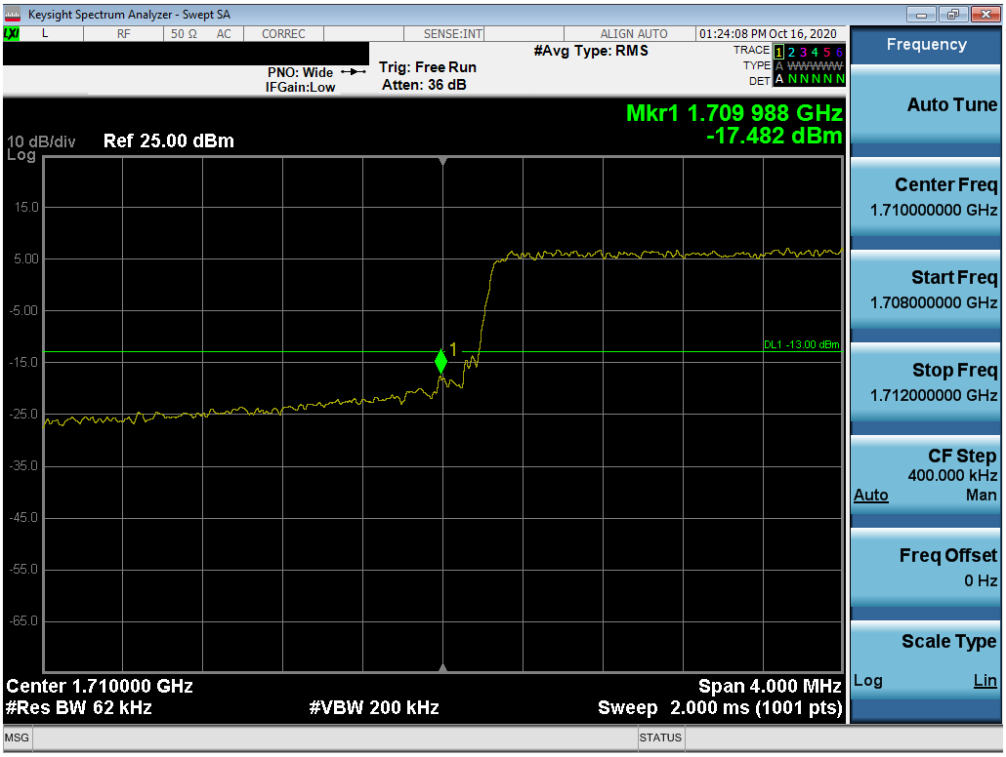
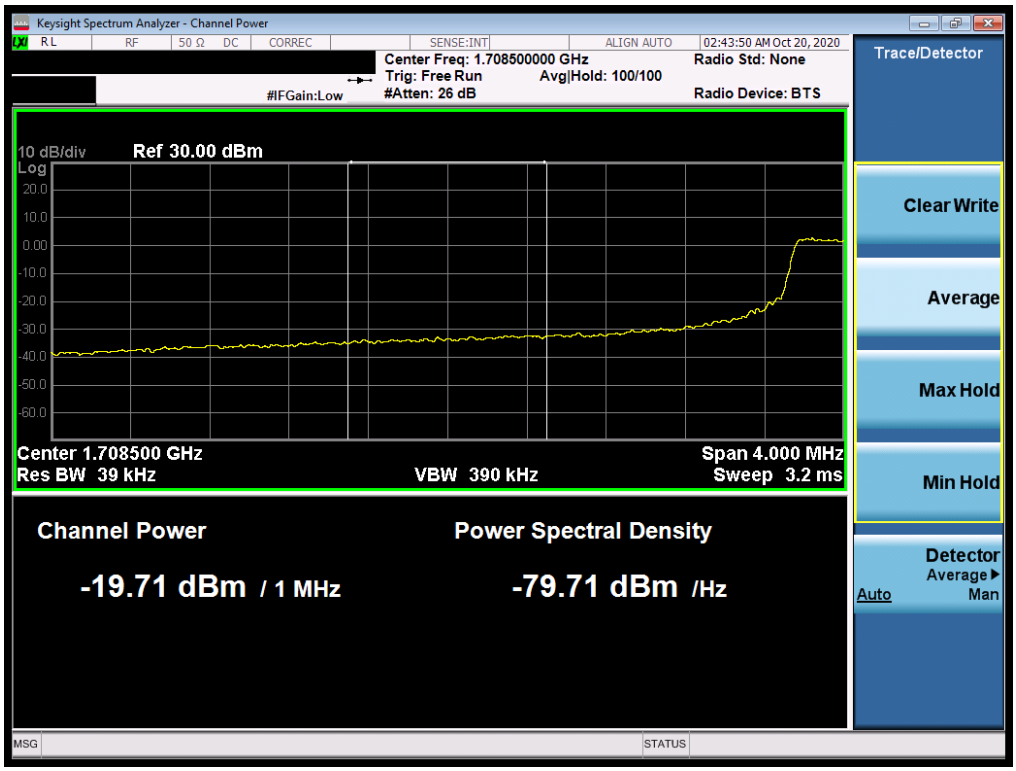
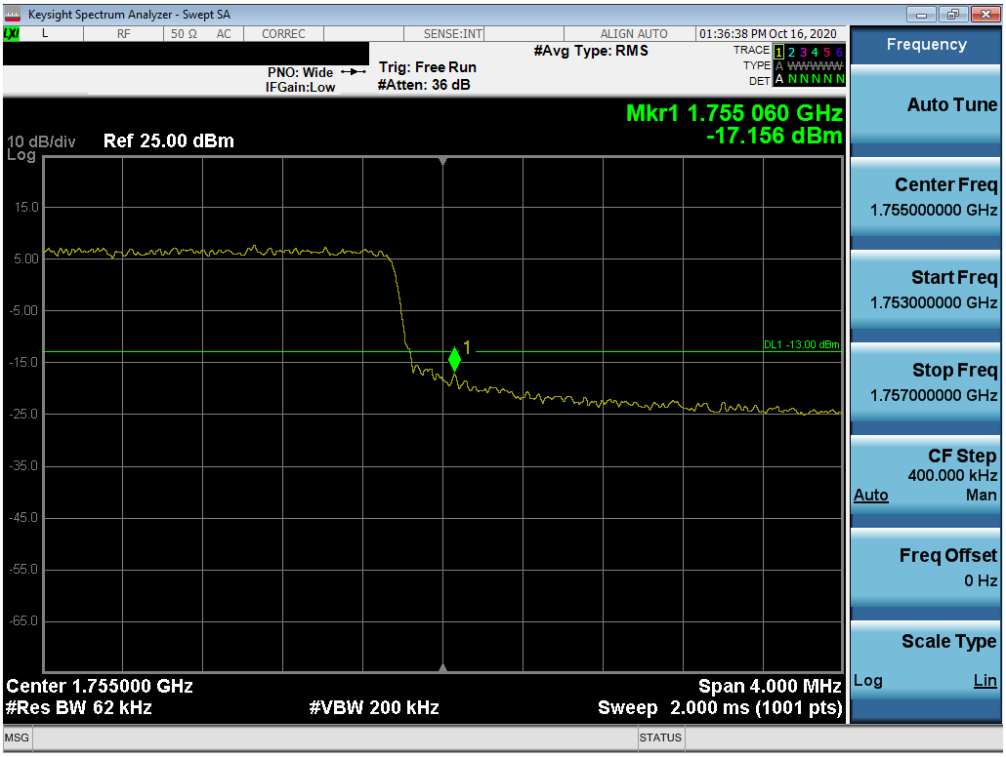


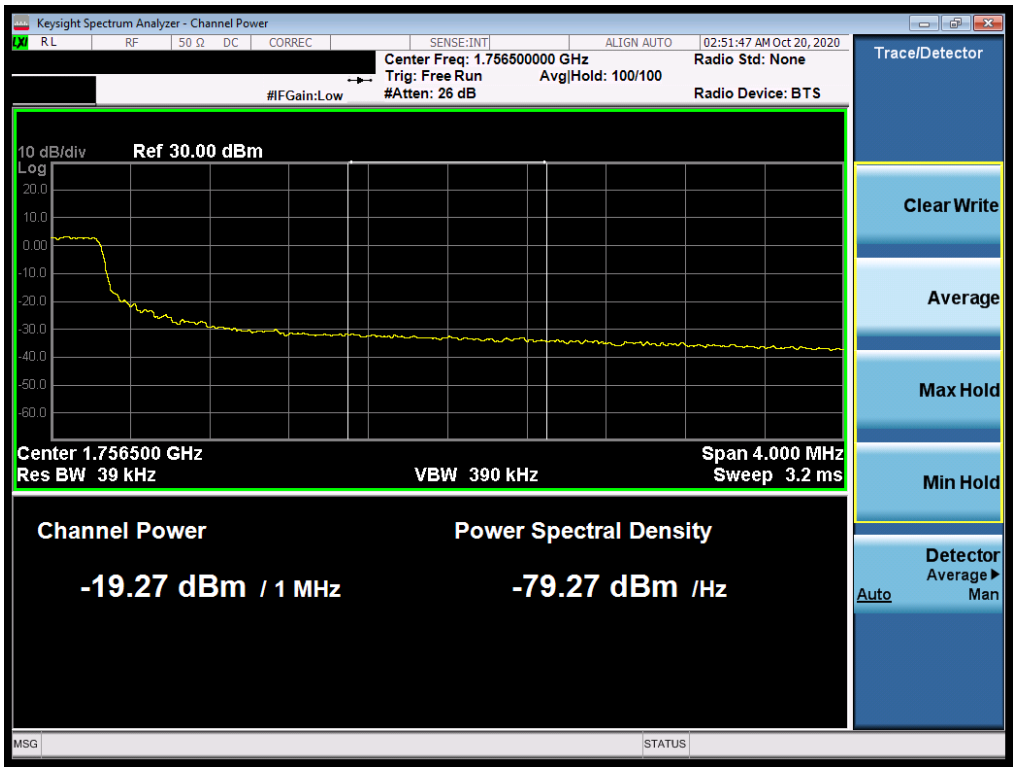
Plot 7-106. Lower Band Edge Plot (LTE Band 66/4 - 5MHz QPSK – Full RB Configuration)



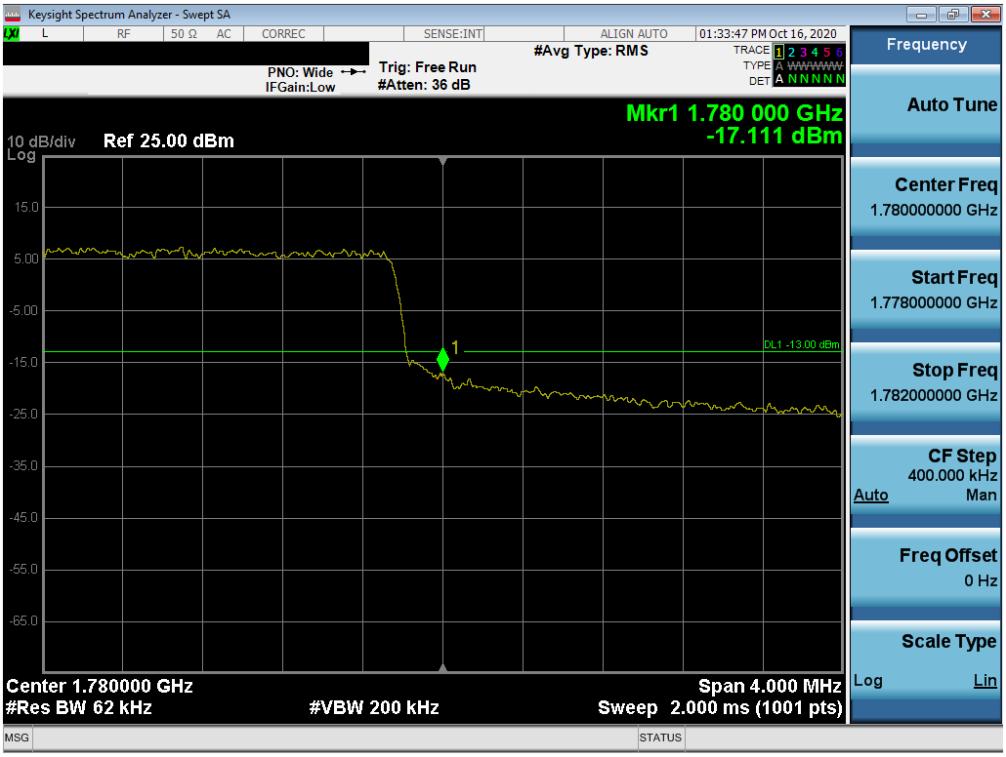
Plot 7-107. Lower Extended Band Edge Plot (LTE Band 66/4 - 5MHz QPSK – Full RB Configuration)



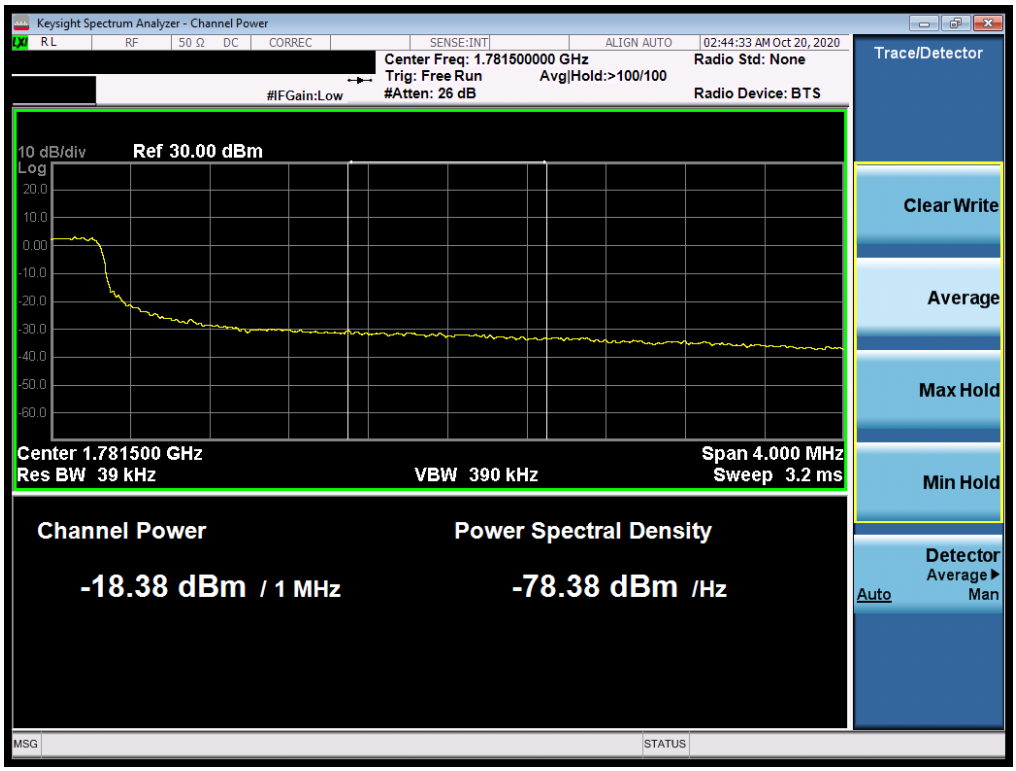
Plot 7-108. Upper Band Edge Plot (LTE Band 4 - 5MHz QPSK – Full RB Configuration)



Plot 7-109. Upper Extended Band Edge Plot (LTE Band 4 - 5MHz QPSK – Full RB Configuration)

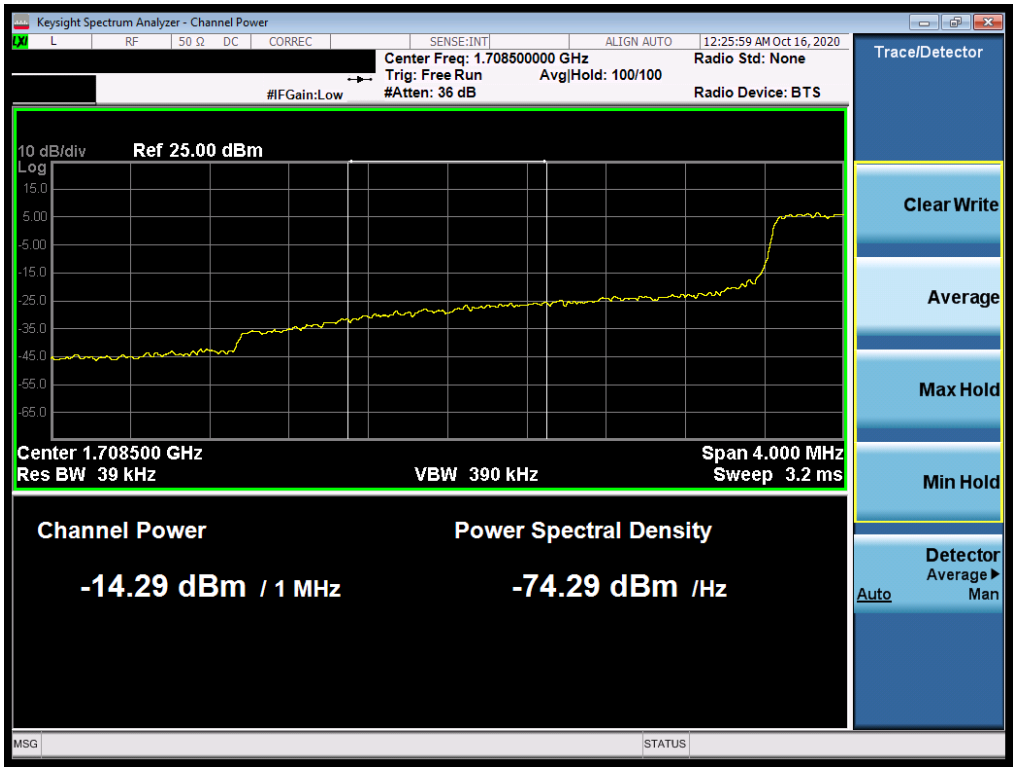


Plot 7-110. Upper Band Edge Plot (LTE Band 66 - 5MHz QPSK – Full RB Configuration)



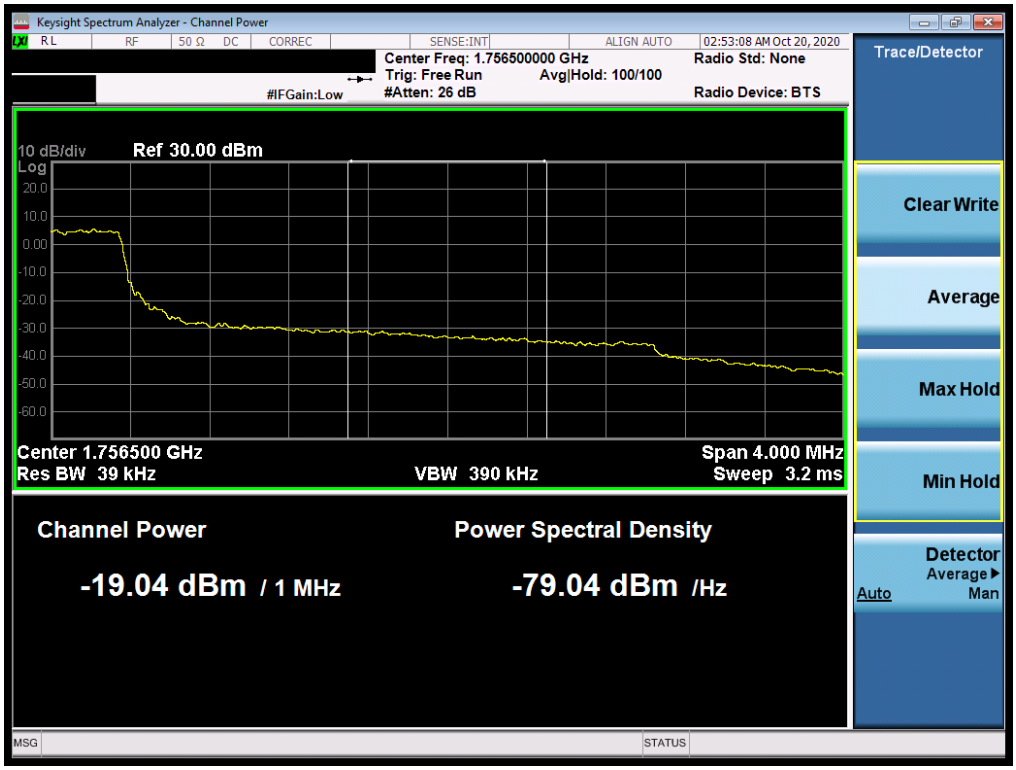
Plot 7-111. Upper Extended Band Edge Plot (LTE Band 66 - 5MHz QPSK – Full RB Configuration)

Plot 7-112. Lower Band Edge Plot (LTE Band 66/4 - 3MHz QPSK – Full RB Configuration)



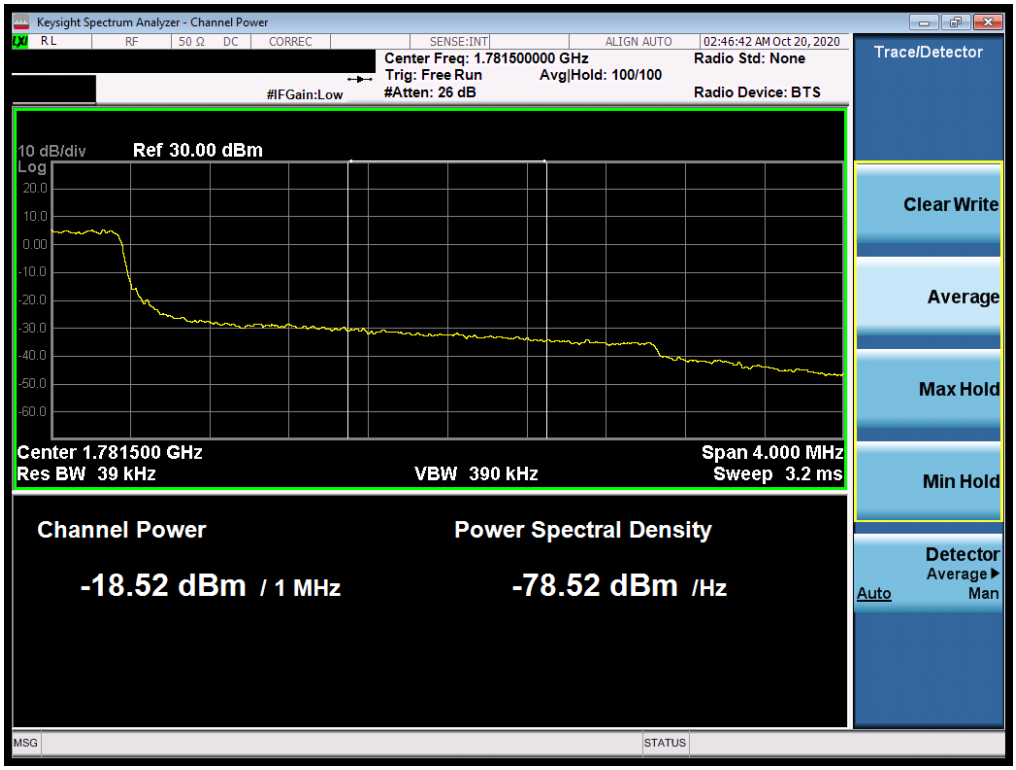
Plot 7-113. Lower Extended Band Edge Plot (LTE Band 66/4 - 3MHz QPSK – Full RB Configuration)

Plot 7-114. Upper Band Edge Plot (LTE Band 4 - 3MHz QPSK – Full RB Configuration)



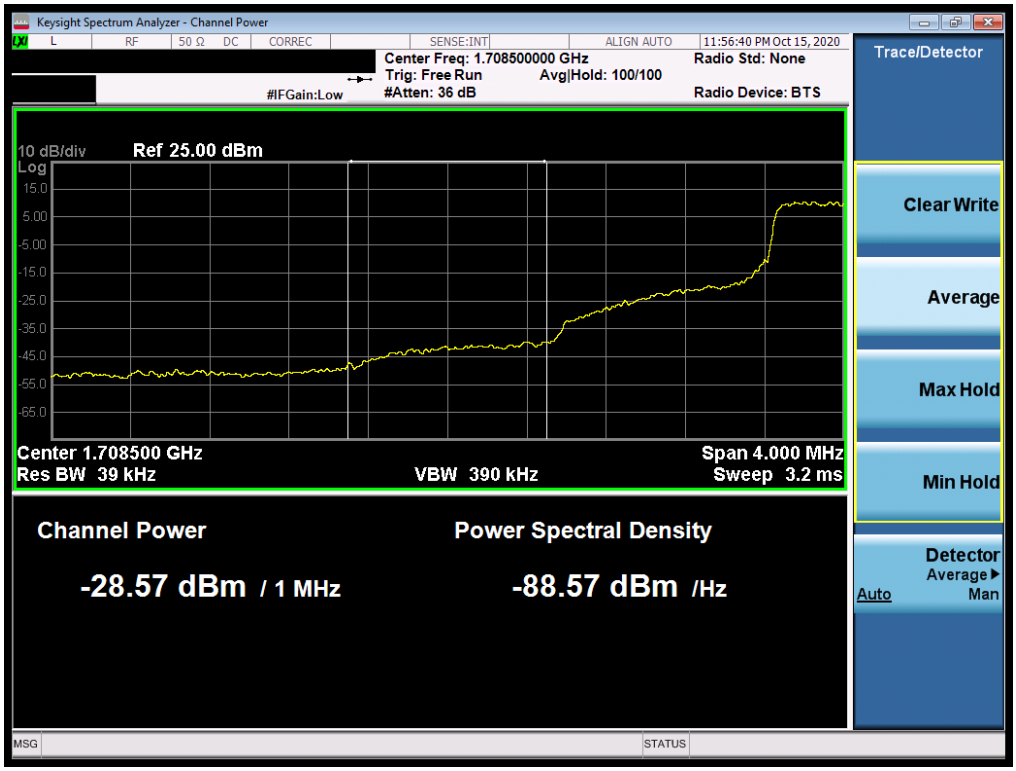
Plot 7-115. Upper Extended Band Edge Plot (LTE Band 4 - 3MHz QPSK – Full RB Configuration)

Plot 7-116. Upper Band Edge Plot (LTE Band 66 - 3MHz QPSK – Full RB Configuration)



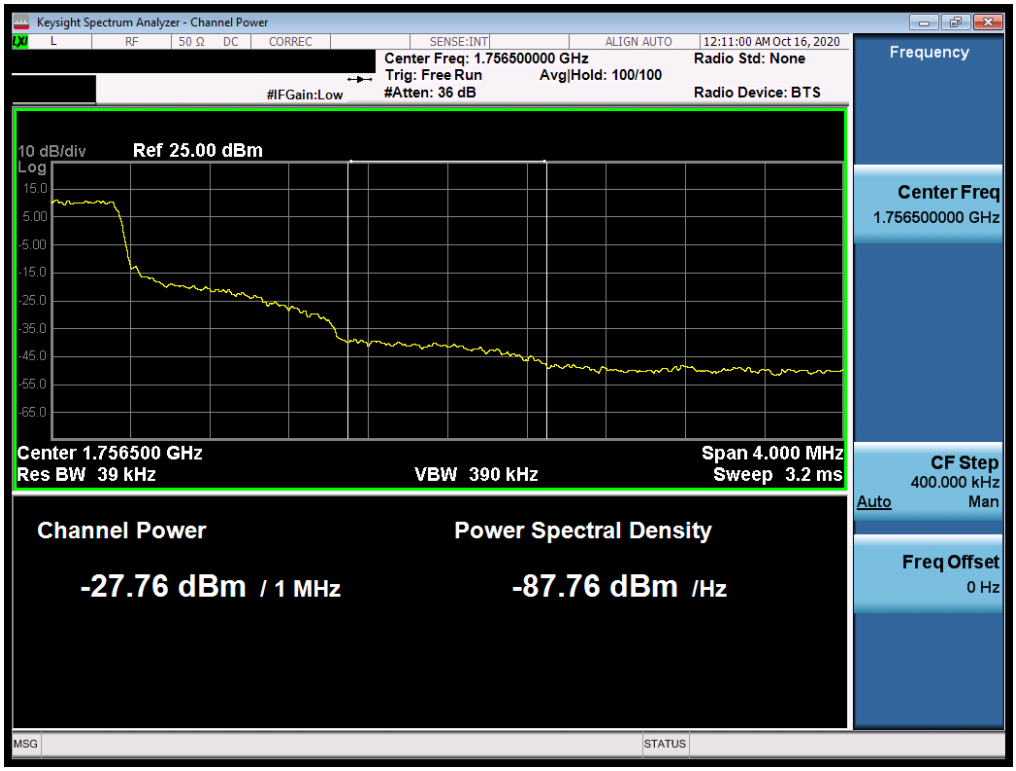
Plot 7-117. Upper Extended Band Edge Plot (LTE Band 66 - 3MHz QPSK – Full RB Configuration)

Plot 7-118. Lower Band Edge Plot (LTE Band 66/4 – 1.4MHz QPSK – Full RB Configuration)



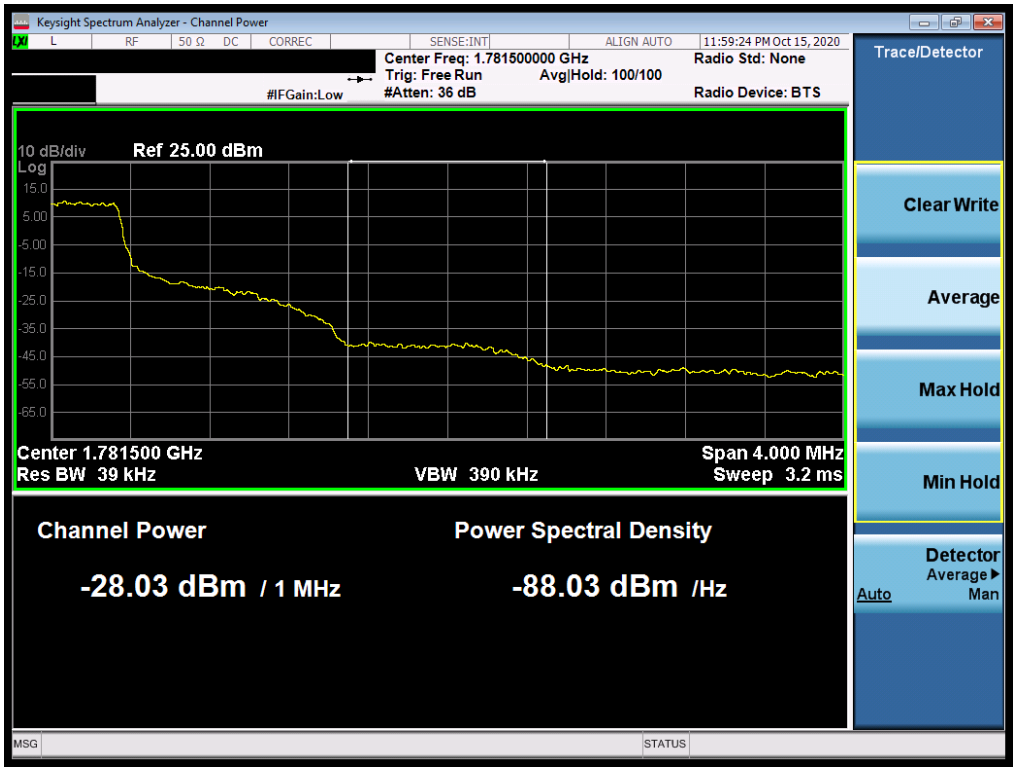
Plot 7-119. Lower Extended Band Edge Plot (LTE Band 66/4 – 1.4MHz QPSK – Full RB Configuration)

