

7.4 Band Edge Emissions at Antenna Terminal

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

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v02r02 – Section 6.0

Test Settings

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

Test Setup

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

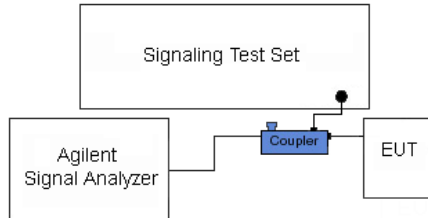




Figure 7-3. Test Instrument & Measurement Setup

Test Notes

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

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

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



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

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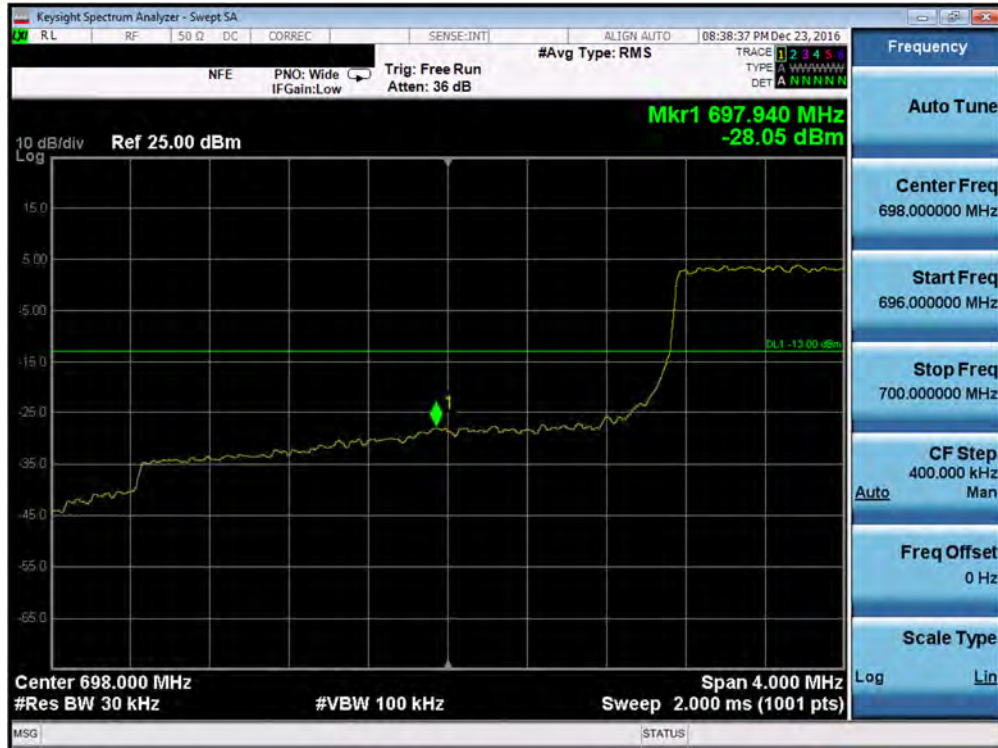


Plot 7-79. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

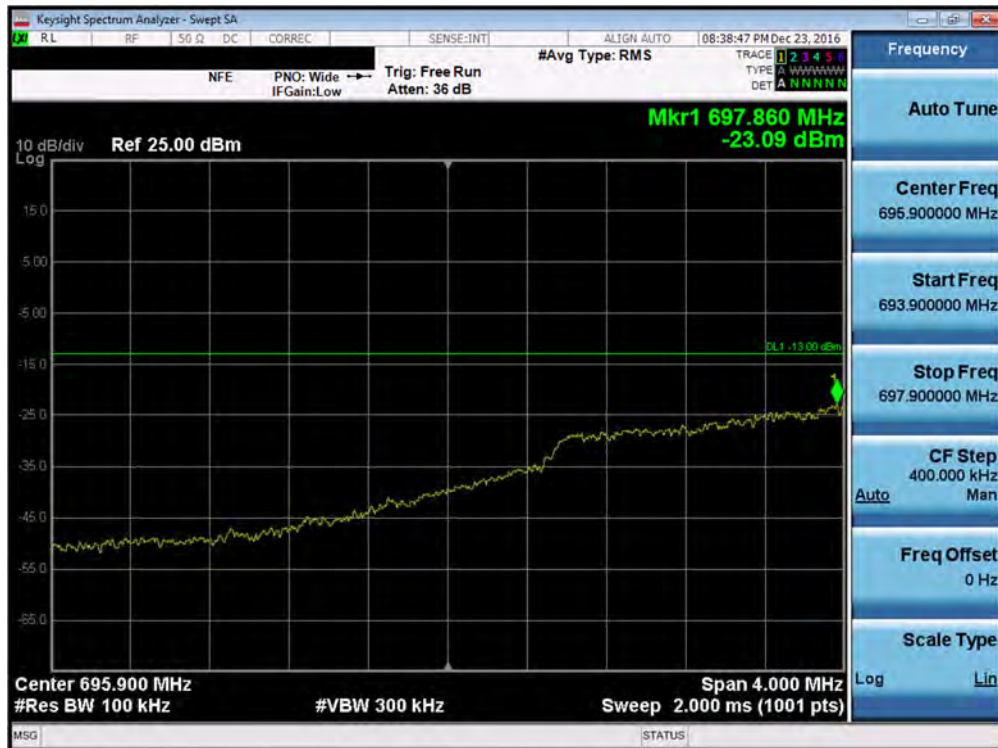


Plot 7-80. Upper Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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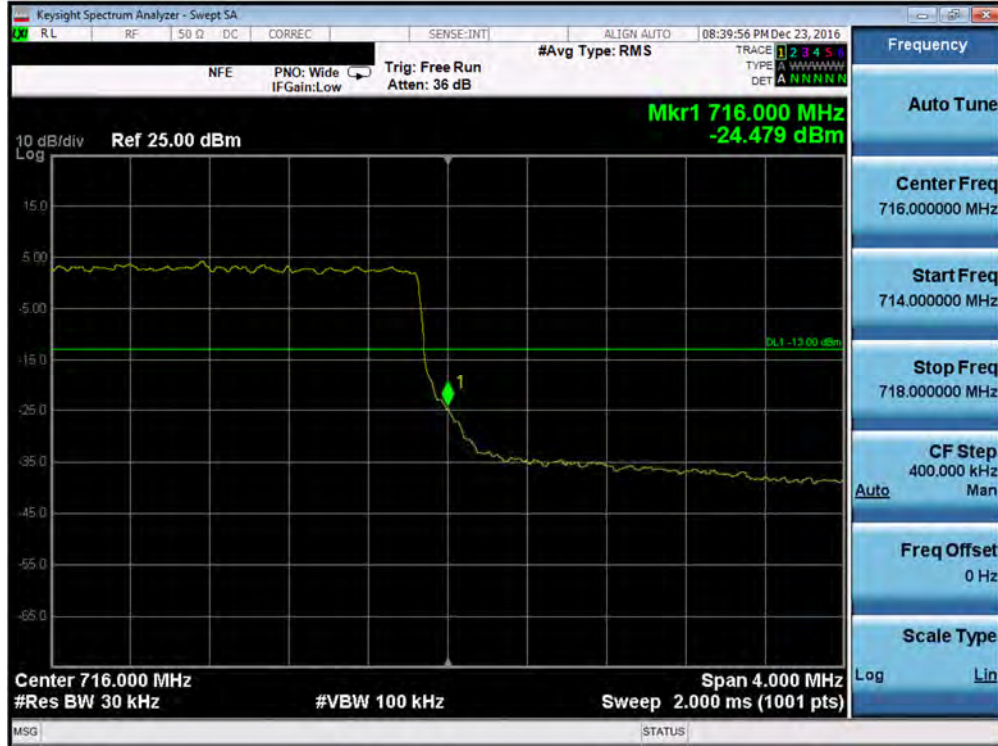


Plot 7-81. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

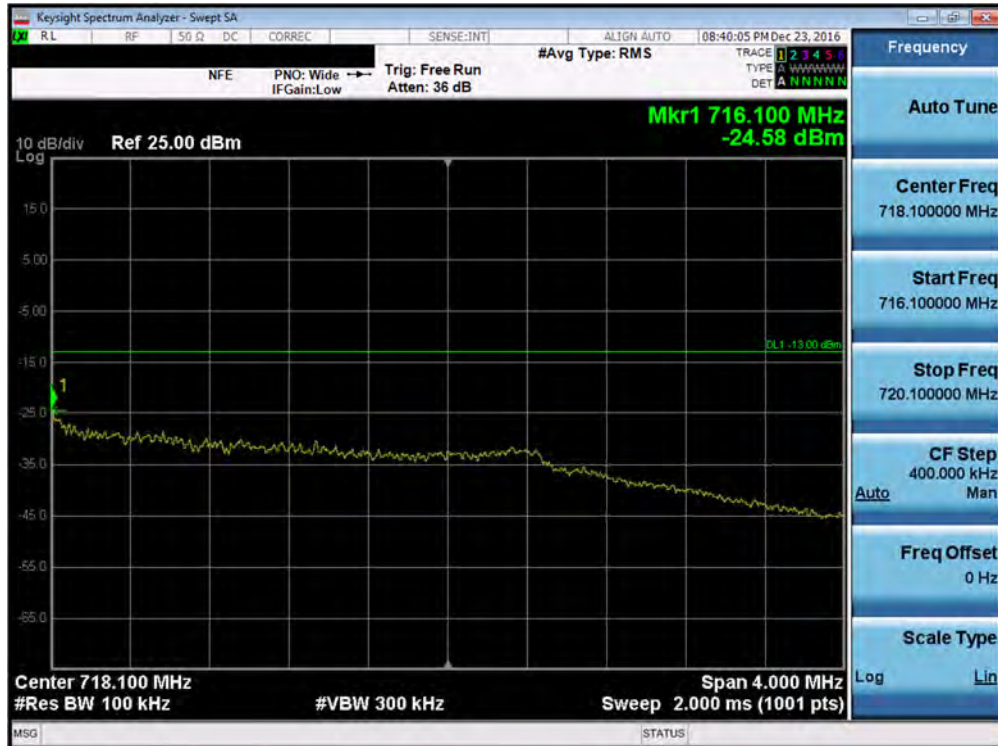


Plot 7-82. Lower Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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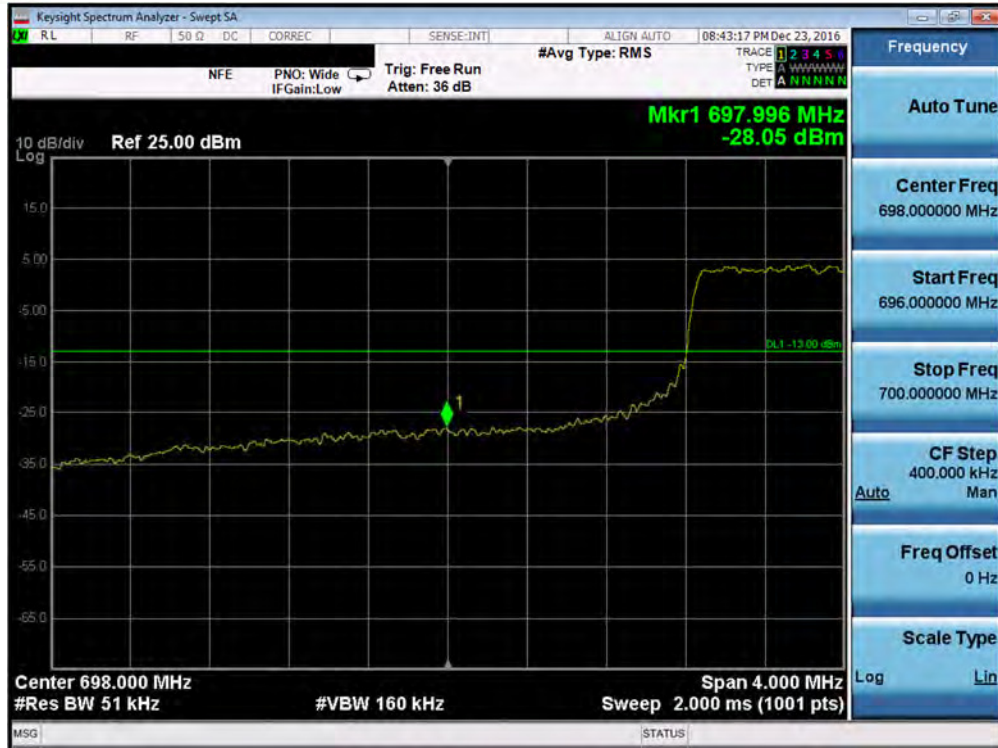


Plot 7-83. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

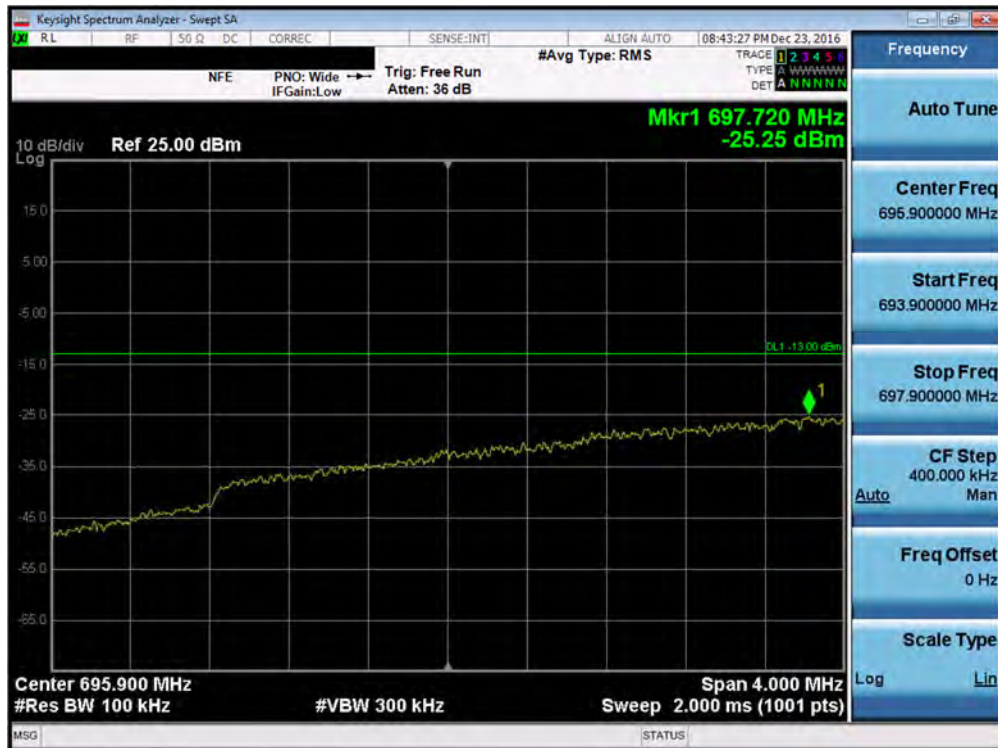


Plot 7-84. Upper Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-85. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

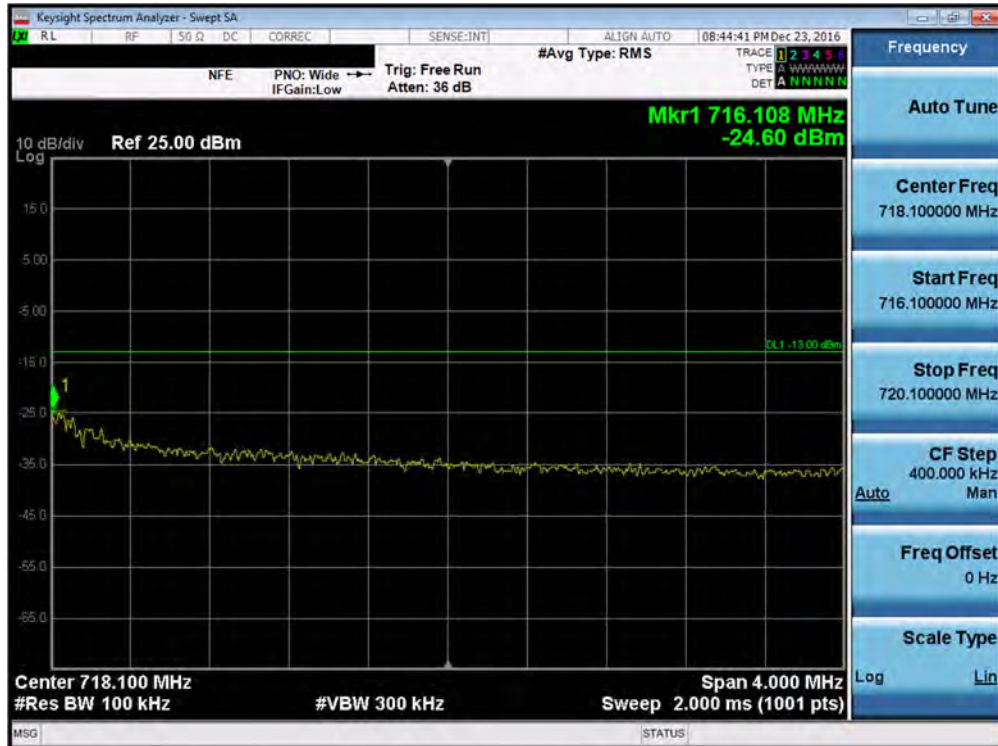


Plot 7-86. Lower Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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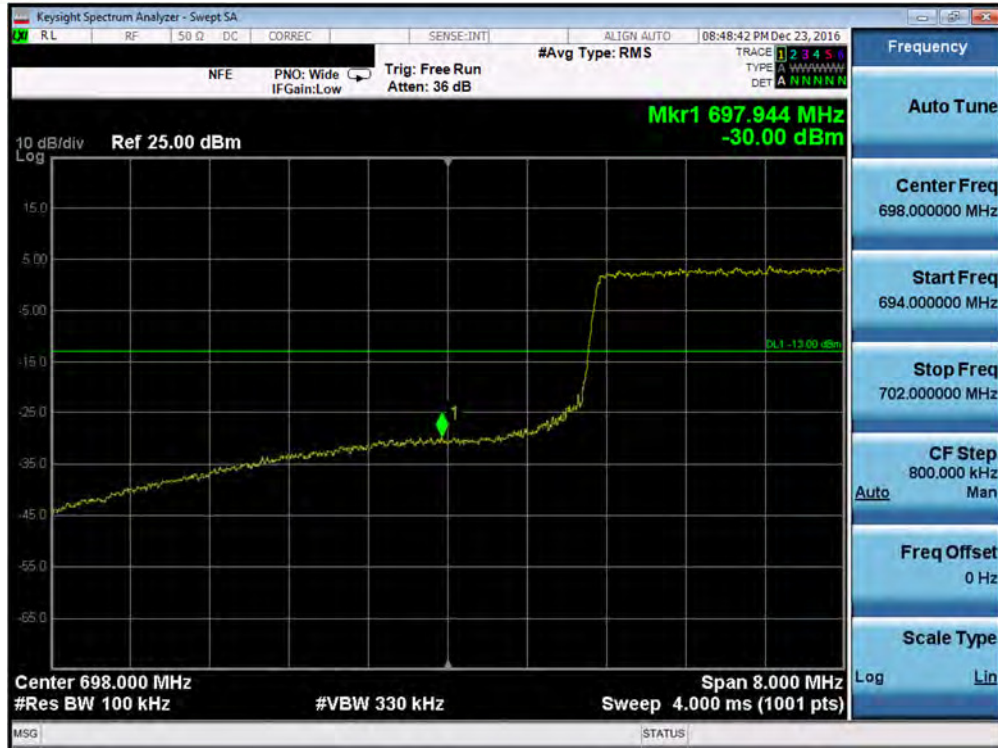


Plot 7-87. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

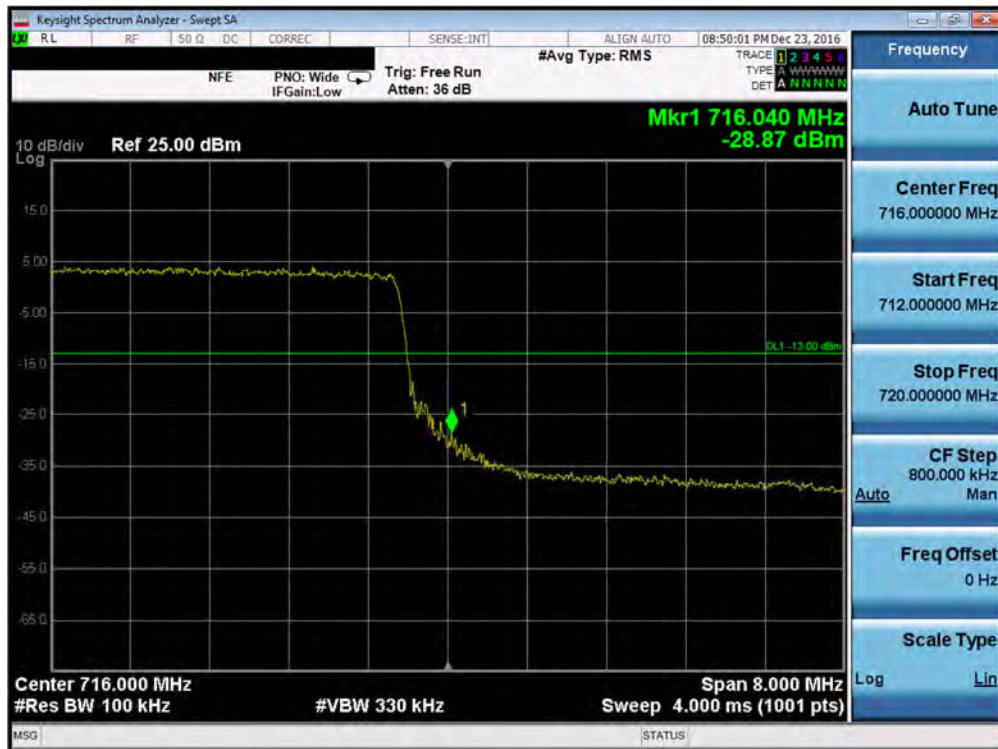


Plot 7-88. Upper Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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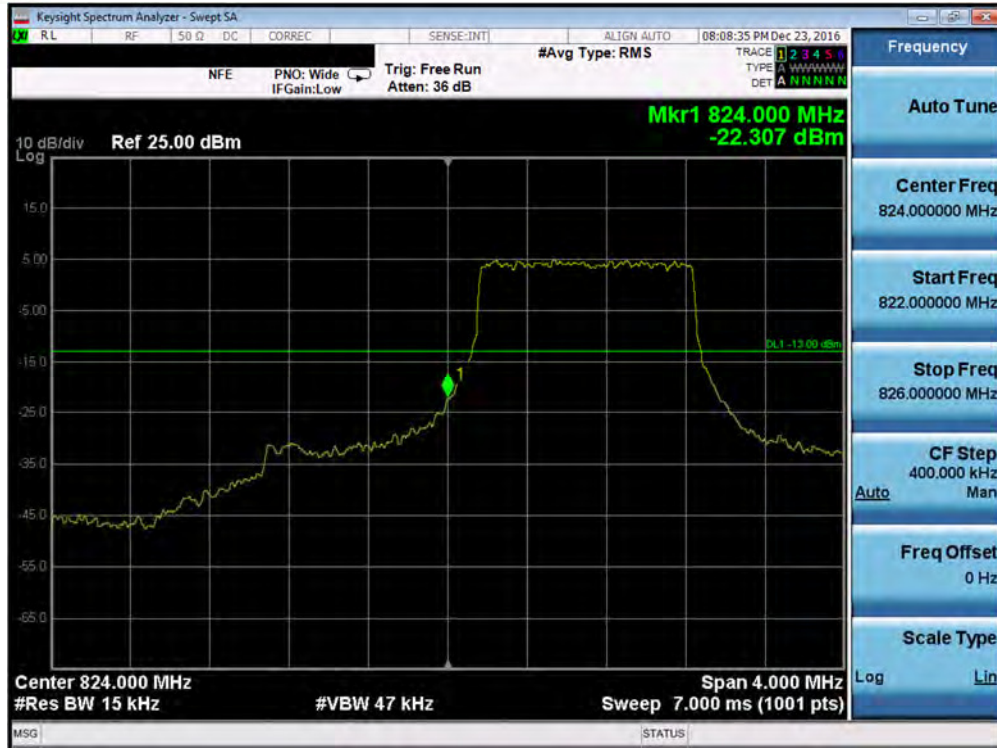


