

6.4 Band Edge Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) §27.53(g) §27.53(h) §27.53(a.4)

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 $43 + \log_{10}(P_{\text{Watts}})$, where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 30 is $> 43 + 10\log_{10}(P[\text{Watts}]$ at 2300-2305MHz & 2345-2360MHz, $> 55 + 10\log_{10}(P[\text{Watts}])$ at 2320-2324MHz & 2341-2345MHz, $> 61 + 10\log_{10}(P[\text{Watts}])$ at 2324-2328MHz & 2337-2341MHz, $> 67 + 10\log_{10}(P[\text{Watts}])$ at 2288-2292MHz & 2328-2337MHz, and $> 70 + 10\log_{10}(P[\text{Watts}])$ at frequencies $< 2288\text{MHz}$ & $> 2365\text{MHz}$.

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 $\geq 3 \times$ RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times$ Span/RBW
7. Trace mode = max hold
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.

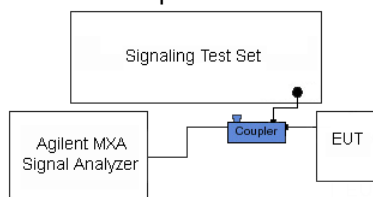


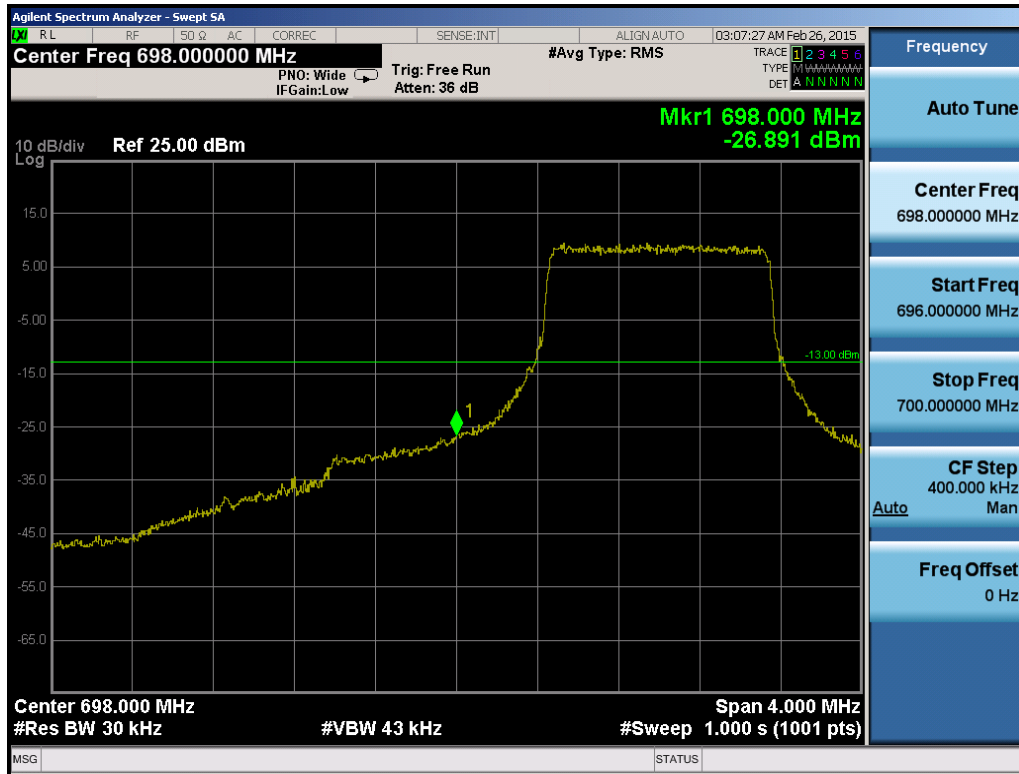
Figure 6-3. Test Instrument & Measurement Setup

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.

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.

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 60 of 142

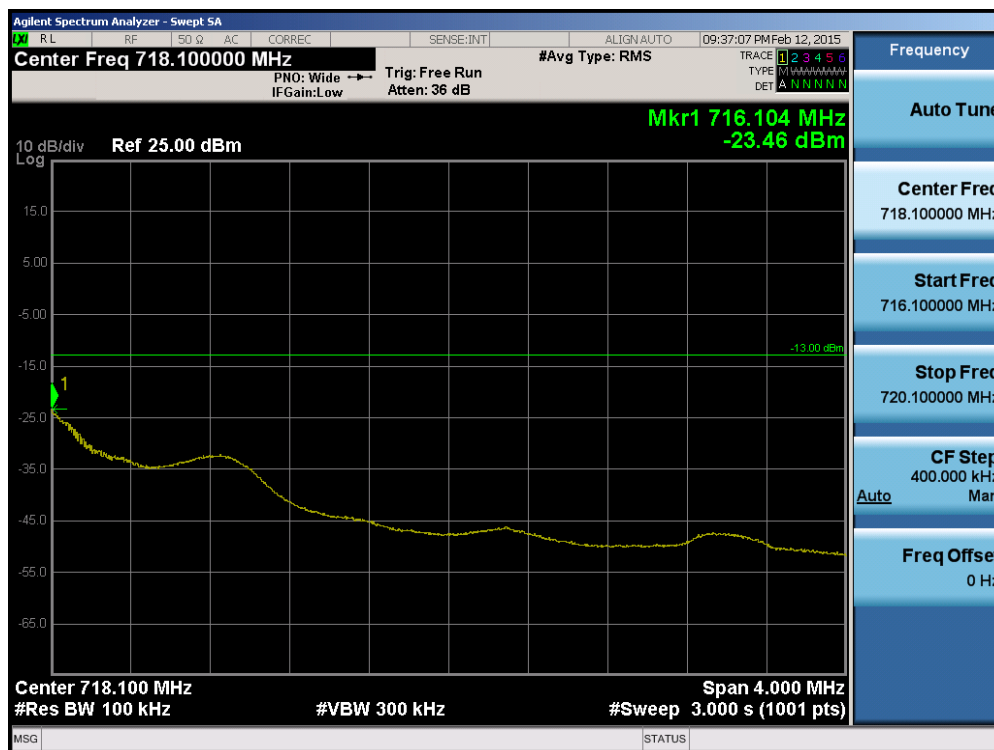
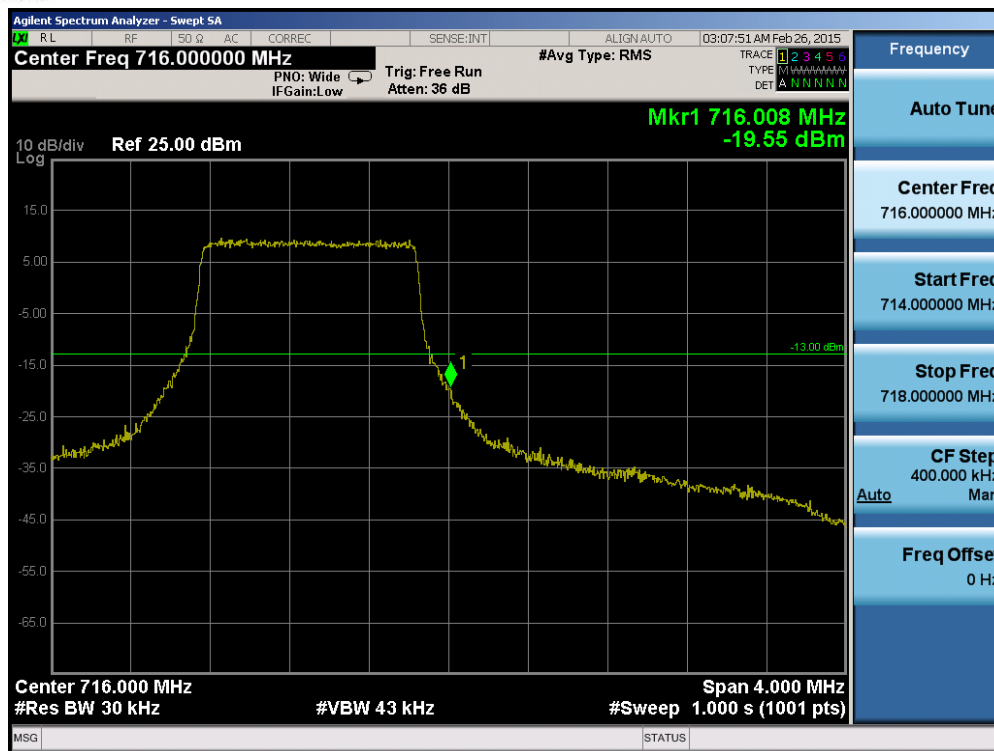


Plot 6-90. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

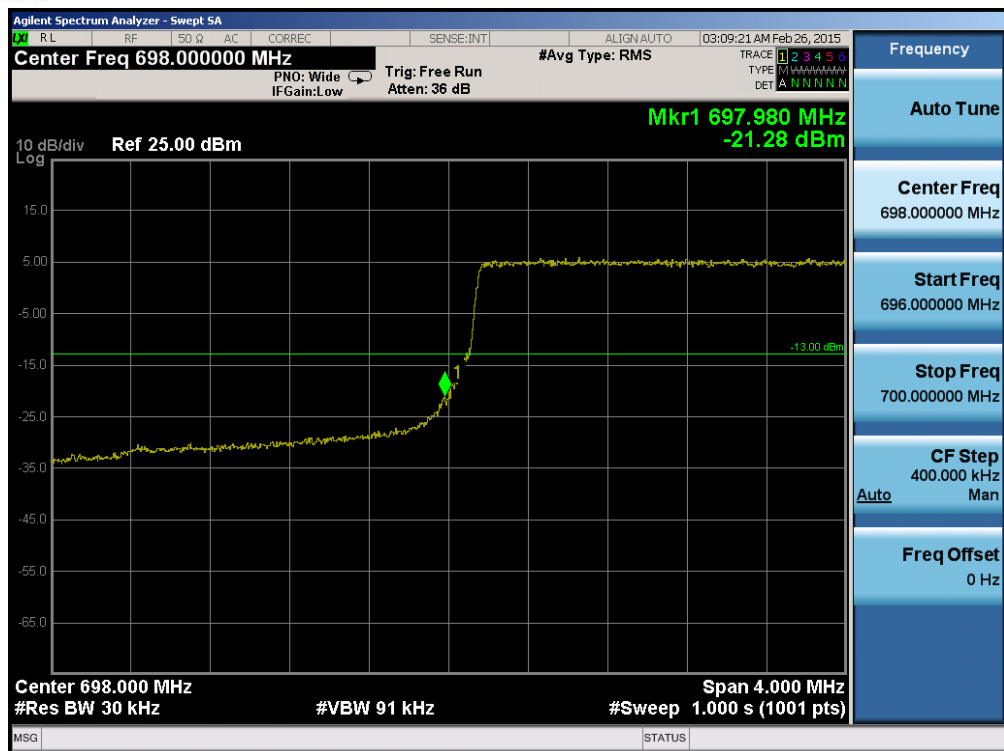


Plot 6-91. Lower Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

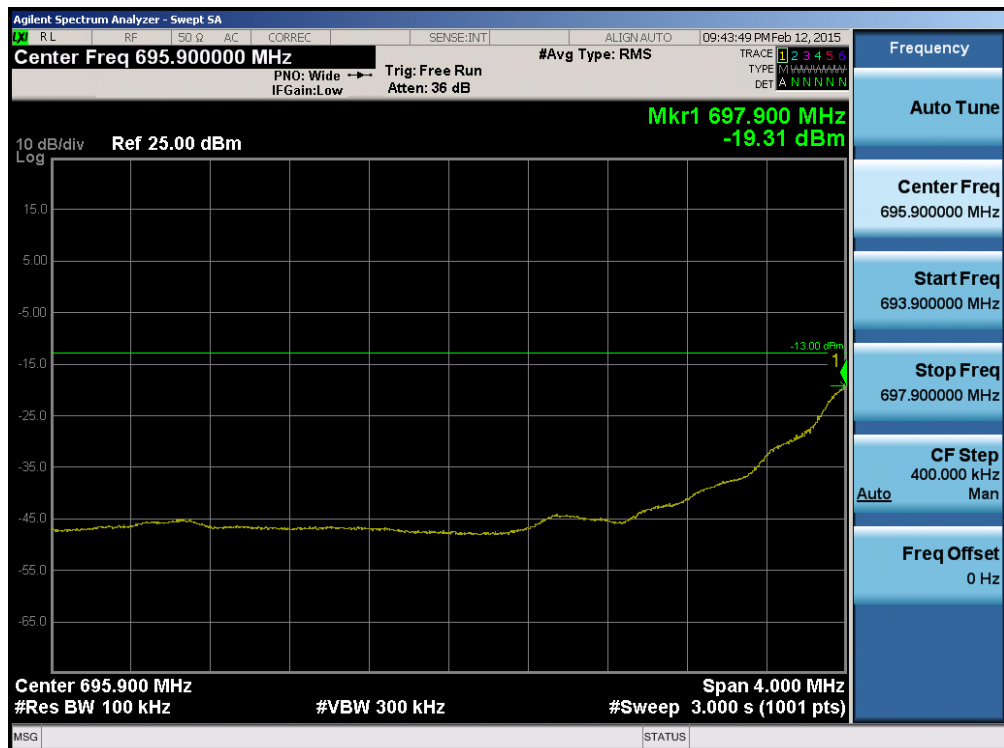
FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 61 of 142



FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 62 of 142

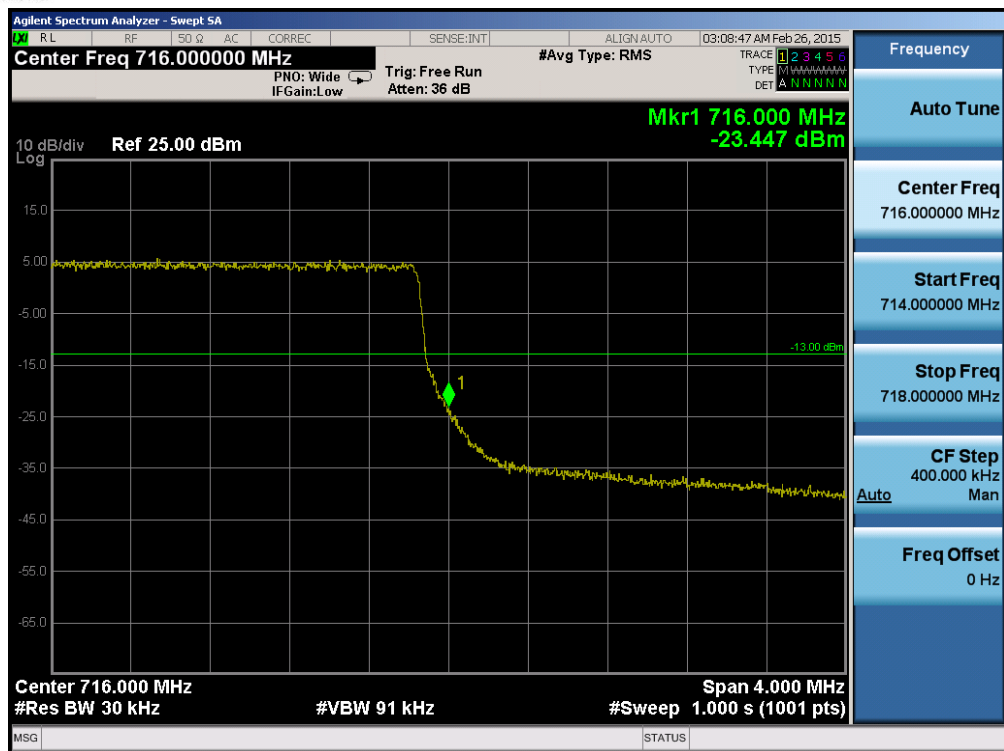


Plot 6-94. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 6-95. Lower Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 63 of 142

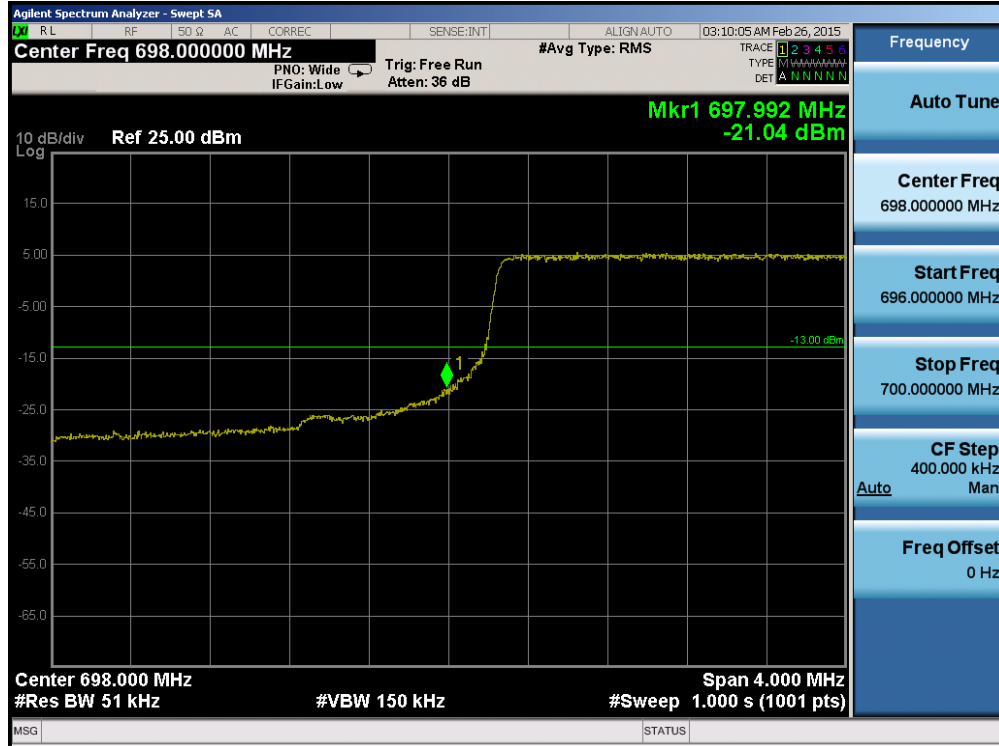


Plot 6-96. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

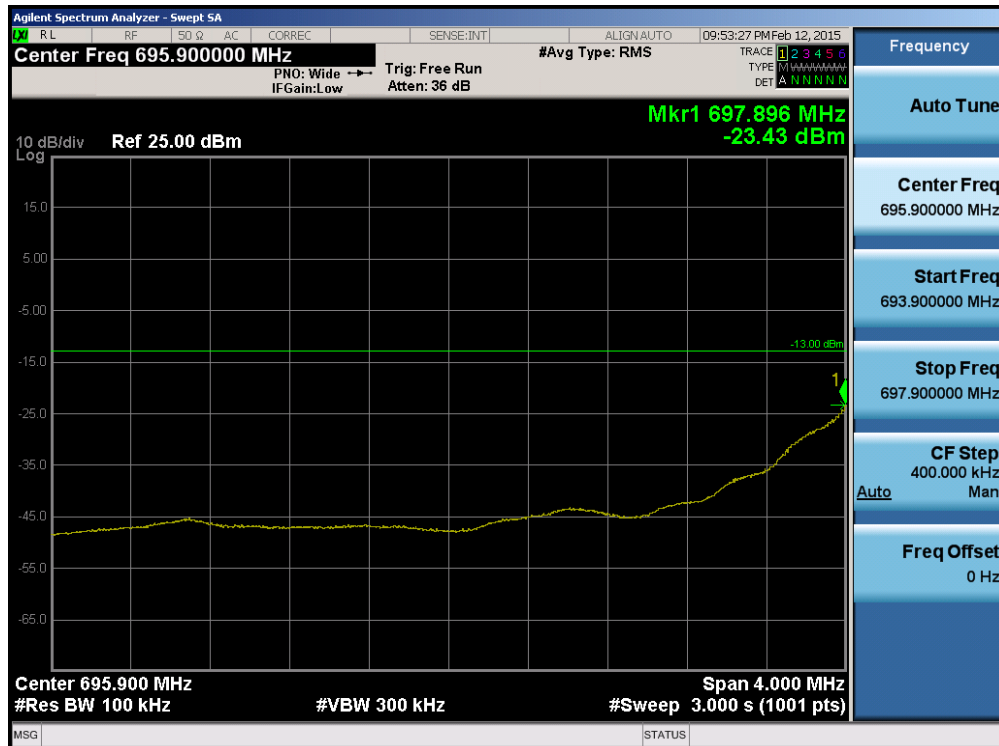


Plot 6-97. Upper Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 64 of 142

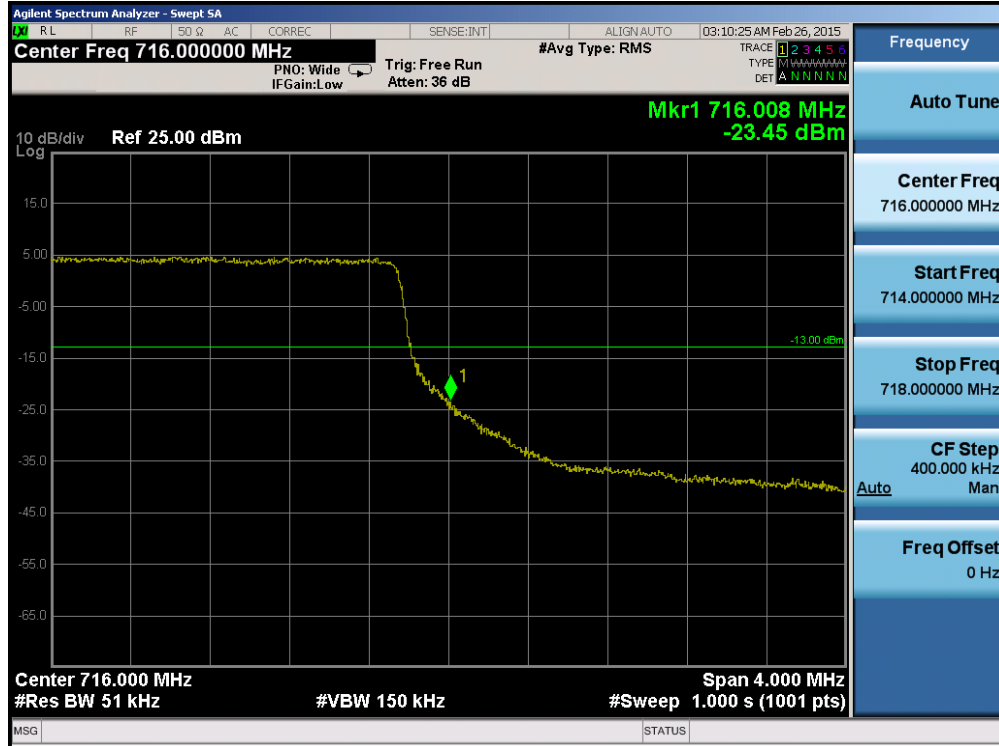


Plot 6-98. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



Plot 6-99. Lower Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 65 of 142

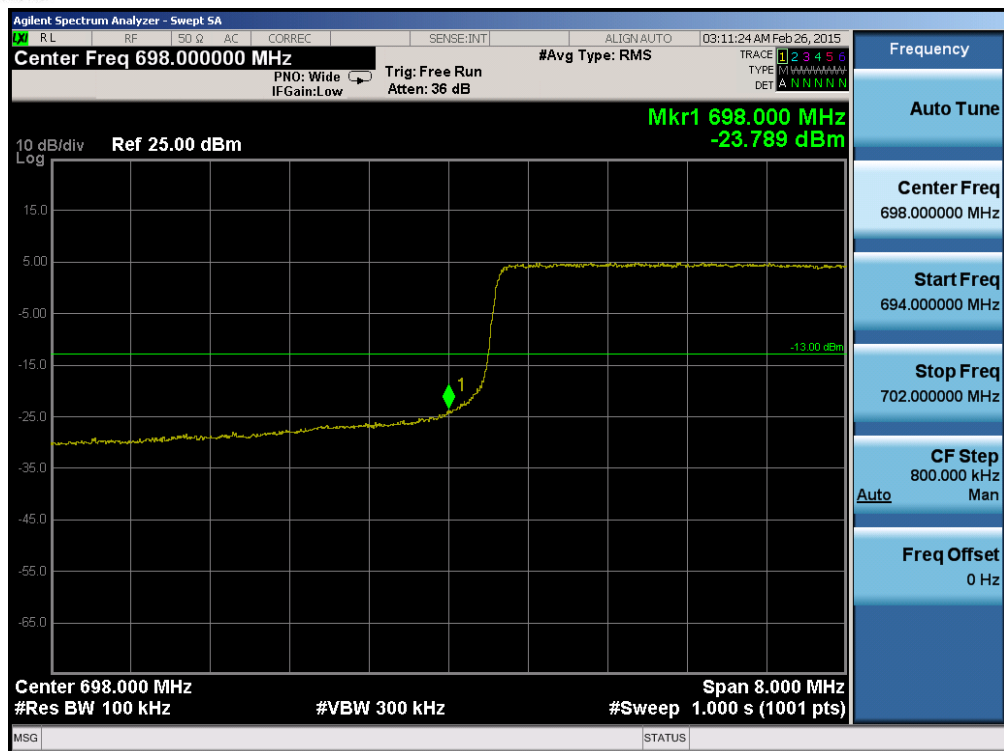


Plot 6-100. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

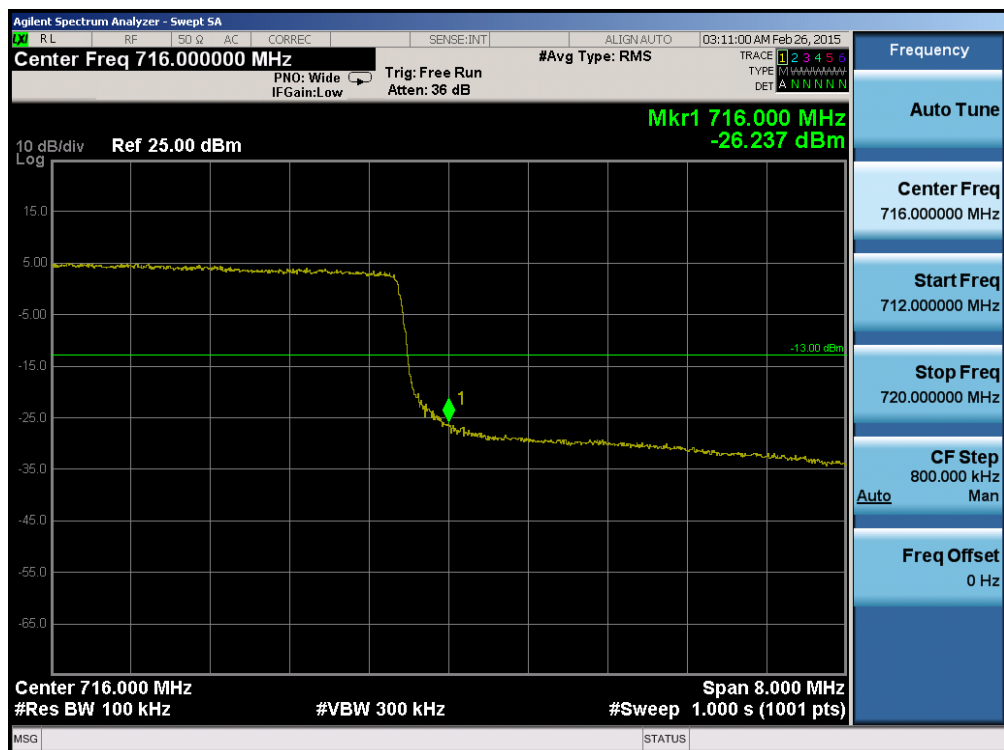


Plot 6-101. Upper Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 66 of 142

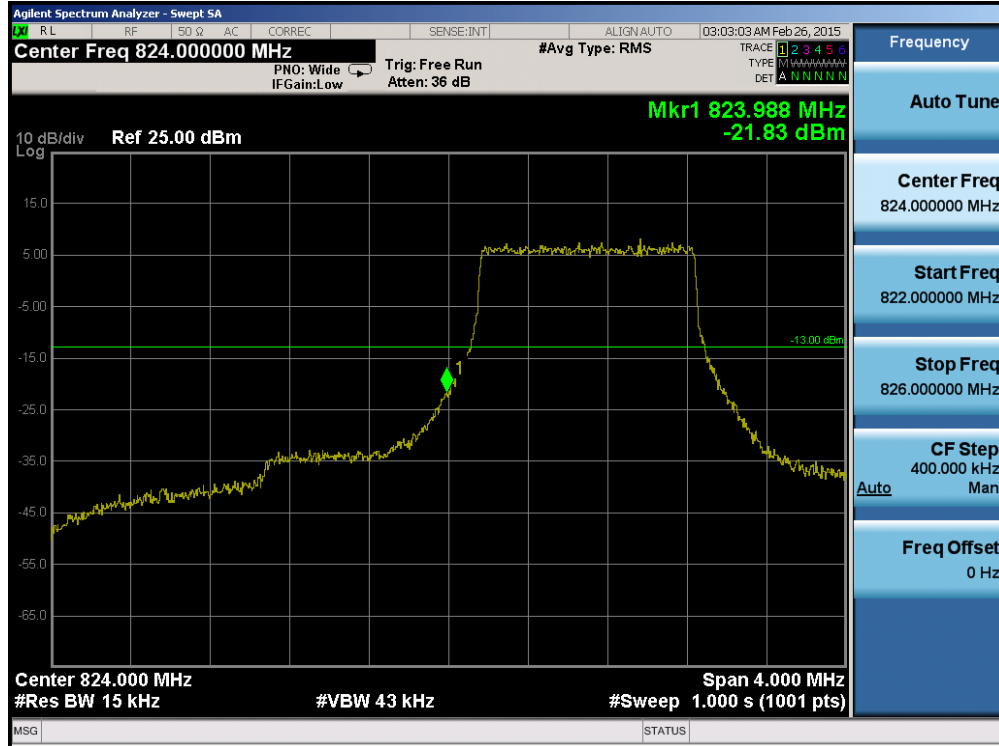


Plot 6-102. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 6-103. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 67 of 142

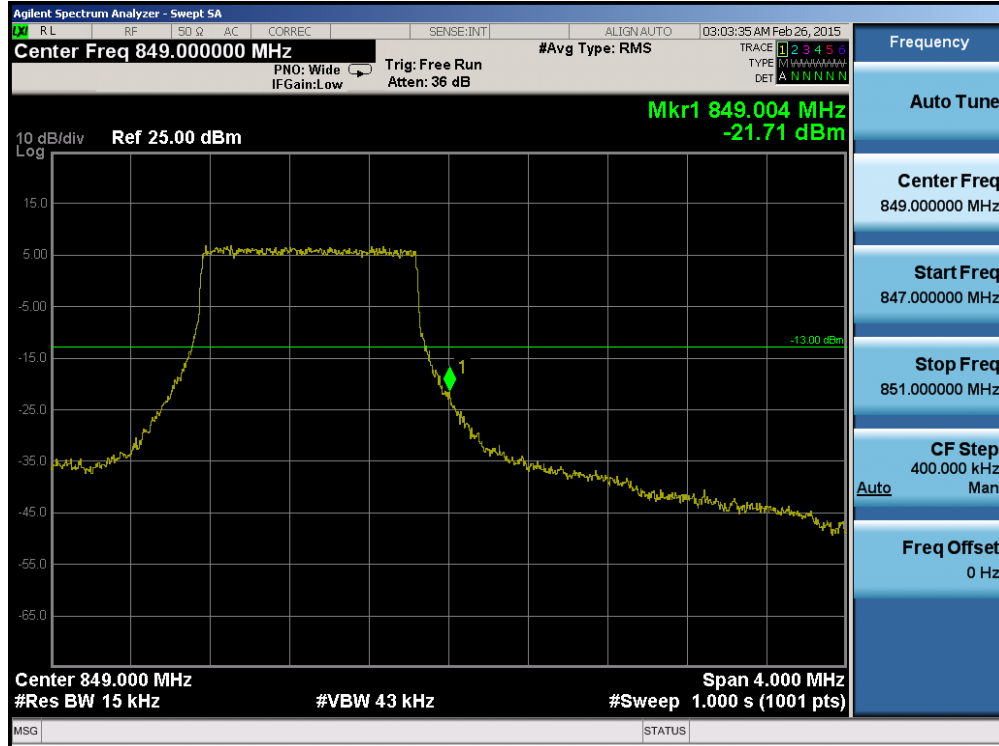


Plot 6-104. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 6-105. Lower Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 68 of 142

