

## 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)

### Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

### Test Procedure Used

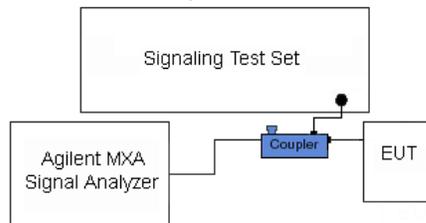
KDB 971168 D01 v02r02 – Section 6.0

### 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  $\geq$  1% of the emission bandwidth
4. VBW  $\geq$  3 x RBW
5. Detector = RMS
6. Number of sweep points  $\geq$  2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

### Test Setup

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



**Figure 7-3. Test Instrument & Measurement Setup**

### Test Notes

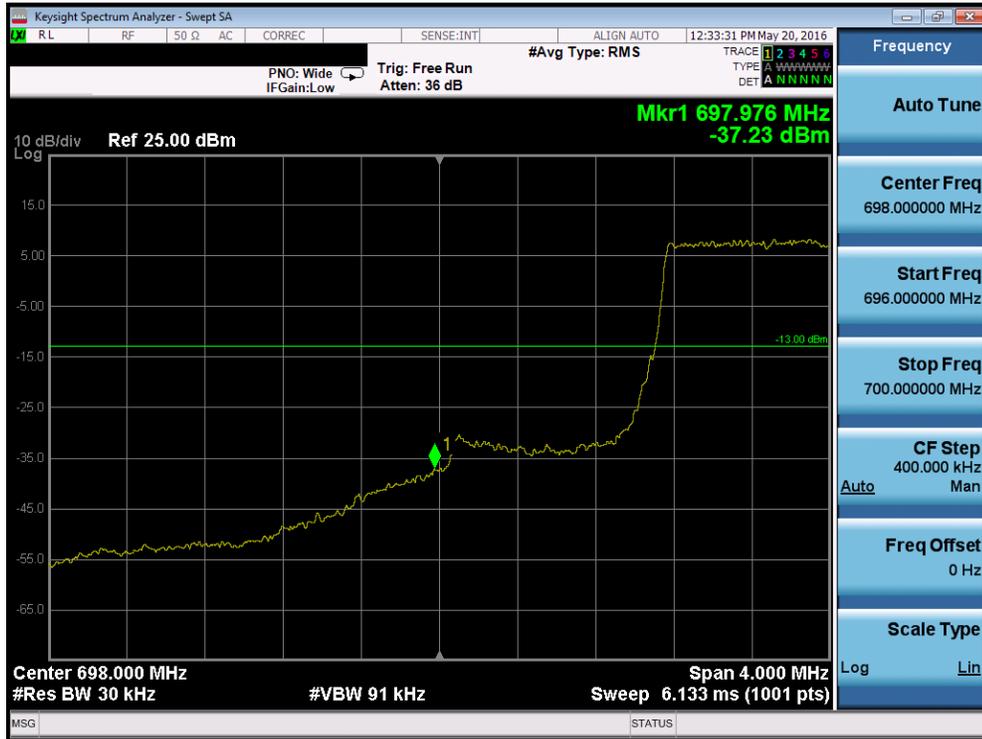
Per 22.917(b), 24.238(a), 27.53(h), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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

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

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



Plot 7-93. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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Plot 7-94. Lower Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

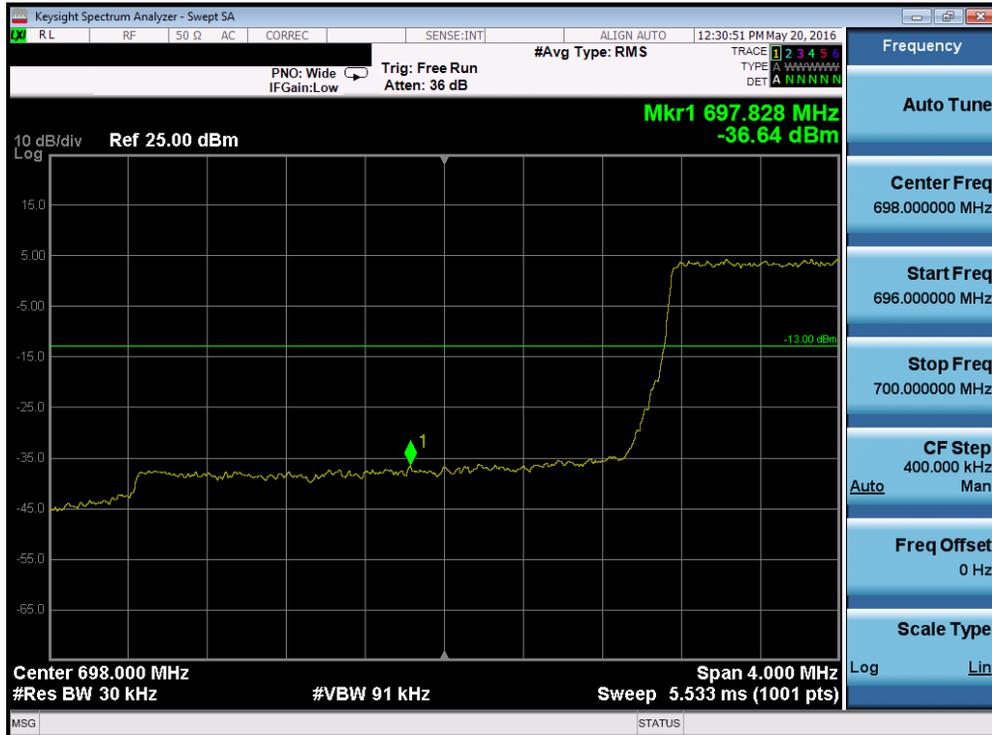


Plot 7-95. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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Plot 7-96. Upper Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

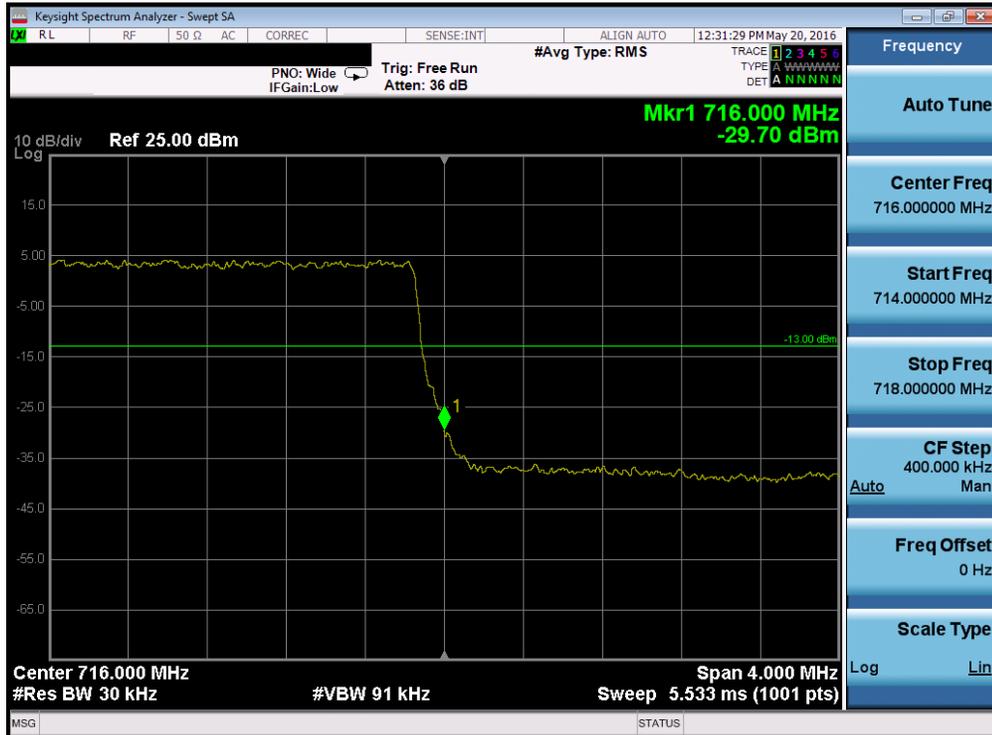


Plot 7-97. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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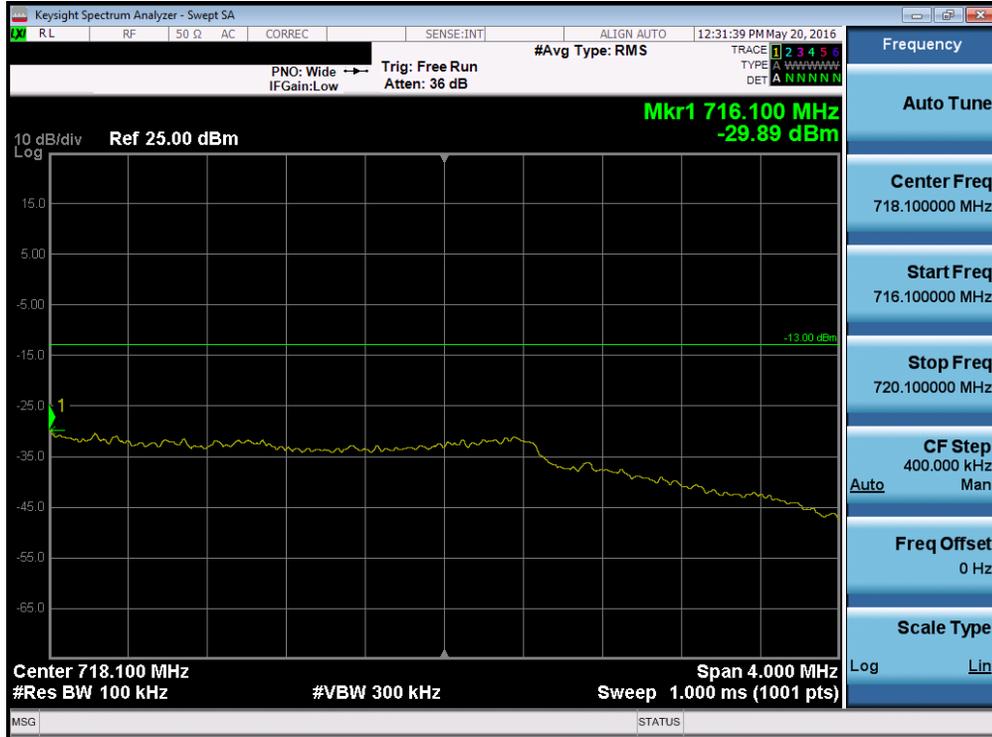


Plot 7-98. Lower Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

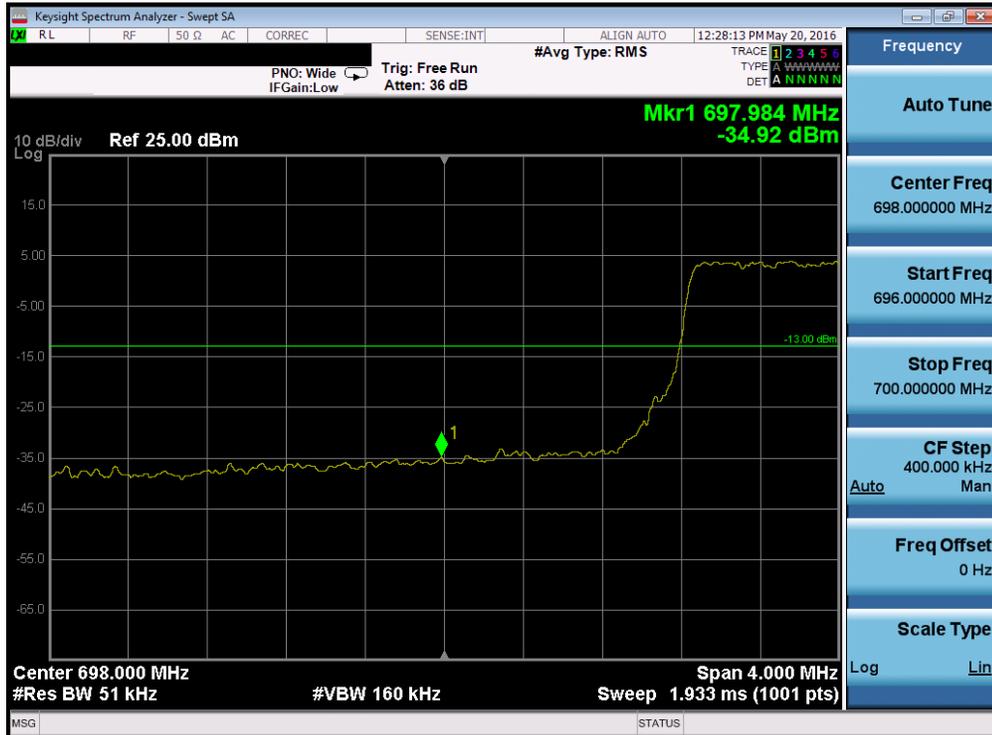


Plot 7-99. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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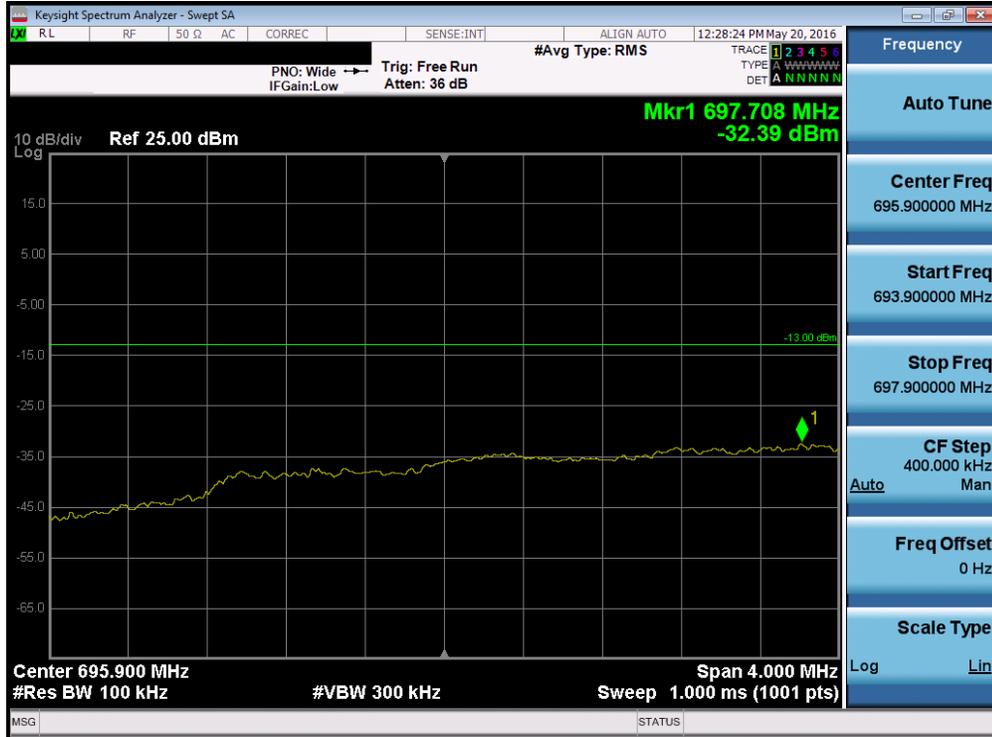


Plot 7-100. Upper Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

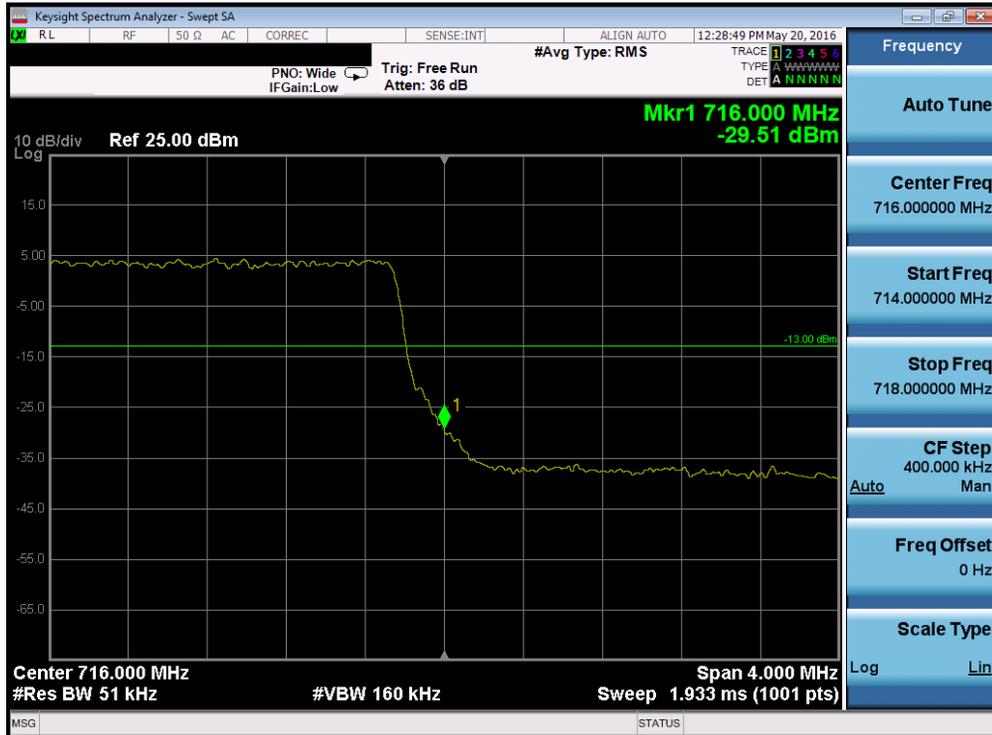


Plot 7-101. Lower Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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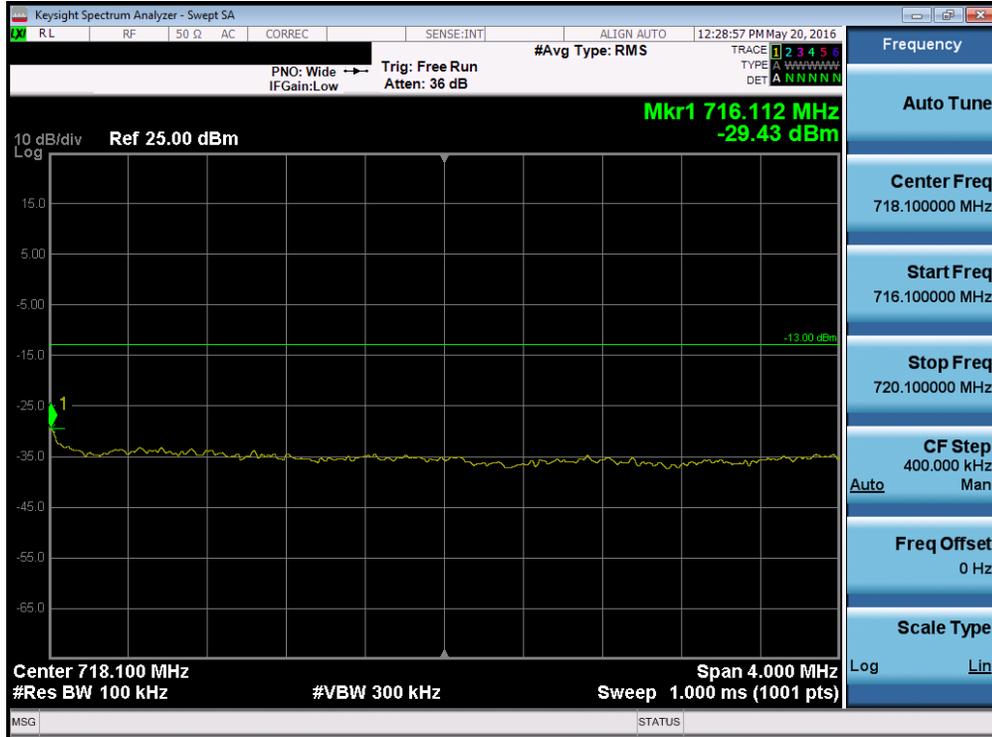


Plot 7-102. Lower Extended Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)

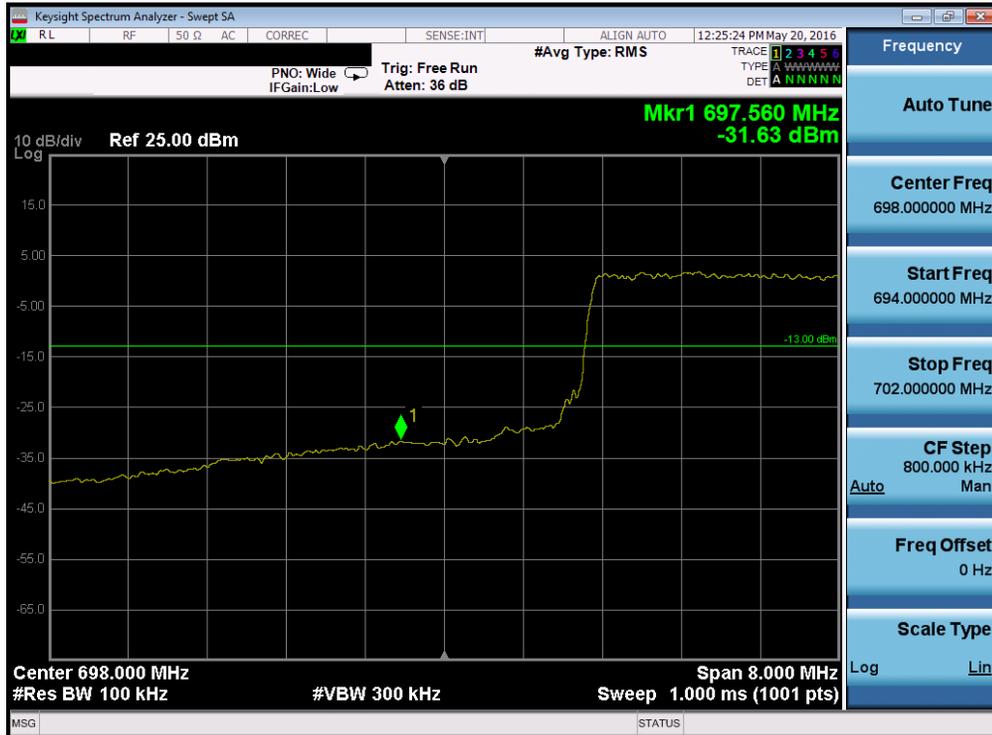


Plot 7-103. Upper Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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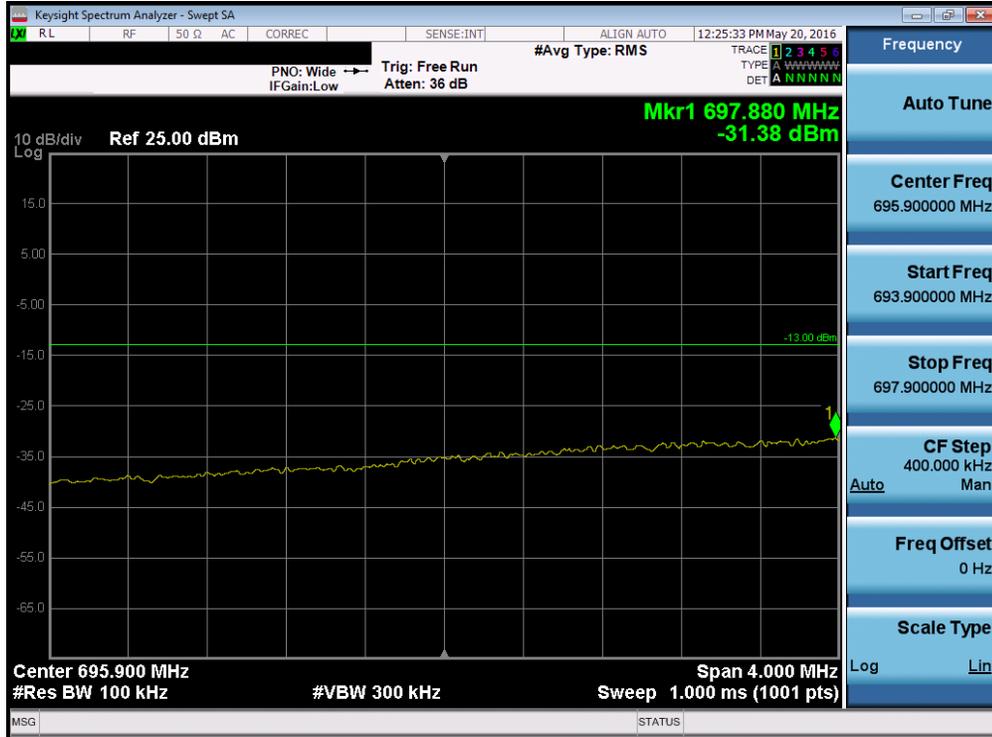


Plot 7-104. Upper Extended Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)

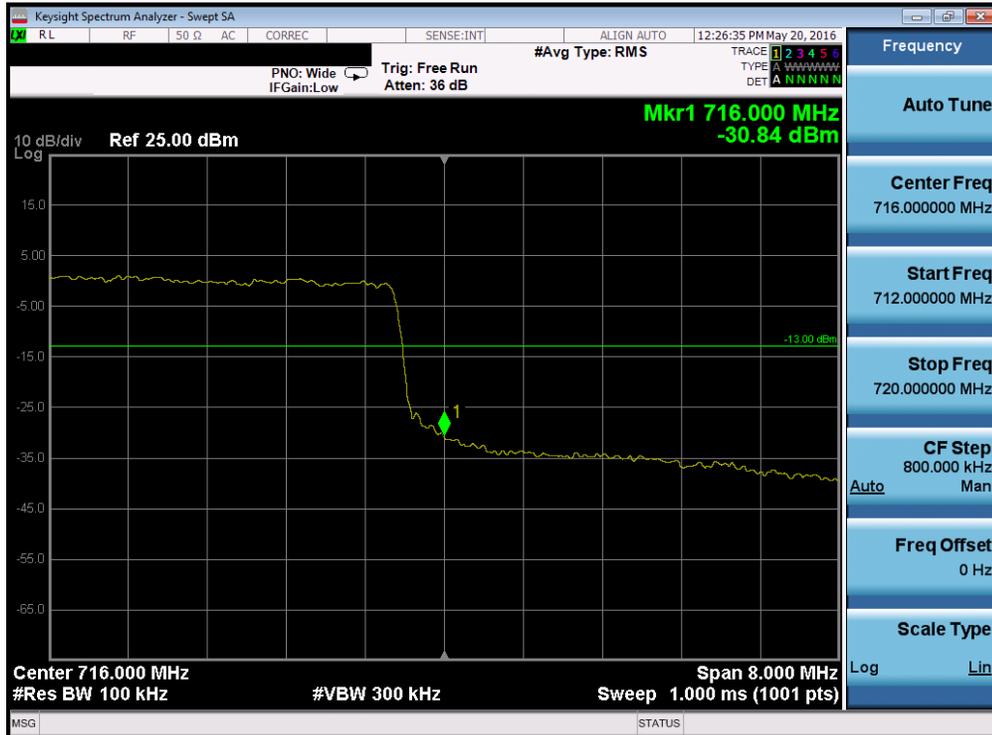


Plot 7-105. Lower Band Edge Plot (Band 12/17 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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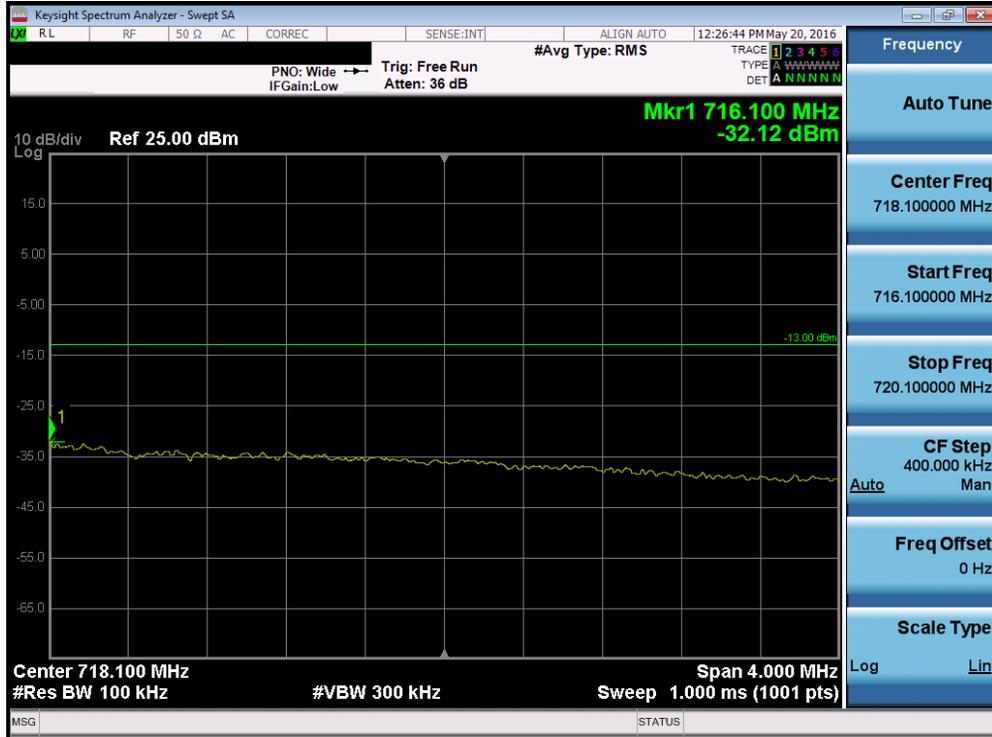


Plot 7-106. Lower Extended Band Edge Plot (Band 12/17 – 10.0MHz QPSK – RB Size 50)