Plot 7-89. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



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

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-91. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

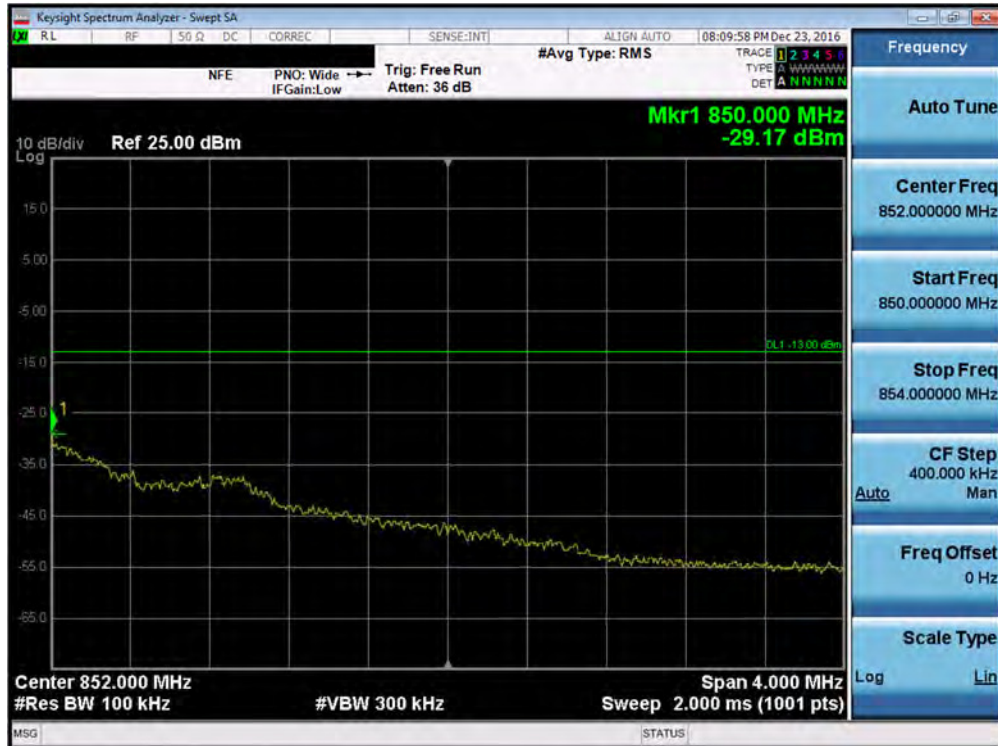


Plot 7-92. Lower Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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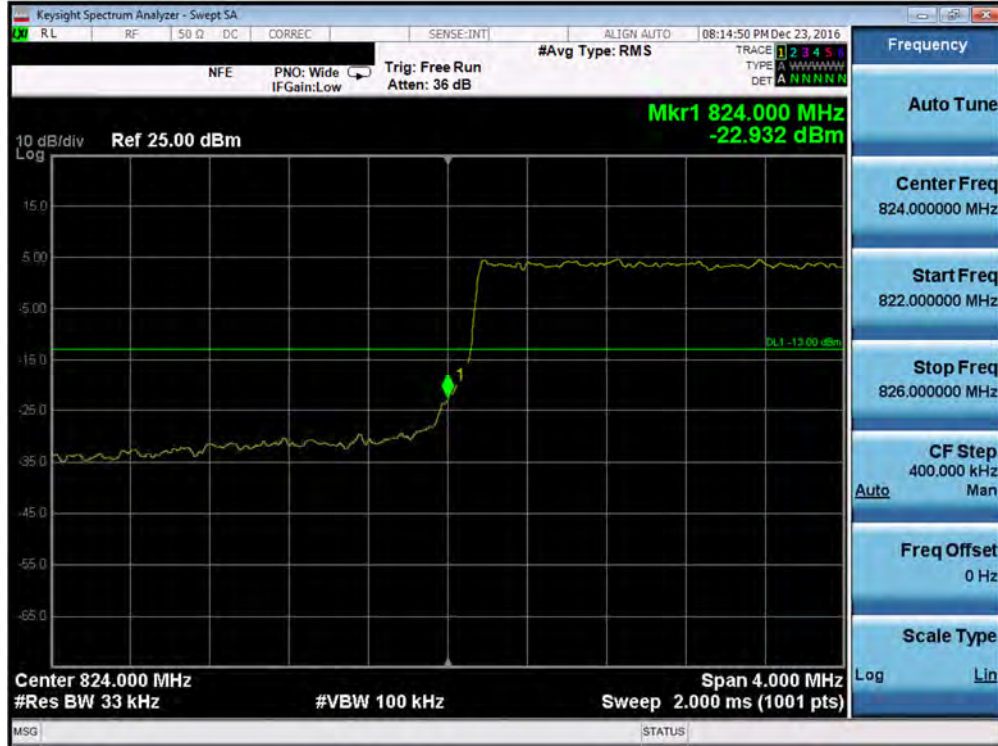


Plot 7-93. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



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

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-95. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-96. Lower Extended Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

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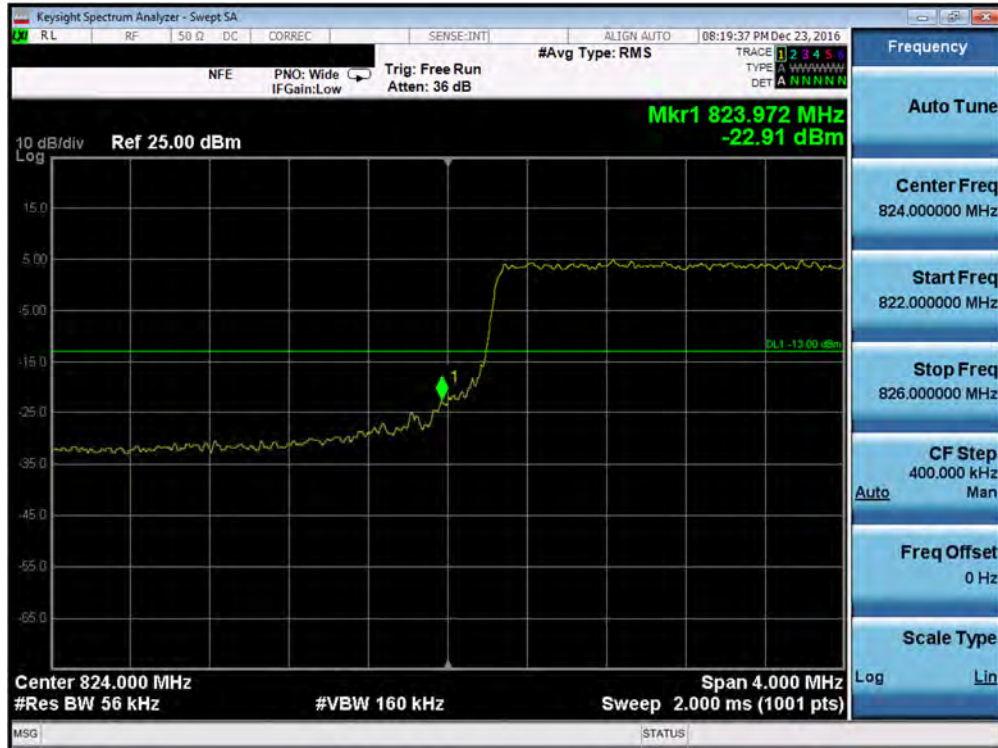


Plot 7-97. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

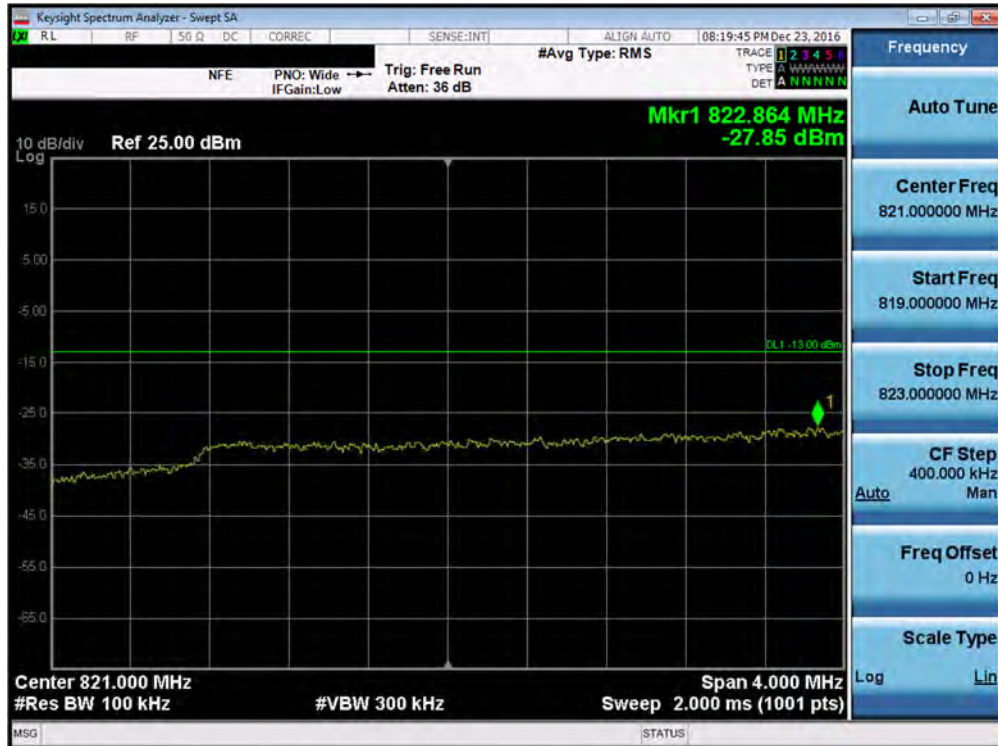


Plot 7-98. Upper Extended Band Edge Plot (Band 5 – Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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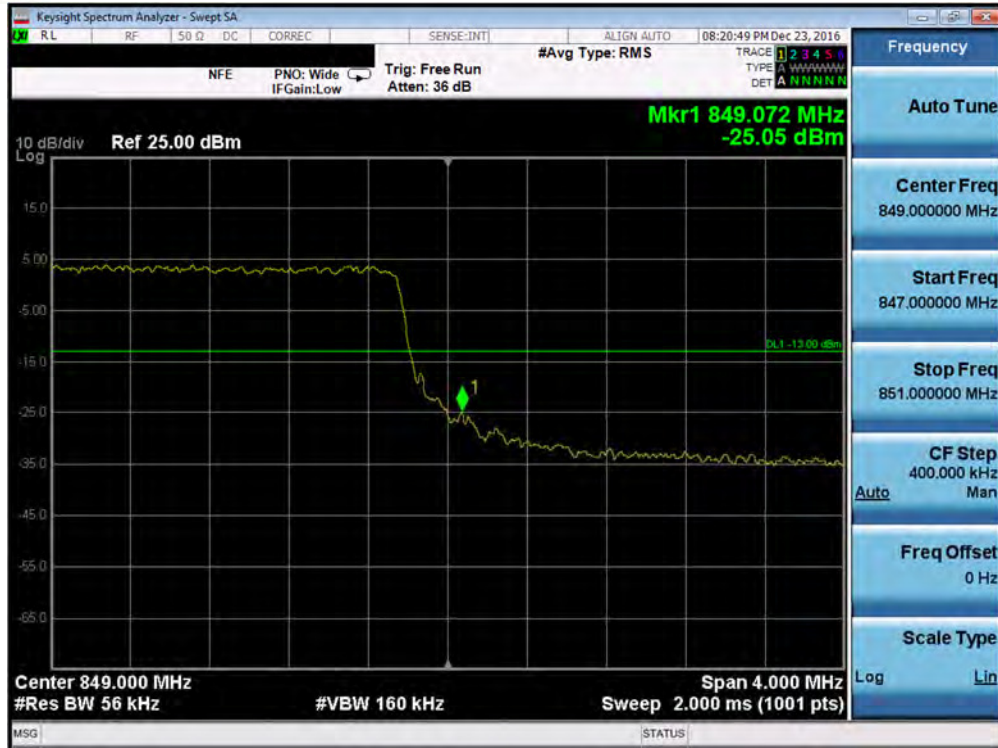


Plot 7-99. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

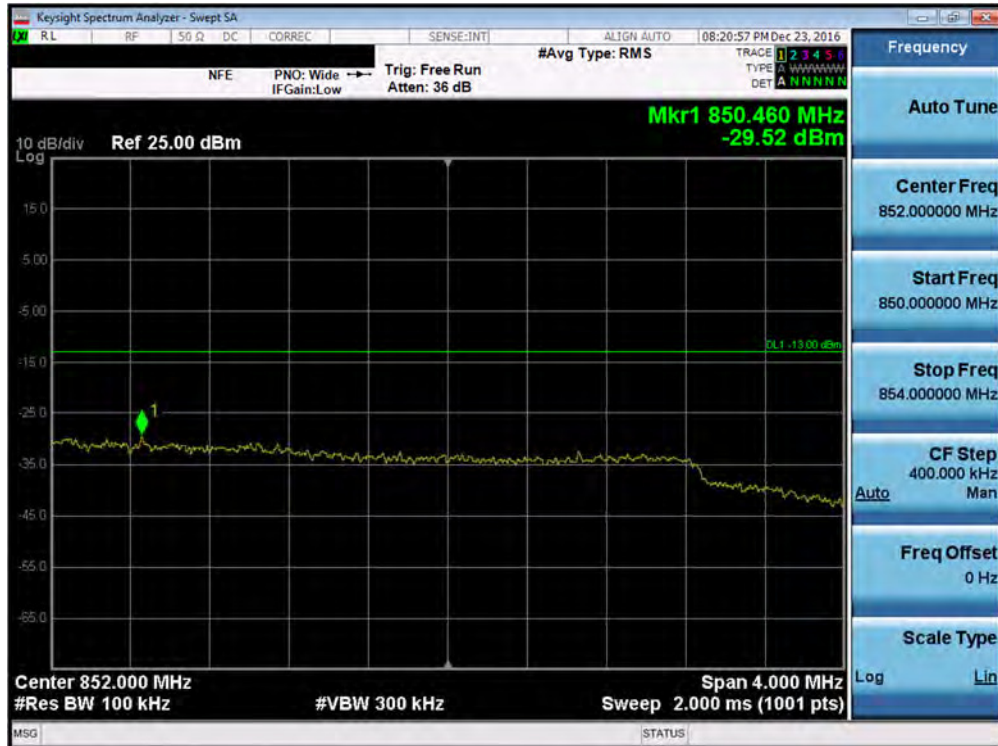


Plot 7-100. Lower Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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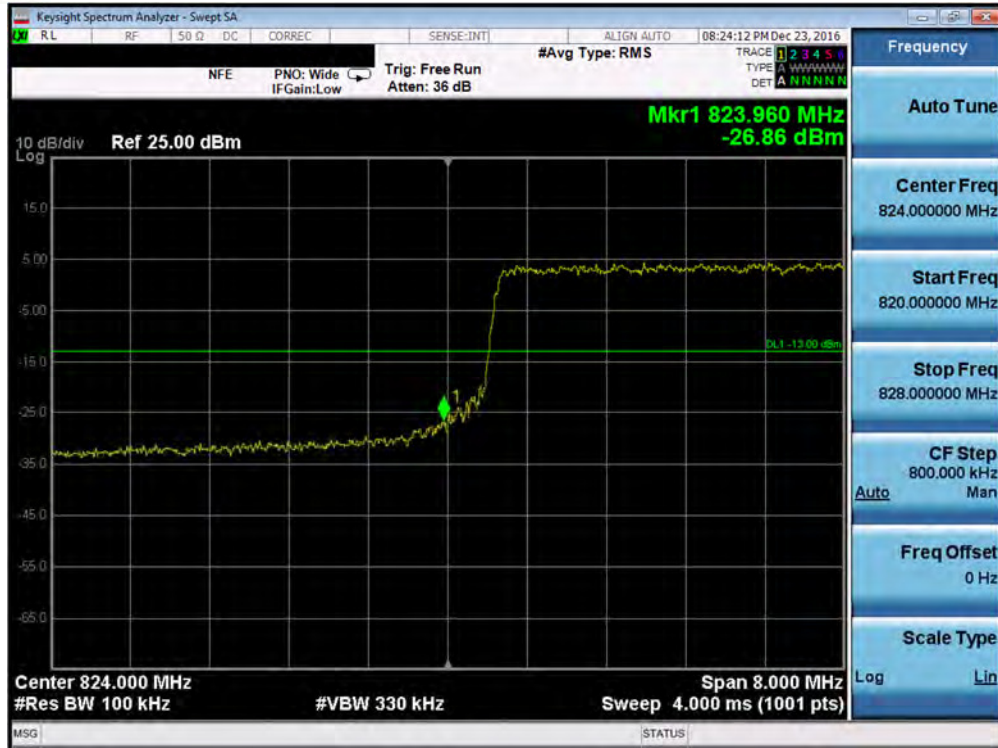


Plot 7-101. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



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

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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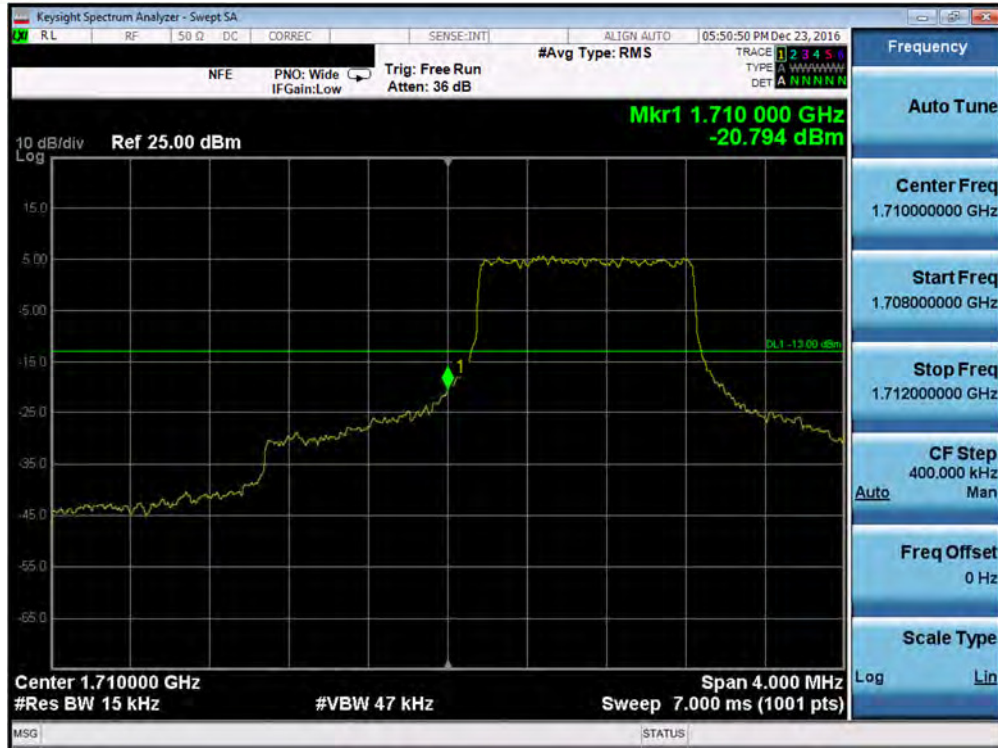


Plot 7-103. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

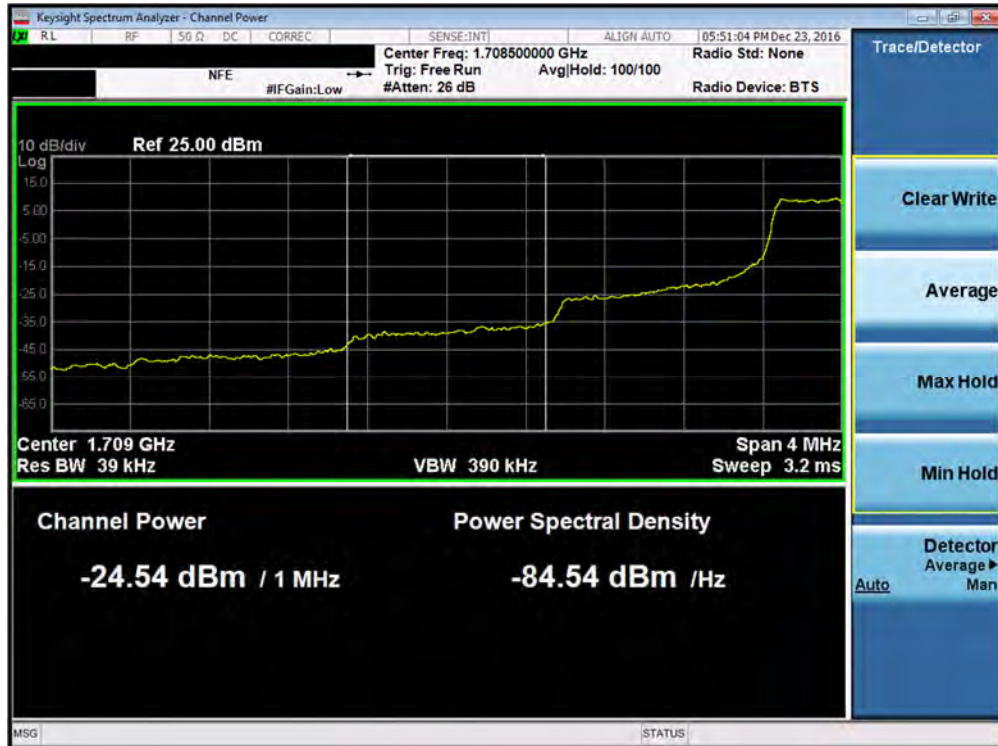


Plot 7-104. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-105. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

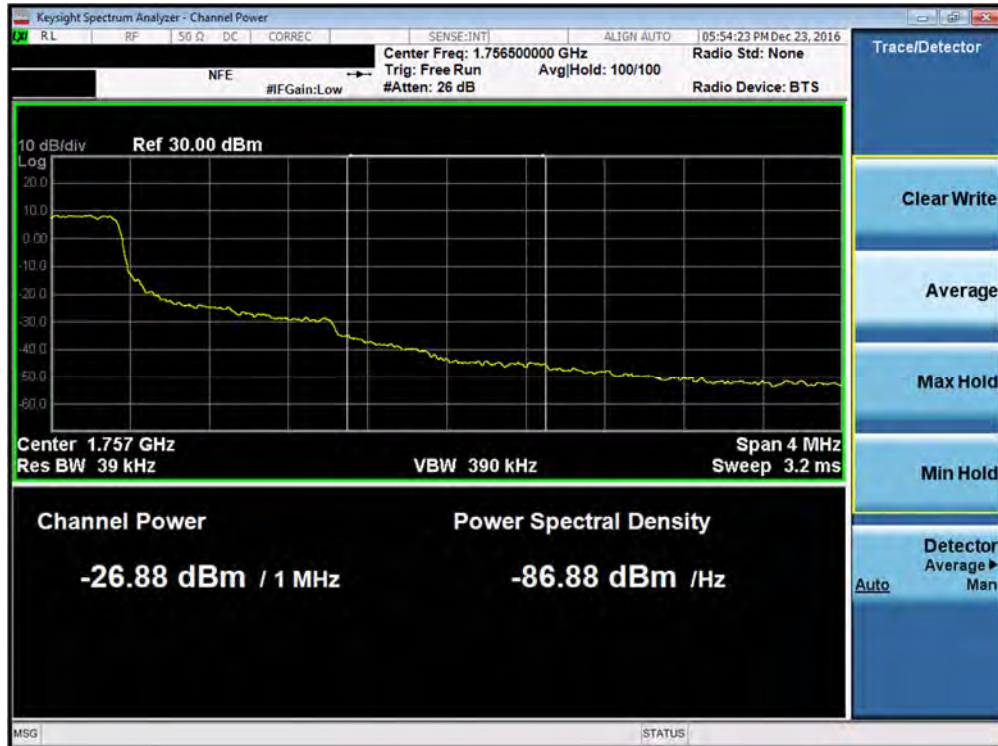


Plot 7-106. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-107. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

