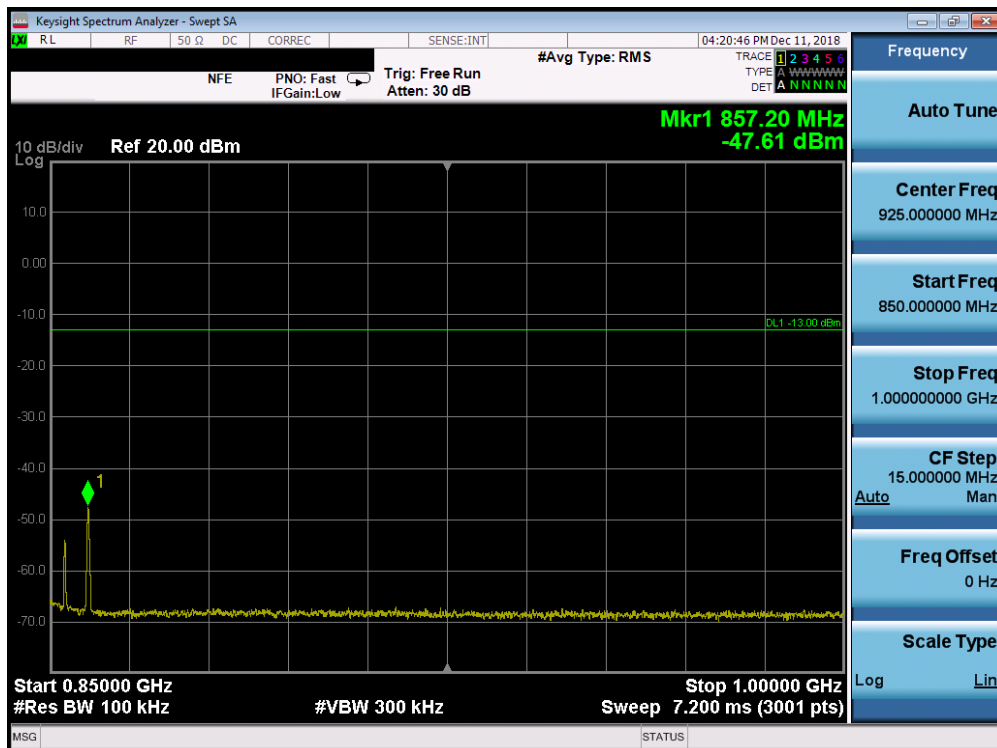
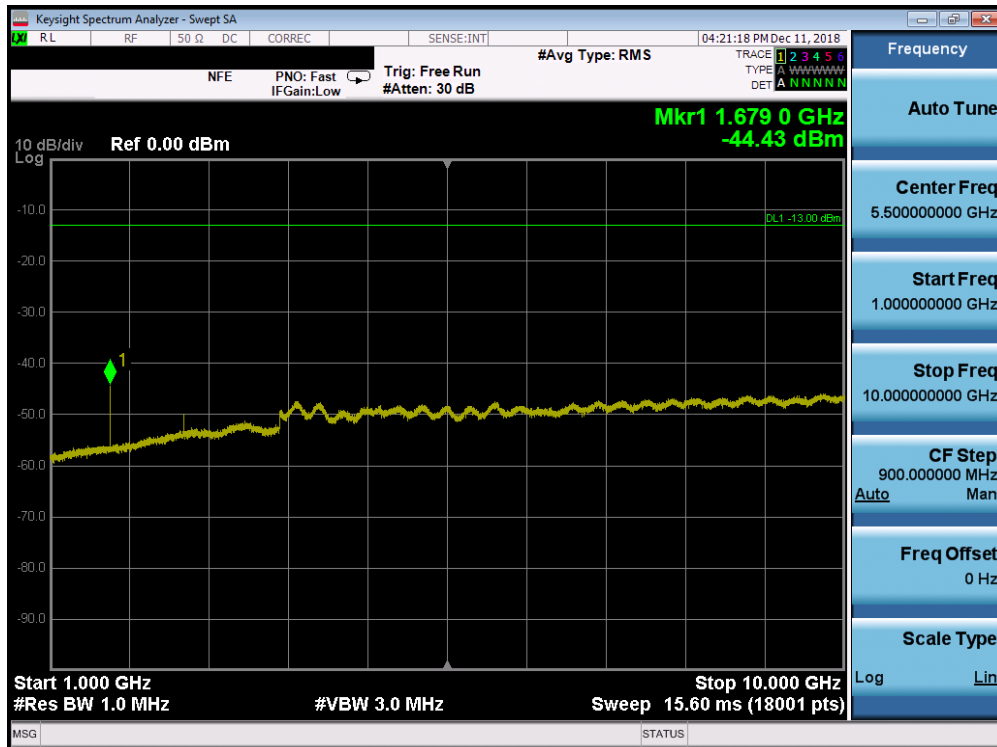


Plot 7-106. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-107. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

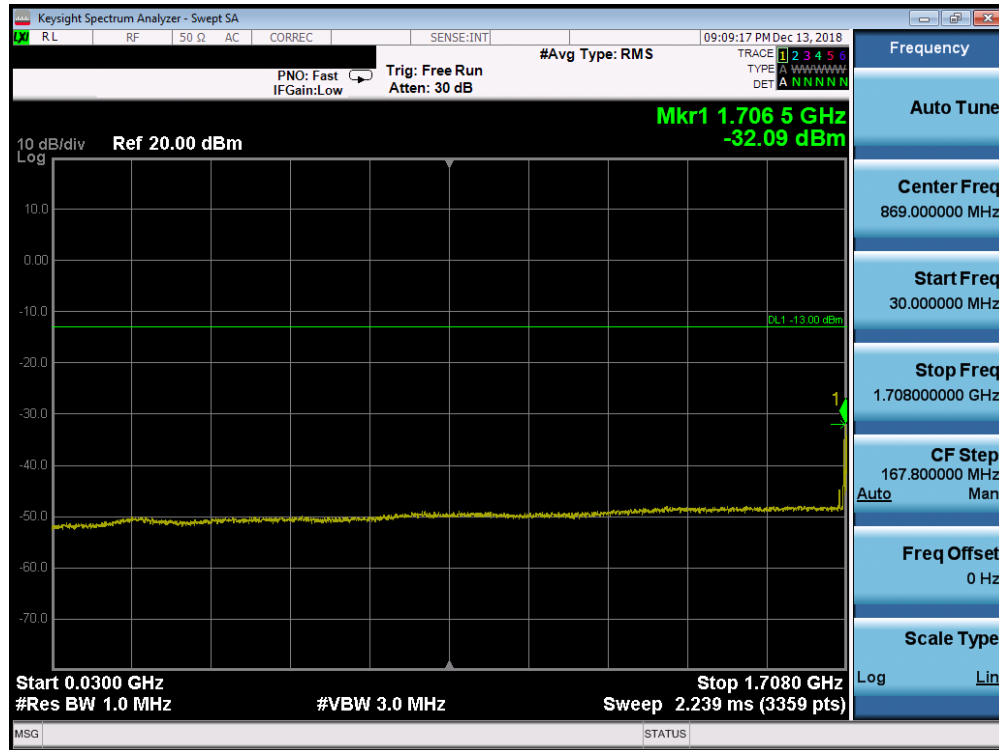
FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 72 of 176



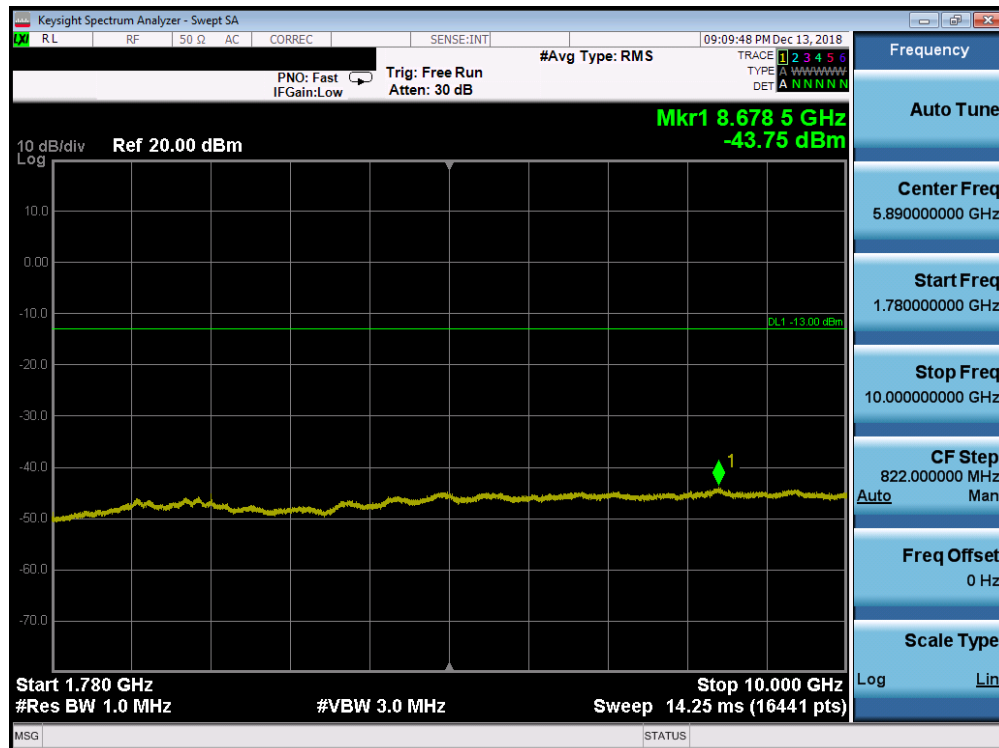
Plot 7-108. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>MEASUREMENT REPORT (CERTIFICATION)</b>	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 73 of 176

## Band 66/4

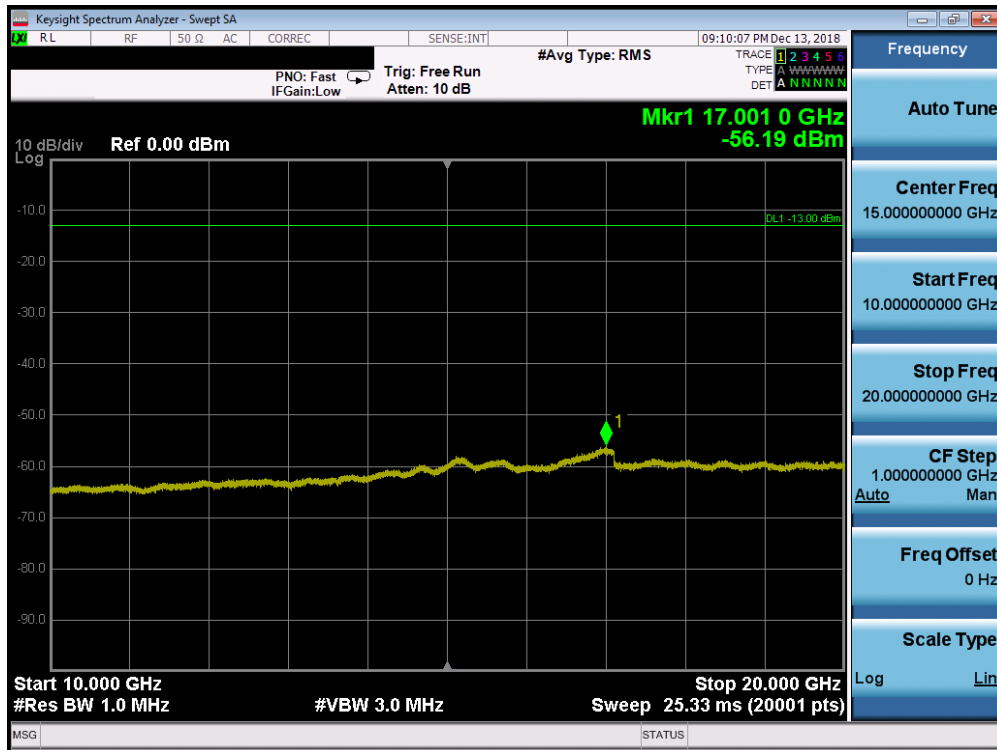


Plot 7-109. Conducted Spurious Plot (Band 66/4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-110. Conducted Spurious Plot (Band 66/4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 74 of 176

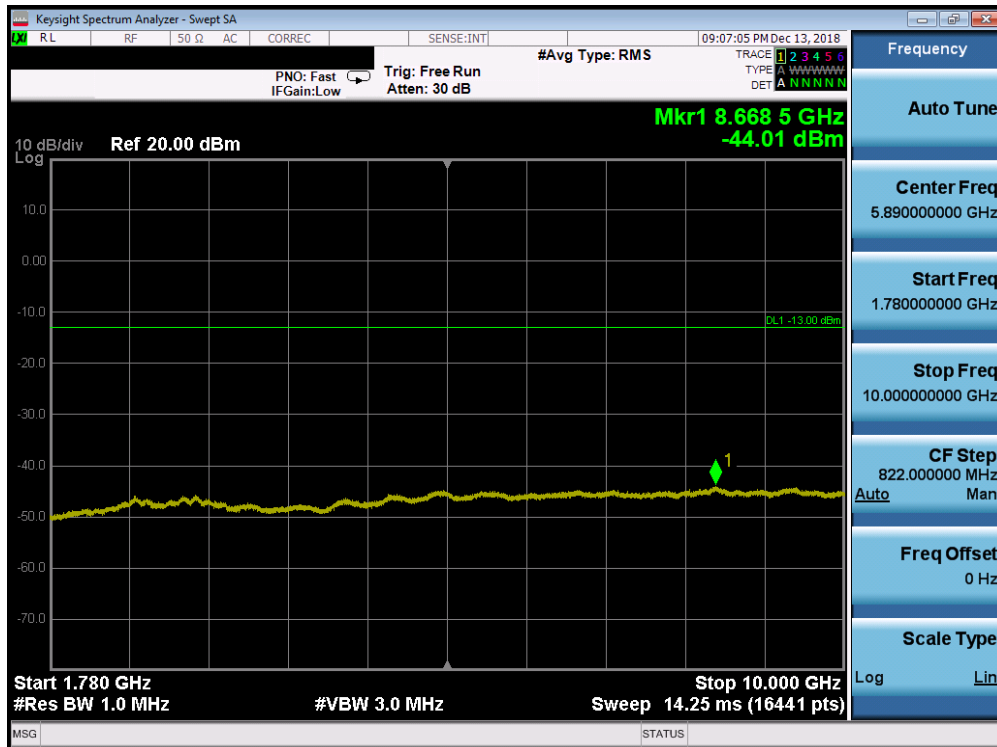


Plot 7-111. Conducted Spurious Plot (Band 66/4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

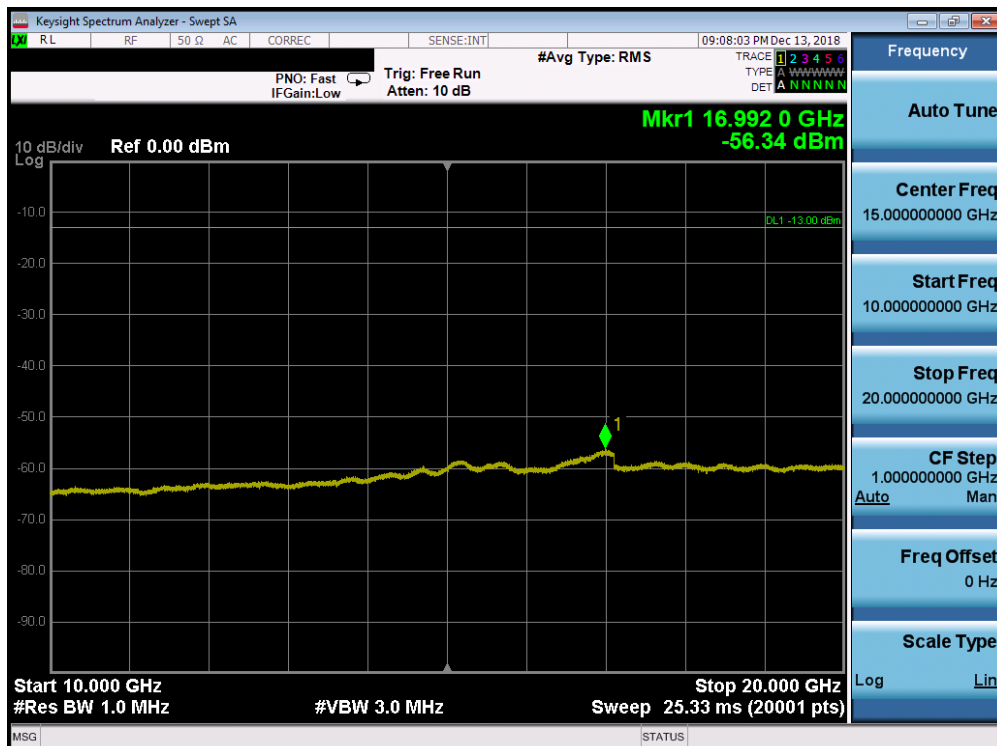


Plot 7-112. Conducted Spurious Plot (Band 66/4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 75 of 176

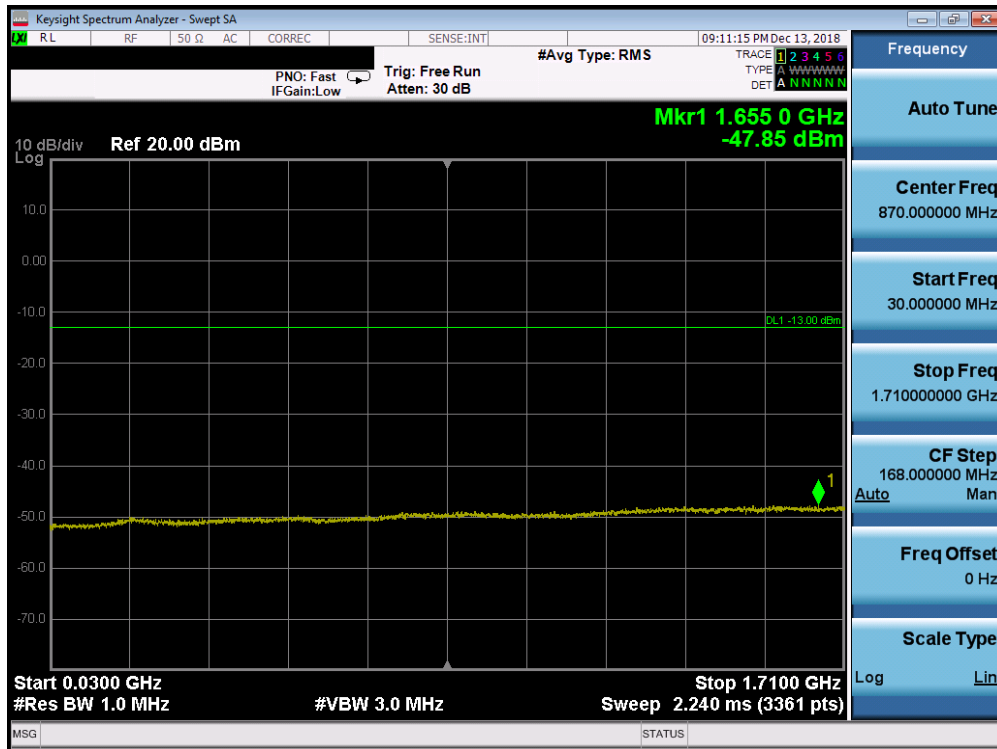


Plot 7-113. Conducted Spurious Plot (Band 66/4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

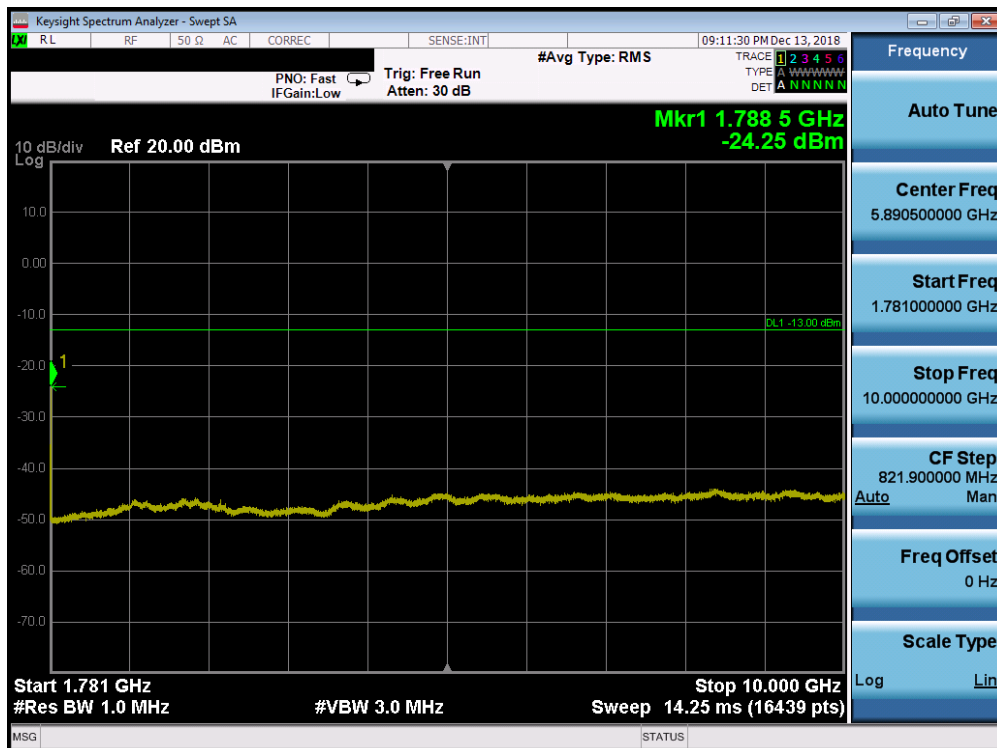


Plot 7-114. Conducted Spurious Plot (Band 66/4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 76 of 176

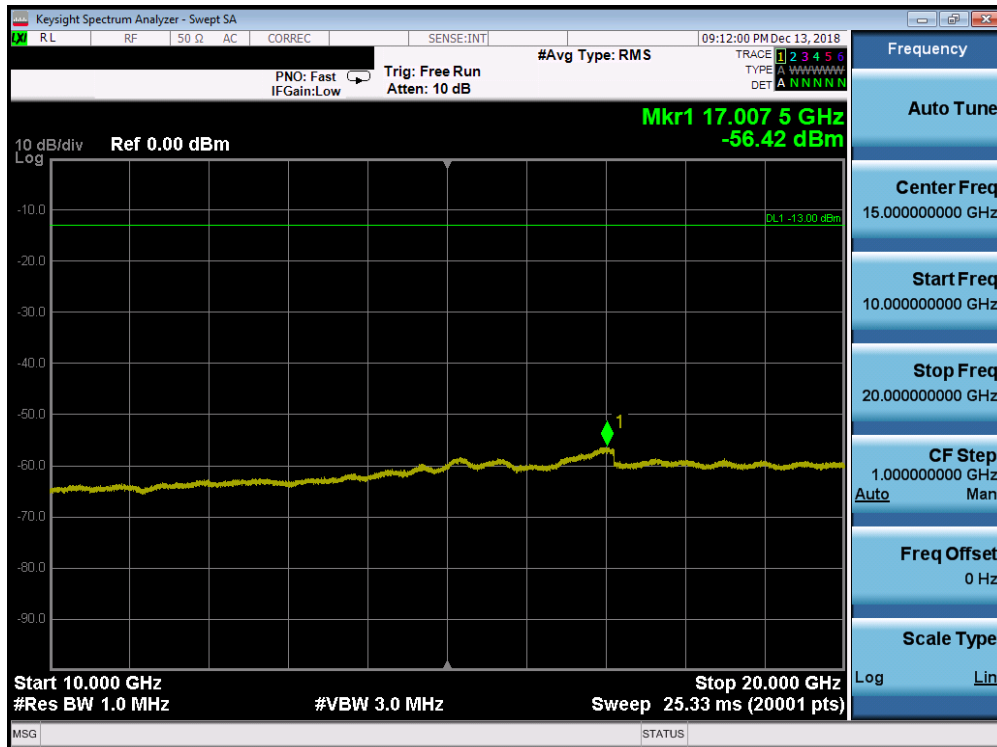


Plot 7-115. Conducted Spurious Plot (Band 66/4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-116. Conducted Spurious Plot (Band 66/4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

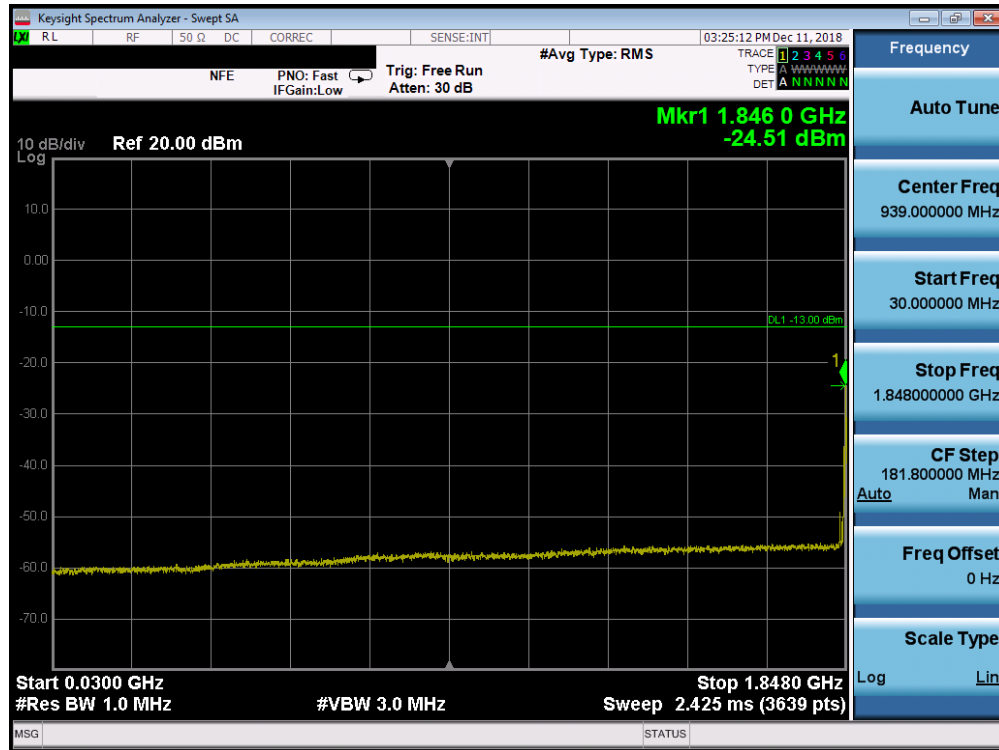
FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 77 of 176



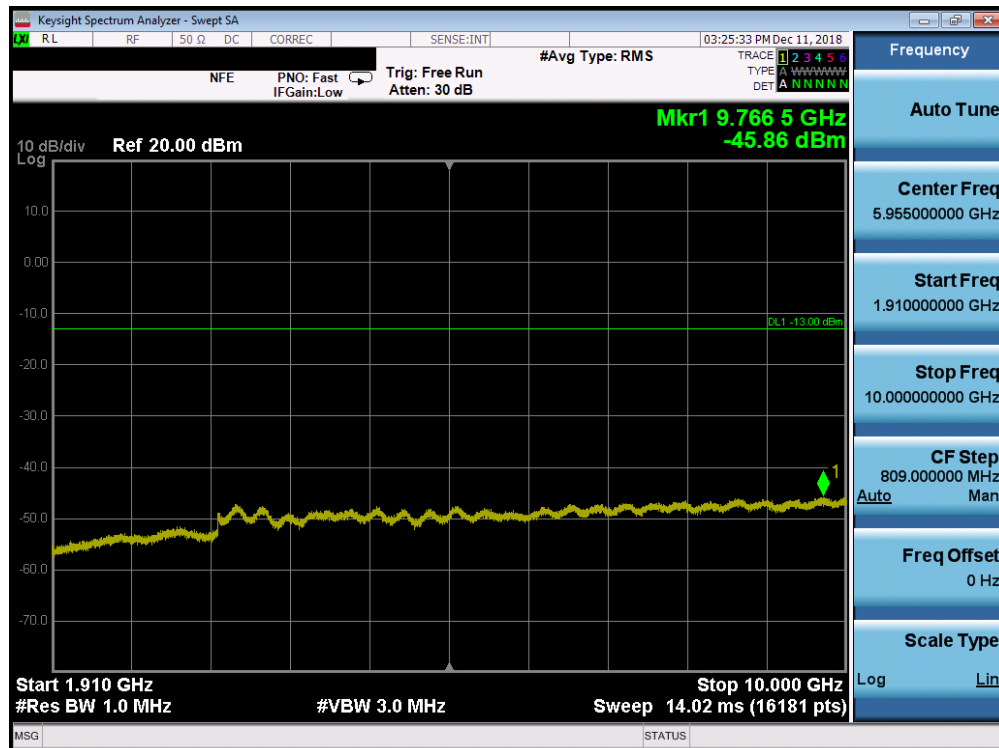
Plot 7-117. Conducted Spurious Plot (Band 66/4 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>MEASUREMENT REPORT (CERTIFICATION)</b>	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 78 of 176

