

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 7 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 \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 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.

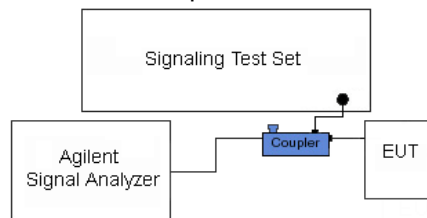




Figure 7-3. Test Instrument & Measurement Setup

Test Notes

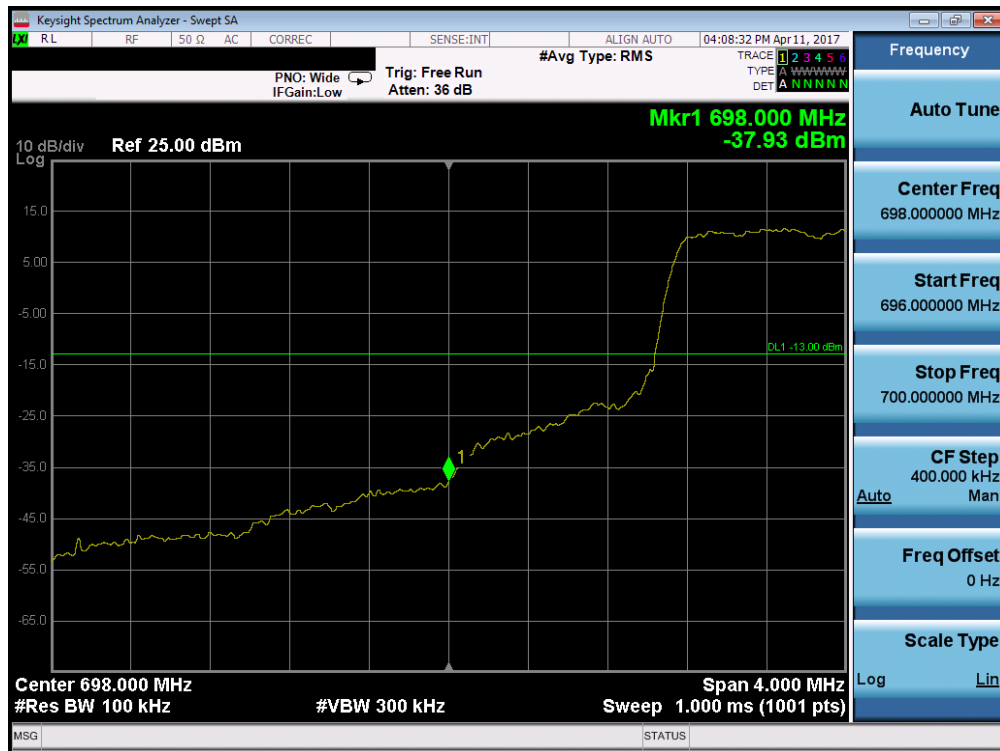
Per 22.917(b) 24.238(a) 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions 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 $65 + 10\log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

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

For some of the extended band edge plots, the VBW is slightly lesser than what should have been used. However, this deviation does not create any noticeable difference to the data provided.

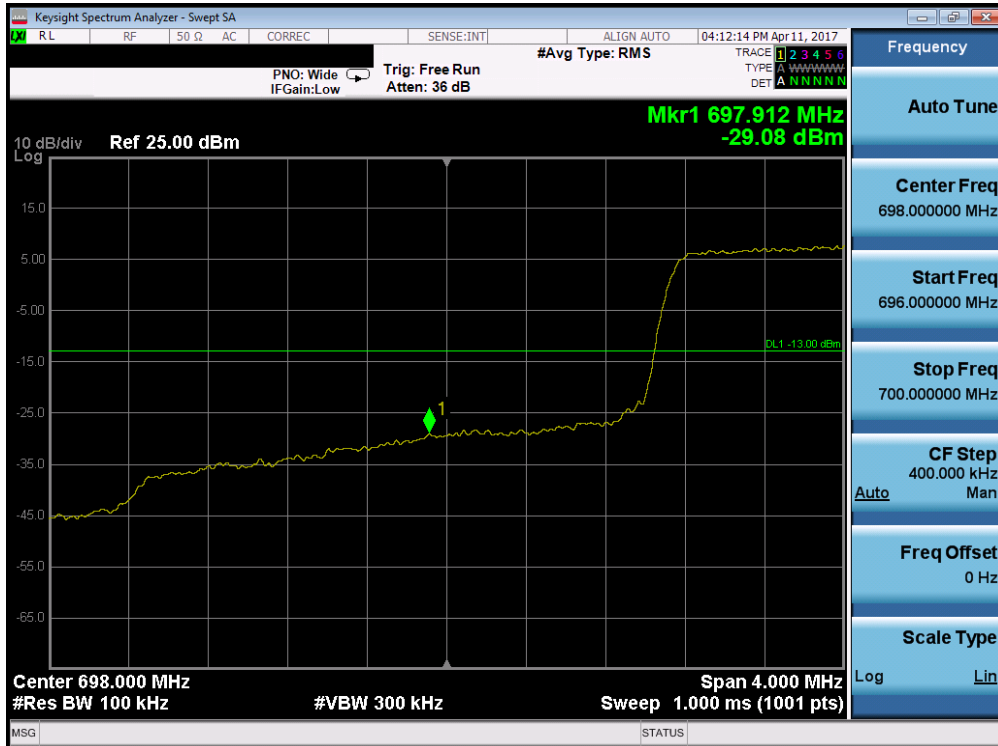


Plot 7-101. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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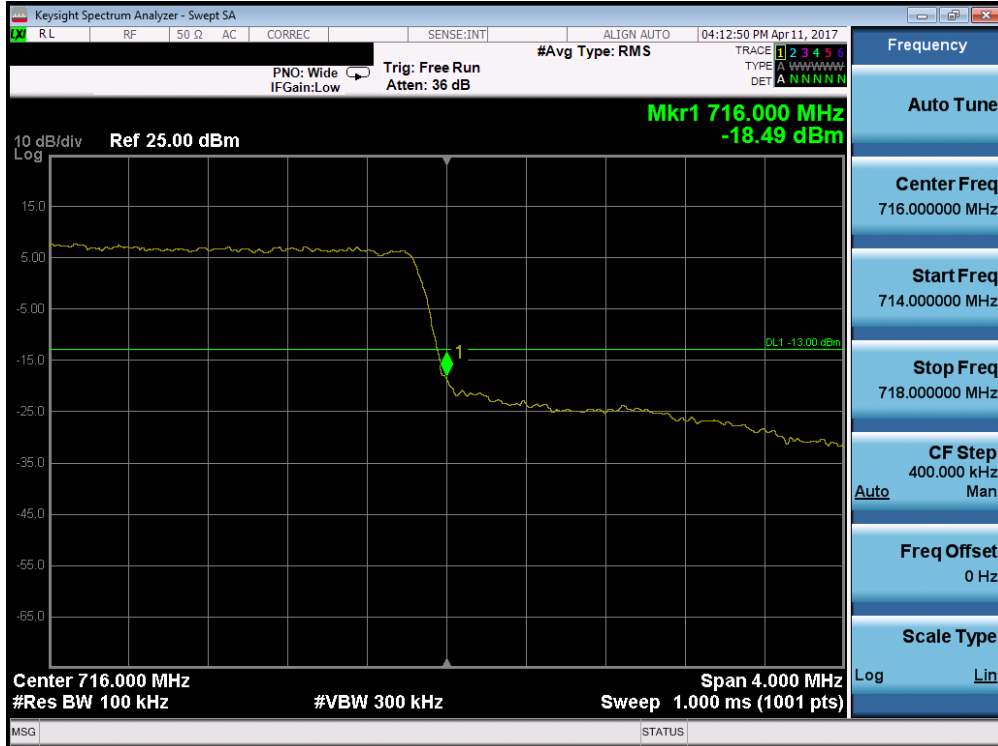


Plot 7-102. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

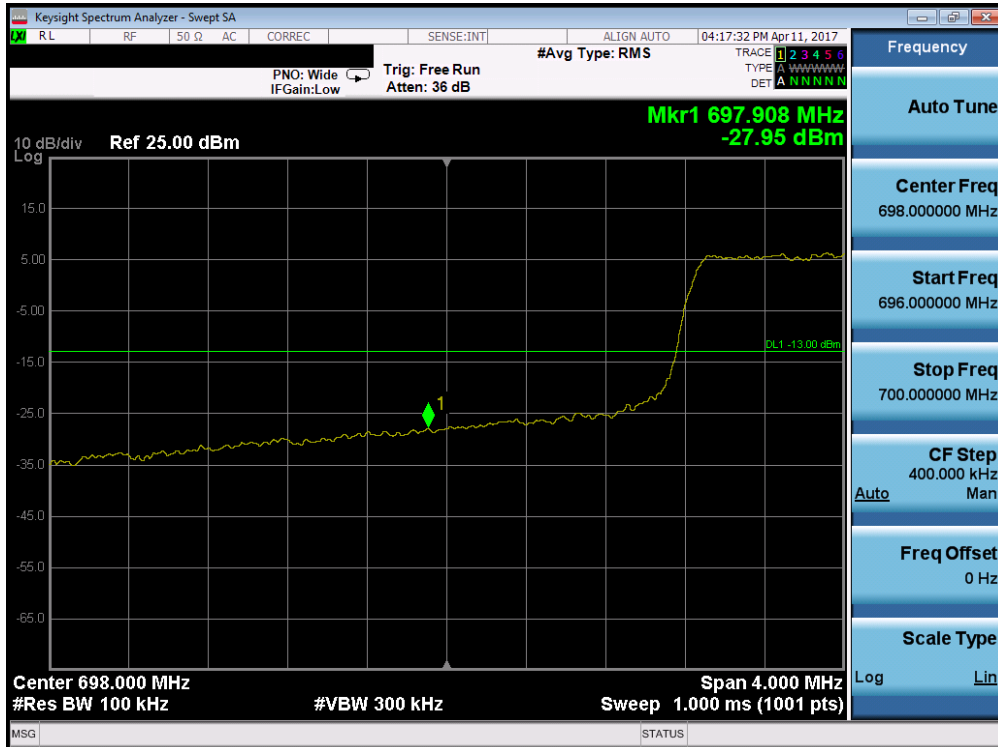


Plot 7-103. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)


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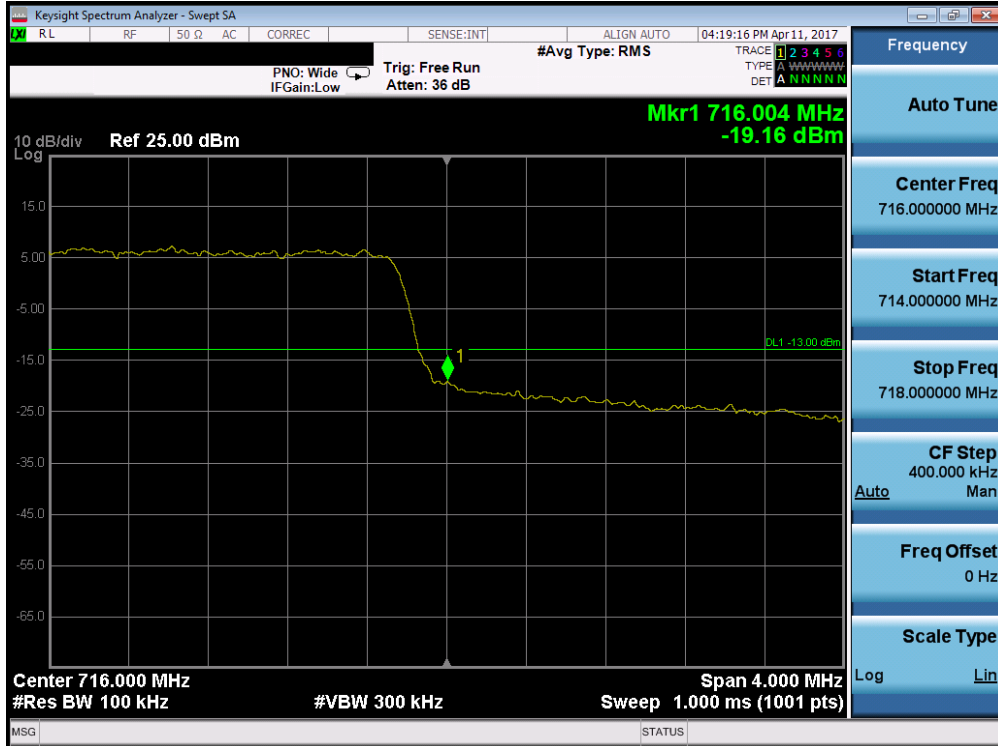


Plot 7-104. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

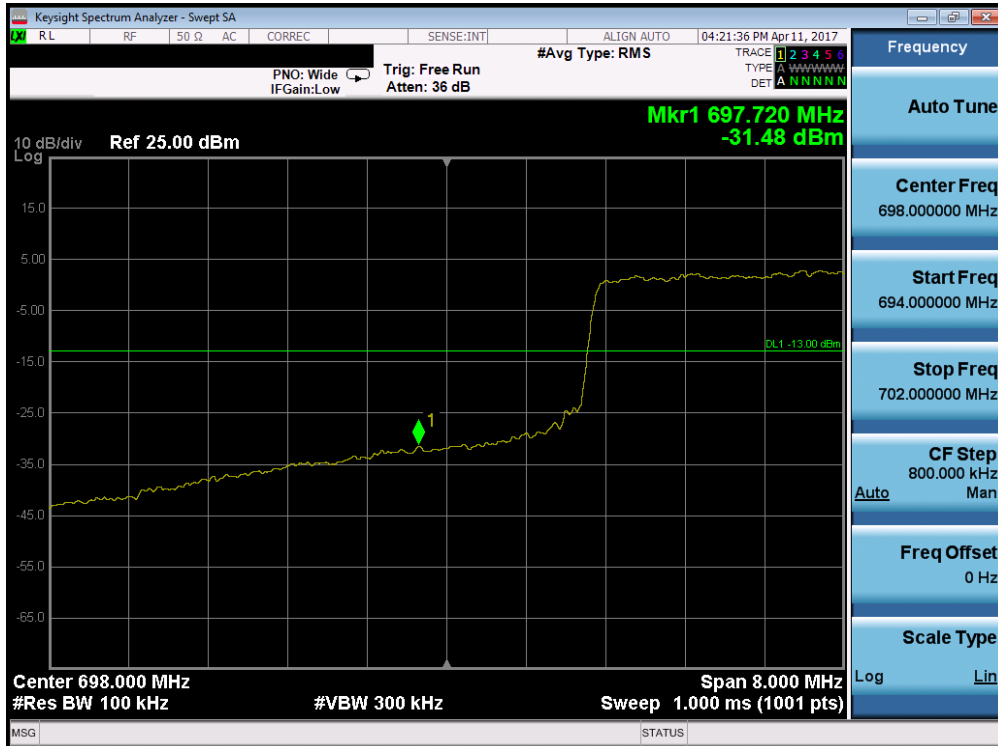


Plot 7-105. Lower Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-106. Upper Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)

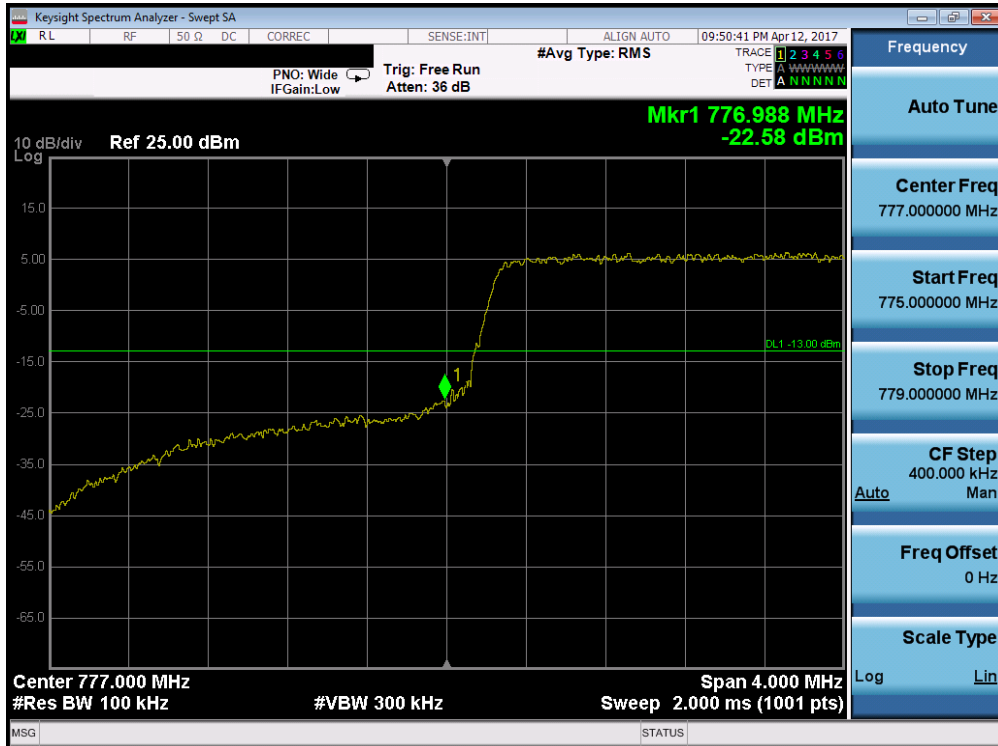


Plot 7-107. Lower Band Edge Plot (Band 12/17 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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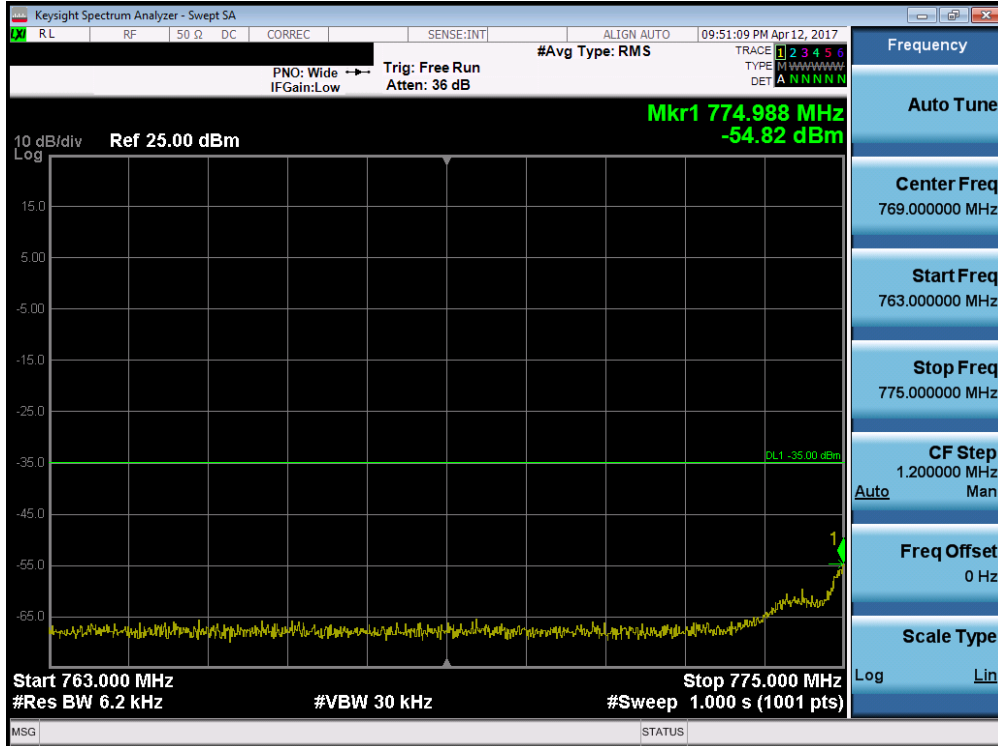


Plot 7-108. Upper Band Edge Plot (Band 12/17 – 10.0MHz QPSK – RB Size 50)

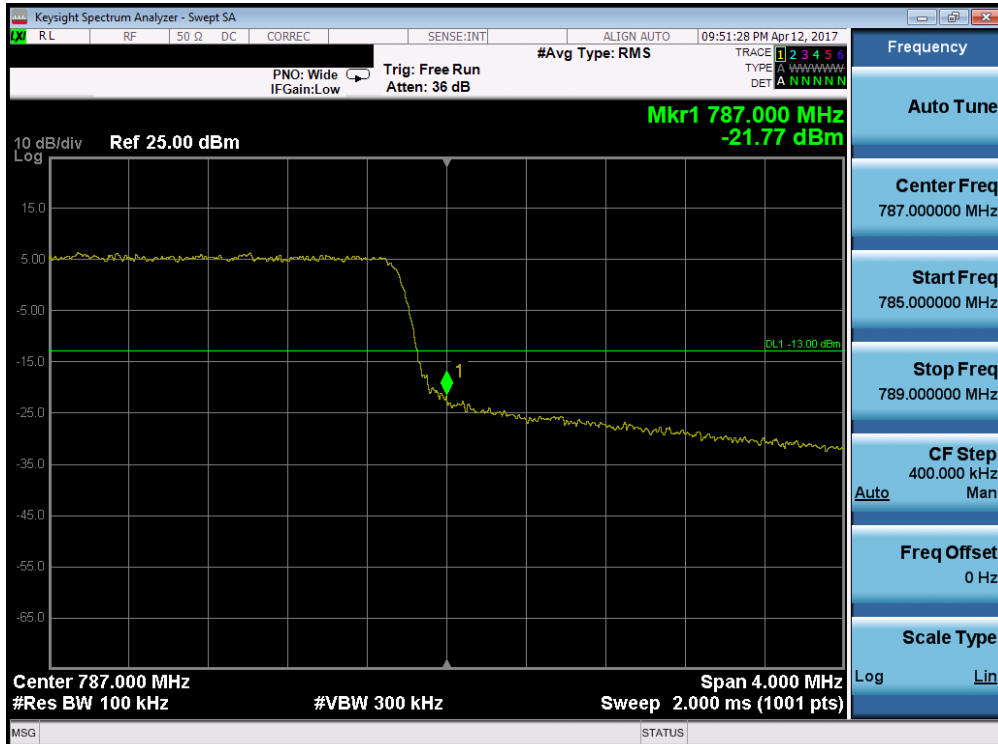


Plot 7-109. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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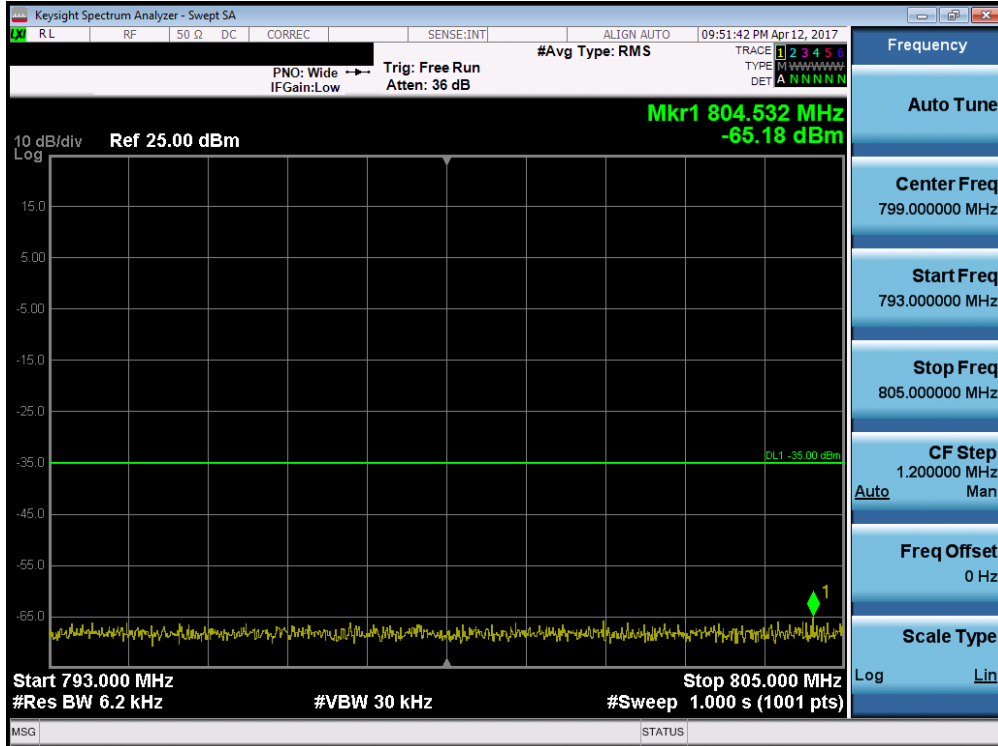


Plot 7-110. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

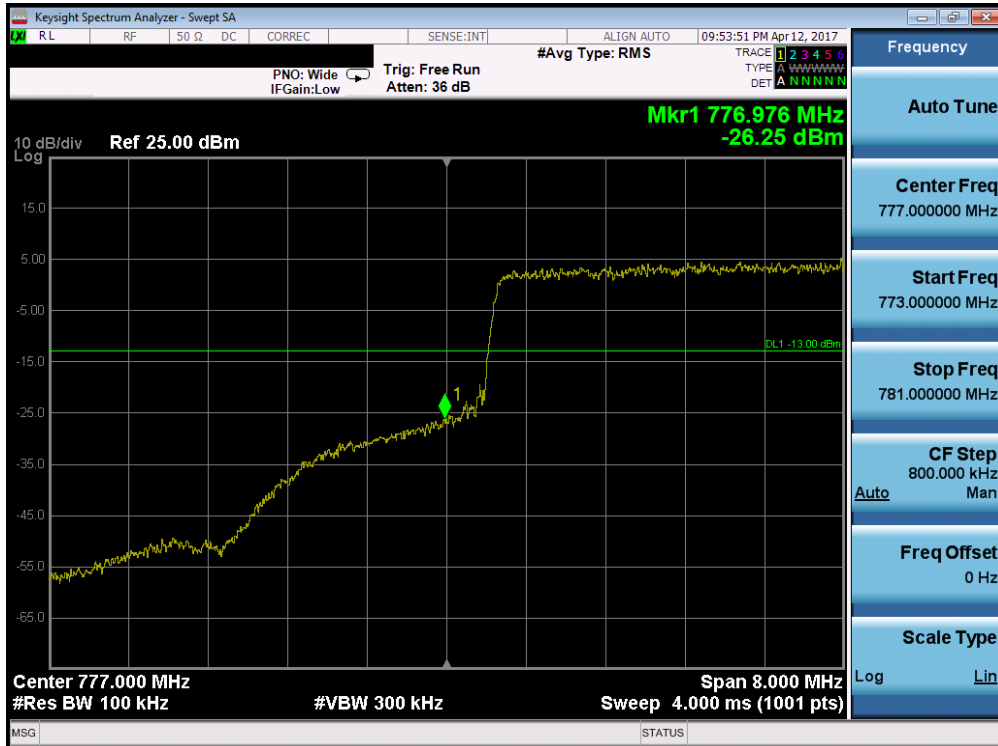


Plot 7-111. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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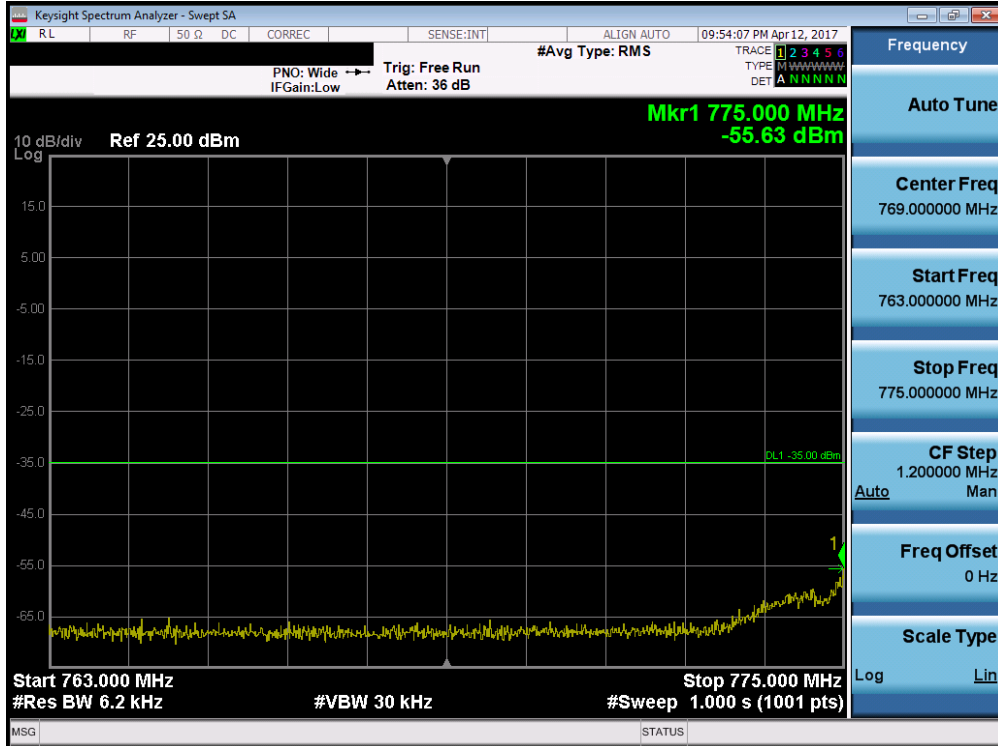


Plot 7-112. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

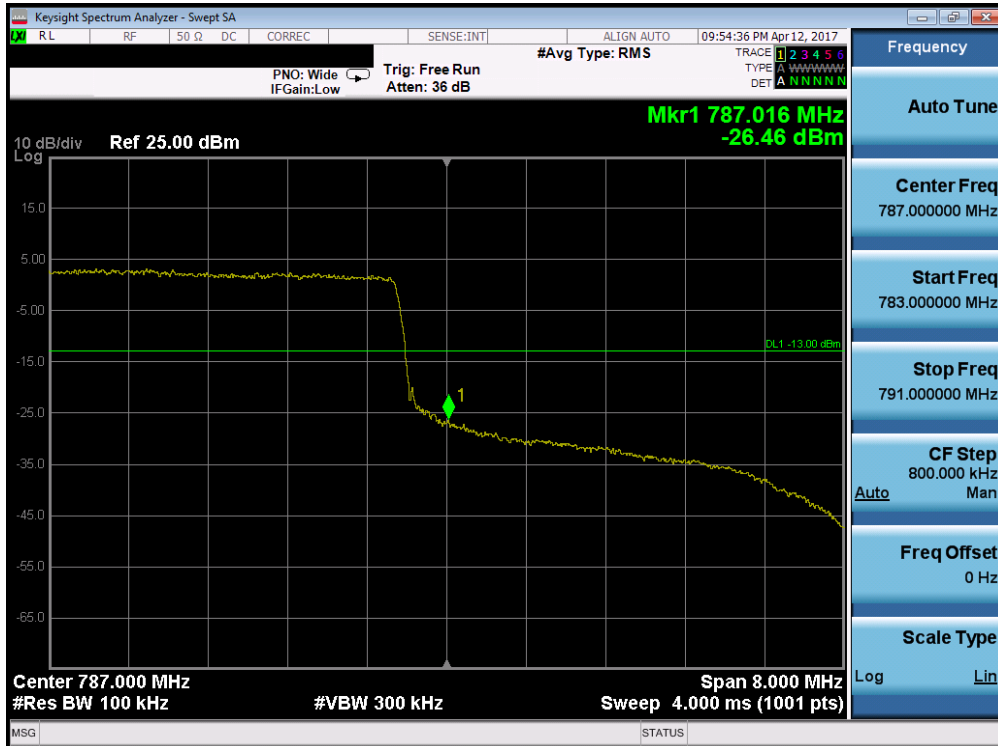


Plot 7-113. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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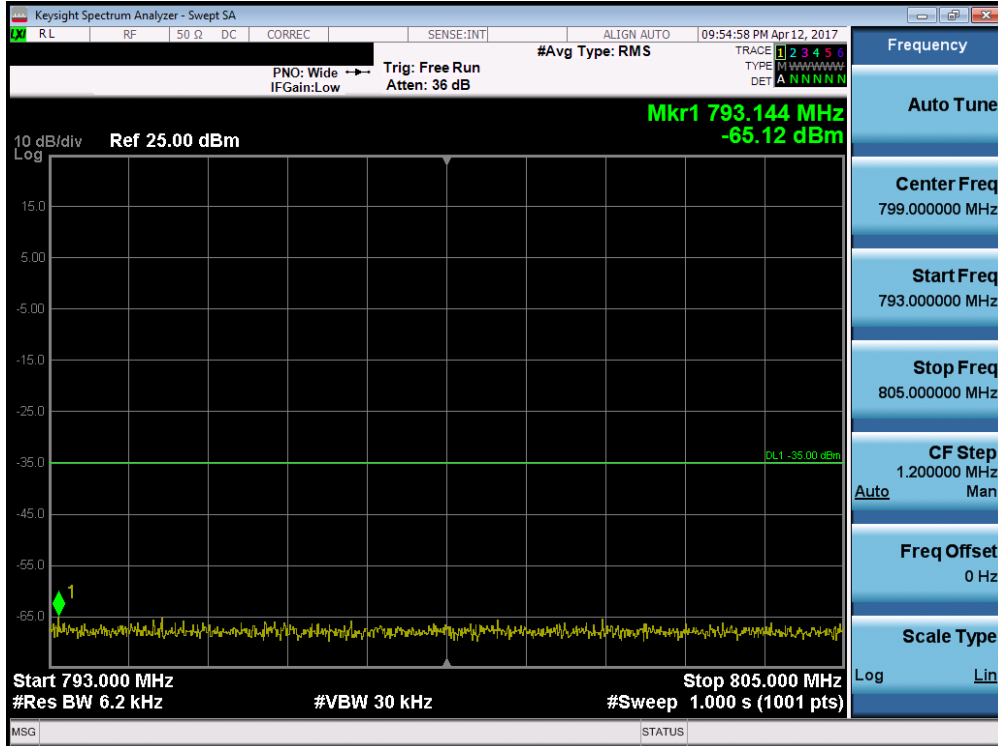


