

6.4 Band Edge Emissions at Antenna Terminal

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

Test Overview

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

The minimum permissible attenuation level for Band 7 is as noted in the Test Notes on the following page.

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

Test Procedure Used

KDB 971168 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.

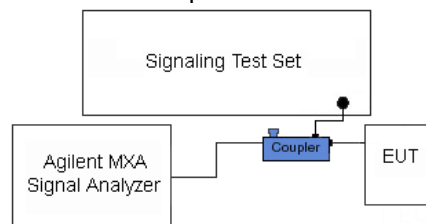


Figure 6-3. Test Instrument & Measurement Setup

Test Notes

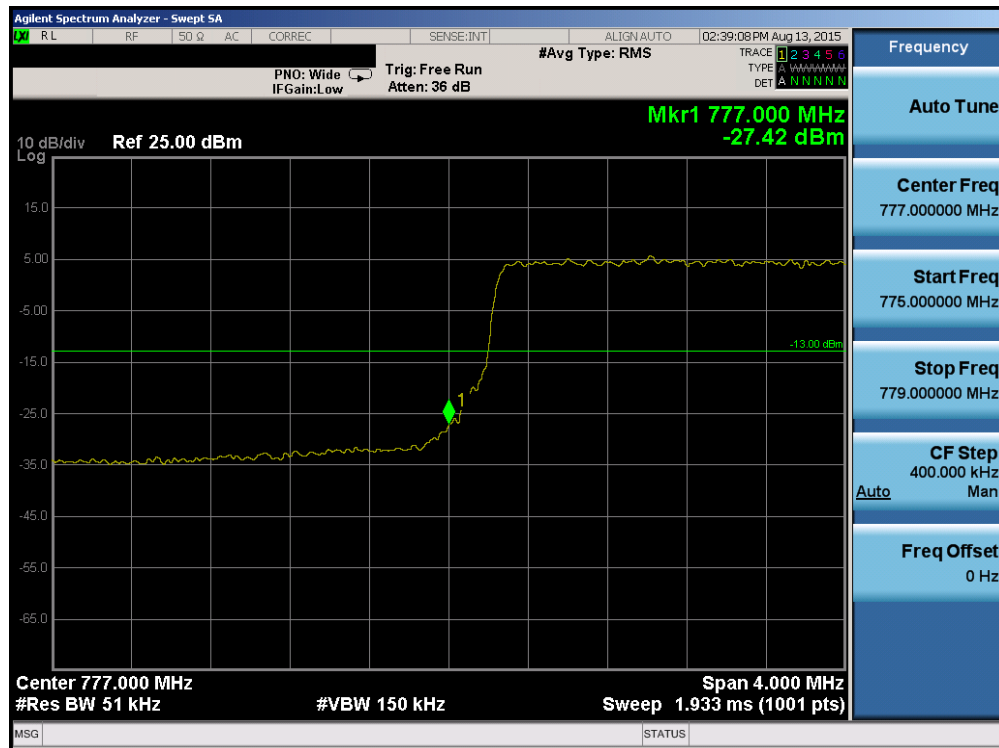
Per 22.917(b) 24.238(a) 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions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

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

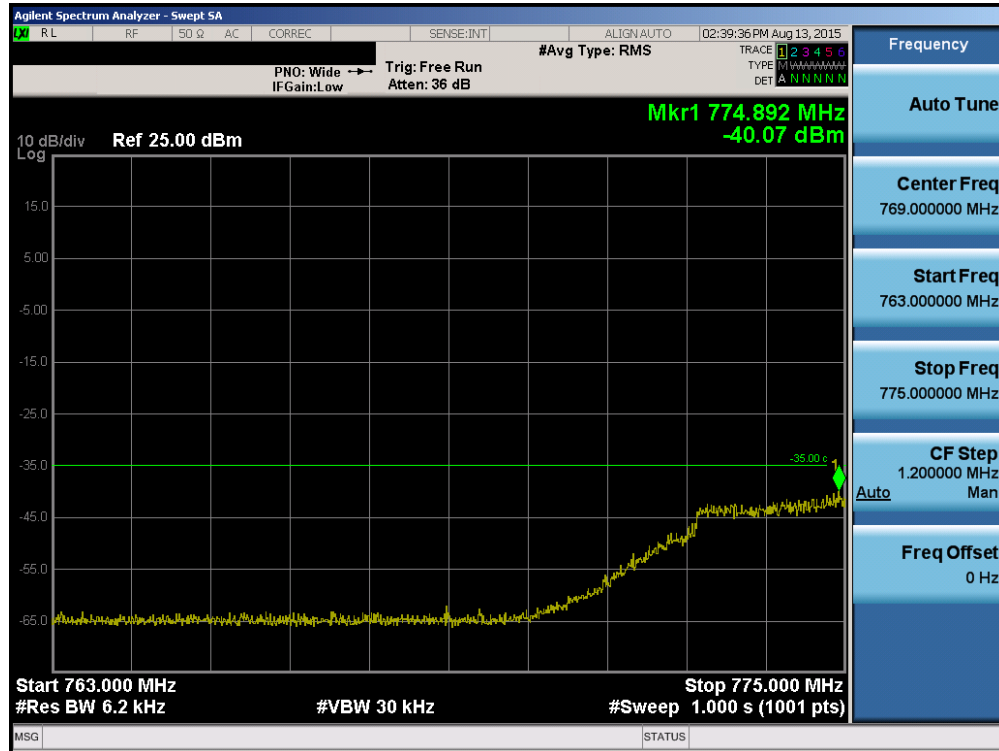
For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is $65 + 10\log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

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

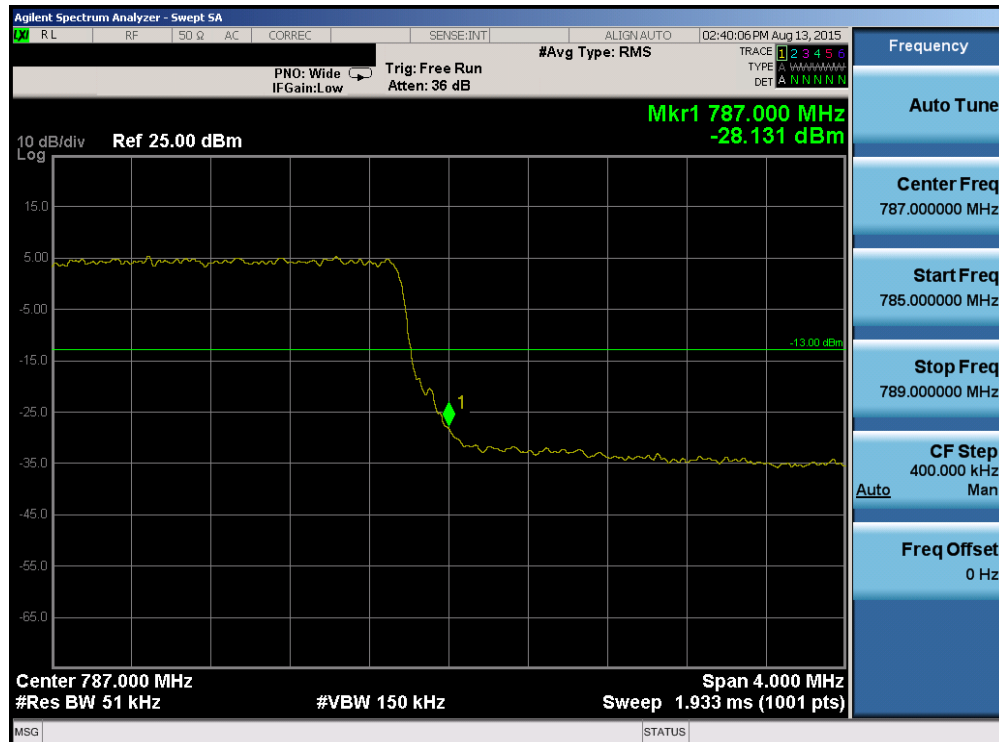


Plot 6-90. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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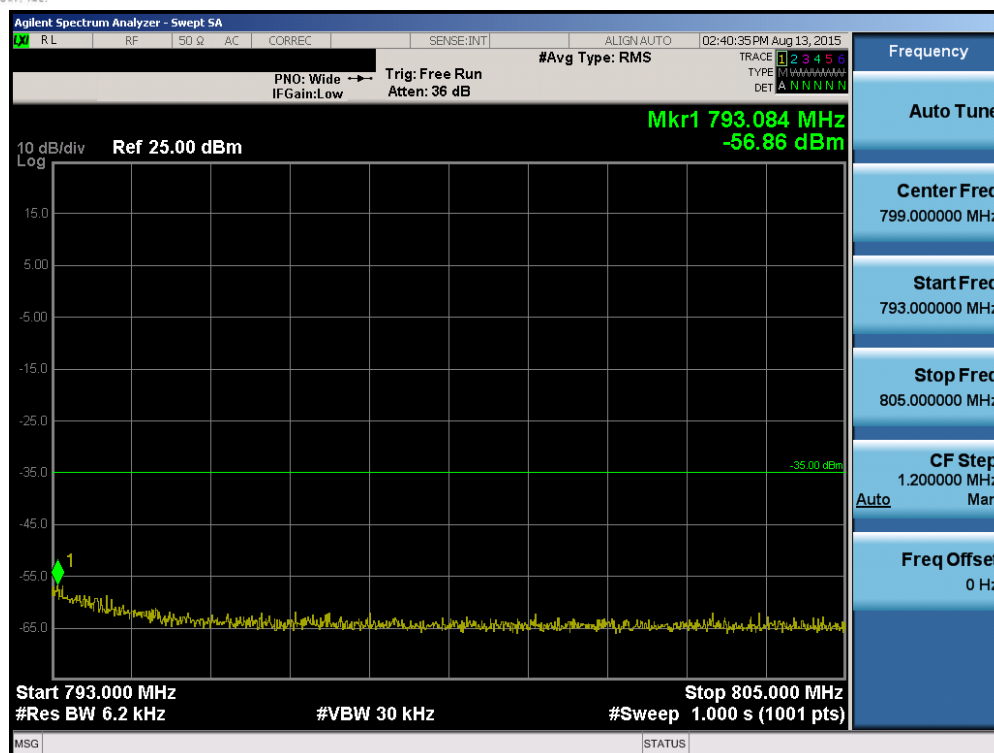


Plot 6-91. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

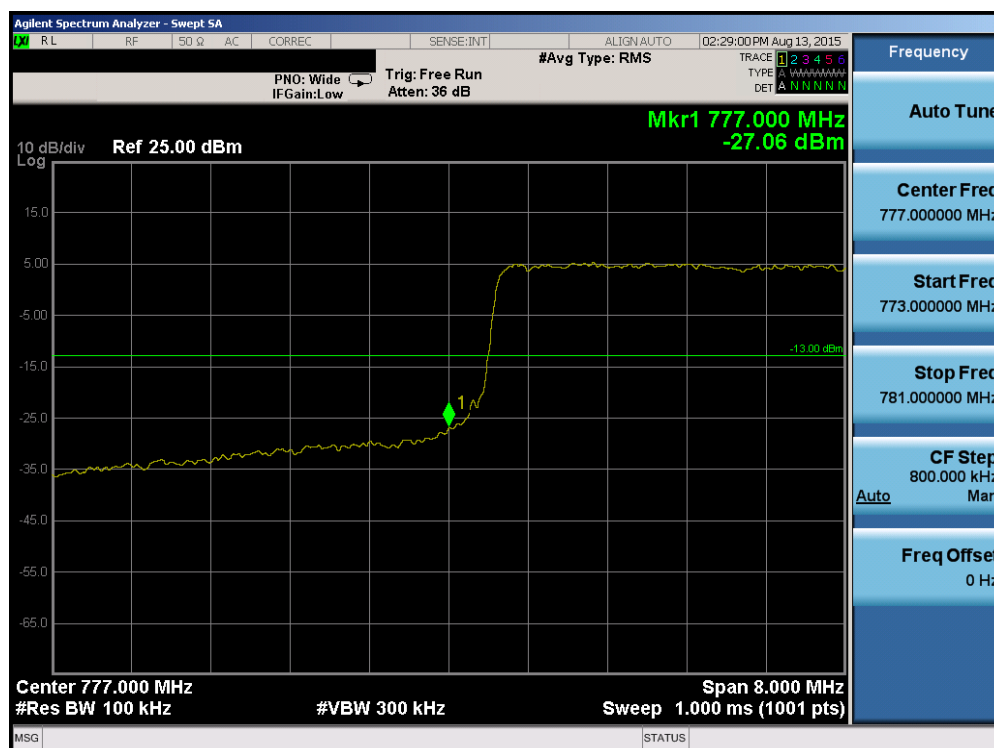


Plot 6-92. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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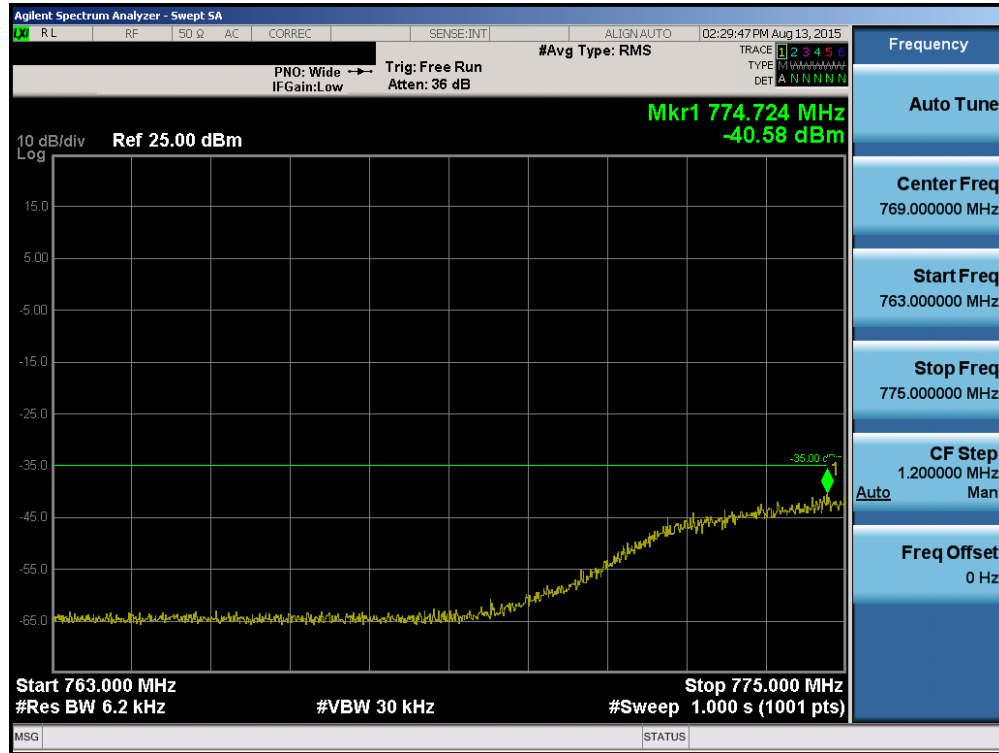


Plot 6-93. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 6-94. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
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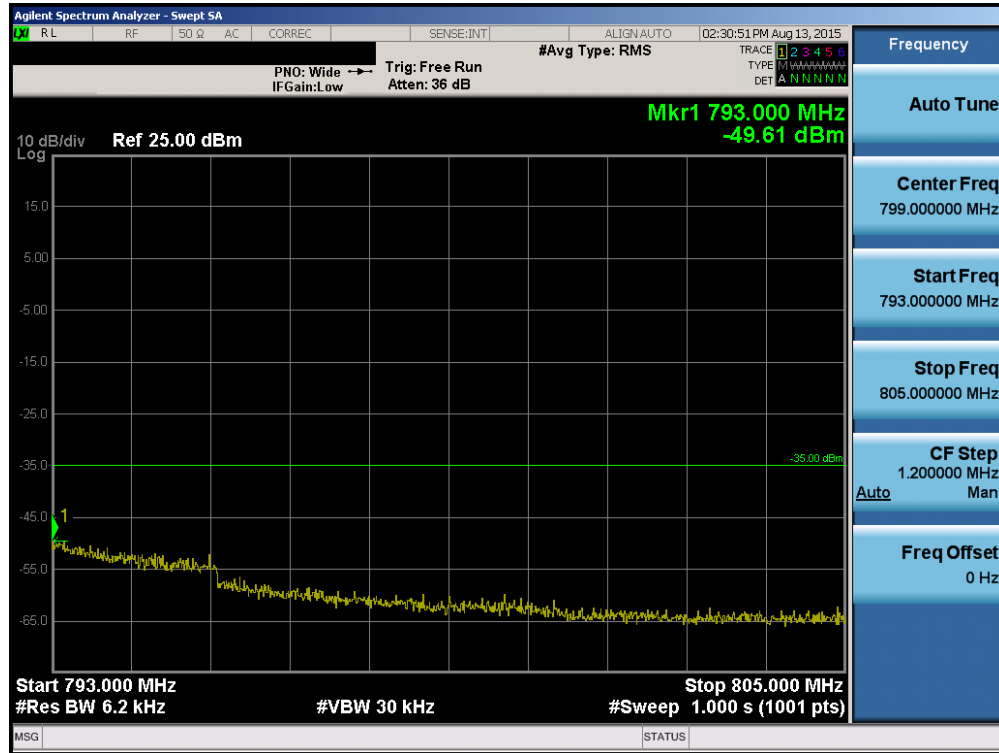


Plot 6-95. Lower Emission Mask Edge Plot (Band 13 - 10.0MHz QPSK - RB Size 50)

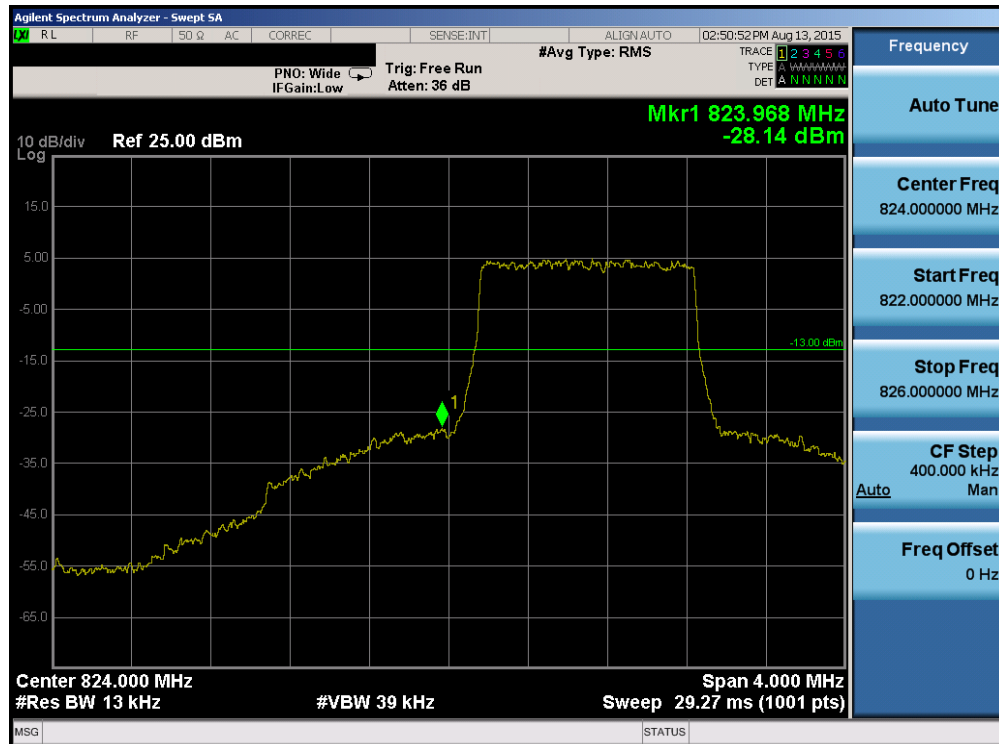


Plot 6-96. Upper Band Edge Plot (Band 13 - 10.0MHz QPSK - RB Size 50)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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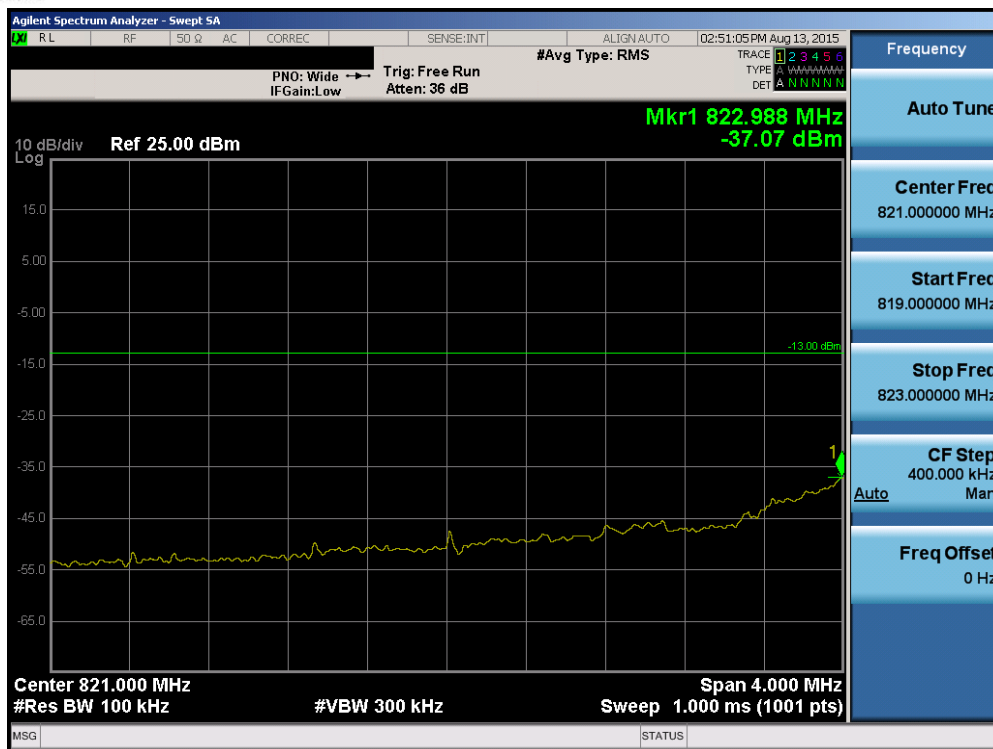


Plot 6-97. Upper Emission Mask Edge Plot (Band 13 - 10.0MHz QPSK - RB Size 50)

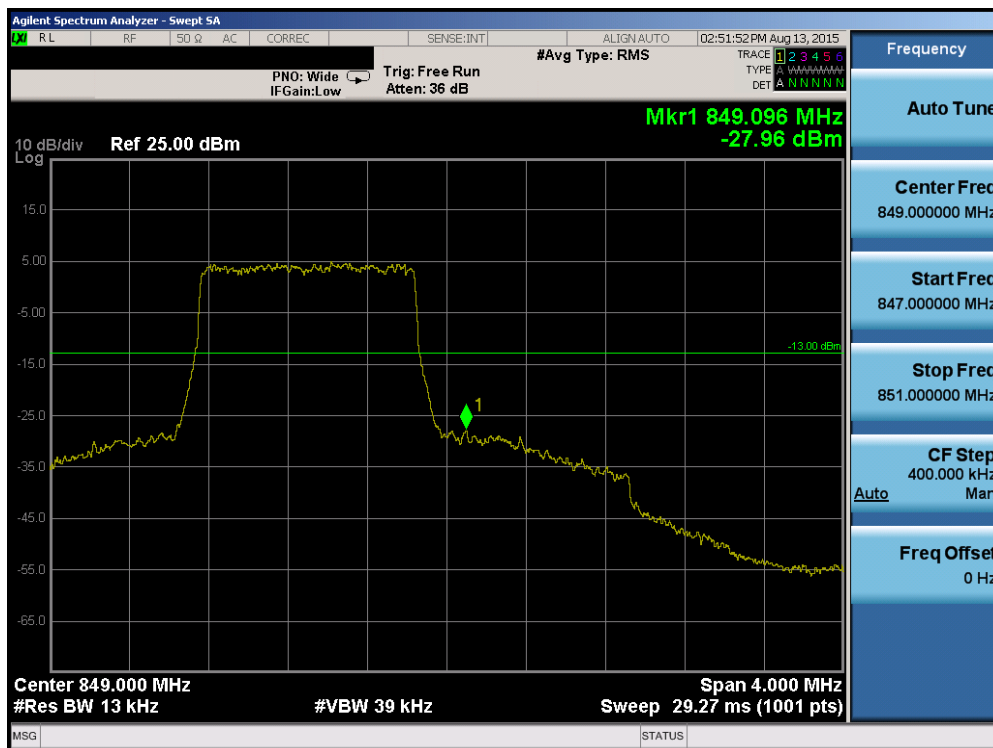


Plot 6-98. Lower Band Edge Plot (Band 5 - 1.4MHz QPSK - RB Size 6)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 6-99. Lower Extended Band Edge Plot (Band 5 - 1.4MHz QPSK - RB Size 6)

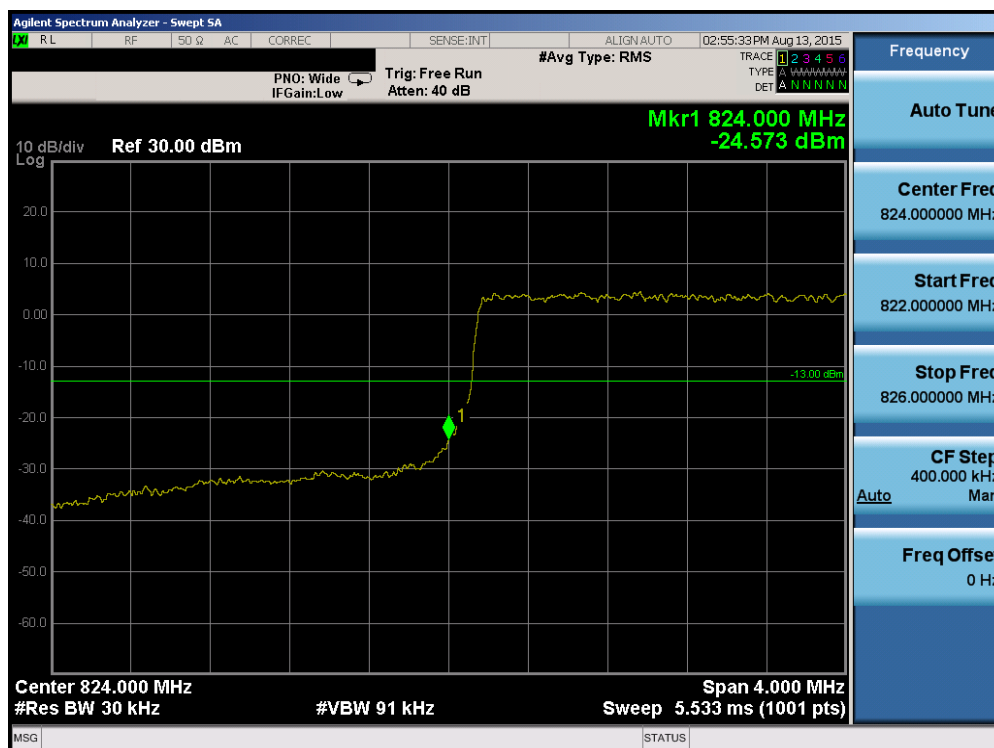


Plot 6-100. Upper Band Edge Plot (Band 5 - 1.4MHz QPSK - RB Size 6)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 6-101. Upper Extended Band Edge Plot (Band 5 - 1.4MHz QPSK - RB Size 6)

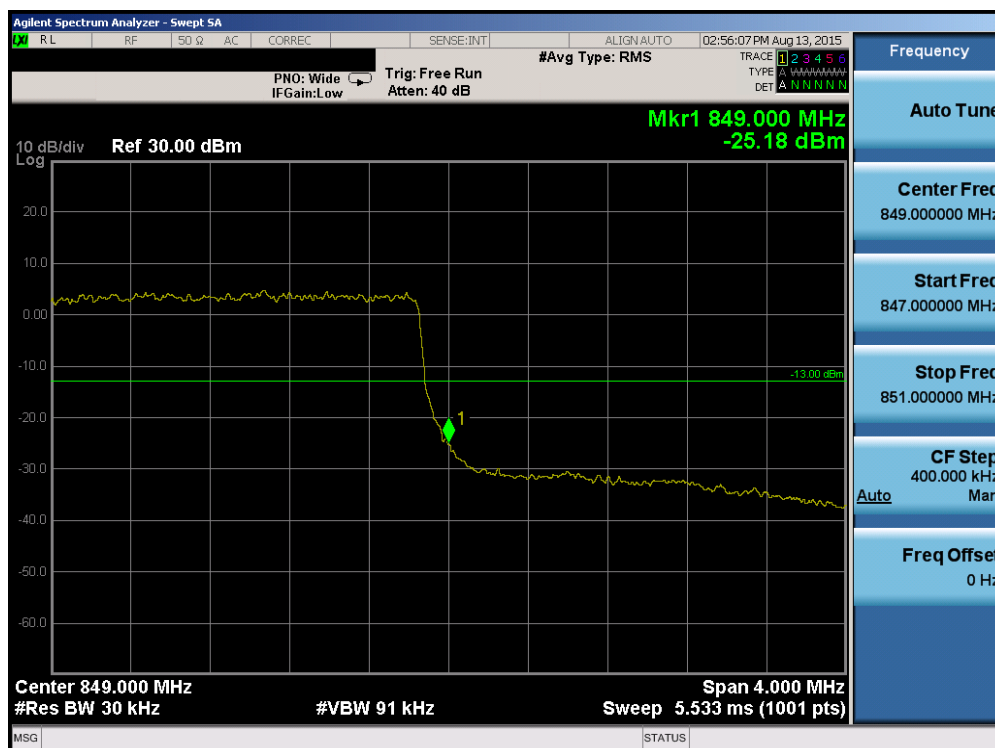


Plot 6-102. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - RB Size 15)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 6-103. Lower Extended Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

