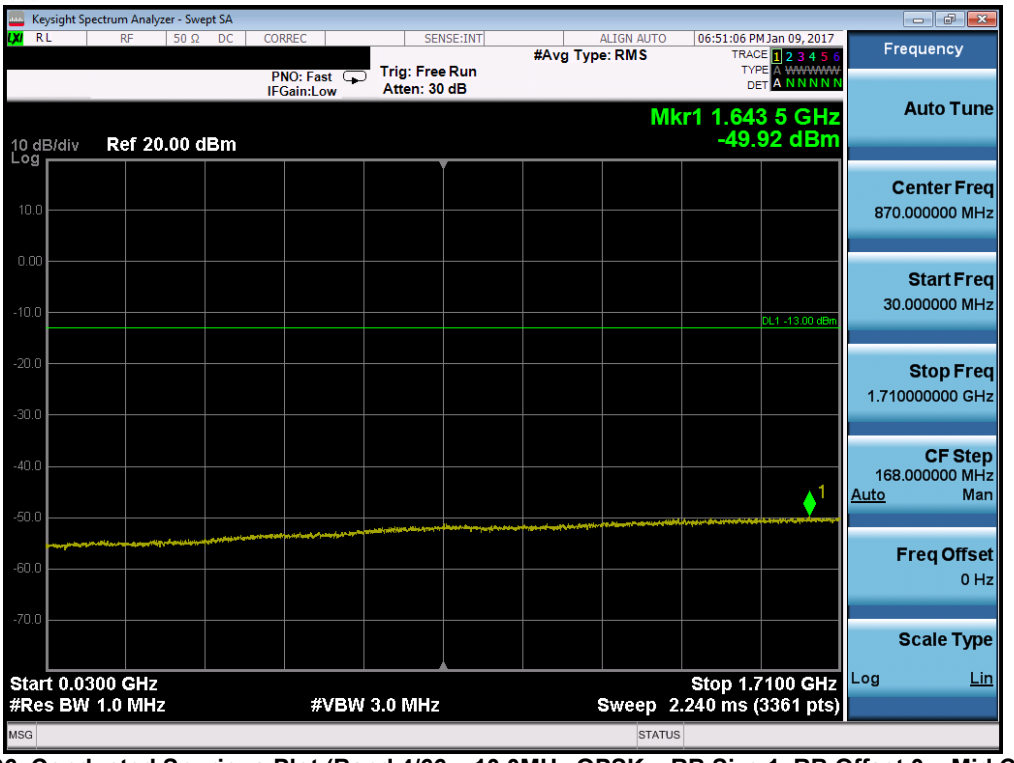
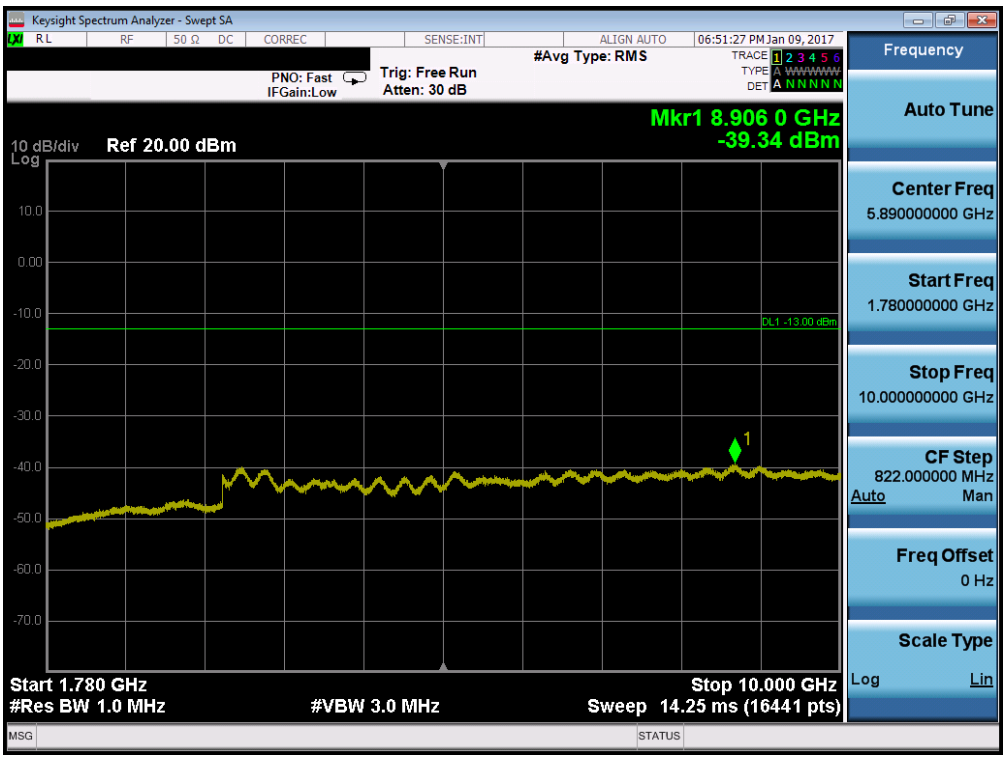


Plot 7-106. Conducted Spurious Plot (Band 4/66 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-107. Conducted Spurious Plot (Band 4/66 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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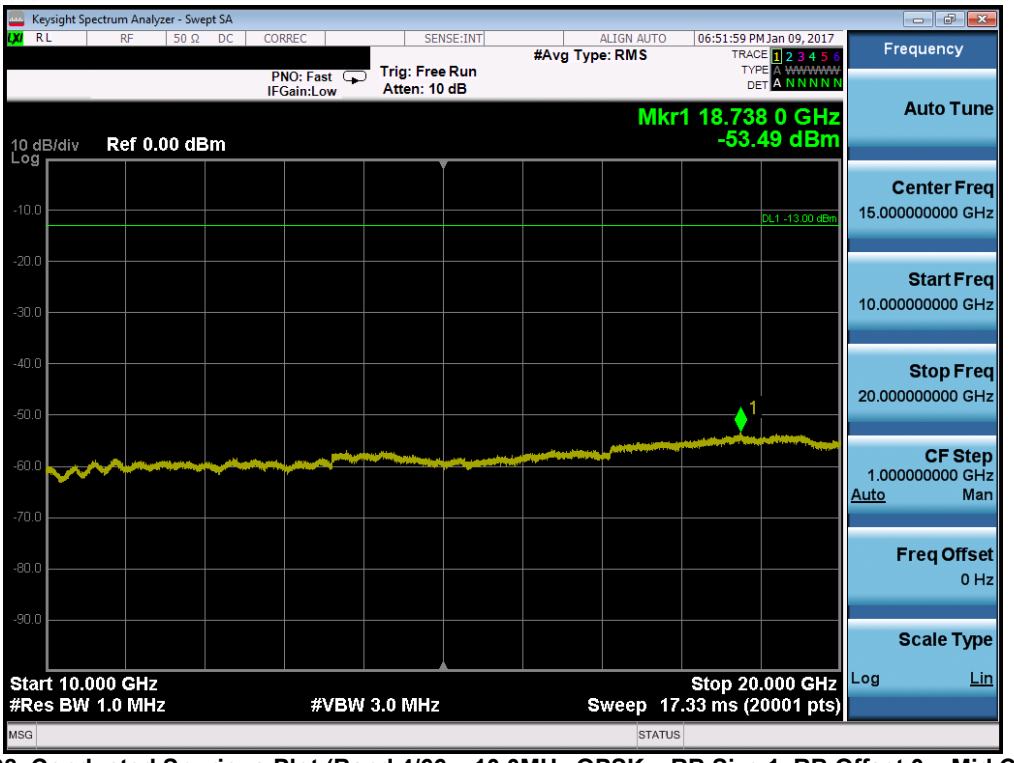
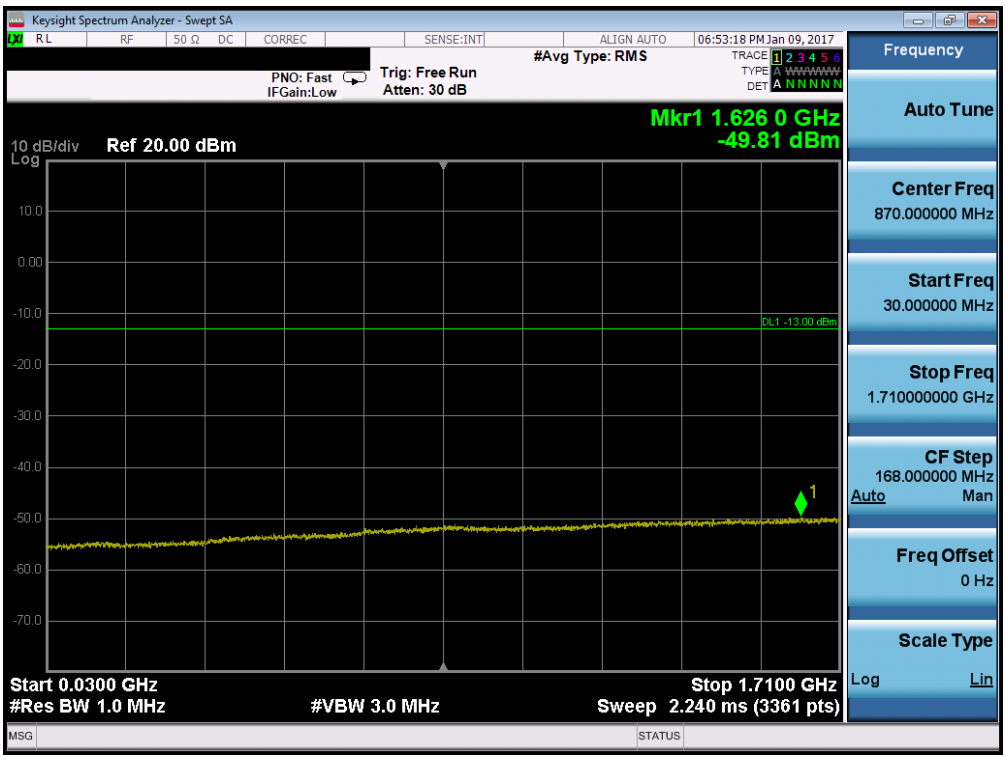


Plot 7-108. Conducted Spurious Plot (Band 4/66 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



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

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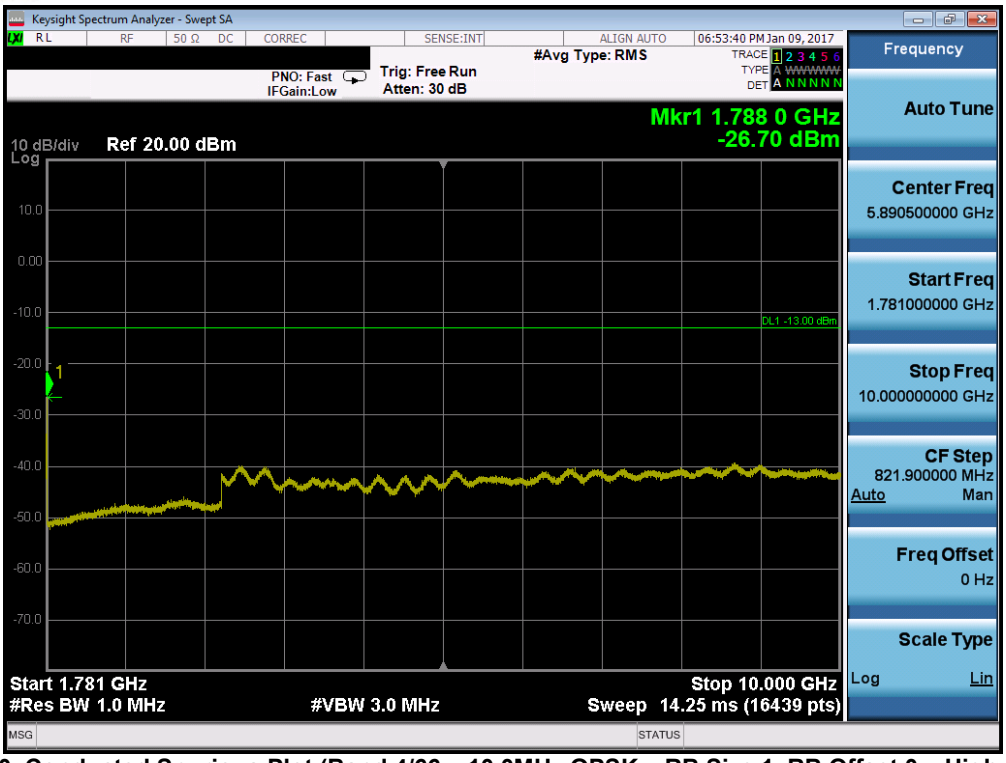
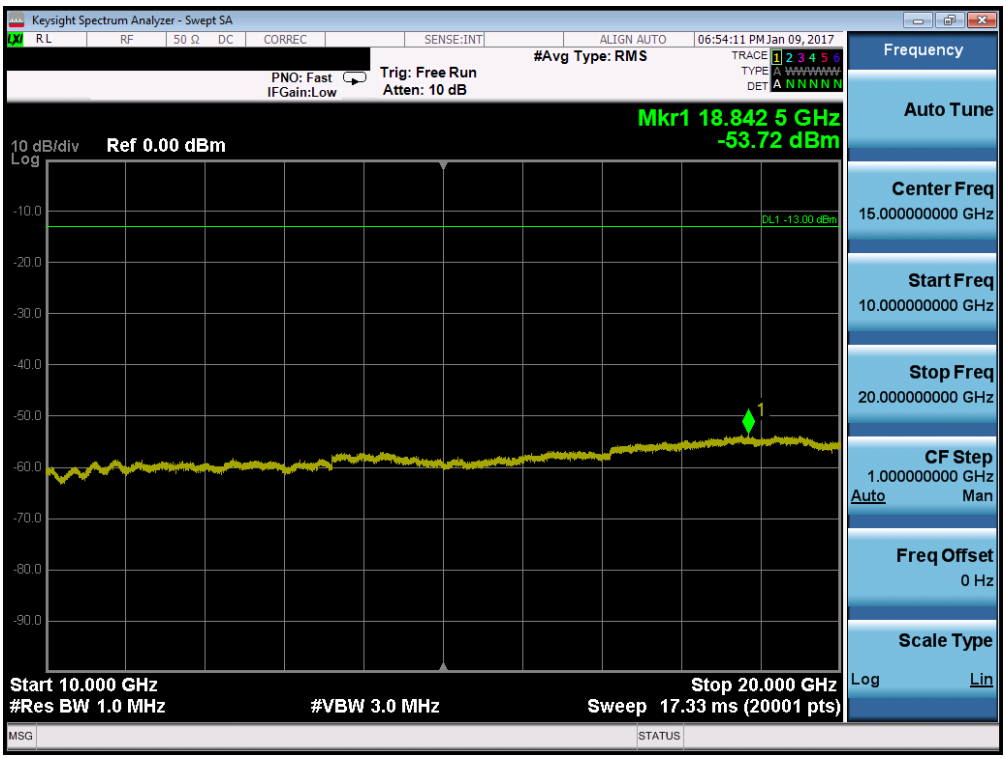


Plot 7-110. Conducted Spurious Plot (Band 4/66 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



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

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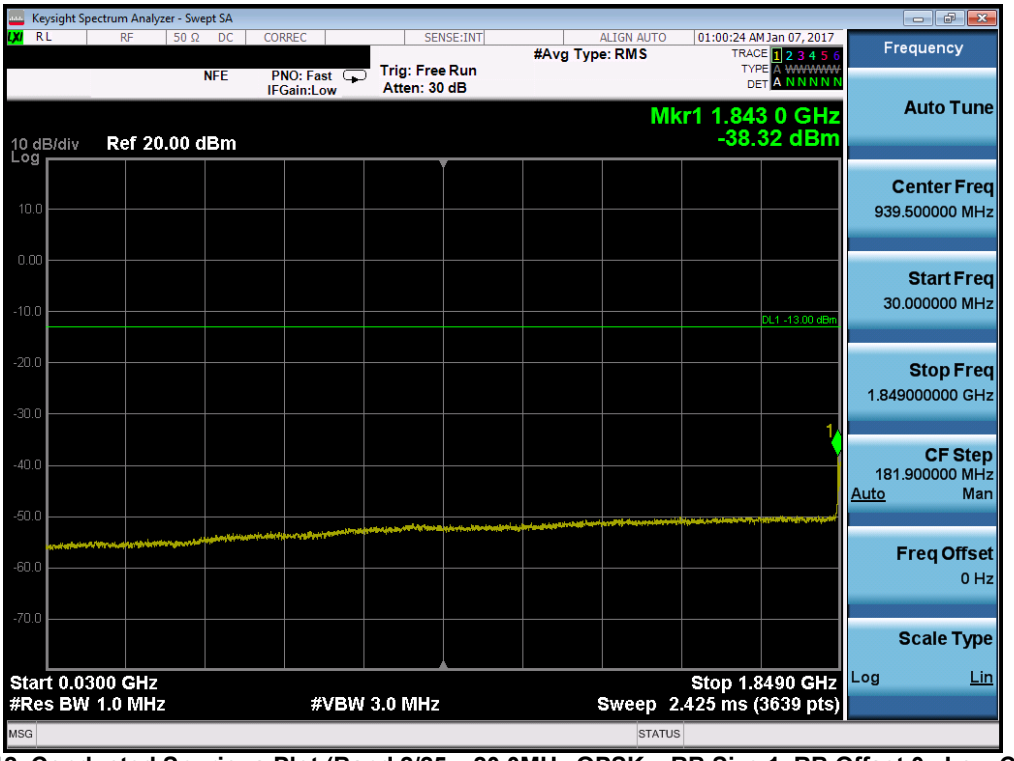
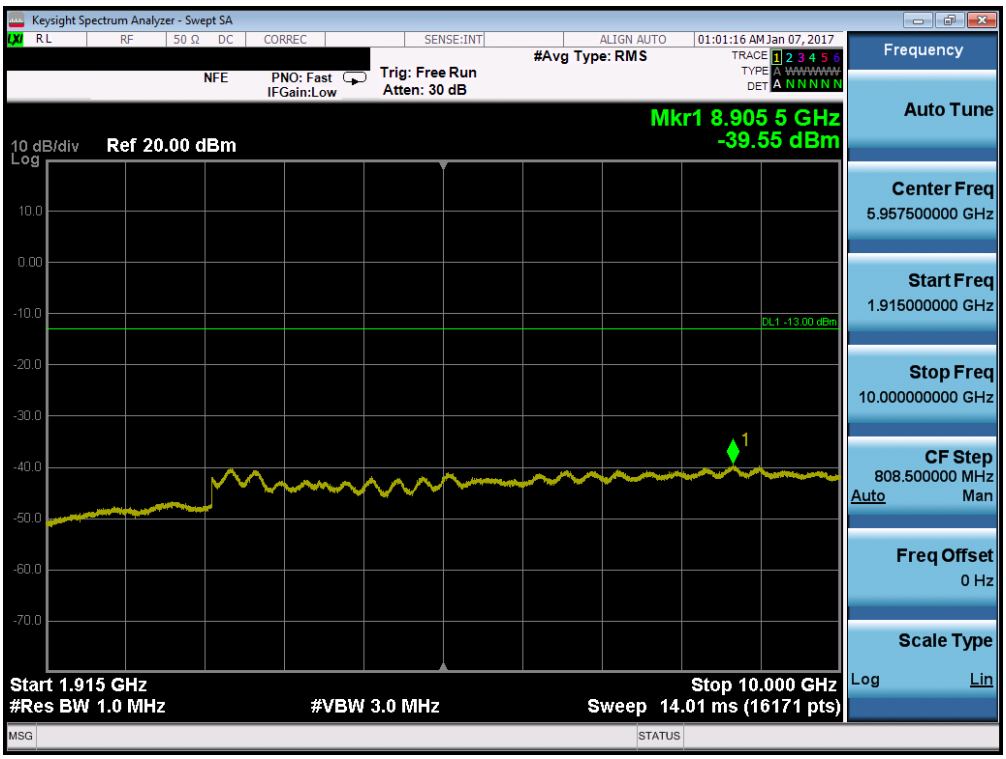


Plot 7-112. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)



Plot 7-113. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

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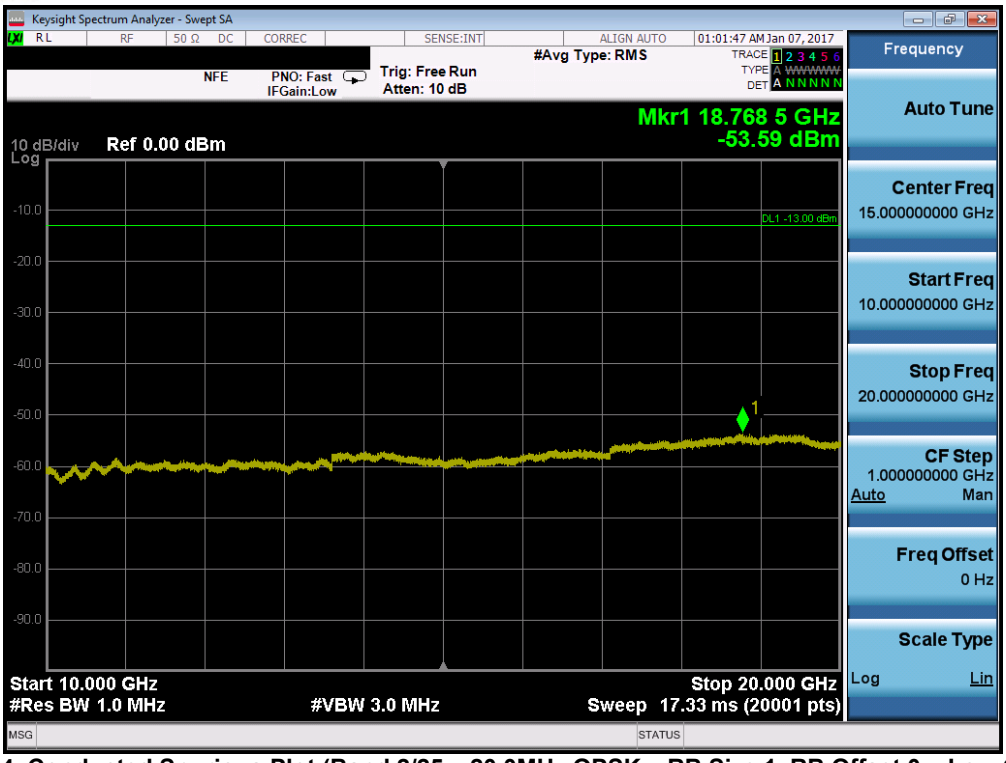
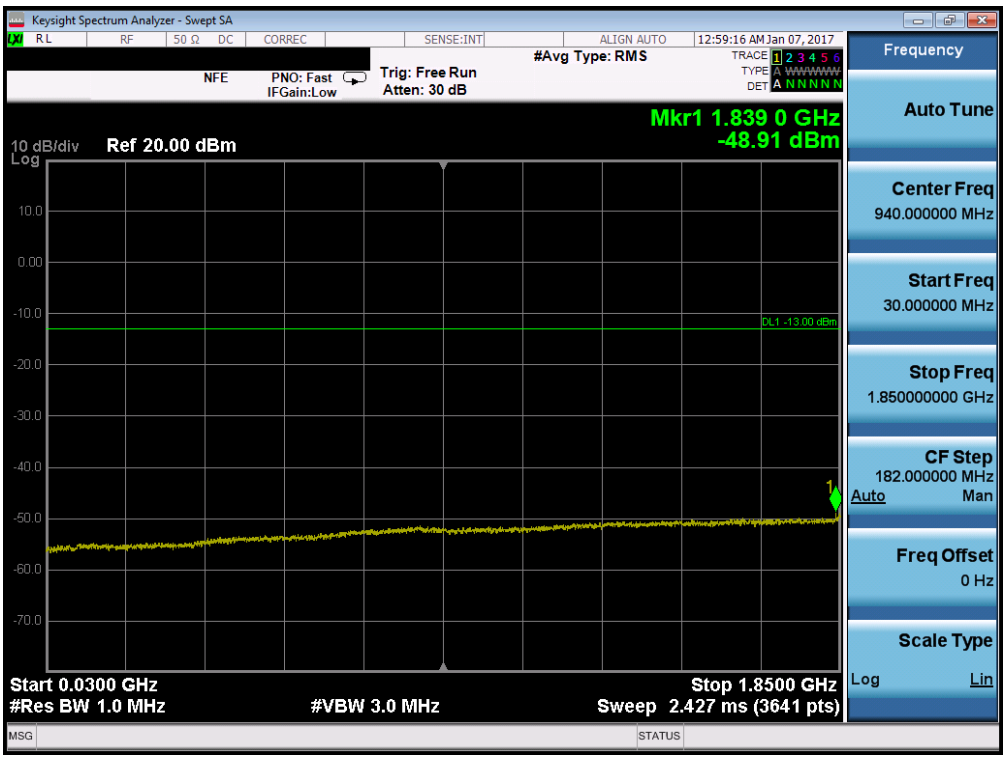


Plot 7-114. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 7-115. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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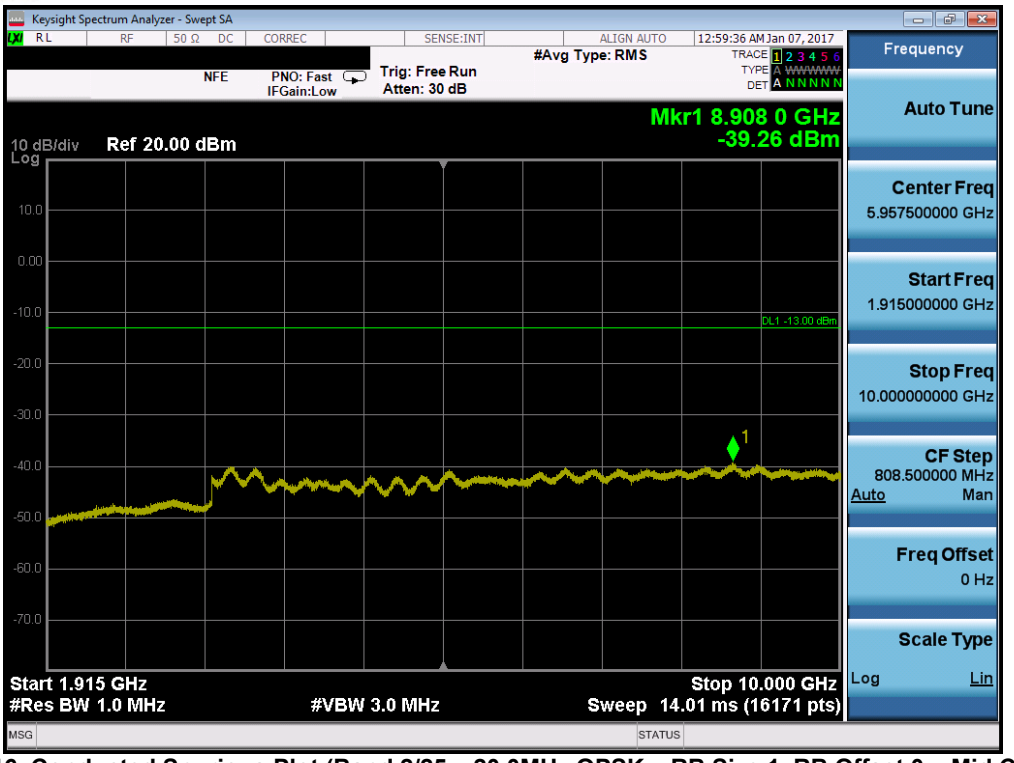
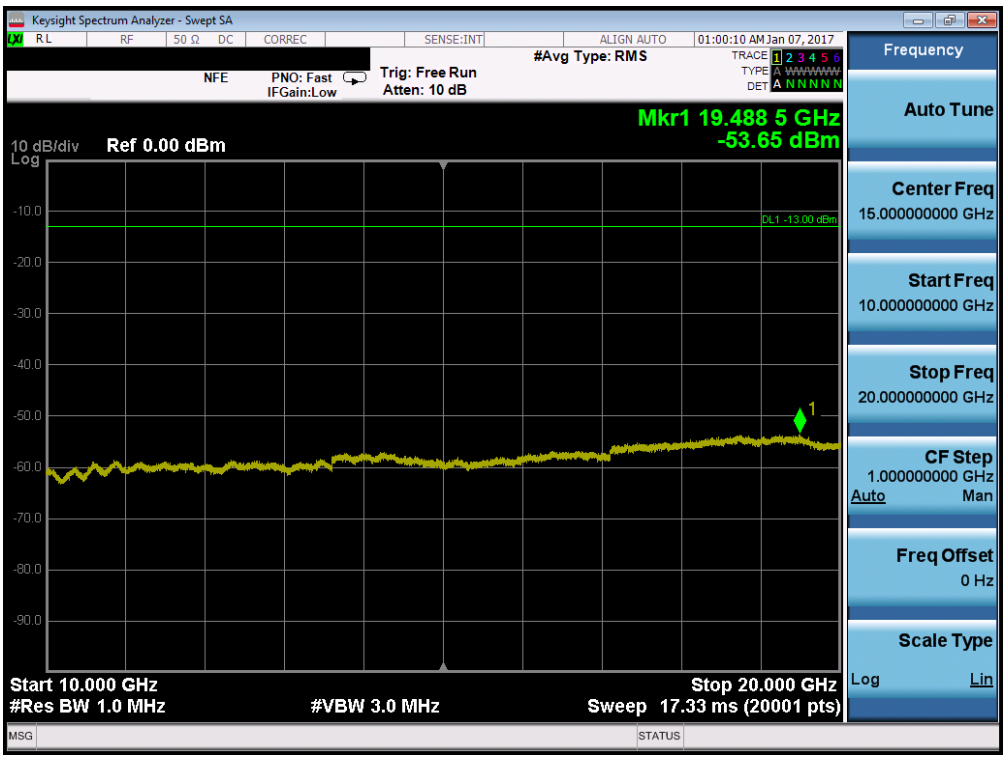


Plot 7-116. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-117. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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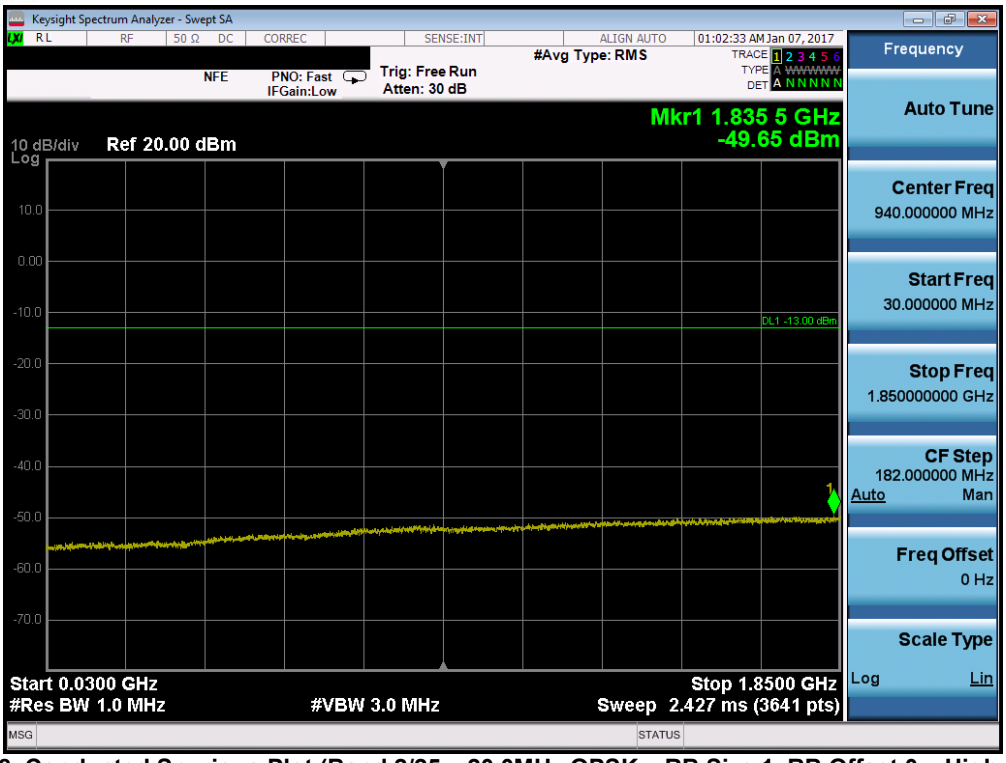
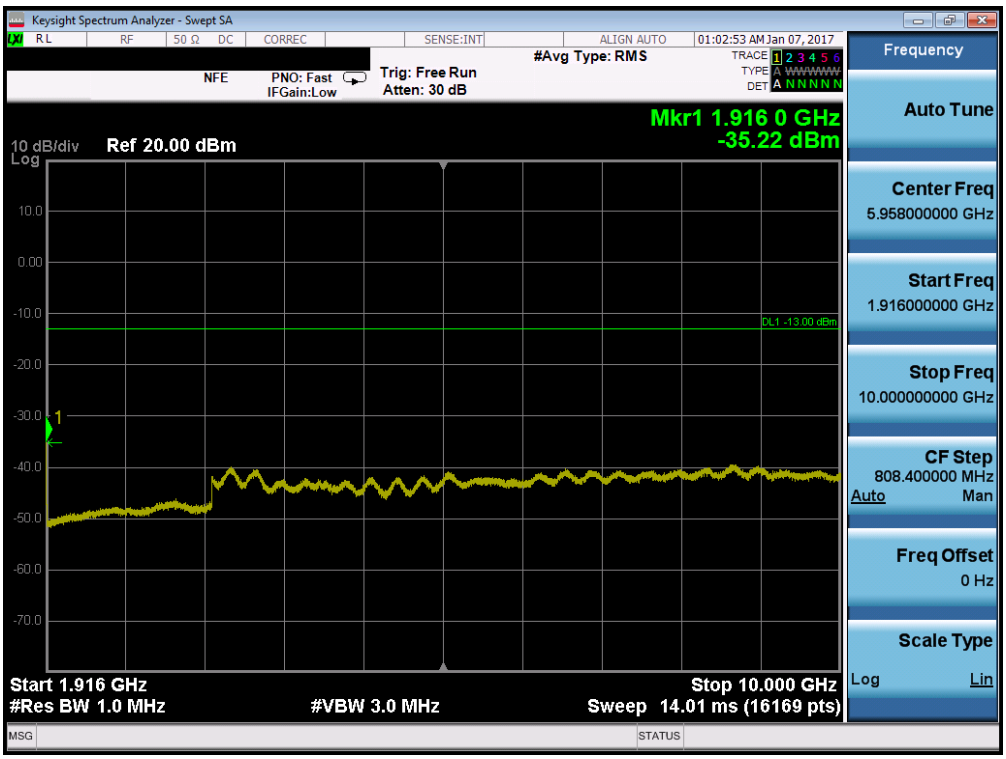


Plot 7-118. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-119. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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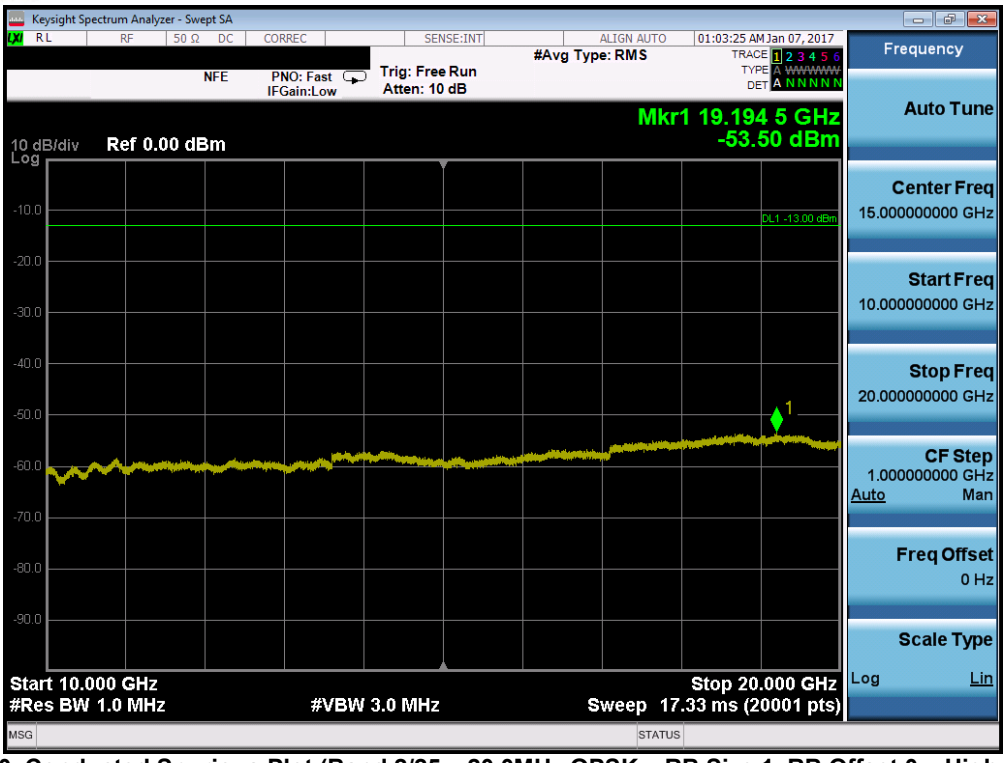
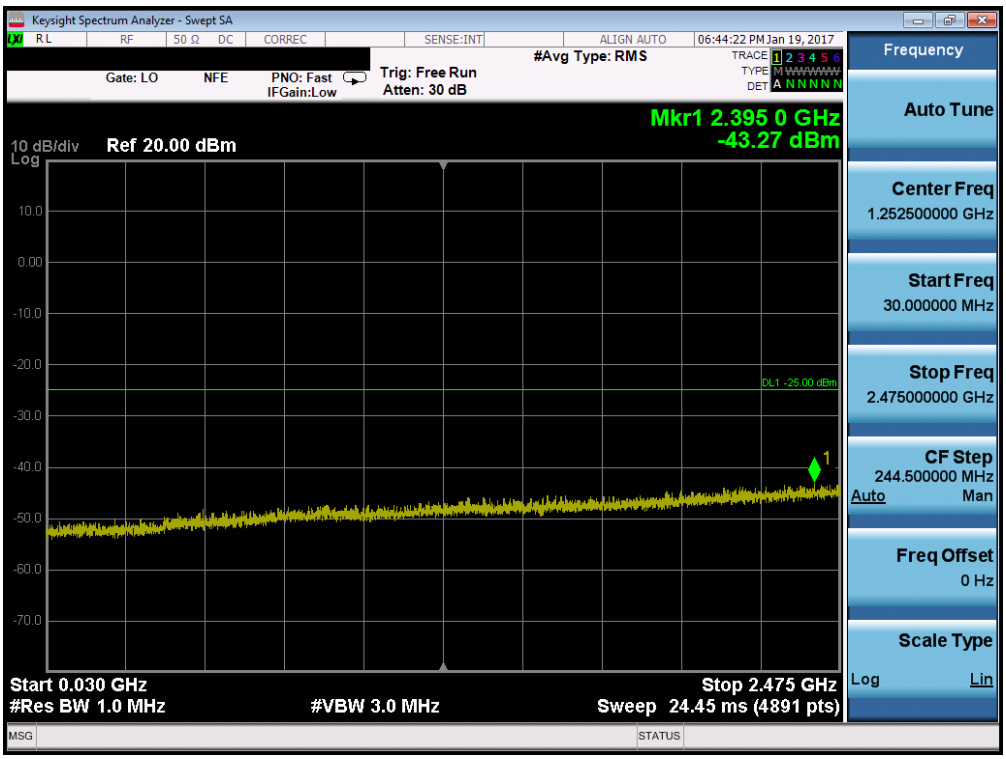


Plot 7-120. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-121. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

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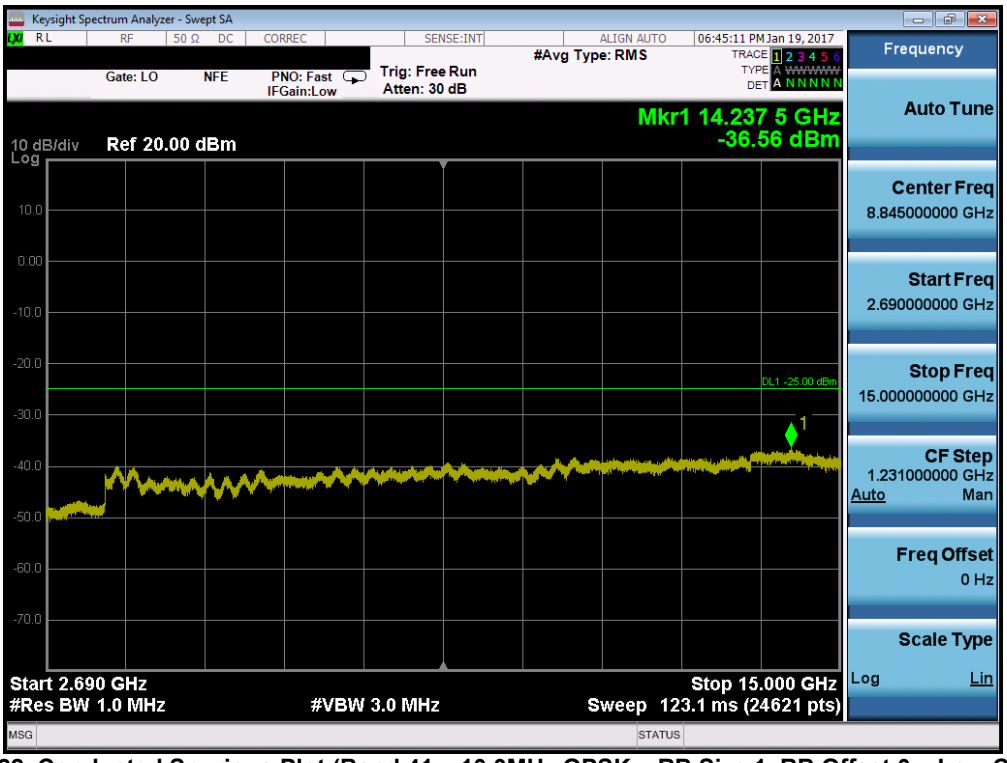