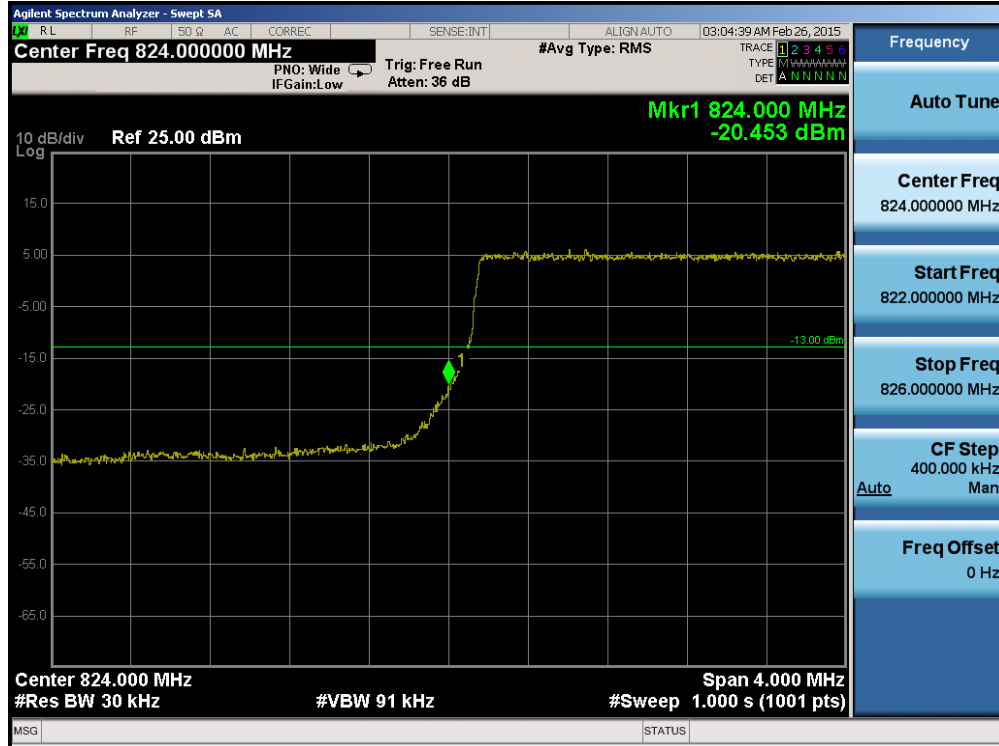


Plot 6-106. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

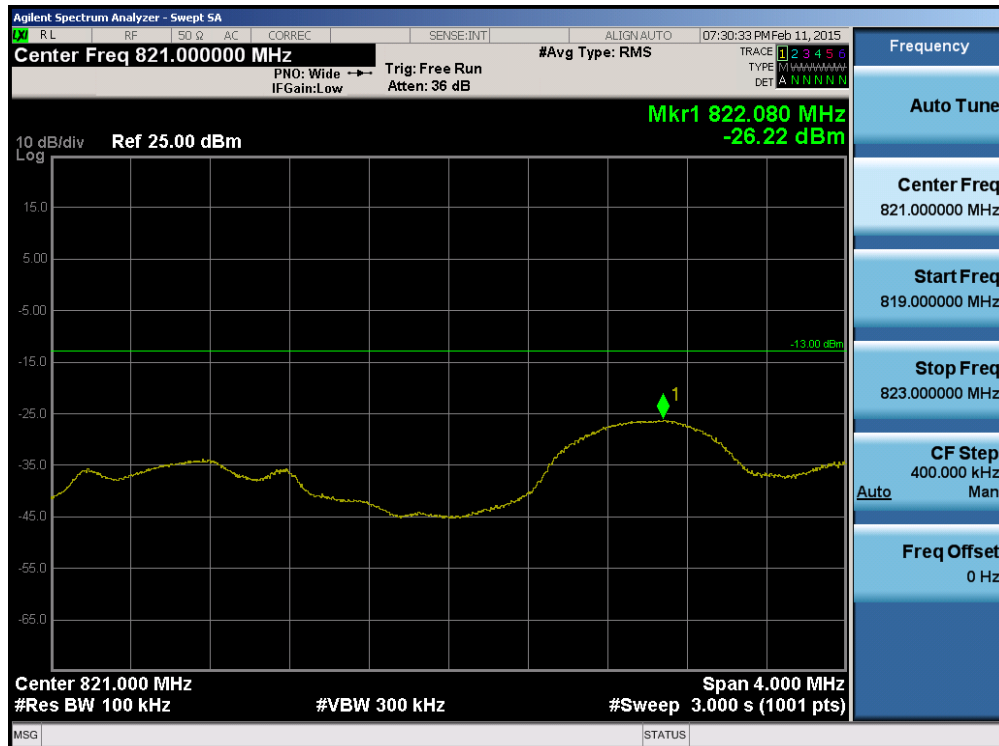


Plot 6-107. Upper Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 69 of 142

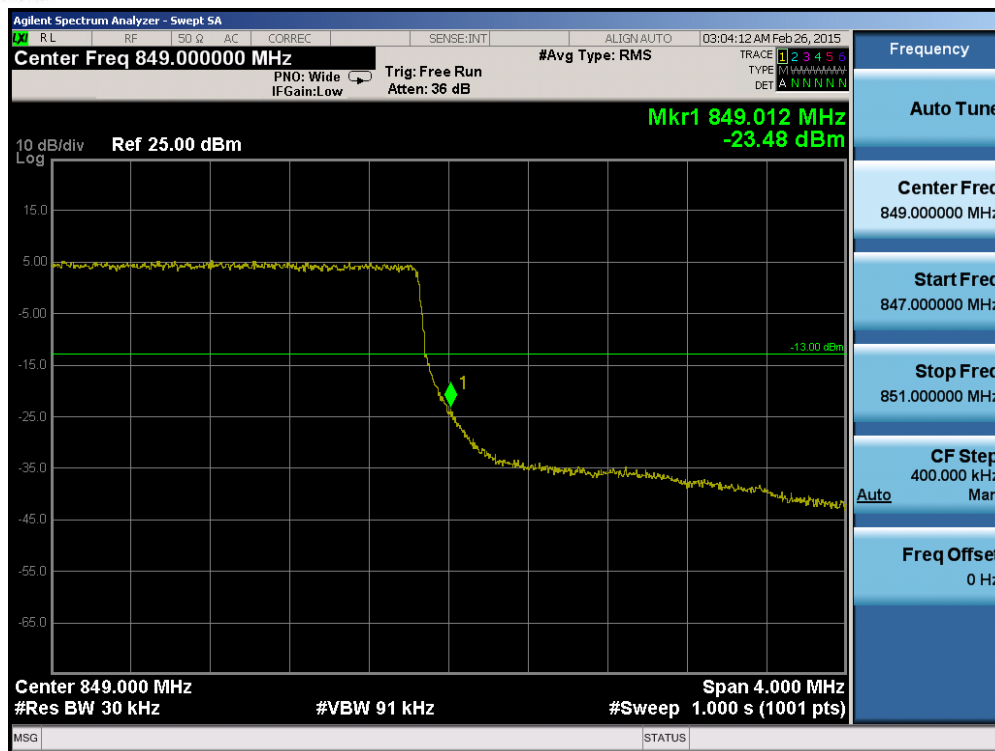


Plot 6-108. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

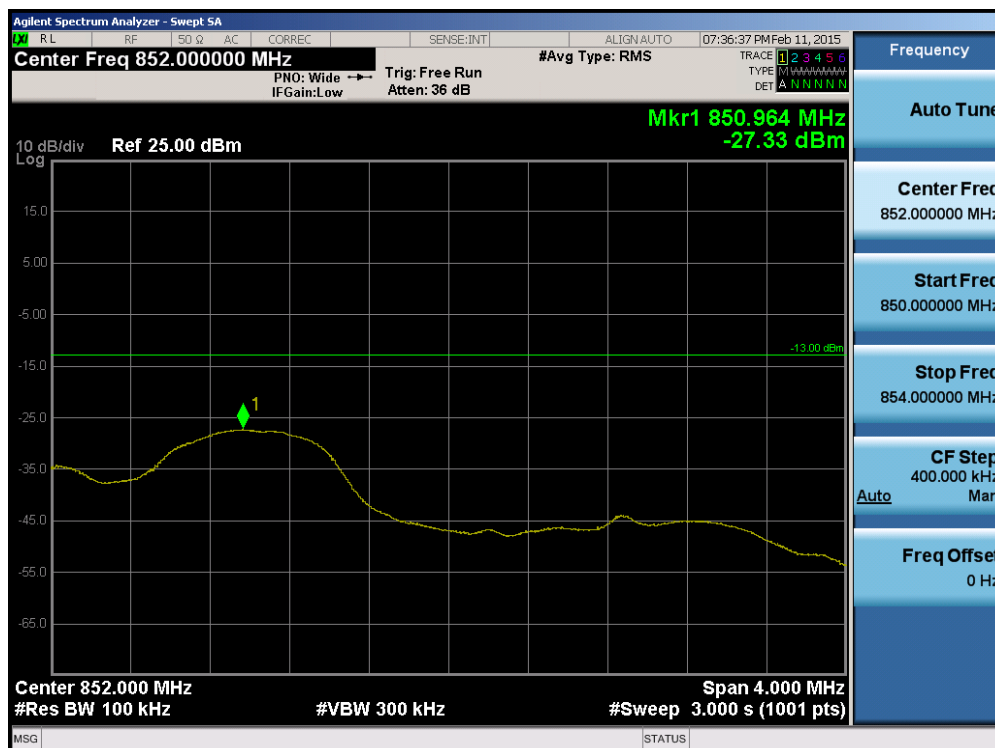


Plot 6-109. Lower Extended Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 70 of 142

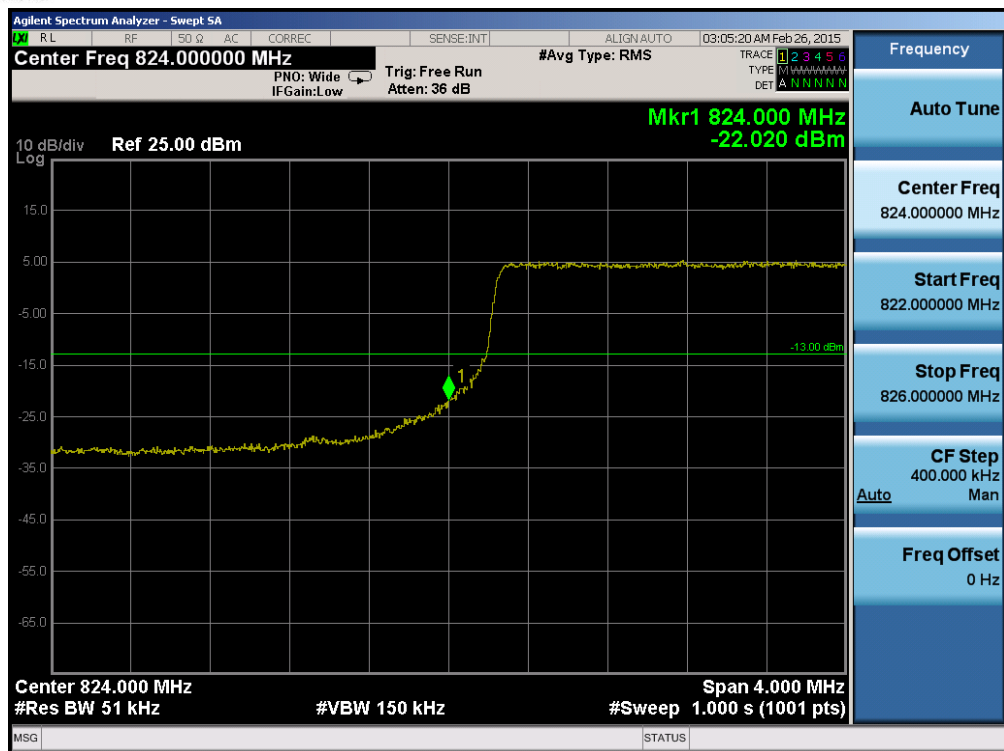


Plot 6-110. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

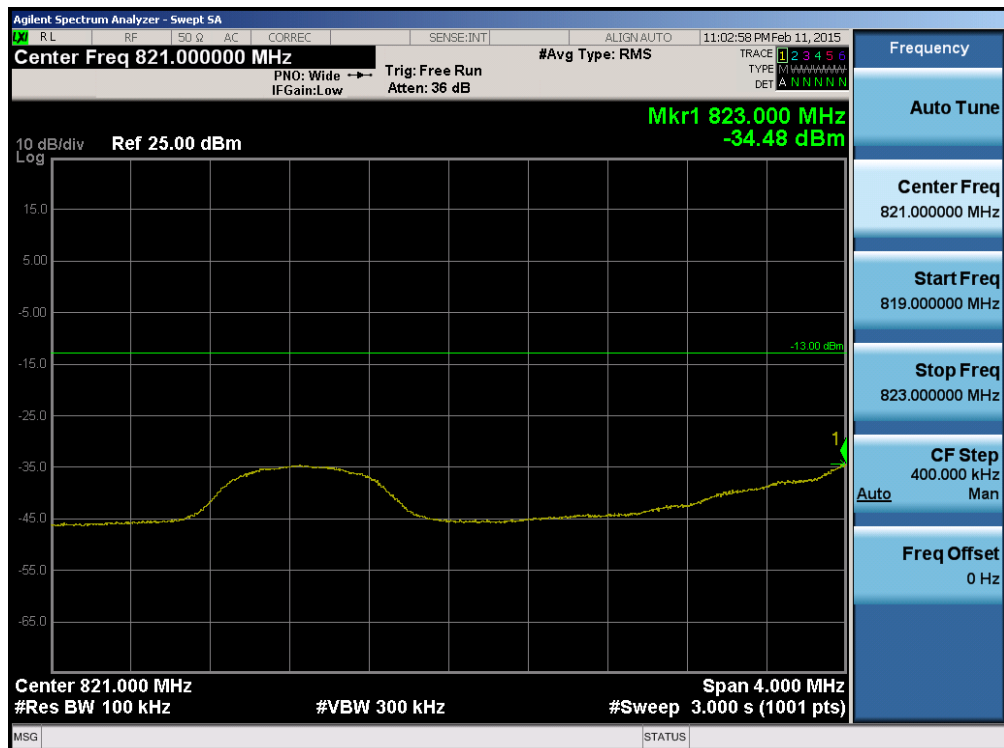


Plot 6-111. Upper Extended Band Edge Plot (Band 5 – Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 71 of 142

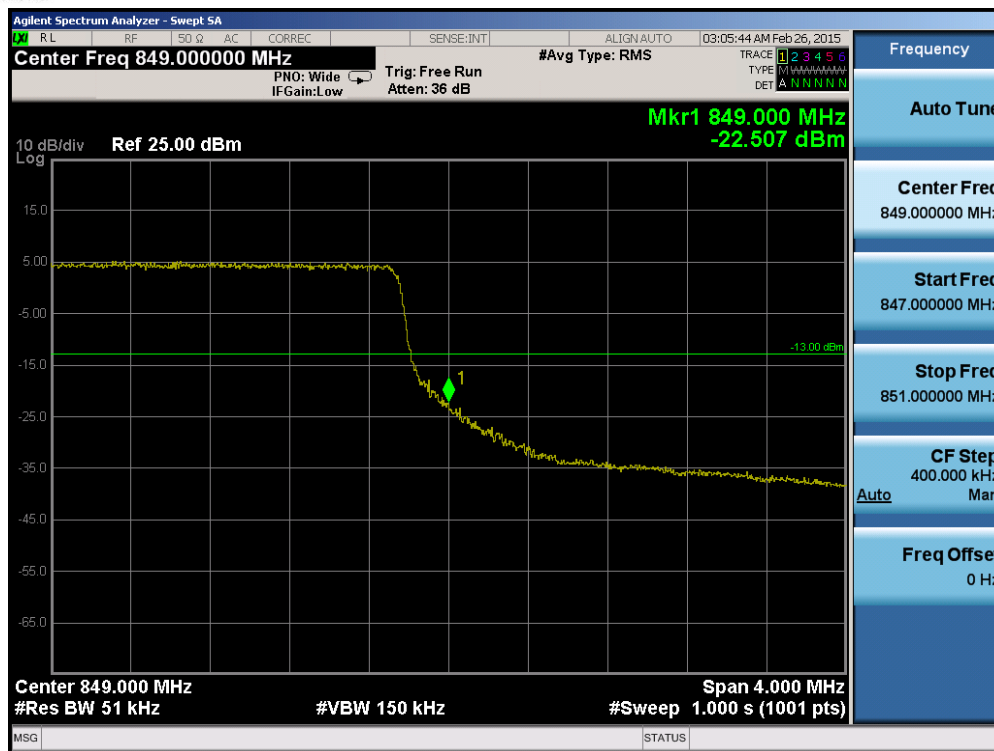


Plot 6-112. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

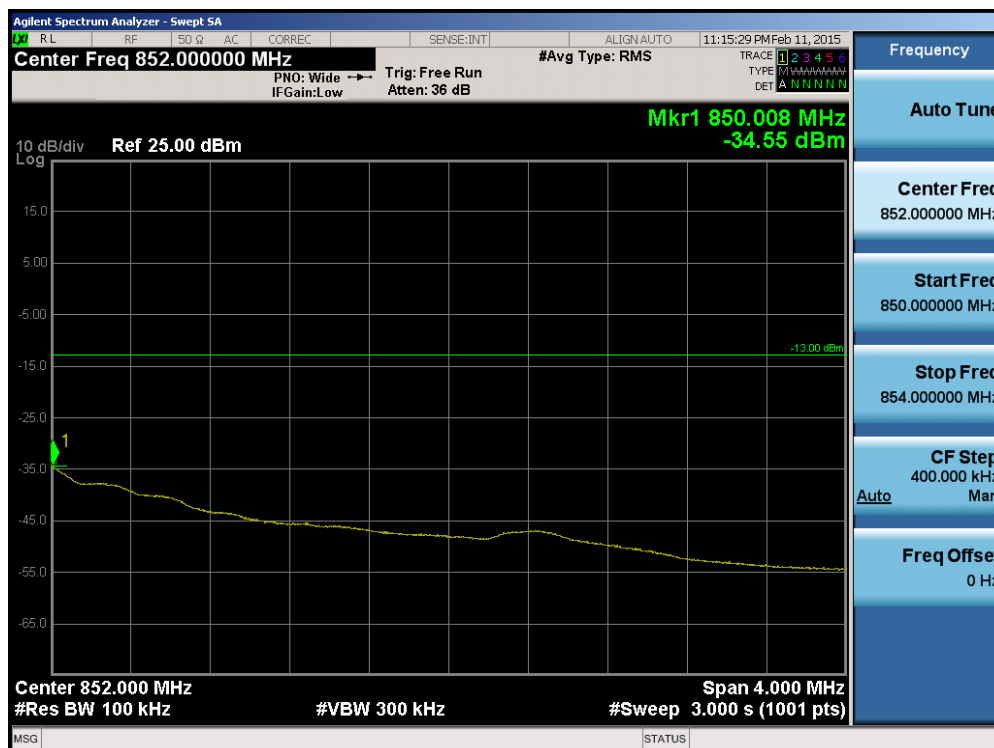


Plot 6-113. Lower Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 72 of 142

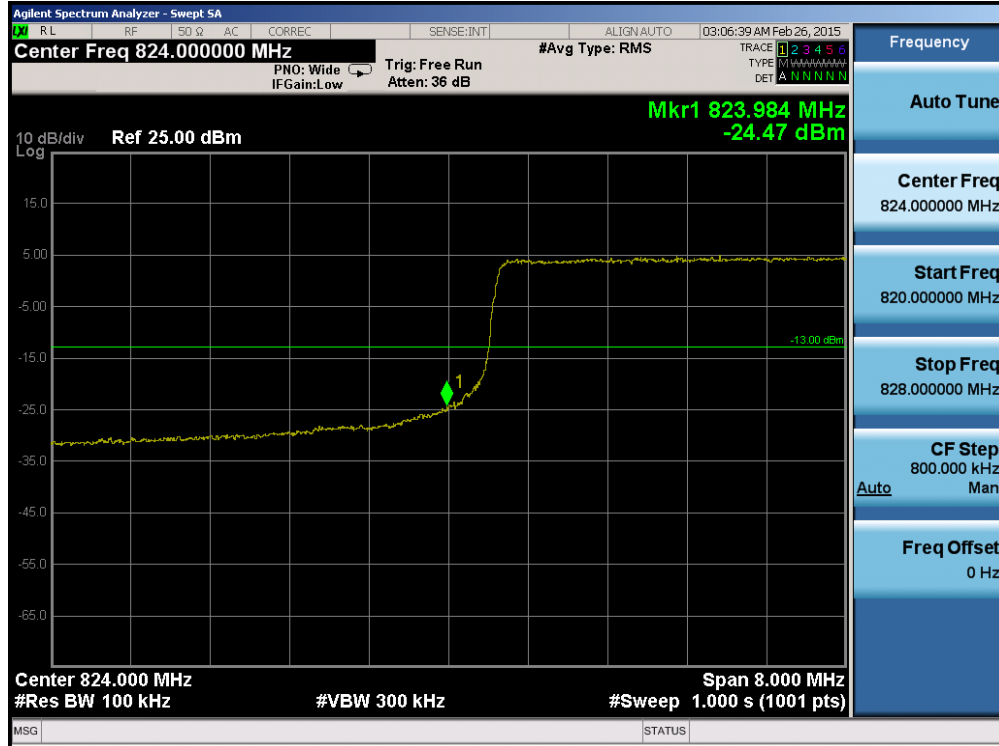


Plot 6-114. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - RB Size 25)

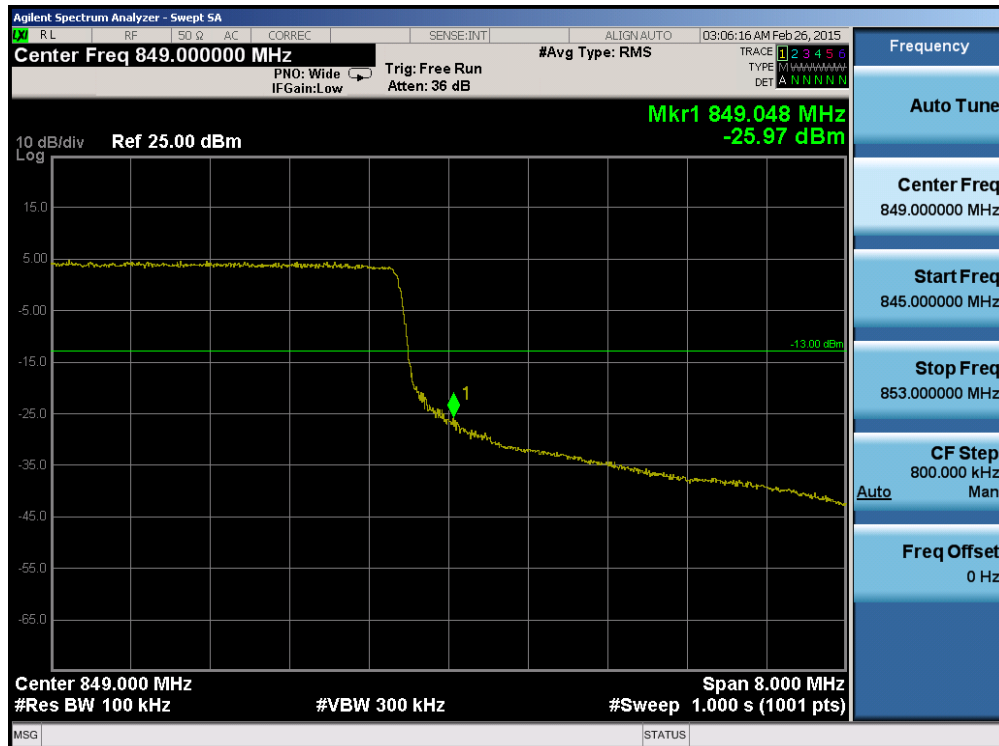


Plot 6-115. Upper Extended Band Edge Plot (Band 5 - 5.0MHz QPSK - RB Size 25)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 73 of 142