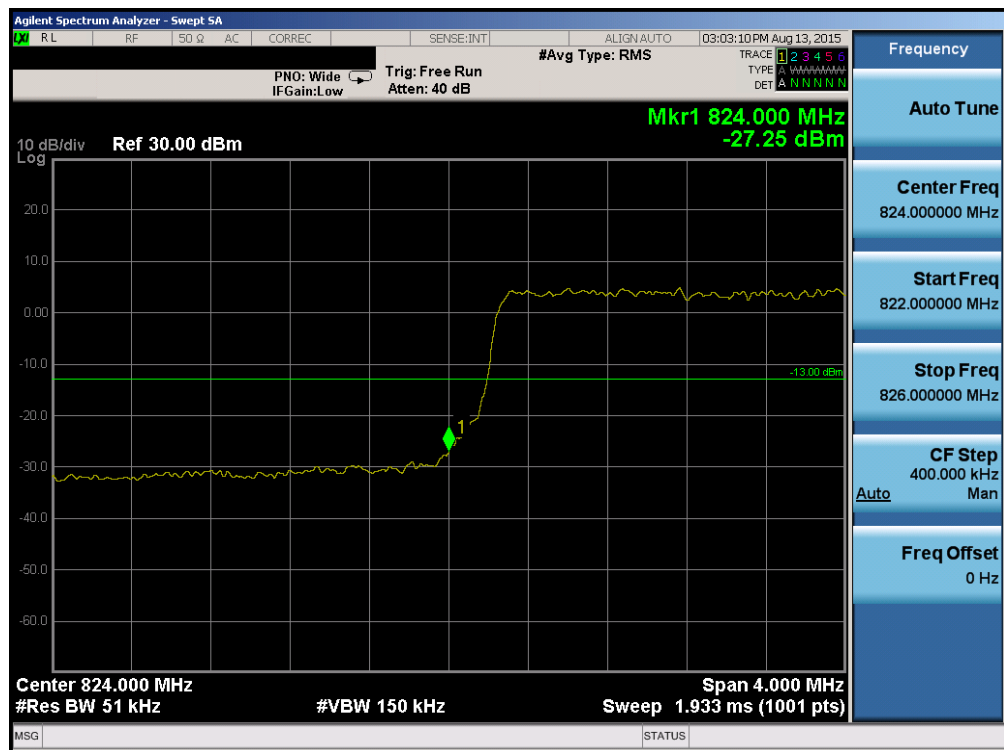


Plot 6-104. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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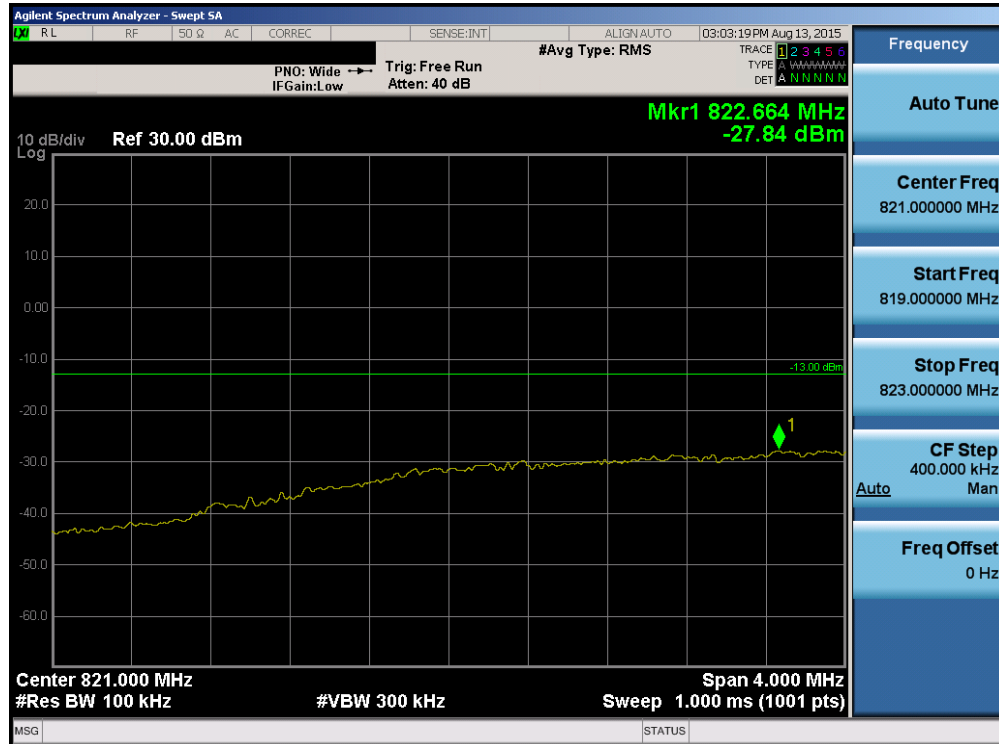


Plot 6-105. Upper Extended Band Edge Plot (Band 5 – Band 5 – 3.0MHz QPSK – RB Size 15)

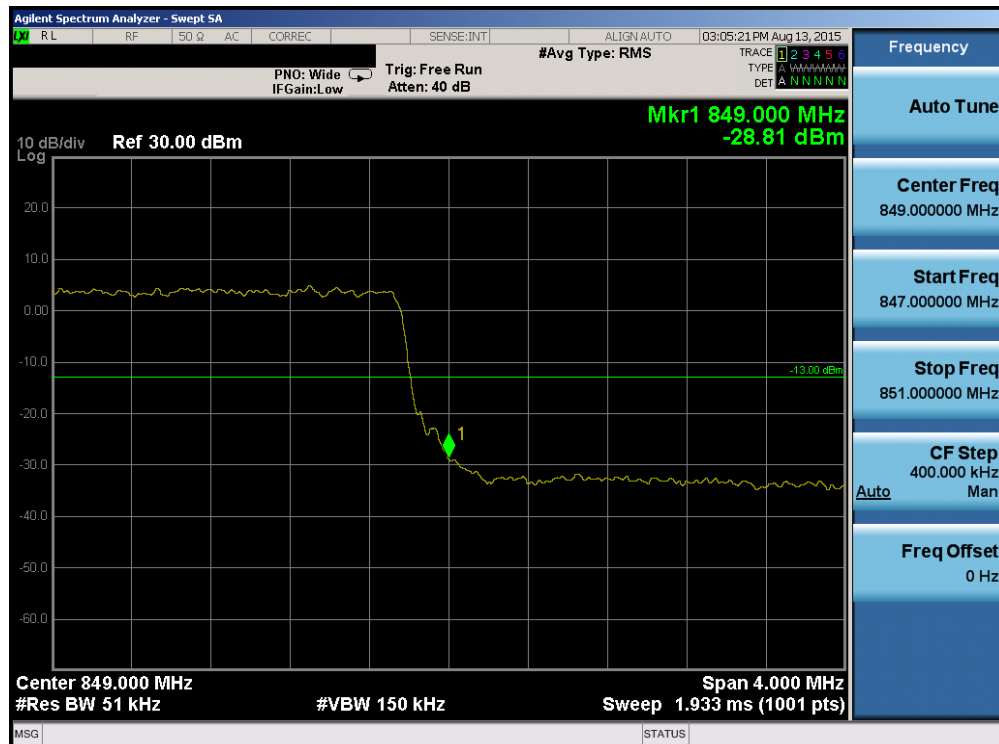


Plot 6-106. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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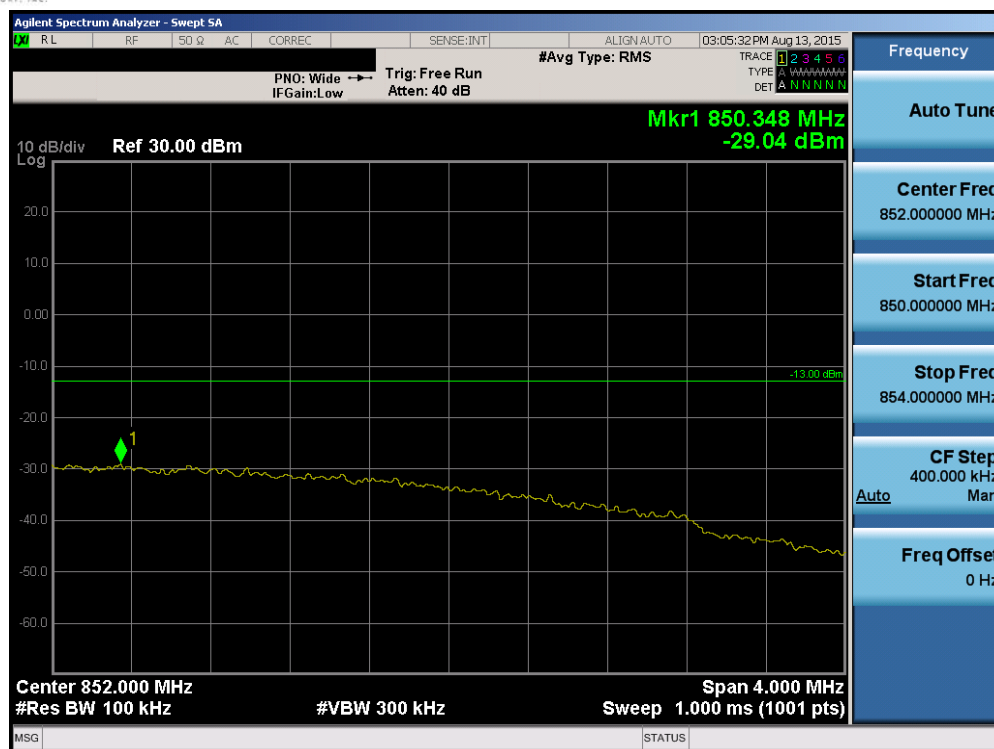


Plot 6-107. Lower Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

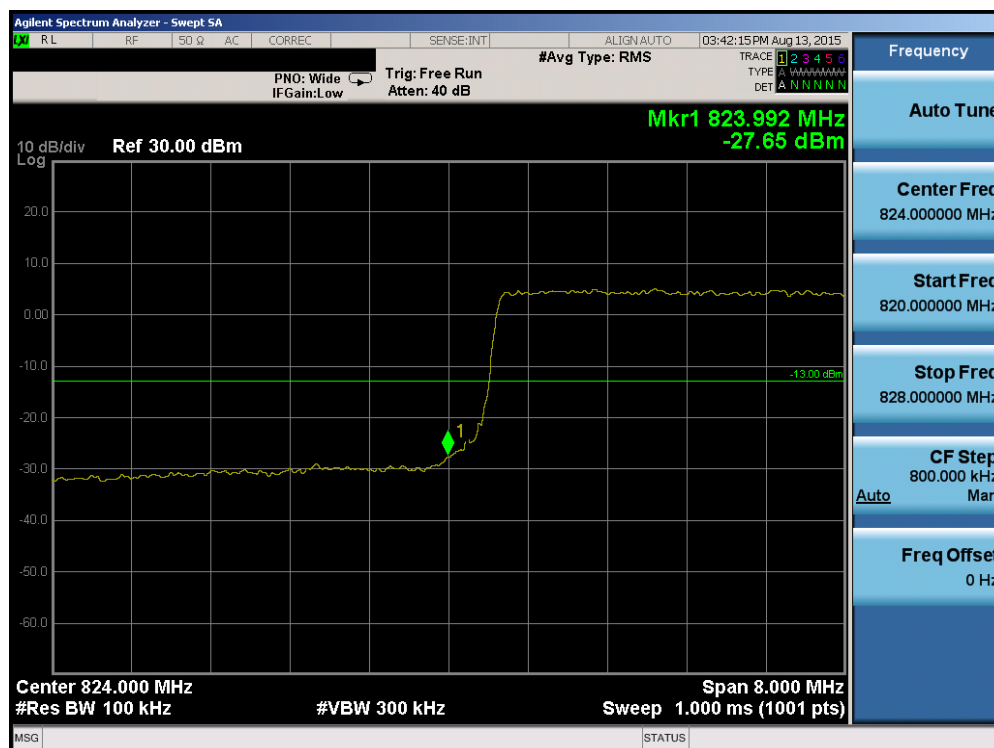


Plot 6-108. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 6-109. Upper Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

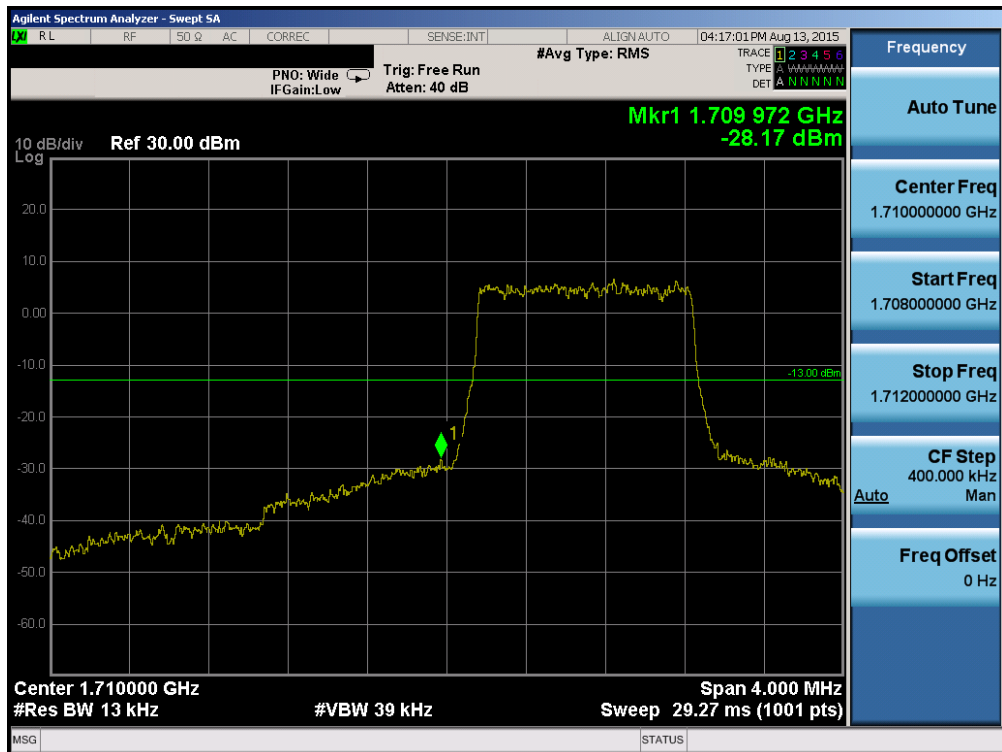


Plot 6-110. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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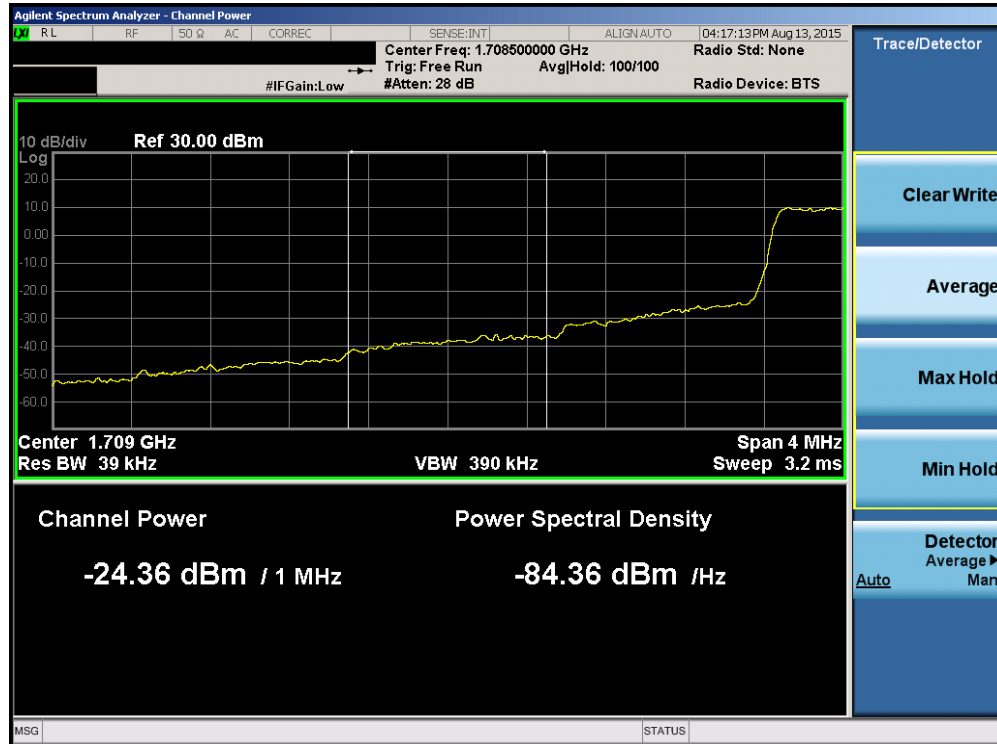


Plot 6-111. Upper Band Edge Plot (Band 5 - 10.0MHz QPSK - RB Size 50)

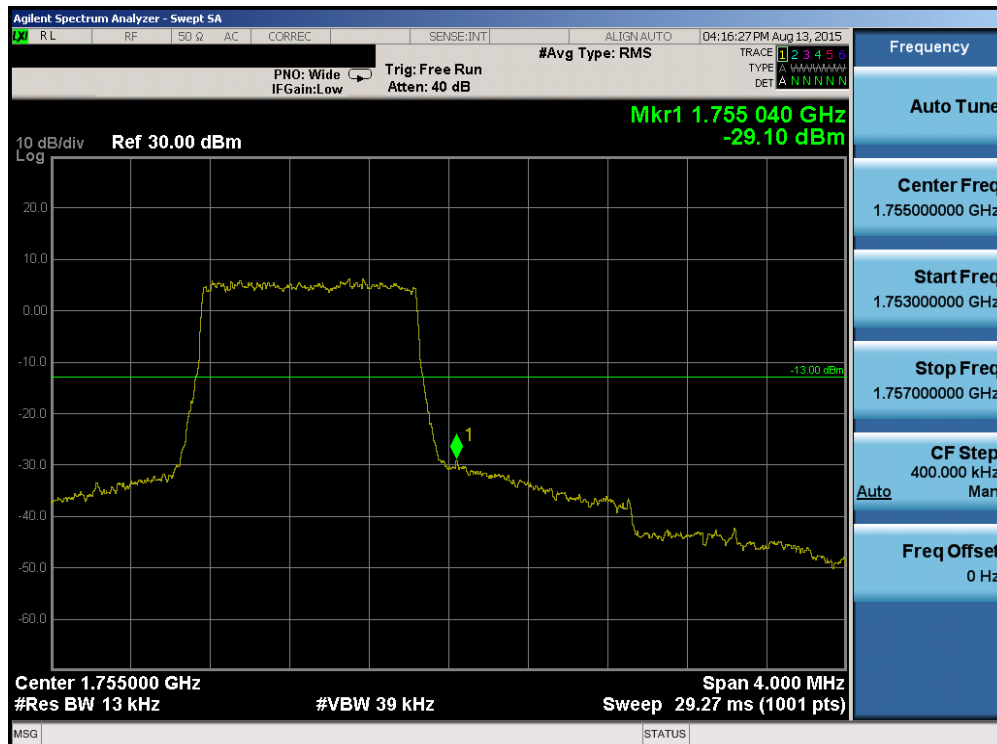


Plot 6-112. Lower Band Edge Plot (Band 4 - 1.4MHz QPSK - RB Size 6)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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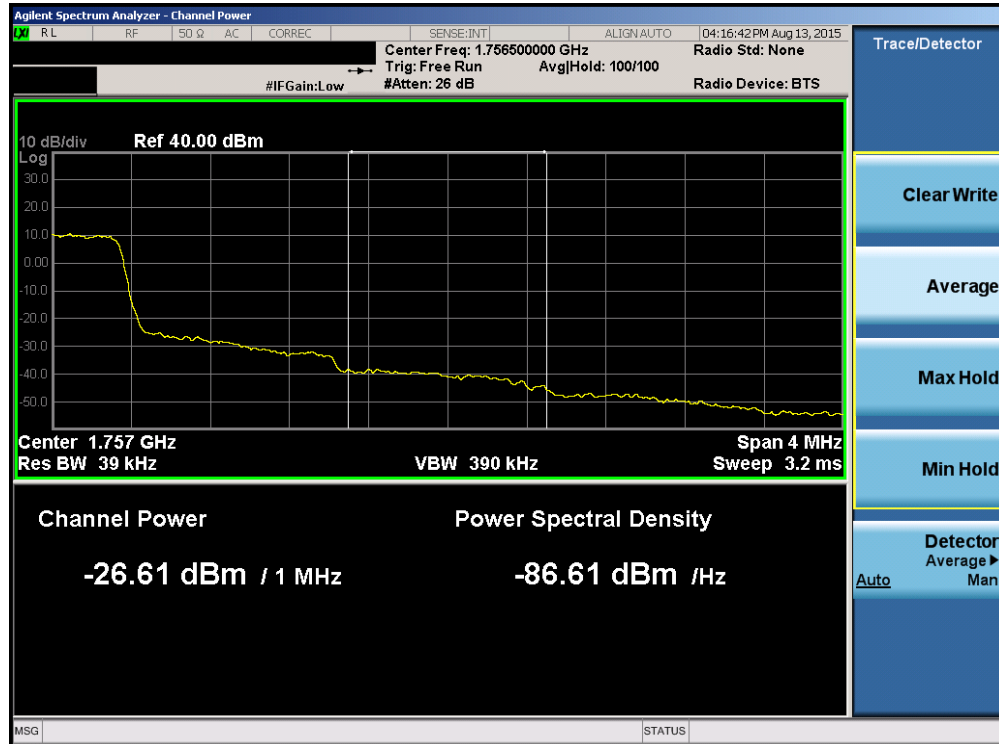


Plot 6-113. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

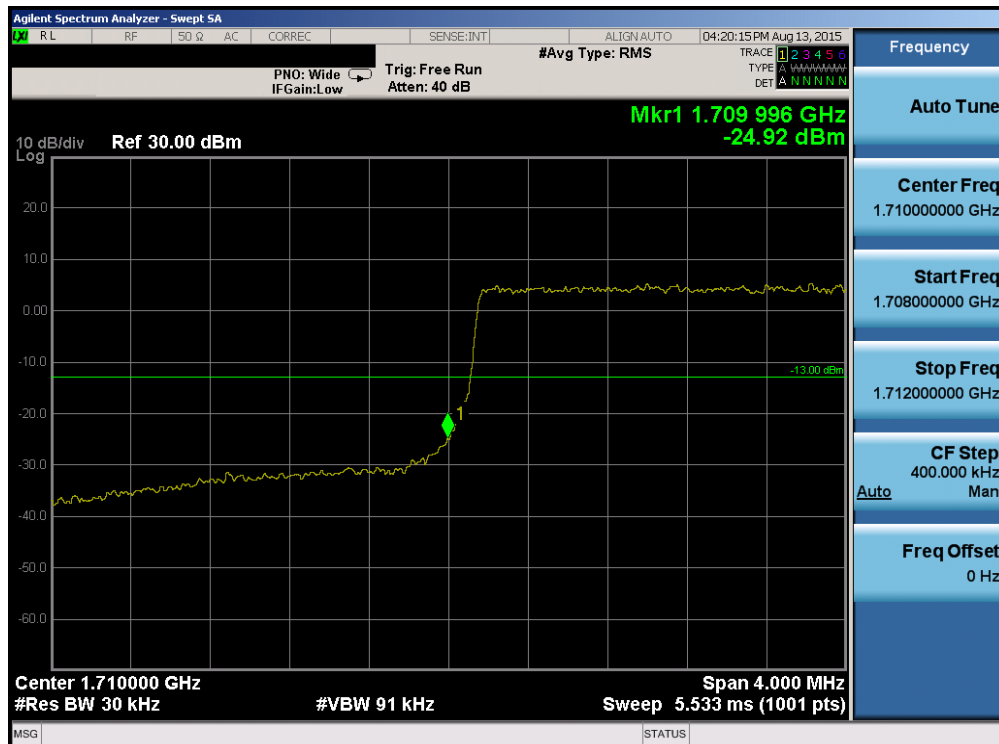


Plot 6-114. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 73 of 135

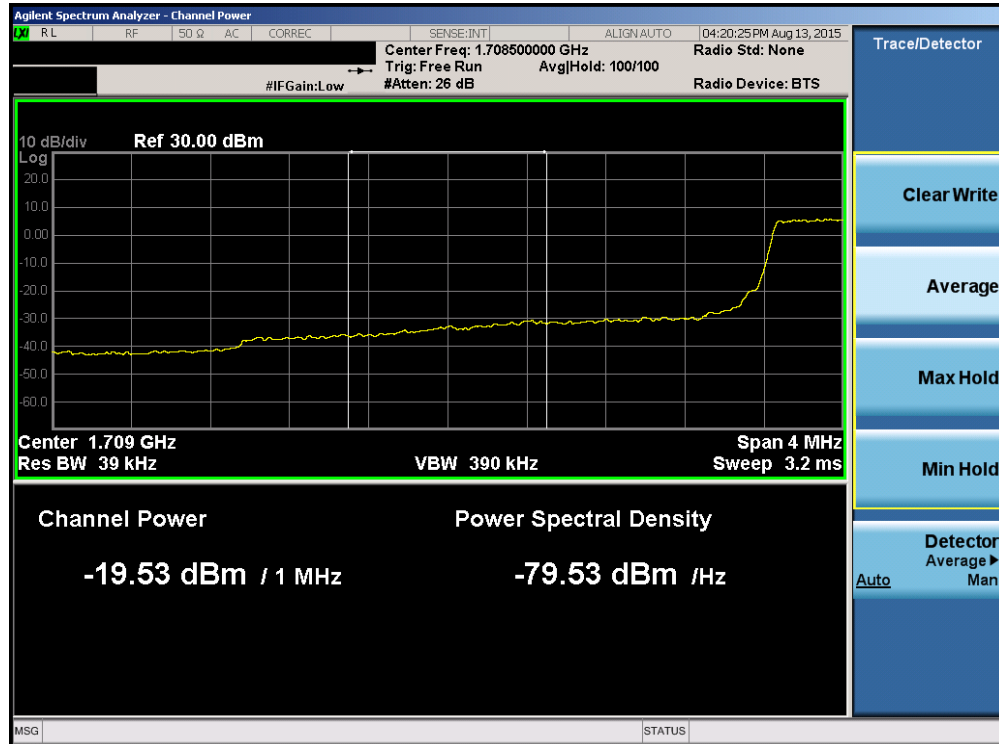


Plot 6-115. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 6-116. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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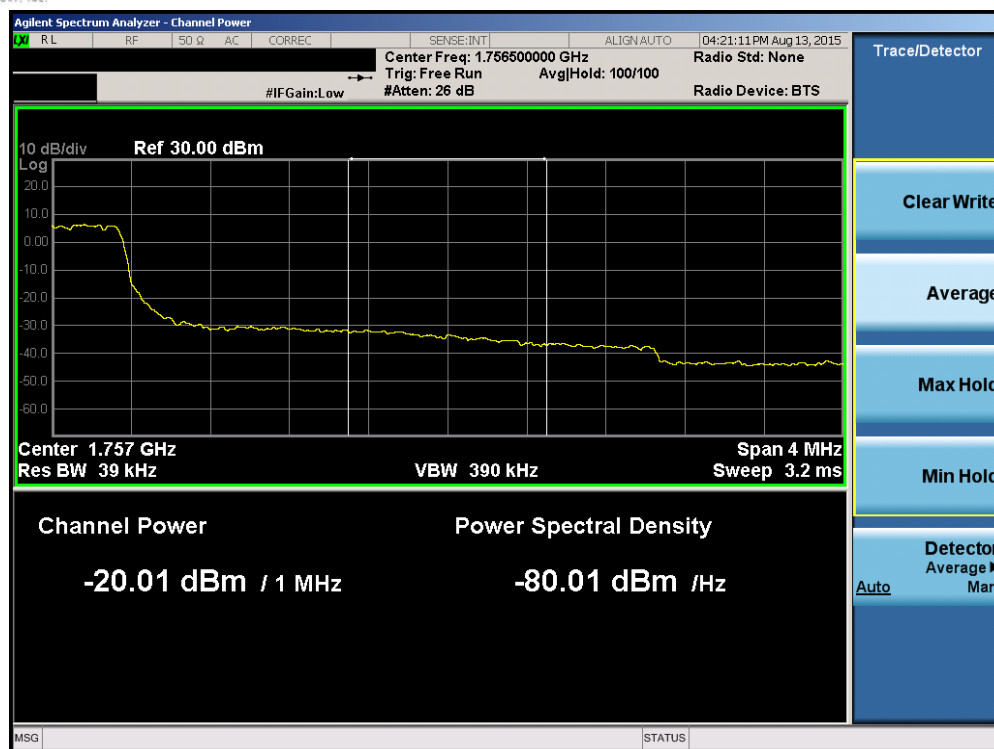