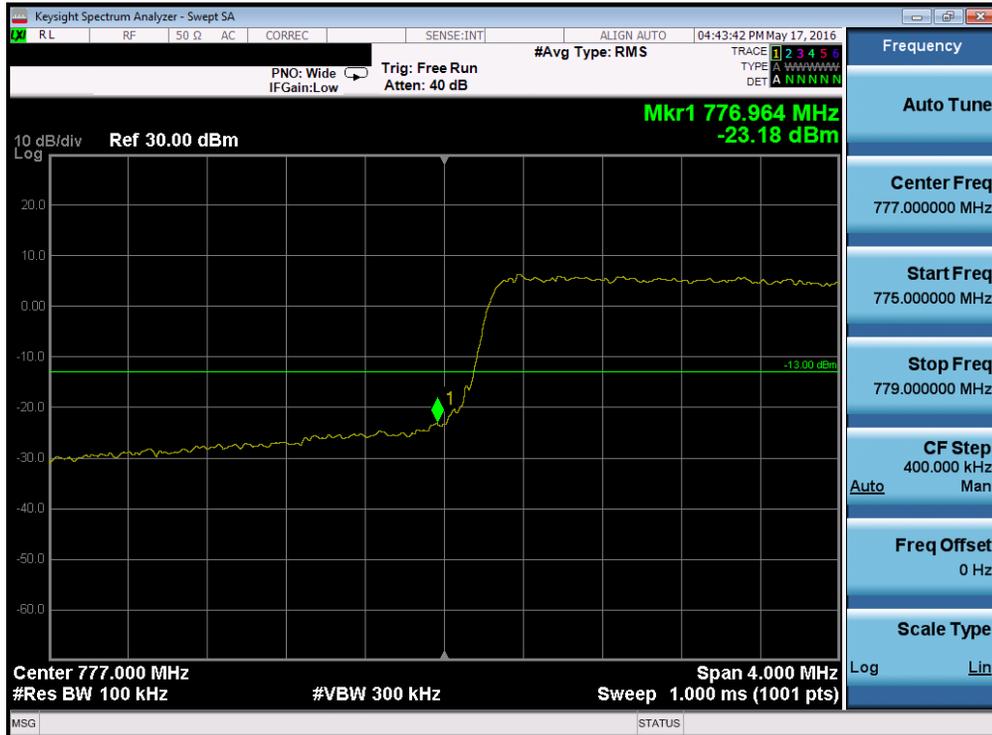


Plot 7-107. Upper Band Edge Plot (Band 12/17 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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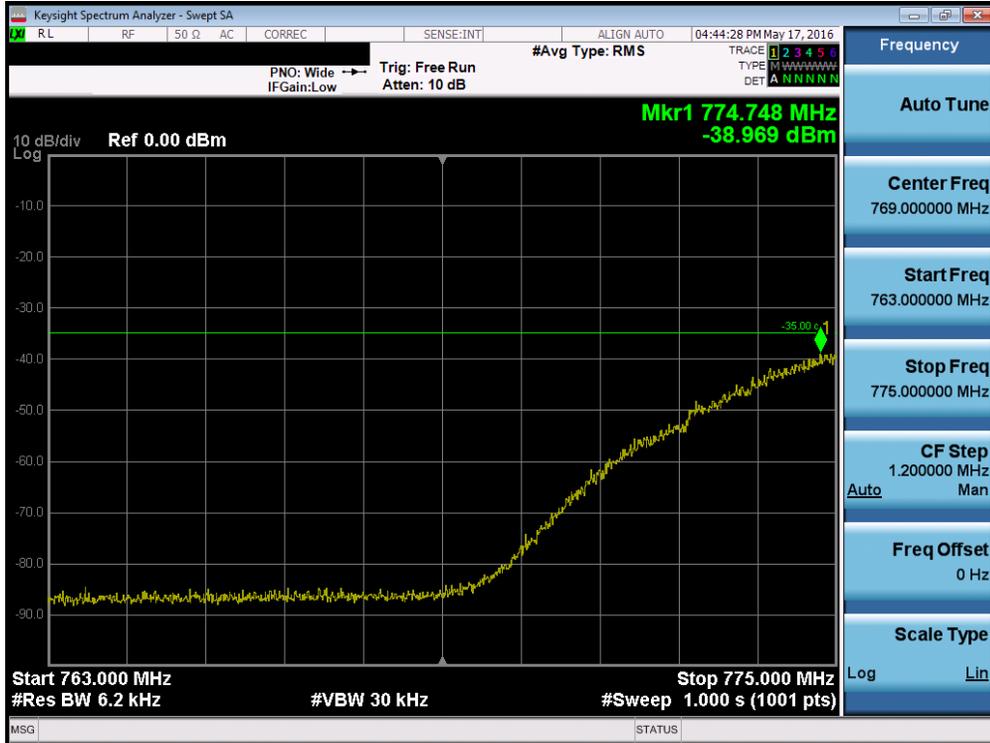


Plot 7-108. Upper Extended Band Edge Plot (Band 12 /17– 10.0MHz QPSK – RB Size 50)

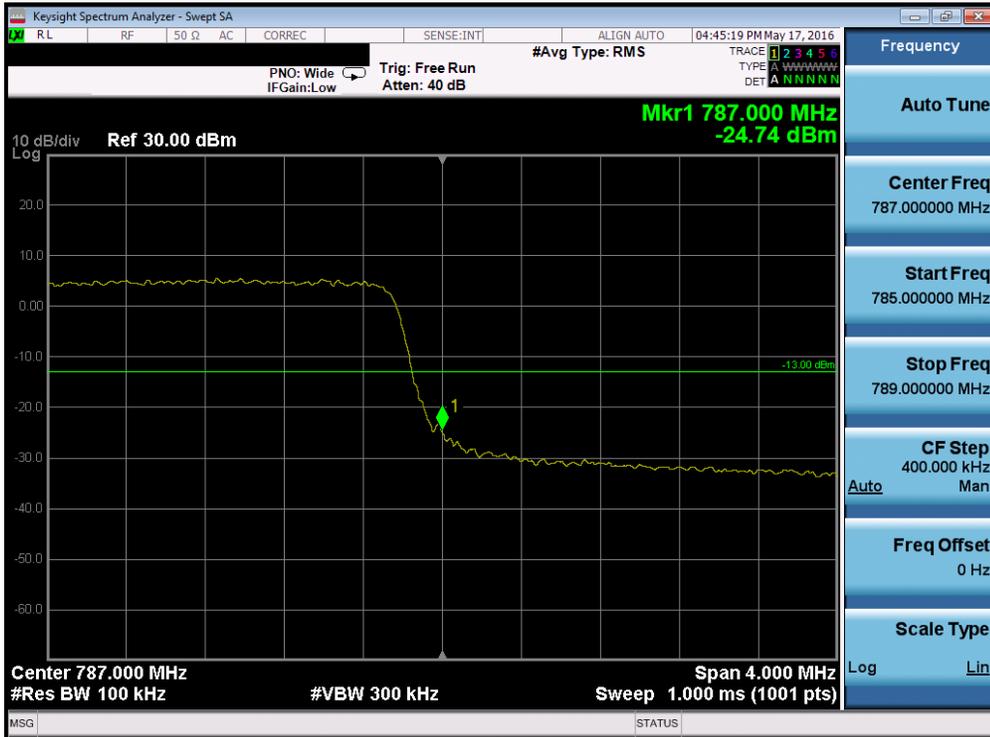


Plot 7-109. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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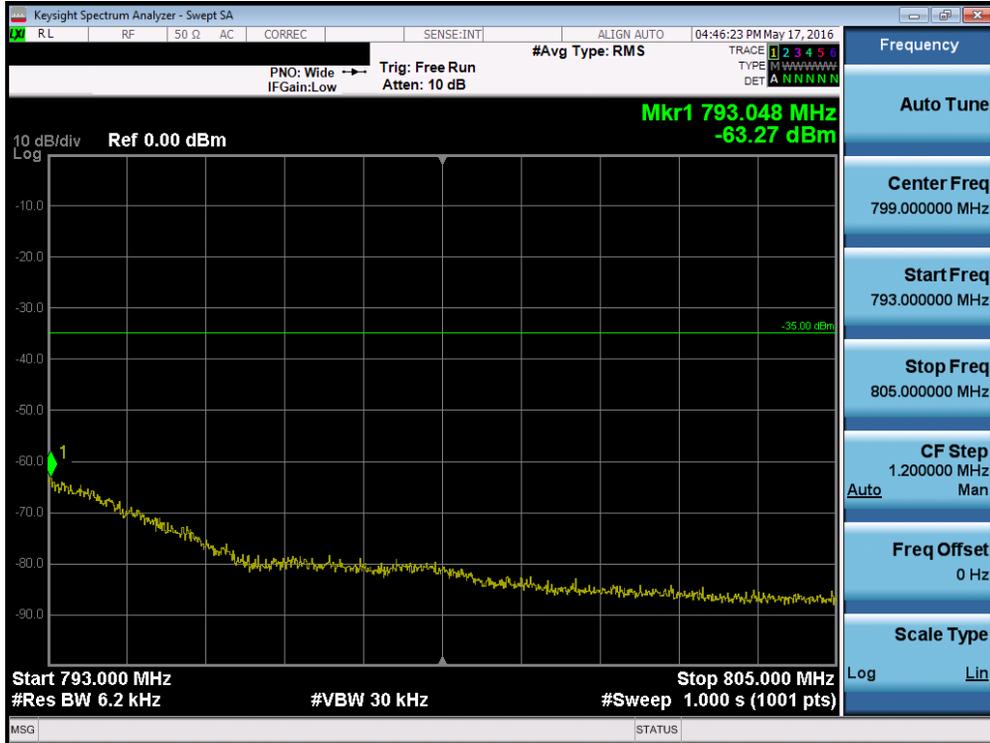


Plot 7-110. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

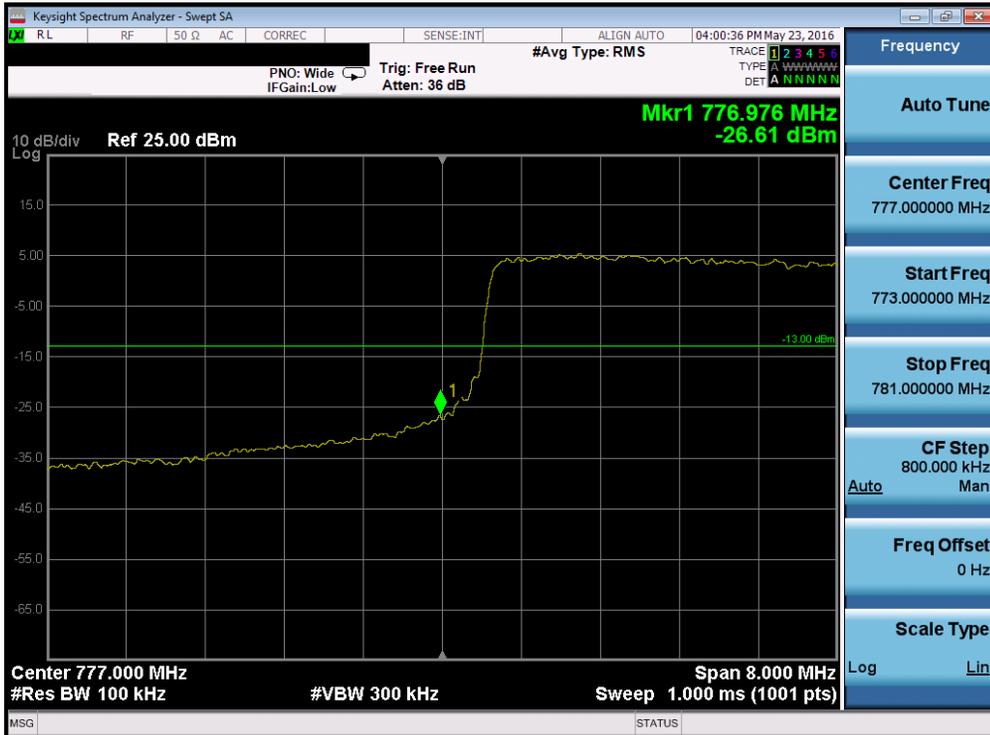


Plot 7-111. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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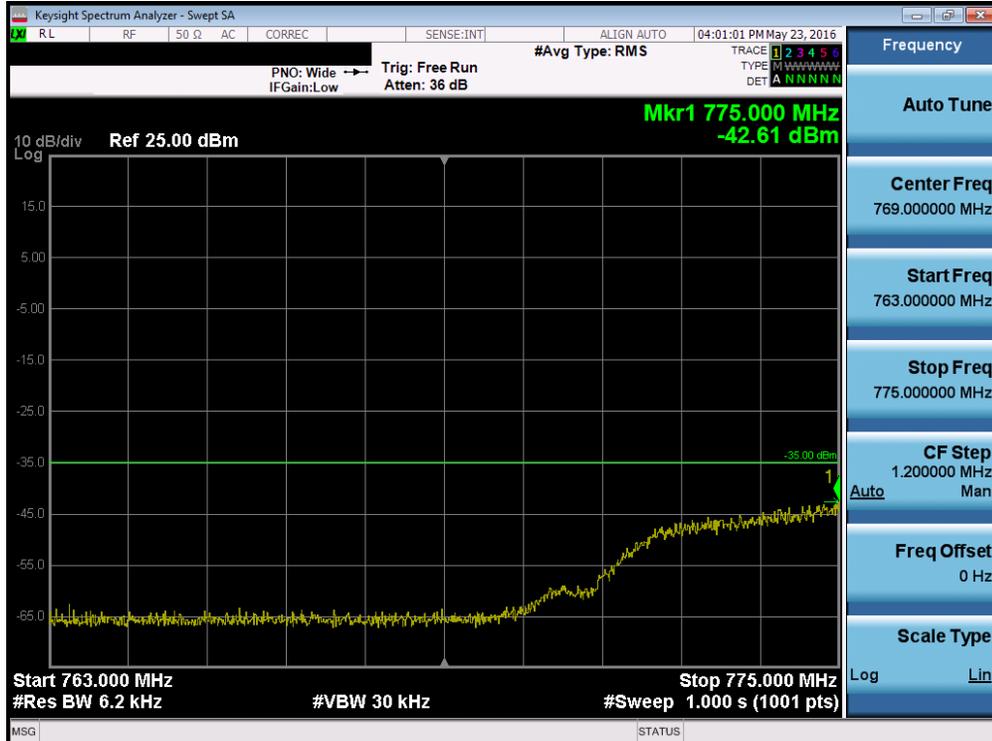


Plot 7-112. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

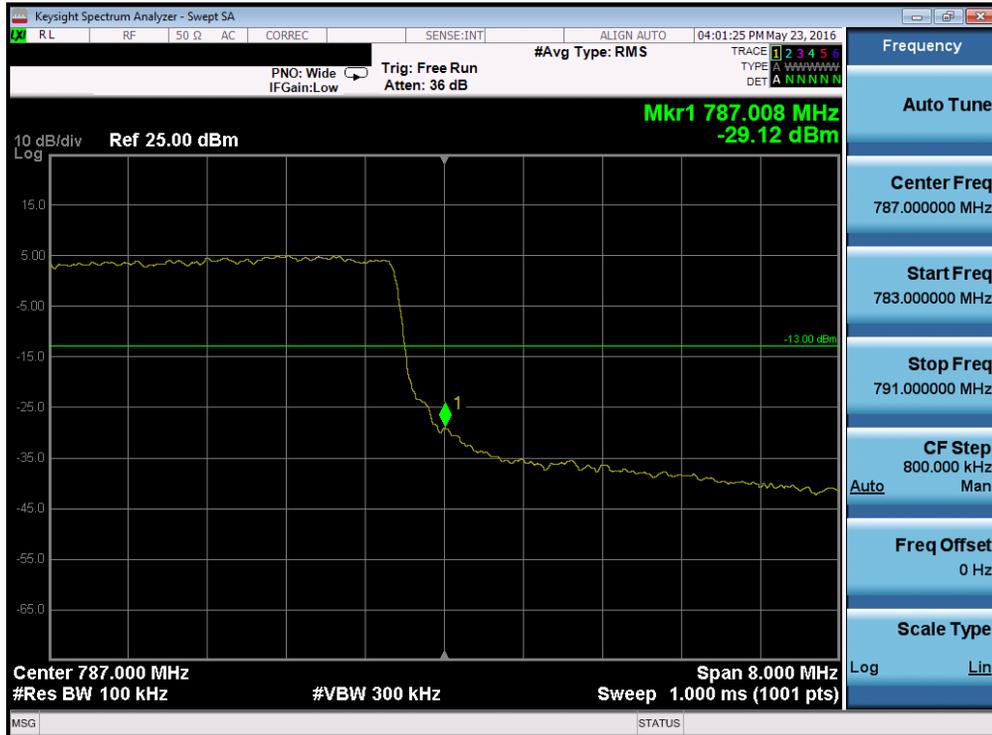


Plot 7-113. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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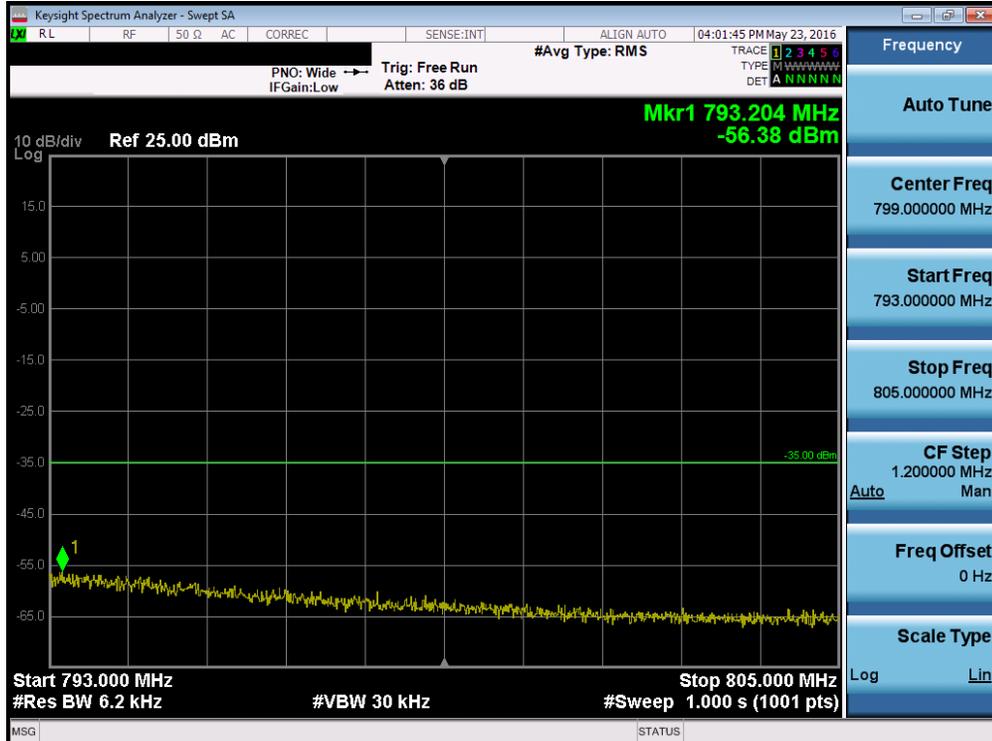


Plot 7-114. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

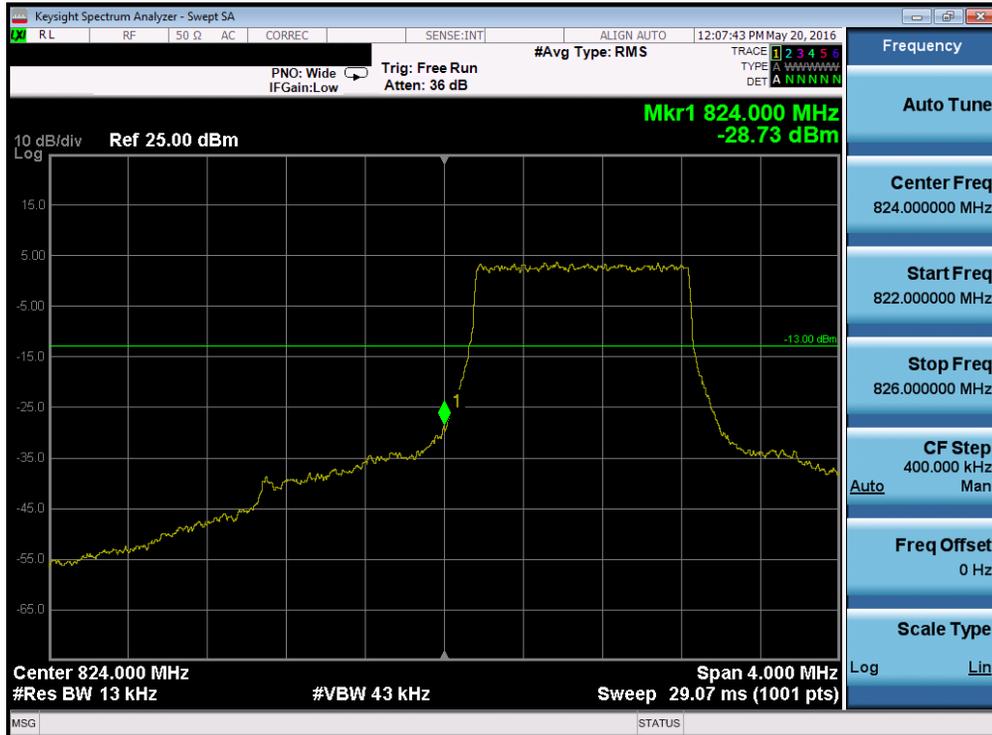


Plot 7-115. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-116. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

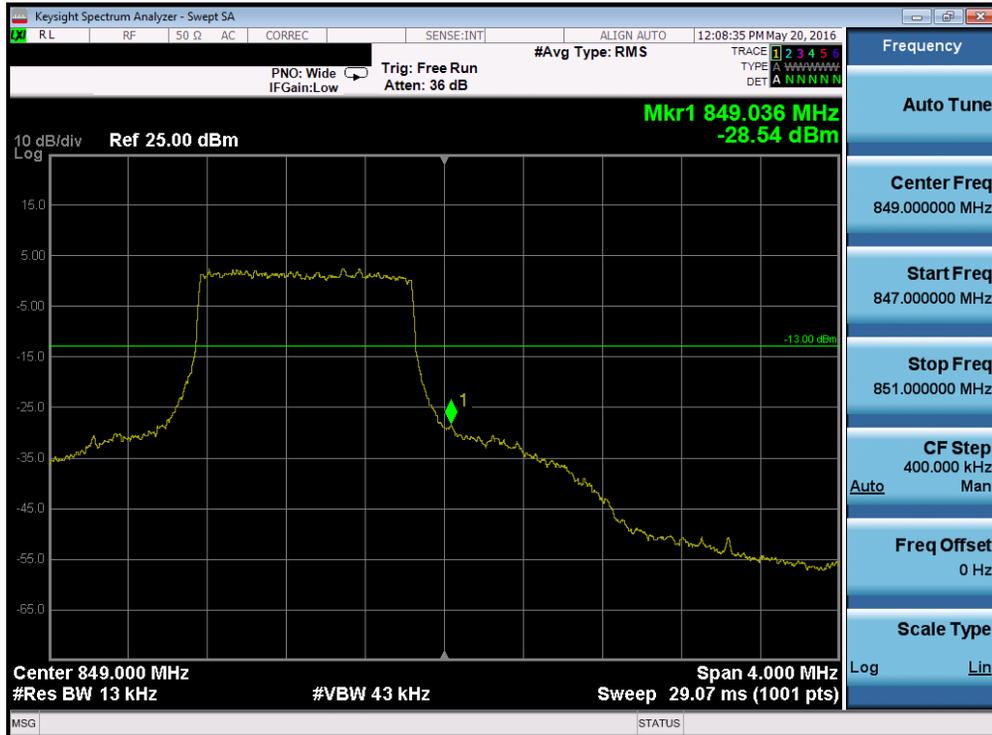


Plot 7-117. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-118. Lower Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

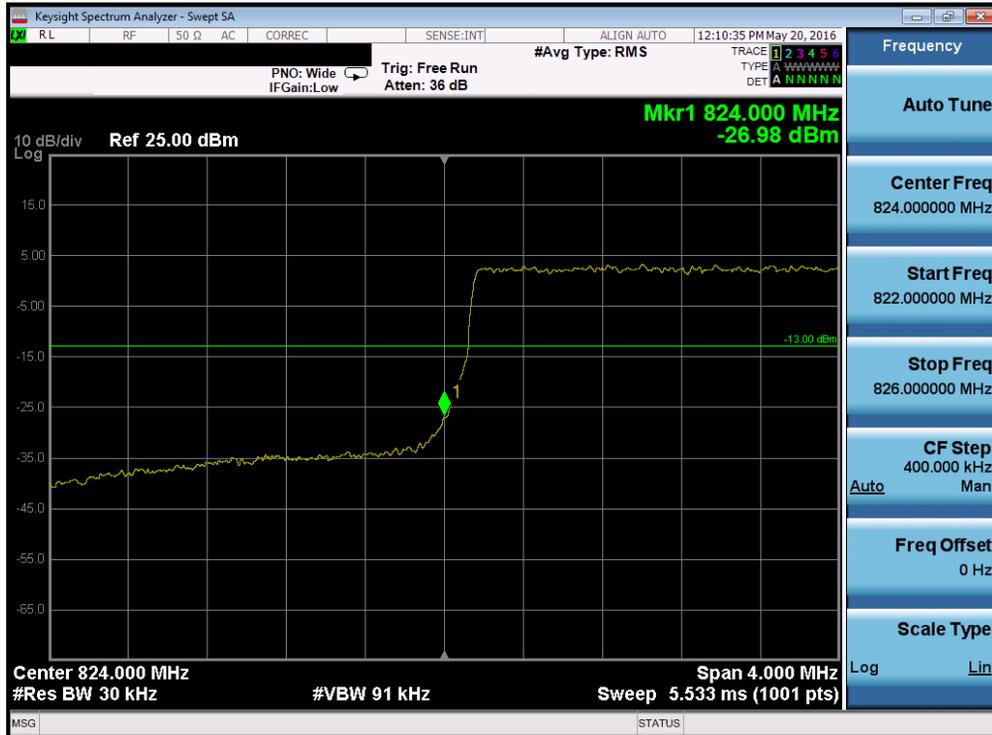


Plot 7-119. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-120. Upper Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

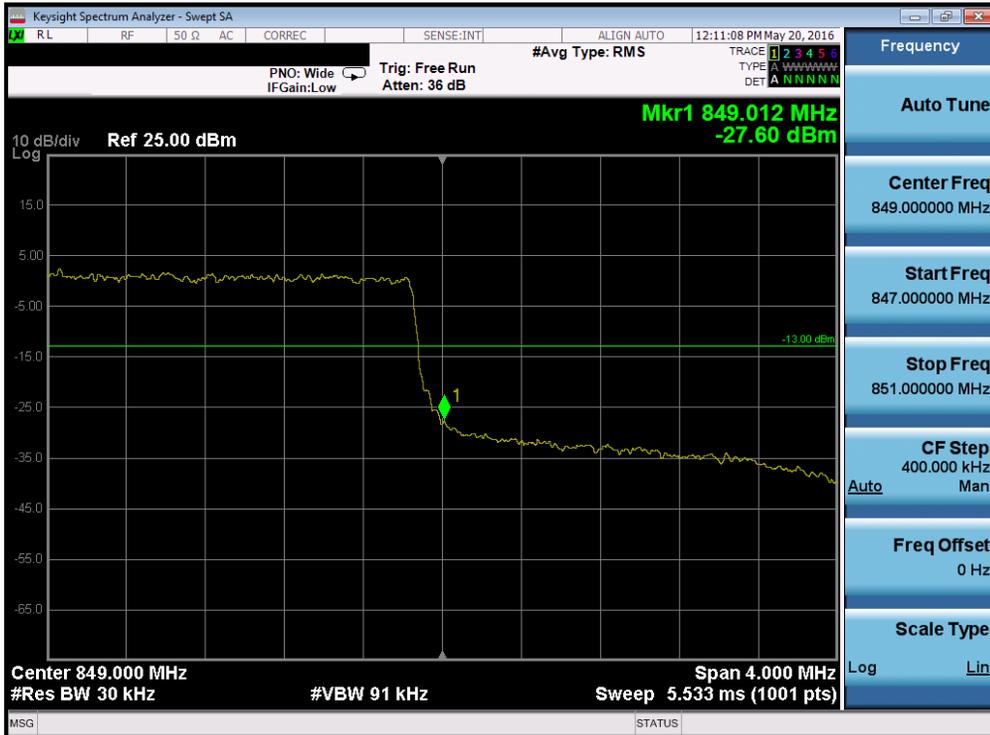


Plot 7-121. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-122. Lower Extended Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

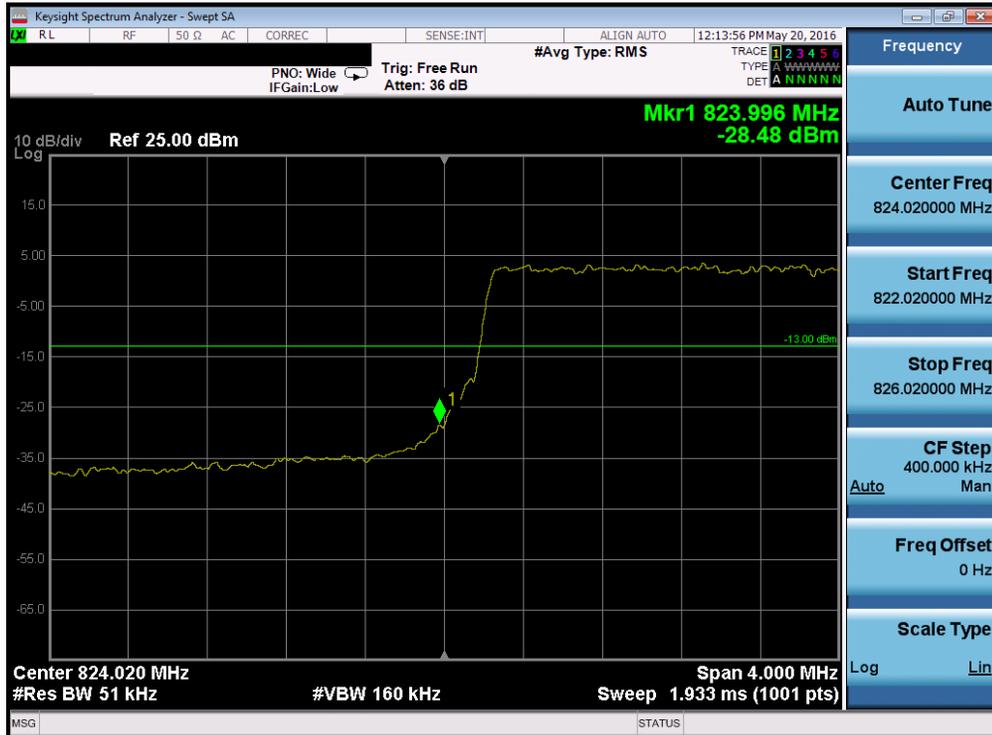


Plot 7-123. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-124. Upper Extended Band Edge Plot (Band 5 – Band 5 – 3.0MHz QPSK – RB Size 15)

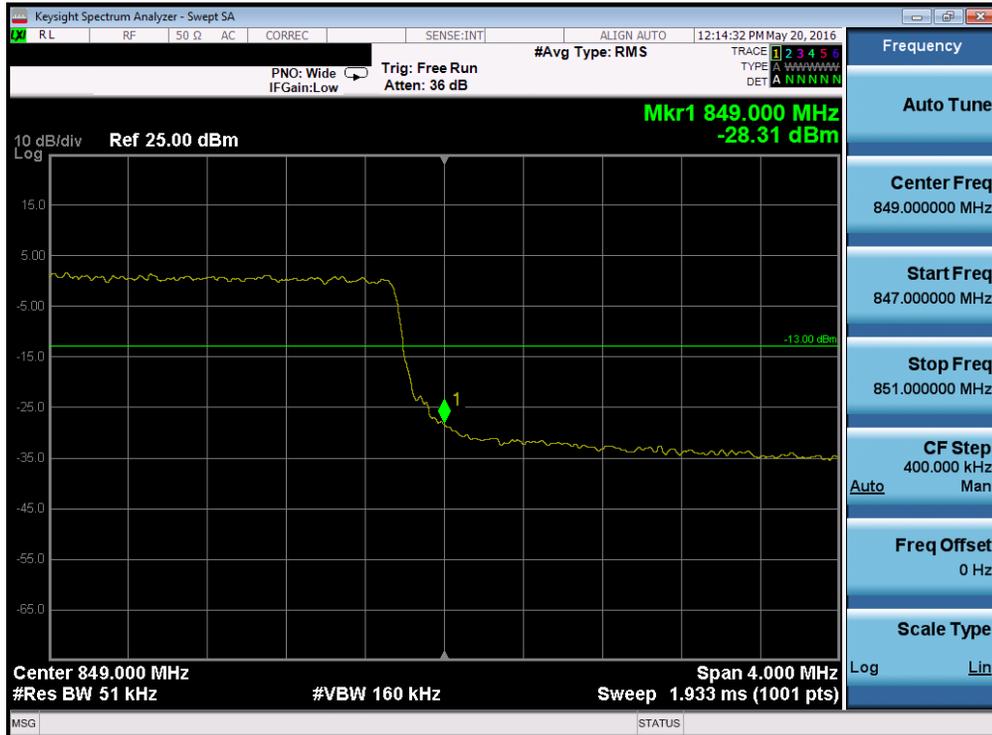


Plot 7-125. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-126. Lower Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