Plot 7-114. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

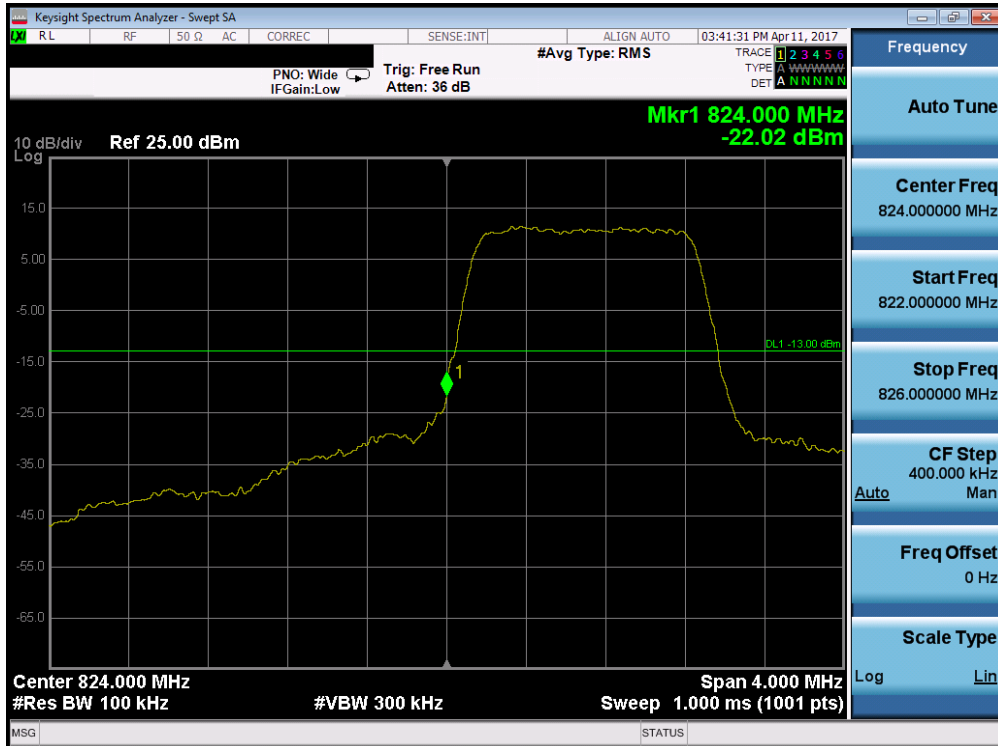


Plot 7-115. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-116. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

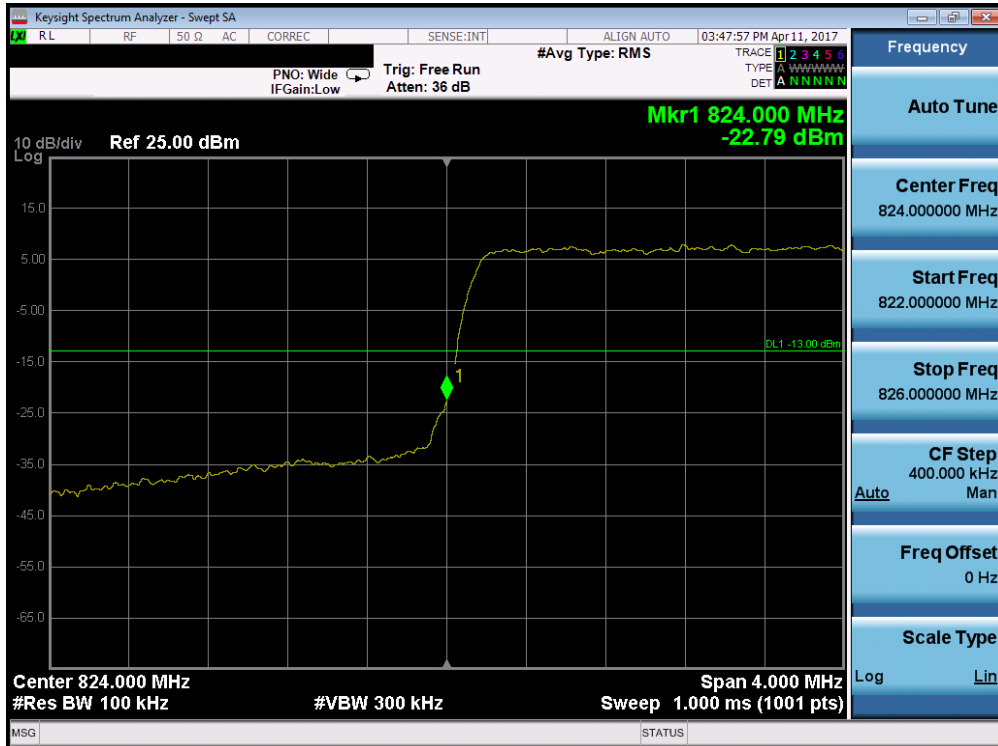


Plot 7-117. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Plot 7-118. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

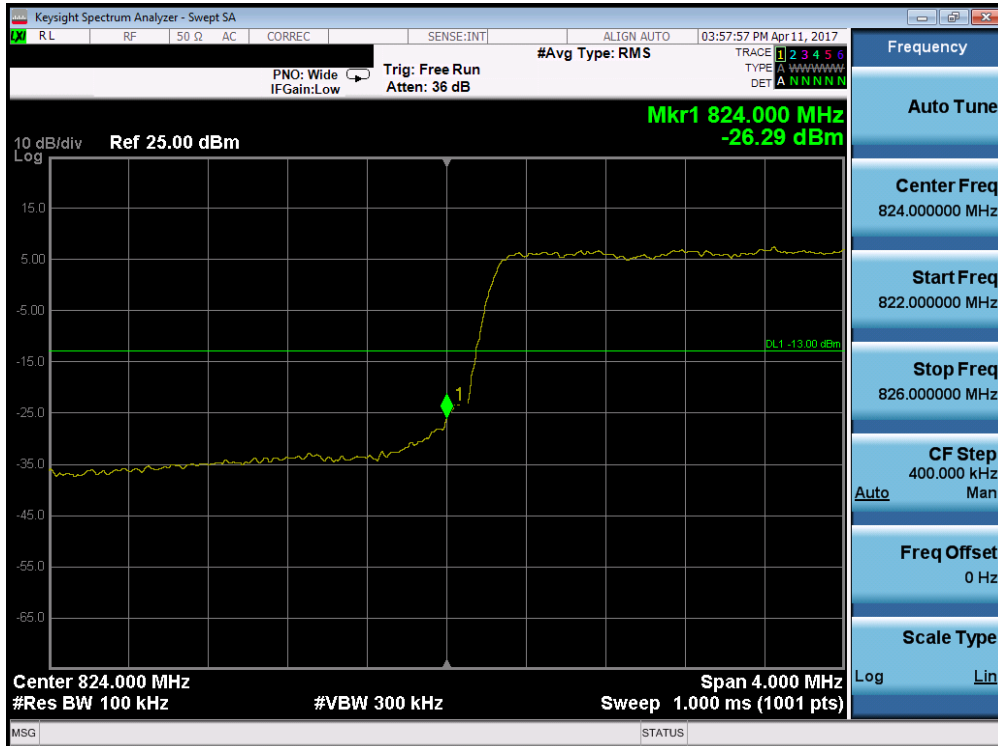


Plot 7-119. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Plot 7-120. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

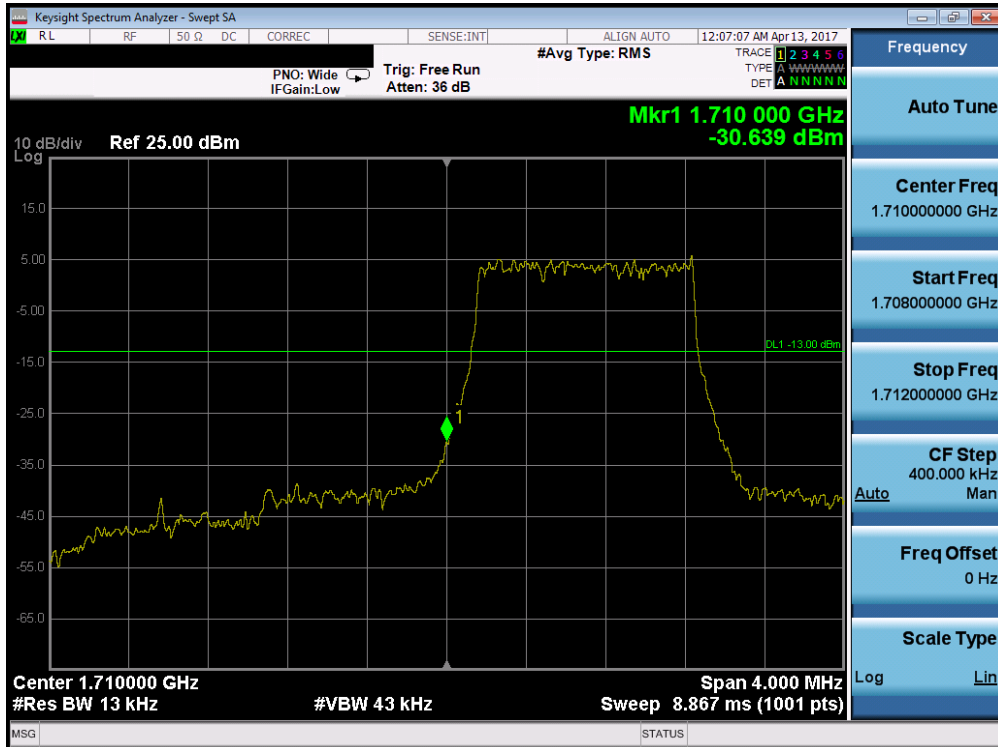


Plot 7-121. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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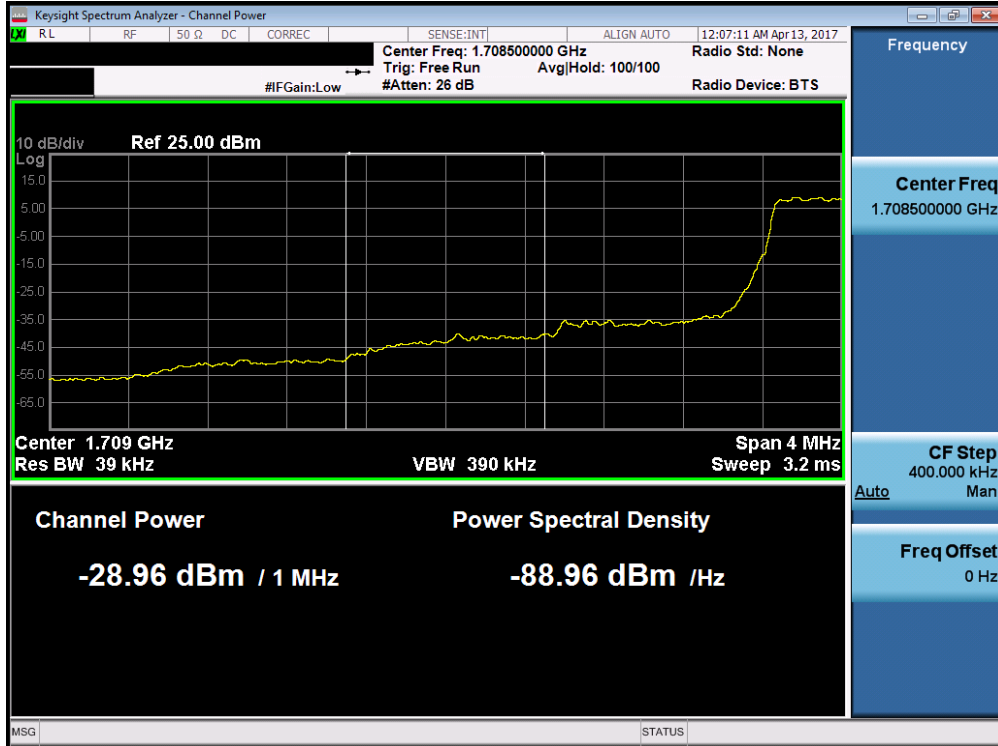


Plot 7-124. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

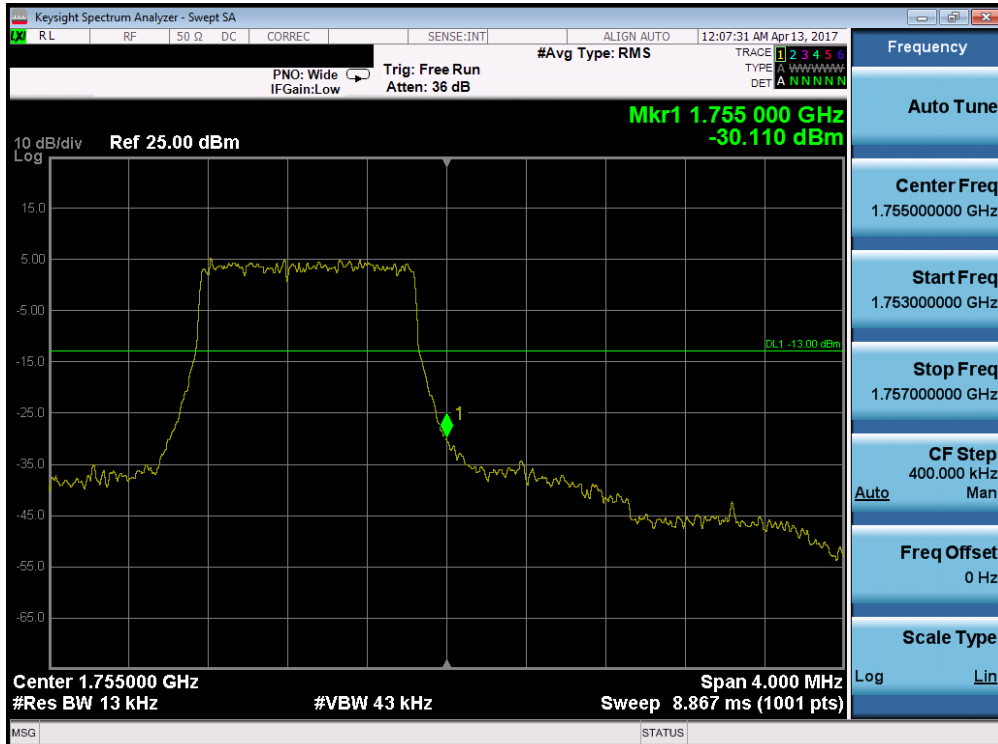


Plot 7-125. Lower Band Edge Plot (Band 4/66 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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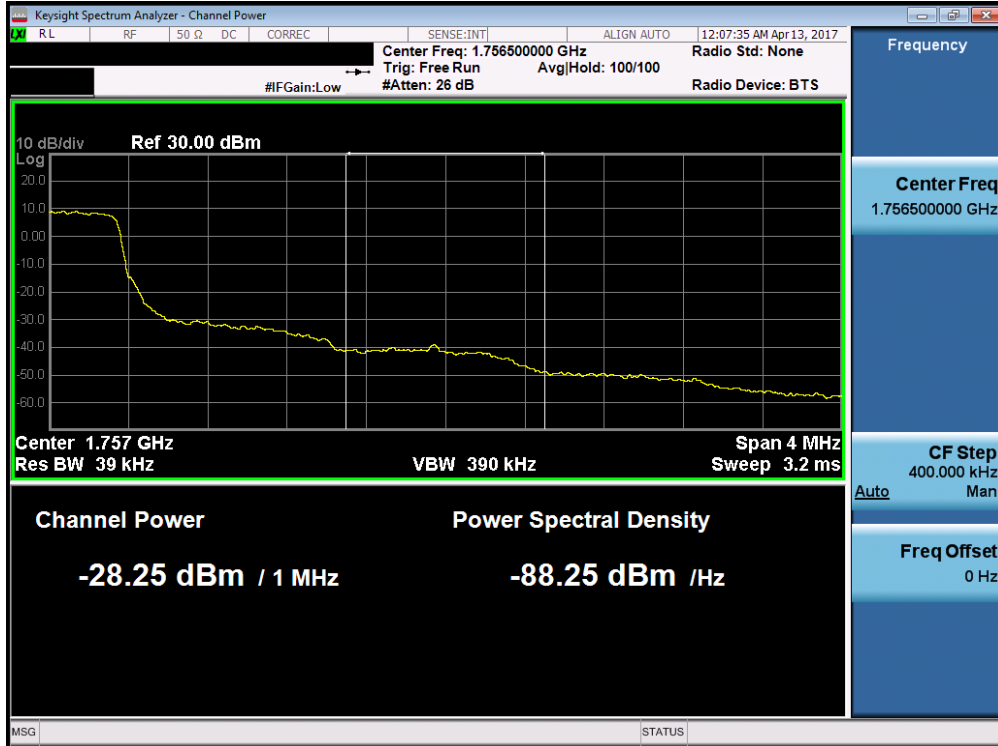


Plot 7-126. Lower Extended Band Edge Plot (Band 4/66– 1.4MHz QPSK – RB Size 6)

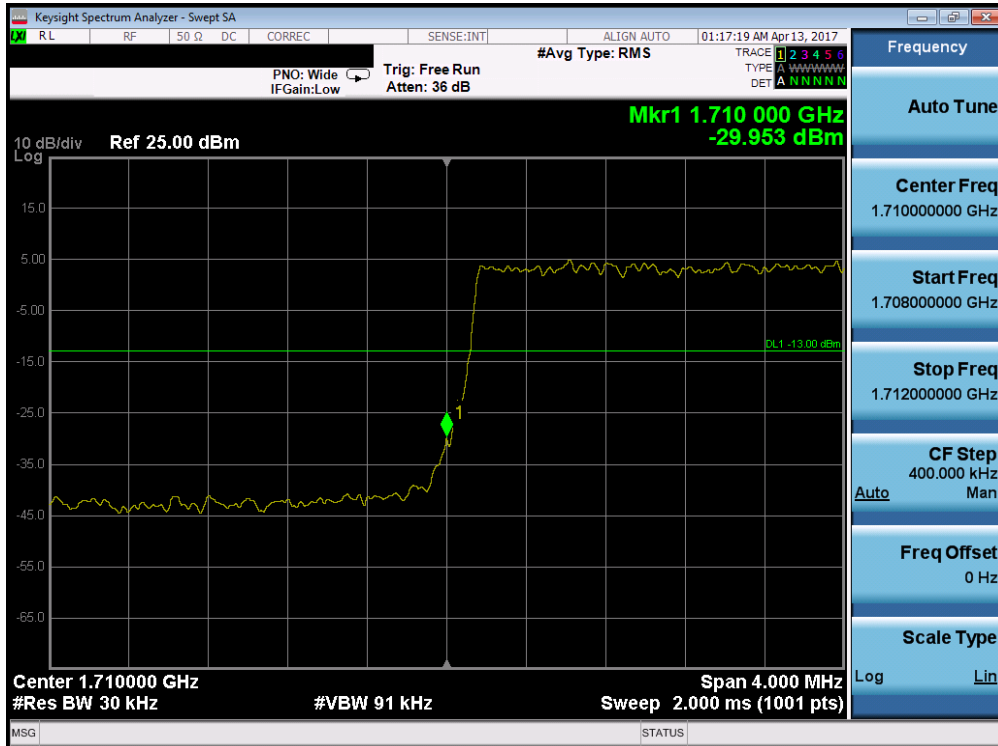


Plot 7-127. Upper Band Edge Plot (Band 4/66– 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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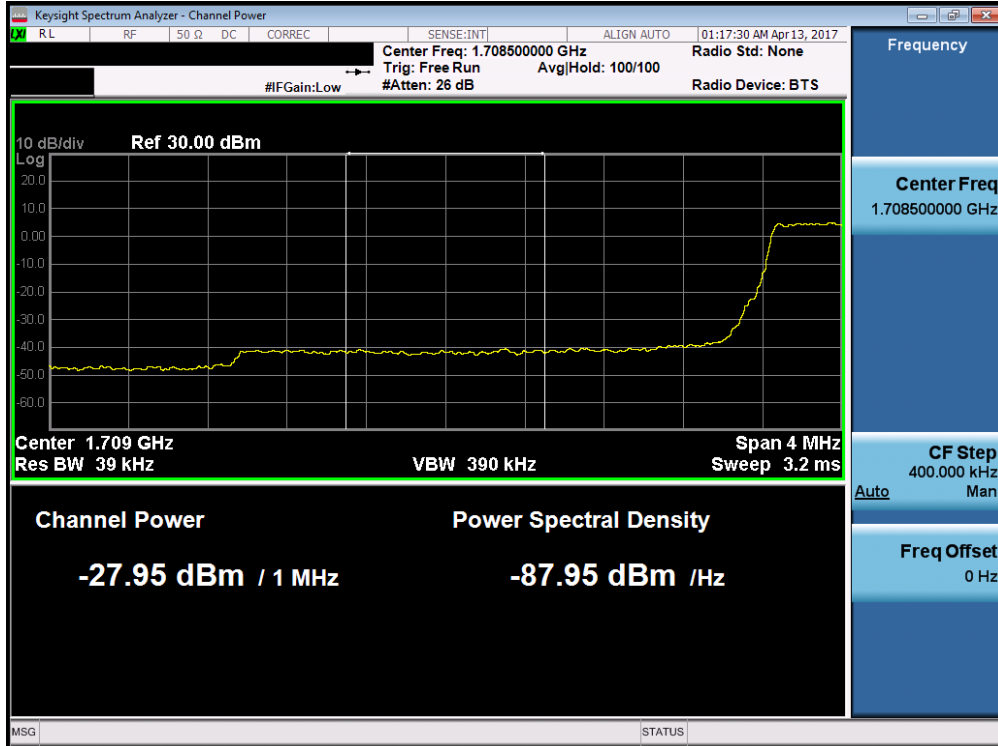


Plot 7-128. Upper Extended Band Edge Plot (Band 4/66– 1.4MHz QPSK – RB Size 6)

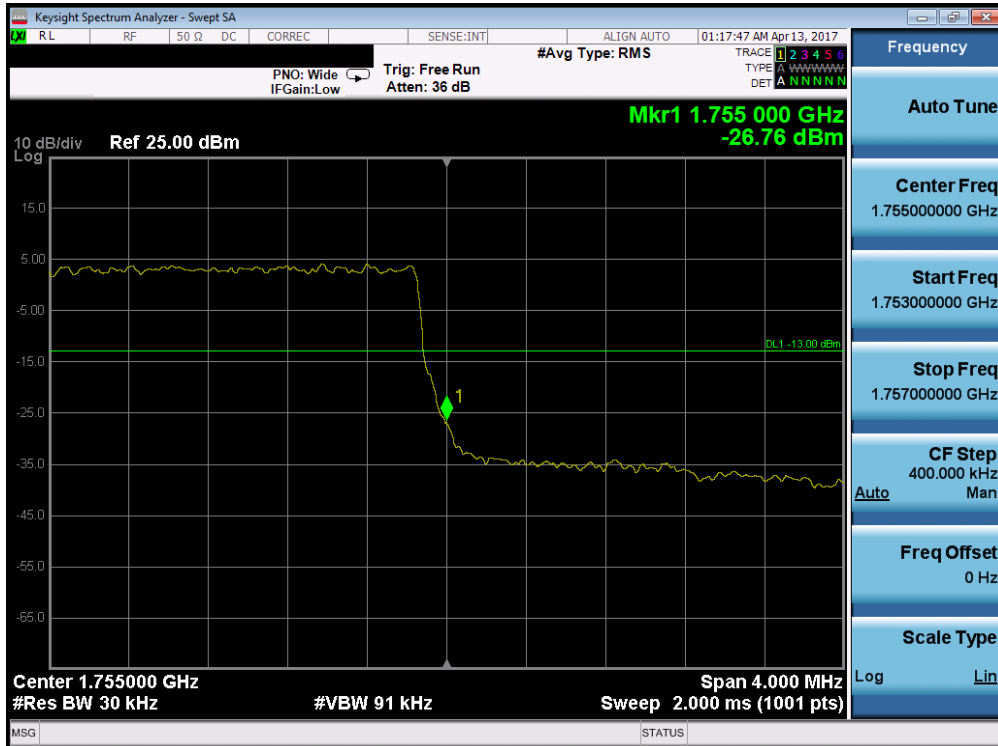


Plot 7-129. Lower Band Edge Plot (Band 4/66– 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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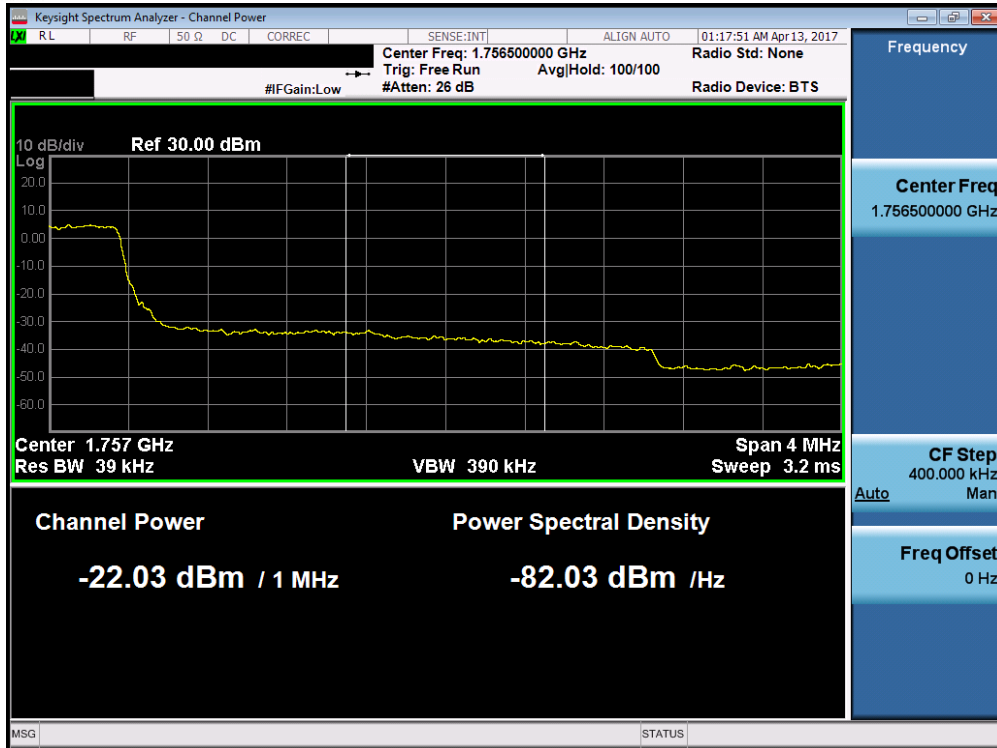


Plot 7-130. Lower Extended Band Edge Plot (Band 4/66– 3.0MHz QPSK – RB Size 15)

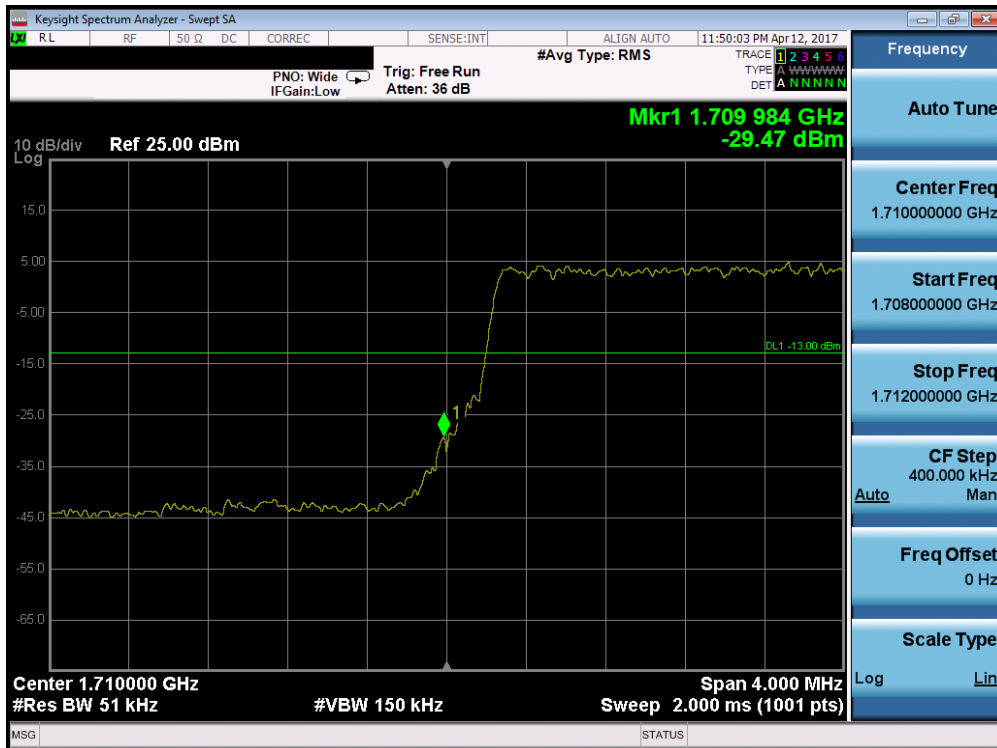


Plot 7-131. Upper Band Edge Plot (Band 4/66– 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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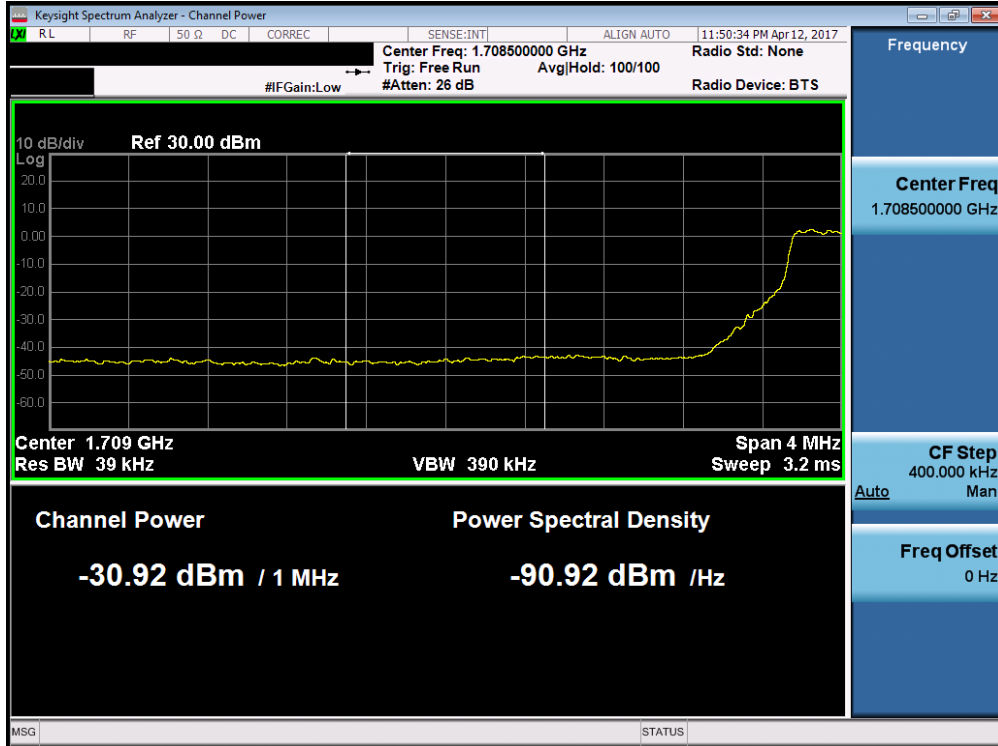


