

## 7.4 Band Edge Emissions at Antenna Terminal

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

### Test Overview

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

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

### Test Procedure Used

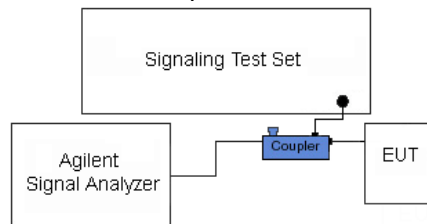
KDB 971168 D01 v02r02 – Section 6.0

### Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW  $\geq$  1% of the emission bandwidth
4. VBW  $\geq$  3 x RBW
5. Detector = RMS
6. Number of sweep points  $\geq$  2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

### Test Setup

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




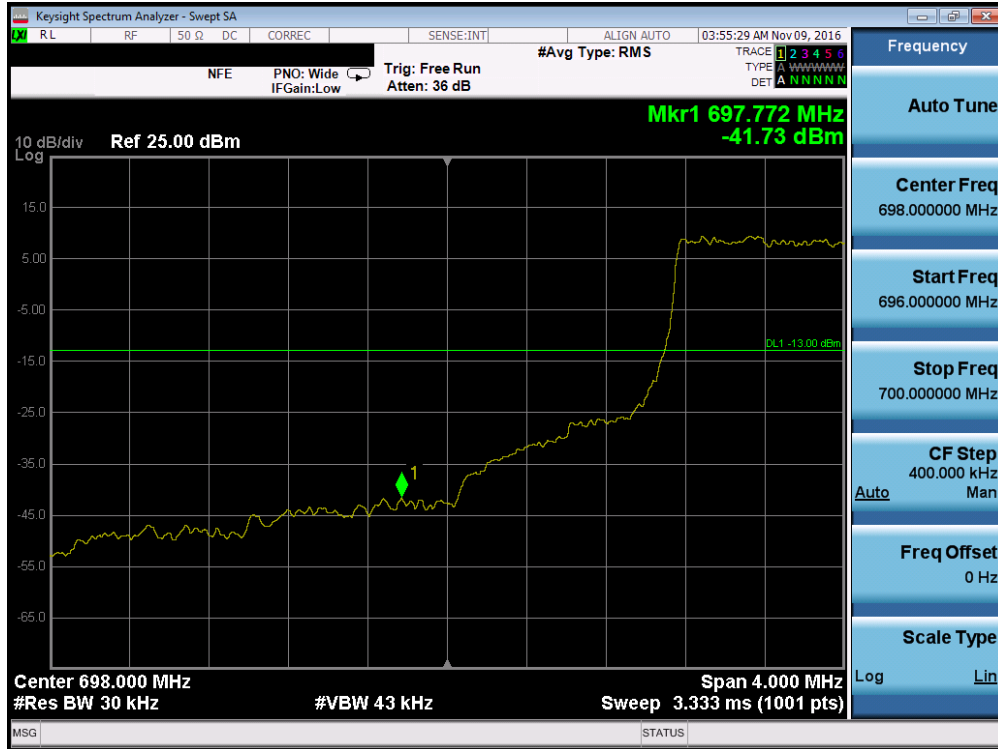
**Figure 7-3. Test Instrument & Measurement Setup**

### Test Notes

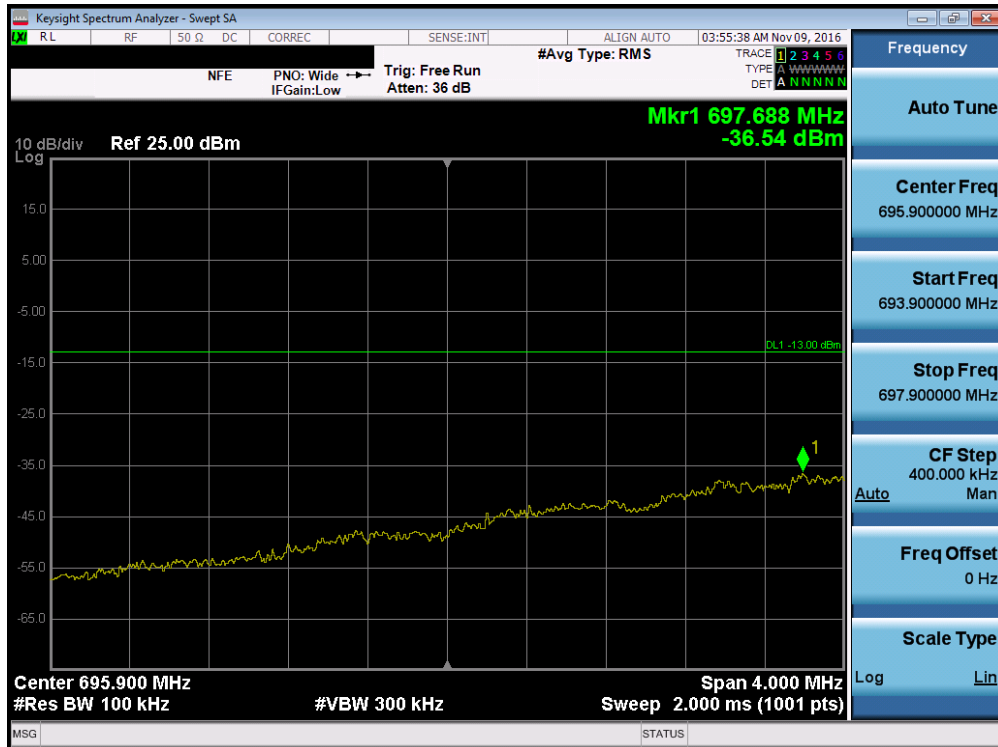
Per 22.917(b) 24.238(a) 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions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

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

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Plot 7-77. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



Plot 7-78. Lower Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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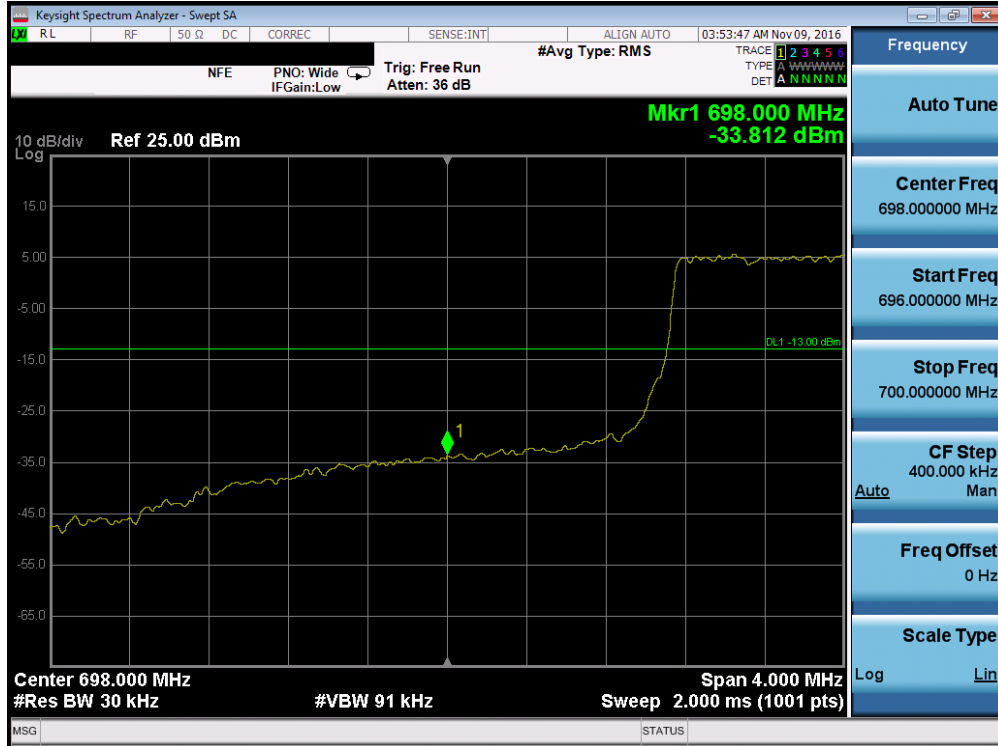


Plot 7-79. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

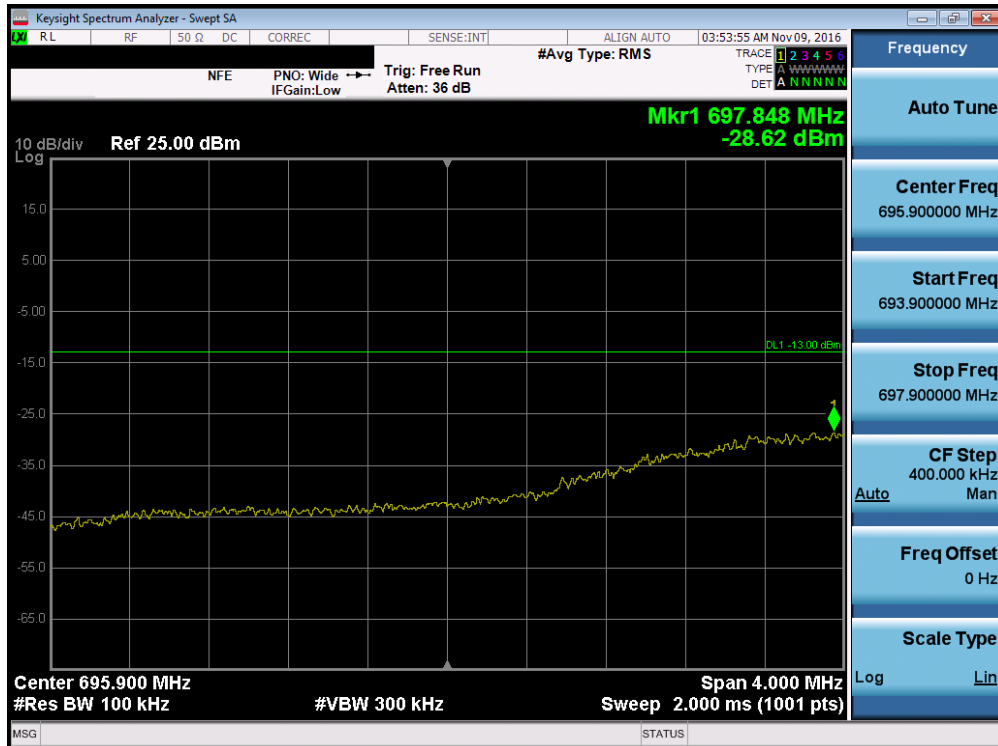


Plot 7-80. Upper Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-81. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-82. Lower Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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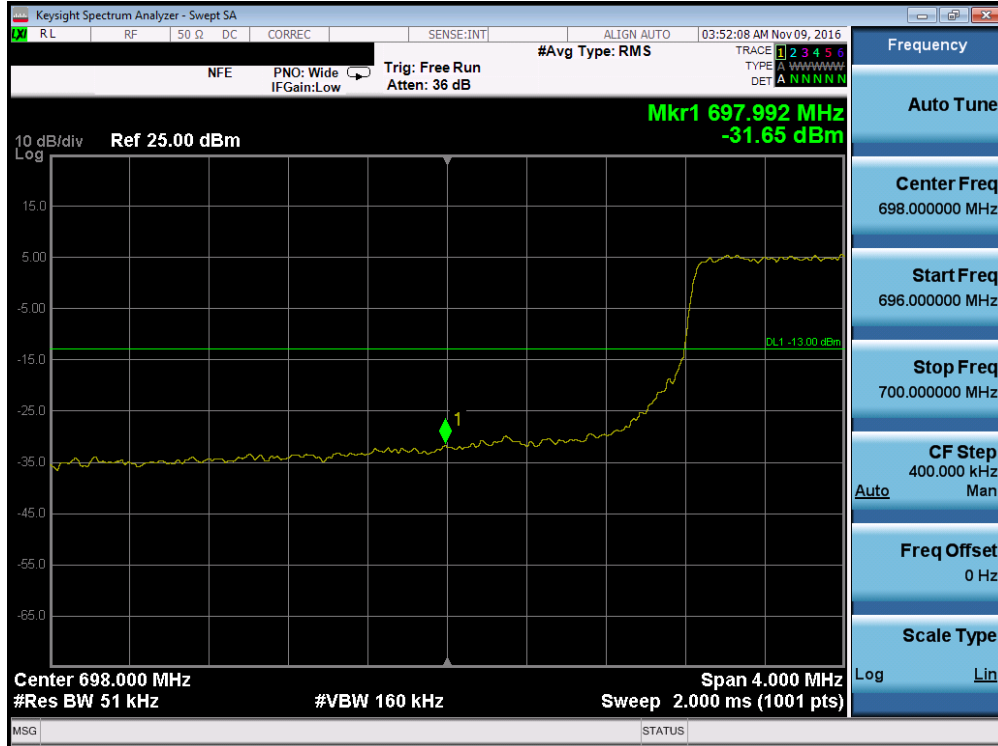


Plot 7-83. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

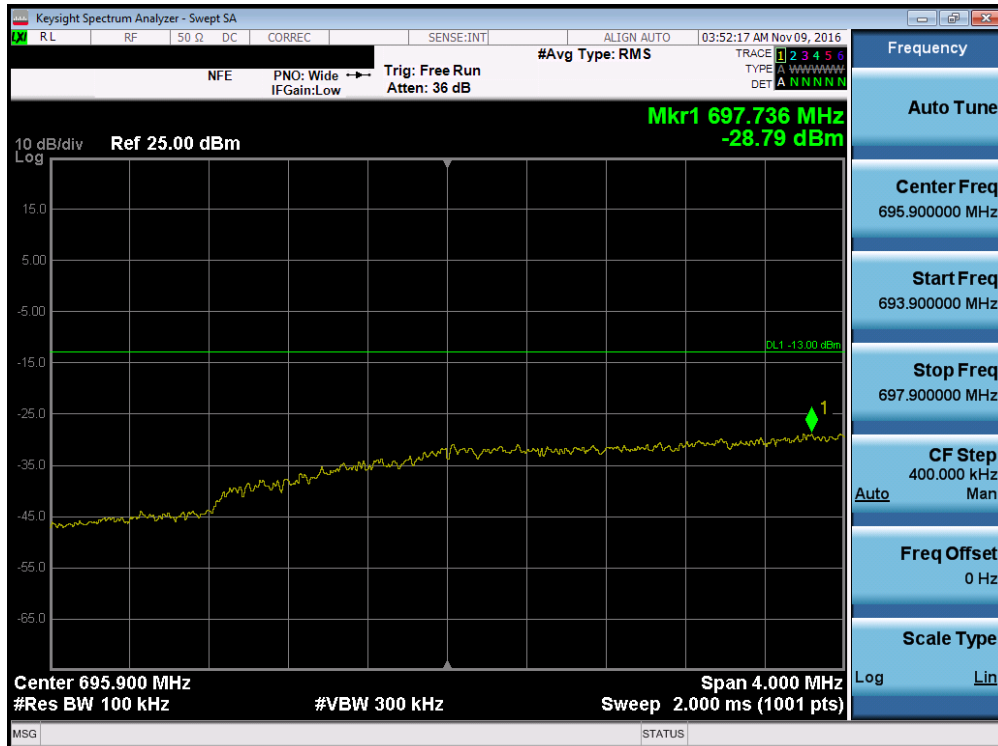


Plot 7-84. Upper Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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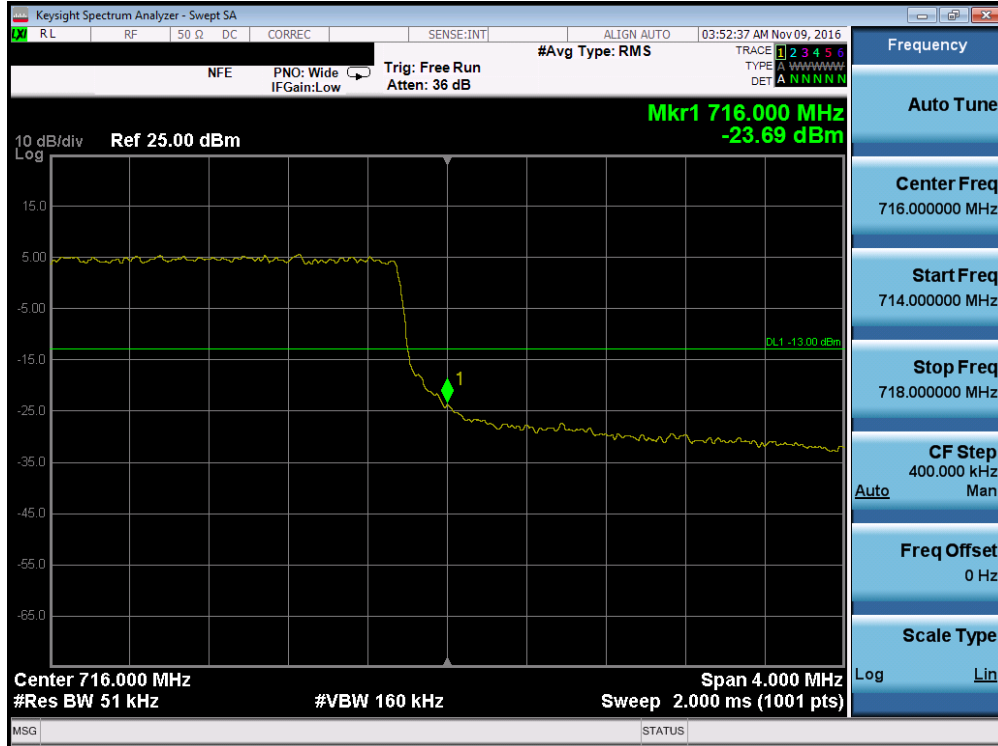


Plot 7-85. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



Plot 7-86. Lower Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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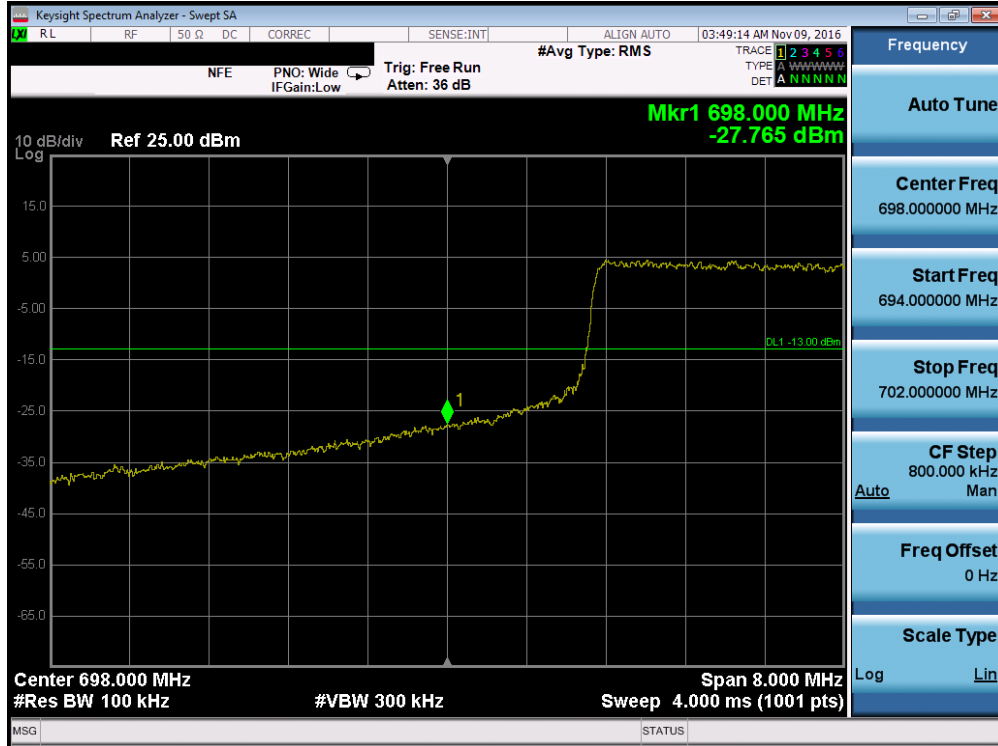


Plot 7-87. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

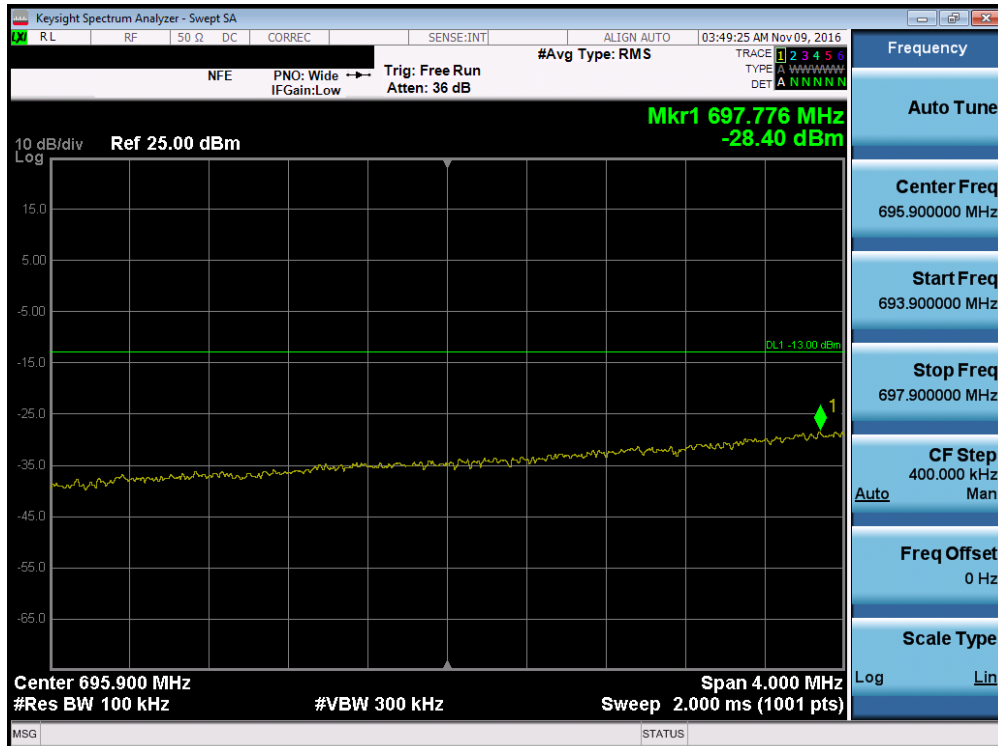


Plot 7-88. Upper Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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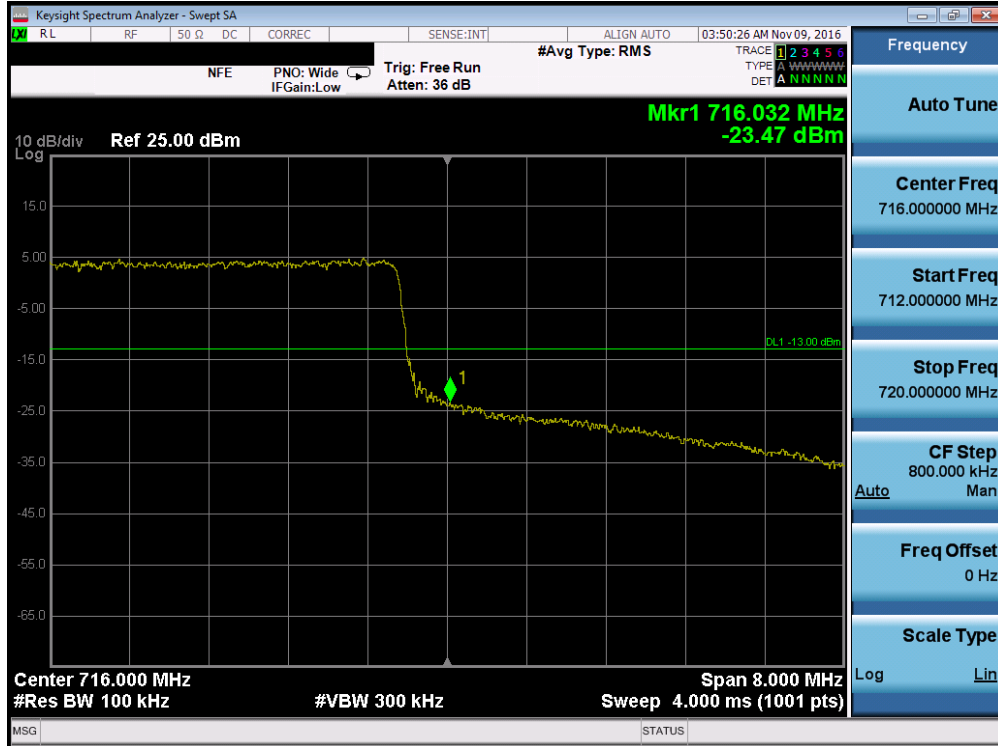
Plot 7-89. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 7-90. Lower Extended Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

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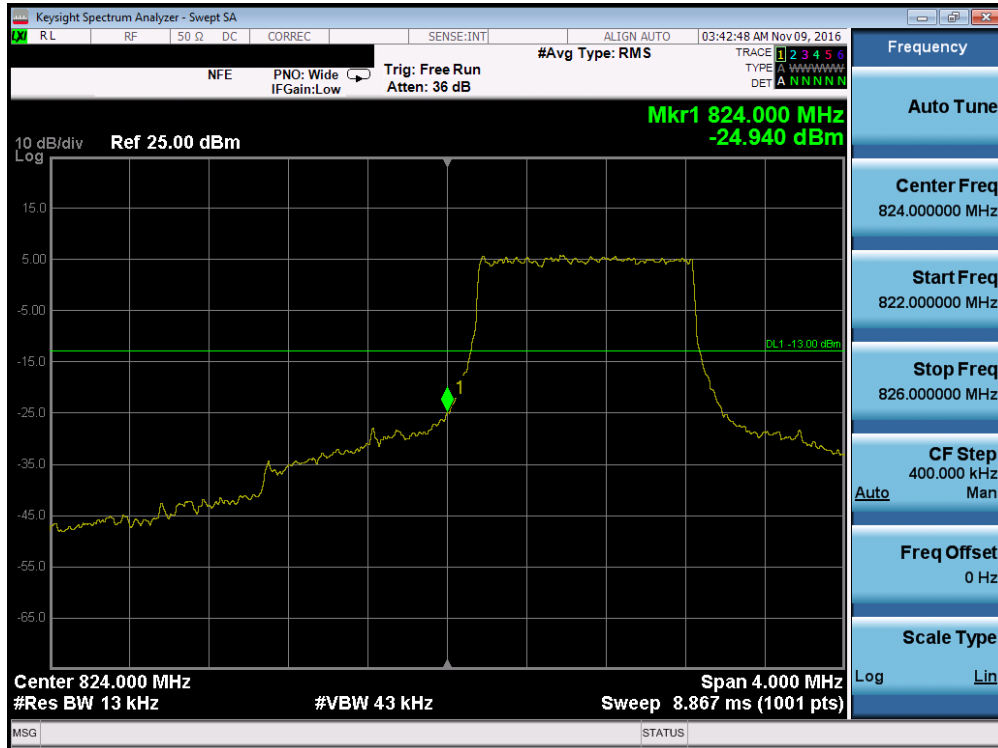