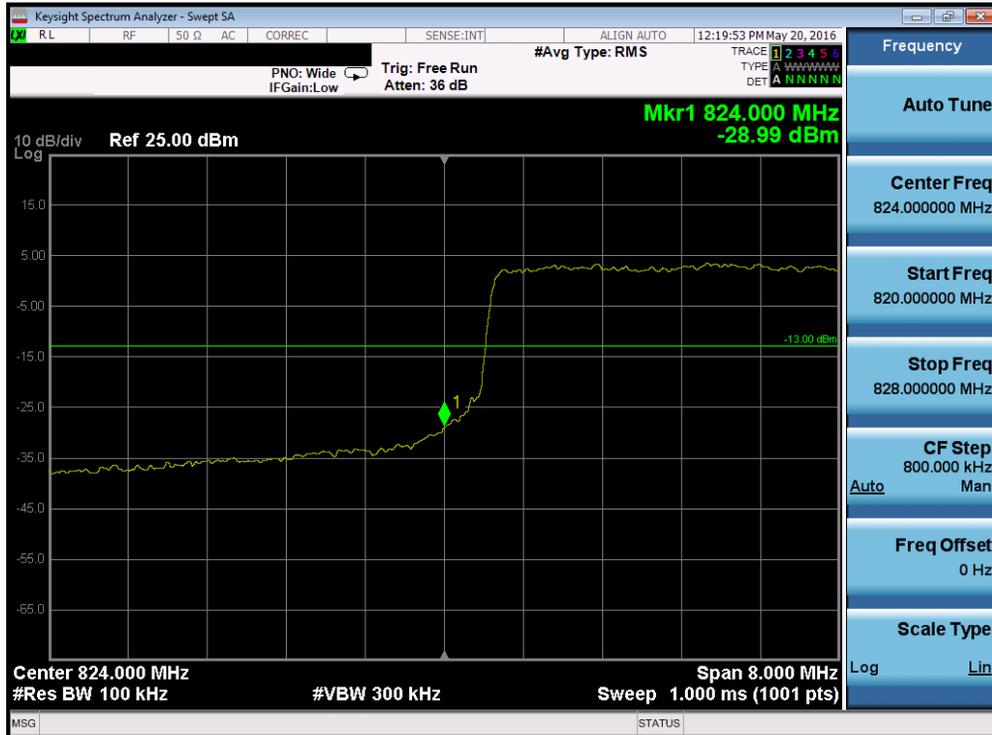


Plot 7-127. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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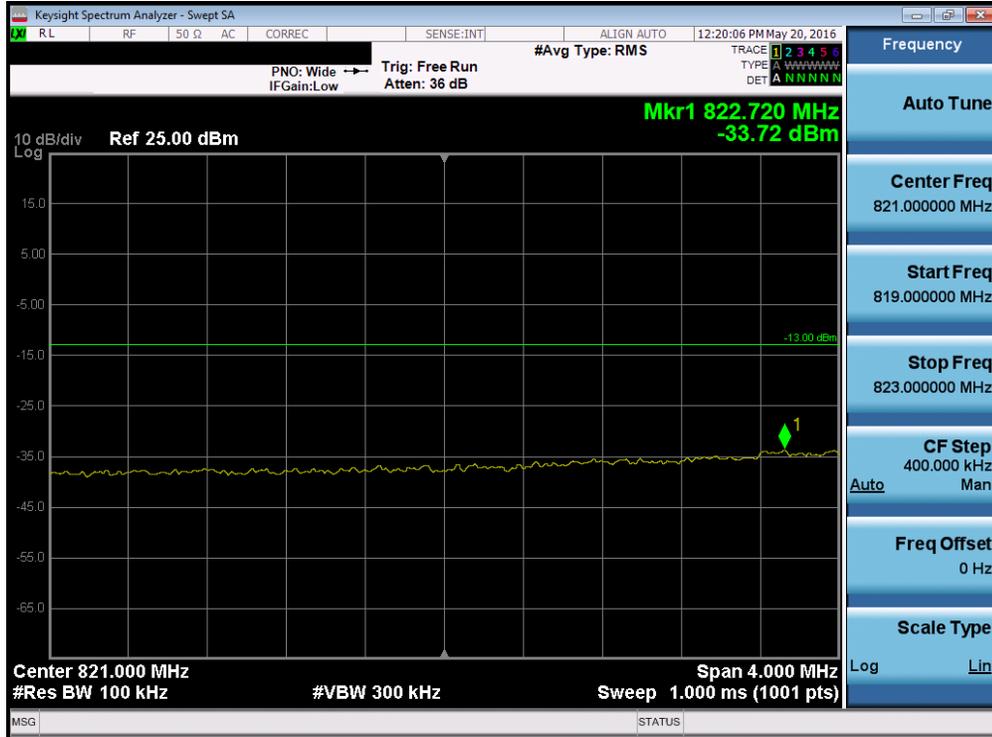


Plot 7-128. Upper Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

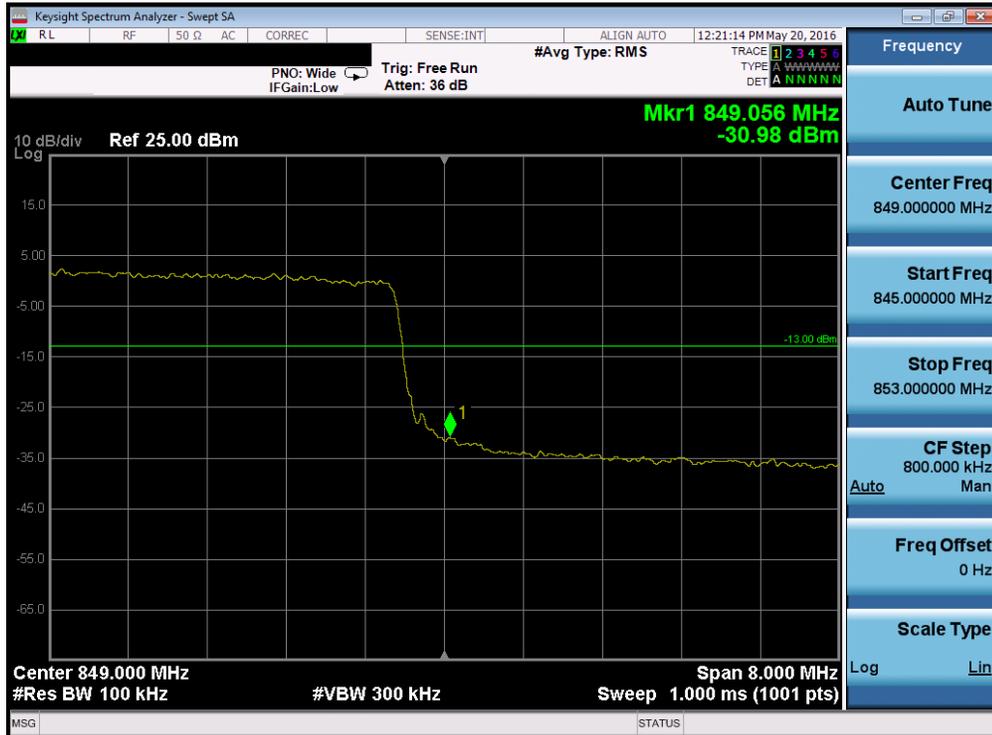


Plot 7-129. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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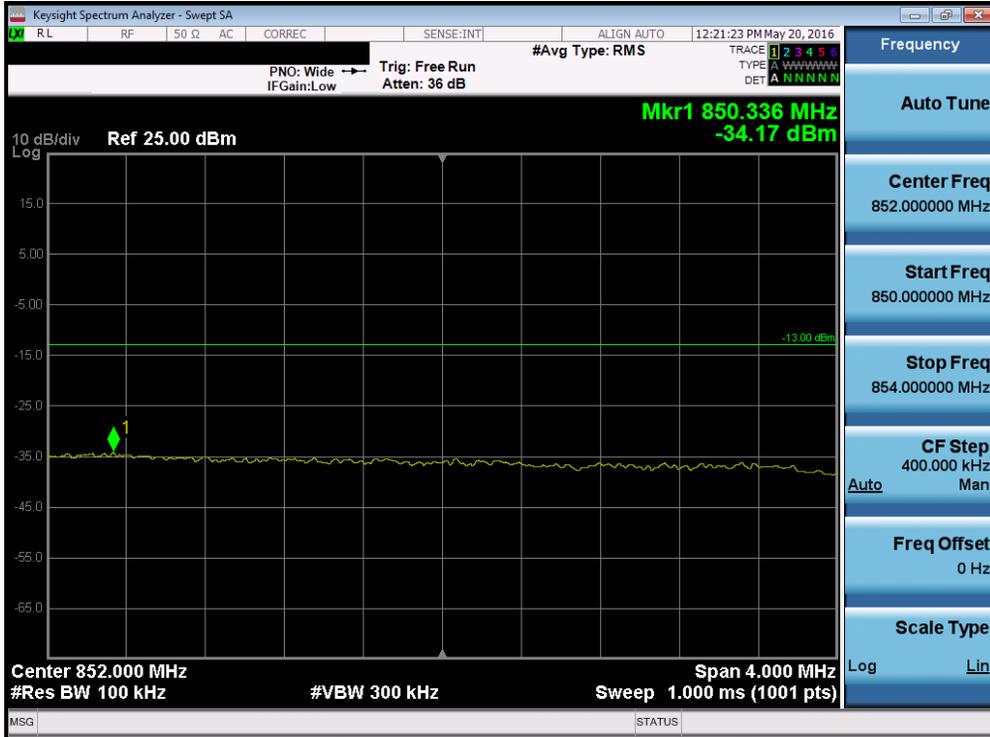


Plot 7-130. Lower Extended Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

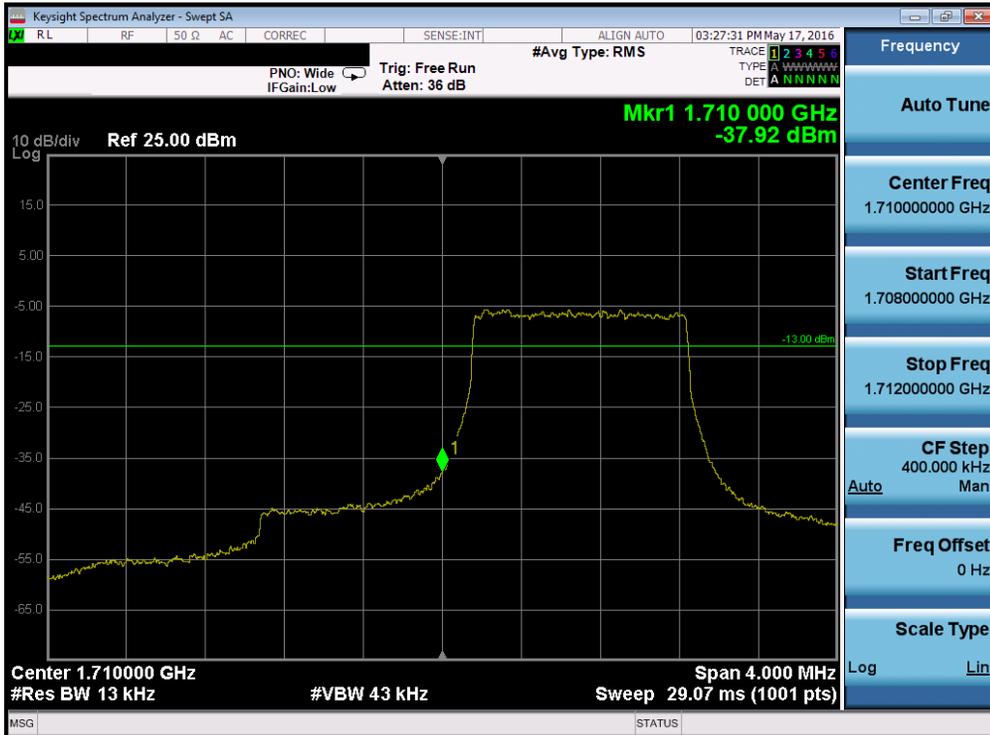


Plot 7-131. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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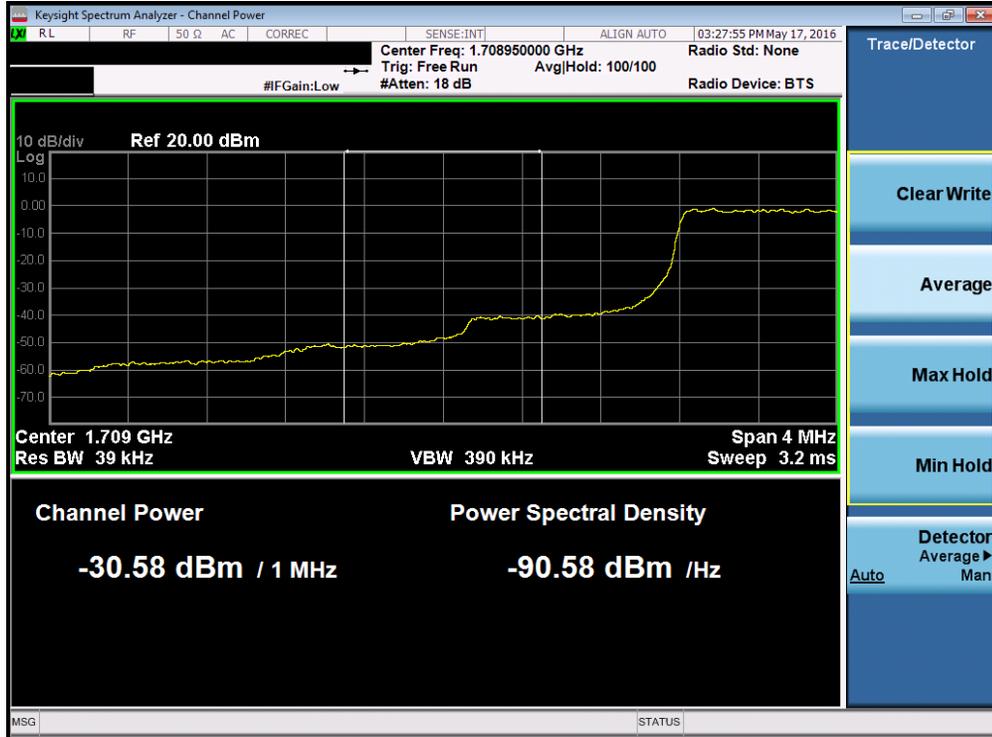


Plot 7-132. Upper Extended Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



Plot 7-133. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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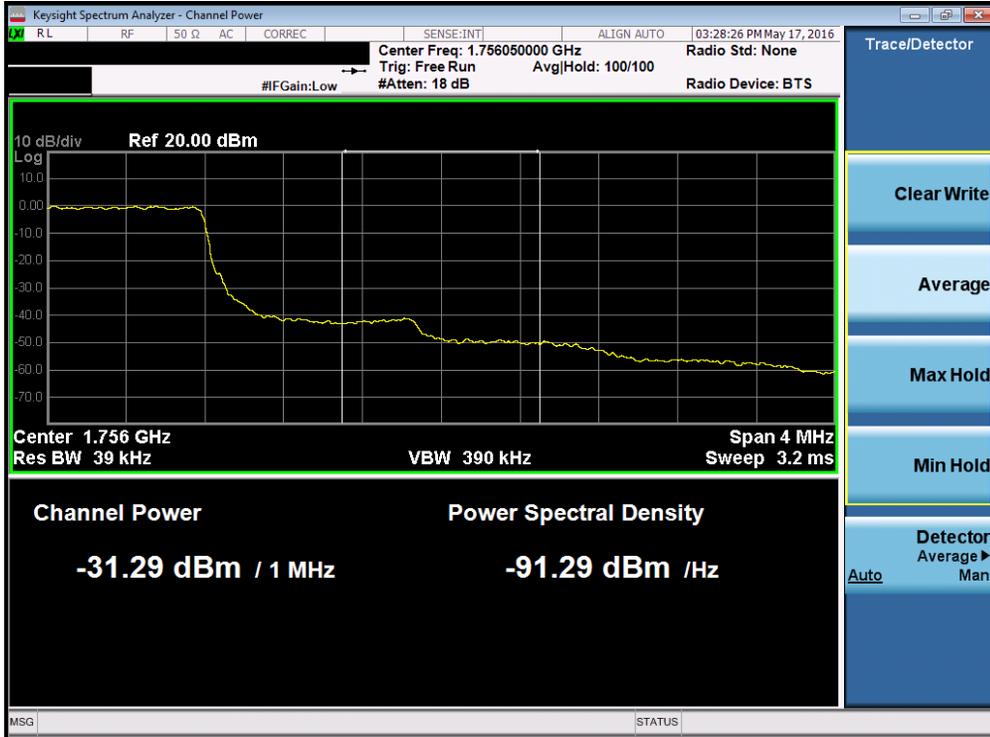


Plot 7-134. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

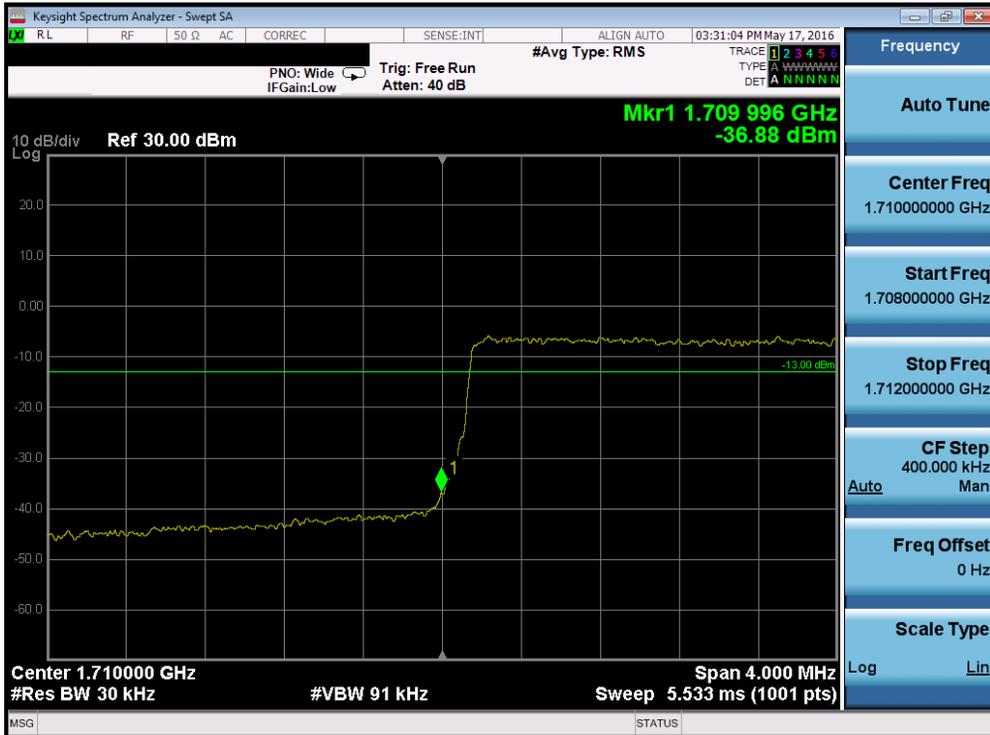


Plot 7-135. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUS610	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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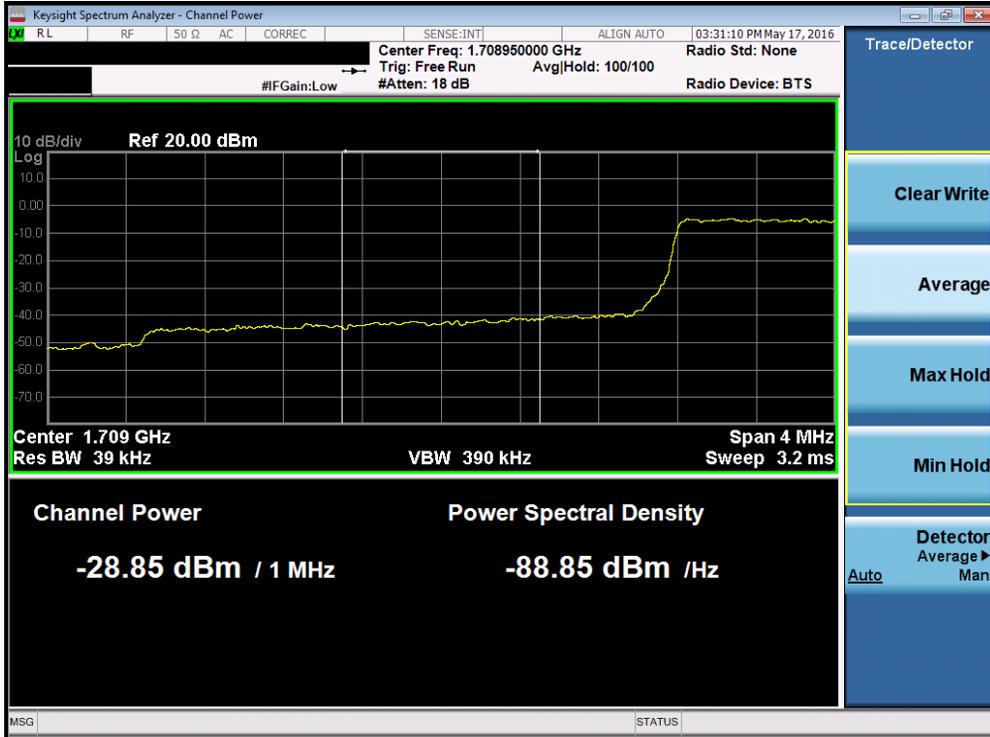


Plot 7-136. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

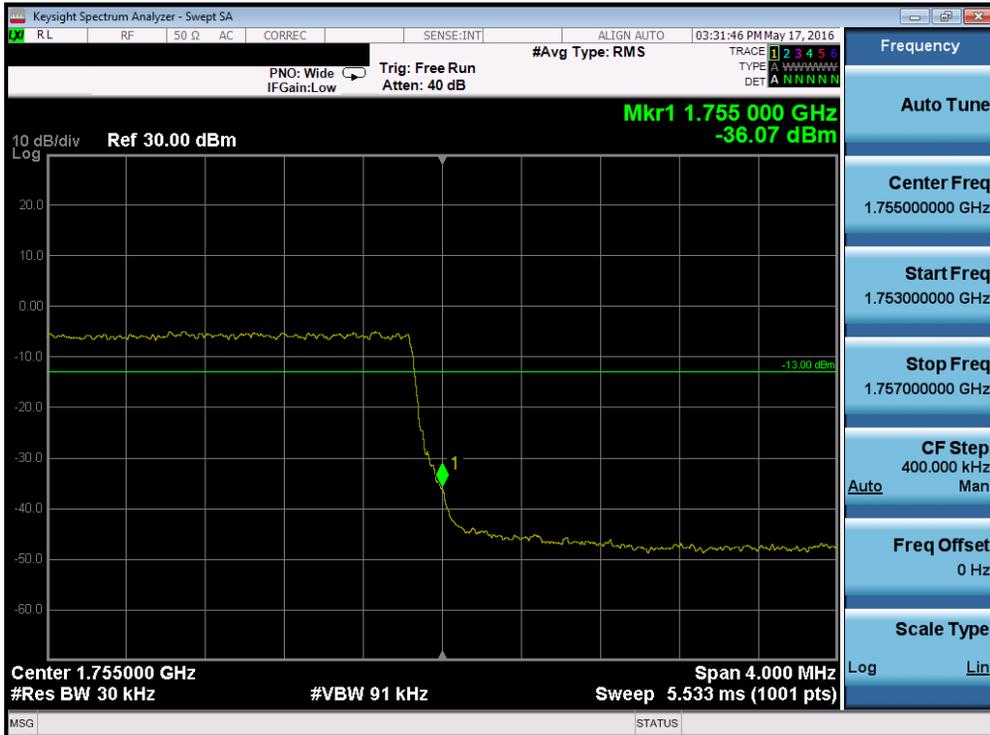


Plot 7-137. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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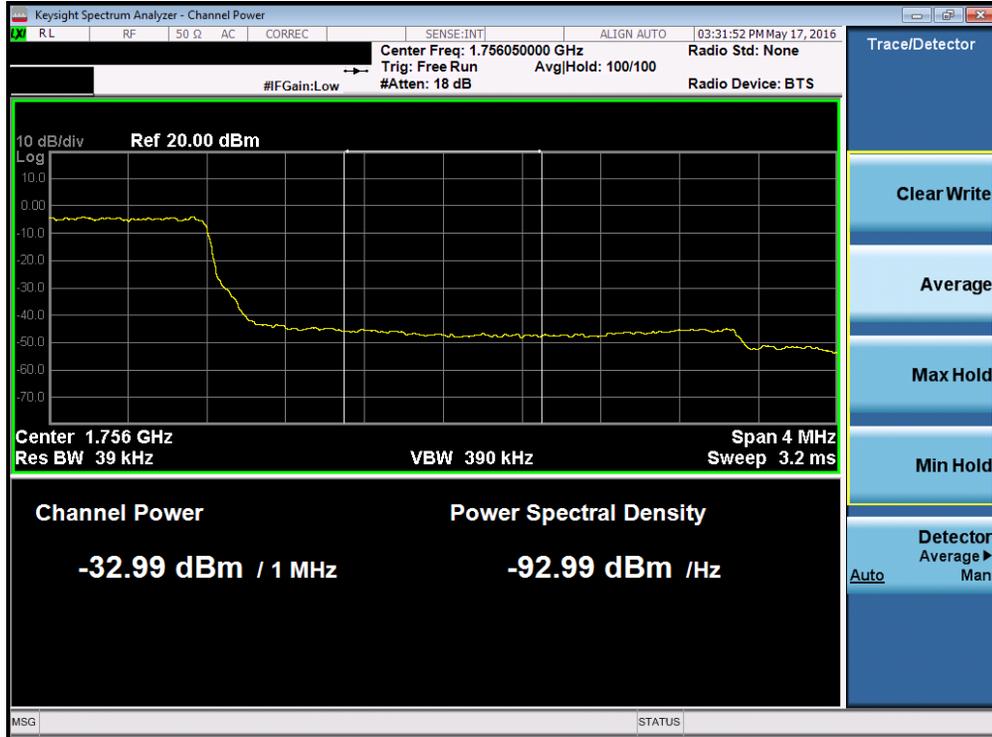


Plot 7-138. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

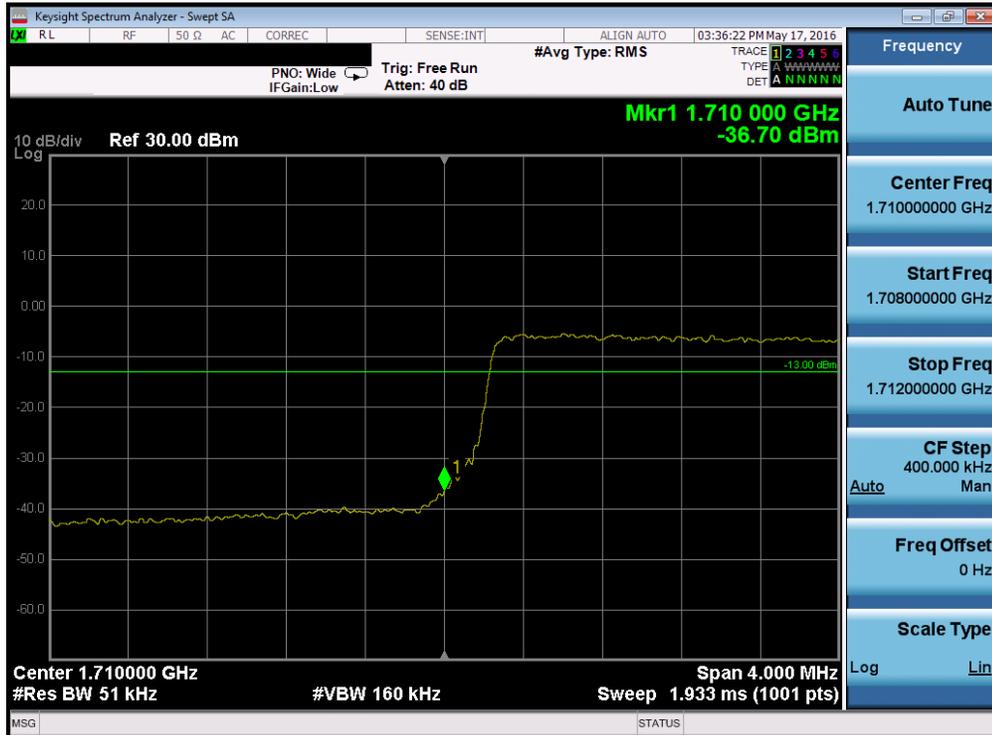


Plot 7-139. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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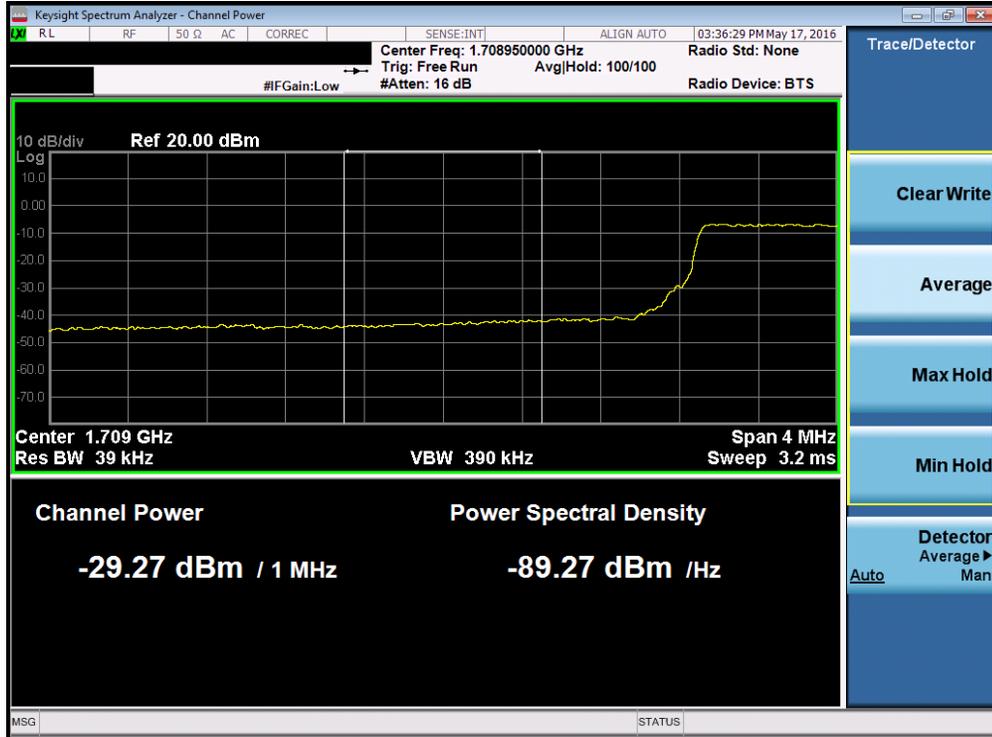