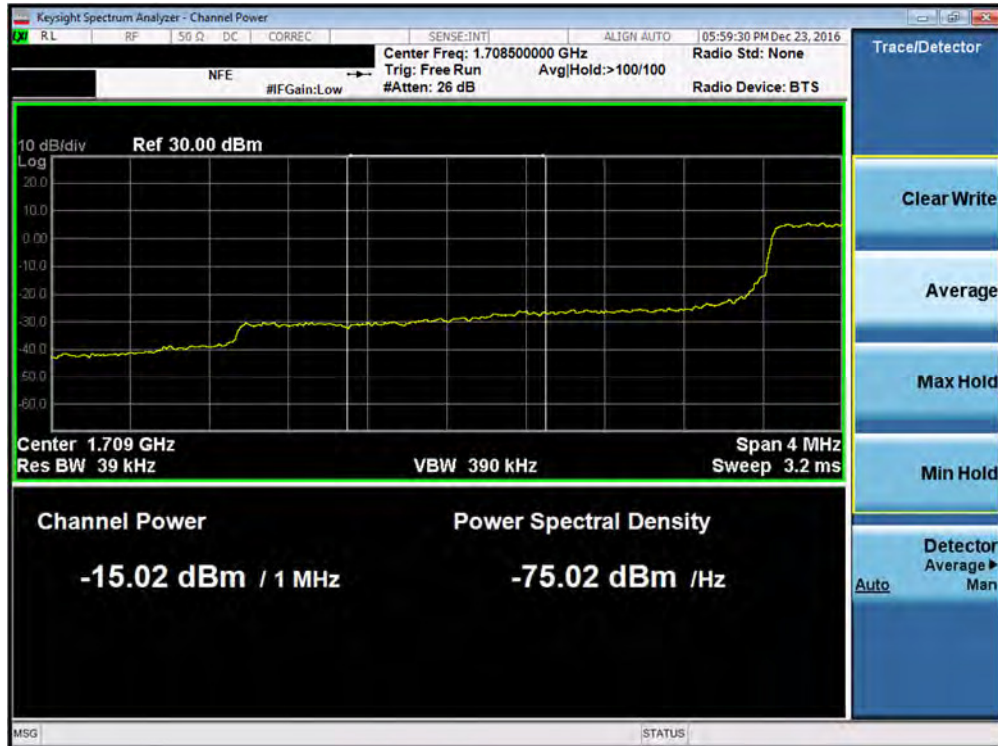


Plot 7-108. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-109. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

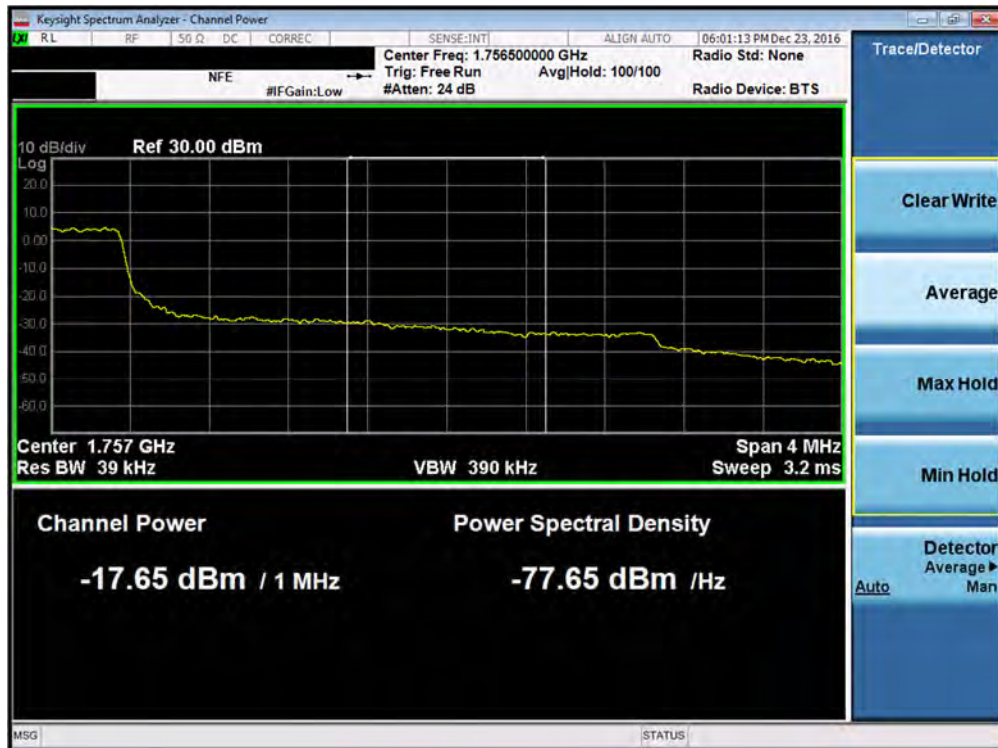


Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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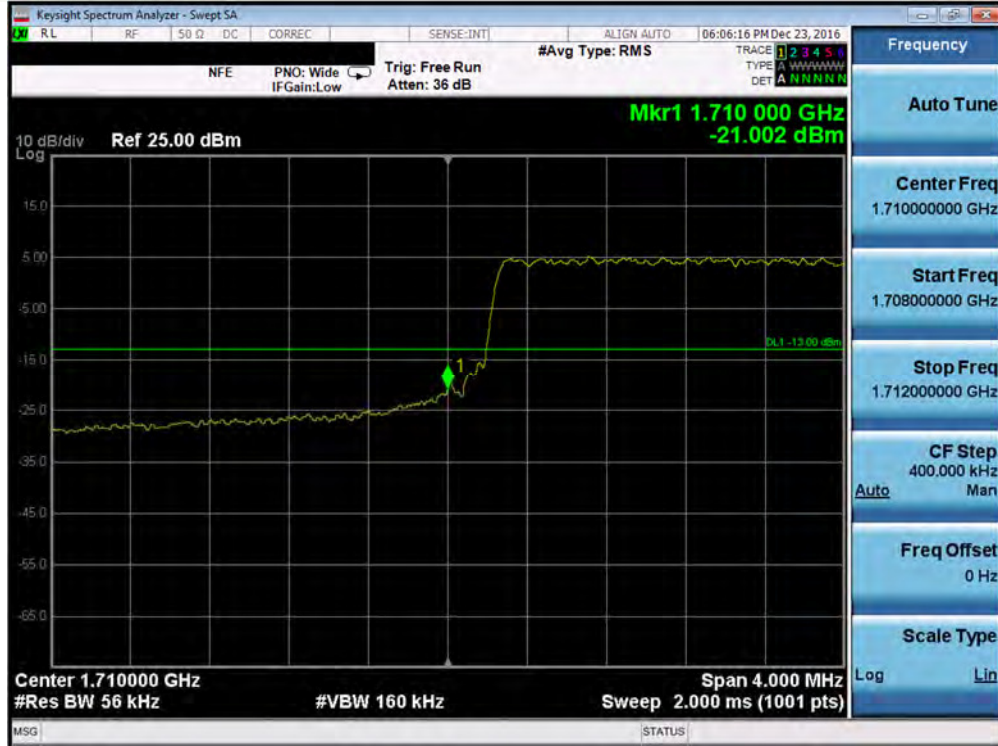


Plot 7-111. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

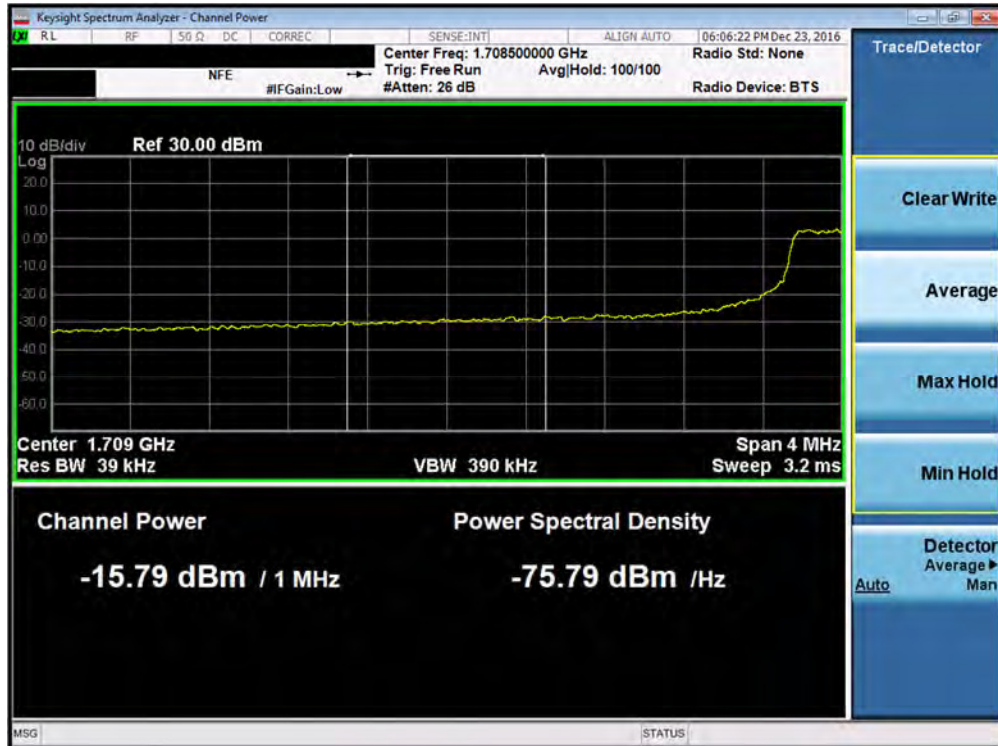


Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-113. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

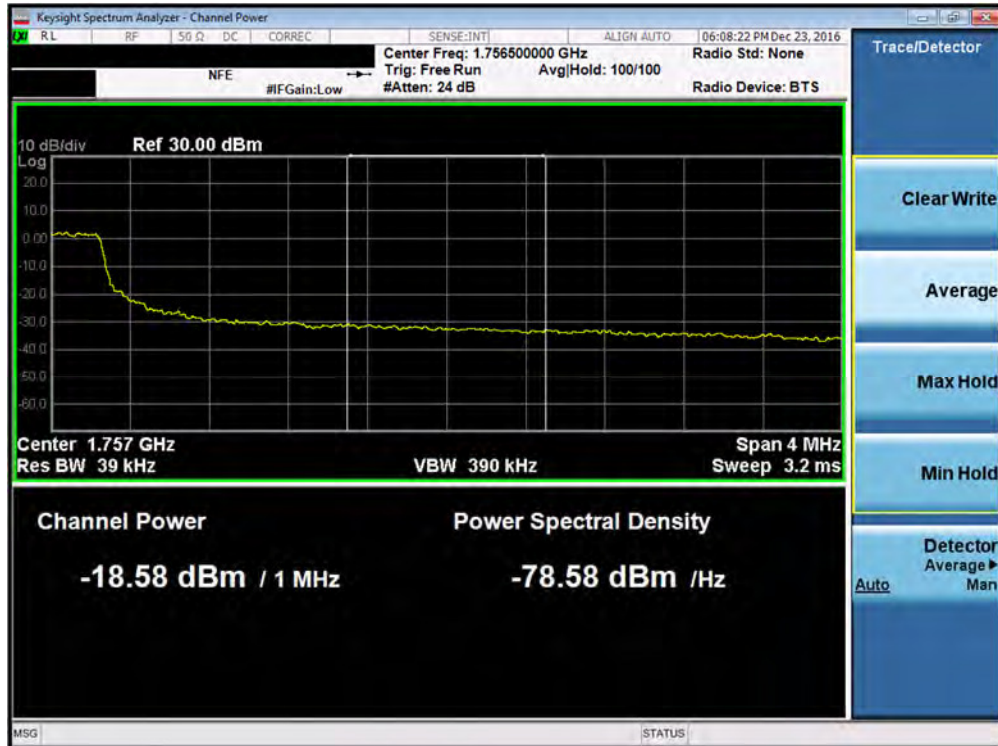


Plot 7-114. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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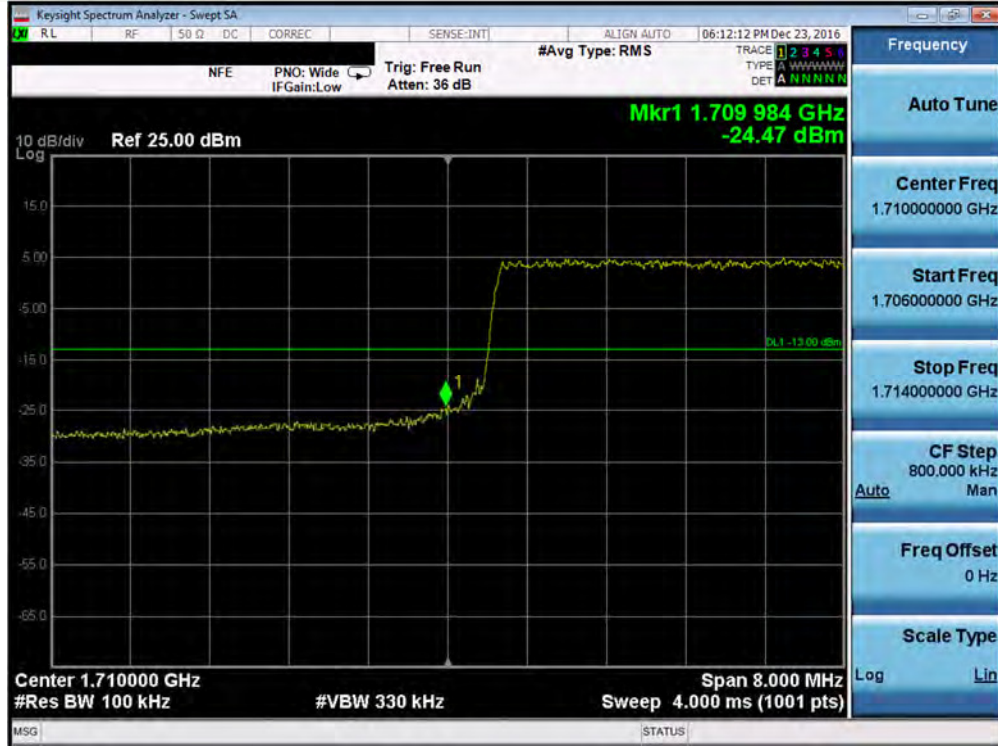


Plot 7-115. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

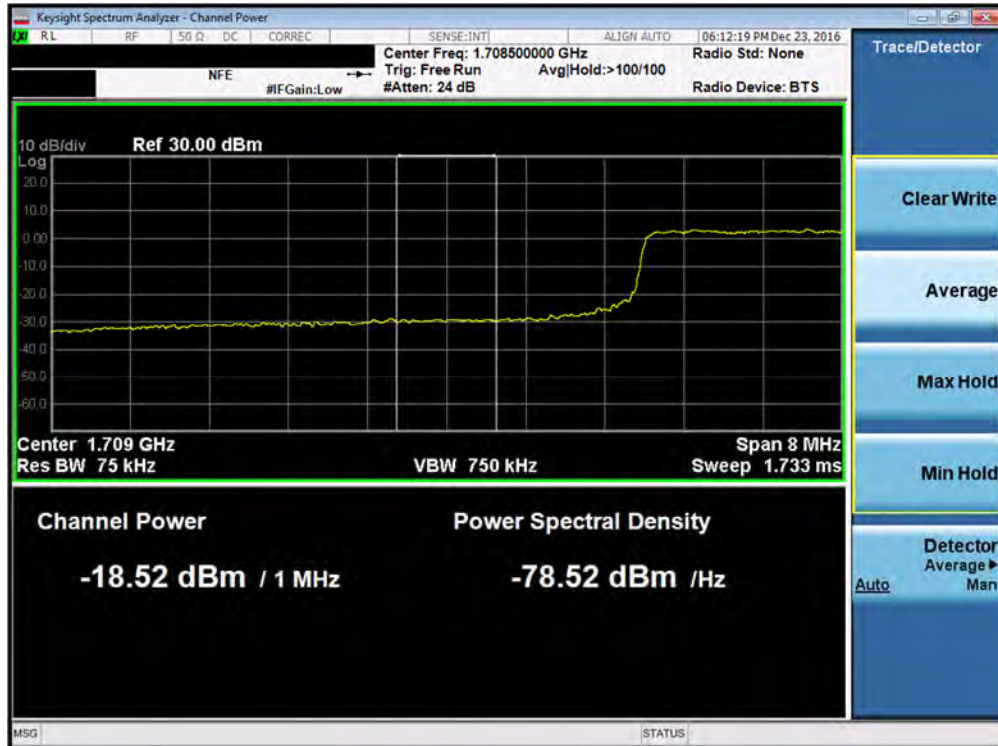


Plot 7-116. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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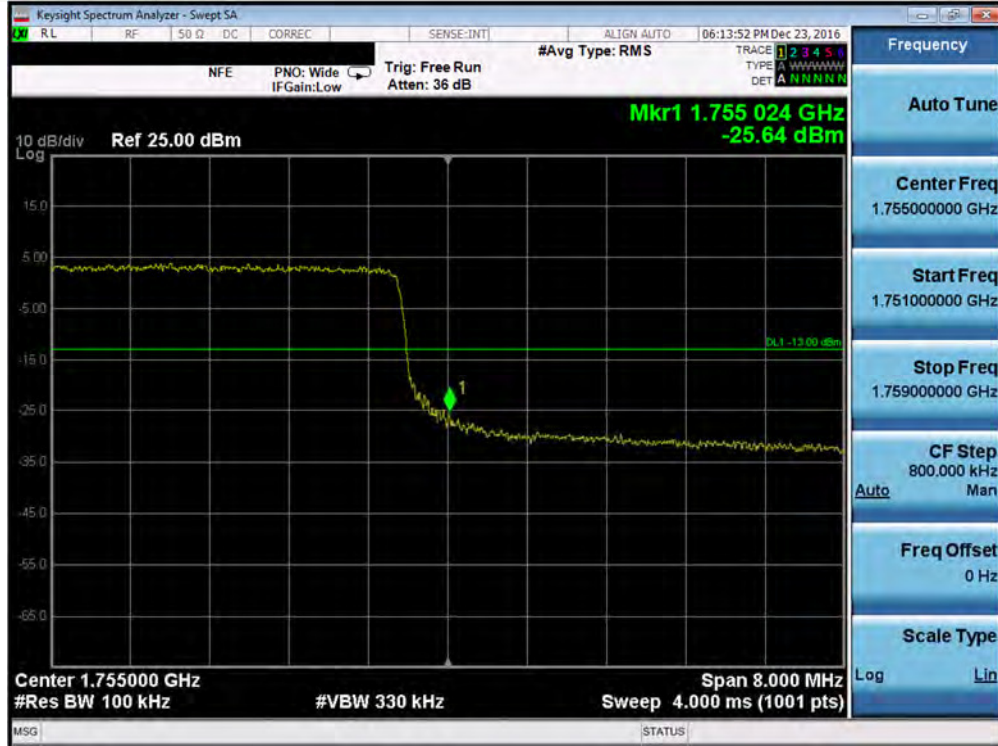


Plot 7-117. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

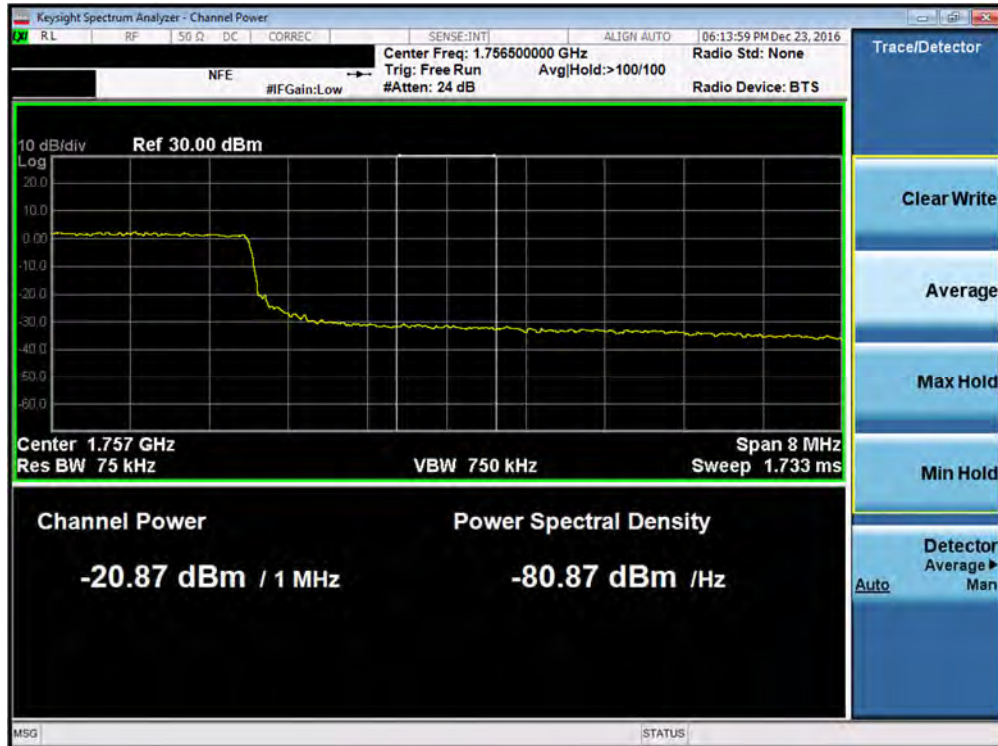


Plot 7-118. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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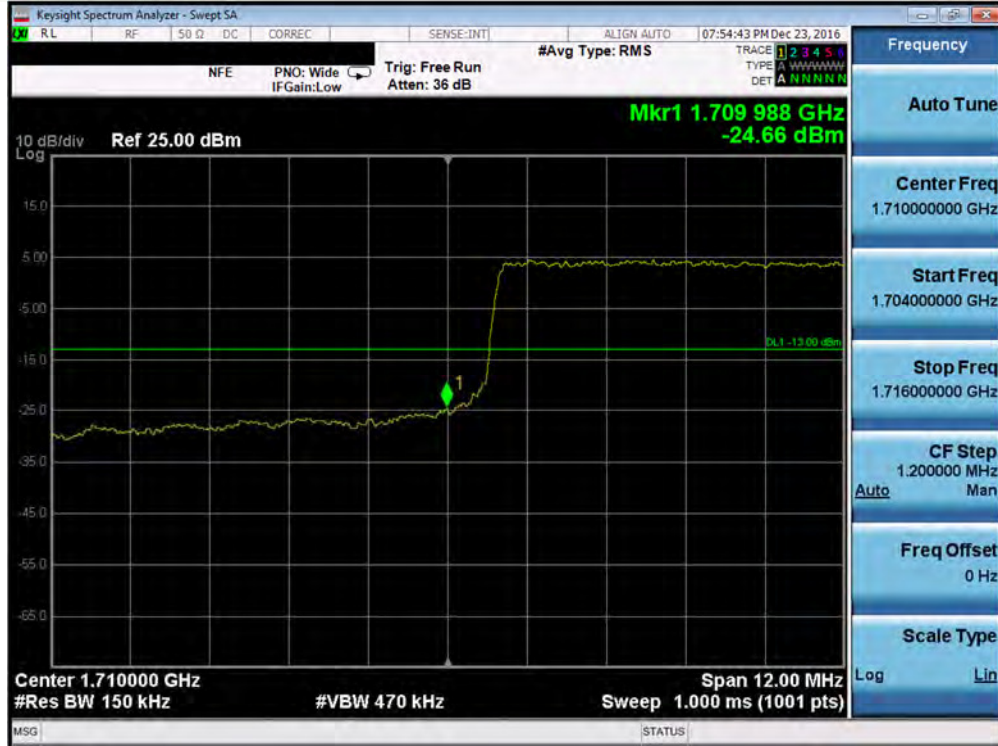


