

7.4 Band Edge Emissions at Antenna Terminal

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

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v02r02 – Section 6.0

Test Settings

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

Test Setup

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

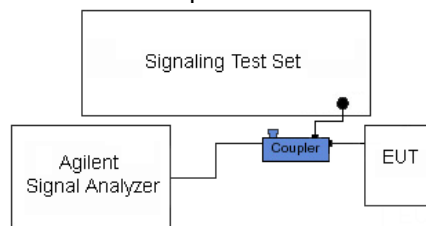


Figure 7-3. Test Instrument & Measurement Setup

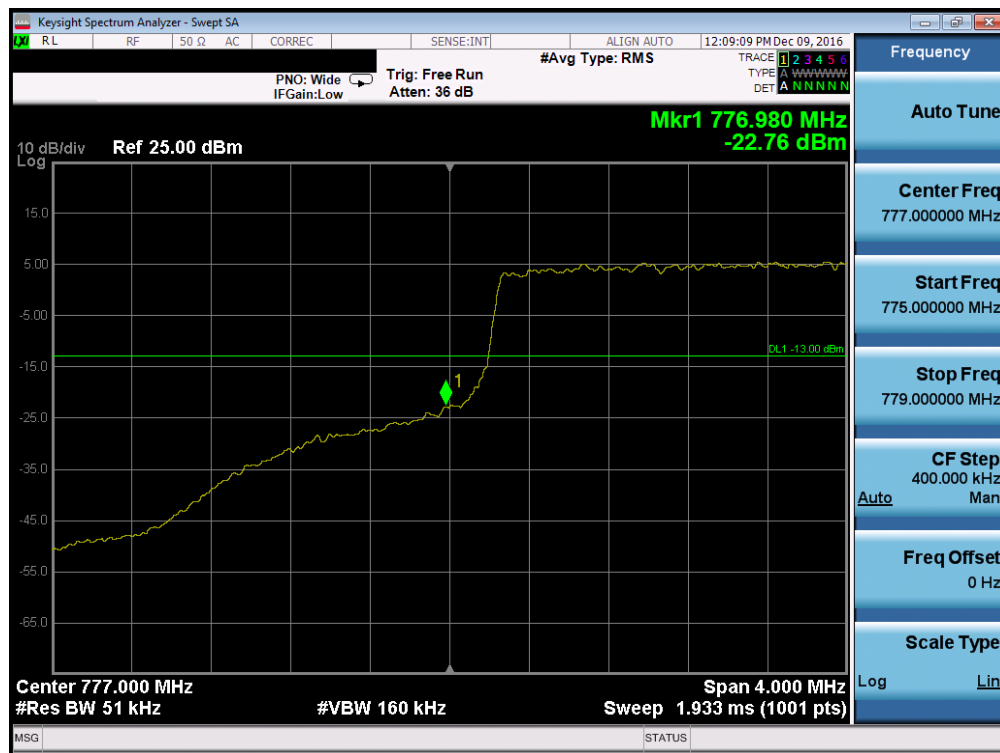
FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 49 of 116

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.

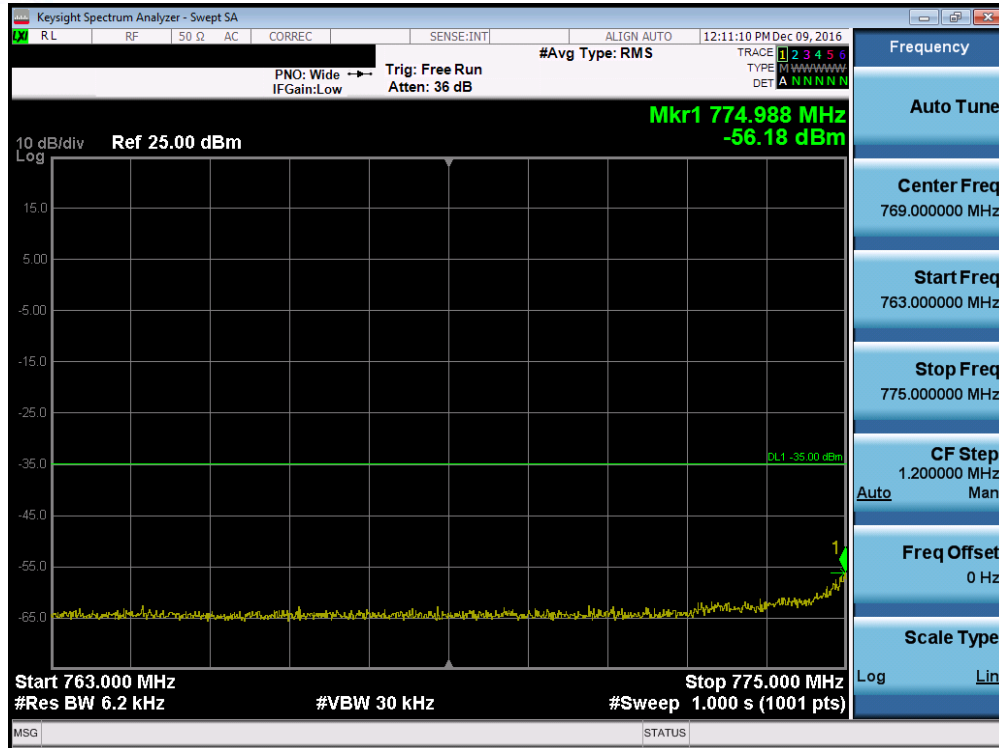
Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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.

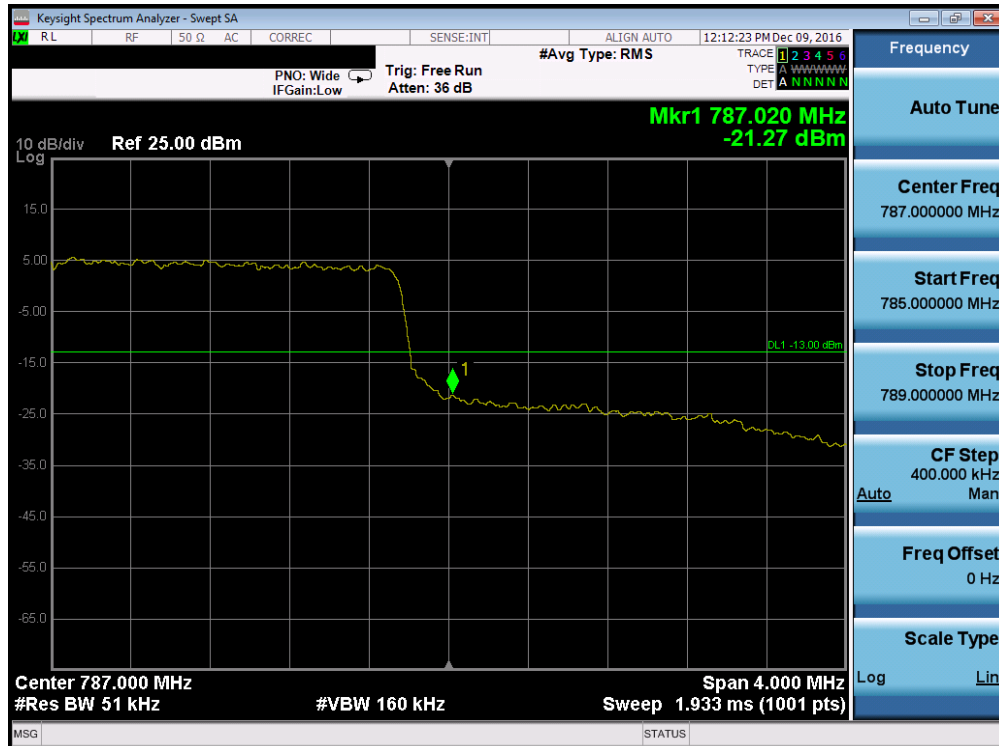


Plot 7-67. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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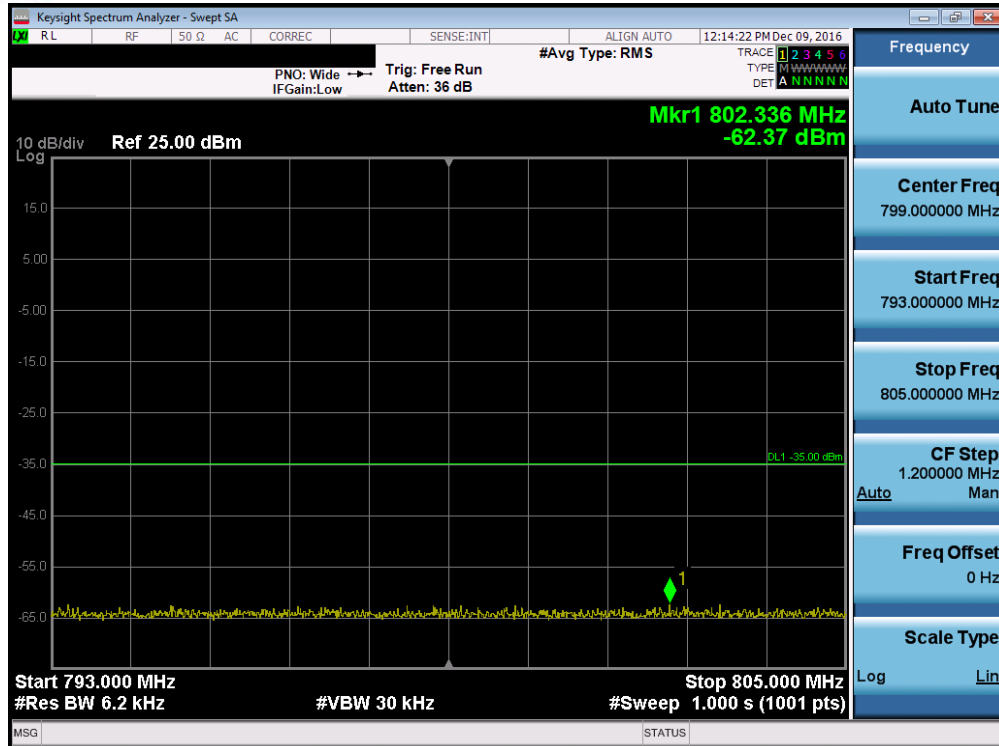


Plot 7-68. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

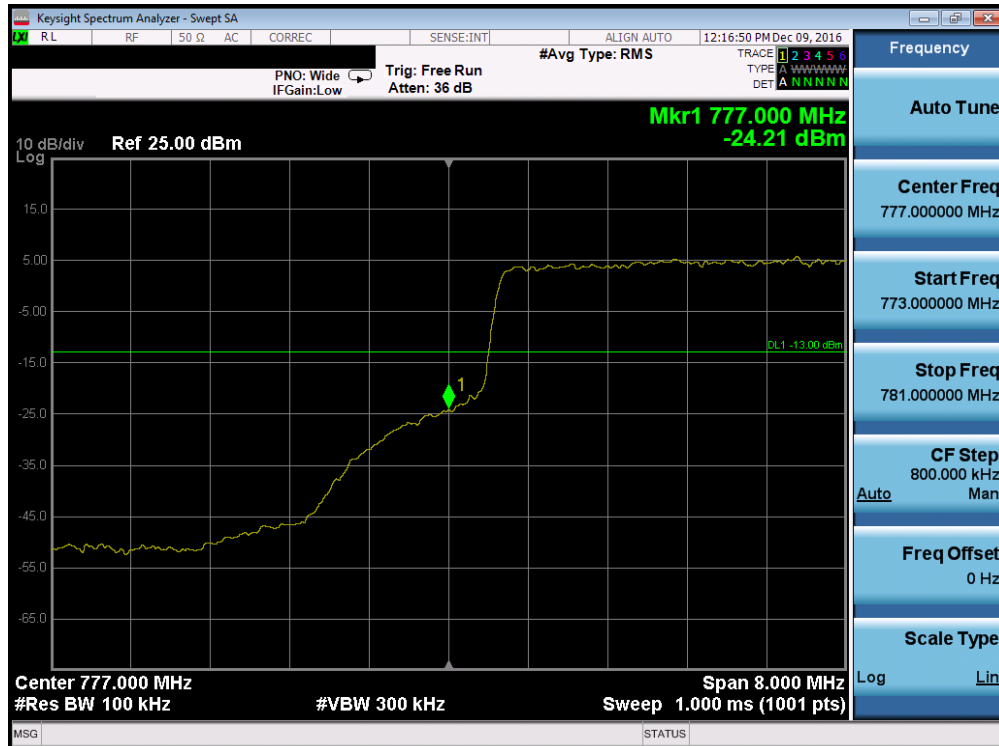


Plot 7-69. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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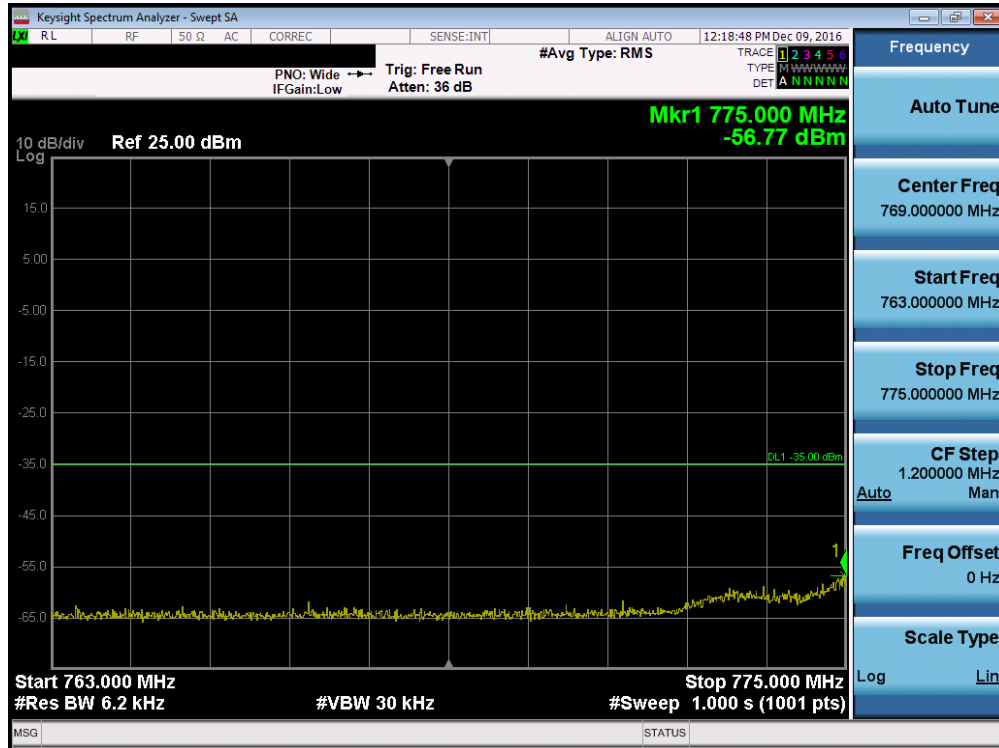


Plot 7-70. Upper Emission Mask Edge Plot (Band 13 - 5.0MHz QPSK - RB Size 25)



Plot 7-71. Lower Band Edge Plot (Band 13 - 10.0MHz QPSK - RB Size 50)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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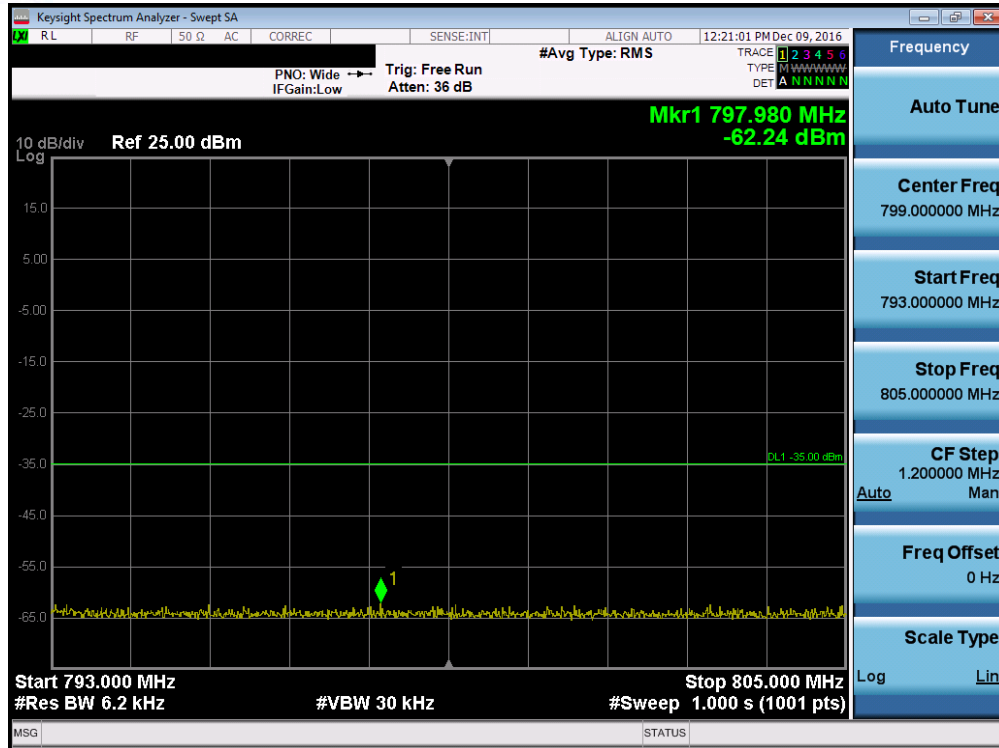


Plot 7-72. Lower Emission Mask Edge Plot (Band 13 - 10.0MHz QPSK - RB Size 50)

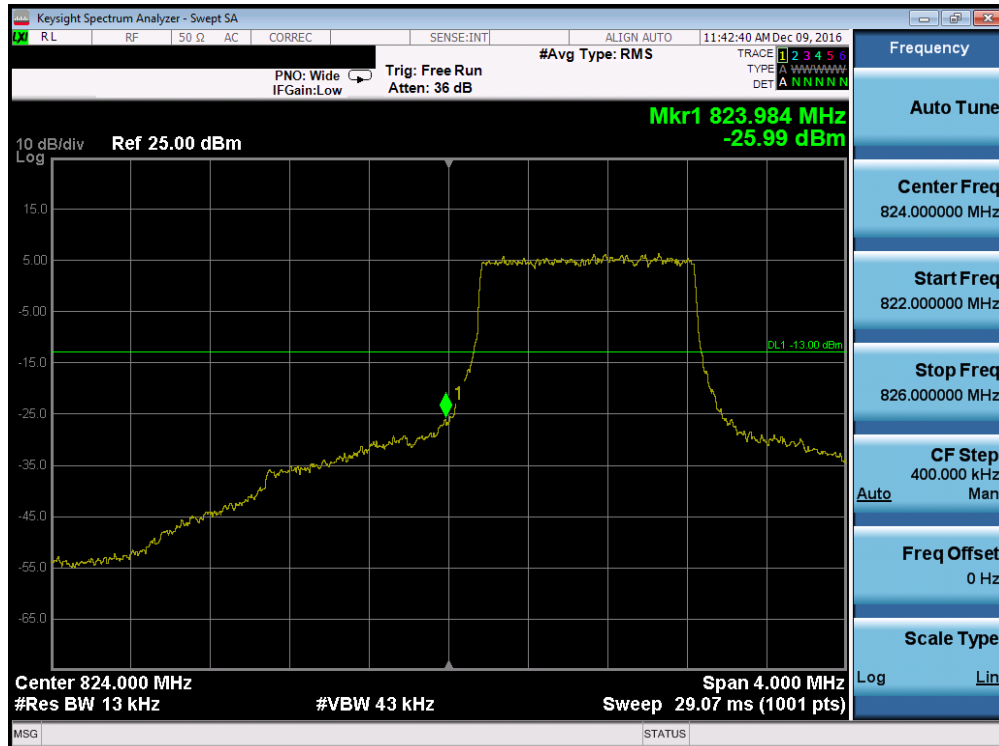


Plot 7-73. Upper Band Edge Plot (Band 13 - 10.0MHz QPSK - RB Size 50)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-74. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-75. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

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Plot 7-76. Lower Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

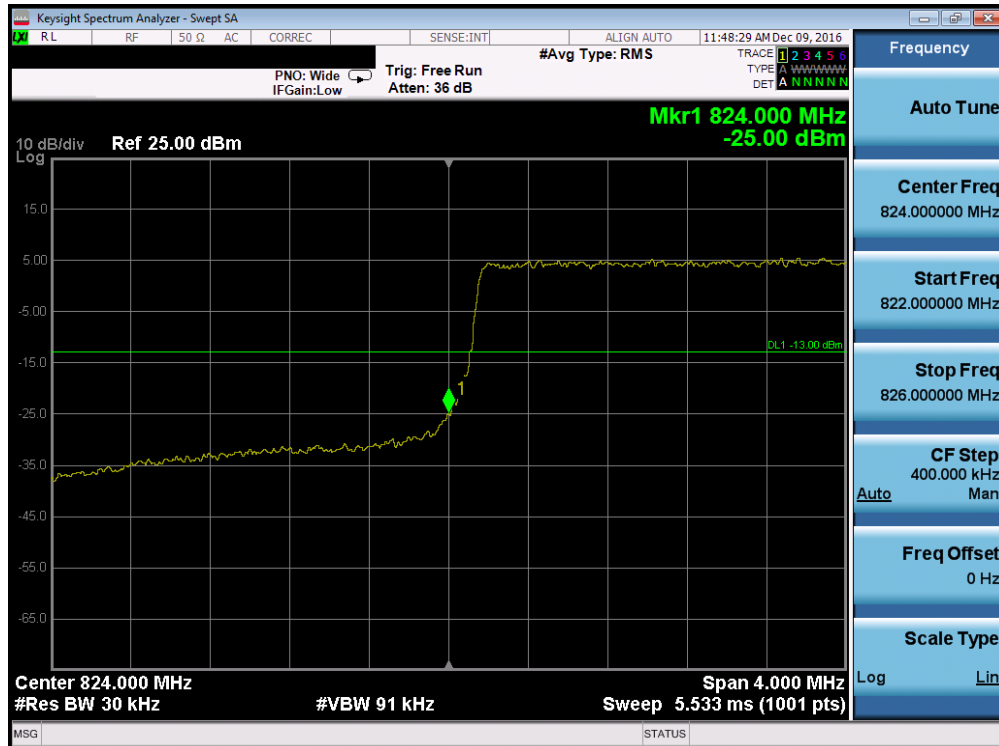


Plot 7-77. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-78. Upper Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

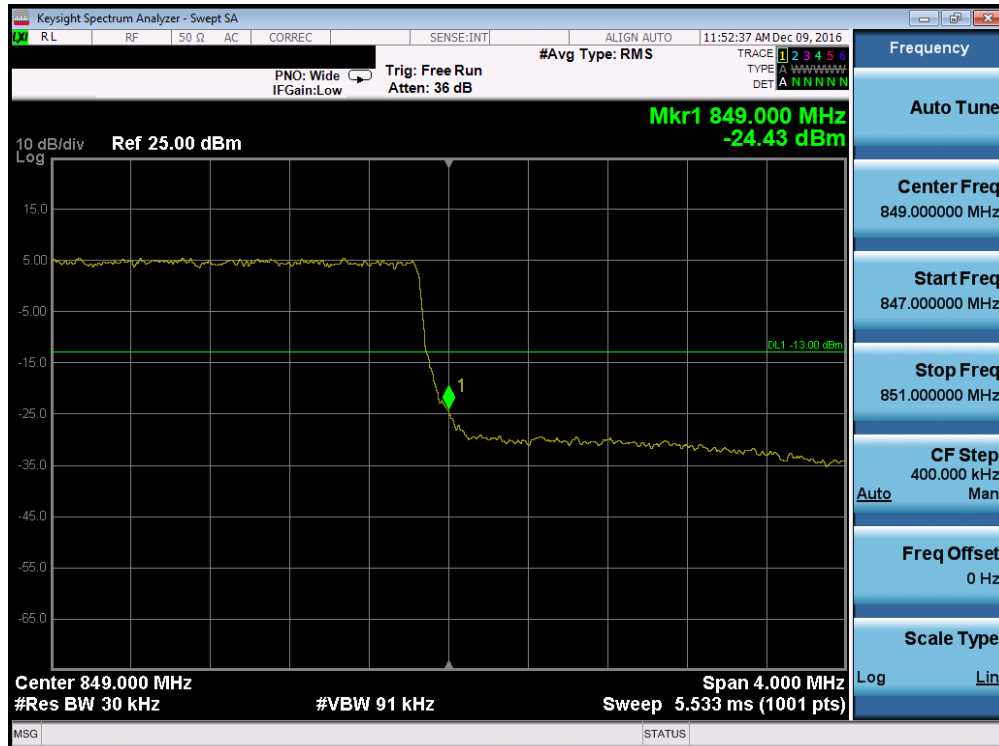


Plot 7-79. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-80. Lower Extended Band Edge Plot (Band 5 - 3.0MHz QPSK - RB Size 15)