Plot 7-132. Upper Extended Band Edge Plot (Band 4/66– 3.0MHz QPSK – RB Size 15)

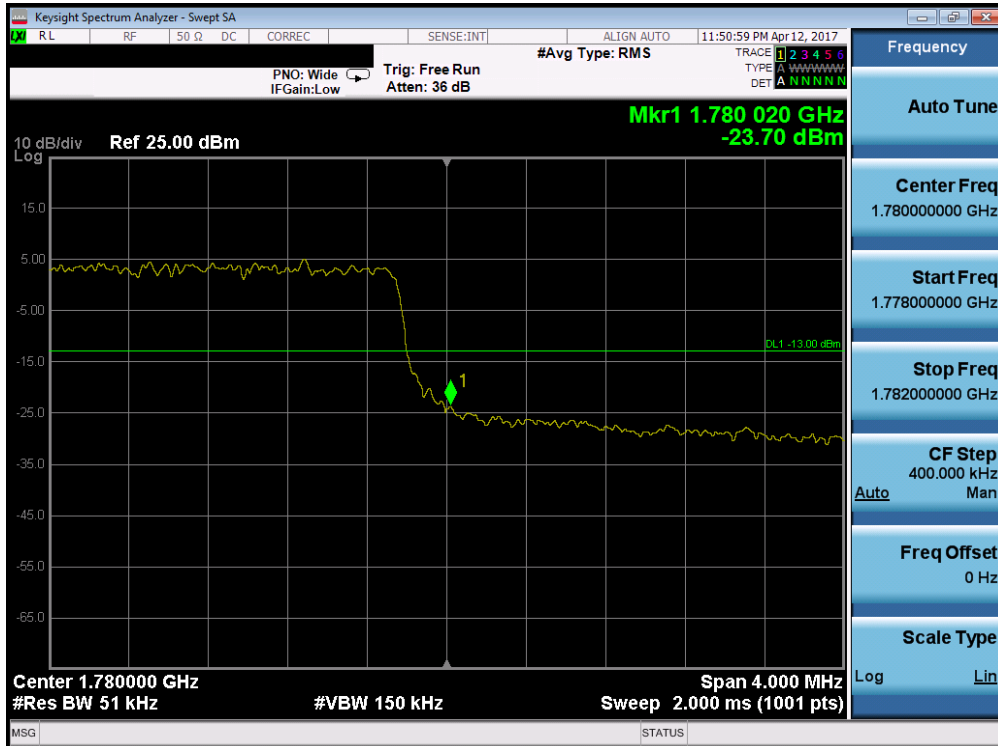


Plot 7-133. Lower Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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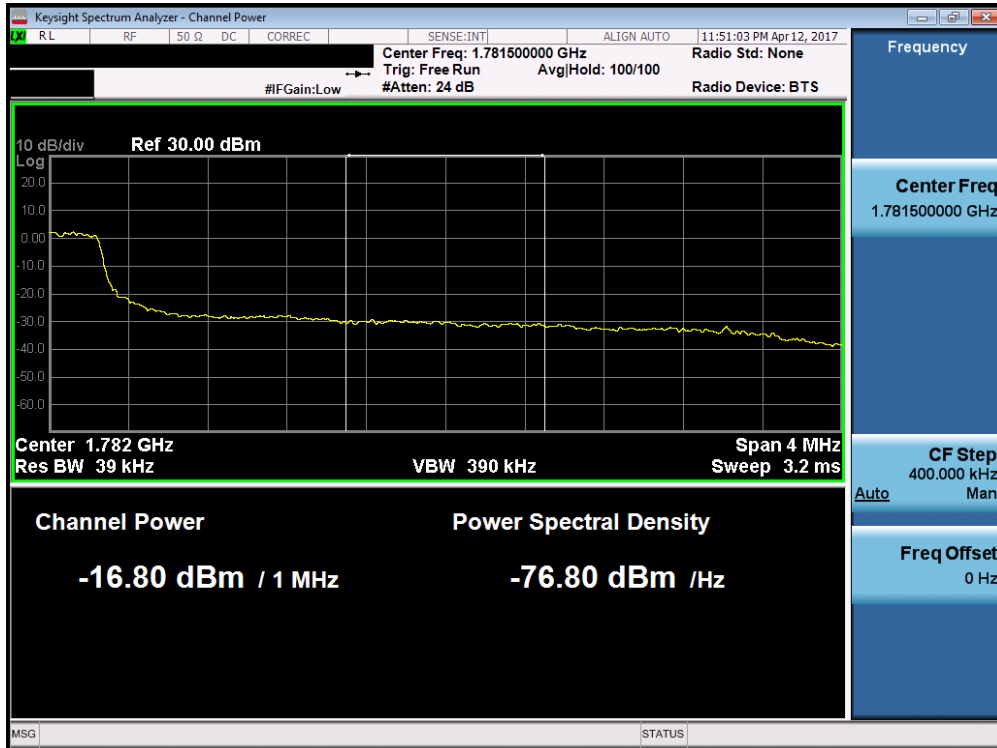


Plot 7-134. Lower Extended Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)

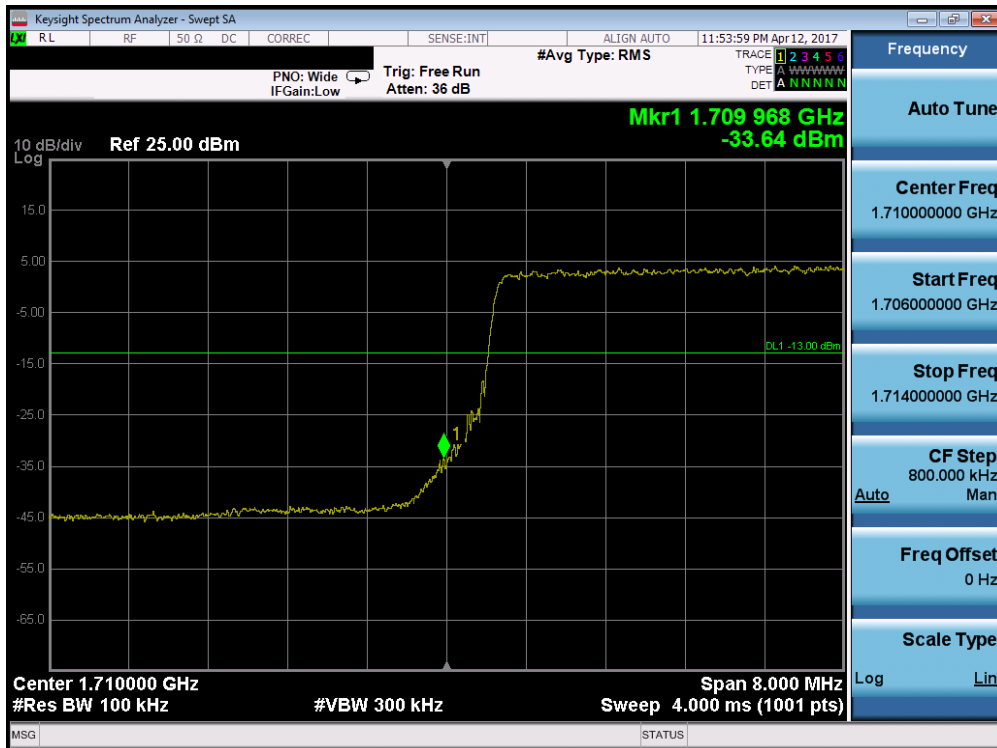


Plot 7-135. Upper Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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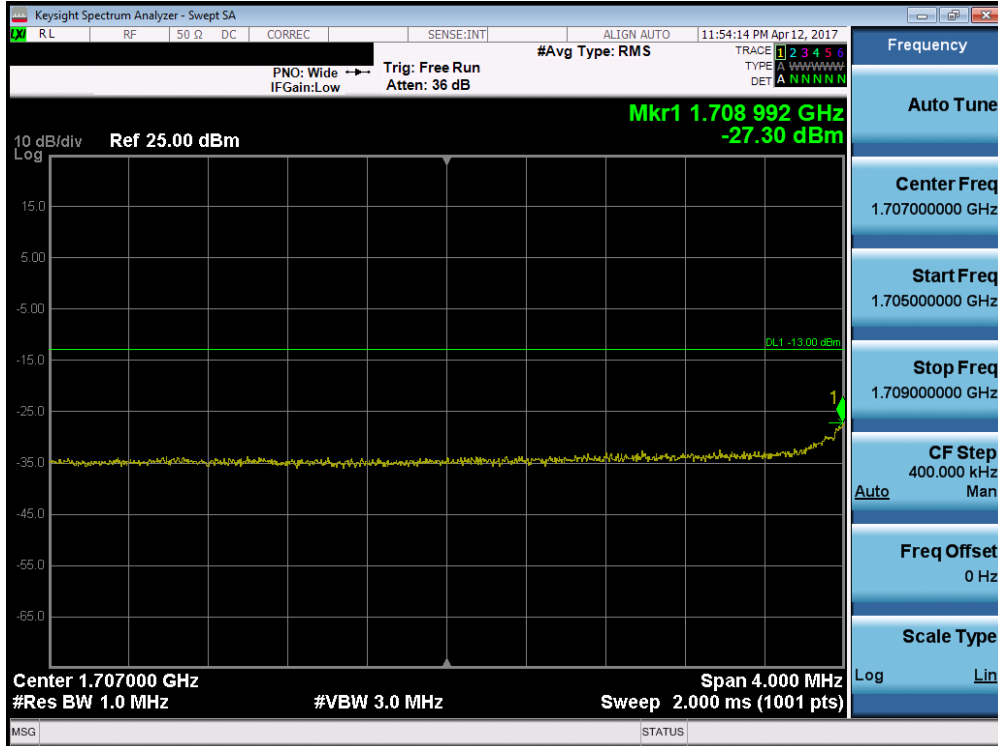


Plot 7-136. Upper Extended Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)

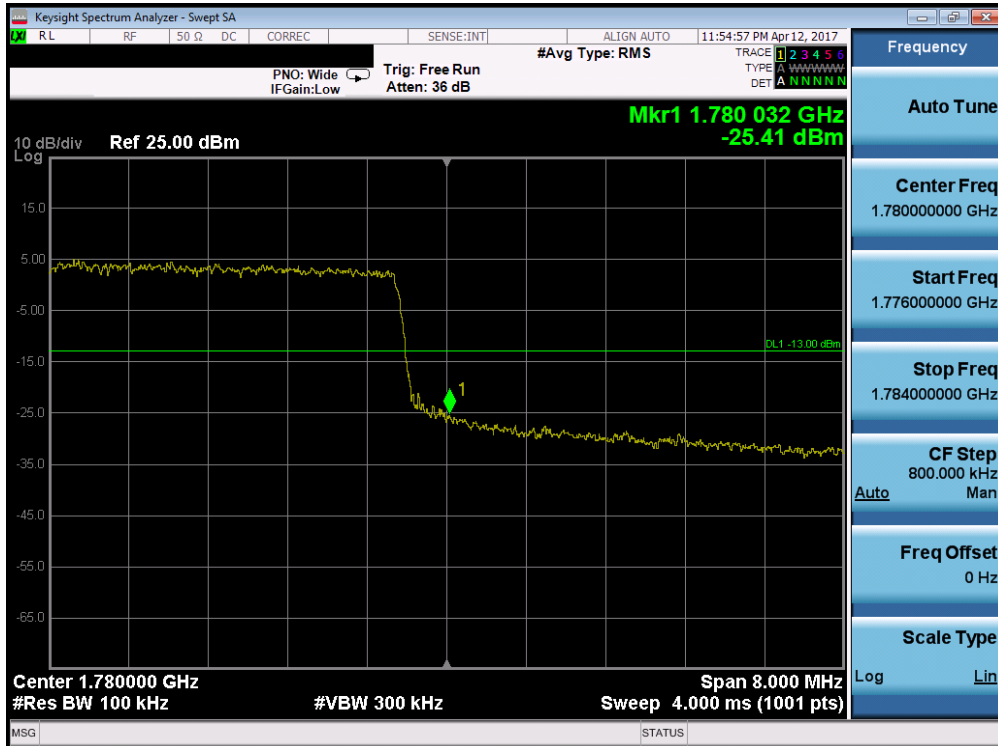


Plot 7-137. Lower Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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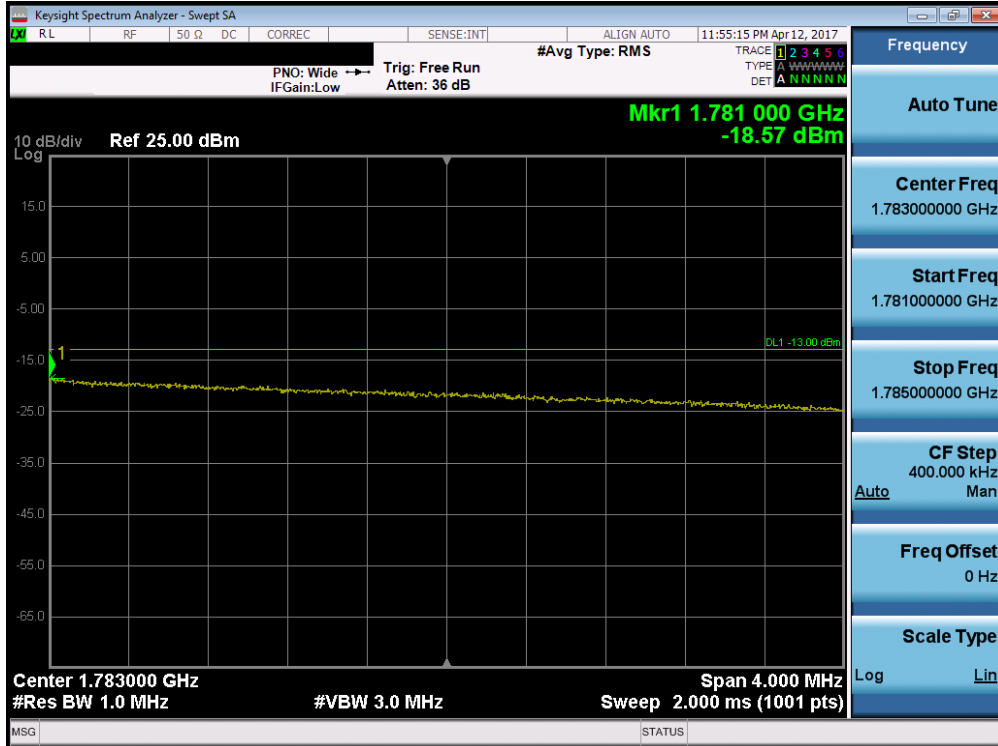


Plot 7-138. Lower Extended Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)

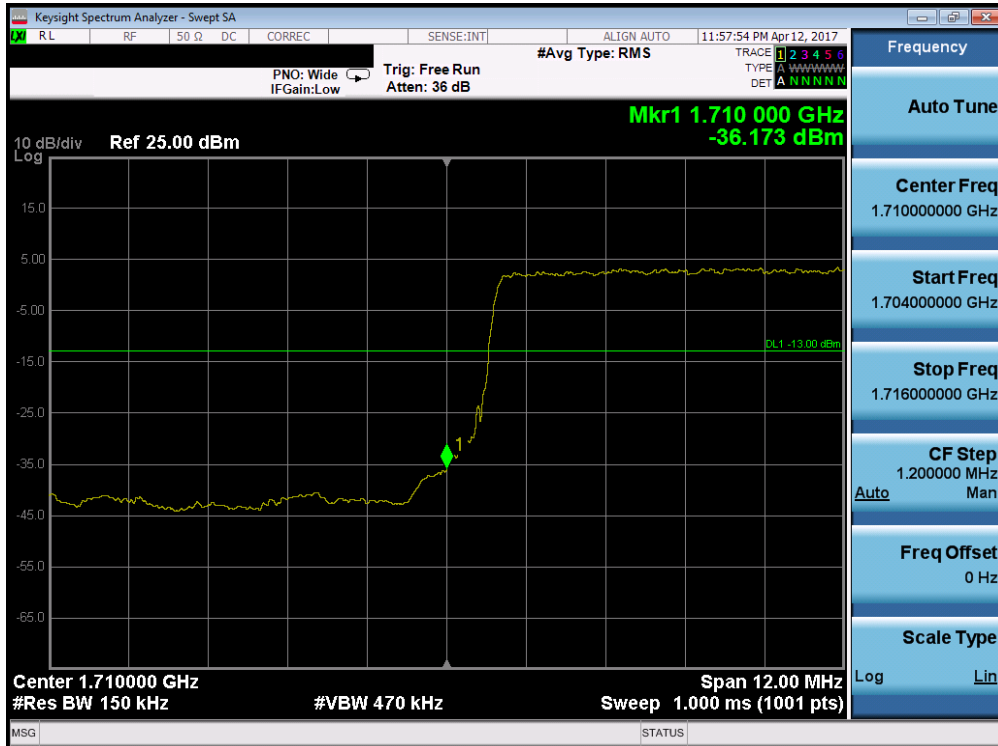


Plot 7-139. Upper Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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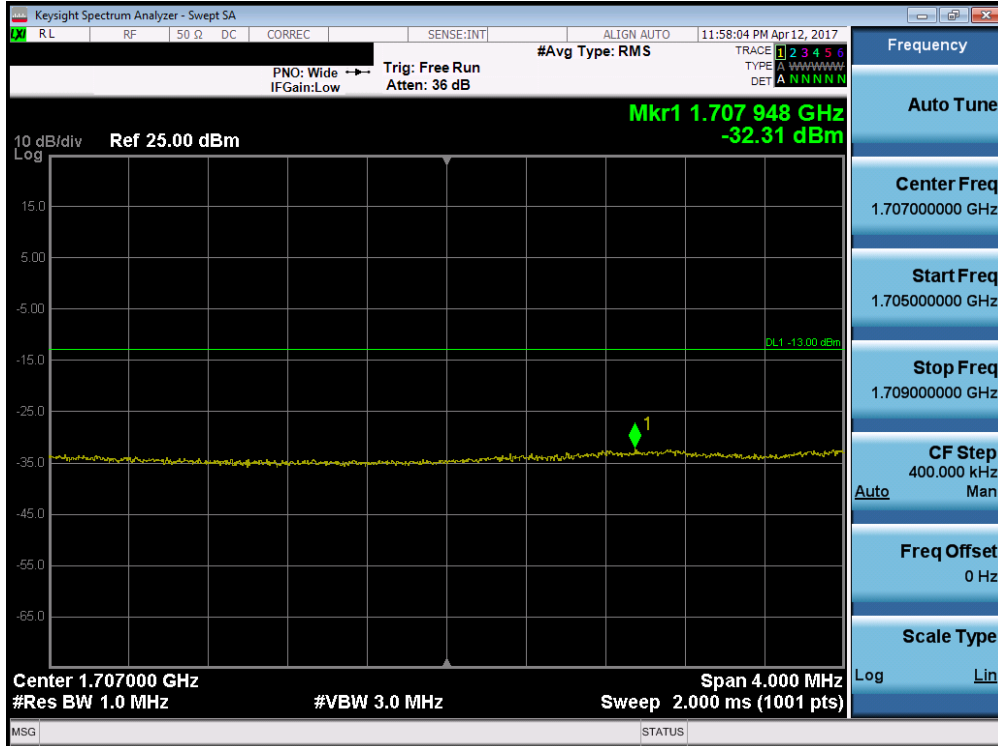


Plot 7-140. Upper Extended Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)

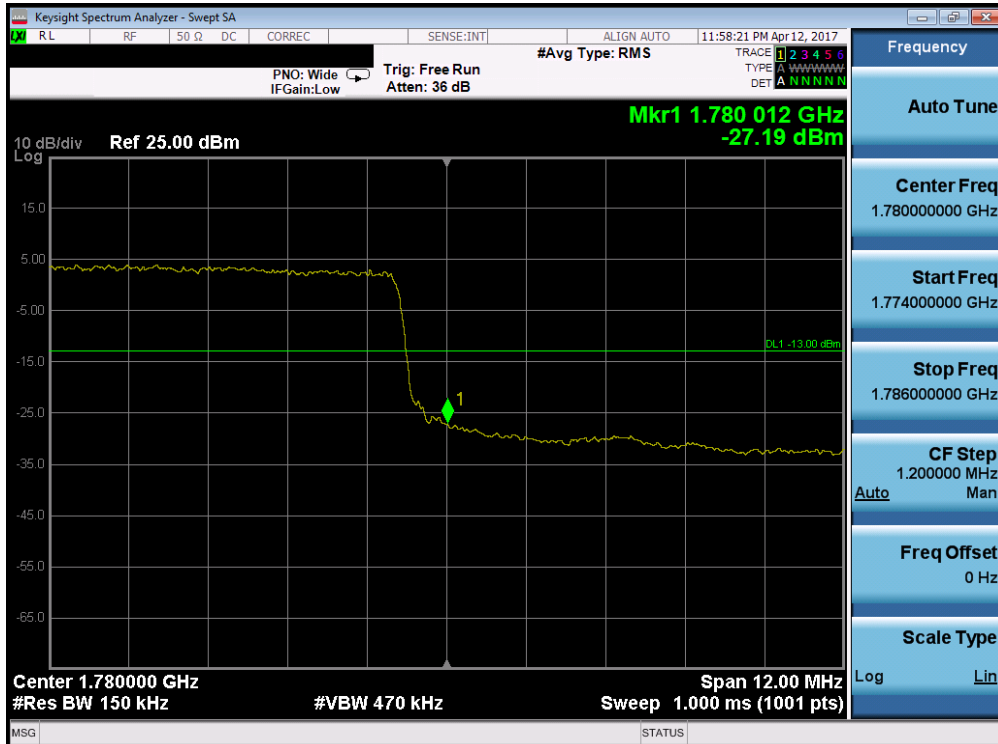


Plot 7-141. Lower Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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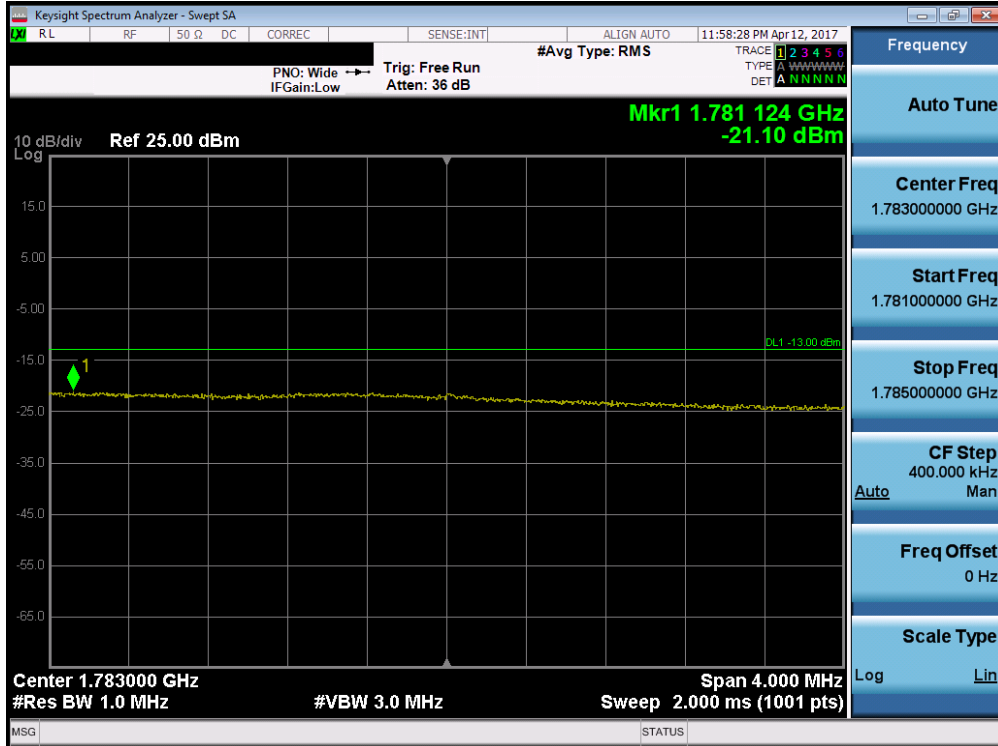


Plot 7-142. Lower Extended Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)

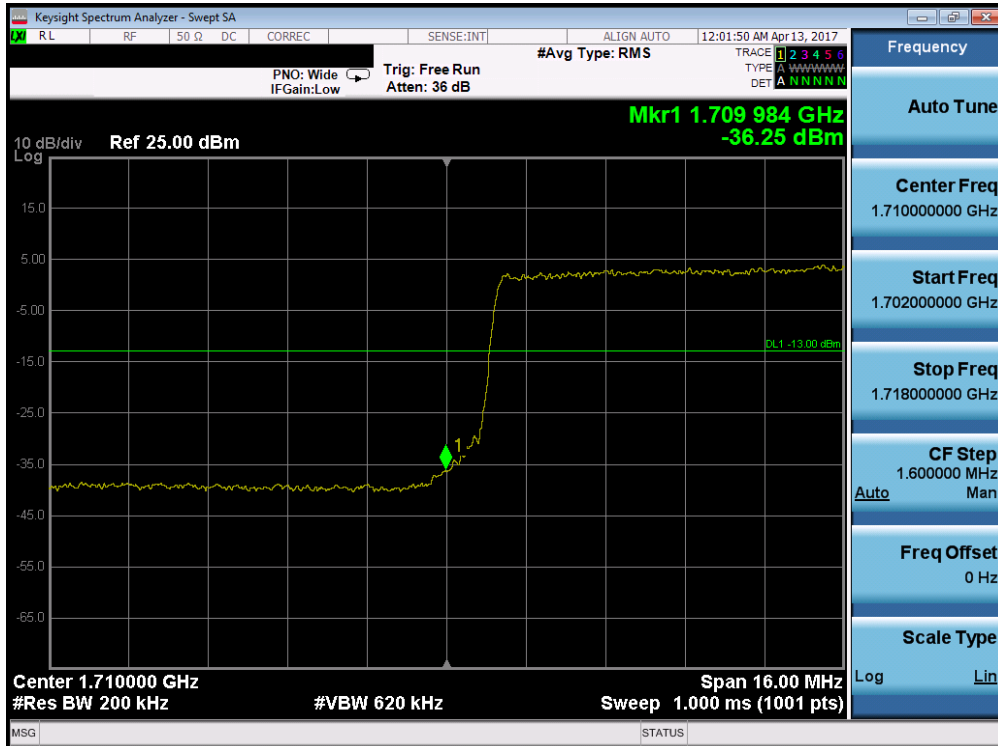


Plot 7-143. Upper Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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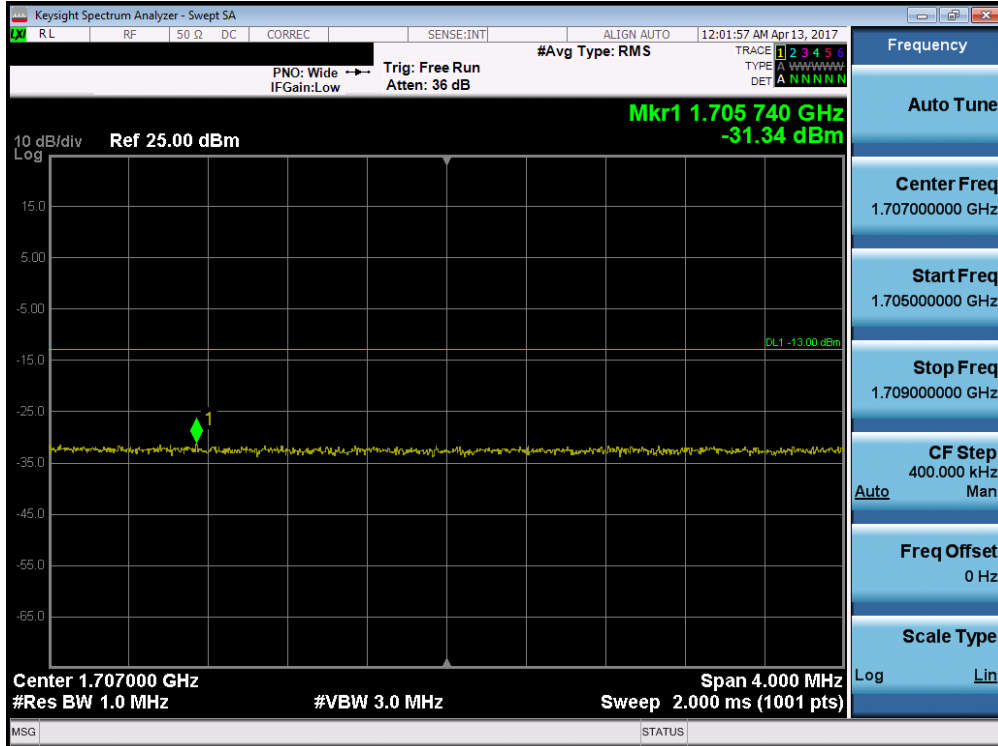


Plot 7-144. Upper Extended Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)

