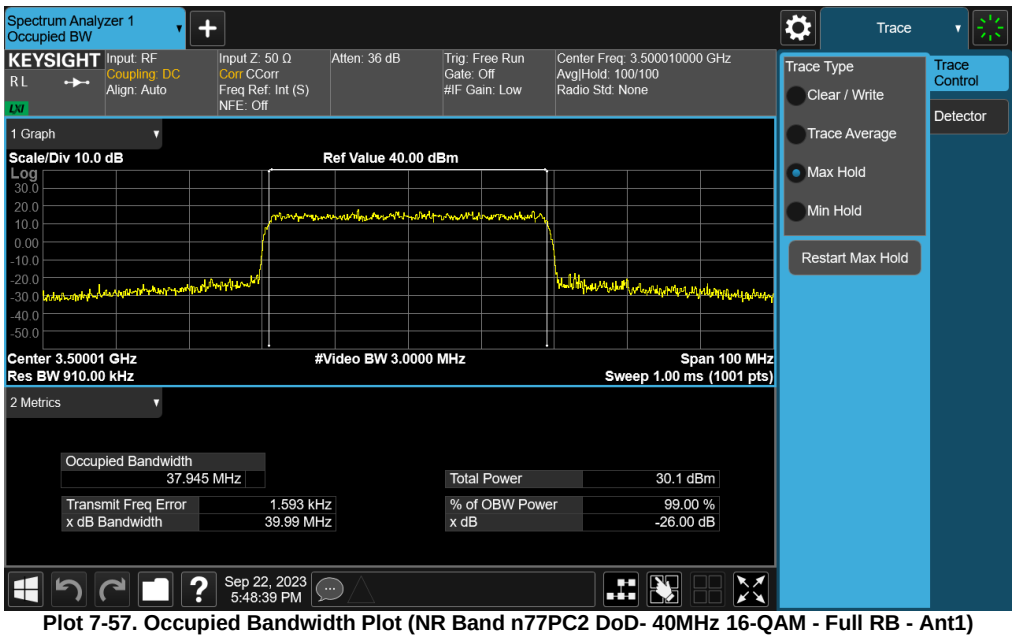
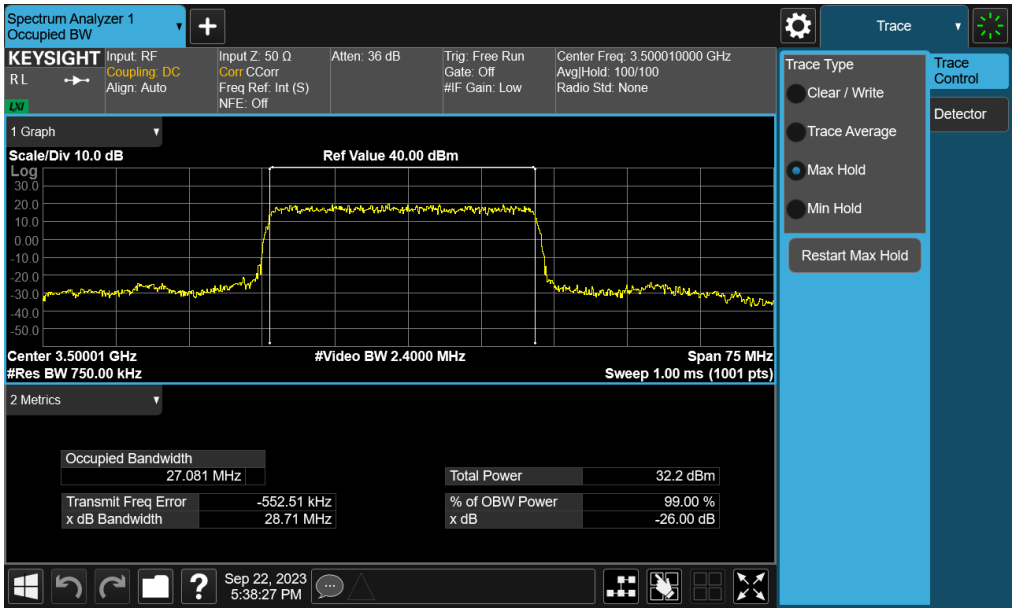
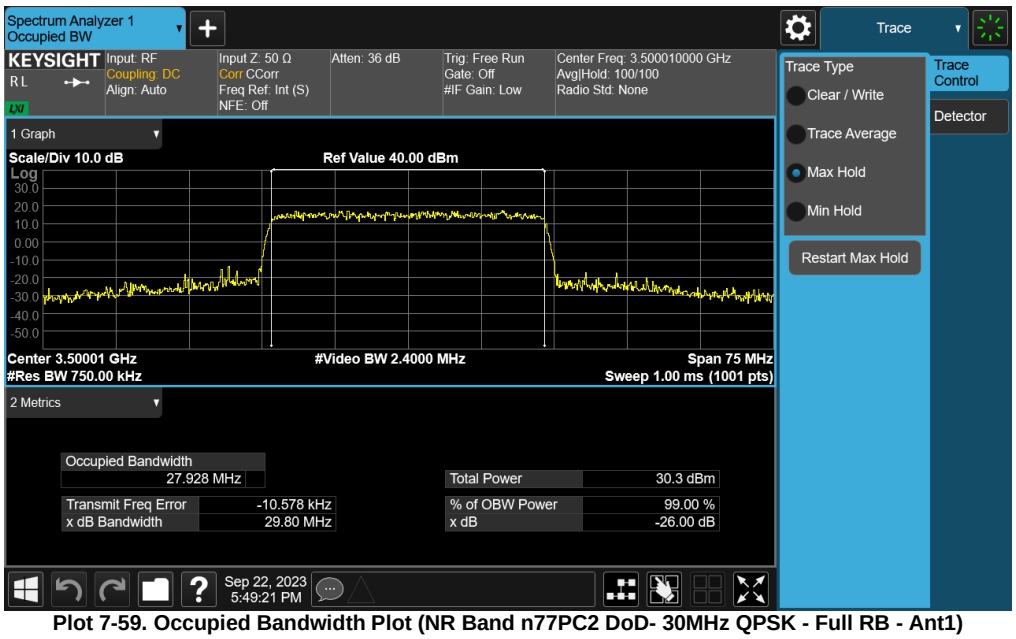


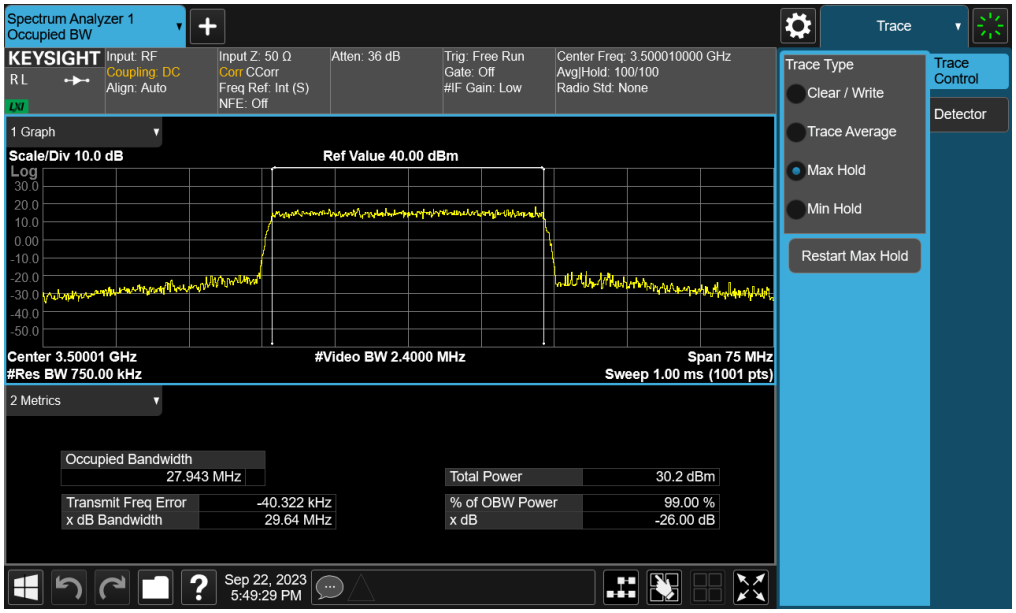
Plot 7-57. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 40MHz 16-QAM - Full RB - Ant1)



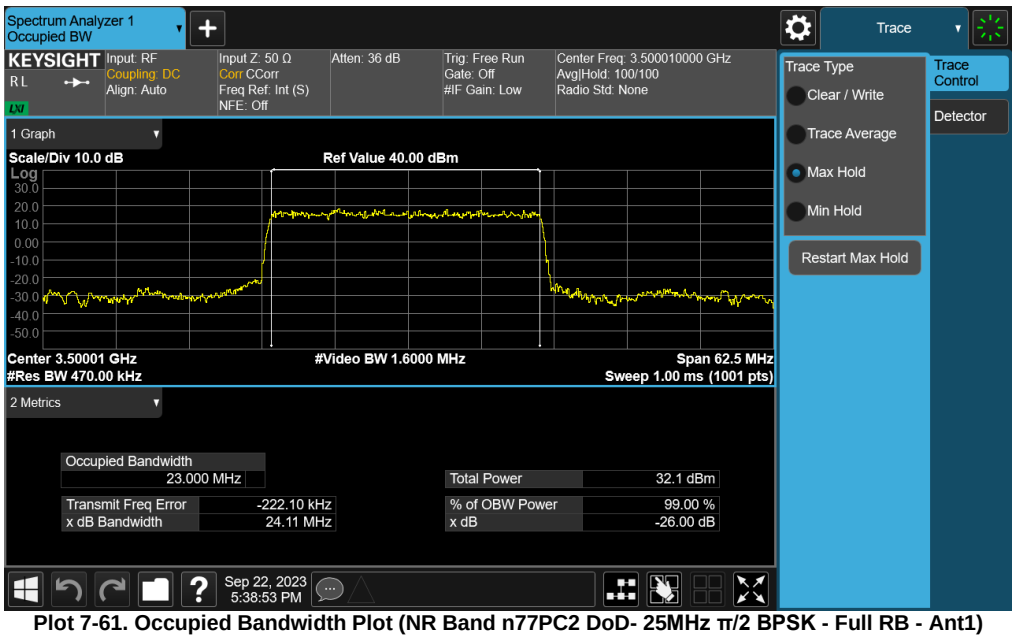
Plot 7-58. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 30MHz π/2 BPSK - Full RB - Ant1)



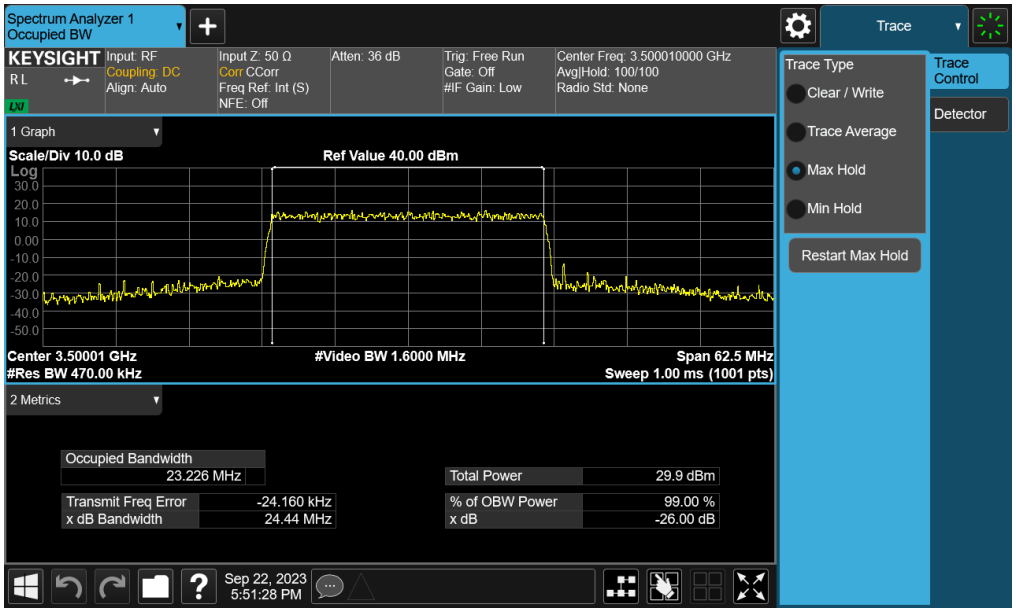
Plot 7-59. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 30MHz QPSK - Full RB - Ant1)



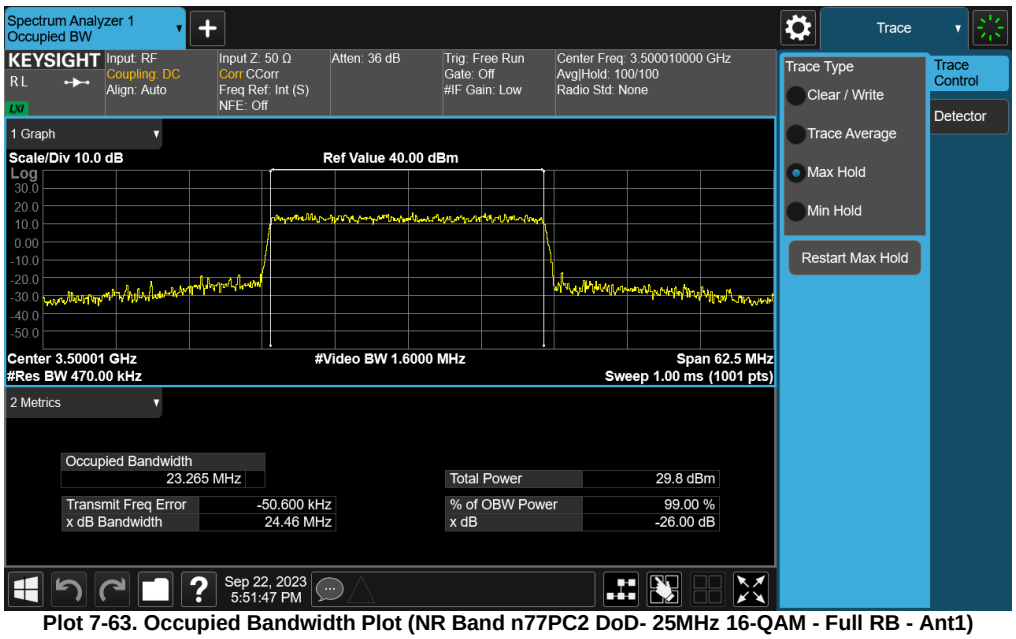
Plot 7-60. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 30MHz 16-QAM - Full RB - Ant1)



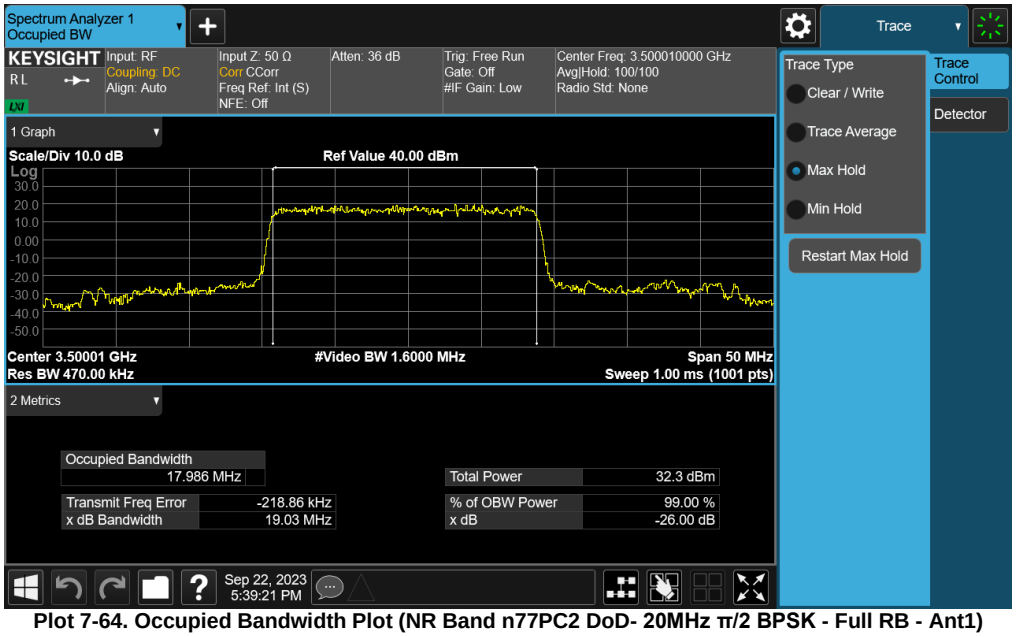
Plot 7-61. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 25MHz π/2 BPSK - Full RB - Ant1)