Plot 7-91. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 7-92. Upper Extended Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 7-93. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 7-94. Lower Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

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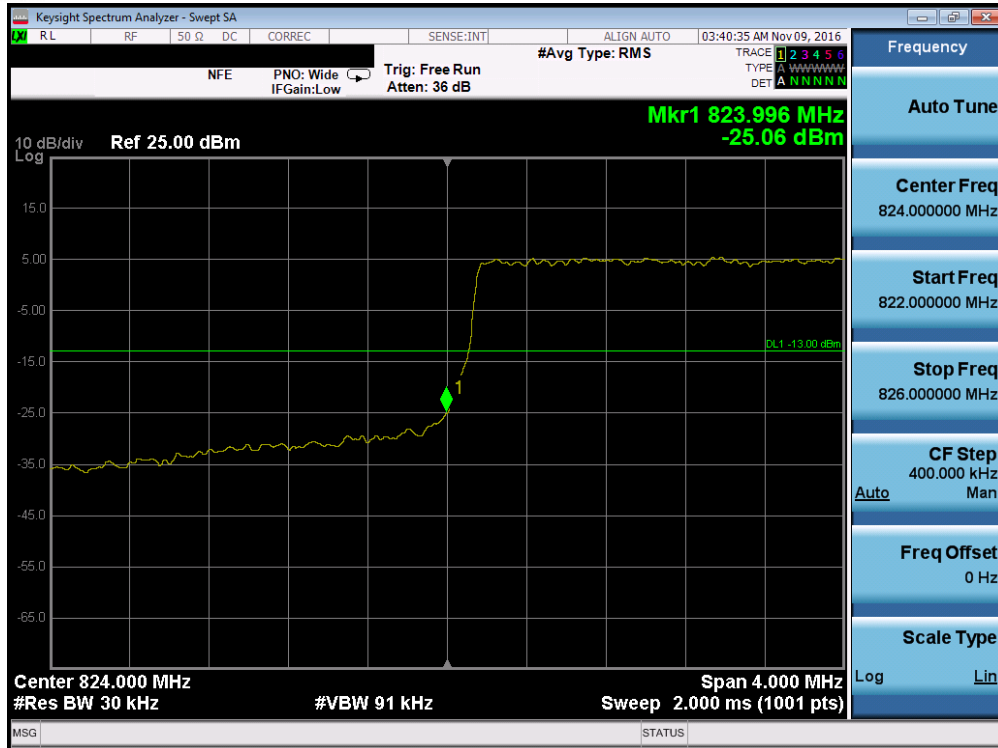


Plot 7-95. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 7-96. Upper Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

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Plot 7-97. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-98. Lower Extended Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

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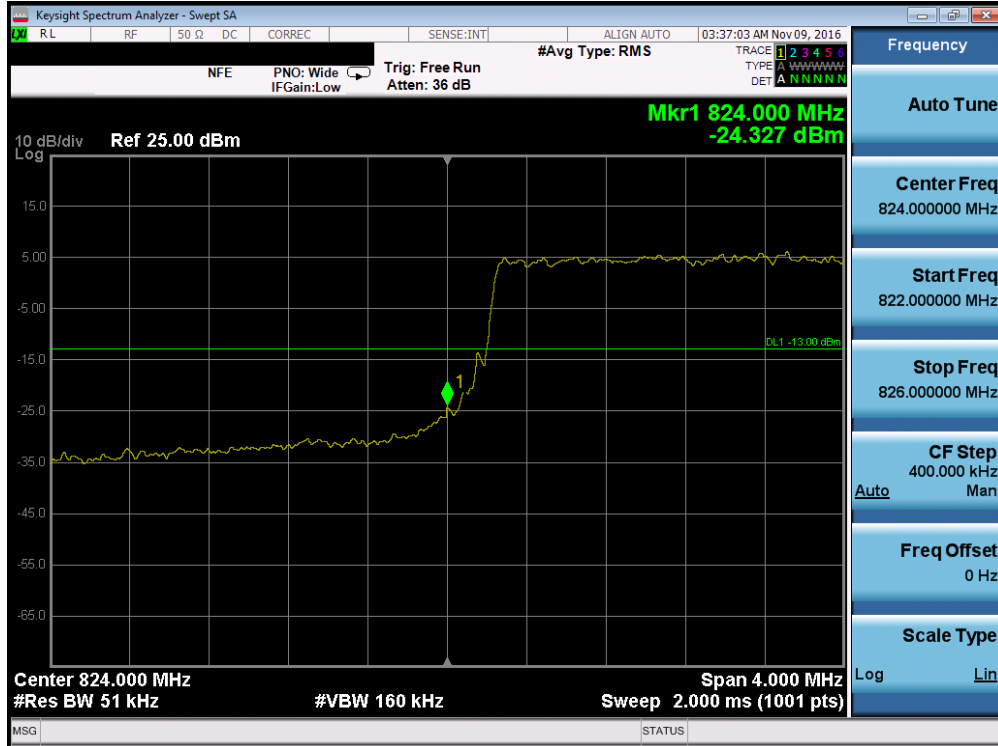


Plot 7-99. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

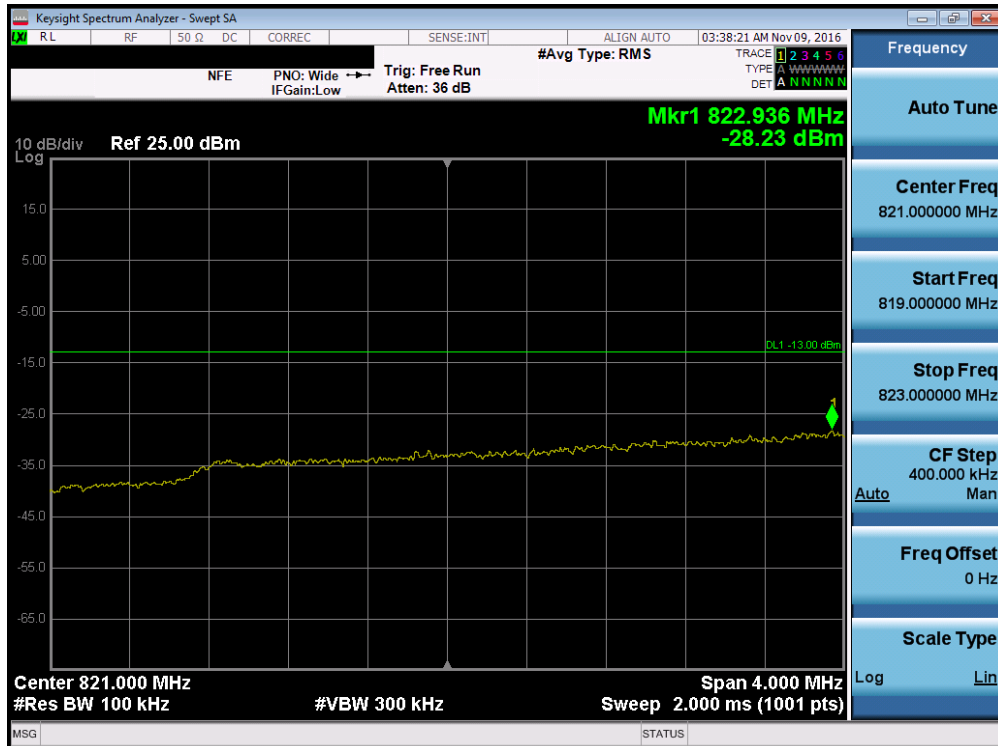


Plot 7-100. Upper Extended Band Edge Plot (Band 5 – Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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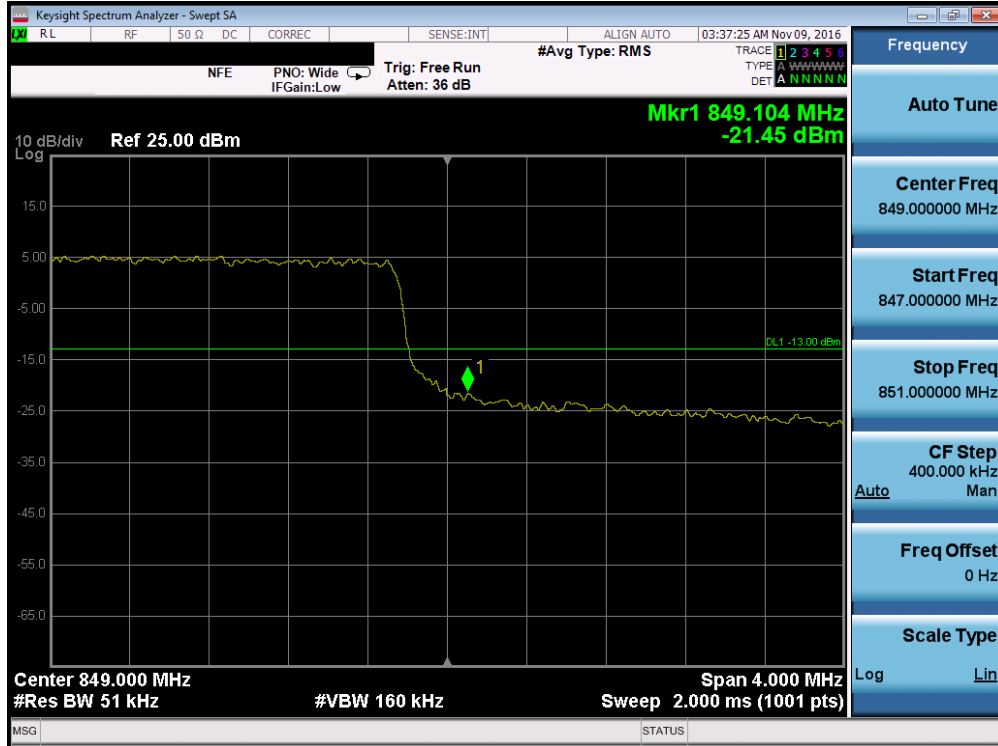


Plot 7-101. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 7-102. Lower Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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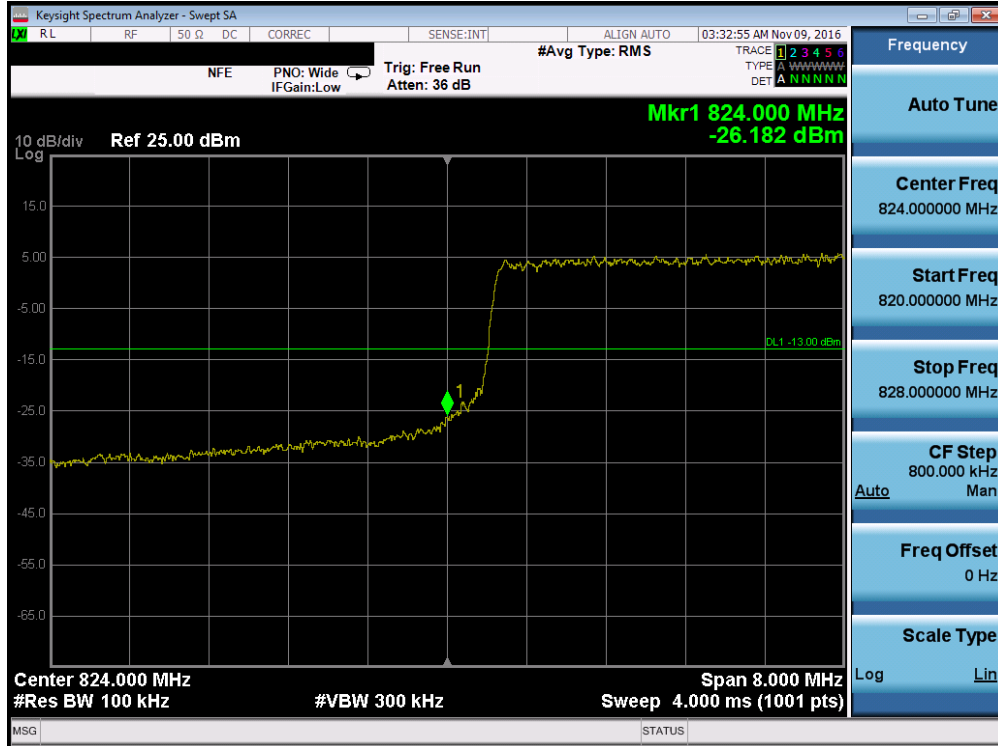


Plot 7-103. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

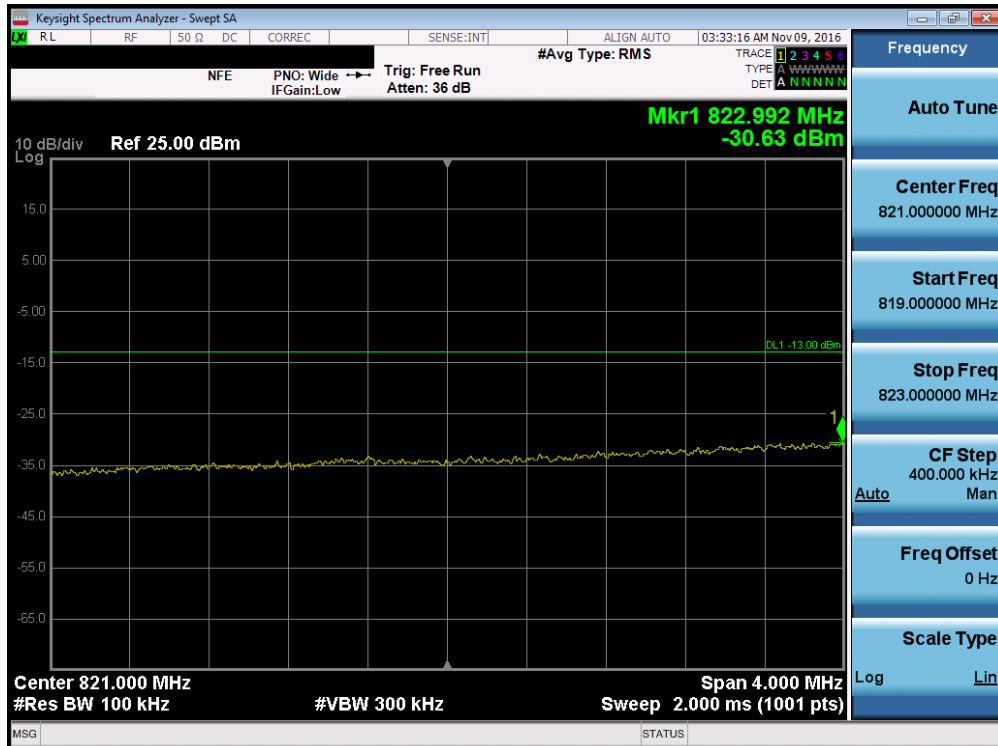


Plot 7-104. Upper Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 7-105. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



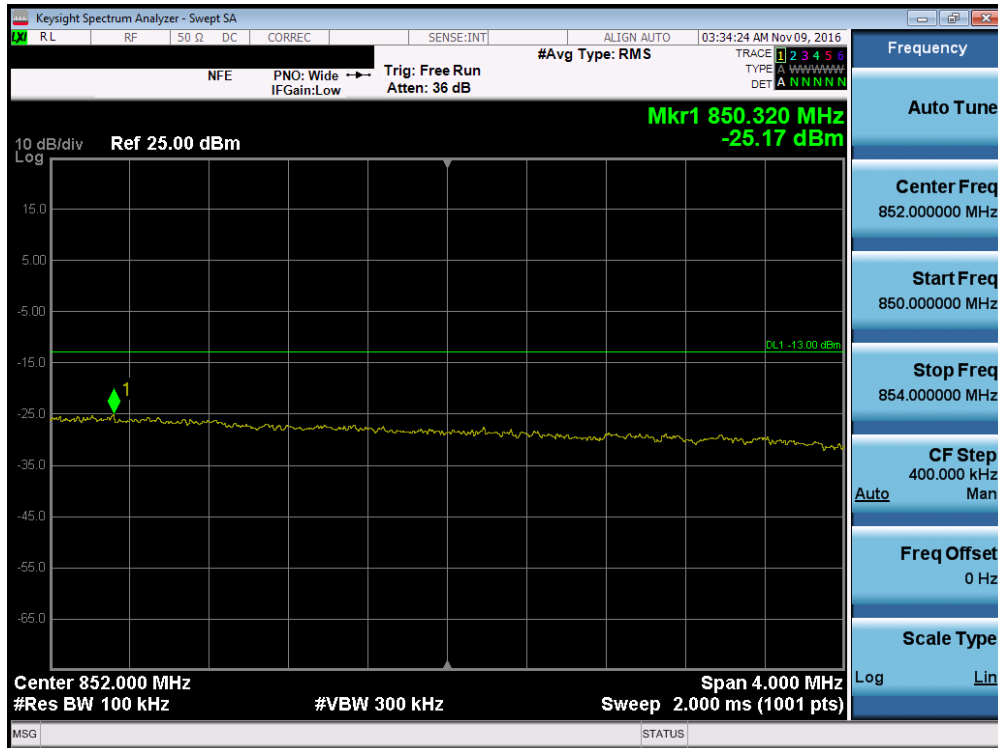
Plot 7-106. Lower Extended Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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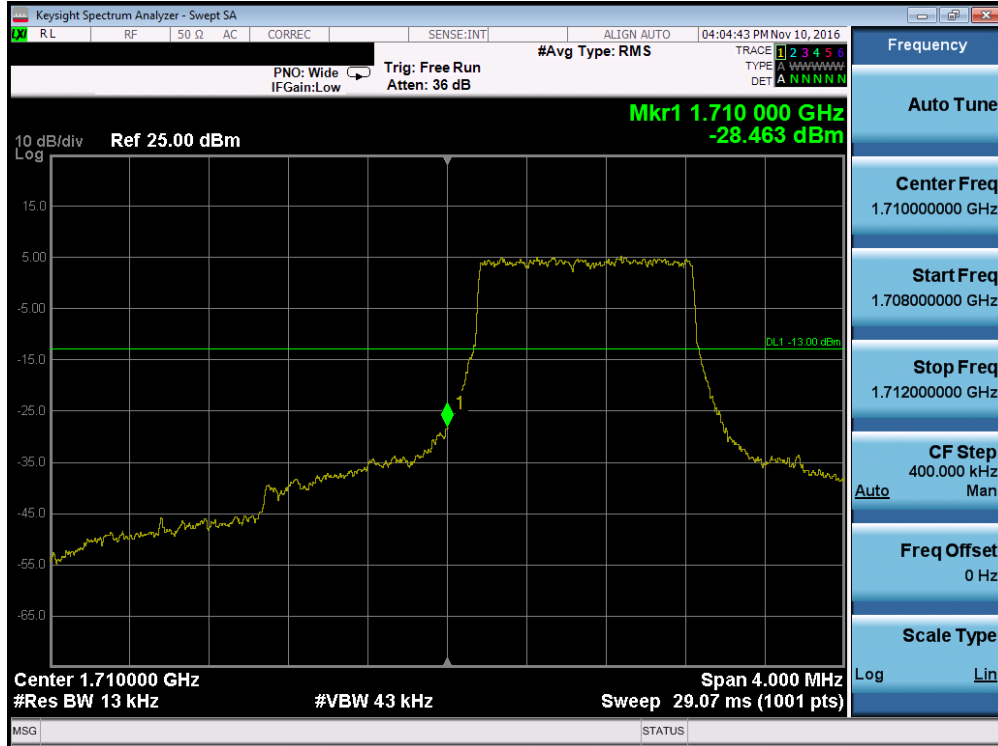


Plot 7-107. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

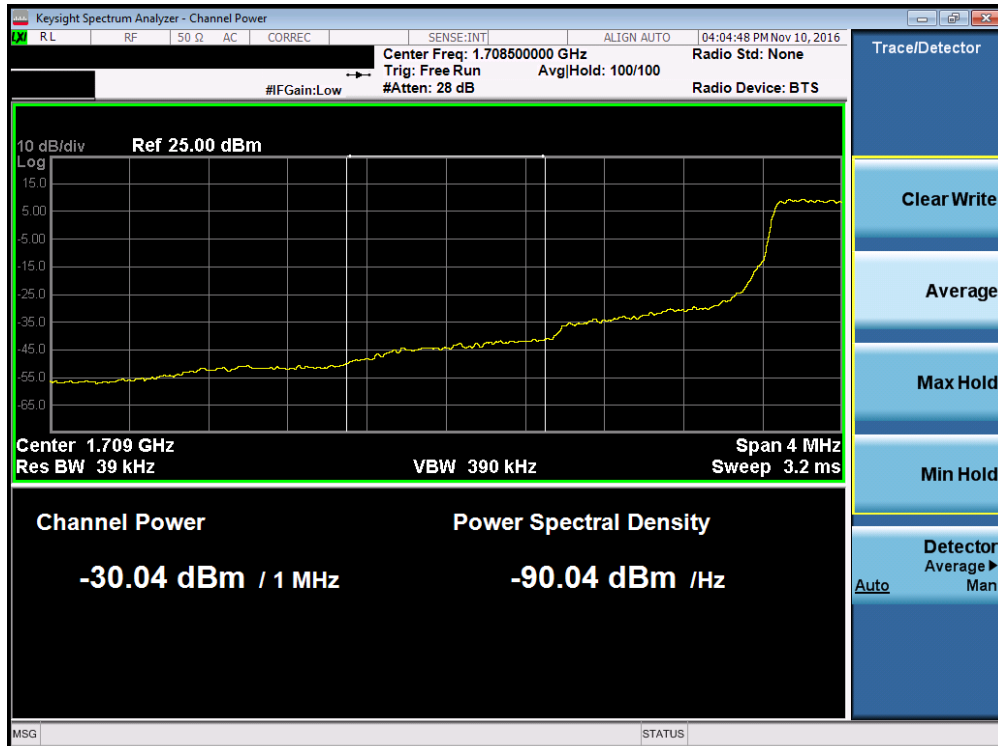


Plot 7-108. Upper Extended Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-109. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

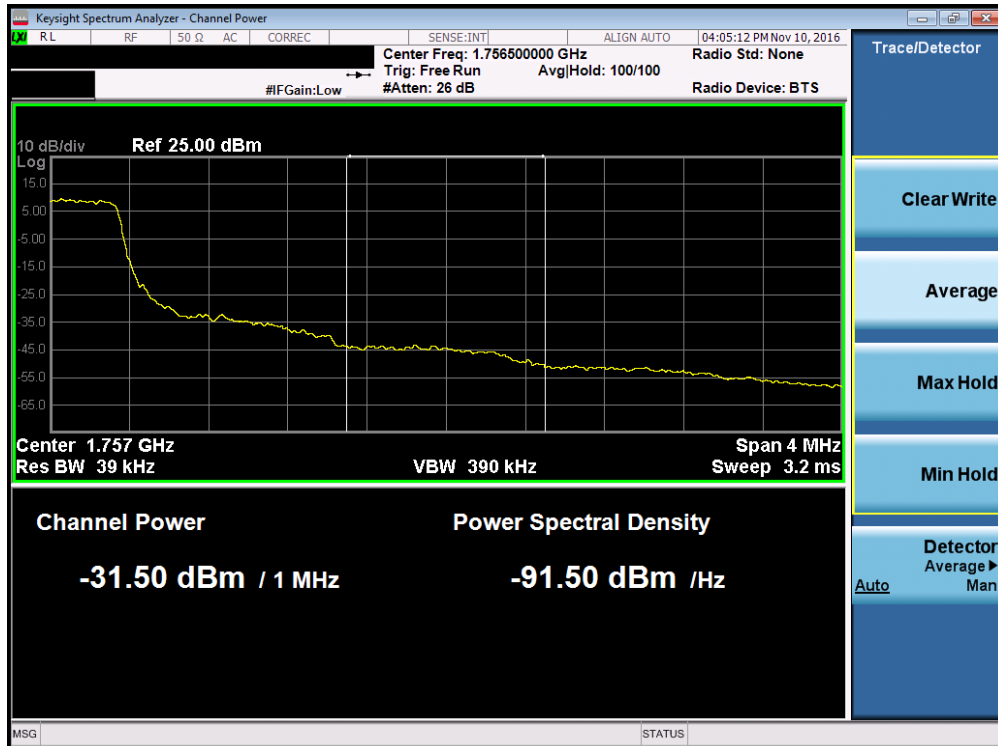


Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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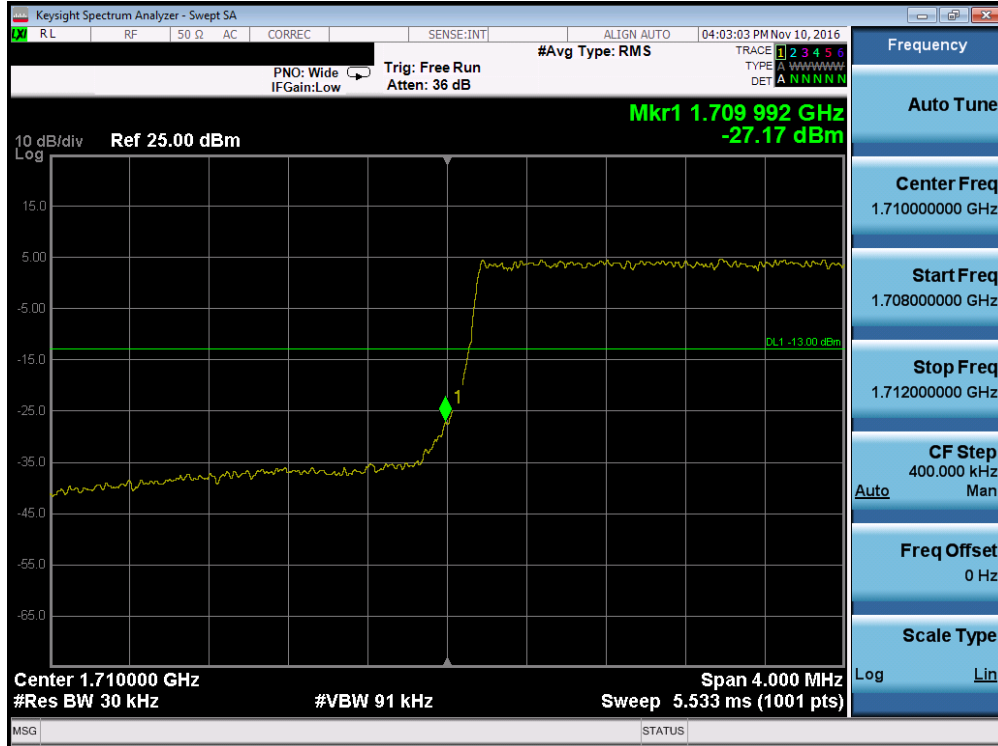


