

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

Test Procedure Used

KDB 971168 D01 v02r02 – Section 6.0

Test Settings

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

Test Setup

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

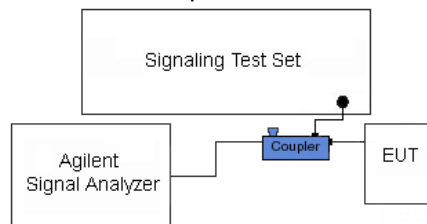


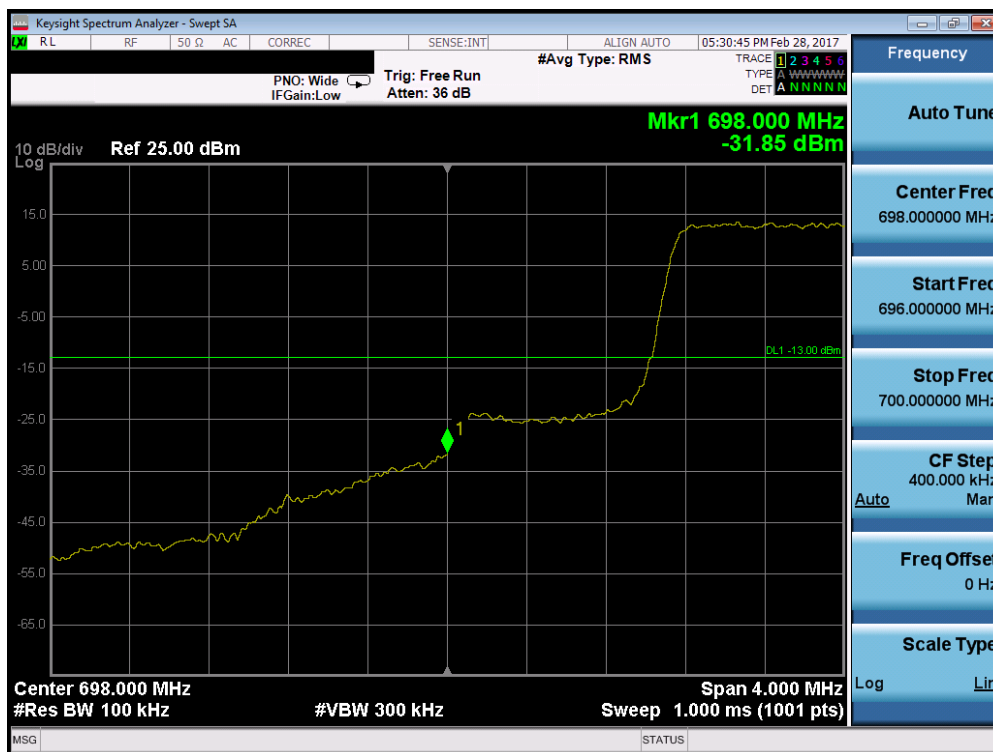
Figure 7-3. Test Instrument & Measurement Setup

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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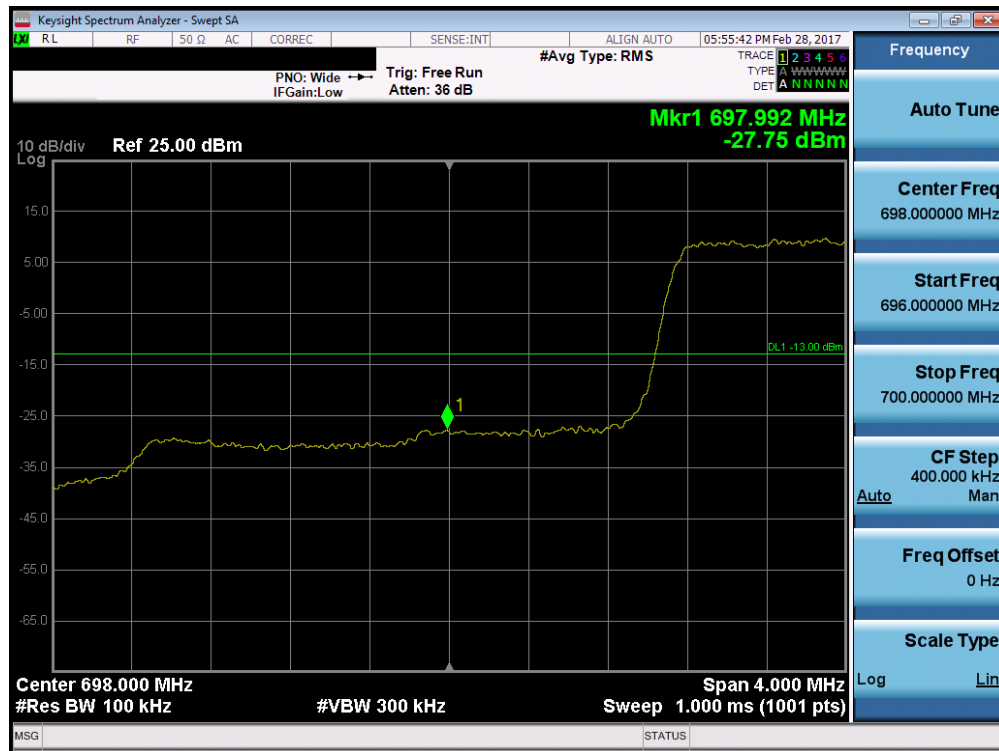


Plot 7-77. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

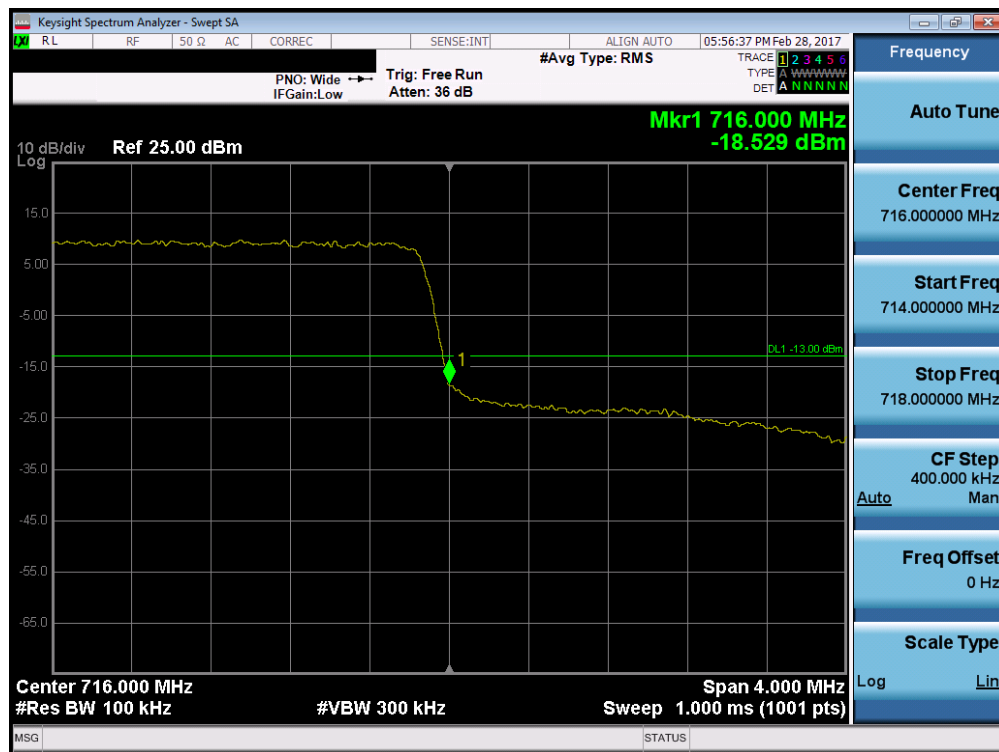


Plot 7-78. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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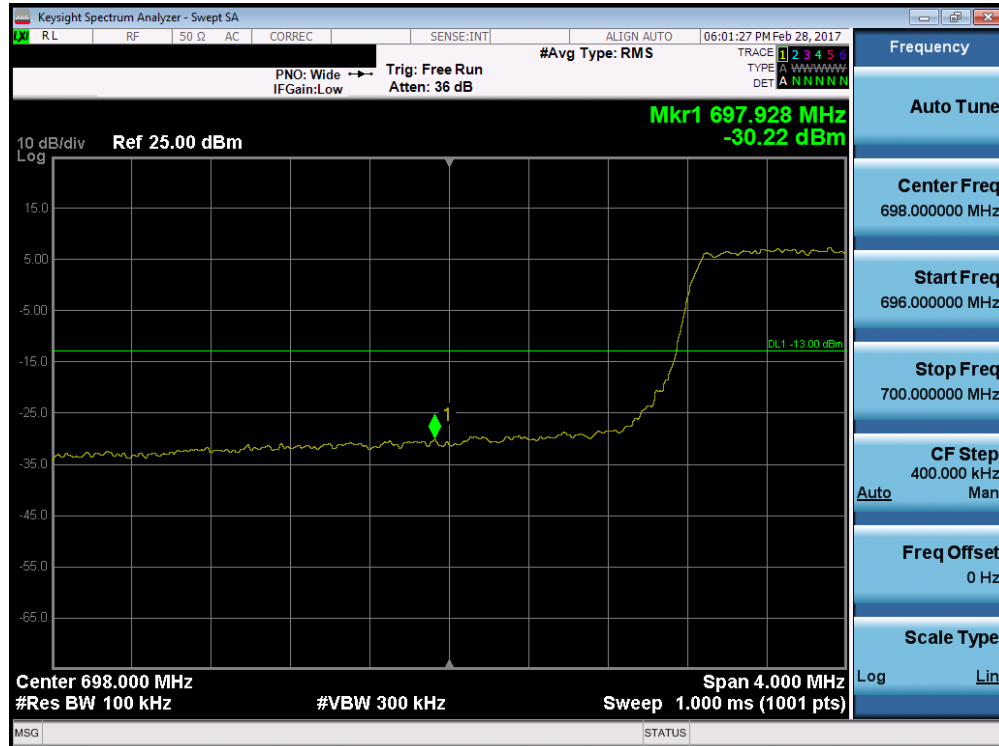


Plot 7-79. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

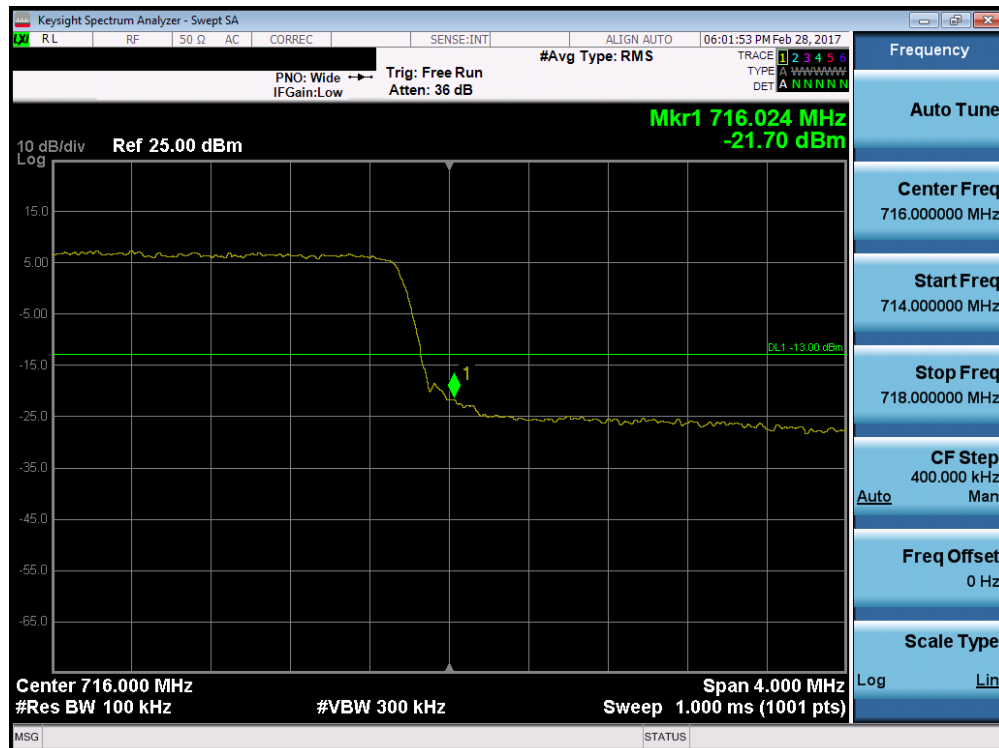


Plot 7-80. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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Plot 7-81. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

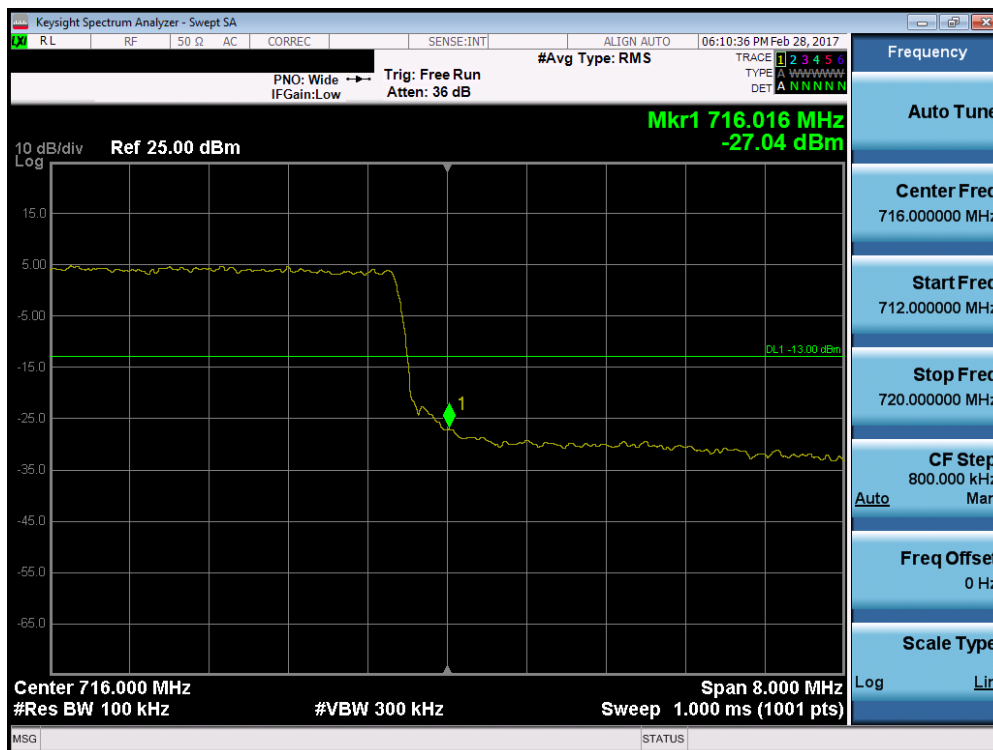


Plot 7-82. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

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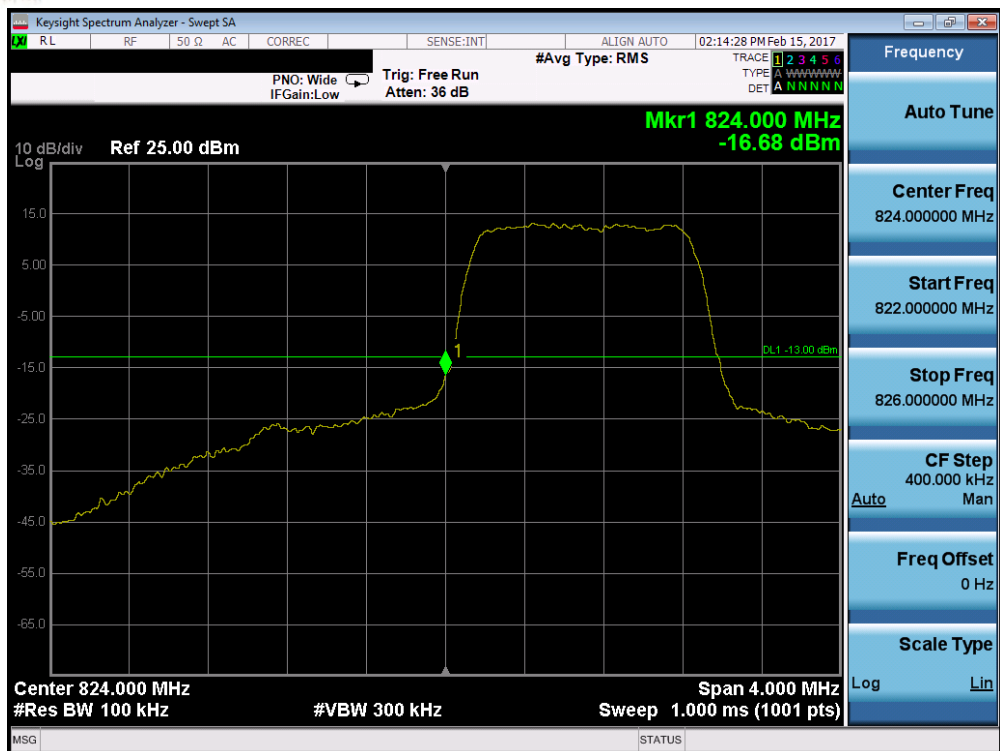


Plot 7-83. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 7-84. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

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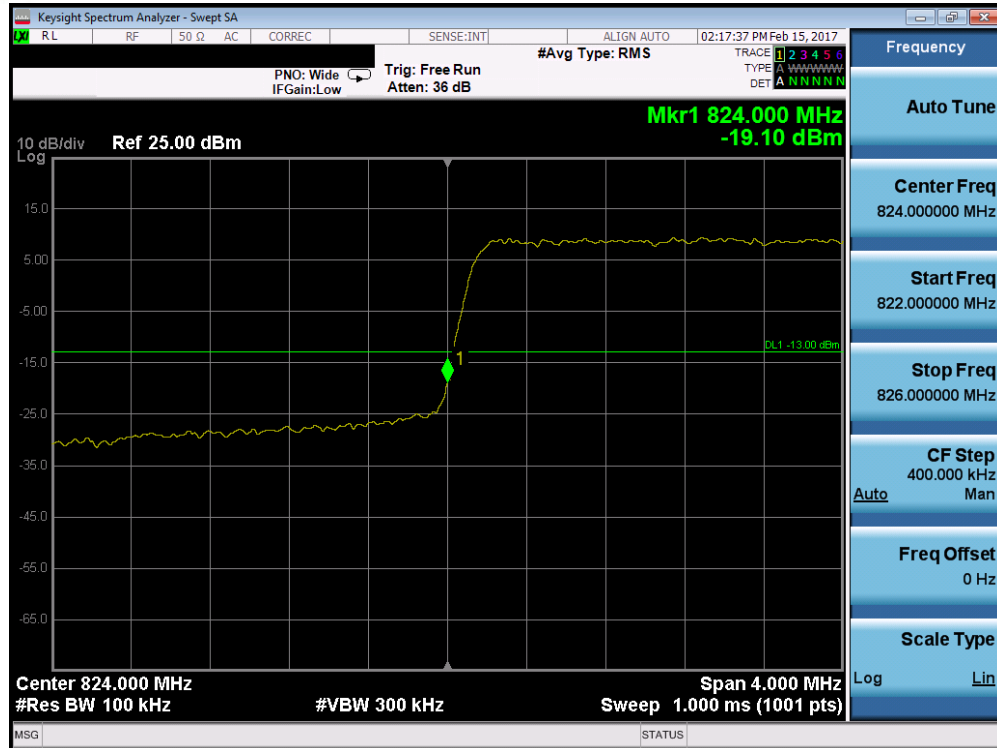


Plot 7-85. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

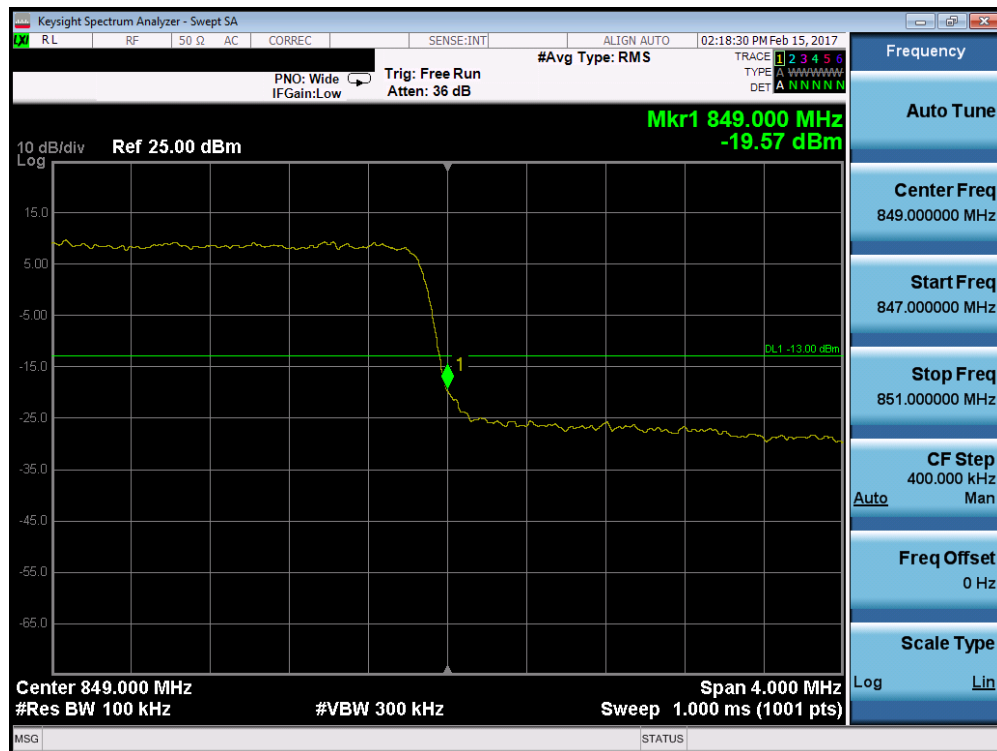


Plot 7-86. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ727R4	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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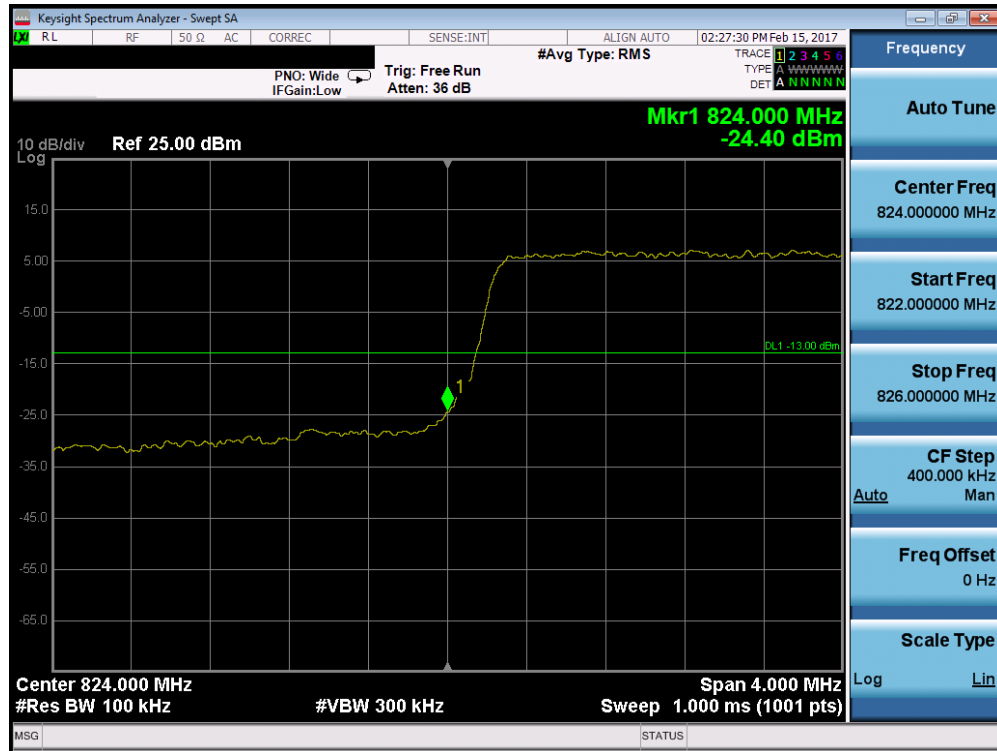