Plot 6-117. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

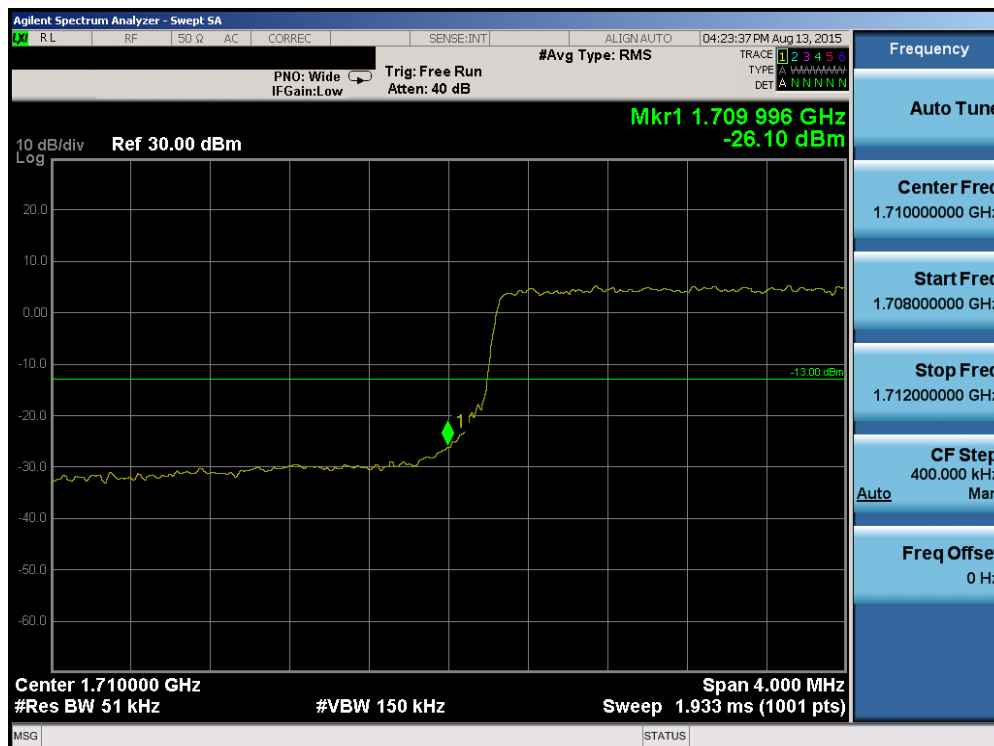


Plot 6-118. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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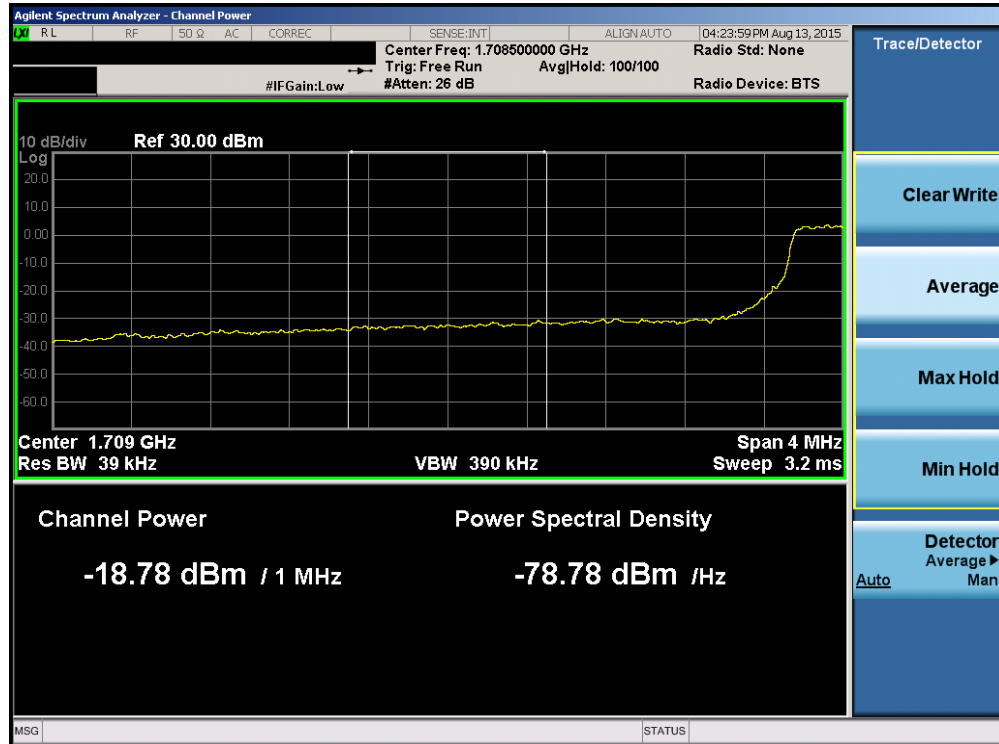


Plot 6-119. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

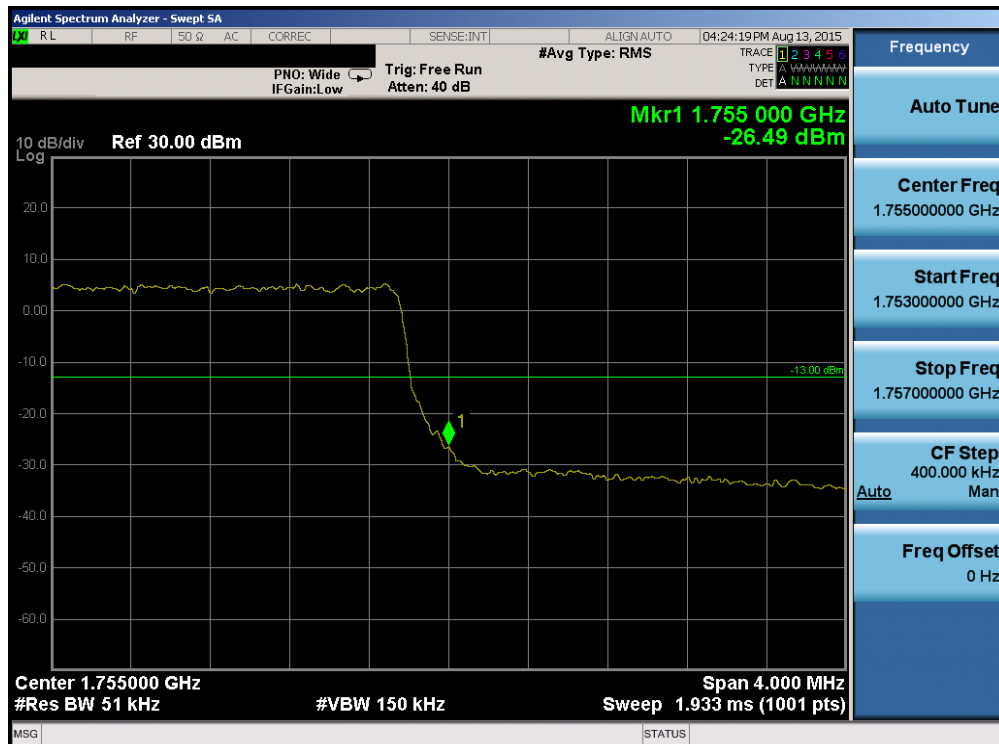


Plot 6-120. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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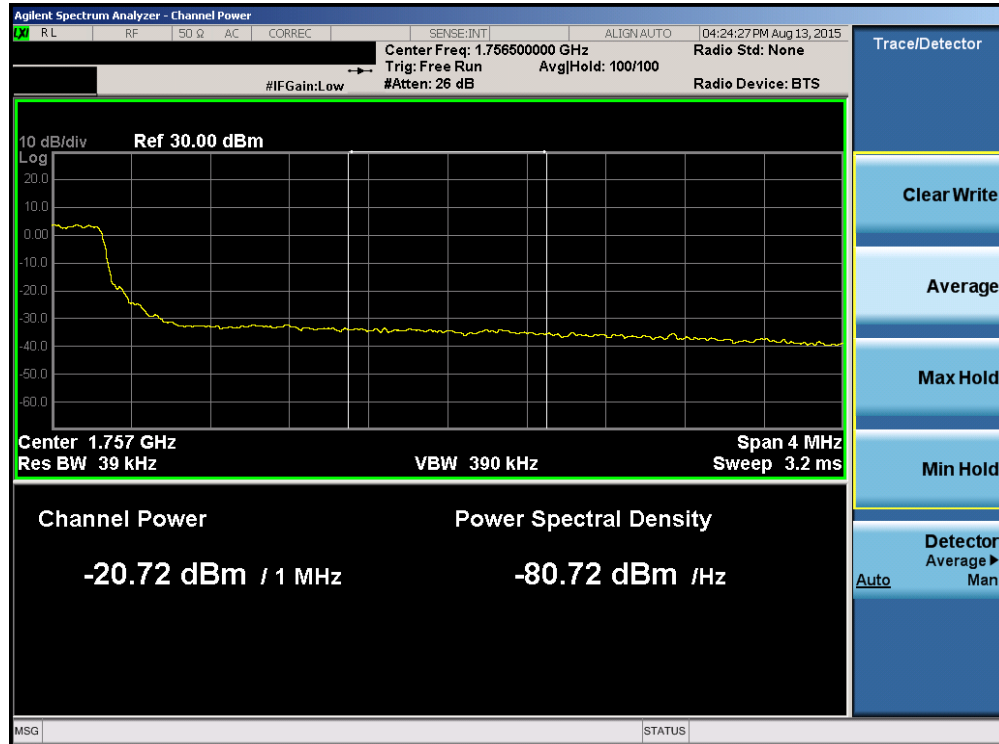


Plot 6-121. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

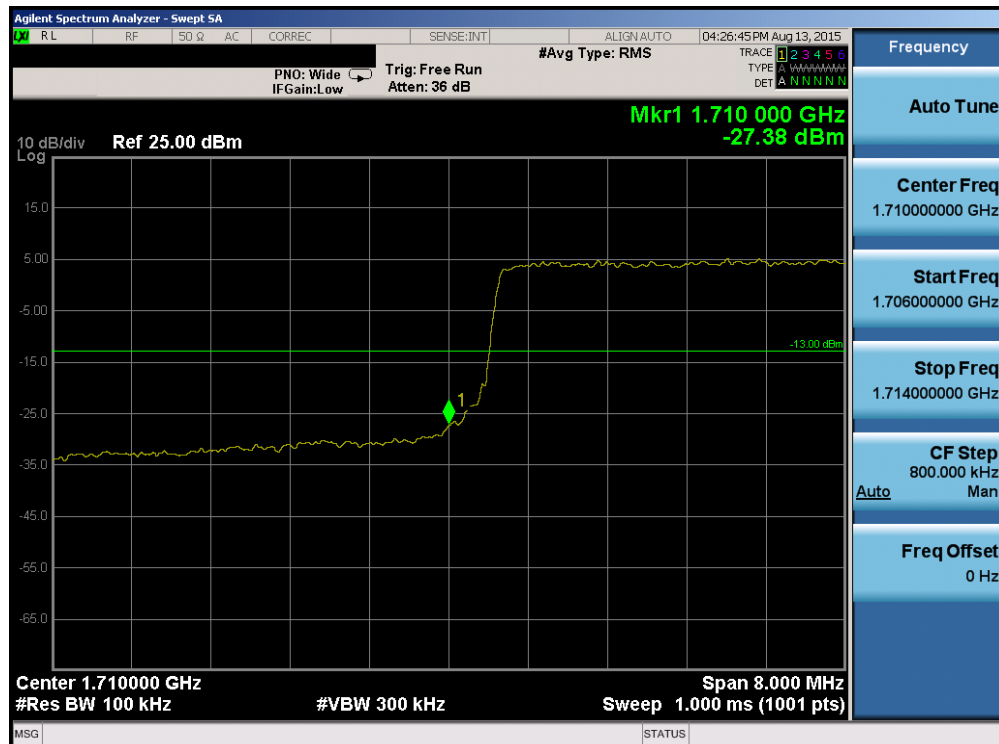


Plot 6-122. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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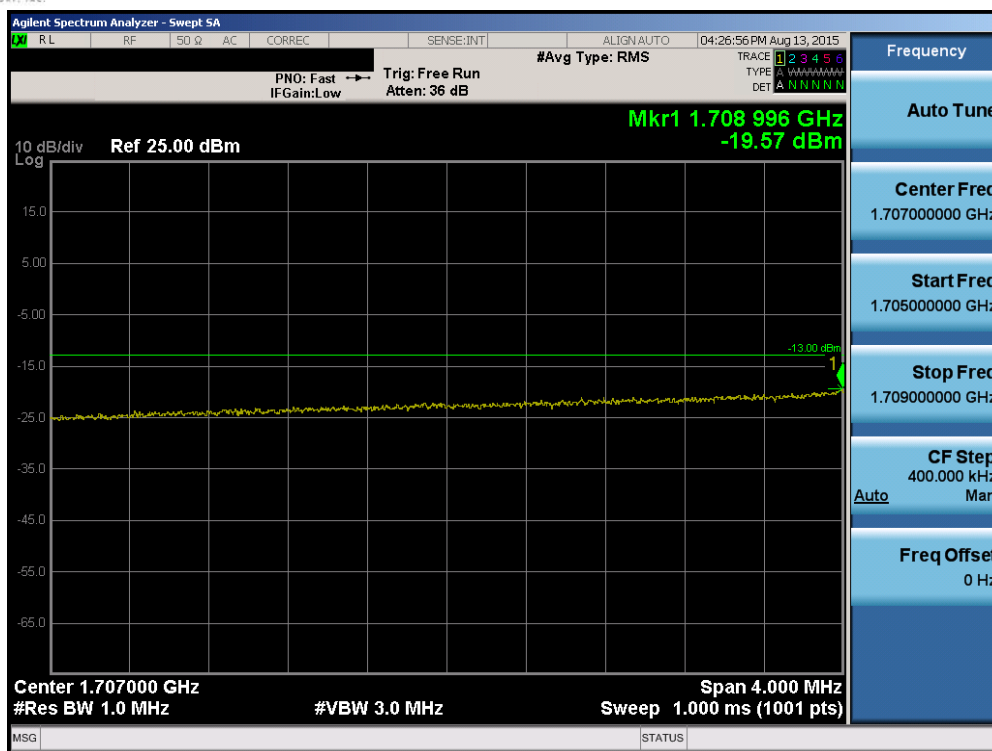


Plot 6-123. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

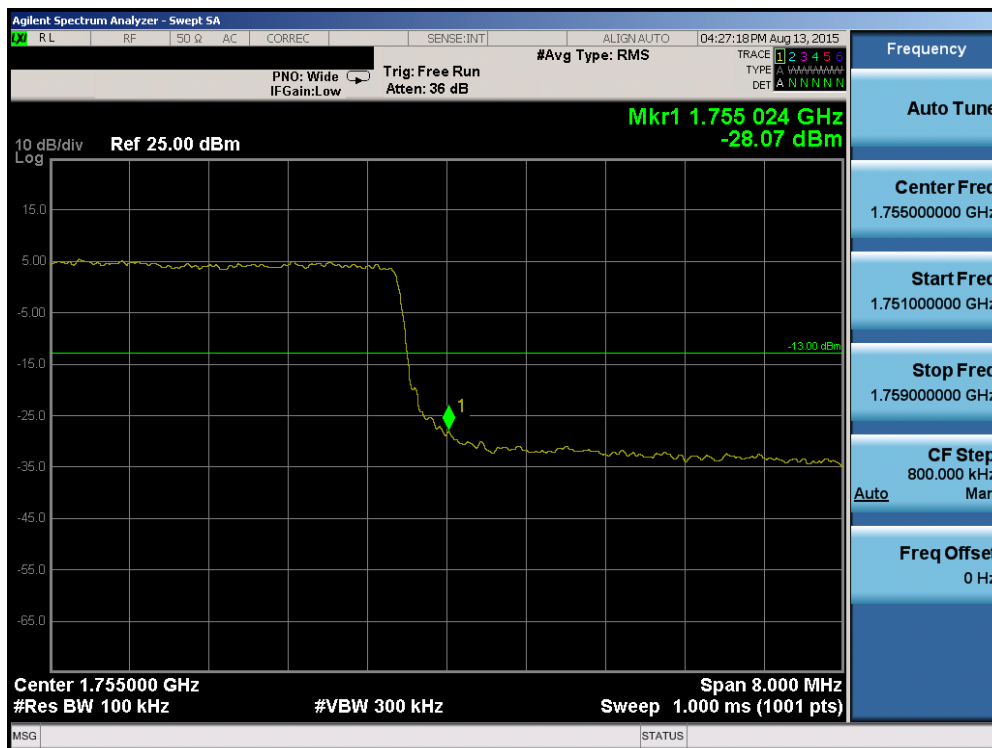


Plot 6-124. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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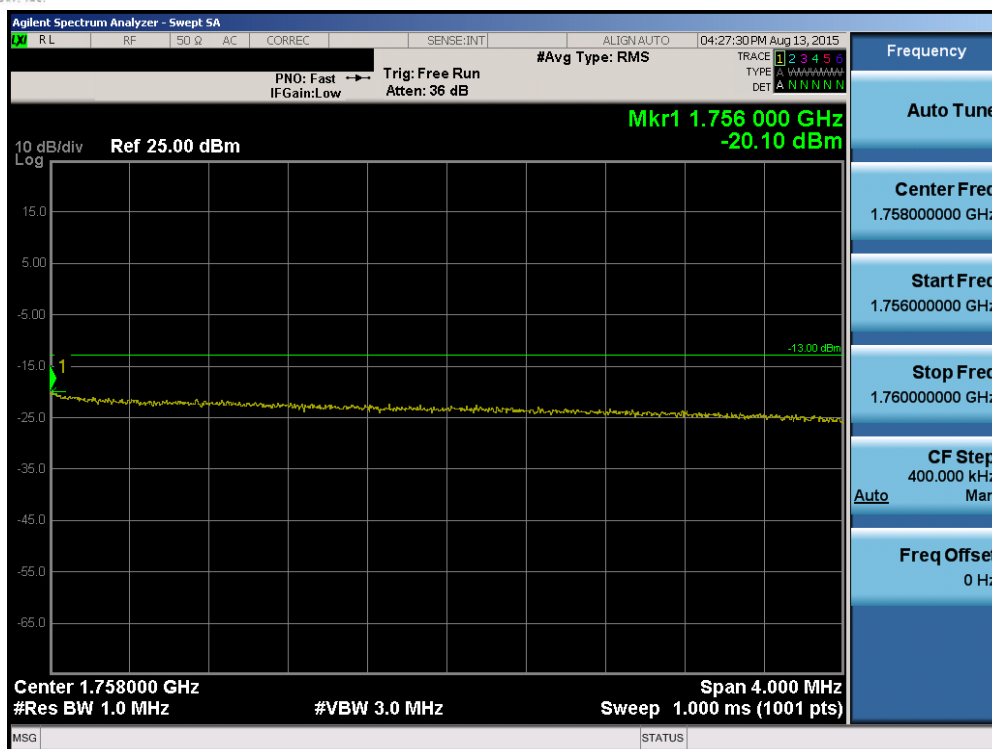


Plot 6-125. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

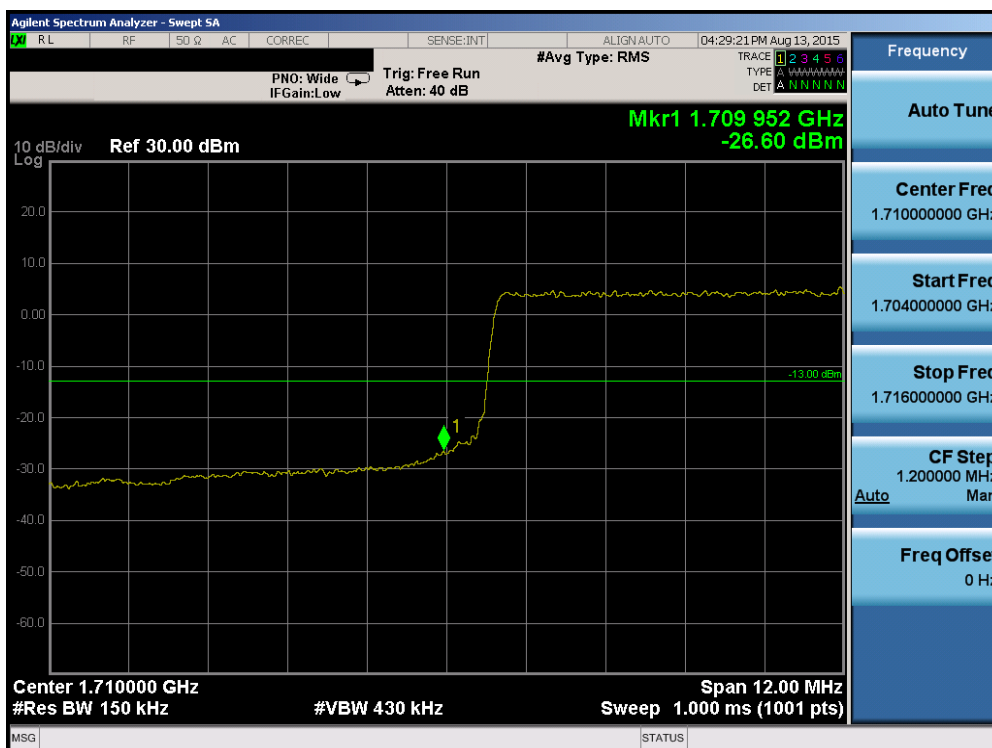


Plot 6-126. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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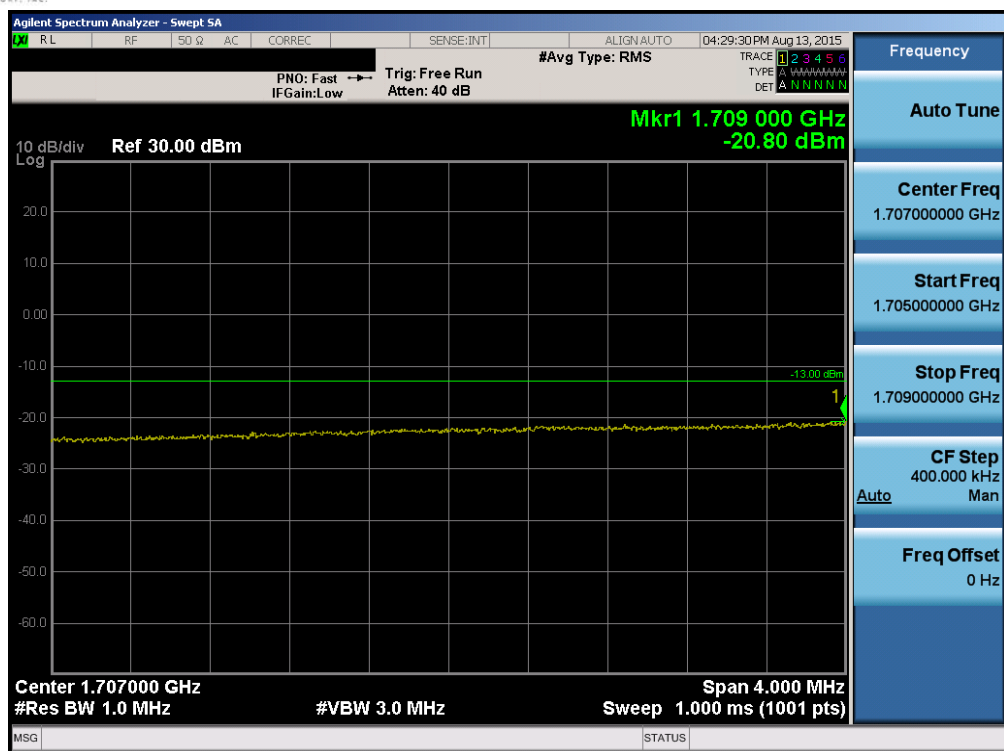


Plot 6-127. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

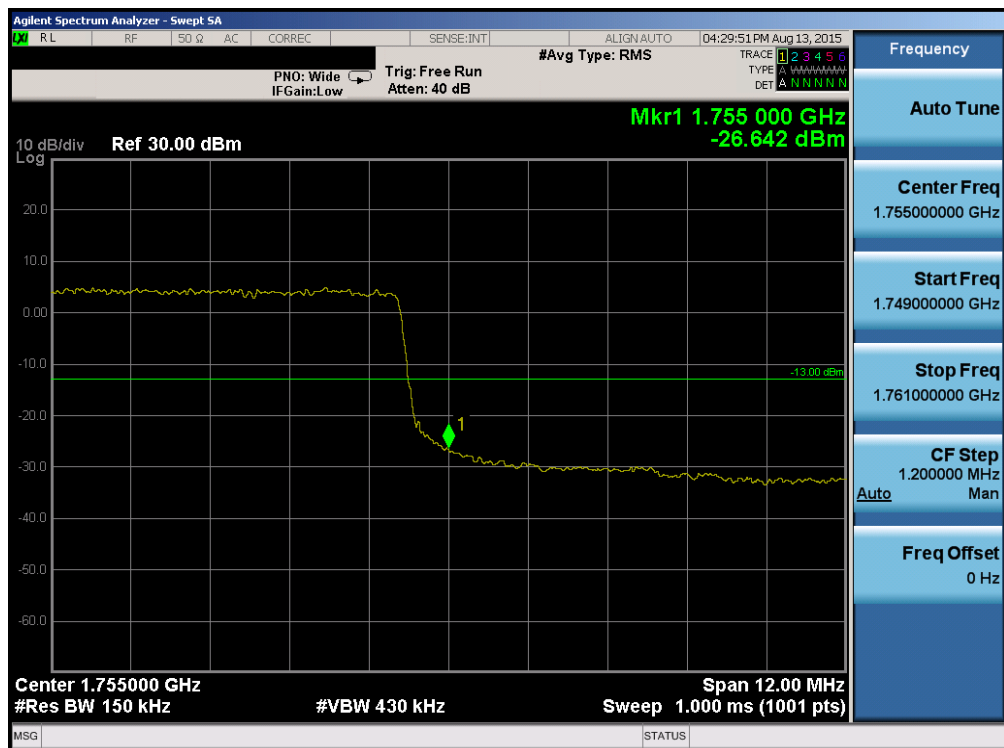


Plot 6-128. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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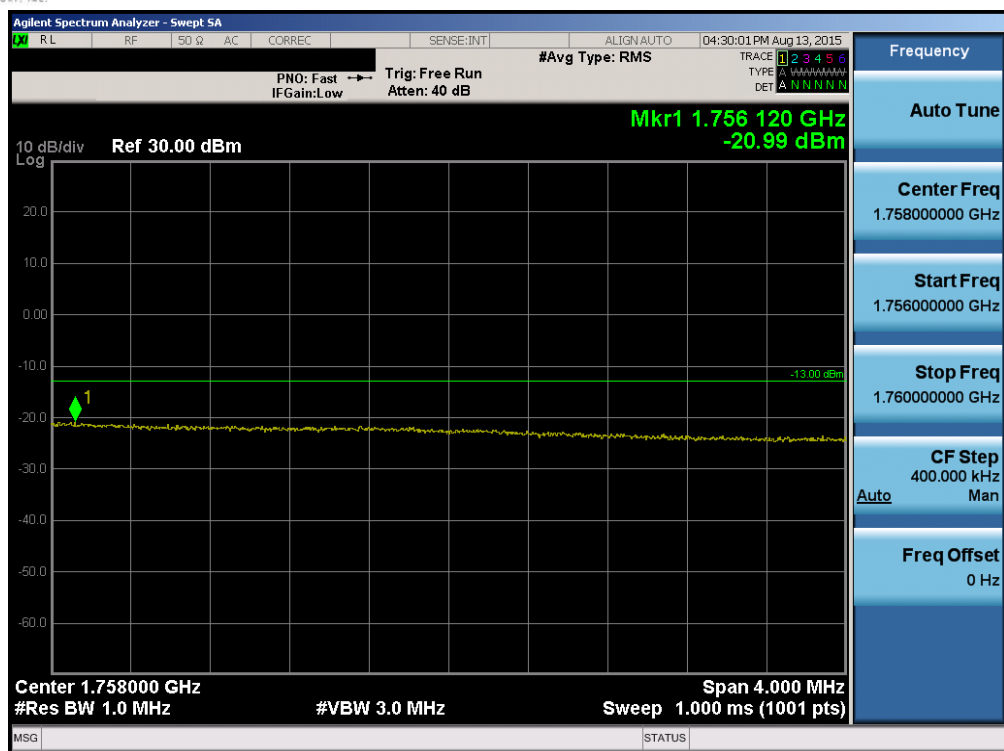