Plot 7-111. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

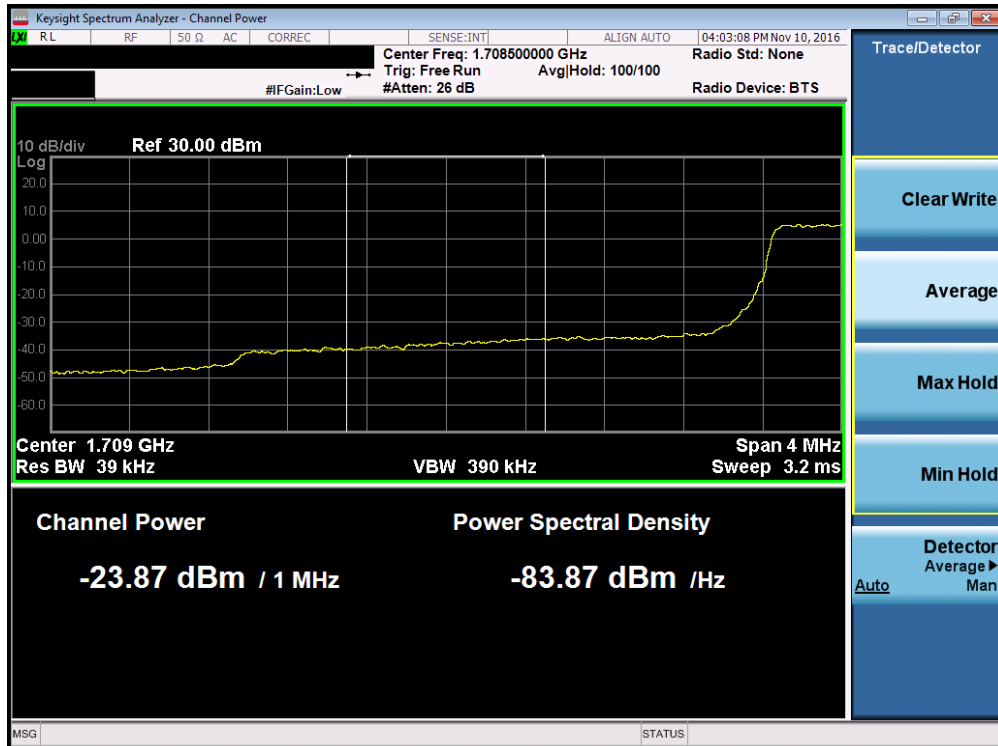


Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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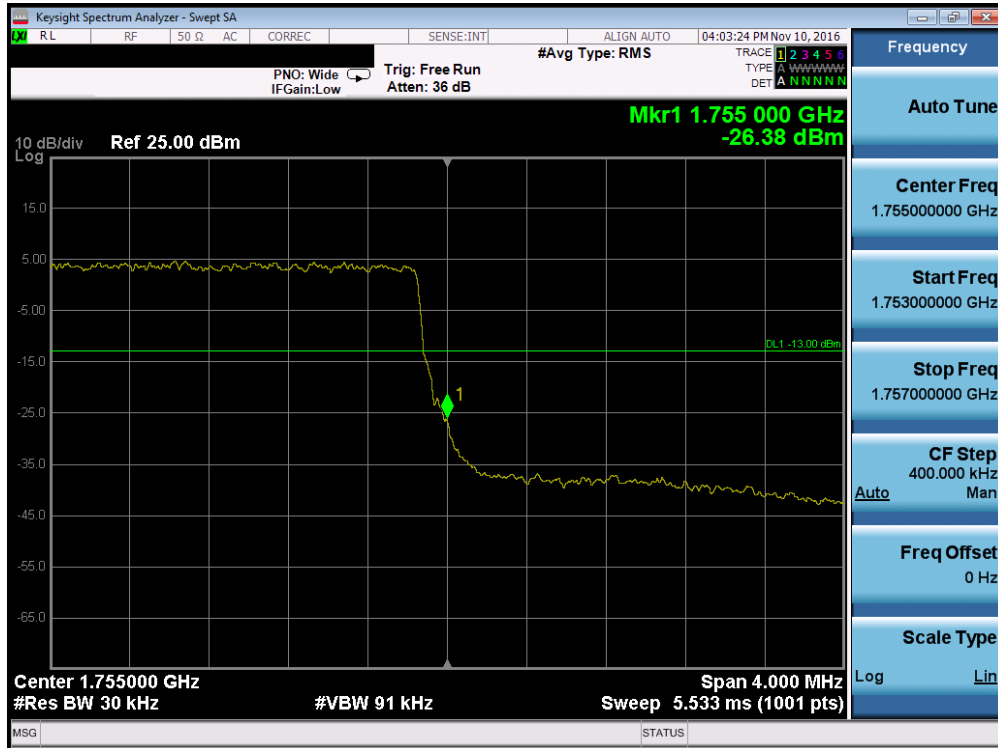


Plot 7-113. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

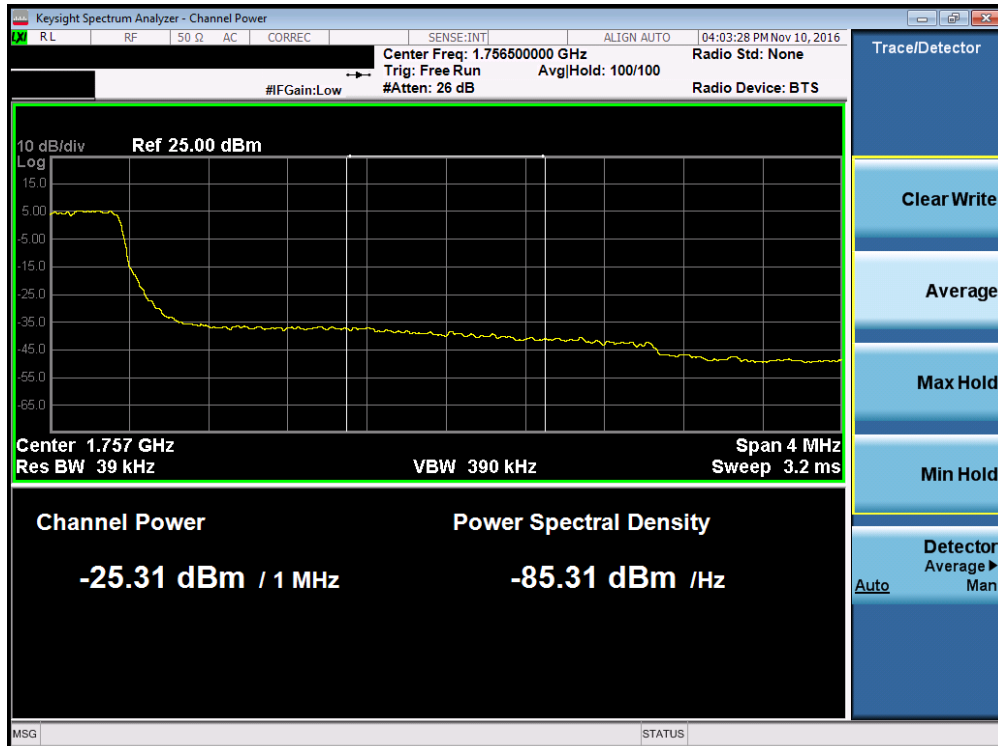


Plot 7-114. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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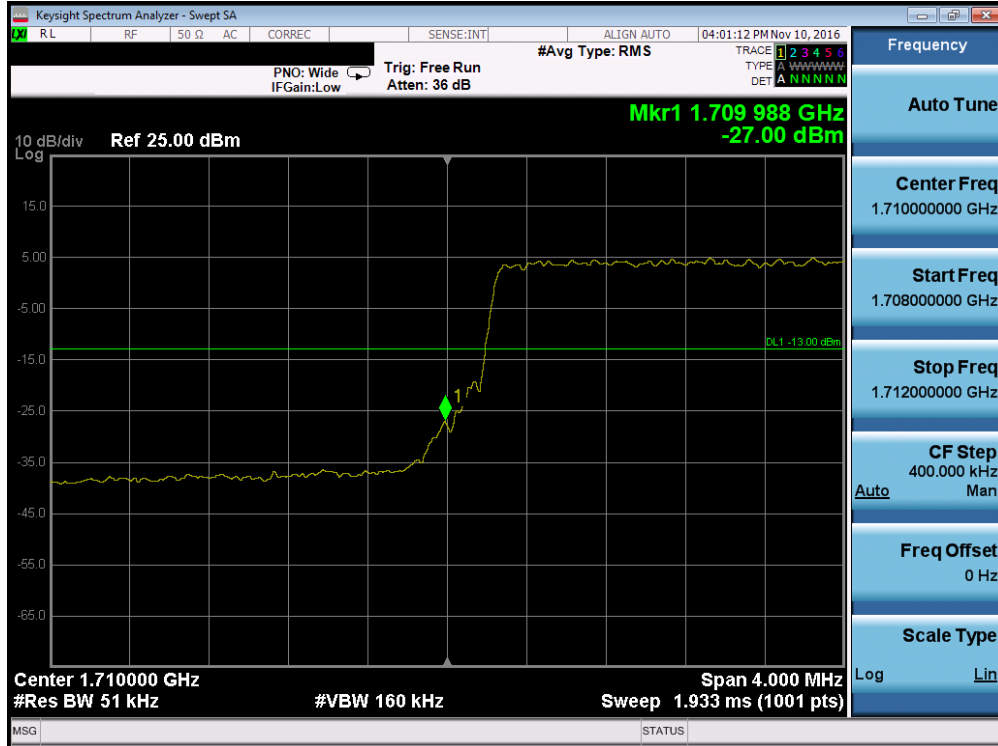


Plot 7-115. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

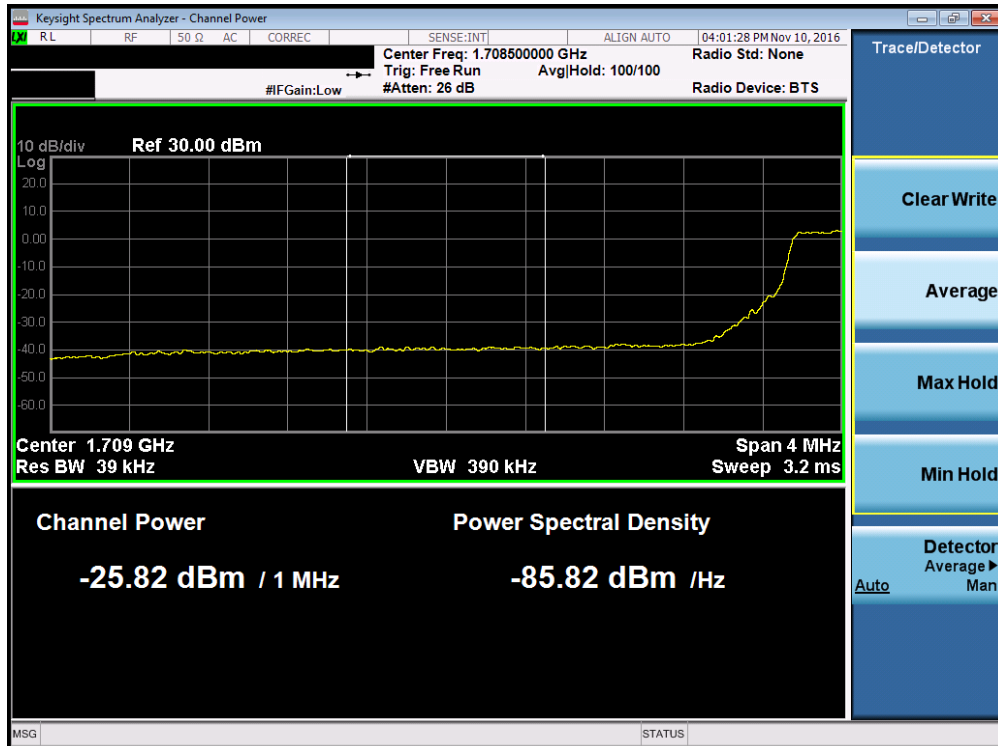


Plot 7-116. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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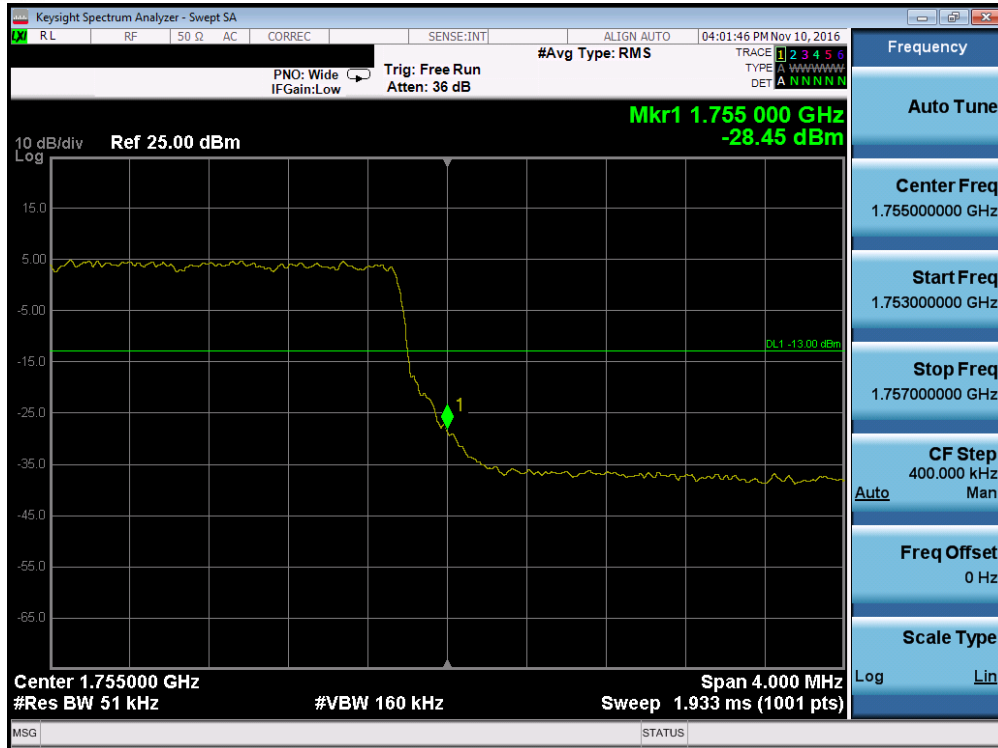


Plot 7-117. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

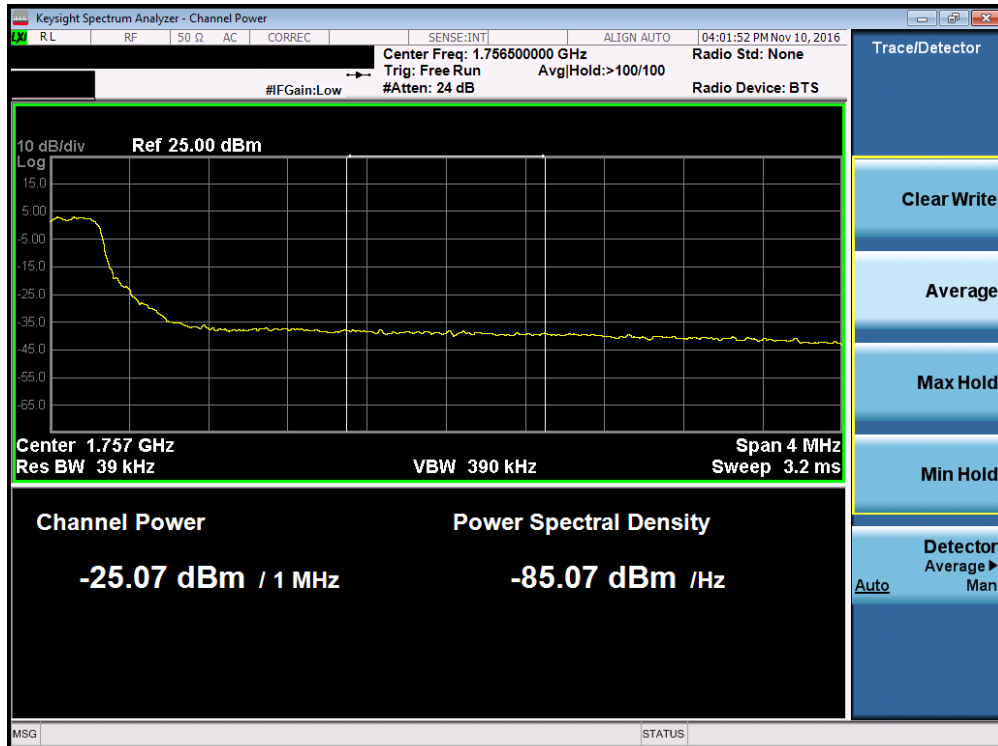


Plot 7-118. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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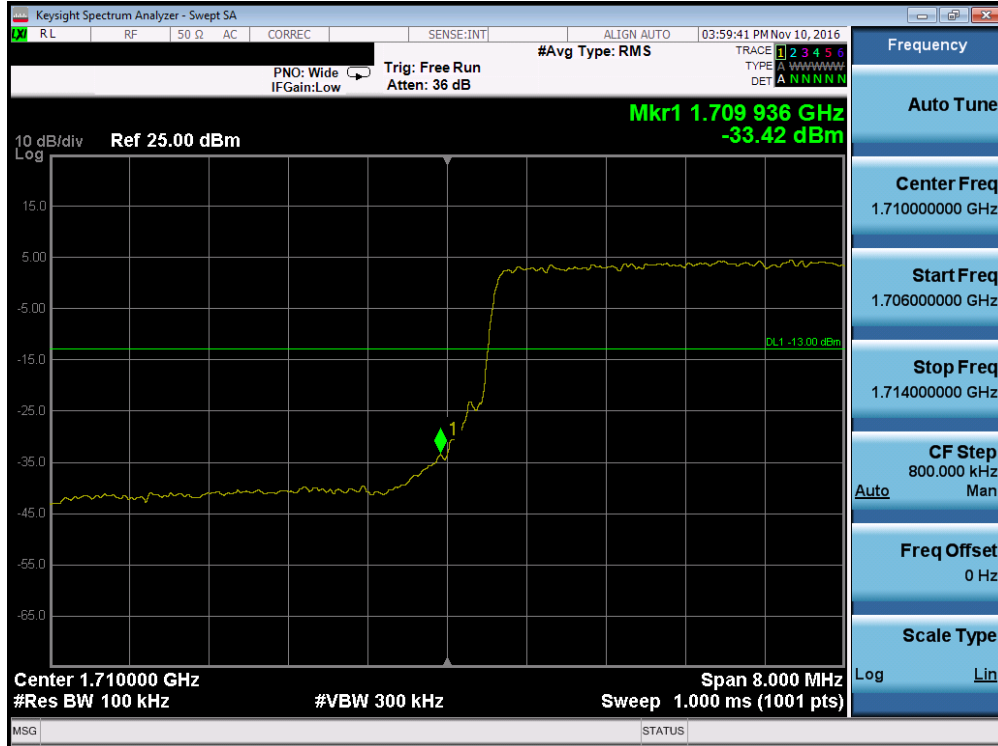


Plot 7-119. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

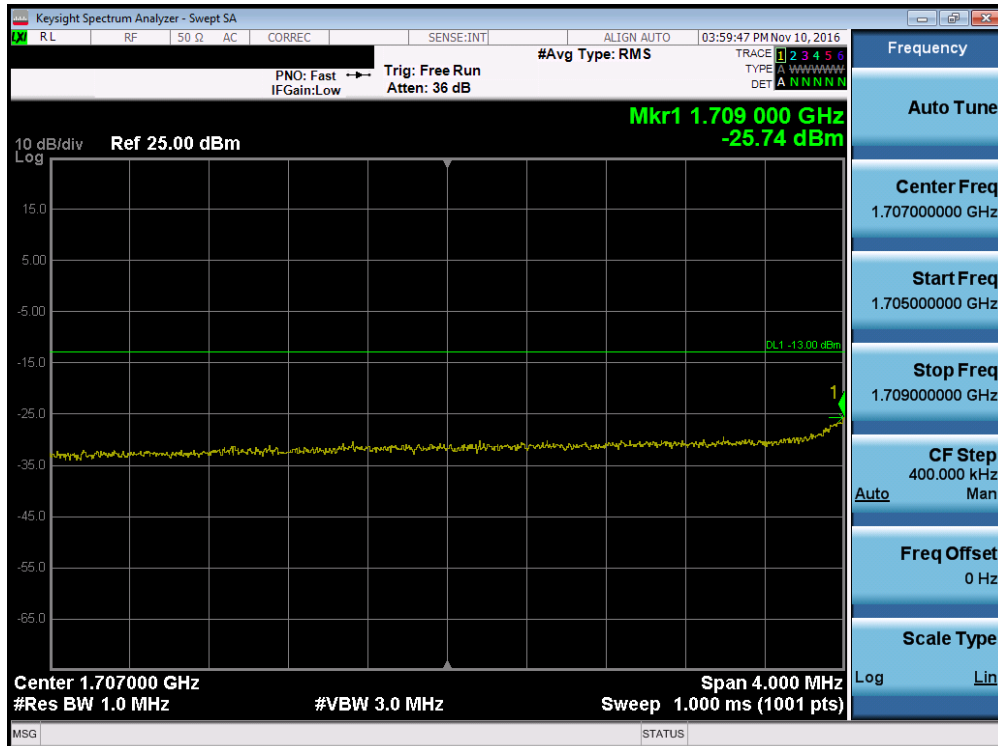


Plot 7-120. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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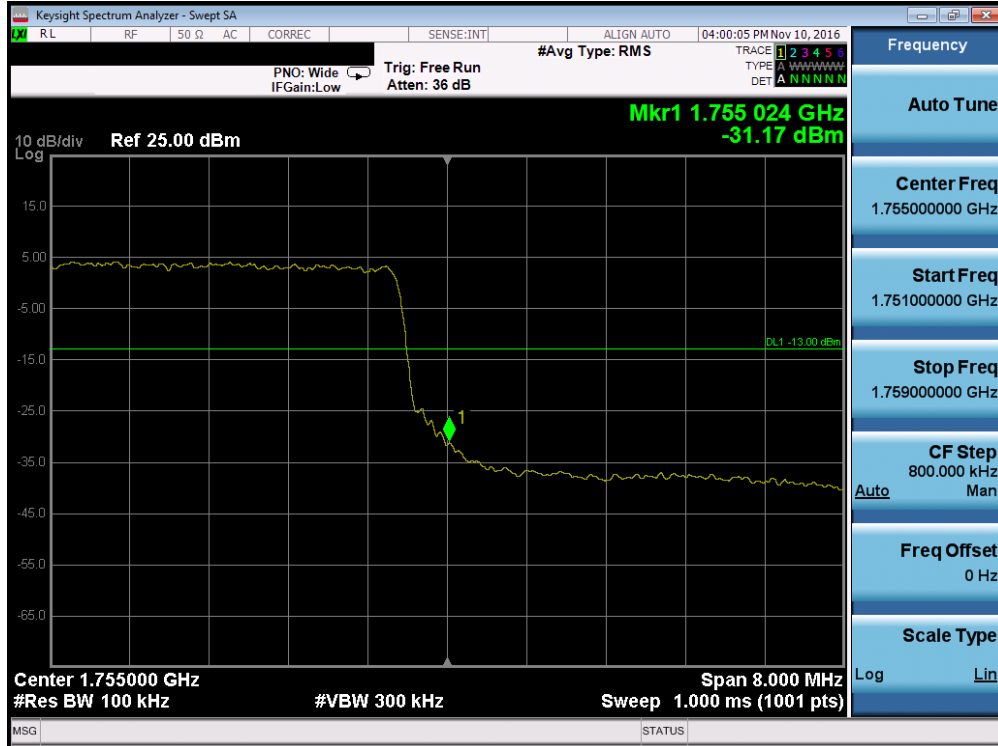
Plot 7-121. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



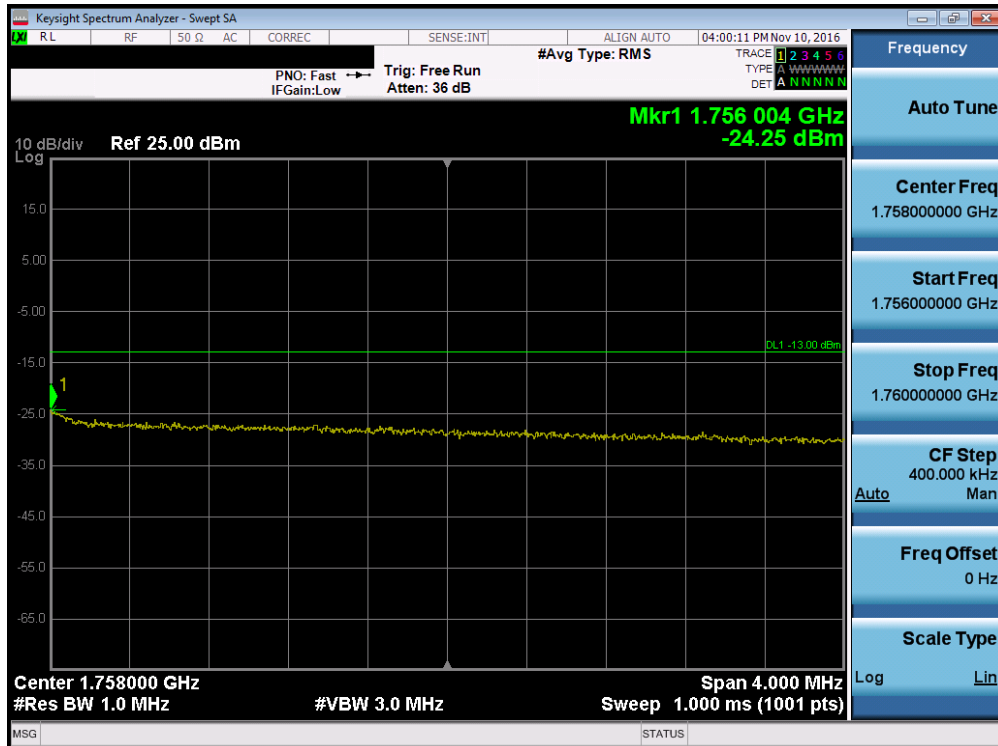
Plot 7-122. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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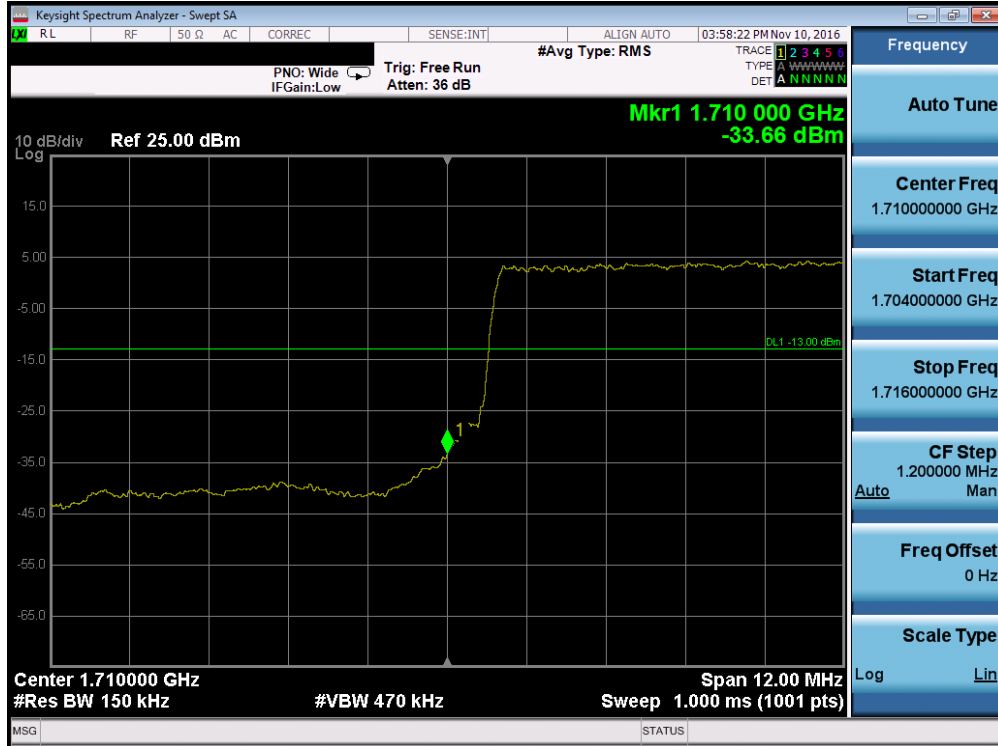