## Band 2

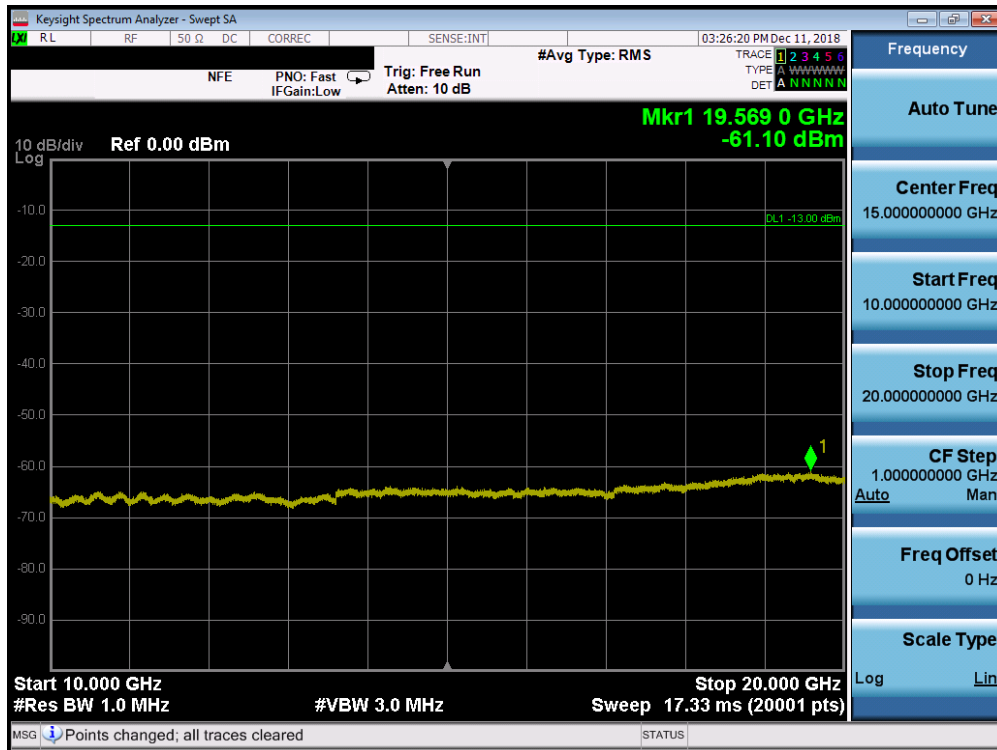


Plot 7-118. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

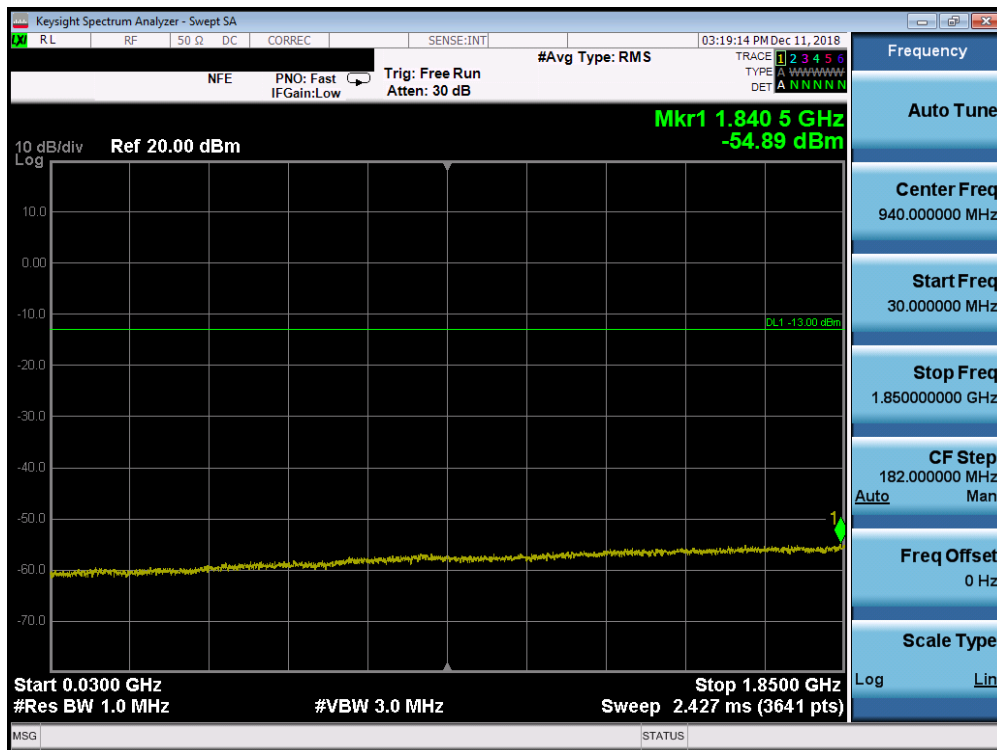


Plot 7-119. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 79 of 176

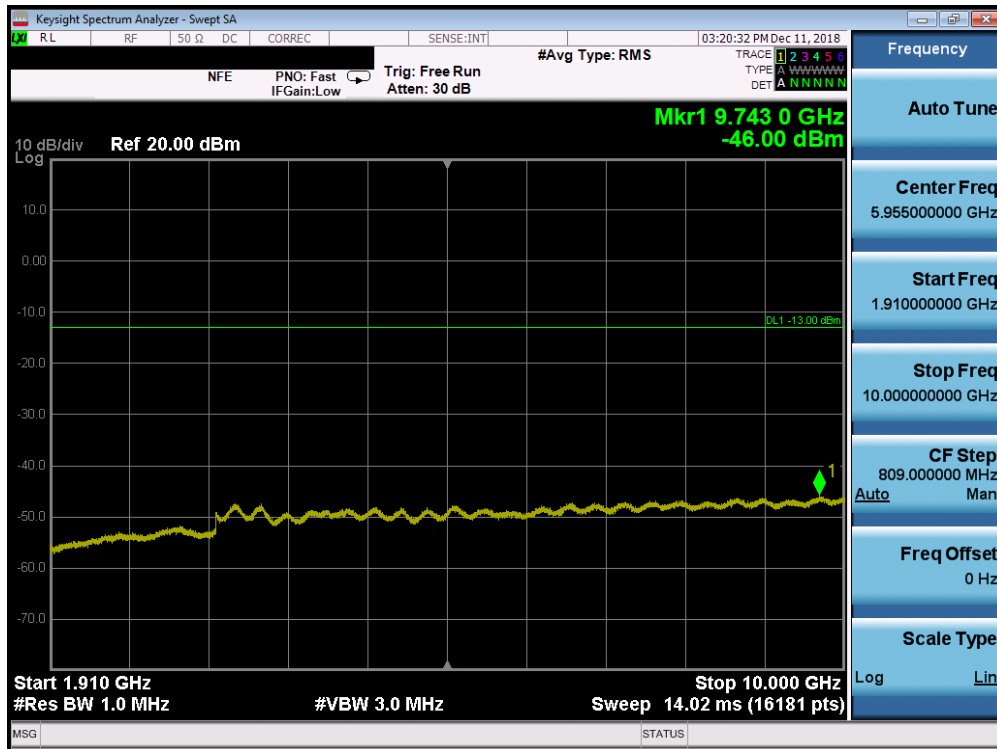


Plot 7-120. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

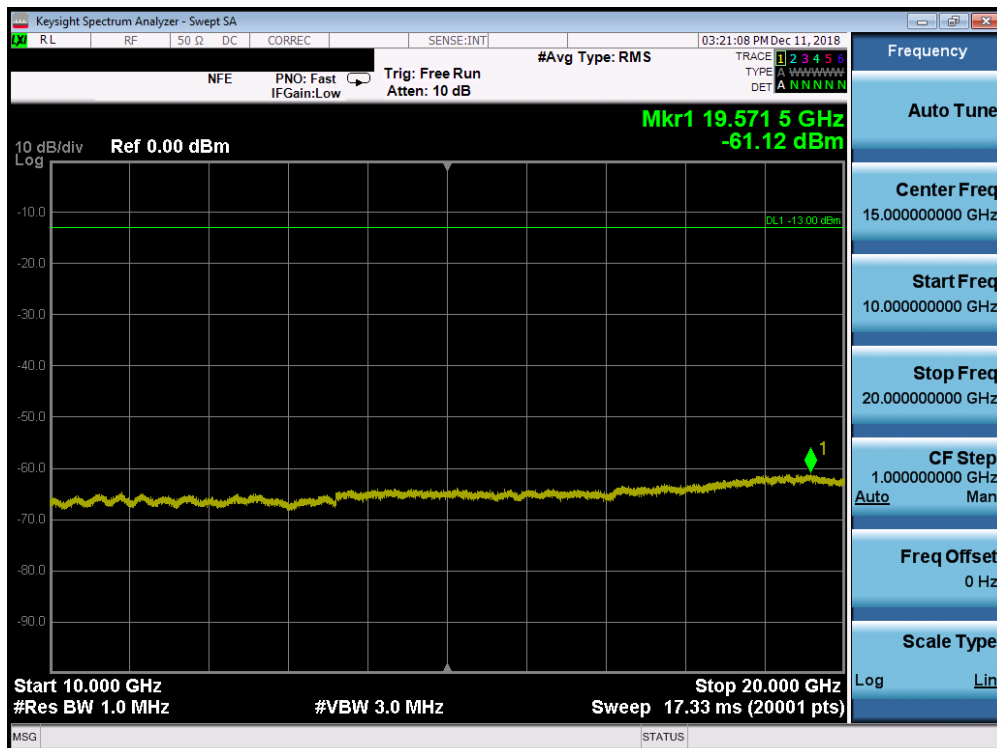


Plot 7-121. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 80 of 176

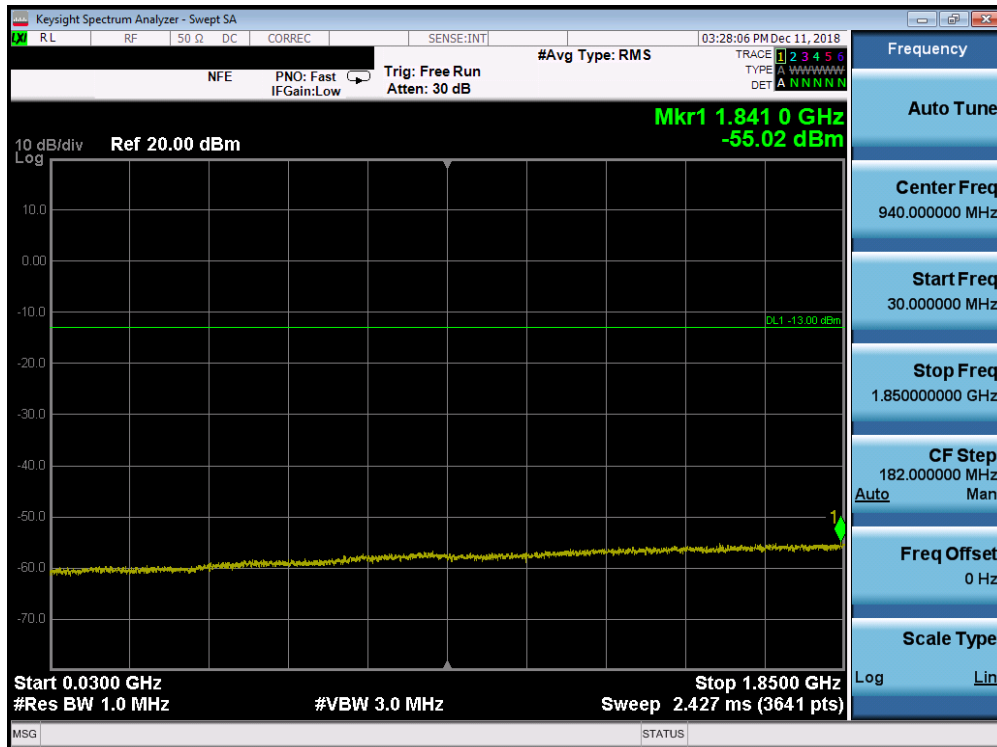


Plot 7-122. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

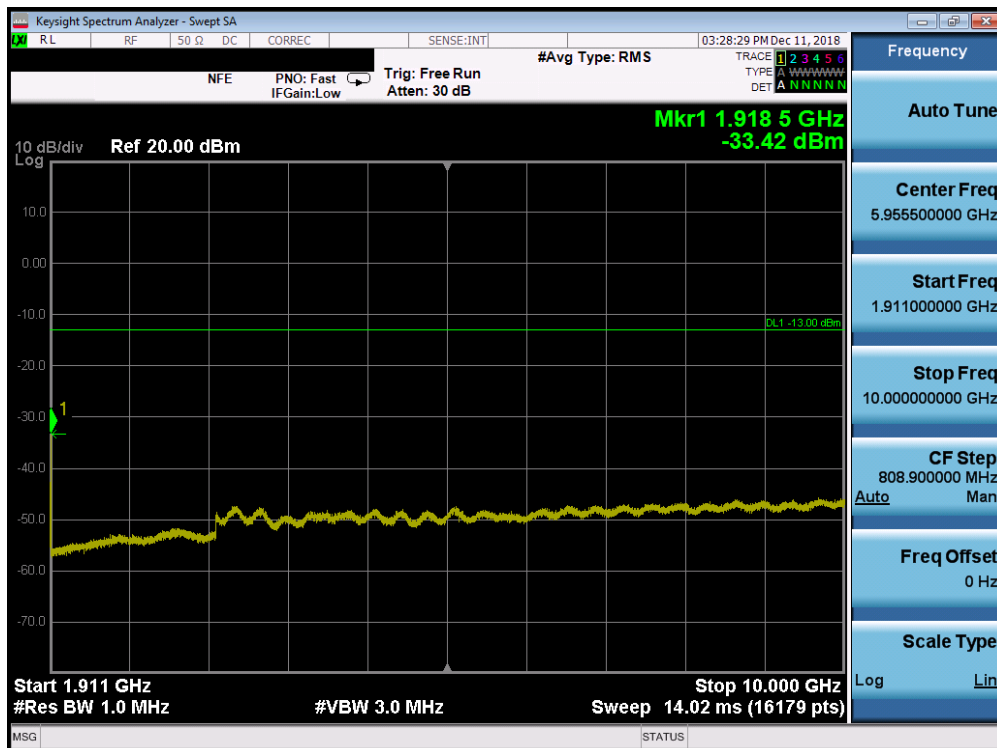


Plot 7-123. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 81 of 176

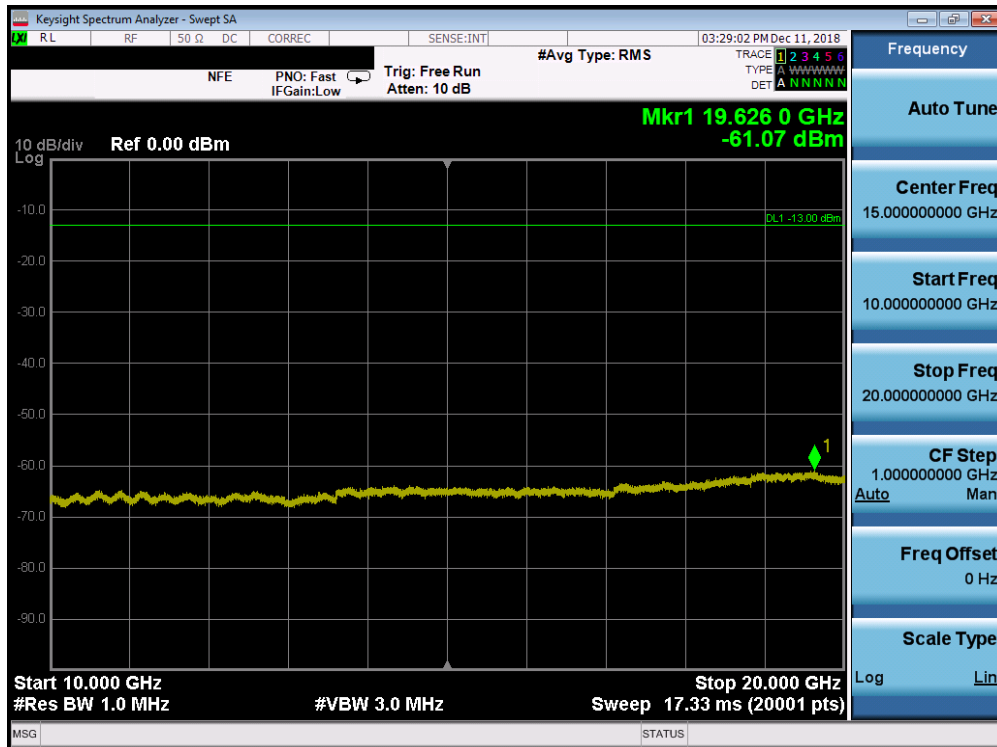


Plot 7-124. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-125. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1-ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 82 of 176



Plot 7-126. Conducted Spurious Plot (Band 2 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 83 of 176

## 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.***

### Test Procedure Used

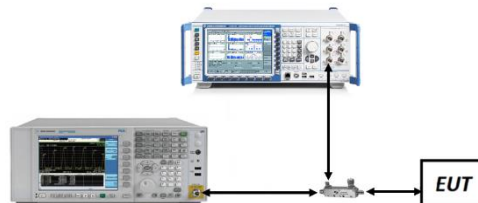
KDB 971168 D01 v03r01 – Section 6.0

### 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  $\geq 3 \times$  RBW
5. Detector = RMS
6. Number of sweep points  $\geq 2 \times$  Span/RBW
7. Trace mode = trace average
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**

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>MEASUREMENT REPORT (CERTIFICATION)</b>	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 84 of 176

## 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.

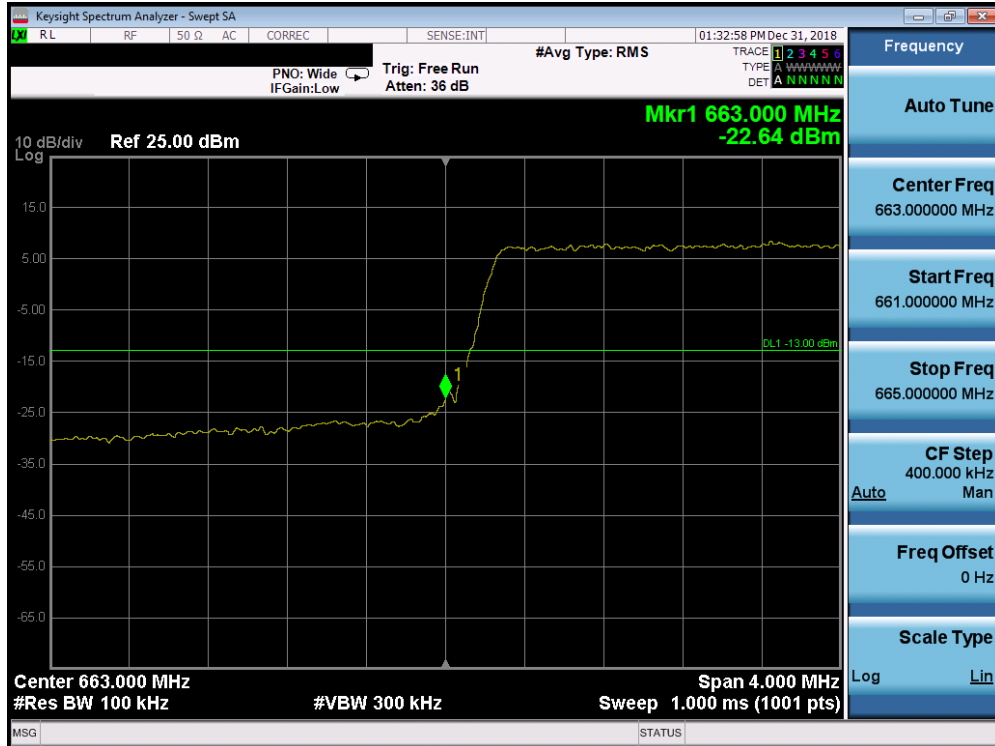
Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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  $65 + 10\log_{10}(P) = -35\text{dBm}$  in a 6.25kHz bandwidth.

FCC ID: ZNFL423DL	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset	Page 85 of 176

## Band 71

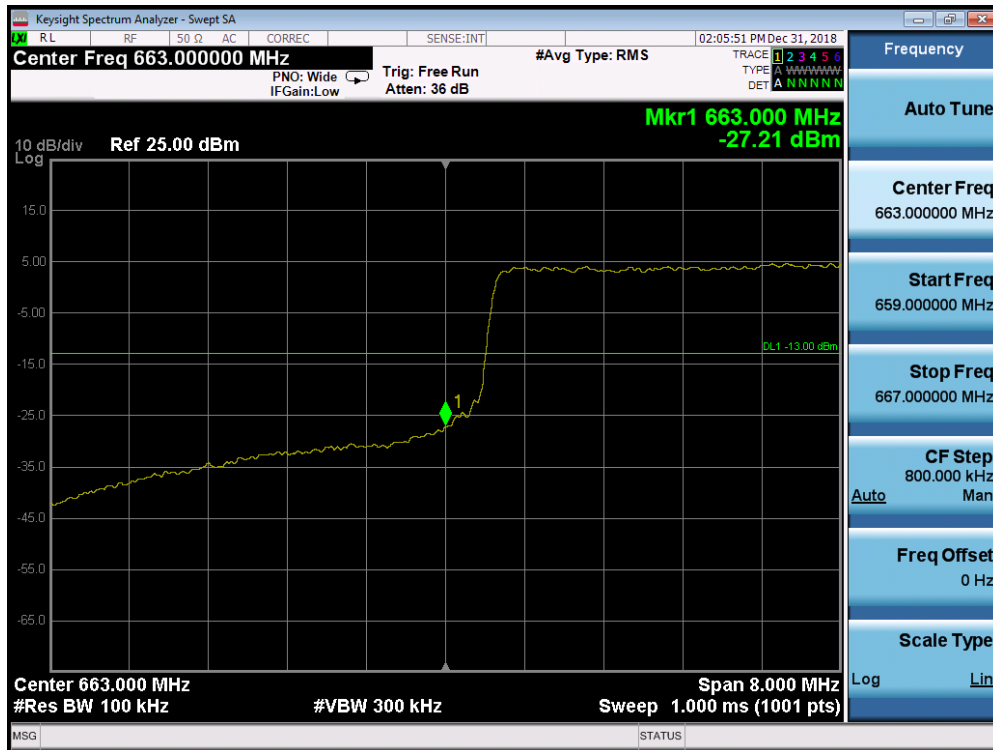


Plot 7-127. Lower Band Edge Plot (Band 71 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-128. Upper Band Edge Plot (Band 71 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 86 of 176

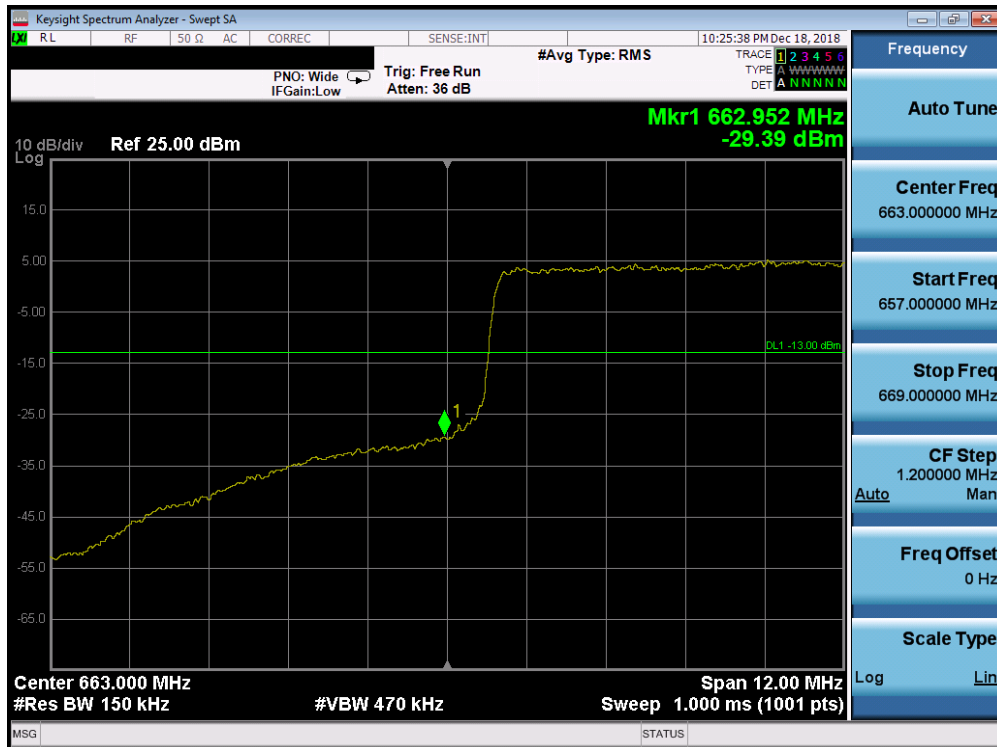


Plot 7-129. Lower Band Edge Plot (Band 71 - 10.0MHz QPSK - Full RB Configuration)

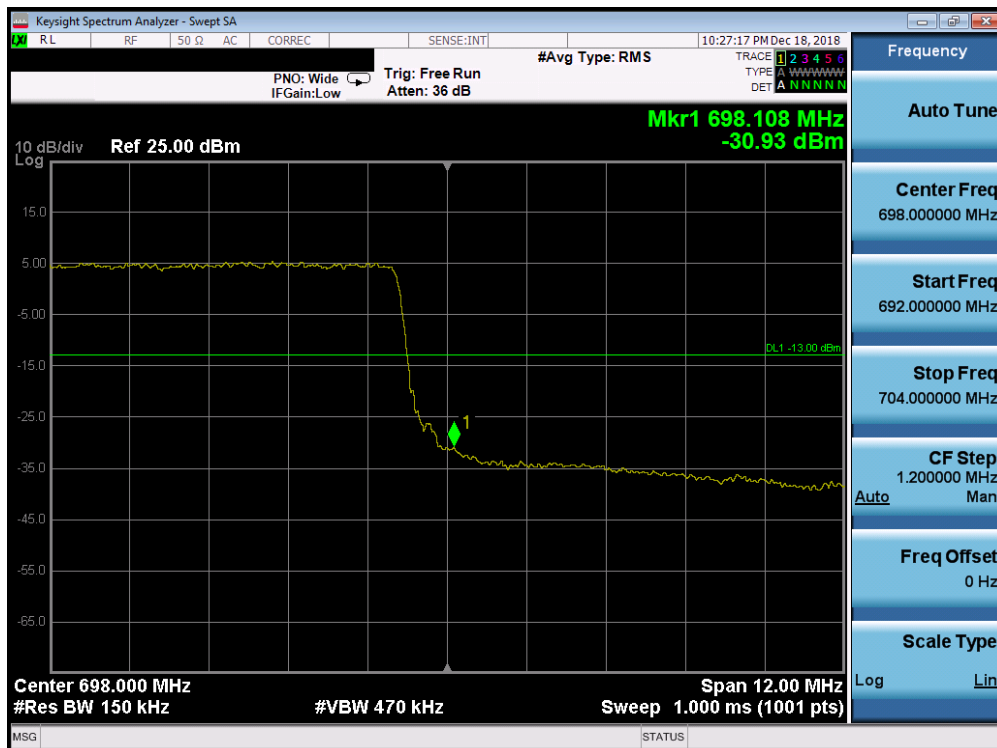


Plot 7-130. Upper Band Edge Plot (Band 71 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1-ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 87 of 176

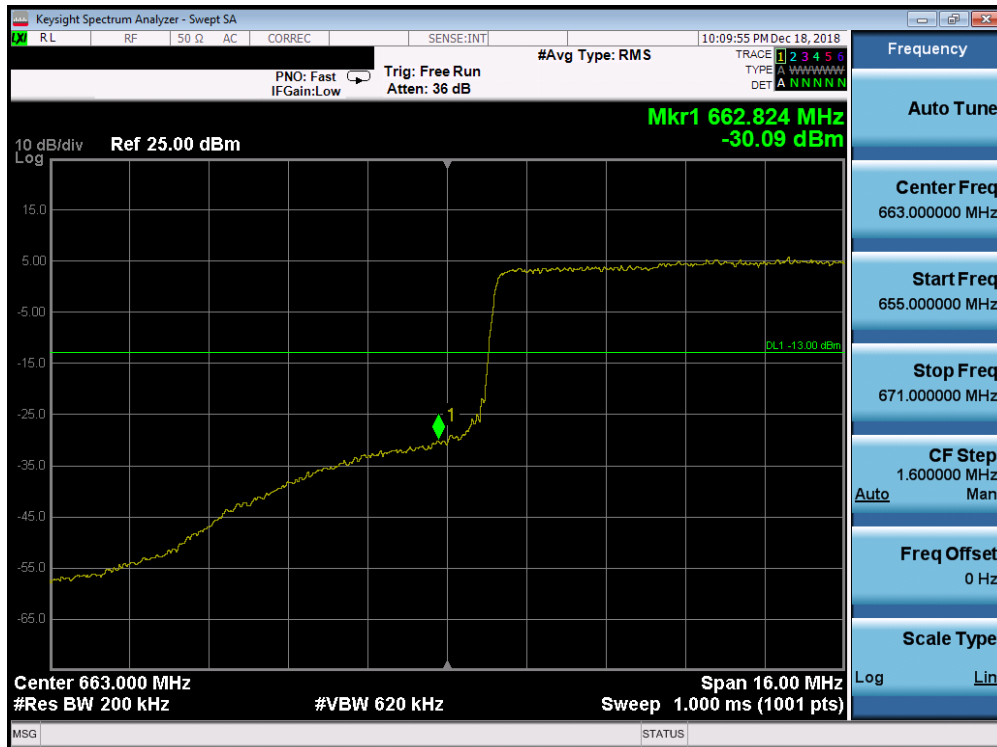


Plot 7-131. Lower Band Edge Plot (Band 71 - 15.0MHz QPSK - Full RB Configuration)