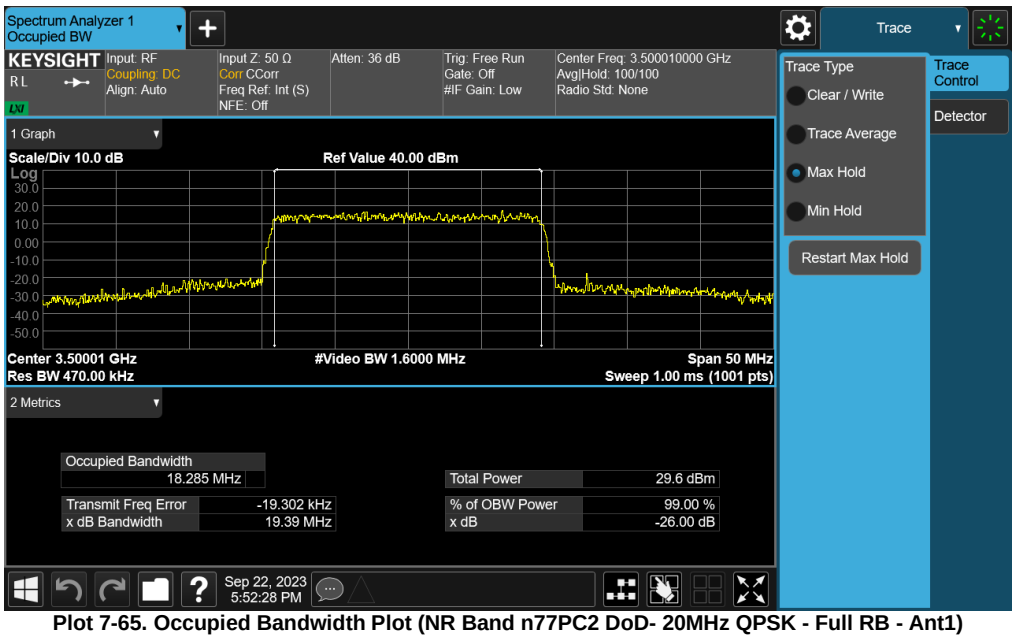
Plot 7-62. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 25MHz QPSK - Full RB - Ant1)



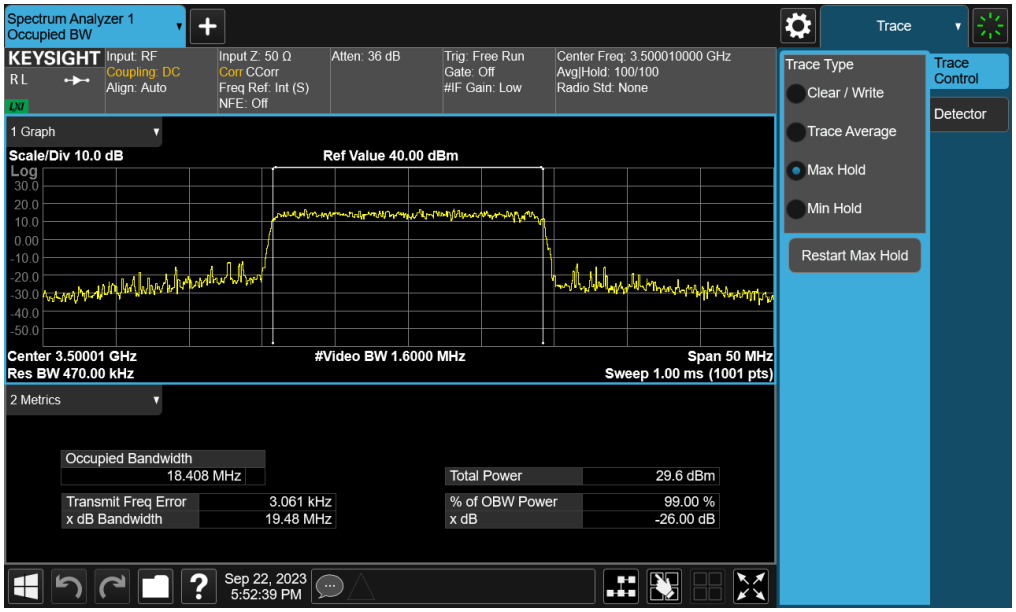
Plot 7-63. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 25MHz 16-QAM - Full RB - Ant1)



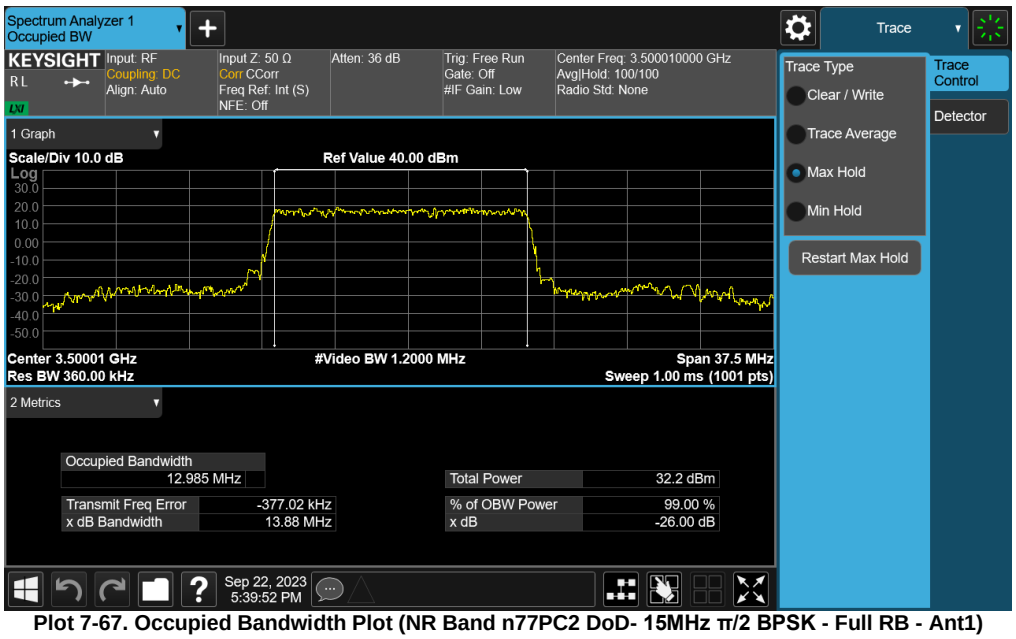
Plot 7-64. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 20MHz π/2 BPSK - Full RB - Ant1)



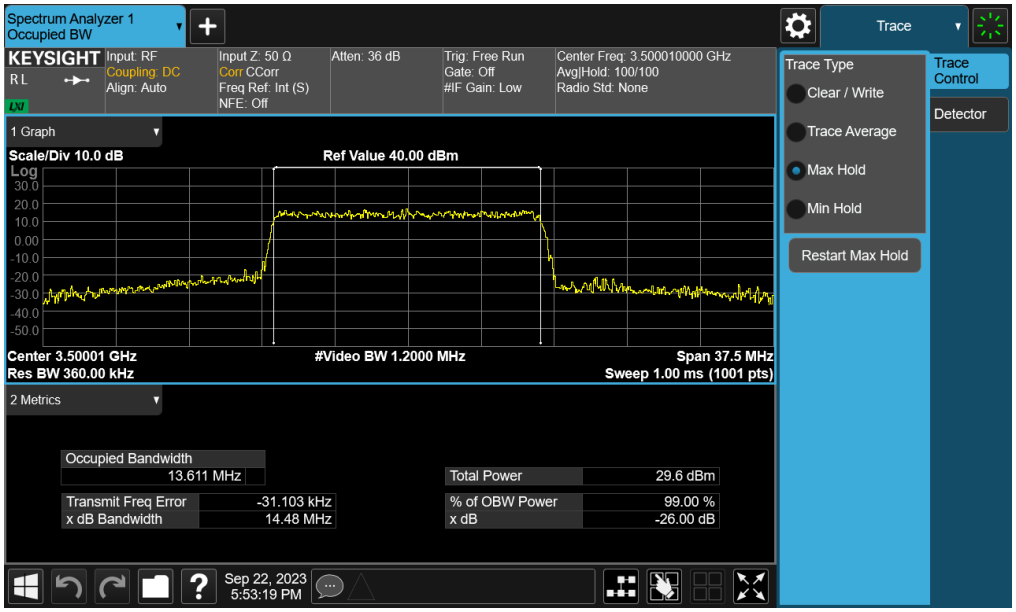
Plot 7-65. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 20MHz QPSK - Full RB - Ant1)



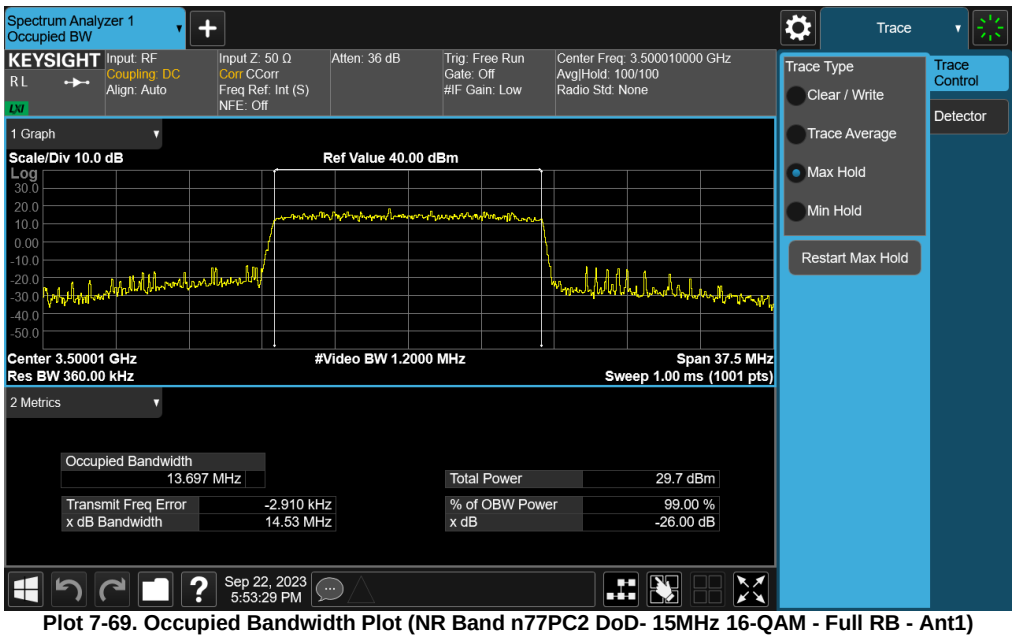
Plot 7-66. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 20MHz 16-QAM - Full RB - Ant1)



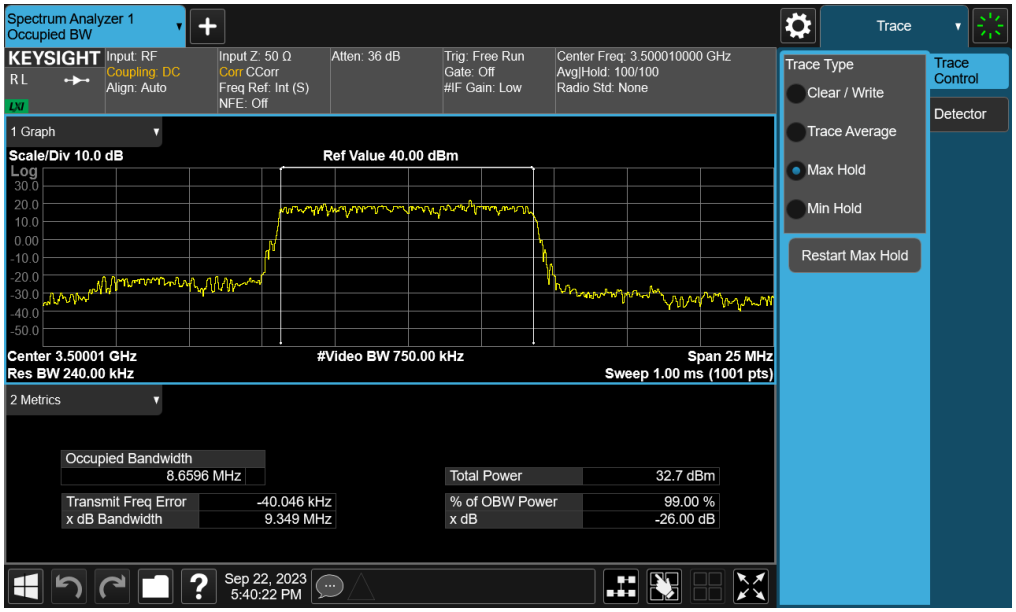
Plot 7-67. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 15MHz π/2 BPSK - Full RB - Ant1)



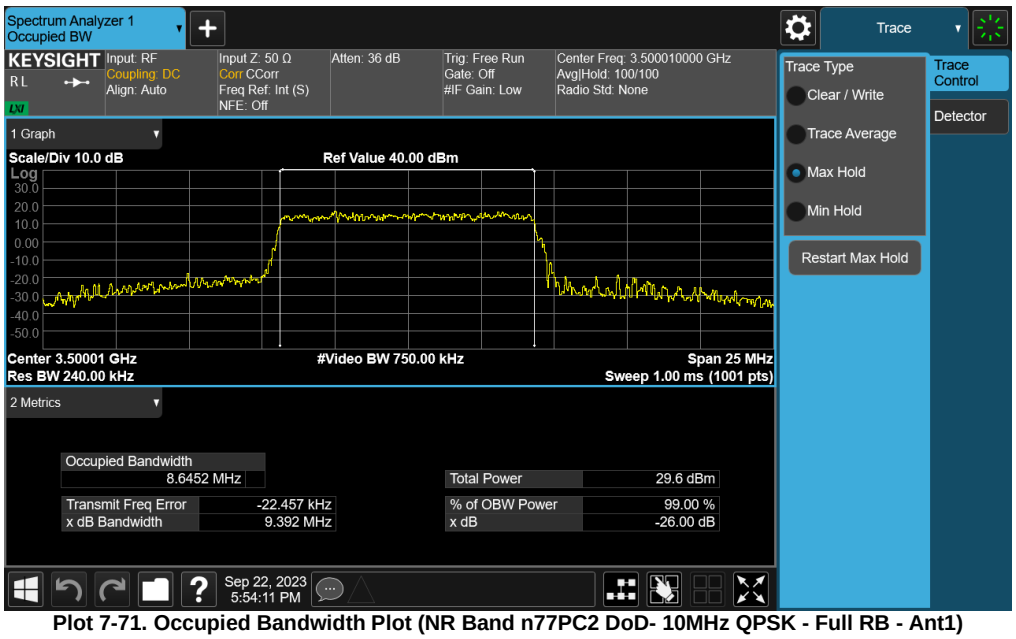
Plot 7-68. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 15MHz QPSK - Full RB - Ant1)



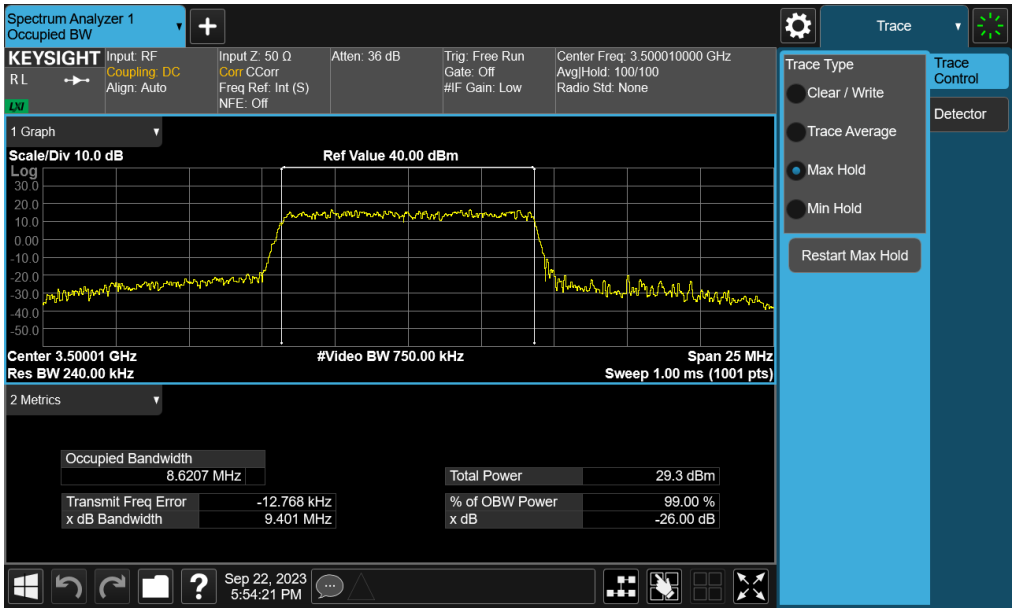
Plot 7-69. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 15MHz 16-QAM - Full RB - Ant1)



Plot 7-70. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 10MHz π/2 BPSK - Full RB - Ant1)



Plot 7-71. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 10MHz QPSK - Full RB - Ant1)



Plot 7-72. Occupied Bandwidth Plot (NR Band n77PC2 DoD- 10MHz 16-QAM - Full RB - Ant1)

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.

