

7.3 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) §27.53(c.2) §27.53(h)

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. 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 frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

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

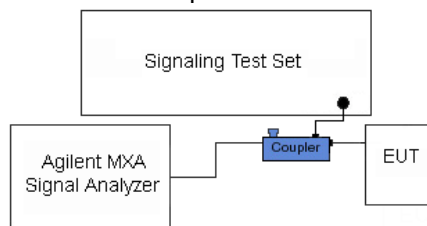
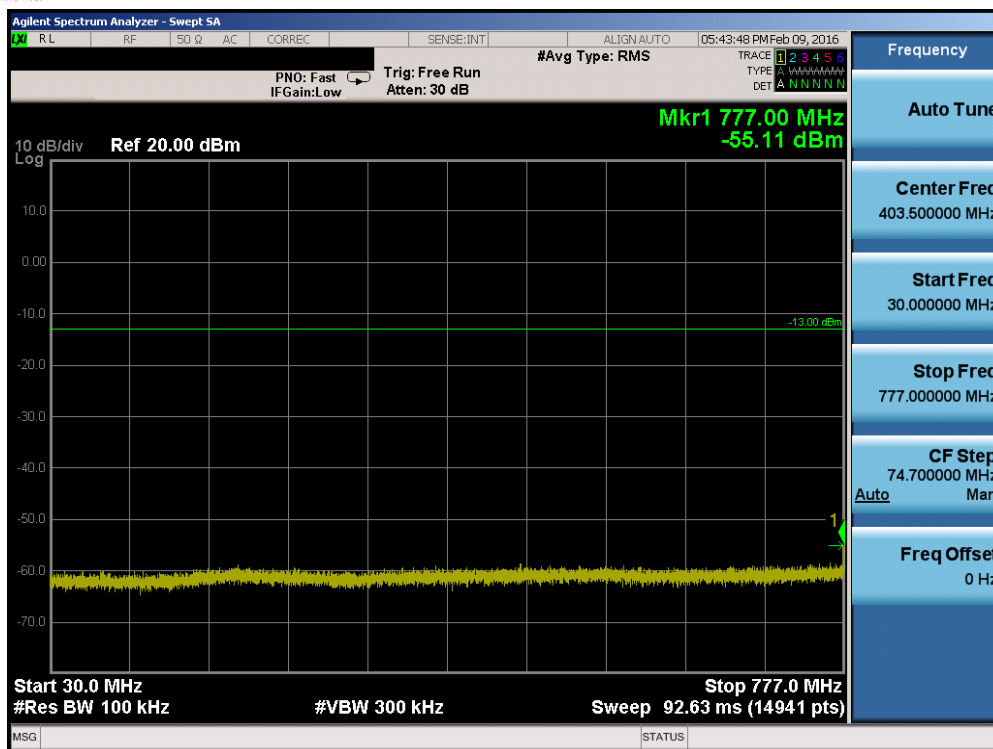


Figure 7-2. Test Instrument & Measurement Setup

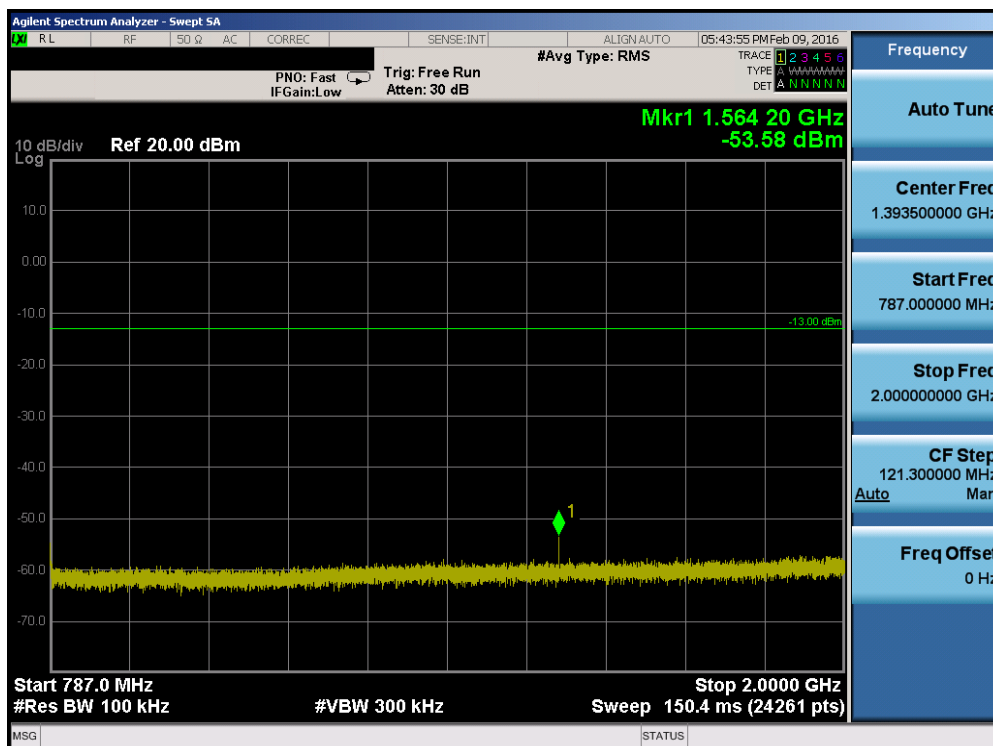
Test Notes

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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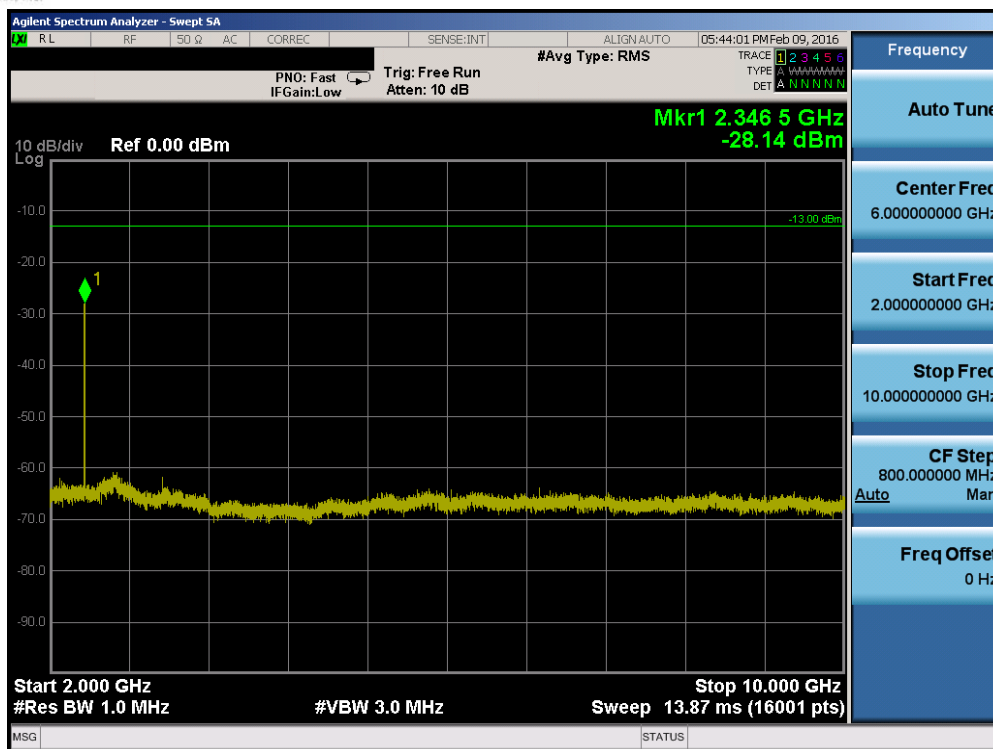


Plot 7-37. Conducted Spurious Plot (Band 13 – 10.0MHz QPSK – RB Size 1, RB Offset 0)

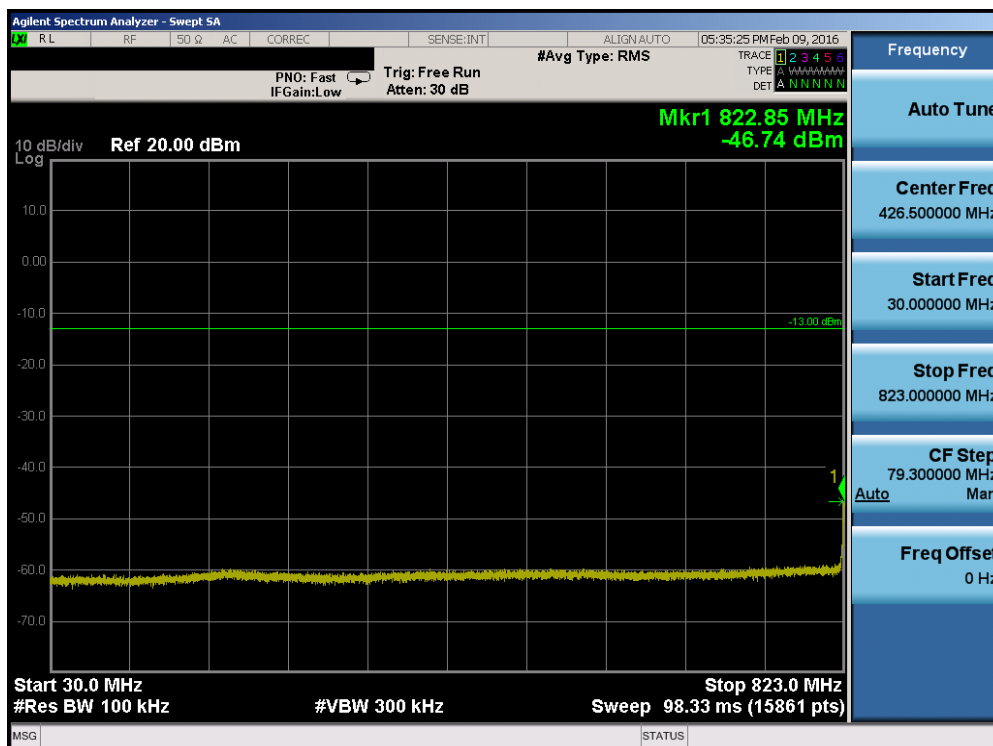


Plot 7-38. Conducted Spurious Plot (Band 13 – 10.0MHz QPSK – RB Size 1, RB Offset 0)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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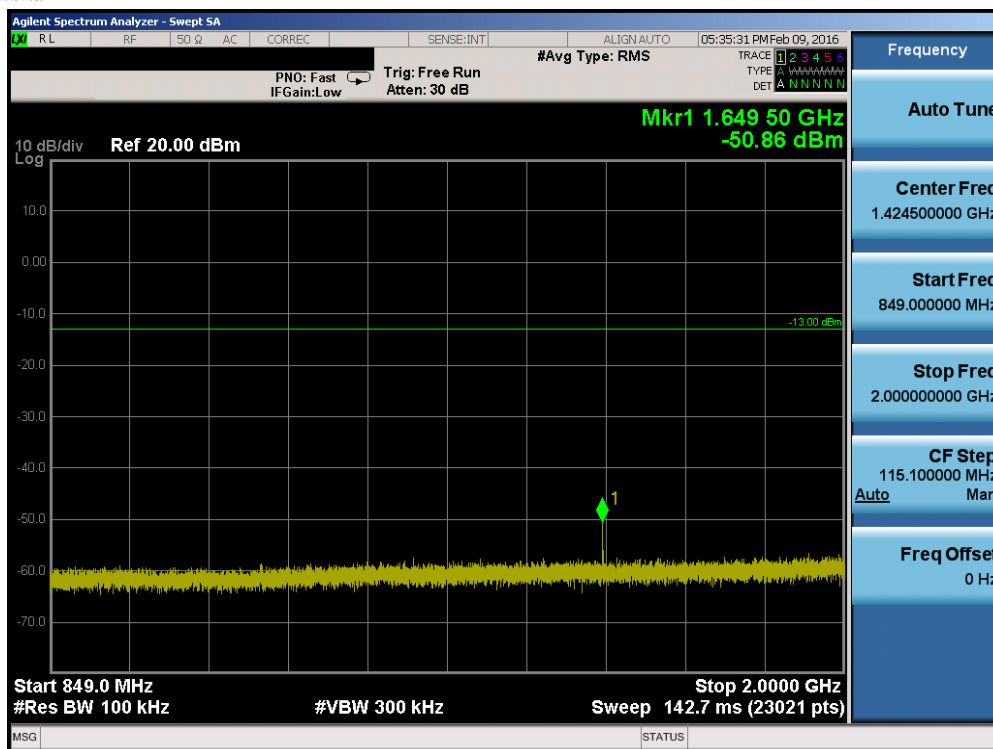


Plot 7-39. Conducted Spurious Plot (Band 13 – 10.0MHz QPSK – RB Size 1, RB Offset 0)

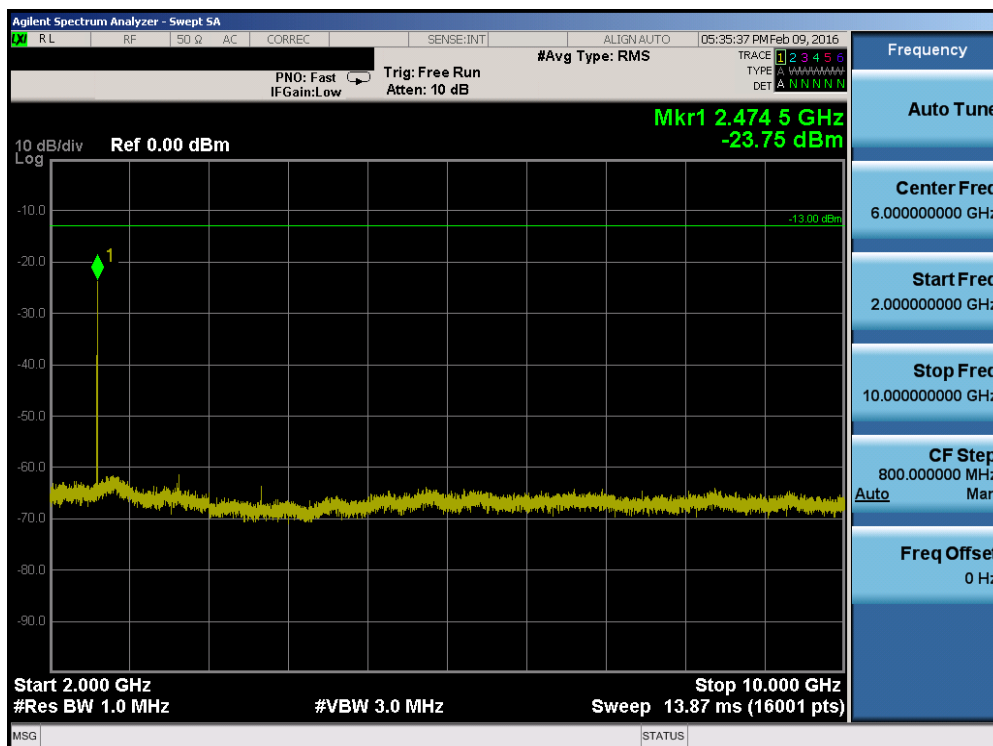


Plot 7-40. Conducted Spurious Plot (Band 5 – 1.4MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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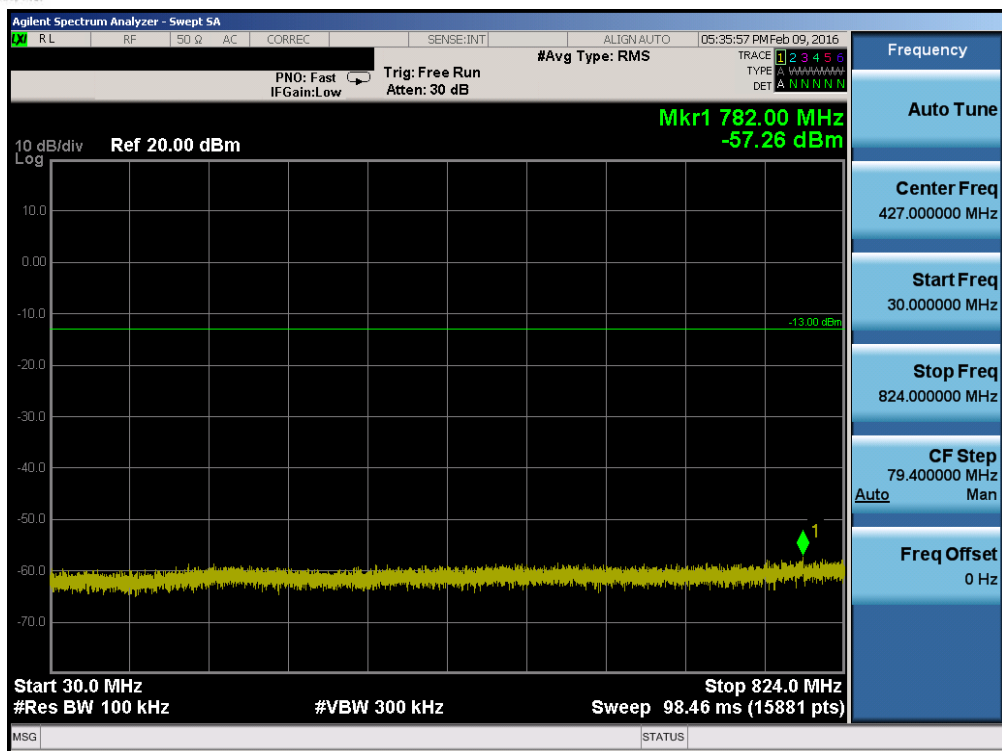


Plot 7-41. Conducted Spurious Plot (Band 5 – 1.4MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

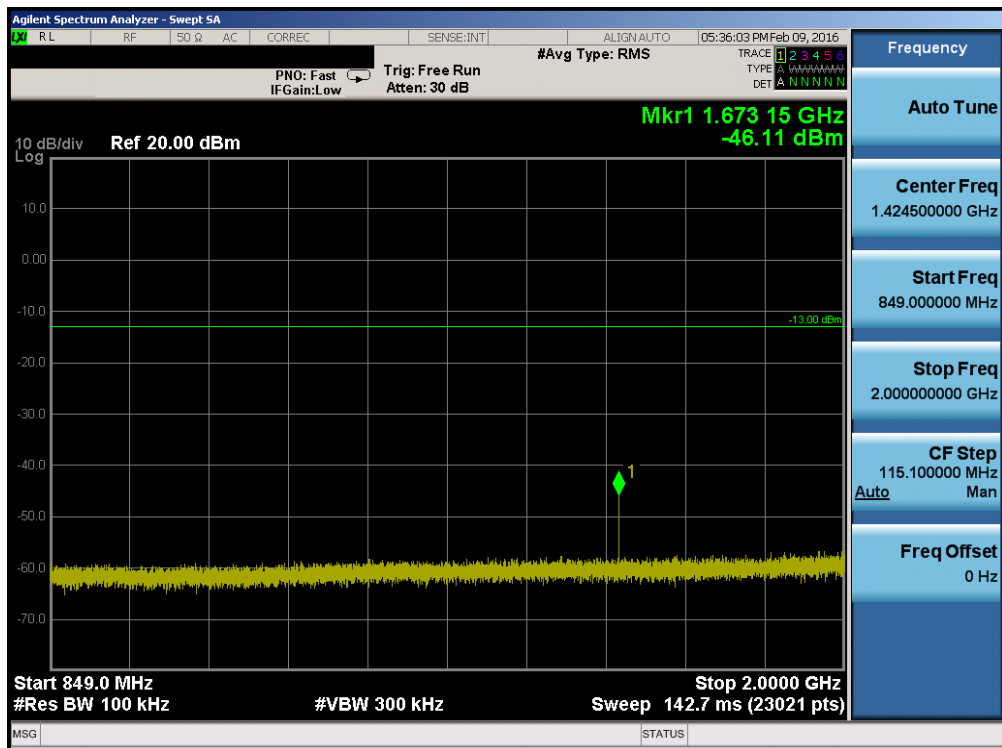


Plot 7-42. Conducted Spurious Plot (Band 5 – 1.4MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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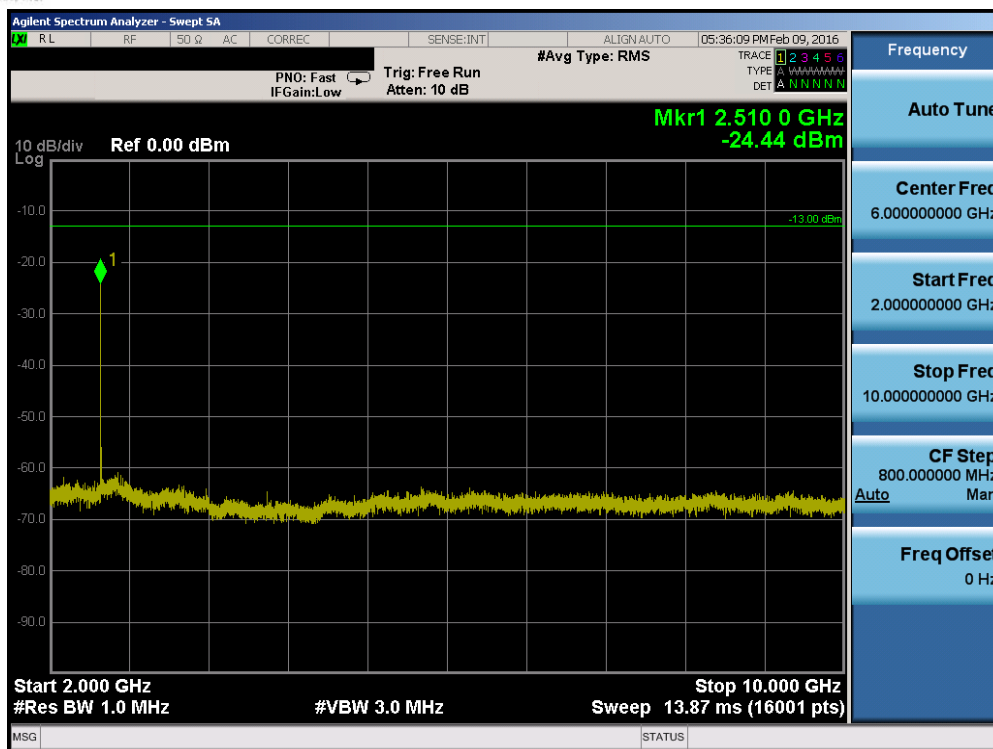


Plot 7-43. Conducted Spurious Plot (Band 5 – 1.4MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

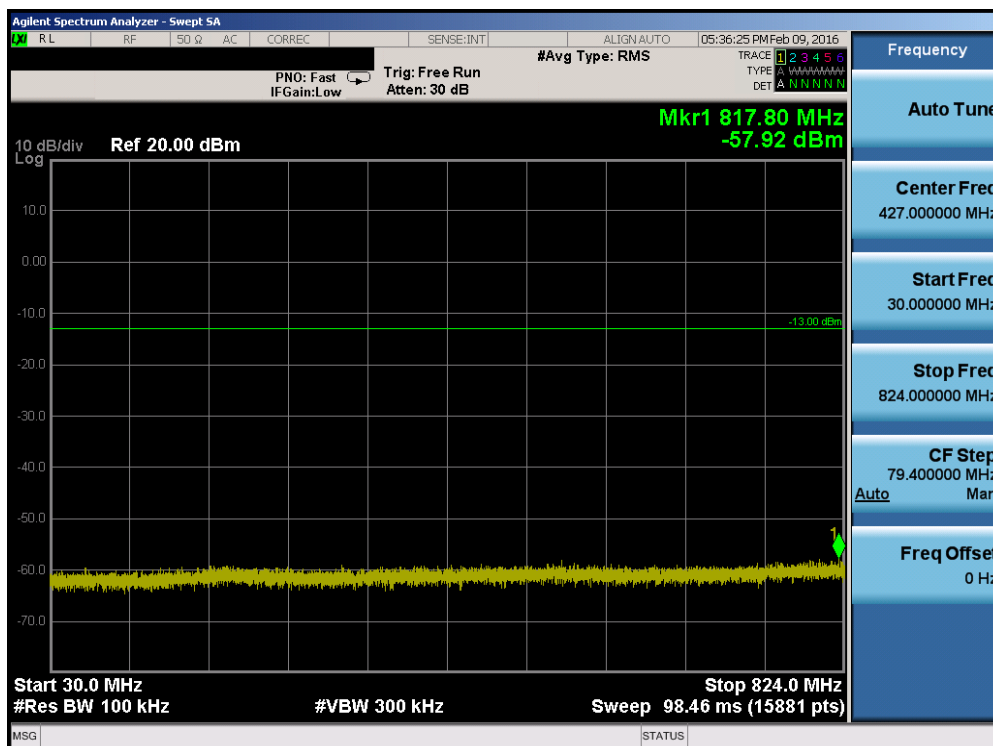


Plot 7-44. Conducted Spurious Plot (Band 5 – 1.4MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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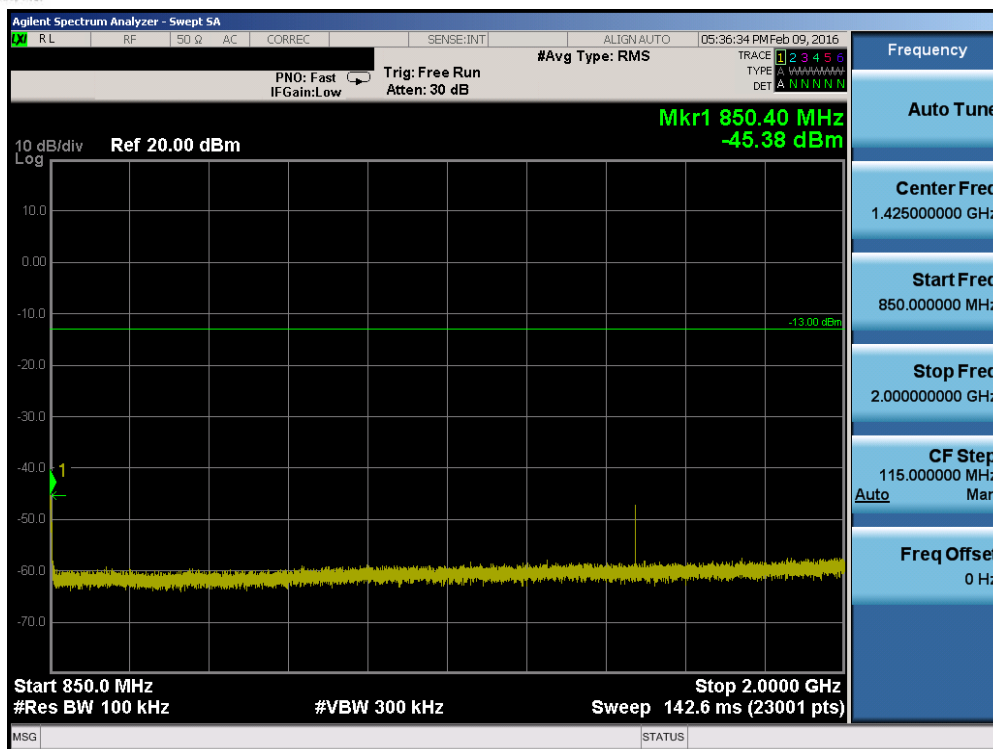


Plot 7-45. Conducted Spurious Plot (Band 5 – 1.4MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

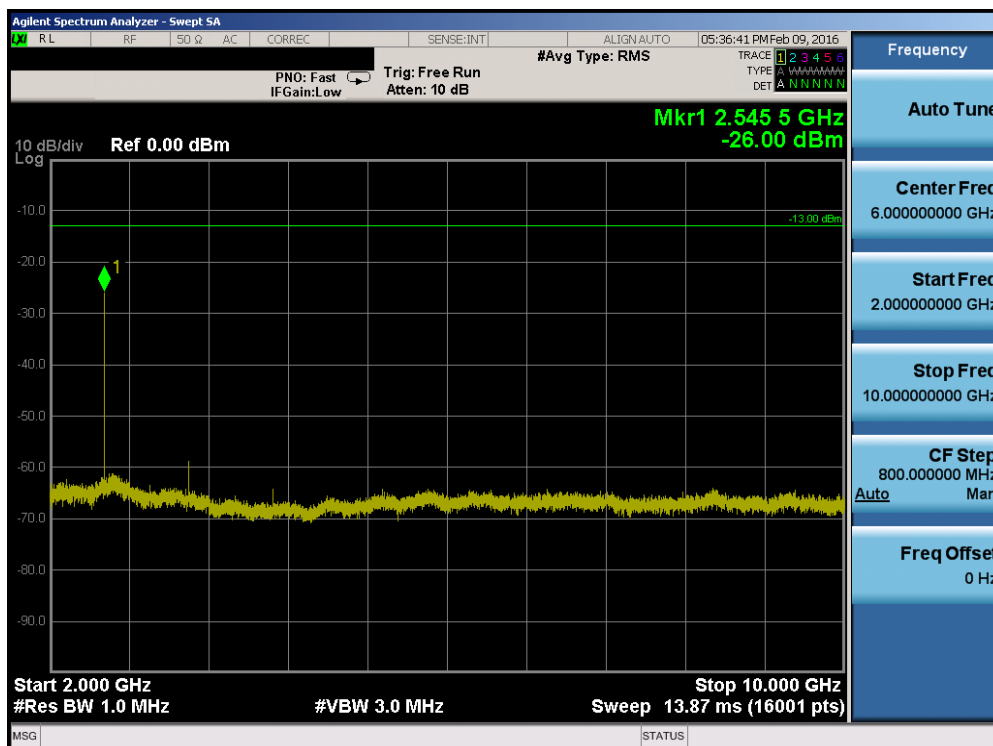


Plot 7-46. Conducted Spurious Plot (Band 5 – 1.4MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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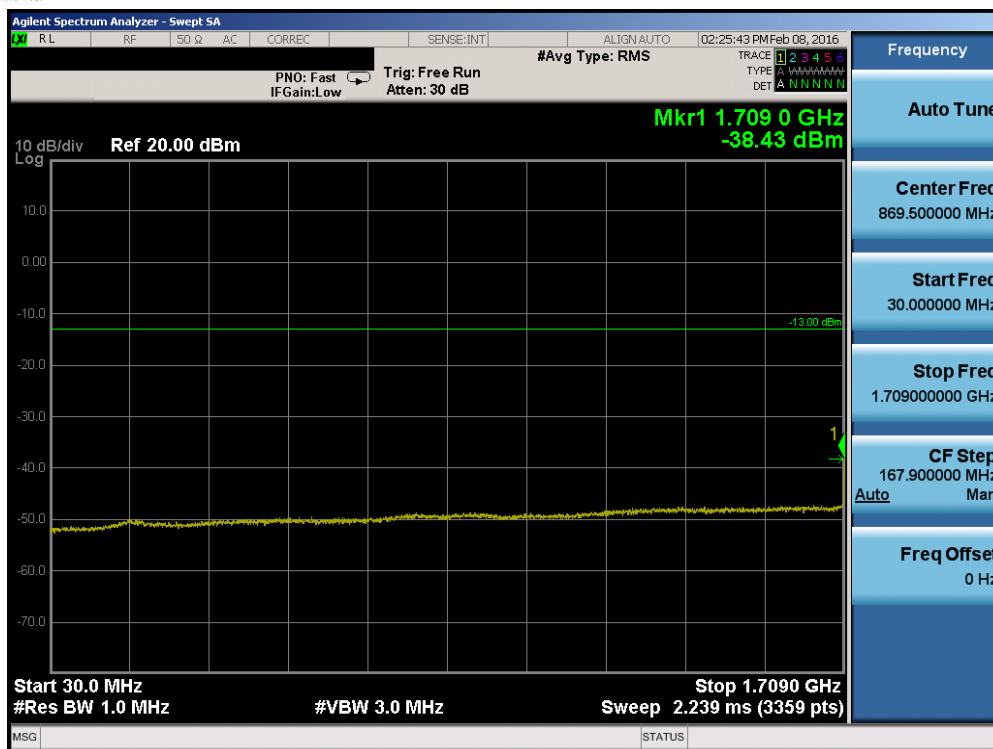


Plot 7-47. Conducted Spurious Plot (Band 5 – 1.4MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

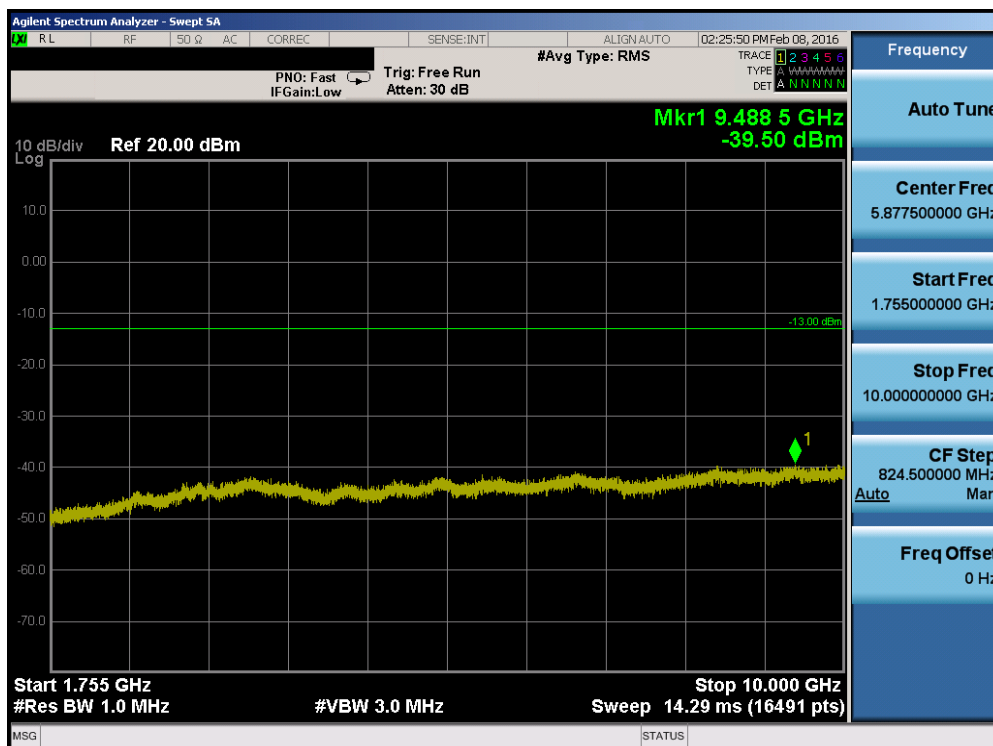


Plot 7-48. Conducted Spurious Plot (Band 5 – 1.4MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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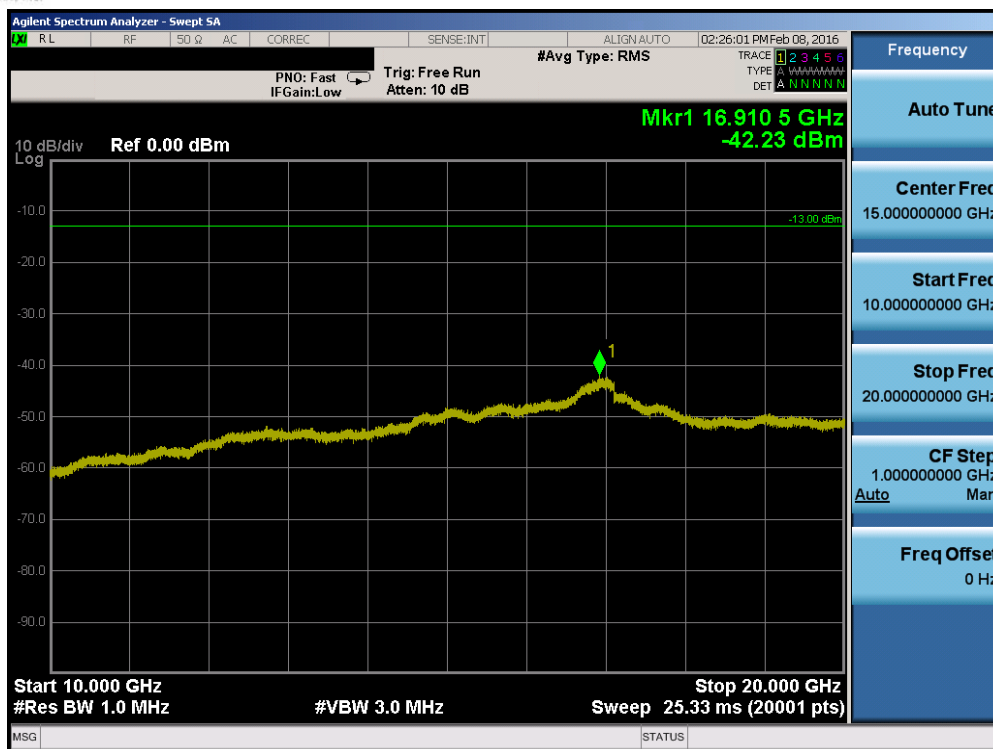