Plot 7-87. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - RB Size 15)

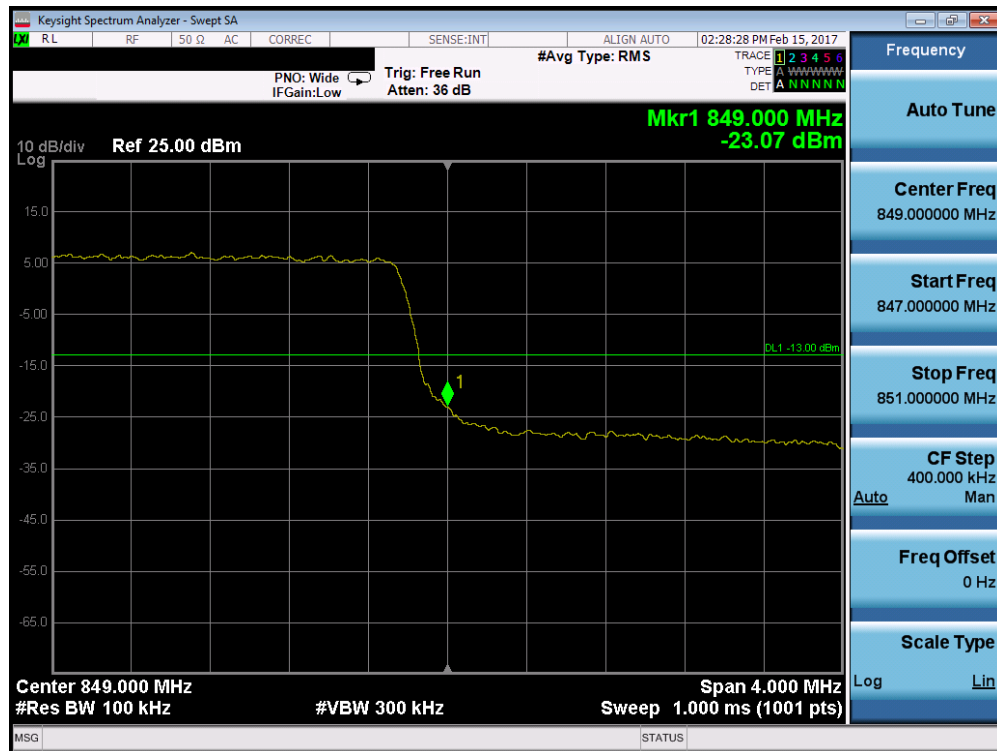


Plot 7-88. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - RB Size 15)

FCC ID: A3LSMJ727R4			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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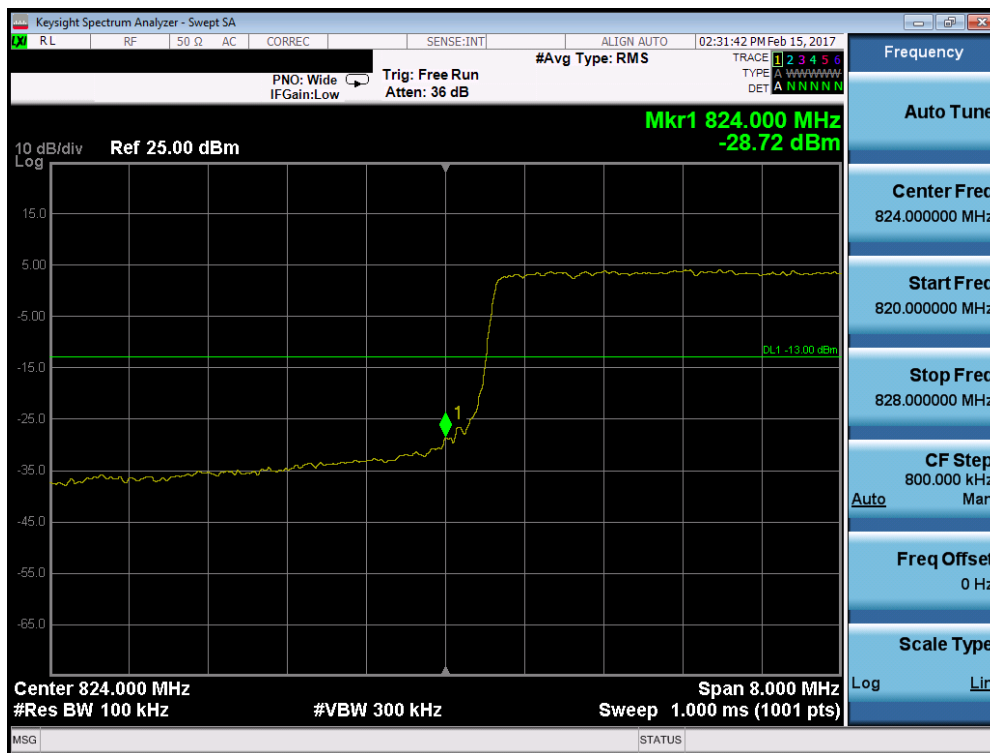


Plot 7-89. Lower Band Edge Plot (Band 5 - 5.0MHz QPSK - RB Size 25)

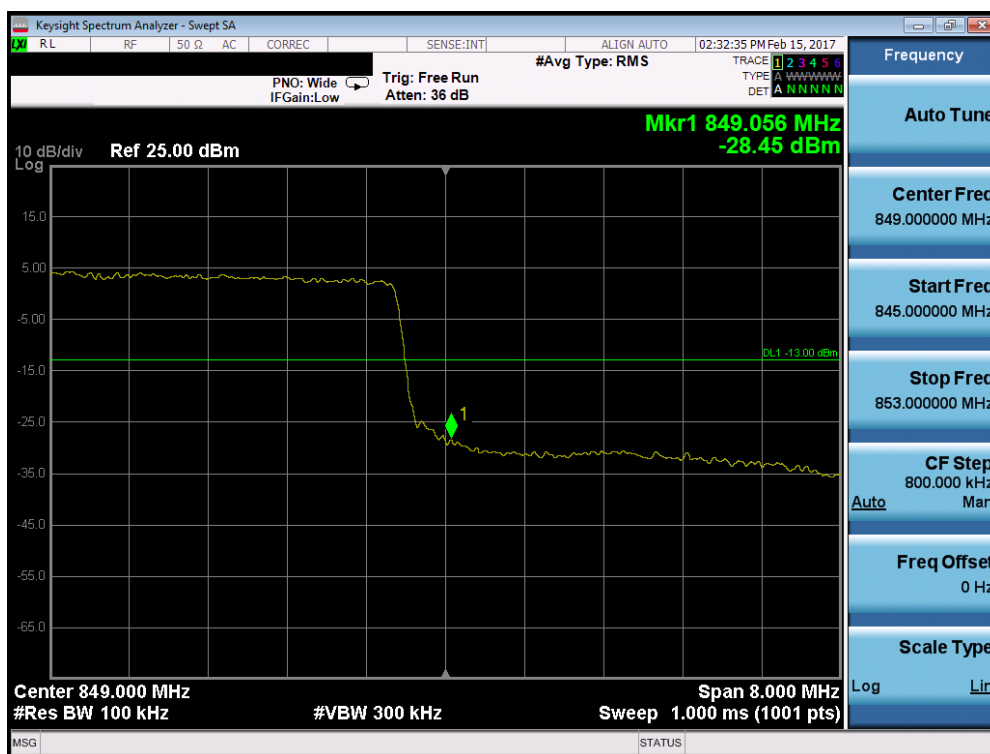


Plot 7-90. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - RB Size 25)

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Plot 7-91. Lower Band Edge Plot (Band 5 - 10.0MHz QPSK - RB Size 50)

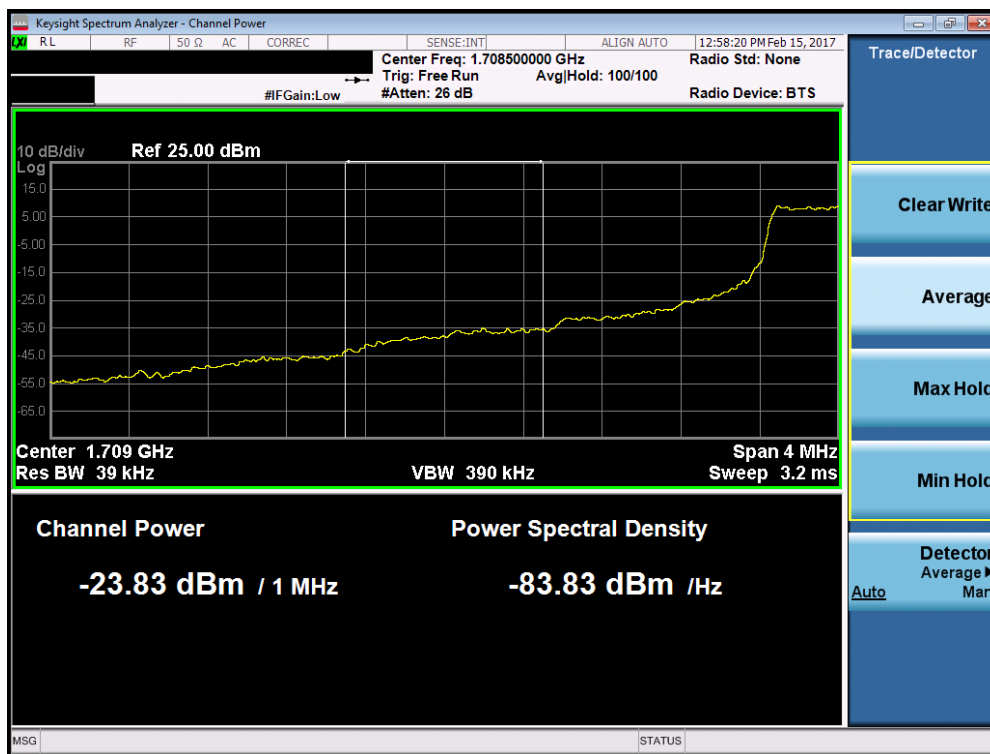


Plot 7-92. Upper Band Edge Plot (Band 5 - 10.0MHz QPSK - RB Size 50)

FCC ID: A3LSMJ727R4	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Plot 7-93. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

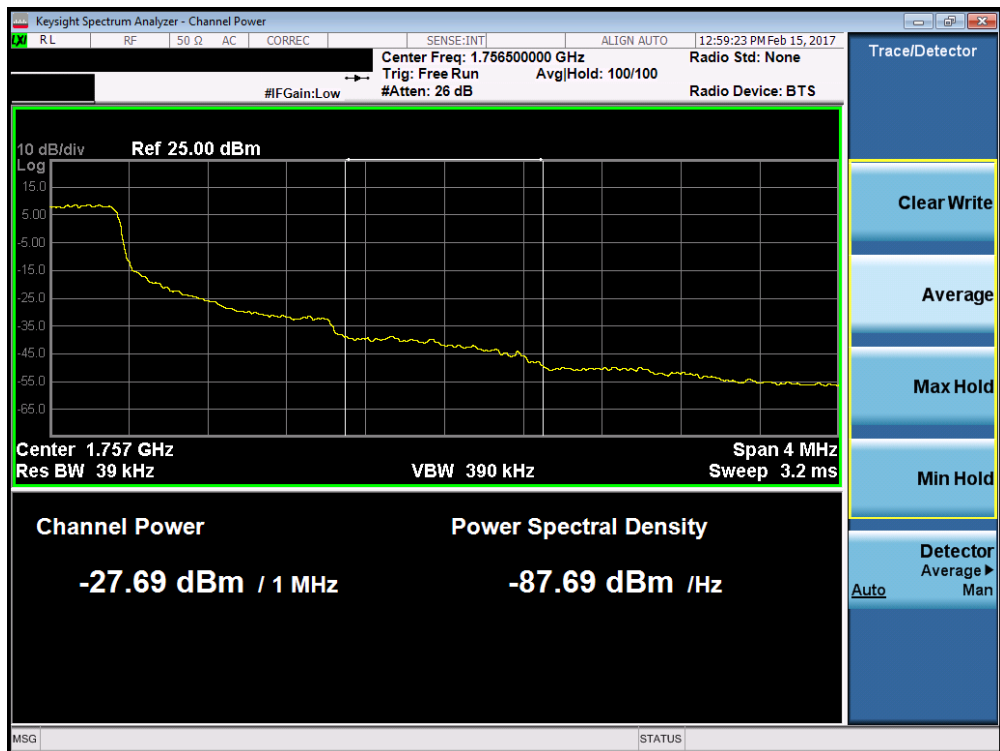


Plot 7-94. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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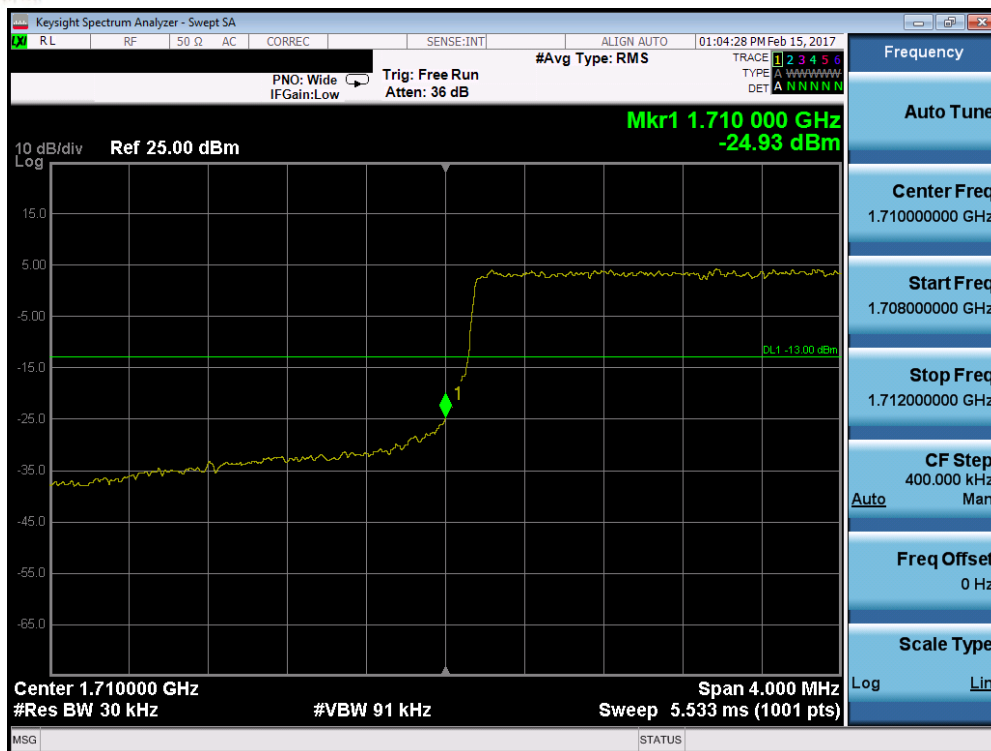


Plot 7-95. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

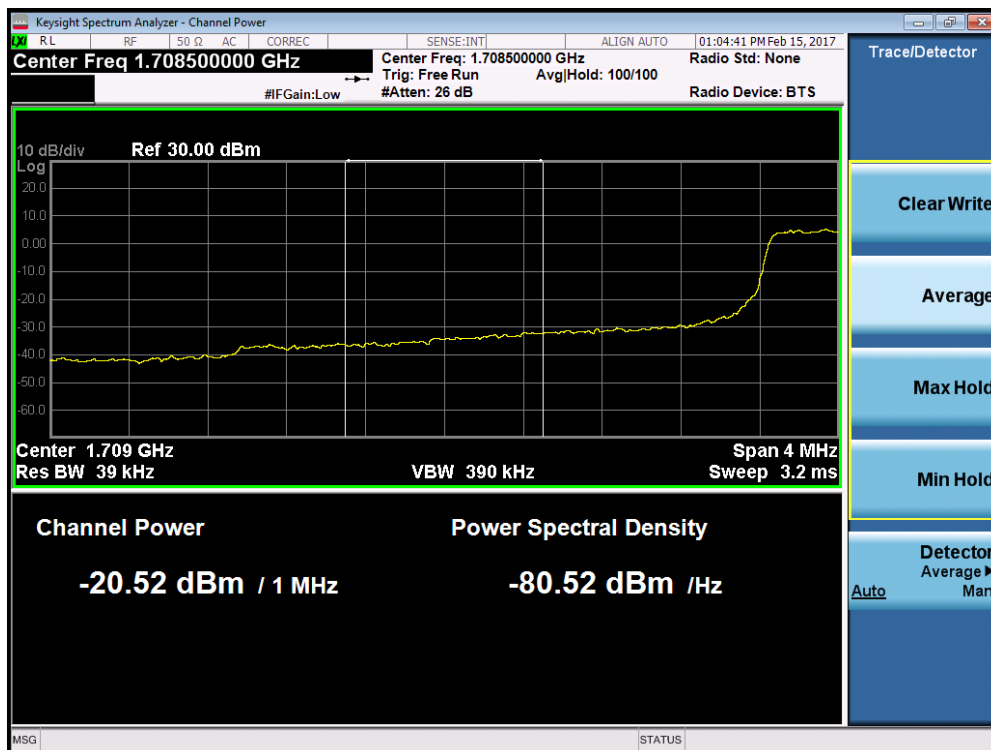


Plot 7-96. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-97. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

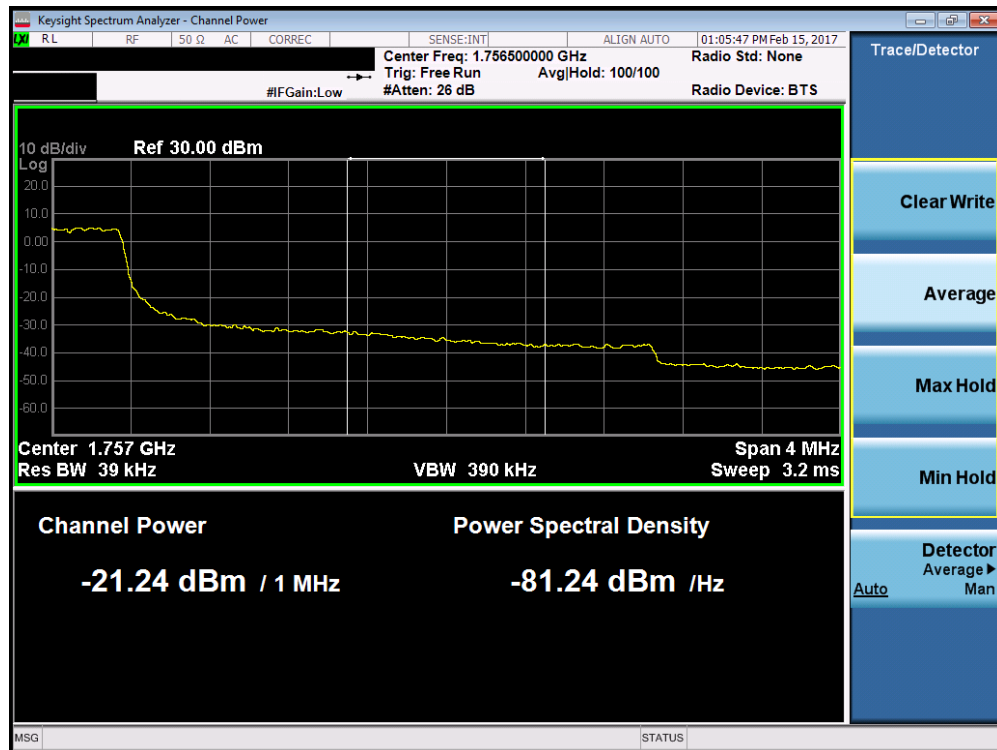


Plot 7-98. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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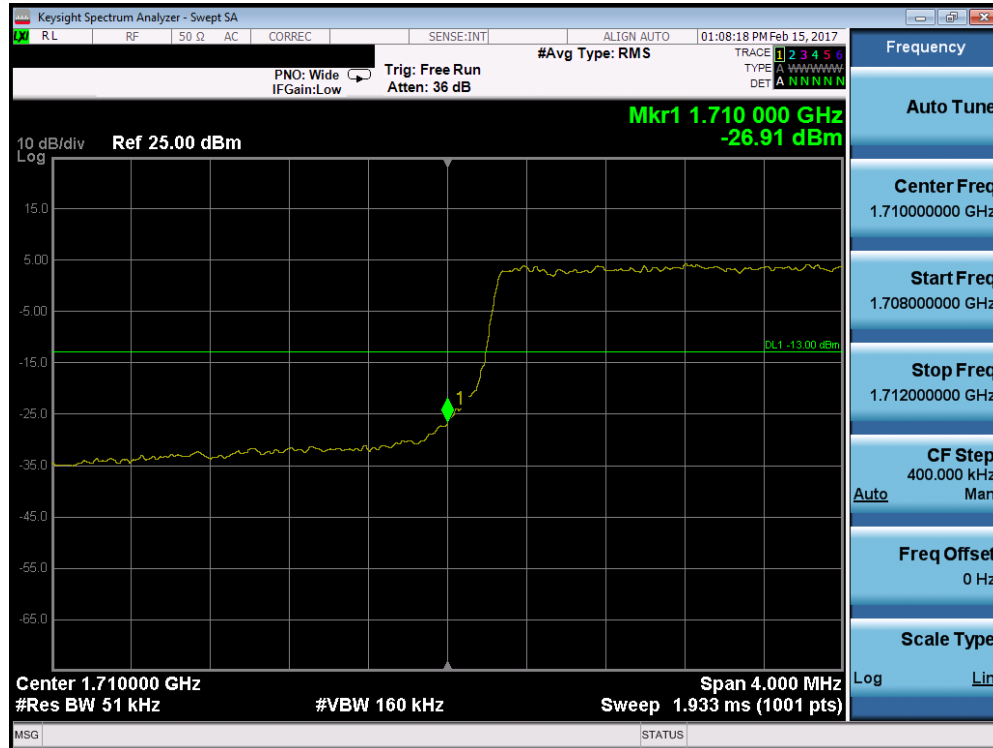


