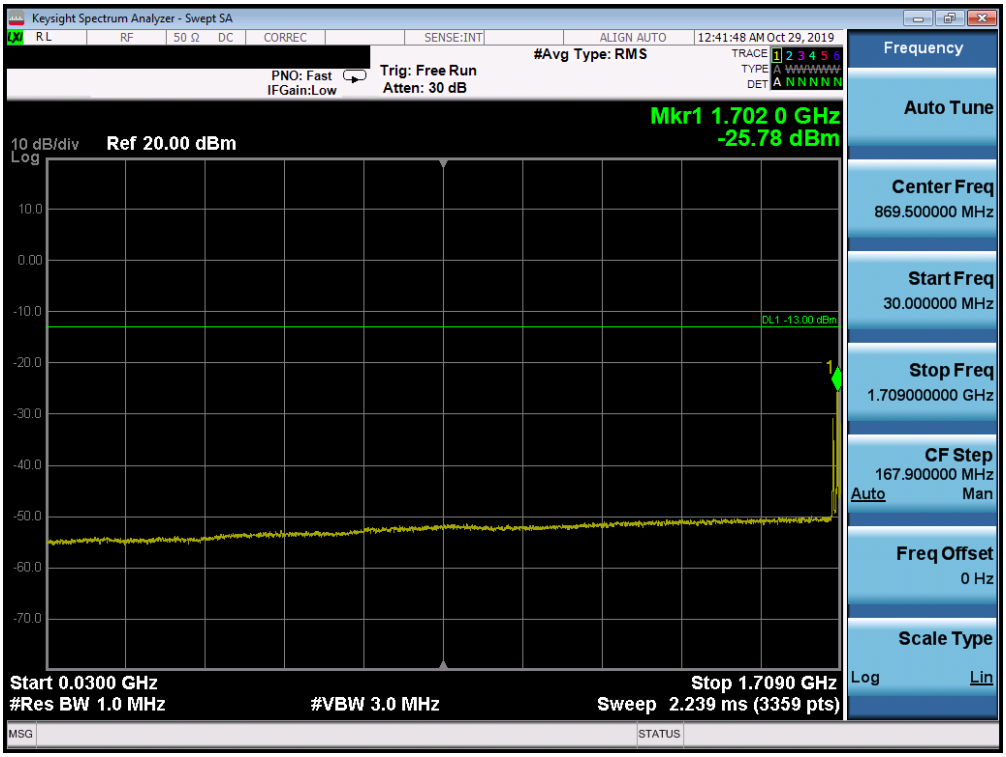
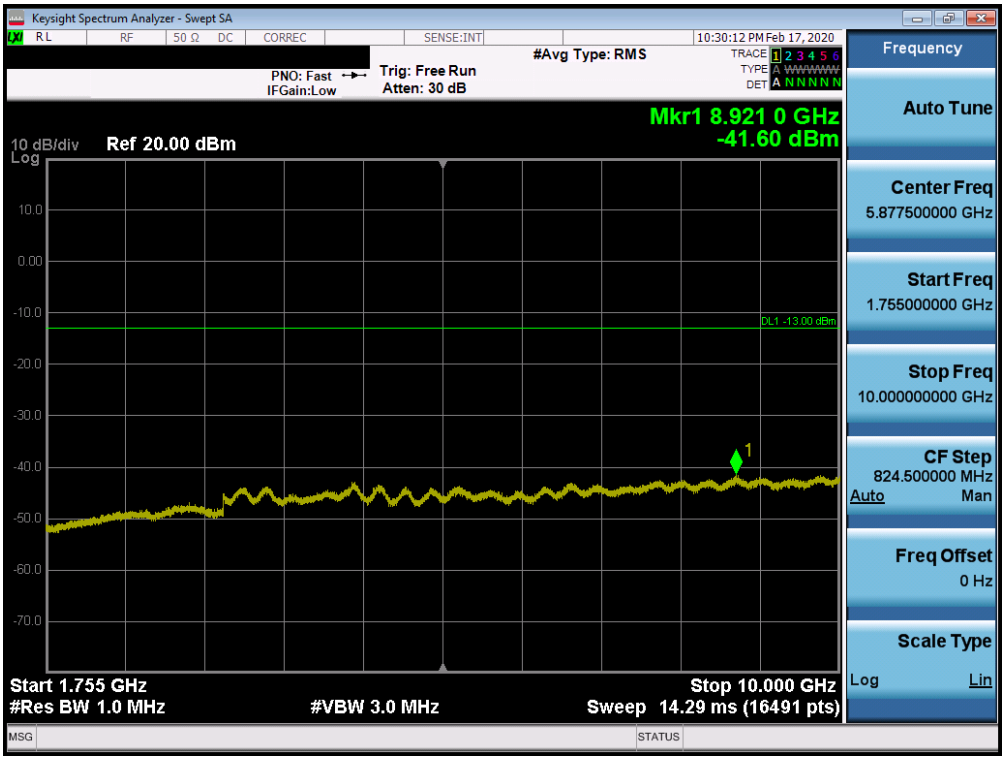
Band 4



Plot 7-82. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-83. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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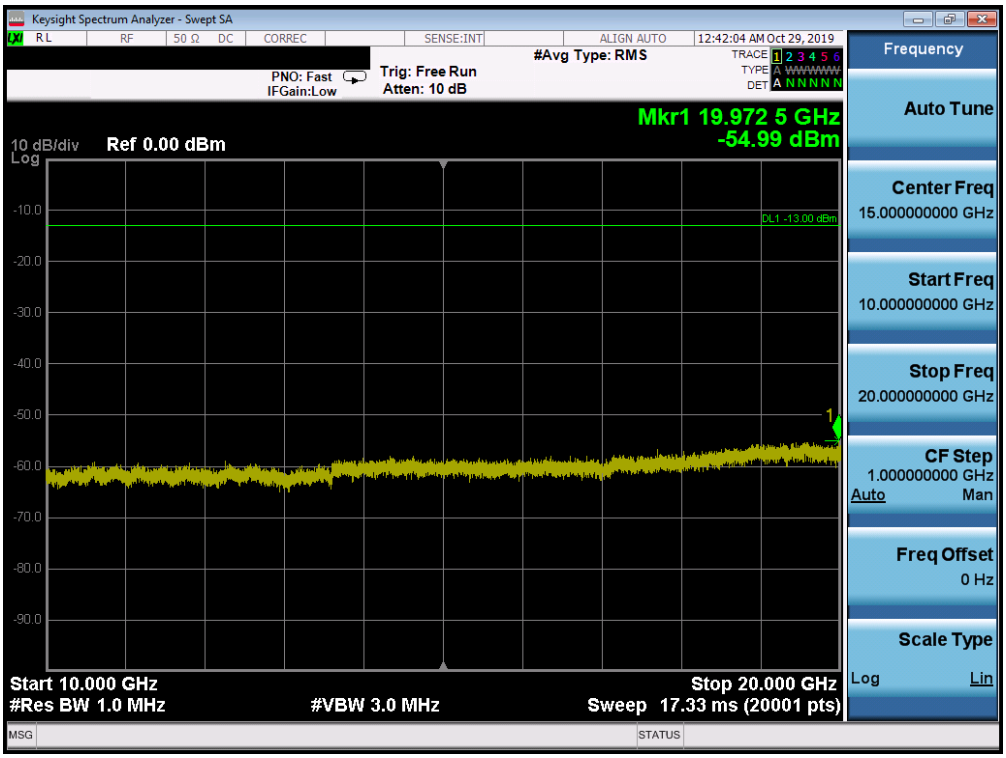
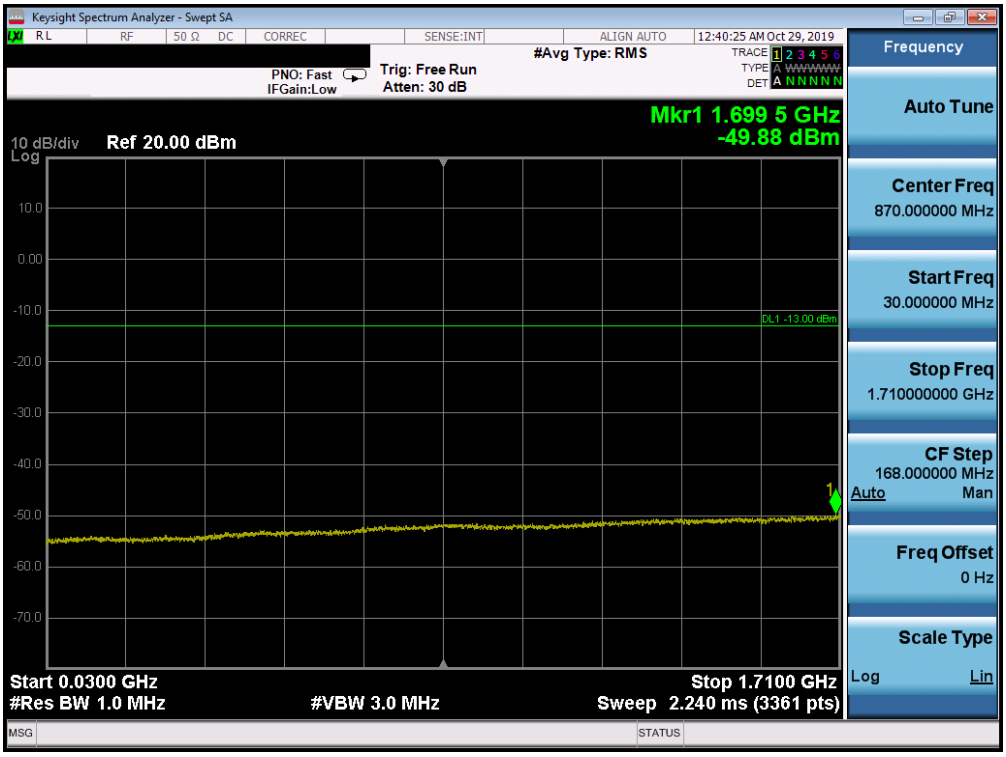


Plot 7-84. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-85. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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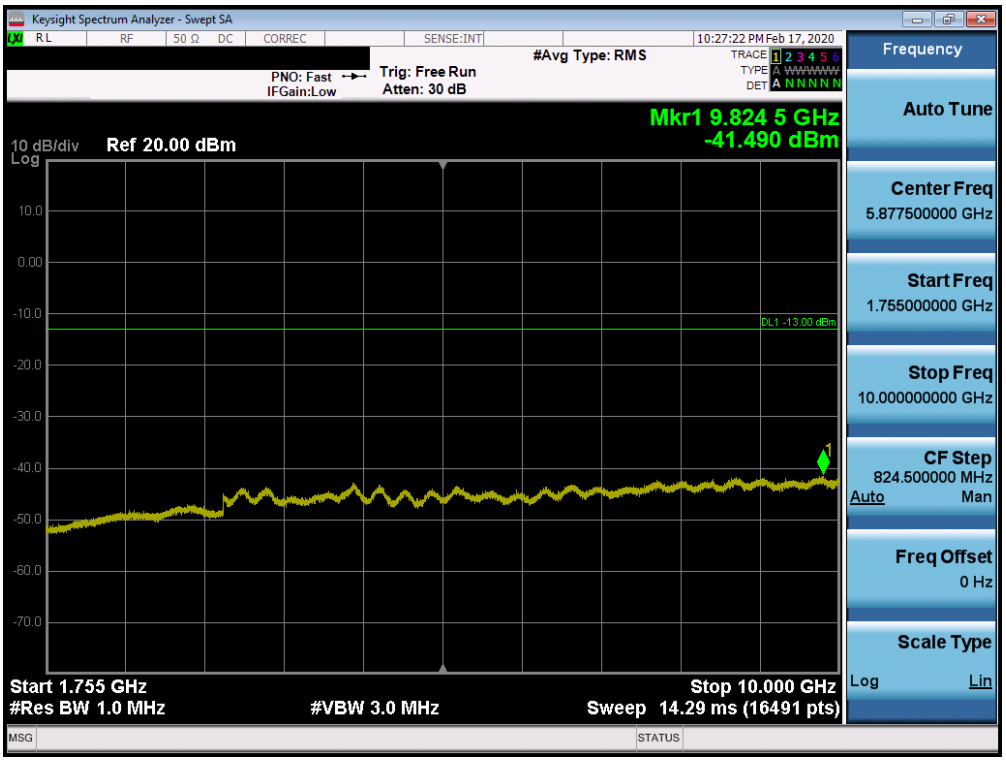
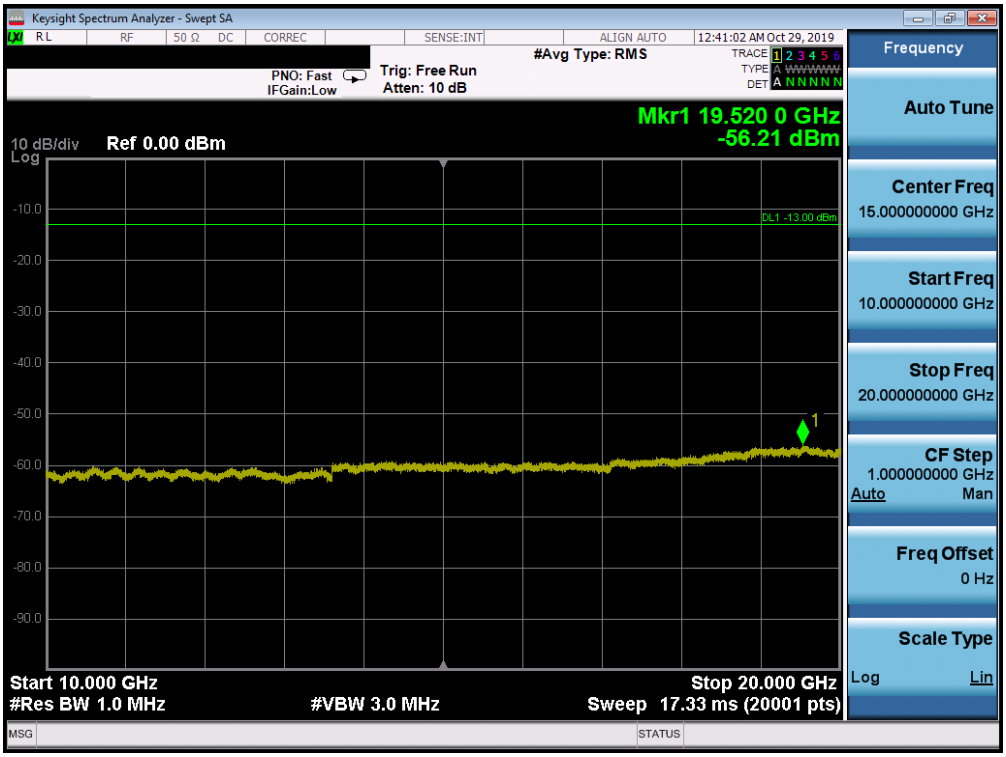


Plot 7-86. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-87. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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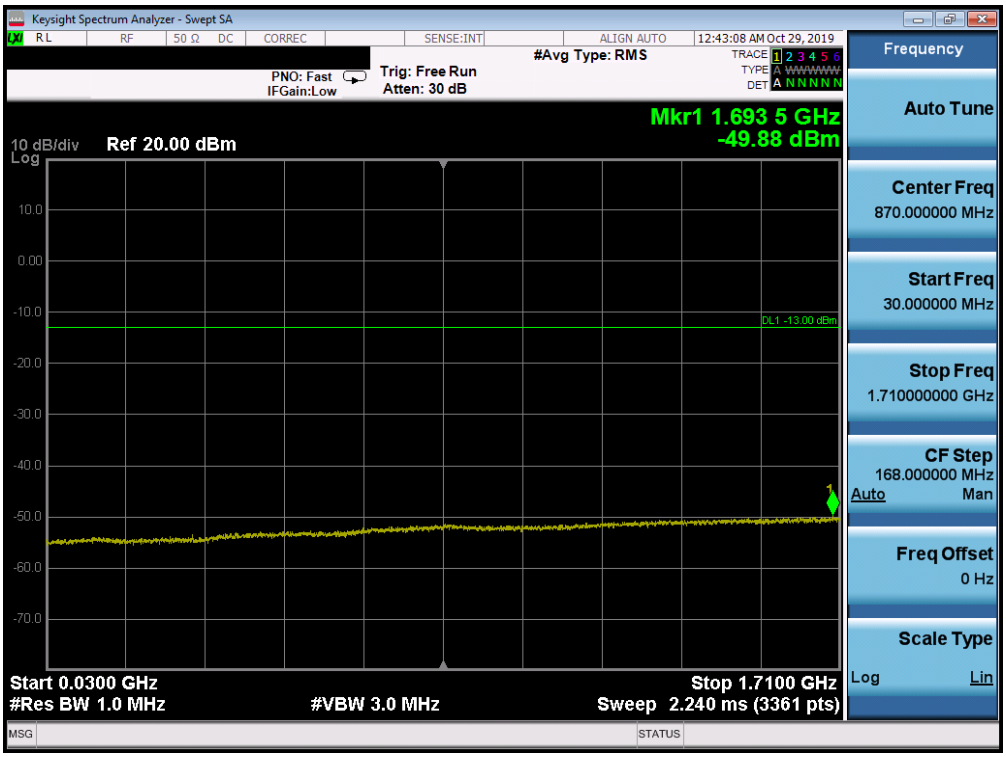
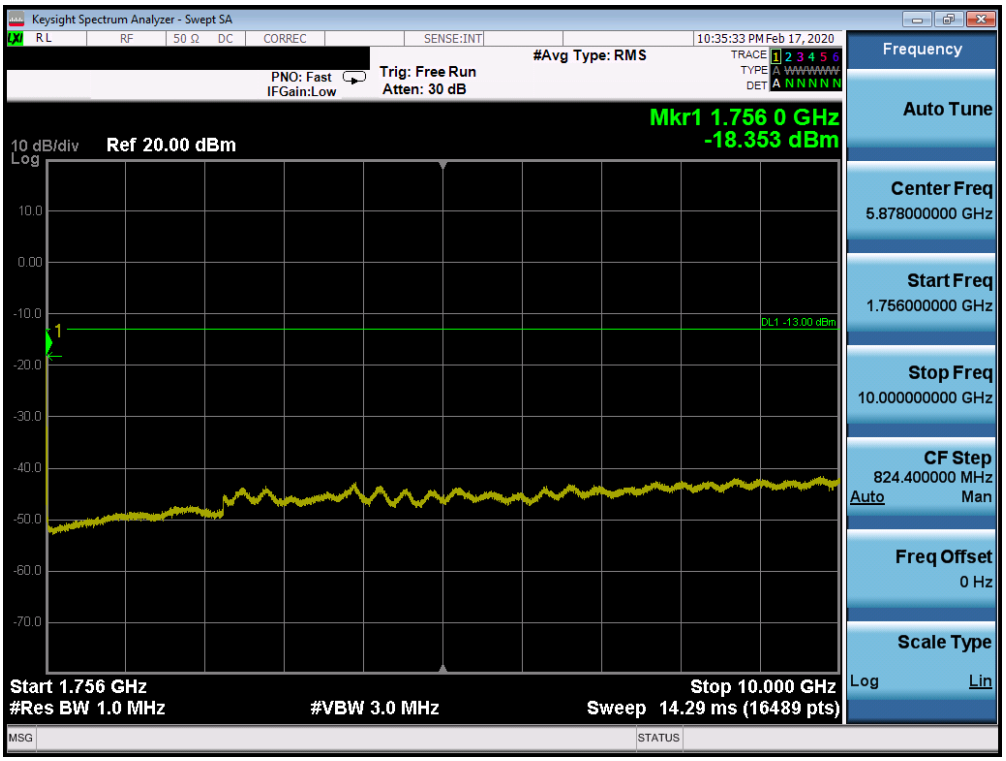


Plot 7-88. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-89. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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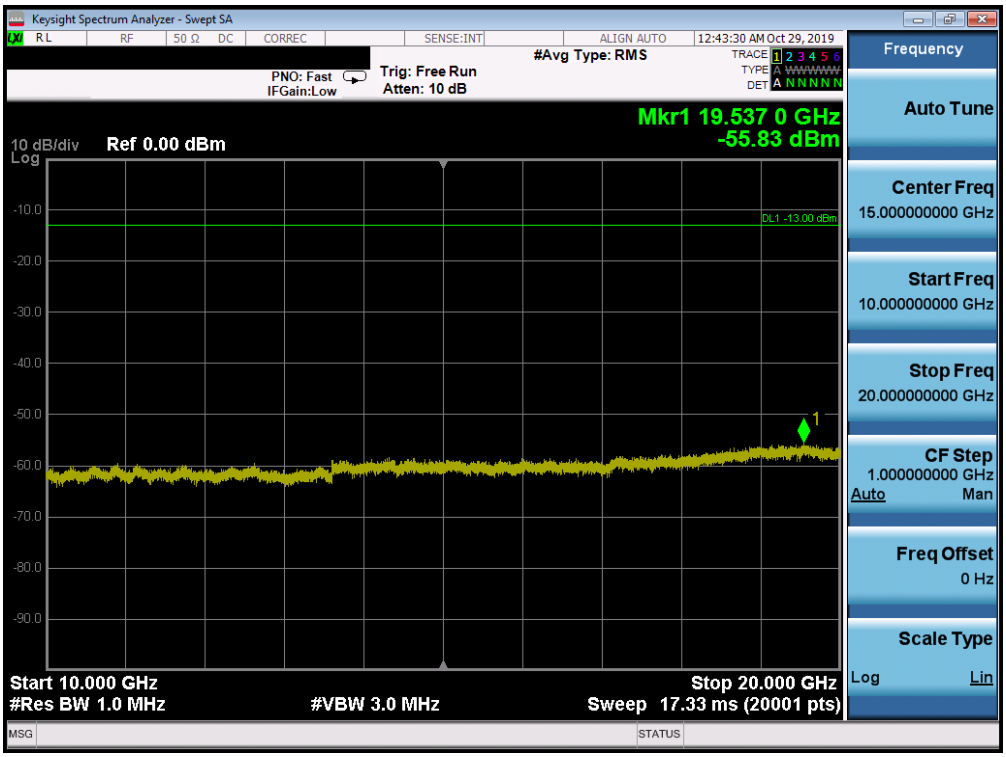

Plot 7-90. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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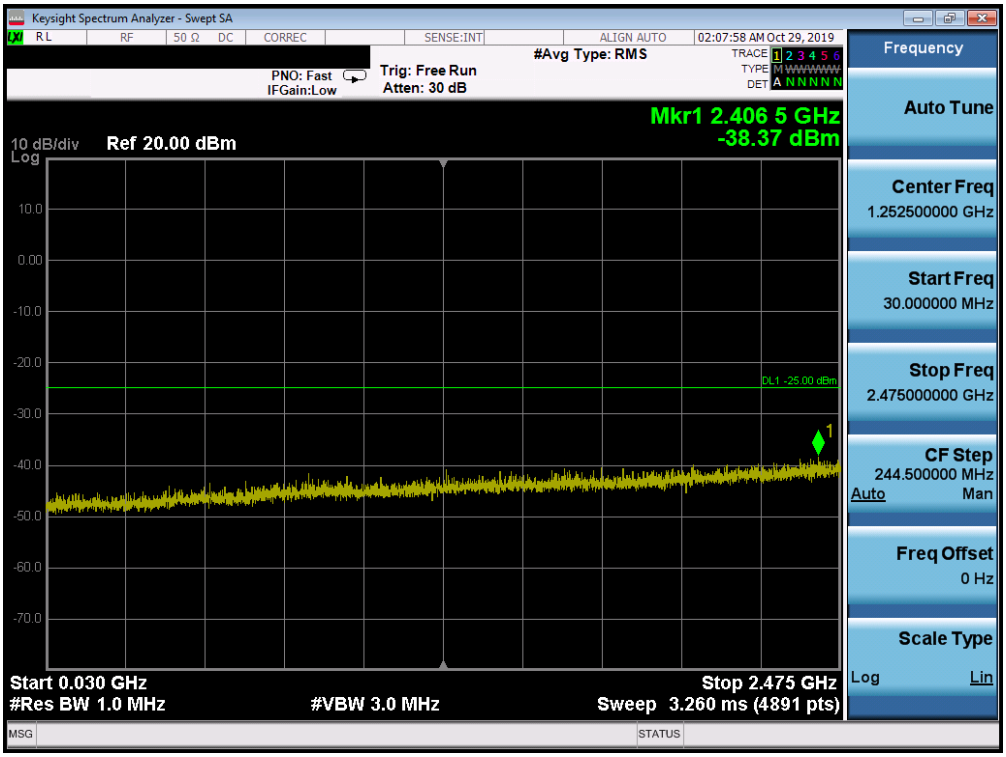
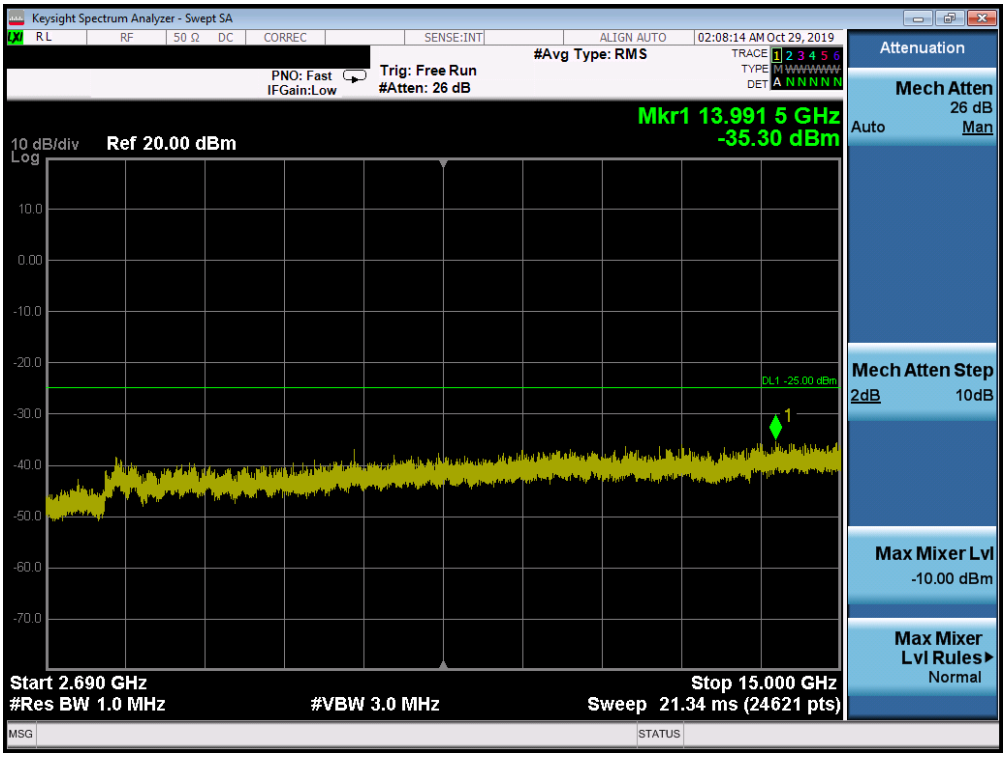
Band 41