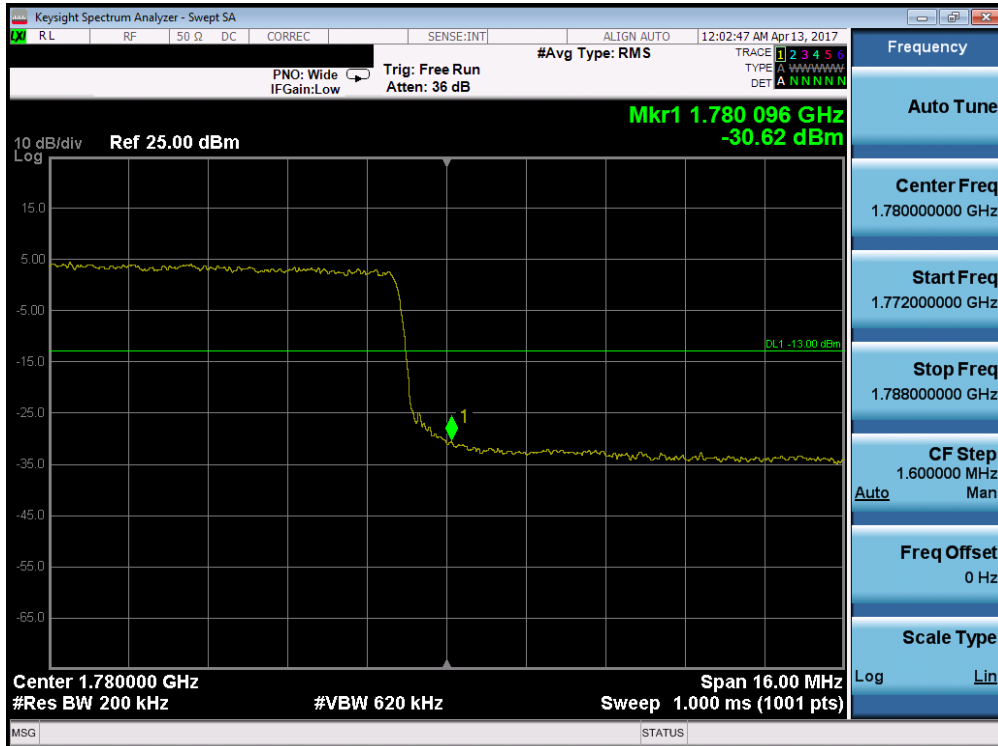


Plot 7-145. Lower Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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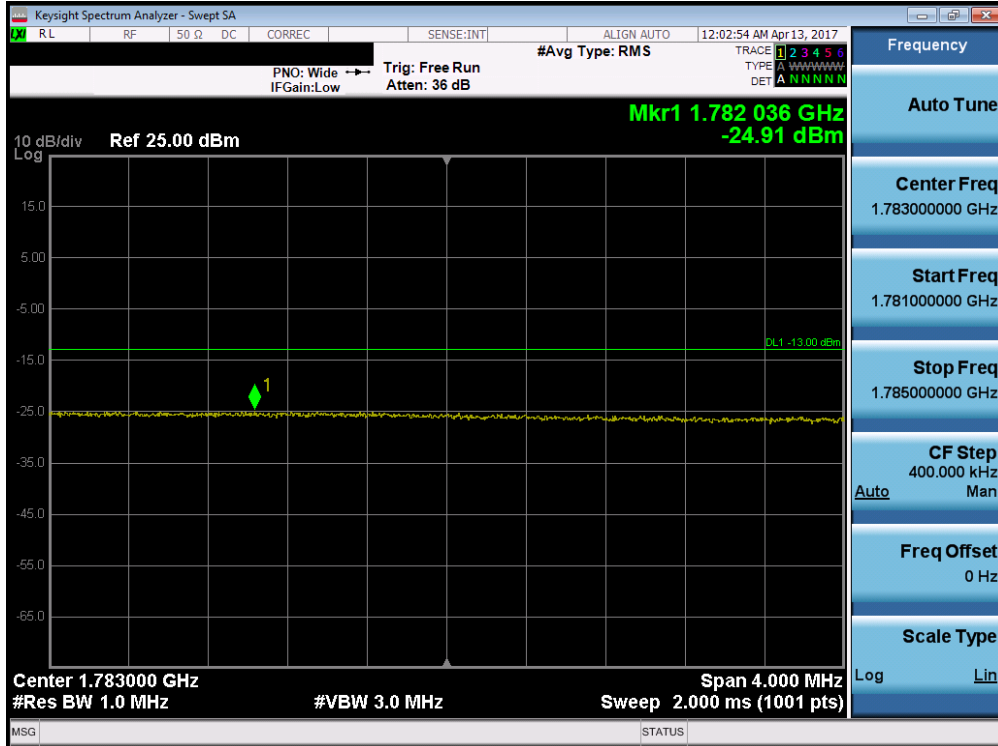


Plot 7-146. Lower Extended Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)

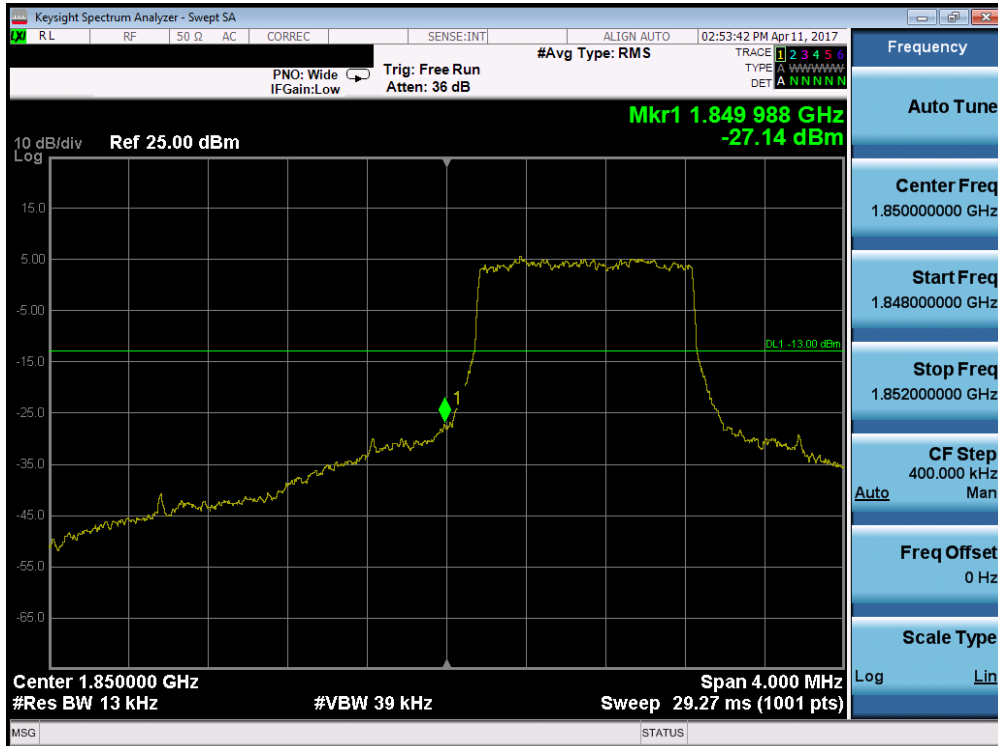


Plot 7-147. Upper Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 91 of 148

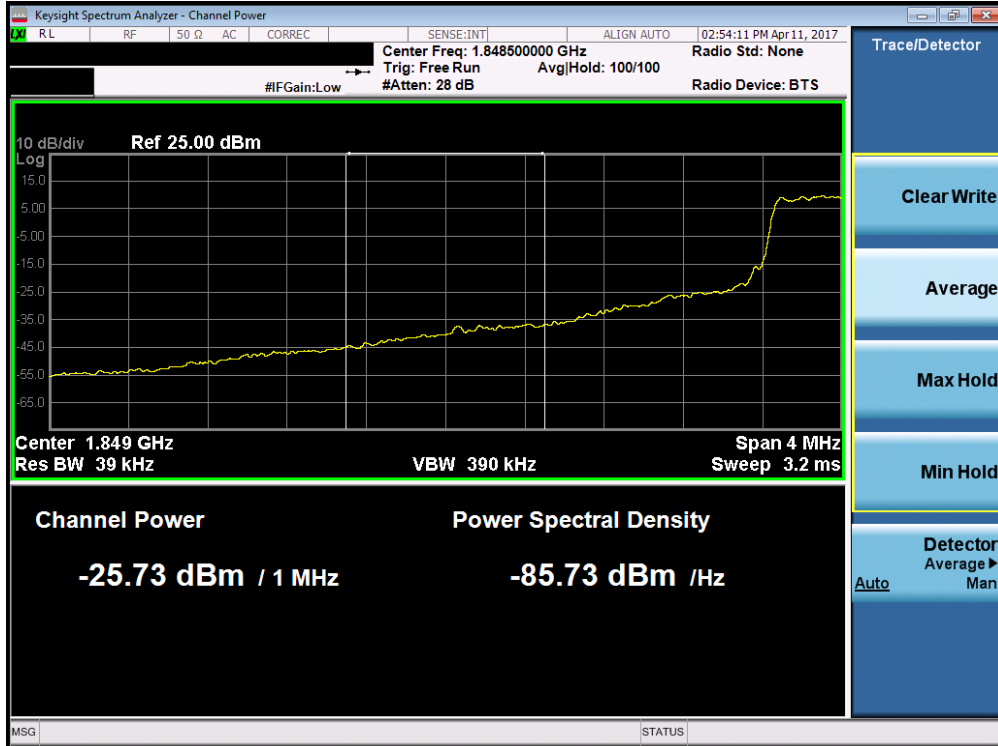


Plot 7-148. Upper Extended Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)

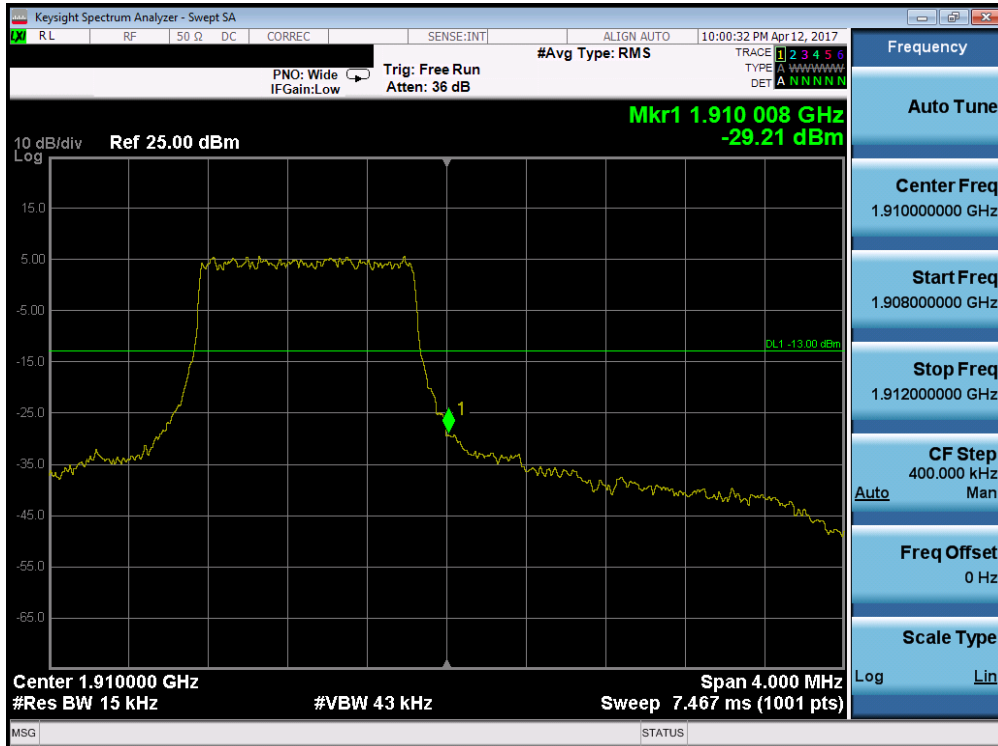


Plot 7-149. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M170404134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 92 of 148

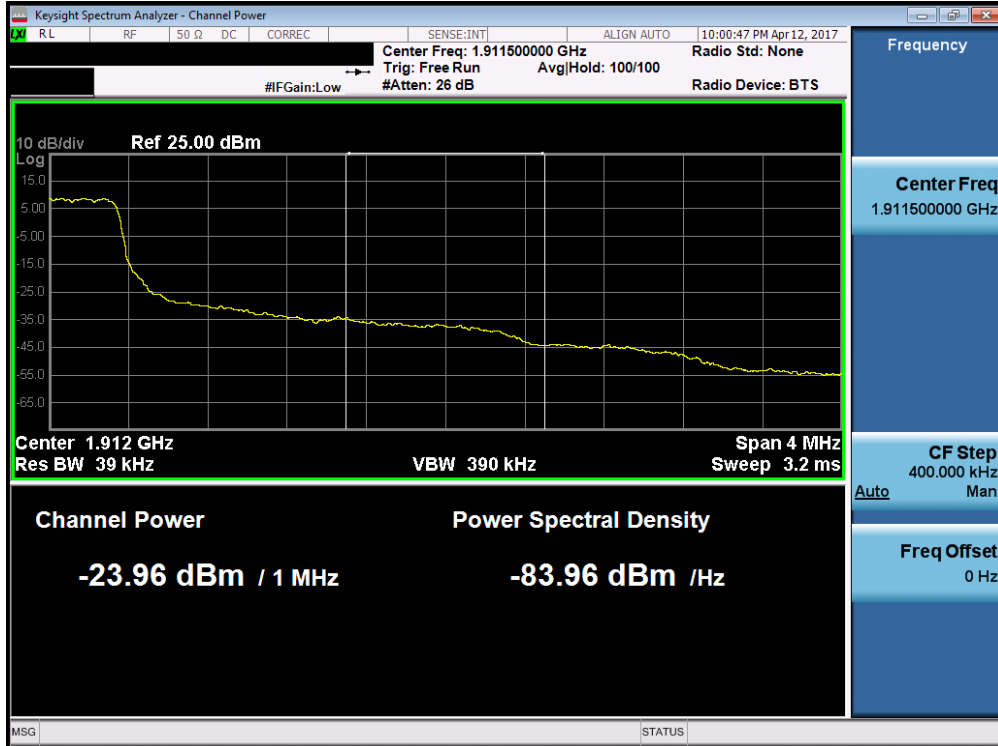


Plot 7-150. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

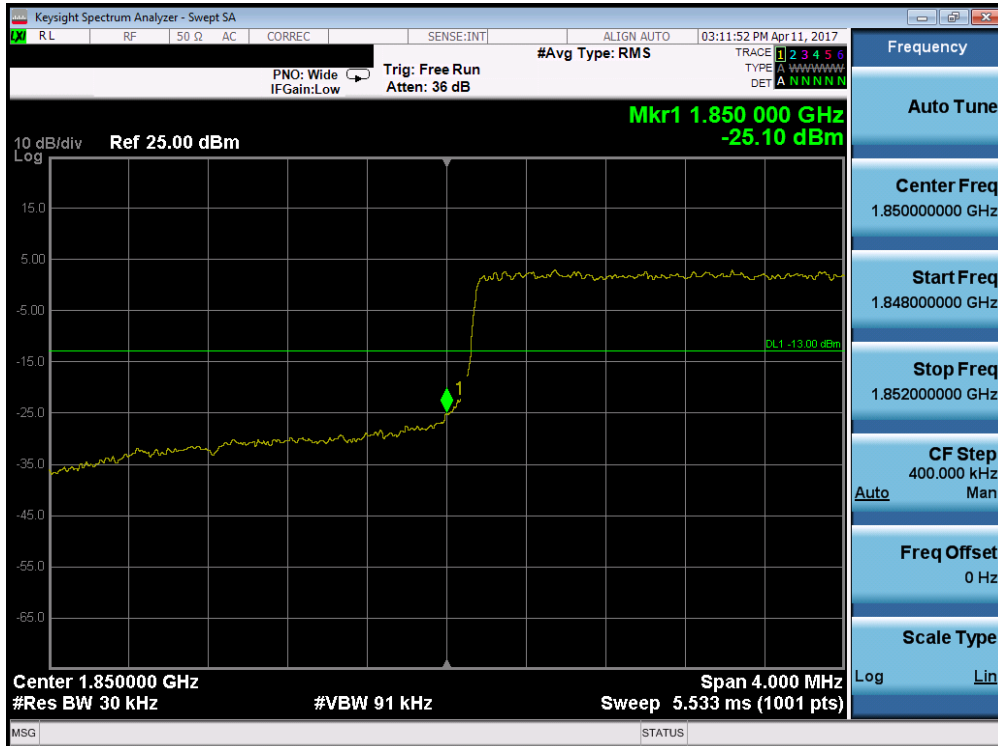


Plot 7-151. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 93 of 148

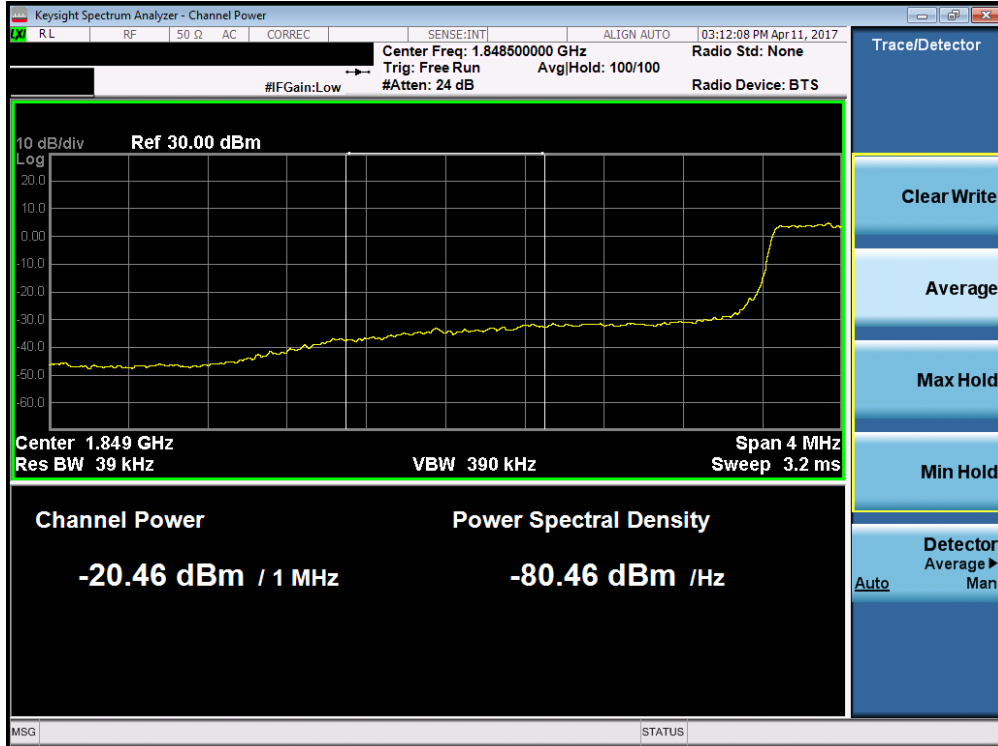


Plot 7-152. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

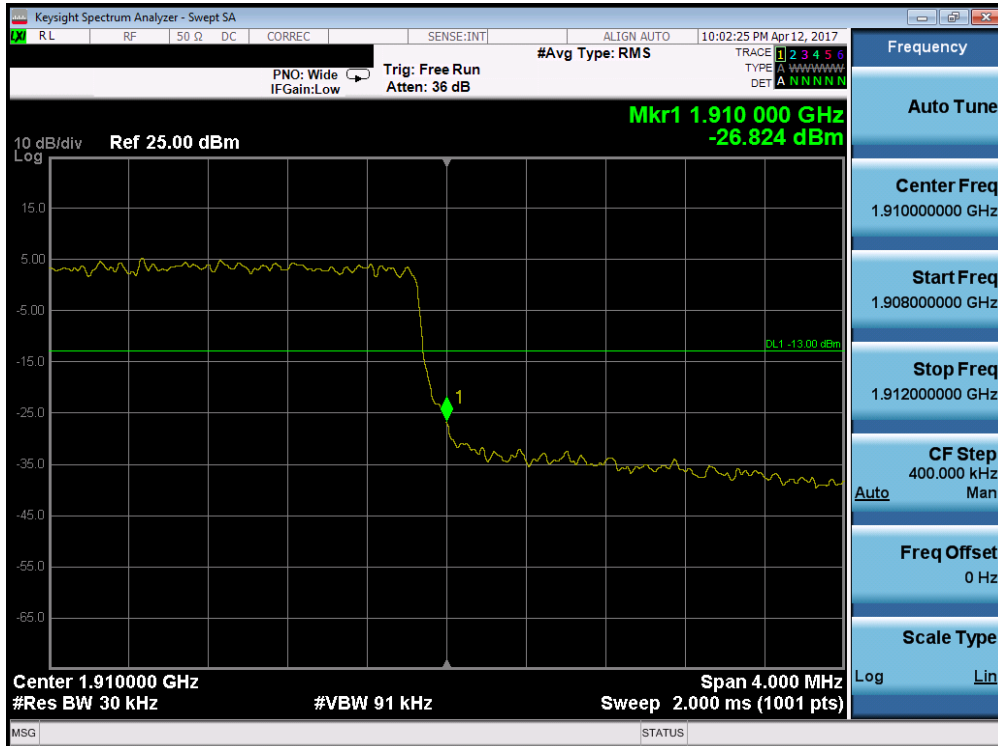


Plot 7-153. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1-ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 94 of 148

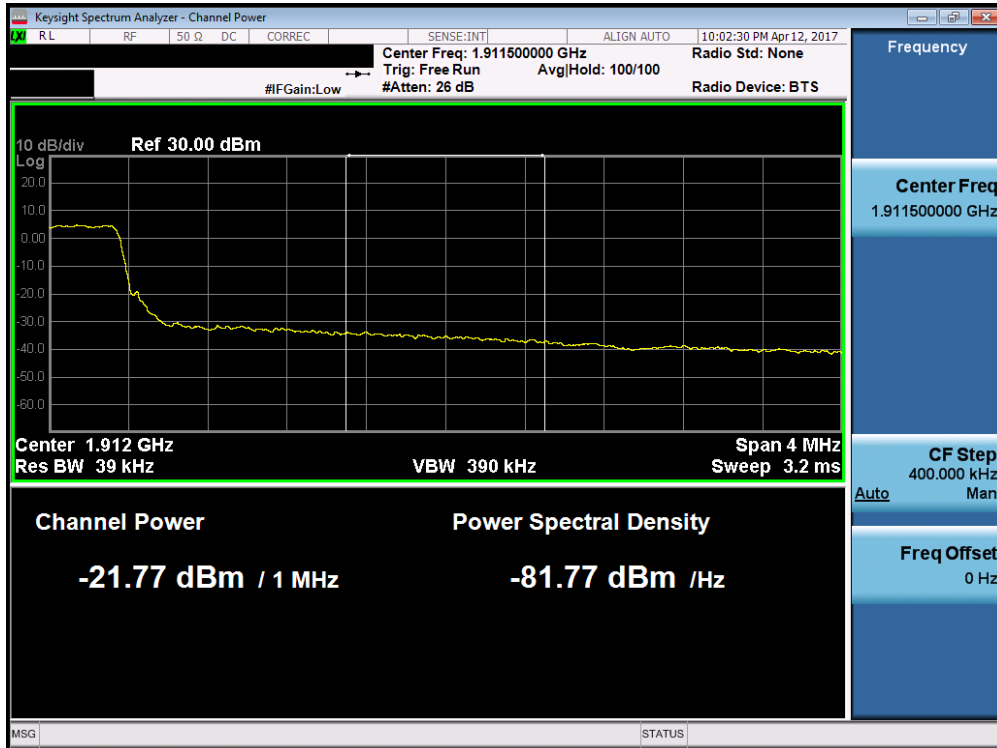


Plot 7-154. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

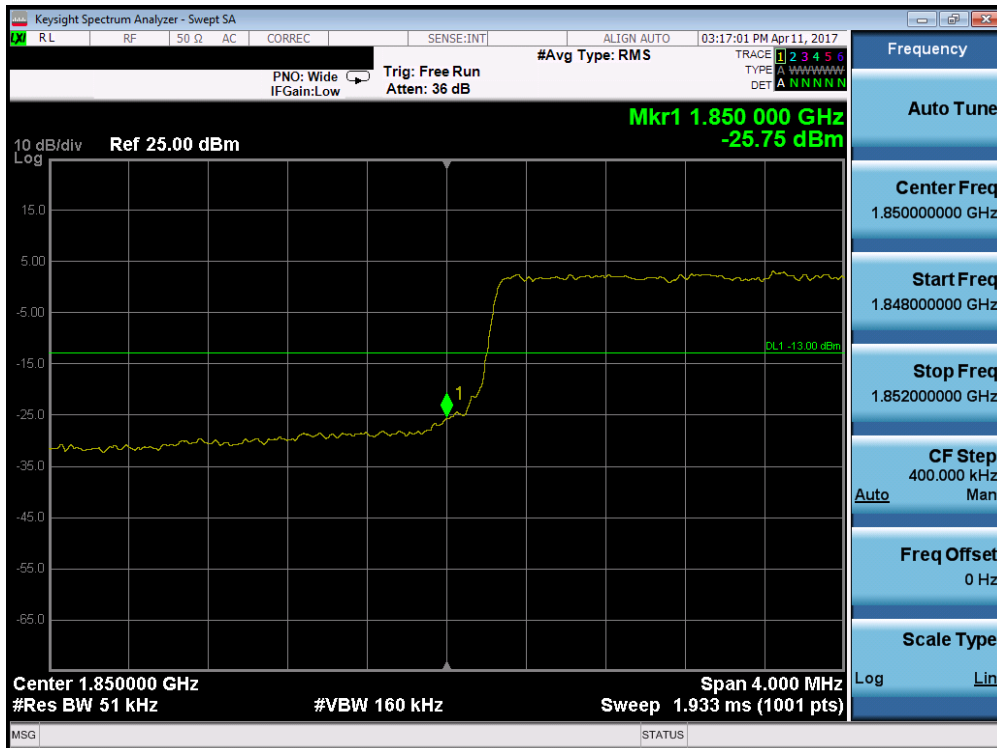


Plot 7-155. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1-ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 95 of 148

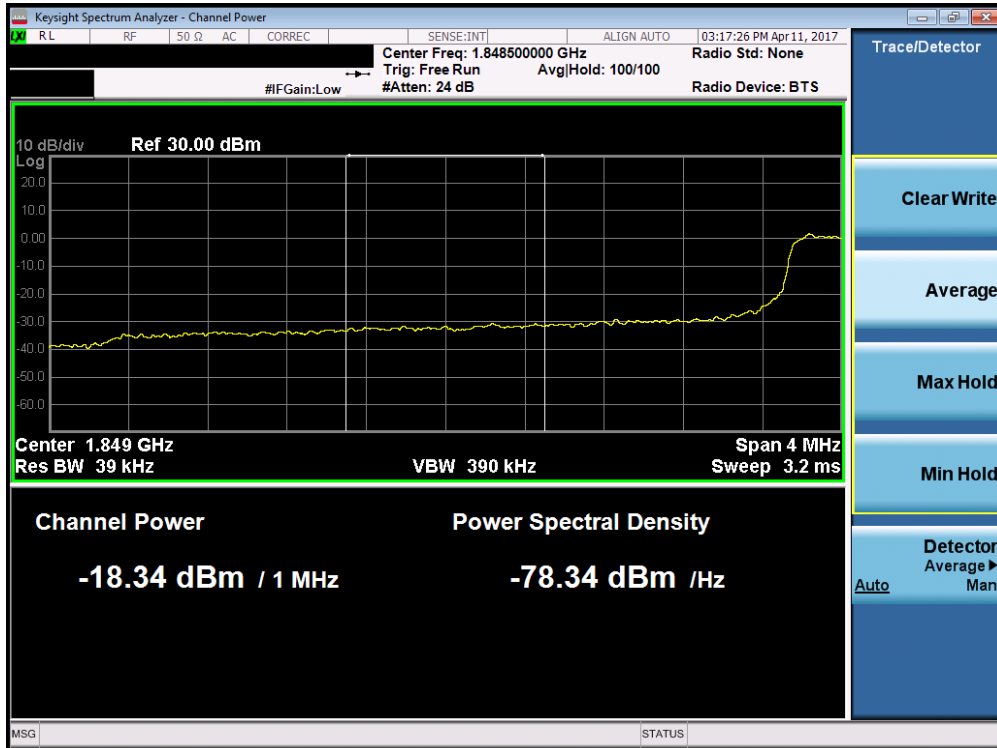


Plot 7-156. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

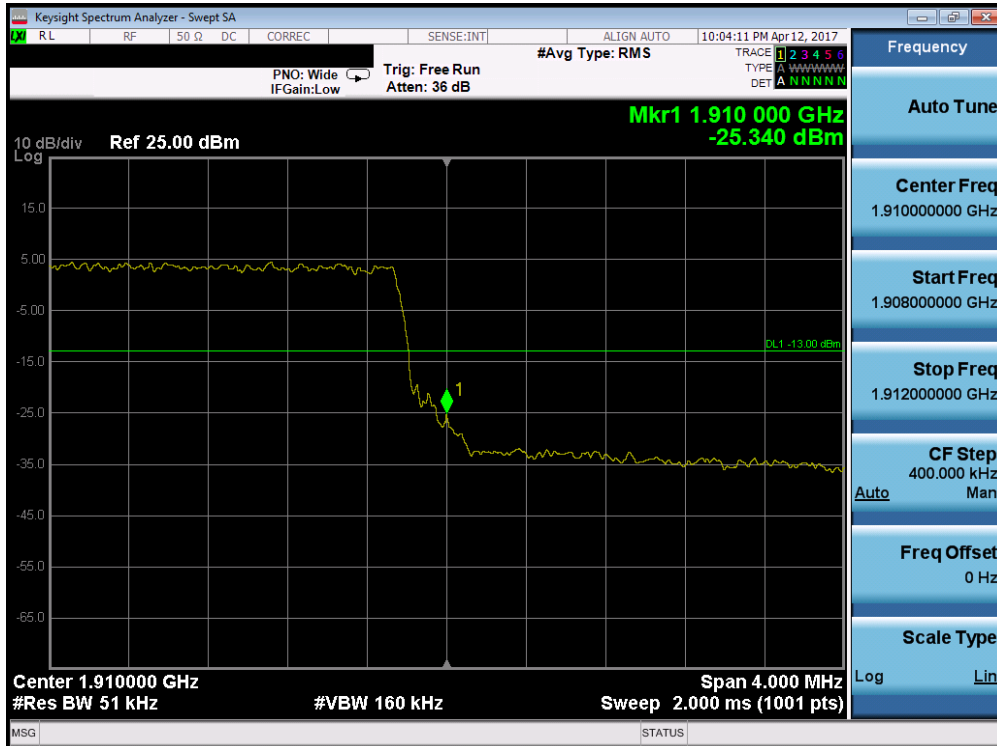


Plot 7-157. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M170404134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 96 of 148