Plot 7-99. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

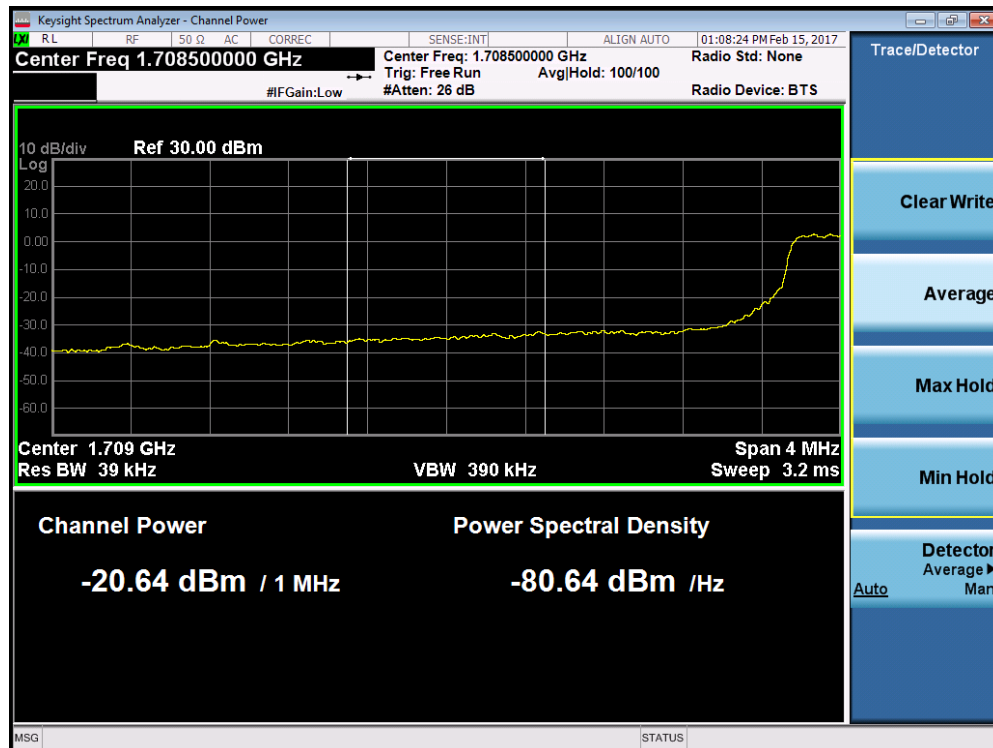


Plot 7-100. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-101. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

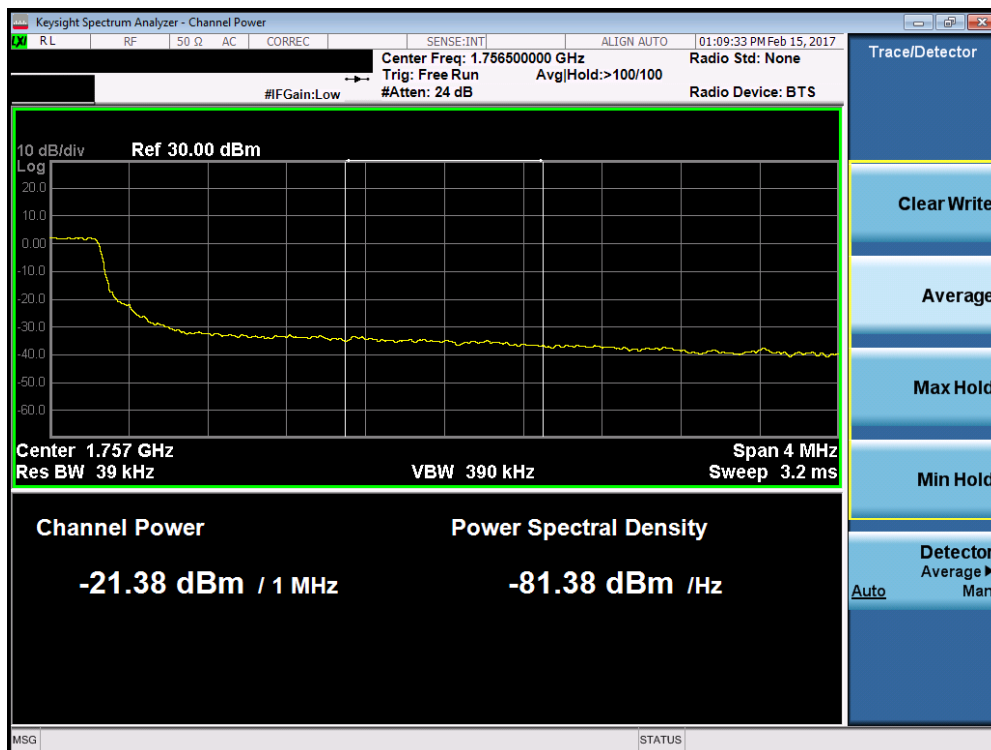


Plot 7-102. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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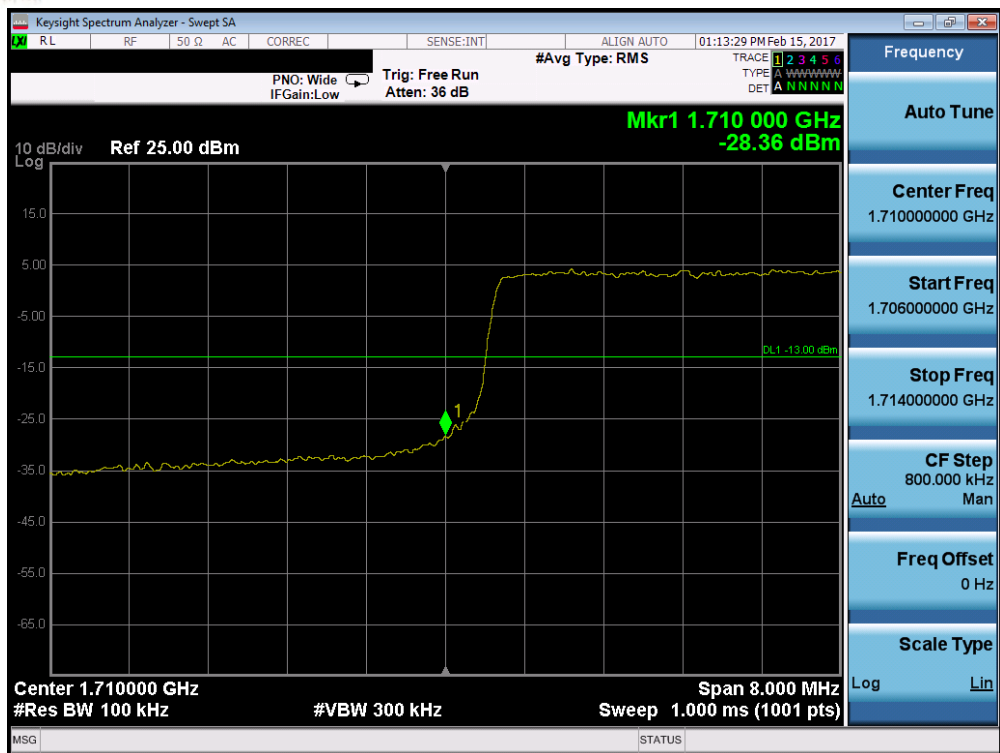


Plot 7-103. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

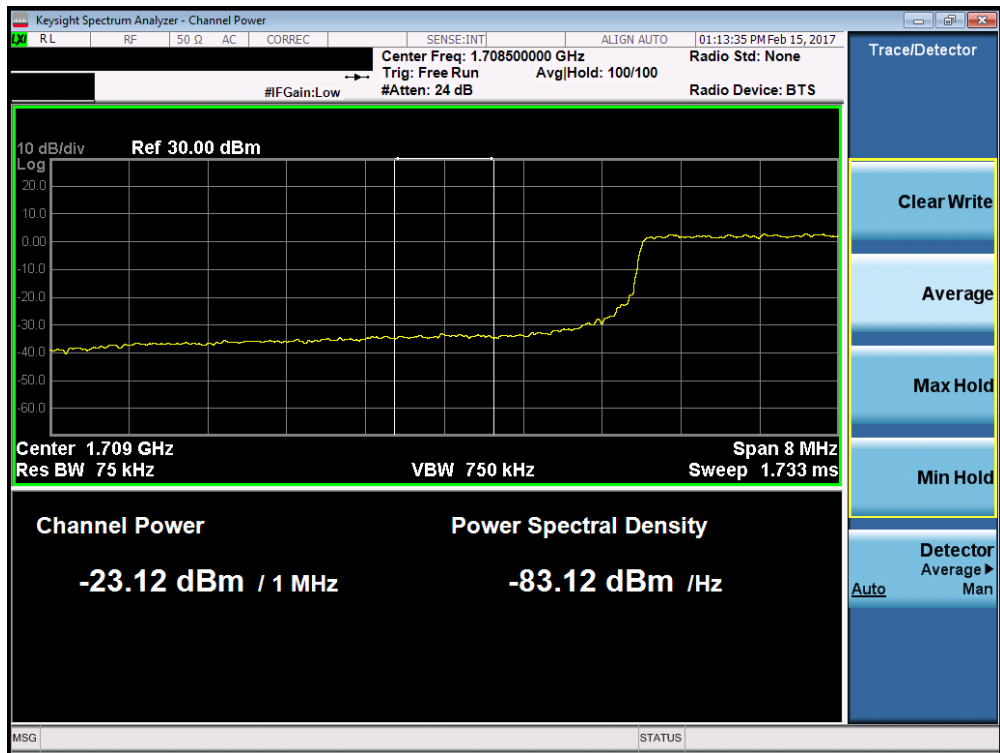


Plot 7-104. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-105. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

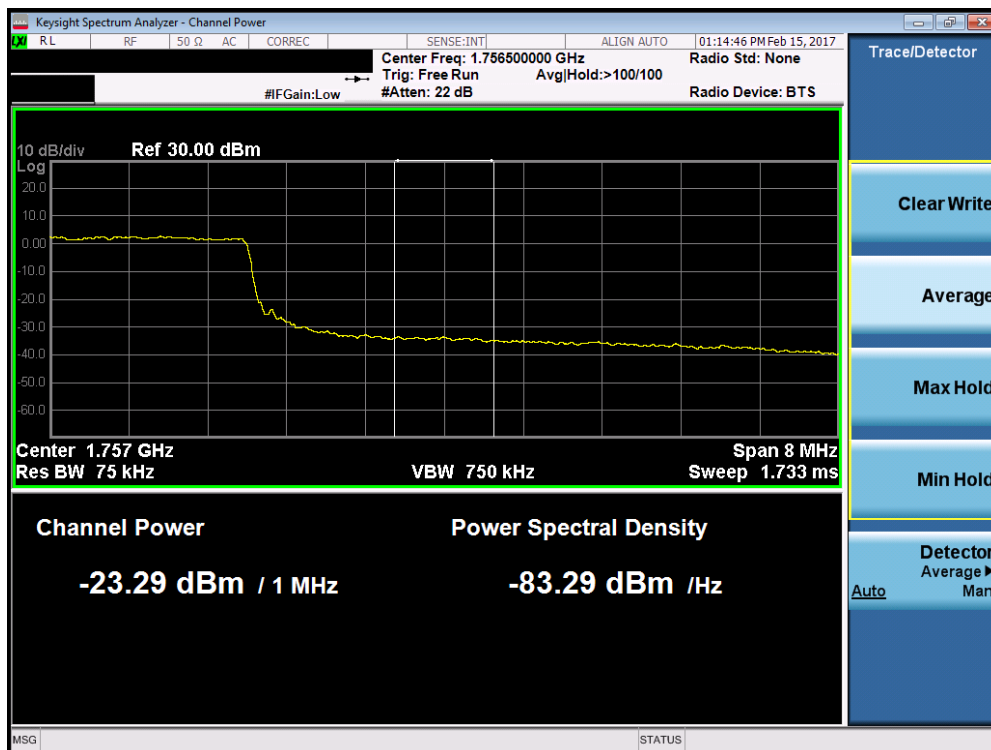


Plot 7-106. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ727R4	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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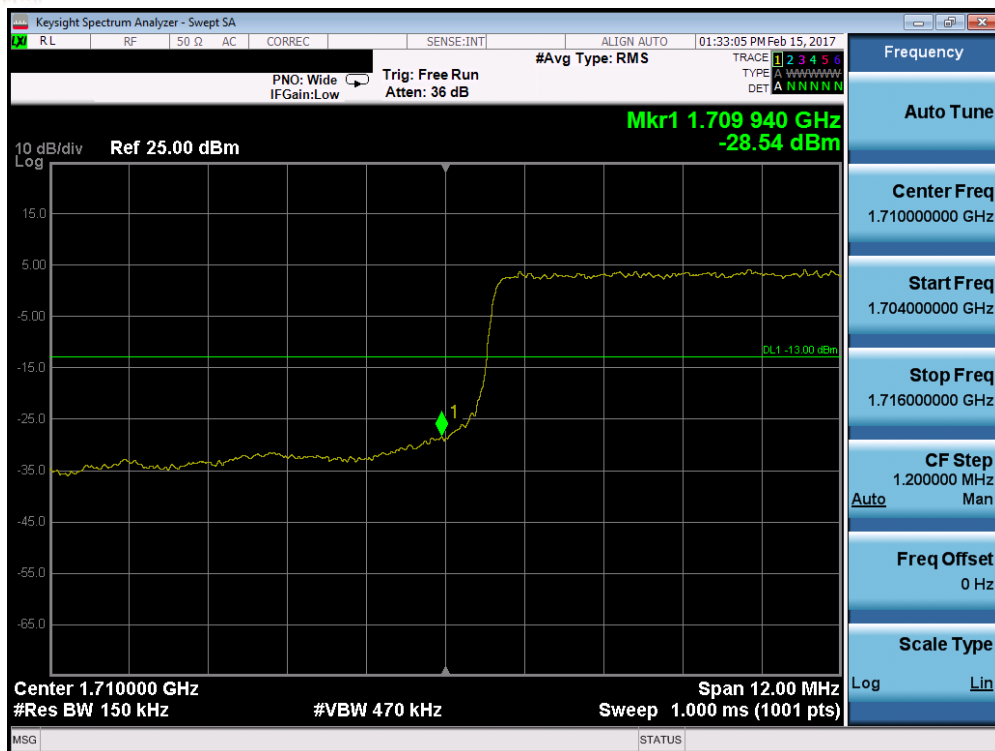


Plot 7-107. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

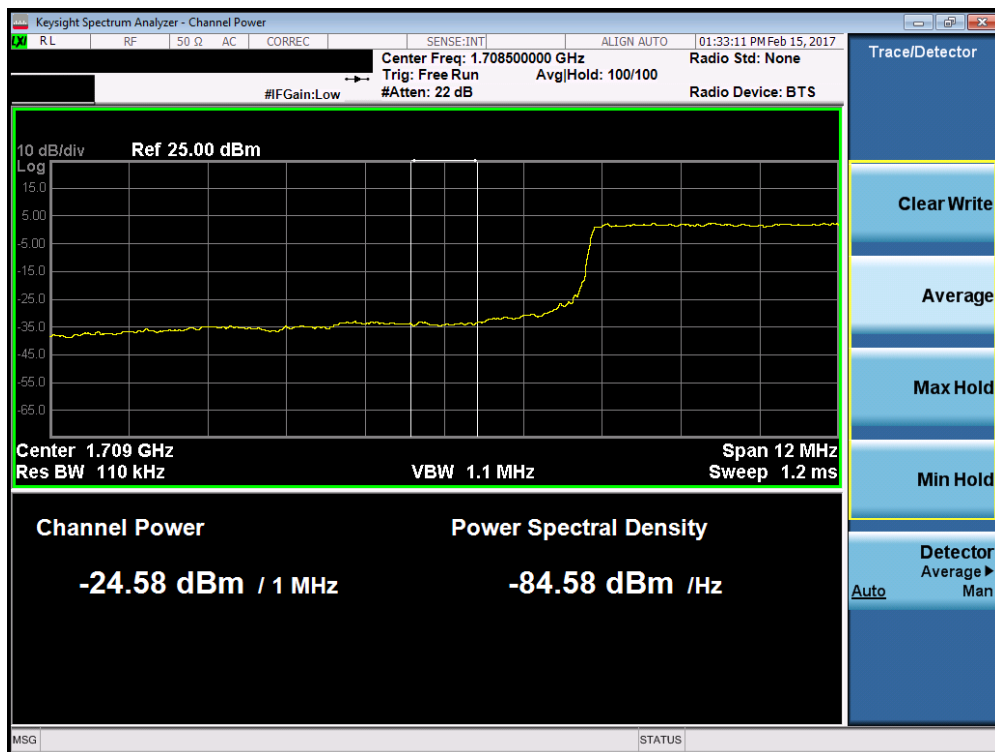


Plot 7-108. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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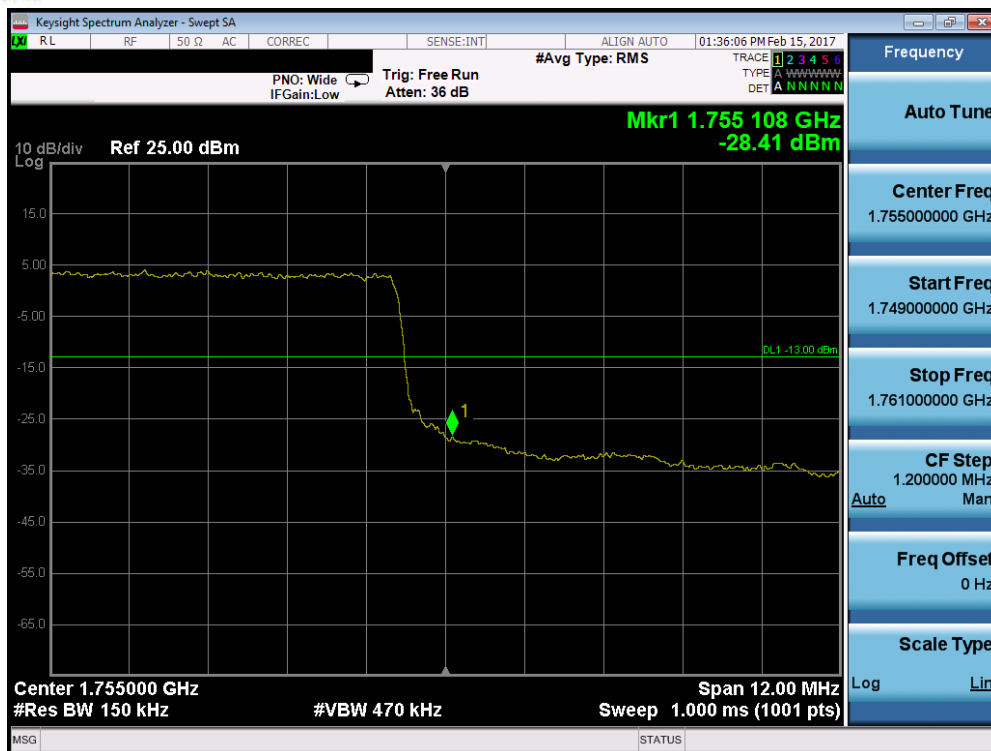


Plot 7-109. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

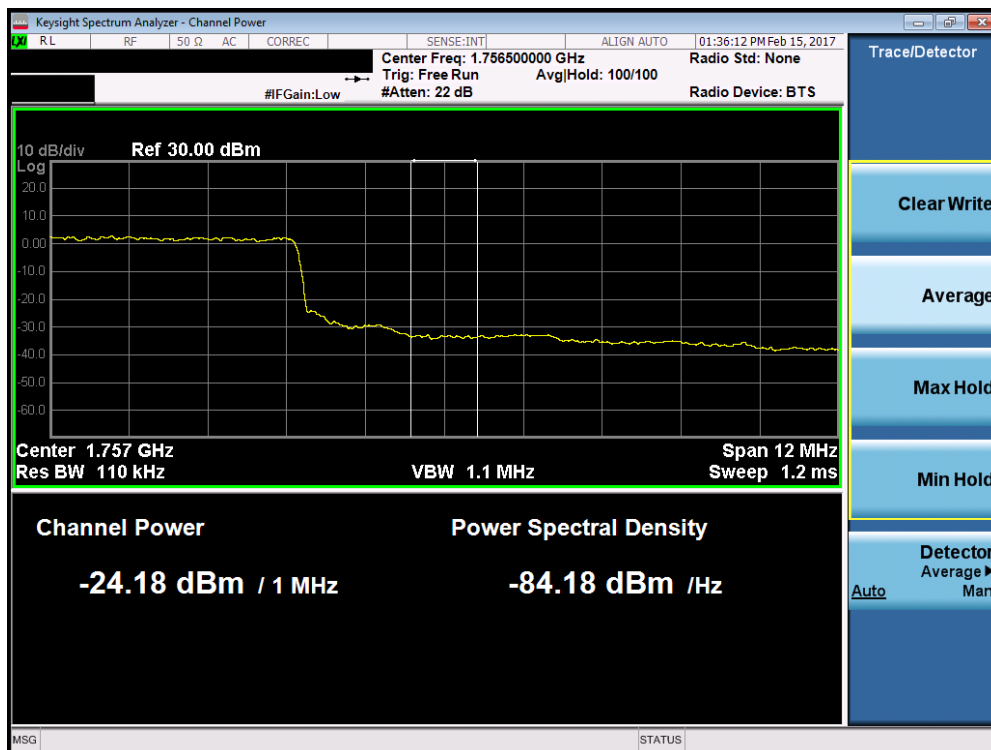


Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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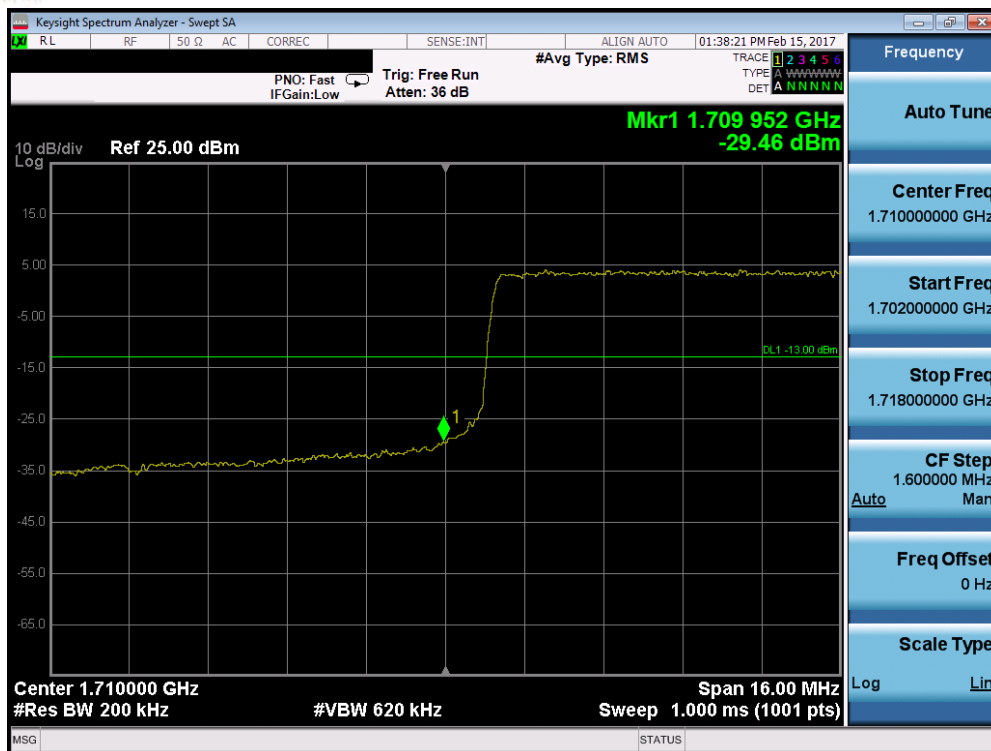