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

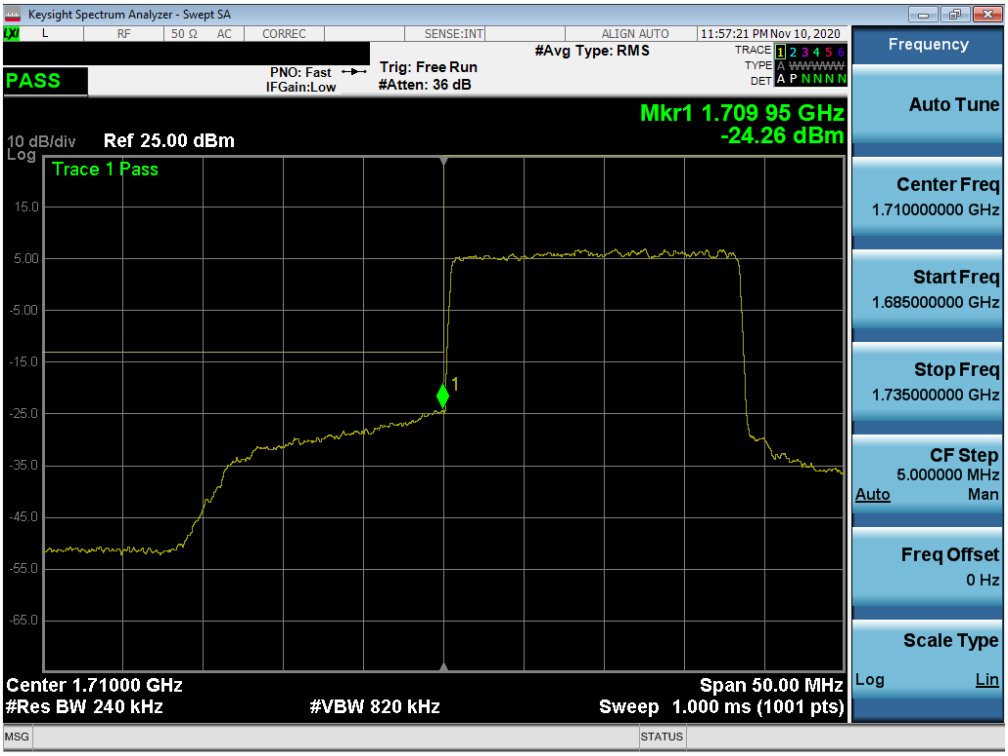


Plot 7-121. Upper Extended Band Edge Plot (LTE Band 4 – 1.4MHz QPSK – Full RB Configuration)

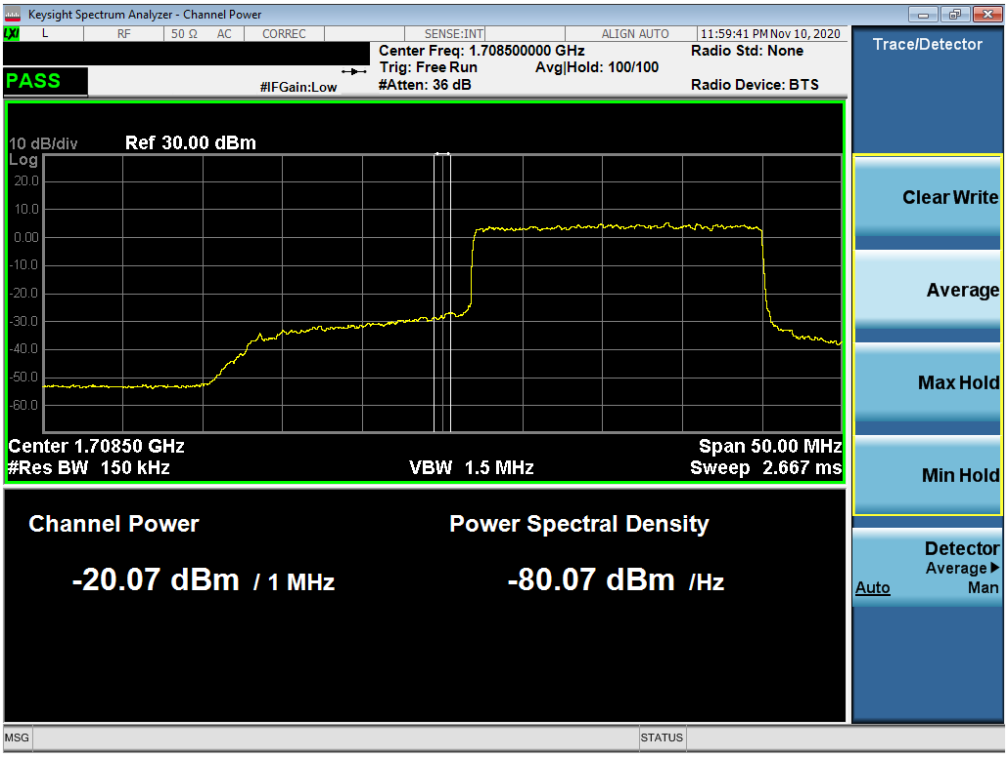
Plot 7-122. Upper Band Edge Plot (LTE Band 66 – 1.4MHz QPSK – Full RB Configuration)



Plot 7-123. Upper Extended Band Edge Plot (LTE Band 66 – 1.4MHz QPSK – Full RB Configuration)

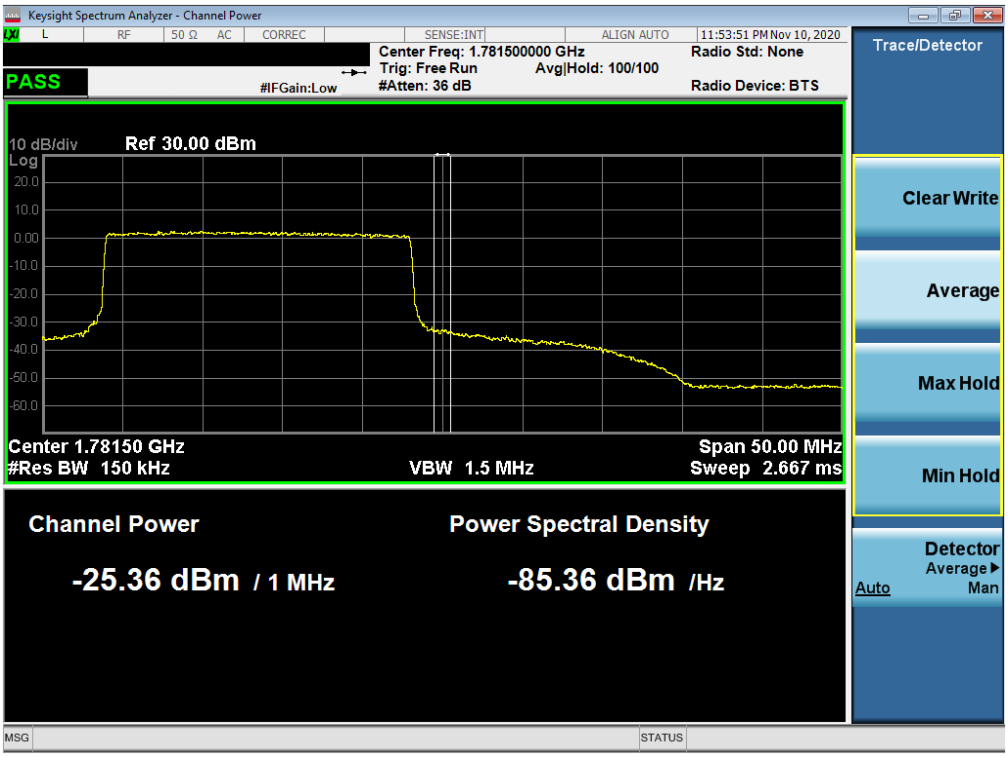


Plot 7-124. Lower Band Edge Plot (NR Band n66 – 20.0MHz-DFT-s - Full RB)

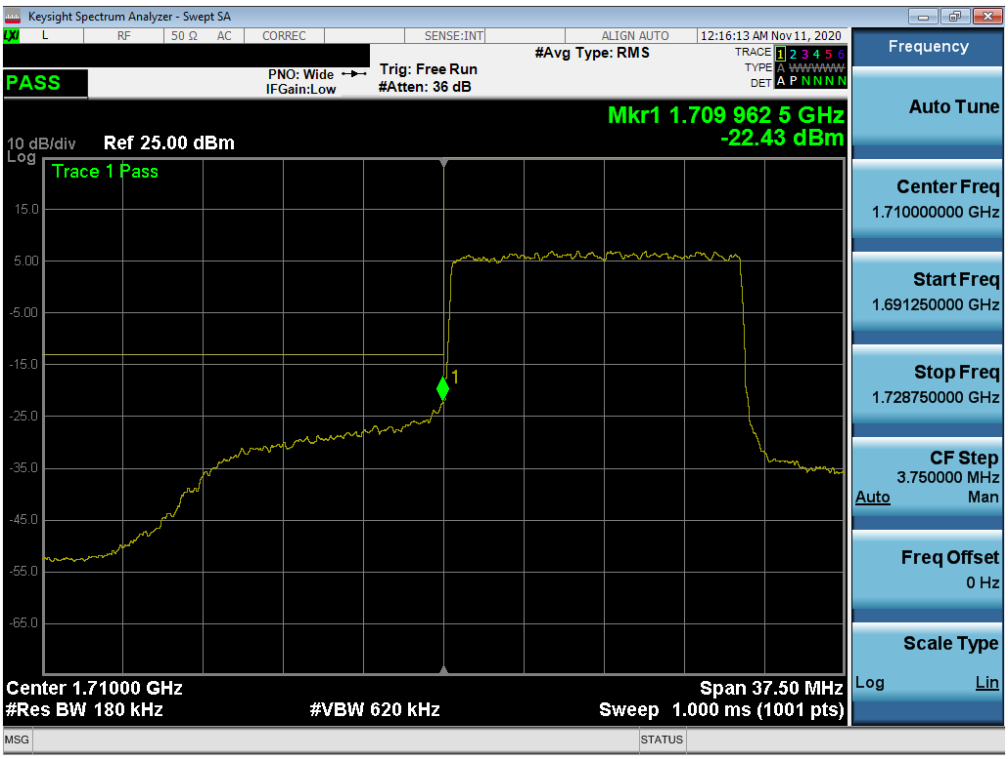


Plot 7-125. Lower Extended Band Edge Plot (NR Band n66 – 20.0MHz-DFT-s - Full RB)

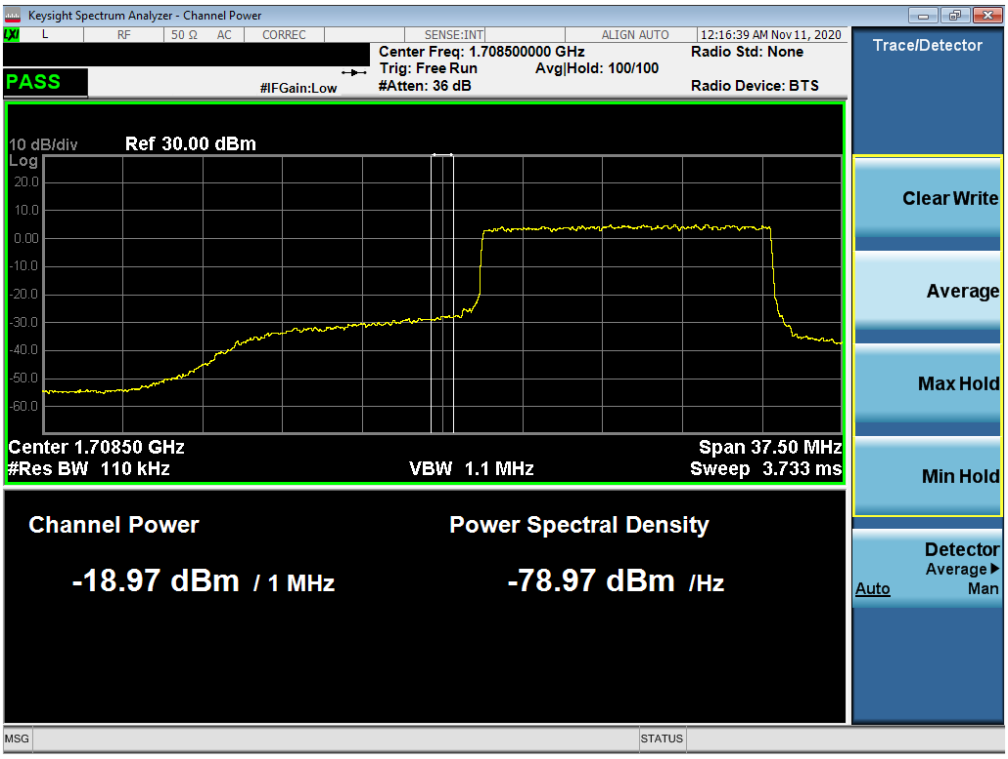
Plot 7-126. Upper Band Edge Plot (NR Band n66 – 20.0MHz-CP - Full RB)



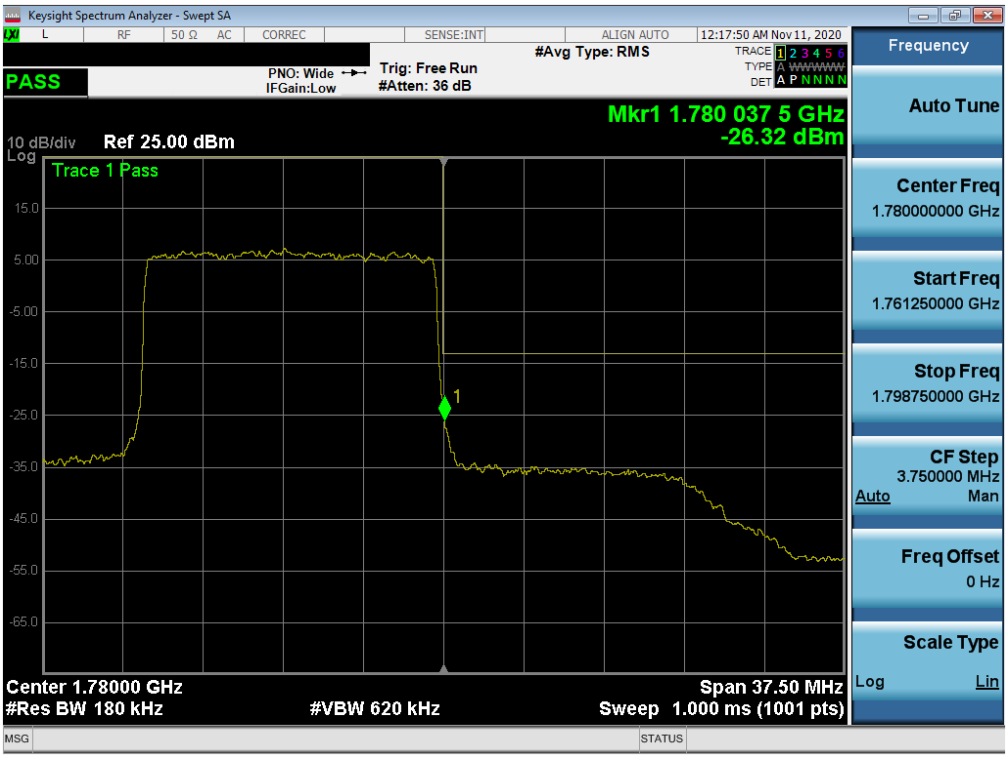
Plot 7-127. Upper Extended Band Edge Plot (NR Band n66 – 20.0MHz-CP - Full RB)



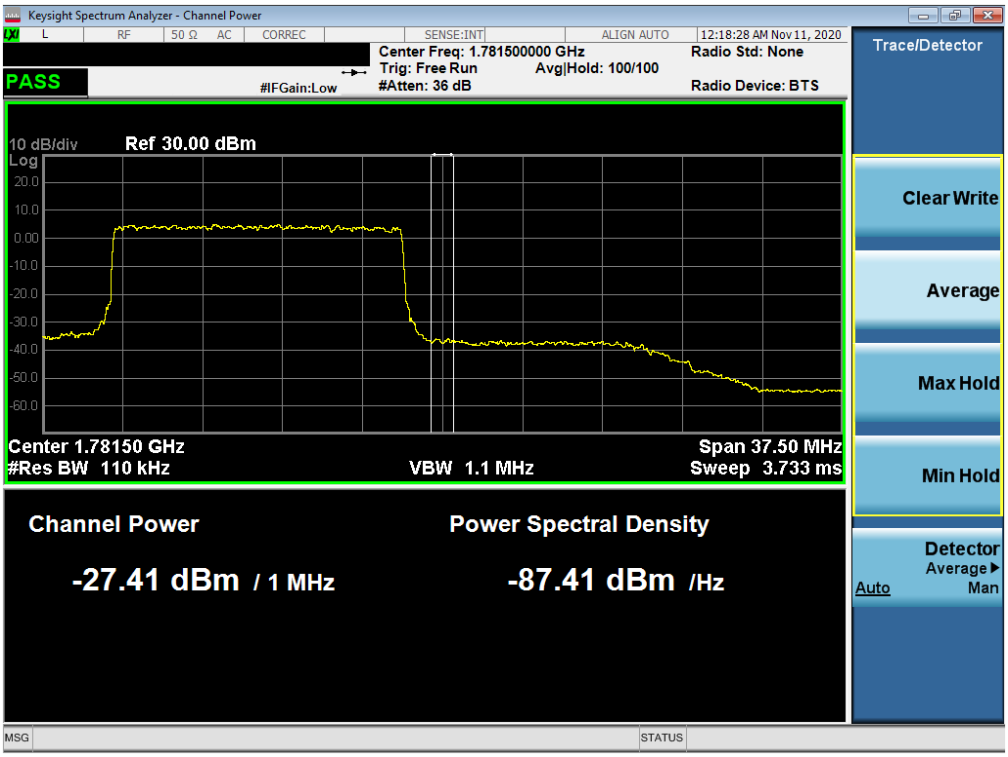
Plot 7-128. Lower Band Edge Plot (NR Band n66 – 15.0MHz-DFT-s - Full RB)



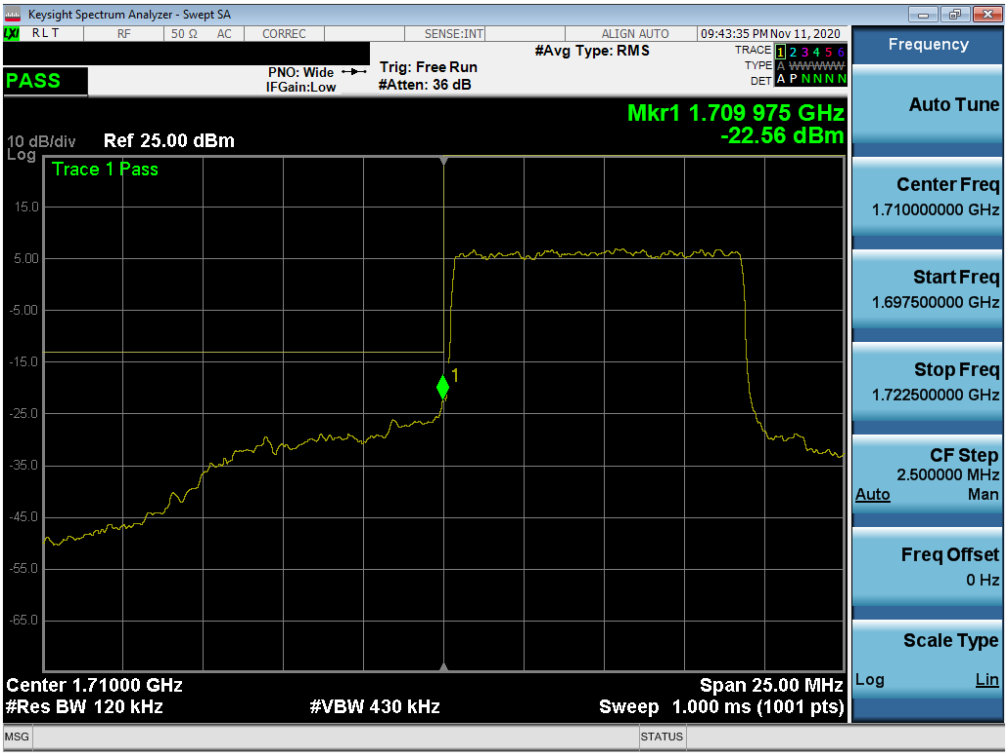
Plot 7-129. Lower Extended Band Edge Plot (NR Band n66 – 15.0MHz DFT-s - Full RB)



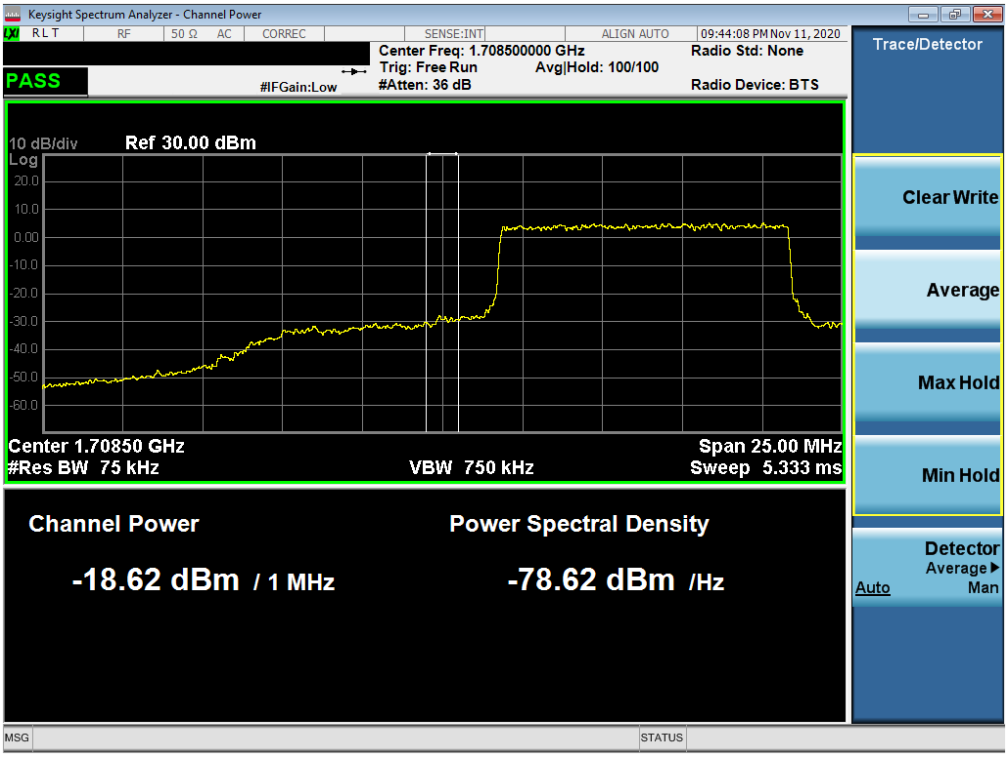
Plot 7-130. Upper Band Edge Plot (NR Band n66 – 15.0MHz DFT-s - Full RB)



Plot 7-131. Upper Extended Band Edge Plot (NR Band n66 – 15.0MHz DFT-s - Full RB)

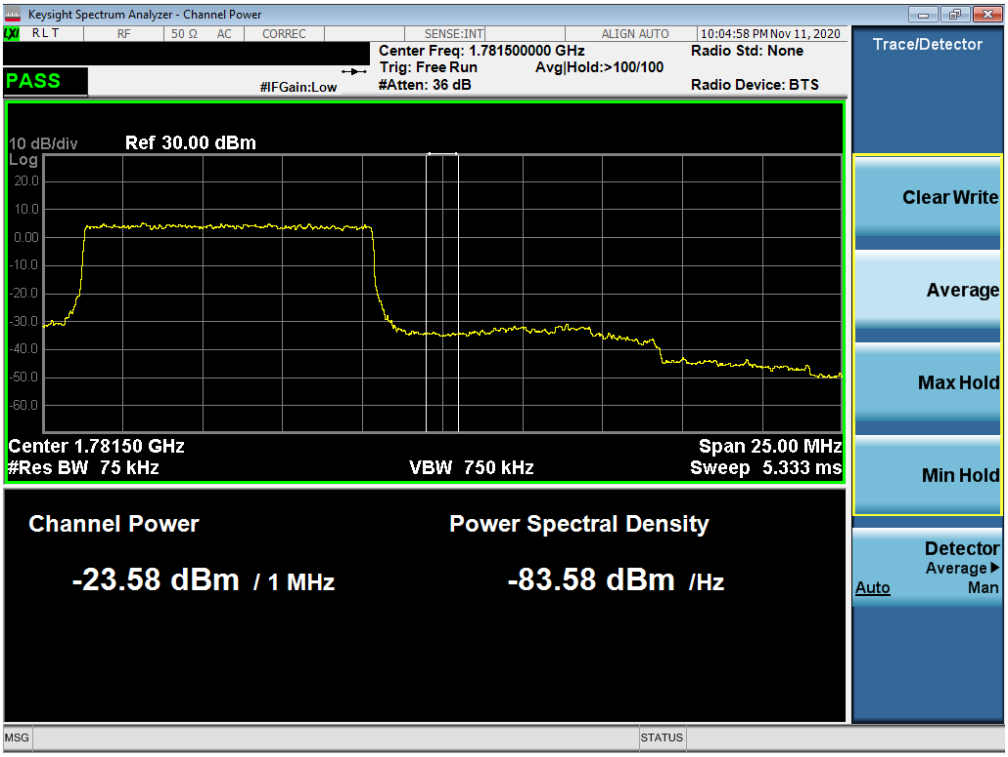


Plot 7-132. Lower Band Edge Plot (NR Band n66 – 10.0MHz DFT-s - Full RB)

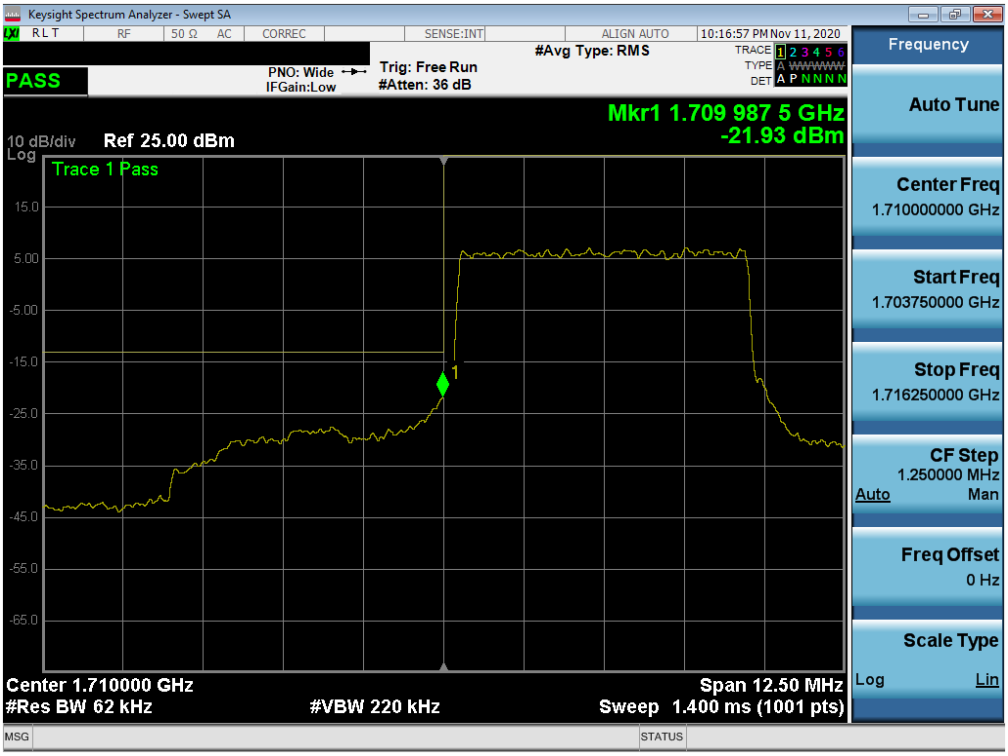


Plot 7-133. Lower Extended Band Edge Plot (NR Band n66 – 10.0MHz DFT-s - Full RB)

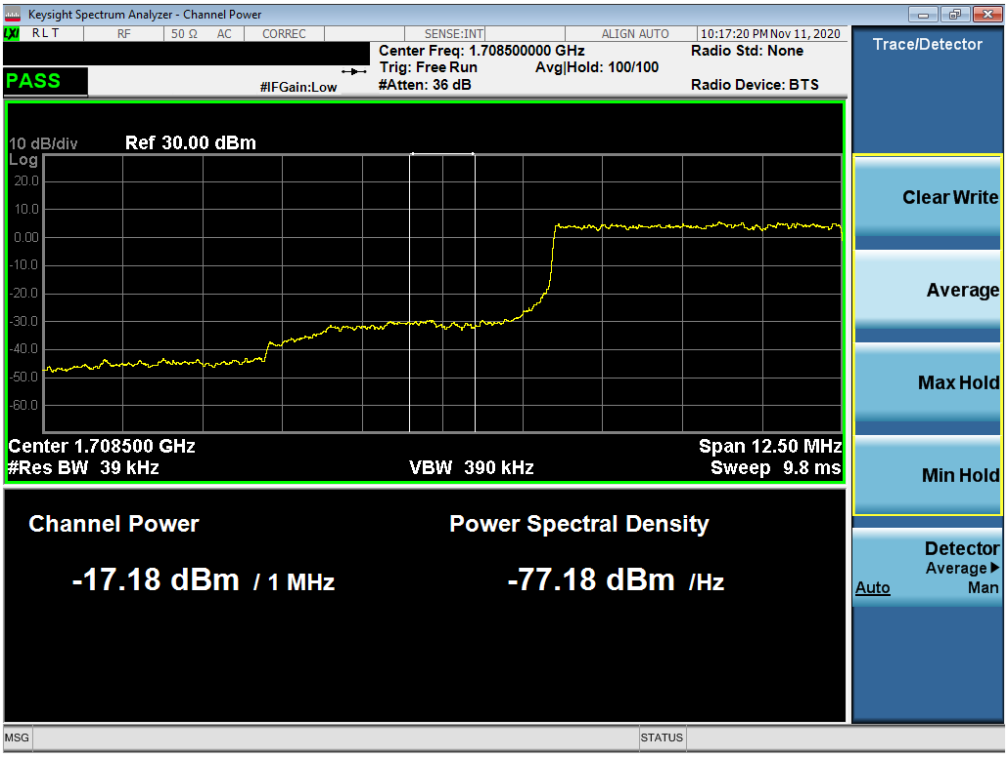
Plot 7-134. Upper Band Edge Plot (NR Band n66 – 10.0MHz DFT-s - Full RB)



Plot 7-135. Upper Extended Band Edge Plot (NR Band n66 – 10.0MHz DFT-s - Full RB)