Plot 7-91. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-92. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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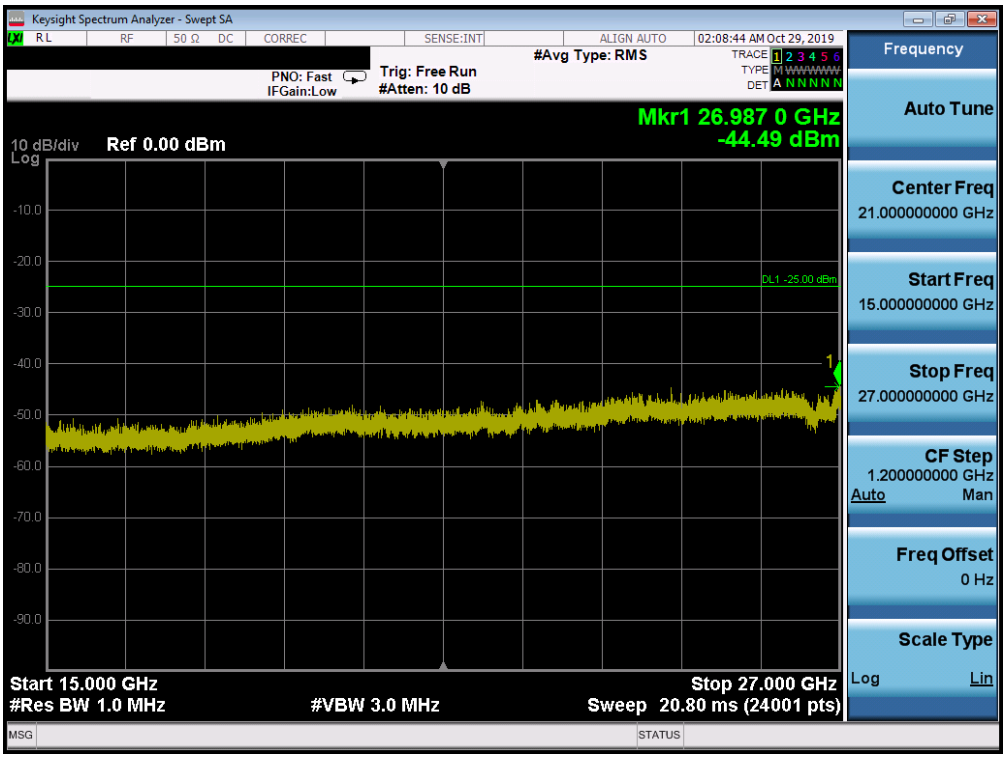
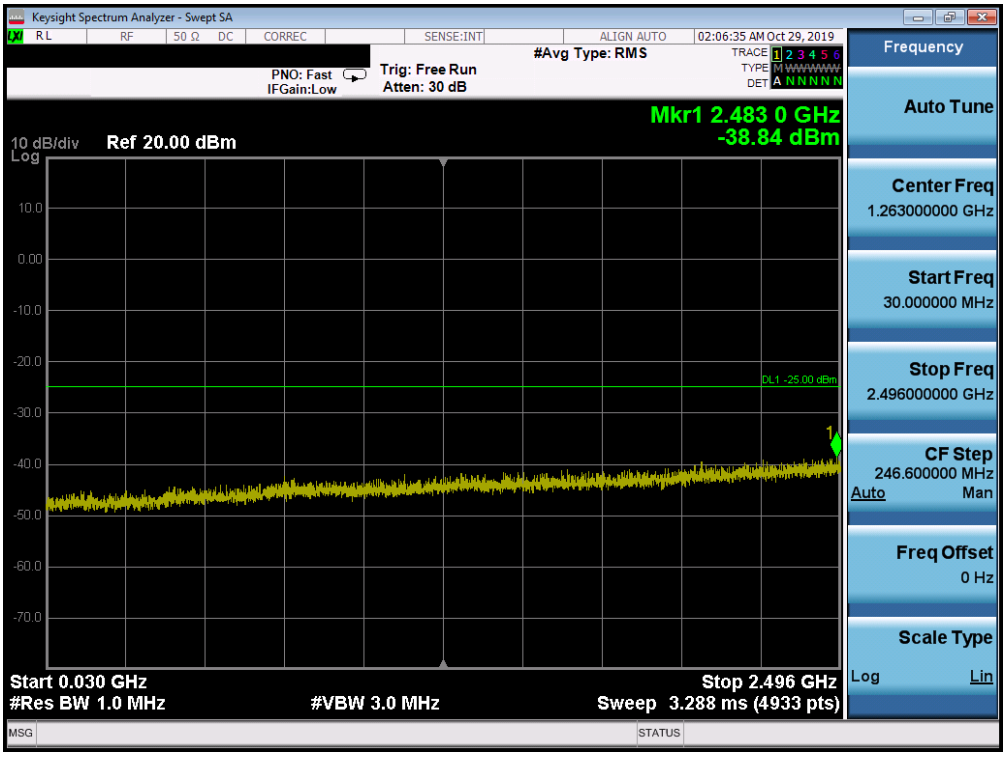


Plot 7-93. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-94. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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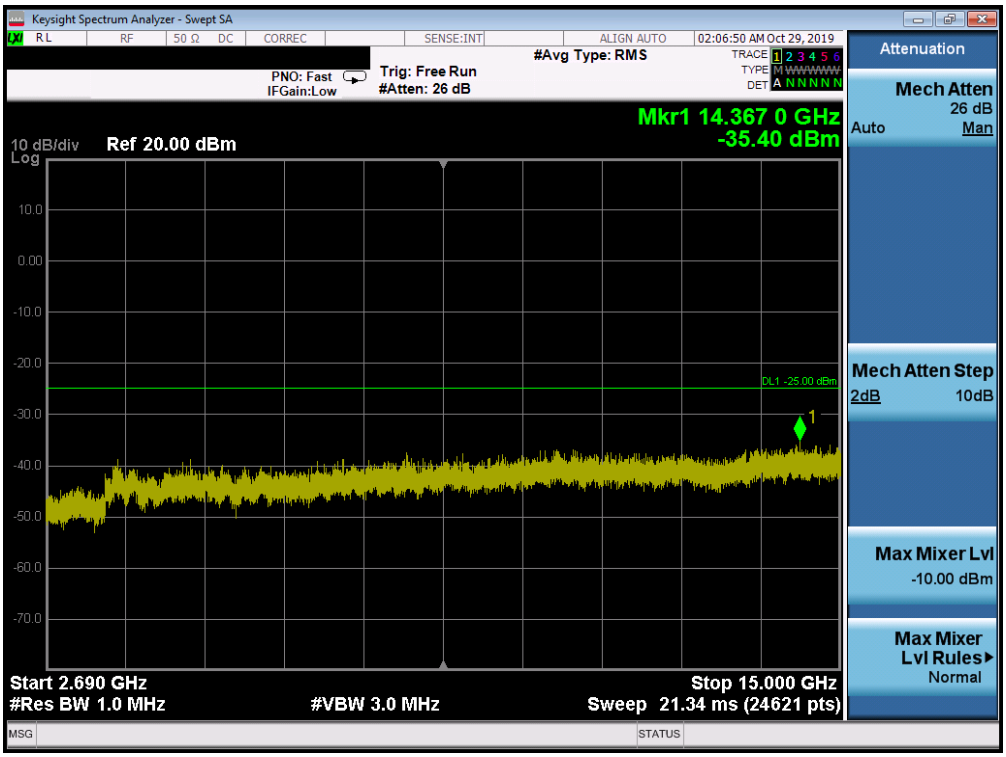
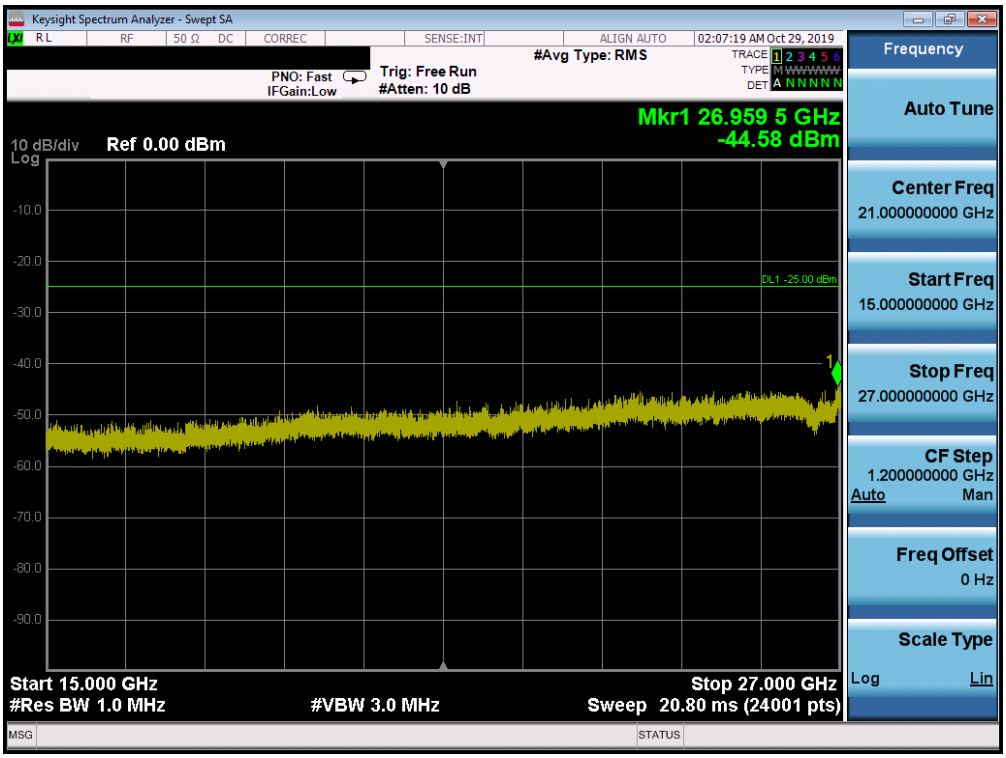


Plot 7-95. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-96. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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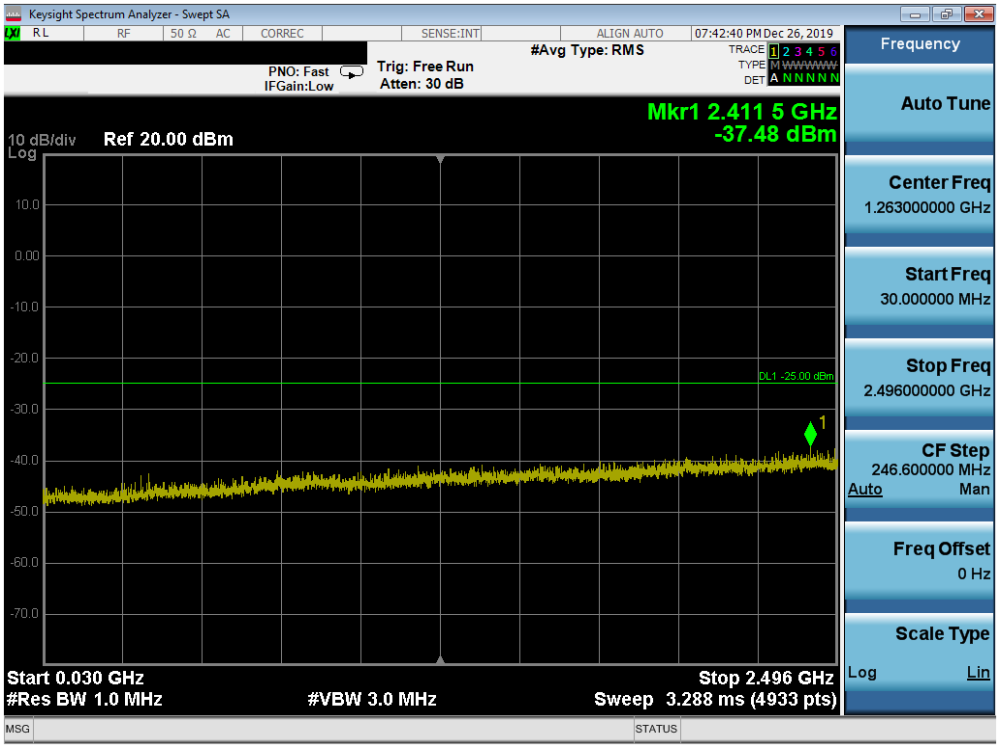
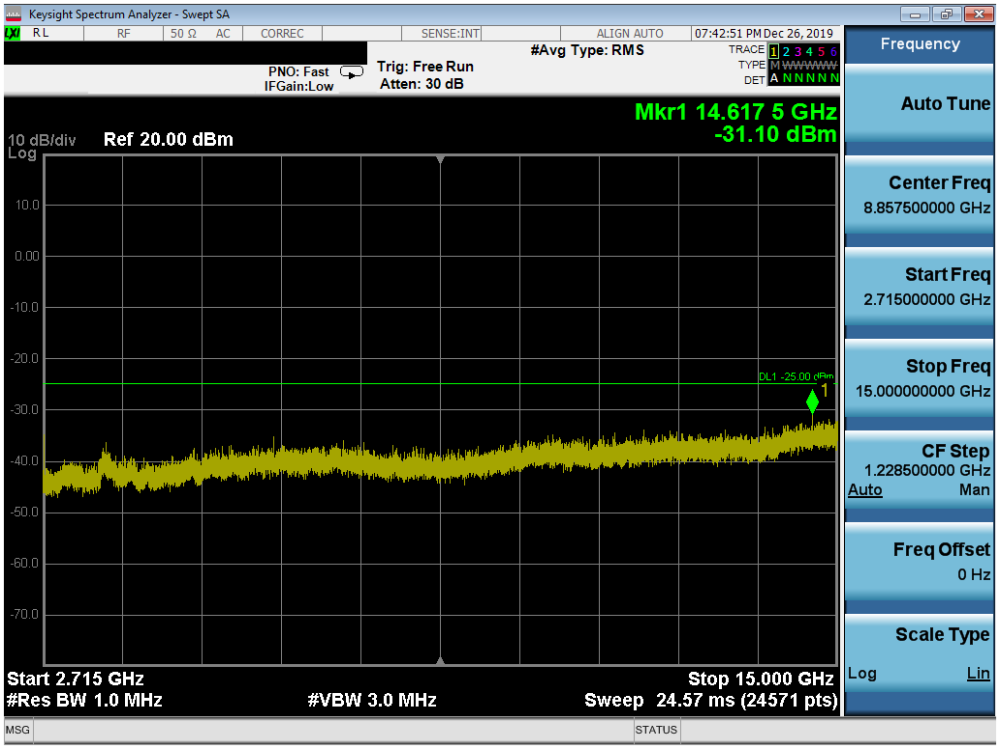


Plot 7-97. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-98. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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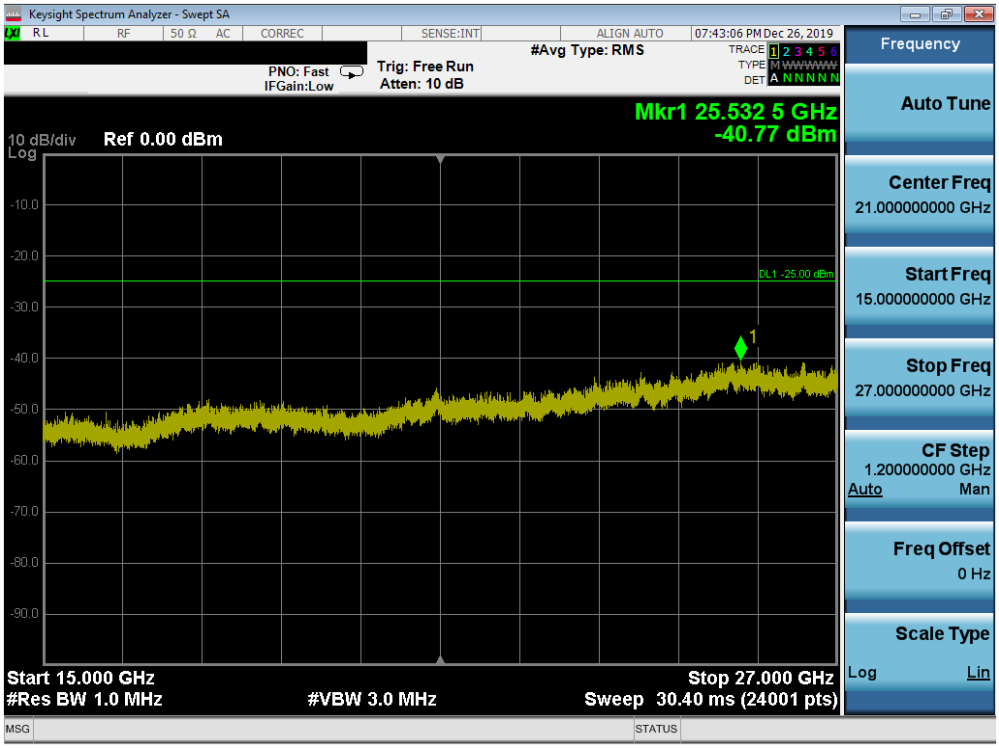

Plot 7-99. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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7.4 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 its maximum duty cycle, 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.

The minimum permissible attenuation level for Band 41 is as noted in the Test Notes on the following page.

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 $\geq$ 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.

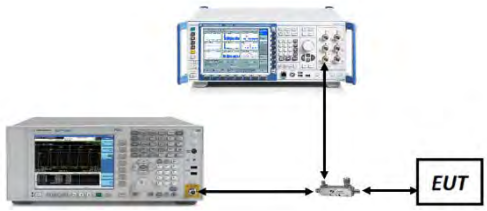

Figure 7-3. Test Instrument & Measurement Setup

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Test Notes

Per 22.917(b) 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. 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 emission are attenuated at least 26 dB below the transmitter power.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c)(5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c)(4) is 65 + 10 $\log_{10}$(P) = -35dBm in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.

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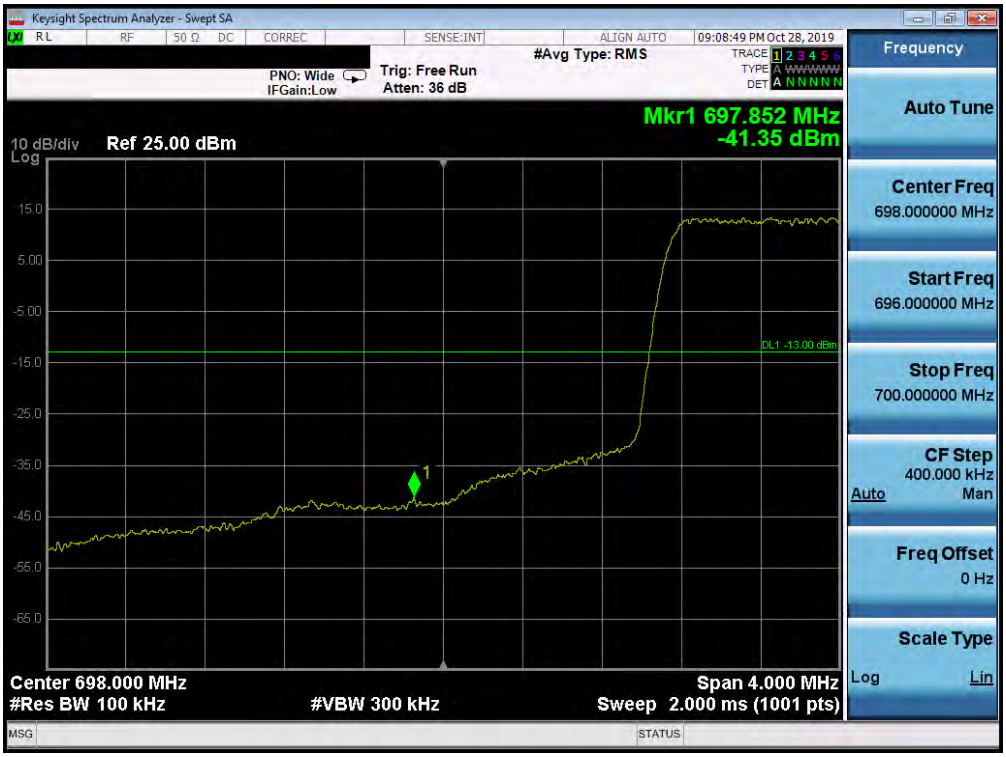
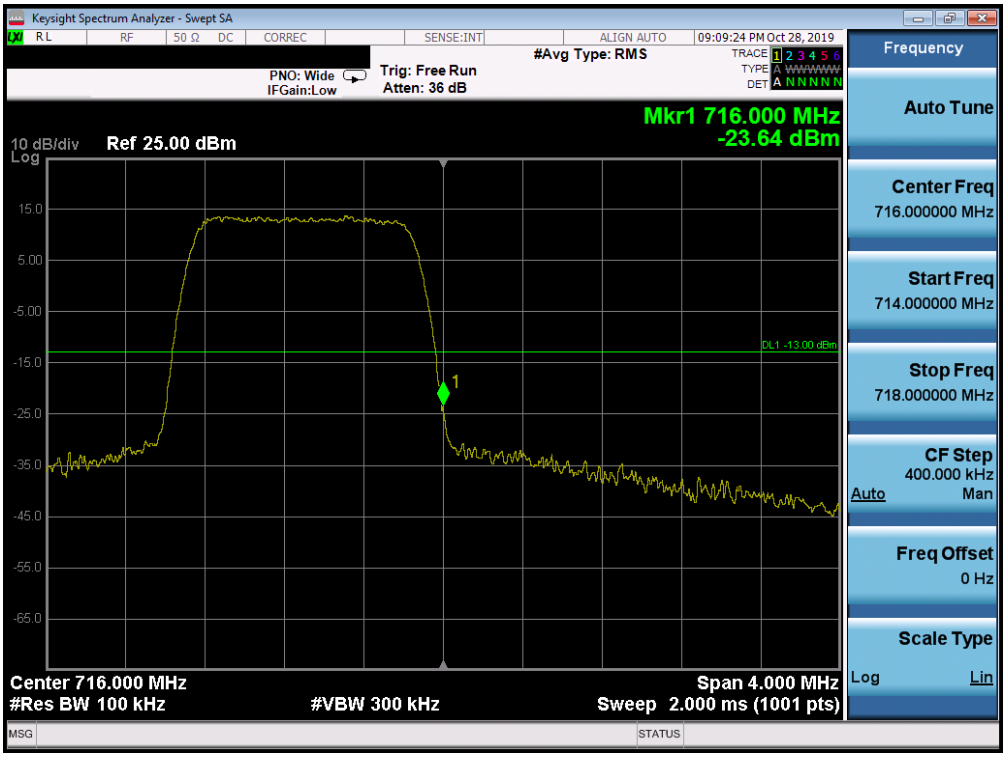
Band 12



Plot 7-100. Lower Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-101. Upper Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