For operations in the 3700 – 3980MHz band and the 3450 – 3550MHz band, the maximum permissible conducted power level of any spurious emission is -13dBm/MHz.

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.4

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to the tenth harmonic of the highest transmit frequency (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.

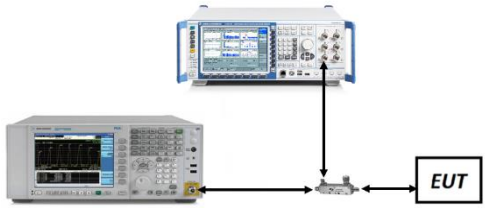


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

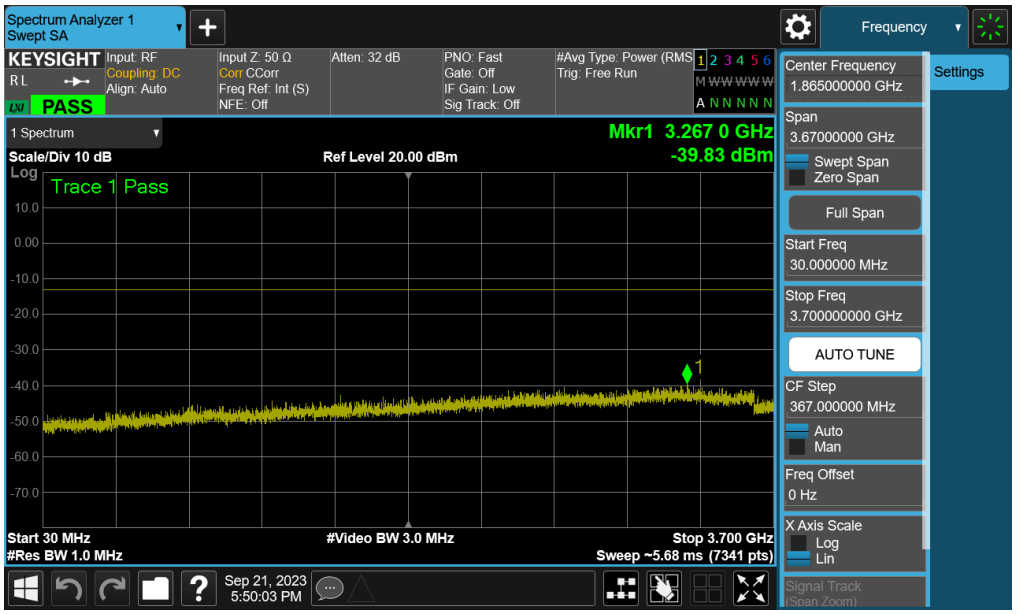
1. Per Part 27.53(l), Part 27.53(n), and RSS-199, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz.

2. 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 are reported in this section.

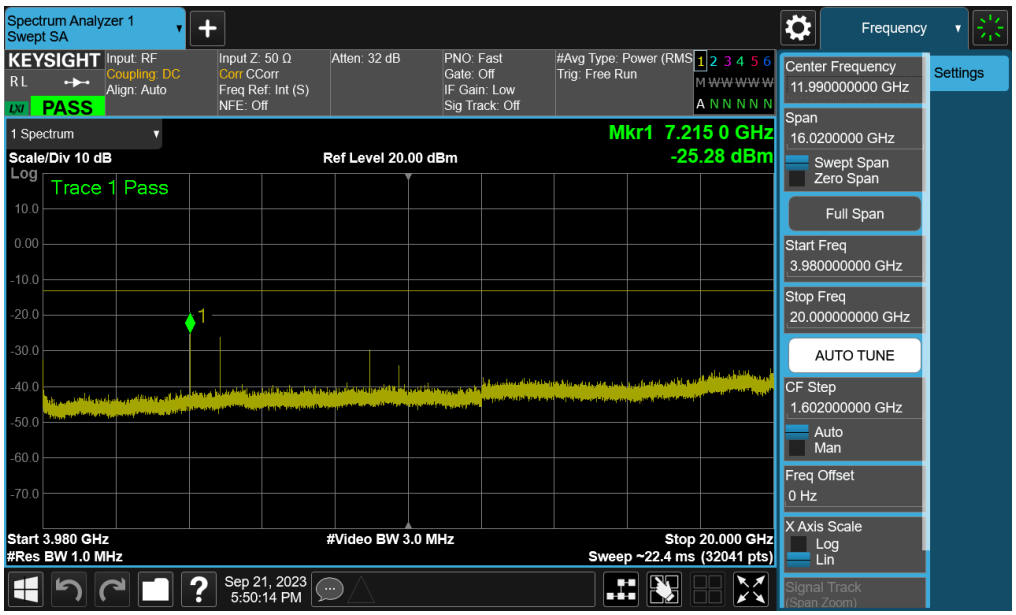
Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
NR-n77 PC2 C Band	100MHz	Low	30.0 - 3700.0	-35.53	-13	-22.53
		Low	3980.0 - 20000.0	-29.74	-13	-16.74
		Low	20000.0 - 40000.0	-25.67	-13	-12.67
		Mid	30.0 - 3700.0	-26.18	-13	-13.18
		Mid	3980.0 - 20000.0	-26.29	-13	-13.29
		Mid	20000.0 - 40000.0	-24.90	-13	-11.90
		High	30.0 - 3700.0	-39.83	-13	-26.83
		High	3980.0 - 20000.0	-25.28	-13	-12.28
		High	20000.0 - 40000.0	-24.81	-13	-11.81
NR-n77 PC2 DoD Band	100MHz	Mid	30.0 - 3450.0	-37.06	-13	-24.06
		Mid	3550.0 - 20000.0	-26.75	-13	-13.75
		Mid	20000.0 - 40000.0	-25.39	-13	-12.39
NR-n78	100MHz	Low	30.0 - 3350.0	-47.68	-13	-34.68
		Low	3650.0 - 18000.0	-33.68	-13	-20.68
		Low	18000.0 - 37000.0	-38.20	-13	-25.20
		Mid	30.0 - 3450.0	-47.71	-13	-34.71
		Mid	3650.0 - 18000.0	-33.33	-13	-20.33
		Mid	18000.0 - 37000.0	-36.60	-13	-23.60
		High	30.0 - 3450.0	-48.71	-13	-35.71
		High	3750.0 - 18000.0	-33.72	-13	-20.72
		High	18000.0 - 37000.0	-34.54	-13	-21.54

Table 7-13. Conducted Emission Test Results – Ant1

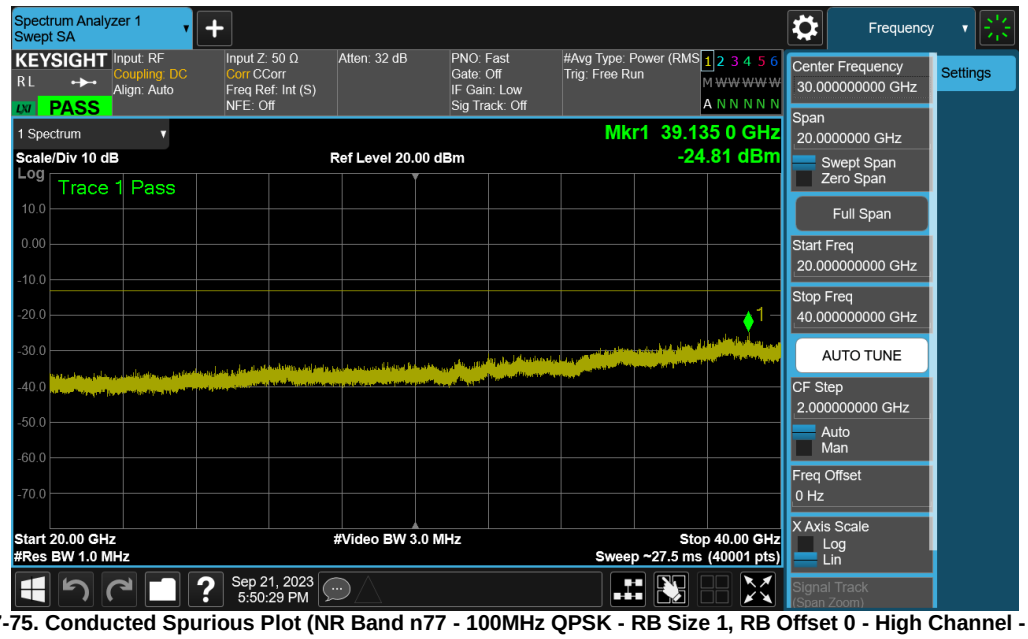
NR Band n77 (C-Band) – Ant1



Plot 7-73. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - Ant1)

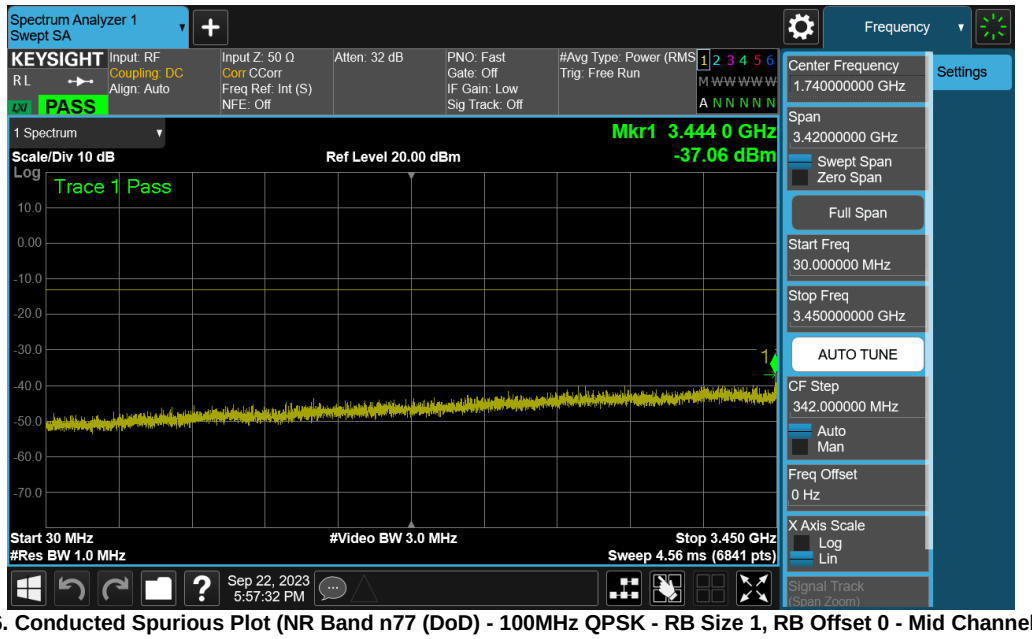


Plot 7-74. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - Ant1)

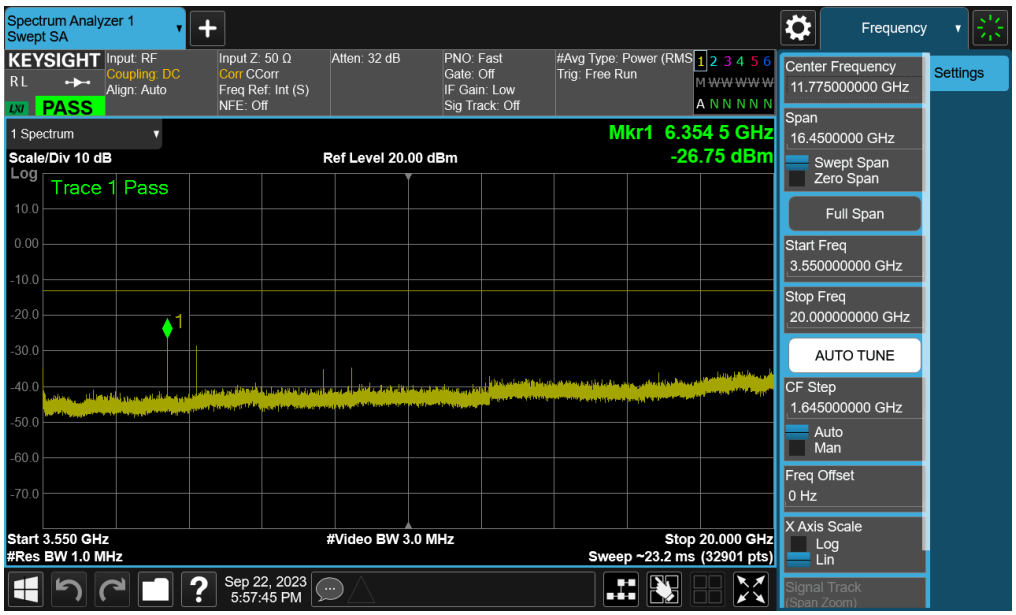


Plot 7-75. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - Ant1)

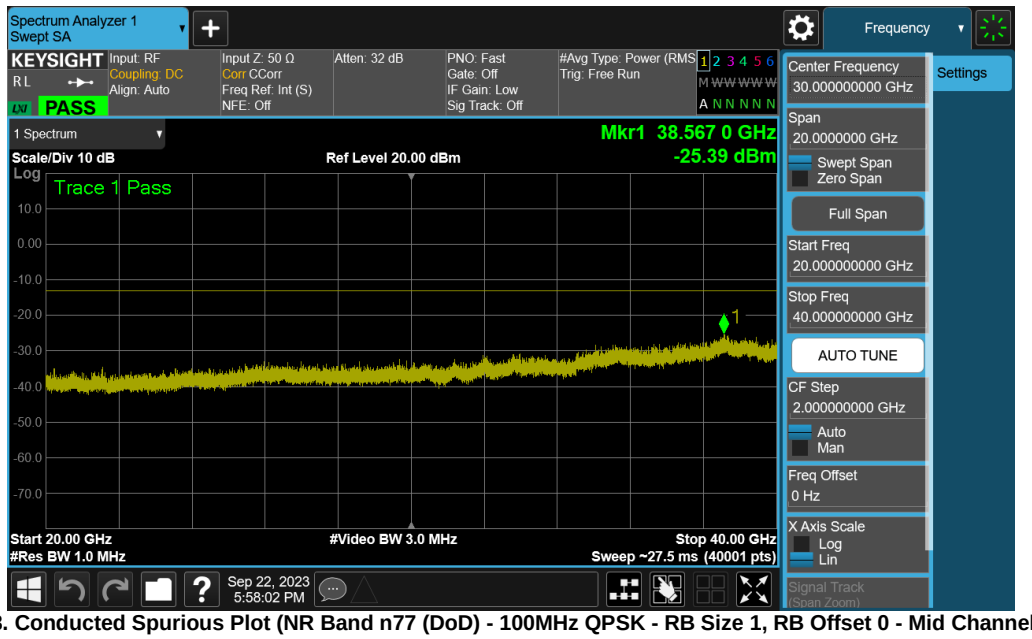
NR Band n77 (DoD Band) – Ant1



Plot 7-76. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant1)