Plot 7-140. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

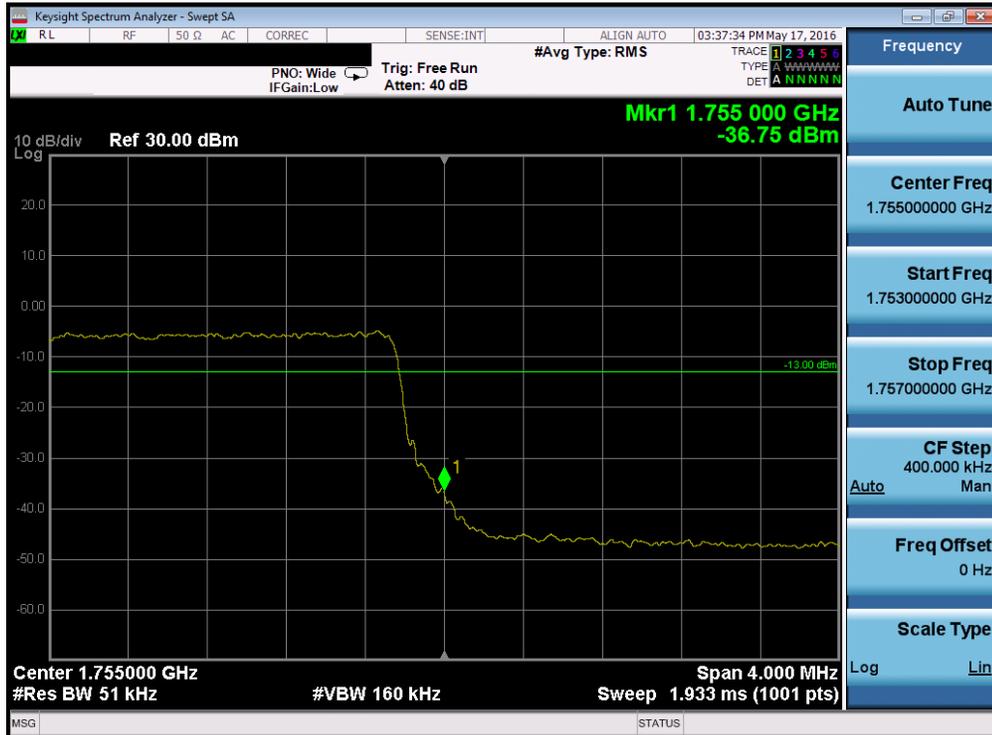


Plot 7-141. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 87 of 143

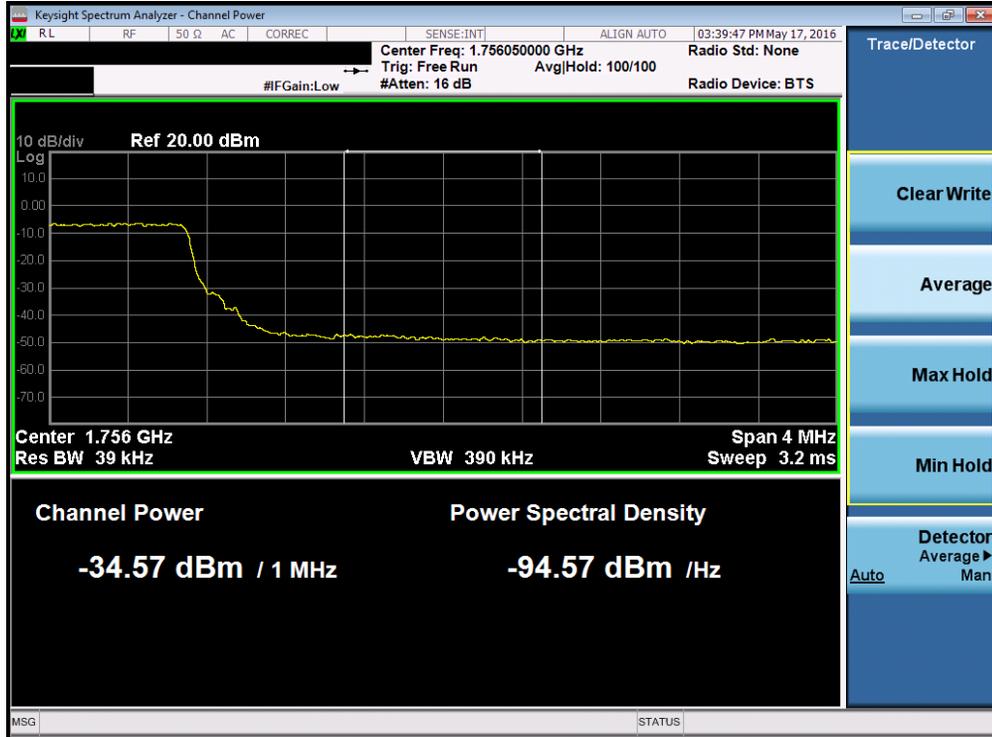


Plot 7-142. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

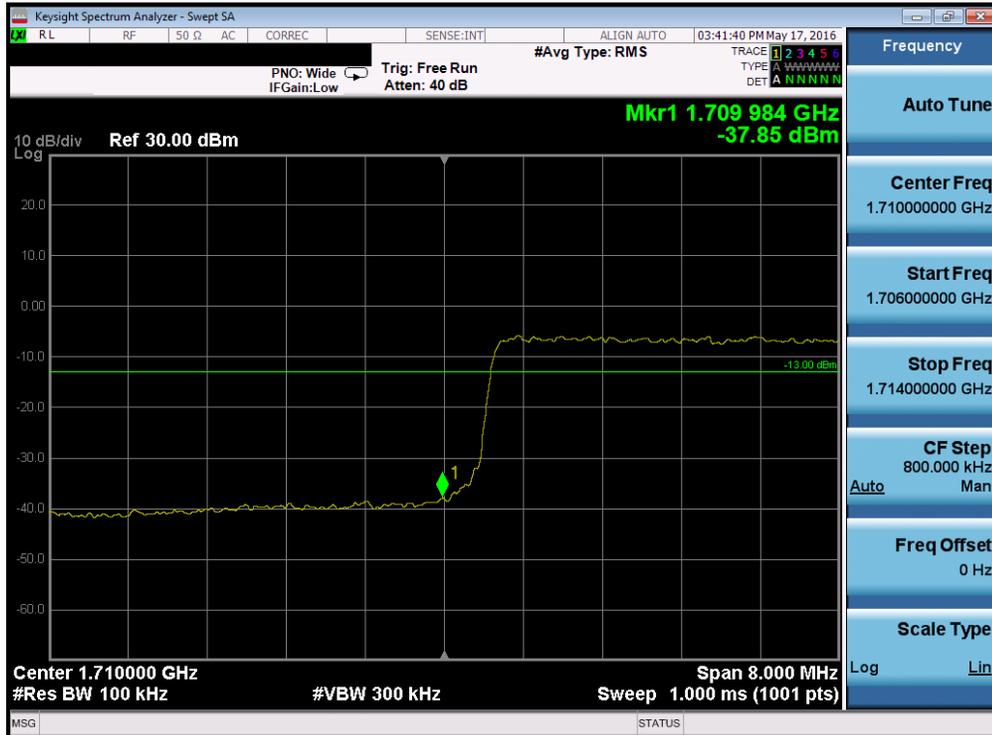


Plot 7-143. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 88 of 143

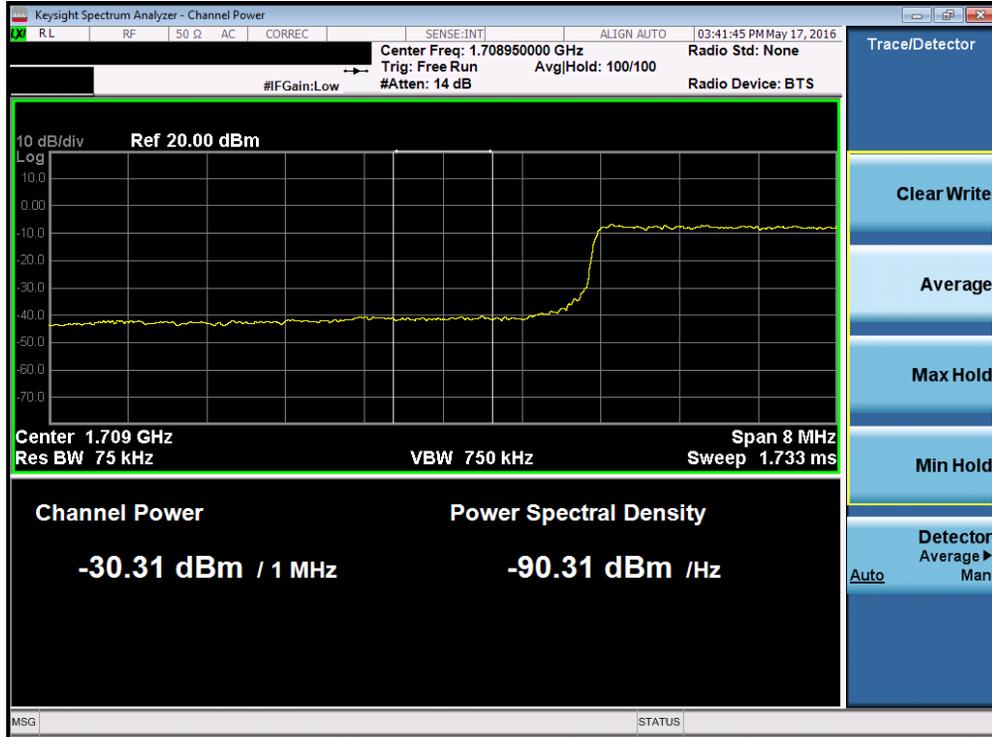


Plot 7-144. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

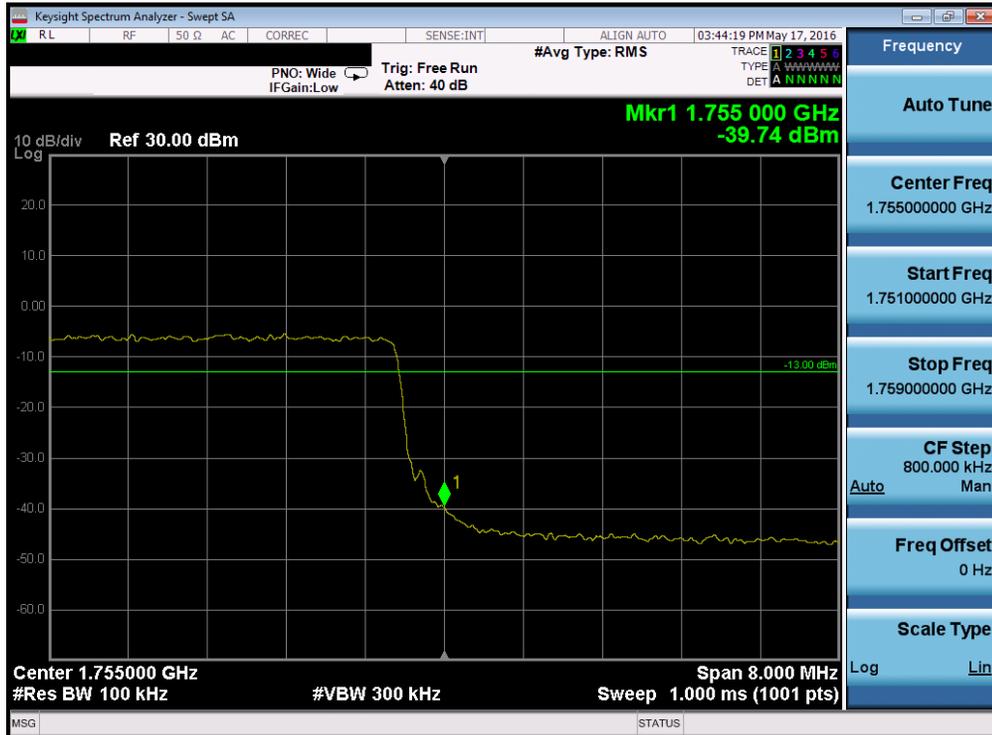


Plot 7-145. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 89 of 143

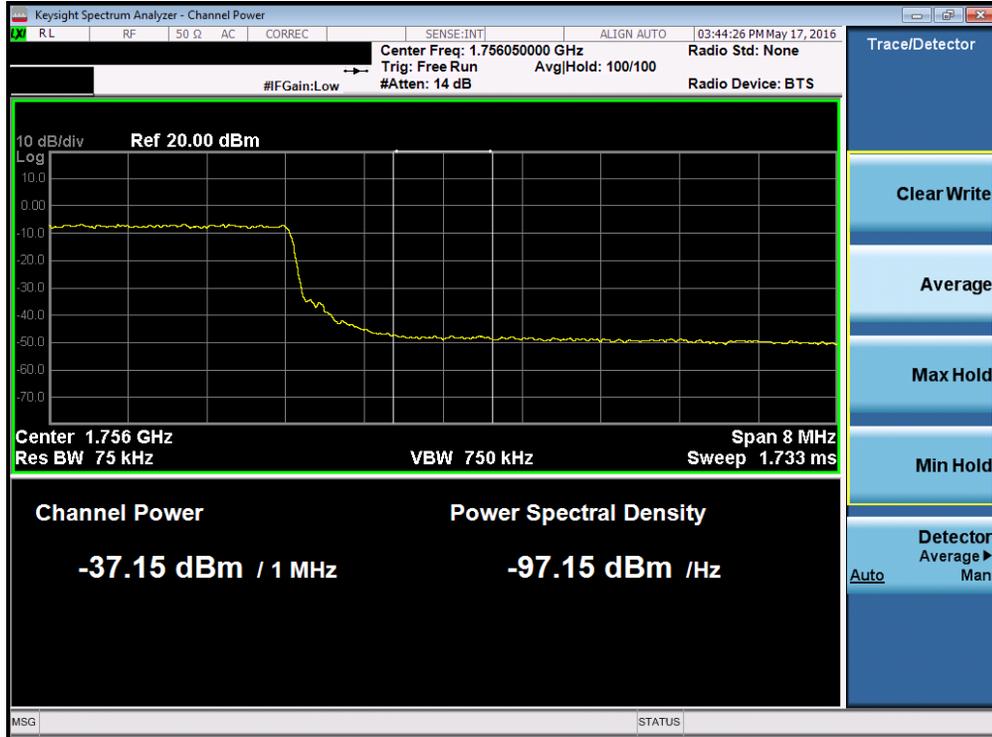


Plot 7-146. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

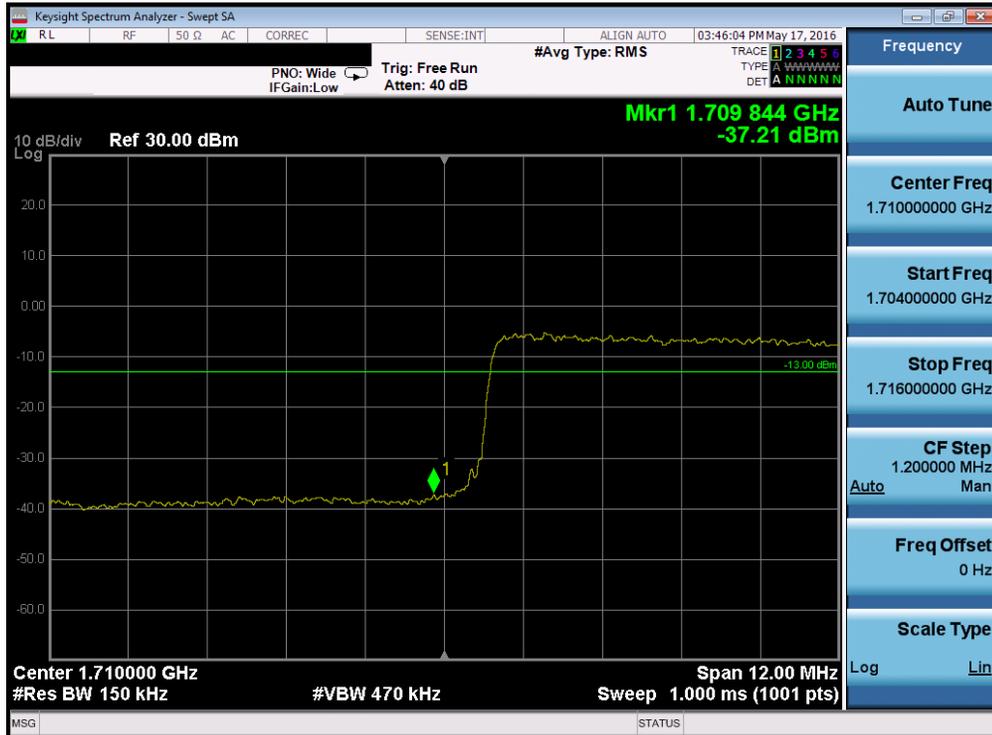


Plot 7-147. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 90 of 143

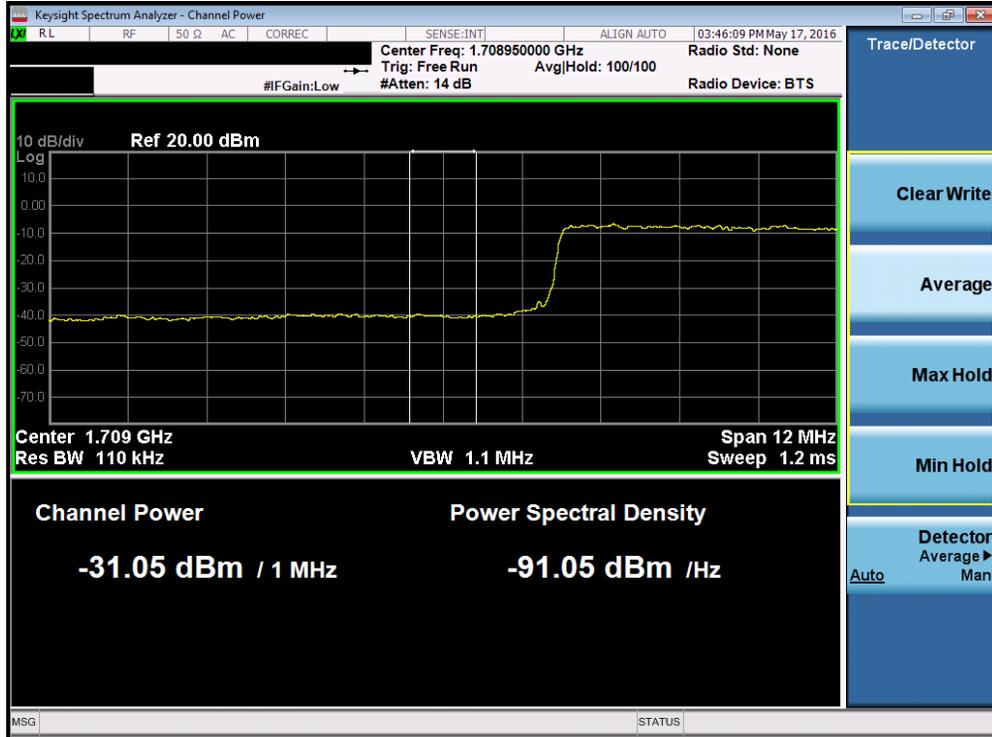


Plot 7-148. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

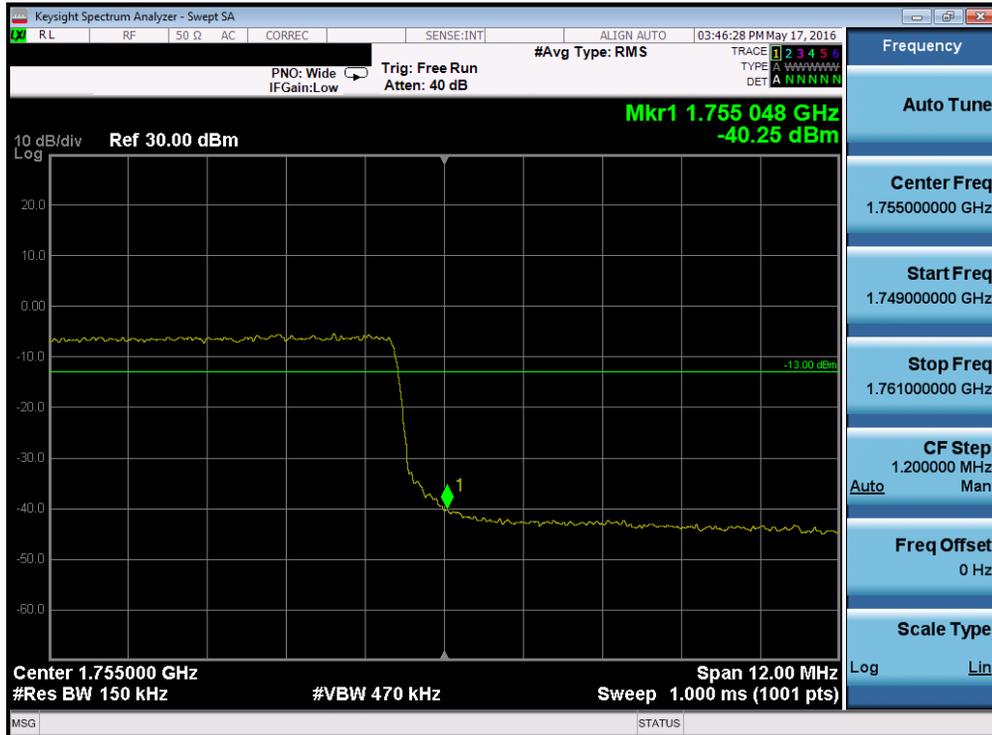


Plot 7-149. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 91 of 143

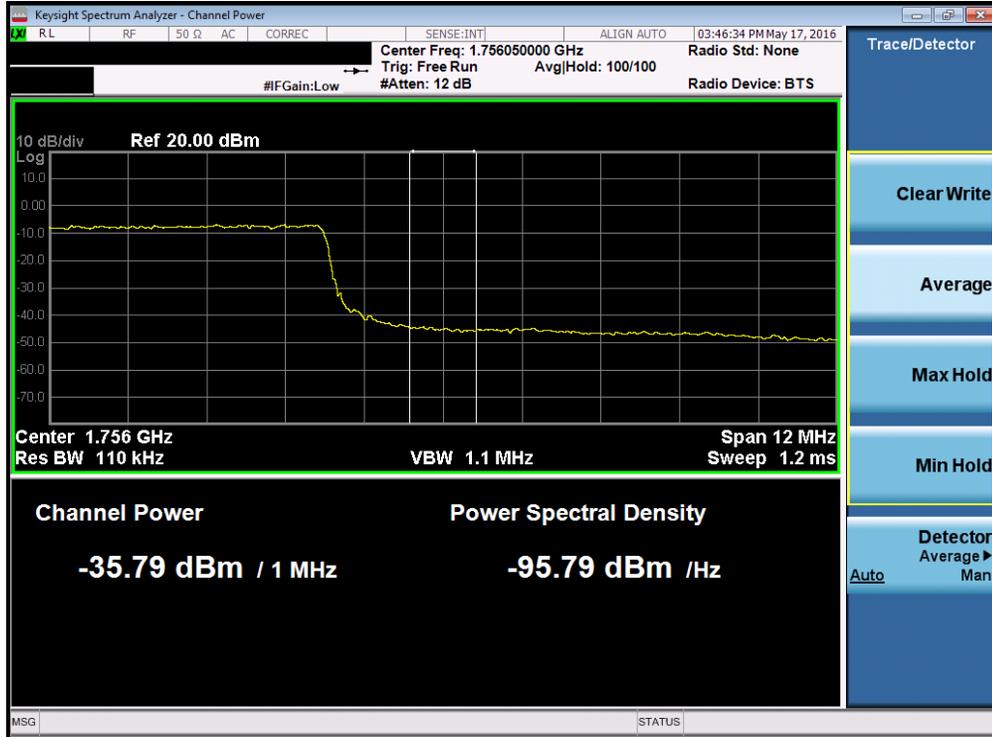


Plot 7-150. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

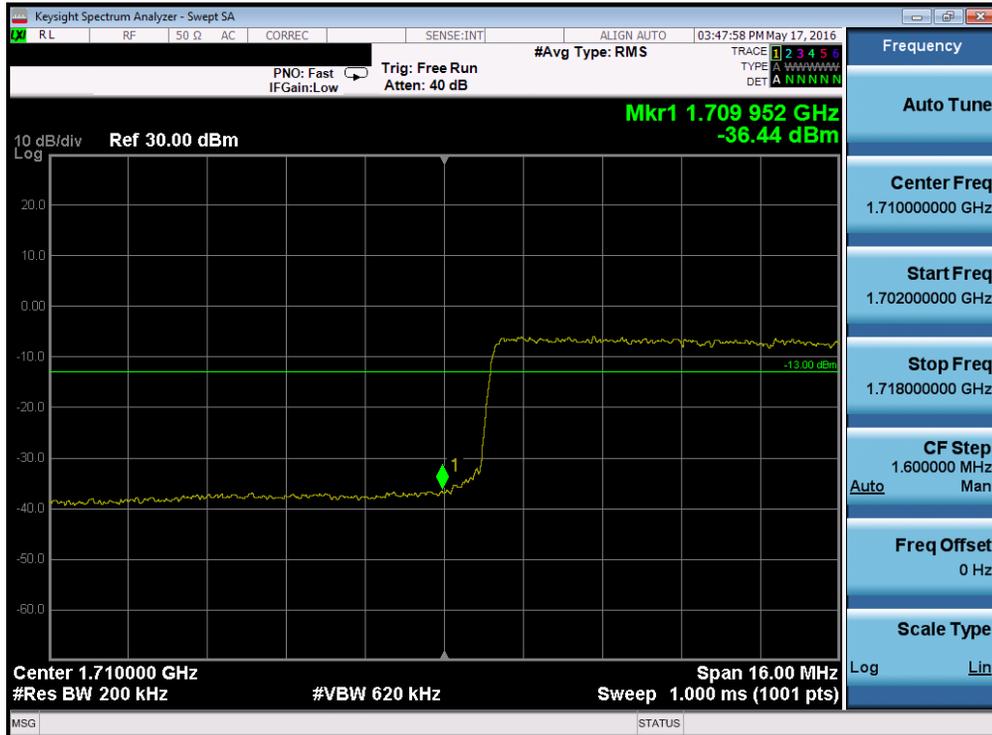


Plot 7-151. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 92 of 143

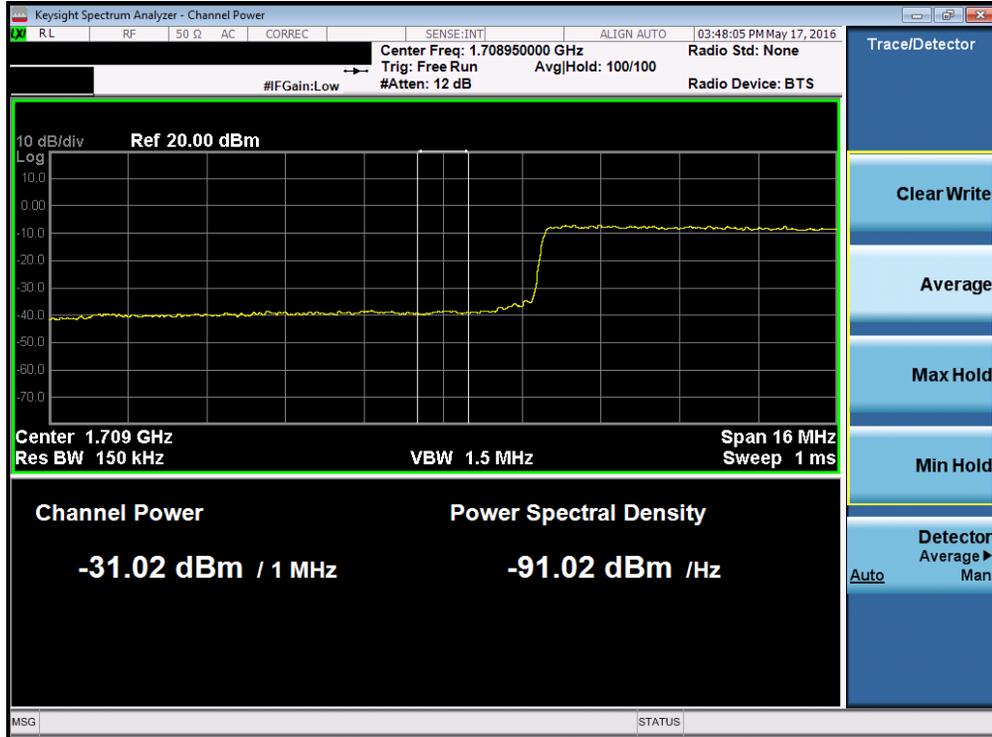


Plot 7-152. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

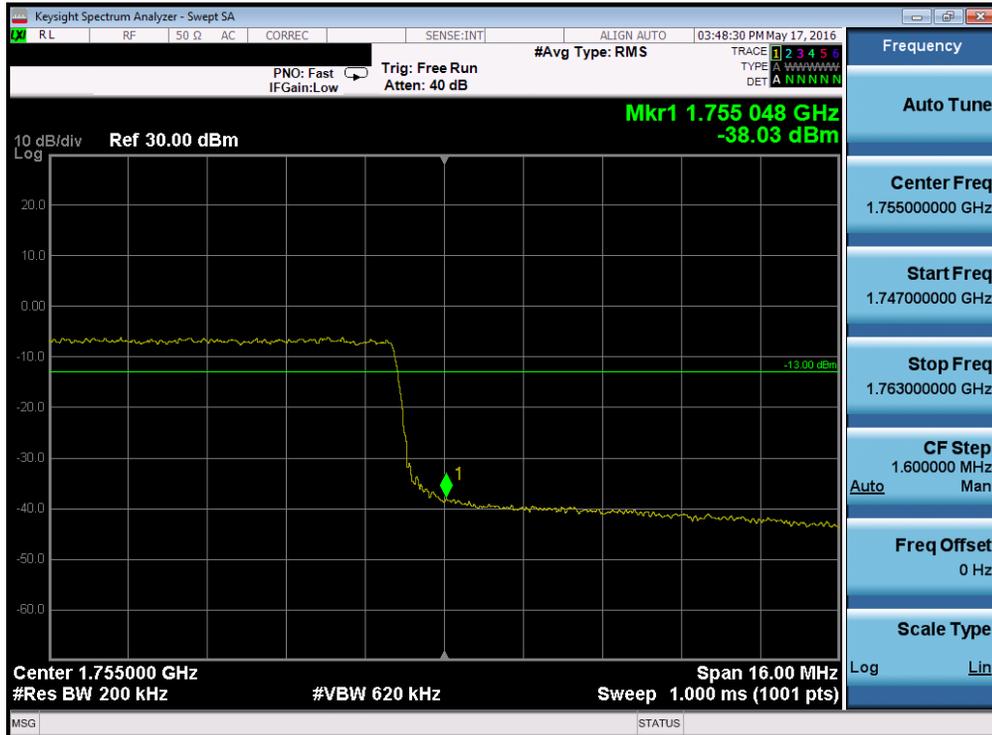


Plot 7-153. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 93 of 143

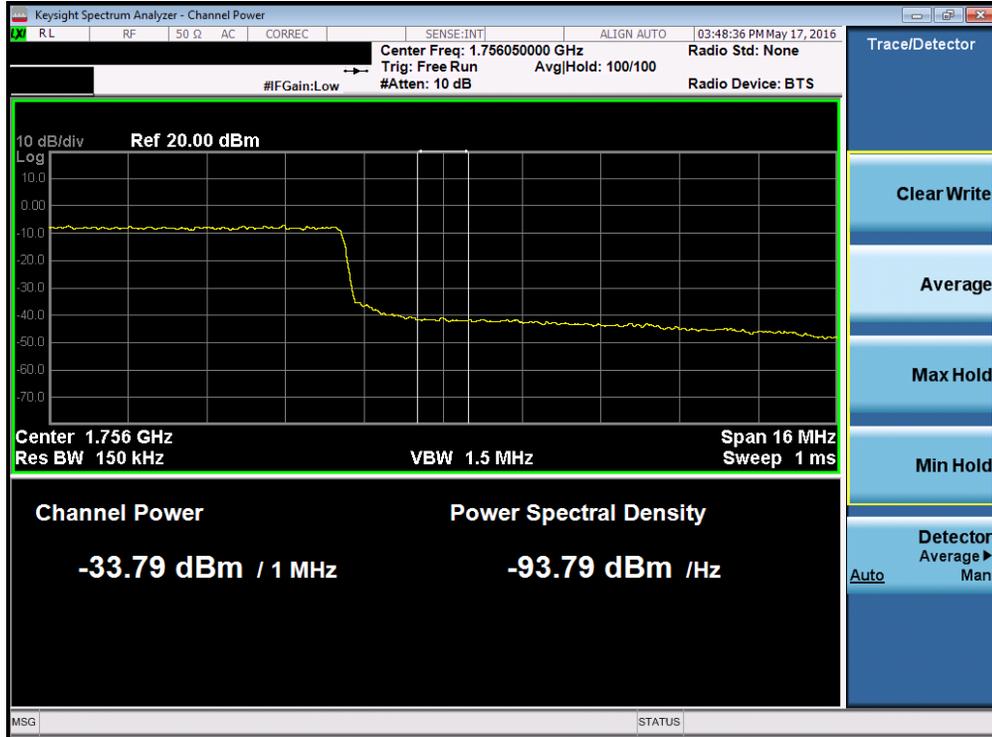


Plot 7-154. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

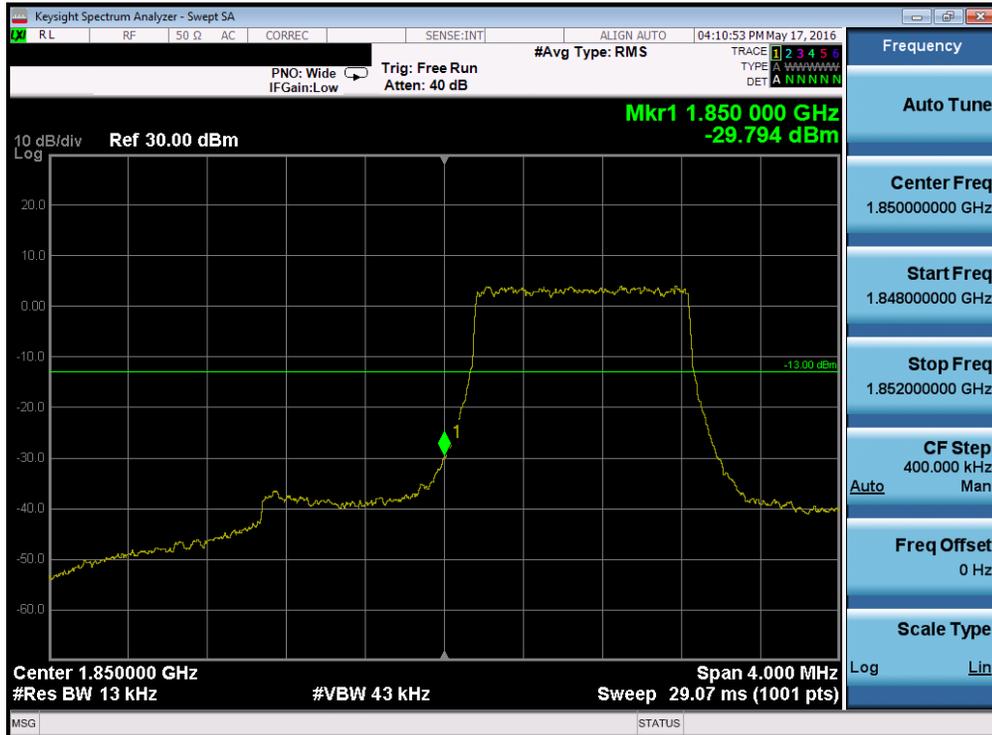