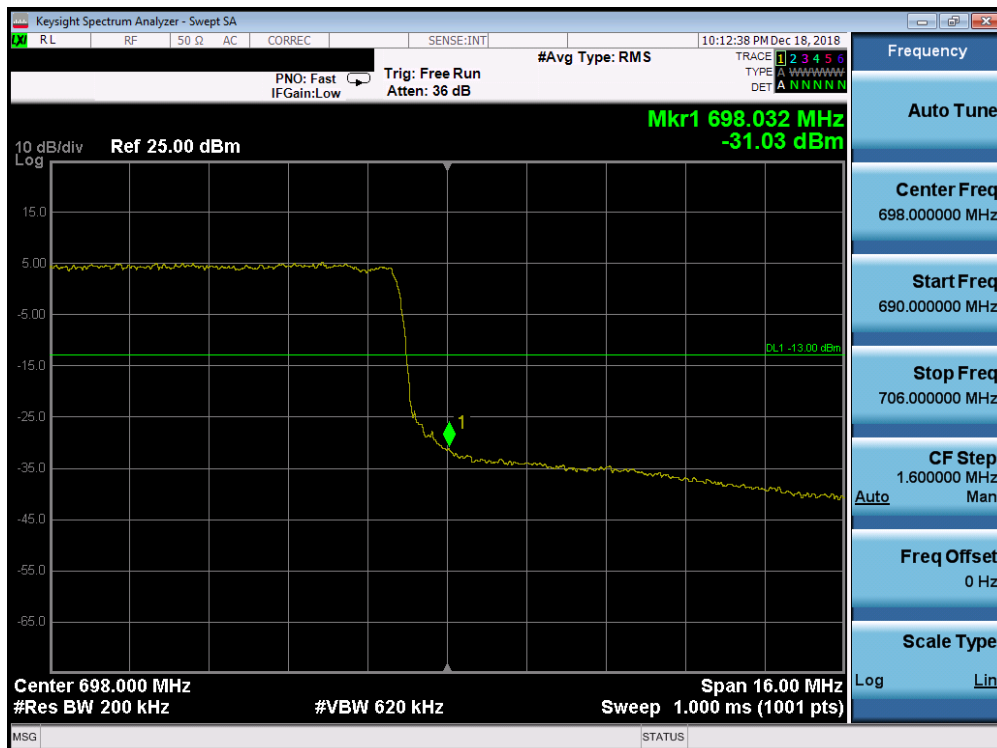


Plot 7-132. Upper Band Edge Plot (Band 71 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1-ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 88 of 176



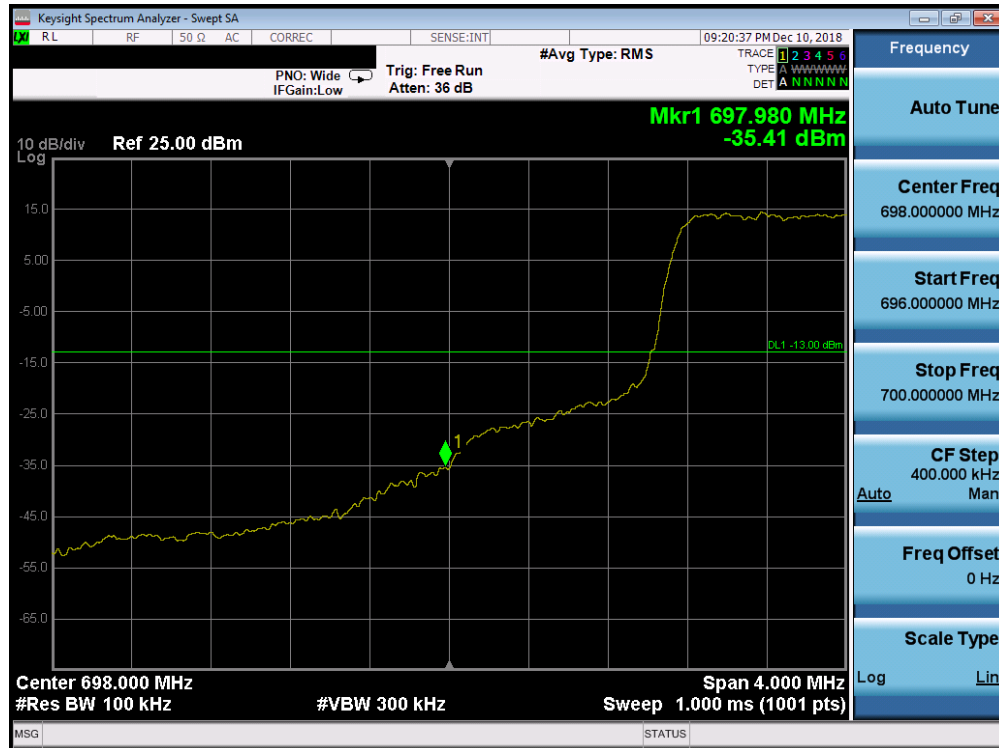
Plot 7-133. Lower Band Edge Plot (Band 71 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-134. Upper Band Edge Plot (Band 71 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 89 of 176

## Band 12

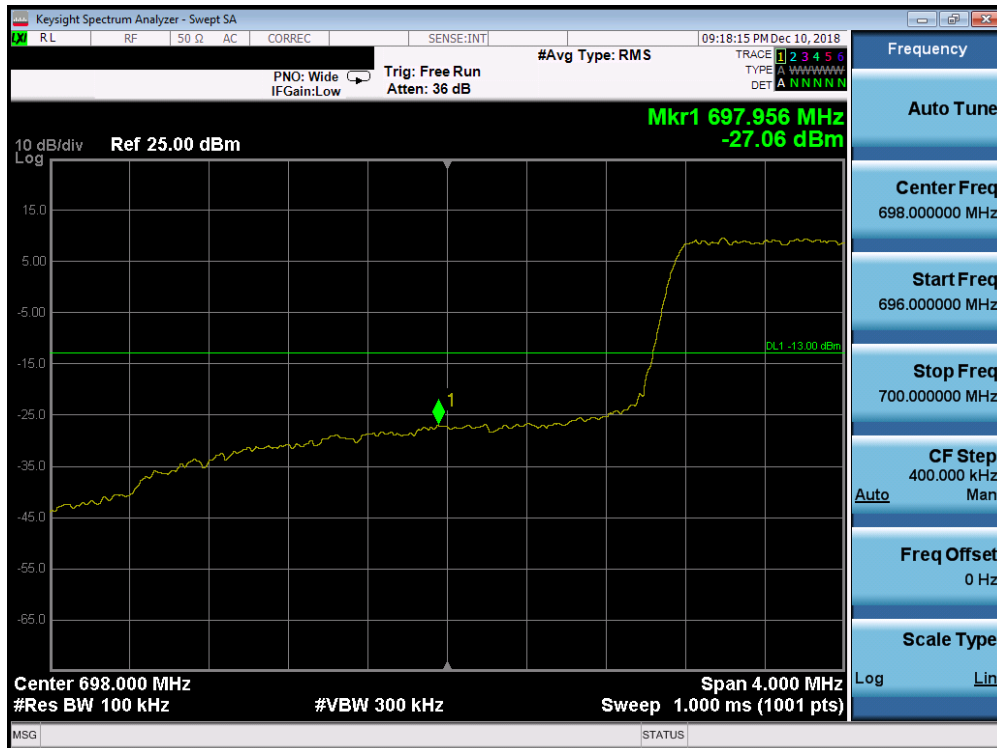


Plot 7-135. Lower Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-136. Upper Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 90 of 176

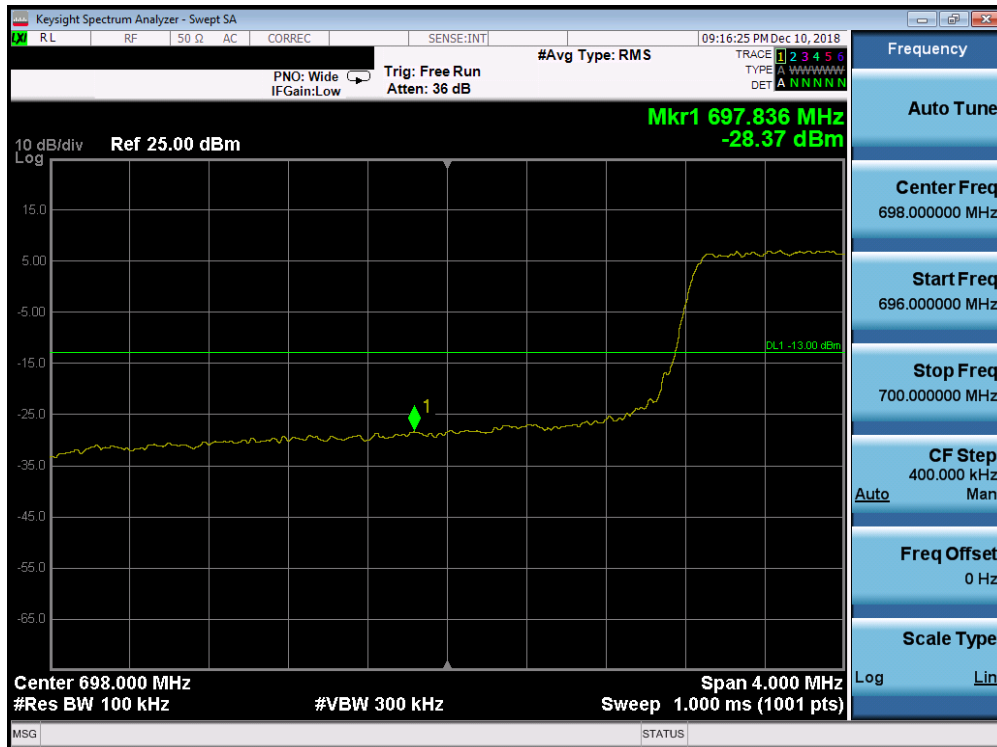


Plot 7-137. Lower Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

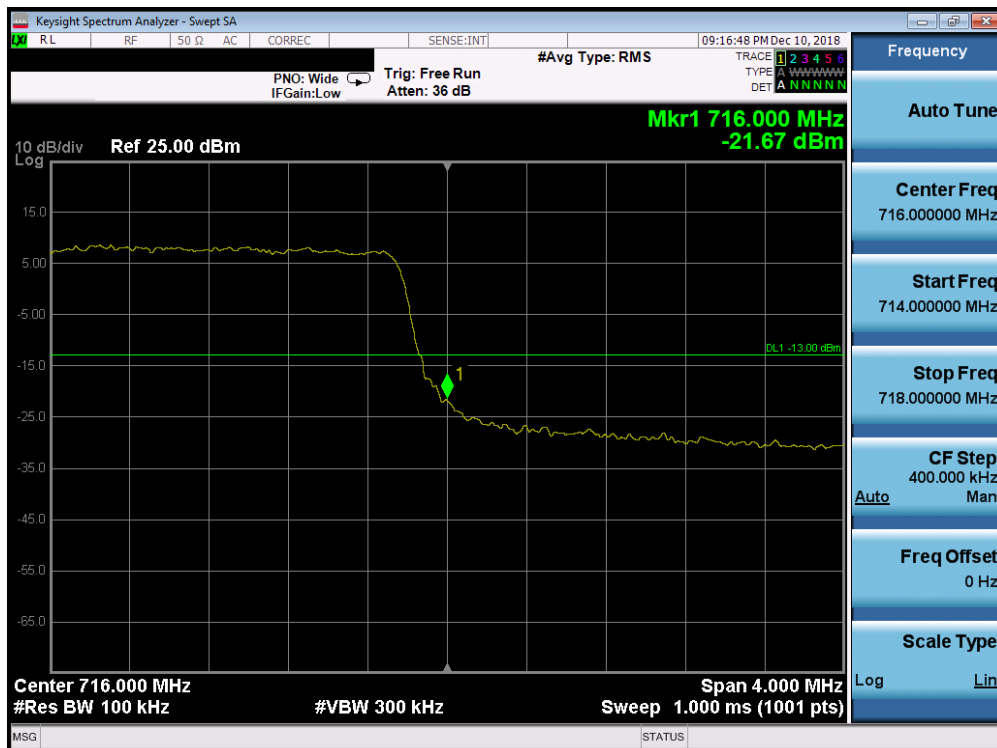


Plot 7-138. Upper Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 91 of 176

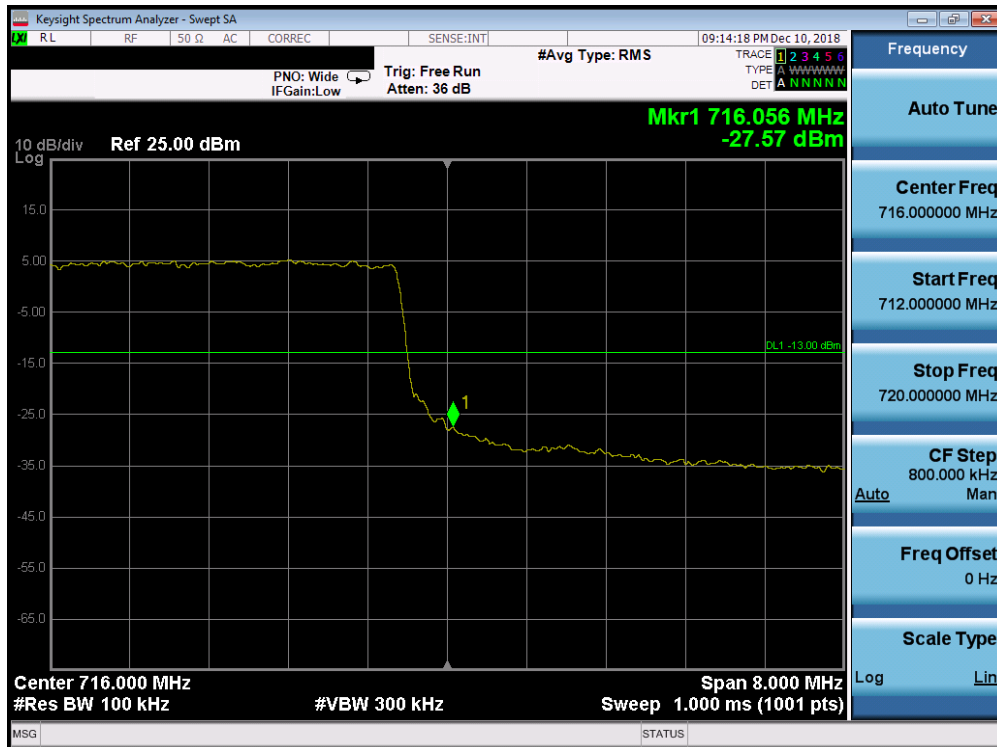


Plot 7-139. Lower Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-140. Upper Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)

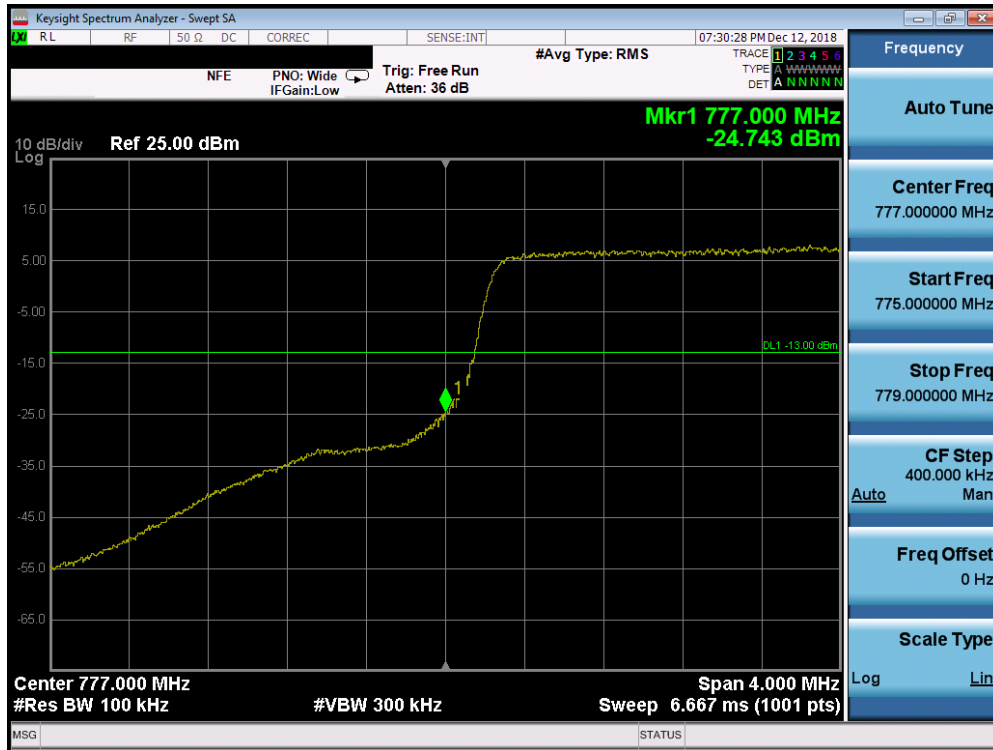
FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 92 of 176



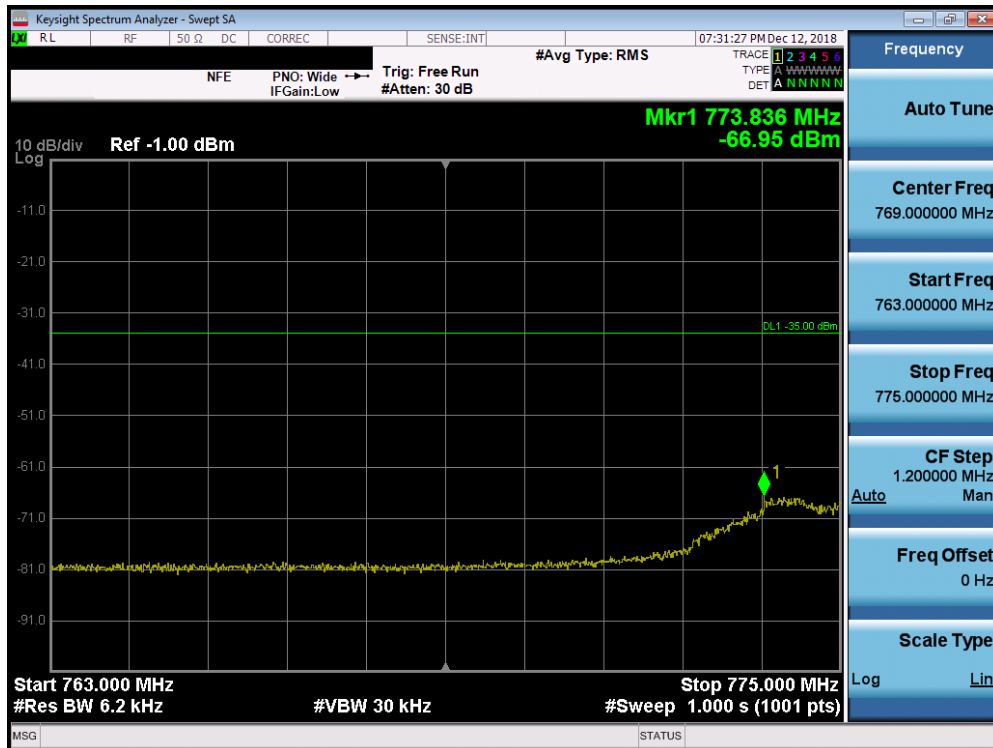
Plot 7-141. Upper Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 93 of 176

## Band 13

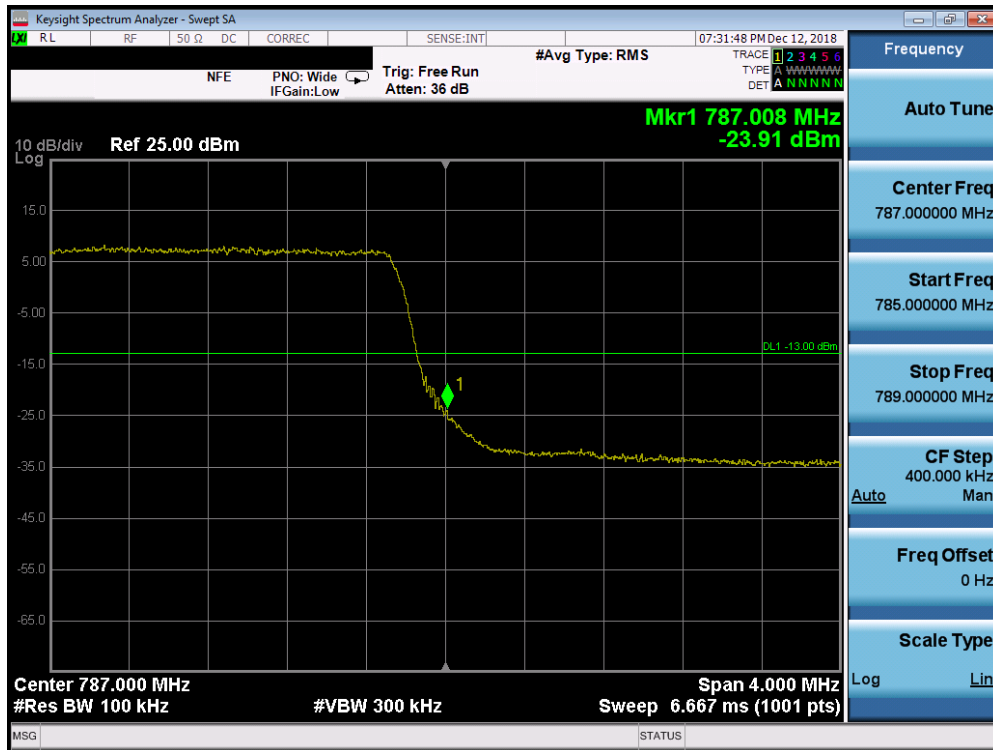


Plot 7-142. Lower Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-143. Lower Emission Mask Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 94 of 176



Plot 7-144. Upper Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

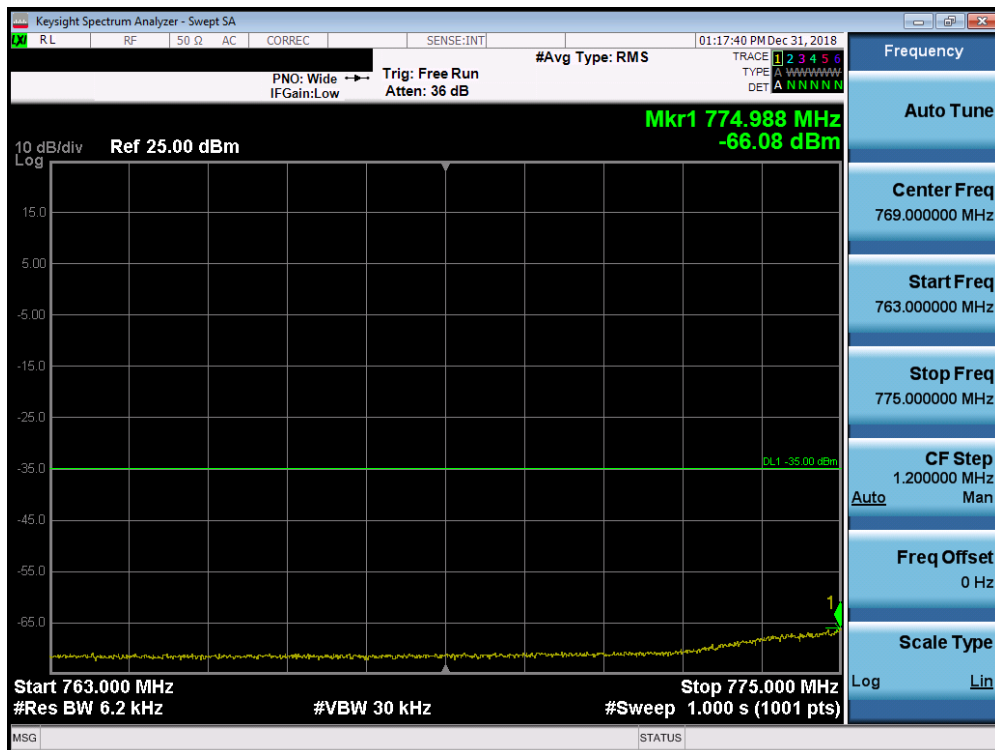


Plot 7-145. Upper Emission Mask Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 95 of 176



Plot 7-146. Lower Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-147. Lower Emission Mask Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 96 of 176



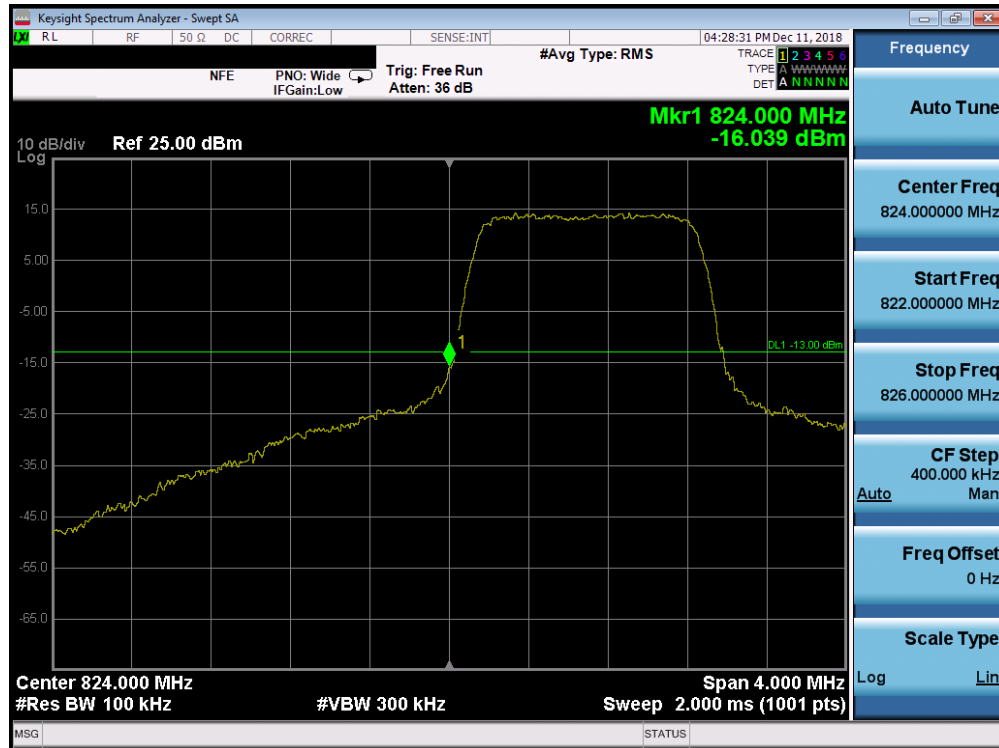
Plot 7-148. Upper Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-149. Upper Emssion Mask Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 97 of 176

## Band 5

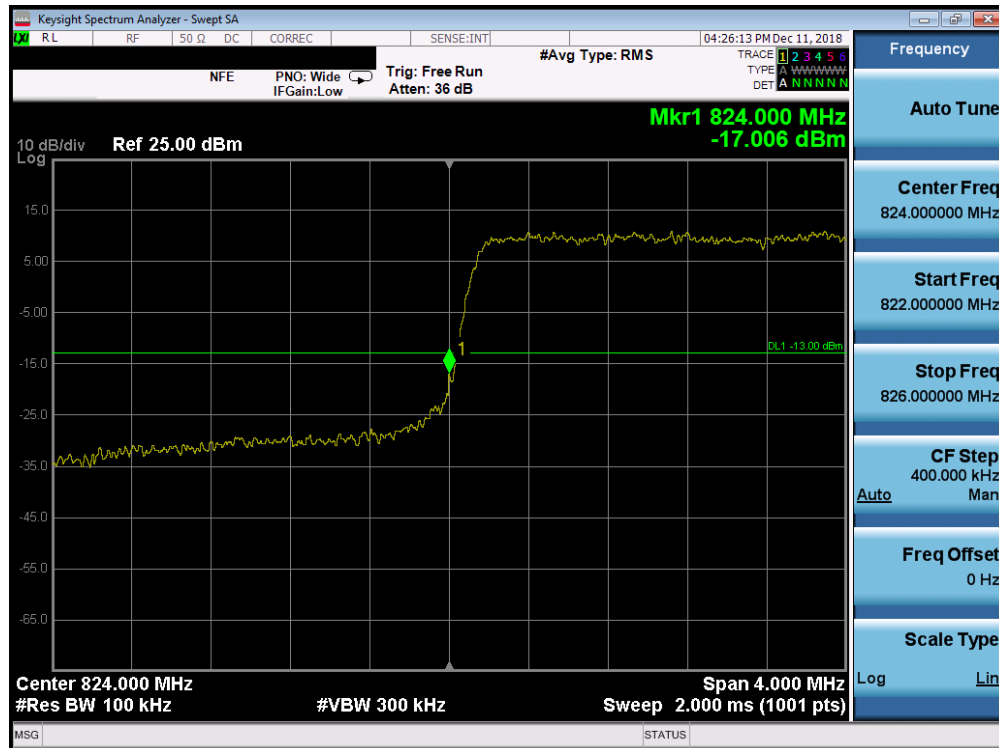


Plot 7-150. Lower Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-151. Upper Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 98 of 176