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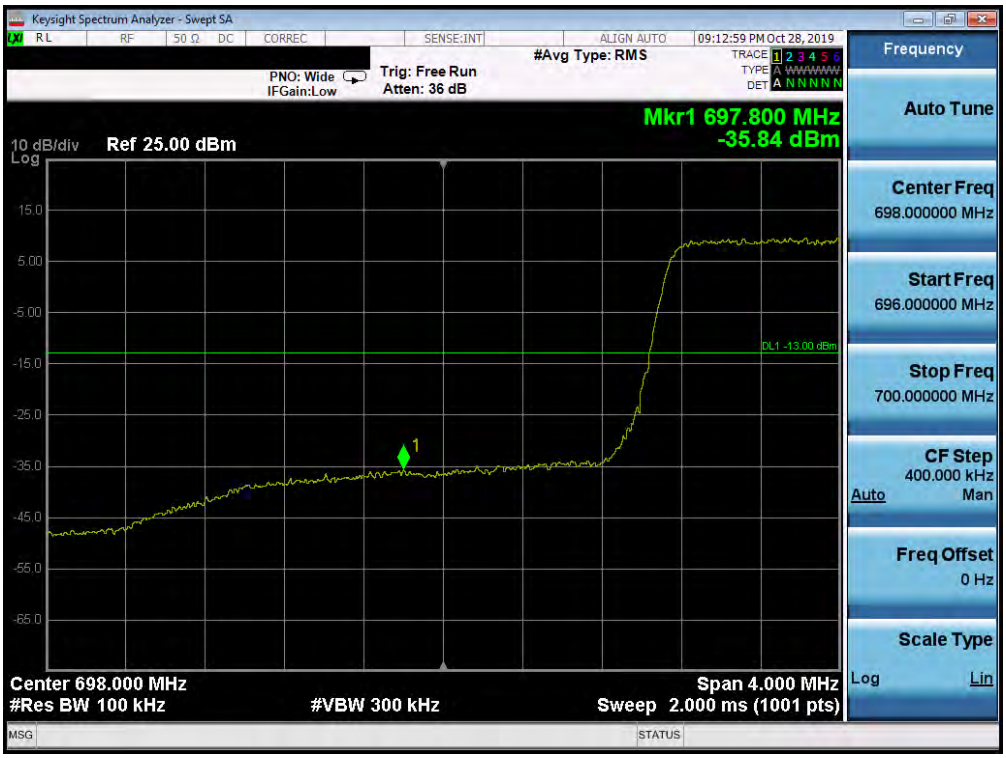

Plot 7-102. Lower Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

Plot 7-103. Upper Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

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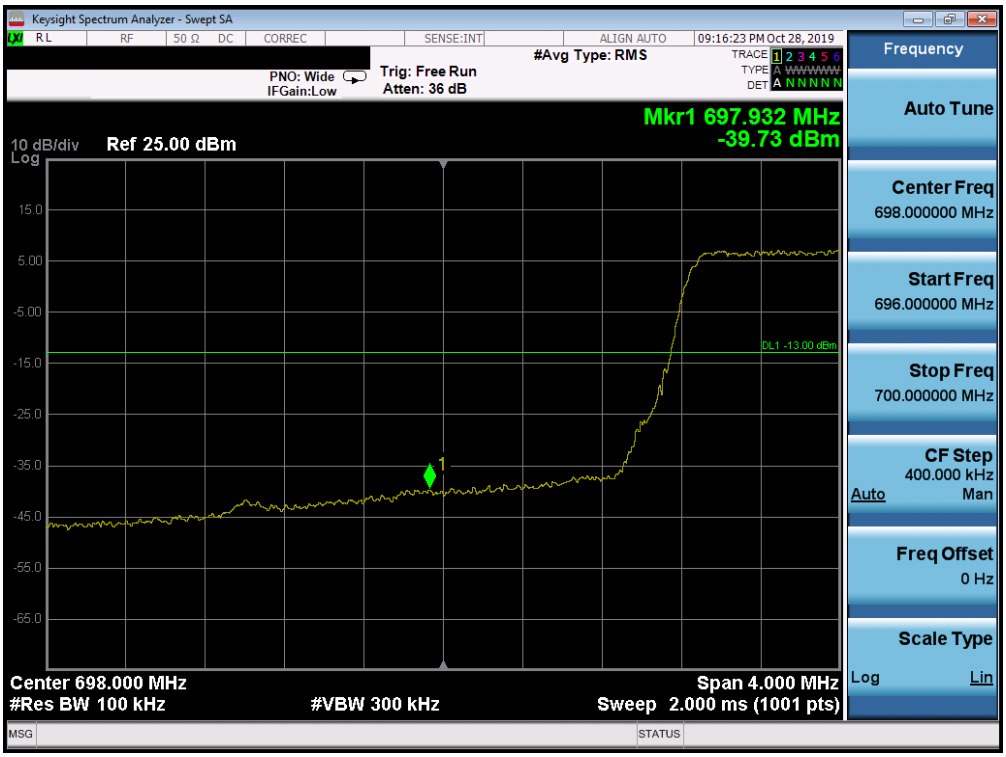
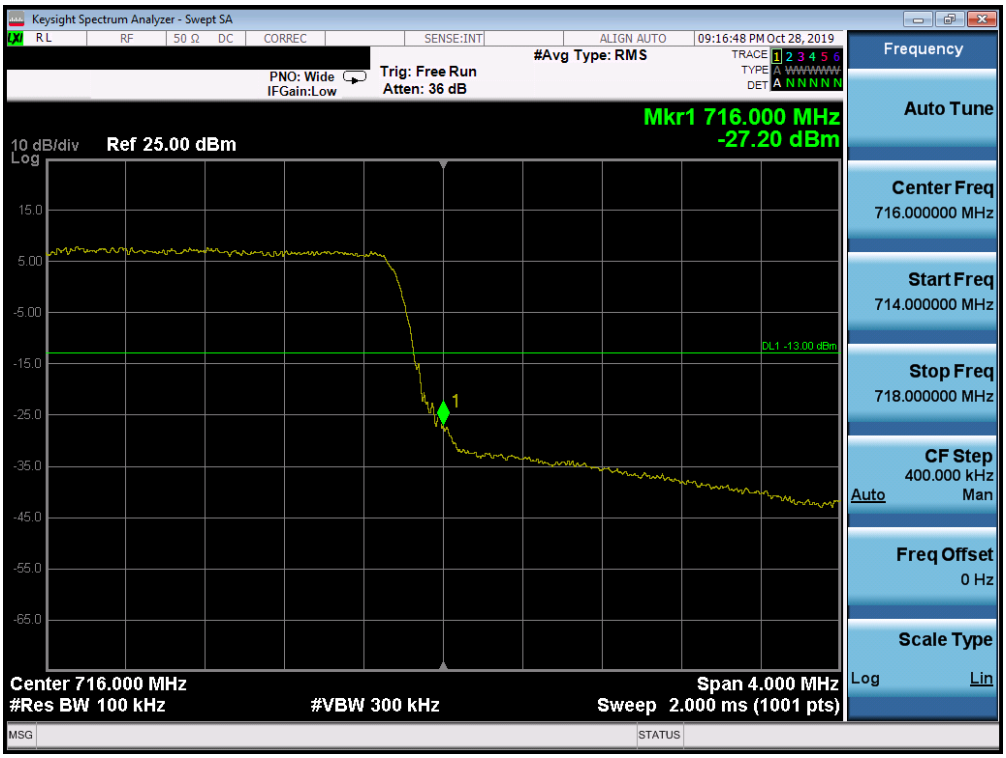


Plot 7-104. Lower Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-105. Upper Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)

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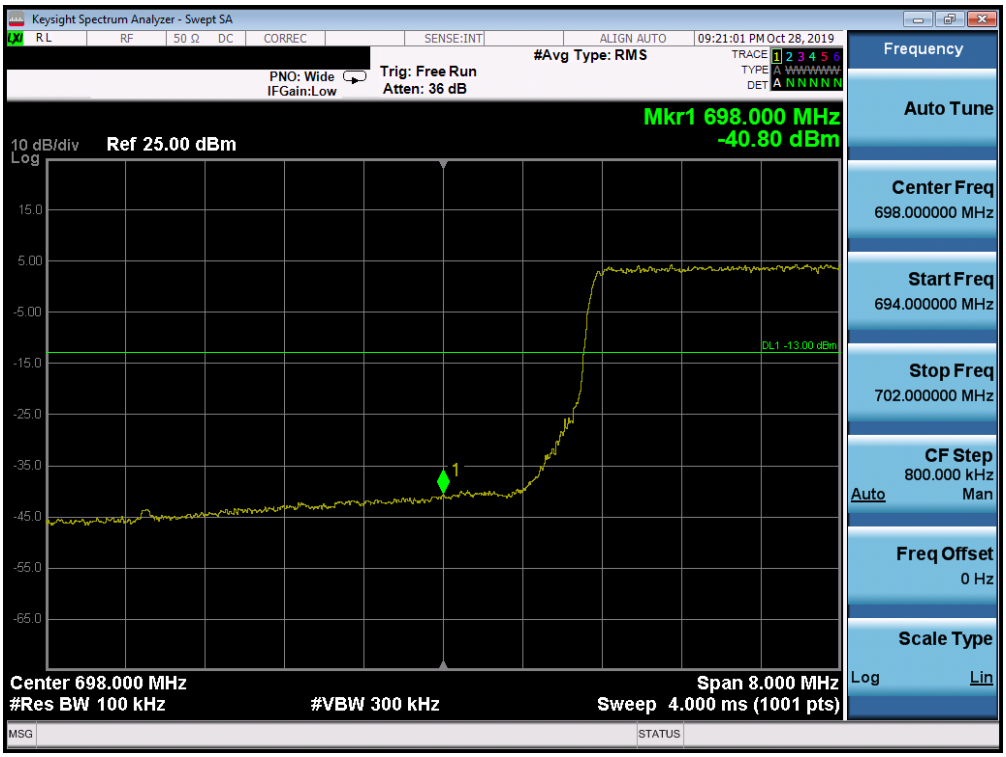
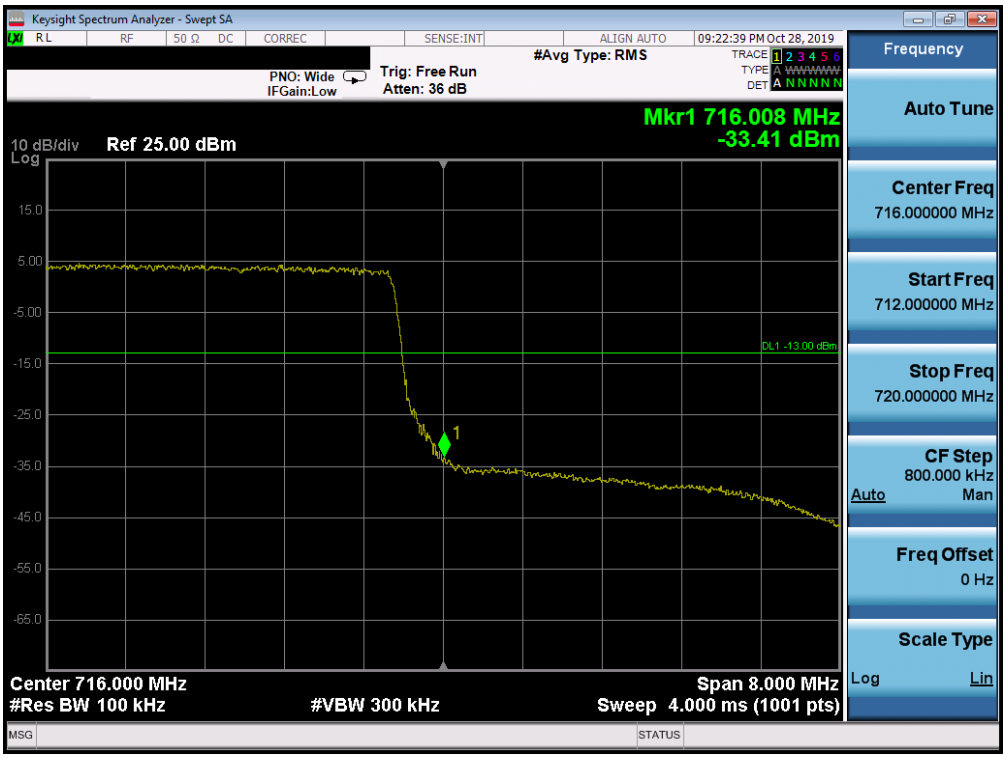


Plot 7-106. Lower Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-107. Upper Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

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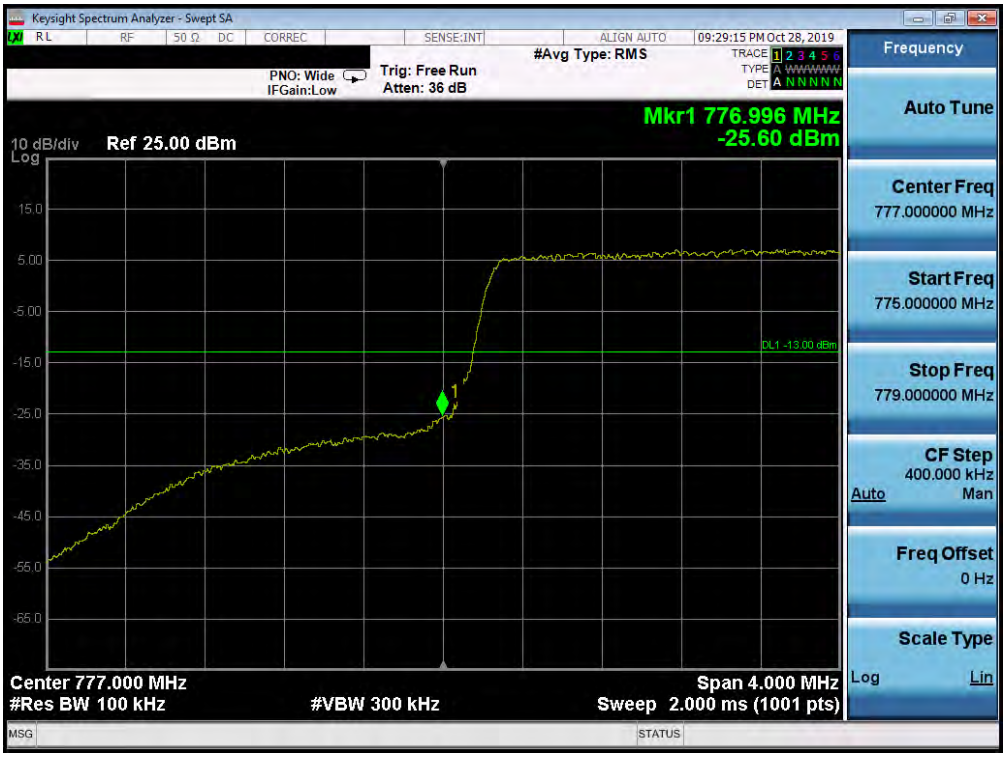
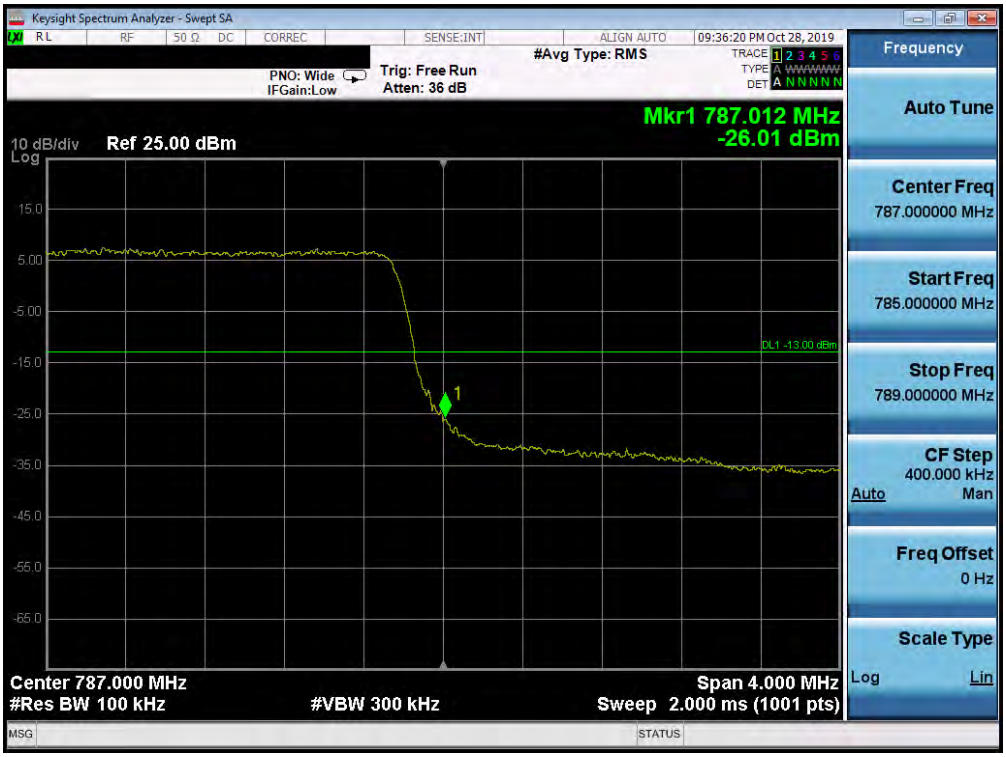
Band 13



Plot 7-108. Lower Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-109. Upper Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

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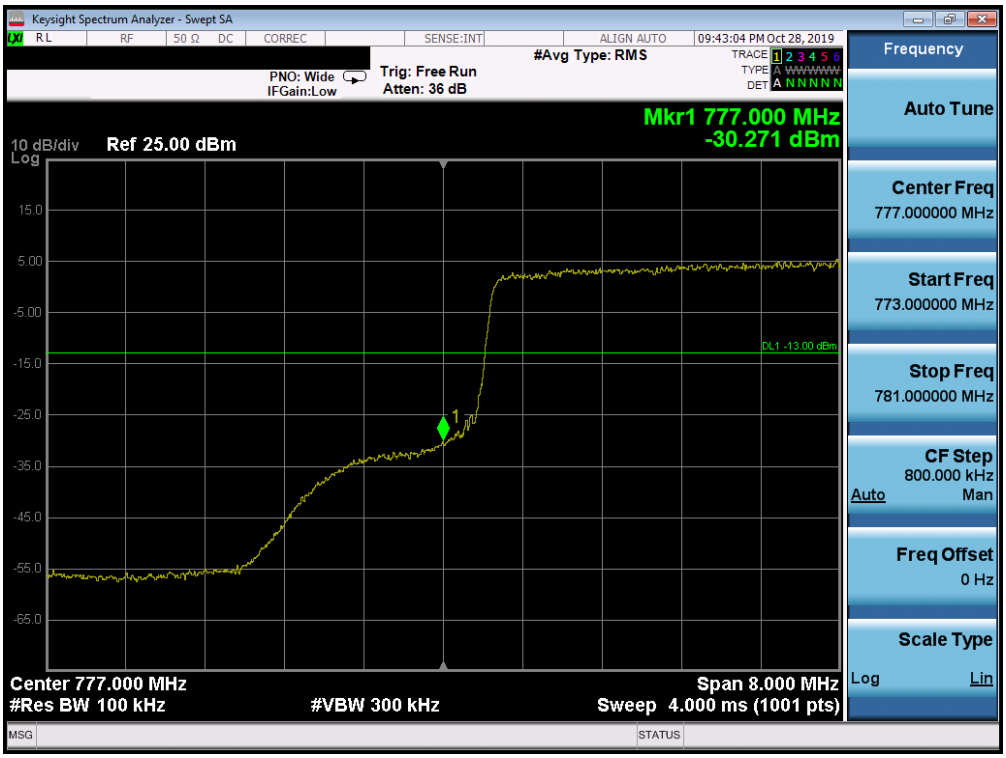
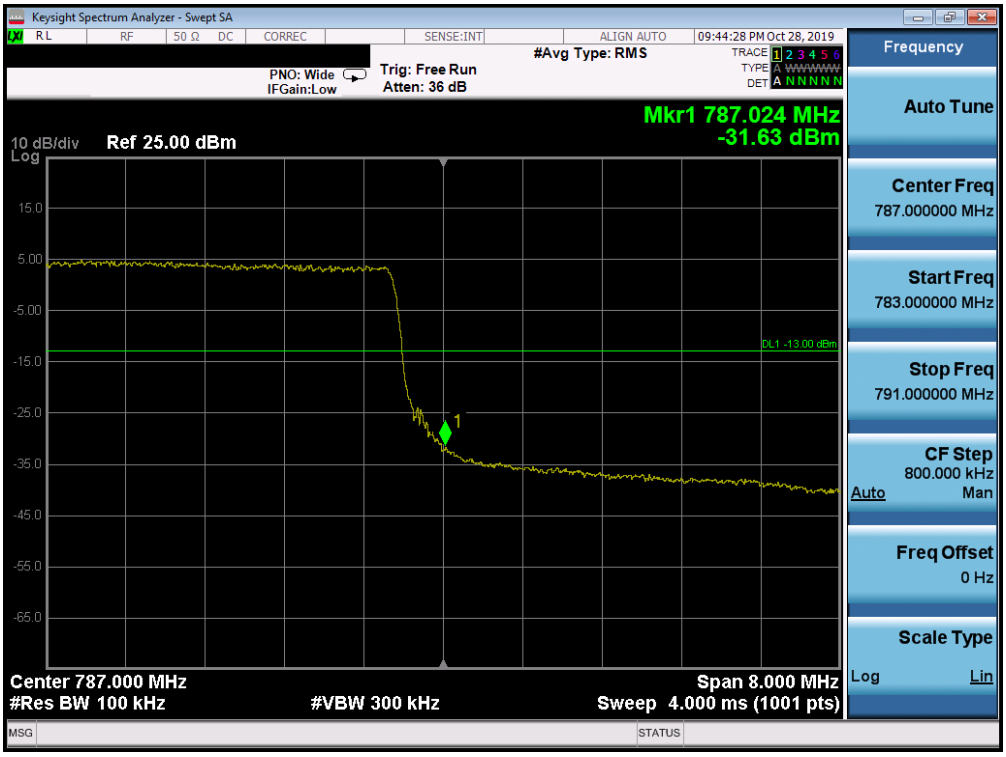


Plot 7-110. Lower Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-111. Upper Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

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Band 5

Plot 7-112. Lower Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)

Plot 7-113. Upper Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)

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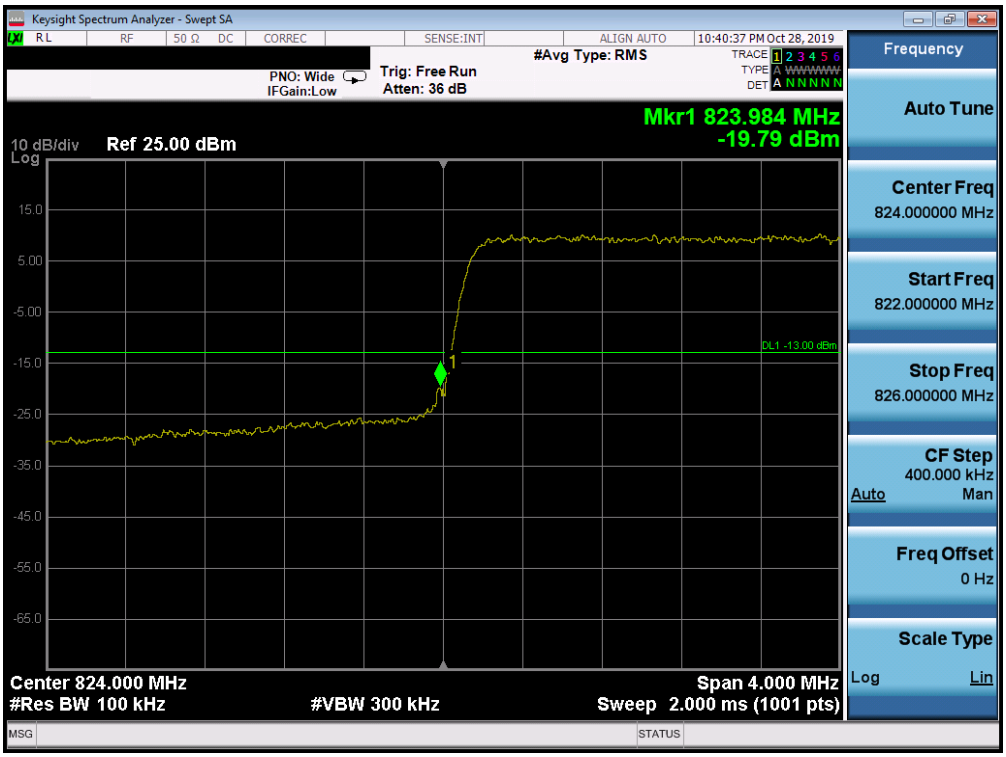