Plot 7-49. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

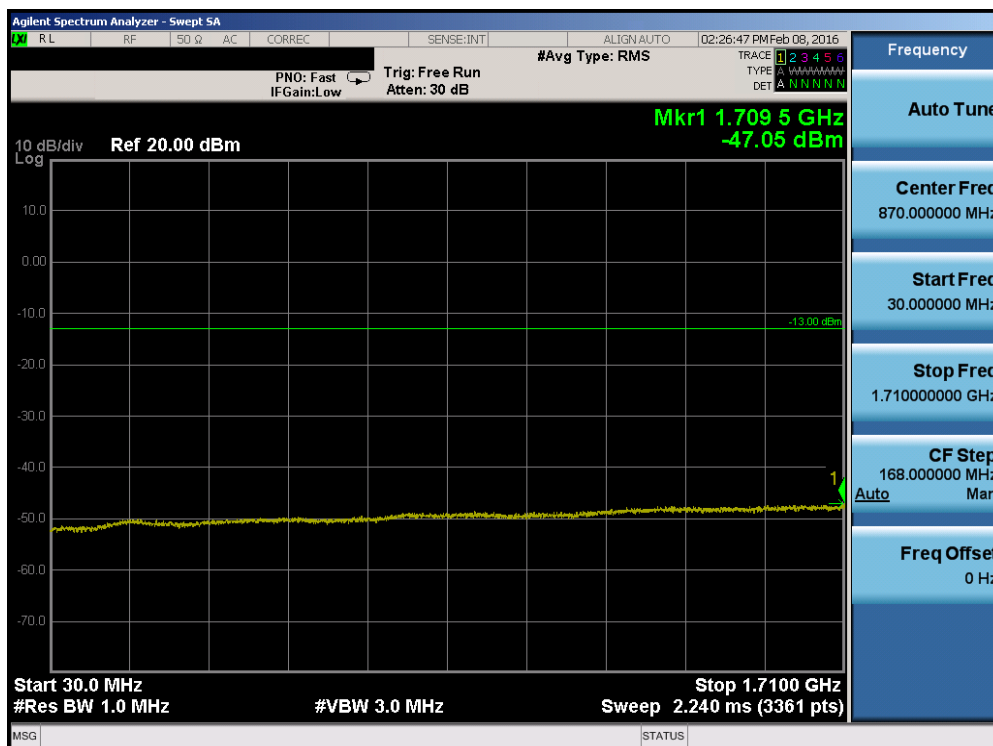


Plot 7-50. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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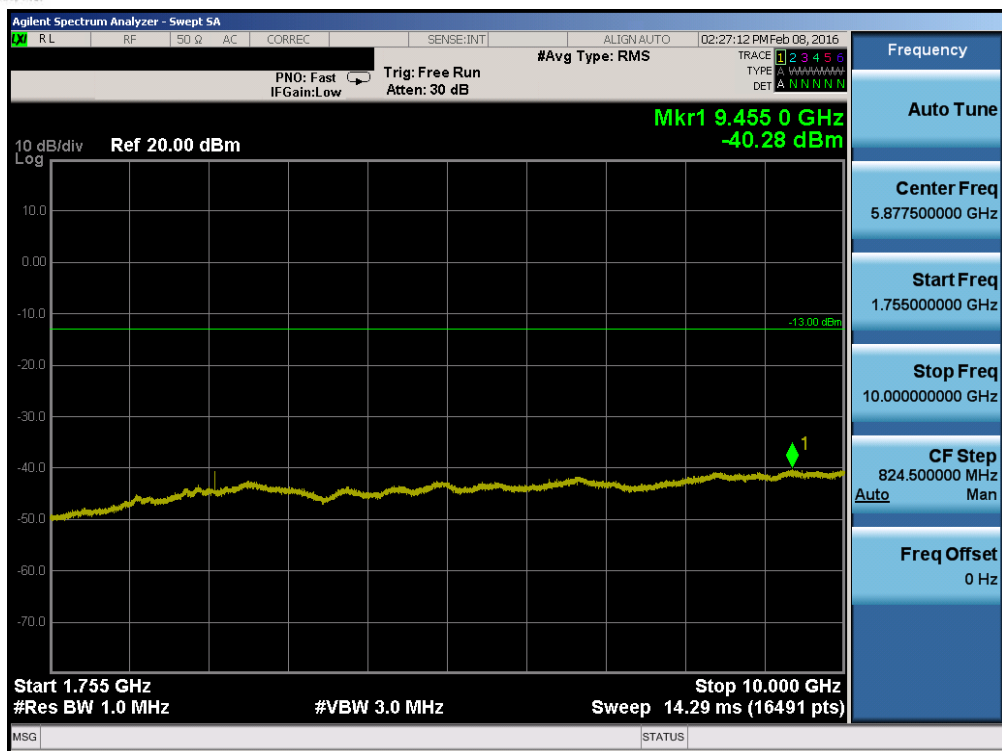


Plot 7-51. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

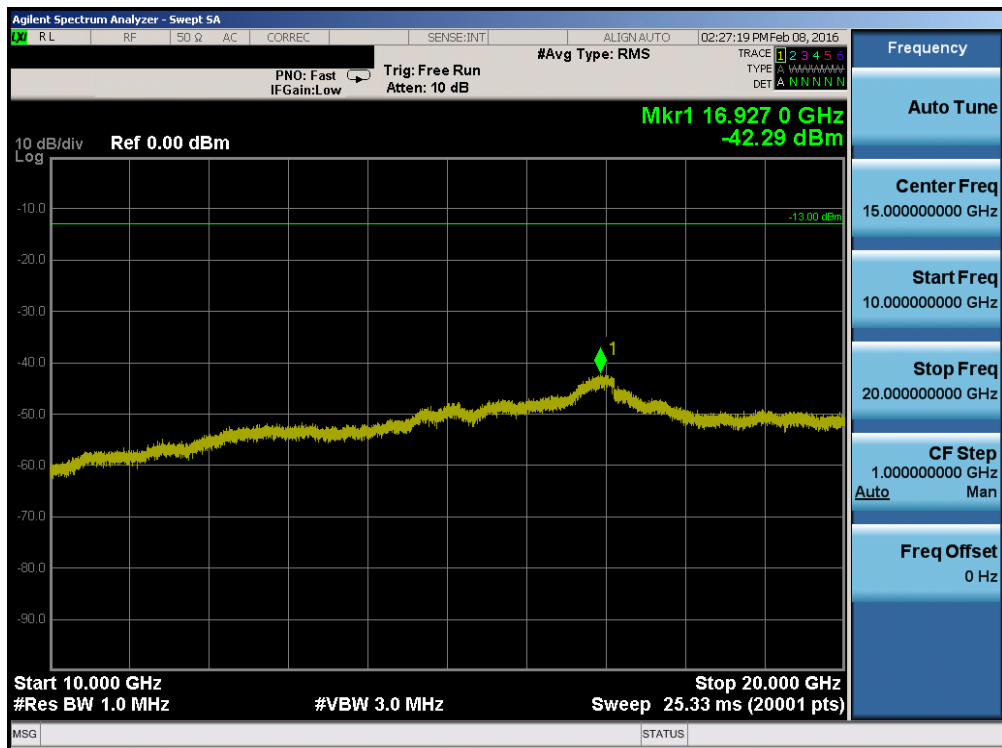


Plot 7-52. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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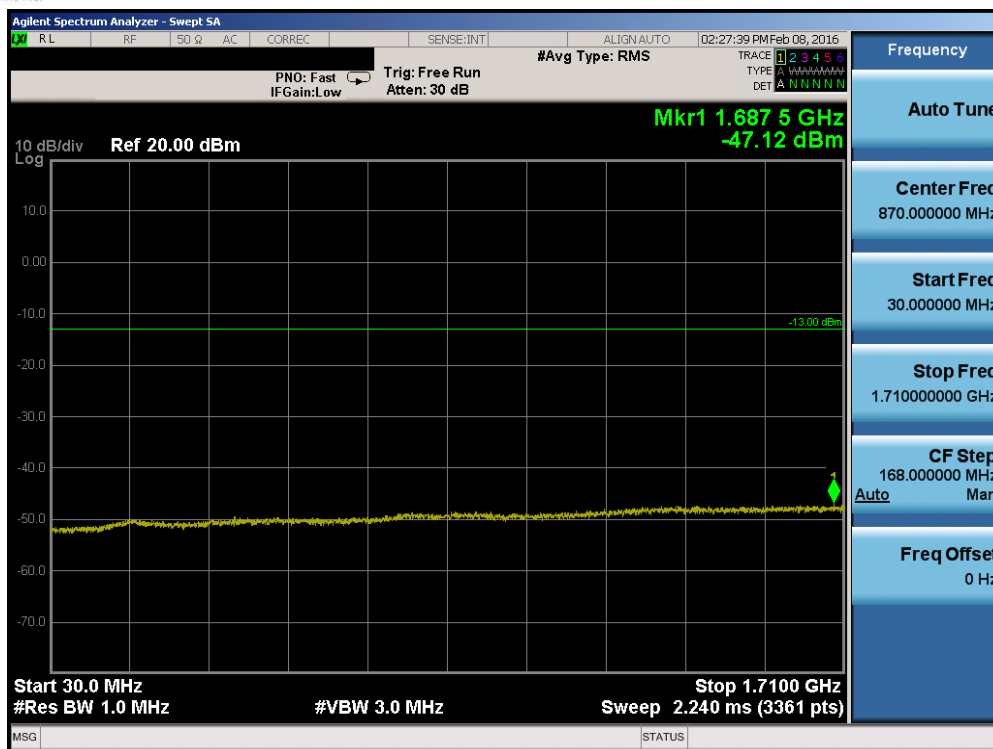


Plot 7-53. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

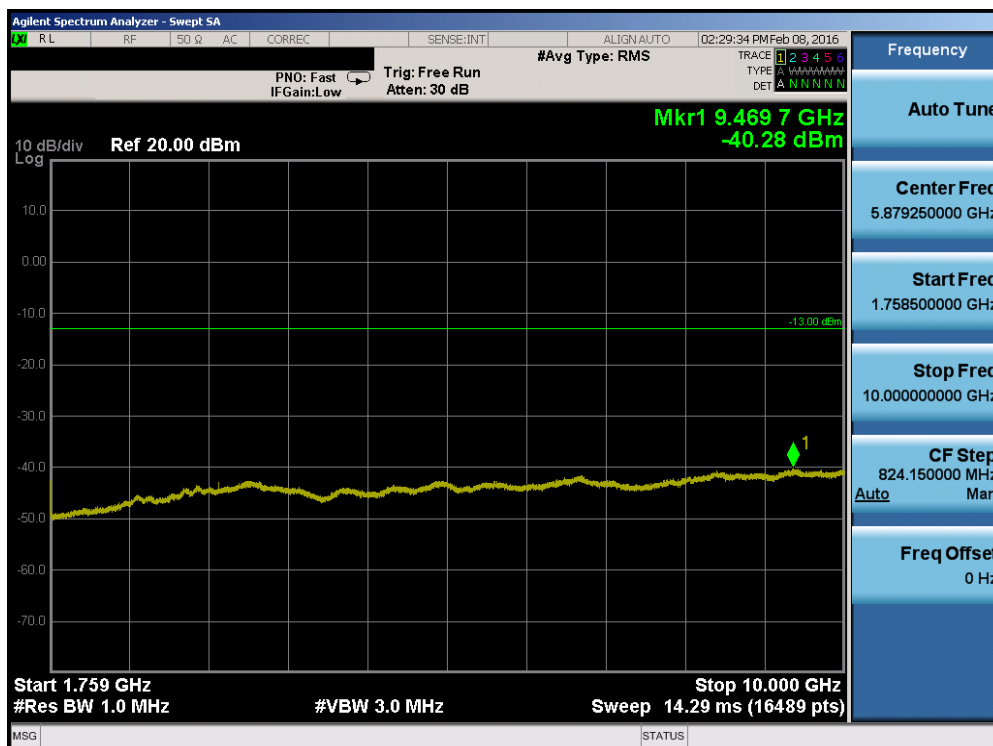


Plot 7-54. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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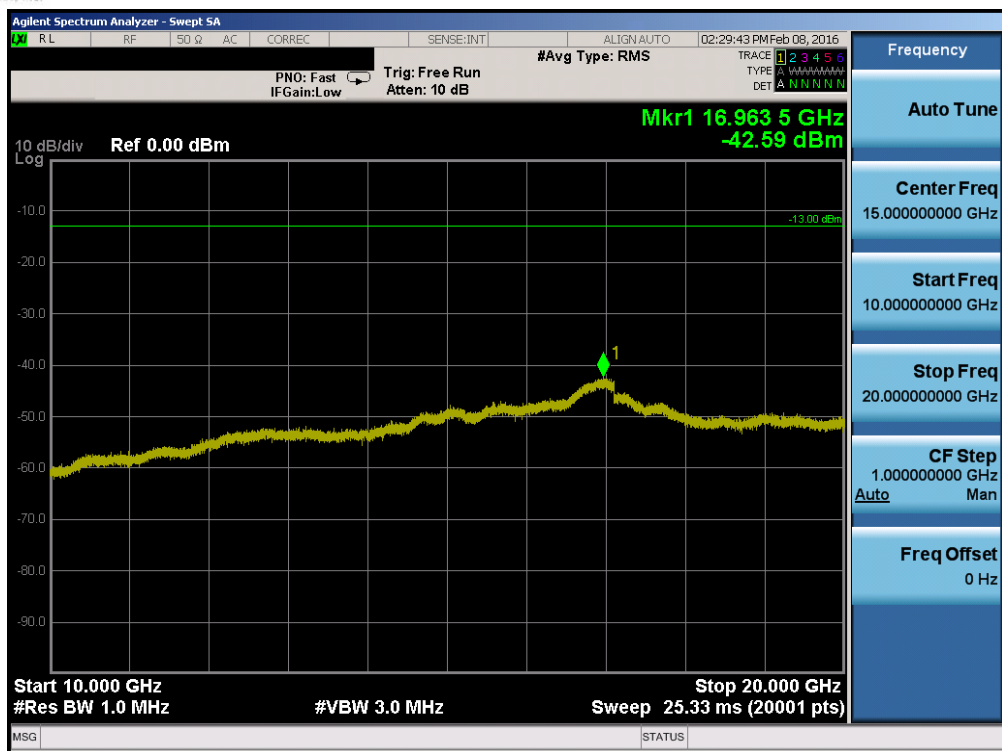


Plot 7-55. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

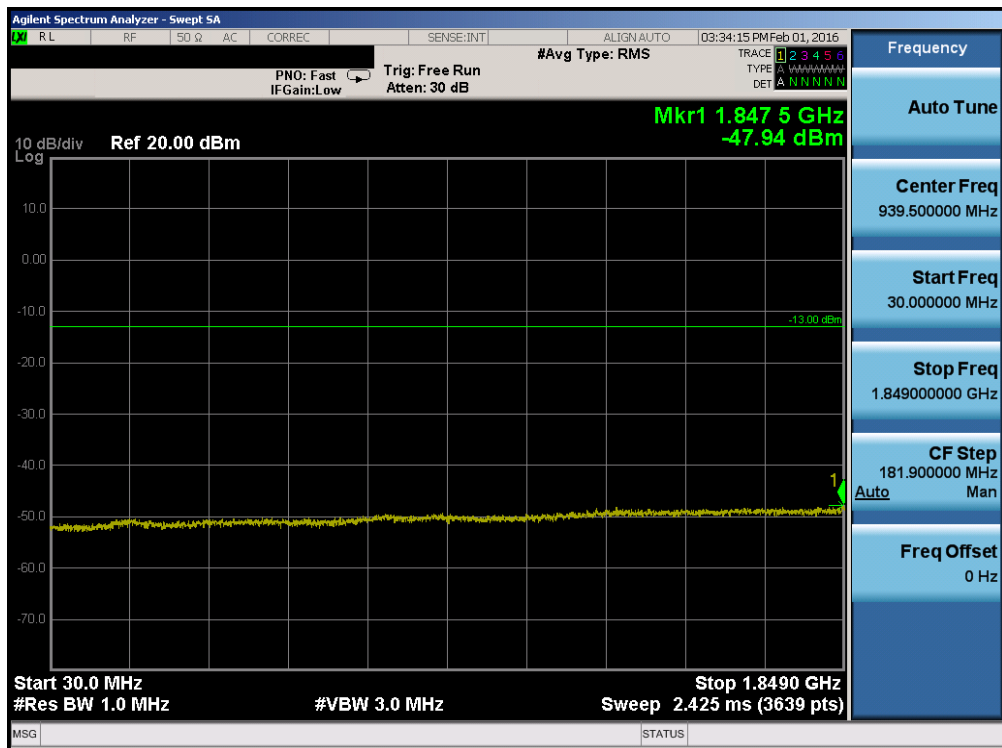


Plot 7-56. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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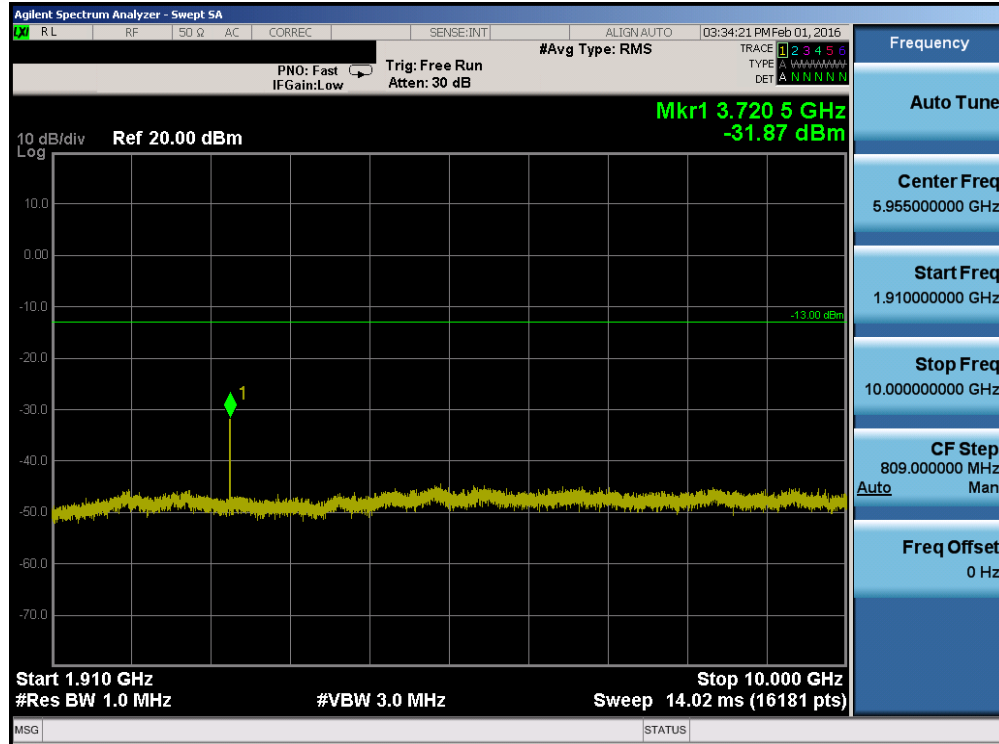


Plot 7-57. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

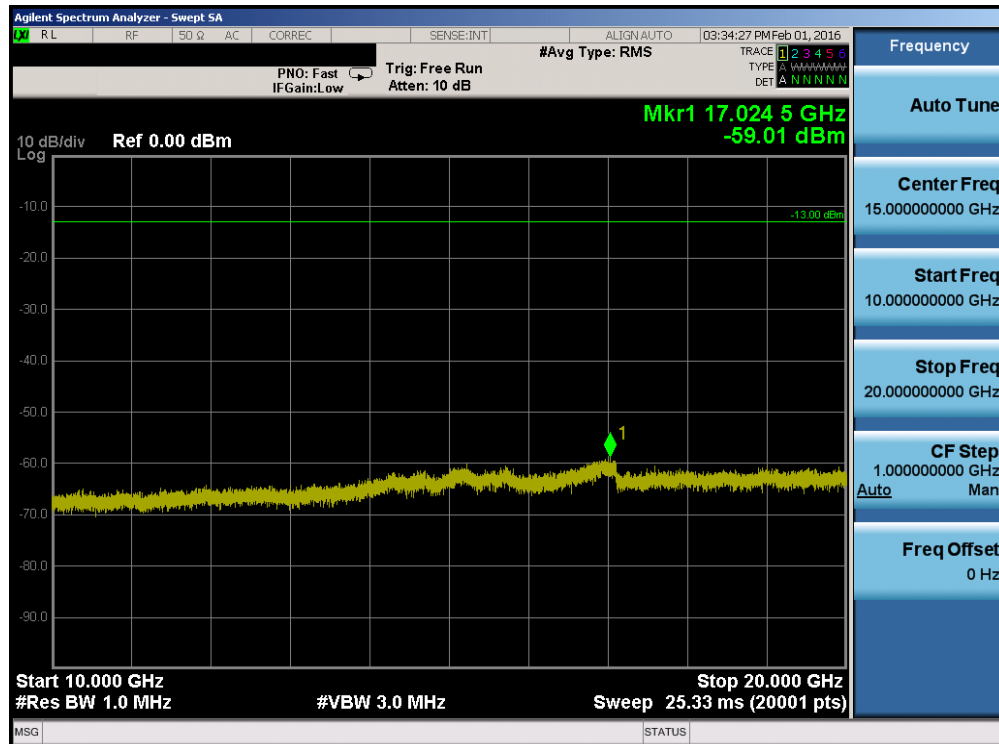


Plot 7-58. Conducted Spurious Plot (Band 2 – 20.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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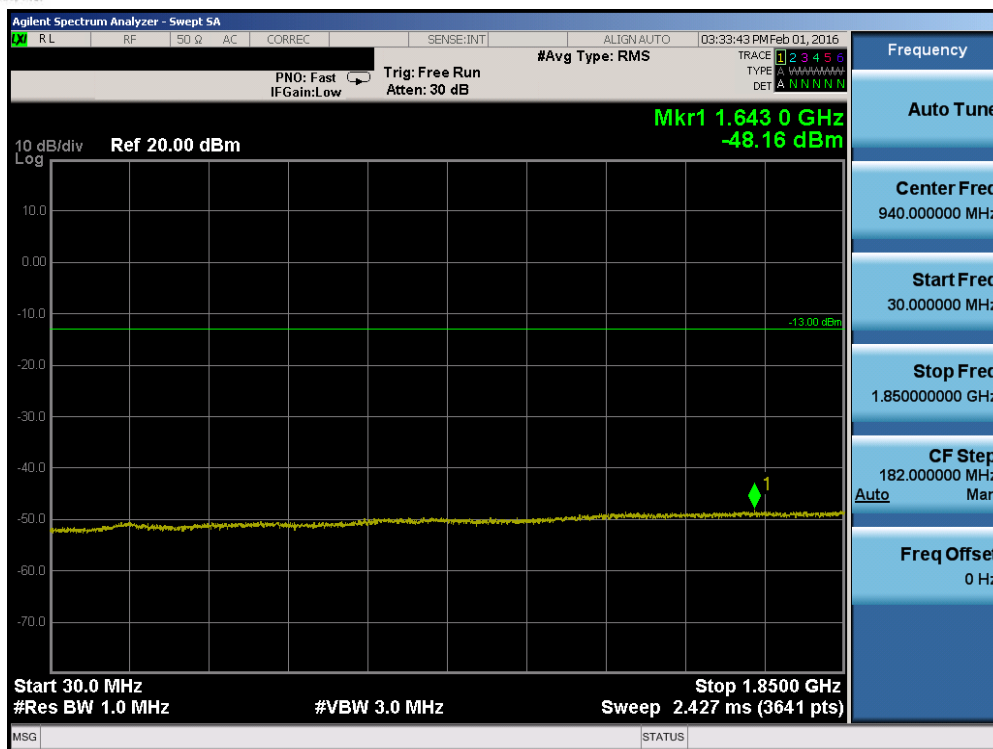


Plot 7-59. Conducted Spurious Plot (Band 2 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

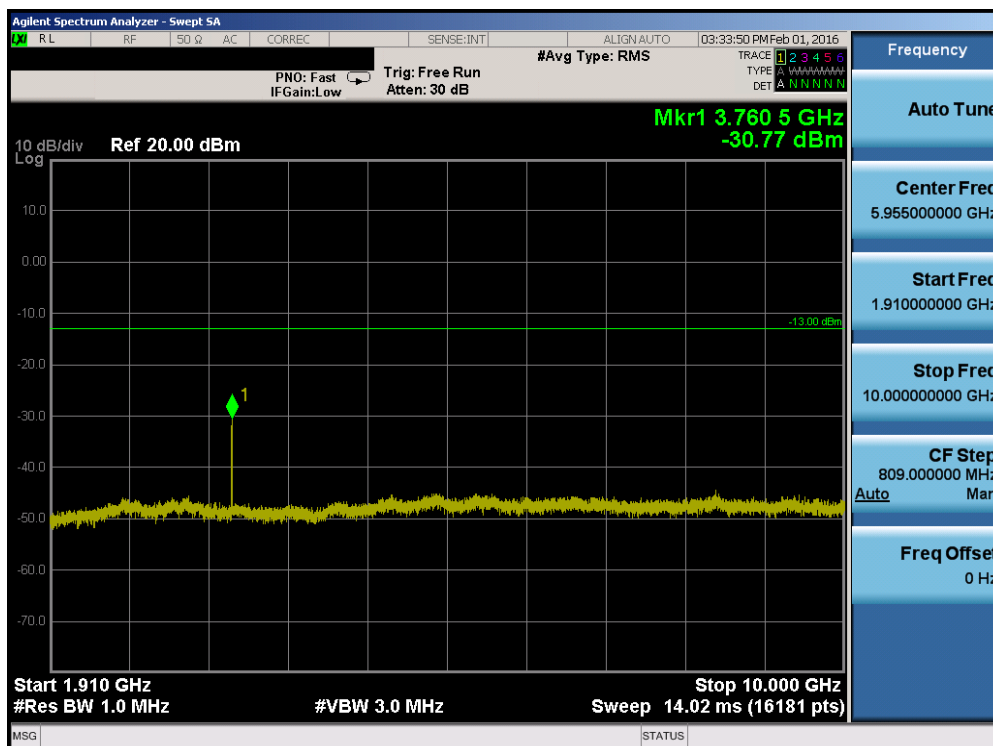


Plot 7-60. Conducted Spurious Plot (Band 2 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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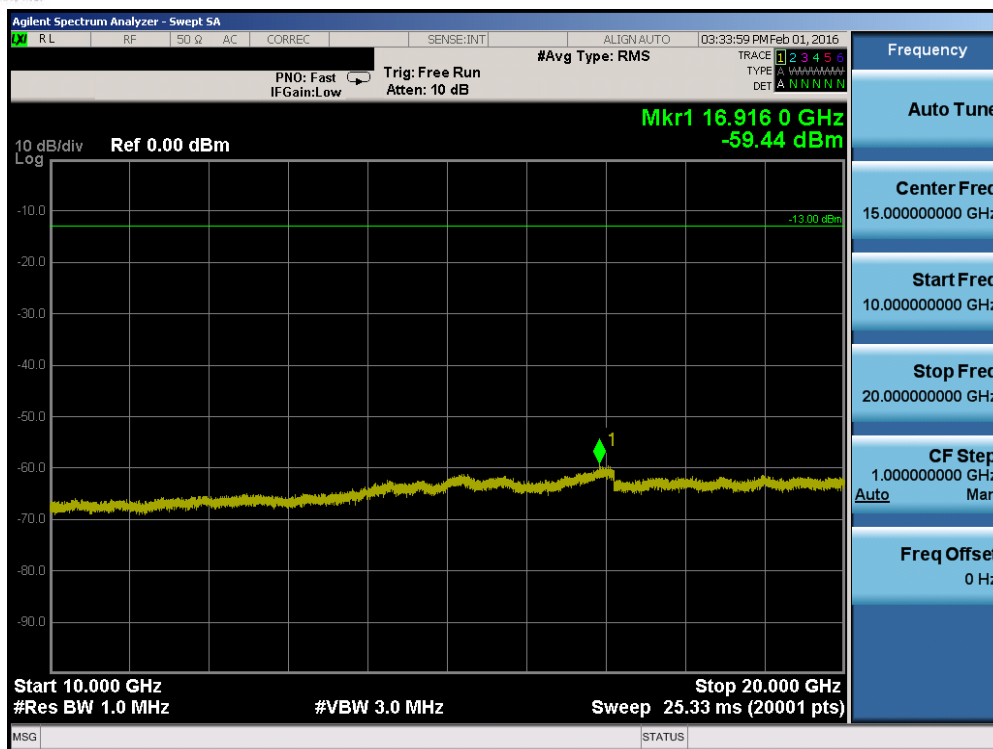


Plot 7-61. Conducted Spurious Plot (Band 2 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

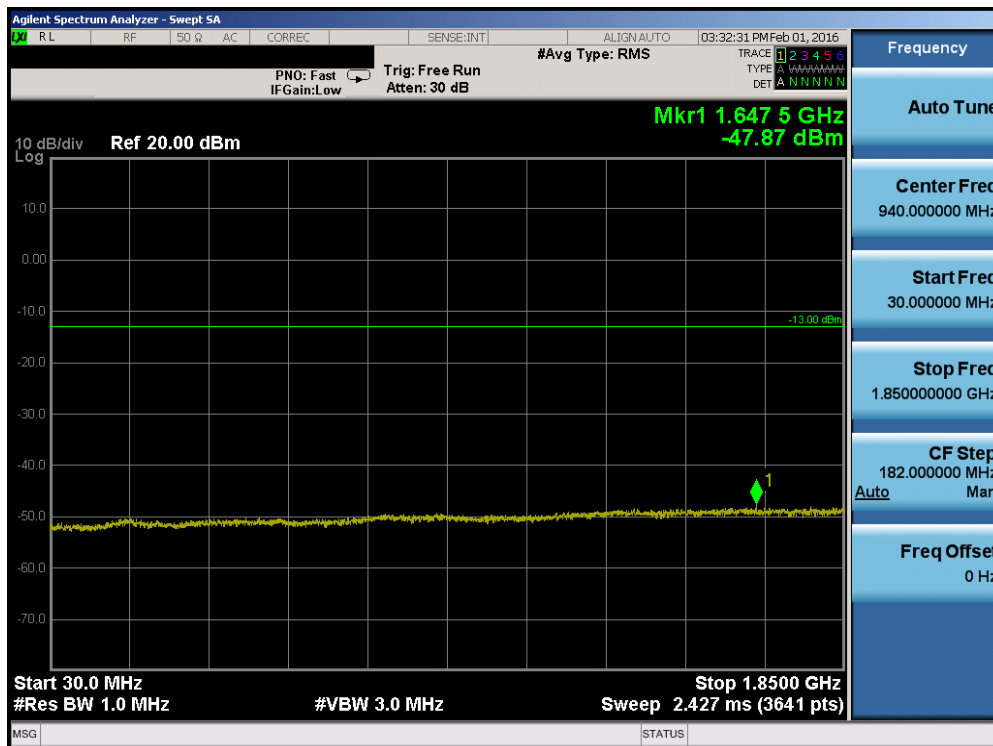


Plot 7-62. Conducted Spurious Plot (Band 2 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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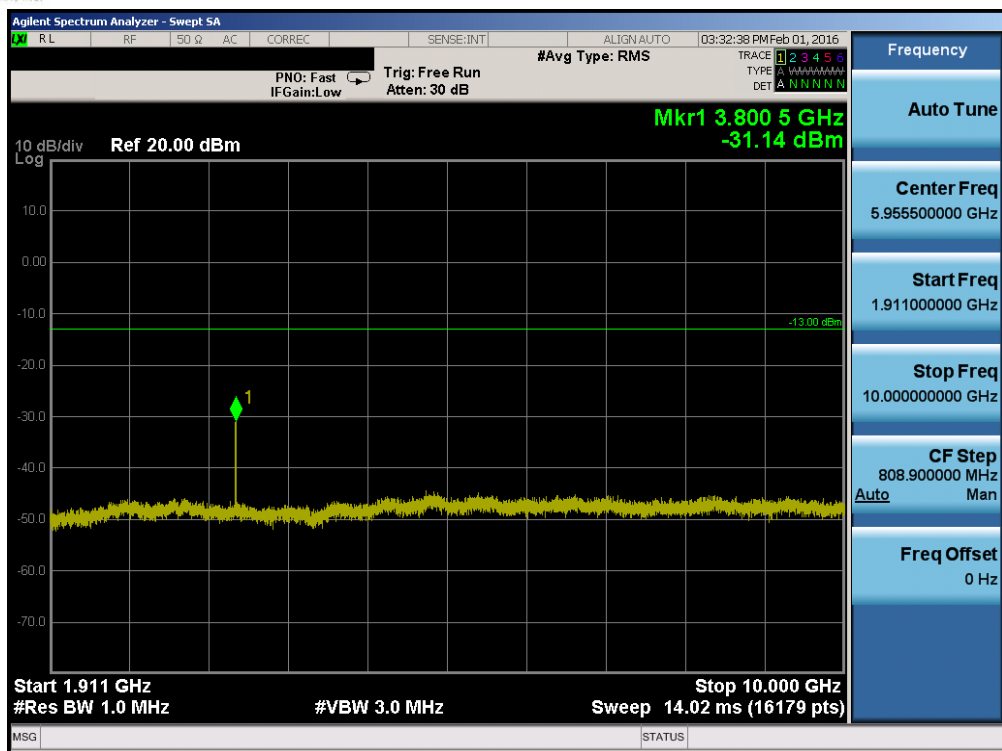


Plot 7-63. Conducted Spurious Plot (Band 2 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

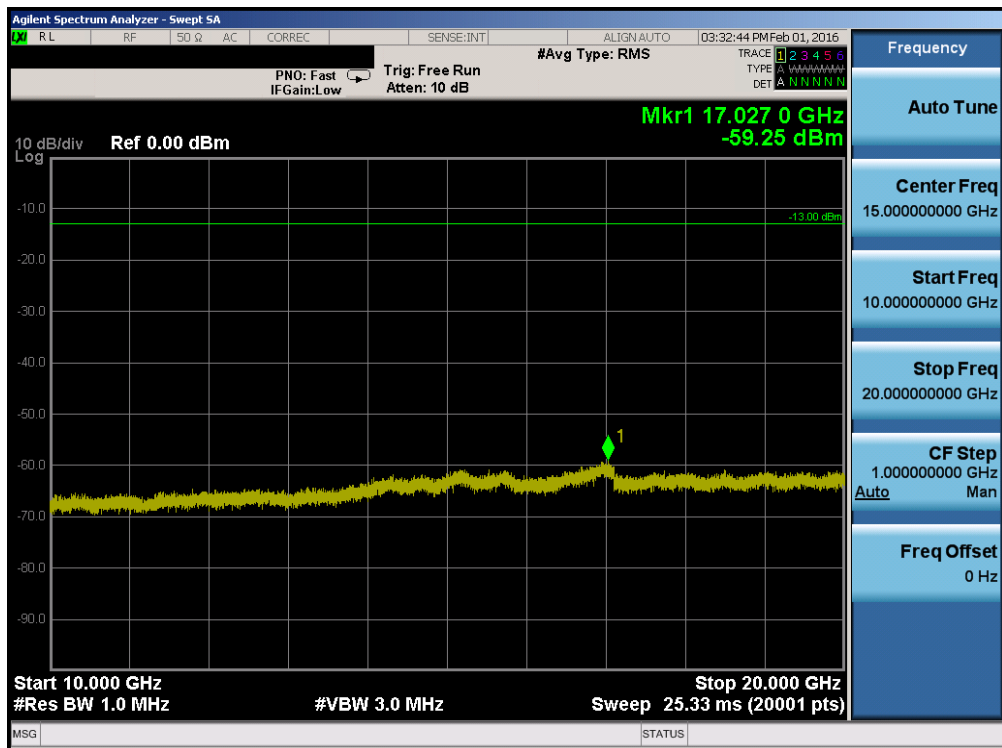


Plot 7-64. Conducted Spurious Plot (Band 2 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 7-65. Conducted Spurious Plot (Band 2 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-66. Conducted Spurious Plot (Band 2 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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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 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.

