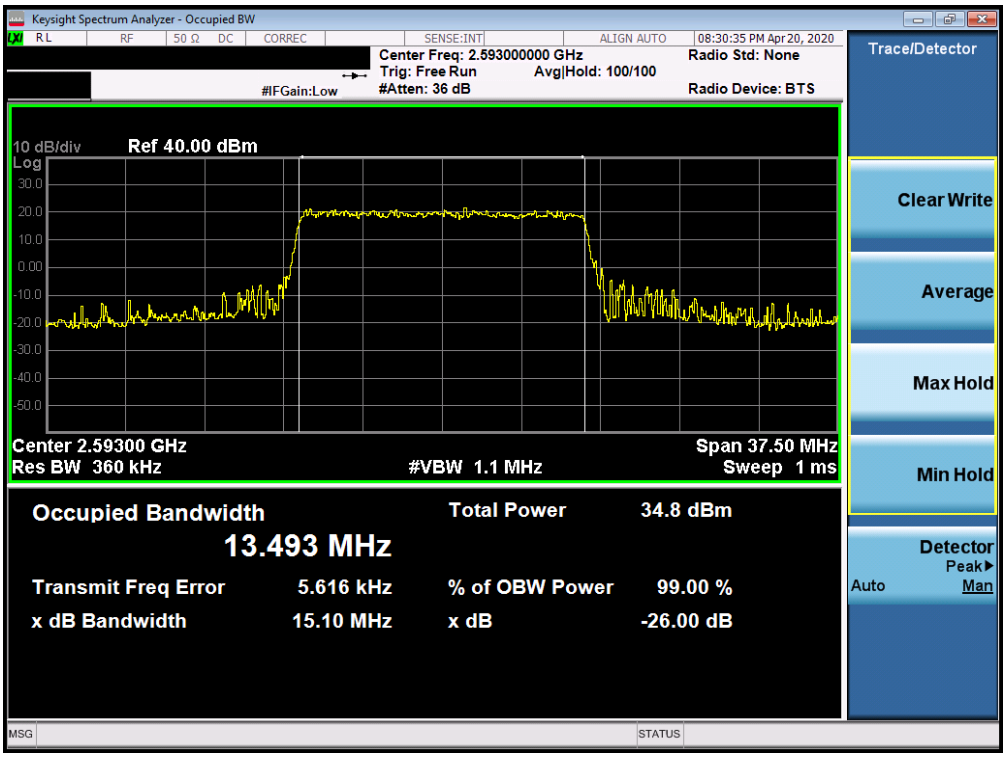
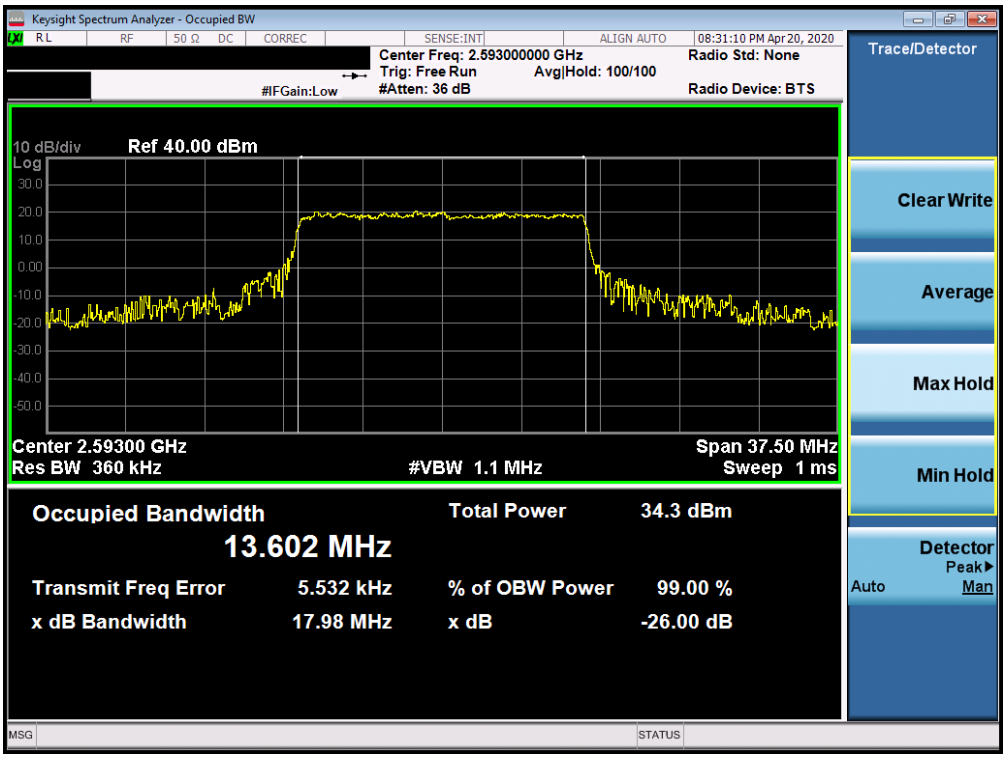
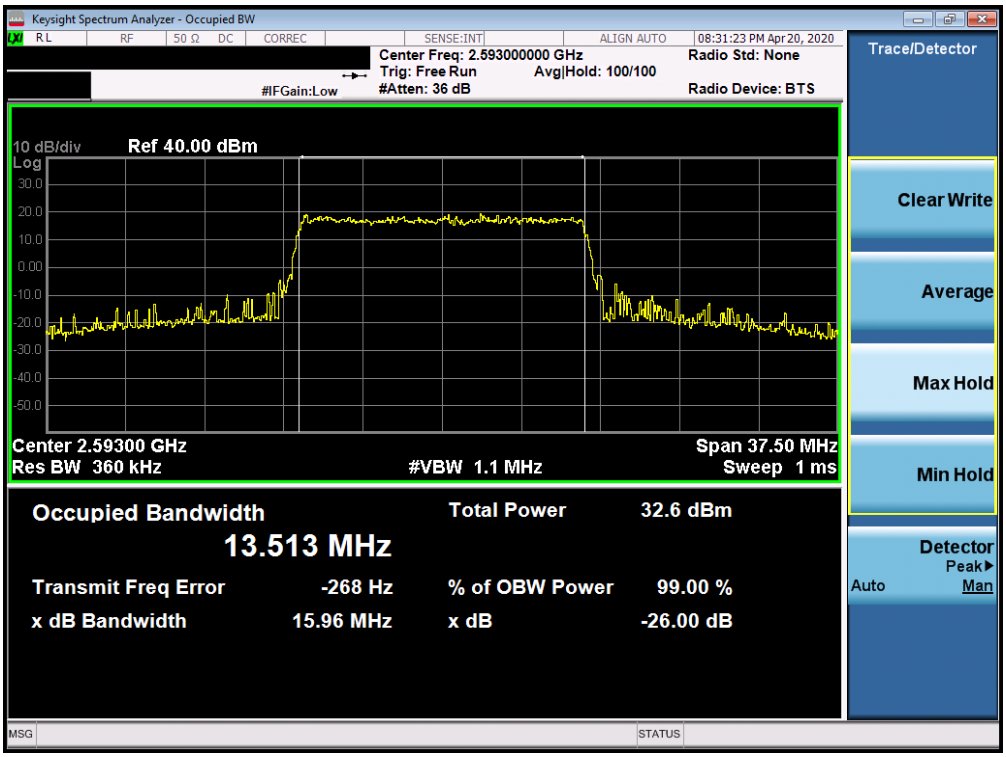


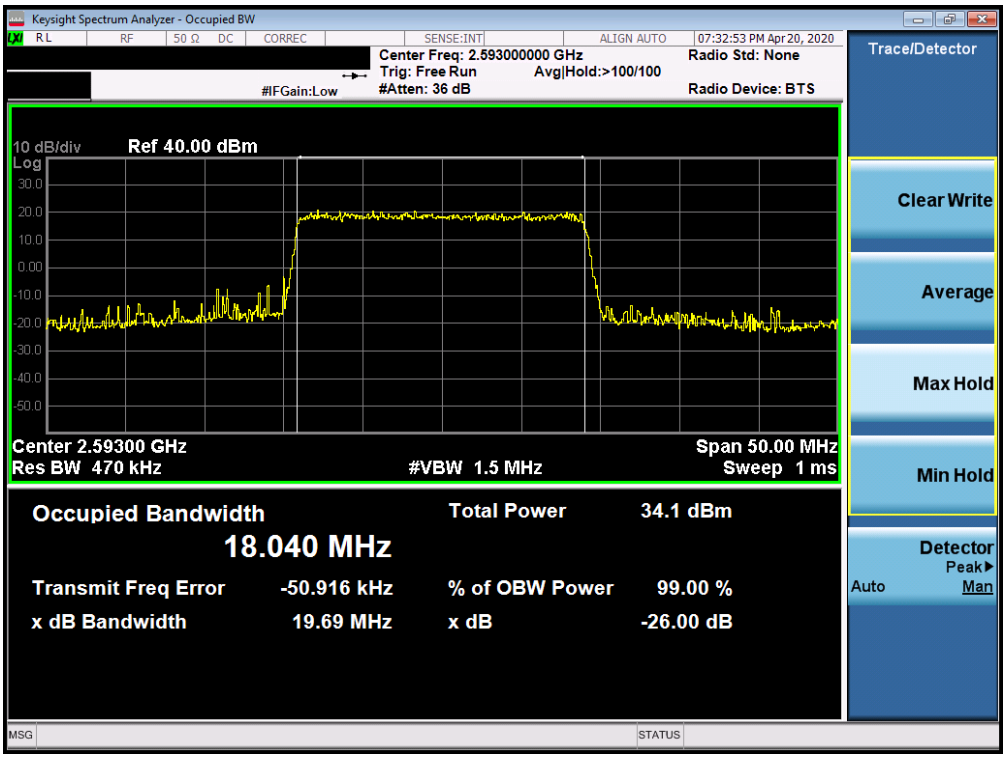
Plot 7-88. Occupied Bandwidth Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)



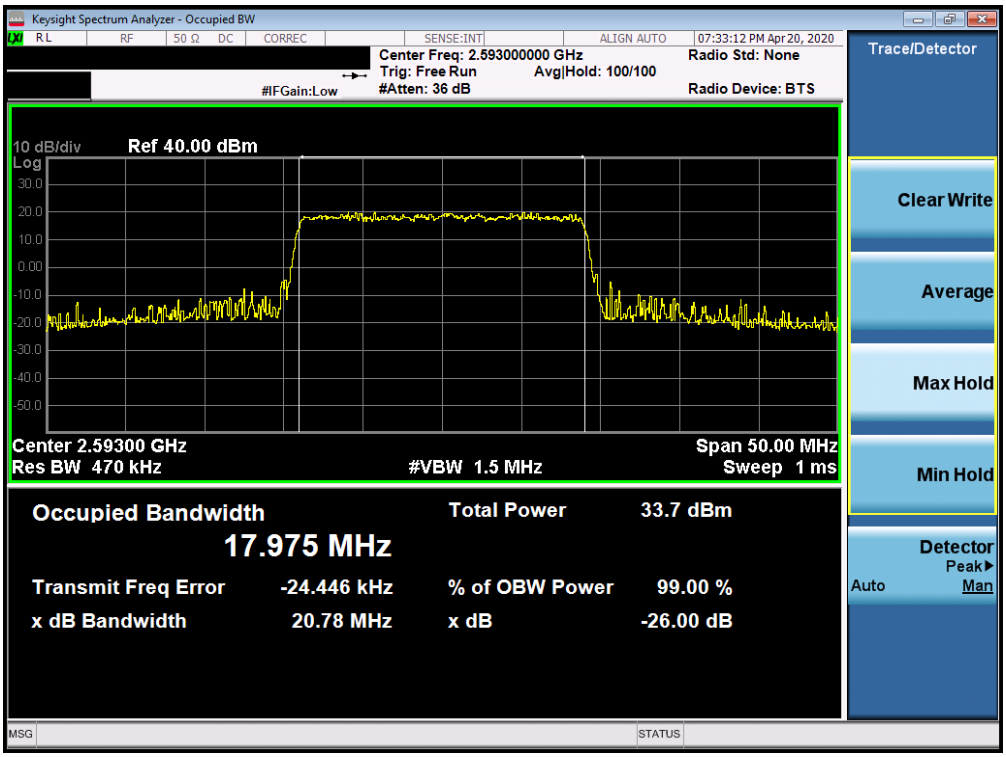
Plot 7-89. Occupied Bandwidth Plot (Band 41 - 15.0MHz 16-QAM - Full RB Configuration)



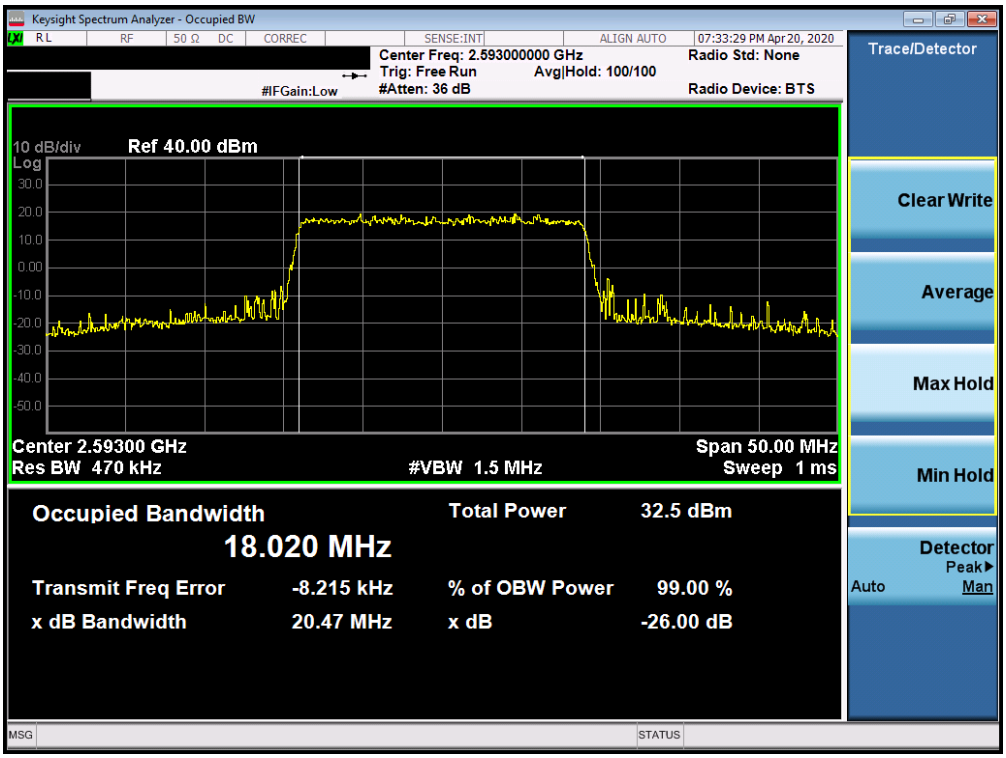
Plot 7-90. Occupied Bandwidth Plot (Band 41 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-91. Occupied Bandwidth Plot (Band 41 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-92. Occupied Bandwidth Plot (Band 41 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-93. Occupied Bandwidth Plot (Band 41 - 20.0MHz 64-QAM - Full RB Configuration)

7.3 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 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.

For Band 41, the minimum permissible attenuation level of any spurious emission is 55 + 10 $log_{10}(P_{[Watts]})$.

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 at least 10 * the fundamental 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.

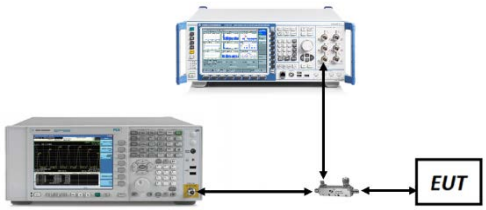
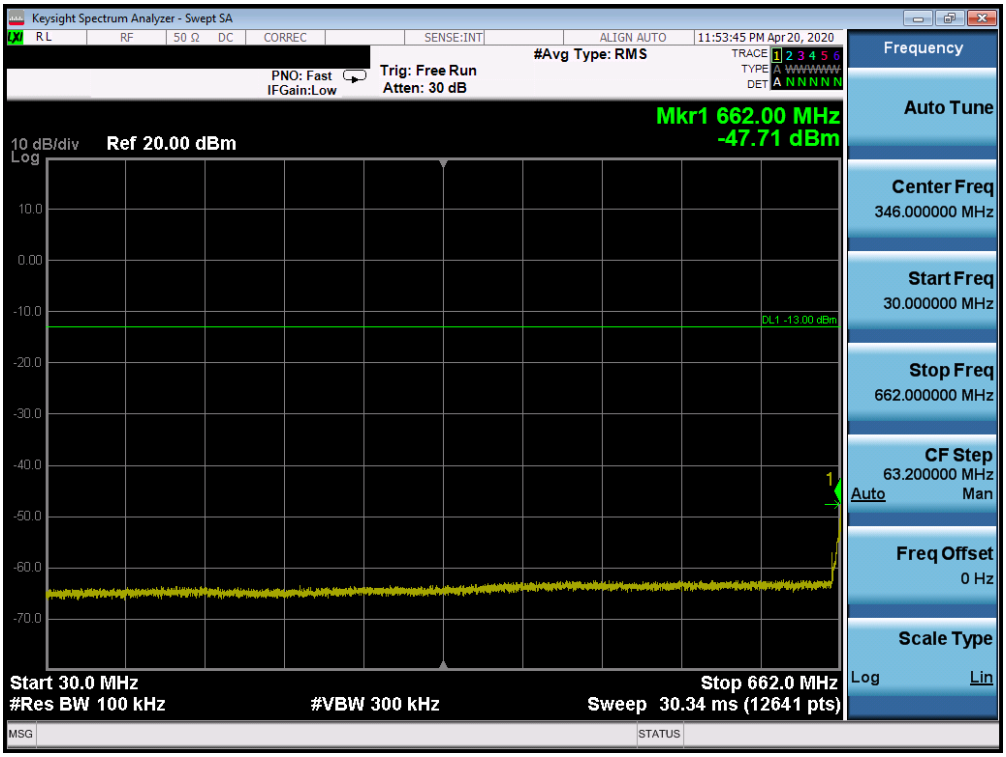


Figure 7-2. Test Instrument & Measurement Setup

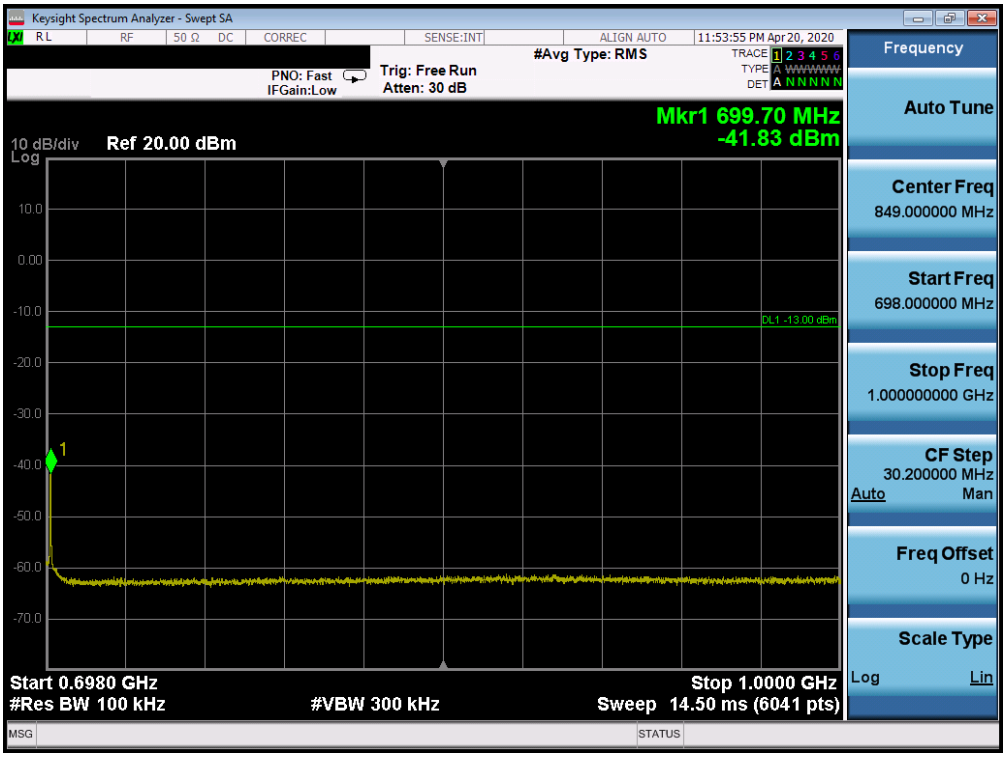
Test Notes

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, 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. 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.

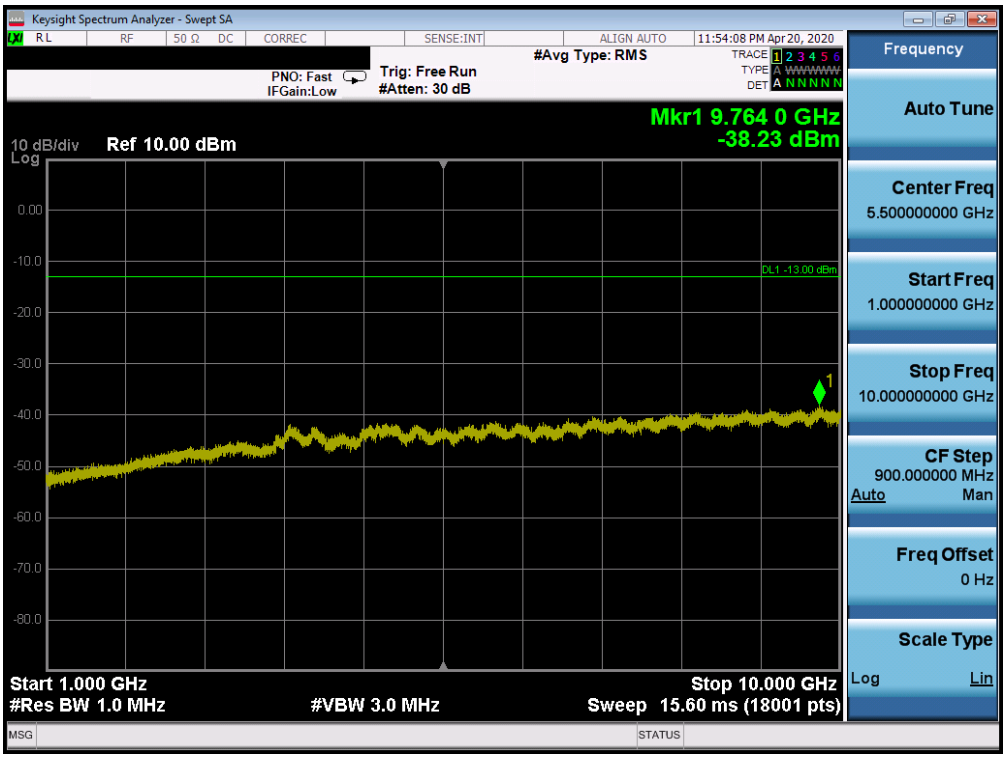
Band 71



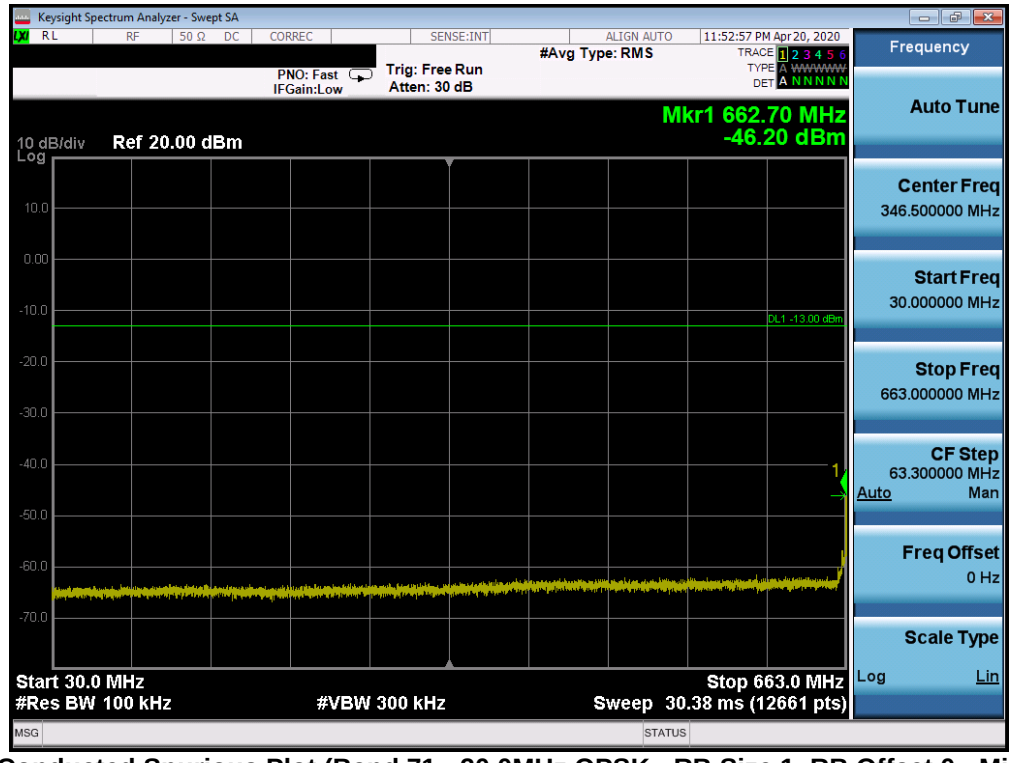
Plot 7-94. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



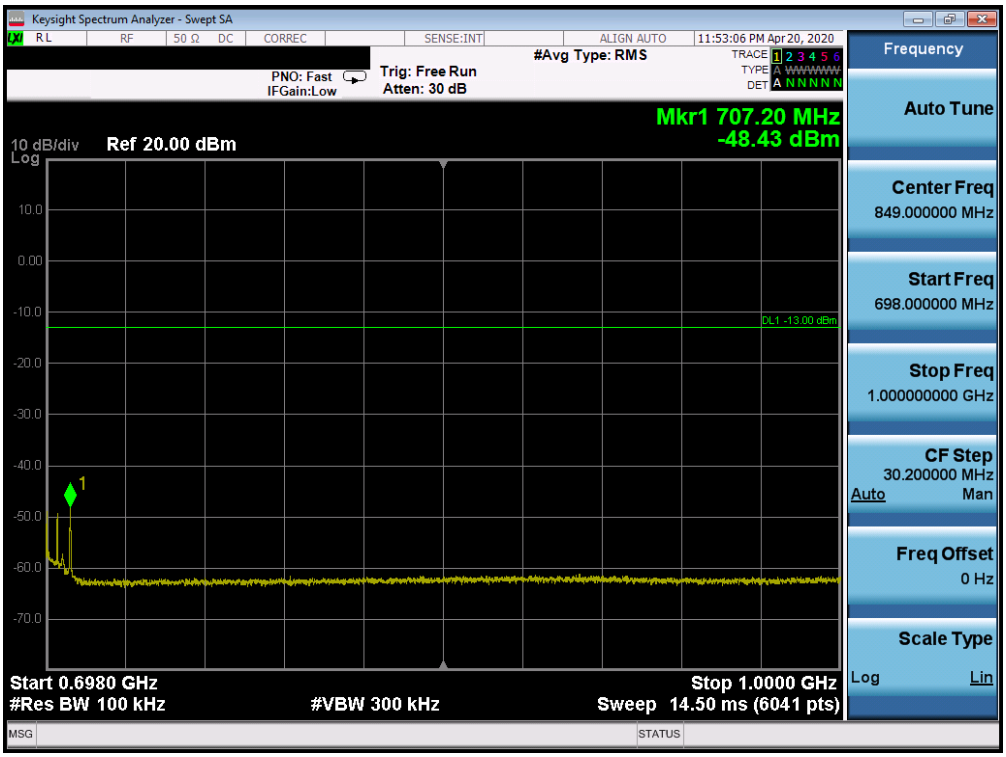
Plot 7-95. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