Plot 7-119. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

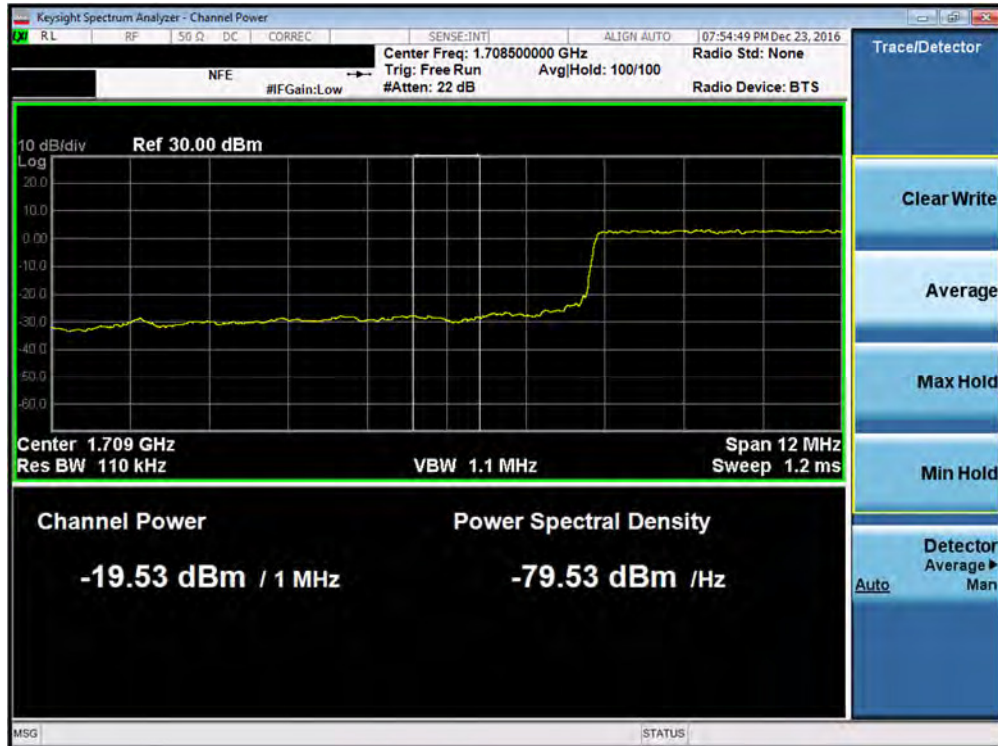


Plot 7-120. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-121. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

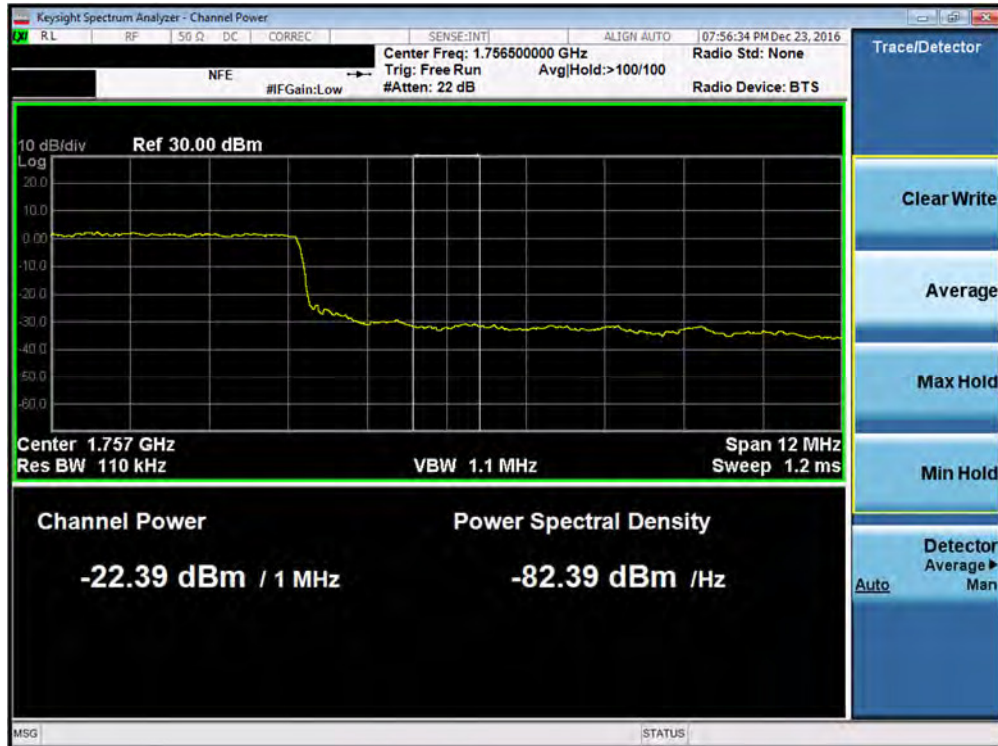


Plot 7-122. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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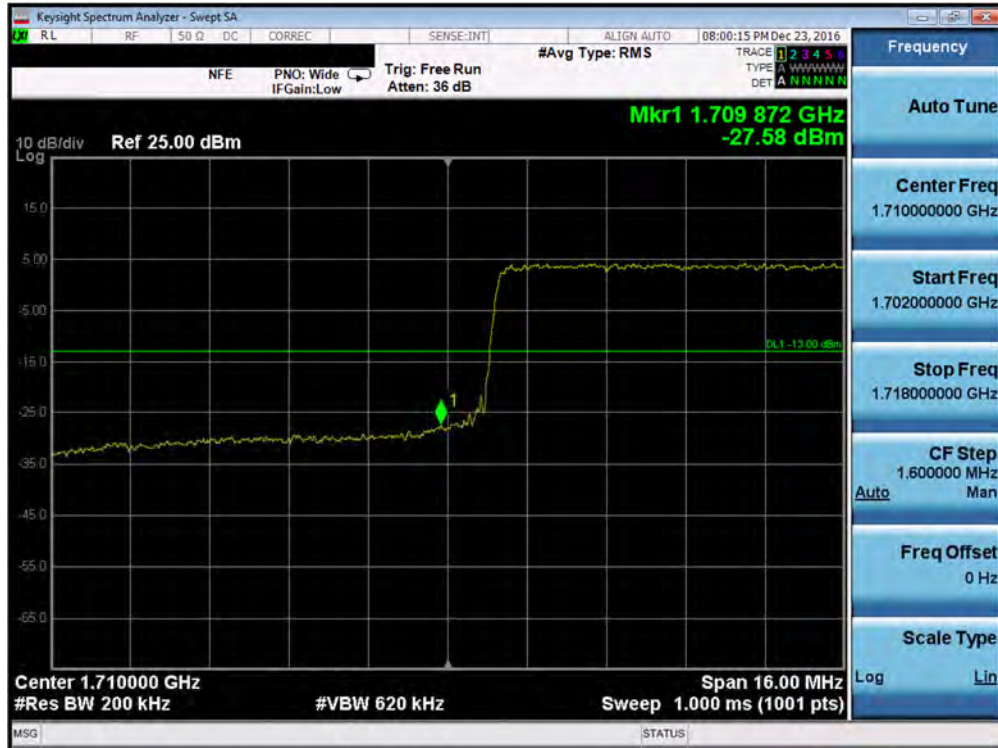


Plot 7-123. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

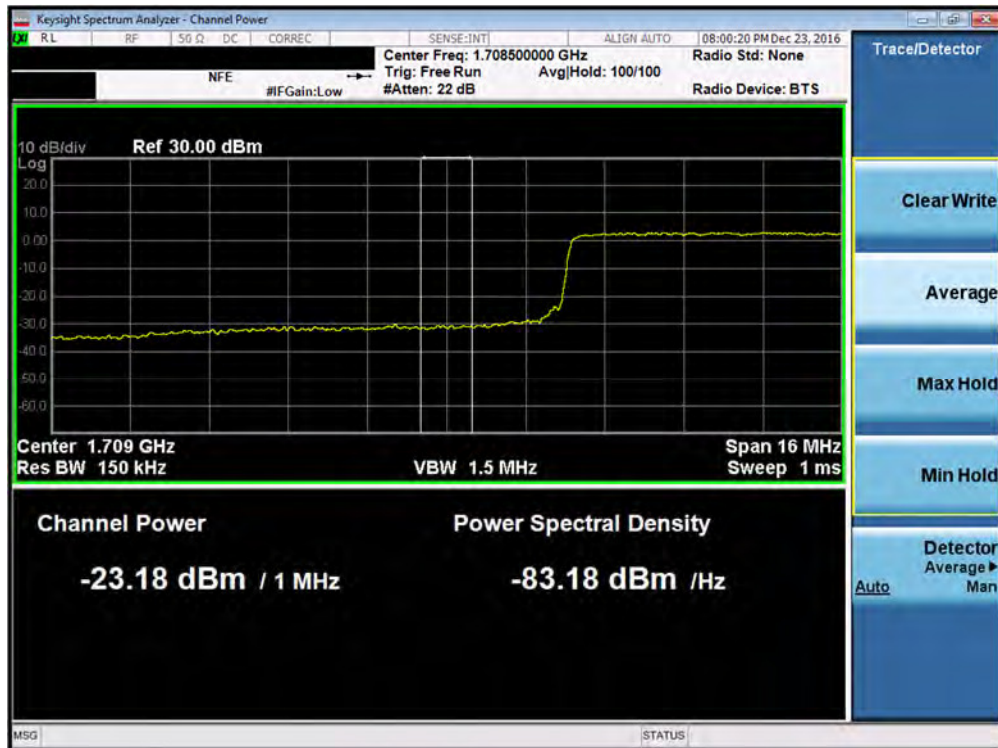


Plot 7-124. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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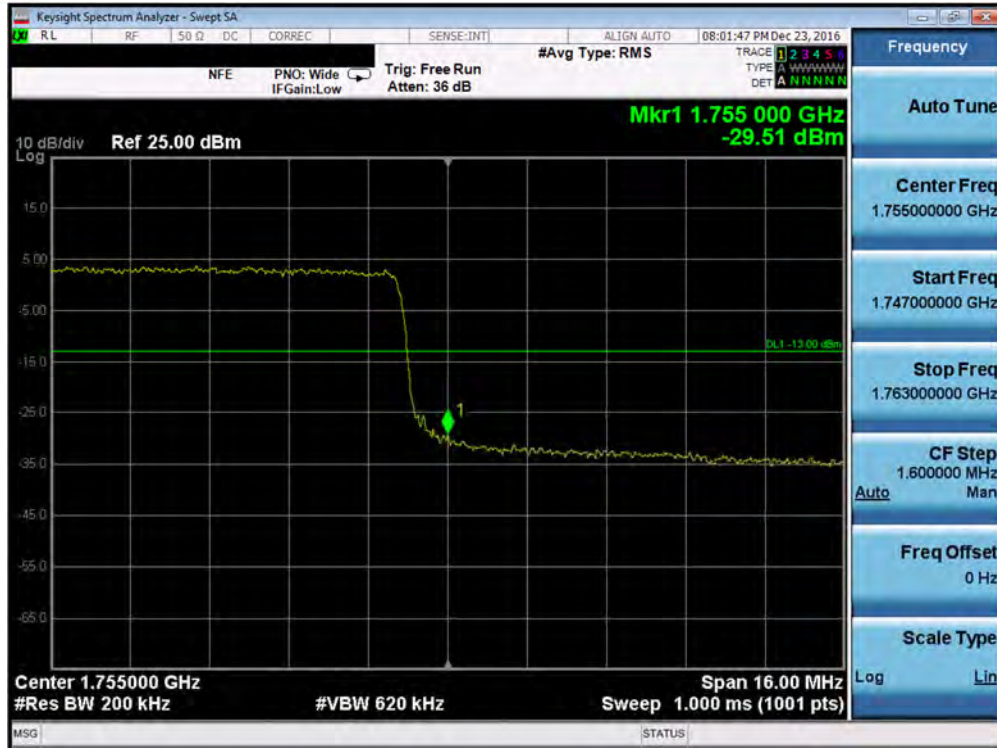


Plot 7-125. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

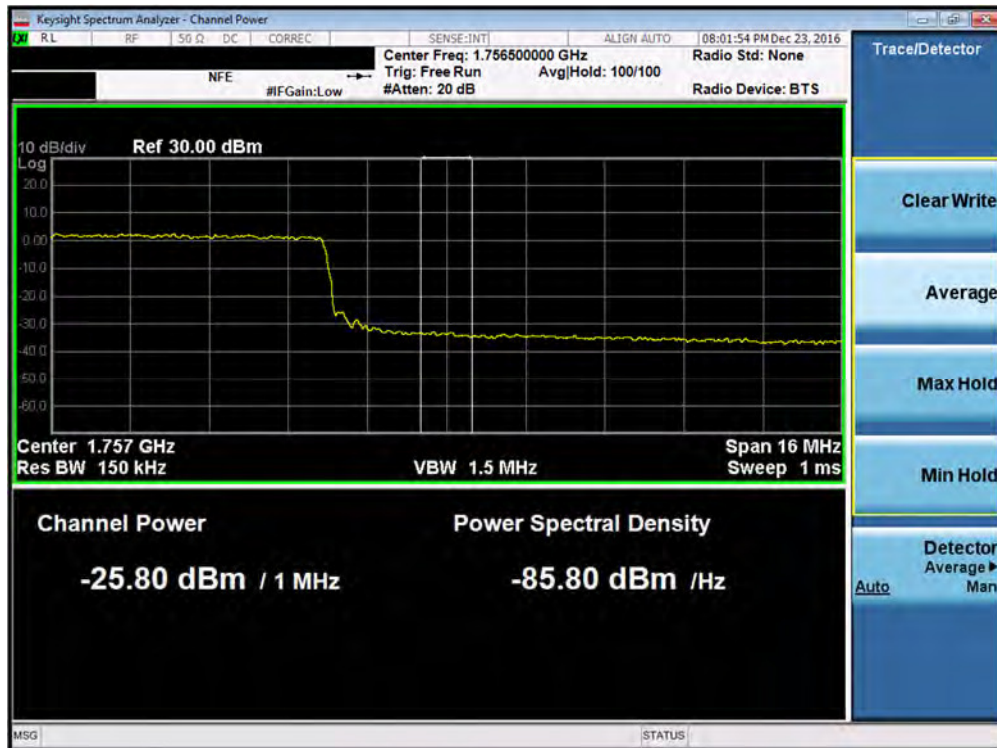


Plot 7-126. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-127. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

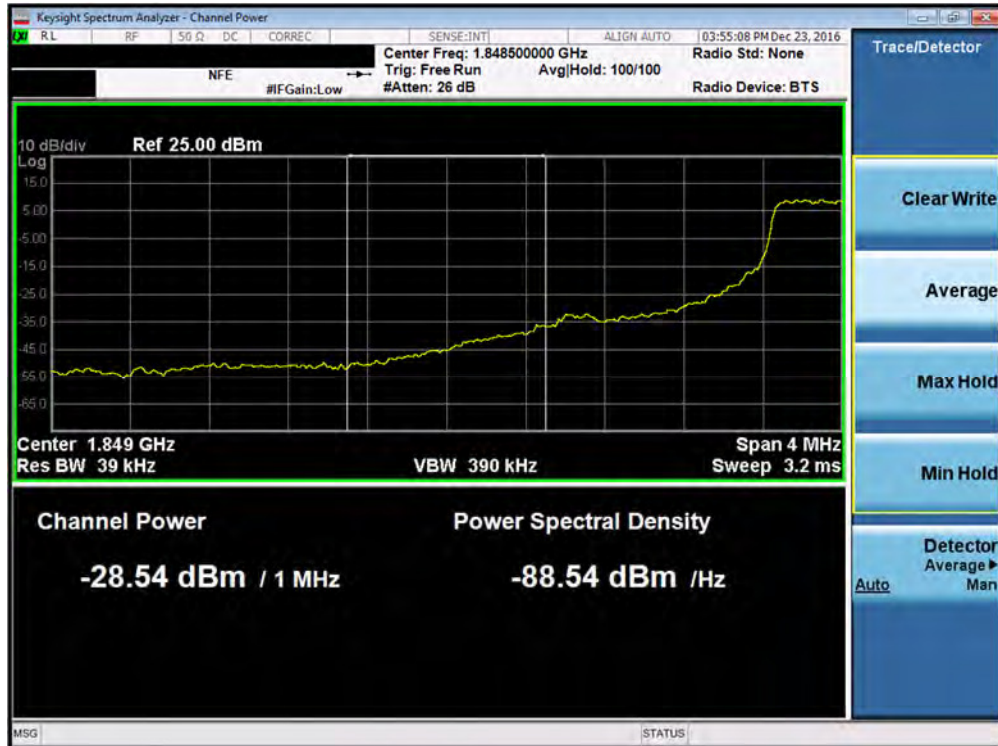


Plot 7-128. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-129. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

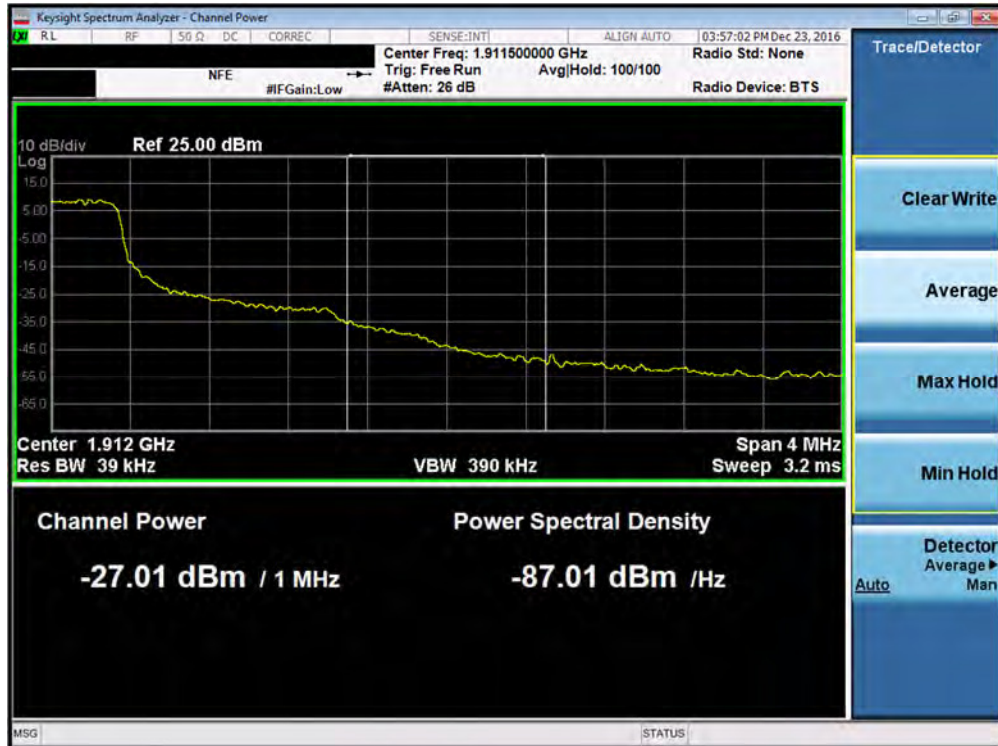


Plot 7-130. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-131. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

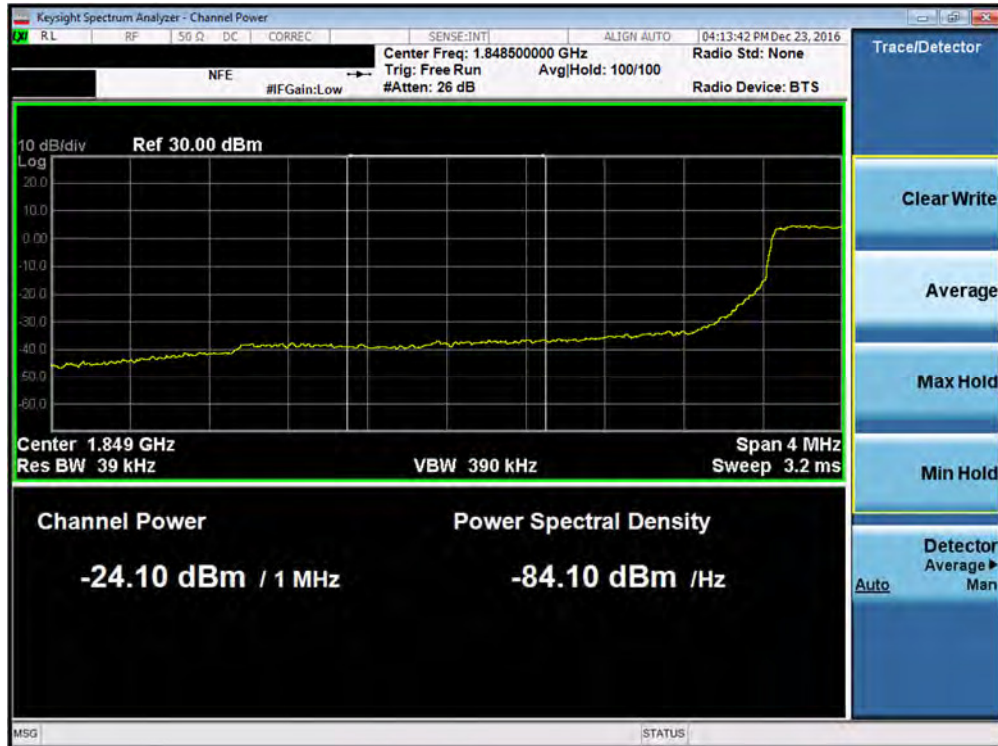


Plot 7-132. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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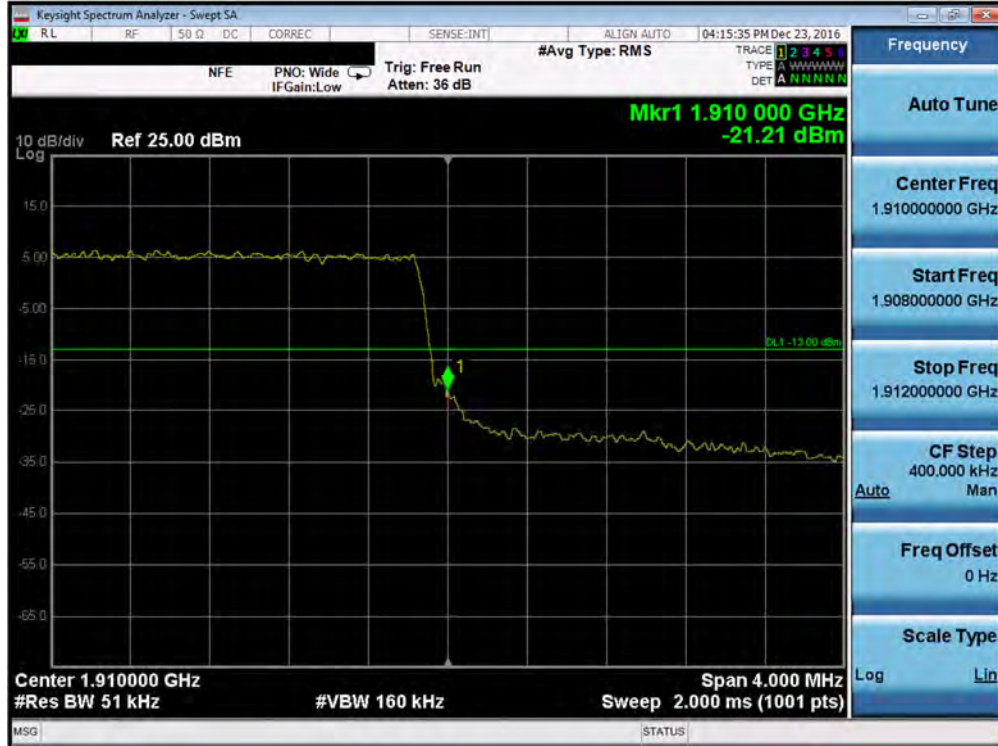