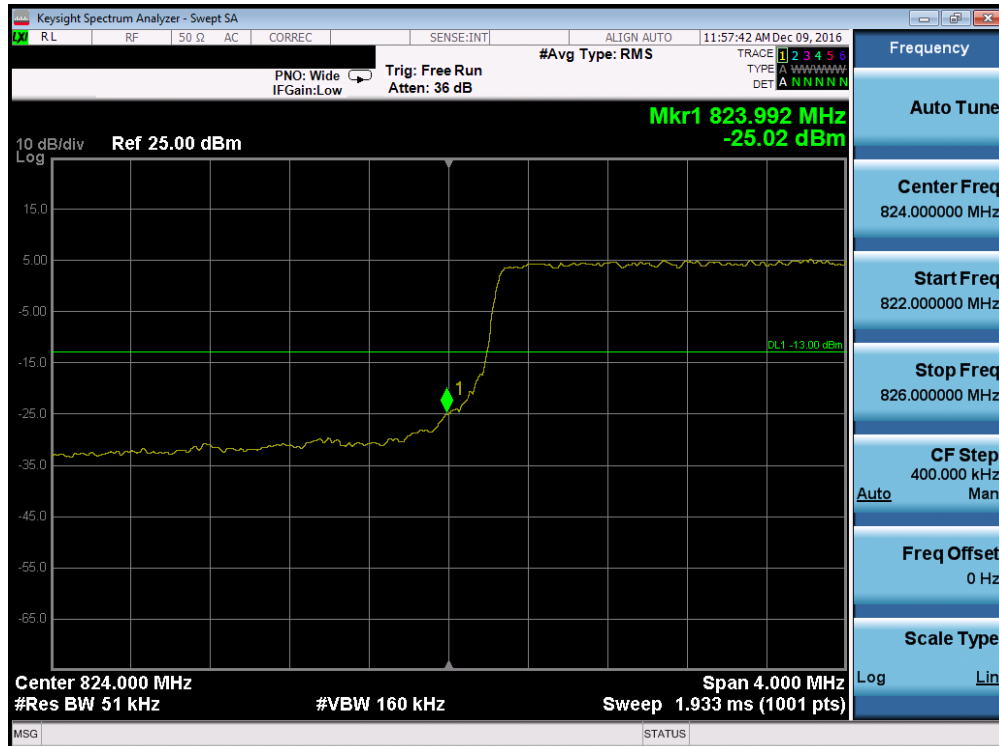


Plot 7-81. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - RB Size 15)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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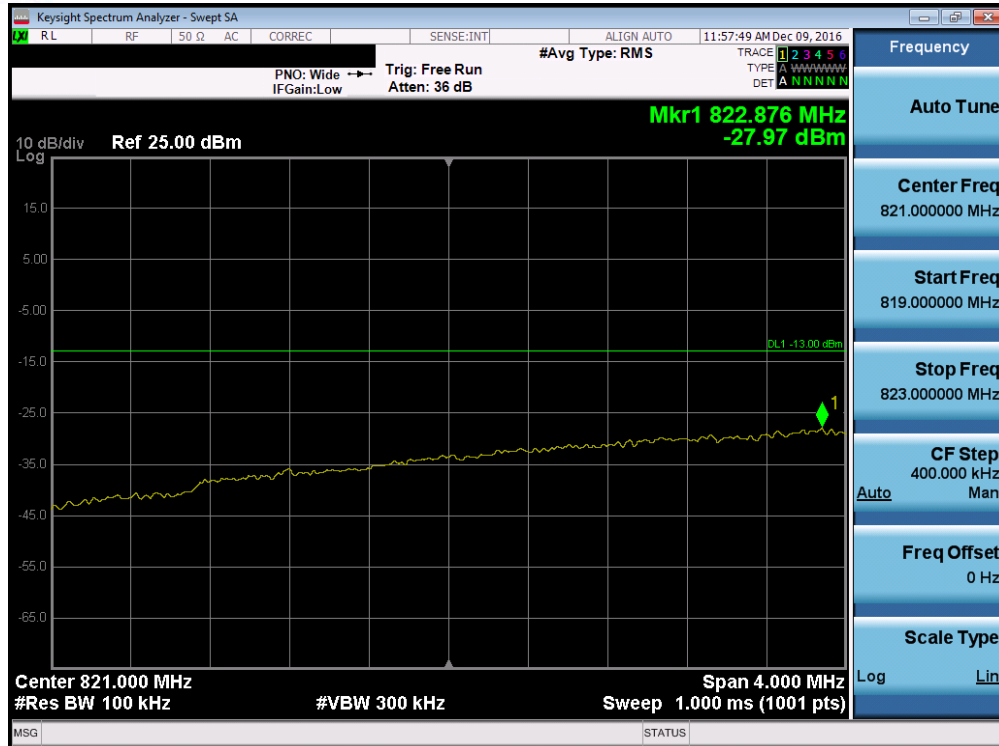


Plot 7-82. Upper Extended Band Edge Plot (Band 5 – Band 5 – 3.0MHz QPSK – RB Size 15)

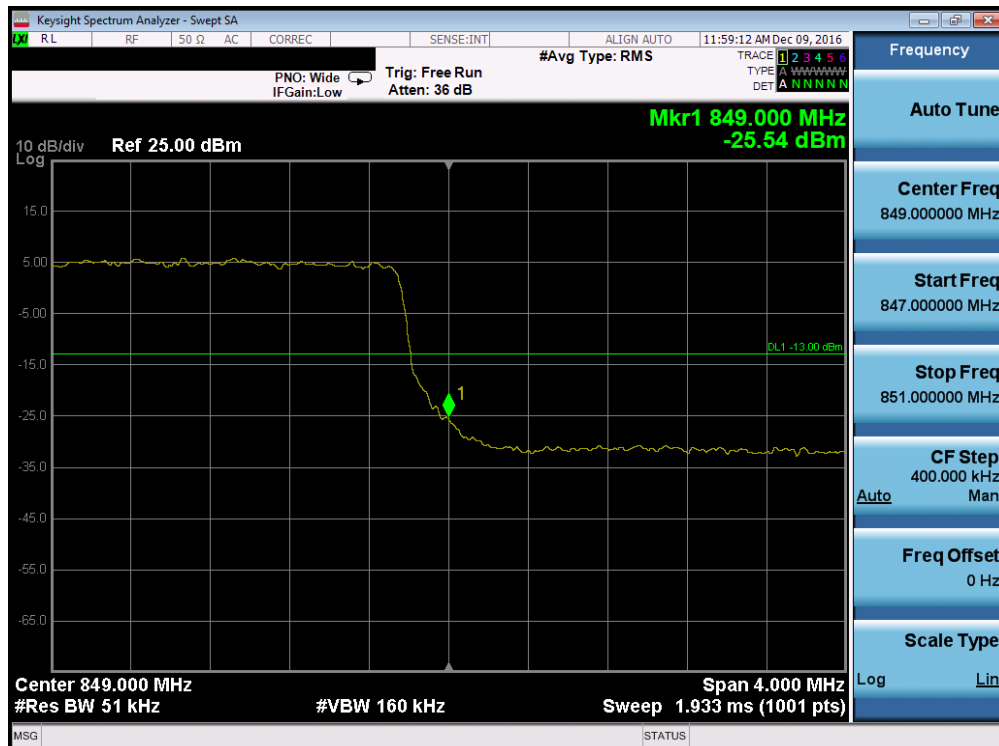


Plot 7-83. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-84. Lower Extended Band Edge Plot (Band 5 - 5.0MHz QPSK - RB Size 25)

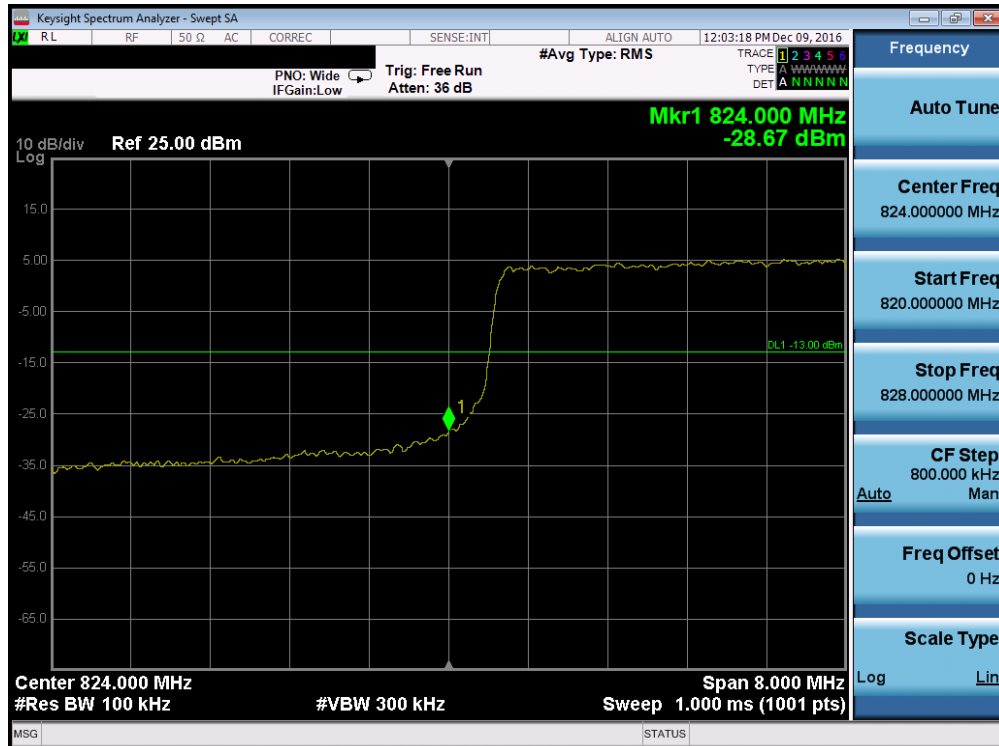


Plot 7-85. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - RB Size 25)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 59 of 116

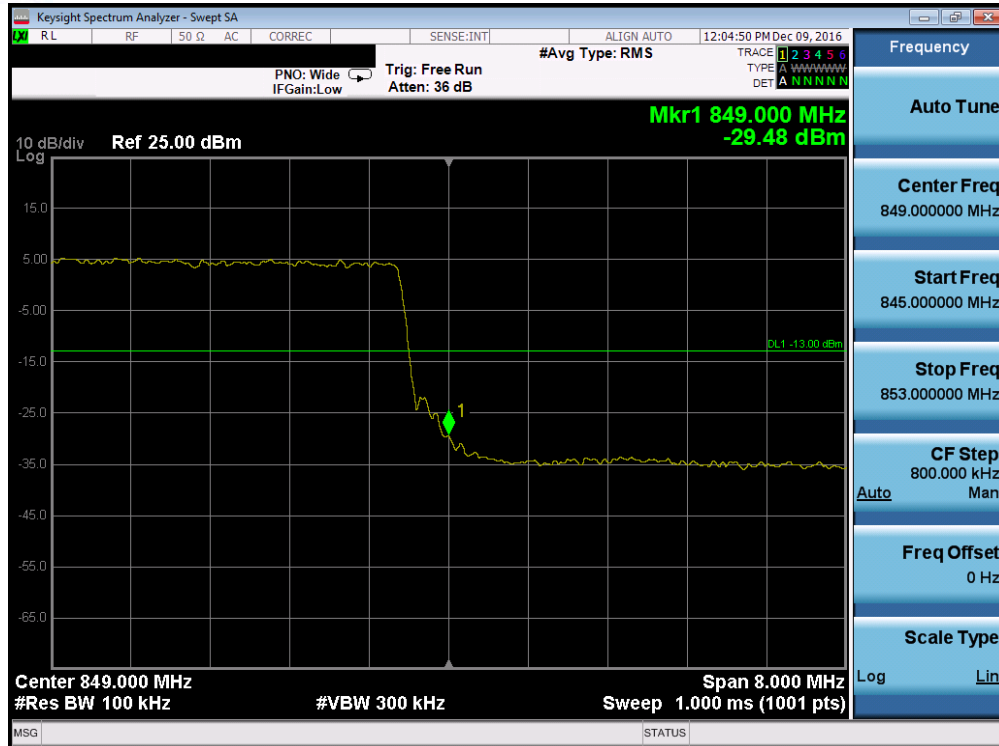


Plot 7-86. Upper Extended Band Edge Plot (Band 5 - 5.0MHz QPSK - RB Size 25)

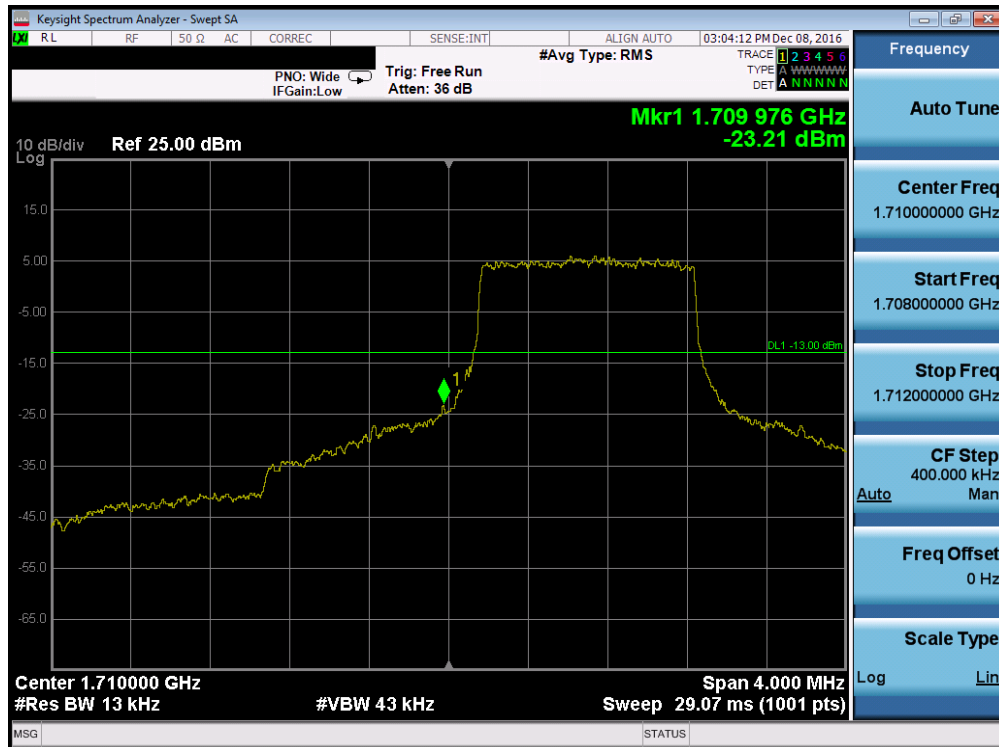


Plot 7-87. Lower Band Edge Plot (Band 5 - 10.0MHz QPSK - RB Size 50)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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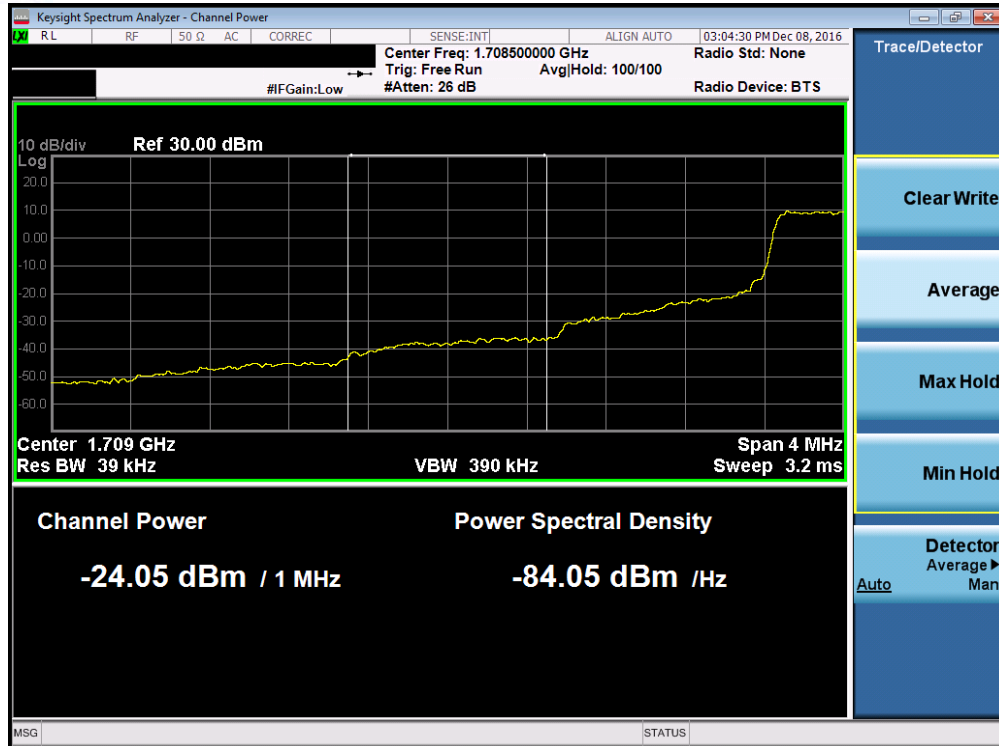


Plot 7-88. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



Plot 7-89. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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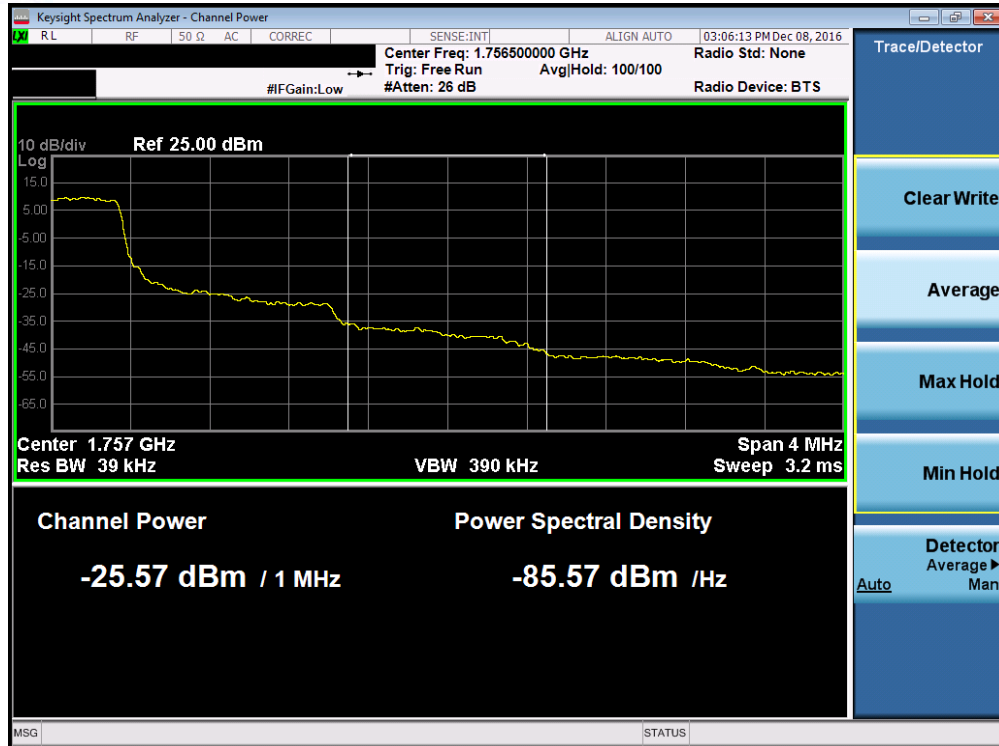


Plot 7-90. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

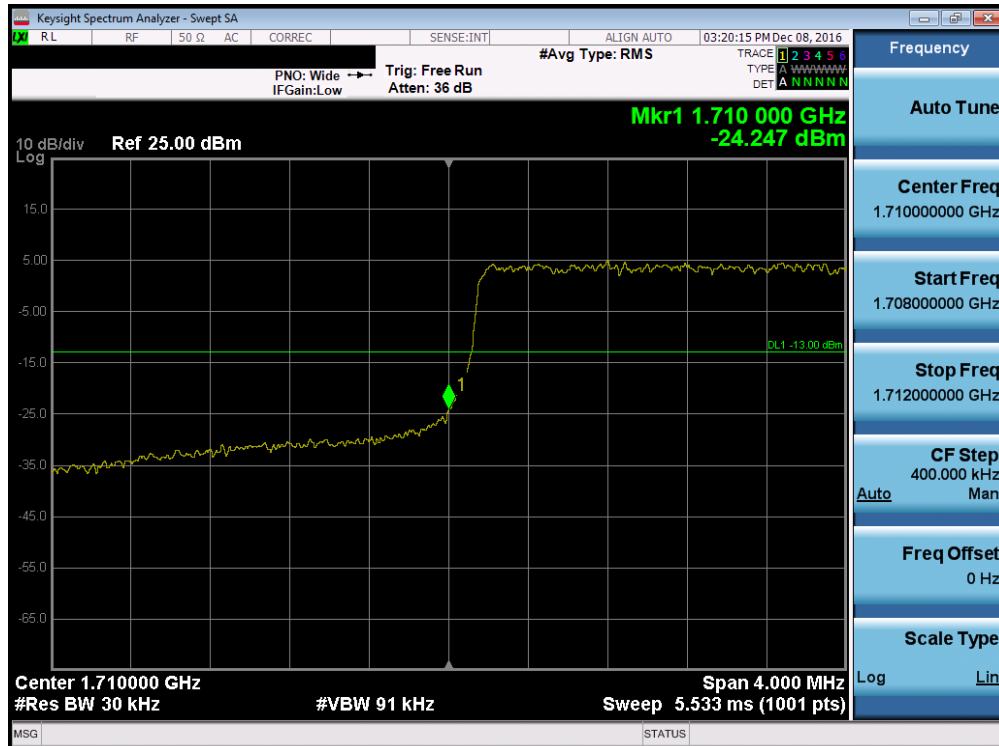


Plot 7-91. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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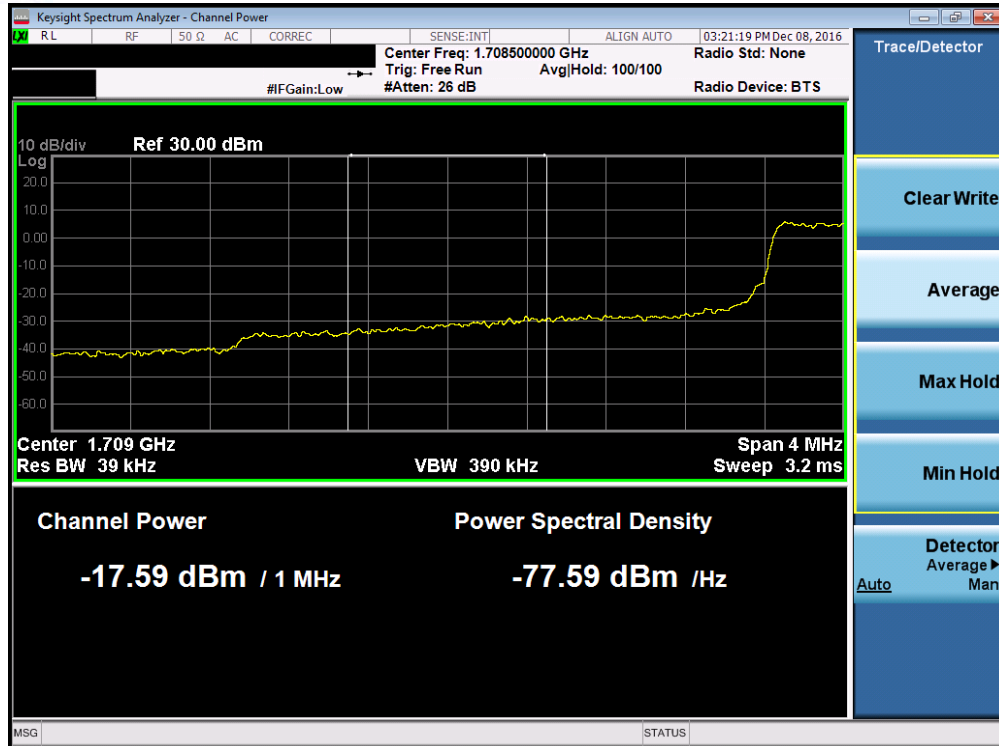


