

7.4 Band Edge Emissions at Antenna Terminal

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

Test Overview

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

The minimum permissible attenuation level for Band 41 is as noted in the Test Notes on the following page.

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

Test Procedure Used

KDB 971168 D01 v02r02 – Section 6.0

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW \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.

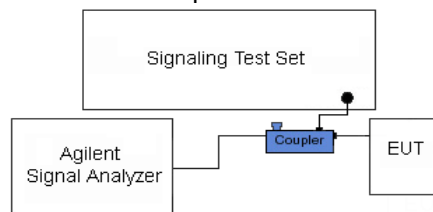




Figure 7-3. Test Instrument & Measurement Setup

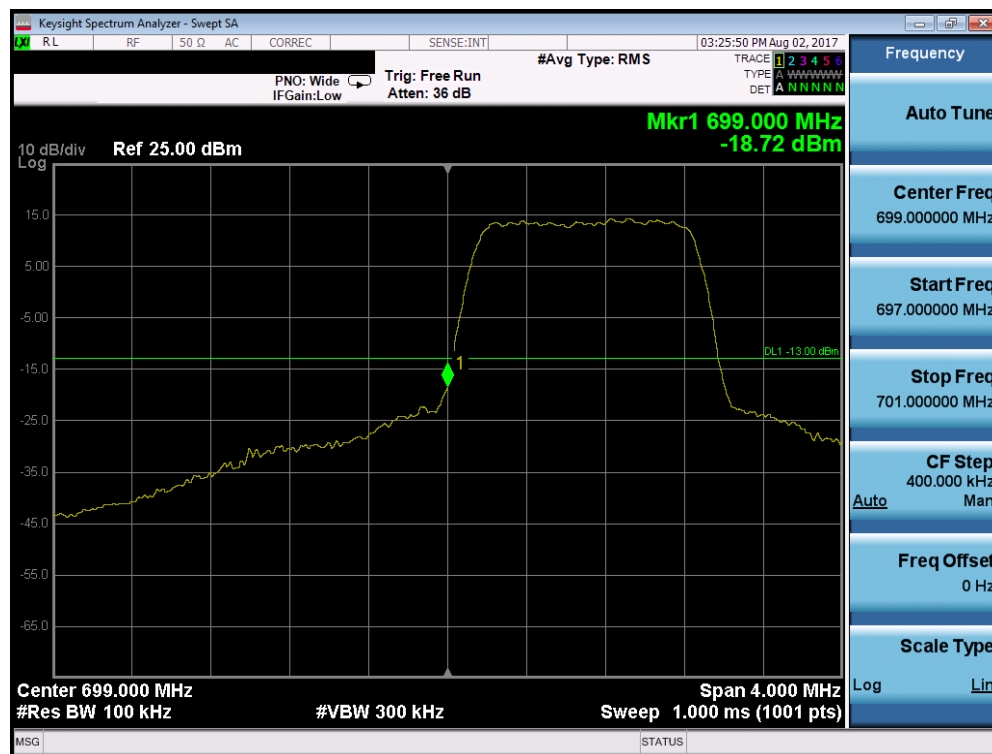
FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 67 of 151

Test Notes



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

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

Per 27.53(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 than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz.

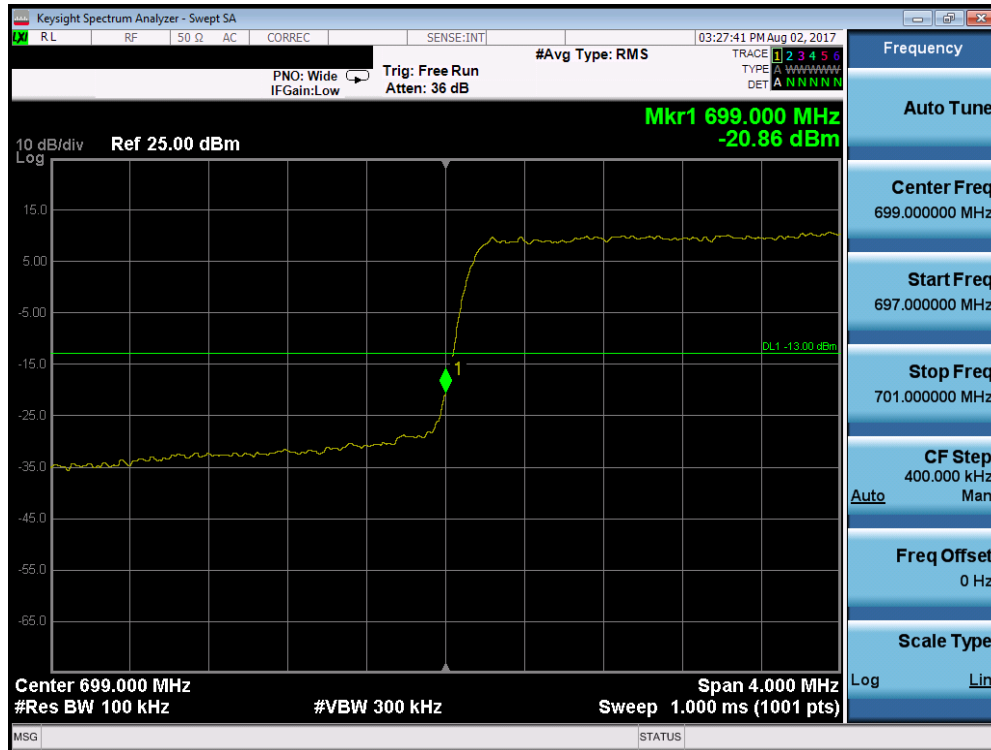


Plot 7-96. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 68 of 151



Plot 7-97. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

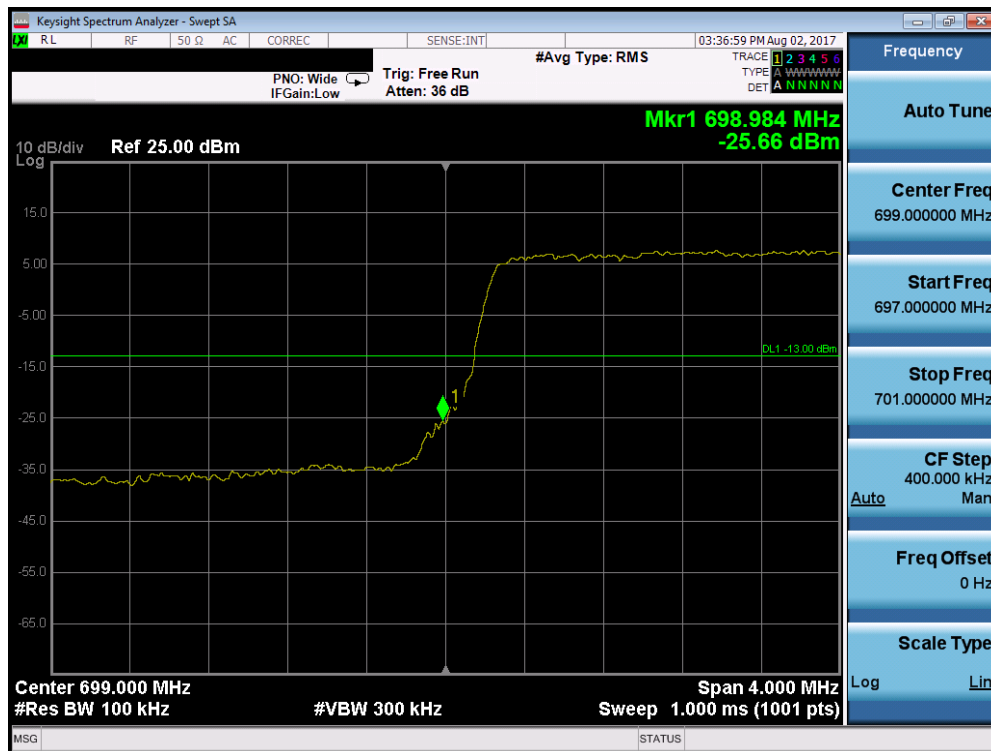


Plot 7-98. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 69 of 151

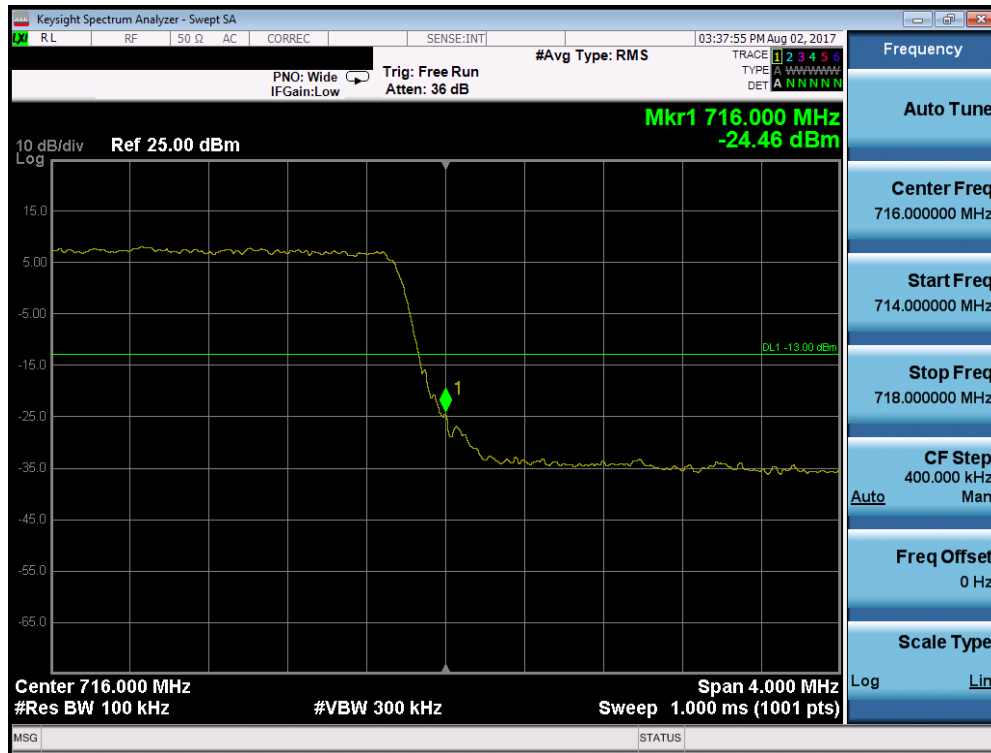


Plot 7-99. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

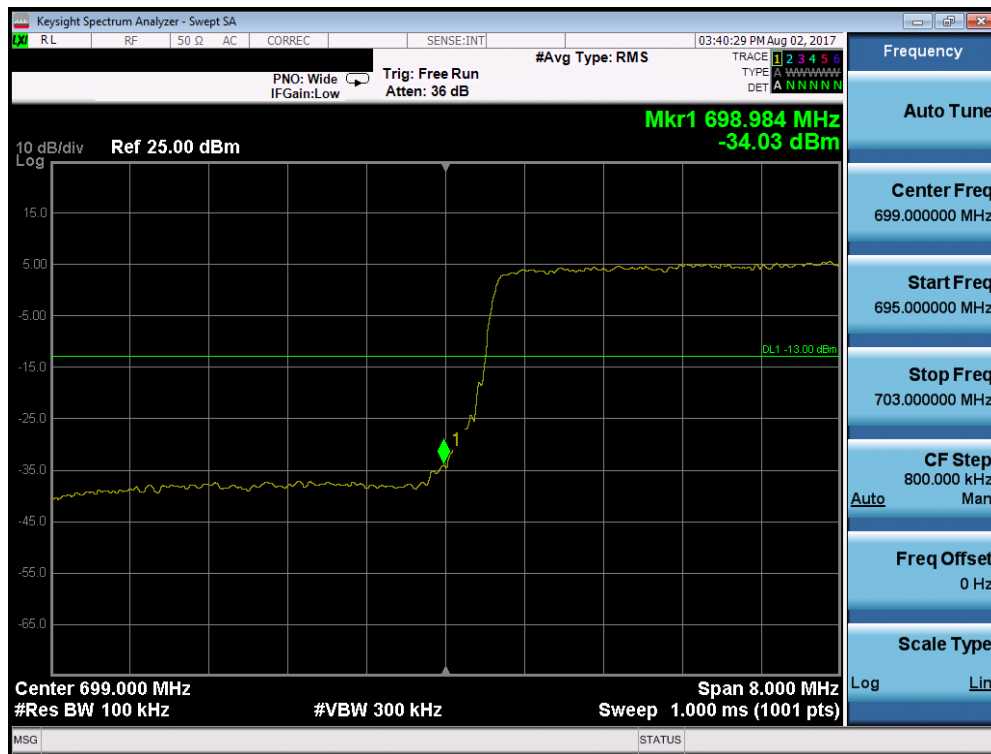




Plot 7-100. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 70 of 151

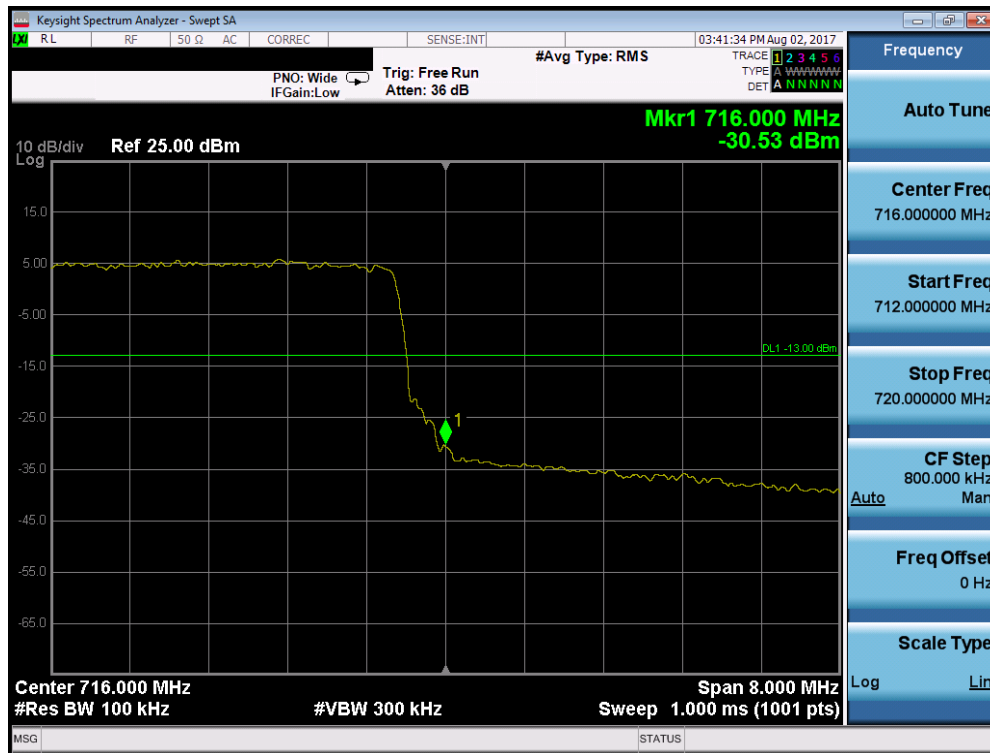


Plot 7-101. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)





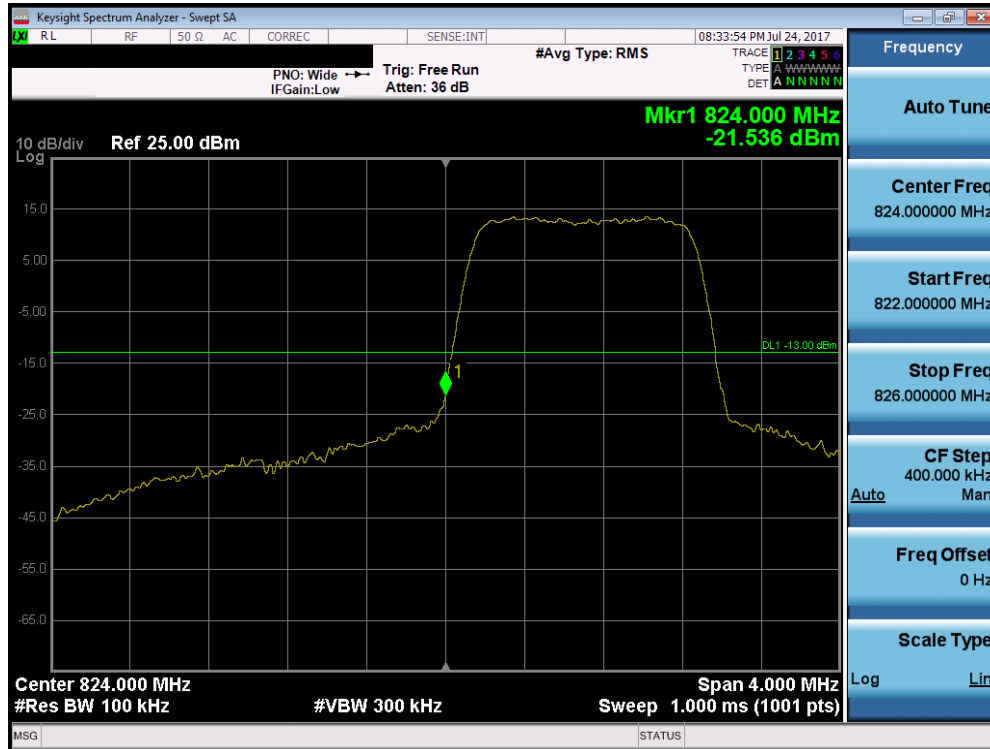
FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 71 of 151

Plot 7-102. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 7-103. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 72 of 151

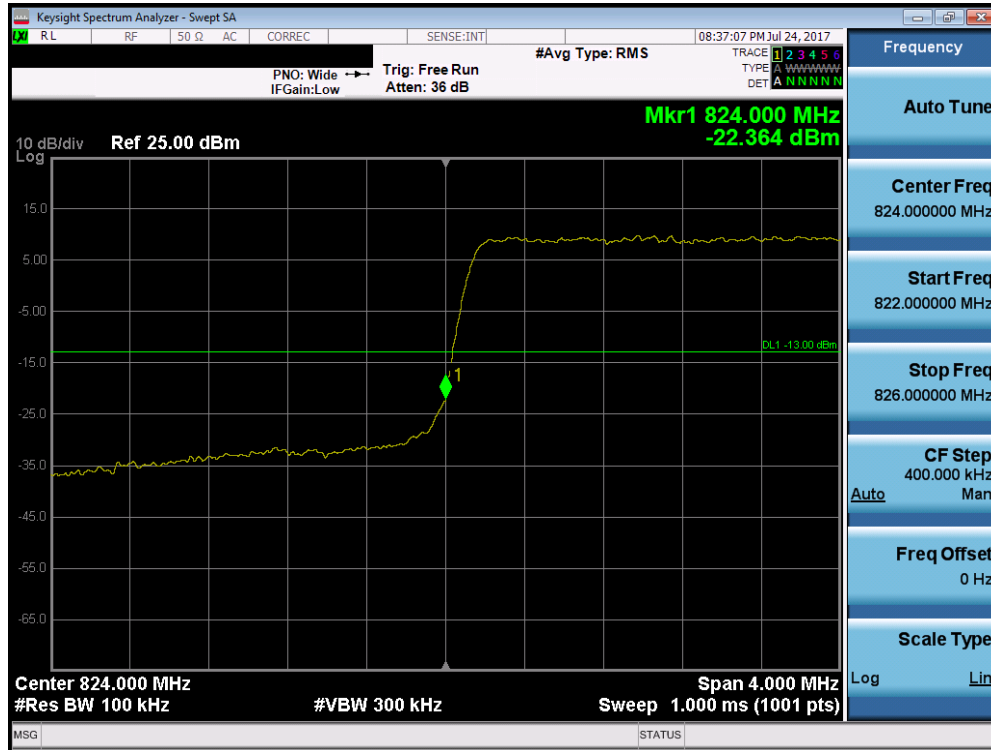


Plot 7-104. Lower Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)

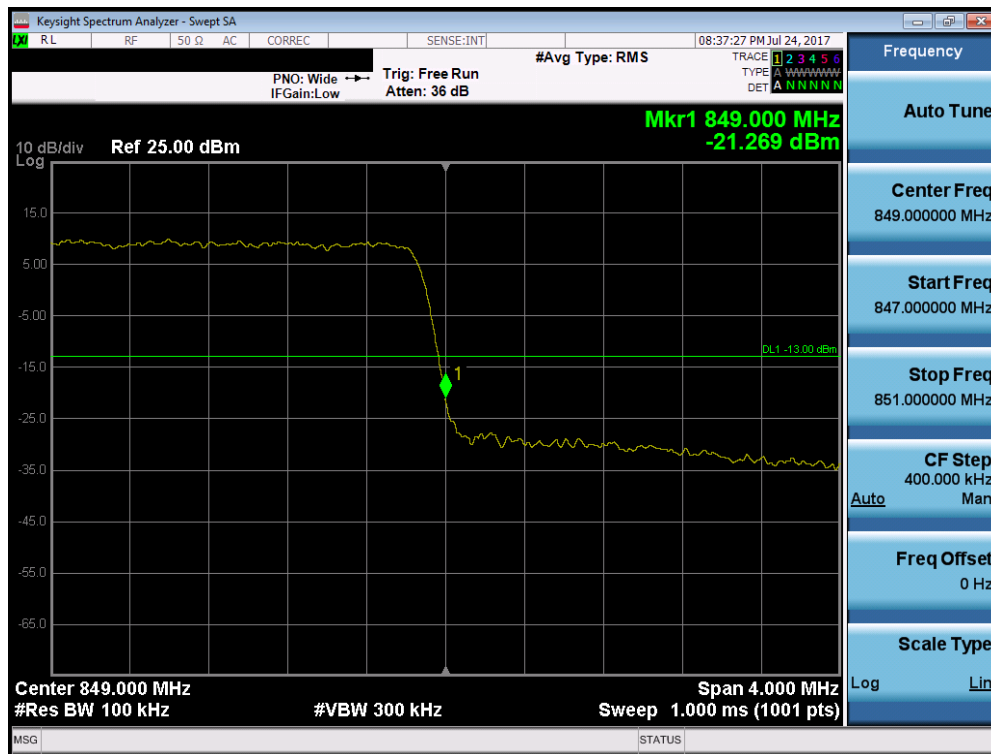




Plot 7-105. Upper Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 73 of 151

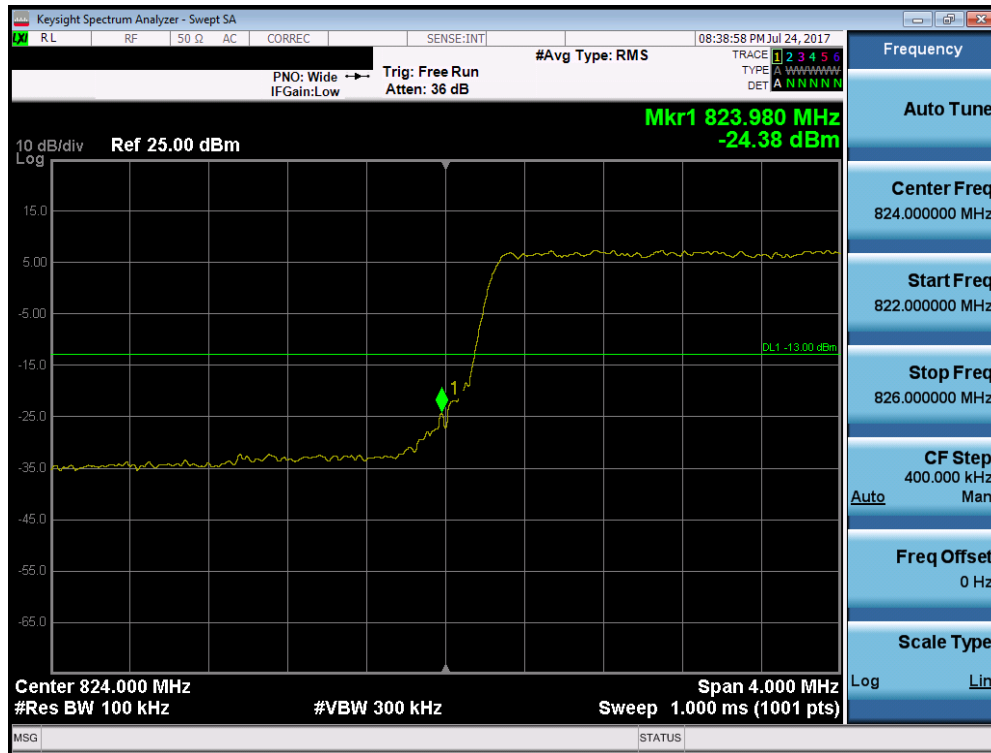


Plot 7-106. Lower Band Edge Plot (Band 5/26 – 3.0MHz QPSK – RB Size 15)





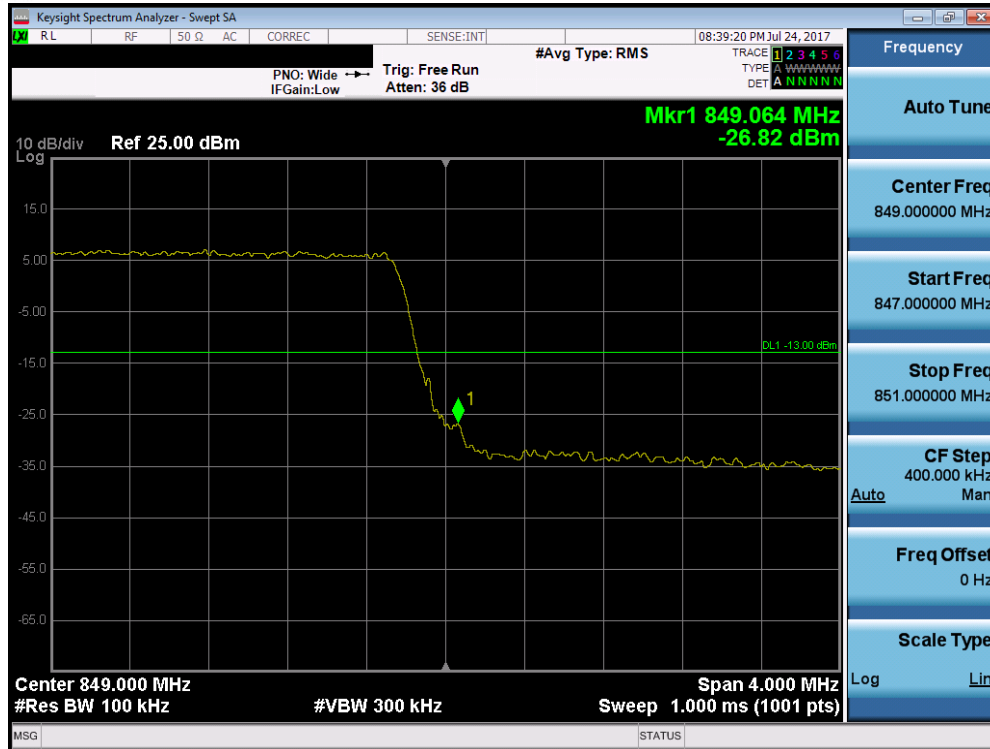
FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 74 of 151

Plot 7-107. Upper Band Edge Plot (Band 5/26 – 3.0MHz QPSK – RB Size 15)

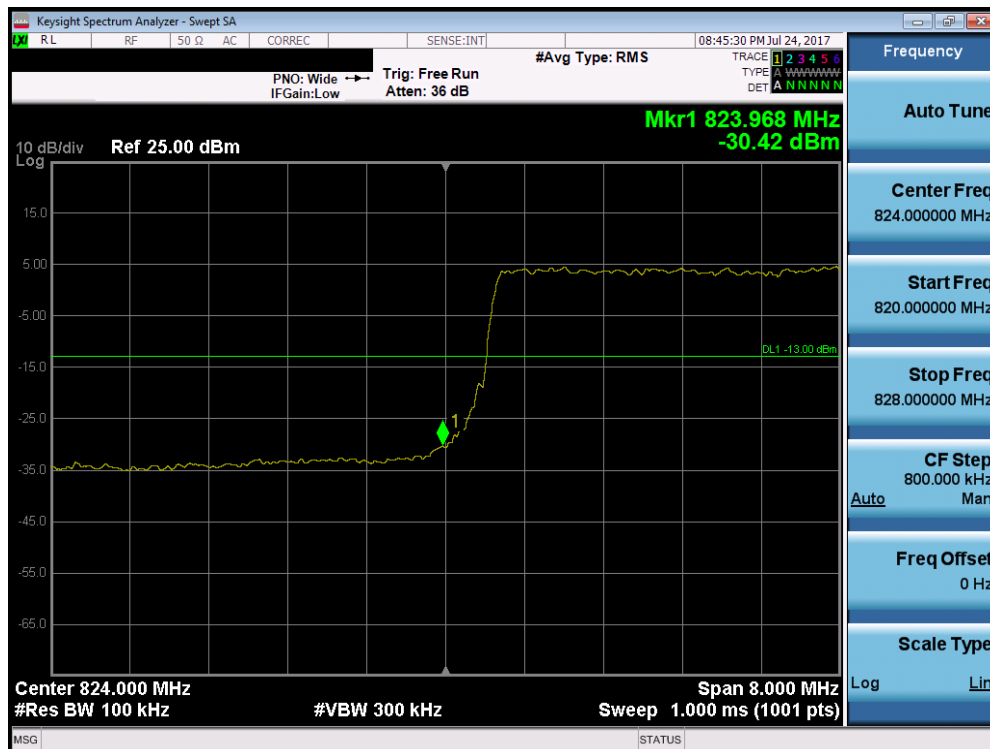


Plot 7-108. Lower Band Edge Plot (Band 5/26 – 5.0MHz QPSK – RB Size 25)



FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 75 of 151



Plot 7-109. Upper Band Edge Plot (Band 5/26 – 5.0MHz QPSK – RB Size 25)

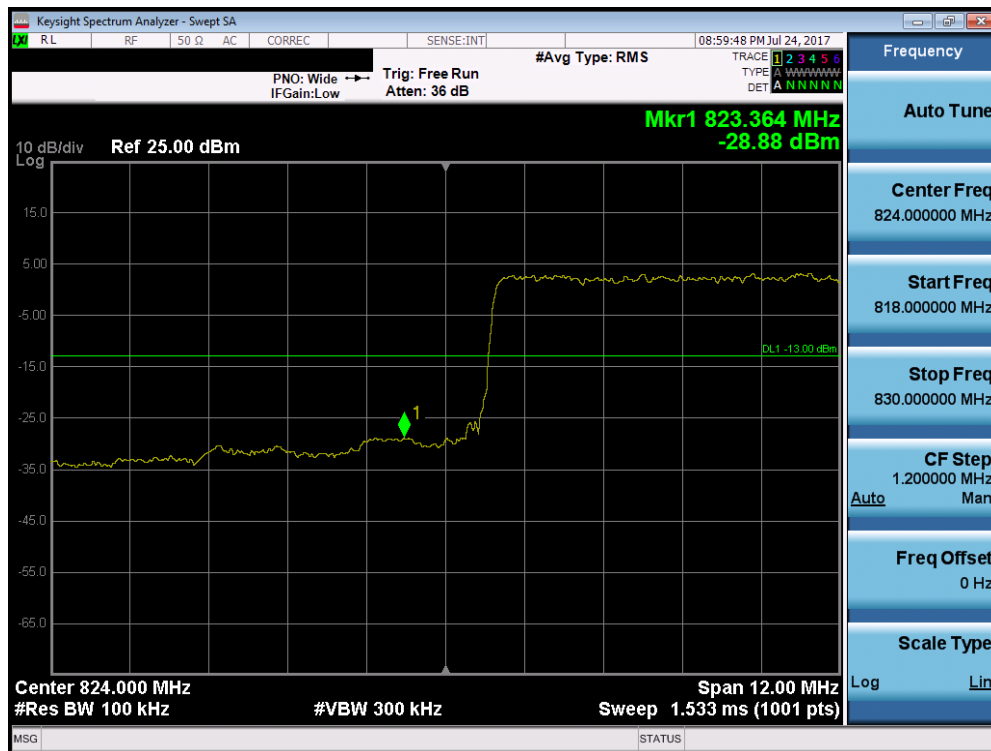


Plot 7-110. Lower Band Edge Plot (Band 5/26 – 10.0MHz QPSK – RB Size 50)



FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 76 of 151

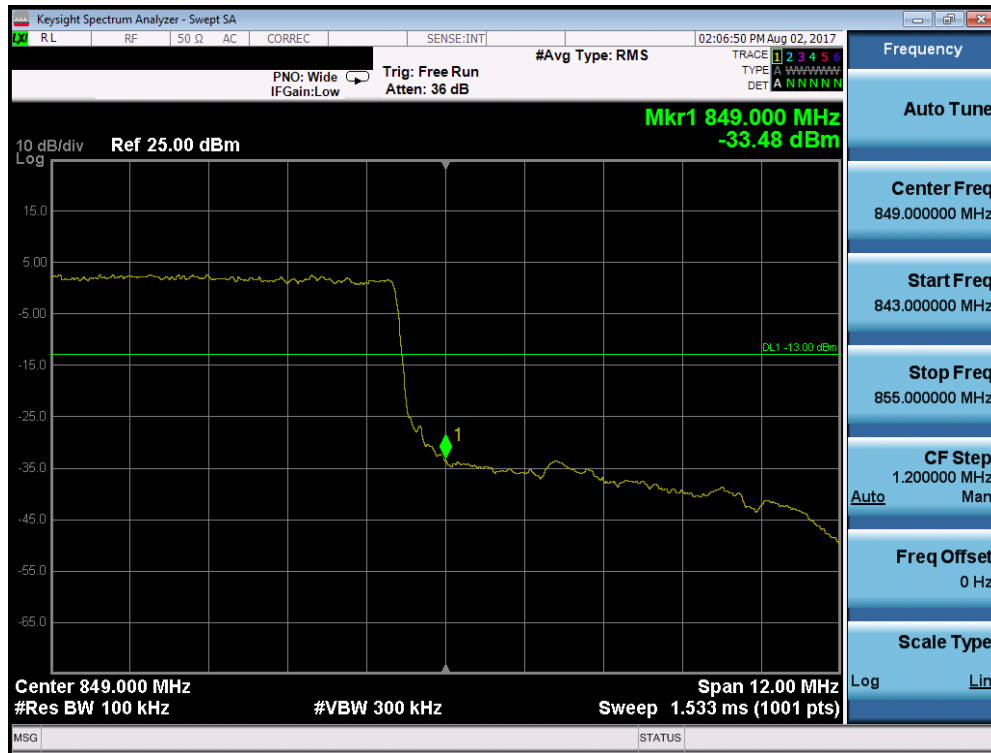


Plot 7-111. Upper Band Edge Plot (Band 5/26 – 10.0MHz QPSK – RB Size 50)

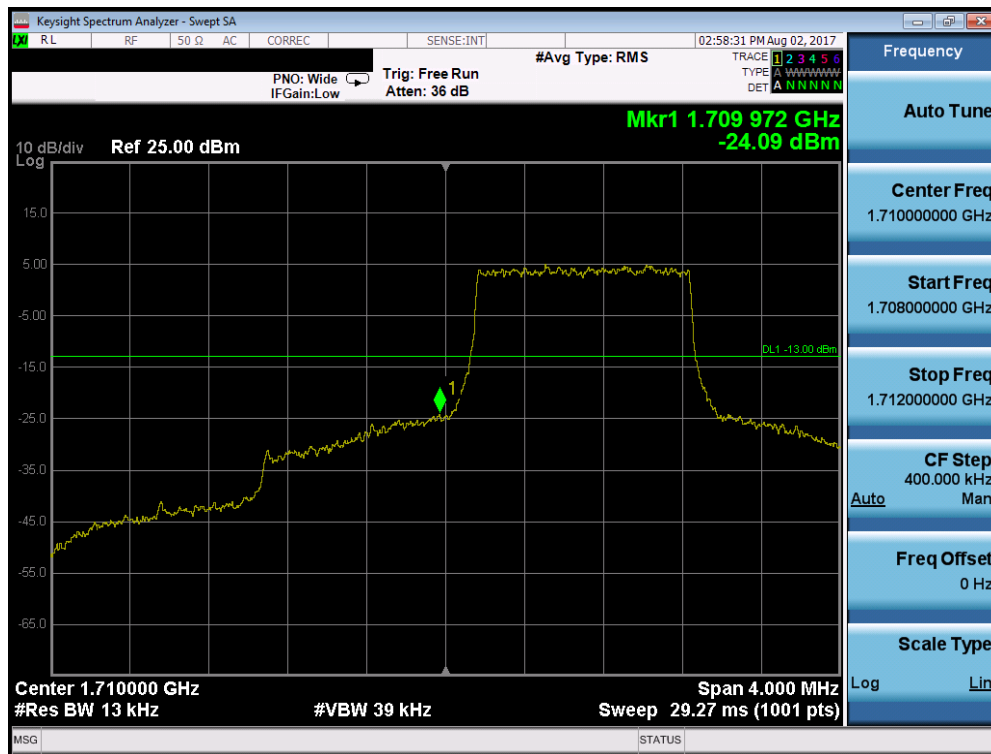


Plot 7-112. Lower Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 77 of 151

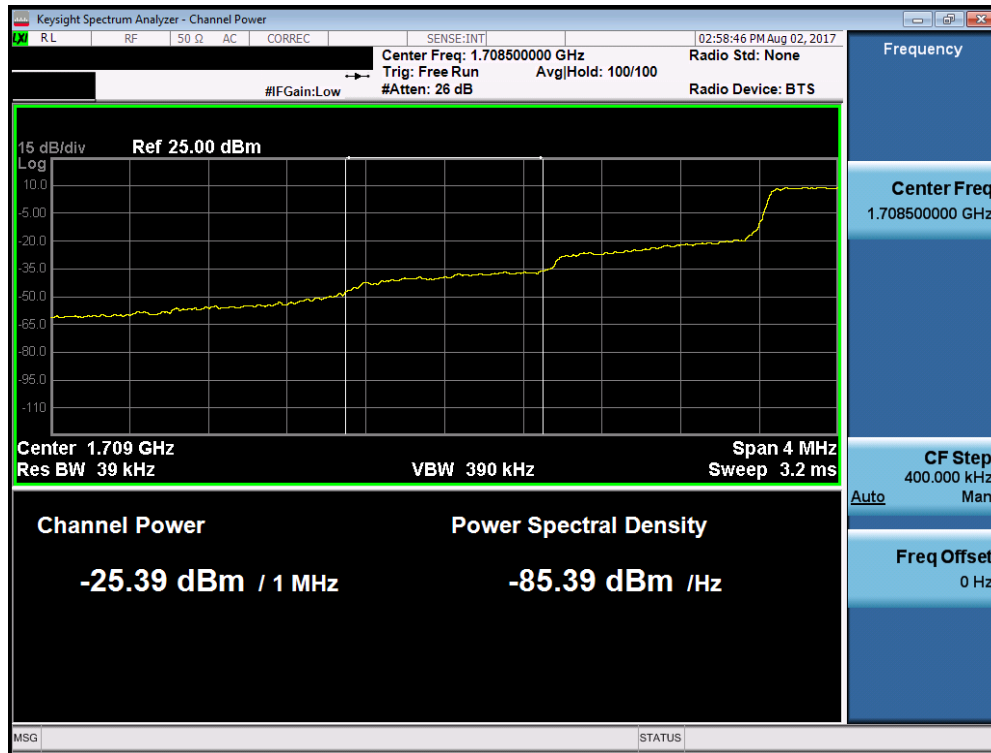


Plot 7-113. Upper Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)



FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 78 of 151

Plot 7-114. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

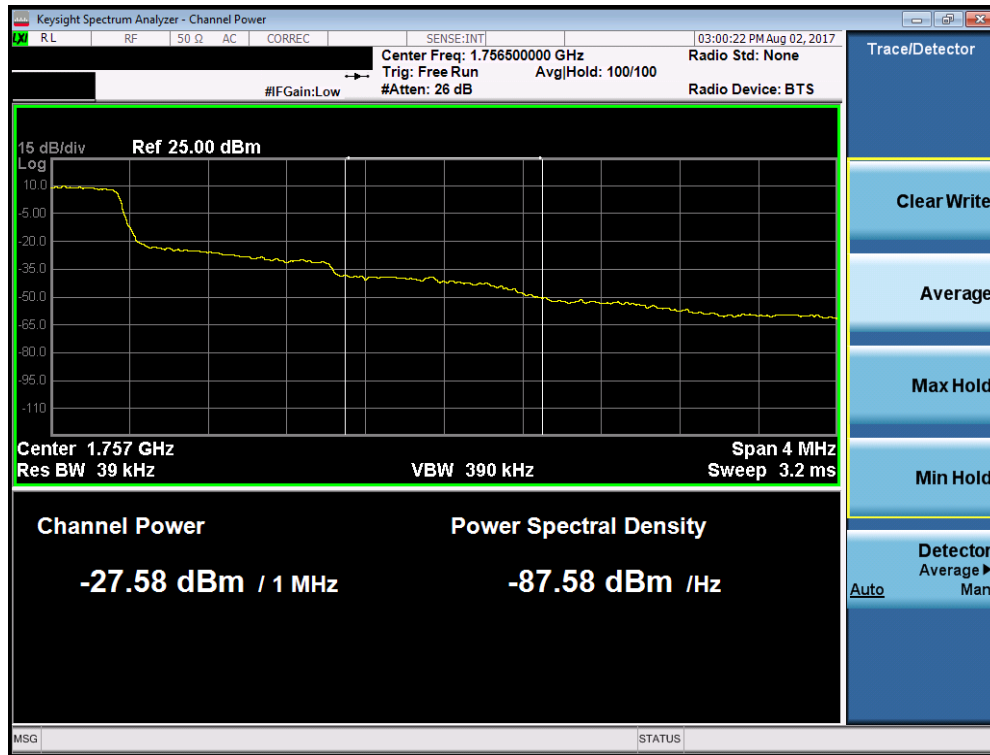


Plot 7-115. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

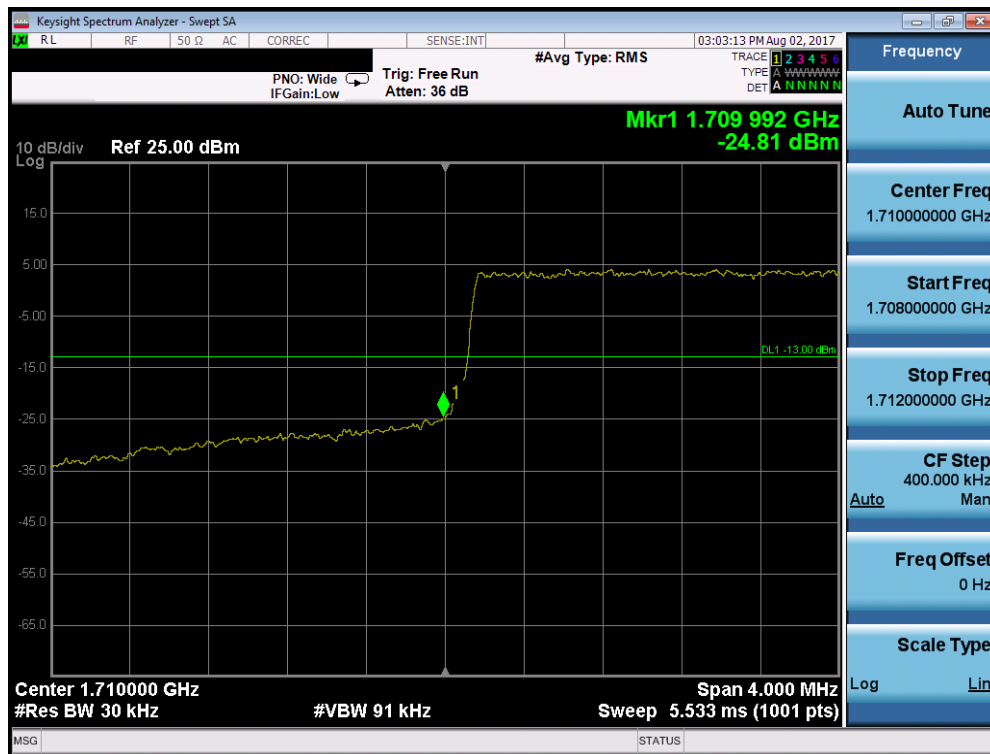


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 79 of 151

Plot 7-116. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

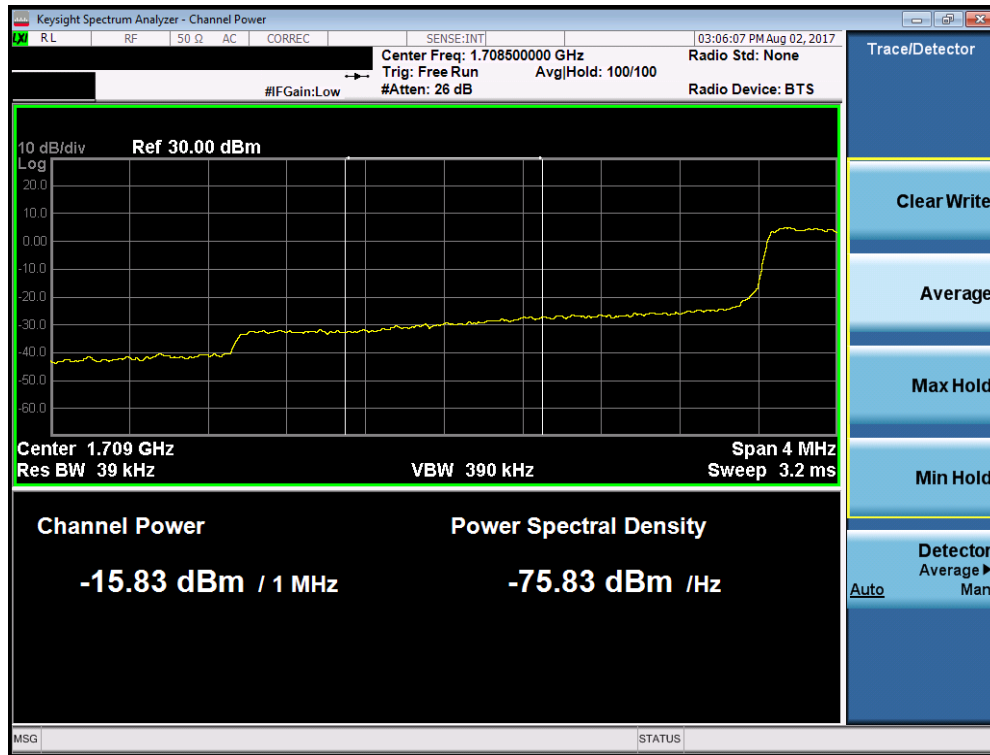


Plot 7-117. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

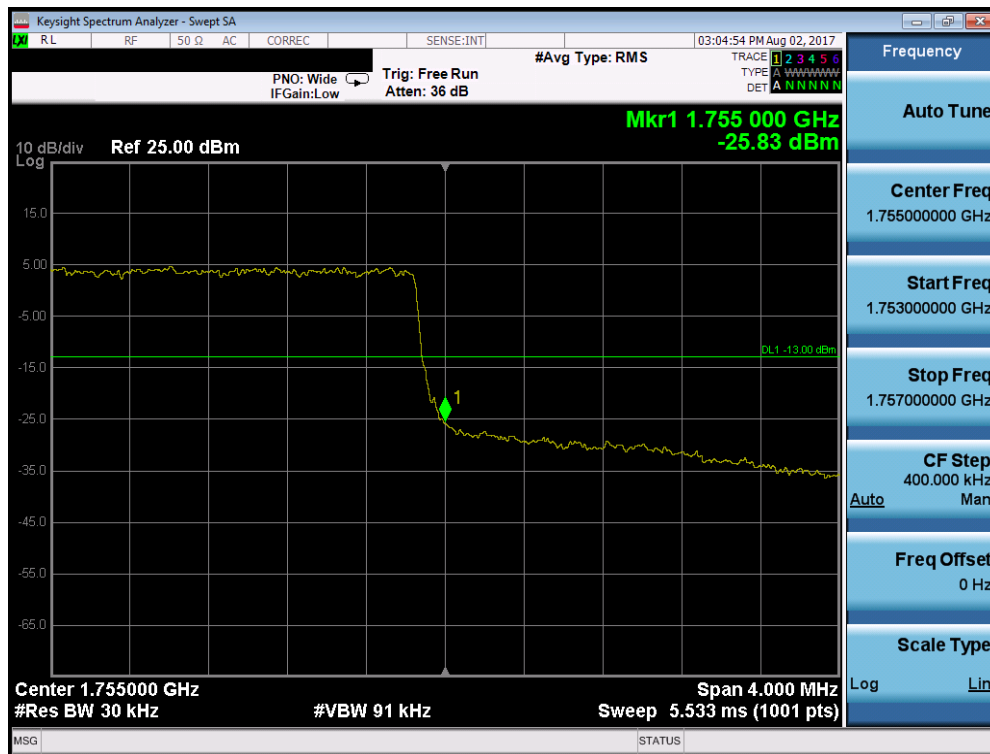


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 80 of 151

Plot 7-118. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

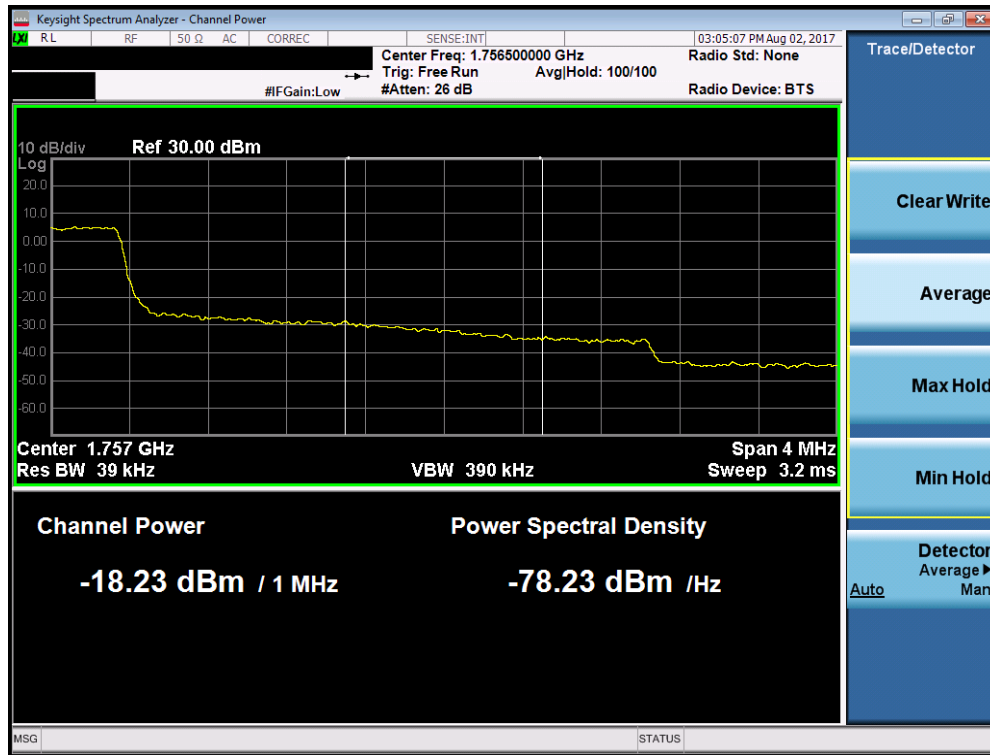


Plot 7-119. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

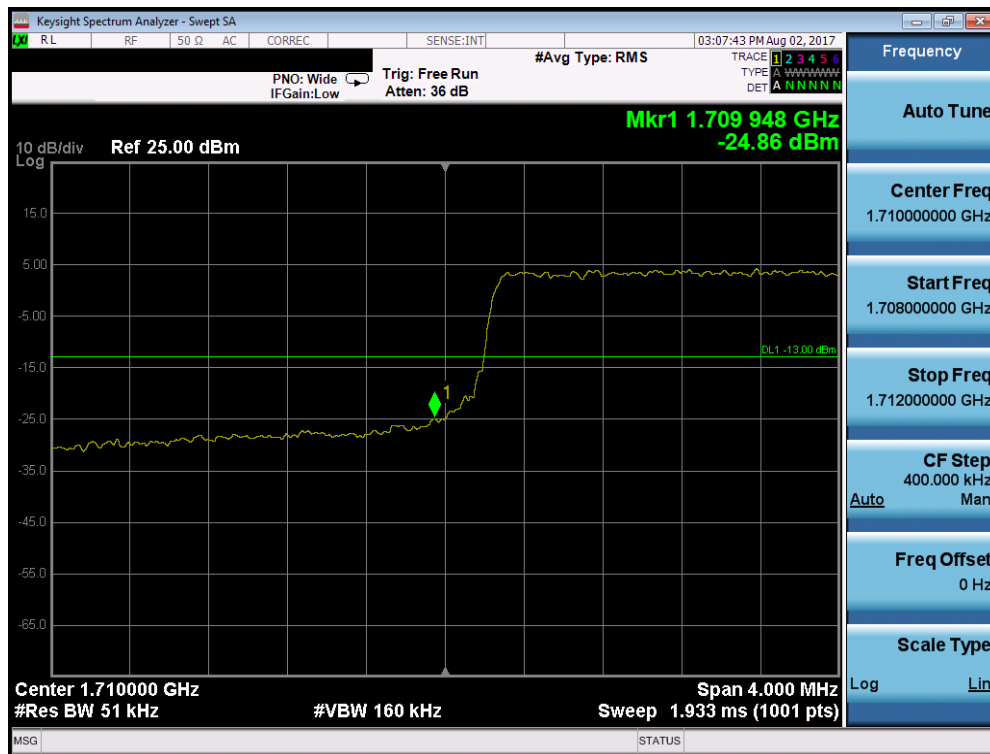


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 81 of 151

Plot 7-120. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

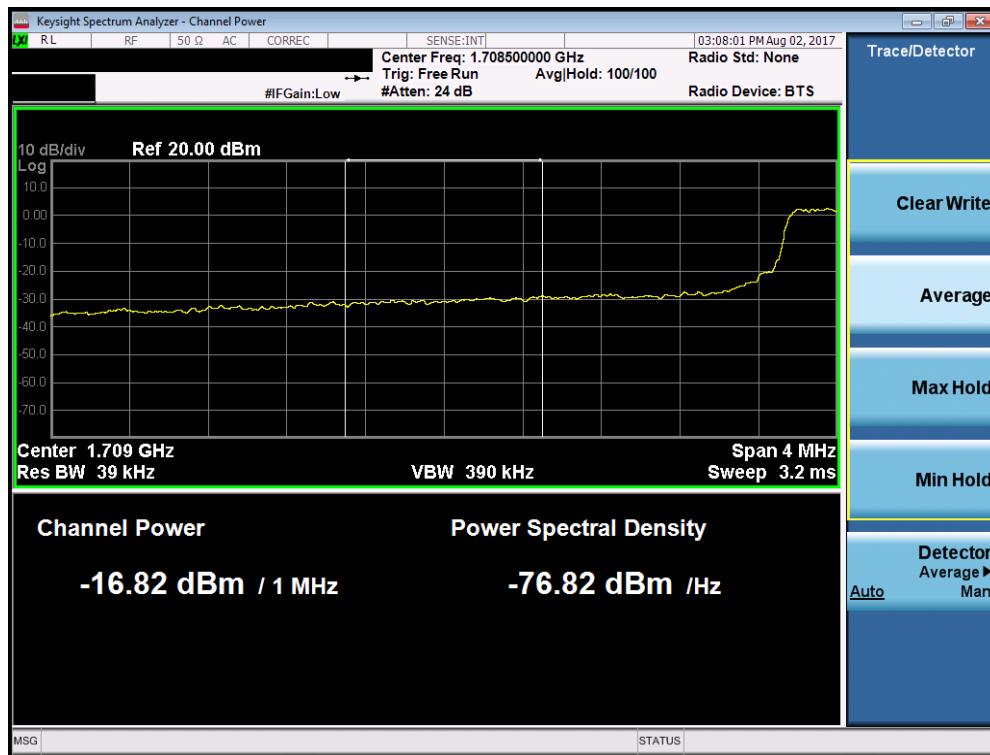


Plot 7-121. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

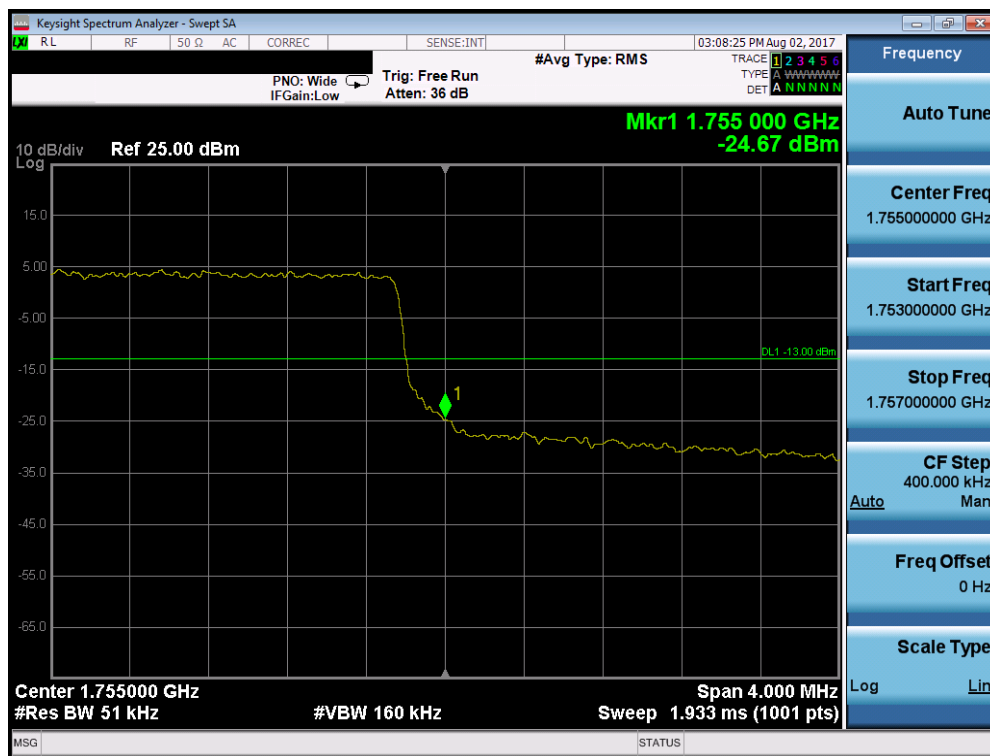




FCC ID: ZNFLK460	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 82 of 151

Plot 7-122. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

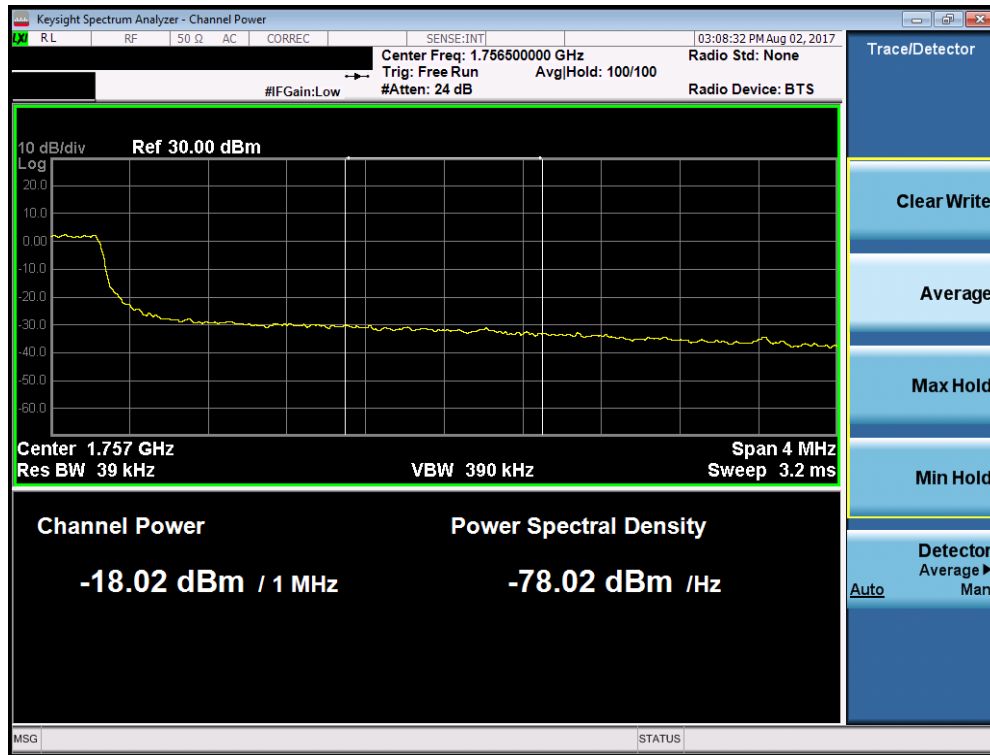


Plot 7-123. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

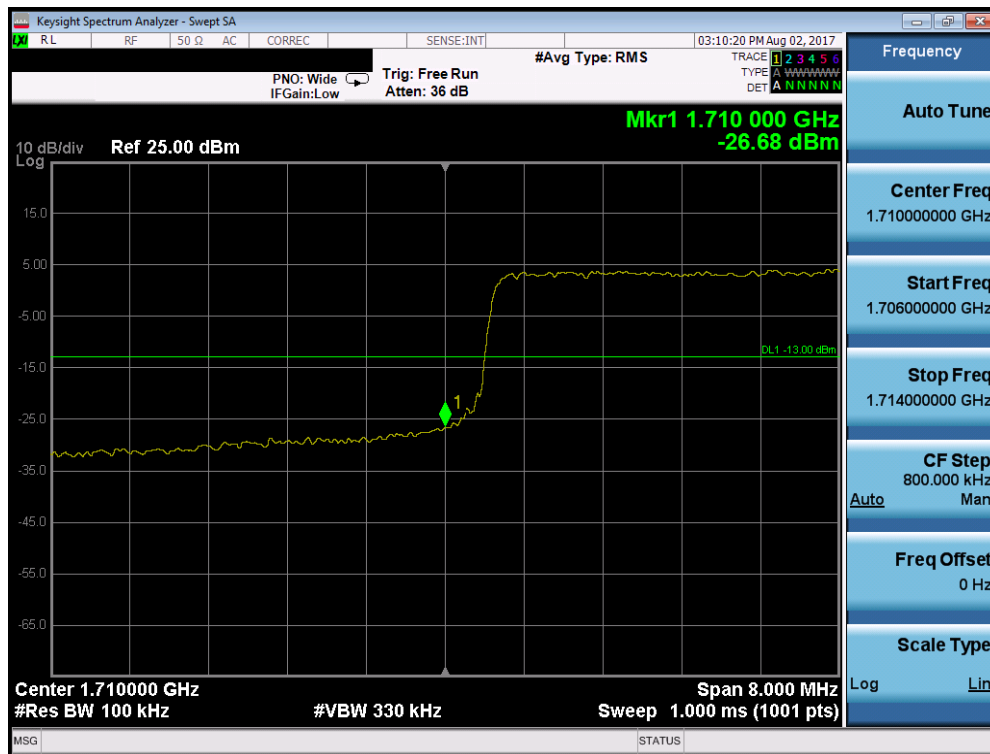


FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 83 of 151

Plot 7-124. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

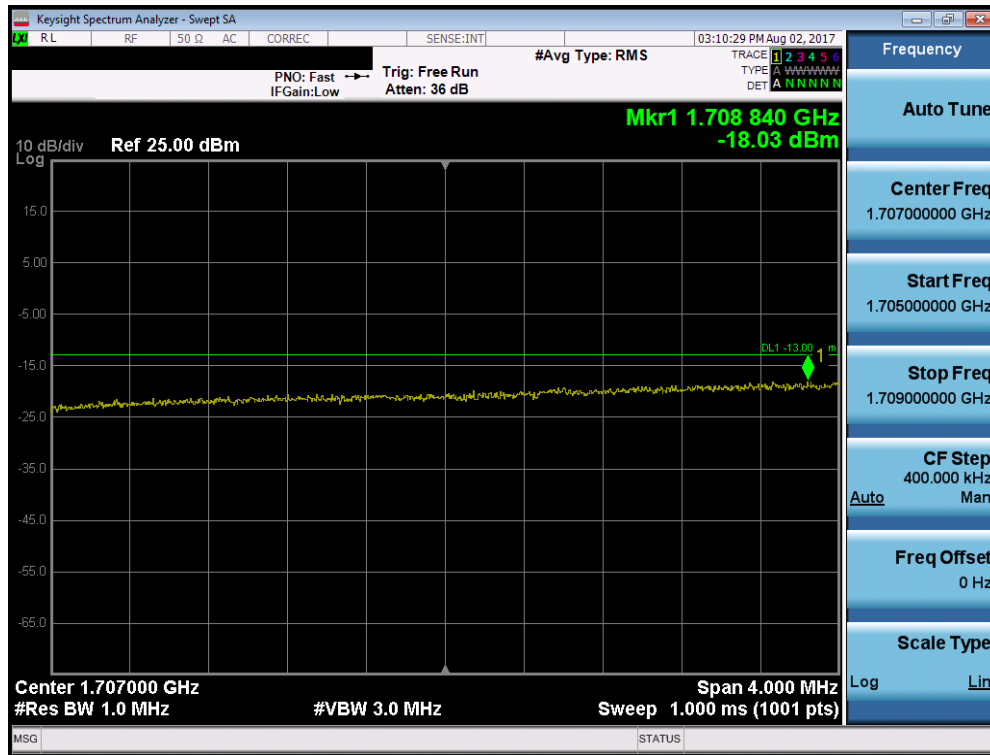


Plot 7-125. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

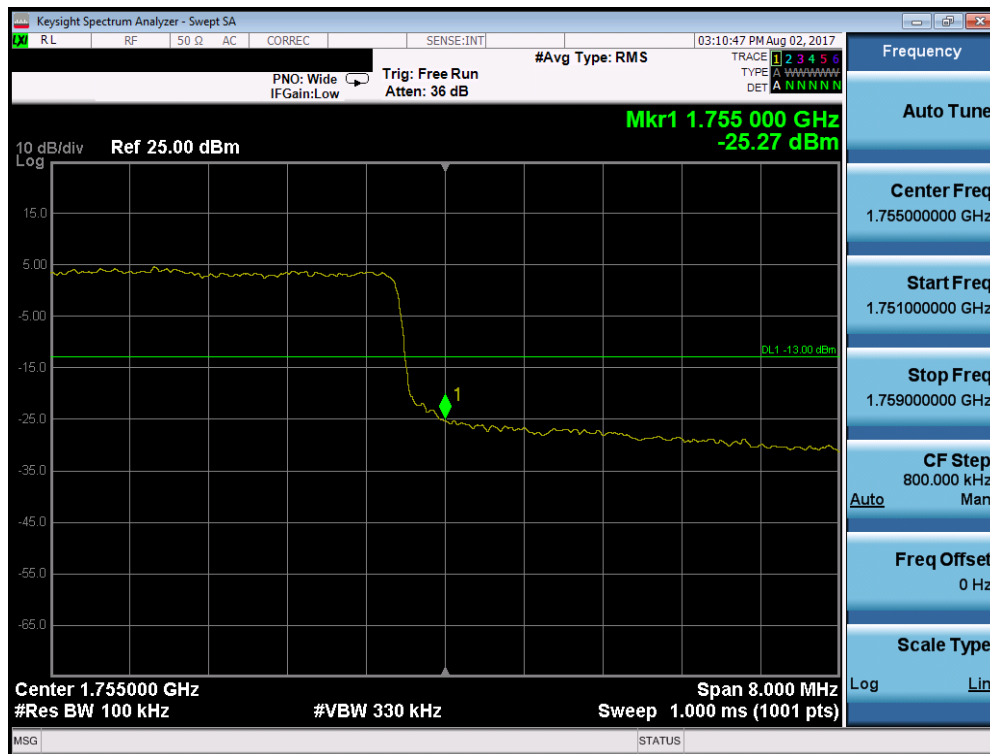


FCC ID: ZNFLK460	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 84 of 151

Plot 7-126. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

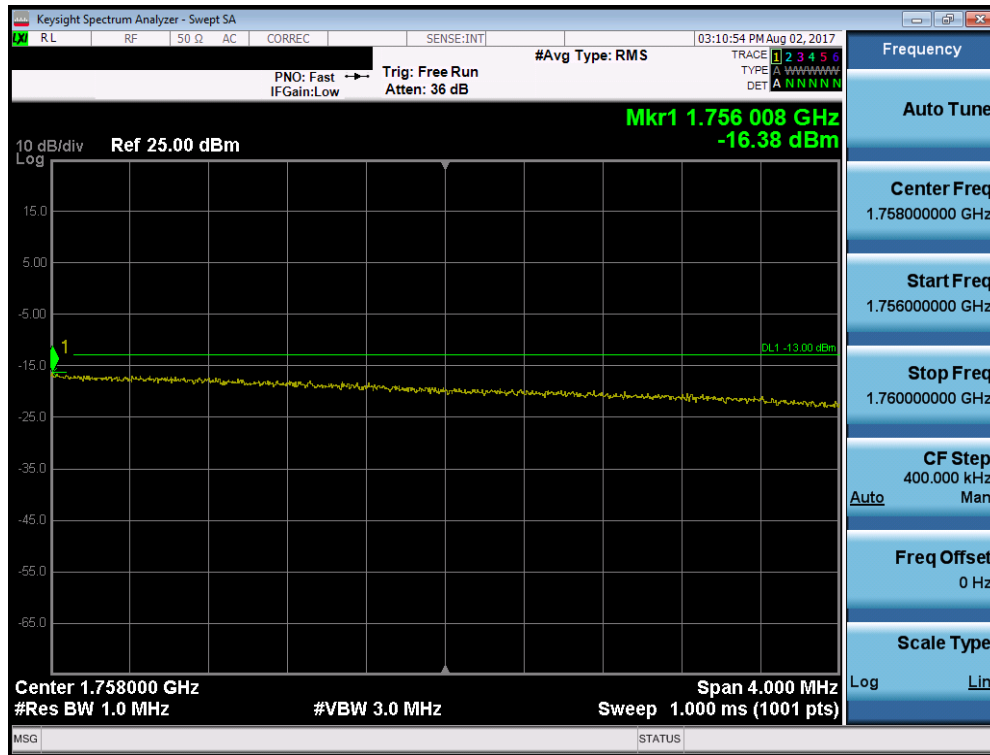


Plot 7-127. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

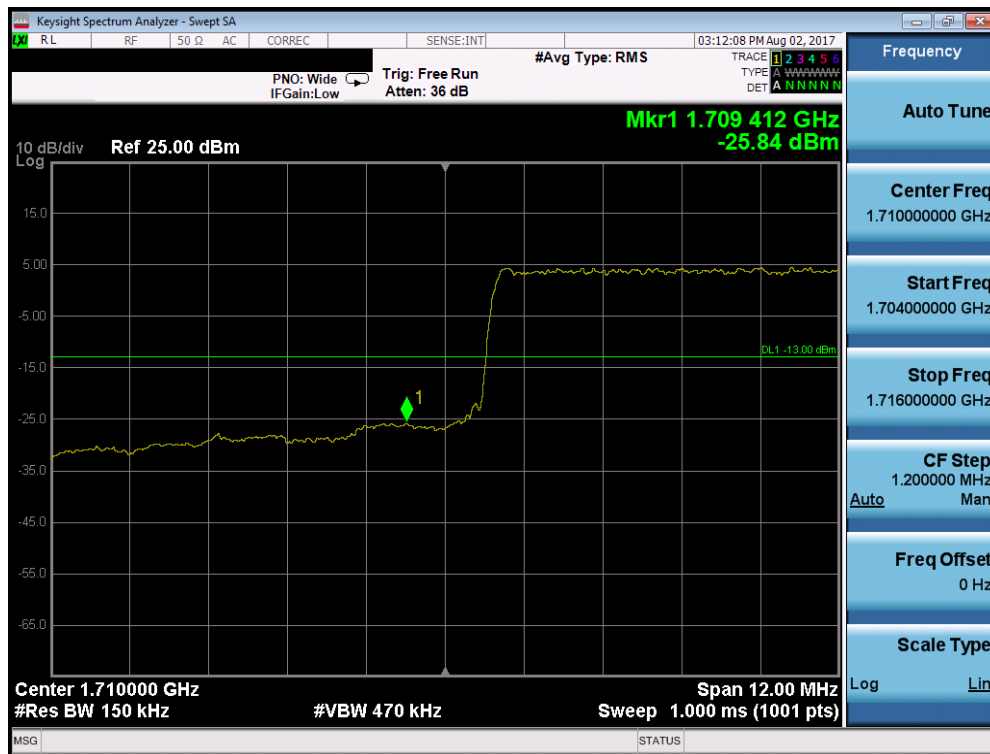


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 85 of 151

Plot 7-128. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

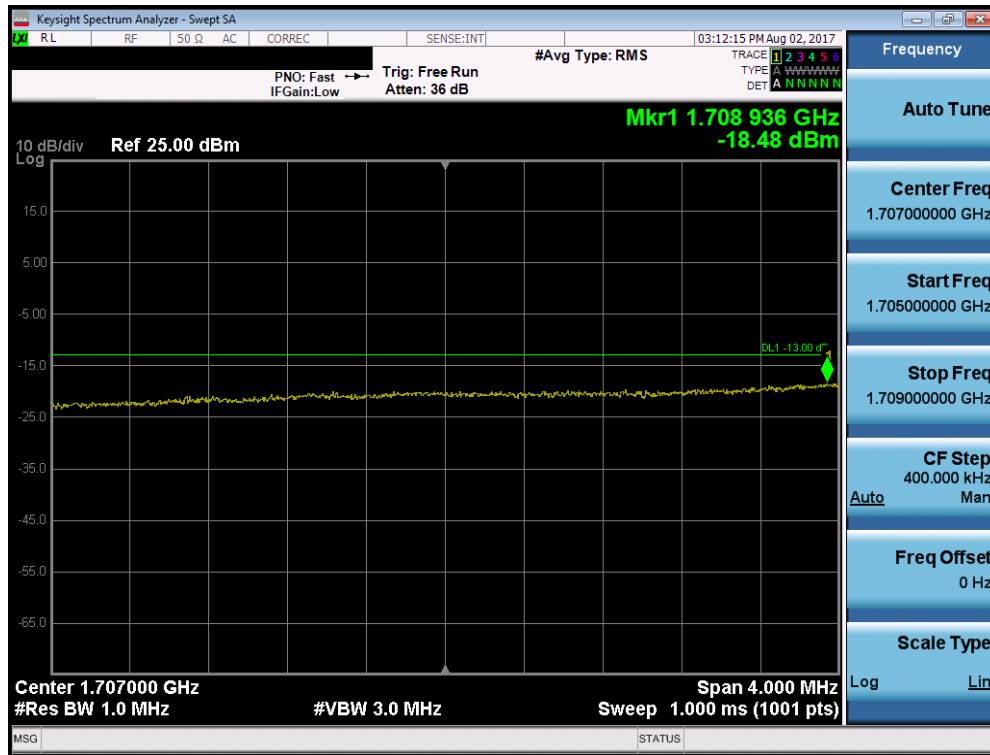


Plot 7-129. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

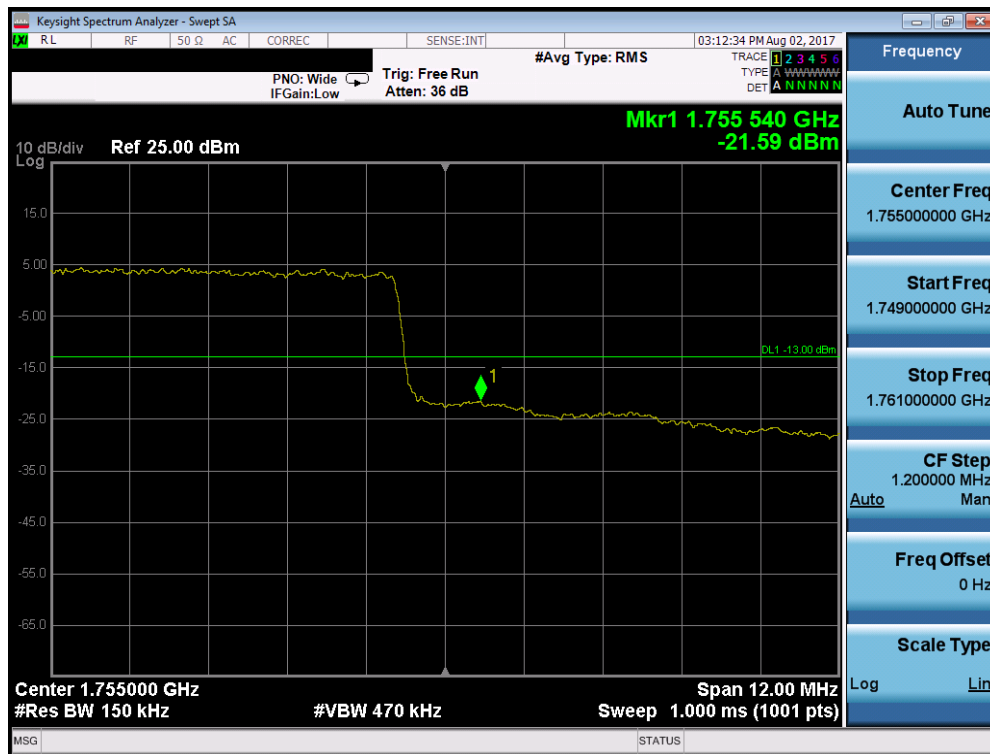


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 86 of 151

Plot 7-130. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

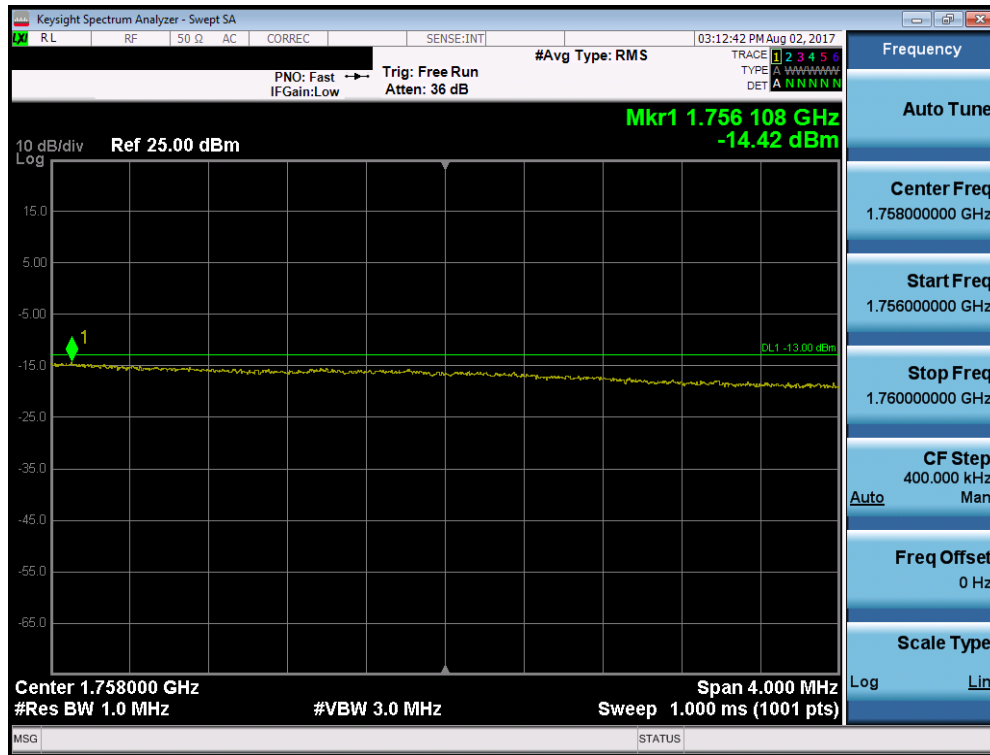


Plot 7-131. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

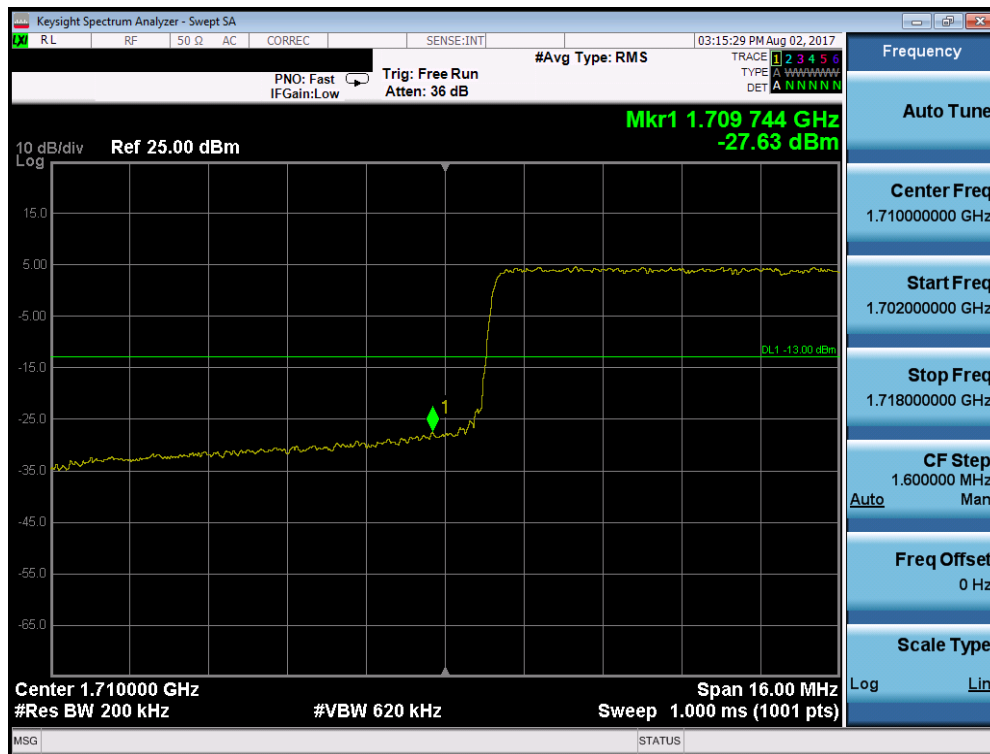




FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 87 of 151

Plot 7-132. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

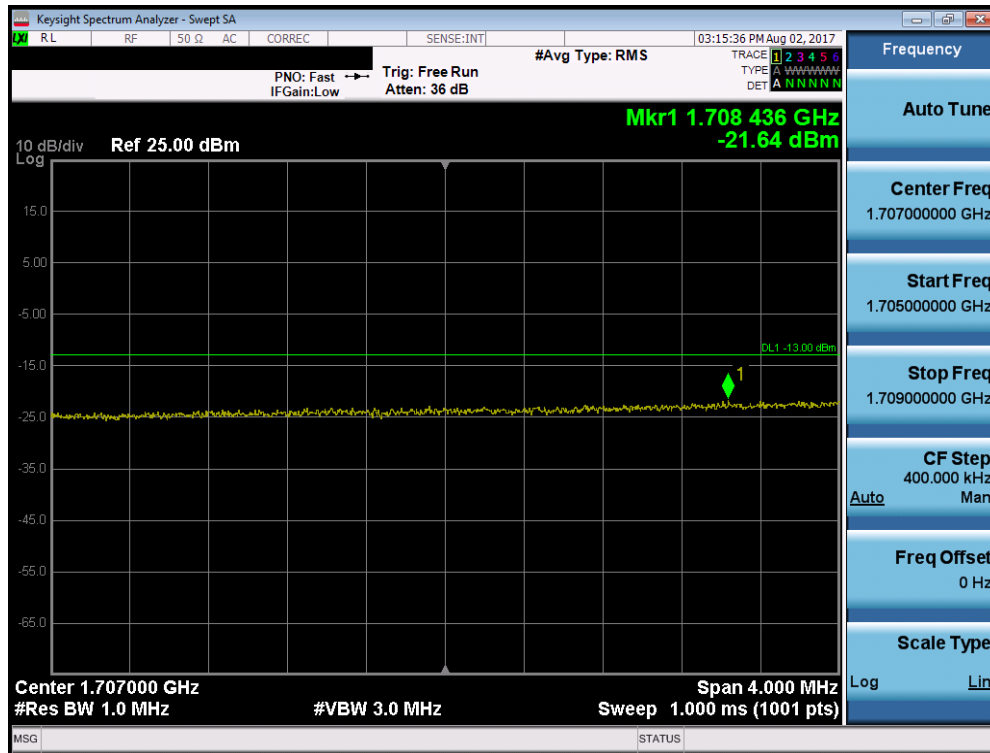


Plot 7-133. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

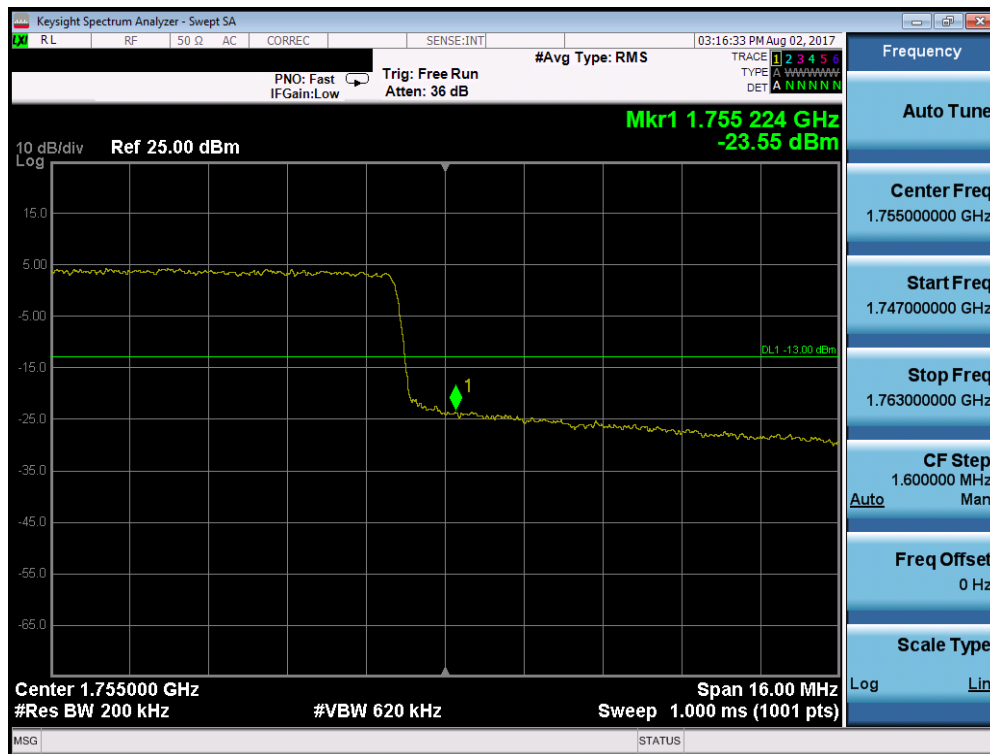


FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 88 of 151

Plot 7-134. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