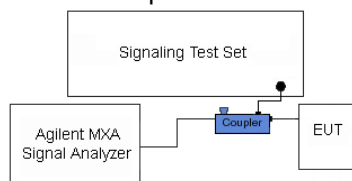


Figure 7-3. Test Instrument & Measurement Setup

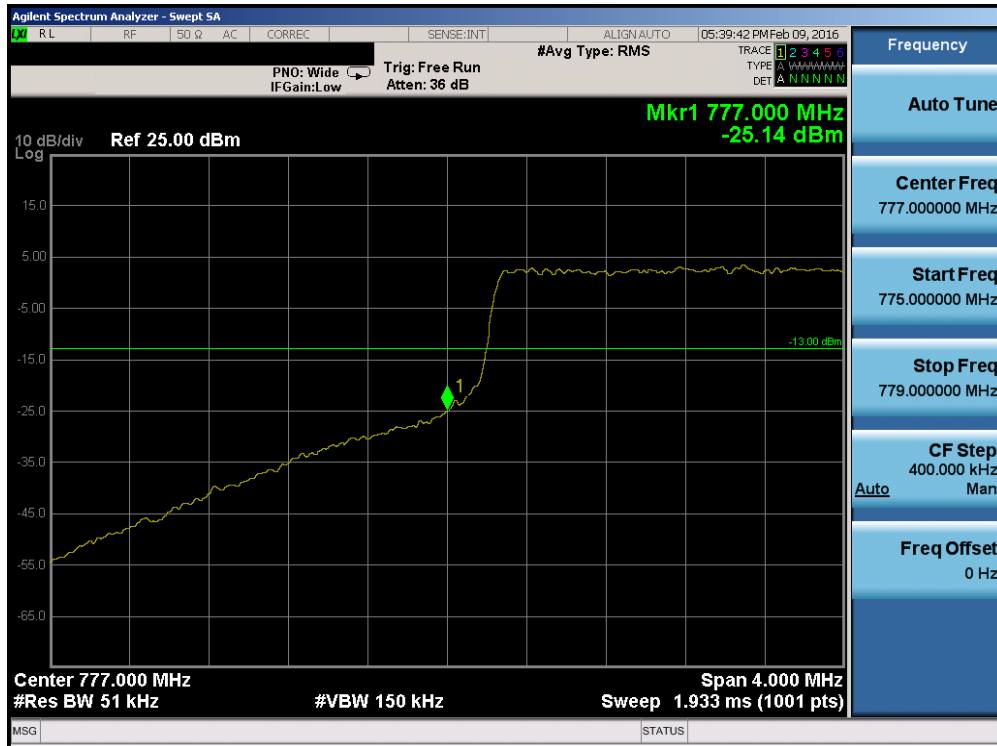
Test Notes

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.

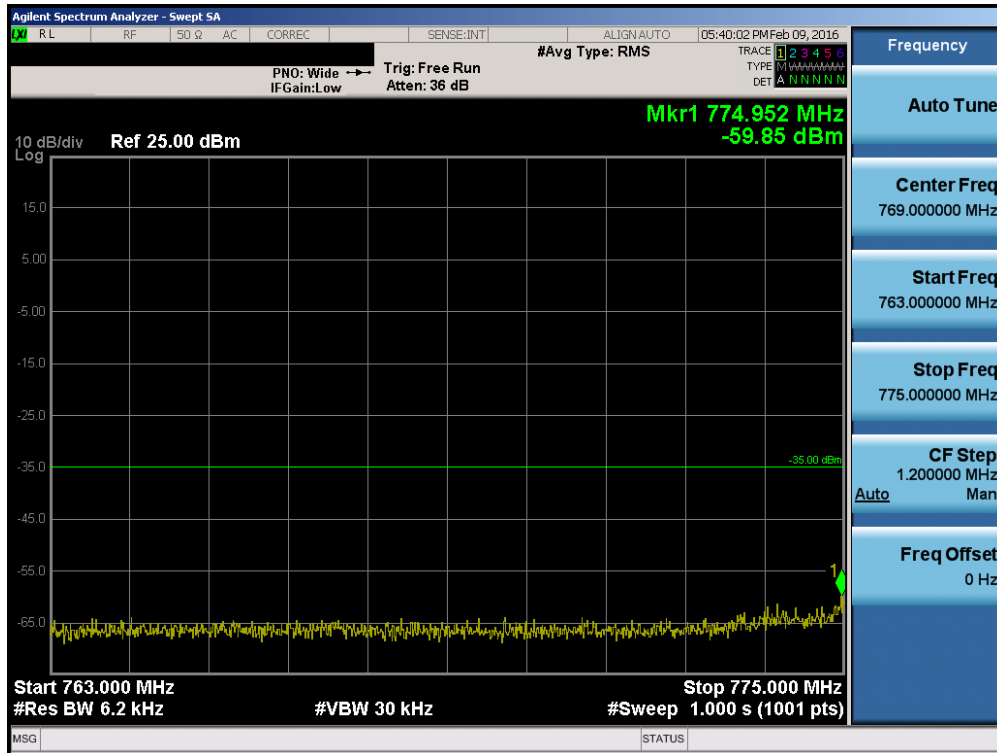
Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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.

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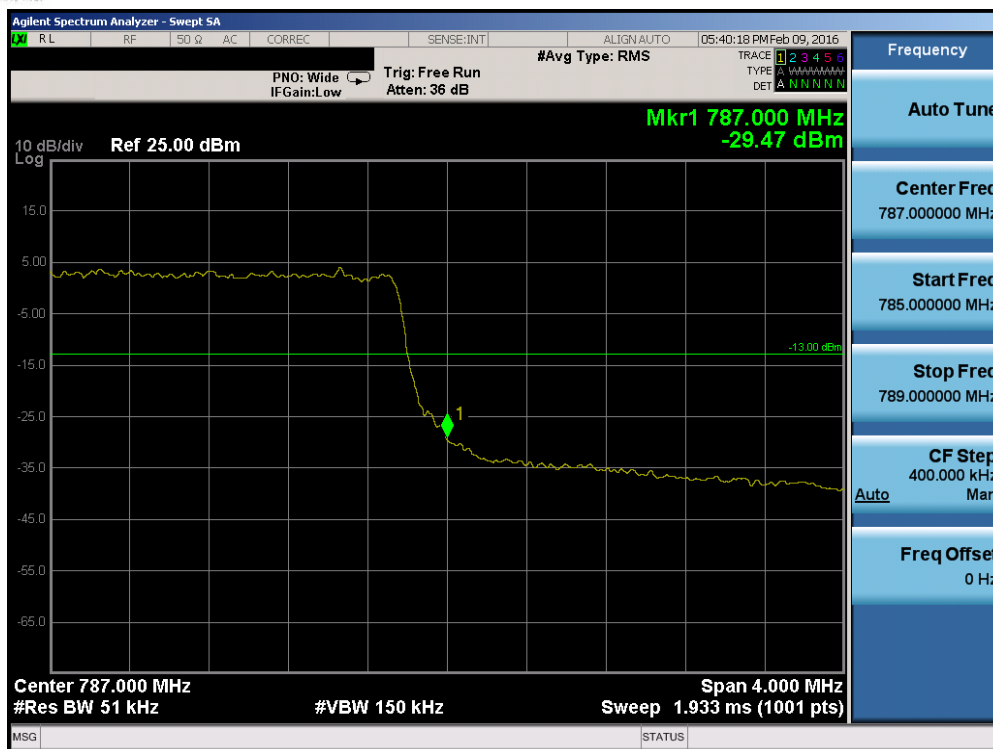


Plot 7-67. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

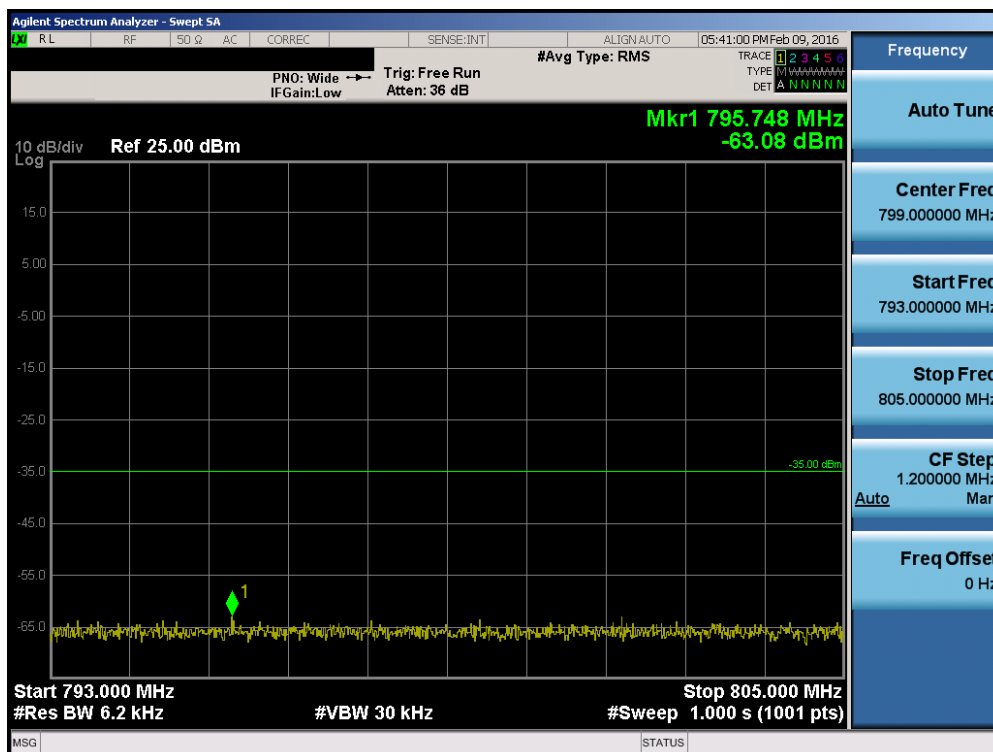


Plot 7-68. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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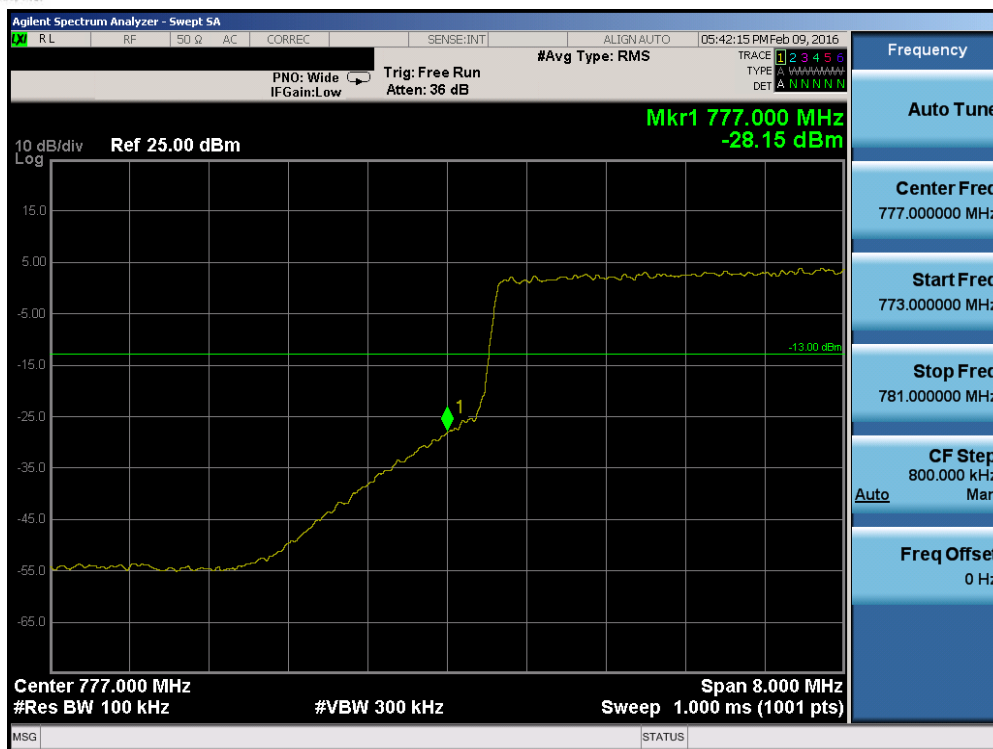


Plot 7-69. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

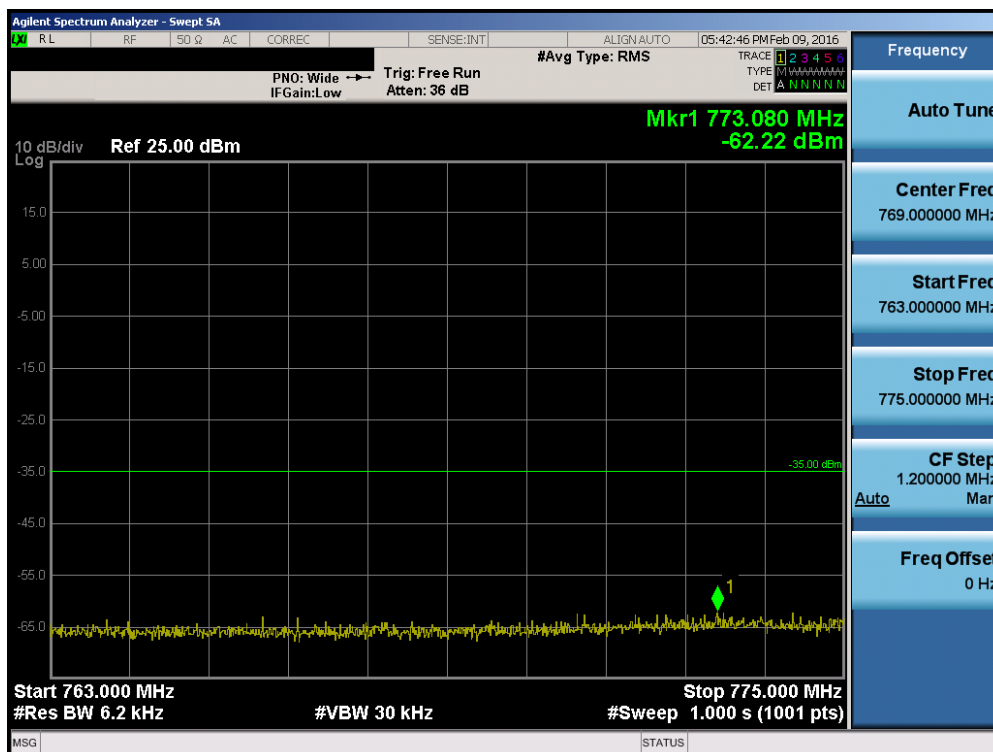


Plot 7-70. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 7-71. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

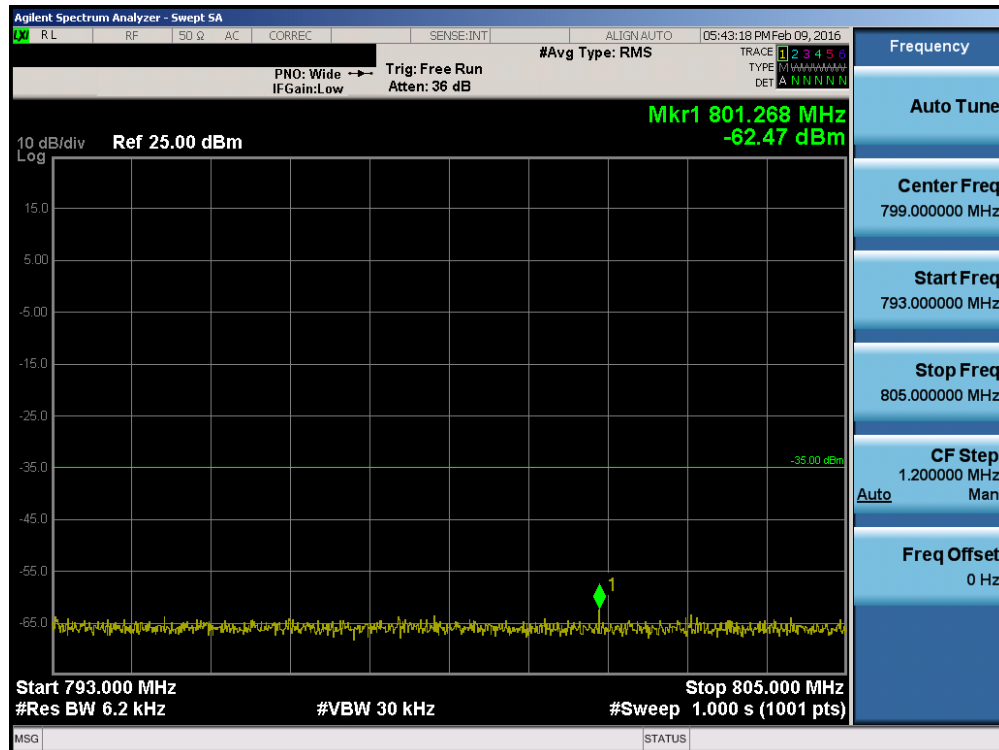


Plot 7-72. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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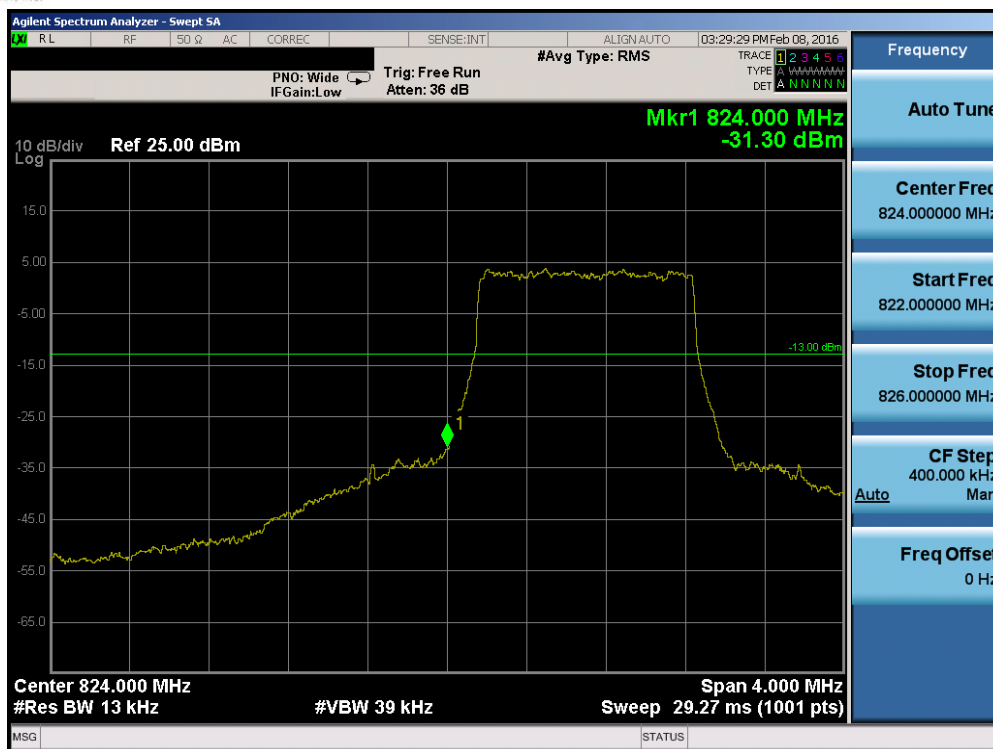


Plot 7-73. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

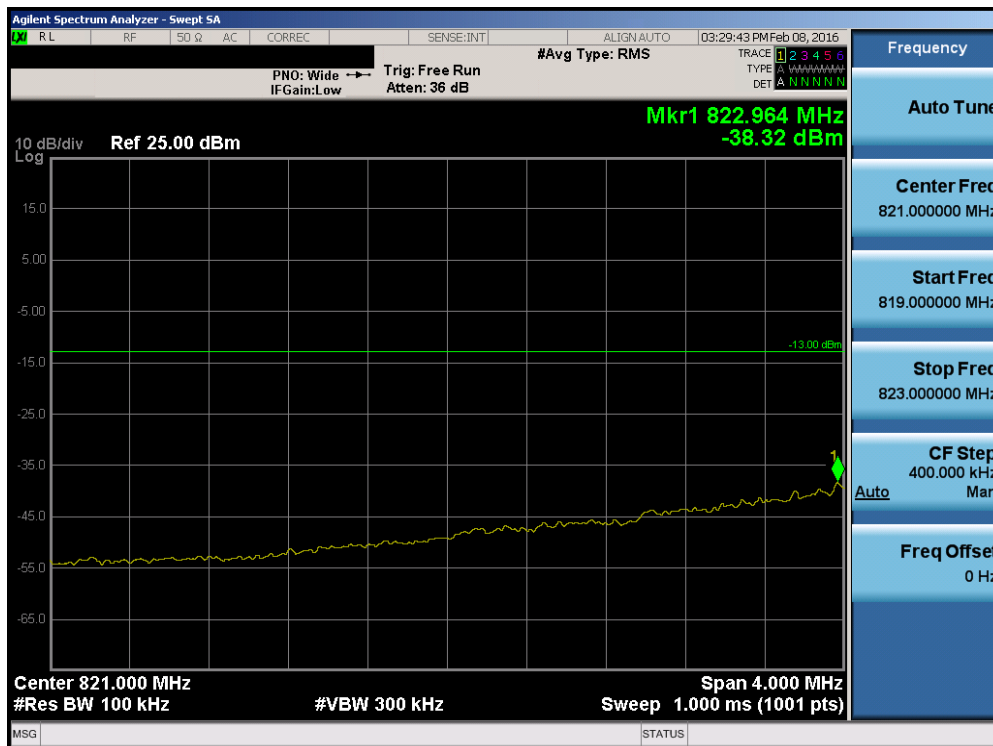


Plot 7-74. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 7-75. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



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

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 53 of 115

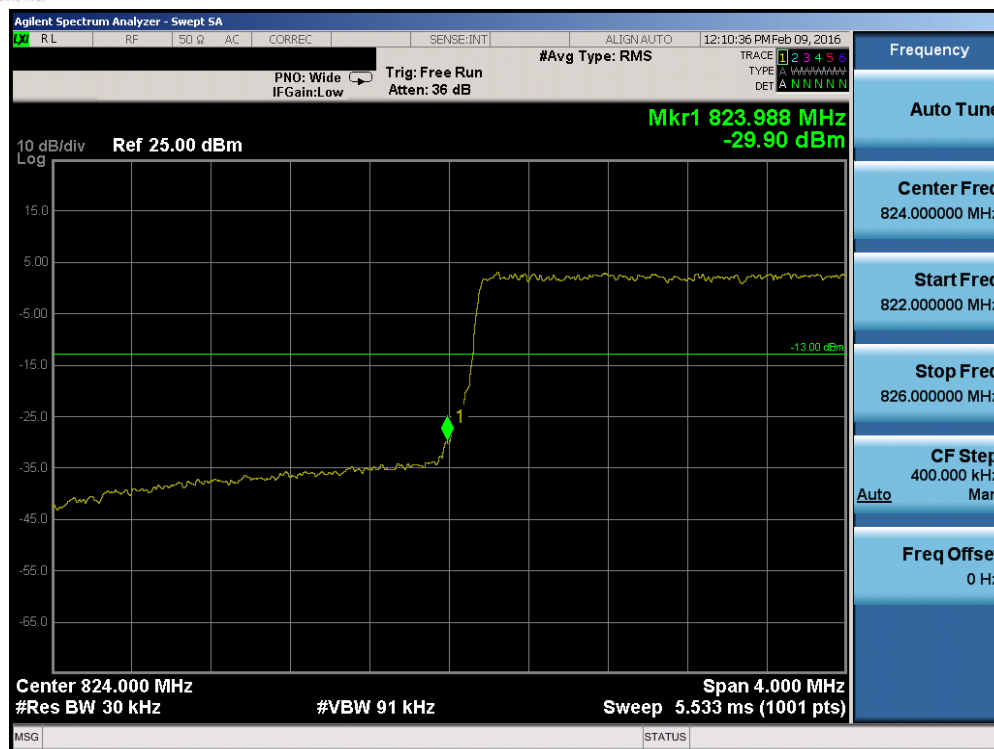


Plot 7-77. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

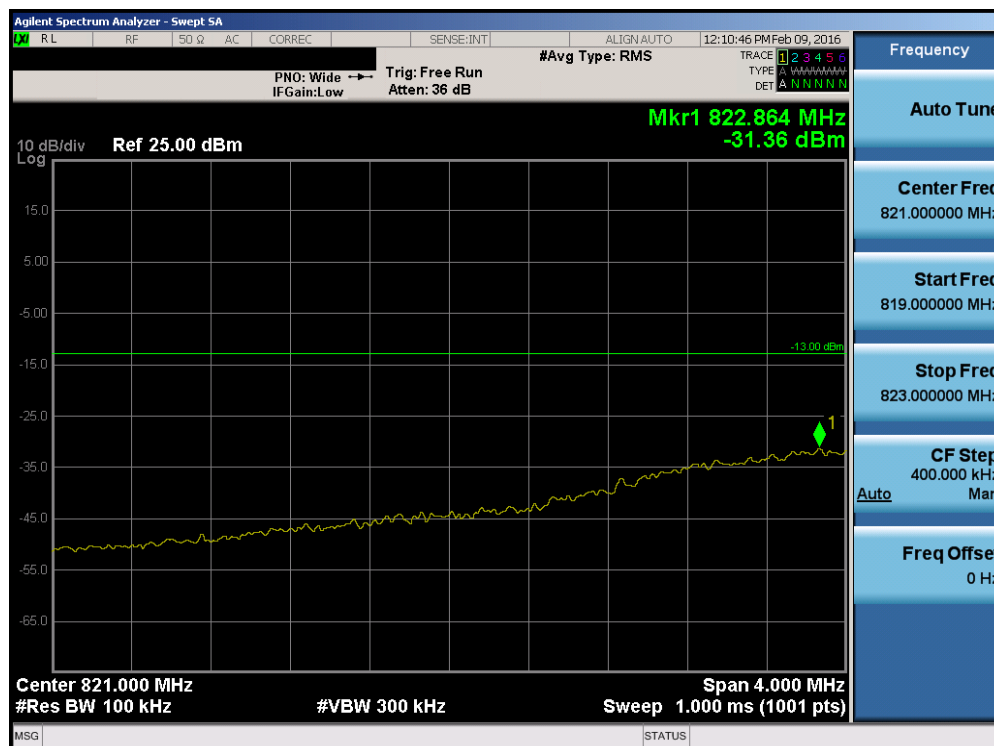


Plot 7-78. Upper Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 54 of 115

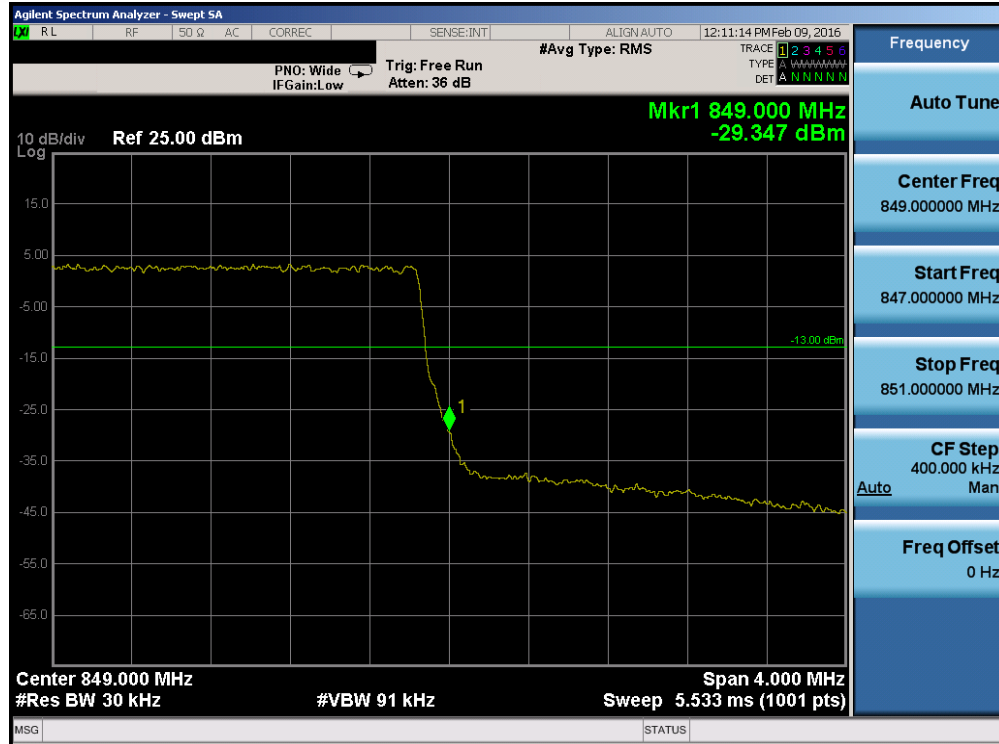


Plot 7-79. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - RB Size 15)

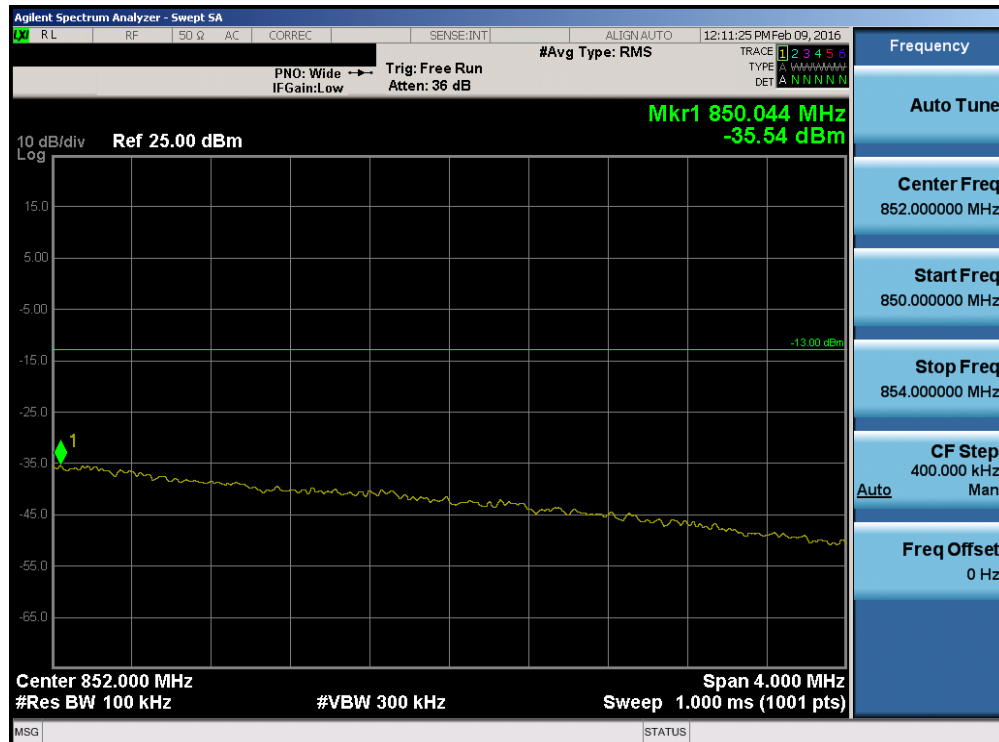


Plot 7-80. Lower Extended Band Edge Plot (Band 5 - 3.0MHz QPSK - RB Size 15)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 55 of 115

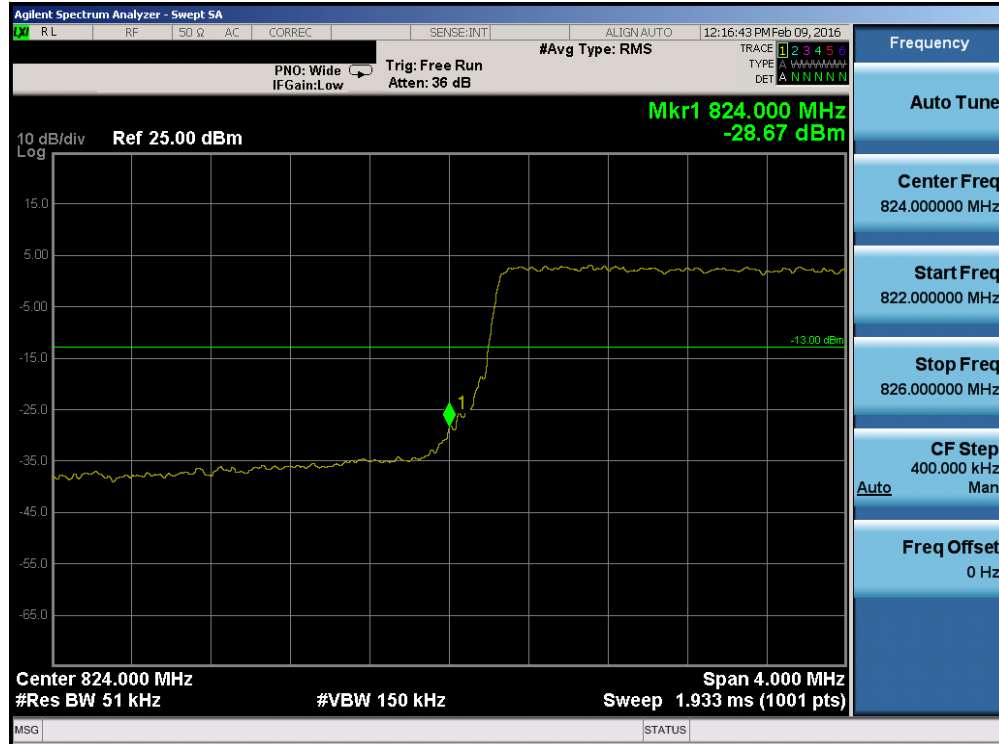


Plot 7-81. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



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

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 56 of 115



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



Plot 7-84. Lower Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 57 of 115

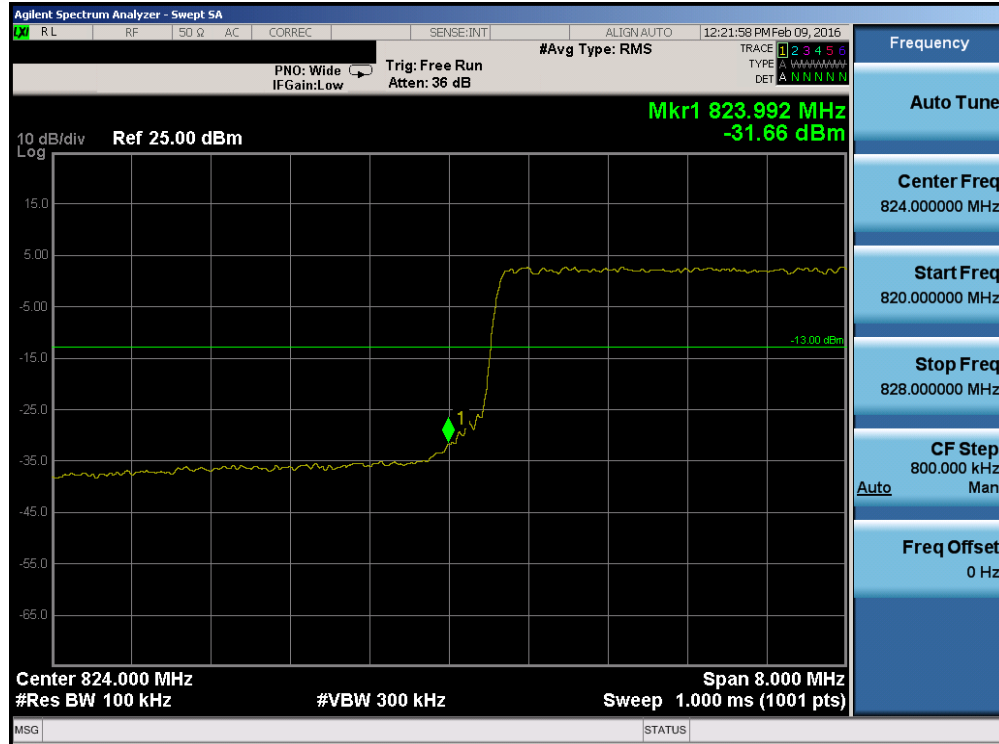


Plot 7-85. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - RB Size 25)