Plot 7-92. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

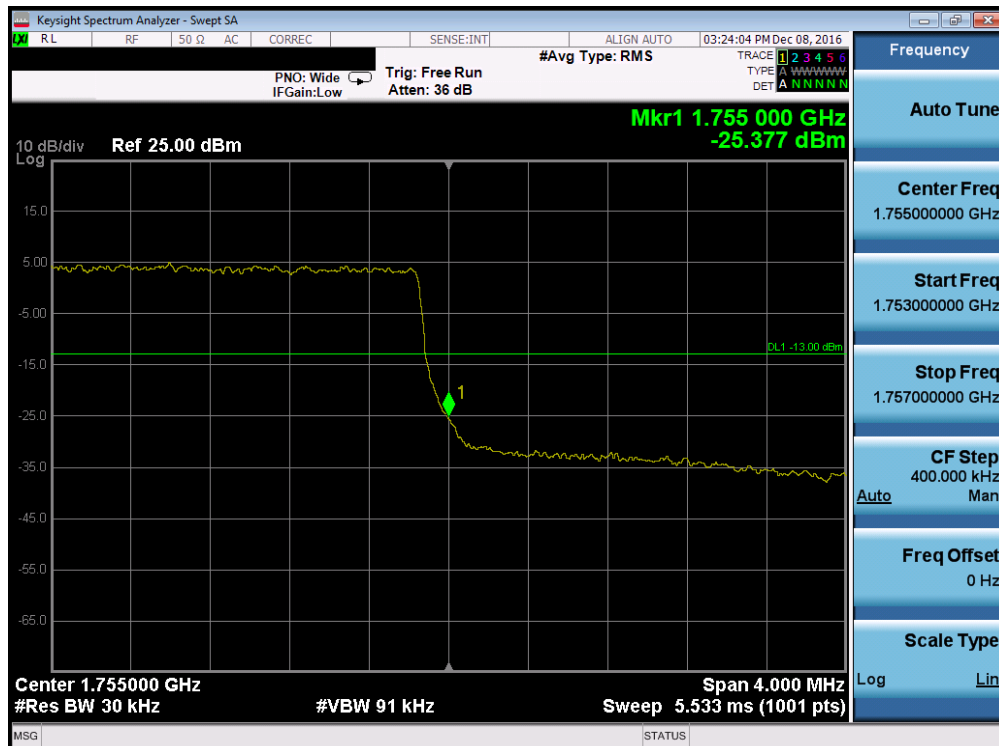


Plot 7-93. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 63 of 116

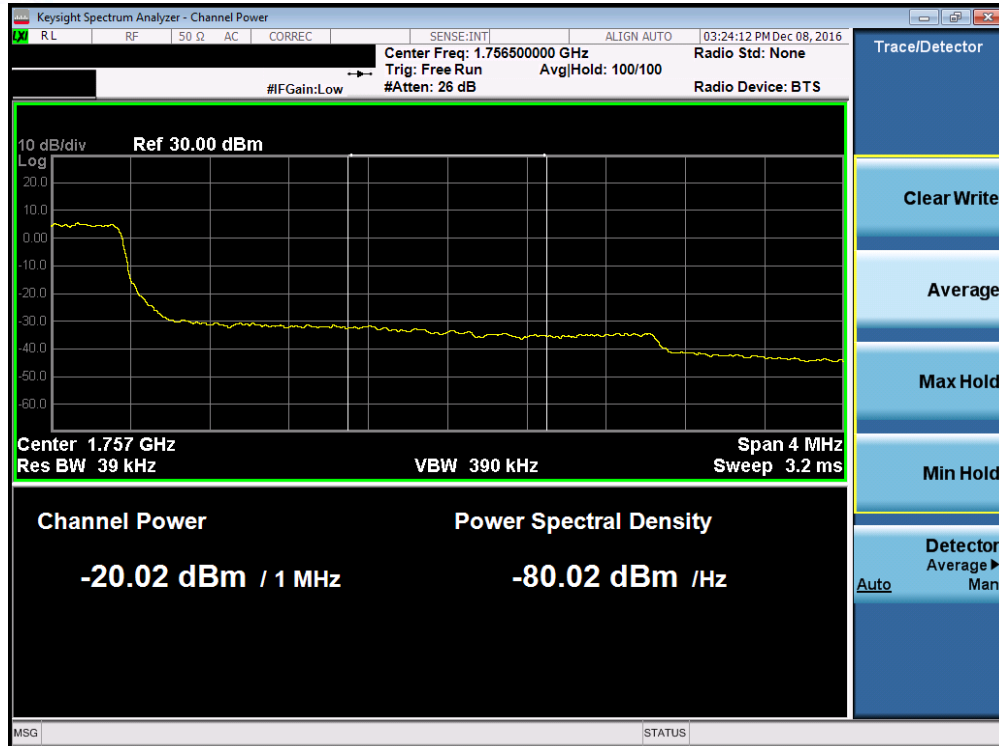


Plot 7-94. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

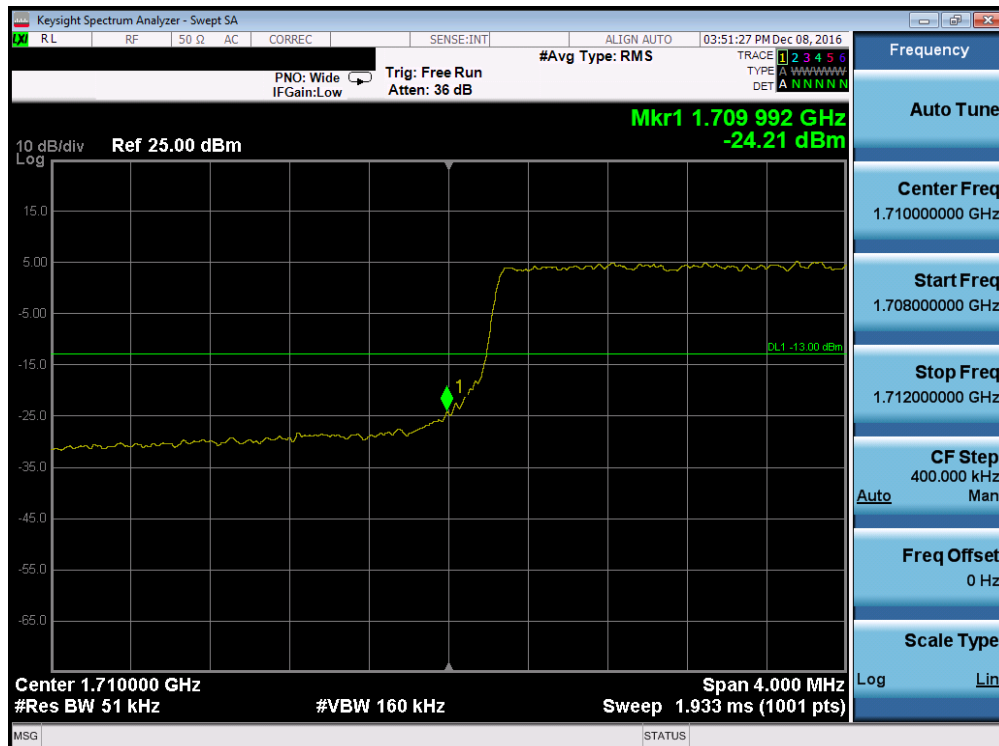


Plot 7-95. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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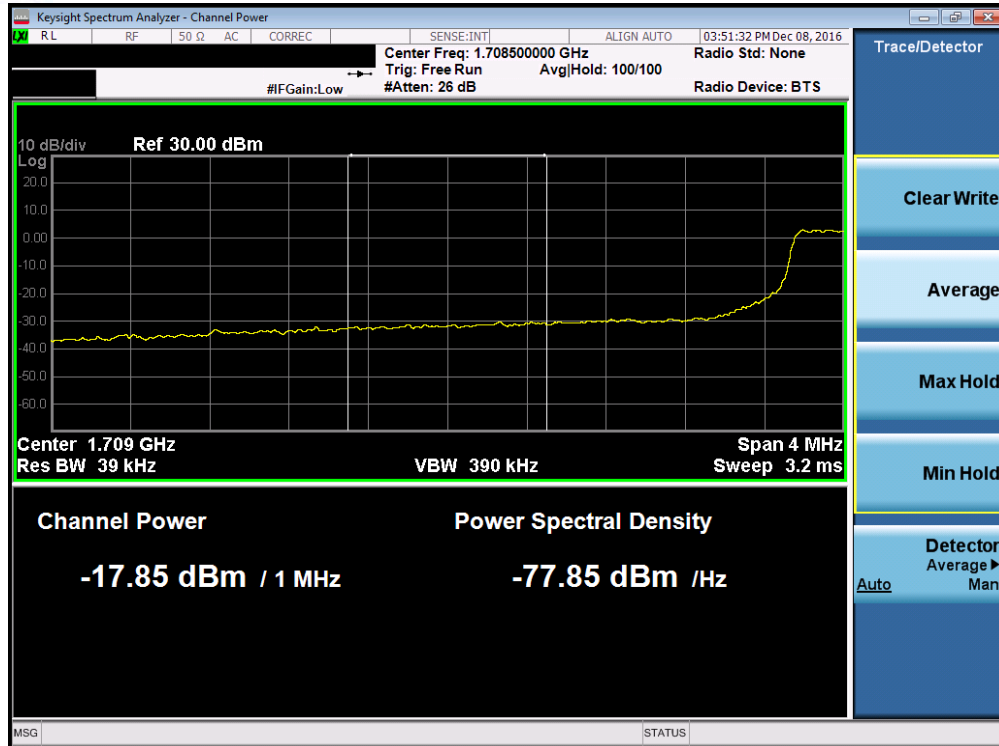


Plot 7-96. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

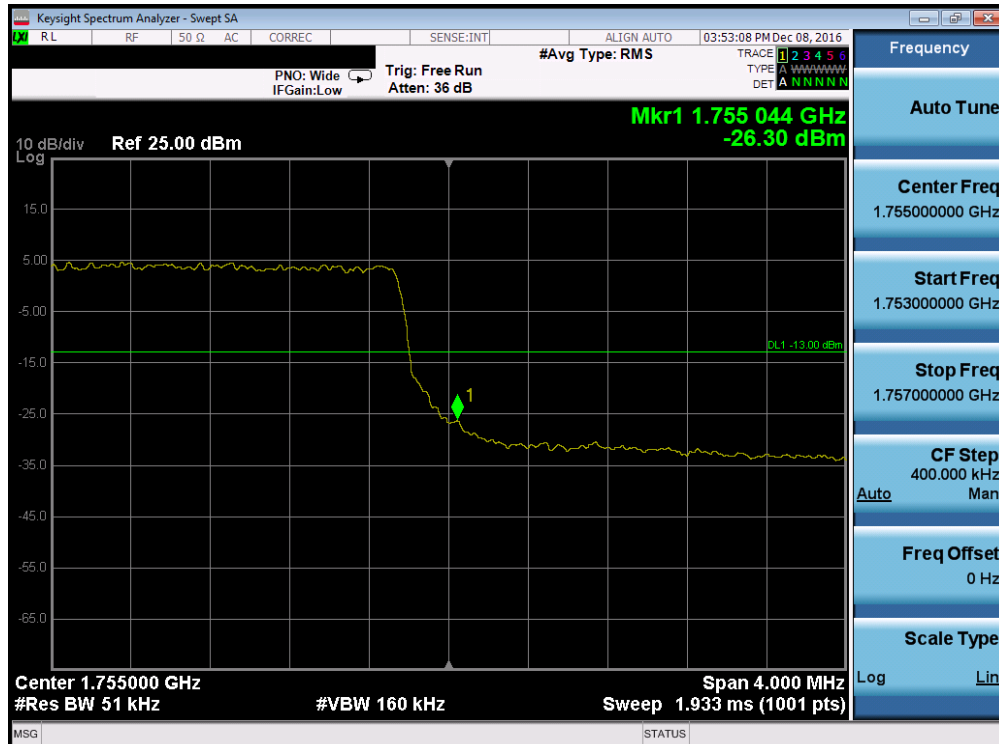


Plot 7-97. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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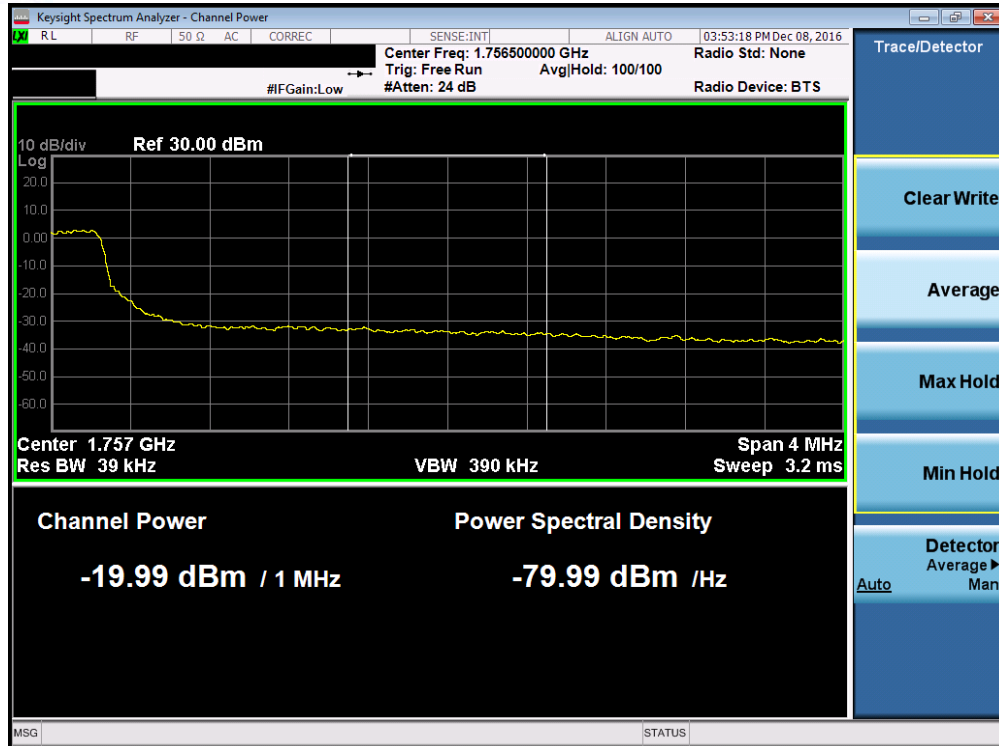


Plot 7-98. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

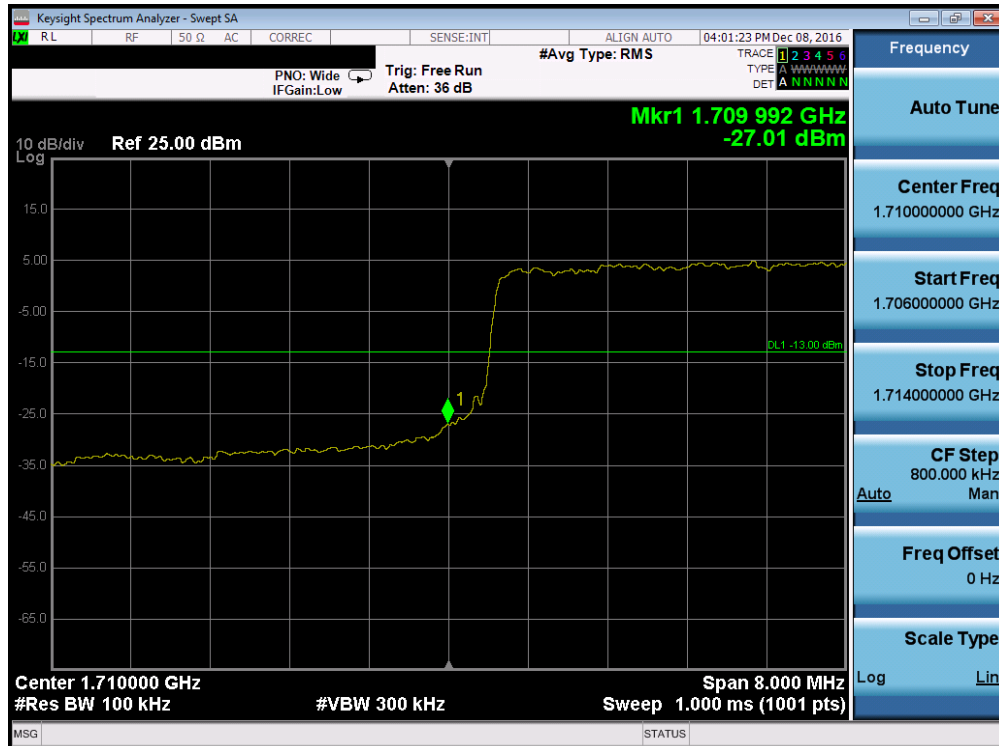


Plot 7-99. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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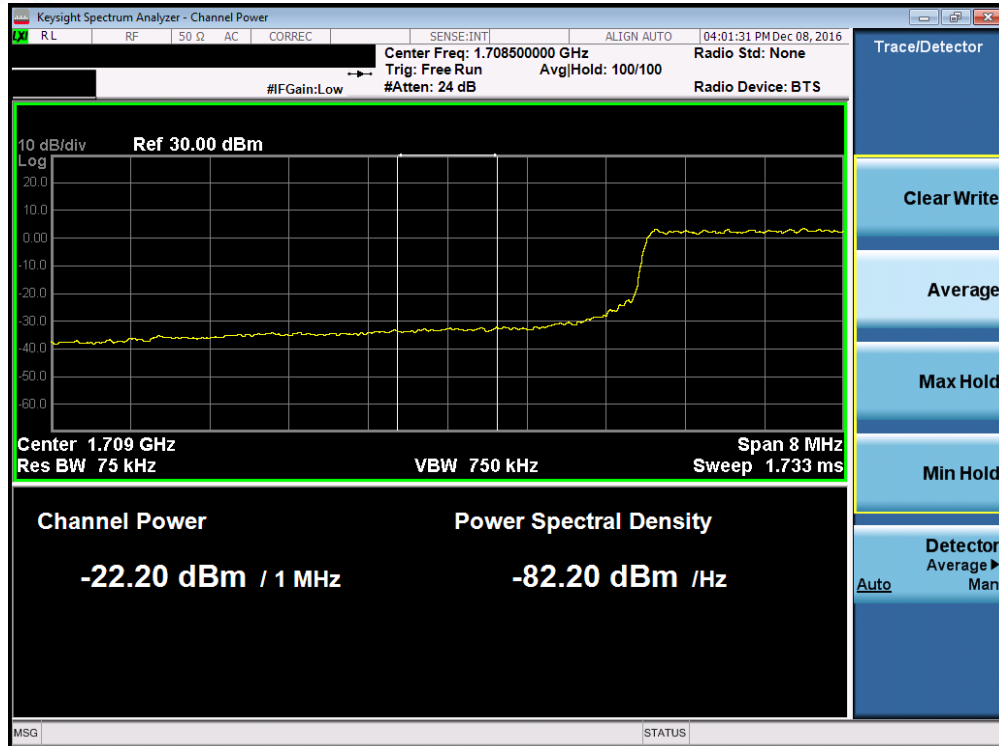


Plot 7-100. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-101. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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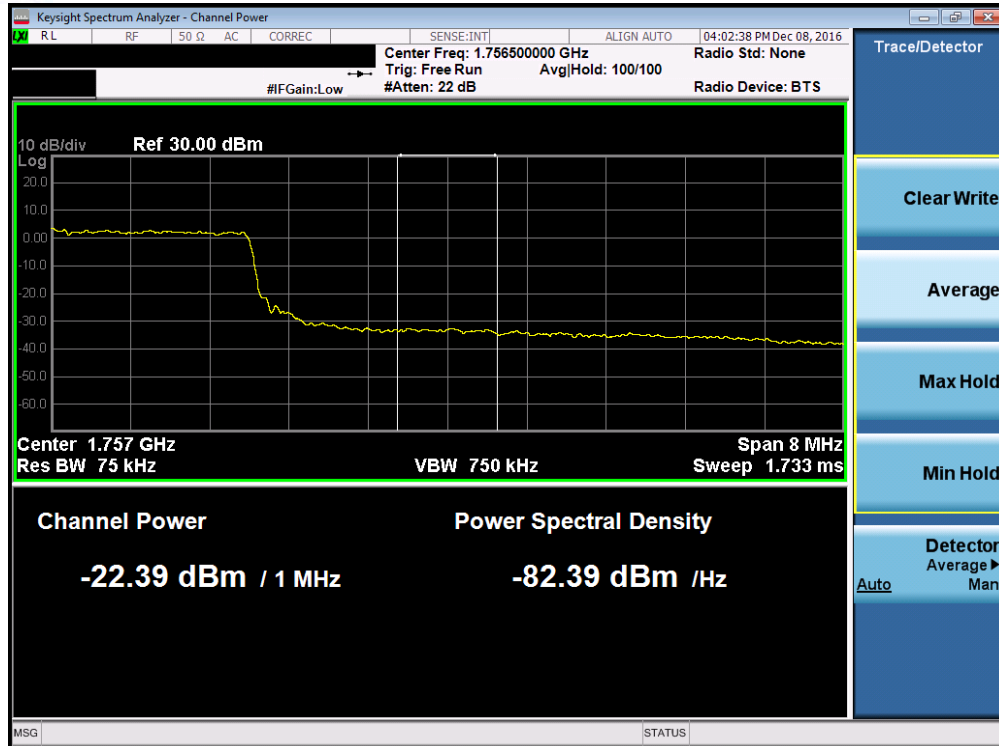


Plot 7-102. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

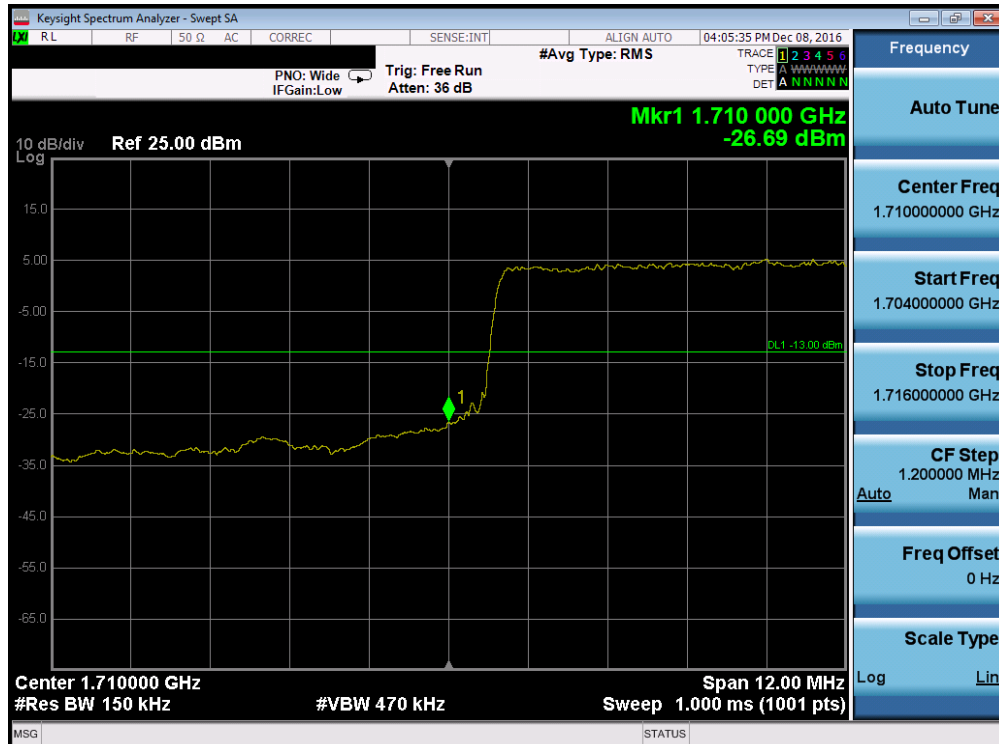


Plot 7-103. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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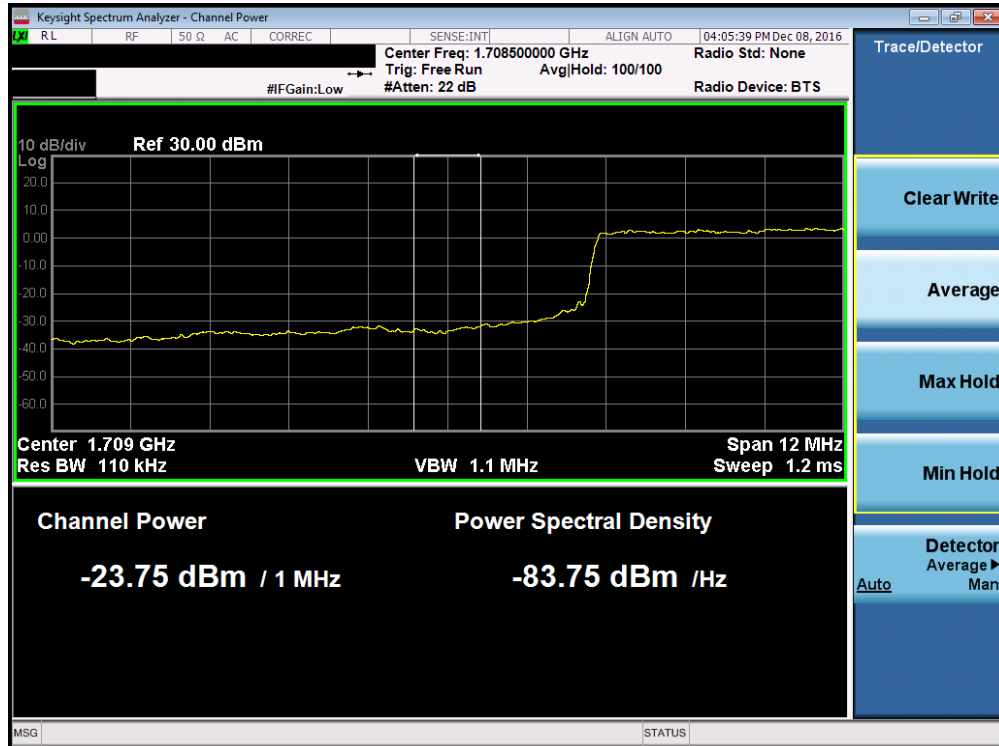