Plot 7-114. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

Plot 7-115. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

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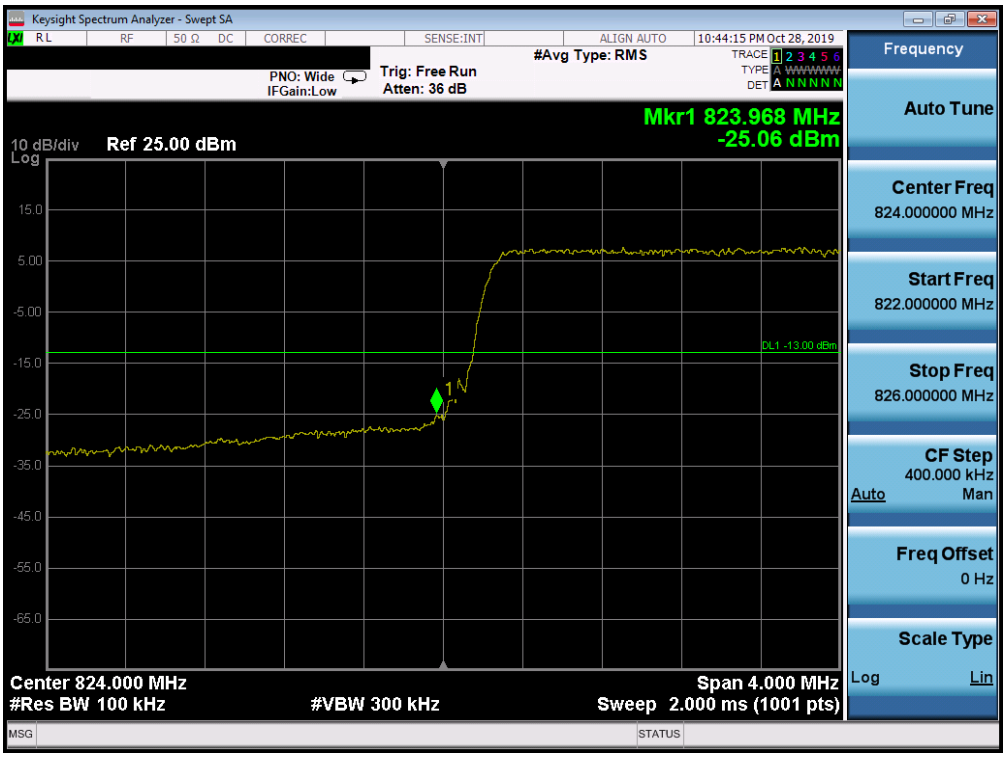
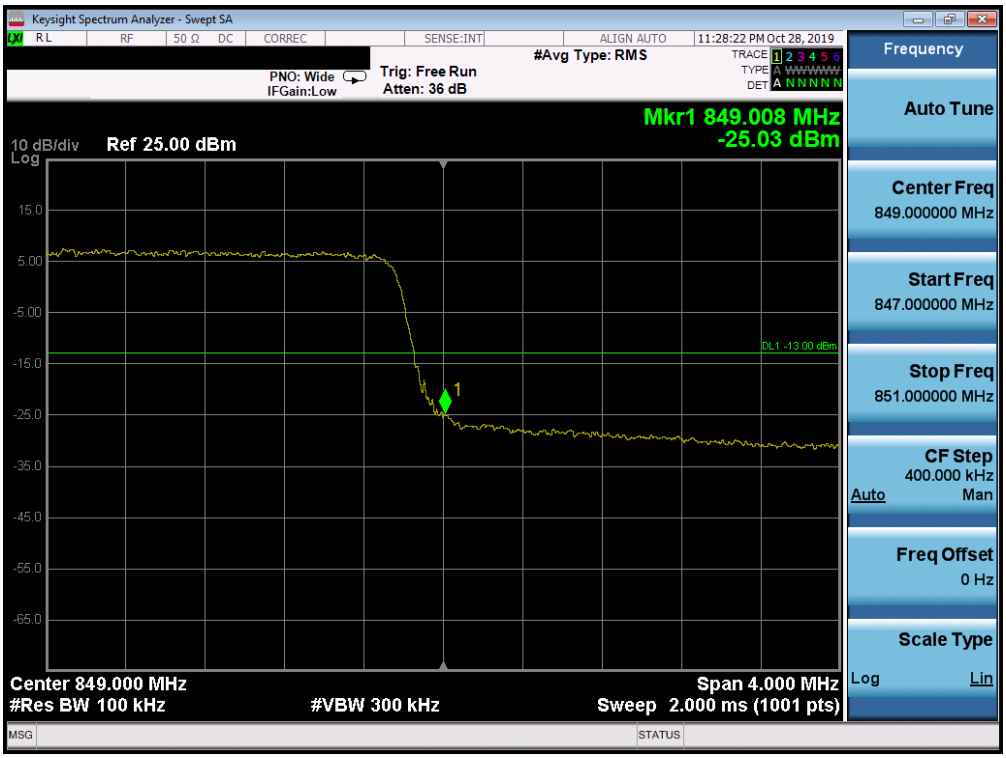


Plot 7-116. Lower Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-117. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

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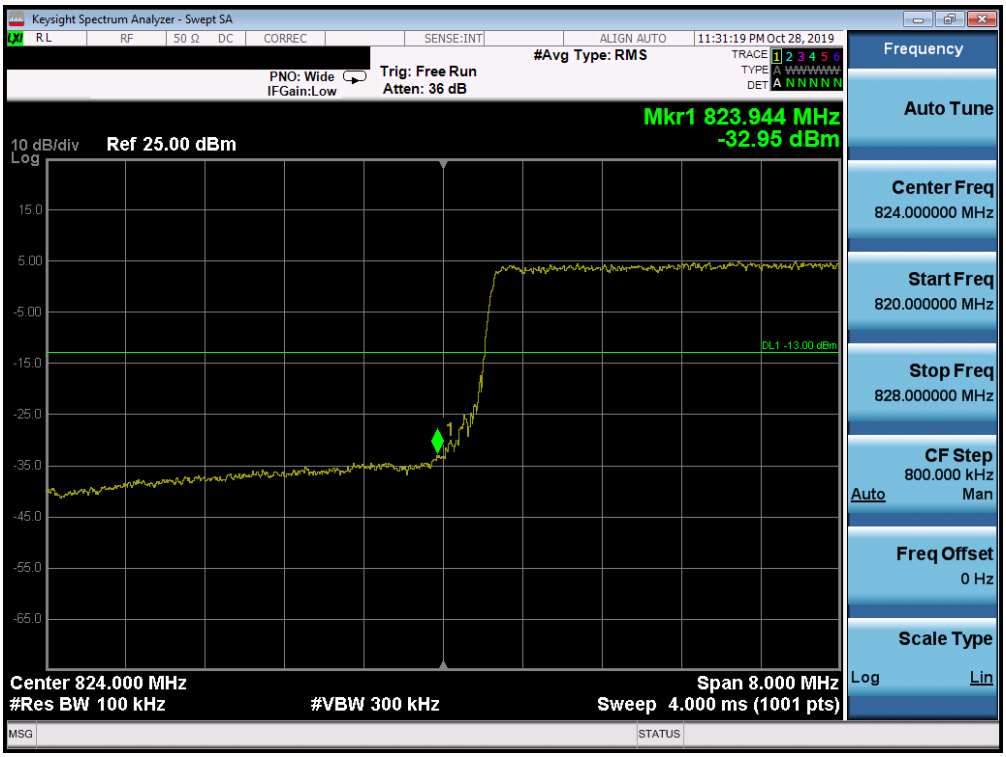
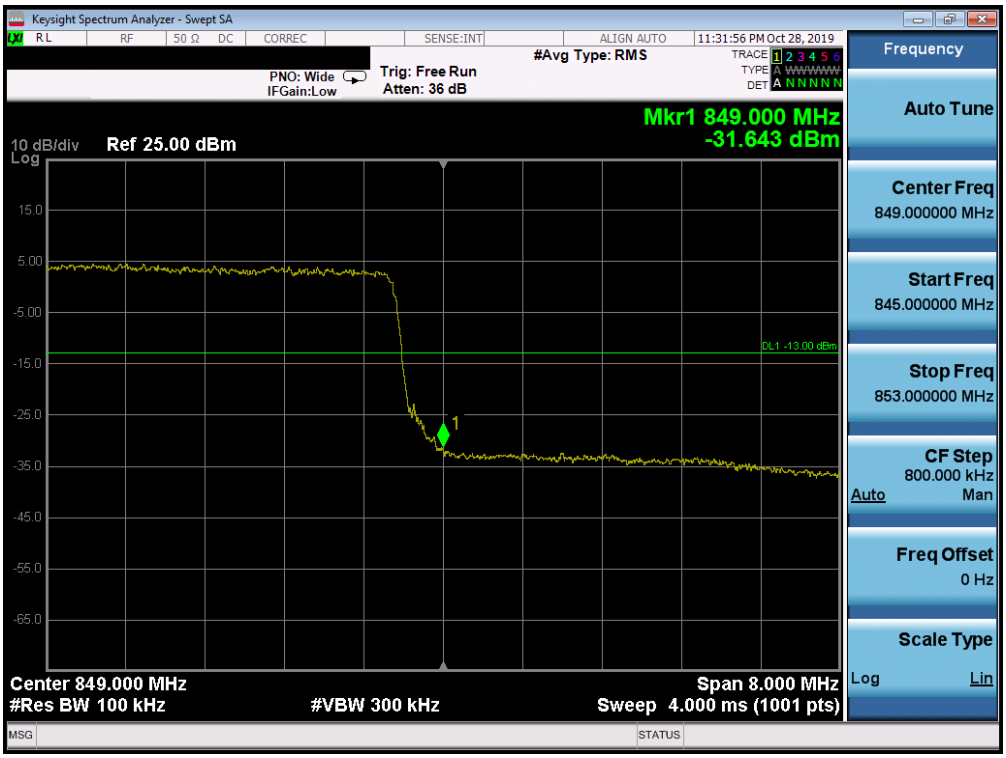


Plot 7-118. Lower Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-119. Upper Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

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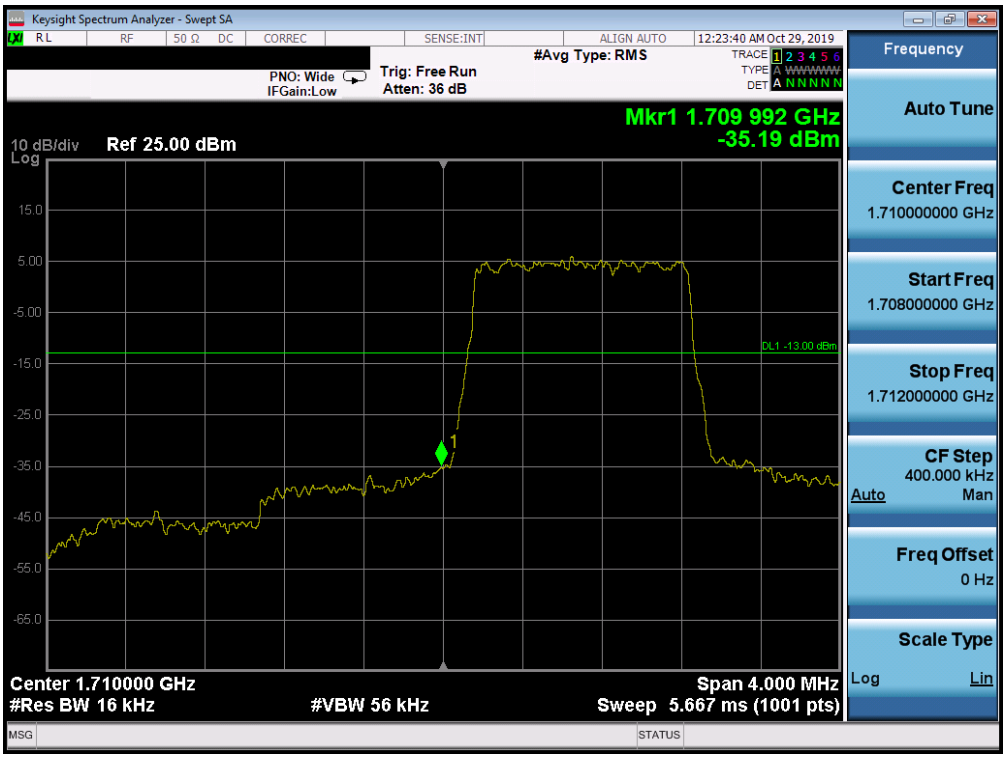
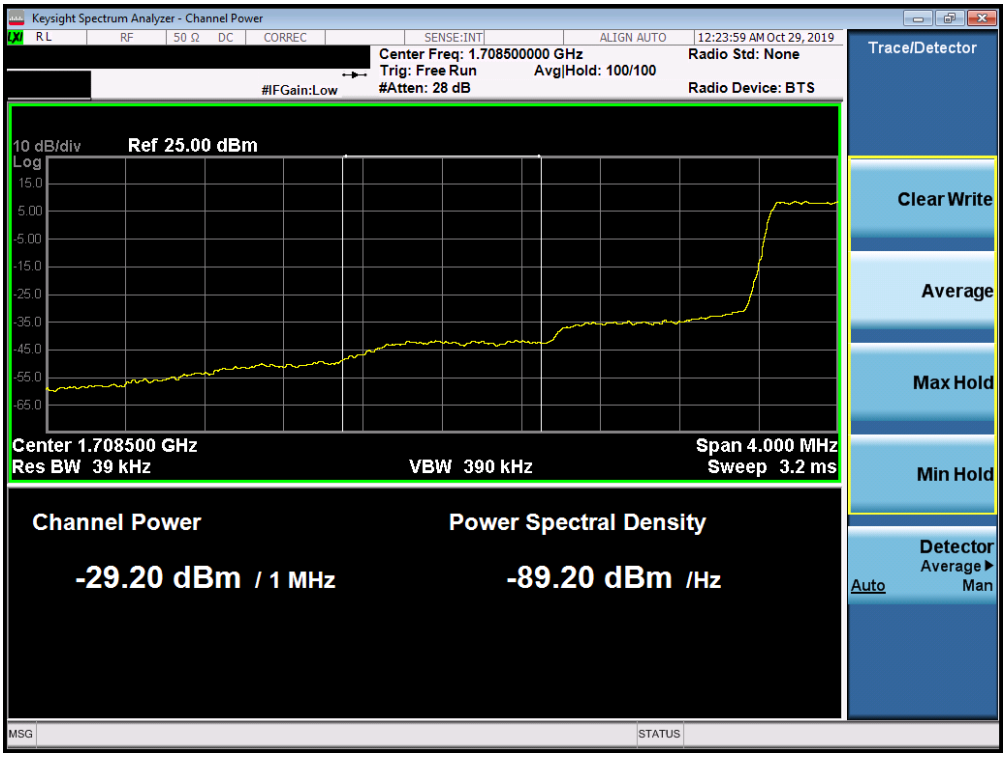
Band 4



Plot 7-120. Lower Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-121. Lower Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

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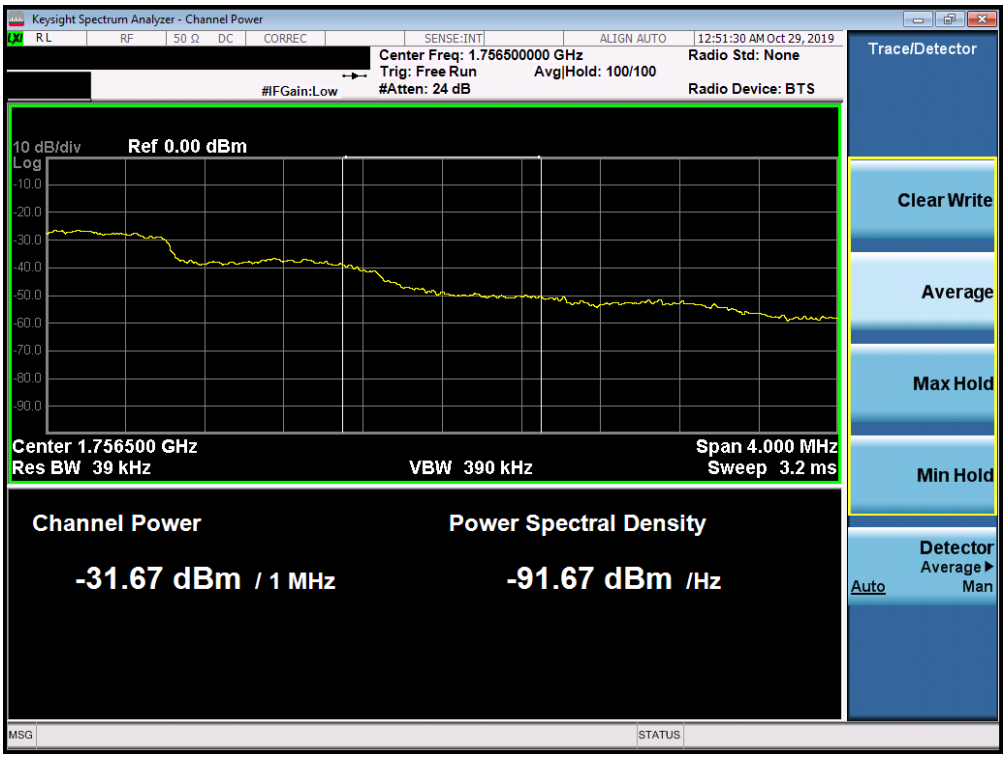
Plot 7-122. Upper Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-123. Upper Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

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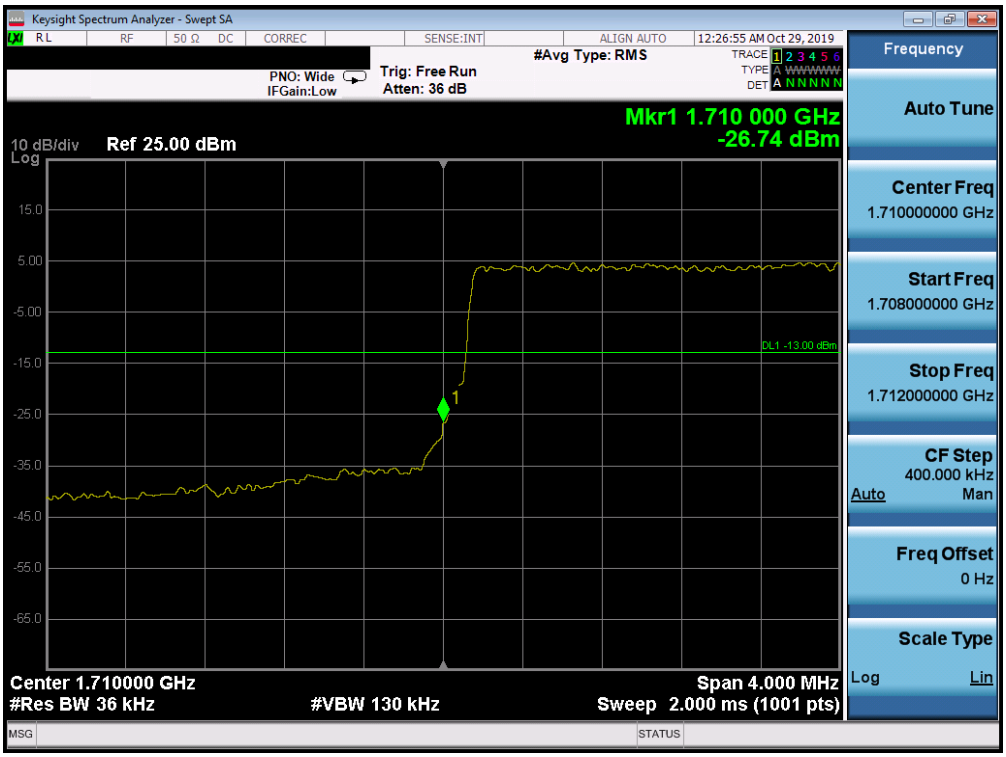
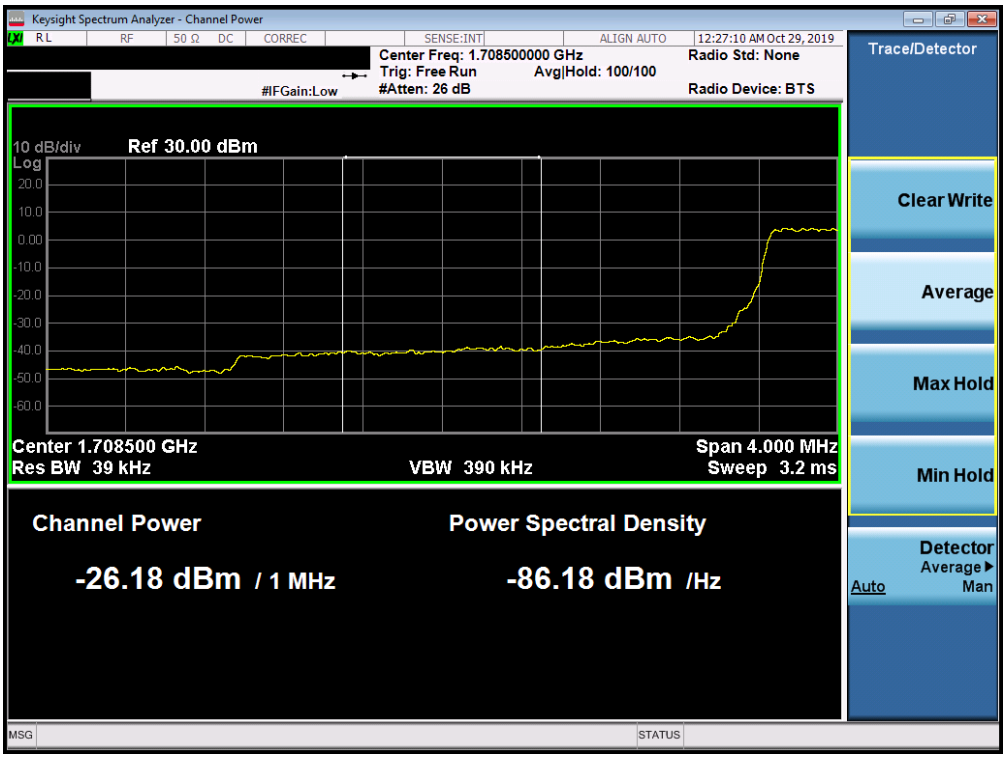


Plot 7-124. Lower Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-125. Lower Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

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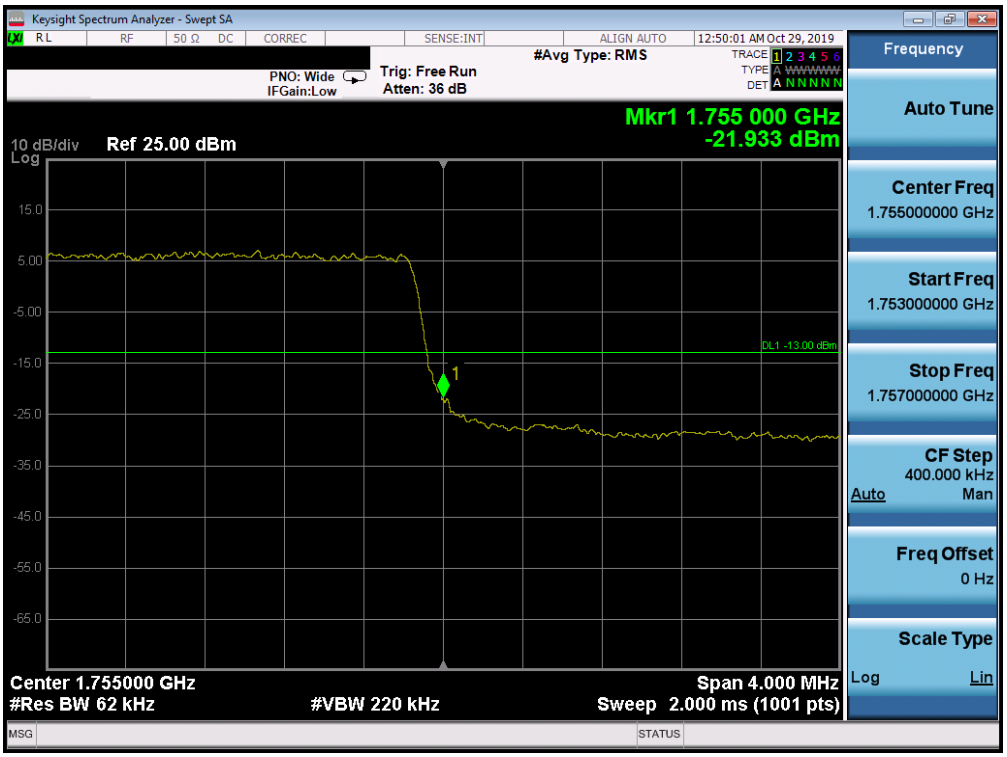
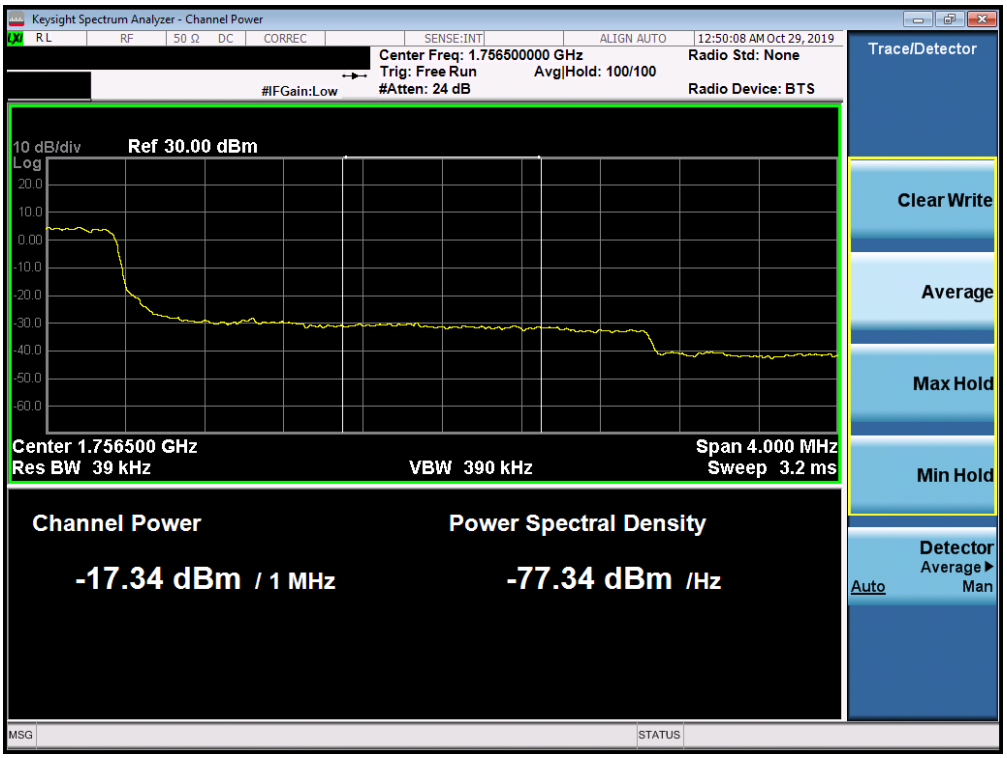