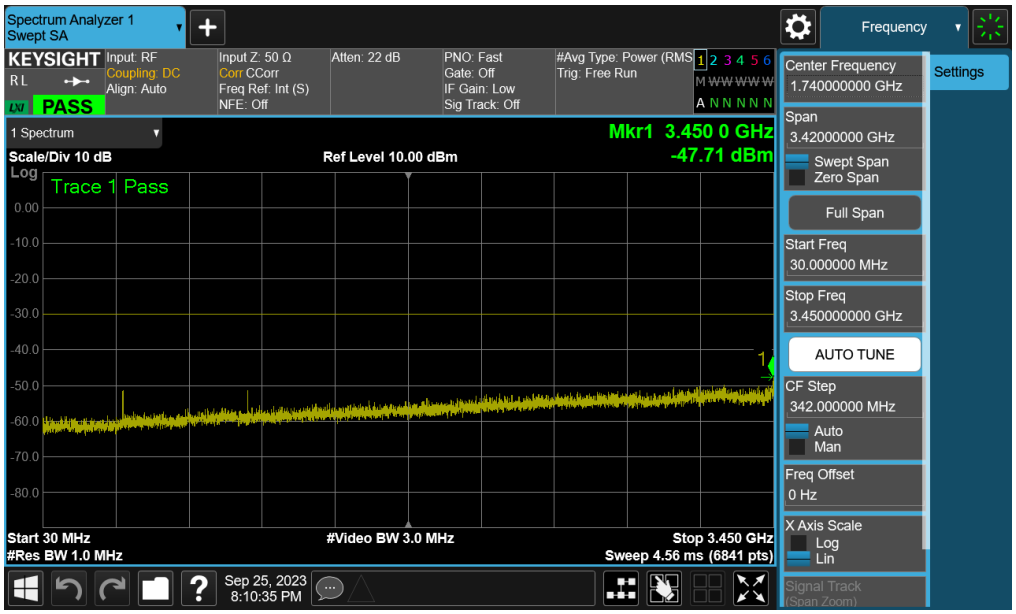


Plot 7-77. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant1)

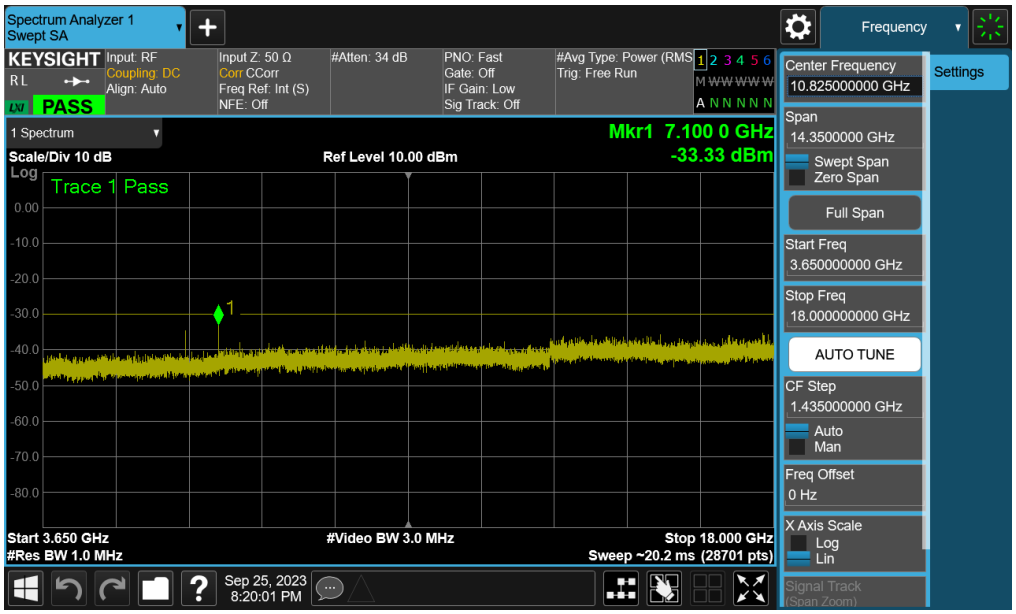


Plot 7-78. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant1)

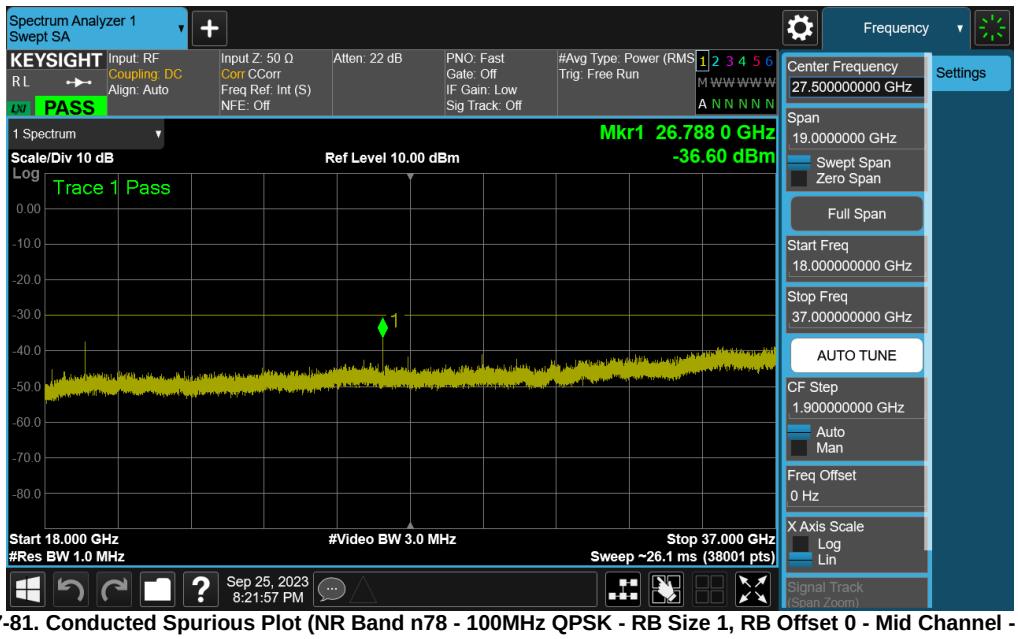
NR Band n78 – Ant1



Plot 7-79. Conducted Spurious Plot (NR Band n78 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant1)



Plot 7-80. Conducted Spurious Plot (NR Band n78 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant1)

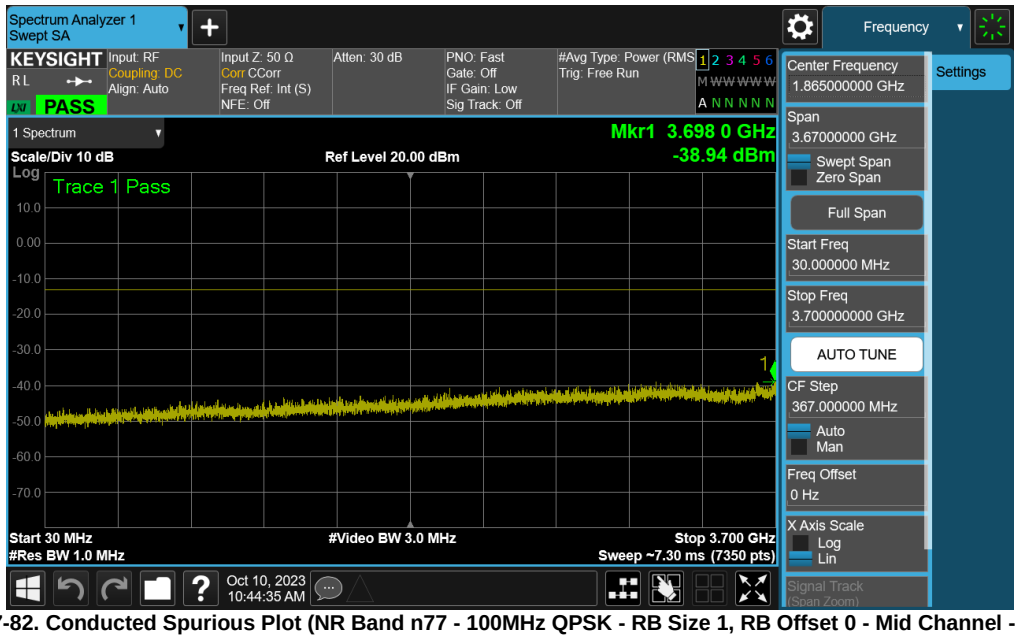


Plot 7-81. Conducted Spurious Plot (NR Band n78 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant1)

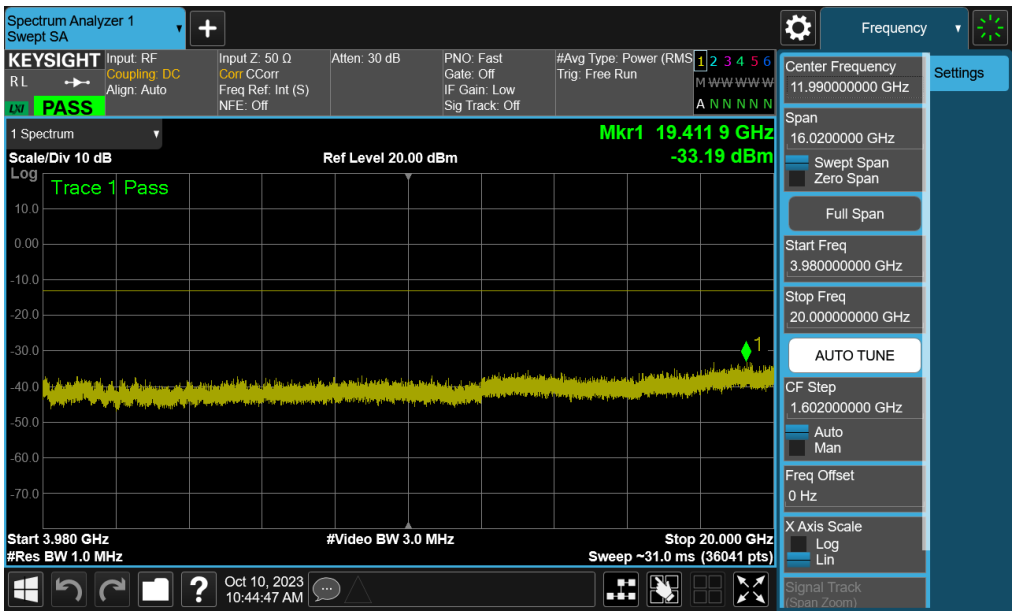
Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
NR-n77/78 PC2 C Band	100MHz	Low	30.0 - 3700.0	-37.90	-13	-24.90
		Low	3980.0 - 20000.0	-33.72	-13	-20.72
		Low	20000.0 - 40000.0	-43.00	-13	-30.00
		Mid	30.0 - 3700.0	-38.94	-13	-25.94
		Mid	3980.0 - 20000.0	-33.19	-13	-20.19
		Mid	20000.0 - 40000.0	-43.16	-13	-30.16
		High	30.0 - 3700.0	-38.21	-13	-25.21
		High	3980.0 - 20000.0	-33.69	-13	-20.69
		High	20000.0 - 40000.0	-44.05	-13	-31.05
NR-n77/78 PC2 DoD Band	100MHz	Mid	30.0 - 3450.0	-38.76	-13	-25.76
		Mid	3550.0 - 20000.0	-32.69	-13	-19.69
		Mid	20000.0 - 40000.0	-43.64	-13	-30.64

Table 7-14. Conducted Emission Test Results – Ant2

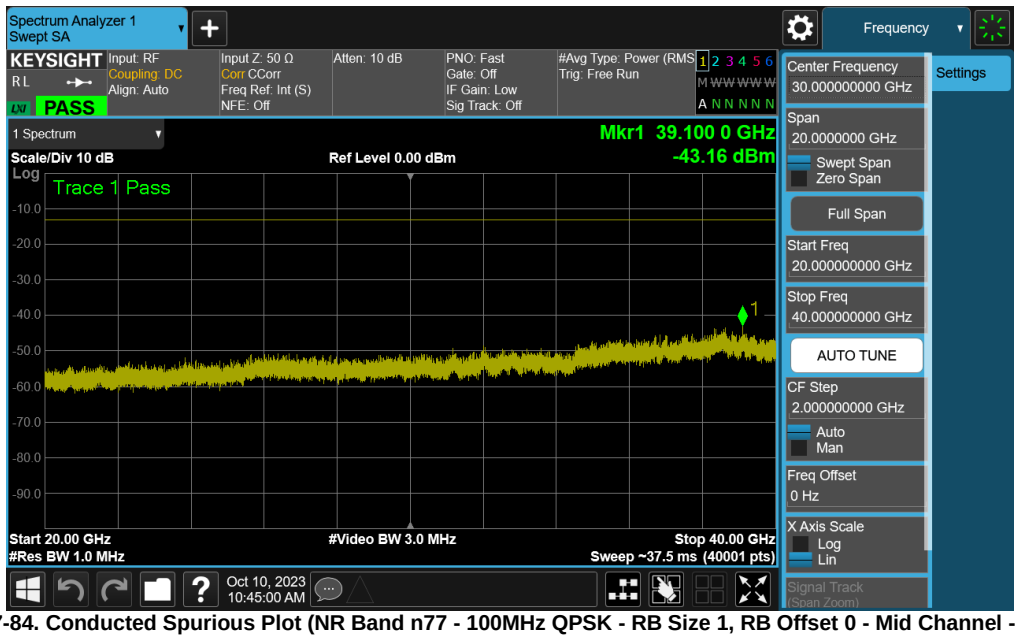
NR Band n77 (C-Band) – Ant2



Plot 7-82. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant2)

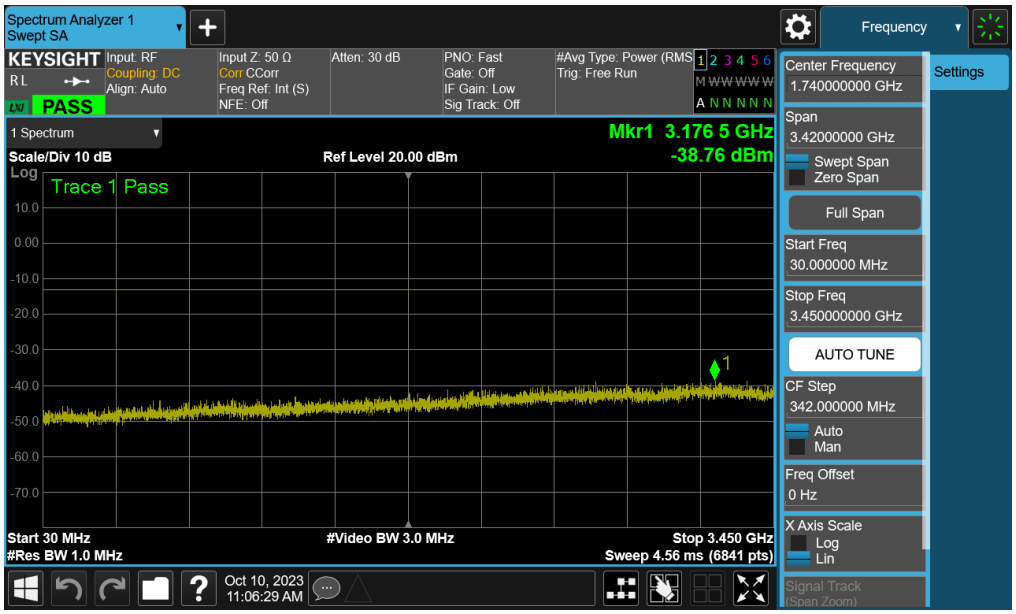


Plot 7-83. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant2)