Plot 7-104. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

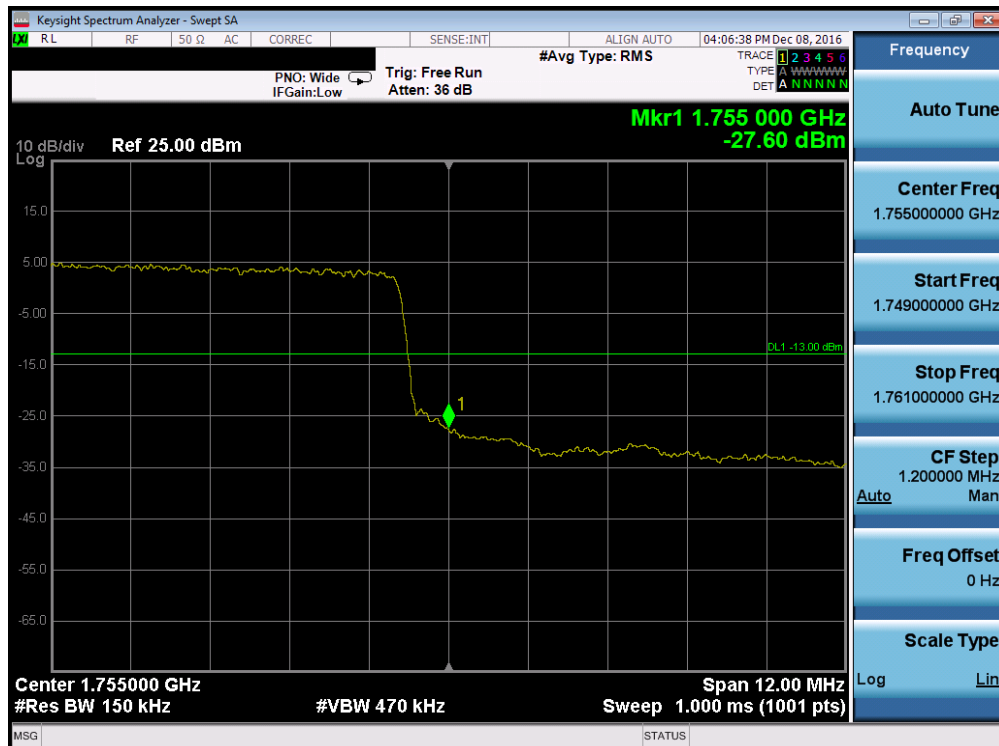


Plot 7-105. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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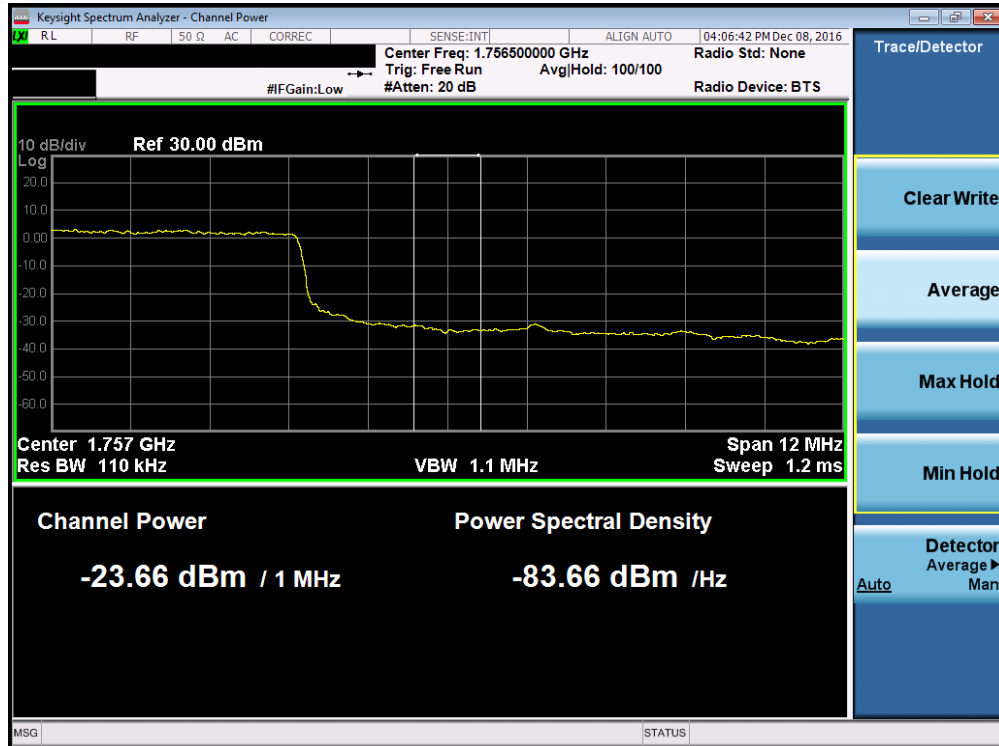


Plot 7-106. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

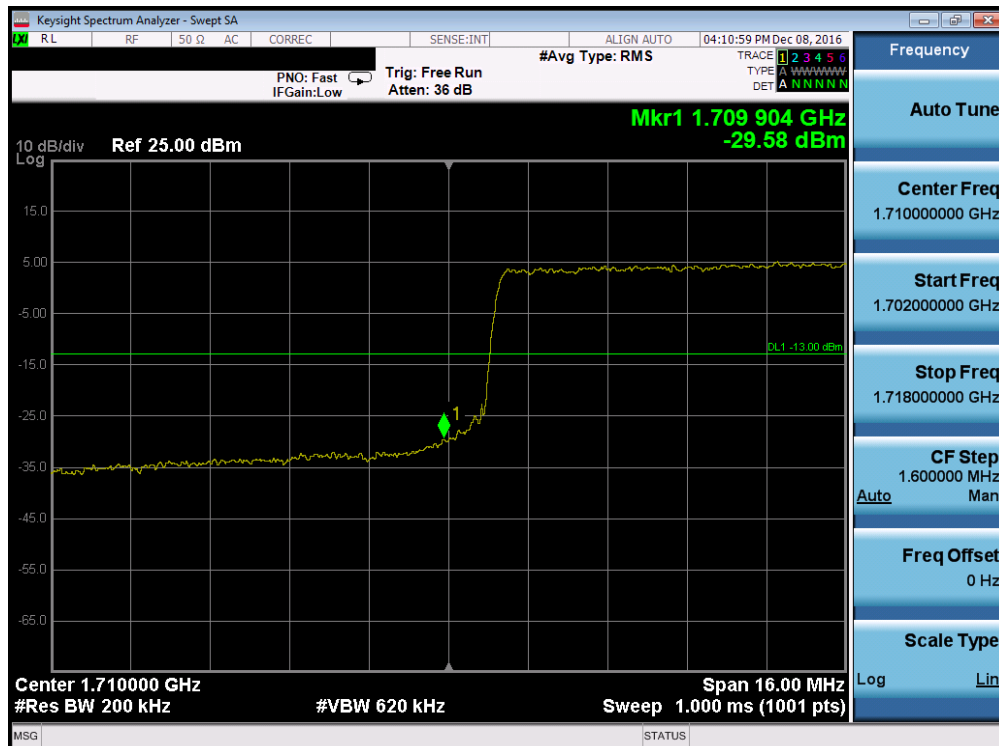


Plot 7-107. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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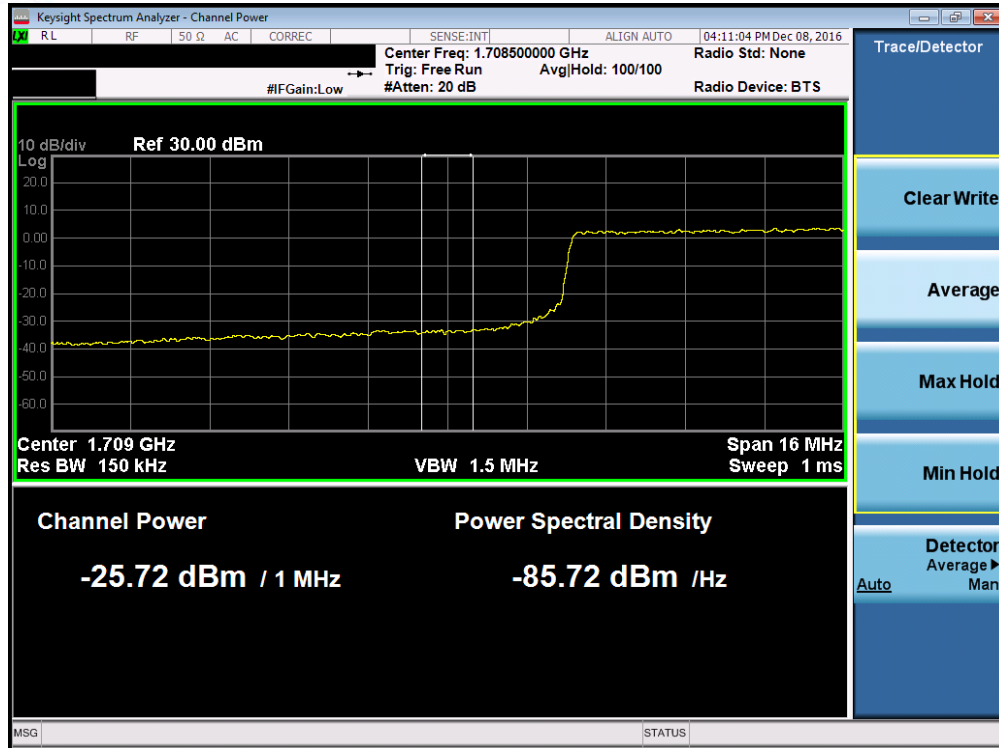


Plot 7-108. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

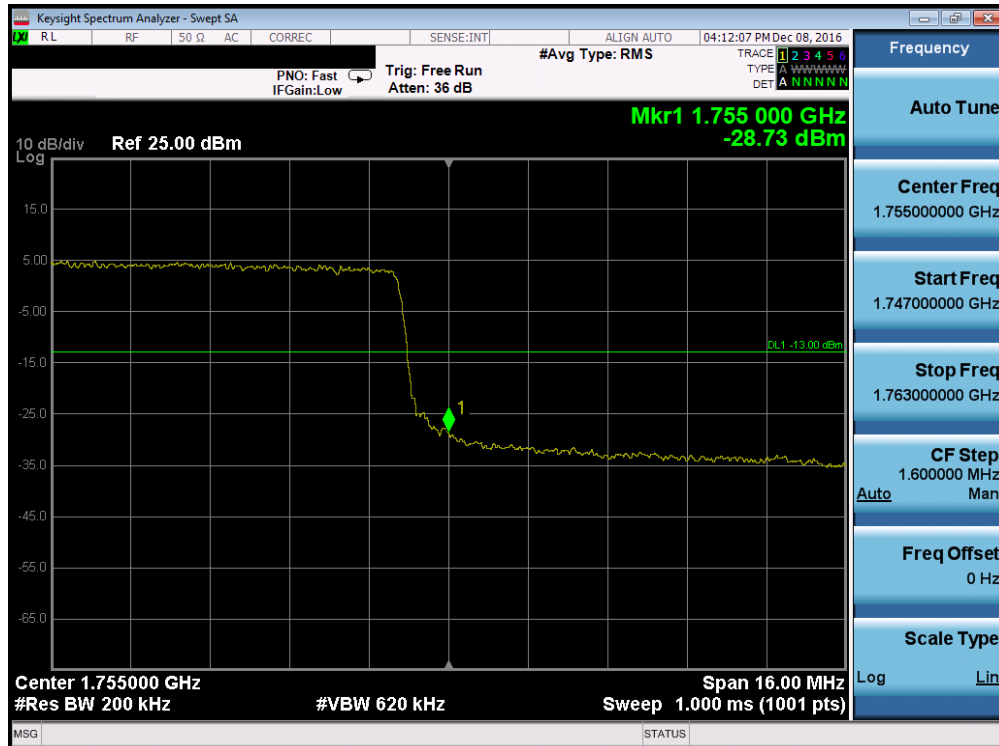


Plot 7-109. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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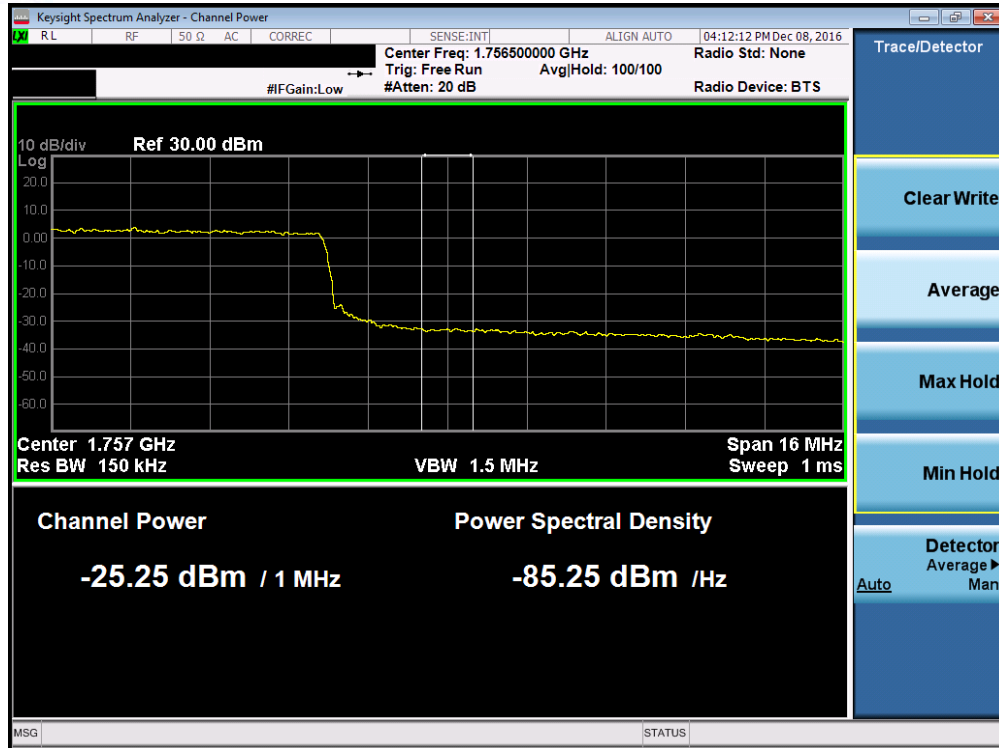


Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

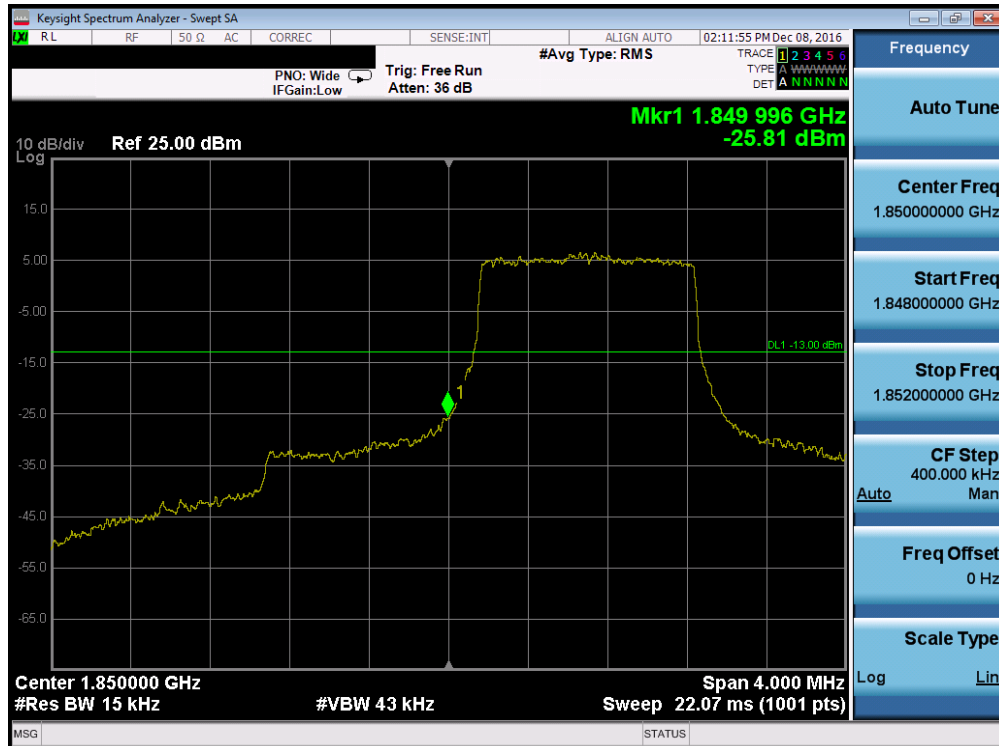


Plot 7-111. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 72 of 116

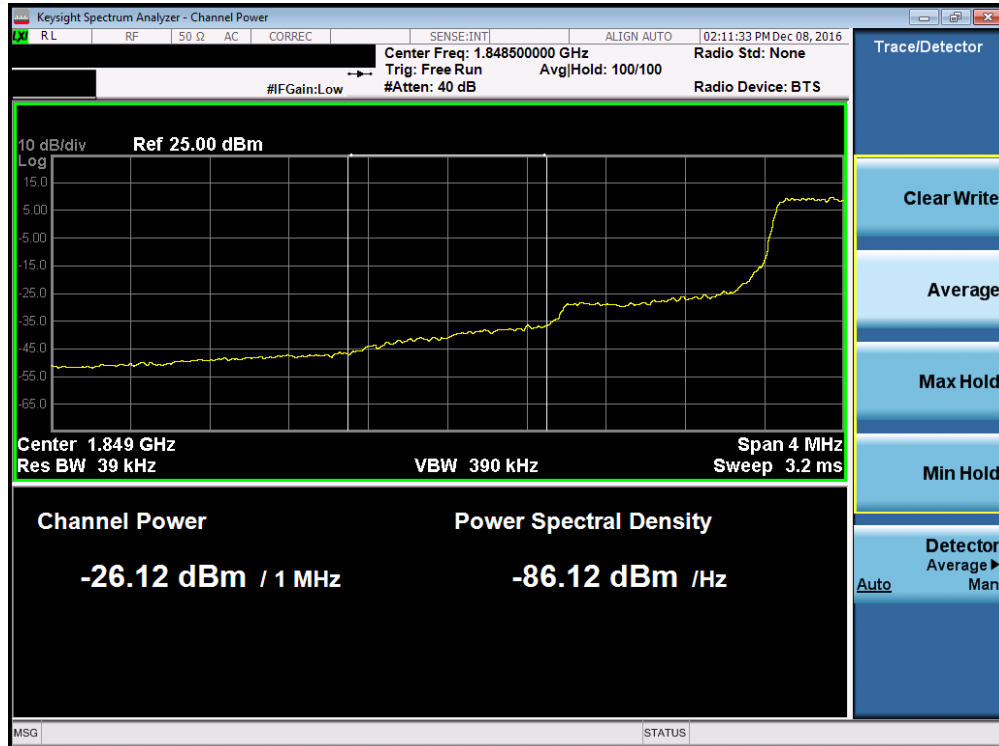


Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

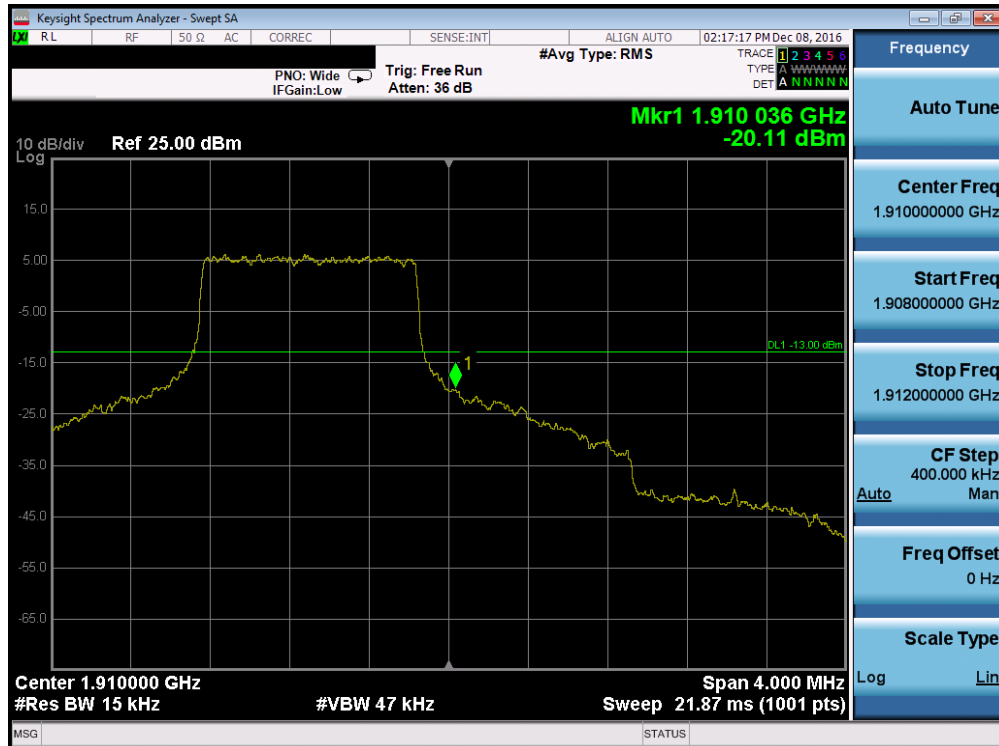


Plot 7-113. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 73 of 116

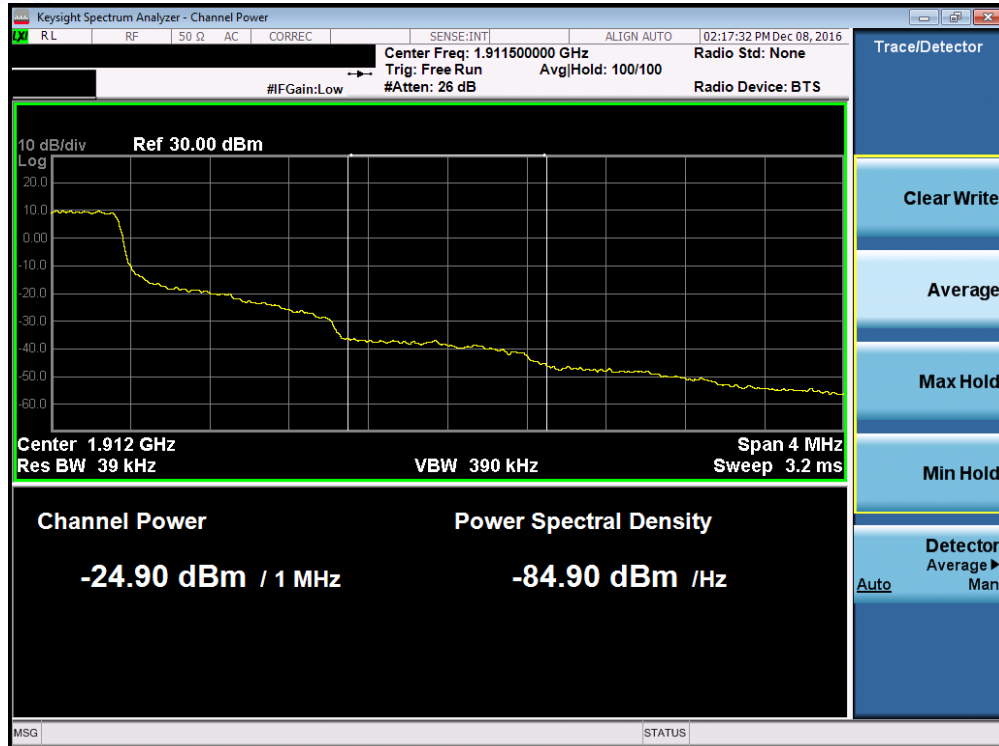


Plot 7-114. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

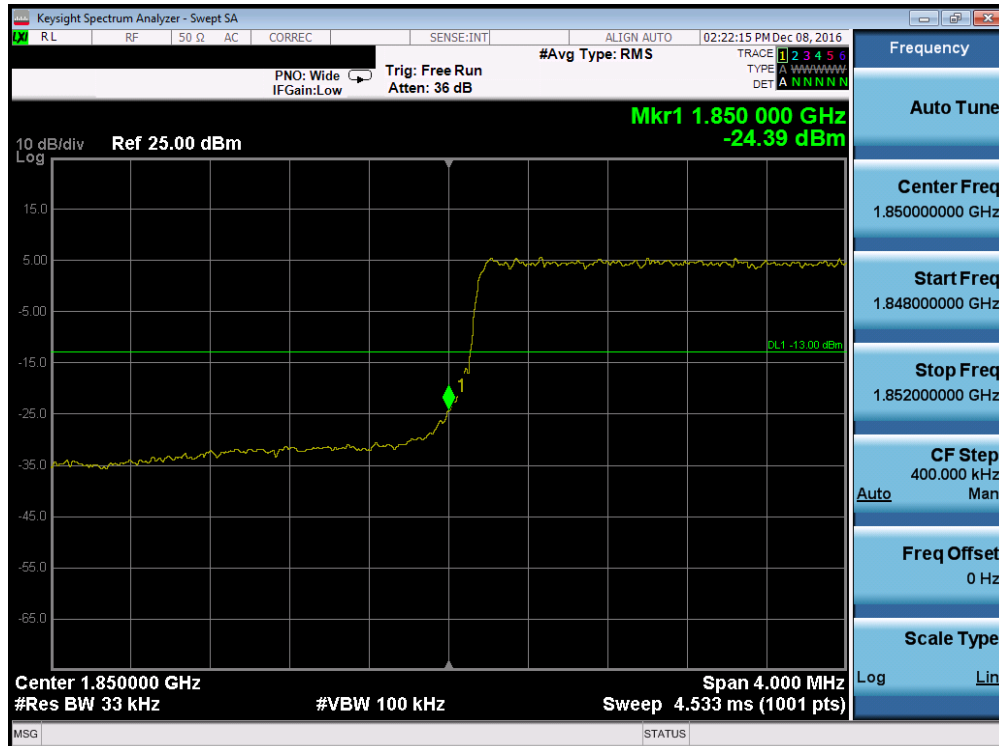


Plot 7-115. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 74 of 116

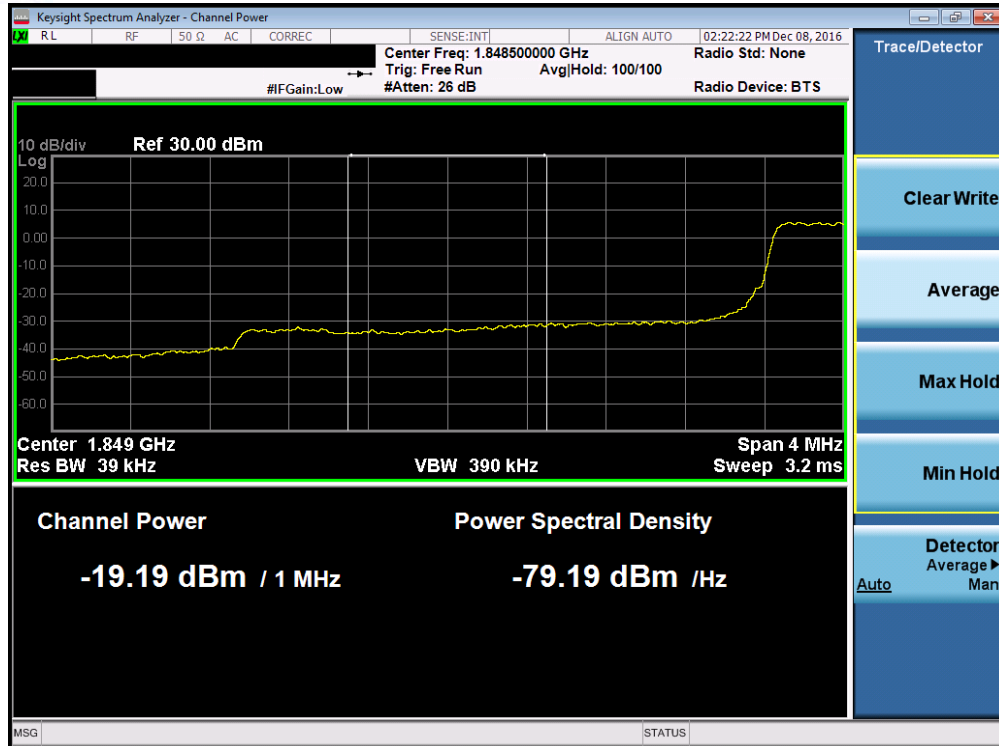


Plot 7-116. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 7-117. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 75 of 116