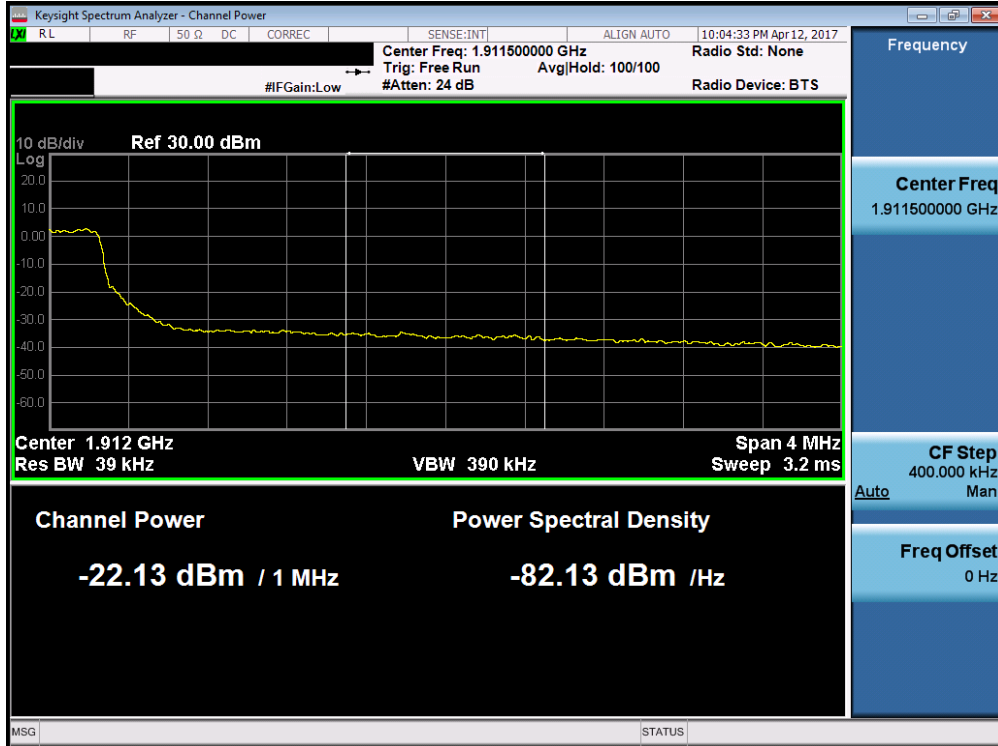


Plot 7-158. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

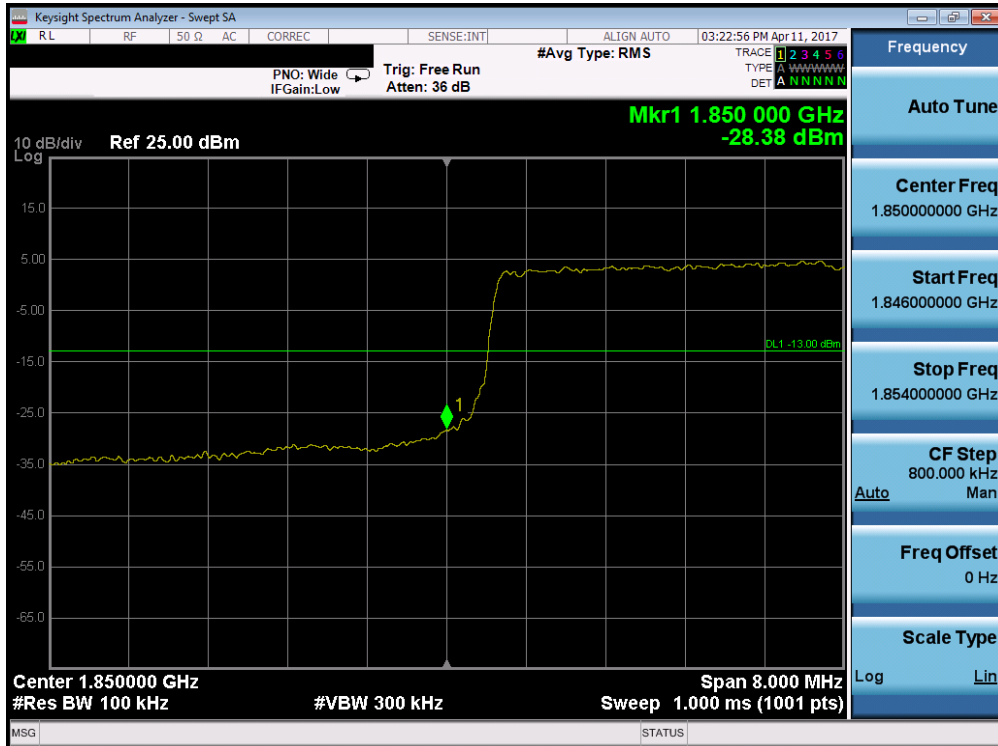


Plot 7-159. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M170404134-03-R1-ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 97 of 148

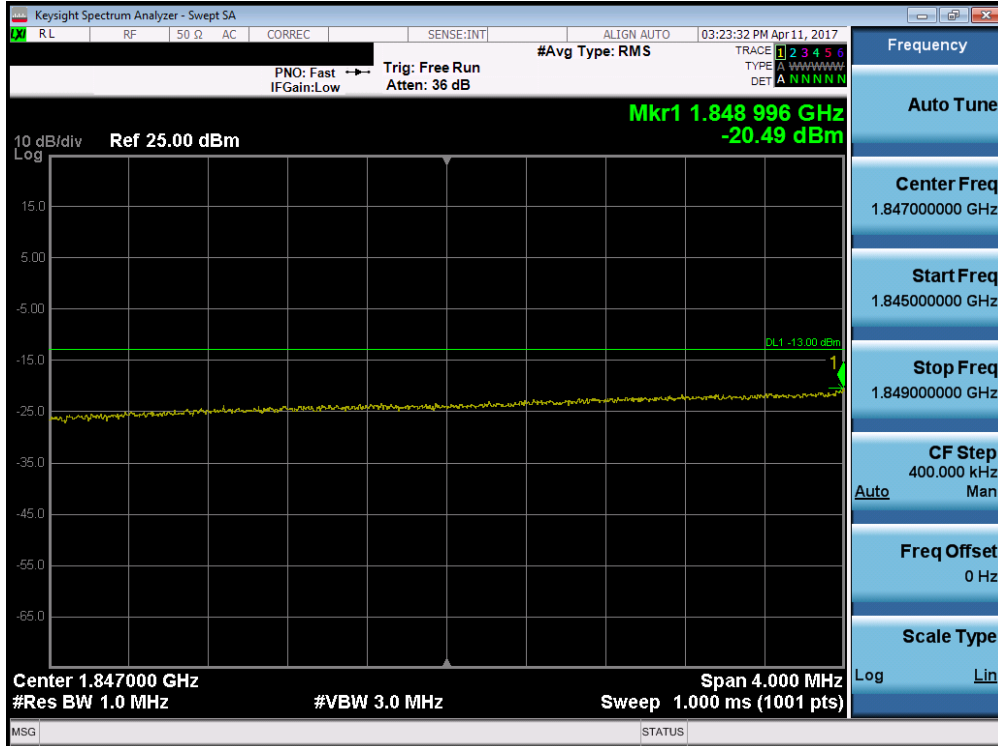


Plot 7-160. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

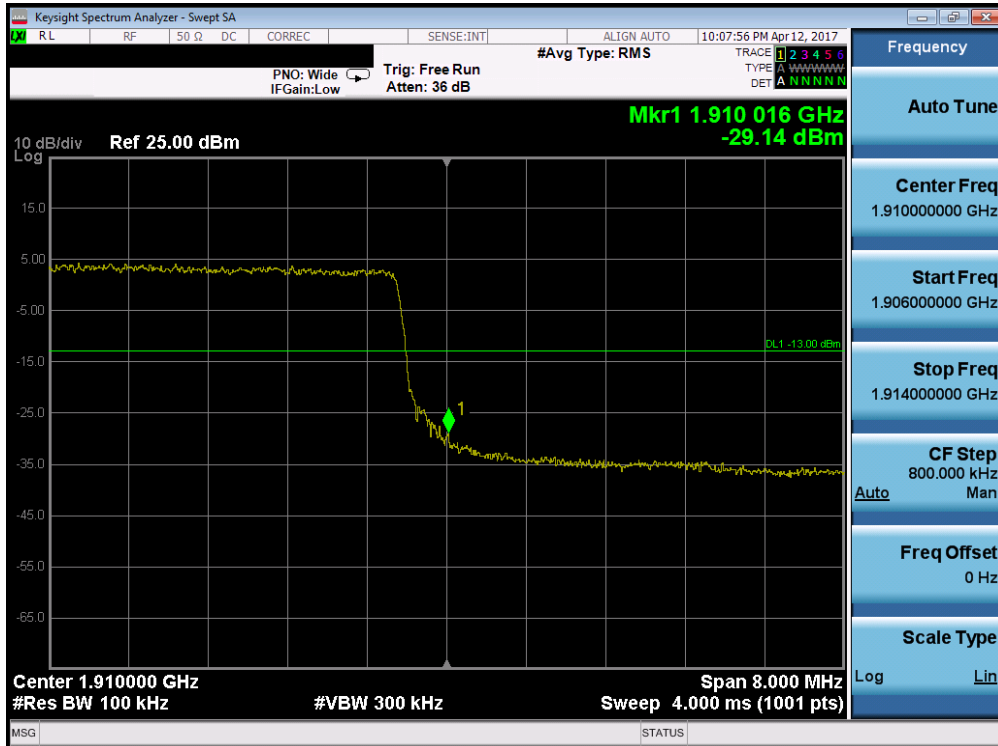


Plot 7-161. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 98 of 148

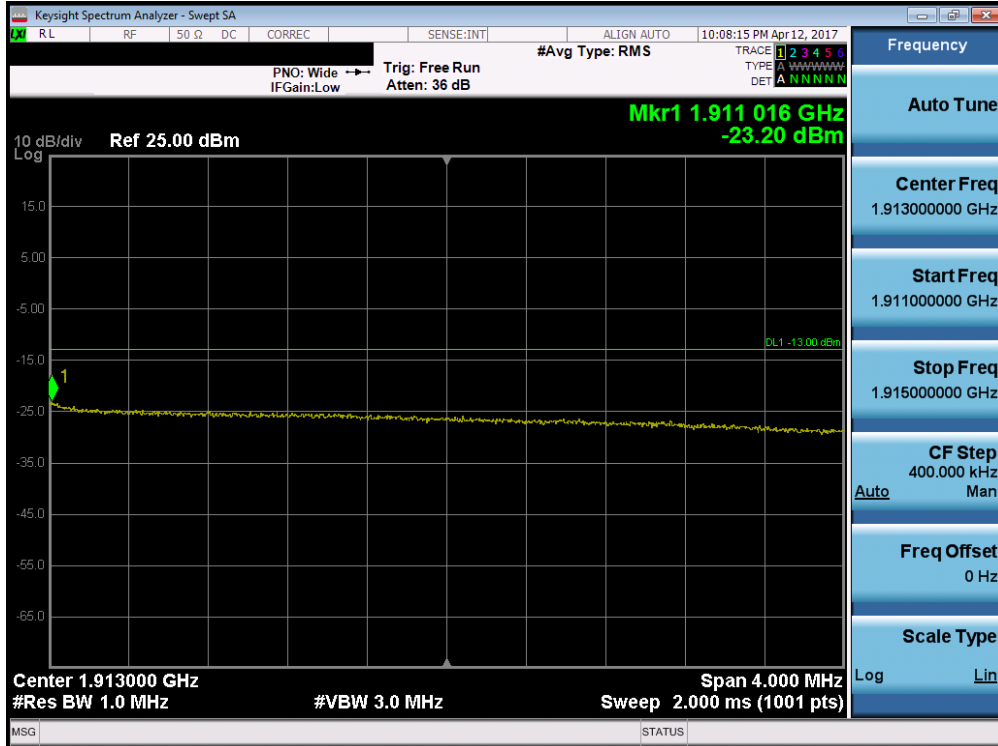


Plot 7-162. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

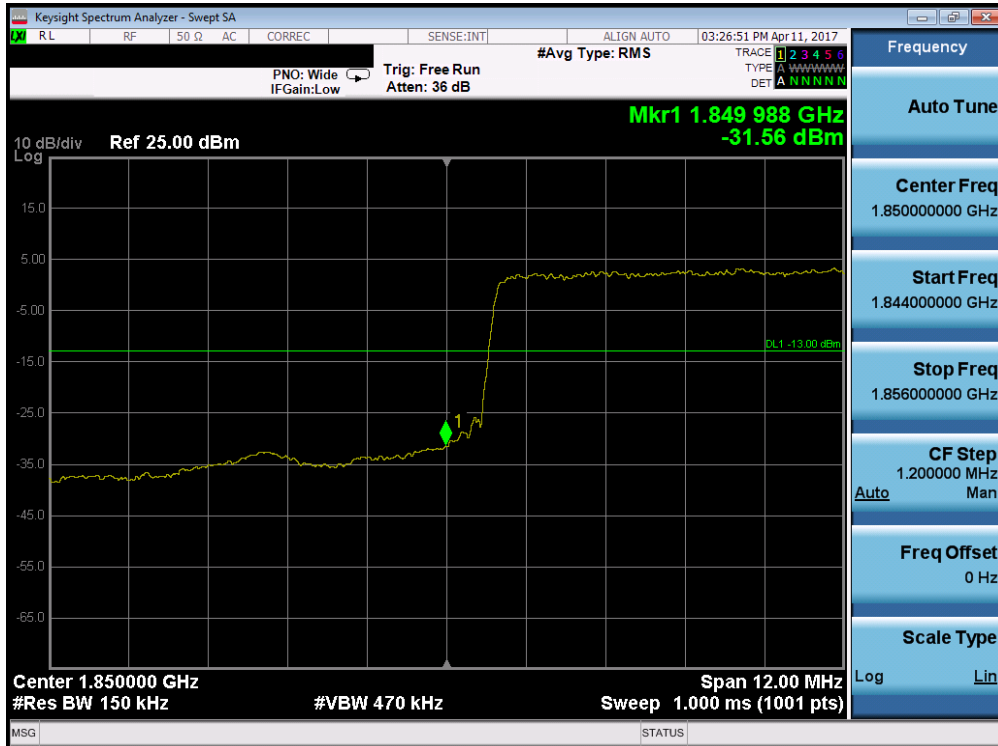


Plot 7-163. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1-ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 99 of 148

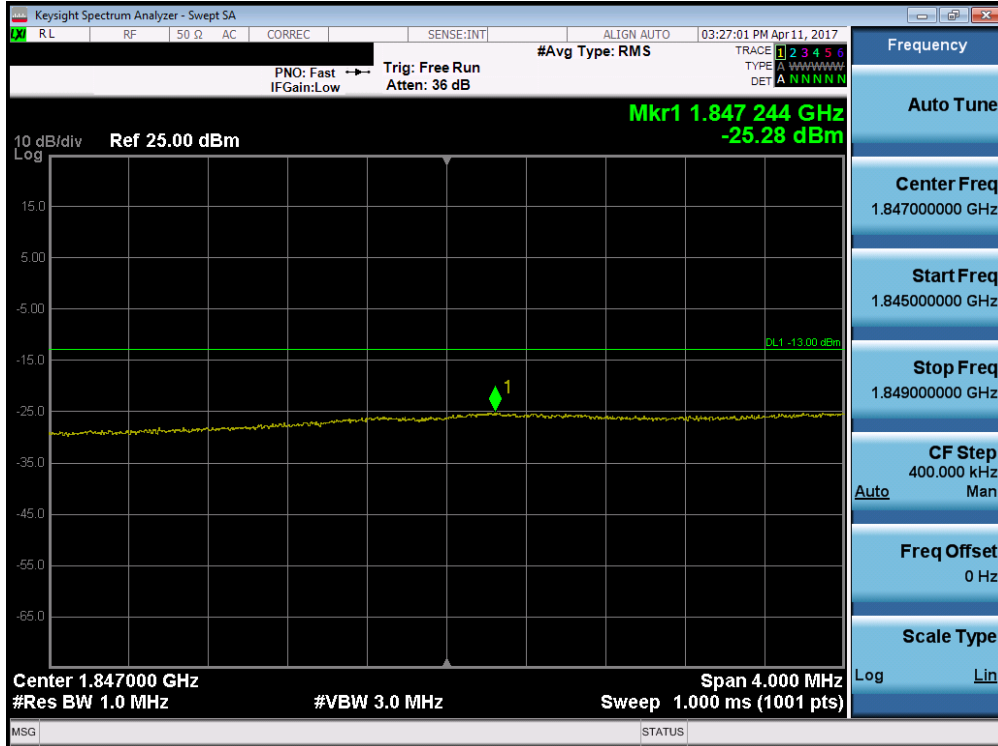


Plot 7-164. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

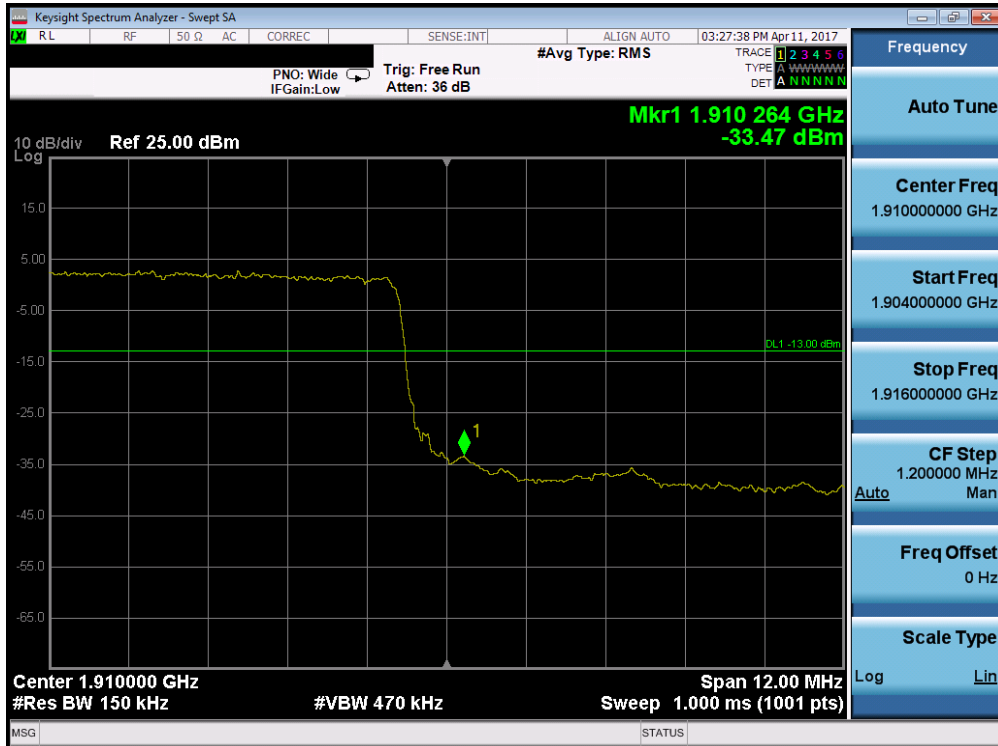


Plot 7-165. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M170404134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 100 of 148

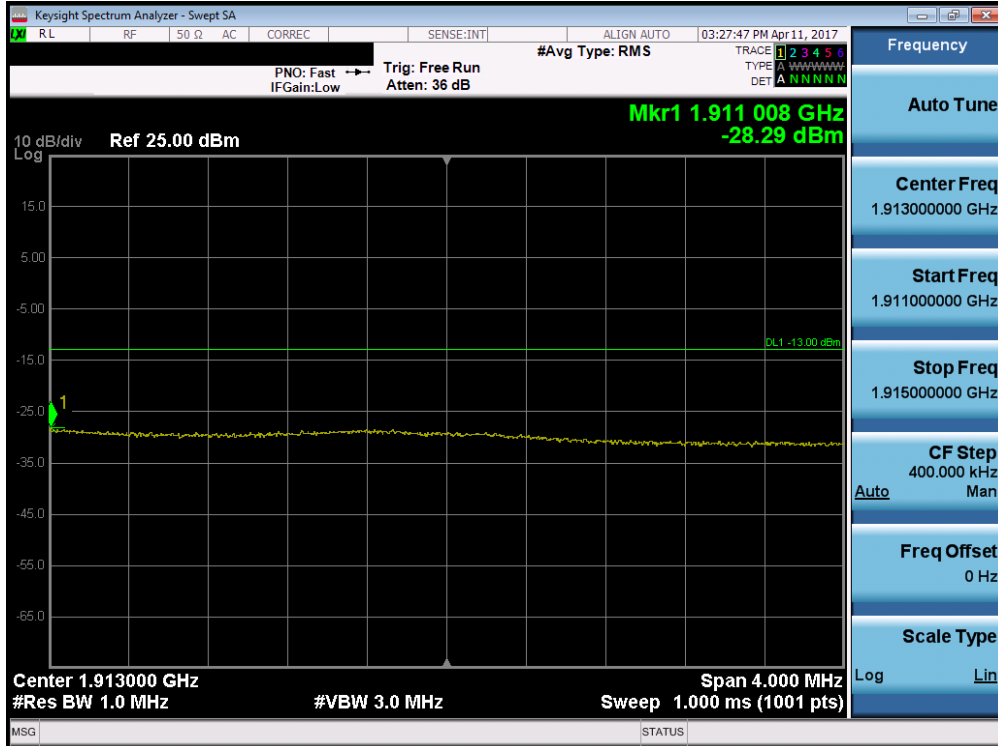


Plot 7-166. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

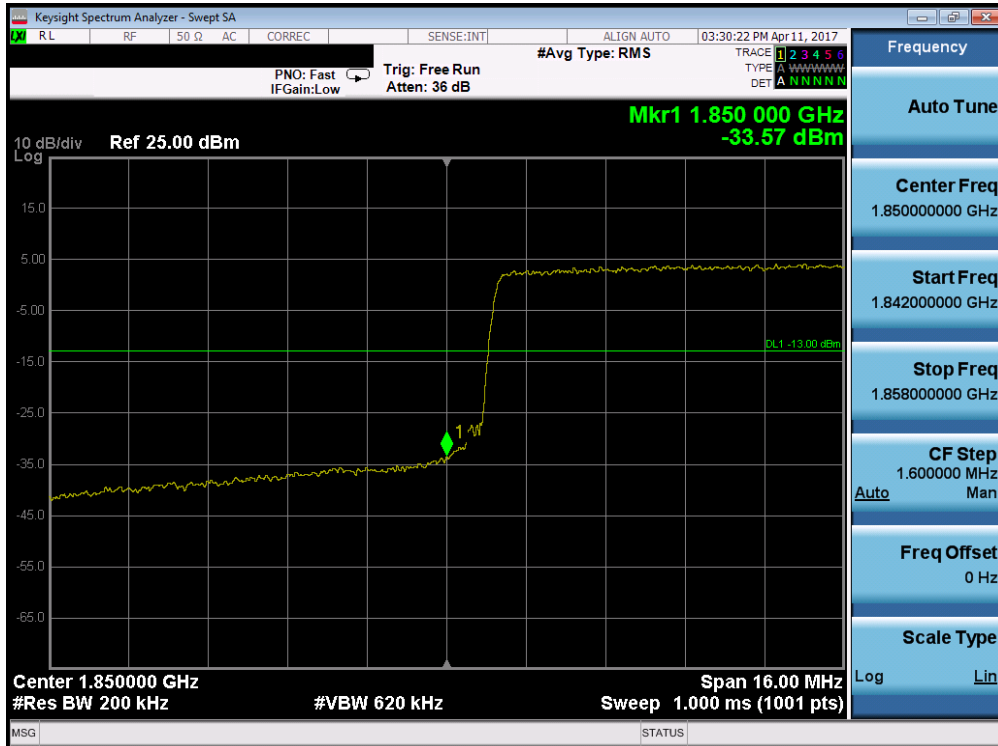


Plot 7-167. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M170404134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 101 of 148

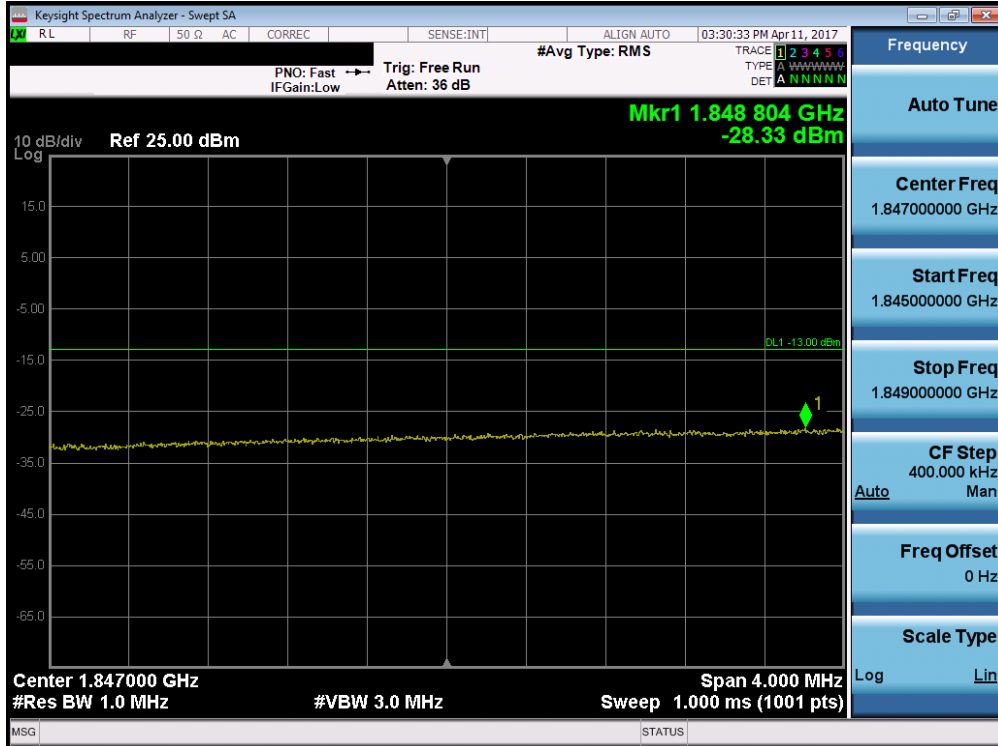


Plot 7-168. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

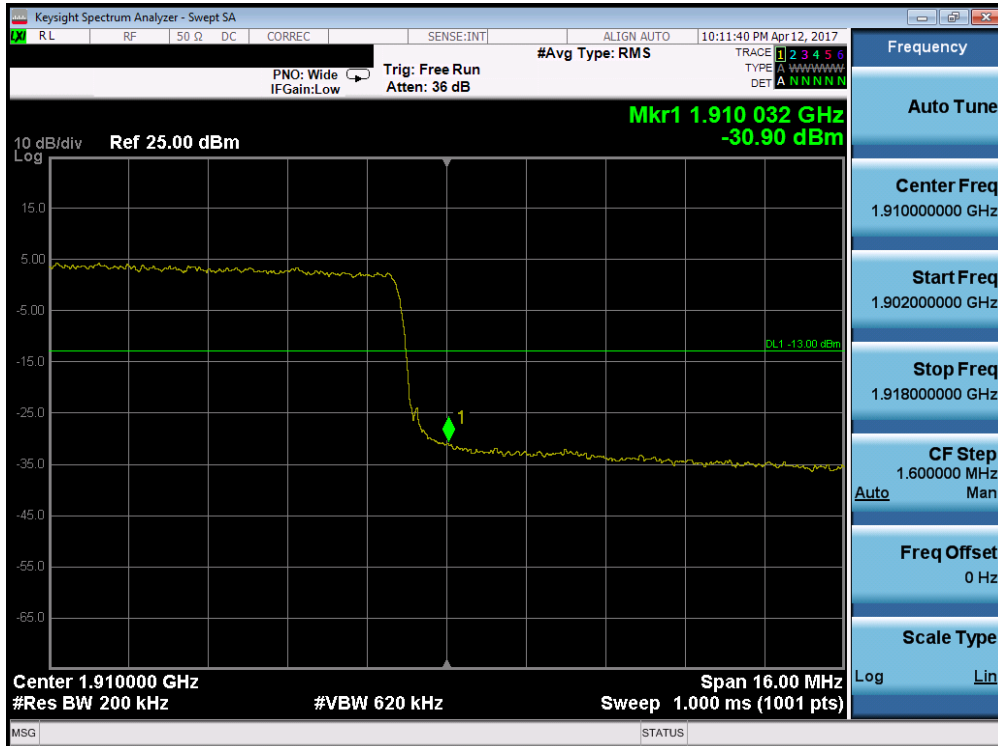


Plot 7-169. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M170404134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 102 of 148

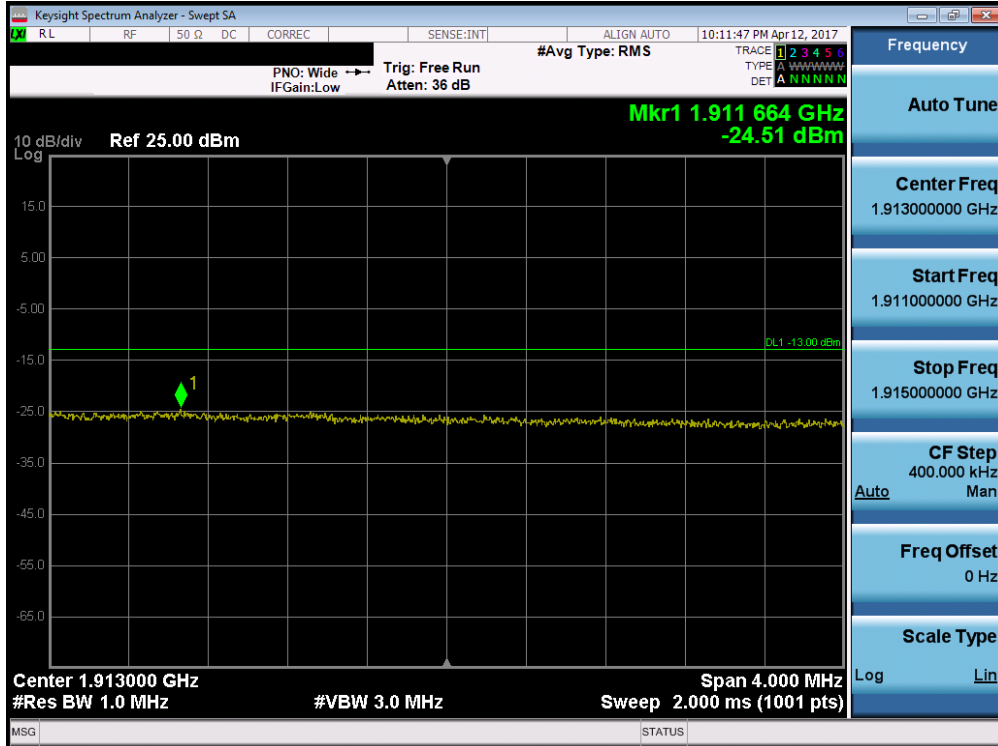


Plot 7-170. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

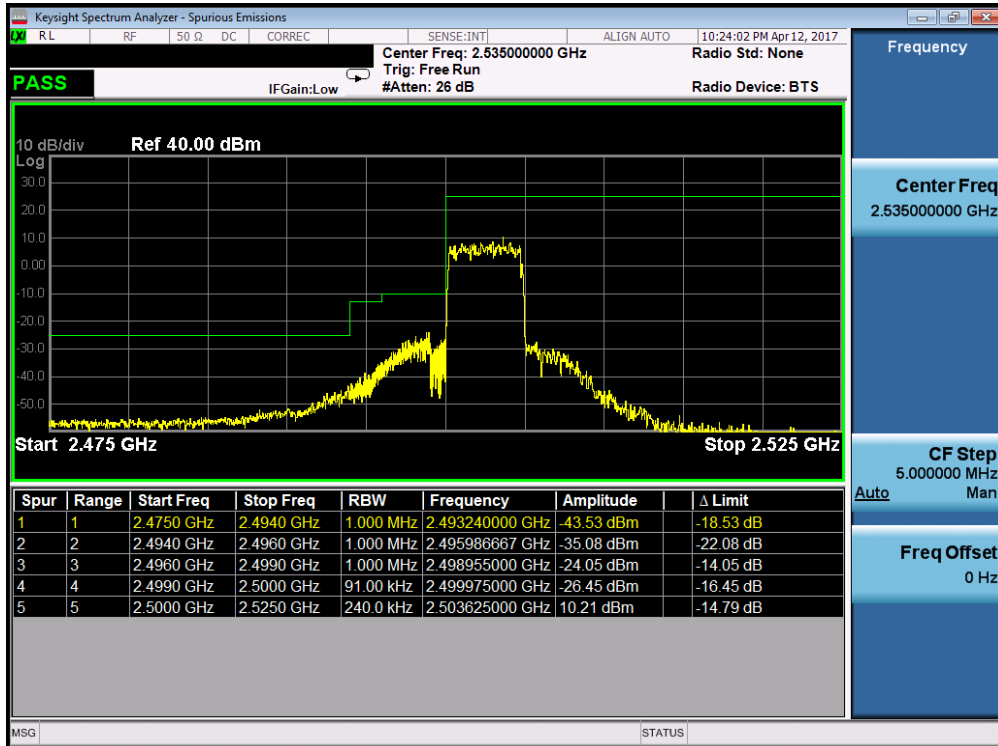


Plot 7-171. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 103 of 148

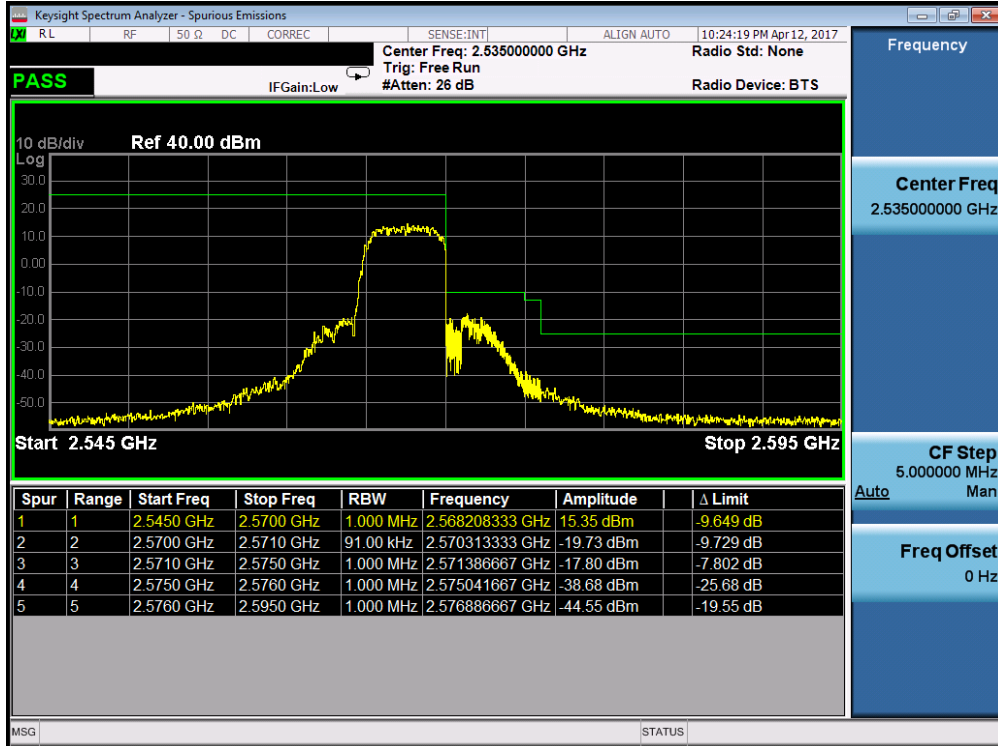


Plot 7-172. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

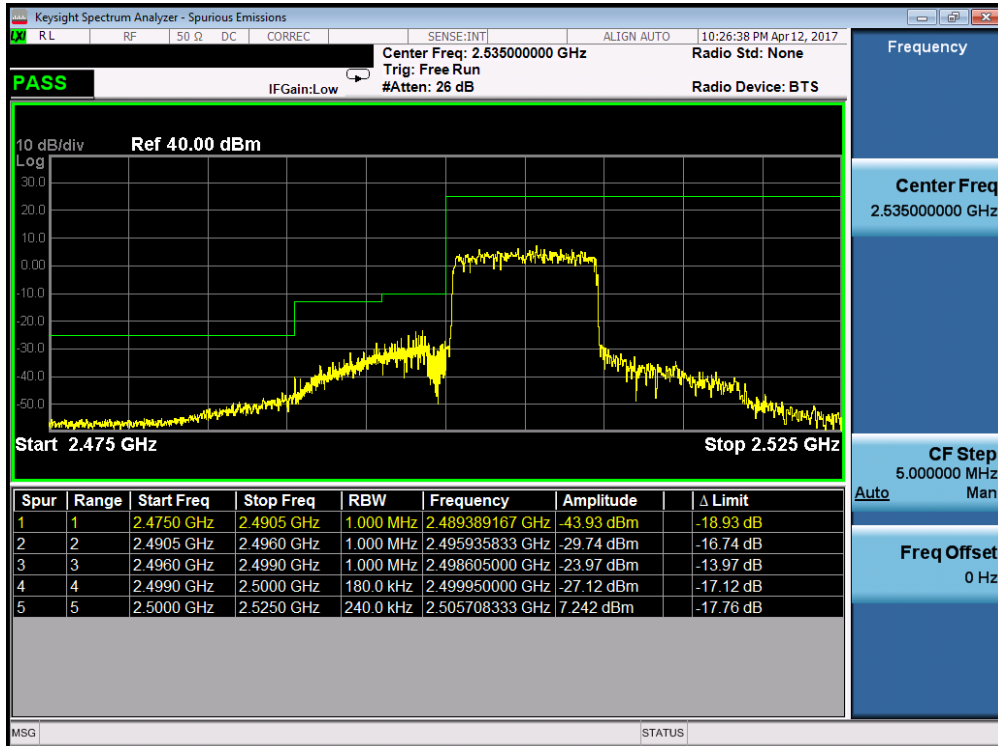


Plot 7-173. Lower ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 104 of 148