Plot 7-123. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

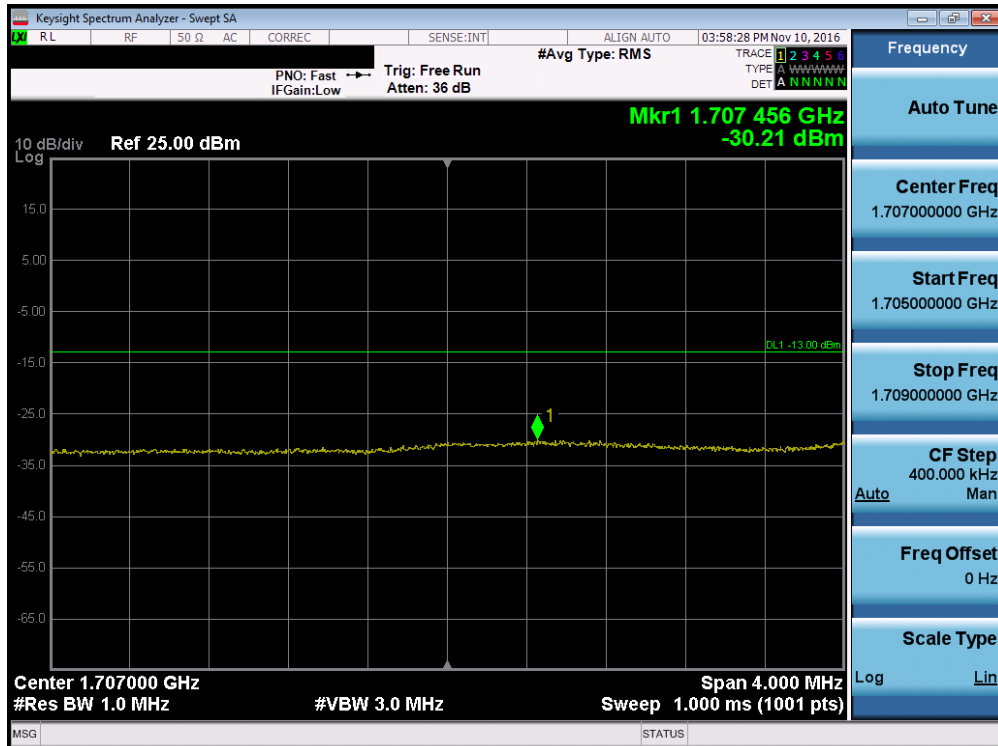


Plot 7-124. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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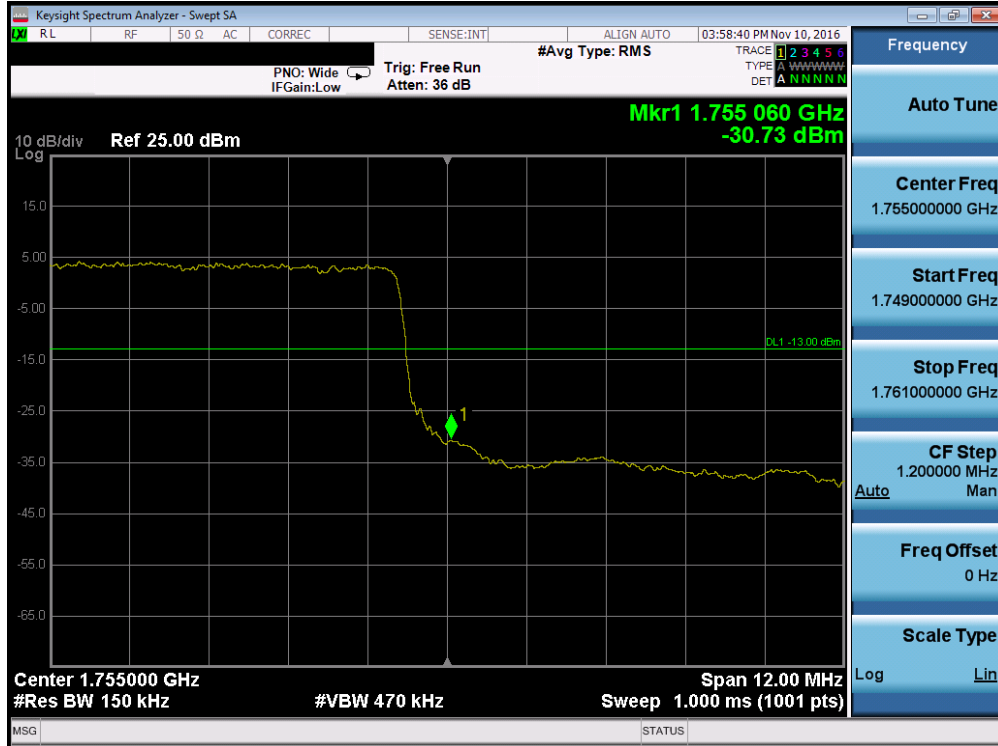


Plot 7-125. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

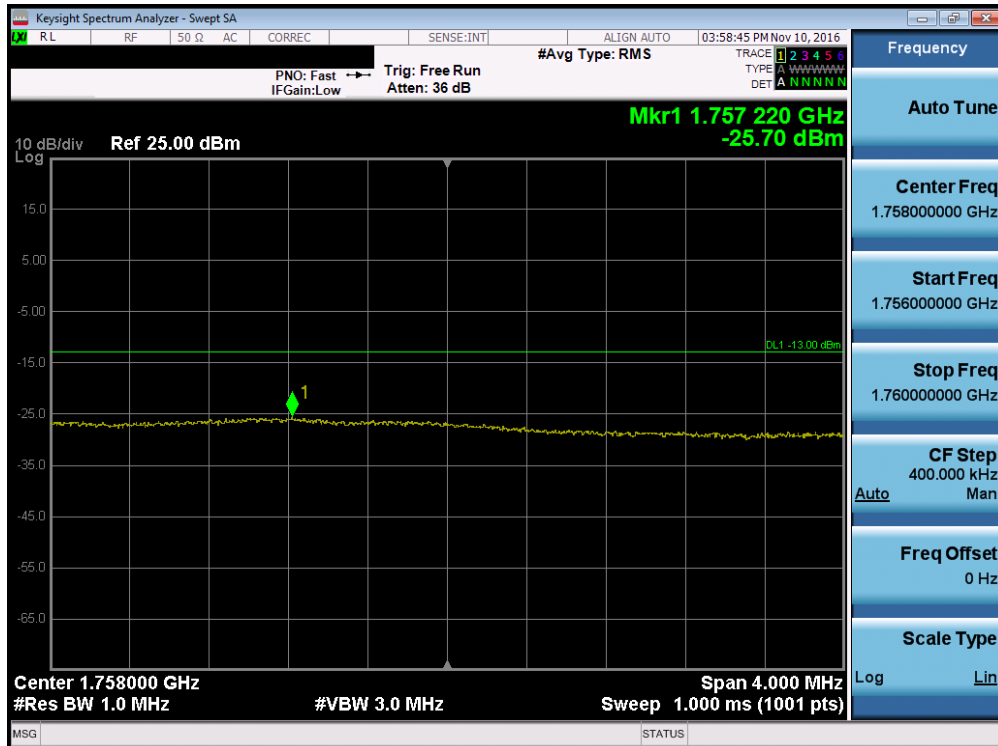


Plot 7-126. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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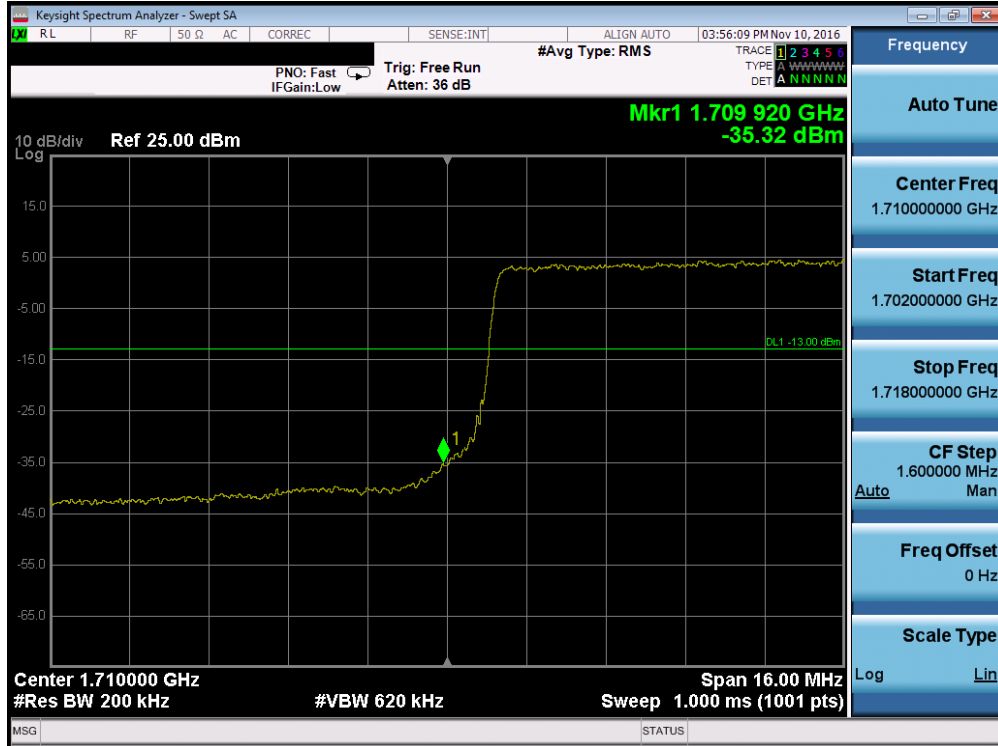


Plot 7-127. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

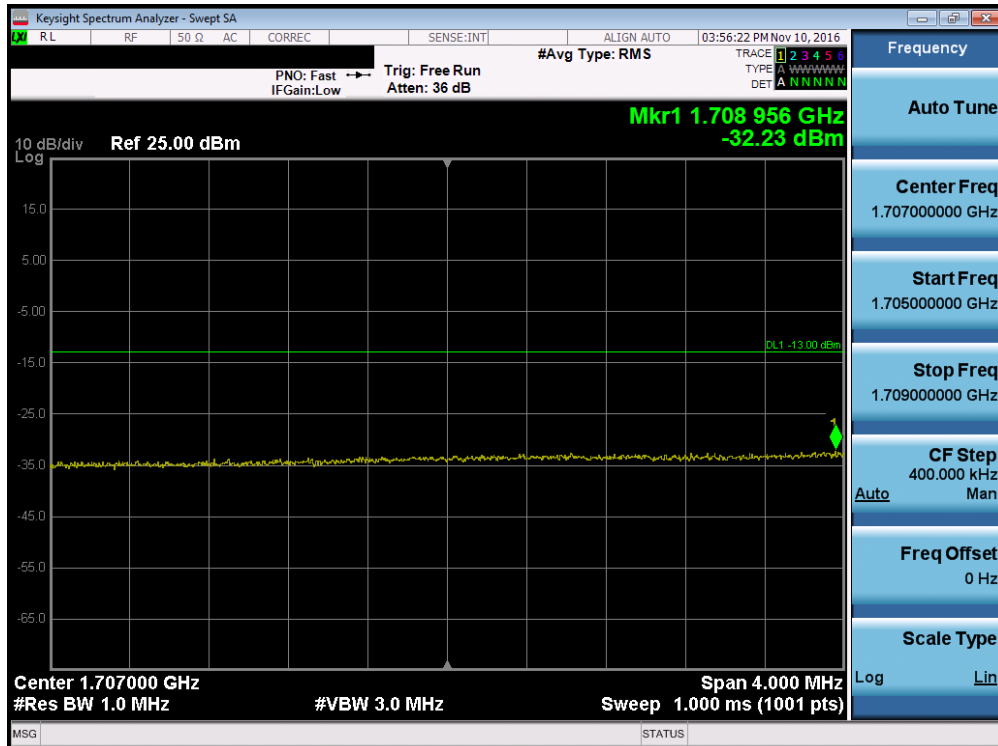


Plot 7-128. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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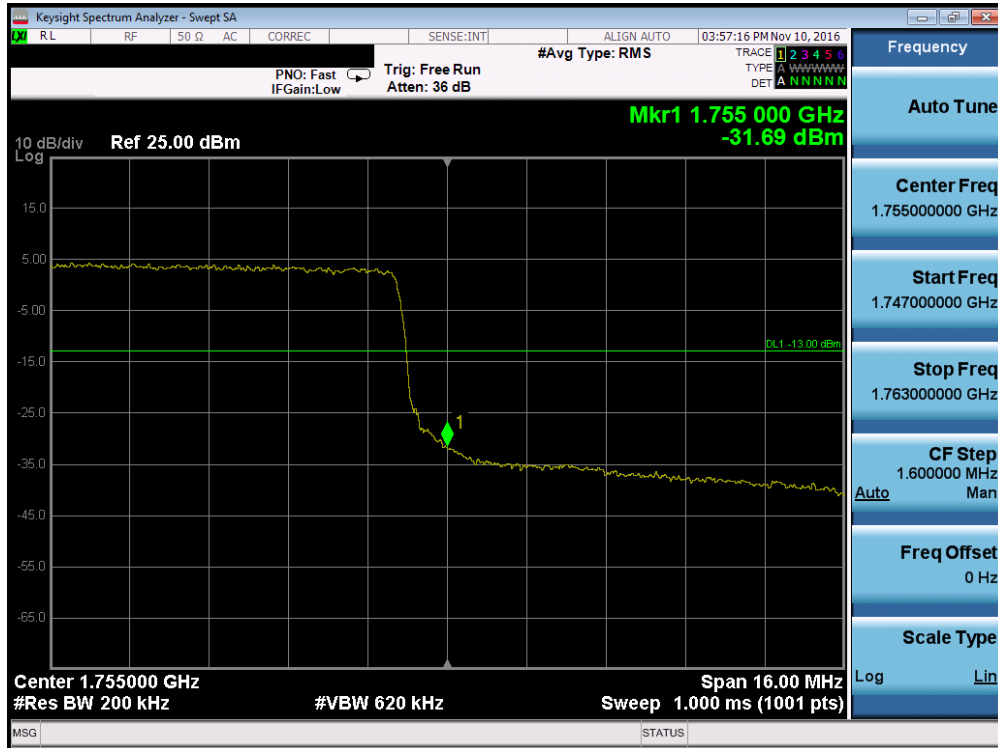