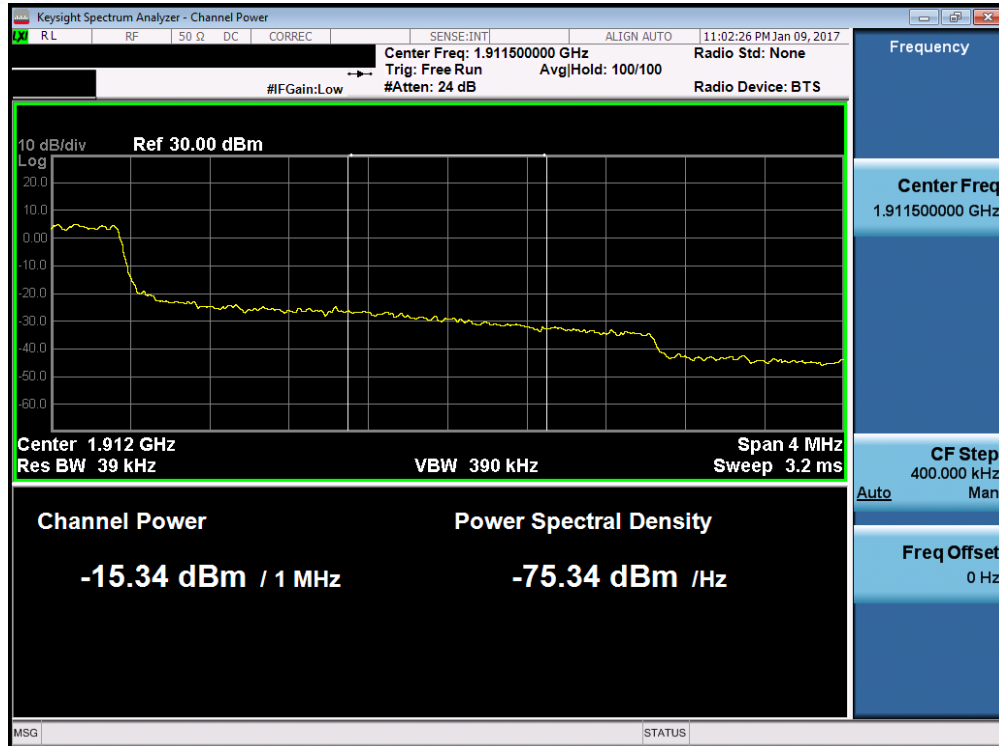


Plot 7-118. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

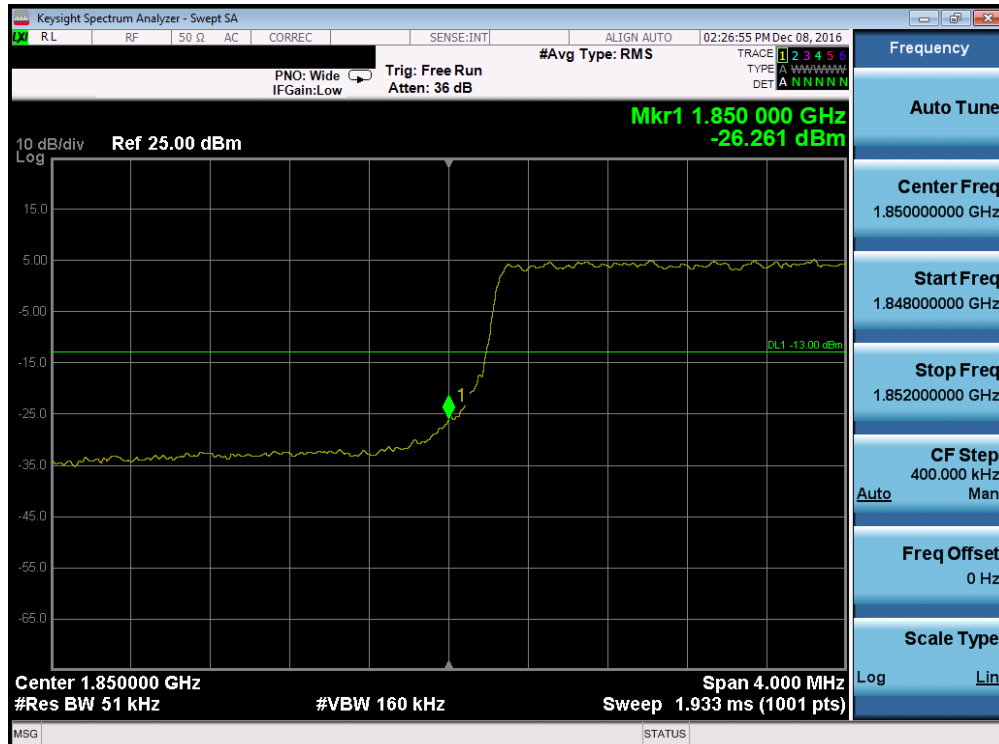


Plot 7-119. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 76 of 116

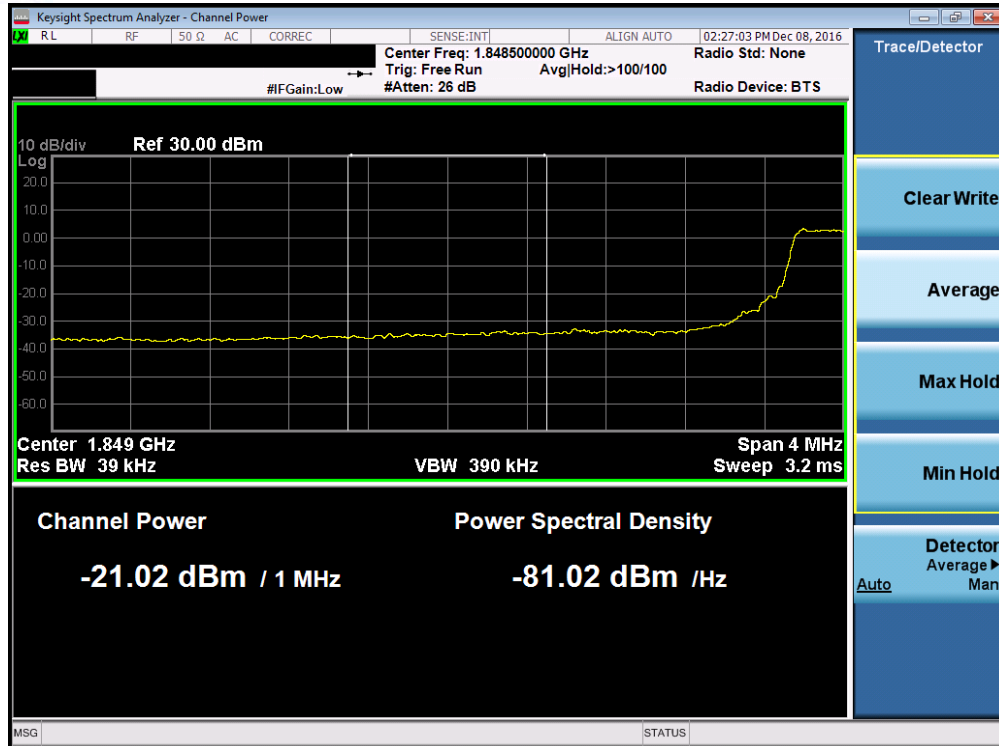


Plot 7-120. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



Plot 7-121. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 77 of 116

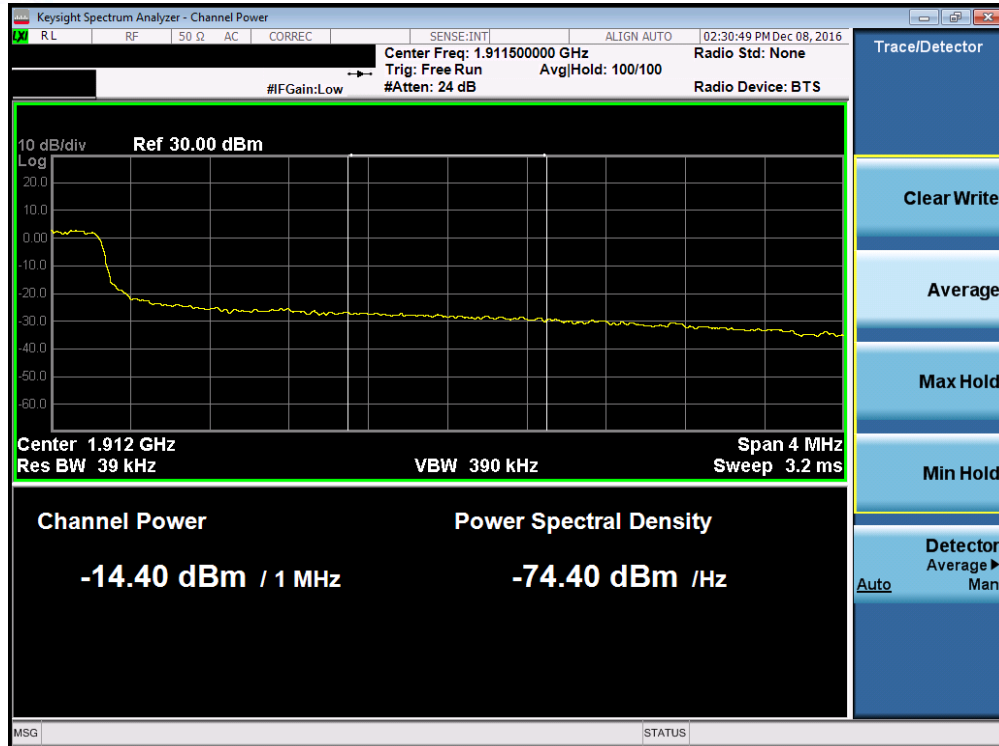


Plot 7-122. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

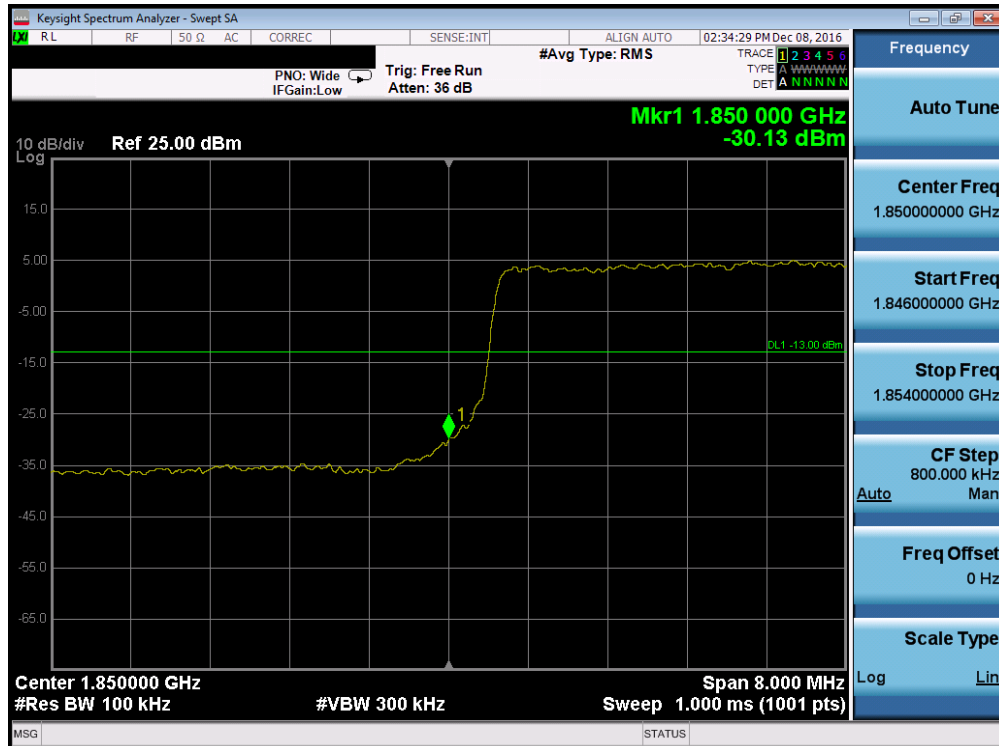


Plot 7-123. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 78 of 116

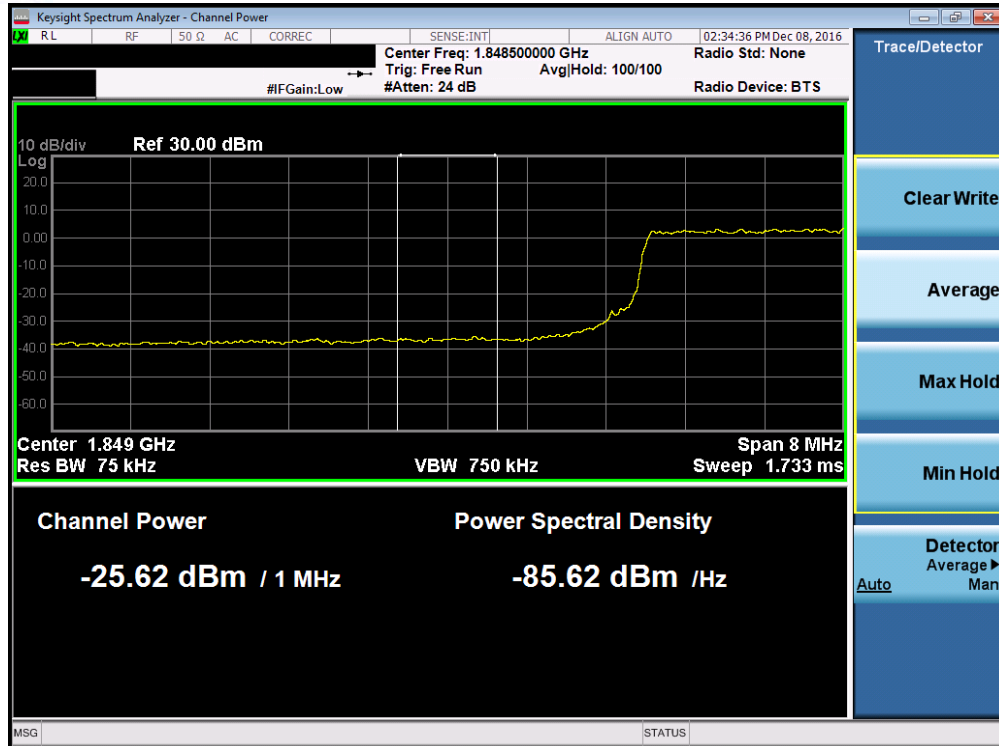


Plot 7-124. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-125. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 79 of 116

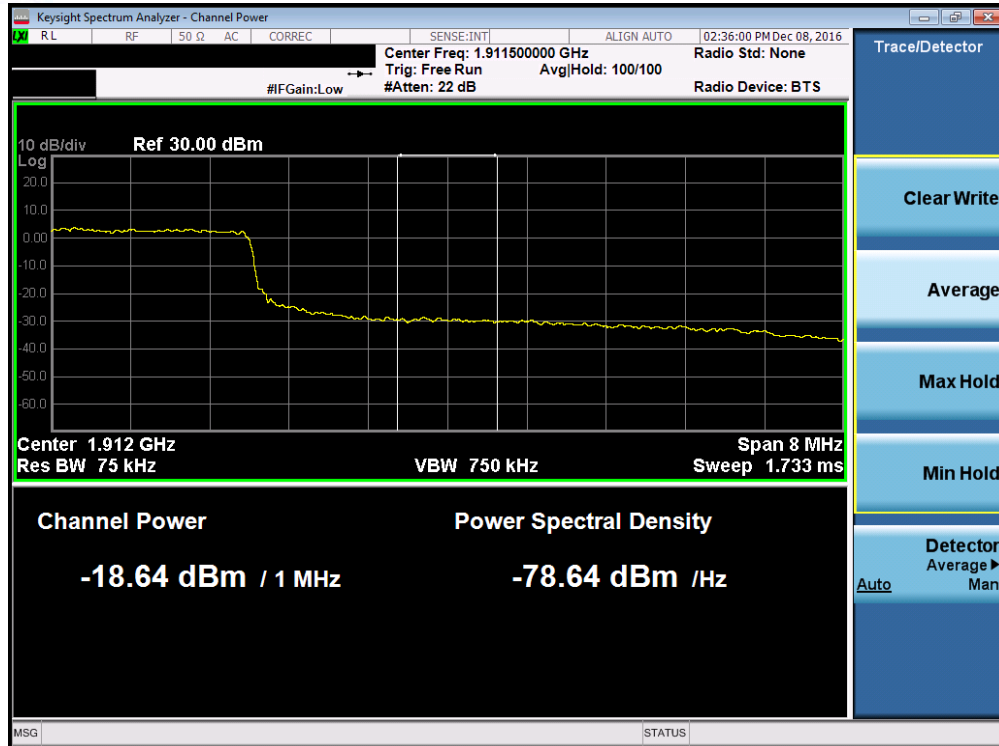


Plot 7-126. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

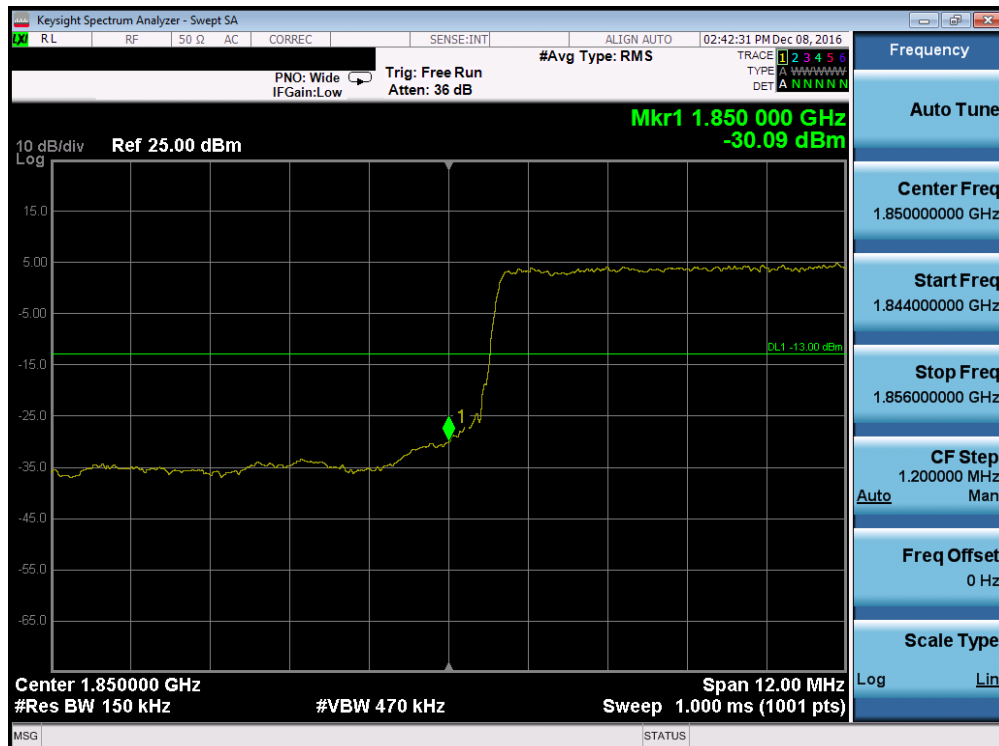


Plot 7-127. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 80 of 116

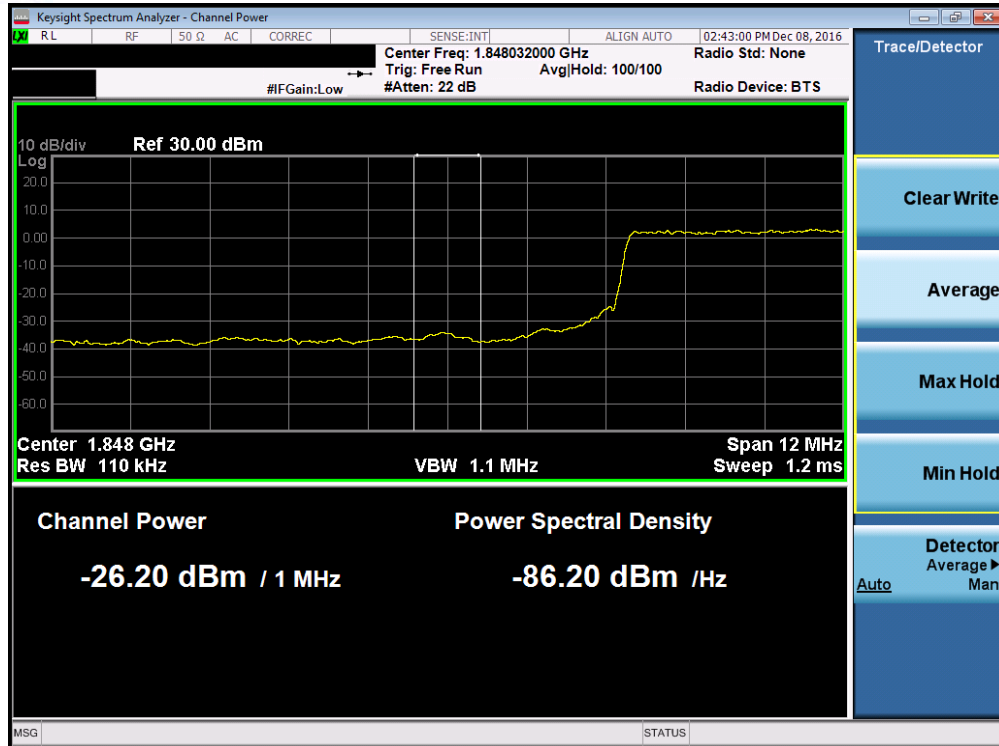


Plot 7-128. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 7-129. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 81 of 116