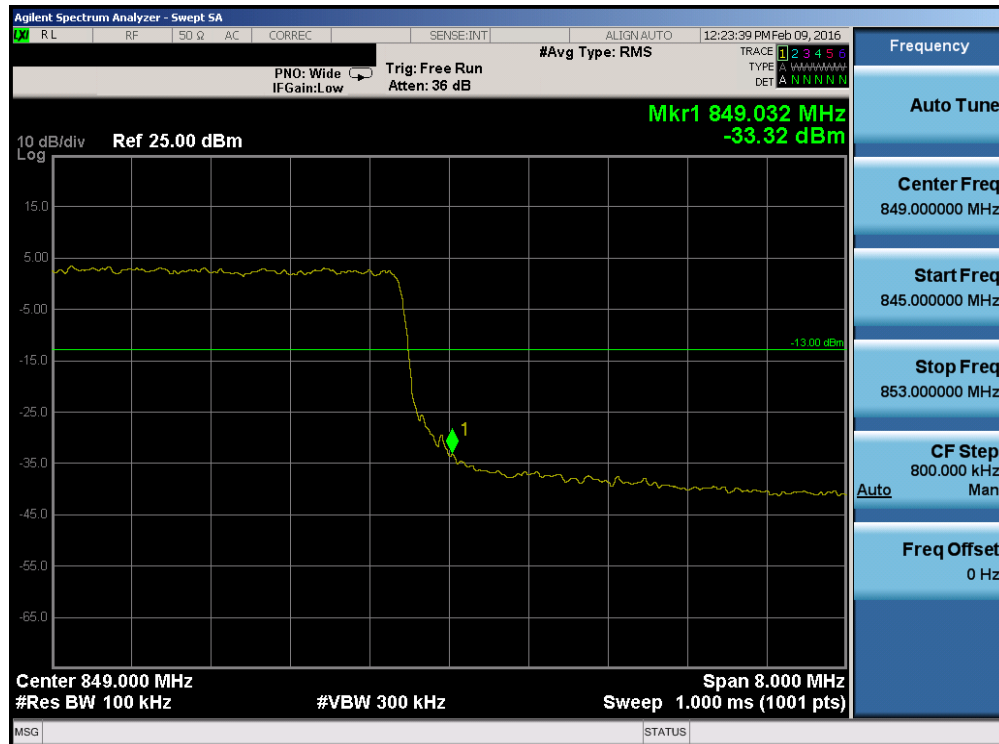


Plot 7-86. Upper Extended Band Edge Plot (Band 5 - 5.0MHz QPSK - RB Size 25)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 58 of 115