Plot 7-122. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

Plot 7-123. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

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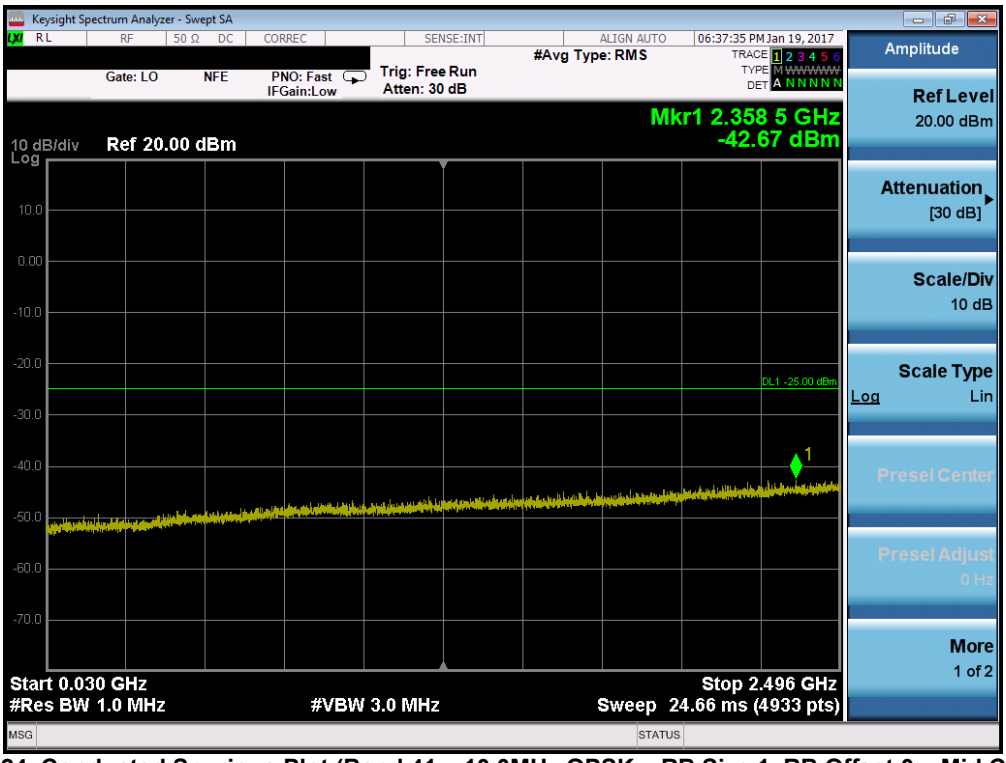
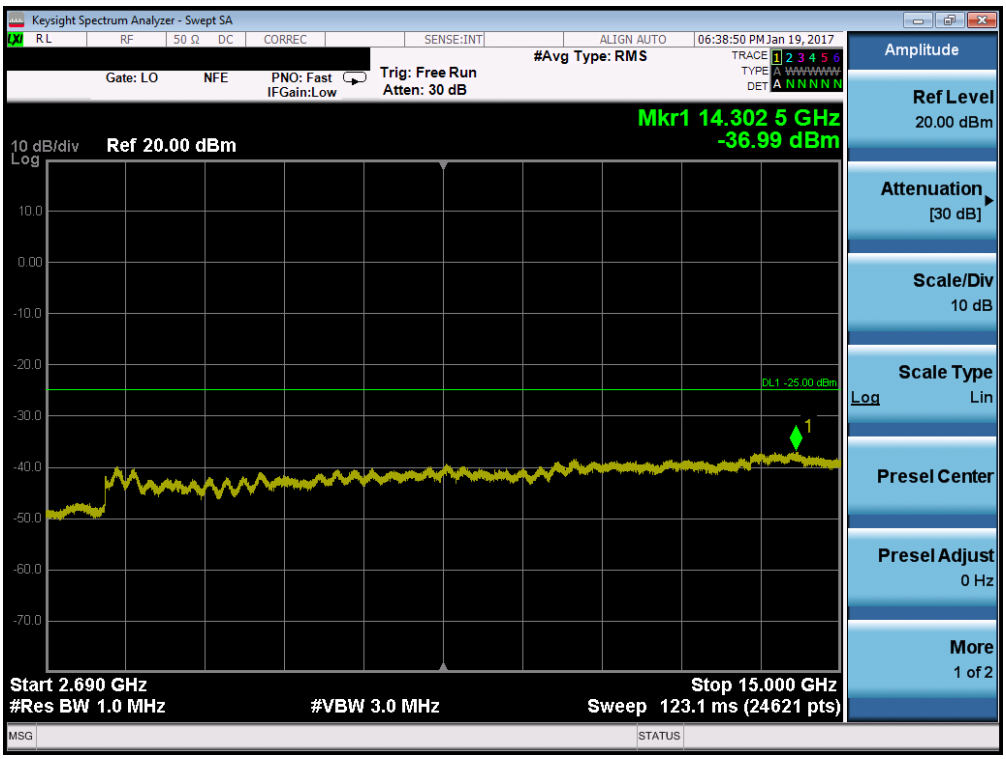


Plot 7-124. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-125. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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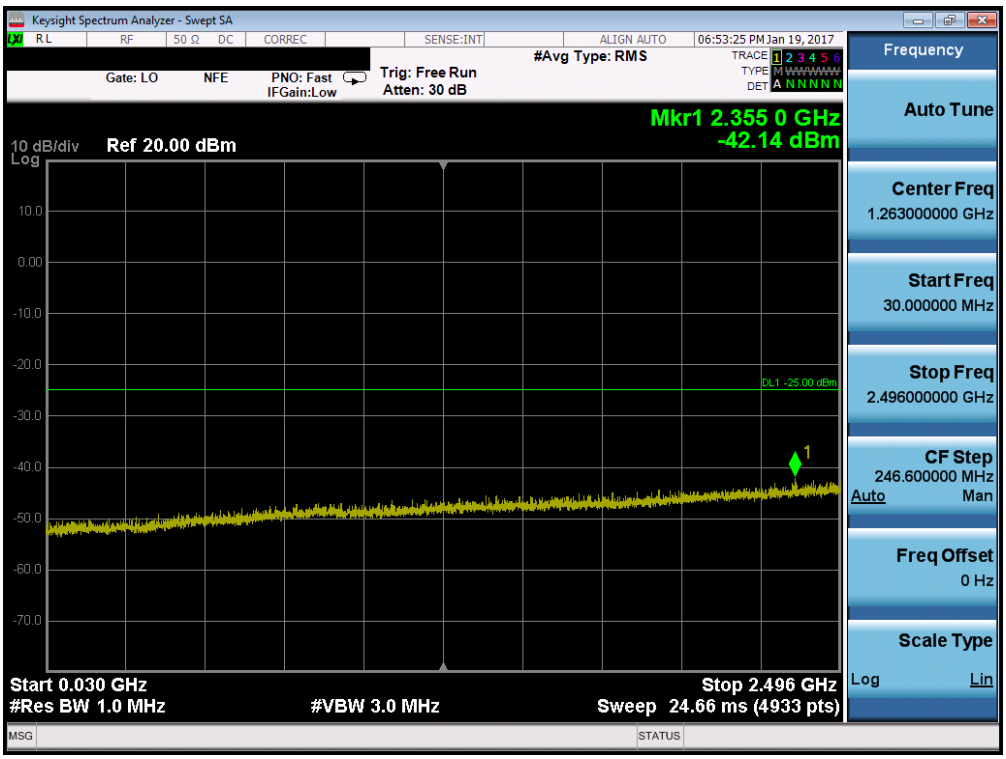
Plot 7-126. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-127. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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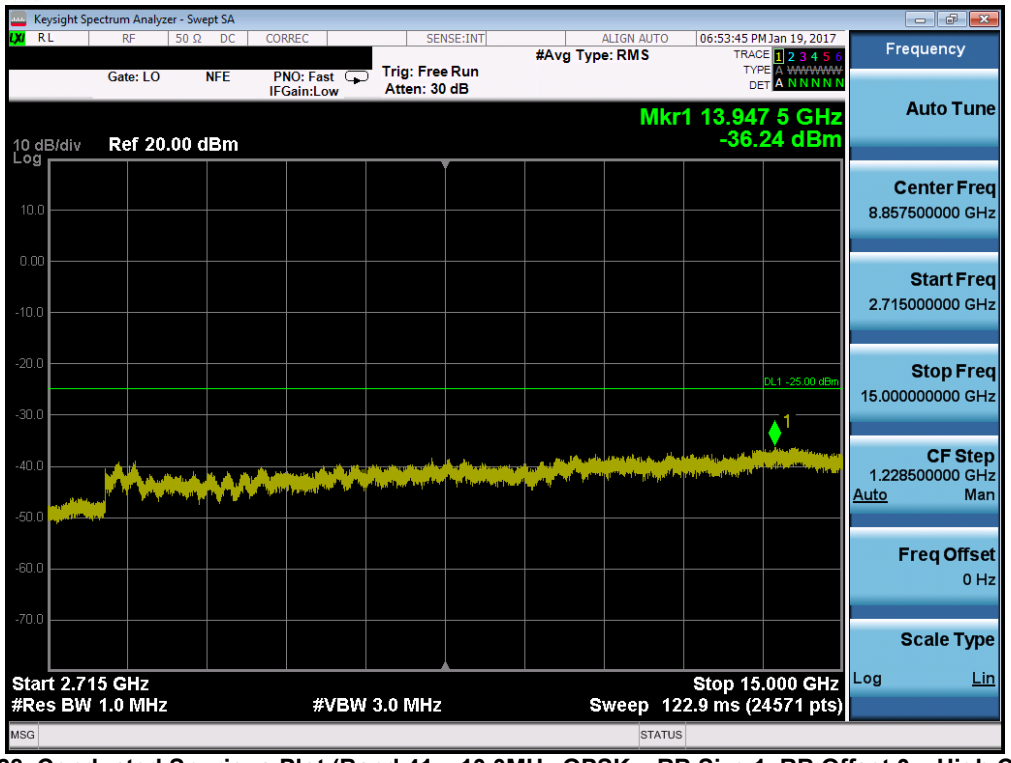

Plot 7-128. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

Plot 7-129. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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7.4 Band Edge Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) §27.53(c) §27.53(g) §27.53(h) §27.53(m)

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 for Band 41 is as noted in the Test Notes on the following page.

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

Test Procedure Used

KDB 971168 D01 v02r02 – 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.

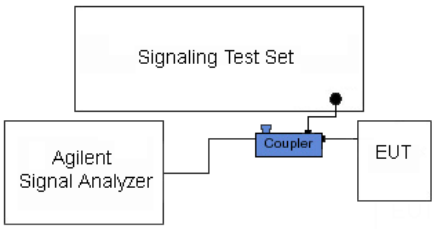

Figure 7-3. Test Instrument & Measurement Setup

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.

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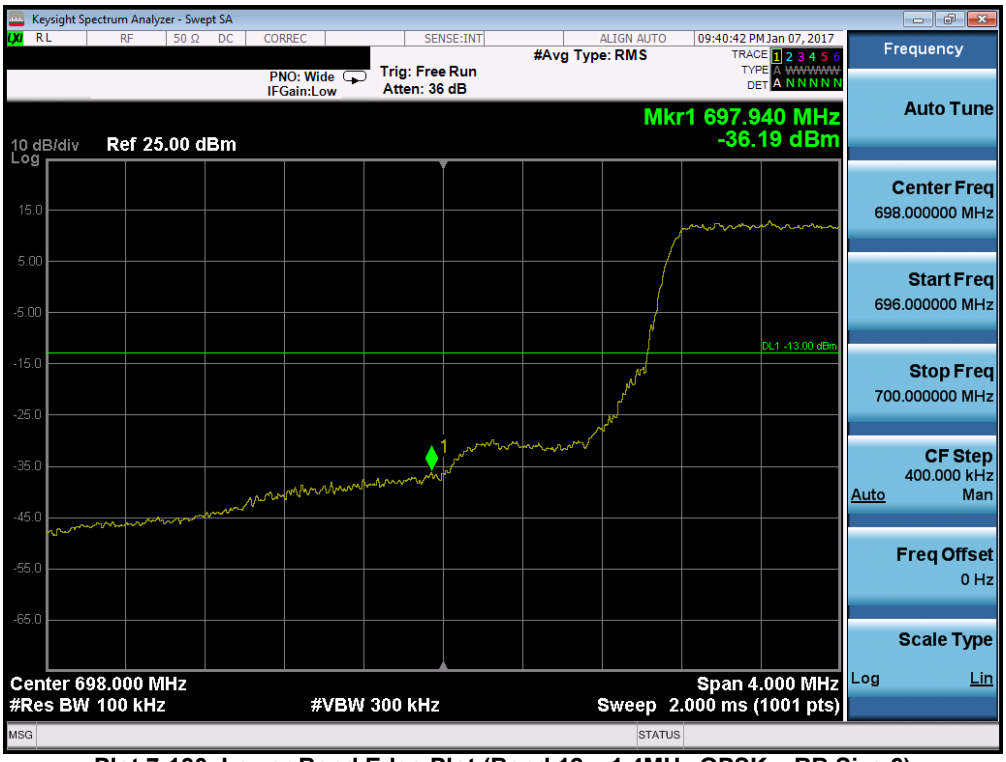
Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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 + 10log$_{10}$(P) = -35dBm in a 6.25kHz bandwidth.

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



Plot 7-130. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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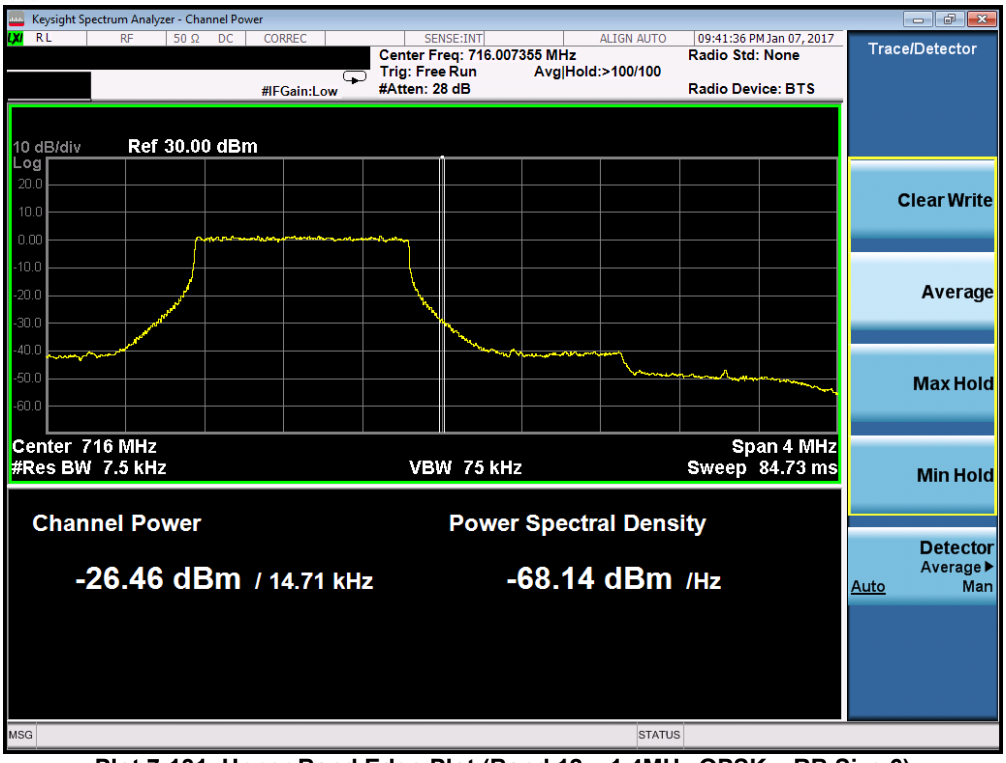

Plot 7-131. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

Plot 7-132. Upper Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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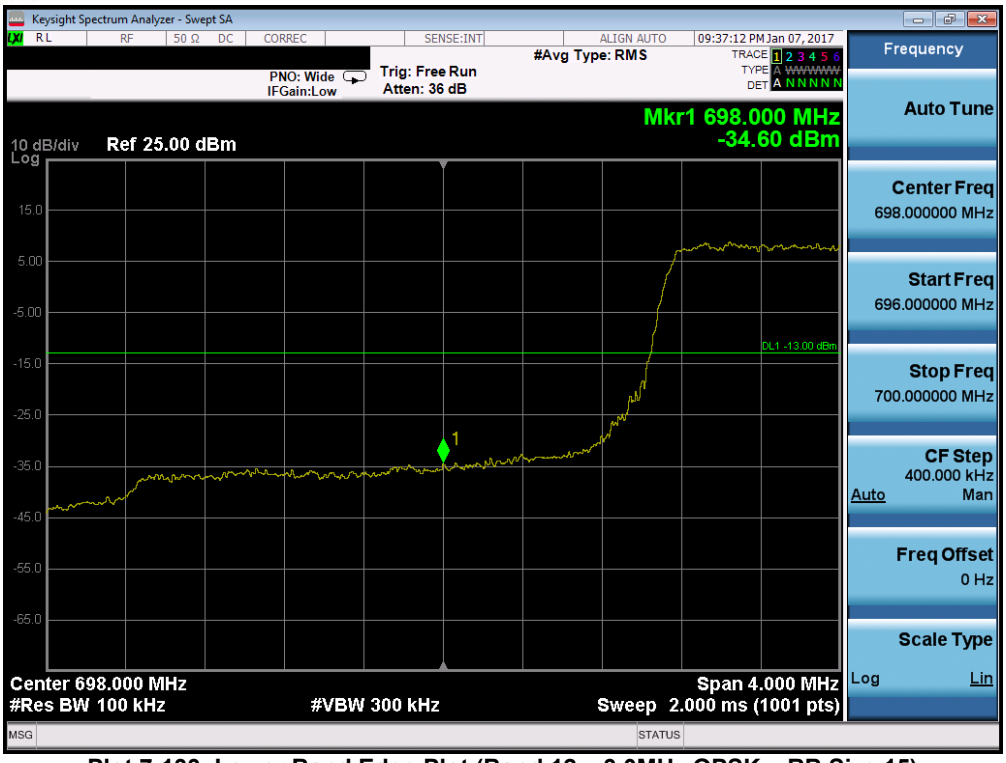
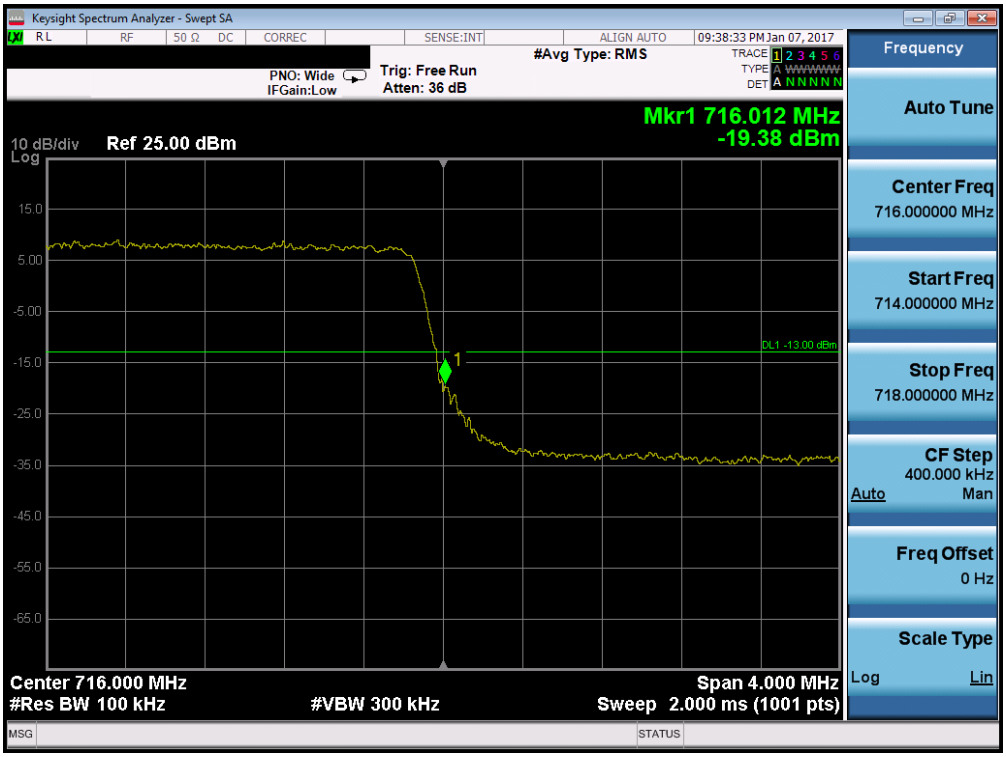


Plot 7-133. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-134. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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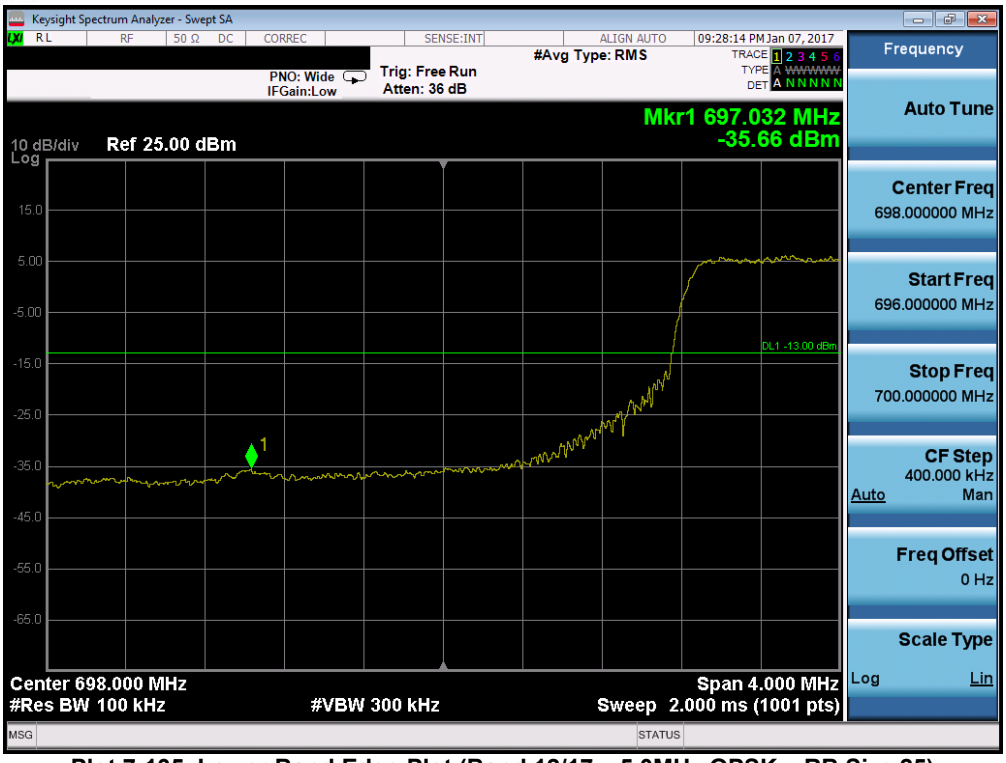
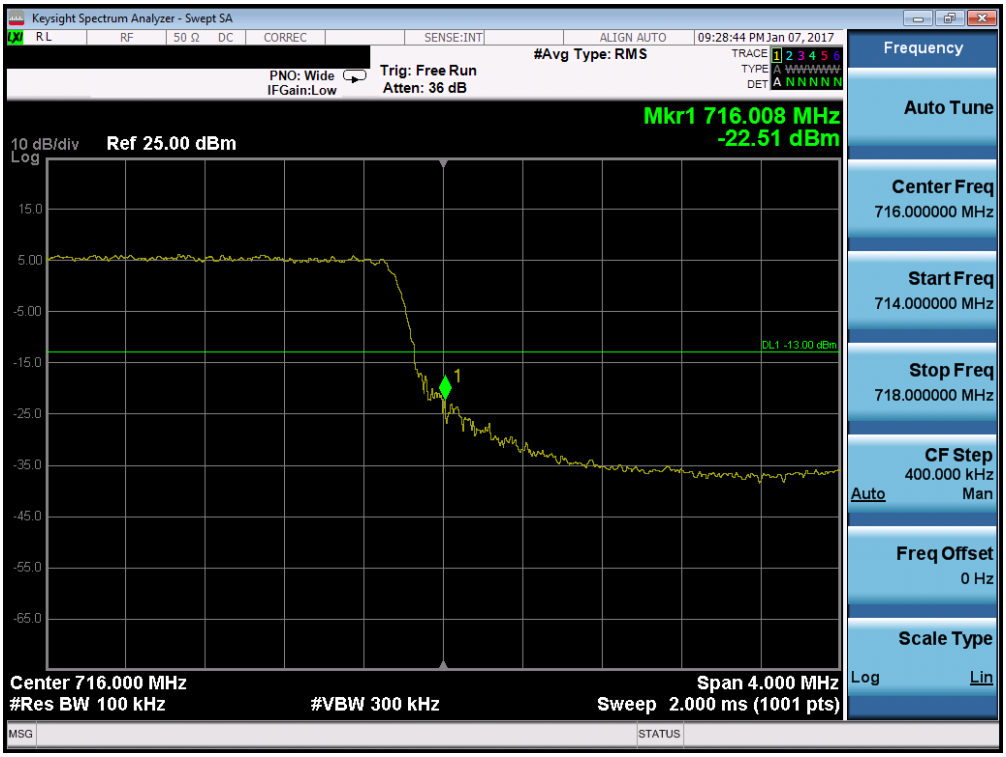


Plot 7-135. Lower Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)



Plot 7-136. Upper Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)

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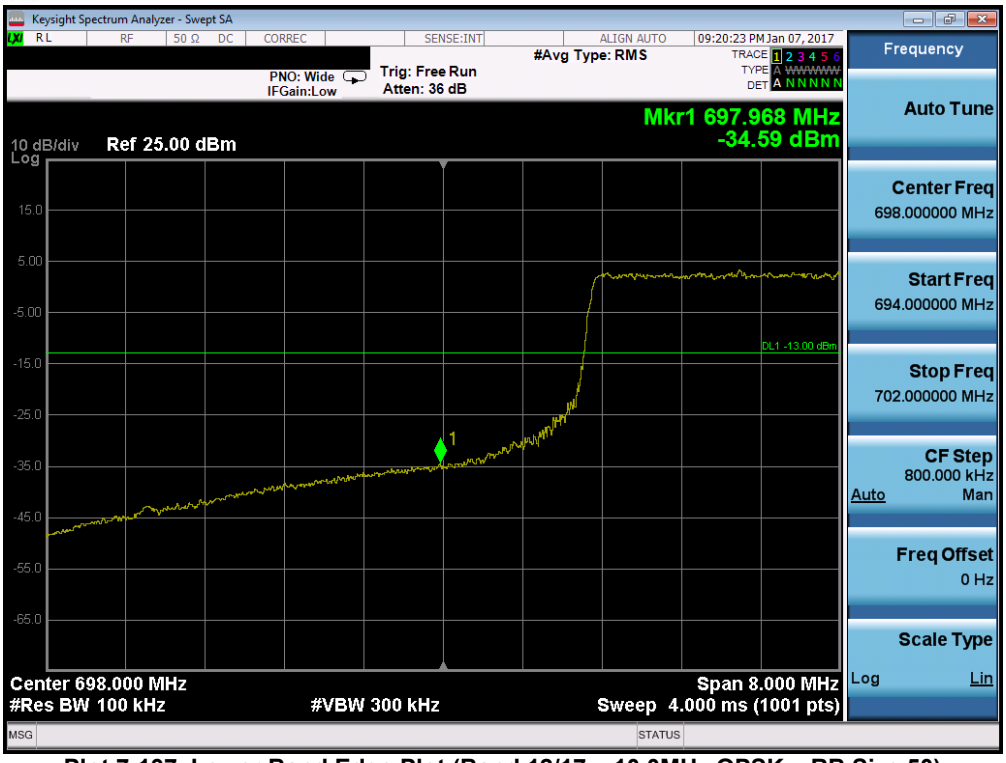
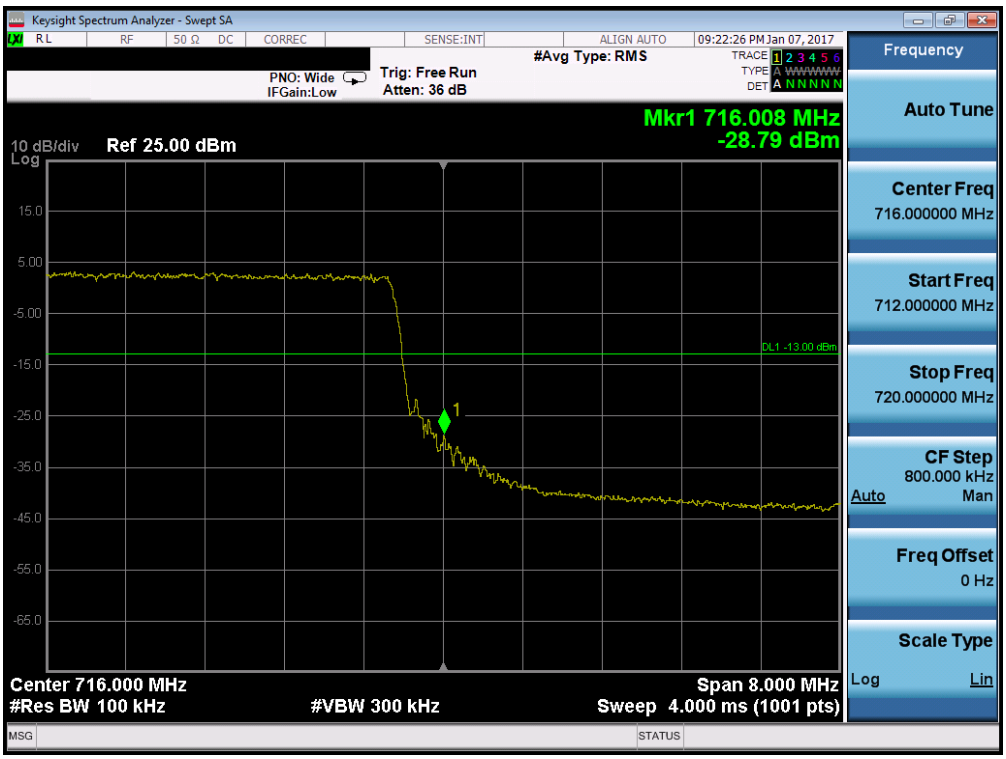


Plot 7-137. Lower Band Edge Plot (Band 12/17 – 10.0MHz QPSK – RB Size 50)



Plot 7-138. Upper Band Edge Plot (Band 12/17 – 10.0MHz QPSK – RB Size 50)

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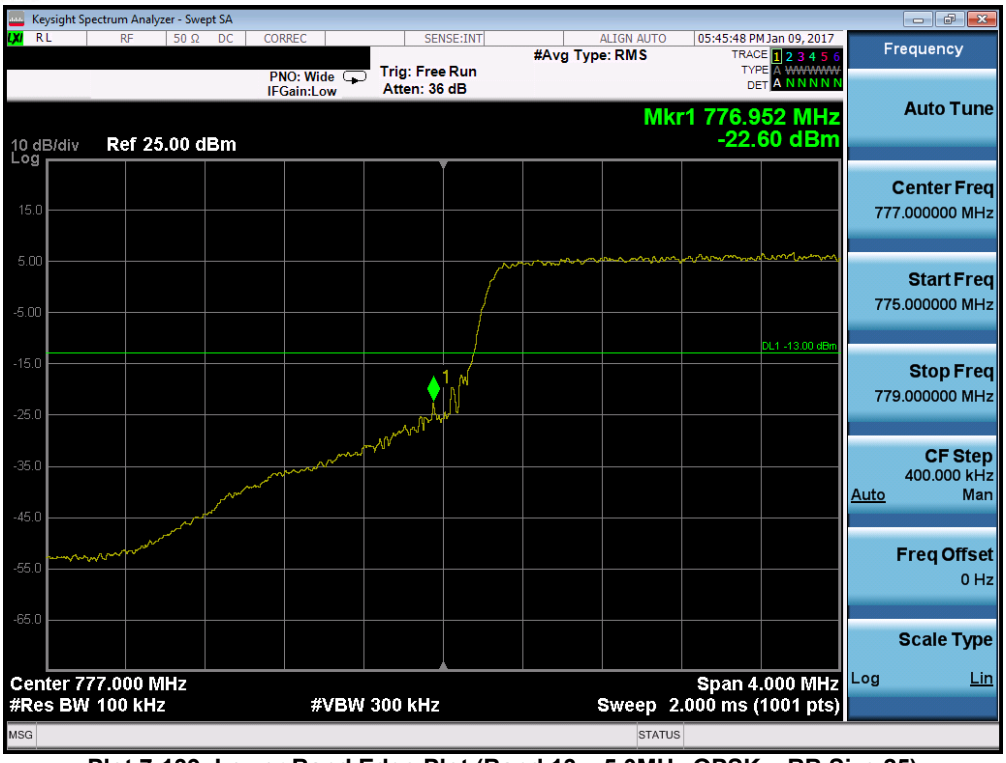
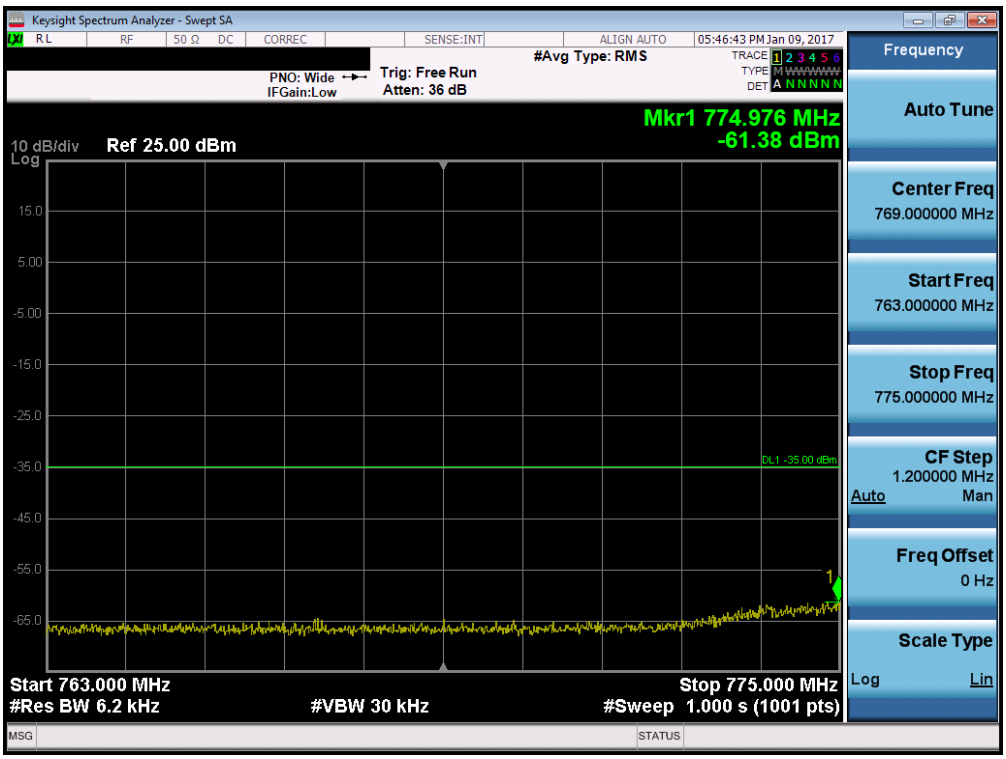


Plot 7-139. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-140. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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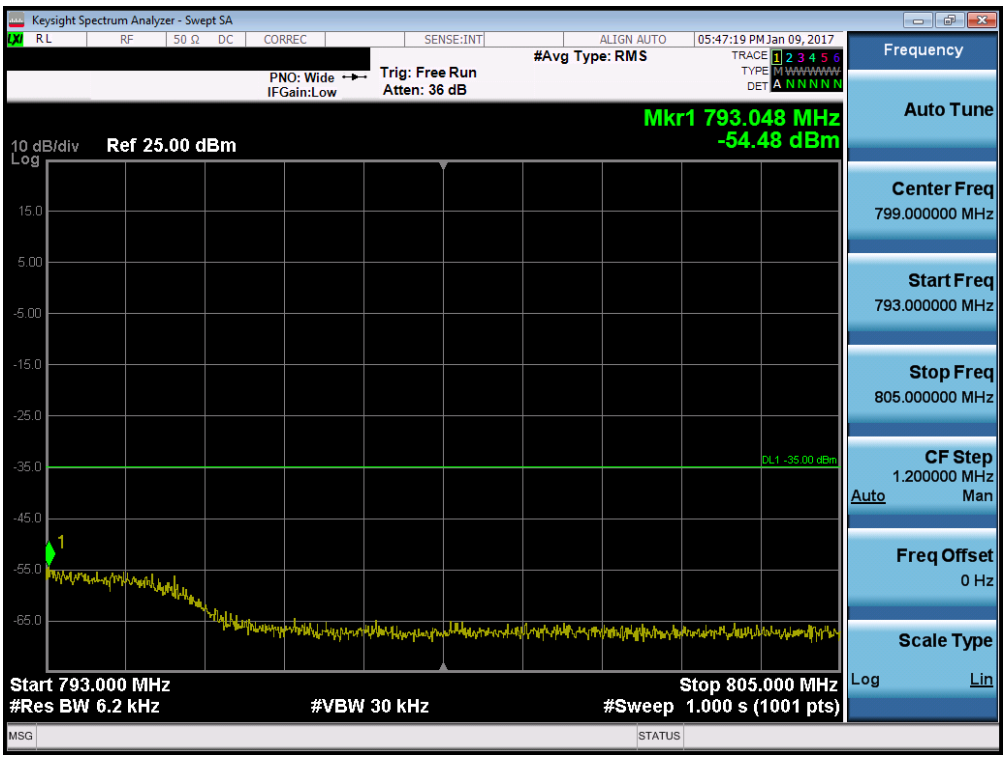
Plot 7-141. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-142. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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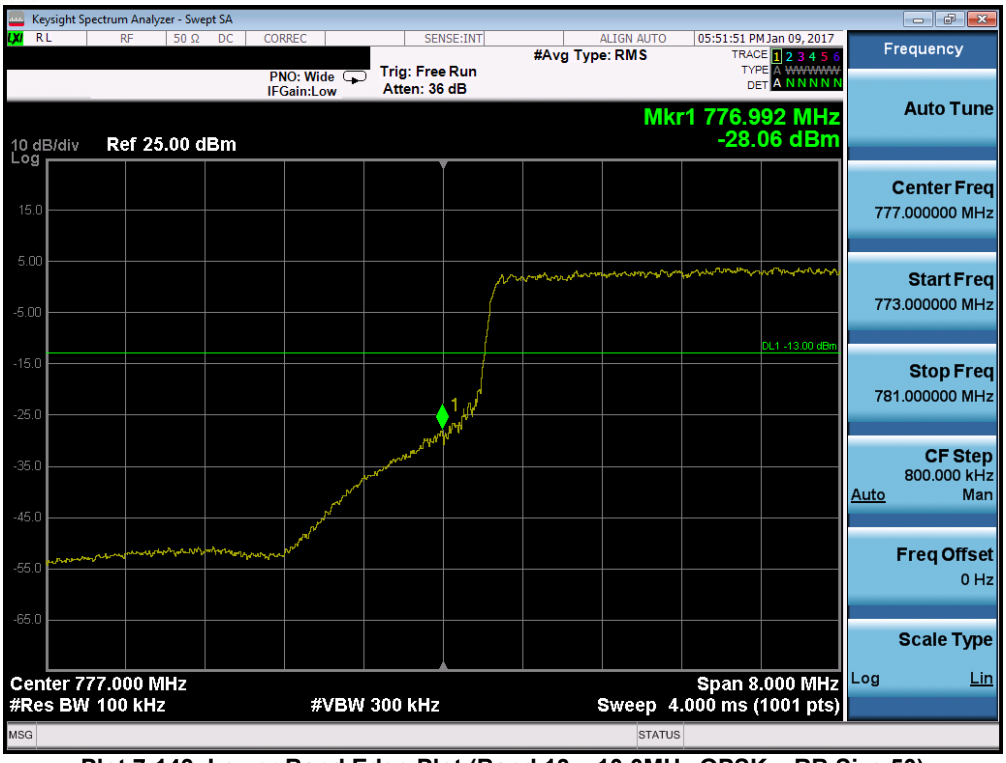
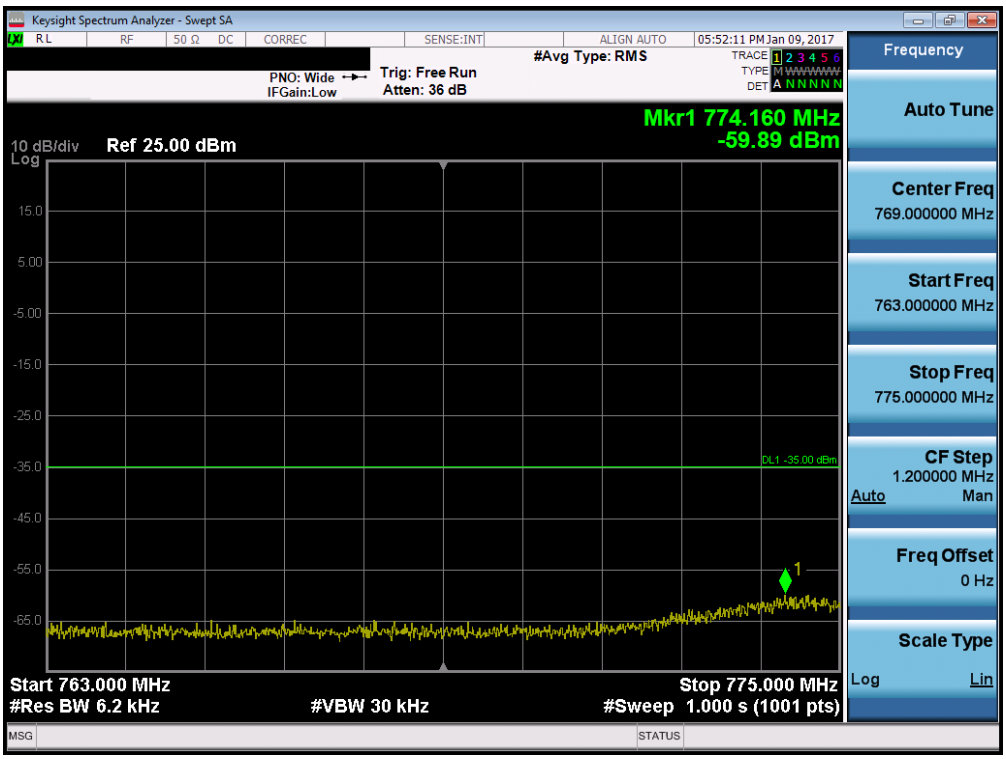