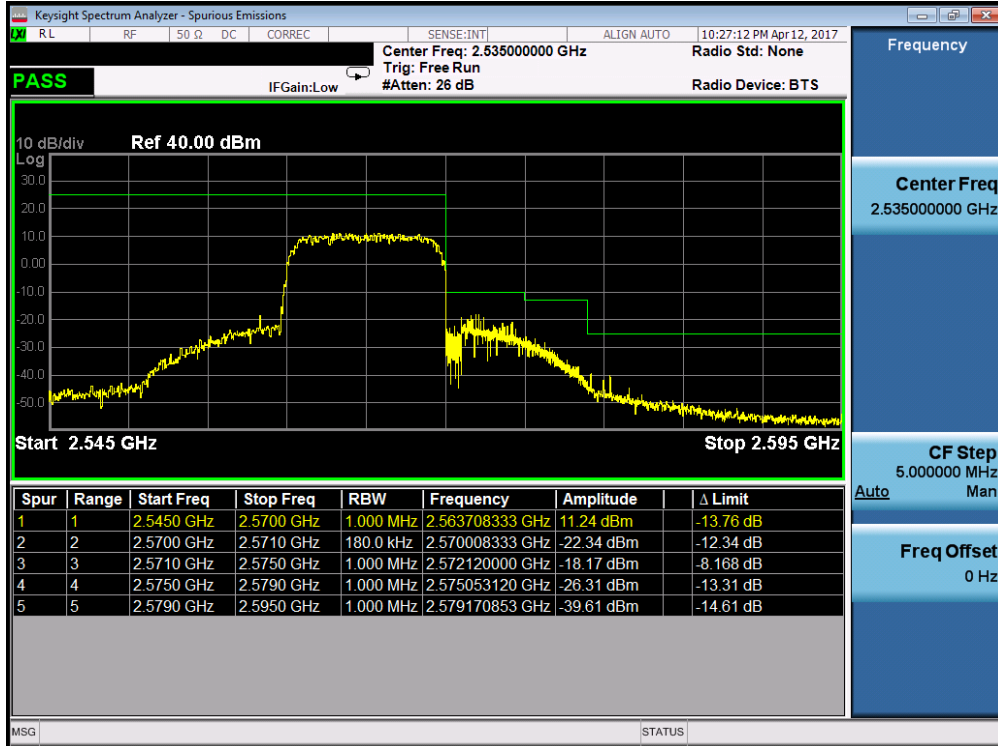


Plot 7-174. Upper ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)

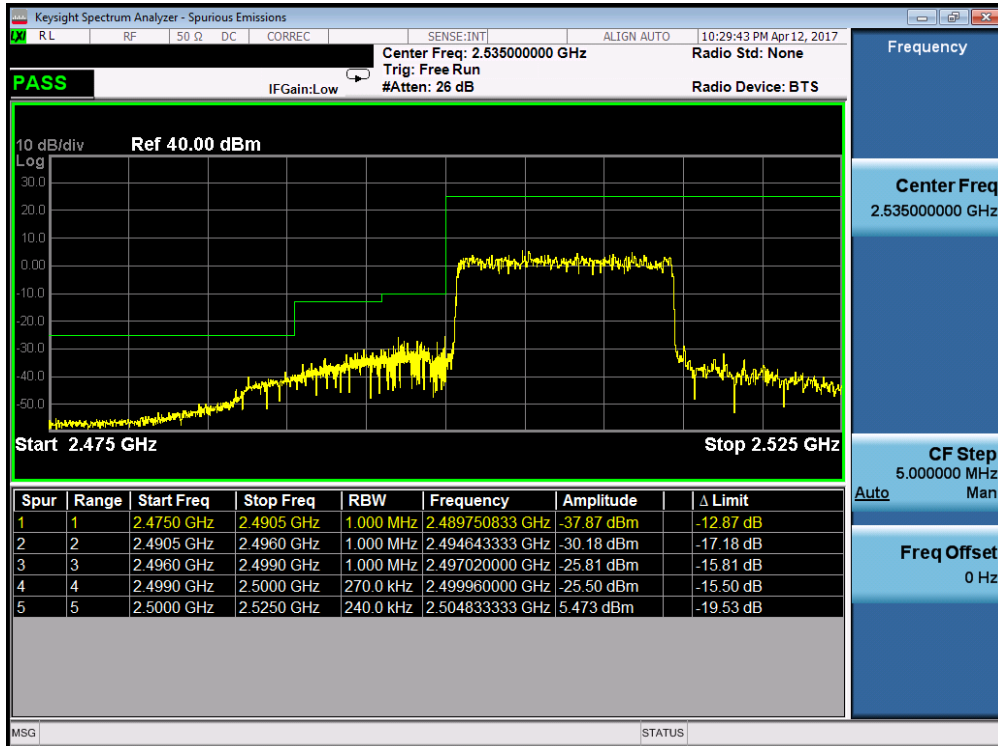


Plot 7-175. Lower ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-176. Upper ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)

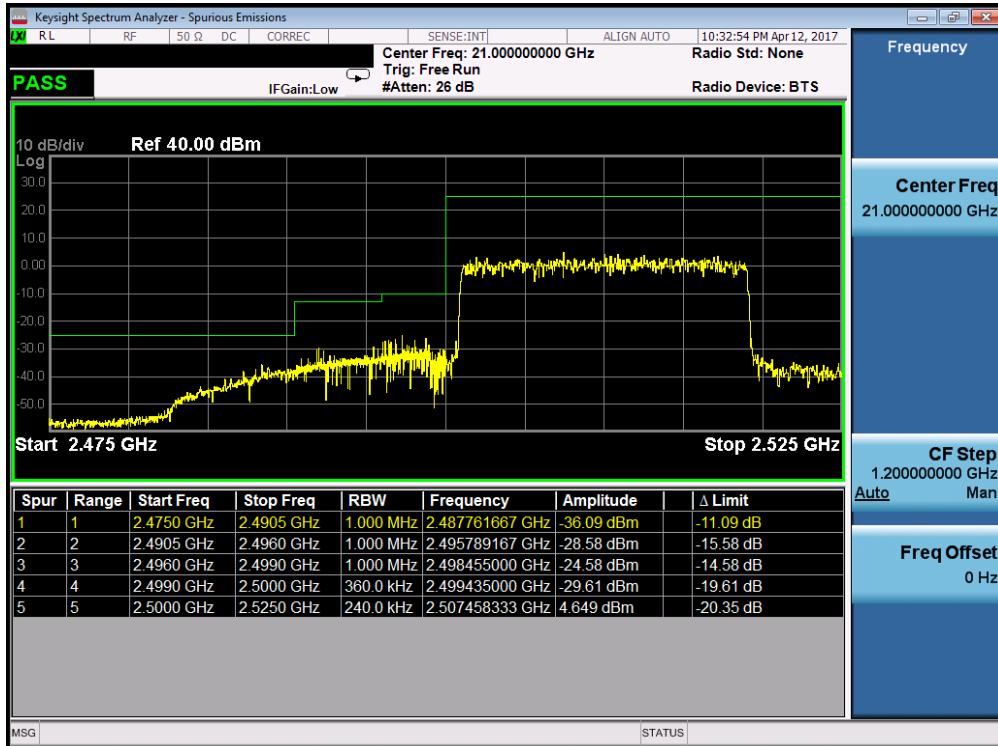


Plot 7-177. Lower ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1-ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 106 of 148

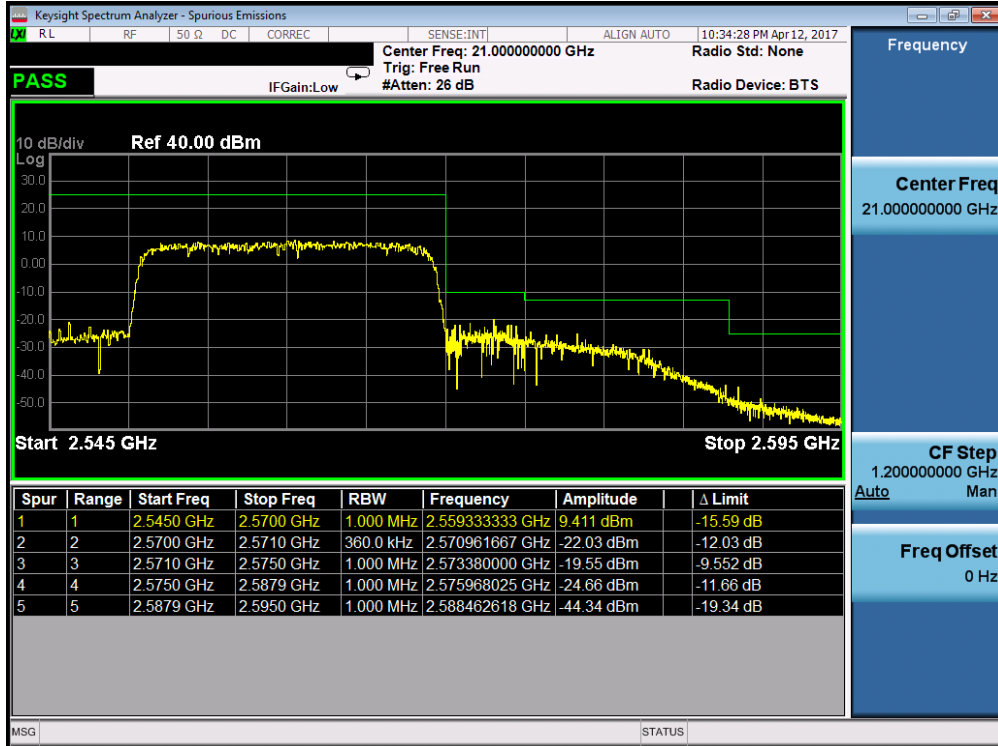


Plot 7-178. Upper ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)



Plot 7-179. Lower ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1-ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 107 of 148



Plot 7-180. Upper ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 108 of 148

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.

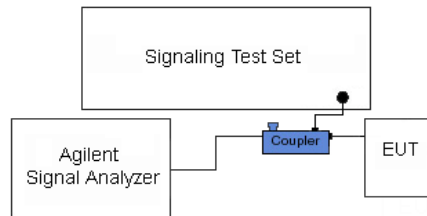
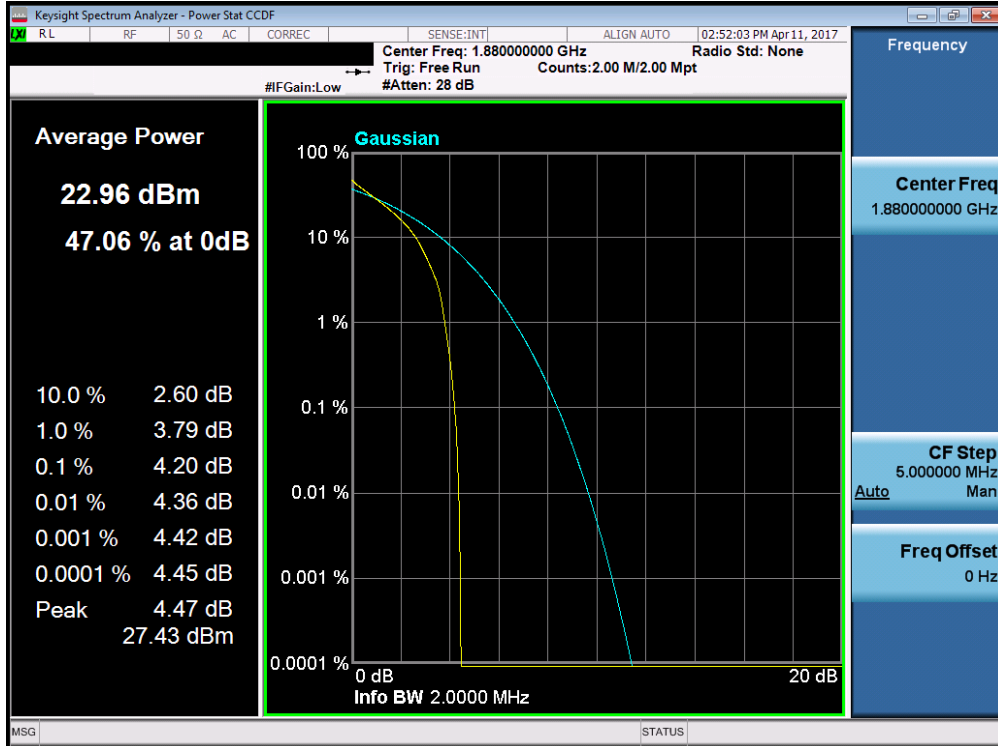


Figure 7-4. Test Instrument & Measurement Setup

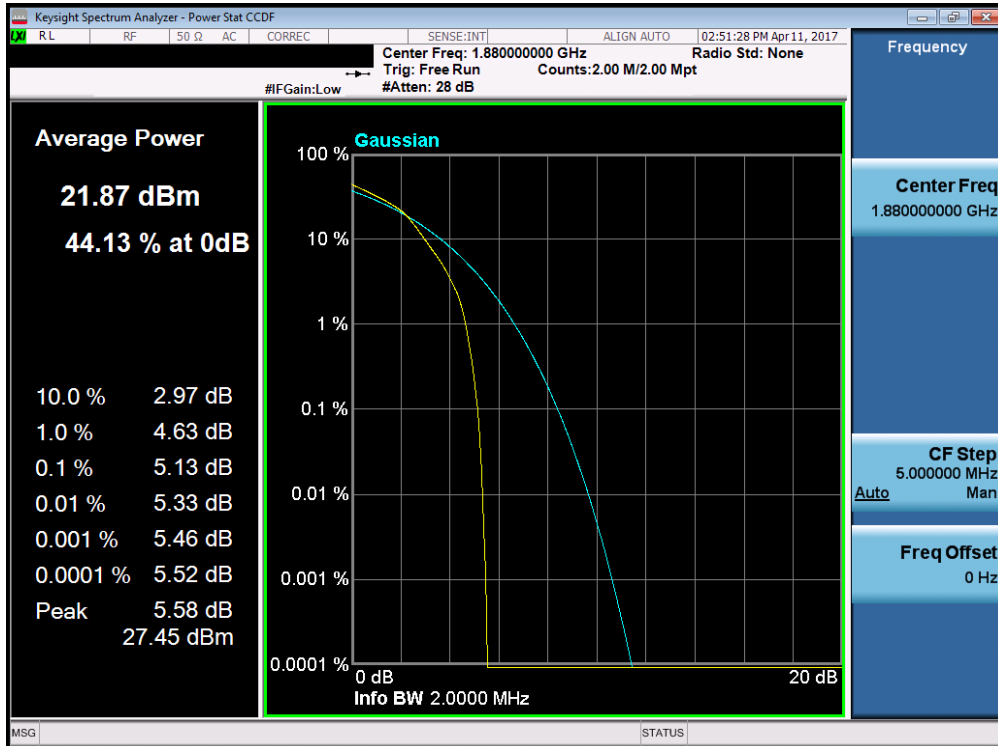
Test Notes

None.

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset	Page 109 of 148	

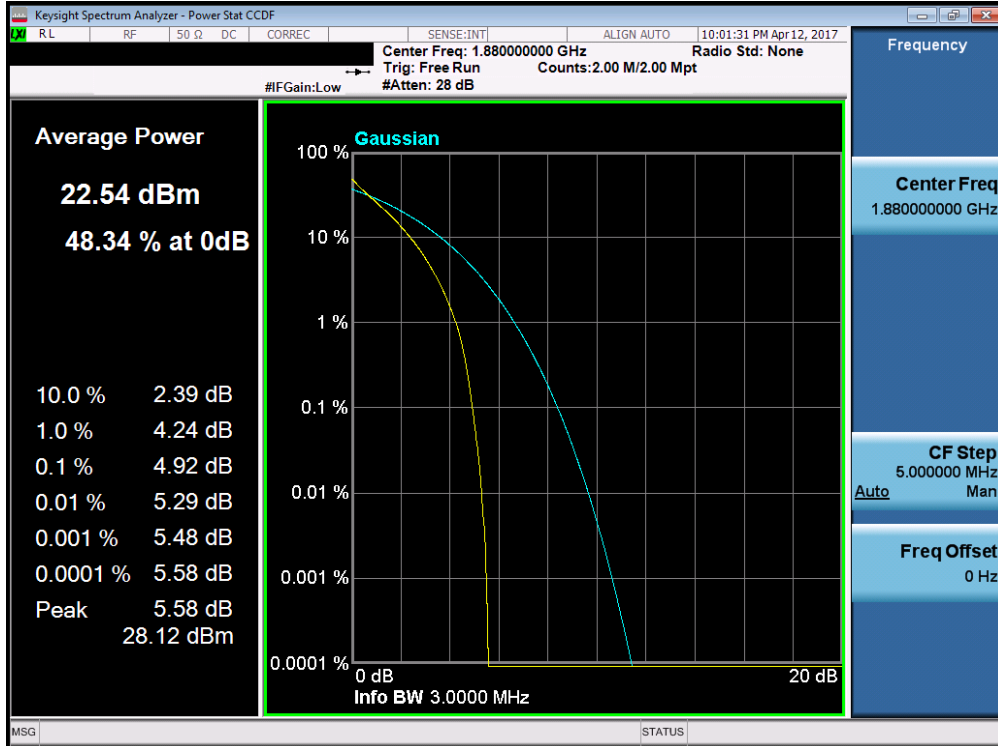


Plot 7-181. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

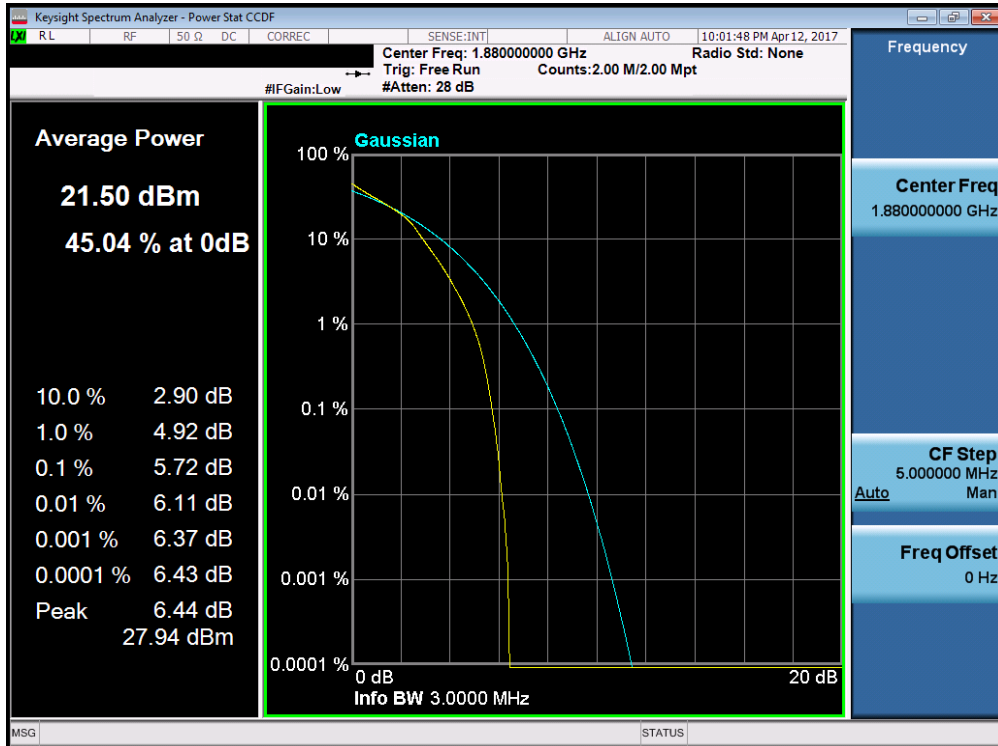


Plot 7-182. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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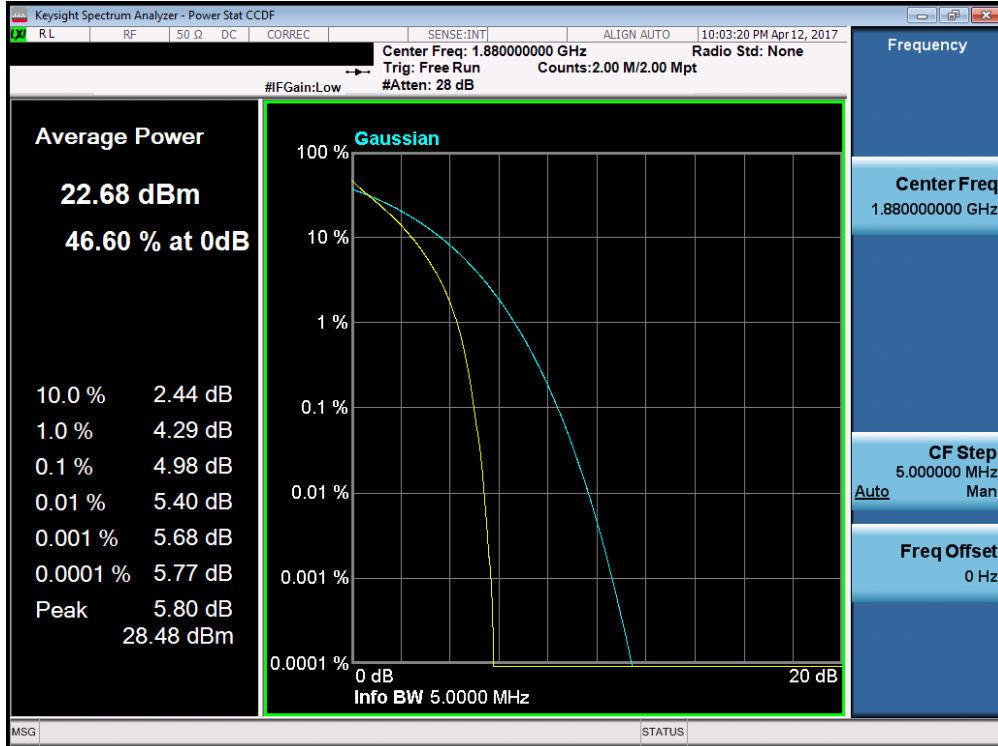


Plot 7-183. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

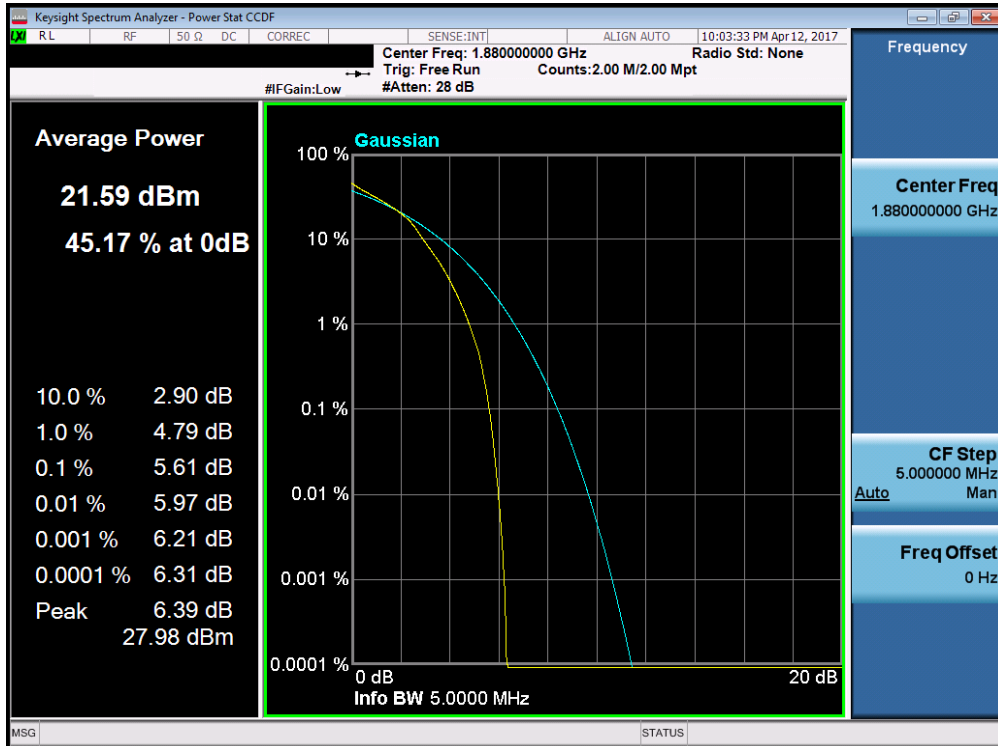


Plot 7-184. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 111 of 148

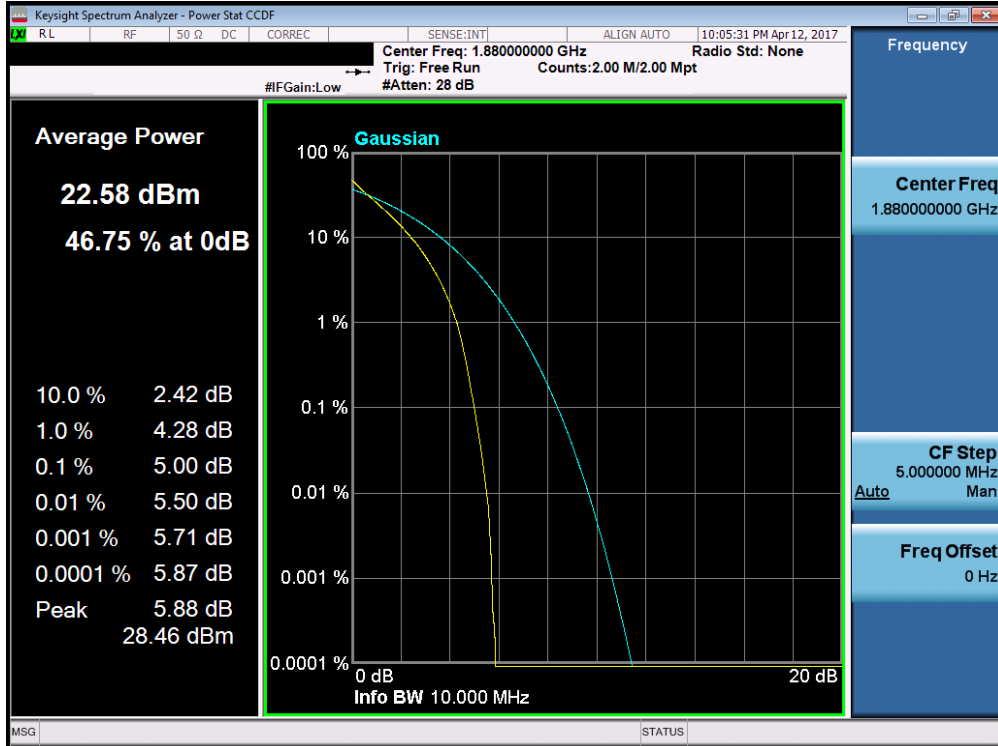


Plot 7-185. PAR Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

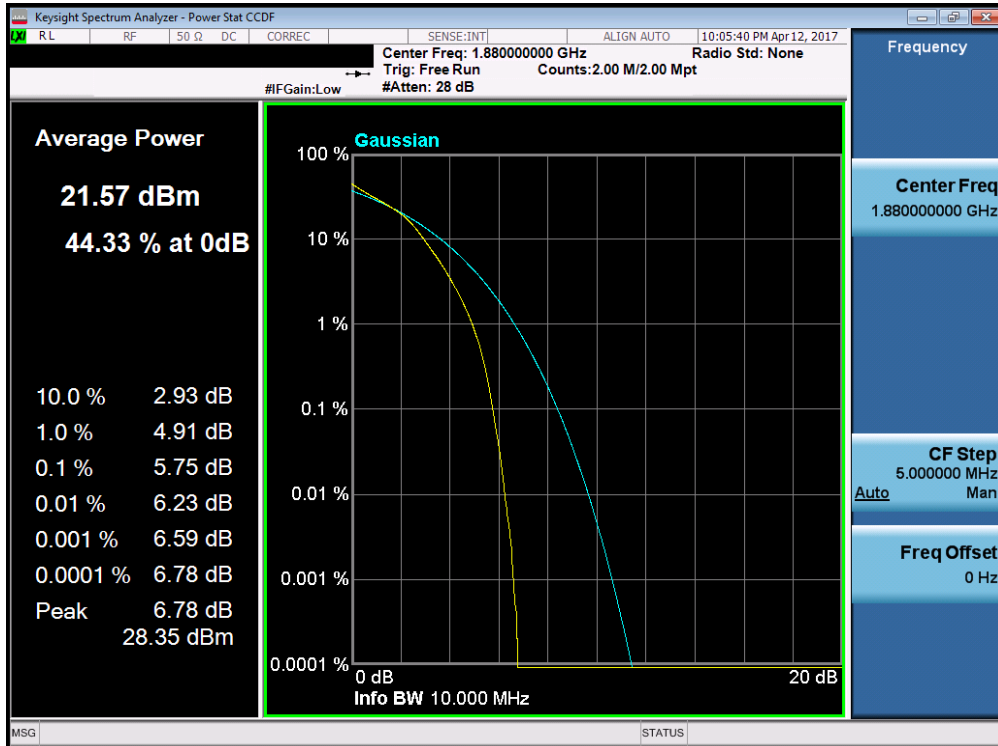


Plot 7-186. PAR Plot (Band 2 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 112 of 148