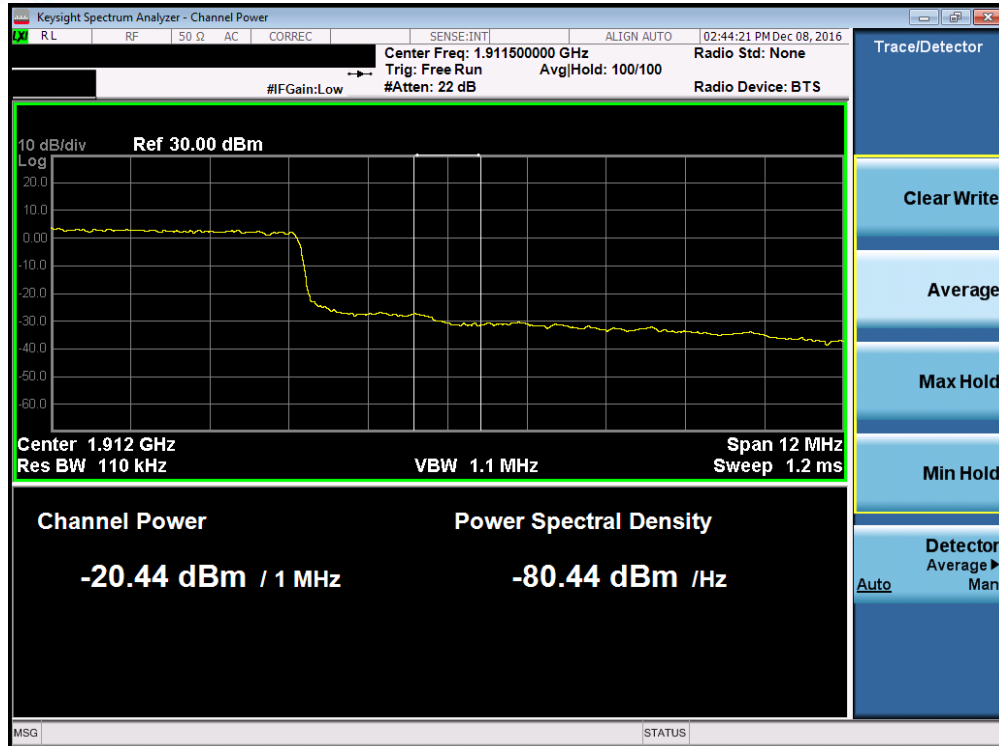


Plot 7-130. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

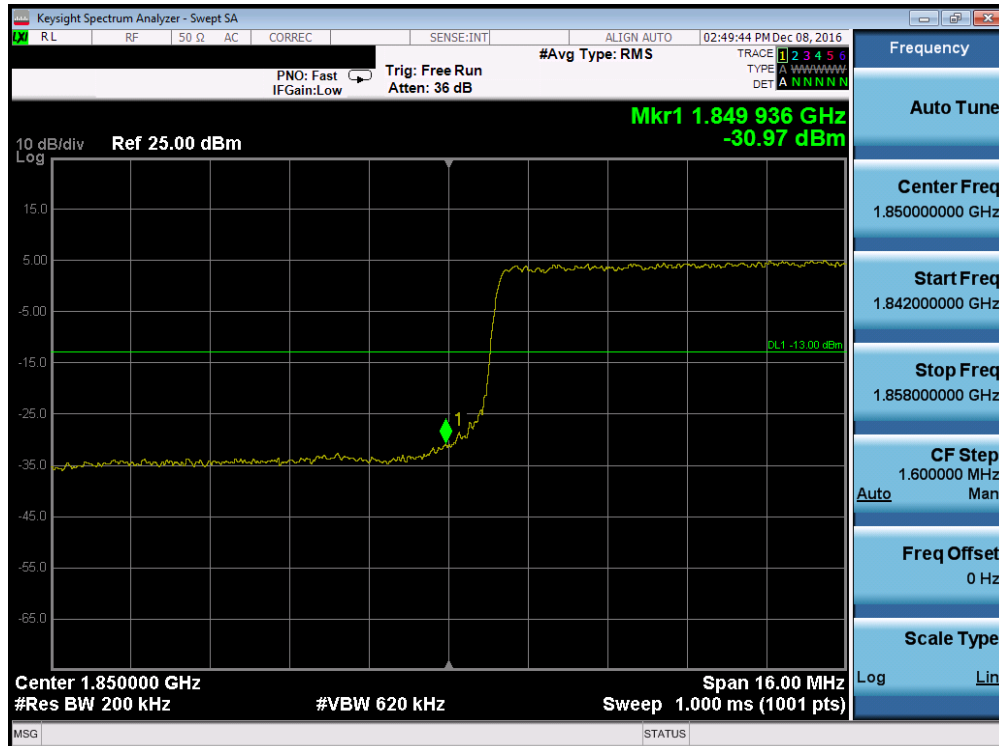


Plot 7-131. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 82 of 116

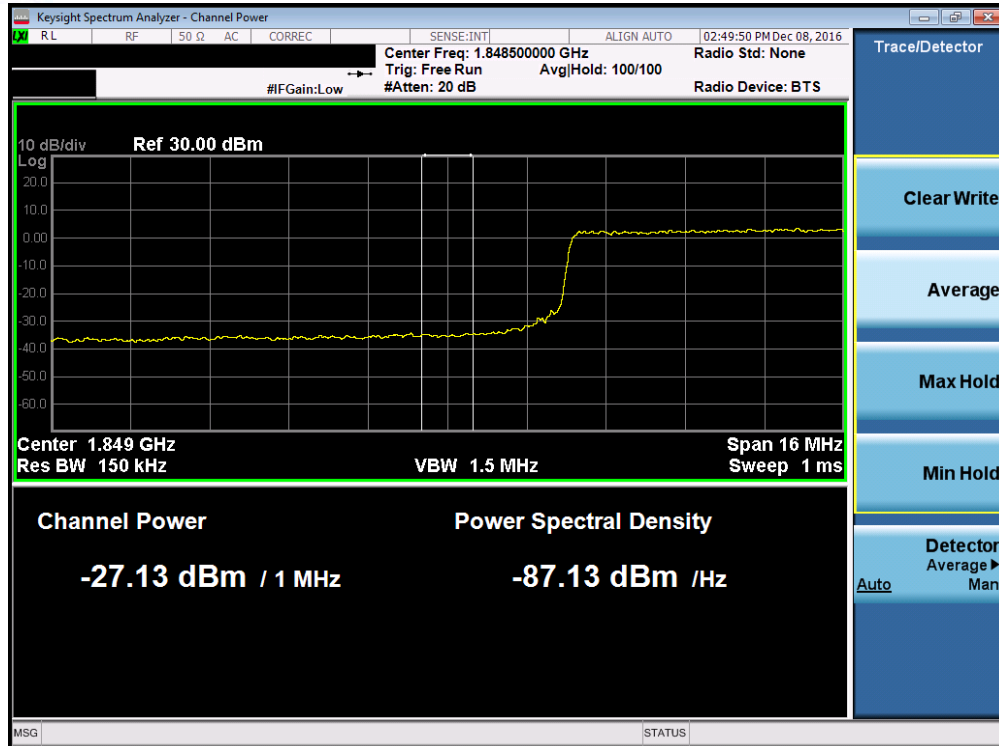


Plot 7-132. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 7-133. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 83 of 116

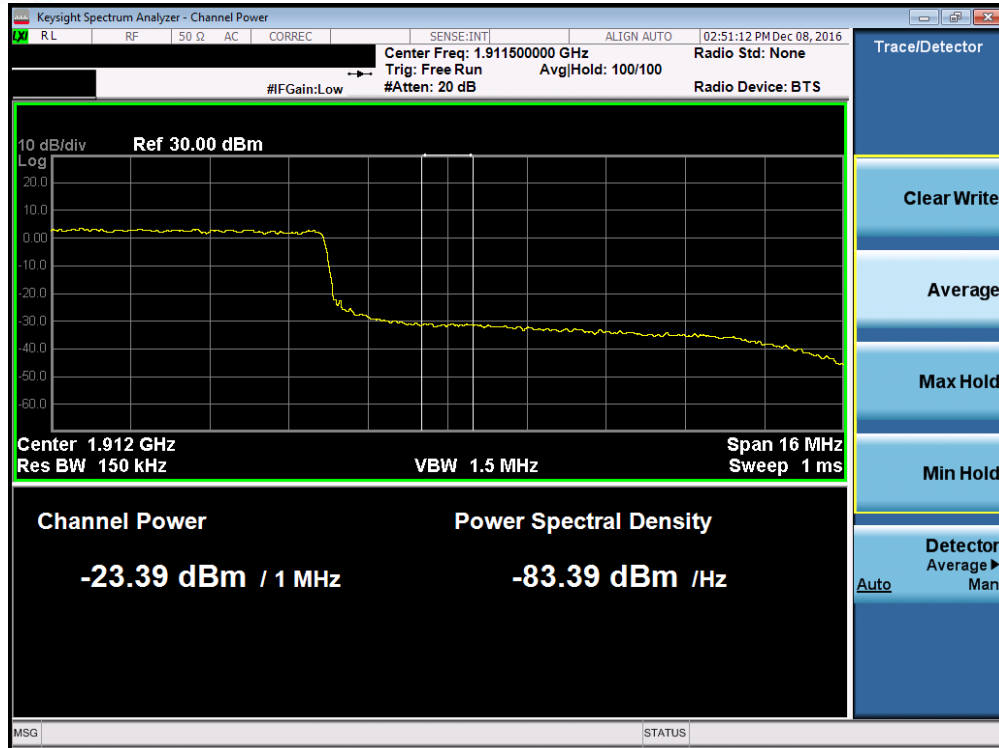


Plot 7-134. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-135. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 84 of 116



Plot 7-136. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 85 of 116

7.5 Peak-Average Ratio

§24.232(d)

Test Overview

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

Test Procedure Used

KDB 971168 D01 v02r02 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.

Test Setup

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

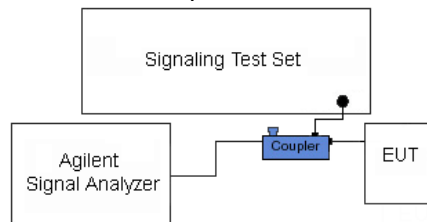
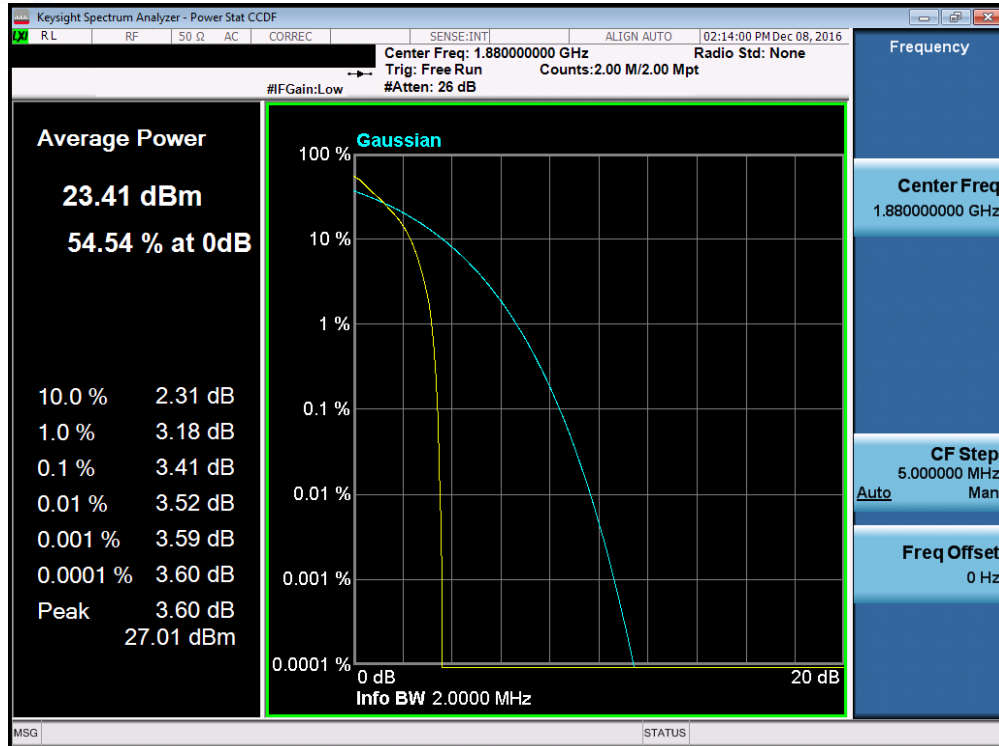


Figure 7-4. Test Instrument & Measurement Setup

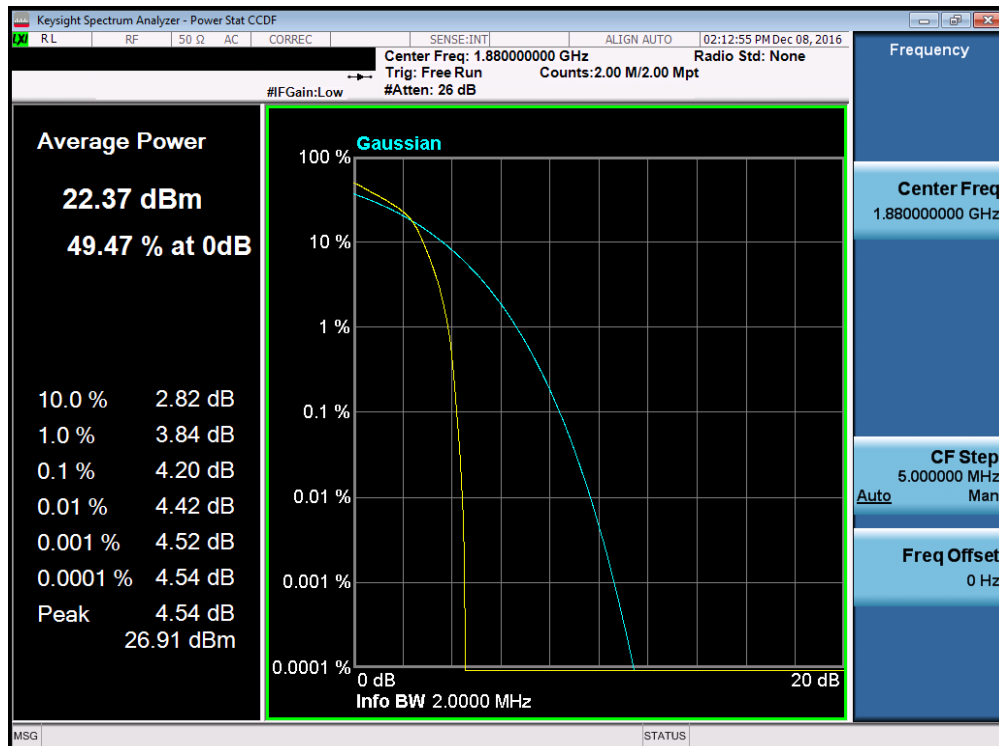
Test Notes

None.

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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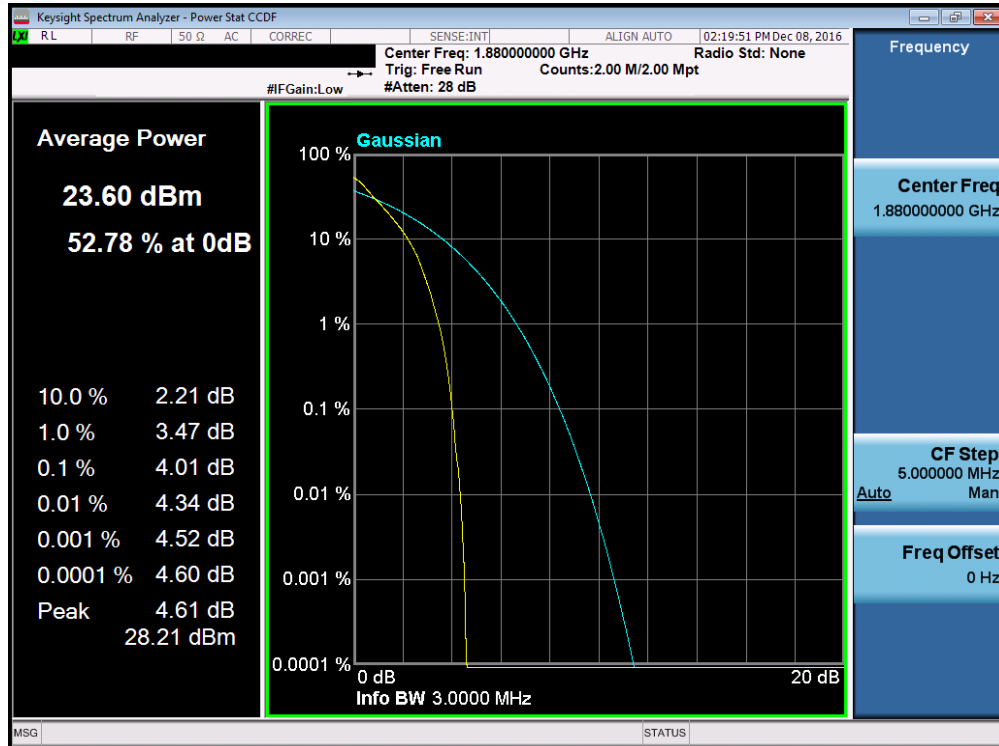


Plot 7-137. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

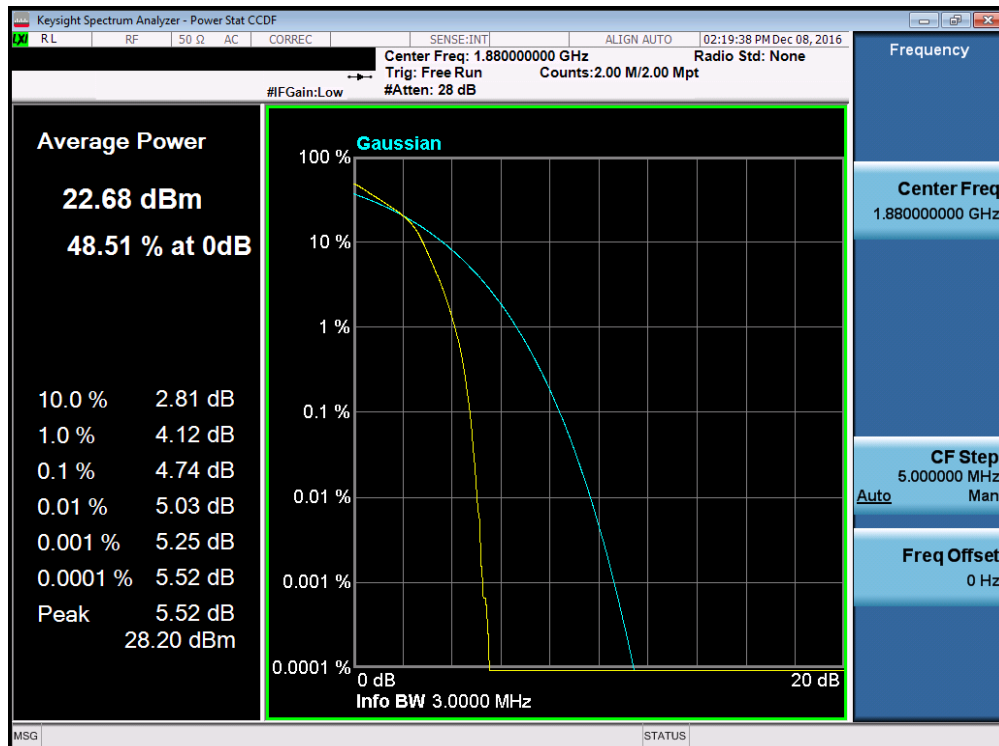


Plot 7-138. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 87 of 116

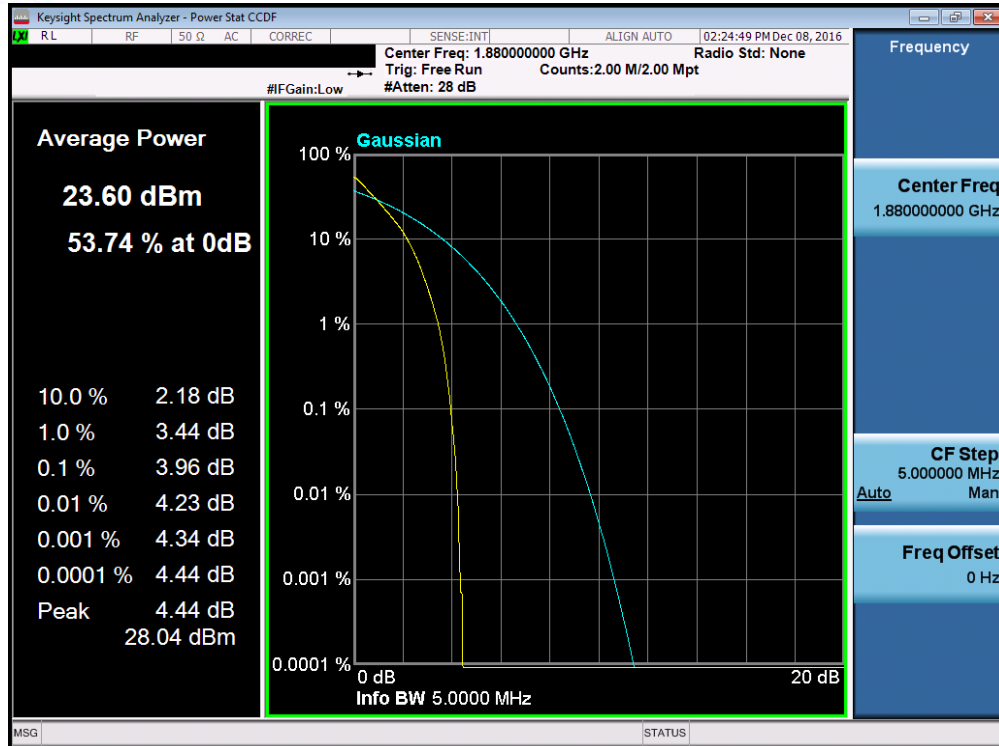


Plot 7-139. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

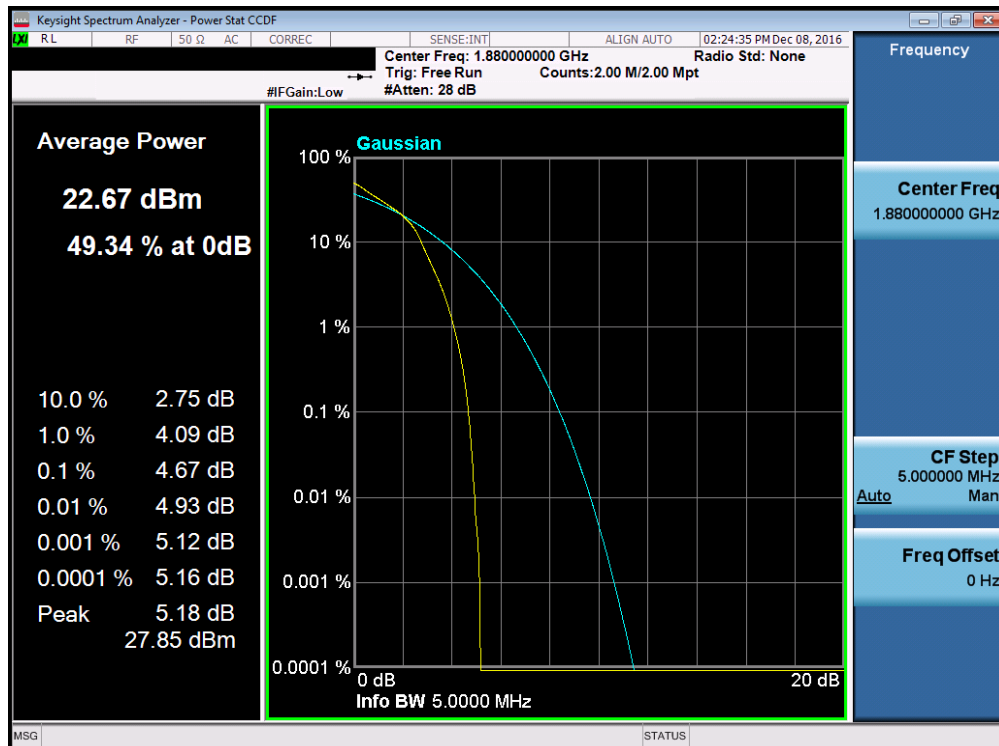


Plot 7-140. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 88 of 116

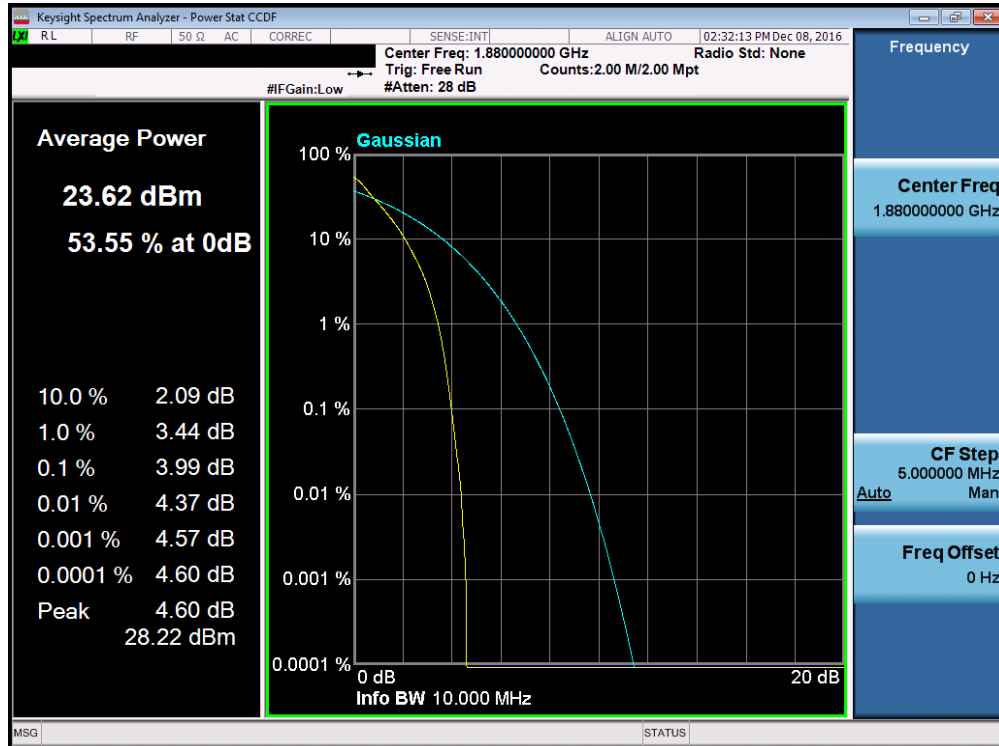


Plot 7-141. PAR Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

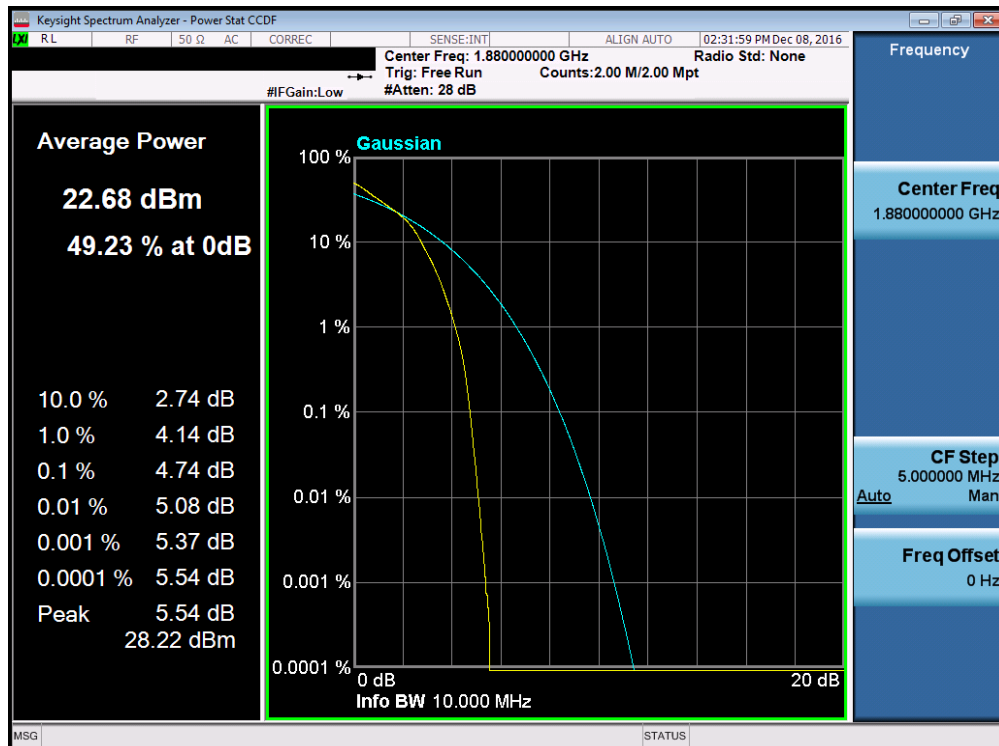


Plot 7-142. PAR Plot (Band 2 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 89 of 116