Plot 7-143. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-144. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

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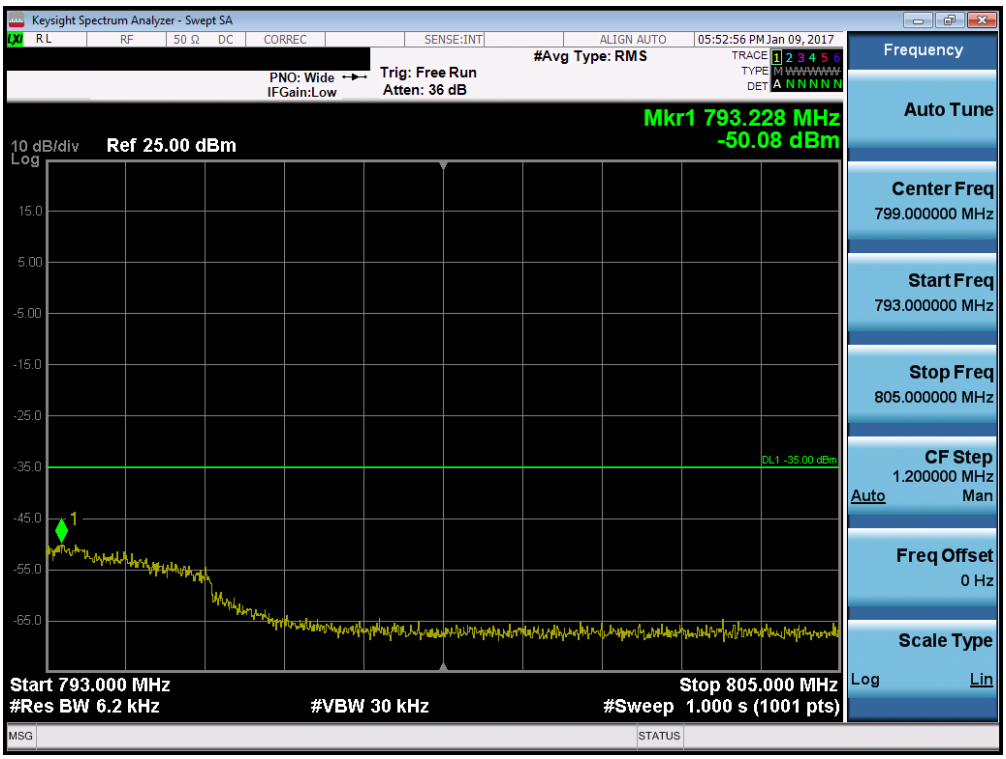
Plot 7-145. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-146. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

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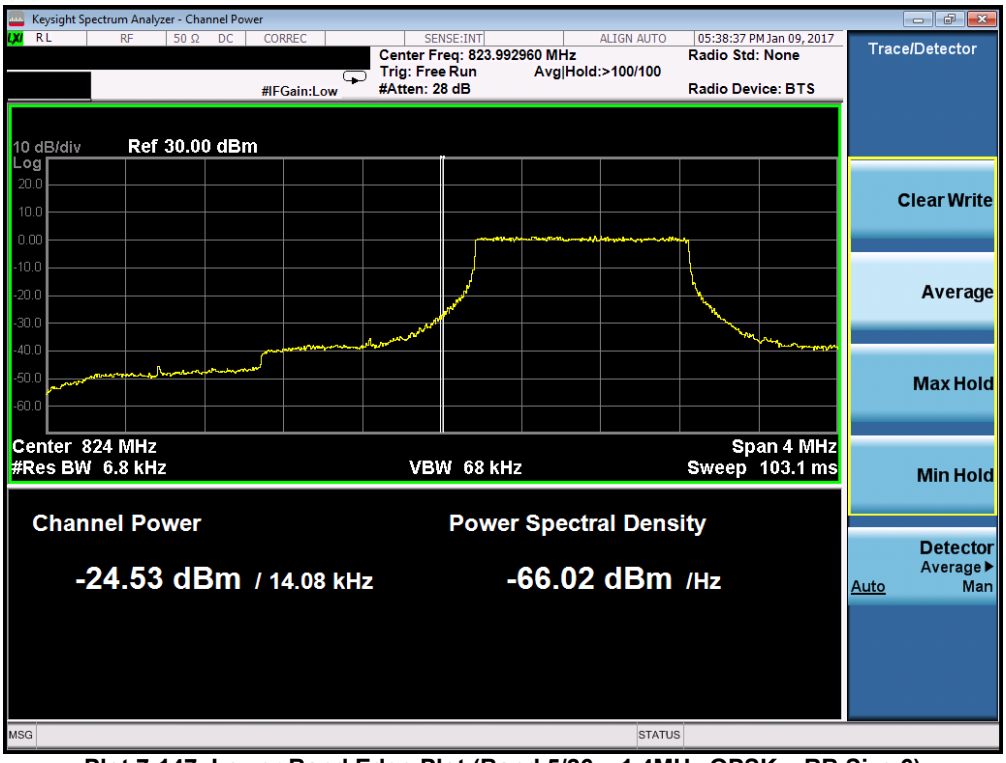

Plot 7-147. Lower Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)

Plot 7-148. Lower Extended Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)

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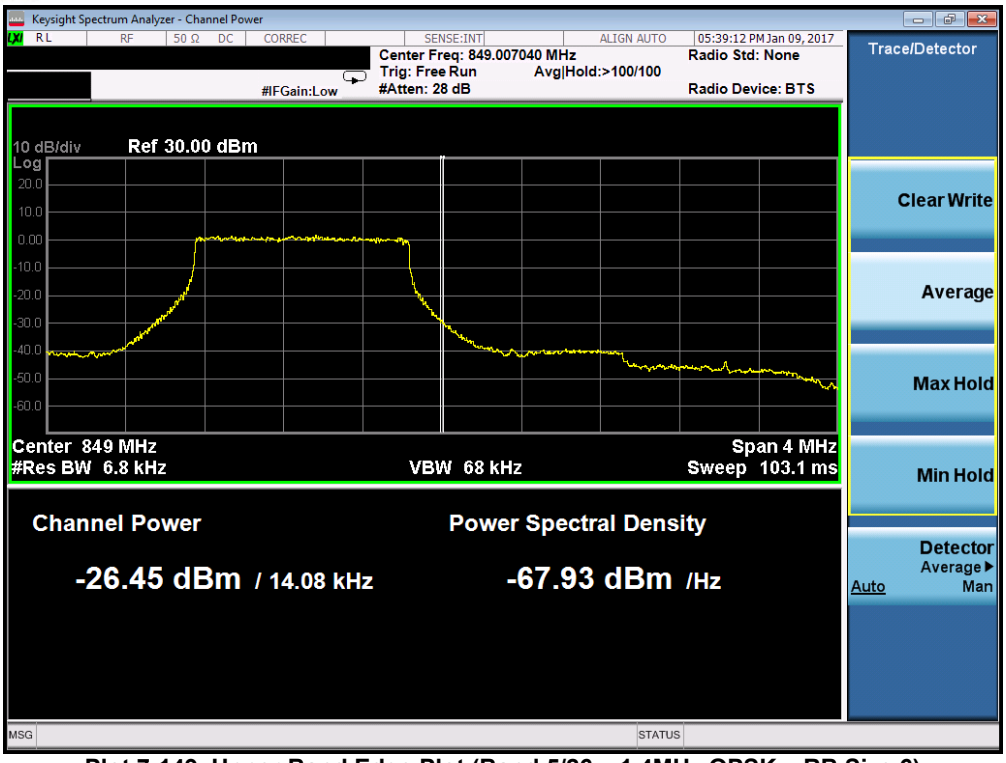

Plot 7-149. Upper Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)

Plot 7-150. Upper Extended Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)

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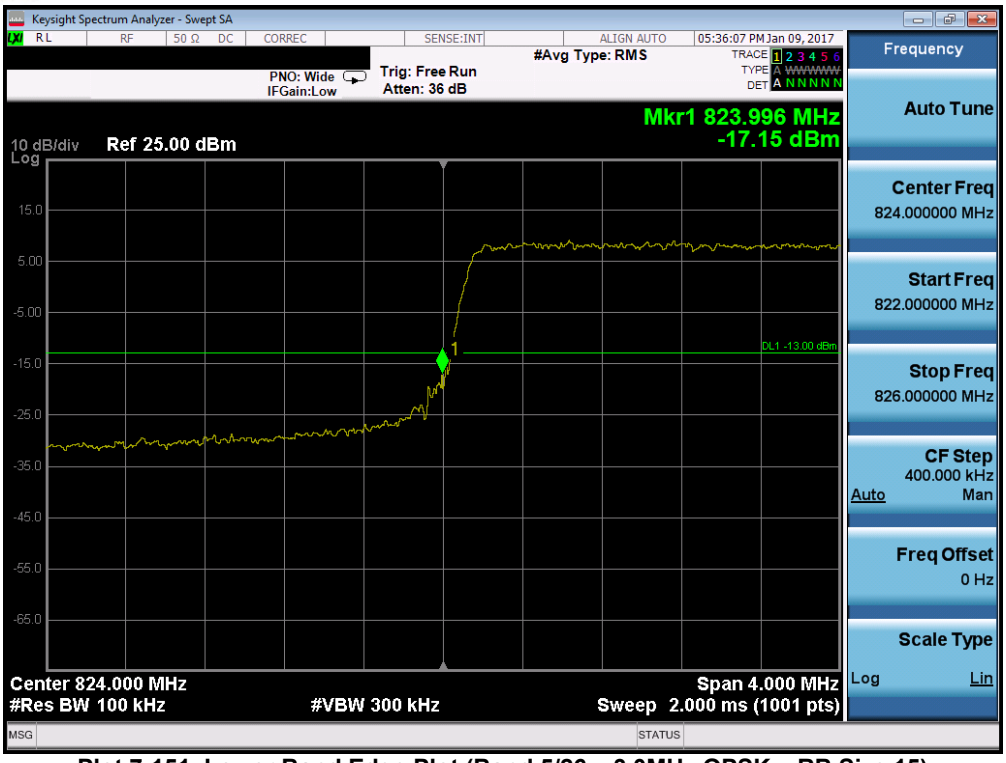

Plot 7-151. Lower Band Edge Plot (Band 5/26 – 3.0MHz QPSK – RB Size 15)

Plot 7-152. Upper Band Edge Plot (Band 5/26 – 3.0MHz QPSK – RB Size 15)

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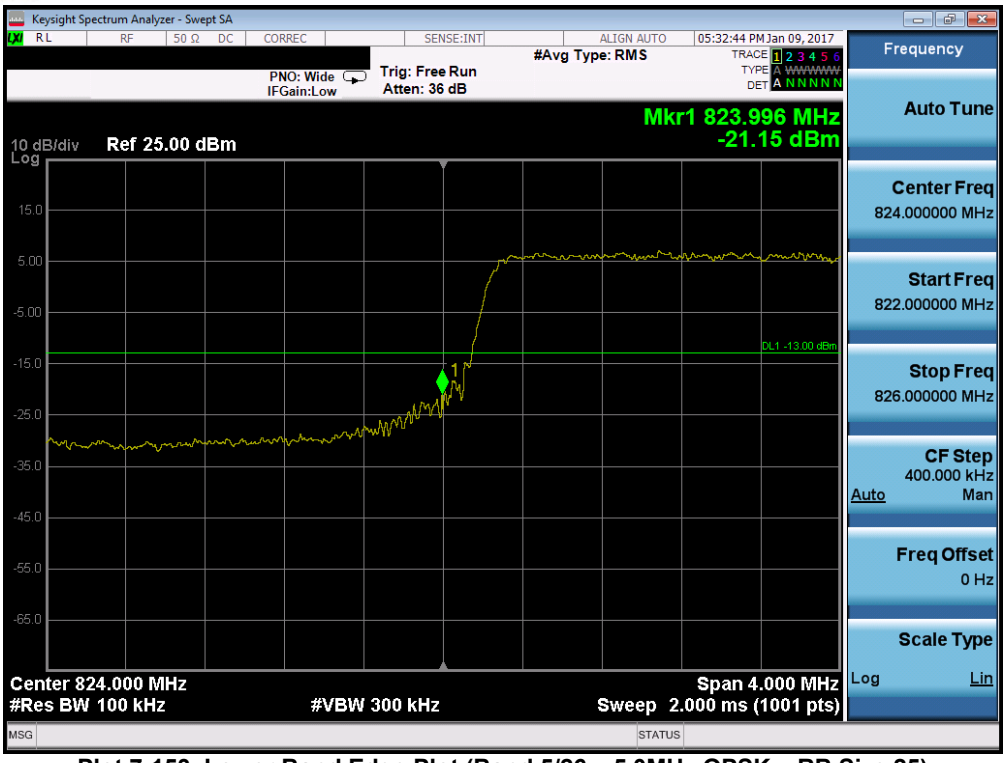
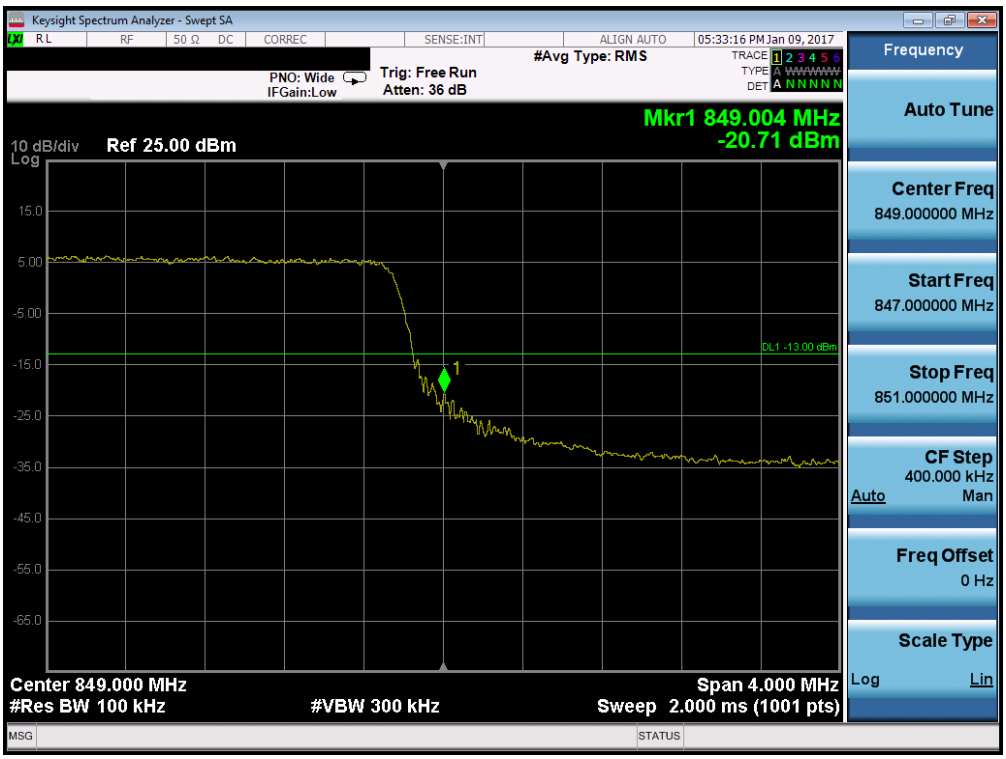


Plot 7-153. Lower Band Edge Plot (Band 5/26 – 5.0MHz QPSK – RB Size 25)



Plot 7-154. Upper Band Edge Plot (Band 5/26 – 5.0MHz QPSK – RB Size 25)

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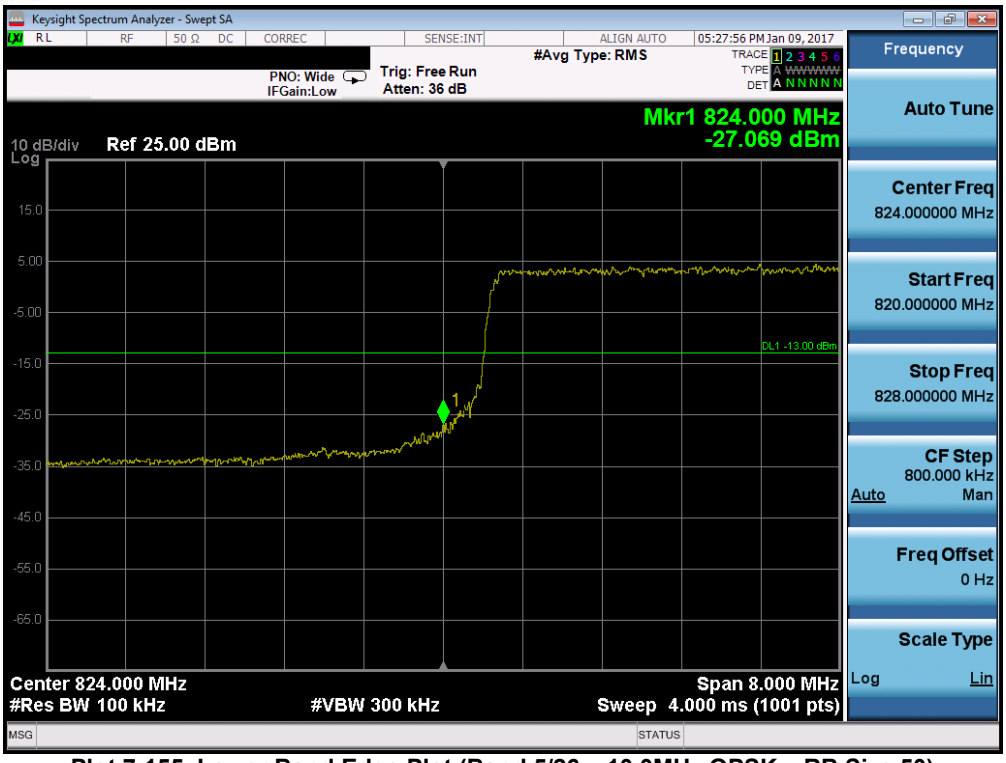
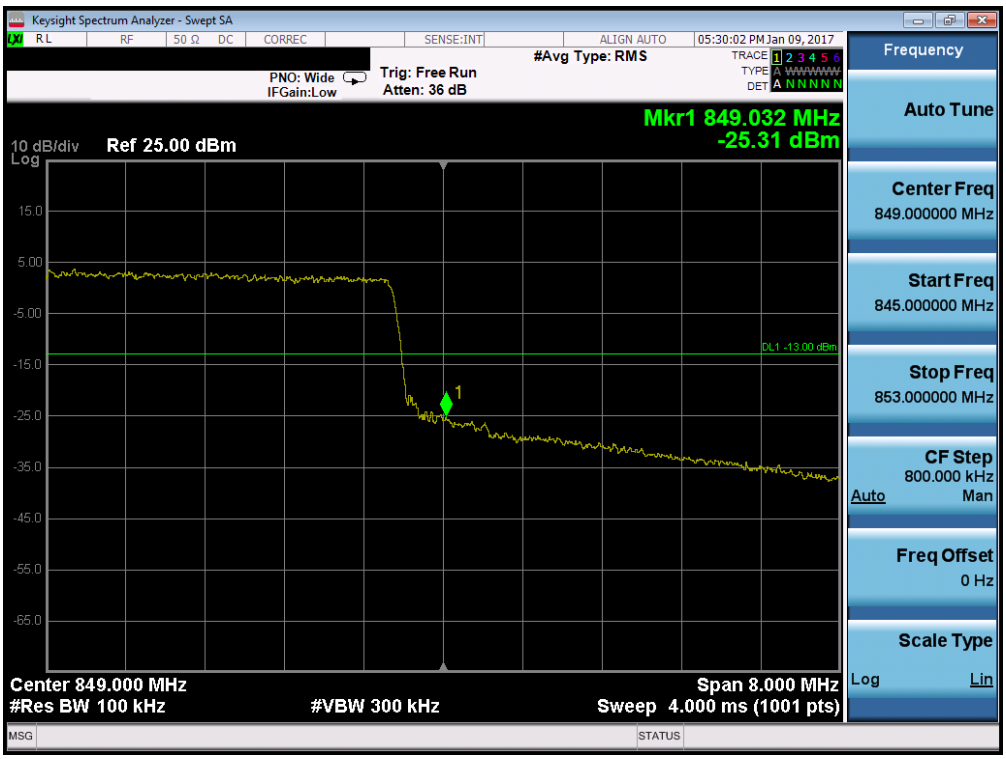


Plot 7-155. Lower Band Edge Plot (Band 5/26 – 10.0MHz QPSK – RB Size 50)



Plot 7-156. Upper Band Edge Plot (Band 5/26 – 10.0MHz QPSK – RB Size 50)

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Plot 7-157. Lower Band Edge Plot (Band 5/26 – 15.0MHz QPSK – RB Size 75)

Plot 7-158. Upper Band Edge Plot (Band 5/26 – 15.0MHz QPSK – RB Size 75)

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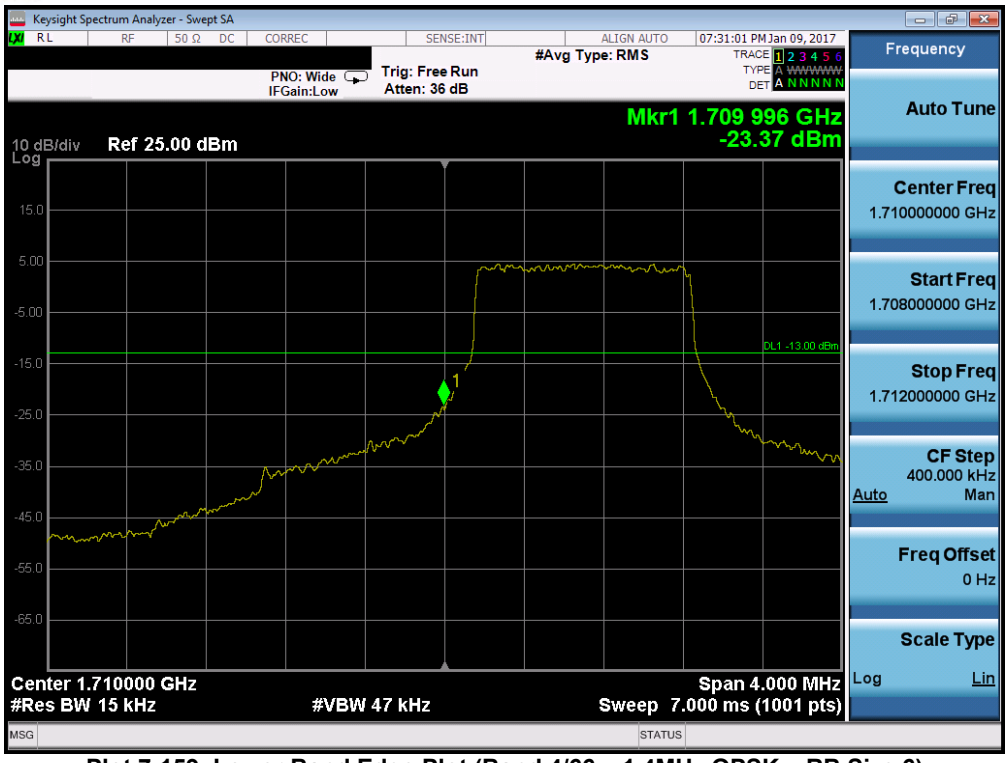
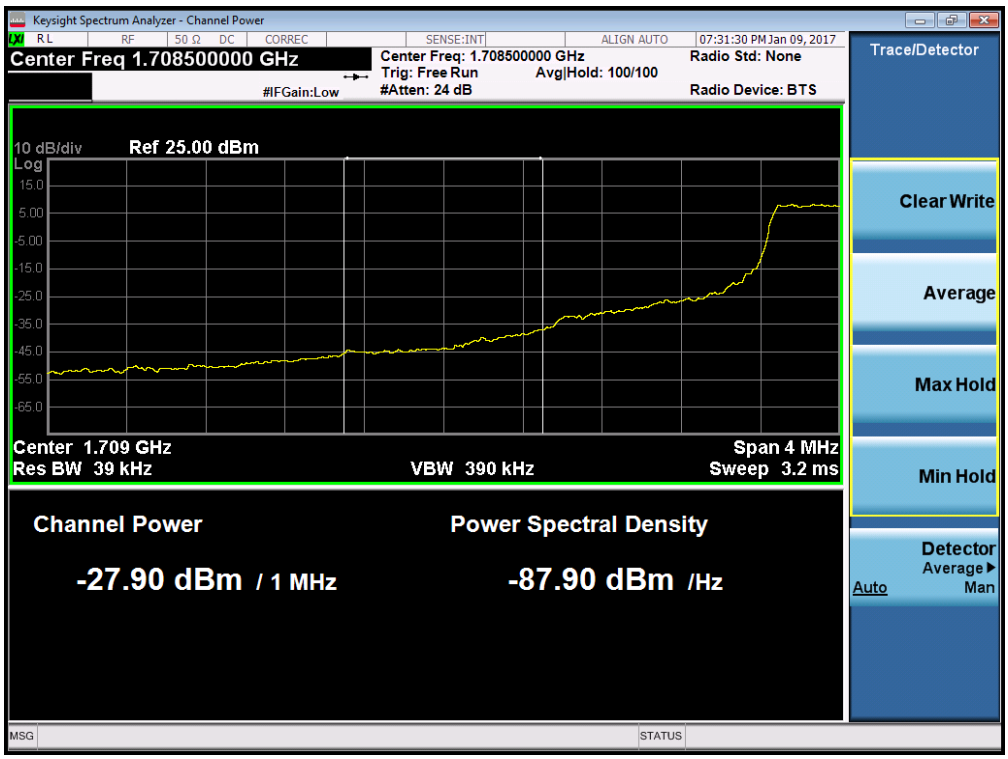


Plot 7-159. Lower Band Edge Plot (Band 4/66 – 1.4MHz QPSK – RB Size 6)



Plot 7-160. Lower Extended Band Edge Plot (Band 4/66 – 1.4MHz QPSK – RB Size 6)

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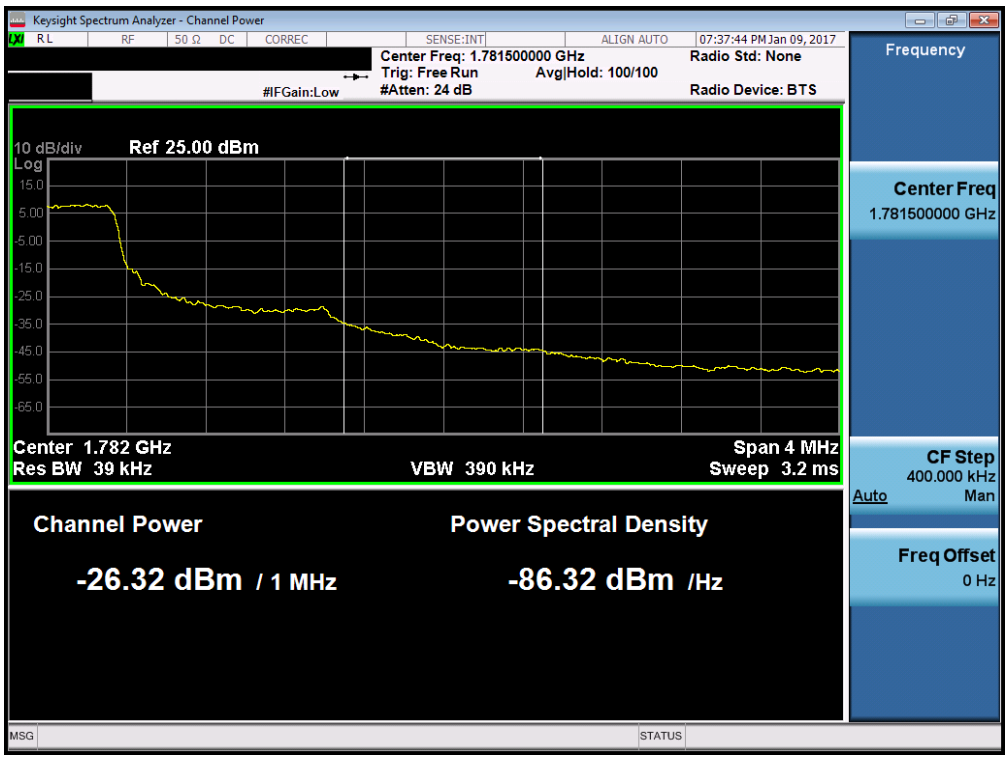
Plot 7-161. Upper Band Edge Plot (Band 4/66 – 1.4MHz QPSK – RB Size 6)



Plot 7-162. Upper Extended Band Edge Plot (Band 4/66 – 1.4MHz QPSK – RB Size 6)

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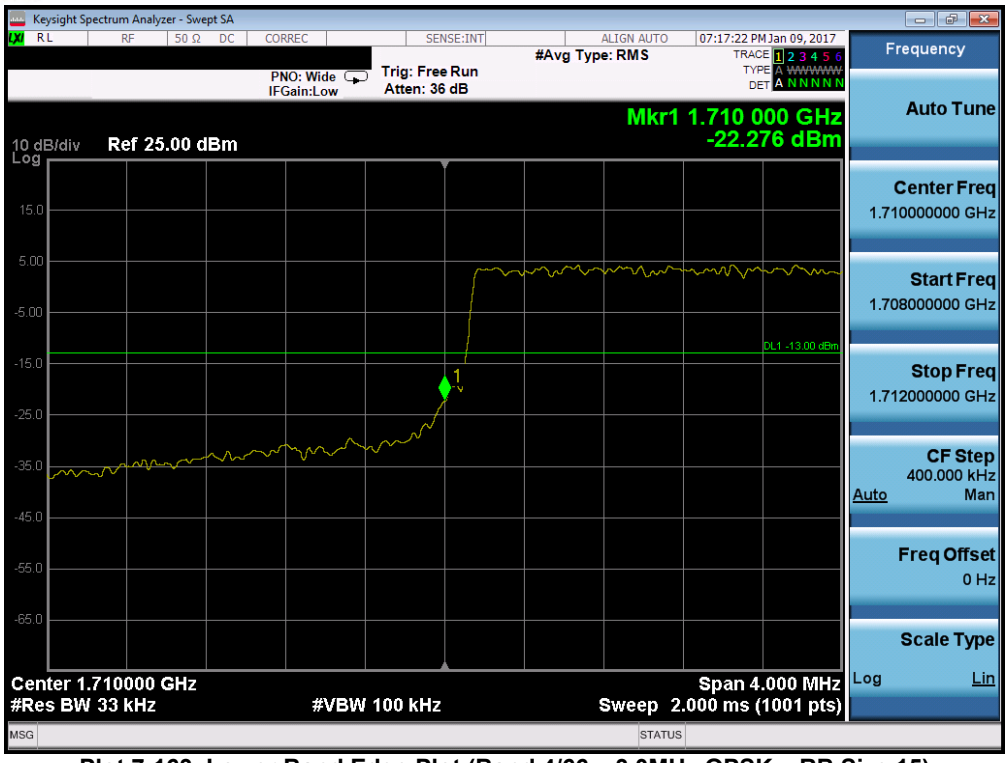
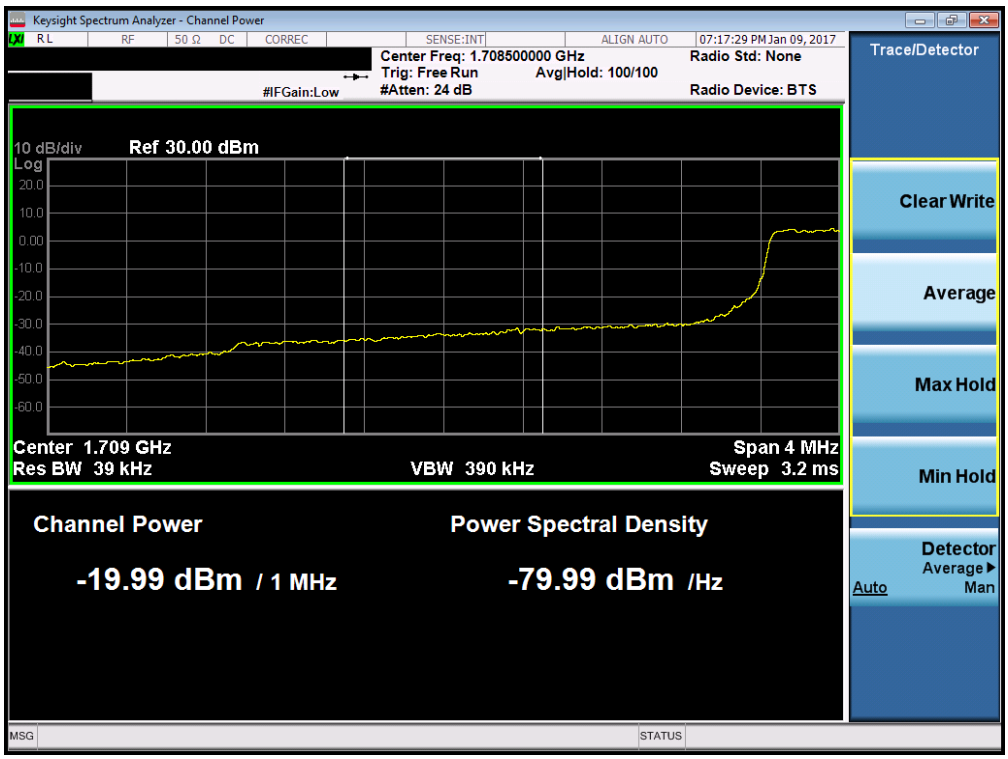


Plot 7-163. Lower Band Edge Plot (Band 4/66 – 3.0MHz QPSK – RB Size 15)



Plot 7-164. Lower Extended Band Edge Plot (Band 4/66 – 3.0MHz QPSK – RB Size 15)

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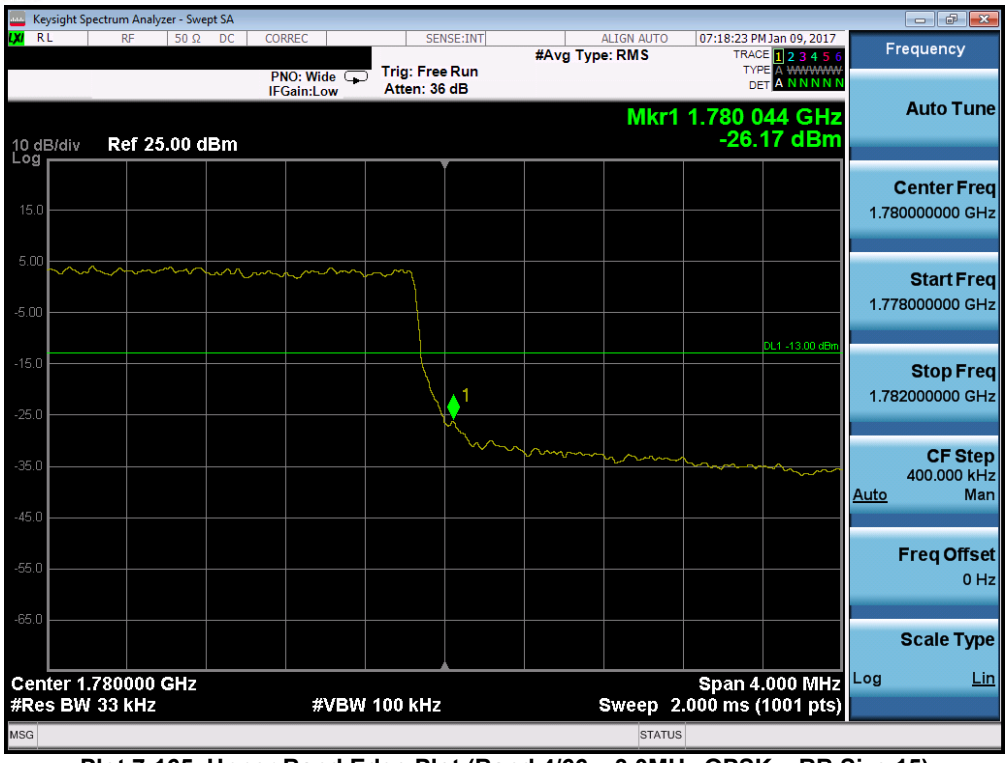
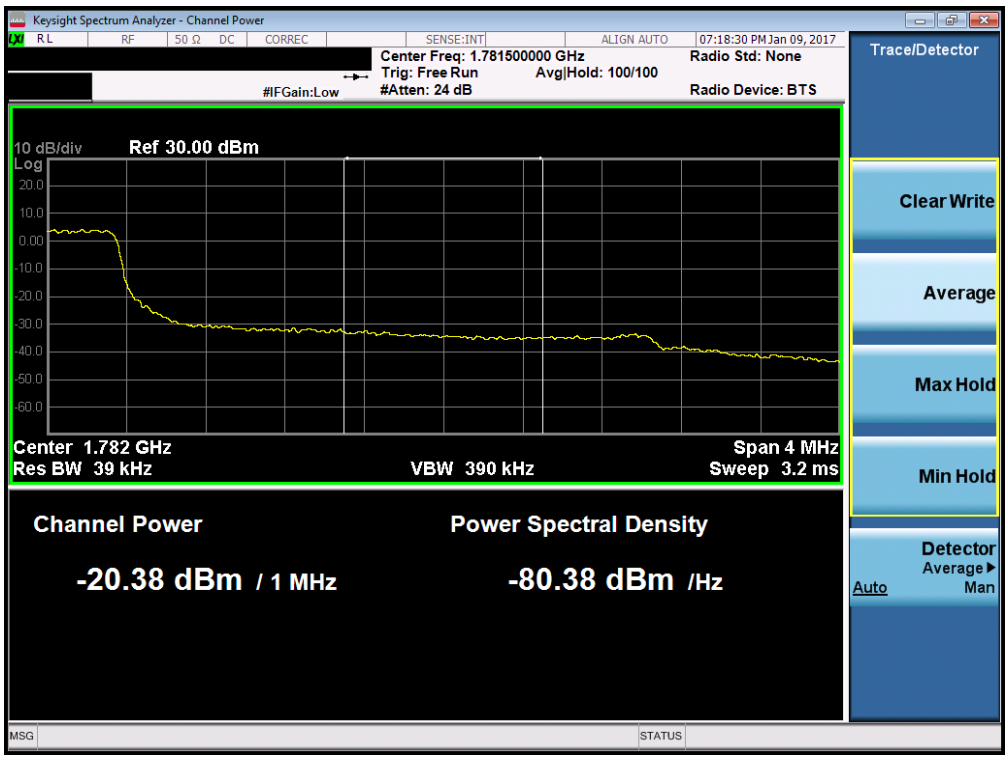


Plot 7-165. Upper Band Edge Plot (Band 4/66 – 3.0MHz QPSK – RB Size 15)



Plot 7-166. Upper Extended Band Edge Plot (Band 4/66 – 3.0MHz QPSK – RB Size 15)

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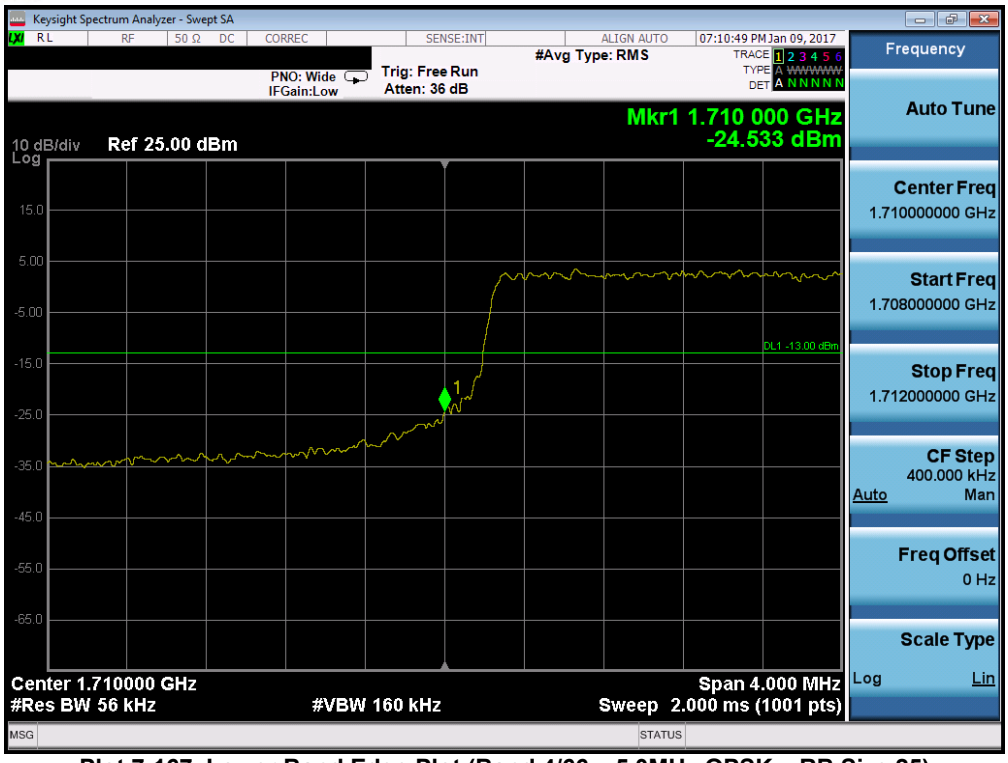
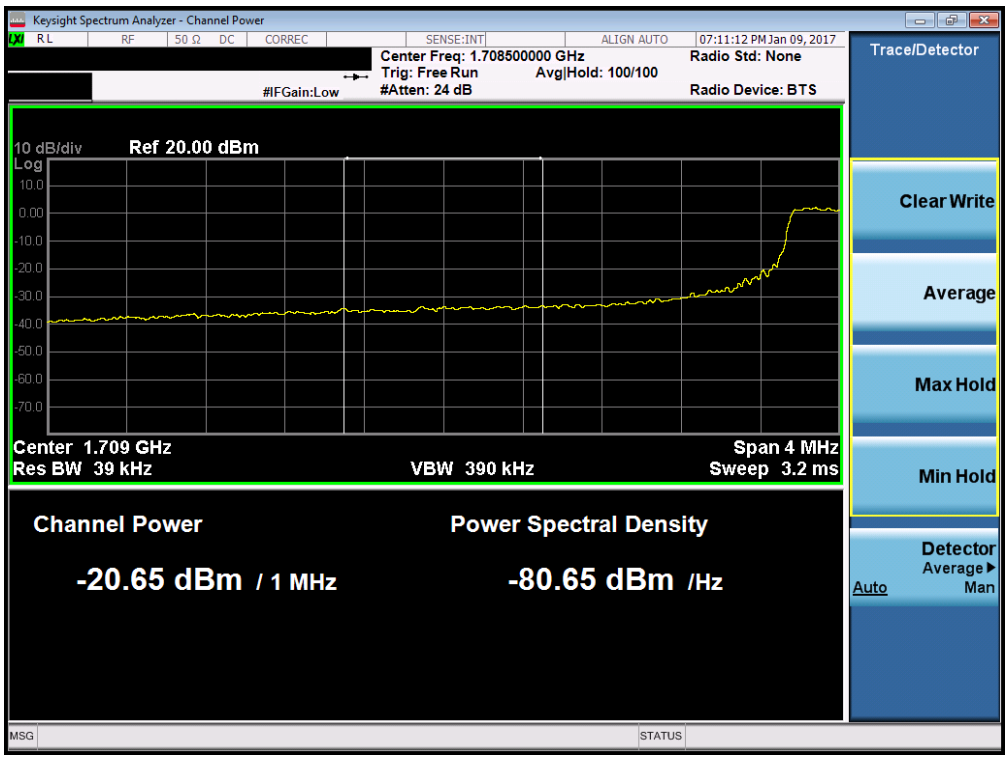