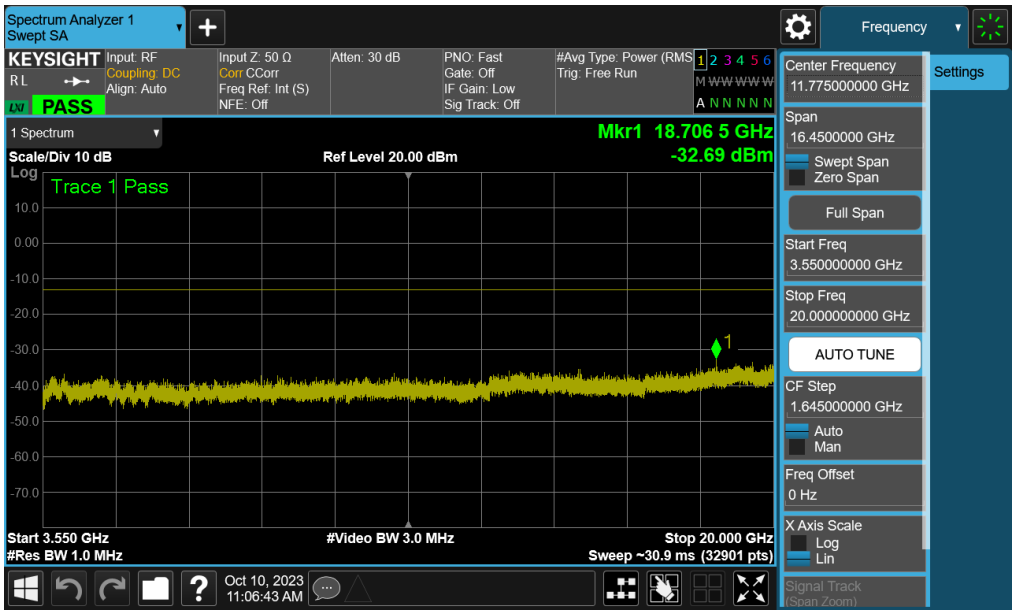


Plot 7-84. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant2)

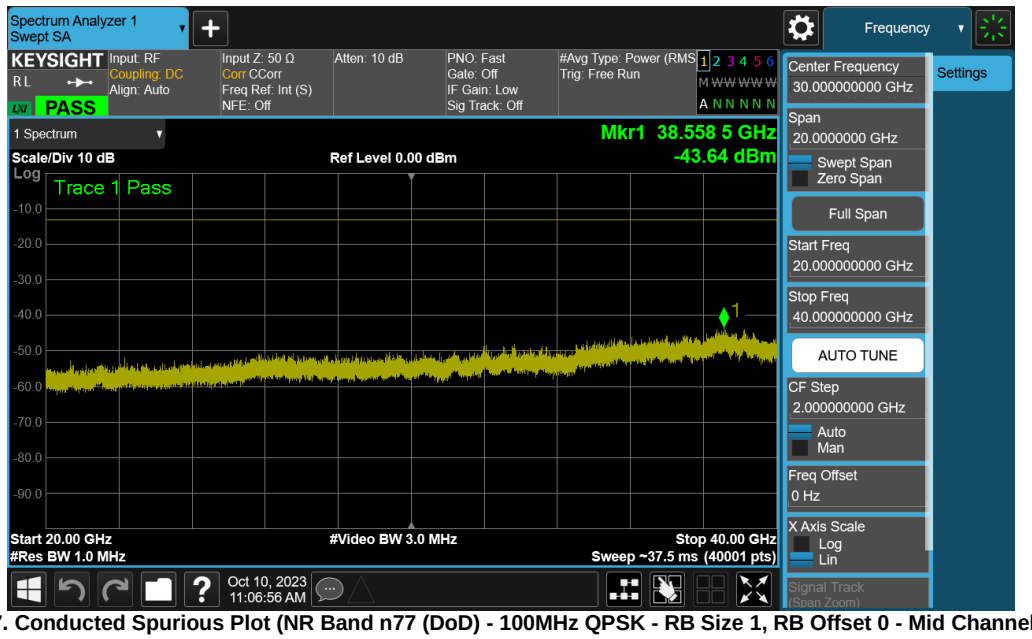
NR Band n77 (DoD Band) – Ant2



Plot 7-85. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant2)



Plot 7-86. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant2)

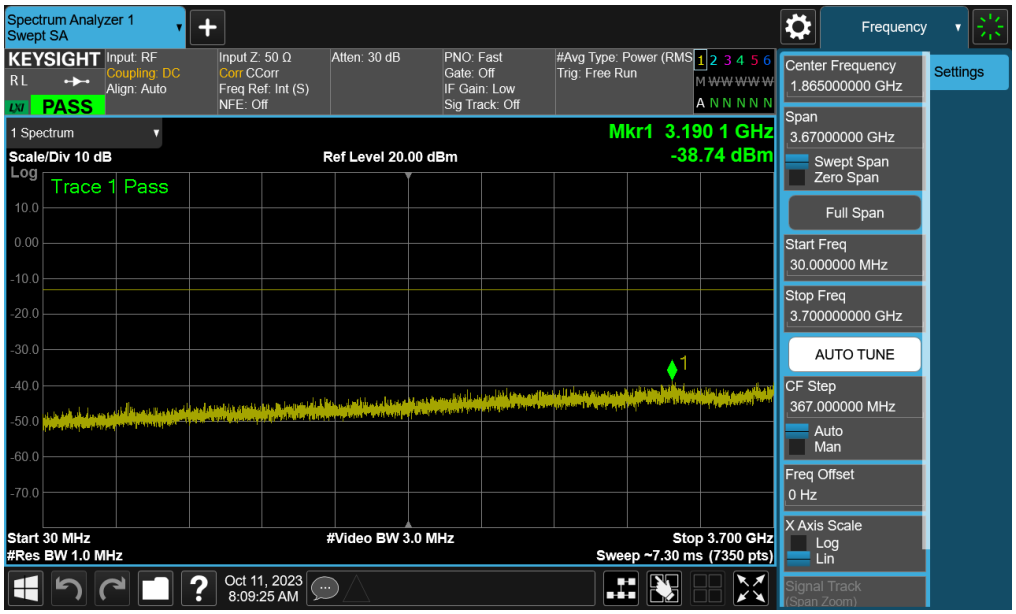


Plot 7-87. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant2)

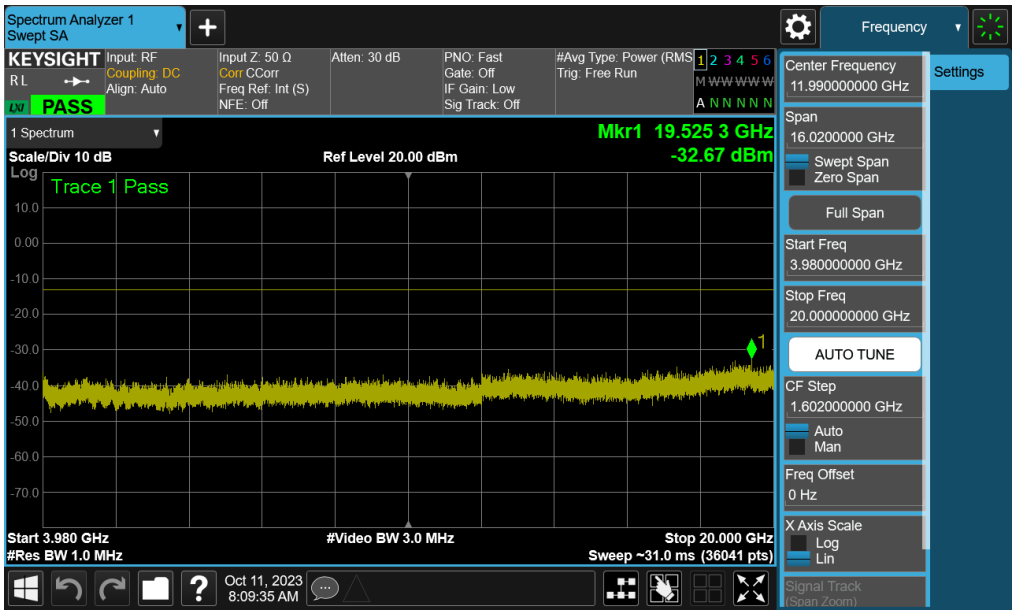
Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
NR-n77/78 PC2 C Band	100MHz	Low	30.0 - 3700.0	-38.84	-13	-25.84
		Low	3980.0 - 20000.0	-34.10	-13	-21.10
		Low	20000.0 - 40000.0	-44.00	-13	-31.00
		Mid	30.0 - 3700.0	-38.74	-13	-25.74
		Mid	3980.0 - 20000.0	-32.67	-13	-19.67
		Mid	20000.0 - 40000.0	-43.98	-13	-30.98
		High	30.0 - 3700.0	-38.53	-13	-25.53
		High	3980.0 - 20000.0	-32.95	-13	-19.95
		High	20000.0 - 40000.0	-43.90	-13	-30.90
NR-n77/78 PC2 DoD Band	100MHz	Mid	30.0 - 3450.0	-37.78	-13	-24.78
		Mid	3550.0 - 20000.0	-33.57	-13	-20.57
		Mid	20000.0 - 40000.0	-43.67	-13	-30.67

Table 7-15. Conducted Emission Test Results – Ant3

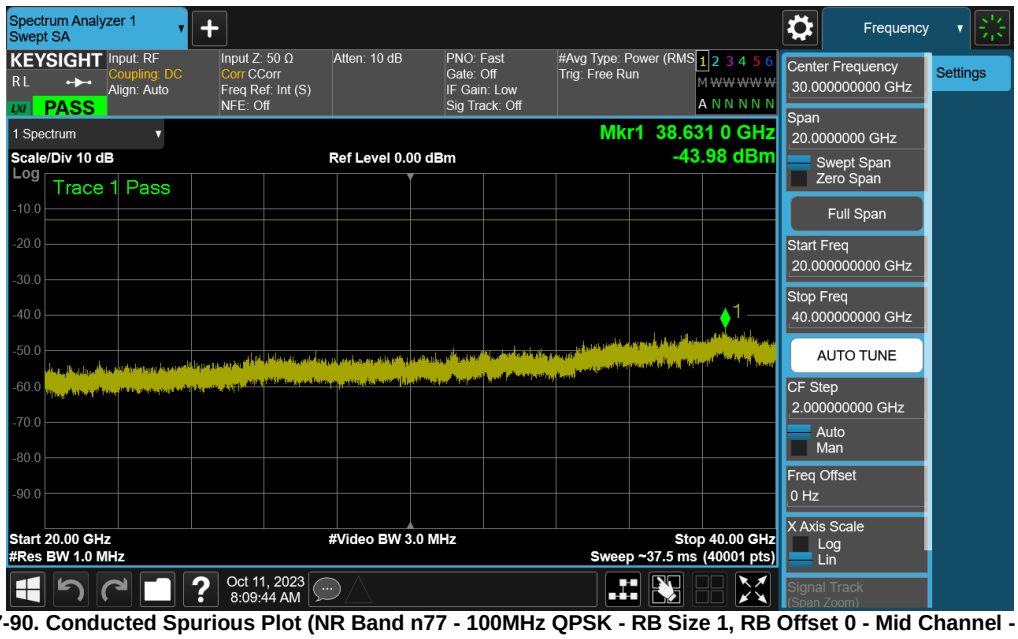
NR Band n77 – Ant3



Plot 7-88. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant3)

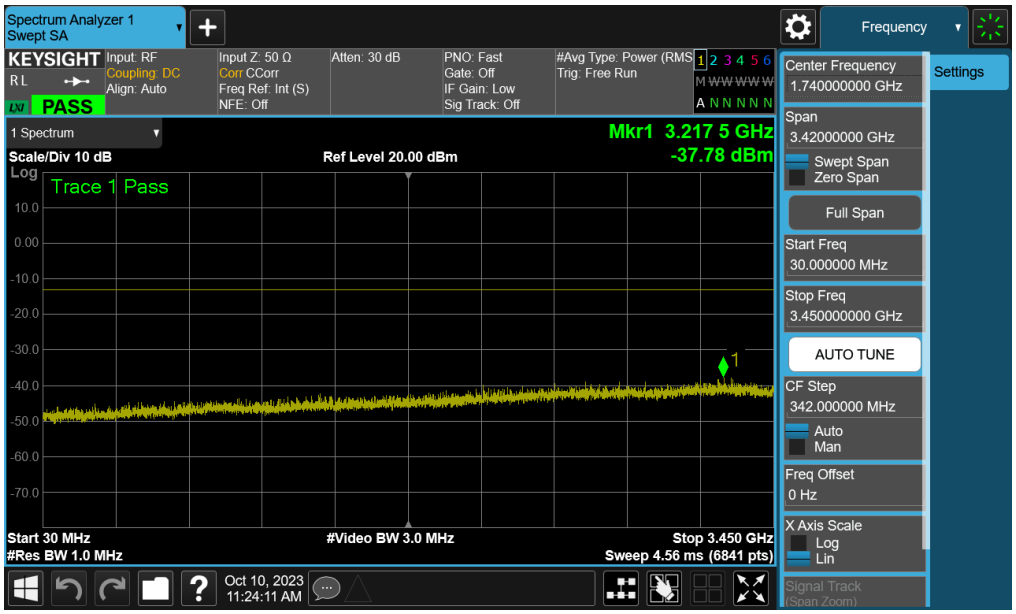


Plot 7-89. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant3)

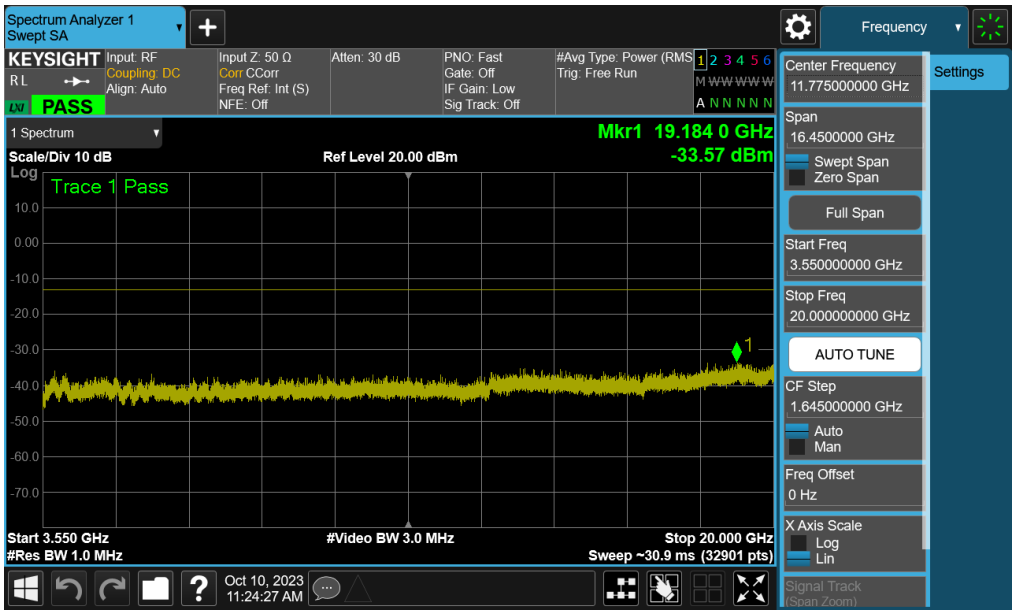


Plot 7-90. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant3)