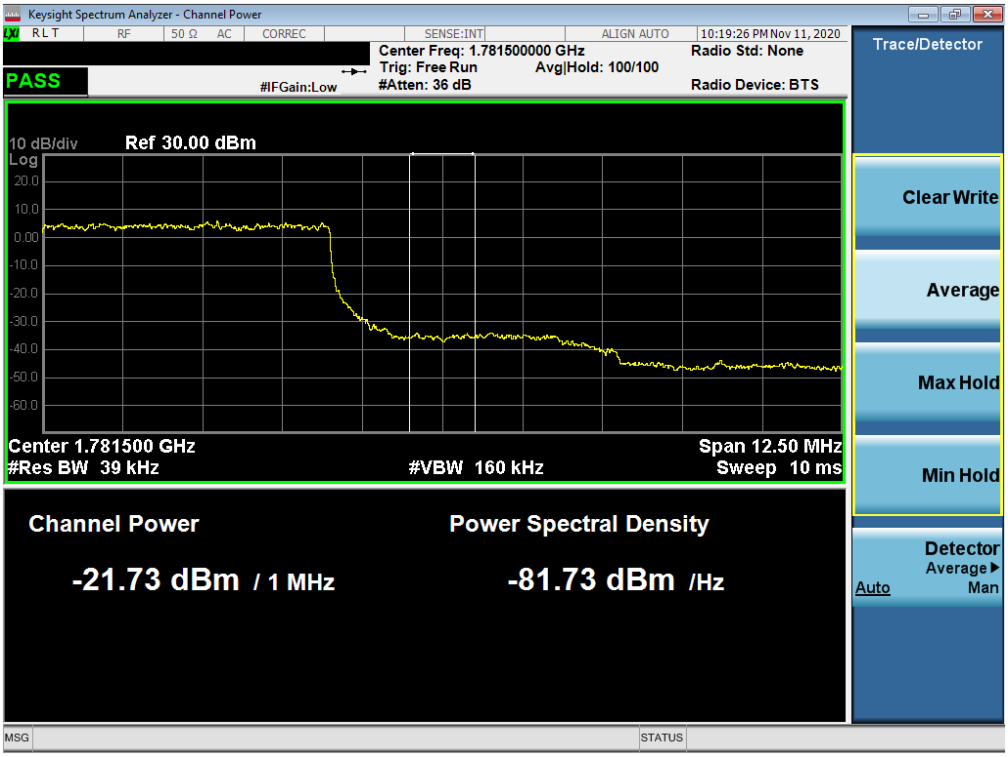


Plot 7-136. Lower Band Edge Plot (NR Band n66 – 5.0MHz DFT-s - Full RB)



Plot 7-137. Lower Extended Band Edge Plot (NR Band n66 – 5.0MHz DFT-s - Full RB)

Plot 7-138. Upper Band Edge Plot (NR Band n66 – 5.0MHz DFT-s - Full RB)



Plot 7-139. Upper Extended Band Edge Plot (NR Band n66 – 5.0MHz DFT-s - Full RB

7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 18GHz (separated into at least two plots per channel)
2. RBW ≥ 100kHz
3. VBW ≥ 3 x RBW
4. Detector = RMS
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

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

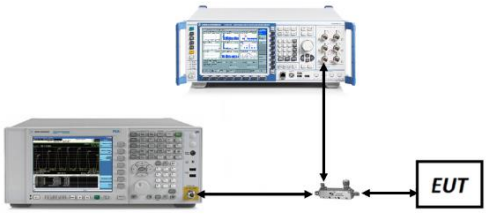
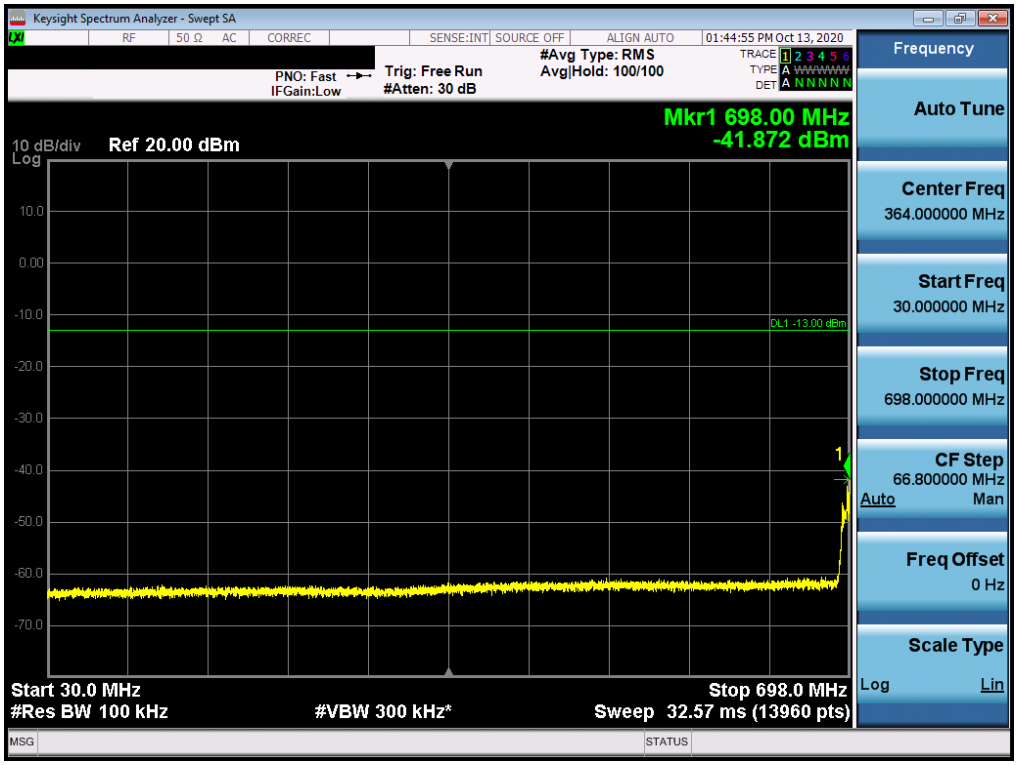


Figure 7-3. Test Instrument & Measurement Setup

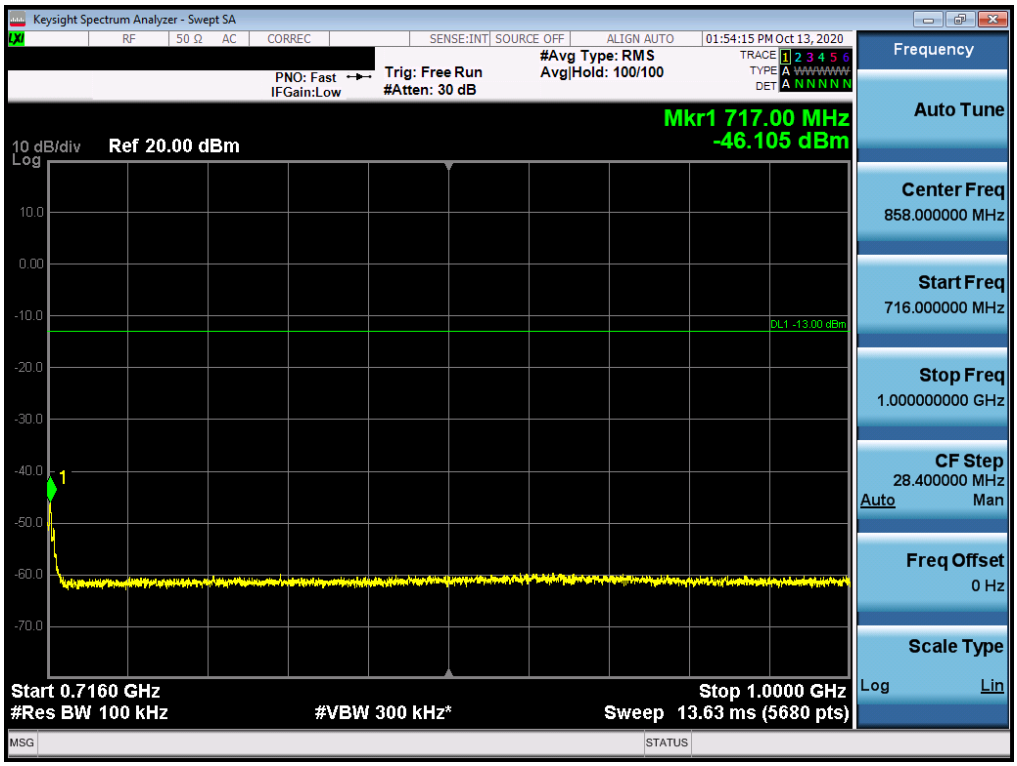
Test Notes

1. Per Part 27 and RSS-139, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. 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.

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.

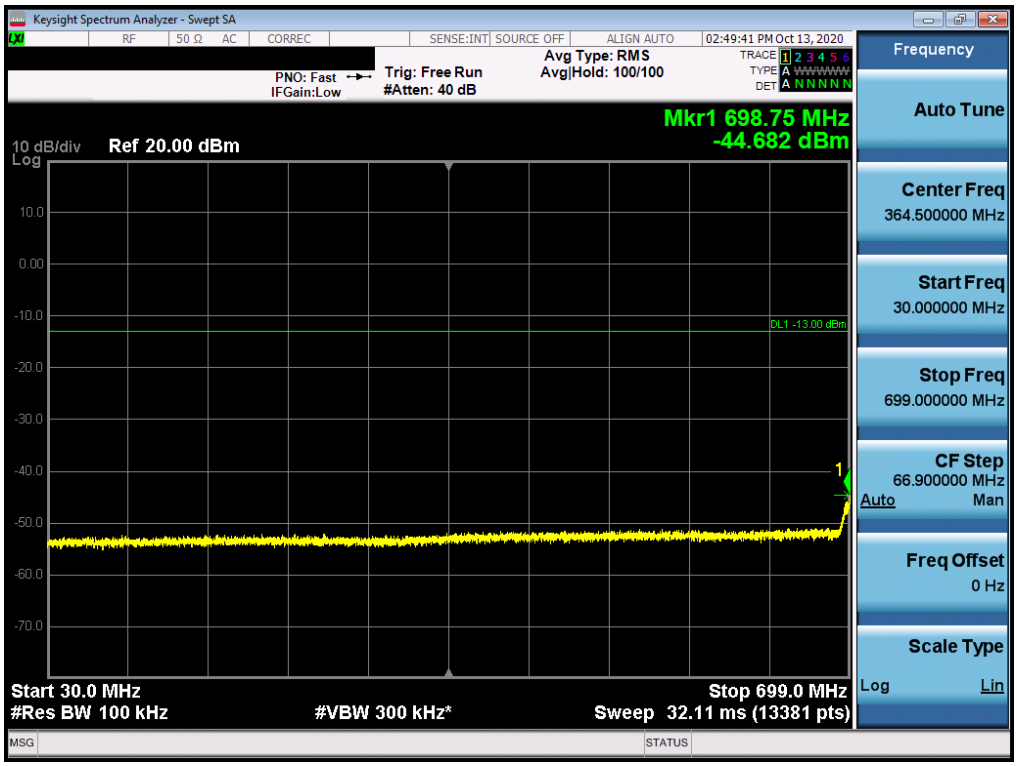


Plot 7-140. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

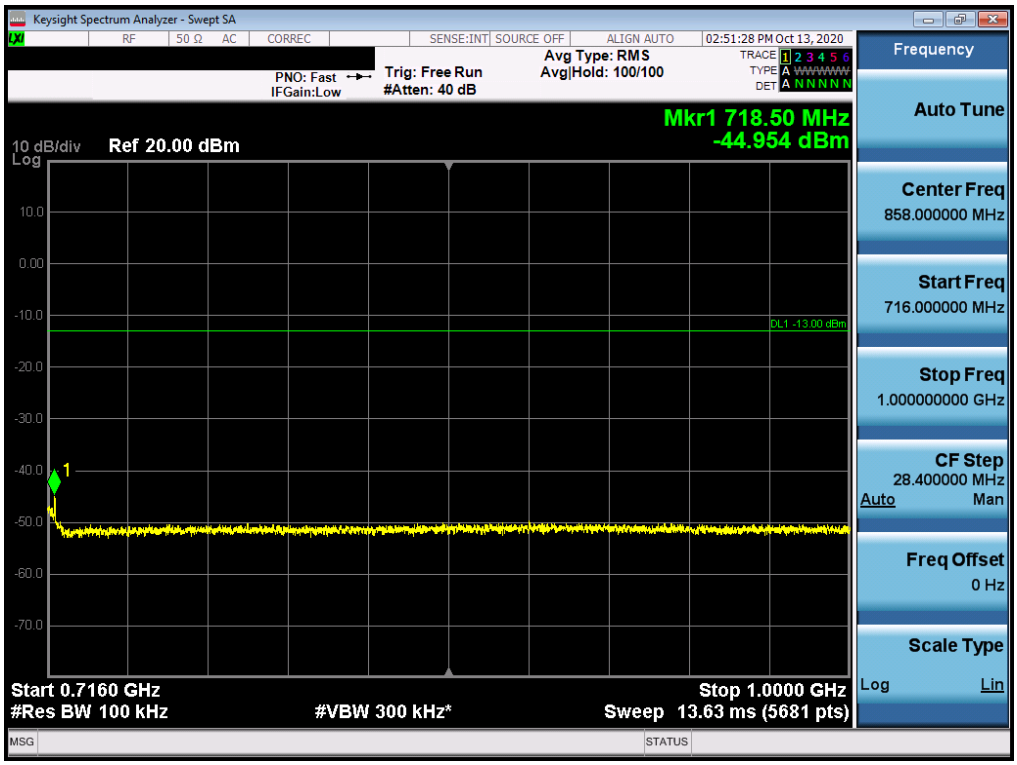


Plot 7-141. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

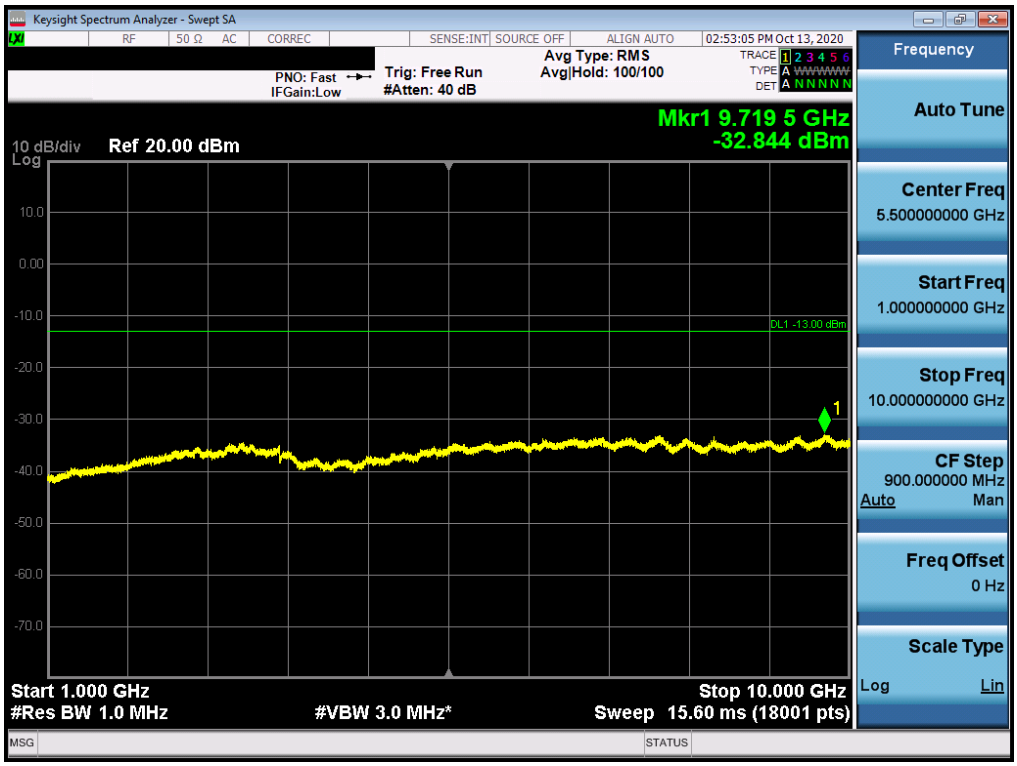
Plot 7-142. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



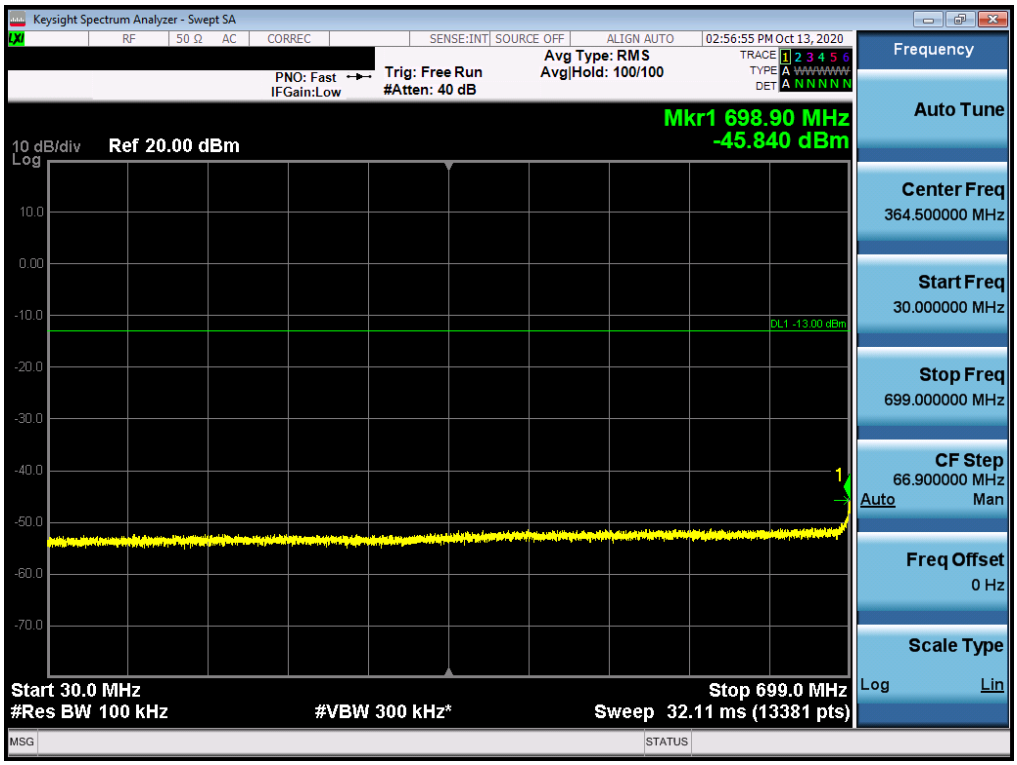
Plot 7-143. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



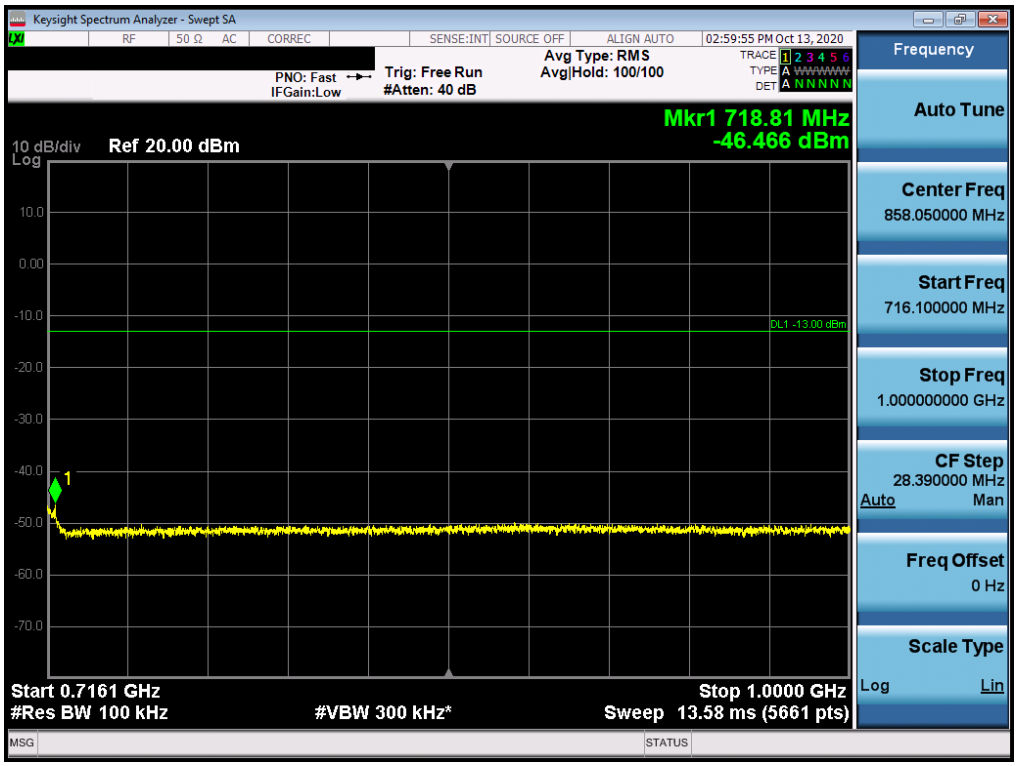
Plot 7-144. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



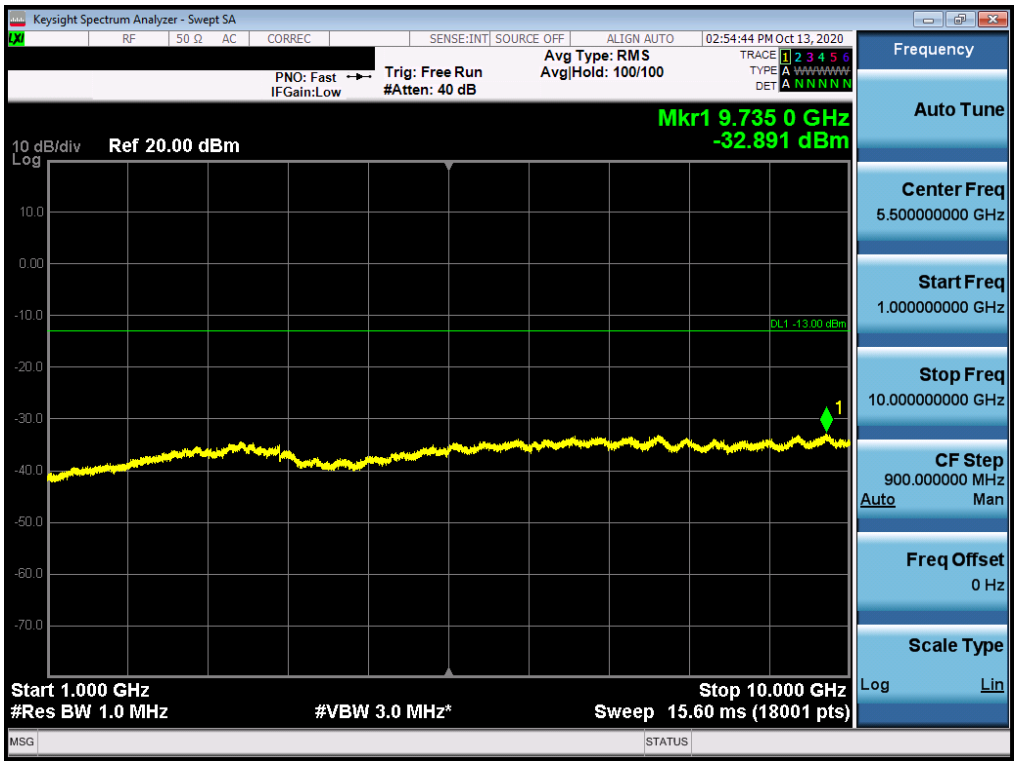
Plot 7-145. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-146. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

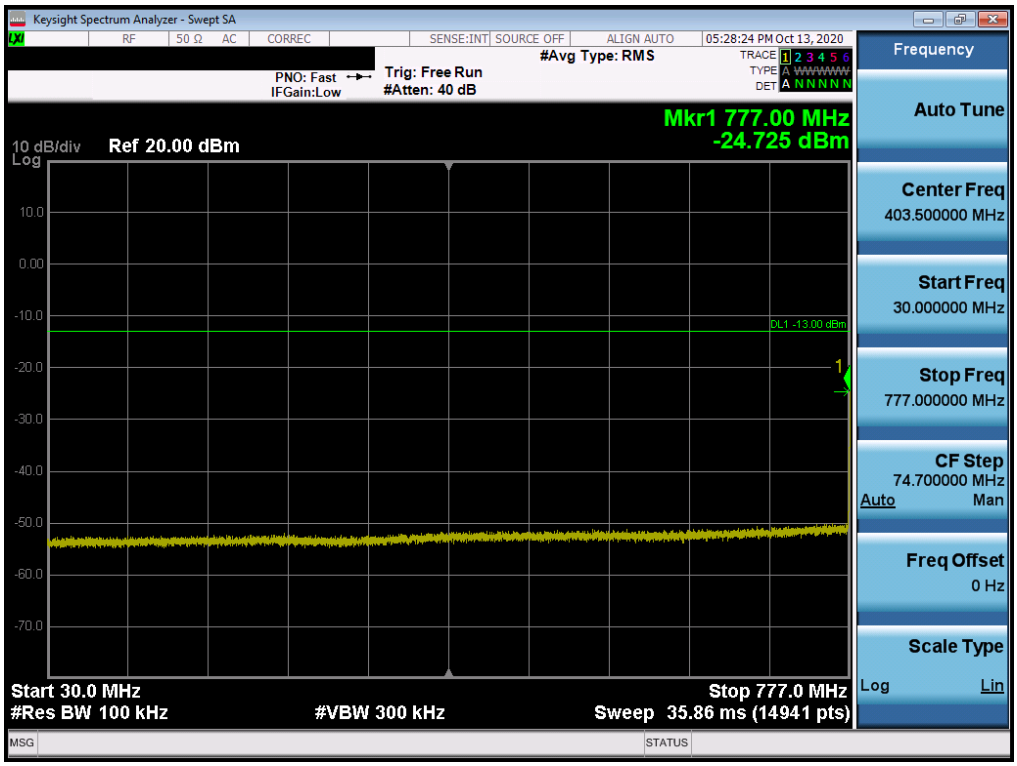


Plot 7-147. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

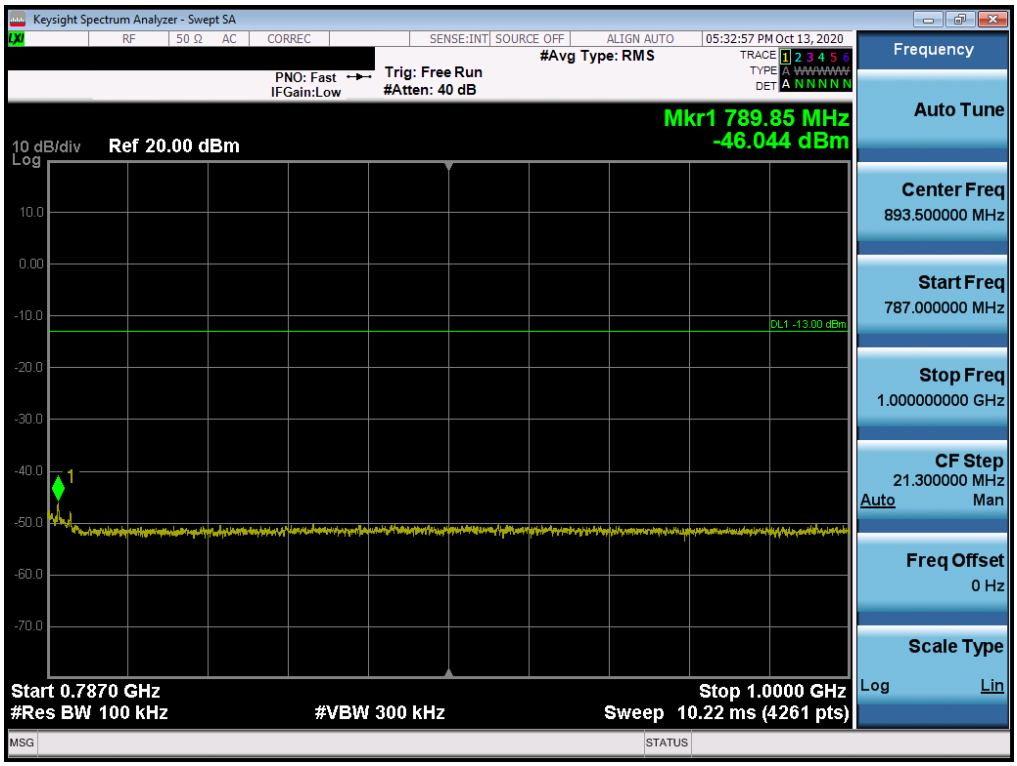


Plot 7-148. Conducted Spurious Plot (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

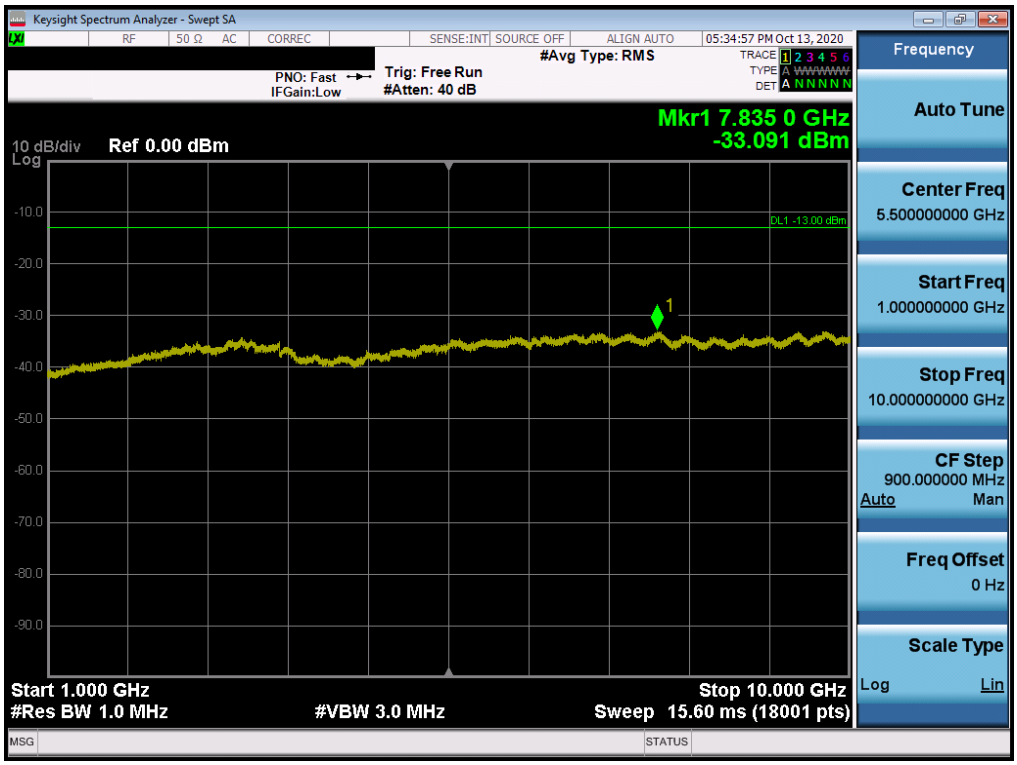
LTE Band 13



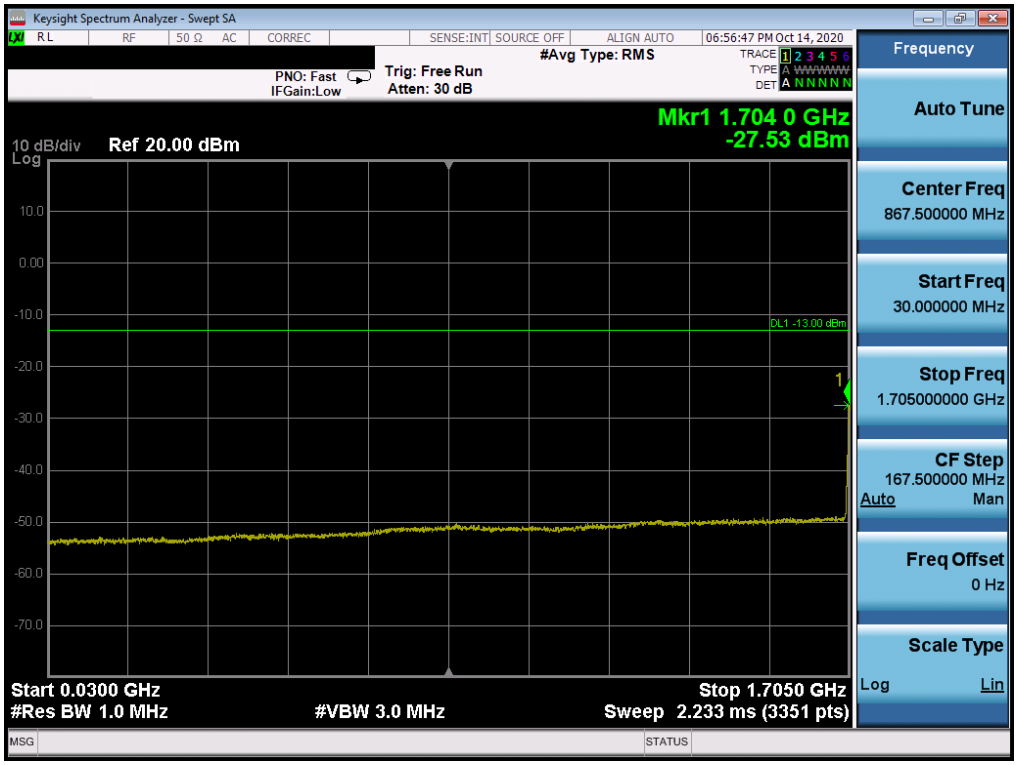
Plot 7-149. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - RB Size 1, RB Offset 0)