Plot 6-129. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - RB Size 75)

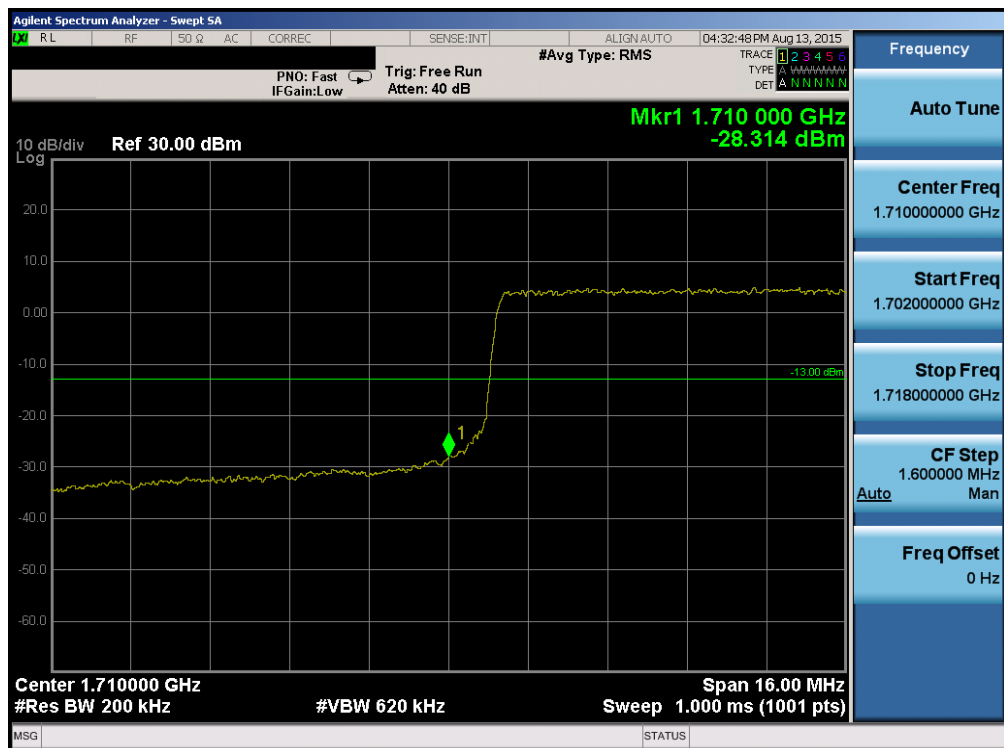


Plot 6-130. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - RB Size 75)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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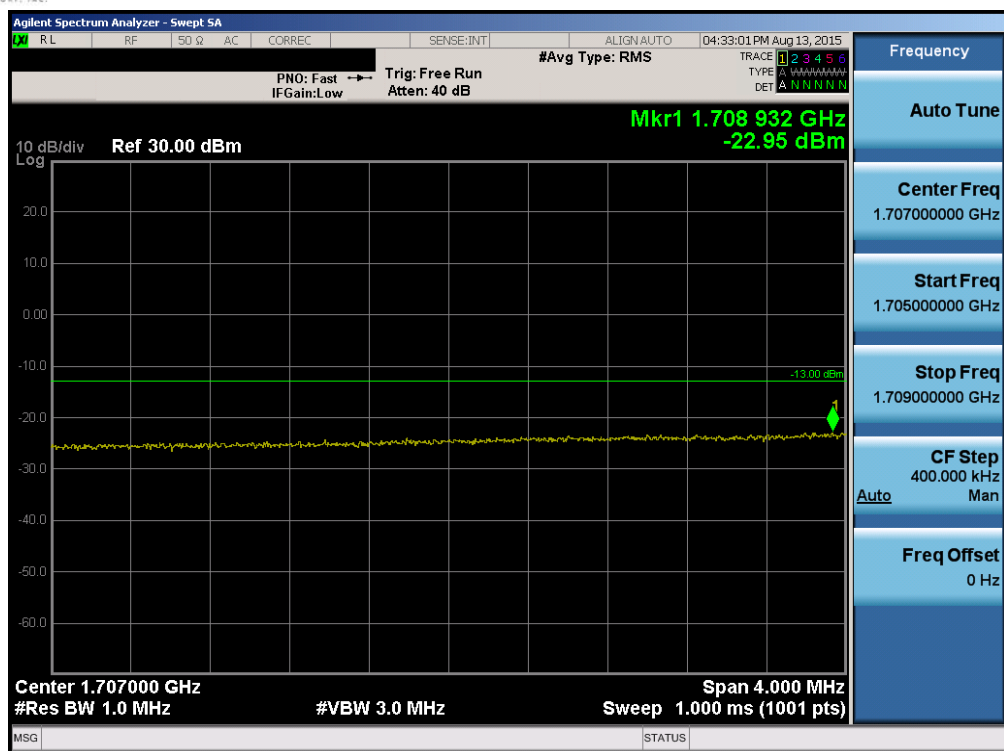


Plot 6-131. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

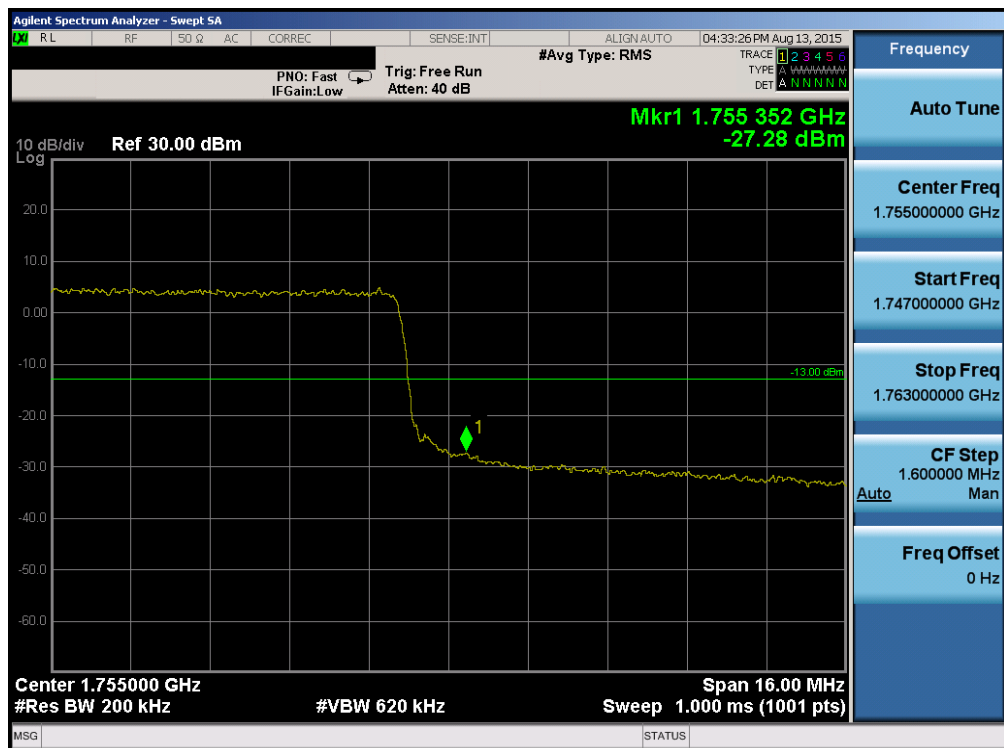


Plot 6-132. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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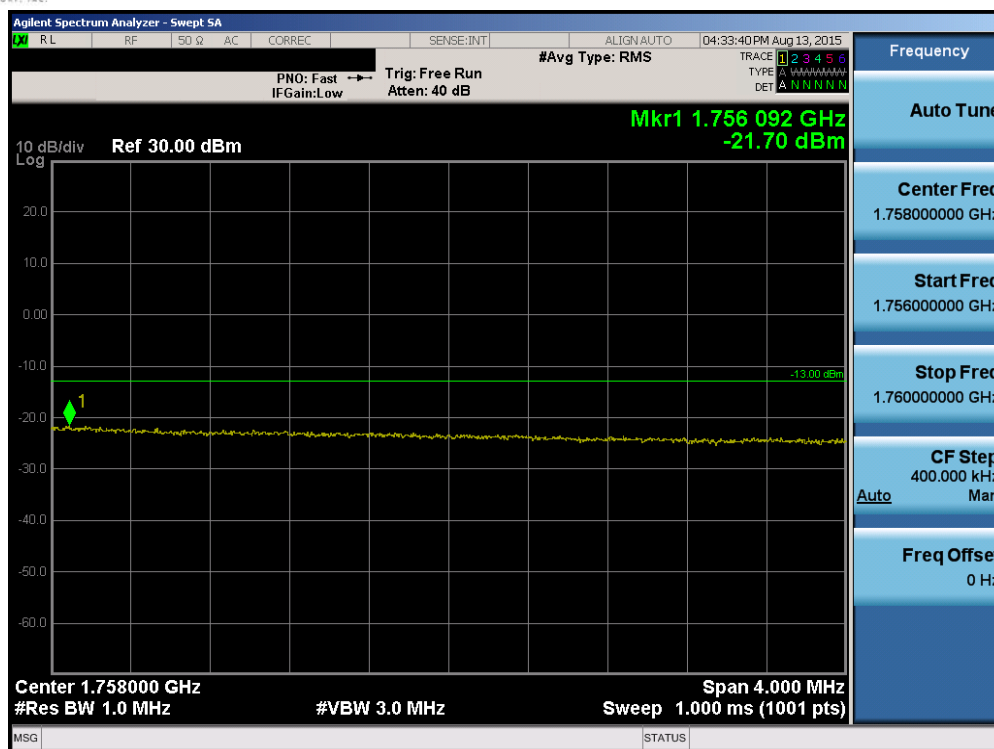


Plot 6-133. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

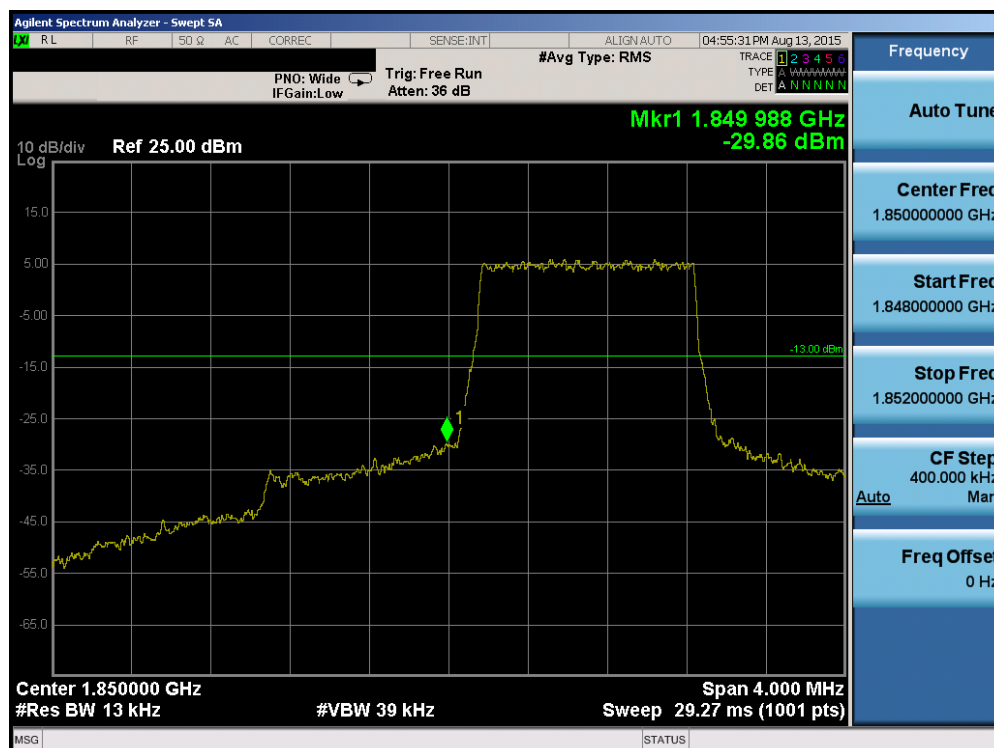


Plot 6-134. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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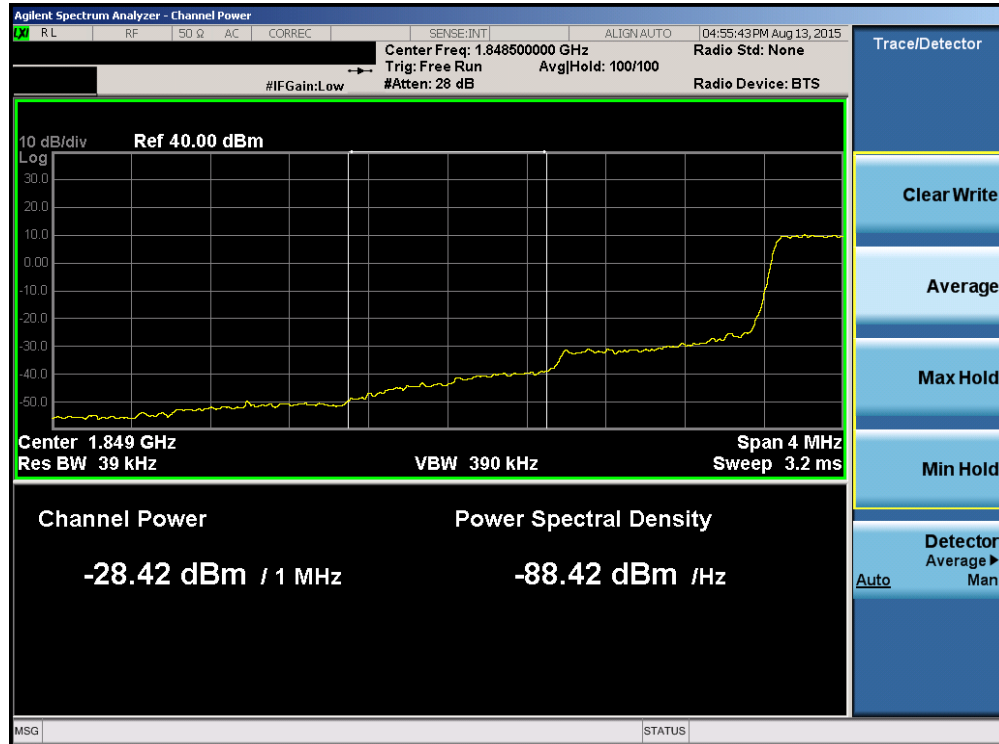