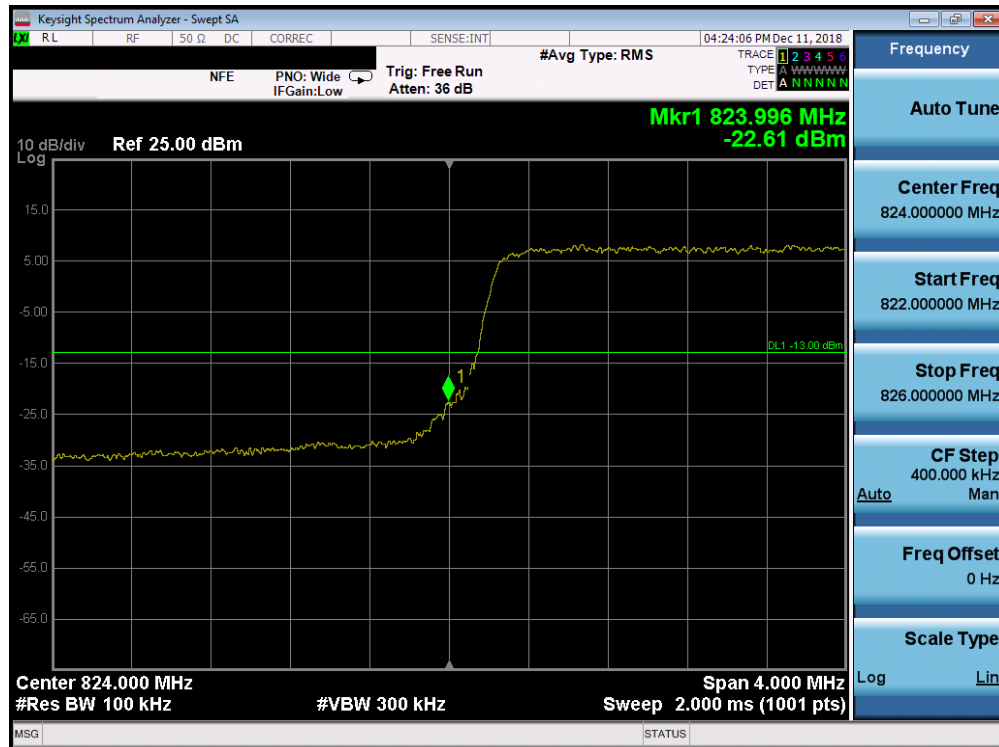


Plot 7-152. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

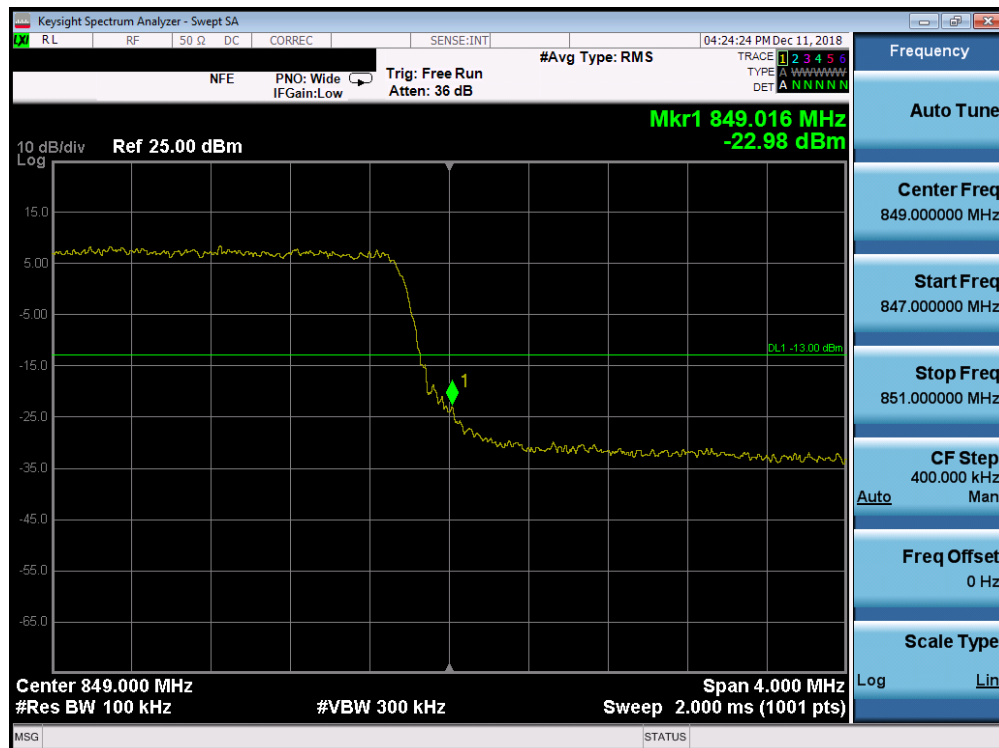


Plot 7-153. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 99 of 176

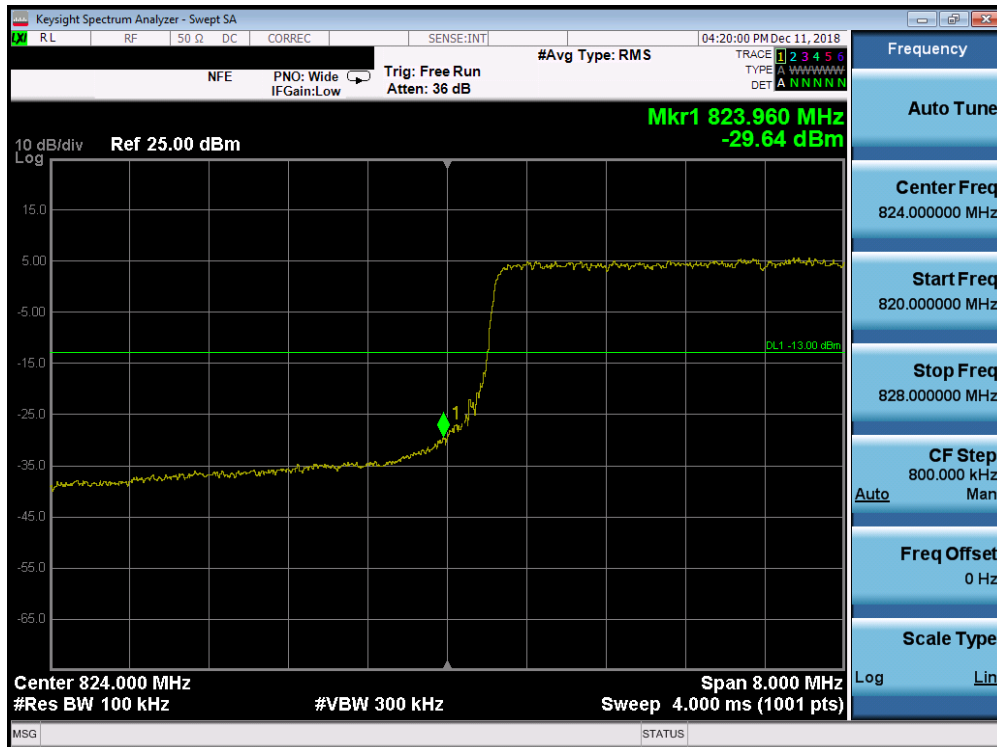


Plot 7-154. Lower Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

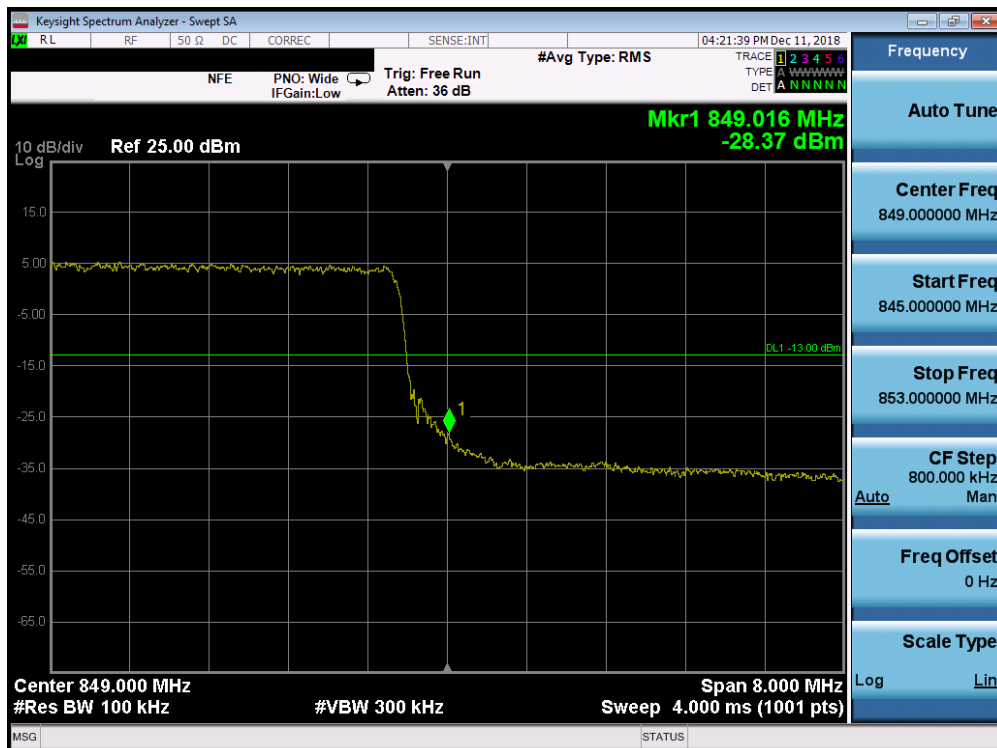


Plot 7-155. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 100 of 176



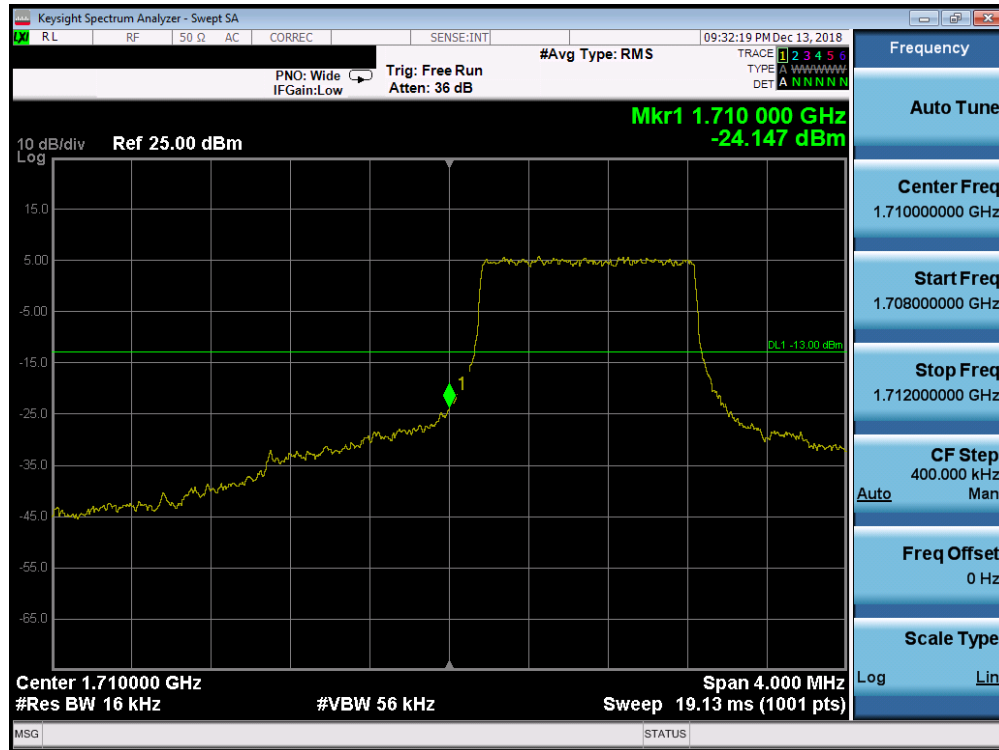
Plot 7-156. Lower Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)



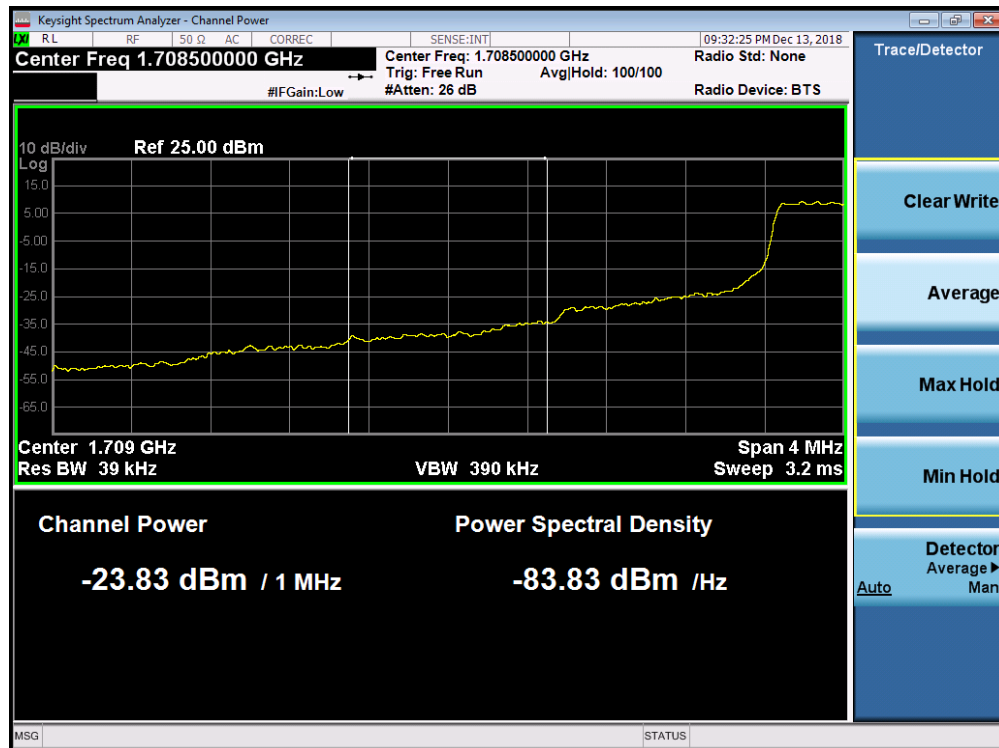
Plot 7-157. Upper Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 101 of 176

## Band 66/4



Plot 7-158. Lower Band Edge Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)

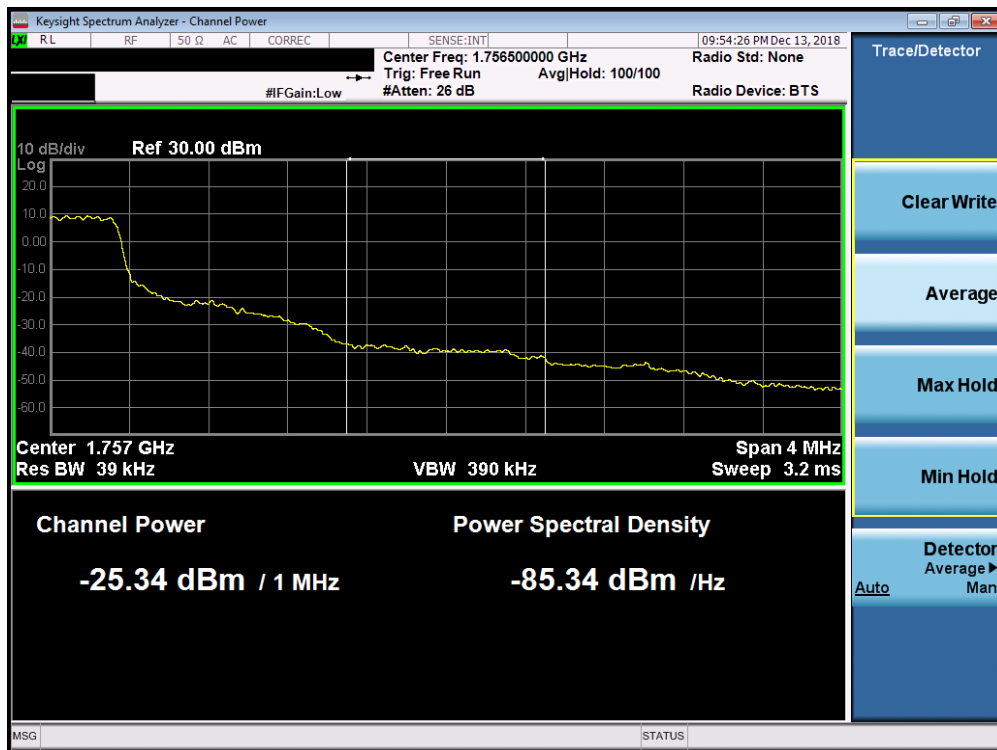


Plot 7-159. Lower Extended Band Edge Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 102 of 176

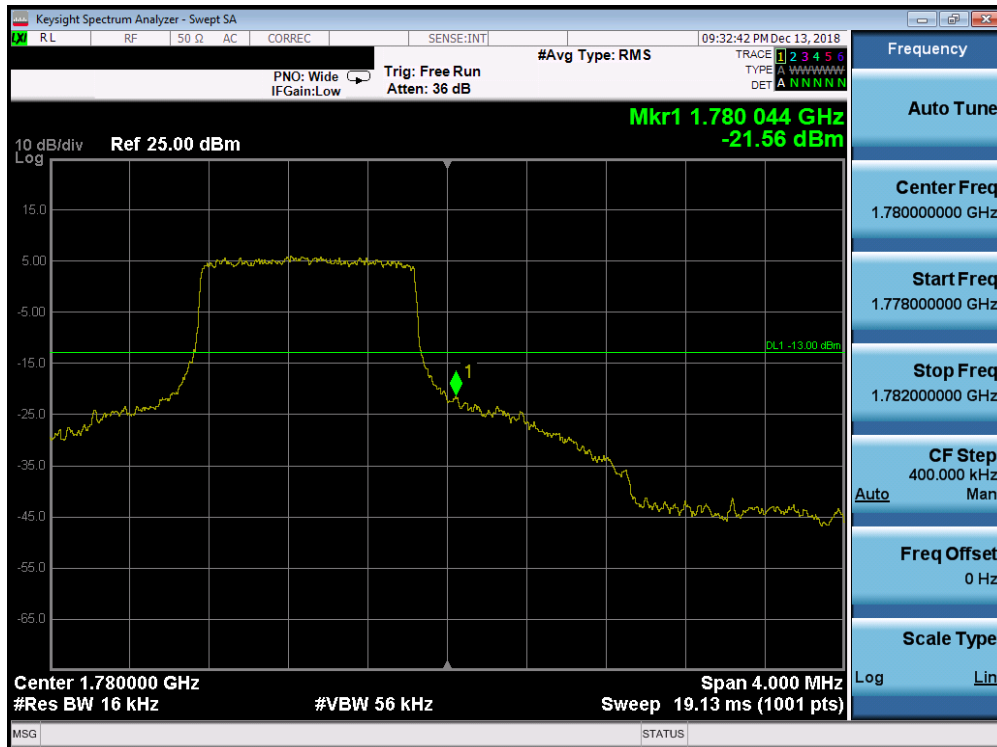


Plot 7-160. Upper Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

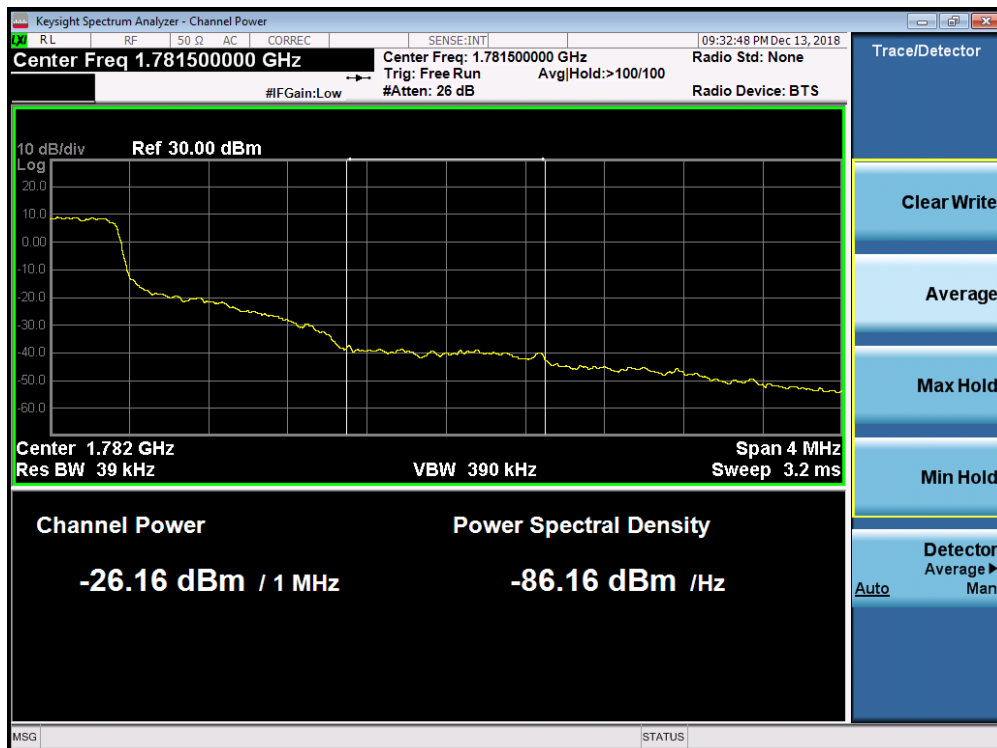


Plot 7-161. Upper Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1-ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 103 of 176

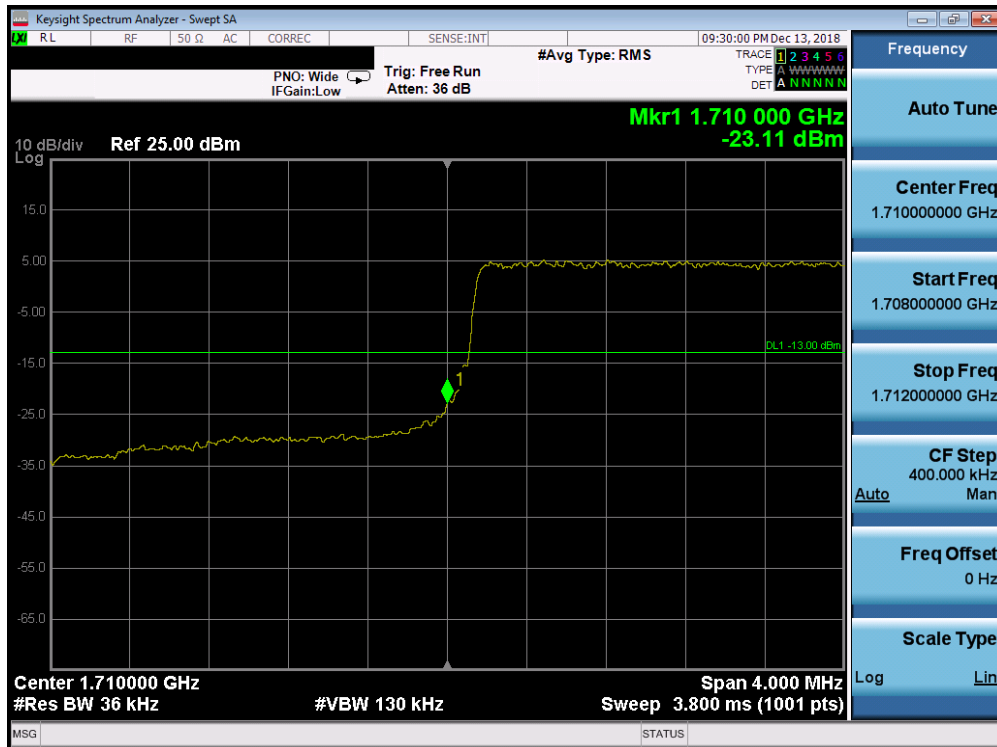


Plot 7-162. Upper Band Edge Plot (Band 66 - 1.4MHz QPSK - Full RB Configuration)

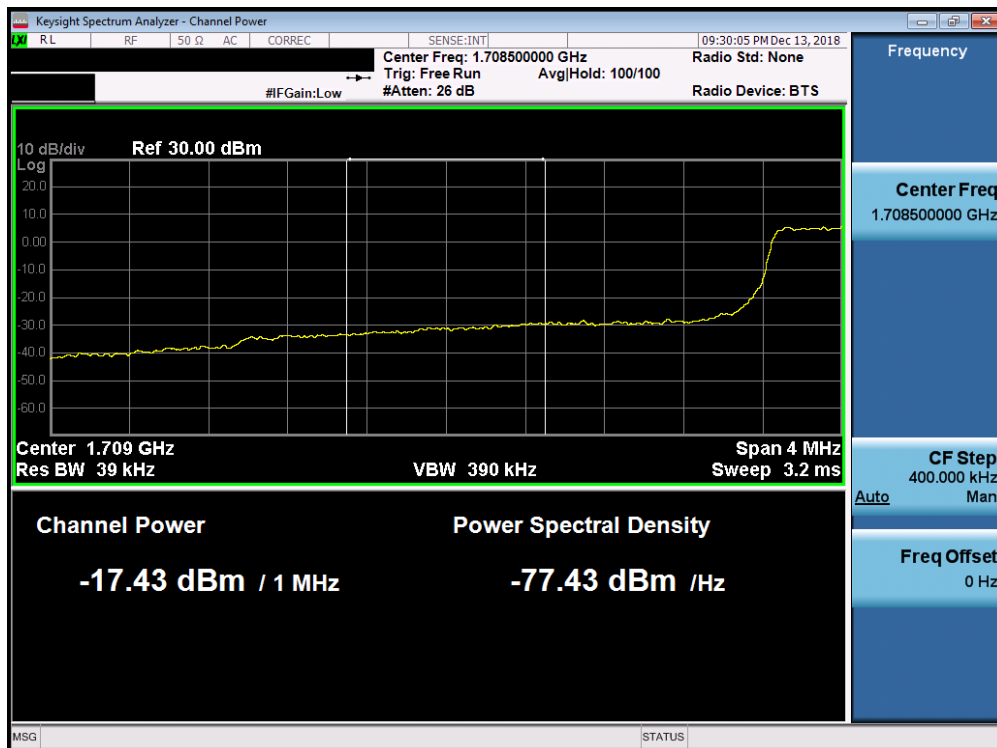


Plot 7-163. Upper Extended Band Edge Plot (Band 66 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 104 of 176