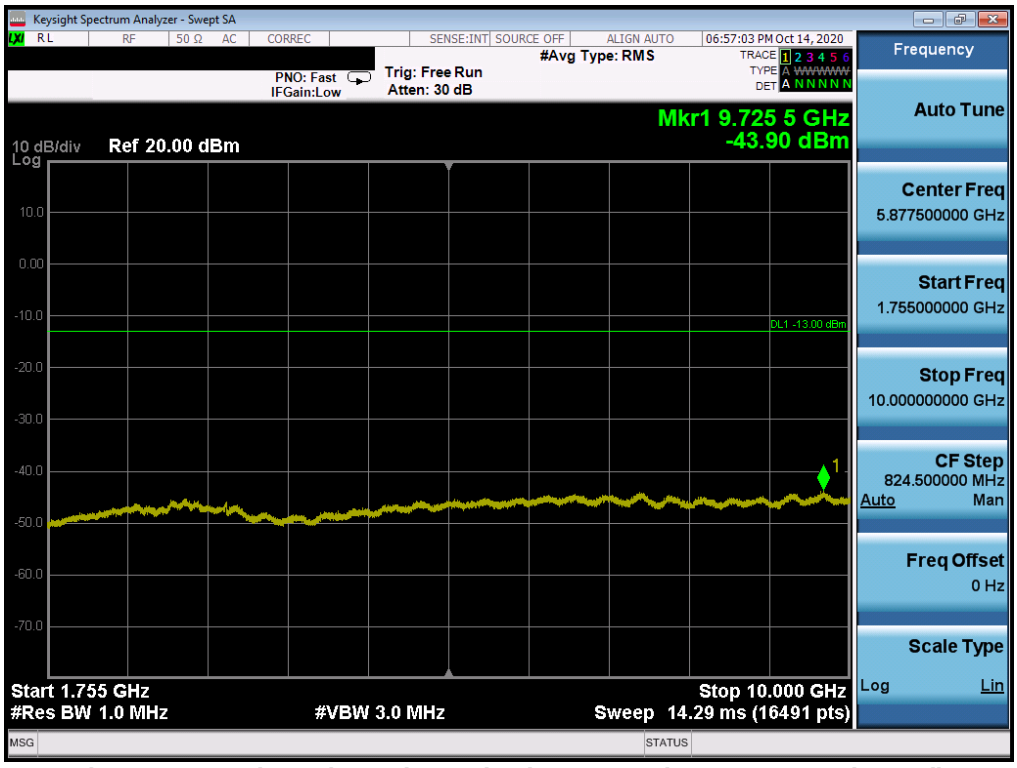
Plot 7-150. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - RB Size 1, RB Offset 0)



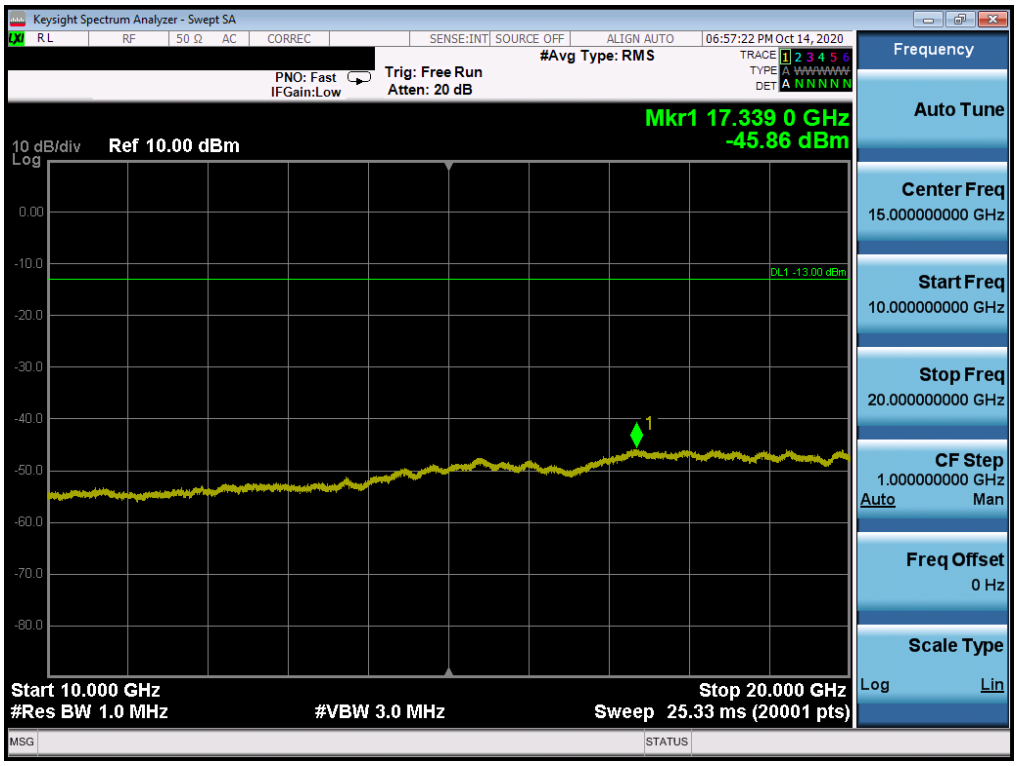
Plot 7-151. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - RB Size 1, RB Offset 0)



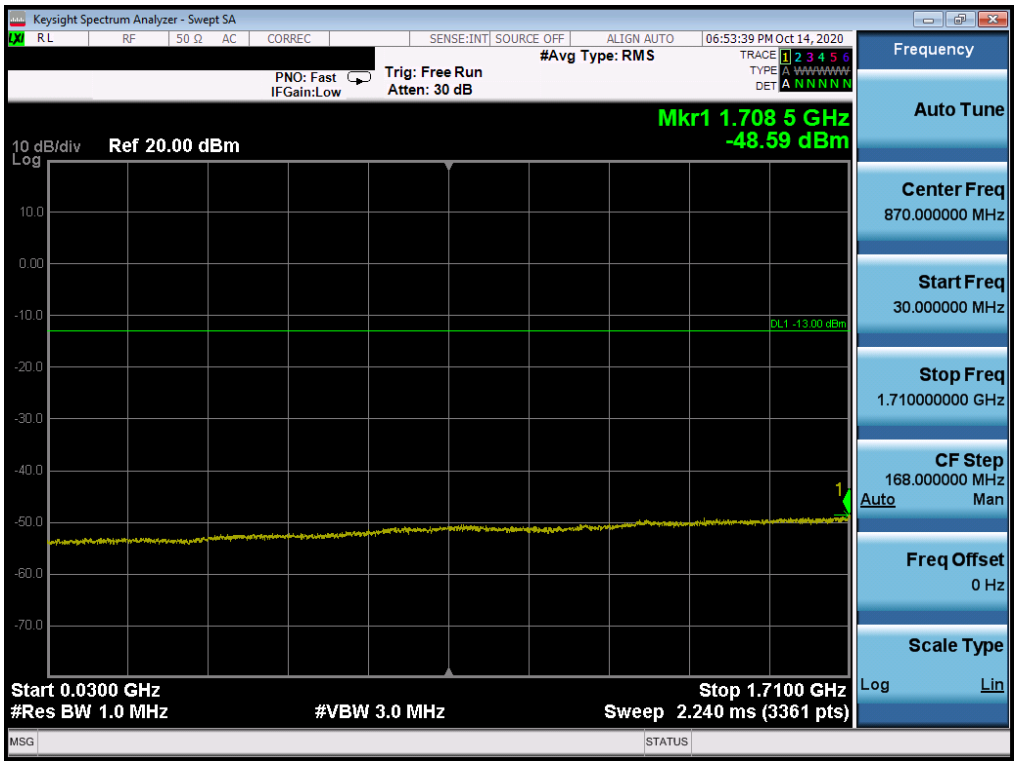
Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 1312- Low Channel)



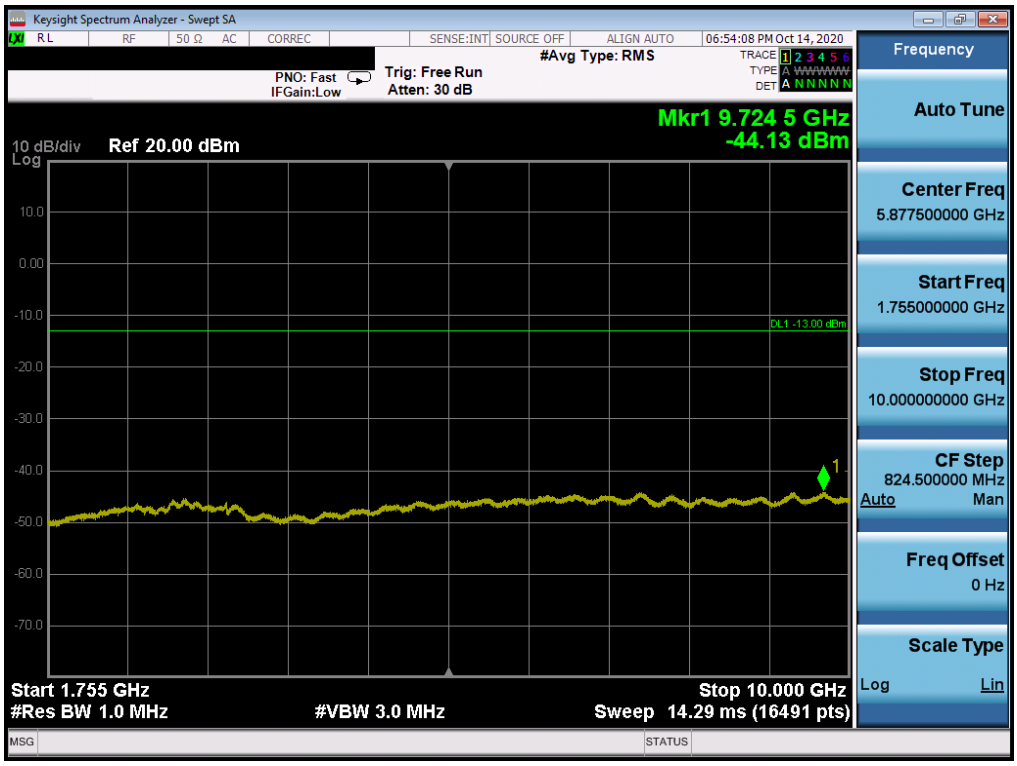
Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 1312- Low Channel)



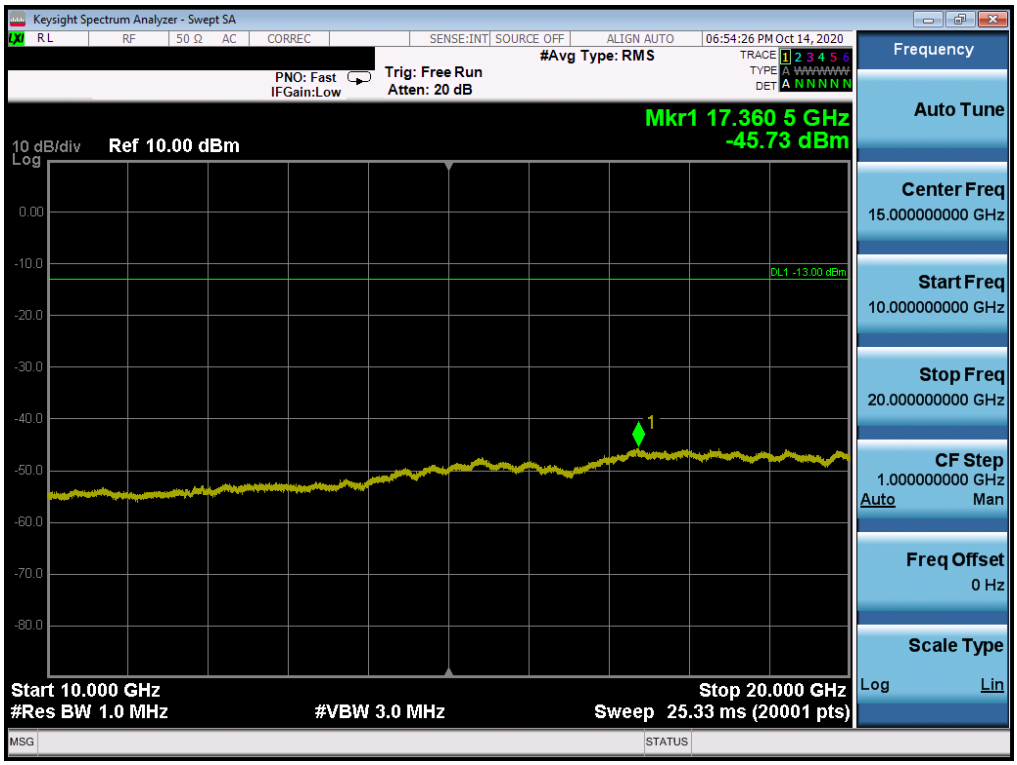
Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 1312- Low Channel)



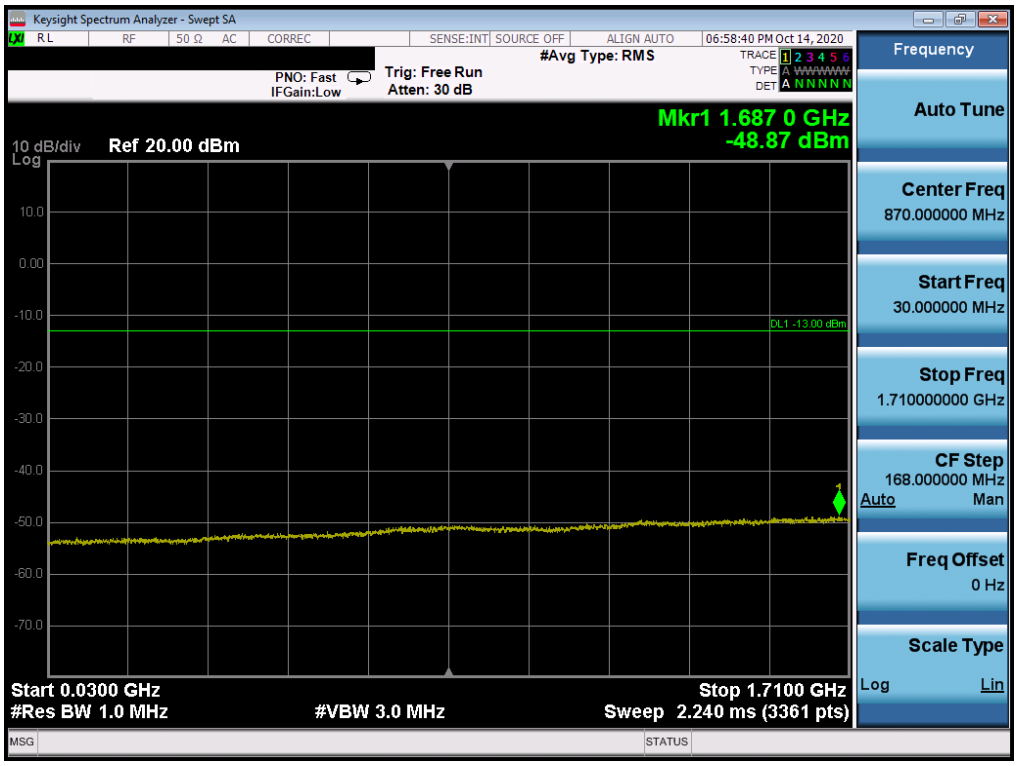
Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 1413- Mid Channel)



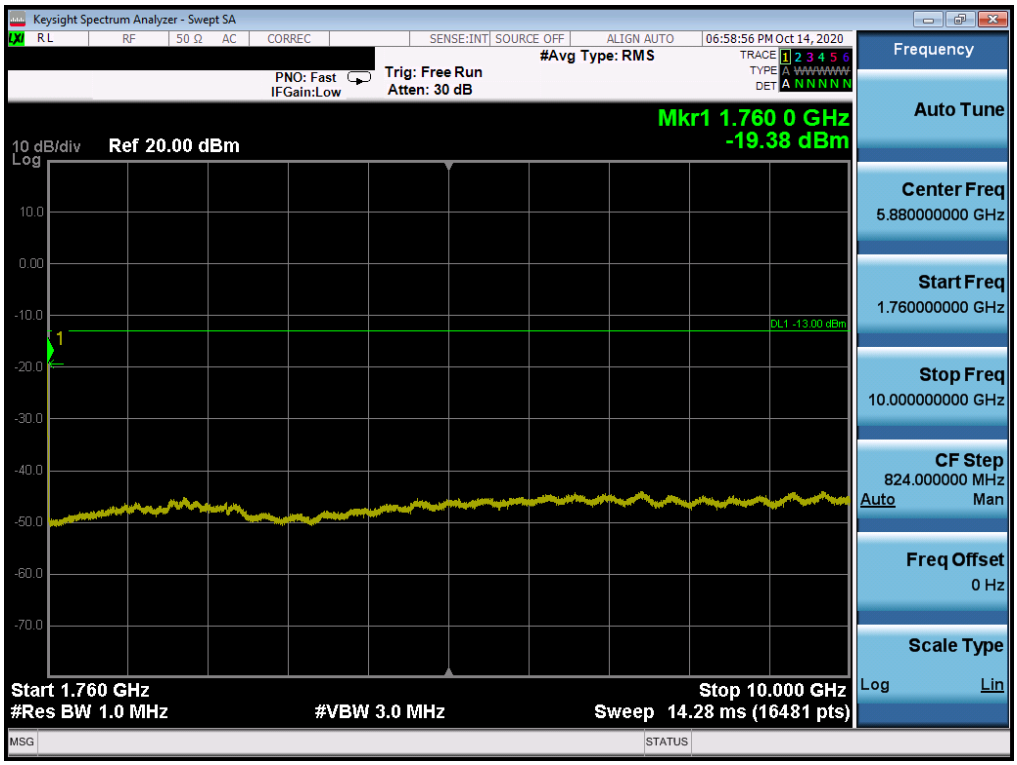
Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 1413- Mid Channel)



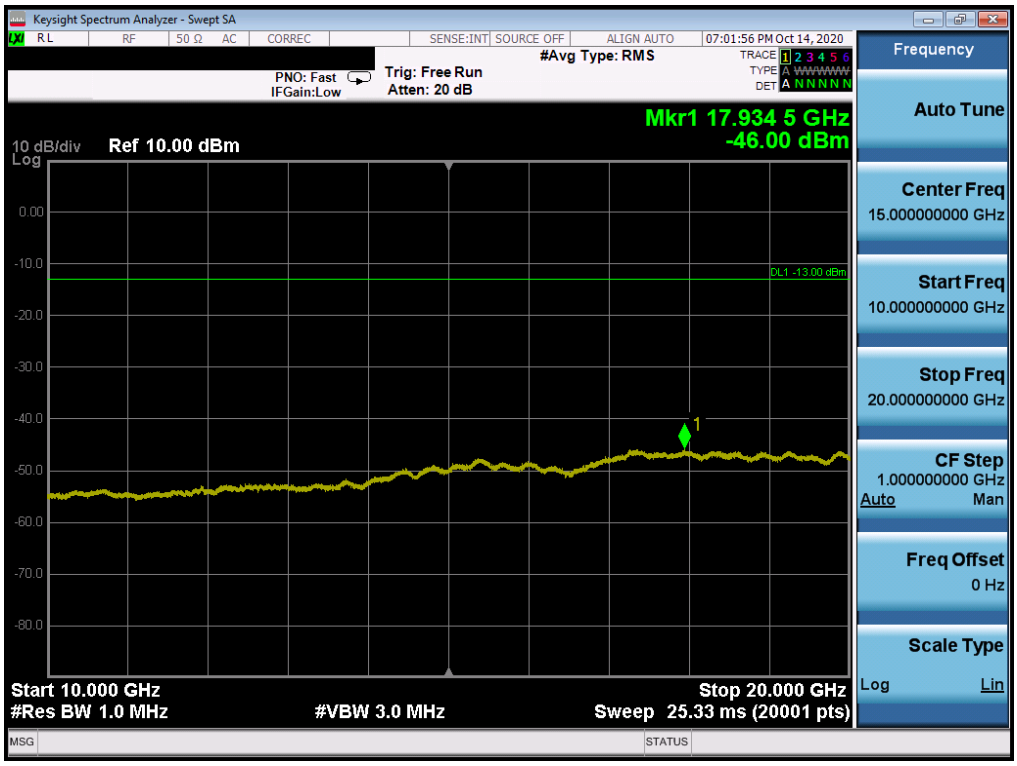
Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 1413- Mid Channel)



Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 1513- High Channel)

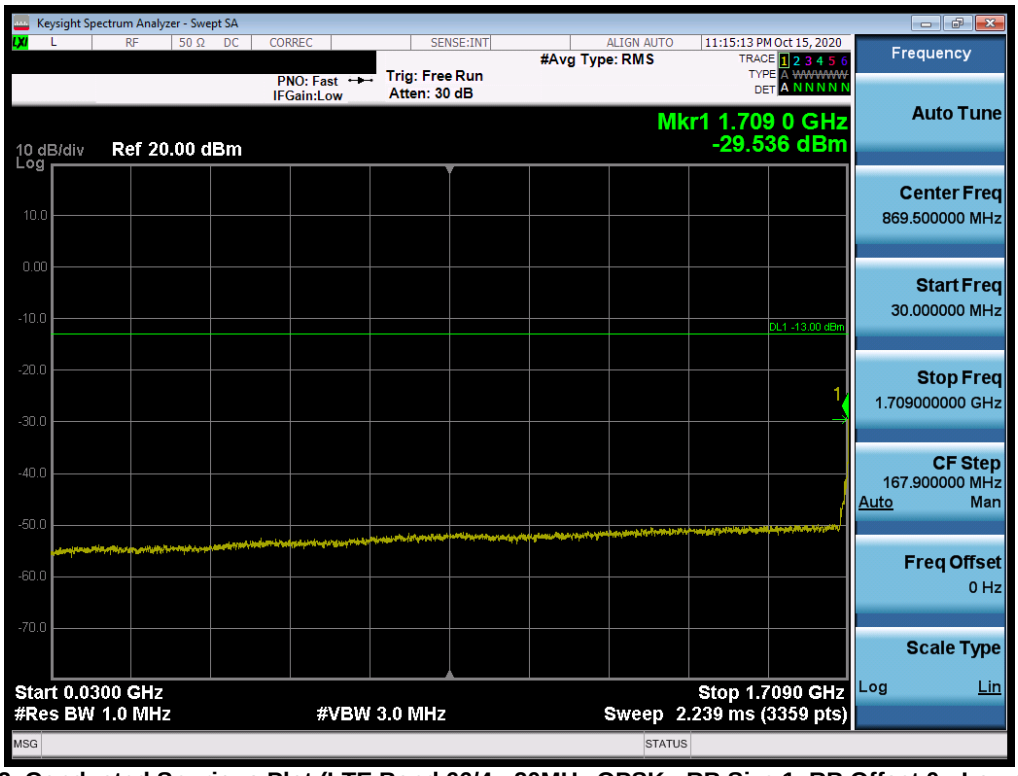


Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 1513- High Channel)

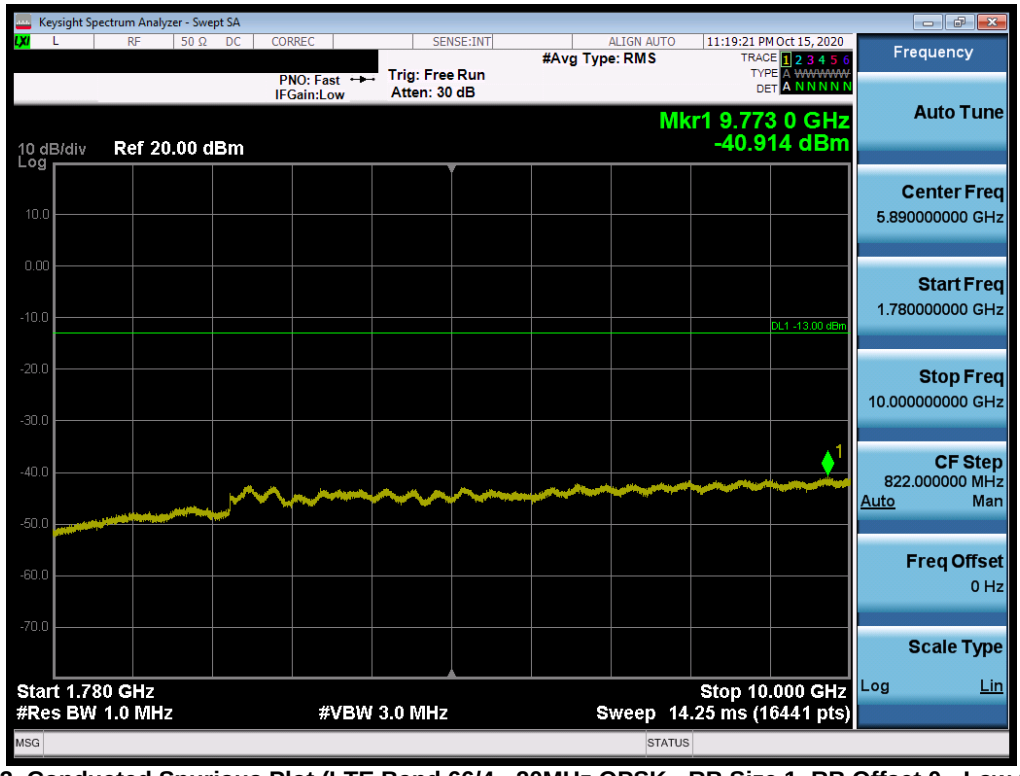


Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 1513- High Channel)

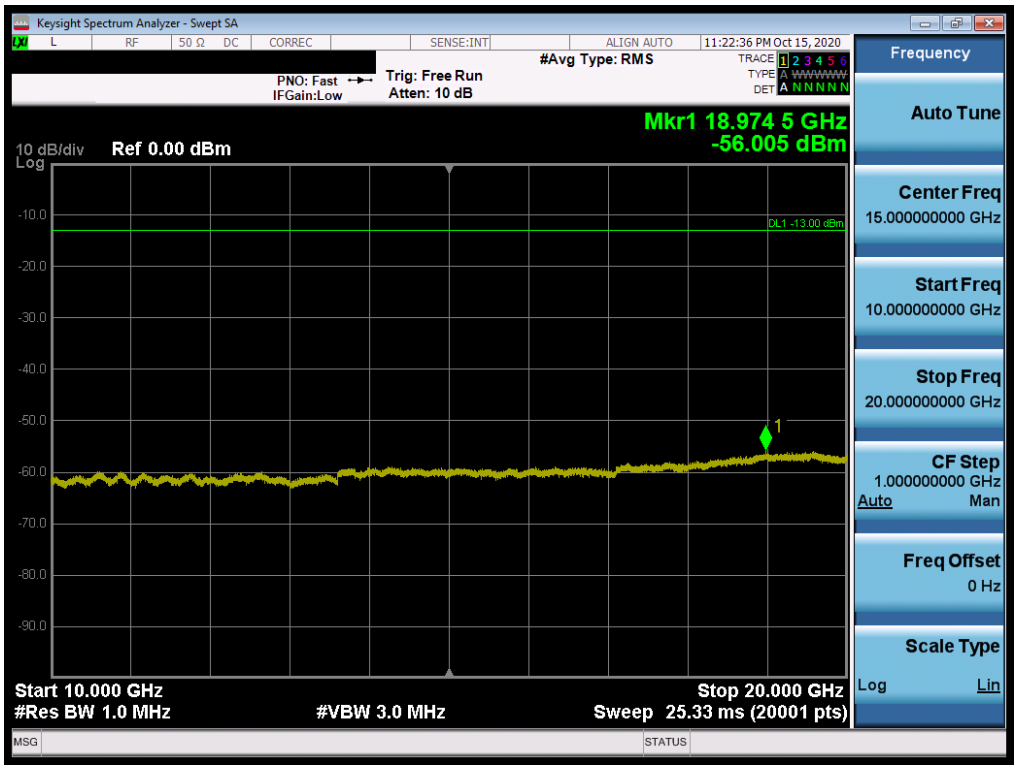
LTE Band 66/4



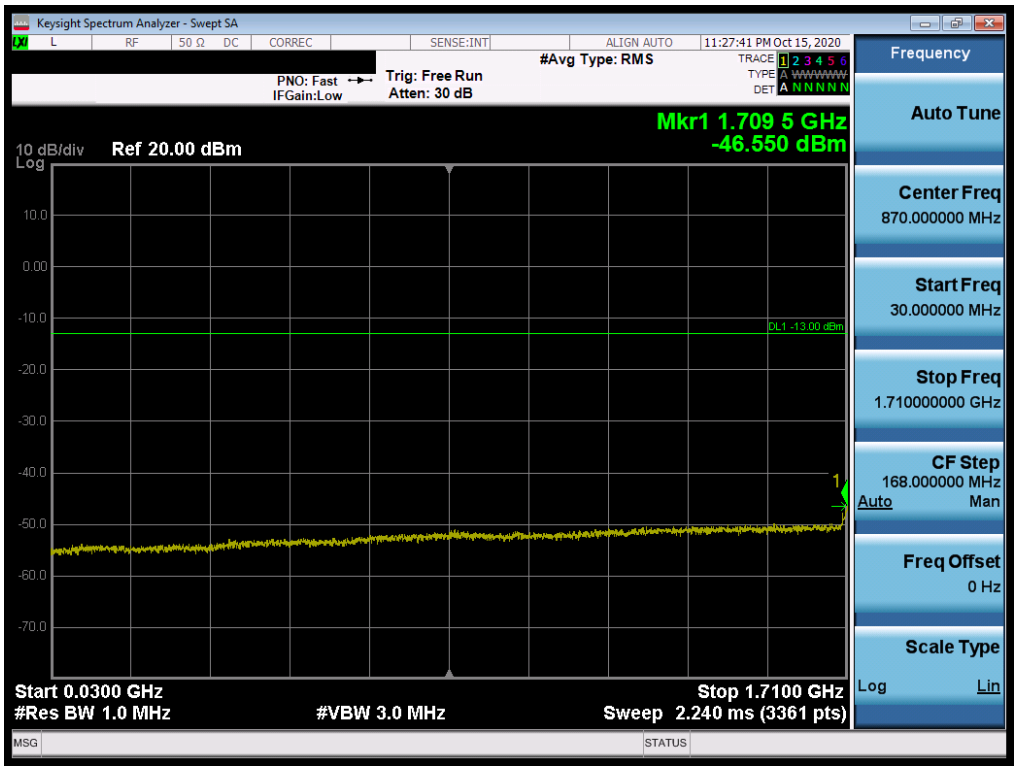
Plot 7-152. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