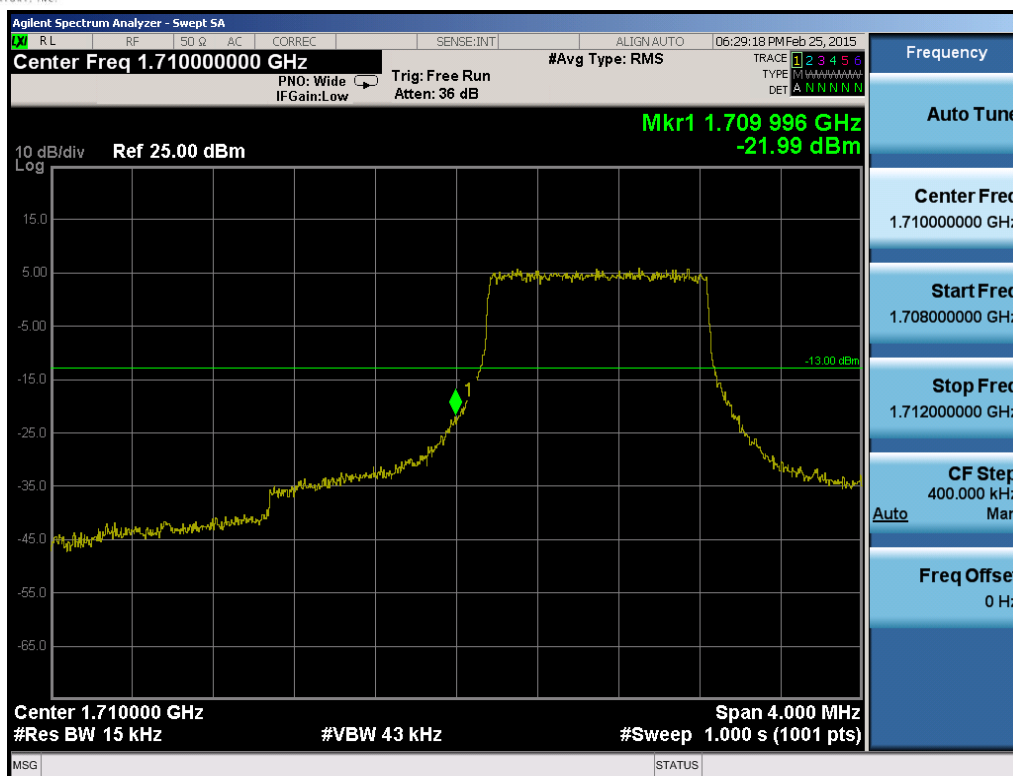


Plot 6-116. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

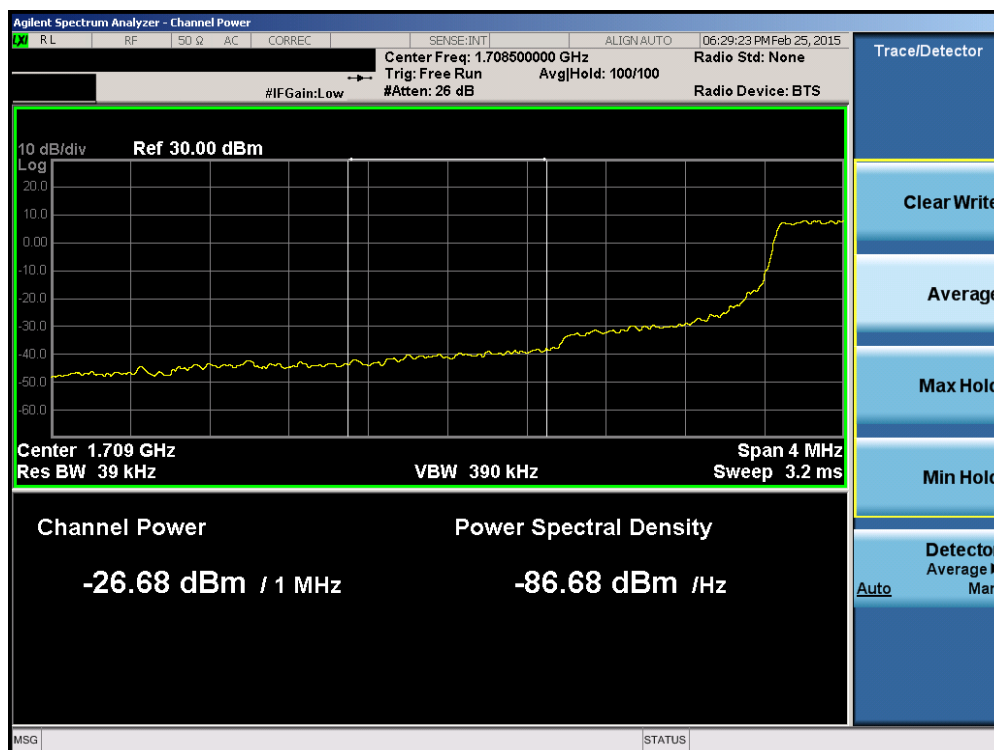


Plot 6-117. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 74 of 142

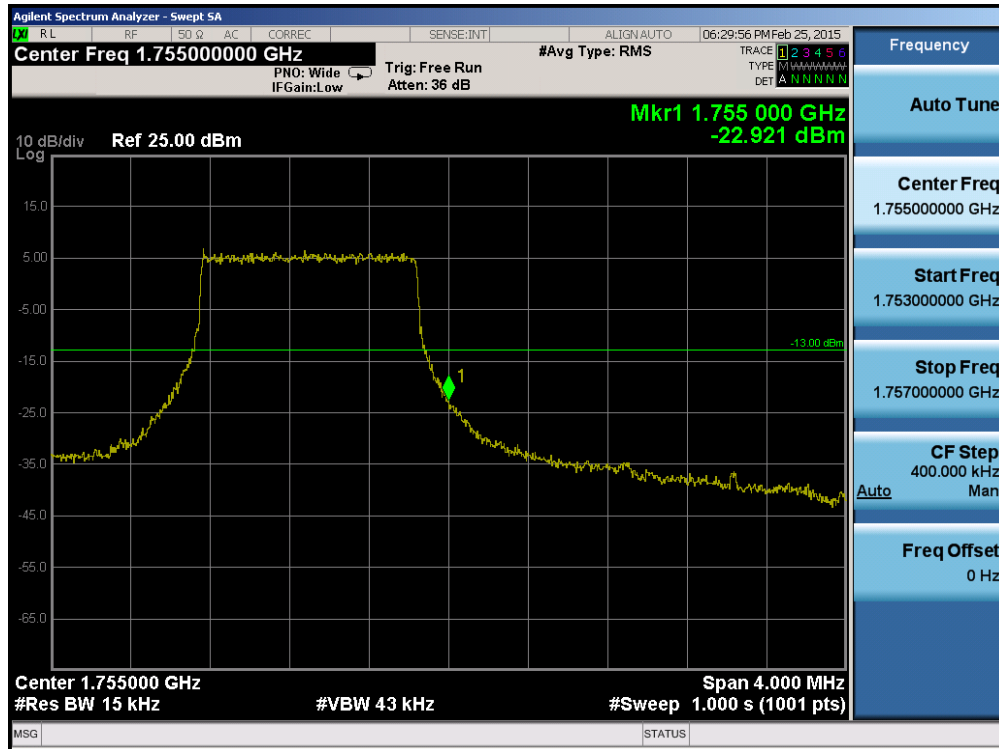


Plot 6-118. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

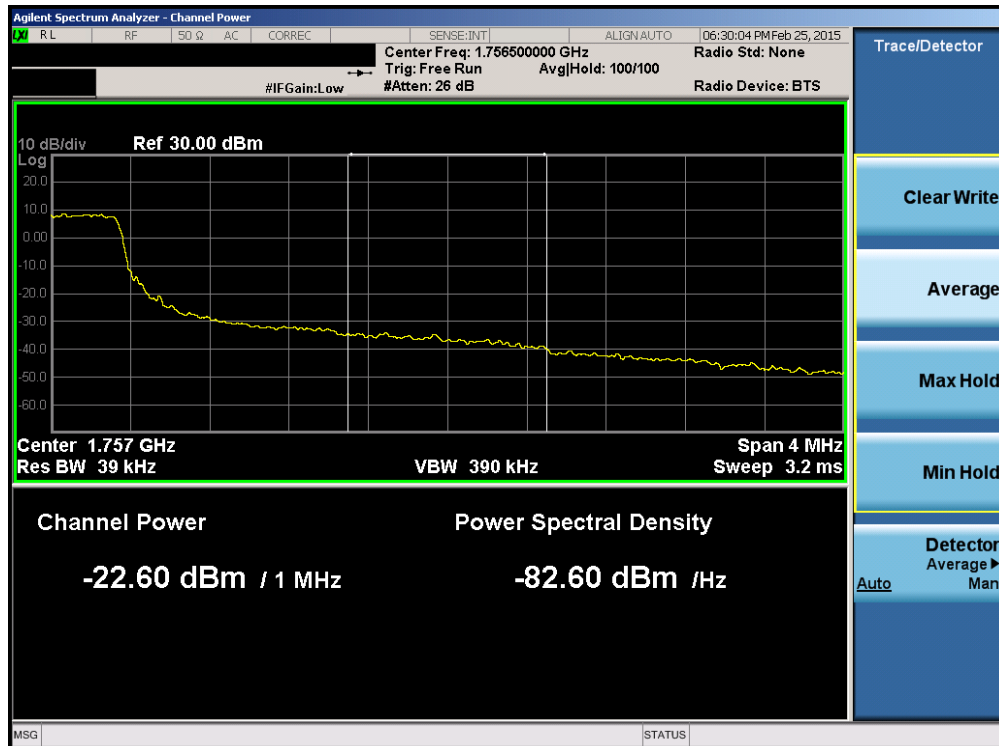


Plot 6-119. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 75 of 142

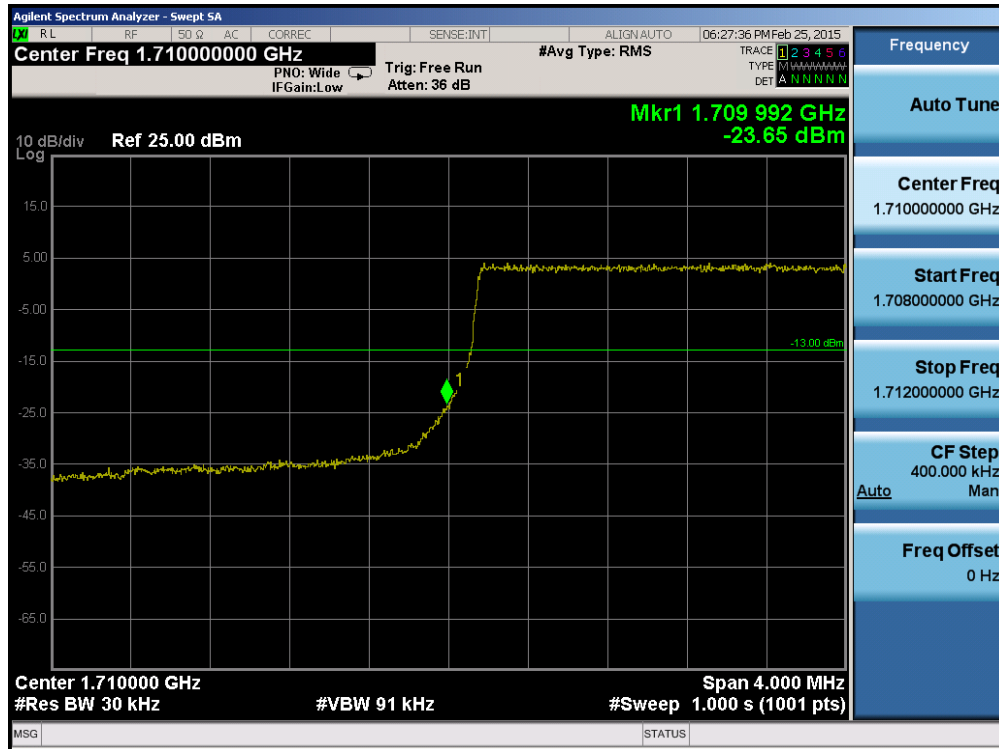


Plot 6-120. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

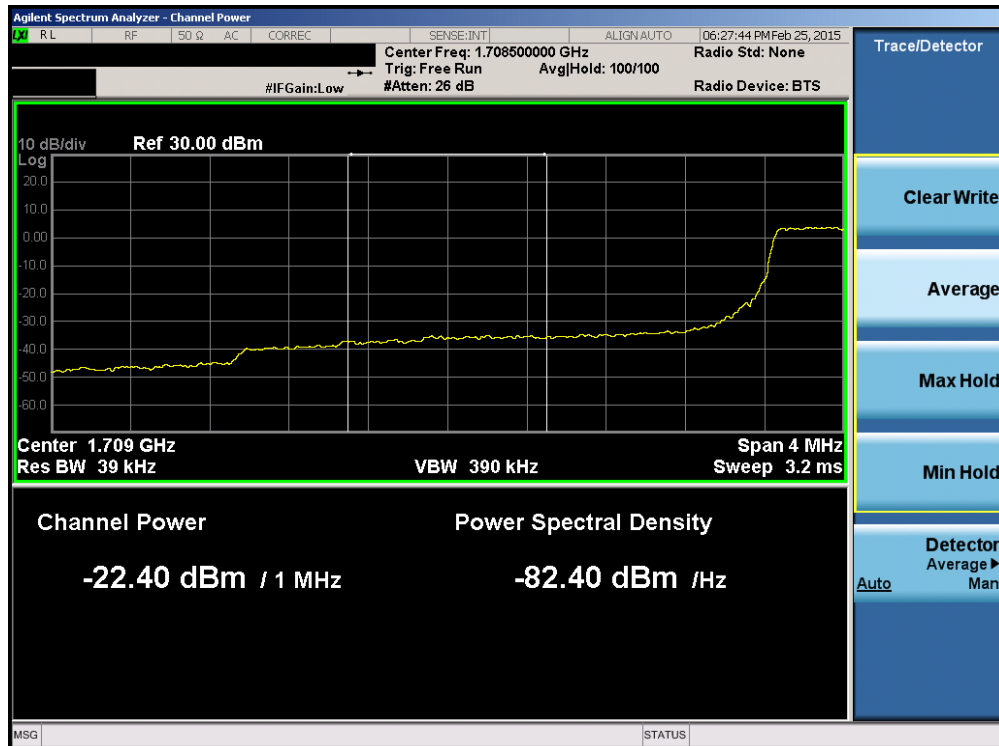


Plot 6-121. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 76 of 142

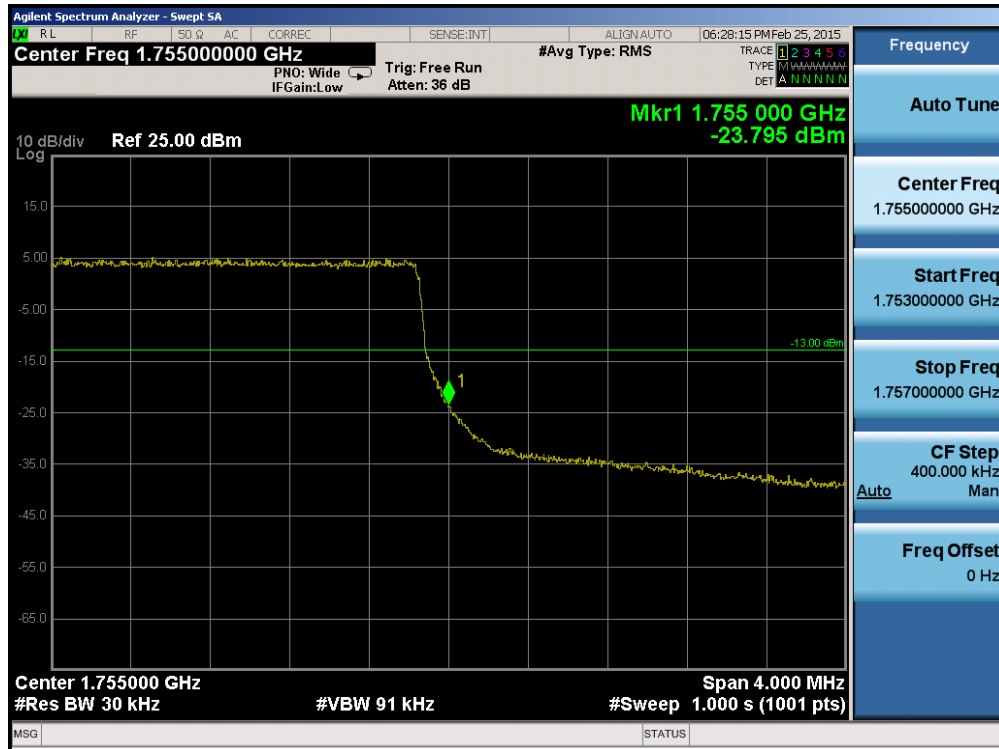


Plot 6-122. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

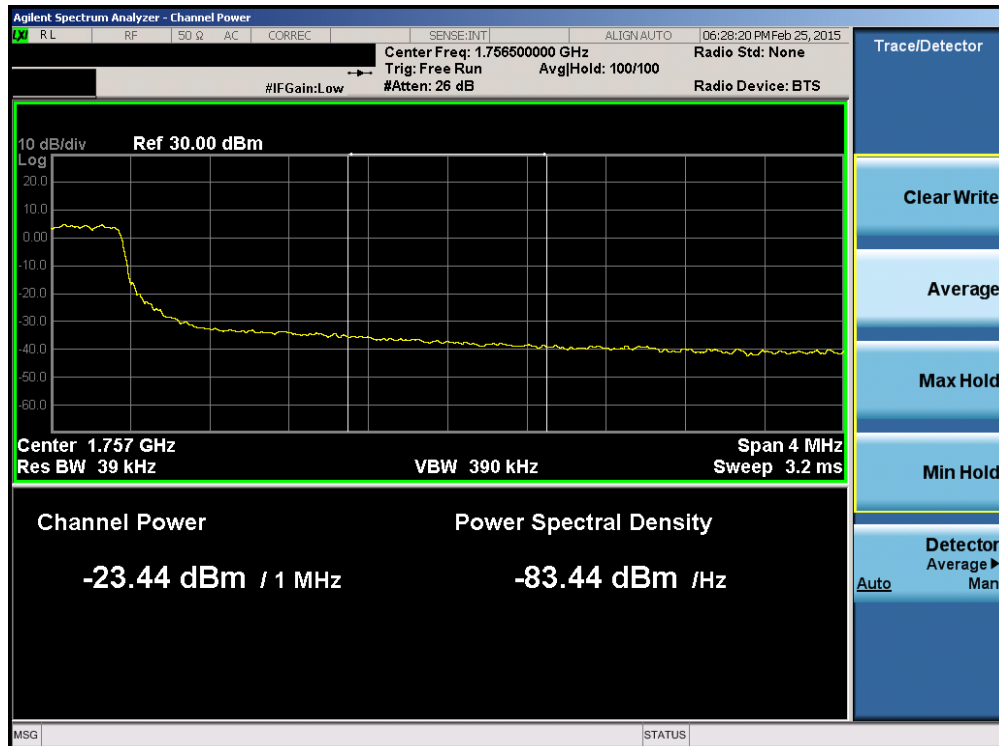


Plot 6-123. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 77 of 142

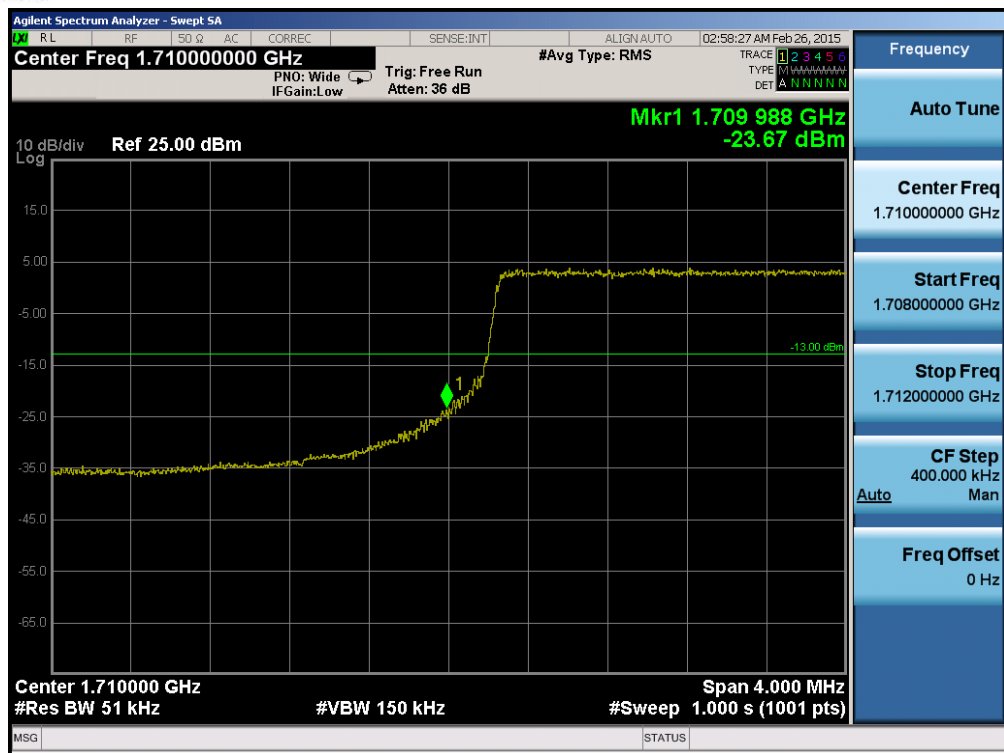


Plot 6-124. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

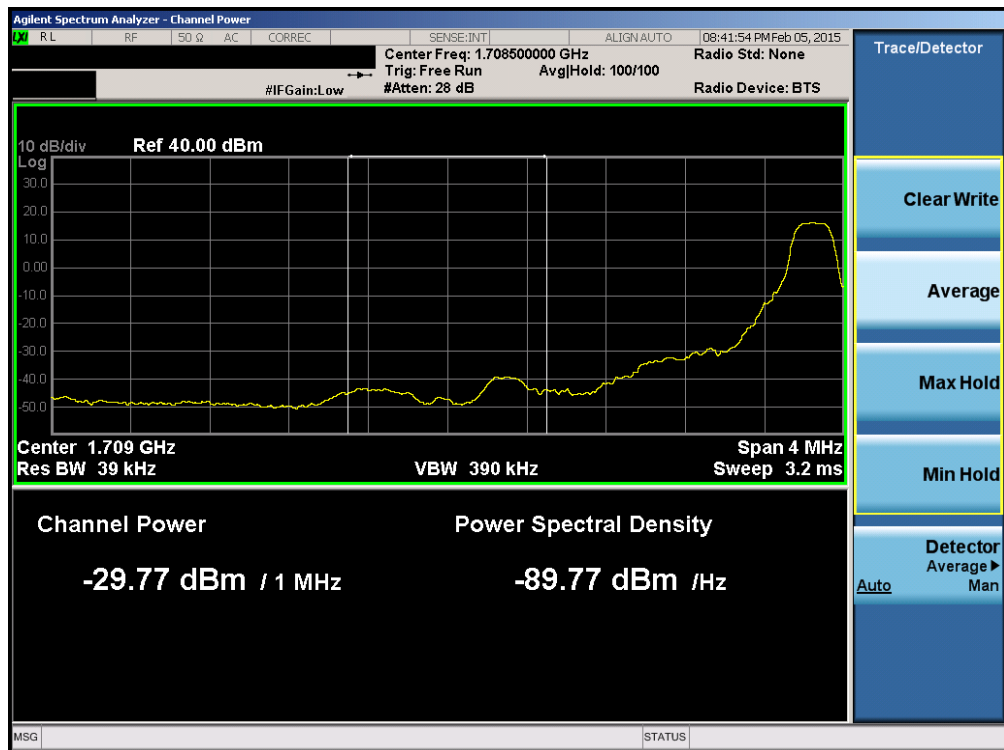


Plot 6-125. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 78 of 142

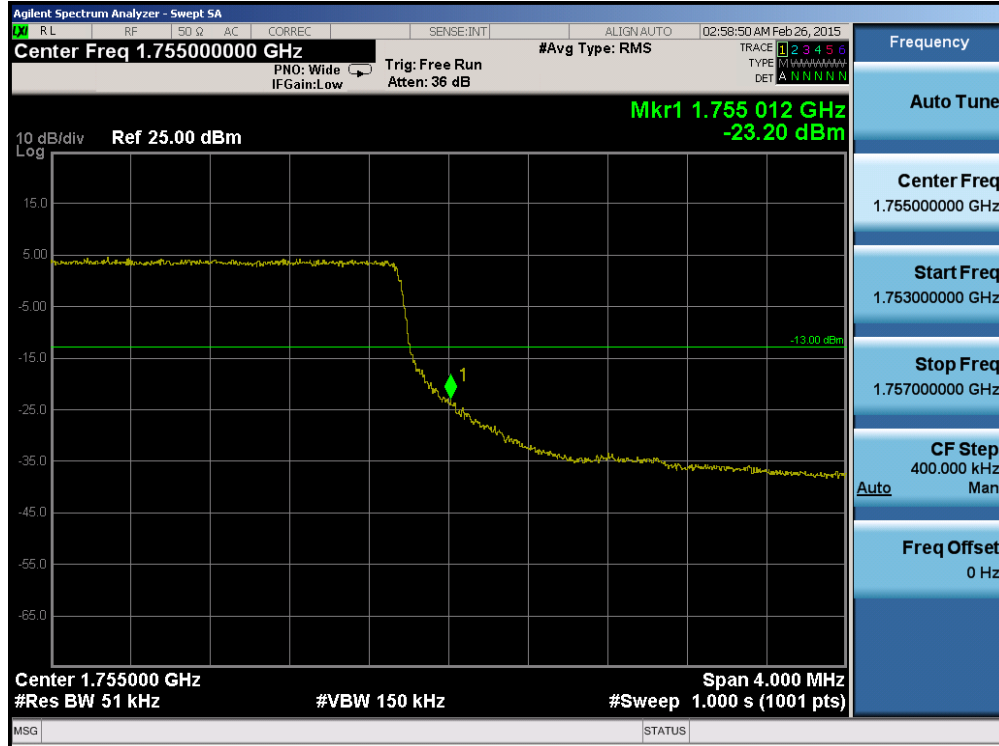


Plot 6-126. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

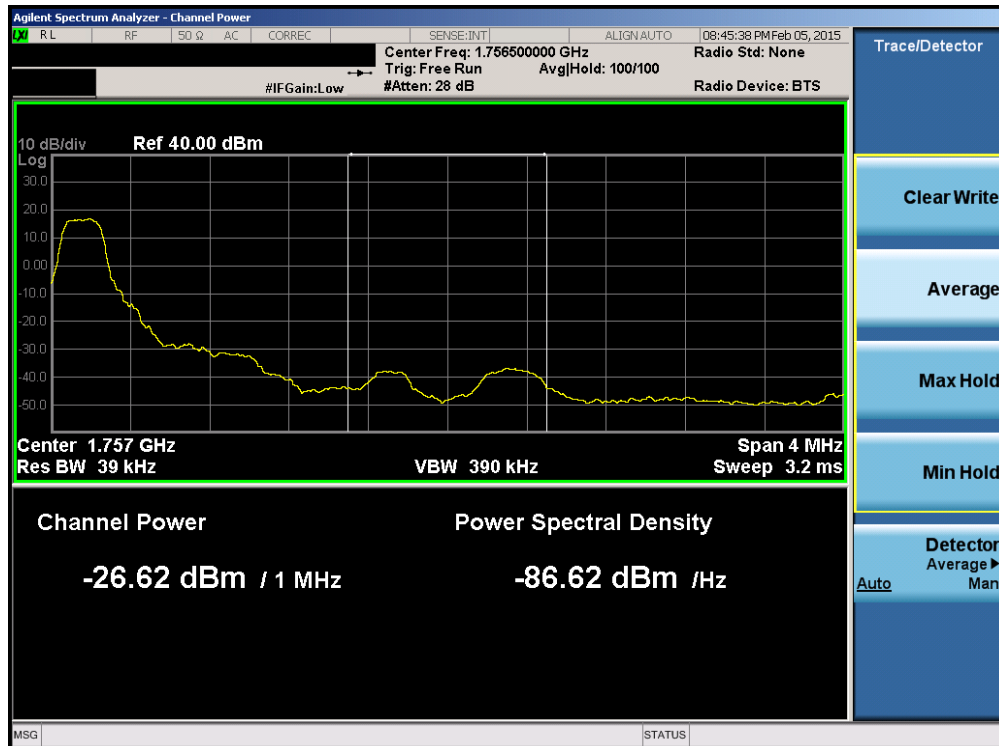


Plot 6-127. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 79 of 142

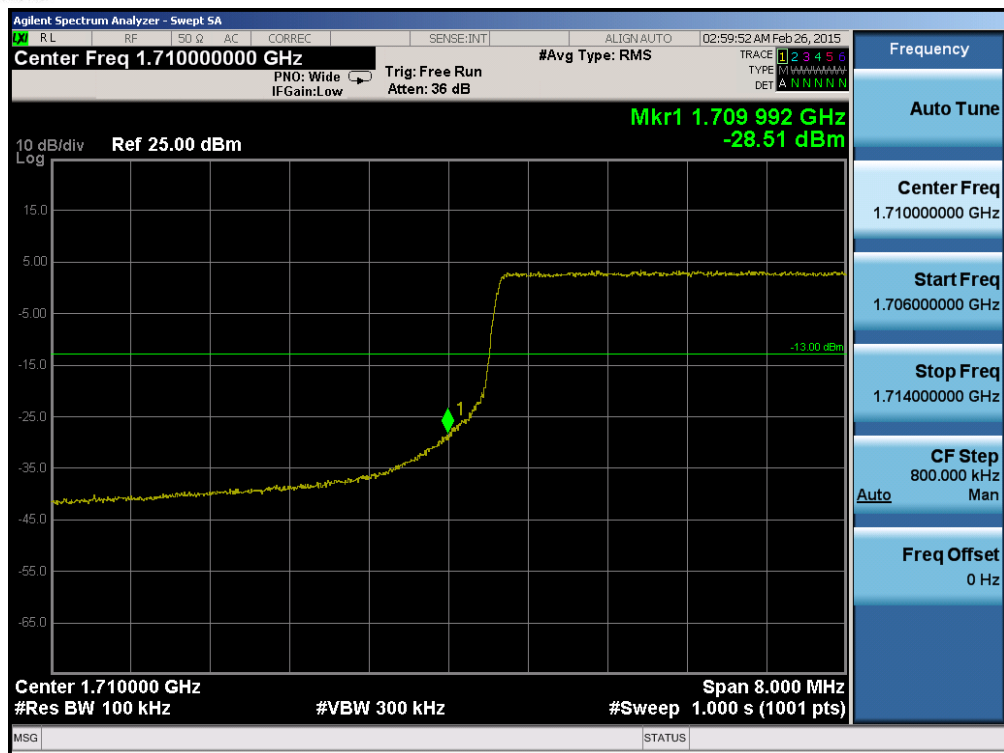


Plot 6-128. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

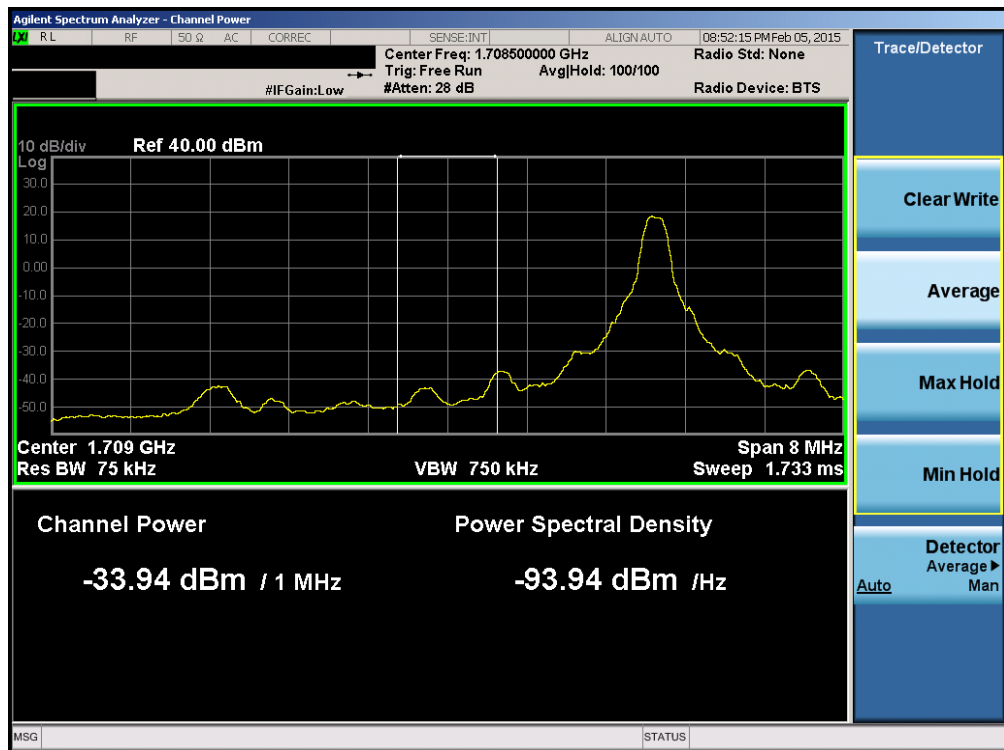


Plot 6-129. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 80 of 142



Plot 6-130. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

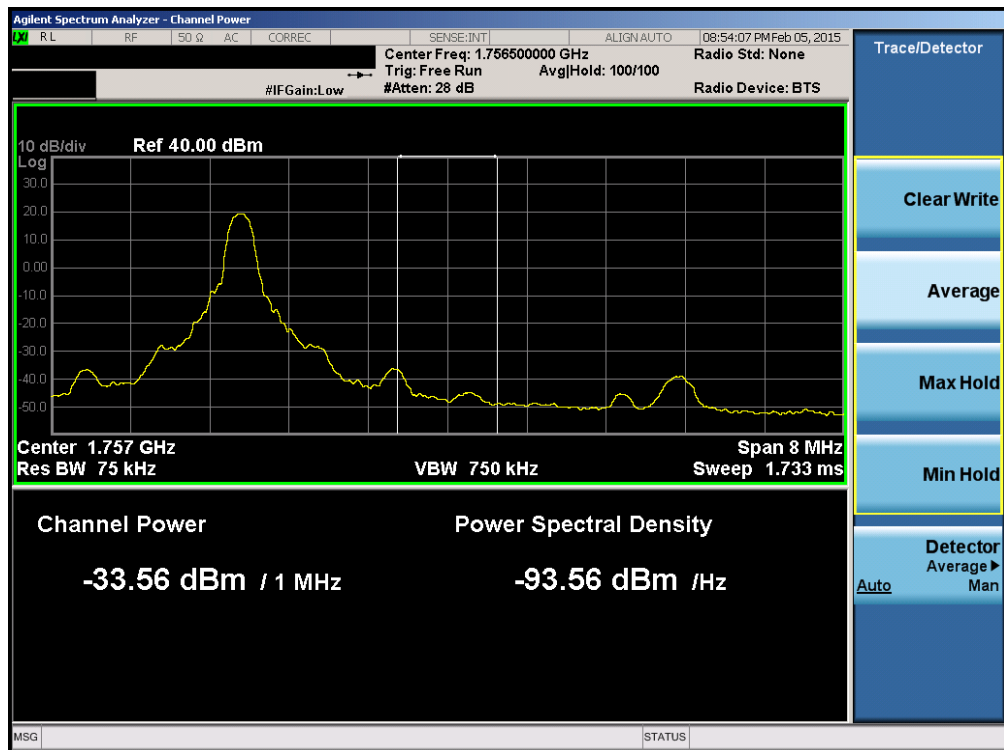


Plot 6-131. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 81 of 142

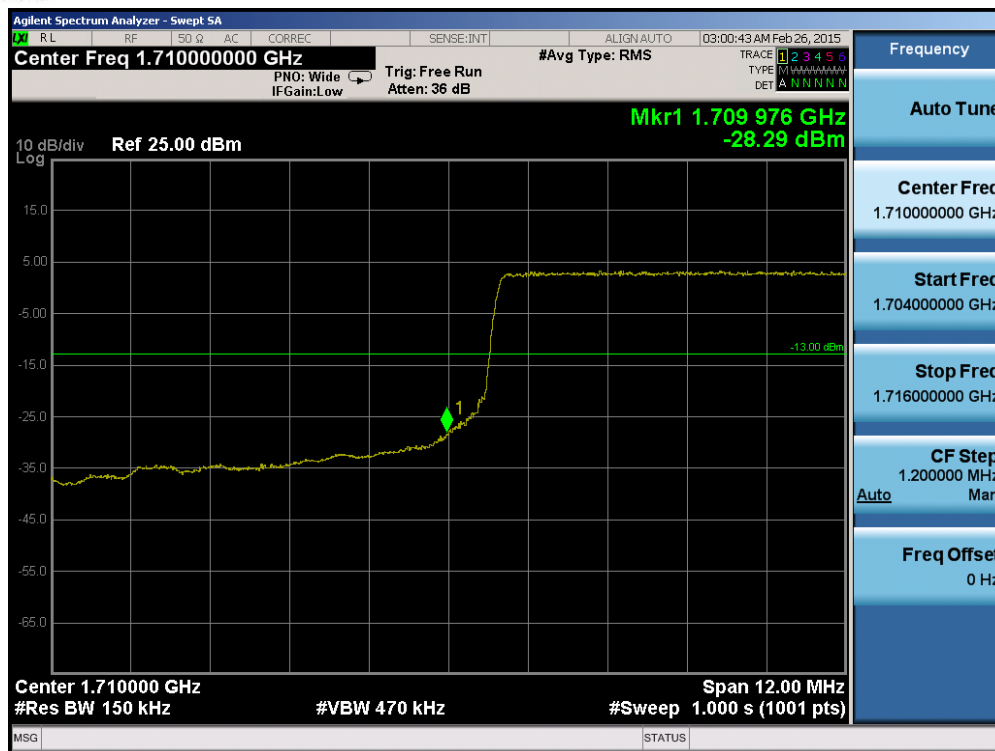


Plot 6-132. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