Plot 7-129. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

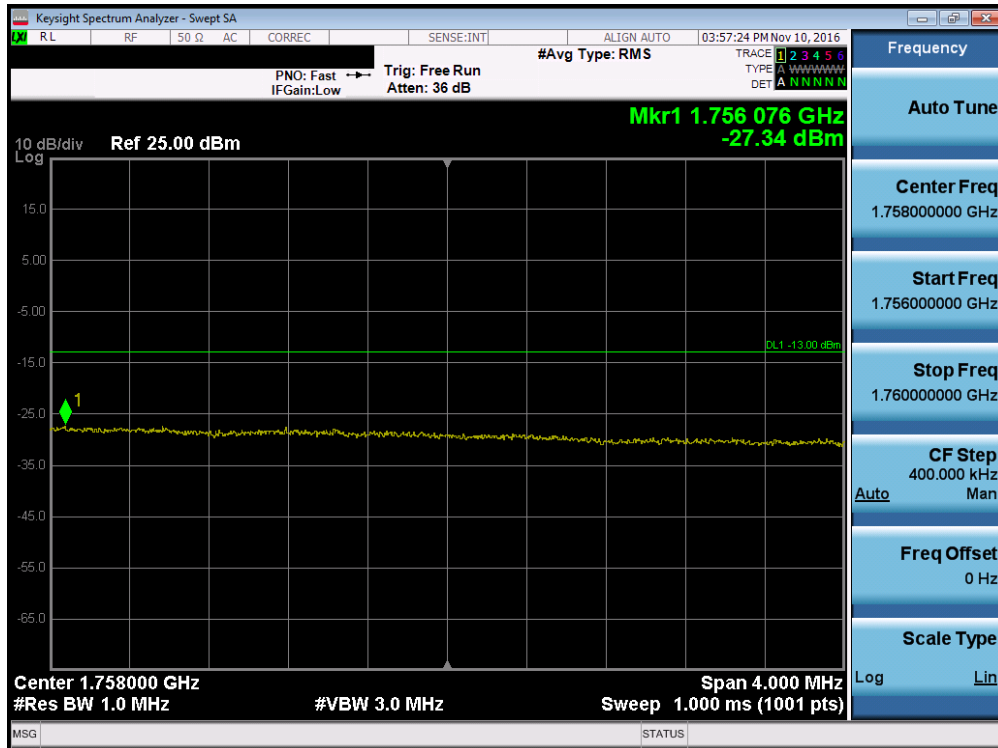


Plot 7-130. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 81 of 125

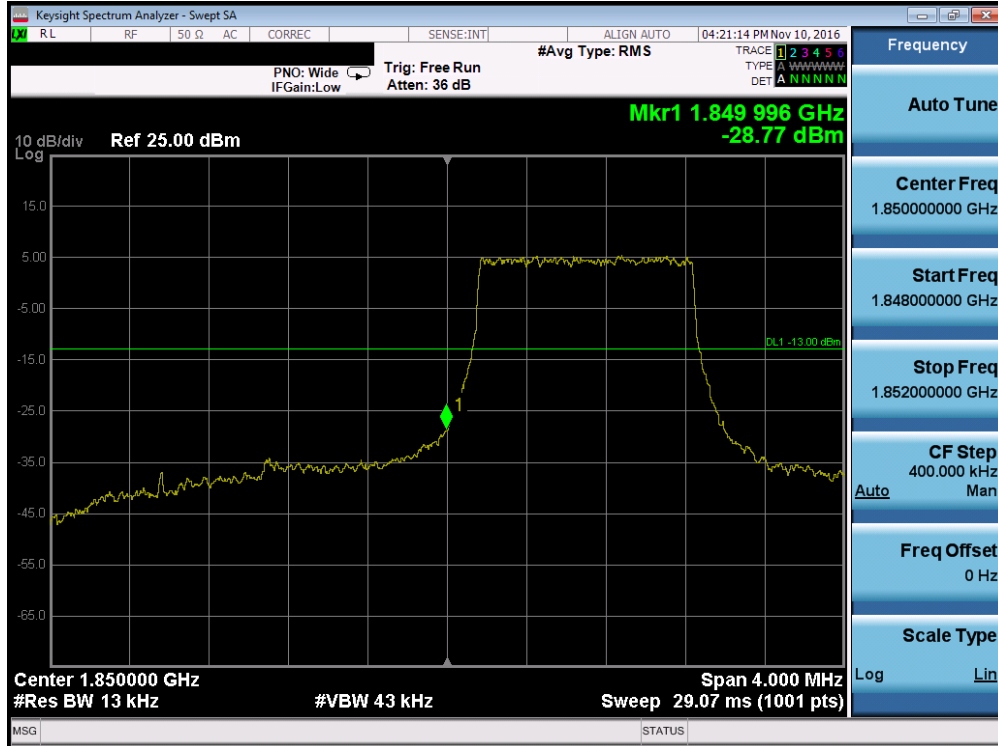


Plot 7-131. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

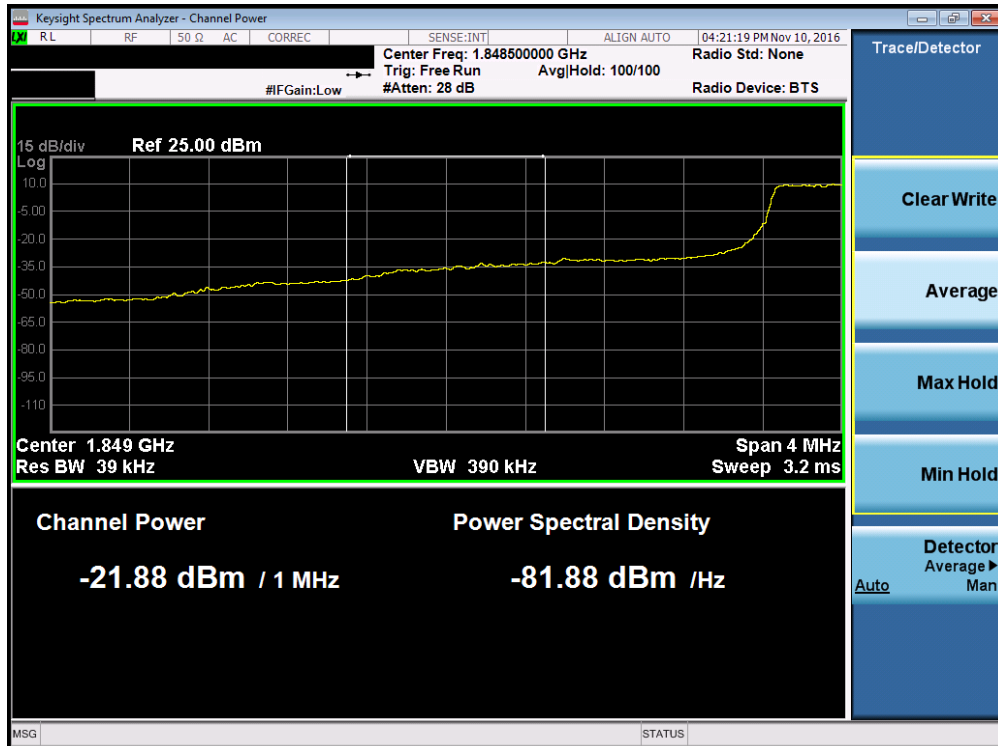


Plot 7-132. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 82 of 125



Plot 7-133. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

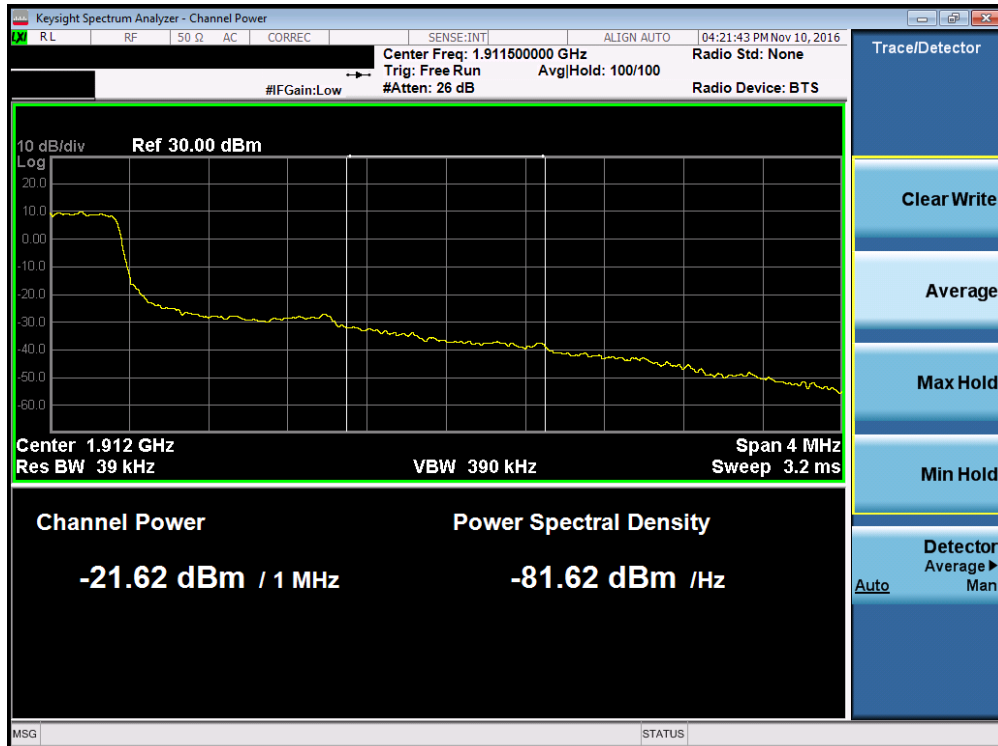


Plot 7-134. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 83 of 125

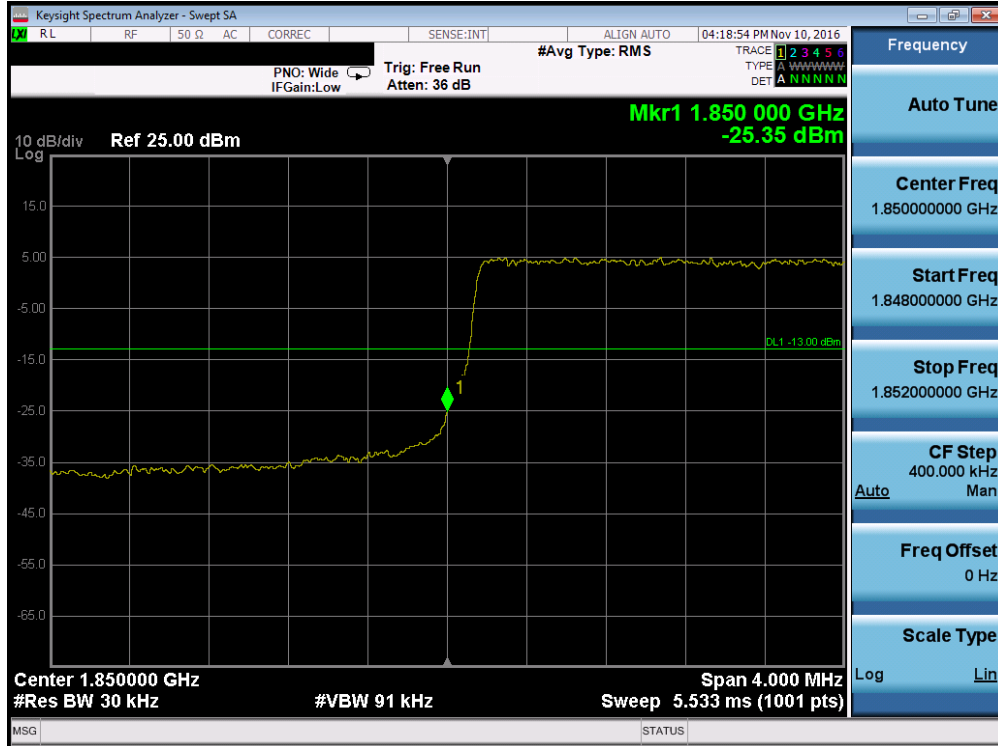


Plot 7-135. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

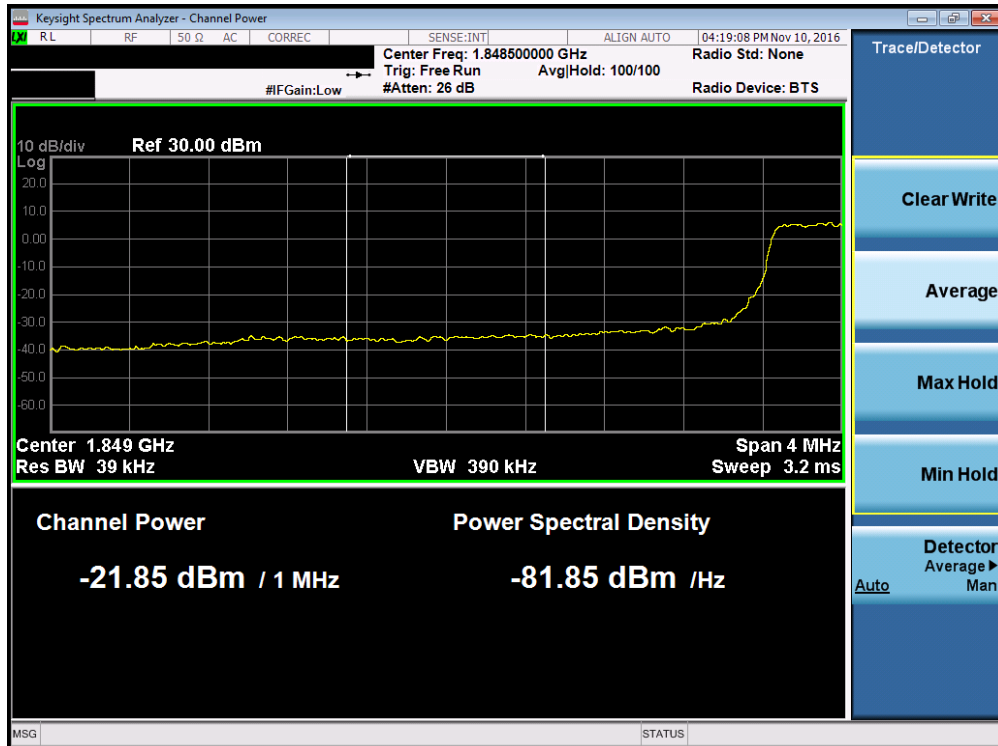


Plot 7-136. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 84 of 125



Plot 7-137. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



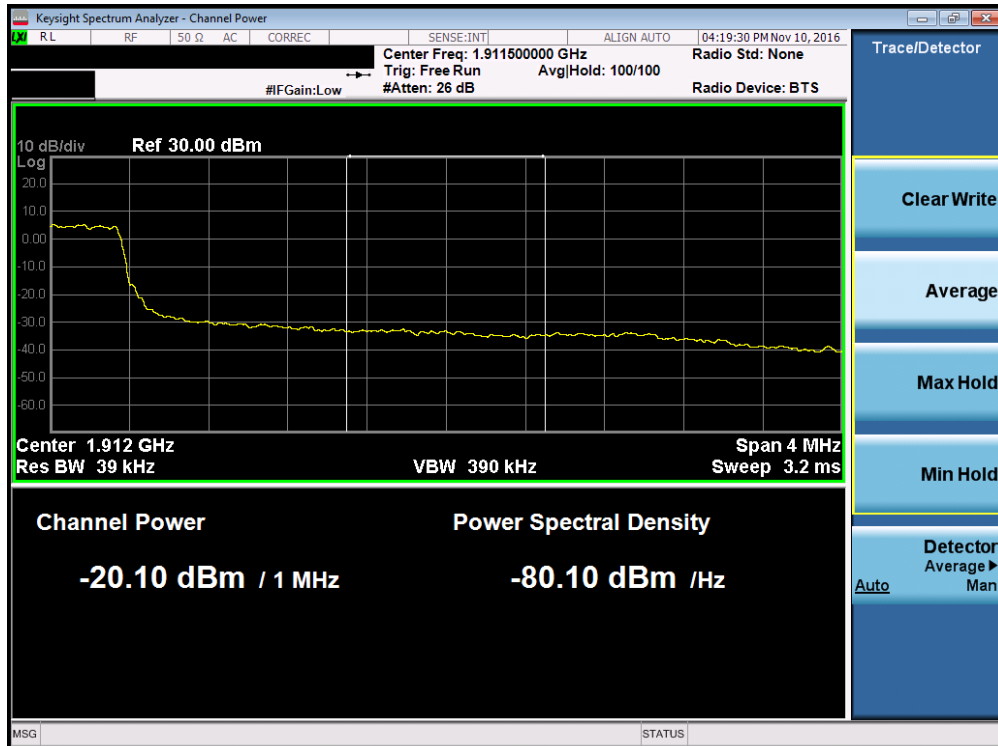
Plot 7-138. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 85 of 125



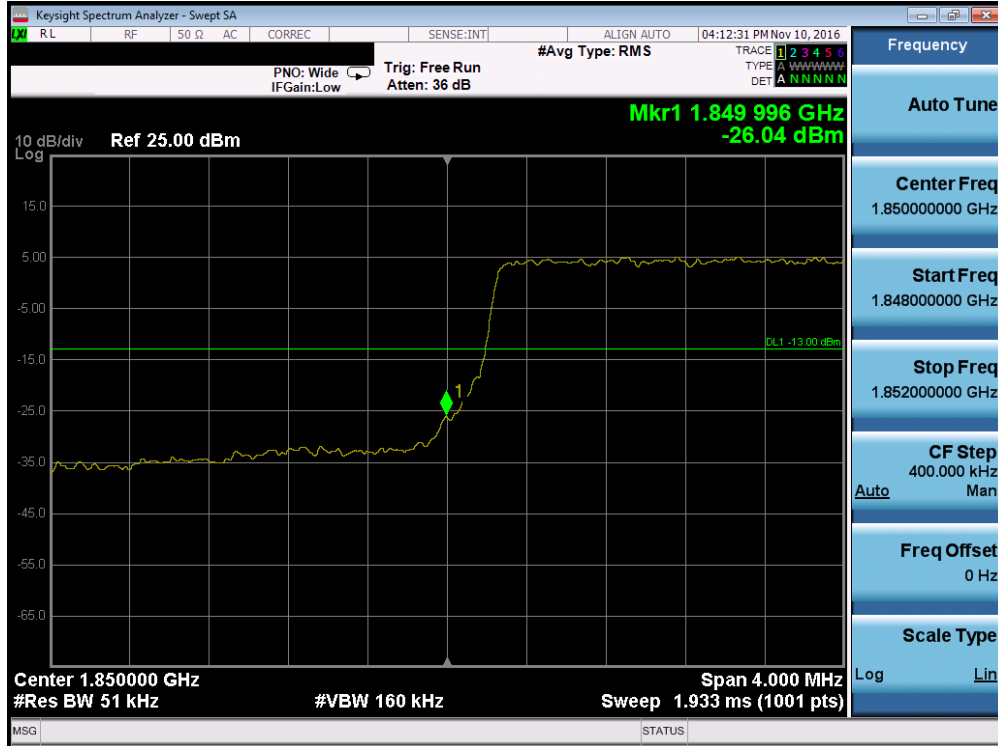


Plot 7-139. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - RB Size 15)

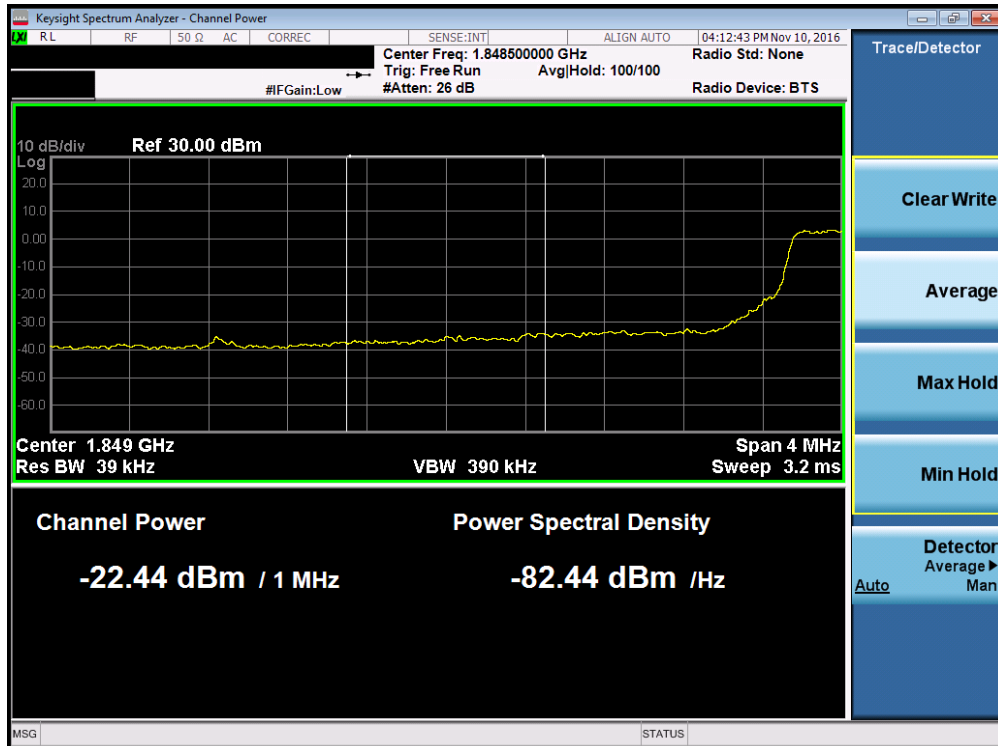


Plot 7-140. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - RB Size 15)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 86 of 125