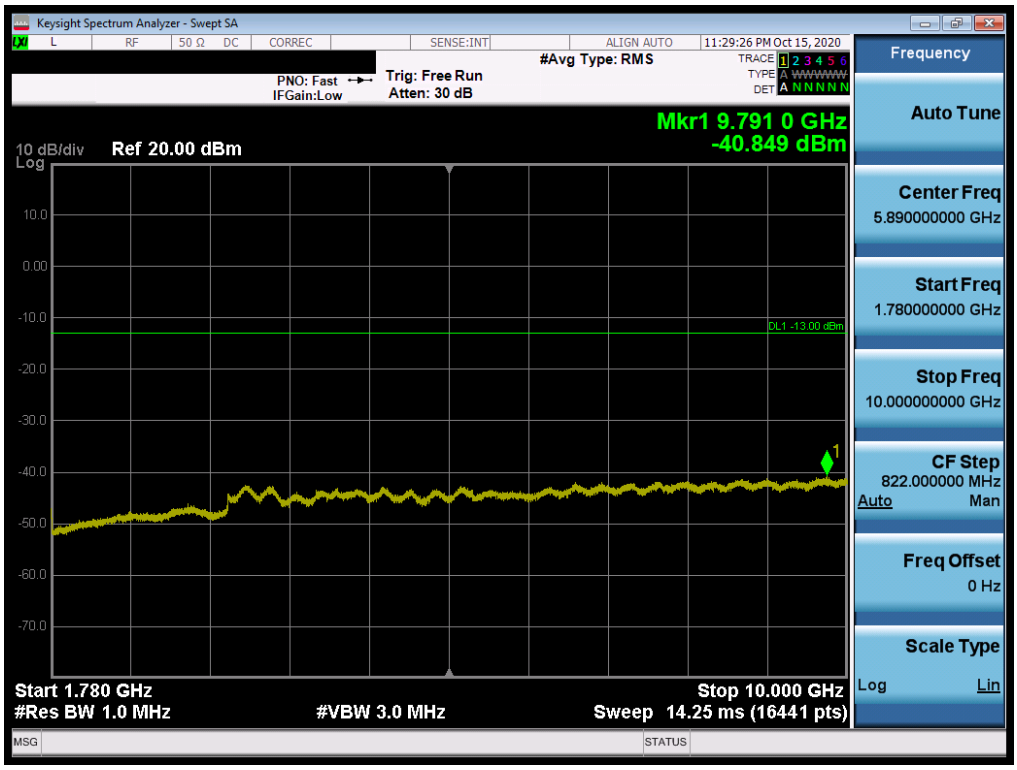
Plot 7-153. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



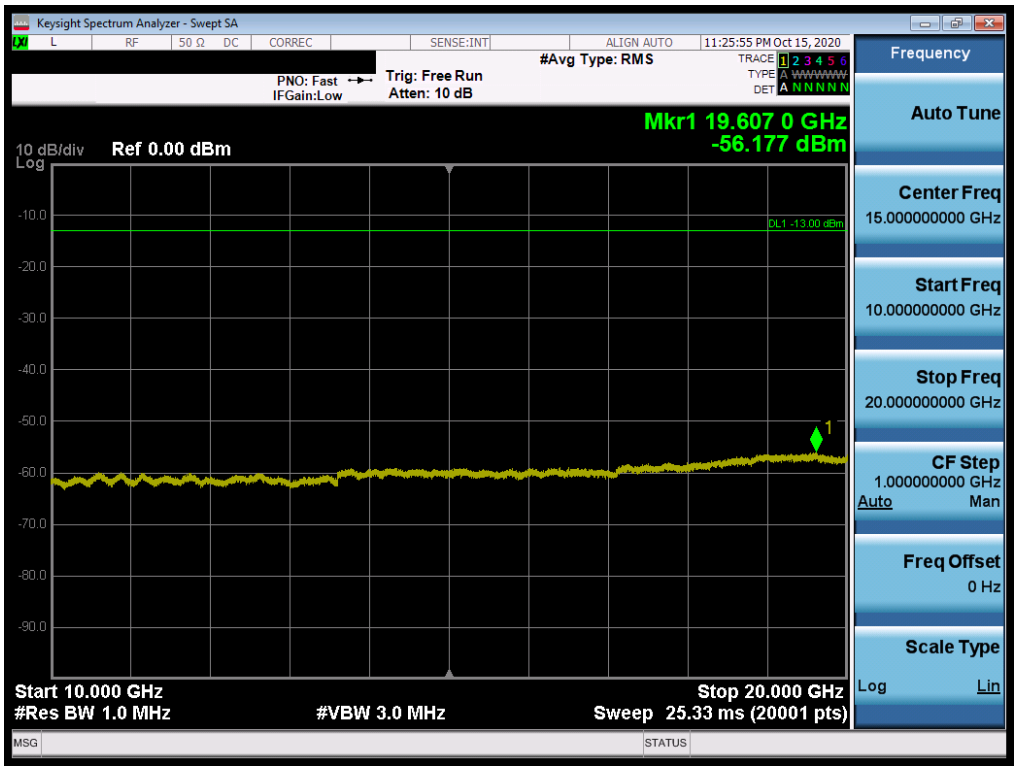
Plot 7-154. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



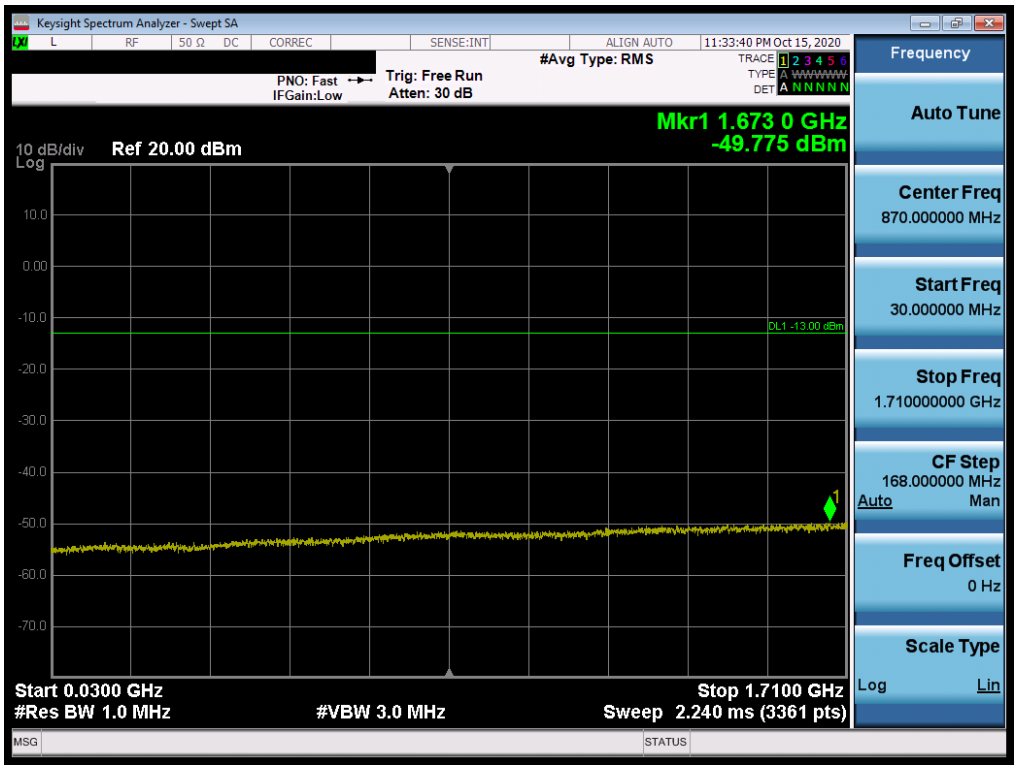
Plot 7-155. Conducted Spurious Plot (LTE Band 66/4 – 20MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



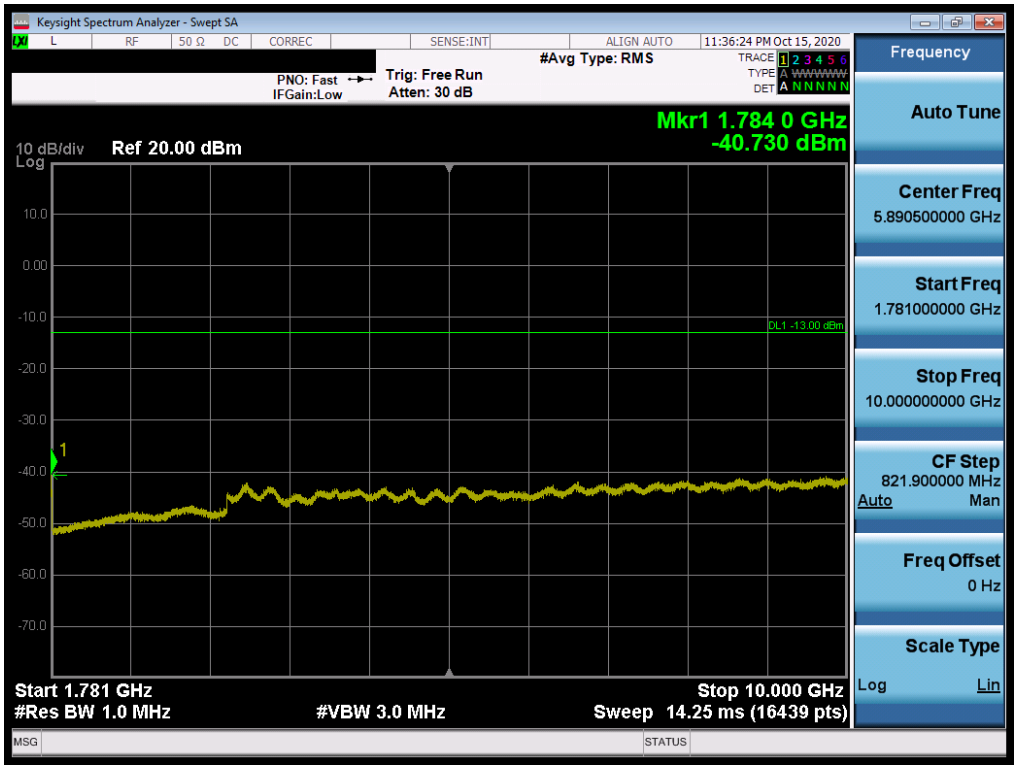
Plot 7-156. Conducted Spurious Plot (LTE Band 66/4 – 20MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



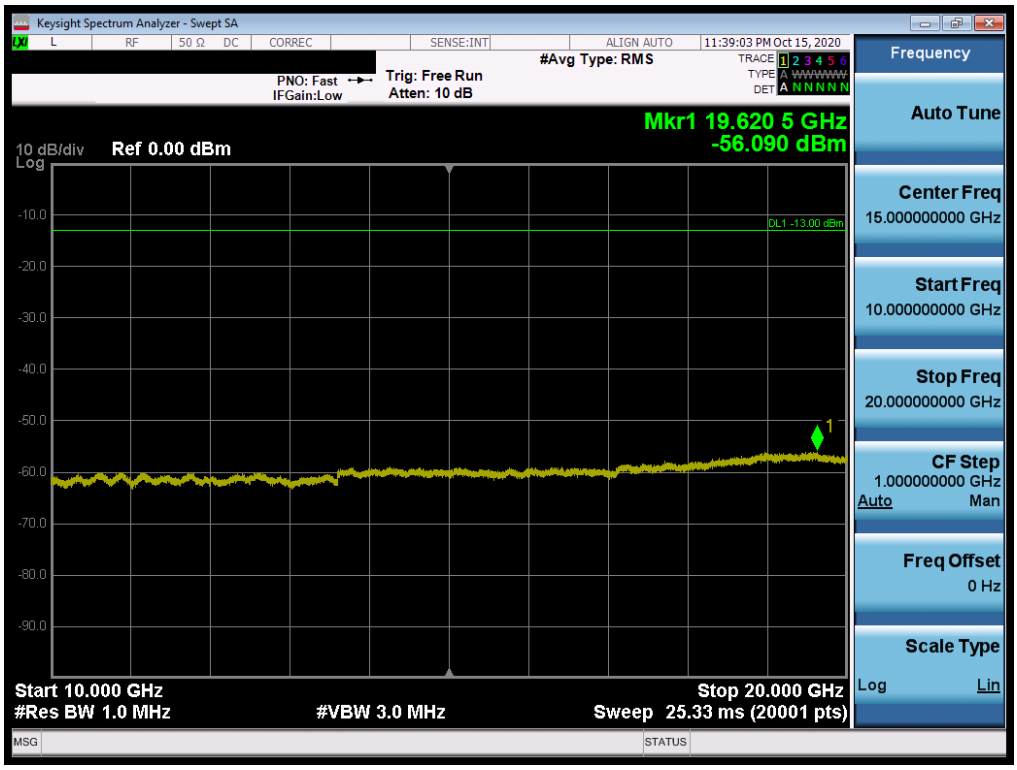
Plot 7-157. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-158. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



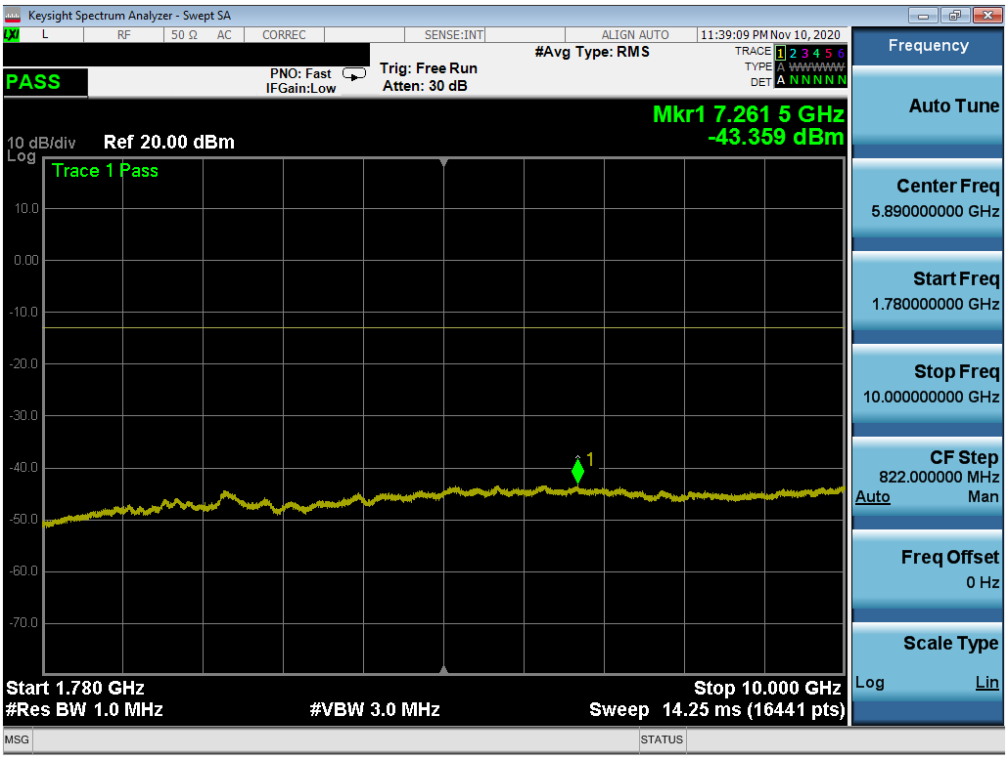
Plot 7-159. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



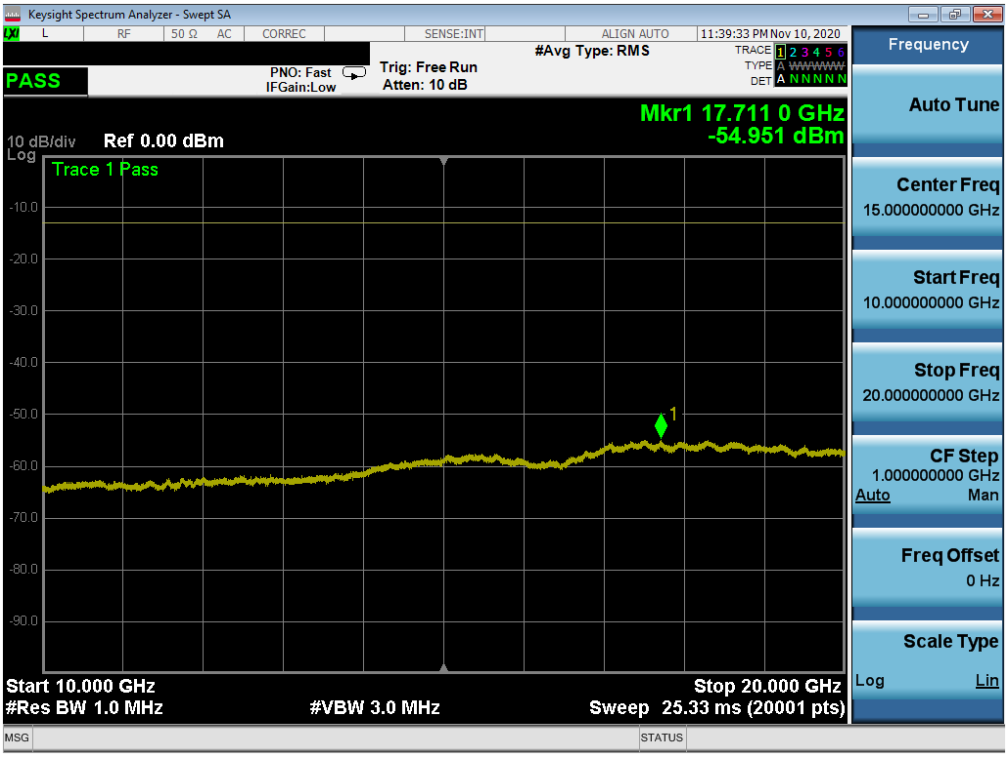
Plot 7-160. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

NR Band n66

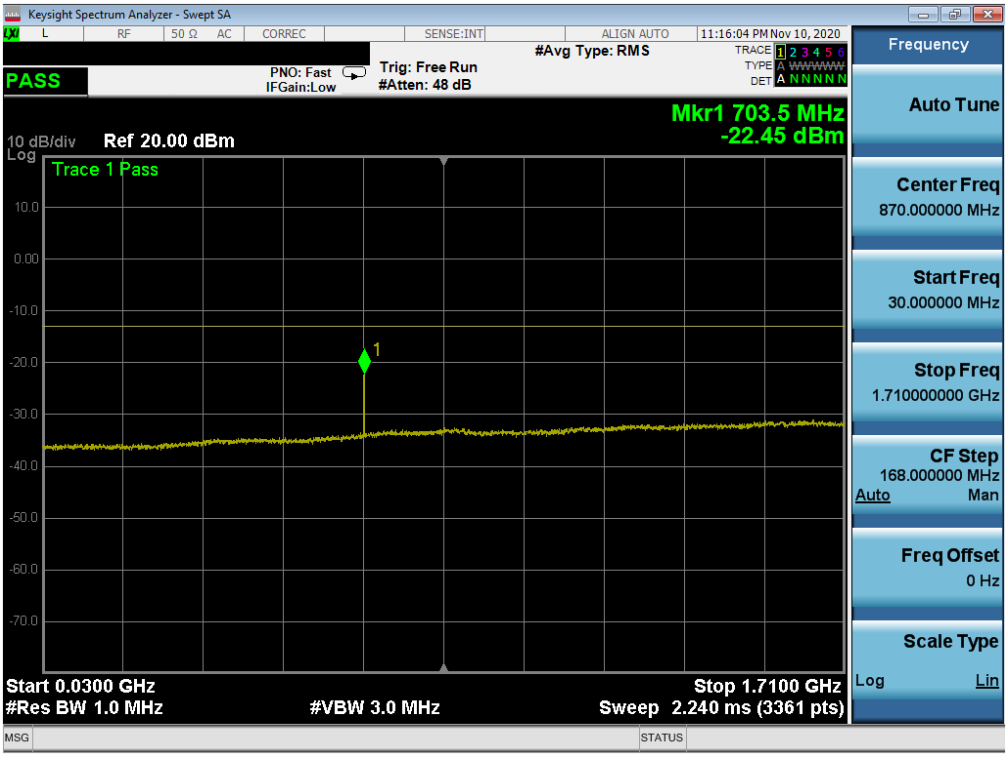
Plot 7-161. Conducted Spurious Plot (NR Band n66 -20.0MHz - RB Size 1, RB Offset 0 - Low Channel)



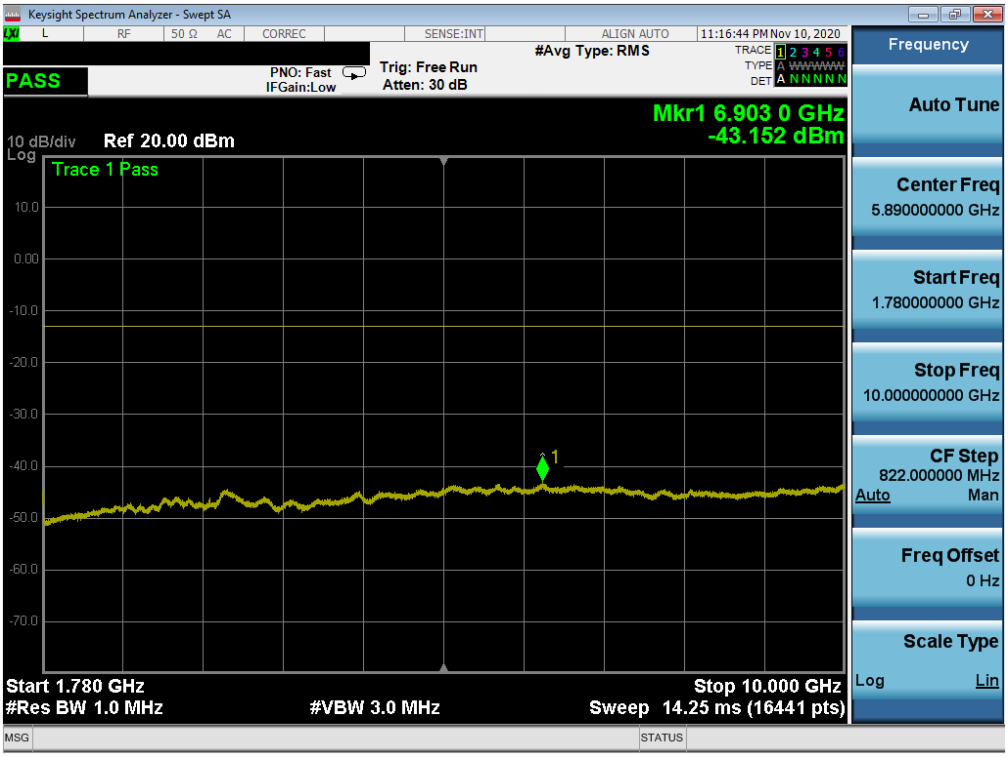
Plot 7-162. Conducted Spurious Plot (NR Band n66 - 20.0MHz - RB Size 1, RB Offset 0 - Low Channel)



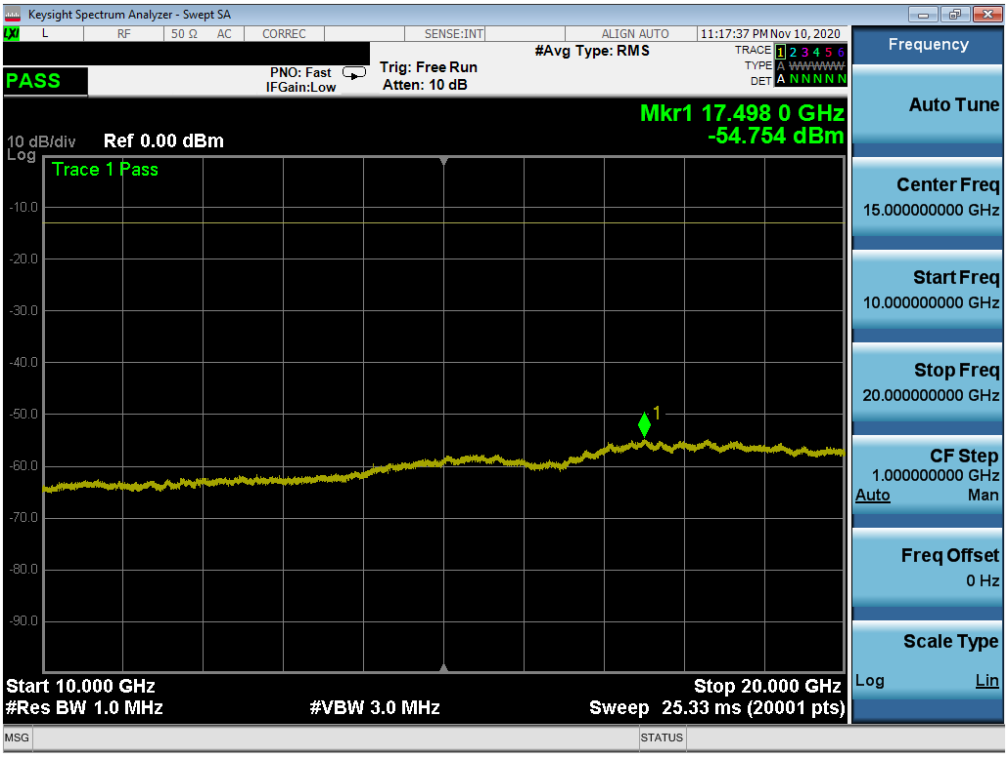
Plot 7-163. Conducted Spurious Plot (NR Band n66 - 20.0MHz - RB Size 1, RB Offset 0 - Low Channel)



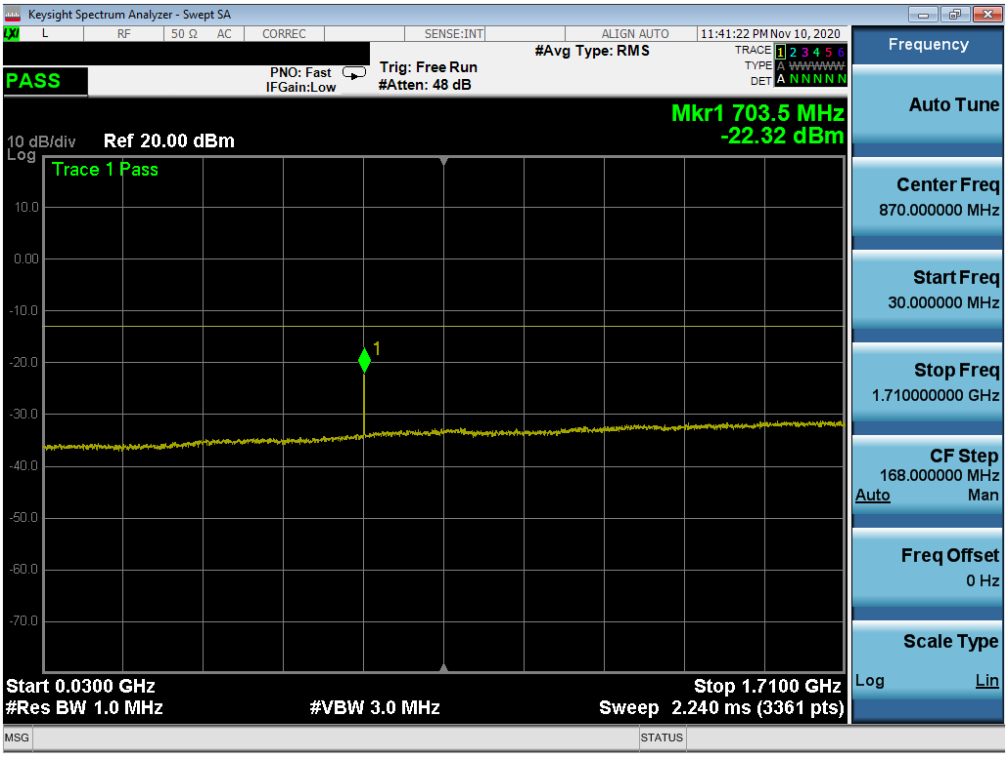
Plot 7-164. Conducted Spurious Plot (NR Band n66 - 20.0MHz - RB Size 1, RB Offset 0 - Mid Channel)



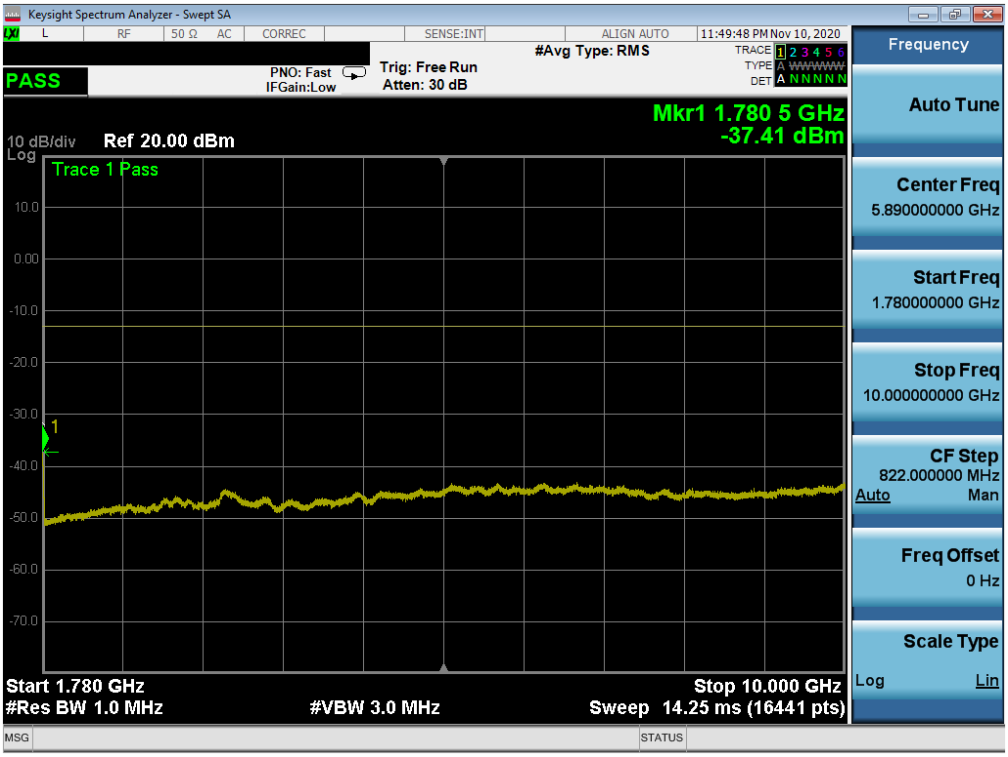
Plot 7-165. Conducted Spurious Plot (NR Band n66 - 20.0MHz - RB Size 1, RB Offset 0 - Mid Channel)



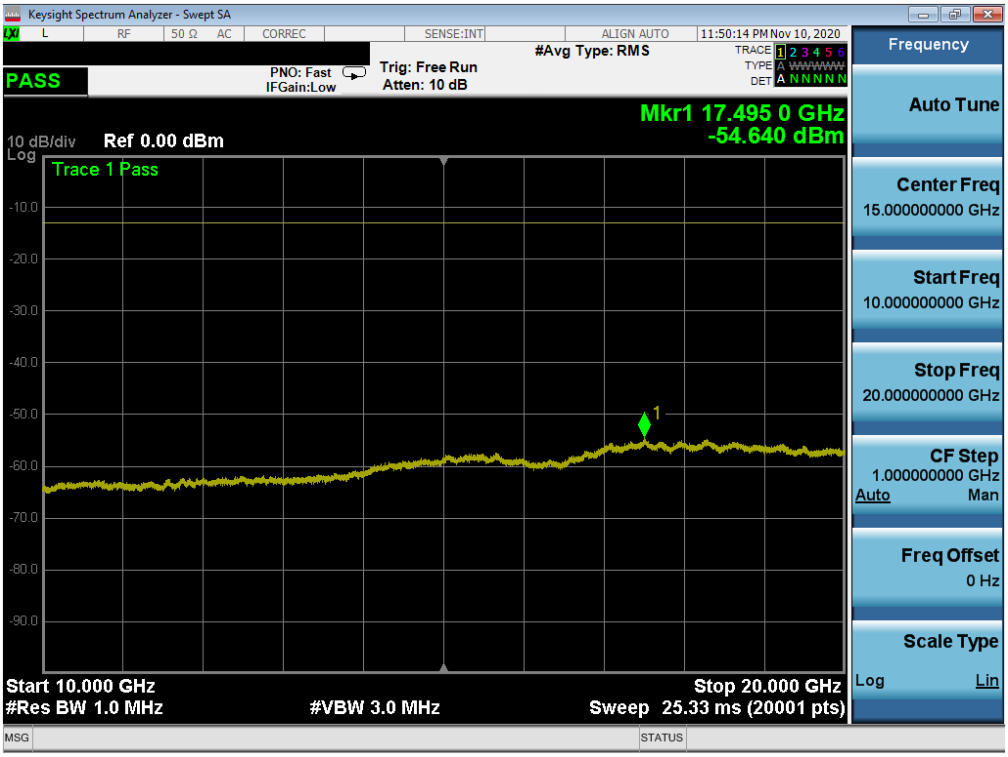
Plot 7-166. Conducted Spurious Plot (NR Band n66 - 20.0MHz - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-167. Conducted Spurious Plot (NR Band n66 - 20.0MHz - RB Size 1, RB Offset 0 - High Channel)



Plot 7-168. Conducted Spurious Plot (NR Band n66 - 20.0MHz - RB Size 1, RB Offset 0 - High Channel)



Plot 7-169. Conducted Spurious Plot (NR Band n66 - 20.0MHz - RB Size 1, RB Offset 0 - High Channel)

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.