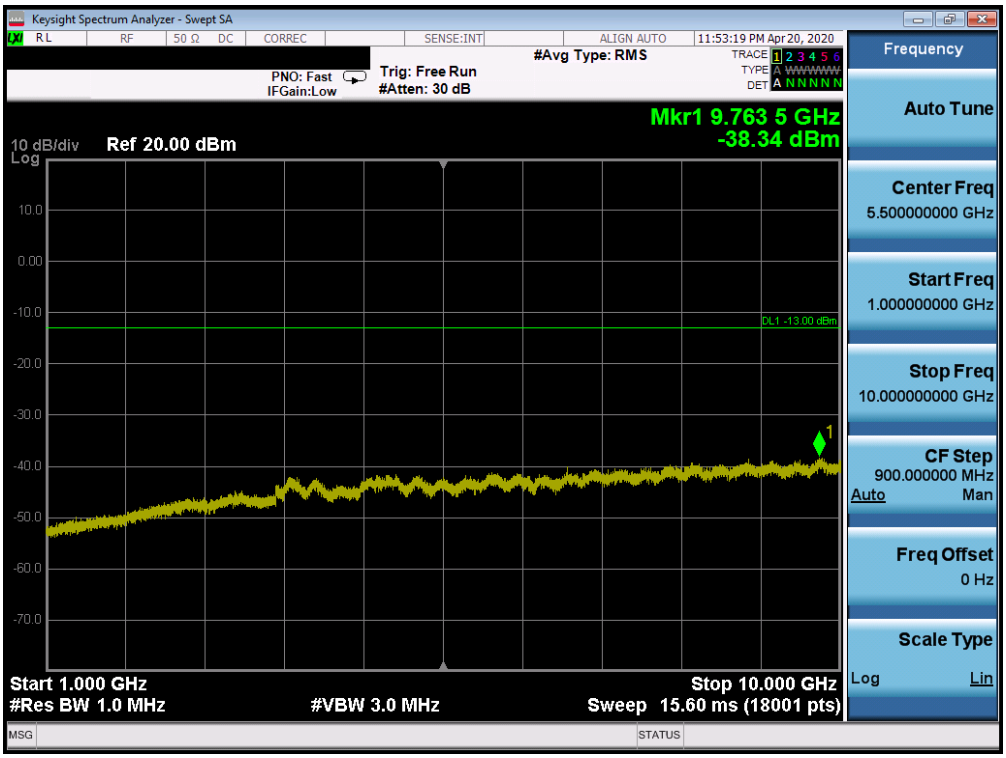
Plot 7-96. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



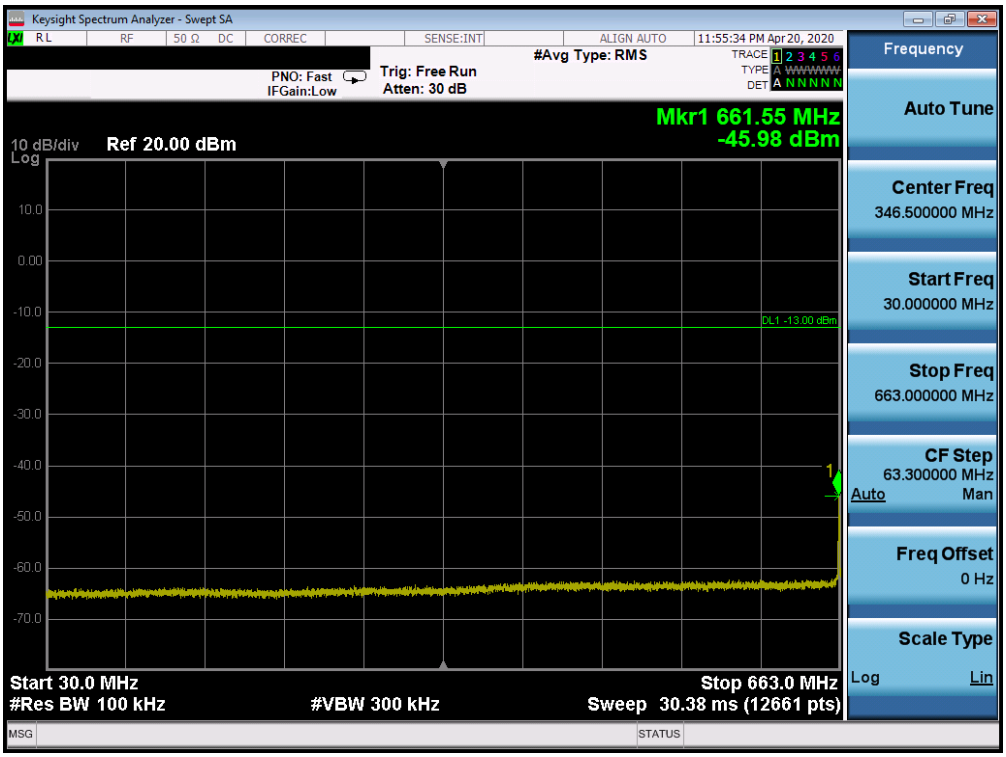
Plot 7-97. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



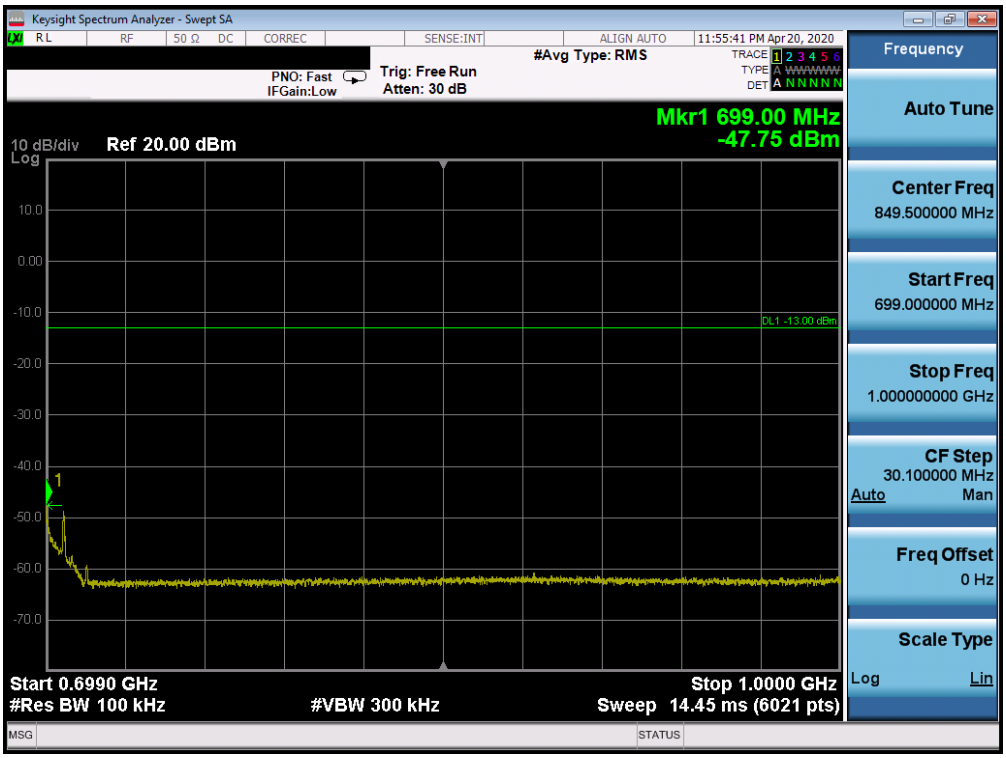
Plot 7-98. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



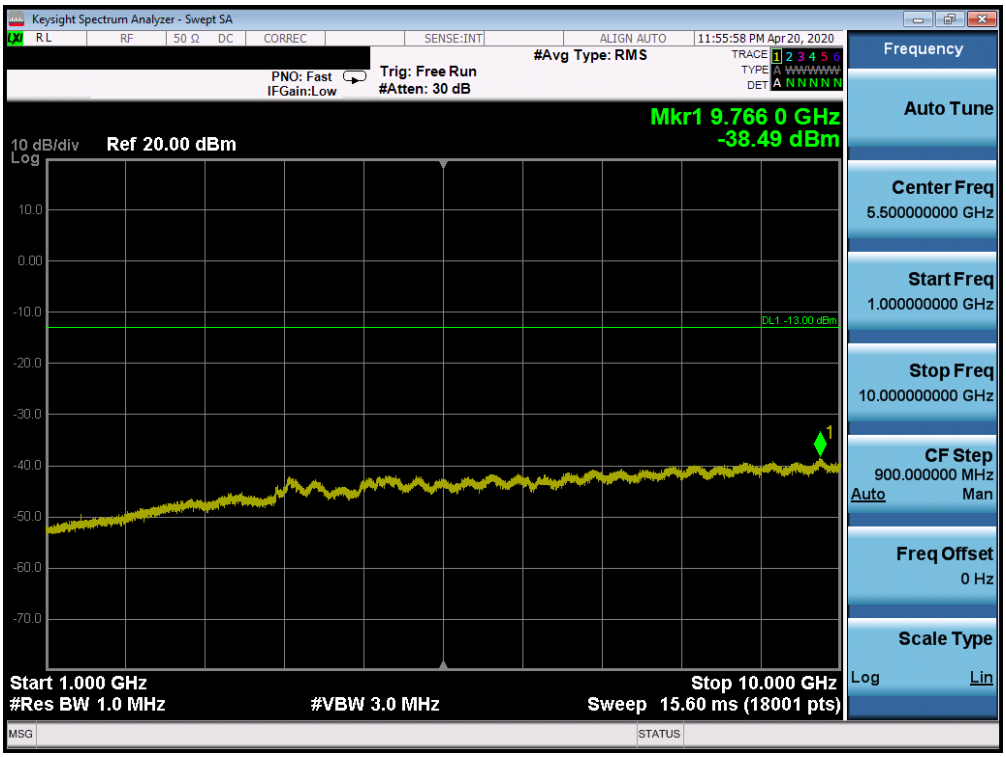
Plot 7-99. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-100. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

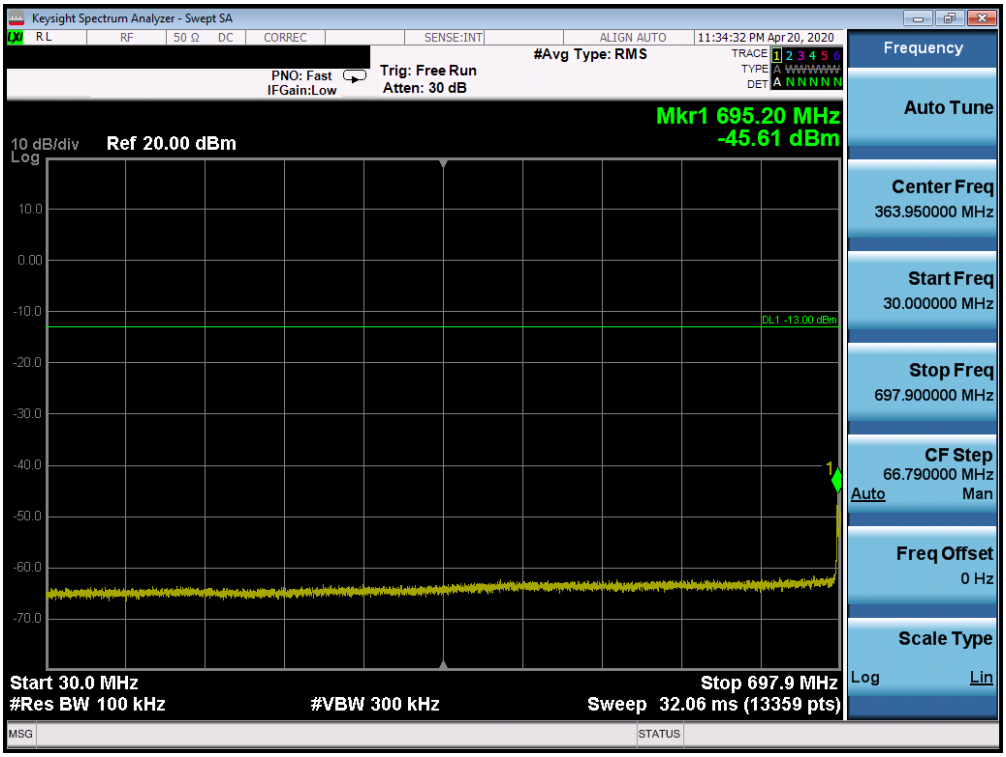


Plot 7-101. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

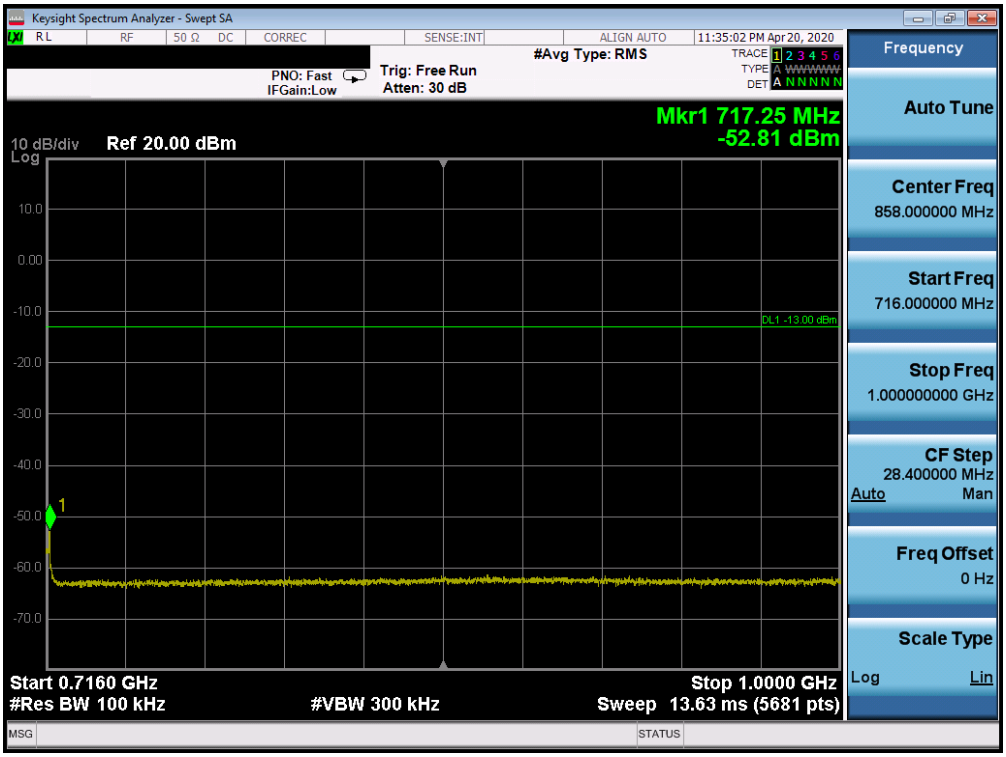


Plot 7-102. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

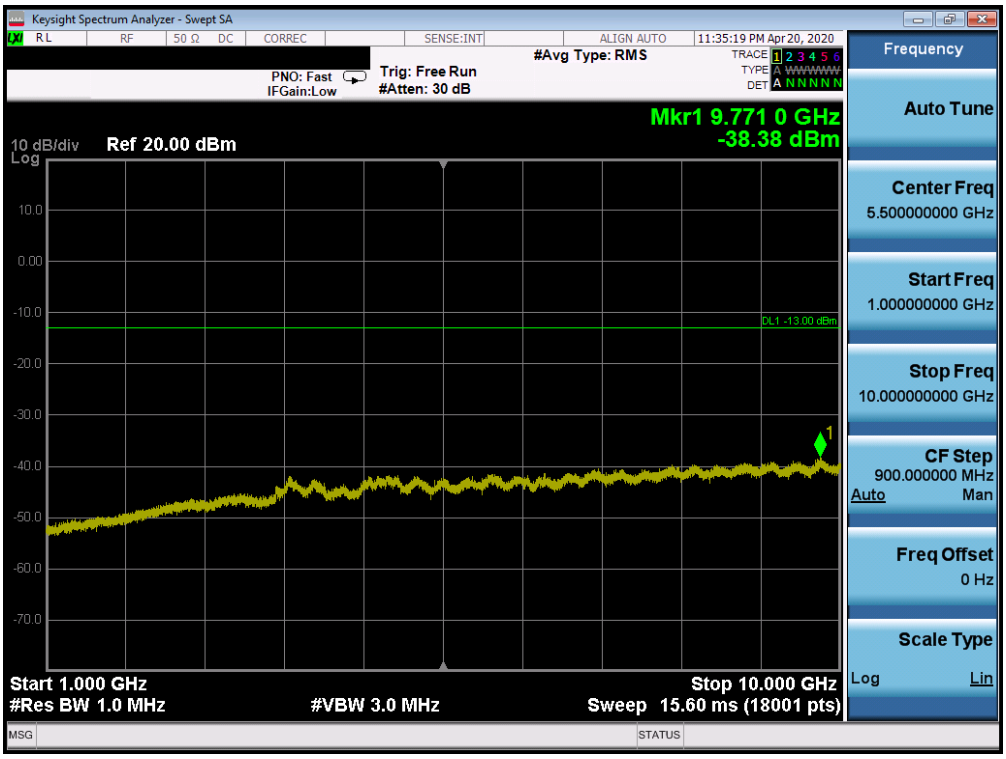
Band 12



Plot 7-103. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

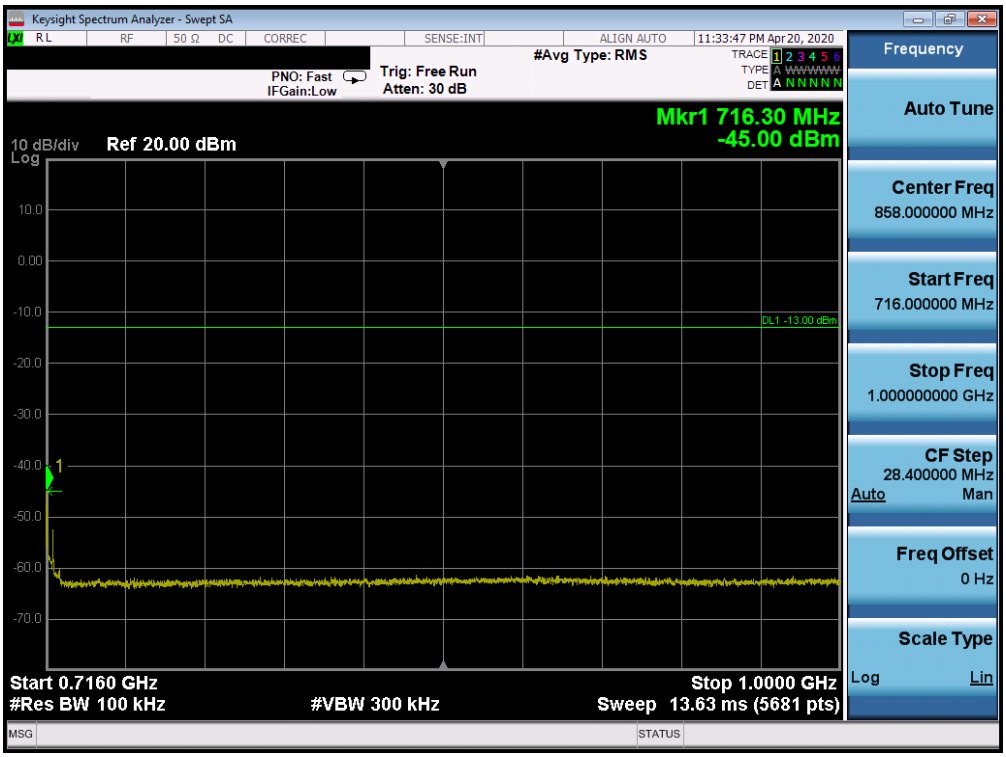


Plot 7-104. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

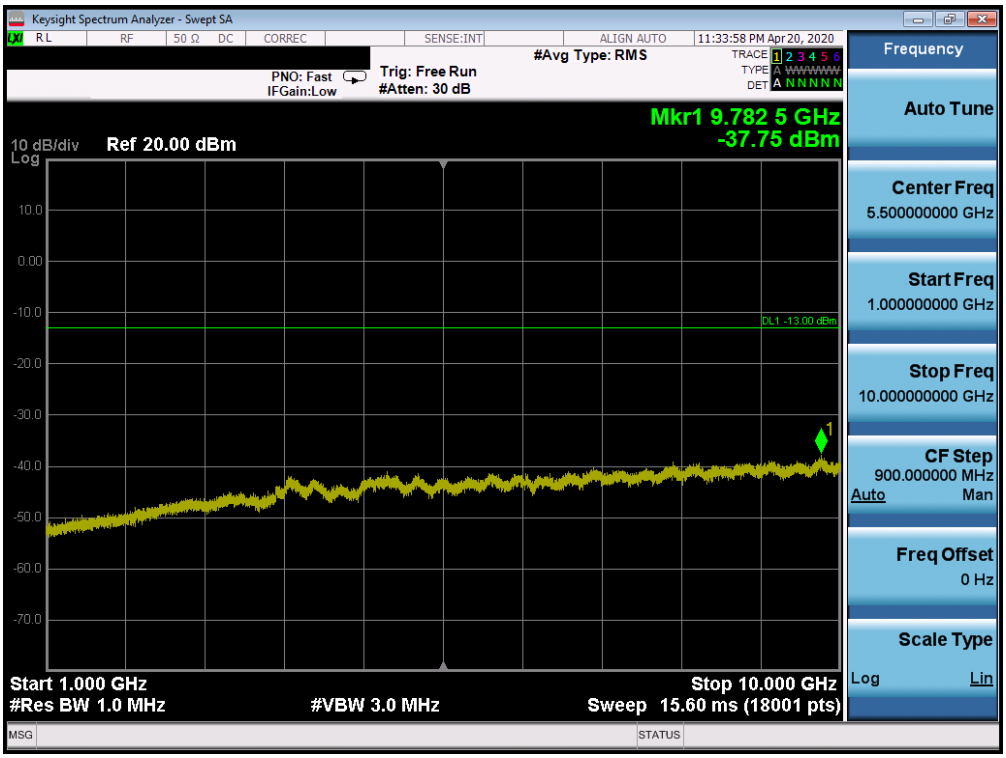


Plot 7-105. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

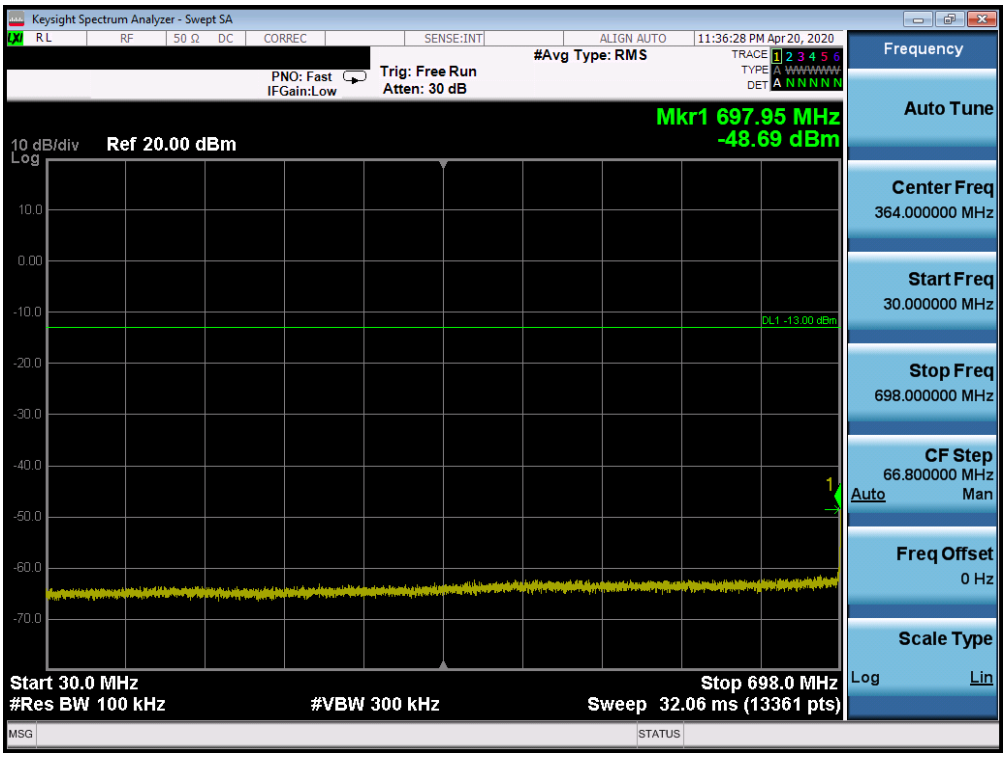
Plot 7-106. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



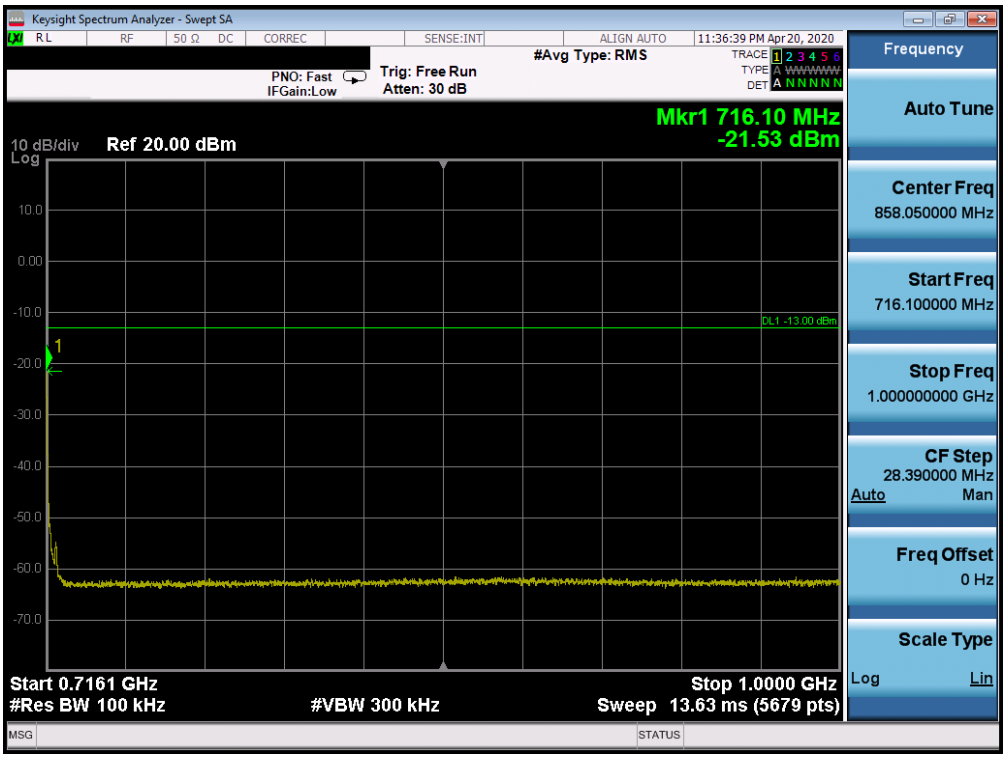
Plot 7-107. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