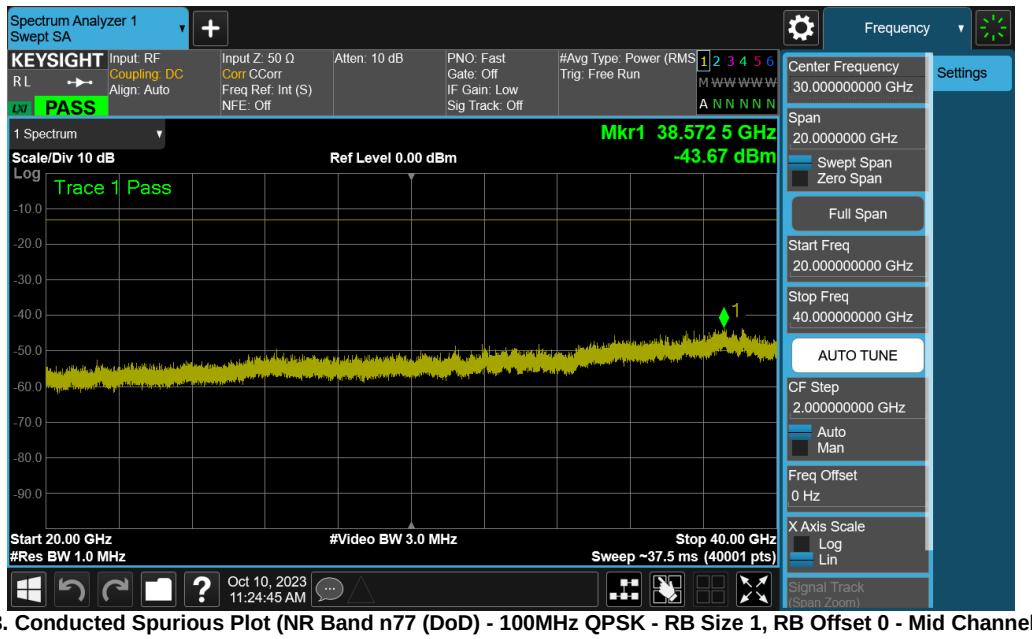
NR Band n77 (DoD Band) – Ant3



Plot 7-91. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant3)



Plot 7-92. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant3)

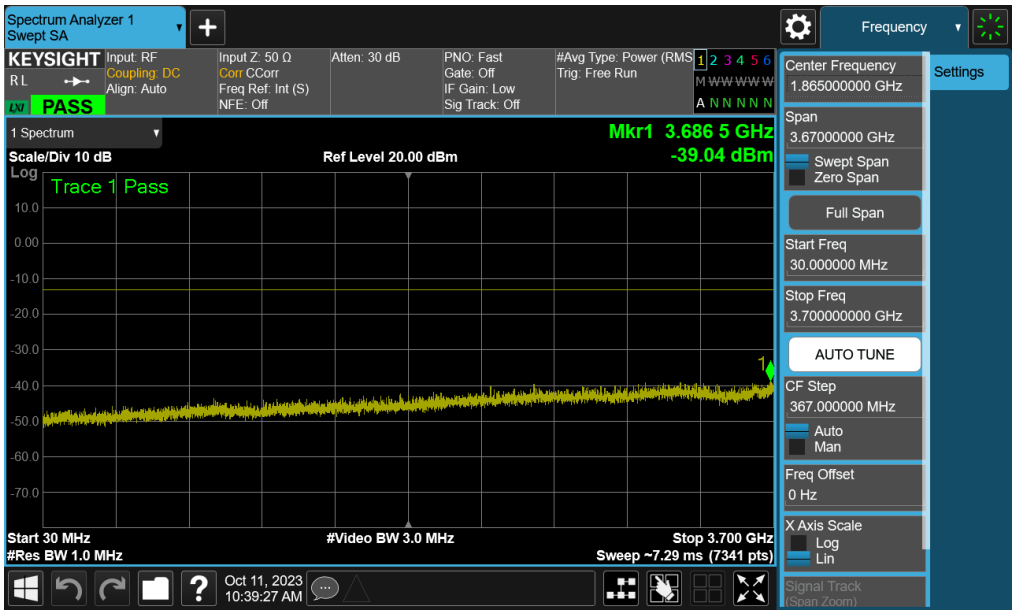


Plot 7-93. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant3)

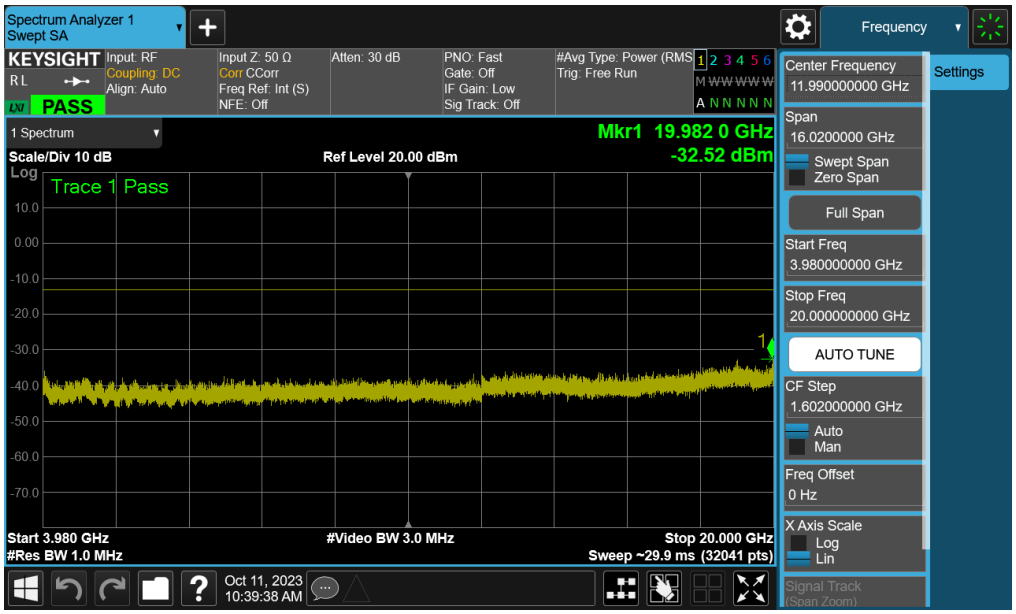
Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
NR-n77/78 PC2 C Band	100MHz	Low	30.0 - 3700.0	-39.13	-13	-26.13
		Low	3980.0 - 20000.0	-33.67	-13	-20.67
		Low	20000.0 - 40000.0	-43.21	-13	-30.21
		Mid	30.0 - 3700.0	-38.95	-13	-25.95
		Mid	3980.0 - 20000.0	-33.17	-13	-20.17
		Mid	20000.0 - 40000.0	-43.93	-13	-30.93
		High	30.0 - 3700.0	-39.04	-13	-26.04
		High	3980.0 - 20000.0	-32.53	-13	-19.53
		High	20000.0 - 40000.0	-43.33	-13	-30.33
NR-n77/78 PC2 DoD Band	100MHz	Mid	30.0 - 3450.0	-38.05	-13	-25.05
		Mid	3550.0 - 20000.0	-33.42	-13	-20.42
		Mid	20000.0 - 40000.0	-44.12	-13	-31.12

Table 7-16. Conducted Emission Test Results – Ant4

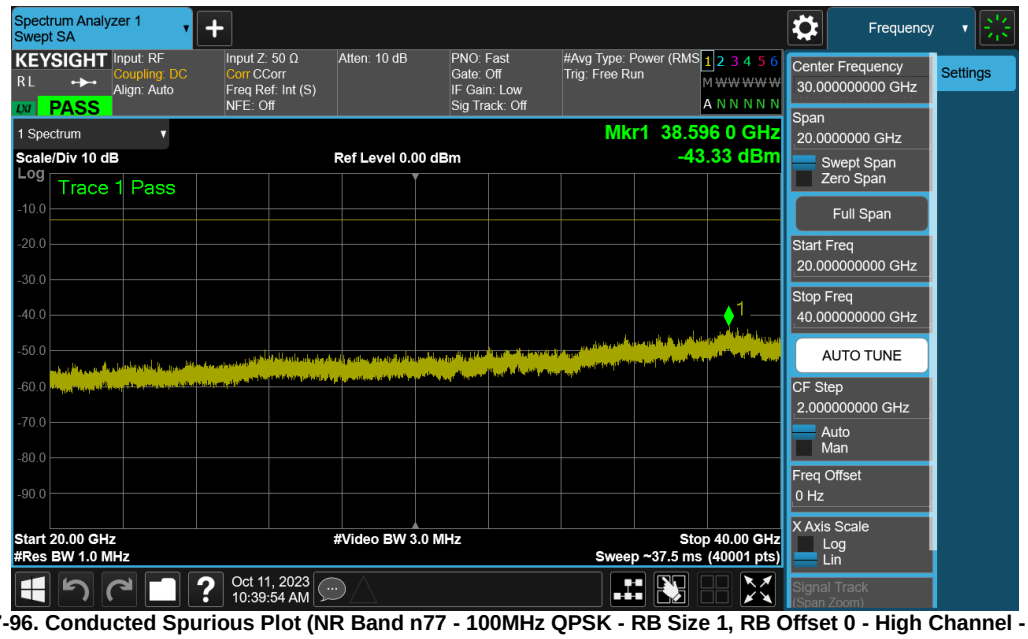
NR Band n77 (C-Band) – Ant4



Plot 7-94. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - Ant4)

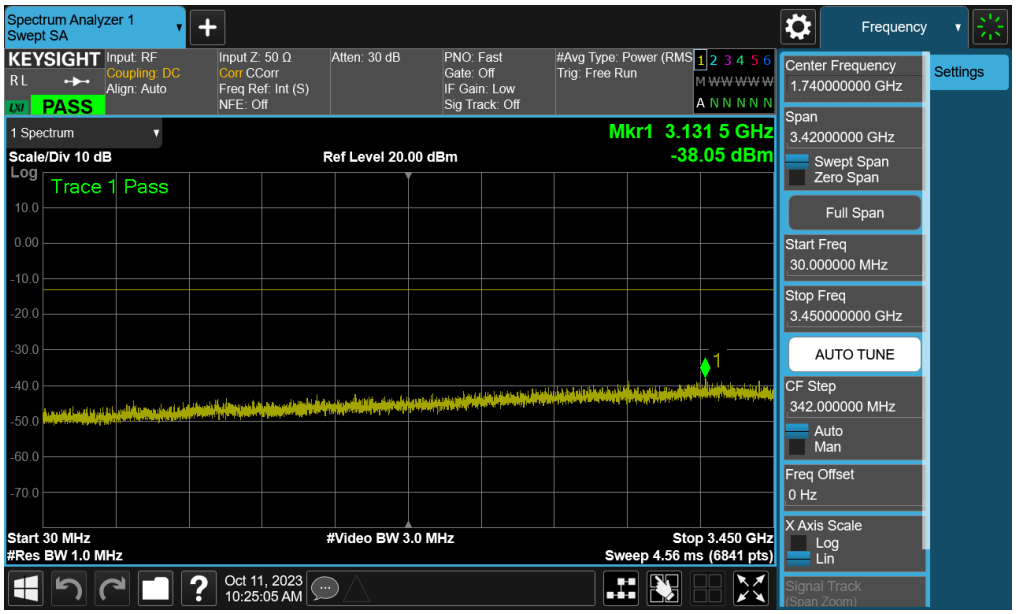


Plot 7-95. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - Ant4)

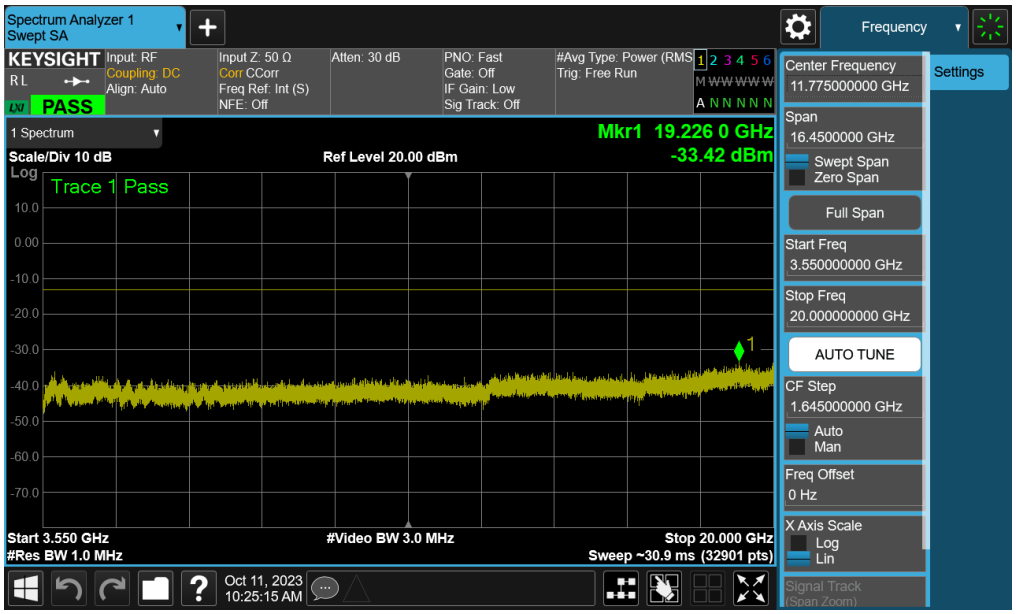


Plot 7-96. Conducted Spurious Plot (NR Band n77 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - Ant4)

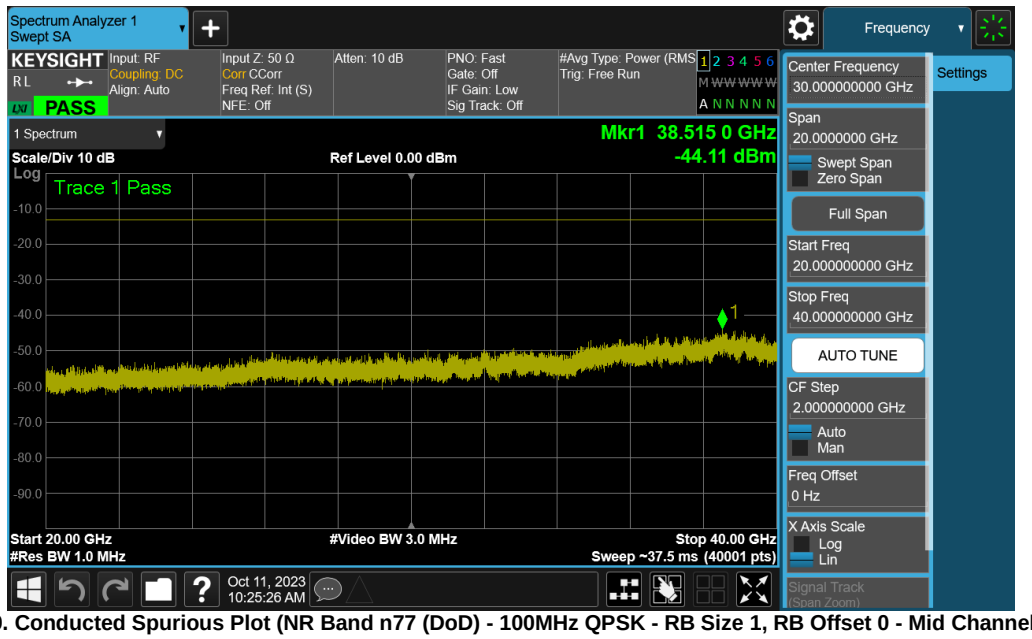
NR Band n77 (DoD Band) – Ant4



Plot 7-97. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant4)



Plot 7-98. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant4)



Plot 7-99. Conducted Spurious Plot (NR Band n77 (DoD) - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Ant4)

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.