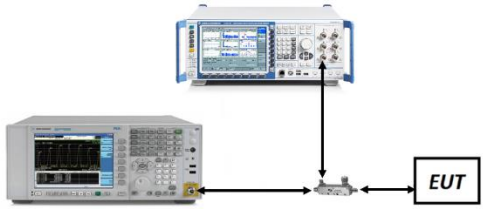
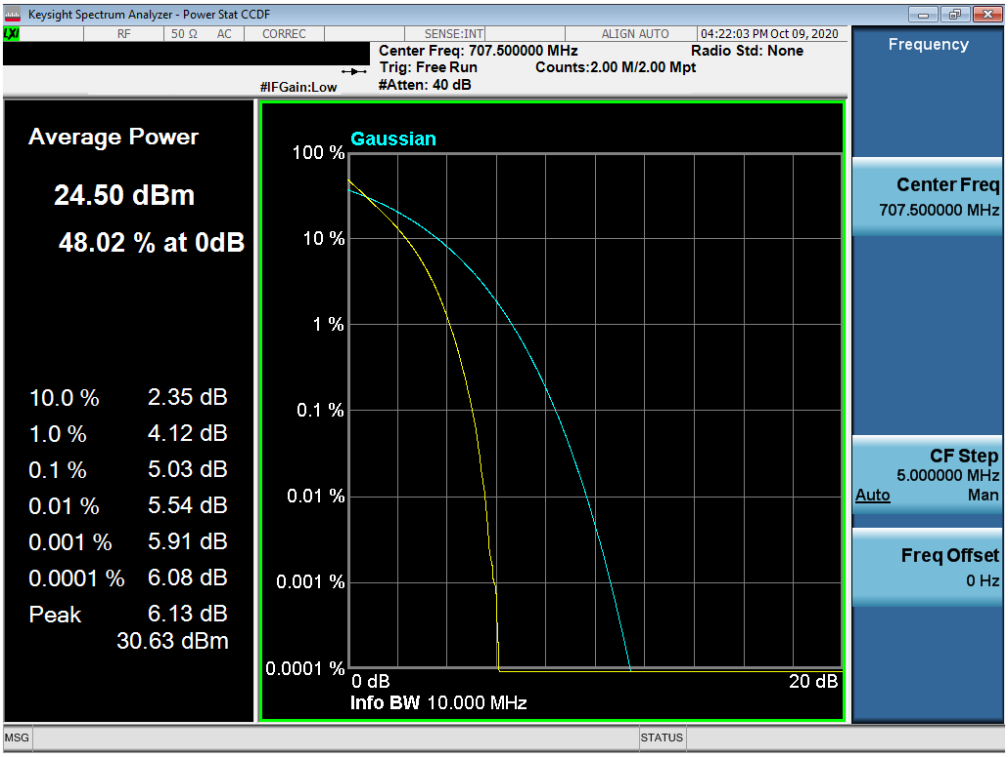


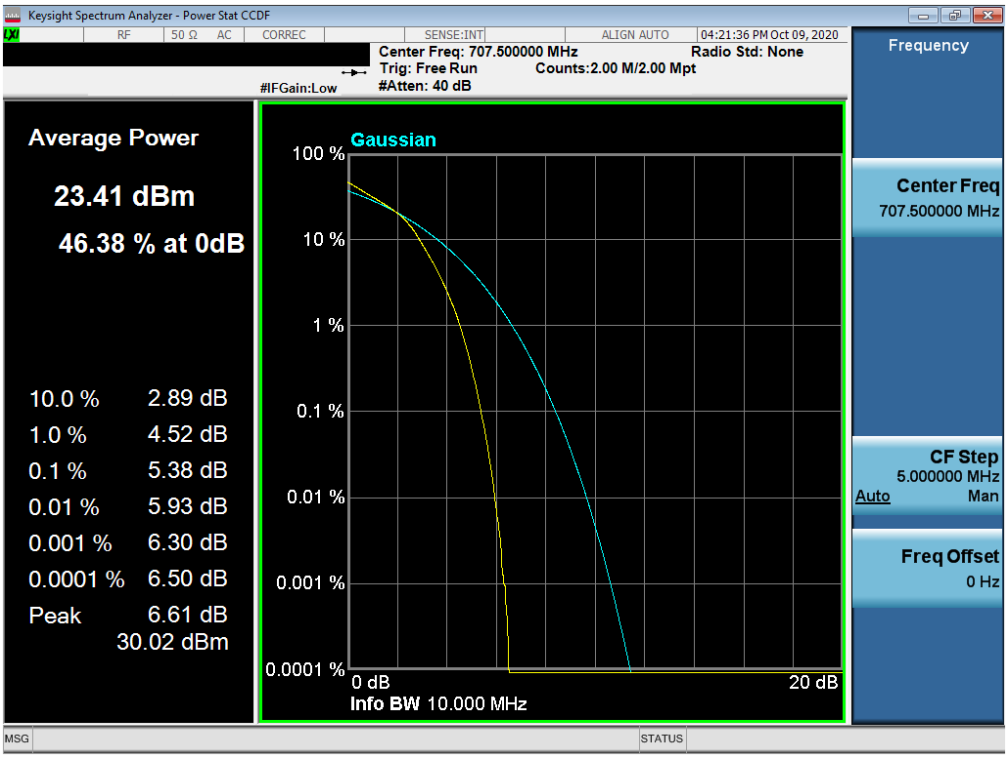
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

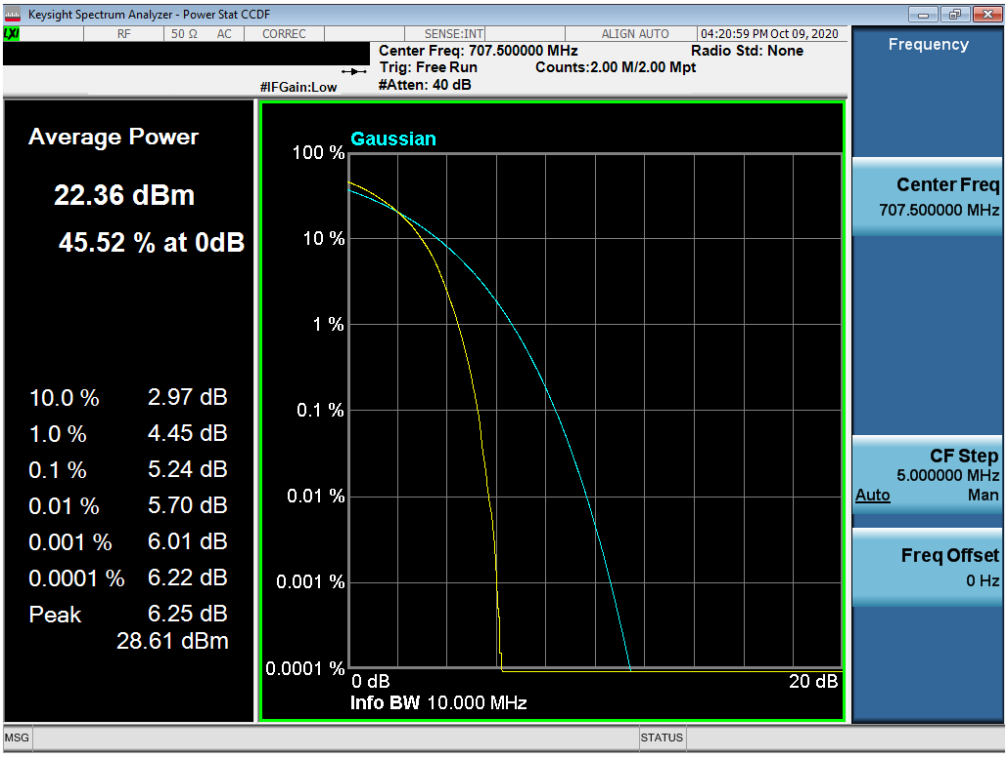
None.



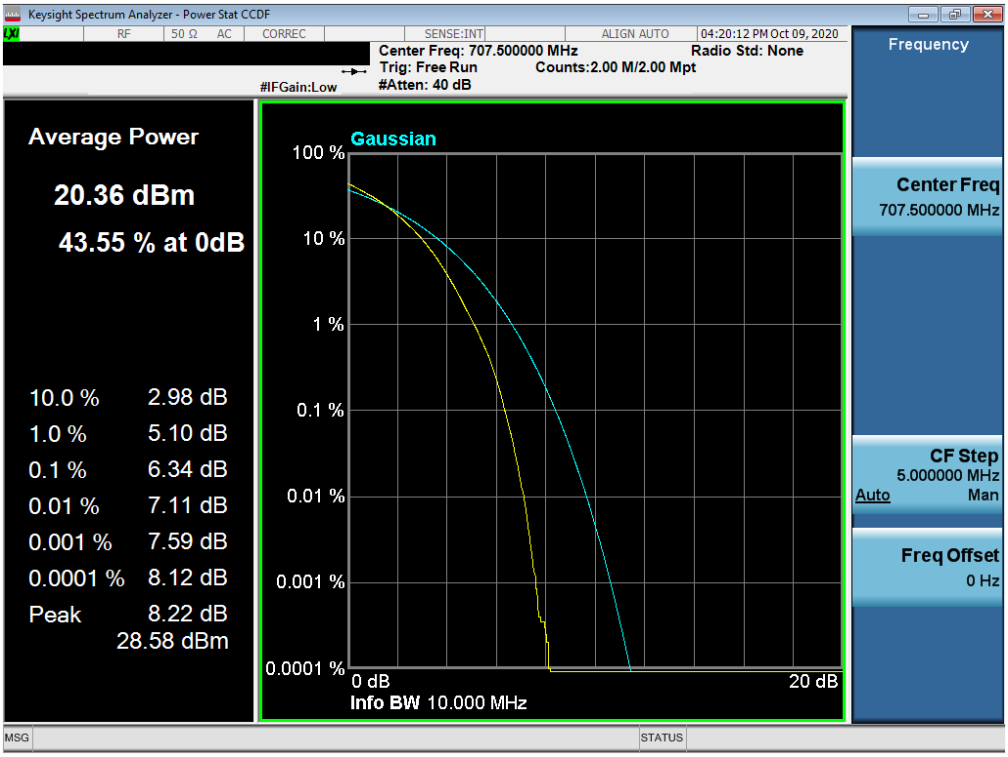
Plot 7-170. PAR Plot (LTE Band 12/17- 10MHz QPSK - Full RB Configuration)



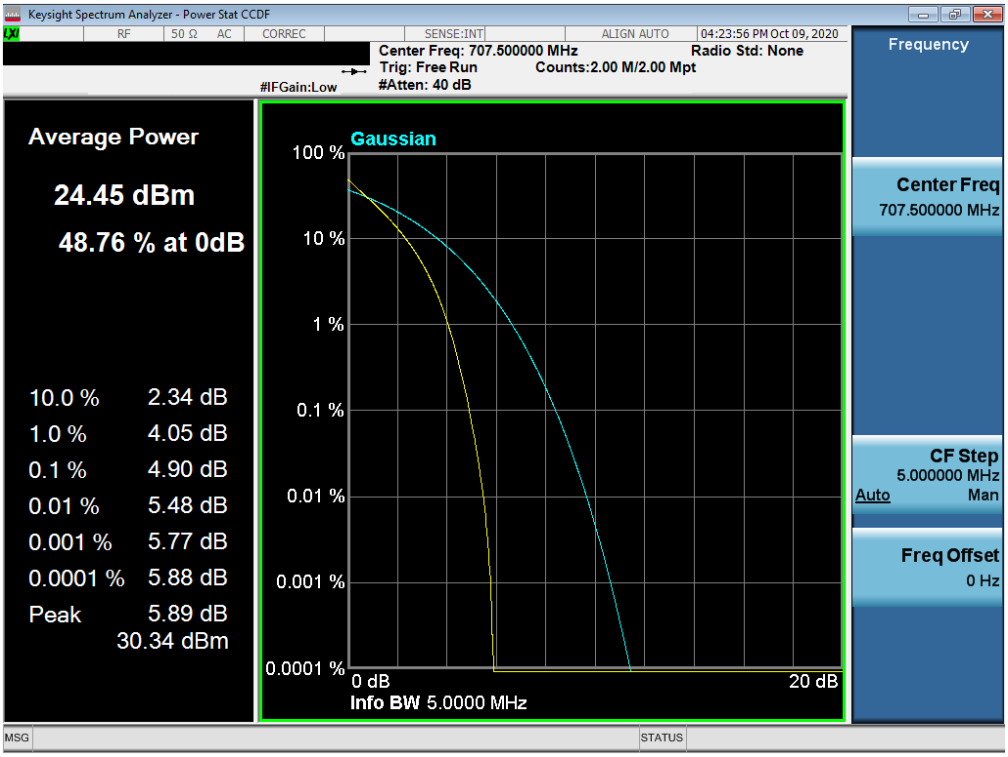
Plot 7-171. PAR Plot (LTE Band 12/17- 10MHz 16-QAM - Full RB Configuration)



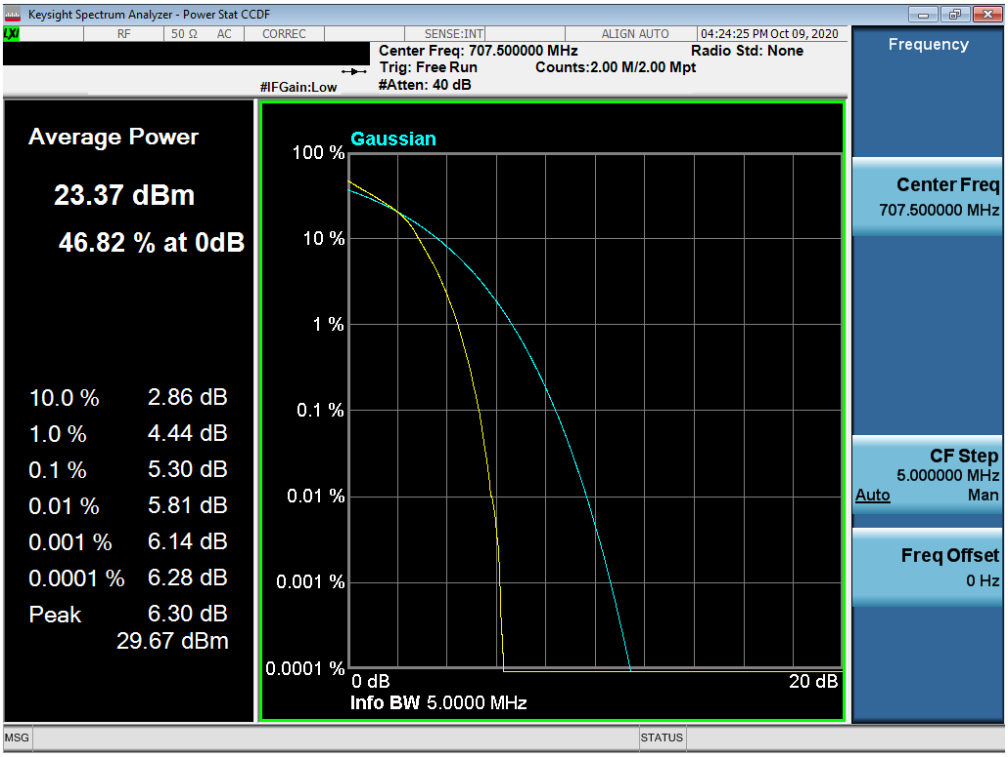
Plot 7-172. PAR Plot (LTE Band 12/17- 10MHz 64-QAM - Full RB Configuration)



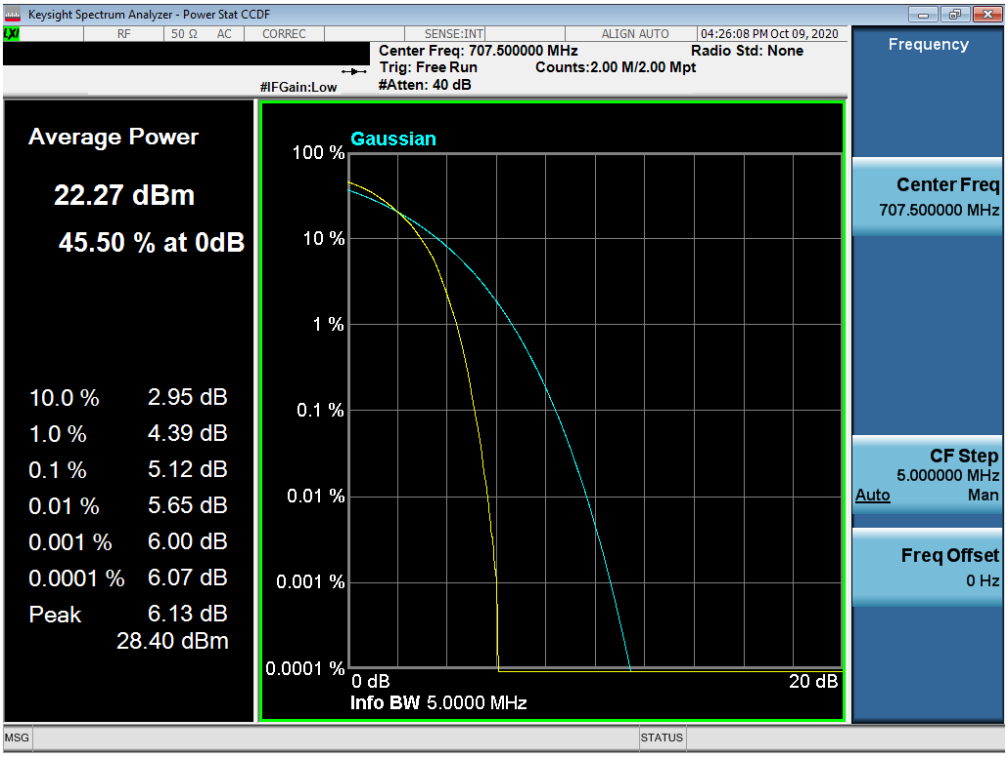
Plot 7-173. PAR Plot (LTE Band 12/17- 10MHz 256-QAM - Full RB Configuration)



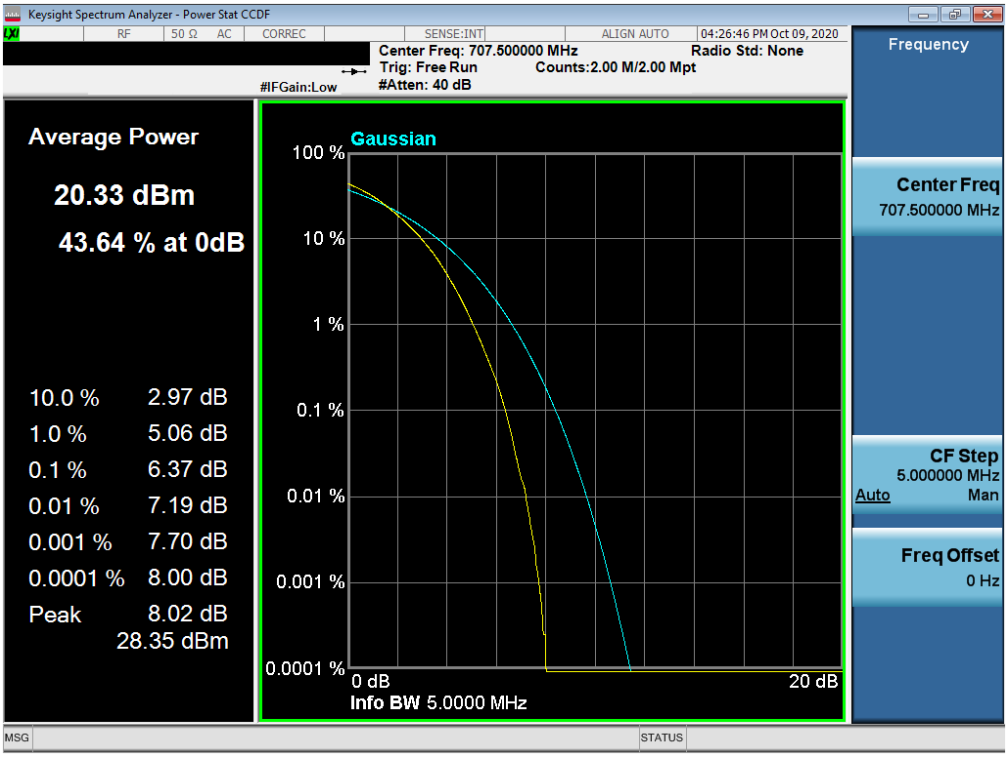
Plot 7-174. PAR Plot (LTE Band 12/17- 5MHz QPSK - Full RB Configuration)



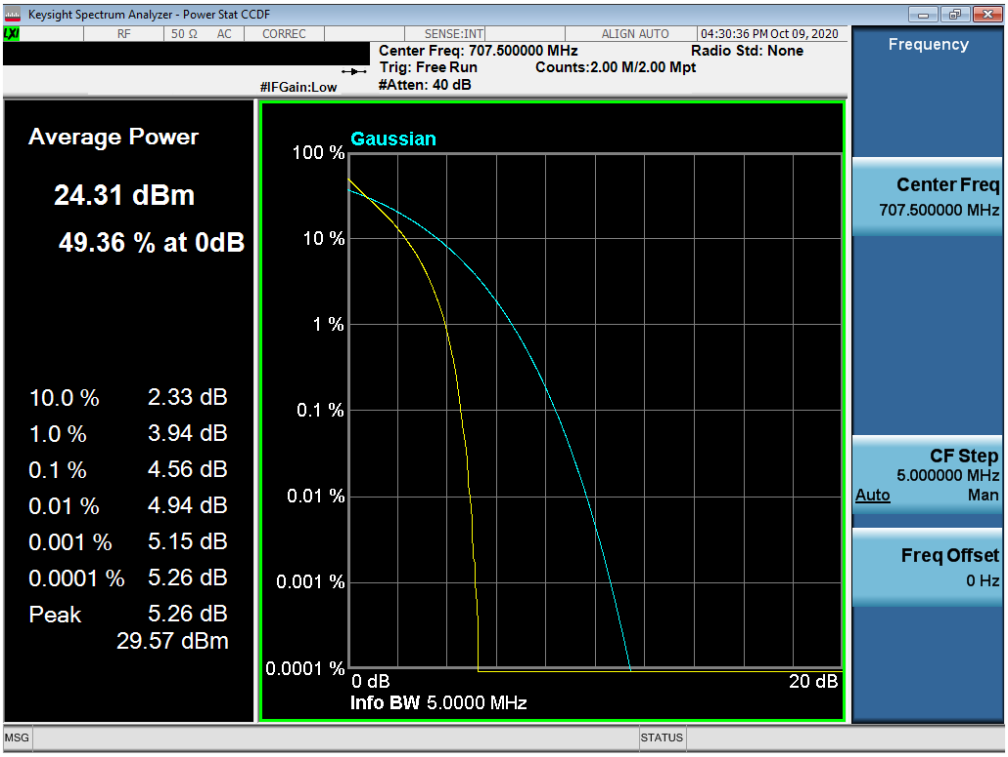
Plot 7-175. PAR Plot (LTE Band 12/17- 5MHz 16-QAM - Full RB Configuration)



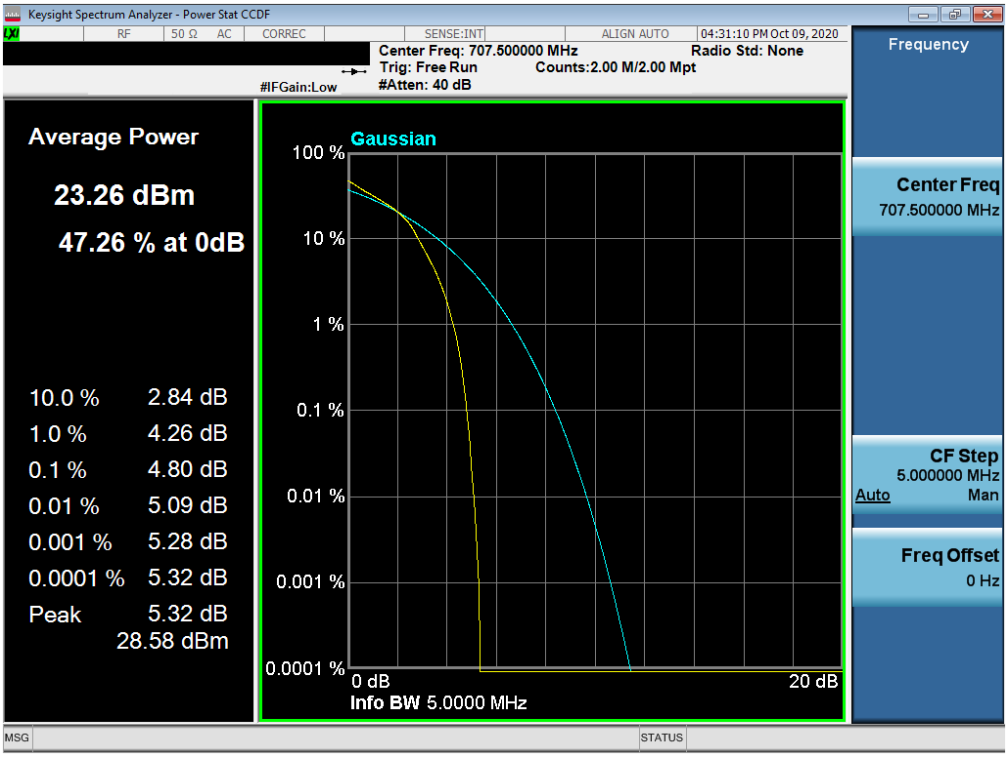
Plot 7-176. PAR Plot (LTE Band 12/17- 5MHz 64-QAM - Full RB Configuration)



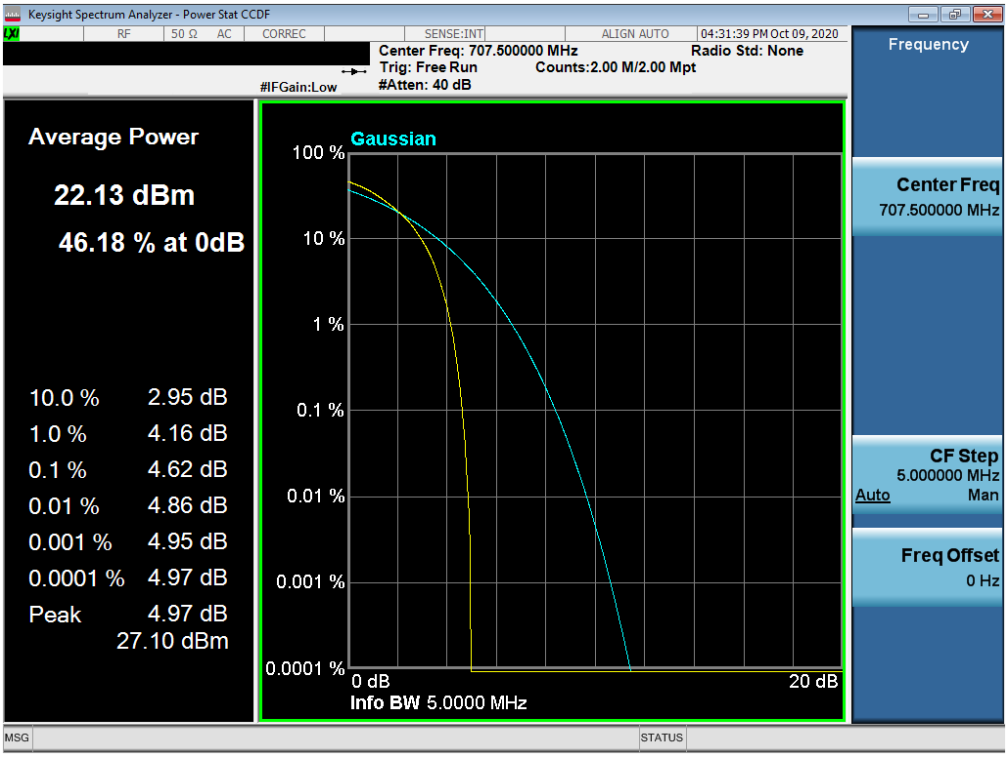
Plot 7-177. PAR Plot (LTE Band 12/17- 5MHz 256-QAM - Full RB Configuration)