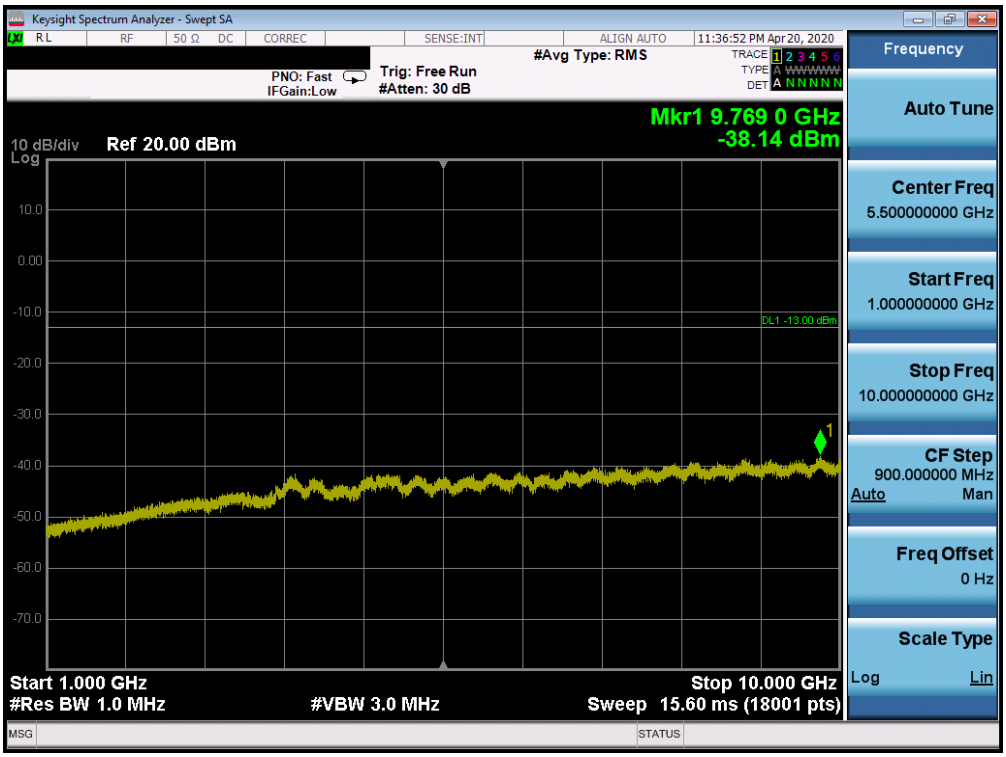
Plot 7-108. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-109. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

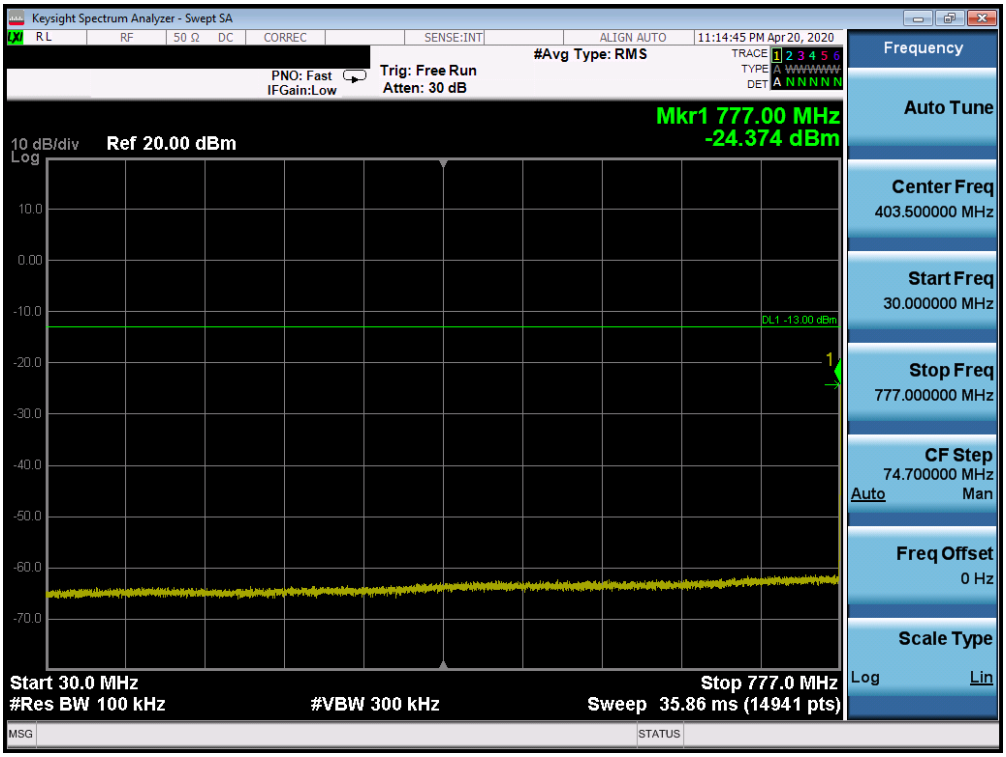


Plot 7-110. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

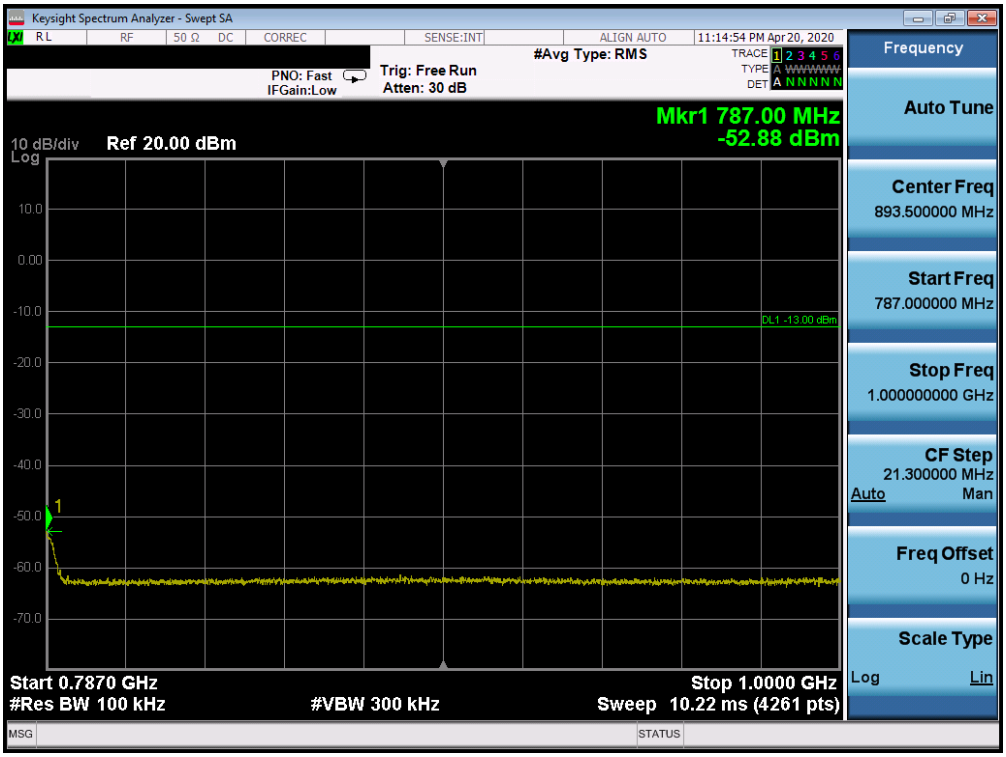


Plot 7-111. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

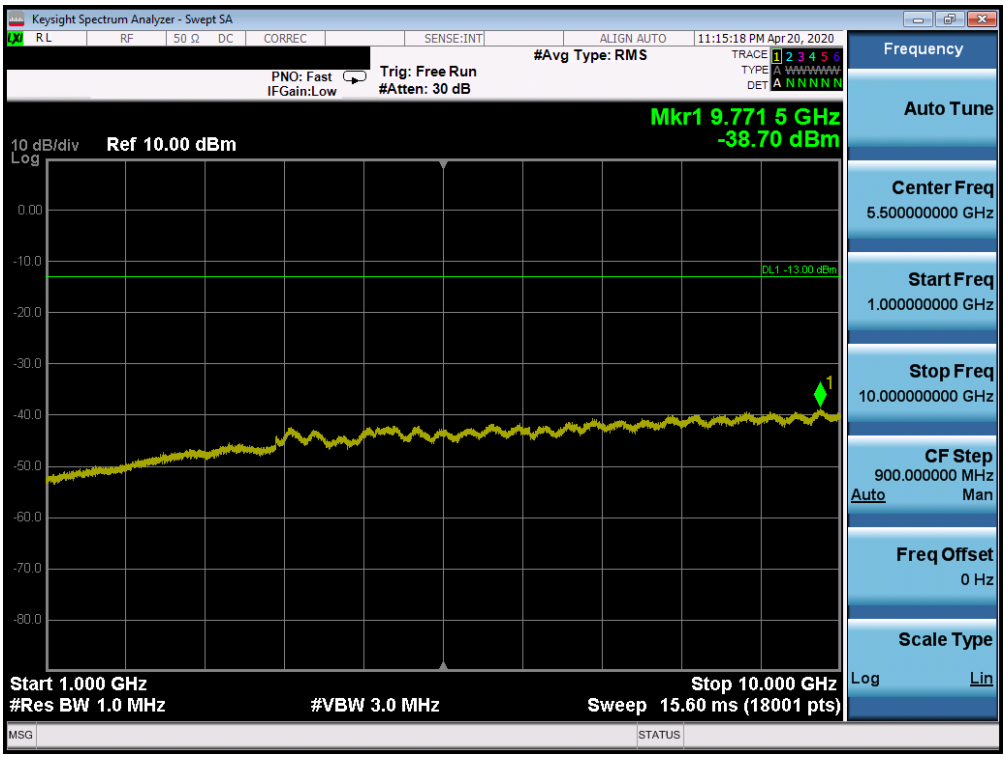
Band 13



Plot 7-112. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0)

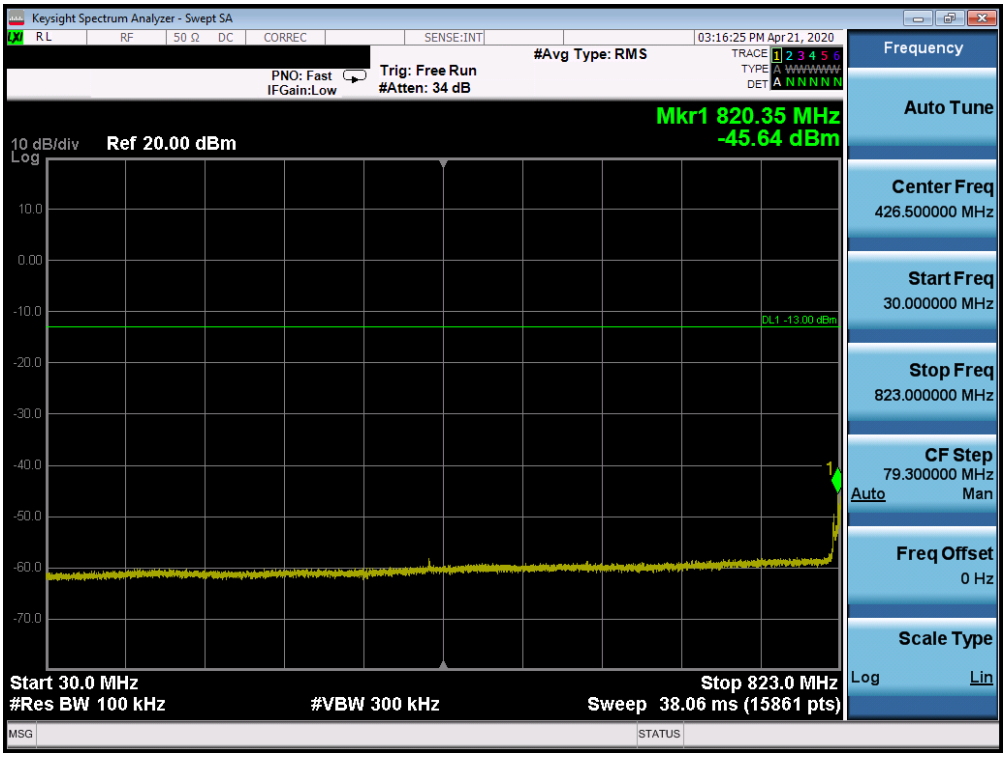


Plot 7-113. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0)

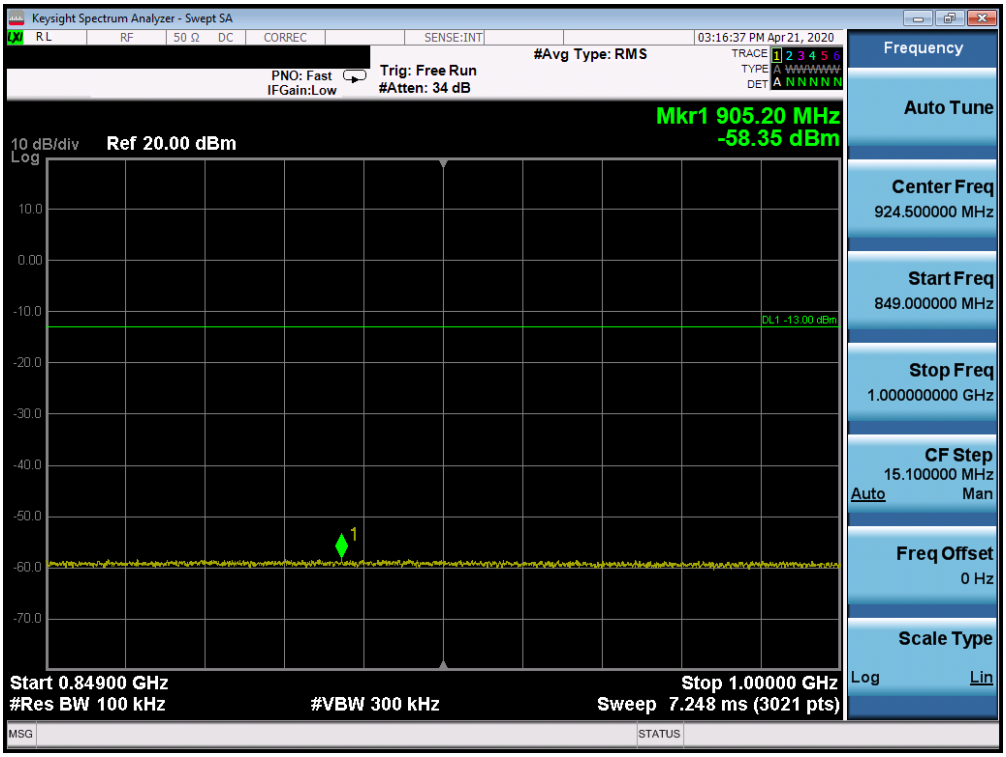


Plot 7-114. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0)

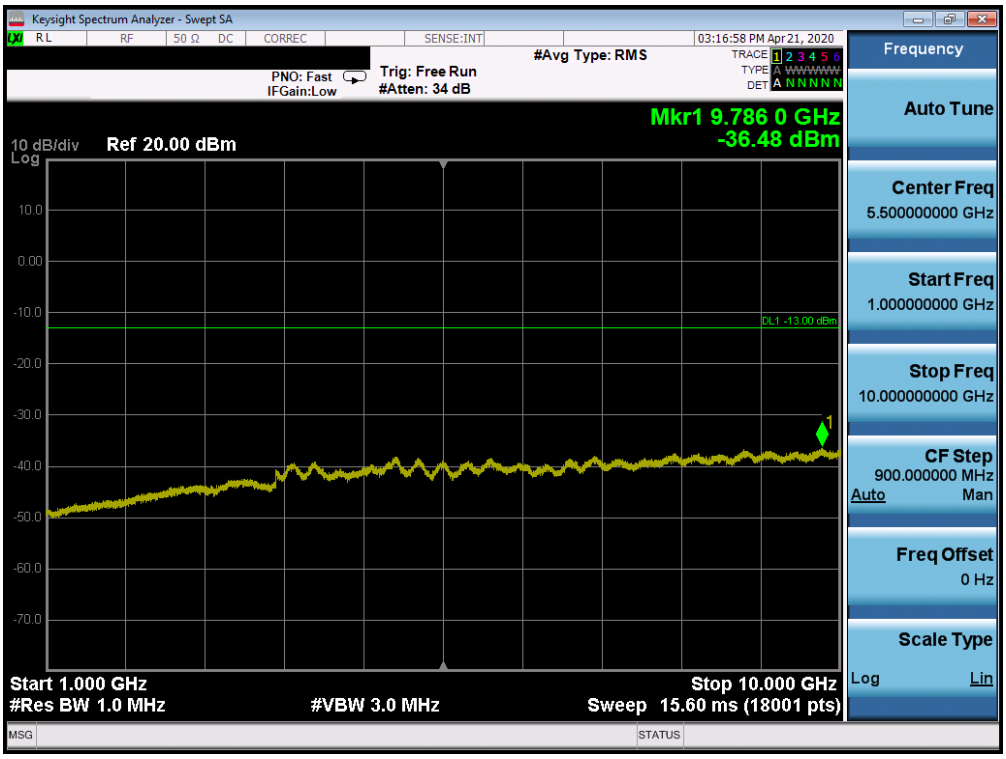
Band 26/5



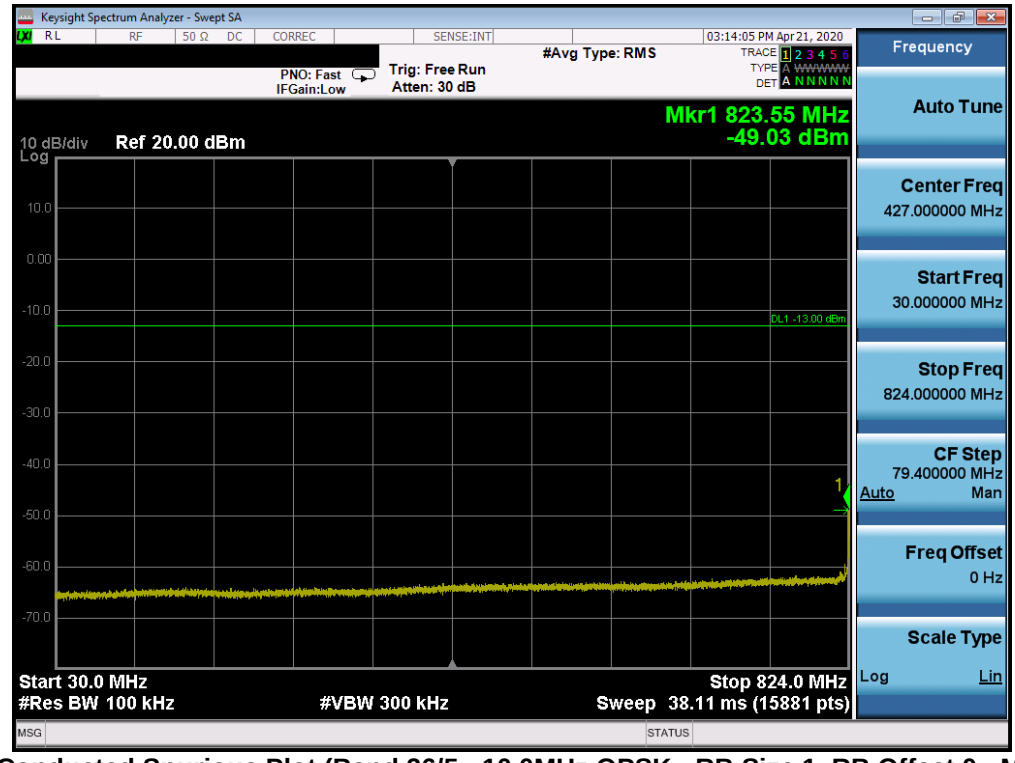
Plot 7-115. Conducted Spurious Plot (Band 26/5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



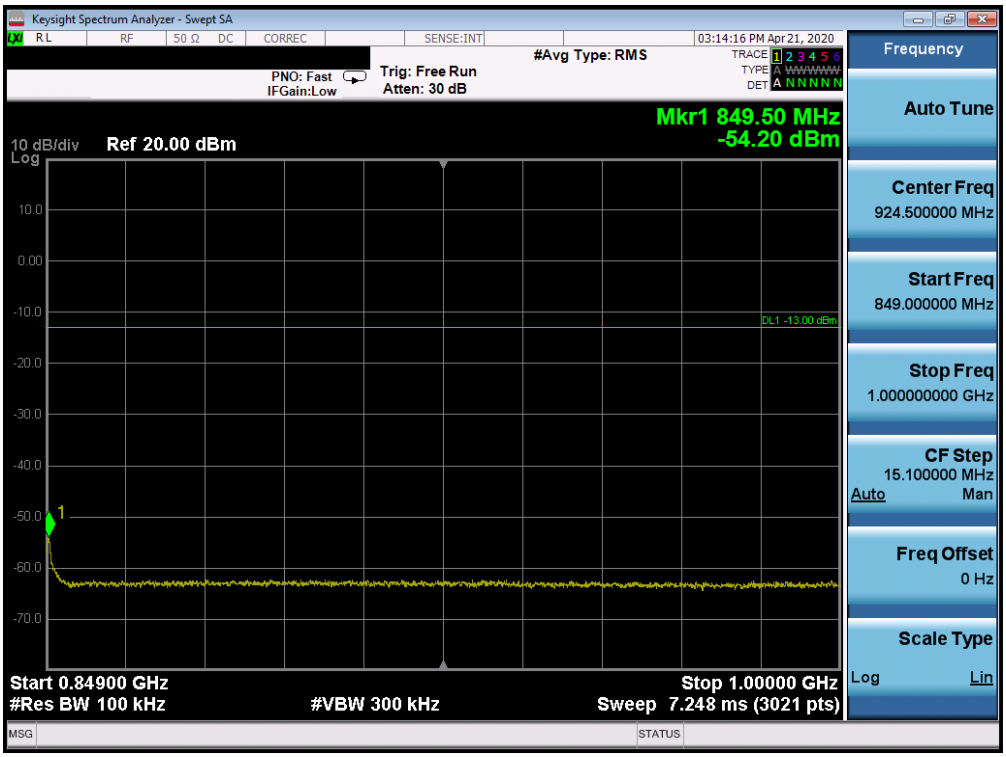
Plot 7-116. Conducted Spurious Plot (Band 26/5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



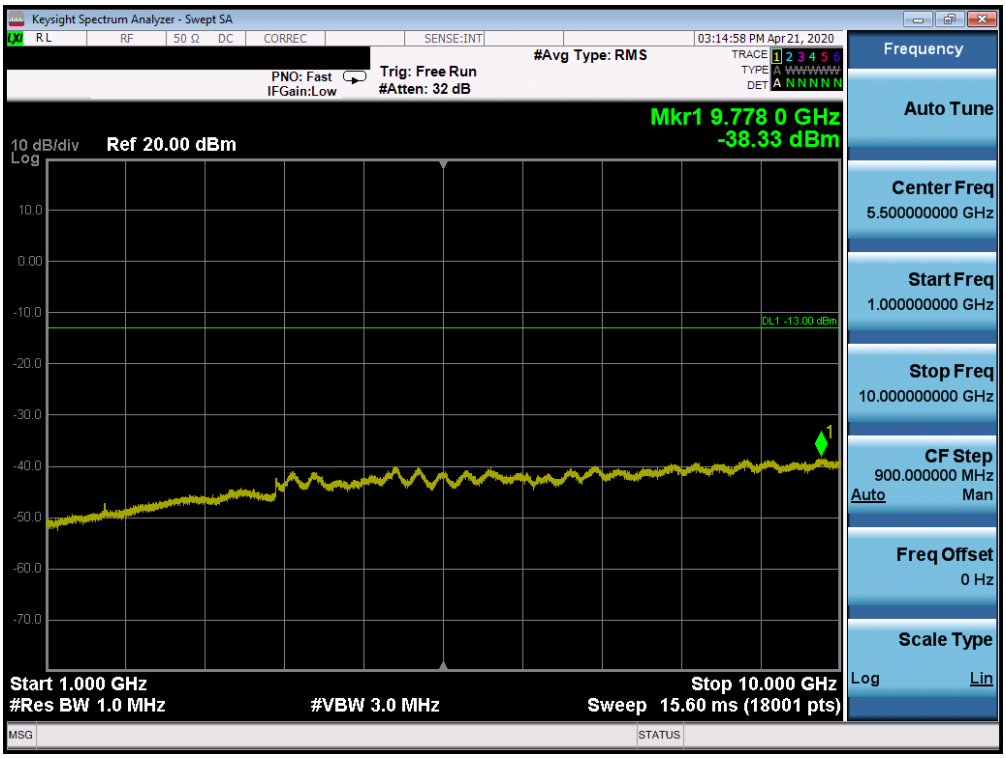
Plot 7-117. Conducted Spurious Plot (Band 26/5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



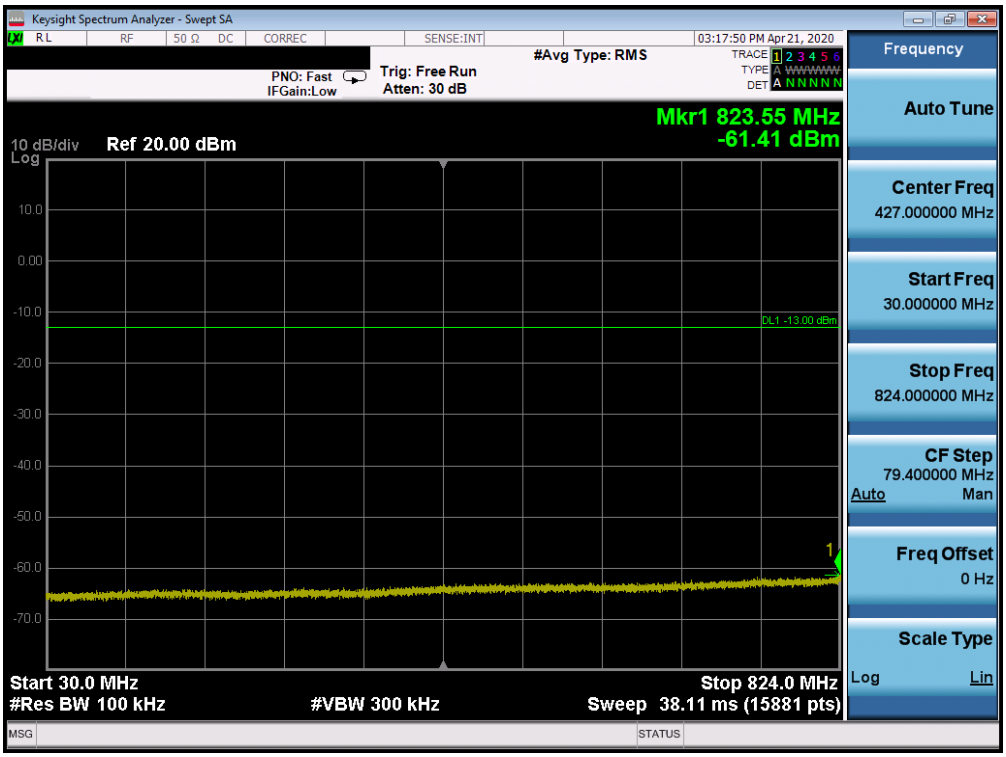
Plot 7-118. Conducted Spurious Plot (Band 26/5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