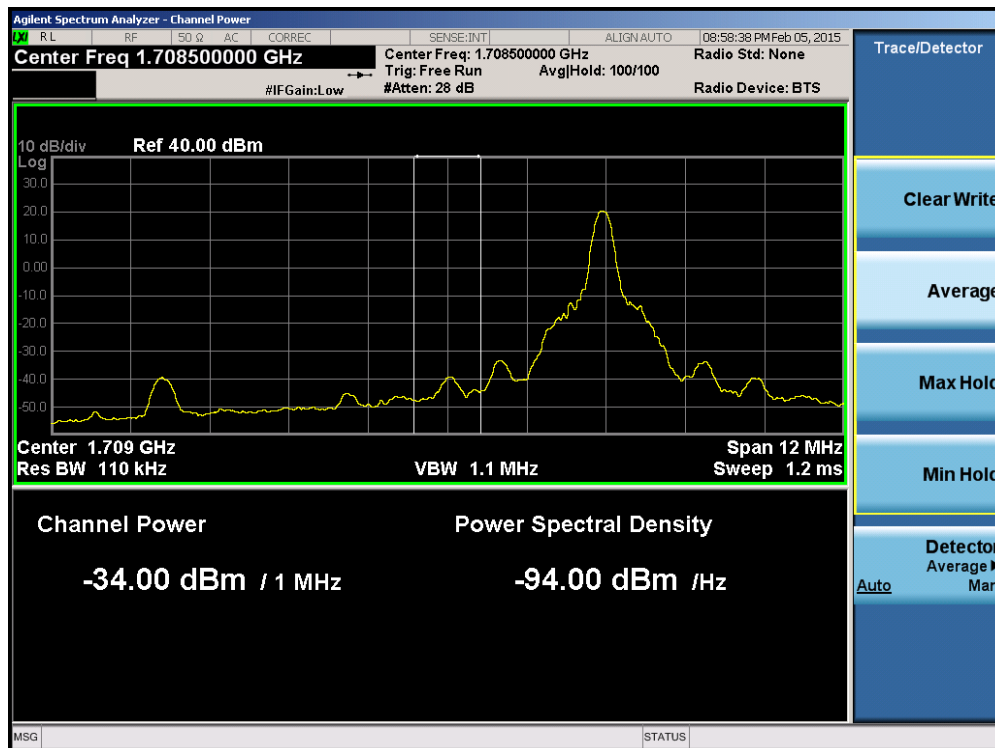


Plot 6-133. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 82 of 142

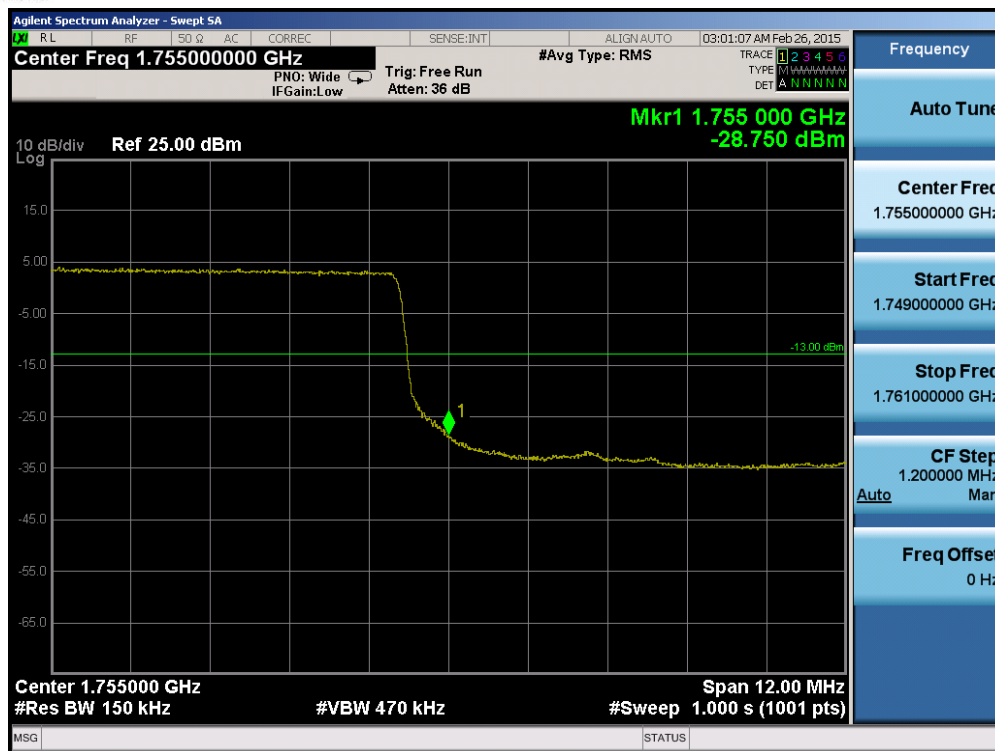


Plot 6-134. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

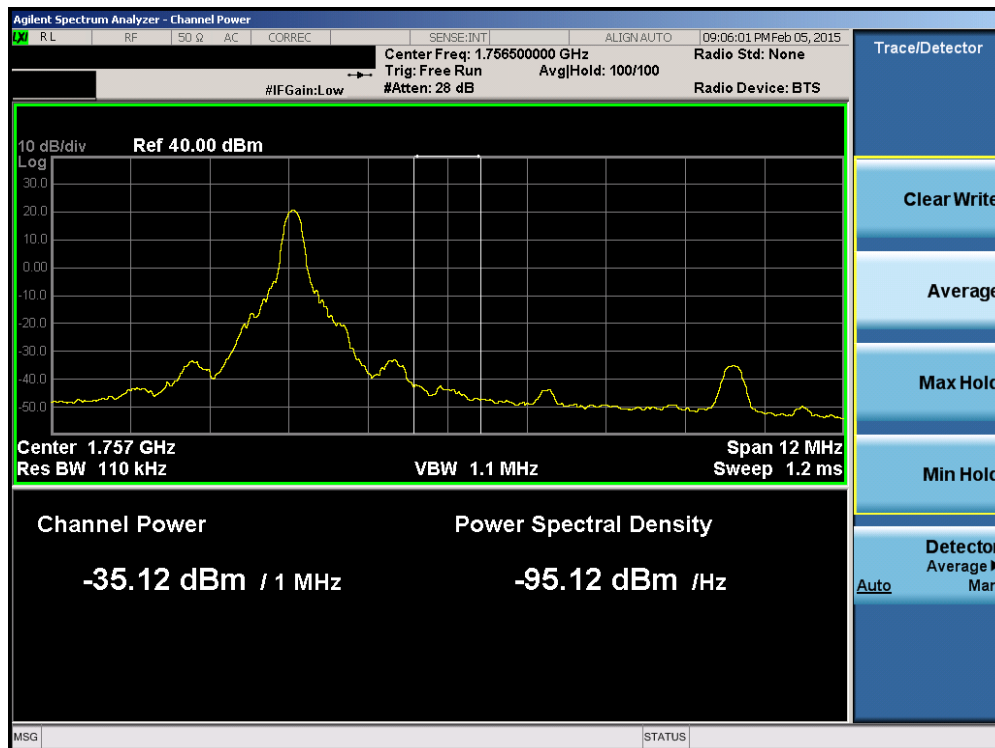


Plot 6-135. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 83 of 142

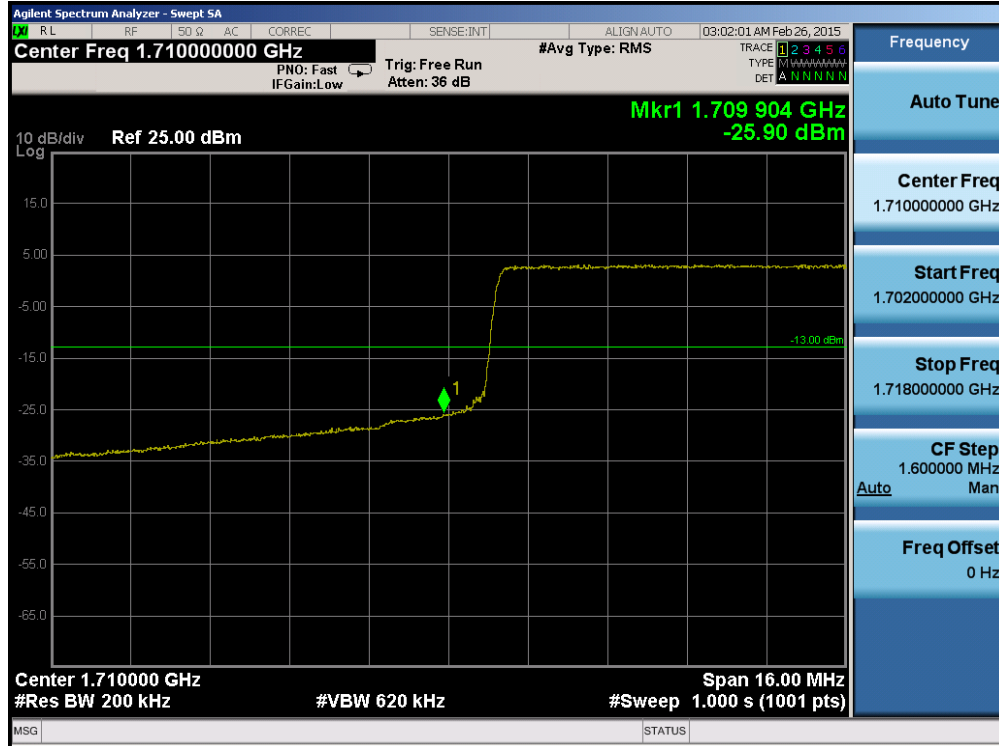


Plot 6-136. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

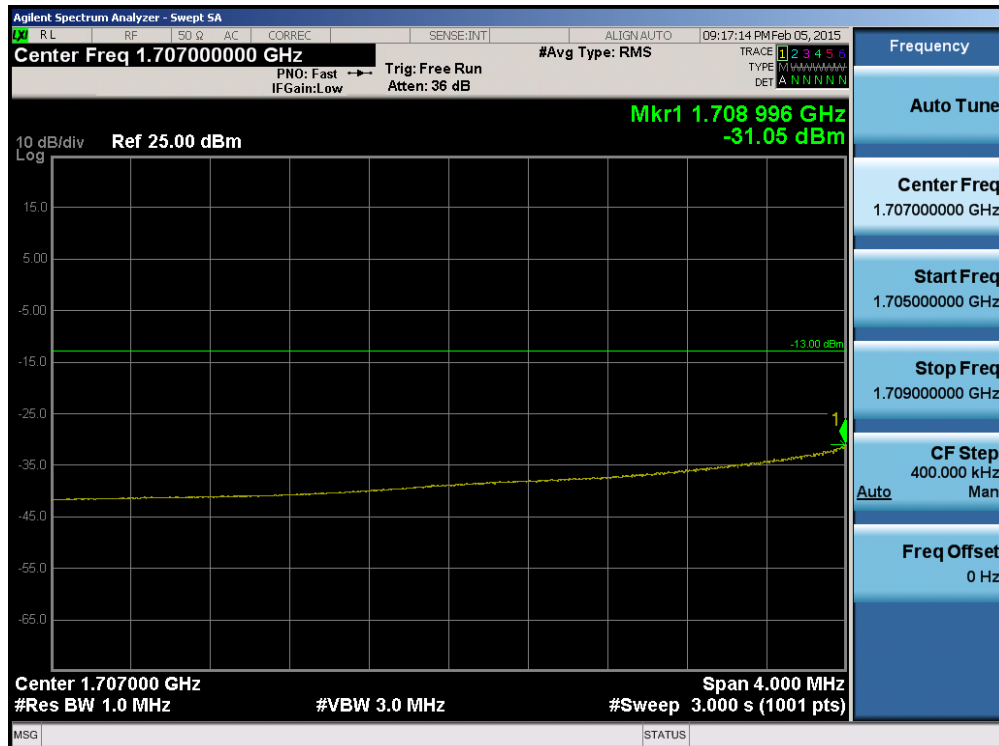


Plot 6-137. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 84 of 142

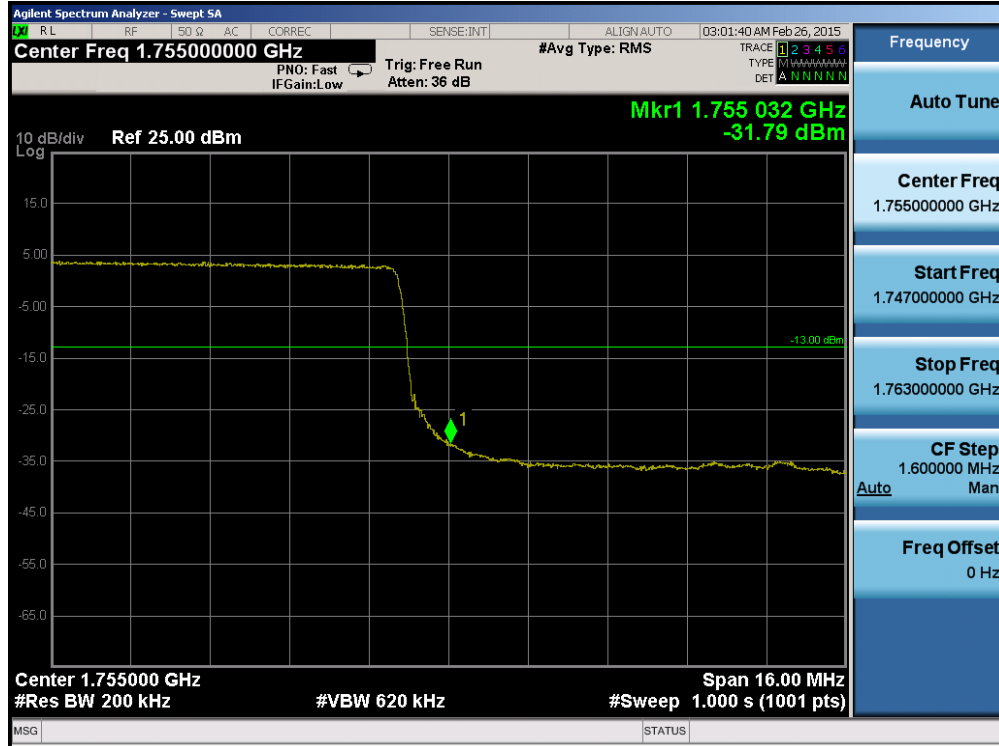


Plot 6-138. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

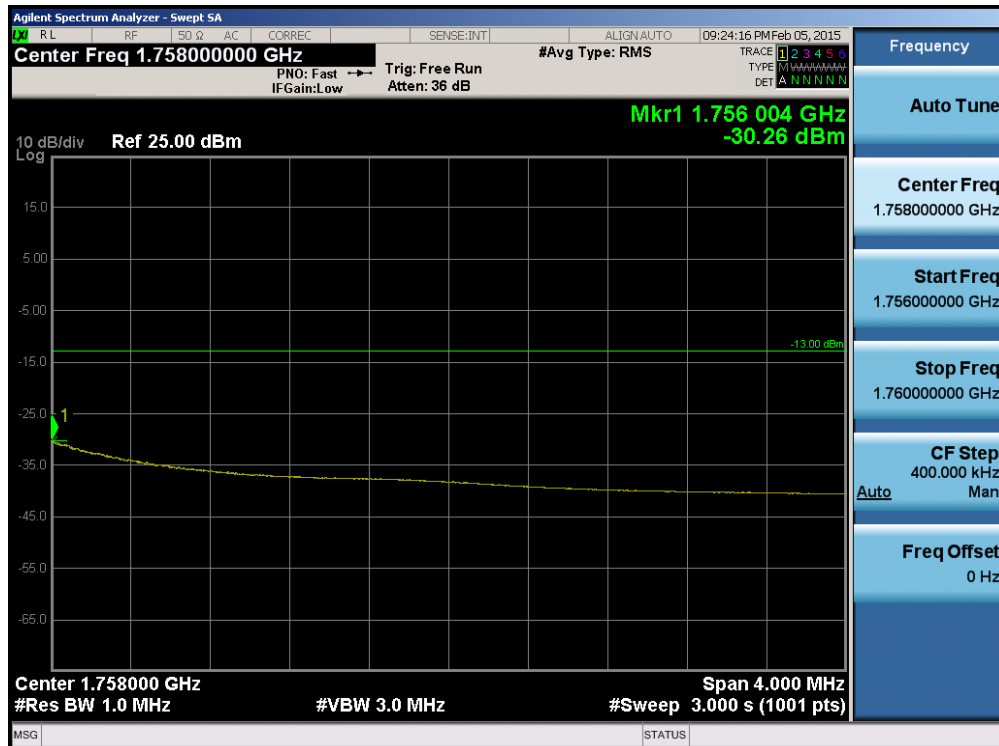


Plot 6-139. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 85 of 142

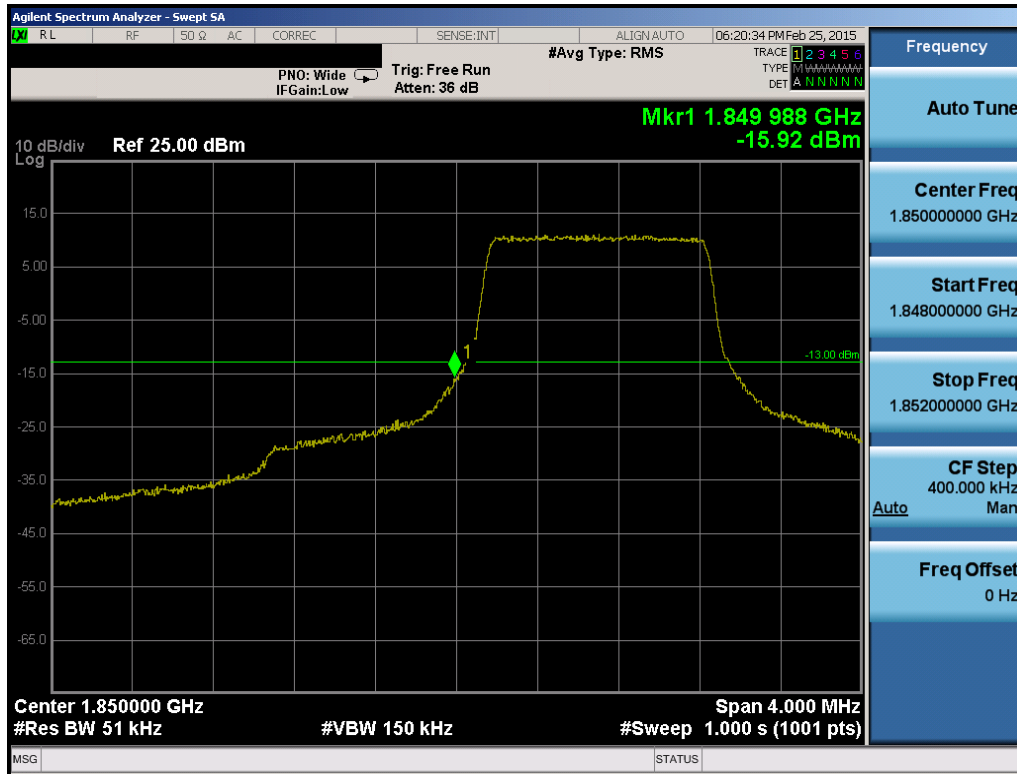


Plot 6-140. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

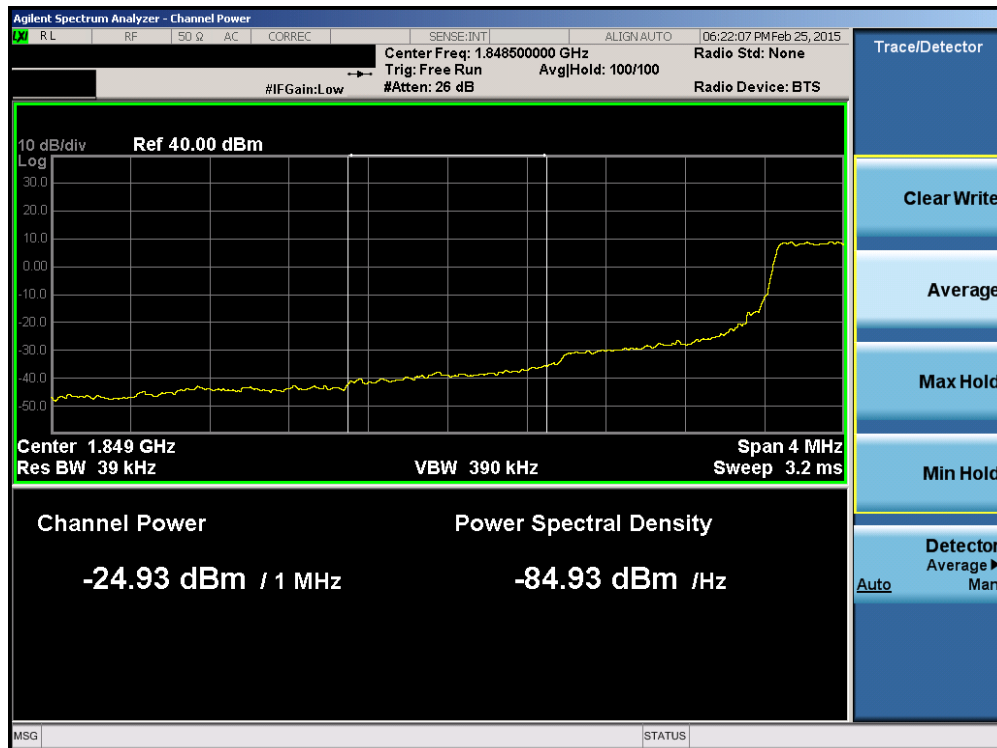


Plot 6-141. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 86 of 142

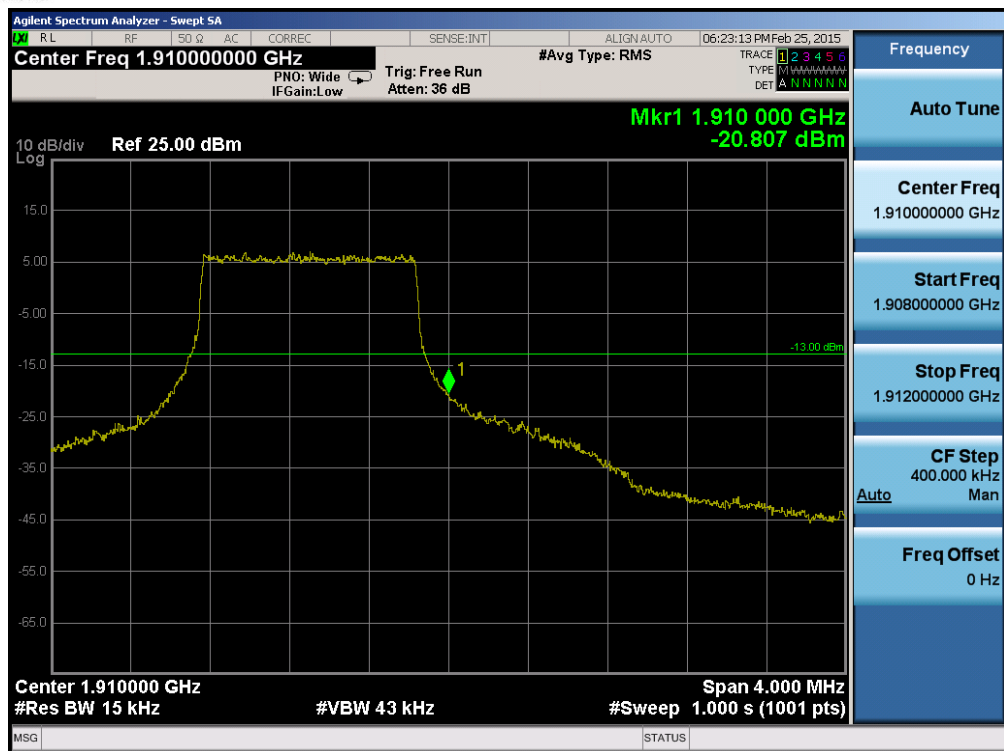


Plot 6-142. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

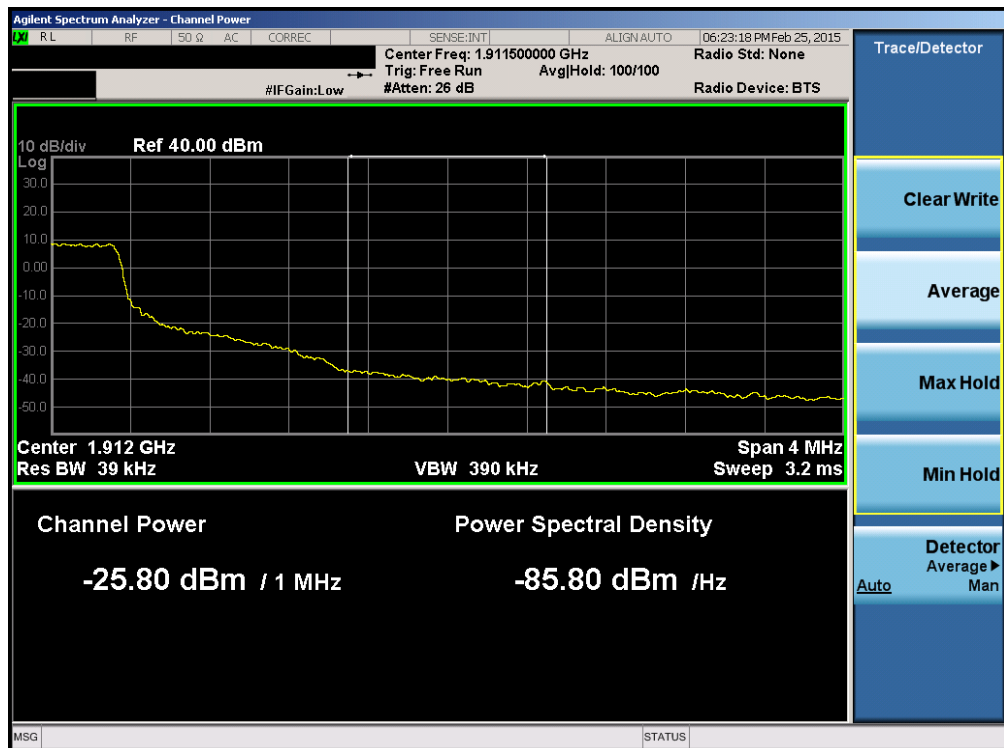


Plot 6-143. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 87 of 142

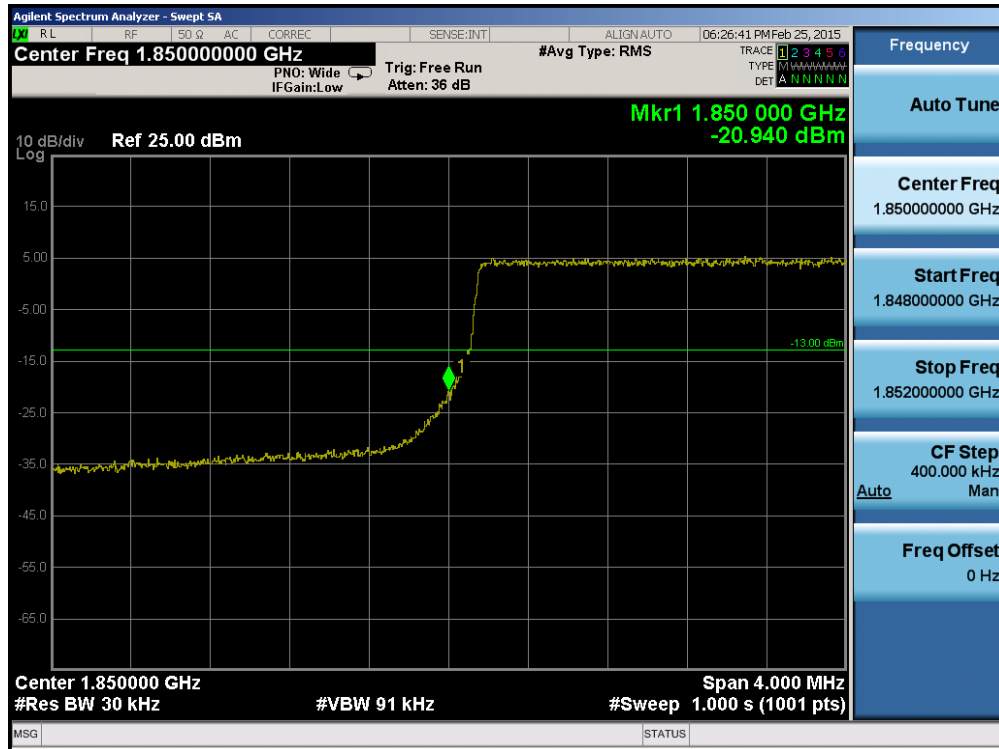


Plot 6-144. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

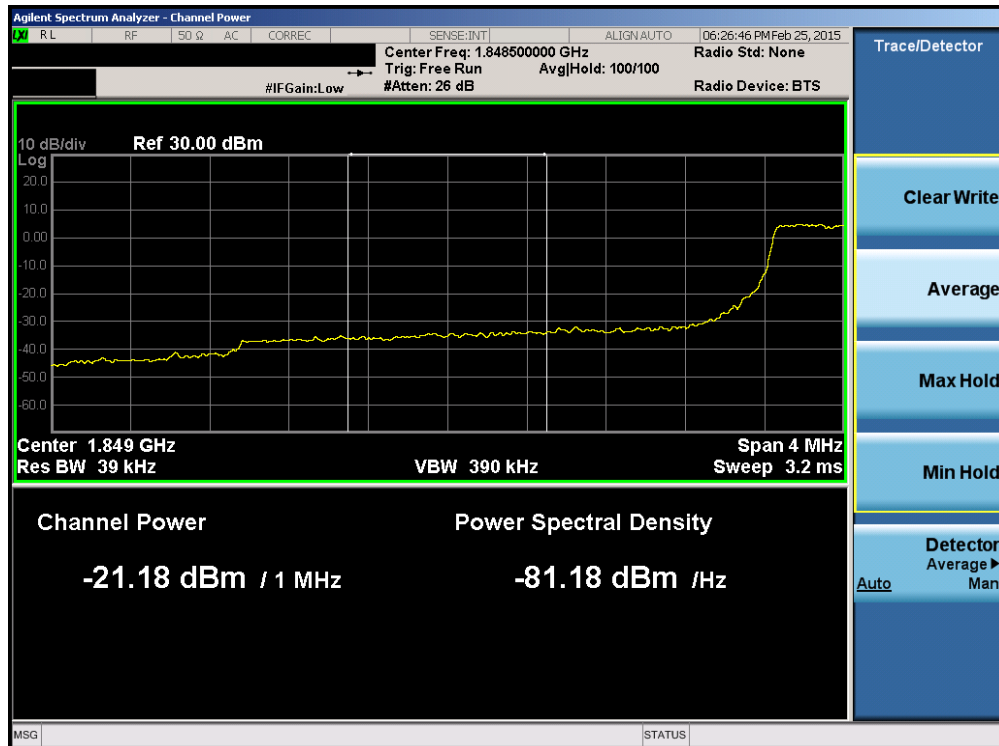


Plot 6-145. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 88 of 142

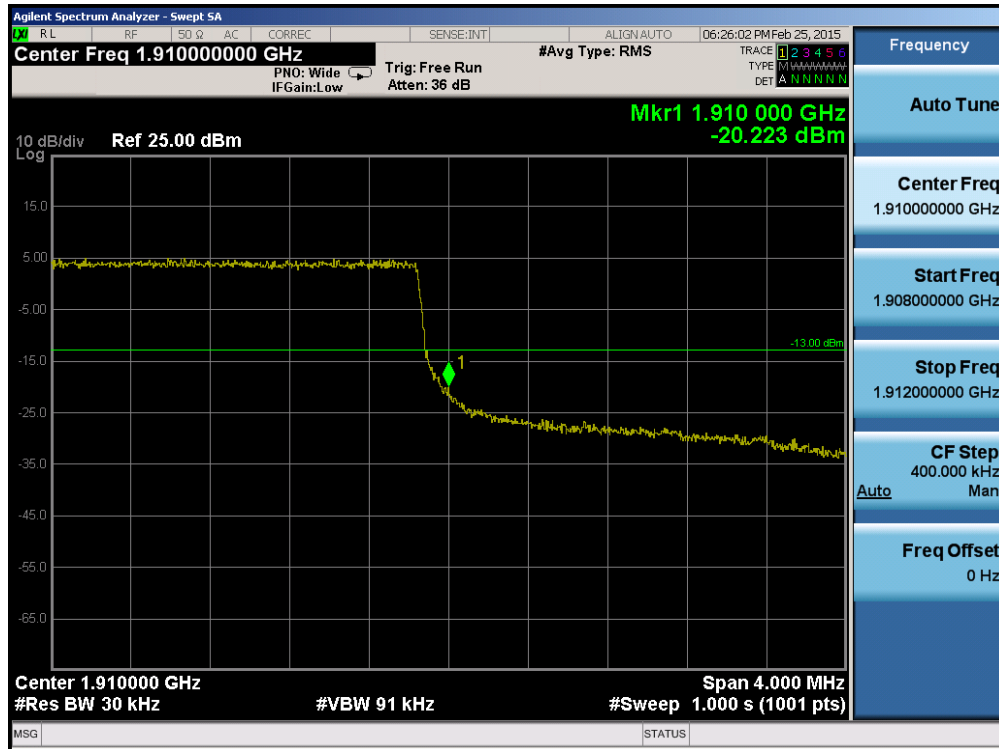


Plot 6-146. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

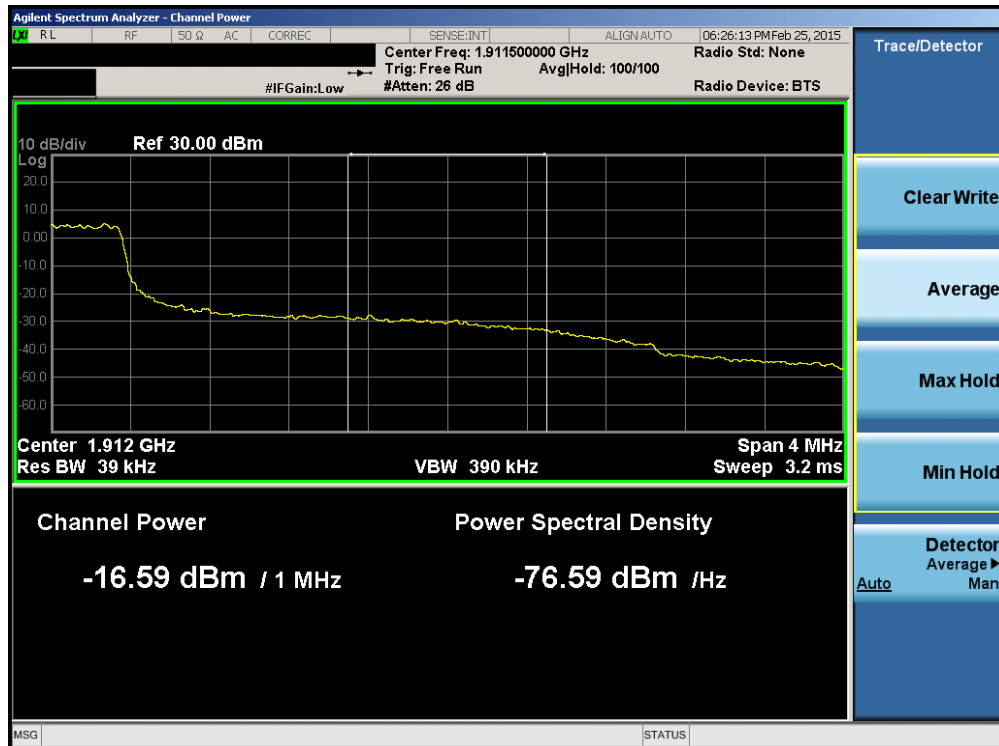


Plot 6-147. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 89 of 142

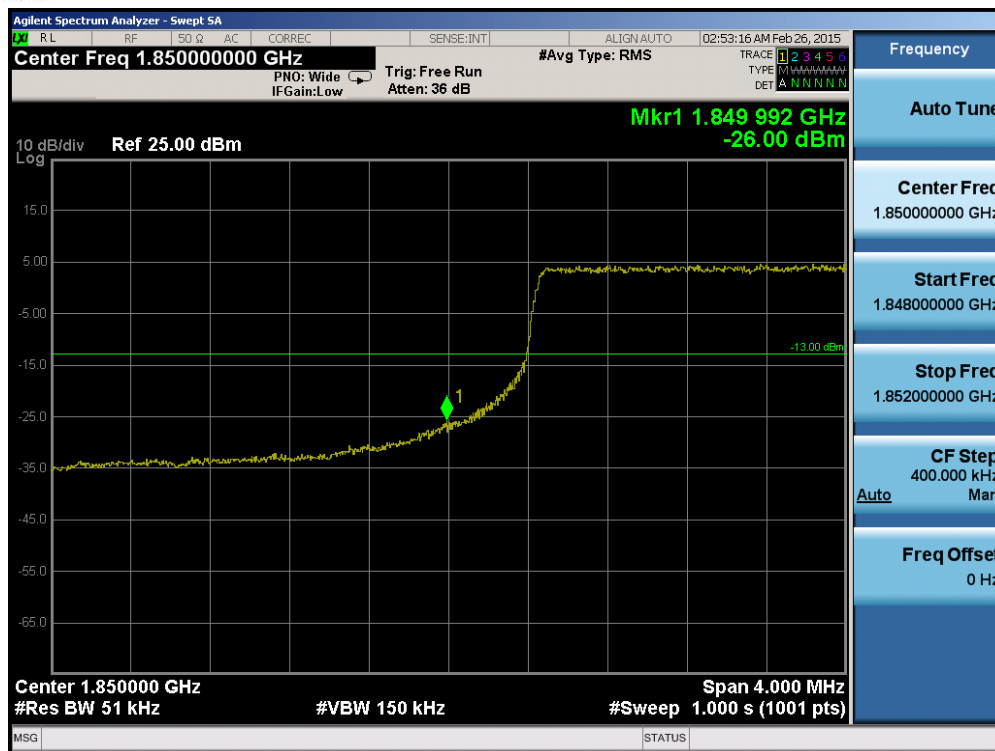


Plot 6-148. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

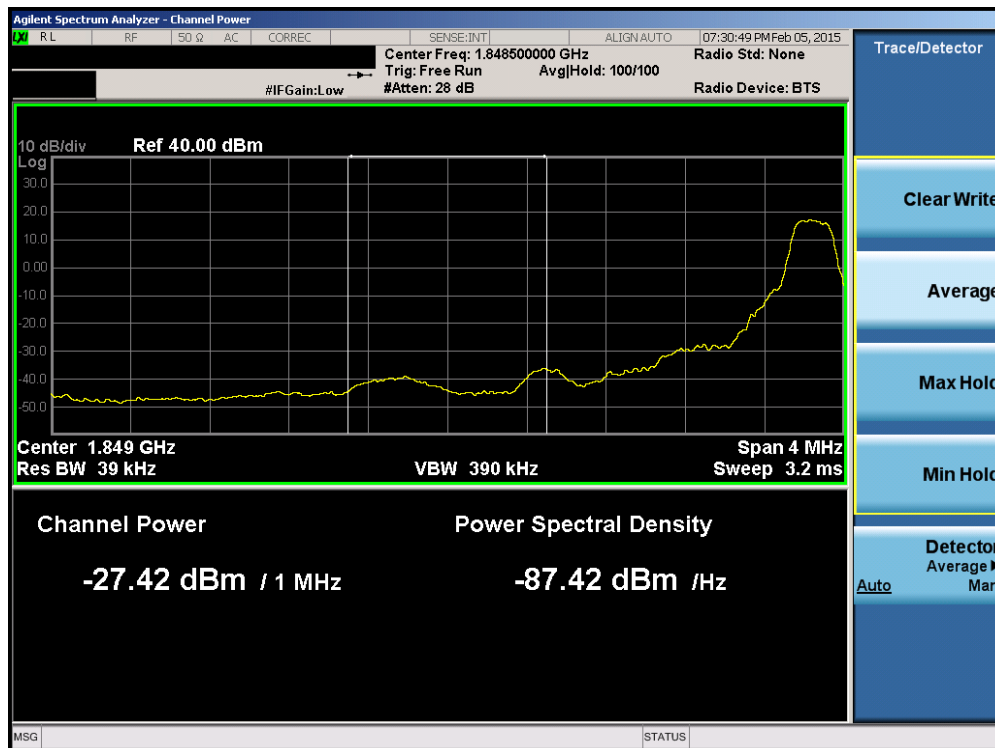