Plot 7-155. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 94 of 143

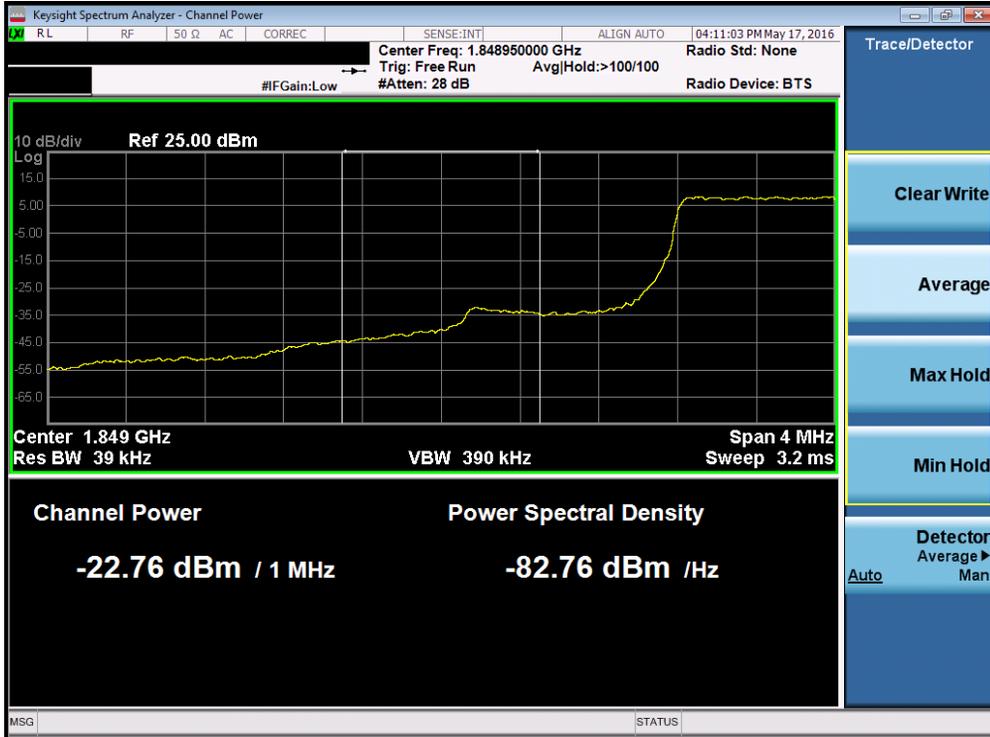


Plot 7-156. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



Plot 7-157. Lower Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 95 of 143

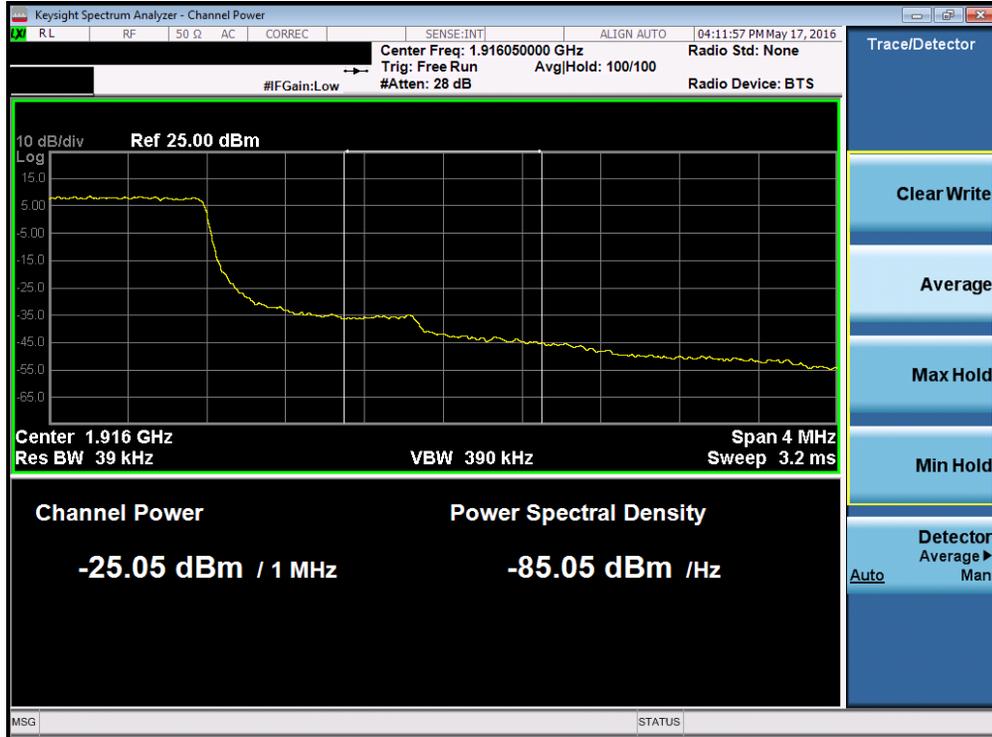


Plot 7-158. Lower Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

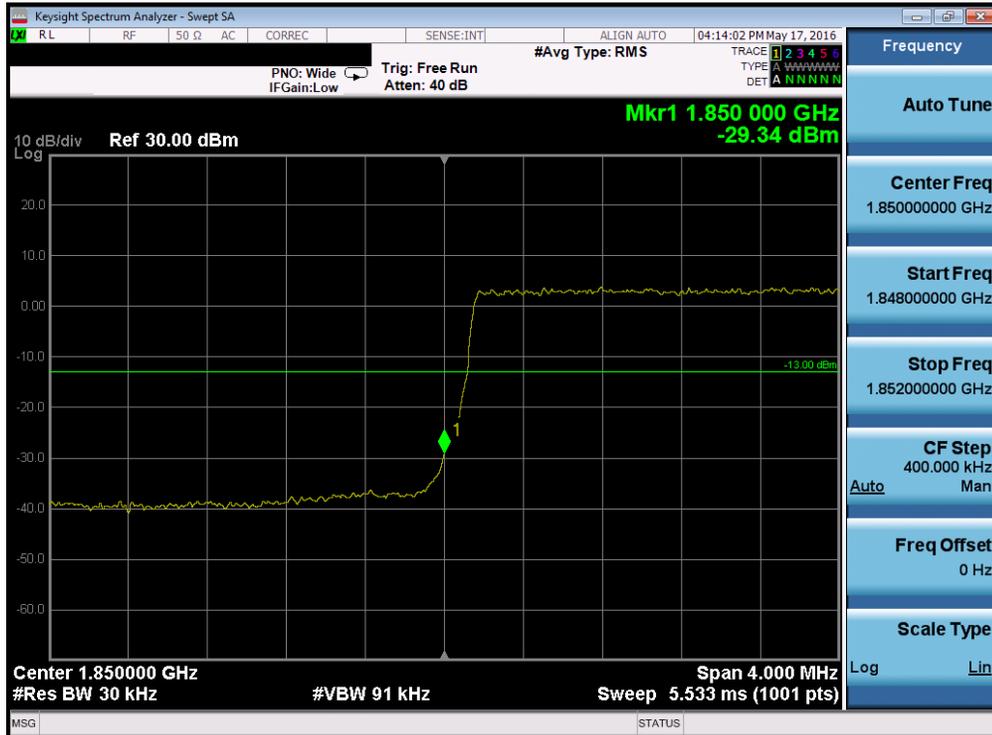


Plot 7-159. Upper Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUS610	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 96 of 143

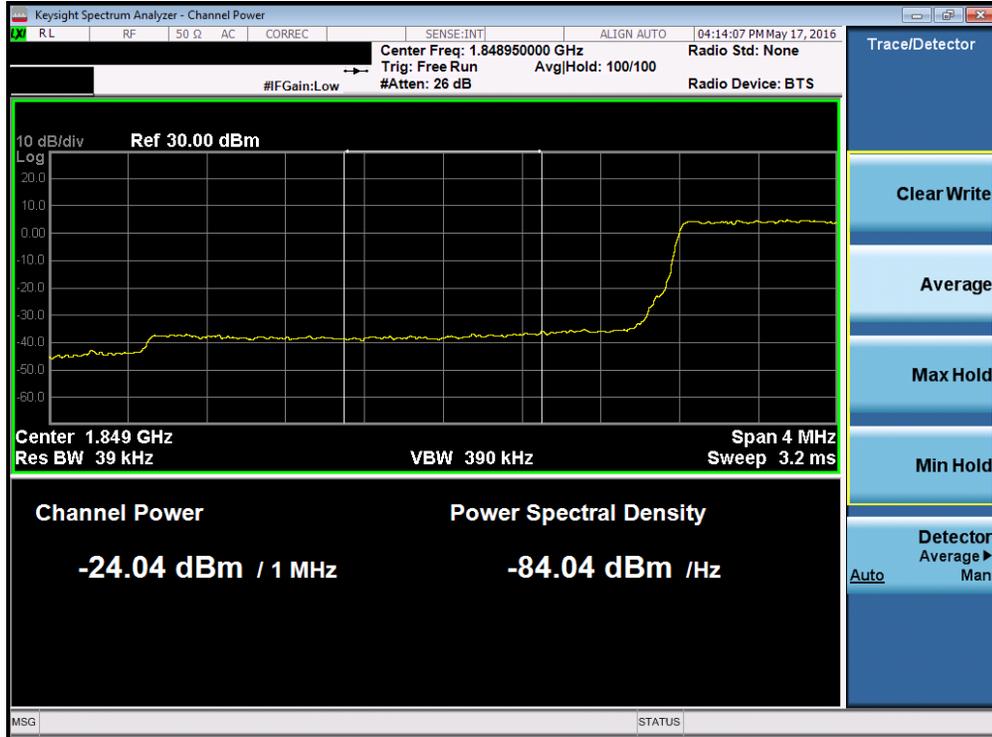


Plot 7-160. Upper Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

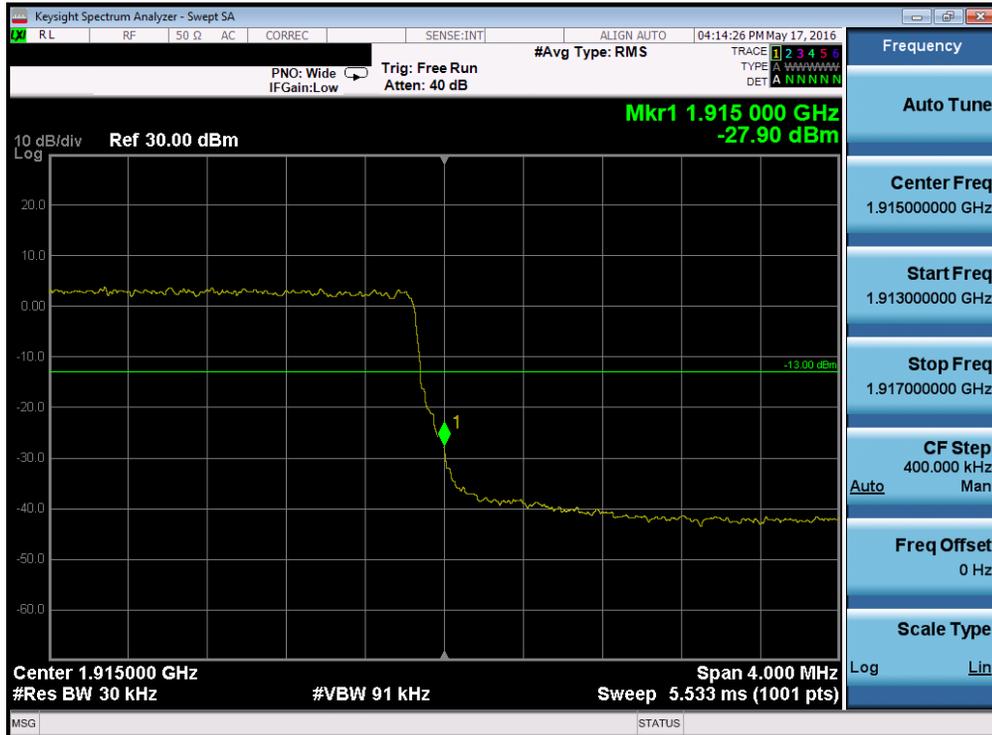


Plot 7-161. Lower Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 97 of 143

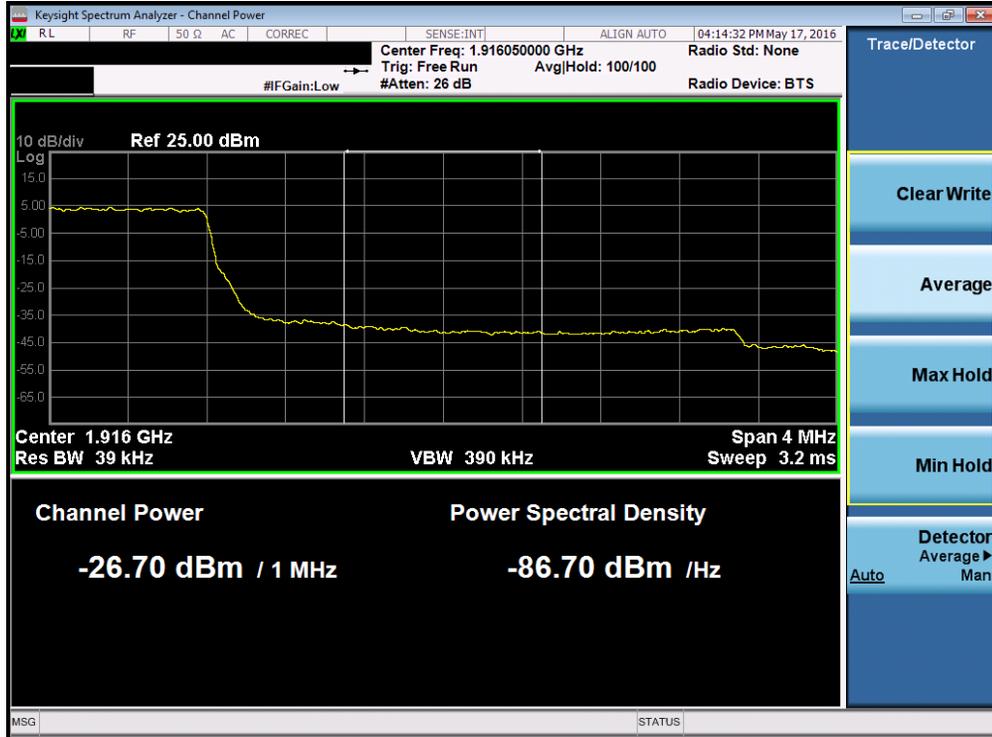


Plot 7-162. Lower Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

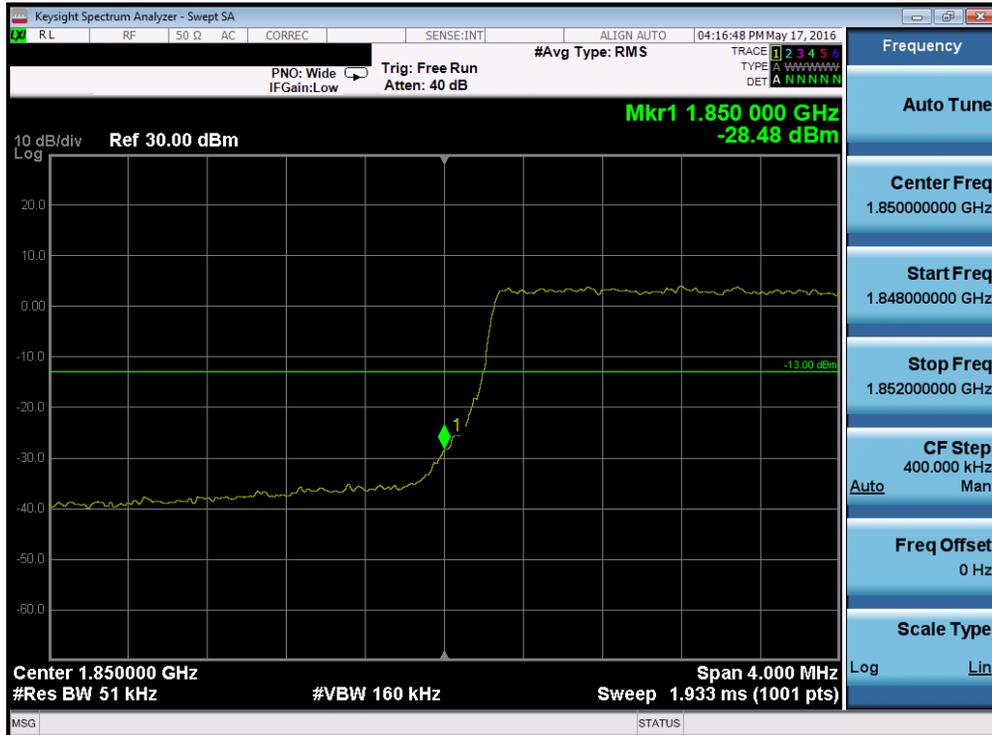


Plot 7-163. Upper Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 98 of 143

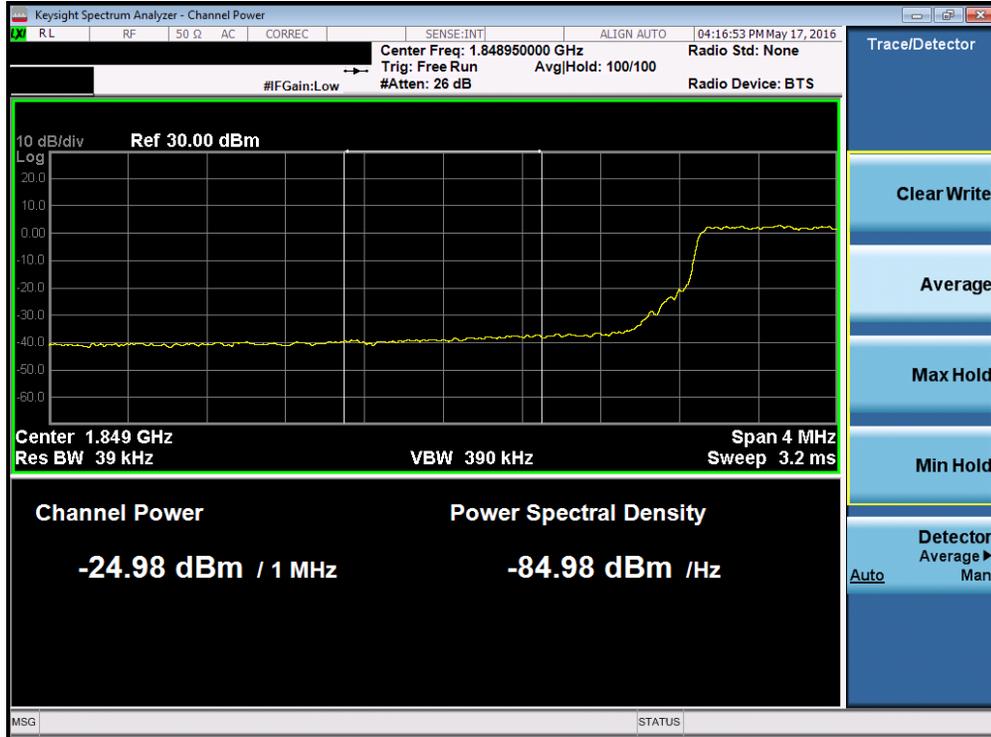


Plot 7-164. Upper Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



Plot 7-165. Lower Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 99 of 143

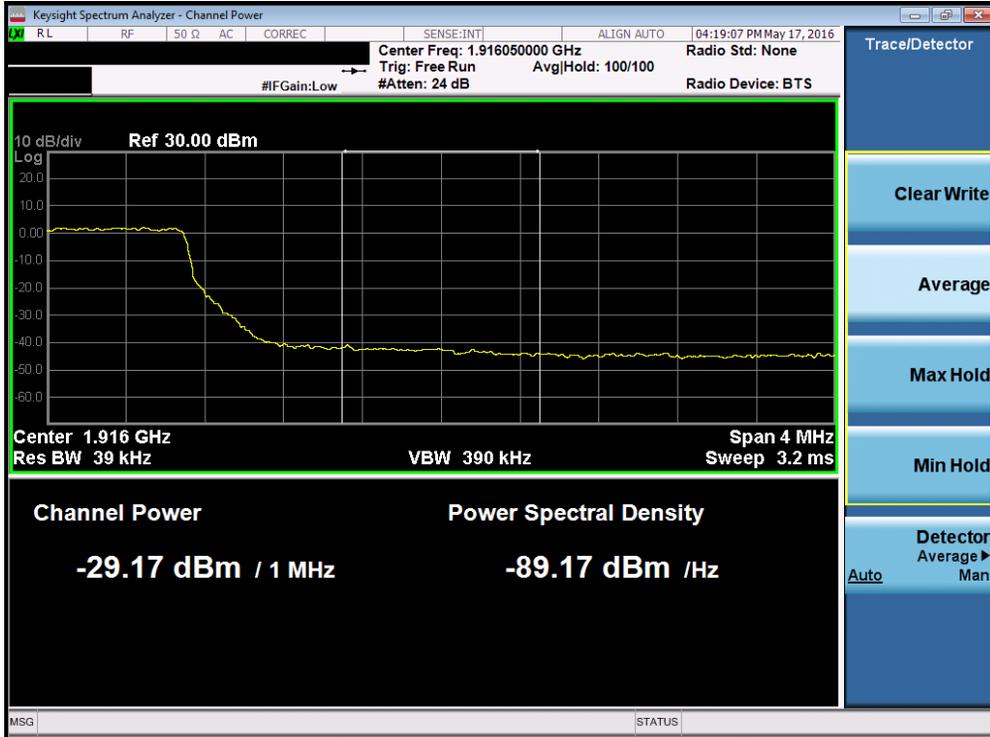


Plot 7-166. Lower Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

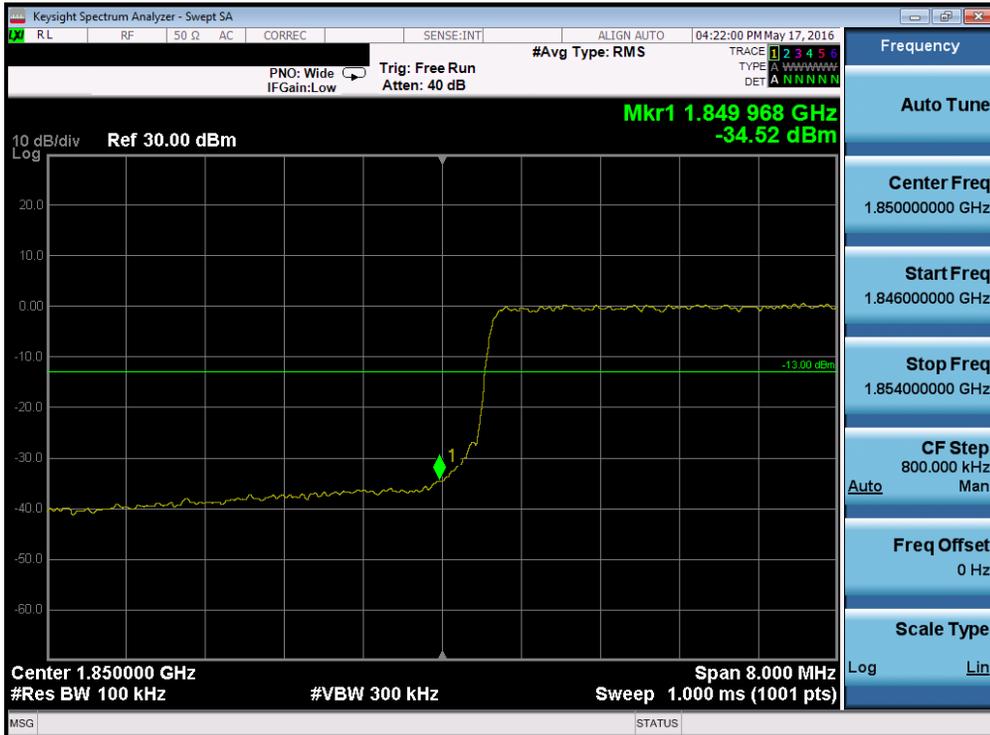


Plot 7-167. Upper Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 100 of 143

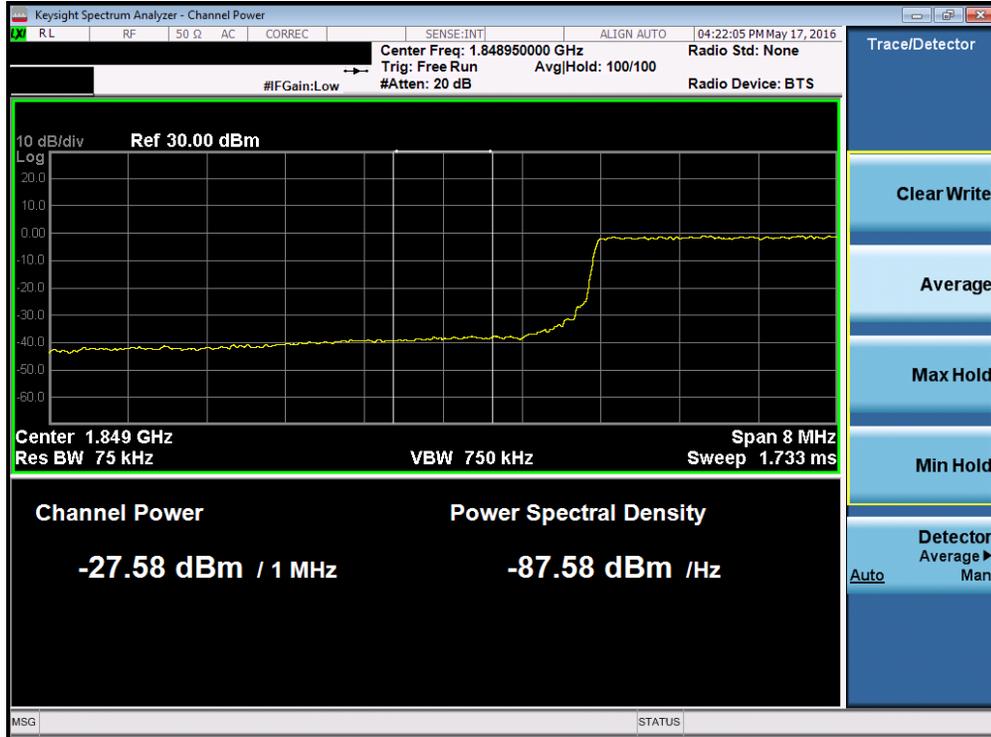


Plot 7-168. Upper Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

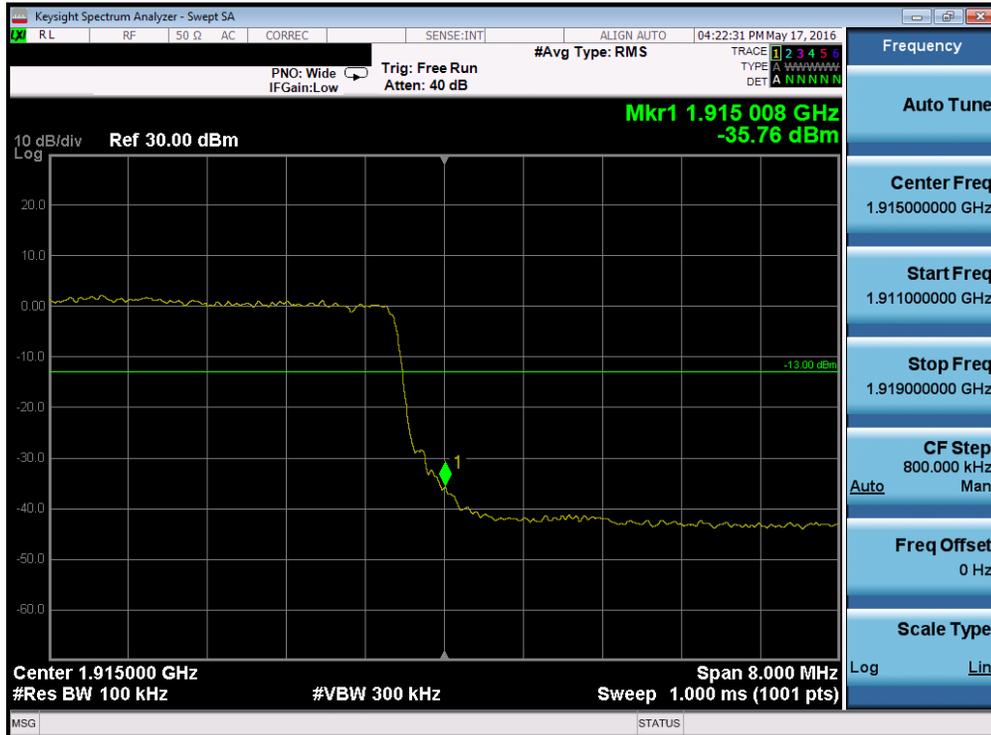


Plot 7-169. Lower Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 101 of 143