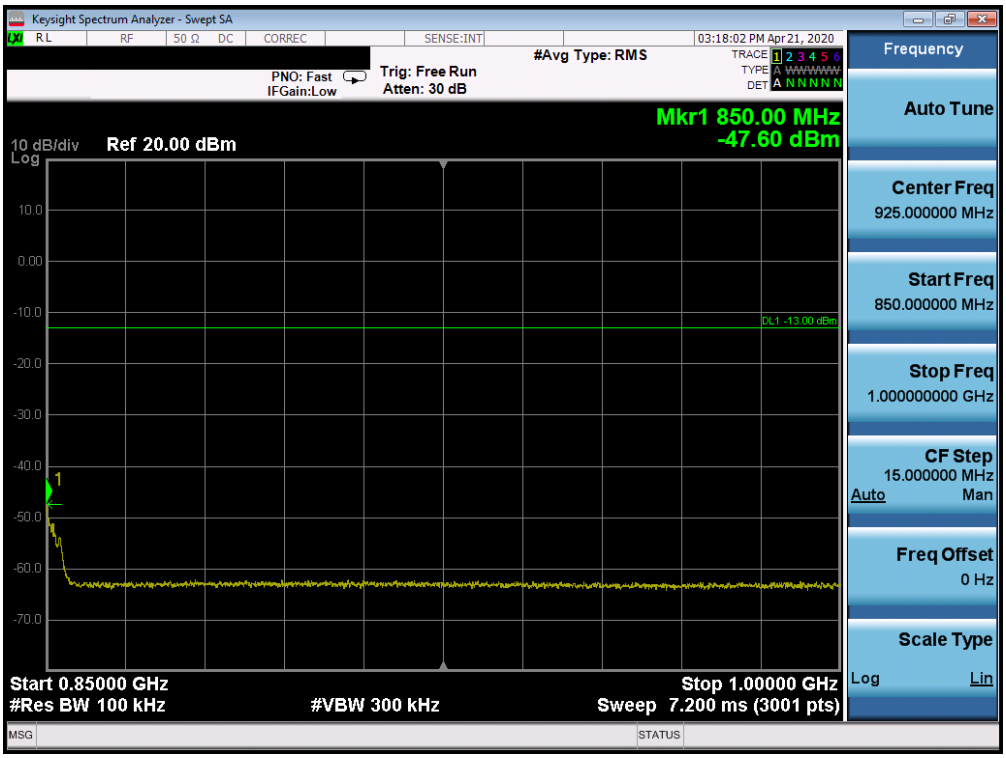
Plot 7-119. Conducted Spurious Plot (Band 26/5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-120. Conducted Spurious Plot (Band 26/5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



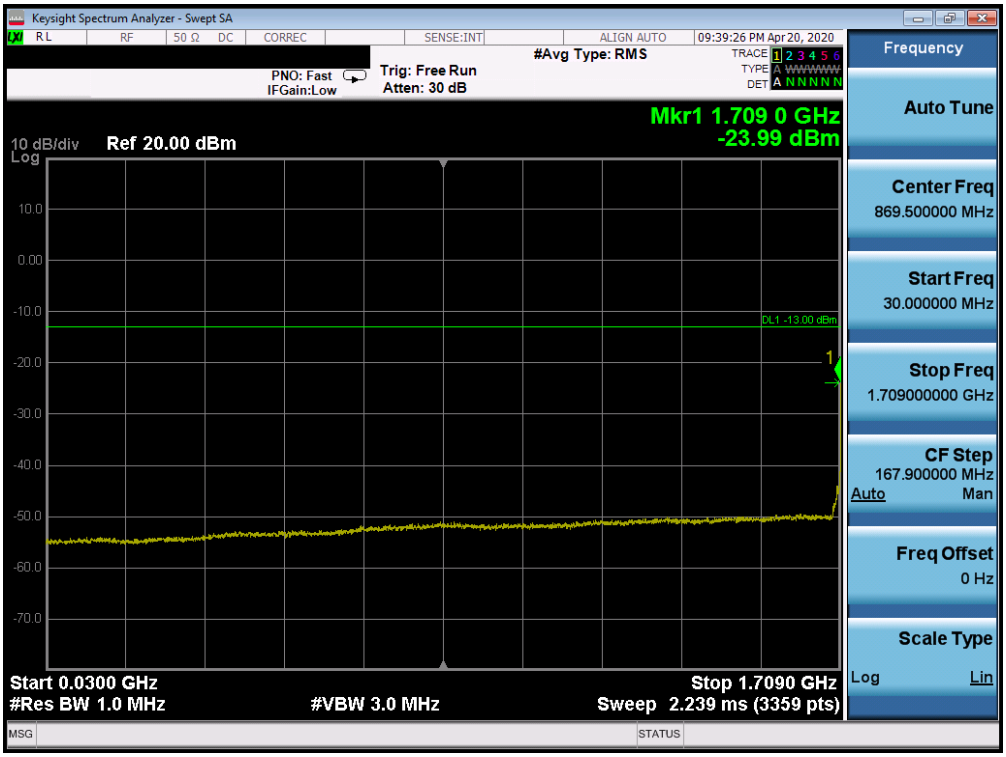
Plot 7-121. Conducted Spurious Plot (Band 26/5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



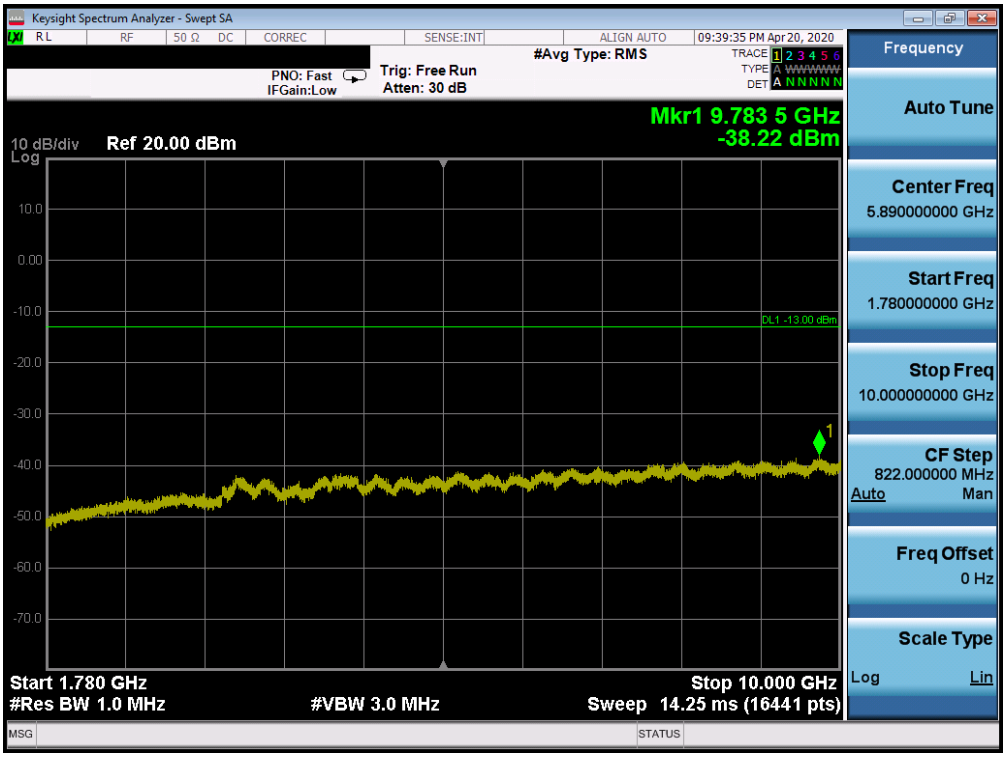
Plot 7-122. Conducted Spurious Plot (Band 26/5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

Plot 7-123. Conducted Spurious Plot (Band 26/5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

Band 66/4

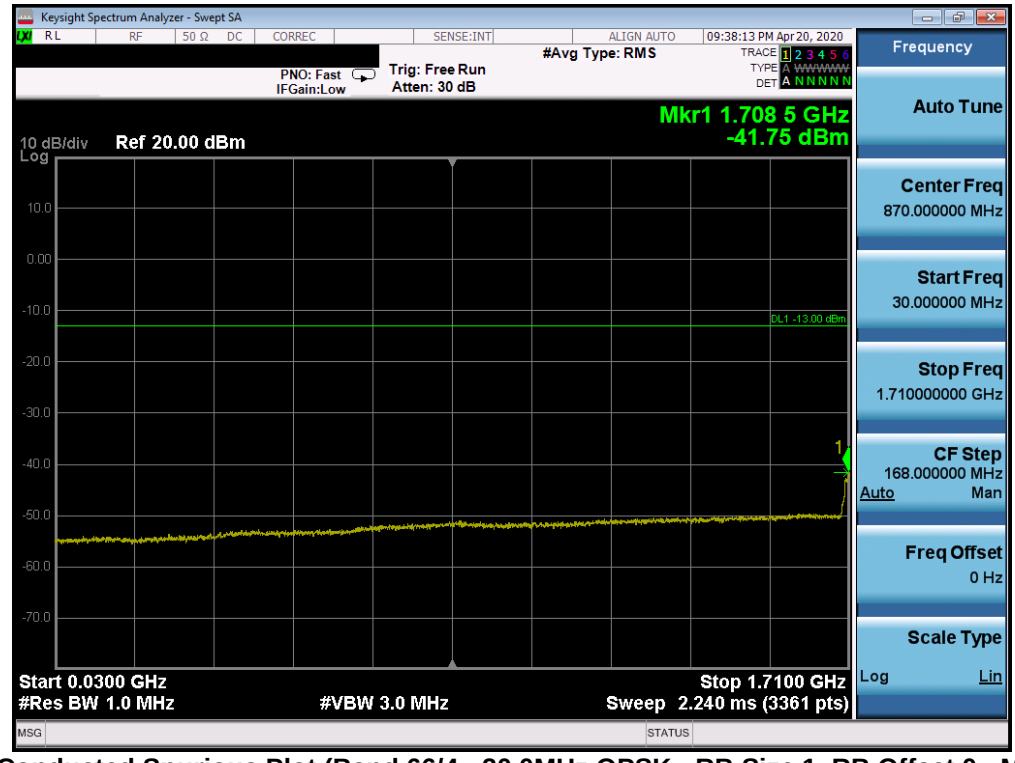


Plot 7-124. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

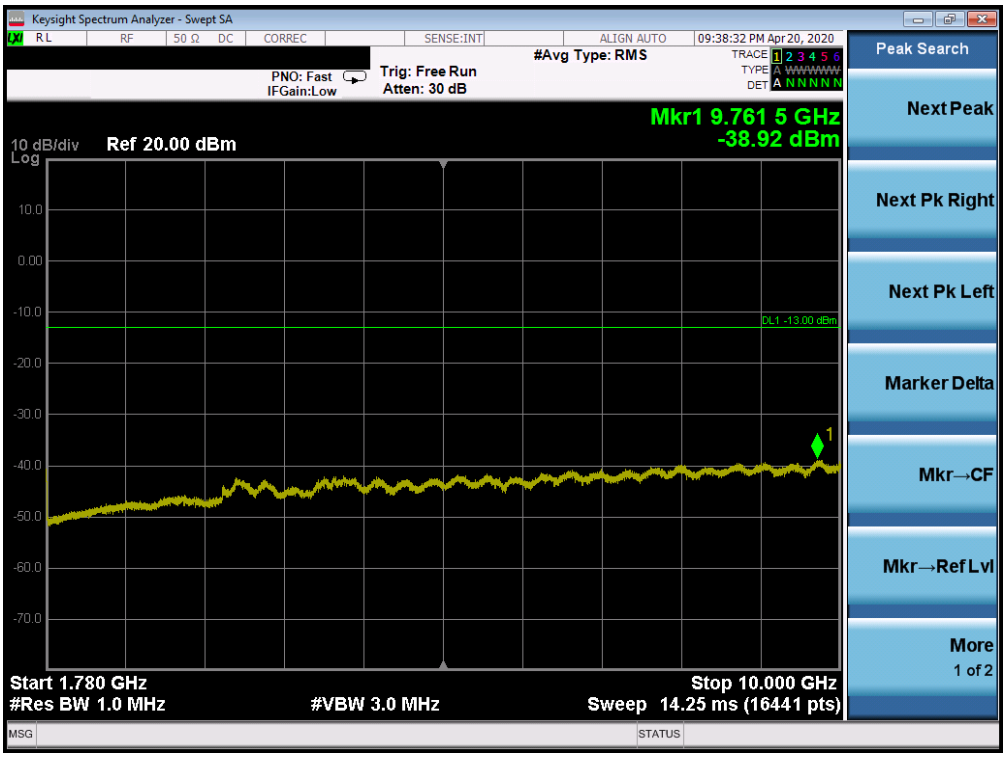


Plot 7-125. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

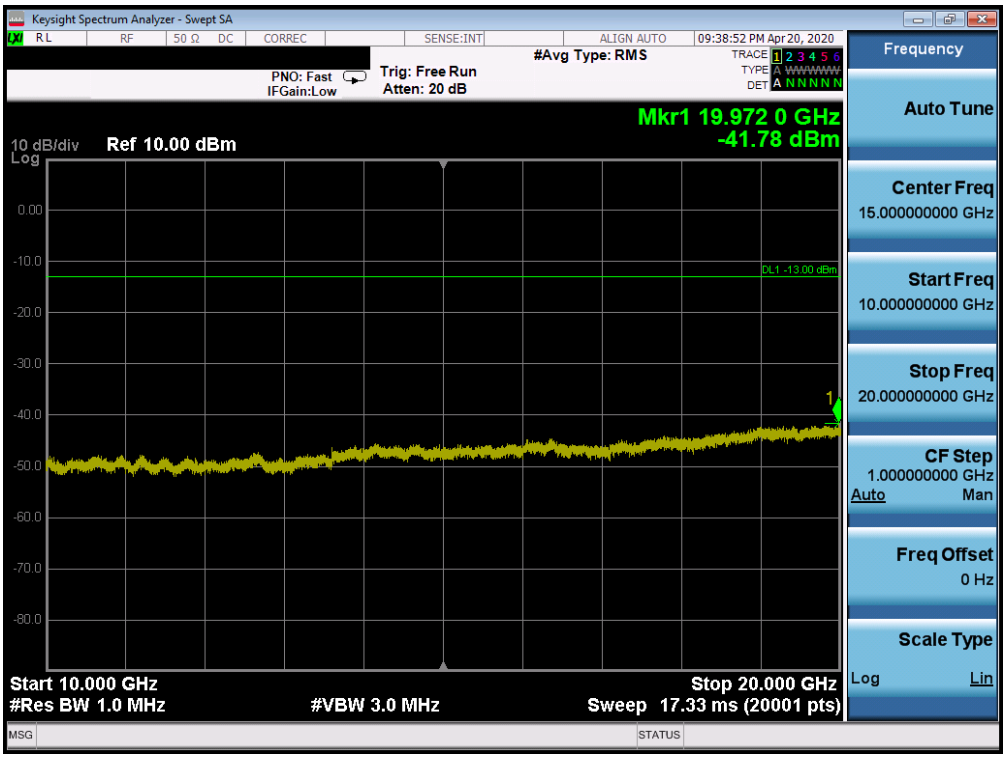
Plot 7-126. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



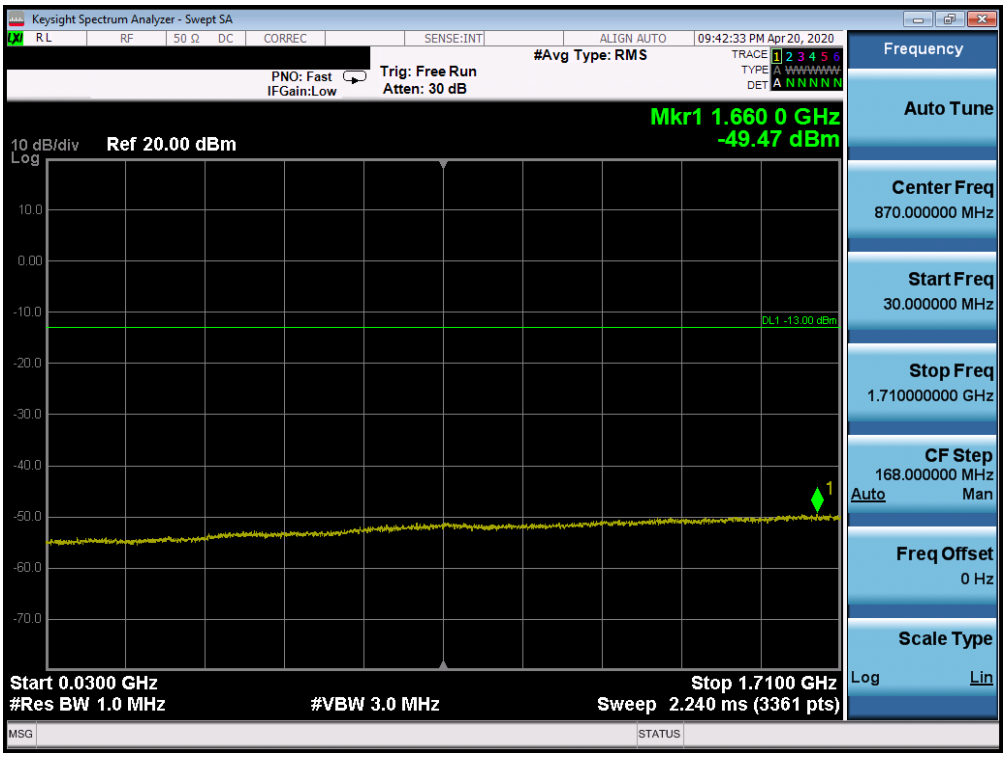
Plot 7-127. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



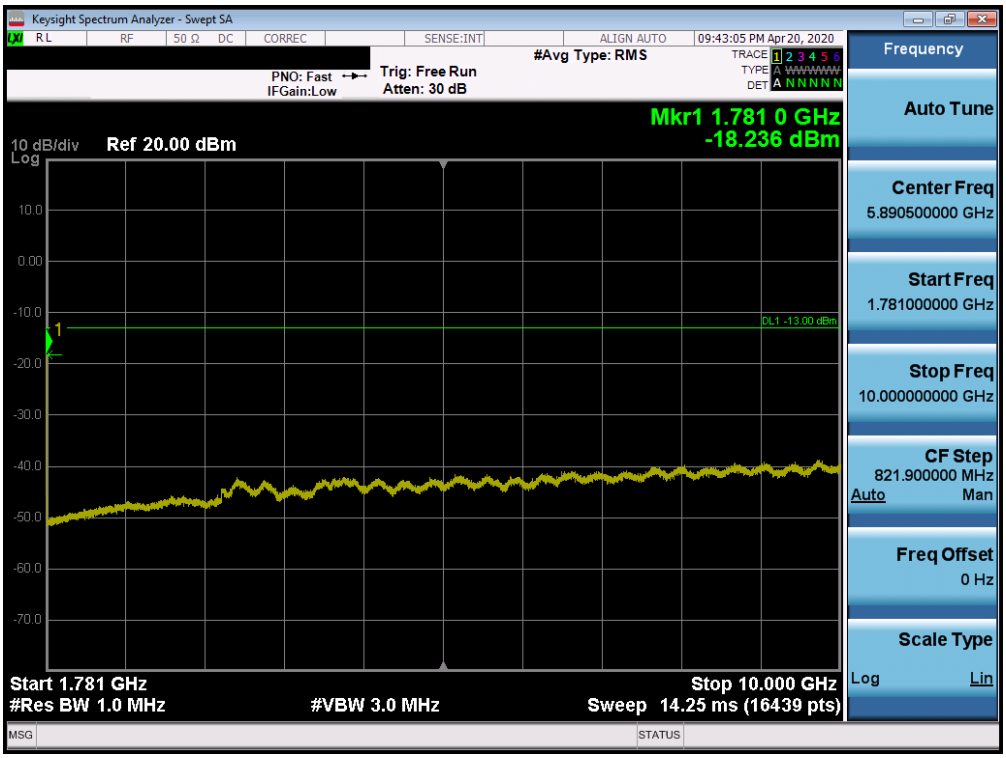
Plot 7-128. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



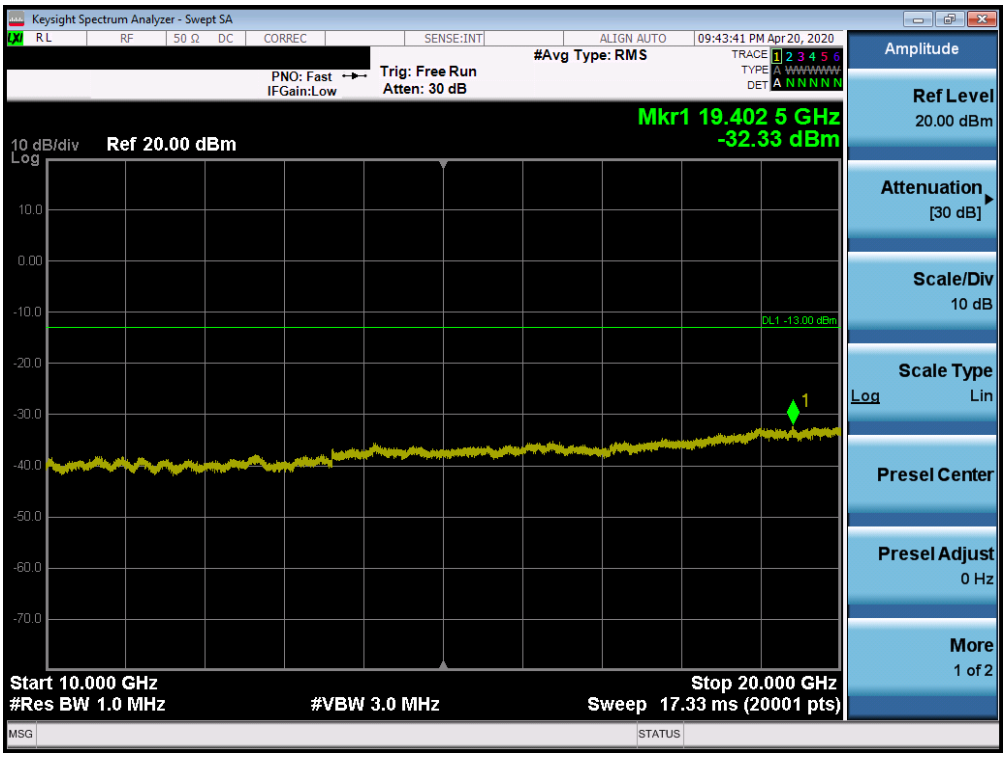
Plot 7-129. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-130. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