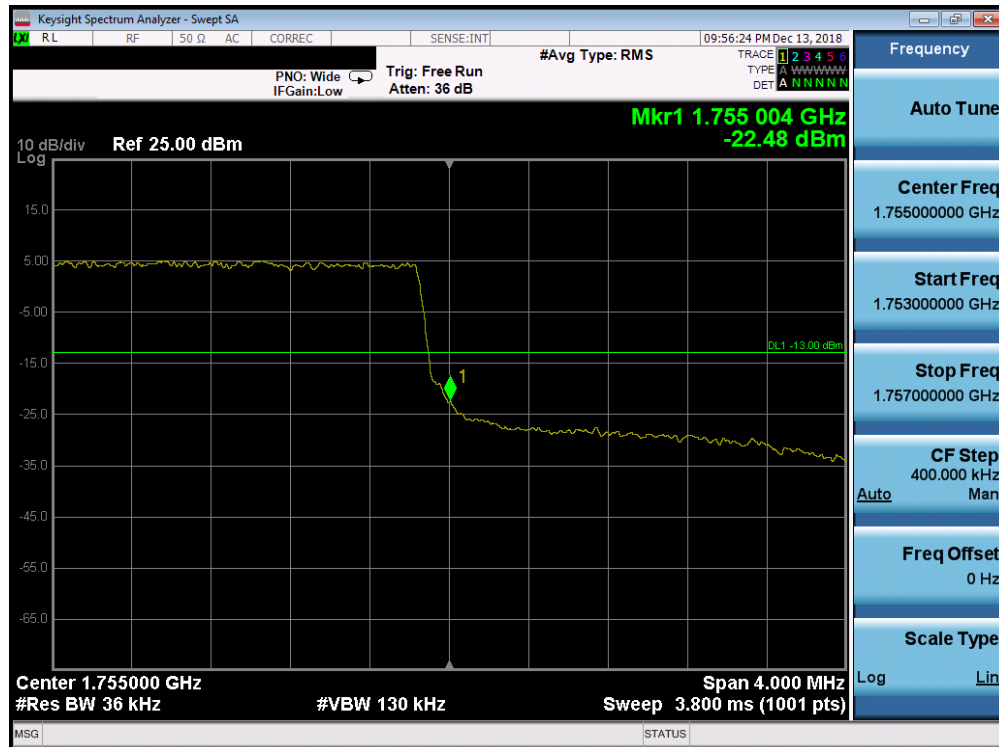


Plot 7-164. Lower Band Edge Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

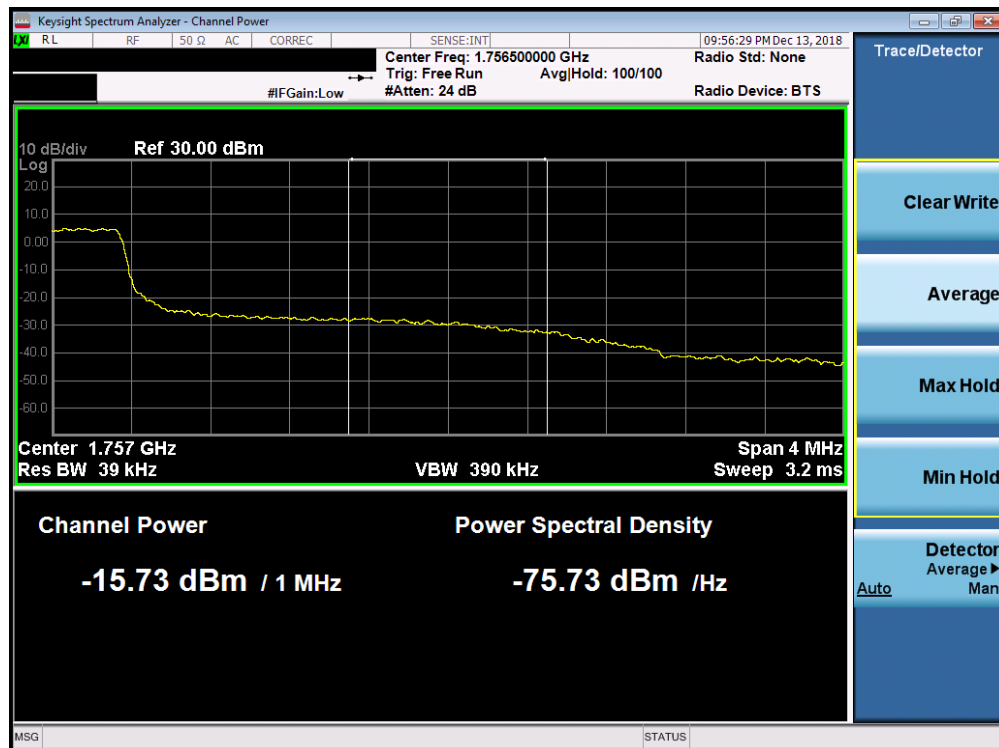


Plot 7-165. Lower Extended Band Edge Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 105 of 176

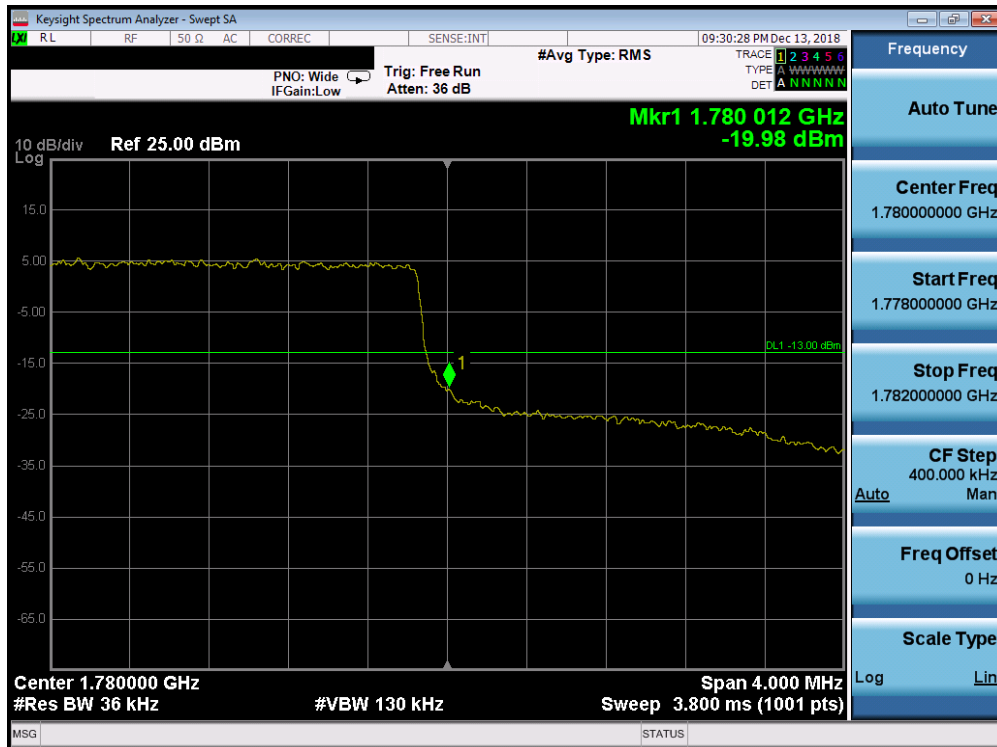


Plot 7-166. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

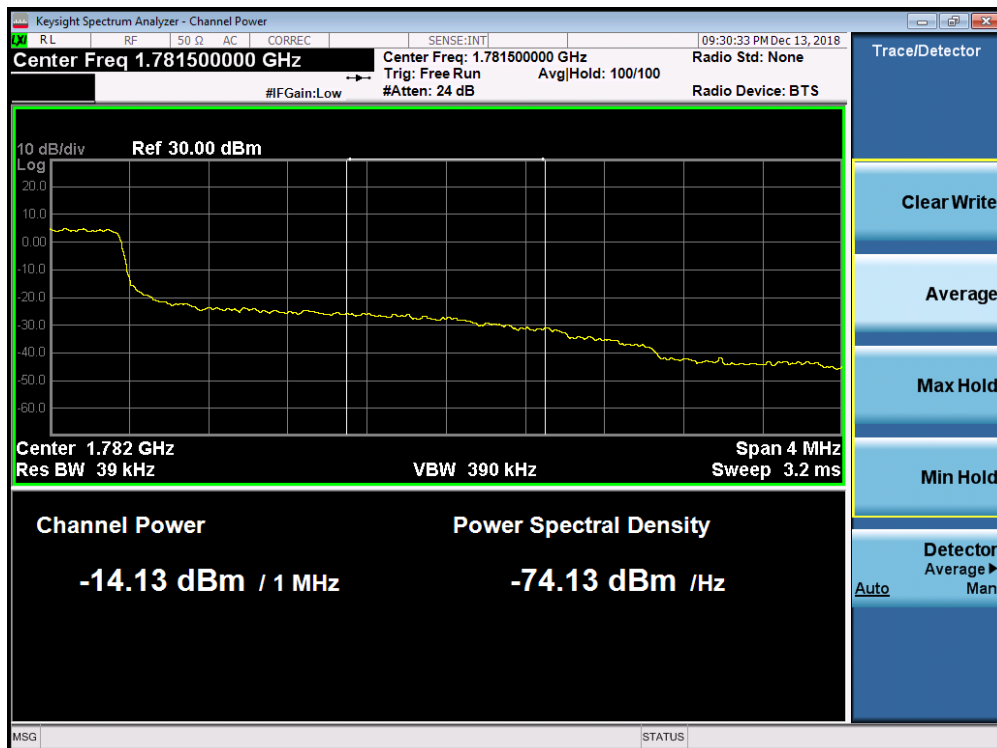


Plot 7-167. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 106 of 176

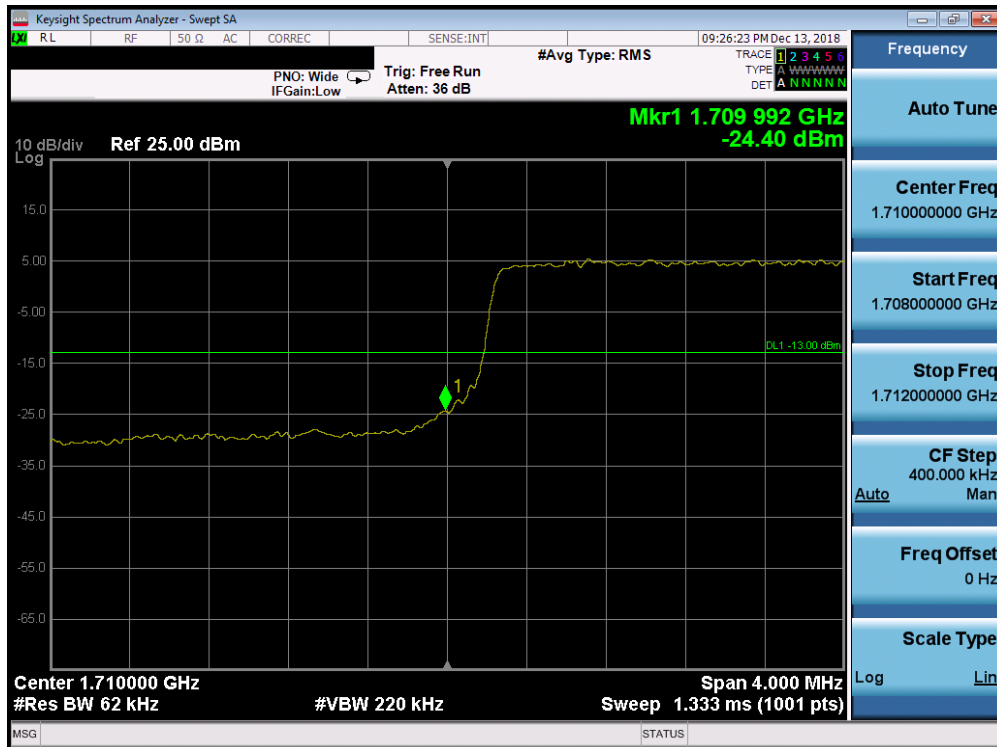


Plot 7-168. Upper Band Edge Plot (Band 66 - 3.0MHz QPSK - Full RB Configuration)

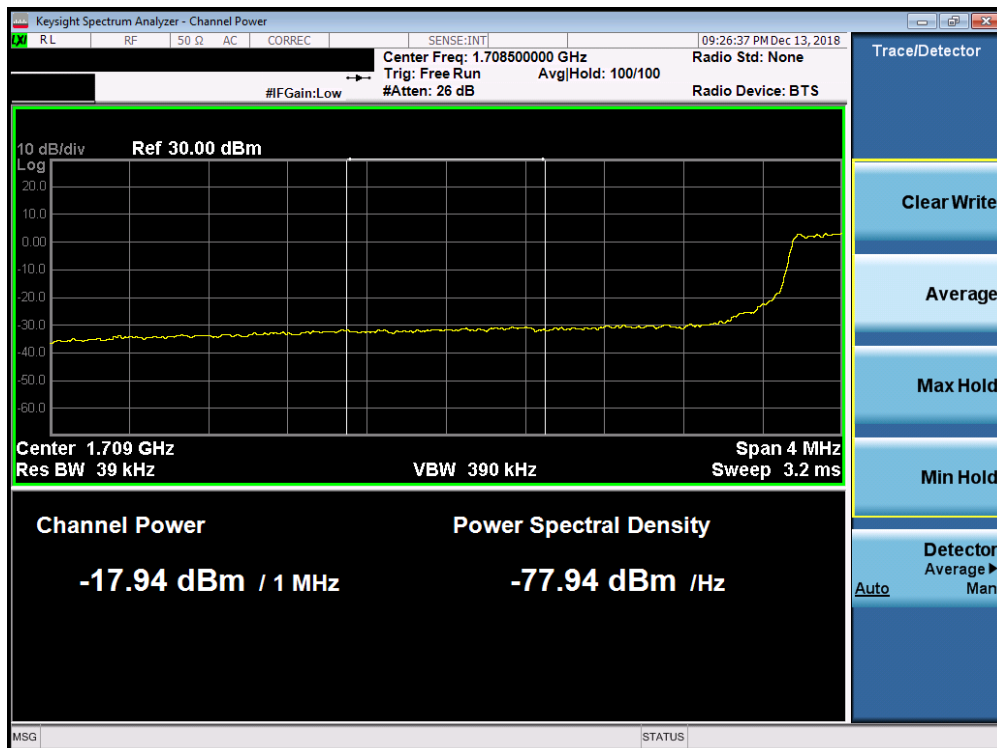


Plot 7-169. Upper Extended Band Edge Plot (Band 66 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 107 of 176

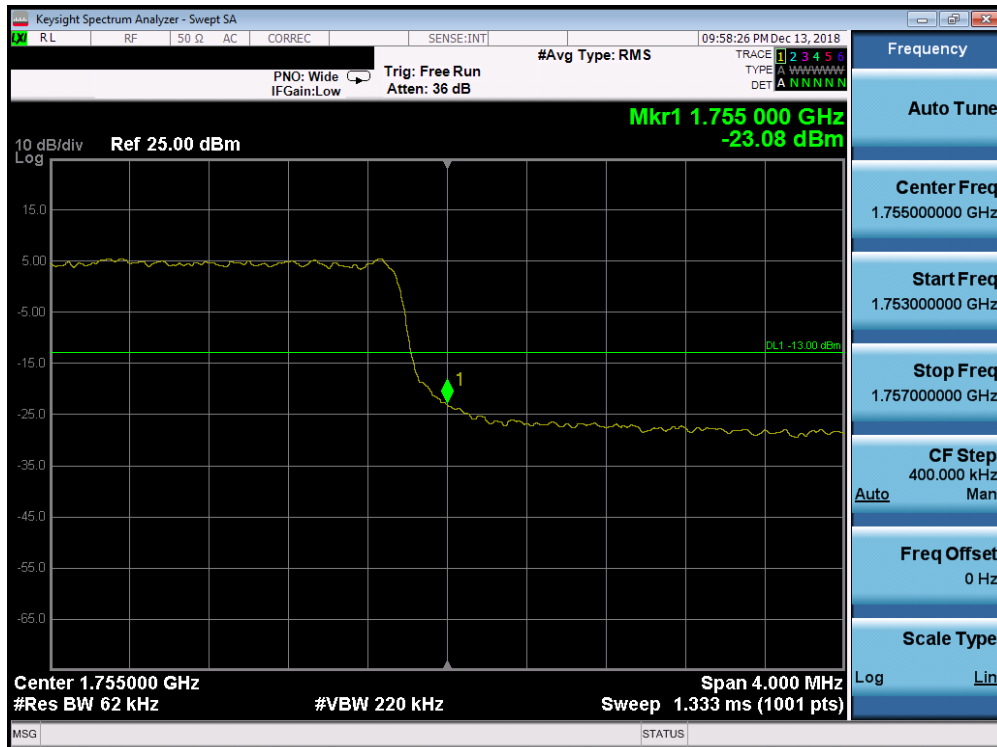


Plot 7-170. Lower Band Edge Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)

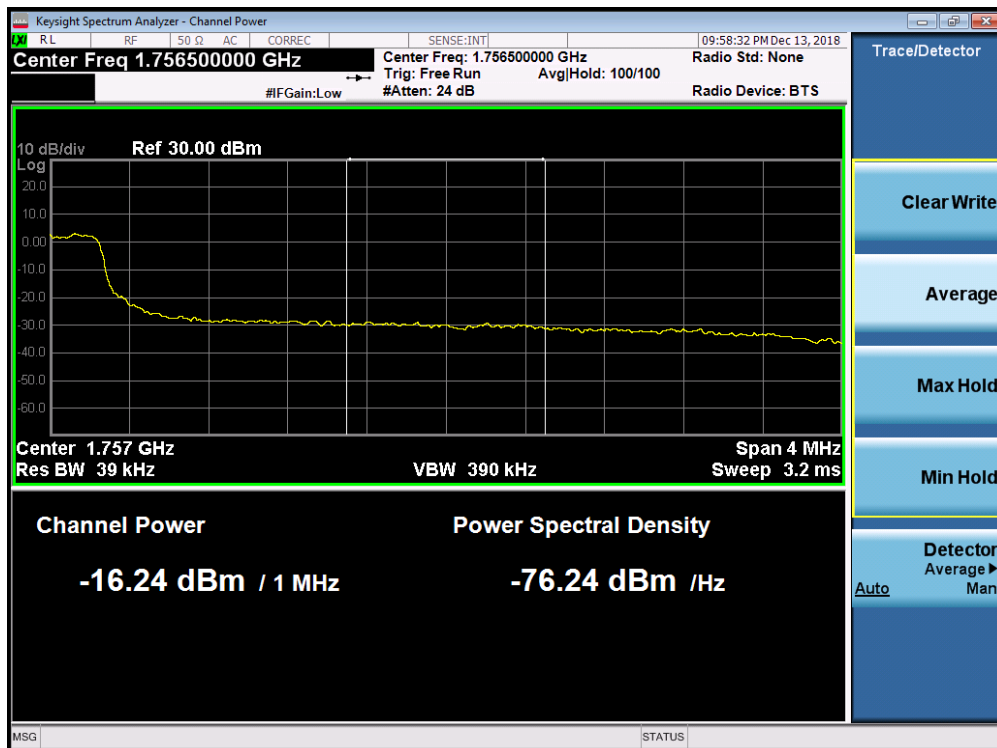


Plot 7-171. Lower Extended Band Edge Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 108 of 176

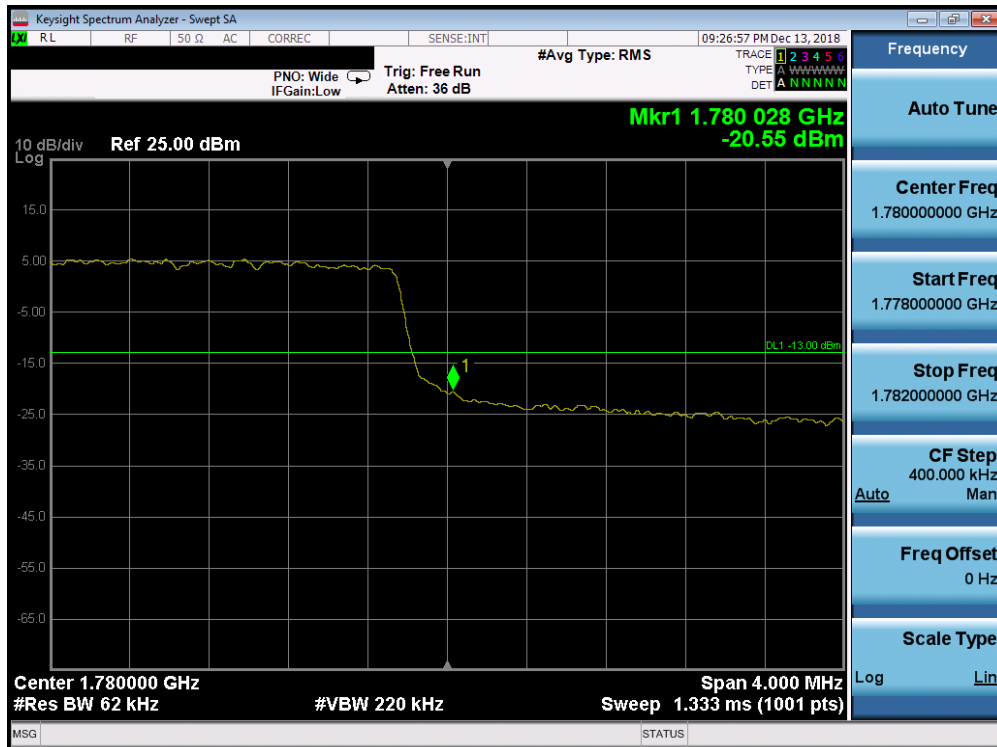


Plot 7-172. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

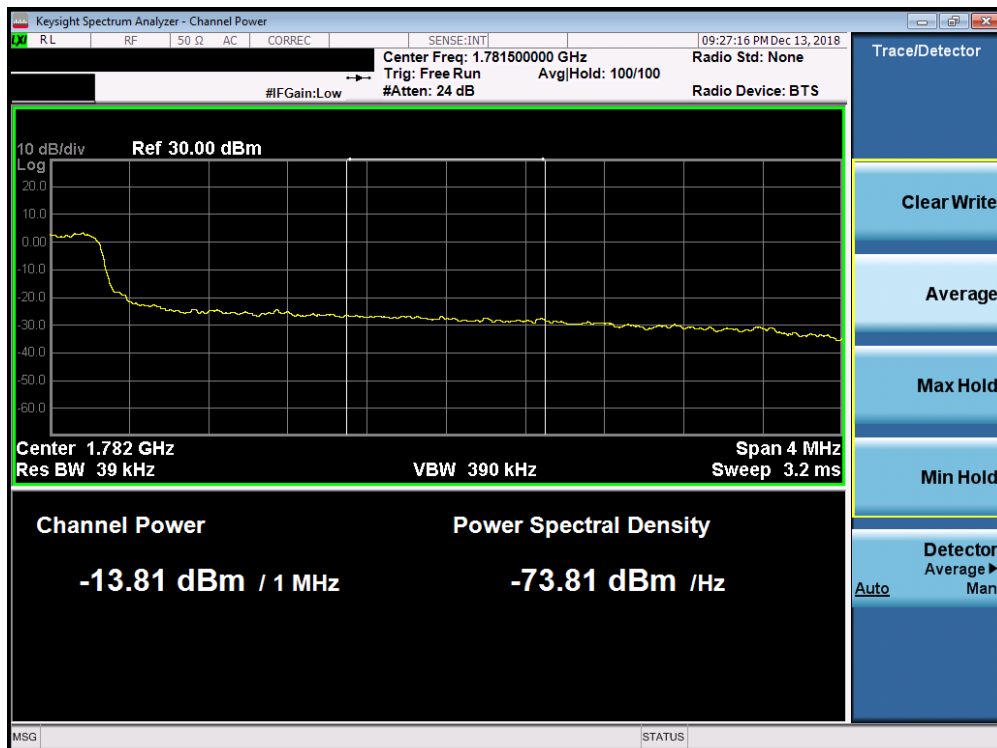


Plot 7-173. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 109 of 176

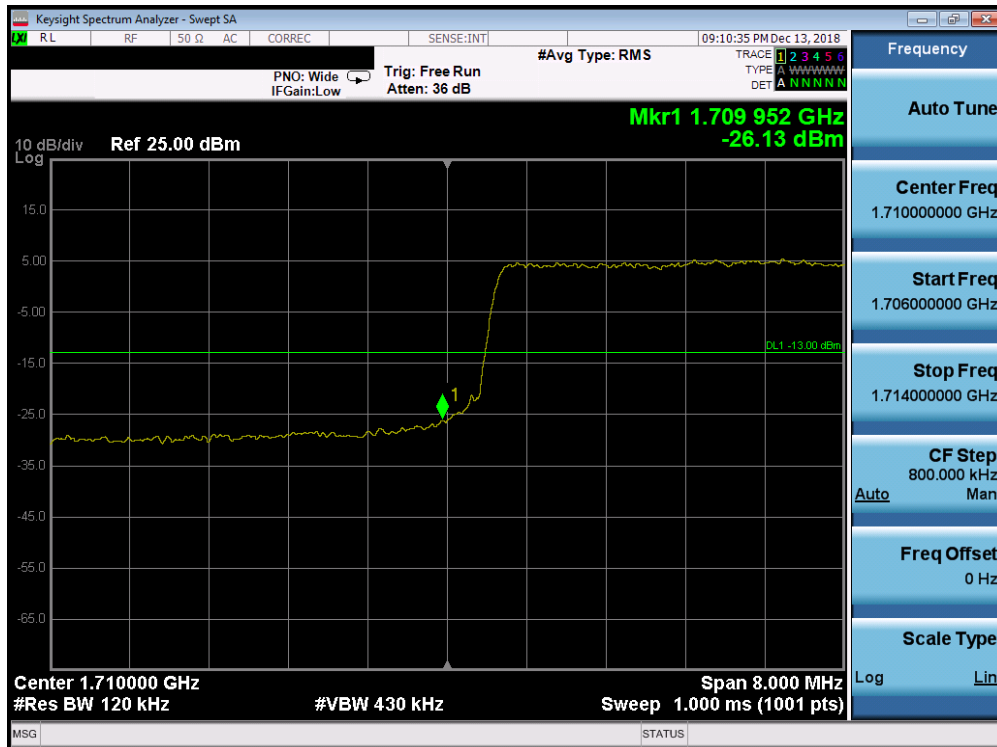


Plot 7-174. Upper Band Edge Plot (Band 66 - 5.0MHz QPSK - Full RB Configuration)

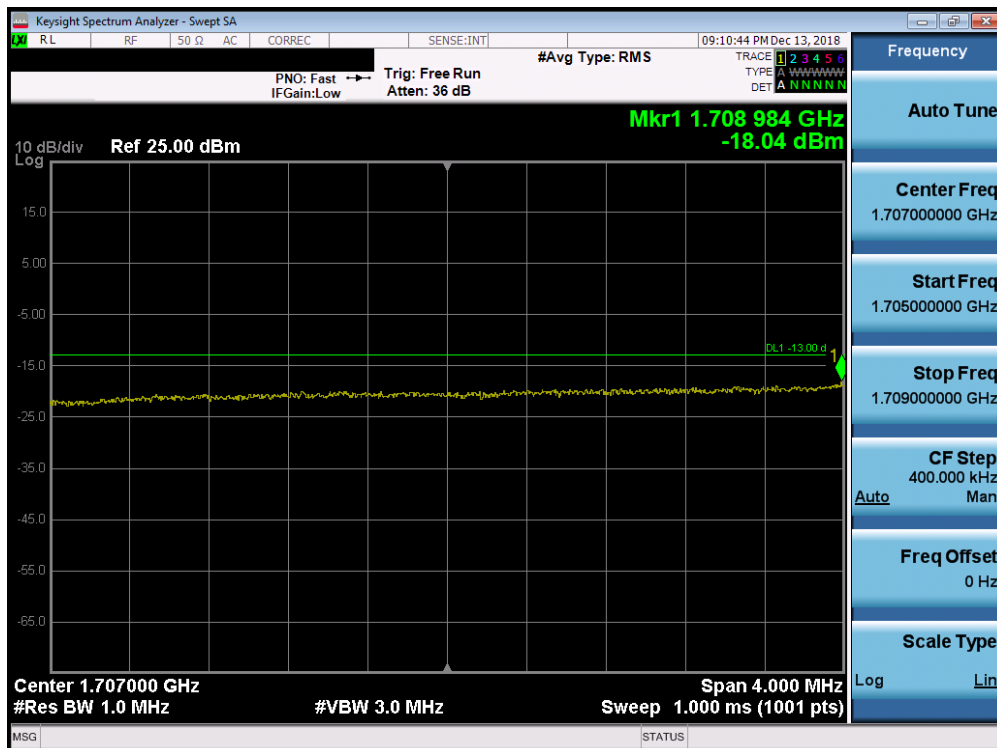


Plot 7-175. Upper Extended Band Edge Plot (Band 66 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 110 of 176



Plot 7-176. Lower Band Edge Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

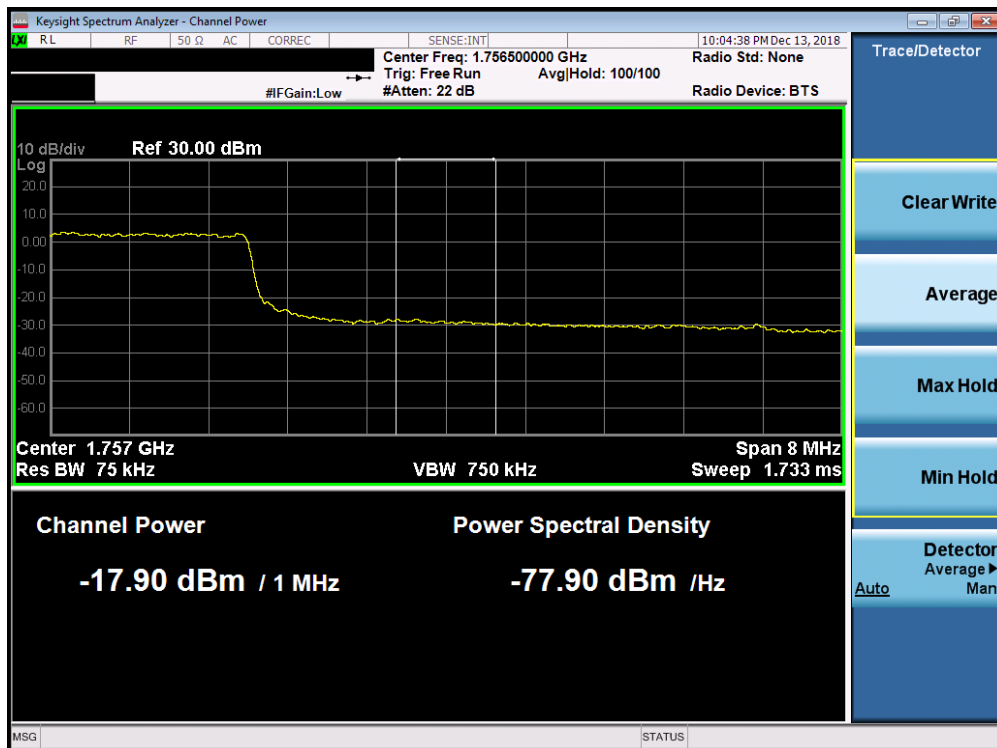


Plot 7-177. Lower Extended Band Edge Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 111 of 176