Plot 7-167. Lower Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)



Plot 7-168. Lower Extended Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)

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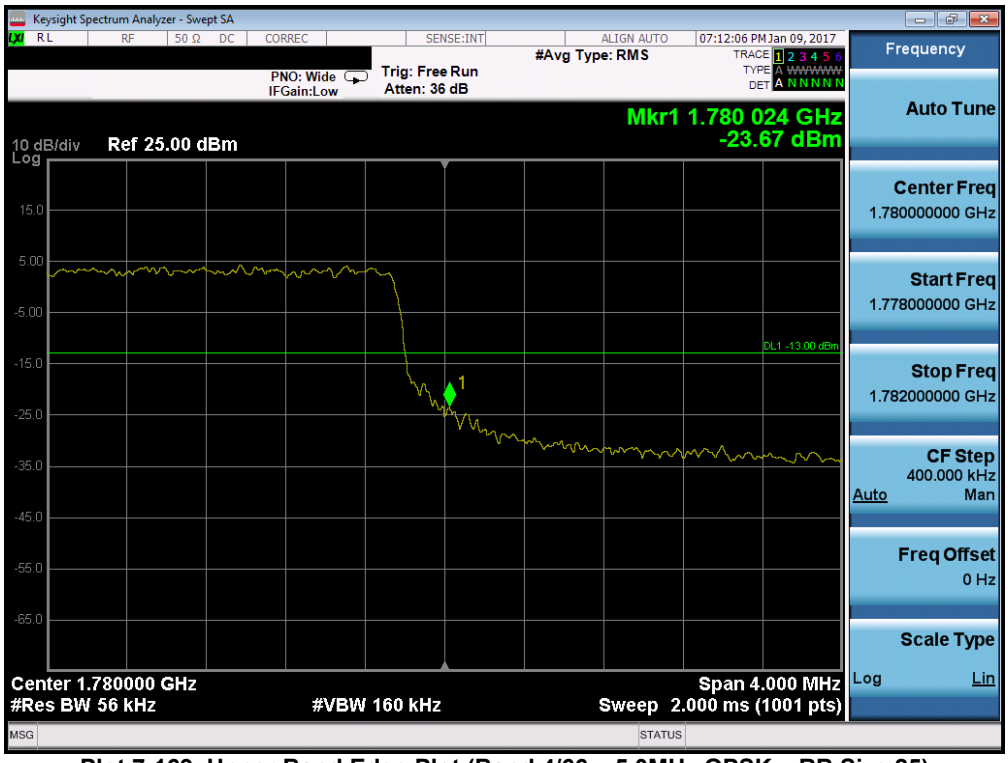
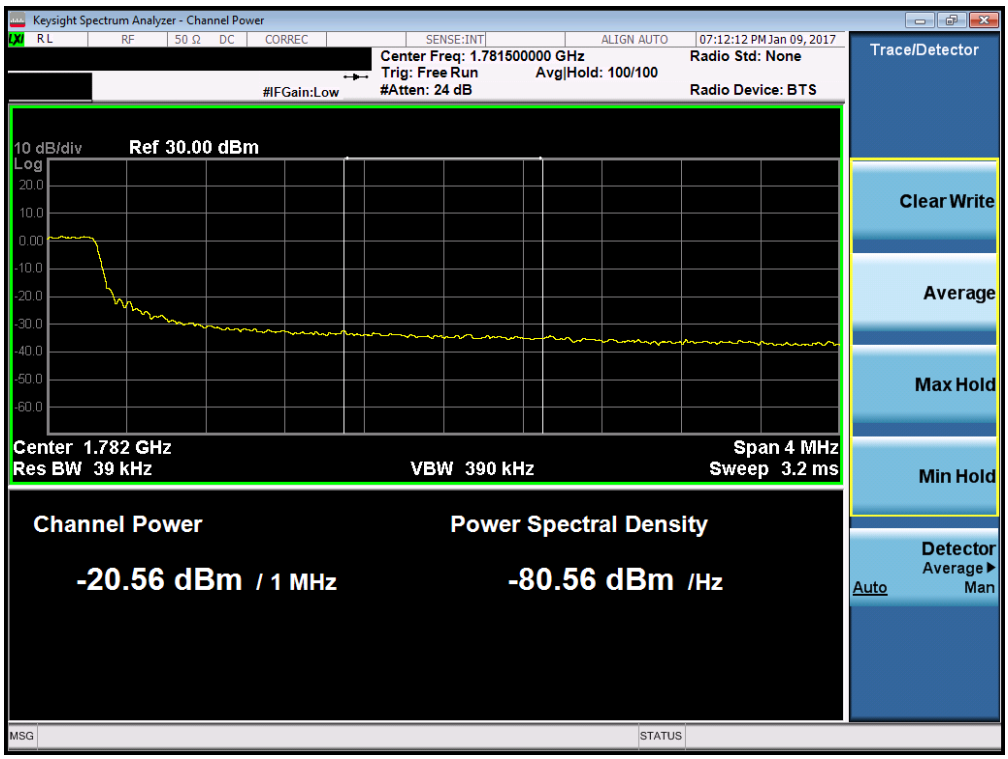


Plot 7-169. Upper Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)



Plot 7-170. Upper Extended Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)

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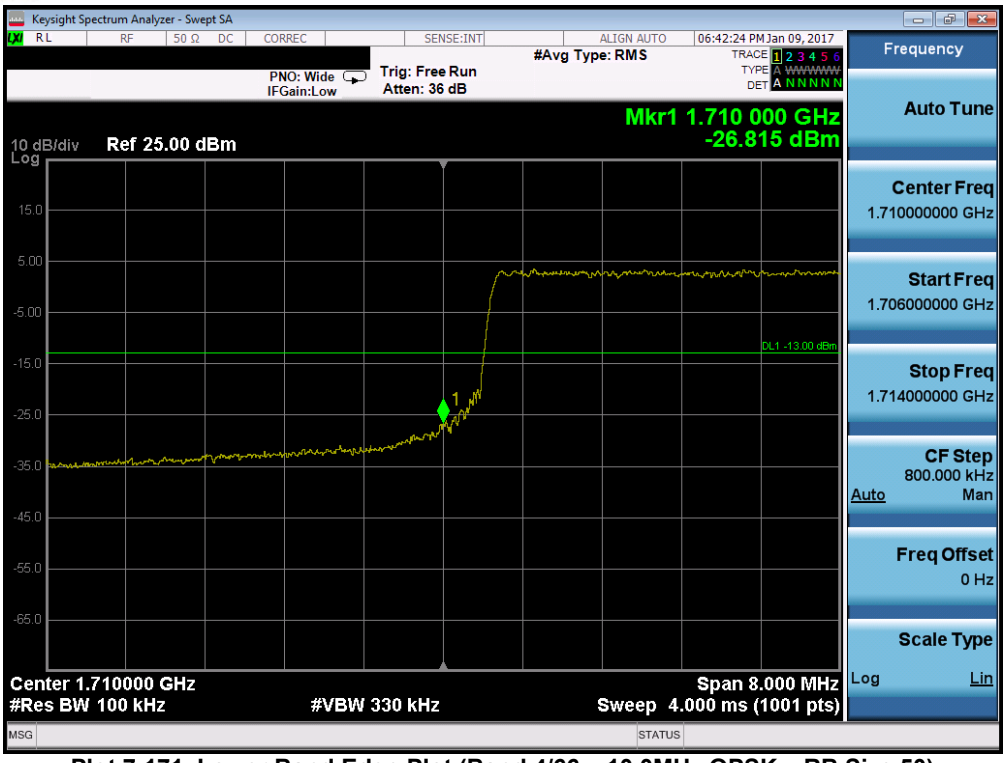
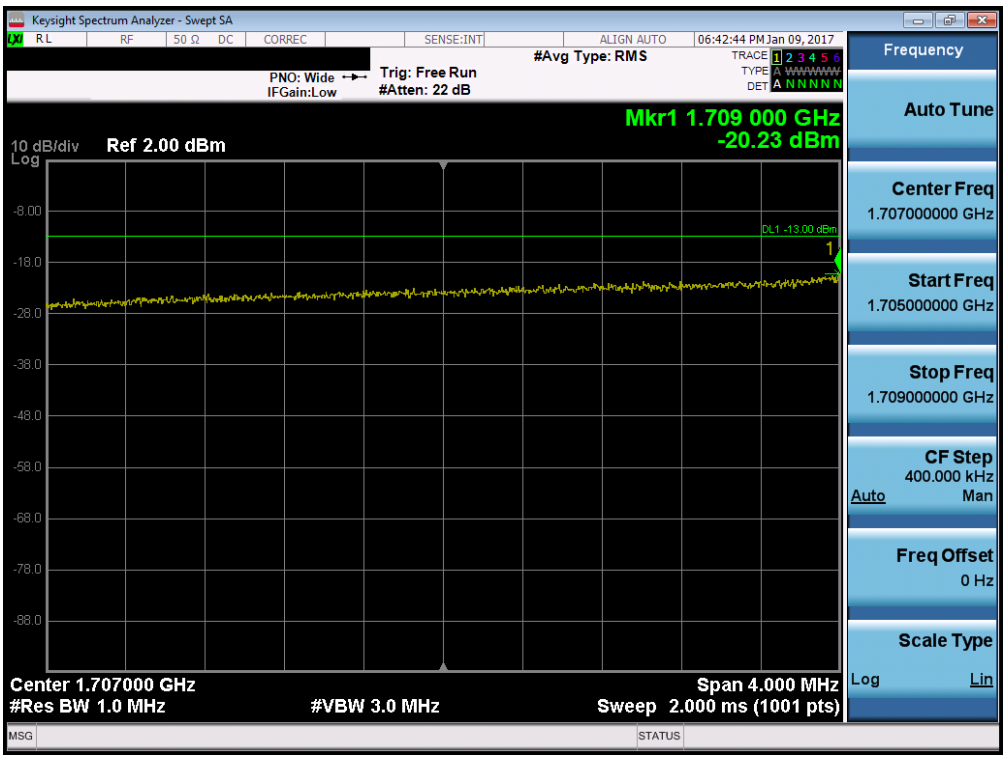


Plot 7-171. Lower Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)



Plot 7-172. Lower Extended Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)

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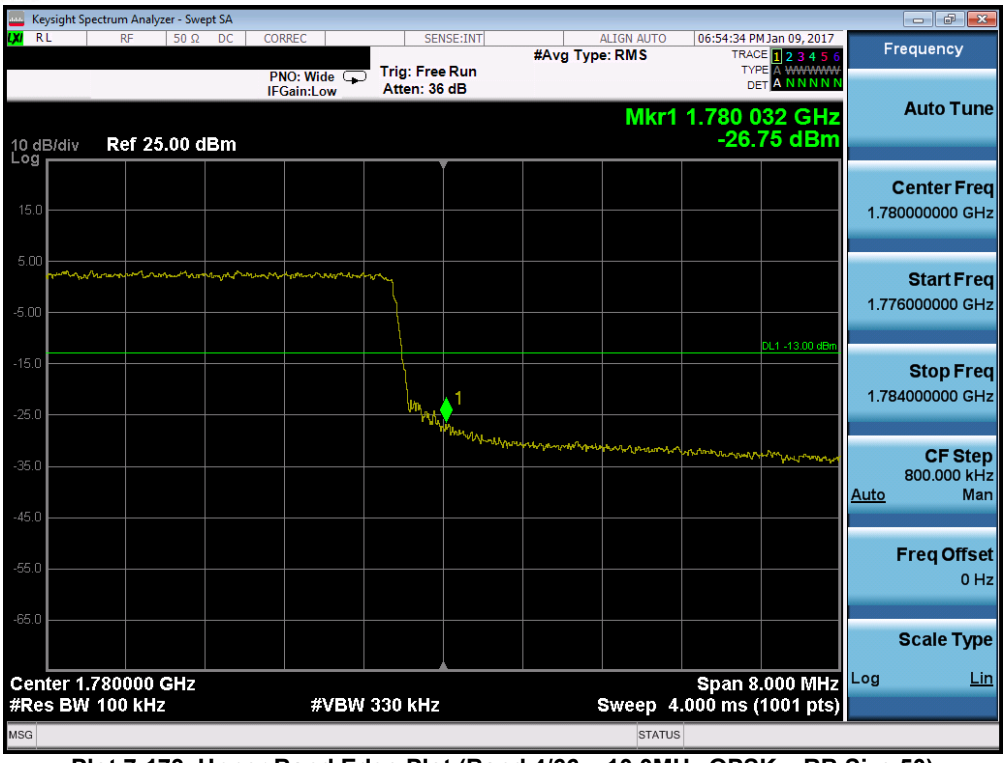
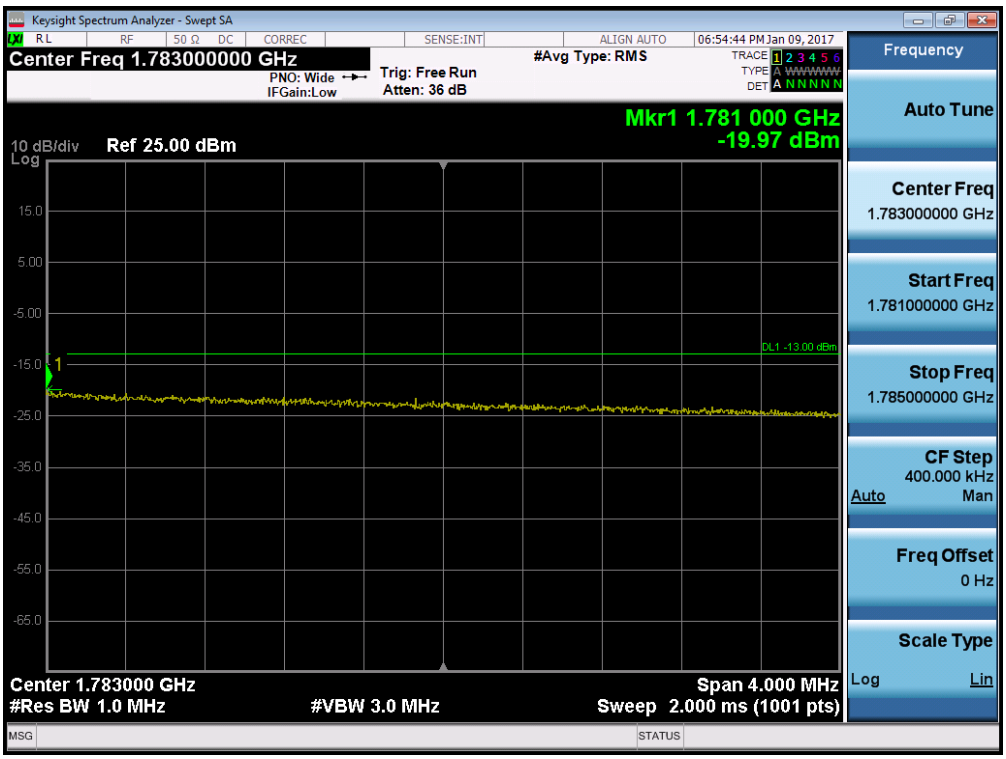


Plot 7-173. Upper Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)



Plot 7-174. Upper Extended Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)

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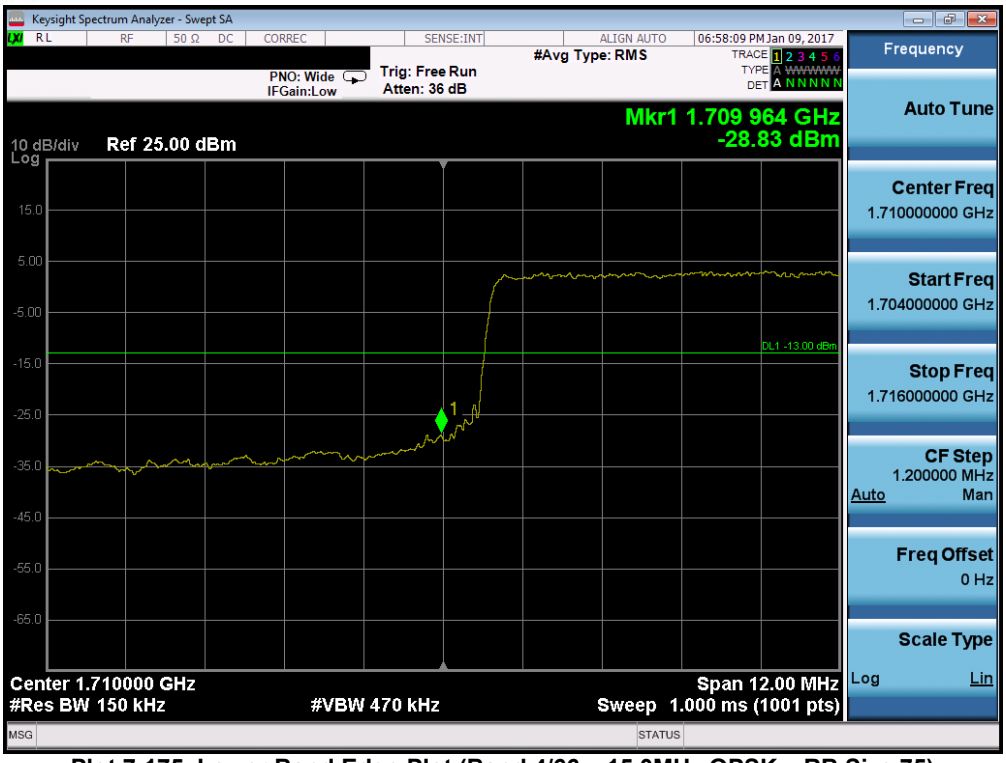
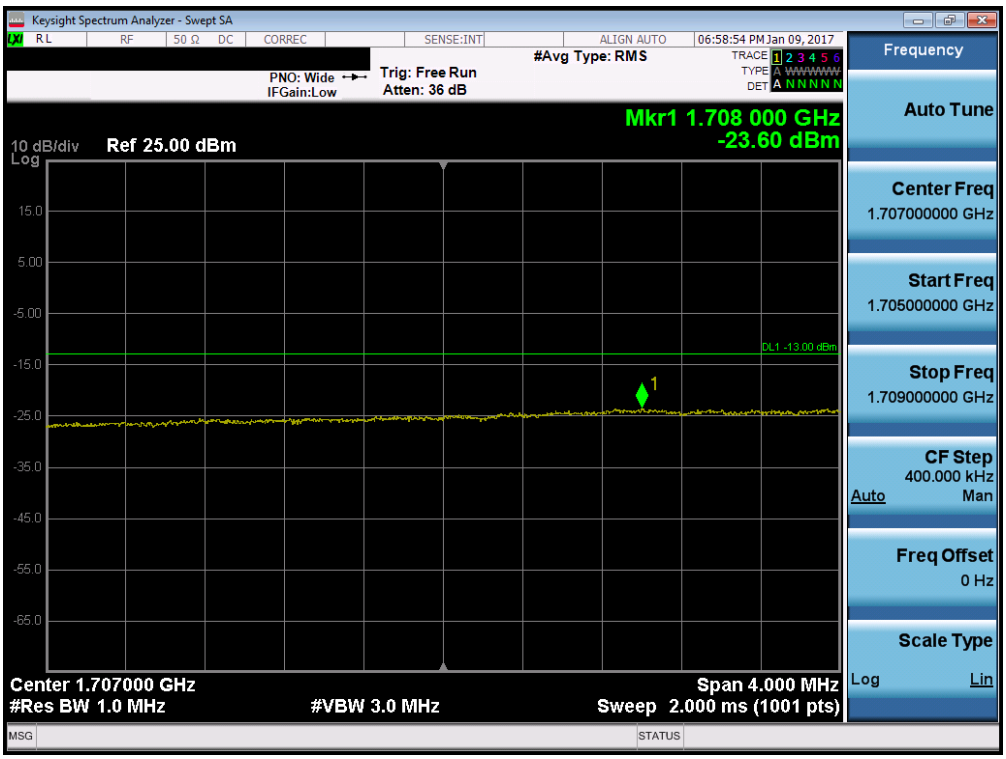


Plot 7-175. Lower Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)



Plot 7-176. Lower Extended Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)

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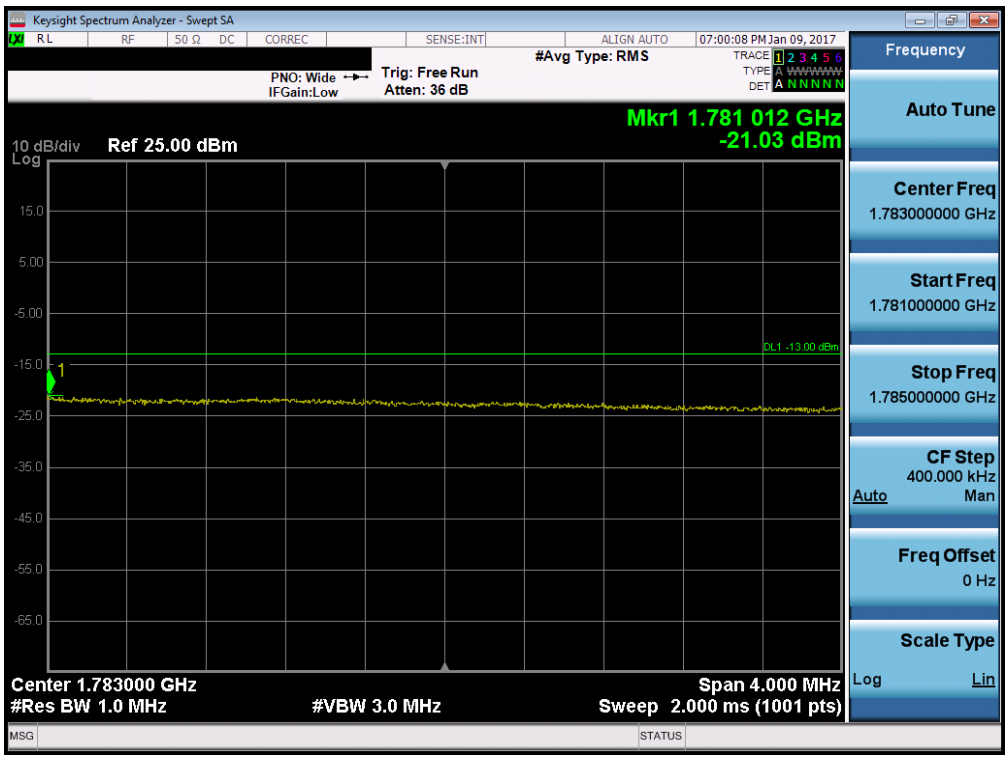
Plot 7-177. Upper Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)



Plot 7-178. Upper Extended Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)

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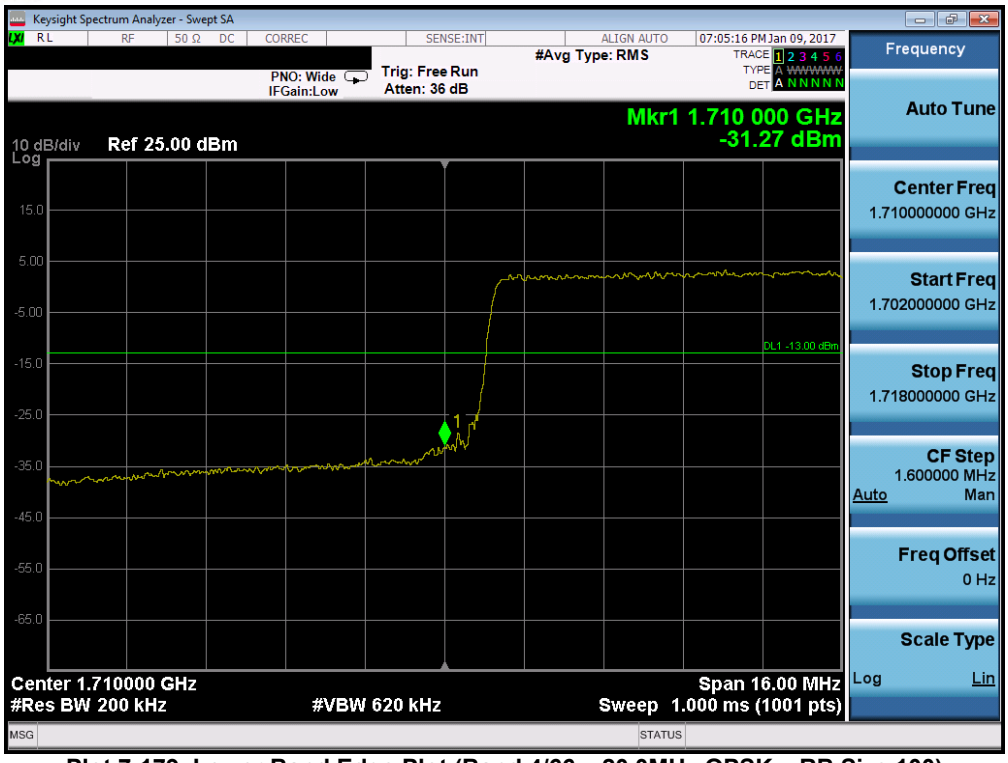
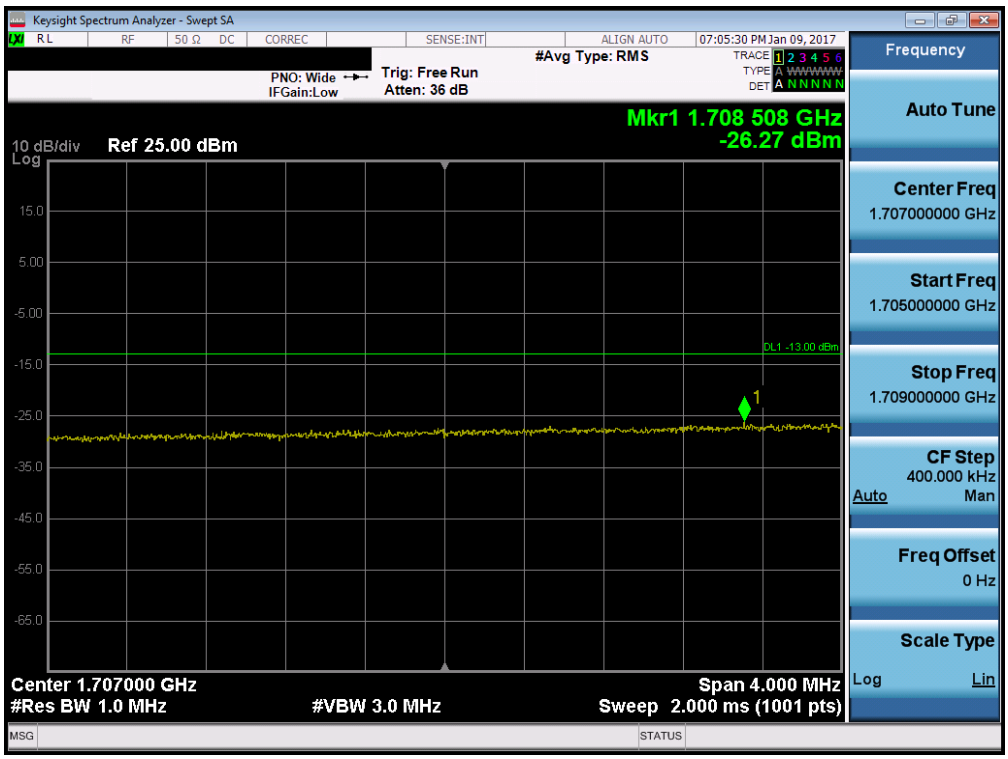


Plot 7-179. Lower Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)



Plot 7-180. Lower Extended Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)

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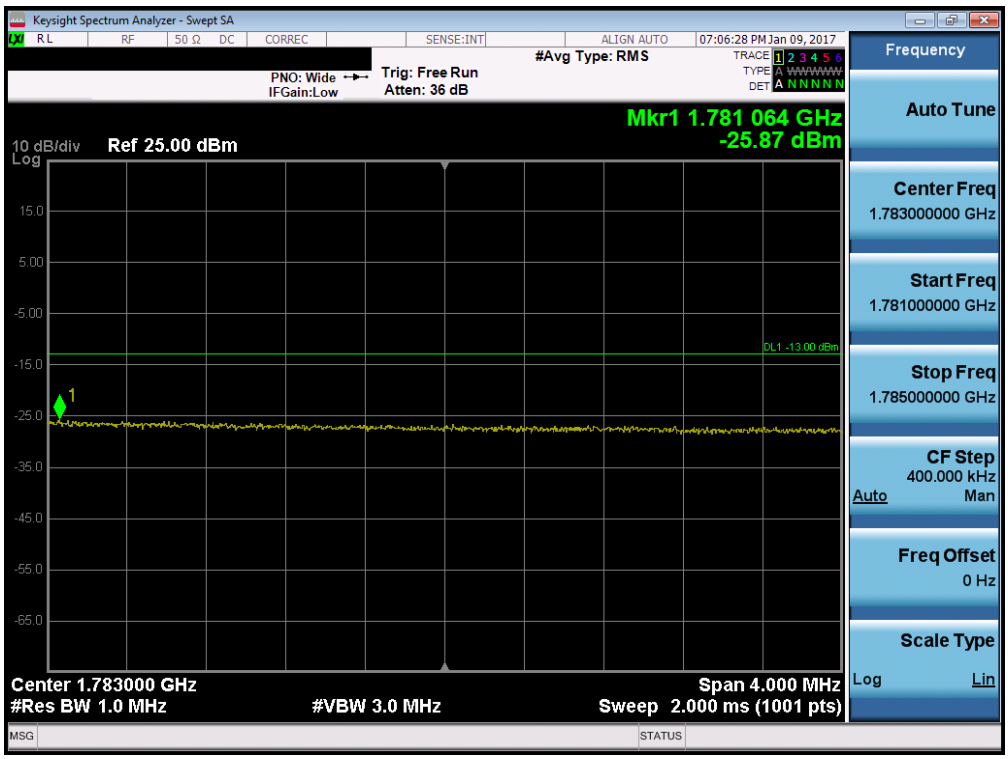
Plot 7-181. Upper Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)



Plot 7-182. Upper Extended Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)

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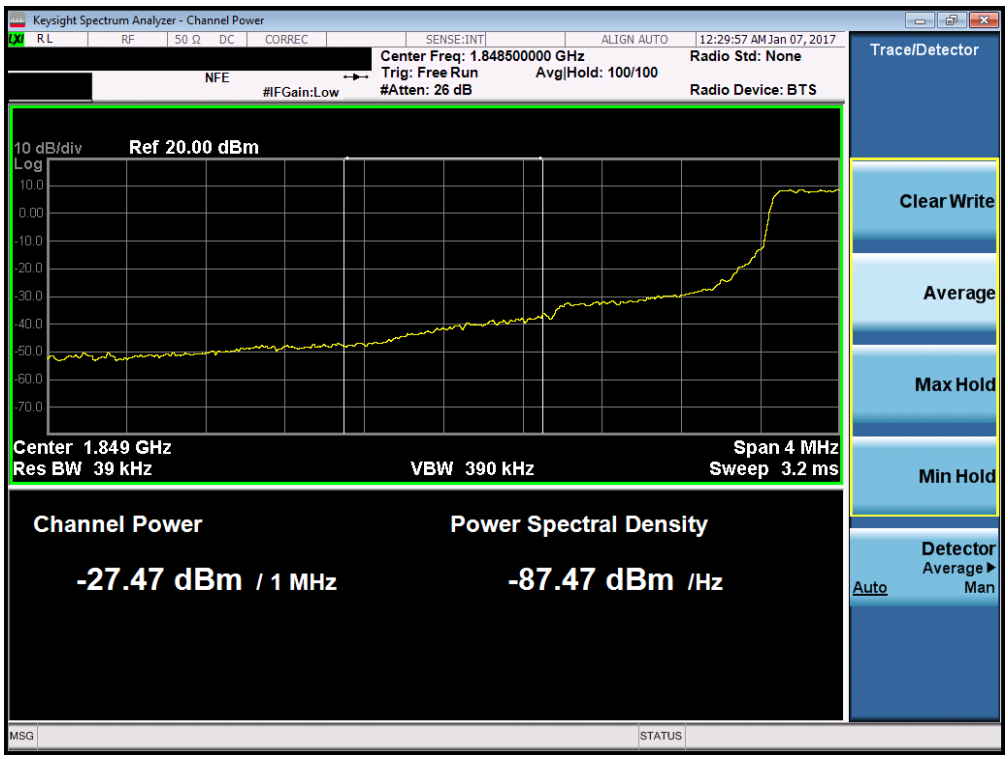
Plot 7-183. Lower Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-184. Lower Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

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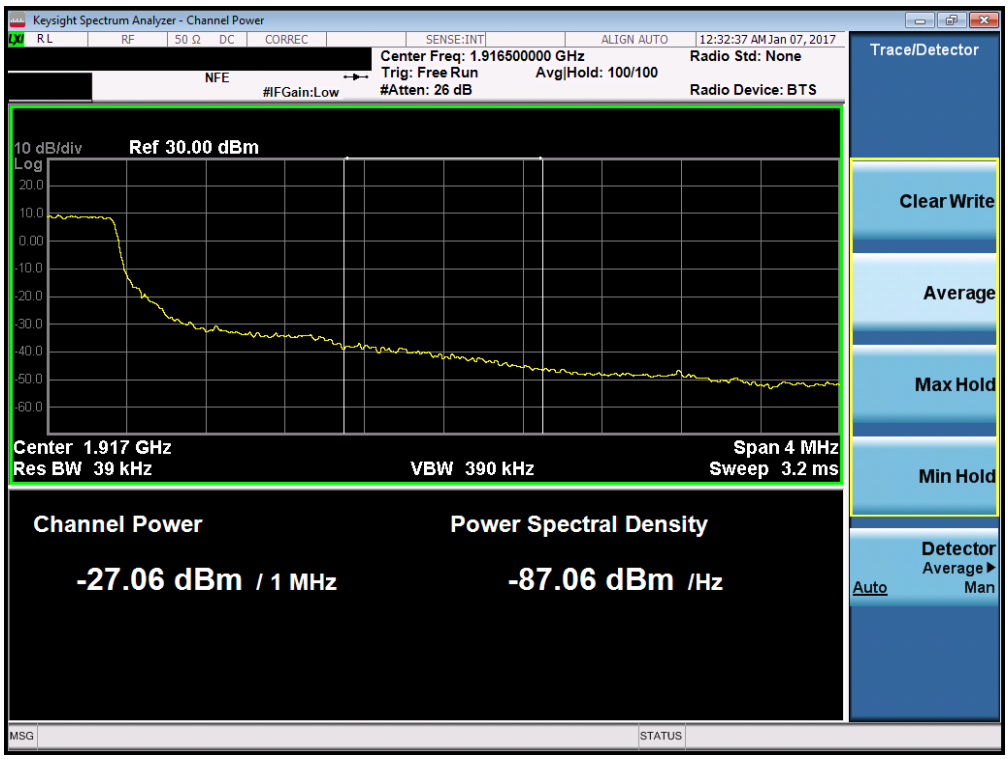
Plot 7-185. Upper Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-186. Upper Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

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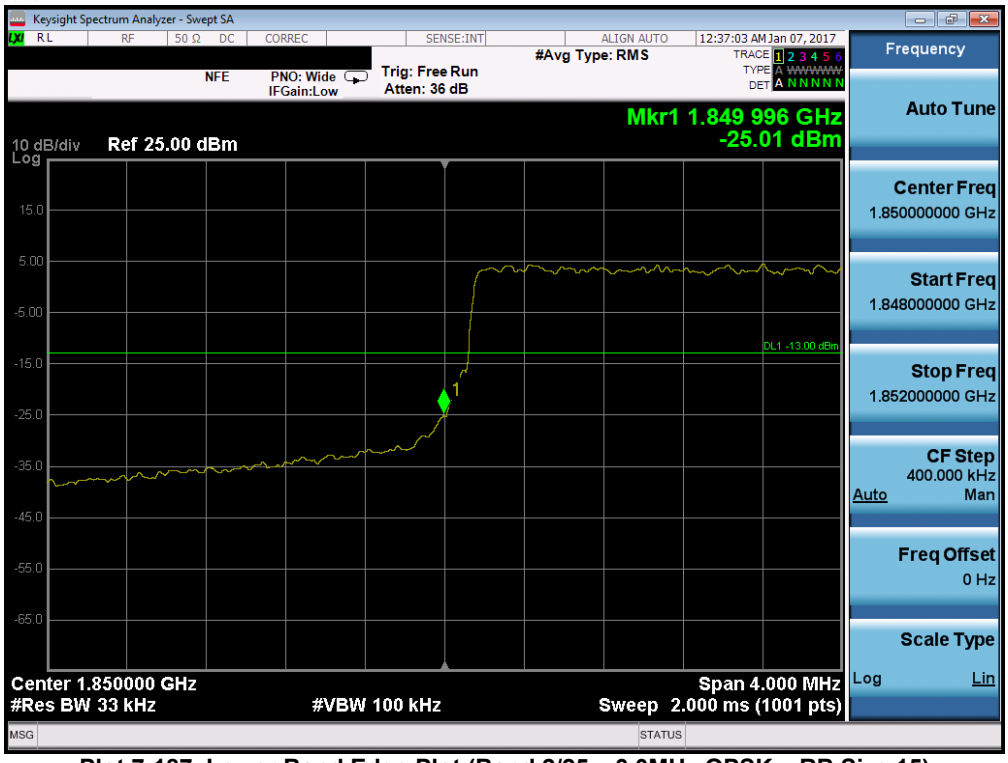
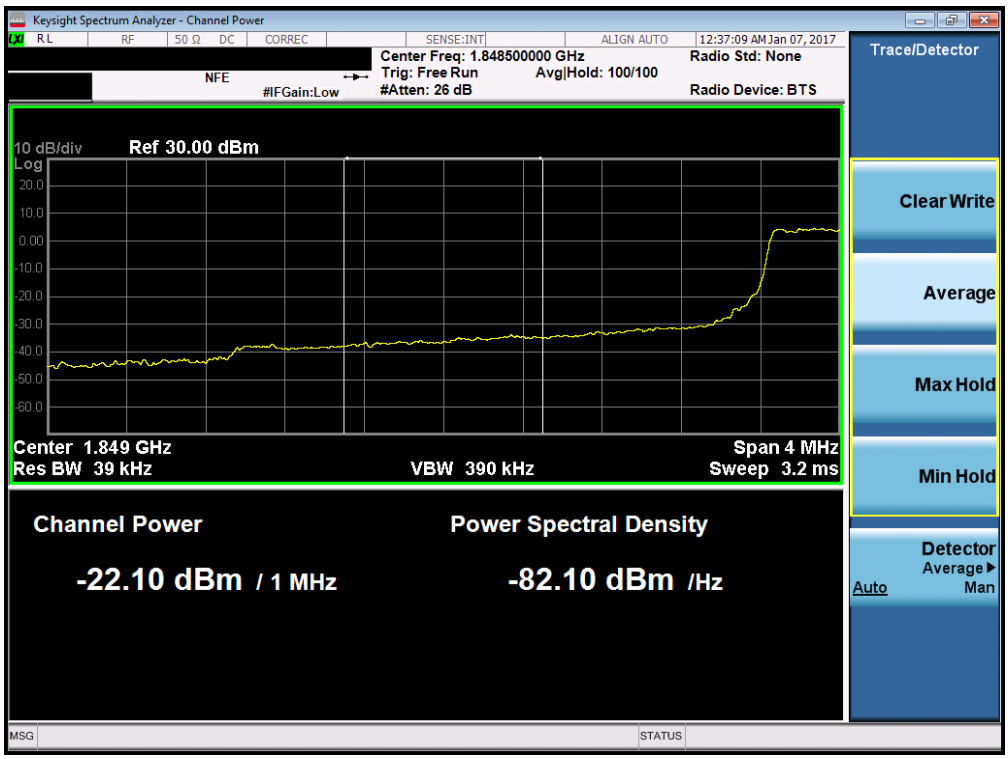