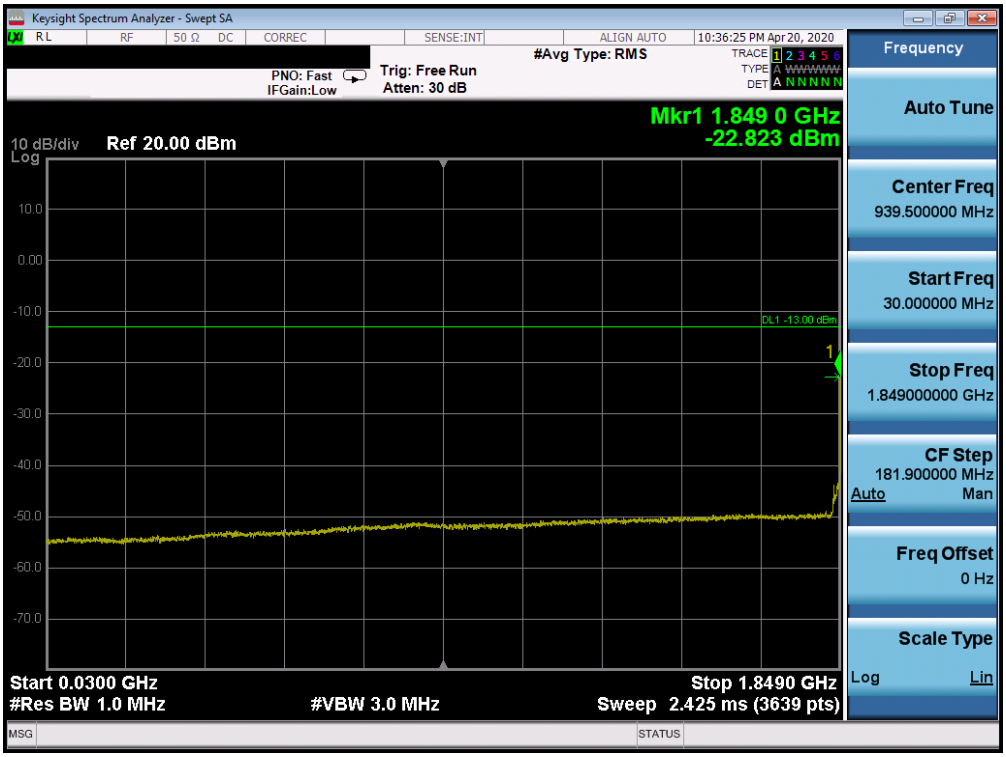


Plot 7-131. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

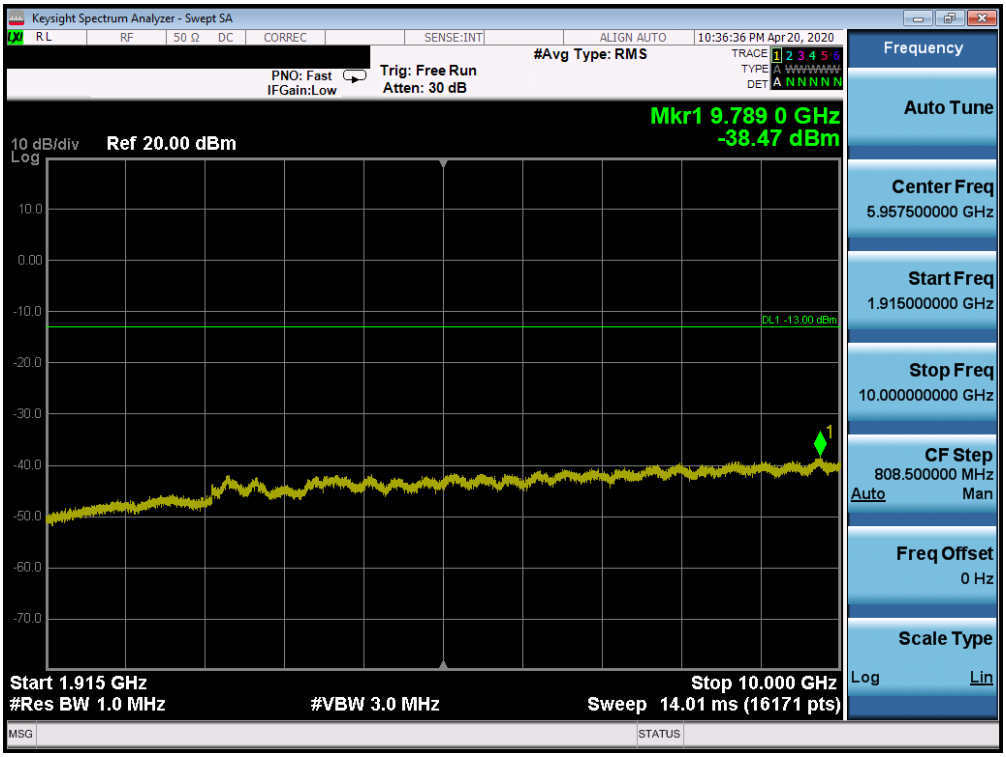


Plot 7-132. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

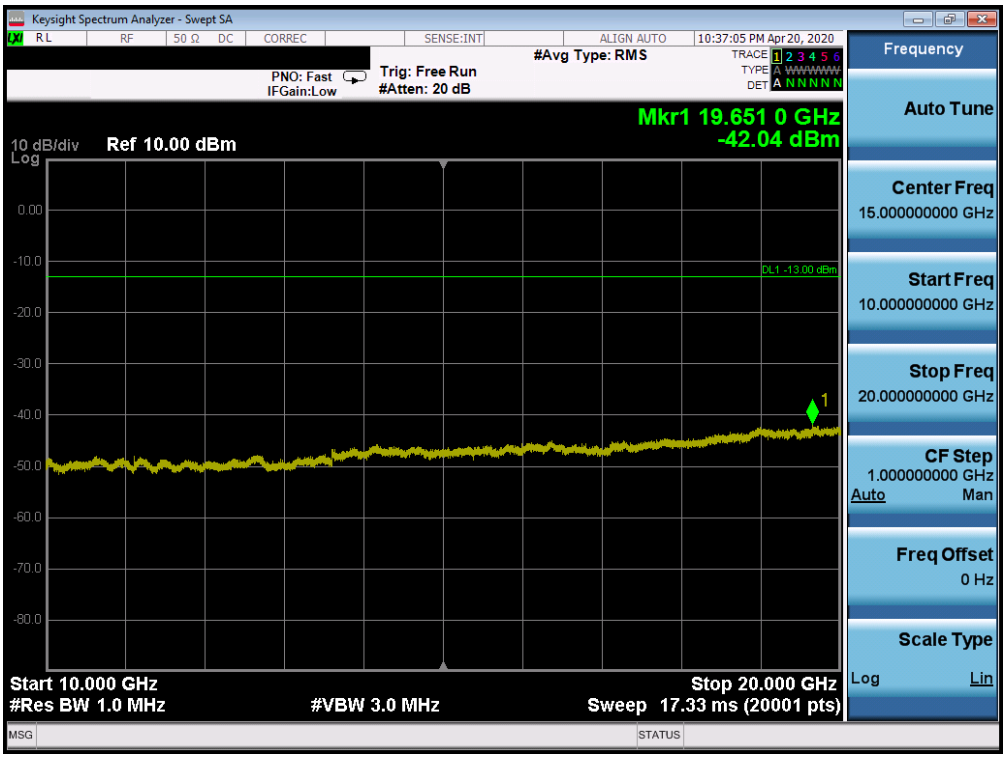
Band 25/2



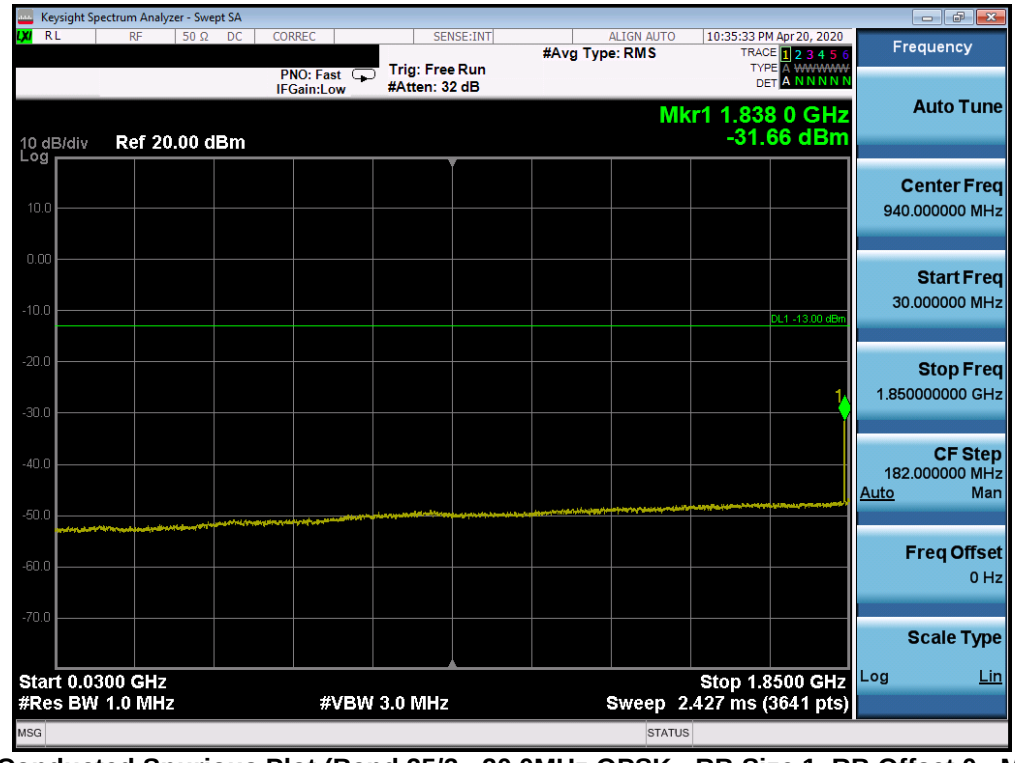
Plot 7-133. Conducted Spurious Plot (Band 25/2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



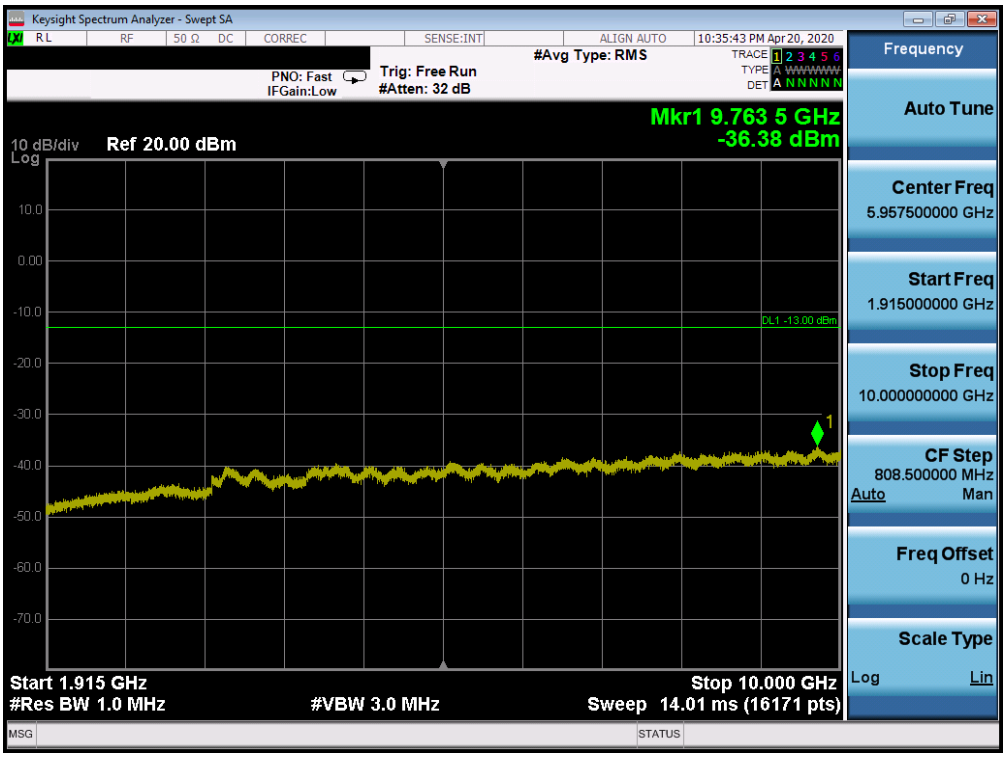
Plot 7-134. Conducted Spurious Plot (Band 25/2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



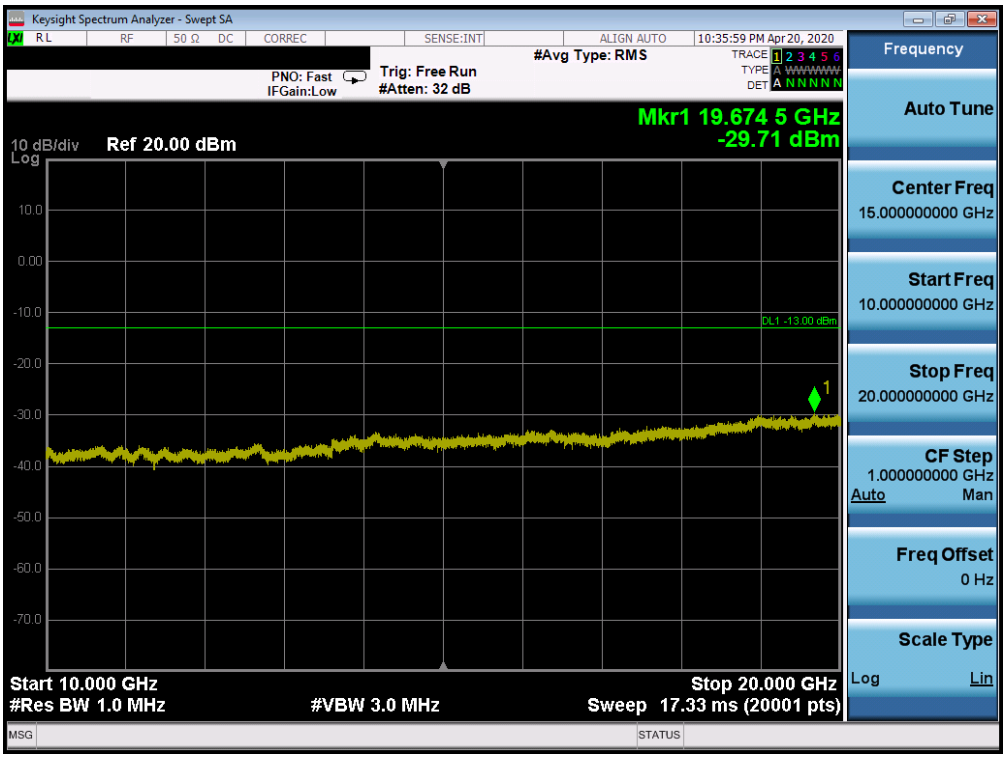
Plot 7-135. Conducted Spurious Plot (Band 25/2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



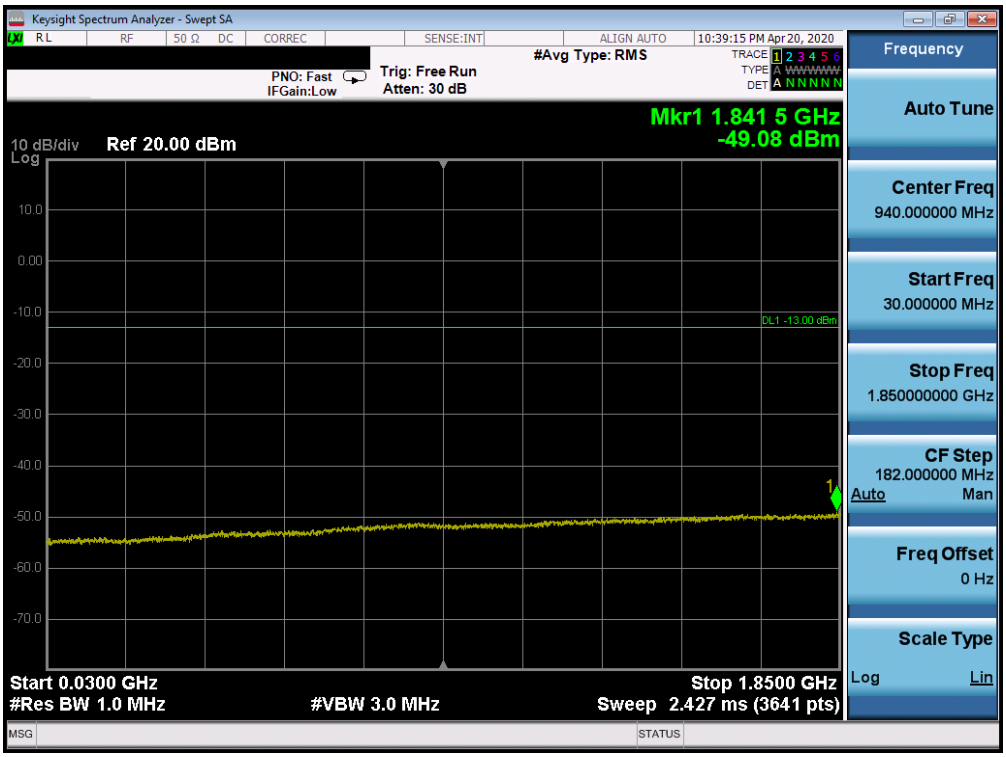
Plot 7-136. Conducted Spurious Plot (Band 25/2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



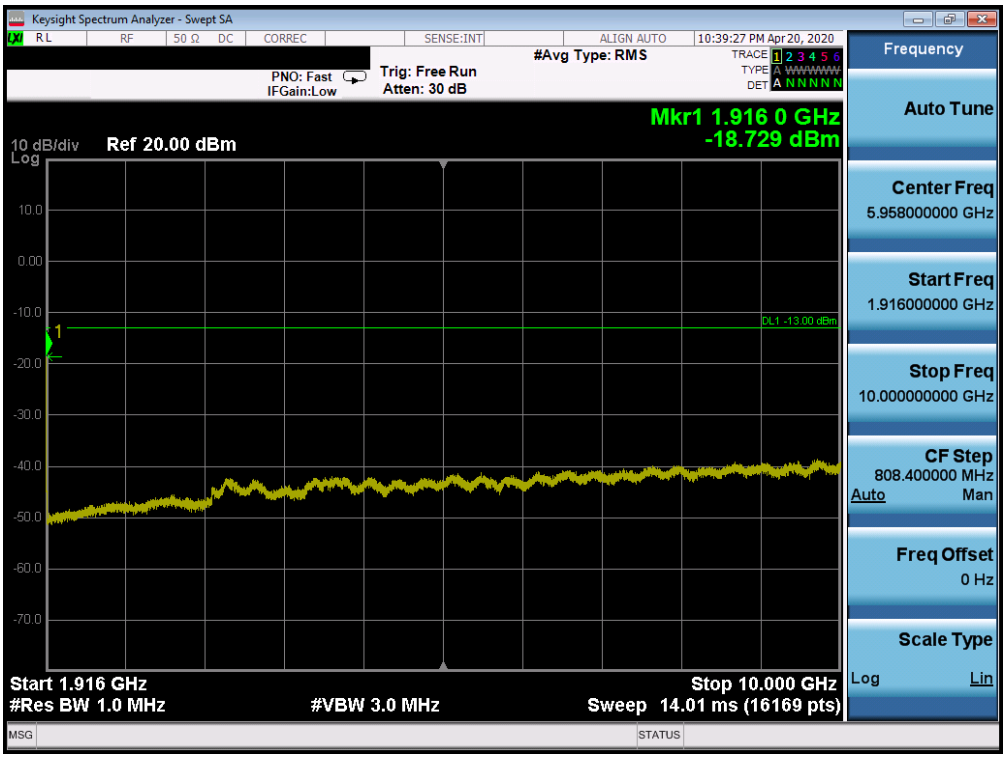
Plot 7-137. Conducted Spurious Plot (Band 25/2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



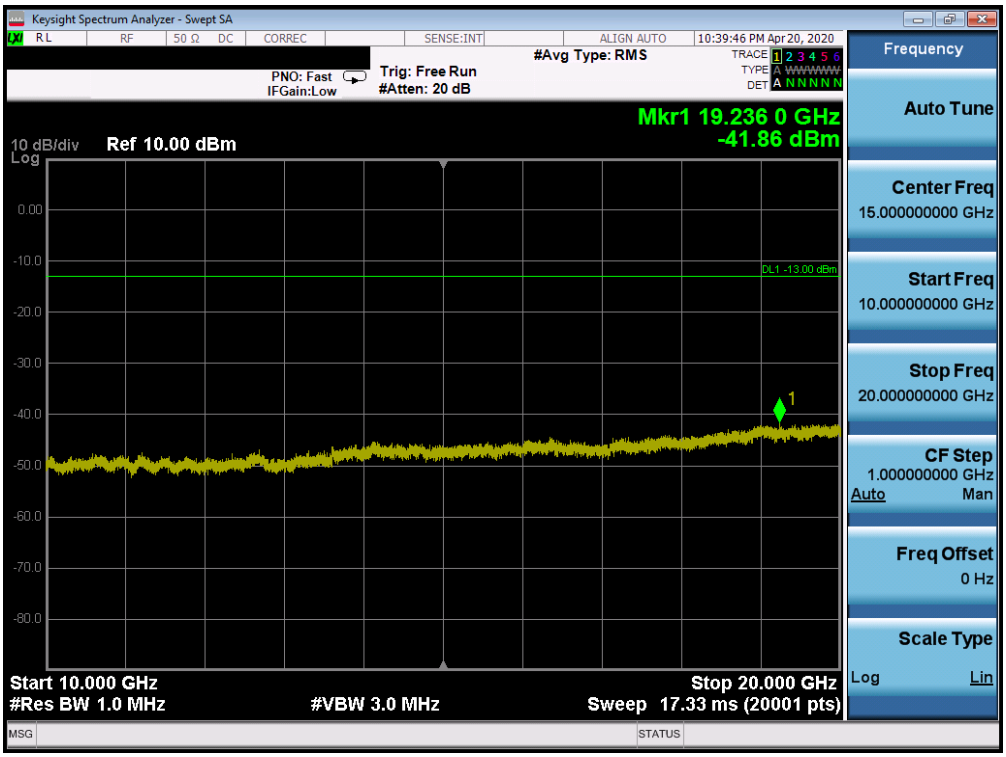
Plot 7-138. Conducted Spurious Plot (Band 25/2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-139. Conducted Spurious Plot (Band 25/2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

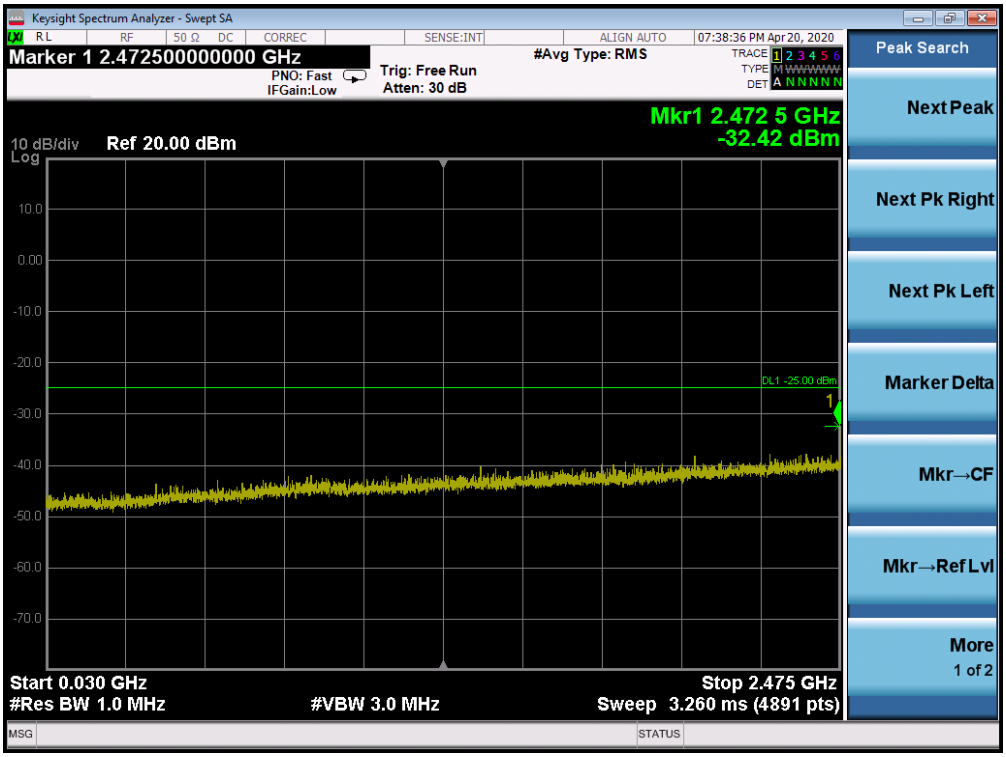


Plot 7-140. Conducted Spurious Plot (Band 25/2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

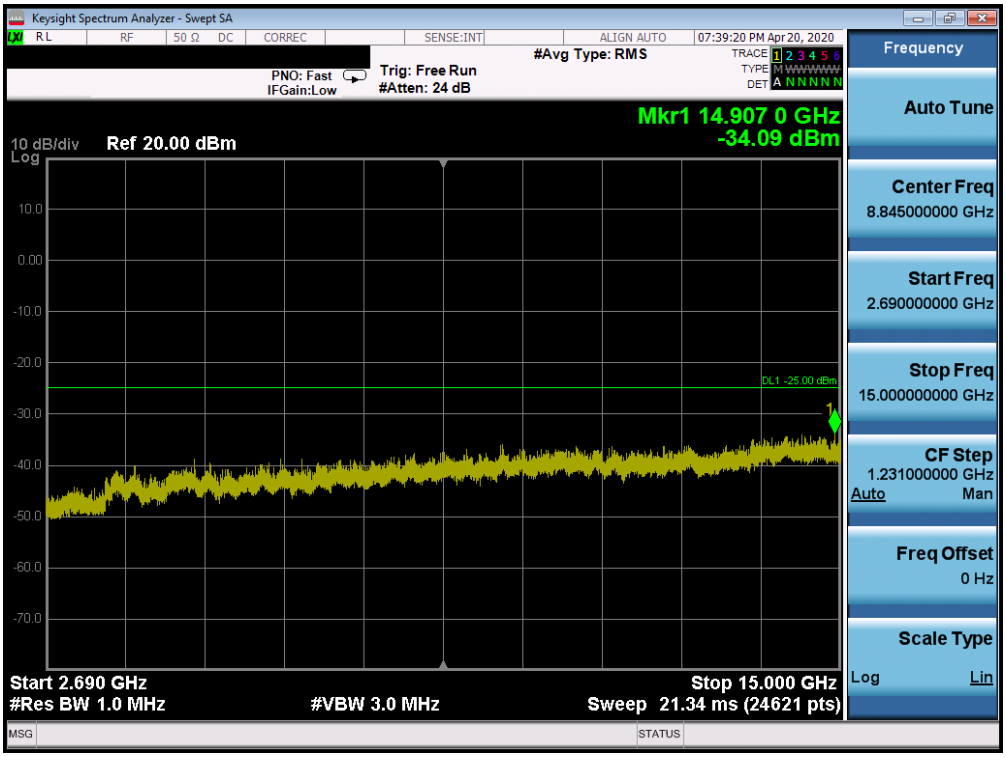


Plot 7-141. Conducted Spurious Plot (Band 25/2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

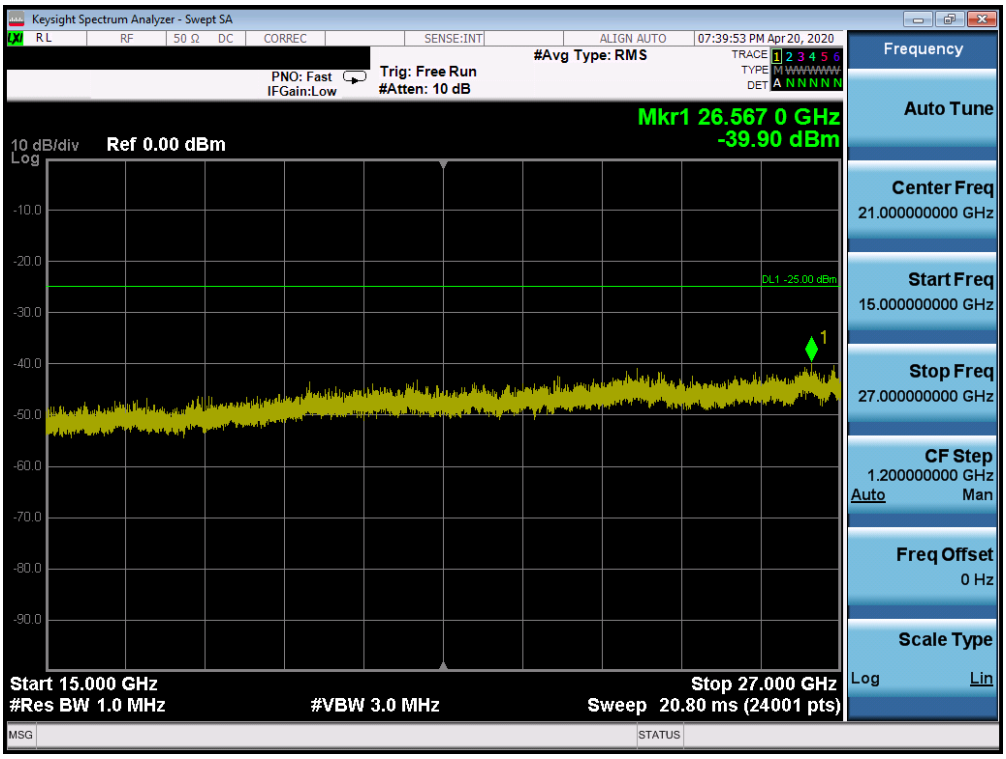
Band 41



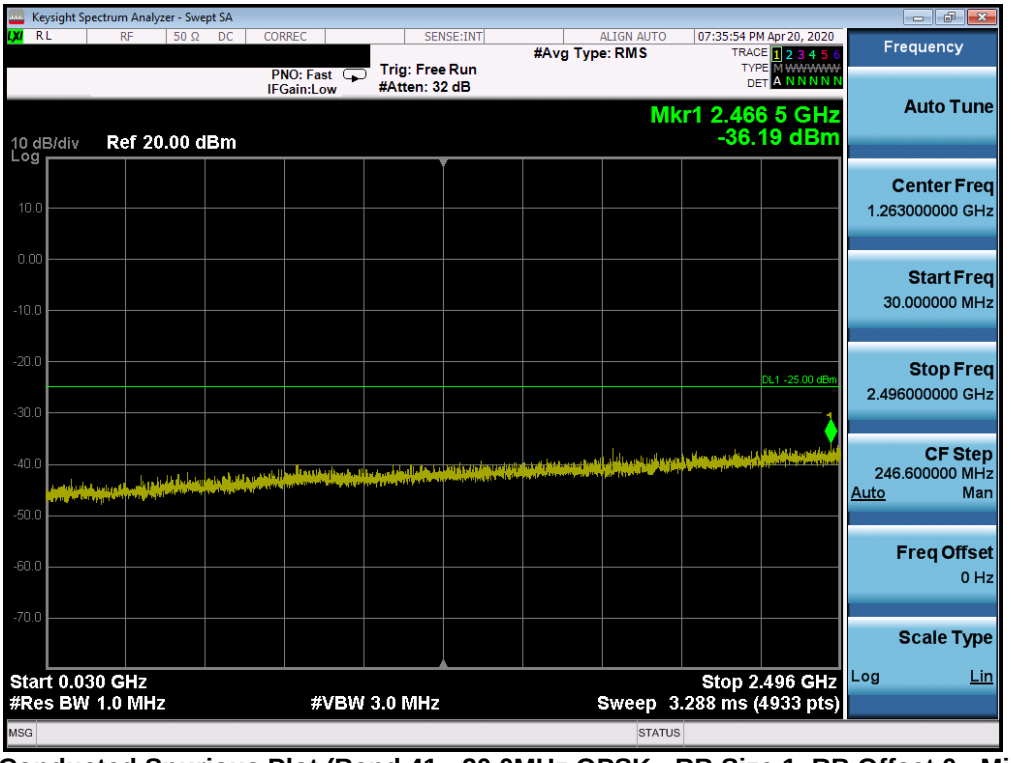
Plot 7-142. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