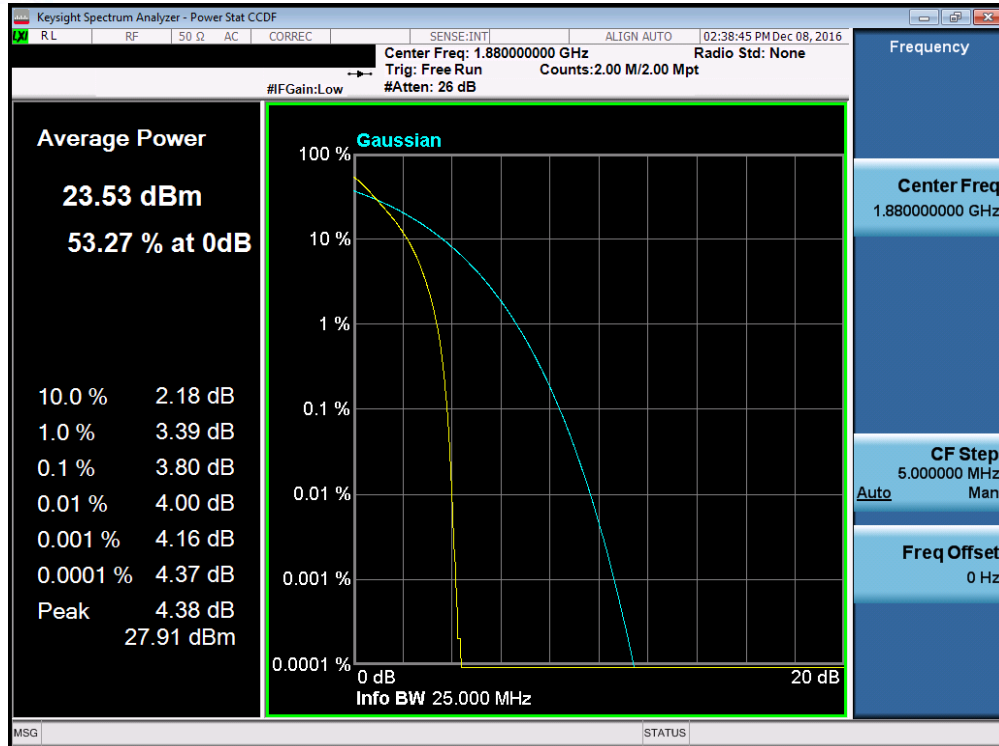


Plot 7-143. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

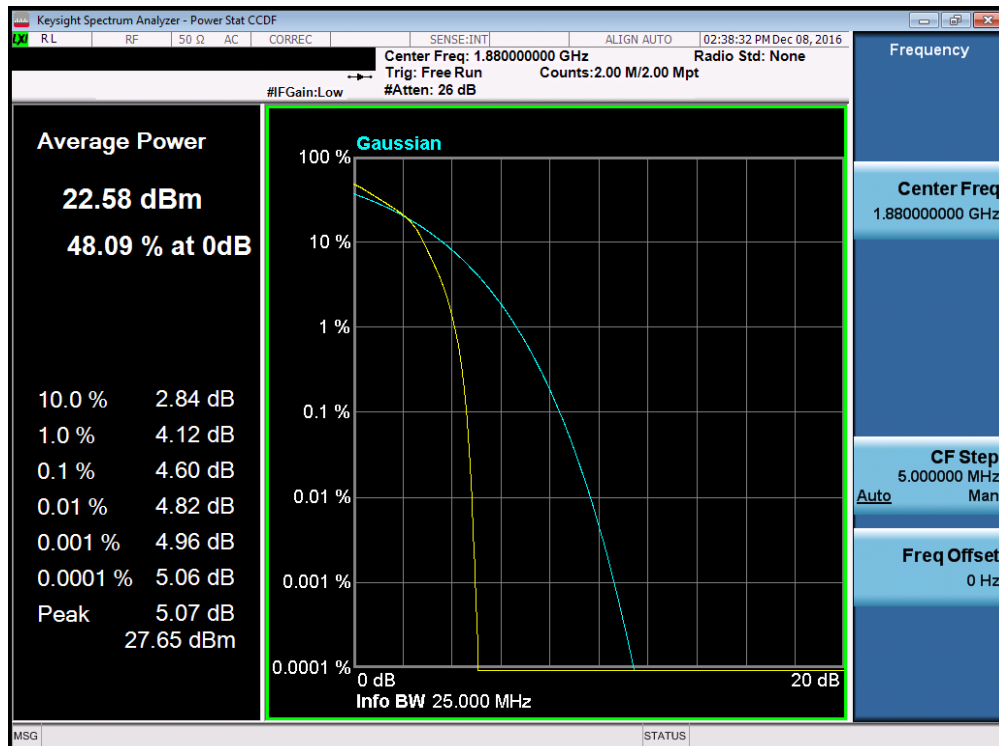


Plot 7-144. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 90 of 116

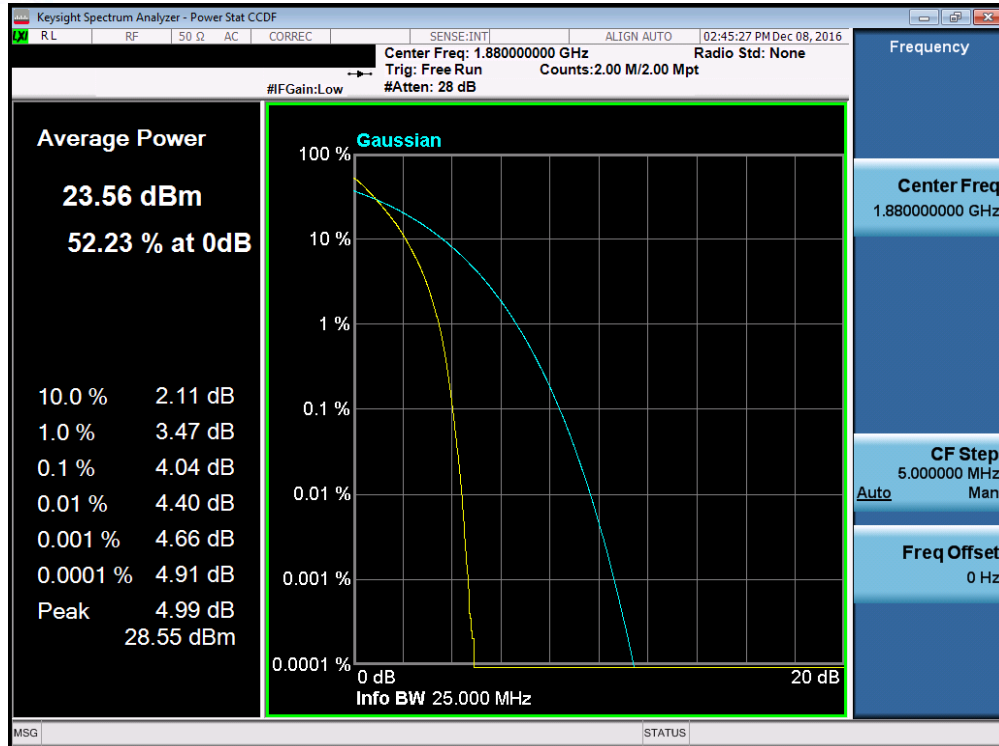


Plot 7-145. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

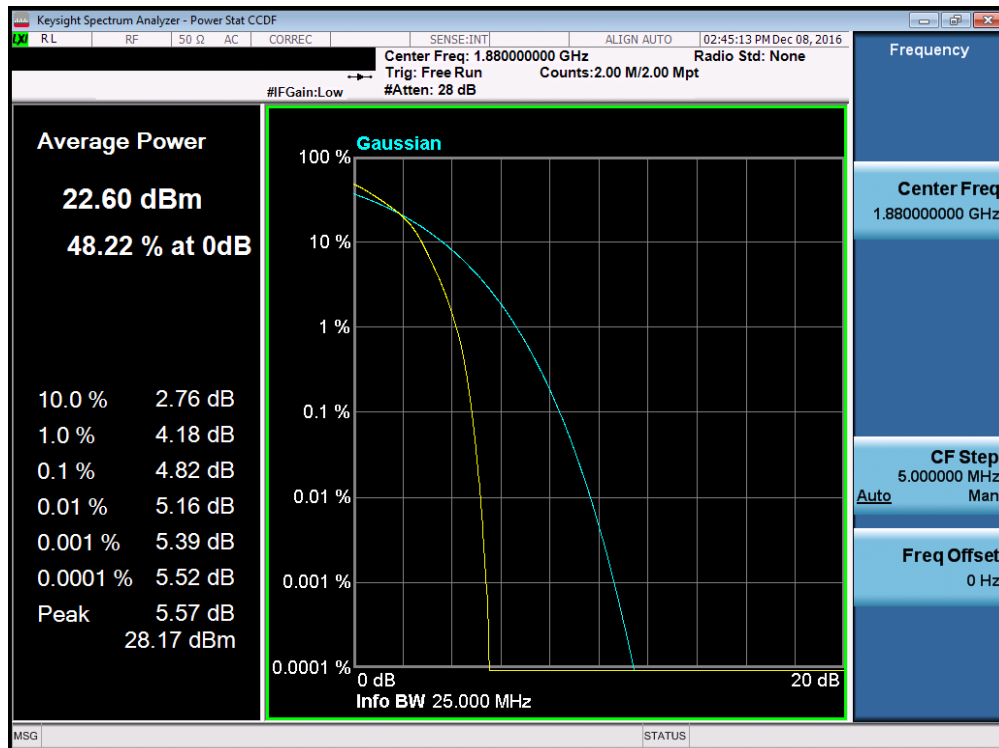


Plot 7-146. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 91 of 116



Plot 7-147. PAR Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-148. PAR Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 92 of 116

7.6 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.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-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.2.1

ANSI/TIA-603-D-2010 – Section 2.2.17

Test Settings

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

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Test Setup

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

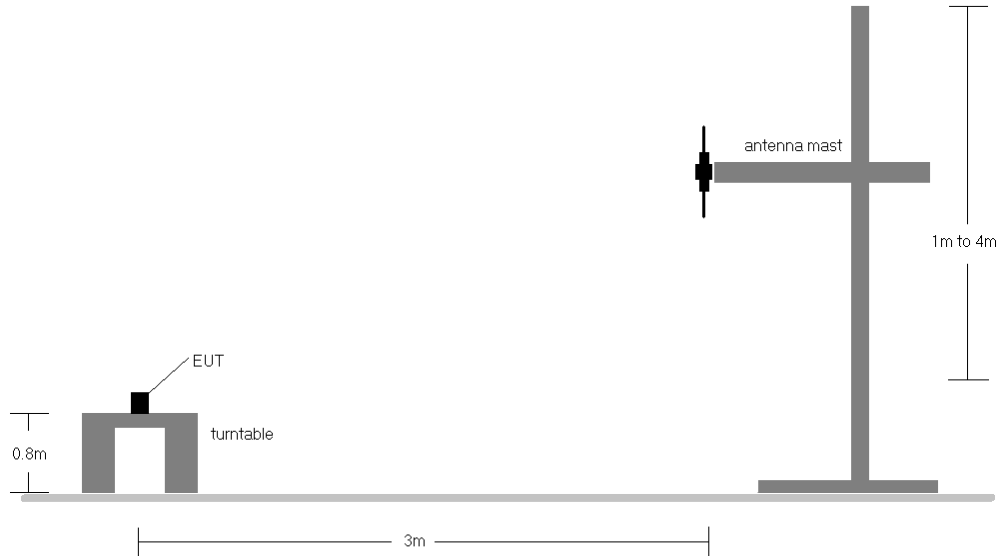


Figure 7-5. Radiated Test Setup <1GHz

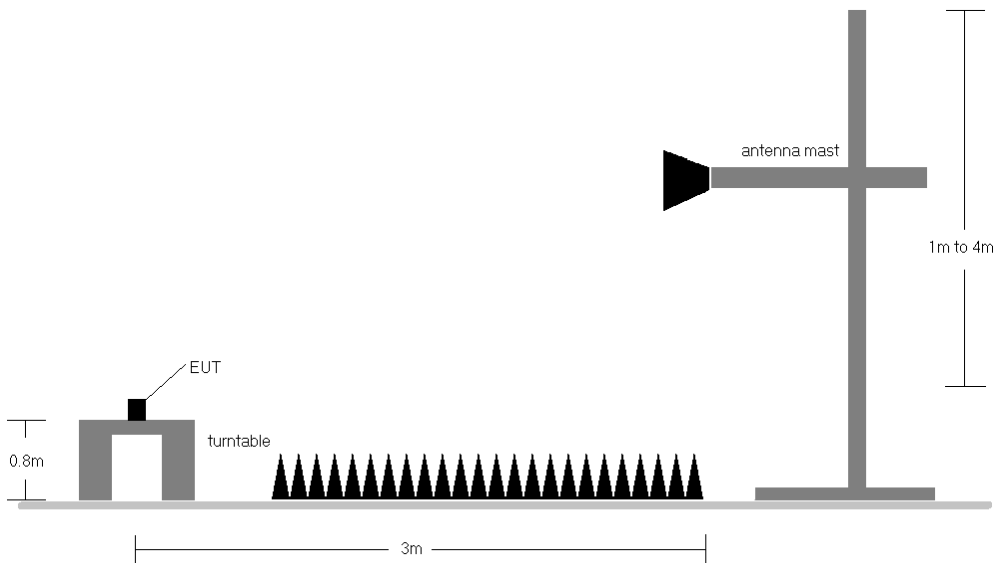


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	235	180	1 / 24	16.27	2.47	18.74	34.77	-16.03
782.00	5	QPSK	H	235	180	1 / 0	16.06	2.54	18.60	34.77	-16.17
784.50	5	QPSK	H	235	178	1 / 0	15.83	2.63	18.46	34.77	-16.31
779.50	5	16QAM	H	235	180	1 / 24	14.99	2.47	17.46	34.77	-17.31
782.00	5	16QAM	H	235	180	1 / 0	15.43	2.54	17.97	34.77	-16.80
784.50	5	16QAM	H	235	178	1 / 0	15.20	2.63	17.83	34.77	-16.94
782.00	10	QPSK	H	235	178	1 / 0	16.30	2.54	18.84	34.77	-15.93
782.00	10	16QAM	H	235	178	1 / 0	15.64	2.54	18.18	34.77	-16.59
782.00	10	QPSK	V	140	359	1 / 74	12.33	2.54	14.87	34.77	-19.90

Table 7-2. ERP Data (Band 13)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset	Page 95 of 116	

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	200	184	3 / 2	14.86	5.51	20.37	38.45	-18.08
836.50	1.4	QPSK	H	200	184	3 / 2	15.91	5.14	21.05	38.45	-17.40
848.30	1.4	QPSK	H	205	164	1 / 0	14.00	4.68	18.68	38.45	-19.77
824.70	1.4	16-QAM	H	200	184	3 / 2	14.36	5.51	19.87	38.45	-18.58
836.50	1.4	16-QAM	H	200	184	3 / 2	15.51	5.14	20.65	38.45	-17.80
848.30	1.4	16-QAM	H	205	164	1 / 0	13.74	4.68	18.42	38.45	-20.03
825.50	3	QPSK	H	241	19	1 / 0	15.00	5.52	20.52	38.45	-17.93
836.50	3	QPSK	H	200	20	1 / 14	15.38	5.14	20.52	38.45	-17.93
847.50	3	QPSK	H	209	24	1 / 0	14.87	4.67	19.54	38.45	-18.91
825.50	3	16-QAM	H	241	19	1 / 0	14.20	5.52	19.72	38.45	-18.73
836.50	3	16-QAM	H	200	20	1 / 14	14.69	5.14	19.83	38.45	-18.62
847.50	3	16-QAM	H	209	24	1 / 0	14.58	4.67	19.25	38.45	-19.20
826.50	5	QPSK	H	199	172	1 / 24	15.70	5.51	21.21	38.45	-17.24
836.50	5	QPSK	H	200	173	1 / 0	16.12	5.14	21.26	38.45	-17.19
846.50	5	QPSK	H	203	182	1 / 0	15.22	4.66	19.88	38.45	-18.57
826.50	5	16-QAM	H	199	172	1 / 24	15.08	5.51	20.59	38.45	-17.86
836.50	5	16-QAM	H	200	173	1 / 0	15.24	5.14	20.38	38.45	-18.07
846.50	5	16-QAM	H	203	182	1 / 0	14.53	4.66	19.19	38.45	-19.26
829.00	10	QPSK	H	216	3	1 / 0	14.68	5.49	20.17	38.45	-18.28
836.50	10	QPSK	H	100	14	1 / 0	15.08	5.14	20.22	38.45	-18.23
844.00	10	QPSK	H	216	3	1 / 0	13.69	4.70	18.39	38.45	-20.06
829.00	10	16-QAM	H	216	3	1 / 0	13.90	5.49	19.39	38.45	-19.06
836.50	10	16-QAM	H	100	14	1 / 0	14.75	5.14	19.89	38.45	-18.56
844.00	10	16-QAM	H	216	3	1 / 0	13.45	4.70	18.15	38.45	-20.30
836.50	5	QPSK	V	156	119	1 / 74	14.96	5.14	20.10	38.45	-18.35

Table 7-3. ERP Data (Band 5)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset	Page 96 of 116	

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	V	101	192	1 / 5	15.27	9.62	24.89	30.00	-5.11
1732.50	1.4	QPSK	V	123	217	1 / 0	14.59	9.50	24.09	30.00	-5.91
1754.30	1.4	QPSK	V	107	200	1 / 0	14.78	9.38	24.16	30.00	-5.84
1710.70	1.4	16-QAM	V	101	192	1 / 5	13.88	9.62	23.50	30.00	-6.50
1732.50	1.4	16-QAM	V	123	217	1 / 0	13.71	9.50	23.21	30.00	-6.79
1754.30	1.4	16-QAM	V	107	200	1 / 0	13.74	9.38	23.12	30.00	-6.88
1711.50	3	QPSK	V	109	211	1 / 14	15.47	9.62	25.09	30.00	-4.91
1732.50	3	QPSK	V	120	216	1 / 0	14.74	9.50	24.24	30.00	-5.76
1753.50	3	QPSK	V	124	202	1 / 0	14.96	9.39	24.35	30.00	-5.65
1711.50	3	16-QAM	V	109	211	1 / 14	14.03	9.62	23.65	30.00	-6.35
1732.50	3	16-QAM	V	120	216	1 / 0	14.00	9.50	23.50	30.00	-6.50
1753.50	3	16-QAM	V	124	202	1 / 0	14.10	9.39	23.49	30.00	-6.51
1712.50	5	QPSK	V	115	192	1 / 24	15.94	9.61	25.55	30.00	-4.45
1732.50	5	QPSK	V	128	213	1 / 0	14.94	9.50	24.44	30.00	-5.56
1752.50	5	QPSK	V	127	195	1 / 0	15.24	9.39	24.63	30.00	-5.37
1712.50	5	16-QAM	V	115	192	1 / 24	15.20	9.61	24.81	30.00	-5.19
1732.50	5	16-QAM	V	128	213	1 / 0	13.86	9.50	23.36	30.00	-6.64
1752.50	5	16-QAM	V	127	195	1 / 0	15.37	9.39	24.76	30.00	-5.24
1715.00	10	QPSK	V	110	209	1 / 49	15.58	9.60	25.18	30.00	-4.82
1732.50	10	QPSK	V	112	214	1 / 0	14.91	9.50	24.41	30.00	-5.59
1750.00	10	QPSK	V	136	215	1 / 0	15.18	9.41	24.59	30.00	-5.41
1715.00	10	16-QAM	V	110	209	1 / 49	15.28	9.60	24.88	30.00	-5.12
1732.50	10	16-QAM	V	112	214	1 / 0	13.91	9.50	23.41	30.00	-6.59
1750.00	10	16-QAM	V	136	215	1 / 0	14.30	9.41	23.70	30.00	-6.30
1717.50	15	QPSK	V	104	178	1 / 74	15.87	9.58	25.45	30.00	-4.55
1732.50	15	QPSK	V	111	219	1 / 74	15.29	9.50	24.79	30.00	-5.21
1747.50	15	QPSK	V	125	202	1 / 0	15.37	9.42	24.79	30.00	-5.21
1717.50	15	16-QAM	V	104	178	1 / 74	15.43	9.58	25.01	30.00	-4.99
1732.50	15	16-QAM	V	111	219	1 / 74	14.06	9.50	23.56	30.00	-6.44
1747.50	15	16-QAM	V	125	202	1 / 0	14.56	9.42	23.98	30.00	-6.02
1720.00	20	QPSK	V	106	193	1 / 99	15.54	9.57	25.11	30.00	-4.89
1732.50	20	QPSK	V	117	205	1 / 99	14.92	9.50	24.42	30.00	-5.58
1745.00	20	QPSK	V	126	197	1 / 0	15.09	9.43	24.52	30.00	-5.48
1720.00	20	16-QAM	V	106	193	1 / 99	14.14	9.57	23.71	30.00	-6.29
1732.50	20	16-QAM	V	117	205	1 / 99	13.89	9.50	23.39	30.00	-6.61
1745.00	20	16-QAM	V	126	197	1 / 0	14.21	9.43	23.64	30.00	-6.36
1712.50	5	QPSK	H	150	50	1 / 0	11.66	9.61	21.27	30.00	-8.73

Table 7-4. EIRP Data (Band 4)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 97 of 116