Plot 7-111. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

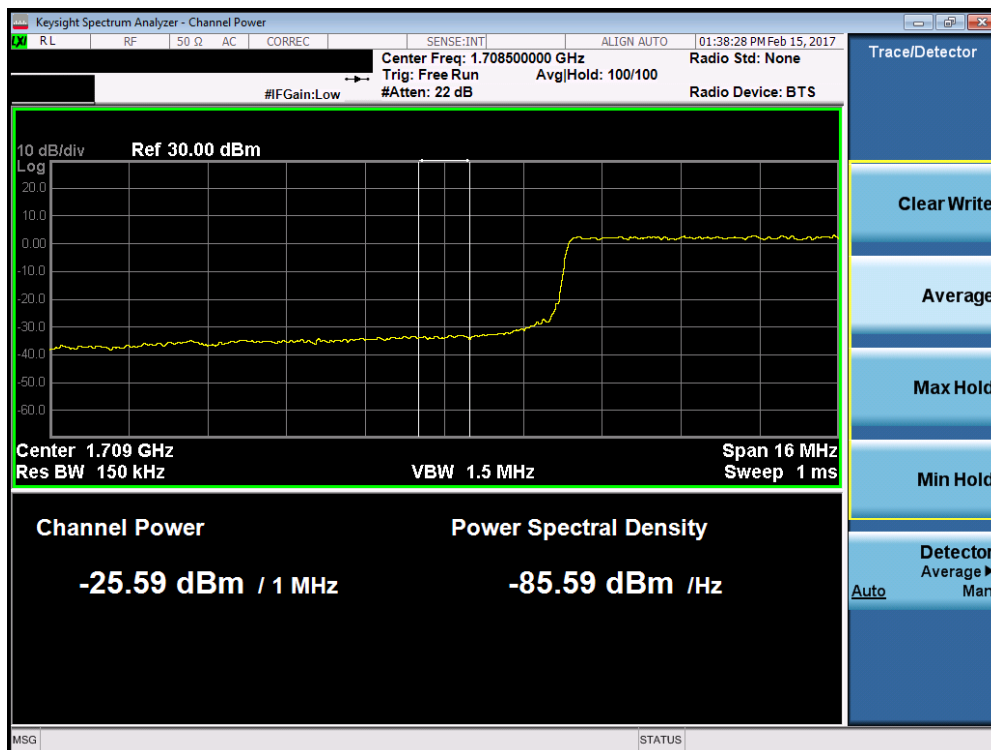


Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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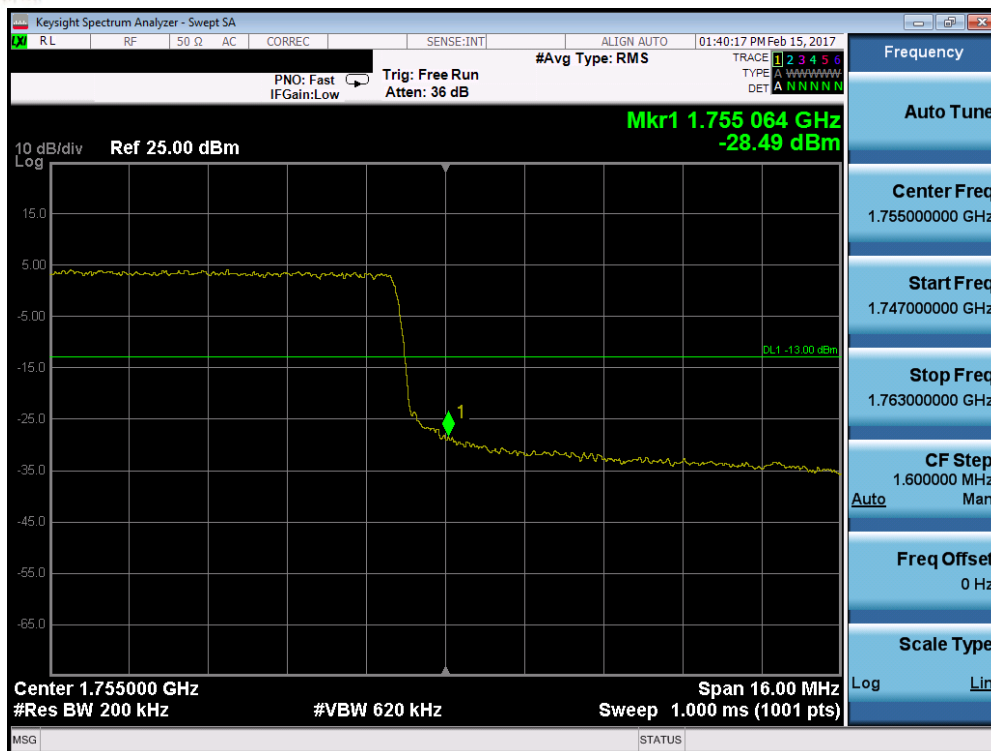


Plot 7-113. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

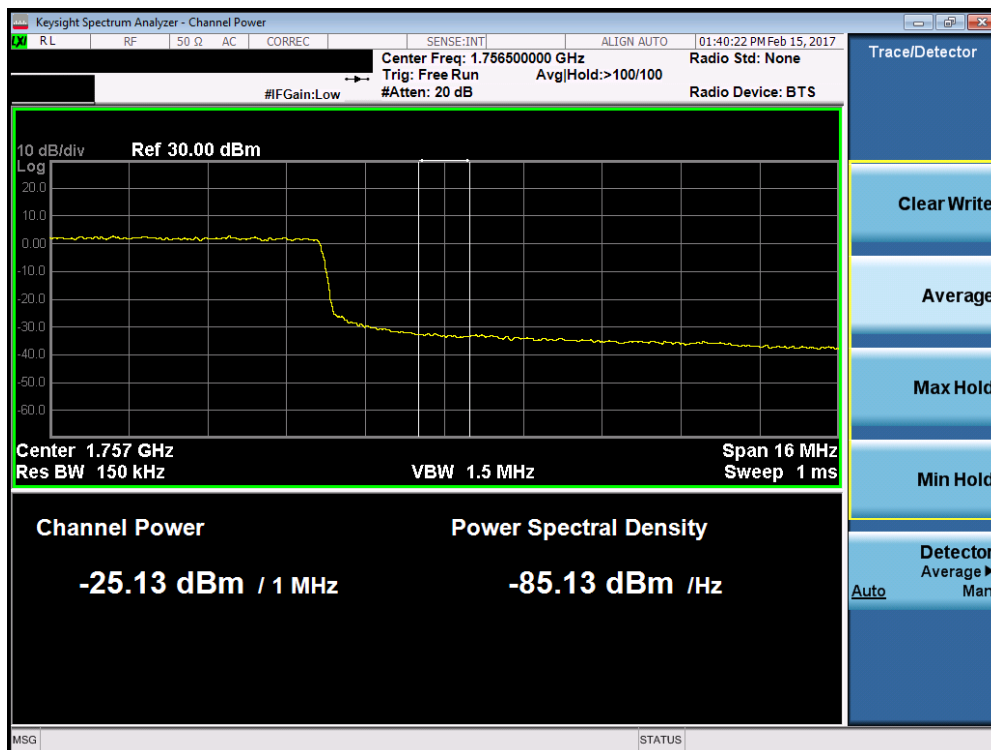


Plot 7-114. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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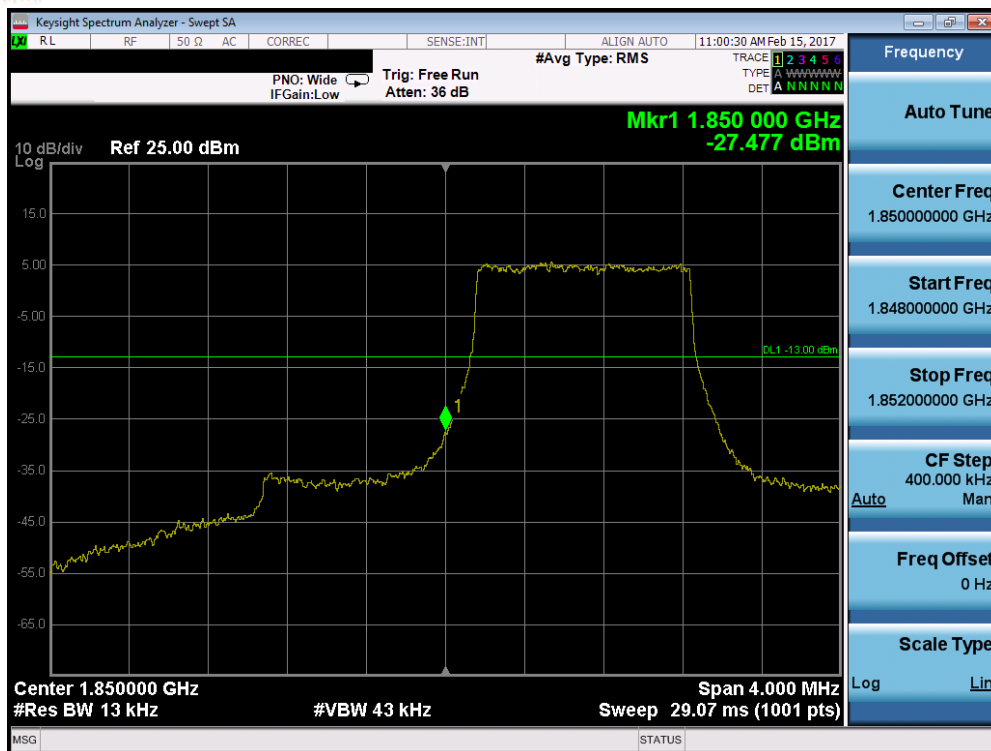


Plot 7-115. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

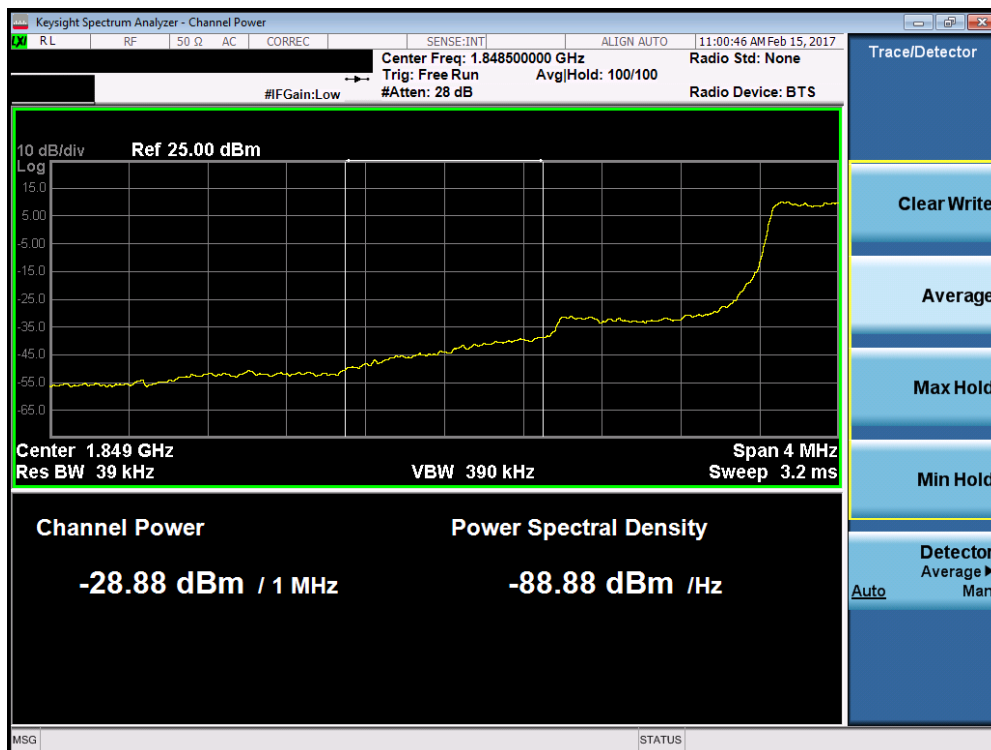


Plot 7-116. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-117. Lower Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

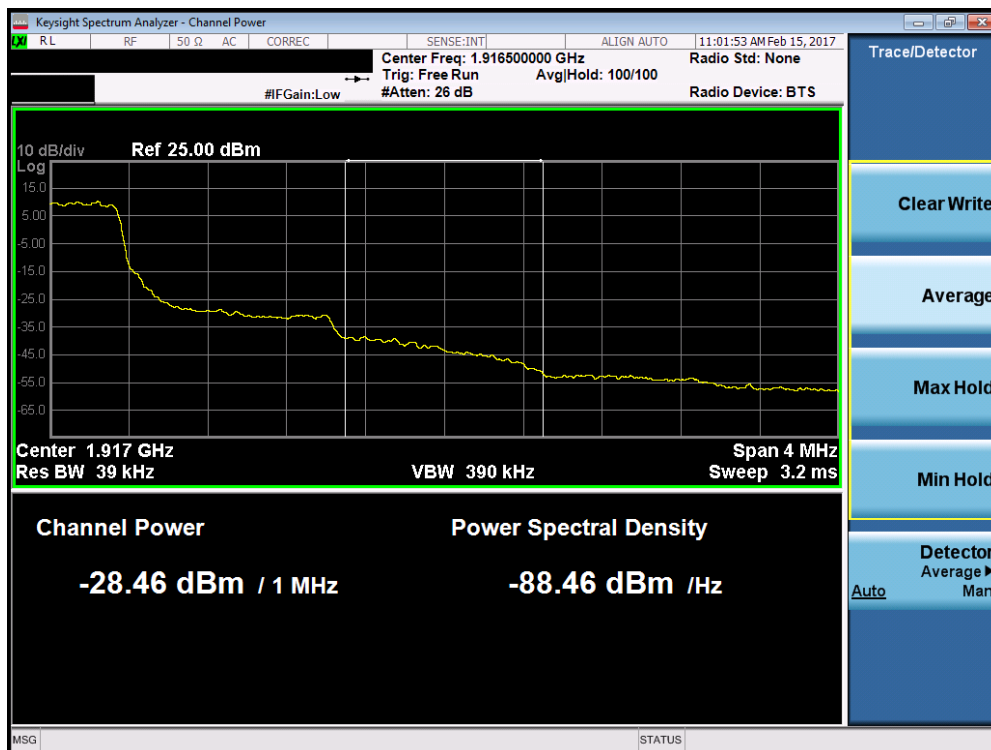


Plot 7-118. Lower Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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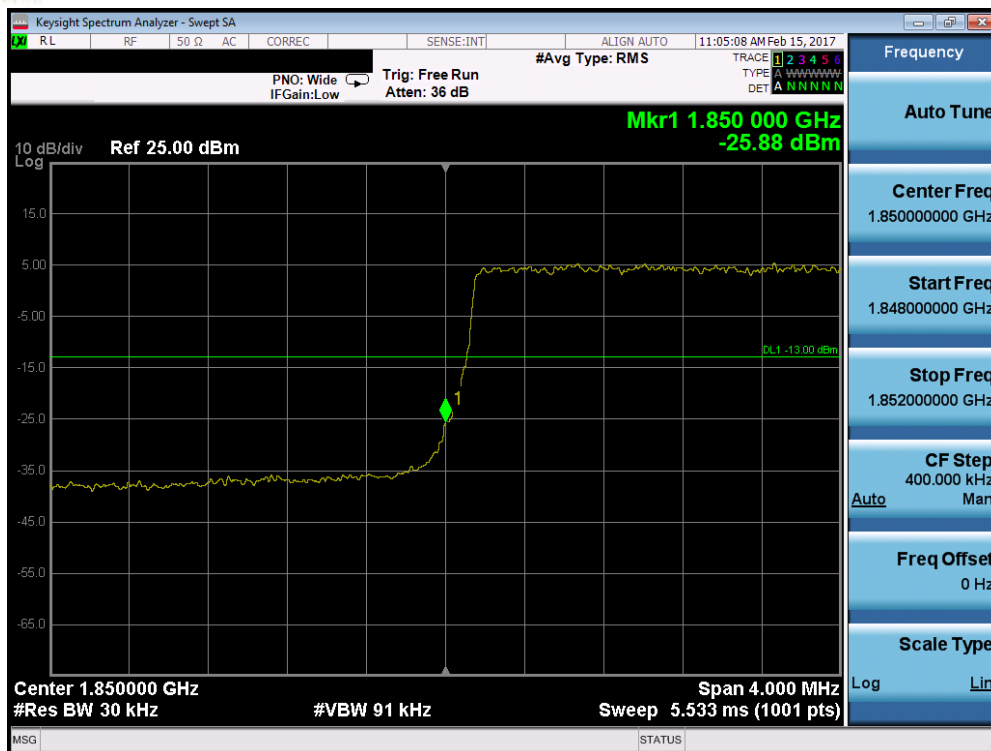


Plot 7-119. Upper Band Edge Plot (Band 2/25 - 1.4MHz QPSK - RB Size 6)

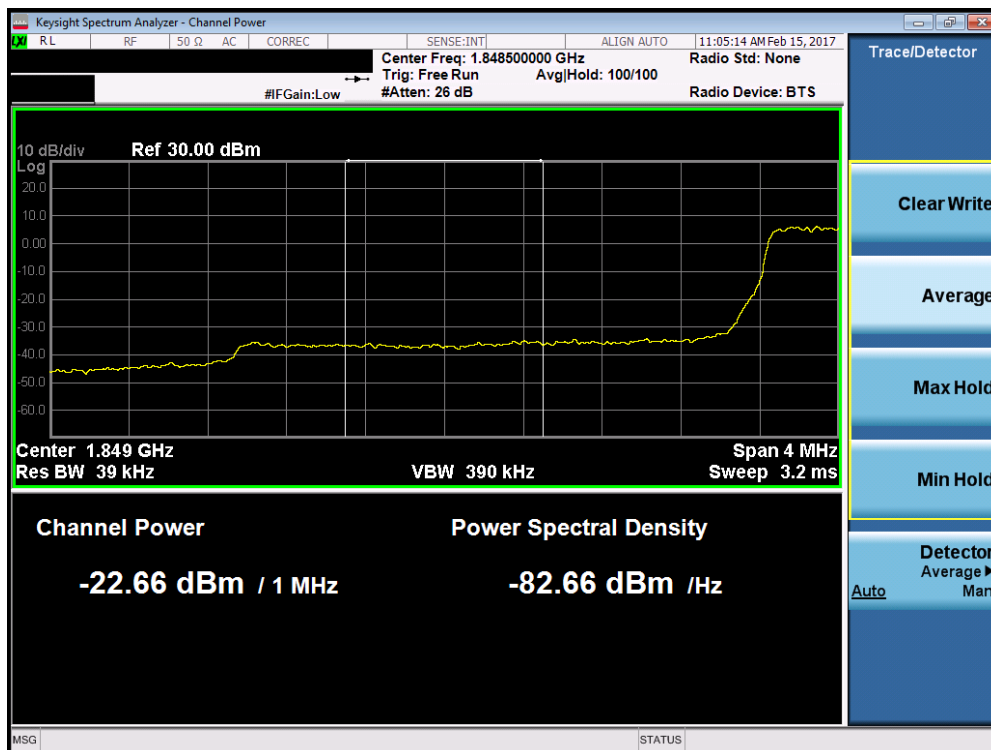


Plot 7-120. Upper Extended Band Edge Plot (Band 2/25 - 1.4MHz QPSK - RB Size 6)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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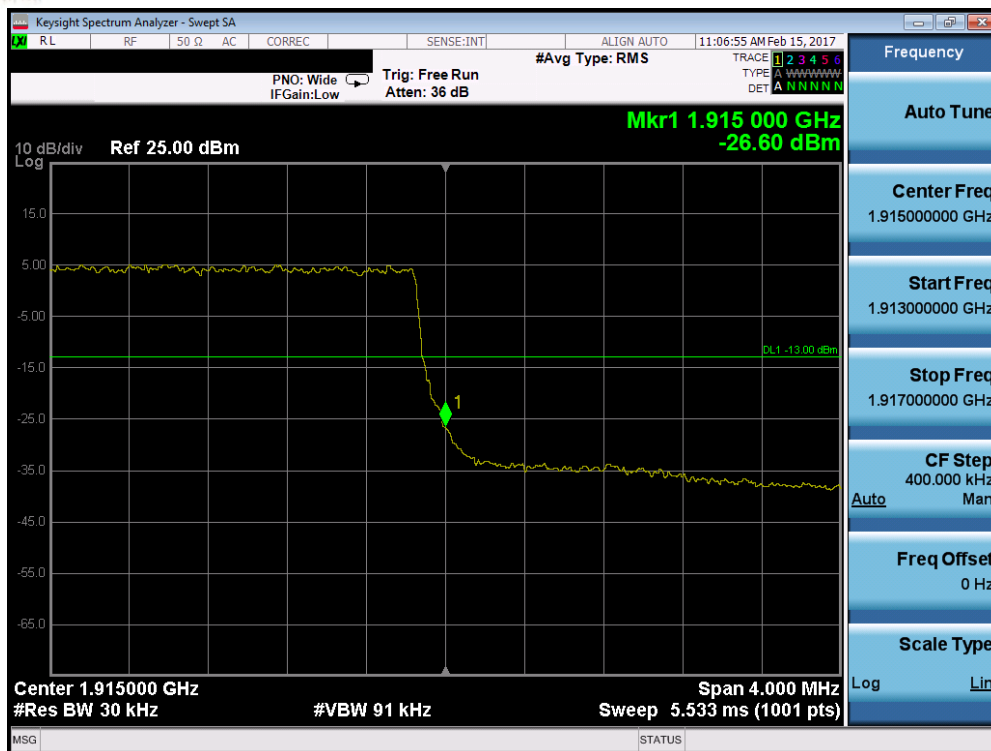