Plot 6-149. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 90 of 142



Plot 6-150. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

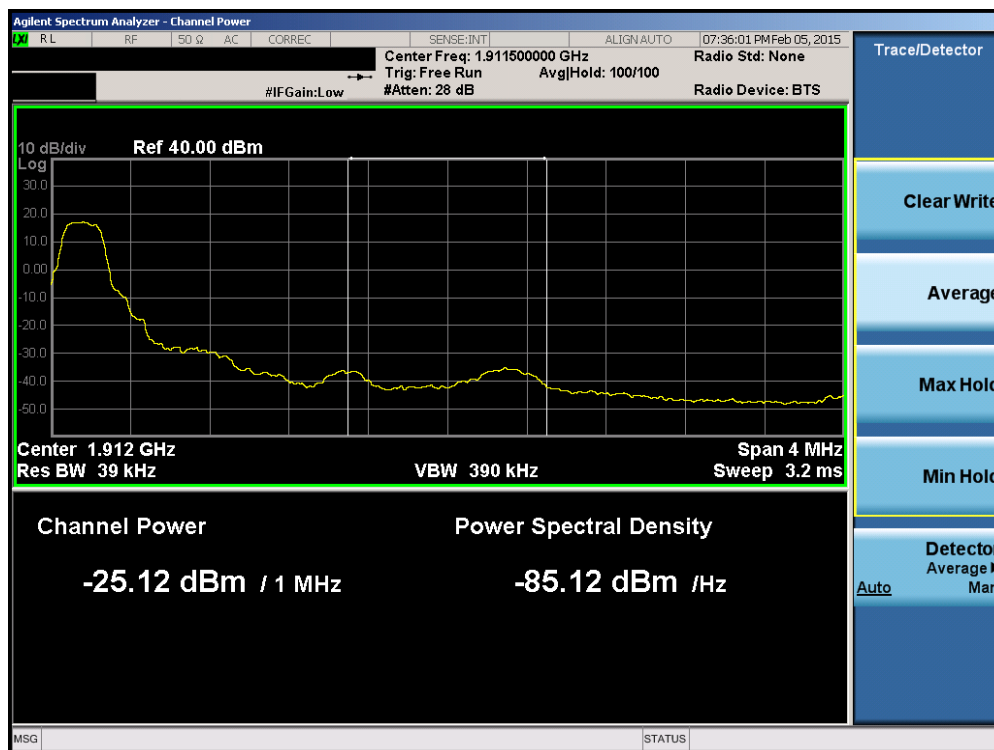


Plot 6-151. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 91 of 142

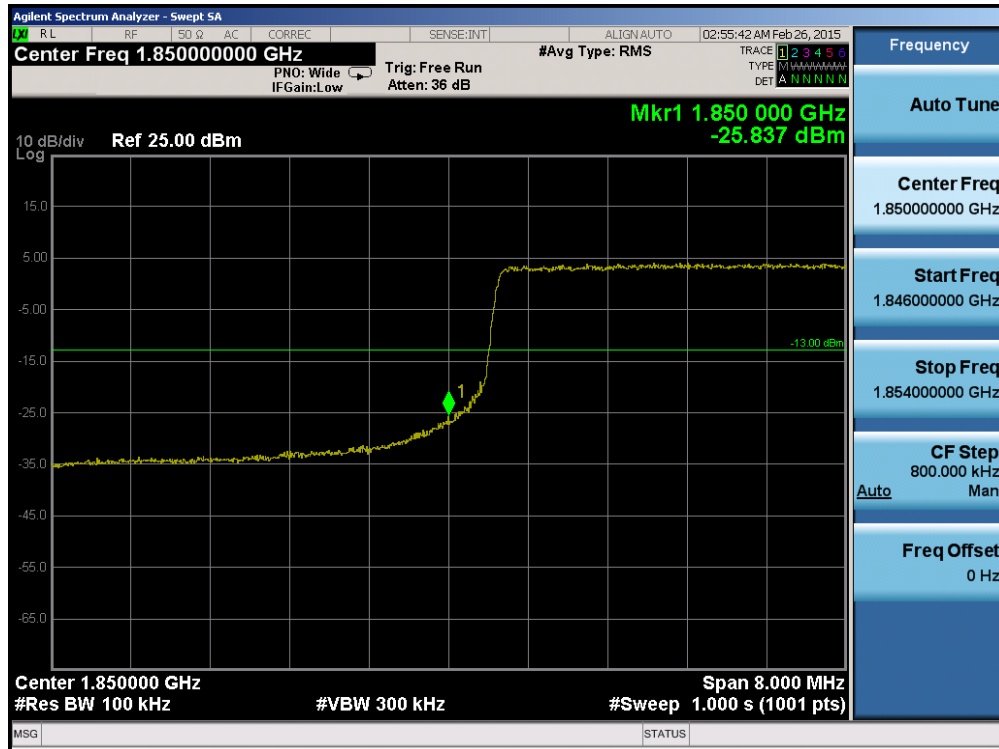


Plot 6-152. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

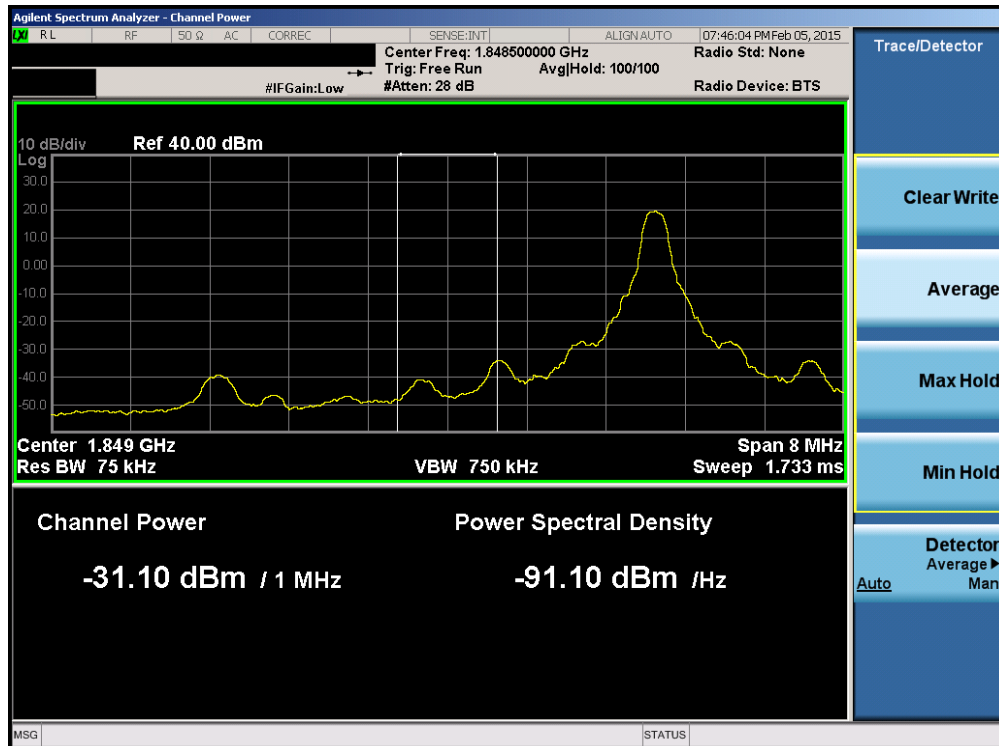


Plot 6-153. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 92 of 142

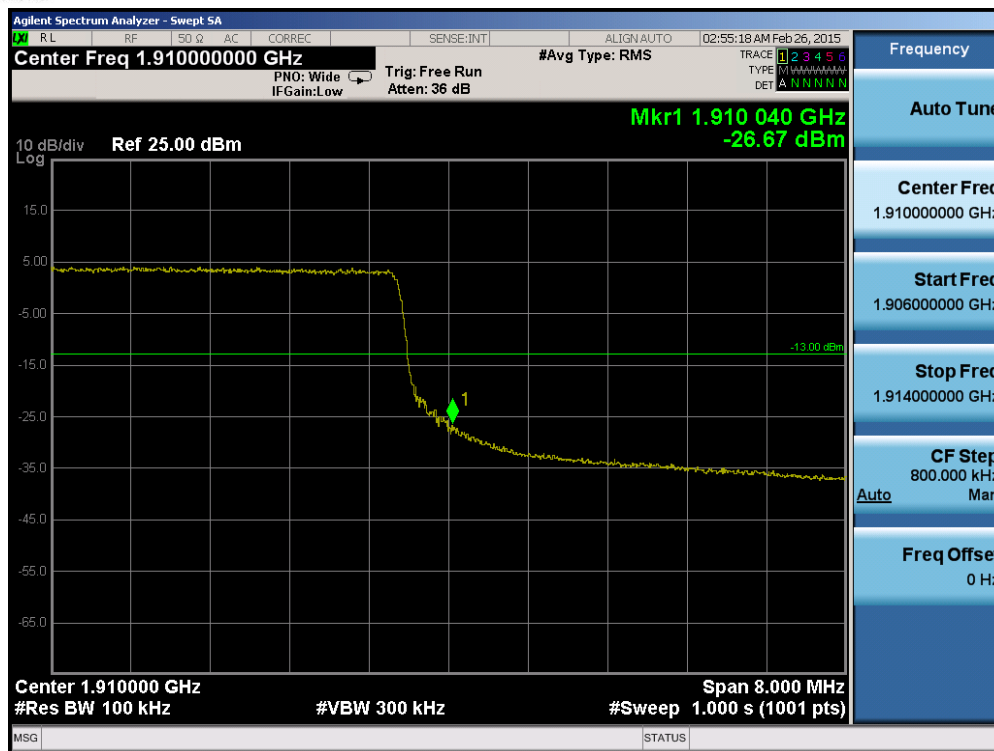


Plot 6-154. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

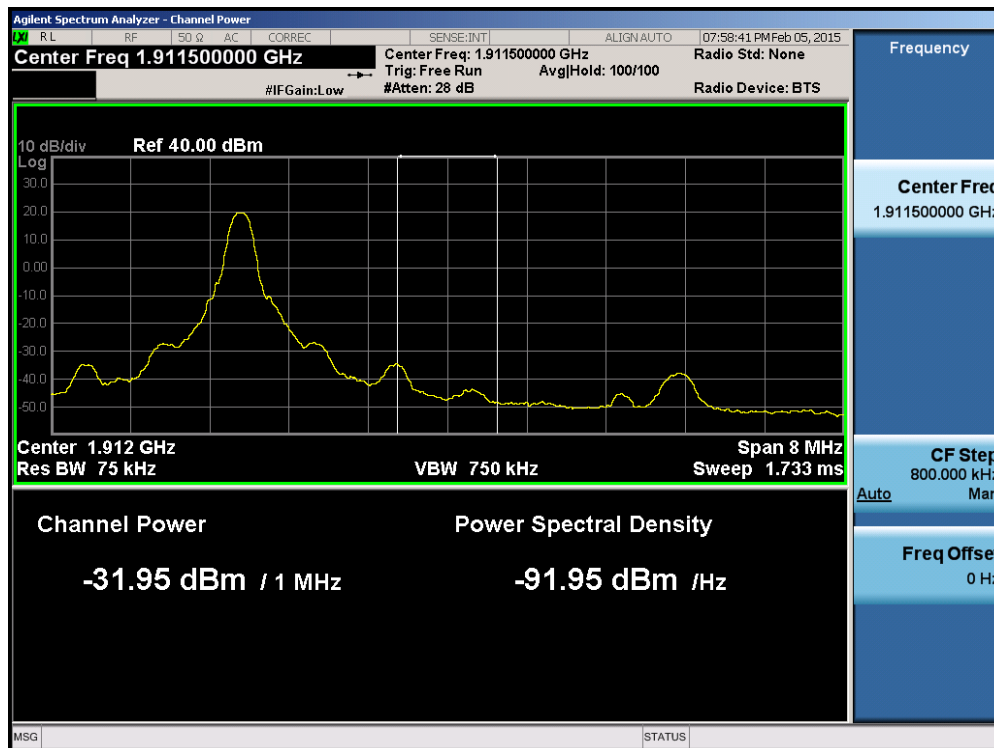


Plot 6-155. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 93 of 142

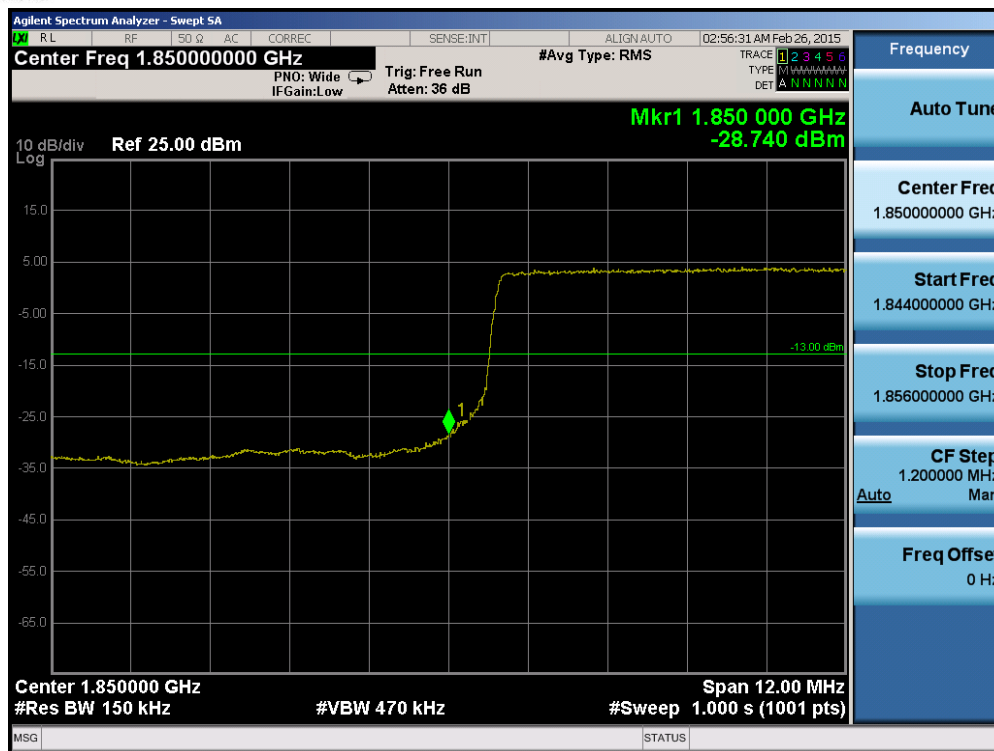


Plot 6-156. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

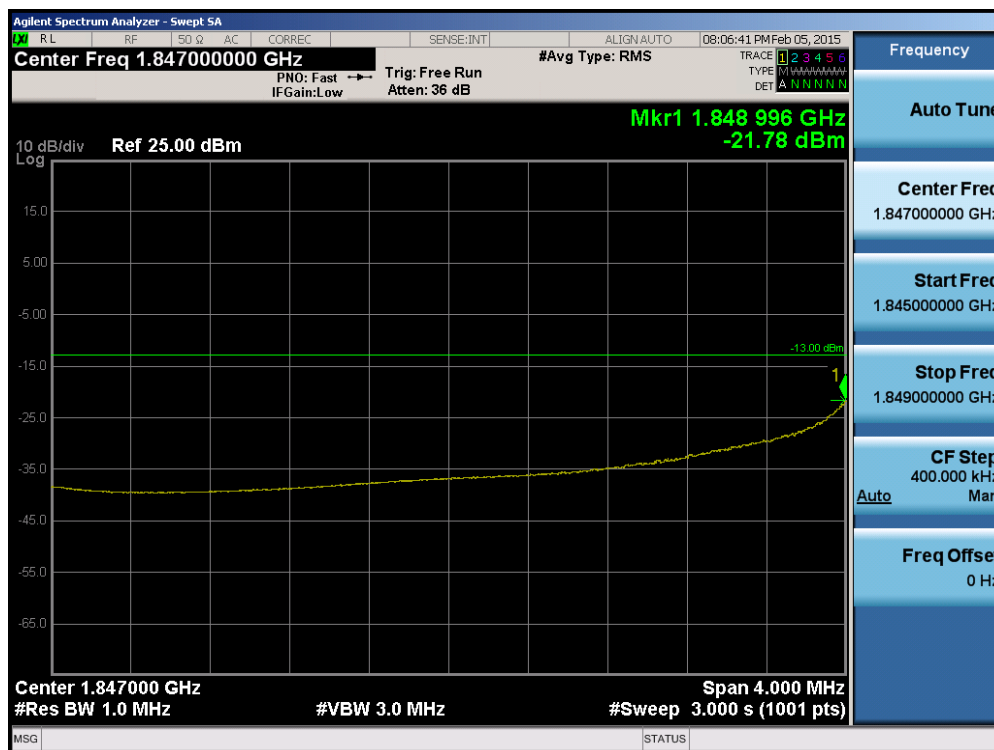


Plot 6-157. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 1)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 94 of 142

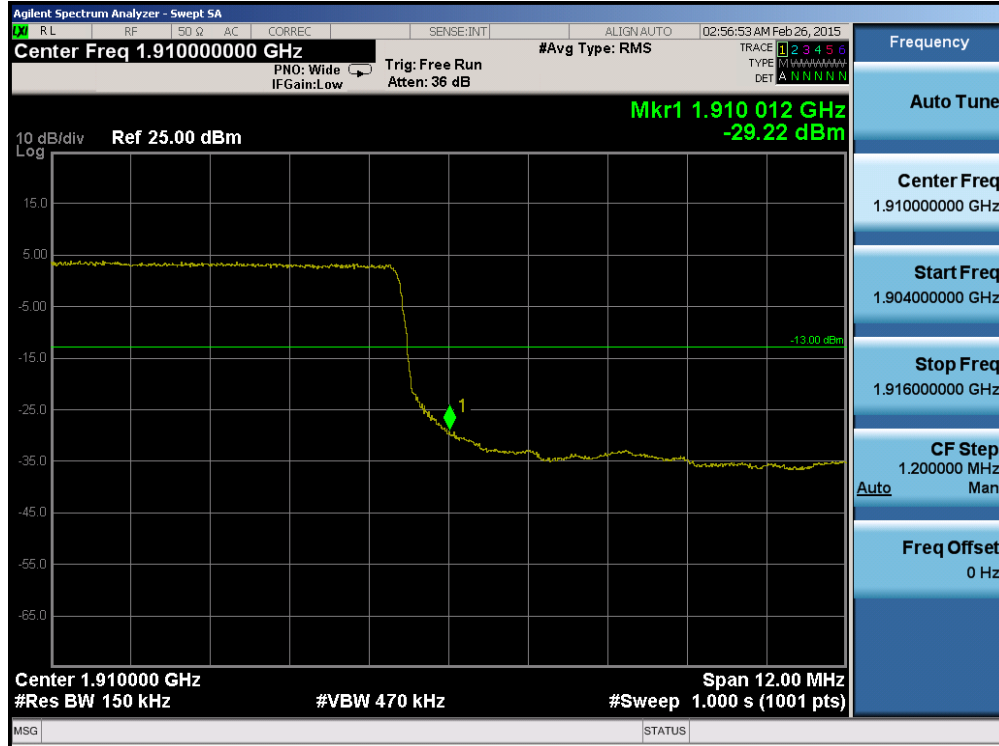


Plot 6-158. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 6-159. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 95 of 142

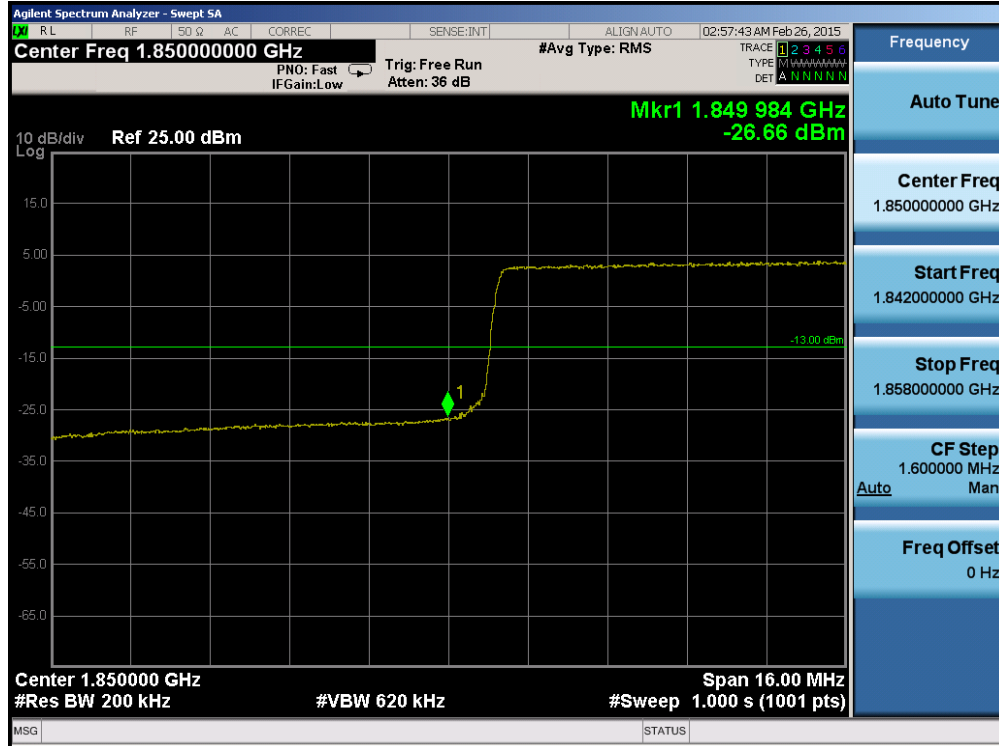


Plot 6-160. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - RB Size 75)

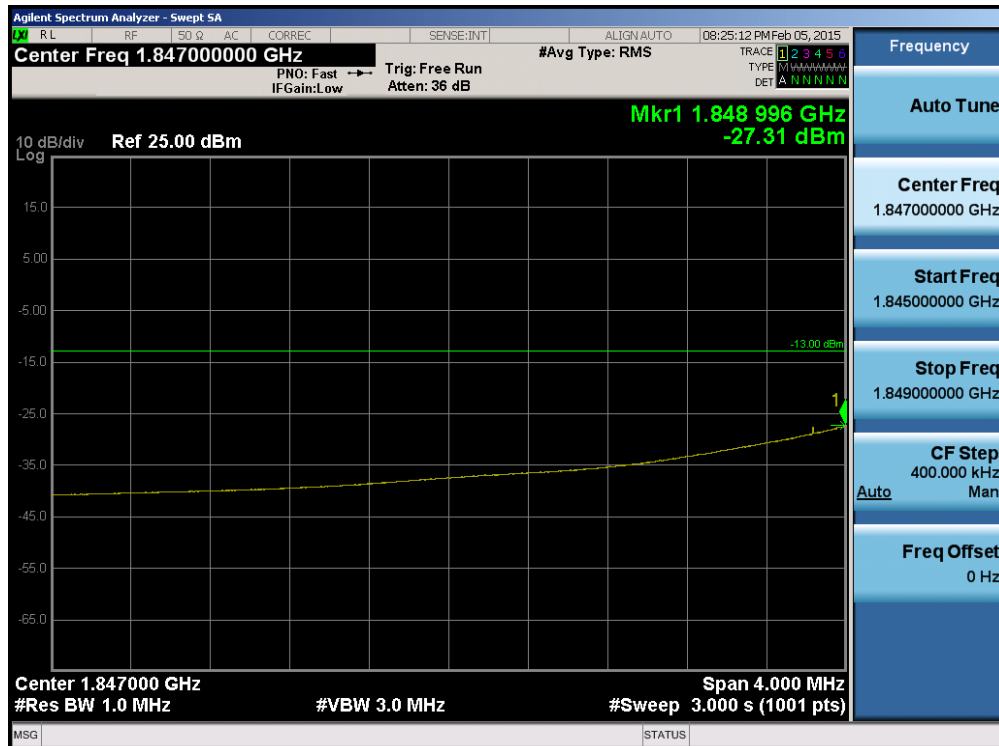


Plot 6-161. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - RB Size 75)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 96 of 142

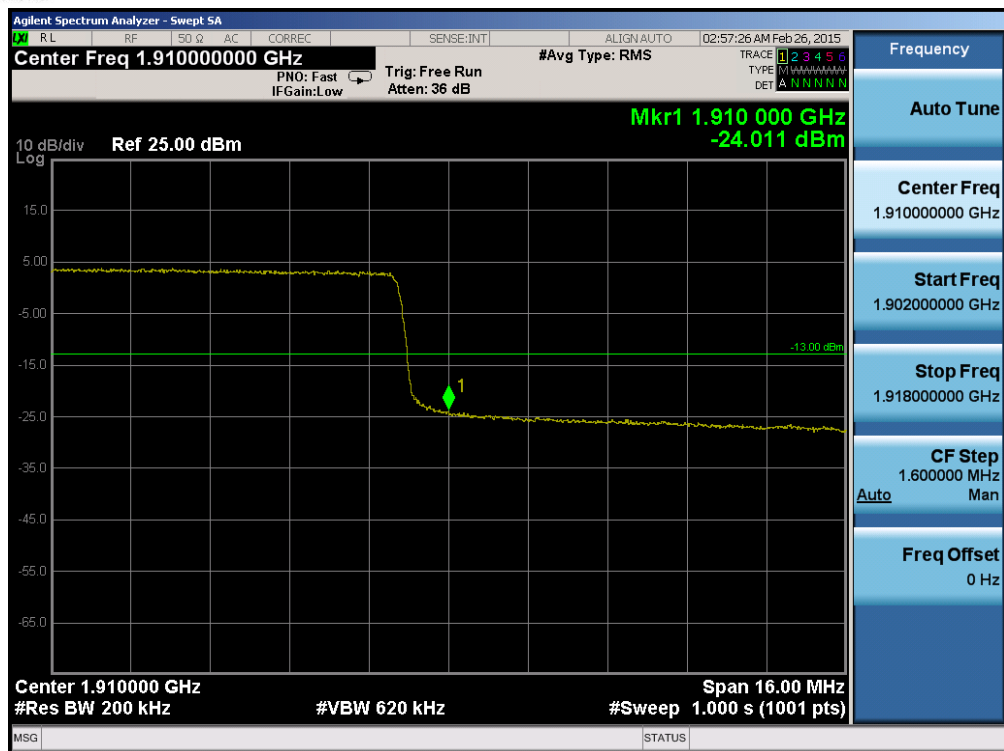


Plot 6-162. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

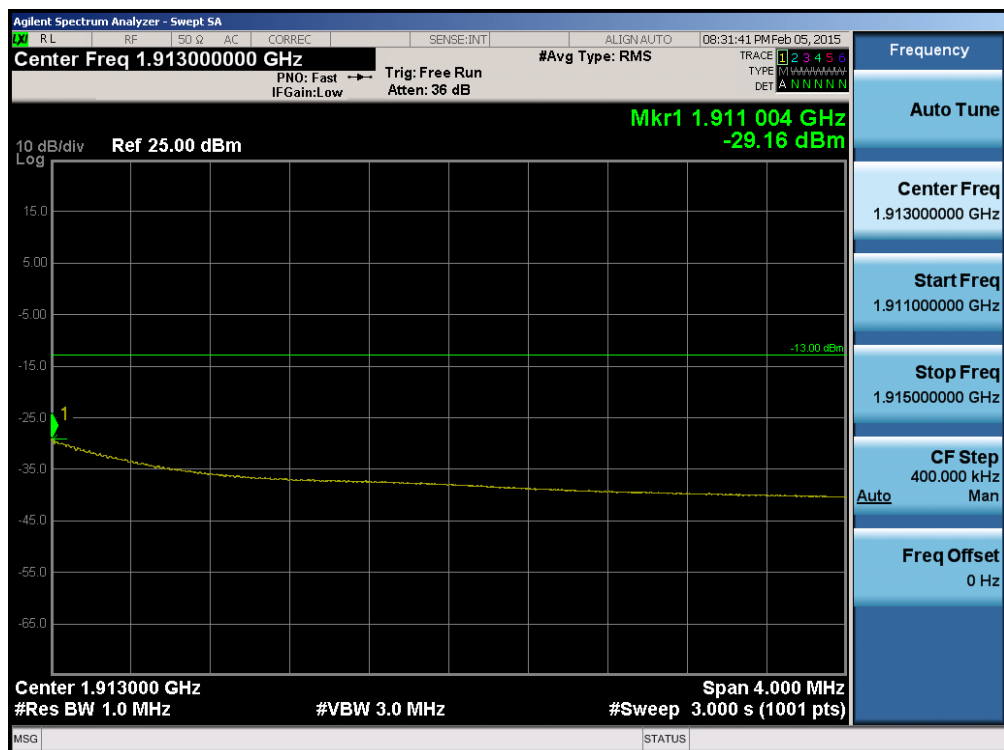


Plot 6-163. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 97 of 142

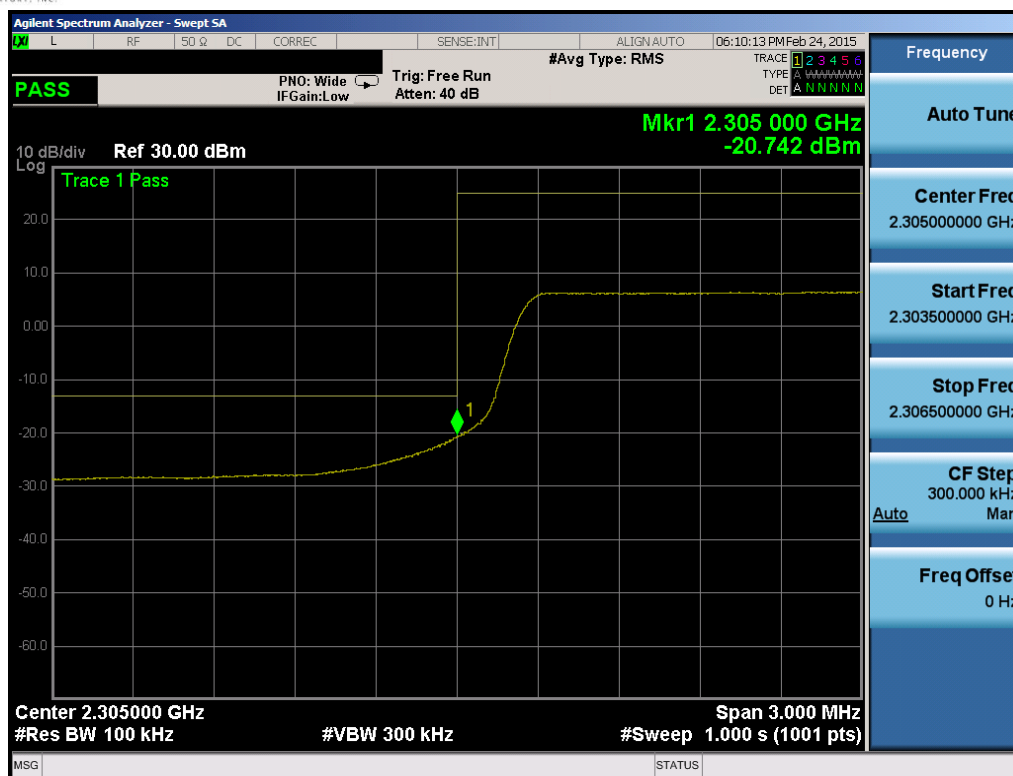


Plot 6-164. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 6-165. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 98 of 142