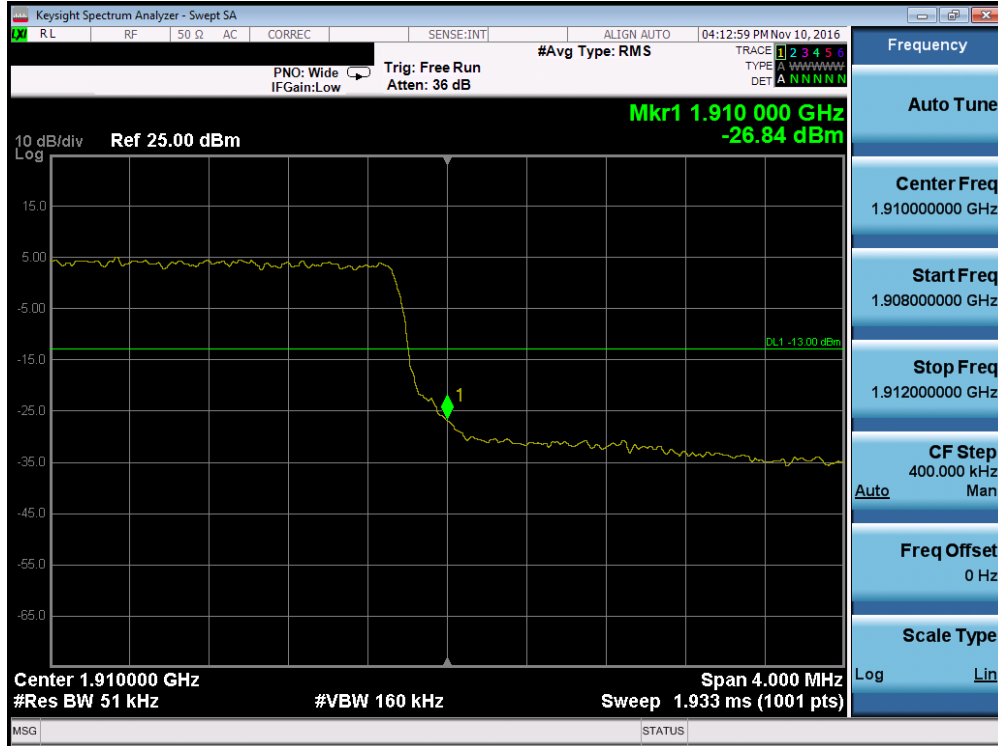


Plot 7-141. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

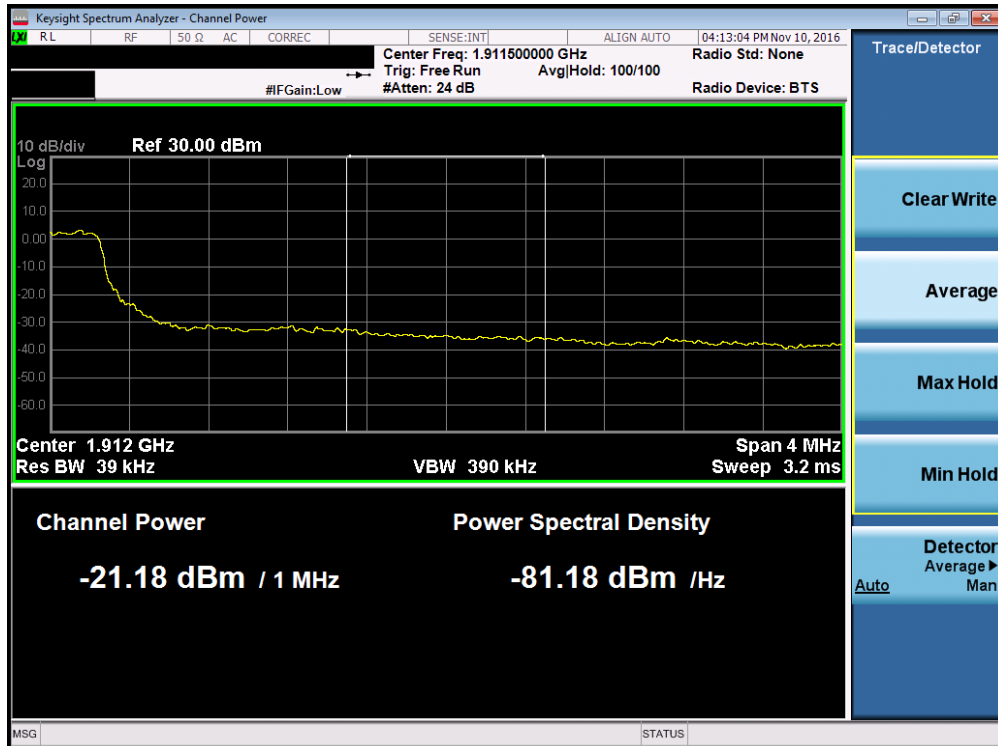


Plot 7-142. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 87 of 125

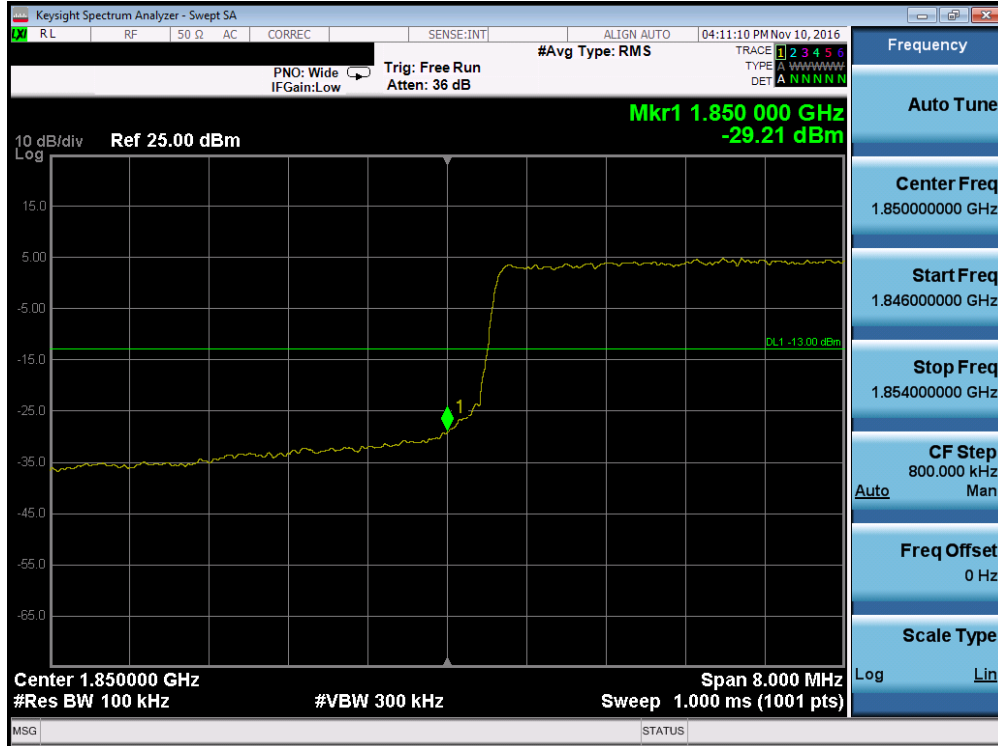


Plot 7-143. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

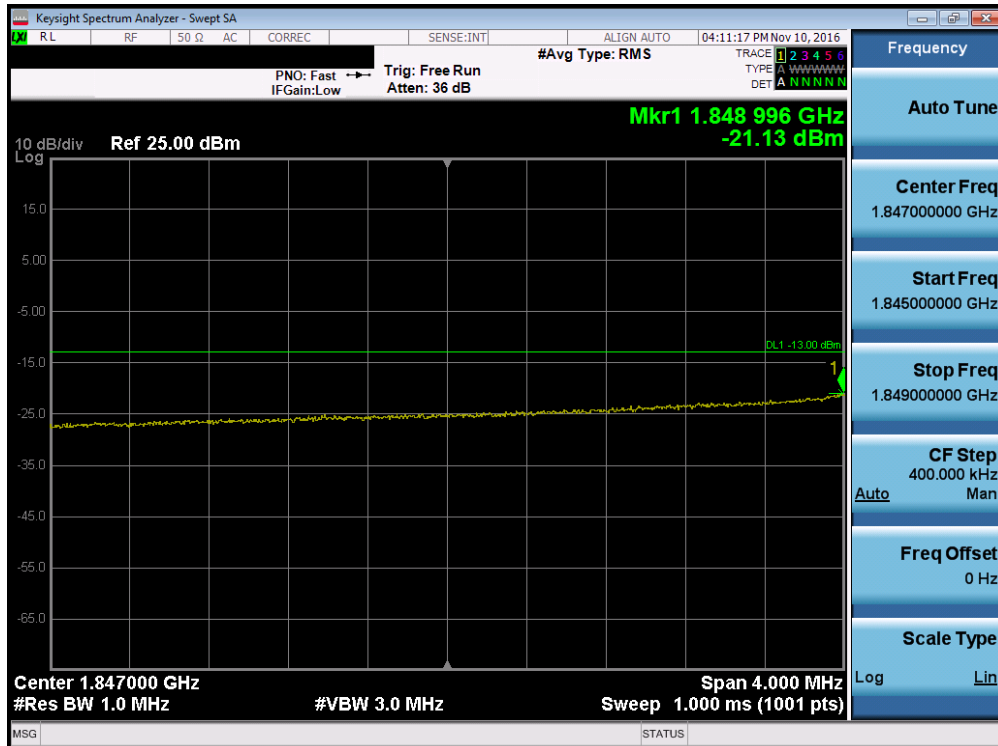


Plot 7-144. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 88 of 125



Plot 7-145. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

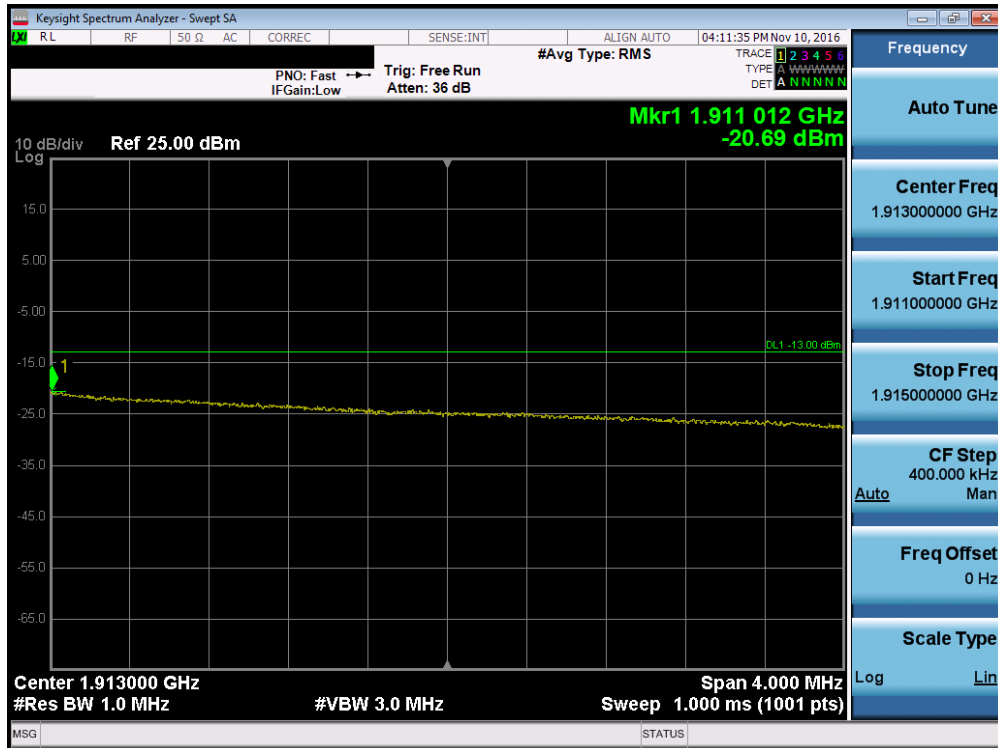


Plot 7-146. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 89 of 125

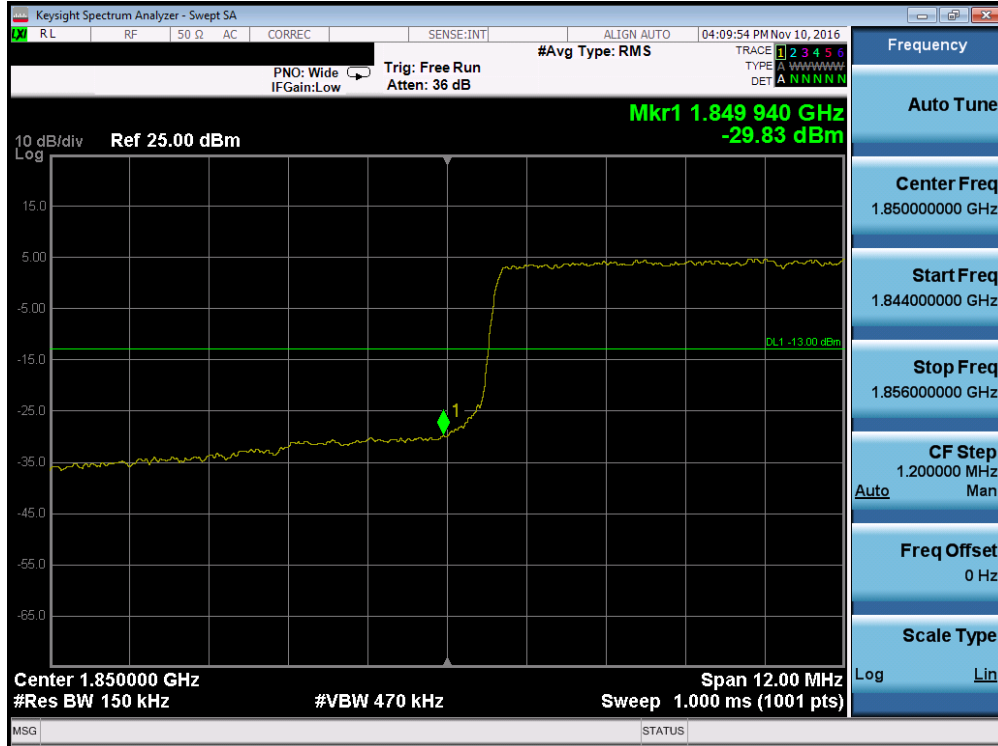


Plot 7-147. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

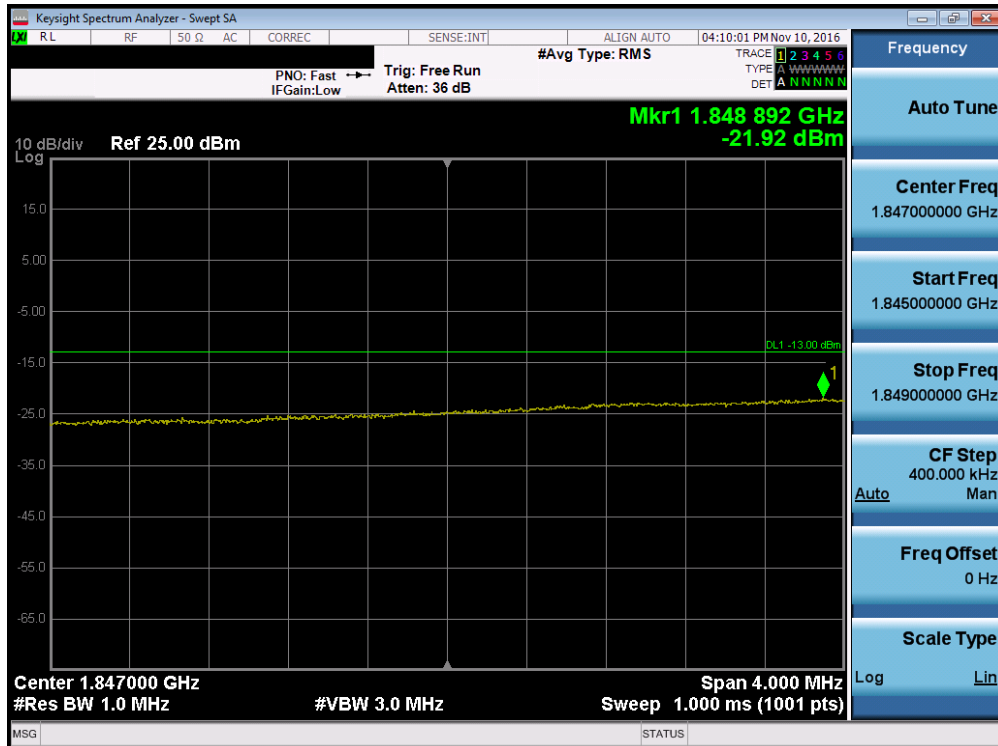


Plot 7-148. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 90 of 125

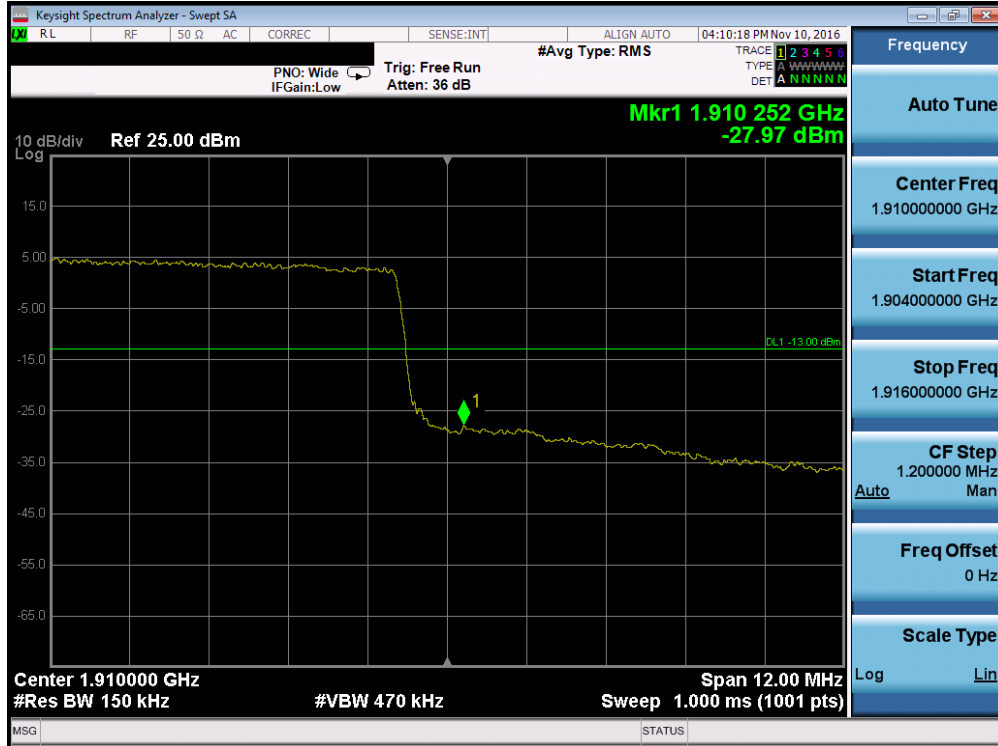


Plot 7-149. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

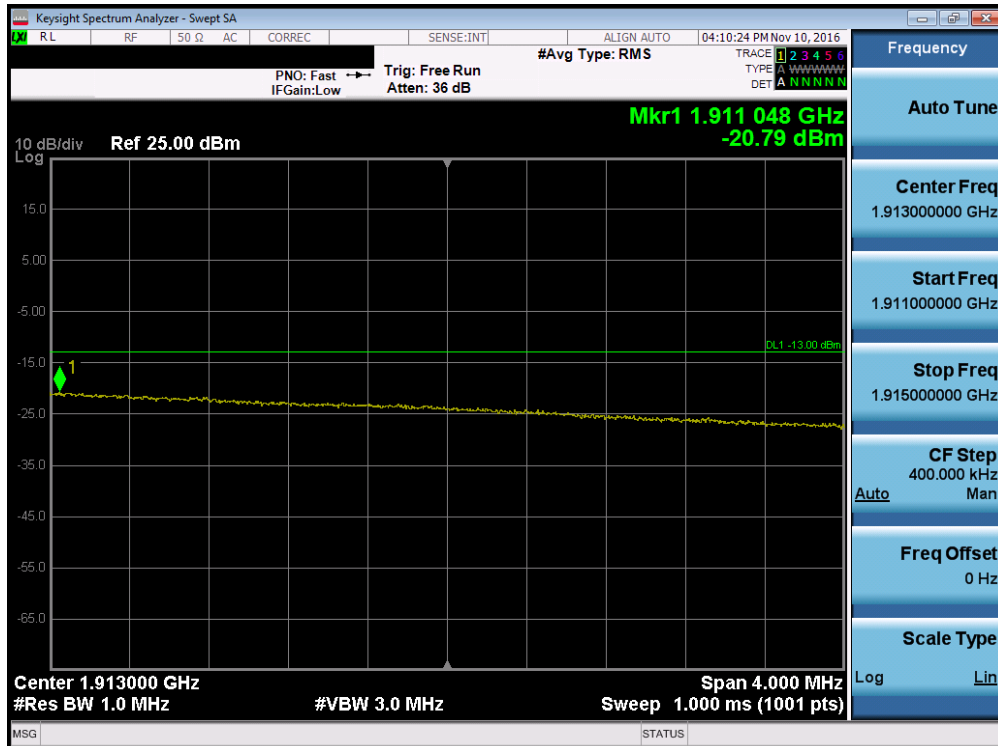


Plot 7-150. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 91 of 125

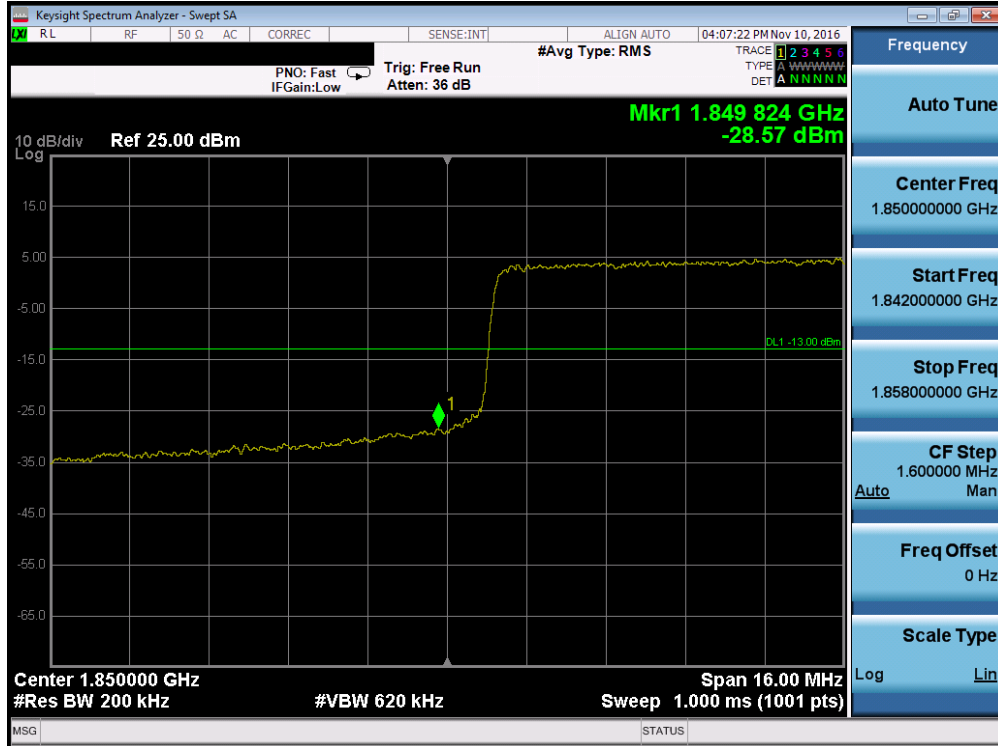


Plot 7-151. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

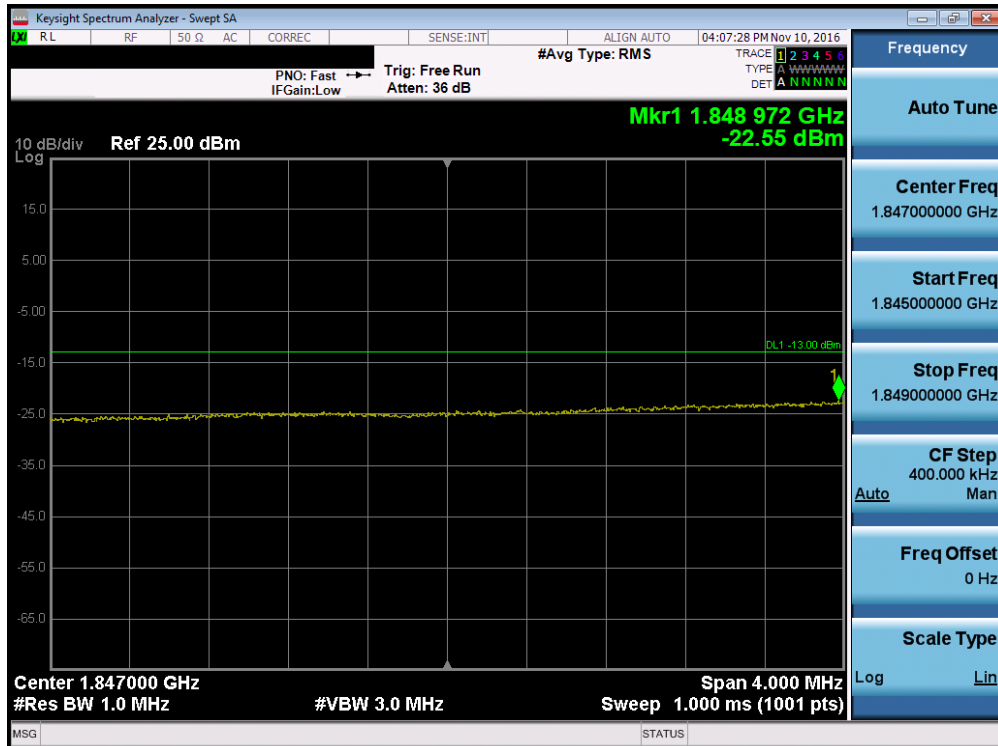


Plot 7-152. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset	Page 92 of 125	



Plot 7-153. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



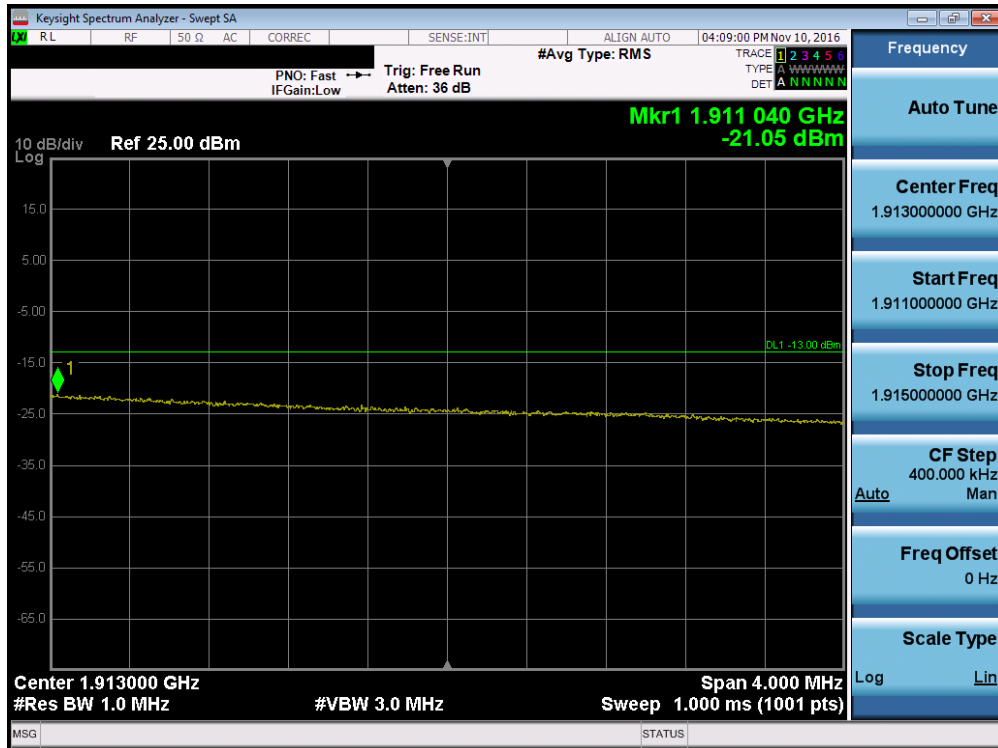
Plot 7-154. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 93 of 125





Plot 7-155. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-156. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 94 of 125

## 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

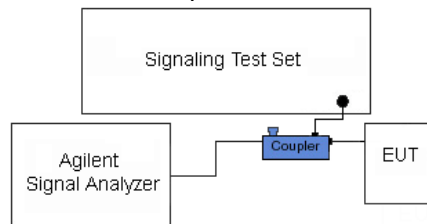
KDB 971168 D01 v02r02 – Section 5.7.1

#### 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.

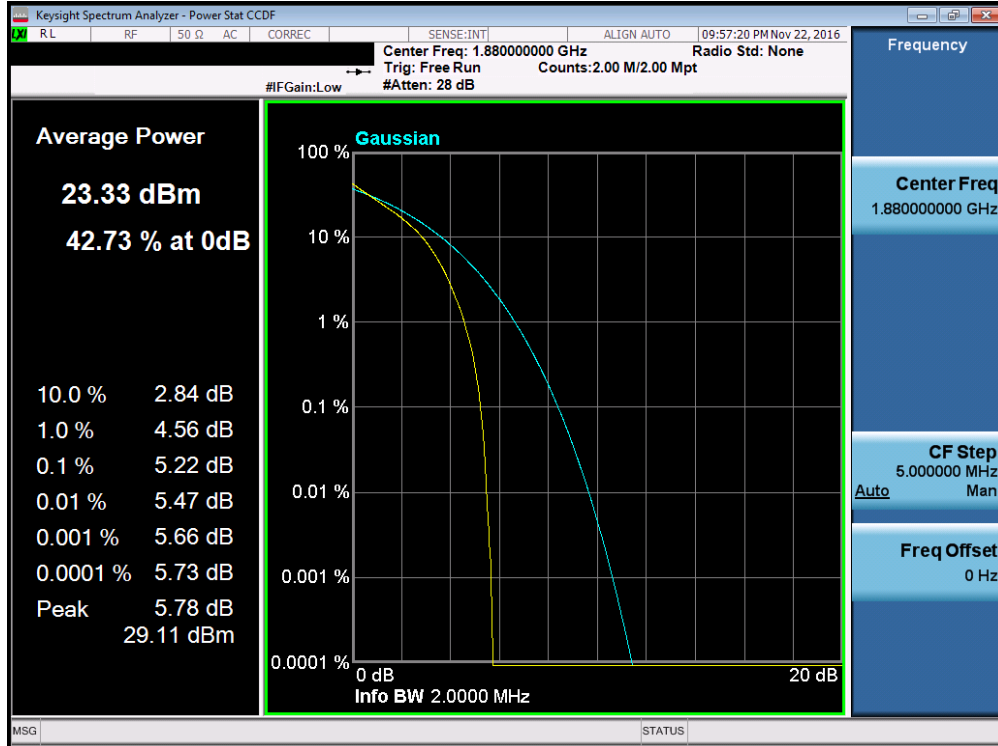


**Figure 7-4. Test Instrument & Measurement Setup**

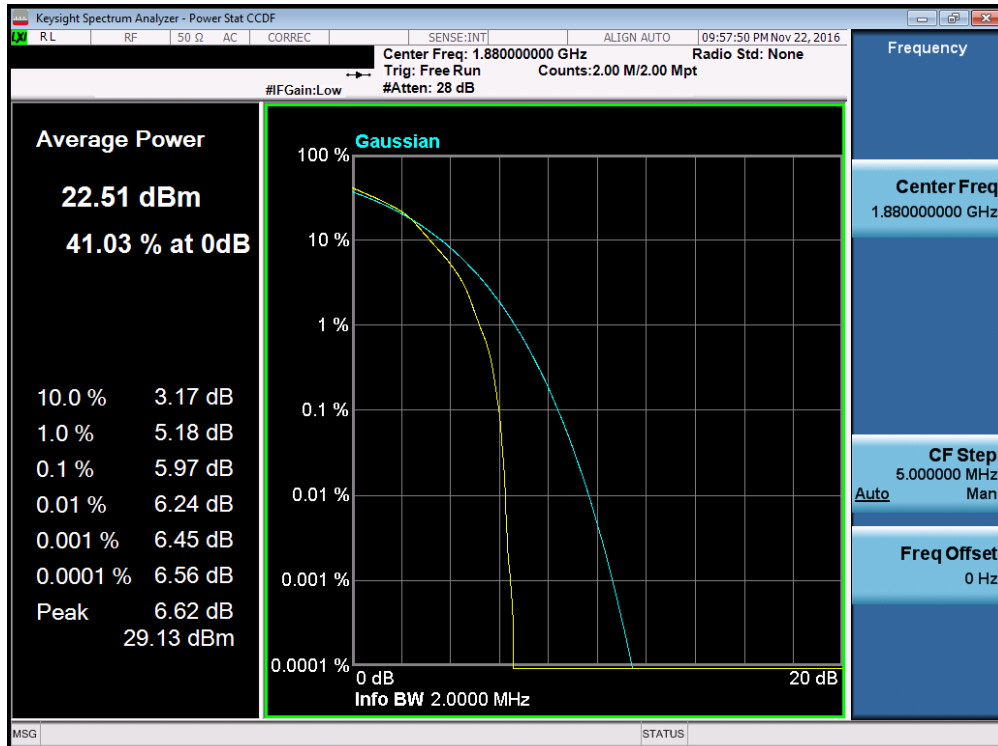
#### Test Notes

None.

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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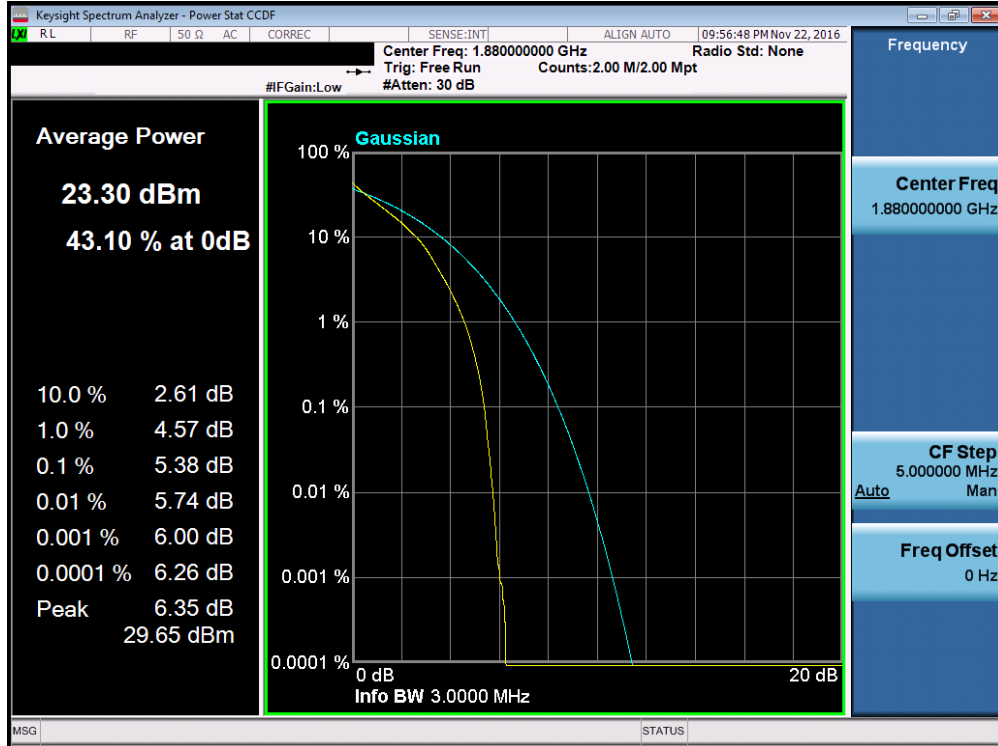


Plot 7-157. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

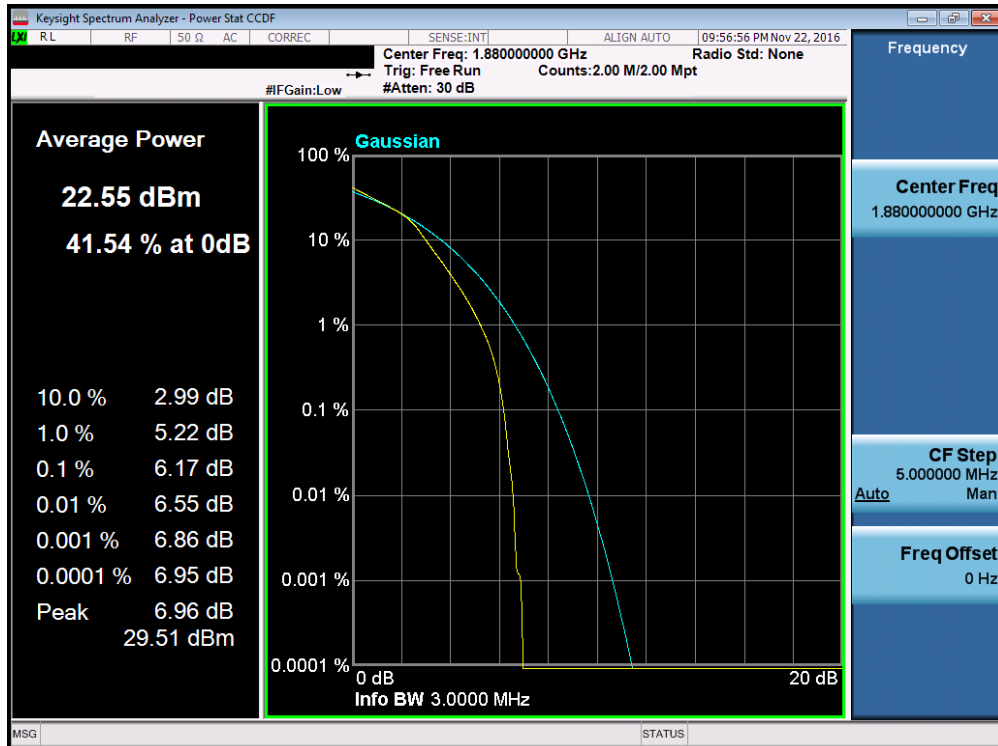


Plot 7-158. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 96 of 125

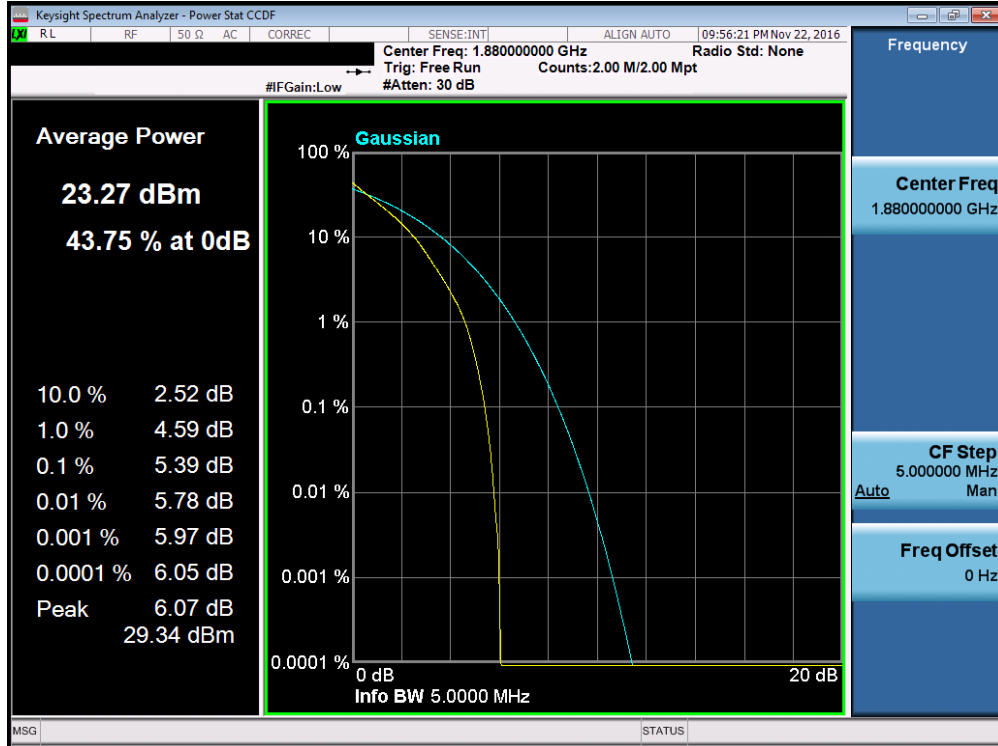


Plot 7-159. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

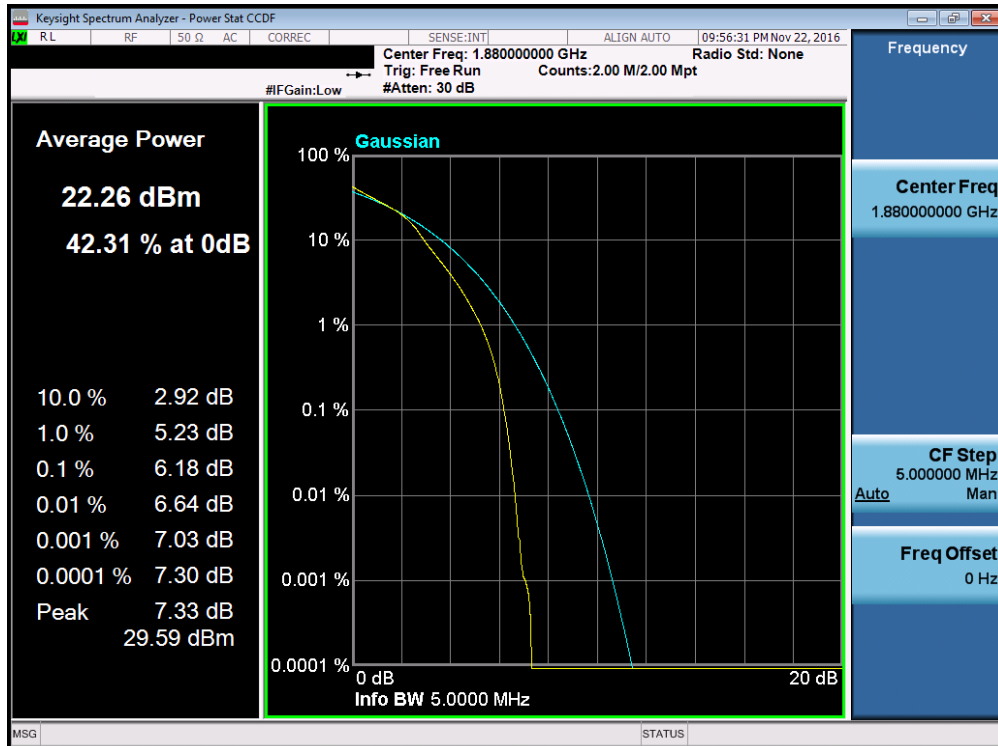


Plot 7-160. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: ZNFTP260	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 97 of 125