Plot 7-121. Lower Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

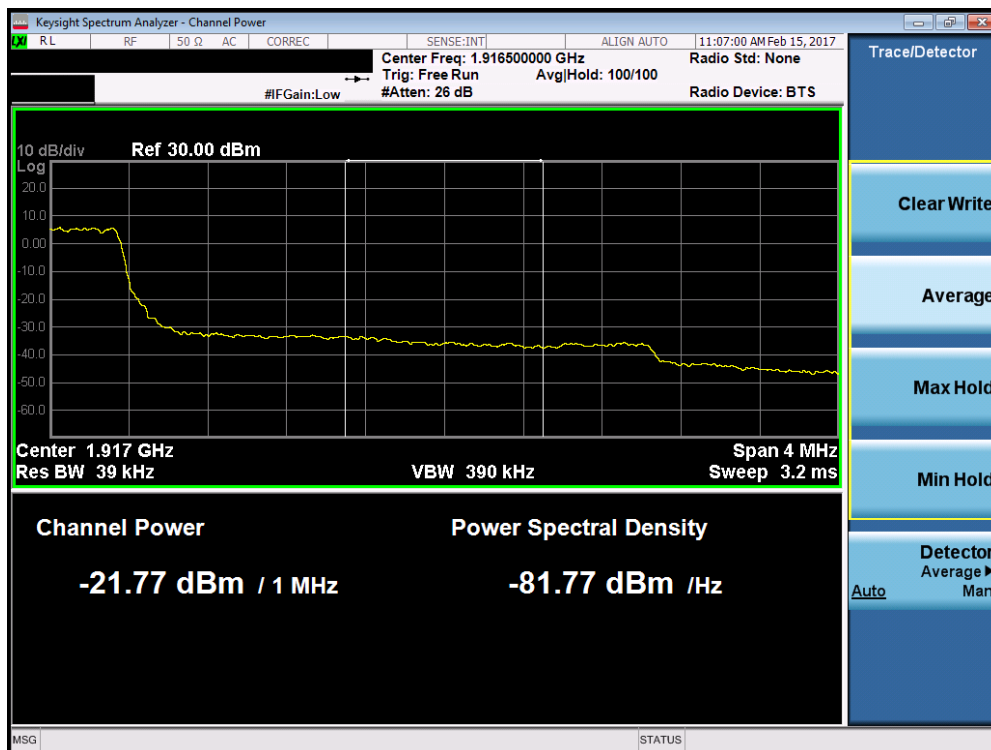


Plot 7-122. Lower Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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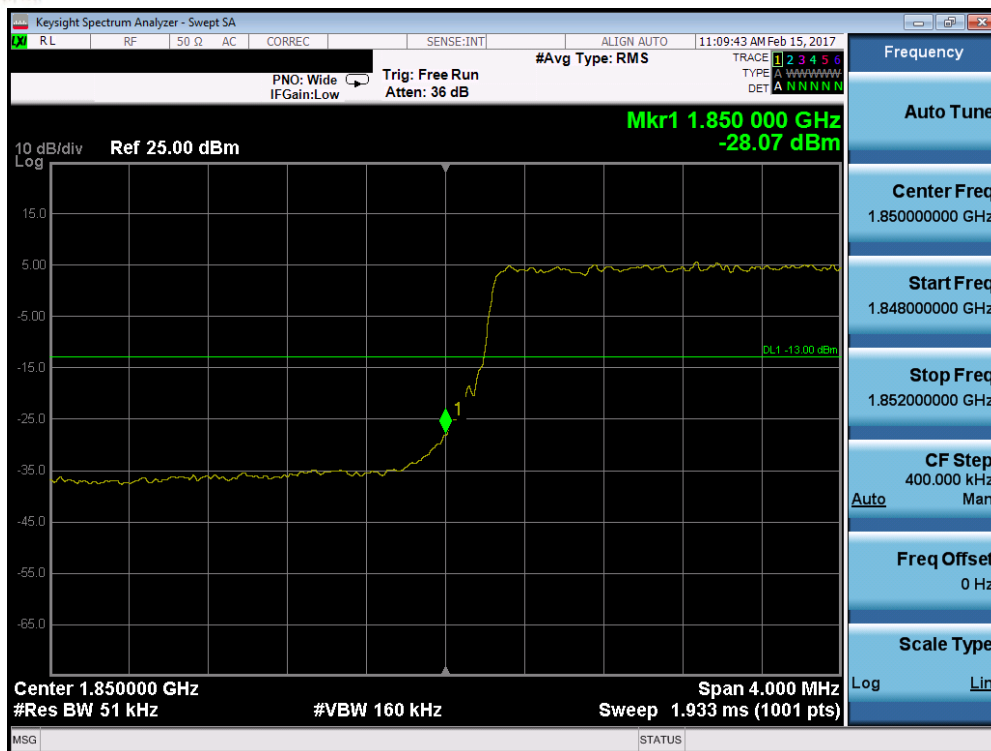


Plot 7-123. Upper Band Edge Plot (Band 2/25 - 3.0MHz QPSK - RB Size 15)

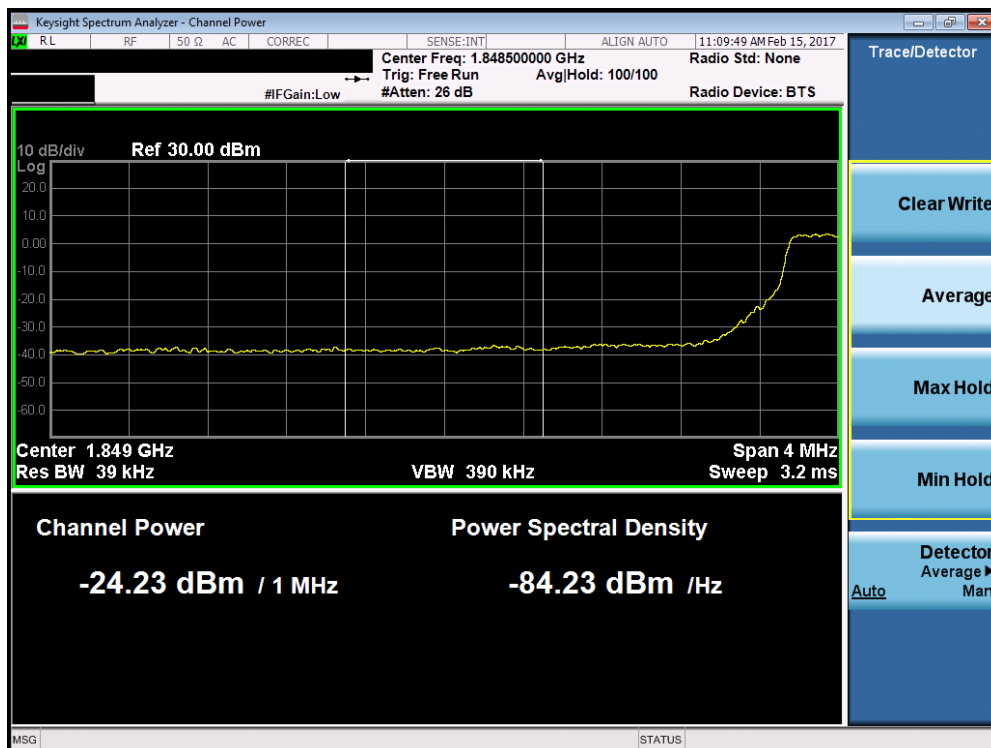


Plot 7-124. Upper Extended Band Edge Plot (Band 2/25 - 3.0MHz QPSK - RB Size 15)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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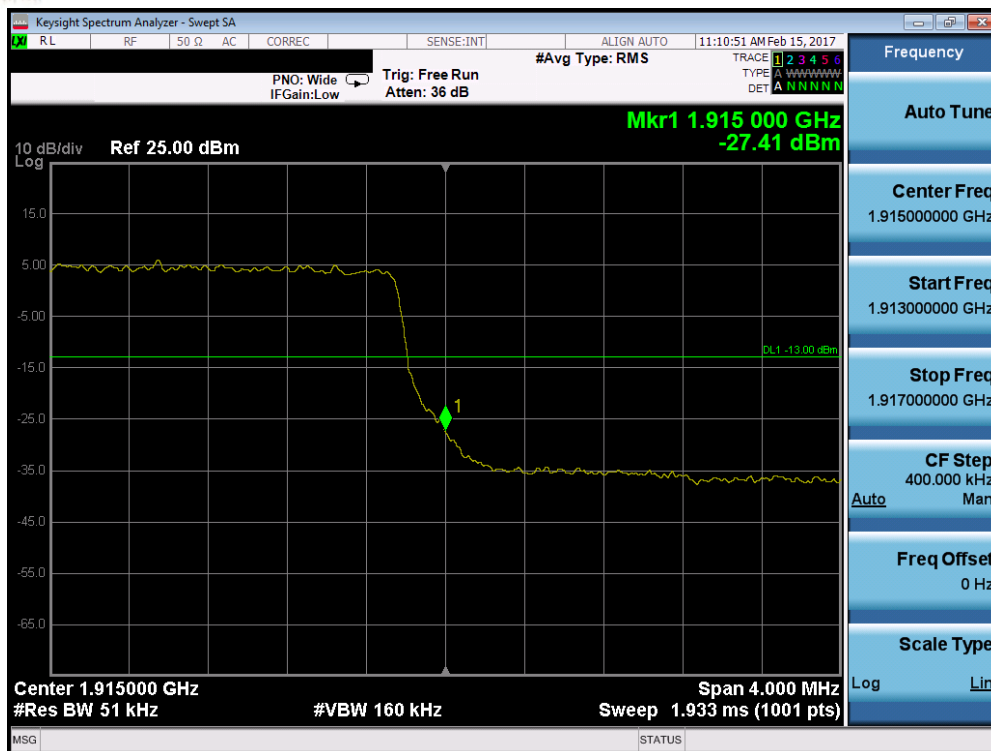