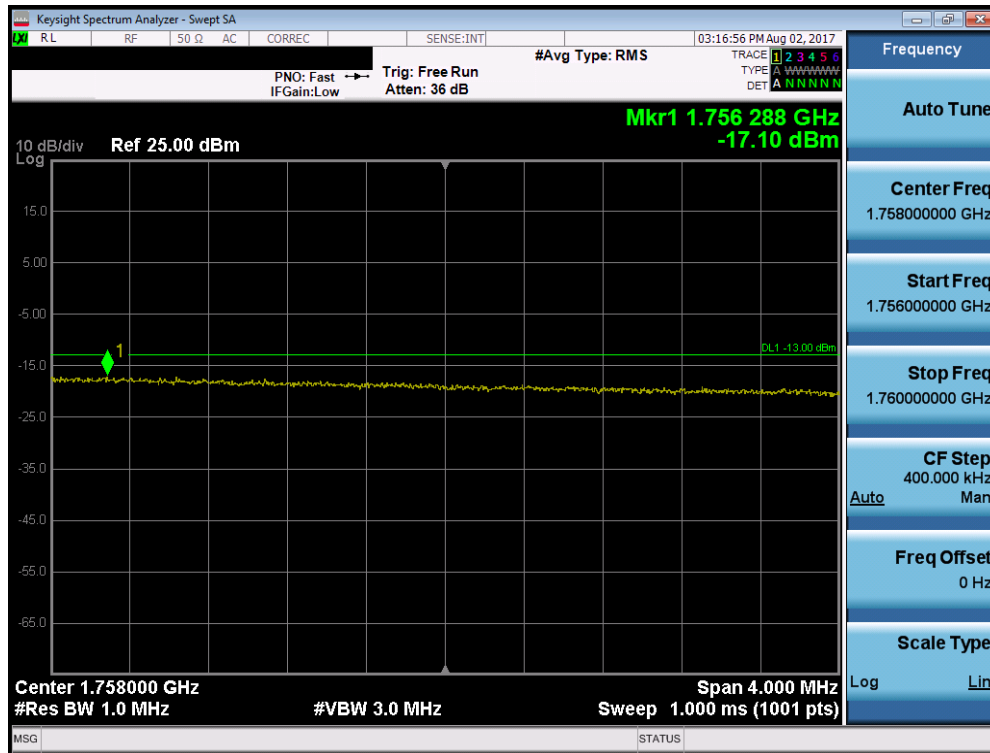


Plot 7-135. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

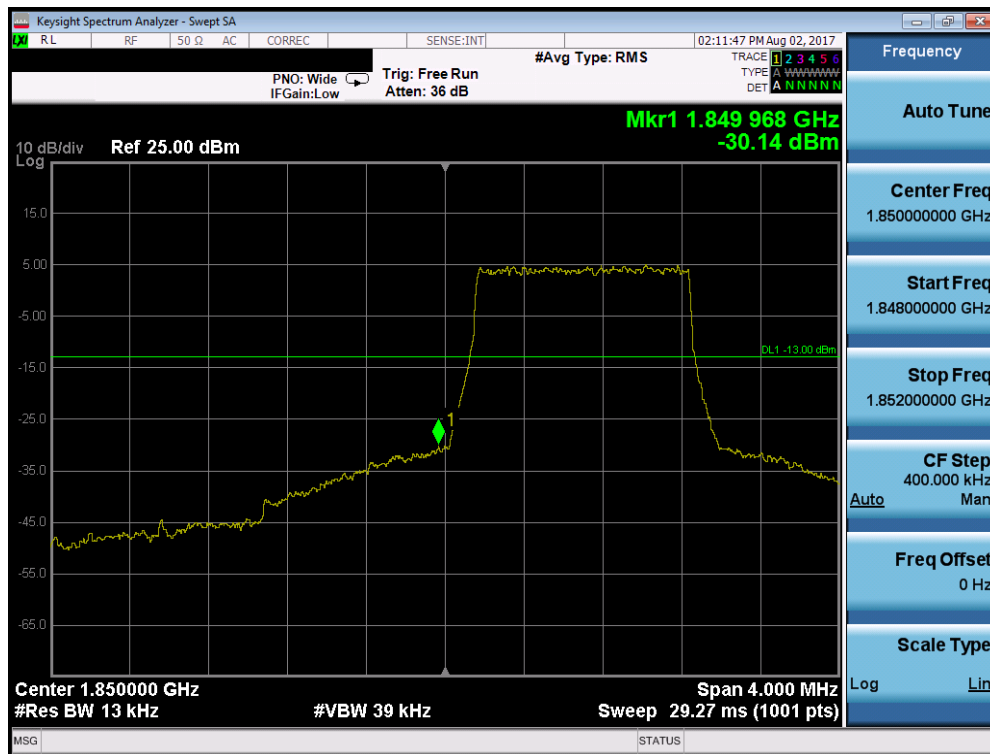


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 89 of 151

Plot 7-136. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

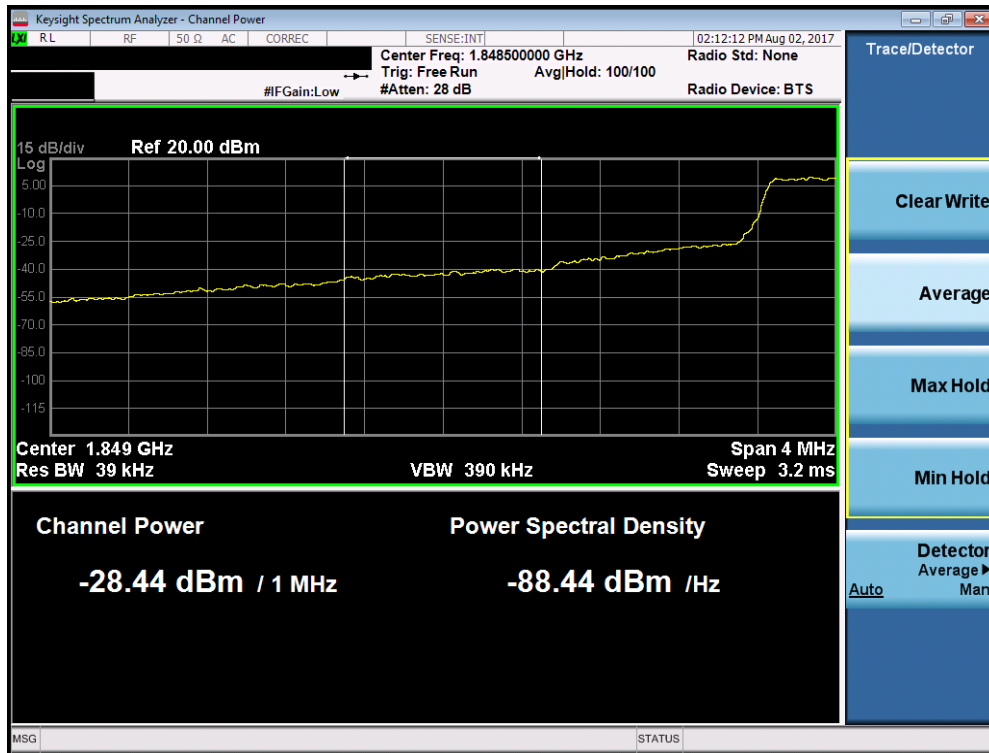


Plot 7-137. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

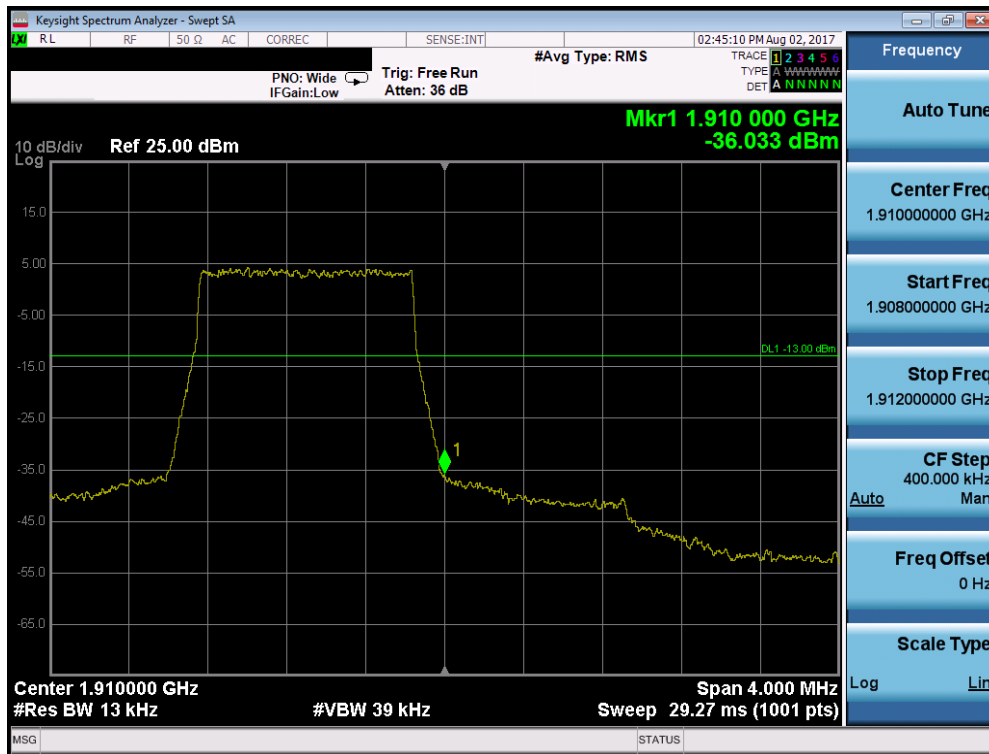


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 90 of 151

Plot 7-138. Lower Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

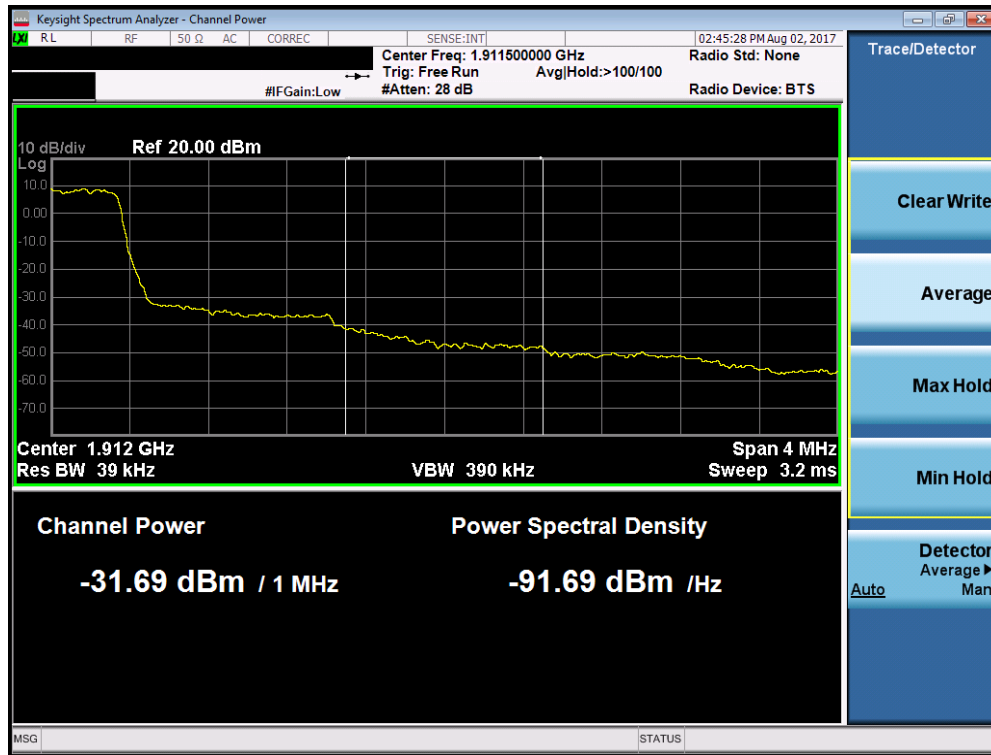


Plot 7-139. Lower Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

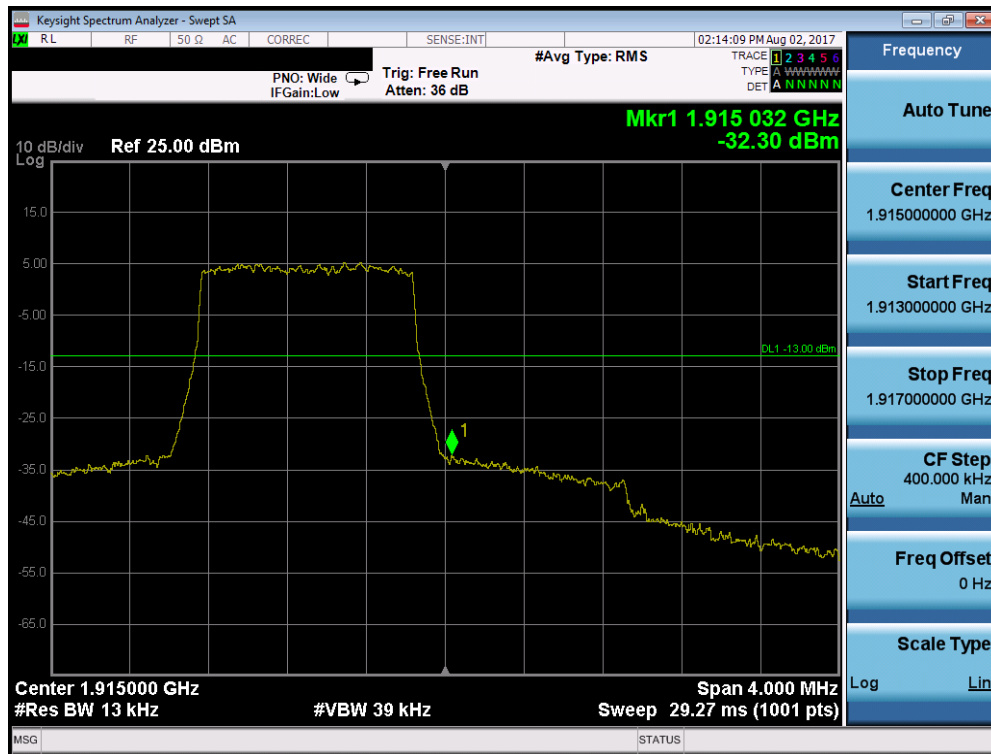


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 91 of 151

Plot 7-140. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

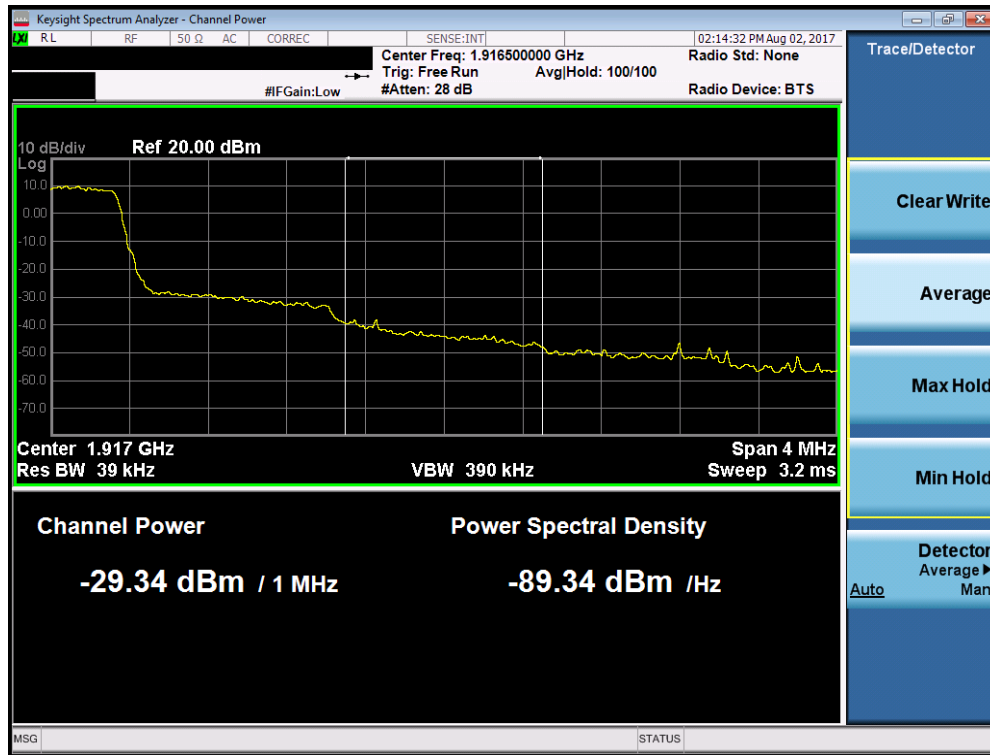


Plot 7-141. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

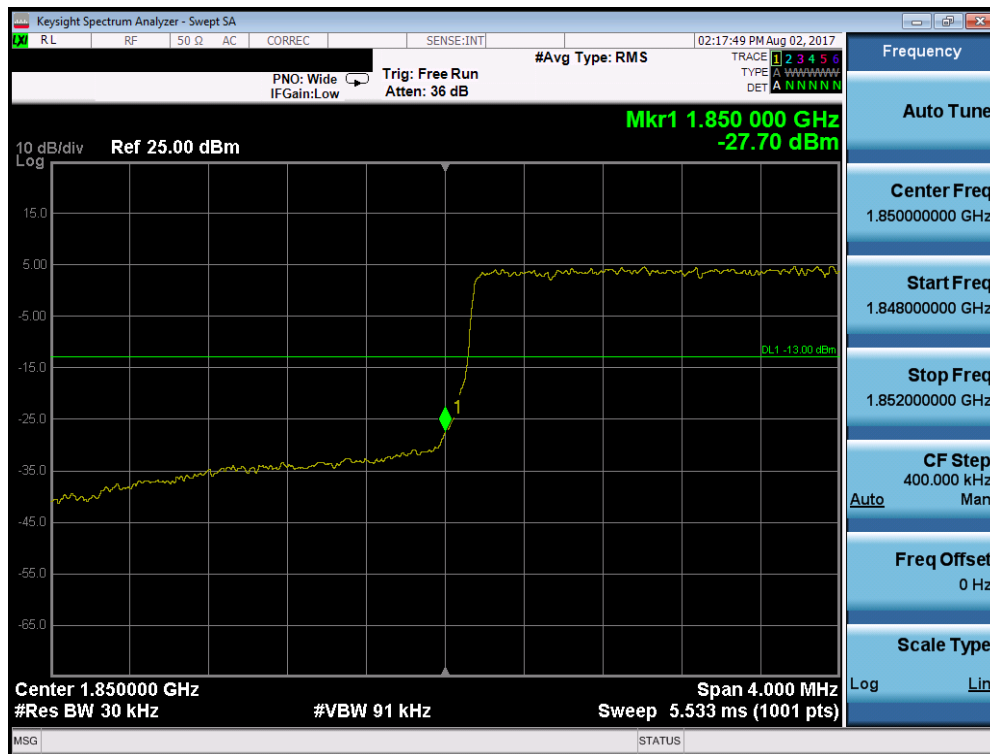


FCC ID: ZNFLK460			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet			Page 92 of 151

Plot 7-142. Upper Band Edge Plot (Band 25 – 1.4MHz QPSK – RB Size 6)

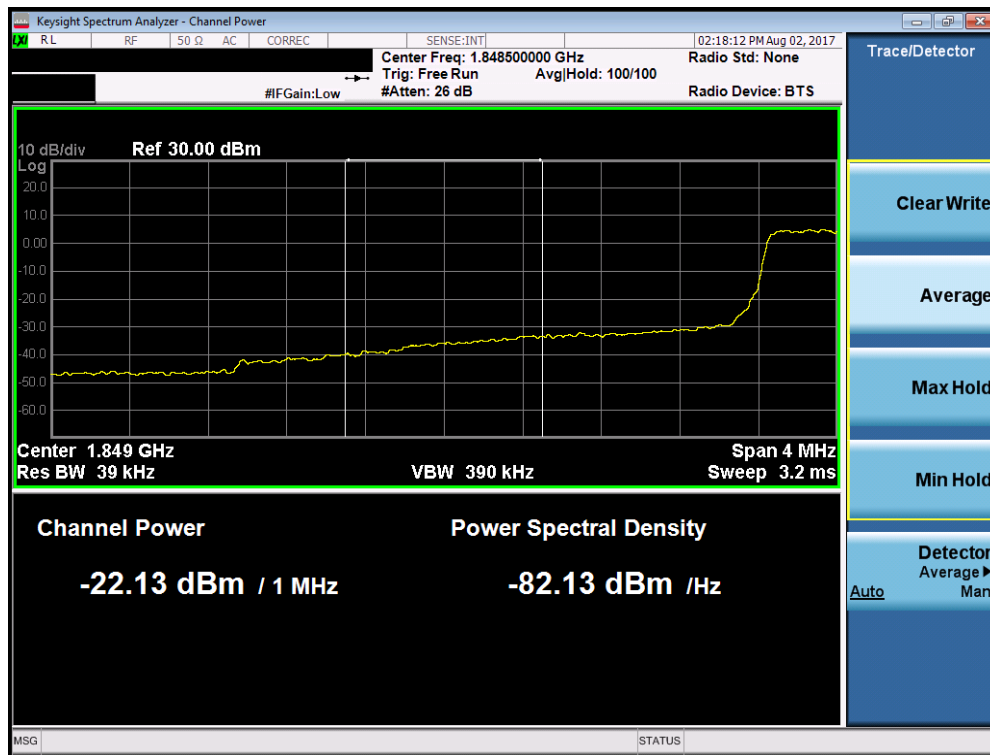


Plot 7-143. Upper Extended Band Edge Plot (Band 25 – 1.4MHz QPSK – RB Size 6)

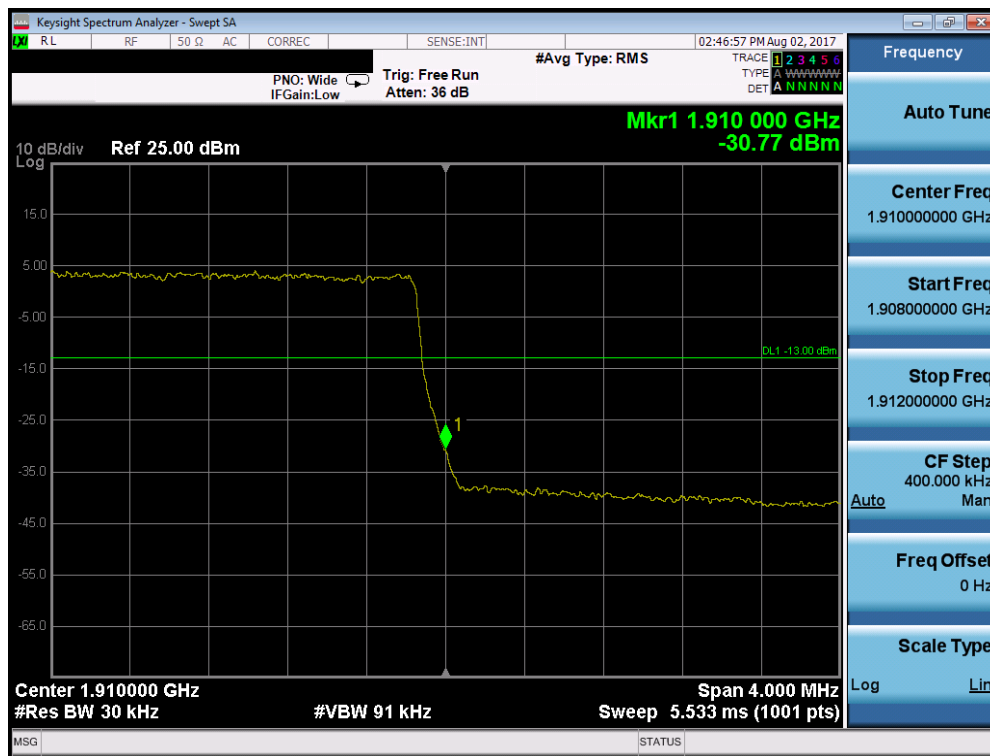


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 93 of 151

Plot 7-144. Lower Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

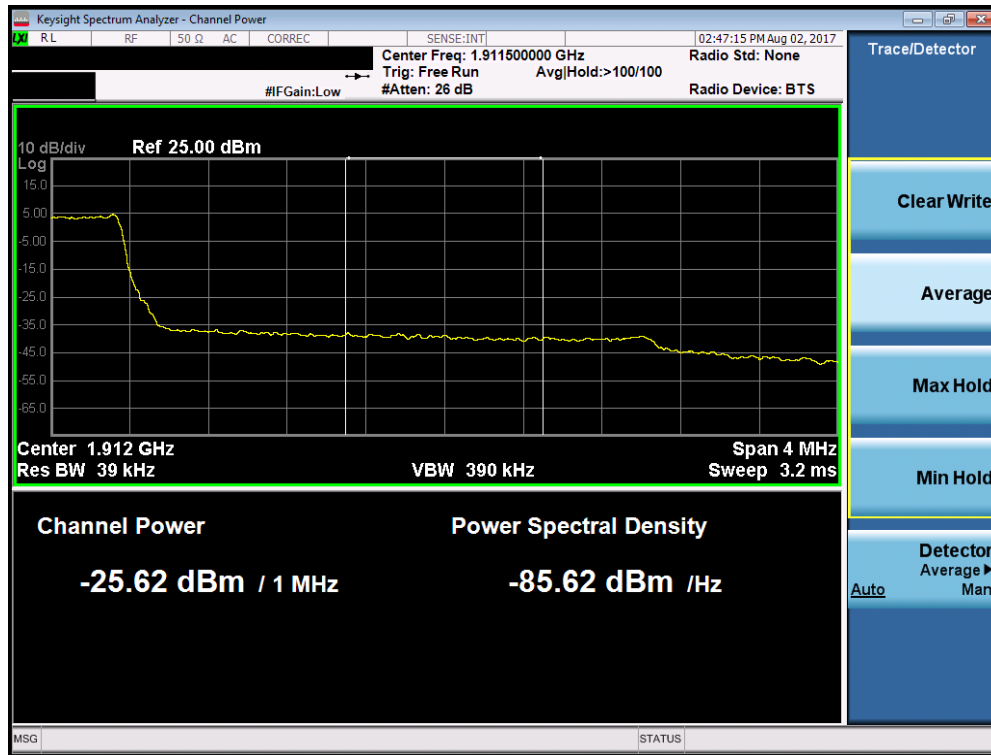


Plot 7-145. Lower Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

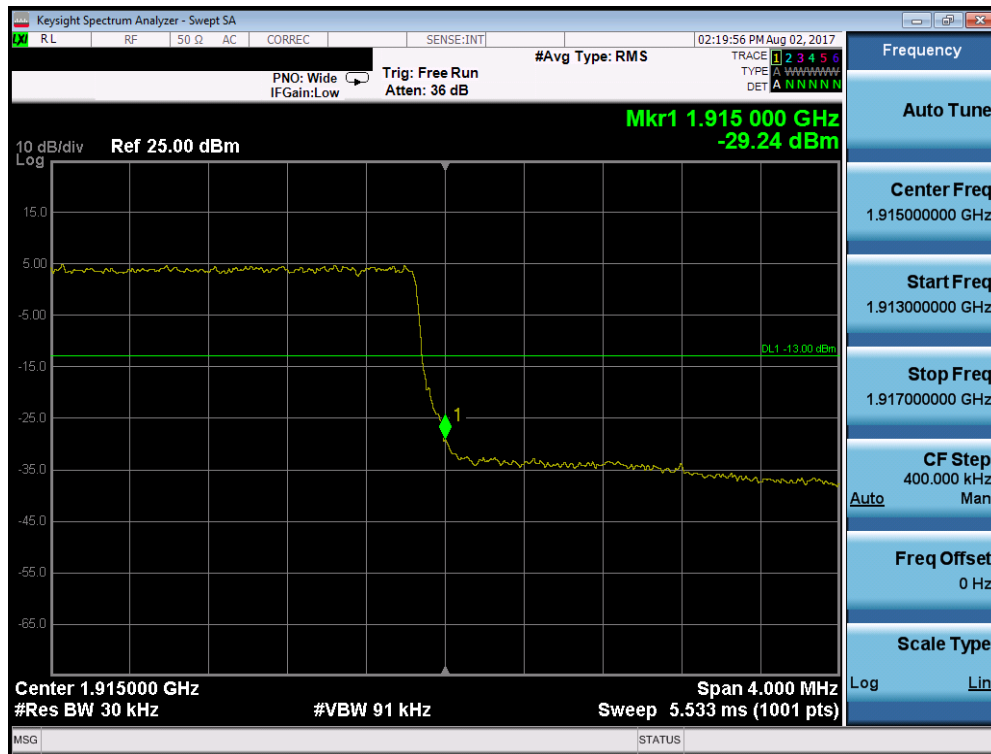


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 94 of 151

Plot 7-146. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

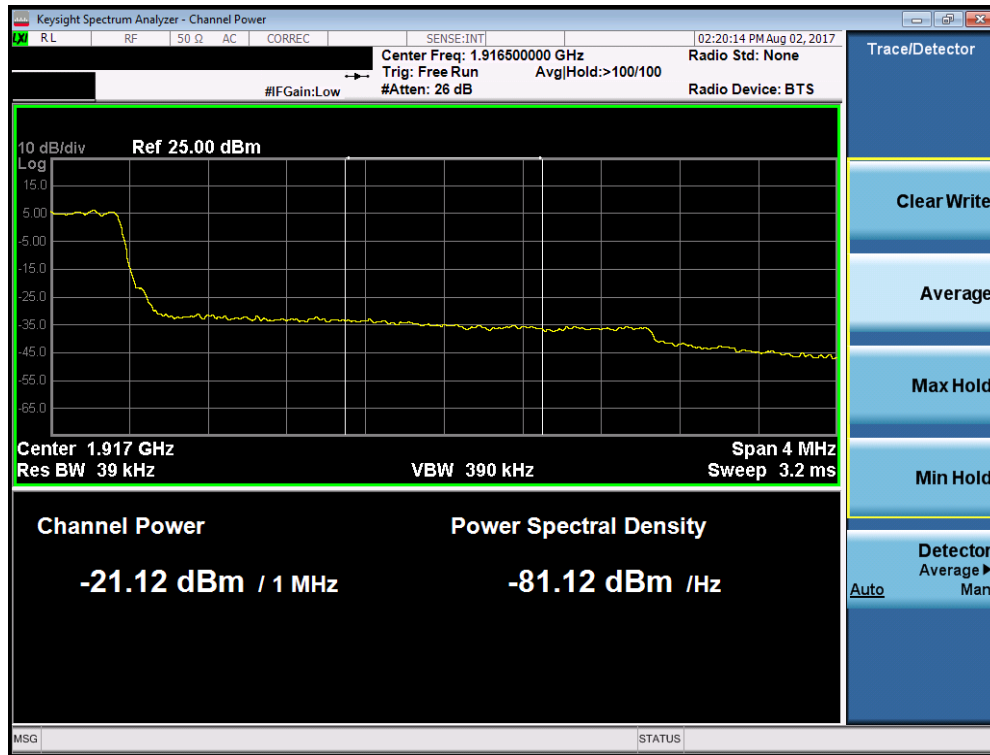


Plot 7-147. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

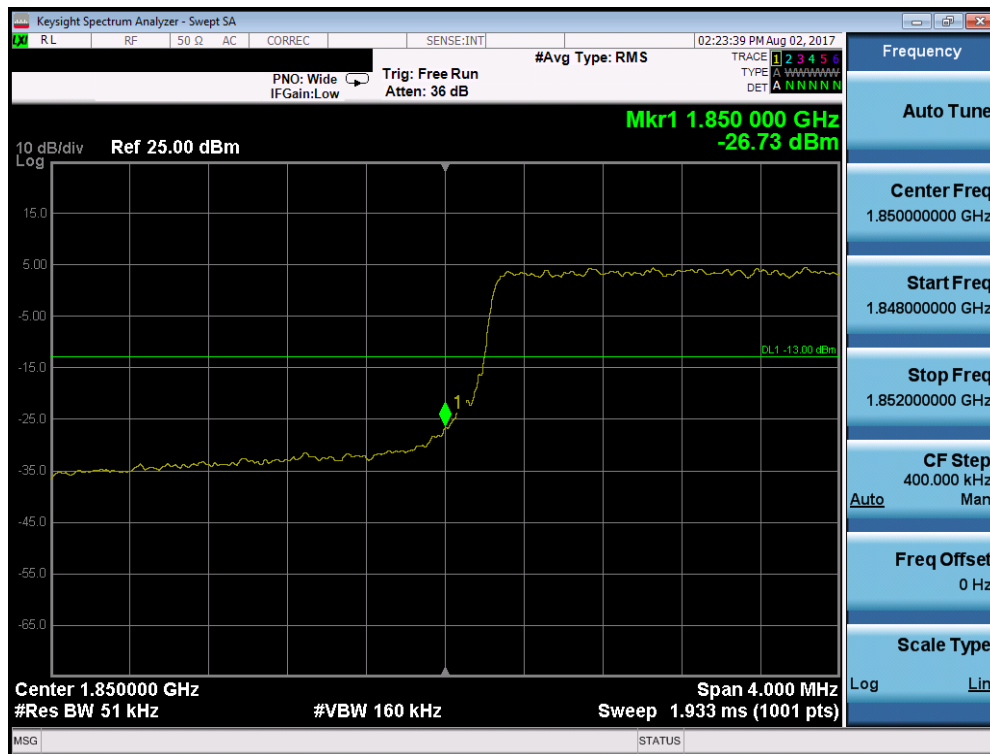


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 95 of 151

Plot 7-148. Upper Band Edge Plot (Band 25 – 3.0MHz QPSK – RB Size 15)



Plot 7-149. Upper Extended Band Edge Plot (Band 25 – 3.0MHz QPSK – RB Size 15)



FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 96 of 151

Plot 7-150. Lower Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

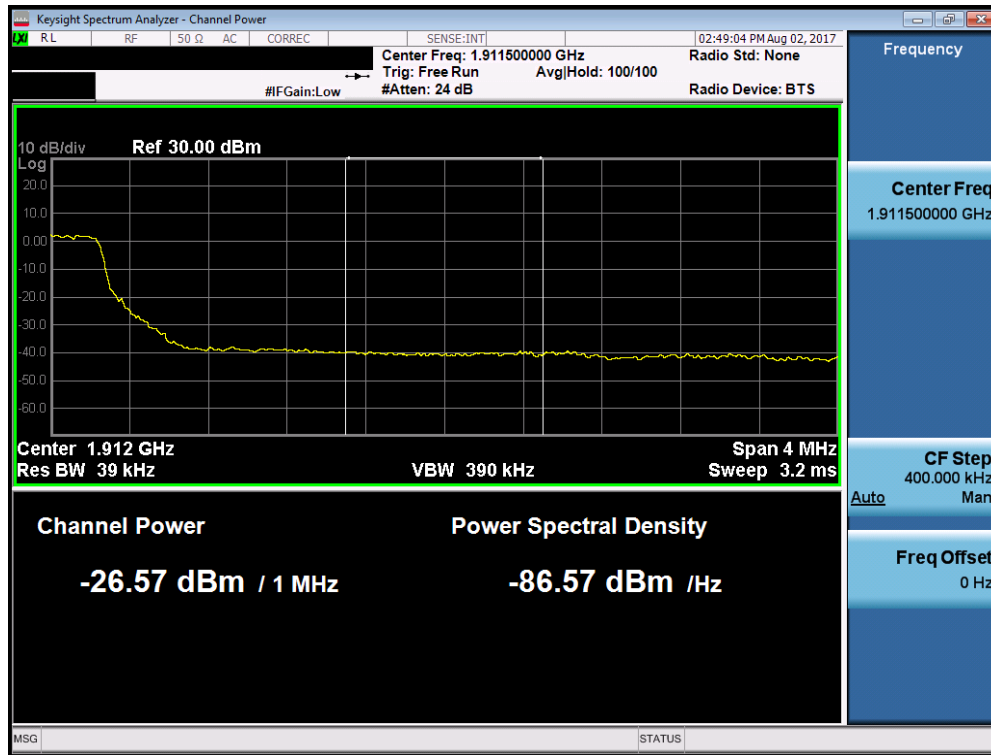


Plot 7-151. Lower Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

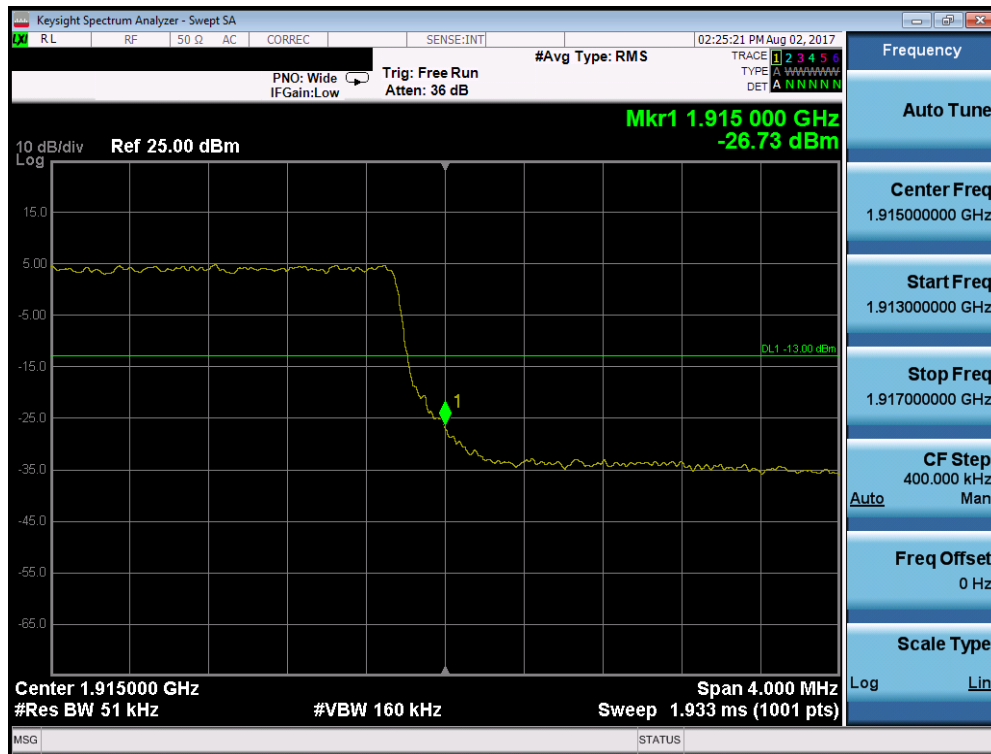


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 97 of 151

Plot 7-152. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

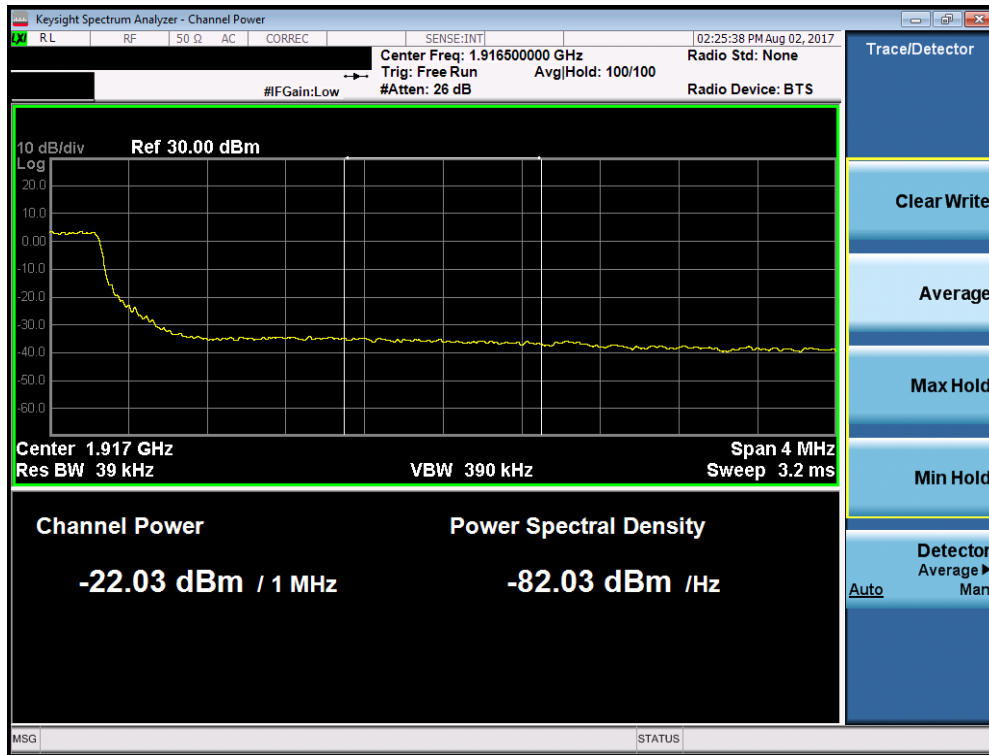


Plot 7-153. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

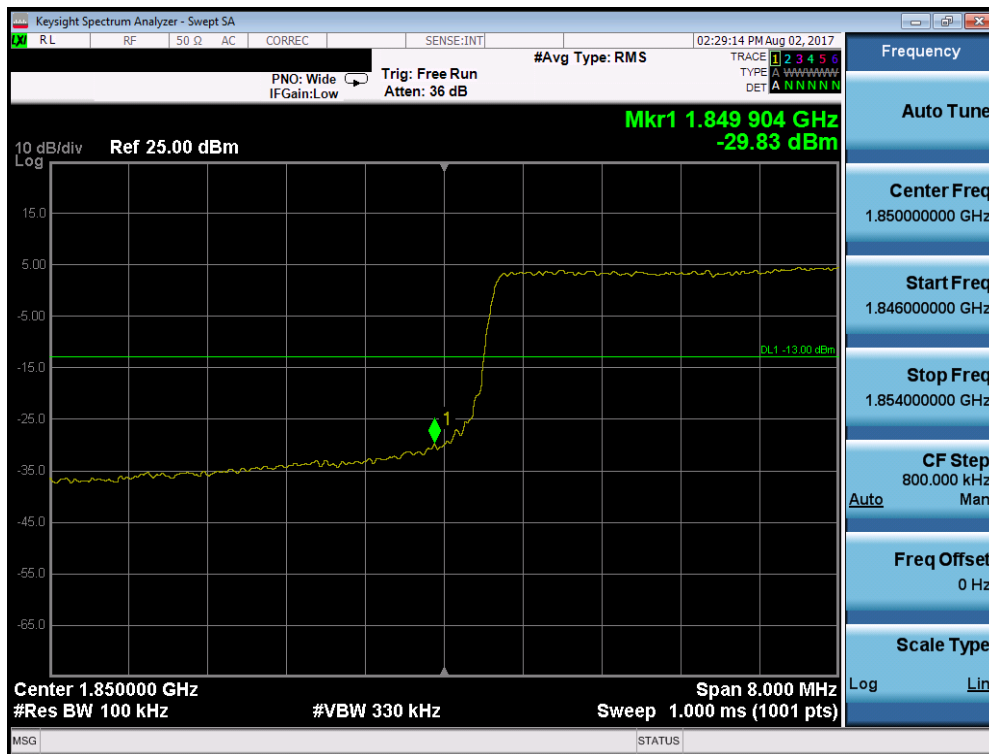


FCC ID: ZNFLK460			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet			Page 98 of 151

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

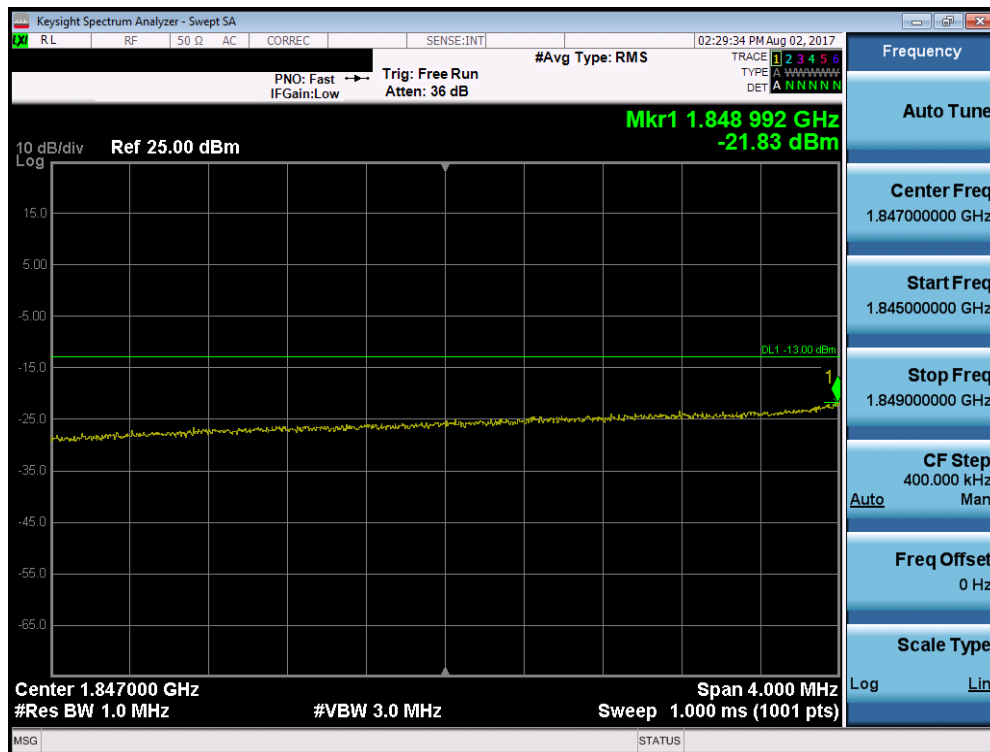


Plot 7-155. Upper Extended Band Edge Plot (Band 25 – 5.0MHz QPSK – RB Size 25)