Plot 7-187. Lower Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



Plot 7-188. Lower Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

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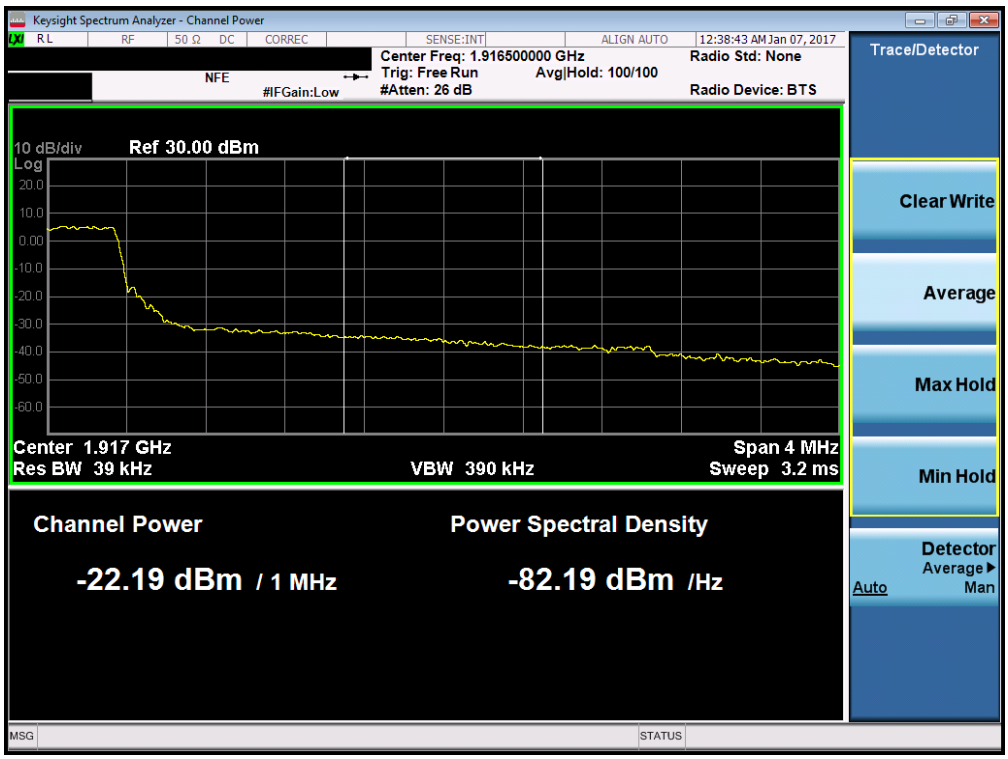
Plot 7-189. Upper Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



Plot 7-190. Upper Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

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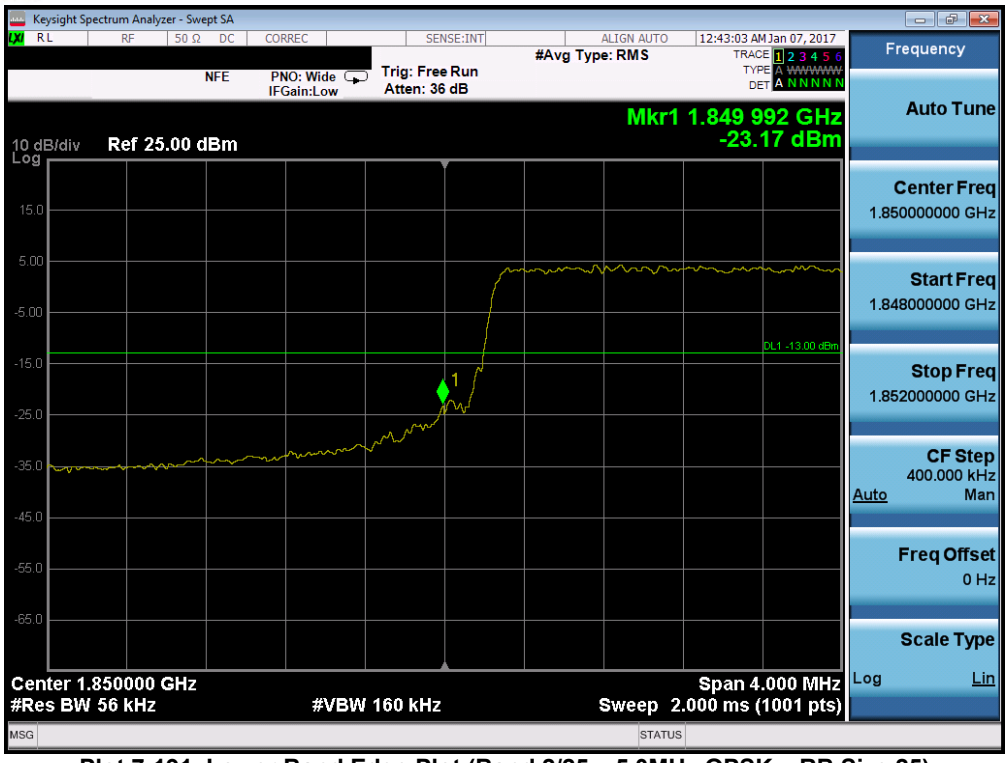
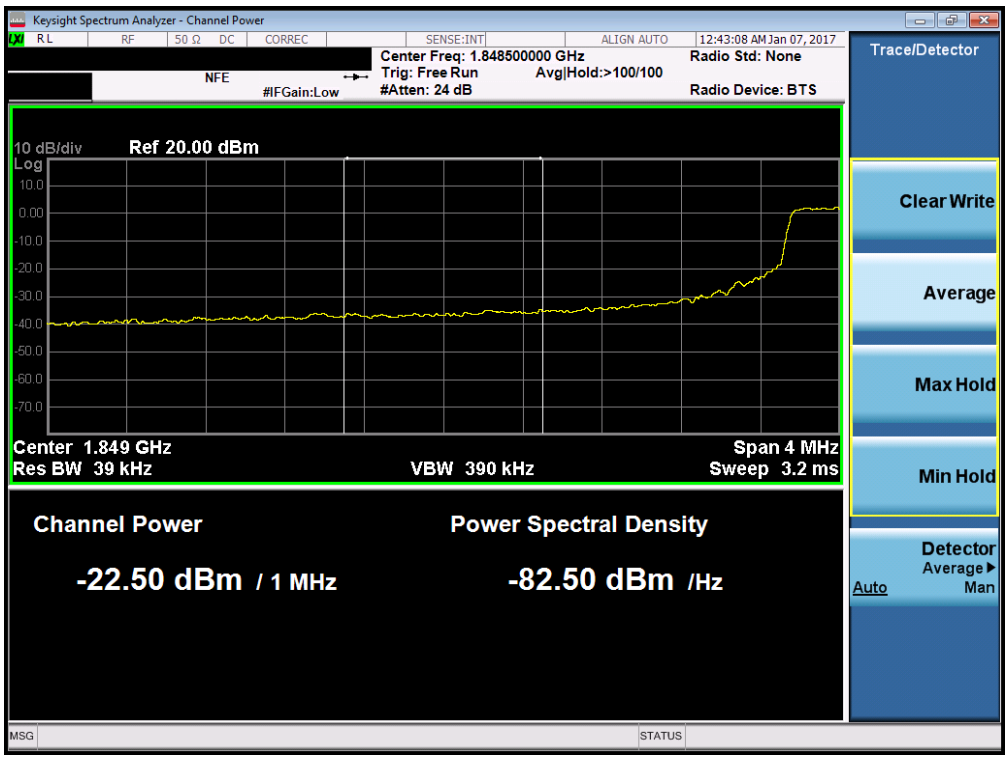


Plot 7-191. Lower Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)



Plot 7-192. Lower Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

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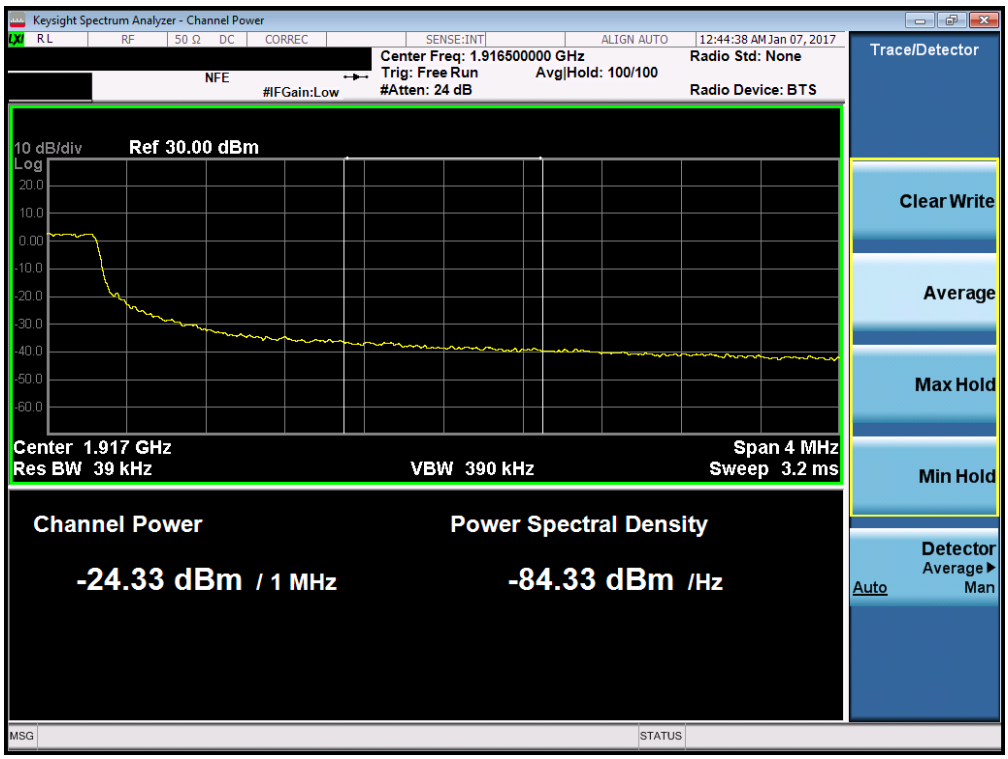
Plot 7-193. Upper Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)



Plot 7-194. Upper Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

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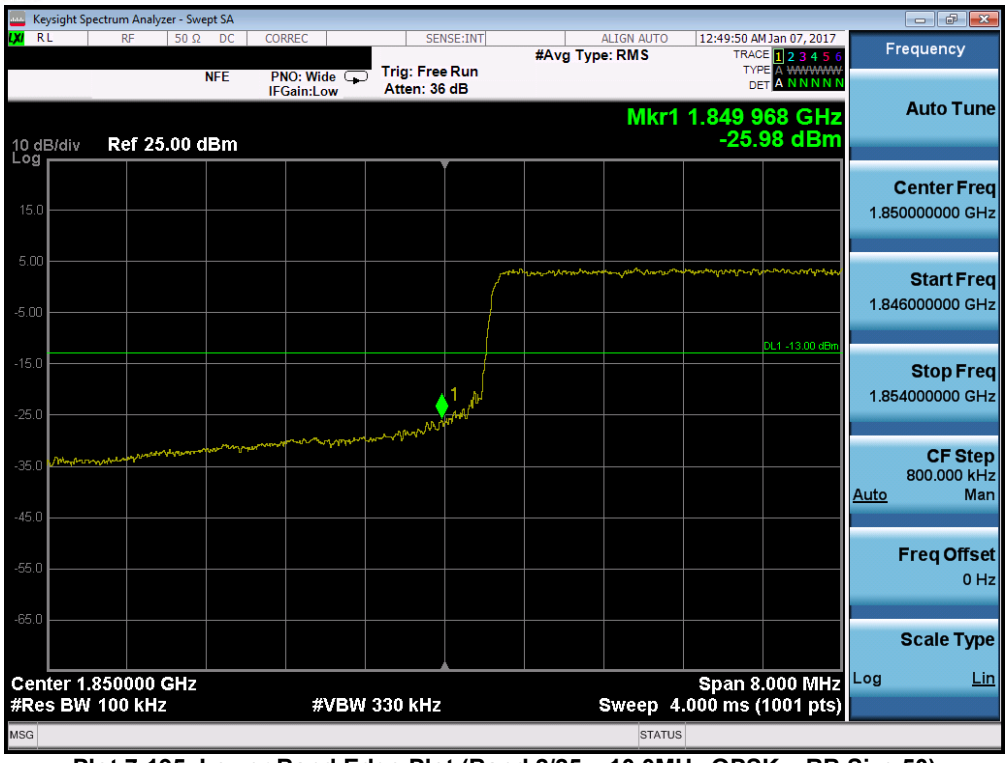
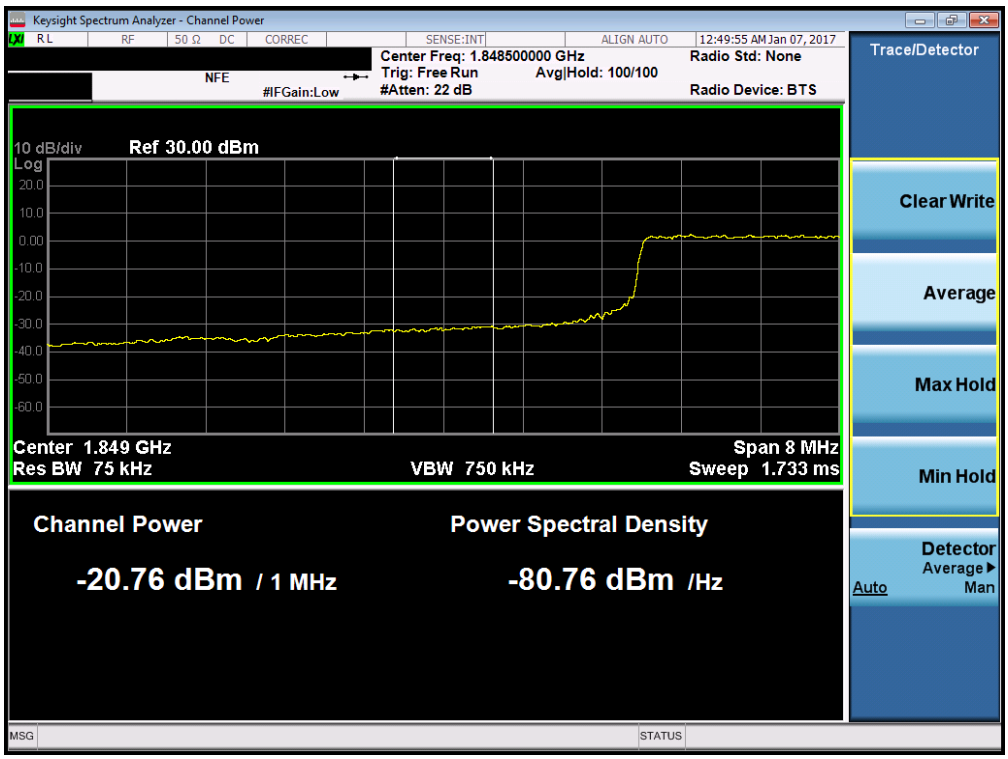


Plot 7-195. Lower Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)



Plot 7-196. Lower Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

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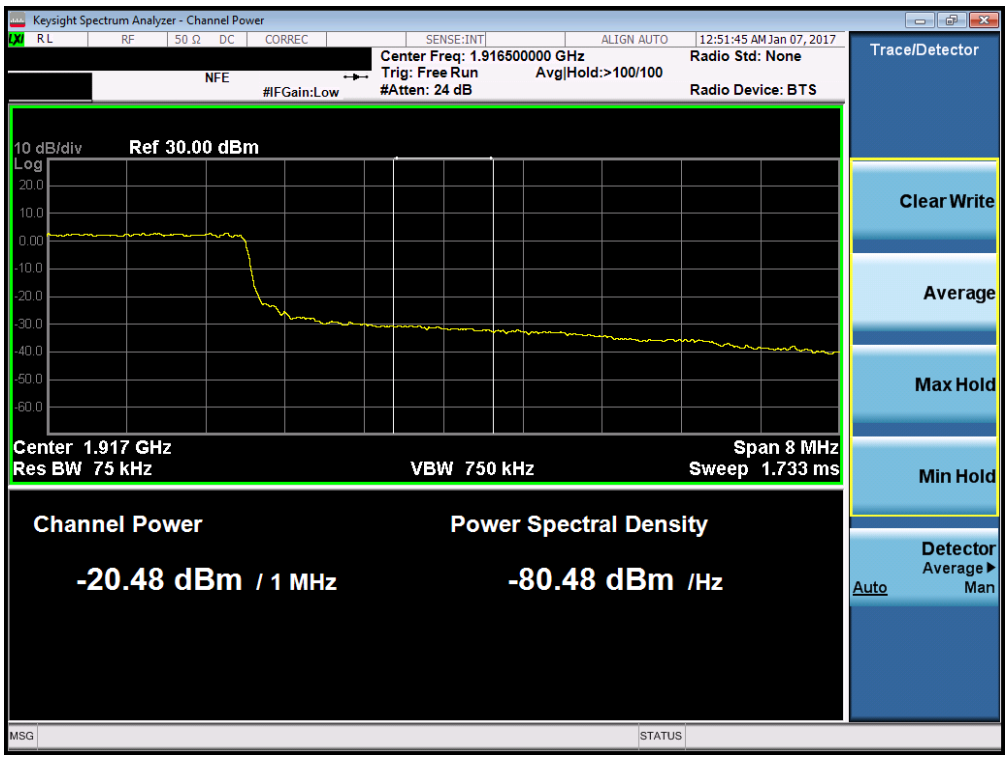
Plot 7-197. Upper Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)



Plot 7-198. Upper Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

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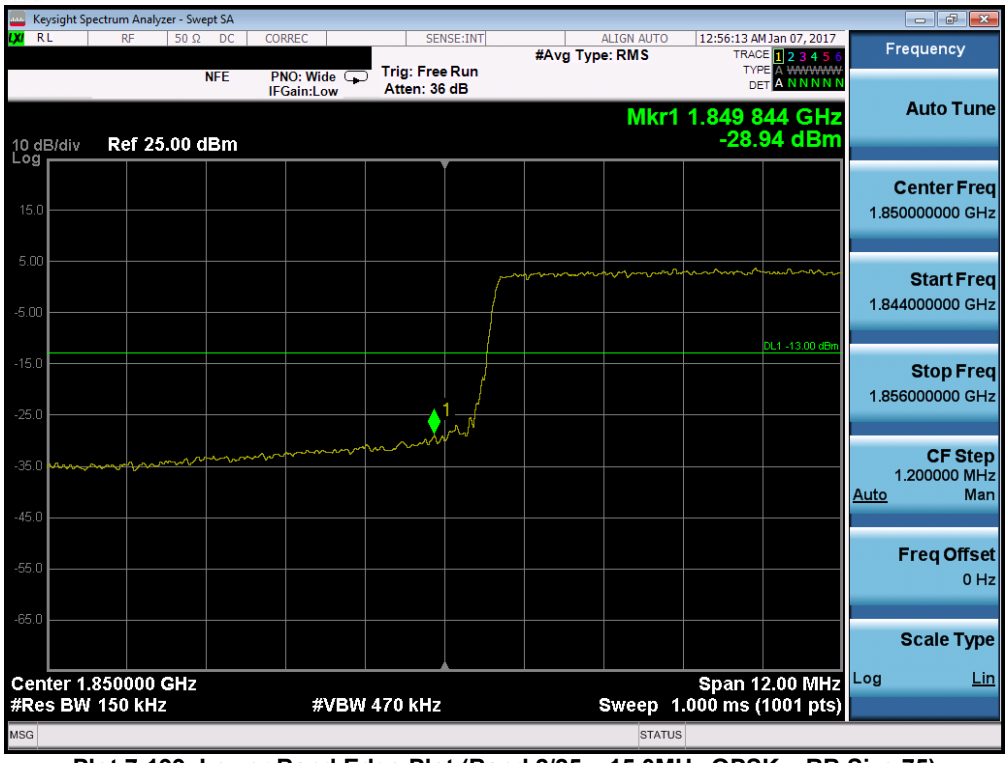
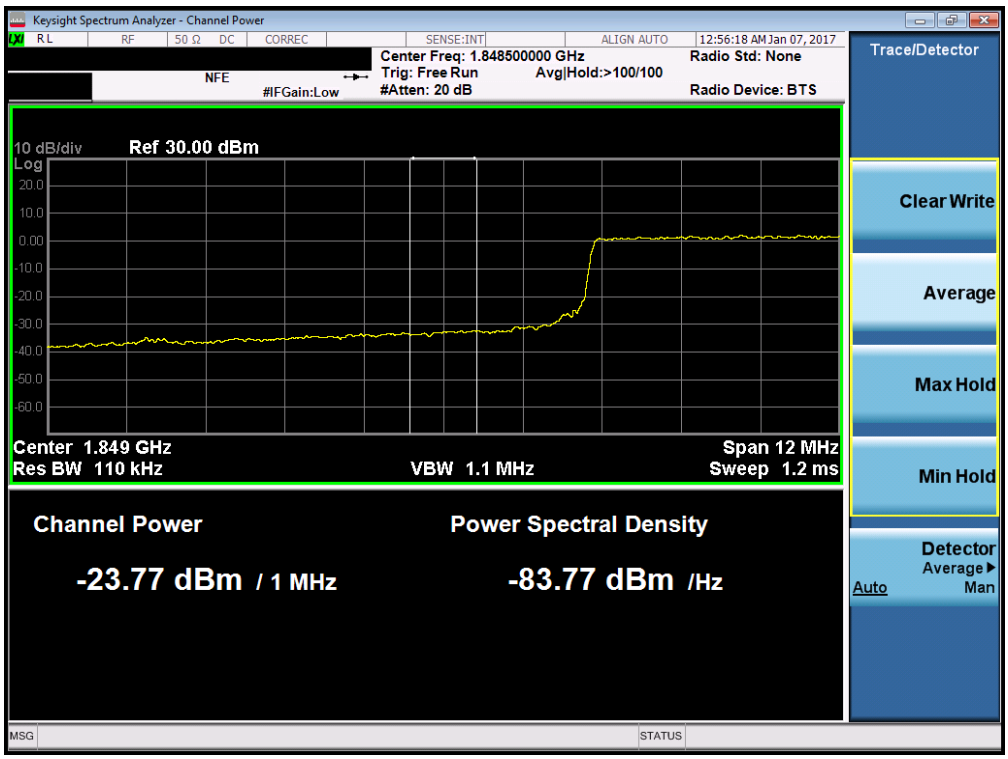


Plot 7-199. Lower Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)



Plot 7-200. Lower Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

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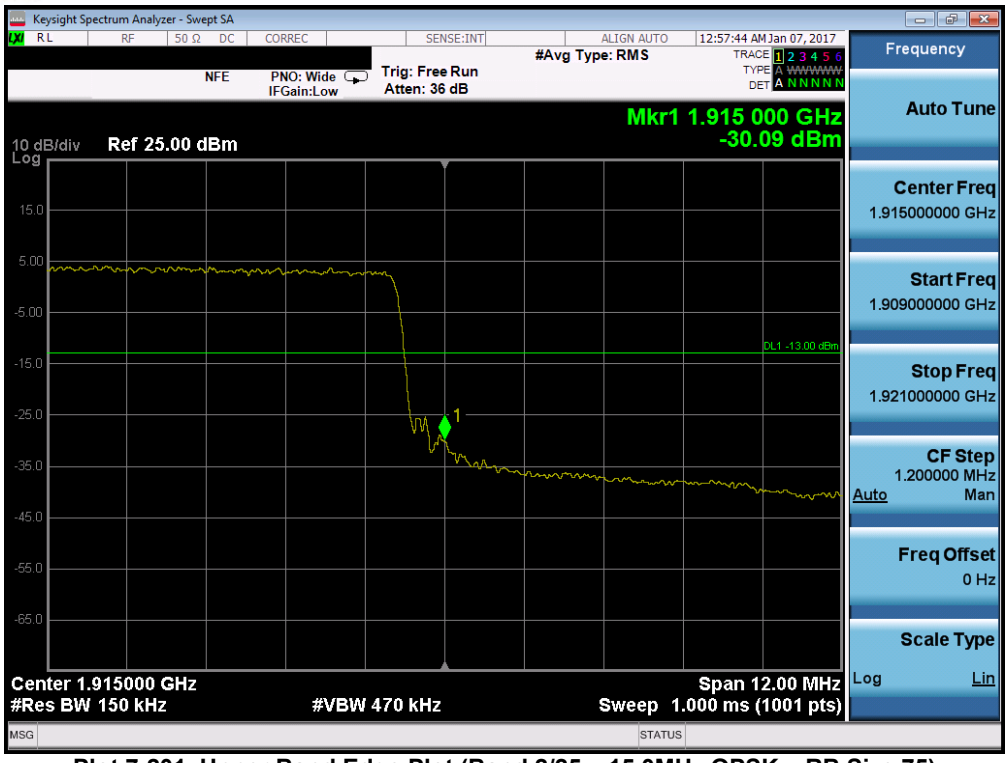
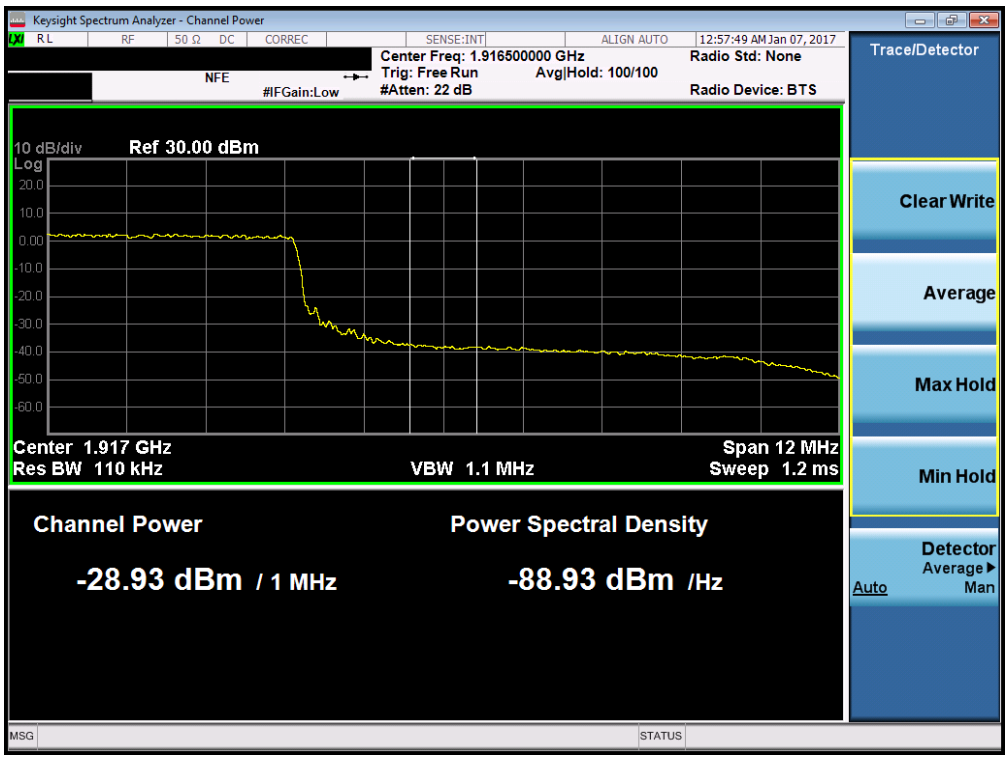


Plot 7-201. Upper Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)



Plot 7-202. Upper Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

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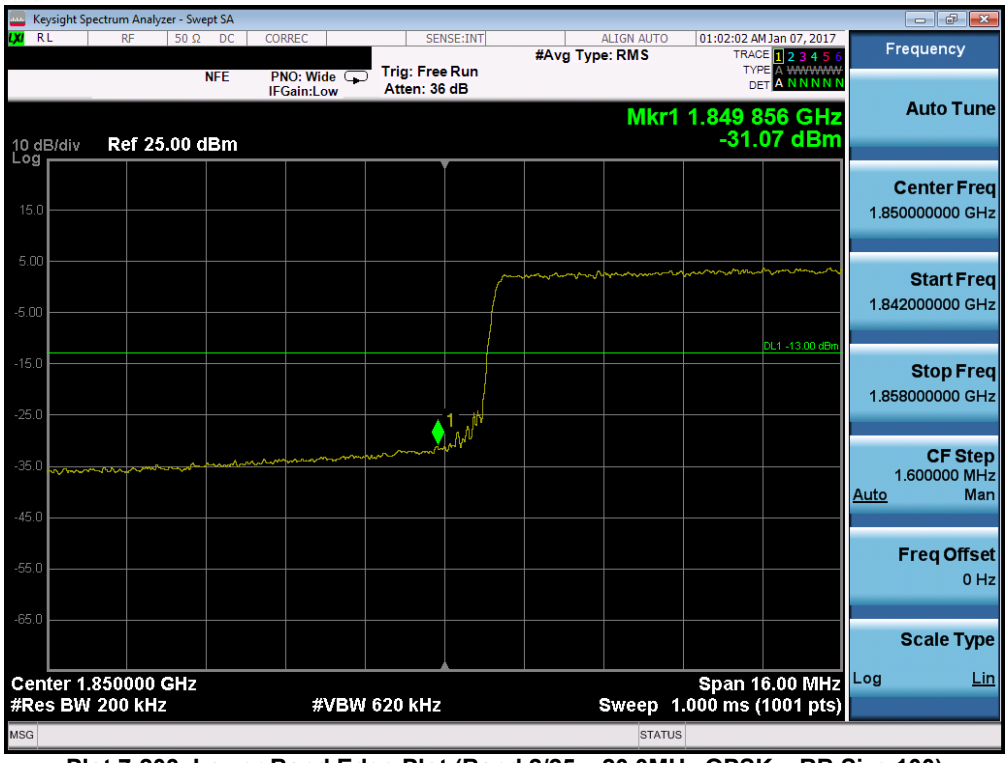
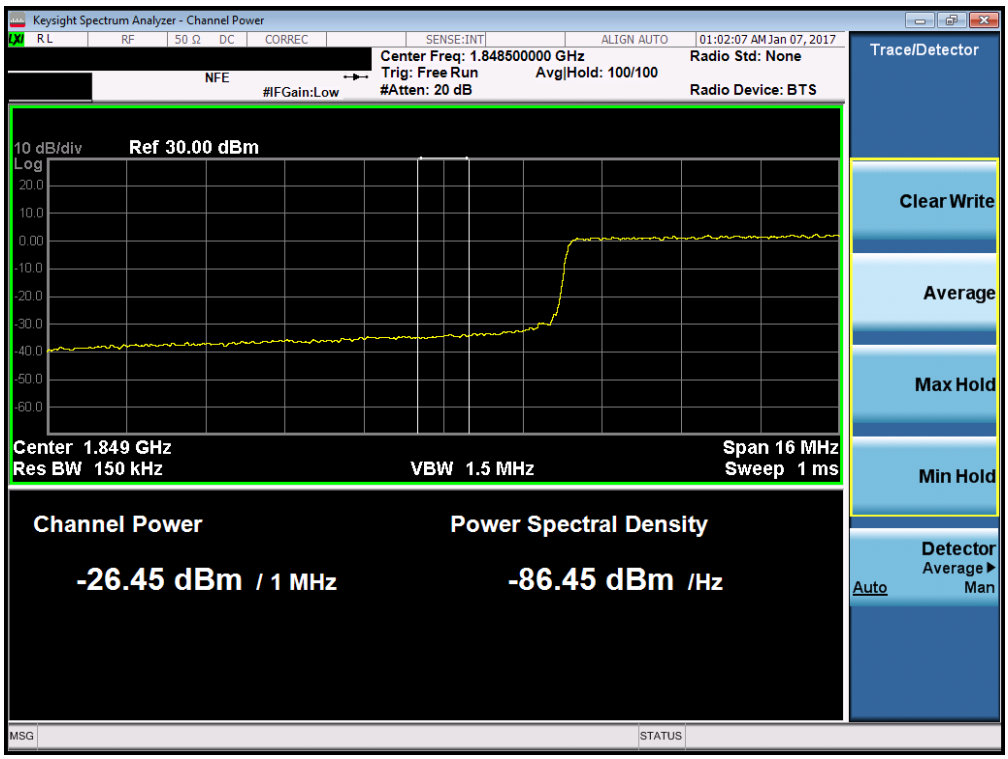


Plot 7-203. Lower Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)



Plot 7-204. Lower Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

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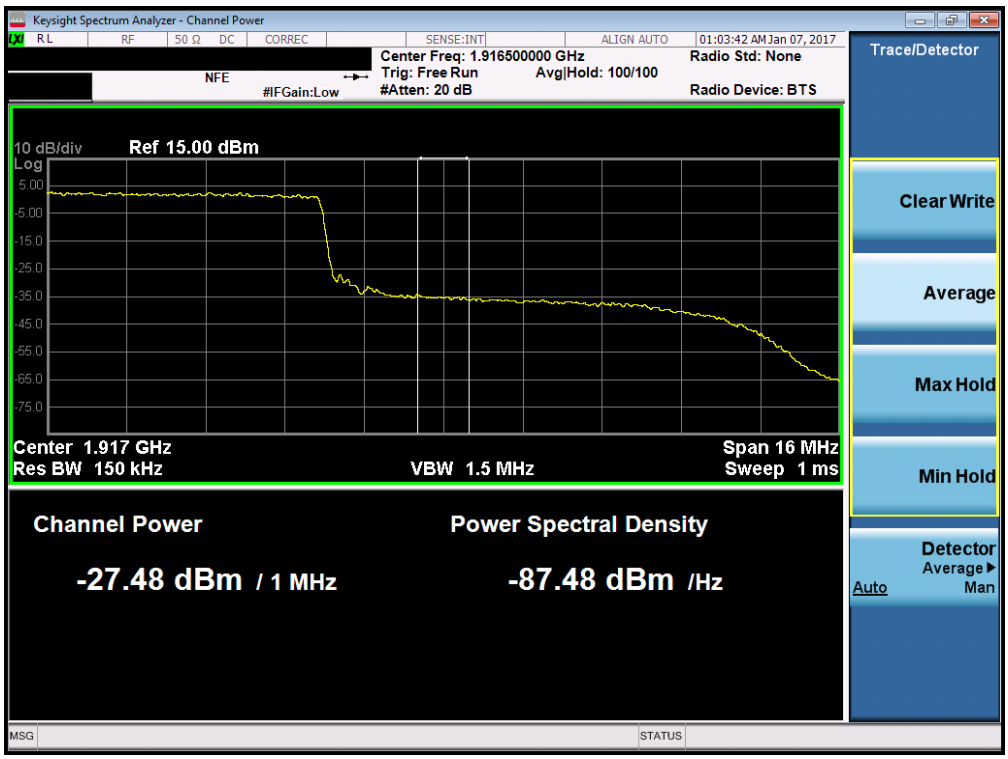
Plot 7-205. Upper Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)



Plot 7-206. Upper Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

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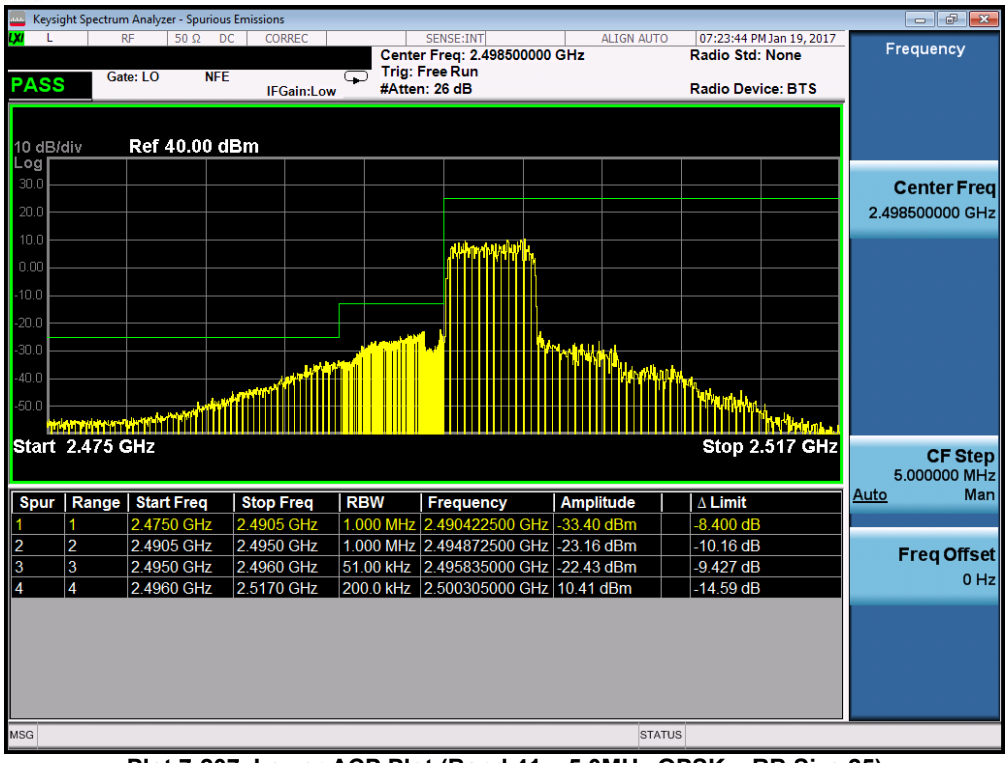
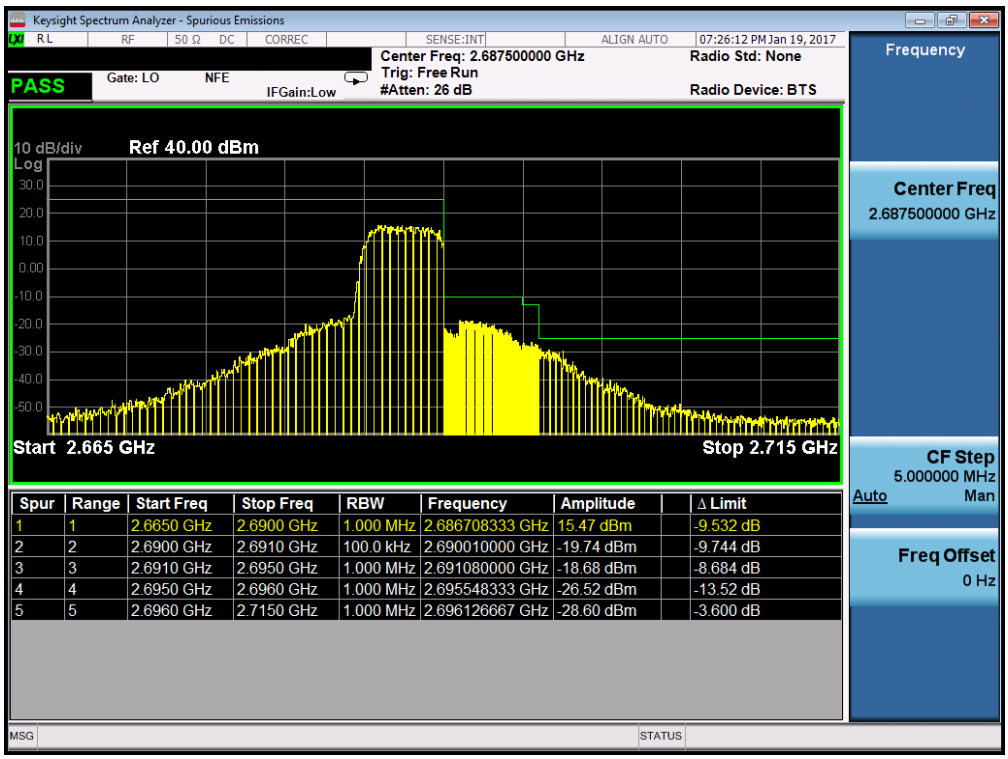


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490422500 GHz	-33.40 dBm	-8.400 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494872500 GHz	-23.16 dBm	-10.16 dB
3	3	2.4950 GHz	2.4960 GHz	51.00 kHz	2.495835000 GHz	-22.43 dBm	-9.427 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.500305000 GHz	10.41 dBm	-14.59 dB

Plot 7-207. Lower ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.686708333 GHz	15.47 dBm	-9.532 dB
2	2	2.6900 GHz	2.6910 GHz	100.0 kHz	2.690010000 GHz	-19.74 dBm	-9.744 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691080000 GHz	-18.68 dBm	-8.684 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695548333 GHz	-26.52 dBm	-13.52 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696126667 GHz	-28.60 dBm	-3.600 dB