Plot 7-125. Lower Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

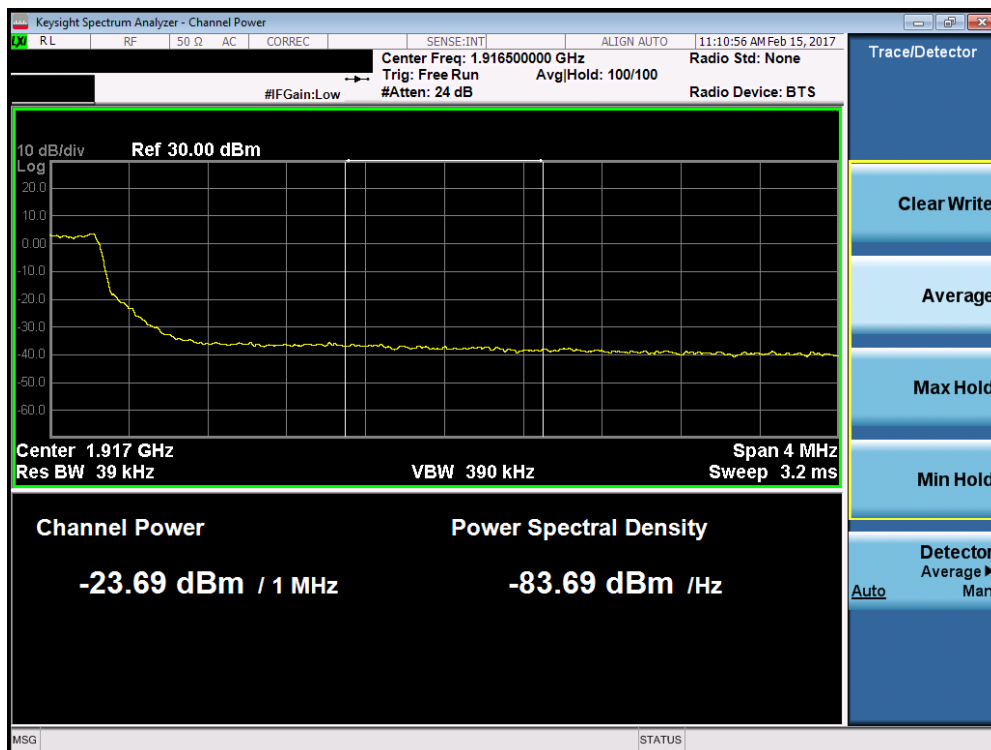


Plot 7-126. Lower Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 80 of 118

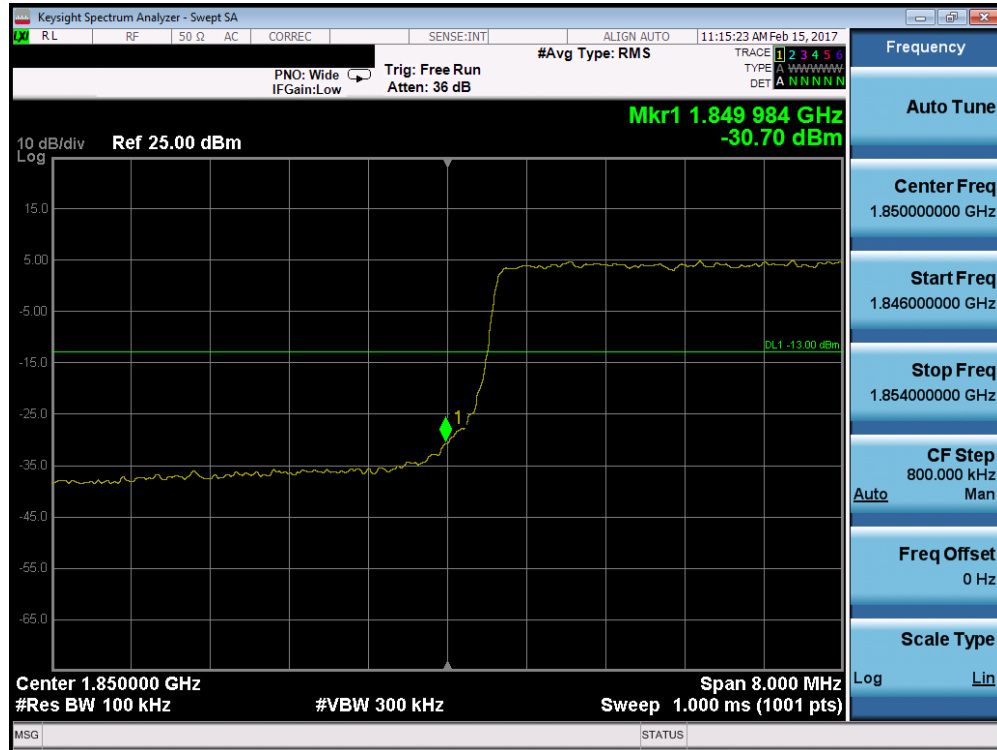


Plot 7-127. Upper Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

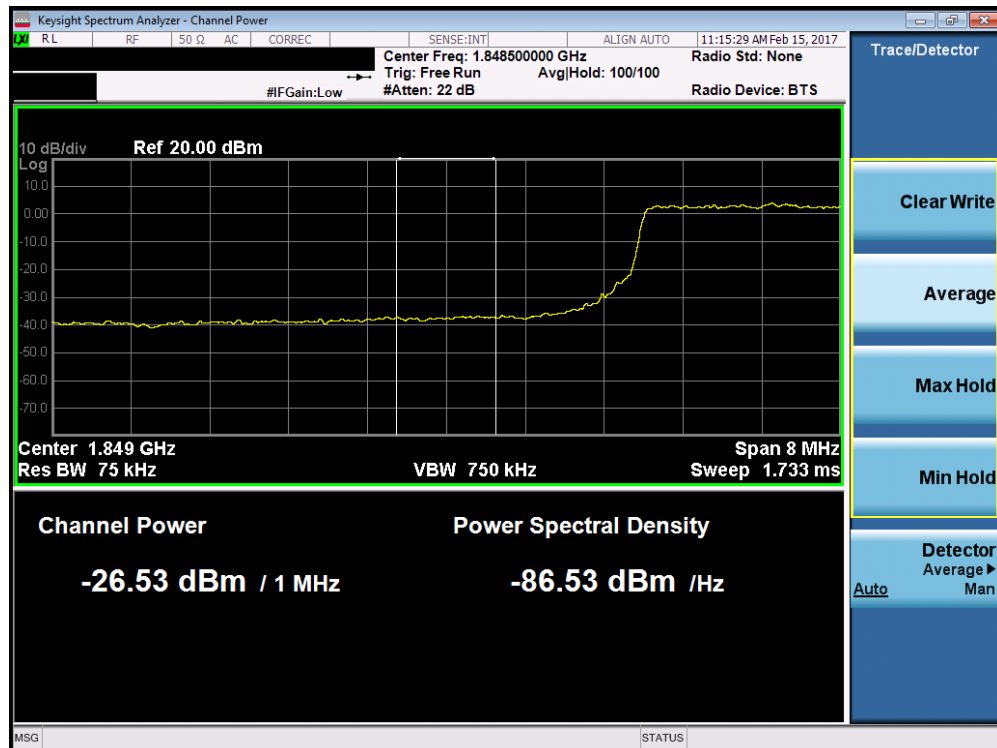


Plot 7-128. Upper Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 81 of 118



Plot 7-129. Lower Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

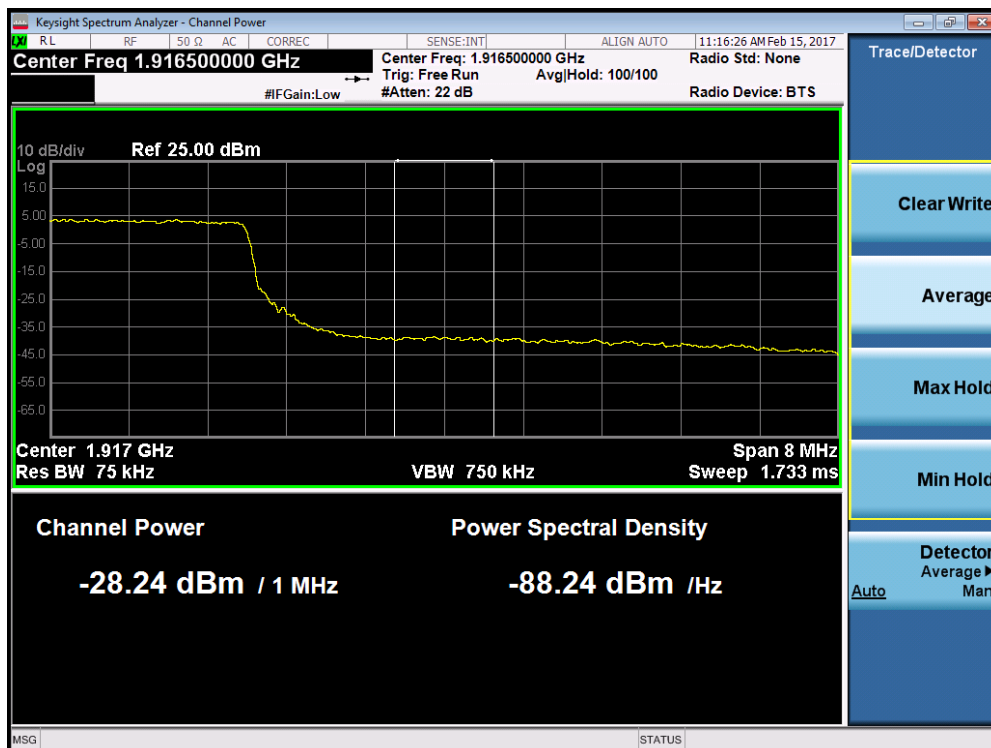


Plot 7-130. Lower Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 82 of 118

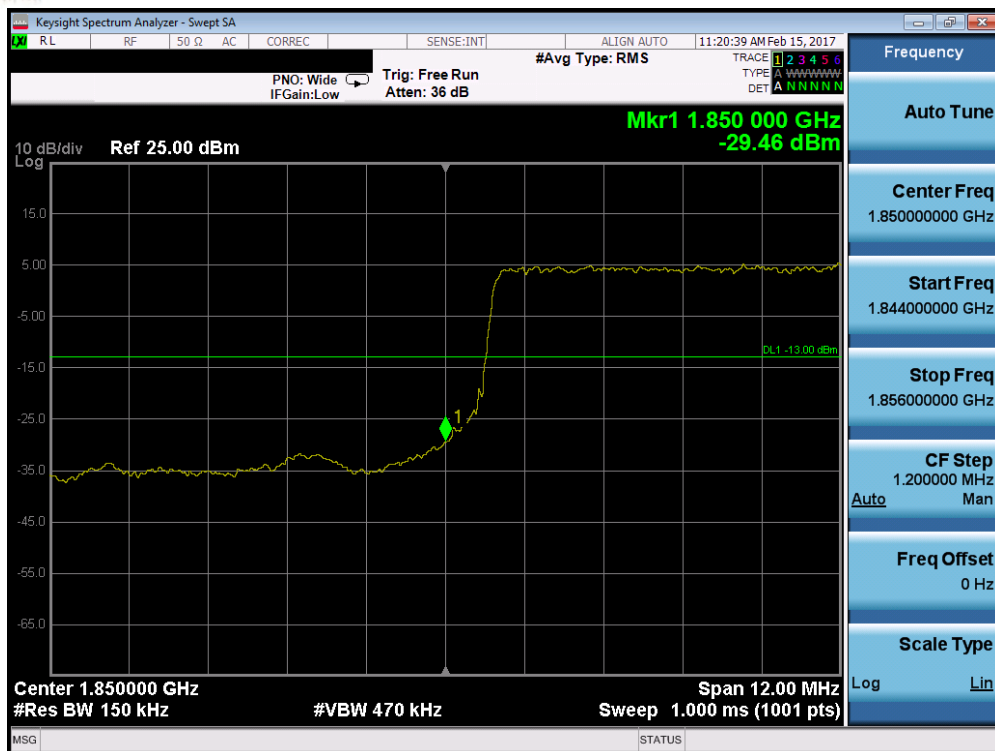


Plot 7-131. Upper Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

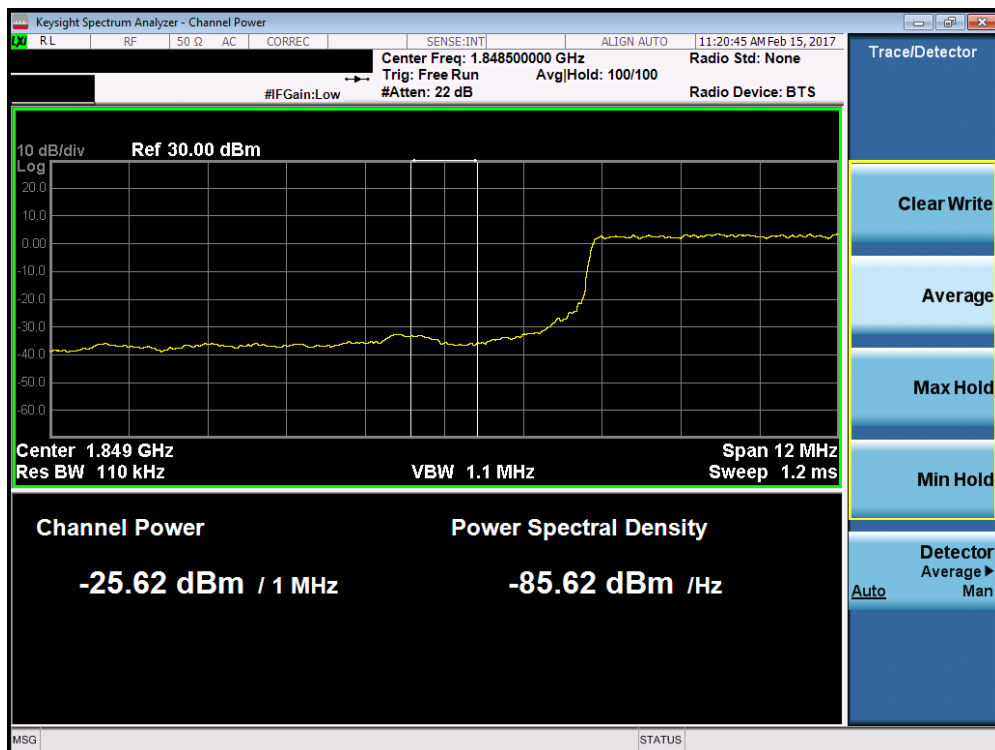


Plot 7-132. Upper Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 83 of 118

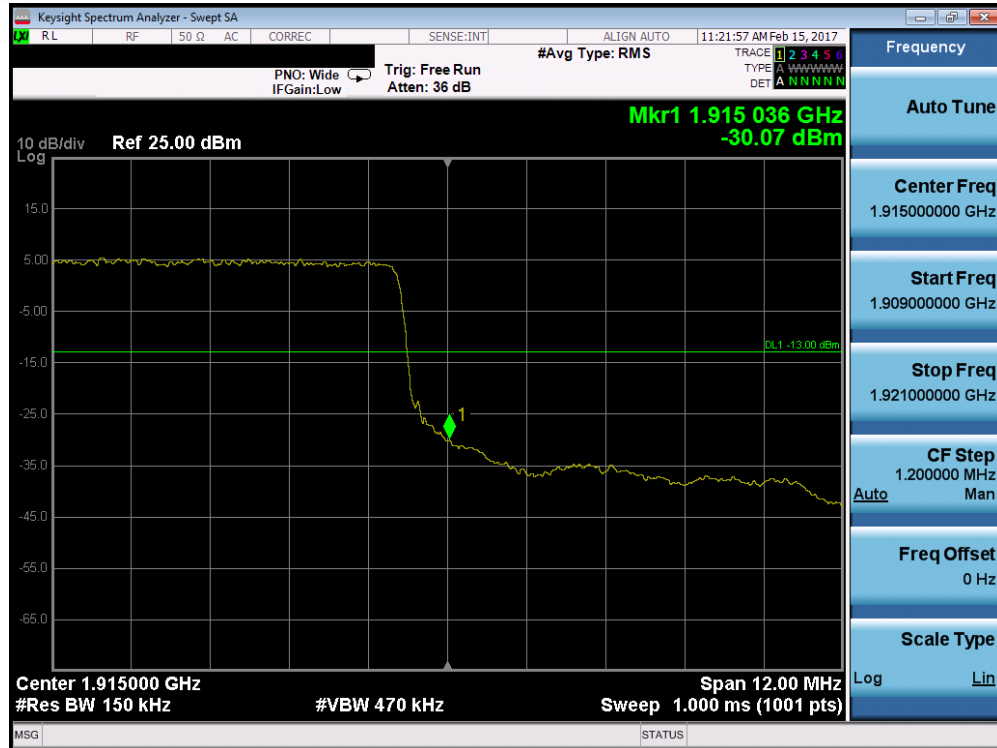


Plot 7-133. Lower Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

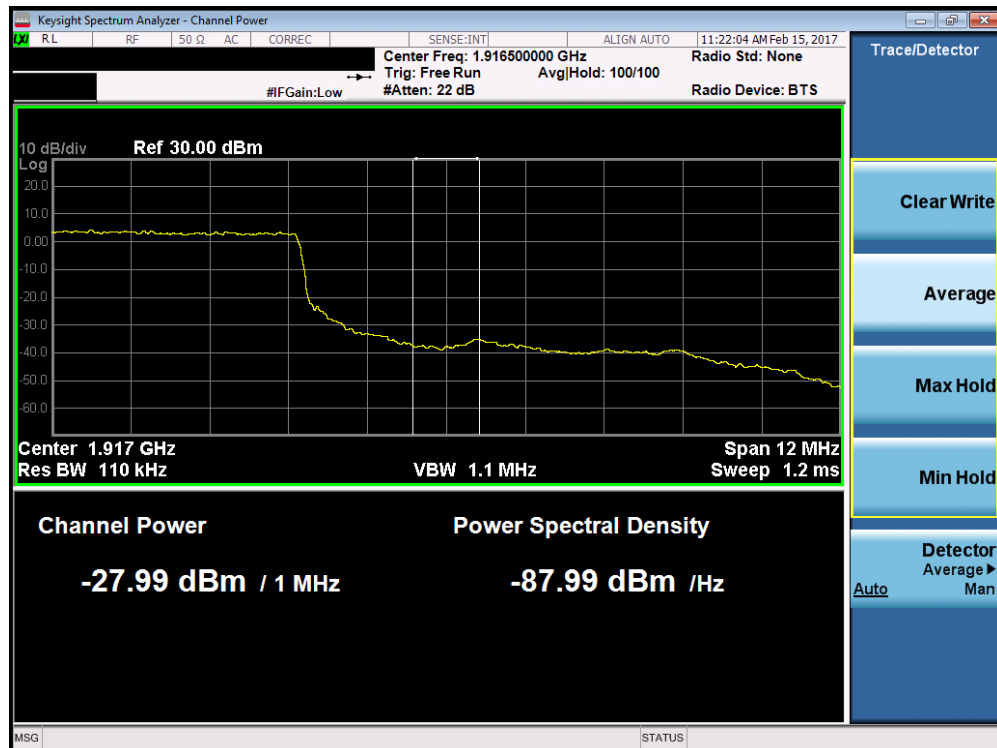


Plot 7-134. Lower Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 84 of 118

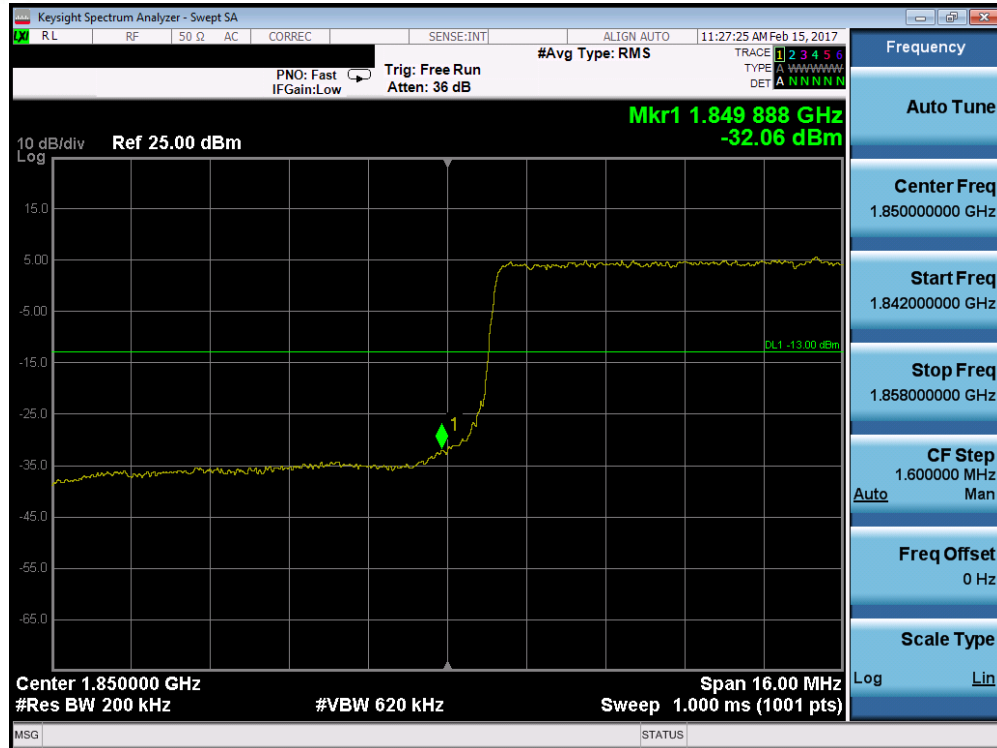


Plot 7-135. Upper Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

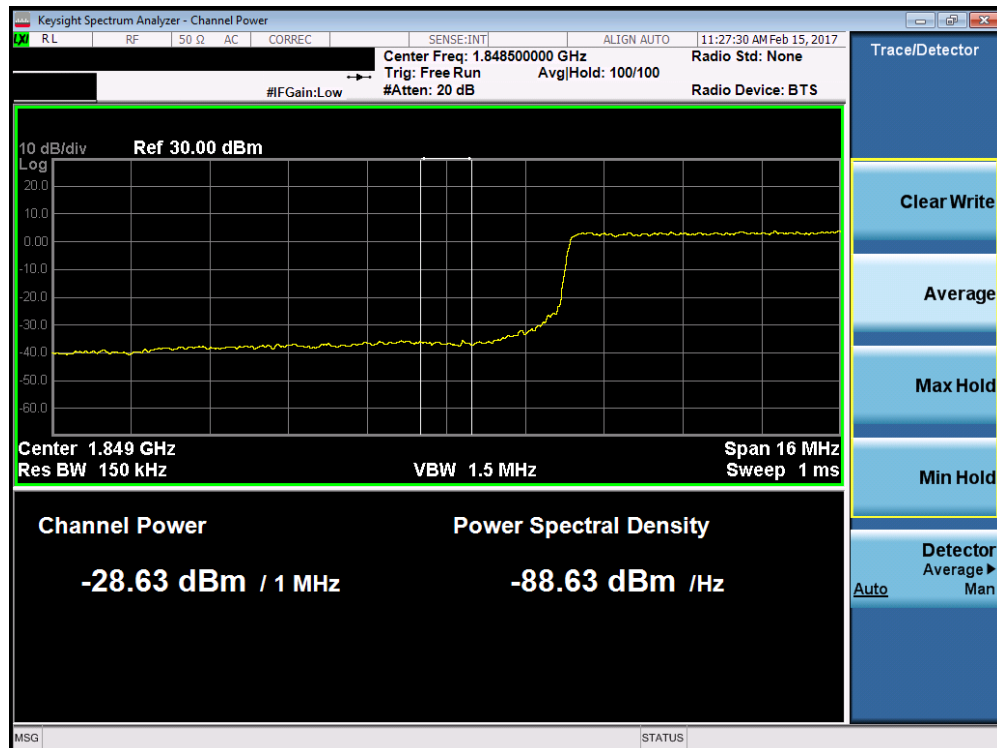


Plot 7-136. Upper Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 85 of 118



Plot 7-137. Lower Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

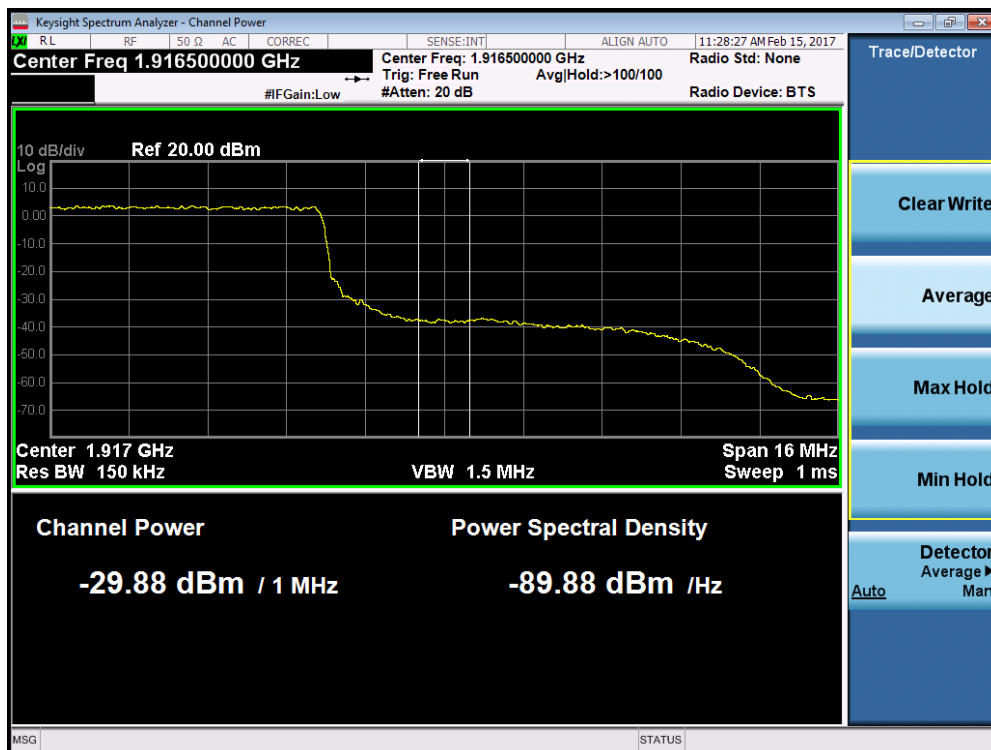


Plot 7-138. Lower Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 86 of 118



Plot 7-139. Upper Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)



Plot 7-140. Upper Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMJ727R4	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 87 of 118

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.

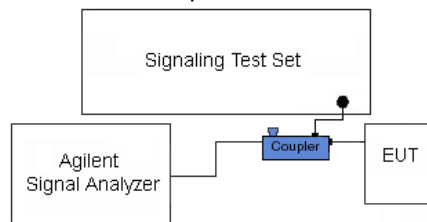
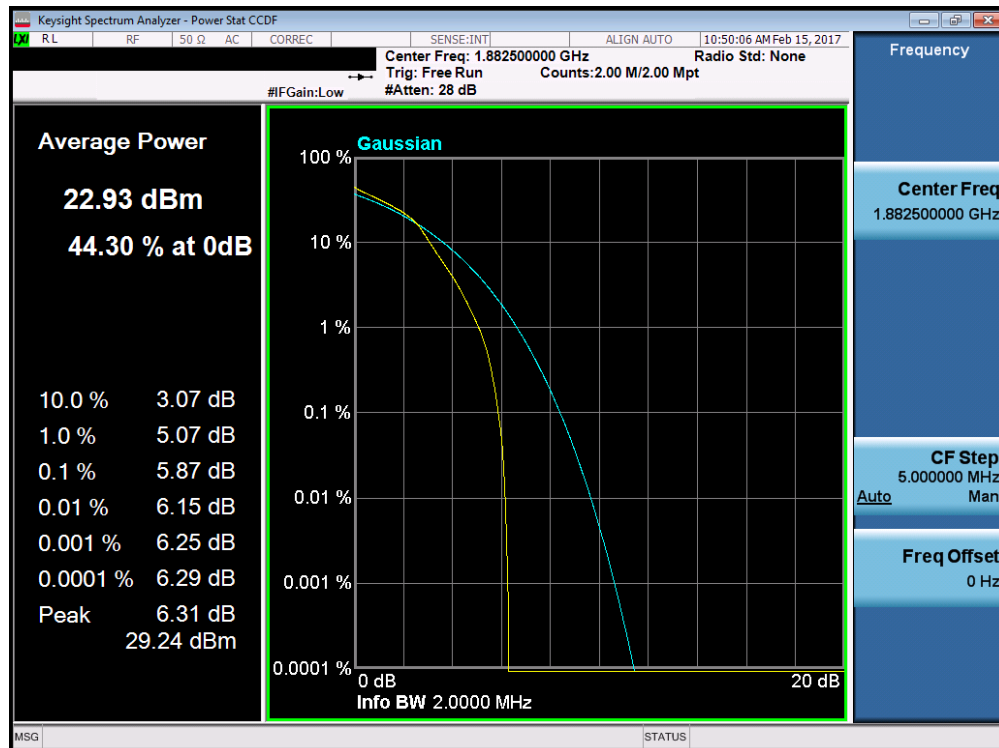
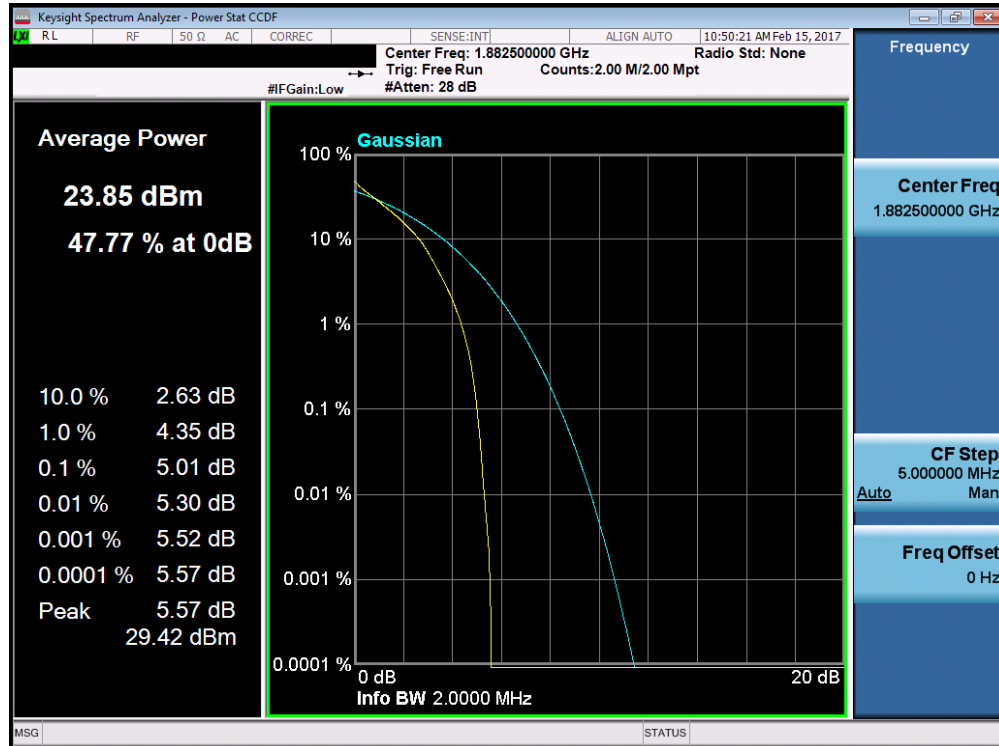


Figure 7-4. Test Instrument & Measurement Setup

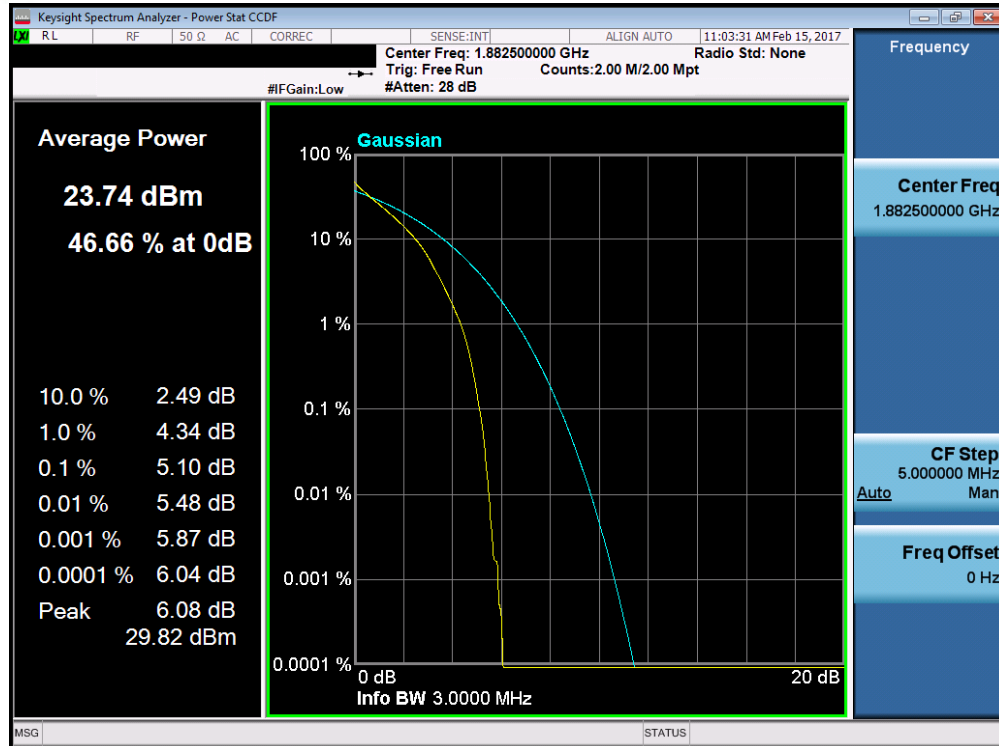
Test Notes

None.

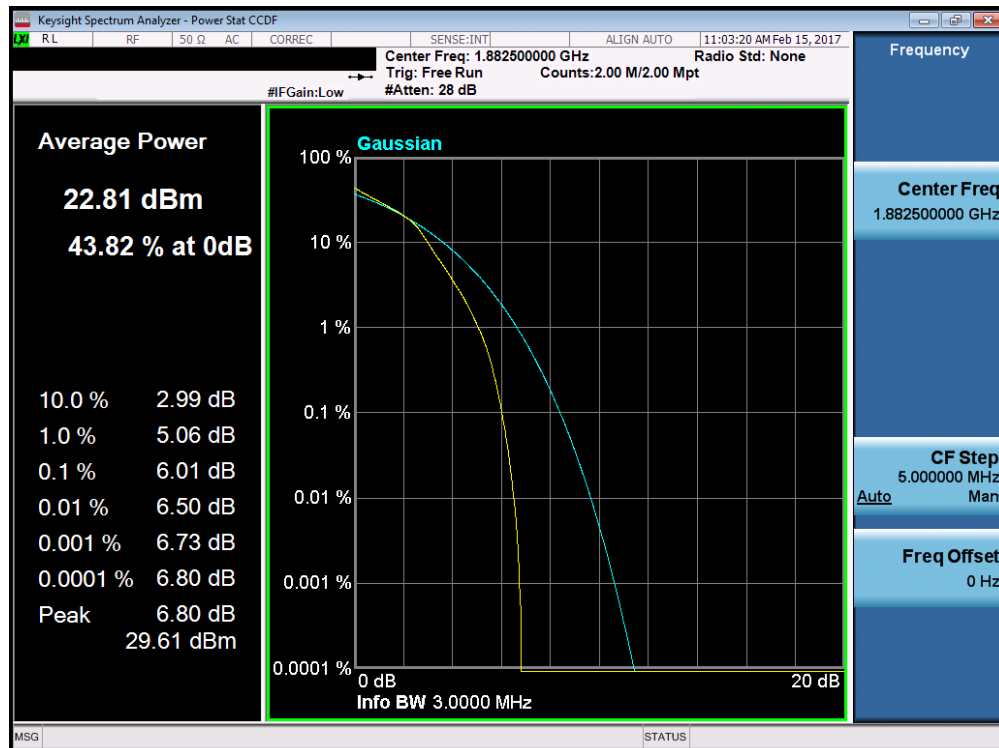
FCC ID: A3LSMJ727R4		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 88 of 118



FCC ID: A3LSMJ727R4	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset	Page 89 of 118

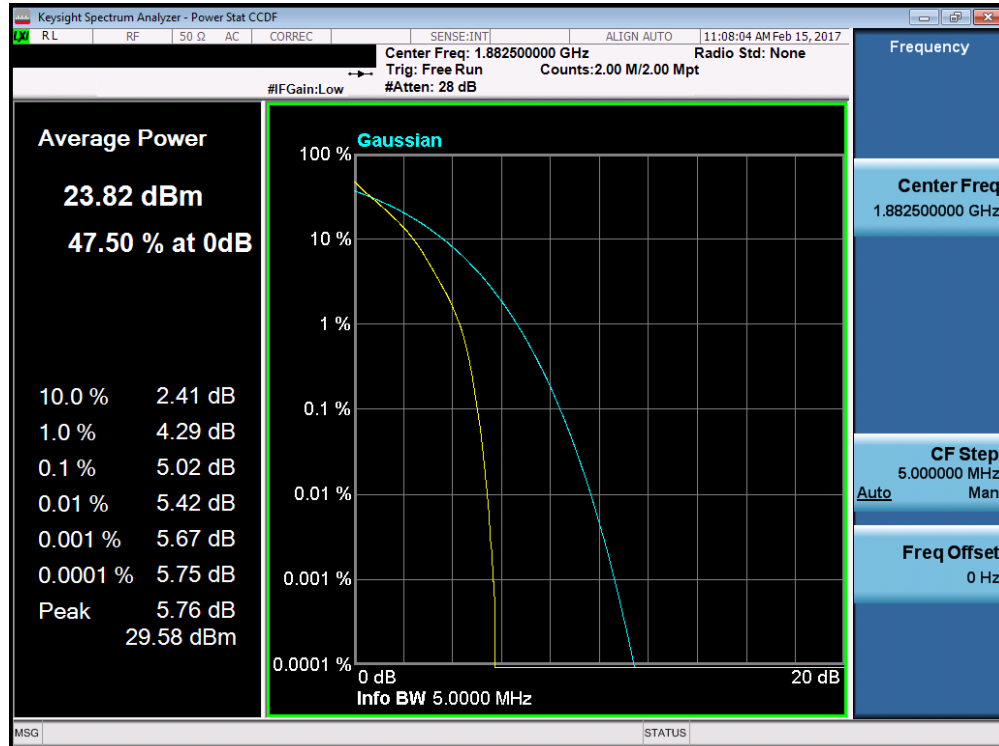


Plot 7-143. PAR Plot (Band 2/25 - 3.0MHz QPSK - RB Size 15)