Plot 7-126. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-127. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

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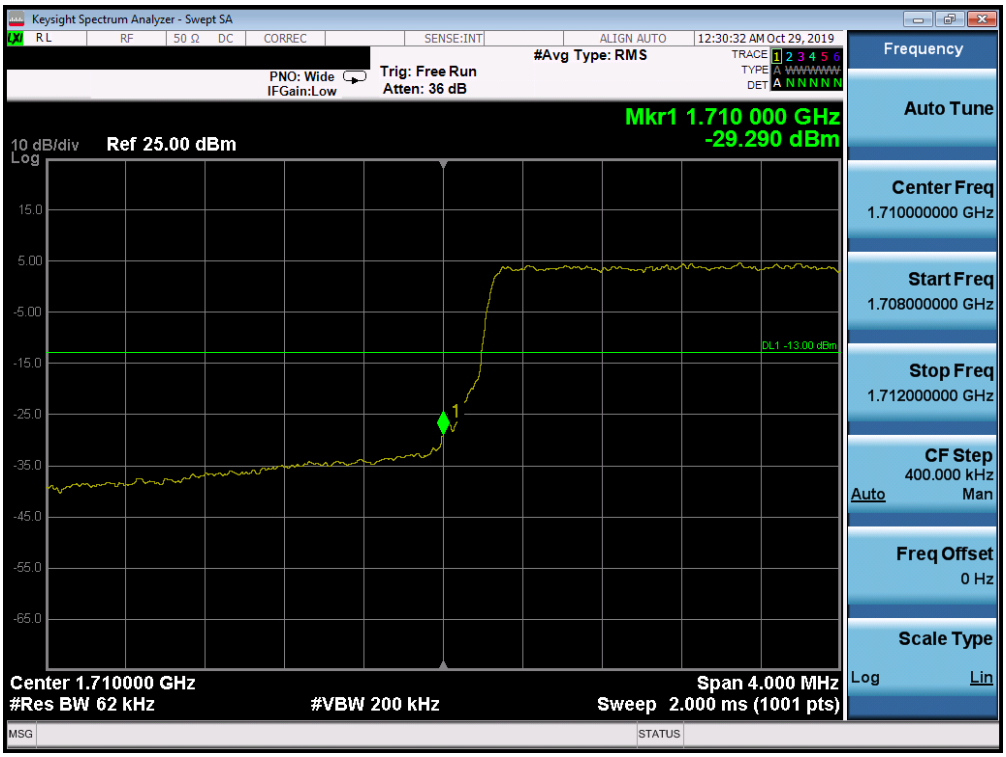
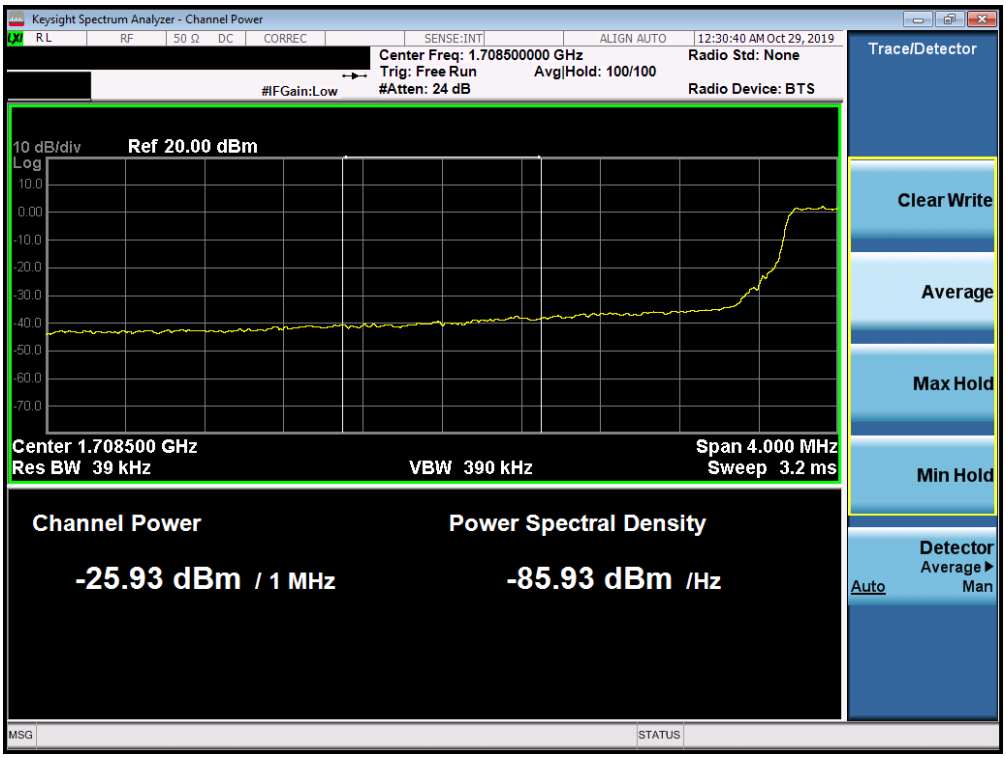


Plot 7-128. Lower Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-129. Lower Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

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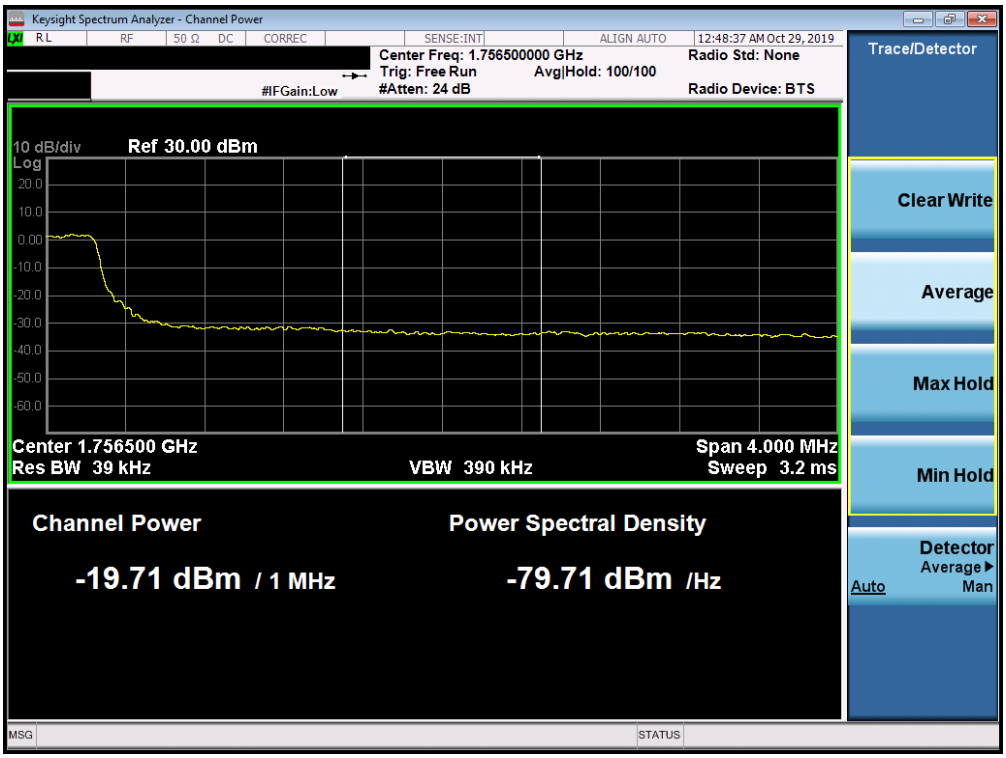
Plot 7-130. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-131. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

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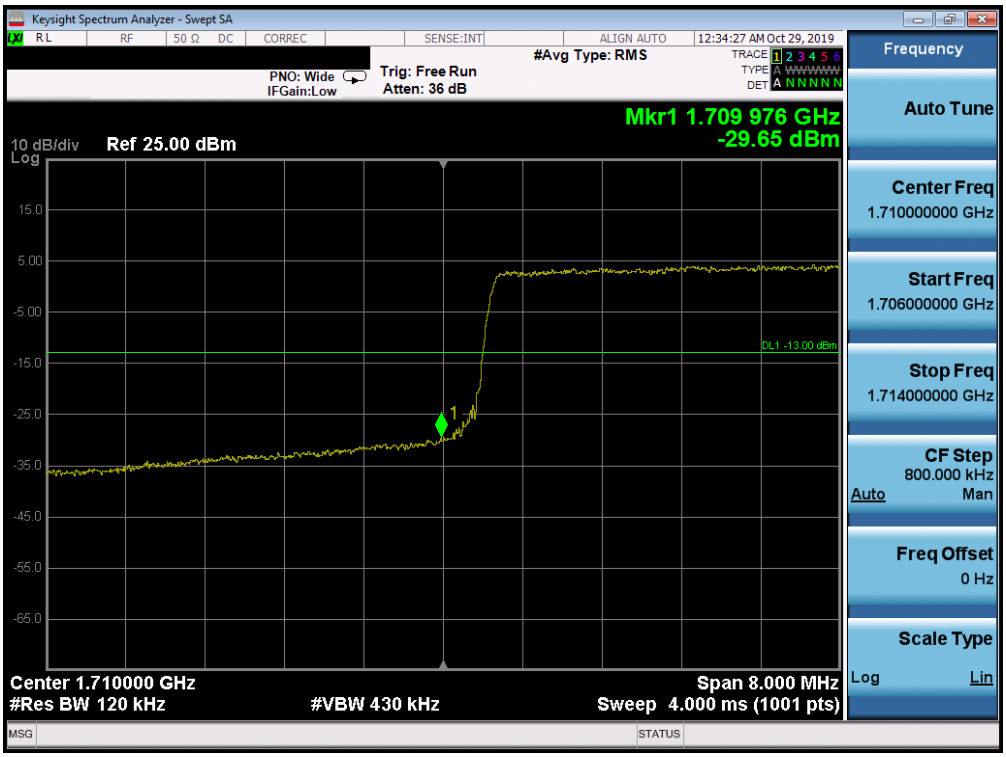
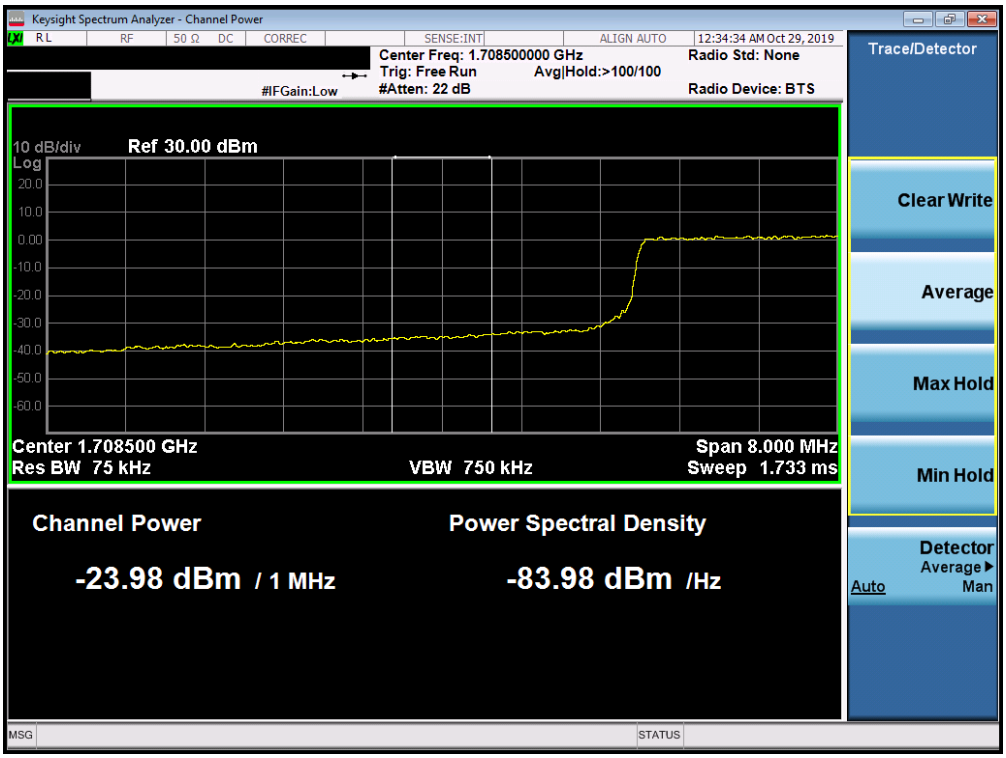


Plot 7-132. Lower Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-133. Lower Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

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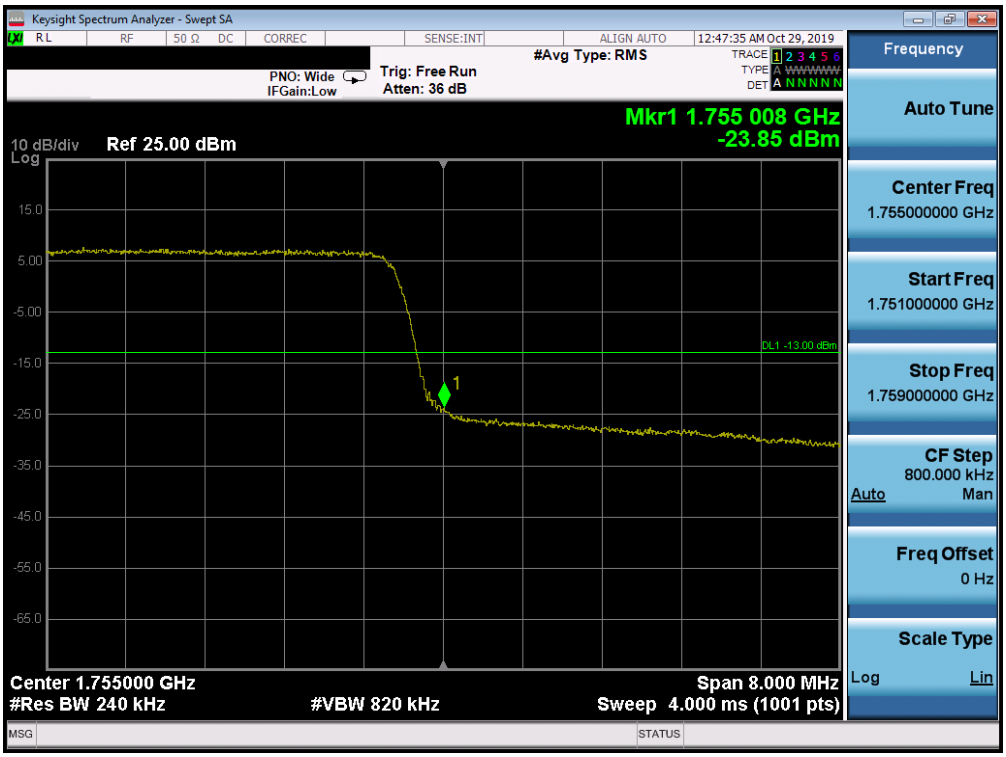
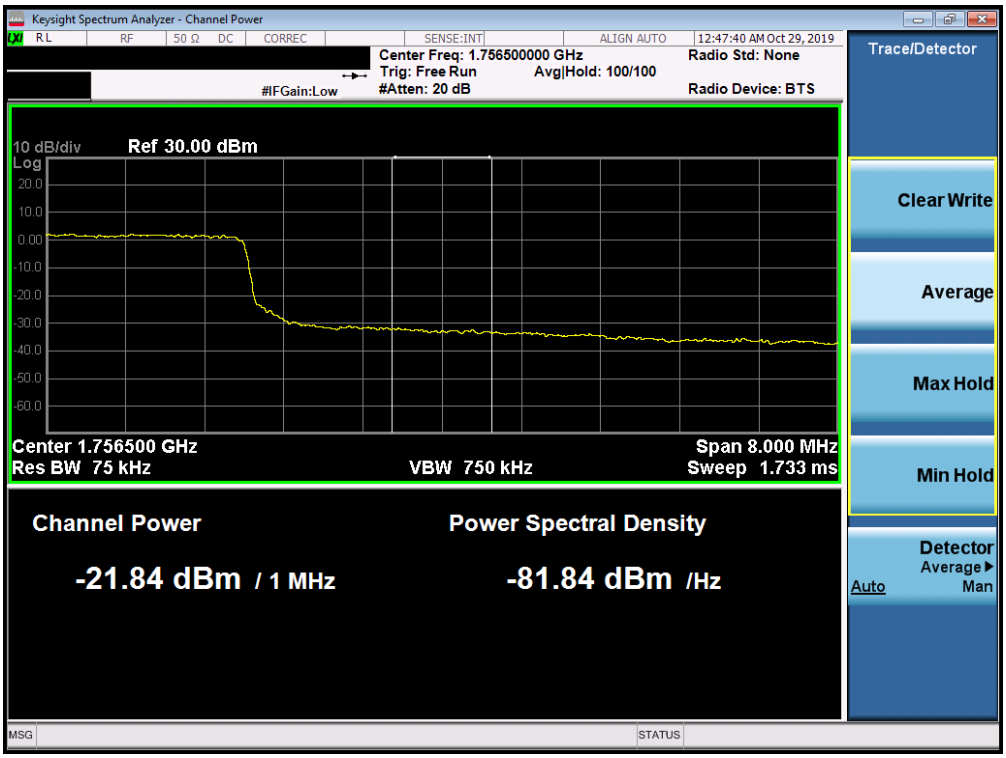


Plot 7-134. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-135. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

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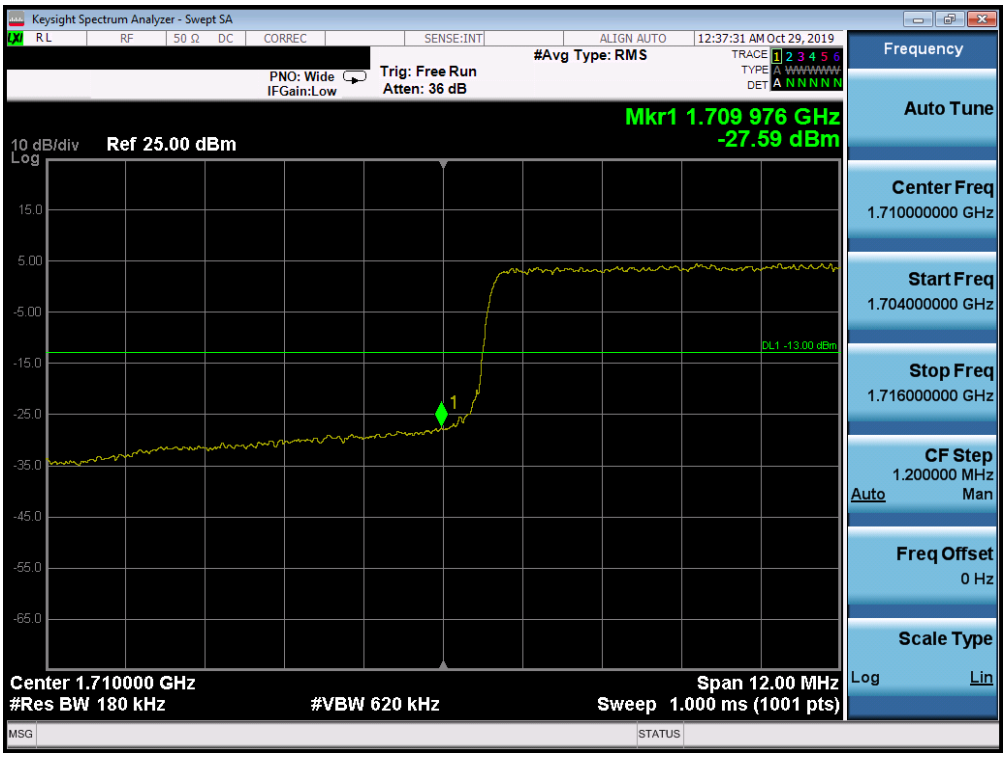
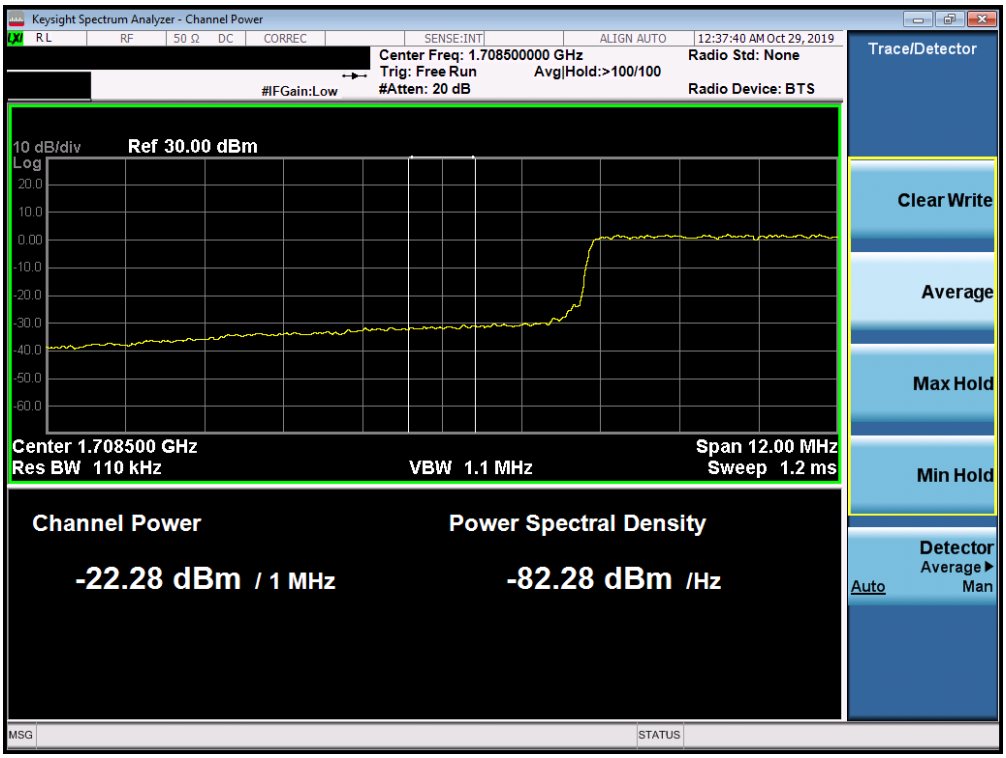


Plot 7-136. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-137. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

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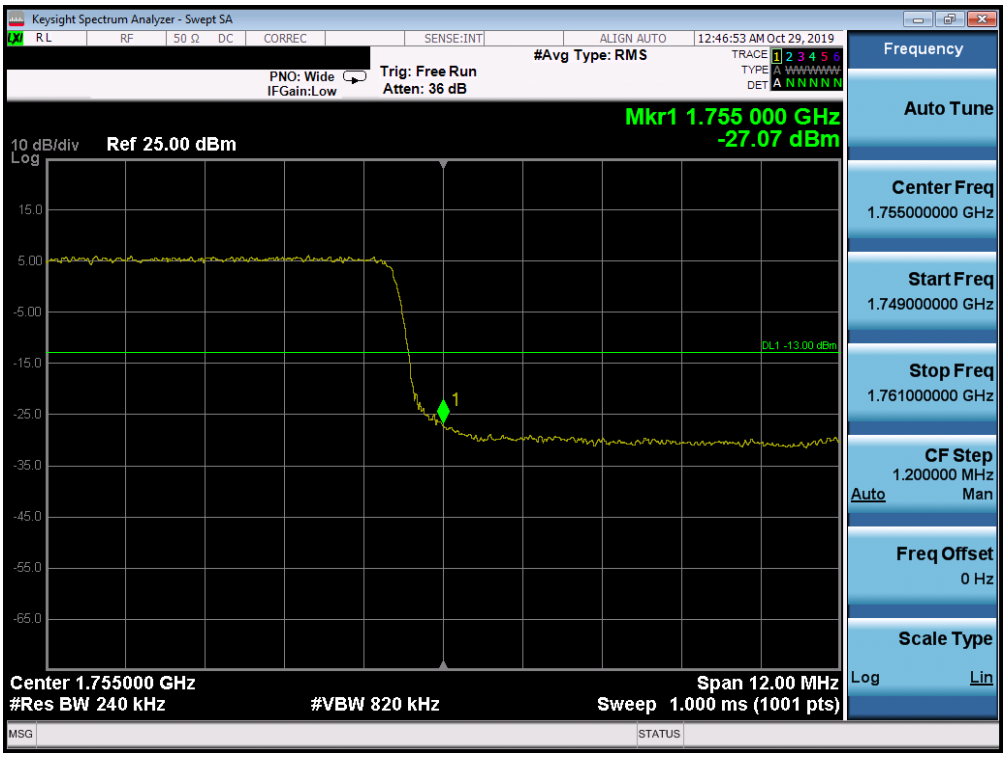
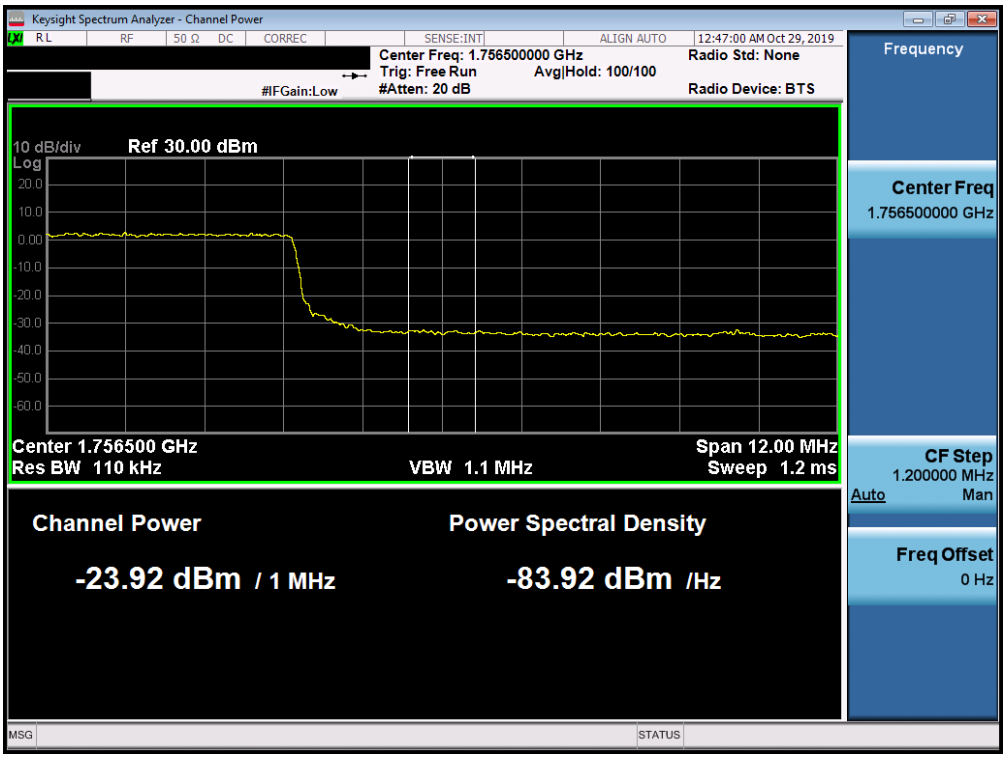