Plot 6-135. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



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

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 84 of 135

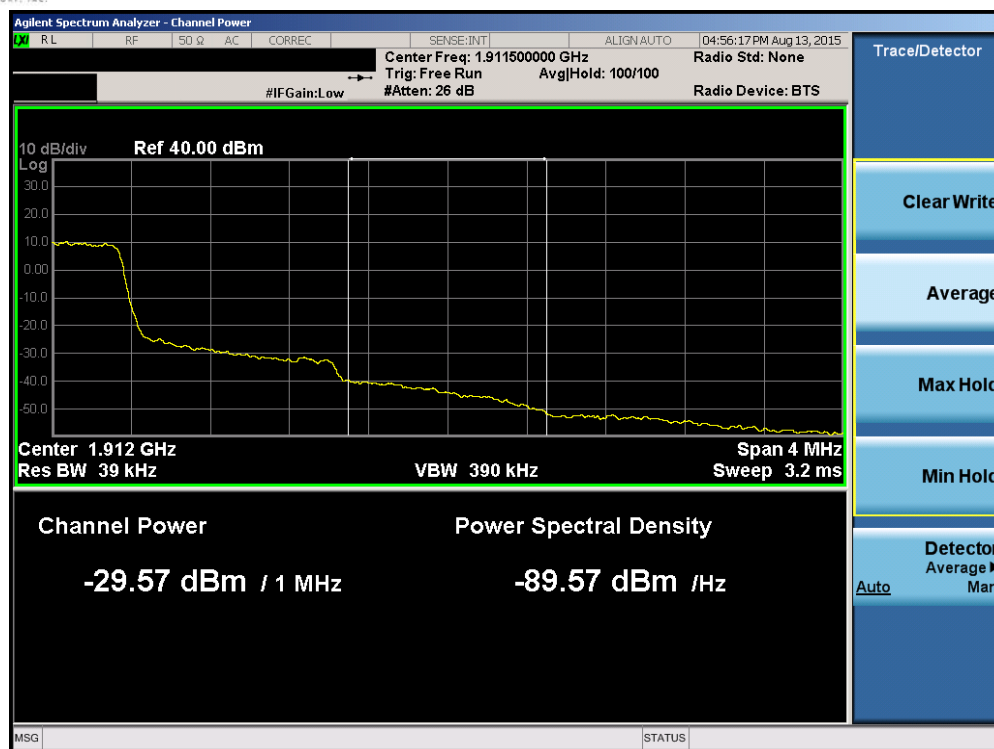


Plot 6-137. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

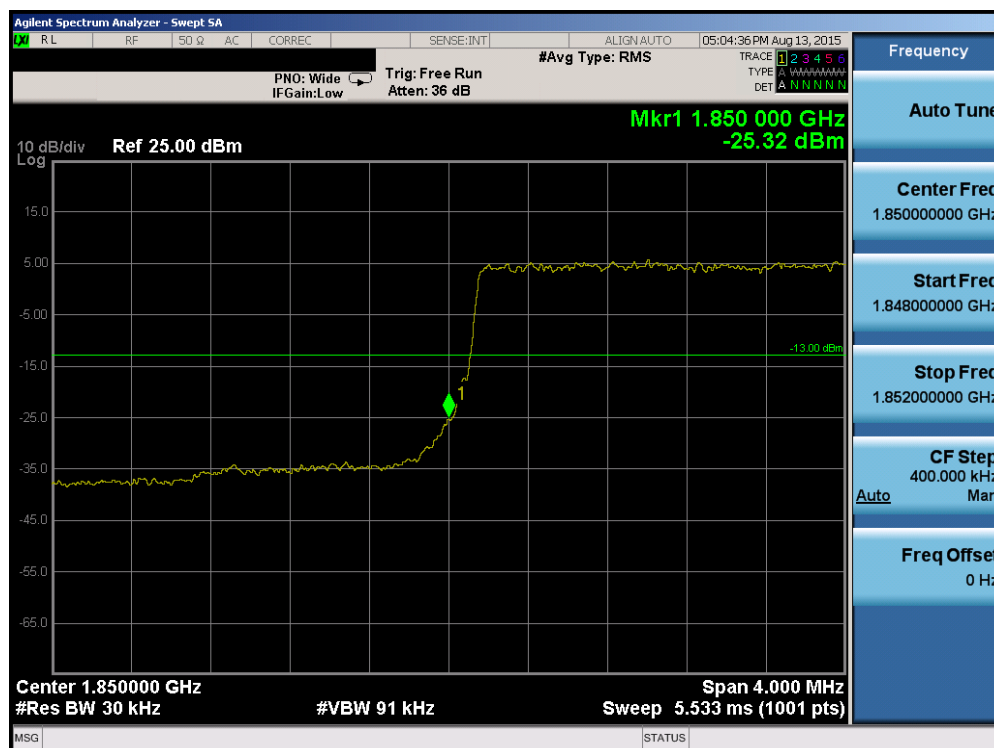


Plot 6-138. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 85 of 135

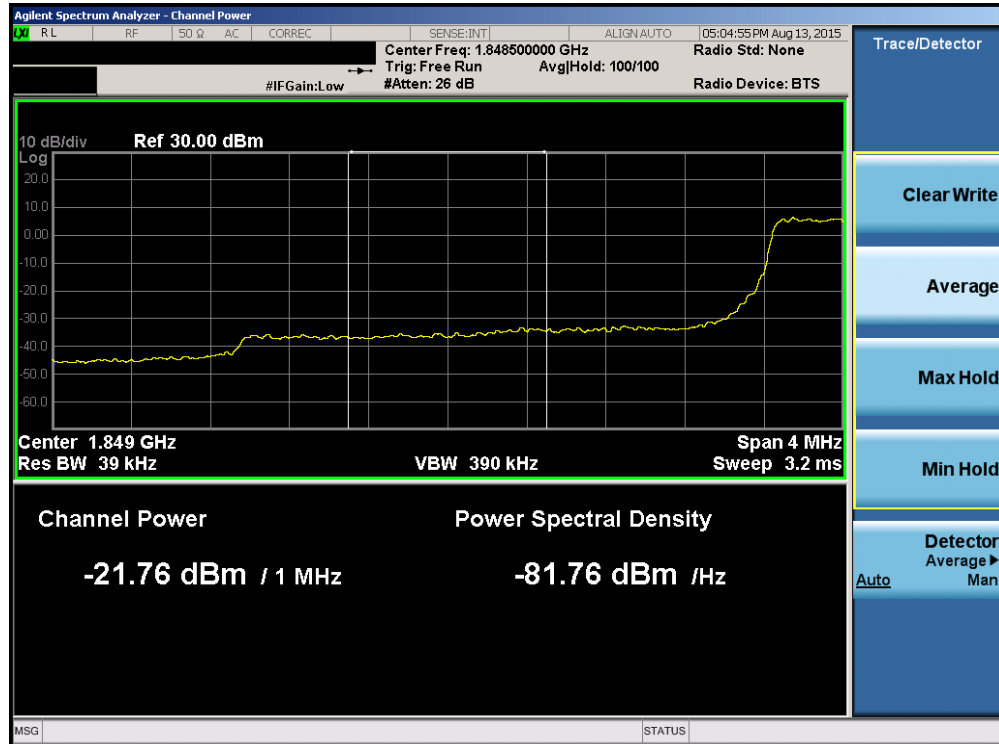


Plot 6-139. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

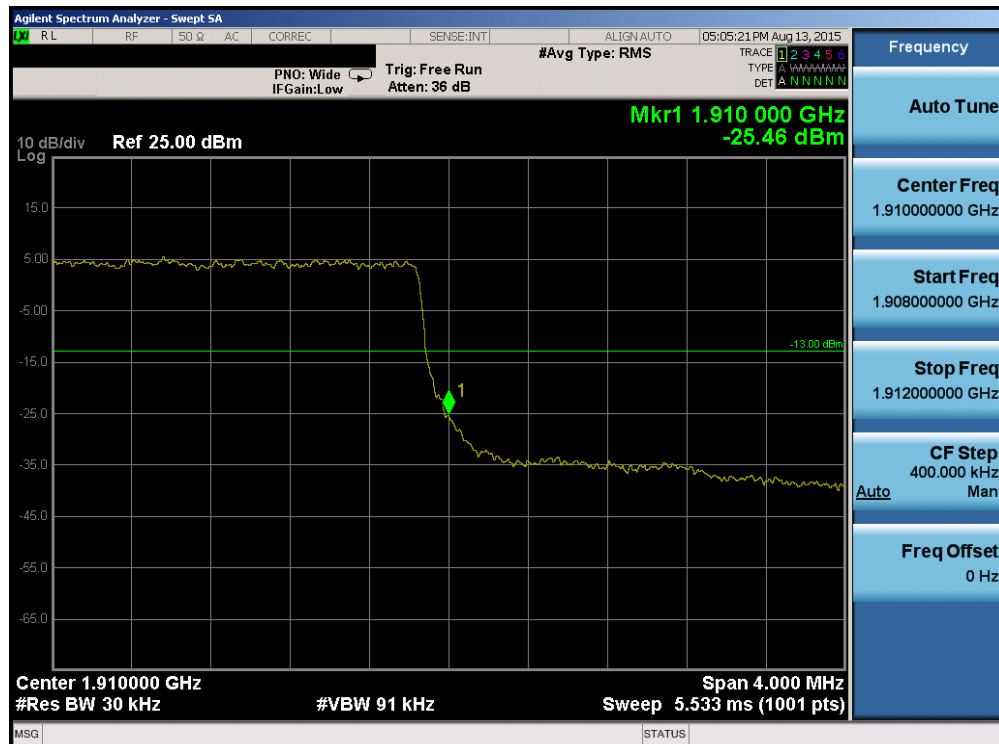


Plot 6-140. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 86 of 135

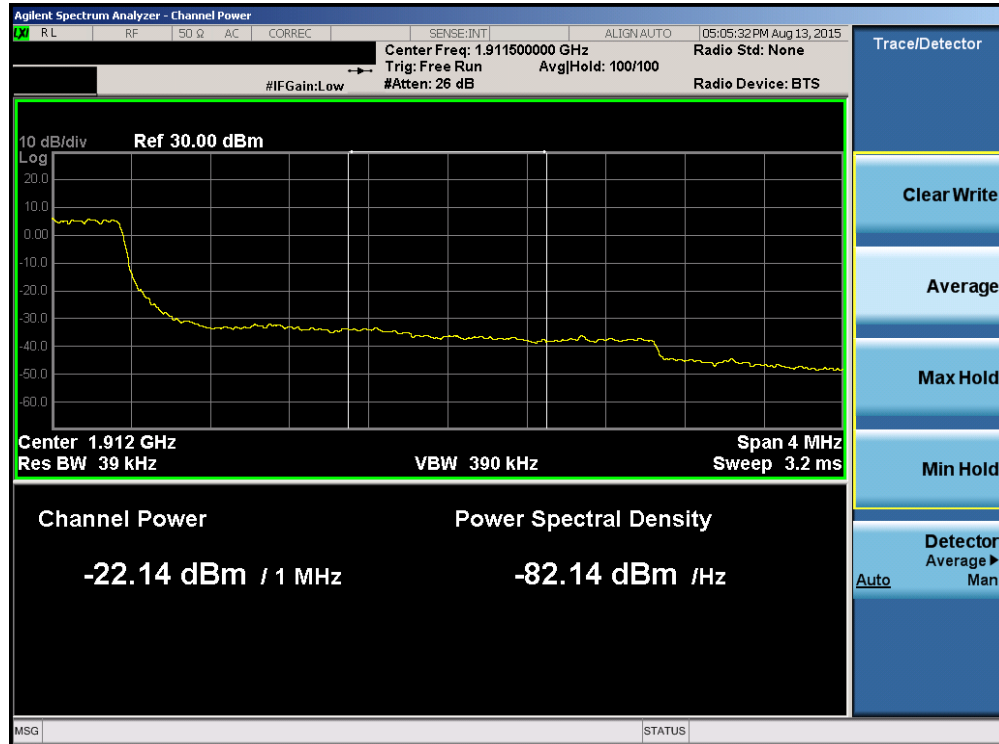


Plot 6-141. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

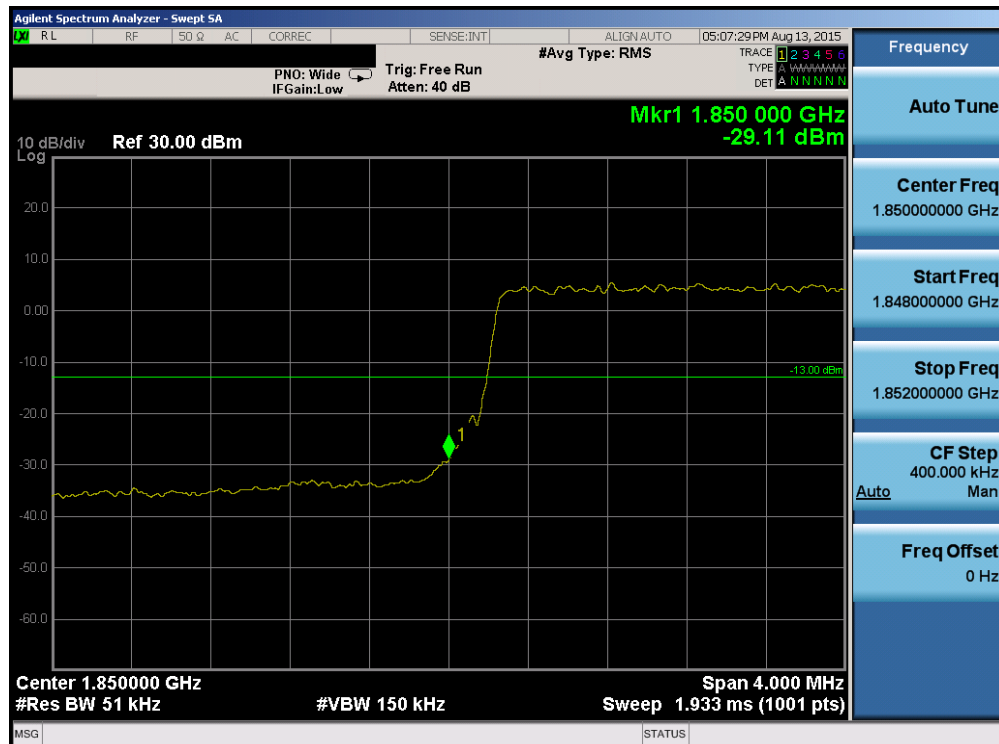


Plot 6-142. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 87 of 135

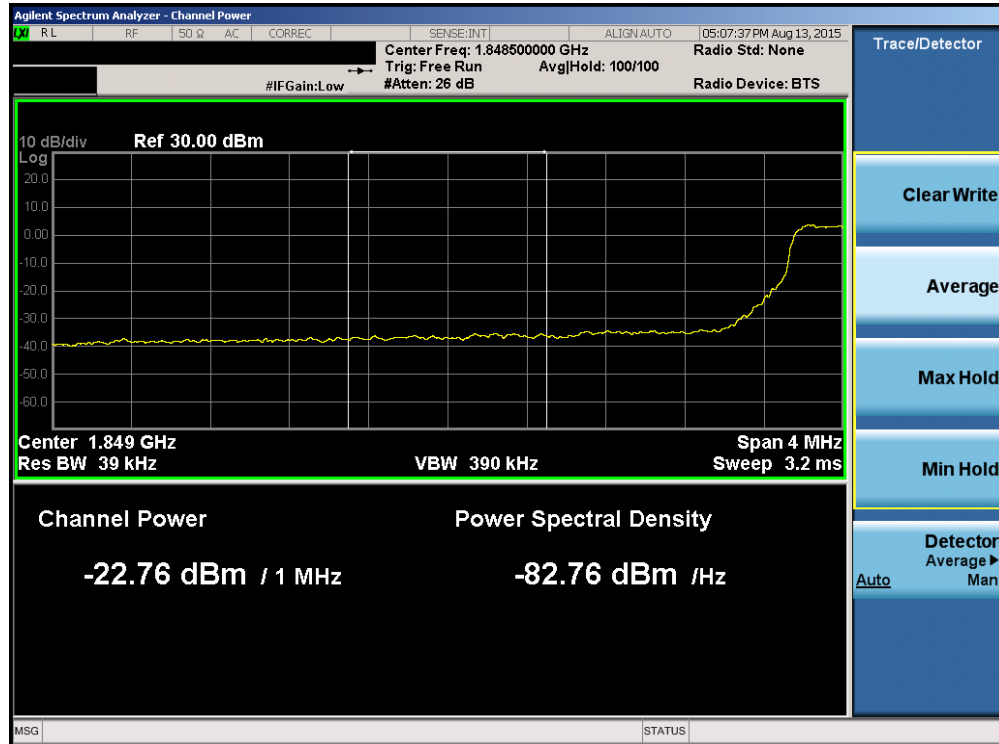


Plot 6-143. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

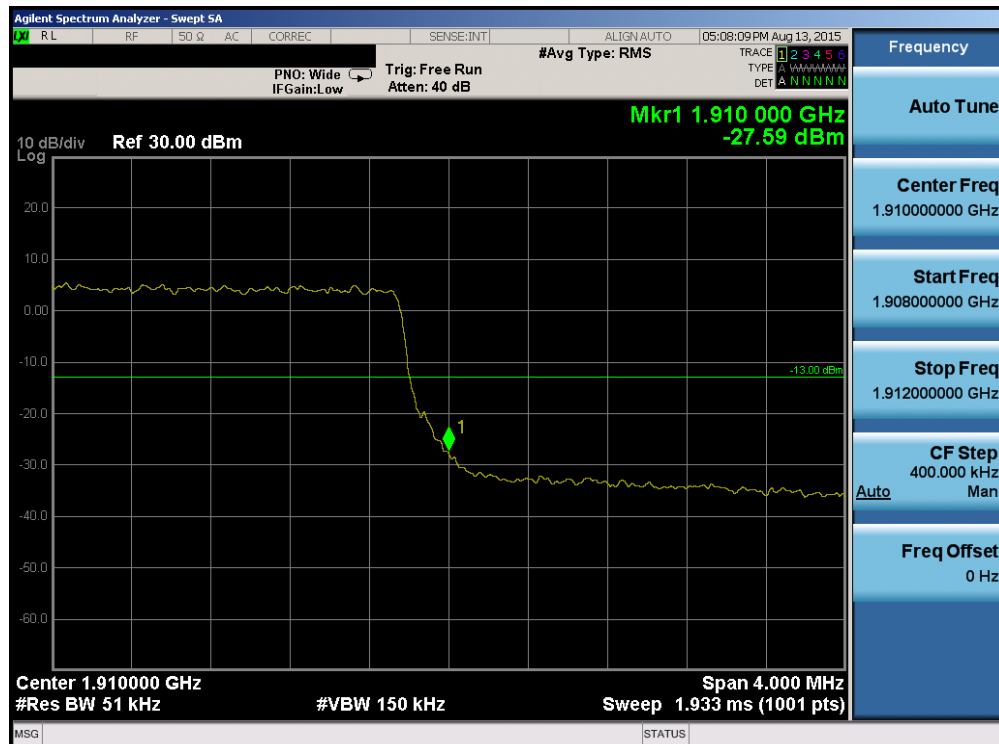


Plot 6-144. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 88 of 135

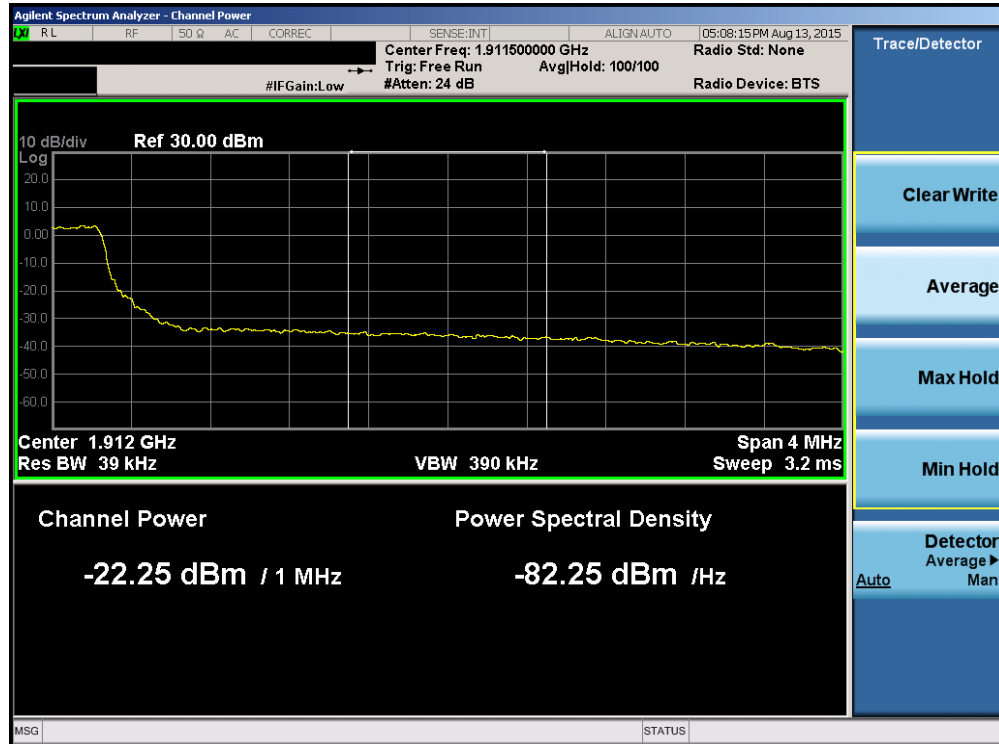


Plot 6-145. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

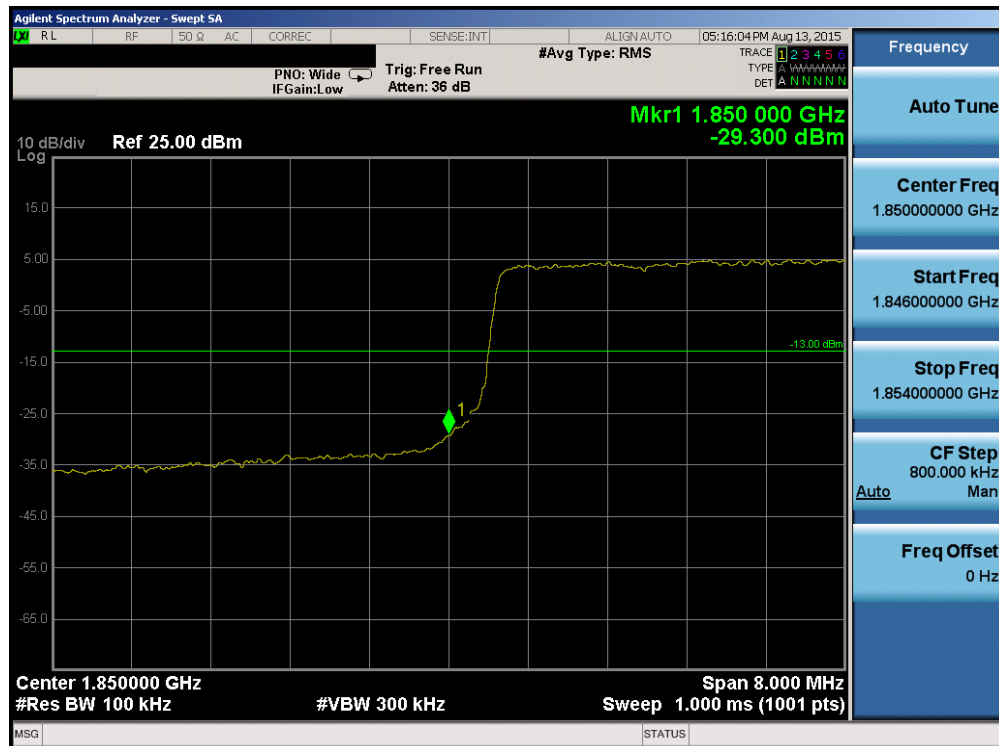


Plot 6-146. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 89 of 135

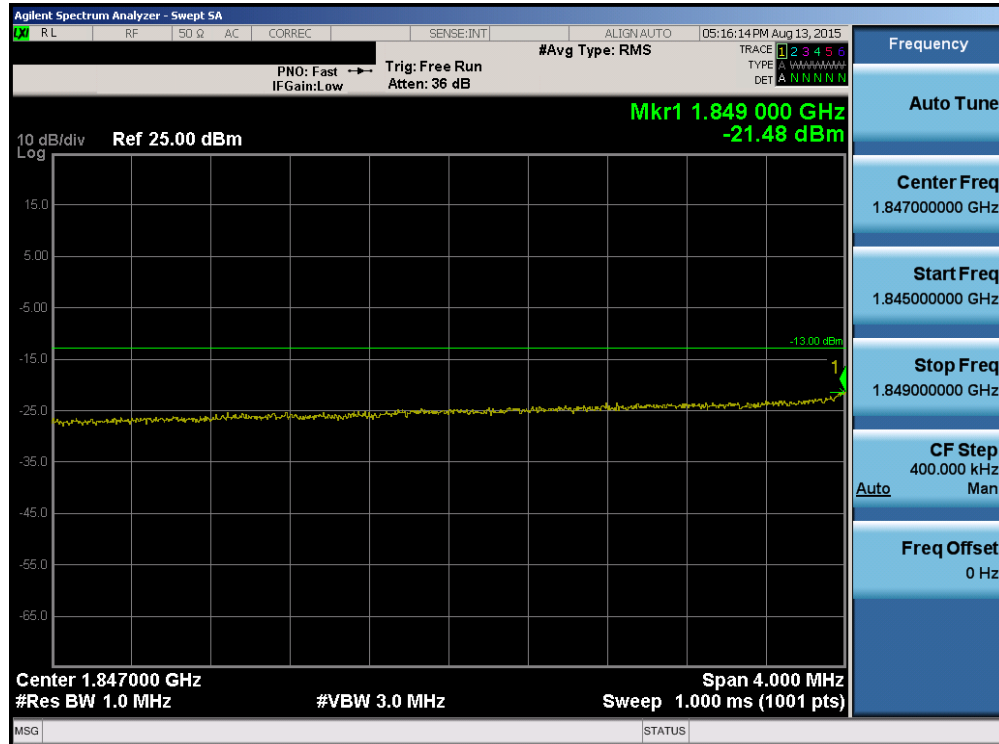


Plot 6-147. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

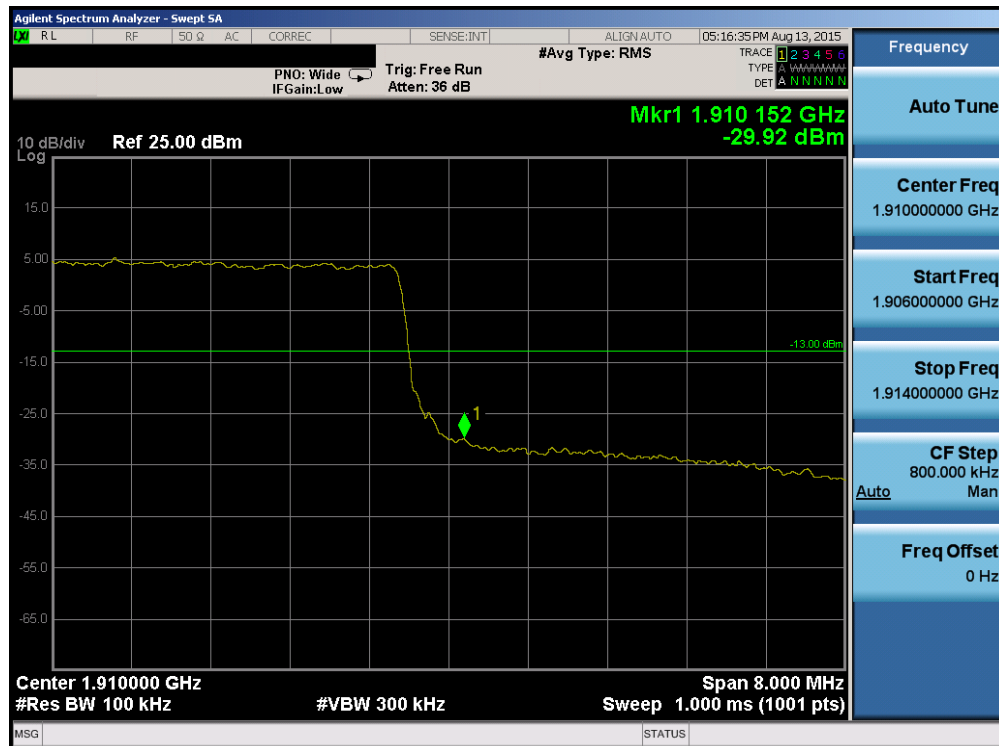


Plot 6-148. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 90 of 135



Plot 6-149. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

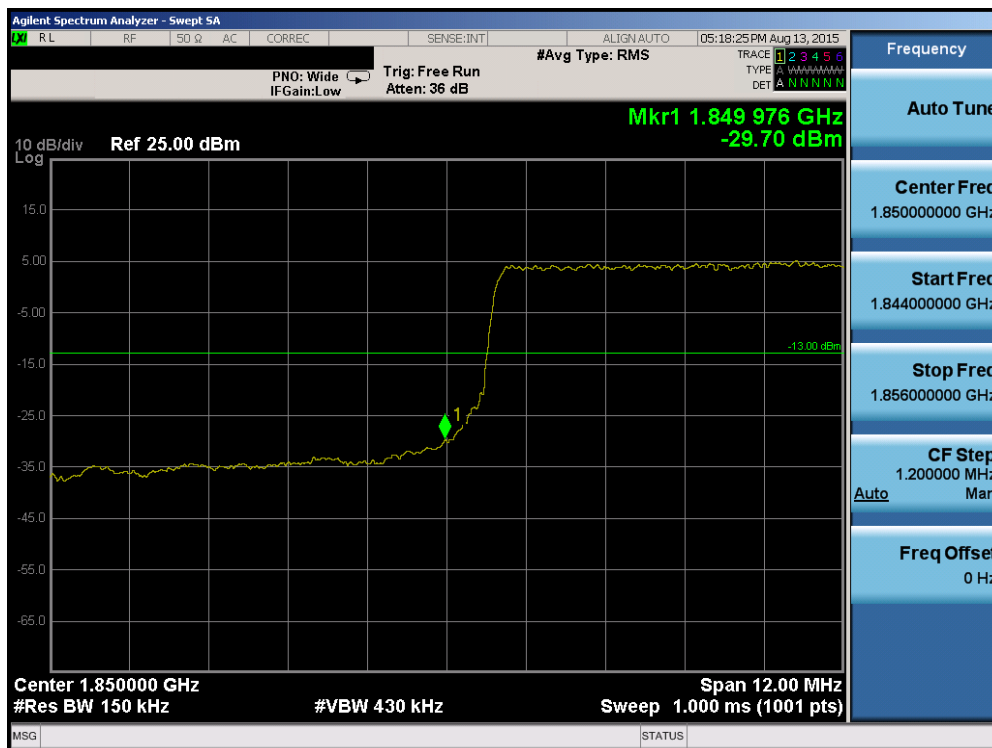


Plot 6-150. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 91 of 135

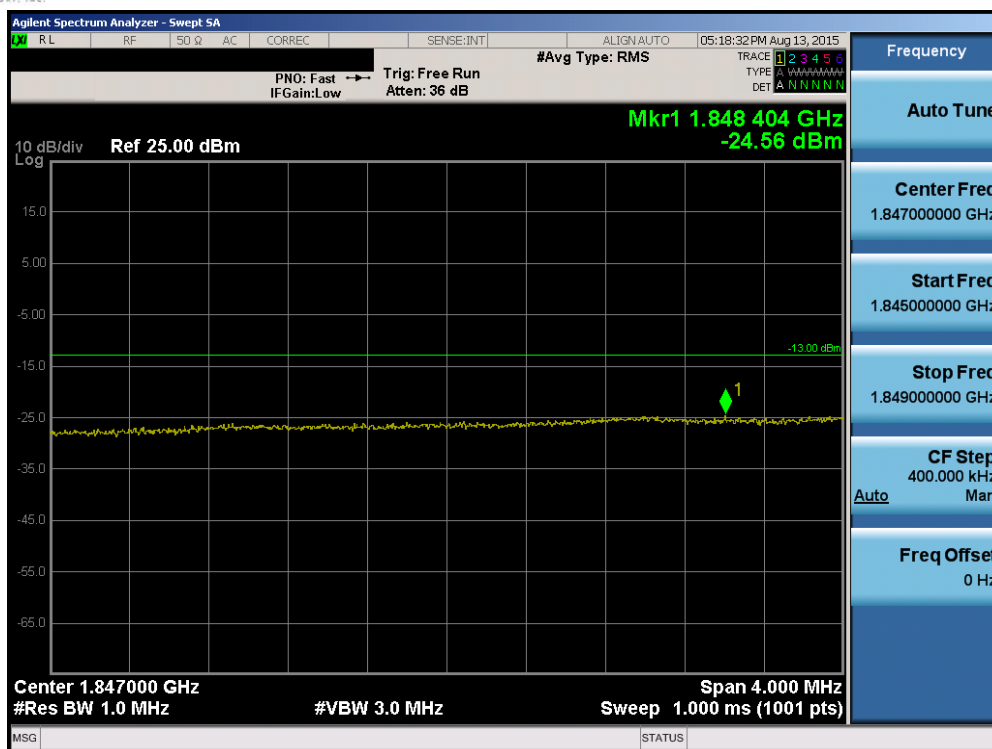


Plot 6-151. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - RB Size 50)

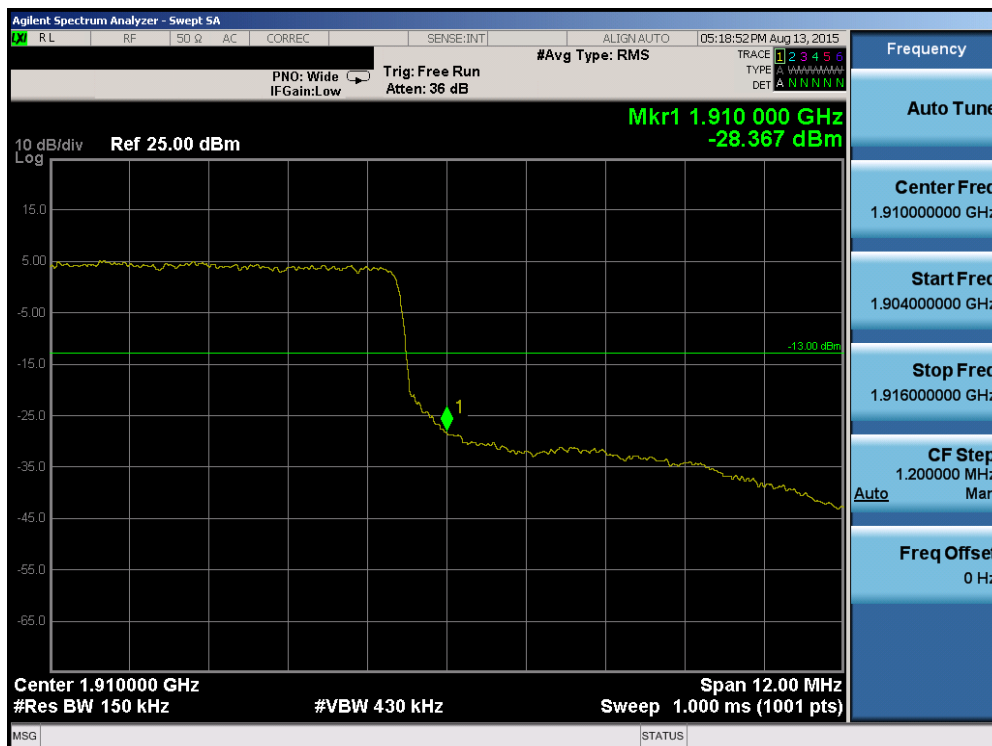


Plot 6-152. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - RB Size 75)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 92 of 135

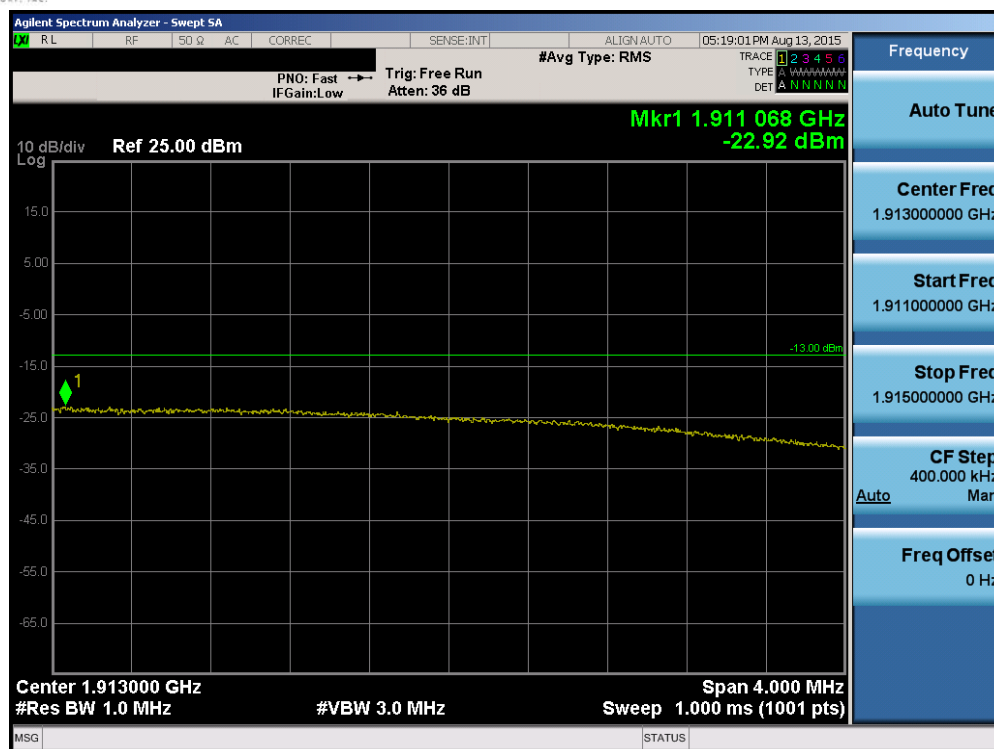


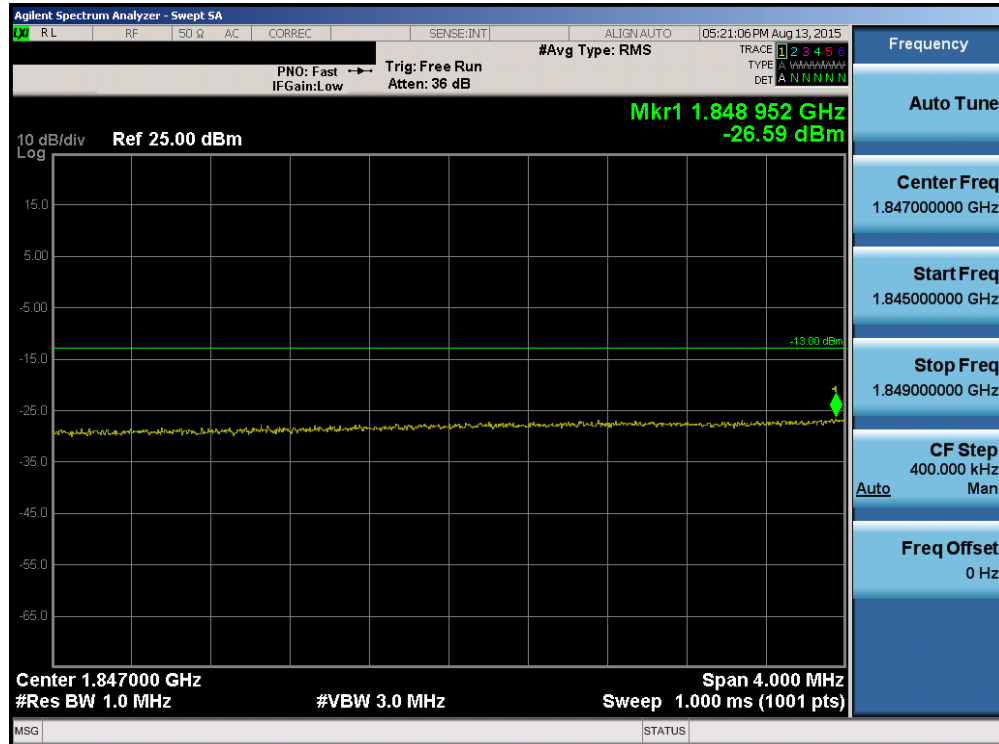
Plot 6-153. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 6-154. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 93 of 135





Plot 6-157. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

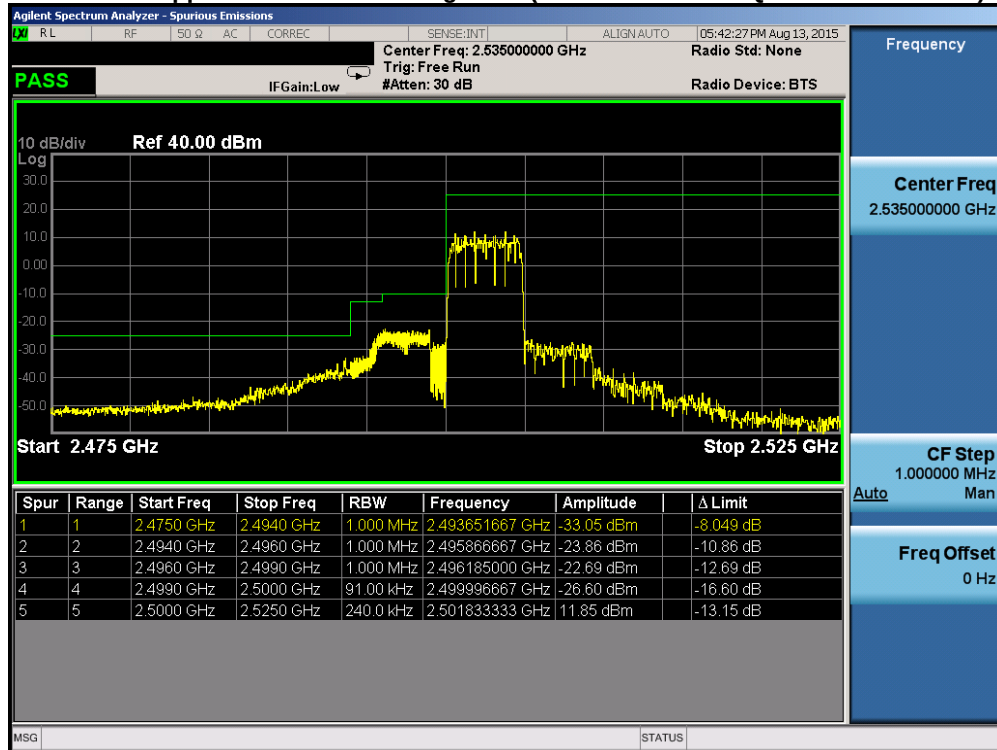


Plot 6-158. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 95 of 135

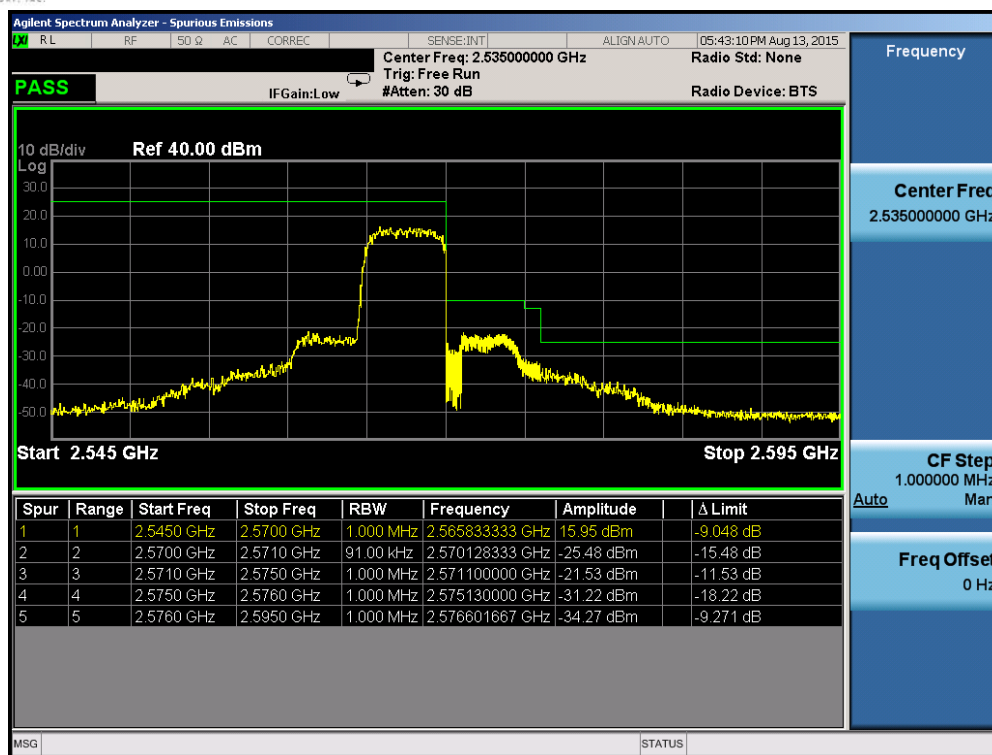


Plot 6-159. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - RB Size 100)