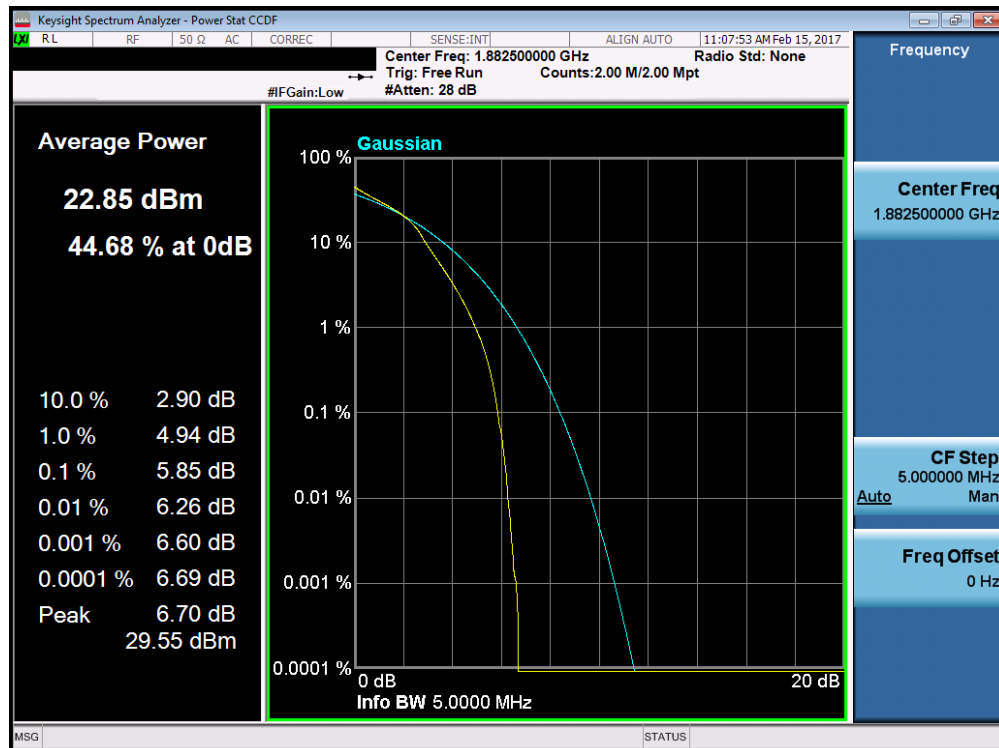


Plot 7-144. PAR Plot (Band 2/25 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: A3LSMJ727R4	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset	Page 90 of 118

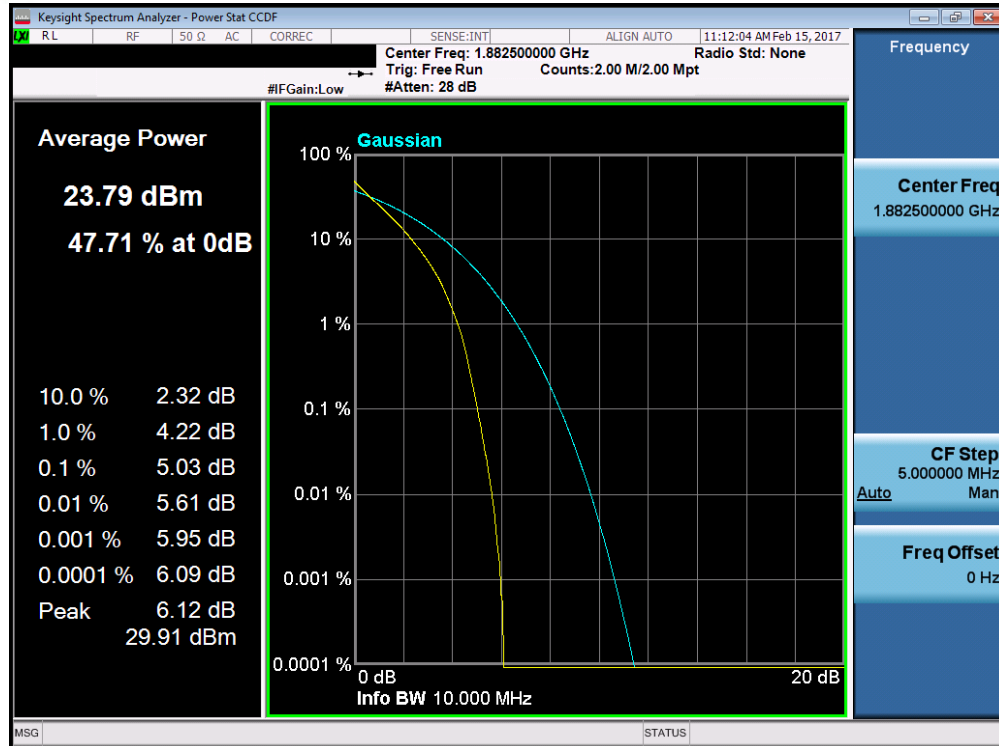


Plot 7-145. PAR Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

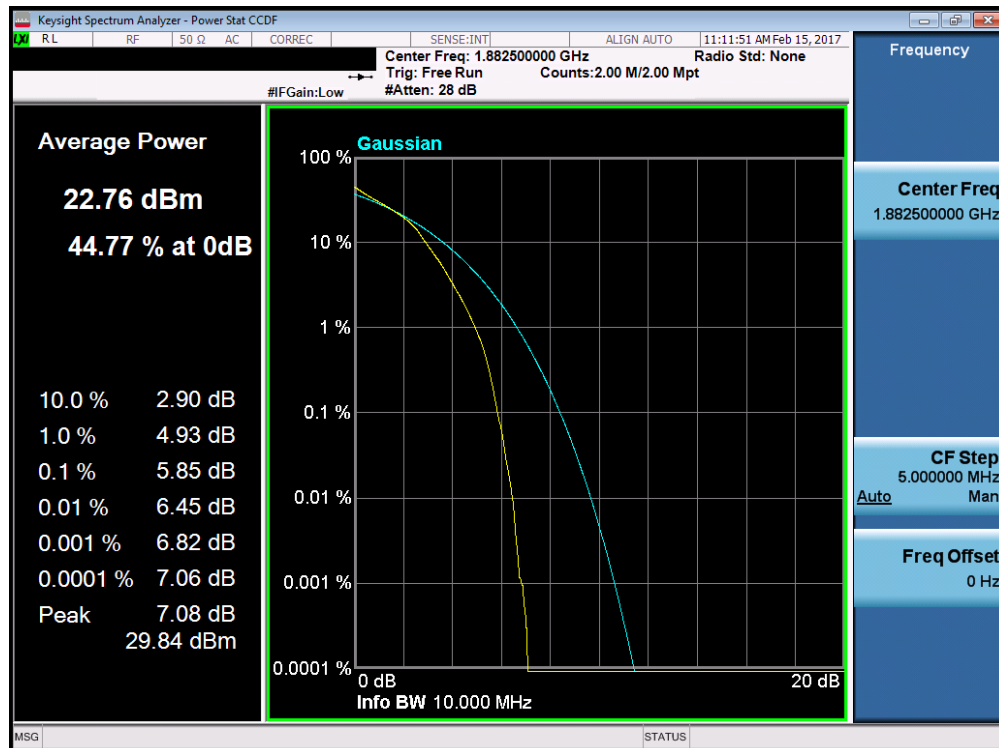


Plot 7-146. PAR Plot (Band 2/25 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSMJ727R4	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset	Page 91 of 118

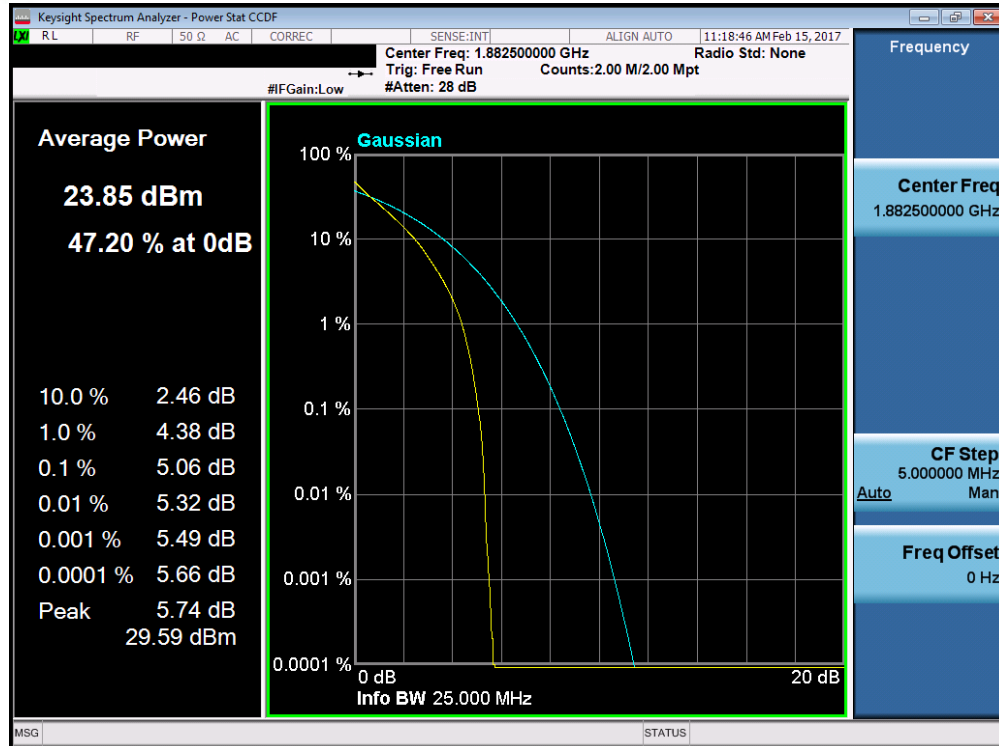


Plot 7-147. PAR Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

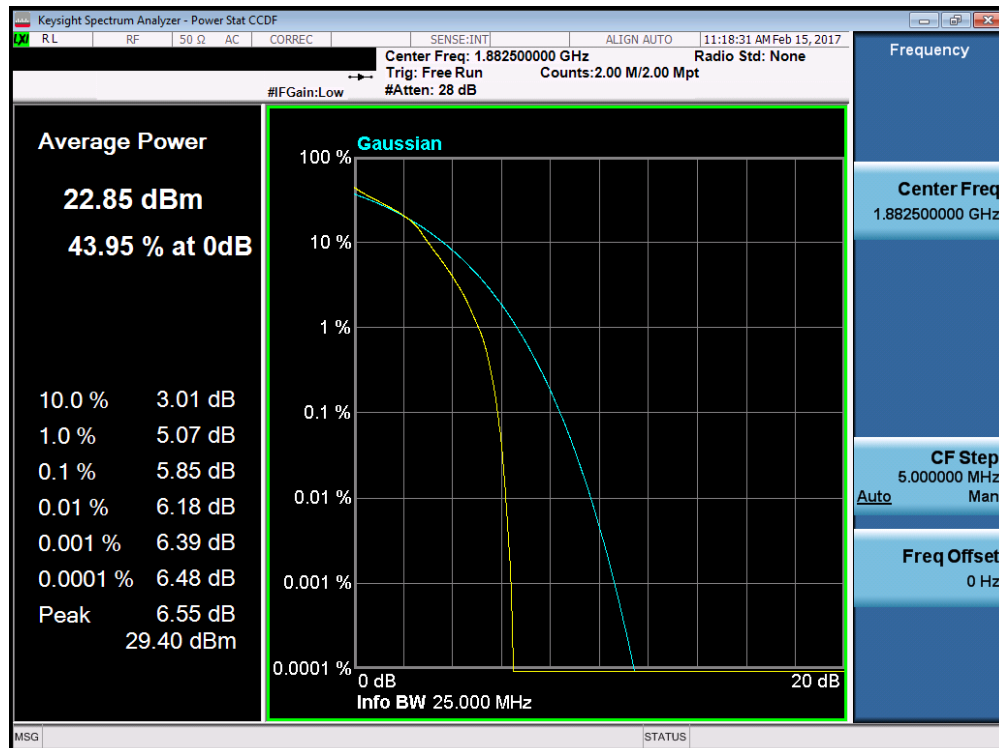


Plot 7-148. PAR Plot (Band 2/25 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSMJ727R4	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset	Page 92 of 118

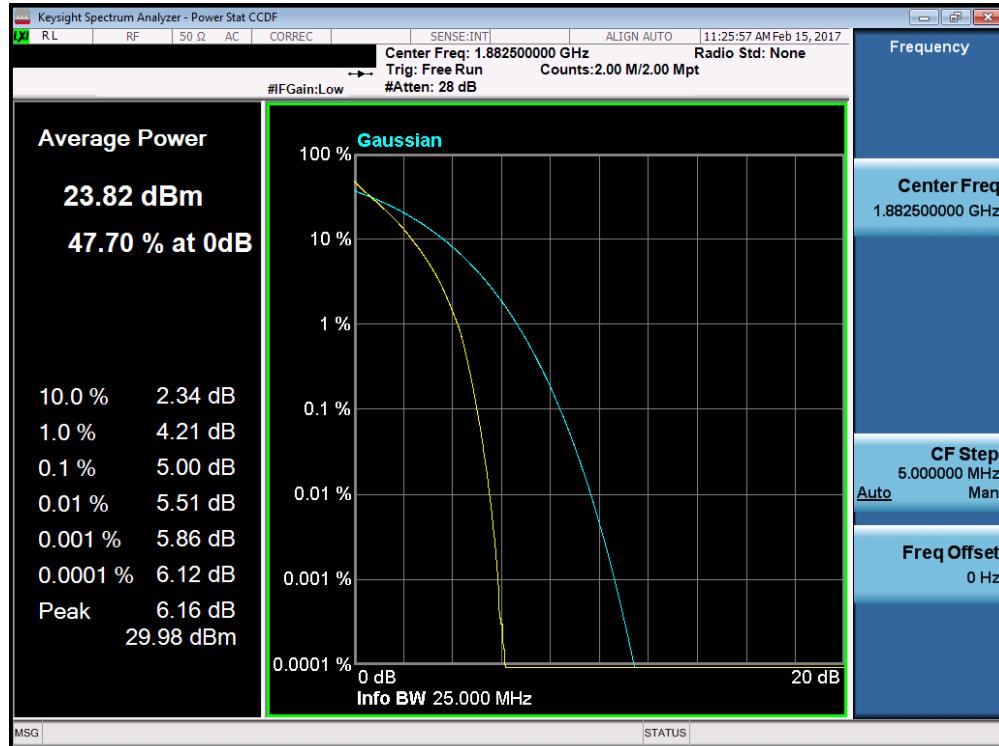


Plot 7-149. PAR Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

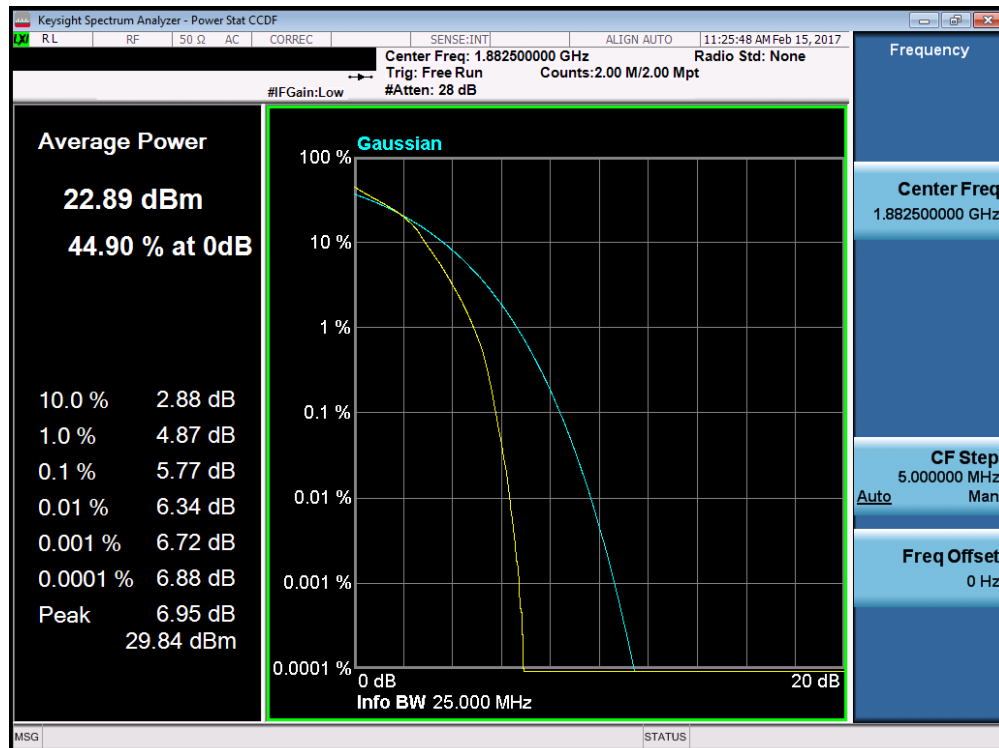


Plot 7-150. PAR Plot (Band 2/25 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMJ727R4	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset	Page 93 of 118



Plot 7-151. PAR Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)



Plot 7-152. PAR Plot (Band 2/25 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: A3LSMJ727R4	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset	Page 94 of 118

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 $\geq 3 \times$ 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: A3LSMJ727R4		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 95 of 118

Test Setup

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

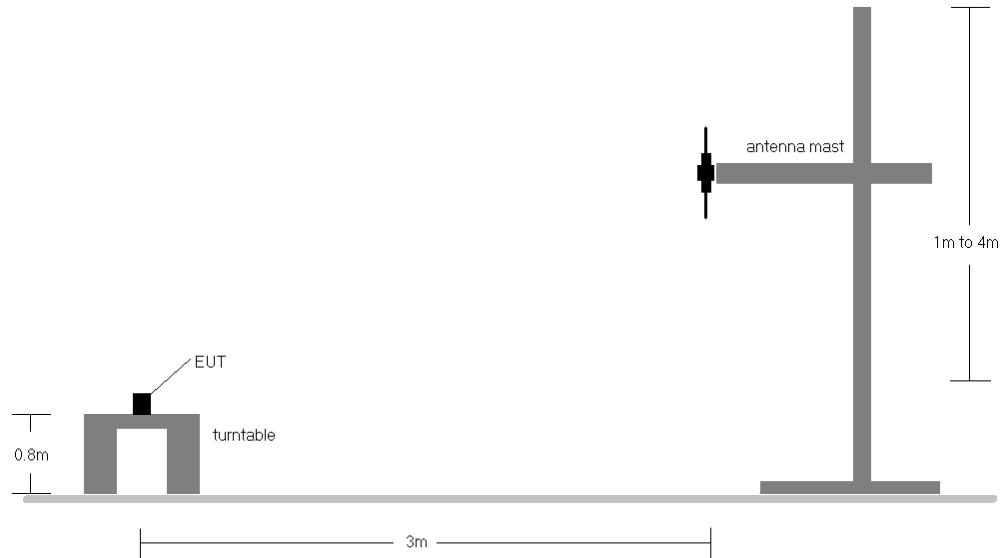


Figure 7-5. Radiated Test Setup <1GHz

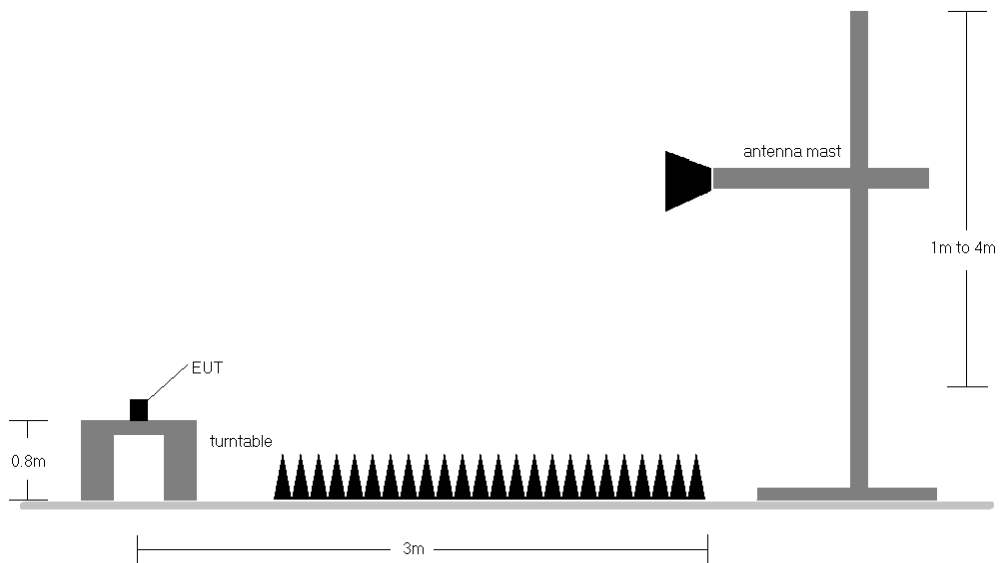


Figure 7-6. Radiated Test Setup >1GHz

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: A3LSMJ727R4		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 96 of 118

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	150	90	1 / 0	17.08	-0.25	16.83	34.77	-17.94
707.50	1.4	QPSK	H	150	91	1 / 5	18.20	-0.28	17.92	34.77	-16.85
715.30	1.4	QPSK	H	150	95	1 / 0	19.19	-0.31	18.88	34.77	-15.89
715.30	1.4	16-QAM	H	150	95	1 / 0	18.06	-0.31	17.75	34.77	-17.02
700.50	3	QPSK	H	150	91	1 / 14	17.75	-0.25	17.50	34.77	-17.27
707.50	3	QPSK	H	150	92	1 / 14	18.92	-0.28	18.64	34.77	-16.13
714.50	3	QPSK	H	150	95	1 / 14	19.44	-0.31	19.13	34.77	-15.64
714.50	3	16-QAM	H	150	95	1 / 14	18.69	-0.31	18.38	34.77	-16.39
701.50	5	QPSK	H	150	84	1 / 24	19.22	-0.26	18.96	34.77	-15.81
707.50	5	QPSK	H	150	90	1 / 24	19.96	-0.28	19.68	34.77	-15.09
713.50	5	QPSK	H	150	92	1 / 24	20.87	-0.30	20.57	34.77	-14.21
713.50	5	16-QAM	H	150	92	1 / 24	19.83	-0.30	19.53	34.77	-15.25
704.00	10	QPSK	H	150	89	1 / 49	19.91	-0.27	19.64	34.77	-15.13
707.50	10	QPSK	H	150	92	1 / 49	20.01	-0.28	19.73	34.77	-15.04
711.00	10	QPSK	H	150	96	1 / 49	20.59	-0.29	20.30	34.77	-14.48
711.00	10	16-QAM	H	150	96	1 / 49	19.45	-0.29	19.16	34.77	-15.62
713.50	5	QPSK	V	150	112	1 / 0	18.25	-0.25	18.00	34.77	-16.77