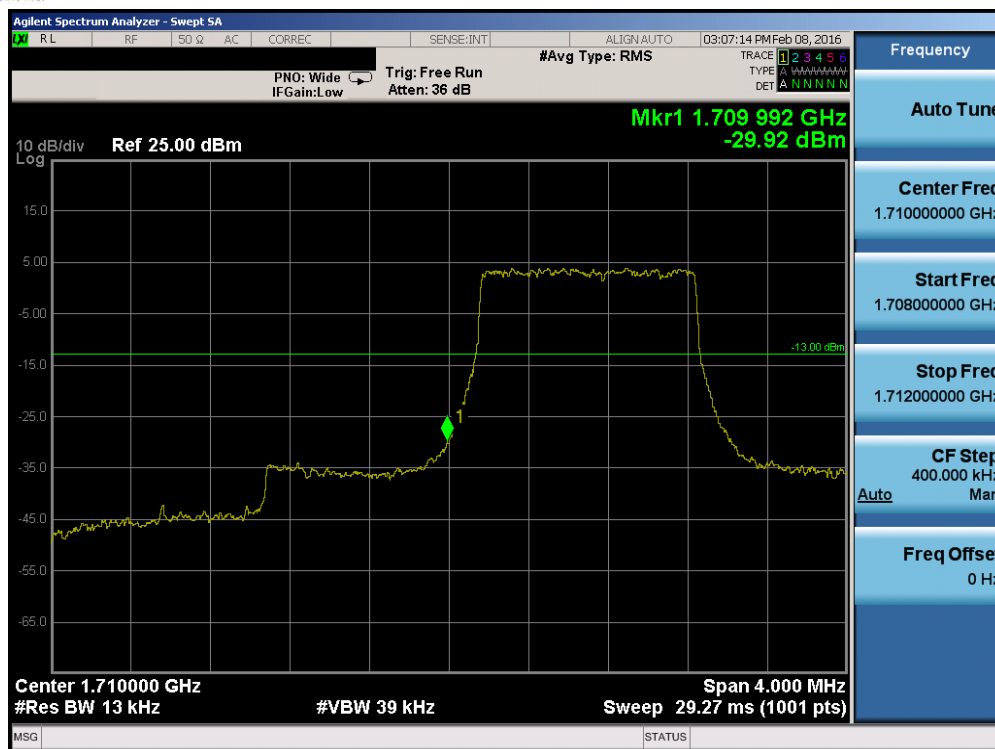


Plot 7-87. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

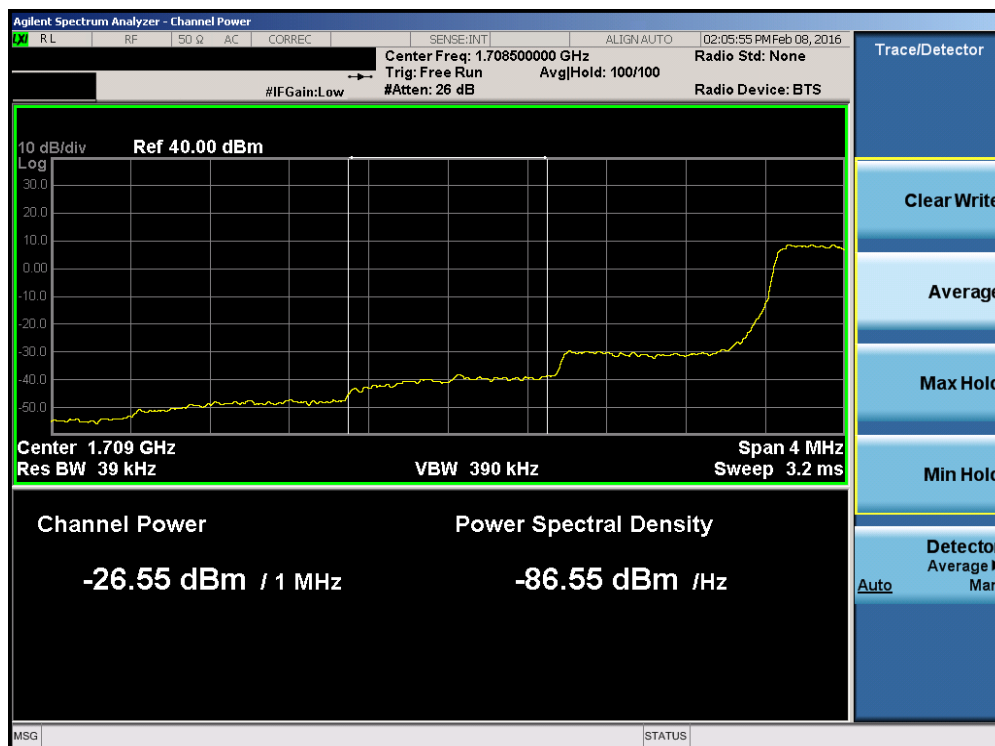


Plot 7-88. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 59 of 115



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

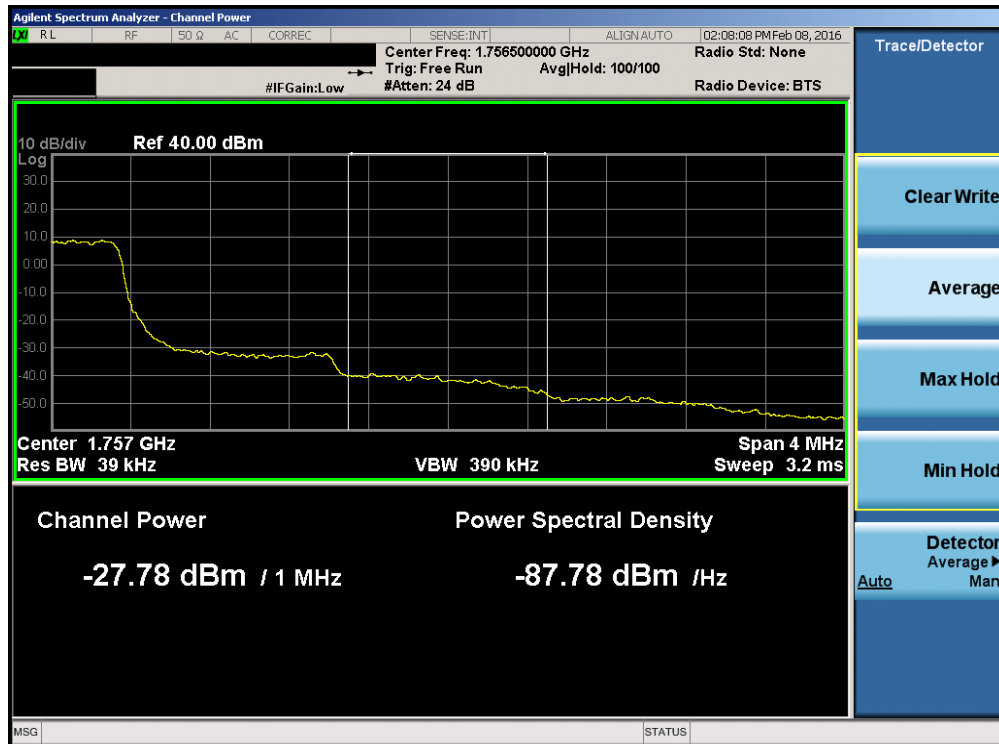


Plot 7-90. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 60 of 115

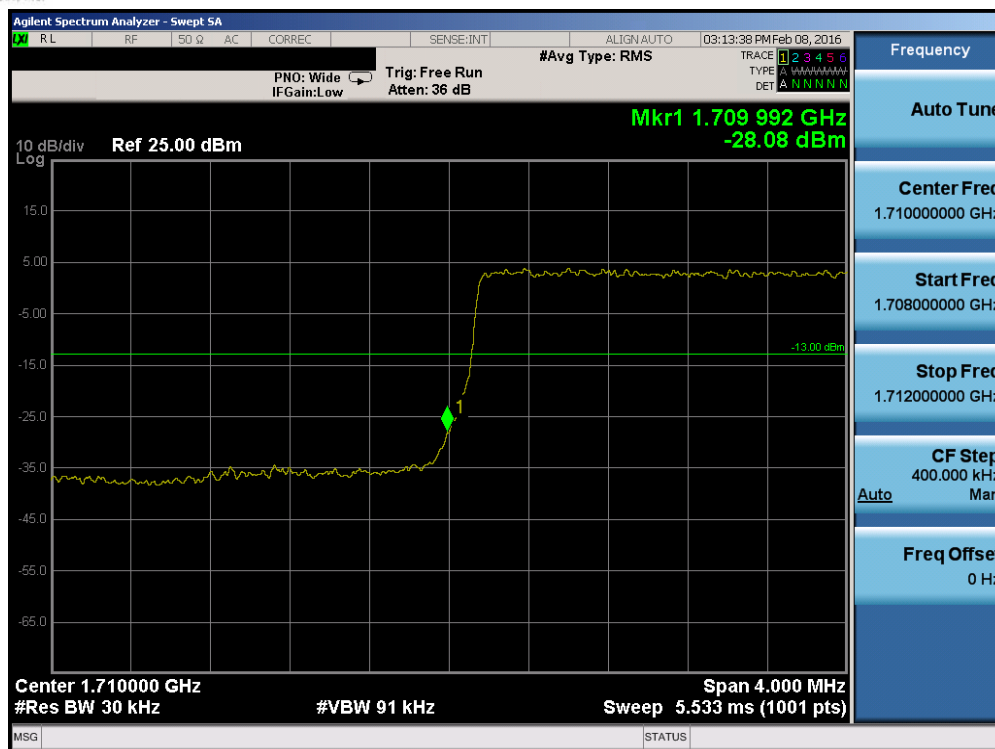


Plot 7-91. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

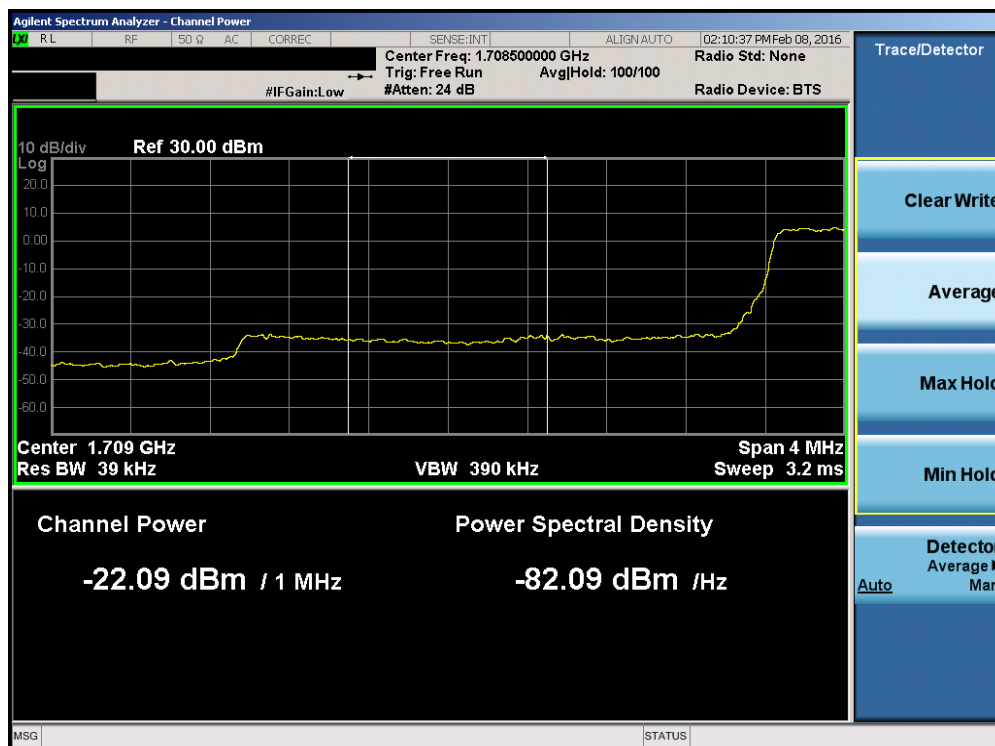


Plot 7-92. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 61 of 115

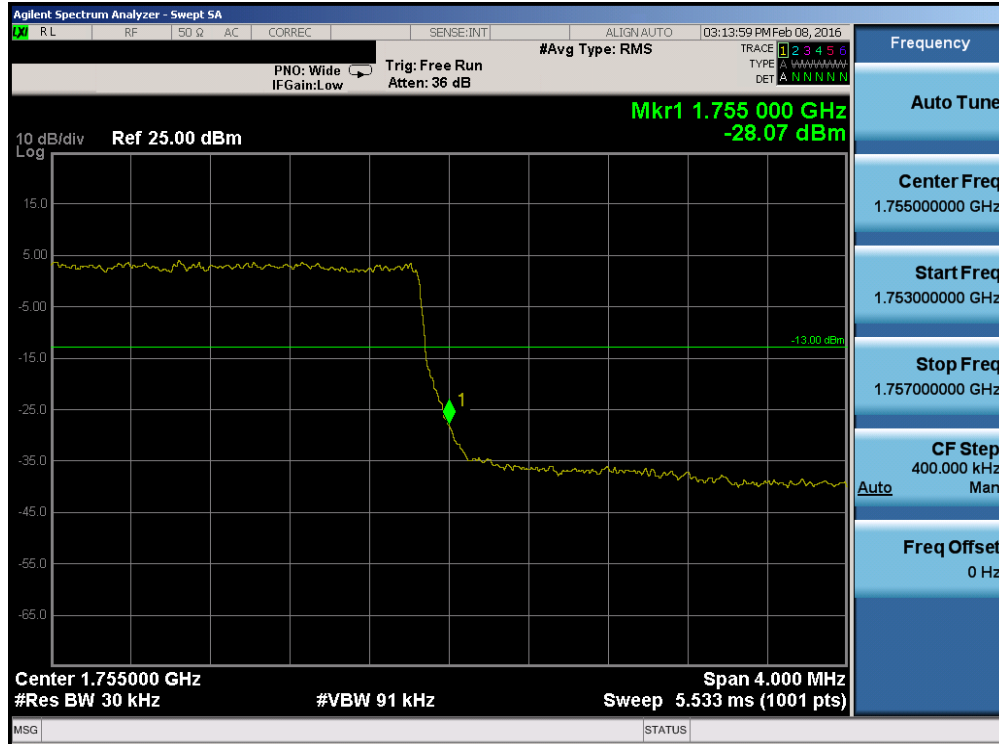


Plot 7-93. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

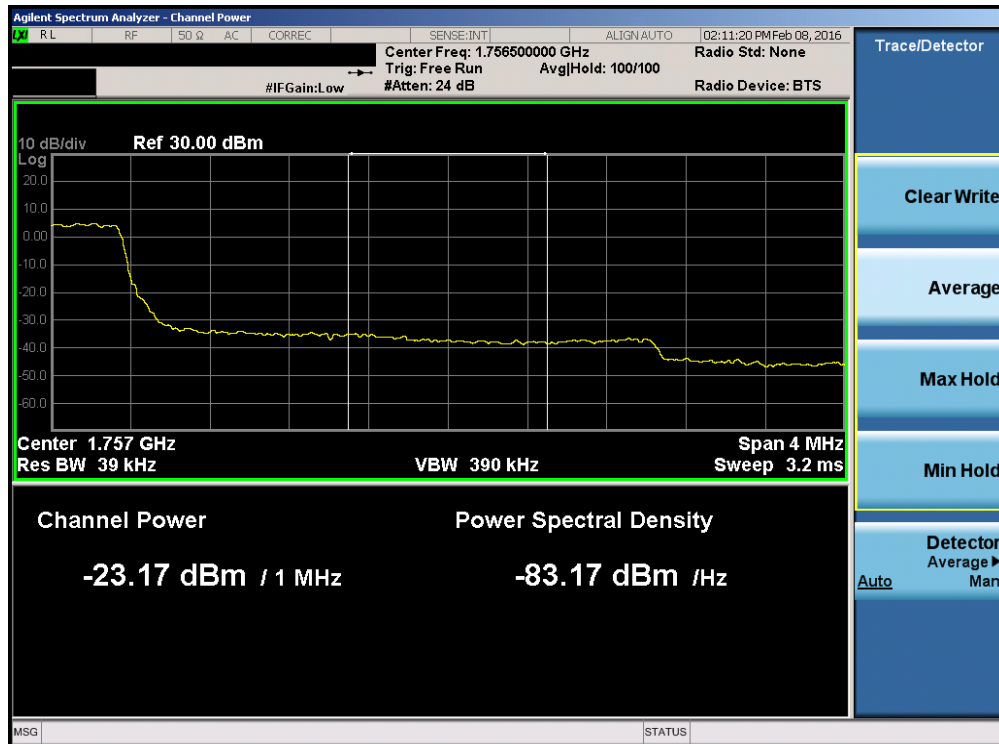


Plot 7-94. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 62 of 115

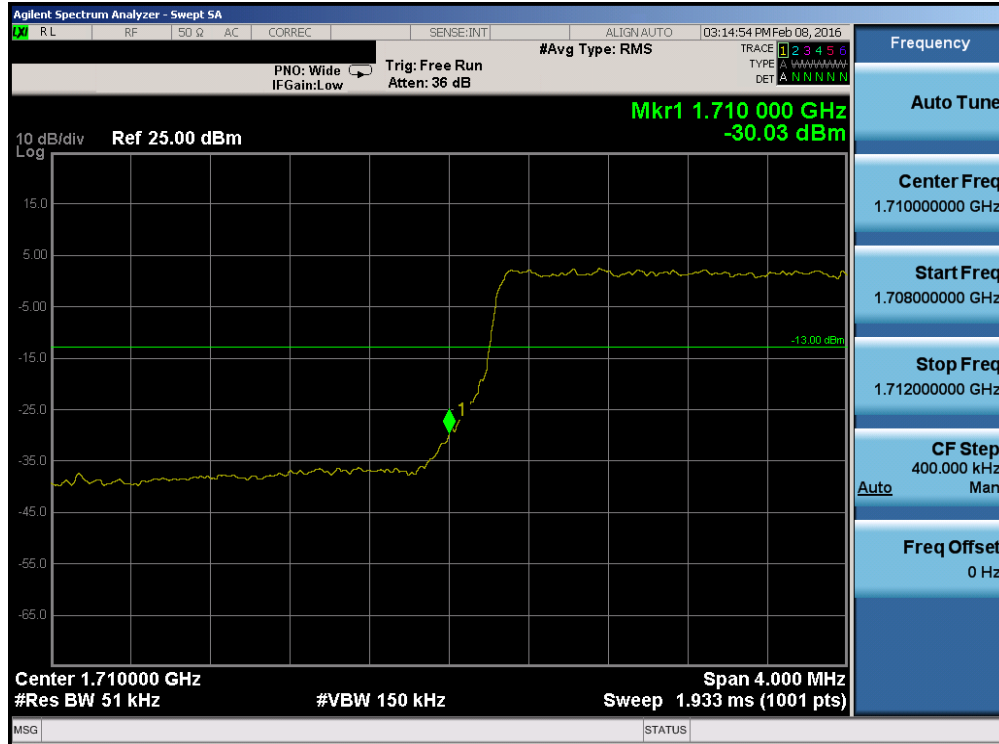


Plot 7-95. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

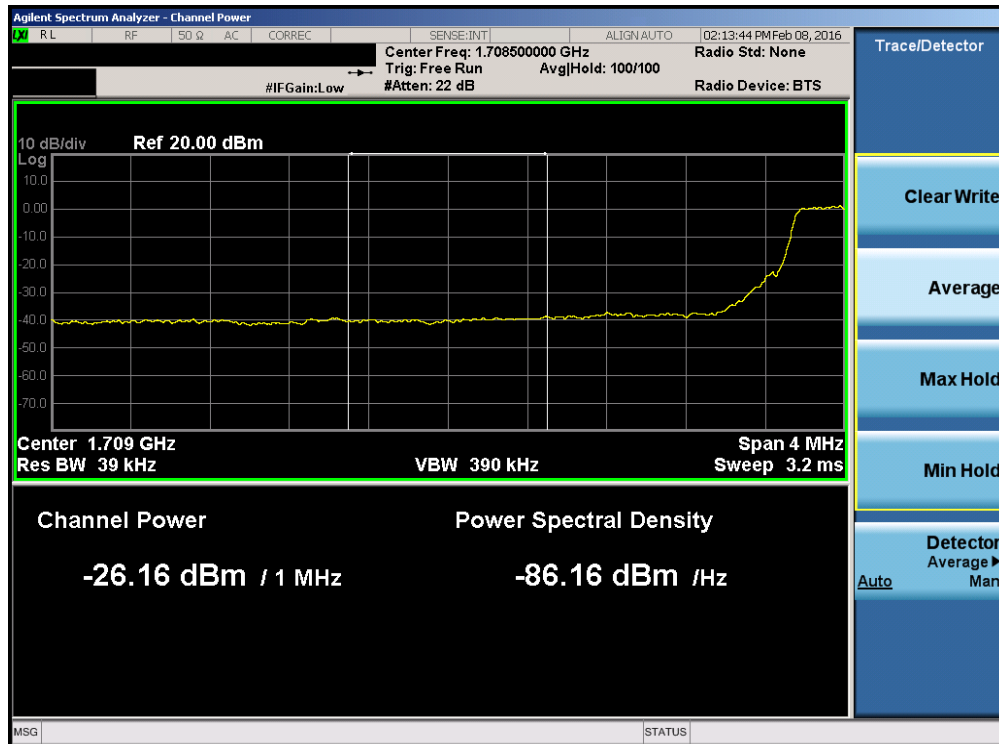


Plot 7-96. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 63 of 115

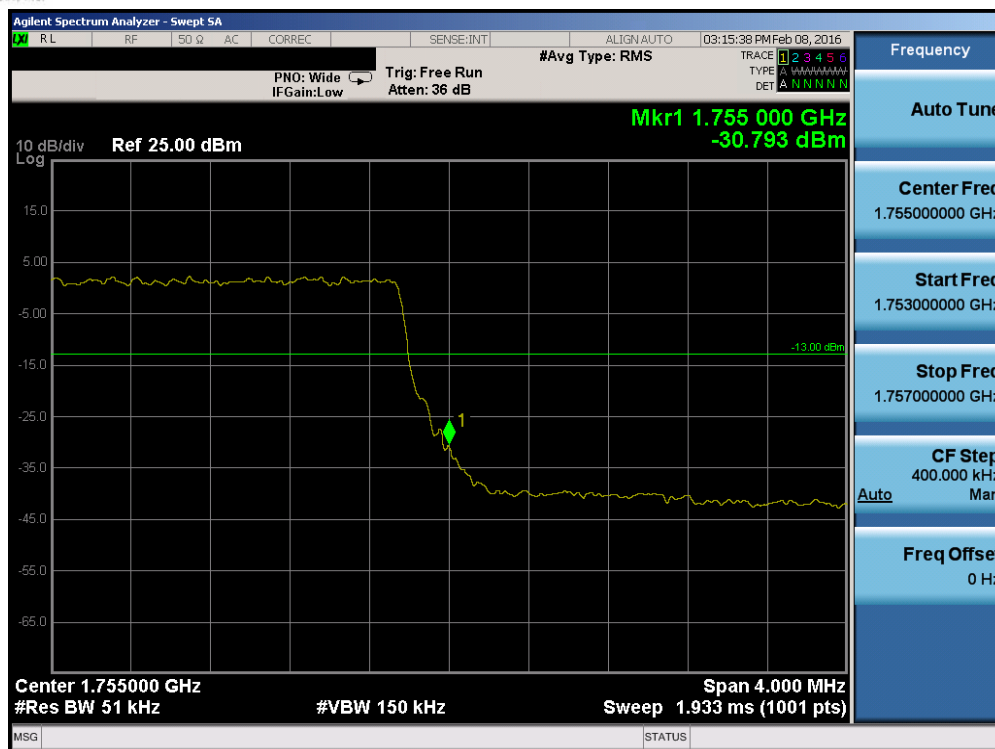


Plot 7-97. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

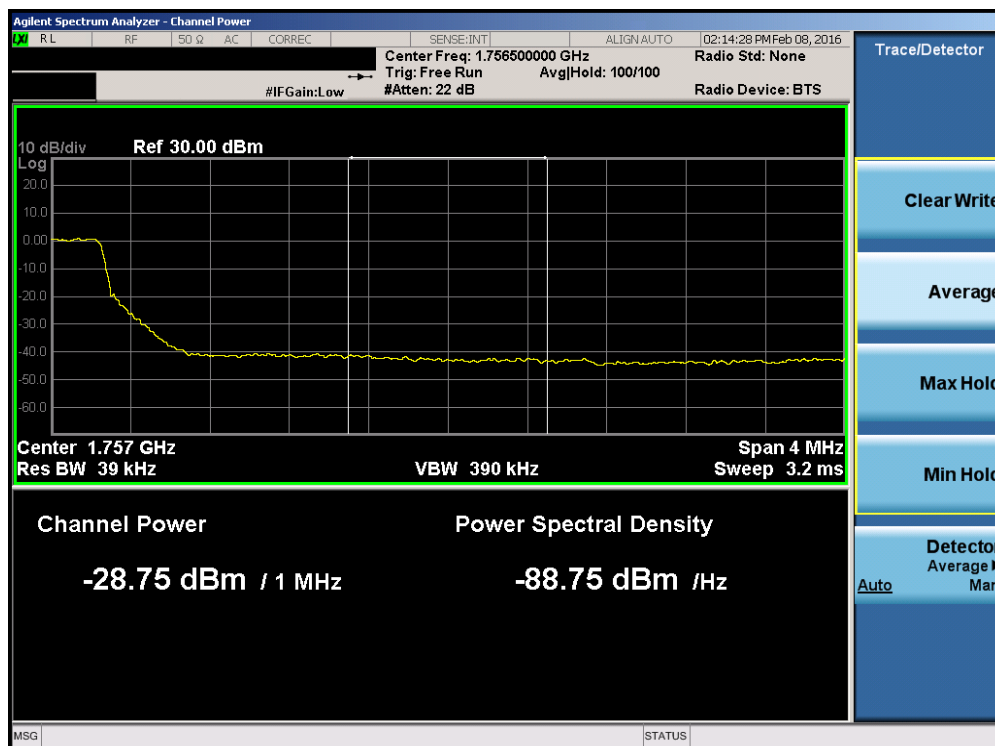


Plot 7-98. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 64 of 115

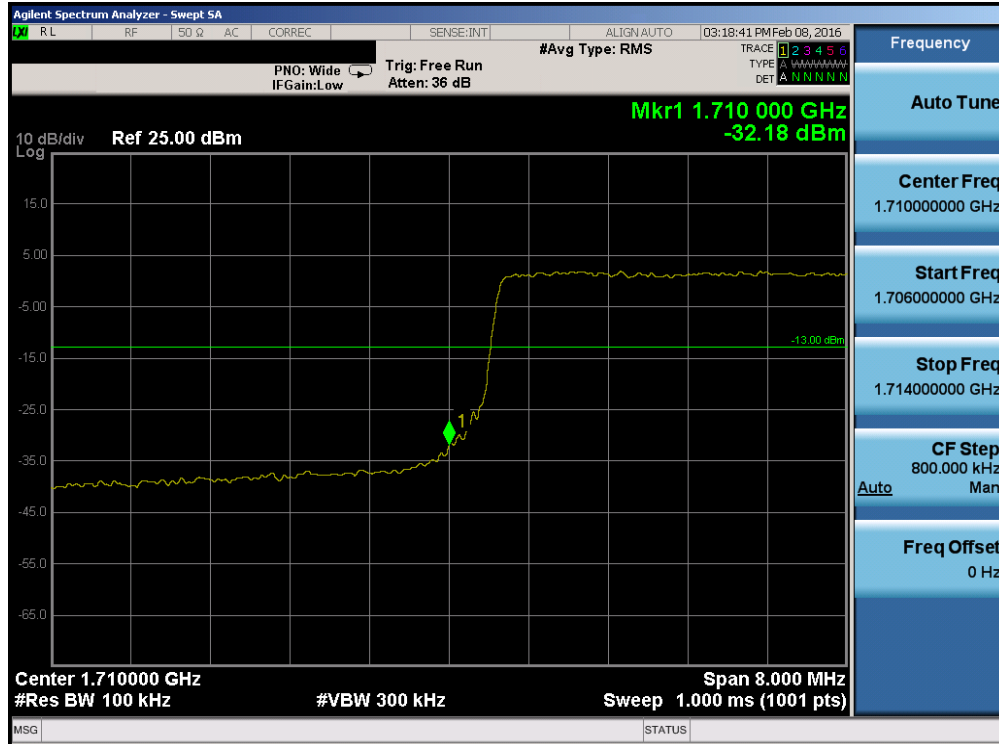


Plot 7-99. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

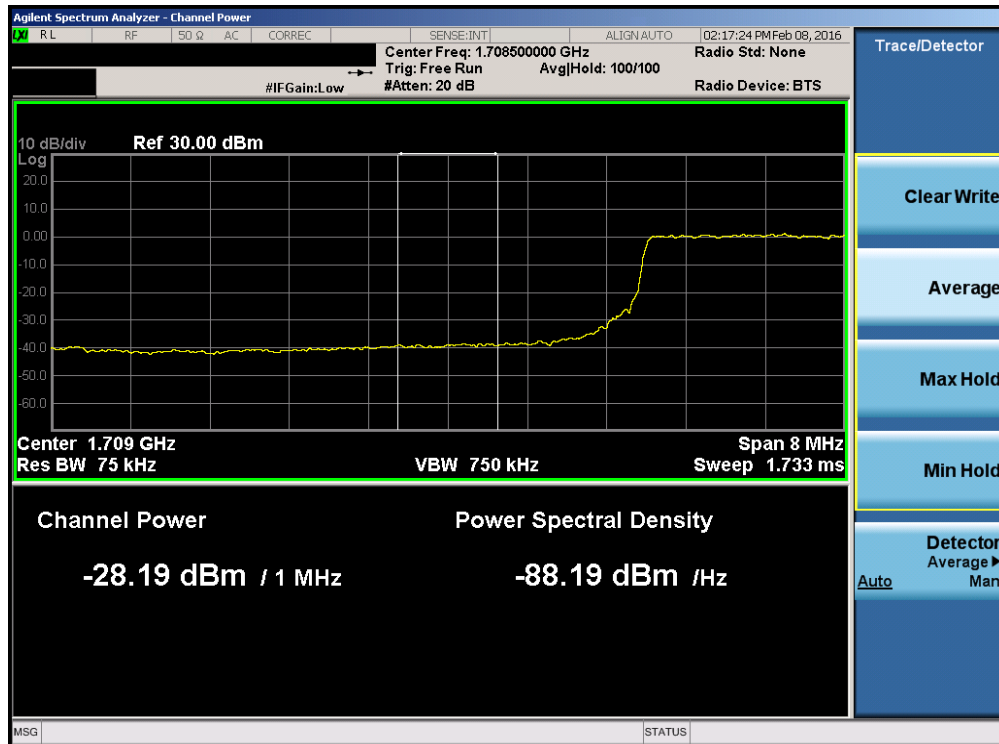


Plot 7-100. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 65 of 115

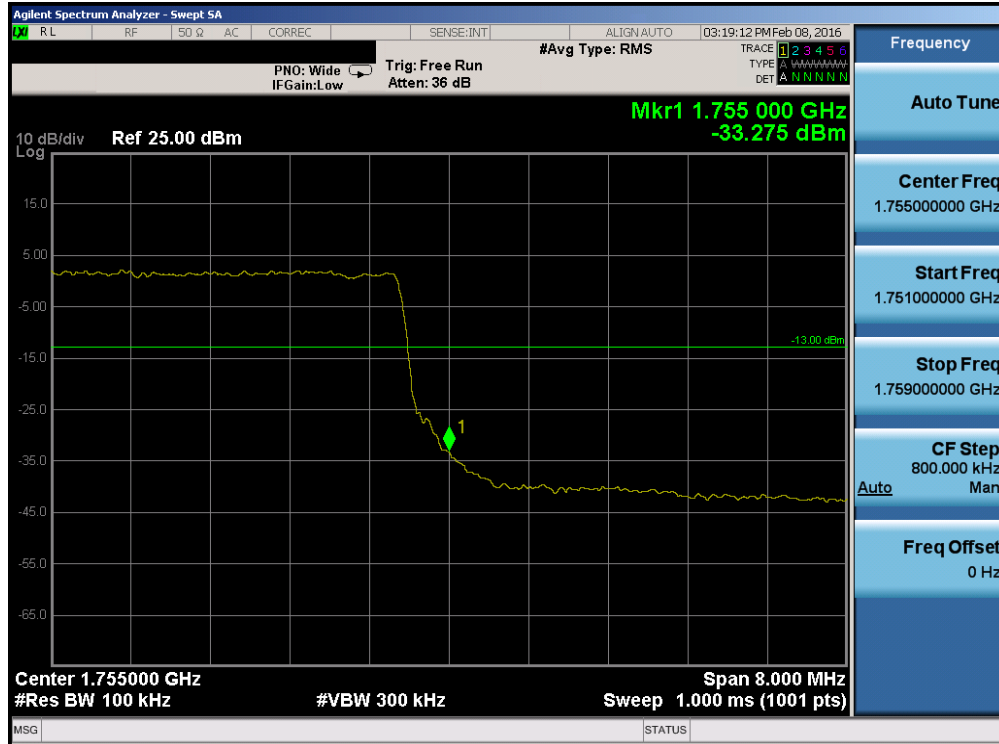


Plot 7-101. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

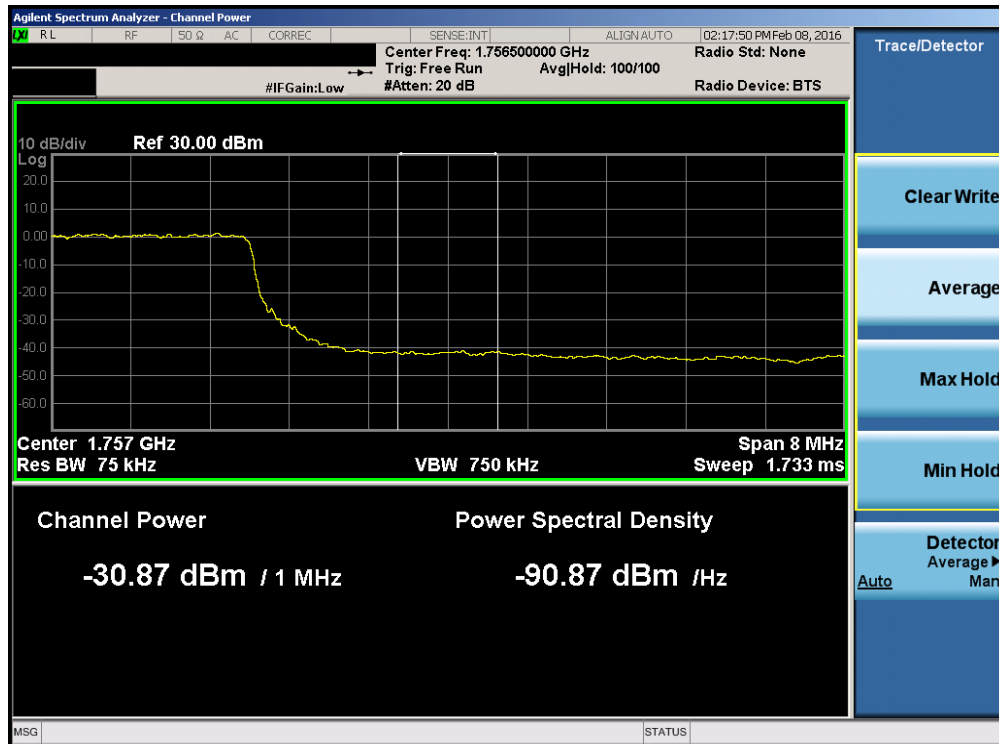


Plot 7-102. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 66 of 115

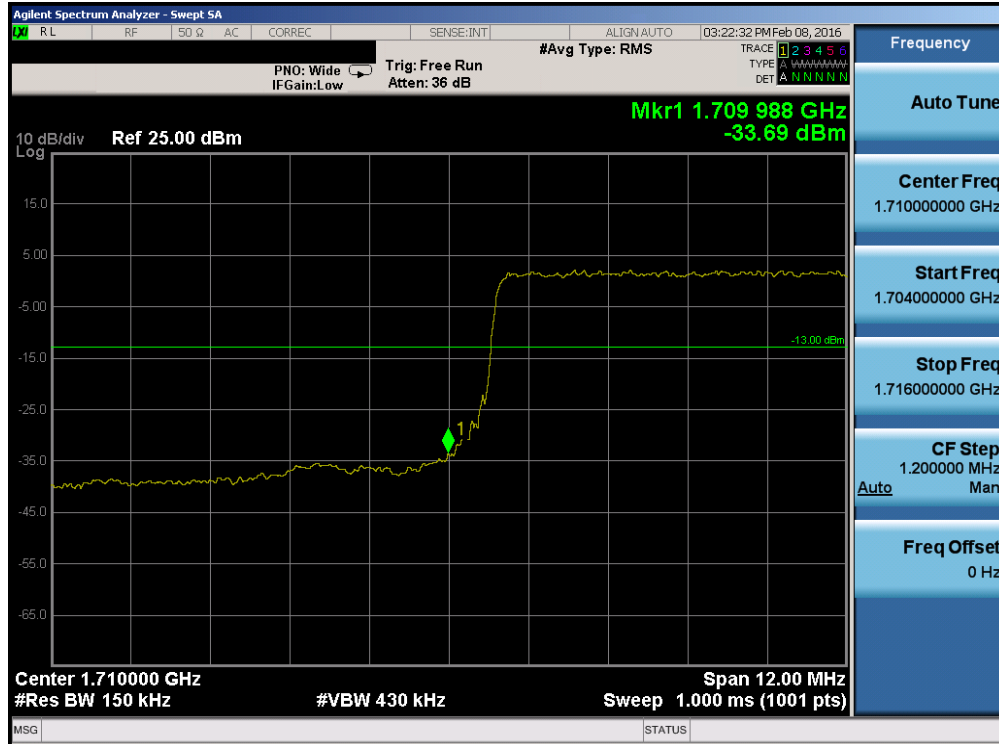


Plot 7-103. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

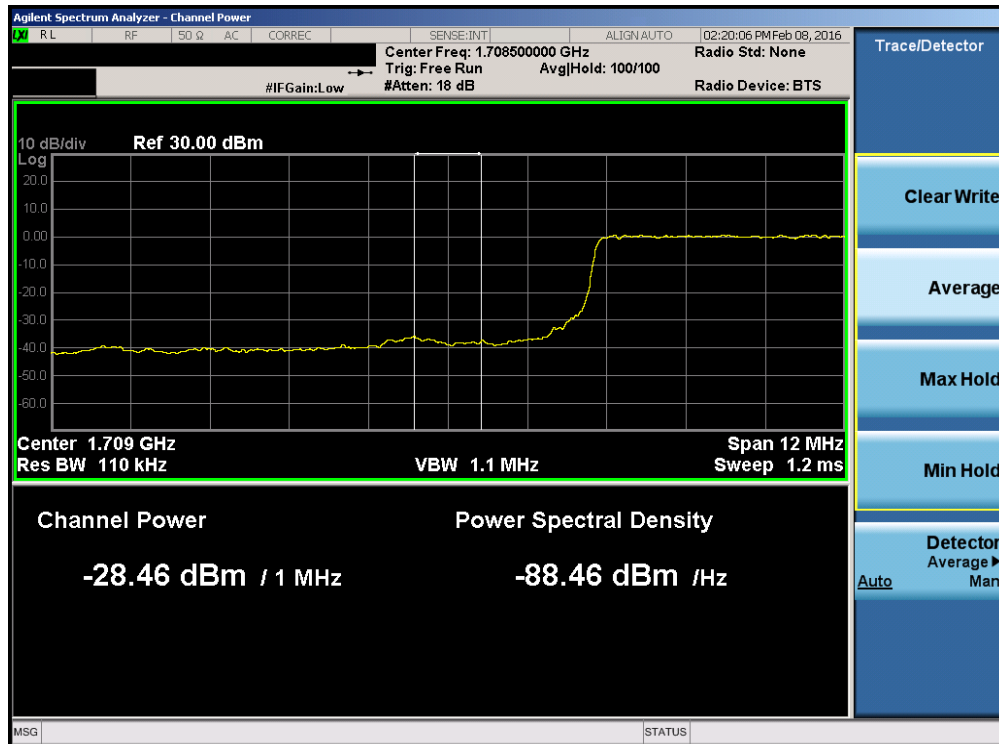


Plot 7-104. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 67 of 115

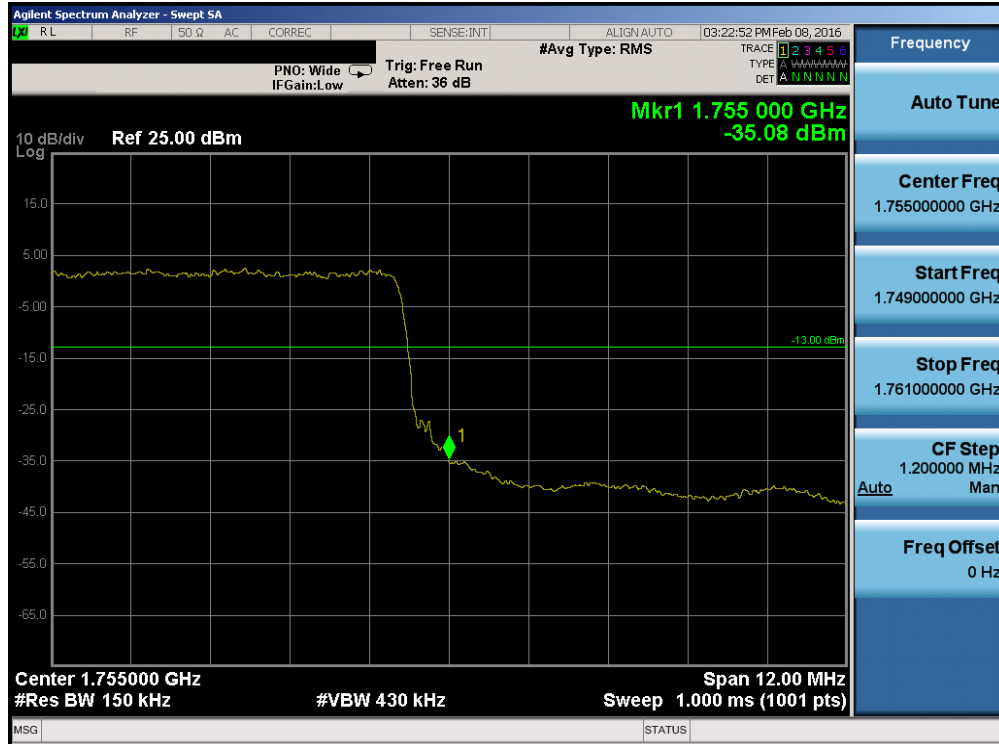


Plot 7-105. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

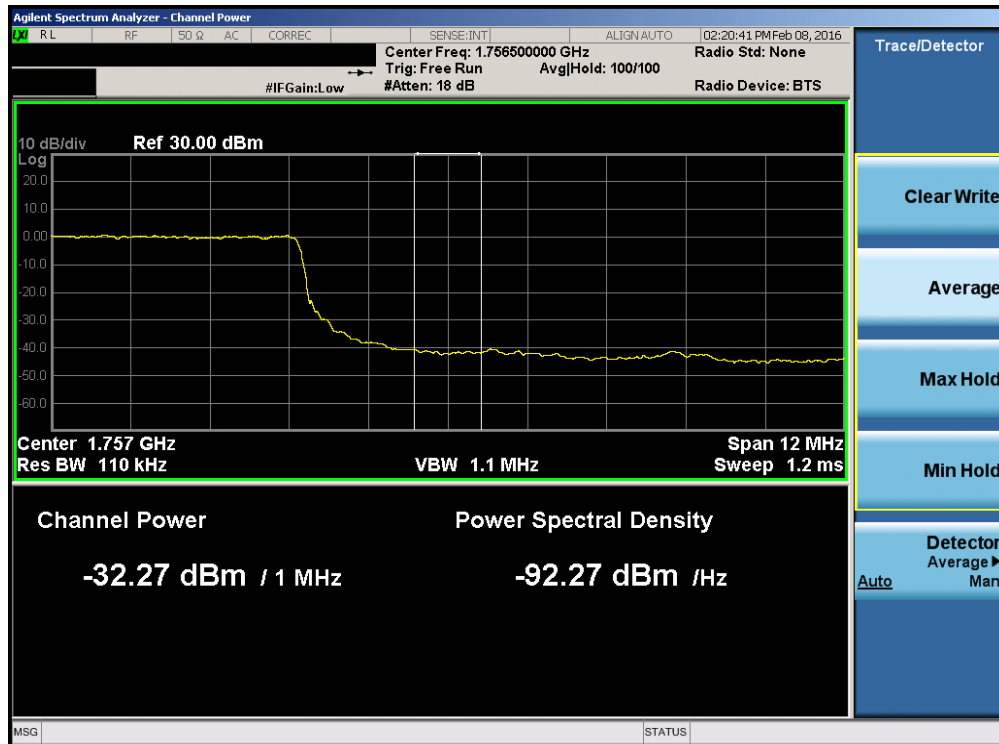


Plot 7-106. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 68 of 115

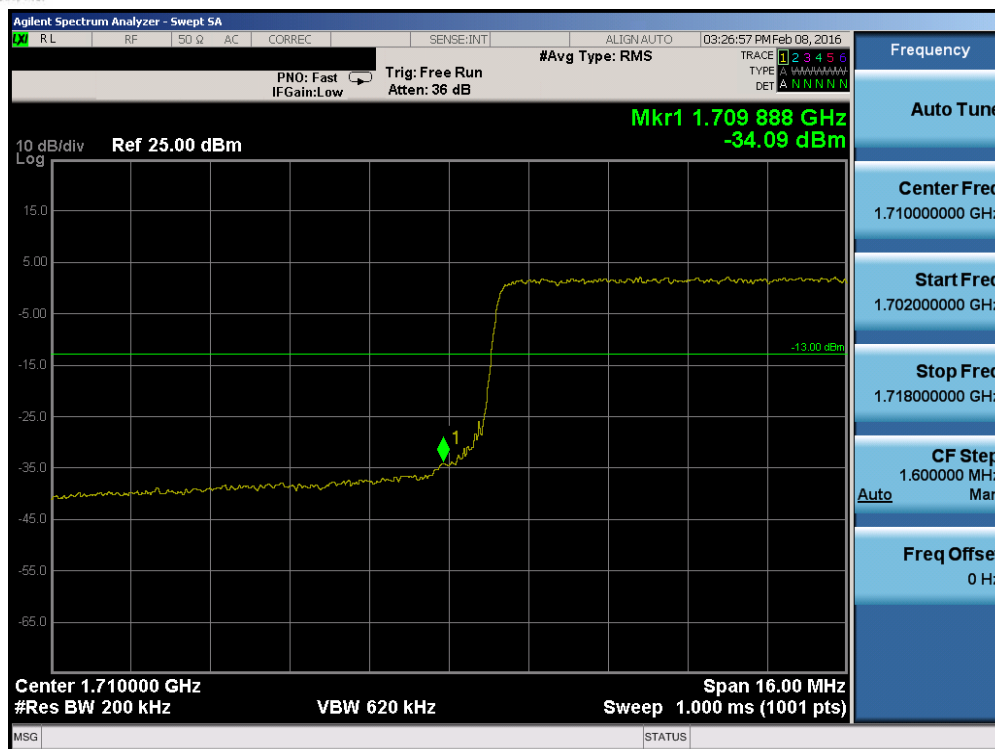


Plot 7-107. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

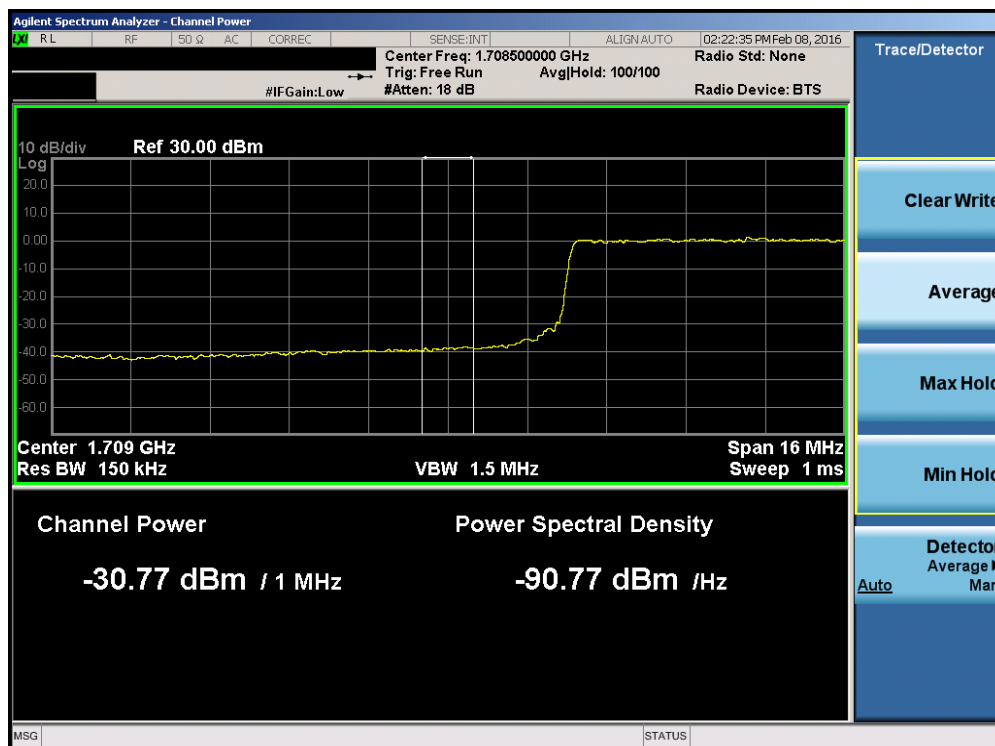


Plot 7-108. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 69 of 115

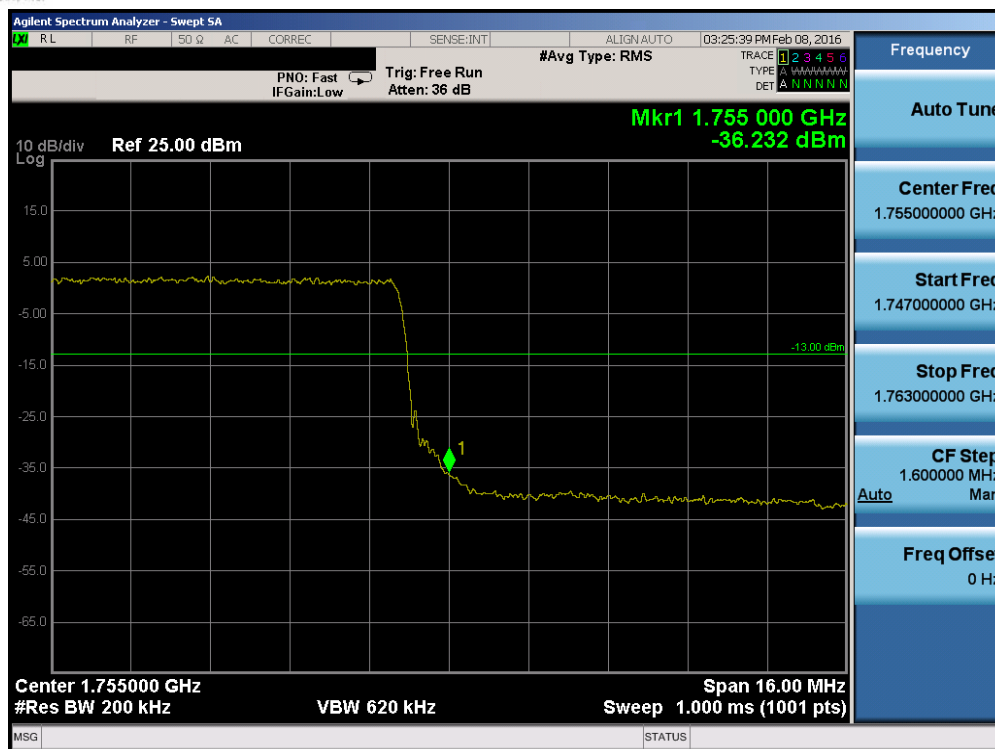


Plot 7-109. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

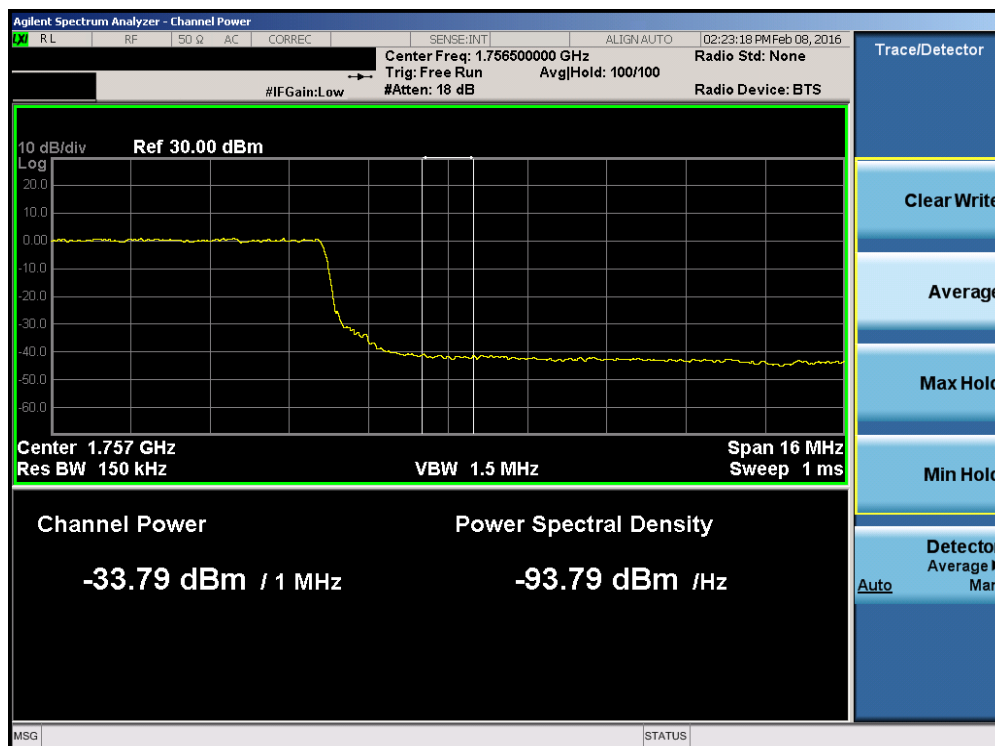


Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 70 of 115

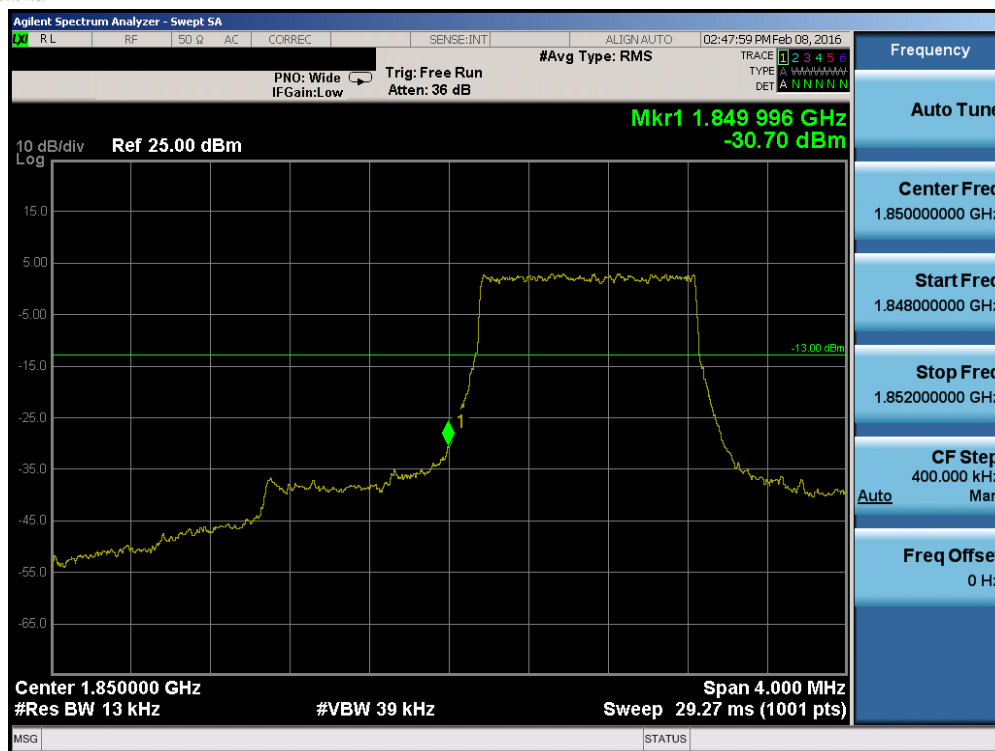


Plot 7-111. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

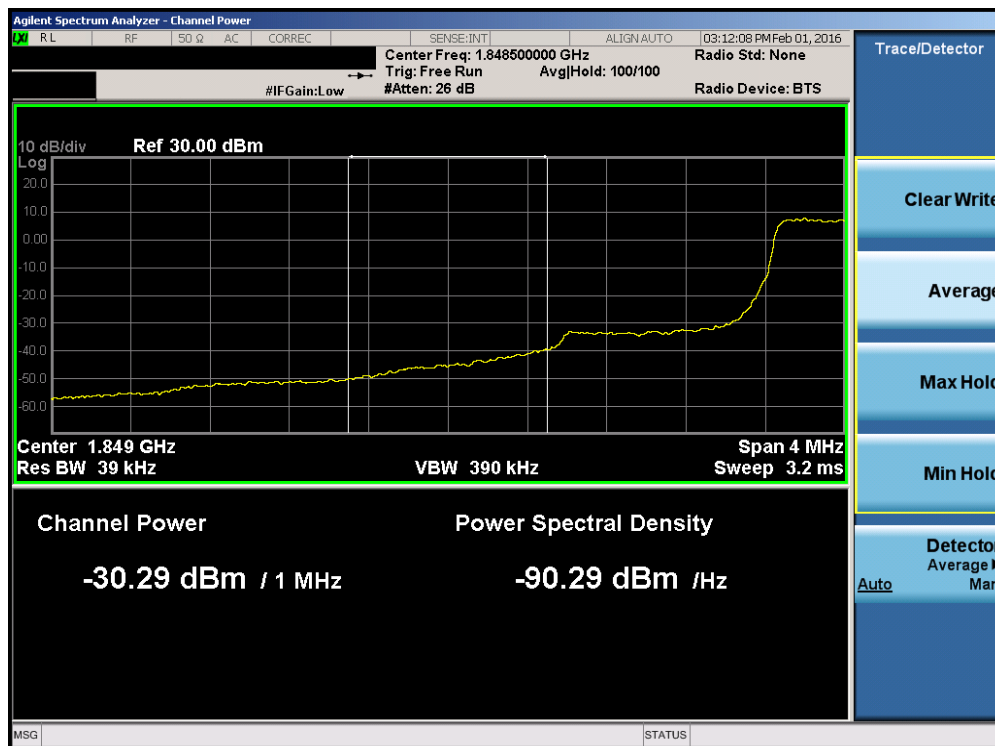


Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 7-113. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