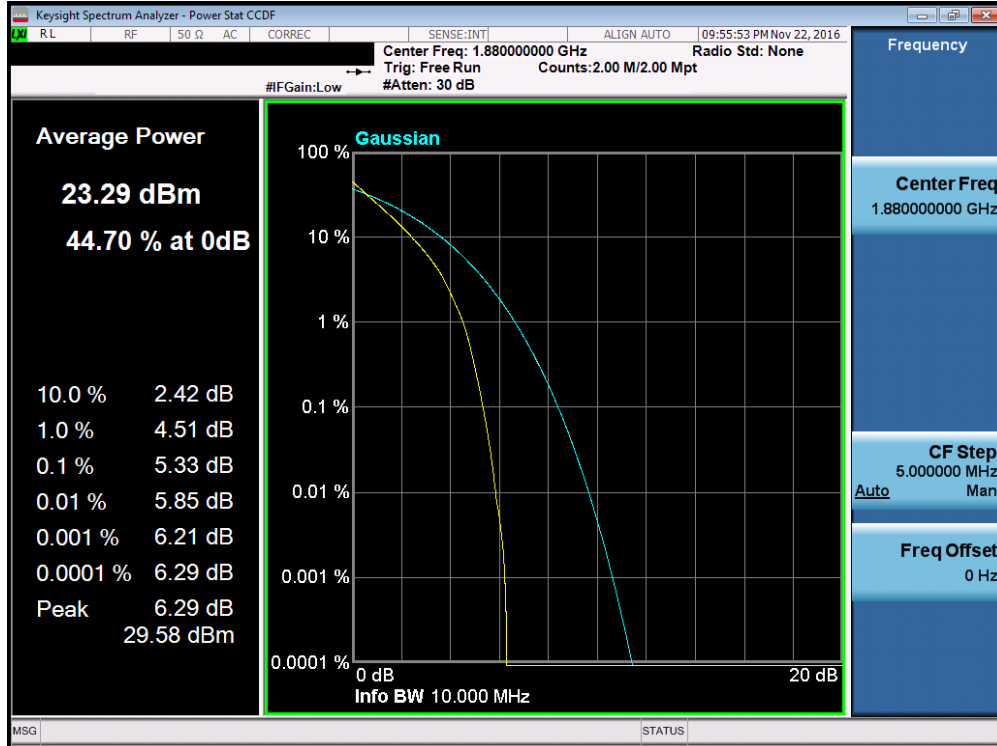


Plot 7-161. PAR Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

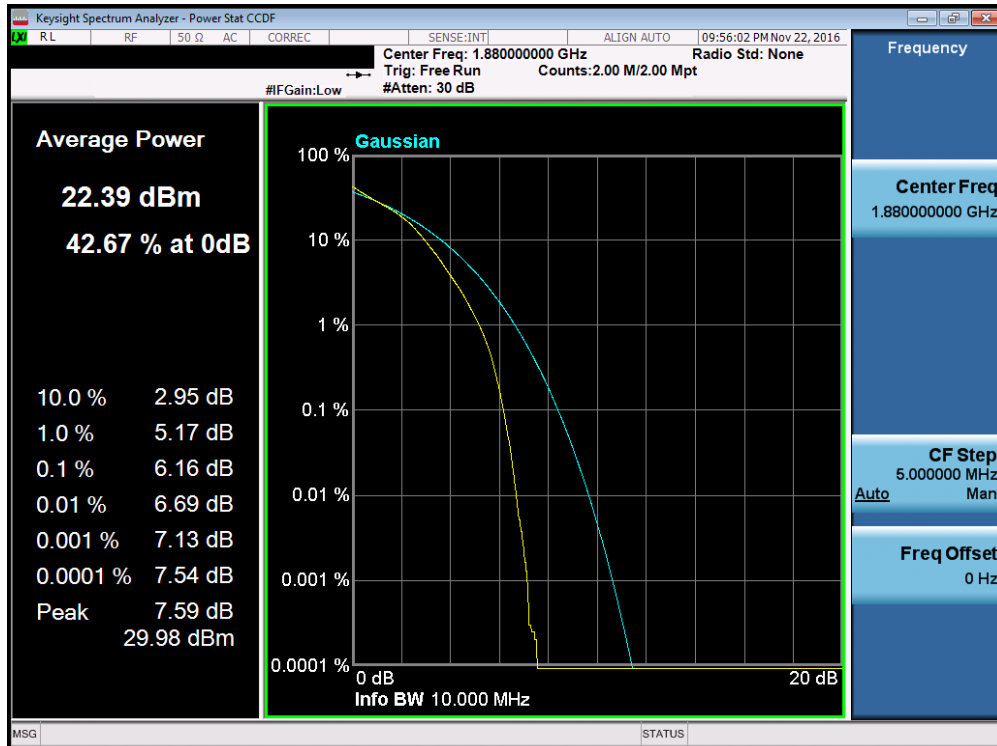


Plot 7-162. PAR Plot (Band 2 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: ZNFTP260	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 98 of 125

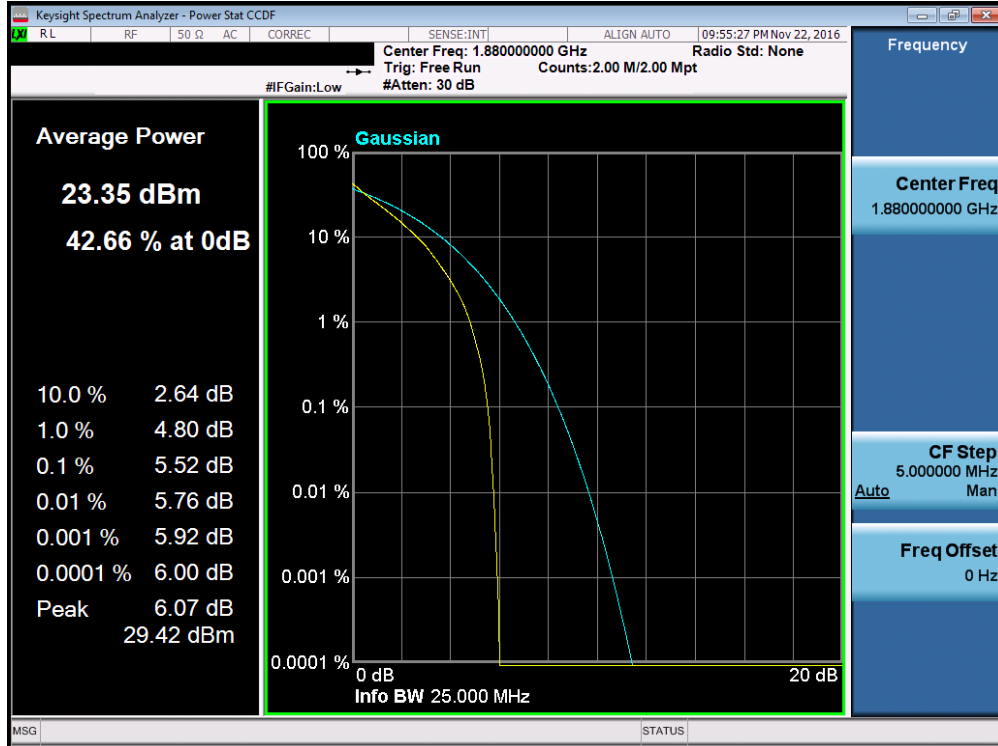


Plot 7-163. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

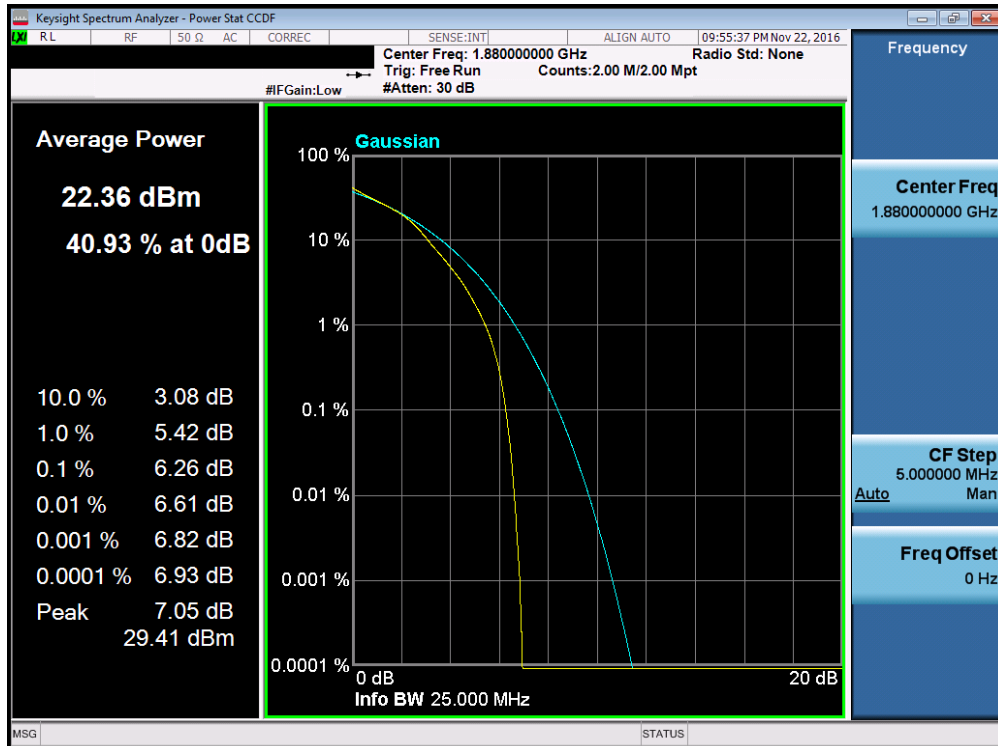


Plot 7-164. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 99 of 125

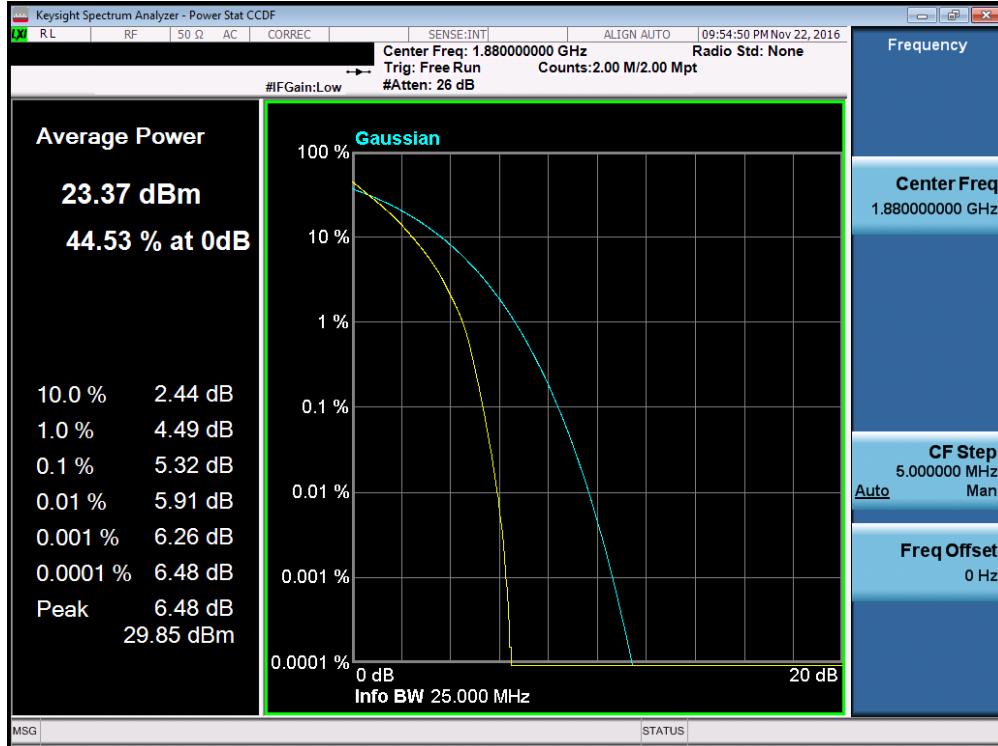


Plot 7-165. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

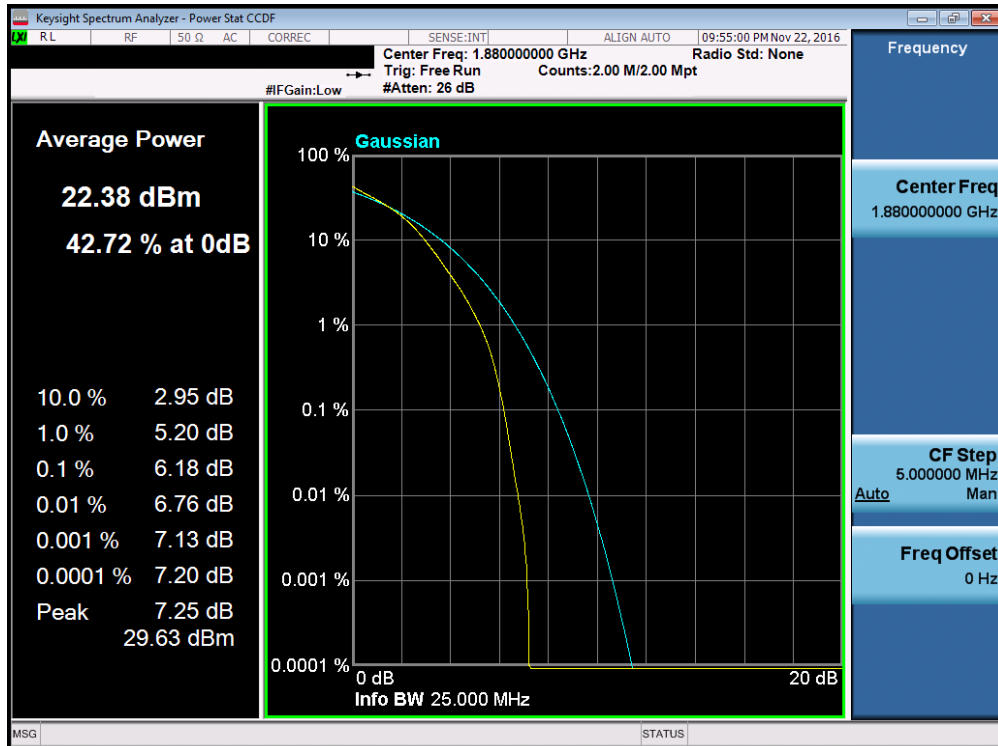


Plot 7-166. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFTP260	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-167. PAR Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-168. PAR Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: ZNFTP260	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset		Page 101 of 125



**7.6 Radiated Power (ERP/EIRP)**  
§22.913(a.2) §24.232(c.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

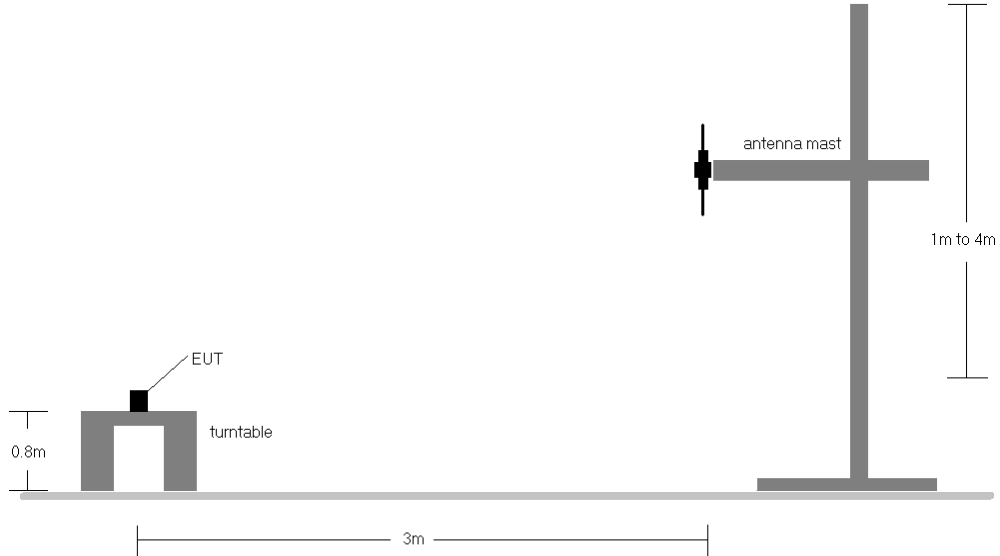
**Test Settings**

1. Radiated power measurements are performed using the signal analyzer’s “channel power” measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to “free run” for signals with continuous operation with the sweep times set to “auto”.
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

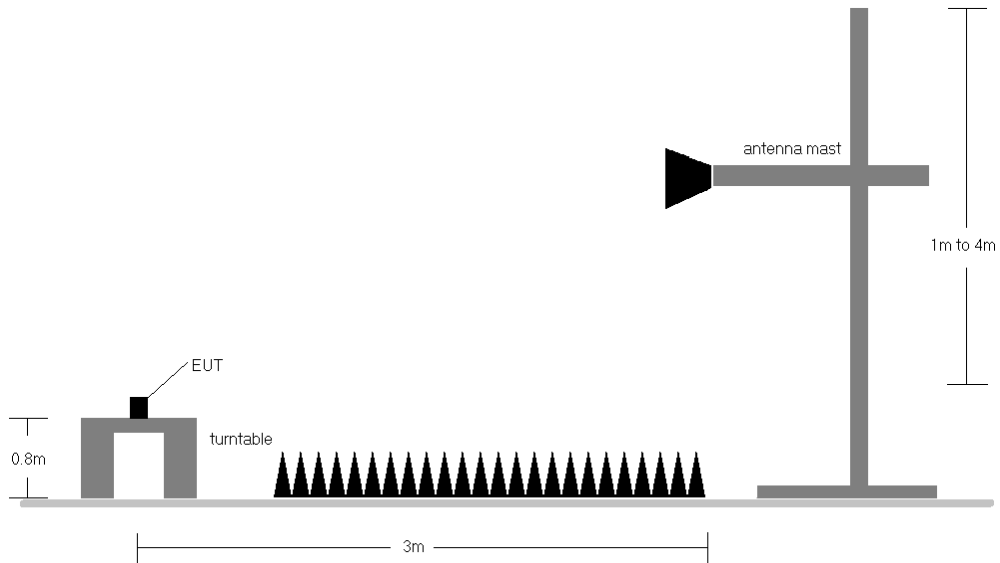
FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset	Page 102 of 125	

### 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: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed 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 [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	V	164	352	1 / 5	19.62	2.48	22.10	34.77	-12.67
707.50	1.4	QPSK	V	178	355	1 / 0	19.87	2.56	22.43	34.77	-12.34
715.30	1.4	QPSK	V	155	370	1 / 0	18.91	2.60	21.51	34.77	-13.27
699.70	1.4	16-QAM	V	164	352	1 / 5	18.17	2.48	20.65	34.77	-14.12
707.50	1.4	16-QAM	V	178	355	1 / 0	18.82	2.56	21.38	34.77	-13.39
715.30	1.4	16-QAM	V	155	370	1 / 0	17.90	2.60	20.50	34.77	-14.28
700.50	3	QPSK	V	173	379	1 / 14	19.89	2.48	22.37	34.77	-12.40
707.50	3	QPSK	V	163	362	1 / 0	20.16	2.56	22.72	34.77	-12.05
714.50	3	QPSK	V	160	329	1 / 0	19.26	2.60	21.86	34.77	-12.91
700.50	3	16-QAM	V	173	379	1 / 14	18.58	2.48	21.06	34.77	-13.71
707.50	3	16-QAM	V	163	362	1 / 0	19.39	2.56	21.95	34.77	-12.82
714.50	3	16-QAM	V	160	329	1 / 0	18.26	2.60	20.86	34.77	-13.91
701.50	5	QPSK	V	164	316	1 / 0	20.15	2.49	22.64	34.77	-12.13
707.50	5	QPSK	V	159	361	1 / 0	20.25	2.56	22.81	34.77	-11.96
713.50	5	QPSK	V	117	337	1 / 0	19.41	2.60	22.01	34.77	-12.76
701.50	5	16-QAM	V	164	316	1 / 0	18.74	2.49	21.23	34.77	-13.54
707.50	5	16-QAM	V	159	361	1 / 0	18.93	2.56	21.49	34.77	-13.28
713.50	5	16-QAM	V	117	337	1 / 0	17.91	2.60	20.51	34.77	-14.26
704.00	10	QPSK	V	148	349	1 / 49	19.68	2.51	22.19	34.77	-12.58
707.50	10	QPSK	V	166	343	1 / 0	19.80	2.56	22.36	34.77	-12.41
711.00	10	QPSK	V	131	357	1 / 0	19.92	2.60	22.52	34.77	-12.26
704.00	10	16-QAM	V	148	349	1 / 49	18.49	2.51	21.00	34.77	-13.77
707.50	10	16-QAM	V	166	343	1 / 0	18.55	2.56	21.11	34.77	-13.66
711.00	10	16-QAM	V	131	357	1 / 0	18.66	2.60	21.26	34.77	-13.52
707.50	5	QPSK	H	142	175	1 / 0	17.54	2.56	20.10	34.77	-14.67

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

FCC ID: ZNFTP260	 <b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>			Reviewed by: Quality Manager
Test Report S/N: 0Y1611071722.ZNF	Test Dates: 11/08-11/22/2016	EUT Type: Portable Handset	Page 104 of 125	



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	V	117	51	1 / 0	17.50	5.51	23.01	38.45	-15.44
836.50	1.4	QPSK	V	246	98	1 / 0	17.35	5.14	22.49	38.45	-15.96
848.30	1.4	QPSK	V	119	99	1 / 0	16.47	4.68	21.15	38.45	-17.30
824.70	1.4	16-QAM	V	117	51	1 / 0	16.57	5.51	22.08	38.45	-16.37
836.50	1.4	16-QAM	V	246	98	1 / 0	16.51	5.14	21.65	38.45	-16.80
848.30	1.4	16-QAM	V	119	99	1 / 0	15.55	4.68	20.23	38.45	-18.22
825.50	3	QPSK	V	114	76	1 / 0	17.56	5.52	23.08	38.45	-15.37
836.50	3	QPSK	V	228	105	1 / 0	17.45	5.14	22.59	38.45	-15.86
847.50	3	QPSK	V	150	97	1 / 0	16.85	4.67	21.52	38.45	-16.93
825.50	3	16-QAM	V	114	76	1 / 0	16.33	5.52	21.85	38.45	-16.60
836.50	3	16-QAM	V	228	105	1 / 0	16.33	5.14	21.47	38.45	-16.98
847.50	3	16-QAM	V	150	97	1 / 0	15.91	4.67	20.58	38.45	-17.87
826.50	5	QPSK	V	128	77	1 / 0	17.65	5.51	23.16	38.45	-15.29
836.50	5	QPSK	V	207	115	1 / 0	17.74	5.14	22.88	38.45	-15.57
846.50	5	QPSK	V	139	68	1 / 0	16.75	4.66	21.41	38.45	-17.04
826.50	5	16-QAM	V	128	77	1 / 0	16.42	5.51	21.93	38.45	-16.52
836.50	5	16-QAM	V	207	115	1 / 0	16.59	5.14	21.73	38.45	-16.72
846.50	5	16-QAM	V	139	68	1 / 0	15.56	4.66	20.22	38.45	-18.23
829.00	10	QPSK	V	135	84	1 / 0	17.09	5.49	22.58	38.45	-15.87
836.50	10	QPSK	V	124	71	1 / 0	16.56	5.14	21.70	38.45	-16.75
844.00	10	QPSK	V	227	95	1 / 0	16.13	4.70	20.83	38.45	-17.62
829.00	10	16-QAM	V	135	84	1 / 0	16.21	5.49	21.70	38.45	-16.75
836.50	10	16-QAM	V	124	71	1 / 0	15.52	5.14	20.66	38.45	-17.79
844.00	10	16-QAM	V	227	95	1 / 0	15.02	4.70	19.72	38.45	-18.73
826.50	5	QPSK	H	203	172	1 / 0	16.30	5.51	21.81	38.45	-16.64

**Table 7-3. ERP Data (Band 5)**

FCC ID: ZNFTP260	 <b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b> 		Reviewed 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	130	168	1 / 5	15.50	9.62	25.12	30.00	-4.88
1732.50	1.4	QPSK	H	100	162	1 / 5	16.84	9.50	26.34	30.00	-3.66
1754.30	1.4	QPSK	H	125	195	1 / 0	17.31	9.38	26.69	30.00	-3.31
1710.70	1.4	16-QAM	H	130	168	1 / 5	14.55	9.62	24.17	30.00	-5.83
1732.50	1.4	16-QAM	H	100	162	1 / 5	15.82	9.50	25.32	30.00	-4.68
1754.30	1.4	16-QAM	H	125	195	1 / 5	16.36	9.38	25.74	30.00	-4.26
1711.50	3	QPSK	H	129	180	1 / 14	15.54	9.62	25.16	30.00	-4.84
1732.50	3	QPSK	H	113	174	1 / 14	16.87	9.50	26.37	30.00	-3.63
1753.50	3	QPSK	H	120	192	1 / 14	17.56	9.39	26.95	30.00	-3.05
1711.50	3	16-QAM	H	129	180	1 / 14	14.33	9.62	23.95	30.00	-6.05
1732.50	3	16-QAM	H	113	174	1 / 14	16.05	9.50	25.55	30.00	-4.45
1753.50	3	16-QAM	H	120	192	1 / 14	16.24	9.39	25.63	30.00	-4.37
1712.50	5	QPSK	H	120	156	1 / 24	15.53	9.61	25.14	30.00	-4.86
1732.50	5	QPSK	H	106	189	1 / 24	17.11	9.50	26.61	30.00	-3.39
1752.50	5	QPSK	H	134	177	1 / 24	17.58	9.39	26.97	30.00	-3.03
1712.50	5	16-QAM	H	120	156	1 / 24	14.59	9.61	24.20	30.00	-5.80
1732.50	5	16-QAM	H	106	189	1 / 24	15.68	9.50	25.18	30.00	-4.82
1752.50	5	16-QAM	H	134	177	1 / 24	16.25	9.39	25.64	30.00	-4.36
1715.00	10	QPSK	H	106	181	1 / 49	16.34	9.60	25.94	30.00	-4.06
1732.50	10	QPSK	H	117	169	1 / 49	16.94	9.50	26.44	30.00	-3.56
1750.00	10	QPSK	H	101	185	1 / 49	17.33	9.41	26.74	30.00	-3.26
1715.00	10	16-QAM	H	106	181	1 / 49	14.90	9.60	24.50	30.00	-5.50
1732.50	10	16-QAM	H	117	169	1 / 49	15.77	9.50	25.27	30.00	-4.73
1750.00	10	16-QAM	H	101	185	1 / 49	16.11	9.41	25.52	30.00	-4.48
1717.50	15	QPSK	H	130	165	1 / 74	15.92	9.58	25.50	30.00	-4.50
1732.50	15	QPSK	H	135	164	1 / 74	16.75	9.50	26.25	30.00	-3.75
1747.50	15	QPSK	H	128	161	1 / 74	17.20	9.42	26.62	30.00	-3.38
1717.50	15	16-QAM	H	130	165	1 / 74	14.56	9.58	24.14	30.00	-5.86
1732.50	15	16-QAM	H	135	164	1 / 74	15.57	9.50	25.07	30.00	-4.93
1747.50	15	16-QAM	H	128	161	1 / 74	16.02	9.42	25.44	30.00	-4.56
1720.00	20	QPSK	H	120	162	1 / 99	16.24	9.57	25.81	30.00	-4.19
1732.50	20	QPSK	H	117	178	1 / 99	16.53	9.50	26.03	30.00	-3.97
1745.00	20	QPSK	H	115	180	1 / 99	17.22	9.43	26.65	30.00	-3.35
1720.00	20	16-QAM	H	120	162	1 / 99	15.36	9.57	24.93	30.00	-5.07
1732.50	20	16-QAM	H	117	178	1 / 99	15.75	9.50	25.25	30.00	-4.75
1745.00	20	16-QAM	H	115	180	1 / 99	16.04	9.43	25.47	30.00	-4.53
1752.50	5	QPSK	V	117	121	1 / 99	14.47	9.39	23.86	30.00	-6.14