Plot 7-208. Upper ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

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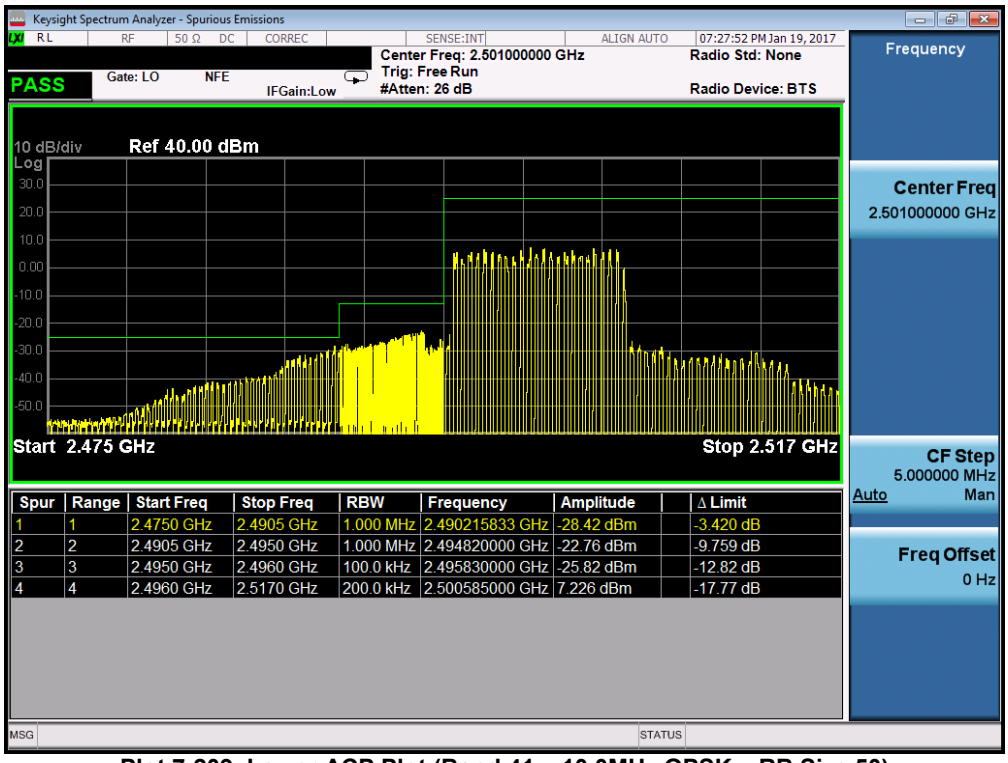
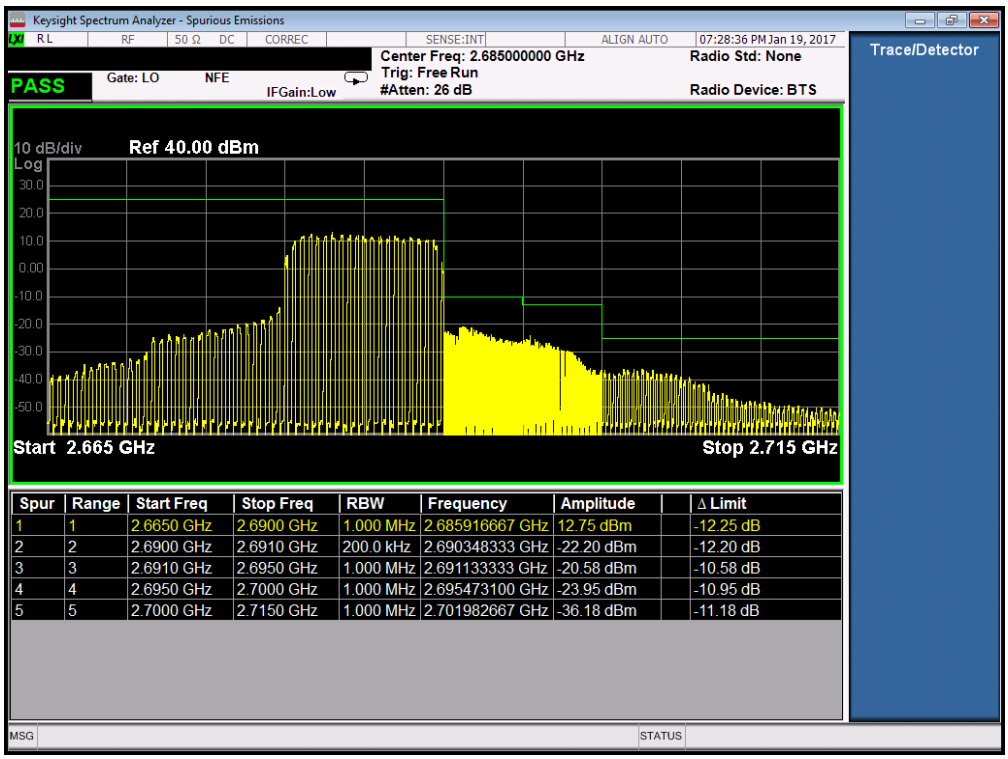


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490215833 GHz	-28.42 dBm	-3.420 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494820000 GHz	-22.76 dBm	-9.759 dB
3	3	2.4950 GHz	2.4960 GHz	100.0 kHz	2.495830000 GHz	-25.82 dBm	-12.82 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.500585000 GHz	7.226 dBm	-17.77 dB

Plot 7-209. Lower ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.685916667 GHz	12.75 dBm	-12.25 dB
2	2	2.6900 GHz	2.6910 GHz	200.0 kHz	2.690348333 GHz	-22.20 dBm	-12.20 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691133333 GHz	-20.58 dBm	-10.58 dB
4	4	2.6950 GHz	2.7000 GHz	1.000 MHz	2.695473100 GHz	-23.95 dBm	-10.95 dB
5	5	2.7000 GHz	2.7150 GHz	1.000 MHz	2.701982667 GHz	-36.18 dBm	-11.18 dB

Plot 7-210. Upper ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)

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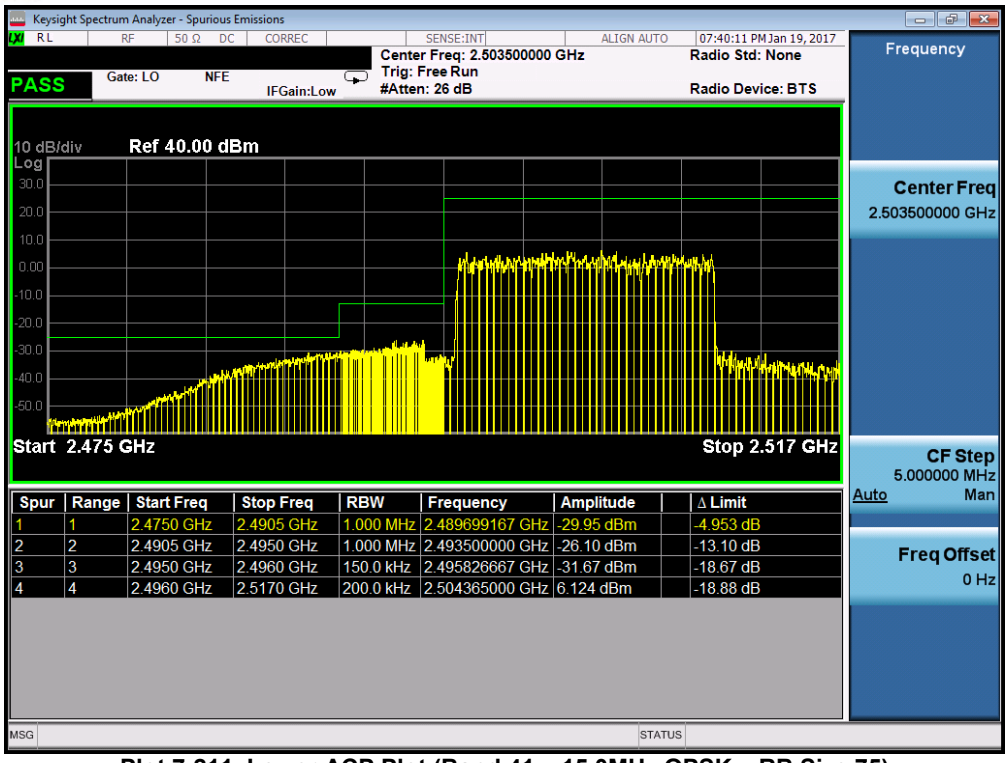
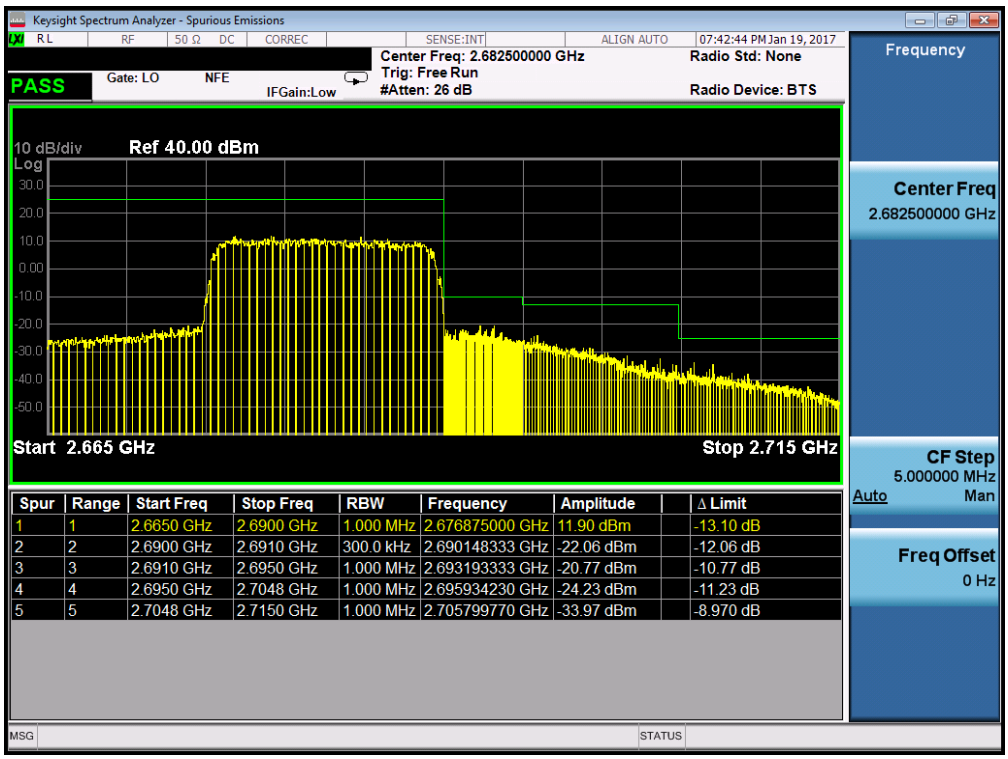


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489699167 GHz	-29.95 dBm	-4.953 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.493500000 GHz	-26.10 dBm	-13.10 dB
3	3	2.4950 GHz	2.4960 GHz	150.0 kHz	2.495826667 GHz	-31.67 dBm	-18.67 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.504365000 GHz	6.124 dBm	-18.88 dB

Plot 7-211. Lower ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.676875000 GHz	11.90 dBm	-13.10 dB
2	2	2.6900 GHz	2.6910 GHz	300.0 kHz	2.690148333 GHz	-22.06 dBm	-12.06 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.693193333 GHz	-20.77 dBm	-10.77 dB
4	4	2.6950 GHz	2.7048 GHz	1.000 MHz	2.695934230 GHz	-24.23 dBm	-11.23 dB
5	5	2.7048 GHz	2.7150 GHz	1.000 MHz	2.705799770 GHz	-33.97 dBm	-8.970 dB

Plot 7-212. Upper ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)

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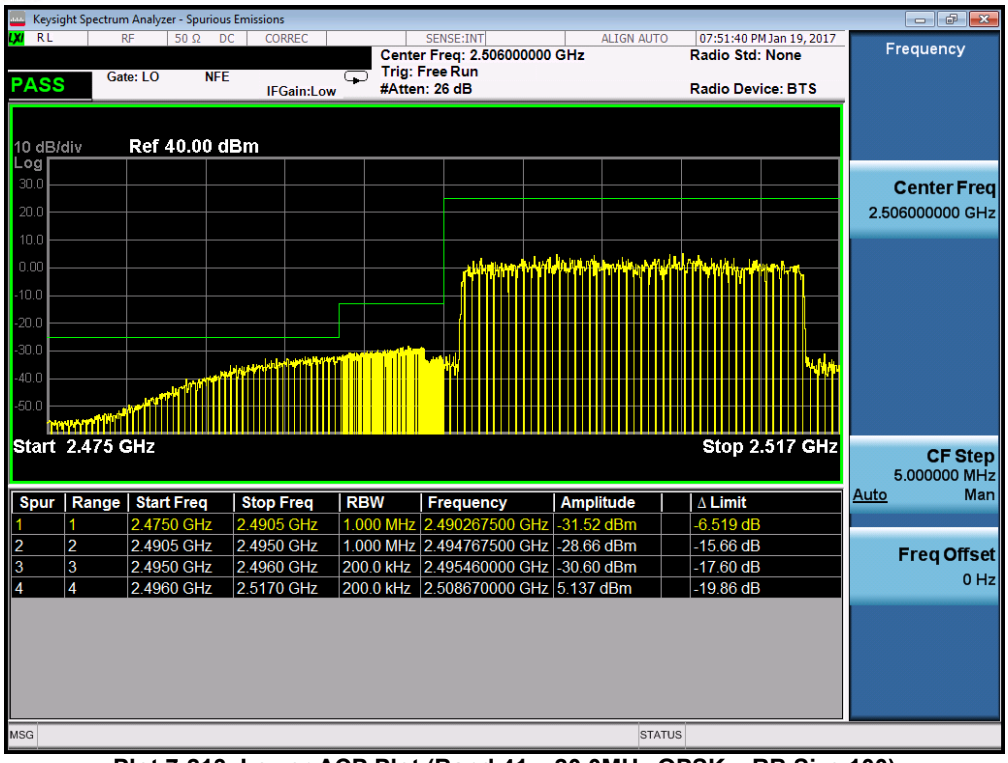
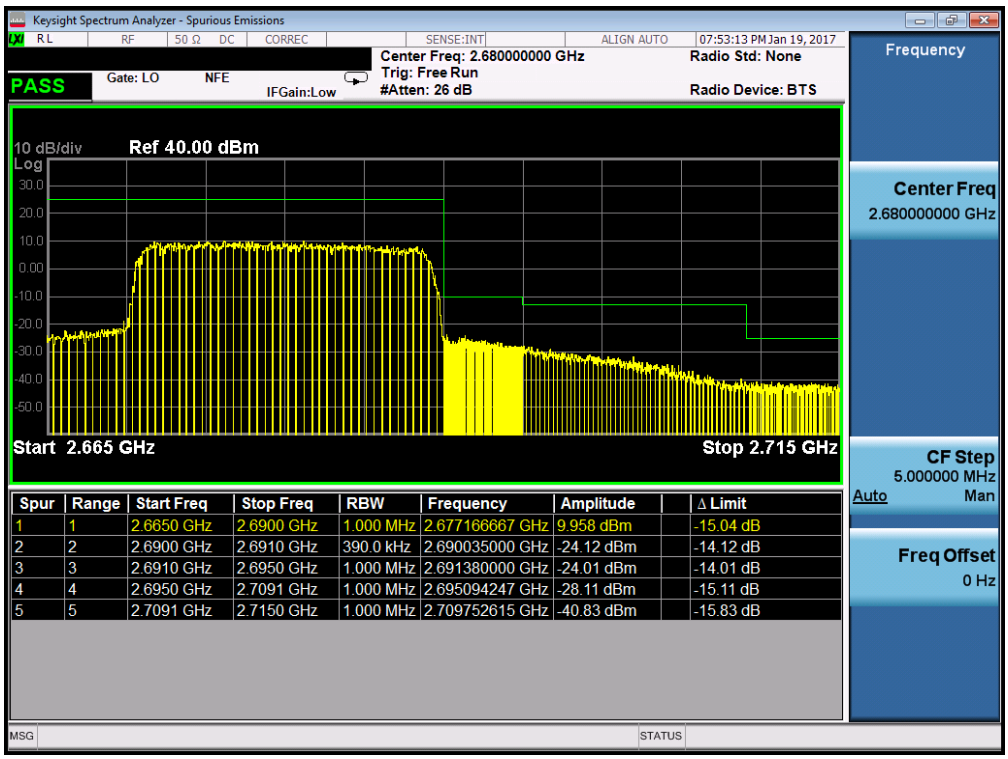


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490267500 GHz	-31.52 dBm	-6.519 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494767500 GHz	-28.66 dBm	-15.66 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495460000 GHz	-30.60 dBm	-17.60 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.508670000 GHz	5.137 dBm	-19.86 dB

Plot 7-213. Lower ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.677166667 GHz	9.958 dBm	-15.04 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690035000 GHz	-24.12 dBm	-14.12 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691380000 GHz	-24.01 dBm	-14.01 dB
4	4	2.6950 GHz	2.7091 GHz	1.000 MHz	2.695094247 GHz	-28.11 dBm	-15.11 dB
5	5	2.7091 GHz	2.7150 GHz	1.000 MHz	2.709752615 GHz	-40.83 dBm	-15.83 dB

Plot 7-214. Upper ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)

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7.5 Peak-Average Ratio

§24.232(d)

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 v02r02 – Section 5.7.1

Test Settings

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

Test Setup

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

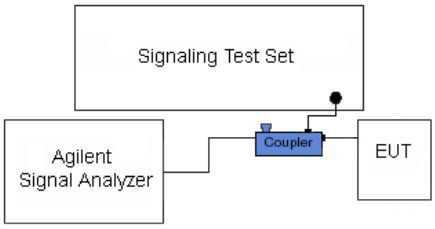

Figure 7-4. Test Instrument & Measurement Setup

Test Notes

None.

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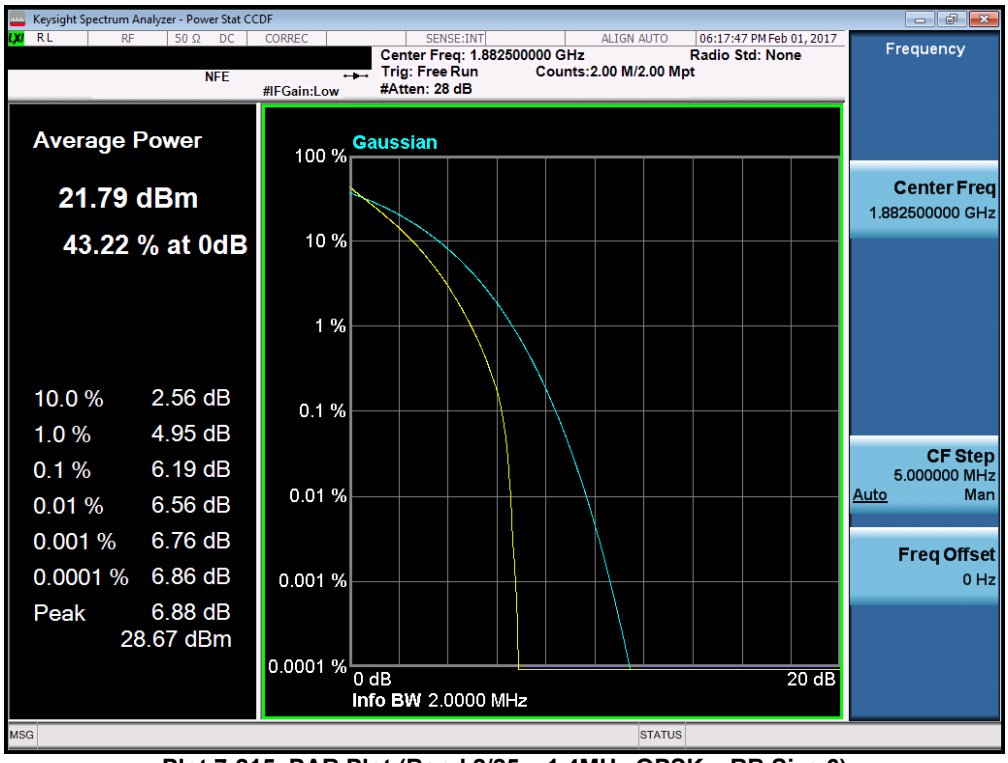
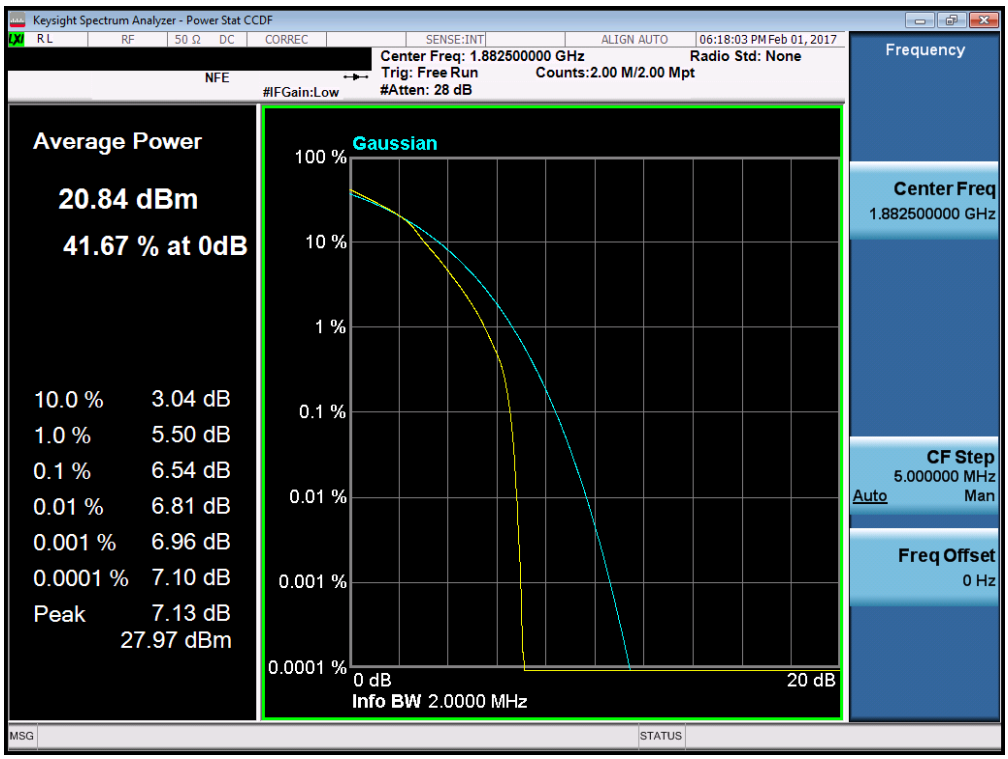


Plot 7-215. PAR Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-216. PAR Plot (Band 2/25 – 1.4MHz 16-QAM – RB Size 6)

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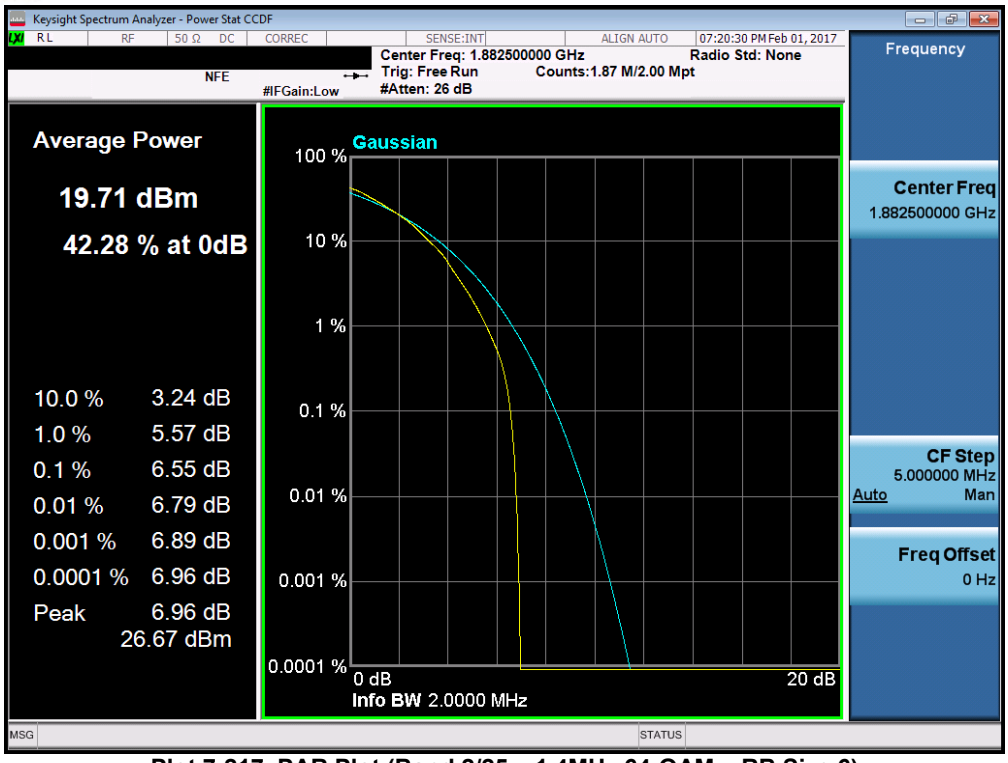
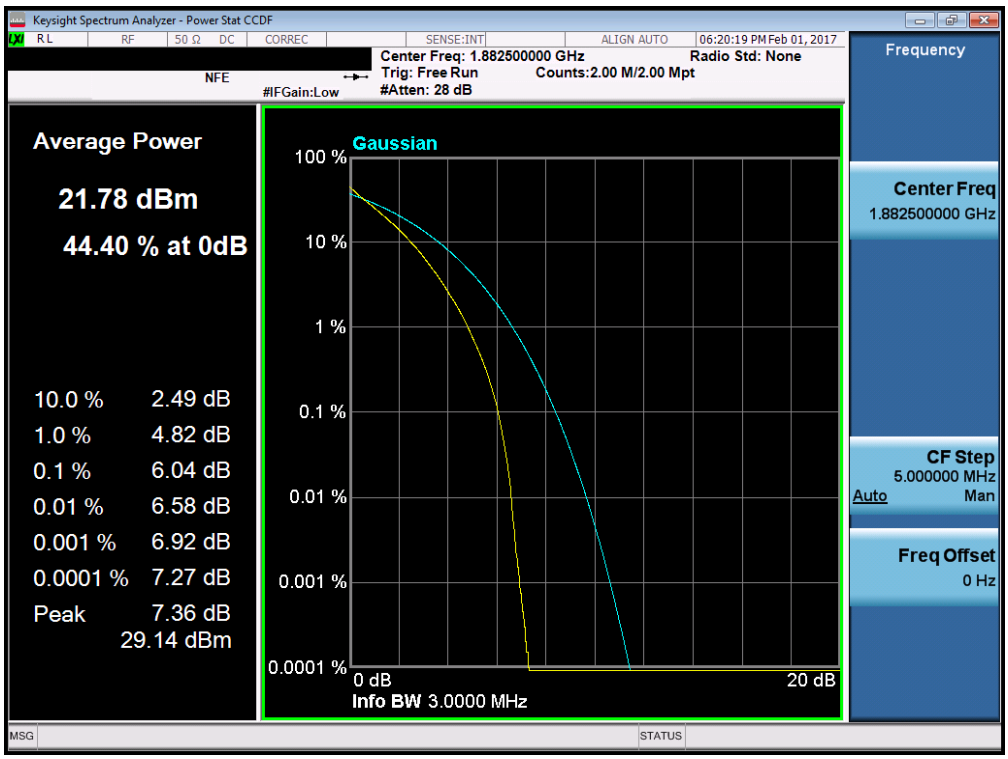


Plot 7-217. PAR Plot (Band 2/25 – 1.4MHz 64-QAM – RB Size 6)



Plot 7-218. PAR Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

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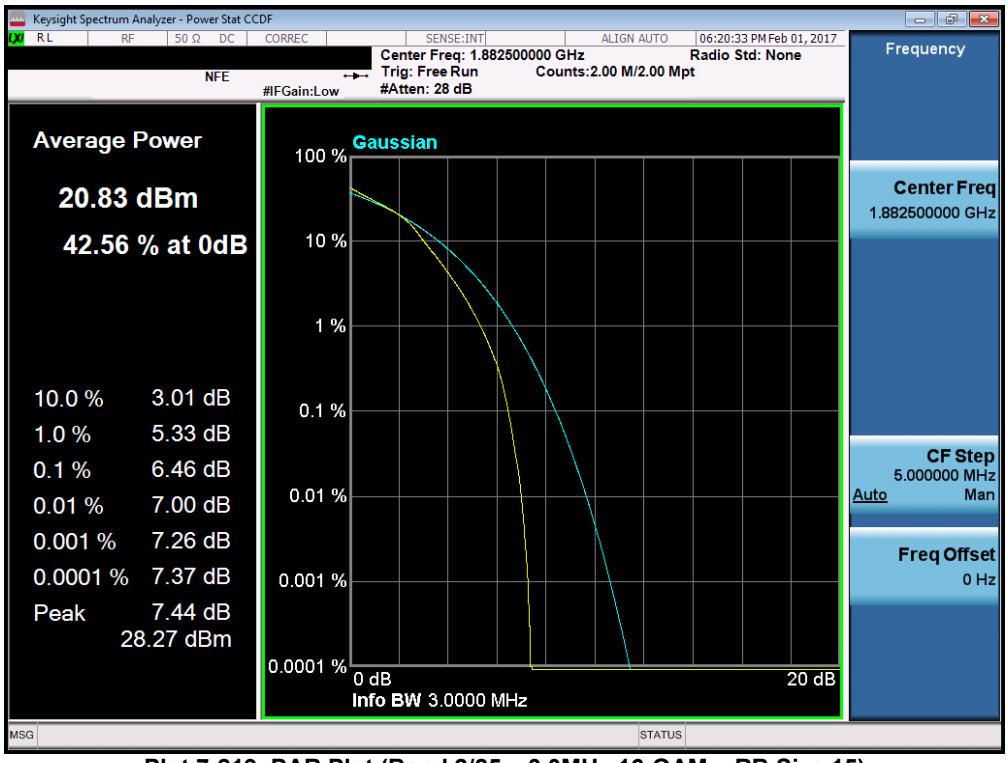
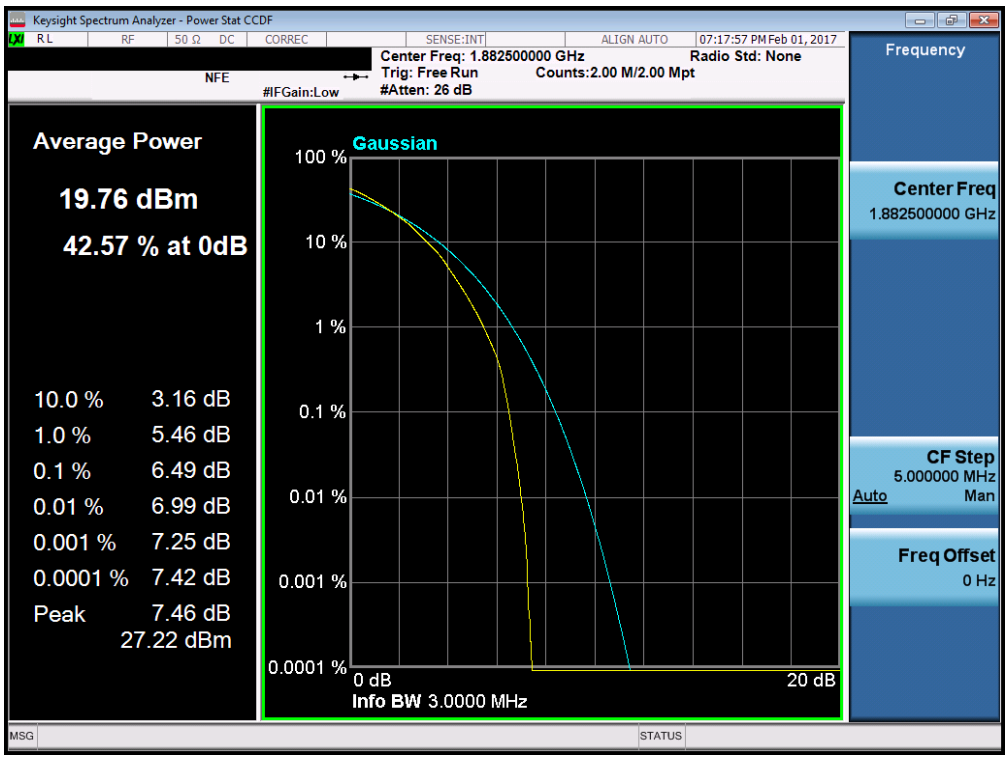


Plot 7-219. PAR Plot (Band 2/25 – 3.0MHz 16-QAM – RB Size 15)



Plot 7-220. PAR Plot (Band 2/25 – 3.0MHz 64-QAM – RB Size 15)

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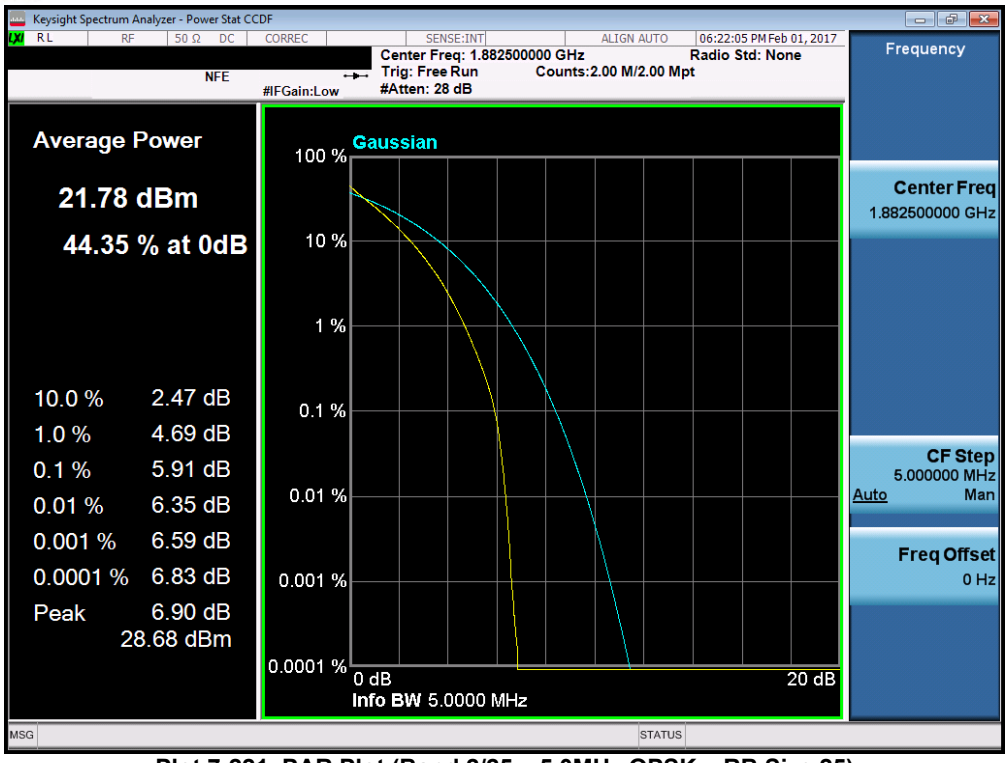
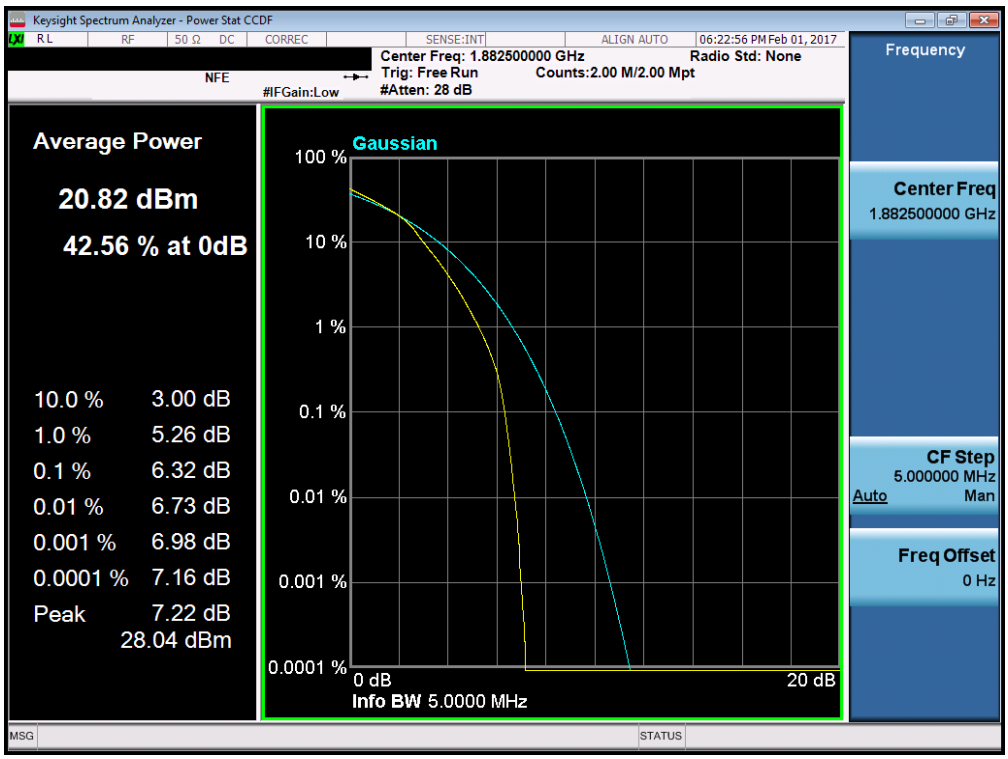


Plot 7-221. PAR Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)



Plot 7-222. PAR Plot (Band 2/25 – 5.0MHz 16-QAM – RB Size 25)

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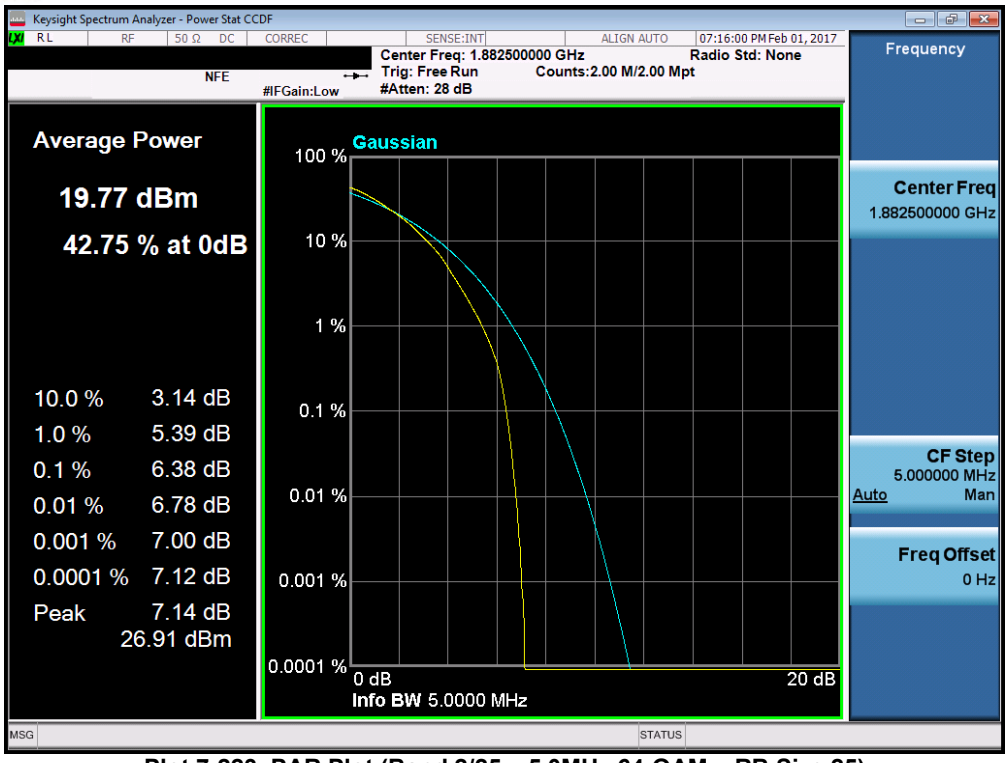
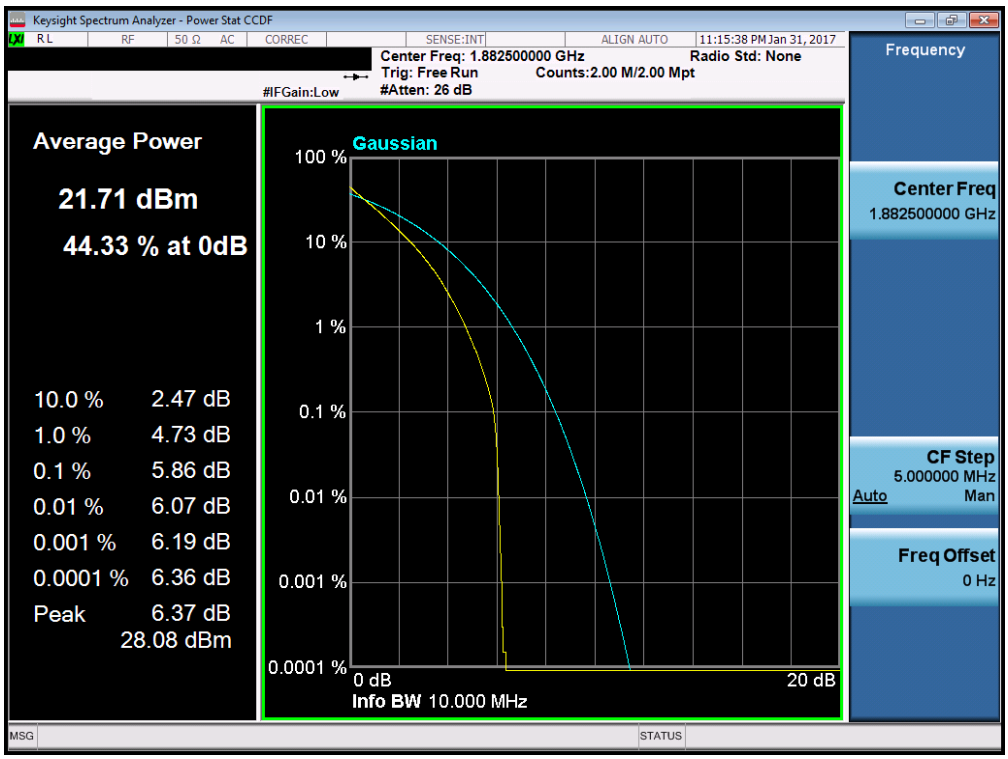


Plot 7-223. PAR Plot (Band 2/25 – 5.0MHz 64-QAM – RB Size 25)