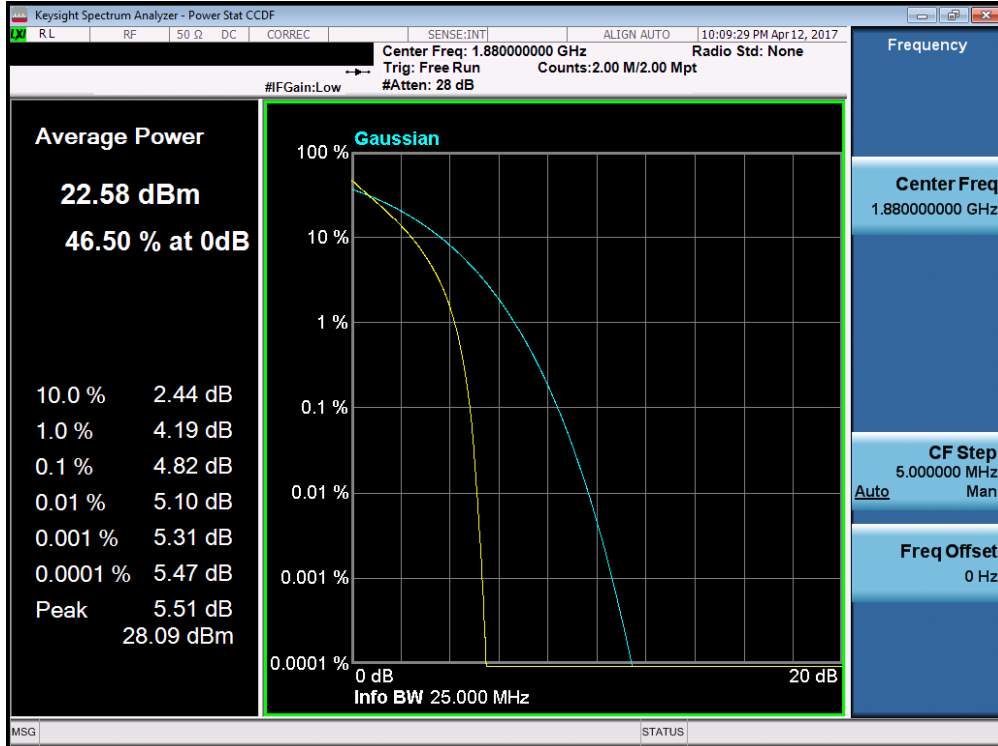


Plot 7-187. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

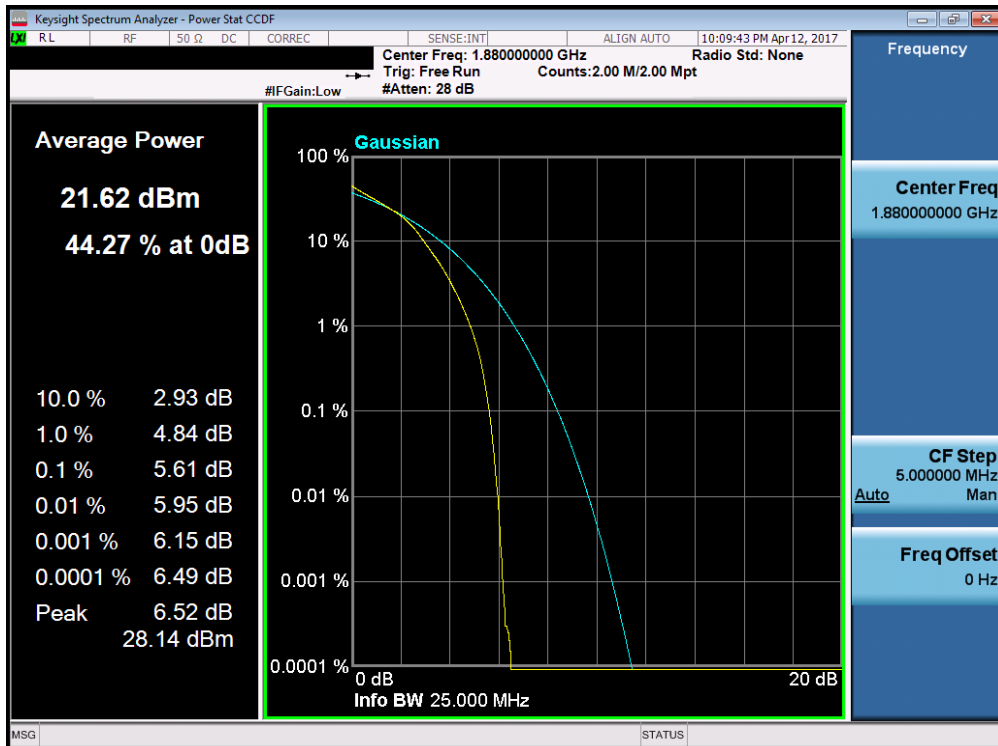


Plot 7-188. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 113 of 148

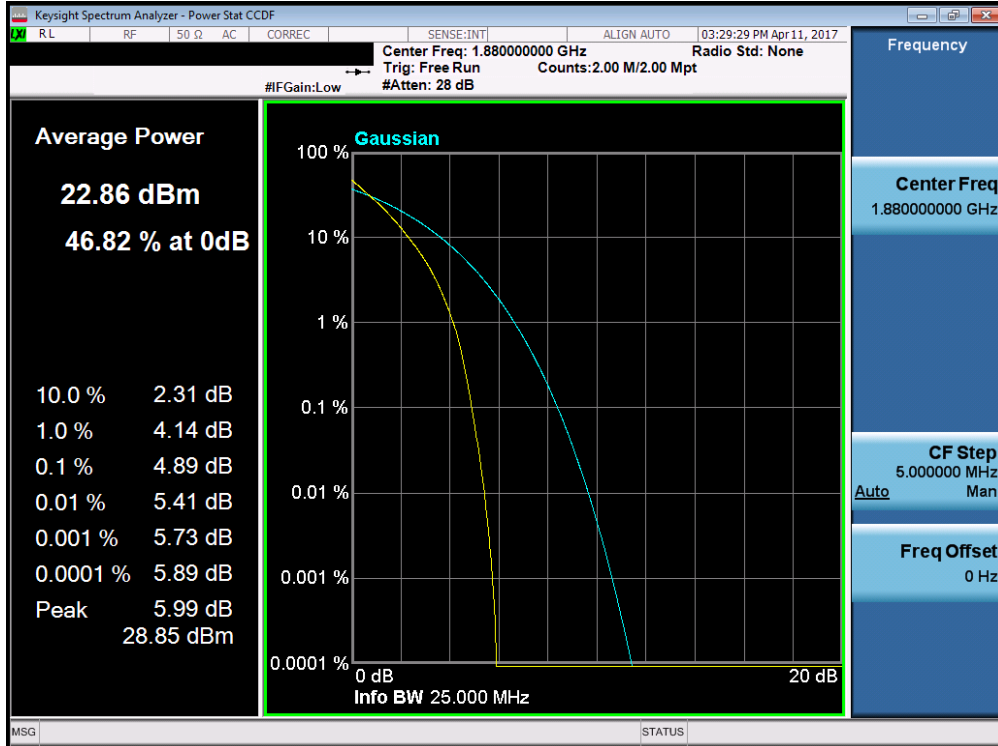


Plot 7-189. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

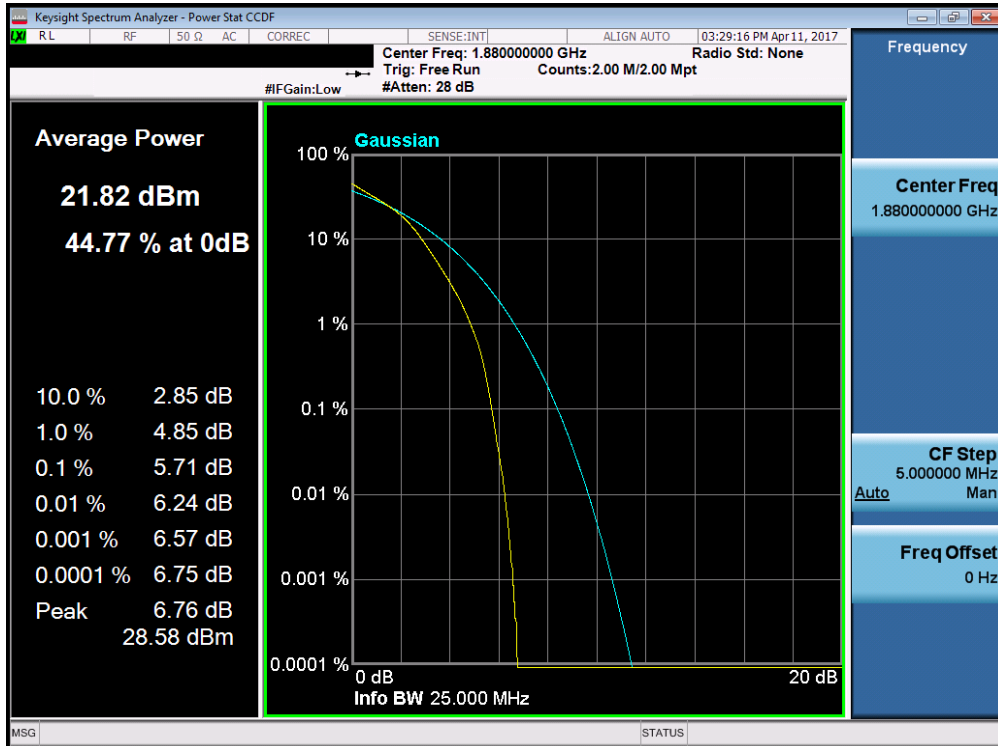


Plot 7-190. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-191. PAR Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



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

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 115 of 148

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.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ 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

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Test Setup

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

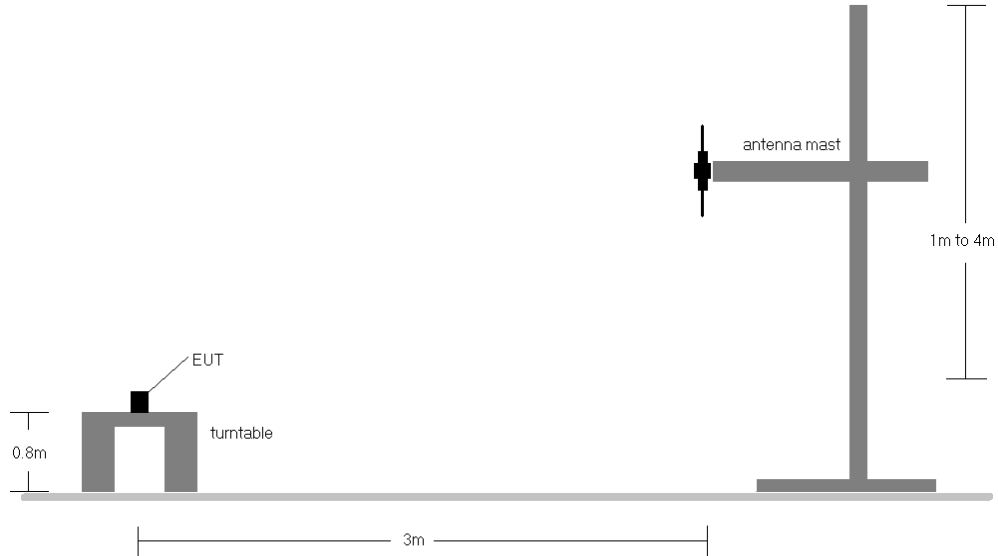


Figure 7-5. Radiated Test Setup <1GHz

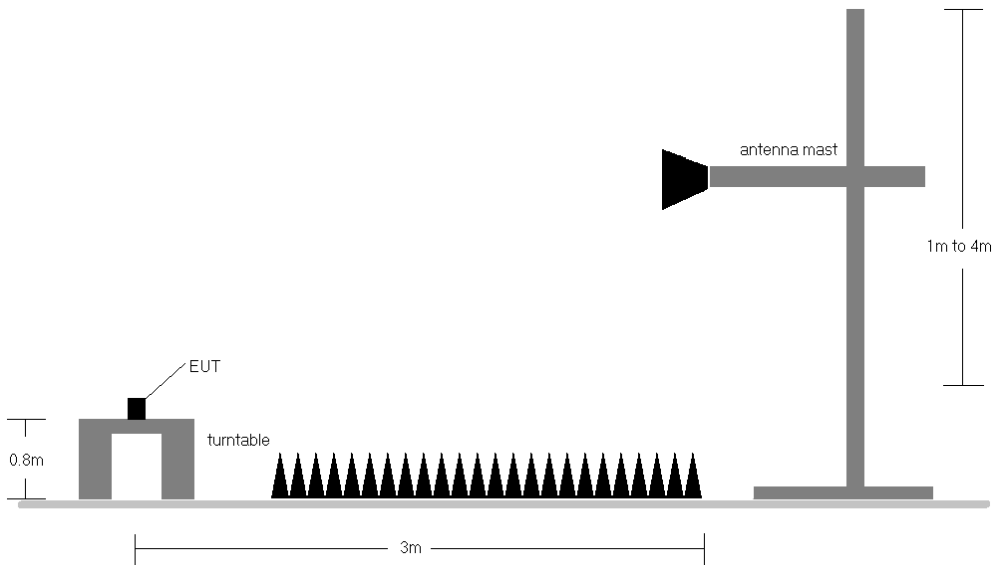




Figure 7-6. Radiated Test Setup >1GHz

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	121	287	1 / 5	15.21	2.48	17.69	34.77	-17.08
707.50	1.4	QPSK	H	125	291	1 / 0	15.74	2.56	18.30	34.77	-16.47
715.30	1.4	QPSK	H	125	287	1 / 0	15.19	2.60	17.79	34.77	-16.99
699.70	1.4	16-QAM	H	121	287	1 / 5	13.65	2.48	16.13	34.77	-18.64
707.50	1.4	16-QAM	H	125	291	1 / 0	14.69	2.56	17.25	34.77	-17.52
715.30	1.4	16-QAM	H	125	287	1 / 0	14.02	2.60	16.62	34.77	-18.16
700.50	3	QPSK	H	152	281	1 / 0	15.40	2.48	17.88	34.77	-16.89
707.50	3	QPSK	H	126	285	1 / 0	15.93	2.56	18.49	34.77	-16.28
714.50	3	QPSK	H	133	293	1 / 0	14.80	2.60	17.40	34.77	-17.37
700.50	3	16-QAM	H	152	281	1 / 0	14.29	2.48	16.77	34.77	-18.00
707.50	3	16-QAM	H	126	285	1 / 0	14.76	2.56	17.32	34.77	-17.45
714.50	3	16-QAM	H	133	293	1 / 0	13.19	2.60	15.79	34.77	-18.98

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	134	285	1 / 0	15.16	2.49	17.65	34.77	-17.12
707.50	5	QPSK	H	285	284	1 / 0	16.03	2.56	18.59	34.77	-16.18
713.50	5	QPSK	H	291	280	1 / 0	16.22	2.60	18.82	34.77	-15.95
701.50	5	16-QAM	H	134	285	1 / 0	14.08	2.49	16.57	34.77	-18.20
707.50	5	16-QAM	H	285	284	1 / 0	15.18	2.56	17.74	34.77	-17.03
713.50	5	16-QAM	H	291	280	1 / 0	14.95	2.60	17.55	34.77	-17.22
704.00	10	QPSK	H	294	290	1 / 49	15.91	2.51	18.42	34.77	-16.35
707.50	10	QPSK	H	289	295	1 / 49	16.07	2.56	18.63	34.77	-16.14
711.00	10	QPSK	H	296	281	1 / 49	15.98	2.60	18.58	34.77	-16.20
704.00	10	16-QAM	H	294	290	1 / 49	14.97	2.51	17.48	34.77	-17.29
707.50	10	16-QAM	H	289	295	1 / 49	15.20	2.56	17.76	34.77	-17.01
711.00	10	16-QAM	H	296	281	1 / 49	14.90	2.60	17.50	34.77	-17.28
713.50	5	QPSK	V	213	103	1 / 0	15.44	2.60	18.04	34.77	-16.73

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

FCC ID: ZNFM320G	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset	Page 118 of 148	


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	100	289	1 / 0	16.28	2.47	18.75	34.77	-16.02
782.00	5	QPSK	H	104	289	1 / 0	15.86	2.54	18.40	34.77	-16.37
784.50	5	QPSK	H	104	296	1 / 0	15.81	2.63	18.44	34.77	-16.33
779.50	5	16-QAM	H	100	289	1 / 0	15.19	2.47	17.66	34.77	-17.11
782.00	5	16-QAM	H	104	289	1 / 0	14.77	2.54	17.31	34.77	-17.46
784.50	5	16-QAM	H	104	296	1 / 0	14.80	2.63	17.43	34.77	-17.34
782.00	10	QPSK	H	100	277	1 / 0	16.28	2.54	18.82	34.77	-15.95
782.00	10	16-QAM	H	100	277	1 / 0	14.67	2.54	17.21	34.77	-17.56
782.00	10	QPSK	V	100	281	1 / 0	15.02	2.54	17.56	34.77	-17.21

Table 7-4. ERP Data (Band 13)

FCC ID: ZNFM320G	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1704040134-03-R1.ZNF	Test Dates: 3/29-4/17/2017	EUT Type: Portable Handset		Page 119 of 148

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	199	295	1 / 0	14.65	5.51	20.16	38.45	-18.29
836.50	1.4	QPSK	H	202	305	1 / 5	14.99	5.14	20.13	38.45	-18.32
848.30	1.4	QPSK	H	195	300	1 / 0	14.66	4.68	19.34	38.45	-19.11
824.70	1.4	16-QAM	H	199	295	1 / 0	13.53	5.51	19.04	38.45	-19.41
836.50	1.4	16-QAM	H	202	305	1 / 5	14.11	5.14	19.25	38.45	-19.20
848.30	1.4	16-QAM	H	195	300	1 / 0	13.66	4.68	18.34	38.45	-20.11
825.50	3	QPSK	H	195	300	1 / 14	14.78	5.52	20.30	38.45	-18.15
836.50	3	QPSK	H	206	298	1 / 14	14.87	5.14	20.01	38.45	-18.44
847.50	3	QPSK	H	211	304	1 / 0	14.60	4.67	19.27	38.45	-19.18
825.50	3	16-QAM	H	195	300	1 / 14	13.80	5.52	19.32	38.45	-19.13
836.50	3	16-QAM	H	206	298	1 / 14	13.73	5.14	18.87	38.45	-19.58
847.50	3	16-QAM	H	211	304	1 / 0	13.32	4.67	17.99	38.45	-20.46
826.50	5	QPSK	H	200	300	1 / 24	15.21	5.51	20.72	38.45	-17.73
836.50	5	QPSK	H	199	297	1 / 0	15.07	5.14	20.21	38.45	-18.24
846.50	5	QPSK	H	195	303	1 / 24	14.56	4.66	19.22	38.45	-19.23
826.50	5	16-QAM	H	200	300	1 / 24	14.32	5.51	19.83	38.45	-18.62
836.50	5	16-QAM	H	199	297	1 / 0	13.59	5.14	18.73	38.45	-19.72
846.50	5	16-QAM	H	195	303	1 / 24	13.15	4.66	17.81	38.45	-20.64
829.00	10	QPSK	H	202	300	1 / 49	15.19	5.49	20.68	38.45	-17.77
836.50	10	QPSK	H	200	313	1 / 0	15.20	5.14	20.34	38.45	-18.11
844.00	10	QPSK	H	200	299	1 / 0	14.66	4.70	19.36	38.45	-19.09
829.00	10	16-QAM	H	202	300	1 / 49	13.84	5.49	19.33	38.45	-19.12
836.50	10	16-QAM	H	200	313	1 / 0	14.27	5.14	19.41	38.45	-19.04
844.00	10	16-QAM	H	200	299	1 / 0	13.47	4.70	18.17	38.45	-20.28
826.50	5	QPSK	V	176	103	1 / 0	14.27	5.51	19.78	38.45	-18.67

Table 7-5. ERP Data (Band 5)

FCC ID: ZNFM320G	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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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	133	21	1 / 0	12.32	9.62	21.94	30.00	-8.06
1745.00	1.4	QPSK	H	126	36	1 / 5	12.07	9.50	21.57	30.00	-8.43
1779.30	1.4	QPSK	H	131	29	1 / 0	11.56	9.38	20.94	30.00	-9.06
1710.70	1.4	16-QAM	H	133	21	1 / 0	11.20	9.62	20.82	30.00	-9.18
1745.00	1.4	16-QAM	H	126	36	1 / 5	10.42	9.50	19.92	30.00	-10.08
1779.30	1.4	16-QAM	H	131	29	1 / 0	10.44	9.38	19.82	30.00	-10.18
1711.50	3	QPSK	H	129	28	1 / 0	12.39	9.62	22.01	30.00	-7.99
1745.00	3	QPSK	H	135	41	1 / 14	11.99	9.50	21.49	30.00	-8.51
1778.50	3	QPSK	H	130	35	1 / 0	11.60	9.39	20.99	30.00	-9.01
1711.50	3	16-QAM	H	129	28	1 / 0	11.10	9.62	20.72	30.00	-9.28
1745.00	3	16-QAM	H	135	41	1 / 14	10.36	9.50	19.86	30.00	-10.14
1778.50	3	16-QAM	H	130	35	1 / 0	10.39	9.39	19.78	30.00	-10.22
1712.50	5	QPSK	H	125	14	1 / 0	12.51	9.61	22.12	30.00	-7.88
1745.00	5	QPSK	H	125	14	1 / 24	12.03	9.50	21.53	30.00	-8.47
1777.50	5	QPSK	H	125	14	1 / 0	11.77	9.39	21.16	30.00	-8.84
1712.50	5	16-QAM	H	125	14	1 / 0	11.14	9.61	20.75	30.00	-9.25
1745.00	5	16-QAM	H	125	14	1 / 24	10.41	9.50	19.91	30.00	-10.09
1777.50	5	16-QAM	H	125	14	1 / 0	10.35	9.39	19.74	30.00	-10.26
1715.00	10	QPSK	H	124	8	1 / 0	12.06	9.60	21.66	30.00	-8.34
1745.00	10	QPSK	H	126	13	1 / 0	11.82	9.50	21.32	30.00	-8.68
1775.00	10	QPSK	H	127	7	1 / 0	11.93	9.41	21.34	30.00	-8.66
1715.00	10	16-QAM	H	124	8	1 / 0	10.69	9.60	20.29	30.00	-9.71
1745.00	10	16-QAM	H	126	13	1 / 0	10.57	9.50	20.07	30.00	-9.93
1775.00	10	16-QAM	H	127	7	1 / 0	10.53	9.41	19.94	30.00	-10.06
1717.50	15	QPSK	H	126	12	1 / 0	11.98	9.58	21.56	30.00	-8.44
1745.00	15	QPSK	H	131	11	1 / 0	11.88	9.50	21.38	30.00	-8.62
1772.50	15	QPSK	H	136	17	1 / 0	11.79	9.42	21.21	30.00	-8.79
1717.50	15	16-QAM	H	126	12	1 / 0	10.53	9.58	20.11	30.00	-9.89
1745.00	15	16-QAM	H	131	11	1 / 0	10.60	9.50	20.10	30.00	-9.90
1772.50	15	16-QAM	H	136	17	1 / 0	10.53	9.42	19.95	30.00	-10.05
1720.00	20	QPSK	H	140	8	1 / 0	11.82	9.57	21.39	30.00	-8.61
1745.00	20	QPSK	H	125	11	1 / 0	11.79	9.50	21.29	30.00	-8.71
1770.00	20	QPSK	H	133	13	1 / 0	11.68	9.43	21.11	30.00	-8.89
1720.00	20	16-QAM	H	140	8	1 / 0	10.61	9.57	20.18	30.00	-9.82
1745.00	20	16-QAM	H	125	11	1 / 0	10.54	9.50	20.04	30.00	-9.96
1770.00	20	16-QAM	H	133	13	1 / 0	10.46	9.43	19.89	30.00	-10.11
1712.50	5	QPSK	V	195	85	1 / 0	9.61	9.61	19.22	30.00	-10.78

Table 7-6. EIRP Data (Band 4/66)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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	100	0	1 / 3	15.51	9.12	24.63	33.01	-8.38
1880.00	1.4	QPSK	H	100	0	1 / 5	15.80	9.10	24.90	33.01	-8.11
1909.30	1.4	QPSK	H	100	0	1 / 3	15.81	9.16	24.97	33.01	-8.04
1850.70	1.4	16-QAM	H	100	0	1 / 3	13.75	9.12	22.87	33.01	-10.14
1880.00	1.4	16-QAM	H	100	0	1 / 5	14.30	9.10	23.40	33.01	-9.61
1909.30	1.4	16-QAM	H	100	0	1 / 3	14.54	9.16	23.70	33.01	-9.31
1851.50	3	QPSK	H	100	0	1 / 0	15.45	9.12	24.57	33.01	-8.44
1880.00	3	QPSK	H	100	0	1 / 0	15.91	9.10	25.01	33.01	-8.00
1908.50	3	QPSK	H	100	0	1 / 7	16.09	9.15	25.24	33.01	-7.77
1851.50	3	16-QAM	H	100	0	1 / 0	13.99	9.12	23.11	33.01	-9.90
1880.00	3	16-QAM	H	100	0	1 / 0	14.40	9.10	23.50	33.01	-9.51
1908.50	3	16-QAM	H	100	0	1 / 7	14.36	9.15	23.51	33.01	-9.50
1852.50	5	QPSK	H	100	0	1 / 0	15.59	9.12	24.71	33.01	-8.30
1880.00	5	QPSK	H	100	0	1 / 24	15.88	9.10	24.98	33.01	-8.03
1907.50	5	QPSK	H	100	0	1 / 12	16.02	9.15	25.17	33.01	-7.84
1852.50	5	16-QAM	H	100	0	1 / 0	13.58	9.12	22.70	33.01	-10.31
1880.00	5	16-QAM	H	100	0	1 / 24	14.11	9.10	23.21	33.01	-9.80
1907.50	5	16-QAM	H	100	0	1 / 12	14.37	9.15	23.52	33.01	-9.49
1855.00	10	QPSK	H	100	0	1 / 0	15.67	9.12	24.79	33.01	-8.22
1880.00	10	QPSK	H	100	0	1 / 49	15.84	9.10	24.94	33.01	-8.07
1905.00	10	QPSK	H	100	0	1 / 25	16.10	9.13	25.23	33.01	-7.78
1855.00	10	16-QAM	H	100	0	1 / 0	13.68	9.12	22.80	33.01	-10.21
1880.00	10	16-QAM	H	100	0	1 / 49	14.00	9.10	23.10	33.01	-9.91
1905.00	10	16-QAM	H	100	0	1 / 25	14.26	9.13	23.39	33.01	-9.62
1857.50	15	QPSK	H	100	0	1 / 0	15.55	9.11	24.66	33.01	-8.35
1880.00	15	QPSK	H	100	0	1 / 74	15.74	9.10	24.84	33.01	-8.17
1902.50	15	QPSK	H	100	0	1 / 37	15.90	9.11	25.01	33.01	-8.00
1857.50	15	16-QAM	H	100	0	1 / 0	13.42	9.11	22.53	33.01	-10.48
1880.00	15	16-QAM	H	100	0	1 / 74	13.89	9.10	22.99	33.01	-10.02
1902.50	15	16-QAM	H	100	0	1 / 37	14.20	9.11	23.31	33.01	-9.70
1860.00	20	QPSK	H	100	0	1 / 0	15.41	9.11	24.52	33.01	-8.49
1880.00	20	QPSK	H	100	0	1 / 99	15.59	9.10	24.69	33.01	-8.32
1900.00	20	QPSK	H	100	0	1 / 0	15.85	9.09	24.94	33.01	-8.07
1860.00	20	16-QAM	H	100	0	1 / 0	13.48	9.11	22.59	33.01	-10.42
1880.00	20	16-QAM	H	100	0	1 / 99	13.79	9.10	22.89	33.01	-10.12
1900.00	20	16-QAM	H	100	0	1 / 0	14.23	9.09	23.32	33.01	-9.69
1908.50	3	QPSK	V	226	135	1 / 0	13.57	9.15	22.72	33.01	-10.29

Table 7-7. EIRP Data (Band 2)

FCC ID: ZNFM320G	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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]
2502.50	5	QPSK	H	100	209	1 / 12	13.48	8.42	21.90	33.01	-11.11
2535.00	5	QPSK	H	100	203	1 / 0	13.38	8.50	21.88	33.01	-11.13
2567.50	5	QPSK	H	100	210	1 / 12	13.26	8.59	21.85	33.01	-11.16
2502.50	5	16-QAM	H	100	209	1 / 12	11.73	8.42	20.15	33.01	-12.86
2535.00	5	16-QAM	H	100	203	1 / 0	11.75	8.50	20.25	33.01	-12.76
2567.50	5	16-QAM	H	100	210	1 / 12	11.79	8.59	20.38	33.01	-12.63
2505.00	10	QPSK	H	100	200	1 / 49	13.48	8.42	21.90	33.01	-11.11
2535.00	10	QPSK	H	100	209	1 / 25	13.35	8.50	21.85	33.01	-11.16
2565.00	10	QPSK	H	100	205	1 / 49	12.98	8.58	21.56	33.01	-11.45
2505.00	10	16-QAM	H	100	200	1 / 49	12.39	8.42	20.81	33.01	-12.20
2535.00	10	16-QAM	H	100	209	1 / 25	11.65	8.50	20.15	33.01	-12.86
2565.00	10	16-QAM	H	100	205	1 / 49	11.36	8.58	19.94	33.01	-13.07
2507.50	15	QPSK	H	100	213	1 / 0	13.48	8.43	21.91	33.01	-11.10
2535.00	15	QPSK	H	100	206	1 / 37	13.38	8.50	21.88	33.01	-11.13
2562.50	15	QPSK	H	100	197	1 / 0	13.14	8.57	21.71	33.01	-11.30
2507.50	15	16-QAM	H	100	213	1 / 0	12.56	8.43	20.99	33.01	-12.02
2535.00	15	16-QAM	H	100	206	1 / 37	12.42	8.50	20.92	33.01	-12.09
2562.50	15	16-QAM	H	100	197	1 / 0	12.50	8.57	21.07	33.01	-11.94
2510.00	20	QPSK	H	100	206	1 / 99	13.90	8.44	22.34	33.01	-10.67
2535.00	20	QPSK	H	100	200	1 / 0	13.39	8.50	21.89	33.01	-11.12
2560.00	20	QPSK	H	100	200	1 / 50	13.26	8.57	21.83	33.01	-11.18
2510.00	20	16-QAM	H	100	206	1 / 99	13.20	8.44	21.64	33.01	-11.37
2535.00	20	16-QAM	H	100	200	1 / 0	11.97	8.50	20.47	33.01	-12.54
2560.00	20	16-QAM	H	100	200	1 / 50	12.25	8.57	20.82	33.01	-12.19
2510.00	20	QPSK	V	165	81	1 / 0	12.04	8.44	20.48	33.01	-12.53

Table 7-8. EIRP Data (Band 7)

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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 $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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The EUT and measurement equipment were set up as shown in the diagram below.