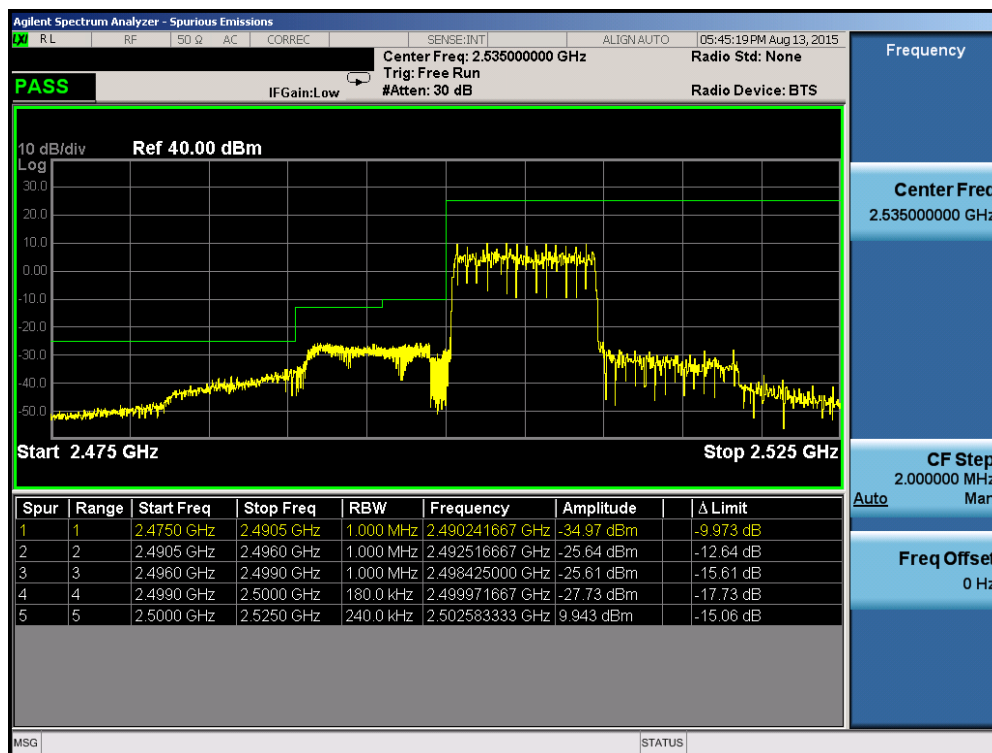


Plot 6-160. Lower ACP Plot (Band 7 - 5.0MHz QPSK - RB Size 25)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 96 of 135



Plot 6-161. Upper ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)

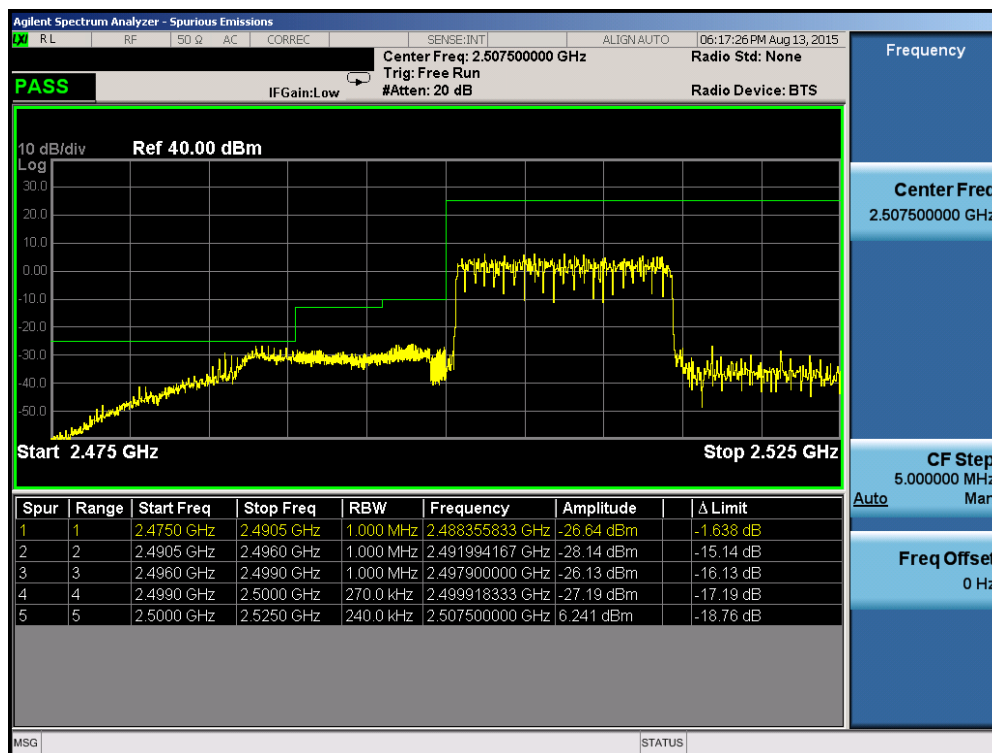


Plot 6-162. Lower ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 97 of 135

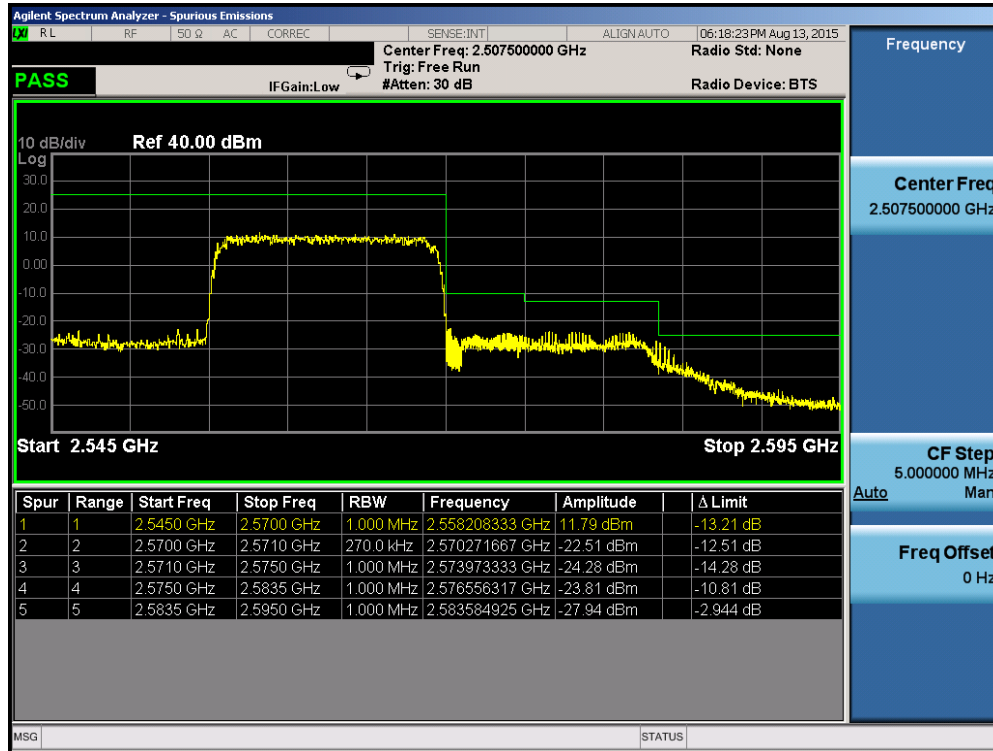


Plot 6-163. Upper ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)

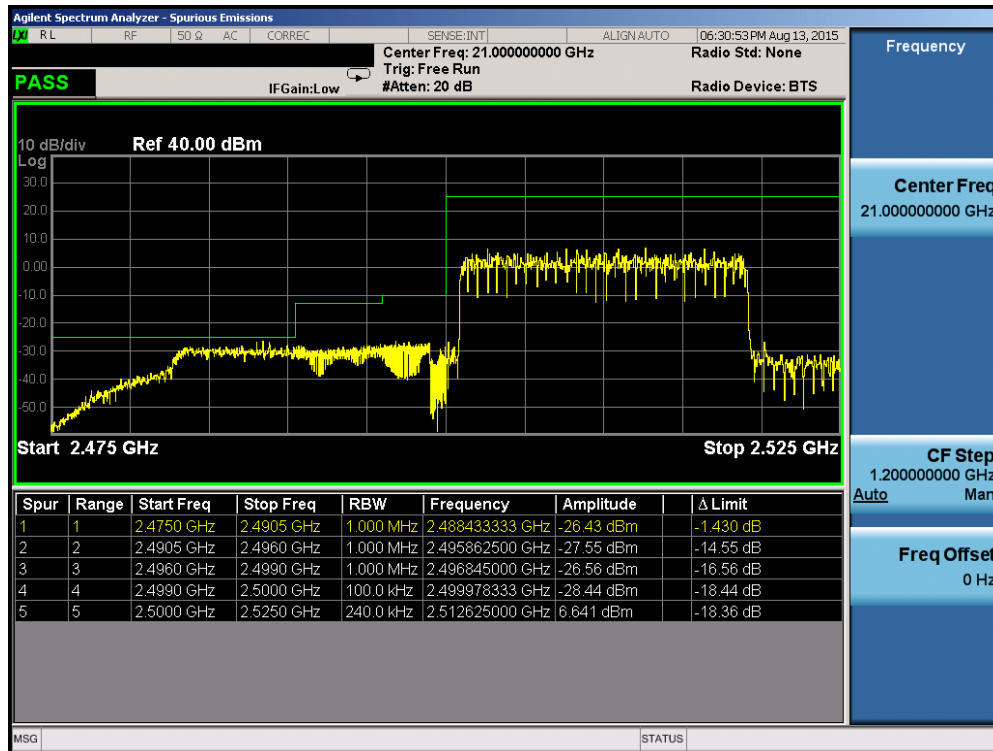


Plot 6-164. Lower ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 98 of 135

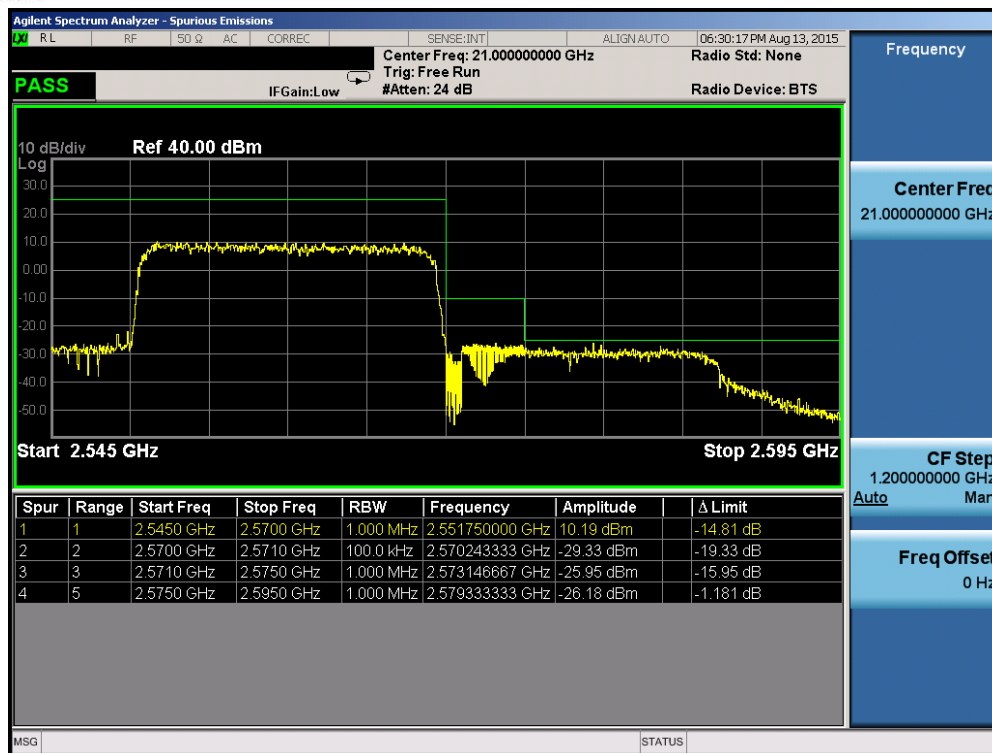


Plot 6-165. Upper ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)



Plot 6-166. Lower ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 99 of 135



Plot 6-167. Upper ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 100 of 135

6.5 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 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.

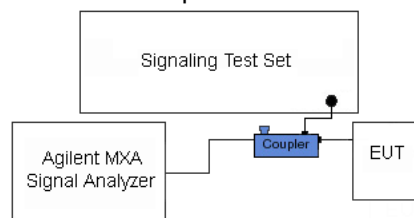
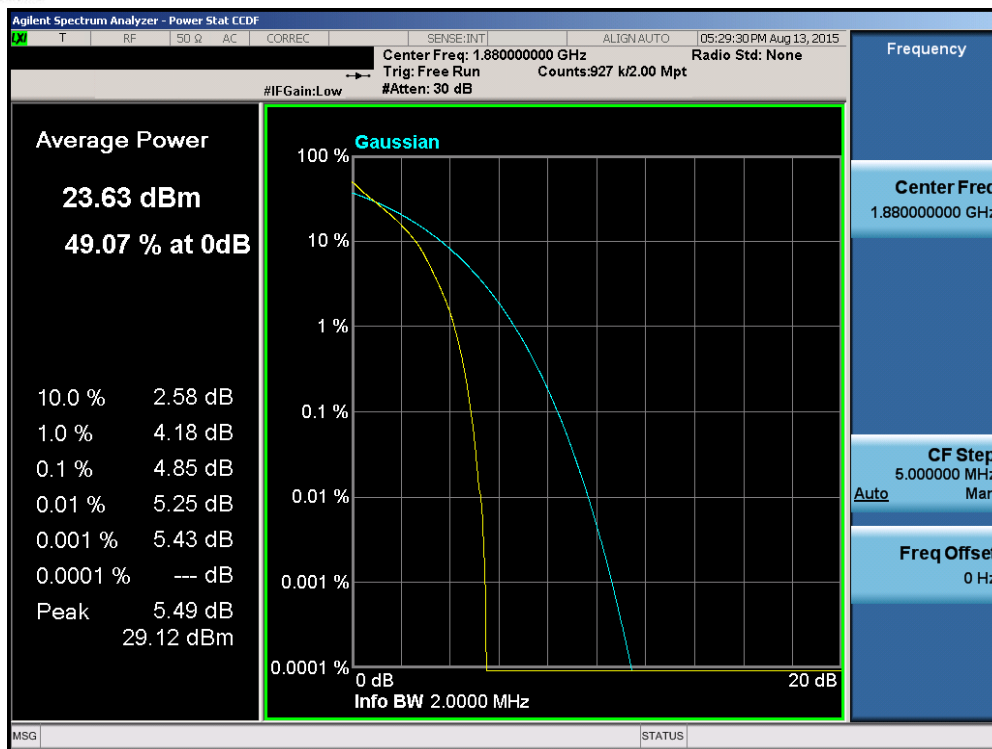


Figure 6-4. Test Instrument & Measurement Setup

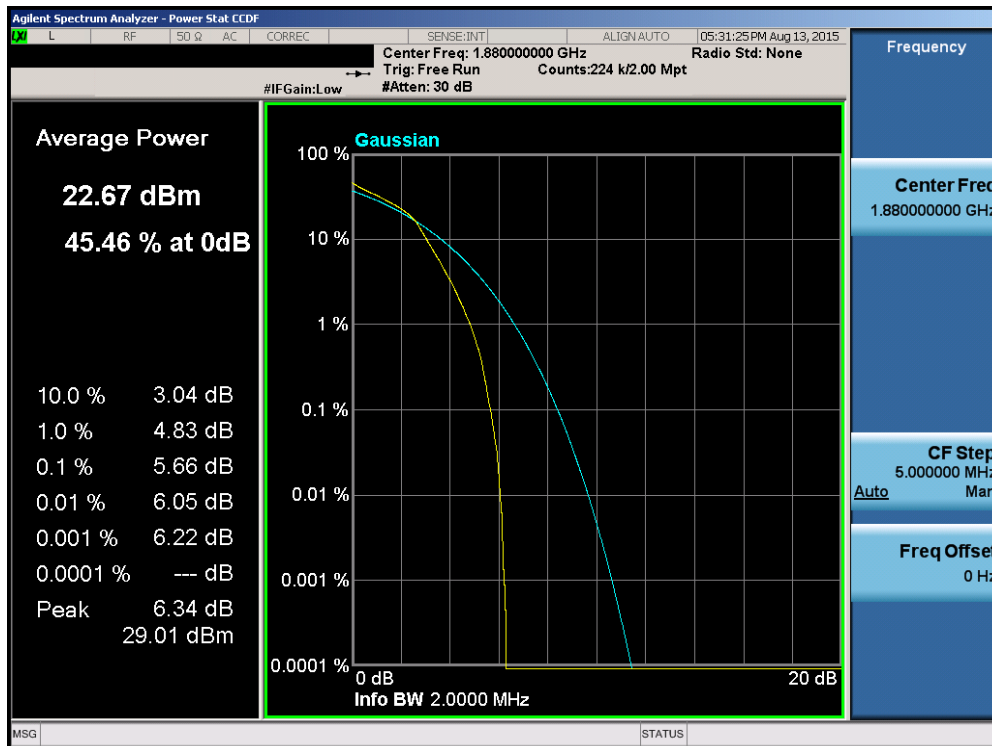
Test Notes

None.

FCC ID: ZNFVS990		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 101 of 135

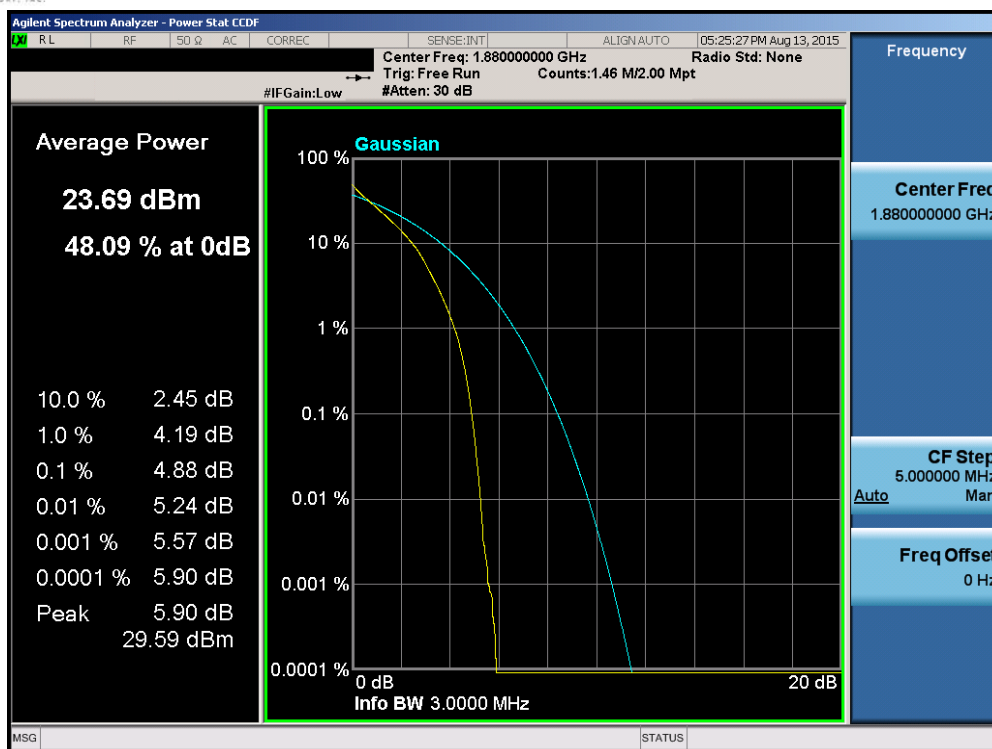


Plot 6-168. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

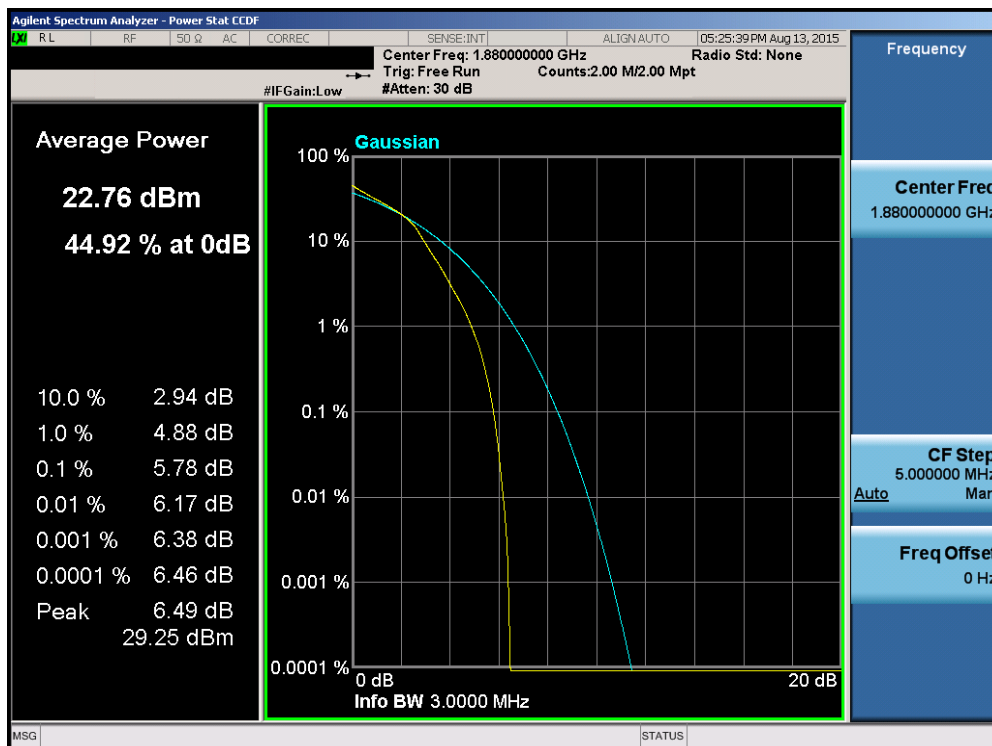


Plot 6-169. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 102 of 135

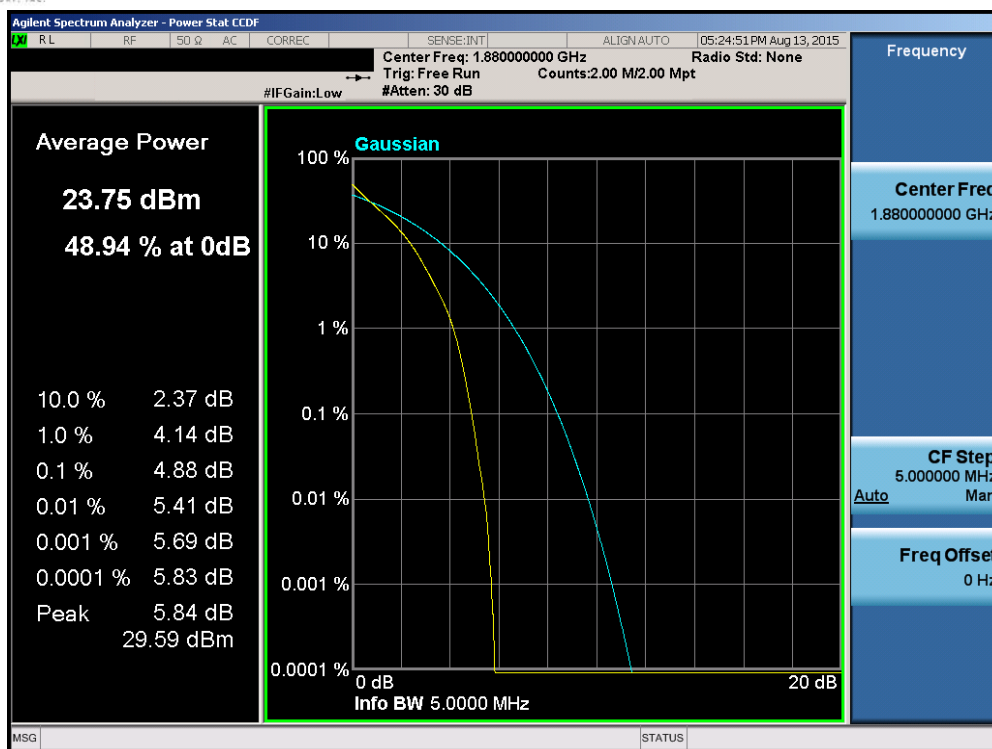


Plot 6-170. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

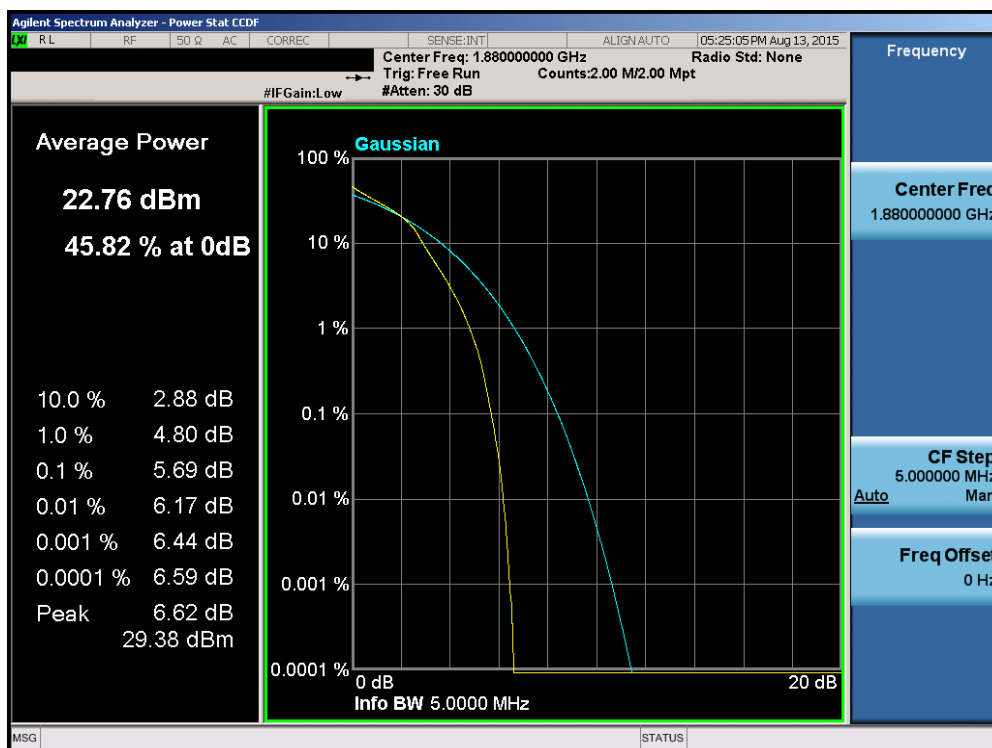


Plot 6-171. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 103 of 135

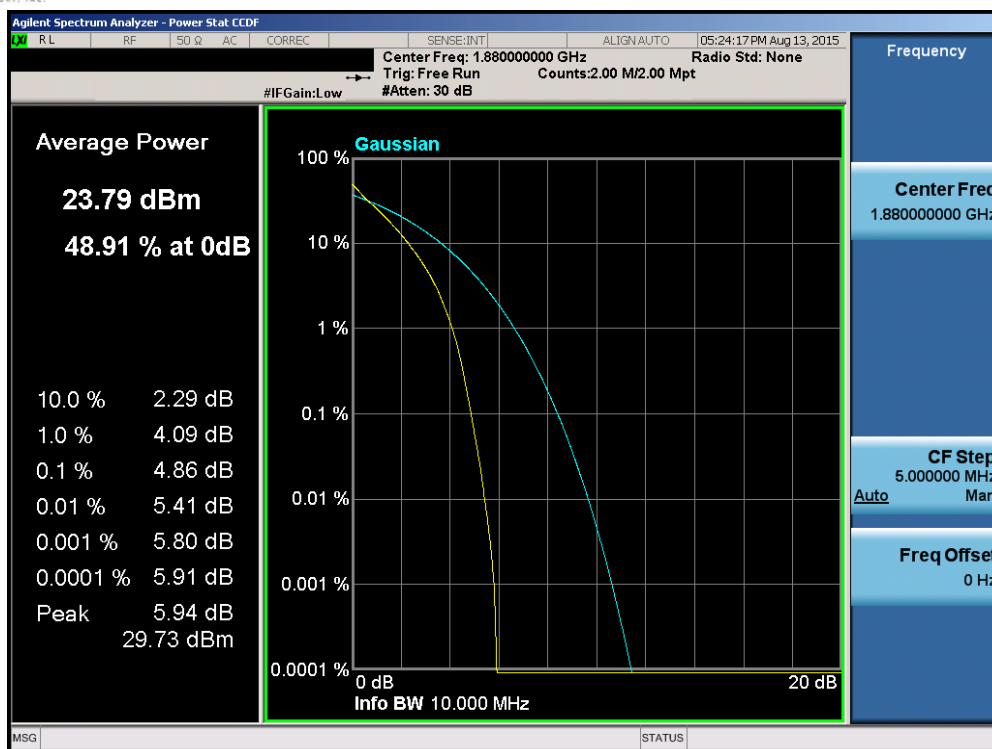


Plot 6-172. PAR Plot (Band 2 - 5.0MHz QPSK - RB Size 25)