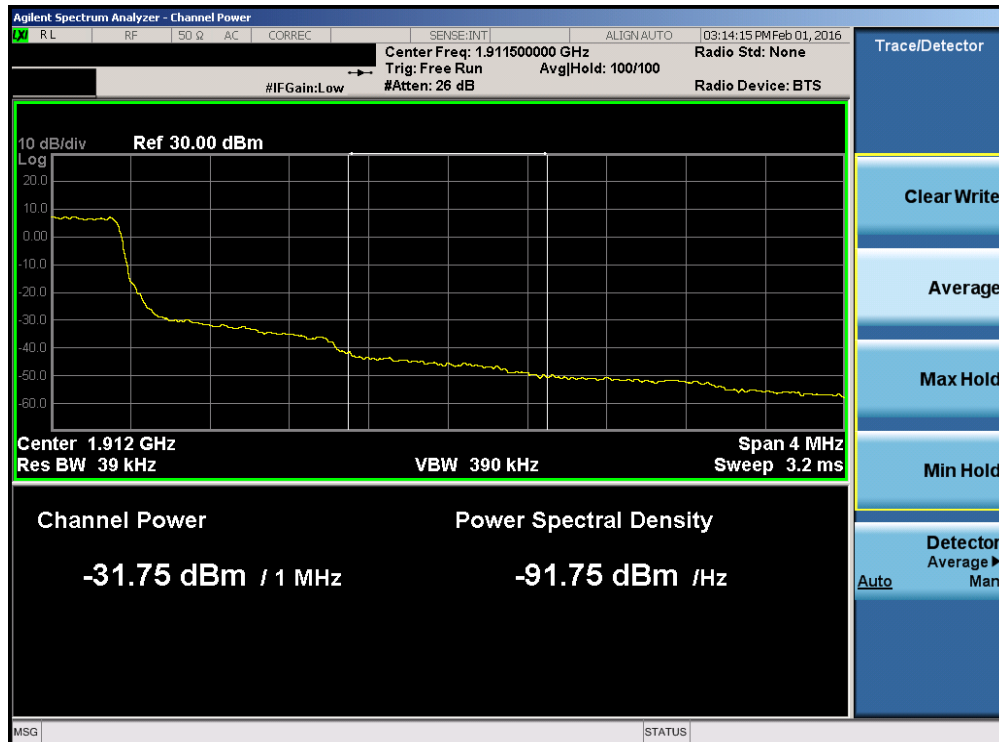


Plot 7-114. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 72 of 115

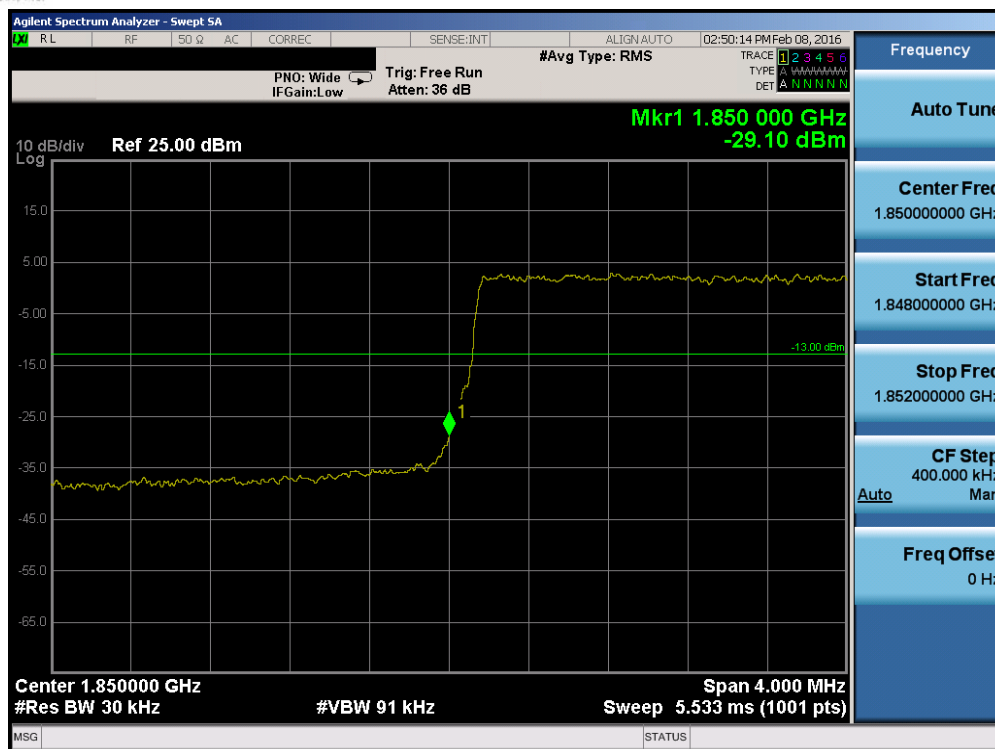


Plot 7-115. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

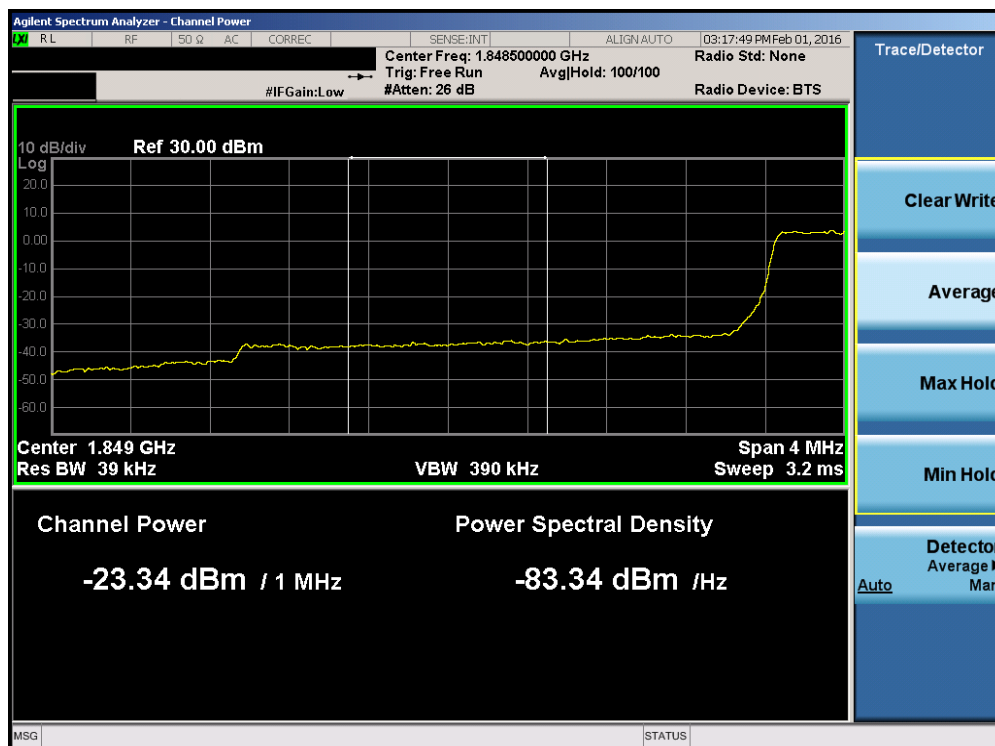


Plot 7-116. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 73 of 115

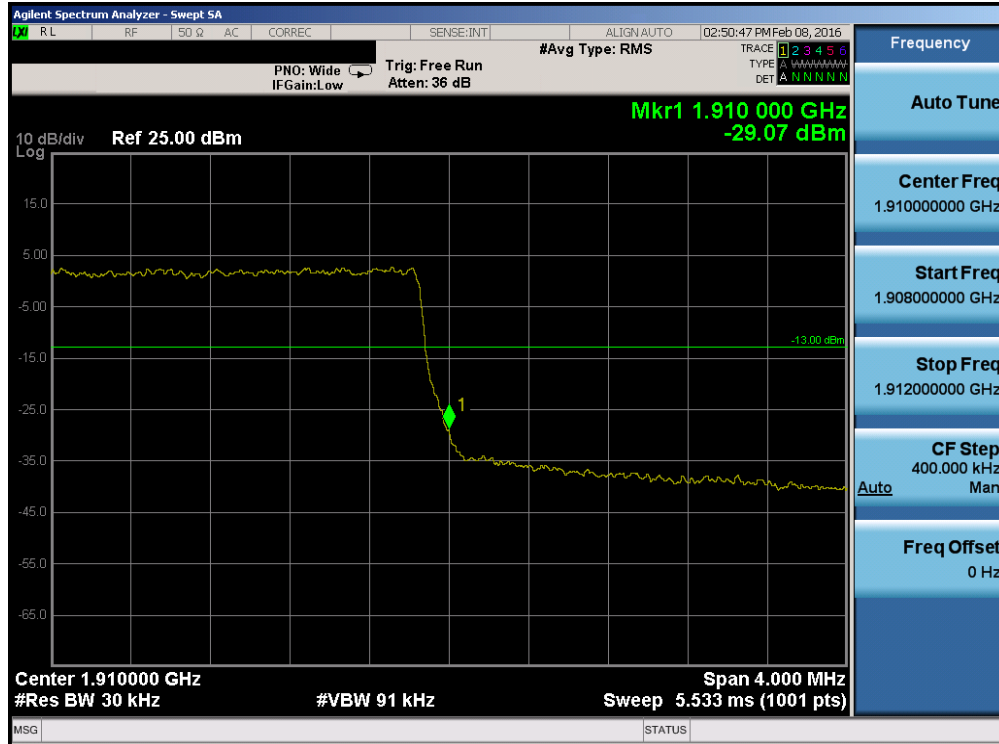


Plot 7-117. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

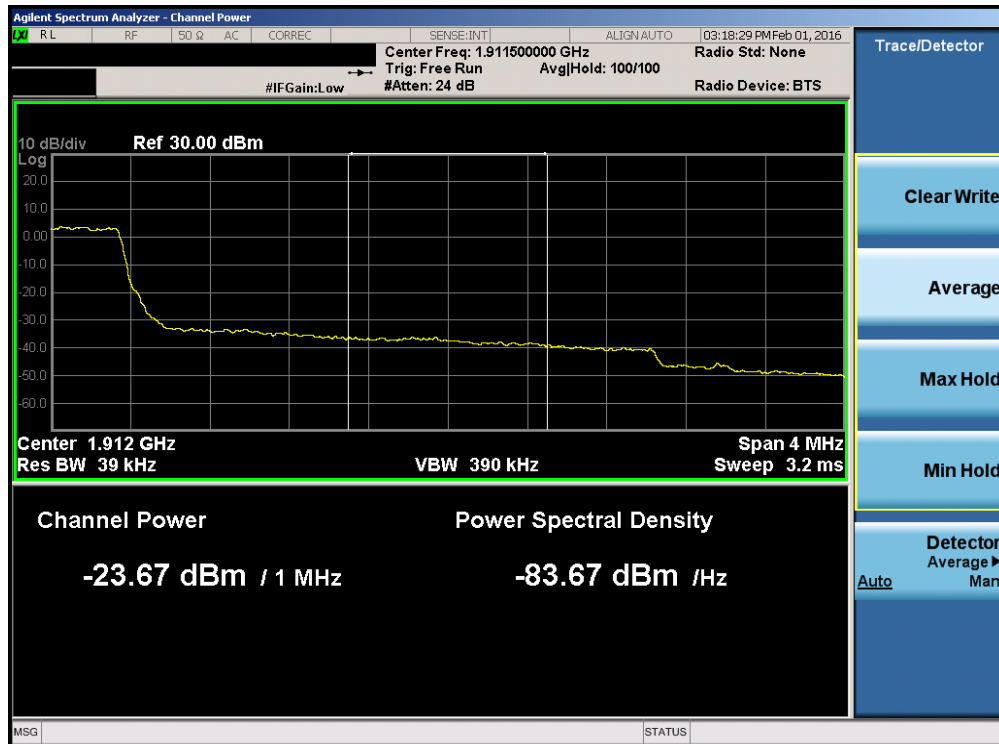


Plot 7-118. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 74 of 115

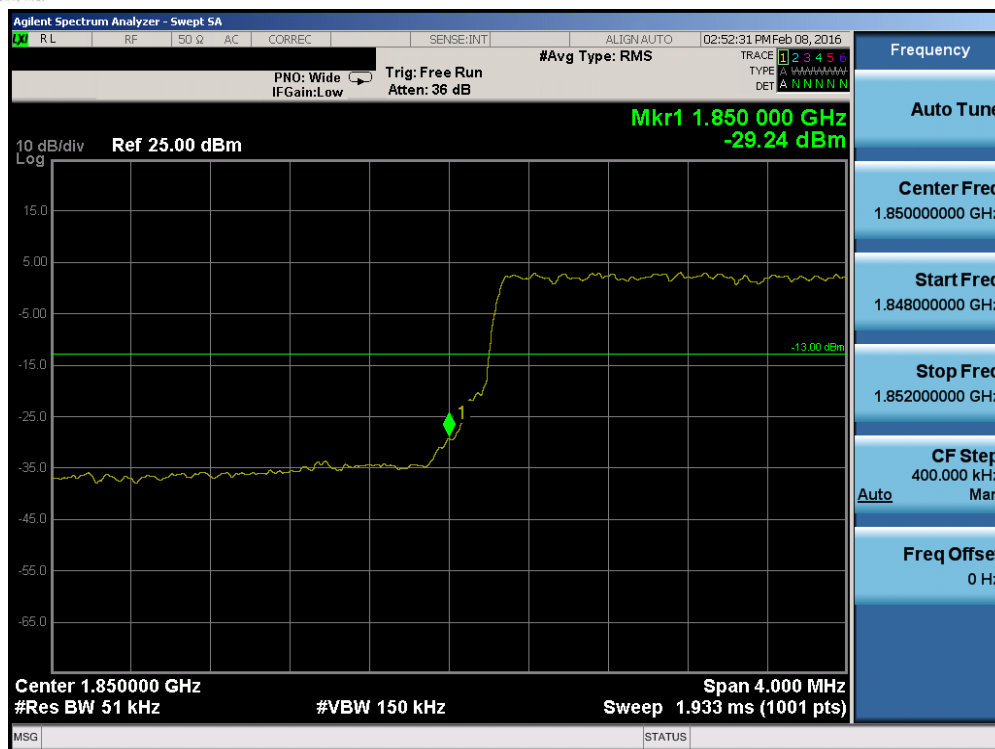


Plot 7-119. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

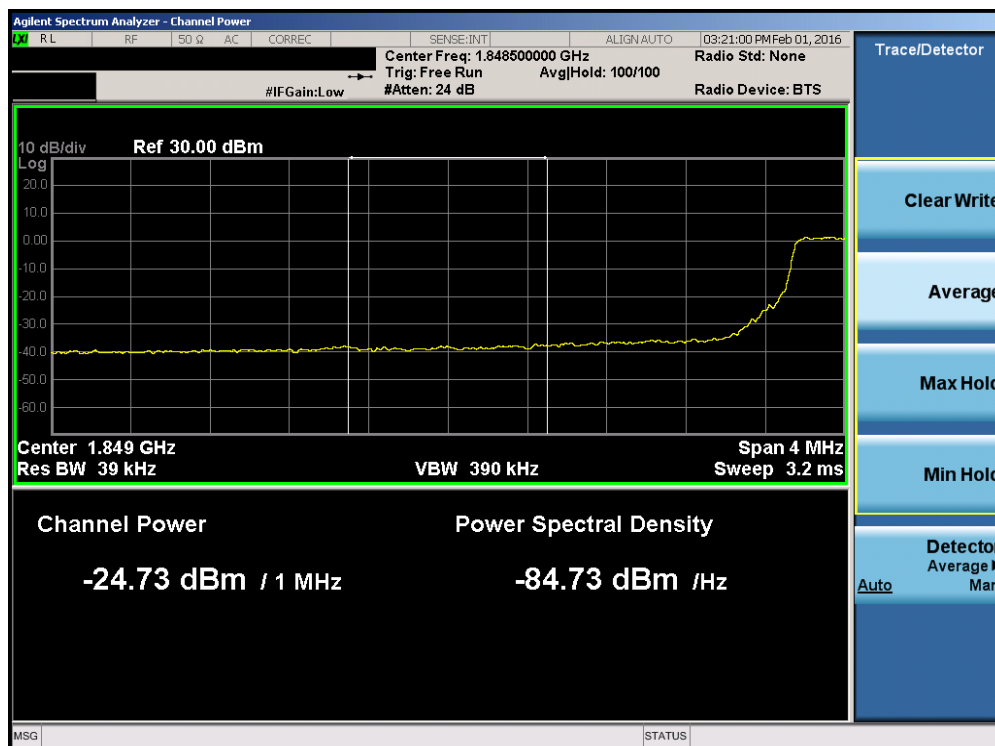


Plot 7-120. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 75 of 115



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

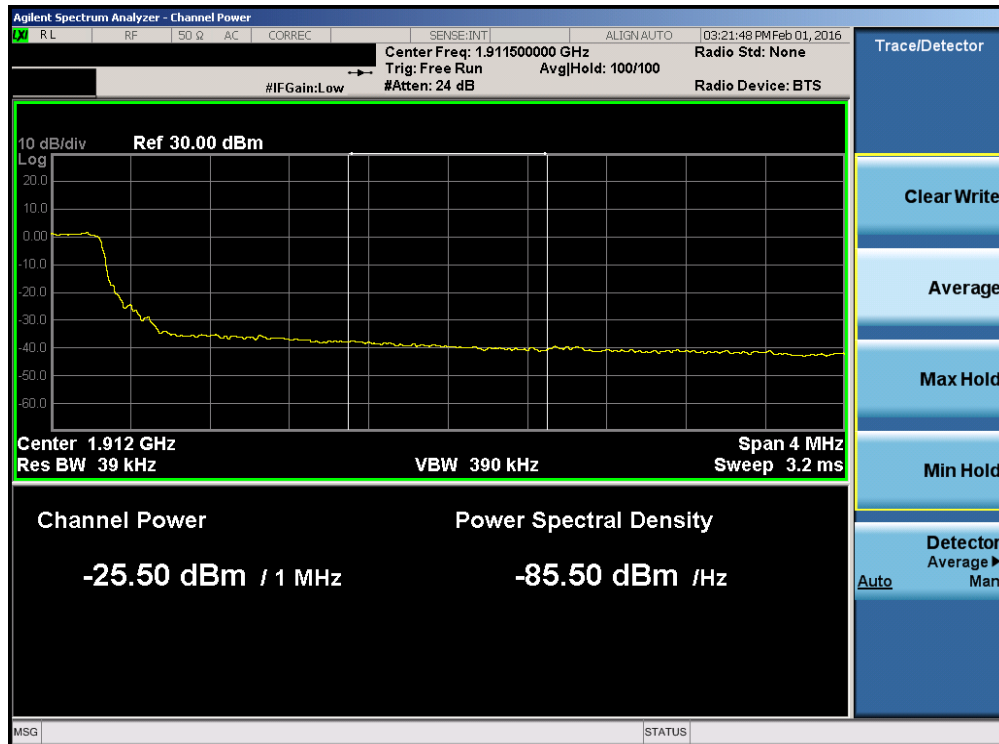


Plot 7-122. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 76 of 115

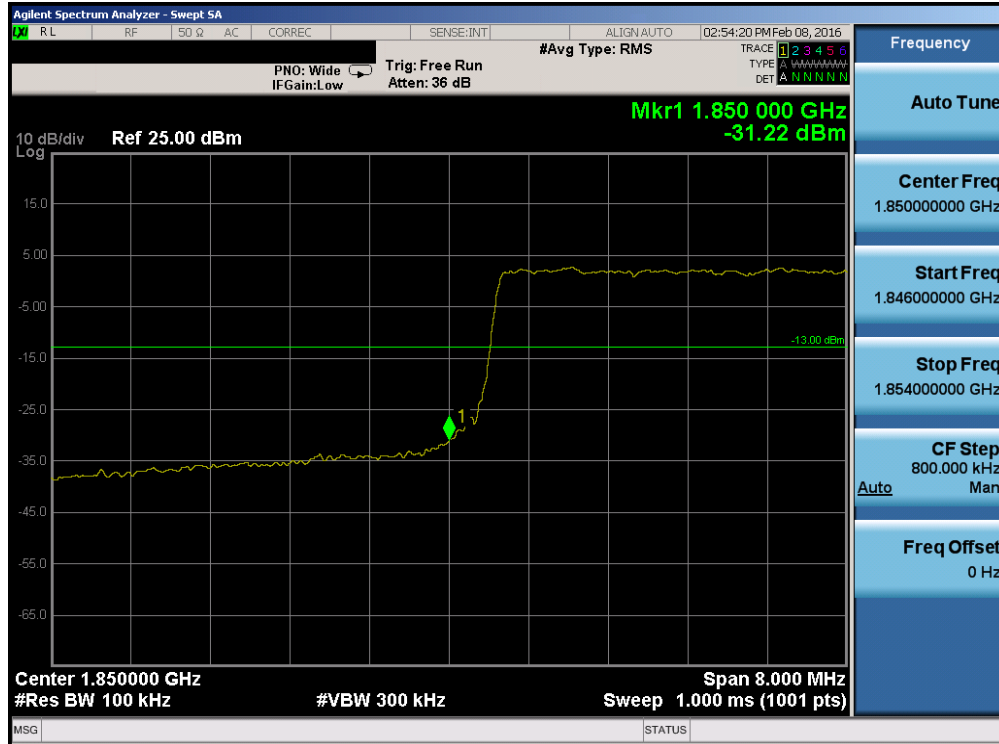


Plot 7-123. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

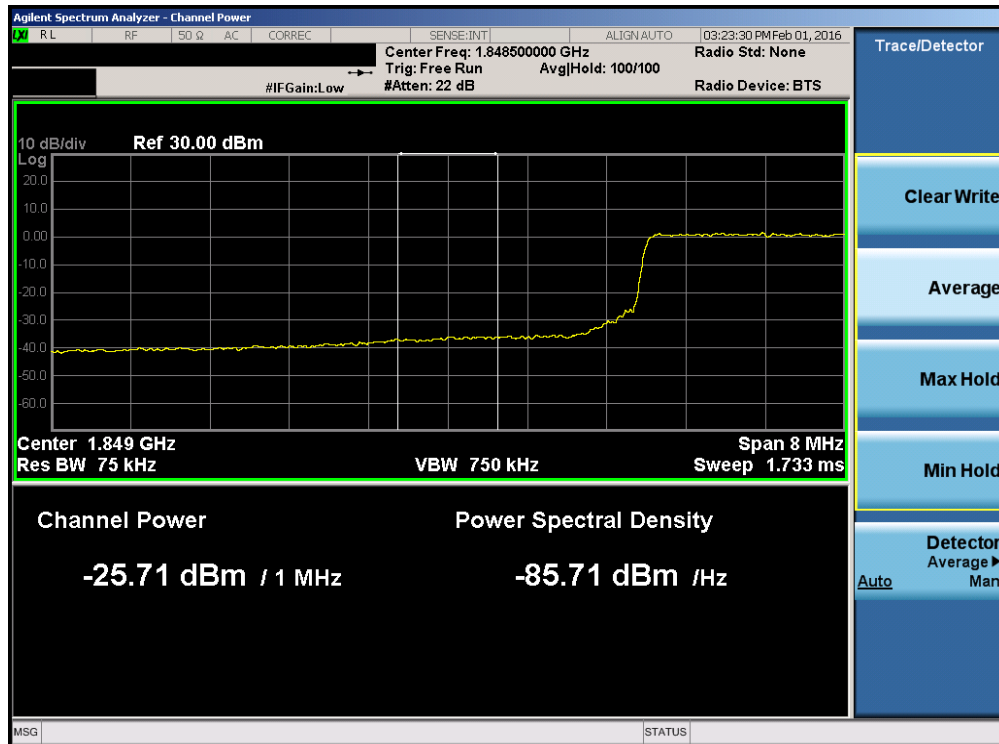


Plot 7-124. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 77 of 115

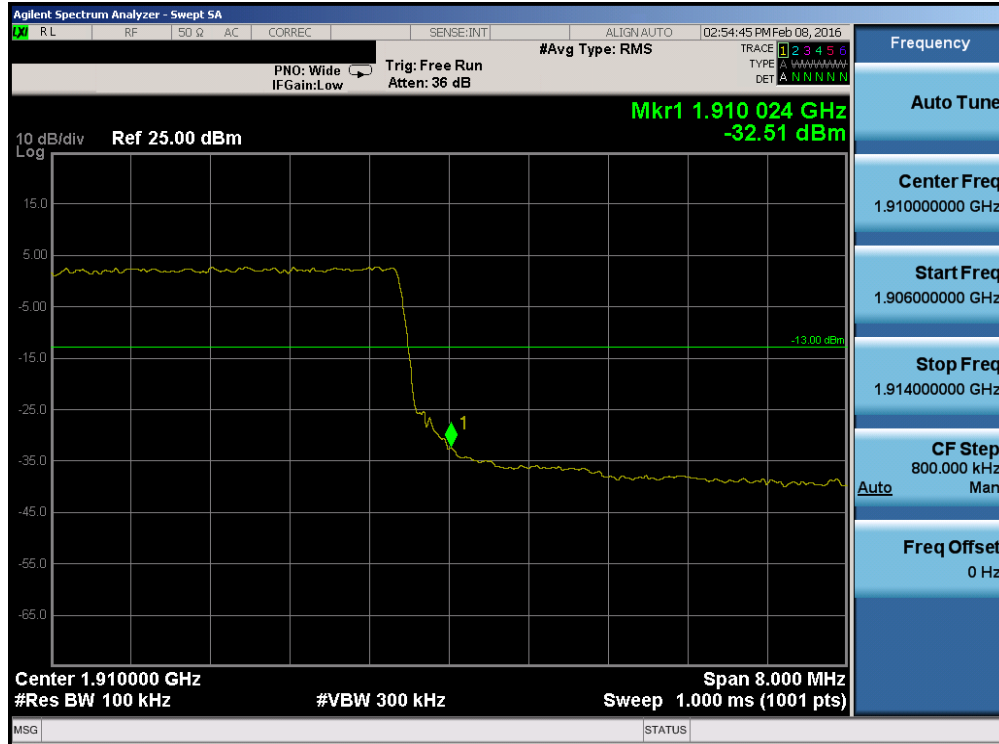


Plot 7-125. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

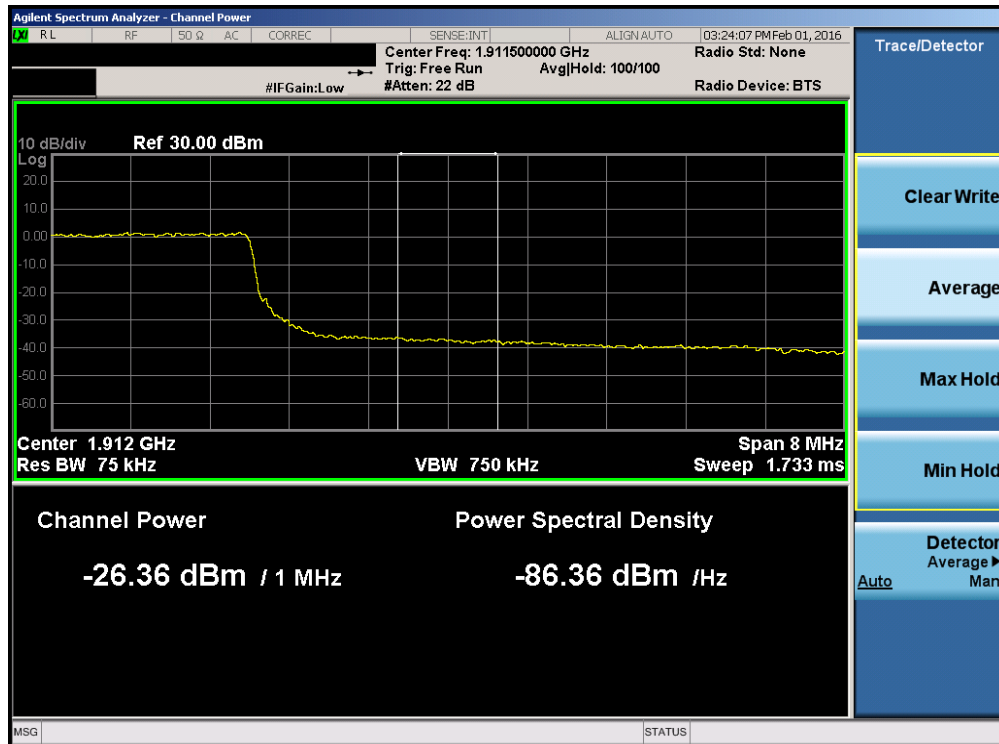


Plot 7-126. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 78 of 115

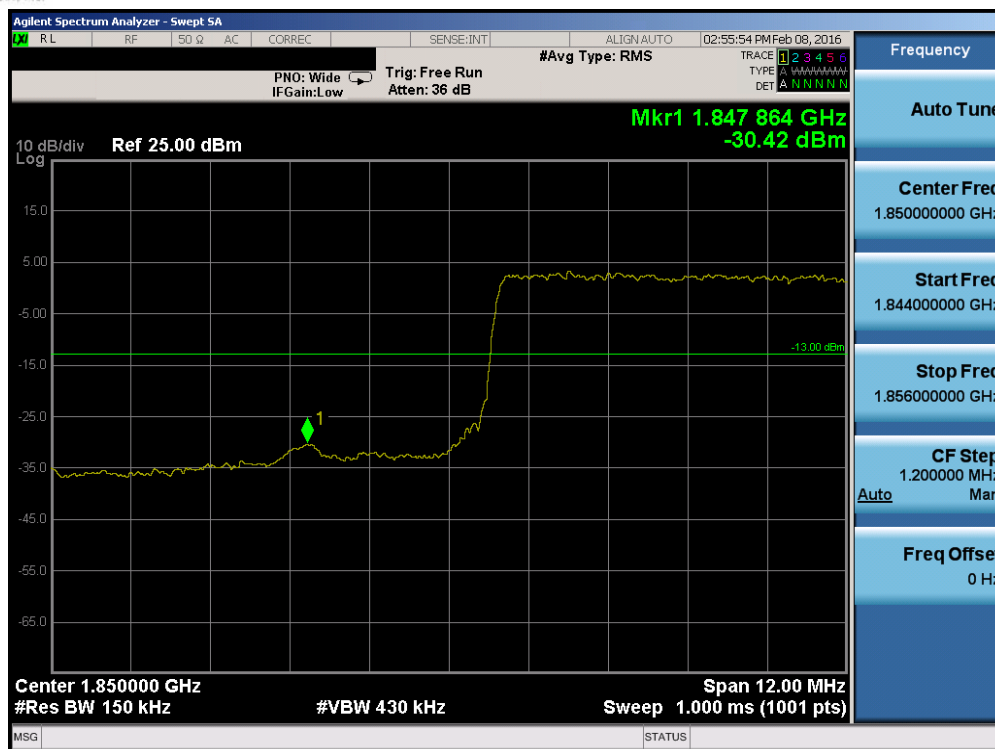


Plot 7-127. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

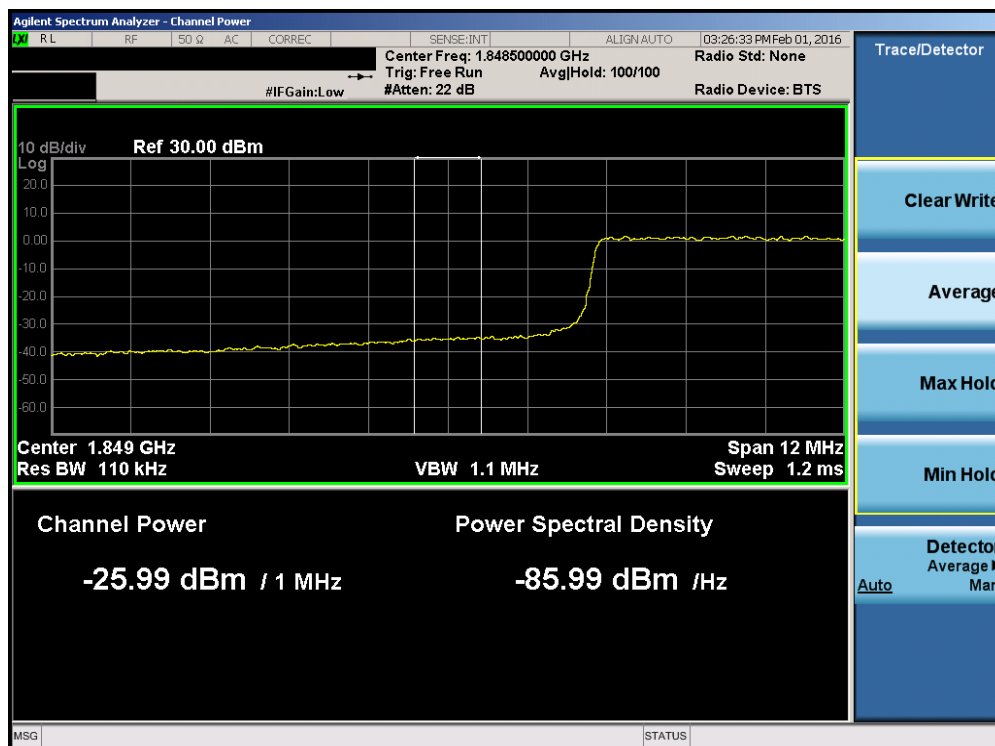


Plot 7-128. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 79 of 115

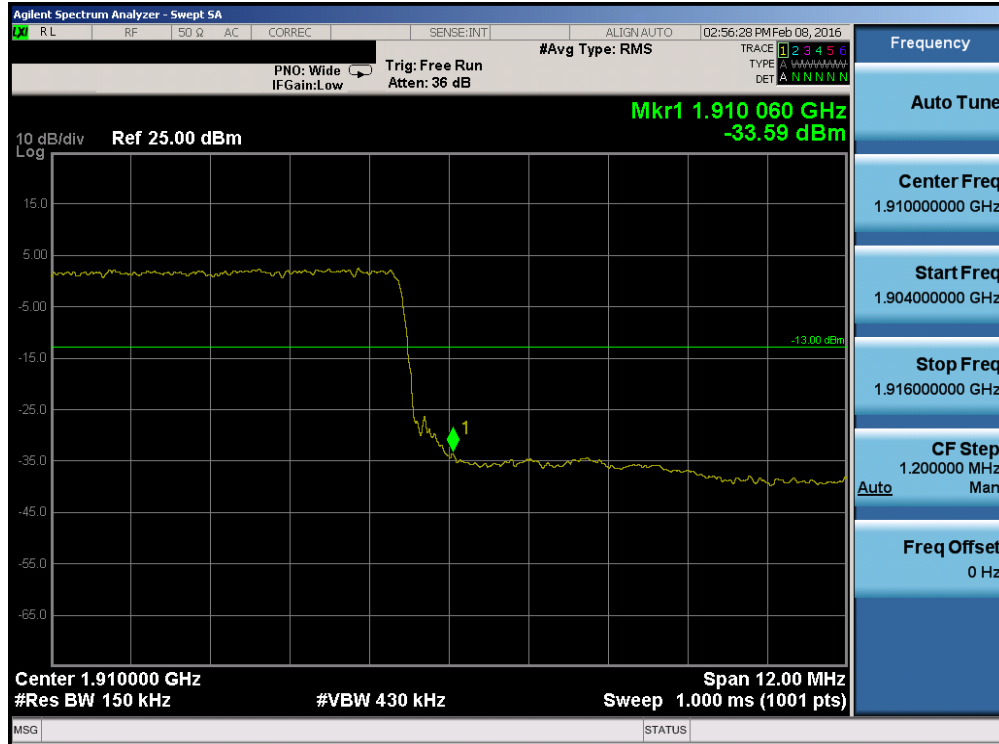


Plot 7-129. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

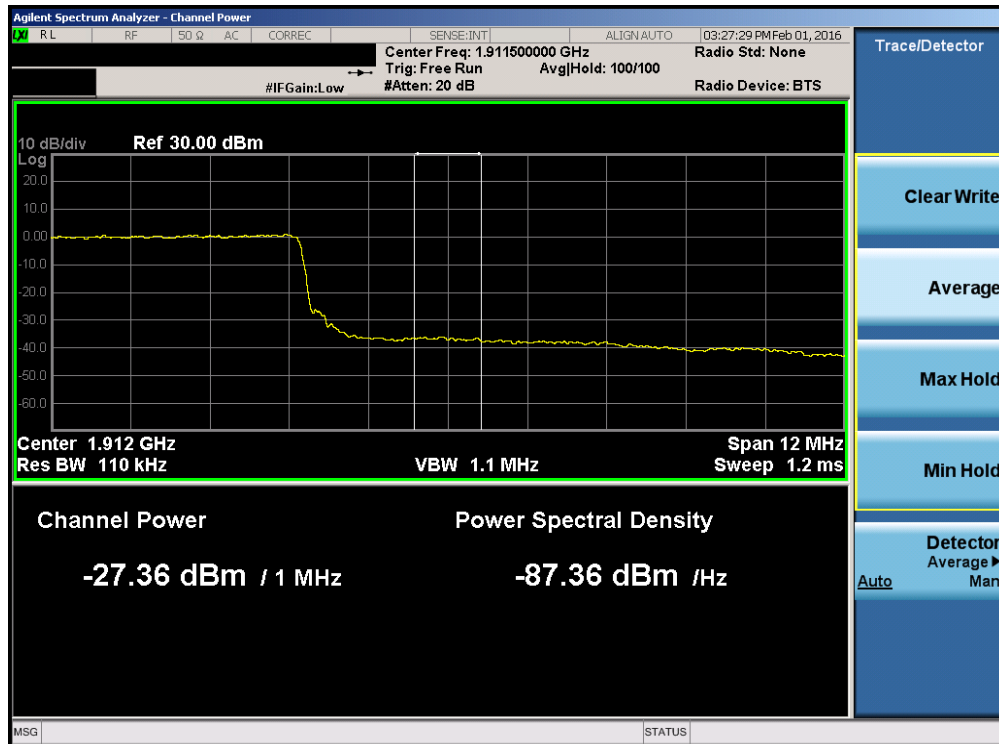


Plot 7-130. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 80 of 115

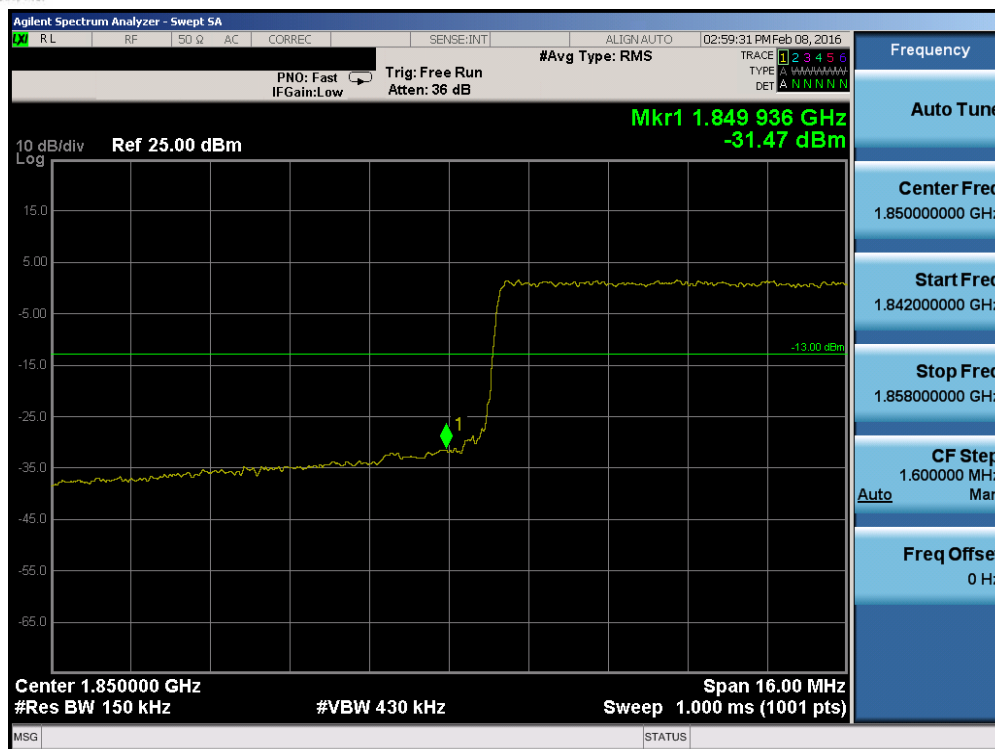


Plot 7-131. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

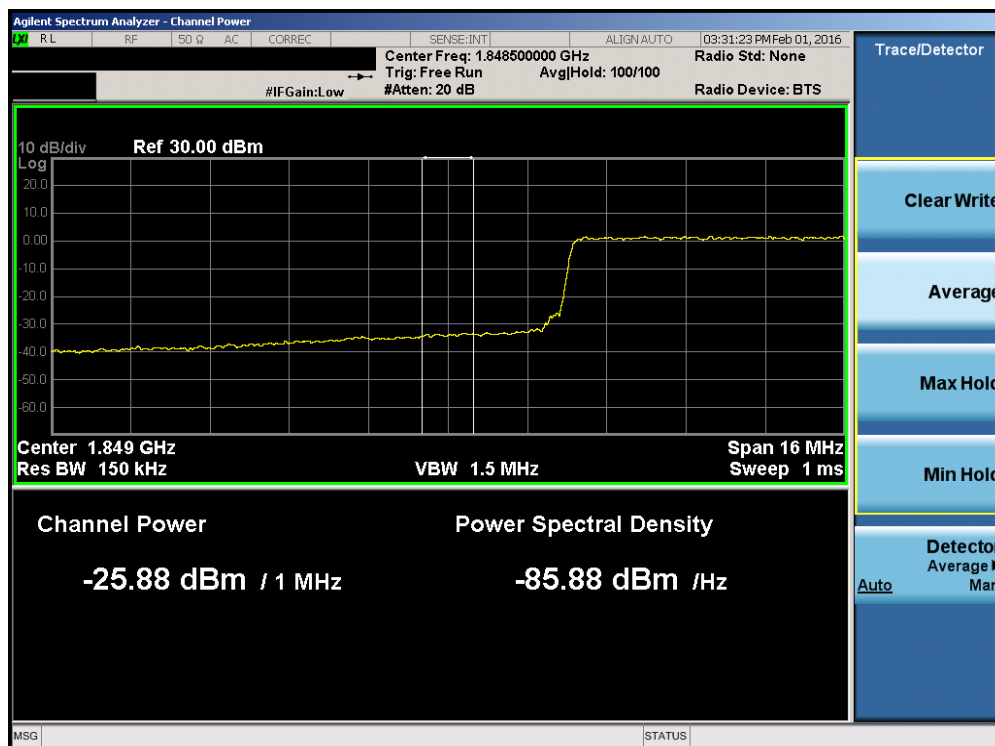


Plot 7-132. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 81 of 115

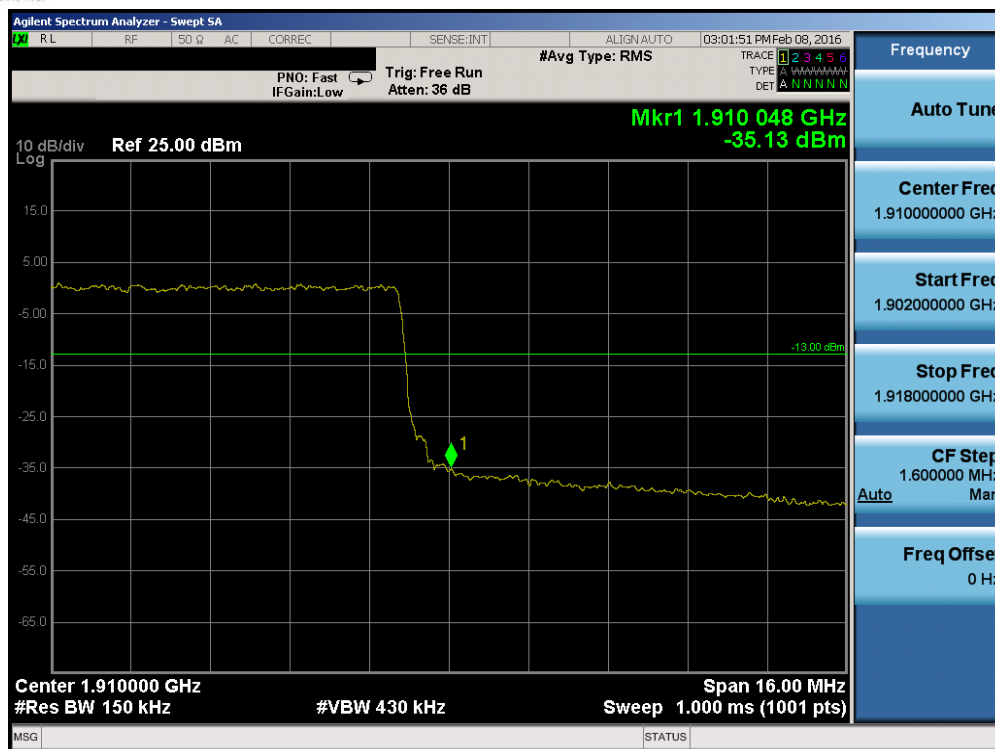


Plot 7-133. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

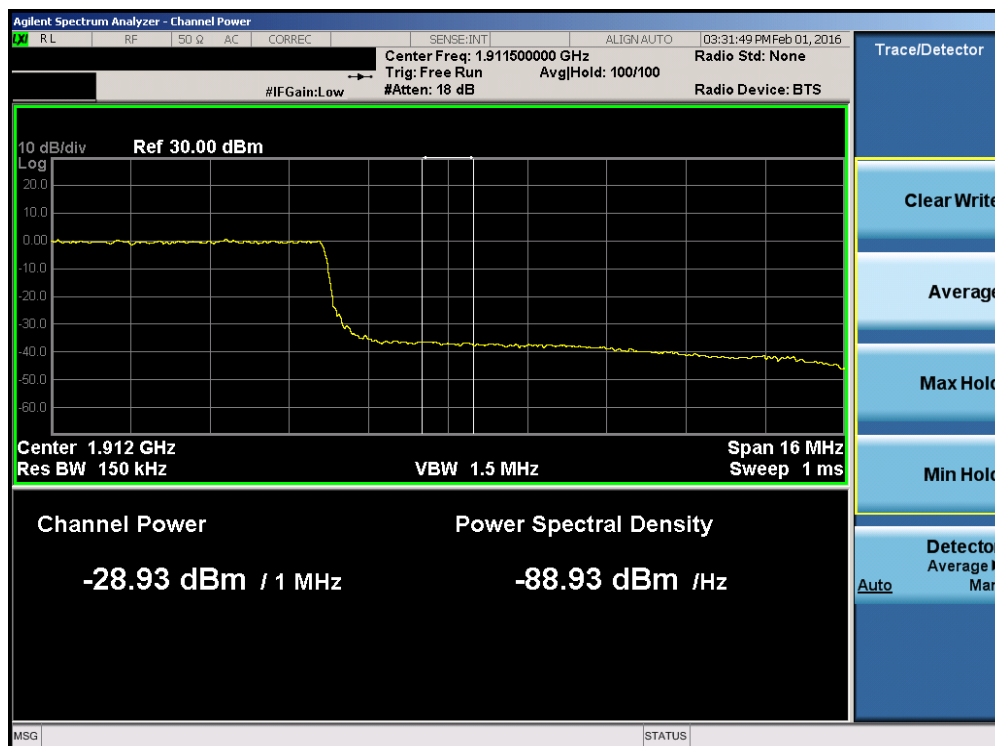


Plot 7-134. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 82 of 115



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



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

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 83 of 115

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.