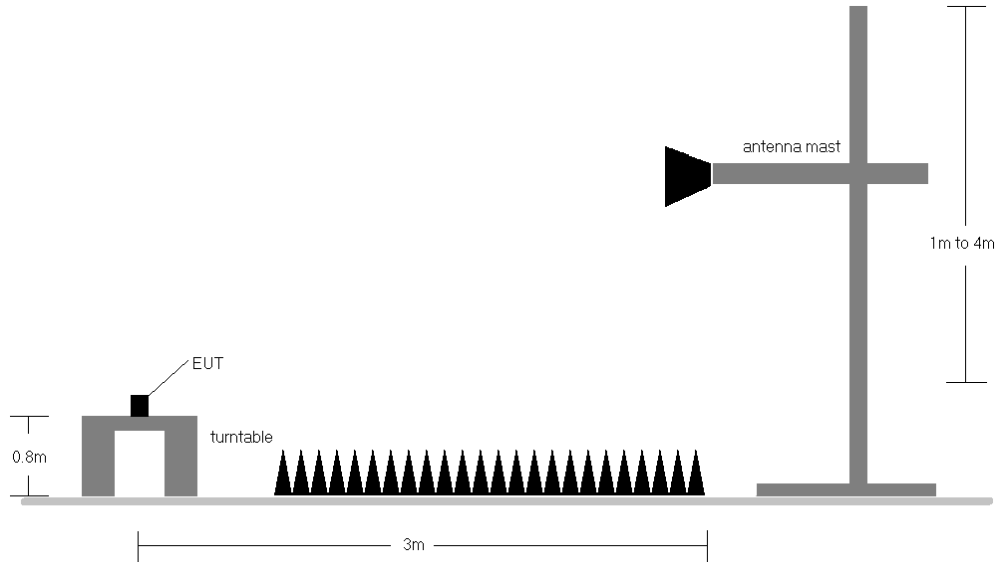



Figure 7-7. Test Instrument & Measurement Setup

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.

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OPERATING FREQUENCY: 701.50 MHz
 CHANNEL: 23035
 MEASURED OUTPUT POWER: 17.65 dBm = 0.058 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 30.65 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	214	-67.25	5.92	-61.33	79.0
2104.50	H	100	132	-69.43	6.80	-62.63	80.3
2806.00	H	-	-	-72.18	8.12	-64.06	81.7
3507.50	H	-	-	-68.80	7.74	-61.05	78.7

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

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 MEASURED OUTPUT POWER: 18.59 dBm = 0.072 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 31.59 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	307	-64.56	5.96	-58.59	77.2
2122.50	H	100	55	-69.98	6.84	-63.13	81.7
2830.00	H	-	-	-70.89	8.13	-62.76	81.3
3537.50	H	-	-	-69.12	7.79	-61.33	79.9

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

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 713.50 MHz
 CHANNEL: 23155
 MEASURED OUTPUT POWER: 18.82 dBm = 0.076 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 31.82 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	307	-66.93	6.01	-60.92	79.7
2140.50	H	100	55	-70.25	6.89	-63.36	82.2
2854.00	H	-	-	-71.75	8.15	-63.60	82.4
3567.50	H	-	-	-68.25	7.84	-60.41	79.2

Table 7-11. Radiated Spurious Data (Band 12/17 – High Channel)

OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MEASURED OUTPUT POWER: 18.82 dBm = 0.076 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 31.82 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	-	-	-71.73	7.00	-64.73	83.6
3128.00	H	-	-	-68.28	7.21	-61.07	79.9

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

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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	-	-	-74.84	6.41	-68.43	-28.4

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

OPERATING FREQUENCY: 826.50 MHz
 CHANNEL: 20425
 MEASURED OUTPUT POWER: 20.72 dBm = 0.118 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.72 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	-	-	-72.69	6.28	-66.41	87.1
2479.50	H	100	265	-66.75	6.84	-59.90	80.6
3306.00	H	-	-	-66.84	7.14	-59.69	80.4
4132.50	H	-	-	-66.53	7.74	-58.79	79.5

Table 7-14. Radiated Spurious Data (Band 5 – Low Channel)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MEASURED OUTPUT POWER: 20.21 dBm = 0.105 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.21 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	-	-	-73.73	6.21	-67.52	87.7
2509.50	H	100	18	-42.76	6.86	-35.90	56.1
3346.00	H	-	-	-67.47	7.26	-60.20	80.4
4182.50	H	-	-	-67.06	8.07	-58.99	79.2

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

OPERATING FREQUENCY: 846.50 MHz
 CHANNEL: 20625
 MEASURED OUTPUT POWER: 19.22 dBm = 0.084 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 32.22 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	-	-	-73.93	6.14	-67.79	87.0
2539.50	H	101	21	-39.13	6.95	-32.18	51.4
3386.00	H	-	-	-67.81	7.38	-60.43	79.7
4232.50	H	-	-	-67.96	8.34	-59.63	78.9

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

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1712.50 MHz
 CHANNEL: 19975
 MEASURED OUTPUT POWER: 22.12 dBm = 0.163 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 35.12 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]
3425.00	H	110	21	-53.11	9.65	-43.46	65.6
5137.50	H	-	-	-66.85	10.91	-55.94	78.1
6850.00	H	-	-	-60.16	10.78	-49.38	71.5

Table 7-17. Radiated Spurious Data (Band 4/66 – Low Channel)

OPERATING FREQUENCY: 1745.00 MHz
 CHANNEL: 132322
 MEASURED OUTPUT POWER: 21.53 dBm = 0.142 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 34.53 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	102	67	-59.51	9.77	-49.73	71.3
5235.00	H	-	-	-66.91	10.81	-56.10	77.6
6980.00	H	-	-	-60.27	10.89	-49.39	70.9

Table 7-18. Radiated Spurious Data (Band 4/66 – Mid Channel)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1777.50 MHz
 CHANNEL: 132647
 MEASURED OUTPUT POWER: 21.16 dBm = 0.131 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 34.16 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]
3555.00	H	100	26	-54.40	9.89	-44.52	65.7
5332.50	H	-	-	-66.35	10.92	-55.42	76.6
7110.00	H	-	-	-61.02	11.06	-49.96	71.1

Table 7-19. Radiated Spurious Data (Band 4/66 – High Channel)

OPERATING FREQUENCY: 1851.50 MHz
 CHANNEL: 18615
 MEASURED OUTPUT POWER: 24.57 dBm = 0.286 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.57 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	-	-	-68.99	10.02	-58.97	83.5
5554.50	H	-	-	-66.88	11.19	-55.69	80.3

Table 7-20. Radiated Spurious Data (Band 2 – Low Channel)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MEASURED OUTPUT POWER: 25.01 dBm = 0.317 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 38.01 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]
3760.00	H	-	-	-68.43	9.79	-58.64	83.7
5640.00	H	-	-	-67.26	11.35	-55.91	80.9

Table 7-21. Radiated Spurious Data (Band 2 – Mid Channel)

OPERATING FREQUENCY: 1908.50 MHz
 CHANNEL: 19185
 MEASURED OUTPUT POWER: 25.24 dBm = 0.335 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 38.24 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]
3817.00	H	-	-	-67.57	9.57	-58.00	83.2
5725.50	H	-	-	-66.52	11.43	-55.09	80.3

Table 7-22. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 2510.00 MHz
 CHANNEL: 20850
 MEASURED OUTPUT POWER: 22.34 dBm = 0.171 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 47.34 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]
5020.00	H	-	-	-68.30	11.15	-57.15	79.5
7530.00	H	-	-	-60.20	11.25	-48.95	71.3

Table 7-23. Radiated Spurious Data (Band 7 – Low Channel)

OPERATING FREQUENCY: 2535.00 MHz
 CHANNEL: 21100
 MEASURED OUTPUT POWER: 21.89 dBm = 0.155 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 46.89 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]
5070.00	H	-	-	-67.39	11.04	-56.35	78.2
7605.00	H	-	-	-60.48	11.47	-49.01	70.9



Table 7-24. Radiated Spurious Data (Band 7 – Mid Channel)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 2560.00 MHz
 CHANNEL: 21350
 MEASURED OUTPUT POWER: 21.83 dBm = 0.152 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 46.83 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]
5120.00	H	-	-	-67.33	10.94	-56.39	78.2
7680.00	H	-	-	-61.31	11.54	-49.77	71.6

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

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved 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 ±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)	707,500,115	115	0.0000163
100 %		- 30	707,499,896	-104	-0.0000147
100 %		- 20	707,500,005	5	0.0000007
100 %		- 10	707,500,213	213	0.0000301
100 %		0	707,499,985	-15	-0.0000021
100 %		+ 10	707,499,990	-10	-0.0000014
100 %		+ 20	707,500,258	258	0.0000365
100 %		+ 30	707,500,330	330	0.0000466
100 %		+ 40	707,500,067	67	0.0000095
100 %		+ 50	707,499,990	-10	-0.0000014
BATT. ENDPOINT	3.45	+ 20	707,500,096	96	0.0000136

Table 7-26. 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.

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Band 12/17 Frequency Stability Measurements
§2.1055 §27.54

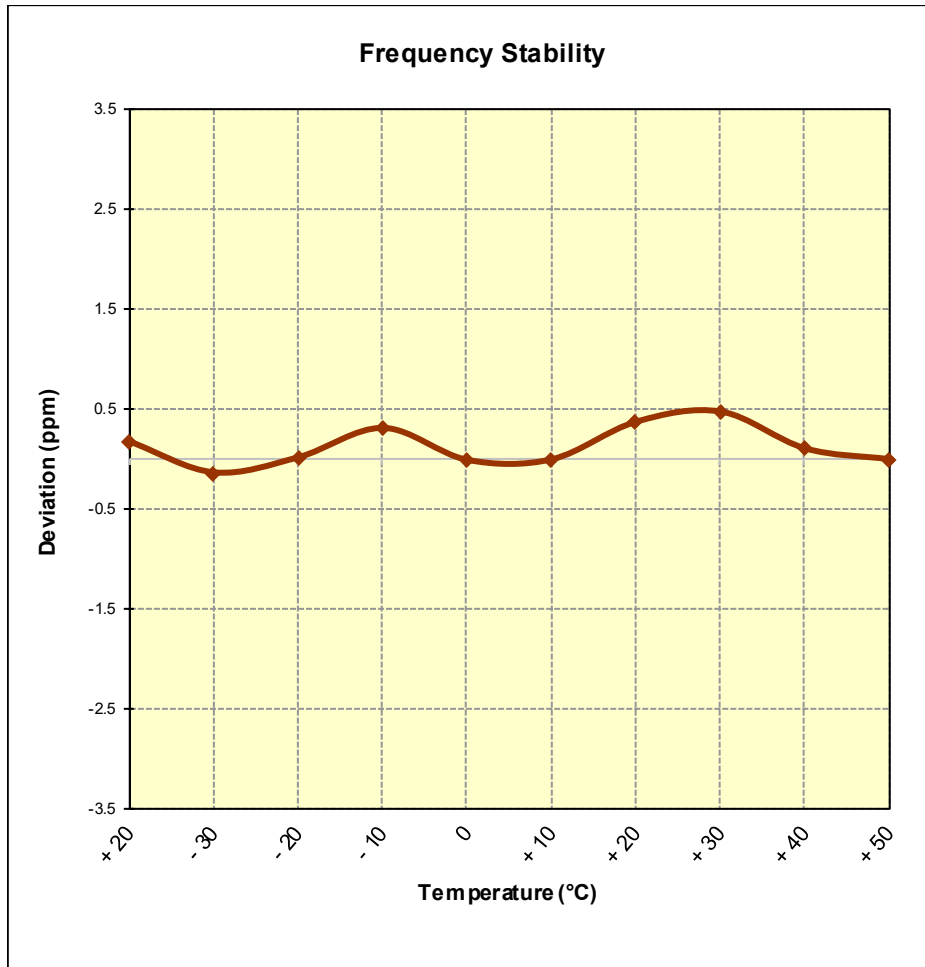


Figure 7-8. Frequency Stability Graph (Band 12/17)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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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)	782,000,010	10	0.000013
100 %		- 30	781,999,940	-60	-0.0000077
100 %		- 20	781,999,991	-9	-0.0000012
100 %		- 10	782,000,013	13	0.0000017
100 %		0	781,999,789	-211	-0.0000270
100 %		+ 10	782,000,239	239	0.0000306
100 %		+ 20	781,999,792	-208	-0.0000266
100 %		+ 30	782,000,072	72	0.0000092
100 %		+ 40	782,000,110	110	0.0000141
100 %		+ 50	782,000,282	282	0.0000361
BATT. ENDPOINT	3.45	+ 20	781,999,912	-88	-0.0000113

Table 7-27. 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.

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 13 Frequency Stability Measurements
§2.1055 §27.54

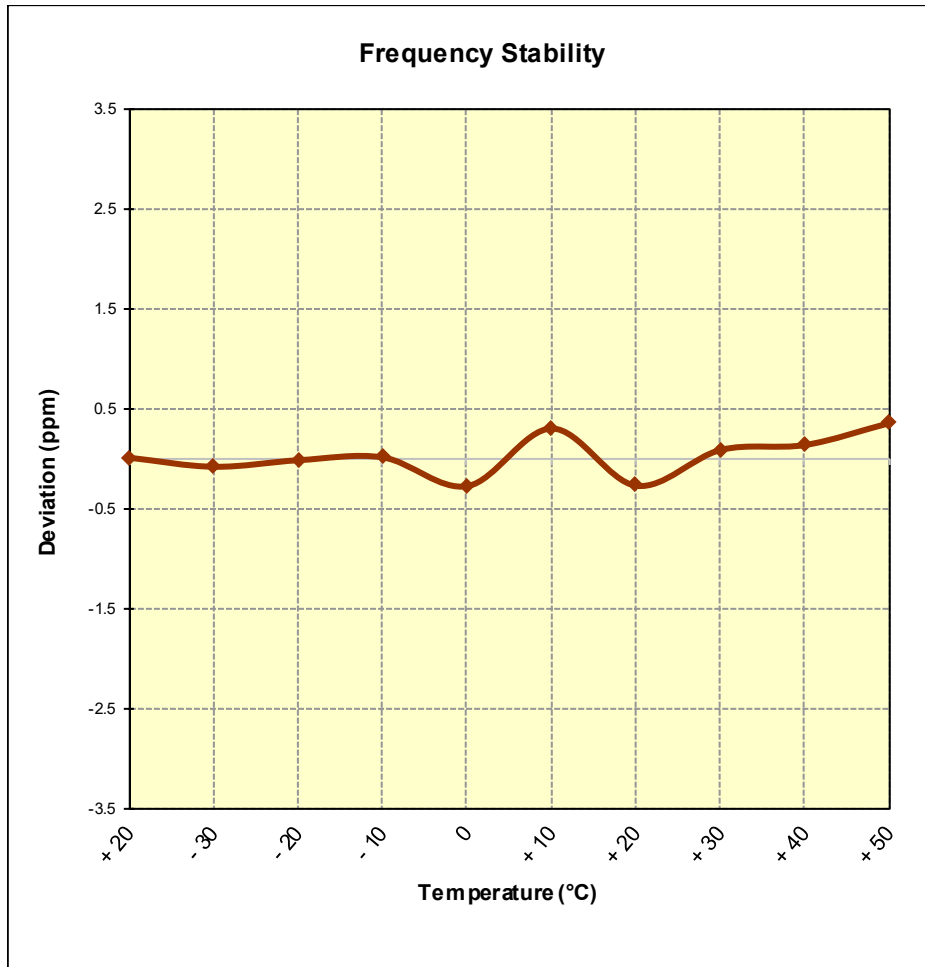


Figure 7-9. Frequency Stability Graph (Band 13)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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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)	836,500,104	104	0.0000124
100 %		- 30	836,500,142	142	0.0000170
100 %		- 20	836,500,083	83	0.0000099
100 %		- 10	836,500,015	15	0.0000018
100 %		0	836,499,927	-73	-0.0000087
100 %		+ 10	836,499,984	-16	-0.0000019
100 %		+ 20	836,499,611	-389	-0.0000465
100 %		+ 30	836,499,771	-229	-0.0000274
100 %		+ 40	836,500,117	117	0.0000140
100 %		+ 50	836,500,167	167	0.0000200
BATT. ENDPOINT	3.45	+ 20	836,500,238	238	0.0000285

Table 7-28. Frequency Stability Data (Band 5)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 5 Frequency Stability Measurements
§2.1055 §22.355

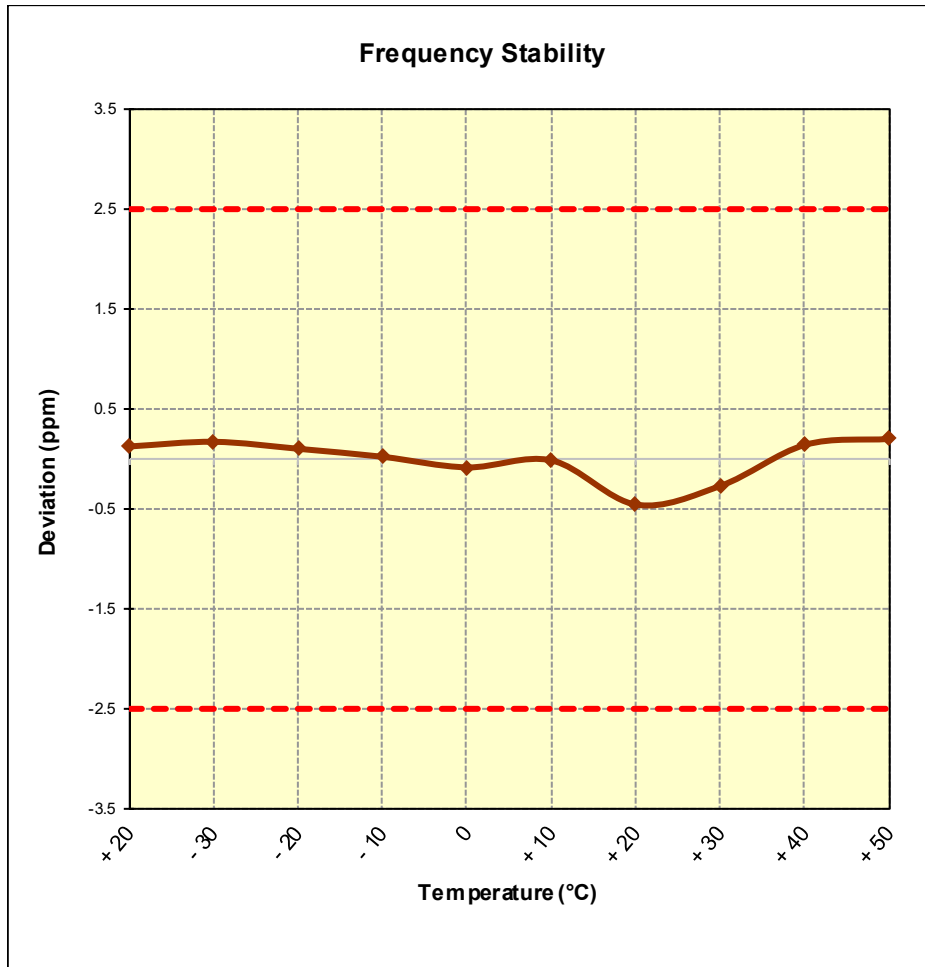


Figure 7-10. Frequency Stability Graph (Band 5)

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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)	1,744,999,887	-113	-0.0000065
100 %		- 30	1,745,000,011	11	0.0000006
100 %		- 20	1,744,999,833	-167	-0.0000096
100 %		- 10	1,745,000,039	39	0.0000022
100 %		0	1,745,000,116	116	0.0000066
100 %		+ 10	1,745,000,019	19	0.0000011
100 %		+ 20	1,744,999,797	-203	-0.0000116
100 %		+ 30	1,745,000,074	74	0.0000042
100 %		+ 40	1,745,000,083	83	0.0000048
100 %		+ 50	1,745,000,029	29	0.0000017
BATT. ENDPOINT	3.45	+ 20	1,745,000,351	351	0.0000201

Table 7-29. 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.

FCC ID: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 4/66 Frequency Stability Measurements
§2.1055 §§27.54

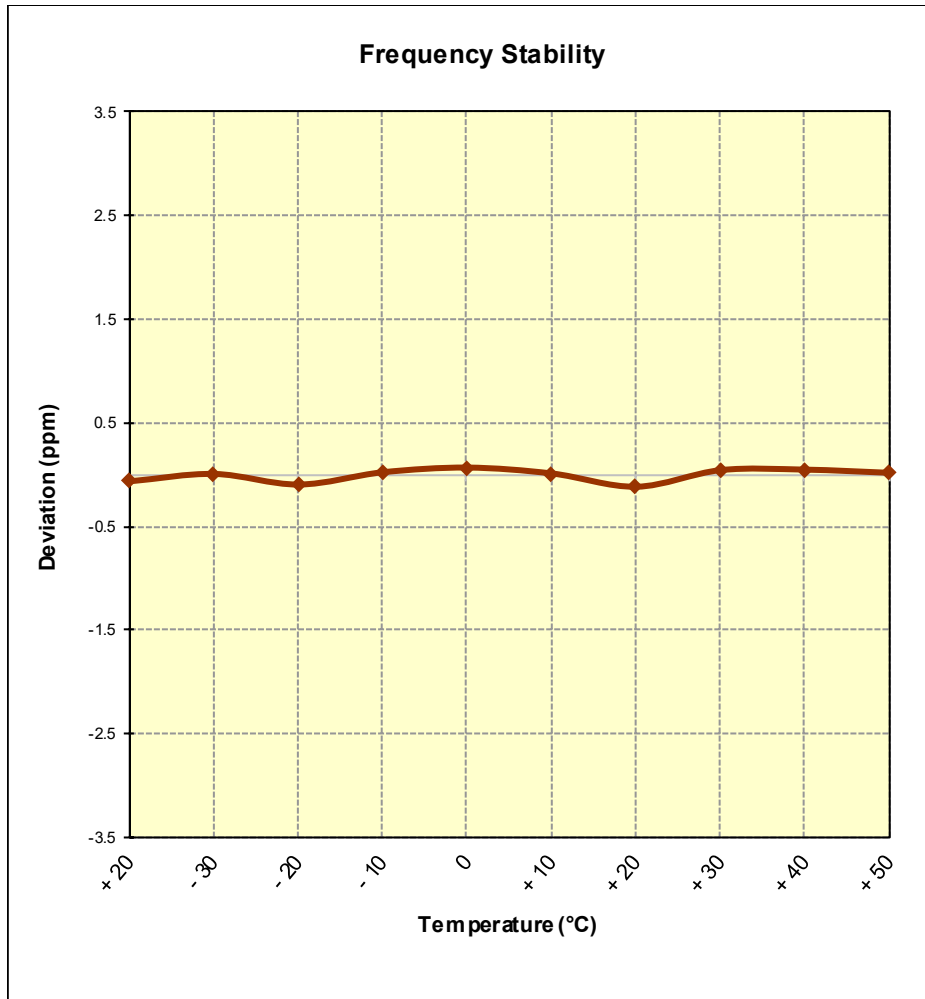


Figure 7-11. Frequency Stability Graph (Band 4/66)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Band 2 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY: 1,880,000,000 Hz
 CHANNEL: 18900
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,742	-258	-0.0000137
100 %		- 30	1,879,999,884	-116	-0.0000062
100 %		- 20	1,880,000,029	29	0.0000015
100 %		- 10	1,879,999,874	-126	-0.0000067
100 %		0	1,880,000,047	47	0.0000025
100 %		+ 10	1,880,000,110	110	0.0000059
100 %		+ 20	1,879,999,557	-443	-0.0000236
100 %		+ 30	1,880,000,130	130	0.0000069
100 %		+ 40	1,879,999,827	-173	-0.0000092
100 %		+ 50	1,879,999,719	-281	-0.0000149
BATT. ENDPOINT	3.45	+ 20	1,879,999,998	-2	-0.0000001

Table 7-30. Frequency Stability Data (Band 2)

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: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 2 Frequency Stability Measurements
§2.1055 §24.235

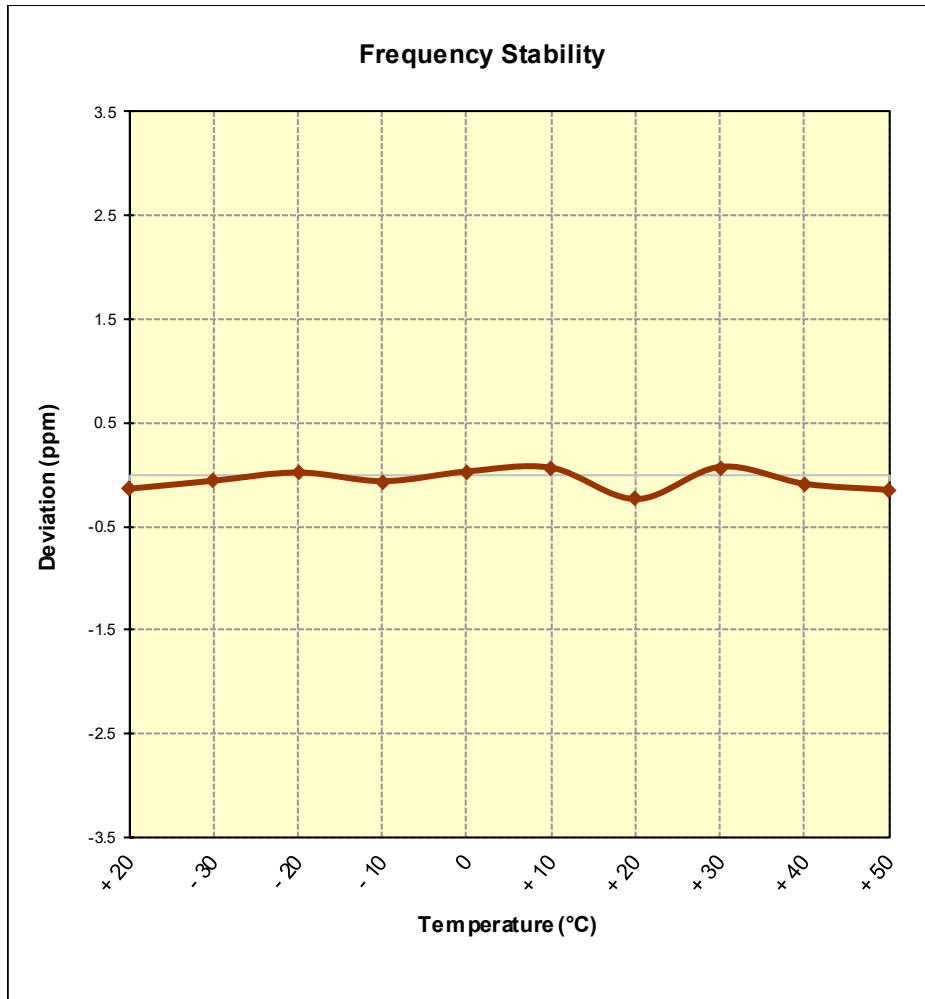



Figure 7-12. Frequency Stability Graph (Band 2)

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Band 7 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY: 2,535,000,000 Hz
 CHANNEL: 21100
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,535,000,071	71	0.0000028
100 %		- 30	2,534,999,976	-24	-0.0000009
100 %		- 20	2,534,999,697	-303	-0.0000120
100 %		- 10	2,534,999,827	-173	-0.0000068
100 %		0	2,535,000,193	193	0.0000076
100 %		+ 10	2,535,000,004	4	0.0000002
100 %		+ 20	2,534,999,892	-108	-0.0000043
100 %		+ 30	2,534,999,772	-228	-0.0000090
100 %		+ 40	2,534,999,963	-37	-0.0000015
100 %		+ 50	2,535,000,274	274	0.0000108
BATT. ENDPOINT	3.45	+ 20	2,535,000,143	143	0.0000056

Table 7-31. Frequency Stability Data (Band 7)

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: ZNFM320G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 7 Frequency Stability Measurements
§2.1055 §27.54

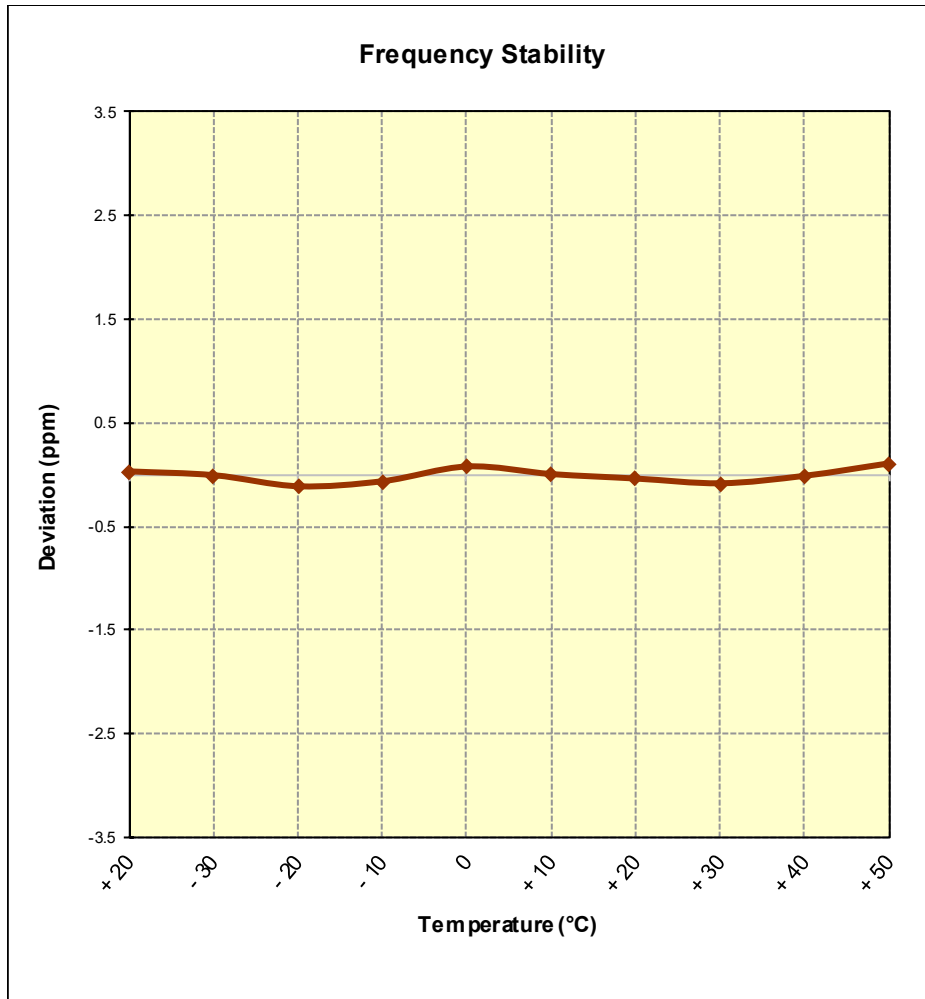



Figure 7-13. Frequency Stability Graph (Band 7)

FCC ID: ZNFM320G	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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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: ZNFM320G** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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