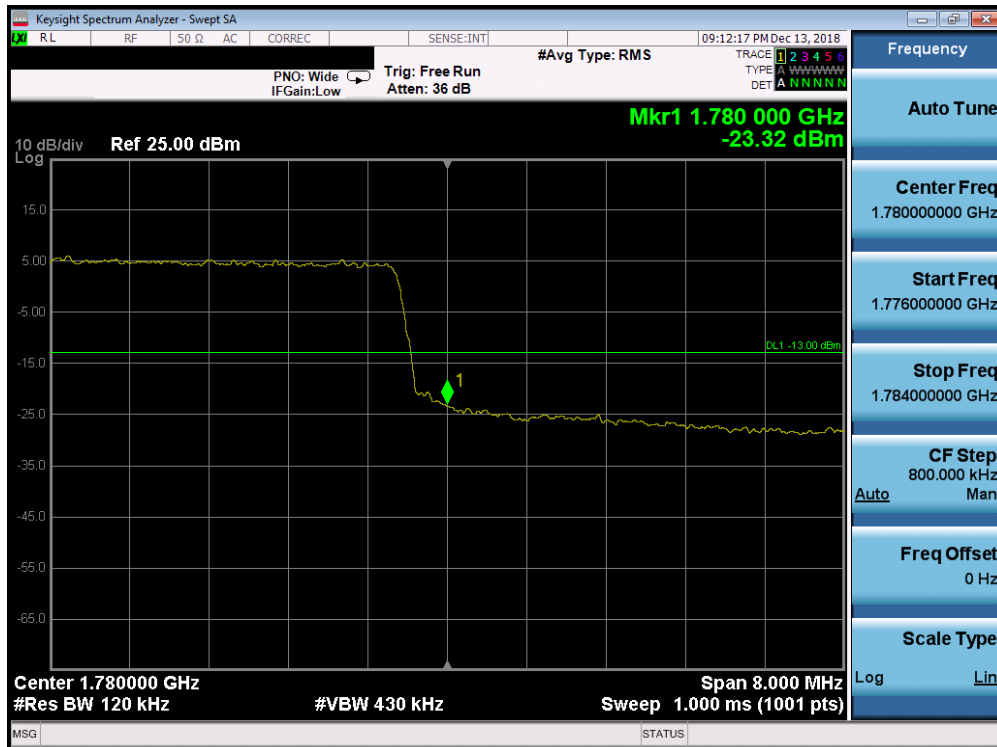


Plot 7-178. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

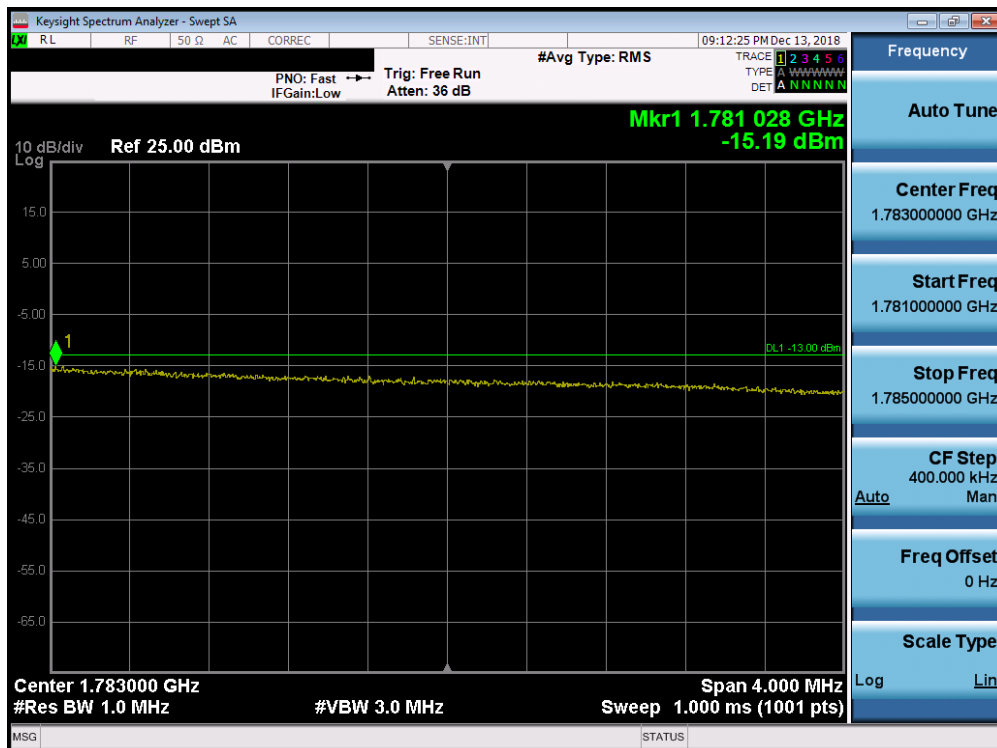


Plot 7-179. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 112 of 176

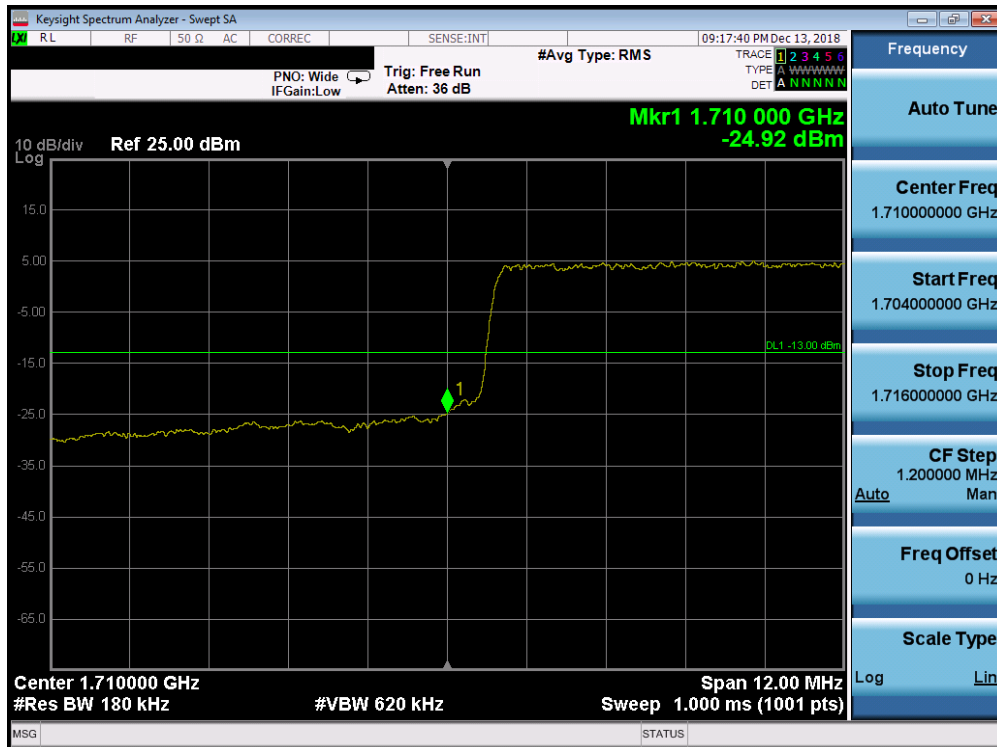


Plot 7-180. Upper Band Edge Plot (Band 66 - 10.0MHz QPSK - Full RB Configuration)

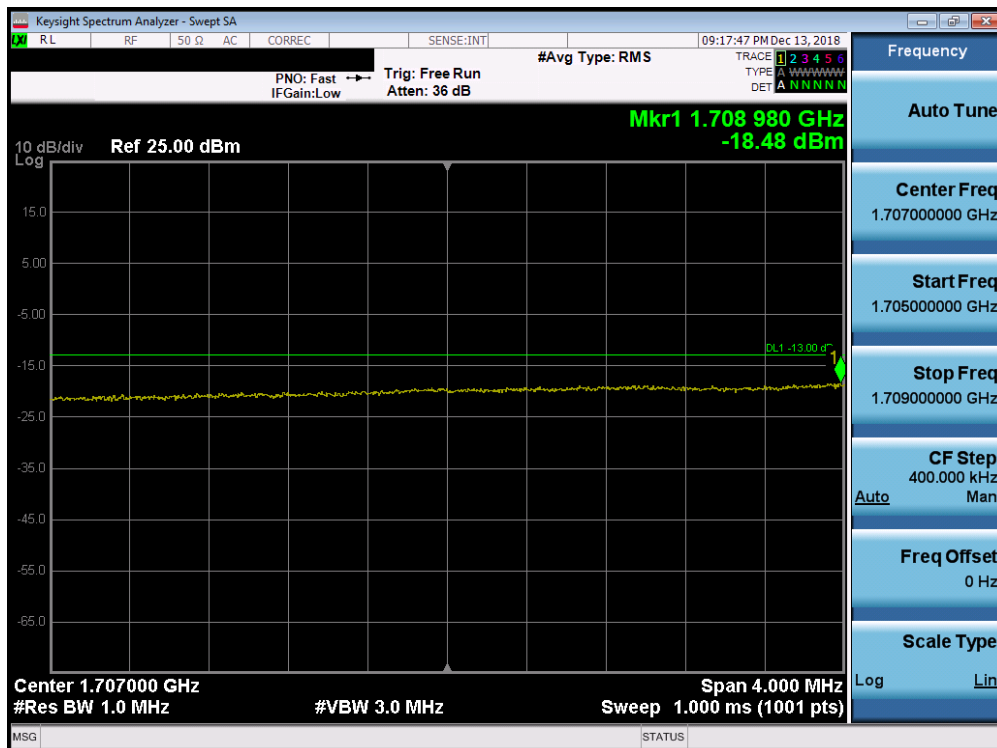


Plot 7-181. Upper Extended Band Edge Plot (Band 66 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 113 of 176

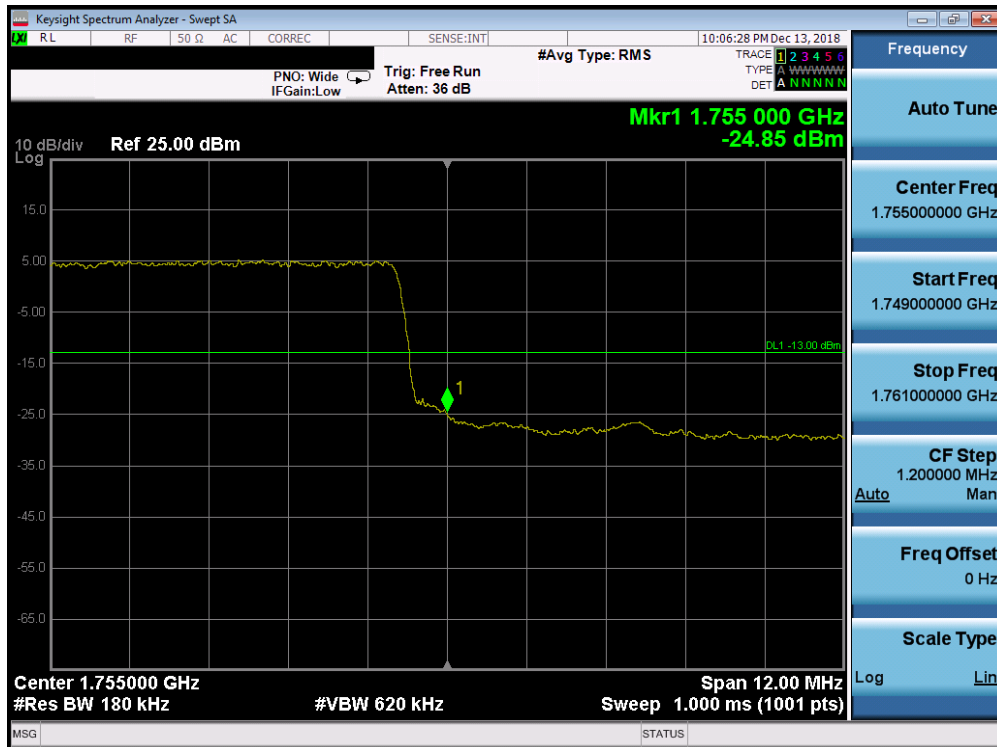


Plot 7-182. Lower Band Edge Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)

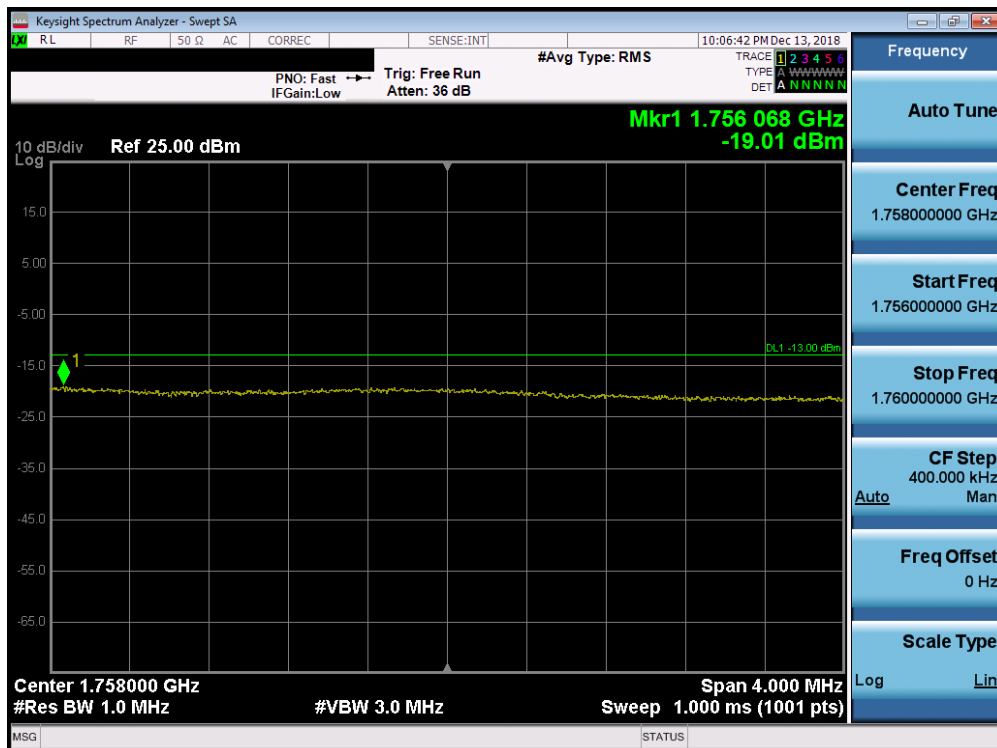


Plot 7-183. Lower Extended Band Edge Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 114 of 176

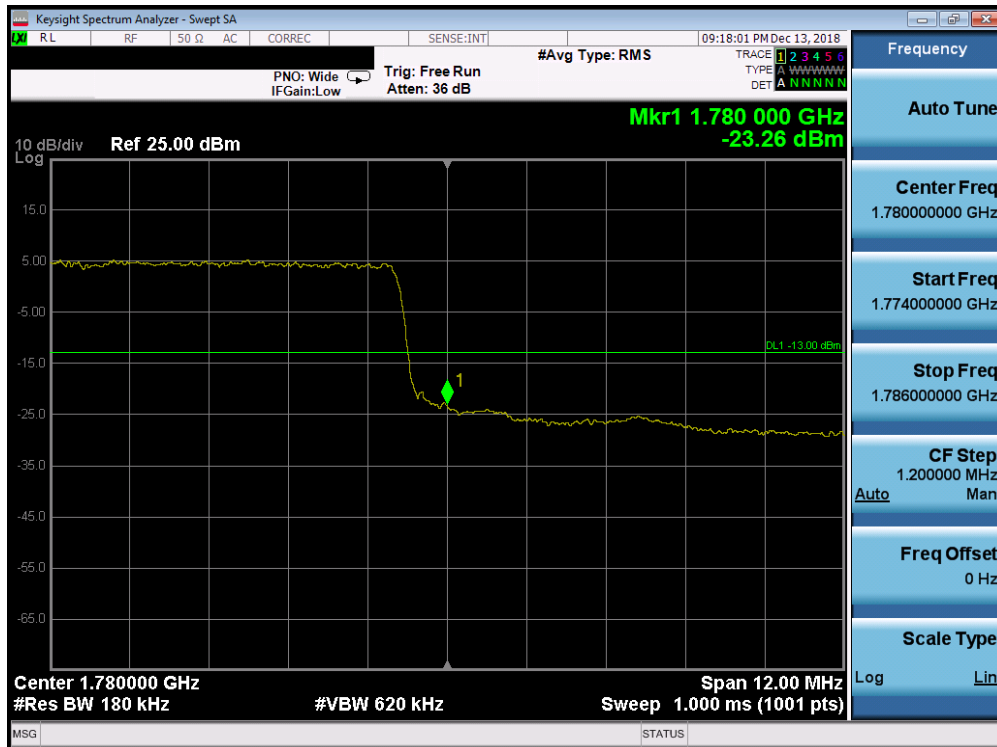


Plot 7-184. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

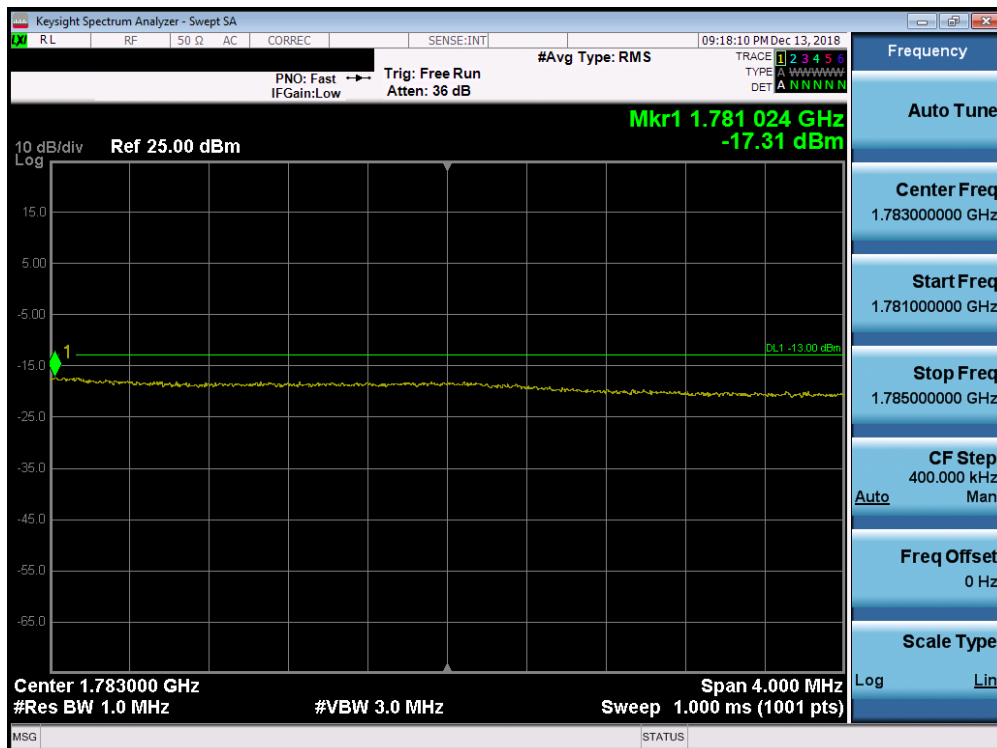


Plot 7-185. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 115 of 176

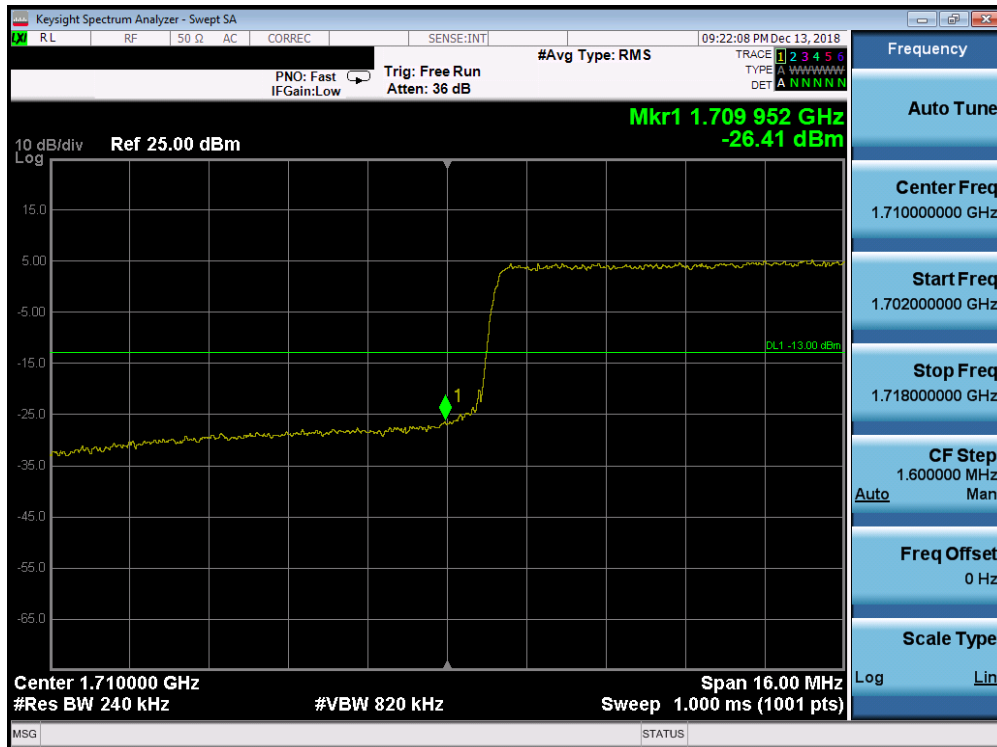


Plot 7-186. Upper Band Edge Plot (Band 66 - 15.0MHz QPSK - Full RB Configuration)

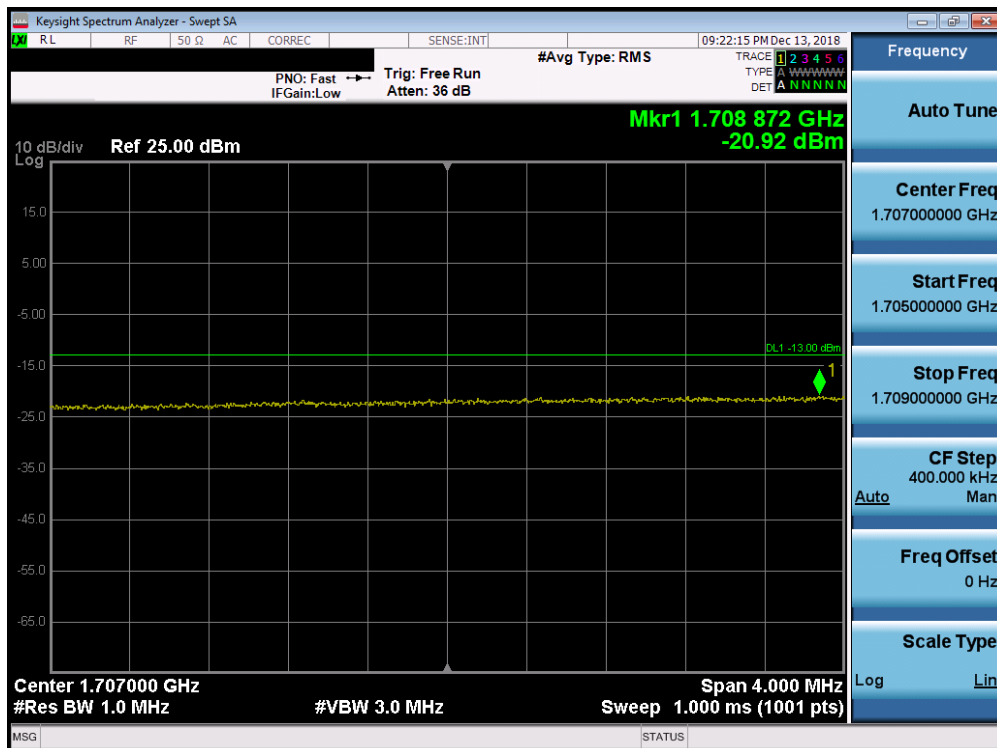


Plot 7-187. Upper Extended Band Edge Plot (Band 66 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 116 of 176

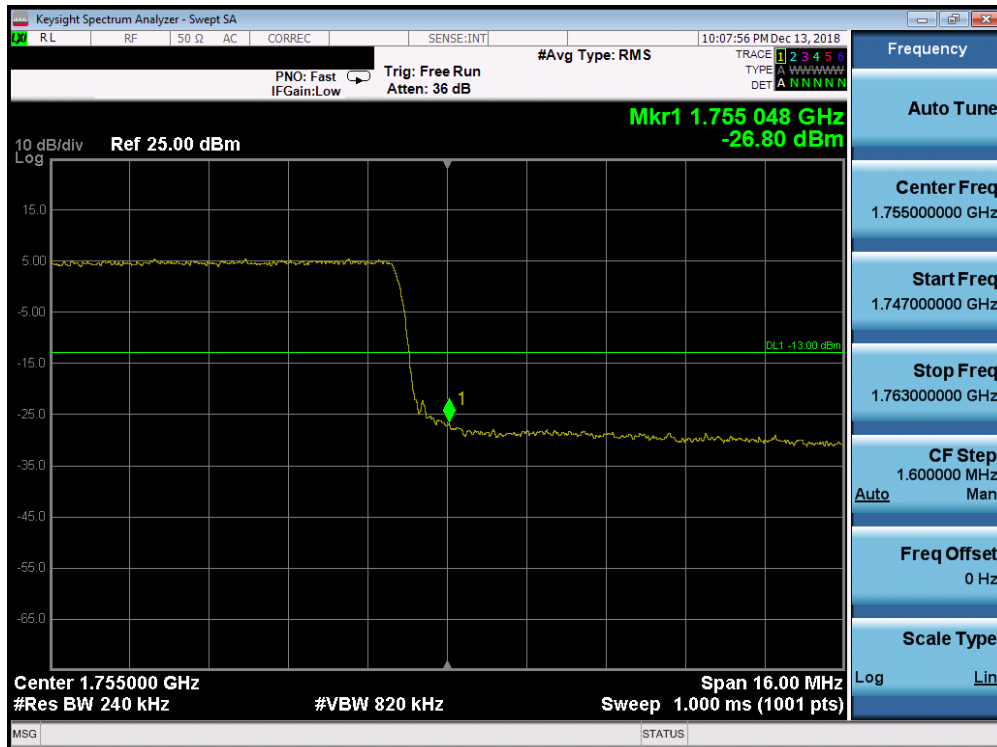


Plot 7-188. Lower Band Edge Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

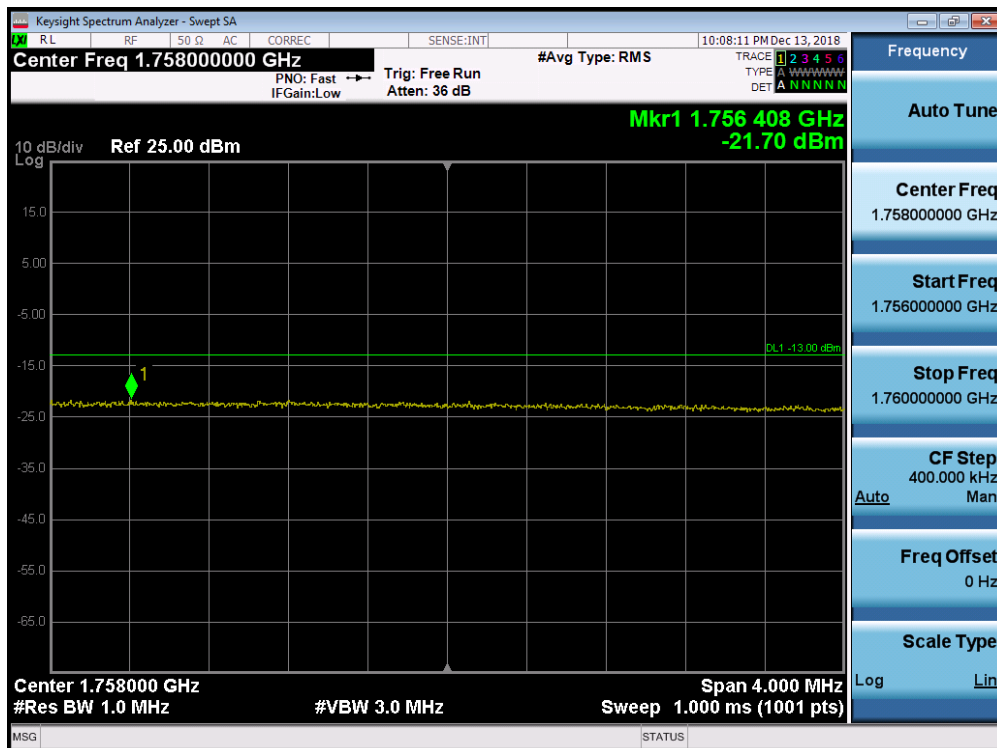


Plot 7-189. Lower Extended Band Edge Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 117 of 176