Plot 7-224. PAR Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

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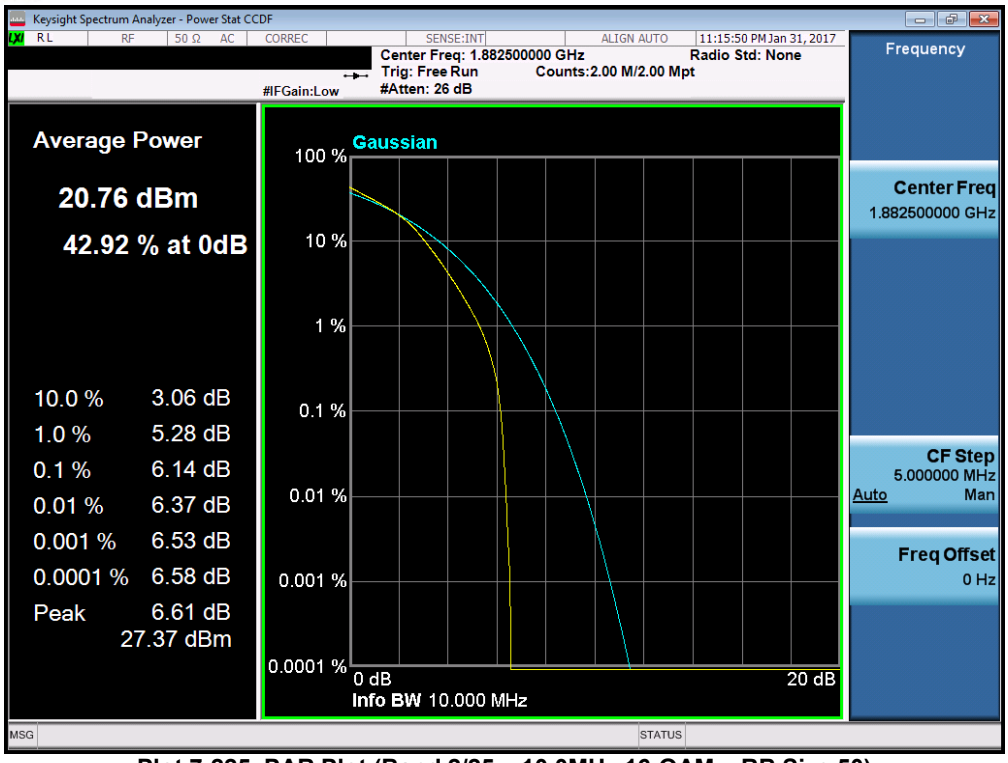
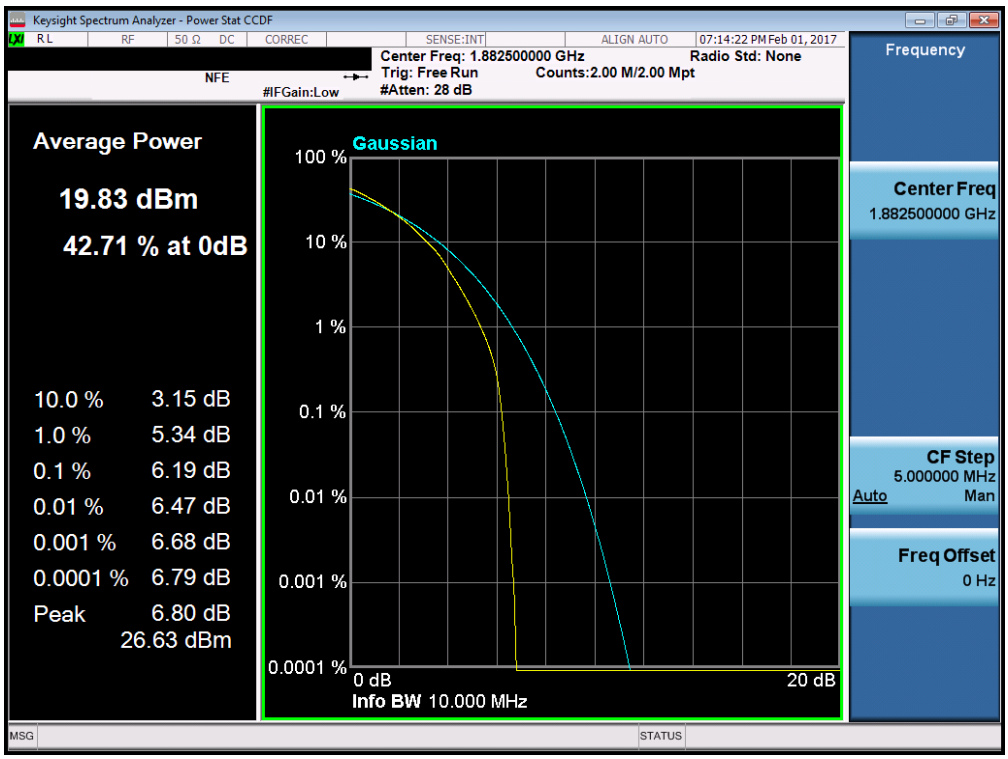


Plot 7-225. PAR Plot (Band 2/25 – 10.0MHz 16-QAM – RB Size 50)



Plot 7-226. PAR Plot (Band 2/25 – 10.0MHz 64-QAM – RB Size 50)

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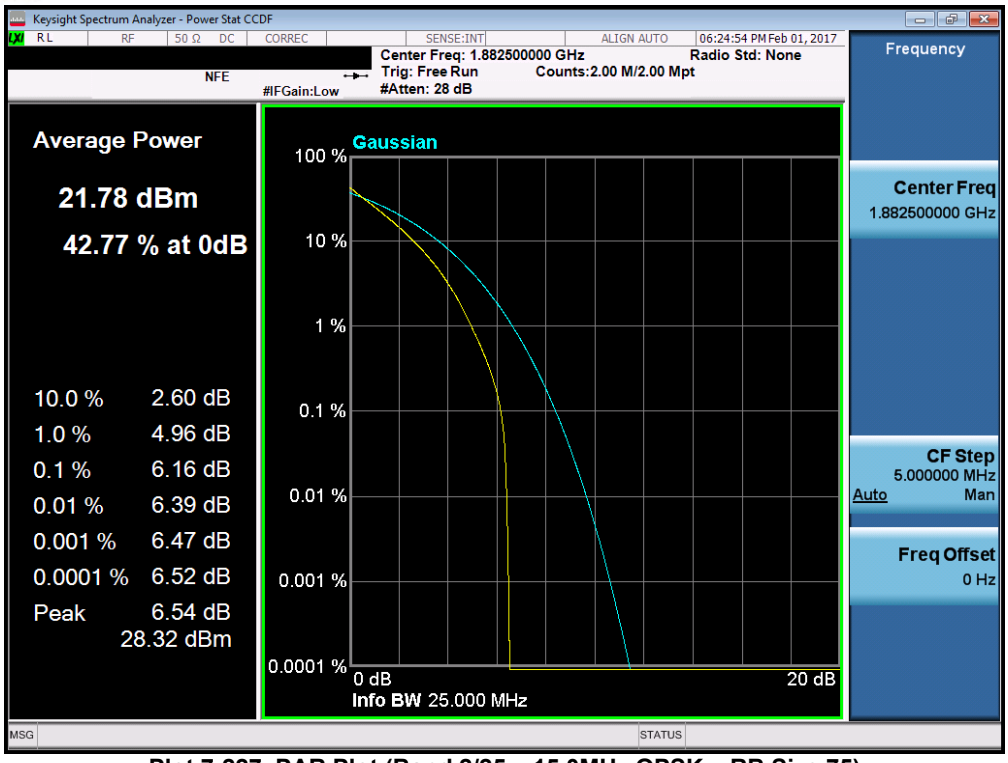
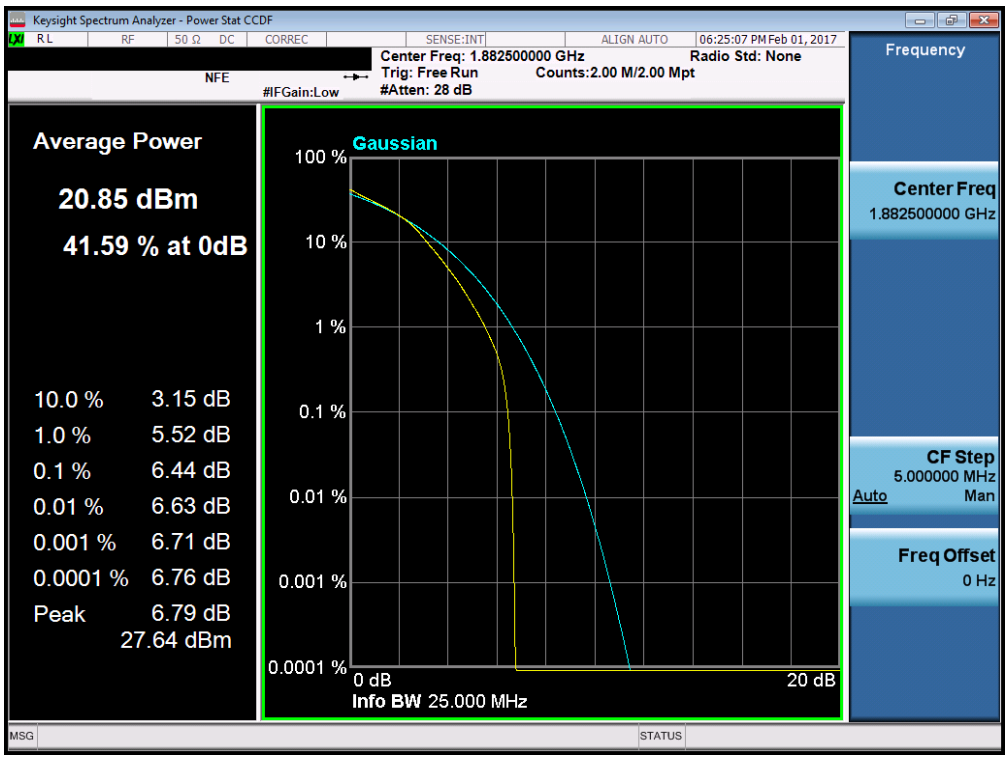


Plot 7-227. PAR Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)



Plot 7-228. PAR Plot (Band 2/25 – 15.0MHz 16-QAM – RB Size 75)

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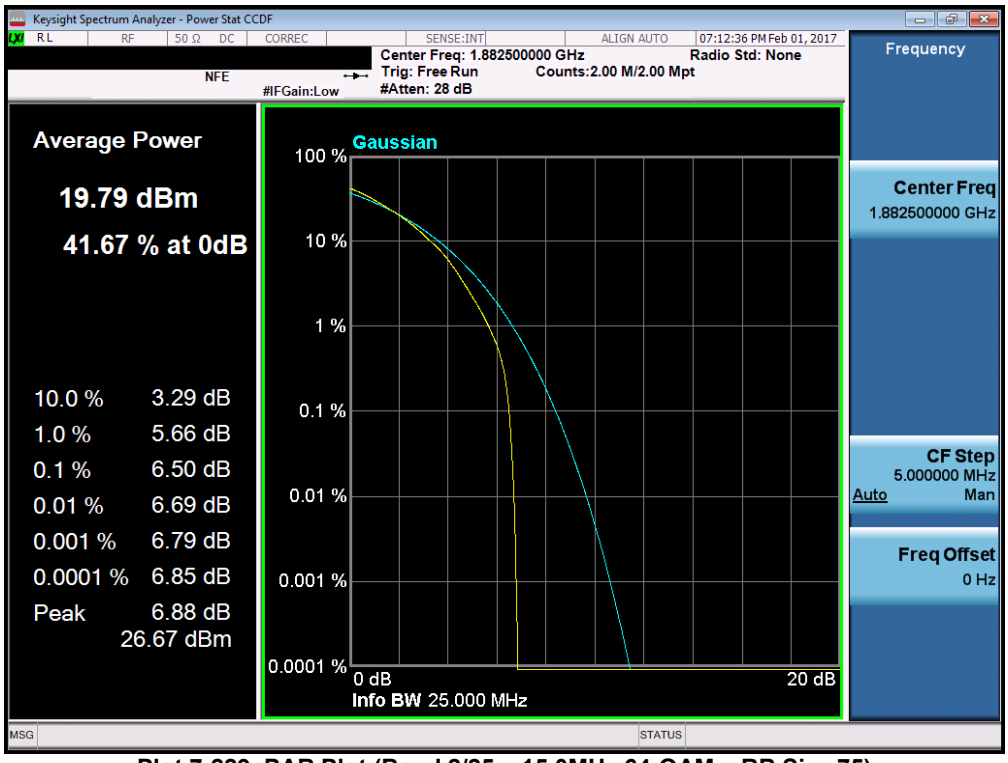
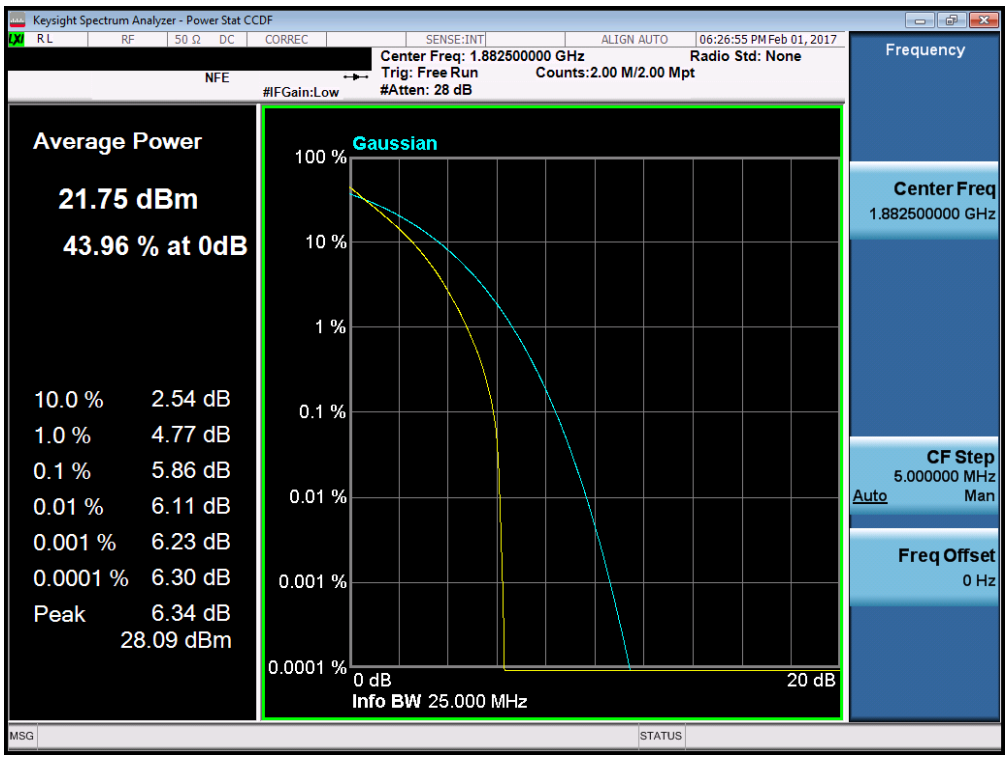


Plot 7-229. PAR Plot (Band 2/25 – 15.0MHz 64-QAM – RB Size 75)



Plot 7-230. PAR Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

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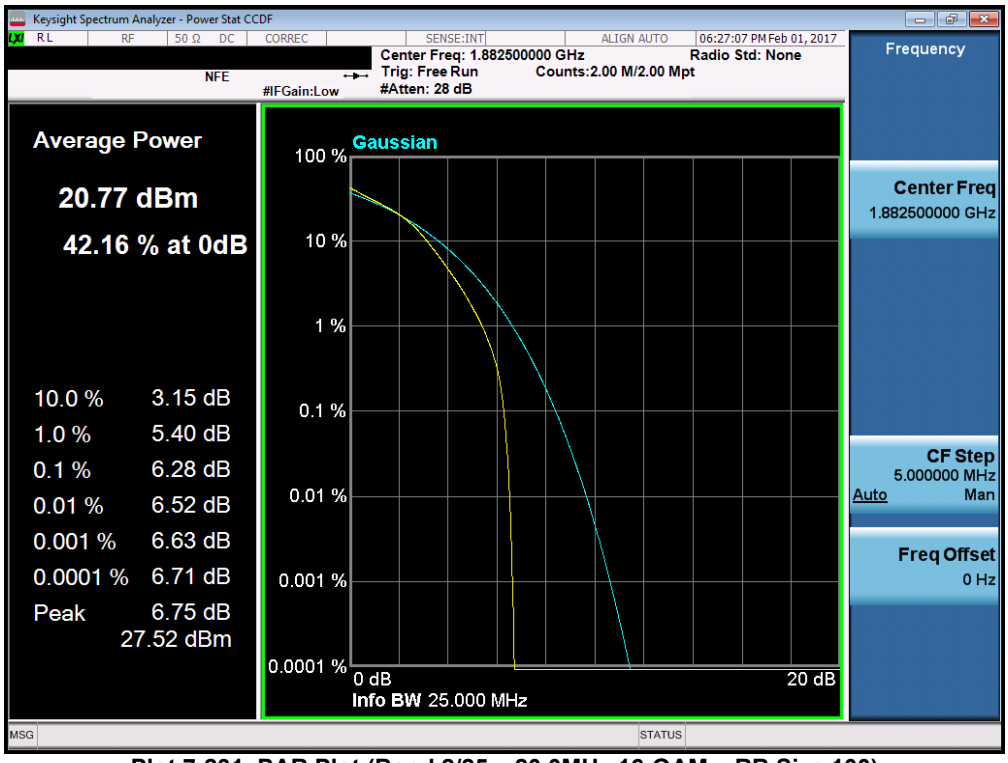
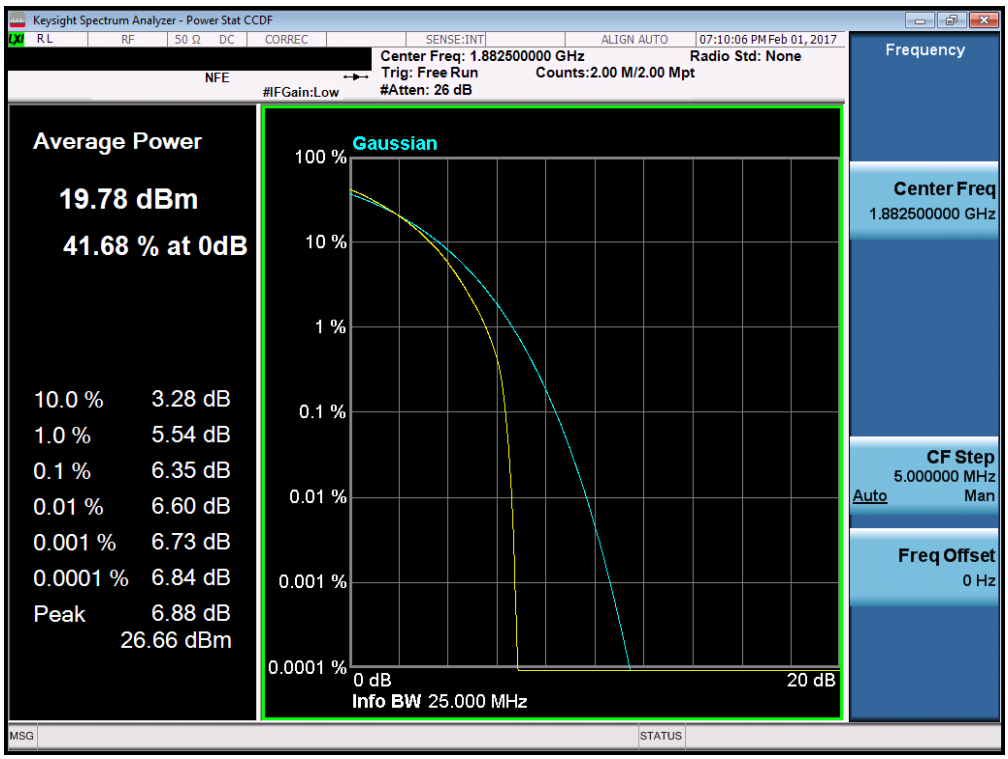


Plot 7-231. PAR Plot (Band 2/25 – 20.0MHz 16-QAM – RB Size 100)



Plot 7-232. PAR Plot (Band 2/25 – 20.0MHz 64-QAM – RB Size 100)

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7.6 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §27.50(h.2) §27.50(b.10) §27.50(c.10) §27.50(d.4)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.2.1

ANSI/TIA-603-D-2010 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

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

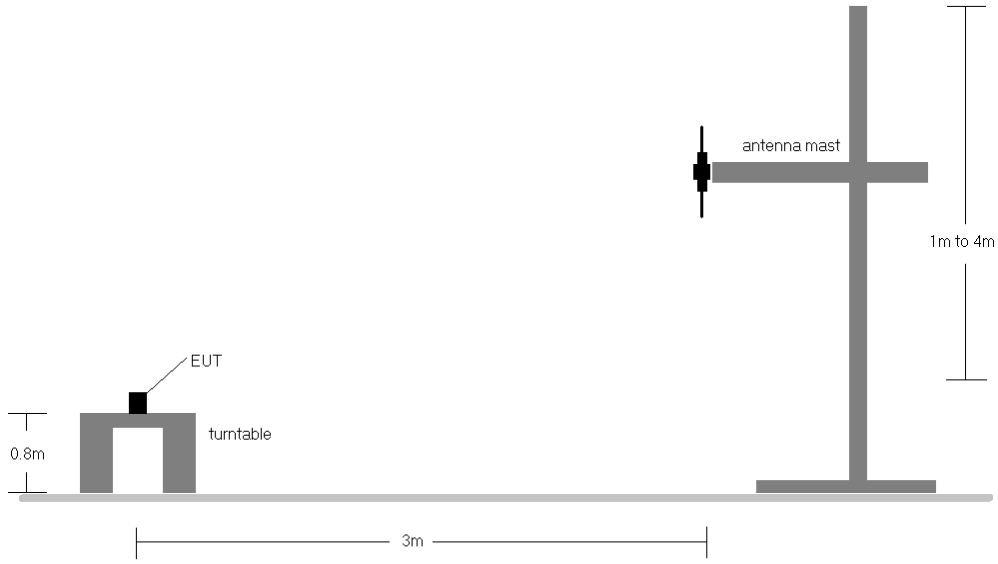

Figure 7-5. Radiated Test Setup <1GHz

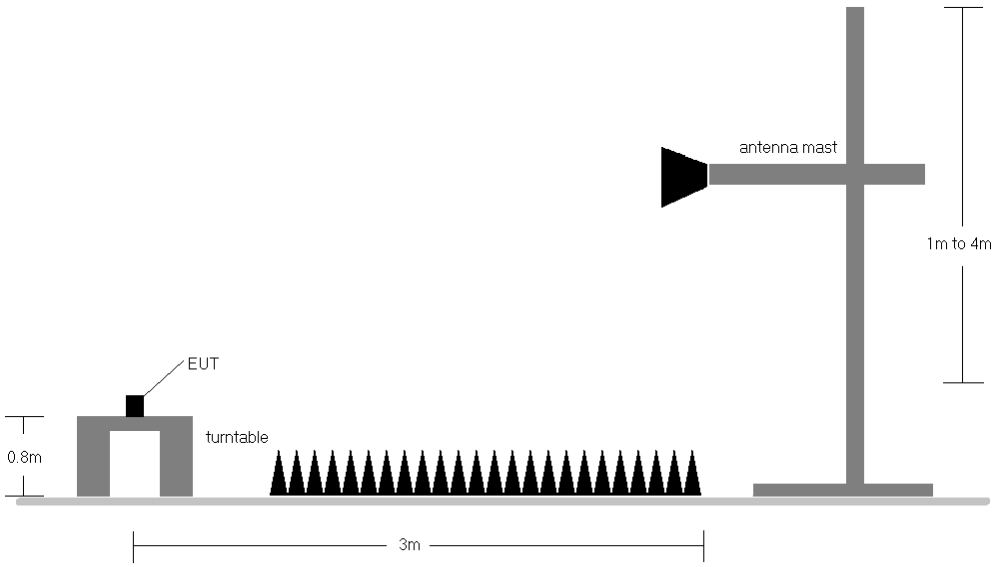

Figure 7-6. Radiated Test Setup >1GHz

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	150	89	1 / 5	13.75	-1.05	12.70	34.77	-22.07
707.50	1.4	QPSK	H	150	88	1 / 5	15.30	-1.02	14.28	34.77	-20.49
715.30	1.4	QPSK	H	150	84	1 / 5	16.57	-0.99	15.58	34.77	-19.19
699.70	1.4	16-QAM	H	150	89	1 / 5	12.67	-1.05	11.62	34.77	-23.15
707.50	1.4	16-QAM	H	150	88	1 / 5	14.27	-1.02	13.25	34.77	-21.52
715.30	1.4	16-QAM	H	150	84	1 / 5	15.60	-0.99	14.61	34.77	-20.16
699.70	1.4	64-QAM	H	150	89	1 / 5	11.59	-1.05	10.54	34.77	-24.23
707.50	1.4	64-QAM	H	150	88	1 / 5	12.99	-1.02	11.97	34.77	-22.80
715.30	1.4	64-QAM	H	150	84	1 / 5	14.39	-0.99	13.40	34.77	-21.37
700.50	3	QPSK	H	150	81	1 / 14	14.12	-1.05	13.07	34.77	-21.70
707.50	3	QPSK	H	150	91	1 / 14	15.18	-1.02	14.16	34.77	-20.61
714.50	3	QPSK	H	150	89	1 / 14	16.60	-0.99	15.61	34.77	-19.16
700.50	3	16-QAM	H	150	81	1 / 14	13.00	-1.05	11.95	34.77	-22.82
707.50	3	16-QAM	H	150	91	1 / 14	13.98	-1.02	12.96	34.77	-21.81
714.50	3	16-QAM	H	150	89	1 / 14	15.48	-0.99	14.49	34.77	-20.28
700.50	3	64-QAM	H	150	81	1 / 14	11.89	-1.05	10.84	34.77	-23.93
707.50	3	64-QAM	H	150	91	1 / 14	12.84	-1.02	11.82	34.77	-22.95
714.50	3	64-QAM	H	150	89	1 / 14	14.39	-0.99	13.40	34.77	-21.37
714.50	3	QPSK	V	150	360	1 / 74	16.29	-0.99	15.30	34.77	-19.47
714.50	3 (WCP)	QPSK	H	150	86	1 / 74	15.39	-0.99	14.40	34.77	-20.37

Table 7-2. ERP Data (Band 12)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
701.50	5	QPSK	H	150	87	1 / 24	14.37	-1.05	13.32	34.77	-21.45
707.50	5	QPSK	H	150	90	1 / 24	15.20	-1.02	14.18	34.77	-20.59
713.50	5	QPSK	H	150	93	1 / 24	16.26	-0.99	15.27	34.77	-19.50
701.50	5	16-QAM	H	150	87	1 / 24	13.42	-1.05	12.37	34.77	-22.40
707.50	5	16-QAM	H	150	90	1 / 24	14.30	-1.02	13.28	34.77	-21.49
713.50	5	16-QAM	H	150	93	1 / 24	15.20	-0.99	14.21	34.77	-20.56
701.50	5	64-QAM	H	150	87	1 / 24	11.05	-1.05	10.00	34.77	-24.77
707.50	5	64-QAM	H	150	90	1 / 24	11.94	-1.02	10.92	34.77	-23.85
713.50	5	64-QAM	H	150	93	1 / 24	12.87	-0.99	11.88	34.77	-22.89
704.00	10	QPSK	H	150	230	1 / 49	14.98	-1.05	13.93	34.77	-20.84
707.50	10	QPSK	H	150	230	1 / 49	15.66	-1.02	14.64	34.77	-20.13
711.00	10	QPSK	H	150	231	1 / 49	16.46	-0.99	15.47	34.77	-19.30
704.00	10	16-QAM	H	150	230	1 / 49	13.90	-1.05	12.85	34.77	-21.92
707.50	10	16-QAM	H	150	230	1 / 49	14.69	-1.02	13.67	34.77	-21.10
711.00	10	16-QAM	H	150	231	1 / 49	15.30	-0.99	14.31	34.77	-20.46
704.00	10	64-QAM	H	150	230	1 / 49	12.77	-1.05	11.72	34.77	-23.05
707.50	10	64-QAM	H	150	230	1 / 49	13.39	-1.02	12.37	34.77	-22.40
711.00	10	64-QAM	H	150	231	1 / 49	14.19	-0.99	13.20	34.77	-21.57

Table 7-3. ERP Data (Band 12/17)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	150	82	1 / 0	20.98	-0.83	20.15	34.77	-14.62
782.00	5	QPSK	H	150	79	1 / 0	20.97	-0.82	20.15	34.77	-14.62
784.50	5	QPSK	H	150	78	1 / 24	20.74	-0.81	19.93	34.77	-14.84
779.50	5	16-QAM	H	150	82	1 / 0	19.84	-0.83	19.01	34.77	-15.76
782.00	5	16-QAM	H	150	79	1 / 0	19.69	-0.82	18.87	34.77	-15.90
784.50	5	16-QAM	H	150	78	1 / 24	19.56	-0.81	18.75	34.77	-16.02
779.50	5	64-QAM	H	150	82	1 / 0	18.79	-0.83	17.96	34.77	-16.81
782.00	5	64-QAM	H	150	79	1 / 0	18.67	-0.82	17.85	34.77	-16.92
784.50	5	64-QAM	H	150	78	1 / 24	18.49	-0.81	17.68	34.77	-17.09
782.00	10	QPSK	H	150	79	1 / 0	21.27	-0.82	20.45	34.77	-14.32
782.00	10	16-QAM	H	150	79	1 / 0	19.50	-0.82	18.68	34.77	-16.09
782.00	10	64-QAM	H	150	79	1 / 0	18.57	-0.82	17.75	34.77	-17.02
782.00	10	QPSK	V	150	326	1 / 74	19.09	-0.82	18.27	34.77	-16.50
782.00	10 (WCP)	QPSK	H	150	79	1 / 0	19.79	-0.82	18.97	34.77	-15.80

Table 7-4. ERP Data (Band 13)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	150	69	1 / 5	20.14	-0.65	19.49	38.45	-18.96
836.50	1.4	QPSK	H	150	75	1 / 5	21.34	-0.65	20.69	38.45	-17.76
848.30	1.4	QPSK	H	150	79	1 / 5	21.84	-0.65	21.19	38.45	-17.26
824.70	1.4	16-QAM	H	150	69	1 / 5	18.90	-0.65	18.25	38.45	-20.20
836.50	1.4	16-QAM	H	150	75	1 / 5	20.12	-0.65	19.47	38.45	-18.98
848.30	1.4	16-QAM	H	150	79	1 / 5	20.80	-0.65	20.15	38.45	-18.30
824.70	1.4	64-QAM	H	150	69	1 / 5	17.88	-0.65	17.23	38.45	-21.22
836.50	1.4	64-QAM	H	150	75	1 / 5	18.93	-0.65	18.28	38.45	-20.17
848.30	1.4	64-QAM	H	150	79	1 / 5	19.38	-0.65	18.73	38.45	-19.72
825.50	3	QPSK	H	150	73	1 / 14	20.36	-0.65	19.71	38.45	-18.74
836.50	3	QPSK	H	150	72	1 / 14	21.17	-0.65	20.52	38.45	-17.93
847.50	3	QPSK	H	150	77	1 / 0	22.08	-0.65	21.43	38.45	-17.02
825.50	3	16-QAM	H	150	73	1 / 14	19.18	-0.65	18.53	38.45	-19.92
836.50	3	16-QAM	H	150	72	1 / 14	20.06	-0.65	19.41	38.45	-19.04
847.50	3	16-QAM	H	150	77	1 / 14	20.95	-0.65	20.30	38.45	-18.15
825.50	3	64-QAM	H	150	73	1 / 14	18.18	-0.65	17.53	38.45	-20.92
836.50	3	64-QAM	H	150	72	1 / 14	19.03	-0.65	18.38	38.45	-20.07
847.50	3	64-QAM	H	150	77	1 / 14	17.18	-0.65	16.53	38.45	-21.92
826.50	5	QPSK	H	150	72	1 / 24	20.60	-0.65	19.95	38.45	-18.50
836.50	5	QPSK	H	150	75	1 / 24	21.31	-0.65	20.66	38.45	-17.79
846.50	5	QPSK	H	150	58	1 / 24	21.99	-0.65	21.34	38.45	-17.11
826.50	5	16-QAM	H	150	72	1 / 24	19.29	-0.65	18.64	38.45	-19.81
836.50	5	16-QAM	H	150	75	1 / 24	20.18	-0.65	19.53	38.45	-18.92
846.50	5	16-QAM	H	150	58	1 / 0	20.65	-0.65	20.00	38.45	-18.45
826.50	5	64-QAM	H	150	72	1 / 24	18.08	-0.65	17.43	38.45	-21.02
836.50	5	64-QAM	H	150	75	1 / 24	19.78	-0.65	19.13	38.45	-19.32
846.50	5	64-QAM	H	150	58	1 / 24	17.96	-0.65	17.31	38.45	-21.14
829.00	10	QPSK	H	150	68	1 / 49	21.02	-0.65	20.37	38.45	-18.08
836.50	10	QPSK	H	150	79	1 / 49	21.50	-0.65	20.85	38.45	-17.60
844.00	10	QPSK	H	150	73	1 / 49	22.07	-0.65	21.42	38.45	-17.03
829.00	10	16-QAM	H	150	68	1 / 49	19.72	-0.65	19.07	38.45	-19.38
836.50	10	16-QAM	H	150	79	1 / 49	20.36	-0.65	19.71	38.45	-18.74
844.00	10	16-QAM	H	150	73	1 / 49	21.02	-0.65	20.37	38.45	-18.08
829.00	10	64-QAM	H	150	68	1 / 49	17.68	-0.65	17.03	38.45	-21.42
836.50	10	64-QAM	H	150	79	1 / 49	18.08	-0.65	17.43	38.45	-21.02
844.00	10	64-QAM	H	150	73	1 / 49	15.53	-0.65	14.88	38.45	-23.57
847.50	3	QPSK	V	150	91	1 / 74	18.10	-0.65	17.45	38.45	-21.00
847.50	3 (WCP)	QPSK	H	150	267	1 / 99	18.28	-0.65	17.63	38.45	-20.82

Table 7-5. ERP Data (Band 5/26)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	150	110	1 / 74	21.28	-0.65	20.63	38.45	-17.82
836.50	15	QPSK	H	150	112	1 / 74	21.18	-0.65	20.53	38.45	-17.92
841.50	15	QPSK	H	150	115	1 / 74	20.83	-0.65	20.18	38.45	-18.27
831.50	15	16-QAM	H	150	110	1 / 74	20.43	-0.65	19.78	38.45	-18.67
836.50	15	16-QAM	H	150	112	1 / 74	20.29	-0.65	19.64	38.45	-18.81
841.50	15	16-QAM	H	150	115	1 / 74	19.53	-0.65	18.88	38.45	-19.57
831.50	15	64-QAM	H	150	110	1 / 74	17.60	-0.65	16.95	38.45	-21.50
836.50	15	64-QAM	H	150	112	1 / 74	17.33	-0.65	16.68	38.45	-21.77
841.50	15	64-QAM	H	150	115	1 / 74	17.18	-0.65	16.53	38.45	-21.92

Table 7-6. ERP Data (Band 26)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	150	360	1 / 0	7.20	5.56	12.76	30.00	-17.24
1745.00	1.4	QPSK	H	150	3	1 / 0	8.50	5.32	13.82	30.00	-16.18
1779.30	1.4	QPSK	H	150	360	3 / 2	15.25	5.09	20.34	30.00	-9.66
1710.70	1.4	16-QAM	H	150	360	1 / 0	6.20	5.56	11.76	30.00	-18.24
1745.00	1.4	16-QAM	H	150	3	1 / 5	7.47	5.32	12.79	30.00	-17.21
1779.30	1.4	16-QAM	H	150	360	1 / 5	14.15	5.09	19.24	30.00	-10.76
1710.70	1.4	64-QAM	H	150	360	1 / 0	4.80	5.56	10.36	30.00	-19.64
1745.00	1.4	64-QAM	H	150	3	1 / 0	6.25	5.32	11.57	30.00	-18.43
1779.30	1.4	64-QAM	H	150	360	3 / 2	12.75	5.09	17.84	30.00	-12.16
1711.50	3	QPSK	H	150	335	1 / 14	14.75	5.55	20.30	30.00	-9.70
1745.00	3	QPSK	H	150	360	1 / 14	15.75	5.32	21.07	30.00	-8.93
1778.50	3	QPSK	H	150	306	1 / 14	8.88	5.10	13.98	30.00	-16.02
1711.50	3	16-QAM	H	150	335	1 / 14	13.45	5.55	19.00	30.00	-11.00
1745.00	3	16-QAM	H	150	360	1 / 14	14.57	5.32	19.89	30.00	-10.11
1778.50	3	16-QAM	H	150	306	1 / 14	7.83	5.10	12.93	30.00	-17.07
1711.50	3	64-QAM	H	150	335	1 / 14	12.24	5.55	17.79	30.00	-12.21
1745.00	3	64-QAM	H	150	360	1 / 14	13.20	5.32	18.52	30.00	-11.48
1778.50	3	64-QAM	H	150	306	1 / 14	7.05	5.10	12.15	30.00	-17.85
1712.50	5	QPSK	H	150	360	1 / 24	15.15	5.55	20.70	30.00	-9.30
1745.00	5	QPSK	H	150	360	1 / 24	15.65	5.32	20.97	30.00	-9.03
1777.50	5	QPSK	H	150	322	1 / 24	9.05	5.10	14.15	30.00	-15.85
1712.50	5	16-QAM	H	150	360	1 / 24	14.08	5.55	19.63	30.00	-10.37
1745.00	5	16-QAM	H	150	360	1 / 24	14.50	5.32	19.82	30.00	-10.18
1777.50	5	16-QAM	H	150	322	1 / 24	7.75	5.10	12.85	30.00	-17.15
1712.50	5	64-QAM	H	150	360	1 / 24	12.85	5.55	18.40	30.00	-11.60
1745.00	5	64-QAM	H	150	360	1 / 24	13.25	5.32	18.57	30.00	-11.43
1777.50	5	64-QAM	H	150	322	1 / 0	7.05	5.10	12.15	30.00	-17.85
1715.00	10	QPSK	H	150	360	1 / 0	15.38	5.53	20.91	30.00	-9.09
1745.00	10	QPSK	H	150	189	1 / 0	15.69	5.32	21.01	30.00	-8.99
1775.00	10	QPSK	H	150	320	1 / 0	15.50	5.12	20.62	30.00	-9.38
1715.00	10	16-QAM	H	150	360	1 / 0	14.65	5.53	20.18	30.00	-9.82
1745.00	10	16-QAM	H	150	189	1 / 0	14.61	5.32	19.93	30.00	-10.07
1775.00	10	16-QAM	H	150	320	1 / 0	14.34	5.12	19.46	30.00	-10.54
1715.00	10	64-QAM	H	150	360	1 / 0	13.20	5.53	18.73	30.00	-11.27
1745.00	10	64-QAM	H	150	189	1 / 0	12.25	5.32	17.57	30.00	-12.43
1775.00	10	64-QAM	H	150	320	1 / 0	12.18	5.12	17.30	30.00	-12.70
1717.50	15	QPSK	H	150	360	1 / 0	15.24	5.51	20.75	30.00	-9.25
1745.00	15	QPSK	H	150	360	1 / 0	15.62	5.32	20.94	30.00	-9.06
1772.50	15	QPSK	H	150	321	1 / 0	15.65	5.14	20.79	30.00	-9.21
1717.50	15	16-QAM	H	150	360	1 / 0	14.08	5.51	19.59	30.00	-10.41
1745.00	15	16-QAM	H	150	360	1 / 0	14.45	5.32	19.77	30.00	-10.23
1772.50	15	16-QAM	H	150	321	1 / 0	14.38	5.14	19.52	30.00	-10.48
1717.50	15	64-QAM	H	150	360	1 / 0	11.75	5.51	17.26	30.00	-12.74
1745.00	15	64-QAM	H	150	360	1 / 0	13.24	5.32	18.56	30.00	-11.44
1772.50	15	64-QAM	H	150	321	1 / 0	11.70	5.14	16.84	30.00	-13.16
1720.00	20	QPSK	H	150	322	1 / 0	15.59	5.49	21.08	30.00	-8.92
1745.00	20	QPSK	H	150	327	1 / 0	15.69	5.32	21.01	30.00	-8.99
1770.00	20	QPSK	H	150	369	1 / 0	15.47	5.15	20.62	30.00	-9.38
1720.00	20	16-QAM	H	150	322	1 / 0	14.47	5.49	19.96	30.00	-10.04
1745.00	20	16-QAM	H	150	327	1 / 0	14.65	5.32	19.97	30.00	-10.03
1770.00	20	16-QAM	H	150	369	1 / 0	14.35	5.15	19.50	30.00	-10.50
1720.00	20	64-QAM	H	150	322	1 / 0	13.25	5.49	18.74	30.00	-11.26
1745.00	20	64-QAM	H	150	327	1 / 0	13.30	5.32	18.62	30.00	-11.38
1770.00	20	64-QAM	H	150	369	1 / 0	13.00	5.15	18.15	30.00	-11.85
1720.00	20	QPSK	V	150	0	1 / 0	14.59	5.49	20.08	30.00	-9.92
1720.00	20 (WCP)	QPSK	H	150	327	1 / 99	15.49	5.49	20.98	30.00	-9.02