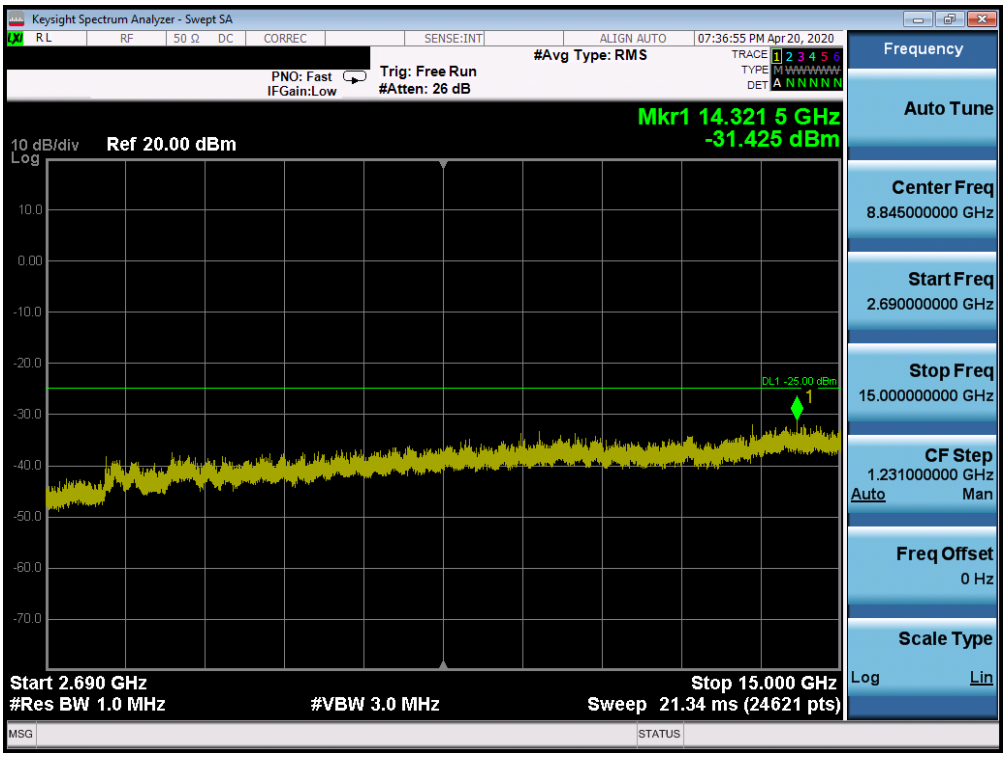
Plot 7-143. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



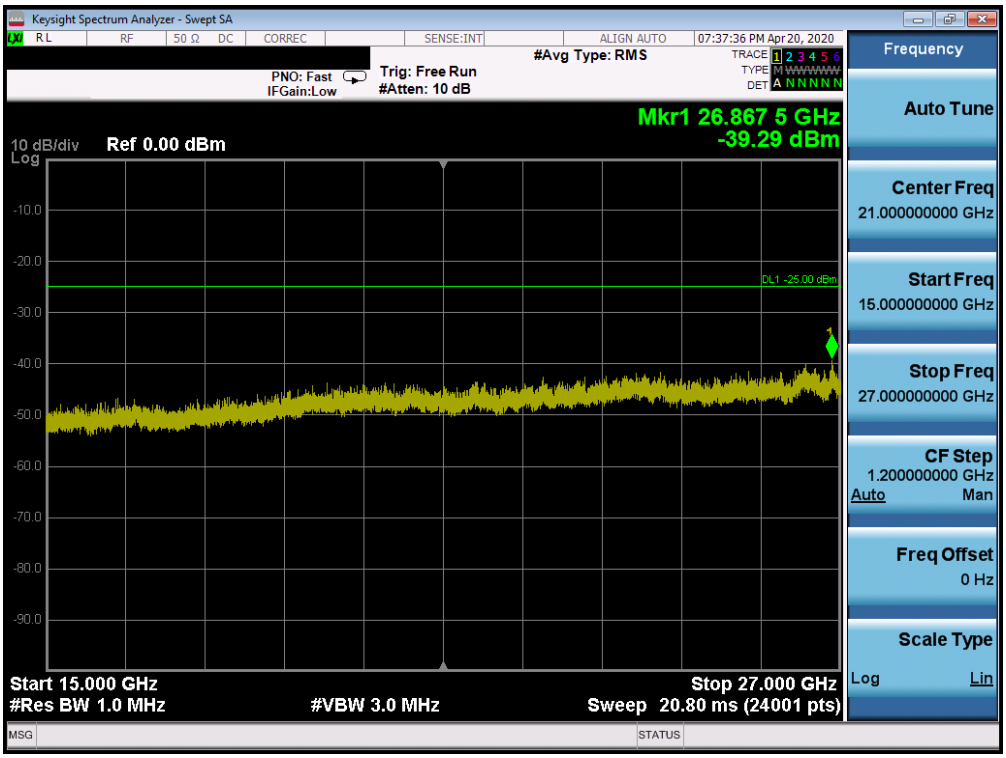
Plot 7-144. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



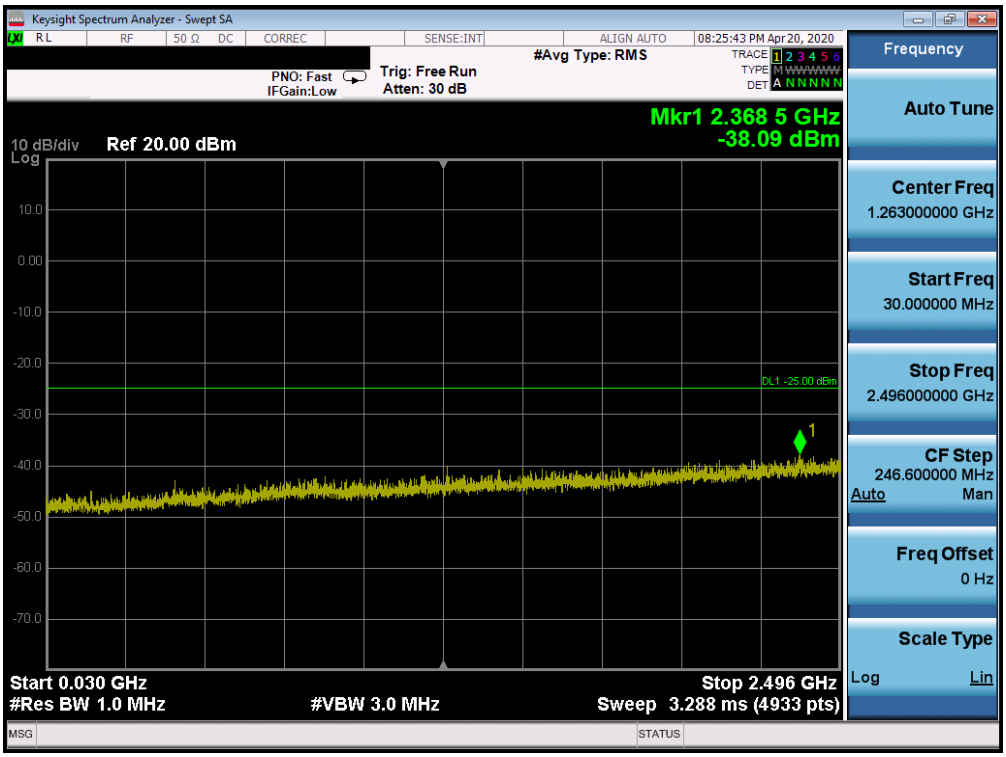
Plot 7-145. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



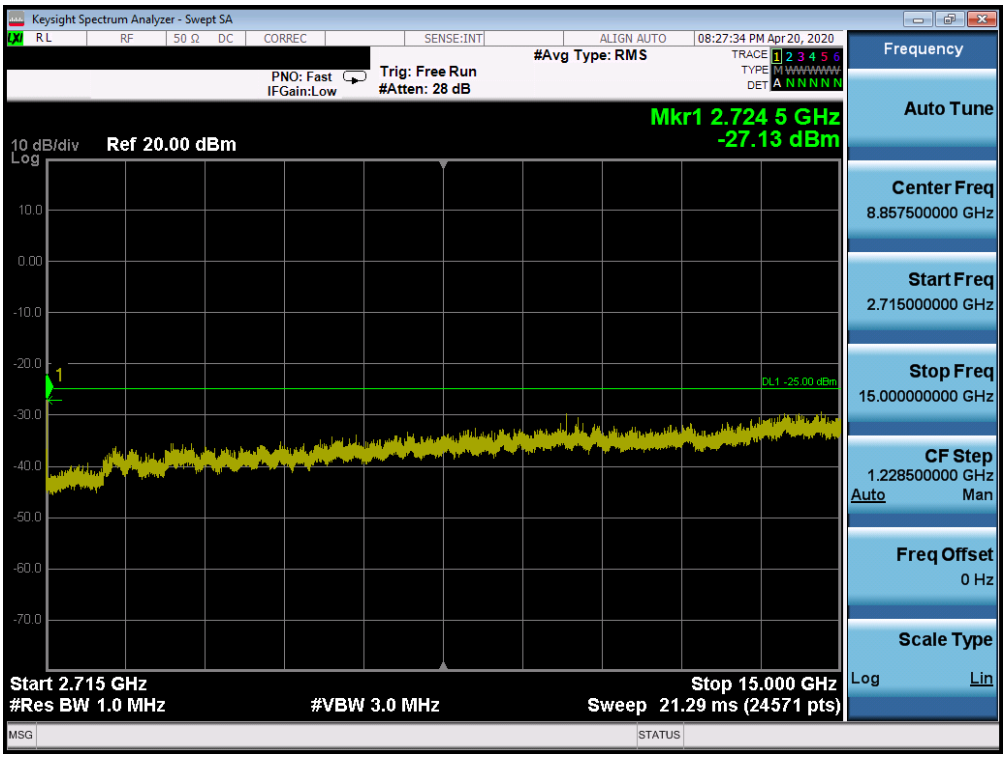
Plot 7-146. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



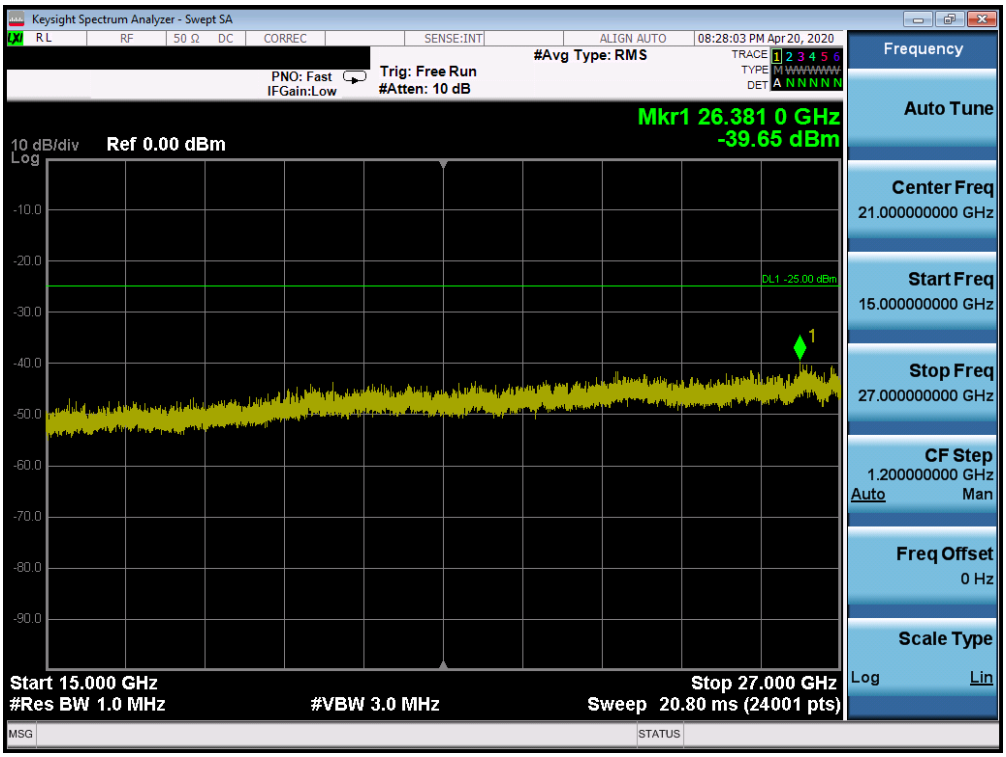
Plot 7-147. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-148. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-149. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-150. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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 ≥ 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.

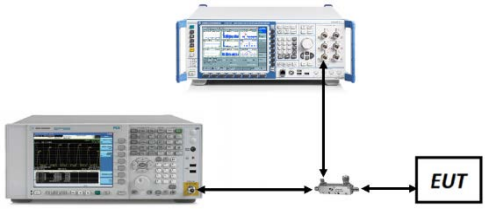


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

Per 22.917(b) 24.238(a) 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.

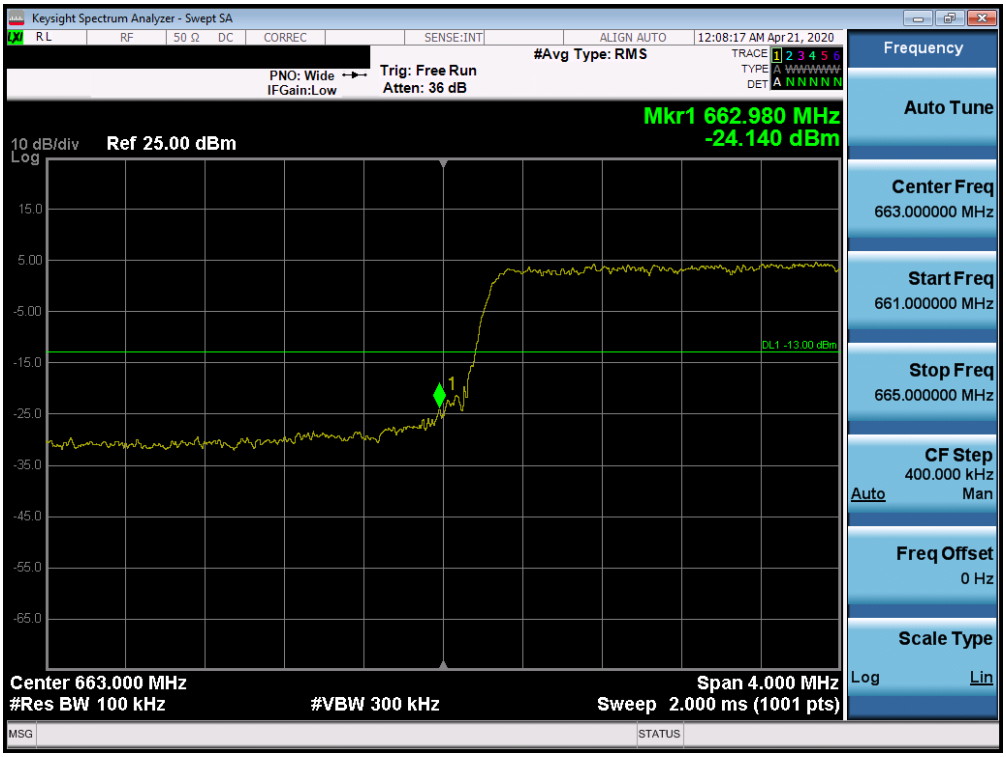
Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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.

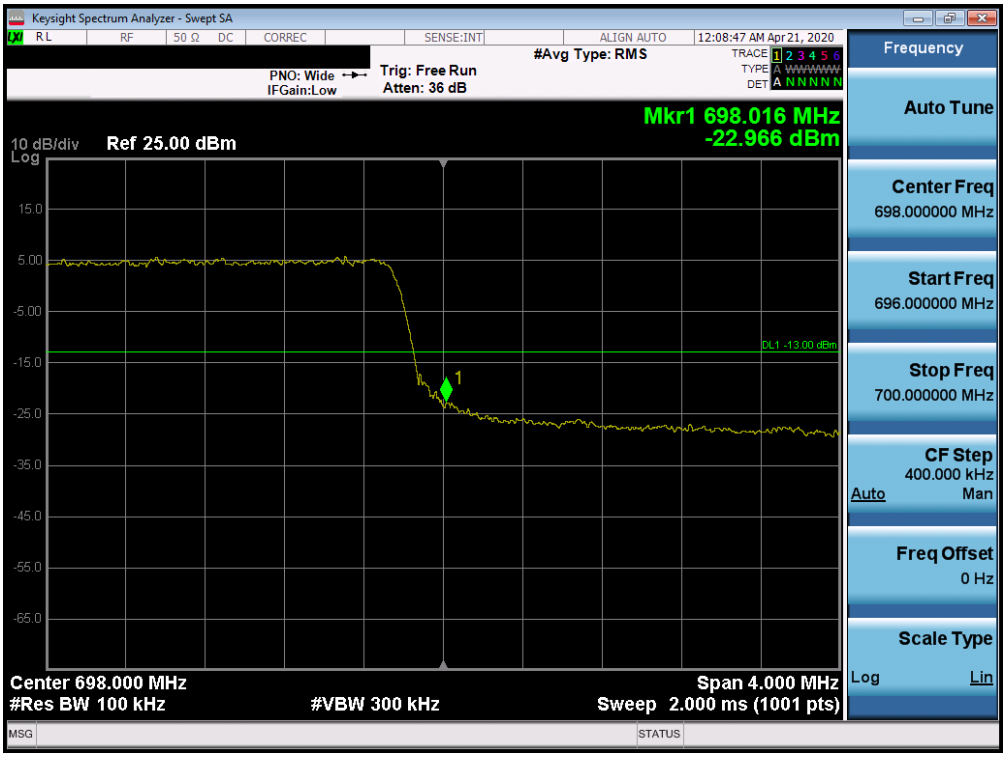
For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c)(4) is $65 + 10 \log_{10}(P) = -35$dBm in a 6.25kHz bandwidth.

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.

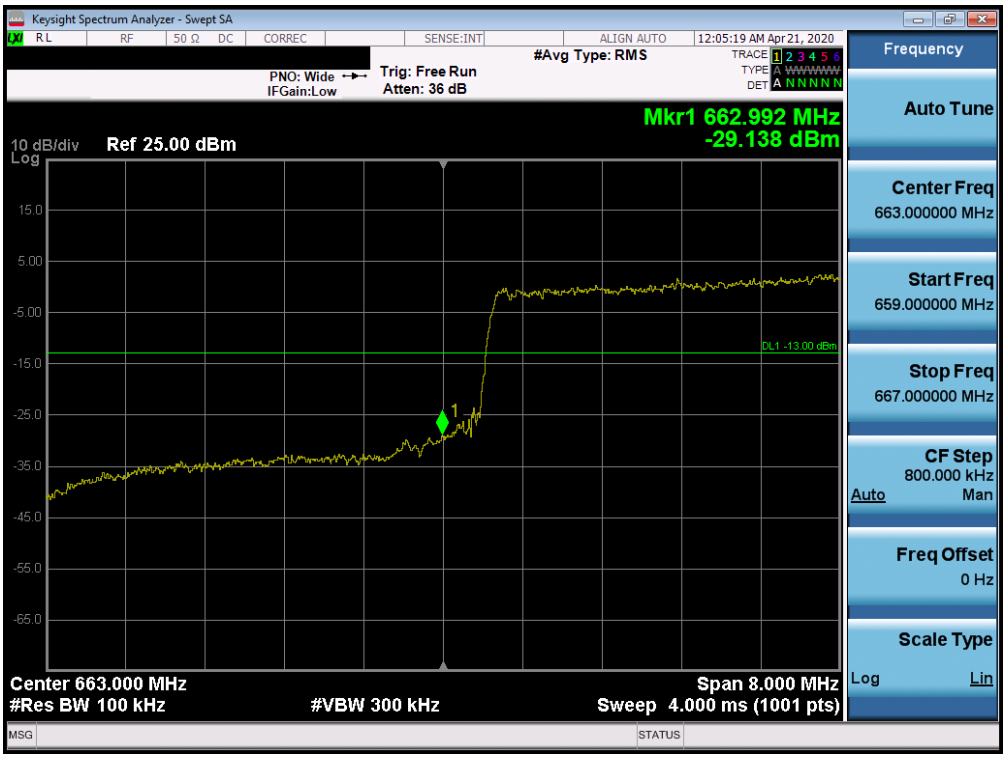
Band 71



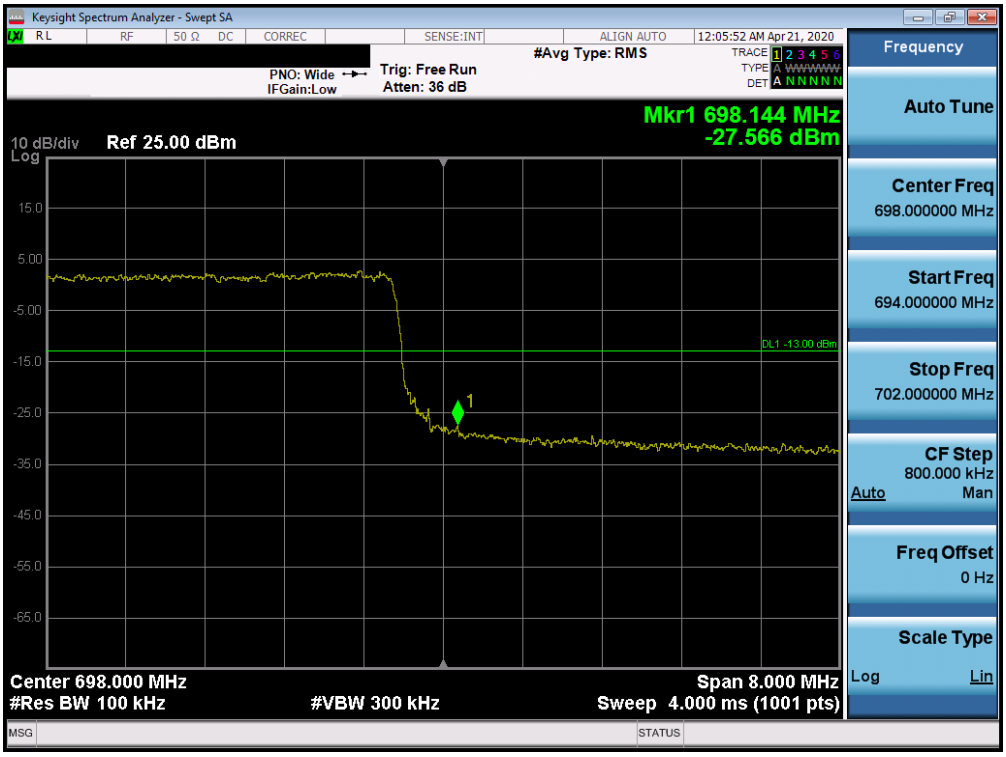
Plot 7-151. Lower Band Edge Plot (Band 71 - 5.0MHz QPSK - Full RB Configuration)



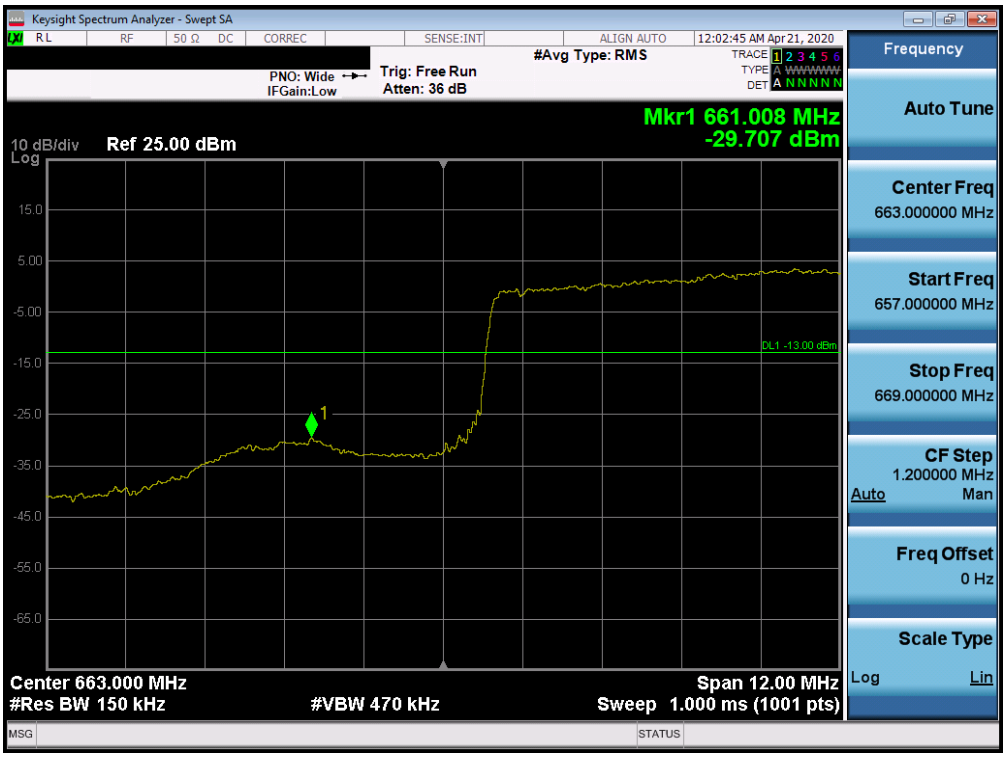
Plot 7-152. Upper Band Edge Plot (Band 71 - 5.0MHz QPSK - Full RB Configuration)