Plot 7-138. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-139. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

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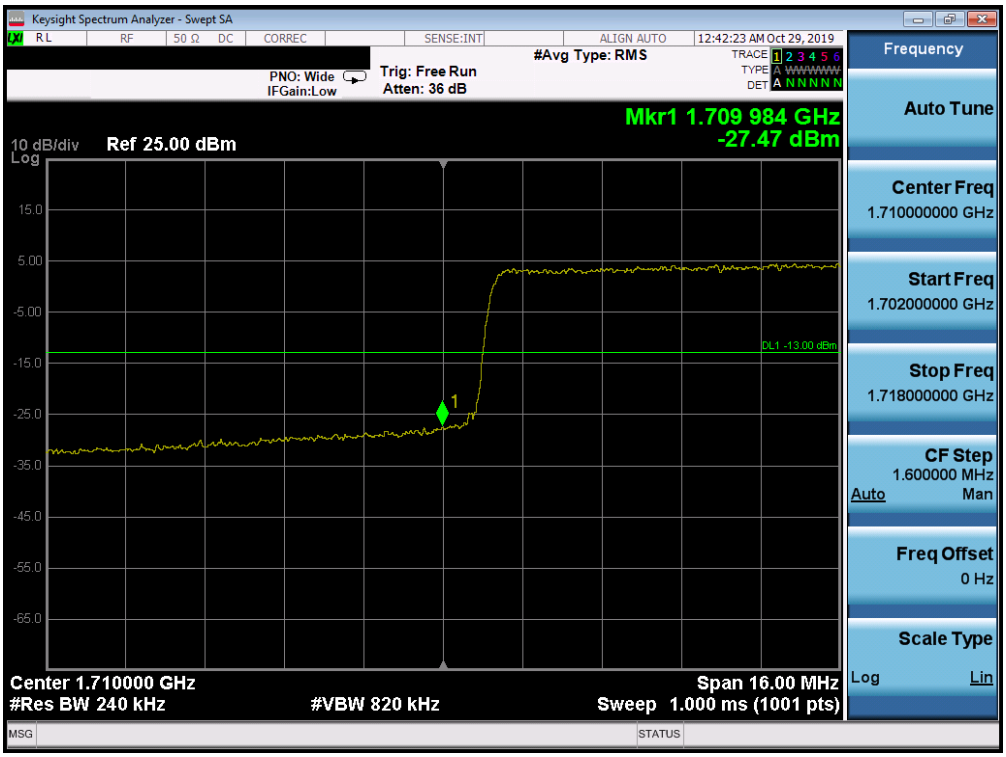
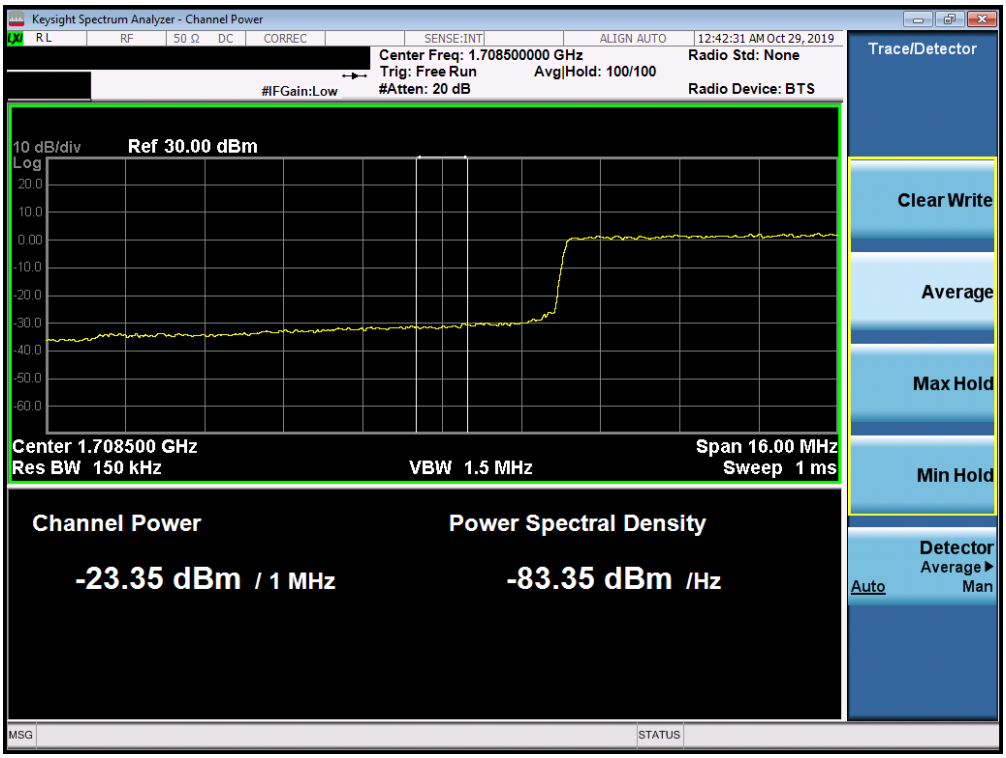


Plot 7-140. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-141. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

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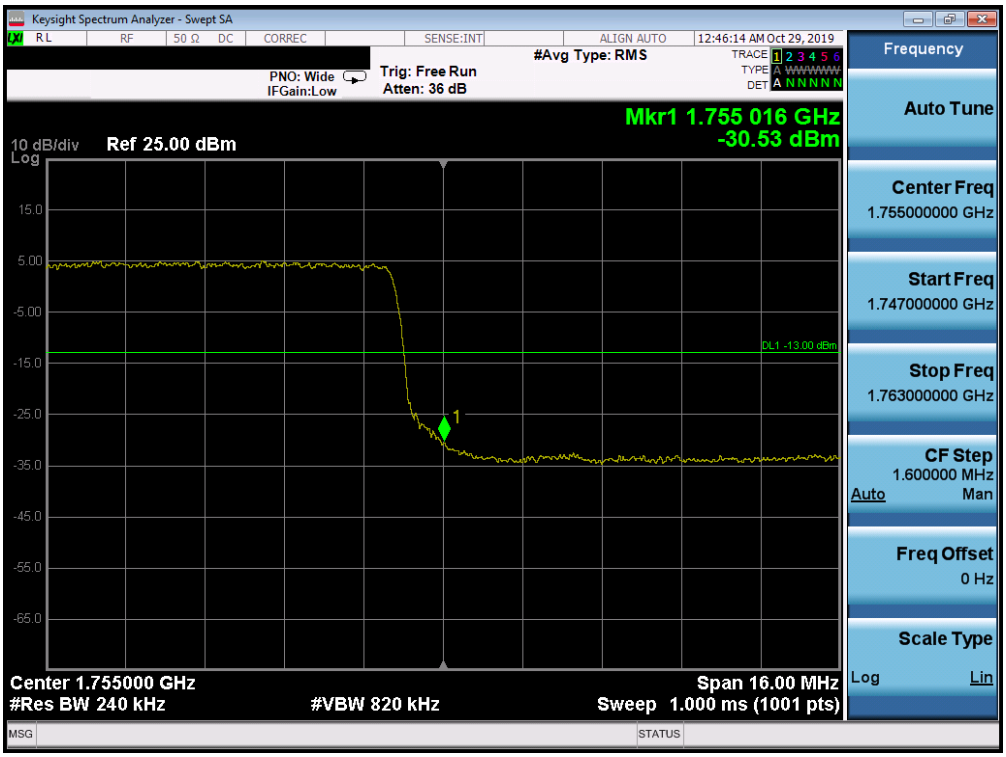
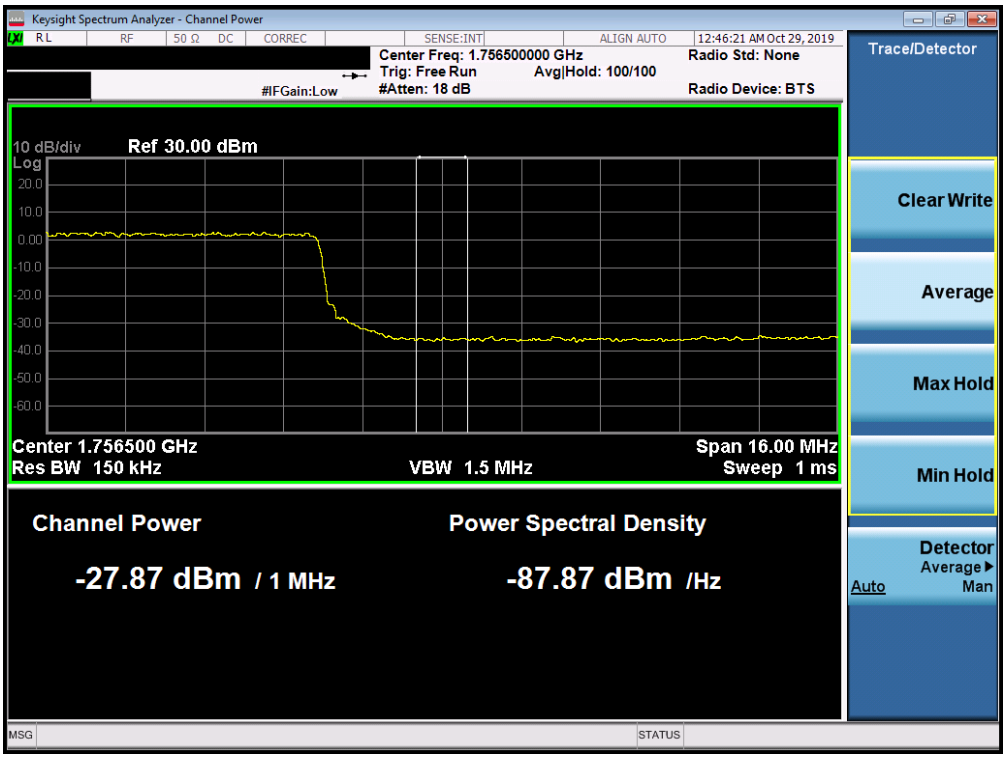


Plot 7-142. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-143. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

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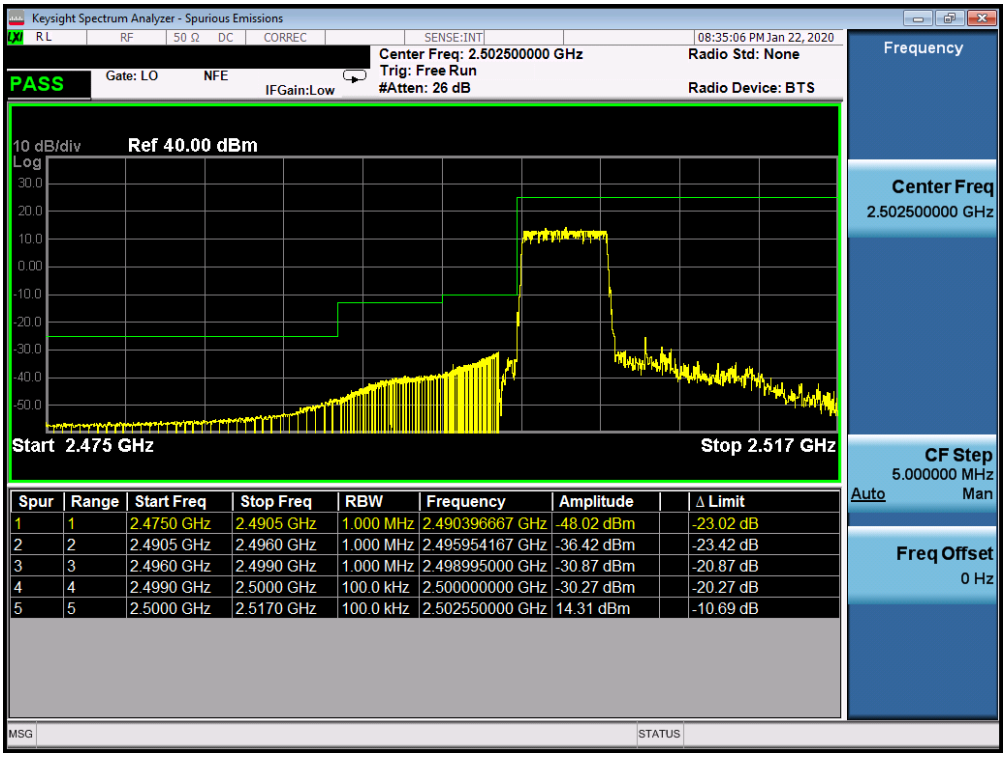
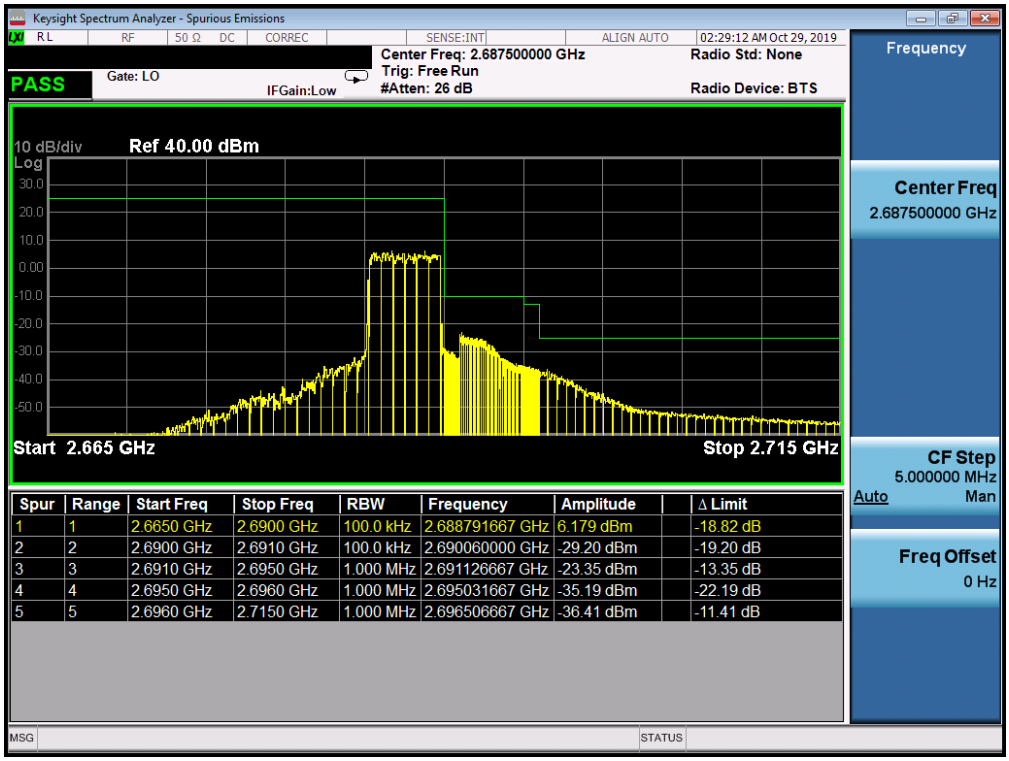
Band 41 PC3



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490396667 GHz	-48.02 dBm	-23.02 dB
2	2	2.4905 GHz	2.4960 GHz	1.000 MHz	2.495954167 GHz	-36.42 dBm	-23.42 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.498995000 GHz	-30.87 dBm	-20.87 dB
4	4	2.4990 GHz	2.5000 GHz	100.0 kHz	2.500000000 GHz	-30.27 dBm	-20.27 dB
5	5	2.5000 GHz	2.5170 GHz	100.0 kHz	2.502550000 GHz	14.31 dBm	-10.69 dB

Plot 7-144. Lower ACP Plot at 2496 MHz (Band 41 - 5.0MHz QPSK - Full RB Configuration)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	100.0 kHz	2.688791667 GHz	6.179 dBm	-18.82 dB
2	2	2.6900 GHz	2.6910 GHz	100.0 kHz	2.690060000 GHz	-29.20 dBm	-19.20 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691126667 GHz	-23.35 dBm	-13.35 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695031667 GHz	-35.19 dBm	-22.19 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696506667 GHz	-36.41 dBm	-11.41 dB

Plot 7-145. Upper ACP Plot (Band 41 PC3 - 5.0MHz QPSK - Full RB Configuration)

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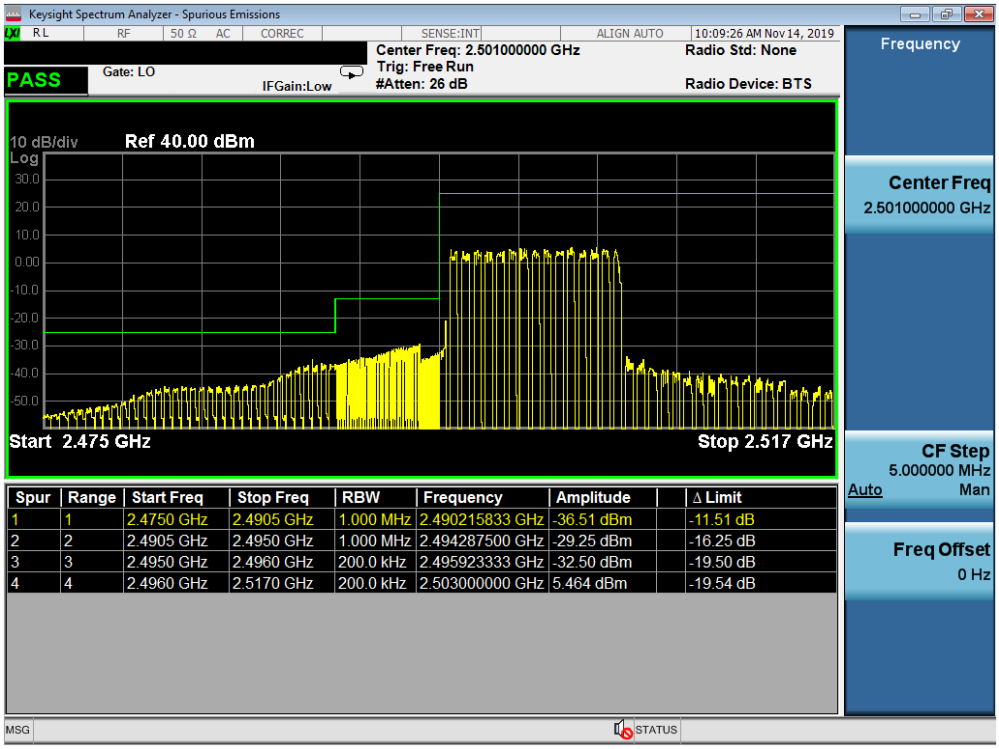
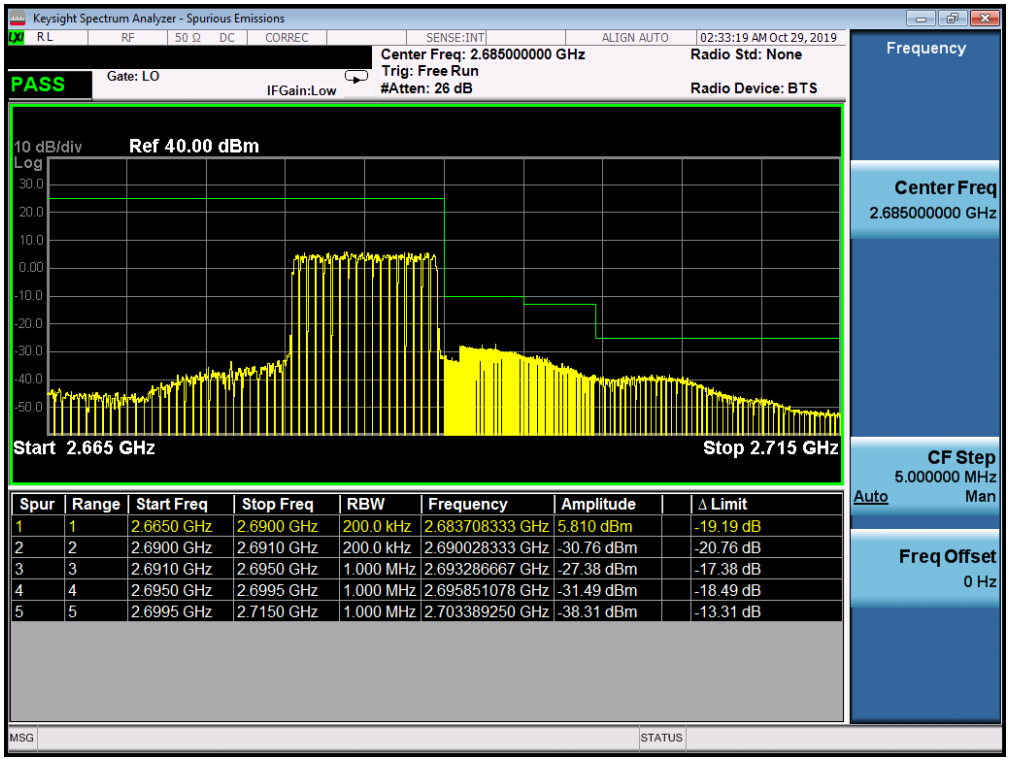


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490215833 GHz	-36.51 dBm	-11.51 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494287500 GHz	-29.25 dBm	-16.25 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495923333 GHz	-32.50 dBm	-19.50 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.503000000 GHz	5.464 dBm	-19.54 dB

Plot 7-146. Lower ACP Plot at 2496 MHz (Band 41 - 10.0MHz QPSK - Full RB Configuration)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	200.0 kHz	2.683708333 GHz	5.810 dBm	-19.19 dB
2	2	2.6900 GHz	2.6910 GHz	200.0 kHz	2.690028333 GHz	-30.76 dBm	-20.76 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.693286667 GHz	-27.38 dBm	-17.38 dB
4	4	2.6950 GHz	2.6995 GHz	1.000 MHz	2.695851078 GHz	-31.49 dBm	-18.49 dB
5	5	2.6995 GHz	2.7150 GHz	1.000 MHz	2.703389250 GHz	-38.31 dBm	-13.31 dB

Plot 7-147. Upper ACP Plot (Band 41 PC3 - 10.0MHz QPSK - Full RB Configuration)