Plot 7-133. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

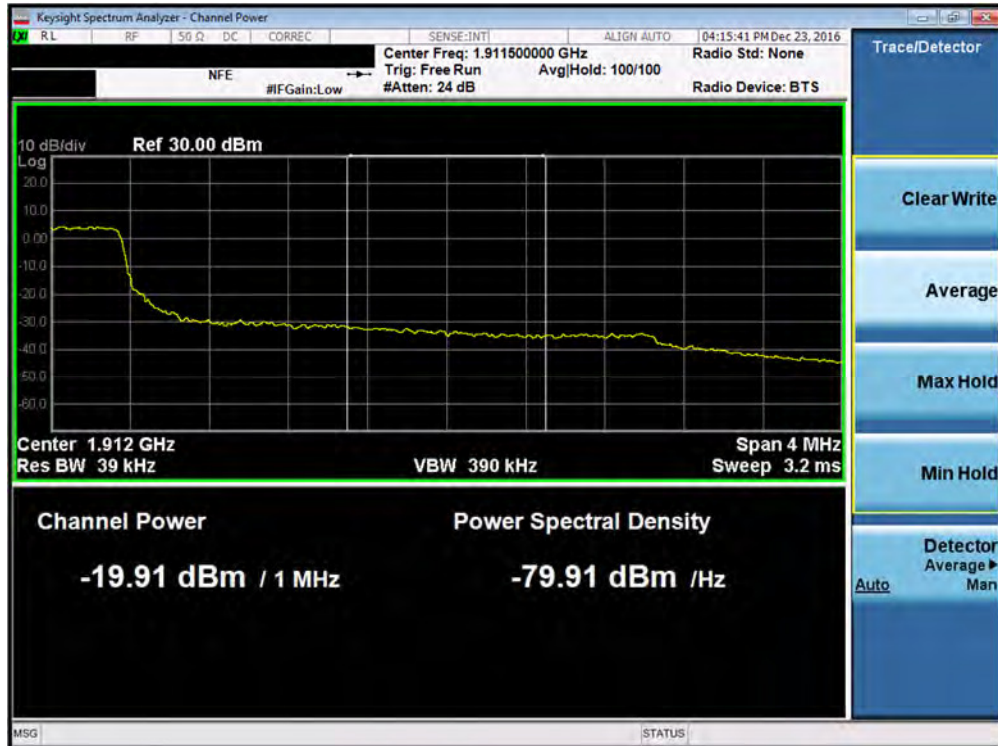


Plot 7-134. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 83 of 123

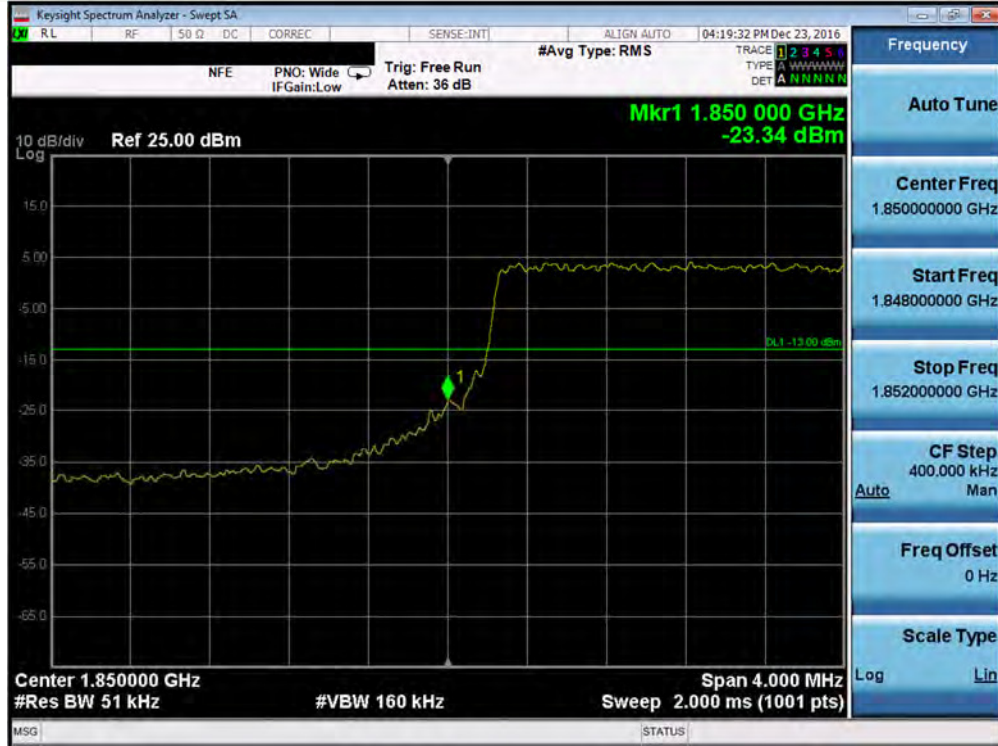


Plot 7-135. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

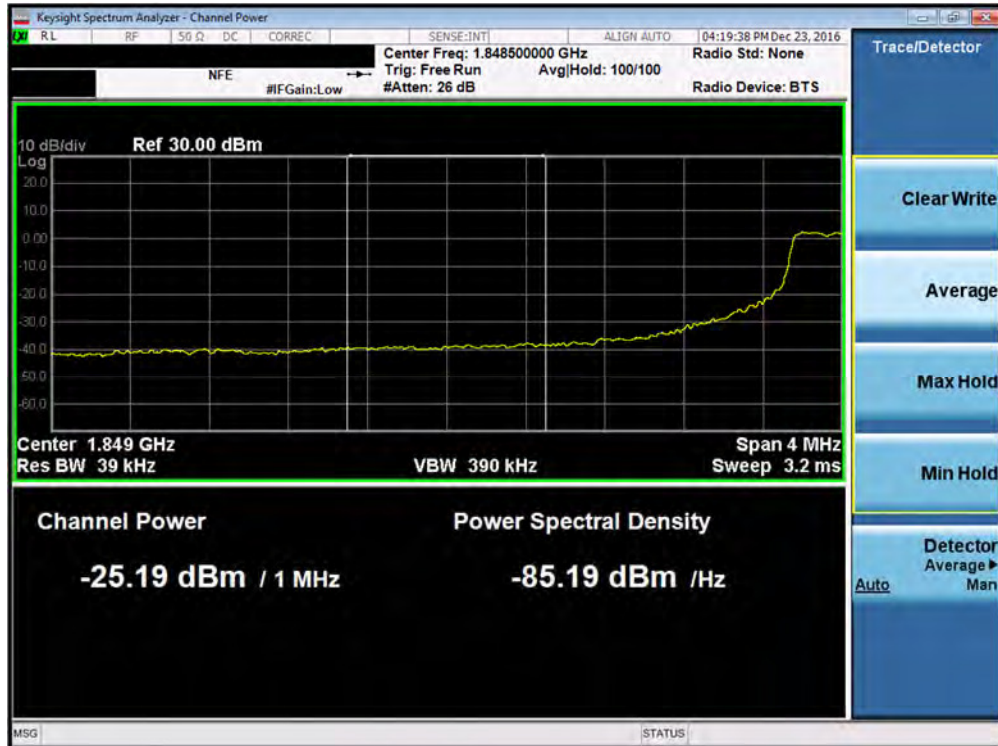


Plot 7-136. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-137. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-138. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 85 of 123

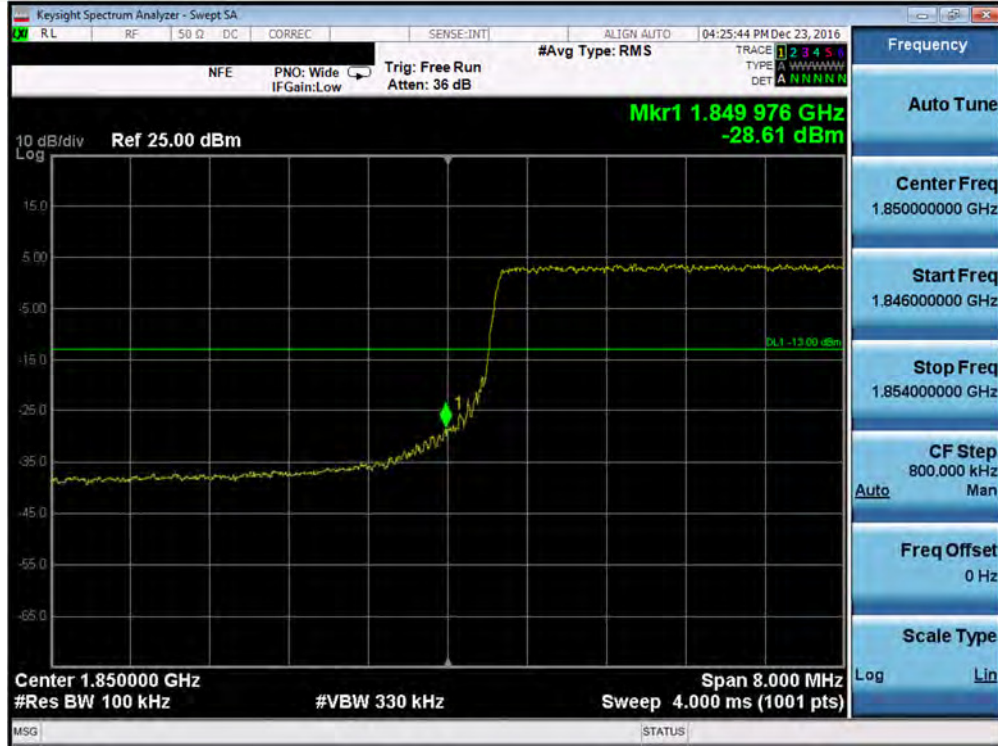


Plot 7-139. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

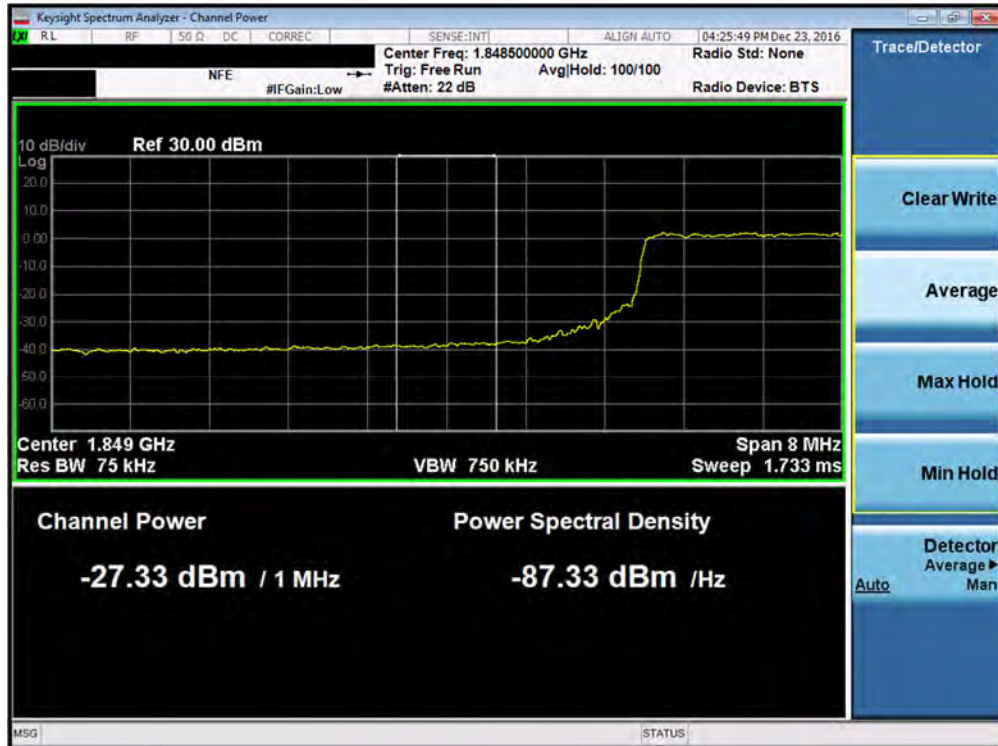


Plot 7-140. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 86 of 123

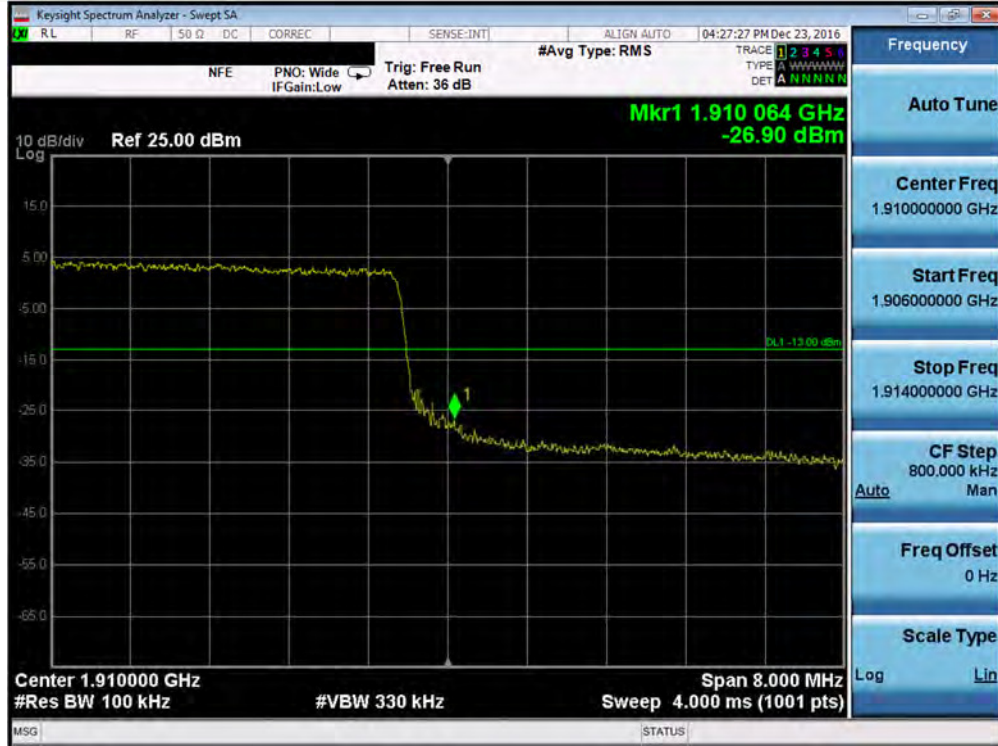


Plot 7-141. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

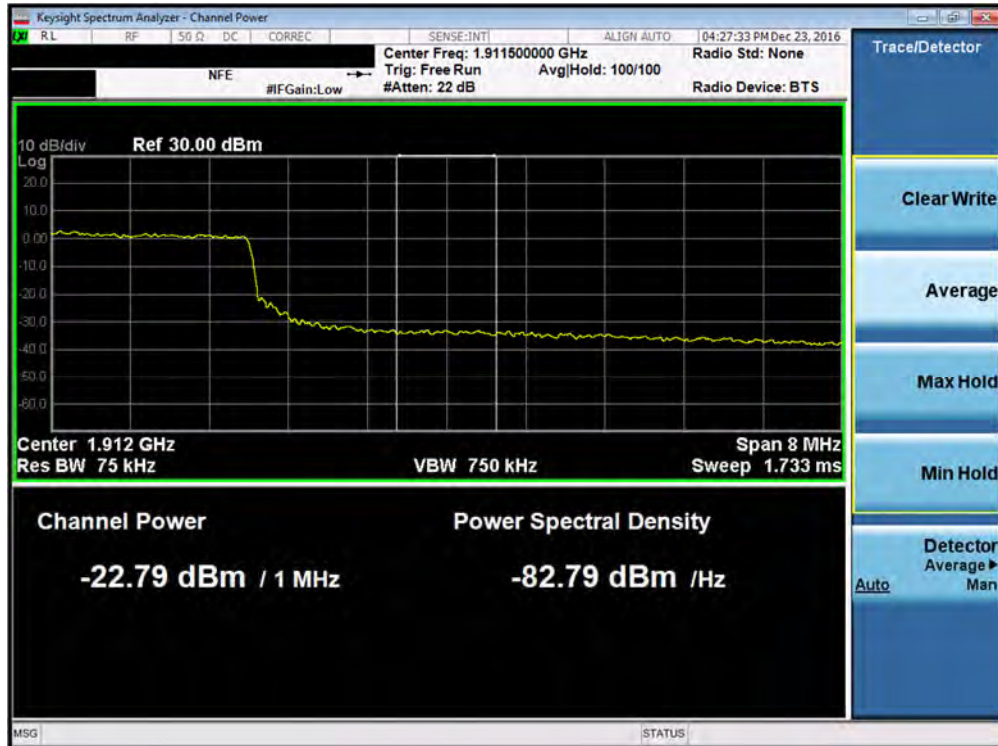


Plot 7-142. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 87 of 123

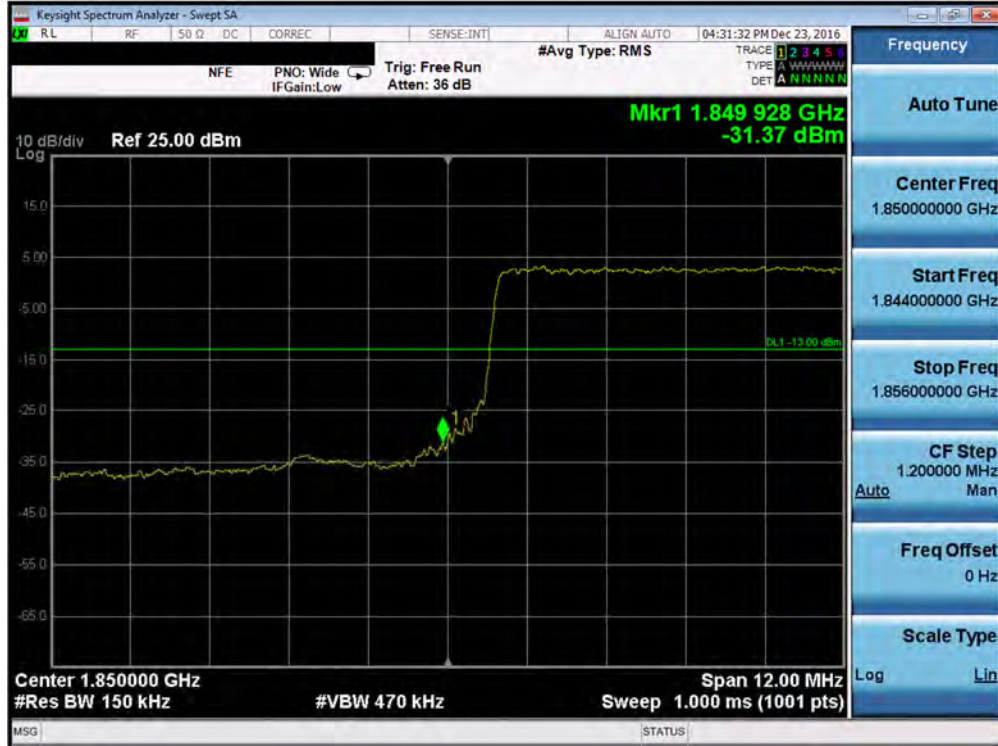


Plot 7-143. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

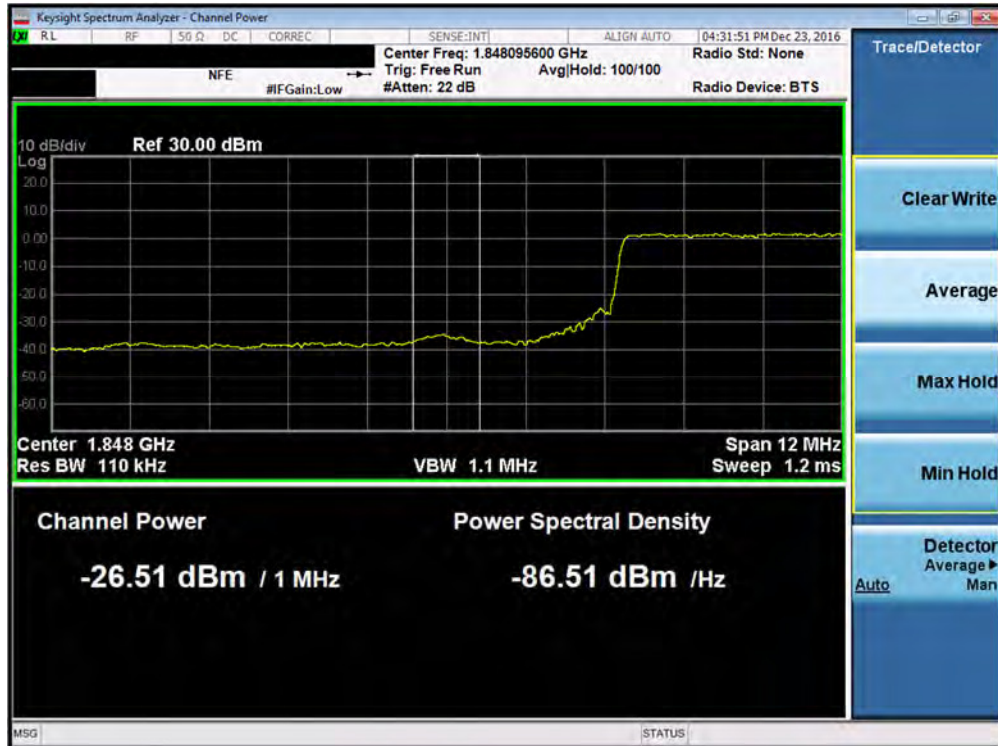


Plot 7-144. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-145. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