Table 7-7. EIRP Data (Band 4/66)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	H	150	13	1 / 0	16.47	4.82	21.29	33.01	-11.72
1882.50	1.4	QPSK	H	150	44	1 / 5	15.96	4.73	20.69	33.01	-12.32
1914.30	1.4	QPSK	H	150	6	1 / 0	16.48	4.68	21.16	33.01	-11.85
1850.70	1.4	16-QAM	H	150	13	1 / 0	15.31	4.82	20.13	33.01	-12.88
1882.50	1.4	16-QAM	H	150	44	1 / 0	14.90	4.73	19.63	33.01	-13.38
1914.30	1.4	16-QAM	H	150	6	1 / 0	15.30	4.68	19.98	33.01	-13.03
1850.70	1.4	64-QAM	H	150	13	1 / 0	14.06	4.82	18.88	33.01	-14.13
1882.50	1.4	64-QAM	H	150	44	1 / 0	13.76	4.73	18.49	33.01	-14.52
1914.30	1.4	64-QAM	H	150	6	1 / 0	14.16	4.68	18.84	33.01	-14.17
1851.50	3	QPSK	H	150	18	1 / 14	16.12	4.82	20.94	33.01	-12.07
1882.50	3	QPSK	H	150	43	1 / 0	16.09	4.73	20.82	33.01	-12.19
1913.50	3	QPSK	H	150	13	1 / 14	16.26	4.68	20.94	33.01	-12.07
1851.50	3	16-QAM	H	150	18	1 / 0	15.10	4.82	19.92	33.01	-13.09
1882.50	3	16-QAM	H	150	43	1 / 0	15.08	4.73	19.81	33.01	-13.20
1913.50	3	16-QAM	H	150	13	1 / 14	15.05	4.68	19.73	33.01	-13.28
1851.50	3	64-QAM	H	150	18	1 / 0	13.96	4.82	18.78	33.01	-14.23
1882.50	3	64-QAM	H	150	43	1 / 0	13.66	4.73	18.39	33.01	-14.62
1913.50	3	64-QAM	H	150	13	1 / 14	13.76	4.68	18.44	33.01	-14.57
1852.50	5	QPSK	H	150	7	1 / 0	16.30	4.81	21.11	33.01	-11.90
1882.50	5	QPSK	H	150	42	1 / 0	16.08	4.73	20.81	33.01	-12.20
1912.50	5	QPSK	H	150	8	1 / 0	16.42	4.68	21.10	33.01	-11.91
1852.50	5	16-QAM	H	150	7	1 / 0	15.24	4.81	20.05	33.01	-12.96
1882.50	5	16-QAM	H	150	42	1 / 0	14.98	4.73	19.71	33.01	-13.30
1912.50	5	16-QAM	H	150	8	1 / 24	15.23	4.68	19.91	33.01	-13.10
1852.50	5	64-QAM	H	150	7	1 / 0	13.86	4.81	18.67	33.01	-14.34
1882.50	5	64-QAM	H	150	42	1 / 0	13.96	4.73	18.69	33.01	-14.32
1912.50	5	64-QAM	H	150	8	1 / 24	13.16	4.68	17.84	33.01	-15.17
1855.00	10	QPSK	H	150	5	1 / 49	16.53	4.81	21.34	33.01	-11.67
1882.50	10	QPSK	H	150	44	1 / 0	15.87	4.73	20.60	33.01	-12.41
1910.00	10	QPSK	H	150	8	1 / 0	16.48	4.68	21.16	33.01	-11.85
1855.00	10	16-QAM	H	150	5	1 / 49	15.48	4.81	20.29	33.01	-12.72
1882.50	10	16-QAM	H	150	44	1 / 49	14.76	4.73	19.49	33.01	-13.52
1910.00	10	16-QAM	H	150	8	1 / 0	15.26	4.68	19.94	33.01	-13.07
1855.00	10	64-QAM	H	150	5	1 / 49	14.06	4.81	18.87	33.01	-14.14
1882.50	10	64-QAM	H	150	44	1 / 49	13.56	4.73	18.29	33.01	-14.72
1910.00	10	64-QAM	H	150	8	1 / 0	12.96	4.68	17.64	33.01	-15.37
1857.50	15	QPSK	H	150	8	1 / 0	16.37	4.80	21.17	33.01	-11.84
1882.50	15	QPSK	H	150	45	1 / 0	15.88	4.73	20.61	33.01	-12.40
1907.50	15	QPSK	H	150	15	1 / 0	16.24	4.68	20.92	33.01	-12.09
1857.50	15	16-QAM	H	150	8	1 / 0	15.19	4.80	19.99	33.01	-13.02
1882.50	15	16-QAM	H	150	45	1 / 74	14.26	4.73	18.99	33.01	-14.02
1907.50	15	16-QAM	H	150	15	1 / 0	15.30	4.68	19.98	33.01	-13.03
1857.50	15	64-QAM	H	150	8	1 / 0	14.06	4.80	18.86	33.01	-14.15
1882.50	15	64-QAM	H	150	45	1 / 0	13.46	4.73	18.19	33.01	-14.82
1907.50	15	64-QAM	H	150	15	1 / 74	13.86	4.68	18.54	33.01	-14.47
1860.00	20	QPSK	H	150	7	1 / 0	16.67	4.79	21.46	33.01	-11.55
1882.50	20	QPSK	H	150	47	1 / 0	15.71	4.73	20.44	33.01	-12.57
1905.00	20	QPSK	H	150	8	1 / 99	16.47	4.68	21.15	33.01	-11.86
1860.00	20	16-QAM	H	150	7	1 / 0	15.43	4.79	20.22	33.01	-12.79
1882.50	20	16-QAM	H	150	47	1 / 99	14.83	4.73	19.56	33.01	-13.45
1905.00	20	16-QAM	H	150	8	1 / 99	15.27	4.68	19.95	33.01	-13.06
1860.00	20	64-QAM	H	150	7	1 / 99	13.86	4.79	18.65	33.01	-14.36
1882.50	20	64-QAM	H	150	47	1 / 99	13.06	4.73	17.79	33.01	-15.22
1905.00	20	64-QAM	H	150	8	1 / 99	13.04	4.68	17.72	33.01	-15.29
1860.00	20	QPSK	V	150	273	1 / 0	16.49	4.79	21.28	33.01	-11.73
1860.00	20 (WCP)	QPSK	H	150	347	1 / 0	16.26	4.79	21.05	33.01	-11.96

Table 7-8. EIRP Data (Band 2/25)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	H	150	360	25 / 0	14.69	5.73	20.42	33.01	-12.59
2593.00	5	QPSK	H	150	108	1 / 0	16.22	6.07	22.29	33.01	-10.72
2687.50	5	QPSK	H	150	360	25 / 0	14.51	6.48	20.99	33.01	-12.02
2498.50	5	16-QAM	H	150	360	25 / 0	13.78	5.73	19.51	33.01	-13.50
2593.00	5	16-QAM	H	150	108	1 / 0	15.21	6.07	21.28	33.01	-11.73
2687.50	5	16-QAM	H	150	360	25 / 0	13.81	6.48	20.29	33.01	-12.72
2498.50	5	64-QAM	H	150	360	25 / 0	12.31	5.73	18.04	33.01	-14.97
2593.00	5	64-QAM	H	150	108	1 / 0	13.81	6.07	19.88	33.01	-13.13
2687.50	5	64-QAM	H	150	360	25 / 0	12.21	6.48	18.69	33.01	-14.32
2501.00	10	QPSK	H	150	217	1 / 49	16.88	5.73	22.61	33.01	-10.40
2593.00	10	QPSK	H	150	227	1 / 0	15.60	6.07	21.67	33.01	-11.34
2685.00	10	QPSK	H	150	60	1 / 0	15.39	6.47	21.86	33.01	-11.15
2501.00	10	16-QAM	H	150	217	1 / 49	15.94	5.73	21.67	33.01	-11.34
2593.00	10	16-QAM	H	150	227	1 / 0	15.00	6.07	21.07	33.01	-11.94
2685.00	10	16-QAM	H	150	60	1 / 0	14.26	6.47	20.73	33.01	-12.28
2501.00	10	64-QAM	H	150	217	1 / 49	14.51	5.73	20.24	33.01	-12.77
2593.00	10	64-QAM	H	150	227	1 / 0	13.33	6.07	19.40	33.01	-13.61
2685.00	10	64-QAM	H	150	60	1 / 0	12.81	6.47	19.28	33.01	-13.73
2503.50	15	QPSK	H	150	222	1 / 0	13.44	5.74	19.18	33.01	-13.83
2593.00	15	QPSK	H	150	224	1 / 0	16.08	6.07	22.15	33.01	-10.86
2682.50	15	QPSK	H	150	191	1 / 0	16.06	6.46	22.52	33.01	-10.49
2503.50	15	16-QAM	H	150	222	1 / 0	12.51	5.74	18.25	33.01	-14.76
2593.00	15	16-QAM	H	150	224	1 / 0	14.77	6.07	20.84	33.01	-12.17
2682.50	15	16-QAM	H	150	191	1 / 0	15.00	6.46	21.46	33.01	-11.55
2503.50	15	64-QAM	H	150	222	1 / 0	11.31	5.74	17.05	33.01	-15.96
2593.00	15	64-QAM	H	150	224	1 / 0	13.81	6.07	19.88	33.01	-13.13
2682.50	15	64-QAM	H	150	191	1 / 0	10.31	6.46	16.77	33.01	-16.24
2506.00	20	QPSK	H	150	227	1 / 0	16.81	5.75	22.56	33.01	-10.45
2593.00	20	QPSK	H	150	228	1 / 0	15.83	6.07	21.90	33.01	-11.11
2680.00	20	QPSK	H	150	25	1 / 0	14.21	6.45	20.66	33.01	-12.35
2506.00	20	16-QAM	H	150	227	1 / 0	15.84	5.75	21.59	33.01	-11.42
2593.00	20	16-QAM	H	150	228	1 / 0	14.93	6.07	21.00	33.01	-12.01
2680.00	20	16-QAM	H	150	25	1 / 0	13.31	6.45	19.76	33.01	-13.25
2506.00	20	64-QAM	H	150	227	1 / 0	14.76	5.75	20.51	33.01	-12.50
2593.00	20	64-QAM	H	150	228	1 / 0	13.31	6.07	19.38	33.01	-13.63
2680.00	20	64-QAM	H	150	25	1 / 0	11.81	6.45	18.26	33.01	-14.75
2501.00	10	QPSK	V	150	112	1 / 99	14.18	5.73	19.91	33.01	-13.10
2501.00	10 (WCP)	QPSK	H	150	105	1 / 99	14.91	5.73	20.64	33.01	-12.37

Table 7-9. EIRP Data (Band 41)

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7.7 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(c) §27.53(f) §27.53(g) §27.53(h) §27.53(m)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

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Test Setup

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

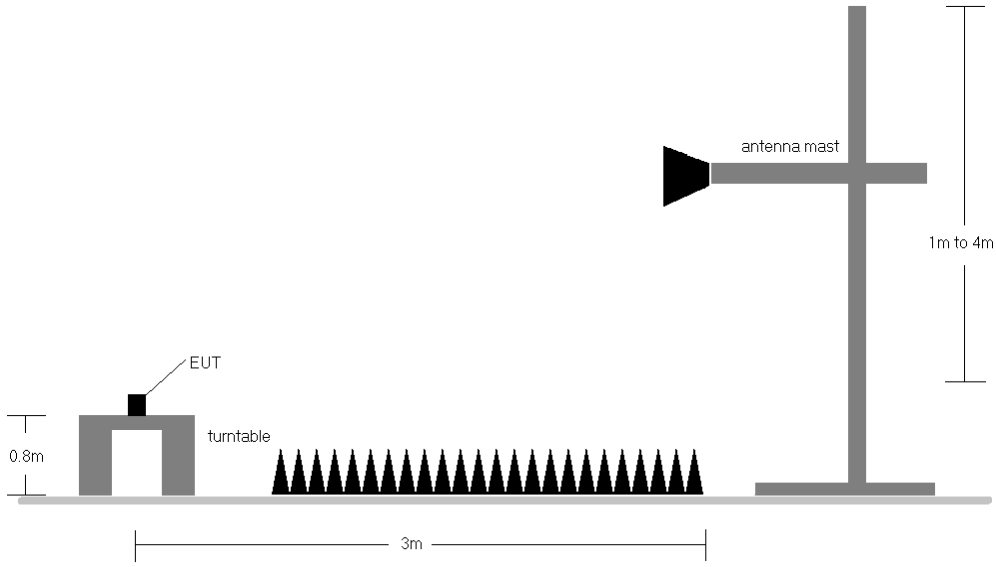

Figure 7-7. Test Instrument & Measurement Setup

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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OPERATING FREQUENCY:	700.50	MHz		
CHANNEL:	23025			
MEASURED OUTPUT POWER:	13.07	dBm	=	0.020 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	26.07	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1401.00	H	-	-	-74.62	5.91	-68.70	81.8
2101.50	H	127	31	-68.47	6.79	-61.68	74.7
2802.00	H	-	-	-72.09	8.12	-63.97	77.0

Table 7-10. Radiated Spurious Data (Band 12 – Low Channel)

OPERATING FREQUENCY:	707.50	MHz		
CHANNEL:	23095			
MEASURED OUTPUT POWER:	14.16	dBm	=	0.026 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	27.16	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	H	-	-	-70.81	5.96	-64.85	79.0
2122.50	H	-	-	-72.03	6.84	-65.18	79.3
2830.00	H	100	40	-69.90	8.13	-61.77	75.9
3537.50	H	-	-	-68.30	7.79	-60.51	74.7

Table 7-11. Radiated Spurious Data (Band 12 – Mid Channel)

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OPERATING FREQUENCY:	714.50	MHz		
CHANNEL:	23165			
MEASURED OUTPUT POWER:	15.61	dBm	=	0.036 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	28.61	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1429.00	H	-	-	-75.03	6.02	-69.02	84.6
2143.50	H	-	-	-72.57	6.90	-65.68	81.3

Table 7-12. Radiated Spurious Data (Band 12 – High Channel)

OPERATING FREQUENCY:	714.50	MHz		
CHANNEL:	23165			
MEASURED OUTPUT POWER:	14.40	dBm	=	0.028 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	27.40	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1429.00	H	-	-	-76.57	6.02	-70.56	85.0
2143.50	H	-	-	-72.35	6.90	-65.46	79.9

Table 7-13. Radiated Spurious Data with WCP (Band 12 – High Channel)

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OPERATING FREQUENCY:	782.00	MHz		
CHANNEL:	23230			
MEASURED OUTPUT POWER:	20.45	dBm	=	0.111 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.45	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	H	219	380	-69.79	7.00	-62.79	83.2
3128.00	H	-	-	-68.87	7.21	-61.65	82.1

Table 7-14. Radiated Spurious Data (Band 13 – Mid Channel)

MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	H	129	227	-74.79	6.41	-68.38	-28.4

Table 7-15. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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OPERATING FREQUENCY:	782.00	MHz		
CHANNEL:	23230			
MEASURED OUTPUT POWER:	18.97	dBm	=	0.079 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	31.97	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	H	-	-	-70.03	7.00	-63.03	82.0
3128.00	H	-	-	-68.88	7.21	-61.66	80.6

Table 7-16. Radiated Spurious Data with WCP (Band 13 – Mid Channel)

MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	H	-	-	-73.88	6.41	-67.47	-27.5

Table 7-17. Radiated Spurious Data with WCP (Band 13 – 1559-1610MHz Band)

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OPERATING FREQUENCY:	825.50	MHz		
CHANNEL:	26805			
MEASURED OUTPUT POWER:	19.71	dBm	=	0.094 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.71	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
1651.00	H	-	-	-74.56	6.26	-68.29	88.0
2476.50	H	-	-	-73.36	6.84	-66.52	86.2

Table 7-18. Radiated Spurious Data (Band 5/26 – Low Channel)

OPERATING FREQUENCY:	836.50	MHz		
CHANNEL:	26915			
MEASURED OUTPUT POWER:	20.52	dBm	=	0.113 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.52	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	H	-	-	-74.17	6.21	-67.96	88.5
2509.50	H	-	-	-72.99	6.86	-66.13	86.6

Table 7-19. Radiated Spurious Data (Band 5/26 – Mid Channel)

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OPERATING FREQUENCY:	847.50	MHz		
CHANNEL:	27025			
MEASURED OUTPUT POWER:	21.43	dBm	=	0.139 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.43	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1695.00	H	-	-	-72.46	6.15	-66.31	87.7
2542.50	H	-	-	-72.99	6.93	-66.07	87.5

Table 7-20. Radiated Spurious Data (Band 5/26 – High Channel)

OPERATING FREQUENCY:	847.50	MHz		
CHANNEL:	27025			
MEASURED OUTPUT POWER:	17.63	dBm	=	0.058 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	30.63	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1695.00	H	-	-	-71.33	6.15	-65.18	82.8
2542.50	H	-	-	-71.42	6.93	-64.50	82.1

Table 7-21. Radiated Spurious Data with WCP (Band 5/26 – High Channel)

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OPERATING FREQUENCY:	1720.00	MHz		
CHANNEL:	132072			
MEASURED OUTPUT POWER:	21.08	dBm	=	0.128 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.08	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3440.00	H	120	201	-62.30	9.70	-52.61	73.7
5160.00	H	-	-	-64.33	10.87	-53.46	74.5

Table 7-22. Radiated Spurious Data (Band 4/66 – Low Channel)

OPERATING FREQUENCY:	1745.00	MHz		
CHANNEL:	132322			
MEASURED OUTPUT POWER:	21.01	dBm	=	0.126 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.01	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3490.00	H	101	293	-60.09	9.85	-50.24	71.2
5235.00	H	-	-	-64.43	10.88	-53.55	74.6

Table 7-23. Radiated Spurious Data (Band 4/66 – Mid Channel)

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OPERATING FREQUENCY:	1770.00	MHz		
CHANNEL:	132572			
MEASURED OUTPUT POWER:	20.62	dBm	=	0.115 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.62	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3540.00	H	101	142	-57.20	9.95	-47.25	67.9
5310.00	H	-	-	-64.80	11.02	-53.78	74.4

Table 7-24. Radiated Spurious Data (Band 4/66 – High Channel)

OPERATING FREQUENCY:	1720.00	MHz		
CHANNEL:	132072			
MEASURED OUTPUT POWER:	20.98	dBm	=	0.125 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.98	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3440.00	H	101	292	-62.63	9.70	-52.94	73.9
5160.00	H	-	-	-64.39	10.87	-53.52	74.5

Table 7-25. Radiated Spurious Data with WCP (Band 4/66 - Low Channel)

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OPERATING FREQUENCY:	1860.00	MHz		
CHANNEL:	26140			
MEASURED OUTPUT POWER:	21.46	dBm	=	0.140 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.46	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3720.00	H	100	277	-58.75	9.95	-48.80	70.3
5580.00	H	-	-	-64.83	11.25	-53.58	75.0

Table 7-26. Radiated Spurious Data (Band 2/25 – Low Channel)

OPERATING FREQUENCY:	1882.50	MHz		
CHANNEL:	26365			
MEASURED OUTPUT POWER:	20.44	dBm	=	0.111 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.44	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3765.00	H	101	288	-58.30	9.76	-48.53	69.0
5647.50	H	-	-	-64.76	11.36	-53.40	73.8

Table 7-27. Radiated Spurious Data (Band 2/25 – Mid Channel)

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OPERATING FREQUENCY:	1905.00	MHz		
CHANNEL:	26590			
MEASURED OUTPUT POWER:	21.15	dBm	=	0.130 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.15	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3810.00	H	306	216	-57.79	9.59	-48.21	69.4
5715.00	H	-	-	-64.72	11.43	-53.29	74.4

Table 7-28. Radiated Spurious Data (Band 2/25 – High Channel)

OPERATING FREQUENCY:	1860.00	MHz		
CHANNEL:	26140			
MEASURED OUTPUT POWER:	21.05	dBm	=	0.127 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.05	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3720.00	H	142	240	-58.47	9.95	-48.52	69.6
5580.00	H	-	-	-62.89	11.25	-51.64	72.7

Table 7-29. Radiated Spurious Data with WCP (Band 2/25 – Low Channel)

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OPERATING FREQUENCY:	2501.00	MHz		
CHANNEL:	39700			
MEASURED OUTPUT POWER:	22.61	dBm	=	0.183 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	47.61	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5002.00	H	-	-	-60.98	11.18	-49.79	72.4
7503.00	H	-	-	-53.55	11.16	-42.39	65.0

Table 7-30. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY:	2593.00	MHz		
CHANNEL:	40620			
MEASURED OUTPUT POWER:	21.67	dBm	=	0.147 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	46.67	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5186.00	H	-	-	-60.52	10.83	-49.69	71.4
7779.00	H	-	-	-52.36	11.60	-40.76	62.4

Table 7-31. Radiated Spurious Data (Band 41 – Mid Channel)

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OPERATING FREQUENCY:	2685.00	MHz		
CHANNEL:	41540			
MEASURED OUTPUT POWER:	21.86	dBm	=	0.154 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	46.86	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5370.00	H	-	-	-59.51	11.09	-48.42	70.3
8055.00	H	-	-	-51.08	11.55	-39.53	61.4

Table 7-32. Radiated Spurious Data (Band 41 – High Channel)

OPERATING FREQUENCY:	2501.00	MHz		
CHANNEL:	39700			
MEASURED OUTPUT POWER:	20.64	dBm	=	0.116 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	10.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	45.64	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5002.00	H	-	-	-62.60	11.18	-51.41	72.1
7503.00	H	-	-	-53.72	11.16	-42.56	63.2

Table 7-33. Radiated Spurious Data with WCP (Band 41 – Low Channel)

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7.8 Frequency Stability / Temperature Variation

§2.1055 §22.355 §24.235 §27.54

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-D-2010. The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-D-2010

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None

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Band 12/17 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,499,973	-27	-0.0000039
100 %		- 30	707,499,972	-28	-0.0000040
100 %		- 20	707,499,902	-98	-0.0000139
100 %		- 10	707,499,879	-121	-0.0000171
100 %		0	707,499,873	-127	-0.0000180
100 %		+ 10	707,499,952	-48	-0.0000068
100 %		+ 20	707,499,944	-56	-0.0000079
100 %		+ 30	707,499,862	-138	-0.0000195
100 %		+ 40	707,499,848	-152	-0.0000214
100 %		+ 50	707,499,857	-143	-0.0000202
BATT. ENDPOINT	3.45	+ 20	707,499,978	-22	-0.0000031

Table 7-34. Frequency Stability Data (Band 12/17)

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Band 12/17 Frequency Stability Measurements

§2.1055 §27.54

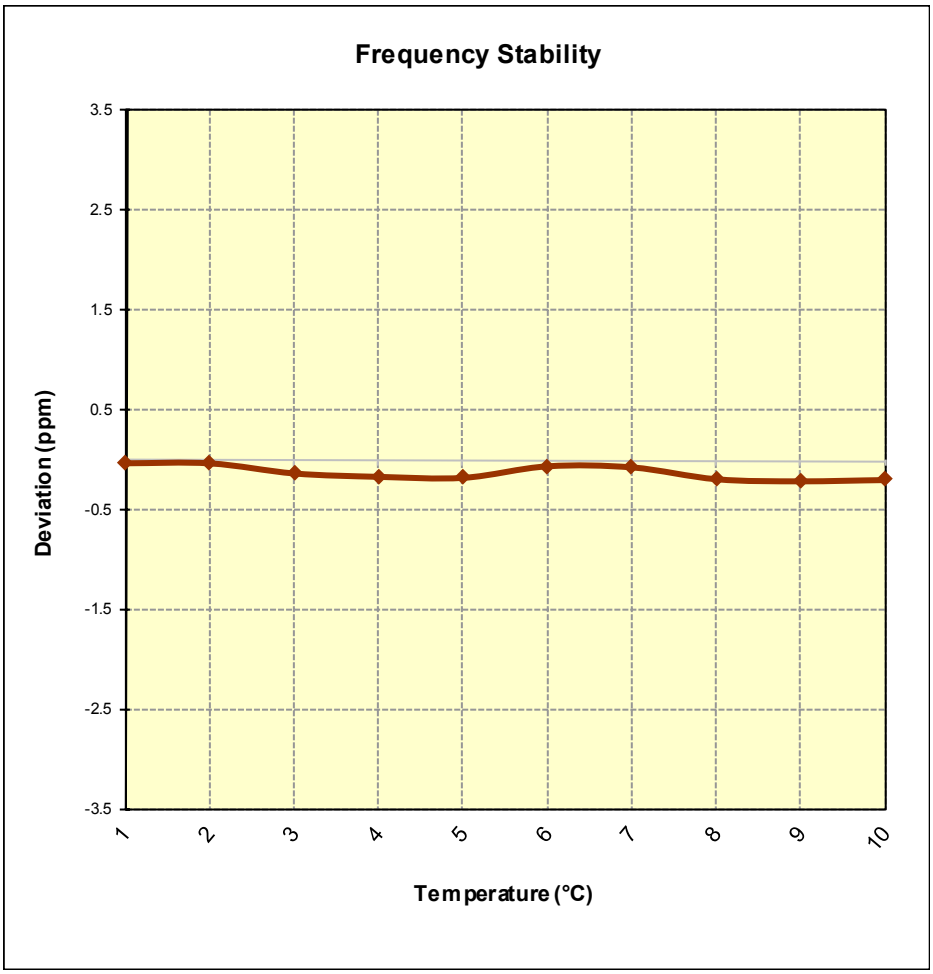

Figure 7-8. Frequency Stability Graph (Band 12/17)

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Band 13 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	781,999,855	-145	-0.0000185
100 %		- 30	781,999,905	-95	-0.0000122
100 %		- 20	781,999,938	-62	-0.0000079
100 %		- 10	781,999,801	-199	-0.0000254
100 %		0	781,999,884	-116	-0.0000149
100 %		+ 10	781,999,805	-195	-0.0000250
100 %		+ 20	781,999,994	-6	-0.0000008
100 %		+ 30	781,999,847	-153	-0.0000195
100 %		+ 40	781,999,831	-169	-0.0000216
100 %		+ 50	781,999,841	-159	-0.0000203
BATT. ENDPOINT	3.45	+ 20	781,999,875	-125	-0.0000159

Table 7-35. Frequency Stability Data (Band 13)

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Band 13 Frequency Stability Measurements

§2.1055 §27.54

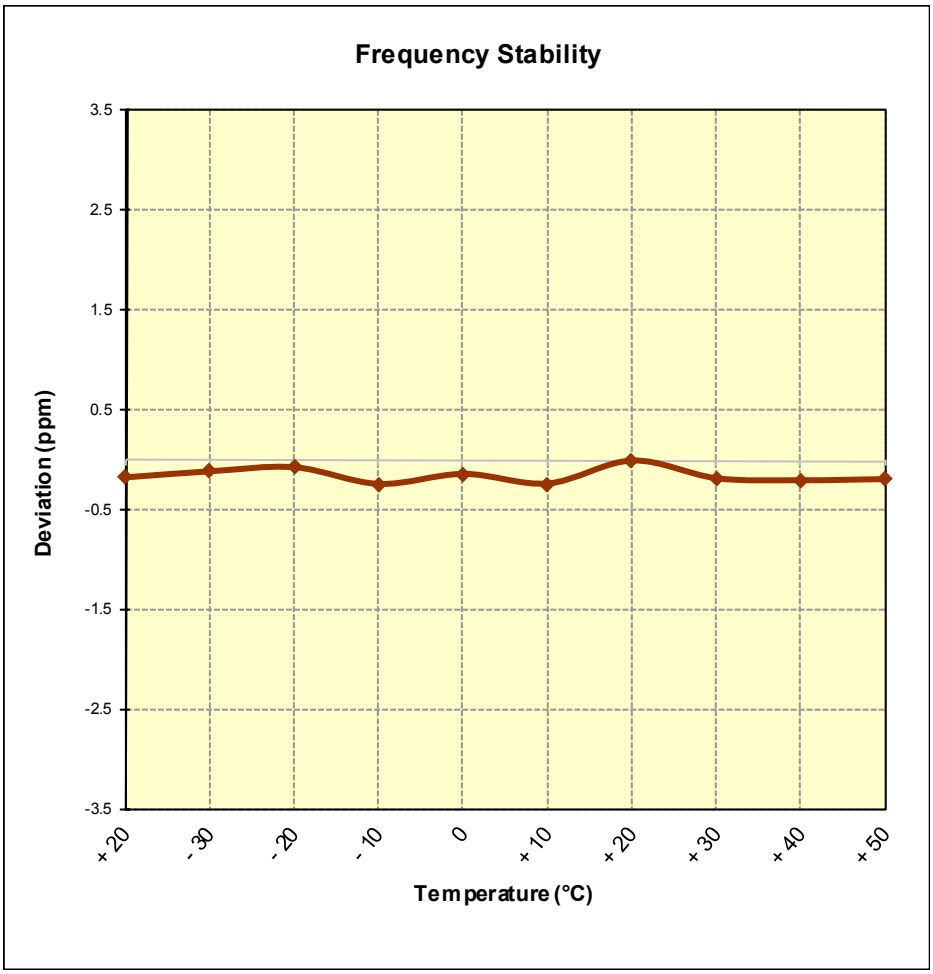

Figure 7-9. Frequency Stability Graph (Band 13)

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Band 5/26 Frequency Stability Measurements

§2.1055 §22.355

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	831,499,853	-147	-0.0000177
100 %		- 30	831,499,884	-116	-0.0000140
100 %		- 20	831,499,968	-32	-0.0000039
100 %		- 10	831,499,971	-29	-0.0000035
100 %		0	831,499,805	-195	-0.0000234
100 %		+ 10	831,499,965	-35	-0.0000042
100 %		+ 20	831,499,937	-63	-0.0000076
100 %		+ 30	831,499,880	-120	-0.0000145
100 %		+ 40	831,499,900	-100	-0.0000120
100 %		+ 50	831,499,864	-136	-0.0000163
BATT. ENDPOINT	3.45	+ 20	831,499,800	-200	-0.0000240

Table 7-36. Frequency Stability Data (Band 5/26)

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Band 5/26 Frequency Stability Measurements

§2.1055 §22.355

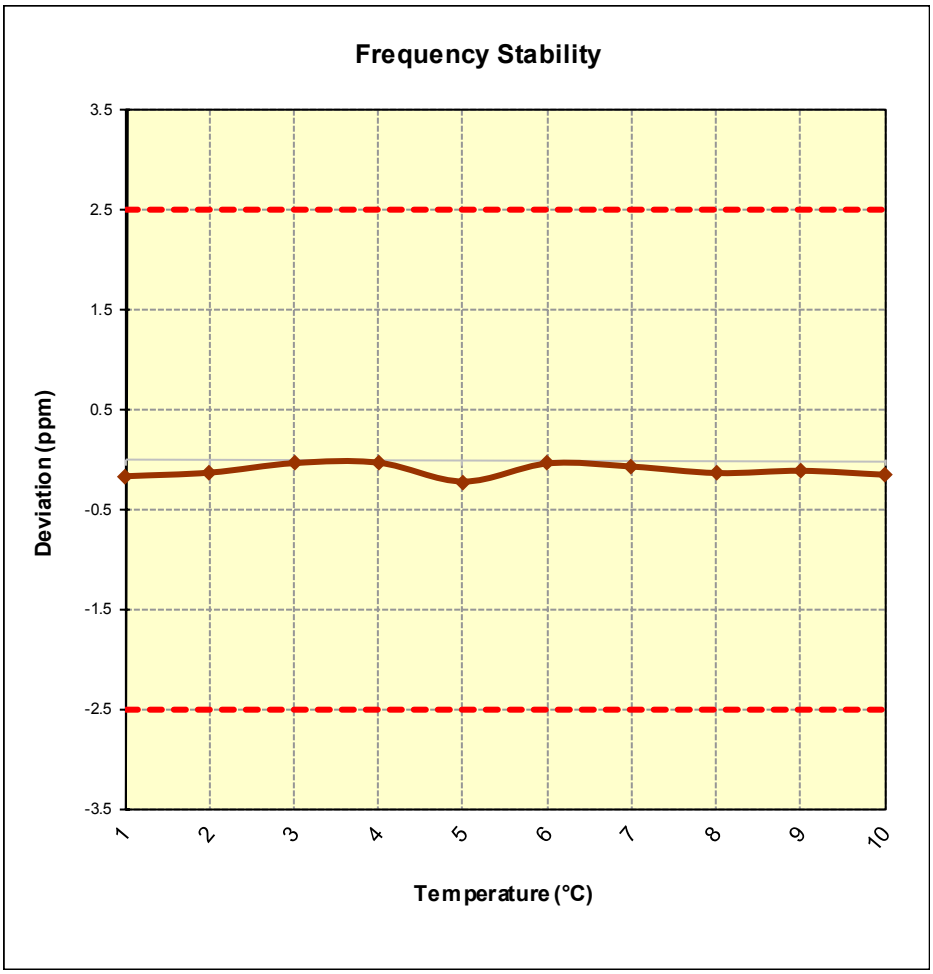

Figure 7-10. Frequency Stability Graph (Band 5/26)

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Band 4/66 Frequency Stability Measurements

§2.1055 §§27.54

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,744,999,975	-25	-0.0000014
100 %		- 30	1,744,999,934	-66	-0.0000038
100 %		- 20	1,744,999,890	-110	-0.0000063
100 %		- 10	1,744,999,962	-38	-0.0000022
100 %		0	1,744,999,981	-19	-0.0000011
100 %		+ 10	1,744,999,815	-185	-0.0000106
100 %		+ 20	1,744,999,911	-89	-0.0000051
100 %		+ 30	1,744,999,983	-17	-0.0000010
100 %		+ 40	1,744,999,999	-1	-0.0000001
100 %		+ 50	1,744,999,976	-24	-0.0000014
BATT. ENDPOINT	3.45	+ 20	1,744,999,953	-47	-0.0000027

Table 7-37. Frequency Stability Data (Band 4/66)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 4/66 Frequency Stability Measurements

§2.1055 §§27.54

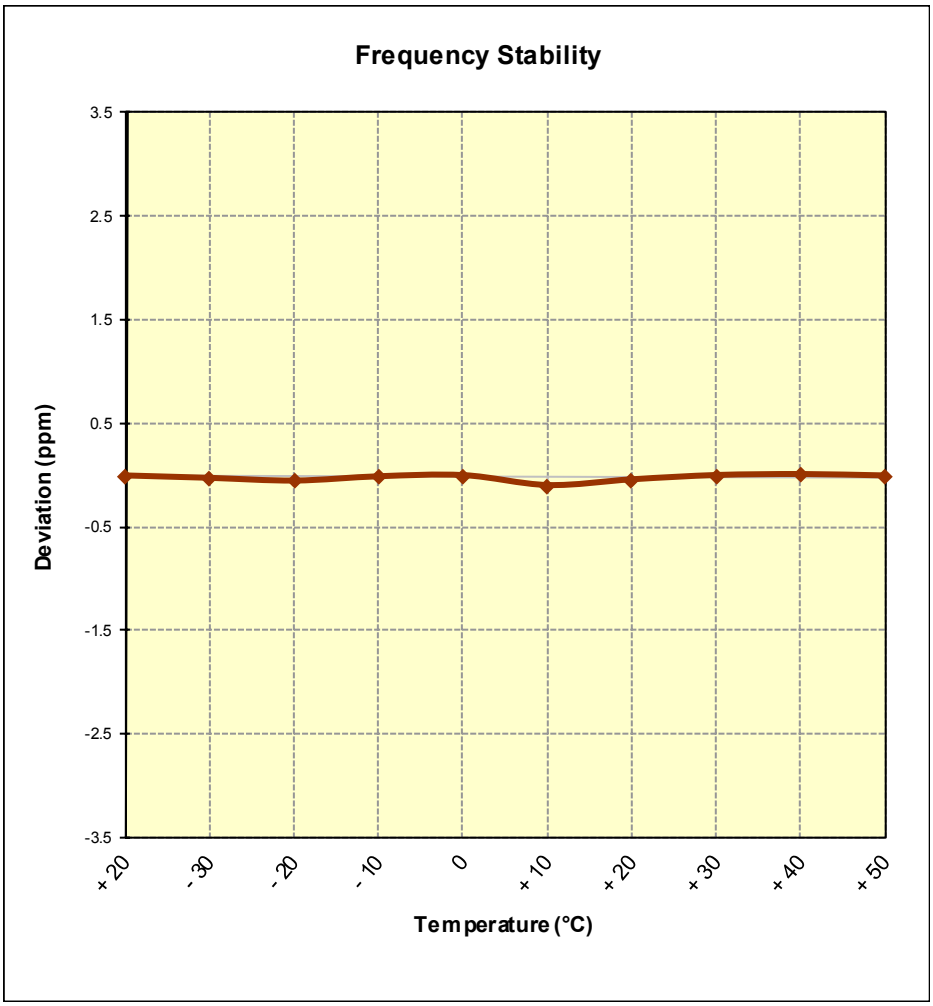

Figure 7-11. Frequency Stability Graph (Band 4/66)

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Band 2/25 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,882,499,877	-123	-0.0000065
100 %		- 30	1,882,499,870	-130	-0.0000069
100 %		- 20	1,882,499,860	-140	-0.0000074
100 %		- 10	1,882,499,992	-8	-0.0000004
100 %		0	1,882,499,841	-159	-0.0000085
100 %		+ 10	1,882,499,957	-43	-0.0000023
100 %		+ 20	1,882,499,800	-200	-0.0000106
100 %		+ 30	1,882,499,969	-31	-0.0000016
100 %		+ 40	1,882,499,917	-83	-0.0000044
100 %		+ 50	1,882,499,942	-58	-0.0000031
BATT. ENDPOINT	3.45	+ 20	1,882,499,922	-78	-0.0000041

Table 7-38. Frequency Stability Data (Band 2/25)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 2/25 Frequency Stability Measurements

§2.1055 §24.235

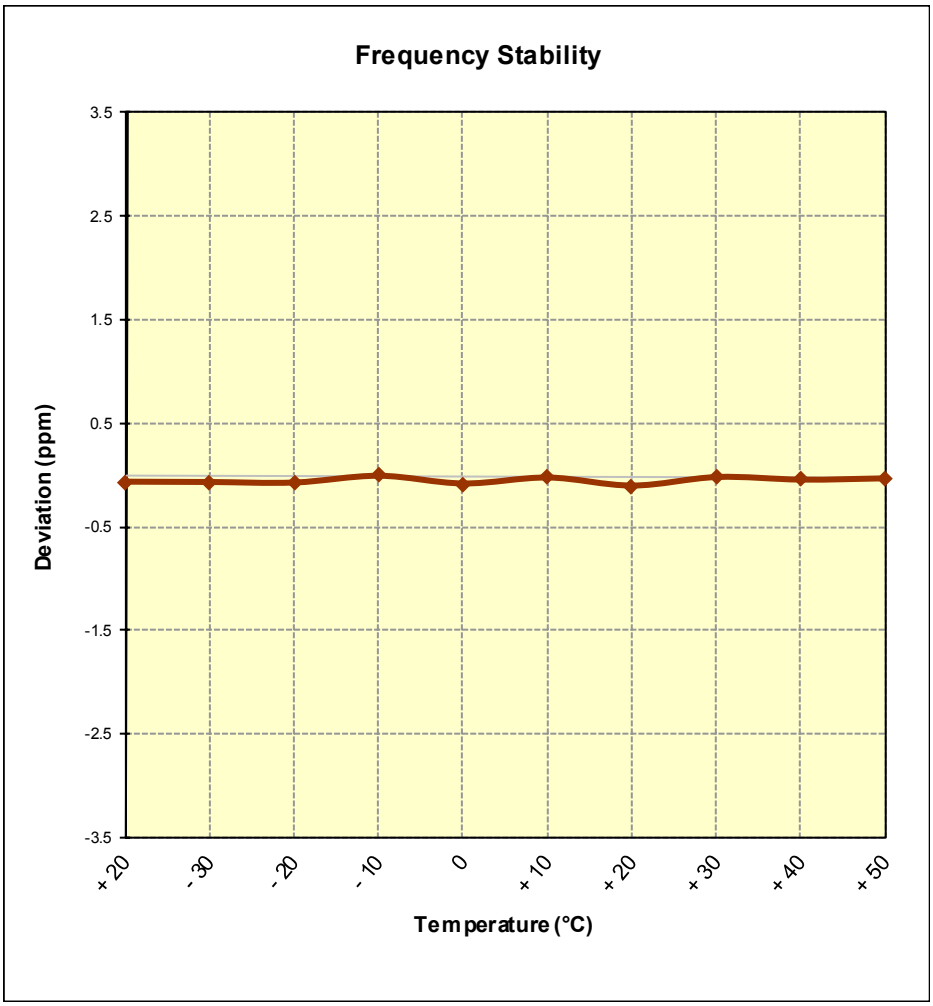

Figure 7-12. Frequency Stability Graph (Band 2/25)

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Band 41 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,592,999,824	-176	-0.0000068
100 %		- 30	2,592,999,818	-182	-0.0000070
100 %		- 20	2,592,999,906	-94	-0.0000036
100 %		- 10	2,592,999,872	-128	-0.0000049
100 %		0	2,592,999,838	-162	-0.0000063
100 %		+ 10	2,592,999,985	-15	-0.0000006
100 %		+ 20	2,592,999,845	-155	-0.0000060
100 %		+ 30	2,592,999,998	-2	-0.0000001
100 %		+ 40	2,592,999,923	-77	-0.0000030
100 %		+ 50	2,592,999,903	-97	-0.0000037
BATT. ENDPOINT	3.45	+ 20	2,592,999,865	-135	-0.0000052

Table 7-39. Frequency Stability Data (Band 41)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 41 Frequency Stability Measurements

§2.1055 §27.54

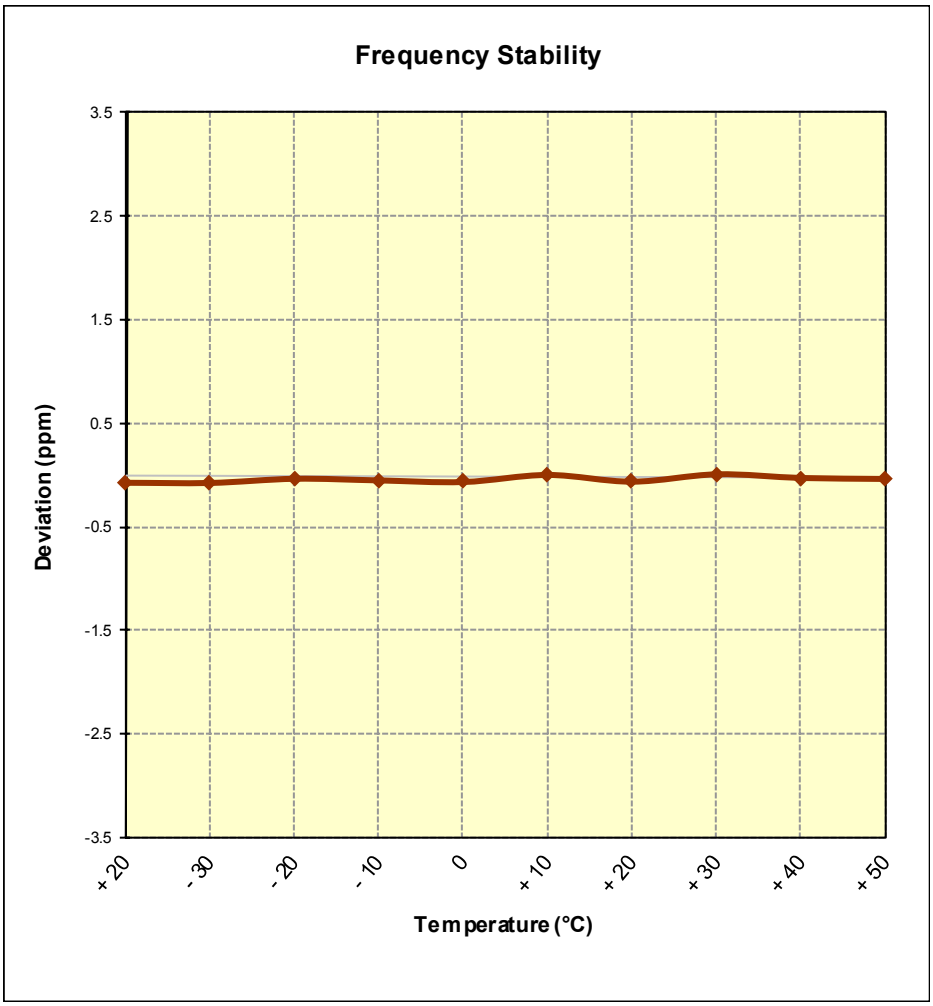

Figure 7-13. Frequency Stability Graph (Band 41)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG950F** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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