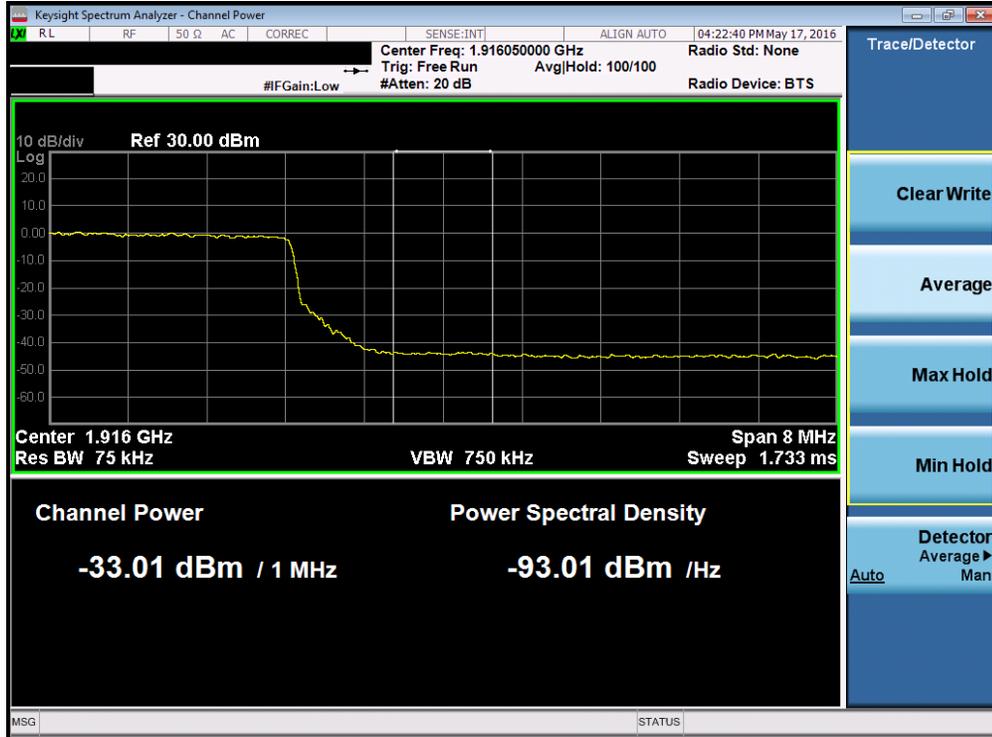


Plot 7-170. Lower Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

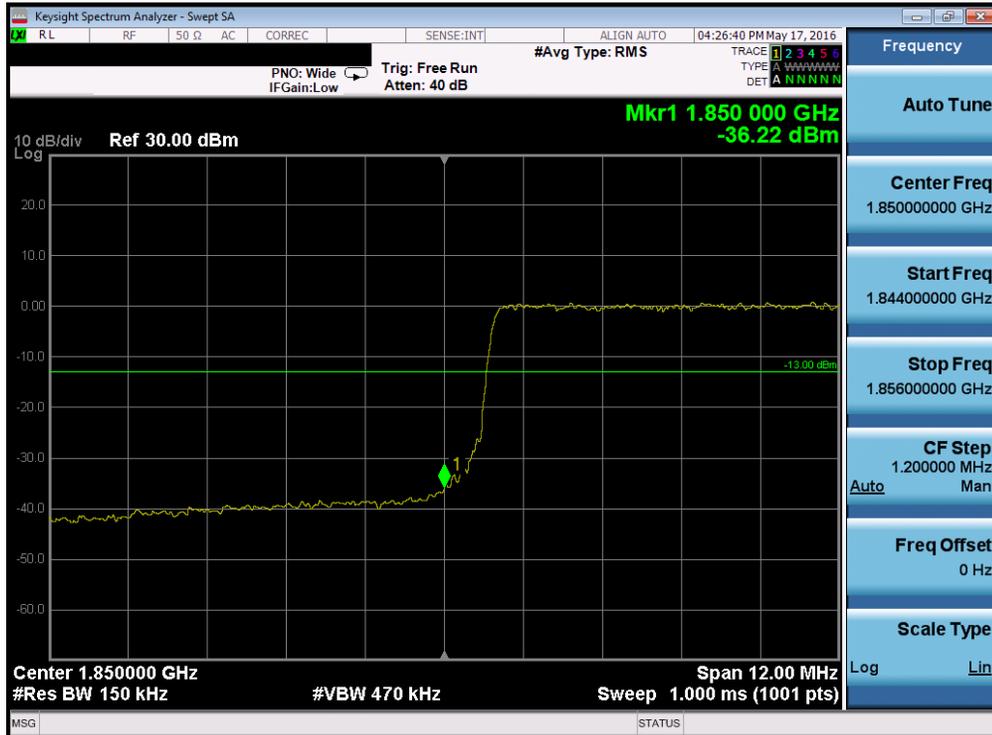


Plot 7-171. Upper Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 102 of 143

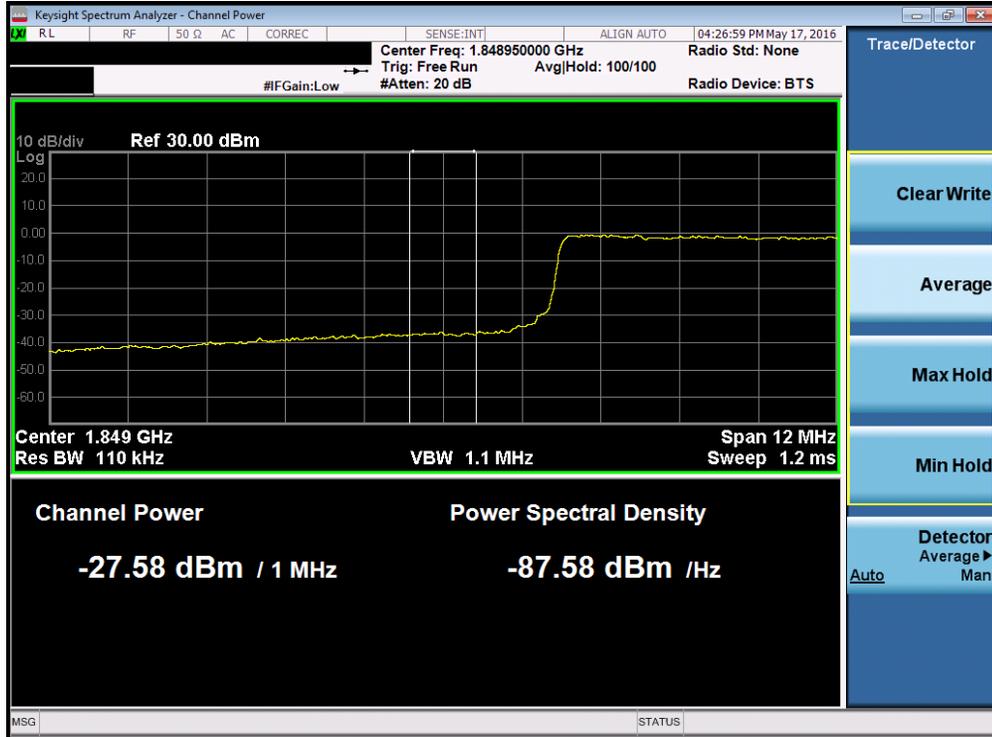


Plot 7-172. Upper Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

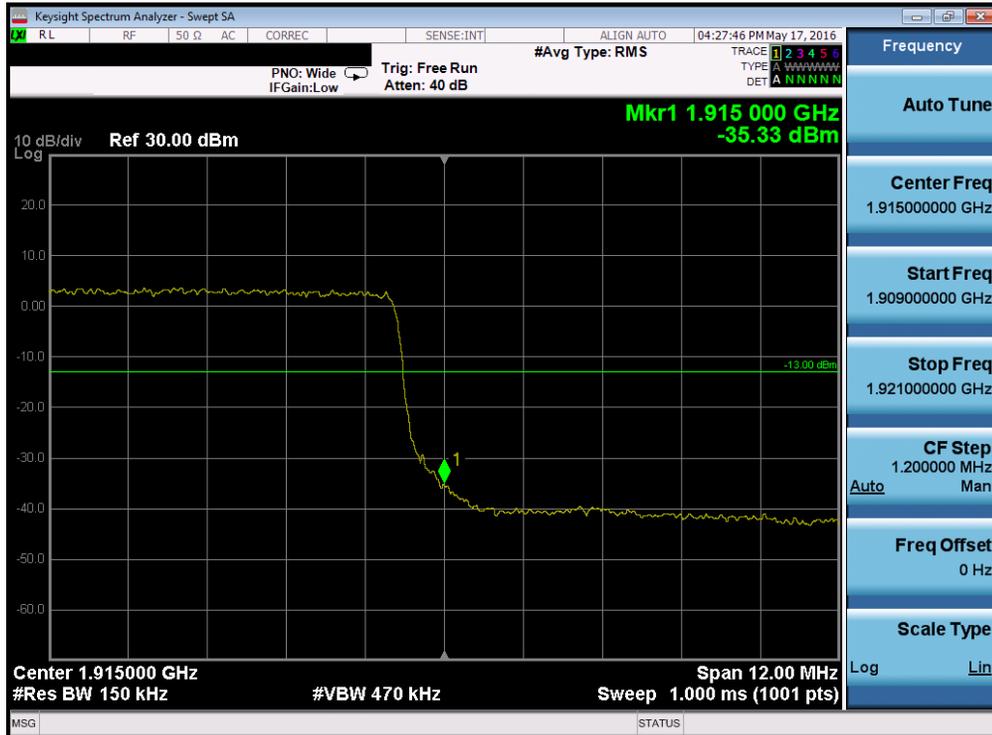


Plot 7-173. Lower Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 103 of 143

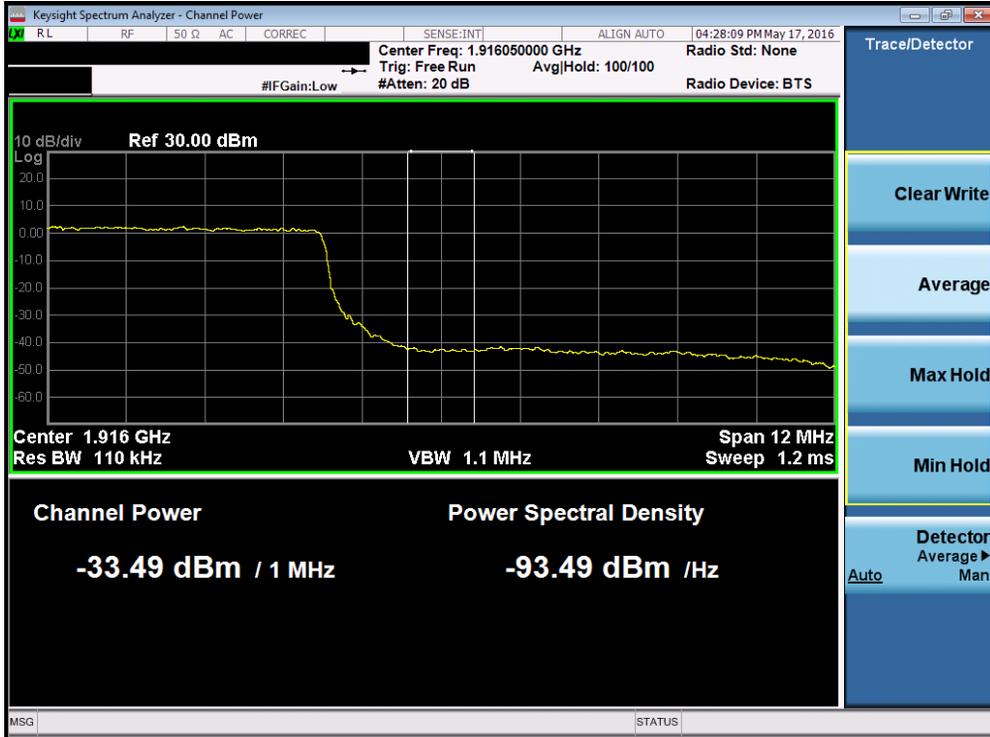


Plot 7-174. Lower Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

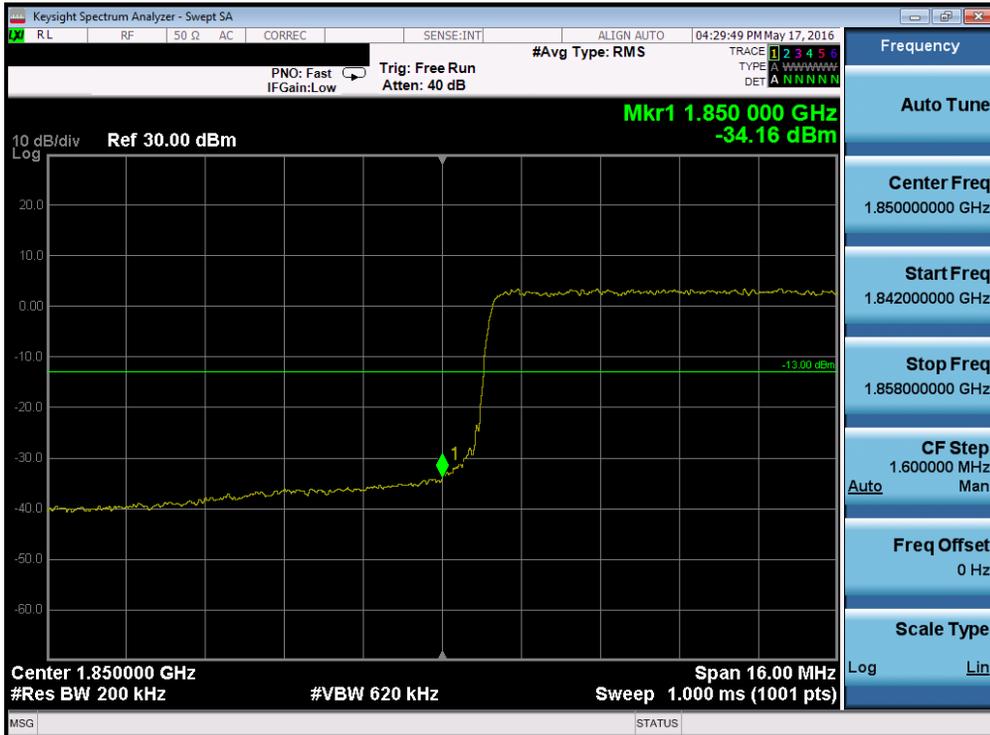


Plot 7-175. Upper Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 104 of 143

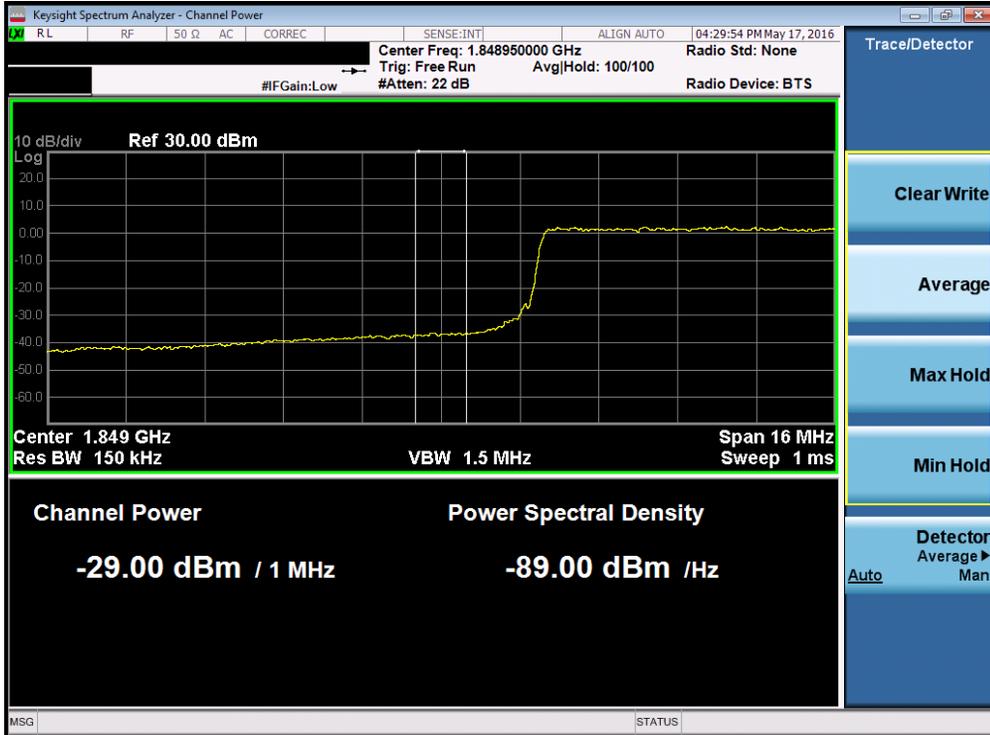


Plot 7-176. Upper Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)



Plot 7-177. Lower Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 105 of 143

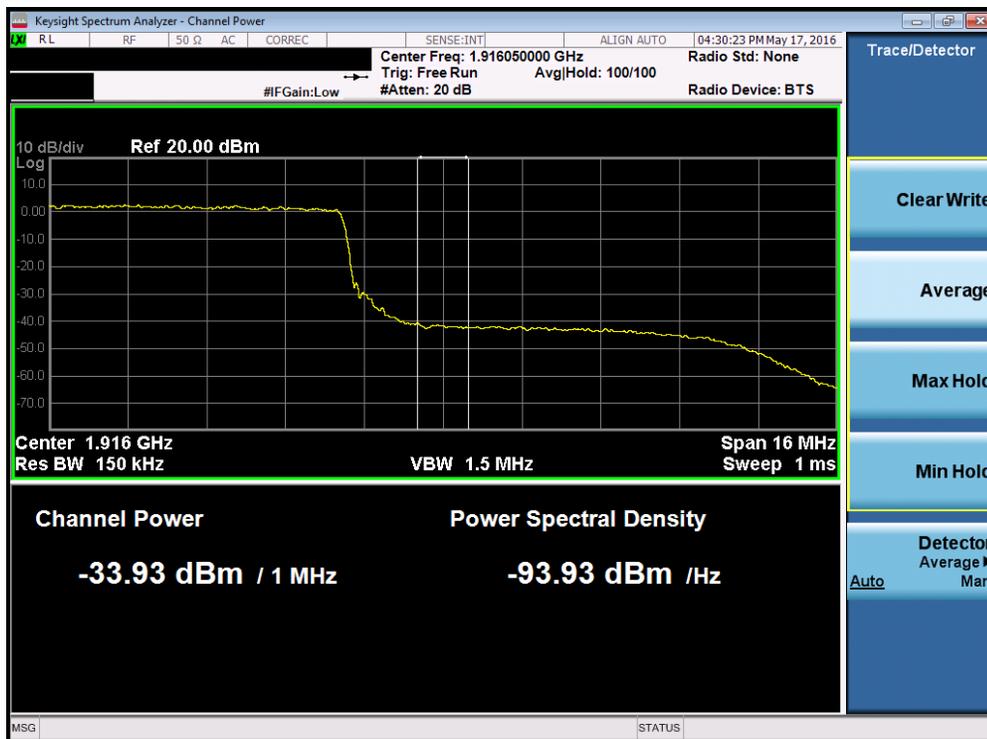


Plot 7-178. Lower Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)



Plot 7-179. Upper Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 106 of 143



Plot 7-180. Upper Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 107 of 143

## 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

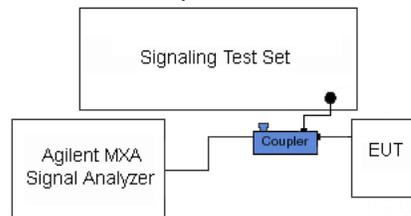
KDB 971168 D01 v02r02 – Section 5.7.1

#### 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.

#### Test Setup

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

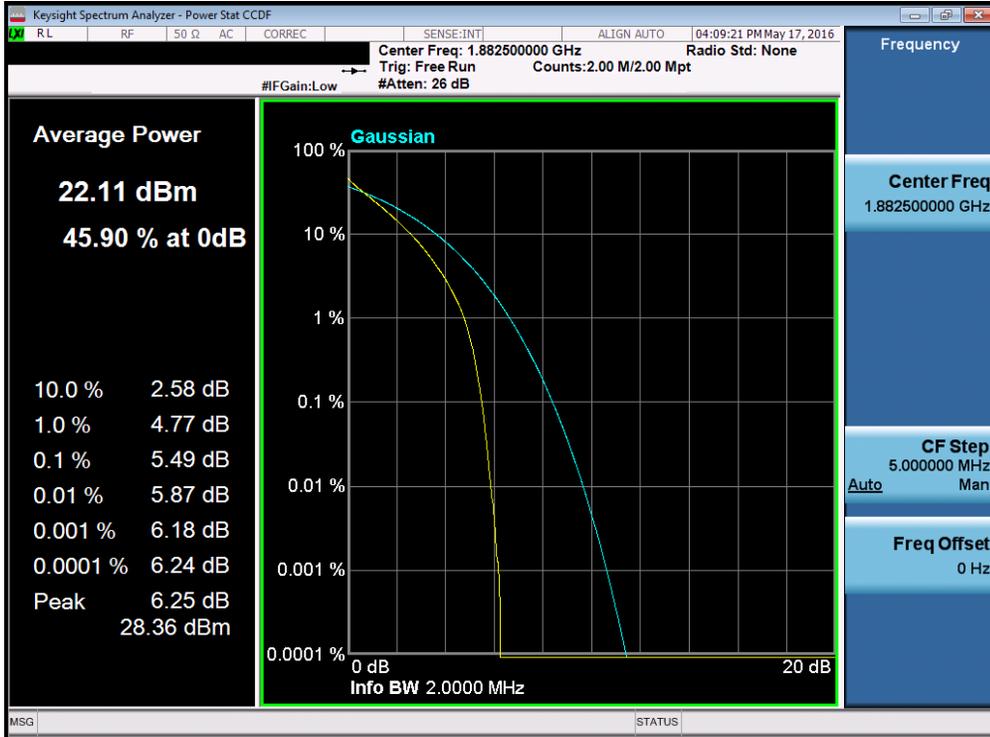


**Figure 7-4. Test Instrument & Measurement Setup**

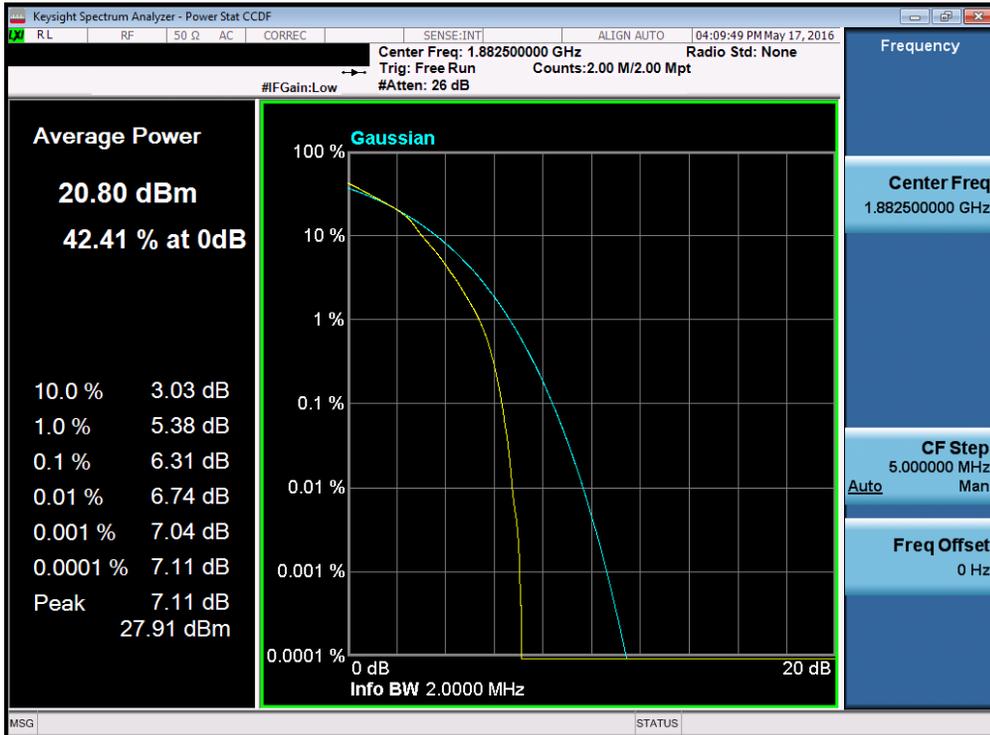
#### Test Notes

None.

FCC ID: ZNFUS610	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
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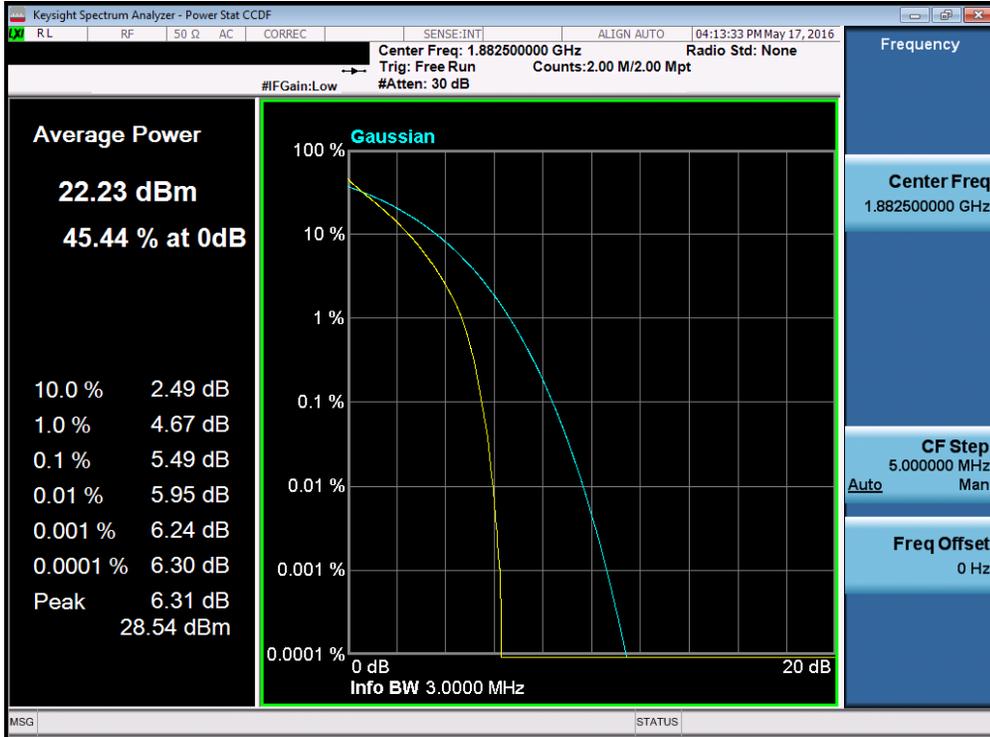


Plot 7-181. PAR Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

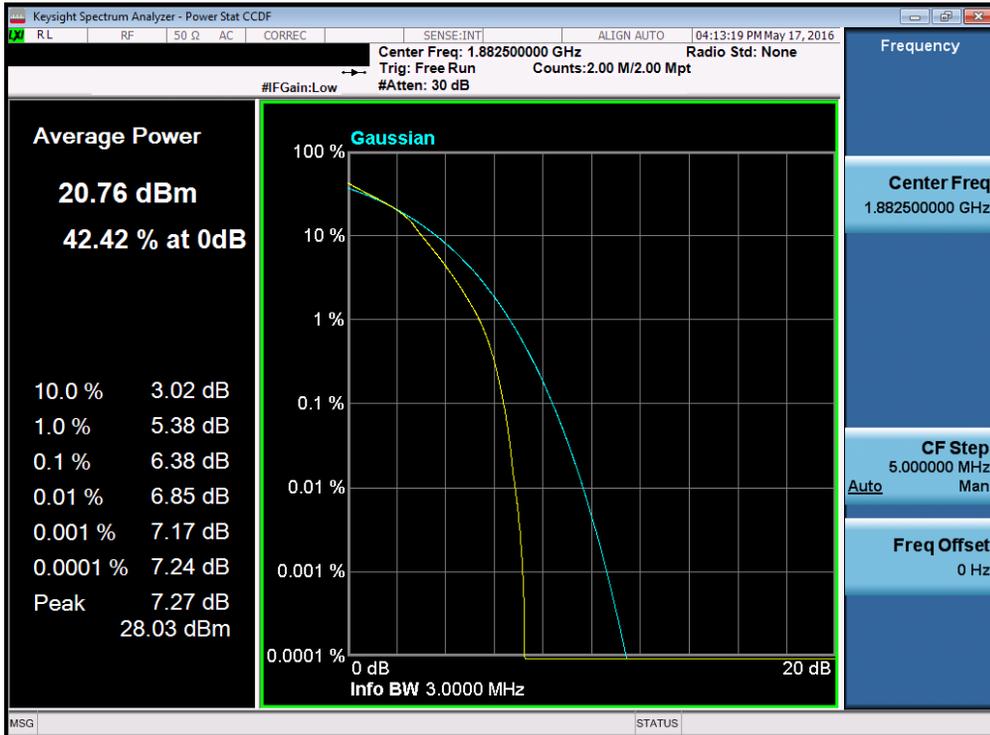


Plot 7-182. PAR Plot (Band 2/25 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFUS610	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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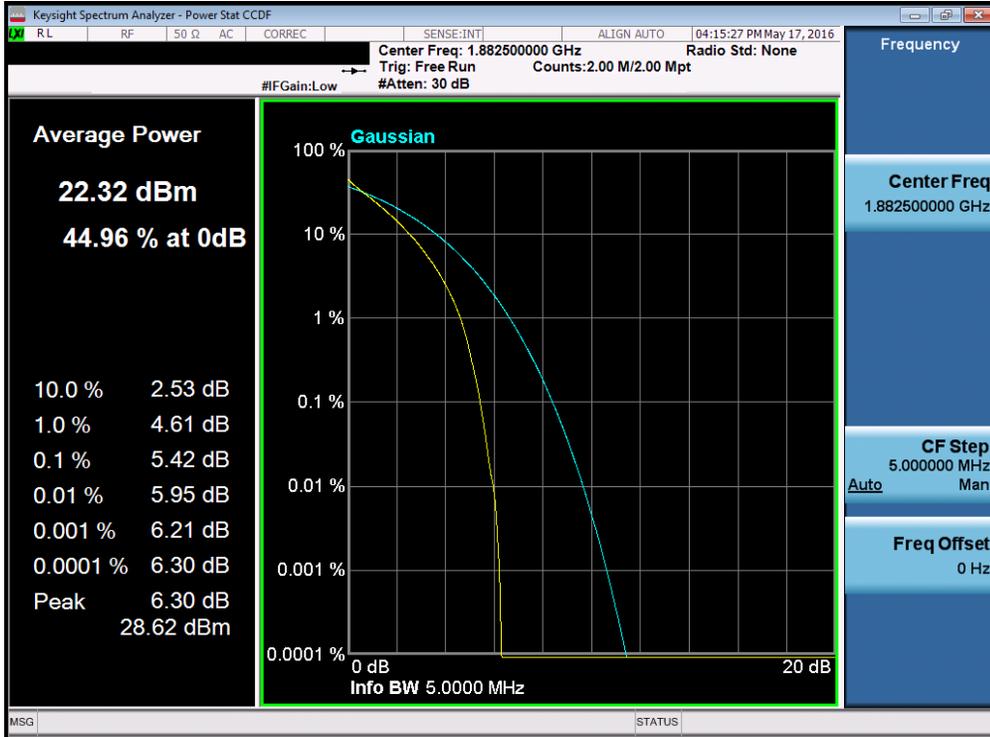