For operations in the 3700 – 3980MHz band and the 3450 – 3550MHz band, the maximum permissible conducted power level of any out-of-band emission is -13dBm/MHz.

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.3

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 ≥ 1% of the emission bandwidth
4. VBW ≥ 3 x 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.

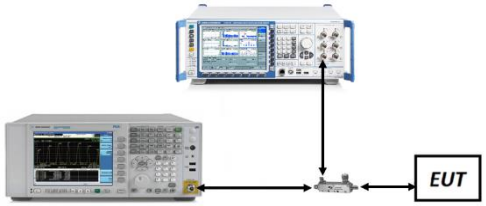


Figure 7-4. Test Instrument & Measurement Setup

Test Notes

1. Per Part 27.53(l), compliance with the -13dBm/MHz conducted power limit for out-of-band emissions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz.

2. Per Part 27.53(n), compliance with the -13dBm/MHz conducted power limit for out-of-band emissions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz.

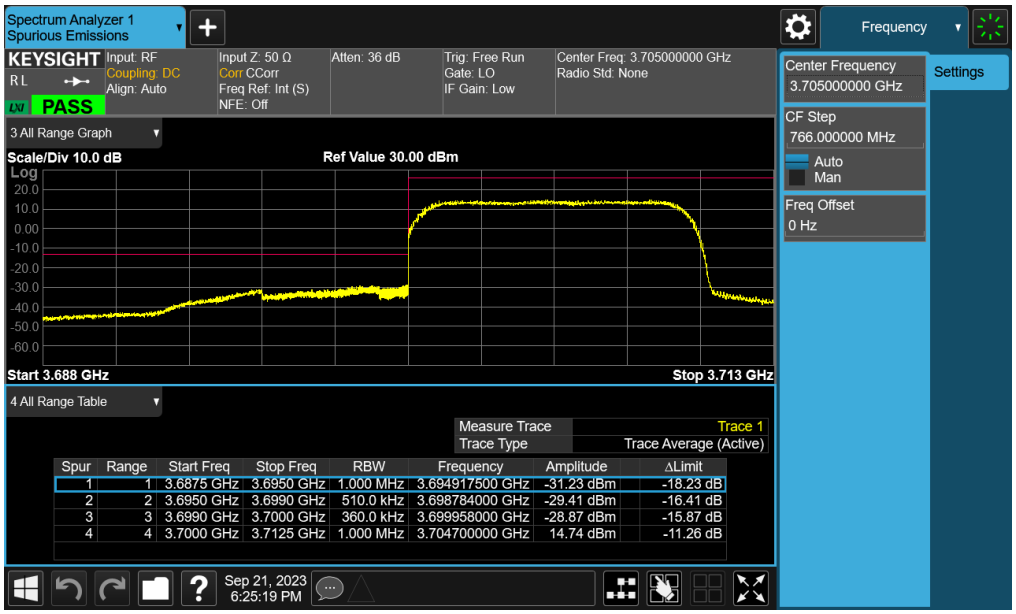
3. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

4. 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 are reported in this section.

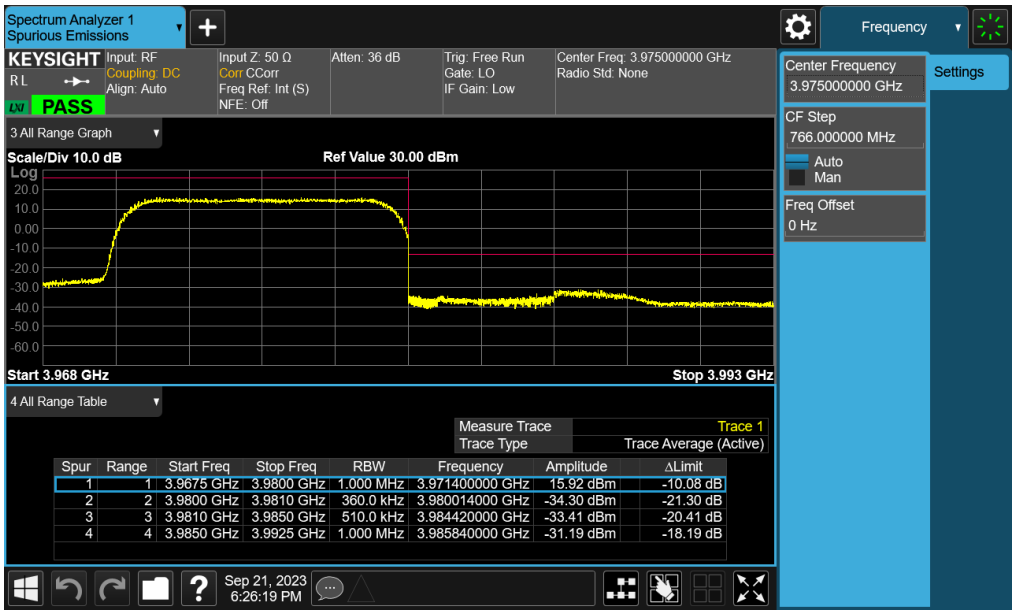
Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
NR-n77 PC2 C Band	100MHz	Low	Band Edge	-34.75	-13	-21.75
		High	Band Edge	-38.70	-13	-25.70
	90MHz	Low	Band Edge	-35.66	-13	-22.66
		High	Band Edge	-38.56	-13	-25.56
	80MHz	Low	Band Edge	-34.92	-13	-21.92
		High	Band Edge	-38.10	-13	-25.10
	70MHz	Low	Band Edge	-36.44	-13	-23.44
		High	Band Edge	-36.99	-13	-23.99
	60MHz	Low	Band Edge	-37.10	-13	-24.10
		High	Band Edge	-36.08	-13	-23.08
	50MHz	Low	Band Edge	-36.91	-13	-23.91
		High	Band Edge	-35.74	-13	-22.74
	40MHz	Low	Band Edge	-36.28	-13	-23.28
		High	Band Edge	-34.59	-13	-21.59
	30MHz	Low	Band Edge	-35.16	-13	-22.16
		High	Band Edge	-33.29	-13	-20.29
	20MHz	Low	Band Edge	-33.23	-13	-20.23
		High	Band Edge	-31.29	-13	-18.29
	15MHz	Low	Band Edge	-30.43	-13	-17.43
		High	Band Edge	-30.81	-13	-17.81
	10MHz	Low	Band Edge	-28.87	-13	-15.87
		High	Band Edge	-31.19	-13	-18.19

Table 7-17. Conducted Band Edge Test Results – Ant1

NR Band n77 (C-Band) – Ant1



Plot 7-100. Lower ACP Plot (NR Band n77 - 10MHz CP-OFDM-QPSK – Full RB - Ant1)

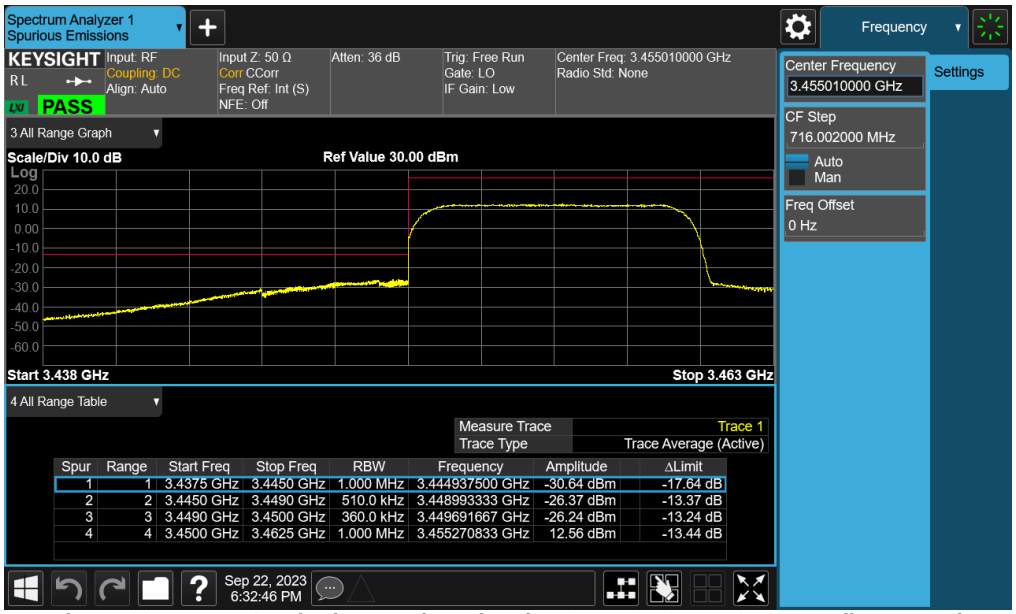


Plot 7-101. Upper ACP Plot (NR Band n77 - 10MHz CP-OFDM-QPSK – Full RB - Ant1)

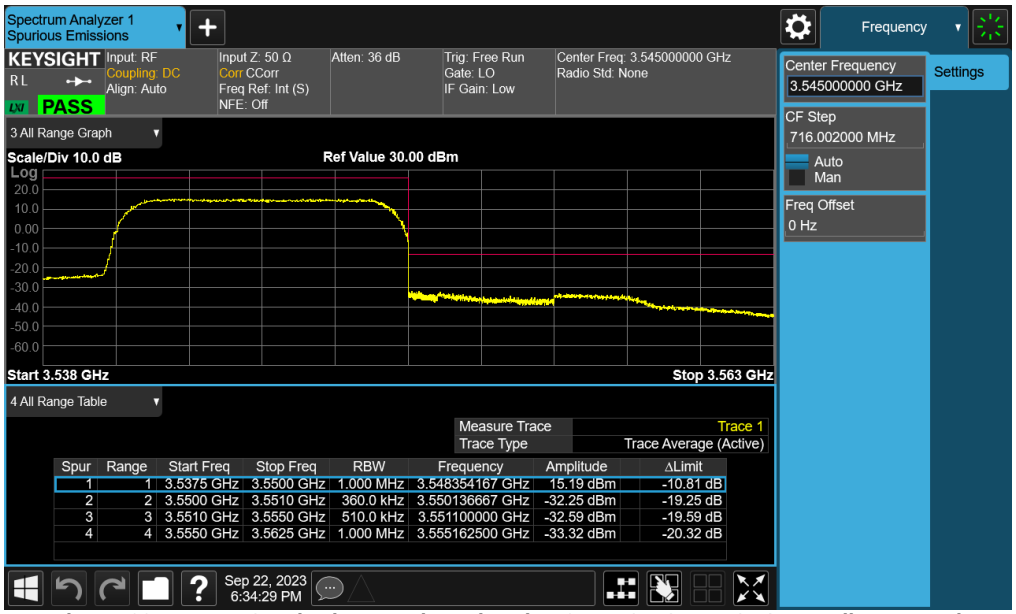
Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
NR-n77 PC2 DoD Band	100MHz	Low	Band Edge	-35.91	-13	-22.91
		High	Band Edge	-37.87	-13	-24.87
	90MHz	Low	Band Edge	-34.71	-13	-21.71
		High	Band Edge	-37.07	-13	-24.07
	80MHz	Low	Band Edge	-34.24	-13	-21.24
		High	Band Edge	-37.16	-13	-24.16
	70MHz	Low	Band Edge	-34.58	-13	-21.58
		High	Band Edge	-36.56	-13	-23.56
	60MHz	Low	Band Edge	-34.49	-13	-21.49
		High	Band Edge	-35.94	-13	-22.94
	50MHz	Low	Band Edge	-33.60	-13	-20.60
		High	Band Edge	-35.23	-13	-22.23
	40MHz	Low	Band Edge	-33.13	-13	-20.13
		High	Band Edge	-33.76	-13	-20.76
	30MHz	Low	Band Edge	-31.87	-13	-18.87
		High	Band Edge	-32.58	-13	-19.58
	20MHz	Low	Band Edge	-29.88	-13	-16.88
		High	Band Edge	-30.41	-13	-17.41
	15MHz	Low	Band Edge	-28.30	-13	-15.30
		High	Band Edge	-31.14	-13	-18.14
	10MHz	Low	Band Edge	-26.24	-13	-13.24
		High	Band Edge	-32.25	-13	-19.25

Table 7-18. Conducted Band Edge Test Results – Ant1

NR Band n77 (DoD Band) – Ant1



Plot 7-102. Lower ACP Plot (NR Band n77 (DoD) - 10MHz CP-OFDM-QPSK – Full RB - Ant1)

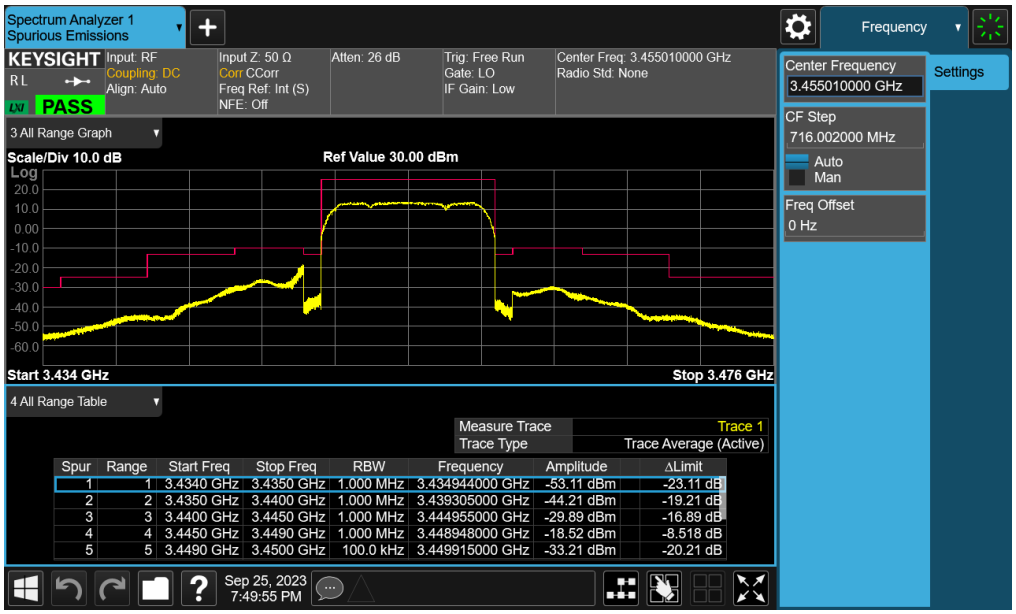


Plot 7-103. Upper ACP Plot (NR Band n77 (DoD) - 10MHz CP-OFDM-QPSK – Full RB - Ant1)