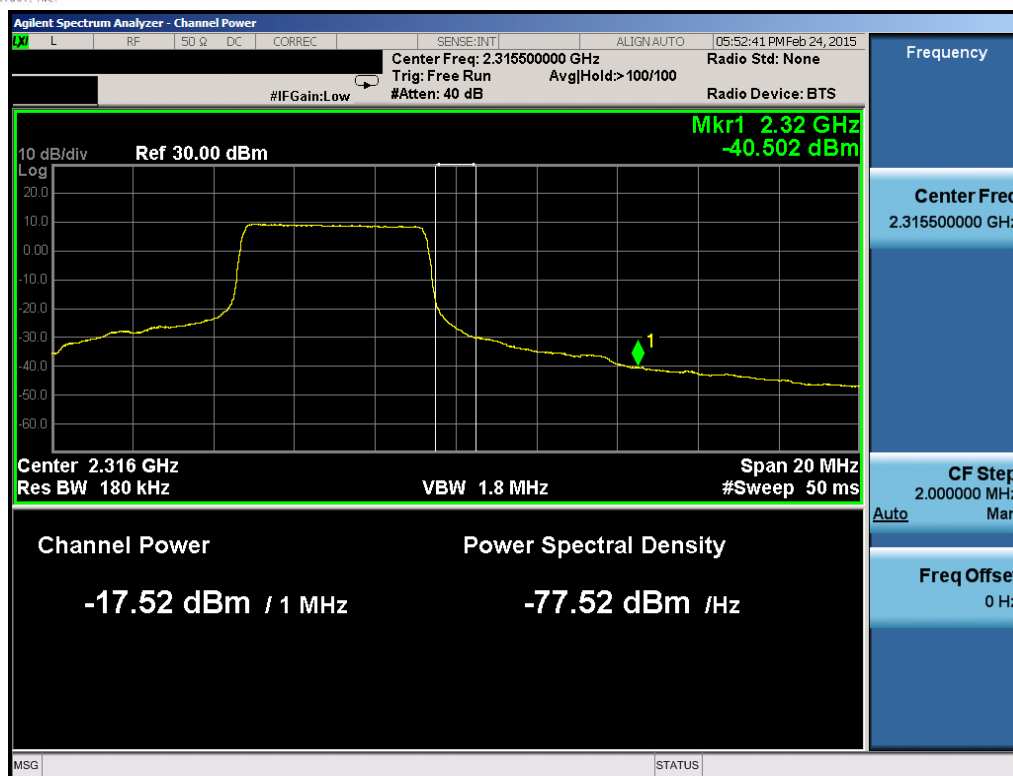


Plot 6-166. Lower Band Edge Plot (Band 30 – 5MHz QPSK – RB Size 25)

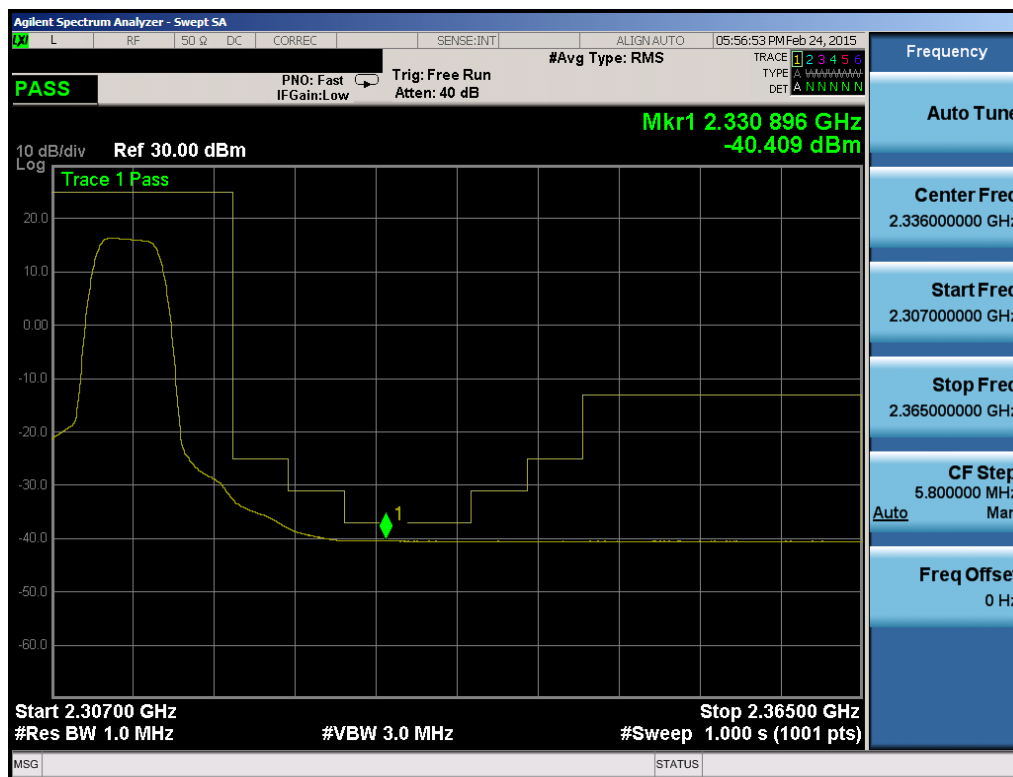


Plot 6-167. Lower Extended Band Edge Plot (Band 30 – 5MHz QPSK – RB Size 25)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 99 of 142



Plot 6-168. Upper Band Edge Plot (Band 30 – 5MHz QPSK – RB Size 25)

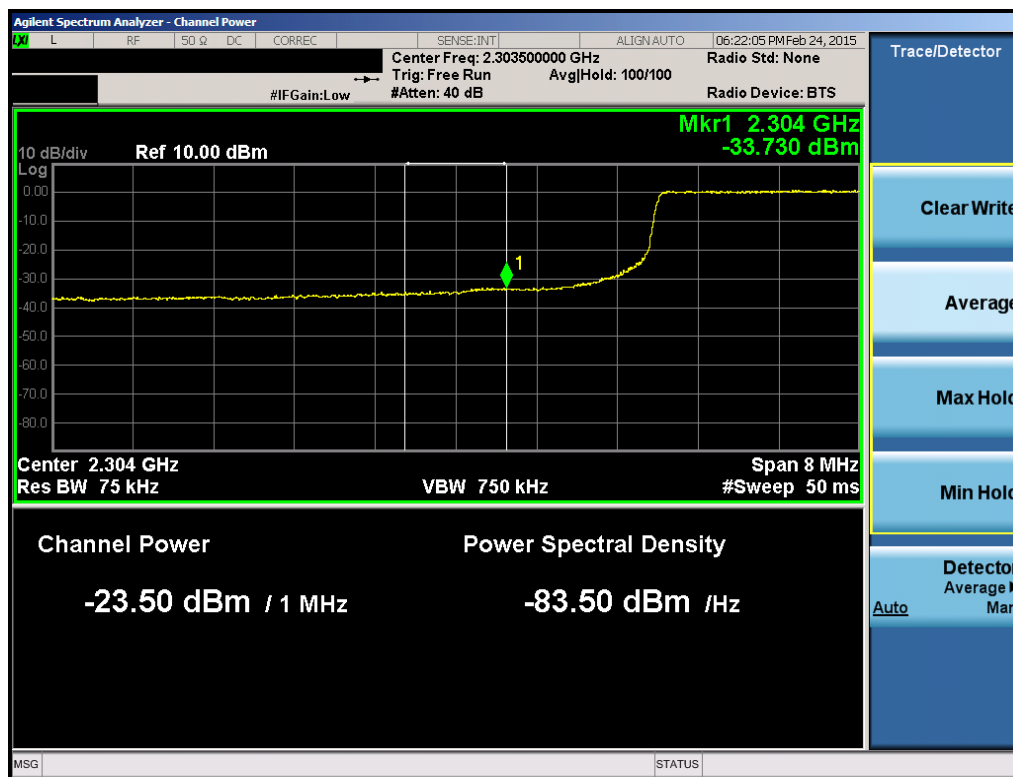


Plot 6-169. Upper Extended Band Edge Plot (Band 30 – 5MHz QPSK – RB Size 25)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 100 of 142

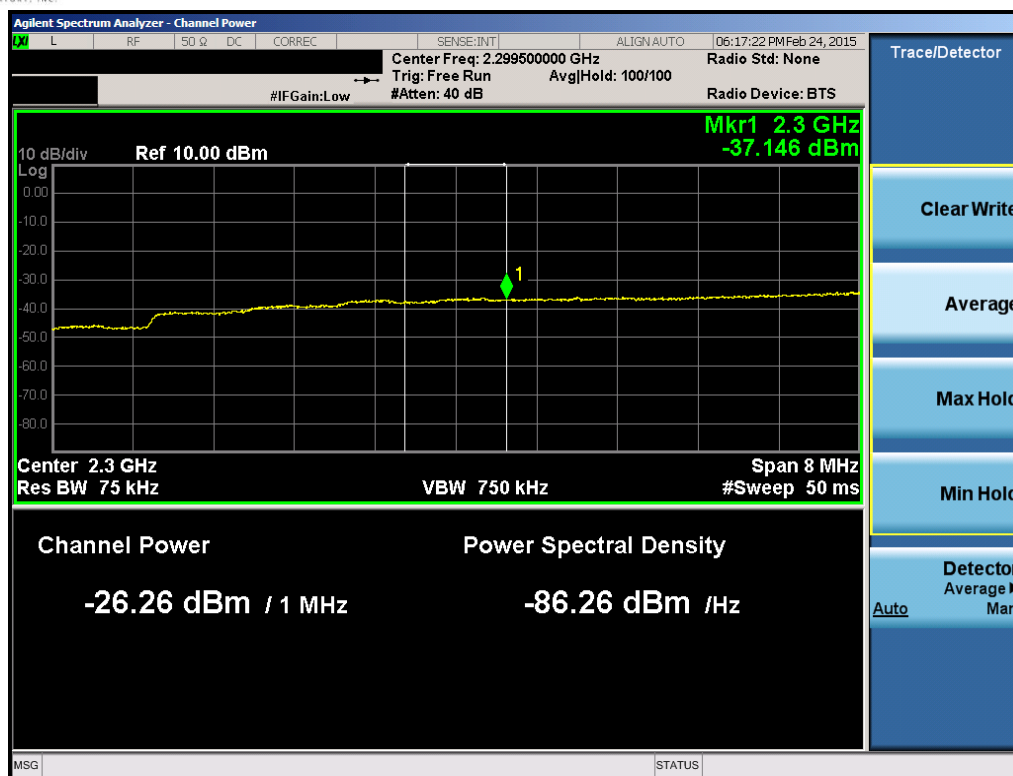


Plot 6-170. Lower Band Edge Plot (Band 30 – 10MHz QPSK – RB Size 50)

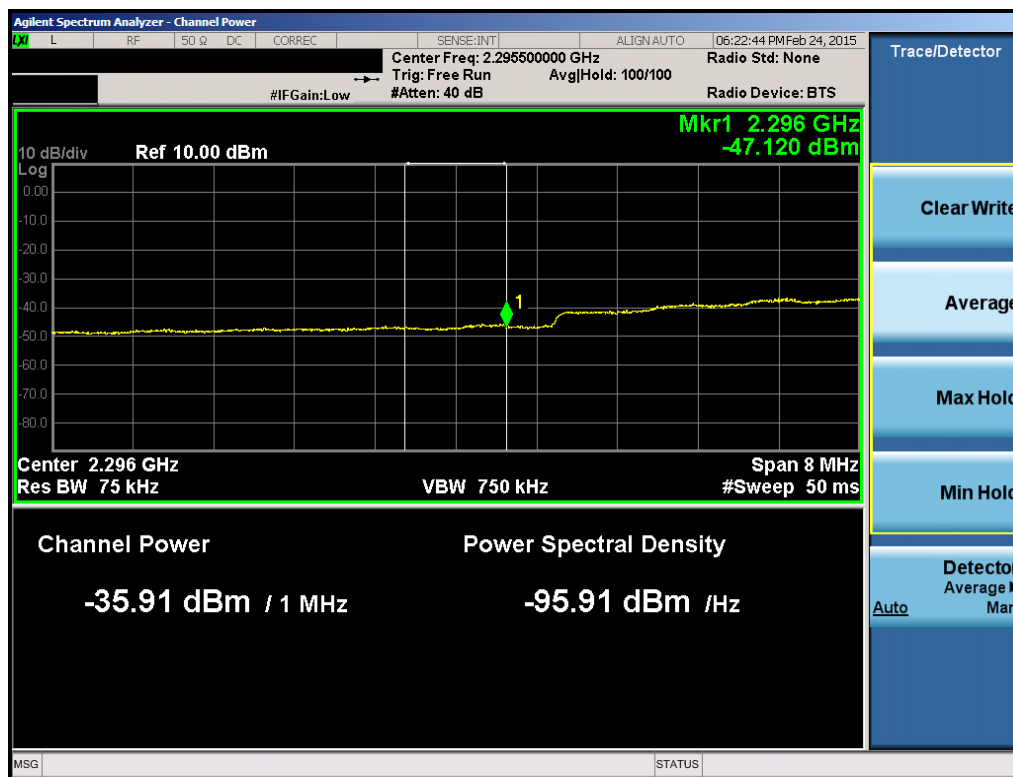


Plot 6-171. Lower Extended Band Edge Plot (Band 30 – 10MHz QPSK – RB Size 50)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 101 of 142

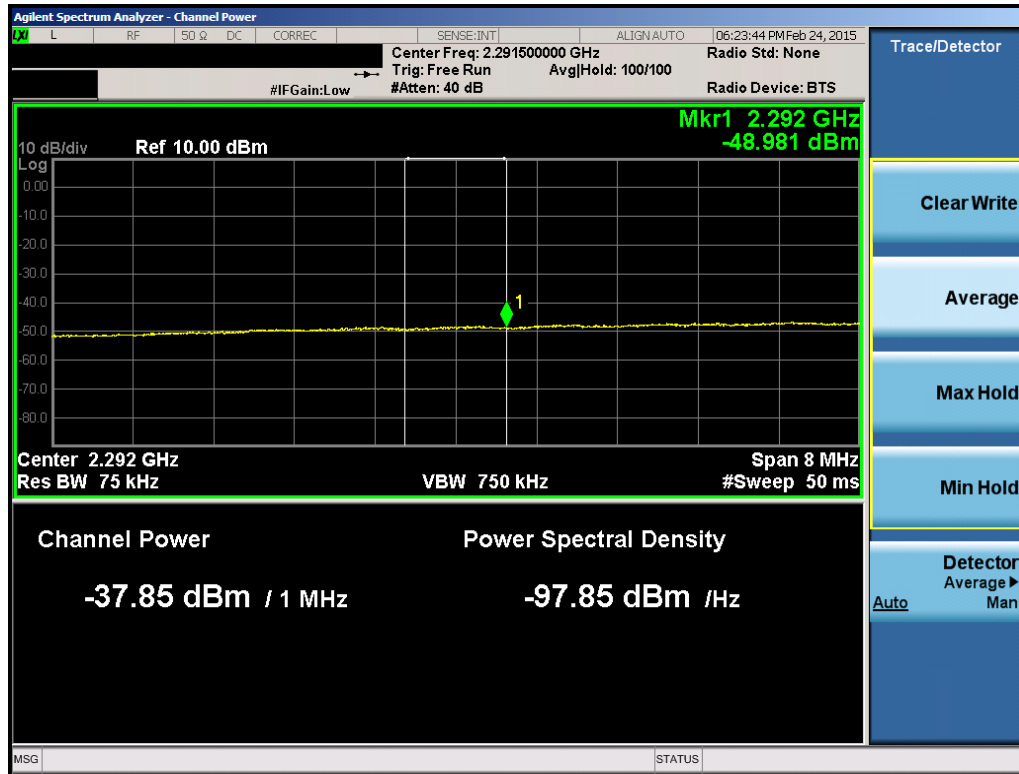


Plot 6-172. Lower Extended Band Edge Plot (Band 30 – 10MHz QPSK – RB Size 50)

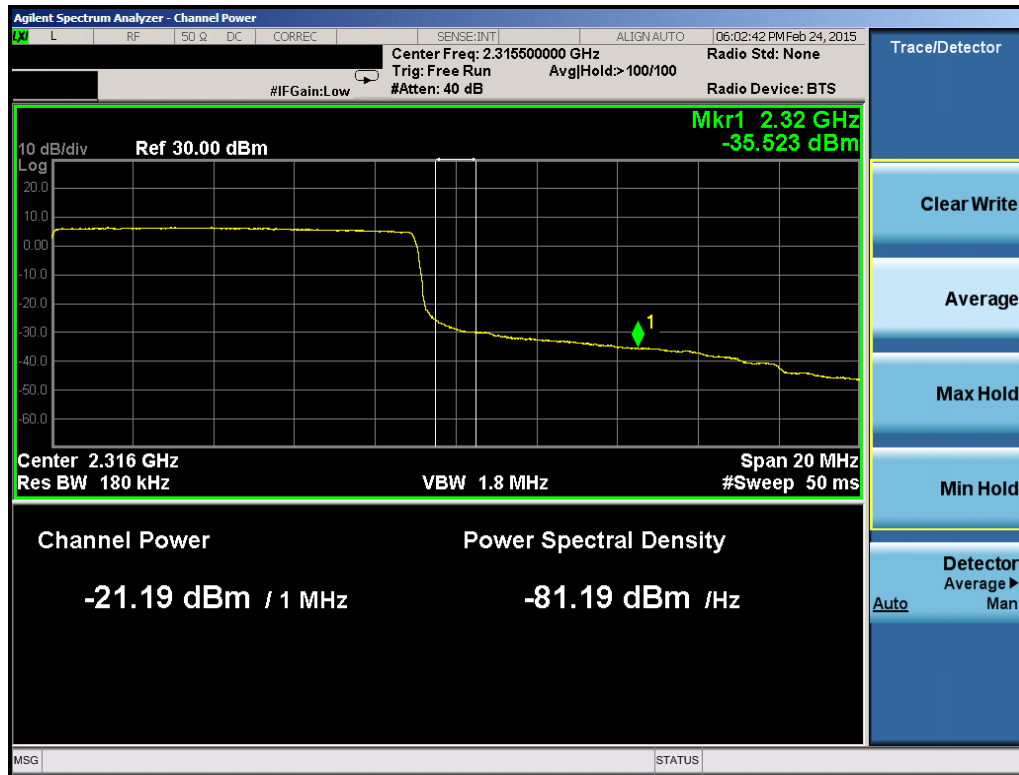


Plot 6-173. Lower Extended Band Edge Plot (Band 30 – 10MHz QPSK – RB Size 50)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 102 of 142

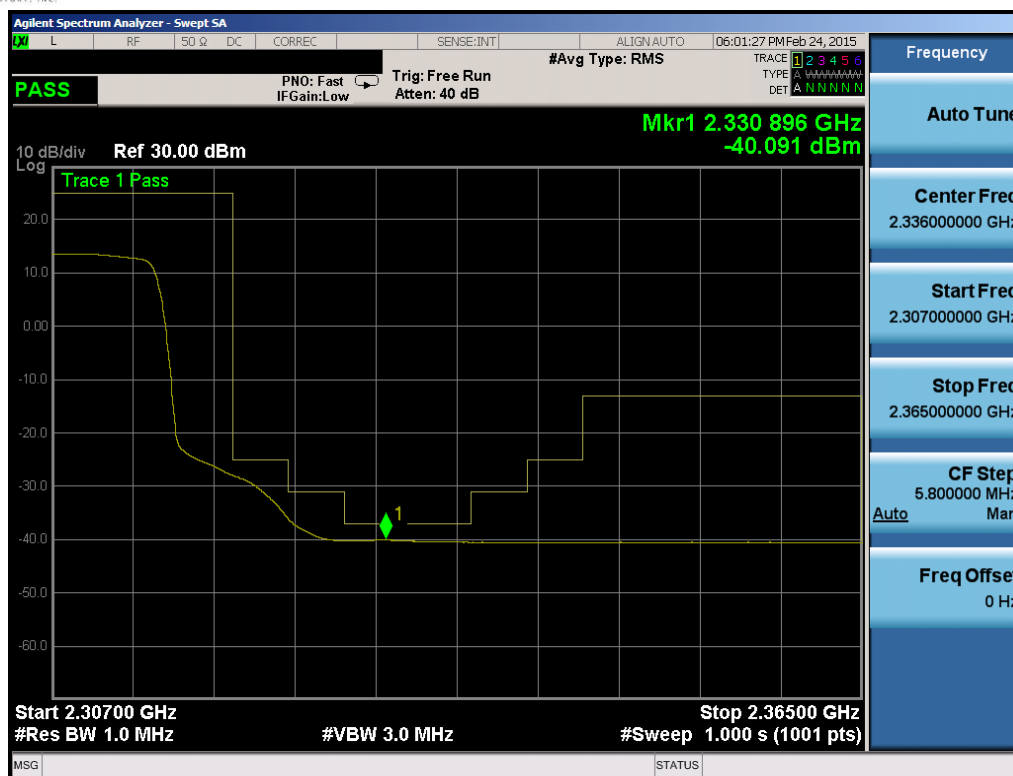


Plot 6-174. Lower Extended Band Edge Plot (Band 30 – 10MHz QPSK – RB Size 50)



Plot 6-175. Upper Band Edge Plot (Band 30 – 10MHz QPSK – RB Size 50)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 103 of 142



Plot 6-176. Upper Extended Band Edge Plot (Band 30 – 10MHz QPSK – RB Size 50)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 104 of 142

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.

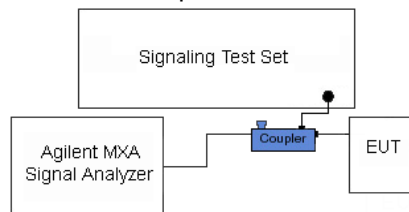


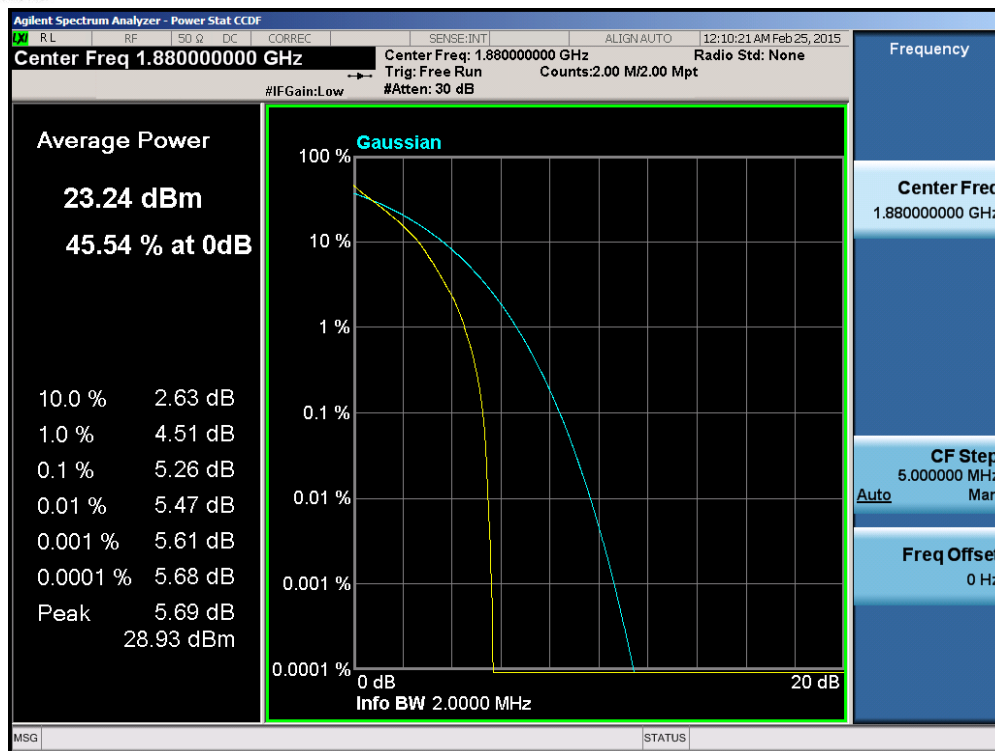


Figure 6-4. Test Instrument & Measurement Setup

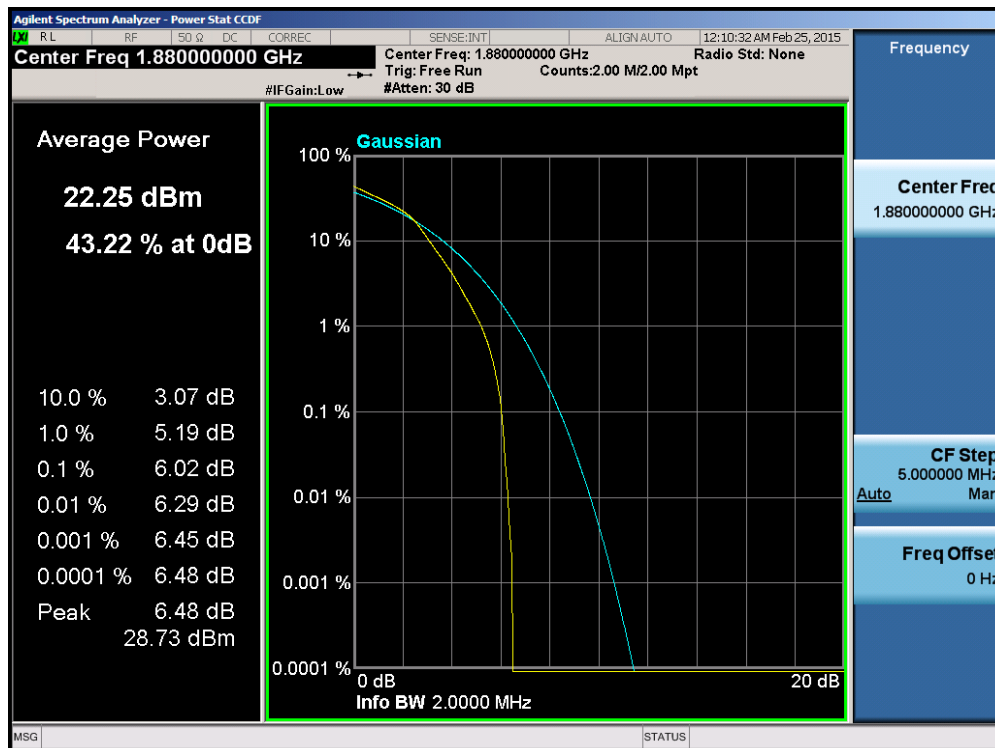
Test Notes

None.