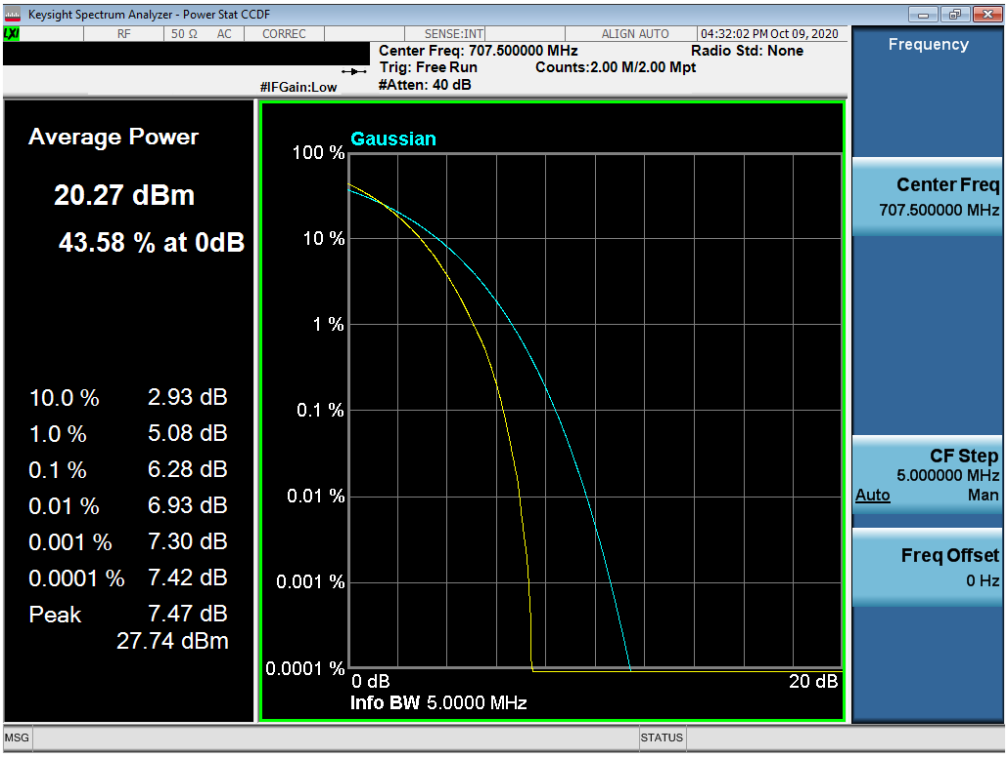
Plot 7-178. PAR Plot (LTE Band 12- 3MHz QPSK - Full RB Configuration)



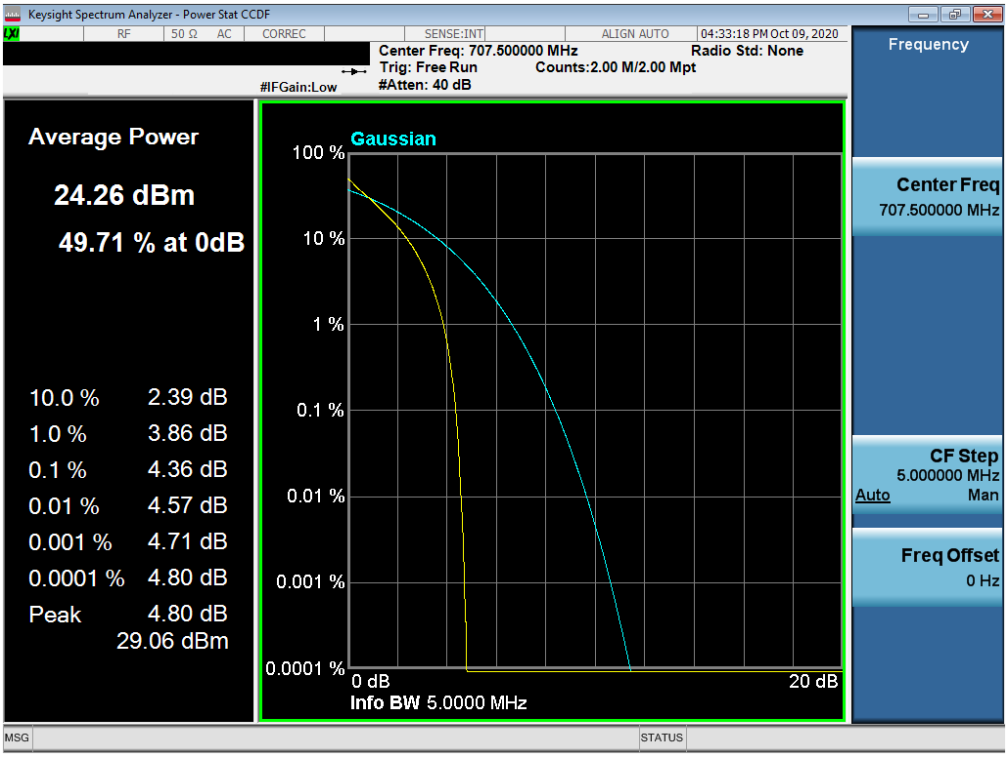
Plot 7-179. PAR Plot (LTE Band 12- 3MHz 16-QAM - Full RB Configuration)



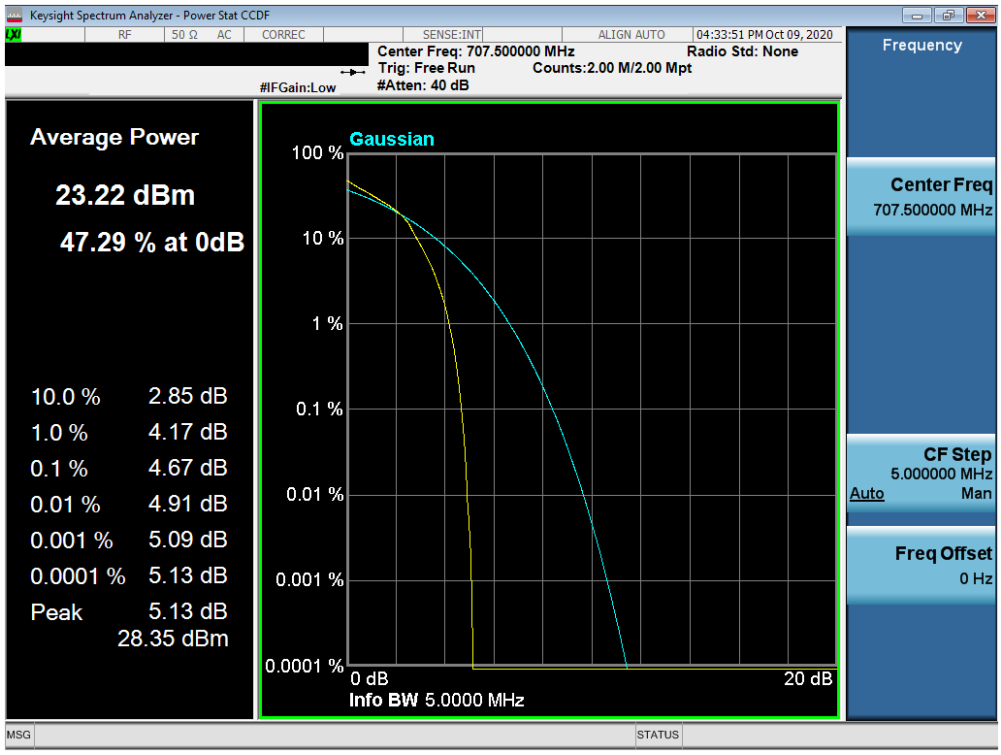
Plot 7-180. PAR Plot (LTE Band 12- 3MHz 64-QAM - Full RB Configuration)



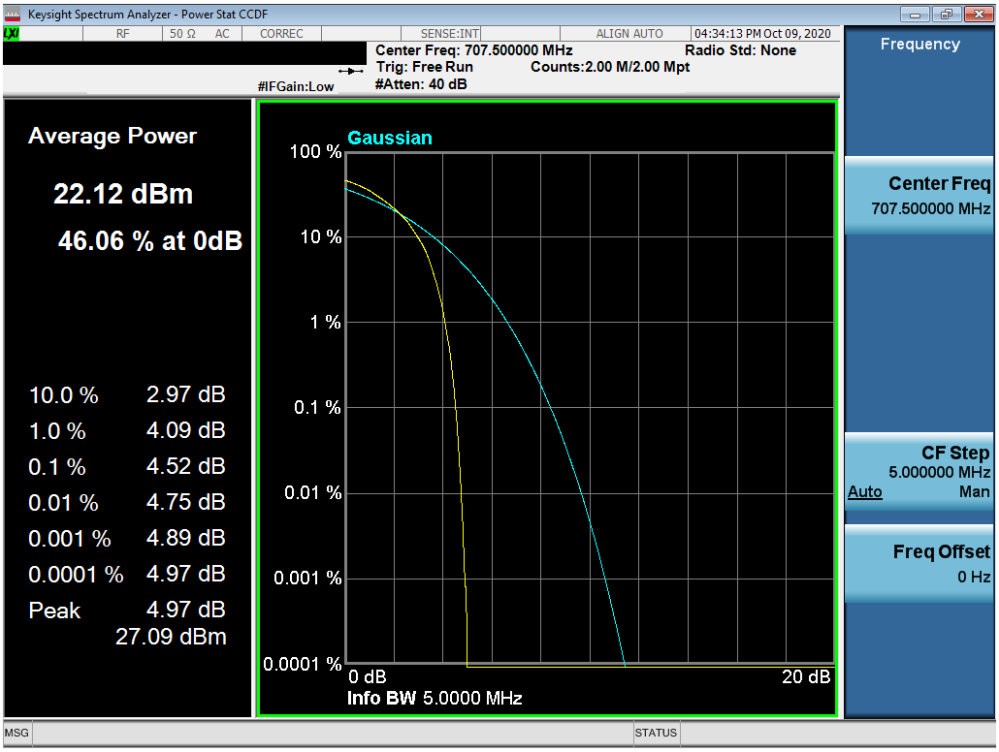
Plot 7-181. PAR Plot (LTE Band 12- 3MHz 256-QAM - Full RB Configuration)



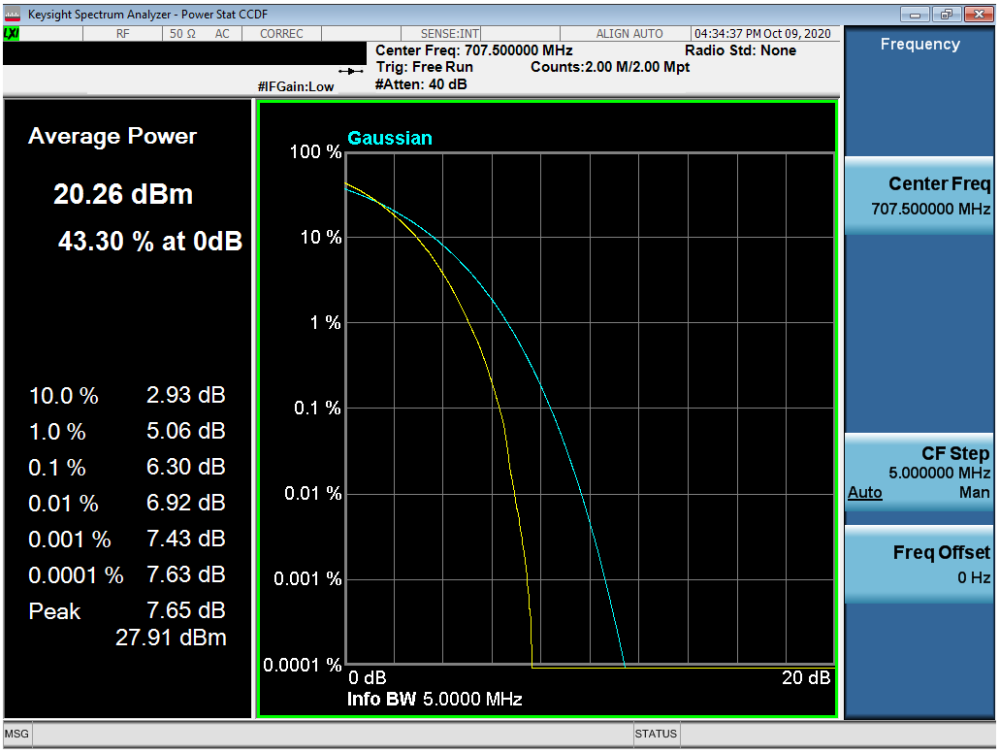
Plot 7-182. PAR Plot (LTE Band 12- 1.4MHz QPSK - Full RB Configuration)



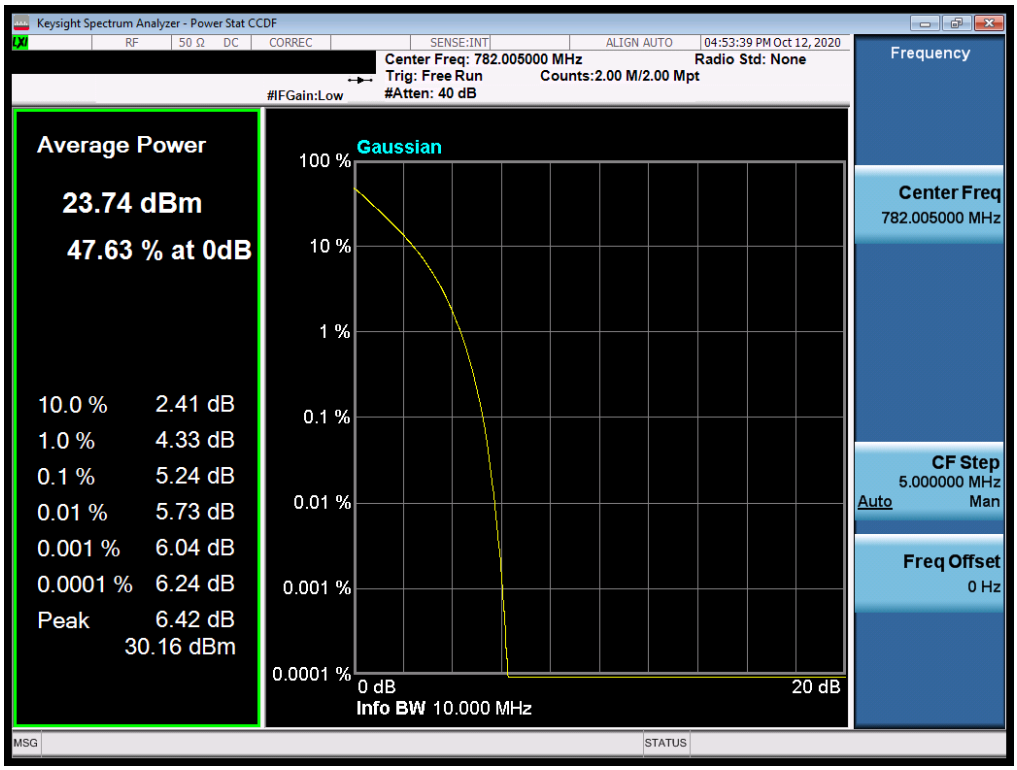
Plot 7-183. PAR Plot (LTE Band 12- 1.4MHz 16-QAM - Full RB Configuration)



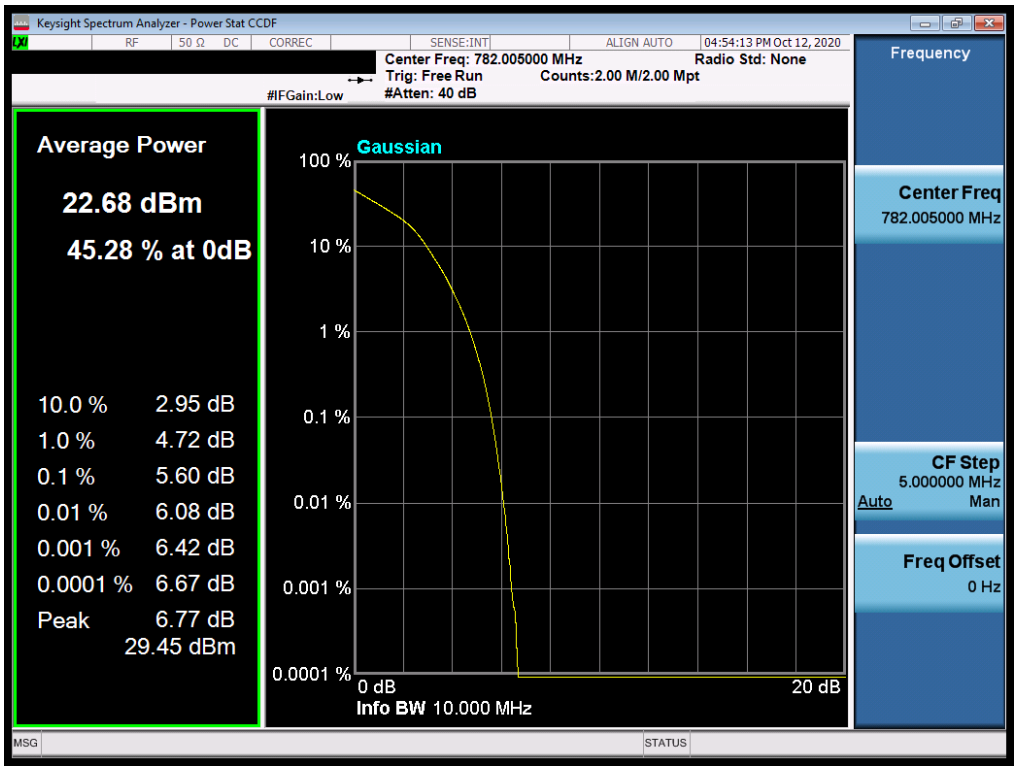
Plot 7-184. PAR Plot (LTE Band 12- 1.4MHz 64-QAM - Full RB Configuration)



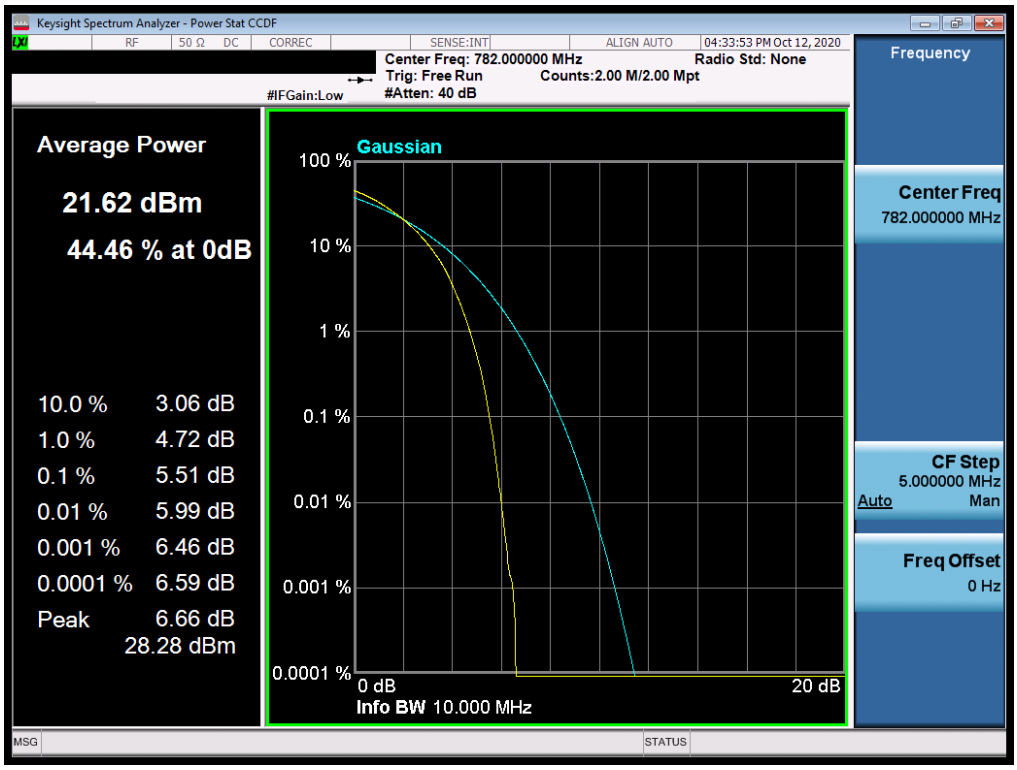
Plot 7-185. PAR Plot (LTE Band 12- 1.4MHz 256-QAM - Full RB Configuration)



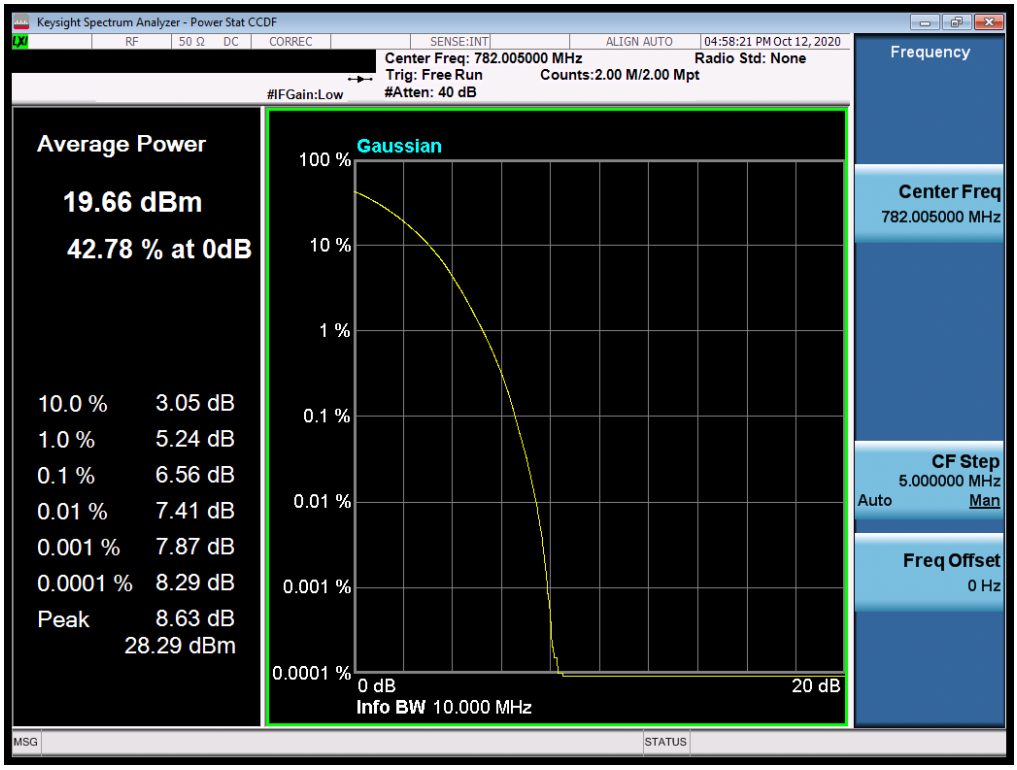
Plot 7-186. PAR Plot (LTE Band 13- 10MHz QPSK - Full RB Configuration)



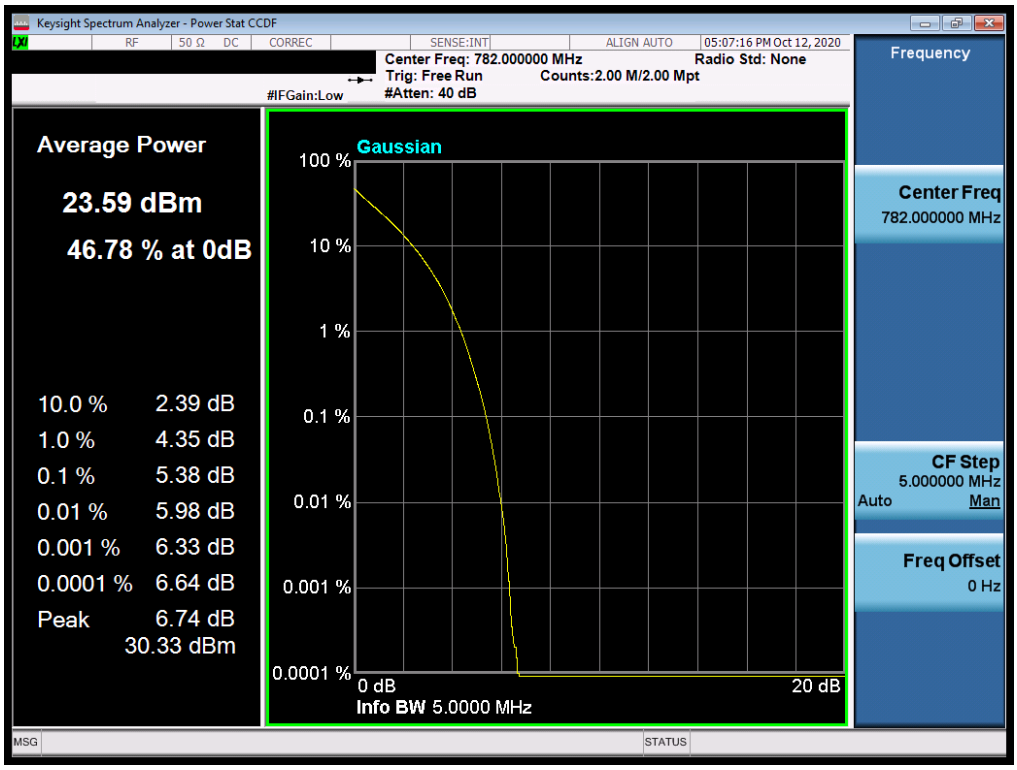
Plot 7-187. PAR Plot (LTE Band 13- 10MHz 16-QAM - Full RB Configuration)



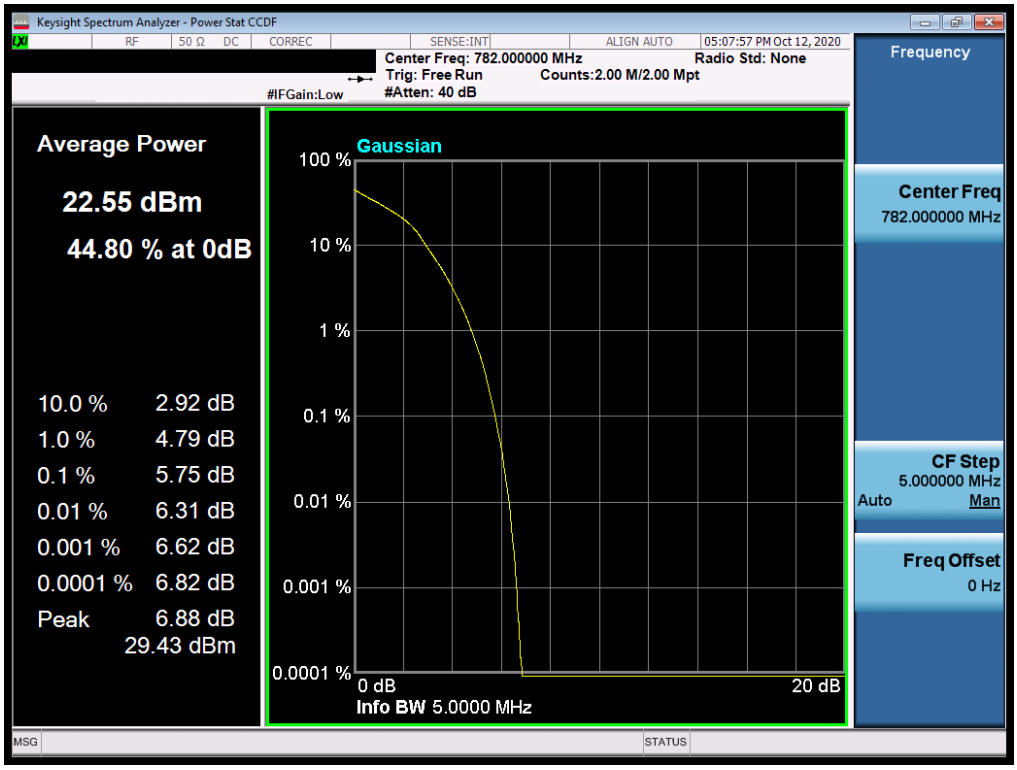
Plot 7-188. PAR Plot (LTE Band 13- 10MHz 64-QAM - Full RB Configuration)



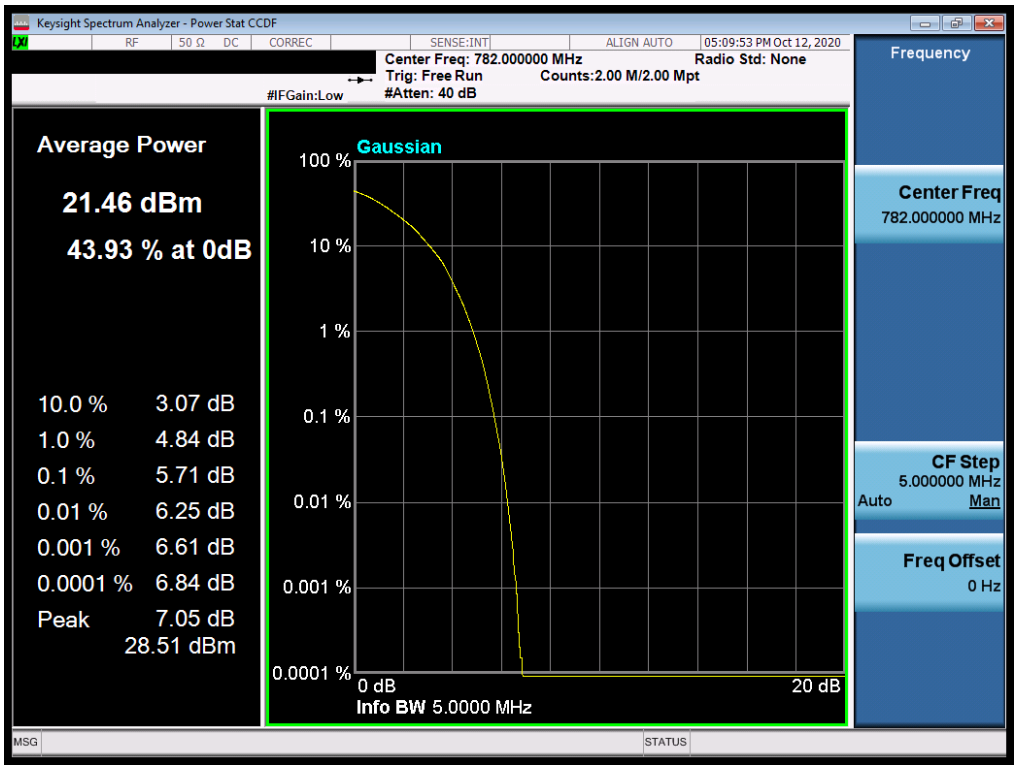
Plot 7-189. PAR Plot (LTE Band 13- 10MHz 256-QAM - Full RB Configuration)