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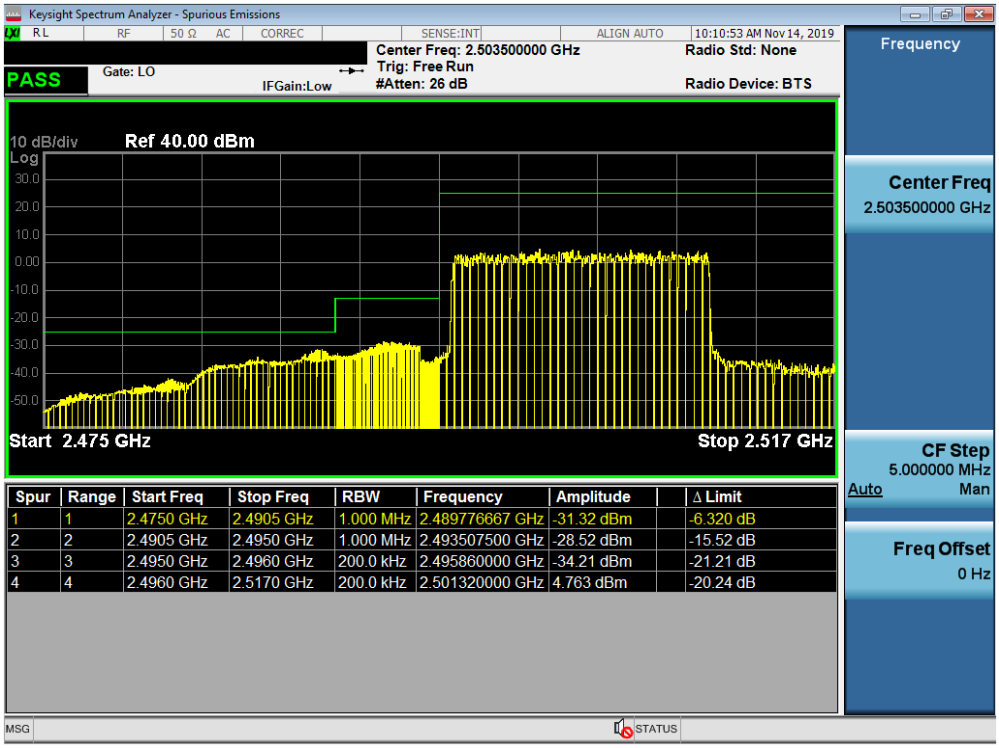
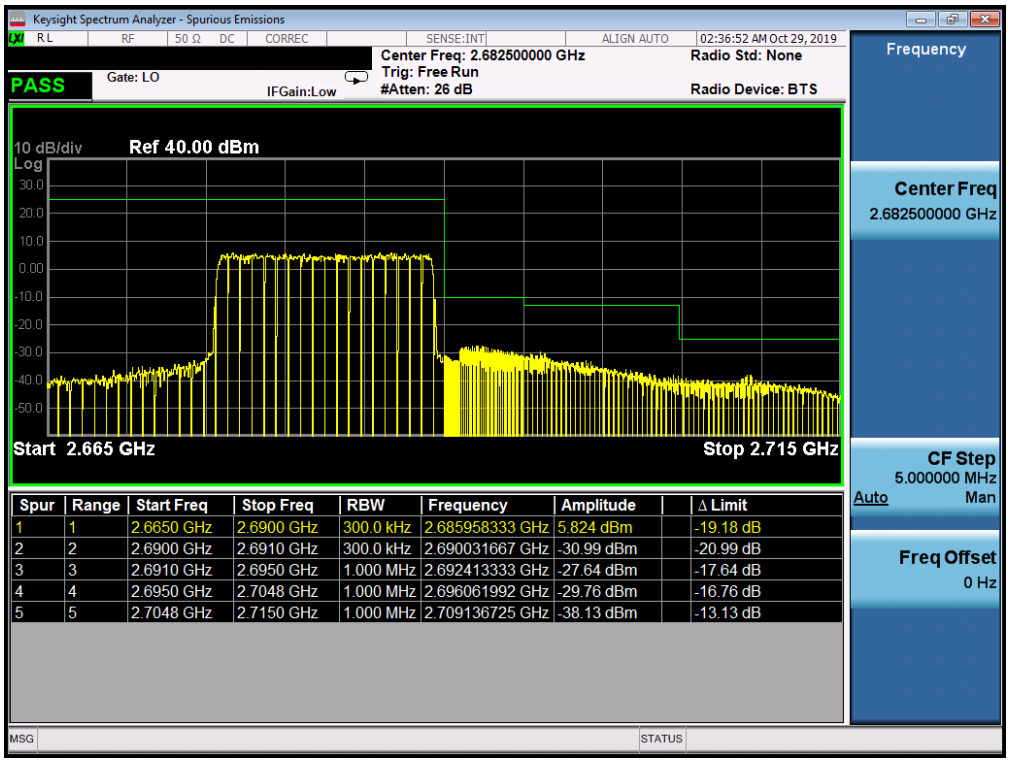


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489776667 GHz	-31.32 dBm	-6.320 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.493507500 GHz	-28.52 dBm	-15.52 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495860000 GHz	-34.21 dBm	-21.21 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.501320000 GHz	4.763 dBm	-20.24 dB

Plot 7-148. Lower ACP Plot at 2496 MHz (Band 41 - 15.0MHz QPSK - Full RB Configuration)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	300.0 kHz	2.685958333 GHz	5.824 dBm	-19.18 dB
2	2	2.6900 GHz	2.6910 GHz	300.0 kHz	2.690031667 GHz	-30.99 dBm	-20.99 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.692413333 GHz	-27.64 dBm	-17.64 dB
4	4	2.6950 GHz	2.7048 GHz	1.000 MHz	2.696061992 GHz	-29.76 dBm	-16.76 dB
5	5	2.7048 GHz	2.7150 GHz	1.000 MHz	2.709136725 GHz	-38.13 dBm	-13.13 dB

Plot 7-149. Upper ACP Plot (Band 41 PC3 - 15.0MHz QPSK - Full RB Configuration)

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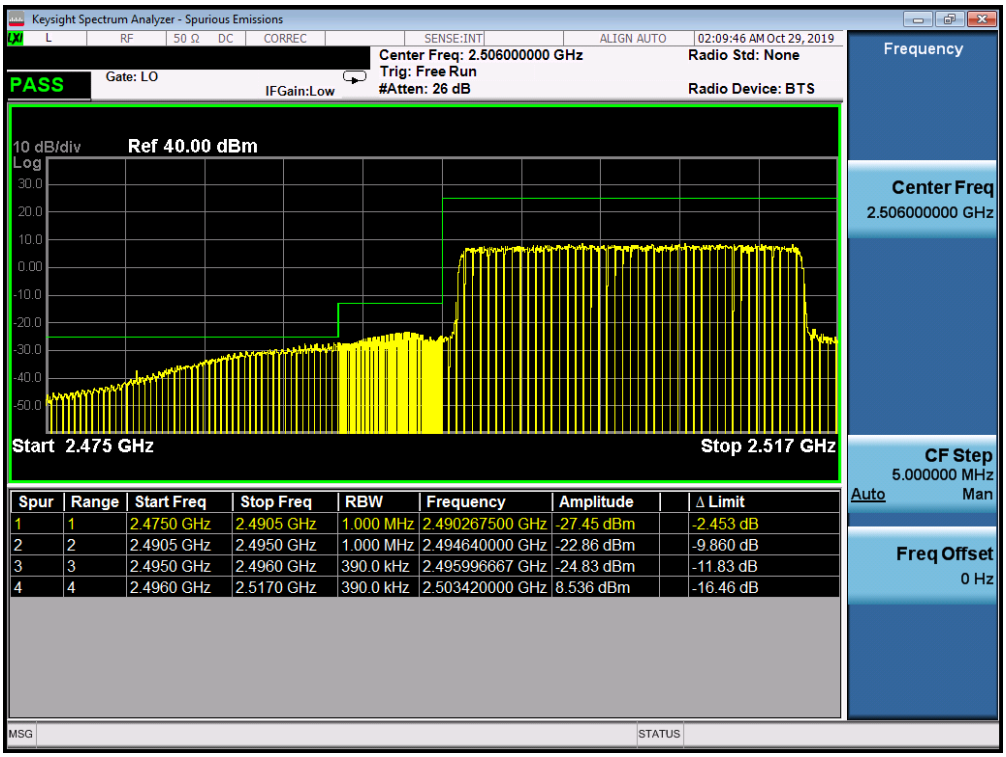
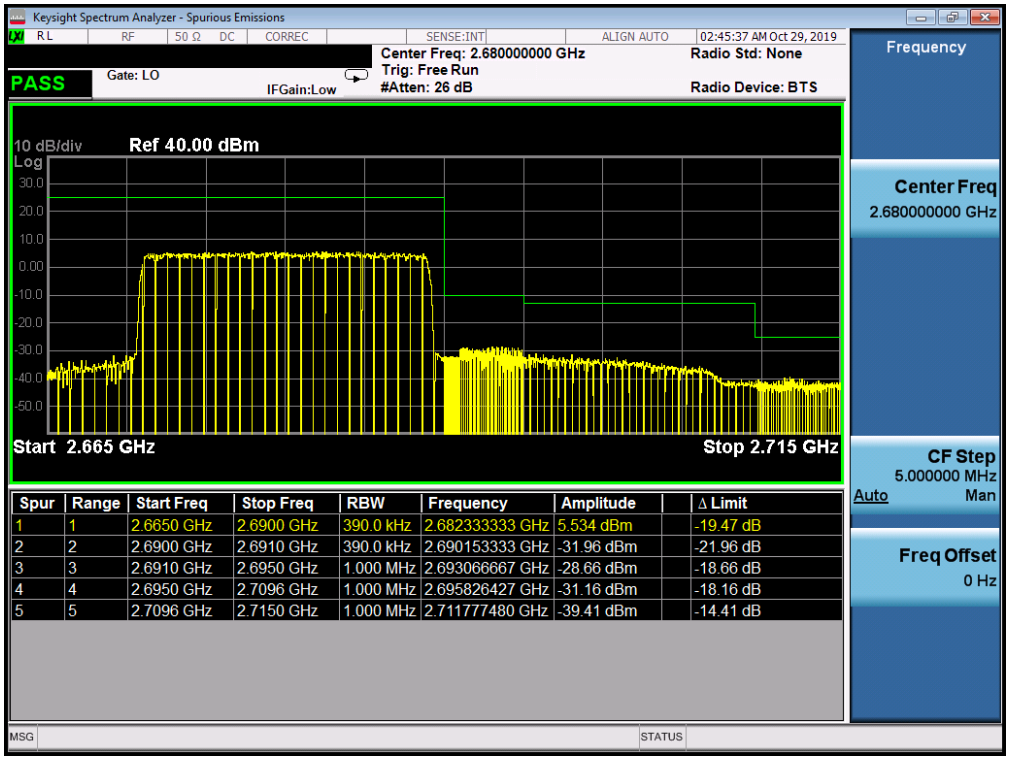


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490267500 GHz	-27.45 dBm	-2.453 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494640000 GHz	-22.86 dBm	-9.860 dB
3	3	2.4950 GHz	2.4960 GHz	390.0 kHz	2.495996667 GHz	-24.83 dBm	-11.83 dB
4	4	2.4960 GHz	2.5170 GHz	390.0 kHz	2.503420000 GHz	8.536 dBm	-16.46 dB

Plot 7-150. Lower ACP Plot at 2496 MHz (Band 41 - 20.0MHz QPSK - Full RB Configuration)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	390.0 kHz	2.682333333 GHz	5.534 dBm	-19.47 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690153333 GHz	-31.96 dBm	-21.96 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.693066667 GHz	-28.66 dBm	-18.66 dB
4	4	2.6950 GHz	2.7096 GHz	1.000 MHz	2.695826427 GHz	-31.16 dBm	-18.16 dB
5	5	2.7096 GHz	2.7150 GHz	1.000 MHz	2.711777480 GHz	-39.41 dBm	-14.41 dB

Plot 7-151. Upper ACP Plot (Band 41 PC3 - 20.0MHz QPSK - Full RB Configuration)

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7.5 Peak-Average Ratio

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW ≥ OBW or specified reference bandwidth
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Setup

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

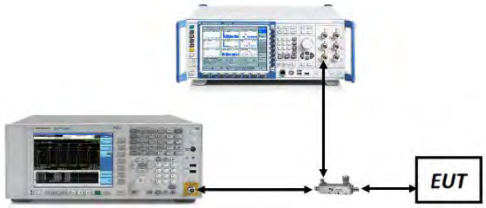

Figure 7-4. Test Instrument & Measurement Setup

Test Notes

None.

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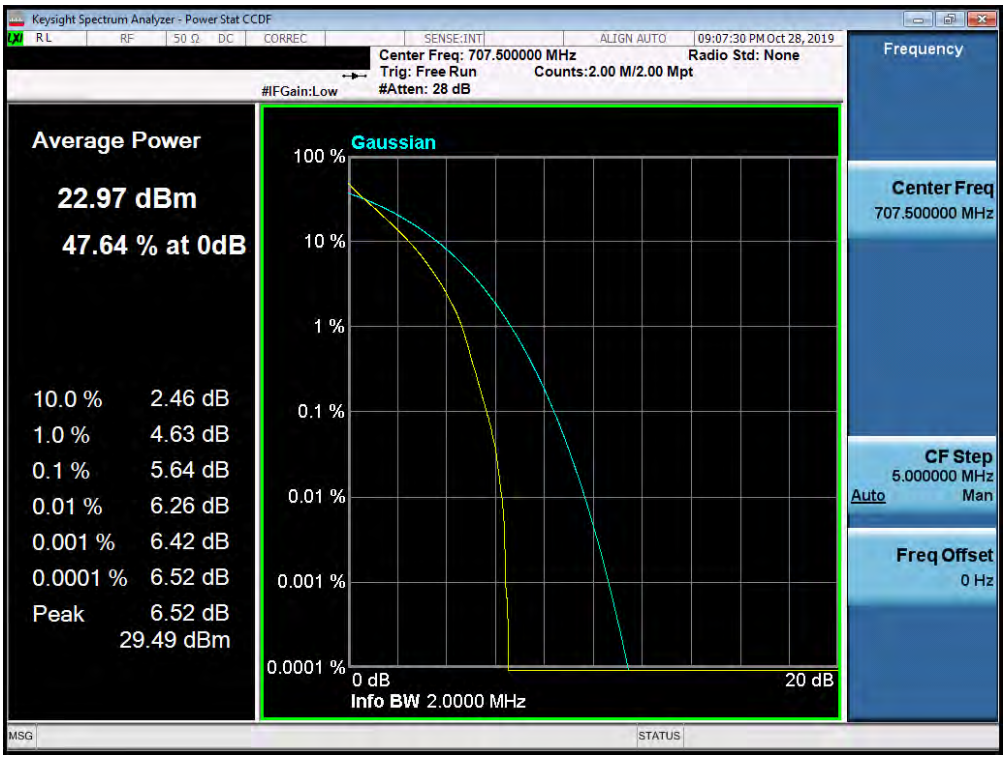
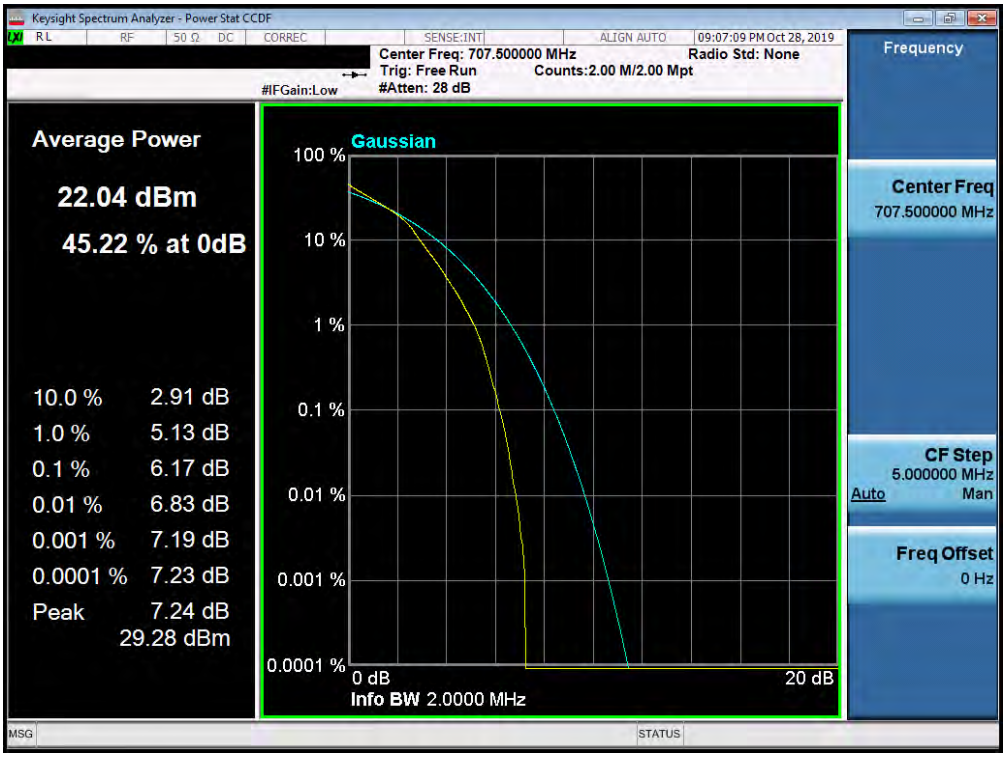
Band 12



Plot 7-152. PAR Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-153. PAR Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)

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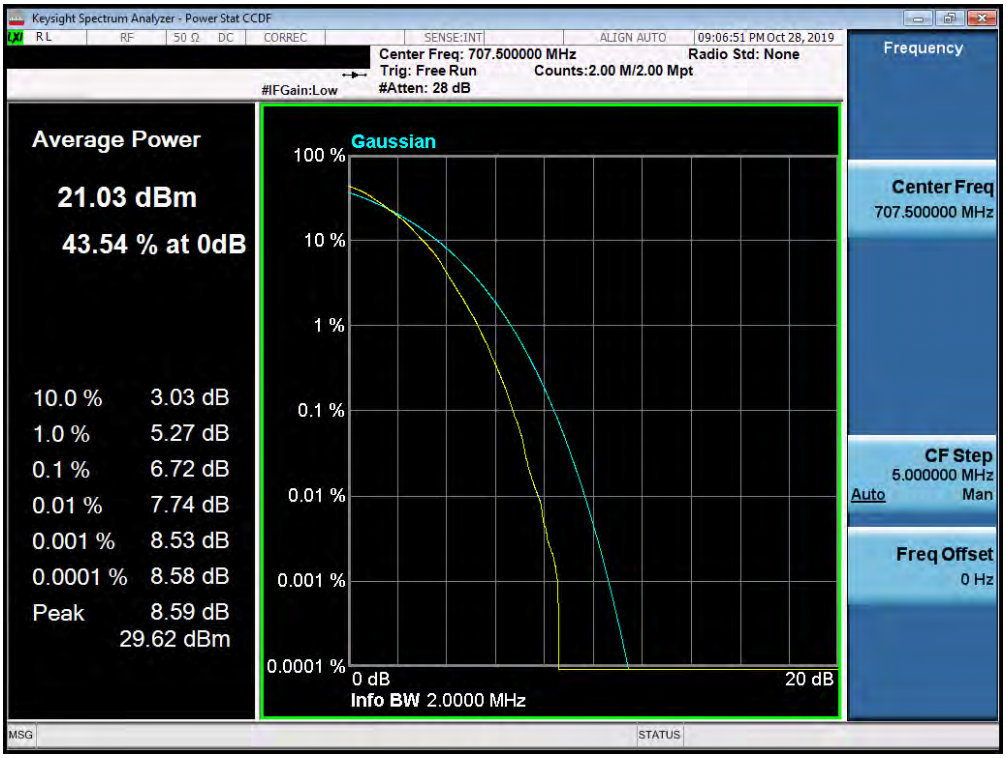
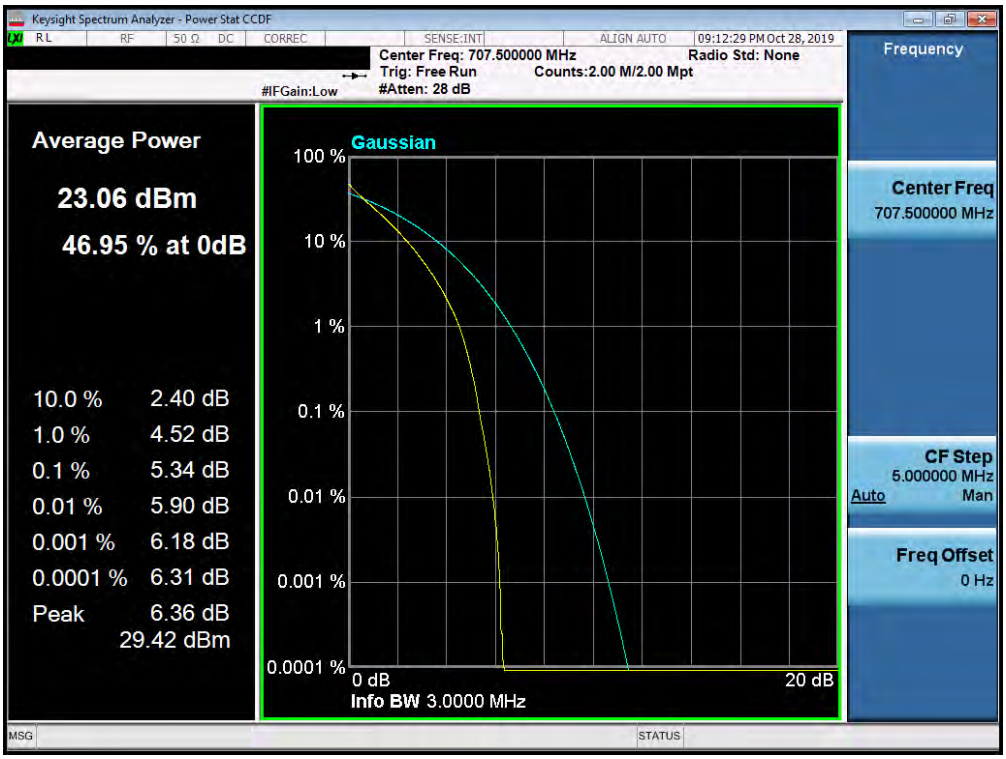


Plot 7-154. PAR Plot (Band 12 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-155. PAR Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

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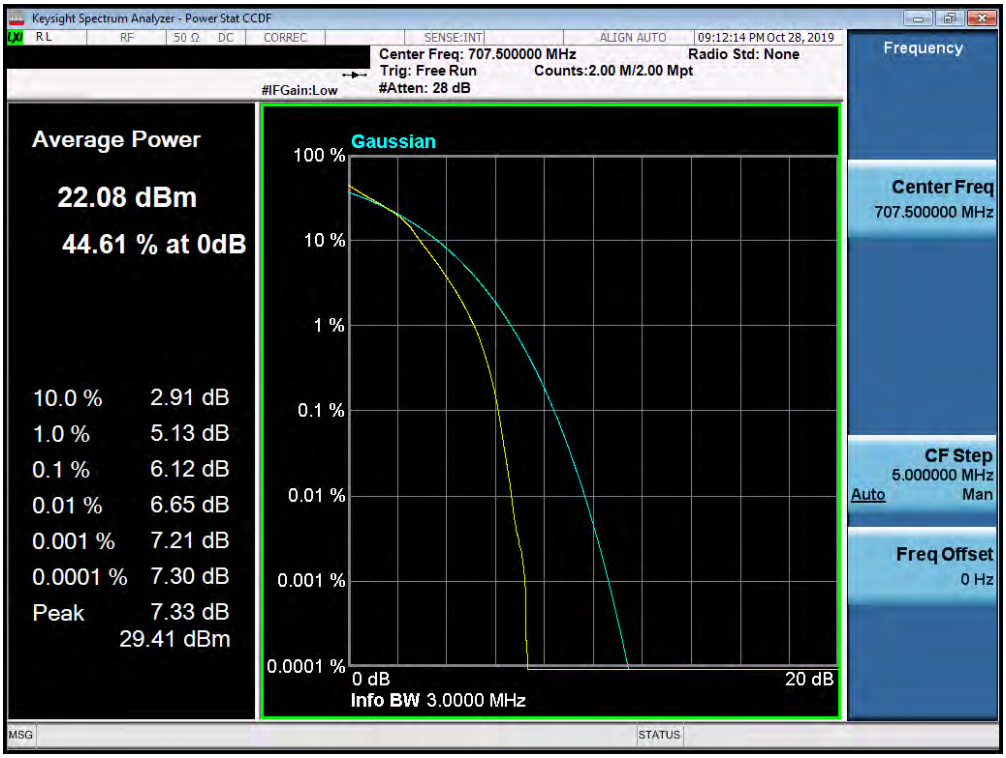
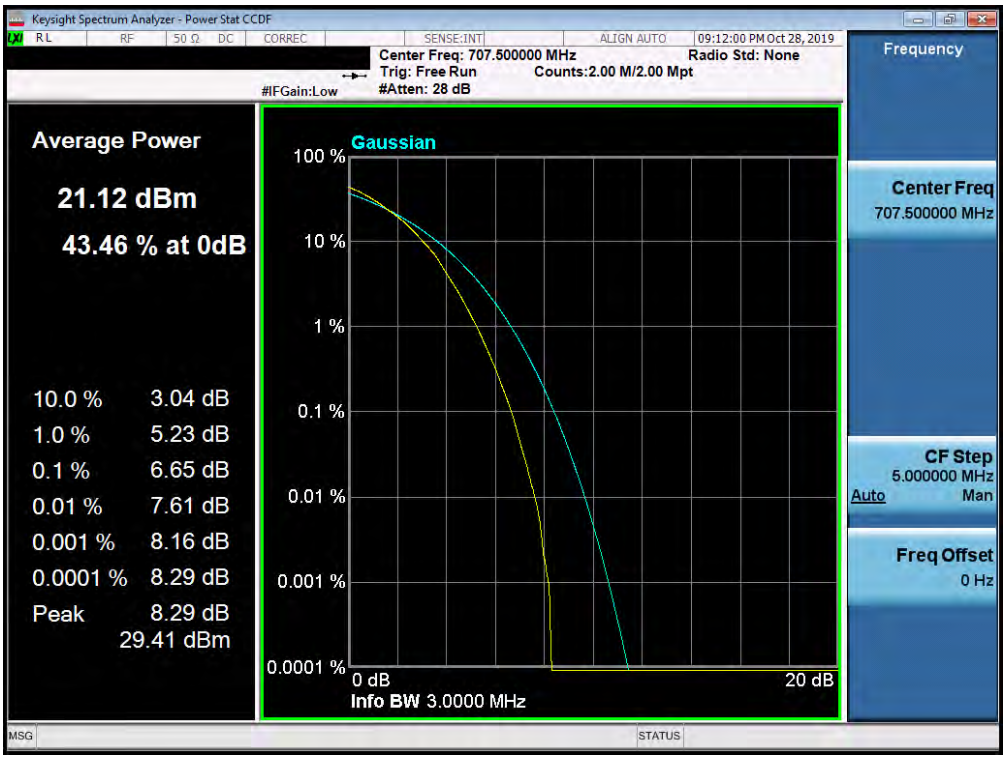