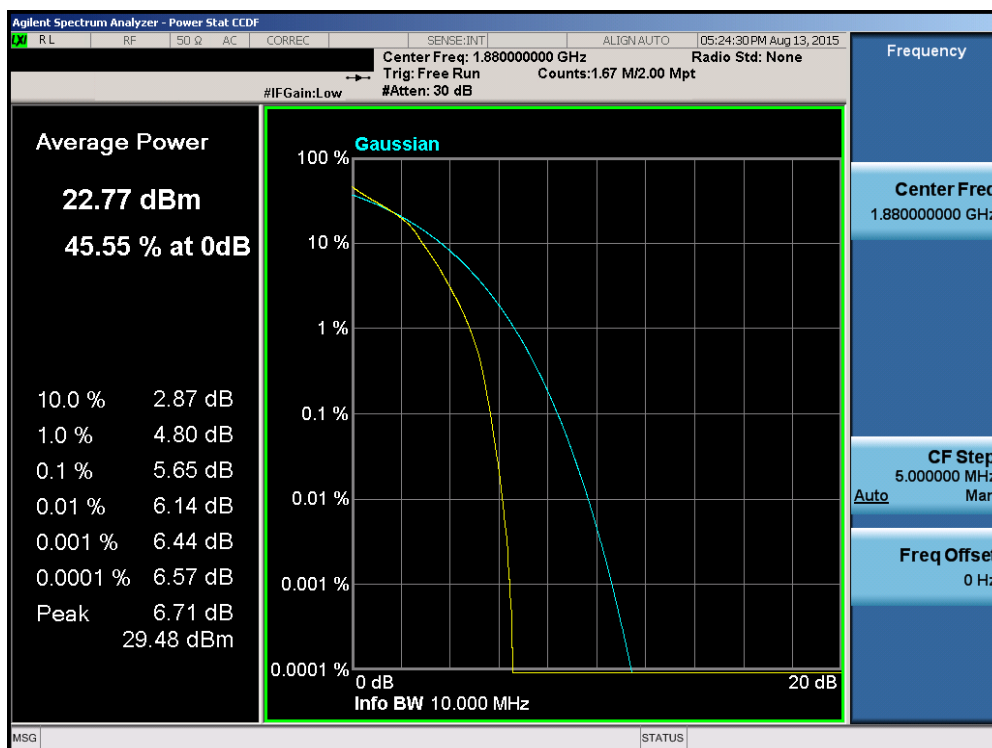


Plot 6-173. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 104 of 135

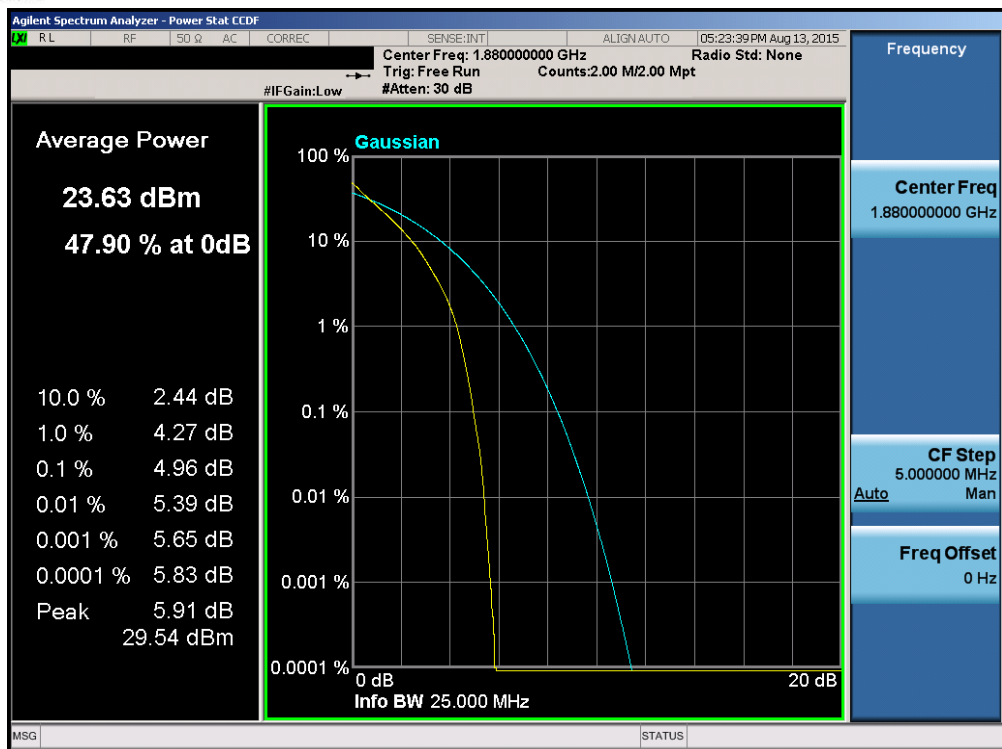


Plot 6-174. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

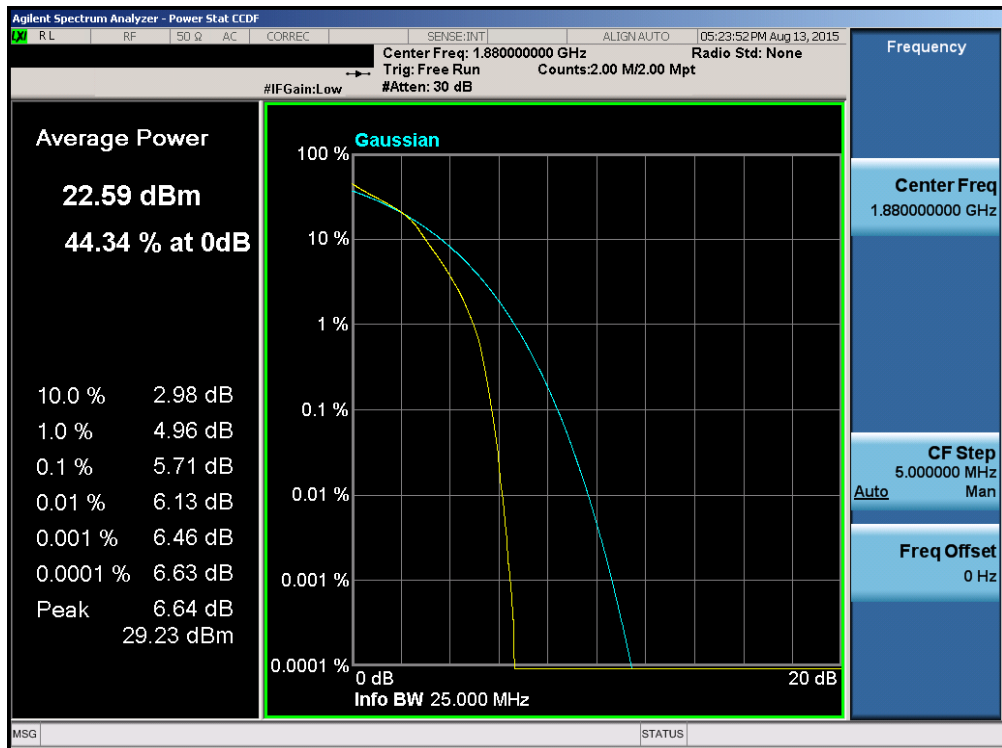


Plot 6-175. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 105 of 135

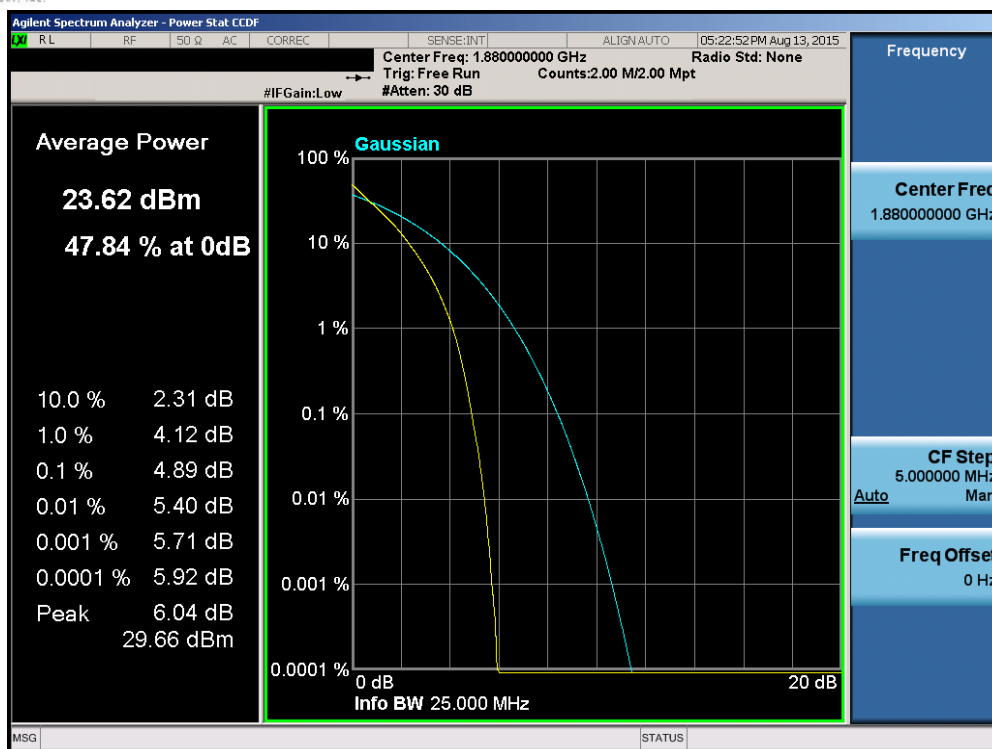


Plot 6-176. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

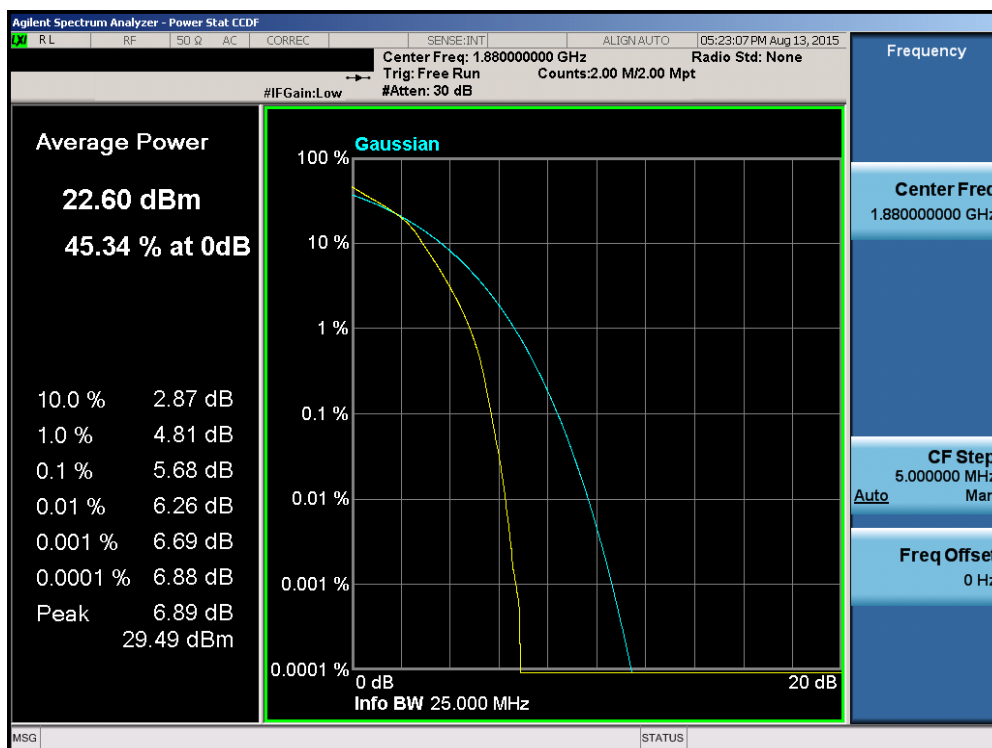


Plot 6-177. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 106 of 135



Plot 6-178. PAR Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 6-179. PAR Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 107 of 135

6.6 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §27.50(h.2) §27.50(b.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-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically 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 v02r02 – Section 5.2.1

ANSI/TIA-603-C-2004 – Section 2.2.17

Test Settings

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

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset	Page 108 of 135

Test Setup

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

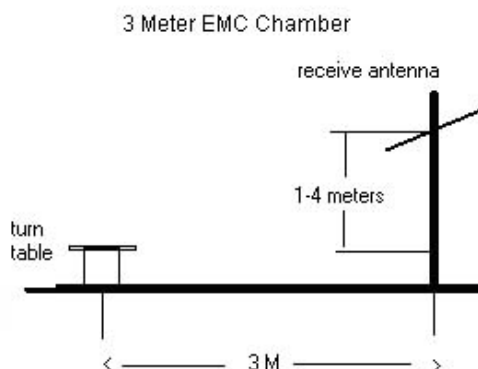


Figure 6-5. Test Instrument & Measurement Setup

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.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery Cover	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	Ant. Pol. [H/V]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	Standard	1 / 0	18.31	2.47	V	20.78	34.77	-13.99
782.00	5	QPSK	Standard	1 / 0	18.21	2.51	V	20.72	34.77	-14.05
784.50	5	QPSK	Standard	1 / 0	17.91	2.56	V	20.47	34.77	-14.30
779.50	5	16QAM	Standard	1 / 0	17.18	2.47	V	19.65	34.77	-15.12
782.00	5	16QAM	Standard	1 / 0	16.83	2.51	V	19.34	34.77	-15.43
784.50	5	16QAM	Standard	1 / 0	16.47	2.56	V	19.03	34.77	-15.74
782.00	10	QPSK	Standard	1 / 0	18.37	2.51	V	20.88	34.77	-13.89
782.00	10	16QAM	Standard	1 / 0	17.27	2.51	V	19.78	34.77	-14.99
782.00	10	QPSK	WCC	1 / 0	17.43	2.51	V	19.94	34.77	-14.83

Table 6-2. ERP Data (Band 13)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 109 of 135

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery Cover	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	Ant. Pol. [H/V]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	Standard	1 / 5	15.89	2.98	V	18.87	38.45	-19.58
836.50	1.4	QPSK	Standard	1 / 0	16.21	3.04	V	19.25	38.45	-19.20
848.30	1.4	QPSK	Standard	1 / 0	16.01	3.10	V	19.11	38.45	-19.34
824.70	1.4	16-QAM	Standard	1 / 5	15.01	2.98	V	17.99	38.45	-20.46
836.50	1.4	16-QAM	Standard	1 / 0	14.89	3.04	V	17.93	38.45	-20.52
848.30	1.4	16-QAM	Standard	1 / 0	14.64	3.10	V	17.74	38.45	-20.71
825.50	3	QPSK	Standard	1 / 14	16.31	2.98	V	19.29	38.45	-19.16
836.50	3	QPSK	Standard	1 / 0	16.21	3.04	V	19.25	38.45	-19.20
847.50	3	QPSK	Standard	1 / 0	15.34	3.10	V	18.44	38.45	-20.01
825.50	3	16-QAM	Standard	1 / 14	15.09	2.98	V	18.07	38.45	-20.38
836.50	3	16-QAM	Standard	1 / 0	14.95	3.04	V	17.99	38.45	-20.46
847.50	3	16-QAM	Standard	1 / 0	14.80	3.10	V	17.90	38.45	-20.55
826.50	5	QPSK	Standard	1 / 24	16.31	2.99	V	19.30	38.45	-19.15
836.50	5	QPSK	Standard	1 / 0	16.15	3.04	V	19.19	38.45	-19.26
846.50	5	QPSK	Standard	1 / 0	16.01	3.09	V	19.10	38.45	-19.35
826.50	5	16-QAM	Standard	1 / 24	15.96	2.99	V	18.95	38.45	-19.50
836.50	5	16-QAM	Standard	1 / 0	14.92	3.04	V	17.96	38.45	-20.49
846.50	5	16-QAM	Standard	1 / 0	14.97	3.09	V	18.06	38.45	-20.39
829.00	10	QPSK	Standard	1 / 0	16.71	3.00	V	19.71	38.45	-18.74
836.50	10	QPSK	Standard	1 / 0	16.43	3.04	V	19.47	38.45	-18.98
844.00	10	QPSK	Standard	1 / 0	15.79	3.08	V	18.87	38.45	-19.58
829.00	10	16-QAM	Standard	1 / 0	15.50	3.00	V	18.50	38.45	-19.95
836.50	10	16-QAM	Standard	1 / 0	15.59	3.04	V	18.63	38.45	-19.82
844.00	10	16-QAM	Standard	1 / 0	14.82	3.08	V	17.90	38.45	-20.55
829.00	10	QPSK	WCC	1 / 0	16.48	3.00	V	19.48	38.45	-18.97

Table 6-3. ERP Data (Band 5)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 110 of 135

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery Cover	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	Standard	1 / 5	11.59	9.28	V	20.87	30.00	-9.13
1732.50	1.4	QPSK	Standard	1 / 0	11.85	9.00	V	20.85	30.00	-9.15
1754.30	1.4	QPSK	Standard	1 / 0	10.58	8.72	V	19.30	30.00	-10.70
1710.70	1.4	16-QAM	Standard	1 / 0	11.18	9.28	V	20.46	30.00	-9.54
1732.50	1.4	16-QAM	Standard	1 / 0	11.57	9.00	V	20.57	30.00	-9.43
1754.30	1.4	16-QAM	Standard	1 / 0	10.87	8.72	V	19.59	30.00	-10.41
1711.50	3	QPSK	Standard	1 / 14	12.80	9.27	V	22.07	30.00	-7.93
1732.50	3	QPSK	Standard	1 / 0	11.70	9.00	V	20.70	30.00	-9.30
1753.50	3	QPSK	Standard	1 / 0	10.40	8.73	V	19.13	30.00	-10.87
1711.50	3	16-QAM	Standard	1 / 14	12.62	9.27	V	21.89	30.00	-8.11
1732.50	3	16-QAM	Standard	1 / 0	11.55	9.00	V	20.55	30.00	-9.45
1753.50	3	16-QAM	Standard	1 / 0	10.72	8.73	V	19.45	30.00	-10.55
1712.50	5	QPSK	Standard	1 / 0	12.12	9.26	V	21.38	30.00	-8.62
1732.50	5	QPSK	Standard	1 / 0	11.54	9.00	V	20.54	30.00	-9.46
1752.50	5	QPSK	Standard	1 / 0	10.88	8.74	V	19.62	30.00	-10.38
1712.50	5	16-QAM	Standard	1 / 0	11.68	9.26	V	20.94	30.00	-9.06
1732.50	5	16-QAM	Standard	1 / 0	11.46	9.00	V	20.46	30.00	-9.54
1752.50	5	16-QAM	Standard	1 / 0	10.59	8.74	V	19.33	30.00	-10.67
1715.00	10	QPSK	Standard	1 / 0	12.71	9.22	V	21.93	30.00	-8.07
1732.50	10	QPSK	Standard	1 / 0	11.52	9.00	V	20.52	30.00	-9.48
1750.00	10	QPSK	Standard	1 / 0	11.06	8.77	V	19.83	30.00	-10.17
1715.00	10	16-QAM	Standard	1 / 0	12.27	9.22	V	21.49	30.00	-8.51
1732.50	10	16-QAM	Standard	1 / 0	11.94	9.00	V	20.94	30.00	-9.06
1750.00	10	16-QAM	Standard	1 / 0	11.14	8.77	V	19.91	30.00	-10.09
1717.50	15	QPSK	Standard	1 / 0	11.95	9.19	V	21.14	30.00	-8.86
1732.50	15	QPSK	Standard	1 / 0	11.24	9.00	V	20.24	30.00	-9.76
1747.50	15	QPSK	Standard	1 / 0	11.20	8.80	V	20.00	30.00	-10.00
1717.50	15	16-QAM	Standard	1 / 0	11.58	9.19	V	20.77	30.00	-9.23
1732.50	15	16-QAM	Standard	1 / 0	11.39	9.00	V	20.39	30.00	-9.61
1747.50	15	16-QAM	Standard	1 / 0	11.36	8.80	V	20.16	30.00	-9.84
1720.00	20	QPSK	Standard	1 / 0	13.47	9.16	V	22.63	30.00	-7.37
1732.50	20	QPSK	Standard	1 / 0	12.06	9.00	V	21.06	30.00	-8.94
1745.00	20	QPSK	Standard	1 / 0	11.86	8.83	V	20.69	30.00	-9.31
1720.00	20	16-QAM	Standard	1 / 0	12.89	9.16	V	22.05	30.00	-7.95
1732.50	20	16-QAM	Standard	1 / 0	11.58	9.00	V	20.58	30.00	-9.42
1745.00	20	16-QAM	Standard	1 / 0	10.60	8.83	V	19.43	30.00	-10.57
1720.00	20	QPSK	WCC	1 / 0	12.39	7.01	V	19.40	30.00	-10.60

Table 6-4. EIRP Data (Band 4)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 111 of 135

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery Cover	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	Standard	1 / 5	13.81	8.34	V	22.15	33.01	-10.86
1880.00	1.4	QPSK	Standard	1 / 0	14.00	8.46	V	22.46	33.01	-10.55
1909.30	1.4	QPSK	Standard	1 / 5	13.11	8.64	V	21.75	33.01	-11.26
1850.70	1.4	16-QAM	Standard	1 / 5	13.30	8.34	V	21.64	33.01	-11.37
1880.00	1.4	16-QAM	Standard	1 / 5	13.43	8.46	V	21.89	33.01	-11.12
1909.30	1.4	16-QAM	Standard	1 / 0	12.51	8.64	V	21.15	33.01	-11.86
1851.50	3	QPSK	Standard	1 / 14	13.28	8.35	V	21.63	33.01	-11.38
1880.00	3	QPSK	Standard	1 / 0	13.60	8.46	V	22.06	33.01	-10.95
1908.50	3	QPSK	Standard	1 / 14	12.68	8.63	V	21.31	33.01	-11.70
1851.50	3	16-QAM	Standard	1 / 0	12.65	8.35	V	21.00	33.01	-12.01
1880.00	3	16-QAM	Standard	1 / 0	13.42	8.46	V	21.88	33.01	-11.13
1908.50	3	16-QAM	Standard	1 / 0	11.97	8.63	V	20.60	33.01	-12.41
1852.50	5	QPSK	Standard	1 / 0	13.56	8.35	V	21.91	33.01	-11.10
1880.00	5	QPSK	Standard	1 / 0	13.25	8.46	V	21.71	33.01	-11.30
1907.50	5	QPSK	Standard	1 / 24	12.66	8.62	V	21.28	33.01	-11.73
1852.50	5	16-QAM	Standard	1 / 0	13.41	8.35	V	21.76	33.01	-11.25
1880.00	5	16-QAM	Standard	1 / 0	13.30	8.46	V	21.76	33.01	-11.25
1907.50	5	16-QAM	Standard	1 / 0	11.63	8.62	V	20.25	33.01	-12.76
1855.00	10	QPSK	Standard	1 / 0	13.08	8.36	V	21.44	33.01	-11.57
1880.00	10	QPSK	Standard	1 / 0	12.85	8.46	V	21.31	33.01	-11.70
1905.00	10	QPSK	Standard	1 / 0	12.15	8.59	V	20.74	33.01	-12.27
1855.00	10	16-QAM	Standard	1 / 0	12.98	8.36	V	21.34	33.01	-11.67
1880.00	10	16-QAM	Standard	1 / 0	13.24	8.46	V	21.70	33.01	-11.31
1905.00	10	16-QAM	Standard	1 / 0	11.63	8.59	V	20.22	33.01	-12.79
1857.50	15	QPSK	Standard	1 / 0	13.03	8.37	V	21.40	33.01	-11.61
1880.00	15	QPSK	Standard	36 / 18	12.54	8.46	V	21.00	33.01	-12.01
1902.50	15	QPSK	Standard	1 / 0	12.70	8.56	V	21.26	33.01	-11.75
1857.50	15	16-QAM	Standard	1 / 0	12.58	8.37	V	20.95	33.01	-12.06
1880.00	15	16-QAM	Standard	1 / 0	12.78	8.46	V	21.24	33.01	-11.77
1902.50	15	16-QAM	Standard	1 / 0	12.09	8.56	V	20.65	33.01	-12.36
1860.00	20	QPSK	Standard	1 / 0	13.03	8.38	V	21.41	33.01	-11.60
1880.00	20	QPSK	Standard	1 / 0	12.83	8.46	V	21.29	33.01	-11.72
1900.00	20	QPSK	Standard	1 / 0	12.90	8.53	V	21.43	33.01	-11.58
1860.00	20	16-QAM	Standard	1 / 0	13.11	8.38	V	21.49	33.01	-11.52
1880.00	20	16-QAM	Standard	1 / 99	12.55	8.46	V	21.01	33.01	-12.00
1900.00	20	16-QAM	Standard	1 / 0	13.06	8.53	V	21.59	33.01	-11.42
1880.00	1.4	QPSK	WCC	1 / 0	12.93	6.31	V	19.24	33.01	-13.77

Table 6-5. EIRP Data (Band 2)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 112 of 135

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery Cover	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	Standard	1 / 0	10.95	7.09	V	18.04	33.01	-14.97
2535.00	5	QPSK	Standard	1 / 24	10.43	7.26	V	17.69	33.01	-15.32
2567.50	5	QPSK	Standard	1 / 0	10.93	7.42	V	18.35	33.01	-14.66
2502.50	5	16-QAM	Standard	1 / 0	10.43	7.09	V	17.52	33.01	-15.49
2535.00	5	16-QAM	Standard	1 / 24	9.70	7.26	V	16.96	33.01	-16.05
2567.50	5	16-QAM	Standard	1 / 0	10.01	7.42	V	17.43	33.01	-15.58
2505.00	10	QPSK	Standard	1 / 0	11.42	7.10	V	18.52	33.01	-14.49
2535.00	10	QPSK	Standard	1 / 49	10.88	7.26	V	18.14	33.01	-14.87
2565.00	10	QPSK	Standard	1 / 0	10.39	7.41	V	17.80	33.01	-15.21
2505.00	10	16-QAM	Standard	1 / 0	10.15	7.10	V	17.25	33.01	-15.76
2535.00	10	16-QAM	Standard	1 / 0	10.17	7.26	V	17.43	33.01	-15.58
2565.00	10	16-QAM	Standard	1 / 0	9.41	7.41	V	16.82	33.01	-16.19
2507.50	15	QPSK	Standard	1 / 0	10.35	7.12	V	17.47	33.01	-15.54
2535.00	15	QPSK	Standard	1 / 74	10.29	7.26	V	17.55	33.01	-15.46
2562.50	15	QPSK	Standard	1 / 0	10.33	7.39	V	17.72	33.01	-15.29
2507.50	15	16-QAM	Standard	1 / 0	9.32	7.12	V	16.44	33.01	-16.57
2535.00	15	16-QAM	Standard	1 / 74	9.71	7.26	V	16.97	33.01	-16.04
2562.50	15	16-QAM	Standard	1 / 0	9.43	7.39	V	16.82	33.01	-16.19
2510.00	20	QPSK	Standard	1 / 0	10.41	7.13	V	17.54	33.01	-15.47
2535.00	20	QPSK	Standard	1 / 0	11.20	7.26	V	18.46	33.01	-14.55
2560.00	20	QPSK	Standard	1 / 0	10.08	7.38	V	17.46	33.01	-15.55
2510.00	20	16-QAM	Standard	1 / 0	10.79	7.13	V	17.92	33.01	-15.09
2535.00	20	16-QAM	Standard	1 / 0	9.94	7.26	V	17.20	33.01	-15.81
2560.00	20	16-QAM	Standard	1 / 0	8.68	7.38	V	16.06	33.01	-16.95
2505.00	10	QPSK	WCP	1 / 0	10.52	4.95	V	15.47	33.01	-17.54

Table 6-6. EIRP Data (Band 7)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset	Page 113 of 135

6.7 Radiated Spurious Emissions Measurements

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

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 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 v02r02 – Section 5.8

ANSI/TIA-603-C-2004 – Section 2.2.12

Test Settings

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

Test Setup

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

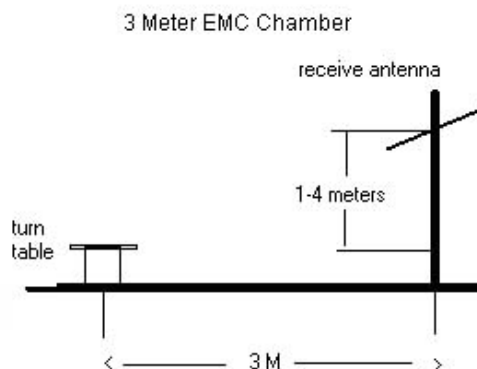


Figure 6-6. Test Instrument & Measurement Setup

FCC ID: ZNFVS990	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 114 of 135

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.

OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MEASURED OUTPUT POWER: 20.88 dBm = 0.123 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.88 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
2346.00	-65.00	7.24	-57.76	V	78.6
3128.00	-62.11	7.27	-54.84	V	75.7
3910.00	-60.01	7.18	-52.83	V	73.7

Table 6-7. Radiated Spurious Data (Band 13 – Mid Channel)

OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MEASURED OUTPUT POWER: 20.88 dBm = 0.123 W
 MODULATION SIGNAL: QPSK
 DISTANCE: 3 meters
 NARROWBAND EMISSION LIMIT: -50 dBm
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	Margin [dB]
1564.00	-67.16	6.48	-60.68	V	-20.7

Table 6-8. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)				Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset			Page 115 of 135

OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MEASURED OUTPUT POWER: 19.94 dBm = 0.099 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.94 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
2346.00	-61.96	7.24	-54.72	V	74.7
3128.00	-63.05	7.27	-55.78	V	75.7
3910.00	-60.55	7.18	-53.37	V	73.3

Table 6-9. Radiated Spurious Data with WCP (Band 13 – Mid Channel)

OPERATING FREQUENCY: 829.00 MHz
 CHANNEL: 20450
 MEASURED OUTPUT POWER: 19.71 dBm = 0.094 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.71 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1658.00	-61.04	3.56	-57.48	V	77.2
2487.00	-51.67	3.52	-48.15	V	67.9
3316.00	-58.77	5.68	-53.08	V	72.8

Table 6-10. Radiated Spurious Data (Band 5 – Low Channel)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)				Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset			Page 116 of 135

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MEASURED OUTPUT POWER: 19.47 dBm = 0.089 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.47 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1673.00	-60.52	3.50	-57.02	V	76.5
2509.50	-51.96	3.53	-48.42	V	67.9
3346.00	-59.06	5.77	-53.29	V	72.8

Table 6-11. Radiated Spurious Data (Band 5 – Mid Channel)

OPERATING FREQUENCY: 844.00 MHz
 CHANNEL: 20600
 MEASURED OUTPUT POWER: 18.87 dBm = 0.077 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 31.87 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1688.00	-58.62	3.44	-55.19	V	74.1
2532.00	-54.10	3.58	-50.52	V	69.4
3376.00	-59.22	5.85	-53.37	V	72.2

Table 6-12. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: ZNFVS990		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 117 of 135

OPERATING FREQUENCY: 829.00 MHz
 CHANNEL: 20450
 MEASURED OUTPUT POWER: 16.62 dBm = 0.046 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 29.62 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1658.00	-61.03	3.50	-57.53	V	74.2
2487.00	-57.82	3.53	-54.28	V	70.9

Table 6-13. Radiated Spurious Data with WCP (Band 5 – Low Channel)

OPERATING FREQUENCY: 1720.00 MHz
 CHANNEL: 20050
 MEASURED OUTPUT POWER: 22.63 dBm = 0.183 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.63 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3440.00	-54.46	8.20	-46.26	V	68.9
5160.00	-56.32	10.29	-46.03	V	68.7
6880.00	-57.74	11.42	-46.32	V	68.9
8600.00	-57.67	13.03	-44.64	V	67.3

Table 6-14. Radiated Spurious Data (Band 4 – Low Channel)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)				Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 21.06 dBm = 0.128 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.06 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3465.00	-54.33	8.28	-46.04	V	67.1
5197.50	-54.18	10.32	-43.86	V	64.9
6930.00	-56.92	11.48	-45.44	V	66.5

Table 6-15. Radiated Spurious Data (Band 4 – Mid Channel)

OPERATING FREQUENCY: 1745.00 MHz
 CHANNEL: 20300
 MEASURED OUTPUT POWER: 20.69 dBm = 0.117 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.69 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3490.00	-58.03	8.37	-49.66	V	70.4
5235.00	-56.31	10.33	-45.98	V	66.7
6980.00	-56.73	11.52	-45.21	V	65.9

Table 6-16. Radiated Spurious Data (Band 4 – High Channel)

OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 20.58 dBm = 0.114 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.58 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3465.00	-55.31	8.20	-47.11	V	67.7
5197.50	-57.15	10.29	-46.86	V	67.4
6930.00	-56.95	11.42	-45.53	V	66.1
8662.50	-57.79	13.03	-44.76	V	65.3

Table 6-17. Radiated Spurious Data with WCP (Band 4 – Mid Channel)

OPERATING FREQUENCY: 1850.70 MHz
 CHANNEL: 18607
 MEASURED OUTPUT POWER: 22.15 dBm = 0.164 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.15 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3701.40	-55.17	8.39	-46.78	V	68.9
5552.10	-49.57	10.55	-39.03	V	61.2
7402.80	-57.35	12.04	-45.32	V	67.5
9253.50	-56.64	13.22	-43.42	V	65.6

Table 6-18. Radiated Spurious Data with WCP (Band 2 – Low Channel)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MEASURED OUTPUT POWER: 22.46 dBm = 0.176 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.46 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3760.00	-54.75	8.38	-46.38	V	68.8
5640.00	-52.66	10.70	-41.96	V	64.4
7520.00	-57.06	12.09	-44.97	V	67.4
9400.00	-56.99	13.20	-43.79	V	66.3

Table 6-19. Radiated Spurious Data with WCP (Band 2 – Mid Channel)

OPERATING FREQUENCY: 1909.30 MHz
 CHANNEL: 19193
 MEASURED OUTPUT POWER: 21.75 dBm = 0.150 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.75 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3818.60	-48.19	8.38	-39.82	V	61.6
5727.90	-57.14	10.70	-46.44	V	68.2
7637.20	-56.69	12.09	-44.60	V	66.3
9546.50	-56.52	13.20	-43.32	V	65.1
11455.80	-53.78	13.30	-40.48	V	62.2
13365.10	-53.33	13.56	-39.78	V	61.5

Table 6-20. Radiated Spurious Data with WCP (Band 2 – High Channel)

FCC ID: ZNFVS990	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
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OPERATING FREQUENCY: 2505.00 MHz
 CHANNEL: 20800
 MEASURED OUTPUT POWER: 18.52 dBm = 0.071 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W) =$ 43.52 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
5010.00	-53.76	10.16	-43.61	V	62.1
7515.00	-41.43	12.09	-29.35	V	47.9
10020.00	-47.34	13.27	-34.08	V	52.6
12525.00	-51.93	13.18	-38.75	V	57.3
15030.00	-50.01	14.10	-35.91	V	54.4
17535.00	-47.31	13.81	-33.50	V	52.0

Table 6-21. Radiated Spurious Data (Band 7 – Low Channel)

OPERATING FREQUENCY: 2535.00 MHz
 CHANNEL: 21100
 MEASURED OUTPUT POWER: 18.14 dBm = 0.065 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W) =$ 43.14 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
5070.00	-53.69	10.20	-43.49	V	61.6
7605.00	-40.94	12.17	-28.78	V	46.9
10140.00	-53.11	13.30	-39.81	V	57.9
12675.00	-53.08	13.17	-39.91	V	58.0
15210.00	-50.03	13.97	-36.05	V	54.2
17745.00	-48.65	13.86	-34.79	V	52.9

Table 6-22. Radiated Spurious Data (Band 7 – Mid Channel)

FCC ID: ZNFVS990		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 2565.00 MHz
 CHANNEL: 21400
 MEASURED OUTPUT POWER: 17.80 dBm = 0.060 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10} (W) =$ 42.80 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
5130.00	-55.93	10.25	-45.68	V	63.5
7695.00	-57.00	12.26	-44.74	V	62.5
10260.00	-55.19	13.29	-41.90	V	59.7
12825.00	-53.12	13.27	-39.85	V	57.6

Table 6-23. Radiated Spurious Data (Band 7 – High Channel)

OPERATING FREQUENCY: 2535.00 MHz
 CHANNEL: 21100
 MEASURED OUTPUT POWER: 18.14 dBm = 0.065 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10} (W) =$ 43.14 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
5070.00	-58.46	10.16	-48.31	V	66.4
7605.00	-51.62	12.09	-39.54	V	57.7
10140.00	-54.60	13.27	-41.34	V	59.5
12675.00	-52.51	13.18	-39.33	V	57.5
15210.00	-52.32	14.10	-38.22	V	56.4

Table 6-24. Radiated Spurious Data with WCP (Band 7 – Mid Channel)

FCC ID: ZNFVS990		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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6.8 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-C-2004. 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-C-2004

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 13 Frequency Stability Measurements

§2.1055 §27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	781,999,915	-85	-0.0000109
100 %		- 30	781,999,932	-68	-0.0000087
100 %		- 20	782,000,044	44	0.0000056
100 %		- 10	781,999,770	-230	-0.0000294
100 %		0	781,999,541	-459	-0.0000587
100 %		+ 10	782,000,159	159	0.0000203
100 %		+ 20	782,000,039	39	0.0000050
100 %		+ 30	781,999,788	-212	-0.0000271
100 %		+ 40	781,999,785	-215	-0.0000275
100 %		+ 50	781,999,541	-459	-0.0000587
BATT. ENDPOINT	3.45	+ 20	781,999,902	-98	-0.0000125

Table 6-25. Frequency Stability Data (Band 13)

Note:

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

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Band 13 Frequency Stability Measurements

§2.1055 §27.54

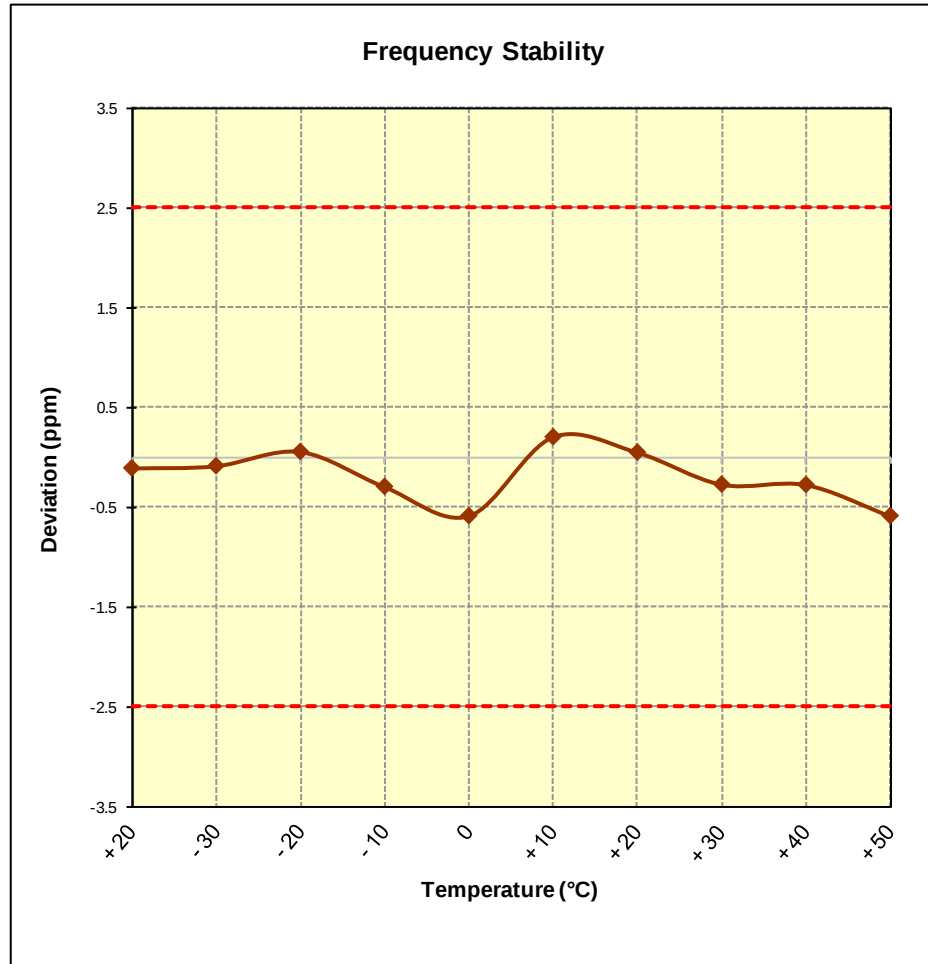


Figure 6-7. Frequency Stability Graph (Band 13)

FCC ID: ZNFVS990		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

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)	836,499,589	-411	-0.0000491
100 %		- 30	836,500,151	151	0.0000181
100 %		- 20	836,500,187	187	0.0000224
100 %		- 10	836,500,030	30	0.0000036
100 %		0	836,500,049	49	0.0000059
100 %		+ 10	836,500,300	300	0.0000359
100 %		+ 20	836,500,258	258	0.0000308
100 %		+ 30	836,500,043	43	0.0000051
100 %		+ 40	836,499,696	-304	-0.0000363
100 %		+ 50	836,499,959	-41	-0.0000049
BATT. ENDPOINT	3.45	+ 20	836,499,806	-194	-0.0000232

Table 6-26. Frequency Stability Data (Band 5)

FCC ID: ZNFVS990	 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

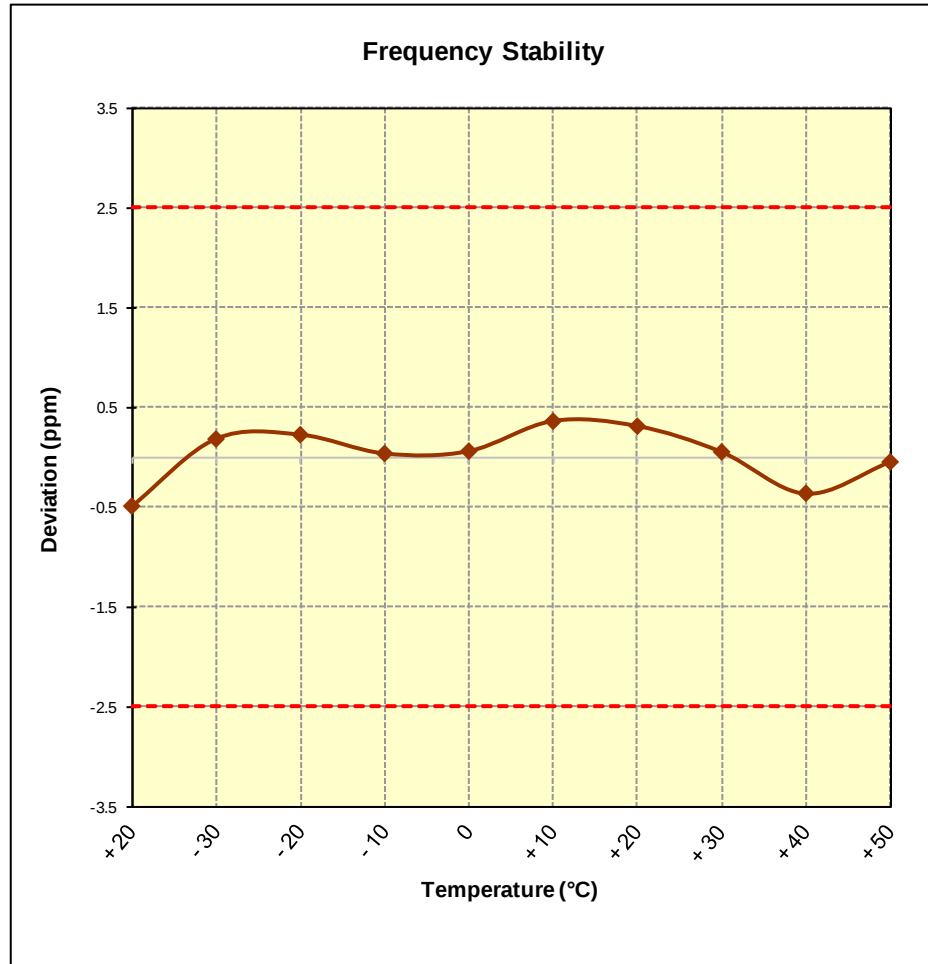


Figure 6-8. Frequency Stability Graph (Band 5)

FCC ID: ZNFVS990		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 4 Frequency Stability Measurements

§2.1055 §27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,500,317	317	0.0000183
100 %		- 30	1,732,500,079	79	0.0000046
100 %		- 20	1,732,499,766	-234	-0.0000135
100 %		- 10	1,732,500,059	59	0.0000034
100 %		0	1,732,500,116	116	0.0000067
100 %		+ 10	1,732,500,064	64	0.0000037
100 %		+ 20	1,732,500,082	82	0.0000047
100 %		+ 30	1,732,499,840	-160	-0.0000092
100 %		+ 40	1,732,500,091	91	0.0000053
100 %		+ 50	1,732,499,791	-209	-0.0000121
BATT. ENDPOINT	3.45	+ 20	1,732,499,943	-57	-0.0000033

Table 6-27. Frequency Stability Data (Band 4)

Note:

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

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Band 4 Frequency Stability Measurements

§2.1055 §§27.54

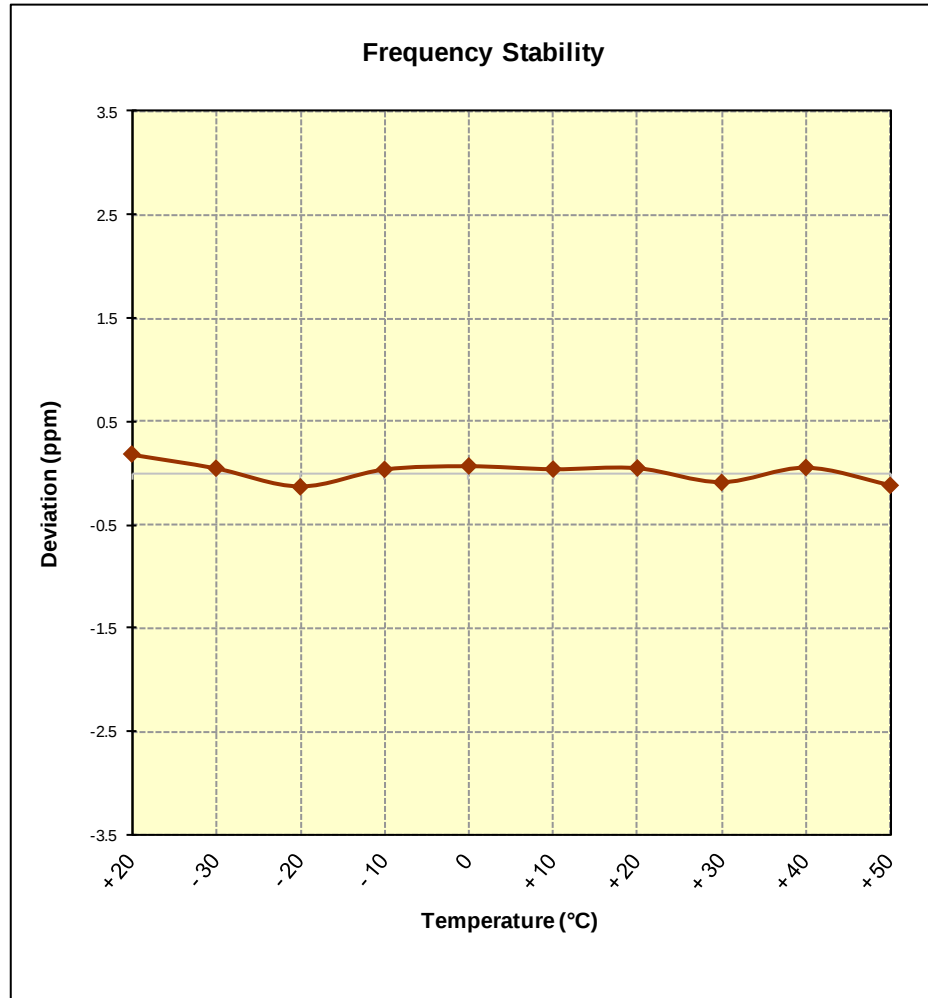


Figure 6-9. Frequency Stability Graph (Band 4)

FCC ID: ZNFVS990	 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

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,840	-160	-0.0000085
100 %		- 30	1,880,000,065	65	0.0000035
100 %		- 20	1,880,000,004	4	0.0000002
100 %		- 10	1,879,999,988	-12	-0.0000006
100 %		0	1,880,000,162	162	0.0000086
100 %		+ 10	1,880,000,042	42	0.0000022
100 %		+ 20	1,879,999,902	-98	-0.0000052
100 %		+ 30	1,879,999,946	-54	-0.0000029
100 %		+ 40	1,879,999,980	-20	-0.0000011
100 %		+ 50	1,880,000,179	179	0.0000095
BATT. ENDPOINT	3.45	+ 20	1,879,999,535	-465	-0.0000247

Table 6-28. 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: ZNFVS990	 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

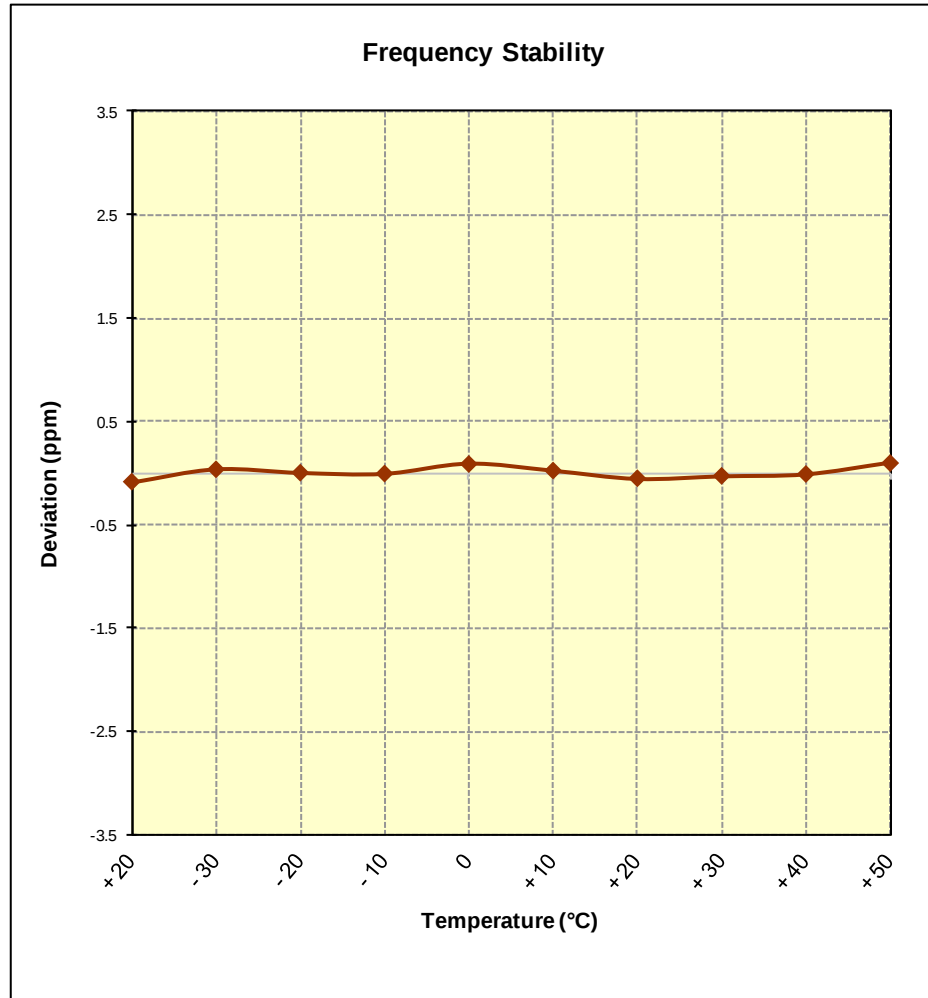


Figure 6-10. Frequency Stability Graph (Band 2)

FCC ID: ZNFVS990		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 7 Frequency Stability Measurements

§2.1055 §27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,535,000,067	67	0.0000026
100 %		- 30	2,534,999,939	-61	-0.0000024
100 %		- 20	2,535,000,258	258	0.0000102
100 %		- 10	2,534,999,751	-249	-0.0000098
100 %		0	2,534,999,649	-351	-0.0000138
100 %		+ 10	2,534,999,529	-471	-0.0000186
100 %		+ 20	2,534,999,625	-375	-0.0000148
100 %		+ 30	2,534,999,897	-103	-0.0000041
100 %		+ 40	2,534,999,904	-96	-0.0000038
100 %		+ 50	2,535,000,030	30	0.0000012
BATT. ENDPOINT	3.45	+ 20	2,535,000,201	201	0.0000079

Table 6-29. Frequency Stability Data (Band 7)

Note:

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

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Band 7 Frequency Stability Measurements

§2.1055 §27.54

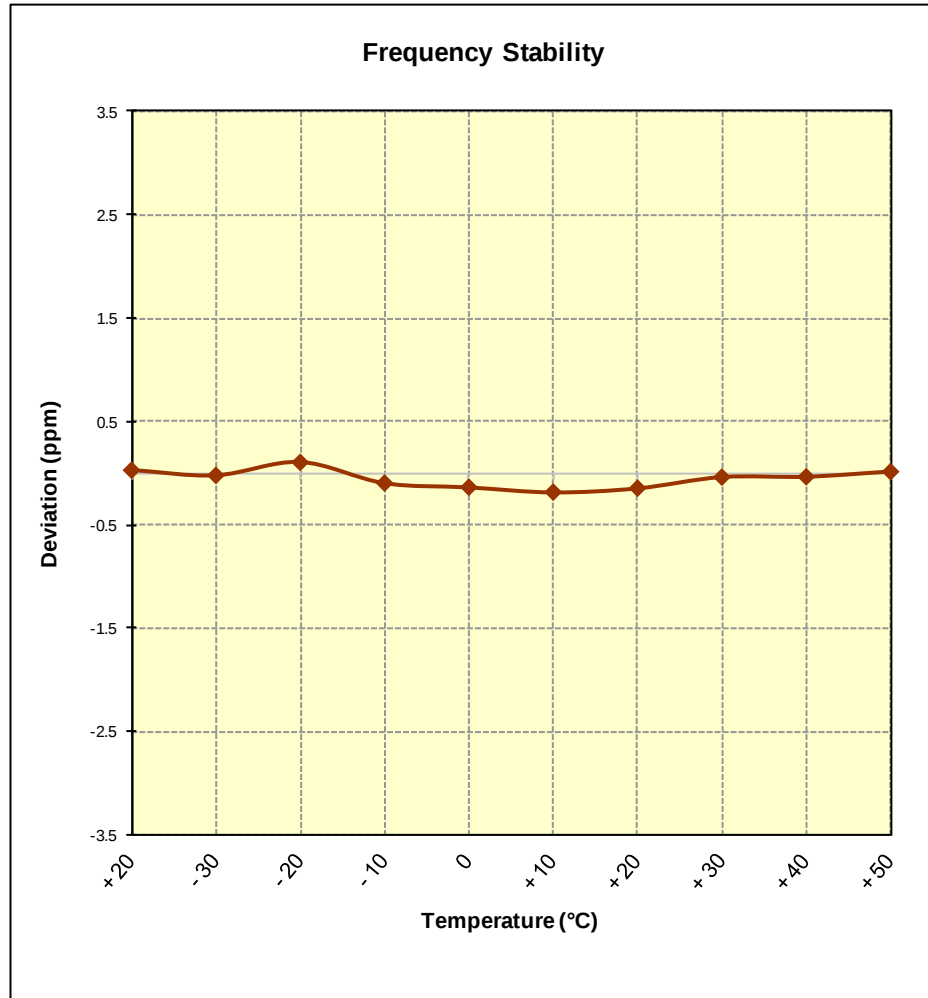


Figure 6-11. Frequency Stability Graph (Band 7)

FCC ID: ZNFVS990		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 134 of 135

7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset** **FCC ID: ZNFVS990** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFVS990		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1508101527.ZNF	Test Dates: 8/10 - 8/25/2015	EUT Type: Portable Handset		Page 135 of 135