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

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed 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	198	43	1 / 5	14.36	9.12	23.48	33.01	-9.53
1880.00	1.4	QPSK	H	194	32	1 / 0	14.76	9.10	23.86	33.01	-9.15
1909.30	1.4	QPSK	H	187	10	1 / 5	13.07	9.16	22.23	33.01	-10.78
1850.70	1.4	16-QAM	H	198	43	1 / 5	13.13	9.12	22.25	33.01	-10.76
1880.00	1.4	16-QAM	H	194	32	1 / 0	13.79	9.10	22.89	33.01	-10.12
1909.30	1.4	16-QAM	H	187	10	1 / 5	12.21	9.16	21.37	33.01	-11.64
1851.50	3	QPSK	H	195	42	1 / 14	14.81	9.12	23.93	33.01	-9.08
1880.00	3	QPSK	H	204	37	1 / 0	14.82	9.10	23.92	33.01	-9.09
1908.50	3	QPSK	H	204	34	1 / 0	13.20	9.15	22.35	33.01	-10.66
1851.50	3	16-QAM	H	195	42	1 / 14	13.42	9.12	22.54	33.01	-10.47
1880.00	3	16-QAM	H	204	37	1 / 0	13.63	9.10	22.73	33.01	-10.28
1908.50	3	16-QAM	H	204	34	1 / 0	11.76	9.15	20.91	33.01	-12.10
1852.50	5	QPSK	H	196	30	1 / 24	14.53	9.12	23.65	33.01	-9.36
1880.00	5	QPSK	H	198	25	1 / 0	14.72	9.10	23.82	33.01	-9.19
1907.50	5	QPSK	H	211	25	1 / 0	13.02	9.15	22.17	33.01	-10.84
1852.50	5	16-QAM	H	196	30	1 / 24	13.77	9.12	22.89	33.01	-10.12
1880.00	5	16-QAM	H	198	25	1 / 0	13.49	9.10	22.59	33.01	-10.42
1907.50	5	16-QAM	H	211	25	1 / 0	11.65	9.15	20.80	33.01	-12.21
1855.00	10	QPSK	H	213	38	1 / 49	13.65	9.12	22.77	33.01	-10.24
1880.00	10	QPSK	H	215	32	1 / 0	14.61	9.10	23.71	33.01	-9.30
1905.00	10	QPSK	H	181	5	1 / 0	13.56	9.13	22.69	33.01	-10.32
1855.00	10	16-QAM	H	213	38	1 / 49	12.56	9.12	21.68	33.01	-11.33
1880.00	10	16-QAM	H	215	32	1 / 0	13.67	9.10	22.77	33.01	-10.24
1905.00	10	16-QAM	H	181	5	1 / 0	12.32	9.13	21.45	33.01	-11.56
1857.50	15	QPSK	H	213	42	1 / 74	13.88	9.11	22.99	33.01	-10.02
1880.00	15	QPSK	H	181	11	1 / 0	14.31	9.10	23.41	33.01	-9.60
1902.50	15	QPSK	H	202	7	1 / 0	13.94	9.11	23.05	33.01	-9.96
1857.50	15	16-QAM	H	213	42	1 / 74	12.54	9.11	21.65	33.01	-11.36
1880.00	15	16-QAM	H	181	11	1 / 0	13.21	9.10	22.31	33.01	-10.70
1902.50	15	16-QAM	H	202	7	1 / 0	13.19	9.11	22.30	33.01	-10.71
1860.00	20	QPSK	H	205	35	1 / 99	14.20	9.11	23.31	33.01	-9.70
1880.00	20	QPSK	H	197	26	1 / 0	14.58	9.10	23.68	33.01	-9.33
1900.00	20	QPSK	H	195	16	1 / 0	14.45	9.09	23.54	33.01	-9.47
1860.00	20	16-QAM	H	205	35	1 / 99	13.06	9.11	22.17	33.01	-10.84
1880.00	20	16-QAM	H	197	26	1 / 0	13.65	9.10	22.75	33.01	-10.26
1900.00	20	16-QAM	H	195	16	1 / 0	13.20	9.09	22.29	33.01	-10.72
1851.50	3	QPSK	V	112	252	1 / 99	14.91	9.12	24.03	33.01	-8.98

**Table 7-5. EIRP Data (Band 2)**

FCC ID: ZNFTP260	 <b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>			Reviewed by: Quality Manager
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## 7.7 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(h)

### Test Overview

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


### Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

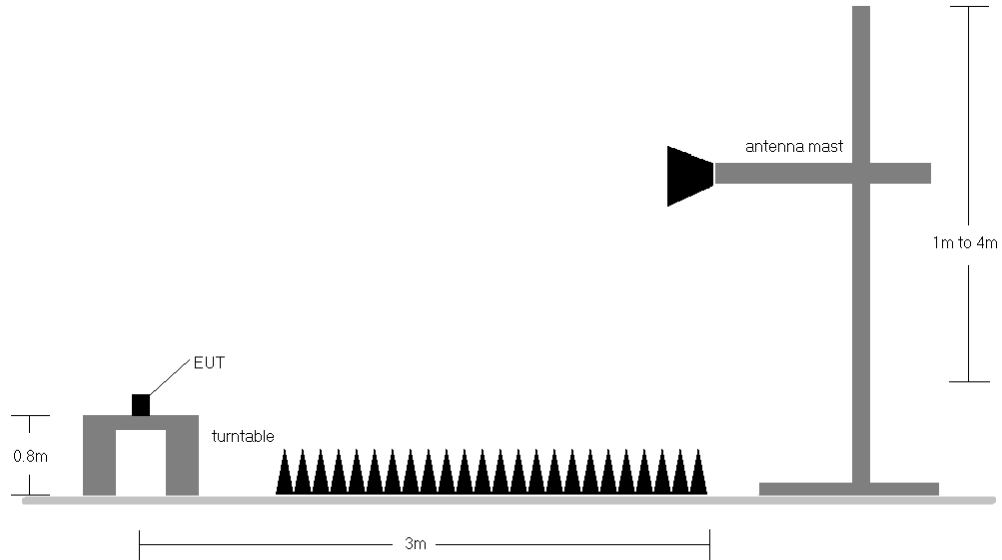
### Test Settings

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

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## Test Setup



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



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

## Test Notes

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

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OPERATING FREQUENCY: 701.50 MHz  
 CHANNEL: 23035  
 MEASURED OUTPUT POWER: 22.64 dBm = 0.184 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.64 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	V	-	-	-57.07	2.39	-54.68	77.3
2104.50	V	-	-	-56.06	3.46	-52.61	75.3
2806.00	V	-	-	-54.82	4.76	-50.06	72.7

Table 7-6. Radiated Spurious Data (Band 12 – Low Channel)

OPERATING FREQUENCY: 707.50 MHz  
 CHANNEL: 23095  
 MEASURED OUTPUT POWER: 22.81 dBm = 0.191 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.81 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	V	-	-	-57.09	2.54	-54.55	77.4
2122.50	V	-	-	-55.08	3.42	-51.66	74.5
2830.00	V	-	-	-55.22	4.85	-50.37	73.2

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

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 713.50 MHz  
 CHANNEL: 23155  
 MEASURED OUTPUT POWER: 22.01 dBm = 0.159 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.01 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	V	-	-	-56.65	2.70	-53.95	76.0
2140.50	V	-	-	-56.39	3.38	-53.01	75.0
2854.00	V	-	-	-53.91	4.95	-48.96	71.0

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

OPERATING FREQUENCY: 826.50 MHz  
 CHANNEL: 20425  
 MEASURED OUTPUT POWER: 23.16 dBm = 0.207 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.16 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1653.00	V	-	-	-59.36	3.62	-55.74	78.9
2479.50	V	-	-	-52.76	3.56	-49.20	72.4
3306.00	V	-	-	-55.42	5.83	-49.59	72.8

**Table 7-9. Radiated Spurious Data (Band 5 – Low Channel)**

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 836.50 MHz  
 CHANNEL: 20525  
 MEASURED OUTPUT POWER: 22.88 dBm = 0.194 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.88 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	V	-	-	-58.59	3.52	-55.07	77.9
2509.50	V	-	-	-53.89	3.59	-50.30	73.2
3346.00	V	-	-	-54.82	5.87	-48.95	71.8

**Table 7-10. Radiated Spurious Data (Band 5 – Mid Channel)**

OPERATING FREQUENCY: 846.50 MHz  
 CHANNEL: 20625  
 MEASURED OUTPUT POWER: 21.41 dBm = 0.139 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  34.41 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	V	-	-	-58.46	3.42	-55.04	76.5
2539.50	V	-	-	-53.84	3.72	-50.12	71.5
3386.00	V	-	-	-55.51	5.91	-49.60	71.0

**Table 7-11. Radiated Spurious Data (Band 5 – High Channel)**

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1712.50 MHz  
 CHANNEL: 19975  
 MEASURED OUTPUT POWER: 25.14 dBm = 0.327 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  38.14 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	174	137	-41.32	8.15	-33.18	58.3
5137.50	H	-	-	-53.89	10.37	-43.53	68.7
6850.00	H	-	-	-53.40	11.48	-41.92	67.1

**Table 7-12. Radiated Spurious Data (Band 4 – Low Channel)**

OPERATING FREQUENCY: 1732.50 MHz  
 CHANNEL: 20175  
 MEASURED OUTPUT POWER: 26.61 dBm = 0.458 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  39.61 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	H	101	223	-41.81	8.26	-33.55	60.2
5197.50	H	-	-	-54.98	10.41	-44.56	71.2
6930.00	H	-	-	-52.87	11.53	-41.34	68.0

**Table 7-13. Radiated Spurious Data (Band 4 – Mid Channel)**

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1752.50 MHz  
 CHANNEL: 20375  
 MEASURED OUTPUT POWER: 26.97 dBm = 0.498 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  39.97 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]
3505.00	H	101	222	-36.65	8.36	-28.29	55.3
5257.50	H	-	-	-53.74	10.35	-43.39	70.4
7010.00	H	-	-	-53.45	11.58	-41.86	68.8

**Table 7-14. Radiated Spurious Data (Band 4 – High Channel)**

OPERATING FREQUENCY: 1851.50 MHz  
 CHANNEL: 18615  
 MEASURED OUTPUT POWER: 23.93 dBm = 0.247 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.93 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	100	210	-40.82	8.41	-32.41	56.3
5554.50	H	-	-	-54.27	10.52	-43.76	67.7
7406.00	H	-	-	-53.14	12.01	-41.14	65.1

**Table 7-15. Radiated Spurious Data (Band 2 – Low Channel)**

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 18900  
 MEASURED OUTPUT POWER: 23.92 dBm = 0.247 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.92 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	103	196	-42.61	8.64	-33.97	57.9
5640.00	H	-	-	-55.21	10.62	-44.60	68.5
7520.00	H	-	-	-53.41	12.04	-41.37	65.3

**Table 7-16. Radiated Spurious Data (Band 2 – Mid Channel)**

OPERATING FREQUENCY: 1908.50 MHz  
 CHANNEL: 19185  
 MEASURED OUTPUT POWER: 22.35 dBm = 0.172 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.35 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	154	255	-42.51	8.77	-33.74	56.1
5725.50	H	-	-	-54.52	10.71	-43.81	66.2
7634.00	H	-	-	-54.06	12.17	-41.89	64.2

**Table 7-17. Radiated Spurious Data (Band 2 – High Channel)**

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## 7.8 Frequency Stability / Temperature Variation

§2.1055 §22.355 §24.235 §27.54

### Test Overview and Limit

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

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

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

### Test Procedure Used

ANSI/TIA-603-D-2010

### Test Settings

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

### Test Setup

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

### Test Notes

None

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**Band 12 Frequency Stability Measurements**  
§2.1055 §27.54

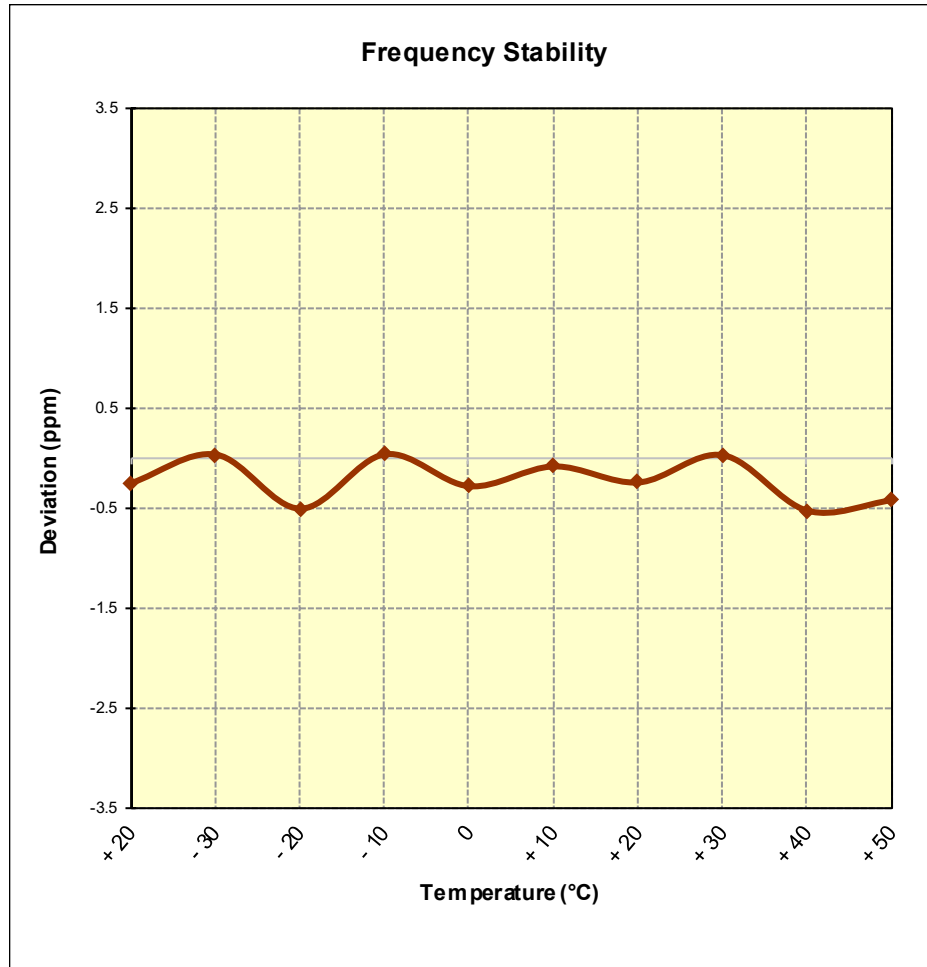
OPERATING FREQUENCY: 707,500,000 Hz  
 CHANNEL: 23790  
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,499,823	-177	-0.0000250
100 %		- 30	707,500,023	23	0.0000033
100 %		- 20	707,499,640	-360	-0.0000509
100 %		- 10	707,500,026	26	0.0000037
100 %		0	707,499,799	-201	-0.0000284
100 %		+ 10	707,499,939	-61	-0.0000086
100 %		+ 20	707,499,826	-174	-0.0000246
100 %		+ 30	707,500,019	19	0.0000027
100 %		+ 40	707,499,625	-375	-0.0000530
100 %		+ 50	707,499,700	-300	-0.0000424
BATT. ENDPOINT	3.45	+ 20	707,499,890	-110	-0.0000155



**Table 7-18. Frequency Stability Data (Band 12)**



**Band 12 Frequency Stability Measurements**  
**§2.1055 §27.54**



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

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## Band 5 Frequency Stability Measurements

§2.1055 §22.355

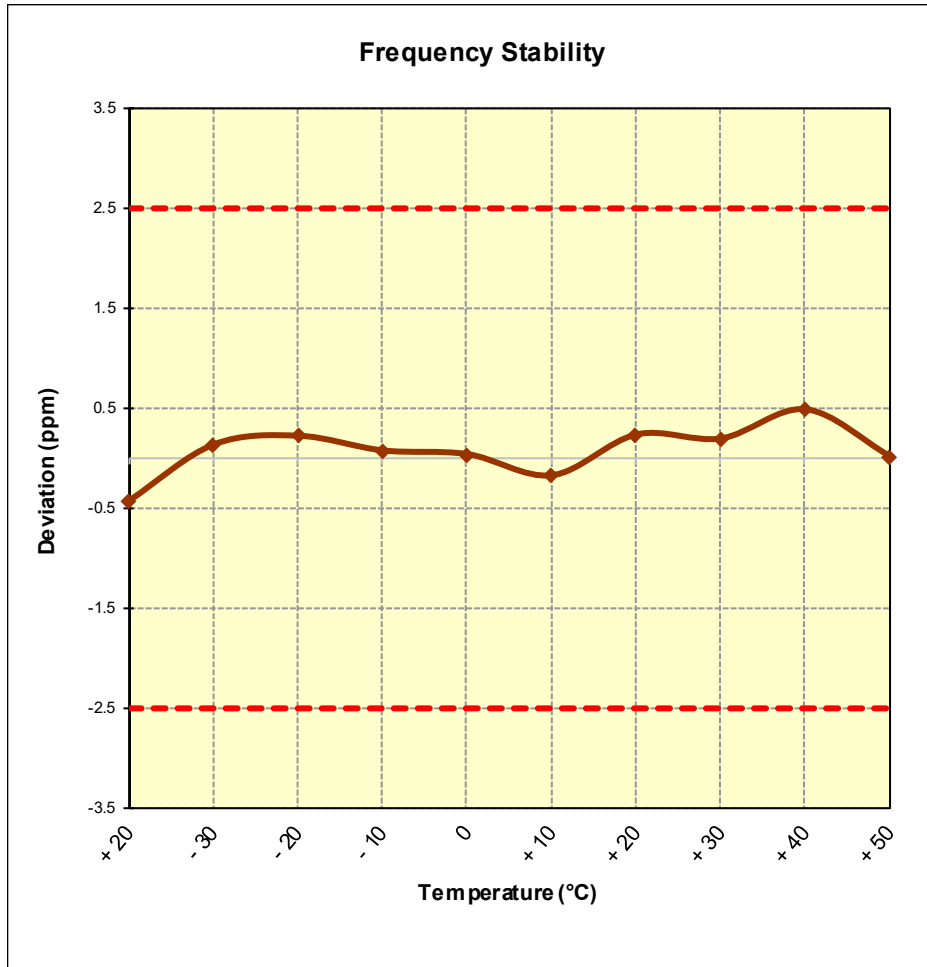
OPERATING FREQUENCY: 836,500,000 Hz  
 CHANNEL: 20525  
 REFERENCE VOLTAGE: 3.85 VDC  
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,499,636	-364	-0.0000435
100 %		- 30	836,500,109	109	0.0000130
100 %		- 20	836,500,182	182	0.0000218
100 %		- 10	836,500,058	58	0.0000069
100 %		0	836,500,027	27	0.0000032
100 %		+ 10	836,499,848	-152	-0.0000182
100 %		+ 20	836,500,193	193	0.0000231
100 %		+ 30	836,500,159	159	0.0000190
100 %		+ 40	836,500,405	405	0.0000484
100 %		+ 50	836,500,009	9	0.0000011
BATT. ENDPOINT	3.45	+ 20	836,500,051	51	0.0000061



**Table 7-19. Frequency Stability Data (Band 5)**

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Band 5 Frequency Stability Measurements**  
**§2.1055 §22.355**



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

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## Band 4 Frequency Stability Measurements

§2.1055 §§27.54


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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,499,682	-318	-0.0000184
100 %		- 30	1,732,499,847	-153	-0.0000088
100 %		- 20	1,732,500,027	27	0.0000016
100 %		- 10	1,732,500,042	42	0.0000024
100 %		0	1,732,500,097	97	0.0000056
100 %		+ 10	1,732,500,282	282	0.0000163
100 %		+ 20	1,732,500,369	369	0.0000213
100 %		+ 30	1,732,499,841	-159	-0.0000092
100 %		+ 40	1,732,499,860	-140	-0.0000081
100 %		+ 50	1,732,500,267	267	0.0000154
BATT. ENDPOINT	3.45	+ 20	1,732,499,907	-93	-0.0000054

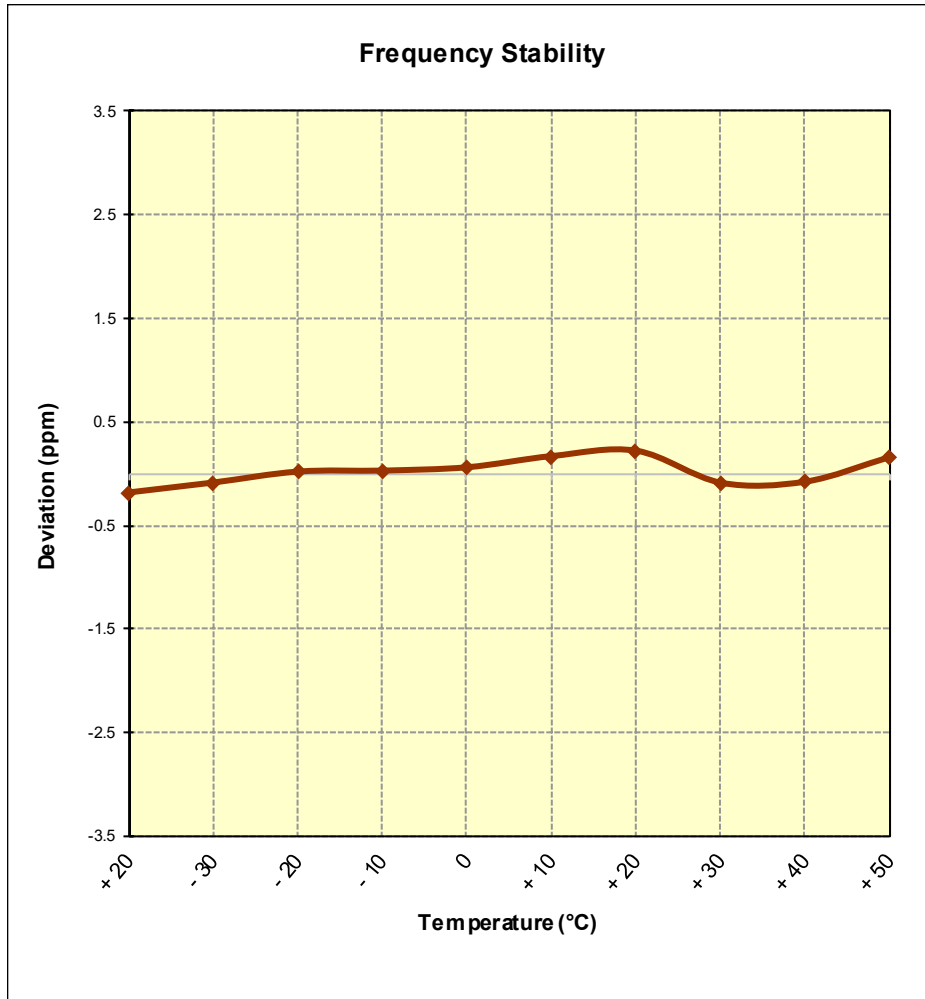
**Table 7-20. Frequency Stability Data (Band 4)**

**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.

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**Band 4 Frequency Stability Measurements**  
**§2.1055 §§27.54**



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

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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)	1,880,000,377	377	0.0000201
100 %		- 30	1,879,999,753	-247	-0.0000131
100 %		- 20	1,880,000,170	170	0.0000090
100 %		- 10	1,880,000,250	250	0.0000133
100 %		0	1,880,000,266	266	0.0000141
100 %		+ 10	1,880,000,141	141	0.0000075
100 %		+ 20	1,880,000,402	402	0.0000214
100 %		+ 30	1,880,000,005	5	0.0000003
100 %		+ 40	1,880,000,072	72	0.0000038
100 %		+ 50	1,879,999,882	-118	-0.0000063
BATT. ENDPOINT	3.45	+ 20	1,880,000,038	38	0.0000020

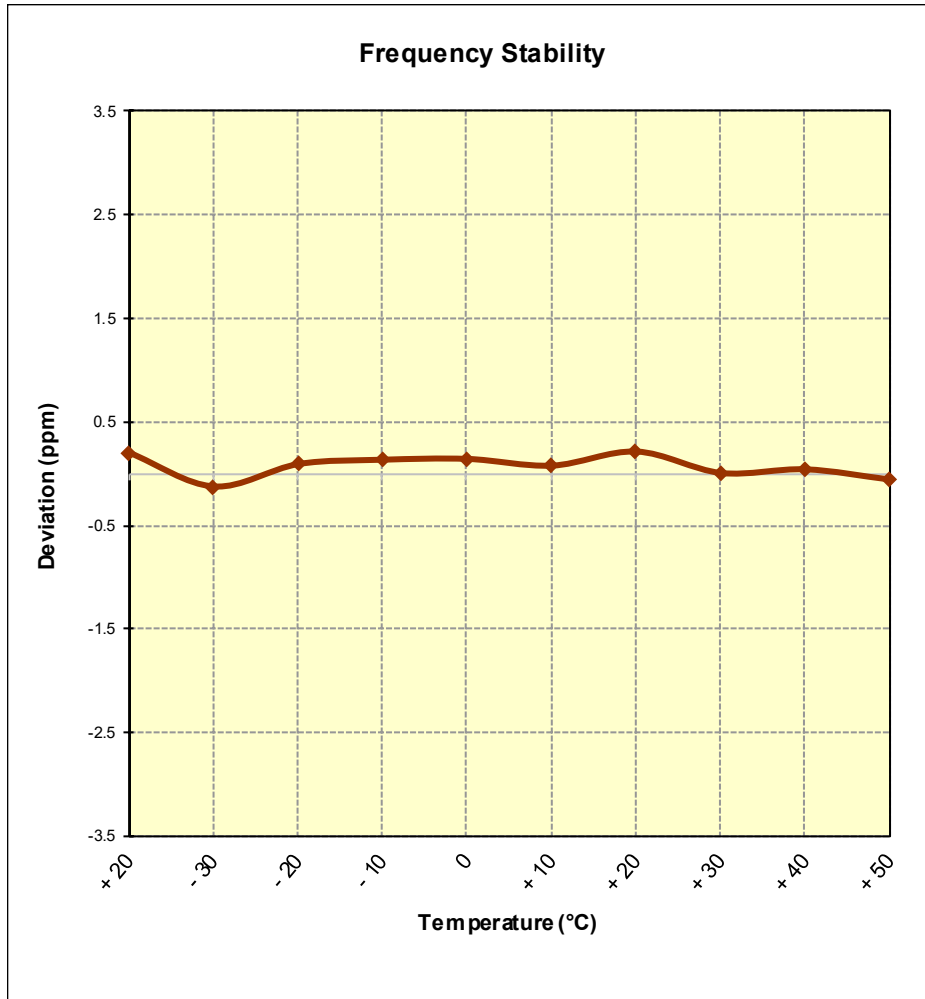
**Table 7-21. Frequency Stability Data (Band 2)**

**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: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Band 2 Frequency Stability Measurements**  
**§2.1055 §24.235**





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

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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: ZNFTP260** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFTP260		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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