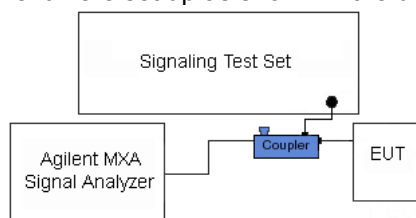
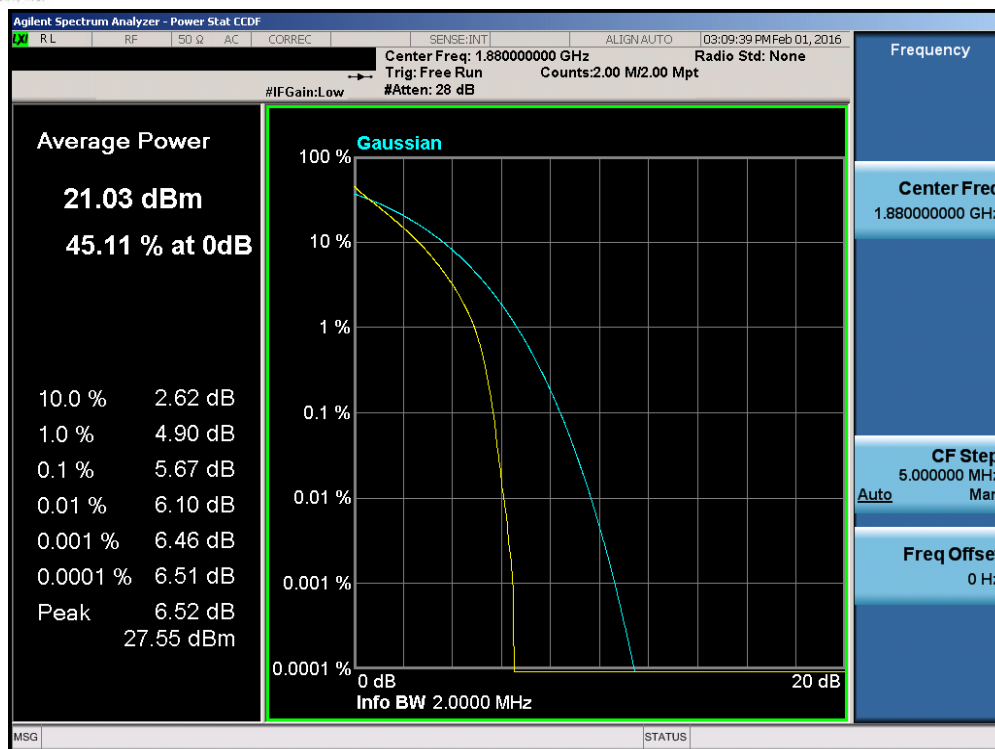


Figure 7-4. Test Instrument & Measurement Setup

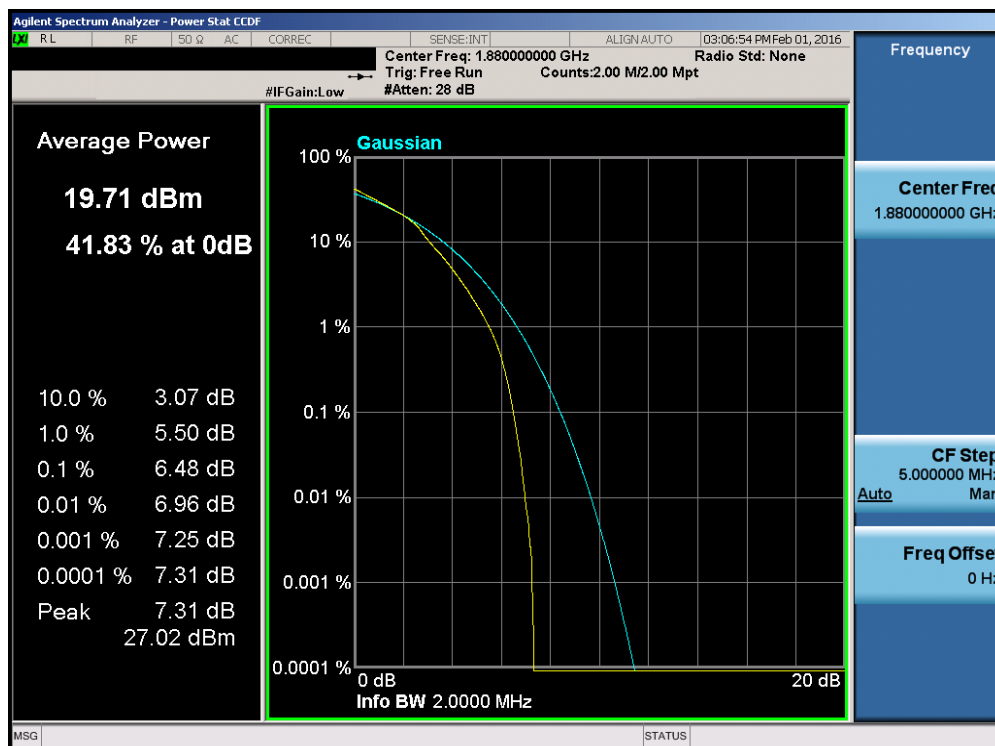
Test Notes

None.

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset	Page 84 of 115	

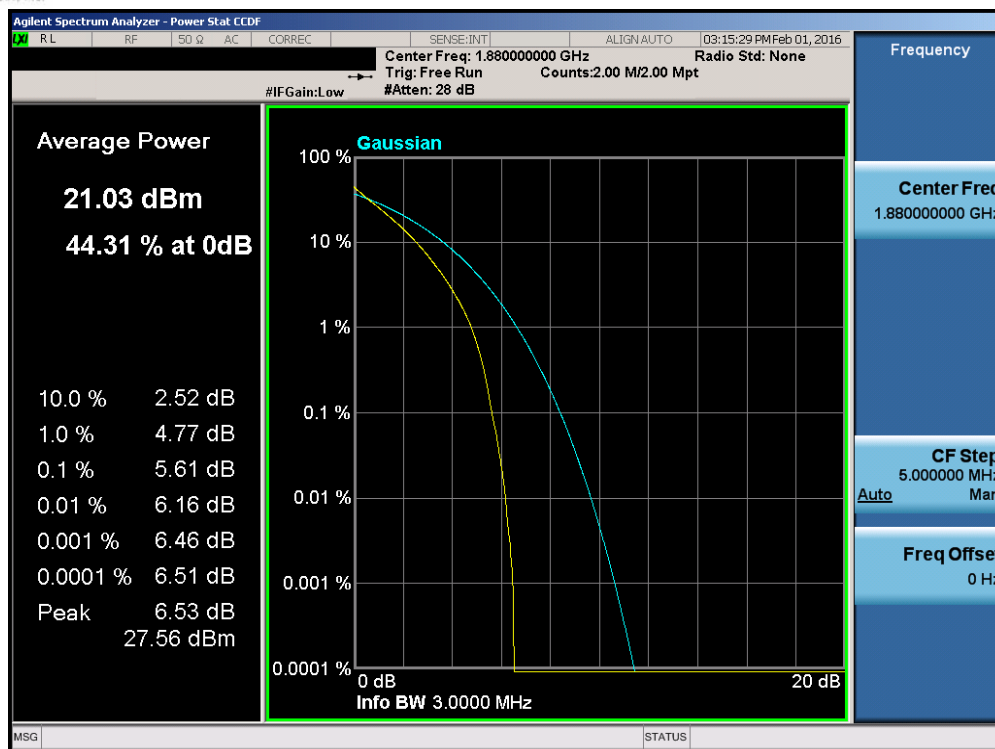


Plot 7-137. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

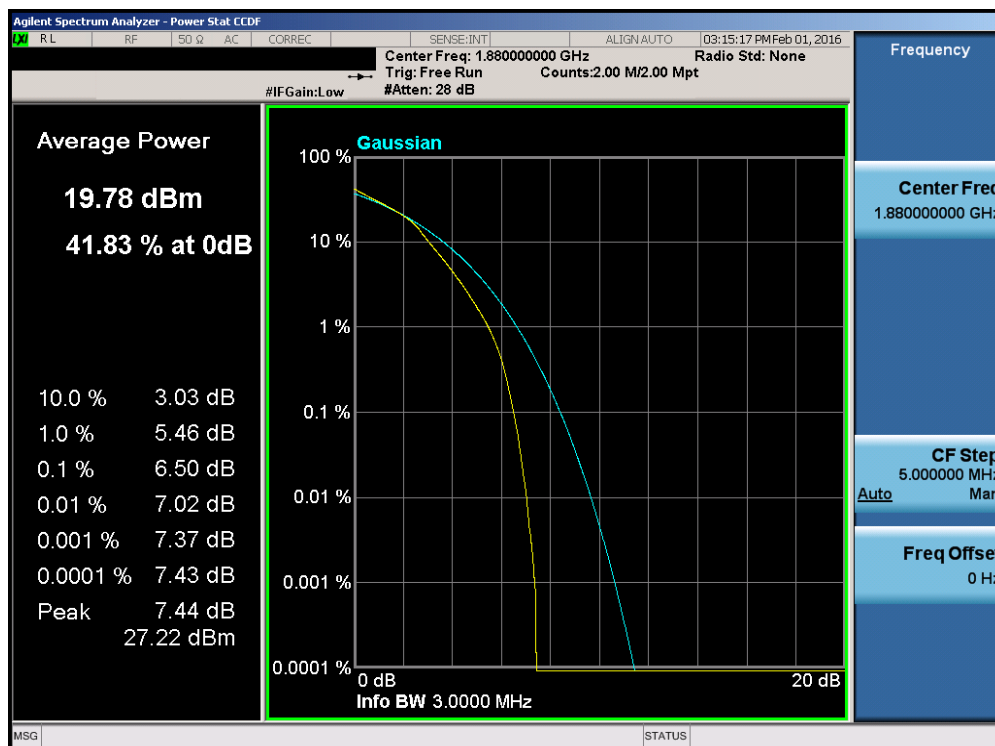


Plot 7-138. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 85 of 115

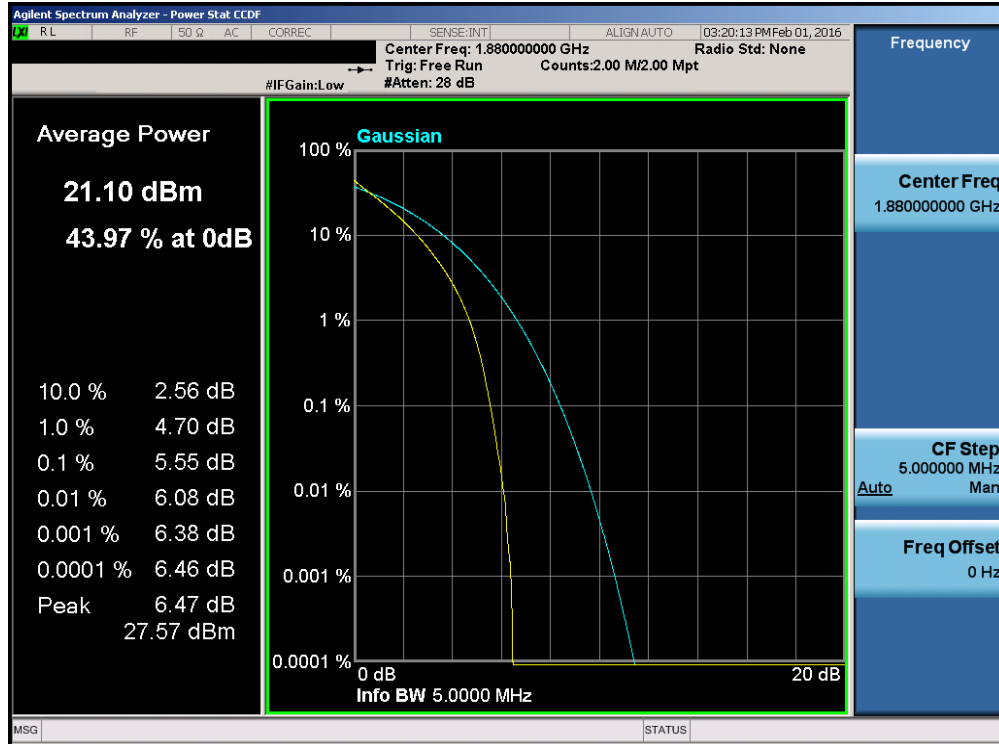


Plot 7-139. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

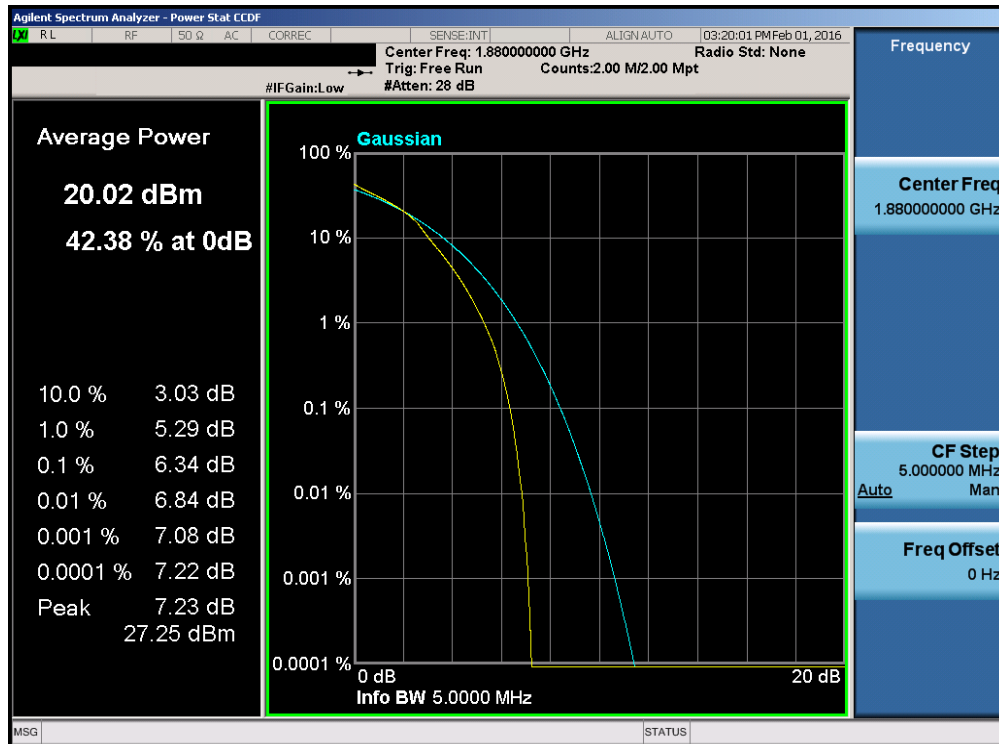


Plot 7-140. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 86 of 115

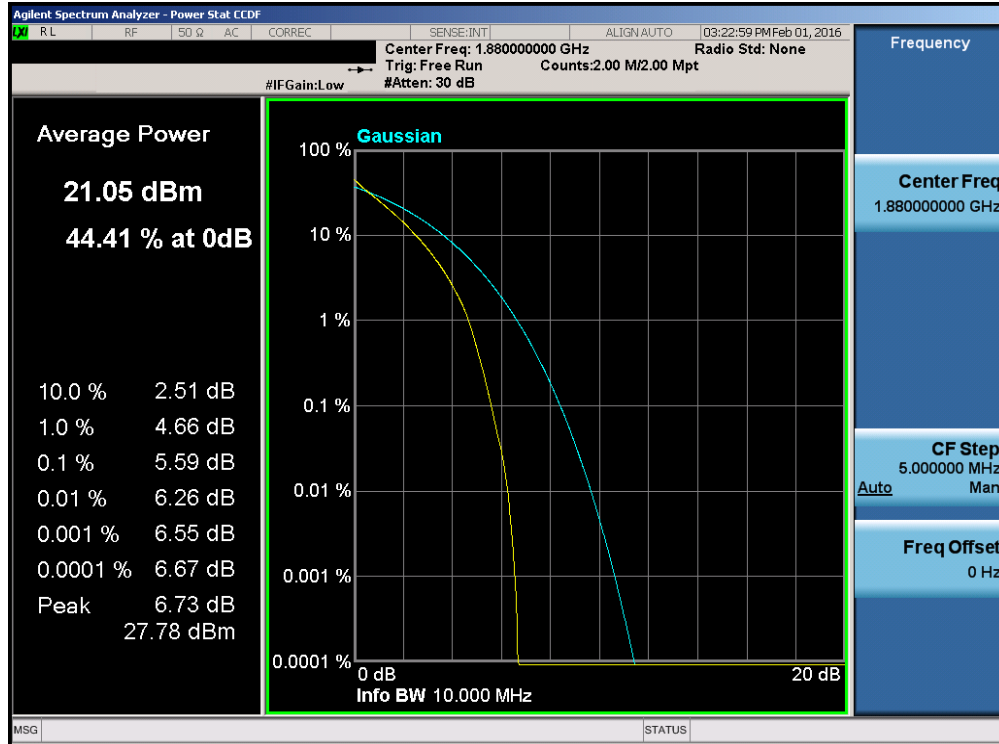


Plot 7-141. PAR Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

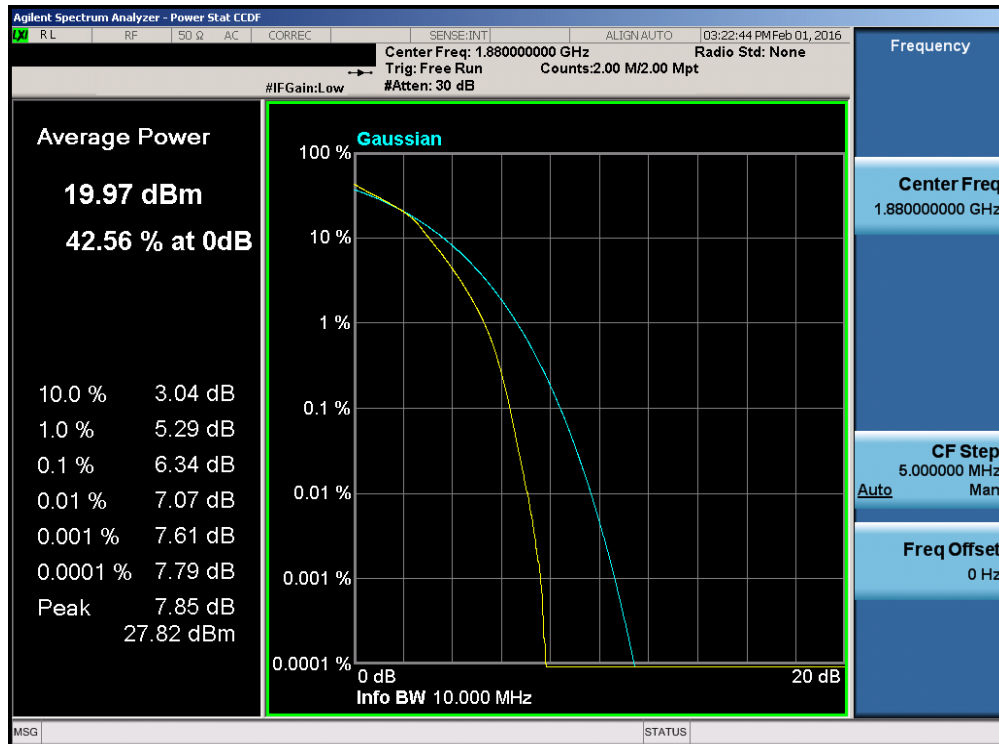


Plot 7-142. PAR Plot (Band 2 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 87 of 115

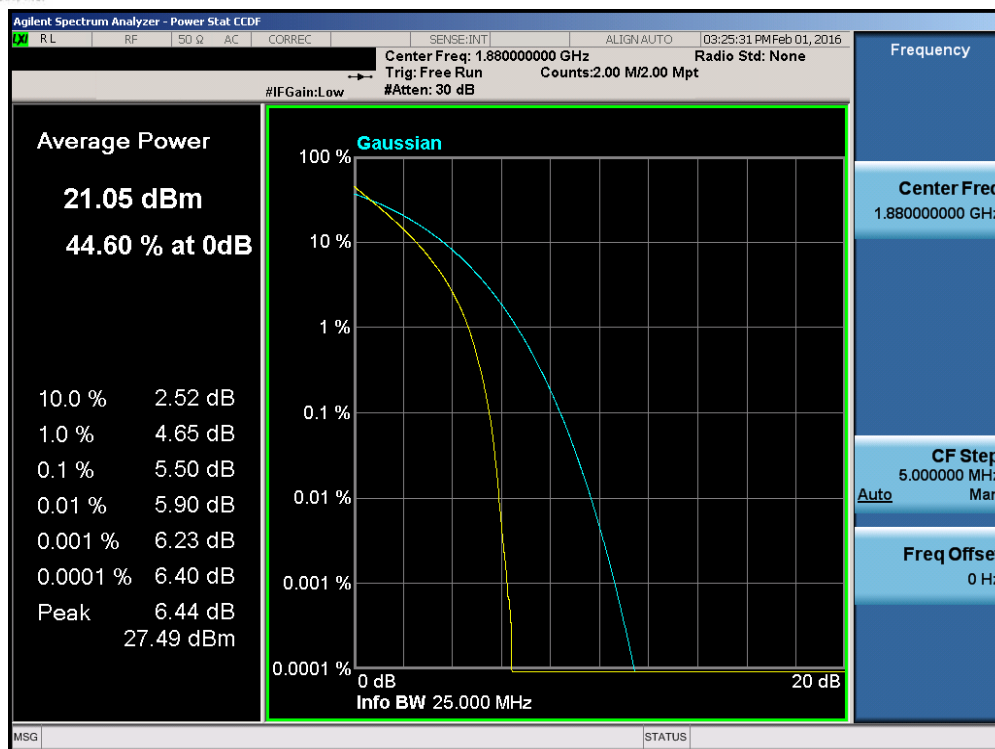


Plot 7-143. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

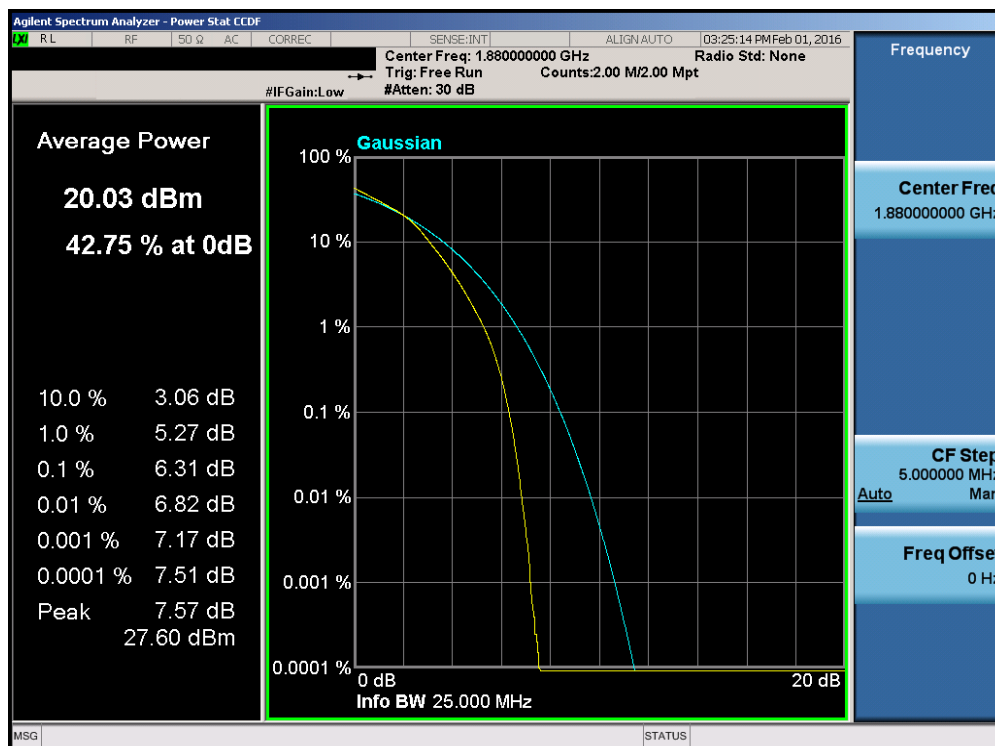


Plot 7-144. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 88 of 115

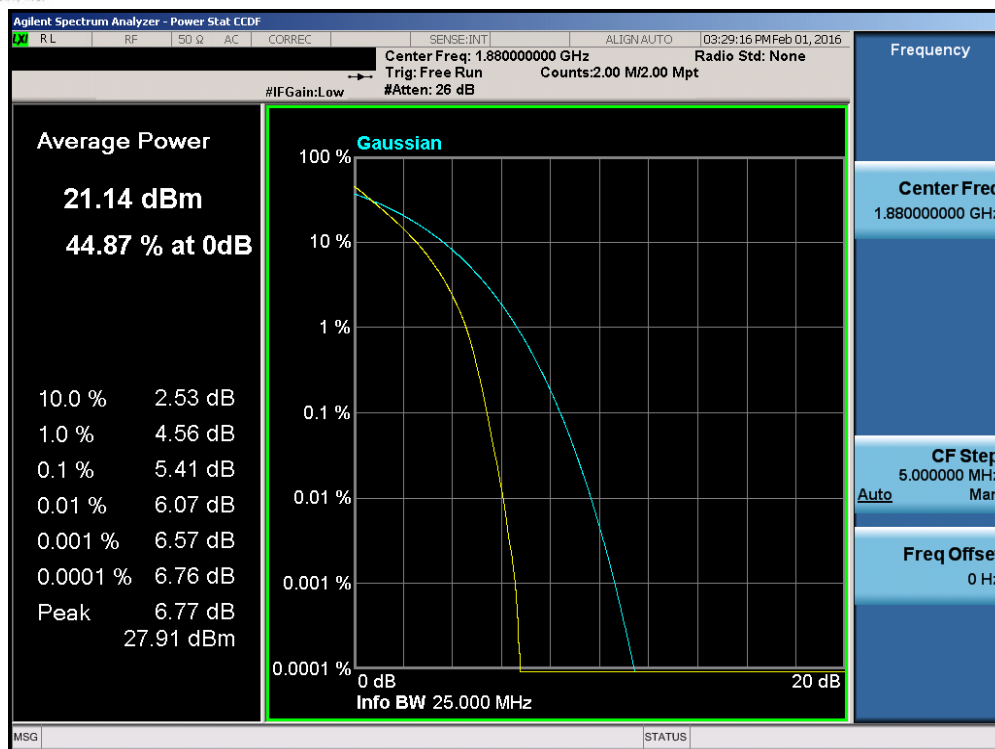


Plot 7-145. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

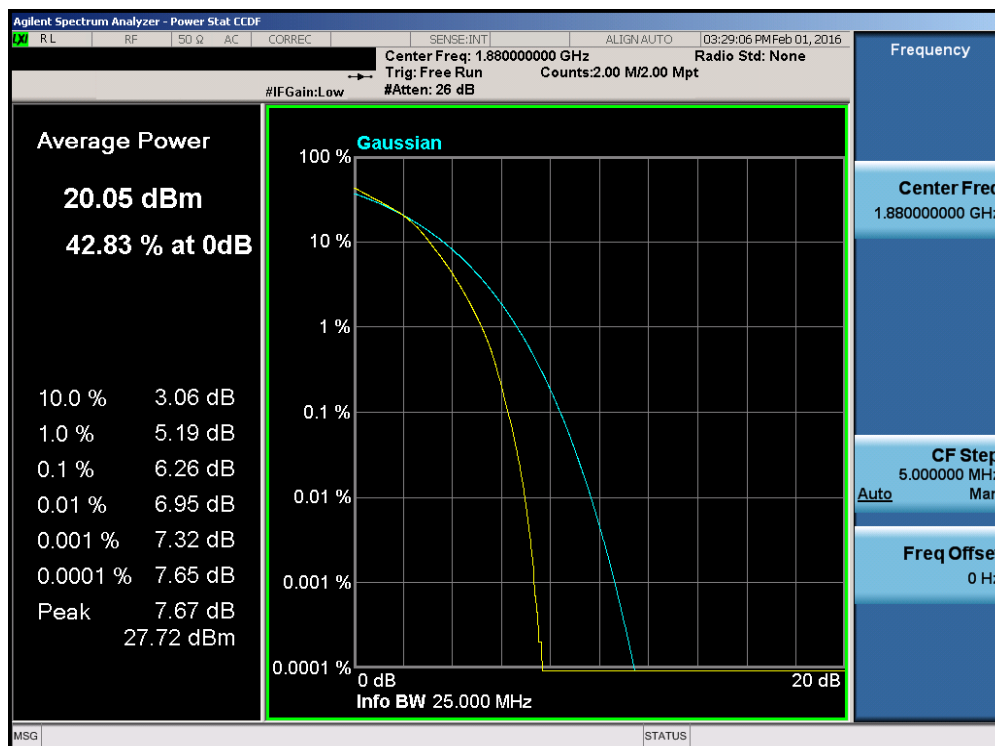


Plot 7-146. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 89 of 115



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: A3LSMJ320VPP	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 90 of 115

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-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as 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-C-2004 – Section 2.2.17

Test Settings

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

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 91 of 115

Test Setup

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

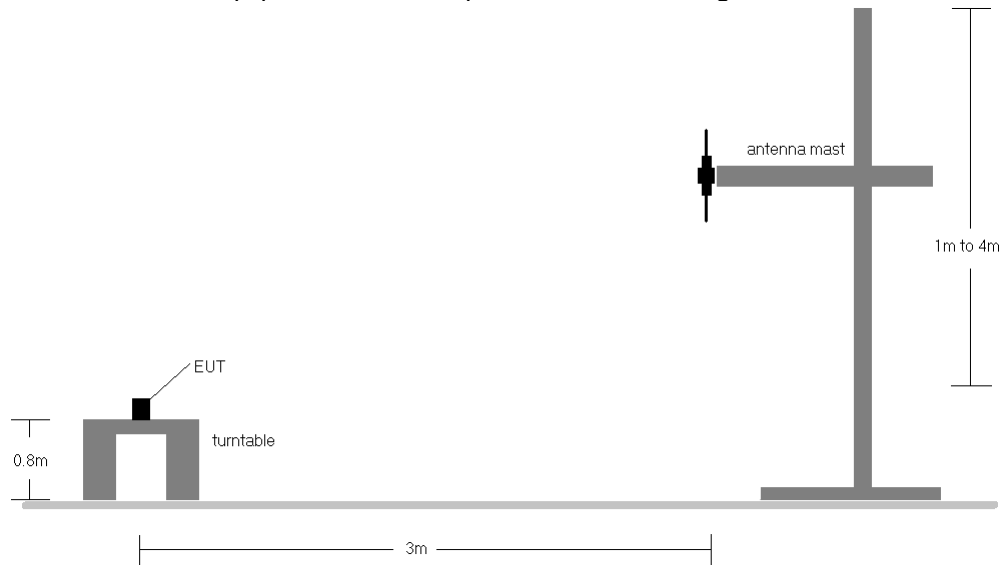


Figure 7-5. Radiated Test Setup <1GHz

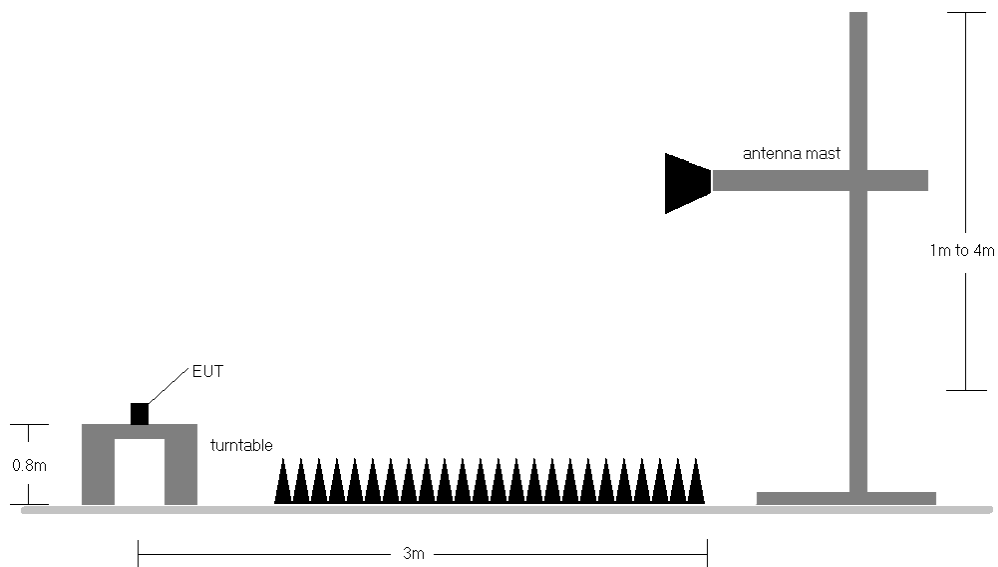


Figure 7-6. Radiated Test Setup >1GHz

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: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 92 of 115