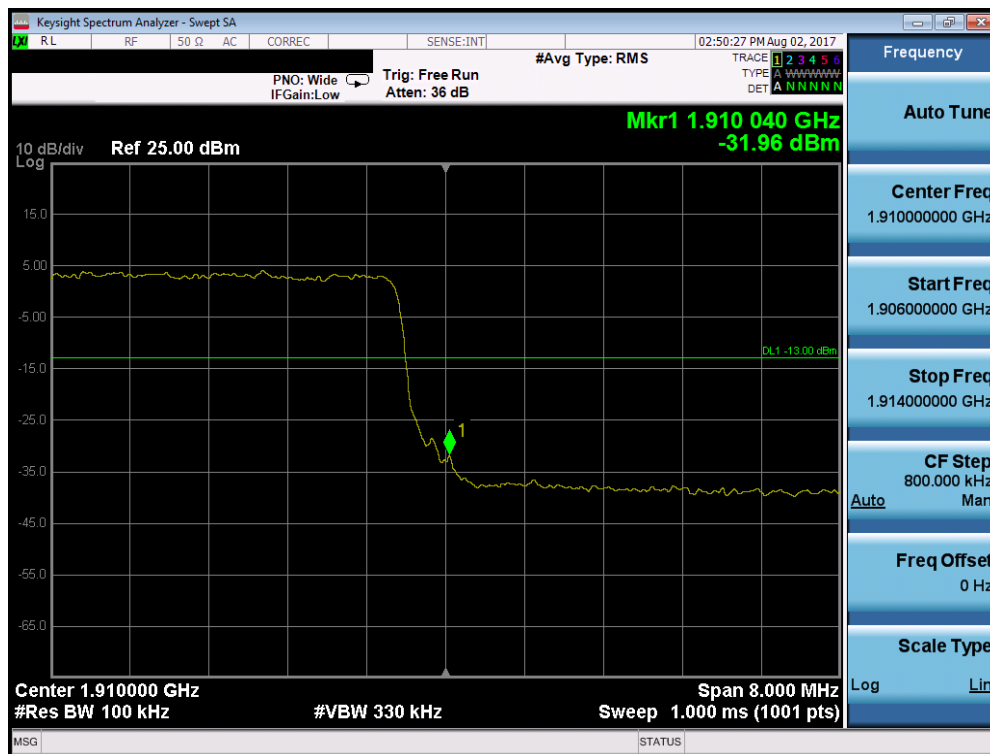


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 99 of 151

Plot 7-156. Lower Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

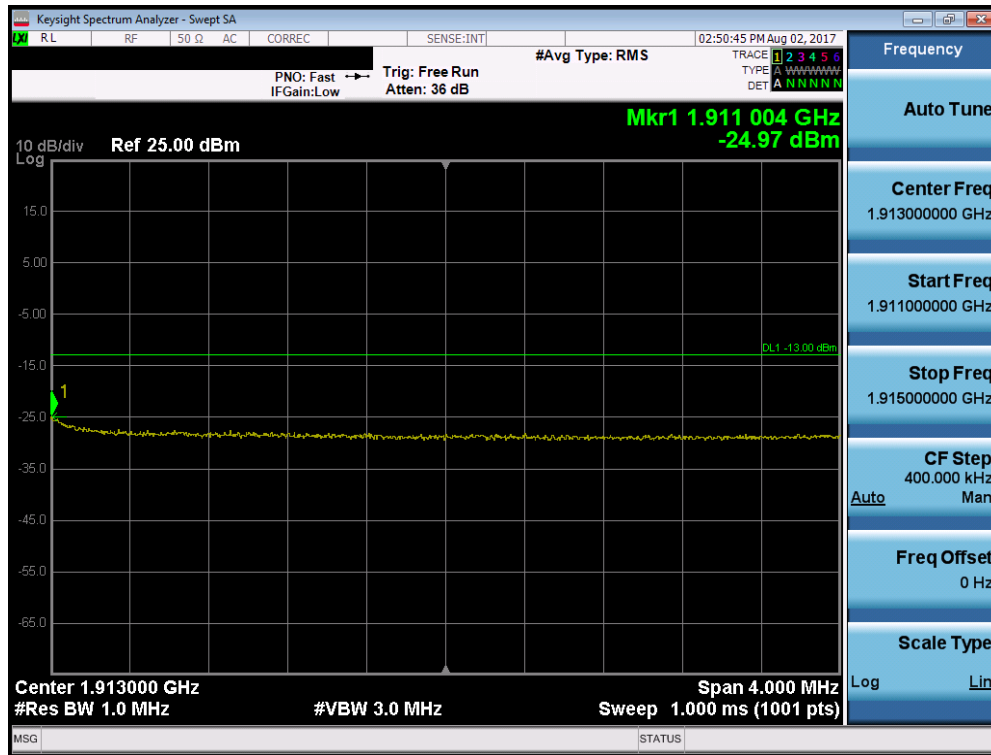


Plot 7-157. Lower Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

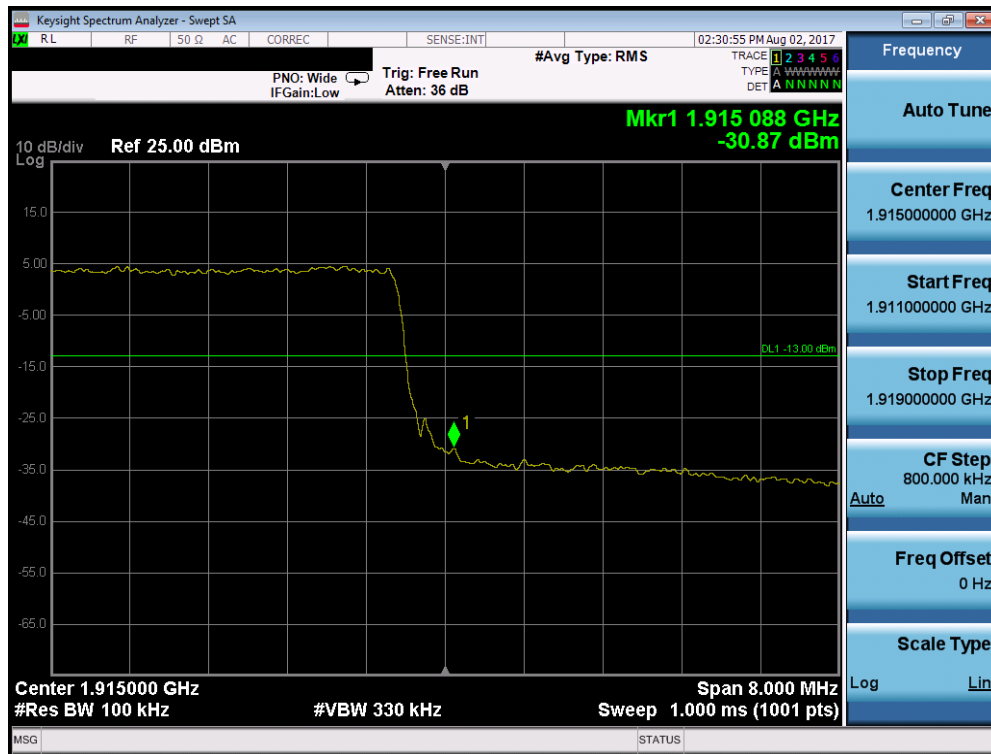


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 100 of 151

Plot 7-158. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 7-159. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

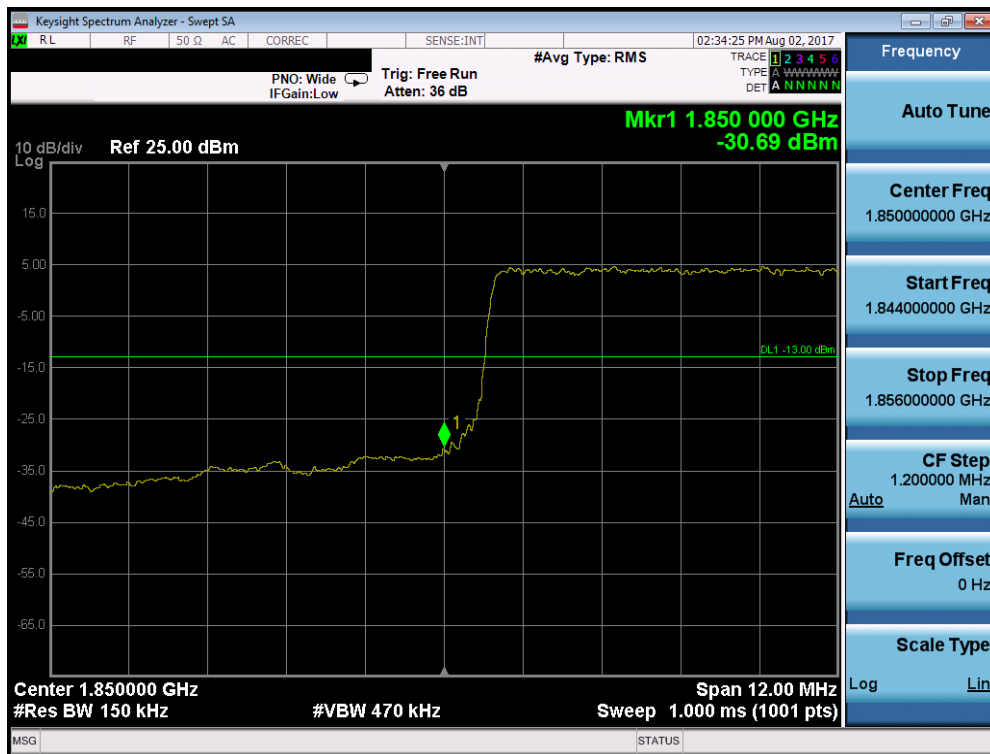




FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 101 of 151

Plot 7-160. Upper Band Edge Plot (Band 25 – 10.0MHz QPSK – RB Size 50)

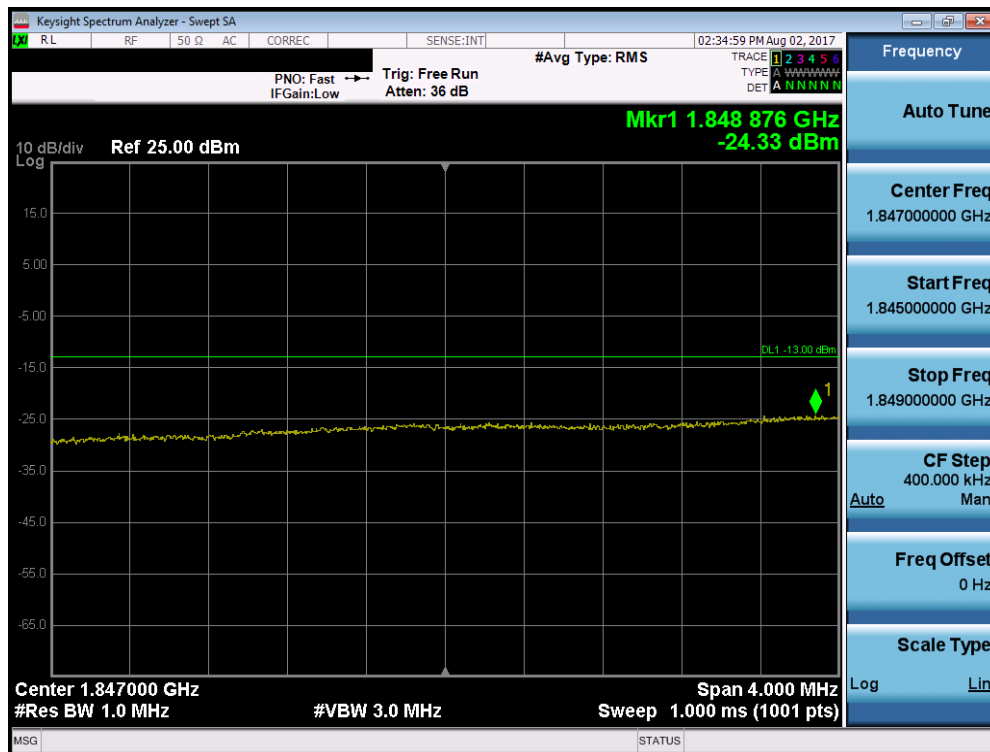


Plot 7-161. Upper Extended Band Edge Plot (Band 25 – 10.0MHz QPSK – RB Size 50)

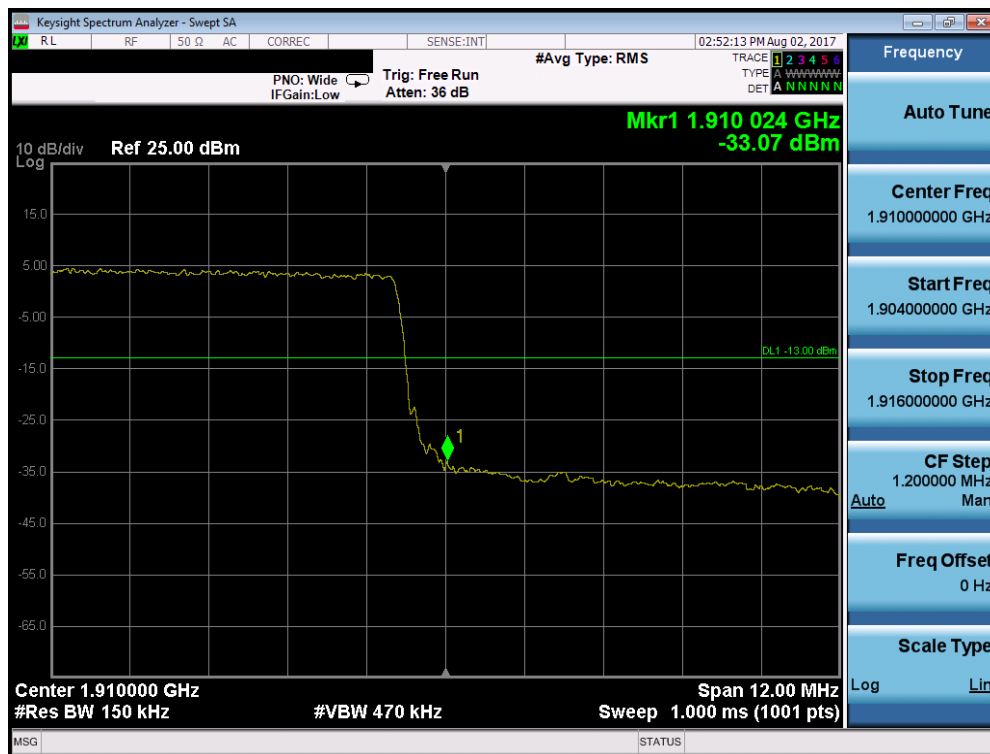


FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 102 of 151

Plot 7-162. Lower Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

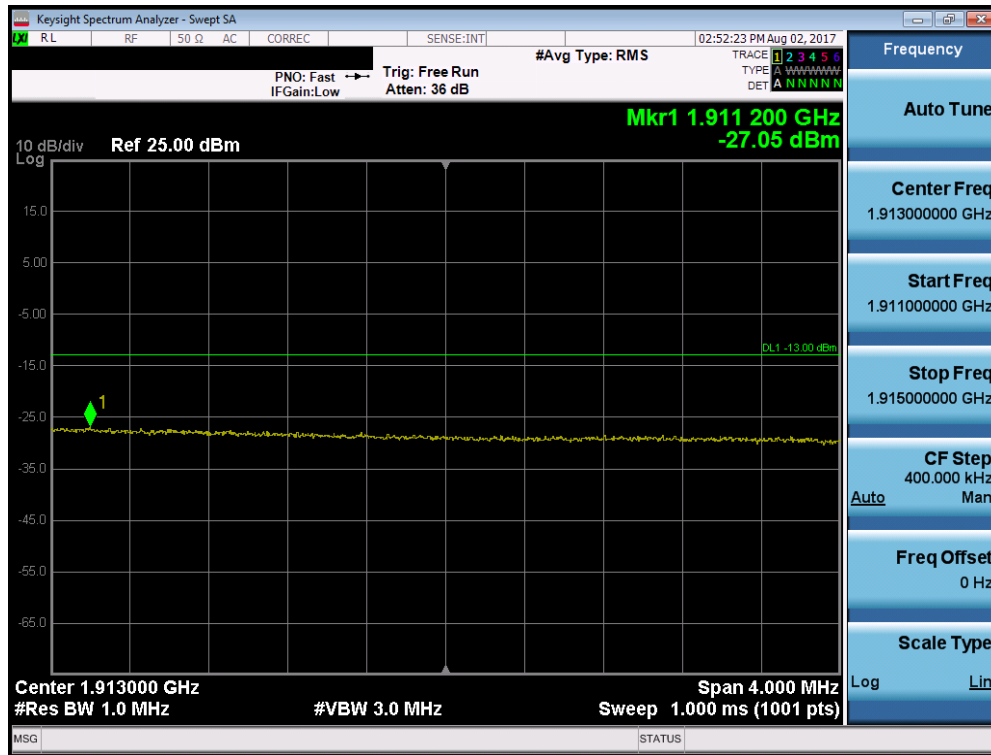


Plot 7-163. Lower Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

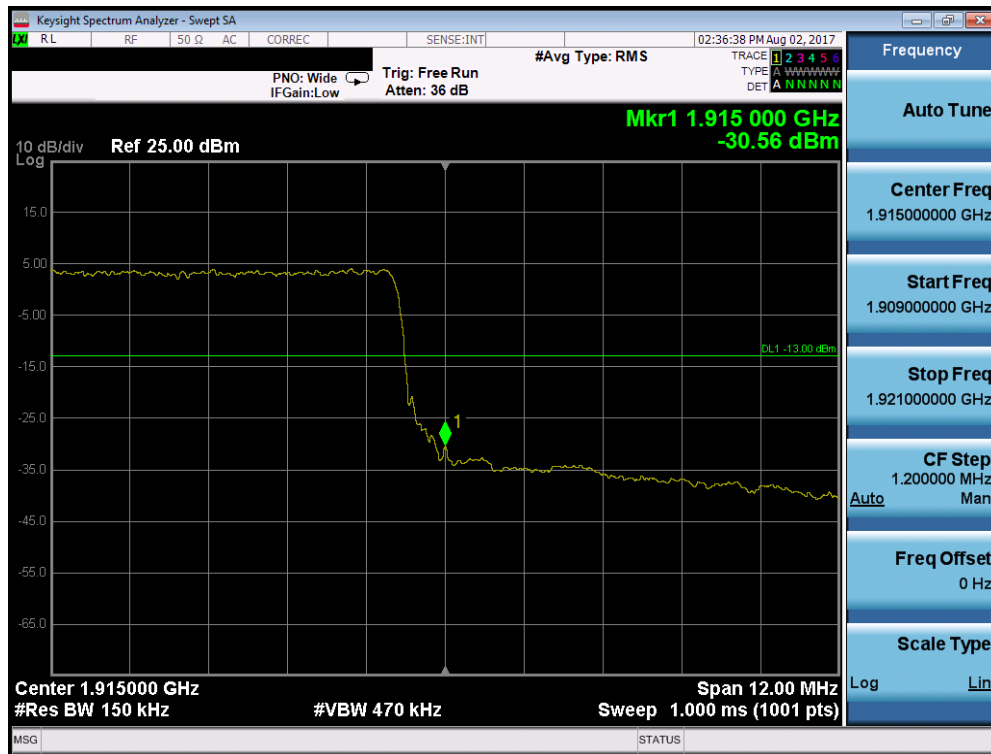


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 103 of 151

Plot 7-164. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



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

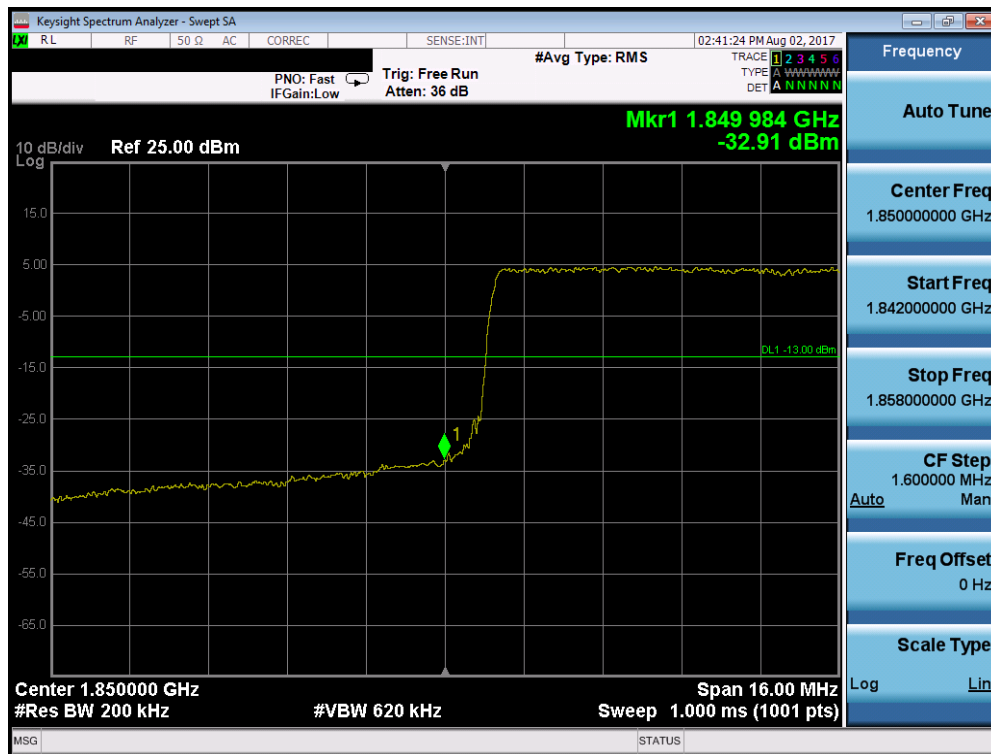


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 104 of 151

Plot 7-166. Upper Band Edge Plot (Band 25 – 15.0MHz QPSK – RB Size 75)

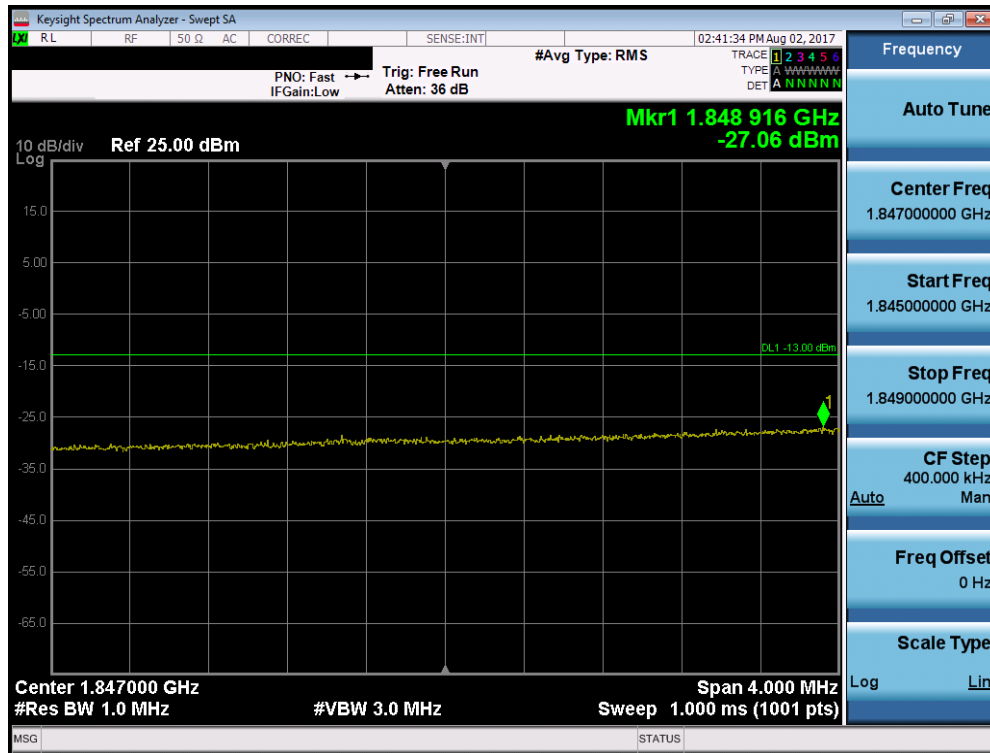


Plot 7-167. Upper Extended Band Edge Plot (Band 25 – 15.0MHz QPSK – RB Size 75)

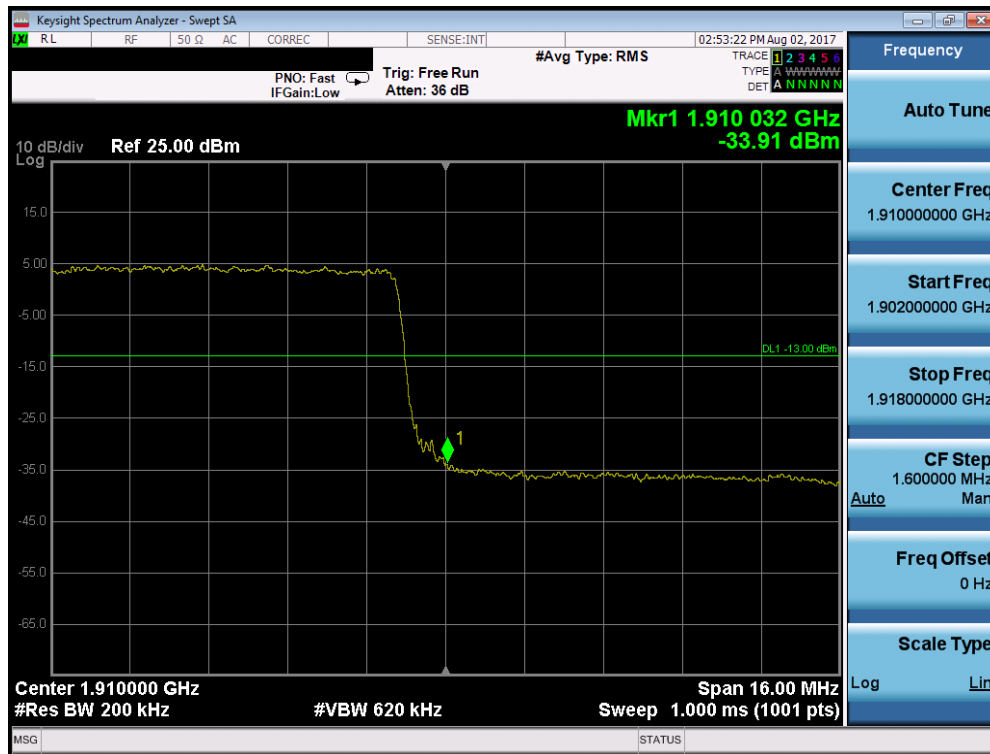


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 105 of 151

Plot 7-168. Lower Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

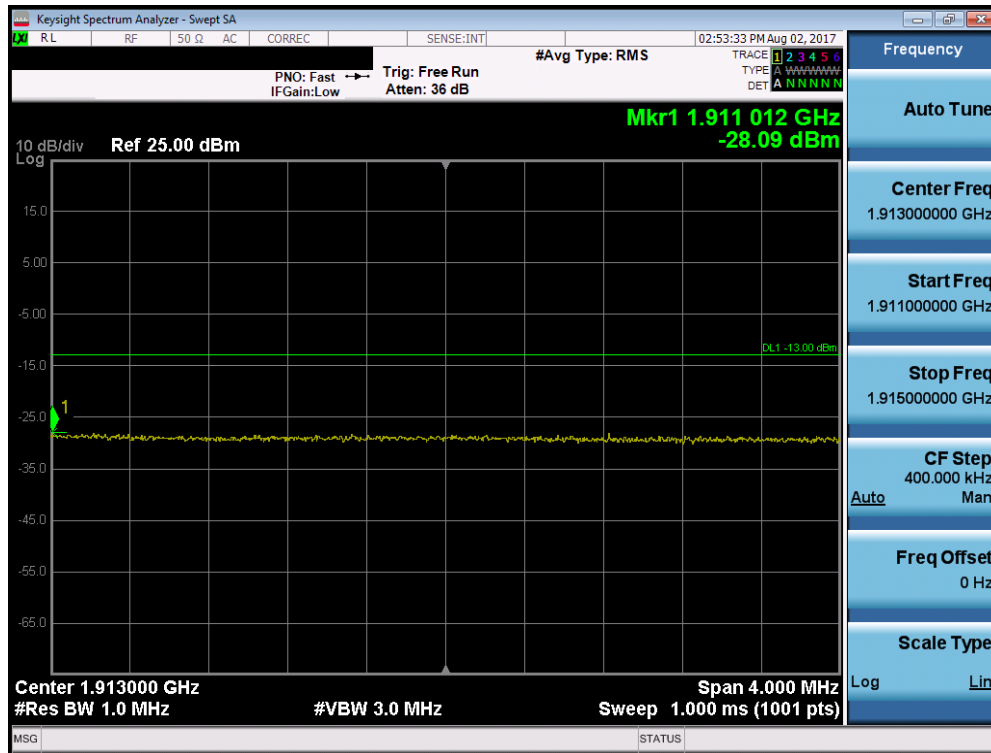


Plot 7-169. Lower Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

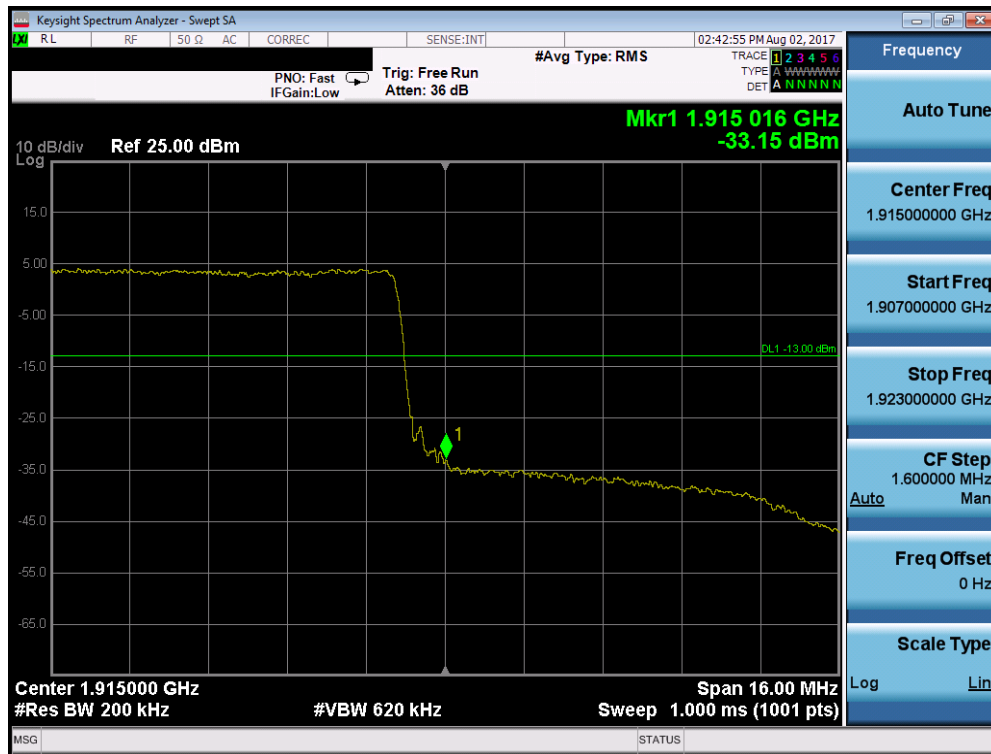


FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 106 of 151

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

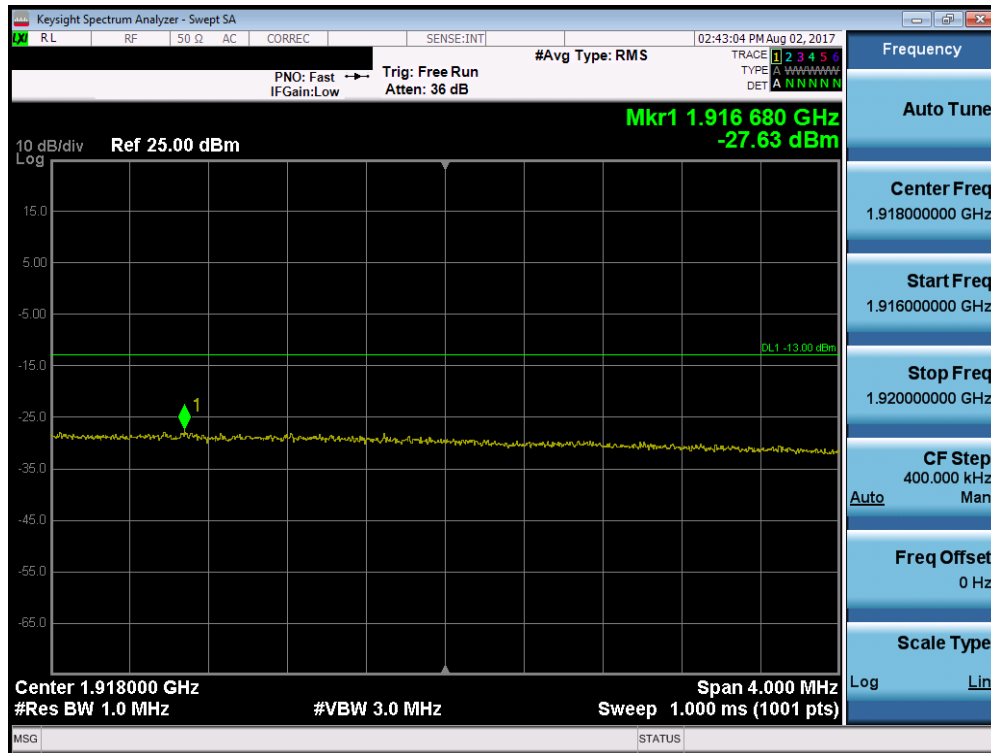


Plot 7-171. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

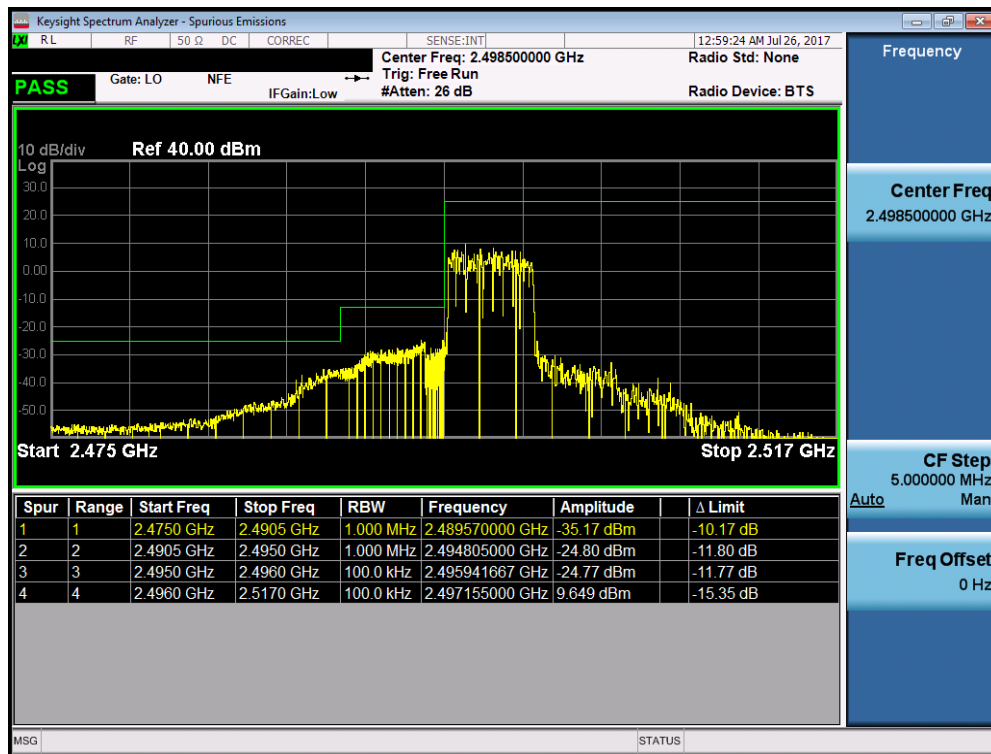




FCC ID: ZNFLK460	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 107 of 151