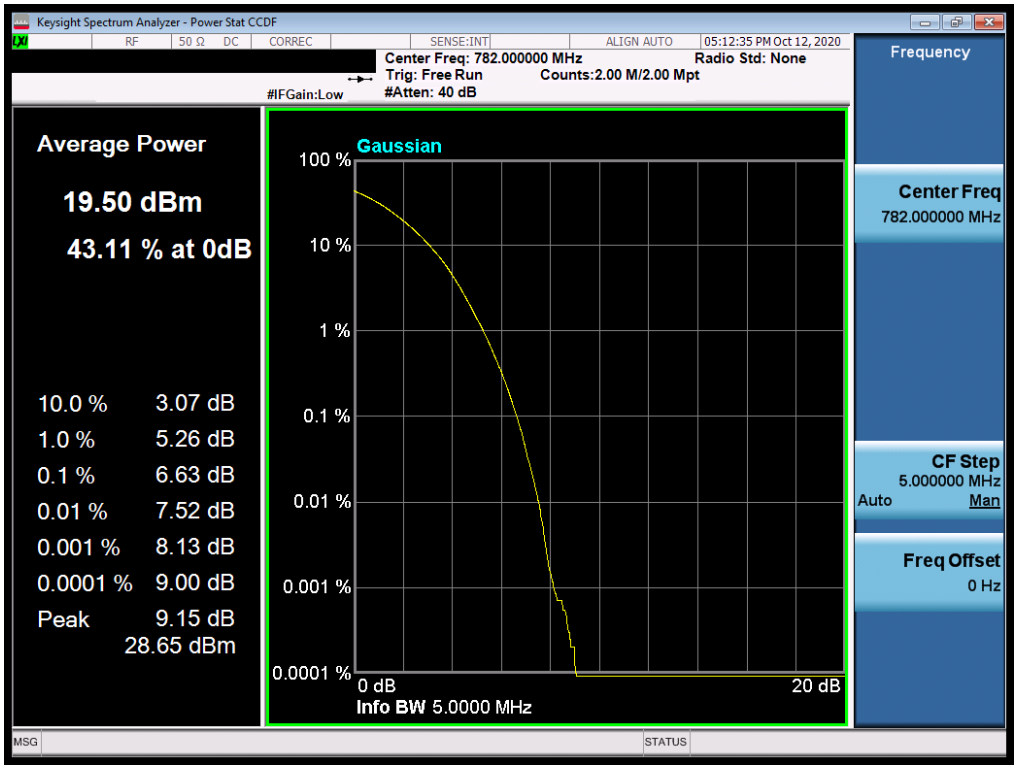
Plot 7-190. PAR Plot (LTE Band 13- 5MHz QPSK - Full RB Configuration)



Plot 7-191. PAR Plot (LTE Band 13- 5MHz 16-QAM - Full RB Configuration)

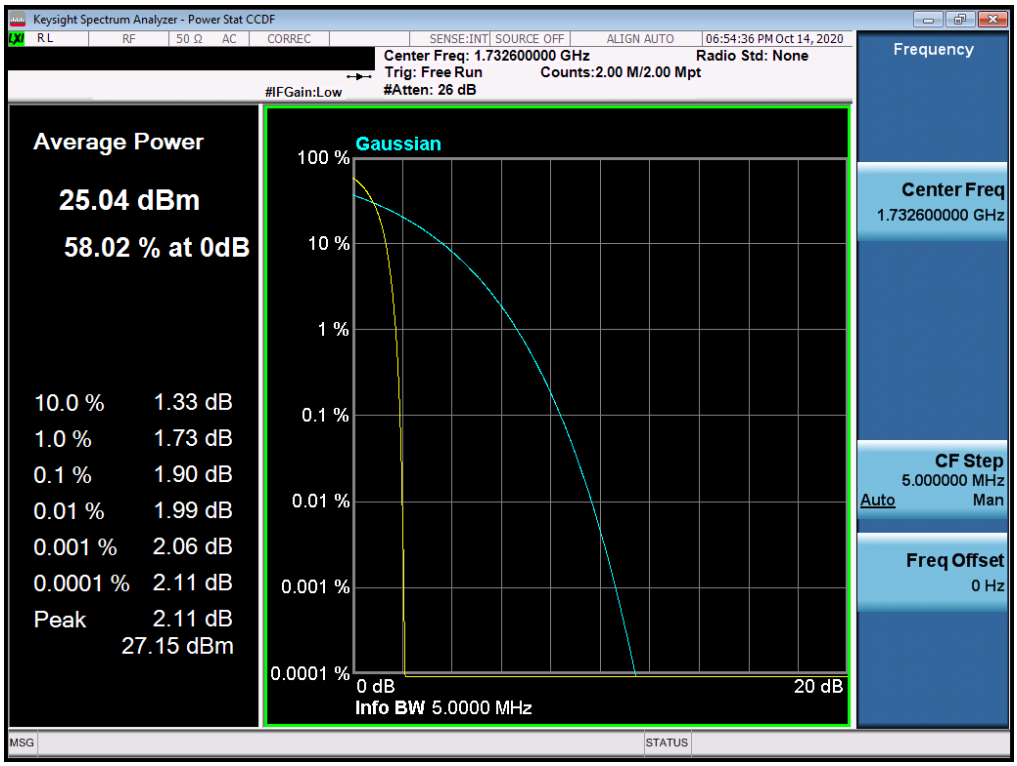


Plot 7-192. PAR Plot (LTE Band 13- 5MHz 64-QAM - Full RB Configuration)

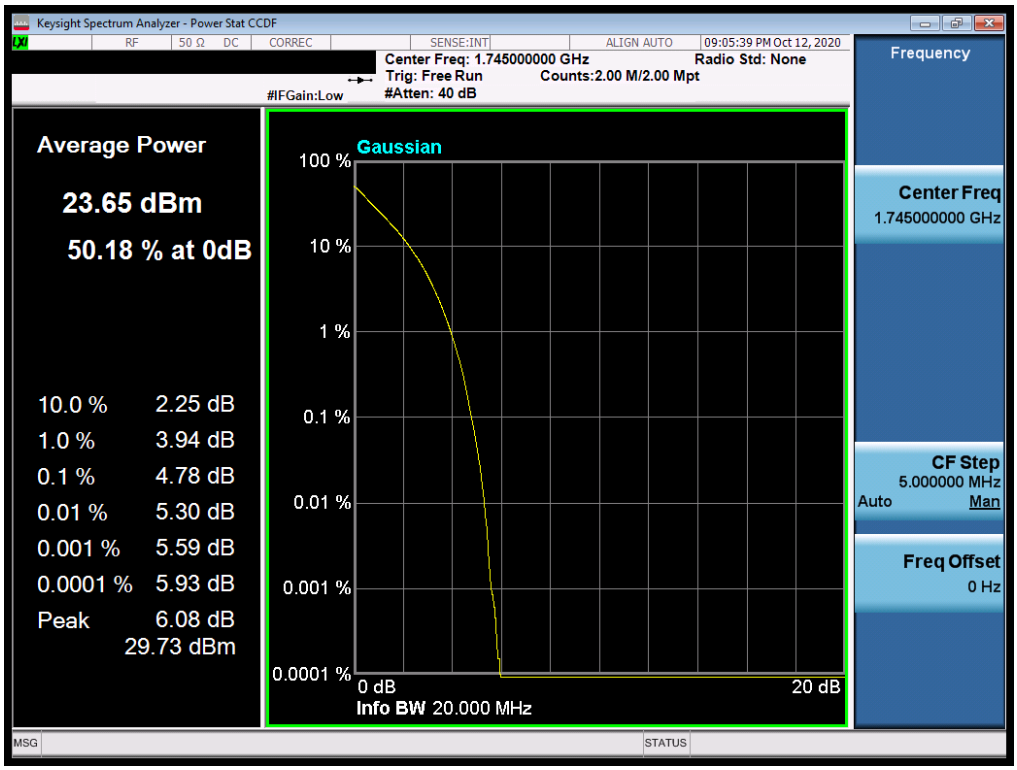


Plot 7-193. PAR Plot (LTE Band 13- 5MHz 256-QAM - Full RB Configuration)

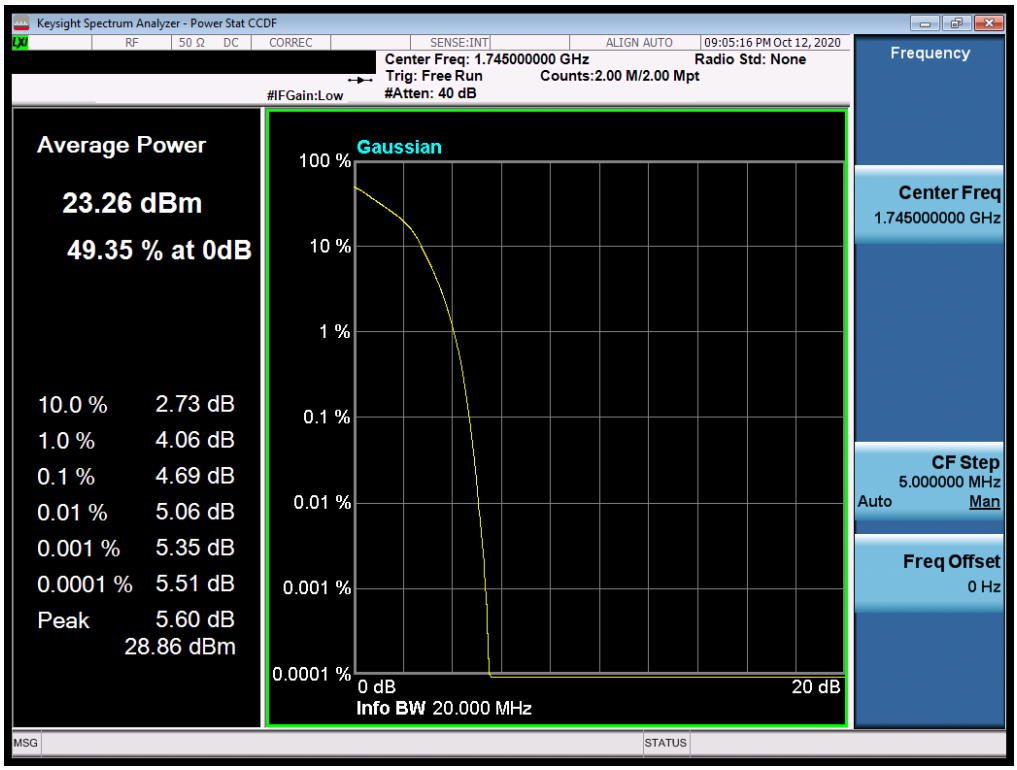
WCDMA AWS



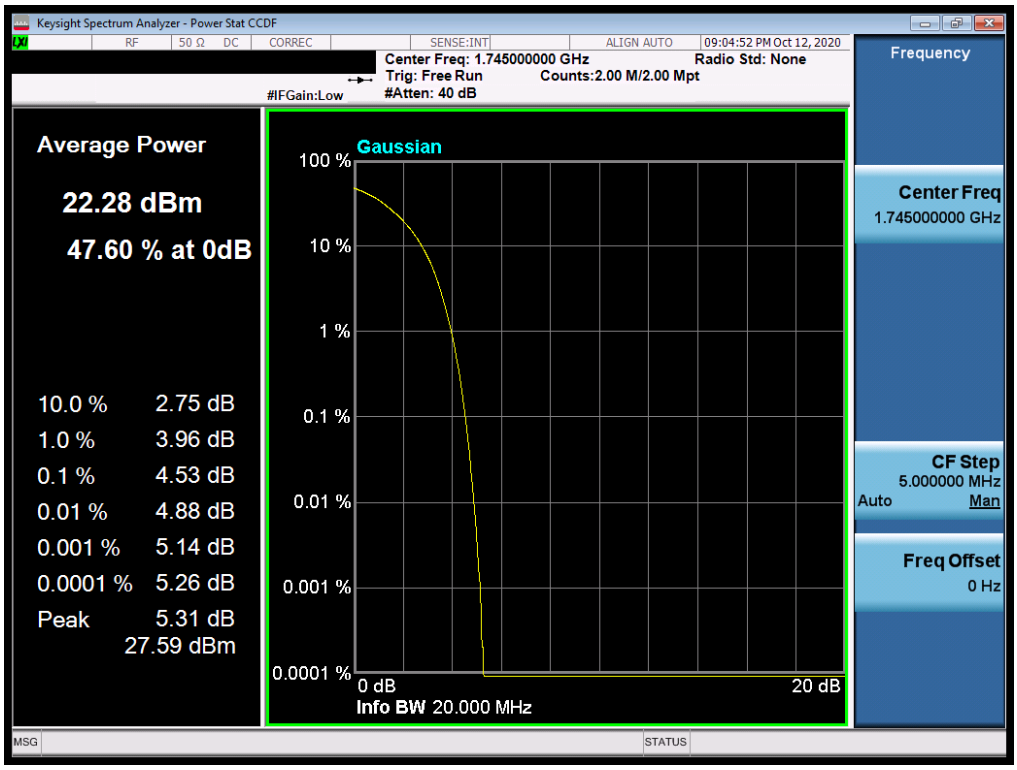
Plot 7-194. PAR Plot (WCDMA, Ch. 1413)



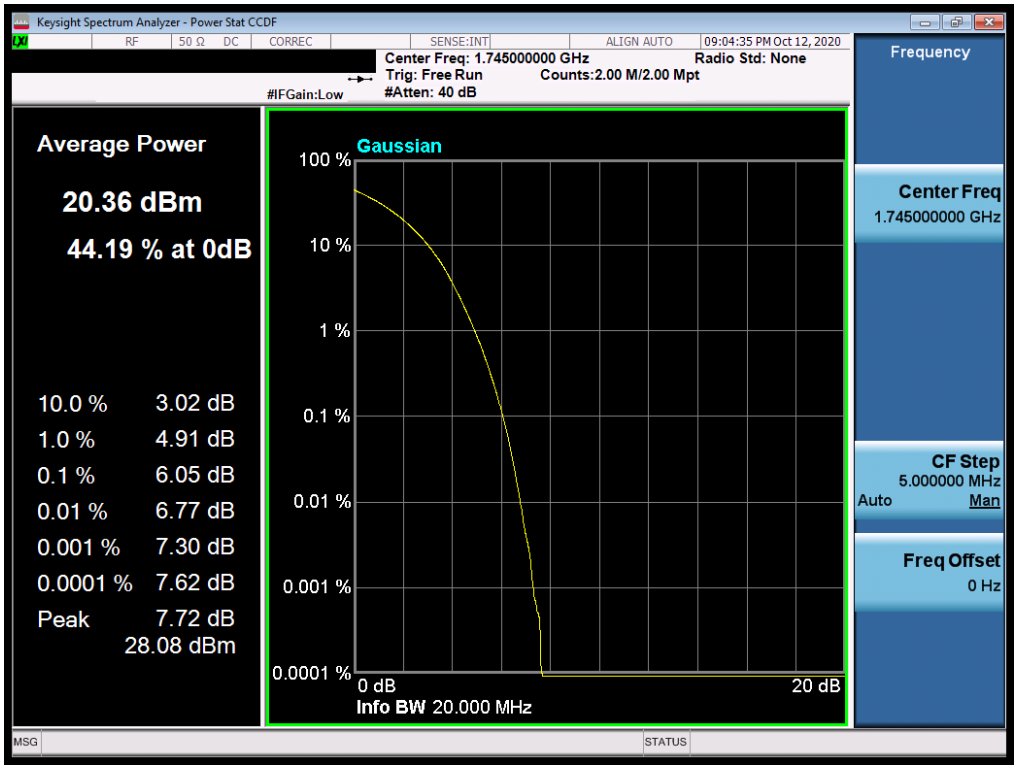
Plot 7-195. PAR Plot (LTE Band 66/4 - 20MHz QPSK - Full RB Configuration)



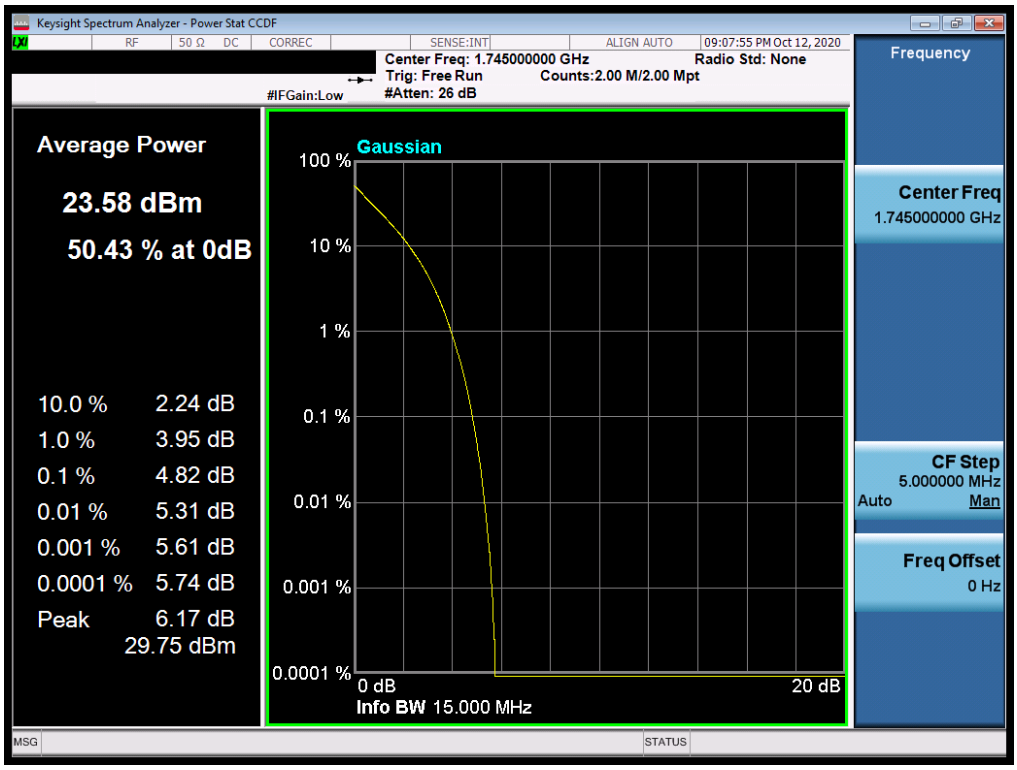
Plot 7-196. PAR Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB Configuration)



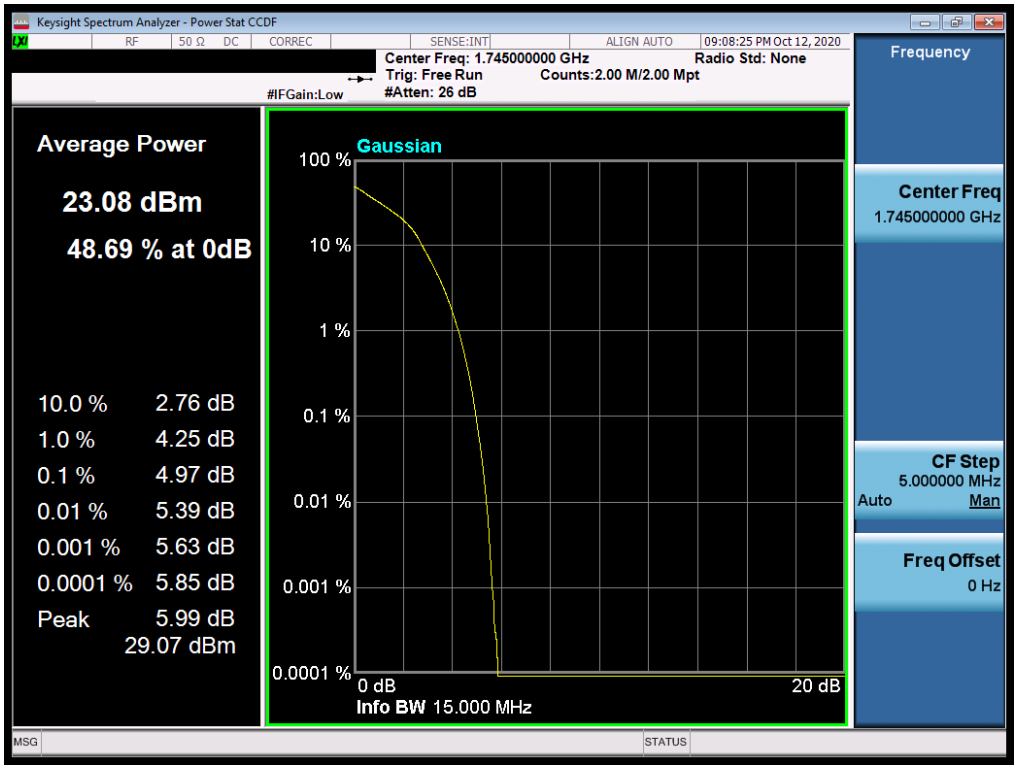
Plot 7-197. PAR Plot (LTE Band 66/4 - 20MHz 64-QAM - Full RB Configuration)



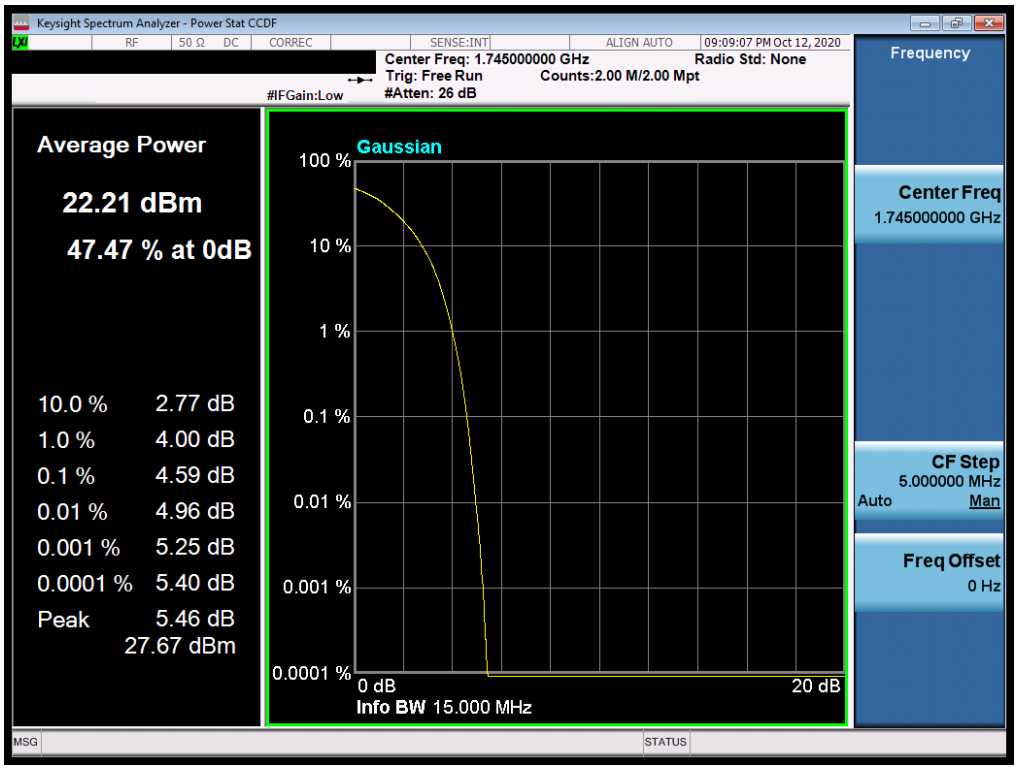
Plot 7-198. PAR Plot (LTE Band 66/4 - 20MHz 256-QAM - Full RB Configuration)



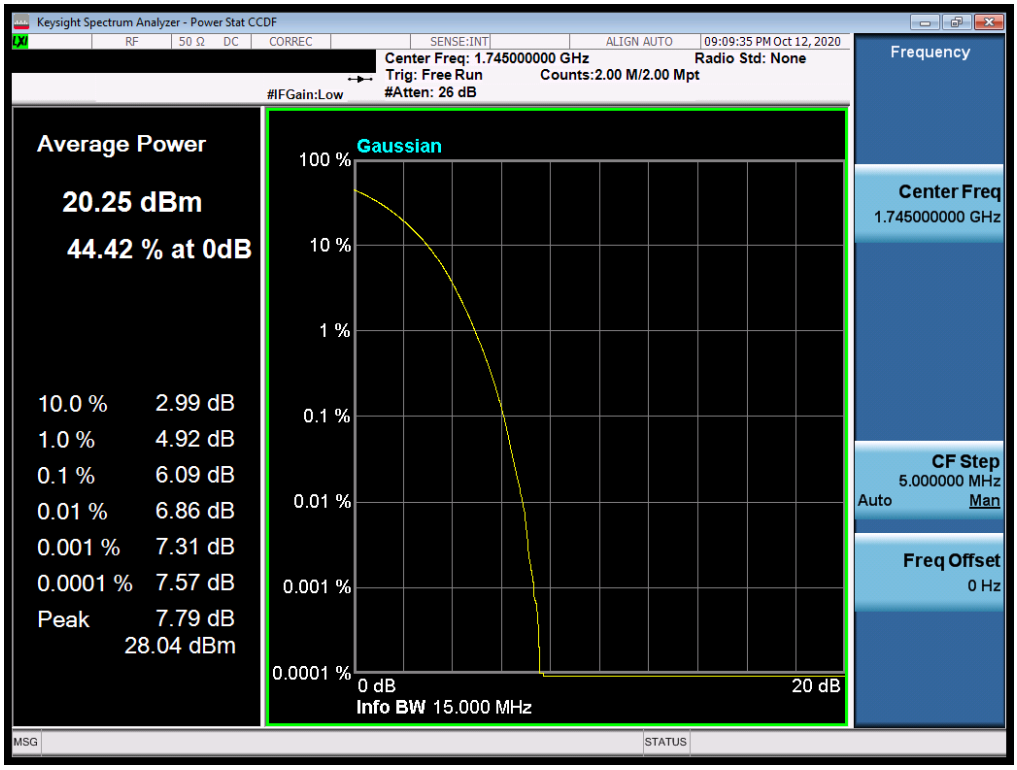
Plot 7-199. PAR Plot (LTE Band 66/4 - 15MHz QPSK - Full RB Configuration)



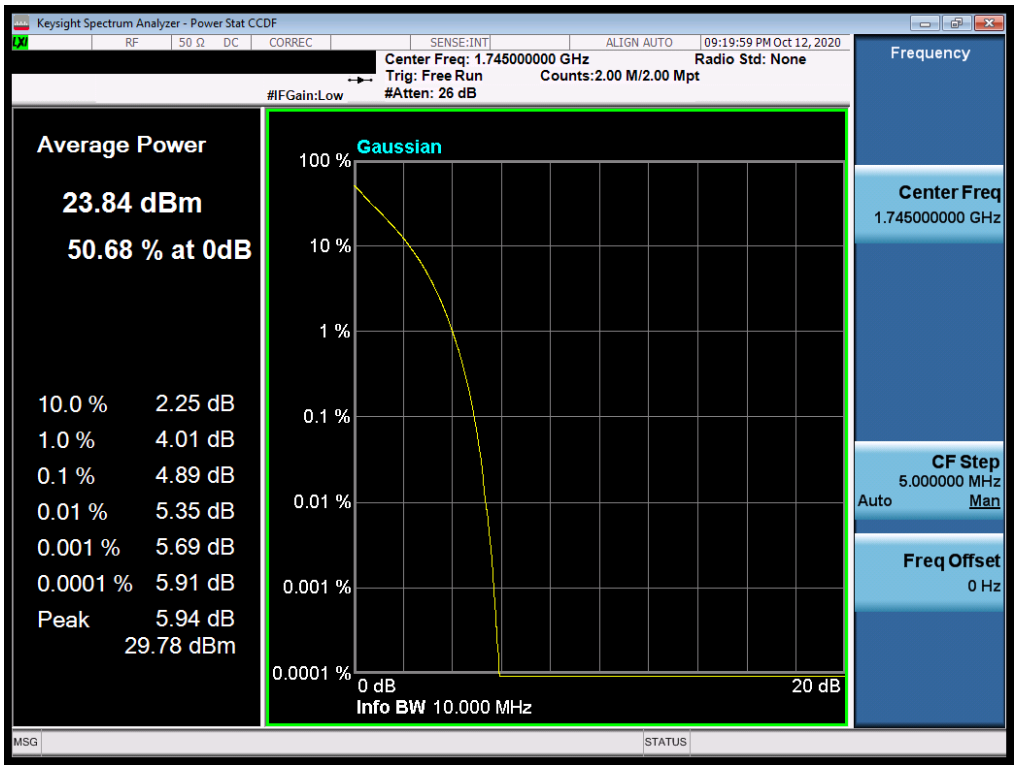
Plot 7-200. PAR Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB Configuration)



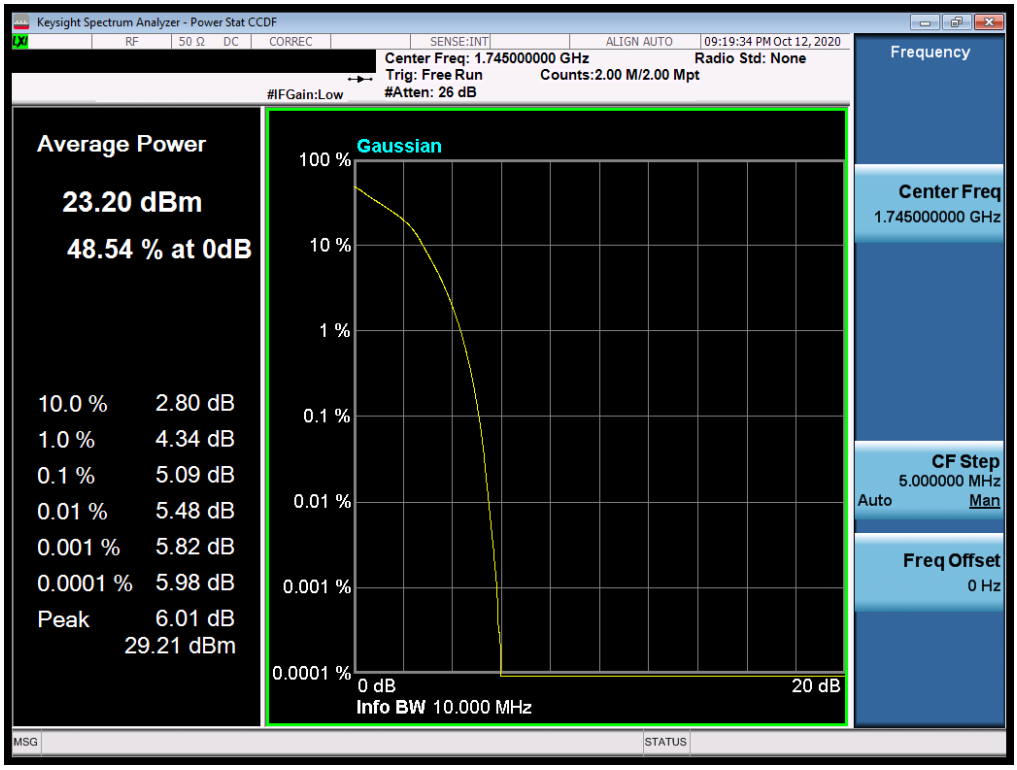
Plot 7-201. PAR Plot (LTE Band 66/4 - 15MHz 64-QAM - Full RB Configuration)



Plot 7-202. PAR Plot (LTE Band 66/4 - 15MHz 256-QAM - Full RB Configuration)



Plot 7-203. PAR Plot (LTE Band 66/4 - 10MHz QPSK - Full RB Configuration)



Plot 7-204. PAR Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB Configuration)