Plot 7-183. PAR Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

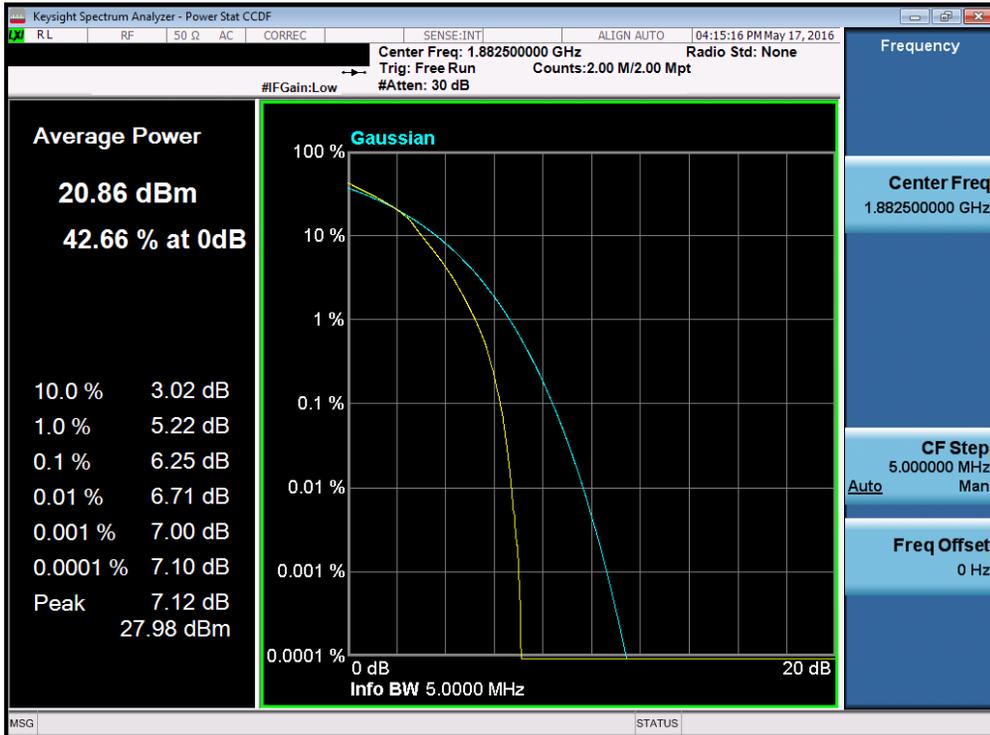


Plot 7-184. PAR Plot (Band 2/25 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: ZNFUS610	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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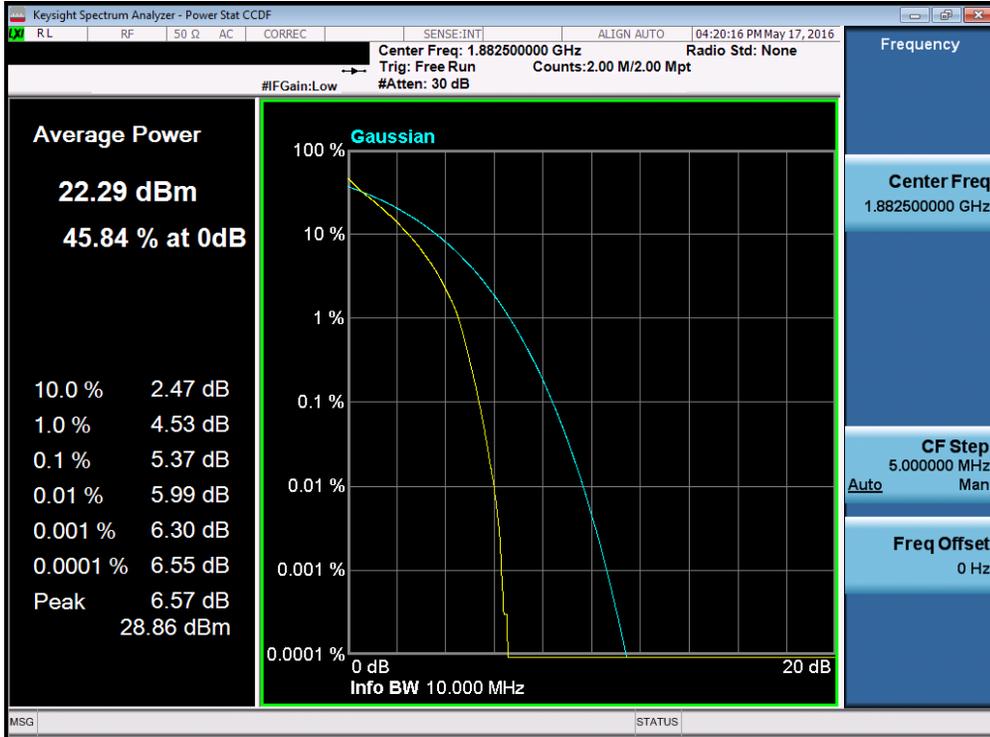


Plot 7-185. PAR Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

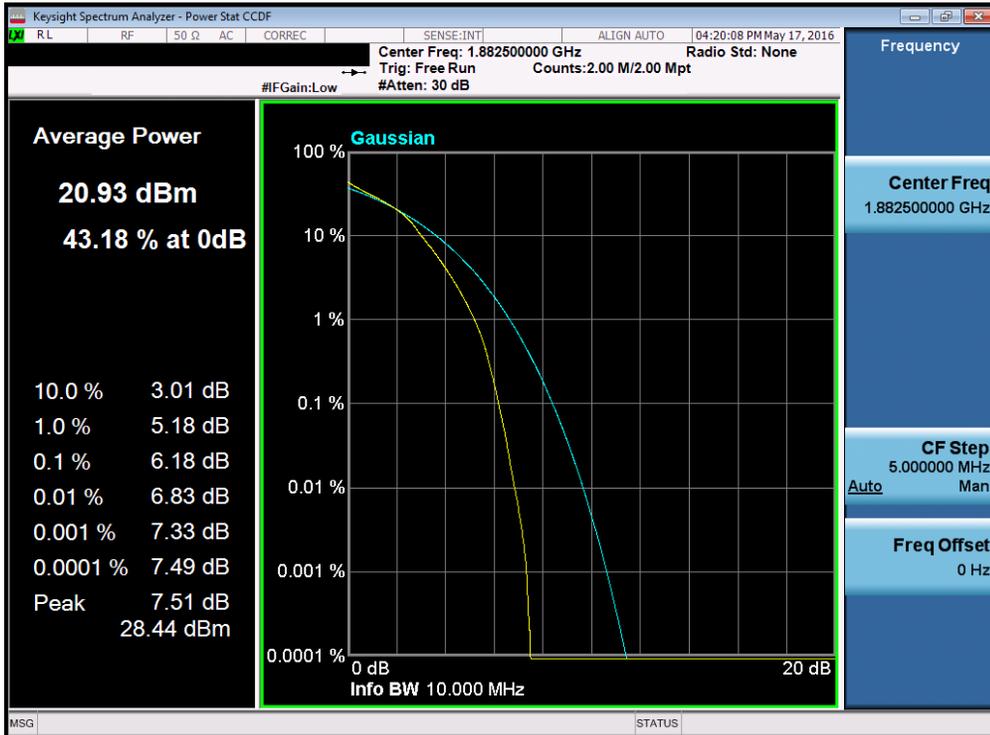


Plot 7-186. PAR Plot (Band 2/25 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: ZNFUS610	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 111 of 143

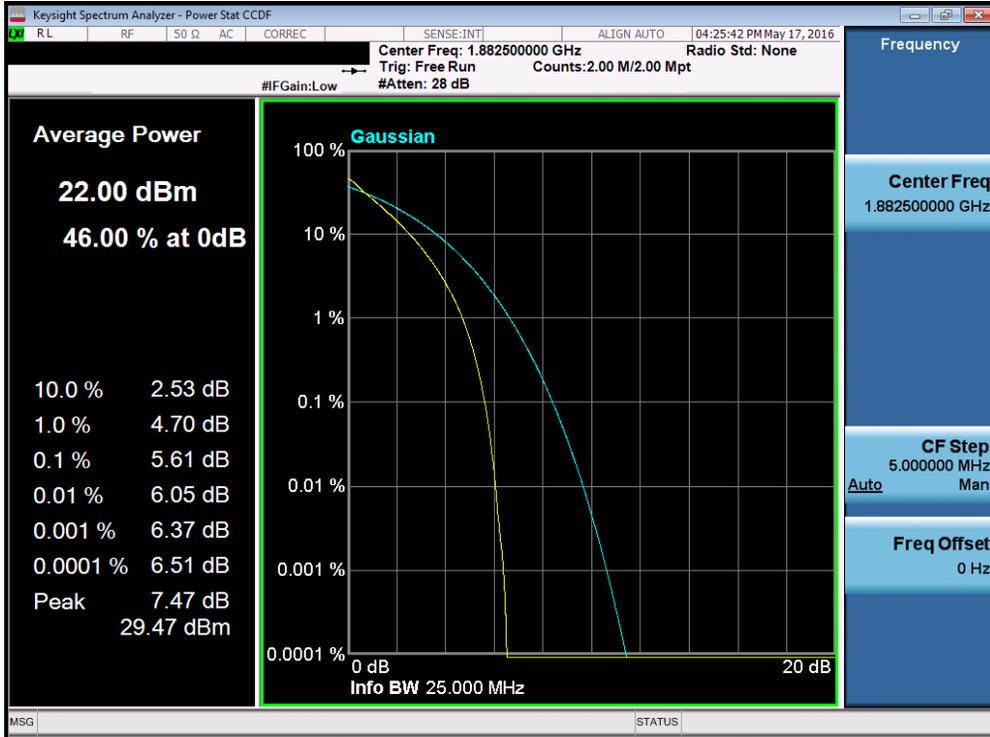


Plot 7-187. PAR Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

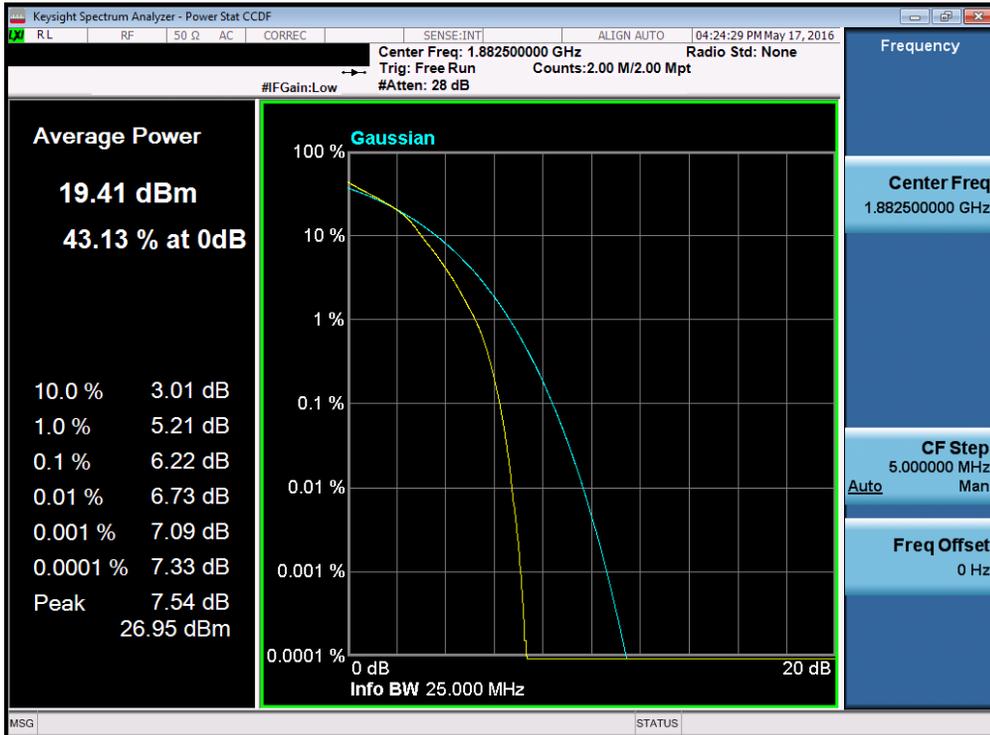


Plot 7-188. PAR Plot (Band 2/25 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFUS610	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 112 of 143

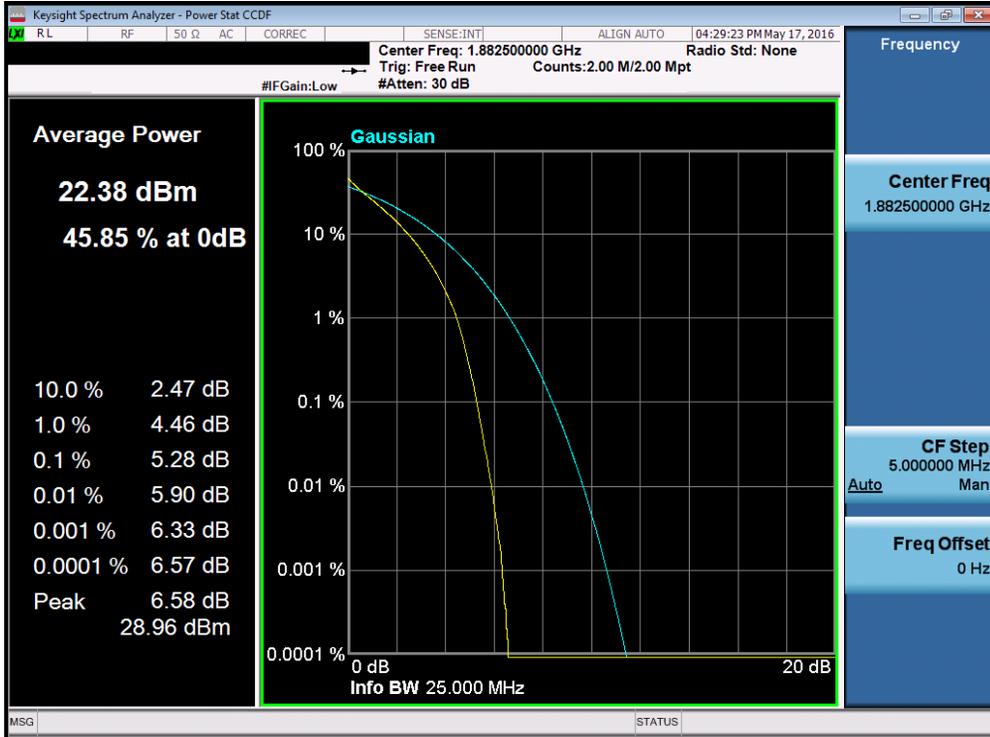


Plot 7-189. PAR Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

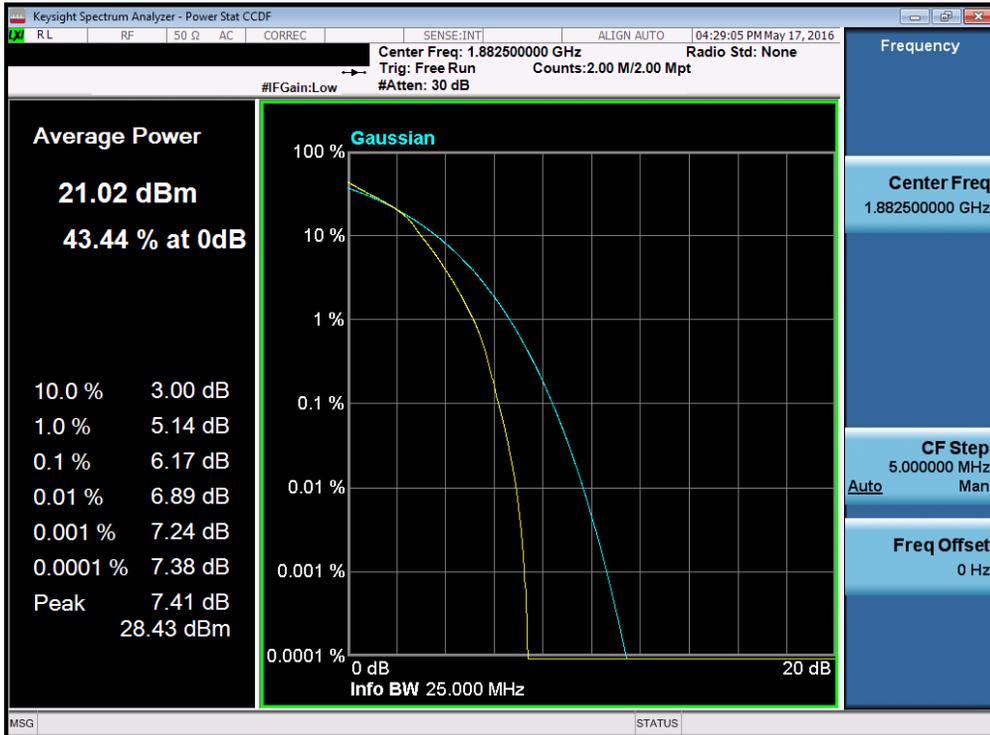


Plot 7-190. PAR Plot (Band 2/25 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 113 of 143



Plot 7-191. PAR Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)



Plot 7-192. PAR Plot (Band 2/25 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 114 of 143

## 7.6 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.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

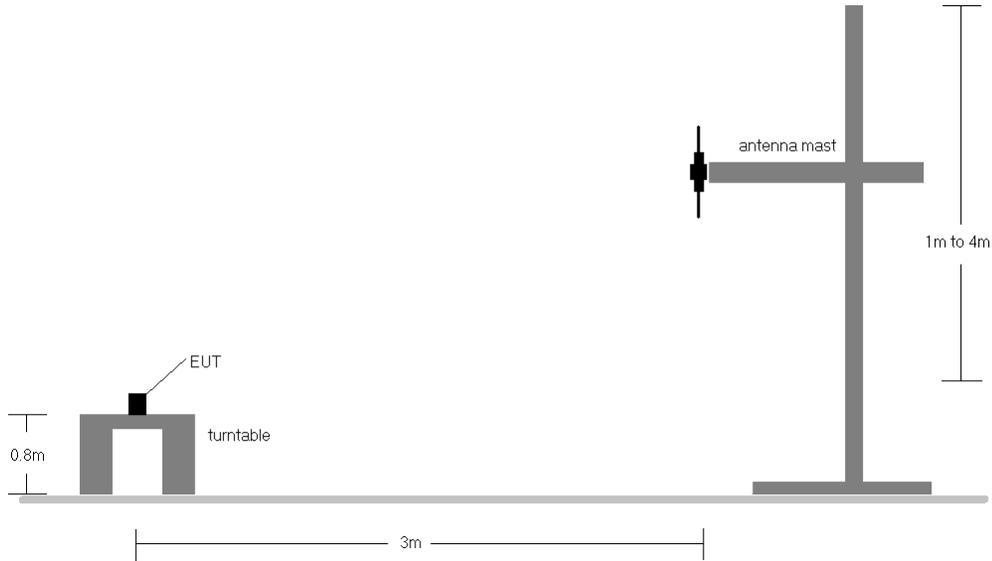
### Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW  $\geq$  3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points  $\geq$  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".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

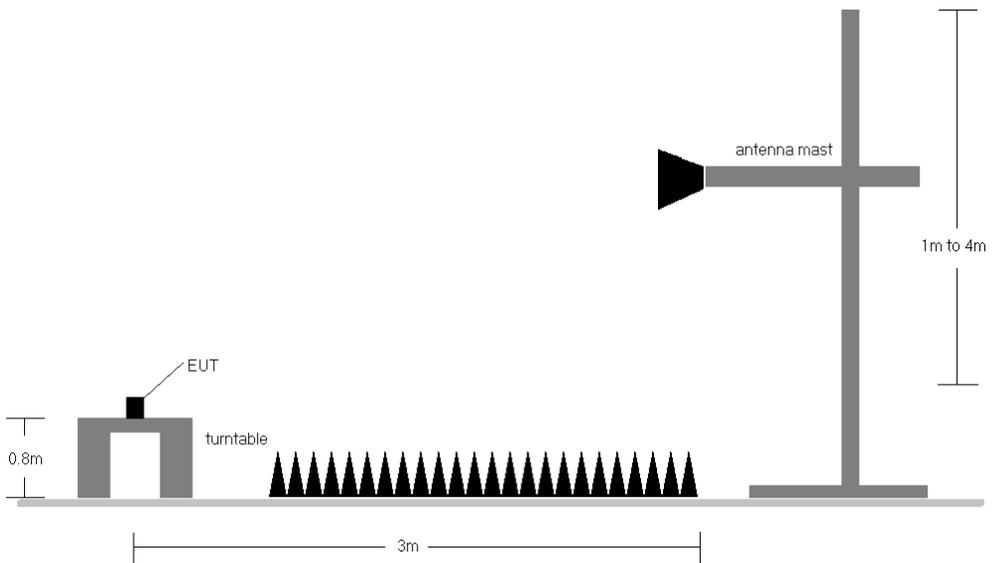
FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset	Page 115 of 143	

**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.

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset		Page 116 of 143

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	264	184	1 / 5	16.07	2.12	18.19	34.77	-16.58
707.50	1.4	QPSK	H	262	166	1 / 5	16.83	2.31	19.14	34.77	-15.63
715.30	1.4	QPSK	H	274	187	1 / 5	16.08	2.52	18.60	34.77	-16.17
699.70	1.4	16-QAM	H	264	184	1 / 5	15.45	2.12	17.57	34.77	-17.20
707.50	1.4	16-QAM	H	262	166	1 / 5	15.99	2.31	18.30	34.77	-16.47
715.30	1.4	16-QAM	H	274	187	1 / 5	15.42	2.52	17.94	34.77	-16.83
700.50	3	QPSK	H	262	178	1 / 0	16.26	2.12	18.38	34.77	-16.39
707.50	3	QPSK	H	267	193	1 / 14	17.02	2.31	19.33	34.77	-15.44
714.50	3	QPSK	H	269	188	1 / 0	16.12	2.50	18.62	34.77	-16.15
700.50	3	16-QAM	H	262	178	1 / 0	15.54	2.12	17.66	34.77	-17.11
707.50	3	16-QAM	H	267	193	1 / 14	16.18	2.31	18.49	34.77	-16.28
714.50	3	16-QAM	H	269	188	1 / 0	15.39	2.50	17.89	34.77	-16.88
707.50	3	QPSK	V	208	162	1 / 14	15.32	2.31	17.63	34.77	-17.14

**Table 7-2. ERP Data (Band 12)**

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	265	180	1 / 24	16.66	2.15	18.81	34.77	-15.96
707.50	5	QPSK	H	265	189	1 / 24	17.03	2.31	19.34	34.77	-15.43
713.50	5	QPSK	H	241	186	1 / 24	16.62	2.48	19.10	34.77	-15.68
701.50	5	16-QAM	H	265	180	1 / 24	15.41	2.15	17.56	34.77	-17.21
707.50	5	16-QAM	H	265	189	1 / 24	15.93	2.31	18.24	34.77	-16.53
713.50	5	16-QAM	H	241	186	1 / 24	15.91	2.48	18.39	34.77	-16.39
704.00	10	QPSK	H	265	189	1 / 49	16.50	2.22	18.72	34.77	-16.06
707.50	10	QPSK	H	265	191	1 / 0	15.88	2.31	18.19	34.77	-16.58
711.00	10	QPSK	H	270	186	1 / 0	16.51	2.41	18.92	34.77	-15.85
704.00	10	16-QAM	H	265	189	1 / 49	15.78	2.22	18.00	34.77	-16.77
707.50	10	16-QAM	H	265	191	1 / 0	15.04	2.31	17.35	34.77	-17.42
711.00	10	16-QAM	H	270	186	1 / 0	15.69	2.41	18.10	34.77	-16.67

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

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset	Page 117 of 143	

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	235	356	1 / 24	15.79	4.19	19.98	34.77	-14.79
782.00	5	QPSK	H	235	0	1 / 24	15.85	4.25	20.10	34.77	-14.67
784.50	5	QPSK	H	235	349	1 / 24	16.01	4.32	20.33	34.77	-14.44
779.50	5	16QAM	H	235	356	1 / 24	15.05	4.19	19.24	34.77	-15.53
782.00	5	16QAM	H	235	0	1 / 24	14.82	4.25	19.07	34.77	-15.70
784.50	5	16QAM	H	235	349	1 / 24	15.02	4.32	19.34	34.77	-15.43
782.00	10	QPSK	H	235	349	1 / 49	15.76	4.25	20.01	34.77	-14.76
782.00	10	16QAM	H	235	349	1 / 49	15.17	4.25	19.42	34.77	-15.35

**Table 7-4. ERP Data (Band 13)**

FCC ID: ZNFUS610	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset	Page 118 of 143	

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	359	193	1 / 5	13.88	5.01	18.89	38.45	-19.56
836.50	1.4	QPSK	H	294	155	3 / 2	14.51	5.16	19.67	38.45	-18.78
848.30	1.4	QPSK	H	293	194	1 / 5	14.38	5.30	19.68	38.45	-18.77
824.70	1.4	16-QAM	H	287	193	1 / 5	13.03	5.01	18.04	38.45	-20.41
836.50	1.4	16-QAM	H	294	155	3 / 2	13.81	5.16	18.97	38.45	-19.48
848.30	1.4	16-QAM	H	293	194	1 / 5	13.54	5.30	18.84	38.45	-19.61
825.50	3	QPSK	H	358	196	1 / 14	14.33	5.02	19.35	38.45	-19.10
836.50	3	QPSK	H	377	196	1 / 14	14.59	5.16	19.75	38.45	-18.70
847.50	3	QPSK	H	319	196	1 / 0	14.83	5.29	20.12	38.45	-18.33
825.50	3	16-QAM	H	358	196	1 / 14	13.59	5.02	18.61	38.45	-19.84
836.50	3	16-QAM	H	377	196	1 / 14	13.69	5.16	18.85	38.45	-19.60
847.50	3	16-QAM	H	319	196	1 / 0	13.93	5.29	19.22	38.45	-19.23
826.50	5	QPSK	H	359	195	1 / 24	14.70	5.03	19.73	38.45	-18.72
836.50	5	QPSK	H	342	196	1 / 0	15.18	5.16	20.34	38.45	-18.11
846.50	5	QPSK	H	318	197	1 / 24	14.55	5.28	19.83	38.45	-18.62
826.50	5	16-QAM	H	359	195	1 / 24	13.66	5.03	18.69	38.45	-19.76
836.50	5	16-QAM	H	342	196	1 / 0	14.06	5.16	19.22	38.45	-19.23
846.50	5	16-QAM	H	318	197	1 / 24	13.90	5.28	19.18	38.45	-19.27
829.00	10	QPSK	H	359	196	1 / 49	14.45	5.06	19.51	38.45	-18.94
836.50	10	QPSK	H	359	195	1 / 0	14.89	5.16	20.05	38.45	-18.40
844.00	10	QPSK	H	319	195	1 / 49	14.34	5.25	19.59	38.45	-18.86
829.00	10	16-QAM	H	359	196	1 / 49	13.81	5.06	18.87	38.45	-19.58
836.50	10	16-QAM	H	359	195	1 / 49	12.98	5.16	18.14	38.45	-20.31
844.00	10	16-QAM	H	319	195	1 / 49	13.71	5.25	18.96	38.45	-19.49
836.50	5	QPSK	V	290	196	1 / 0	14.30	5.16	19.46	38.45	-18.99

**Table 7-5. ERP Data (Band 5)**

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset	Page 119 of 143	

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	187	94	1 / 0	13.46	9.66	23.12	30.00	-6.88
1732.50	1.4	QPSK	H	189	86	1 / 5	13.13	9.61	22.74	30.00	-7.26
1754.30	1.4	QPSK	H	185	81	3 / 2	12.84	9.57	22.41	30.00	-7.59
1710.70	1.4	16-QAM	H	187	94	1 / 0	13.35	9.66	23.01	30.00	-6.99
1732.50	1.4	16-QAM	H	189	86	1 / 5	12.97	9.61	22.58	30.00	-7.42
1754.30	1.4	16-QAM	H	185	81	3 / 2	12.71	9.57	22.28	30.00	-7.72
1711.50	3	QPSK	H	186	95	1 / 0	13.55	9.65	23.20	30.00	-6.80
1732.50	3	QPSK	H	178	90	1 / 14	13.50	9.61	23.11	30.00	-6.89
1753.50	3	QPSK	H	182	85	1 / 0	13.27	9.57	22.84	30.00	-7.16
1711.50	3	16-QAM	H	186	95	1 / 0	13.46	9.65	23.11	30.00	-6.89
1732.50	3	16-QAM	H	178	90	1 / 14	13.33	9.61	22.94	30.00	-7.06
1753.50	3	16-QAM	H	182	85	1 / 0	13.21	9.57	22.78	30.00	-7.22
1712.50	5	QPSK	H	132	98	1 / 0	13.37	9.65	23.02	30.00	-6.98
1732.50	5	QPSK	H	128	92	1 / 0	12.87	9.61	22.48	30.00	-7.52
1752.50	5	QPSK	H	130	89	1 / 0	12.81	9.57	22.38	30.00	-7.62
1712.50	5	16-QAM	H	132	98	1 / 0	12.78	9.65	22.43	30.00	-7.57
1732.50	5	16-QAM	H	128	92	1 / 0	12.45	9.61	22.06	30.00	-7.94
1752.50	5	16-QAM	H	130	89	1 / 0	12.32	9.57	21.89	30.00	-8.11
1715.00	10	QPSK	H	132	92	1 / 0	13.21	9.65	22.86	30.00	-7.14
1732.50	10	QPSK	H	128	88	1 / 0	13.17	9.61	22.78	30.00	-7.22
1750.00	10	QPSK	H	126	88	1 / 49	13.05	9.58	22.63	30.00	-7.37
1715.00	10	16-QAM	H	132	92	1 / 0	13.09	9.65	22.74	30.00	-7.26
1732.50	10	16-QAM	H	128	88	1 / 0	13.09	9.61	22.70	30.00	-7.30
1750.00	10	16-QAM	H	126	88	1 / 49	12.98	9.58	22.56	30.00	-7.44
1717.50	15	QPSK	H	131	83	1 / 0	13.46	9.64	23.10	30.00	-6.90
1732.50	15	QPSK	H	131	91	1 / 0	13.65	9.61	23.26	30.00	-6.74
1747.50	15	QPSK	H	131	93	1 / 74	12.58	9.58	22.16	30.00	-7.84
1717.50	15	16-QAM	H	131	83	1 / 0	13.07	9.64	22.71	30.00	-7.29
1732.50	15	16-QAM	H	131	91	1 / 0	13.50	9.61	23.11	30.00	-6.89
1747.50	15	16-QAM	H	131	93	1 / 74	12.50	9.58	22.08	30.00	-7.92
1720.00	20	QPSK	H	128	113	1 / 99	11.99	9.64	21.63	30.00	-8.37
1732.50	20	QPSK	H	121	94	1 / 99	12.70	9.61	22.31	30.00	-7.69
1745.00	20	QPSK	H	126	97	1 / 99	12.98	9.59	22.57	30.00	-7.43
1720.00	20	16-QAM	H	128	113	1 / 99	11.52	9.64	21.16	30.00	-8.84
1732.50	20	16-QAM	H	121	94	1 / 99	12.58	9.61	22.19	30.00	-7.81
1745.00	20	16-QAM	H	126	97	1 / 99	12.81	9.59	22.40	30.00	-7.60
1711.50	3	QPSK	V	117	340	1 / 0	11.45	9.65	21.10	30.00	-8.90

**Table 7-6. EIRP Data (Band 4)**

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1605160919.ZNF	Test Dates: 5/16-5/26/2016	EUT Type: Portable Handset	Page 120 of 143	