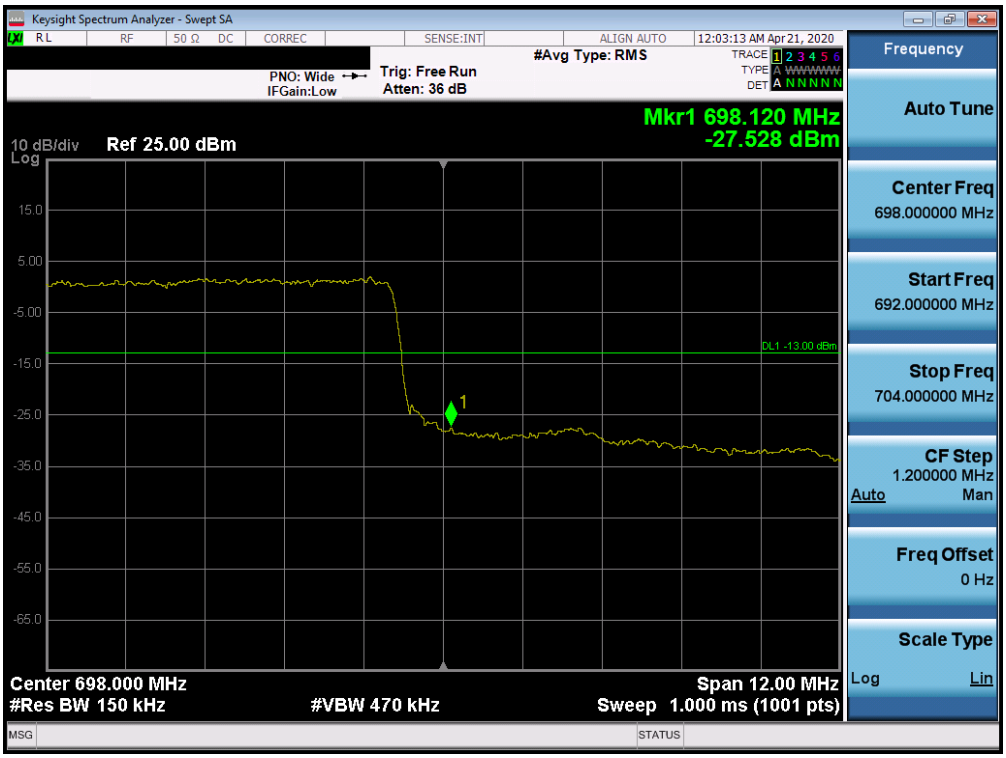
Plot 7-153. Lower Band Edge Plot (Band 71 - 10.0MHz QPSK - Full RB Configuration)



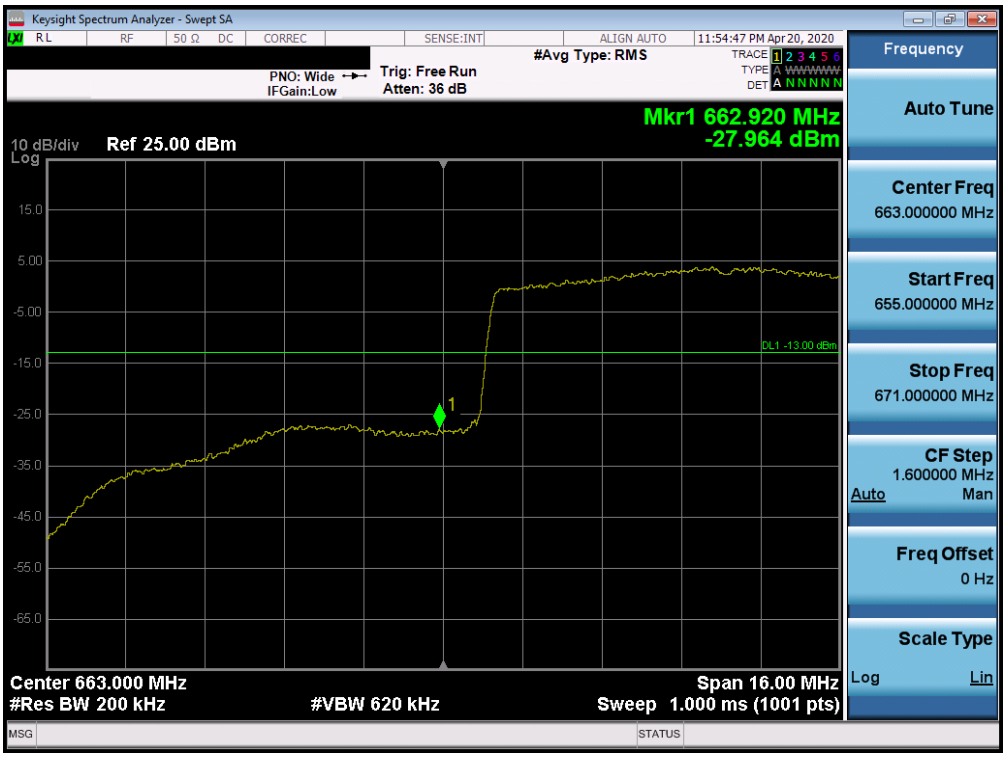
Plot 7-154. Upper Band Edge Plot (Band 71 - 10.0MHz QPSK - Full RB Configuration)



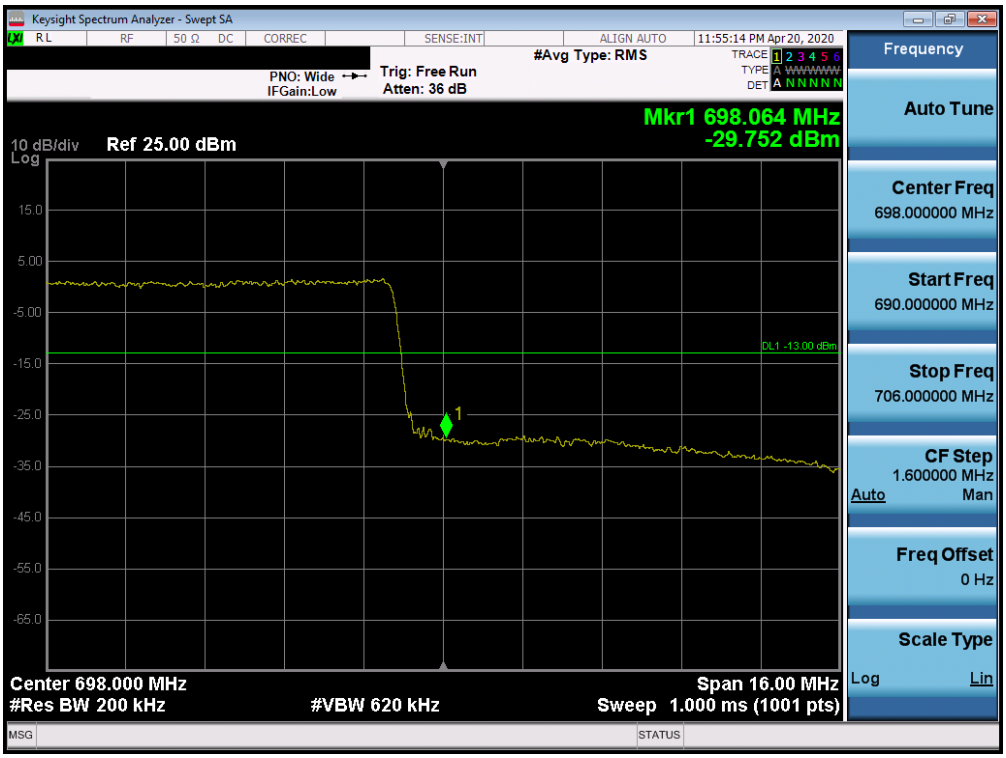
Plot 7-155. Lower Band Edge Plot (Band 71 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-156. Upper Band Edge Plot (Band 71 - 15.0MHz QPSK - Full RB Configuration)

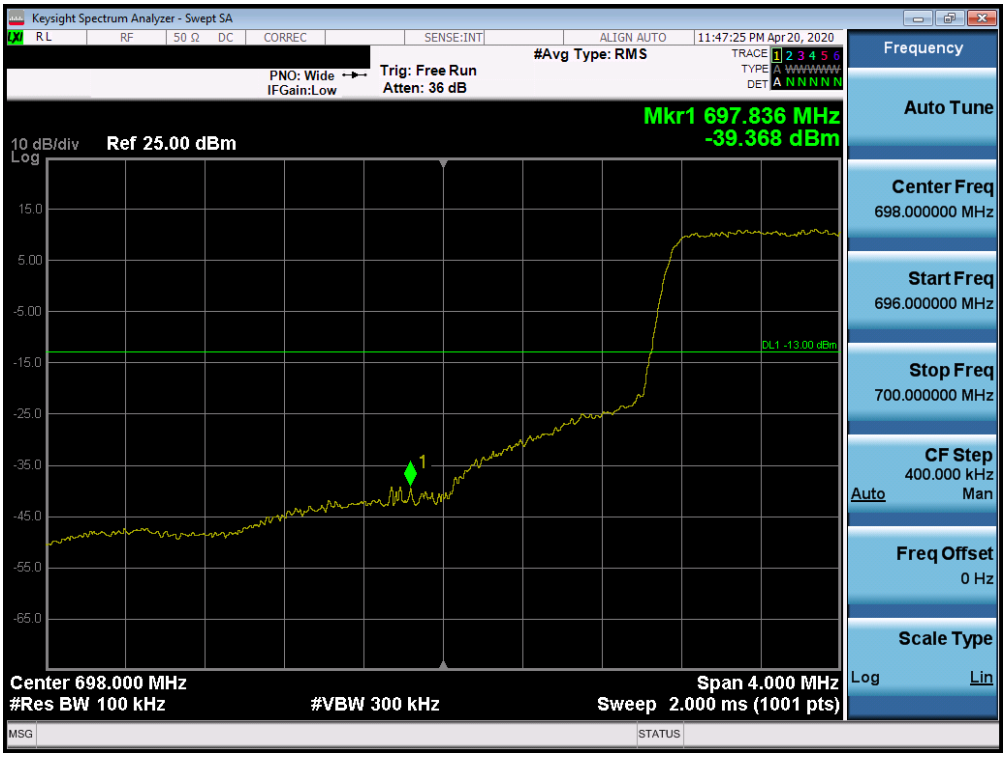


Plot 7-157. Lower Band Edge Plot (Band 71 - 20.0MHz QPSK - Full RB Configuration)



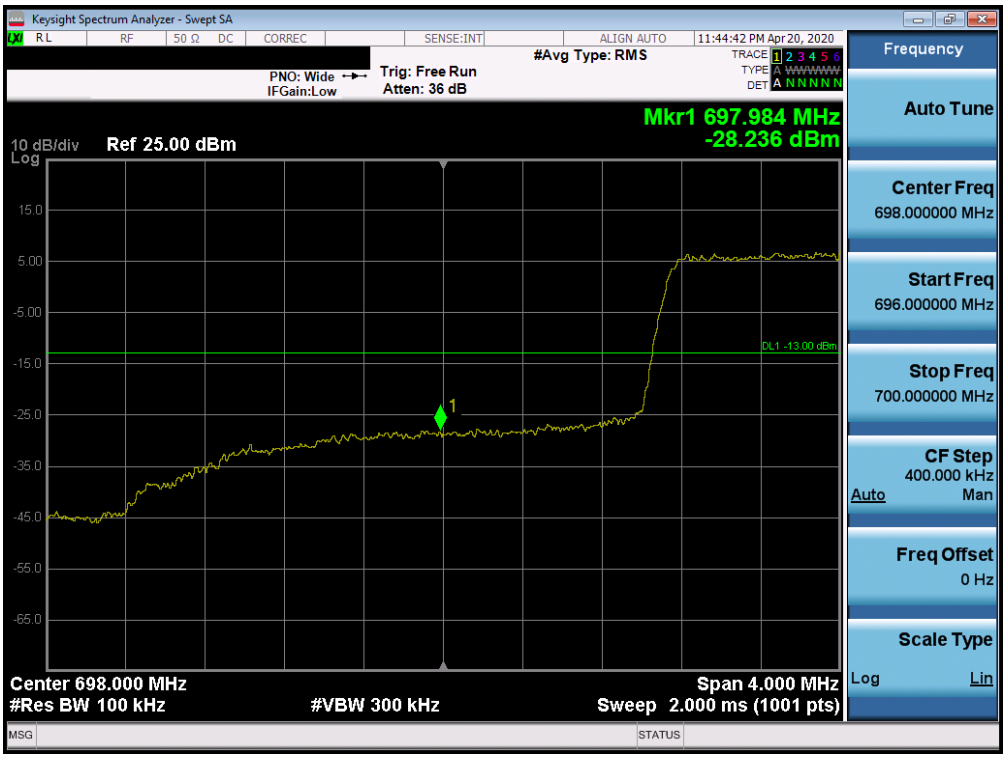
Plot 7-158. Upper Band Edge Plot (Band 71 - 20.0MHz QPSK - Full RB Configuration)

Band 12

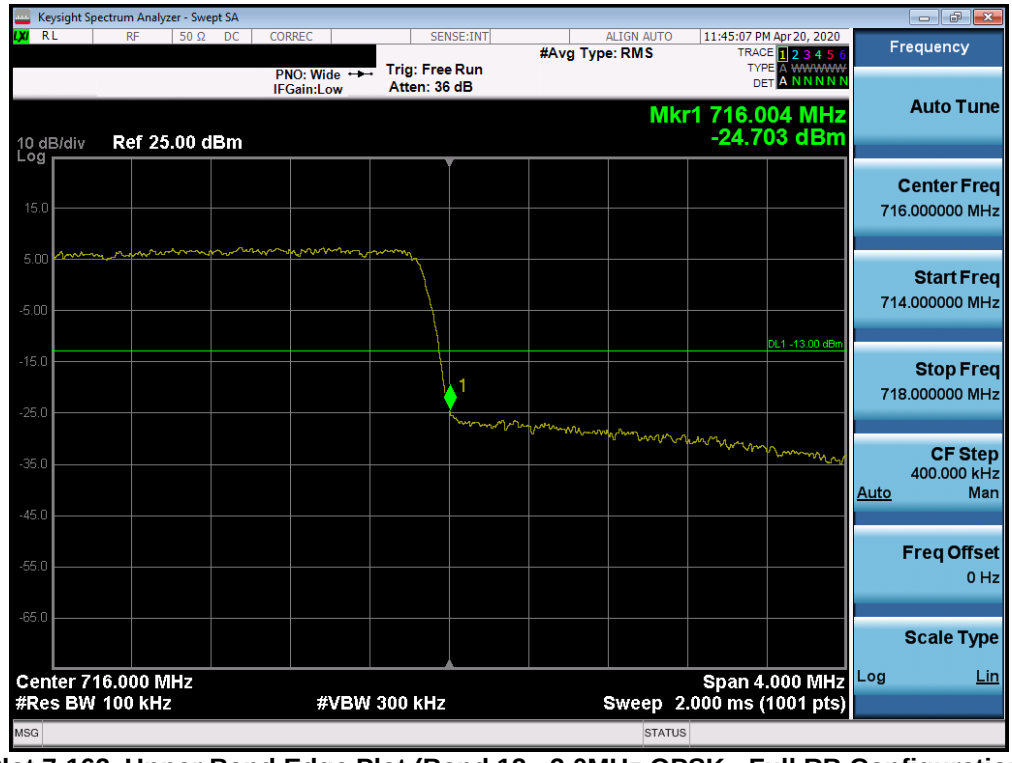


Plot 7-159. Lower Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

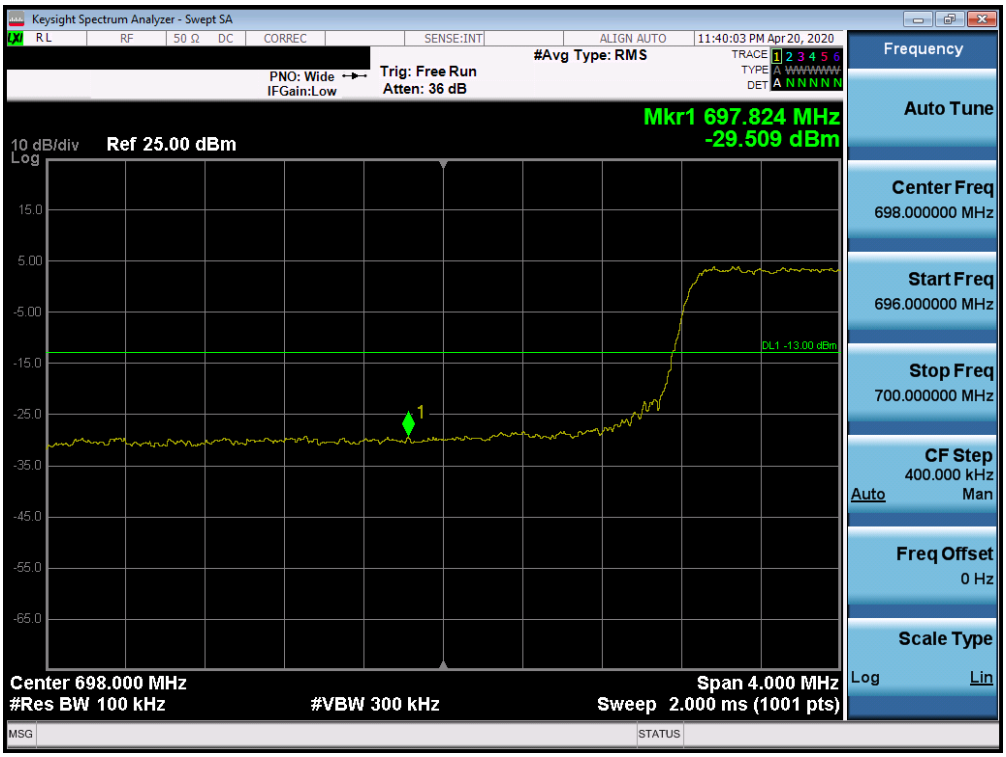
Plot 7-160. Upper Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



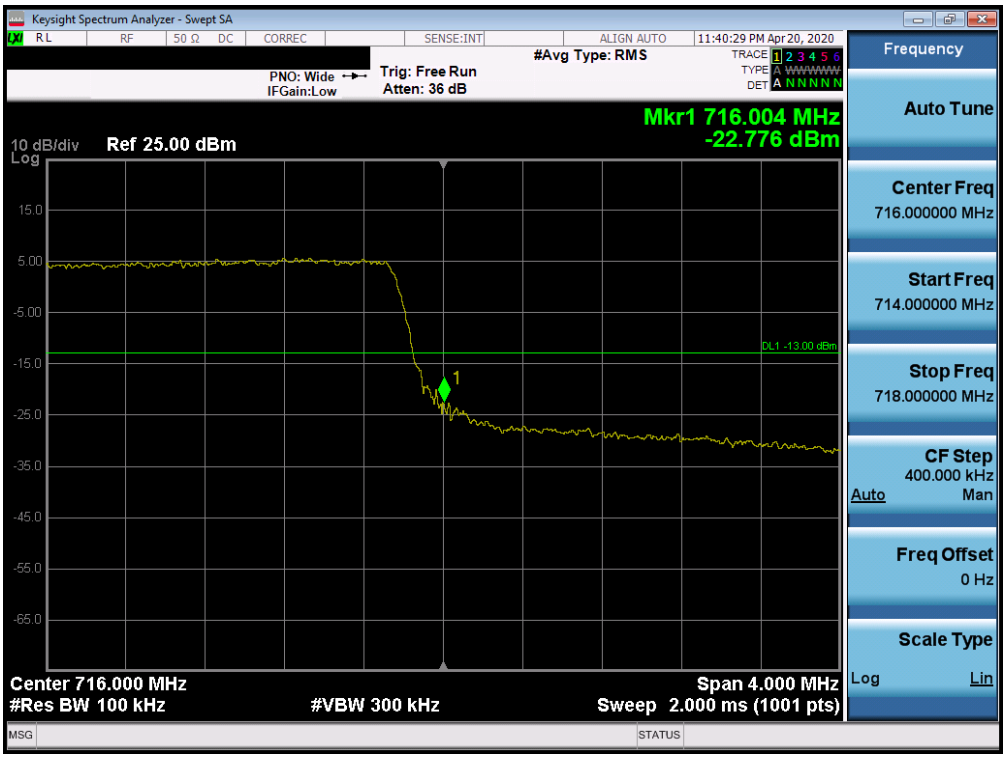
Plot 7-161. Lower Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)



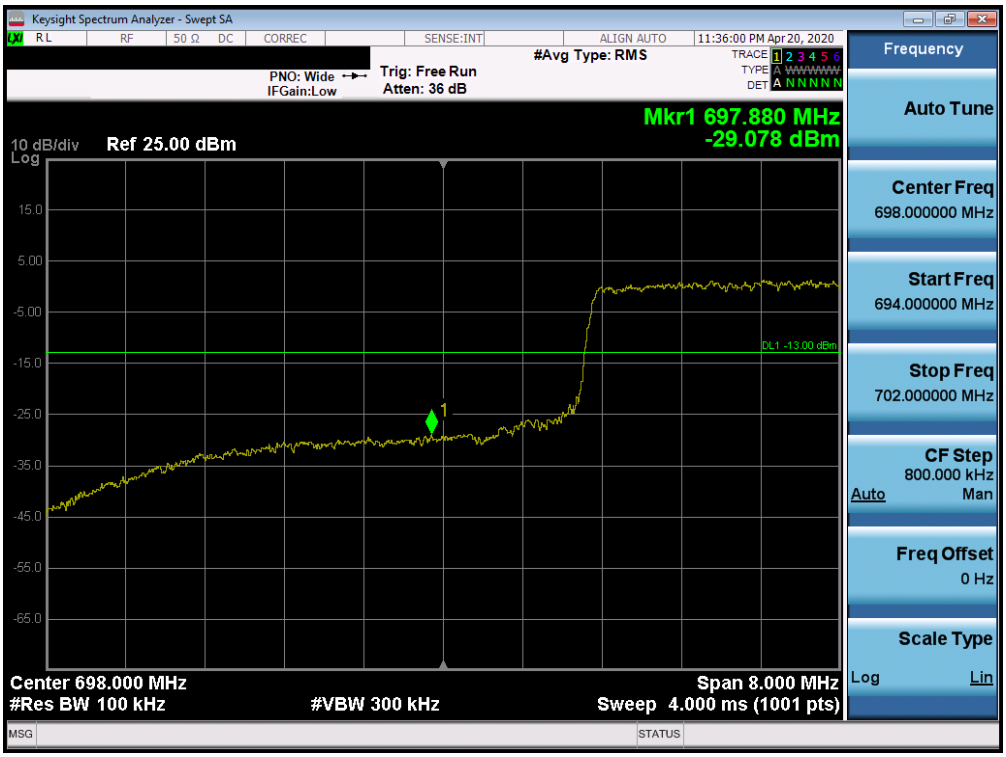
Plot 7-162. Upper Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)



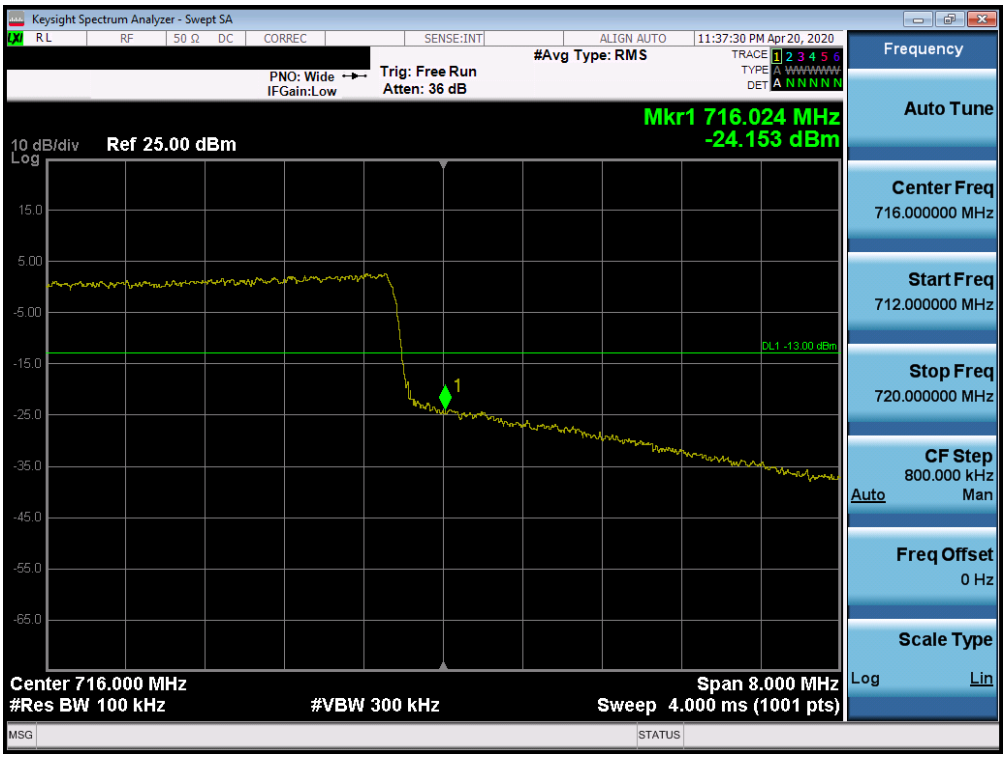
Plot 7-163. Lower Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-164. Upper Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)