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	3.39	341	1 / 24	14.79	4.42	19.21	34.77	-15.56
782.00	5	QPSK	H	3.39	341	1 / 0	14.76	4.47	19.23	34.77	-15.54
784.50	5	QPSK	H	3.39	341	1 / 0	14.89	4.52	19.41	34.77	-15.36
779.50	5	16QAM	H	3.39	341	1 / 24	13.63	4.42	18.05	34.77	-16.72
782.00	5	16QAM	H	3.39	341	1 / 0	13.70	4.47	18.17	34.77	-16.60
784.50	5	16QAM	H	3.39	341	1 / 0	13.77	4.52	18.29	34.77	-16.48
782.00	10	QPSK	H	3.39	341	1 / 0	14.13	4.47	18.60	34.77	-16.17
782.00	10	16QAM	H	3.39	341	1 / 0	13.18	4.47	17.65	34.77	-17.12

Table 7-2. ERP Data (Band 13)

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset	Page 93 of 115	

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	1.77	11	1 / 5	9.88	4.95	14.83	38.45	-23.63
836.50	1.4	QPSK	H	1.60	17	1 / 5	10.80	5.00	15.80	38.45	-22.65
848.30	1.4	QPSK	H	1.77	11	1 / 5	11.23	5.05	16.28	38.45	-22.17
824.70	1.4	16-QAM	H	1.77	11	1 / 5	8.51	4.95	13.46	38.45	-25.00
836.50	1.4	16-QAM	H	1.60	17	1 / 5	9.61	5.00	14.61	38.45	-23.84
848.30	1.4	16-QAM	H	1.77	11	1 / 5	10.24	5.05	15.29	38.45	-23.16
825.50	3	QPSK	H	1.77	11	1 / 0	10.49	4.95	15.44	38.45	-23.01
836.50	3	QPSK	H	1.77	11	1 / 0	9.56	5.00	14.56	38.45	-23.89
847.50	3	QPSK	H	1.77	11	1 / 14	11.79	5.05	16.84	38.45	-21.61
825.50	3	16-QAM	H	1.77	11	1 / 0	9.24	4.95	14.19	38.45	-24.26
836.50	3	16-QAM	H	1.77	11	1 / 0	8.21	5.00	13.21	38.45	-25.24
847.50	3	16-QAM	H	1.77	11	1 / 14	10.70	5.05	15.75	38.45	-22.70
826.50	5	QPSK	H	1.77	11	1 / 0	10.72	4.95	15.67	38.45	-22.78
836.50	5	QPSK	H	1.77	11	1 / 0	9.81	5.00	14.81	38.45	-23.64
846.50	5	QPSK	H	1.77	11	1 / 24	11.96	5.04	17.00	38.45	-21.45
826.50	5	16-QAM	H	1.77	11	1 / 0	8.88	4.95	13.83	38.45	-24.62
836.50	5	16-QAM	H	1.77	11	1 / 0	8.35	5.00	13.35	38.45	-25.10
846.50	5	16-QAM	H	1.77	11	1 / 24	10.70	5.04	15.74	38.45	-22.71
829.00	10	QPSK	H	1.77	11	1 / 0	10.38	4.96	15.34	38.45	-23.11
836.50	10	QPSK	H	1.77	11	1 / 0	10.18	5.00	15.18	38.45	-23.27
844.00	10	QPSK	H	1.77	11	1 / 49	11.89	5.03	16.92	38.45	-21.53
829.00	10	16-QAM	H	1.77	11	1 / 0	9.20	4.96	14.16	38.45	-24.29
836.50	10	16-QAM	H	1.77	11	1 / 0	8.72	5.00	13.72	38.45	-24.73
844.00	10	16-QAM	H	1.77	11	1 / 49	10.68	5.03	15.71	38.45	-22.74

Table 7-3. ERP Data (Band 5)

FCC ID: A3LSMJ320VPP	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset		Page 94 of 115

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	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	3.00	18	1 / 5	11.87	9.67	21.54	30.00	-8.46
1732.50	1.4	QPSK	H	3.00	18	1 / 0	12.03	9.53	21.56	30.00	-8.44
1754.30	1.4	QPSK	H	2.84	20	1 / 0	11.12	9.39	20.51	30.00	-9.49
1710.70	1.4	16-QAM	H	3.00	18	1 / 5	11.73	9.67	20.33	30.00	-9.67
1732.50	1.4	16-QAM	H	3.00	18	1 / 0	12.00	9.53	20.46	30.00	-9.54
1754.30	1.4	16-QAM	H	2.84	20	1 / 0	11.11	9.39	19.43	30.00	-10.57
1711.50	3	QPSK	H	2.84	20	1 / 0	11.15	9.67	20.82	30.00	-9.18
1732.50	3	QPSK	H	2.84	20	1 / 14	10.86	9.53	20.39	30.00	-9.61
1753.50	3	QPSK	H	2.84	20	1 / 0	12.25	9.40	21.65	30.00	-8.35
1711.50	3	16-QAM	H	2.84	20	1 / 0	10.93	9.67	19.53	30.00	-10.47
1732.50	3	16-QAM	H	2.84	20	1 / 14	10.48	9.53	18.94	30.00	-11.06
1753.50	3	16-QAM	H	2.84	20	1 / 0	12.08	9.40	20.41	30.00	-9.59
1712.50	5	QPSK	H	2.84	20	1 / 24	12.43	9.66	22.09	30.00	-7.91
1732.50	5	QPSK	H	2.84	20	1 / 0	12.46	9.53	21.99	30.00	-8.01
1752.50	5	QPSK	H	2.84	20	1 / 0	12.31	9.40	21.71	30.00	-8.29
1712.50	5	16-QAM	H	2.84	20	1 / 24	12.30	9.66	20.89	30.00	-9.11
1732.50	5	16-QAM	H	2.84	20	1 / 0	12.37	9.53	20.83	30.00	-9.17
1752.50	5	16-QAM	H	2.84	20	1 / 0	12.27	9.40	20.60	30.00	-9.40
1715.00	10	QPSK	H	2.84	20	1 / 0	11.87	9.64	21.51	30.00	-8.49
1732.50	10	QPSK	H	2.84	20	1 / 49	12.32	9.53	21.85	30.00	-8.15
1750.00	10	QPSK	H	2.84	20	1 / 0	12.42	9.42	21.84	30.00	-8.16
1715.00	10	16-QAM	H	2.84	20	1 / 0	11.80	9.64	20.37	30.00	-9.63
1732.50	10	16-QAM	H	2.84	20	1 / 49	12.11	9.53	20.57	30.00	-9.43
1750.00	10	16-QAM	H	2.84	20	1 / 0	12.35	9.42	20.70	30.00	-9.30
1717.50	15	QPSK	H	2.84	20	1 / 0	12.10	9.63	21.73	30.00	-8.27
1732.50	15	QPSK	H	2.84	20	1 / 74	12.24	9.53	21.77	30.00	-8.23
1747.50	15	QPSK	H	2.84	20	1 / 0	12.71	9.43	22.14	30.00	-7.86
1717.50	15	16-QAM	H	2.84	20	1 / 0	11.87	9.63	20.43	30.00	-9.57
1732.50	15	16-QAM	H	2.84	20	1 / 74	12.08	9.53	20.54	30.00	-9.46
1747.50	15	16-QAM	H	2.84	20	1 / 0	12.59	9.43	20.95	30.00	-9.05
1720.00	20	QPSK	H	2.84	20	1 / 99	12.41	9.61	22.02	30.00	-7.98
1732.50	20	QPSK	H	2.84	20	1 / 99	12.79	9.53	22.32	30.00	-7.68
1745.00	20	QPSK	H	2.84	20	1 / 0	12.45	9.45	21.90	30.00	-8.10
1720.00	20	16-QAM	H	2.84	20	1 / 99	12.10	9.61	20.64	30.00	-9.36
1732.50	20	16-QAM	H	2.84	20	1 / 99	12.53	9.53	20.99	30.00	-9.01
1745.00	20	16-QAM	H	2.84	20	1 / 0	11.80	9.45	20.18	30.00	-9.82

Table 7-4. EIRP Data (Band 4)

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601280165-R1.A3L	Test Dates: 1/29-2/27/2016	EUT Type: Portable Handset	Page 95 of 115	

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	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	1.02	13	1 / 5	13.58	9.21	22.79	33.01	-10.22
1880.00	1.4	QPSK	H	1.02	13	1 / 5	12.68	9.27	21.95	33.01	-11.06
1909.30	1.4	QPSK	H	1.36	14	1 / 5	11.79	9.36	21.15	33.01	-11.86
1850.70	1.4	16-QAM	H	1.02	13	1 / 5	12.79	9.21	22.00	33.01	-11.01
1880.00	1.4	16-QAM	H	1.02	13	1 / 5	11.77	9.27	21.04	33.01	-11.97
1909.30	1.4	16-QAM	H	1.36	14	1 / 5	10.77	9.36	20.13	33.01	-12.88
1851.50	3	QPSK	H	1.36	14	1 / 14	13.17	9.21	22.38	33.01	-10.63
1880.00	3	QPSK	H	1.36	14	1 / 14	13.64	9.27	22.91	33.01	-10.10
1908.50	3	QPSK	H	1.36	14	1 / 14	12.49	9.36	21.85	33.01	-11.16
1851.50	3	16-QAM	H	1.36	14	1 / 14	11.86	9.21	21.07	33.01	-11.94
1880.00	3	16-QAM	H	1.36	14	1 / 14	12.43	9.27	21.70	33.01	-11.31
1908.50	3	16-QAM	H	1.36	14	1 / 14	11.22	9.36	20.58	33.01	-12.43
1852.50	5	QPSK	H	1.36	14	1 / 24	13.39	9.22	22.61	33.01	-10.40
1880.00	5	QPSK	H	1.36	14	1 / 24	13.78	9.27	23.05	33.01	-9.96
1907.50	5	QPSK	H	1.36	14	1 / 0	12.55	9.35	21.90	33.01	-11.11
1852.50	5	16-QAM	H	1.36	14	1 / 24	12.04	9.22	21.26	33.01	-11.75
1880.00	5	16-QAM	H	1.36	14	1 / 24	12.67	9.27	21.94	33.01	-11.07
1907.50	5	16-QAM	H	1.36	14	1 / 0	11.26	9.35	20.61	33.01	-12.40
1855.00	10	QPSK	H	1.36	14	1 / 49	13.06	9.22	22.28	33.01	-10.73
1880.00	10	QPSK	H	1.36	14	1 / 0	13.44	9.27	22.71	33.01	-10.30
1905.00	10	QPSK	H	1.36	14	1 / 0	13.16	9.34	22.50	33.01	-10.51
1855.00	10	16-QAM	H	1.36	14	1 / 49	11.67	9.22	20.89	33.01	-12.12
1880.00	10	16-QAM	H	1.36	14	1 / 0	12.20	9.27	21.47	33.01	-11.54
1905.00	10	16-QAM	H	1.36	14	1 / 0	11.75	9.34	21.09	33.01	-11.92
1857.50	15	QPSK	H	1.36	14	1 / 74	13.90	9.23	23.13	33.01	-9.88
1880.00	15	QPSK	H	1.36	14	1 / 0	13.62	9.27	22.89	33.01	-10.12
1902.50	15	QPSK	H	1.36	14	1 / 0	13.28	9.33	22.61	33.01	-10.40
1857.50	15	16-QAM	H	1.36	14	1 / 74	12.74	9.23	21.97	33.01	-11.04
1880.00	15	16-QAM	H	1.36	14	1 / 0	12.22	9.27	21.49	33.01	-11.52
1902.50	15	16-QAM	H	1.36	14	1 / 0	12.08	9.33	21.41	33.01	-11.60
1860.00	20	QPSK	H	1.36	14	1 / 0	13.30	9.23	22.53	33.01	-10.48
1880.00	20	QPSK	H	1.36	14	1 / 0	13.45	9.27	22.72	33.01	-10.29
1900.00	20	QPSK	H	1.36	14	1 / 0	13.90	9.31	23.21	33.01	-9.80
1860.00	20	16-QAM	H	1.36	14	1 / 0	12.14	9.23	21.37	33.01	-11.64
1880.00	20	16-QAM	H	1.36	14	1 / 0	12.20	9.27	21.47	33.01	-11.54
1900.00	20	16-QAM	H	1.36	14	1 / 0	12.71	9.31	22.02	33.01	-10.99

Table 7-5. EIRP Data (Band 2)

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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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-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-C-2004 – Section 2.2.12

Test Settings

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

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Test Setup

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

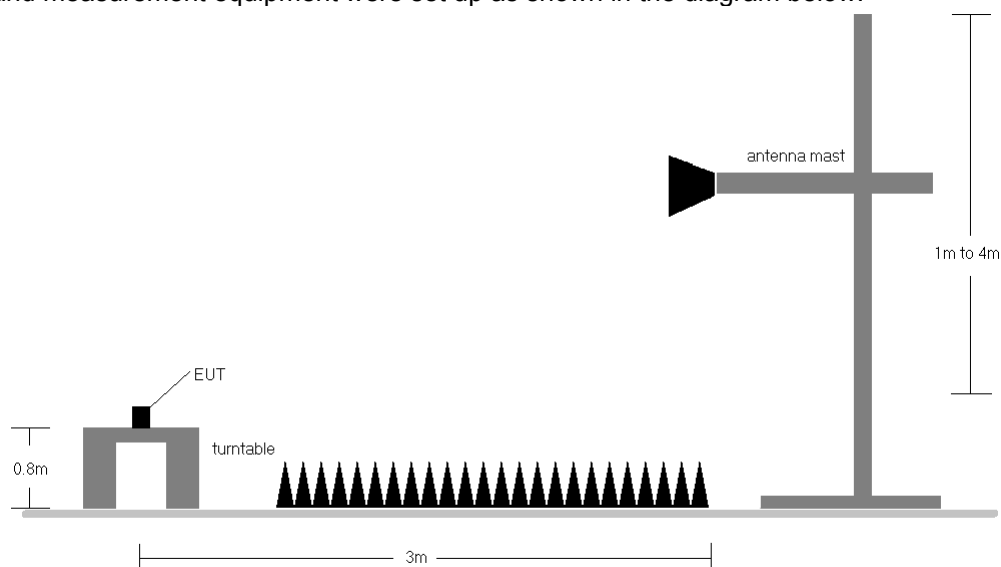


Figure 7-7. Test Instrument & Measurement Setup

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.

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OPERATING FREQUENCY: 779.50 MHz
 CHANNEL: 23205
 MEASURED OUTPUT POWER: 19.21 dBm = 0.083 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.21 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2338.50	H	3.19	108	-55.64	3.67	-51.97	71.2
3118.00	H	-	-	-59.23	5.13	-54.09	73.3

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

OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MEASURED OUTPUT POWER: 19.23 dBm = 0.084 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.23 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	H	3.19	108	-53.97	3.67	-50.30	69.5
3128.00	H	-	-	-56.75	5.17	-51.58	70.8

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

OPERATING FREQUENCY: 784.50 MHz
 CHANNEL: 23255
 MEASURED OUTPUT POWER: 19.41 dBm = 0.087 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.41 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2353.50	H	3.19	108	-54.99	3.66	-51.33	70.7
3138.00	H	-	-	-57.78	5.21	-52.57	72.0

Table 7-8. Radiated Spurious Data (Band 13 – High Channel)

MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.00 MHz
 DISTANCE: 3 meters
 NARROWBAND EMISSION LIMIT: -50 dBm
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	H	1.21	0	-54.44	3.68	-50.76	-10.8
1564.00	H	1.21	0	-57.03	3.69	-53.34	-13.3
1569.00	H	1.21	0	-56.40	3.71	-52.70	-12.7

Table 7-9. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 826.50 MHz
 CHANNEL: 20425
 MEASURED OUTPUT POWER: 15.67 dBm = 0.037 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 28.67 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1653.00	H	1.66	159	-54.35	6.56	-47.79	63.5
2479.50	H	-	-	-65.40	7.31	-58.10	73.8

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

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MEASURED OUTPUT POWER: 14.81 dBm = 0.030 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 27.81 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	H	1.66	159	-62.44	6.55	-55.89	70.7
2509.50	H	-	-	-62.72	7.34	-55.37	70.2

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

OPERATING FREQUENCY: 846.50 MHz
 CHANNEL: 20625
 MEASURED OUTPUT POWER: 17.00 dBm = 0.050 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.00 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.00	H	1.66	159	-54.51	6.55	-47.96	65.0
2539.50	H	-	-	-62.48	7.36	-55.12	72.1

Table 7-12. Radiated Spurious Data (Band 5 – High Channel)

OPERATING FREQUENCY: 1720.00 MHz
 CHANNEL: 20050
 MEASURED OUTPUT POWER: 22.02 dBm = 0.159 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.02 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3440.00	H	1.91	334	-55.16	9.69	-45.47	67.5
5160.00	H	1.51	91	-52.55	10.64	-41.91	63.9
6880.00	H	-	-	-47.91	11.75	-36.16	58.2

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

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 22.32 dBm = 0.171 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.32 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	H	1.08	96	-51.85	9.71	-42.14	64.5
5197.50	H	1.47	97	-50.97	10.59	-40.39	62.7
6930.00	H	1.31	216	-49.97	11.75	-38.22	60.5
8662.50	H	-	-	-50.72	11.06	-39.66	62.0

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

OPERATING FREQUENCY: 1745.00 MHz
 CHANNEL: 20300
 MEASURED OUTPUT POWER: 21.90 dBm = 0.155 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.90 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3490.00	H	1.13	148	-51.26	9.72	-41.54	63.4
5235.00	H	-	-	-55.43	10.62	-44.81	66.7

Table 7-15. Radiated Spurious Data (Band 4 – High Channel)

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1860.00 MHz
 CHANNEL: 18700
 MEASURED OUTPUT POWER: 22.53 dBm = 0.179 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.53 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3720.00	H	1.52	18	-44.88	9.39	-35.49	58.0
5580.00	H	1.28	18	-50.60	10.85	-39.75	62.3
7440.00	H	1.30	18	-51.88	10.79	-41.09	63.6
9300.00	H	-	-	-49.11	11.60	-37.52	60.0

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

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MEASURED OUTPUT POWER: 22.72 dBm = 0.187 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.72 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	1.39	7	-43.29	9.28	-34.01	56.7
5640.00	H	1.08	7	-53.72	11.03	-42.69	65.4
7520.00	H	-	-	-52.61	10.97	-41.64	64.4

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

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1900.00 MHz
 CHANNEL: 19100
 MEASURED OUTPUT POWER: 23.21 dBm = 0.210 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.21 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3800.00	H	1.73	323	-41.92	9.18	-32.74	55.9
5700.00	H	1.04	329	-51.36	11.24	-40.12	63.3
7600.00	H	-	-	-52.37	11.14	-41.22	64.4

Table 7-18. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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7.8 Frequency Stability / Temperature Variation

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

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

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

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

Test Procedure Used

ANSI/TIA-603-C-2004

Test Settings

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

Test Setup

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

Test Notes

None

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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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)	781,999,818	-182	-0.0000233
100 %		- 30	782,000,084	84	0.0000107
100 %		- 20	781,999,873	-127	-0.0000162
100 %		- 10	782,000,047	47	0.0000060
100 %		0	781,999,908	-92	-0.0000118
100 %		+ 10	781,999,653	-347	-0.0000444
100 %		+ 20	781,999,808	-192	-0.0000246
100 %		+ 30	781,999,834	-166	-0.0000212
100 %		+ 40	781,999,634	-366	-0.0000468
100 %		+ 50	782,000,003	3	0.0000004
BATT. ENDPOINT	3.40	+ 20	782,000,010	10	0.0000013

Table 7-19. Frequency Stability Data (Band 13)

Note:

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

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Band 13 Frequency Stability Measurements

§2.1055 §27.54

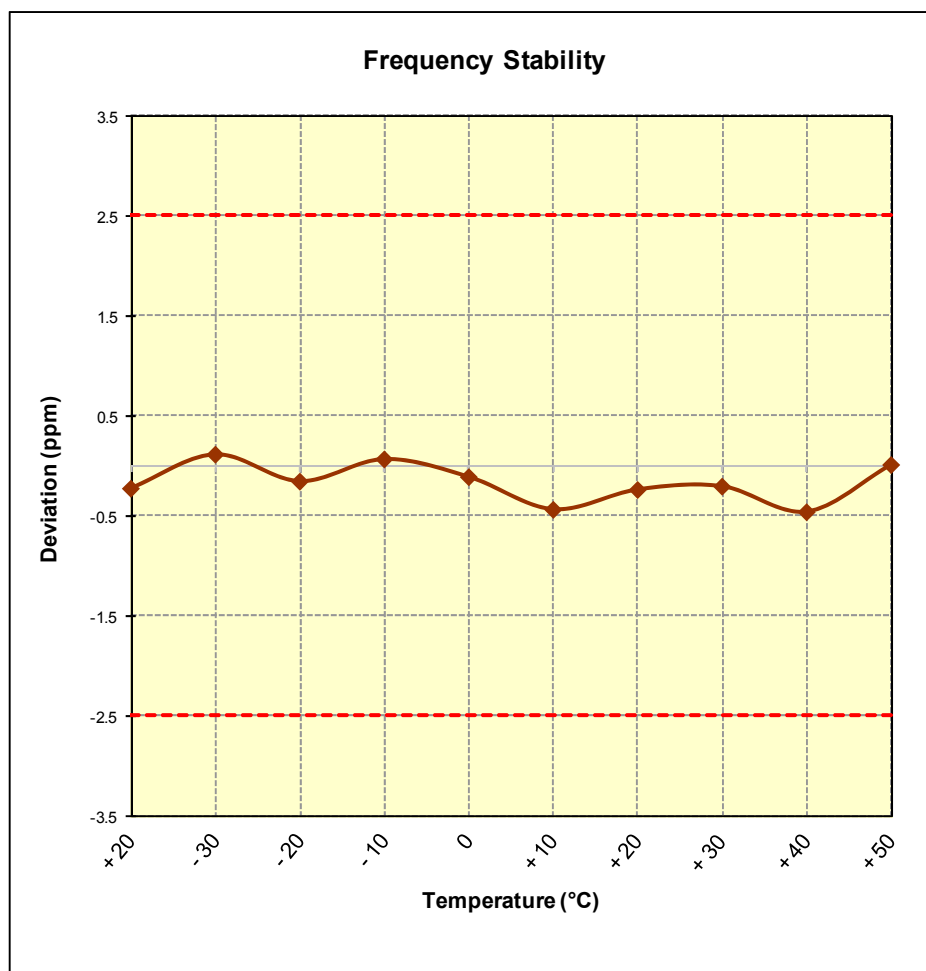


Figure 7-8. Frequency Stability Graph (Band 13)

FCC ID: A3LSMJ320VPP	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
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Band 5 Frequency Stability Measurements

§2.1055 §22.355

OPERATING FREQUENCY: 836,500,000 Hz

CHANNEL: 20525

REFERENCE VOLTAGE: 3.80 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)	836,500,146	146	0.0000175
100 %		- 30	836,500,229	229	0.0000274
100 %		- 20	836,500,072	72	0.0000086
100 %		- 10	836,499,916	-84	-0.0000100
100 %		0	836,500,161	161	0.0000192
100 %		+ 10	836,500,284	284	0.0000340
100 %		+ 20	836,500,146	146	0.0000175
100 %		+ 30	836,499,955	-45	-0.0000054
100 %		+ 40	836,500,371	371	0.0000444
100 %		+ 50	836,499,919	-81	-0.0000097
BATT. ENDPOINT	3.40	+ 20	836,499,949	-51	-0.0000061

Table 7-20. Frequency Stability Data (Band 5)

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
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Band 5 Frequency Stability Measurements

§2.1055 §22.355

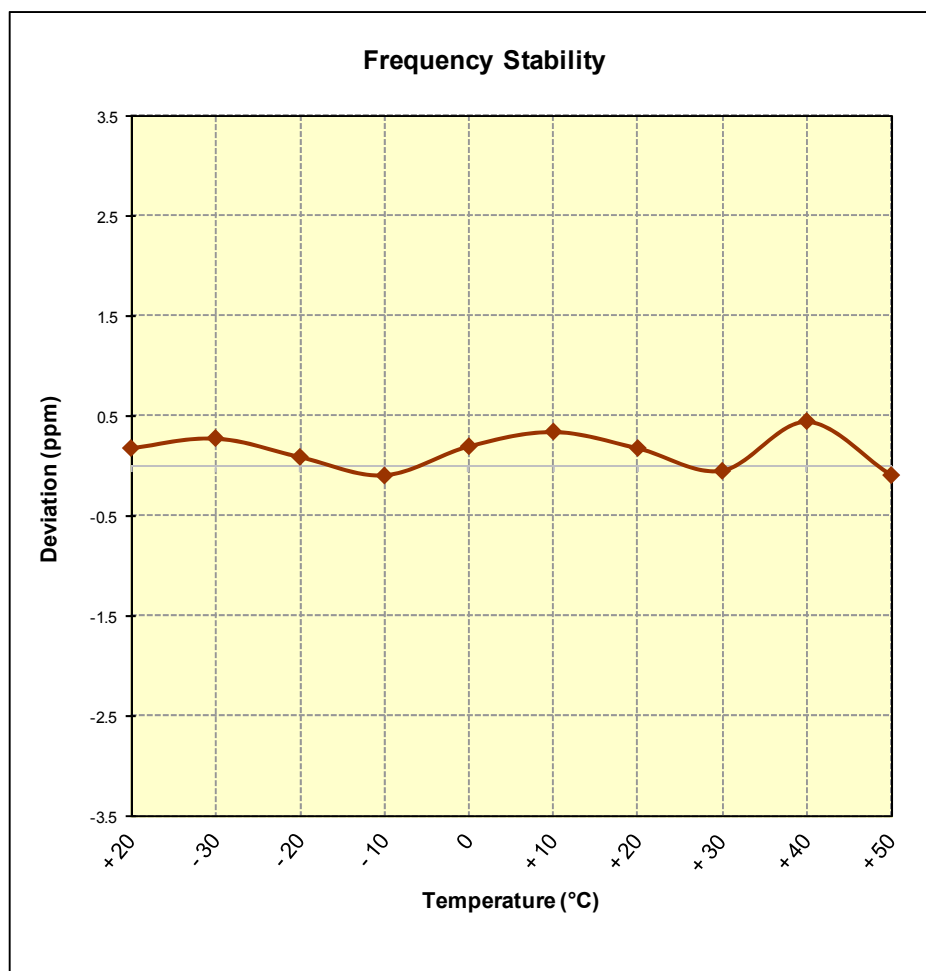


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 4 Frequency Stability Measurements

\$2.1055 \$27.54

OPERATING FREQUENCY: 1,732,500,000 Hz

CHANNEL: 20175

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,500,236	236	0.0000136
100 %		- 30	1,732,500,007	7	0.0000004
100 %		- 20	1,732,500,157	157	0.0000091
100 %		- 10	1,732,499,949	-51	-0.0000029
100 %		0	1,732,499,970	-30	-0.0000017
100 %		+ 10	1,732,500,122	122	0.0000070
100 %		+ 20	1,732,499,941	-59	-0.0000034
100 %		+ 30	1,732,500,298	298	0.0000172
100 %		+ 40	1,732,500,257	257	0.0000148
100 %		+ 50	1,732,500,133	133	0.0000077
BATT. ENDPOINT	3.40	+ 20	1,732,499,773	-227	-0.0000131

Table 7-21. 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: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 4 Frequency Stability Measurements

§2.1055 §§27.54

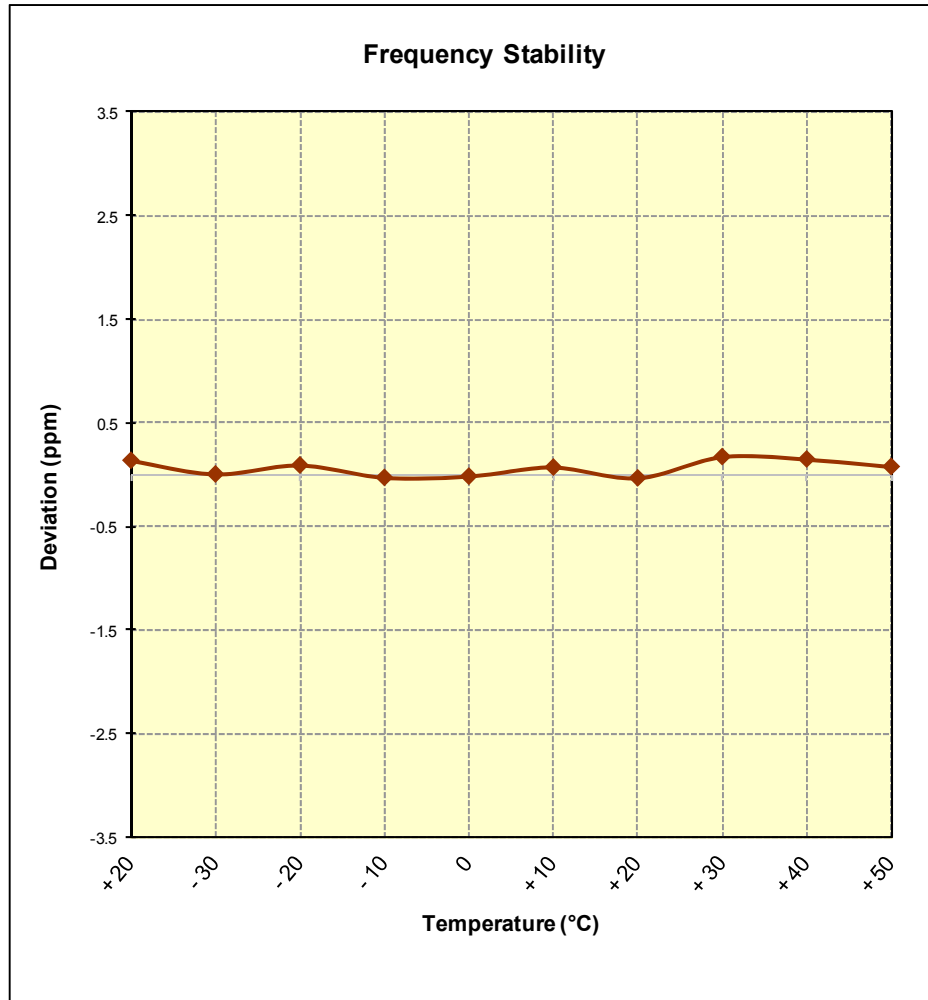


Figure 7-10. Frequency Stability Graph (Band 4)

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 2 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 18900

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,880,000,072	72	0.0000038
100 %		- 30	1,880,000,017	17	0.0000009
100 %		- 20	1,880,000,162	162	0.0000086
100 %		- 10	1,880,000,211	211	0.0000112
100 %		0	1,879,999,683	-317	-0.0000169
100 %		+ 10	1,879,999,952	-48	-0.0000026
100 %		+ 20	1,880,000,140	140	0.0000074
100 %		+ 30	1,879,999,620	-380	-0.0000202
100 %		+ 40	1,880,000,001	1	0.0000001
100 %		+ 50	1,879,999,876	-124	-0.0000066
BATT. ENDPOINT	3.40	+ 20	1,879,999,721	-279	-0.0000148

Table 7-22. 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: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 2 Frequency Stability Measurements

§2.1055 §24.235

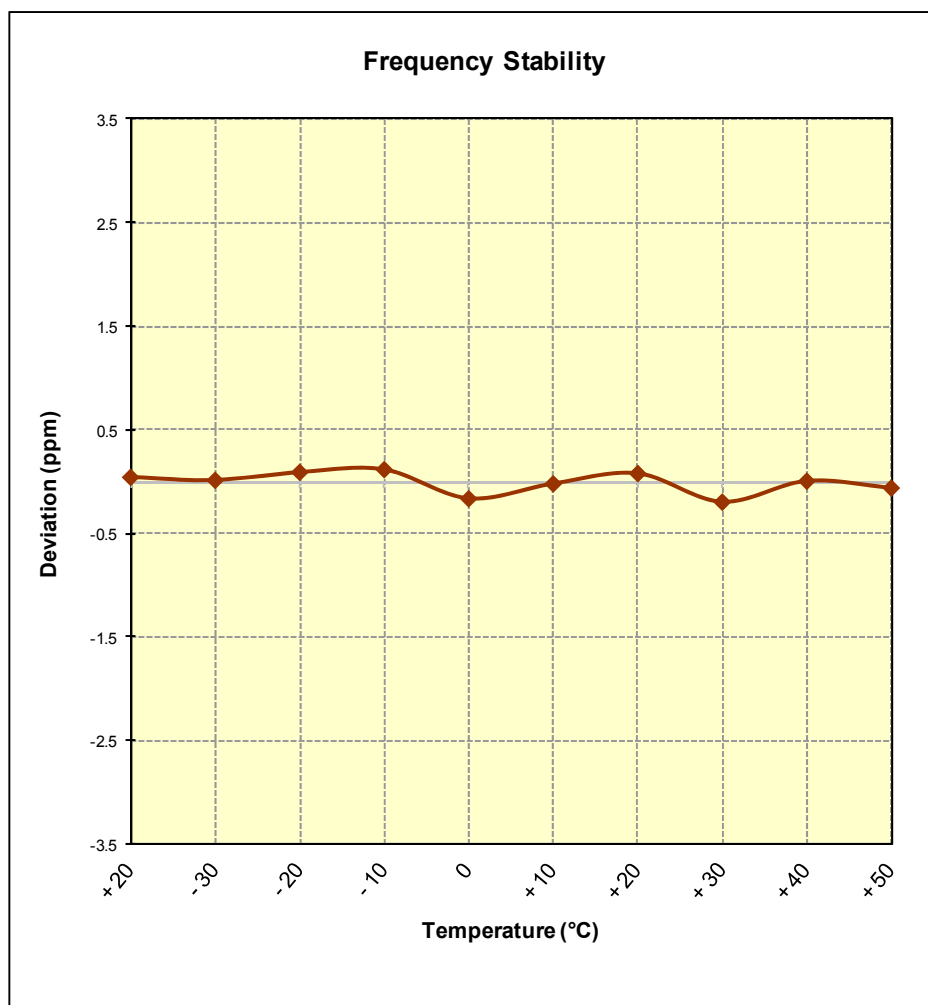


Figure 7-11. Frequency Stability Graph (Band 2)

FCC ID: A3LSMJ320VPP	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed 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: A3LSMJ320VPP** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: A3LSMJ320VPP		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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