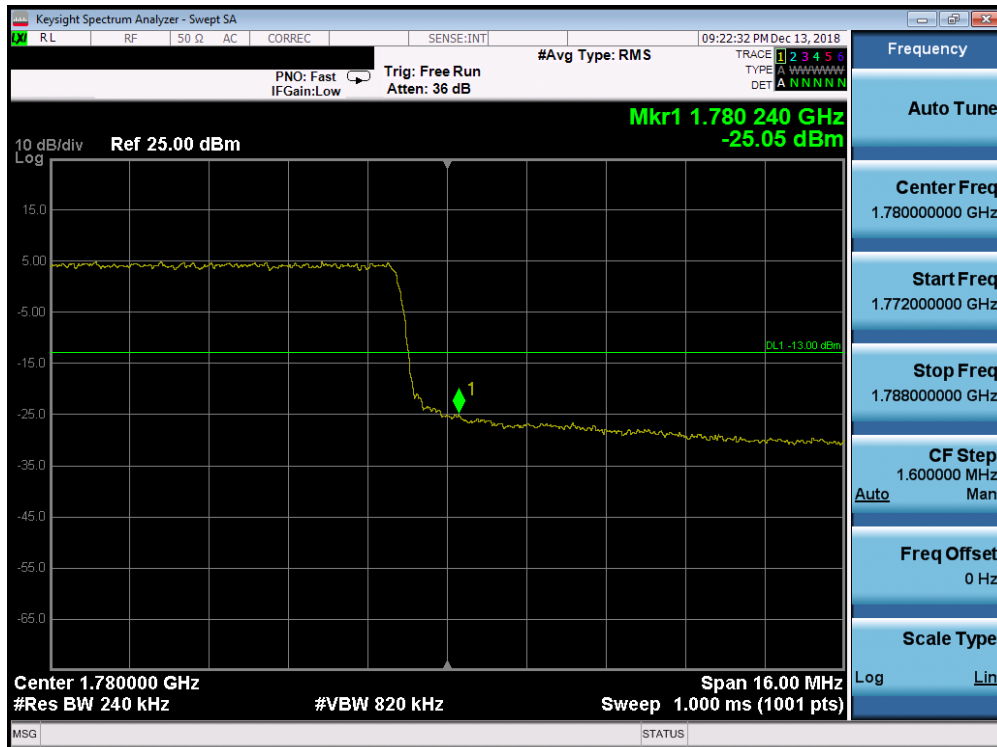


Plot 7-190. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

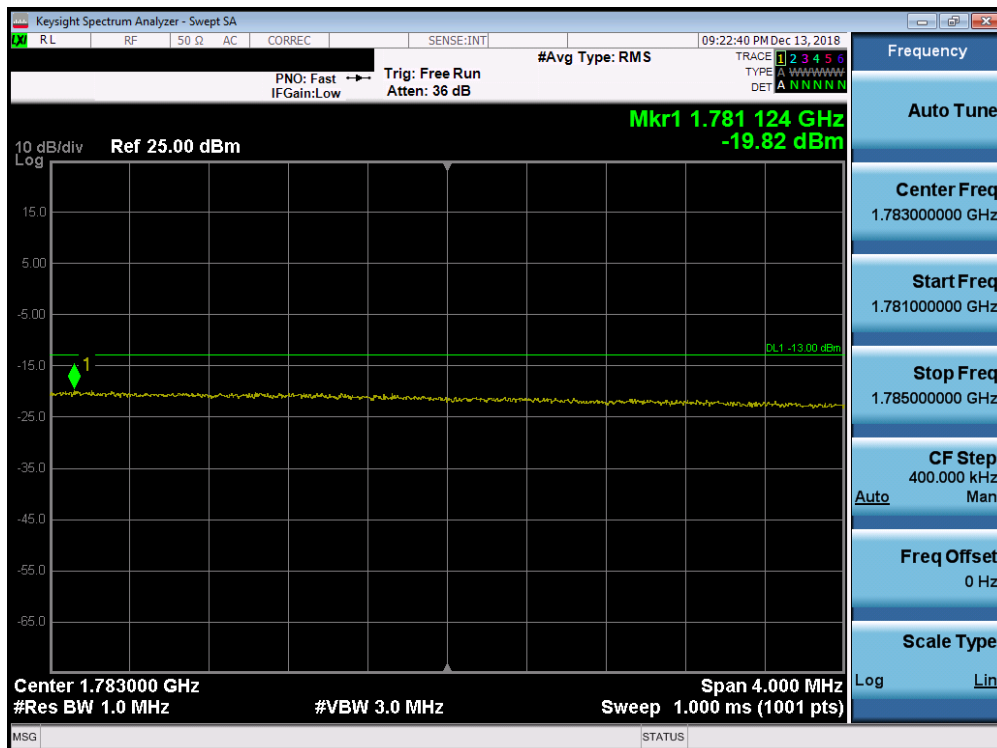


Plot 7-191. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 118 of 176



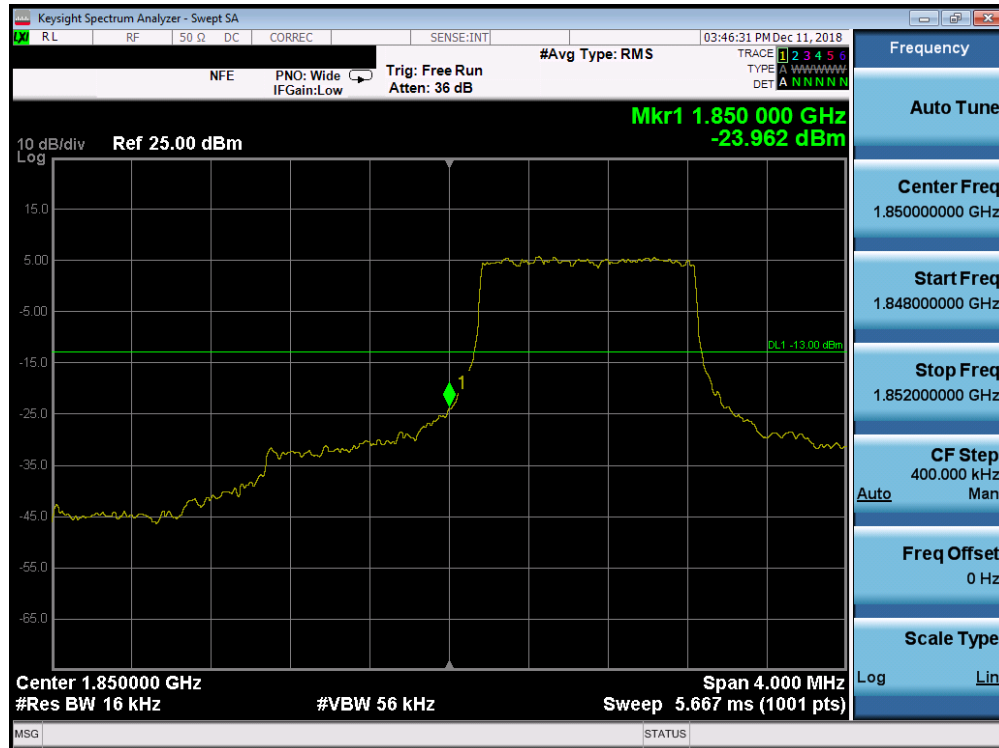
Plot 7-192. Upper Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)



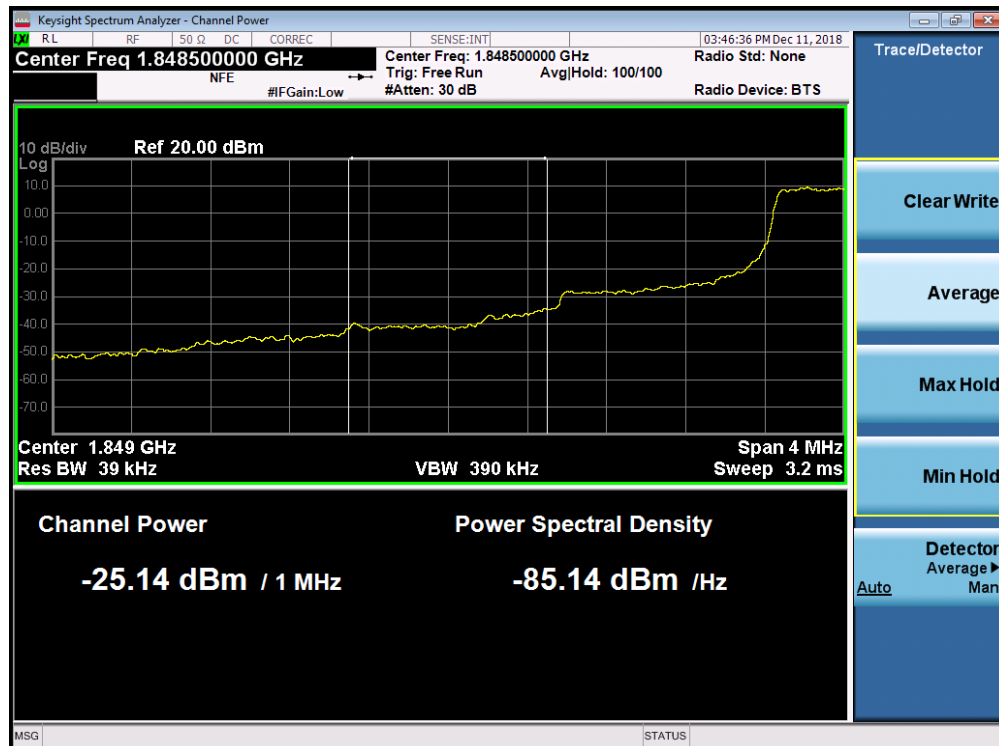
Plot 7-193. Upper Extended Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 119 of 176

## Band 2



Plot 7-194. Lower Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

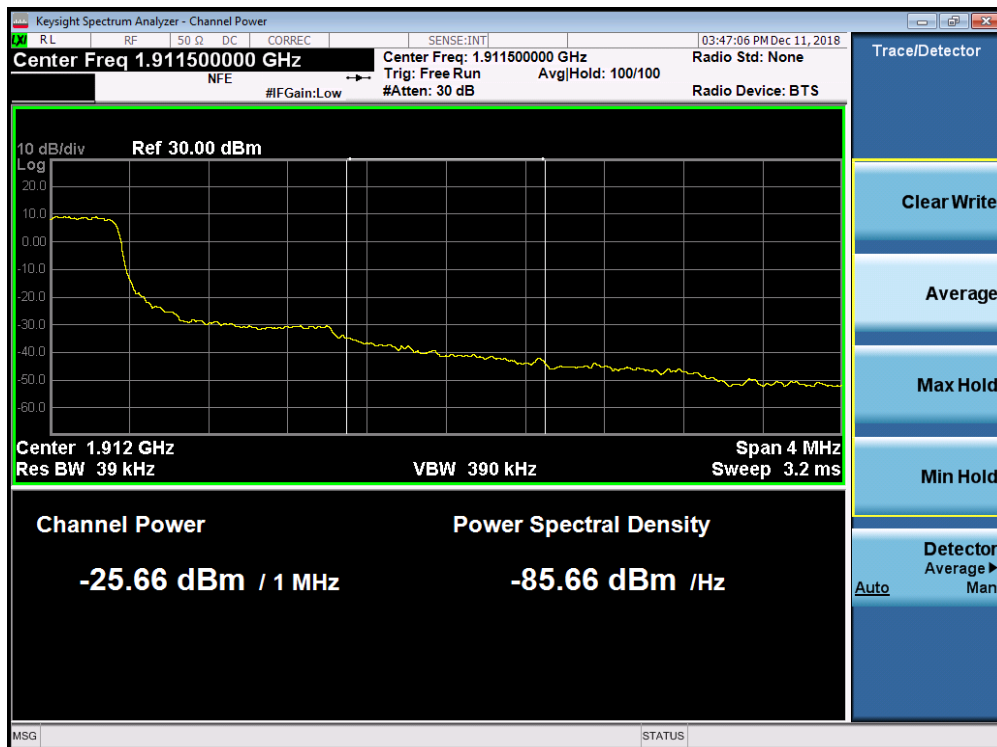


Plot 7-195. Lower Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 120 of 176

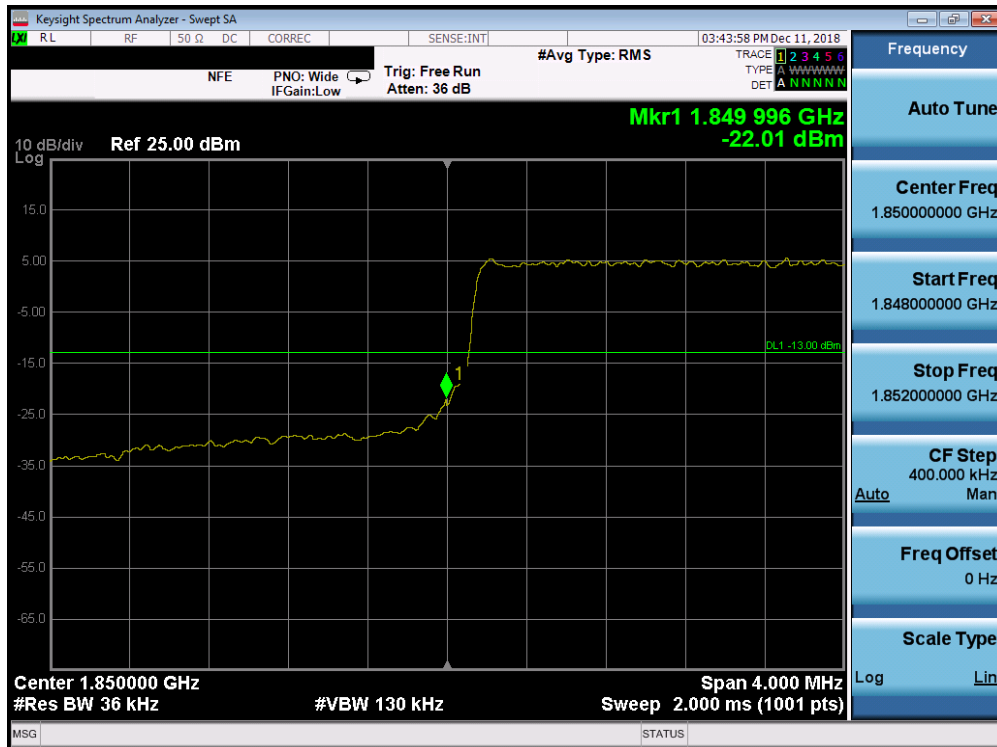


Plot 7-196. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

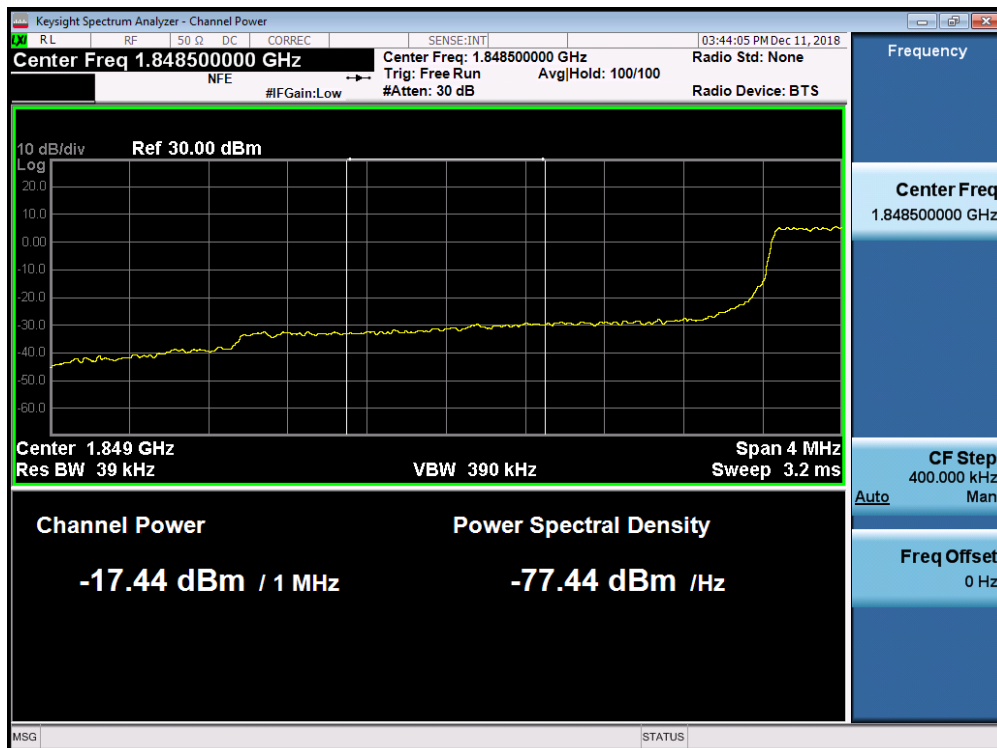


Plot 7-197. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 121 of 176

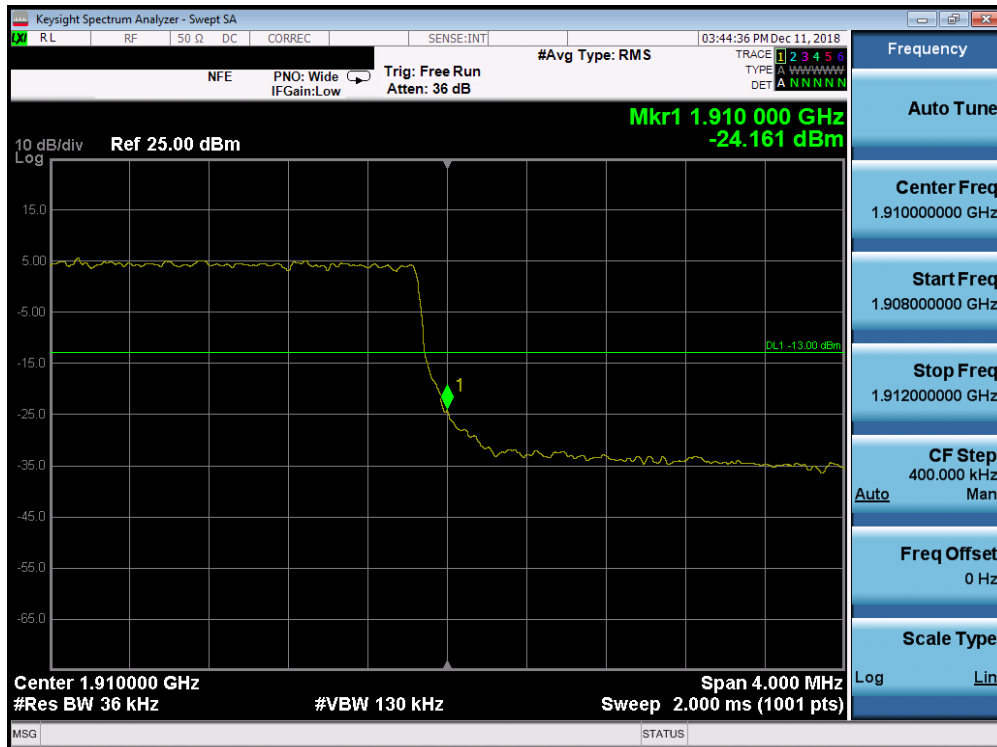


Plot 7-198. Lower Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

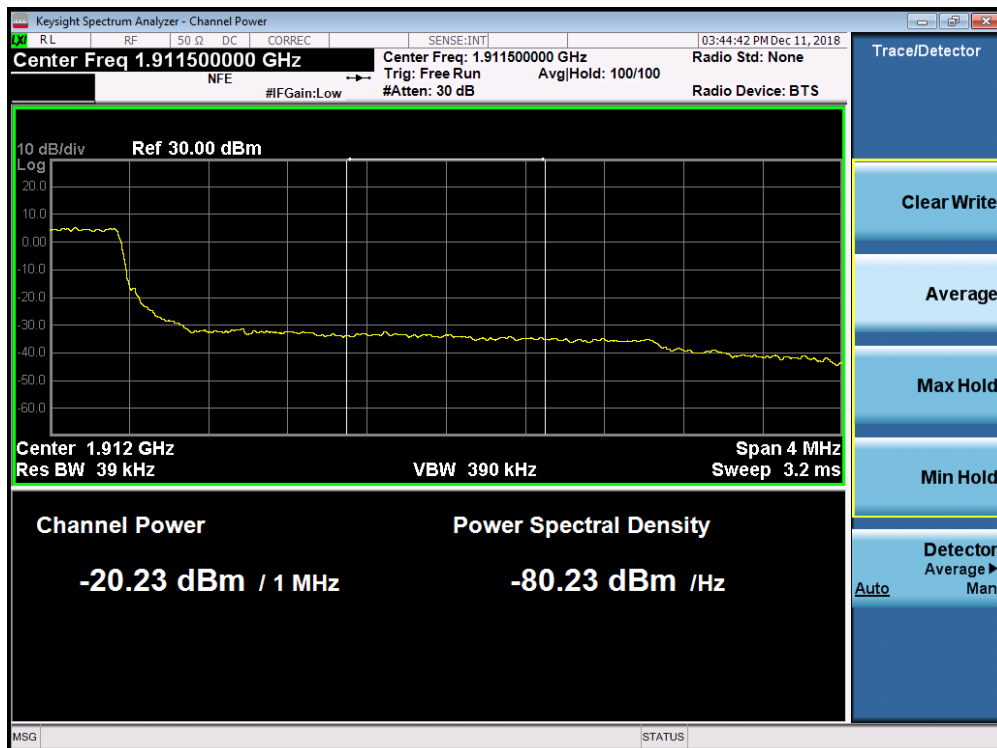


Plot 7-199. Lower Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 122 of 176

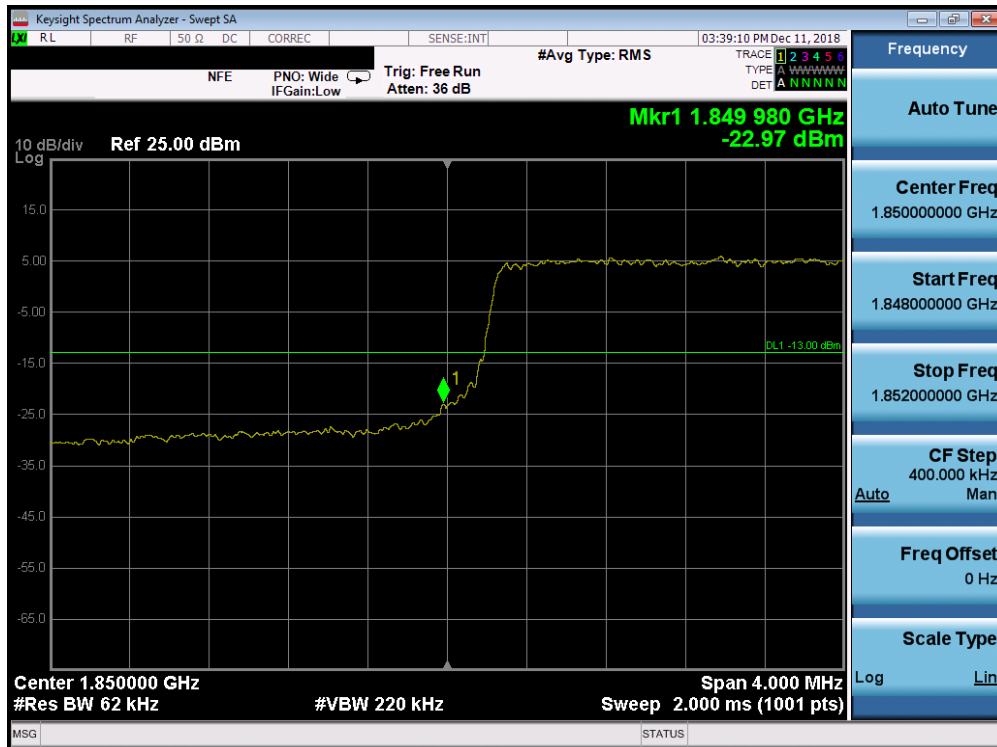


Plot 7-200. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

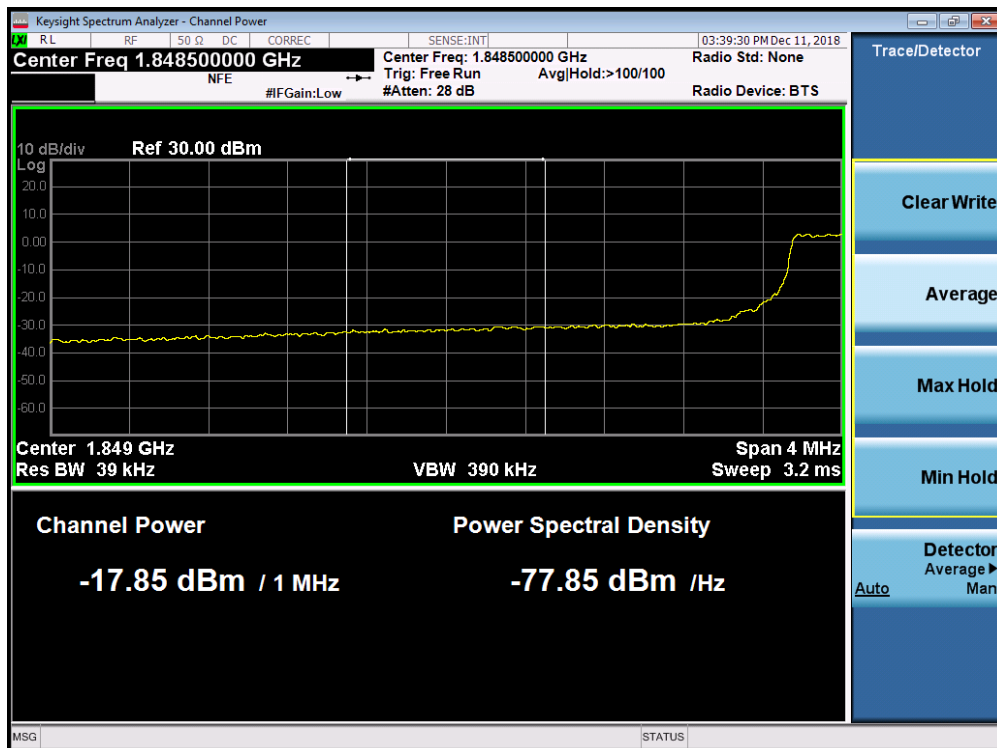


Plot 7-201. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 123 of 176

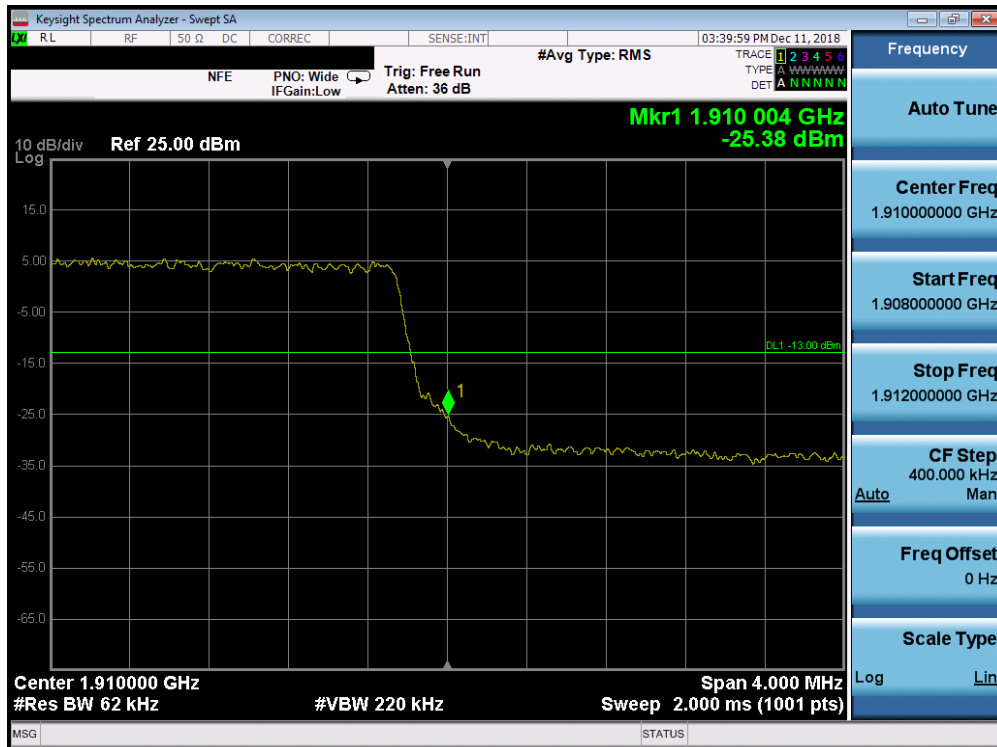


Plot 7-202. Lower Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

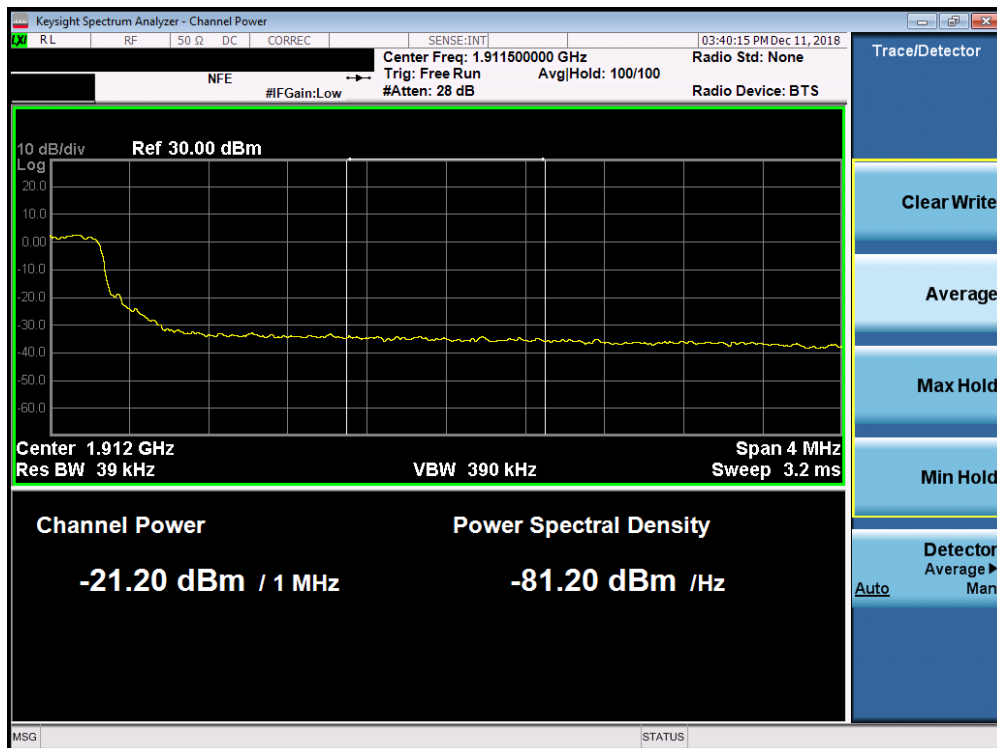


Plot 7-203. Lower Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>MEASUREMENT REPORT (CERTIFICATION)</b>	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 124 of 176