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	125	272	1 / 5	15.40	9.12	24.52	33.01	-8.49
1880.00	1.4	QPSK	V	126	271	1 / 0	15.72	9.10	24.82	33.01	-8.19
1909.30	1.4	QPSK	V	122	274	1 / 5	14.38	9.16	23.54	33.01	-9.47
1850.70	1.4	16-QAM	V	125	272	1 / 5	14.59	9.12	23.71	33.01	-9.30
1880.00	1.4	16-QAM	V	126	271	1 / 0	14.74	9.10	23.84	33.01	-9.17
1909.30	1.4	16-QAM	V	122	274	1 / 5	13.24	9.16	22.40	33.01	-10.61
1851.50	3	QPSK	V	127	273	1 / 14	15.63	9.12	24.75	33.01	-8.26
1880.00	3	QPSK	V	125	275	1 / 14	16.06	9.10	25.16	33.01	-7.85
1908.50	3	QPSK	V	120	273	1 / 0	14.63	9.15	23.78	33.01	-9.23
1851.50	3	16-QAM	V	127	273	1 / 0	15.13	9.12	24.25	33.01	-8.76
1880.00	3	16-QAM	V	125	275	1 / 14	15.35	9.10	24.45	33.01	-8.56
1908.50	3	16-QAM	V	120	273	1 / 0	14.08	9.15	23.23	33.01	-9.78
1852.50	5	QPSK	V	129	271	1 / 24	15.83	9.12	24.95	33.01	-8.06
1880.00	5	QPSK	V	124	273	1 / 24	15.94	9.10	25.04	33.01	-7.97
1907.50	5	QPSK	V	119	271	1 / 0	14.79	9.15	23.94	33.01	-9.07
1852.50	5	16-QAM	V	129	271	1 / 24	15.34	9.12	24.46	33.01	-8.55
1880.00	5	16-QAM	V	124	273	1 / 24	15.33	9.10	24.43	33.01	-8.58
1907.50	5	16-QAM	V	119	271	1 / 0	14.56	9.15	23.71	33.01	-9.30
1855.00	10	QPSK	V	131	272	1 / 0	16.12	9.12	25.24	33.01	-7.77
1880.00	10	QPSK	V	123	277	1 / 49	15.66	9.10	24.76	33.01	-8.25
1905.00	10	QPSK	V	124	272	1 / 49	14.54	9.13	23.67	33.01	-9.34
1855.00	10	16-QAM	V	131	272	1 / 0	15.42	9.12	24.54	33.01	-8.47
1880.00	10	16-QAM	V	123	277	1 / 0	14.84	9.10	23.94	33.01	-9.07
1905.00	10	16-QAM	V	124	272	1 / 0	13.88	9.13	23.01	33.01	-10.00
1857.50	15	QPSK	V	128	273	1 / 74	16.02	9.11	25.13	33.01	-7.88
1880.00	15	QPSK	V	121	275	1 / 74	15.72	9.10	24.82	33.01	-8.19
1902.50	15	QPSK	V	123	274	1 / 0	14.47	9.11	23.58	33.01	-9.43
1857.50	15	16-QAM	V	128	273	1 / 74	15.30	9.11	24.41	33.01	-8.60
1880.00	15	16-QAM	V	121	275	1 / 74	15.07	9.10	24.17	33.01	-8.84
1902.50	15	16-QAM	V	123	274	1 / 0	13.61	9.11	22.72	33.01	-10.29
1860.00	20	QPSK	V	128	273	1 / 0	15.50	9.11	24.61	33.01	-8.40
1880.00	20	QPSK	V	128	272	1 / 99	15.62	9.10	24.72	33.01	-8.29
1900.00	20	QPSK	V	123	271	1 / 0	14.43	9.09	23.52	33.01	-9.49
1860.00	20	16-QAM	V	128	273	1 / 0	15.06	9.11	24.17	33.01	-8.84
1880.00	20	16-QAM	V	128	272	1 / 0	14.90	9.10	24.00	33.01	-9.01
1900.00	20	16-QAM	V	123	271	1 / 0	13.96	9.09	23.05	33.01	-9.96
1855.00	10	QPSK	H	100	3	1 / 0	14.09	9.12	23.21	33.01	-9.80

Table 7-5. EIRP Data (Band 2)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 98 of 116

7.7 Radiated Spurious Emissions Measurements

\$2.1053 \$22.917(a) \$24.238(a) \$27.53(c) \$27.53(f) \$27.53(h)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

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

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Test Setup

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

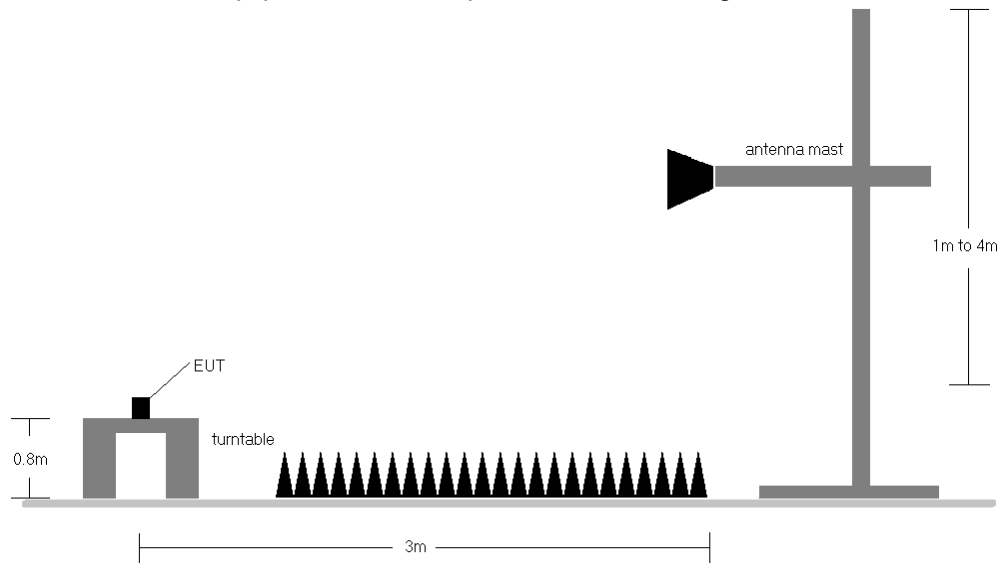


Figure 7-7. Test Instrument & Measurement Setup

Test Notes

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

FCC ID: A3LSMS327VL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 100 of 116

OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MEASURED OUTPUT POWER: 18.84 dBm = 0.077 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 31.84 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	V	100	213	-66.71	7.00	-59.70	78.5
3128.00	V	101	141	-70.72	7.26	-63.46	82.3
3910.00	V	-	-	-69.42	7.18	-62.24	81.1

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

MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.00 MHz
 DISTANCE: 3 meters
 NARROWBAND EMISSION LIMIT: -50 dBm
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	H	100	191	-67.80	6.37	-61.43	-21.4

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

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 826.50 MHz
 CHANNEL: 20425
 MEASURED OUTPUT POWER: 21.21 dBm = 0.132 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 34.21 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1653.00	V	100	27	-62.46	6.27	-56.19	77.4
2479.50	V	100	283	-60.92	6.88	-54.03	75.2
3306.00	V	-	-	-68.31	7.12	-61.19	82.4

Table 7-8. Radiated Spurious Data (Band 5 – Low Channel)

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MEASURED OUTPUT POWER: 21.26 dBm = 0.134 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 34.26 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	V	100	155	-65.70	6.21	-59.49	80.8
2509.50	V	100	283	-60.06	6.90	-53.16	74.4
3346.00	V	173	294	-67.73	7.26	-60.47	81.7
4182.50	V	134	88	-66.12	8.11	-58.01	79.3
5019.00	V	-	-	-67.54	9.02	-58.52	79.8

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

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 846.50 MHz
 CHANNEL: 20625
 MEASURED OUTPUT POWER: 19.88 dBm = 0.097 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 32.88 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.00	V	100	22	-65.68	6.15	-59.53	79.4
2539.50	V	100	265	-59.88	7.00	-52.88	72.8
3386.00	V	149	299	-68.16	7.40	-60.76	80.6
4232.50	V	141	77	-67.91	8.36	-59.55	79.4
5079.00	V	-	-	-67.07	8.90	-58.17	78.1

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

OPERATING FREQUENCY: 1712.50 MHz
 CHANNEL: 19975
 MEASURED OUTPUT POWER: 25.55 dBm = 0.359 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 38.55 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3425.00	H	100	189	-51.67	9.65	-42.02	67.6
5137.50	H	101	1	-55.27	10.91	-44.36	69.9
6850.00	H	101	234	-60.31	10.78	-49.53	75.1
8562.50	H	141	126	-57.92	11.68	-46.24	71.8
10275.00	H	-	-	-60.41	12.75	-47.66	73.2

Table 7-11. Radiated Spurious Data (Band 4 – Low Channel)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 103 of 116

OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 24.44 dBm = 0.278 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) = 37.44$ dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	H	250	16	-54.24	9.77	-44.46	68.9
5197.50	H	154	318	-56.46	10.81	-45.65	70.1
6930.00	H	145	264	-58.34	10.89	-47.45	71.9
8662.50	H	138	125	-59.85	11.86	-47.99	72.4
10395.00	H	-	-	-59.90	12.73	-47.17	71.6

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

OPERATING FREQUENCY: 1752.50 MHz
 CHANNEL: 20375
 MEASURED OUTPUT POWER: 24.63 dBm = 0.291 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) = 37.63$ dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3505.00	H	100	342	-56.24	9.89	-46.36	71.0
5257.50	H	100	356	-58.61	10.92	-47.69	72.3
7010.00	H	101	233	-56.76	11.06	-45.70	70.3
8762.50	H	141	130	-60.07	12.02	-48.05	72.7
10515.00	H	-	-	-60.31	12.69	-47.62	72.3

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

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1855.00 MHz
 CHANNEL: 18650
 MEASURED OUTPUT POWER: 25.24 dBm = 0.334 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 38.24 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3710.00	H	156	240	-46.61	9.99	-36.62	61.9
5565.00	H	160	334	-60.85	11.21	-49.64	74.9
7420.00	H	156	338	-44.84	10.91	-33.93	59.2
9275.00	H	-	-	-61.39	12.35	-49.04	74.3

Table 7-14. Radiated Spurious Data (Band 2 – Low Channel)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MEASURED OUTPUT POWER: 24.76 dBm = 0.299 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.76 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	100	172	-38.89	9.79	-29.11	53.9
5640.00	H	101	19	-58.85	11.35	-47.50	72.3
7520.00	H	100	302	-41.49	11.22	-30.27	55.0
9400.00	H	-	-	-60.80	12.30	-48.50	73.3

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

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1905.00 MHz
 CHANNEL: 19150
 MEASURED OUTPUT POWER: 23.67 dBm = 0.233 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.67 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3810.00	H	100	170	-38.75	9.59	-29.16	52.8
5715.00	H	103	19	-57.37	11.43	-45.94	69.6
7620.00	H	100	301	-45.26	11.49	-33.78	57.4
9525.00	H	100	247	-60.48	12.37	-48.11	71.8
11430.00	H	101	344	-59.10	13.31	-45.79	69.5
13335.00	H	-	-	-56.73	12.97	-43.75	67.4

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

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612071908.A3L	Test Dates: 12/08 - 12/14/2016, 1/9/2017	EUT Type: Portable Handset		Page 106 of 116

7.8 Frequency Stability / Temperature Variation

\$2.1055 \$22.355 \$24.235 \$27.54

Test Overview and Limit

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

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

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

Test Procedure Used

ANSI/TIA-603-D-2010

Test Settings

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

Test Setup

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

Test Notes

None

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Band 13 Frequency Stability Measurements

\$2.1055 \$27.54

OPERATING FREQUENCY: 782,000,000 Hz

CHANNEL: 23230

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	782,000,274	274	0.0000350
100 %		- 30	782,000,121	121	0.0000155
100 %		- 20	781,999,800	-200	-0.0000256
100 %		- 10	782,000,236	236	0.0000302
100 %		0	781,999,966	-34	-0.0000043
100 %		+ 10	782,000,081	81	0.0000104
100 %		+ 20	781,999,891	-109	-0.0000139
100 %		+ 30	781,999,757	-243	-0.0000311
100 %		+ 40	781,999,968	-32	-0.0000041
100 %		+ 50	782,000,097	97	0.0000124
BATT. ENDPOINT	3.40	+ 20	782,000,066	66	0.0000084

Table 7-17. Frequency Stability Data (Band 13)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 13 Frequency Stability Measurements

§2.1055 §27.54

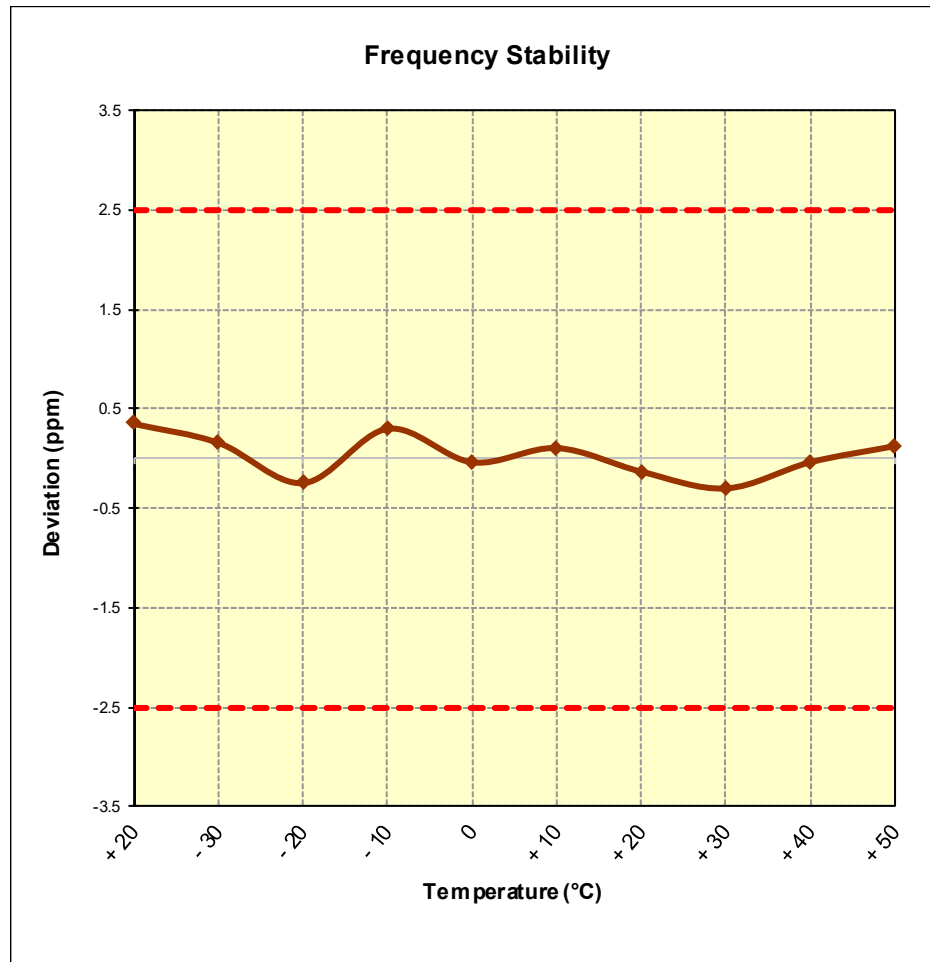


Figure 7-8. Frequency Stability Graph (Band 13)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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Band 5 Frequency Stability Measurements

§2.1055 §22.355

OPERATING FREQUENCY: 836,500,000 Hz

CHANNEL: 20525

REFERENCE VOLTAGE: 3.80 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,500,135	135	0.0000161
100 %		- 30	836,500,079	79	0.0000094
100 %		- 20	836,499,635	-365	-0.0000436
100 %		- 10	836,500,201	201	0.0000240
100 %		0	836,500,301	301	0.0000360
100 %		+ 10	836,500,279	279	0.0000334
100 %		+ 20	836,500,429	429	0.0000513
100 %		+ 30	836,499,990	-10	-0.0000012
100 %		+ 40	836,500,150	150	0.0000179
100 %		+ 50	836,500,141	141	0.0000169
BATT. ENDPOINT	3.40	+ 20	836,500,158	158	0.0000189

Table 7-18. Frequency Stability Data (Band 5)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 5 Frequency Stability Measurements

§2.1055 §22.355

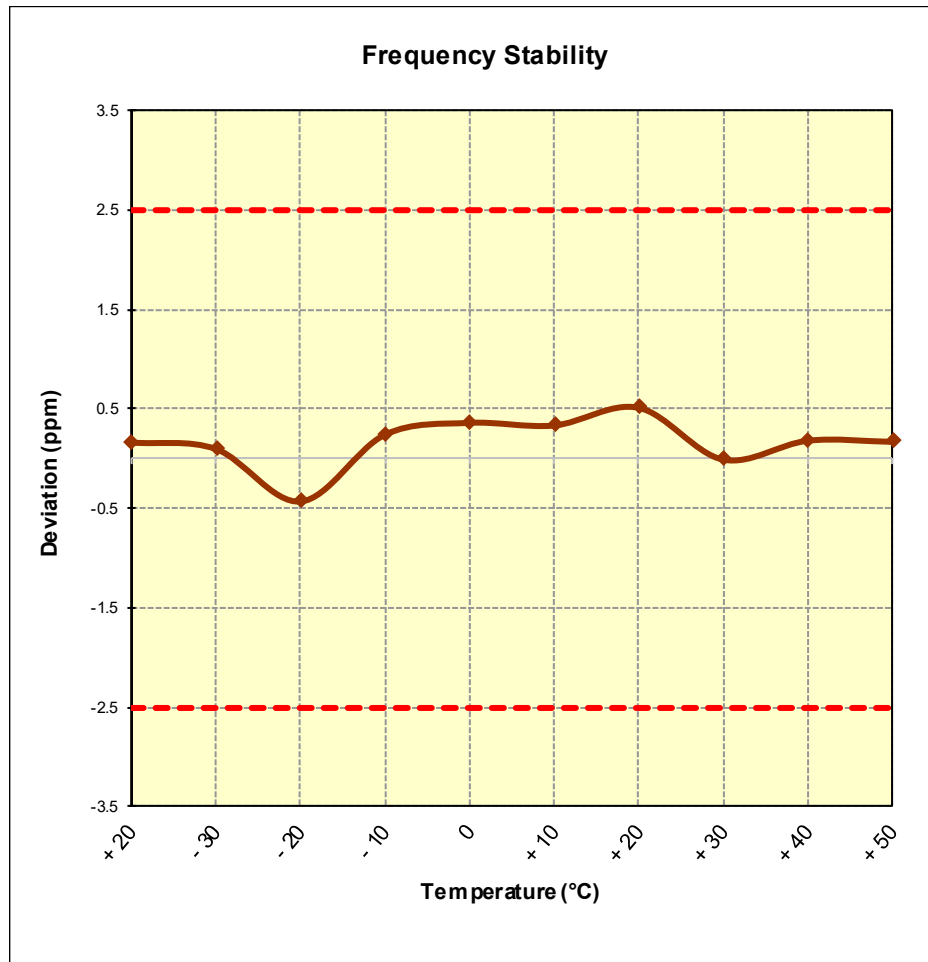


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: A3LSMS327VL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved 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: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,500,009	9	0.0000005
100 %		- 30	1,732,499,998	-2	-0.0000001
100 %		- 20	1,732,499,914	-86	-0.0000050
100 %		- 10	1,732,500,235	235	0.0000136
100 %		0	1,732,500,039	39	0.0000023
100 %		+ 10	1,732,499,988	-12	-0.0000007
100 %		+ 20	1,732,499,767	-233	-0.0000134
100 %		+ 30	1,732,500,146	146	0.0000084
100 %		+ 40	1,732,499,854	-146	-0.0000084
100 %		+ 50	1,732,500,125	125	0.0000072
BATT. ENDPOINT	3.40	+ 20	1,732,499,973	-27	-0.0000016

Table 7-19. 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: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 4 Frequency Stability Measurements

§2.1055 §27.54

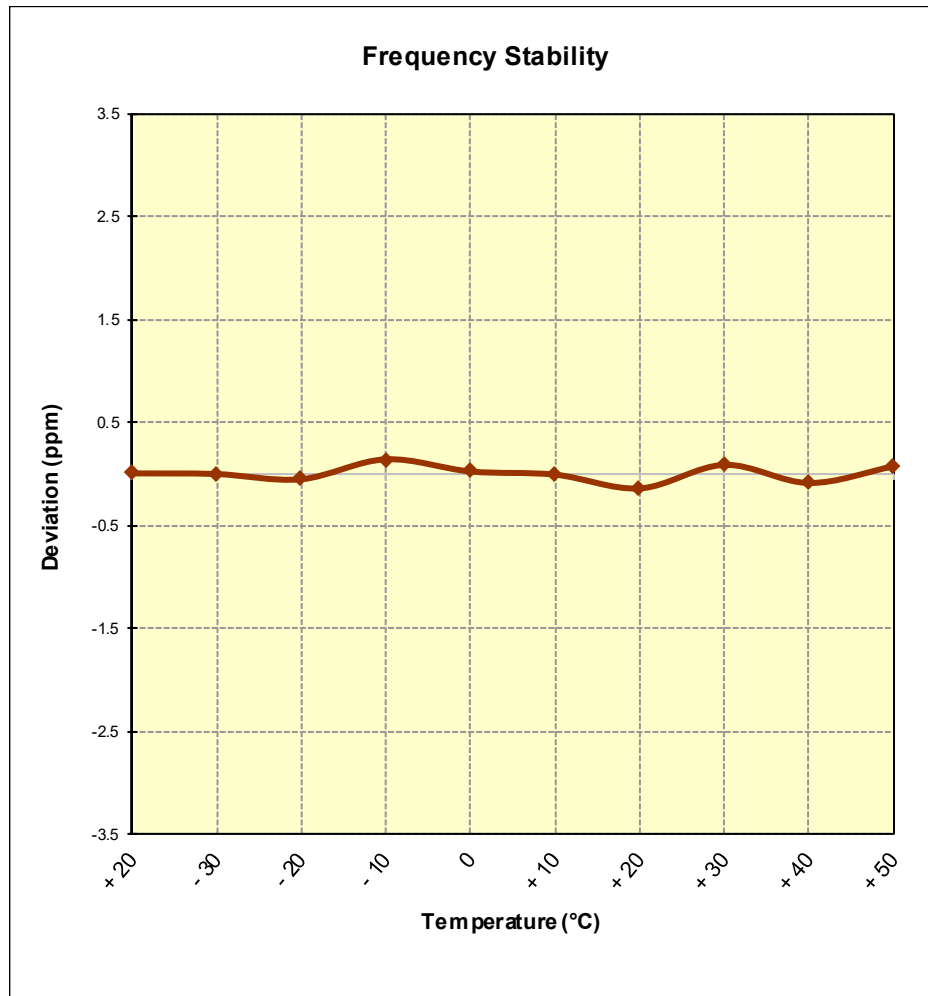


Figure 7-10. Frequency Stability Graph (Band 4)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 2 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 18900

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,747	-253	-0.0000135
100 %		- 30	1,880,000,027	27	0.0000014
100 %		- 20	1,880,000,139	139	0.0000074
100 %		- 10	1,880,000,067	67	0.0000036
100 %		0	1,880,000,168	168	0.0000089
100 %		+ 10	1,879,999,961	-39	-0.0000021
100 %		+ 20	1,879,999,737	-263	-0.0000140
100 %		+ 30	1,879,999,677	-323	-0.0000172
100 %		+ 40	1,879,999,586	-414	-0.0000220
100 %		+ 50	1,880,000,101	101	0.0000054
BATT. ENDPOINT	3.40	+ 20	1,879,999,998	-2	-0.0000001

Table 7-20. 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: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 2 Frequency Stability Measurements

§2.1055 §24.235

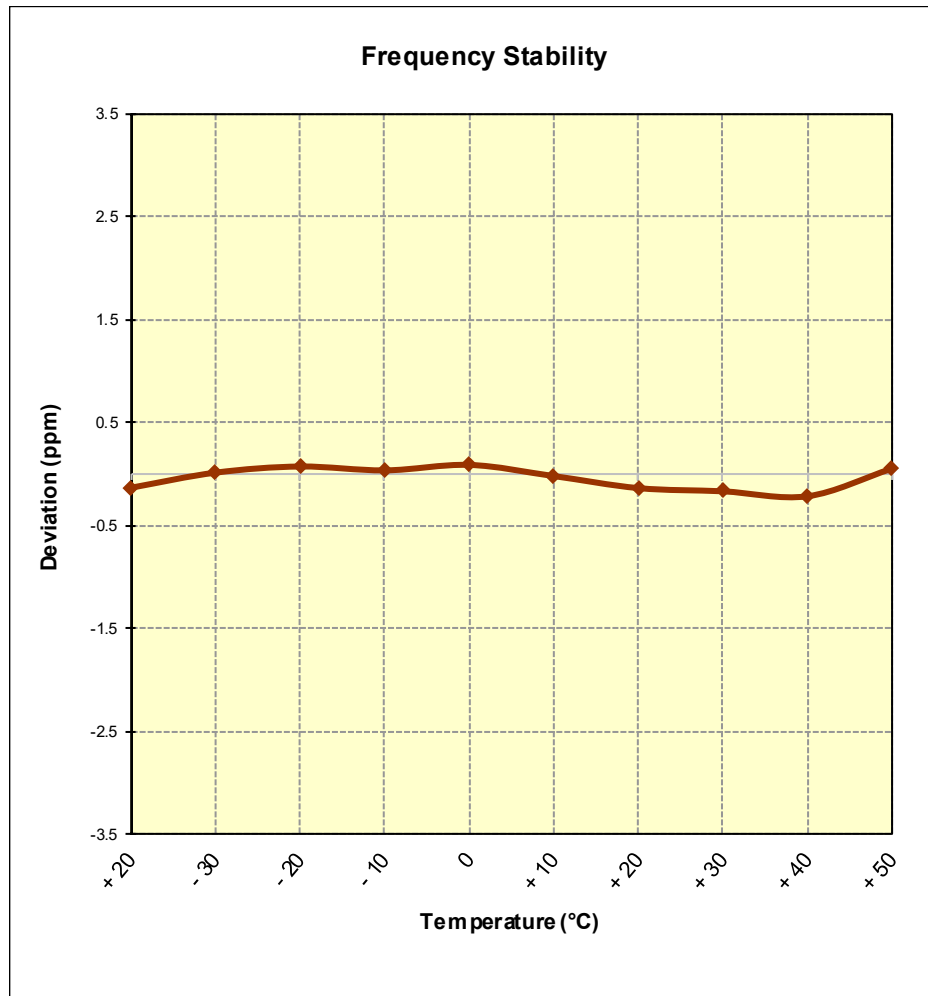


Figure 7-11. Frequency Stability Graph (Band 2)

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMS327VL** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: A3LSMS327VL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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