Plot 7-156. PAR Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-157. PAR Plot (Band 12 - 3.0MHz 64-QAM - Full RB Configuration)

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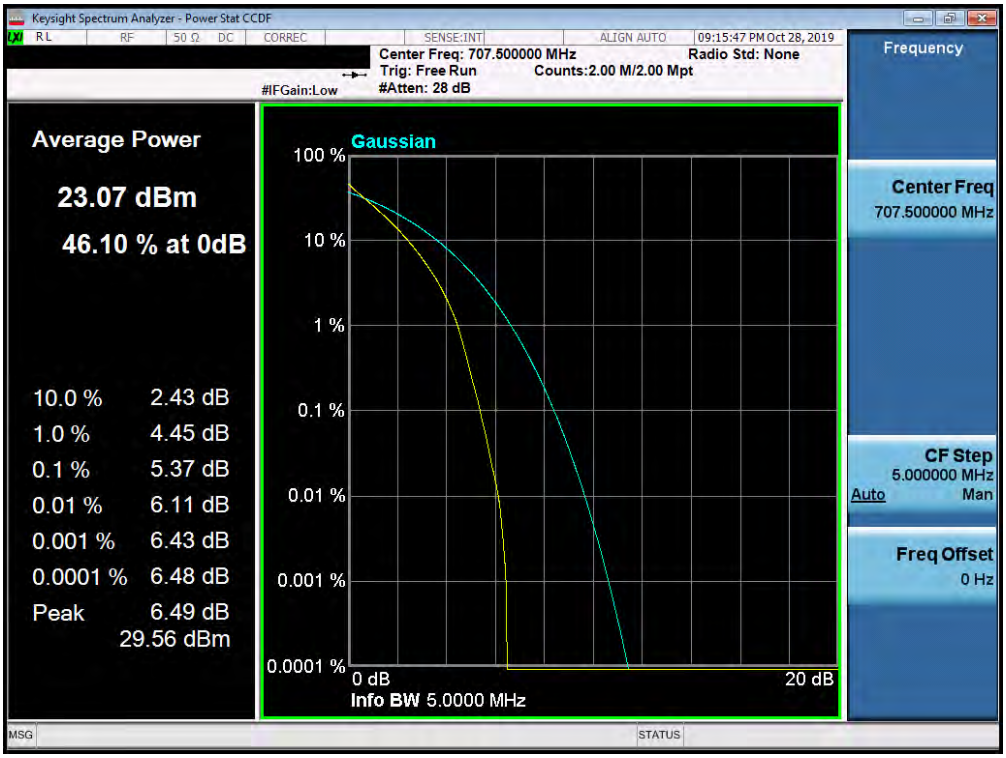
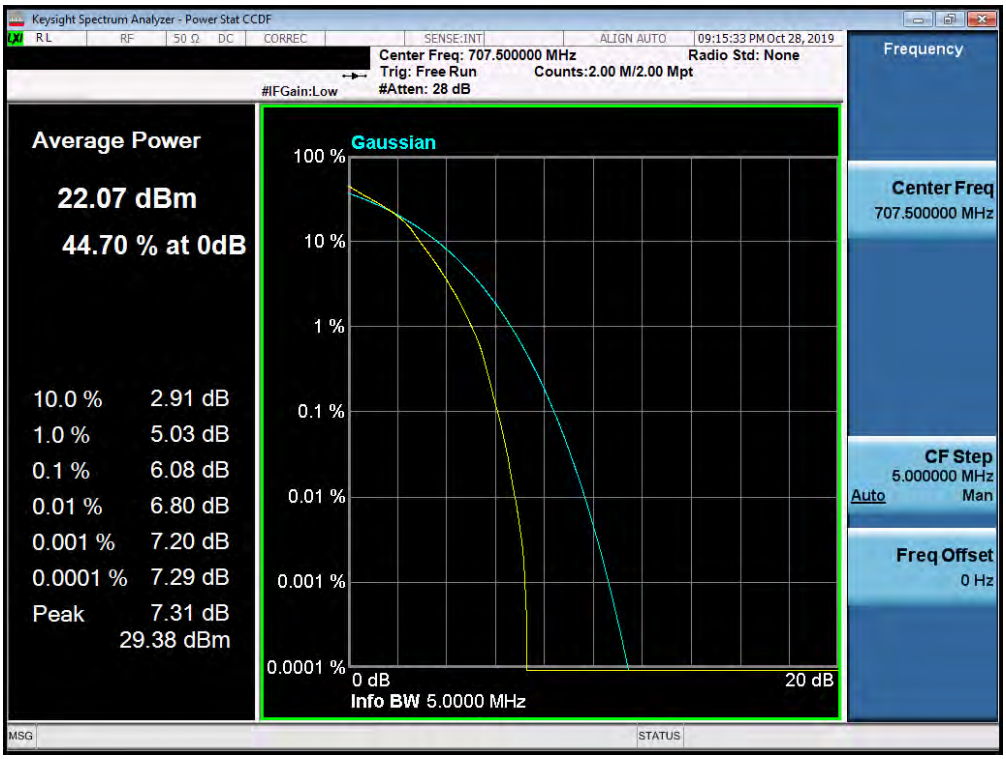


Plot 7-158. PAR Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-159. PAR Plot (Band 12 - 5.0MHz 16-QAM - Full RB Configuration)

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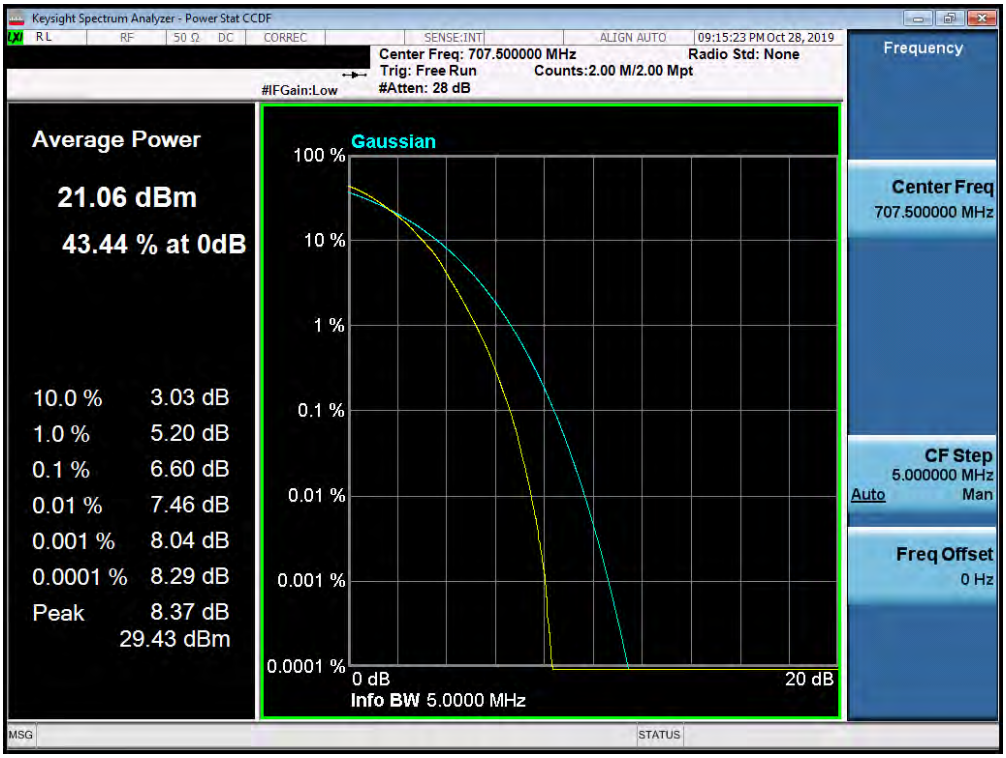
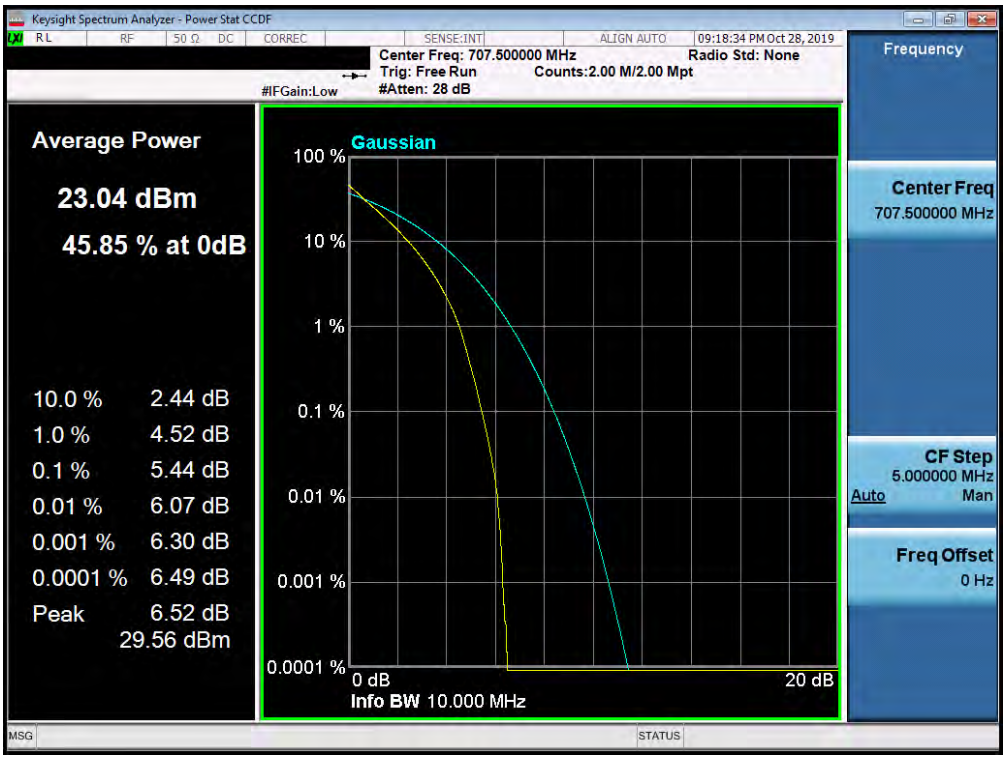


Plot 7-160. PAR Plot (Band 12 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-161. PAR Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

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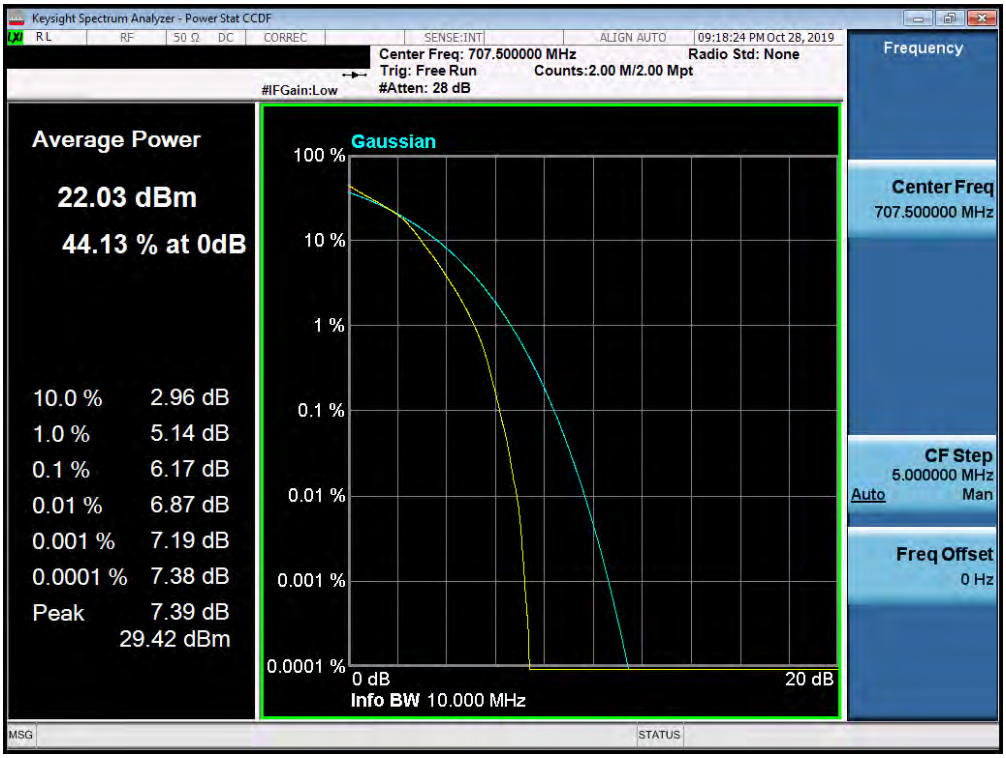
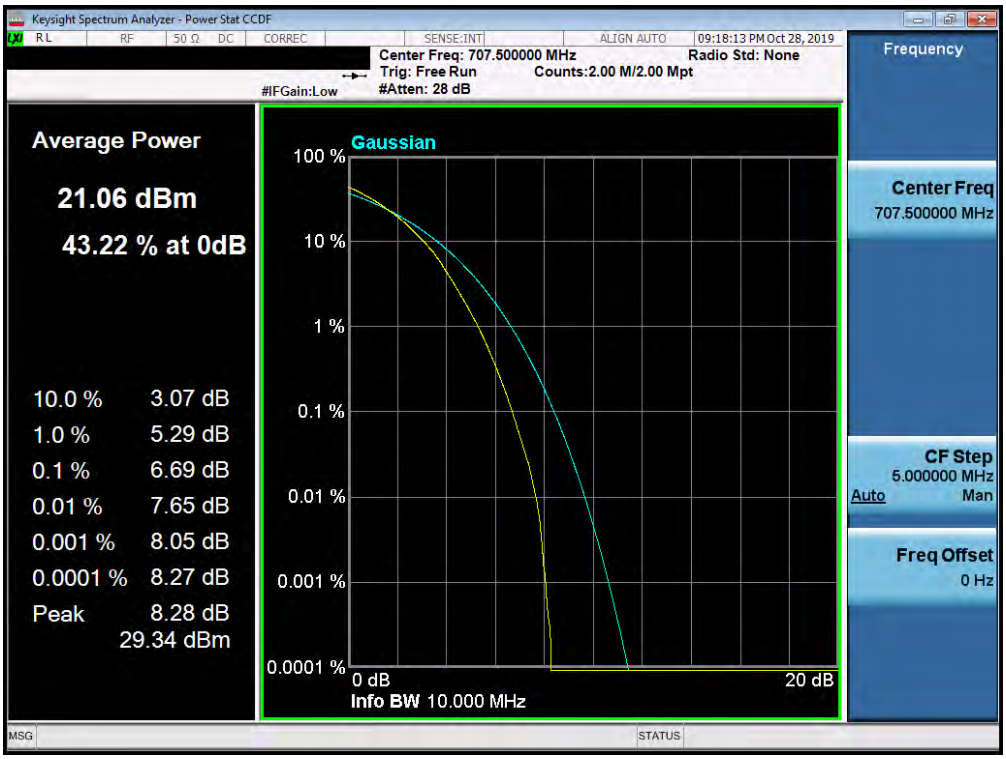


Plot 7-162. PAR Plot (Band 12 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-163. PAR Plot (Band 12 - 10.0MHz 64-QAM - Full RB Configuration)

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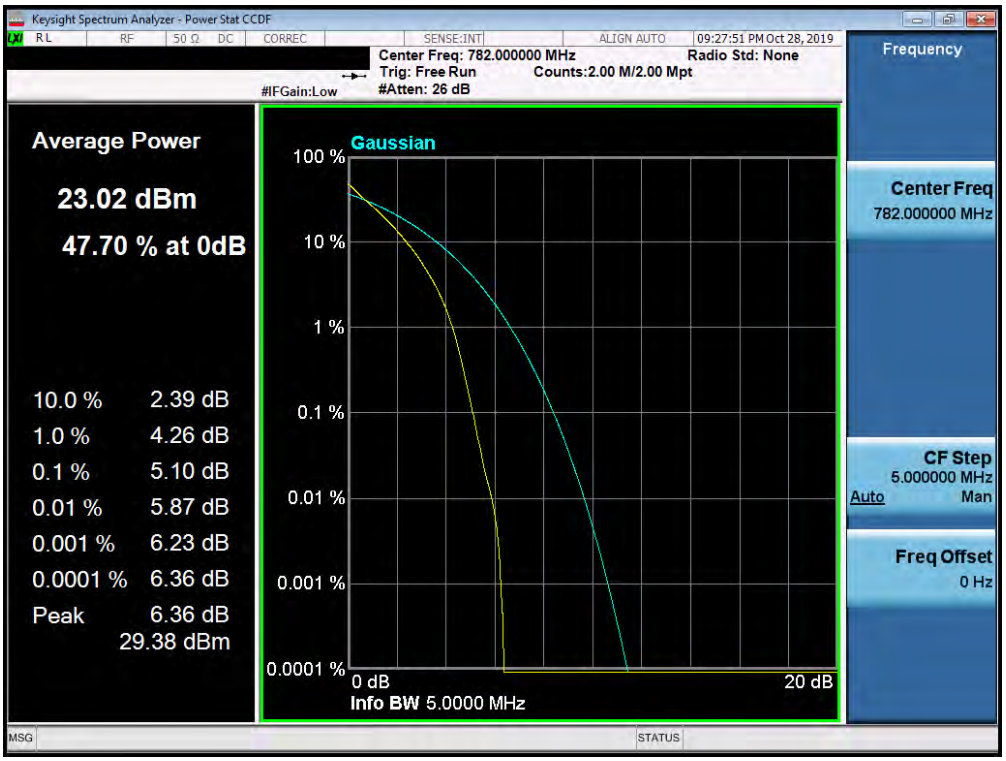
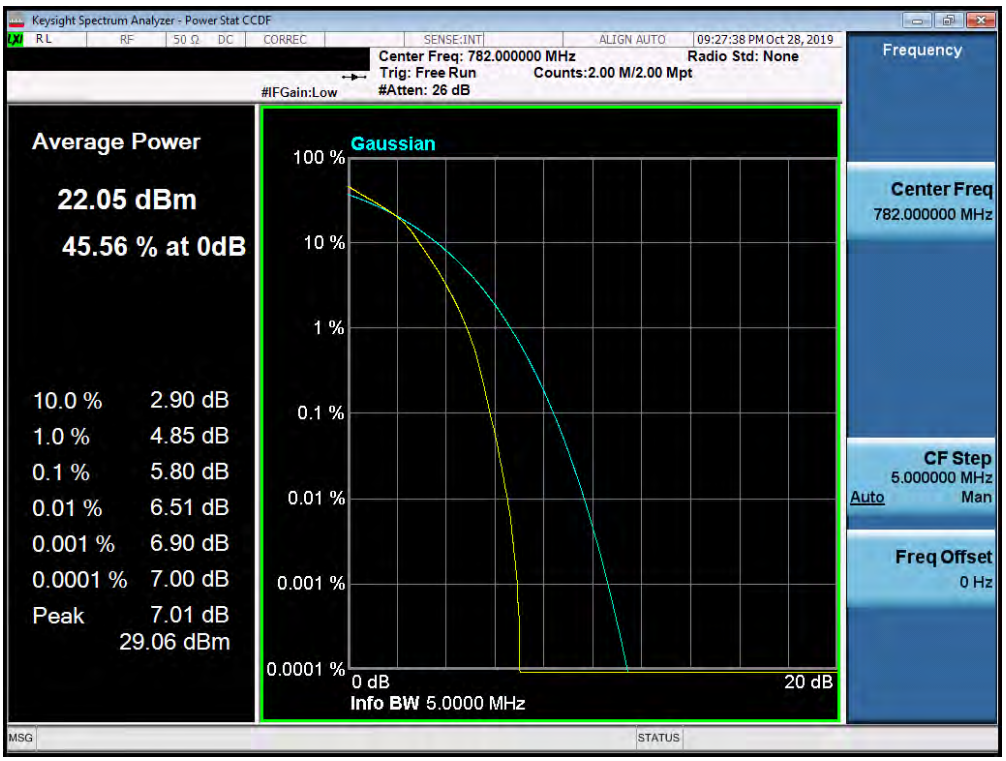
Band 13



Plot 7-164. PAR Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-165. PAR Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)

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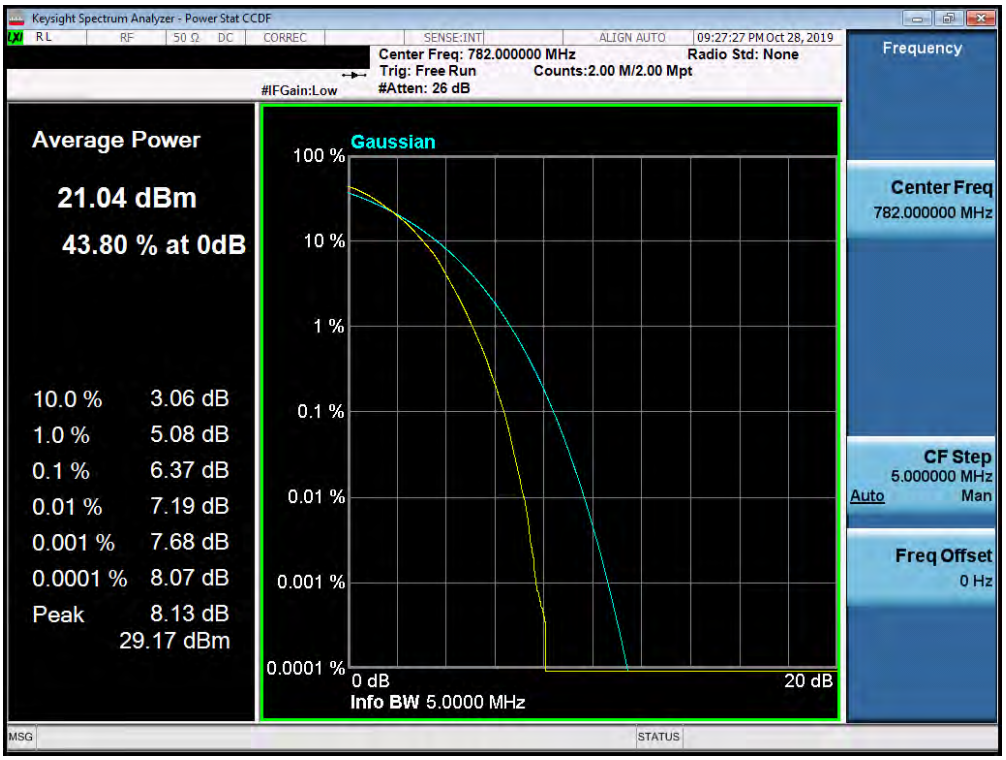
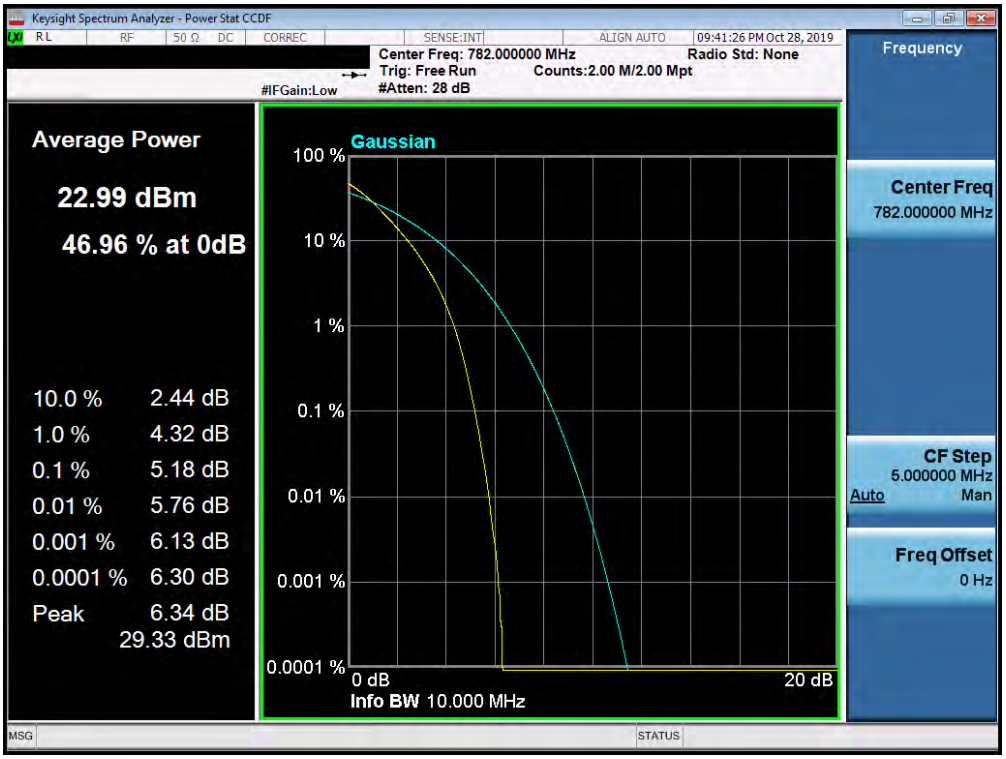


Plot 7-166. PAR Plot (Band 13 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-167. PAR Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

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