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 105 of 142

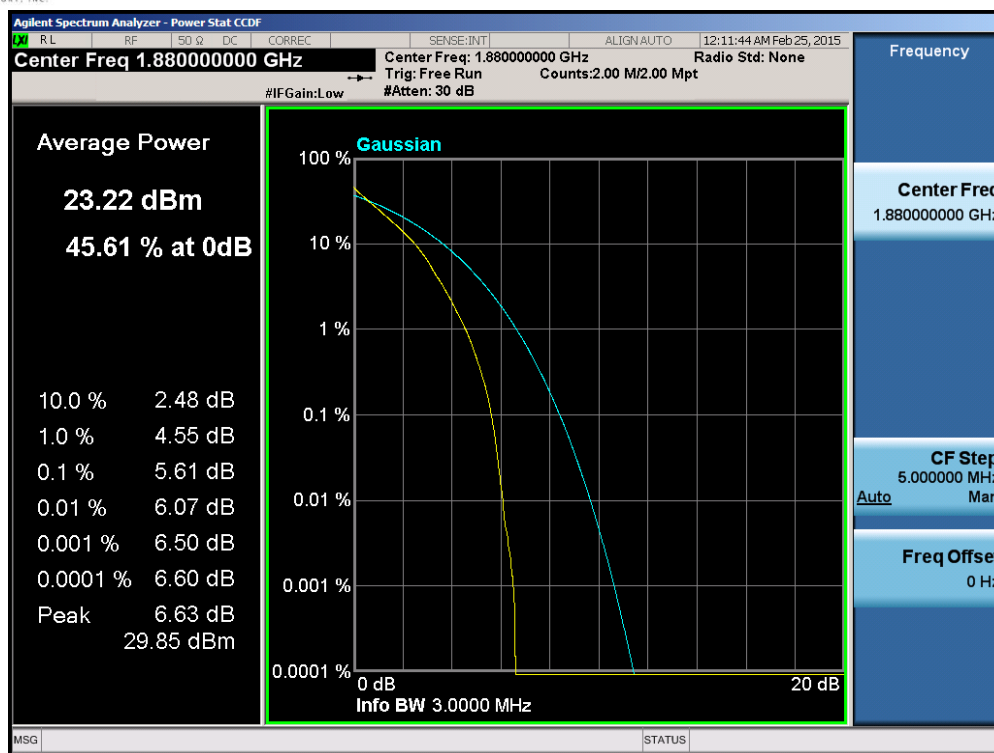


Plot 6-177. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

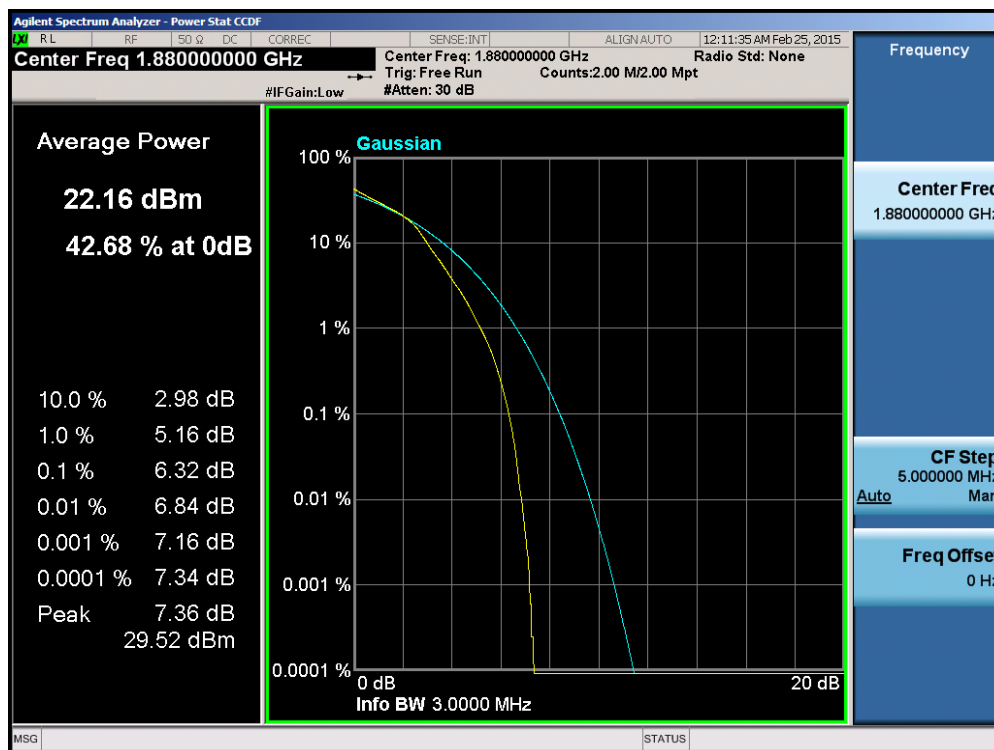


Plot 6-178. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 106 of 142

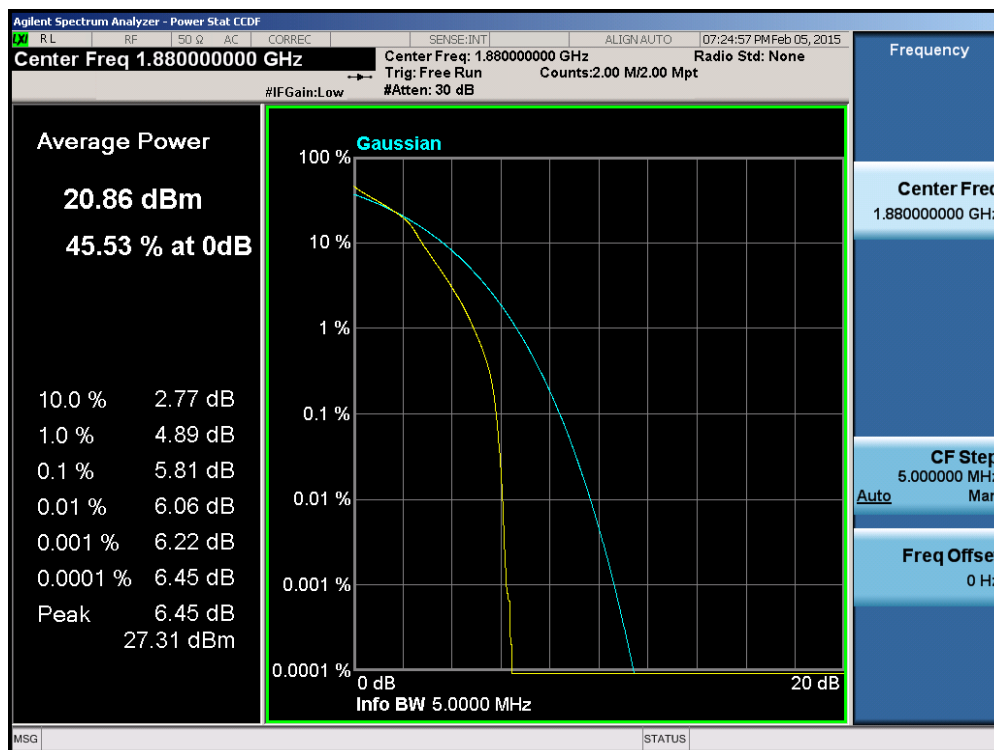
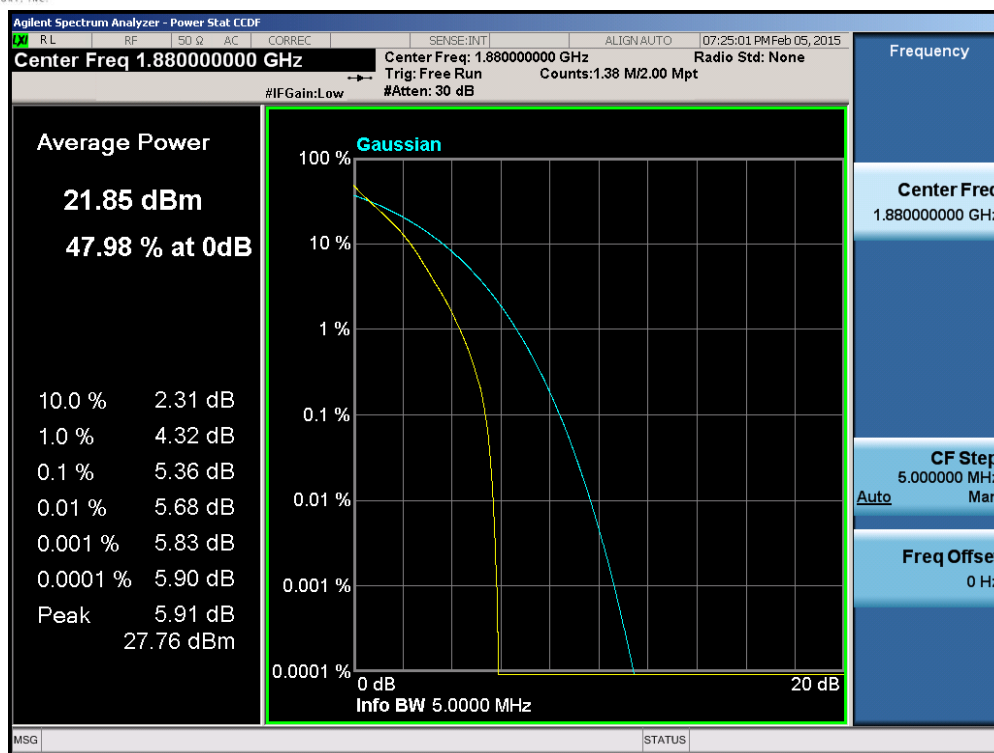


Plot 6-179. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

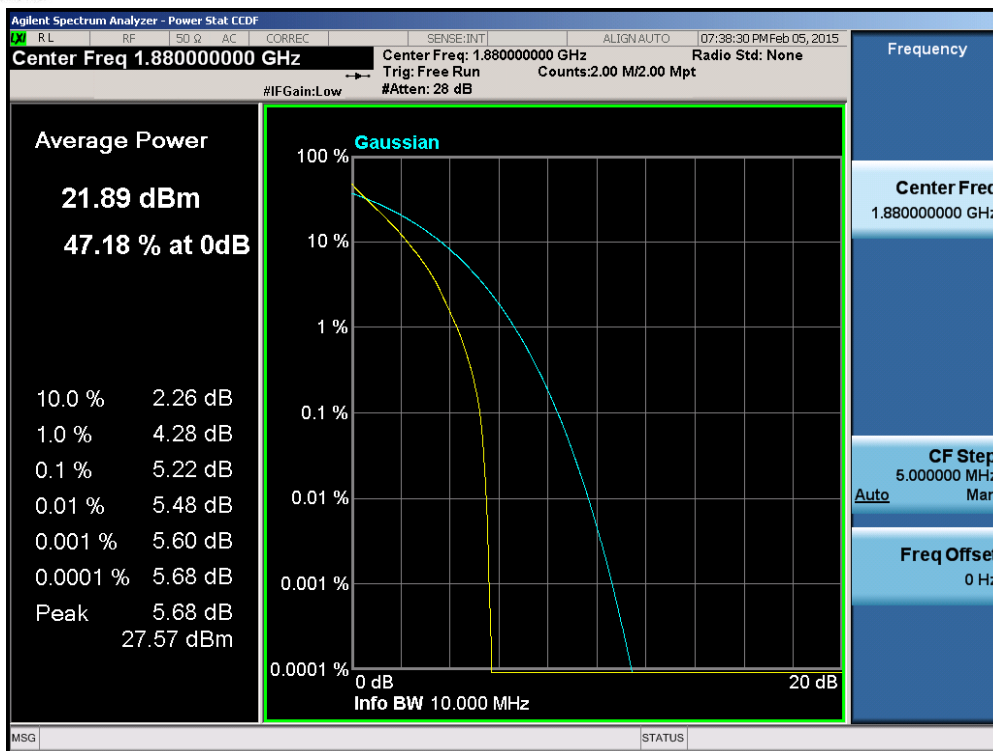


Plot 6-180. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

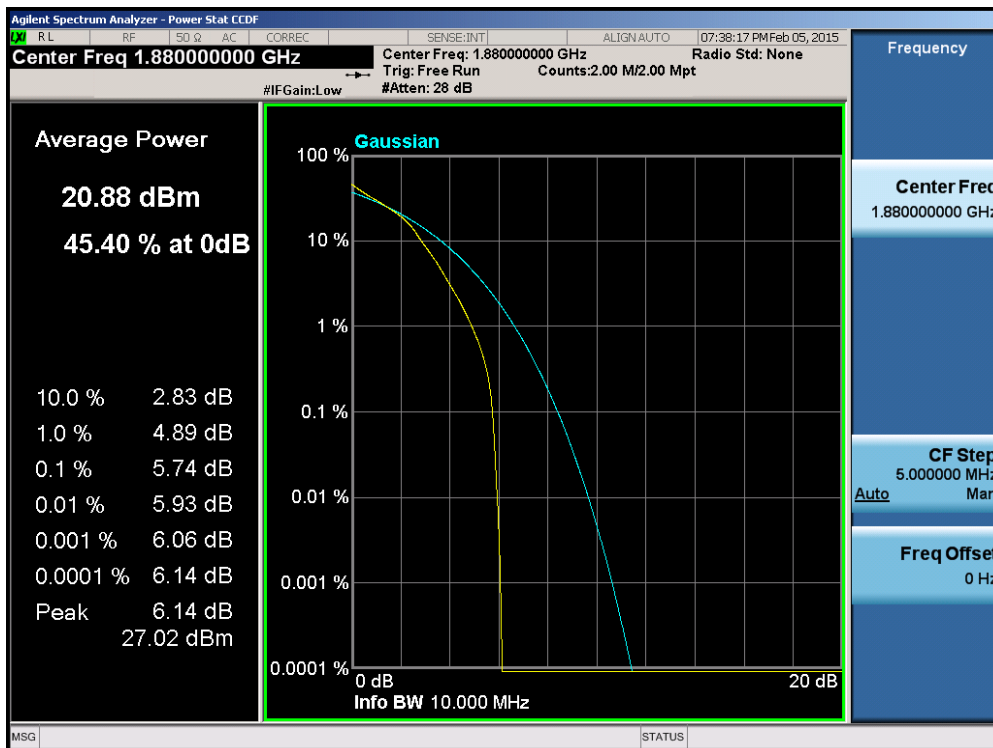
FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 107 of 142



FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 108 of 142

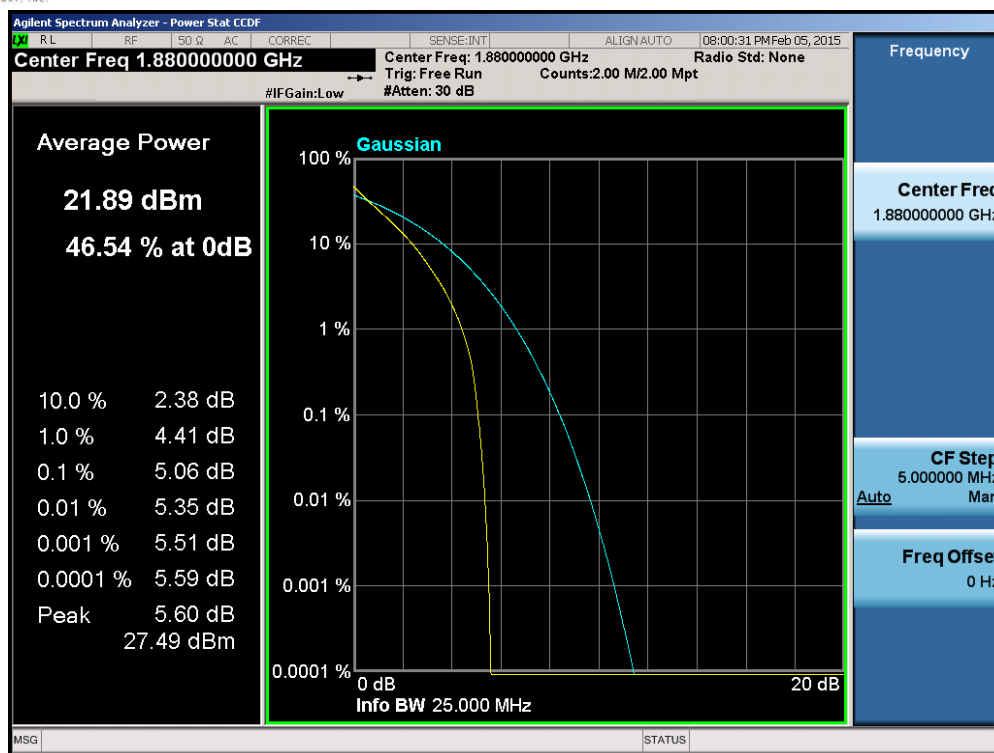


Plot 6-183. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

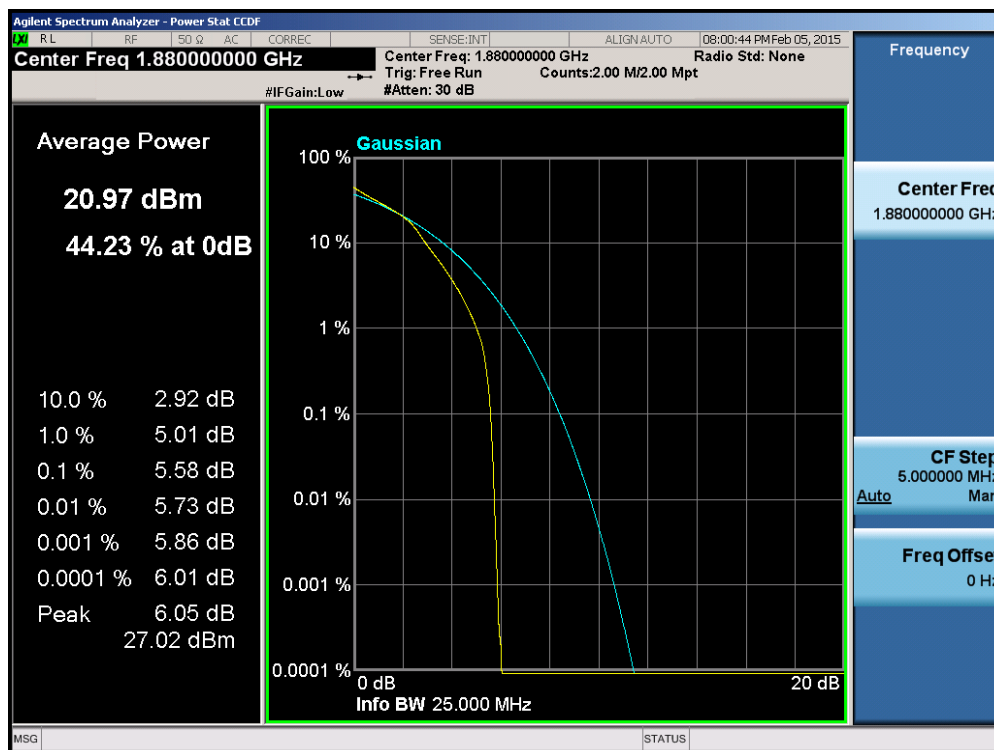


Plot 6-184. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 109 of 142

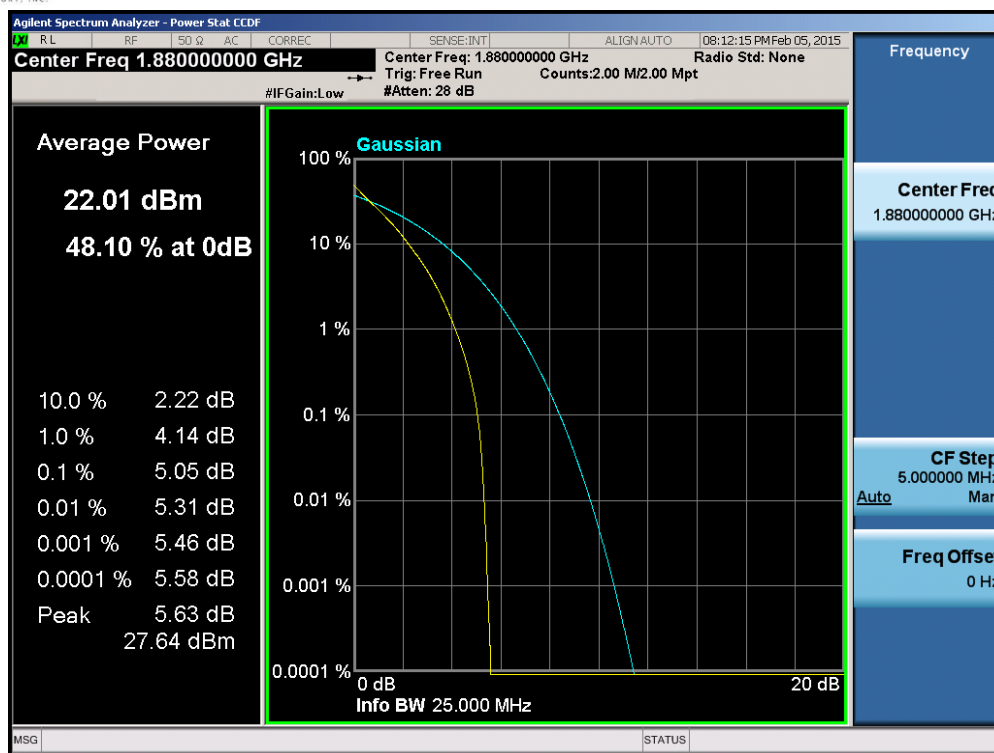


Plot 6-185. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

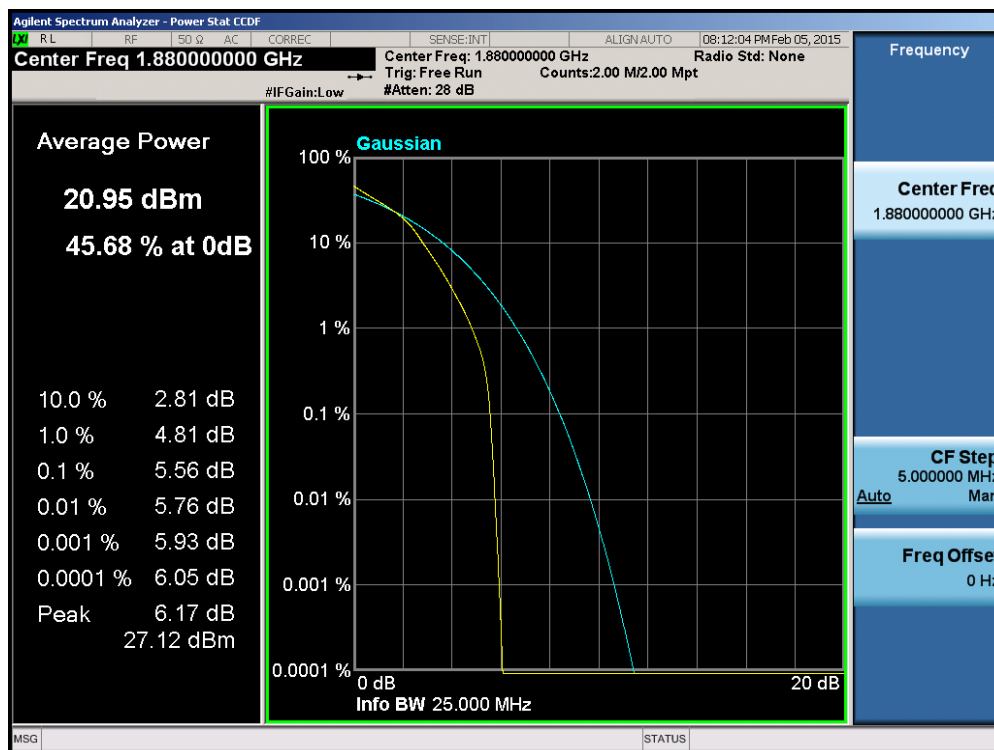


Plot 6-186. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 110 of 142



Plot 6-187. PAR Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 6-188. PAR Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 111 of 142

6.6 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §27.50(c.10) §27.50(d.4) 27.50(a.3)

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: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 112 of 142

Test Setup

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

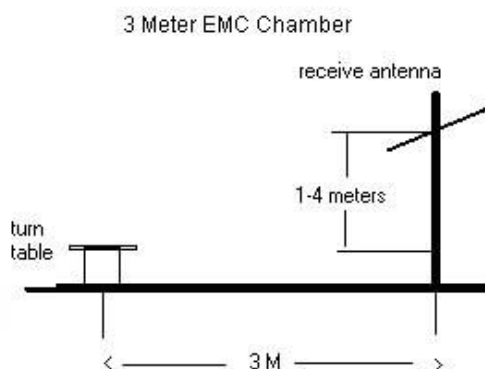



Figure 6-5. Test Instrument & Measurement Setup



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.

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 113 of 142



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]
699.70	1.4	QPSK	Standard	1 / 0	15.74	2.71	V	18.45	34.77	-16.32
707.50	1.4	QPSK	Standard	1 / 0	16.35	2.71	V	19.06	34.77	-15.71
715.30	1.4	QPSK	Standard	1 / 0	17.13	2.71	V	19.84	34.771	-14.93
699.70	1.4	16-QAM	Standard	1 / 0	14.69	2.71	V	17.40	34.771	-17.37
707.50	1.4	16-QAM	Standard	1 / 0	15.17	2.71	V	17.88	34.771	-16.89
715.30	1.4	16-QAM	Standard	1 / 0	15.96	2.71	V	18.67	34.771	-16.10
700.50	3	QPSK	Standard	1 / 14	15.82	2.71	V	18.53	34.771	-16.24
707.50	3	QPSK	Standard	1 / 14	15.31	2.71	V	18.02	34.771	-16.75
714.50	3	QPSK	Standard	1 / 14	16.42	2.71	V	19.13	34.771	-15.64
700.50	3	16-QAM	Standard	1 / 14	14.73	2.71	V	17.44	34.771	-17.33
707.50	3	16-QAM	Standard	1 / 14	14.19	2.71	V	16.90	34.771	-17.87
714.50	3	16-QAM	Standard	1 / 14	15.45	2.71	V	18.16	34.771	-16.61
701.50	5	QPSK	Standard	1 / 24	16.35	2.71	V	19.06	34.771	-15.71
707.50	5	QPSK	Standard	1 / 24	16.60	2.71	V	19.31	34.771	-15.46
713.50	5	QPSK	Standard	1 / 24	17.75	2.71	V	20.46	34.771	-14.31
701.50	5	16-QAM	Standard	1 / 24	15.36	2.71	V	18.07	34.771	-16.70
707.50	5	16-QAM	Standard	1 / 24	15.40	2.71	V	18.11	34.771	-16.66
713.50	5	16-QAM	Standard	1 / 24	15.63	2.71	V	18.34	34.771	-16.43
704.00	10	QPSK	Standard	1 / 49	15.85	2.71	V	18.56	34.771	-16.21
707.50	10	QPSK	Standard	1 / 49	15.56	2.71	V	18.27	34.771	-16.50
711.00	10	QPSK	Standard	1 / 49	16.35	2.71	V	19.06	34.771	-15.71
704.00	10	16-QAM	Standard	1 / 49	14.79	2.71	V	17.50	34.771	-17.27
707.50	10	16-QAM	Standard	1 / 49	14.52	2.71	V	17.23	34.771	-17.54
711.00	10	16-QAM	Standard	1 / 49	15.31	2.71	V	18.02	34.771	-16.75

Table 6-2. ERP Data (Band 12)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 114 of 142

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	13.75	3.01	V	16.76	38.451	-21.70
836.50	1.4	QPSK	Standard	1 / 5	13.10	3.15	V	16.25	38.451	-22.21
848.30	1.4	QPSK	Standard	1 / 5	12.84	3.28	V	16.12	38.451	-22.33
824.70	1.4	16-QAM	Standard	1 / 5	12.80	3.01	V	15.81	38.451	-22.65
836.50	1.4	16-QAM	Standard	1 / 5	12.05	3.15	V	15.20	38.451	-23.26
848.30	1.4	16-QAM	Standard	1 / 5	11.74	3.28	V	15.02	38.451	-23.43
825.50	3	QPSK	Standard	1 / 0	14.14	3.02	V	17.16	38.451	-21.30
836.50	3	QPSK	Standard	1 / 0	13.62	3.15	V	16.77	38.451	-21.69
847.50	3	QPSK	Standard	1 / 0	13.48	3.27	V	16.75	38.451	-21.70
825.50	3	16-QAM	Standard	1 / 0	13.05	3.02	V	16.07	38.451	-22.39
836.50	3	16-QAM	Standard	1 / 0	12.73	3.15	V	15.88	38.451	-22.58
847.50	3	16-QAM	Standard	1 / 0	12.20	3.27	V	15.47	38.451	-22.98
826.50	5	QPSK	Standard	1 / 24	13.26	3.03	V	16.29	38.451	-22.16
836.50	5	QPSK	Standard	1 / 24	13.31	3.15	V	16.46	38.451	-22.00
846.50	5	QPSK	Standard	1 / 24	13.13	3.26	V	16.39	38.451	-22.06
826.50	5	16-QAM	Standard	1 / 24	12.22	3.03	V	15.25	38.451	-23.20
836.50	5	16-QAM	Standard	1 / 24	12.10	3.15	V	15.25	38.451	-23.21
846.50	5	16-QAM	Standard	1 / 24	12.01	3.26	V	15.27	38.451	-23.18
829.00	10	QPSK	Standard	1 / 0	13.63	3.06	V	16.69	38.451	-21.76
836.50	10	QPSK	Standard	1 / 0	13.06	3.15	V	16.21	38.451	-22.25
844.00	10	QPSK	Standard	1 / 0	12.88	3.23	V	16.11	38.451	-22.34
829.00	10	16-QAM	Standard	1 / 0	12.63	3.06	V	15.69	38.451	-22.76
836.50	10	16-QAM	Standard	1 / 0	12.13	3.15	V	15.28	38.451	-23.18
844.00	10	16-QAM	Standard	1 / 0	11.69	3.23	V	14.92	38.451	-23.53

Table 6-3. ERP Data (Band 5)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 115 of 142

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	14.00	9.29	V	23.29	30.000	-6.71
1732.50	1.4	QPSK	Standard	1 / 5	14.18	9.34	V	23.52	30.000	-6.48
1754.30	1.4	QPSK	Standard	1 / 5	13.27	9.38	V	22.65	30.000	-7.35
1710.70	1.4	16-QAM	Standard	1 / 5	12.86	9.29	V	22.15	30.000	-7.85
1732.50	1.4	16-QAM	Standard	1 / 5	13.05	9.34	V	22.39	30.000	-7.61
1754.30	1.4	16-QAM	Standard	1 / 5	12.22	9.38	V	21.60	30.000	-8.40
1711.50	3	QPSK	Standard	1 / 14	13.11	9.30	V	22.41	30.000	-7.59
1732.50	3	QPSK	Standard	1 / 14	13.74	9.34	V	23.08	30.000	-6.92
1753.50	3	QPSK	Standard	1 / 14	13.30	9.38	V	22.68	30.000	-7.32
1711.50	3	16-QAM	Standard	1 / 14	11.98	9.30	V	21.28	30.000	-8.72
1732.50	3	16-QAM	Standard	1 / 14	12.68	9.34	V	22.02	30.000	-7.98
1753.50	3	16-QAM	Standard	1 / 14	12.14	9.38	V	21.52	30.000	-8.48
1712.50	5	QPSK	Standard	1 / 24	13.09	9.30	V	22.39	30.000	-7.61
1732.50	5	QPSK	Standard	1 / 24	14.84	9.34	V	24.18	30.000	-5.82
1752.50	5	QPSK	Standard	1 / 24	15.62	9.38	V	25.00	30.000	-5.00
1712.50	5	16-QAM	Standard	1 / 24	12.10	9.30	V	21.40	30.000	-8.60
1732.50	5	16-QAM	Standard	1 / 24	13.62	9.34	V	22.96	30.000	-7.04
1752.50	5	16-QAM	Standard	1 / 24	14.61	9.38	V	23.99	30.000	-6.01
1715.00	10	QPSK	Standard	1 / 49	14.61	9.30	V	23.91	30.000	-6.09
1732.50	10	QPSK	Standard	1 / 49	15.15	9.34	V	24.49	30.000	-5.51
1750.00	10	QPSK	Standard	1 / 49	15.54	9.37	V	24.91	30.000	-5.09
1715.00	10	16-QAM	Standard	1 / 49	13.59	9.30	V	22.89	30.000	-7.11
1732.50	10	16-QAM	Standard	1 / 49	14.10	9.34	V	23.44	30.000	-6.56
1750.00	10	16-QAM	Standard	1 / 49	14.45	9.37	V	23.82	30.000	-6.18
1717.50	15	QPSK	Standard	1 / 74	14.81	9.31	V	24.12	30.000	-5.88
1732.50	15	QPSK	Standard	1 / 74	15.28	9.34	V	24.62	30.000	-5.38
1747.50	15	QPSK	Standard	1 / 74	15.60	9.37	V	24.97	30.000	-5.03
1717.50	15	16-QAM	Standard	1 / 74	13.93	9.31	V	23.24	30.000	-6.76
1732.50	15	16-QAM	Standard	1 / 74	14.23	9.34	V	23.57	30.000	-6.43
1747.50	15	16-QAM	Standard	1 / 74	14.54	9.37	V	23.91	30.000	-6.09
1720.00	20	QPSK	Standard	1 / 99	14.75	9.31	V	24.06	30.000	-5.94
1732.50	20	QPSK	Standard	1 / 99	15.59	9.34	V	24.93	30.000	-5.07
1745.00	20	QPSK	Standard	1 / 99	15.21	9.36	V	24.57	30.000	-5.43
1720.00	20	16-QAM	Standard	1 / 99	13.62	9.31	V	22.93	30.000	-7.07
1732.50	20	16-QAM	Standard	1 / 99	14.57	9.34	V	23.91	30.000	-6.09
1745.00	20	16-QAM	Standard	1 / 99	14.18	9.36	V	23.54	30.000	-6.46

Table 6-4. EIRP Data (Band 4)

FCC ID: A3LSMG920A	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset	Page 116 of 142