Plot 7-172. Upper Band Edge Plot (Band 25 – 20.0MHz QPSK – RB Size 100)

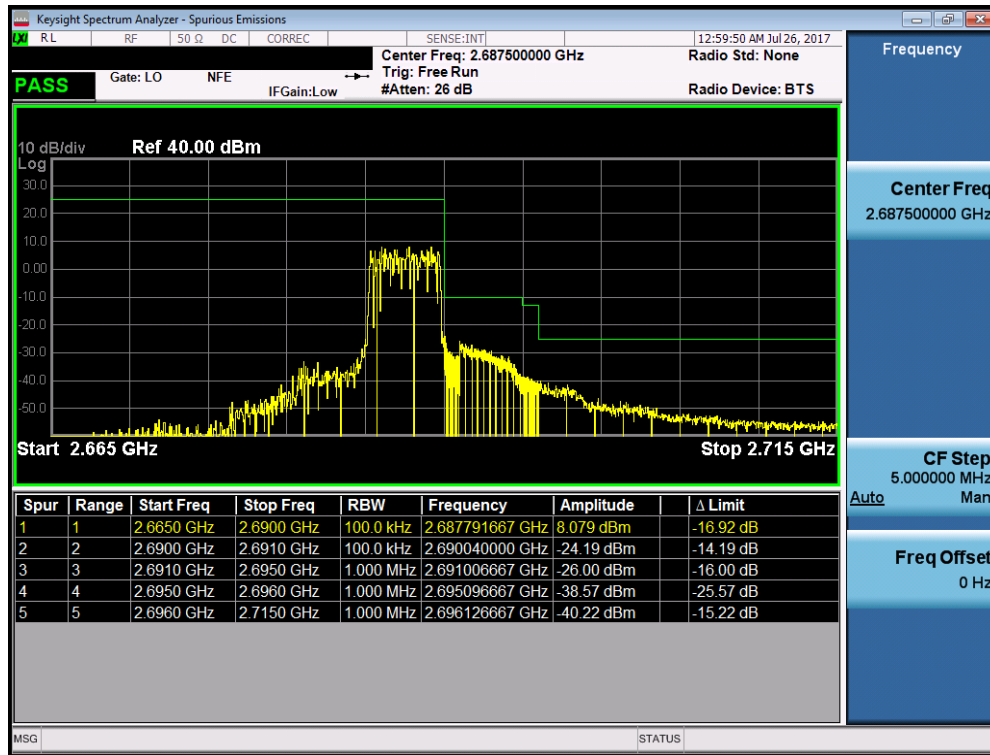


Plot 7-173. Upper Extended Band Edge Plot (Band 25 – 20.0MHz QPSK – RB Size 100)

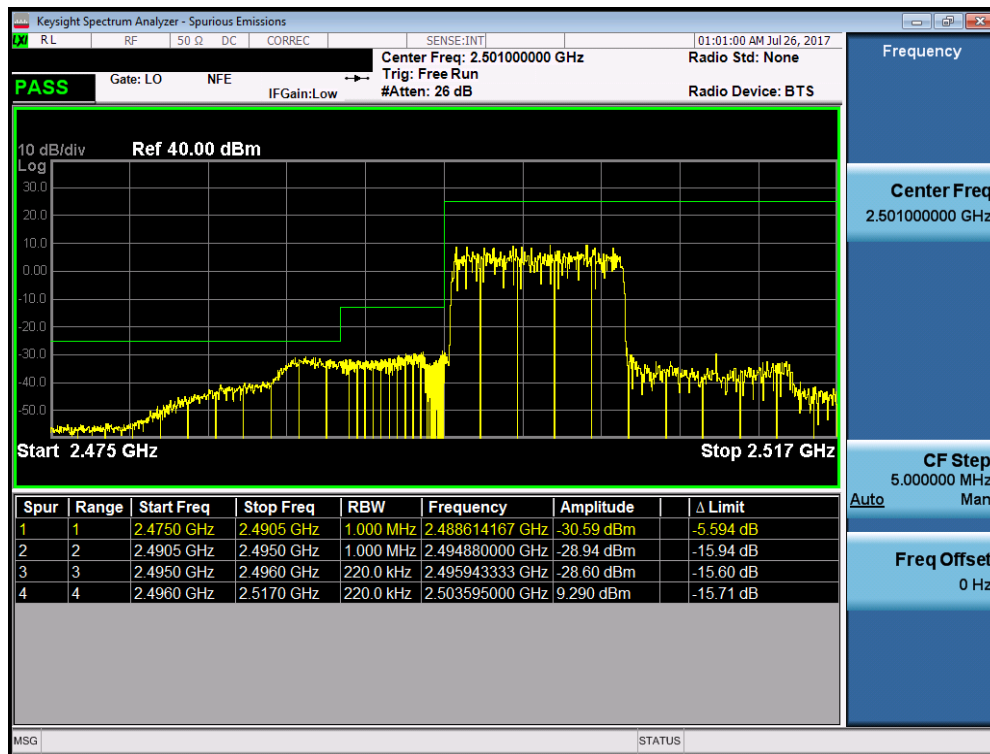


FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	
			Page 108 of 151

Plot 7-174. Lower ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

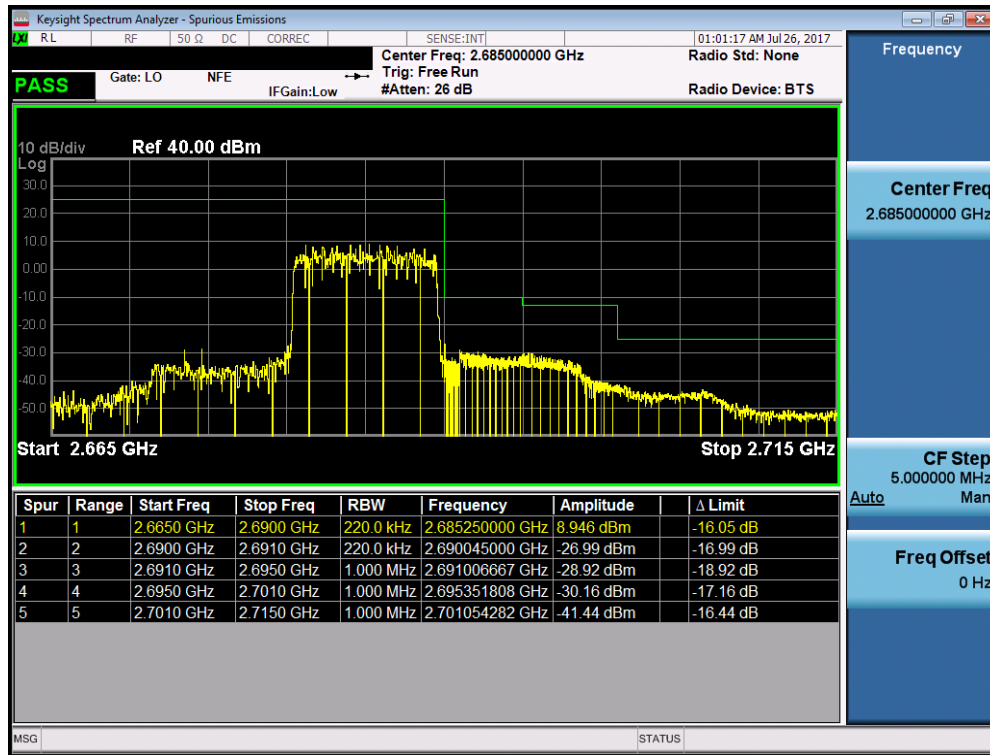


Plot 7-175. Upper ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

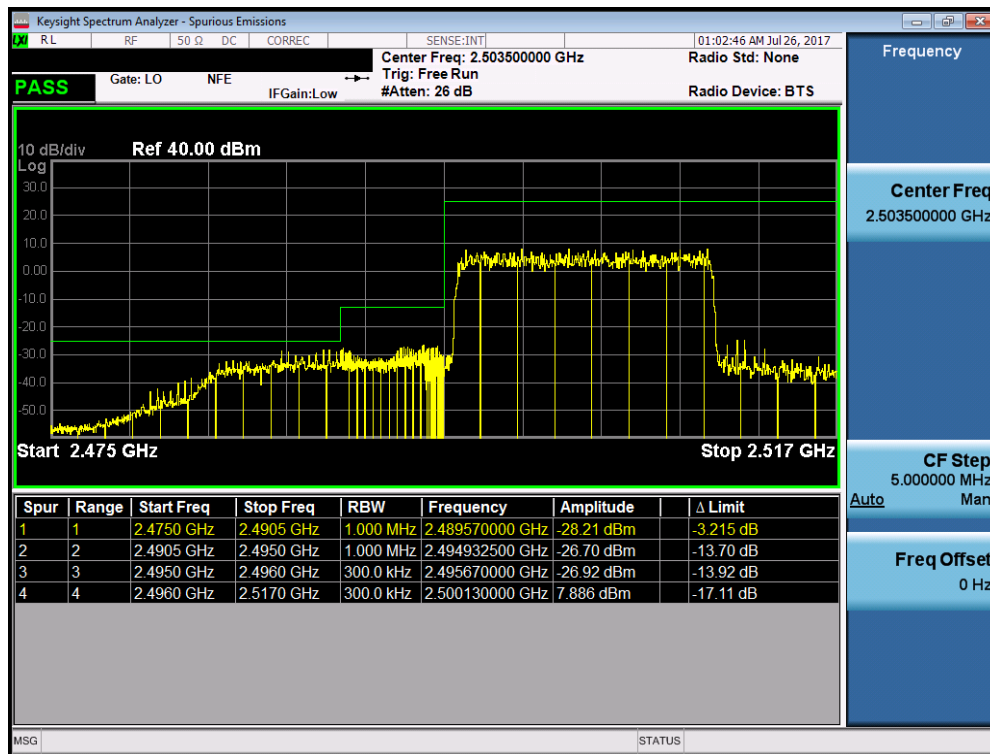




FCC ID: ZNFLK460	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 109 of 151

Plot 7-176. Lower ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)

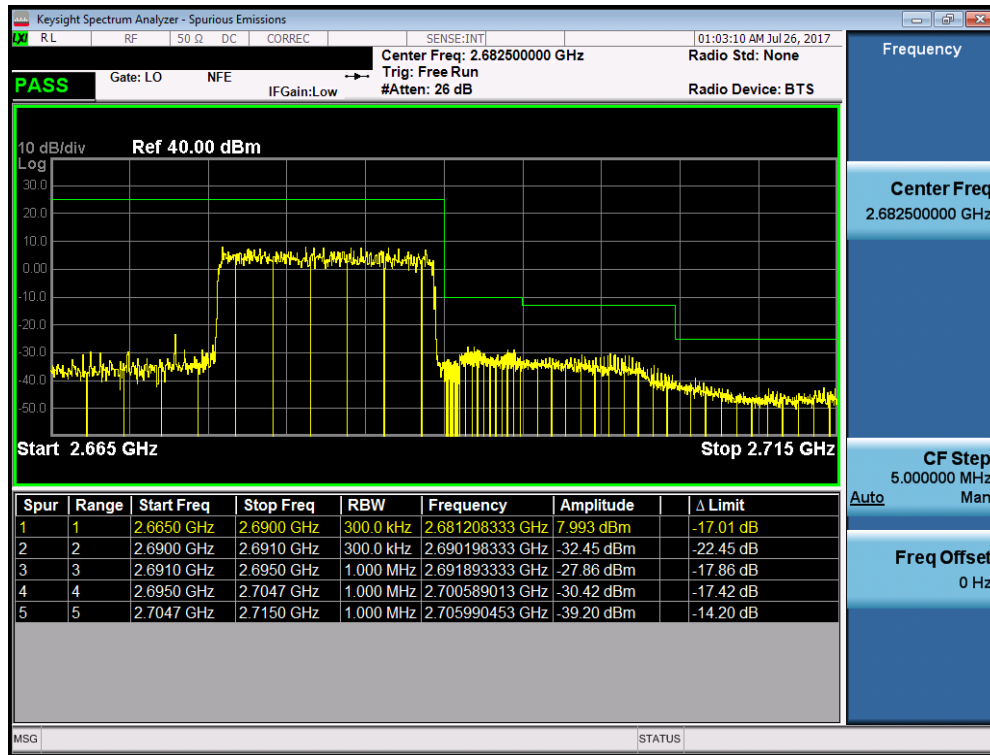


Plot 7-177. Upper ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)

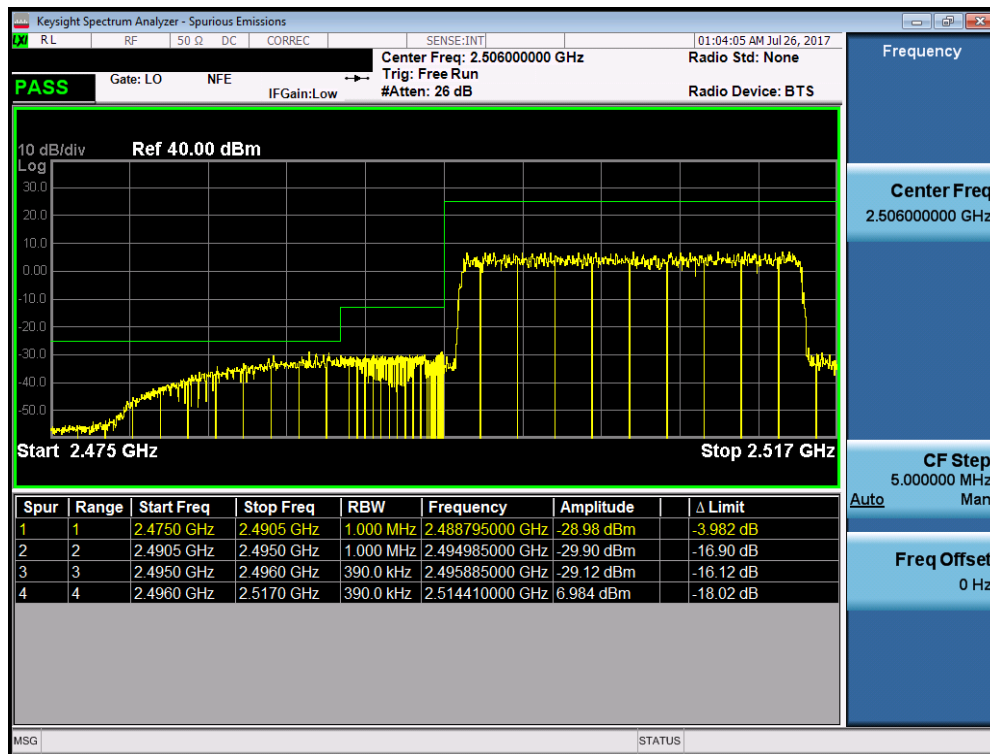


FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 110 of 151	

Plot 7-178. Lower ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)

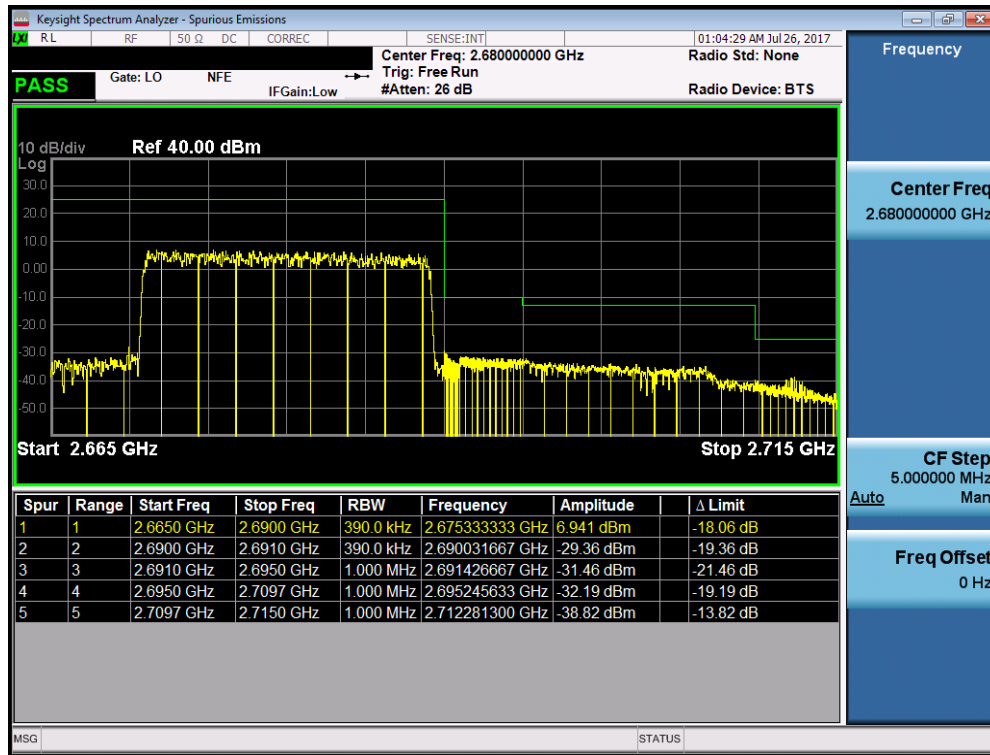


Plot 7-179. Upper ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)





FCC ID: ZNFLK460	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 111 of 151

Plot 7-180. Lower ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Plot 7-181. Upper ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 112 of 151

7.5 Peak-Average Ratio

§24.232(d)

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v02r02 – Section 5.7.1

Test Settings

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

Test Setup

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

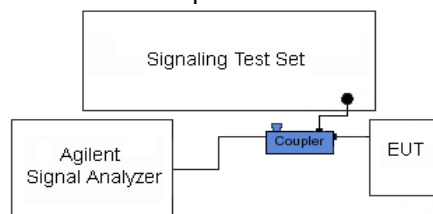


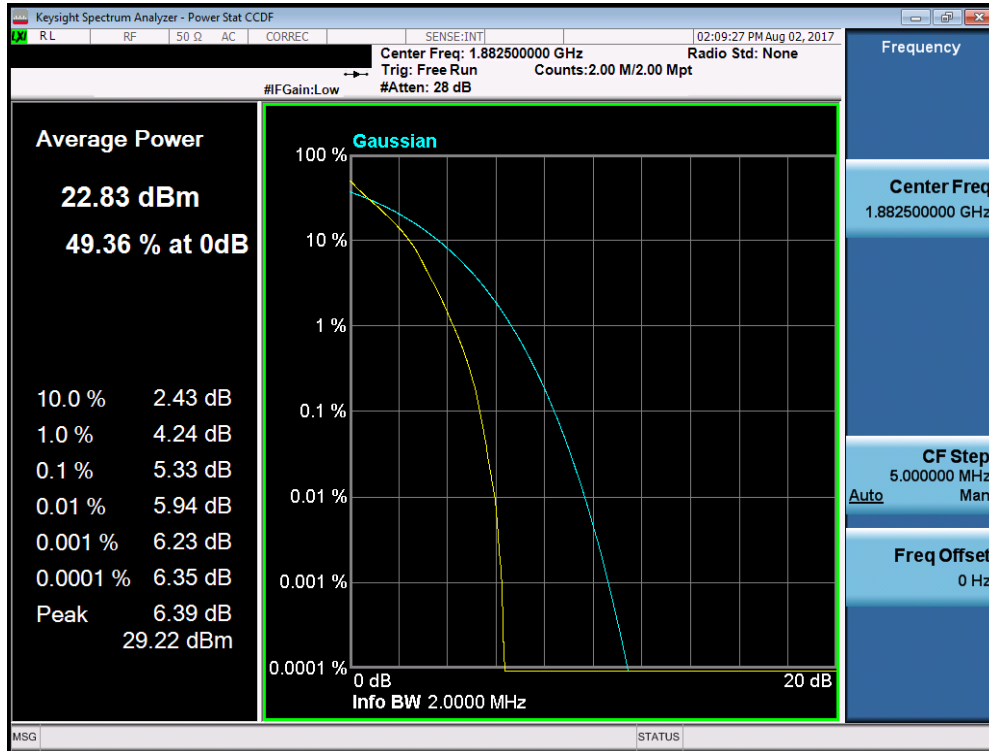


Figure 7-4. Test Instrument & Measurement Setup

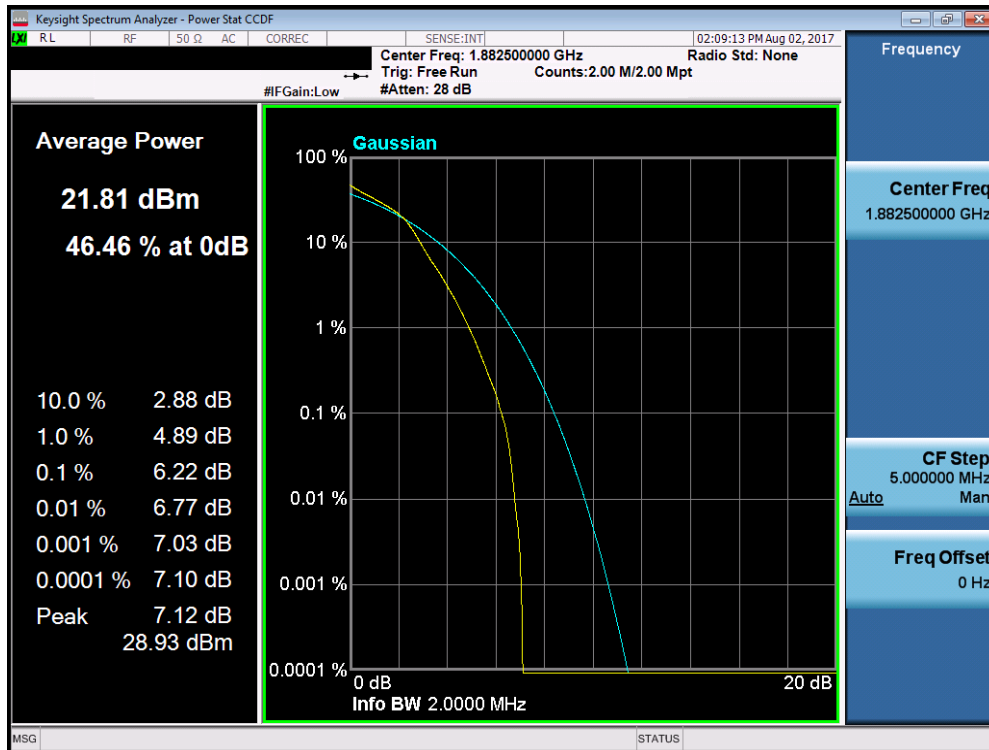
Test Notes

None.

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 113 of 151	

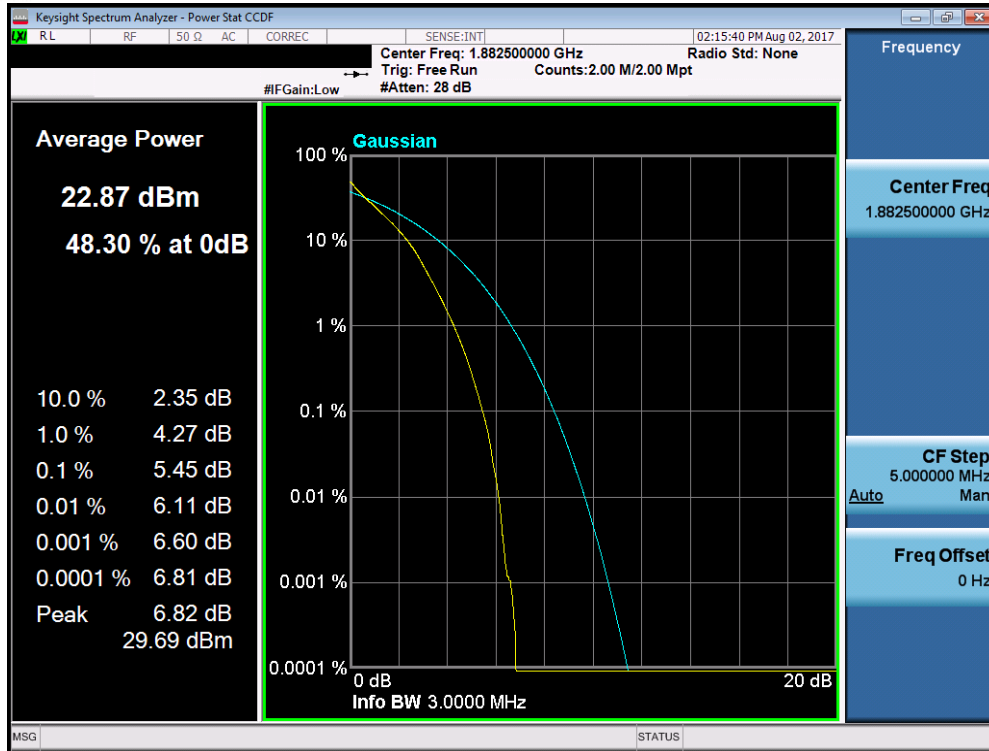


Plot 7-182. PAR Plot (Band 2/25 - 1.4MHz QPSK - RB Size 6)

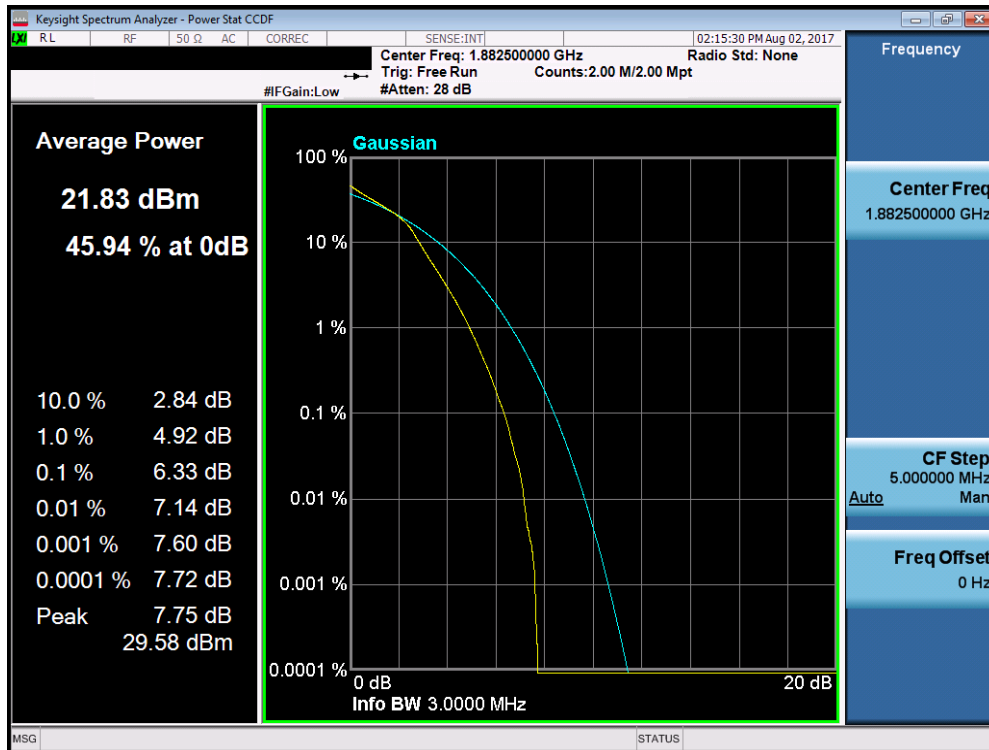


Plot 7-183. PAR Plot (Band 2/25 - 1.4MHz 16-QAM - RB Size 6)

FCC ID: ZNFLK460	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 114 of 151