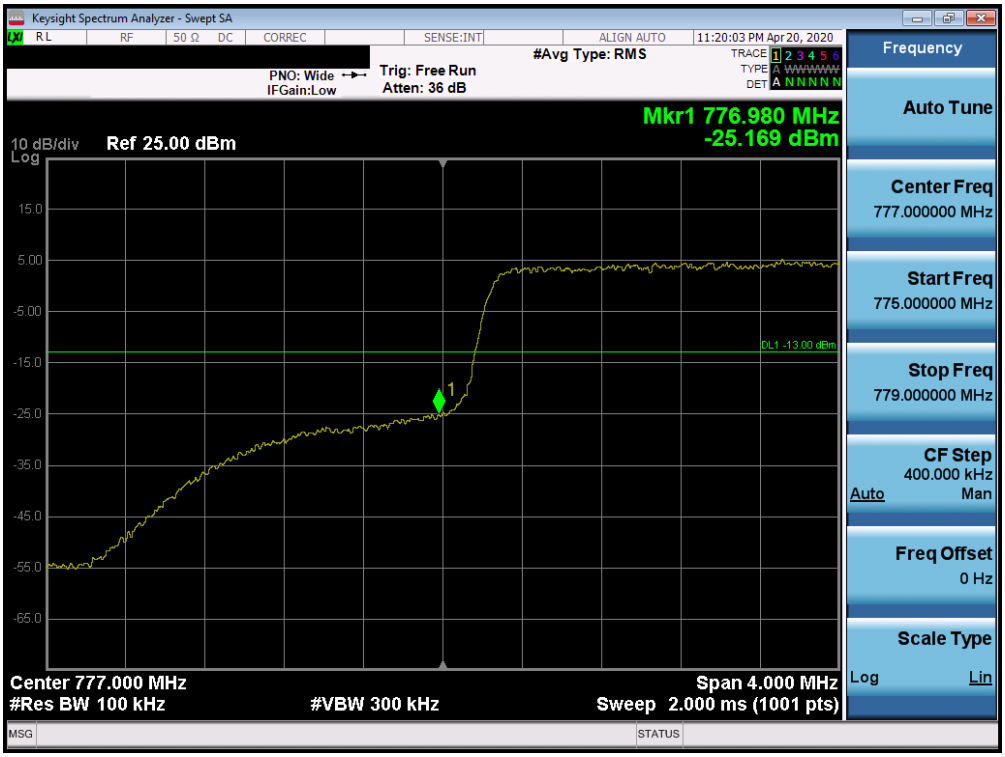


Plot 7-165. Lower Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

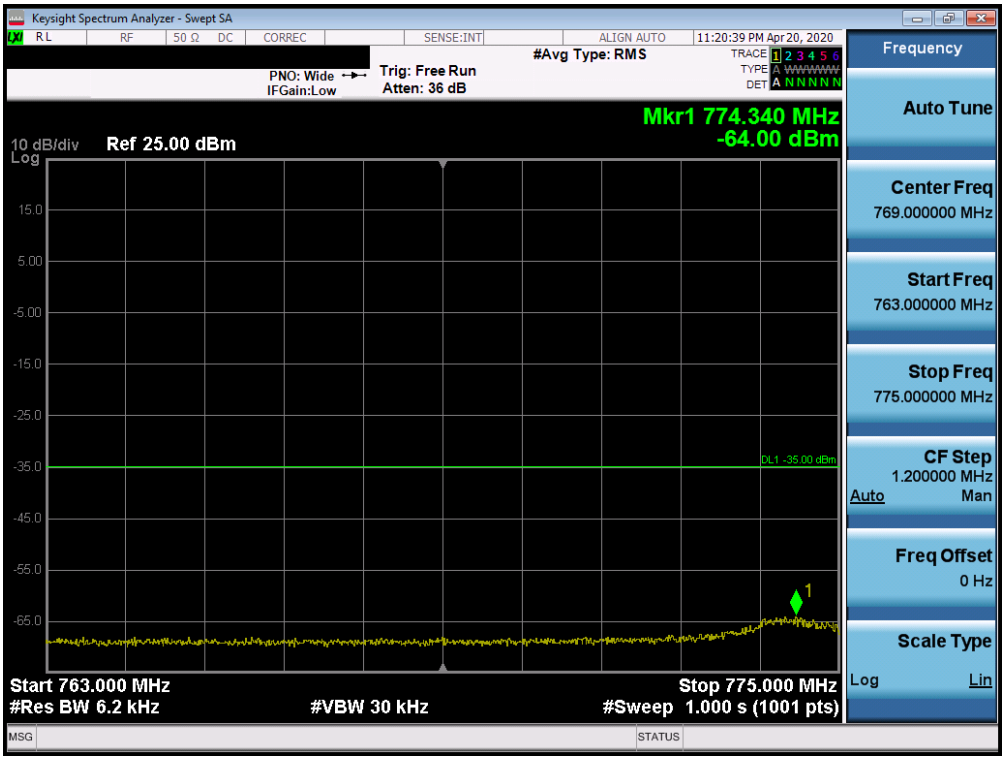


Plot 7-166. Upper Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

Band 13

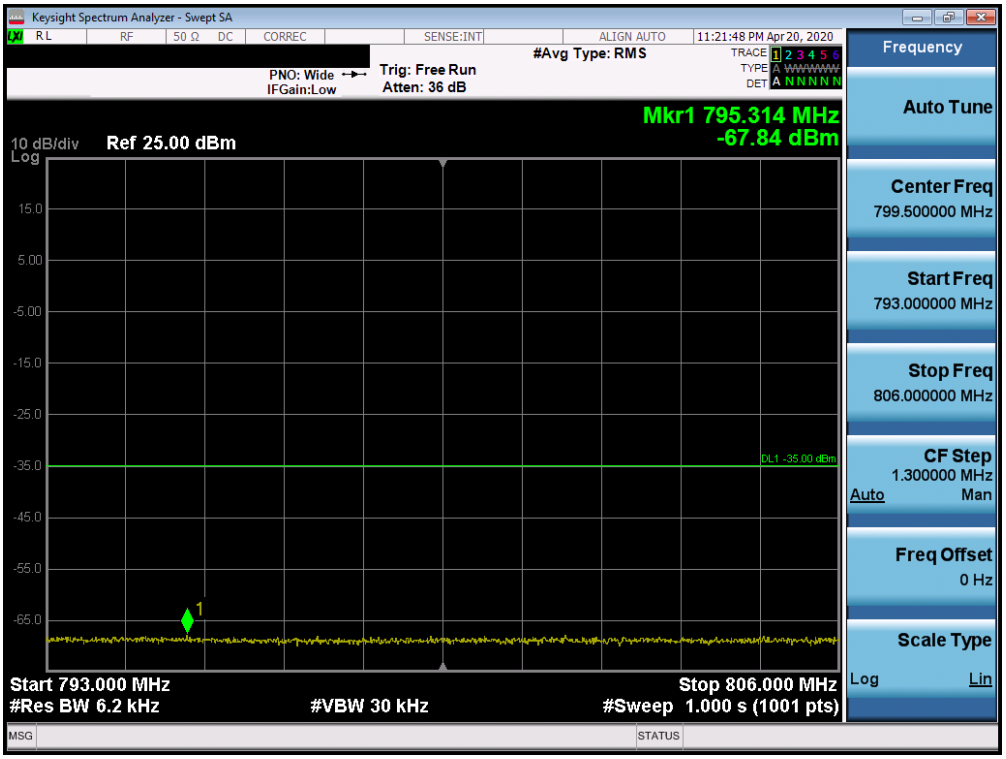


Plot 7-167. Lower Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

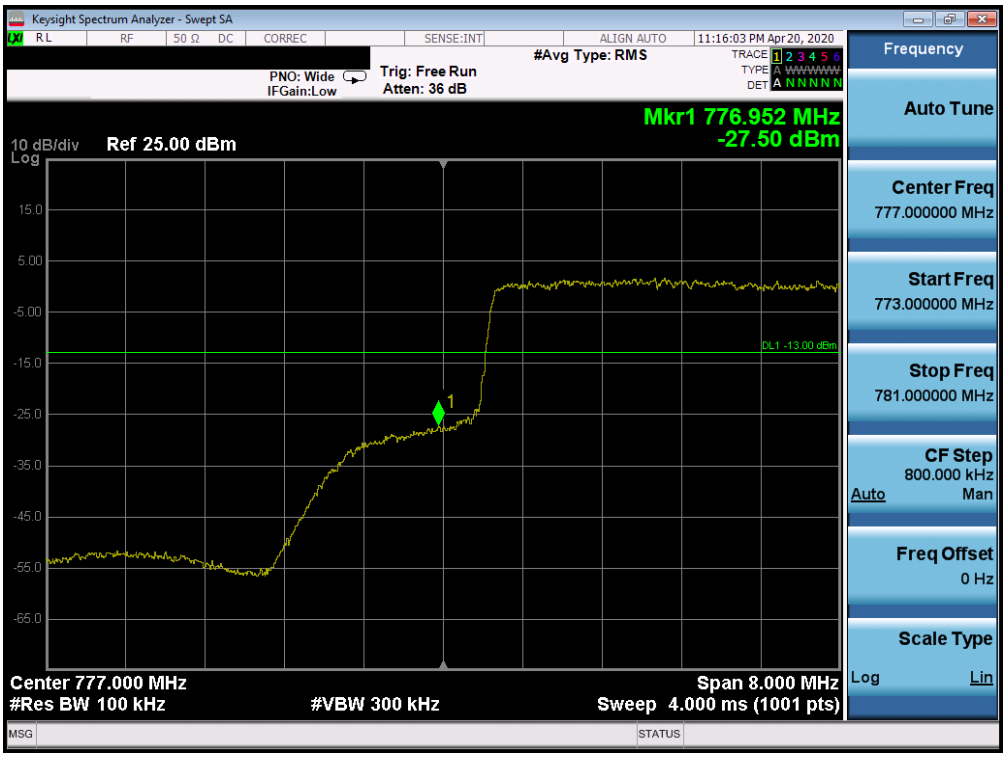


Plot 7-168. Lower Emission Mask Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

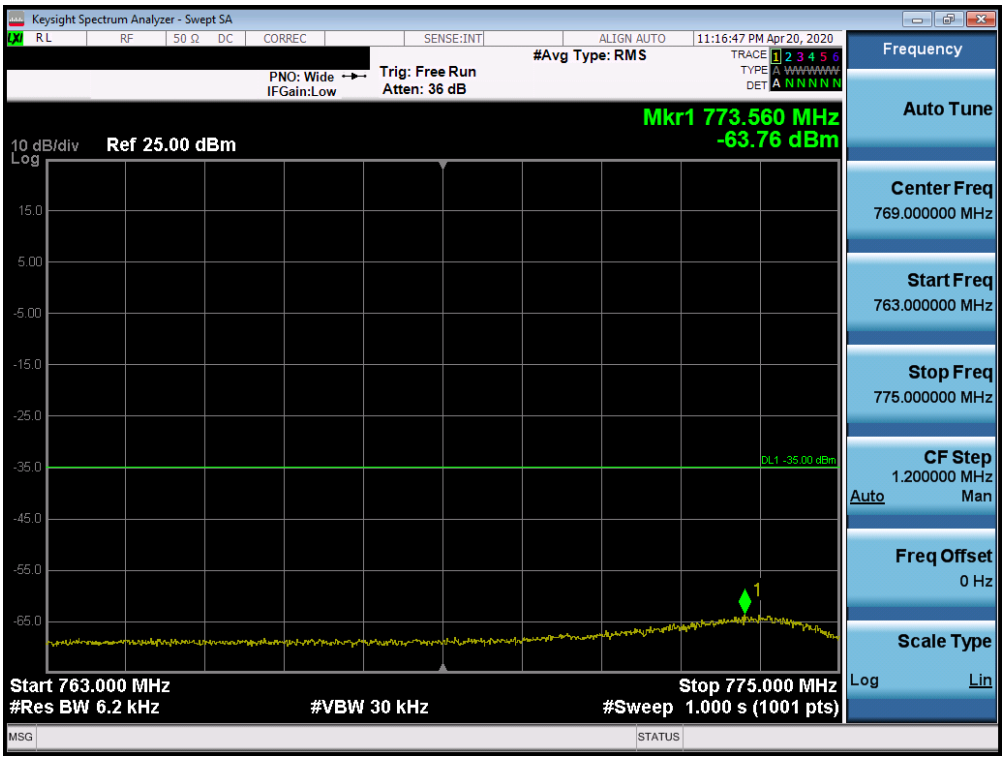
Plot 7-169. Upper Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-170. Upper Emission Mask Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

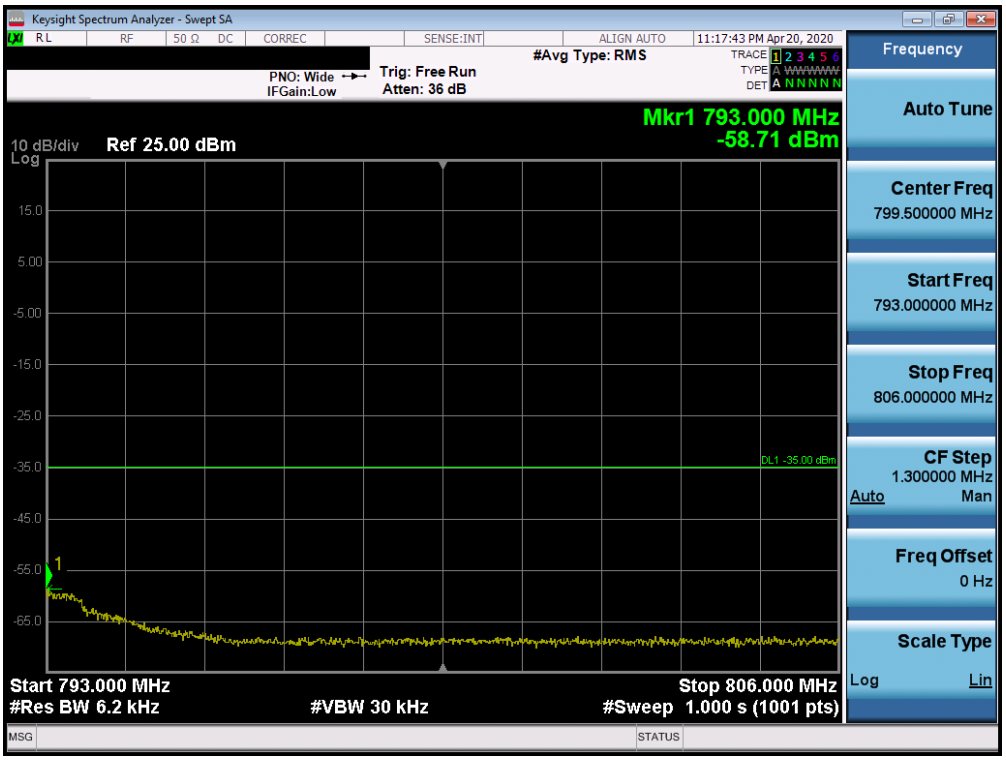


Plot 7-171. Lower Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



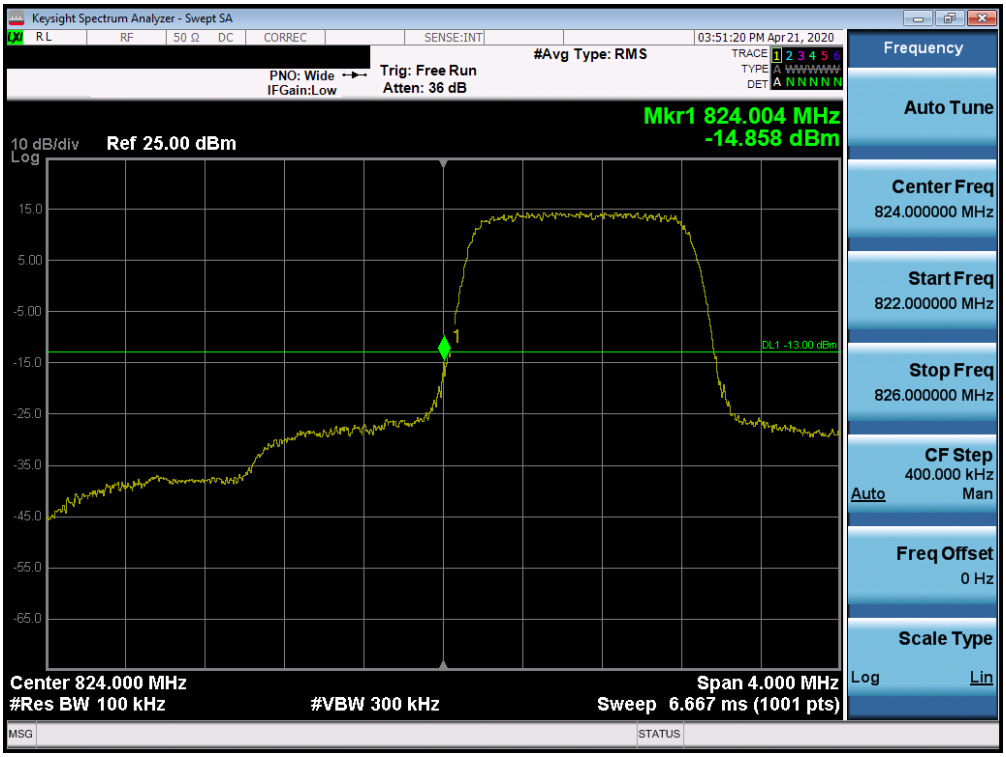
Plot 7-172. Lower Emission Mask Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

Plot 7-173. Upper Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



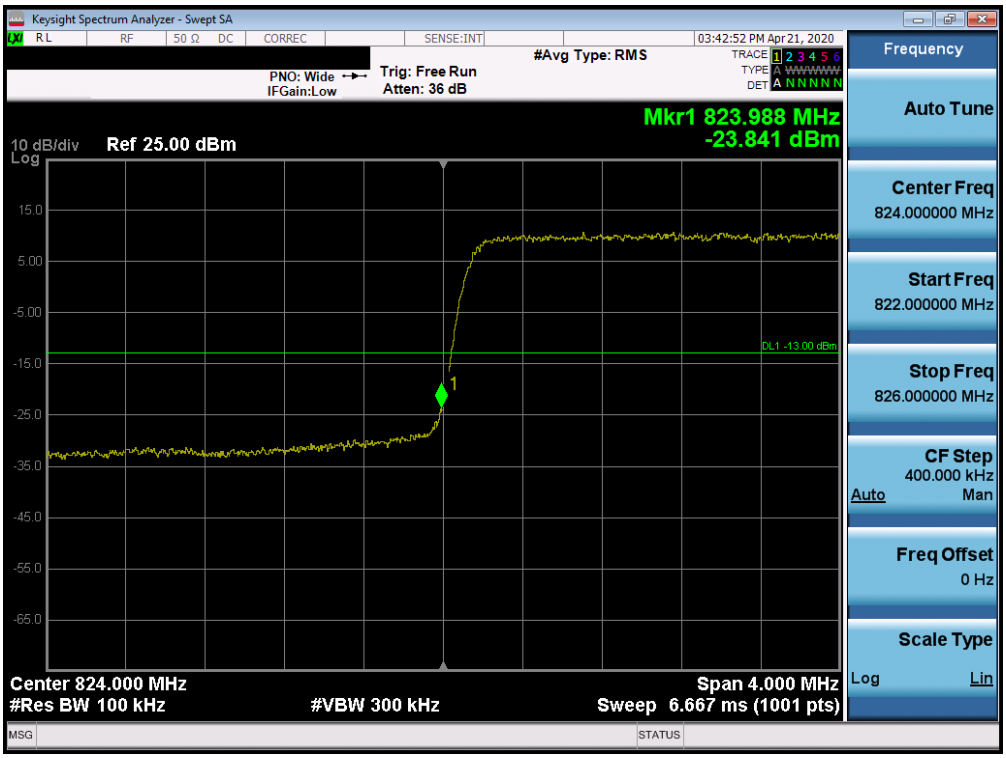
Plot 7-174. Upper Emission Mask Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

Band 26/5



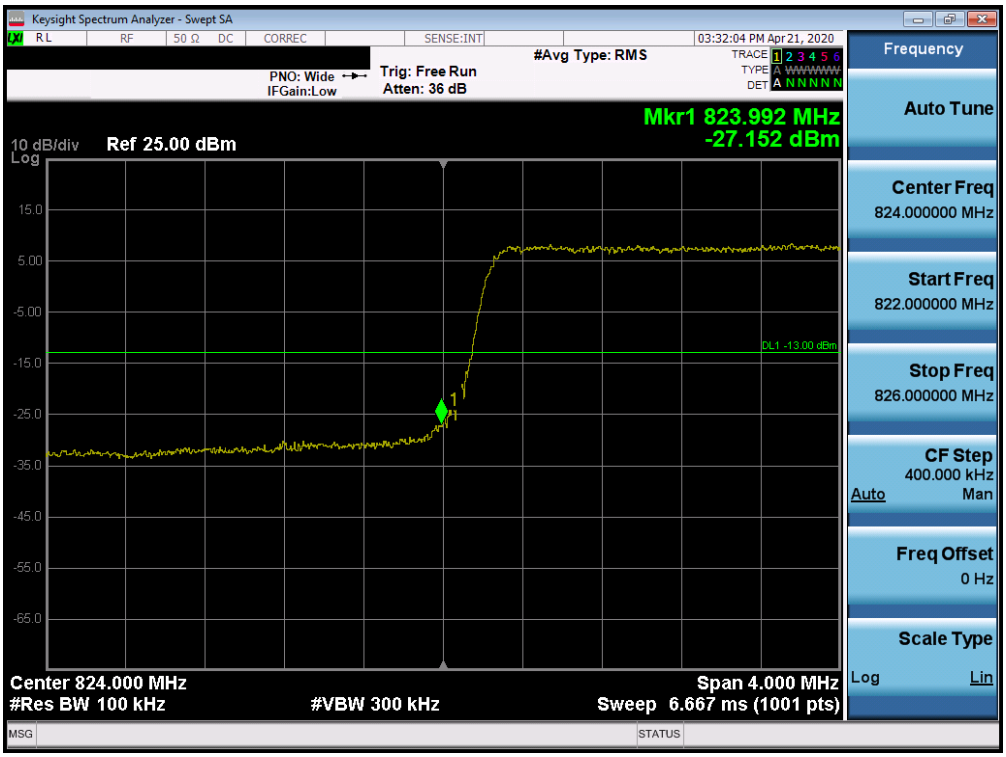
Plot 7-175. Lower Band Edge Plot (Band 26/5 - 1.4MHz QPSK - Full RB Configuration)

Plot 7-176. Upper Band Edge Plot (Band 26/5 - 1.4MHz QPSK - Full RB Configuration)

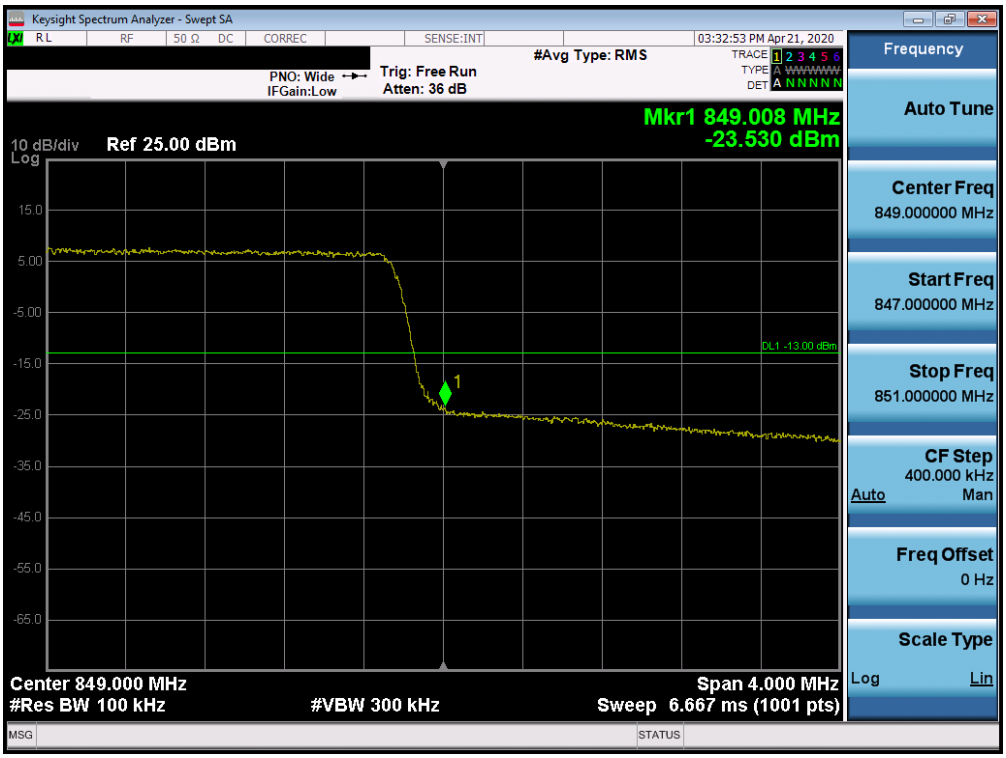


Plot 7-177. Lower Band Edge Plot (Band 26/5 - 3.0MHz QPSK - Full RB Configuration)

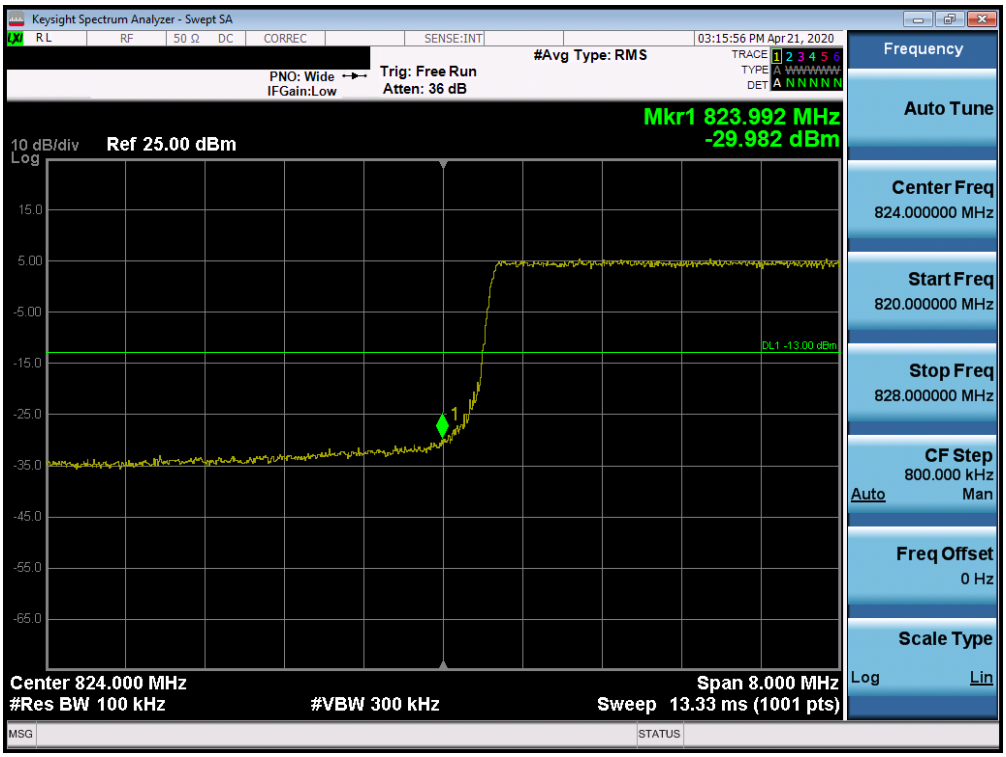
Plot 7-178. Upper Band Edge Plot (Band 26/5 - 3.0MHz QPSK - Full RB Configuration)



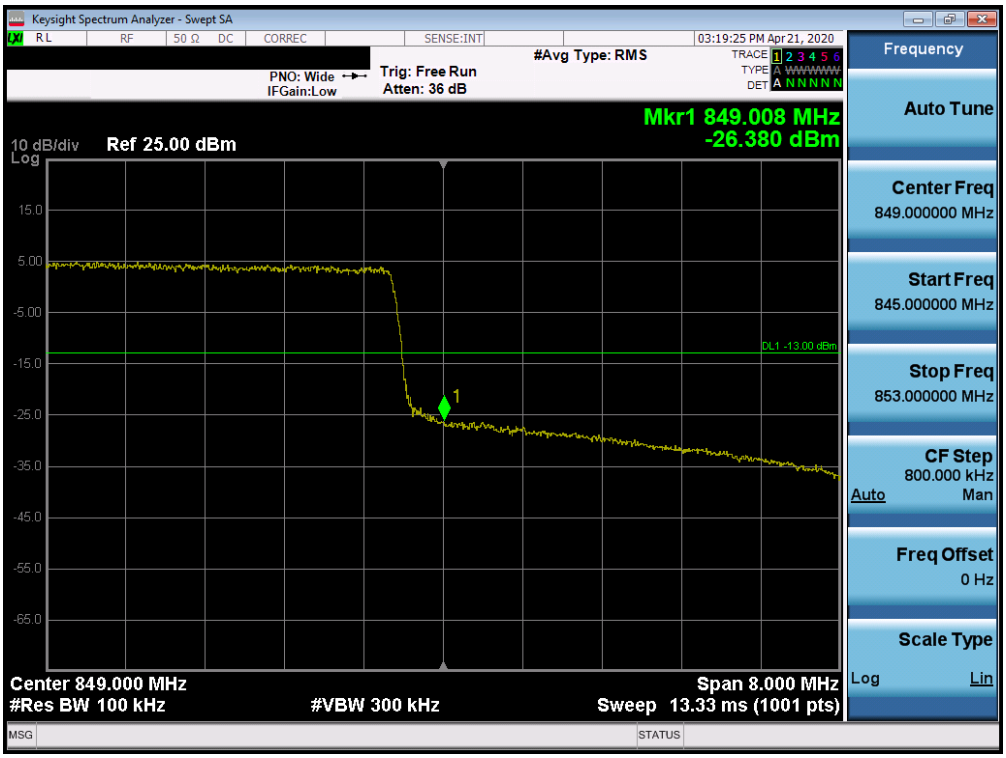
Plot 7-179. Lower Band Edge Plot (Band 26/5 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-180. Upper Band Edge Plot (Band 26/5 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-181. Lower Band Edge Plot (Band 26/5 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-182. Upper Band Edge Plot (Band 26/5 - 10.0MHz QPSK - Full RB Configuration)