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	15.22	9.38	V	24.60	33.010	-8.41
1880.00	1.4	QPSK	Standard	1 / 5	15.35	9.33	V	24.68	33.010	-8.33
1909.30	1.4	QPSK	Standard	1 / 5	14.69	9.29	V	23.98	33.010	-9.03
1850.70	1.4	16-QAM	Standard	1 / 5	14.05	9.38	V	23.43	33.010	-9.58
1880.00	1.4	16-QAM	Standard	1 / 5	14.19	9.33	V	23.52	33.010	-9.49
1909.30	1.4	16-QAM	Standard	1 / 5	13.49	9.29	V	22.78	33.010	-10.23
1851.50	3	QPSK	Standard	1 / 14	14.88	9.38	V	24.26	33.010	-8.75
1880.00	3	QPSK	Standard	1 / 14	14.63	9.33	V	23.96	33.010	-9.05
1908.50	3	QPSK	Standard	1 / 14	14.38	9.29	V	23.67	33.010	-9.34
1851.50	3	16-QAM	Standard	1 / 14	13.83	9.38	V	23.21	33.010	-9.80
1880.00	3	16-QAM	Standard	1 / 14	13.44	9.33	V	22.77	33.010	-10.24
1908.50	3	16-QAM	Standard	1 / 14	13.46	9.29	V	22.75	33.010	-10.26
1852.50	5	QPSK	Standard	1 / 24	16.04	9.38	V	25.42	33.010	-7.59
1880.00	5	QPSK	Standard	1 / 24	15.12	9.33	V	24.45	33.010	-8.56
1907.50	5	QPSK	Standard	1 / 24	15.14	9.29	V	24.43	33.010	-8.58
1852.50	5	16-QAM	Standard	1 / 24	15.17	9.38	V	24.55	33.010	-8.46
1880.00	5	16-QAM	Standard	1 / 24	13.97	9.33	V	23.30	33.010	-9.71
1907.50	5	16-QAM	Standard	1 / 24	14.13	9.29	V	23.42	33.010	-9.59
1855.00	10	QPSK	Standard	1 / 0	16.10	9.37	V	25.47	33.010	-7.54
1880.00	10	QPSK	Standard	1 / 0	14.90	9.33	V	24.23	33.010	-8.78
1905.00	10	QPSK	Standard	1 / 0	14.86	9.29	V	24.15	33.010	-8.86
1855.00	10	16-QAM	Standard	1 / 0	15.09	9.37	V	24.46	33.010	-8.55
1880.00	10	16-QAM	Standard	1 / 0	13.67	9.33	V	23.00	33.010	-10.01
1905.00	10	16-QAM	Standard	1 / 0	13.79	9.29	V	23.08	33.010	-9.93
1857.50	15	QPSK	Standard	1 / 0	14.68	9.37	V	24.05	33.010	-8.96
1880.00	15	QPSK	Standard	1 / 0	14.78	9.33	V	24.11	33.010	-8.90
1902.50	15	QPSK	Standard	1 / 0	14.11	9.30	V	23.41	33.010	-9.60
1857.50	15	16-QAM	Standard	1 / 0	13.54	9.37	V	22.91	33.010	-10.10
1880.00	15	16-QAM	Standard	1 / 0	13.11	9.33	V	22.44	33.010	-10.57
1902.50	15	16-QAM	Standard	1 / 0	13.03	9.30	V	22.33	33.010	-10.68
1860.00	20	QPSK	Standard	1 / 99	13.84	9.37	V	23.21	33.010	-9.80
1880.00	20	QPSK	Standard	1 / 99	14.54	9.33	V	23.87	33.010	-9.14
1900.00	20	QPSK	Standard	1 / 99	13.65	9.30	V	22.95	33.010	-10.06
1860.00	20	16-QAM	Standard	1 / 99	11.26	9.37	V	20.63	33.010	-12.38
1880.00	20	16-QAM	Standard	1 / 99	13.31	9.33	V	22.64	33.010	-10.37
1900.00	20	16-QAM	Standard	1 / 99	12.84	9.30	V	22.14	33.010	-10.87

Table 6-5. EIRP Data (Band 2)

FCC ID: A3LSMG920A	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 117 of 142

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]
2307.50	5	QPSK	Standard	1 / 0	10.41	9.12	V	19.53	23.979	-4.45
2310.00	5	QPSK	Standard	1 / 0	10.51	8.52	V	19.03	23.979	-4.95
2312.50	5	QPSK	Standard	1 / 0	10.34	8.70	V	19.04	23.979	-4.93
2307.50	5	16-QAM	Standard	1 / 0	9.66	9.12	V	18.78	23.979	-5.20
2310.00	5	16-QAM	Standard	1 / 0	9.68	8.52	V	18.20	23.979	-5.78
2312.50	5	16-QAM	Standard	1 / 0	9.36	8.70	V	18.06	23.979	-5.91
2593.00	10	QPSK	Standard	1 / 0	9.30	8.52	V	17.82	23.979	-6.16
2593.00	10	16-QAM	Standard	1 / 0	7.42	8.52	V	15.94	23.979	-8.04

Table 6-6. EIRP Data (Band 30)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 118 of 142

6.7 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(h) §27.53(a.4)

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 for Bands 12/5/4/2
 - a. Detector = RMS for Band 30
6. Trace mode = max hold for Bands 12/5/4/2
 - a. Trace mode = Average for Band 30
7. The trace was allowed to stabilize

Test Setup

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

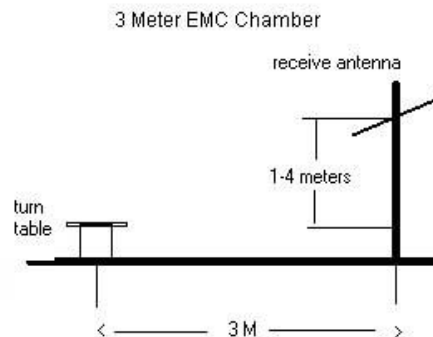


Figure 6-6. Test Instrument & Measurement Setup

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 119 of 142

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: 701.50 MHz
 CHANNEL: 23035
 MEASURED OUTPUT POWER: 19.06 dBm = 0.081 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 32.06 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1403.00	-56.46	2.45	-54.00	H	73.1
2104.50	-56.04	2.96	-53.08	H	72.1
2806.00	-56.24	4.75	-51.49	H	70.5
3507.50	-62.17	6.26	-55.91	H	75.0

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

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 120 of 142

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 MEASURED OUTPUT POWER: 19.31 dBm = 0.085 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.31 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1415.00	-61.70	2.59	-59.12	H	78.4
2122.50	-53.34	3.02	-50.32	H	69.6
2830.00	-59.64	4.74	-54.90	H	74.2

Table 6-8. Radiated Spurious Data (Band 12 – Mid Channel)

OPERATING FREQUENCY: 713.50 MHz
 CHANNEL: 23155
 MEASURED OUTPUT POWER: 20.46 dBm = 0.111 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.46 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1427.00	-62.23	2.72	-59.51	H	80.0
2140.50	-56.72	3.07	-53.64	H	74.1
2854.00	-60.41	4.73	-55.68	H	76.1

Table 6-9. Radiated Spurious Data (Band 12 – High Channel)

OPERATING FREQUENCY: 713.50 MHz
 CHANNEL: 23155
 MEASURED OUTPUT POWER: 20.46 dBm = 0.111 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.46 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1427.00	-62.23	2.72	-59.51	H	80.0
2140.50	-56.72	3.07	-53.64	H	74.1
2854.00	-60.41	4.73	-55.68	H	76.1

Table 6-10. Radiated Spurious Data with WCP (Band 12 – High Channel)

OPERATING FREQUENCY: 825.50 MHz
 CHANNEL: 20415
 MEASURED OUTPUT POWER: 17.16 dBm = 0.052 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.16 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1651.00	-59.52	3.61	-55.92	H	73.1
2476.50	-57.93	3.57	-54.36	H	71.5

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

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 122 of 142

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MEASURED OUTPUT POWER: 16.77 dBm = 0.047 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 29.77 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1673.00	-58.42	3.53	-54.89	H	71.7
2509.50	-56.24	3.57	-52.67	H	69.4

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

OPERATING FREQUENCY: 847.50 MHz
 CHANNEL: 20635
 MEASURED OUTPUT POWER: 16.75 dBm = 0.047 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 29.75 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1695.00	-53.62	3.45	-50.17	H	66.9
2542.50	-57.69	3.64	-54.05	H	70.8

Table 6-13. Radiated Spurious Data (Band 5 – High Channel)

OPERATING FREQUENCY: 847.50 MHz
 CHANNEL: 20635
 MEASURED OUTPUT POWER: 16.75 dBm = 0.047 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 29.75 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1695.00	-53.62	3.45	-50.17	H	66.9
2542.50	-57.69	3.64	-54.05	H	70.8

Table 6-14. Radiated Spurious Data with WCP (Band 5 – High Channel)

OPERATING FREQUENCY: 1712.50 MHz
 CHANNEL: 19975
 MEASURED OUTPUT POWER: 22.39 dBm = 0.173 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.39 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3425.00	-47.26	9.68	-37.57	H	60.0
5137.50	-58.76	10.68	-48.08	H	70.5

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

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 124 of 142

OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 24.18 dBm = 0.262 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.18 dBc


Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3465.00	-42.16	9.71	-32.45	H	56.6
5197.50	-58.64	10.59	-48.06	H	72.2

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

OPERATING FREQUENCY: 1752.50 MHz
 CHANNEL: 20375
 MEASURED OUTPUT POWER: 25.00 dBm = 0.316 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.00 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3505.00	-36.74	9.73	-27.01	H	52.0
5257.50	-58.91	10.64	-48.27	H	73.3

Table 6-17. Radiated Spurious Data (Band 4 – High Channel)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 125 of 142

OPERATING FREQUENCY: 1752.50 MHz
 CHANNEL: 20375
 MEASURED OUTPUT POWER: 25.00 dBm = 0.316 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.00 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3505.00	-36.74	9.73	-27.01	H	52.0
5257.50	-58.91	10.64	-48.27	H	73.3

Table 6-18. Radiated Spurious Data with WCP (Band 4 –High Channel)

OPERATING FREQUENCY: 1855.00 MHz
 CHANNEL: 18650
 MEASURED OUTPUT POWER: 25.47 dBm = 0.353 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.47 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3710.00	-46.02	9.41	-36.61	H	62.1
5565.00	-55.85	10.82	-45.04	H	70.5
7420.00	-46.37	10.74	-35.64	H	61.1
9275.00	-55.27	11.59	-43.68	H	69.2

Table 6-19. Radiated Spurious Data (Band 2 – Low Channel)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 126 of 142

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MEASURED OUTPUT POWER: 24.23 dBm = 0.265 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.23 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3760.00	-41.03	9.28	-31.75	H	56.0
5640.00	-55.63	11.03	-44.59	H	68.8
7520.00	-51.10	10.97	-40.13	H	64.4
9400.00	-54.77	11.53	-43.23	H	67.5

Table 6-20. Radiated Spurious Data (Band 2 – Mid Channel)

OPERATING FREQUENCY: 1905.00 MHz
 CHANNEL: 19150
 MEASURED OUTPUT POWER: 24.15 dBm = 0.260 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.15 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3810.00	-41.73	9.19	-32.55	H	56.7
5715.00	-55.58	11.26	-44.32	H	68.5
7620.00	-52.38	11.16	-41.22	H	65.4
9525.00	-54.98	11.76	-43.22	H	67.4

Table 6-21. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 127 of 142

OPERATING FREQUENCY: 1905.00 MHz
 CHANNEL: 19150
 MEASURED OUTPUT POWER: 24.15 dBm = 0.260 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.15 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3810.00	-41.73	9.19	-32.55	H	56.7
5715.00	-55.58	11.26	-44.32	H	68.5
7620.00	-52.38	11.16	-41.22	H	65.4
9525.00	-54.98	11.76	-43.22	H	67.4

Table 6-22. Radiated Spurious Data with WCP (Band 2 – Low Channel)

OPERATING FREQUENCY: 2307.50 MHz
 CHANNEL: 27685
 MEASURED OUTPUT POWER: 19.53 dBm = 0.090 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $70 + 10 \log_{10} (W) =$ 59.53 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
4615.00	-58.96	10.88	-48.08	V	67.1
6922.50	-54.82	11.75	-43.06	V	62.1
9230.00	-62.23	11.57	-50.66	V	69.7
11537.50	-60.80	12.61	-48.20	V	67.2
13845.00	-58.23	11.87	-46.36	V	65.4

Table 6-23. Radiated Spurious Data with (Band 30 – Low Channel)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 128 of 142

OPERATING FREQUENCY: 2310.00 MHz
 CHANNEL: 27710
 MEASURED OUTPUT POWER: 19.03 dBm = 0.080 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $70 + 10 \log_{10}(W) =$ 59.03 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
4620.00	-56.07	10.87	-45.19	V	64.2
6930.00	-60.57	11.75	-48.82	V	67.9
9240.00	-60.94	11.57	-49.36	V	68.4
11550.00	-58.06	12.59	-45.47	V	64.5
13860.00	-55.19	11.85	-43.35	V	62.4
16170.00	-66.85	16.61	-50.23	V	69.3

Table 6-24. Radiated Spurious Data with (Band 30 – Mid Channel)

OPERATING FREQUENCY: 2312.50 MHz
 CHANNEL: 27735
 MEASURED OUTPUT POWER: 19.04 dBm = 0.080 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $70 + 10 \log_{10}(W) =$ 59.04 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
4625.00	-60.20	10.87	-49.33	V	68.4
6937.50	-57.94	11.75	-46.19	V	65.2
9250.00	-57.63	11.58	-46.05	V	65.1
11562.50	-58.27	12.56	-45.71	V	64.8
13875.00	-57.37	11.82	-45.55	V	64.6
16187.50	-63.57	16.60	-46.97	V	66.0

Table 6-25. Radiated Spurious Data with (Band 30 – High Channel)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 129 of 142

OPERATING FREQUENCY: 2307.50 MHz
 CHANNEL: 39675
 MEASURED OUTPUT POWER: 5.82 dBm = 0.004 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $70 + 10 \log_{10} (W) =$ 42.82 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
4615.00	-69.52	10.87	-58.65	V	64.5
6922.50	-65.83	11.75	-54.08	V	59.9

Table 6-26. Radiated Spurious Data with WCP (Band 30 – Low Channel)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 130 of 142

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

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 131 of 142

Band 12 Frequency Stability Measurements

§2.1055 §27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,500,386	386	0.0000546
100 %		- 30	707,500,332	332	0.0000469
100 %		- 20	707,499,821	-179	-0.0000253
100 %		- 10	707,500,297	297	0.0000420
100 %		0	707,500,132	132	0.0000187
100 %		+ 10	707,500,014	14	0.0000020
100 %		+ 20	707,500,109	109	0.0000154
100 %		+ 30	707,499,827	-173	-0.0000245
100 %		+ 40	707,500,151	151	0.0000213
100 %		+ 50	707,499,609	-391	-0.0000553
BATT. ENDPOINT	3.40	+ 20	707,499,848	-152	-0.0000215

Table 6-27. Frequency Stability Data (Band 12)

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: A3LSMG920A	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 132 of 142

Band 12 Frequency Stability Measurements

§2.1055 §27.54

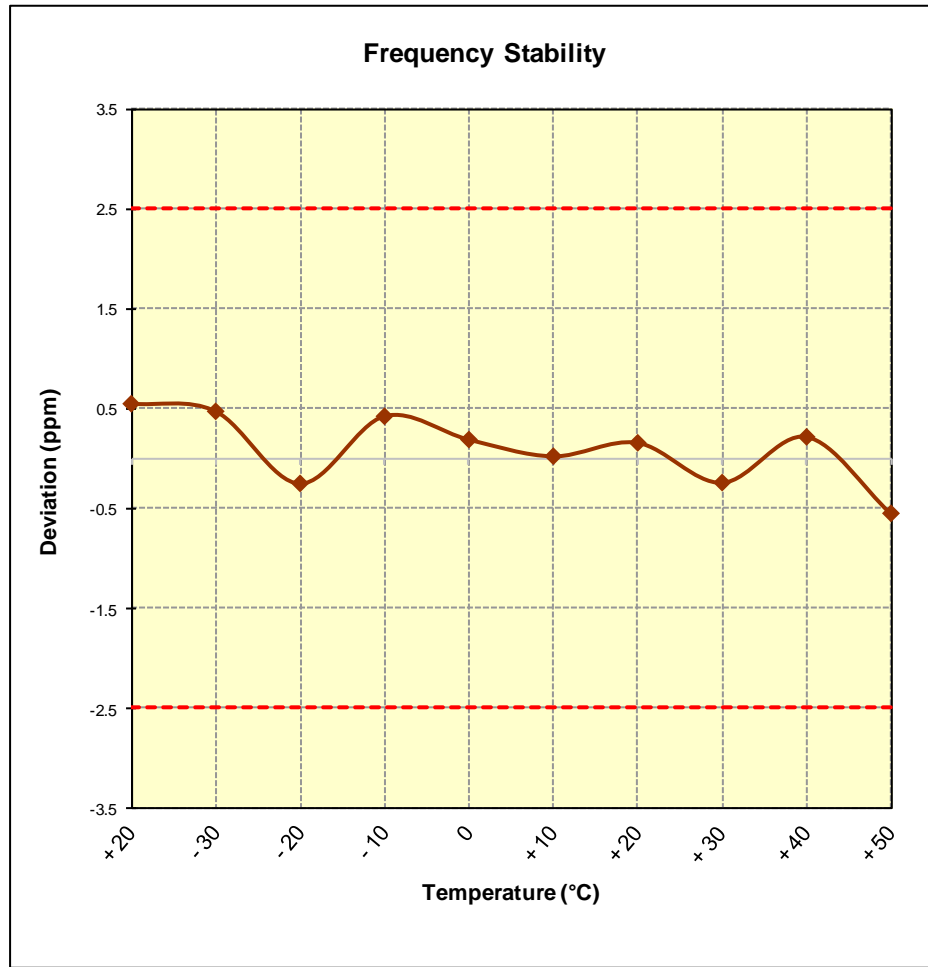




Figure 6-7. Frequency Stability Graph (Band 12)

Band 5 Frequency Stability Measurements

§2.1055 §22.355

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 133 of 142

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)	836,499,981	-19	-0.0000023
100 %		- 30	836,499,663	-337	-0.0000403
100 %		- 20	836,499,625	-375	-0.0000448
100 %		- 10	836,500,152	152	0.0000182
100 %		0	836,500,231	231	0.0000276
100 %		+ 10	836,500,096	96	0.0000115
100 %		+ 20	836,499,903	-97	-0.0000116
100 %		+ 30	836,499,936	-64	-0.0000077
100 %		+ 40	836,499,860	-140	-0.0000167
100 %		+ 50	836,499,982	-18	-0.0000022
BATT. ENDPOINT	3.40	+ 20	836,499,801	-199	-0.0000238

Table 6-28. Frequency Stability Data (Band 5)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset			Page 134 of 142

Band 5 Frequency Stability Measurements

§2.1055 §22.355

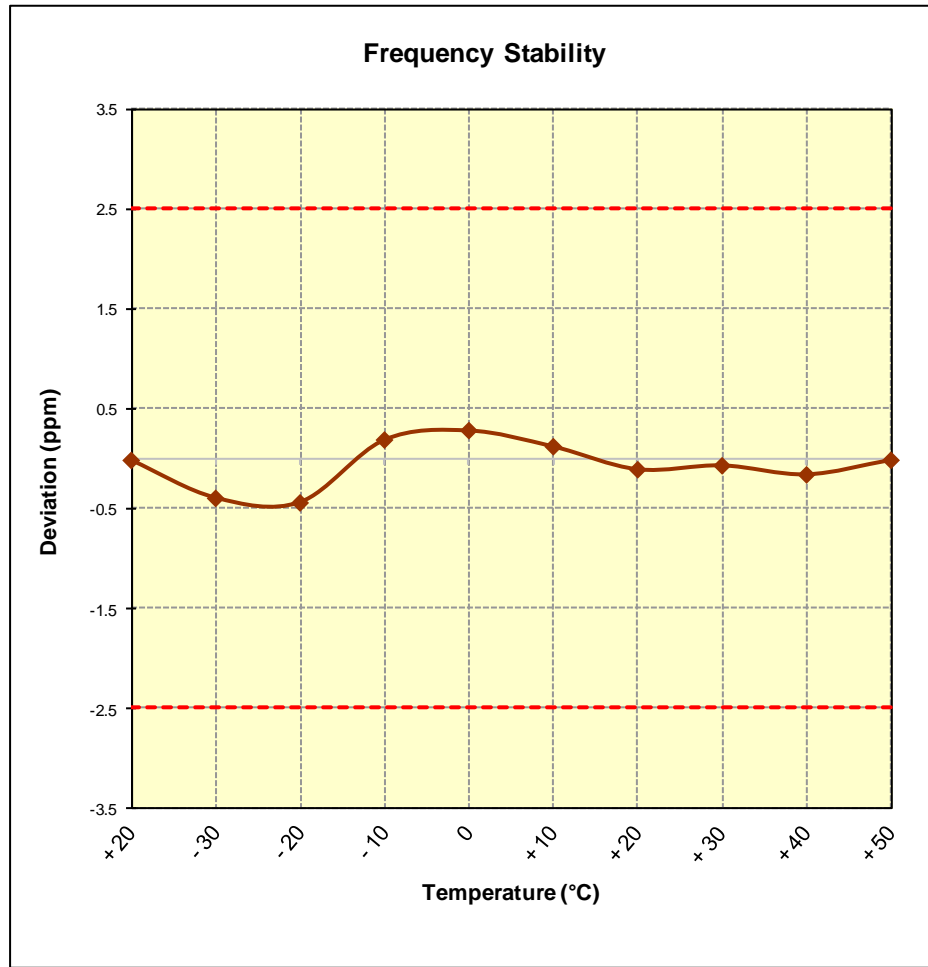




Figure 6-8. Frequency Stability Graph (Band 5)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset	Page 135 of 142	

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)	1,732,500,303	303	0.0000175
100 %		- 30	1,732,500,102	102	0.0000059
100 %		- 20	1,732,500,186	186	0.0000107
100 %		- 10	1,732,500,250	250	0.0000144
100 %		0	1,732,499,682	-318	-0.0000184
100 %		+ 10	1,732,500,232	232	0.0000134
100 %		+ 20	1,732,499,914	-86	-0.0000050
100 %		+ 30	1,732,500,221	221	0.0000128
100 %		+ 40	1,732,500,243	243	0.0000140
100 %		+ 50	1,732,499,626	-374	-0.0000216
BATT. ENDPOINT	3.40	+ 20	1,732,500,305	305	0.0000176

Table 6-29. Frequency Stability Data (Band 4)

Note:

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

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset	Page 136 of 142	

Band 4 Frequency Stability Measurements

§2.1055 §§27.54

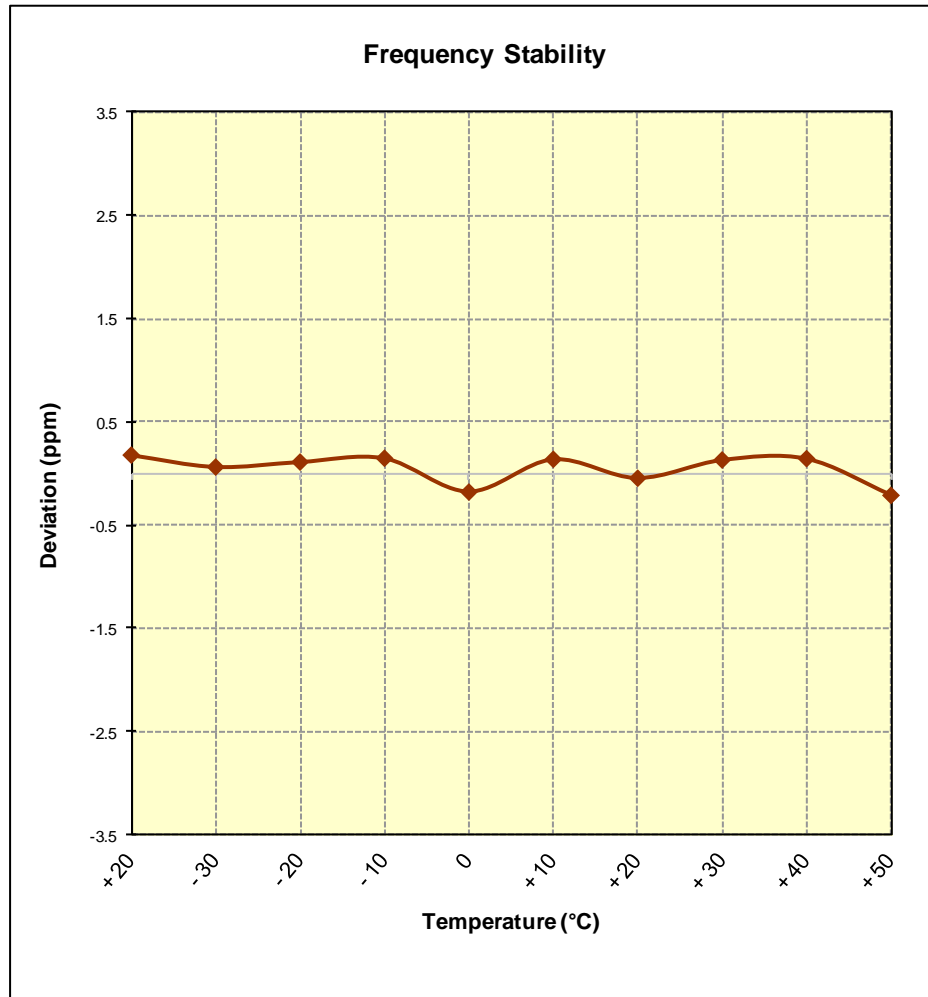


Figure 6-9. Frequency Stability Graph (Band 4)

FCC ID: A3LSMG920A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 137 of 142

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)	1,879,999,659	-341	-0.0000181
100 %		- 30	1,880,000,012	12	0.0000006
100 %		- 20	1,879,999,877	-123	-0.0000065
100 %		- 10	1,879,999,991	-9	-0.0000005
100 %		0	1,880,000,011	11	0.0000006
100 %		+ 10	1,880,000,322	322	0.0000171
100 %		+ 20	1,879,999,846	-154	-0.0000082
100 %		+ 30	1,879,999,840	-160	-0.0000085
100 %		+ 40	1,879,999,664	-336	-0.0000179
100 %		+ 50	1,879,999,859	-141	-0.0000075
BATT. ENDPOINT	3.40	+ 20	1,879,999,861	-139	-0.0000074

Table 6-30. Frequency Stability Data (Band 2)

Note:

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

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 138 of 142

Band 2 Frequency Stability Measurements

§2.1055 §24.235

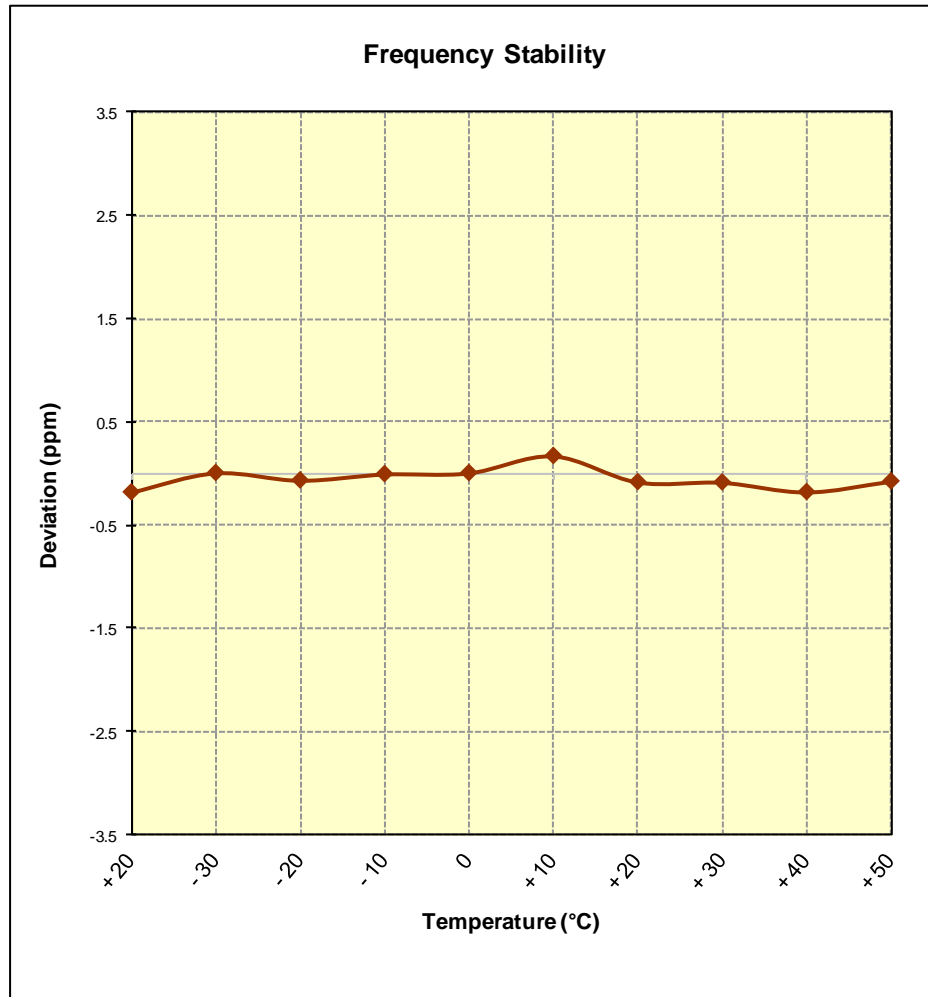




Figure 6-10. Frequency Stability Graph (Band 2)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset	Page 139 of 142	

Band 30 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY: 2,310,000,000 Hz
 CHANNEL: 27710
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,309,999,817	-183	-0.0000079
100 %		- 30	2,310,000,014	14	0.0000006
100 %		- 20	2,309,999,793	-207	-0.0000090
100 %		- 10	2,310,000,262	262	0.0000113
100 %		0	2,309,999,755	-245	-0.0000106
100 %		+ 10	2,309,999,600	-400	-0.0000173
100 %		+ 20	2,310,000,018	18	0.0000008
100 %		+ 30	2,309,999,622	-378	-0.0000164
100 %		+ 40	2,310,000,199	199	0.0000086
100 %		+ 50	2,309,999,997	-3	-0.0000001
BATT. ENDPOINT	3.40	+ 20	2,310,000,027	27	0.0000012

Table 6-31. Frequency Stability Data (Band 30)

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: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 140 of 142

Band 30 Frequency Stability Measurements

§2.1055 §27.54

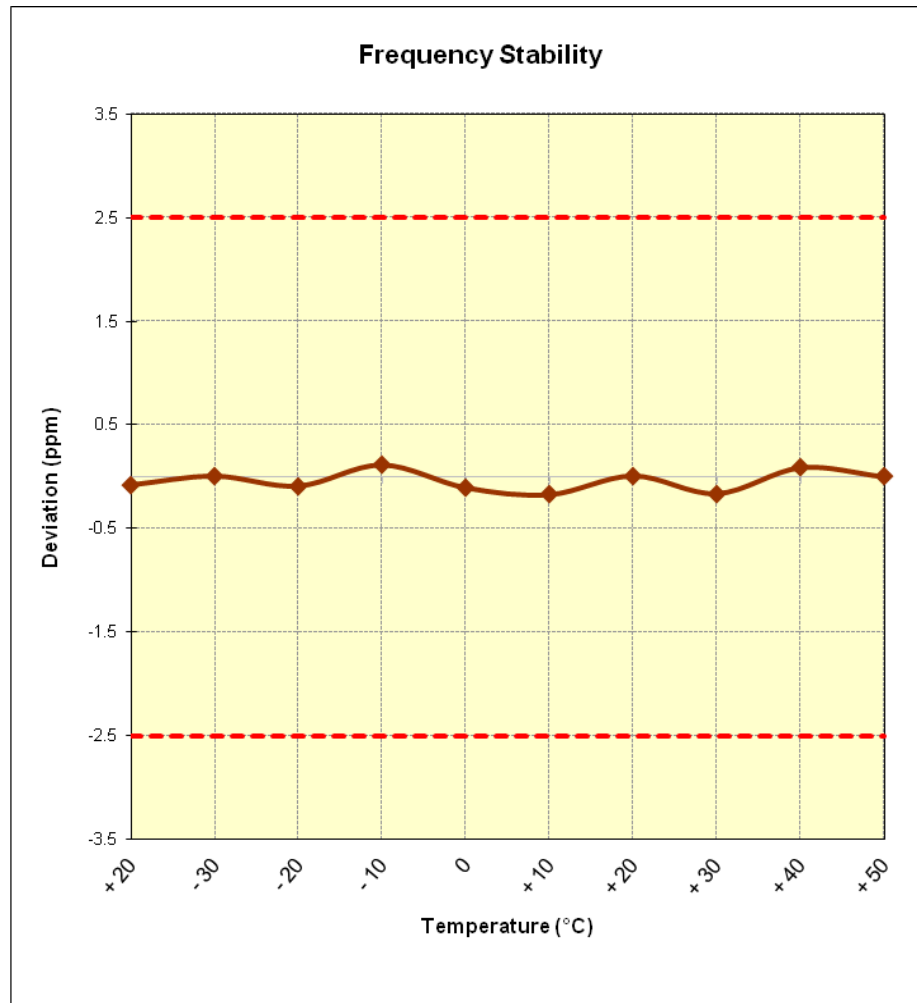






Figure 6-11. Frequency Stability Graph (Band 30)

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset	Page 141 of 142	

7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Electronics Co., Ltd. Portable Handset FCC ID: A3LSMG920A** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: A3LSMG920A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1501300308.A3L	Test Dates: 1/27 - 2/26/2015	EUT Type: Portable Handset		Page 142 of 142