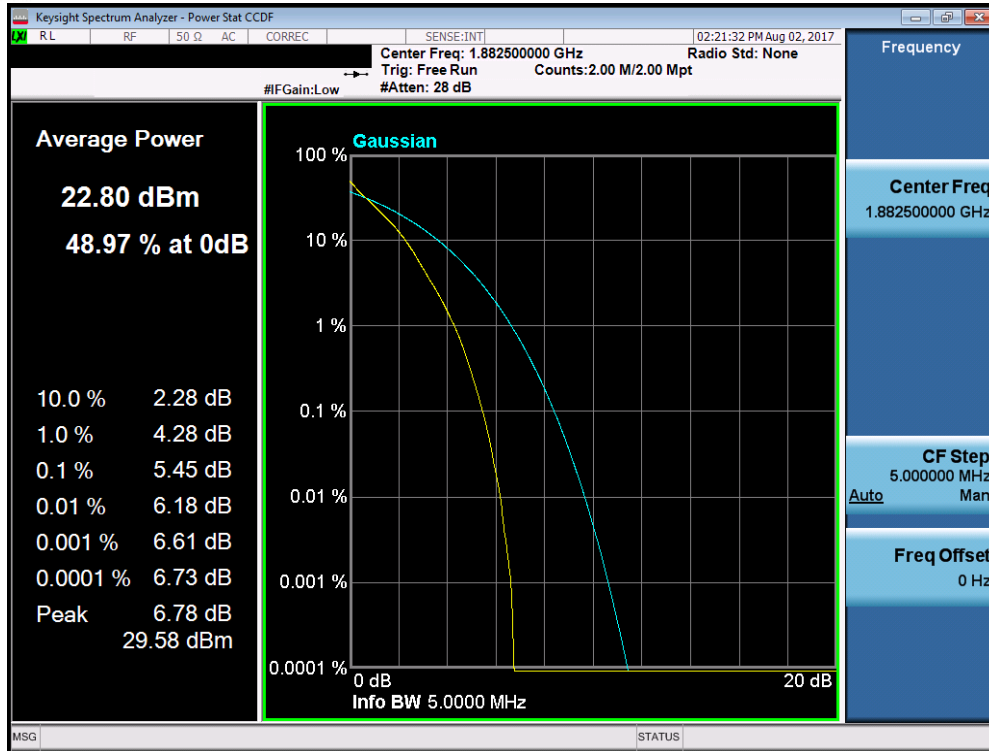


Plot 7-184. PAR Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

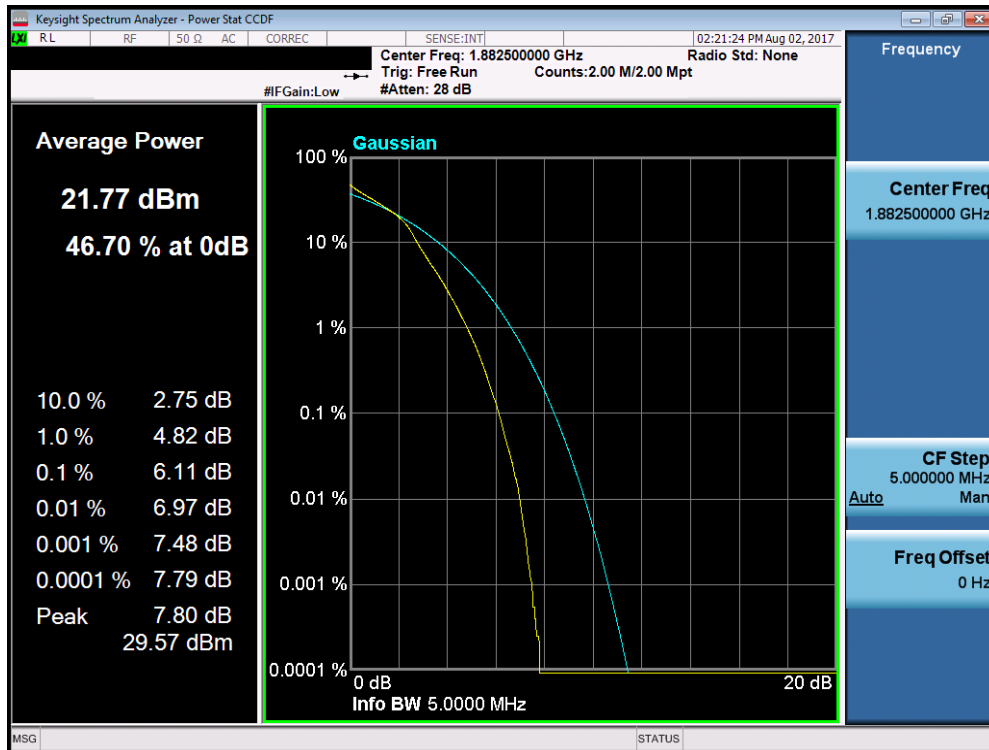


Plot 7-185. PAR Plot (Band 2/25 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: ZNFLK460	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 115 of 151

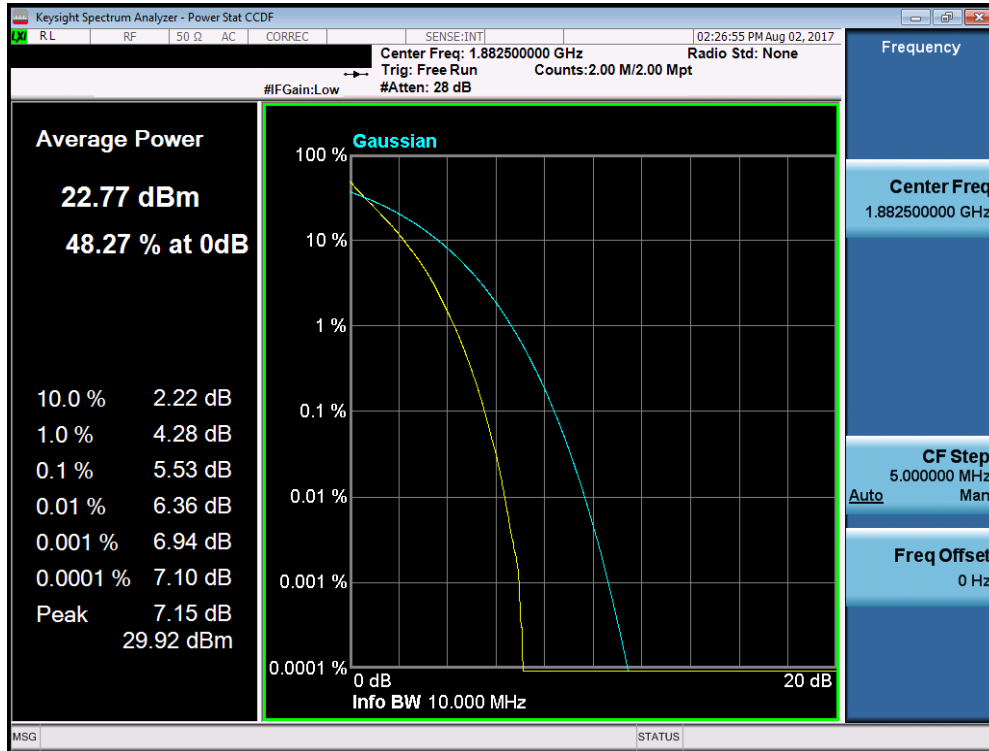


Plot 7-186. PAR Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

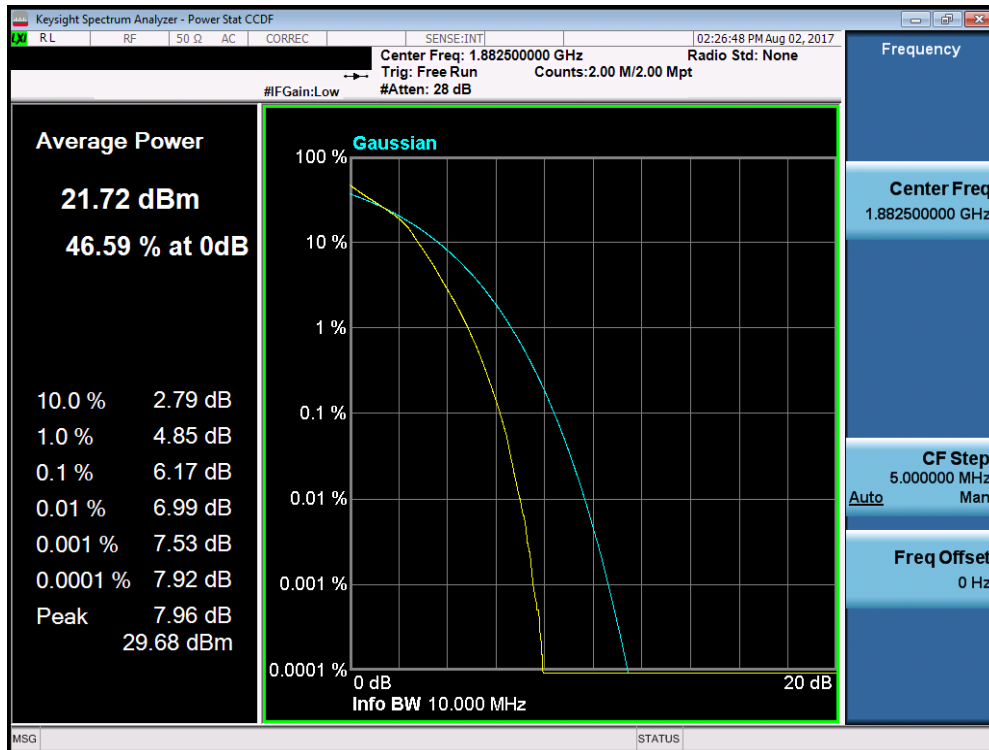


Plot 7-187. PAR Plot (Band 2/25 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: ZNFLK460			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet			Page 116 of 151

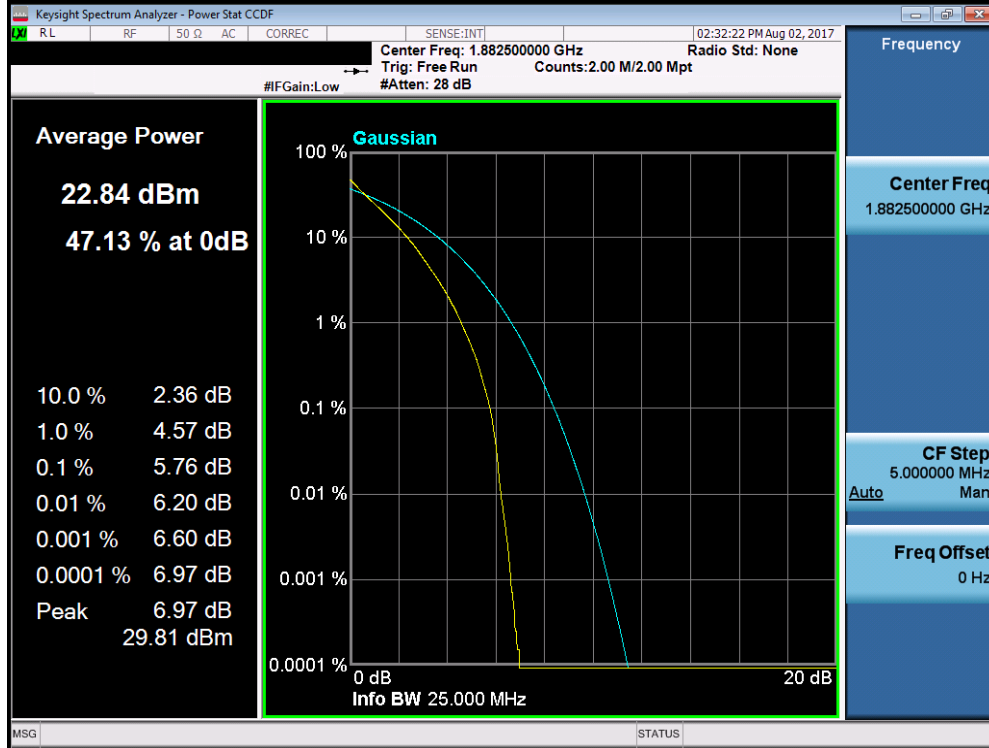


Plot 7-188. PAR Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

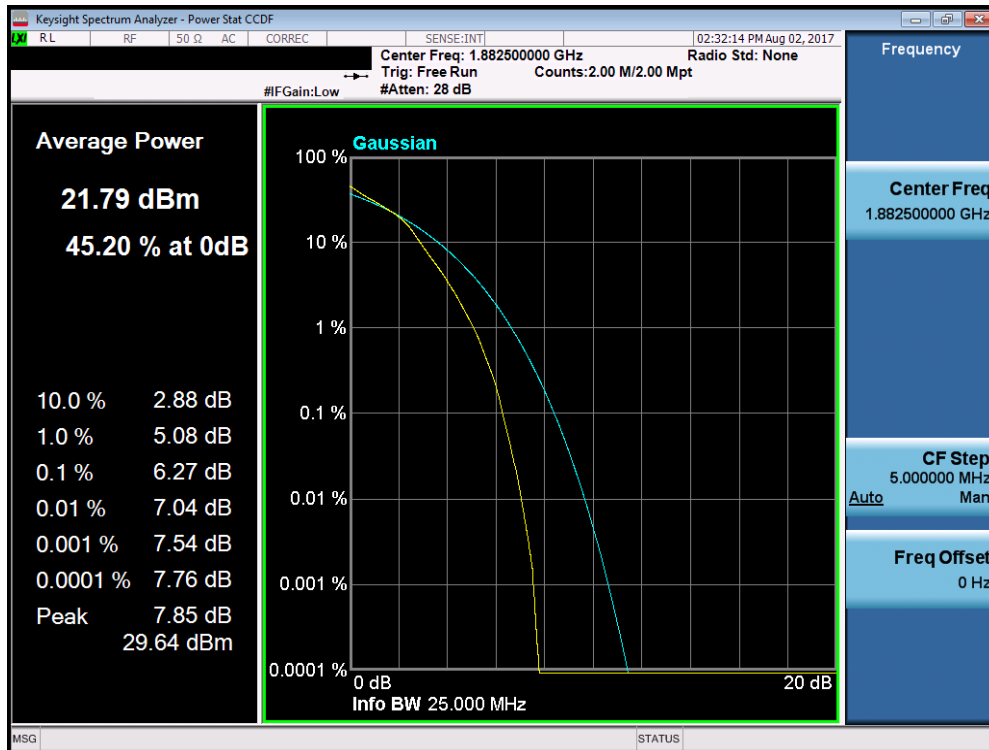


Plot 7-189. PAR Plot (Band 2/25 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFLK460	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 117 of 151

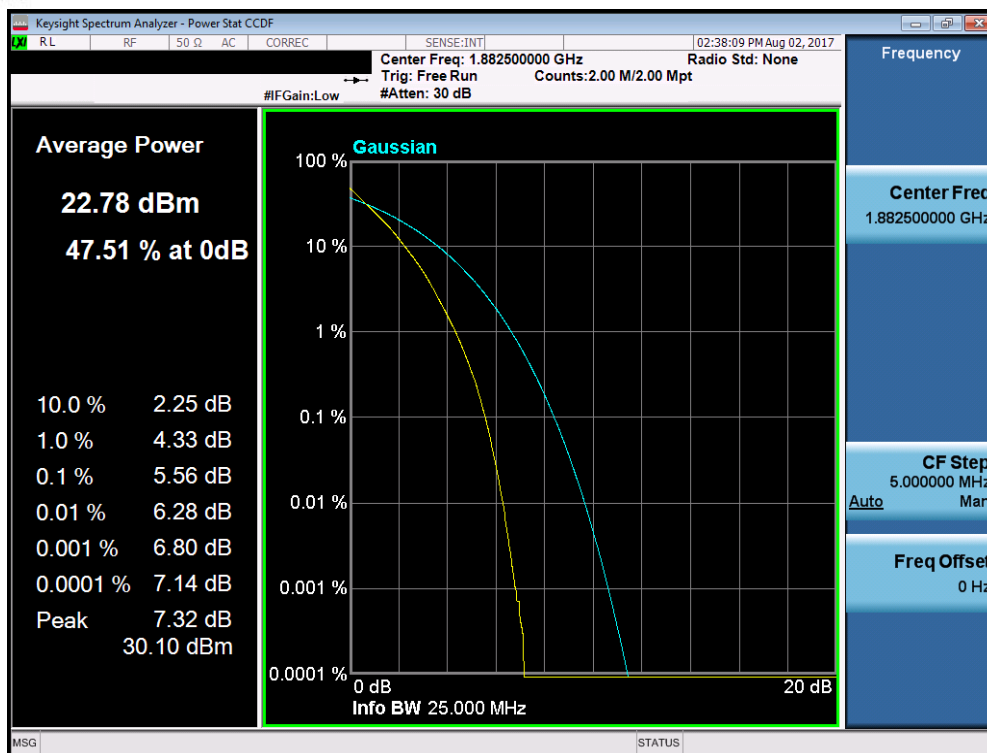


Plot 7-190. PAR Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

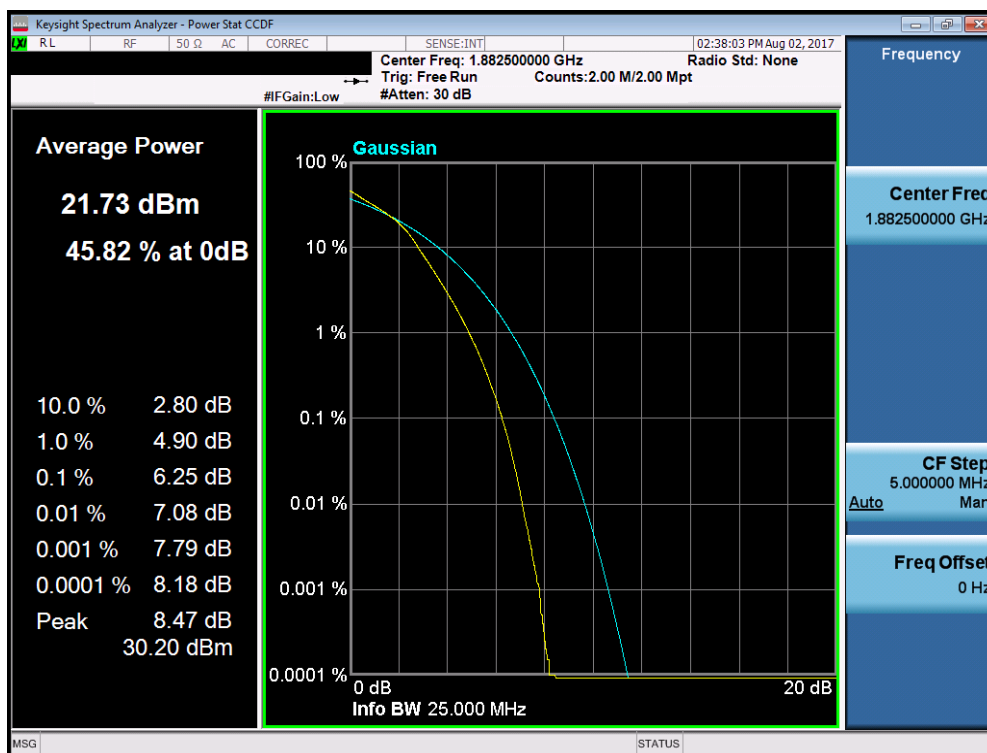


Plot 7-191. PAR Plot (Band 2/25 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFLK460			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet			Page 118 of 151



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



Plot 7-193. PAR Plot (Band 2/25 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: ZNFLK460	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 119 of 151

7.6 Radiated Power (ERP/EIRP)

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

Test Overview

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



Test Procedures Used



KDB 971168 D01 v02r02 – Section 5.2.1

ANSI/TIA-603-D-2010 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ 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". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

FCC ID: ZNFK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 120 of 151

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05- R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 121 of 151

Test Setup

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

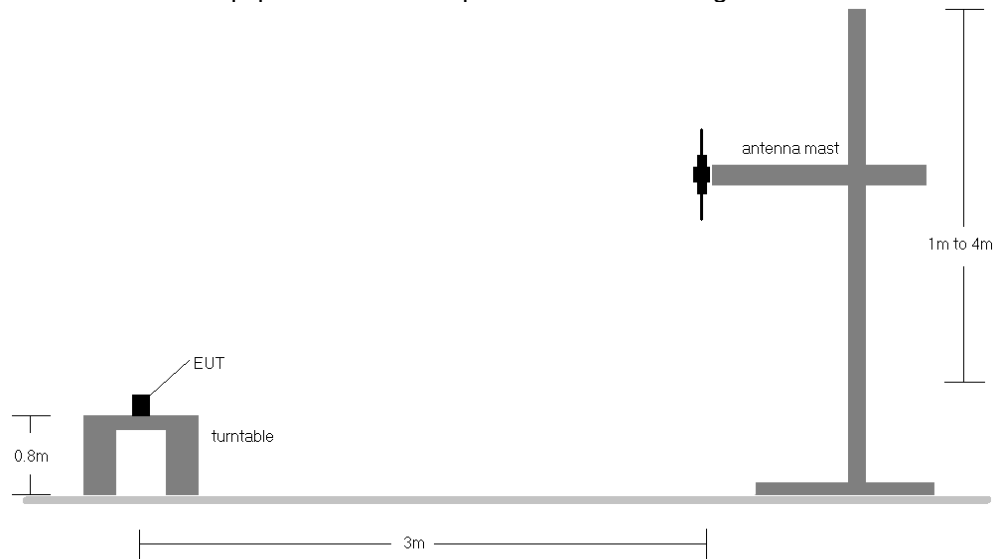


Figure 7-5. Radiated Test Setup <1GHz

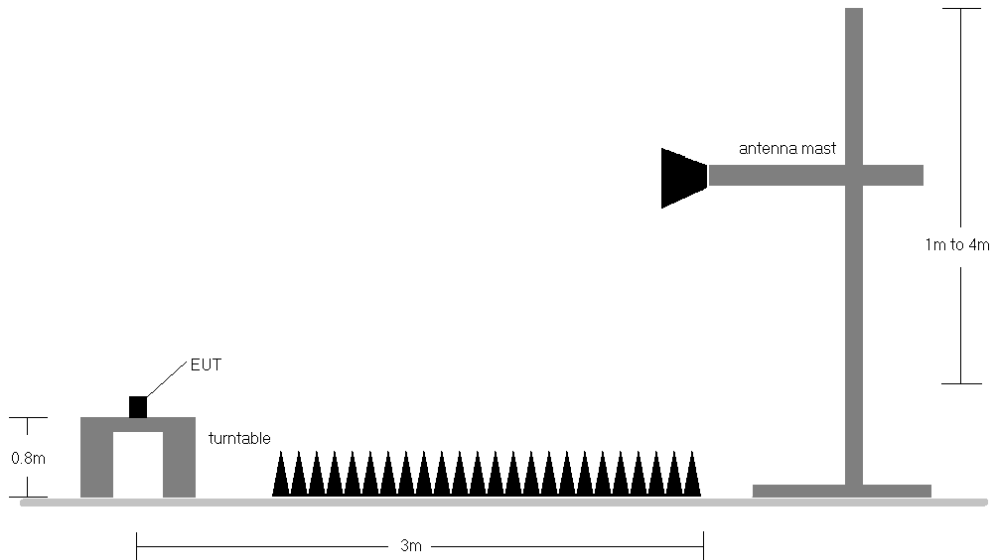




Figure 7-6. Radiated Test Setup >1GHz



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: ZNFK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 122 of 151

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	150	325	1 / 0	17.26	-1.05	16.21	34.77	-18.56
707.50	1.4	QPSK	H	150	310	1 / 0	17.96	-1.02	16.94	34.77	-17.83
715.30	1.4	QPSK	H	150	315	1 / 0	18.47	-0.99	17.48	34.77	-17.29
715.30	1.4	16-QAM	H	150	315	1 / 0	17.68	-0.99	16.69	34.77	-18.08
700.50	3	QPSK	H	150	305	1 / 0	17.24	-1.05	16.19	34.77	-18.58
707.50	3	QPSK	H	150	325	1 / 0	18.20	-1.02	17.18	34.77	-17.59
714.50	3	QPSK	H	150	335	1 / 0	18.50	-0.99	17.51	34.77	-17.26
714.50	3	16-QAM	H	150	335	1 / 0	17.60	-0.99	16.61	34.77	-18.16
701.50	5	QPSK	H	150	301	1 / 0	17.37	-1.04	16.33	34.77	-18.45
707.50	5	QPSK	H	150	310	1 / 0	18.15	-1.02	17.13	34.77	-17.64
713.50	5	QPSK	H	150	312	1 / 0	18.42	-1.00	17.42	34.77	-17.35
713.50	5	16-QAM	H	150	312	1 / 0	17.64	-1.00	16.64	34.77	-18.13
704.00	10	QPSK	H	150	339	1 / 0	17.40	-1.03	16.37	34.77	-18.40
707.50	10	QPSK	H	150	357	1 / 0	17.88	-1.02	16.86	34.77	-17.91
711.00	10	QPSK	H	150	342	1 / 0	17.59	-1.01	16.58	34.77	-18.19
707.50	10	16-QAM	H	150	357	1 / 0	16.91	-1.02	15.89	34.77	-18.88
714.50	3	QPSK	V	150	237	1 / 0	17.29	-0.99	16.30	34.77	-18.47
714.50	3 (WCP)	QPSK	H	150	334	1 / 0	17.93	-0.99	16.94	34.77	-17.83

Table 7-2. ERP Data (Band 12)


FCC ID: ZNFK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 123 of 151

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	150	339	1 / 0	22.35	-0.65	21.70	38.45	-16.75
836.50	1.4	QPSK	H	150	338	1 / 0	23.01	-0.65	22.36	38.45	-16.09
848.30	1.4	QPSK	H	150	345	1 / 0	23.59	-0.65	22.94	38.45	-15.51
848.30	1.4	16-QAM	H	150	345	1 / 0	22.56	-0.65	21.91	38.45	-16.54
825.50	3	QPSK	H	150	351	1 / 0	22.37	-0.65	21.72	38.45	-16.73
836.50	3	QPSK	H	150	325	1 / 0	23.31	-0.65	22.66	38.45	-15.79
847.50	3	QPSK	H	150	348	1 / 0	23.67	-0.65	23.02	38.45	-15.43
847.50	3	16-QAM	H	150	348	1 / 0	22.78	-0.65	22.13	38.45	-16.32
826.50	5	QPSK	H	150	152	1 / 0	22.27	-0.65	21.62	38.45	-16.83
836.50	5	QPSK	H	150	145	1 / 0	23.26	-0.65	22.61	38.45	-15.84
846.50	5	QPSK	H	150	139	1 / 0	23.52	-0.65	22.87	38.45	-15.58
846.50	5	16-QAM	H	150	139	1 / 0	22.79	-0.65	22.14	38.45	-16.31
829.00	10	QPSK	H	150	164	1 / 0	22.43	-0.65	21.78	38.45	-16.67
836.50	10	QPSK	H	150	154	1 / 0	22.77	-0.65	22.12	38.45	-16.33
844.00	10	QPSK	H	150	164	1 / 0	23.32	-0.65	22.67	38.45	-15.78
844.00	10	16-QAM	H	150	164	1 / 0	22.38	-0.65	21.73	38.45	-16.72
847.50	3	QPSK	V	150	123	1 / 0	21.53	-0.65	20.88	38.45	-17.57
847.50	3 (WCP)	QPSK	H	150	346	1 / 0	21.50	-0.65	20.85	38.45	-17.60

Table 7-3. ERP Data (Band 5/26)



Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	150	135	1 / 0	21.57	-0.65	20.92	38.45	-17.53
836.50	15	QPSK	H	150	145	1 / 0	22.51	-0.65	21.86	38.45	-16.59
841.50	15	QPSK	H	150	134	1 / 0	22.86	-0.65	22.21	38.45	-16.24
841.50	15	16-QAM	H	150	134	1 / 0	22.22	-0.65	21.57	38.45	-16.88

Table 7-4. ERP Data (Band 26)

FCC ID: ZNFK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 				Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet			Page 124 of 151



Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	150	335	1 / 0	17.54	5.56	23.10	30.00	-6.90
1732.50	1.4	QPSK	H	150	336	1 / 0	17.91	5.41	23.32	30.00	-6.68
1754.30	1.4	QPSK	H	150	240	1 / 0	18.20	5.26	23.46	30.00	-6.54
1754.30	1.4	16-QAM	H	150	240	1 / 0	17.40	5.26	22.66	30.00	-7.34
1711.50	3	QPSK	H	150	244	1 / 0	17.97	5.55	23.52	30.00	-6.48
1732.50	3	QPSK	H	150	245	1 / 0	17.95	5.41	23.36	30.00	-6.64
1753.50	3	QPSK	H	150	333	1 / 0	18.57	5.26	23.83	30.00	-6.17
1753.50	3	16-QAM	H	150	333	1 / 0	17.38	5.26	22.64	30.00	-7.36
1712.50	5	QPSK	H	150	245	1 / 0	17.27	5.55	22.82	30.00	-7.18
1732.50	5	QPSK	H	150	33	1 / 0	17.70	5.41	23.11	30.00	-6.89
1752.50	5	QPSK	H	150	345	1 / 0	17.79	5.27	23.06	30.00	-6.94
1732.50	5	16-QAM	H	150	33	1 / 0	16.81	5.41	22.22	30.00	-7.78
1715.00	10	QPSK	H	150	244	1 / 0	17.78	5.53	23.31	30.00	-6.69
1732.50	10	QPSK	H	150	244	1 / 0	17.73	5.41	23.14	30.00	-6.86
1750.00	10	QPSK	H	150	248	1 / 0	18.24	5.29	23.53	30.00	-6.47
1750.00	10	16-QAM	H	150	248	1 / 0	16.89	5.29	22.18	30.00	-7.82
1717.50	15	QPSK	H	150	240	1 / 0	17.92	5.51	23.43	30.00	-6.57
1732.50	15	QPSK	H	150	238	1 / 0	17.88	5.41	23.29	30.00	-6.71
1747.50	15	QPSK	H	150	245	1 / 0	17.97	5.31	23.28	30.00	-6.72
1717.50	15	16-QAM	H	150	240	1 / 0	15.82	5.51	21.33	30.00	-8.67
1720.00	20	QPSK	H	150	245	1 / 0	17.79	5.49	23.28	30.00	-6.72
1732.50	20	QPSK	H	150	238	1 / 0	18.02	5.41	23.43	30.00	-6.57
1745.00	20	QPSK	H	150	245	1 / 0	18.05	5.32	23.37	30.00	-6.63
1732.50	20	16-QAM	H	150	238	1 / 0	17.25	5.41	22.66	30.00	-7.34
1753.50	3	QPSK	V	150	234	1 / 0	18.32	5.18	23.50	30.00	-6.50
1753.50	3 (WCP)	QPSK	H	150	328	1 / 0	17.85	5.26	23.11	30.00	-6.89

Table 7-5. EIRP Data (Band 4)

FCC ID: ZNFK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 125 of 151



Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	H	150	231	1 / 0	21.18	4.82	26.00	33.01	-7.01
1882.50	1.4	QPSK	H	150	229	1 / 0	21.01	4.73	25.74	33.01	-7.27
1914.30	1.4	QPSK	H	150	235	1 / 0	19.50	4.68	24.18	33.01	-8.83
1850.70	1.4	16-QAM	H	150	231	1 / 0	20.40	4.82	25.22	33.01	-7.79
1851.50	3	QPSK	H	150	225	1 / 0	21.09	4.82	25.91	33.01	-7.10
1882.50	3	QPSK	H	150	231	1 / 0	21.41	4.73	26.14	33.01	-6.87
1913.50	3	QPSK	H	150	228	1 / 0	19.97	4.68	24.65	33.01	-8.36
1851.50	3	16-QAM	H	150	225	1 / 0	20.47	4.82	25.29	33.01	-7.72
1852.50	5	QPSK	H	150	220	1 / 0	21.22	4.81	26.03	33.01	-6.98
1882.50	5	QPSK	H	150	224	1 / 0	21.52	4.73	26.25	33.01	-6.76
1912.50	5	QPSK	H	150	234	1 / 0	20.51	4.68	25.19	33.01	-7.82
1882.50	5	16-QAM	H	150	224	1 / 0	20.39	4.73	25.12	33.01	-7.89
1855.00	10	QPSK	H	150	220	1 / 0	20.67	4.81	25.48	33.01	-7.53
1882.50	10	QPSK	H	150	223	1 / 0	21.21	4.73	25.94	33.01	-7.07
1910.00	10	QPSK	H	150	225	1 / 0	20.07	4.68	24.75	33.01	-8.26
1882.50	10	16-QAM	H	150	223	1 / 0	20.36	4.73	25.09	33.01	-7.92
1857.50	15	QPSK	H	150	234	1 / 0	21.06	4.80	25.86	33.01	-7.15
1882.50	15	QPSK	H	150	241	1 / 0	21.30	4.73	26.03	33.01	-6.98
1907.50	15	QPSK	H	150	224	1 / 0	20.70	4.68	25.38	33.01	-7.63
1882.50	15	16-QAM	H	150	241	1 / 0	21.14	4.73	25.87	33.01	-7.14
1860.00	20	QPSK	H	150	223	1 / 0	20.76	4.79	25.55	33.01	-7.46
1882.50	20	QPSK	H	150	225	1 / 0	21.61	4.73	26.34	33.01	-6.67
1905.00	20	QPSK	H	150	221	1 / 0	20.49	4.68	25.17	33.01	-7.84
1882.50	20	16-QAM	H	150	225	1 / 0	20.51	4.73	25.24	33.01	-7.77
1882.50	20	QPSK	V	150	267	1 / 0	19.20	4.85	24.05	33.01	-8.96
1882.50	20 (WCP)	QPSK	H	150	324	1 / 0	21.13	4.73	25.86	33.01	-7.15

Table 7-6. EIRP Data (Band 2/25)

FCC ID: ZNFK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 126 of 151

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	H	150	0	1 / 0	16.38	5.73	22.11	33.01	-10.90
2593.00	5	QPSK	H	150	357	1 / 0	16.36	6.07	22.43	33.01	-10.58
2687.50	5	QPSK	H	150	337	1 / 0	16.04	6.48	22.52	33.01	-10.49
2687.50	5	16-QAM	H	150	337	1 / 0	14.14	6.48	20.62	33.01	-12.39
2501.00	10	QPSK	H	150	5	1 / 0	16.50	5.73	22.23	33.01	-10.78
2593.00	10	QPSK	H	150	2	1 / 0	17.47	6.07	23.54	33.01	-9.47
2685.00	10	QPSK	H	150	339	1 / 0	15.41	6.47	21.88	33.01	-11.13
2593.00	10	16-QAM	H	150	2	1 / 0	15.68	6.07	21.75	33.01	-11.26
2503.50	15	QPSK	H	150	2	1 / 0	18.72	5.74	24.46	33.01	-8.55
2593.00	15	QPSK	H	150	5	1 / 0	17.20	6.07	23.27	33.01	-9.74
2682.50	15	QPSK	H	150	333	75 / 0	17.02	6.46	23.48	33.01	-9.53
2503.50	15	16-QAM	H	150	2	1 / 0	18.02	5.74	23.76	33.01	-9.25
2506.00	20	QPSK	H	150	30	1 / 0	19.48	5.75	25.23	33.01	-7.78
2593.00	20	QPSK	H	150	25	1 / 0	18.70	6.07	24.77	33.01	-8.24
2680.00	20	QPSK	H	150	27	1 / 0	15.10	6.45	21.55	33.01	-11.46
2506.00	20	16-QAM	H	150	30	1 / 0	16.31	5.75	22.06	33.01	-10.95
2506.00	20	QPSK	V	150	35	1 / 0	19.18	5.63	24.81	33.01	-8.20
2506.00	20 (WCP)	QPSK	H	150	221	1 / 0	17.77	5.75	23.52	33.01	-9.49

Table 7-7. EIRP Data (Band 41)

FCC ID: ZNFK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 127 of 151

7.7 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §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.