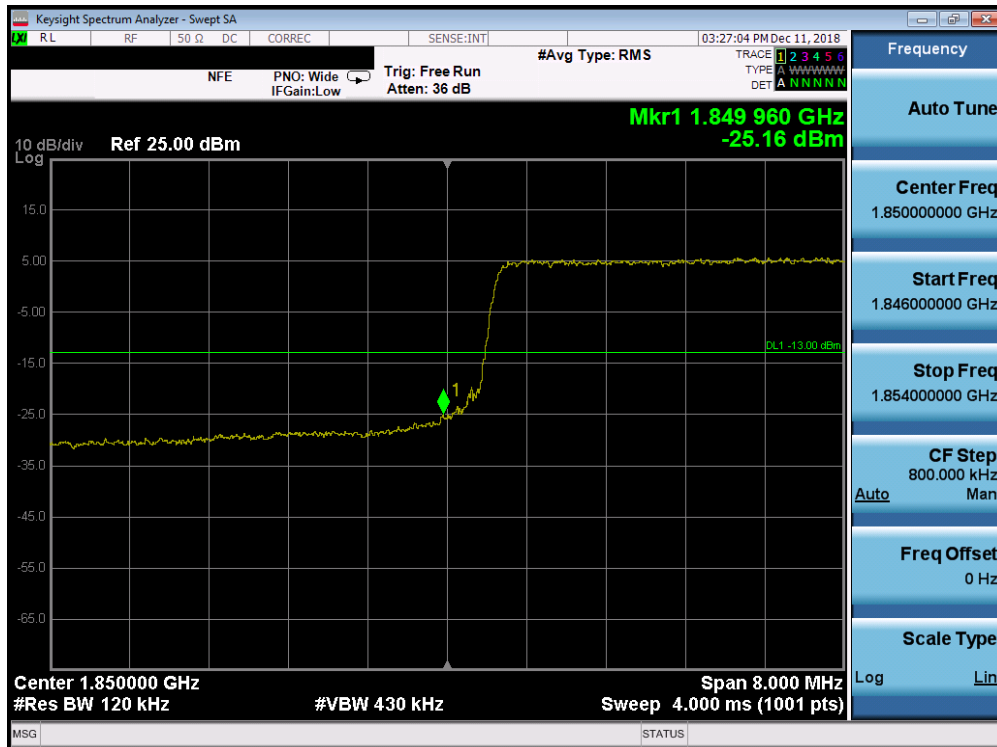


Plot 7-204. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

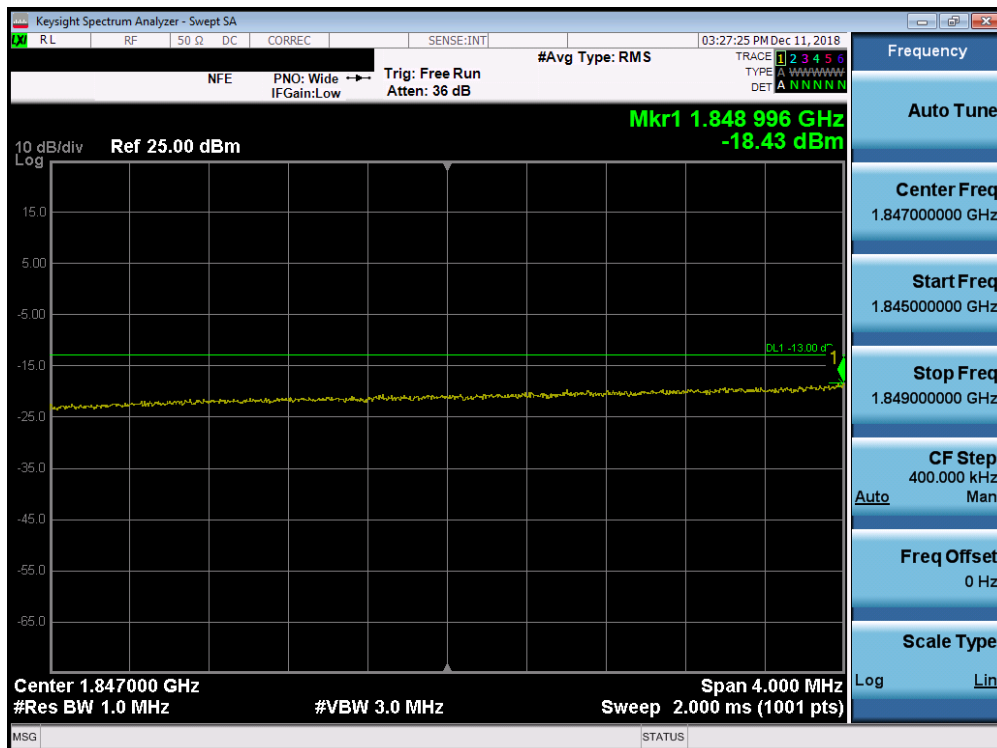


Plot 7-205. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 125 of 176

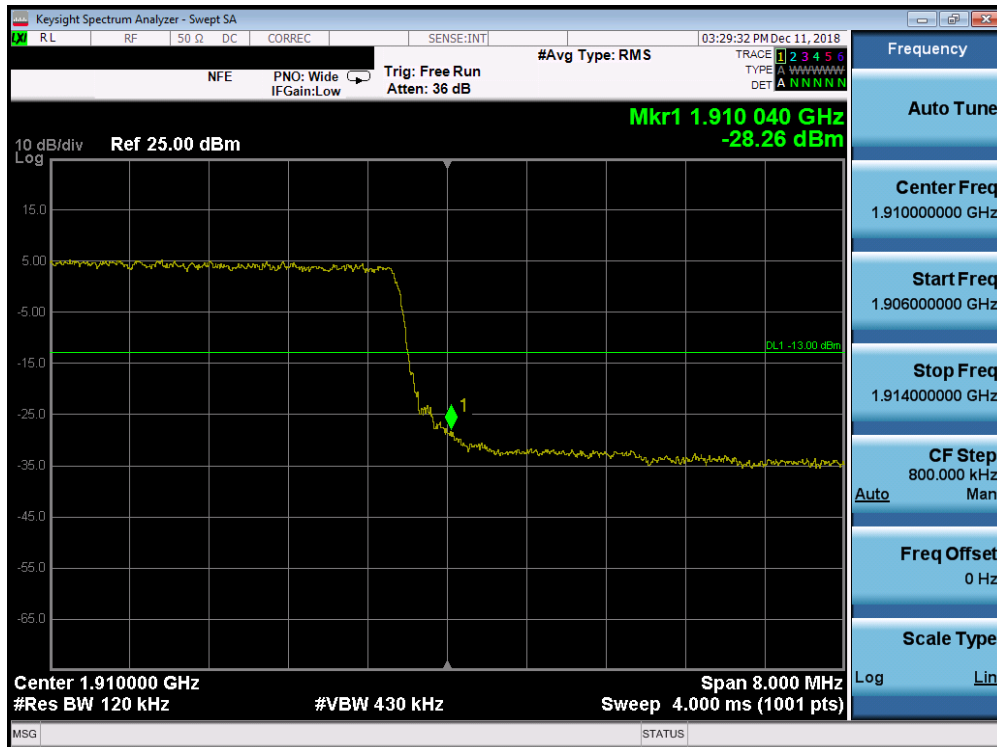


Plot 7-206. Lower Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

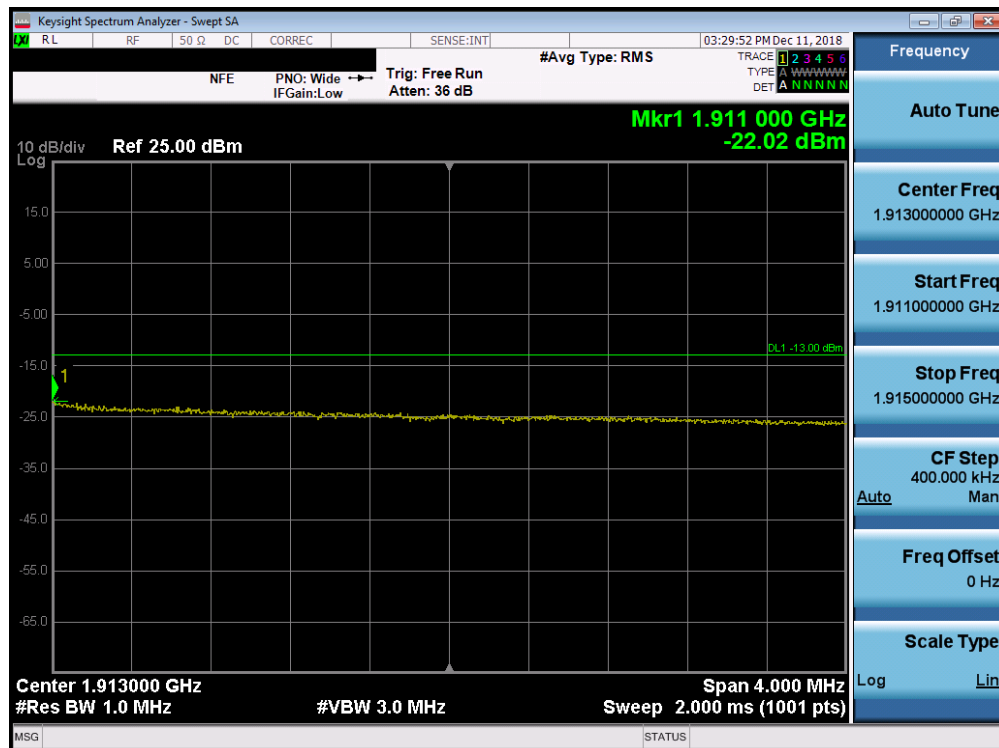


Plot 7-207. Lower Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>MEASUREMENT REPORT (CERTIFICATION)</b>	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 126 of 176

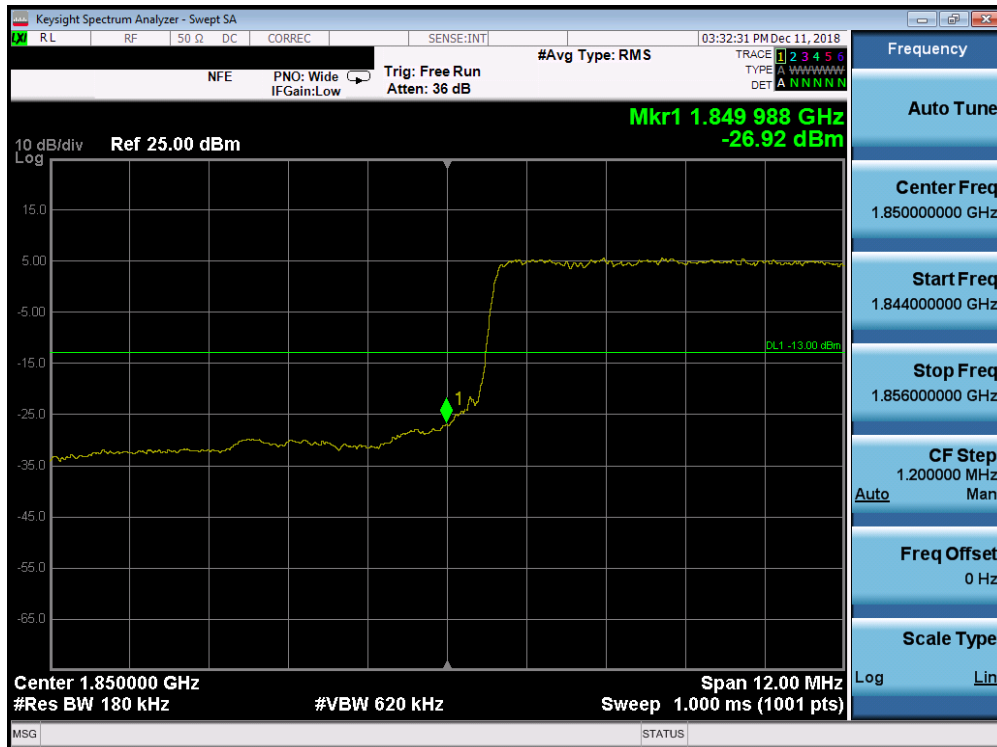


**Plot 7-208. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)**

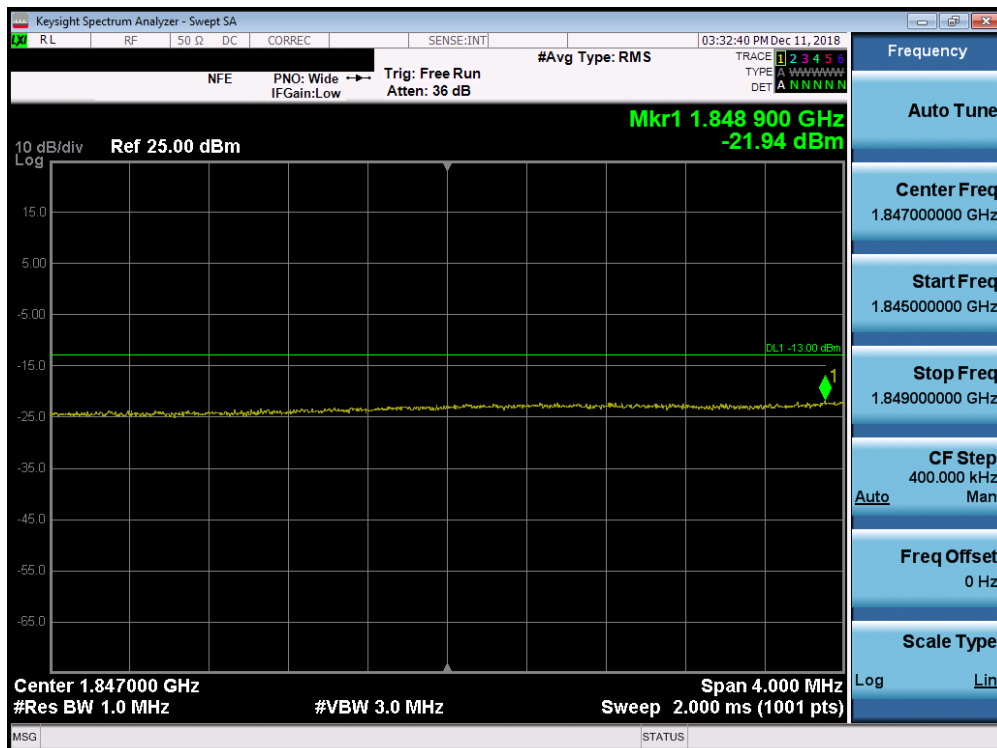


**Plot 7-209. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)**

FCC ID: ZNFL423DL	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1811280213-03-R1.ZNF	<b>Test Dates:</b> 12/4/2018 - 1/2/2019	<b>EUT Type:</b> Portable Handset	Page 127 of 176

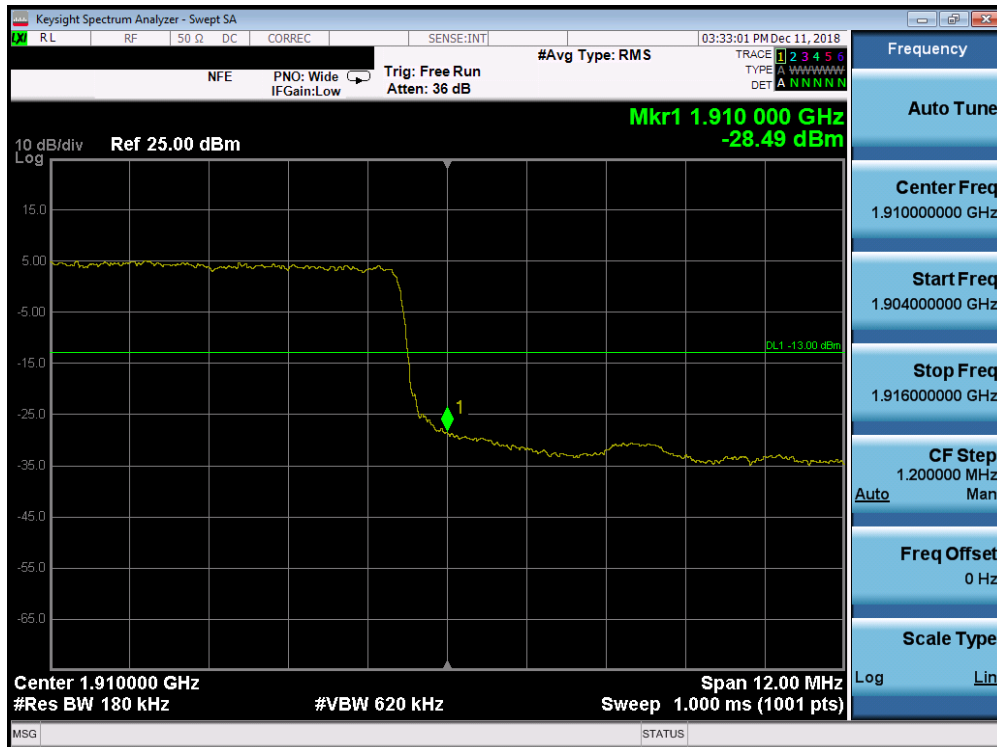


Plot 7-210. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

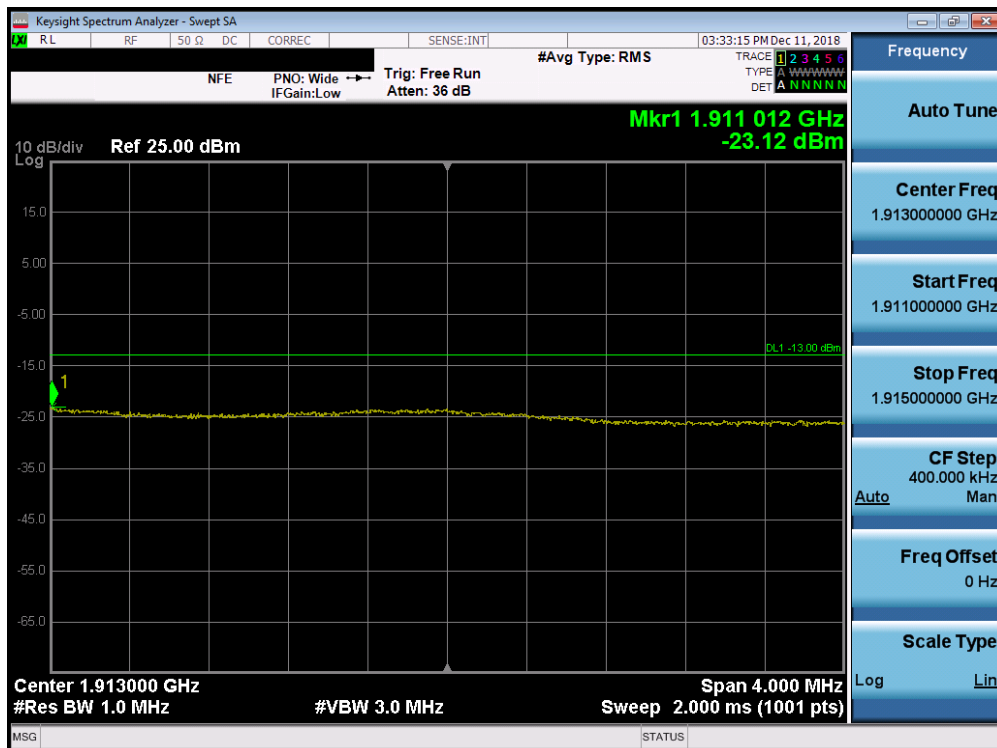


Plot 7-211. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 128 of 176

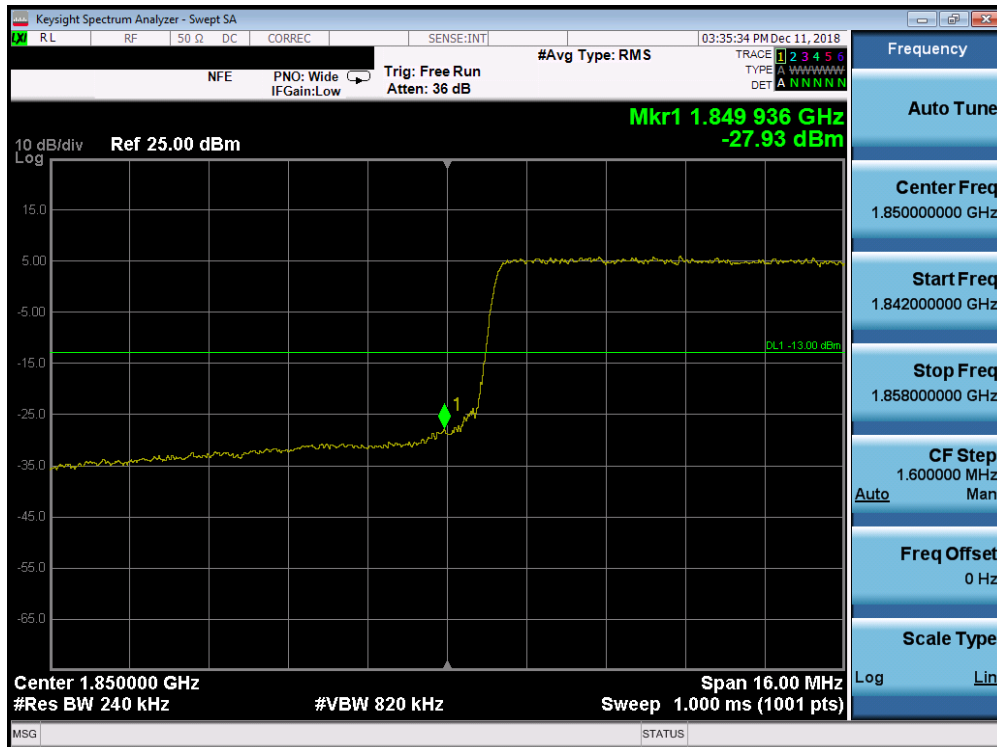


Plot 7-212. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-213. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 129 of 176

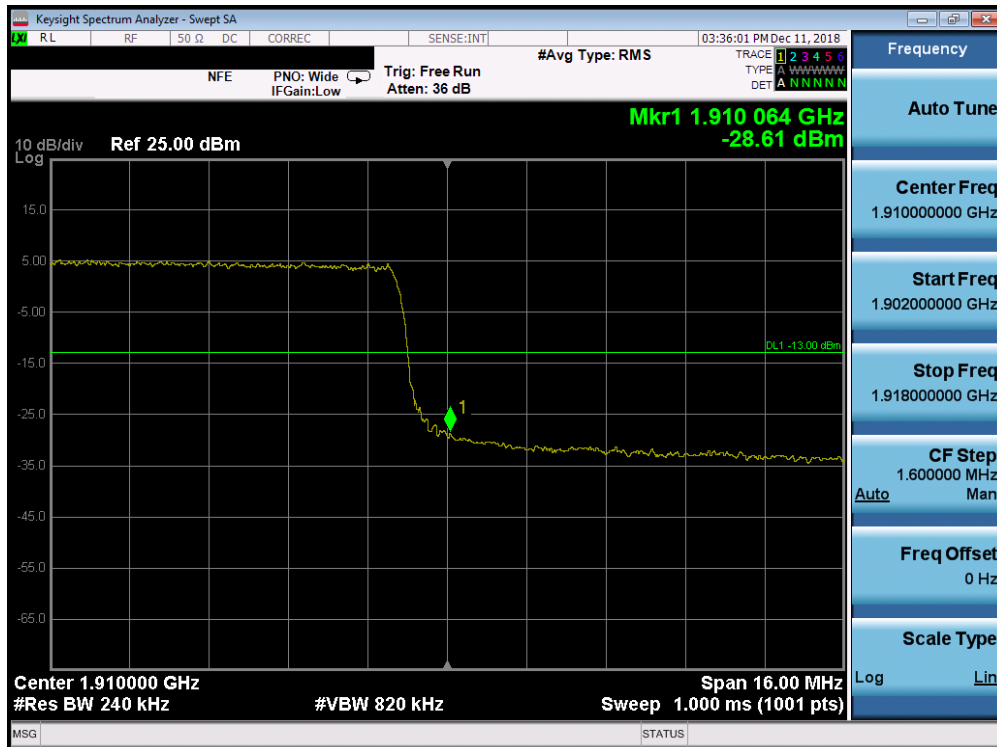


Plot 7-214. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

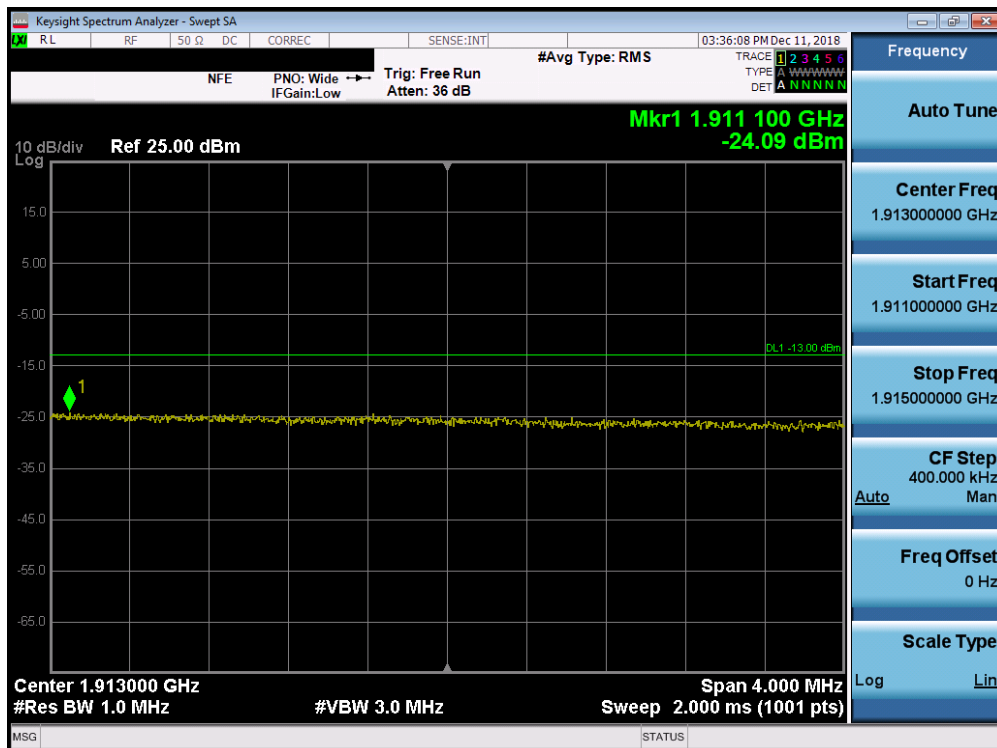


Plot 7-215. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 130 of 176



Plot 7-216. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-217. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1811280213-03-R1.ZNF	Test Dates: 12/4/2018 - 1/2/2019	EUT Type: Portable Handset		Page 131 of 176

## 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

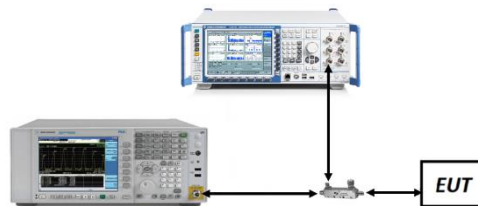
KDB 971168 D01 v03r01 – Section 5.7.1

### Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW  $\geq$  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.

### 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.

FCC ID: ZNFL423DL	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>MEASUREMENT REPORT (CERTIFICATION)</b>	LG	<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1811280213-03-R1.ZNF	<b>Test Dates:</b> 12/4/2018 - 1/2/2019	<b>EUT Type:</b> Portable Handset		Page 132 of 176