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	271	105	1 / 5	16.05	9.35	25.40	33.01	-7.61
1882.50	1.4	QPSK	H	265	97	1 / 0	16.75	9.27	26.02	33.01	-6.99
1914.30	1.4	QPSK	H	263	97	3 / 2	15.24	9.26	24.50	33.01	-8.51
1850.70	1.4	16-QAM	H	271	105	1 / 5	15.90	9.35	25.25	33.01	-7.76
1882.50	1.4	16-QAM	H	265	97	1 / 5	16.61	9.27	25.88	33.01	-7.13
1914.30	1.4	16-QAM	H	263	97	3 / 2	14.13	9.26	23.39	33.01	-9.62
1851.50	3	QPSK	H	272	104	1 / 14	16.25	9.35	25.60	33.01	-7.41
1882.50	3	QPSK	H	267	104	15 / 0	17.06	9.27	26.33	33.01	-6.68
1913.50	3	QPSK	H	263	93	1 / 14	14.81	9.26	24.07	33.01	-8.94
1851.50	3	16-QAM	H	272	104	1 / 14	16.23	9.35	25.58	33.01	-7.43
1882.50	3	16-QAM	H	267	104	15 / 0	16.08	9.27	25.35	33.01	-7.66
1913.50	3	16-QAM	H	263	93	1 / 14	13.86	9.26	23.12	33.01	-9.89
1852.50	5	QPSK	H	270	106	25 / 0	16.23	9.34	25.57	33.01	-7.44
1882.50	5	QPSK	H	269	100	25 / 0	17.00	9.27	26.27	33.01	-6.74
1912.50	5	QPSK	H	263	95	25 / 0	14.89	9.26	24.15	33.01	-8.86
1852.50	5	16-QAM	H	270	106	25 / 0	15.37	9.34	24.71	33.01	-8.30
1882.50	5	16-QAM	H	269	100	25 / 0	16.14	9.27	25.41	33.01	-7.60
1912.50	5	16-QAM	H	263	95	25 / 0	14.28	9.26	23.54	33.01	-9.47
1855.00	10	QPSK	H	267	150	50 / 0	15.74	9.34	25.08	33.01	-7.93
1882.50	10	QPSK	H	265	100	1 / 0	16.99	9.27	26.26	33.01	-6.75
1910.00	10	QPSK	H	260	100	1 / 49	14.91	9.25	24.16	33.01	-8.85
1855.00	10	16-QAM	H	267	150	50 / 0	15.73	9.34	25.07	33.01	-7.94
1882.50	10	16-QAM	H	265	100	1 / 0	16.92	9.27	26.19	33.01	-6.82
1910.00	10	16-QAM	H	260	100	1 / 49	14.02	9.25	23.27	33.01	-9.74
1857.50	15	QPSK	H	208	95	1 / 74	14.55	9.33	23.88	33.01	-9.13
1882.50	15	QPSK	H	208	102	1 / 0	15.95	9.27	25.22	33.01	-7.79
1907.50	15	QPSK	H	201	91	1 / 0	15.36	9.24	24.60	33.01	-8.41
1857.50	15	16-QAM	H	208	95	1 / 74	14.48	9.33	23.81	33.01	-9.20
1882.50	15	16-QAM	H	208	102	1 / 0	15.92	9.27	25.19	33.01	-7.82
1907.50	15	16-QAM	H	201	91	1 / 0	15.66	9.24	24.90	33.01	-8.11
1860.00	20	QPSK	H	271	99	50 / 25	15.70	9.32	25.02	33.01	-7.99
1882.50	20	QPSK	H	265	98	50 / 25	16.66	9.27	25.93	33.01	-7.08
1905.00	20	QPSK	H	260	96	1 / 99	15.06	9.24	24.30	33.01	-8.71
1860.00	20	16-QAM	H	271	99	50 / 25	14.61	9.32	23.93	33.01	-9.08
1882.50	20	16-QAM	H	265	98	50 / 25	15.68	9.27	24.95	33.01	-8.06
1905.00	20	16-QAM	H	260	96	1 / 99	14.34	9.24	23.58	33.01	-9.43

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

FCC ID: ZNFUS610	 <b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>			Reviewed by: Quality Manager
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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)

### 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

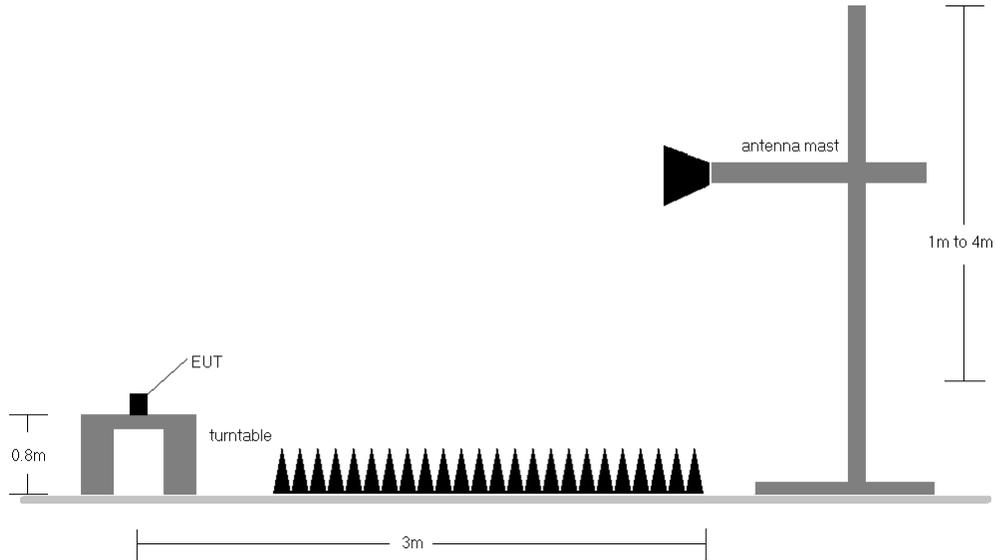
ANSI/TIA-603-D:2010 – Section 2.2.12

### Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW  $\geq 3 \times$  RBW
3. Span = 1.5 times the OBW
4. No. of sweep points  $\geq 2 \times$  span / RBW
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

FCC ID: ZNFUS610	 <b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>			<b>Reviewed by:</b> Quality Manager
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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.

FCC ID: ZNFUS610	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY: 701.50 MHz  
 CHANNEL: 23035  
 MEASURED OUTPUT POWER: 18.81 dBm = 0.076 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  31.81 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]
1403.00	H	100	117	-61.82	5.60	-56.22	75.0
2104.50	H	100	252	-60.65	6.67	-53.98	72.8
2806.00	H	-	-	-61.78	7.92	-53.86	72.7
3507.50	H	100	239	-50.94	7.80	-43.13	61.9
4209.00	H	100	143	-55.05	8.30	-46.75	65.6
4910.50	H	-	-	-56.44	8.71	-47.73	66.5

**Table 7-8. Radiated Spurious Data (Band 12/17 – Low Channel)**

OPERATING FREQUENCY: 707.50 MHz  
 CHANNEL: 23095  
 MEASURED OUTPUT POWER: 19.34 dBm = 0.086 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.34 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	100	100	-59.68	5.69	-53.99	73.3
2122.50	H	100	254	-58.80	6.75	-52.05	71.4
2830.00	H	-	-	-61.49	7.90	-53.60	72.9
3537.50	H	100	347	-51.73	7.81	-43.92	63.3
4245.00	H	100	143	-56.10	8.41	-47.69	67.0
4952.50	H	-	-	-56.00	8.74	-47.25	66.6

**Table 7-9. Radiated Spurious Data (Band 12/17 – Mid Channel)**

FCC ID: ZNFUS610	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY: 713.50 MHz  
 CHANNEL: 23155  
 MEASURED OUTPUT POWER: 19.10 dBm = 0.081 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.10 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]
1427.00	H	100	91	-61.81	5.79	-56.02	75.1
2140.50	H	100	258	-58.02	6.82	-51.20	70.3
2854.00	H	-	-	-61.83	7.88	-53.95	73.0
3567.50	H	100	347	-50.57	7.82	-42.76	61.9
4281.00	H	100	143	-56.52	8.52	-47.99	67.1
4994.50	H	-	-	-56.37	8.78	-47.59	66.7

**Table 7-10. Radiated Spurious Data (Band 12/17 – High Channel)**

OPERATING FREQUENCY: 779.50 MHz  
 CHANNEL: 23205  
 MEASURED OUTPUT POWER: 19.98 dBm = 0.100 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.98 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]
2338.50	H	100	274	-56.46	7.35	-49.11	69.1
3118.00	H	-	-	-61.21	7.19	-54.02	74.0

**Table 7-11. Radiated Spurious Data (Band 13 – Low Channel)**

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 782.00 MHz  
 CHANNEL: 23230  
 MEASURED OUTPUT POWER: 20.10 dBm = 0.102 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  33.10 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	100	206	-46.35	7.33	-39.02	59.1
3128.00	H	-	-	-58.53	7.20	-51.33	71.4

Table 7-12. Radiated Spurious Data (Band 13 – Mid Channel)

OPERATING FREQUENCY: 784.50 MHz  
 CHANNEL: 23255  
 MEASURED OUTPUT POWER: 20.33 dBm = 0.108 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  33.33 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]
2353.50	H	100	271	-48.78	7.30	-41.48	61.8
3138.00	H	-	-	-59.09	7.21	-51.88	72.2

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

FCC ID: ZNFUS610	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
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MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.00 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]
1559.00	H	100	122	-64.55	6.55	-58.00	-18.0
1564.00	H	100	224	-64.69	6.57	-58.12	-18.1
1569.00	H	100	39	-62.97	6.59	-56.39	-16.4

**Table 7-14. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)**

OPERATING FREQUENCY: 826.50 MHz  
 CHANNEL: 20425  
 MEASURED OUTPUT POWER: 19.73 dBm = 0.094 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.73 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]
1653.00	H	100	91	-63.15	6.70	-56.46	76.2
2479.50	H	100	270	-57.23	7.54	-49.69	69.4
3306.00	H	-	-	-58.90	7.38	-51.51	71.2

**Table 7-15. Radiated Spurious Data (Band 5 – Low Channel)**

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 836.50 MHz  
 CHANNEL: 20525  
 MEASURED OUTPUT POWER: 20.34 dBm = 0.108 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  33.34 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	100	178	-62.74	6.70	-56.04	76.4
2509.50	H	100	266	-56.76	7.63	-49.13	69.5
3346.00	H	-	-	-59.13	7.51	-51.62	72.0

**Table 7-16. Radiated Spurious Data (Band 5 – Mid Channel)**

OPERATING FREQUENCY: 846.50 MHz  
 CHANNEL: 20625  
 MEASURED OUTPUT POWER: 19.83 dBm = 0.096 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.83 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]
1693.00	H	100	179	-60.92	6.70	-54.22	74.1
2539.50	H	100	270	-55.37	7.60	-47.77	67.6
3386.00	H	-	-	-59.57	7.65	-51.92	71.8

**Table 7-17. Radiated Spurious Data (Band 5 – High Channel)**

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1717.50 MHz  
 CHANNEL: 20025  
 MEASURED OUTPUT POWER: 23.10 dBm = 0.204 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 15.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.10 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]
3435.00	H	100	78	-51.25	8.14	-43.11	66.2
5152.50	H	188	237	-55.43	10.36	-45.06	68.2
6870.00	H	101	202	-52.53	11.48	-41.06	64.2
8587.50	H	101	236	-53.17	13.04	-40.12	63.2
10305.00	H	-	-	-52.01	13.10	-38.90	62.0

Table 7-18. Radiated Spurious Data (Band 4 – Low Channel)

OPERATING FREQUENCY: 1732.50 MHz  
 CHANNEL: 20175  
 MEASURED OUTPUT POWER: 23.26 dBm = 0.212 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 15.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.26 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]
3465.00	H	100	297	-46.15	8.26	-37.89	61.2
5197.50	H	103	81	-55.52	10.41	-45.10	68.4
6930.00	H	101	261	-50.71	11.53	-39.18	62.4
8662.50	H	101	232	-51.69	13.07	-38.62	61.9
10395.00	H	-	-	-52.64	13.13	-39.51	62.8

Table 7-19. Radiated Spurious Data (Band 4 – Mid Channel)

FCC ID: ZNFUS610	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1747.50 MHz  
 CHANNEL: 20325  
 MEASURED OUTPUT POWER: 22.16 dBm = 0.165 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 15.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.16 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]
3495.00	H	100	123	-50.65	8.36	-42.29	64.5
5242.50	H	101	309	-55.11	10.35	-44.76	66.9
6990.00	H	100	239	-49.83	11.59	-38.24	60.4
8737.50	H	117	235	-50.52	13.08	-37.44	59.6
10485.00	H	-	-	-52.22	12.95	-39.26	61.4

**Table 7-20. Radiated Spurious Data (Band 4 – High Channel)**

OPERATING FREQUENCY: 1851.50 MHz  
 CHANNEL: 26055  
 MEASURED OUTPUT POWER: 25.60 dBm = 0.363 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  38.60 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]
3703.00	H	151	198	-48.26	8.41	-39.85	65.4
5554.50	H	149	265	-54.05	10.52	-43.54	69.1
7406.00	H	144	263	-51.46	12.01	-39.45	65.0
9257.50	H	-	-	-54.12	13.27	-40.86	66.5

**Table 7-21. Radiated Spurious Data (Band 2/25 – Low Channel)**

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1882.50 MHz  
 CHANNEL: 26365  
 MEASURED OUTPUT POWER: 26.33 dBm = 0.429 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  39.33 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	230	192	-52.88	8.66	-44.23	70.6
5647.50	H	235	243	-54.50	10.62	-43.88	70.2
7530.00	H	112	236	-52.44	12.06	-40.38	66.7
9412.50	H	-	-	-54.78	13.24	-41.54	67.9

**Table 7-22. Radiated Spurious Data (Band 2/25 – Mid Channel)**

OPERATING FREQUENCY: 1913.50 MHz  
 CHANNEL: 26675  
 MEASURED OUTPUT POWER: 24.07 dBm = 0.255 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  37.07 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]
3827.00	H	101	248	-48.79	8.76	-40.03	64.1
5740.50	H	101	243	-52.94	10.73	-42.22	66.3
7654.00	H	100	212	-49.15	12.18	-36.97	61.0
9567.50	H	-	-	-54.05	13.28	-40.78	64.8

**Table 7-23. Radiated Spurious Data (Band 2/25 – High Channel)**

FCC ID: ZNFUS610		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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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  $\pm 0.00025\%$  ( $\pm 2.5$  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)	707,500,101	101	0.0000143
100 %		- 30	707,500,326	326	0.0000461
100 %		- 20	707,500,248	248	0.0000351
100 %		- 10	707,500,298	298	0.0000421
100 %		0	707,500,197	197	0.0000278
100 %		+ 10	707,499,779	-221	-0.0000312
100 %		+ 20	707,499,863	-137	-0.0000194
100 %		+ 30	707,500,138	138	0.0000195
100 %		+ 40	707,499,813	-187	-0.0000264
100 %		+ 50	707,500,033	33	0.0000047
BATT. ENDPOINT	3.45	+ 20	707,500,102	102	0.0000144

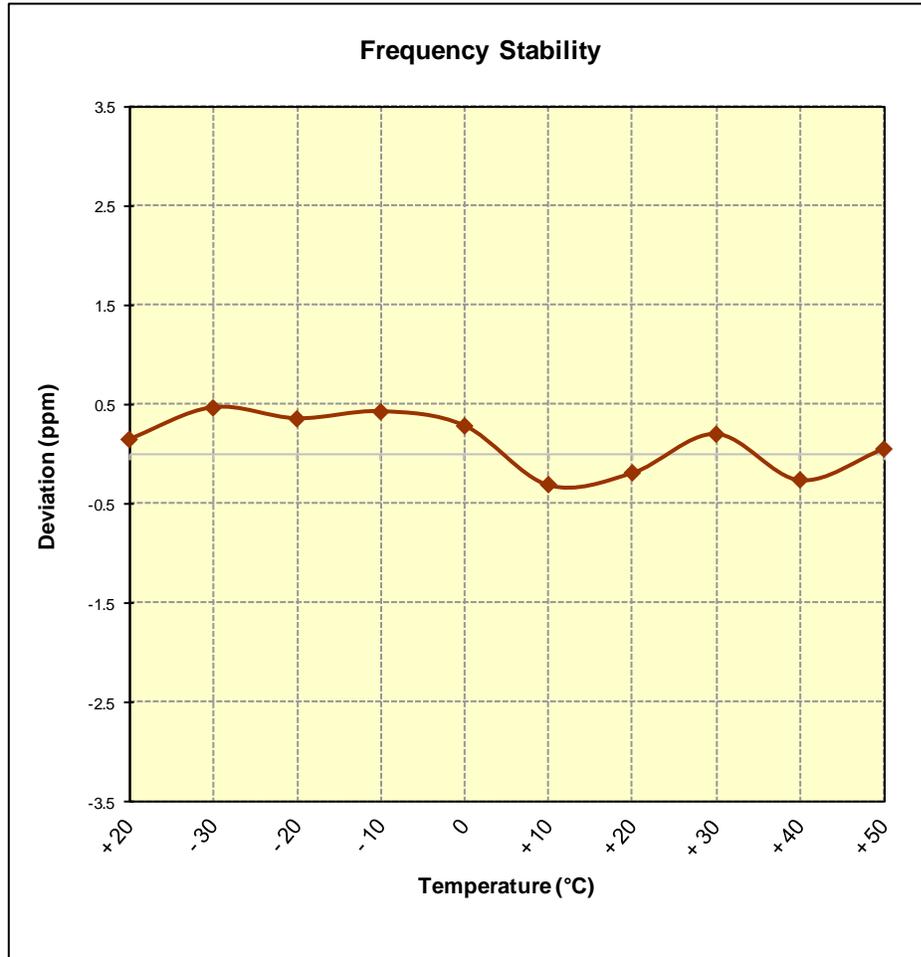
**Table 7-24. Frequency Stability Data (Band 12/17)**

**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.

FCC ID: ZNFUS610	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
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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)	782,000,049	49	0.0000063
100 %		- 30	782,000,067	67	0.0000086
100 %		- 20	782,000,149	149	0.0000191
100 %		- 10	781,999,886	-114	-0.0000146
100 %		0	782,000,028	28	0.0000036
100 %		+ 10	781,999,909	-91	-0.0000116
100 %		+ 20	782,000,136	136	0.0000174
100 %		+ 30	781,999,659	-341	-0.0000436
100 %		+ 40	781,999,542	-458	-0.0000586
100 %		+ 50	782,000,027	27	0.0000035
BATT. ENDPOINT	3.45	+ 20	781,999,939	-61	-0.0000078

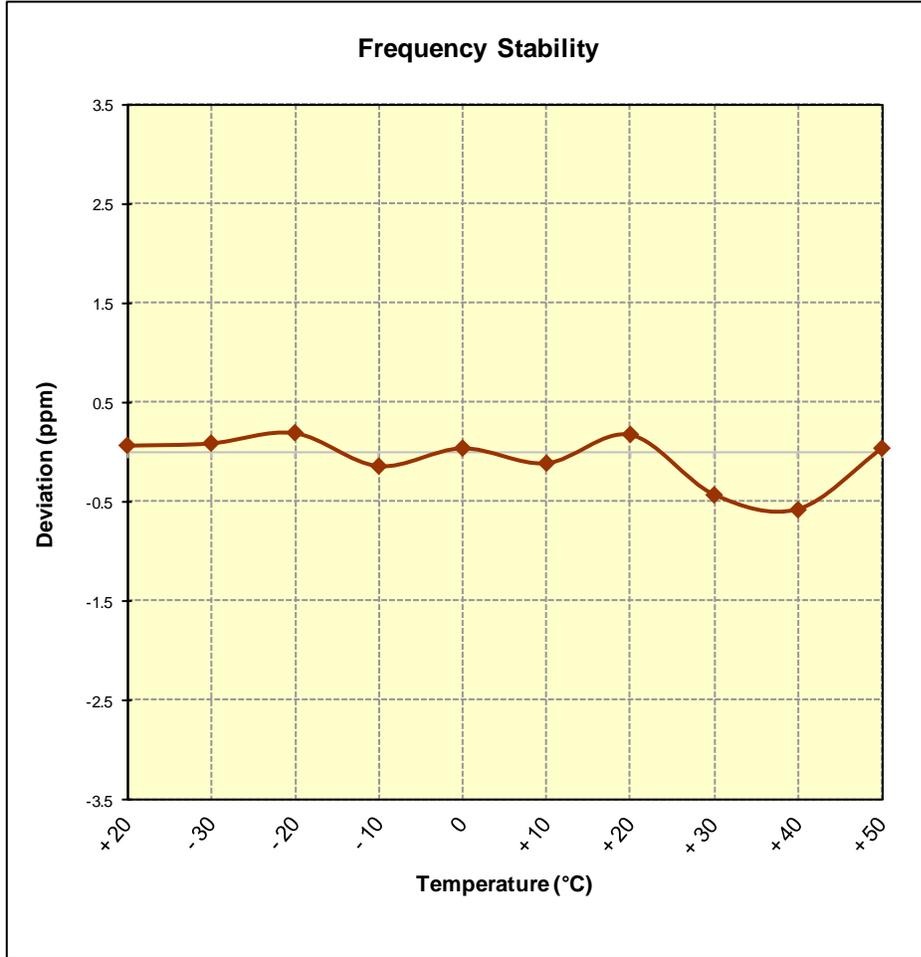
**Table 7-25. Frequency Stability Data (Band 13)**

**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 13 Frequency Stability Measurements**  
**§2.1055 §27.54**



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

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## Band 5 Frequency Stability Measurements

§2.1055 §22.355

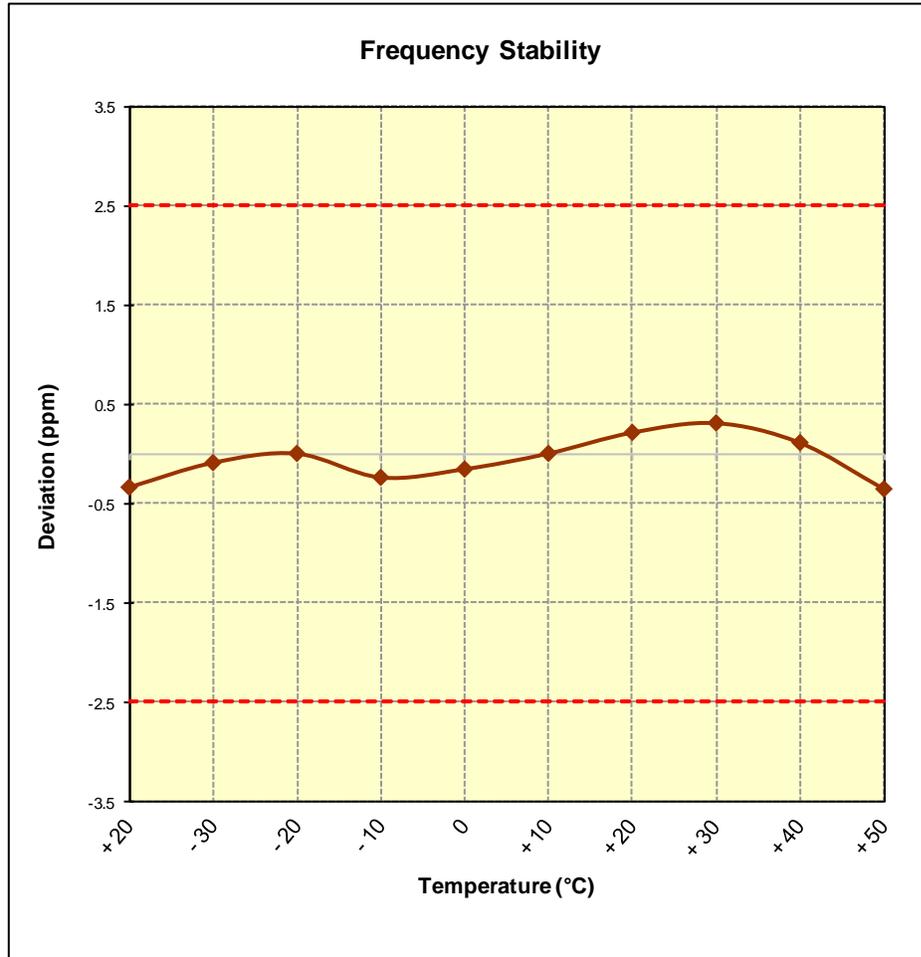
OPERATING FREQUENCY: 836,500,000 Hz  
 CHANNEL: 20525  
 REFERENCE VOLTAGE: 3.85 VDC  
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,499,717	-283	-0.0000338
100 %		- 30	836,499,924	-76	-0.0000091
100 %		- 20	836,500,002	2	0.0000002
100 %		- 10	836,499,800	-200	-0.0000239
100 %		0	836,499,870	-130	-0.0000155
100 %		+ 10	836,500,002	2	0.0000002
100 %		+ 20	836,500,179	179	0.0000214
100 %		+ 30	836,500,259	259	0.0000310
100 %		+ 40	836,500,093	93	0.0000111
100 %		+ 50	836,499,703	-297	-0.0000355
BATT. ENDPOINT	3.45	+ 20	836,500,054	54	0.0000065

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

FCC ID: ZNFUS610	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
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**Band 5 Frequency Stability Measurements**  
**§2.1055 §22.355**



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

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## Band 4 Frequency Stability Measurements

§2.1055 §§27.54

OPERATING FREQUENCY: 1,732,500,000 Hz  
 CHANNEL: 20175  
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,500,305	305	0.0000176
100 %		- 30	1,732,500,302	302	0.0000174
100 %		- 20	1,732,500,192	192	0.0000111
100 %		- 10	1,732,500,230	230	0.0000133
100 %		0	1,732,499,816	-184	-0.0000106
100 %		+ 10	1,732,499,862	-138	-0.0000080
100 %		+ 20	1,732,499,824	-176	-0.0000102
100 %		+ 30	1,732,499,870	-130	-0.0000075
100 %		+ 40	1,732,500,090	90	0.0000052
100 %		+ 50	1,732,499,988	-12	-0.0000007
BATT. ENDPOINT	3.45	+ 20	1,732,499,578	-422	-0.0000244

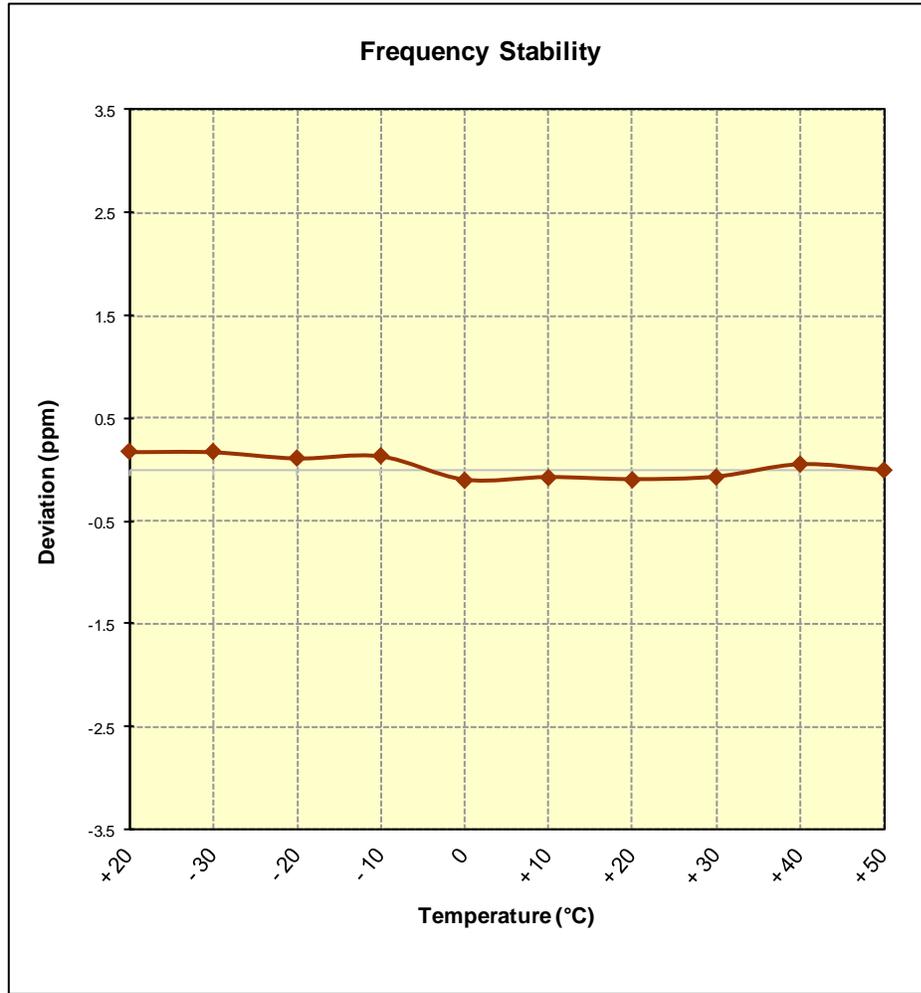
**Table 7-27. Frequency Stability Data (Band 4)**

**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.

FCC ID: ZNFUS610	 <b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>			Reviewed by: Quality Manager
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**Band 4 Frequency Stability Measurements**  
§2.1055 §§27.54



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

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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)	1,882,500,150	150	0.0000080
100 %		- 30	1,882,499,742	-258	-0.0000137
100 %		- 20	1,882,500,171	171	0.0000091
100 %		- 10	1,882,500,121	121	0.0000064
100 %		0	1,882,499,891	-109	-0.0000058
100 %		+ 10	1,882,499,988	-12	-0.0000006
100 %		+ 20	1,882,500,373	373	0.0000198
100 %		+ 30	1,882,500,125	125	0.0000066
100 %		+ 40	1,882,499,675	-325	-0.0000173
100 %		+ 50	1,882,500,083	83	0.0000044
BATT. ENDPOINT	3.45	+ 20	1,882,499,930	-70	-0.0000037

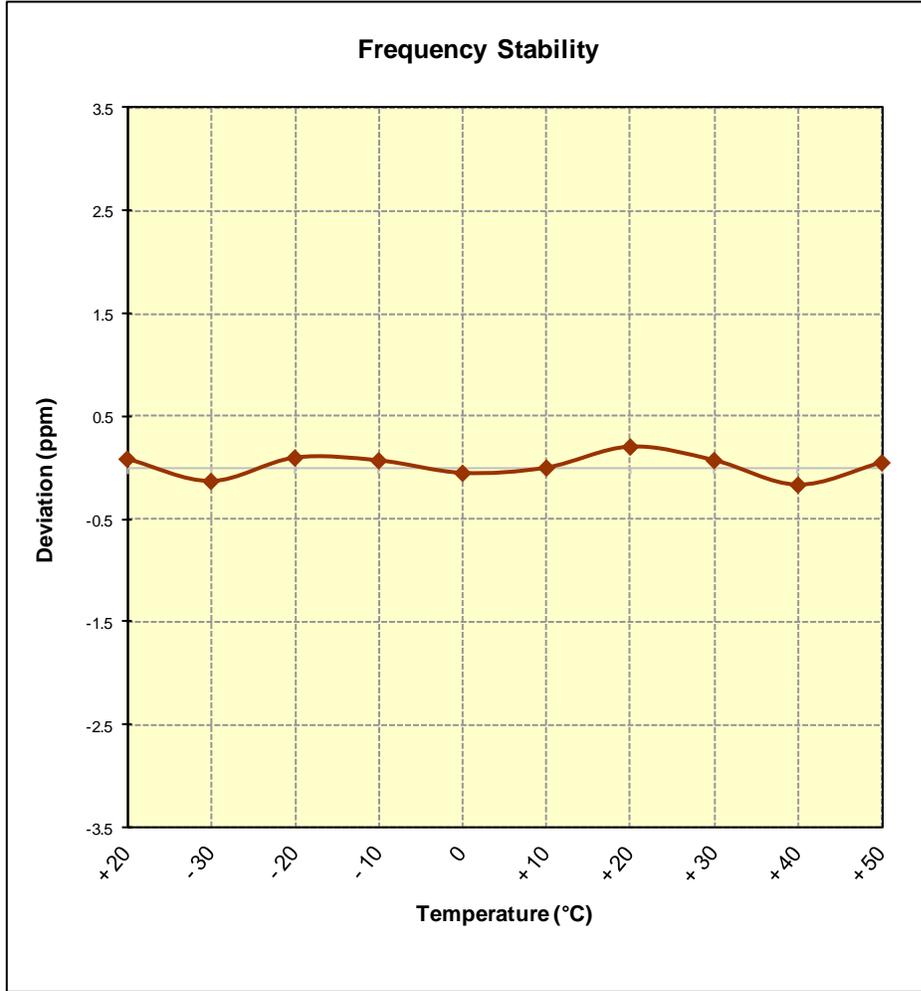
**Table 7-28. Frequency Stability Data (Band 2/25)**

**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.

FCC ID: ZNFUS610			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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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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## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset** **FCC ID: ZNFUS610** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFUS610		<b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1605160919.ZNF	<b>Test Dates:</b> 5/16-5/26/2016	<b>EUT Type:</b> Portable Handset	Page 143 of 143	