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: ZNFK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 128 of 151

Test Setup

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

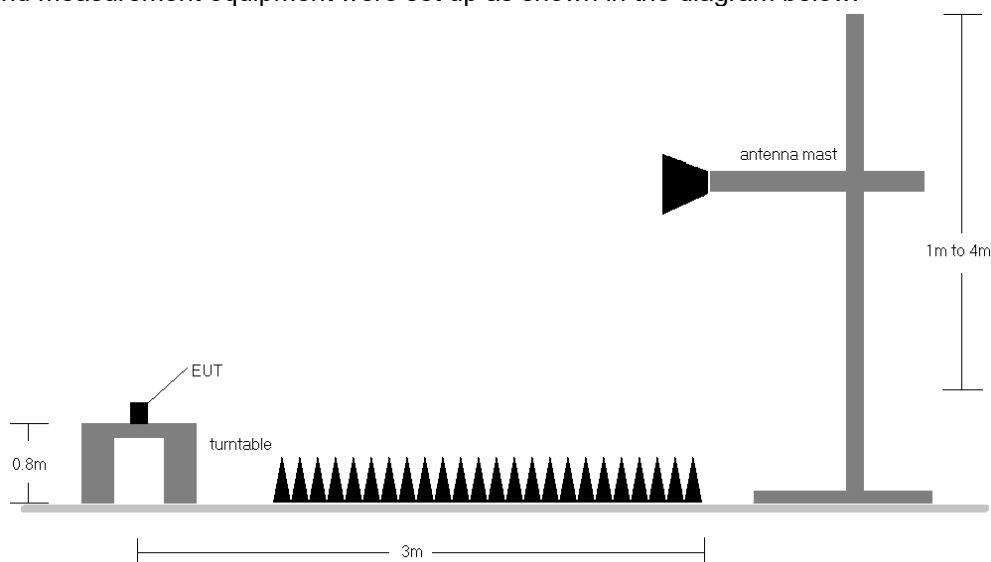




Figure 7-7. Test Instrument & Measurement Setup

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: ZNFK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05- R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 129 of 151

OPERATING FREQUENCY: 700.50 MHz
 CHANNEL: 23025
 MEASURED OUTPUT POWER: 16.19 dBm = 0.042 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 29.19 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1401.00	H	100	42	-48.54	2.22	-46.32	62.5
2101.50	H	100	274	-55.42	3.11	-52.31	68.5
2802.00	H	100	240	-53.07	4.83	-48.24	64.4
3502.50	H	100	26	-57.15	6.37	-50.78	67.0
4203.00	H	100	254	-65.88	7.20	-58.68	74.9
4903.50	H	100	13	-65.17	7.97	-57.20	73.4
5604.00	H	-	-	-66.02	8.46	-57.57	73.8

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

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 MEASURED OUTPUT POWER: 17.18 dBm = 0.052 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 30.18 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	90	-57.42	2.41	-55.01	72.2
2122.50	H	100	277	-56.73	3.16	-53.58	70.8
2830.00	H	100	242	-56.12	4.87	-51.25	68.4
3537.50	H	100	37	-57.42	6.37	-51.05	68.2
4245.00	H	100	270	-65.85	7.24	-58.61	75.8
4952.50	H	100	0	-65.66	7.95	-57.70	74.9
5660.00	H	-	-	-66.10	8.44	-57.66	74.8



FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 130 of 151

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

OPERATING FREQUENCY: 714.50 MHz
CHANNEL: 23165
MEASURED OUTPUT POWER: 17.51 dBm = 0.056 W
MODULATION SIGNAL: QPSK
BANDWIDTH: 3.0 MHz
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10}(W) =$ 30.51 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1429.00	H	100	34	-53.44	2.60	-50.84	68.3
2143.50	H	100	273	-56.75	3.20	-53.54	71.1
2858.00	H	100	306	-61.57	4.91	-56.67	74.2
3572.50	H	100	35	-58.18	6.36	-51.81	69.3
4287.00	H	100	6	-66.38	7.28	-59.09	76.6
5001.50	H	-	-	-66.40	7.94	-58.46	76.0

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

OPERATING FREQUENCY: 714.50 MHz
CHANNEL: 23165
MEASURED OUTPUT POWER: 16.94 dBm = 0.049 W
MODULATION SIGNAL: QPSK
BANDWIDTH: 3.0 MHz
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10}(W) =$ 29.94 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1429.00	H	147	205	-56.37	2.60	-53.77	70.7
2143.50	H	101	49	-57.72	3.20	-54.51	71.5
2858.00	H	103	89	-60.25	4.91	-55.35	72.3
3572.50	H	156	210	-58.22	6.36	-51.85	68.8
4287.00	H	186	178	-66.37	7.28	-59.08	76.0
5001.50	H	-	-	-65.67	7.94	-57.73	74.7

Table 7-11. Radiated Spurious Data with WCP (Band 12 – High Channel)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 131 of 151

OPERATING FREQUENCY: 825.50 MHz
 CHANNEL: 26805
 MEASURED OUTPUT POWER: 21.72 dBm = 0.149 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 34.72 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]
1651.00	H	-	-	-71.29	3.66	-67.63	89.4
2476.50	H	100	21	-66.16	3.57	-62.58	84.3
3302.00	H	-	-	-69.20	5.70	-63.50	85.2

Table 7-12. Radiated Spurious Data (Band 5/26 – Low Channel)

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 26915
 MEASURED OUTPUT POWER: 22.66 dBm = 0.185 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 35.66 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	-	-	-72.17	3.58	-68.60	91.3
2509.50	H	110	27	-66.88	3.62	-63.27	85.9
3346.00	H	-	-	-68.61	5.76	-62.85	85.5

Table 7-13. Radiated Spurious Data (Band 5/26 – Mid Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 132 of 151

OPERATING FREQUENCY: 847.50 MHz
 CHANNEL: 27025
 MEASURED OUTPUT POWER: 23.02 dBm = 0.200 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.02 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1695.00	H	-	-	-70.97	3.50	-67.47	90.5
2542.50	H	100	213	-65.76	3.74	-62.02	85.0
3390.00	H	-	-	-68.55	5.81	-62.74	85.8

Table 7-14. Radiated Spurious Data (Band 5/26 – High Channel)

OPERATING FREQUENCY: 847.50 MHz
 CHANNEL: 27025
 MEASURED OUTPUT POWER: 20.85 dBm = 0.122 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.85 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1695.00	H	-	-	-69.00	3.50	-65.50	86.4
2542.50	H	110	135	-64.09	3.74	-60.35	81.2
3390.00	H	-	-	-66.16	5.81	-60.35	81.2

Table 7-15. Radiated Spurious Data with WCP (Band 5/26 – High Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 133 of 151

OPERATING FREQUENCY: 1711.50 MHz
 CHANNEL: 19965
 MEASURED OUTPUT POWER: 23.52 dBm = 0.225 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 36.52 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]
3423.00	H	100	253	-60.94	8.10	-52.84	76.4
5134.50	H	-	-	-66.71	10.24	-56.47	80.0

Table 7-16. Radiated Spurious Data (Band 4 – Low Channel)

OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 23.36 dBm = 0.217 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 36.36 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	133	-59.87	8.33	-51.54	74.9
5197.50	H	-	-	-66.55	10.27	-56.28	79.6

Table 7-17. Radiated Spurious Data (Band 4 – Mid Channel)

FCC ID: ZNFK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 134 of 151

OPERATING FREQUENCY: 1753.50 MHz
 CHANNEL: 20385
 MEASURED OUTPUT POWER: 23.83 dBm = 0.242 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 36.83 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]
3507.00	H	100	133	-62.50	8.52	-53.98	77.8
5260.50	H	-	-	-66.42	10.29	-56.13	80.0

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

OPERATING FREQUENCY: 1753.50 MHz
 CHANNEL: 20385
 MEASURED OUTPUT POWER: 23.11 dBm = 0.205 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 36.11 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]
3507.00	H	134	24	-62.17	8.52	-53.65	76.8
5260.50	H	-	-	-63.09	10.29	-52.80	75.9

Table 7-19. Radiated Spurious Data with WCP (Band 4 – High Channel)

FCC ID: ZNFK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 135 of 151

OPERATING FREQUENCY: 1860.00 MHz
 CHANNEL: 26140
 MEASURED OUTPUT POWER: 25.55 dBm = 0.359 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) = 38.55$ dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3720.00	H	100	122	-64.02	8.35	-55.66	81.2
5580.00	H	100	15	-65.10	10.57	-54.53	80.1
7440.00	H	-	-	-63.22	11.98	-51.24	76.8

Table 7-20. Radiated Spurious Data (Band 2/25 – Low Channel)

OPERATING FREQUENCY: 1882.50 MHz
 CHANNEL: 26365
 MEASURED OUTPUT POWER: 26.34 dBm = 0.431 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) = 39.34$ 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]
3765.00	H	100	0	-65.05	8.47	-56.58	82.9
5647.50	H	133	68	-65.81	10.60	-55.21	81.6
7530.00	H	-	-	-62.89	12.11	-50.77	77.1

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

FCC ID: ZNFK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 136 of 151

OPERATING FREQUENCY: 1905.00 MHz
 CHANNEL: 26590
 MEASURED OUTPUT POWER: 25.17 dBm = 0.329 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 38.17 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3810.00	H	100	0	-63.35	8.56	-54.79	80.0
5715.00	H	133	329	-63.12	10.62	-52.51	77.7
7620.00	H	-	-	-62.67	12.17	-50.50	75.7

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

OPERATING FREQUENCY: 1882.50 MHz
 CHANNEL: 26365
 MEASURED OUTPUT POWER: 25.86 dBm = 0.386 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 38.86 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3765.00	H	163	358	-63.37	8.47	-54.90	80.8
5647.50	H	119	267	-62.01	10.60	-51.41	77.3
7530.00	H	-	-	-60.49	12.11	-48.37	74.2

Table 7-23. Radiated Spurious Data with WCP (Band 2/25 – Mid Channel)

FCC ID: ZNFK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 137 of 151

OPERATING FREQUENCY: 2506.00 MHz
 CHANNEL: 39750
 MEASURED OUTPUT POWER: 25.23 dBm = 0.334 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 50.23 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]
5012.00	H	150	274	-61.12	10.71	-50.41	75.6
7518.00	H	150	284	-52.62	9.66	-42.97	68.2
10024.00	H	-	-	-65.04	11.32	-53.72	79.0

Table 7-24. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
 CHANNEL: 40620
 MEASURED OUTPUT POWER: 24.77 dBm = 0.300 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 49.77 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5186.00	H	150	278	-62.42	10.85	-51.57	76.3
7779.00	H	150	305	-55.79	10.42	-45.37	70.1
10372.00	H	-	-	-65.52	11.55	-53.97	78.7

Table 7-25. Radiated Spurious Data (Band 41 – Mid Channel)

FCC ID: ZNFK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 138 of 151

OPERATING FREQUENCY: 2680.00 MHz
 CHANNEL: 41490
 MEASURED OUTPUT POWER: 21.55 dBm = 0.143 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 46.55 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]
5360.00	H	150	286	-65.75	10.81	-54.93	76.5
8040.00	H	150	352	-62.13	10.52	-51.62	73.2
10720.00	H	-	-	-65.51	11.86	-53.65	75.2

Table 7-26. Radiated Spurious Data (Band 41 – High Channel)

OPERATING FREQUENCY: 2506.00 MHz
 CHANNEL: 39750
 MEASURED OUTPUT POWER: 23.52 dBm = 0.225 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W)$ 48.52 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]
5012.00	H	151	351	-64.34	10.10	-54.24	77.8
7518.00	H	171	69	-61.31	12.11	-49.20	72.7
10024.00	H	-	-	-60.24	13.17	-47.06	70.6

Table 7-27. Radiated Spurious Data with WCP (Band 41 – Low Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 139 of 151

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 $\pm 0.00025\%$ (± 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

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 140 of 151

Band 12 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)	707,500,286	286	0.0000404
100 %		- 30	707,499,568	-432	-0.0000611
100 %		- 20	707,500,406	406	0.0000574
100 %		- 10	707,499,960	-40	-0.0000057
100 %		0	707,500,153	153	0.0000216
100 %		+ 10	707,499,857	-143	-0.0000202
100 %		+ 20	707,499,977	-23	-0.0000033
100 %		+ 30	707,500,261	261	0.0000369
100 %		+ 40	707,499,848	-152	-0.0000215
100 %		+ 50	707,499,655	-345	-0.0000488
BATT. ENDPOINT	3.45	+ 20	707,500,264	264	0.0000373

Table 7-28. Frequency Stability Data (Band 12)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 141 of 151

Band 12 Frequency Stability Measurements

\$2.1055 \$27.54

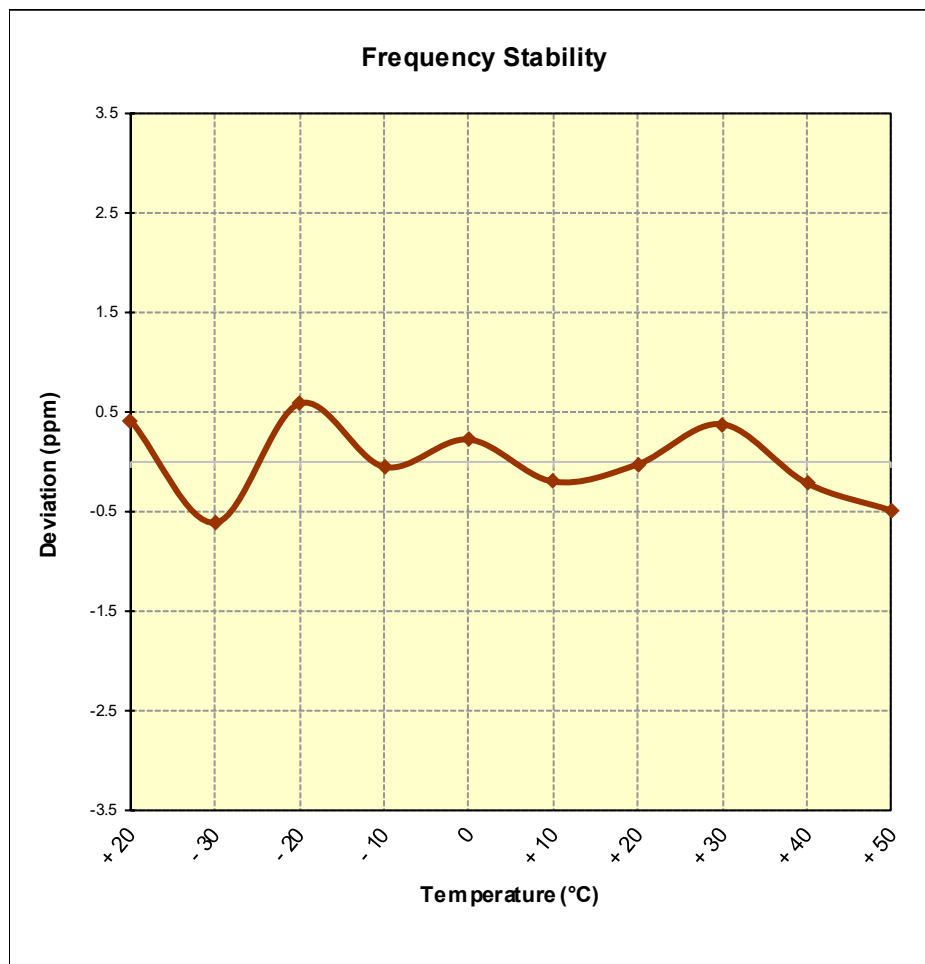




Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 142 of 151



Band 5/26 Frequency Stability Measurements

\$2.1055 \$22.355

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	831,499,967	-33	-0.0000040
100 %		- 30	831,500,244	244	0.0000293
100 %		- 20	831,500,073	73	0.0000088
100 %		- 10	831,500,269	269	0.0000324
100 %		0	831,500,041	41	0.0000049
100 %		+ 10	831,500,036	36	0.0000043
100 %		+ 20	831,499,909	-91	-0.0000109
100 %		+ 30	831,499,938	-62	-0.0000075
100 %		+ 40	831,500,152	152	0.0000183
100 %		+ 50	831,500,057	57	0.0000069
BATT. ENDPOINT	3.45	+ 20	831,500,185	185	0.0000222

Table 7-29. Frequency Stability Data (Band 5/26)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 143 of 151

Band 5/26 Frequency Stability Measurements
\$2.1055 \$22.355

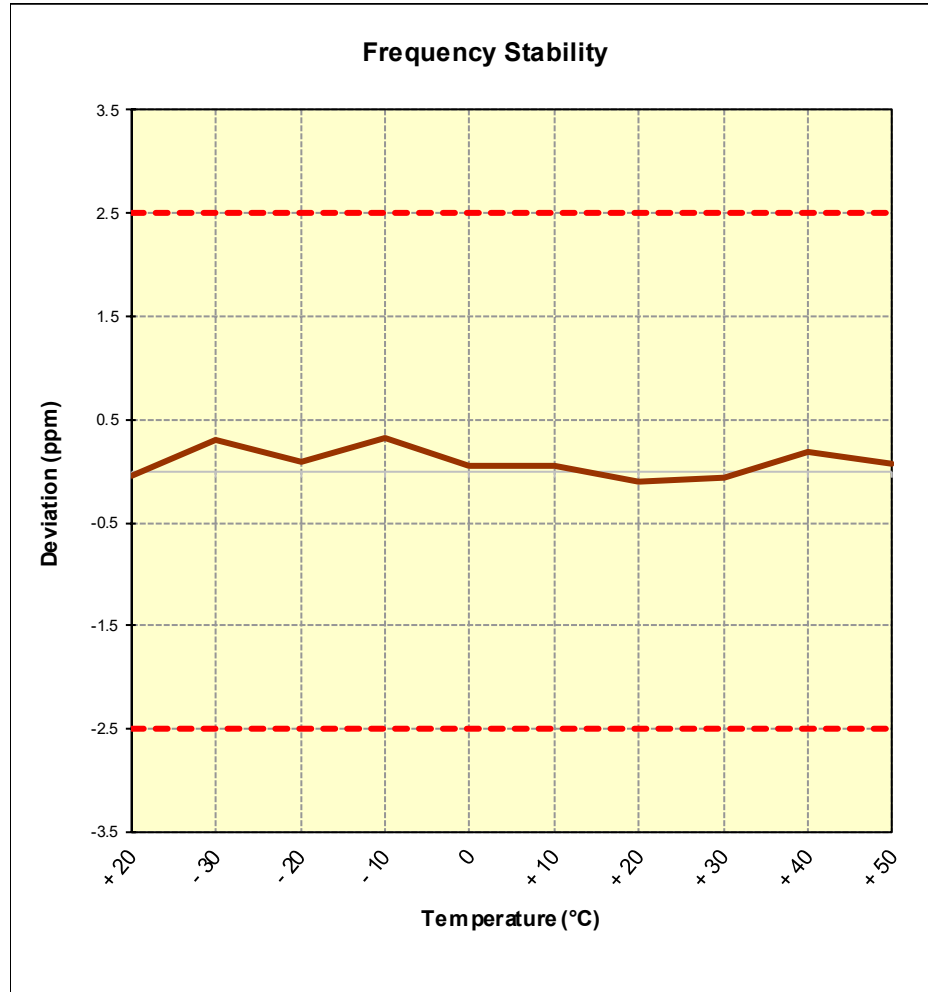




Figure 7-9. Frequency Stability Graph (Band 5/26)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 144 of 151

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)	1,732,500,421	421	0.0000243
100 %		- 30	1,732,499,908	-92	-0.0000053
100 %		- 20	1,732,500,187	187	0.0000108
100 %		- 10	1,732,500,202	202	0.0000117
100 %		0	1,732,500,202	202	0.0000117
100 %		+ 10	1,732,500,040	40	0.0000023
100 %		+ 20	1,732,499,755	-245	-0.0000141
100 %		+ 30	1,732,499,865	-135	-0.0000078
100 %		+ 40	1,732,500,194	194	0.0000112
100 %		+ 50	1,732,500,145	145	0.0000084
BATT. ENDPOINT	3.45	+ 20	1,732,500,242	242	0.0000140

Table 7-30. 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: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 145 of 151

Band 4 Frequency Stability Measurements

\$2.1055 \$27.54

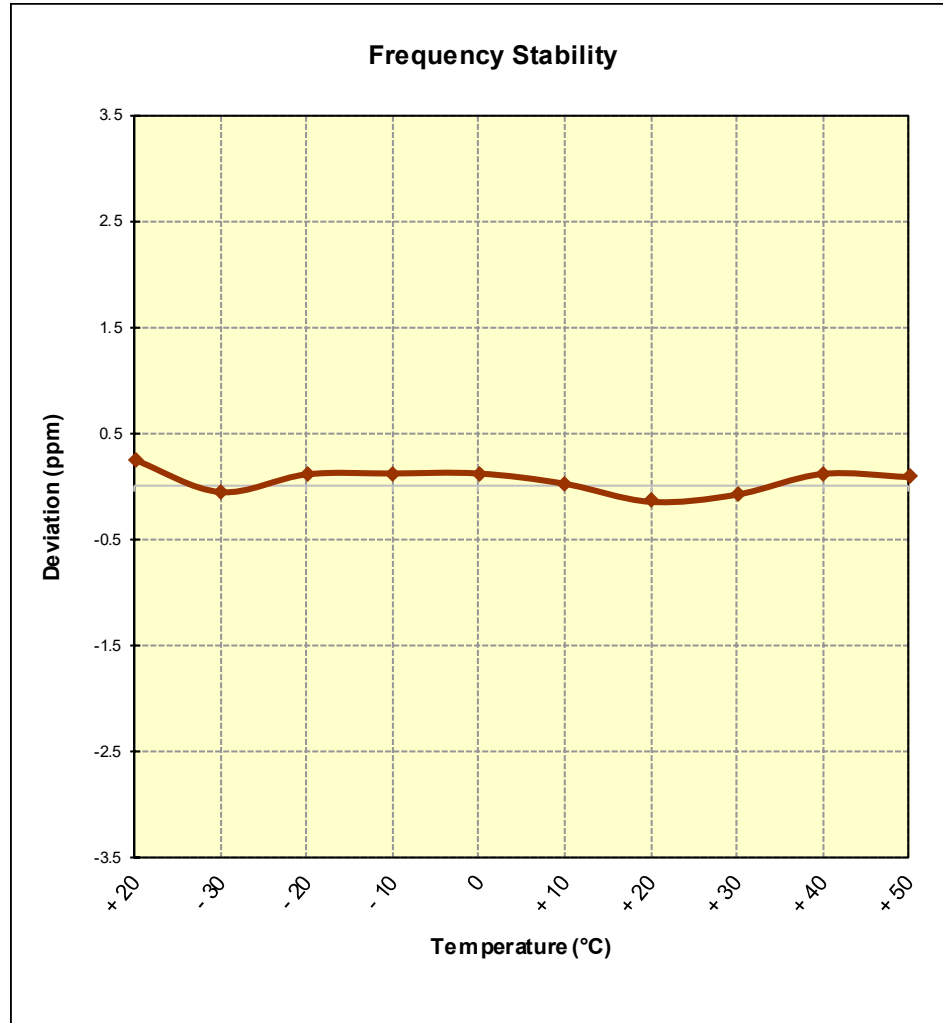




Figure 7-10. Frequency Stability Graph (Band 4)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 146 of 151

Band 2/25 Frequency Stability Measurements

\$2.1055 \$24.235



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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,882,499,806	-194	-0.0000103
100 %		- 30	1,882,500,028	28	0.0000015
100 %		- 20	1,882,500,181	181	0.0000096
100 %		- 10	1,882,500,201	201	0.0000107
100 %		0	1,882,499,829	-171	-0.0000091
100 %		+ 10	1,882,499,978	-22	-0.0000012
100 %		+ 20	1,882,500,095	95	0.0000050
100 %		+ 30	1,882,499,895	-105	-0.0000056
100 %		+ 40	1,882,500,201	201	0.0000107
100 %		+ 50	1,882,499,913	-87	-0.0000046
BATT. ENDPOINT	3.45	+ 20	1,882,499,890	-110	-0.0000058

Table 7-31. 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: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 147 of 151

Band 2/25 Frequency Stability Measurements

S2.1055 S24.235

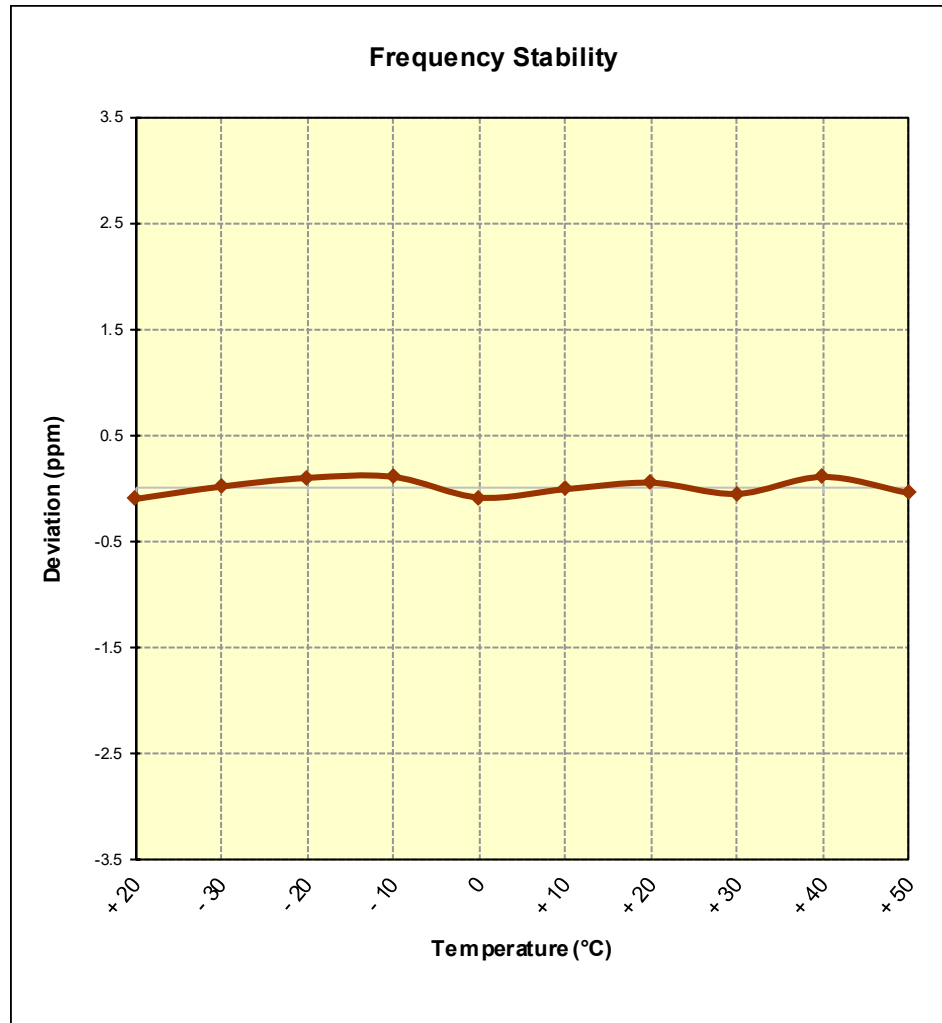




Figure 7-11. Frequency Stability Graph (Band 2/25)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 148 of 151

Band 41 Frequency Stability Measurements

\$2.1055 \$27.54



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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,593,000,060	60	0.0000023
100 %		- 30	2,593,000,281	281	0.0000108
100 %		- 20	2,592,999,790	-210	-0.0000081
100 %		- 10	2,593,000,054	54	0.0000021
100 %		0	2,592,999,890	-110	-0.0000042
100 %		+ 10	2,592,999,847	-153	-0.0000059
100 %		+ 20	2,593,000,023	23	0.0000009
100 %		+ 30	2,593,000,027	27	0.0000010
100 %		+ 40	2,593,000,034	34	0.0000013
100 %		+ 50	2,592,999,708	-292	-0.0000113
BATT. ENDPOINT	3.45	+ 20	2,592,999,949	-51	-0.0000020

Table 7-32. Frequency Stability Data (Band 41)

Note:

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

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 149 of 151

Band 41 Frequency Stability Measurements

\$2.1055 \$27.54

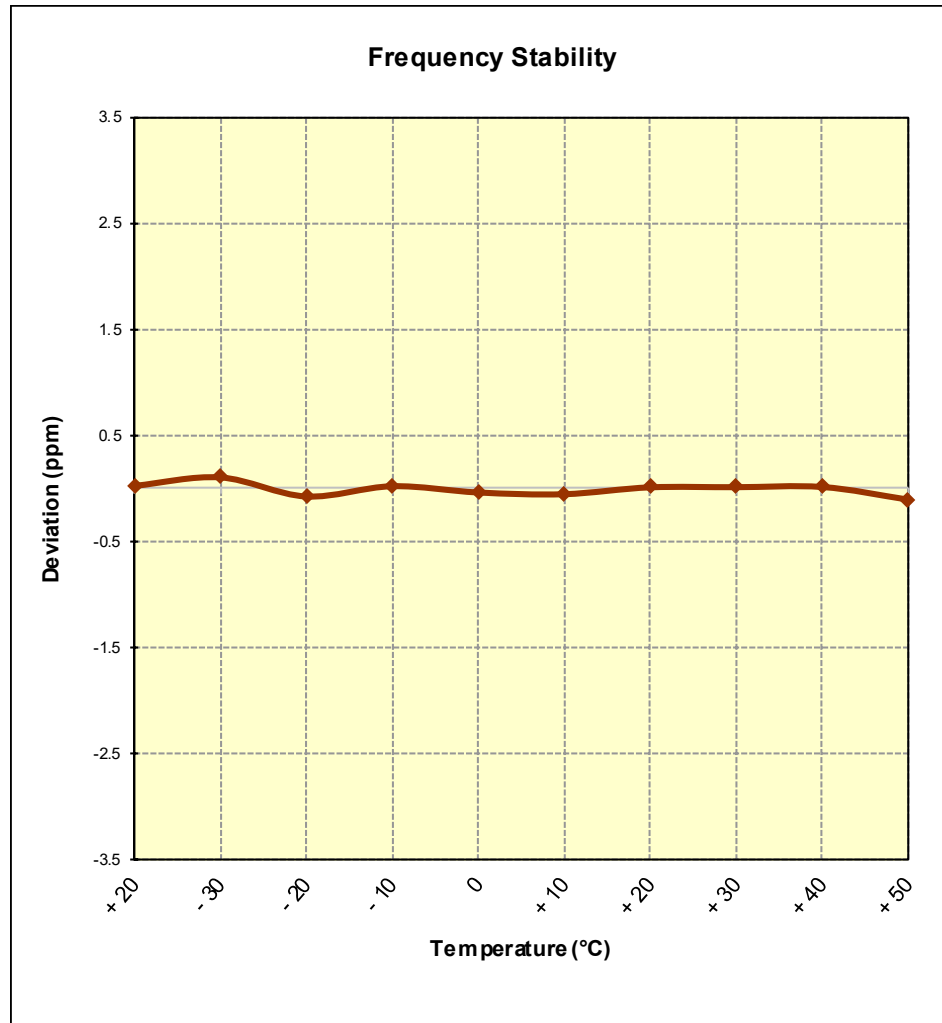






Figure 7-12. Frequency Stability Graph (Band 41)

FCC ID: ZNFLK460	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1707240228-05-R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet	Page 150 of 151

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Tablet FCC ID: ZNFLK460** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1707240228-05- R1.ZNF	Test Dates: 7/24 - 8/7/2017	EUT Type: Portable Tablet		Page 151 of 151