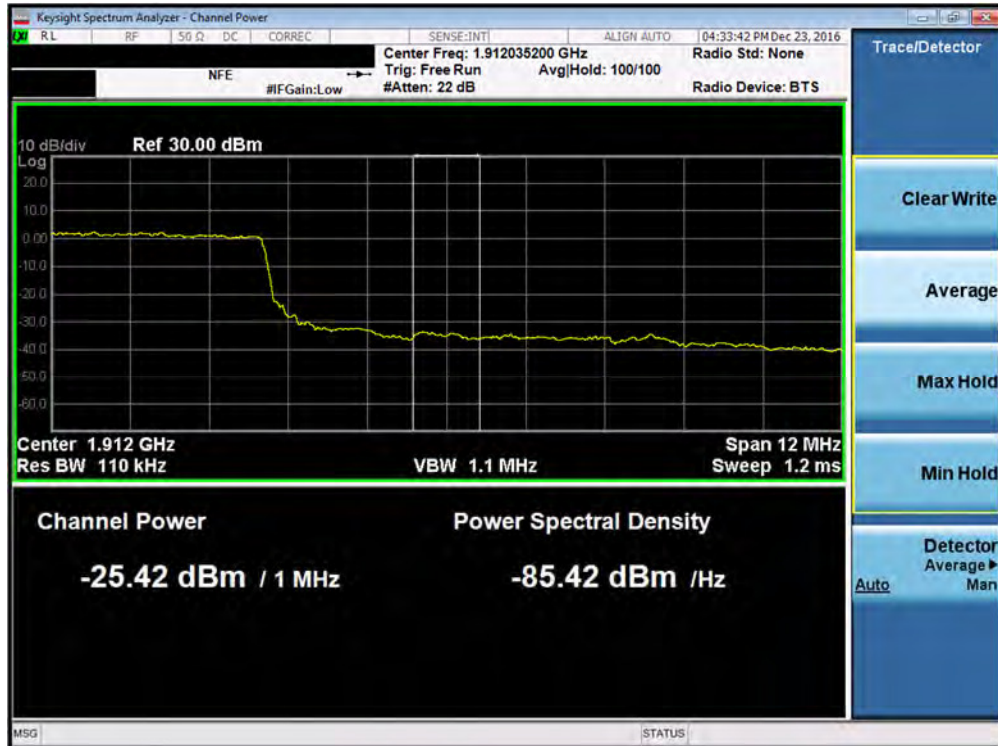


Plot 7-146. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 89 of 123

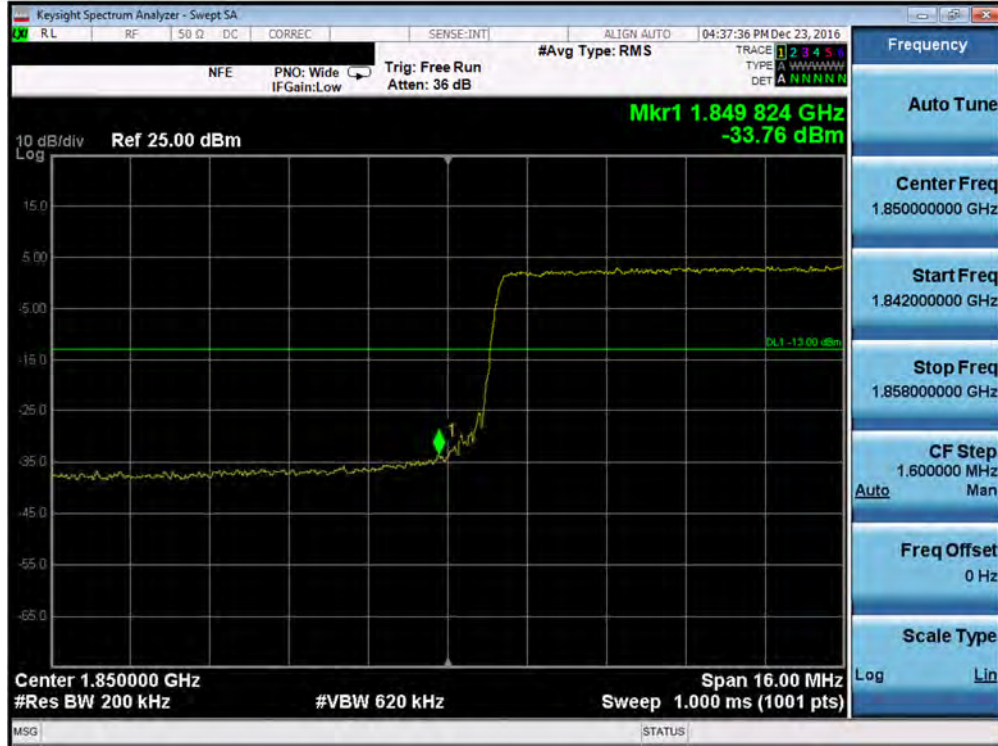


Plot 7-147. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

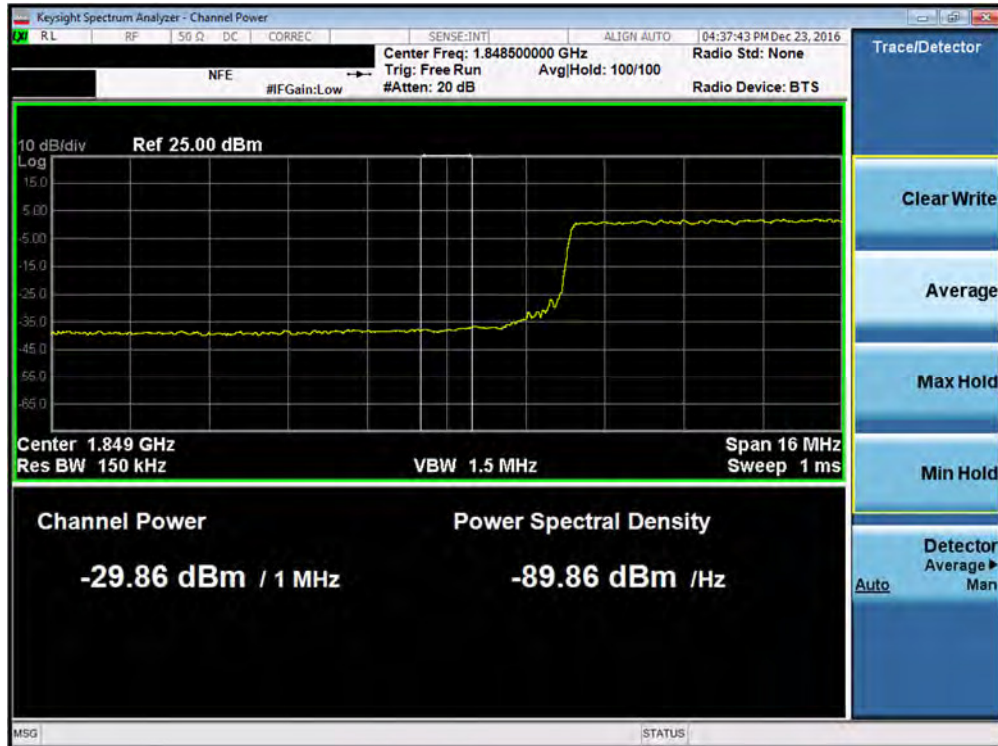


Plot 7-148. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 90 of 123



Plot 7-149. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

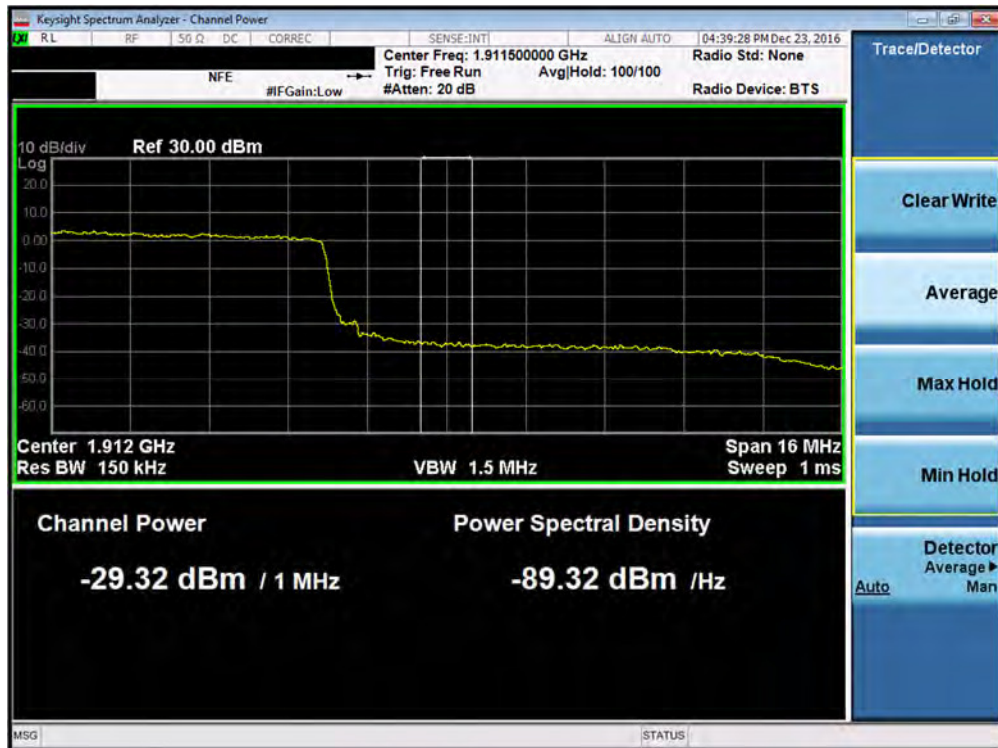


Plot 7-150. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 91 of 123



Plot 7-151. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-152. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 92 of 123

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.

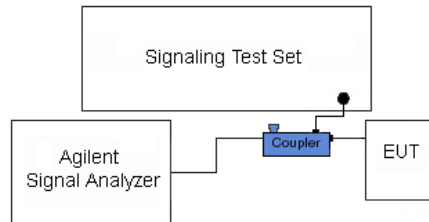


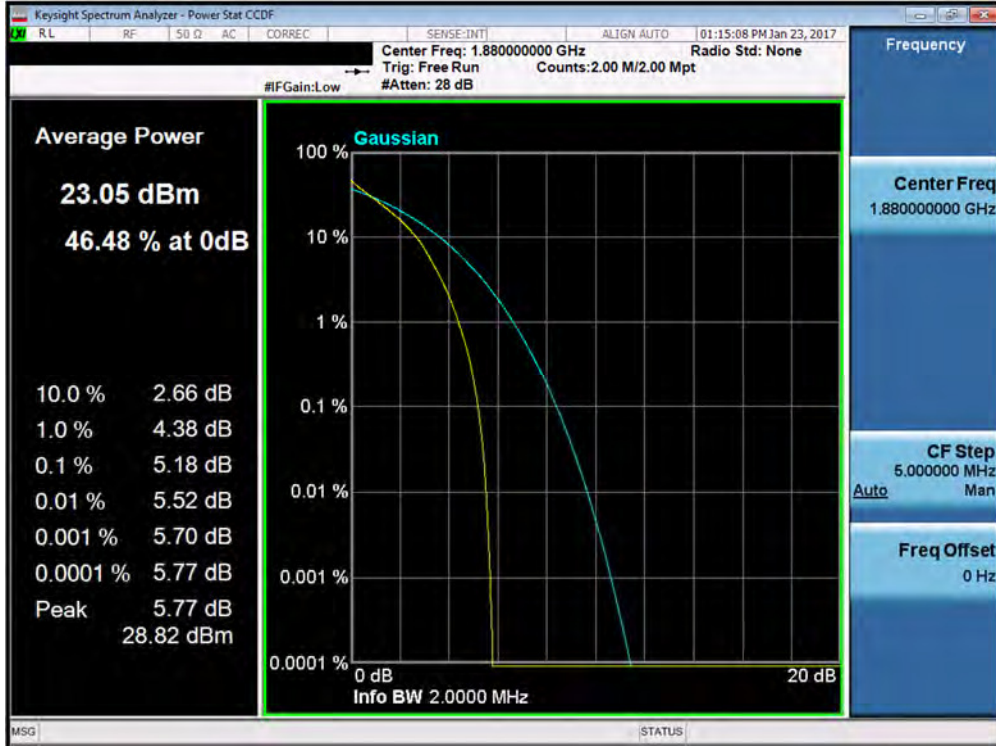


Figure 7-4. Test Instrument & Measurement Setup

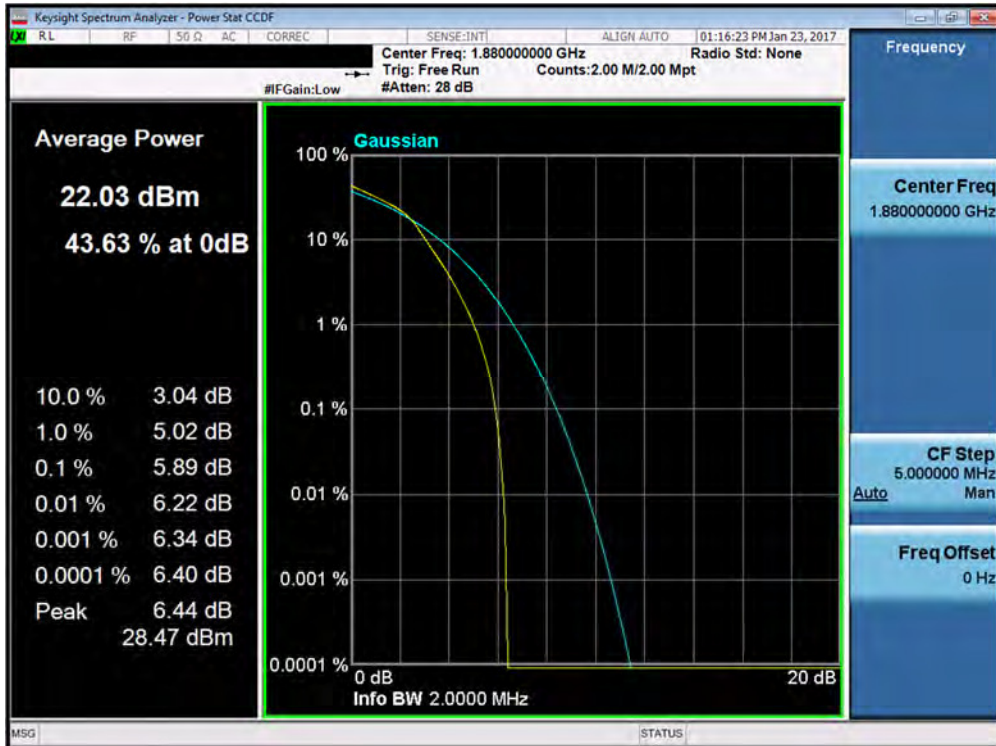
Test Notes

None.

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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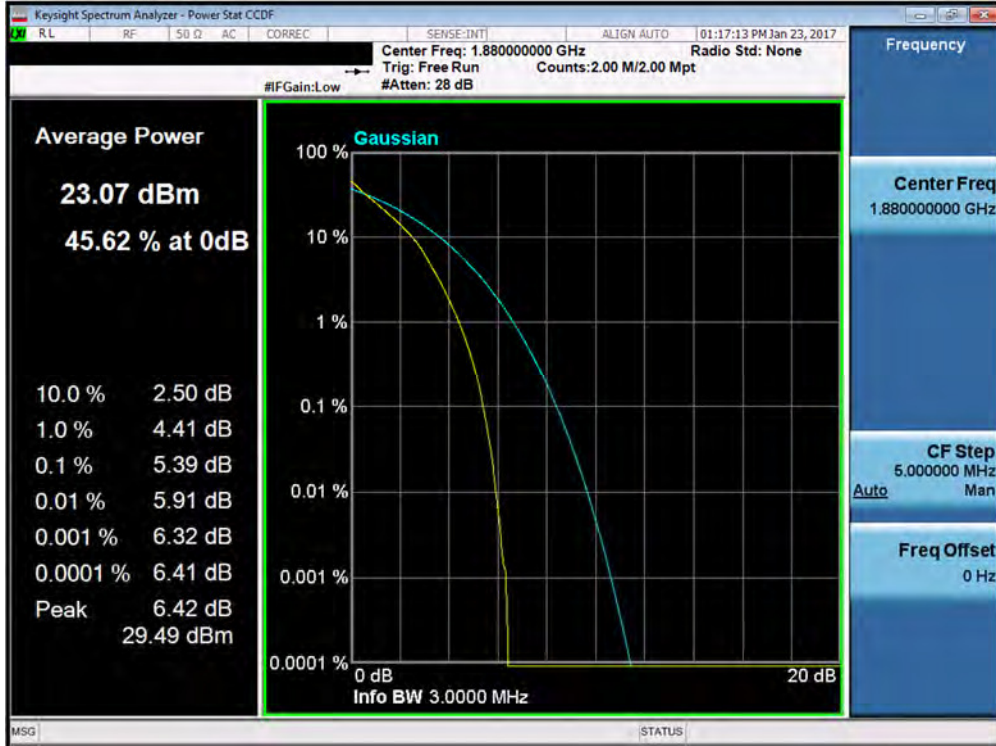


Plot 7-153. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

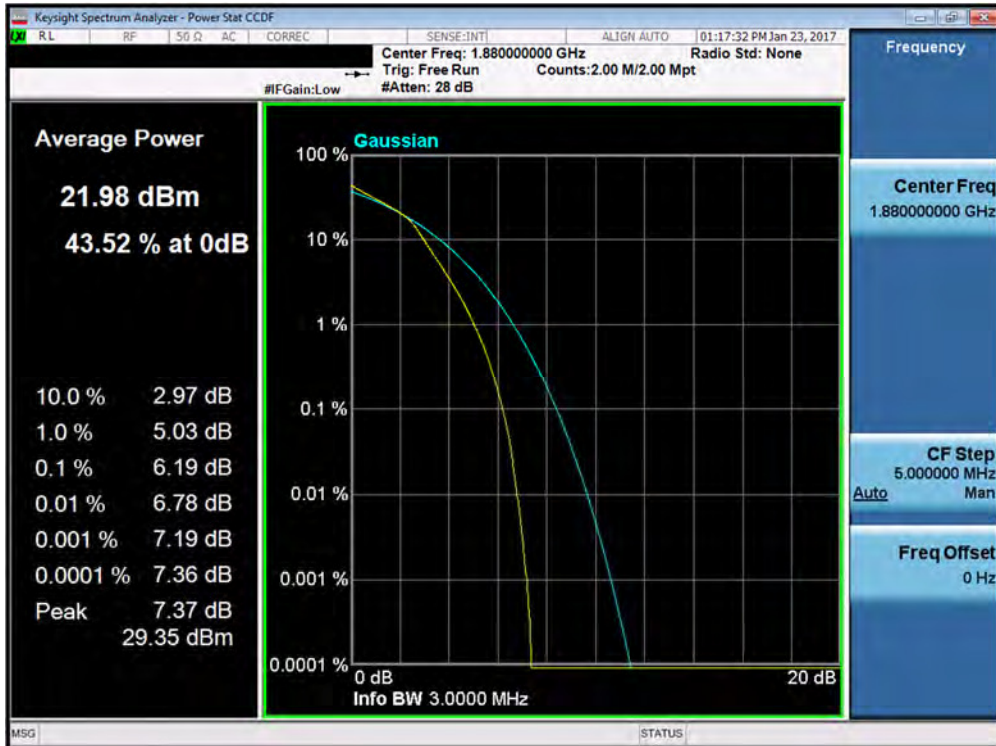


Plot 7-154. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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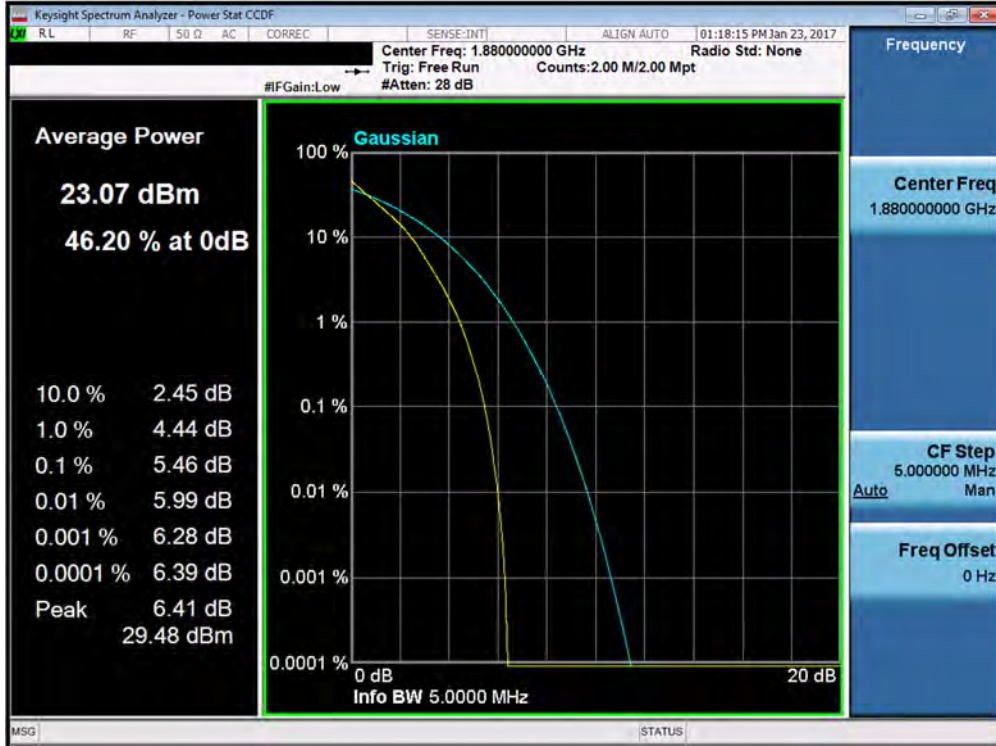


Plot 7-155. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

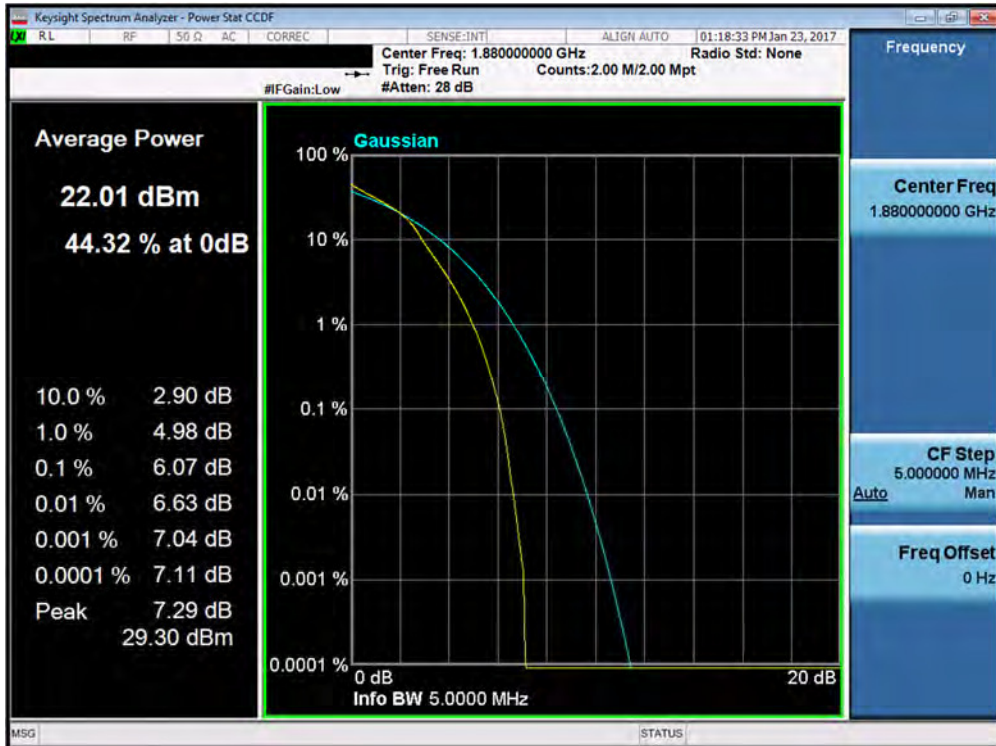


Plot 7-156. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 95 of 123

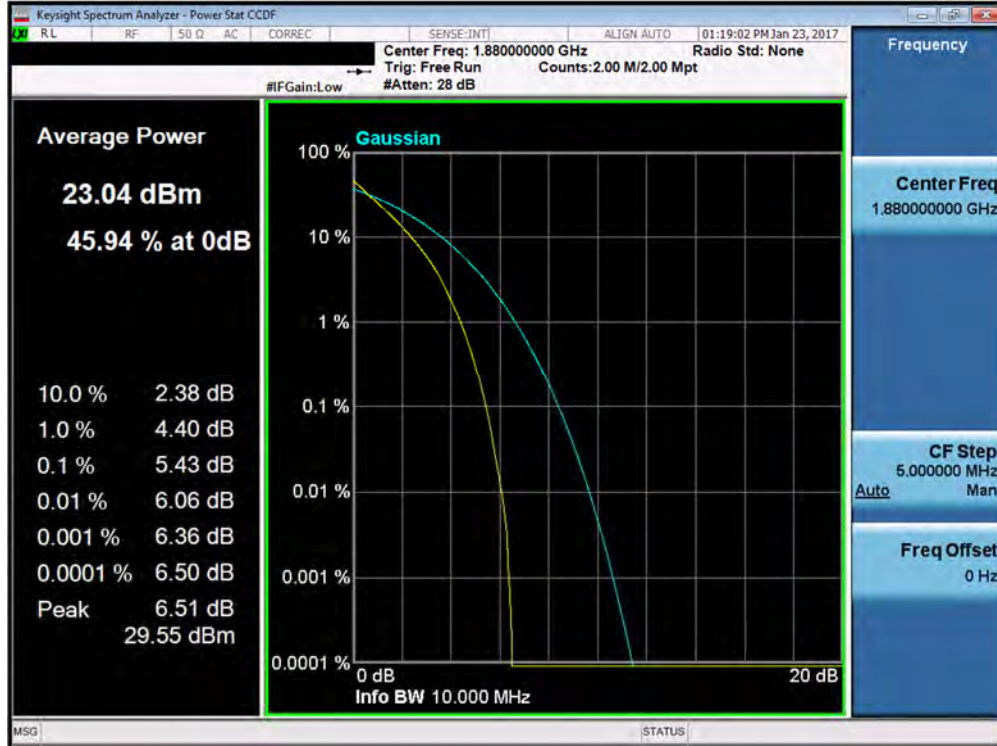


Plot 7-157. PAR Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

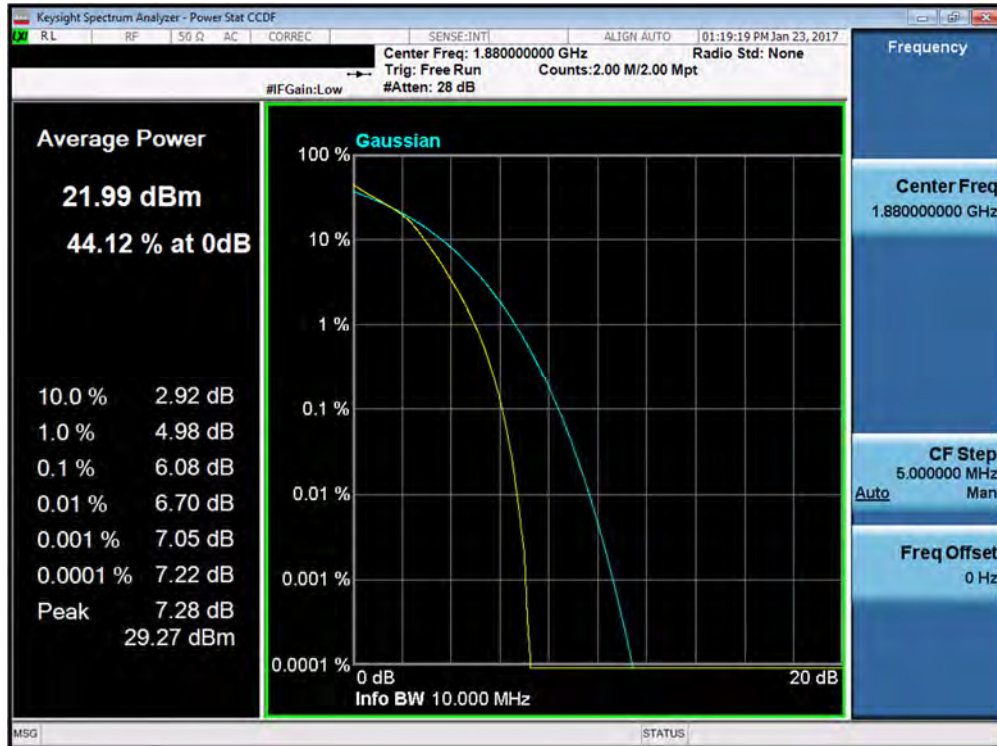


Plot 7-158. PAR Plot (Band 2 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 96 of 123