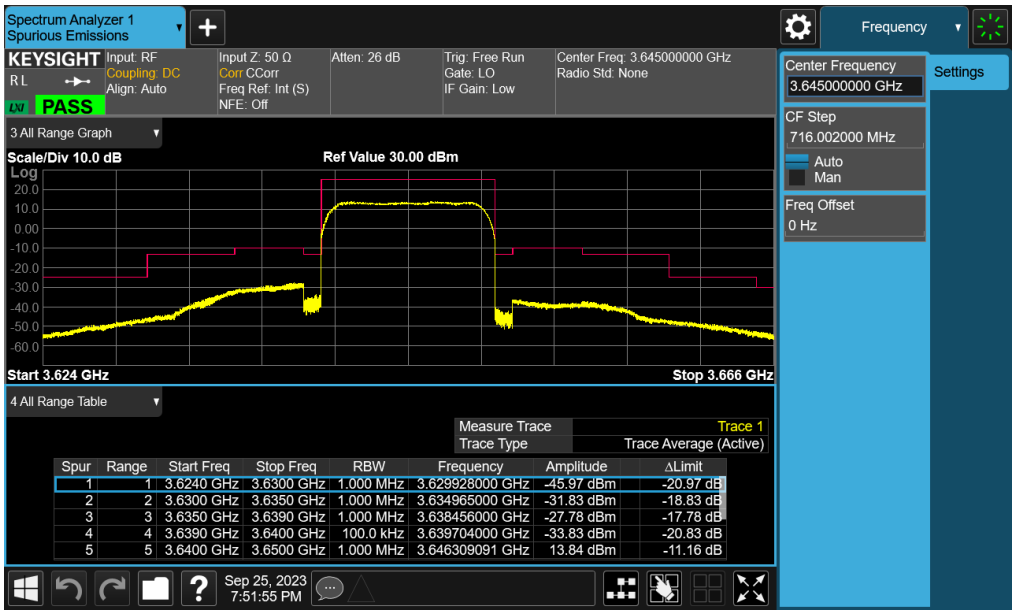
Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
NR-n78	100MHz	Low	Band Edge	-47.99	-13	-34.99
		High	Band Edge	-44.23	-13	-31.23
	90MHz	Low	Band Edge	-44.37	-13	-31.37
		High	Band Edge	-43.84	-13	-30.84
	80MHz	Low	Band Edge	-43.33	-13	-30.33
		High	Band Edge	-50.11	-13	-37.11
	70MHz	Low	Band Edge	-43.05	-13	-30.05
		High	Band Edge	-43.65	-13	-30.65
	60MHz	Low	Band Edge	-42.75	-13	-29.75
		High	Band Edge	-50.46	-13	-37.46
	50MHz	Low	Band Edge	-41.67	-13	-28.67
		High	Band Edge	-43.93	-13	-30.93
	40MHz	Low	Band Edge	-33.27	-13	-20.27
		High	Band Edge	-52.14	-13	-39.14
	30MHz	Low	Band Edge	-32.10	-13	-19.10
		High	Band Edge	-50.97	-13	-37.97
	25MHz	Low	Band Edge	-29.11	-13	-16.11
		High	Band Edge	-53.13	-13	-40.13
	20MHz	Low	Band Edge	-30.11	-13	-17.11
		High	Band Edge	-31.33	-13	-18.33
	15MHz	Low	Band Edge	-26.06	-13	-13.06
		High	Band Edge	-34.44	-13	-21.44
	10MHz	Low	Band Edge	-18.52	-13	-5.52
		High	Band Edge	-27.78	-13	-14.78

Table 7-19. Conducted Band Edge Test Results – Ant1

NR Band n78 – Ant1



Plot 7-104. Lower ACP Plot (NR Band n78 - 10MHz CP-OFDM-QPSK – Full RB - Ant1)

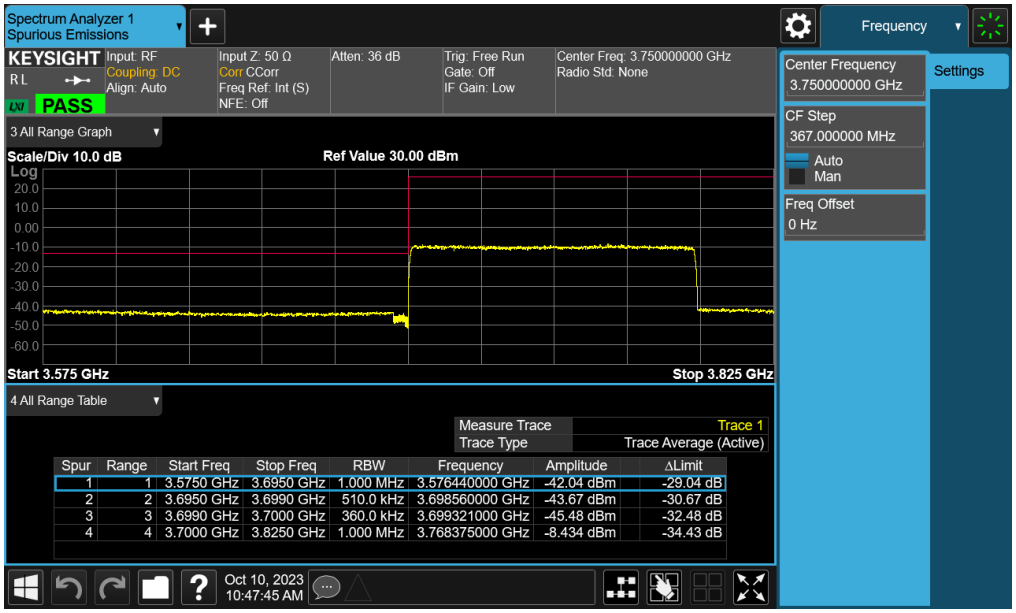


Plot 7-105. Upper ACP Plot (NR Band n78 - 10MHz CP-OFDM-QPSK – Full RB - Ant1)

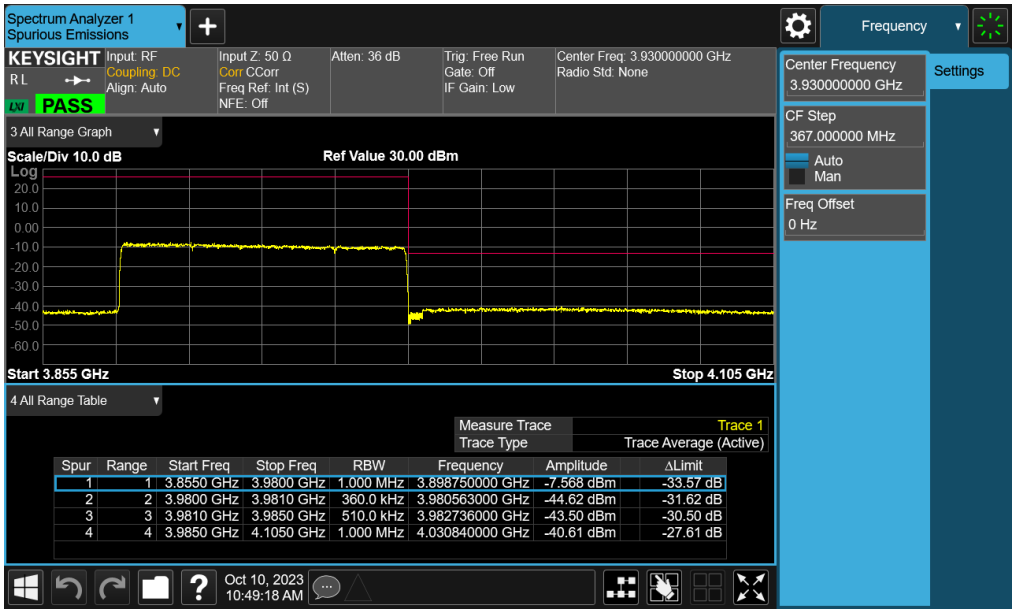
Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
NR-n77/78 PC2 C Band	100MHz	Low	Band Edge	-42.04	-13	-29.04
		High	Band Edge	-40.61	-13	-27.61
NR-n77/78 PC2 DoD Band	100MHz	Low	Band Edge	-45.44	-13	-32.44
		High	Band Edge	-41.54	-13	-28.54

Table 7-20. Conducted Band Edge Test Results – Ant2

NR Band n77 (C-Band) – Ant2

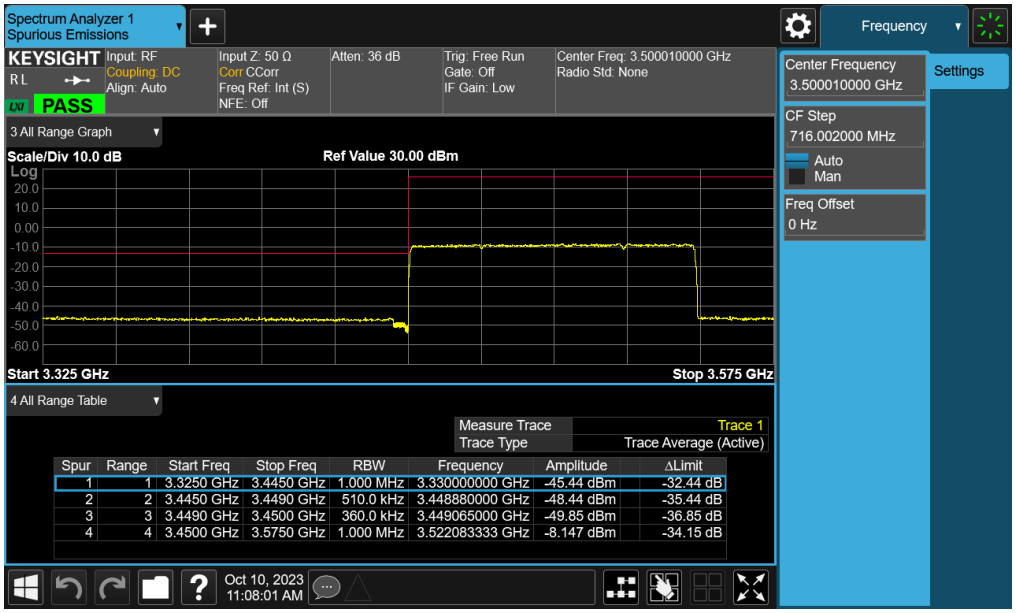


Plot 7-106. Lower ACP Plot (NR Band n77 - 100MHz CP-OFDM-QPSK – Full RB - Ant2)

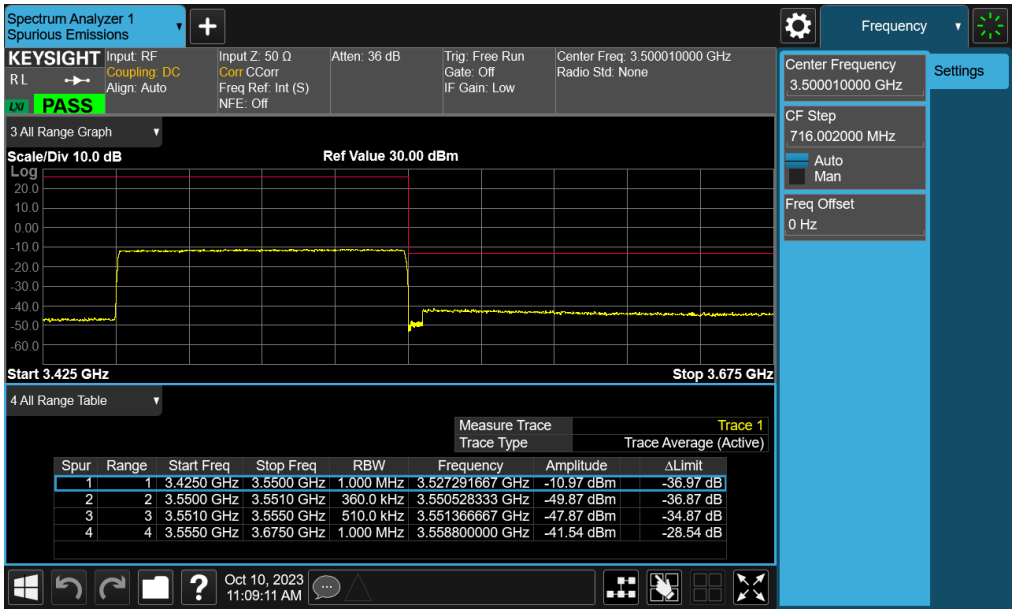


Plot 7-107. Upper ACP Plot (NR Band n77 - 100MHz CP-OFDM-QPSK – Full RB - Ant2)

NR Band n77 (DoD Band) – Ant2



Plot 7-108. Lower ACP Plot (NR Band n77 (DoD) - 100MHz CP-OFDM-QPSK – Full RB - Ant2)

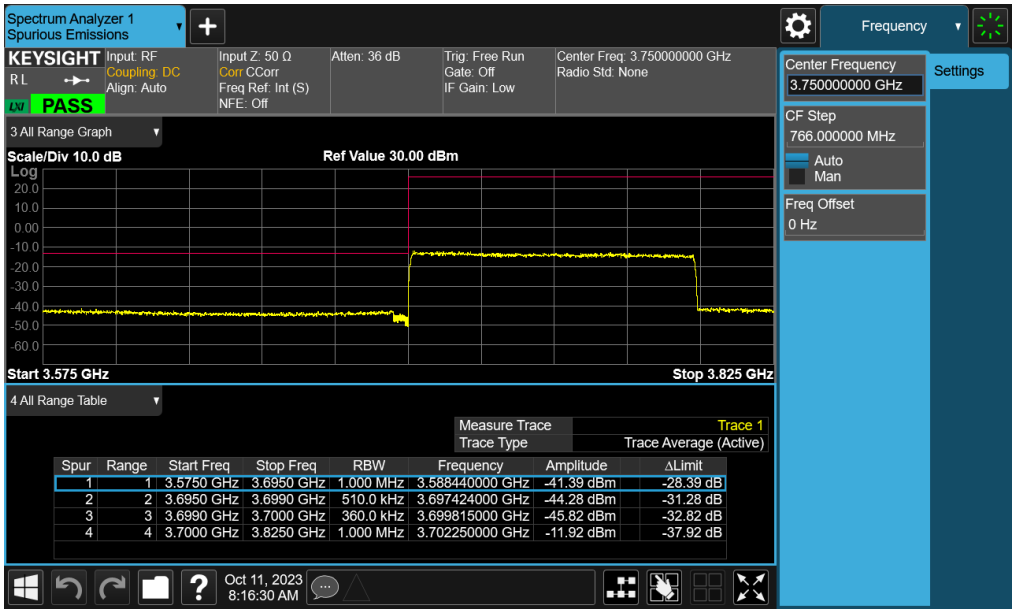


Plot 7-109. Upper ACP Plot (NR Band n77 (DoD) - 100MHz CP-OFDM-QPSK – Full RB - Ant2)

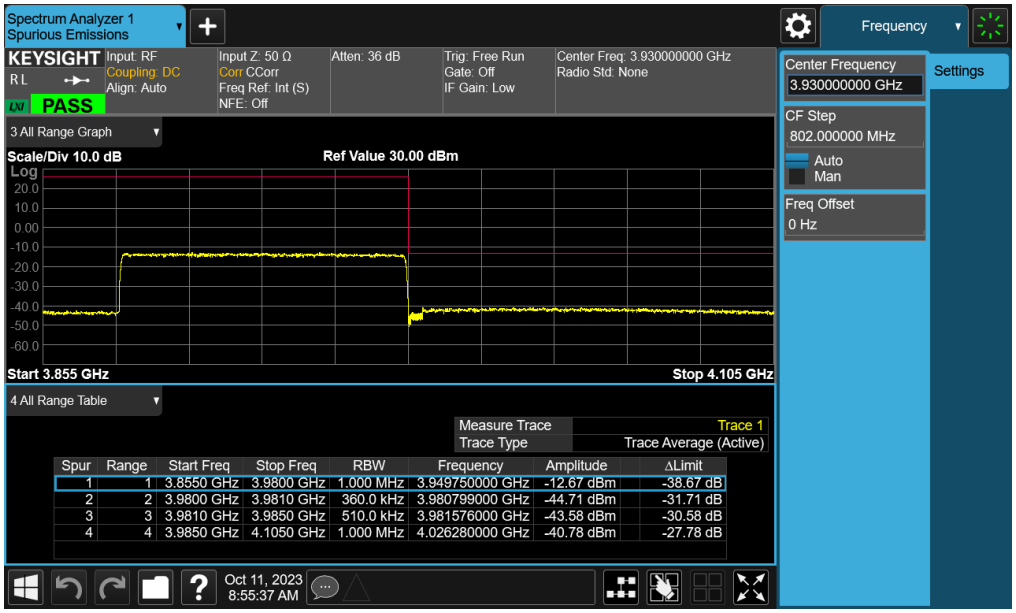
Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
NR-n77/78 PC2 C Band	100MHz	Low	Band Edge	-41.39	-13	-28.39
		High	Band Edge	-40.78	-13	-27.78
NR-n77/78 PC2 DoD Band	100MHz	Low	Band Edge	-45.62	-13	-32.62
		High	Band Edge	-41.77	-13	-28.77

Table 7-21. Conducted Band Edge Test Results – Ant3

NR Band n77 (C-Band) – Ant3



Plot 7-110. Lower ACP Plot (NR Band n77 - 100MHz CP-OFDM-QPSK – Full RB - Ant3)



Plot 7-111. Upper ACP Plot (NR Band n77 - 100MHz CP-OFDM-QPSK – Full RB - Ant3)