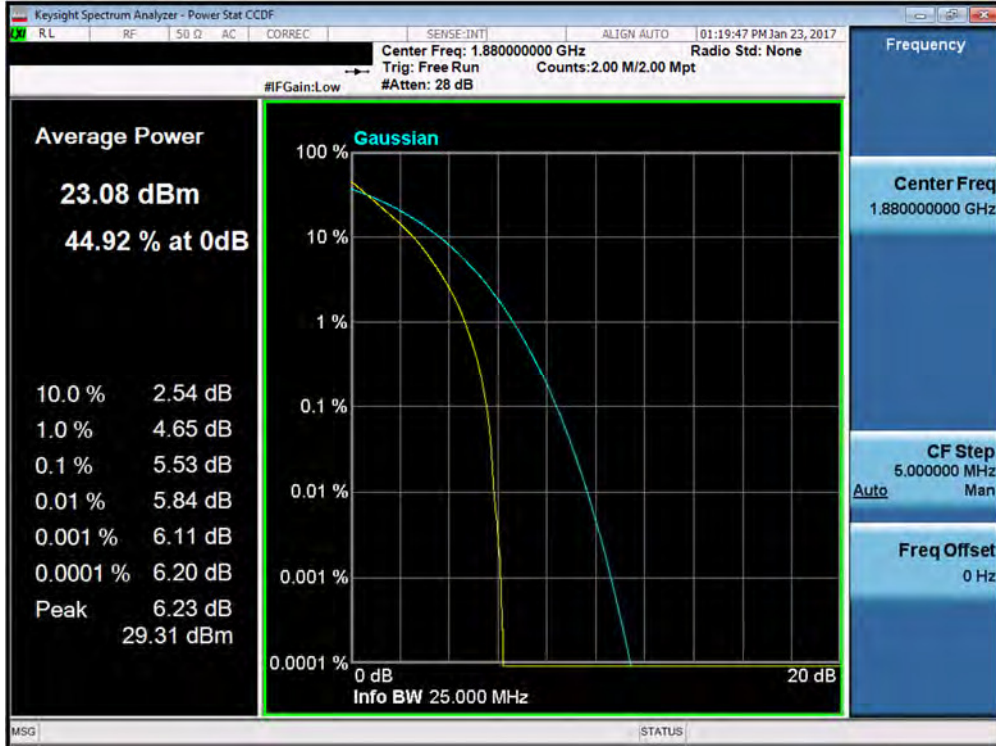


Plot 7-159. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

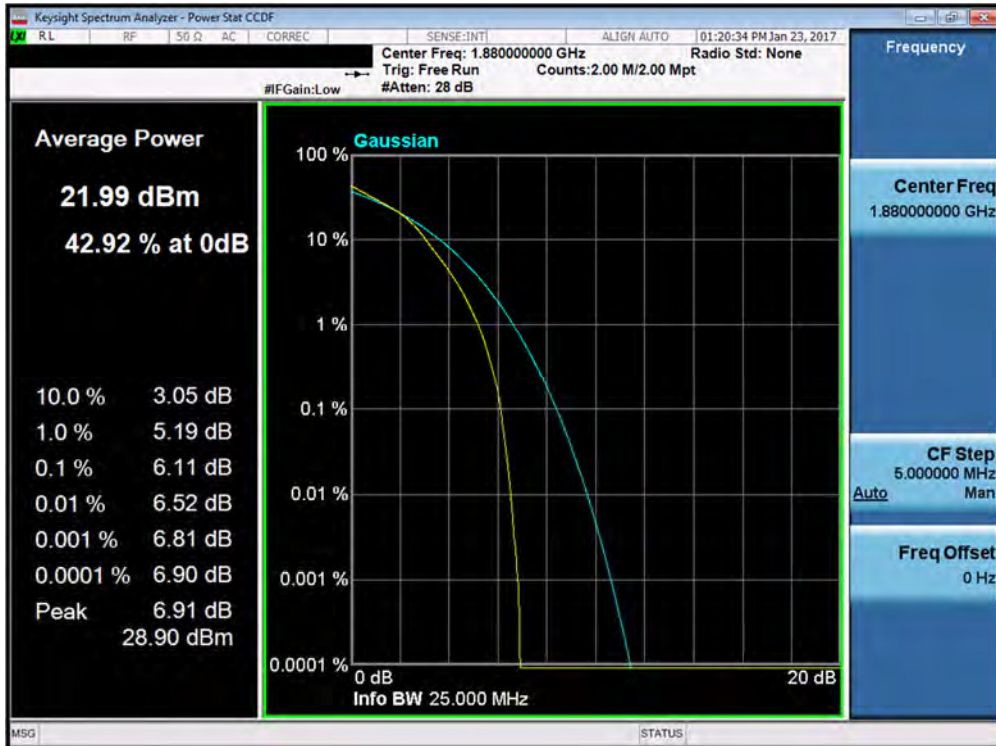


Plot 7-160. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 0Y1612221995.A3L	Test Dates: Dec 22, 2016 - Jan 23, 2017	EUT Type: Portable Handset		Page 97 of 123

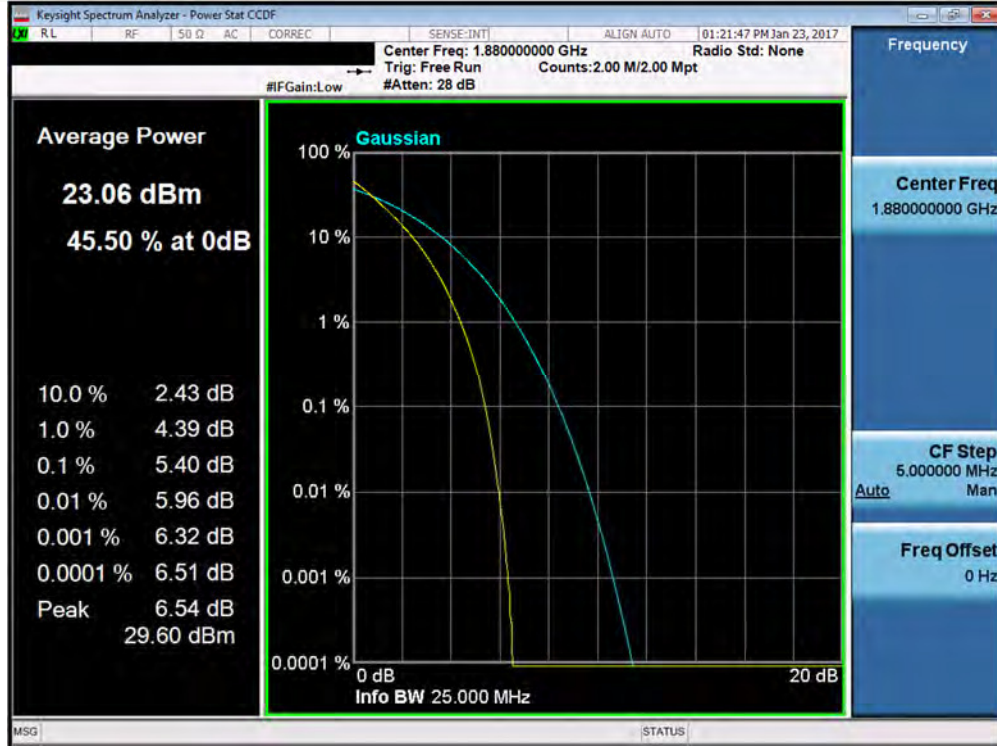


Plot 7-161. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

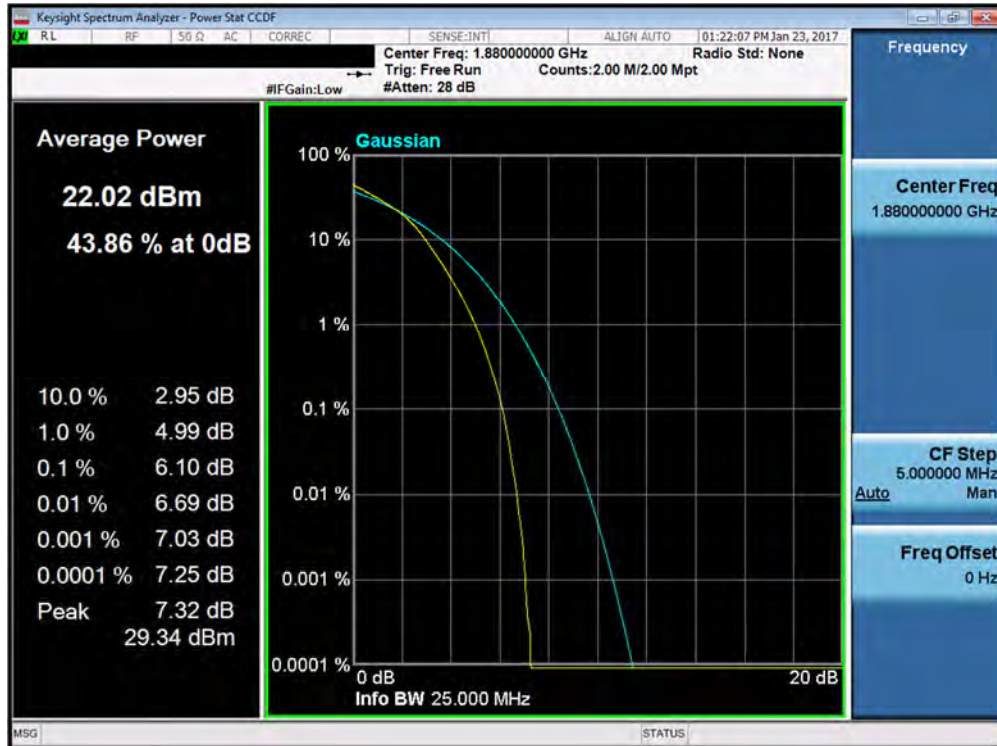


Plot 7-162. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-163. PAR Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-164. PAR Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.6 Radiated Power (ERP/EIRP)
§22.913(a.2) §24.232(c.2) §27.50(c.10) §27.50(d.4)

Test Overview

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



Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.2.1

ANSI/TIA-603-D-2010 – Section 2.2.17

Test Settings

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

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Test Setup

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

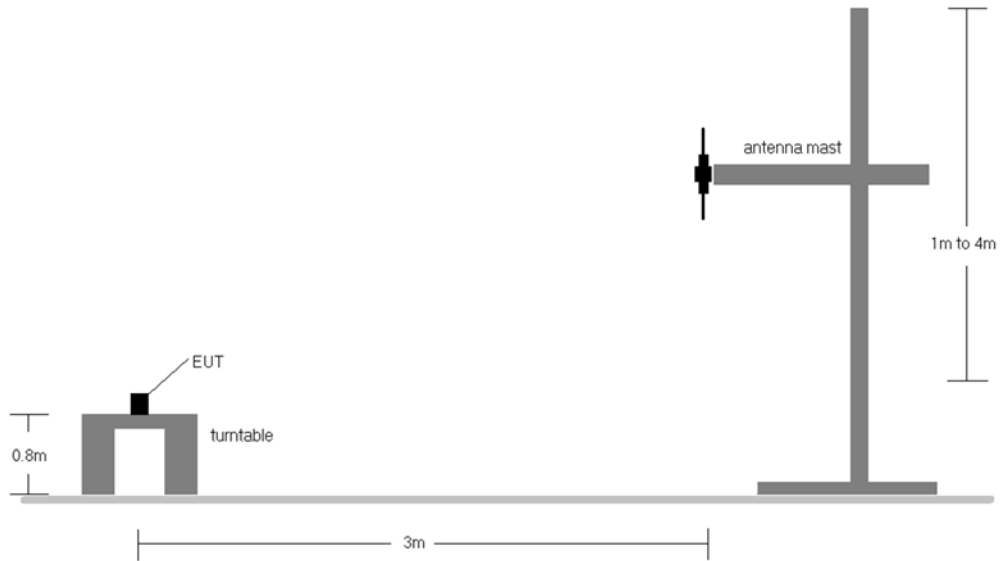


Figure 7-5. Radiated Test Setup <1GHz

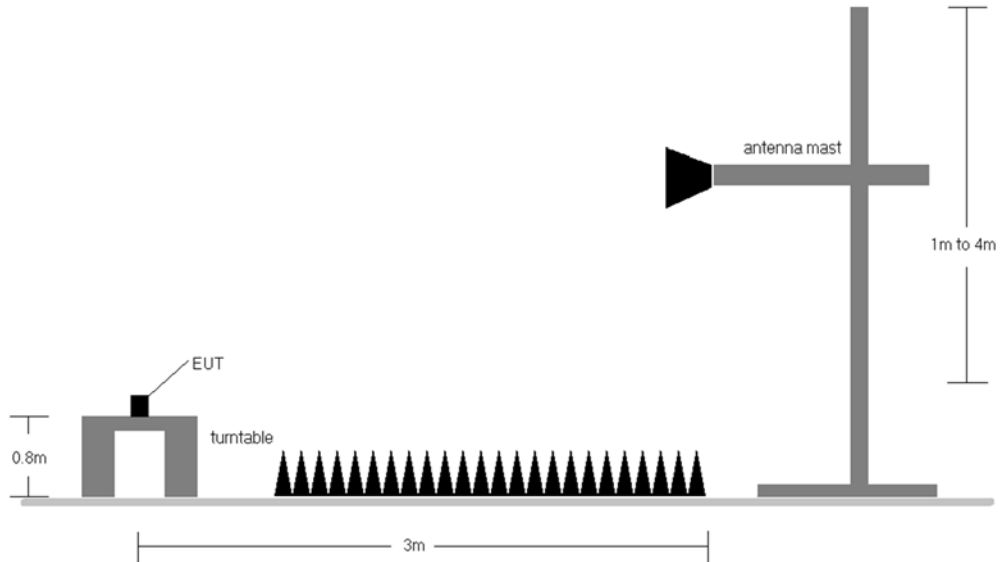




Figure 7-6. Radiated Test Setup >1GHz



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.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	283	165	1 / 0	15.34	2.48	17.82	34.77	-16.95
707.50	1.4	QPSK	H	261	162	1 / 0	15.81	2.56	18.37	34.77	-16.40
715.30	1.4	QPSK	H	265	10	1 / 0	15.31	2.60	17.91	34.77	-16.87
707.50	1.4	16-QAM	H	261	162	1 / 0	14.86	2.56	17.42	34.77	-17.35
700.50	3	QPSK	H	282	4	1 / 0	15.91	2.48	18.39	34.77	-16.38
707.50	3	QPSK	H	267	353	1 / 0	15.63	2.56	18.19	34.77	-16.58
714.50	3	QPSK	H	266	3	1 / 0	16.39	2.60	18.99	34.77	-15.78
714.50	3	16-QAM	H	266	3	1 / 0	15.71	2.60	18.31	34.77	-16.46
701.50	5	QPSK	H	260	10	1 / 0	14.90	2.49	17.39	34.77	-17.38
707.50	5	QPSK	H	260	175	1 / 0	15.40	2.56	17.96	34.77	-16.81
713.50	5	QPSK	H	265	167	1 / 0	16.19	2.60	18.79	34.77	-15.98
713.50	5	16-QAM	H	265	167	1 / 0	15.15	2.60	17.75	34.77	-17.02
704.00	10	QPSK	H	260	3	1 / 0	16.16	2.51	18.67	34.77	-16.10
707.50	10	QPSK	H	258	3	1 / 0	16.05	2.56	18.61	34.77	-16.16
711.00	10	QPSK	H	262	6	1 / 0	15.17	2.60	17.77	34.77	-17.01
704.00	10	16-QAM	H	260	3	1 / 0	14.90	2.51	17.41	34.77	-17.36
714.50	3	QPSK	V	116	20	1 / 0	15.17	3.05	18.22	34.77	-16.55
714.50	3	16-QAM	V	116	20	1 / 0	14.12	3.05	17.17	34.77	-17.60

Table 7-2. ERP Data (Band 12)

FCC ID: A3LSMJ327A		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]
824.70	1.4	QPSK	H	206	202	1 / 5	15.12	5.51	20.63	38.45	-17.82
836.50	1.4	QPSK	H	186	192	1 / 5	13.76	5.14	18.90	38.45	-19.55
848.30	1.4	QPSK	H	189	202	1 / 5	15.60	4.68	20.28	38.45	-18.17
824.70	1.4	16-QAM	H	206	202	1 / 5	14.32	5.51	19.83	38.45	-18.62
825.50	3	QPSK	H	199	351	1 / 14	16.39	5.52	21.91	38.45	-16.54
836.50	3	QPSK	H	184	198	1 / 14	15.15	5.14	20.29	38.45	-18.16
847.50	3	QPSK	H	187	199	1 / 14	16.22	4.67	20.89	38.45	-17.56
825.50	3	16-QAM	H	199	351	1 / 14	15.60	5.52	21.12	38.45	-17.33
826.50	5	QPSK	H	221	184	1 / 24	15.48	5.51	20.99	38.45	-17.46
836.50	5	QPSK	H	357	345	1 / 24	15.82	5.14	20.96	38.45	-17.49
846.50	5	QPSK	H	191	189	1 / 24	15.62	4.66	20.28	38.45	-18.17
826.50	5	16-QAM	H	221	184	1 / 24	14.50	5.51	20.01	38.45	-18.44
829.00	10	QPSK	H	197	199	1 / 49	15.74	5.49	21.23	38.45	-17.22
836.50	10	QPSK	H	191	203	1 / 49	15.57	5.14	20.71	38.45	-17.74
844.00	10	QPSK	H	187	196	1 / 49	16.30	4.70	21.00	38.45	-17.45
829.00	10	16-QAM	H	197	199	1 / 49	15.09	5.49	20.58	38.45	-17.87
825.50	3	QPSK	V	110	339	1 / 14	15.06	5.35	20.41	38.45	-18.04
825.50	3	16-QAM	V	110	339	1 / 14	14.08	5.35	19.43	38.45	-19.02

Table 7-3. ERP Data (Band 5)

FCC ID: A3LSMJ327A		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 [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	101	307	1 / 0	14.45	9.62	24.07	30.00	-5.93
1732.50	1.4	QPSK	H	101	307	1 / 0	14.14	9.50	23.64	30.00	-6.36
1754.30	1.4	QPSK	H	103	311	1 / 0	14.16	9.38	23.54	30.00	-6.46
1710.70	1.4	16-QAM	H	101	307	1 / 0	13.96	9.62	23.58	30.00	-6.42
1711.50	3	QPSK	H	103	294	1 / 0	14.78	9.62	24.40	30.00	-5.60
1732.50	3	QPSK	H	100	299	1 / 0	14.31	9.50	23.81	30.00	-6.19
1753.50	3	QPSK	H	103	305	1 / 0	14.51	9.39	23.90	30.00	-6.10
1711.50	3	16-QAM	H	103	294	1 / 0	14.07	9.62	23.69	30.00	-6.31
1712.50	5	QPSK	H	103	303	1 / 0	14.61	9.61	24.22	30.00	-5.78
1732.50	5	QPSK	H	101	299	1 / 0	14.27	9.50	23.77	30.00	-6.23
1752.50	5	QPSK	H	101	308	1 / 0	14.34	9.39	23.73	30.00	-6.27
1712.50	5	16-QAM	H	103	303	1 / 0	13.82	9.61	23.43	30.00	-6.57
1715.00	10	QPSK	H	103	296	1 / 0	14.90	9.60	24.50	30.00	-5.50
1732.50	10	QPSK	H	100	305	1 / 0	14.20	9.50	23.70	30.00	-6.30
1750.00	10	QPSK	H	100	304	1 / 0	13.84	9.41	23.25	30.00	-6.75
1715.00	10	16-QAM	H	103	296	1 / 0	14.27	9.60	23.87	30.00	-6.13
1717.50	15	QPSK	H	106	298	1 / 0	15.21	9.58	24.79	30.00	-5.21
1732.50	15	QPSK	H	104	300	1 / 0	14.73	9.50	24.23	30.00	-5.77
1747.50	15	QPSK	H	106	308	1 / 0	14.21	9.42	23.63	30.00	-6.37
1717.50	15	16-QAM	H	106	298	1 / 0	14.43	9.58	24.01	30.00	-5.99
1720.00	20	QPSK	H	108	298	1 / 0	14.97	9.57	24.54	30.00	-5.46
1732.50	20	QPSK	H	100	298	1 / 0	13.86	9.50	23.36	30.00	-6.64
1745.00	20	QPSK	H	101	310	1 / 0	13.45	9.43	22.88	30.00	-7.12
1720.00	20	16-QAM	H	108	298	1 / 0	14.46	9.57	24.03	30.00	-5.97
1717.50	15	QPSK	V	124	260	1 / 0	12.33	9.40	21.73	30.00	-8.27
1717.50	15	16-QAM	V	124	260	1 / 0	11.49	9.40	20.89	30.00	-9.11

Table 7-4. EIRP Data (Band 4)

FCC ID: A3LSMJ327A		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 [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	H	100	119	1 / 0	15.43	9.12	24.55	33.01	-8.46
1880.00	1.4	QPSK	H	103	124	1 / 0	15.29	9.10	24.39	33.01	-8.62
1909.30	1.4	QPSK	H	101	115	1 / 0	14.85	9.16	24.01	33.01	-9.00
1850.70	1.4	16-QAM	H	100	119	1 / 0	14.17	9.12	23.29	33.01	-9.72
1851.50	3	QPSK	H	101	124	1 / 0	15.64	9.12	24.76	33.01	-8.25
1880.00	3	QPSK	H	103	115	1 / 0	15.23	9.10	24.33	33.01	-8.68
1908.50	3	QPSK	H	100	119	1 / 0	15.11	9.15	24.26	33.01	-8.75
1851.50	3	16-QAM	H	101	124	1 / 0	13.85	9.12	22.97	33.01	-10.04
1852.50	5	QPSK	H	100	124	1 / 0	15.79	9.12	24.91	33.01	-8.10
1880.00	5	QPSK	H	101	117	1 / 0	15.45	9.10	24.55	33.01	-8.46
1907.50	5	QPSK	H	100	115	1 / 0	15.37	9.15	24.52	33.01	-8.49
1852.50	5	16-QAM	H	100	124	1 / 0	14.17	9.12	23.28	33.01	-9.73
1855.00	10	QPSK	H	105	129	1 / 0	15.78	9.12	24.90	33.01	-8.11
1880.00	10	QPSK	H	100	120	1 / 0	15.46	9.10	24.56	33.01	-8.45
1905.00	10	QPSK	H	100	125	1 / 0	14.88	9.13	24.01	33.01	-9.00
1855.00	10	16-QAM	H	105	129	1 / 0	14.04	9.12	23.16	33.01	-9.85
1857.50	15	QPSK	H	101	128	1 / 0	15.66	9.11	24.77	33.01	-8.24
1880.00	15	QPSK	H	100	129	1 / 0	15.61	9.10	24.71	33.01	-8.30
1902.50	15	QPSK	H	105	125	1 / 0	14.93	9.11	24.04	33.01	-8.97
1880.00	15	16-QAM	H	100	129	1 / 0	14.03	9.10	23.13	33.01	-9.88
1860.00	20	QPSK	H	100	123	1 / 0	13.57	9.11	22.68	33.01	-10.33
1880.00	20	QPSK	H	100	123	1 / 0	13.54	9.10	22.64	33.01	-10.37
1900.00	20	QPSK	H	107	125	1 / 0	15.23	9.09	24.32	33.01	-8.69
1900.00	20	16-QAM	H	107	125	1 / 0	13.63	9.09	22.72	33.01	-10.29
1852.50	5	QPSK	V	120	60	1 / 0	12.27	8.97	21.24	33.01	-11.77
1852.50	5	16-QAM	V	120	60	1 / 0	10.52	8.97	19.49	33.01	-13.52

Table 7-5. EIRP Data (Band 2)

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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7.7 Radiated Spurious Emissions Measurements

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

Test Overview

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



Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

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

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Test Setup

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

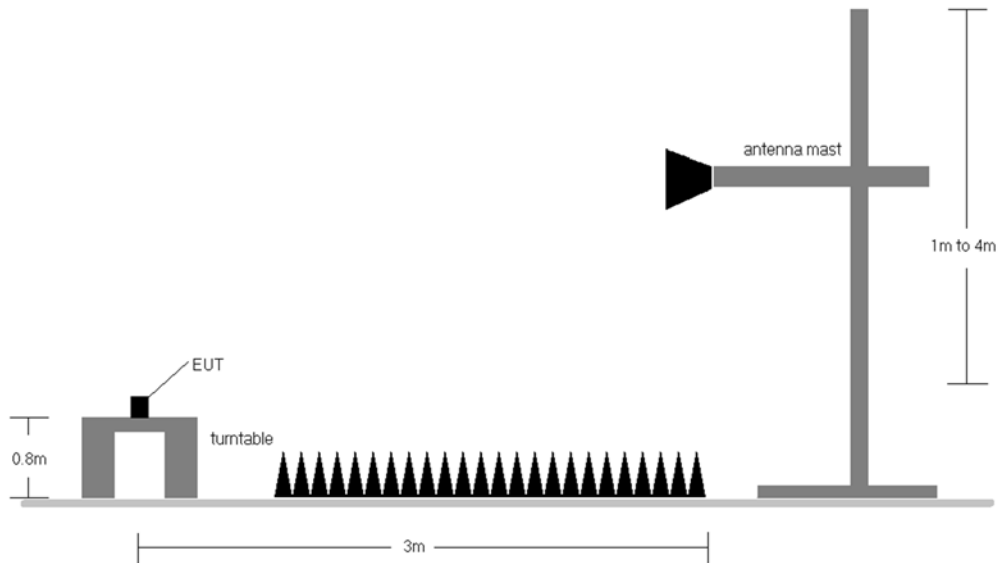




Figure 7-7. Test Instrument & Measurement Setup

Test Notes

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

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OPERATING FREQUENCY: 700.50 MHz
 CHANNEL: 23025
 MEASURED OUTPUT POWER: 18.39 dBm = 0.069 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 31.39 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1401.00	H	171	162	-50.25	5.91	-44.34	62.7
2101.50	H	100	115	-52.83	6.79	-46.04	64.4
2802.00	H	103	175	-54.06	8.12	-45.94	64.3
3502.50	H	105	259	-44.39	7.73	-36.66	55.1
4203.00	H	-	-	-53.19	8.20	-44.99	63.4

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

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 MEASURED OUTPUT POWER: 18.19 dBm = 0.066 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 31.19 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	H	160	164	-46.33	5.96	-40.37	58.6
2122.50	H	158	69	-44.39	6.84	-37.55	55.7
2830.00	H	106	357	-55.70	8.13	-47.56	65.8
3537.50	H	-	-	-55.07	7.79	-47.28	65.5

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

FCC ID: A3LSMJ327A			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 714.50 MHz
 CHANNEL: 23165
 MEASURED OUTPUT POWER: 18.99 dBm = 0.079 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 31.99 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1429.00	H	105	72	-52.77	6.02	-46.76	65.7
2143.50	H	272	61	-50.61	6.90	-43.72	62.7
2858.00	H	-	-	-57.89	8.15	-49.74	68.7

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

OPERATING FREQUENCY: 825.50 MHz
 CHANNEL: 20415
 MEASURED OUTPUT POWER: 21.91 dBm = 0.155 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 34.91 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1651.00	H	104	229	-40.81	6.29	-34.52	56.4
2476.50	H	108	127	-50.97	6.85	-44.13	66.0
3302.00	H	103	135	-51.19	7.13	-44.07	66.0
4127.50	H	-	-	-52.20	7.71	-44.48	66.4

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

FCC ID: A3LSMJ327A			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MEASURED OUTPUT POWER: 20.29 dBm = 0.107 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.29 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	H	123	56	-35.16	6.21	-28.95	49.2
2509.50	H	108	44	-50.88	6.86	-44.03	64.3
3346.00	H	100	263	-44.74	7.26	-37.48	57.8
4182.50	H	149	251	-49.09	8.07	-41.02	61.3
5019.00	H	-	-	-51.13	9.00	-42.14	62.4

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

OPERATING FREQUENCY: 847.50 MHz
 CHANNEL: 20635
 MEASURED OUTPUT POWER: 20.89 dBm = 0.123 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.89 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1695.00	H	114	35	-34.81	6.13	-28.69	49.6
2542.50	H	123	49	-53.19	6.96	-46.24	67.1
3390.00	H	108	257	-47.34	7.39	-39.94	60.8
4237.50	H	123	6	-52.35	8.36	-43.99	64.9
5085.00	H	-	-	-51.16	8.86	-42.30	63.2

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

FCC ID: A3LSMJ327A			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1717.50 MHz
 CHANNEL: 20025
 MEASURED OUTPUT POWER: 24.79 dBm = 0.301 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.79 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]
3435.00	H	130	50	-43.95	9.68	-34.26	59.1
5152.50	H	127	304	-52.59	10.89	-41.71	66.5
6870.00	H	132	260	-45.52	10.79	-34.73	59.5
8587.50	H	139	290	-54.97	11.70	-43.27	68.1
10305.00	H	-	-	-56.21	12.76	-43.45	68.2

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

OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 24.23 dBm = 0.265 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.23 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	H	149	163	-47.65	9.77	-37.88	62.1
5197.50	H	155	113	-55.69	10.81	-44.88	69.1
6930.00	H	145	233	-50.77	10.89	-39.89	64.1
8662.50	H	147	192	-55.47	11.86	-43.61	67.8
10395.00	H	-	-	-55.56	12.73	-42.83	67.1

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

FCC ID: A3LSMJ327A			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1747.50 MHz
 CHANNEL: 20325
 MEASURED OUTPUT POWER: 23.63 dBm = 0.231 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 36.63 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]
3495.00	H	149	139	-44.50	9.86	-34.64	58.3
5242.50	H	136	286	-58.09	10.89	-47.20	70.8
6990.00	H	151	161	-47.79	11.03	-36.76	60.4
8737.50	H	132	337	-56.51	11.99	-44.52	68.1
10485.00	H	-	-	-55.85	12.69	-43.16	66.8

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

OPERATING FREQUENCY: 1852.50 MHz
 CHANNEL: 18625
 MEASURED OUTPUT POWER: 24.91 dBm = 0.310 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.91 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]
3705.00	H	155	64	-47.97	10.01	-37.95	62.9
5557.50	H	275	182	-60.74	11.20	-49.55	74.5
7410.00	H	157	154	-41.47	10.88	-30.59	55.5
9262.50	H	-	-	-58.16	12.36	-45.80	70.7

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

FCC ID: A3LSMJ327A		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MEASURED OUTPUT POWER: 24.55 dBm = 0.285 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.55 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]
3760.00	H	286	369	-50.54	9.79	-40.76	65.3
5640.00	H	100	240	-65.10	11.35	-53.75	78.3
7520.00	H	131	306	-42.70	11.22	-31.49	56.0
9400.00	H	331	133	-55.62	12.30	-43.32	67.9
11280.00	H	-	-	-57.00	13.26	-43.74	68.3

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

OPERATING FREQUENCY: 1907.50 MHz
 CHANNEL: 19175
 MEASURED OUTPUT POWER: 24.52 dBm = 0.283 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.52 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3815.00	H	100	82	-44.92	9.57	-35.35	59.9
5722.50	H	110	90	-59.28	11.43	-47.84	72.4
7630.00	H	110	354	-40.74	11.49	-29.24	53.8
9537.50	H	133	288	-55.32	12.38	-42.94	67.5
11445.00	H	-	-	-57.07	13.32	-43.74	68.3

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

FCC ID: A3LSMJ327A			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.8 Frequency Stability / Temperature Variation

§2.1055 §22.355 §24.235 §27.54

Test Overview and Limit

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

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

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

Test Procedure Used

ANSI/TIA-603-D-2010

Test Settings



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

Test Setup

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

Test Notes

None

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Band 12 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23790
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	707,499,833	-167	-0.0000236
100 %		- 30	707,499,842	-158	-0.0000223
100 %		- 20	707,499,796	-204	-0.0000288
100 %		- 10	707,499,838	-162	-0.0000229
100 %		0	707,499,811	-189	-0.0000267
100 %		+ 10	707,499,799	-201	-0.0000284
100 %		+ 20	707,499,833	-167	-0.0000236
100 %		+ 30	707,499,817	-183	-0.0000259
100 %		+ 40	707,499,833	-167	-0.0000236
100 %		+ 50	707,499,828	-172	-0.0000243
BATT. ENDPOINT	3.40	+ 20	707,499,794	-206	-0.0000291

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

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Band 12 Frequency Stability Measurements
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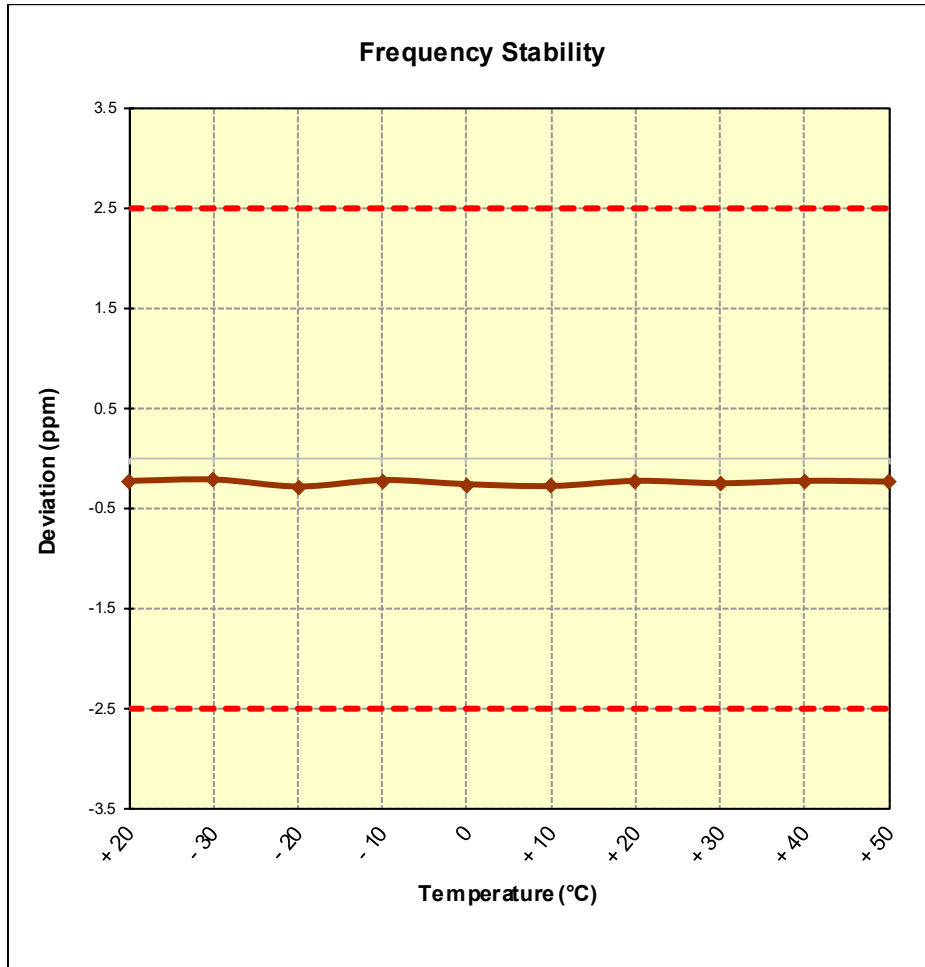




Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: A3LSMJ327A		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)	836,499,821	-179	-0.0000214
100 %		- 30	836,499,797	-203	-0.0000243
100 %		- 20	836,499,881	-119	-0.0000142
100 %		- 10	836,499,842	-158	-0.0000189
100 %		0	836,499,836	-164	-0.0000196
100 %		+ 10	836,499,812	-188	-0.0000225
100 %		+ 20	836,499,821	-179	-0.0000214
100 %		+ 30	836,499,809	-191	-0.0000228
100 %		+ 40	836,499,799	-201	-0.0000240
100 %		+ 50	836,499,832	-168	-0.0000201
BATT. ENDPOINT	3.40	+ 20	836,499,783	-217	-0.0000259

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

FCC ID: A3LSMJ327A	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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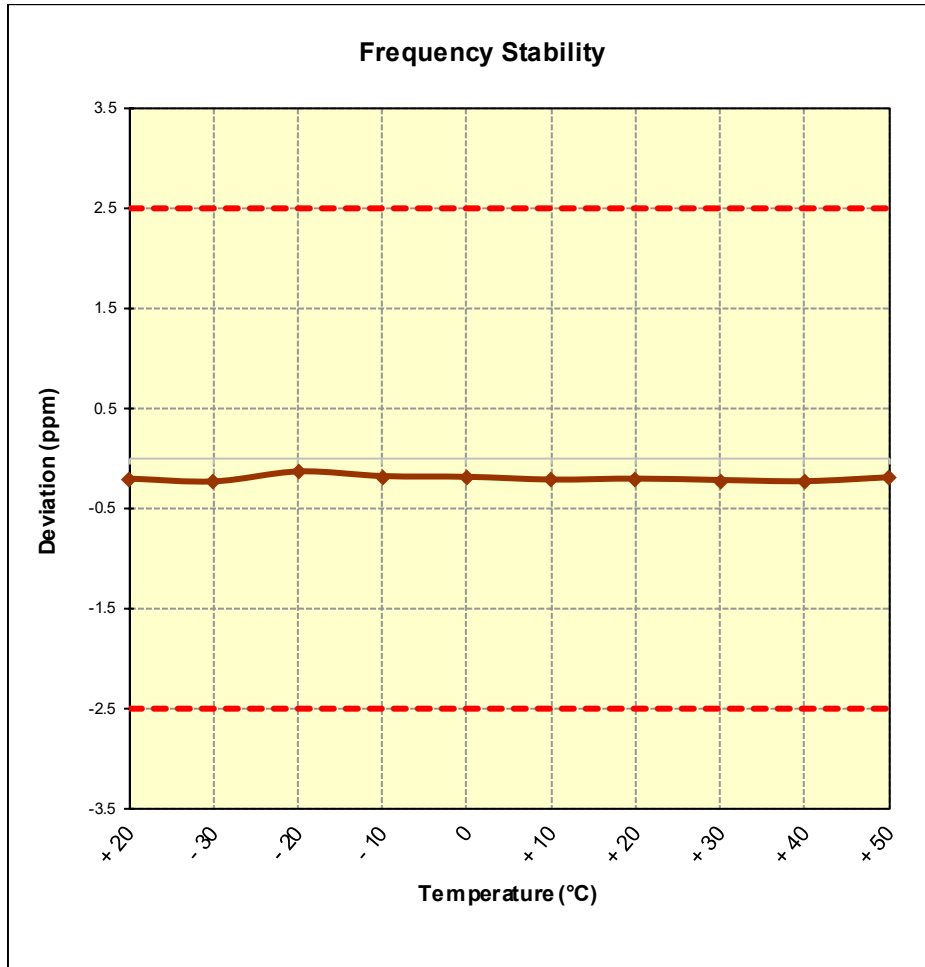




Figure 7-9. Frequency Stability Graph (Band 5)

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Band 4 Frequency Stability Measurements

§2.1055 §§27.54



OPERATING FREQUENCY: 1,732,500,000 Hz
 CHANNEL: 20175
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,499,808	-192	-0.0000111
100 %		- 30	1,732,499,816	-184	-0.0000106
100 %		- 20	1,732,499,865	-135	-0.0000078
100 %		- 10	1,732,500,109	109	0.0000063
100 %		0	1,732,499,872	-128	-0.0000074
100 %		+ 10	1,732,499,823	-177	-0.0000102
100 %		+ 20	1,732,499,808	-192	-0.0000111
100 %		+ 30	1,732,499,862	-138	-0.0000080
100 %		+ 40	1,732,499,833	-167	-0.0000096
100 %		+ 50	1,732,499,799	-201	-0.0000116
BATT. ENDPOINT	3.40	+ 20	1,732,499,785	-215	-0.0000124

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

Note:

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

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Band 4 Frequency Stability Measurements
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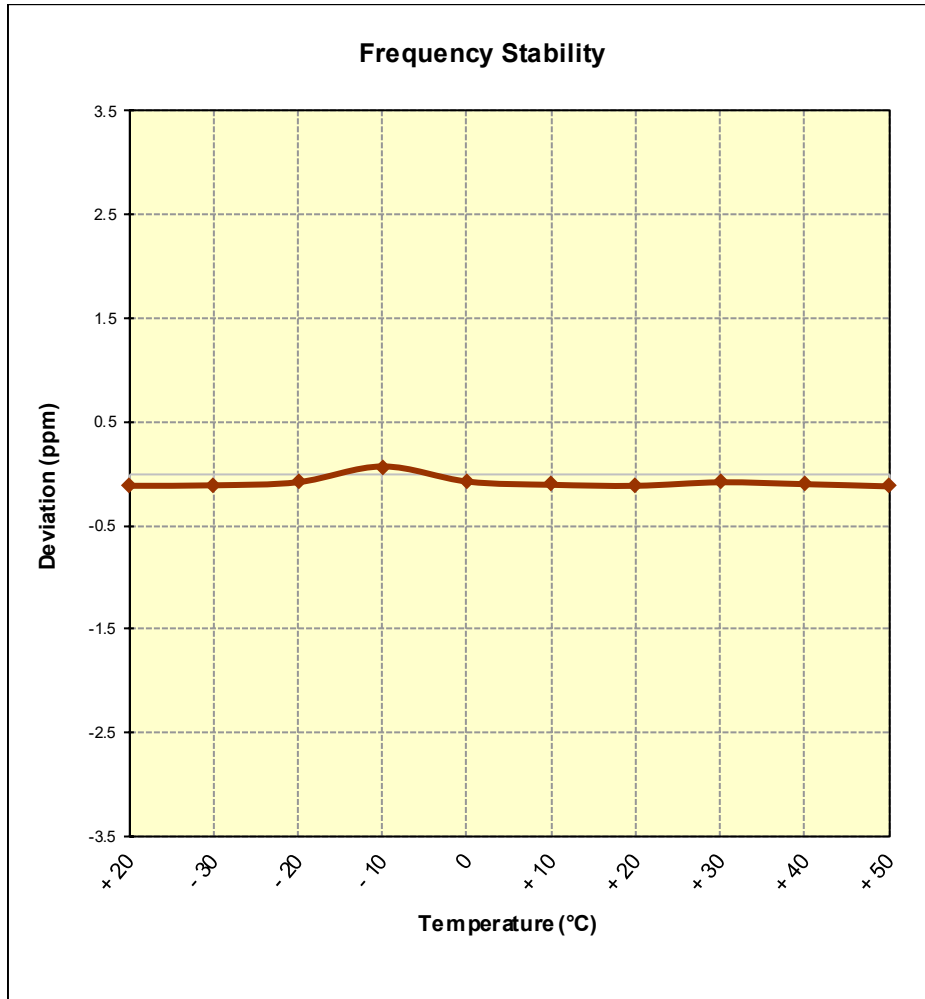




Figure 7-10. Frequency Stability Graph (Band 4)

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Band 2 Frequency Stability Measurements

§2.1055 §24.235



OPERATING FREQUENCY: 1,880,000,000 Hz
 CHANNEL: 18900
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,812	-188	-0.0000100
100 %		- 30	1,879,999,835	-165	-0.0000088
100 %		- 20	1,879,999,857	-143	-0.0000076
100 %		- 10	1,879,999,807	-193	-0.0000103
100 %		0	1,879,999,793	-207	-0.0000110
100 %		+ 10	1,879,999,849	-151	-0.0000080
100 %		+ 20	1,879,999,812	-188	-0.0000100
100 %		+ 30	1,879,999,799	-201	-0.0000107
100 %		+ 40	1,879,999,804	-196	-0.0000104
100 %		+ 50	1,879,999,819	-181	-0.0000096
BATT. ENDPOINT	3.40	+ 20	1,879,999,792	-208	-0.0000111

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

Note:

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

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Band 2 Frequency Stability Measurements
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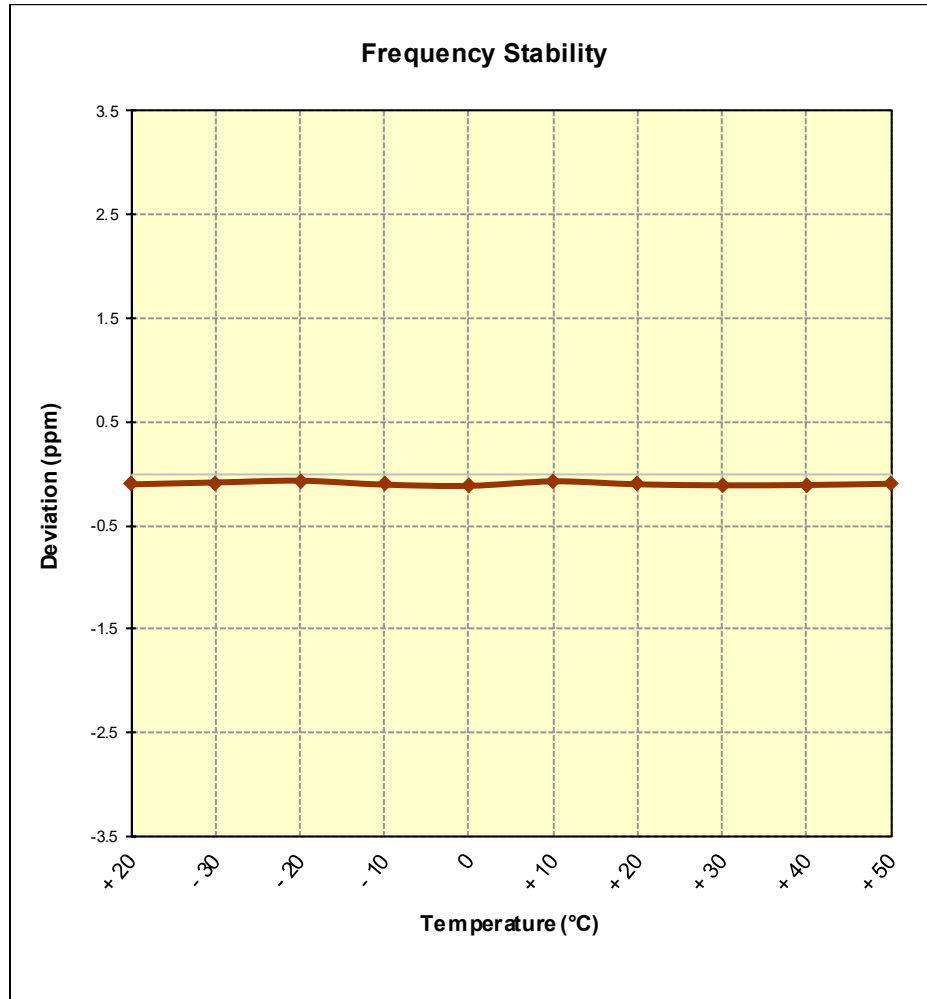






Figure 7-11. Frequency Stability Graph (Band 2)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMJ327A** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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