Table 7-2. ERP Data (Band 12)

FCC ID: A3LSMJ727R4	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 97 of 118

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	150	91	1 / 0	18.74	-0.75	17.99	38.45	-20.46
836.50	1.4	QPSK	H	150	92	1 / 0	19.23	-0.84	18.39	38.45	-20.06
848.30	1.4	QPSK	H	150	95	1 / 0	19.40	-0.94	18.46	38.45	-19.99
848.30	1.4	16-QAM	H	150	95	1 / 0	18.48	-0.94	17.54	38.45	-20.91
825.50	3	QPSK	H	150	90	1 / 0	19.25	-0.75	18.50	38.45	-19.96
836.50	3	QPSK	H	150	92	1 / 0	19.47	-0.84	18.63	38.45	-19.82
847.50	3	QPSK	H	150	95	1 / 0	20.03	-0.93	19.10	38.45	-19.35
847.50	3	16-QAM	H	150	95	1 / 0	18.88	-0.93	17.95	38.45	-20.50
826.50	5	QPSK	H	150	97	1 / 0	20.05	-0.76	19.29	38.45	-19.16
836.50	5	QPSK	H	150	99	1 / 24	20.42	-0.84	19.58	38.45	-18.87
846.50	5	QPSK	H	150	102	1 / 0	20.70	-0.92	19.78	38.45	-18.67
826.50	5	16-QAM	H	150	97	1 / 0	19.90	-0.76	19.14	38.45	-19.31
829.00	10	QPSK	H	150	90	1 / 49	20.82	-0.78	20.04	38.45	-18.41
836.50	10	QPSK	H	150	92	1 / 49	20.91	-0.84	20.07	38.45	-18.38
844.00	10	QPSK	H	150	95	1 / 49	21.23	-0.90	20.33	38.45	-18.12
844.00	10	16-QAM	H	150	95	1 / 49	20.02	-0.90	19.12	38.45	-19.33
844.00	10	QPSK	V	150	35	1 / 74	20.10	-0.75	19.35	38.45	-19.10

Table 7-3. ERP Data (Band 5)

FCC ID: A3LSMJ727R4	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset	Page 98 of 118

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	115	300	1 / 5	12.73	9.62	22.35	30.00	-7.65
1732.50	1.4	QPSK	H	113	304	1 / 5	13.70	9.50	23.20	30.00	-6.80
1754.30	1.4	QPSK	H	110	279	1 / 5	13.91	9.38	23.29	30.00	-6.71
1732.50	1.4	16-QAM	H	113	304	1 / 5	12.47	9.50	21.97	30.00	-8.03
1711.50	3	QPSK	H	114	271	1 / 0	13.25	9.62	22.87	30.00	-7.13
1732.50	3	QPSK	H	115	320	1 / 14	14.27	9.50	23.77	30.00	-6.23
1753.50	3	QPSK	H	110	315	1 / 0	14.13	9.39	23.52	30.00	-6.48
1732.50	3	16-QAM	H	115	320	1 / 14	13.38	9.50	22.88	30.00	-7.12
1712.50	5	QPSK	H	115	299	1 / 0	14.63	9.61	24.24	30.00	-5.76
1732.50	5	QPSK	H	112	297	1 / 24	15.40	9.50	24.90	30.00	-5.10
1752.50	5	QPSK	H	110	302	1 / 0	15.49	9.39	24.88	30.00	-5.12
1732.50	5	16-QAM	H	112	297	1 / 24	14.43	9.50	23.93	30.00	-6.07
1715.00	10	QPSK	H	117	300	1 / 49	14.65	9.60	24.25	30.00	-5.75
1732.50	10	QPSK	H	110	295	1 / 49	15.67	9.50	25.17	30.00	-4.83
1750.00	10	QPSK	H	110	302	1 / 0	15.84	9.41	25.25	30.00	-4.75
1732.50	10	16-QAM	H	110	295	1 / 49	14.56	9.50	24.06	30.00	-5.94
1717.50	15	QPSK	H	116	301	1 / 0	14.47	9.58	24.05	30.00	-5.95
1732.50	15	QPSK	H	110	297	1 / 74	15.47	9.50	24.97	30.00	-5.03
1747.50	15	QPSK	H	110	296	1 / 0	15.63	9.42	25.05	30.00	-4.95
1747.50	15	16-QAM	H	110	296	1 / 0	14.55	9.42	23.97	30.00	-6.03
1720.00	20	QPSK	H	112	126	1 / 99	15.07	9.57	24.64	30.00	-5.36
1732.50	20	QPSK	H	118	119	1 / 99	15.86	9.50	25.36	30.00	-4.64
1745.00	20	QPSK	H	110	115	1 / 99	16.06	9.43	25.49	30.00	-4.51
1732.50	20	16-QAM	H	118	119	1 / 99	14.76	9.50	24.26	30.00	-5.74
1745.00	20	QPSK	V	126	267	1 / 99	15.55	9.43	24.98	30.00	-5.02

Table 7-4. EIRP Data (Band 4)

FCC ID: A3LSMJ727R4	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1702100051-03.A3L	Test Dates: 2/14/2017-3/8/2017	EUT Type: Portable Handset		Page 99 of 118

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	107	292	1 / 5	14.13	9.12	23.25	33.01	-9.76
1882.50	1.4	QPSK	H	106	291	1 / 0	14.56	9.10	23.66	33.01	-9.35
1914.30	1.4	QPSK	H	100	297	1 / 0	13.30	9.20	22.50	33.01	-10.51
1850.70	1.4	16-QAM	H	107	292	1 / 0	13.42	9.12	22.54	33.01	-10.47
1851.50	3	QPSK	H	100	299	1 / 0	14.53	9.12	23.65	33.01	-9.36
1882.50	3	QPSK	H	107	295	1 / 0	14.86	9.10	23.96	33.01	-9.05
1913.50	3	QPSK	H	100	296	1 / 0	13.91	9.19	23.10	33.01	-9.91
1882.50	3	16-QAM	H	107	295	1 / 0	13.00	9.10	22.10	33.01	-10.91
1852.50	5	QPSK	H	103	298	1 / 0	15.73	9.12	24.85	33.01	-8.16
1882.50	5	QPSK	H	100	293	1 / 0	15.74	9.10	24.84	33.01	-8.17
1912.50	5	QPSK	H	104	291	1 / 0	15.20	9.18	24.38	33.01	-8.63
1912.50	5	16-QAM	H	104	291	1 / 0	14.75	9.18	23.93	33.01	-9.08
1855.00	10	QPSK	H	109	299	1 / 49	15.77	9.12	24.89	33.01	-8.12
1882.50	10	QPSK	H	103	296	1 / 0	15.85	9.10	24.95	33.01	-8.06
1910.00	10	QPSK	H	100	298	1 / 0	15.81	9.16	24.97	33.01	-8.04
1882.50	10	16-QAM	H	103	296	1 / 0	14.97	9.10	24.07	33.01	-8.94
1857.50	15	QPSK	H	100	294	1 / 0	15.98	9.11	25.09	33.01	-7.92
1882.50	15	QPSK	H	103	300	1 / 0	16.10	9.10	25.20	33.01	-7.81
1907.50	15	QPSK	H	100	295	1 / 0	16.42	9.15	25.57	33.01	-7.44
1907.50	15	16-QAM	H	100	295	1 / 0	15.26	9.15	24.41	33.01	-8.60
1860.00	20	QPSK	H	105	297	1 / 0	16.03	9.11	25.14	33.01	-7.87
1882.50	20	QPSK	H	100	291	1 / 0	16.22	9.10	25.32	33.01	-7.69
1905.00	20	QPSK	H	104	291	1 / 0	16.25	9.13	25.38	33.01	-7.63
1905.00	20	16-QAM	H	104	291	1 / 0	15.51	9.13	24.64	33.01	-8.37
1907.50	15	QPSK	V	137	28	1 / 0	15.82	9.15	24.97	33.01	-8.04

Table 7-5. EIRP Data (Band 2/25)

FCC ID: A3LSMJ727R4	 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 $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: A3LSMJ27R4		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Test Setup

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

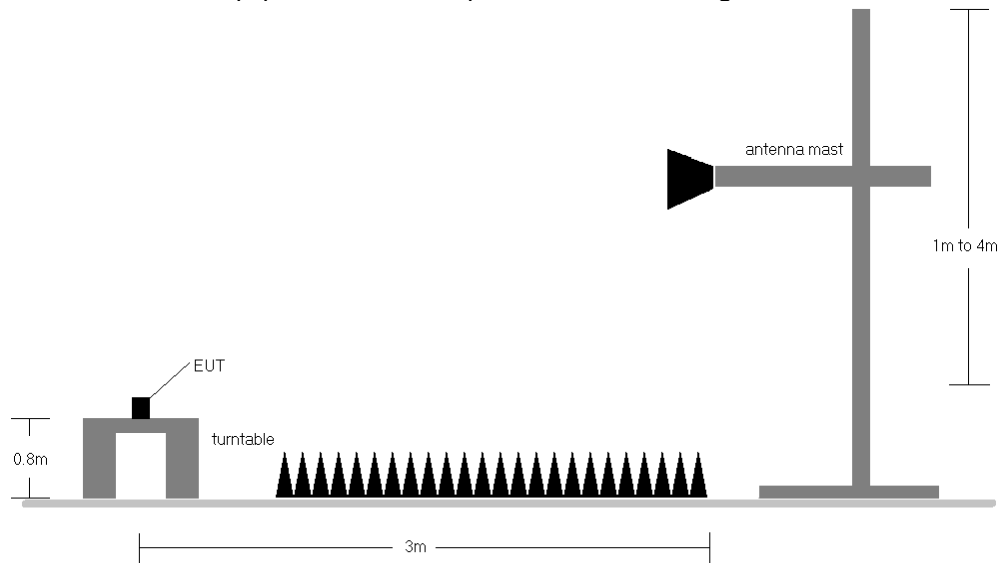


Figure 7-7. Test Instrument & Measurement Setup

Test Notes

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

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OPERATING FREQUENCY: 701.50 MHz
 CHANNEL: 23035
 MEASURED OUTPUT POWER: 18.96 dBm = 0.079 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 31.96 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]
1403.00	H	100	205	-68.87	5.92	-62.95	81.9
2104.50	H	100	87	-64.04	6.80	-57.24	76.2
2806.00	H	100	310	-65.59	8.12	-57.47	76.4
3507.50	H	-	-	-63.43	7.74	-55.68	74.6

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

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 MEASURED OUTPUT POWER: 19.68 dBm = 0.093 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.68 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	100	200	-70.00	5.96	-64.03	83.7
2122.50	H	100	87	-62.46	6.84	-55.61	75.3
2830.00	H	100	126	-63.35	8.13	-55.22	74.9
3537.50	H	-	-	-63.45	7.79	-55.66	75.3

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

FCC ID: A3LSMJ727R4		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 713.50 MHz
 CHANNEL: 23155
 MEASURED OUTPUT POWER: 20.57 dBm = 0.114 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.57 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]
1427.00	H	100	207	-69.07	6.01	-63.06	83.6
2140.50	H	100	93	-62.84	6.89	-55.95	76.5
2854.00	H	100	113	-60.79	8.15	-52.64	73.2
3567.50	H	-	-	-63.58	7.84	-55.74	76.3

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

OPERATING FREQUENCY: 829.00 MHz
 CHANNEL: 20450
 MEASURED OUTPUT POWER: 20.04 dBm = 0.101 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.04 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]
1658.00	H	-	-	-69.59	6.26	-63.33	83.4
2487.00	H	100	152	-56.97	6.84	-50.13	70.2
3316.00	H	100	139	-63.96	7.17	-56.79	76.8
4145.00	H	-	-	-62.05	7.83	-54.22	74.3

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

FCC ID: A3LSMJ727R4	 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: 20.07 dBm = 0.102 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.07 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	100	60	-68.87	6.21	-62.66	82.7
2509.50	H	100	41	-60.23	6.86	-53.37	73.4
3346.00	H	-	-	-64.95	7.26	-57.68	77.8

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

OPERATING FREQUENCY: 844.00 MHz
 CHANNEL: 20600
 MEASURED OUTPUT POWER: 20.33 dBm = 0.108 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.33 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]
1688.00	H	100	177	-67.94	6.15	-61.79	82.1
2532.00	H	100	41	-61.98	6.93	-55.05	75.4
3376.00	H	-	-	-64.55	7.35	-57.20	77.5

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

FCC ID: A3LSMJ727R4		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1720.00 MHz
 CHANNEL: 20050
 MEASURED OUTPUT POWER: 24.64 dBm = 0.291 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.64 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]
3440.00	H	110	314	-54.94	9.88	-45.05	69.7
5160.00	H	110	229	-68.07	10.75	-57.32	82.0
6880.00	H	110	260	-58.62	11.71	-46.91	71.5
8600.00	H	110	84	-53.28	11.07	-42.21	66.8
10320.00	H	-	-	-60.03	12.47	-47.56	72.2
12040.00	H	-	-	-56.66	12.80	-43.86	68.5

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

OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 25.36 dBm = 0.344 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.36 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	110	278	-56.56	9.91	-46.65	72.0
5197.50	H	110	199	-65.85	10.75	-55.11	80.5
6930.00	H	110	51	-59.95	11.76	-48.19	73.6
8662.50	H	110	83	-54.02	11.00	-43.02	68.4
10395.00	H	-	-	-60.29	12.65	-47.64	73.0

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

FCC ID: A3LSMJ727R4	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
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OPERATING FREQUENCY: 1745.00 MHz
 CHANNEL: 20300
 MEASURED OUTPUT POWER: 25.49 dBm = 0.354 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.49 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]
3490.00	H	110	281	-50.39	9.94	-40.45	65.9
5235.00	H	110	191	-67.80	10.72	-57.07	82.6
6980.00	H	110	50	-60.47	11.82	-48.65	74.1
8725.00	H	110	59	-53.57	10.96	-42.61	68.1
10470.00	H	-	-	-60.55	12.67	-47.88	73.4

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

OPERATING FREQUENCY: 1857.50 MHz
 CHANNEL: 26115
 MEASURED OUTPUT POWER: 25.09 dBm = 0.323 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.09 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]
3715.00	H	100	140	-54.26	9.97	-44.29	69.4
5572.50	H	100	12	-57.27	11.23	-46.04	71.1
7430.00	H	100	118	-47.95	10.94	-37.01	62.1
9287.50	H	-	-	-52.24	12.33	-39.91	65.0

Table 7-15. Radiated Spurious Data (Band 2/25 – Low Channel)

FCC ID: A3LSMJ727R4	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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OPERATING FREQUENCY: 1882.50 MHz
 CHANNEL: 26365
 MEASURED OUTPUT POWER: 25.20 dBm = 0.331 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 38.20 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]
3765.00	H	100	91	-56.44	9.76	-46.67	71.9
5647.50	H	100	309	-56.81	11.36	-45.45	70.7
7530.00	H	100	124	-49.40	11.25	-38.15	63.4
9412.50	H	-	-	-51.45	12.31	-39.14	64.3

Table 7-16. Radiated Spurious Data (Band 2/25 – Mid Channel)

OPERATING FREQUENCY: 1907.50 MHz
 CHANNEL: 26615
 MEASURED OUTPUT POWER: 25.57 dBm = 0.360 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 38.57 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	90	-54.25	9.57	-44.68	70.2
5722.50	H	100	309	-54.53	11.43	-43.10	68.7
7630.00	H	100	242	-47.07	11.49	-35.57	61.1
9537.50	H	-	-	-51.80	12.38	-39.42	65.0

Table 7-17. Radiated Spurious Data (Band 2/25 – High Channel)

FCC ID: A3LSMJ727R4	 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

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OPERATING FREQUENCY: 707,500,000 Hz

CHANNEL: 23790

REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,499,802	-198	-0.0000280
100 %		- 30	707,499,867	-133	-0.0000188
100 %		- 20	707,500,011	11	0.0000016
100 %		- 10	707,499,990	-10	-0.0000014
100 %		0	707,499,703	-297	-0.0000420
100 %		+ 10	707,499,942	-58	-0.0000082
100 %		+ 20	707,499,853	-147	-0.0000208
100 %		+ 30	707,499,819	-181	-0.0000256
100 %		+ 40	707,500,268	268	0.0000379
100 %		+ 50	707,499,997	-3	-0.0000004
BATT. ENDPOINT	3.45	+ 20	707,500,313	313	0.0000442

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

FCC ID: A3LSMJ727R4	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 12 Frequency Stability Measurements

§2.1055 §27.54

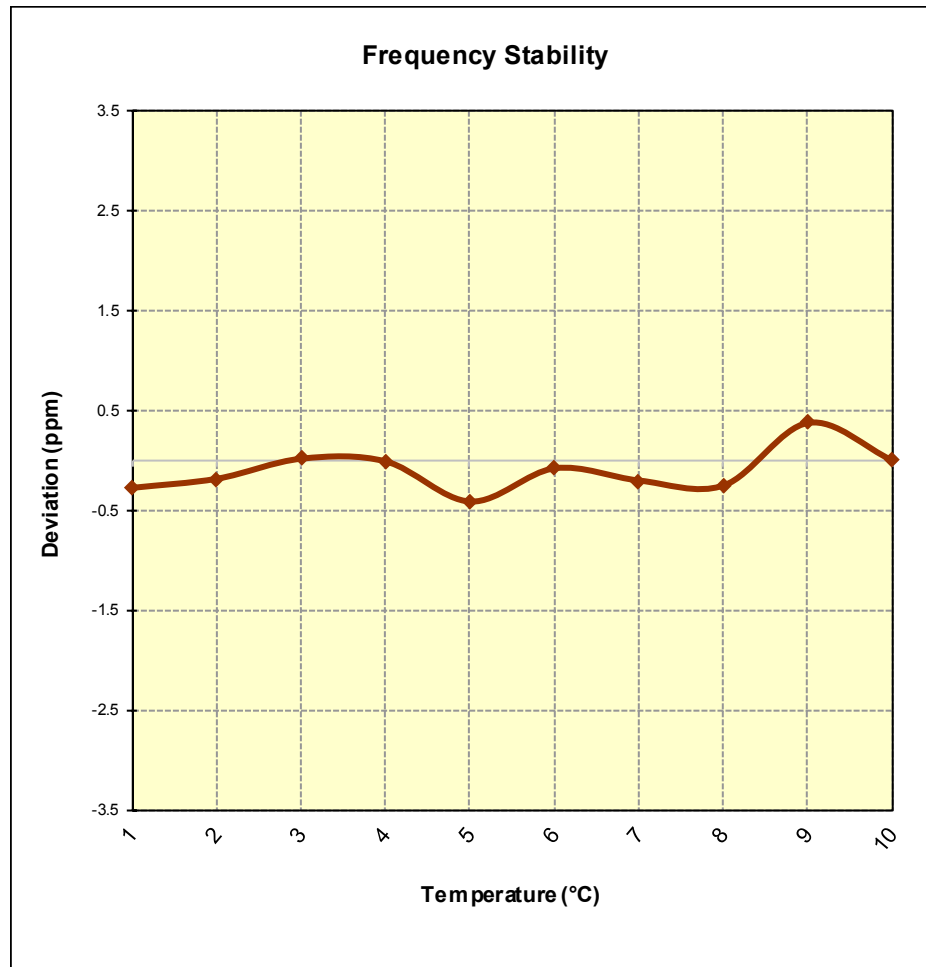


Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: A3LSMJ727R4		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: 3.85 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,500,085	85	0.0000102
100 %		- 30	836,500,164	164	0.0000196
100 %		- 20	836,499,948	-52	-0.0000062
100 %		- 10	836,499,609	-391	-0.0000467
100 %		0	836,499,801	-199	-0.0000238
100 %		+ 10	836,499,841	-159	-0.0000190
100 %		+ 20	836,499,685	-315	-0.0000377
100 %		+ 30	836,499,872	-128	-0.0000153
100 %		+ 40	836,499,824	-176	-0.0000210
100 %		+ 50	836,500,069	69	0.0000082
BATT. ENDPOINT	3.45	+ 20	836,499,799	-201	-0.0000240

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

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Band 5 Frequency Stability Measurements

§2.1055 §22.355

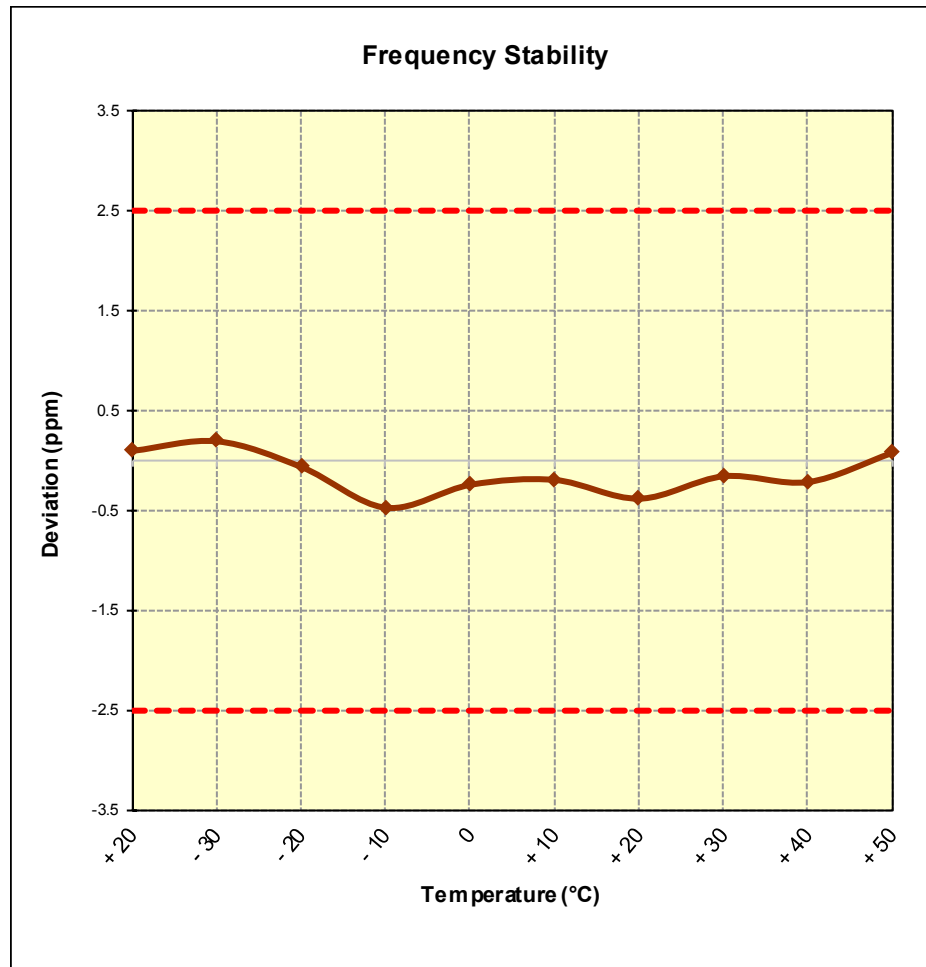


Figure 7-9. Frequency Stability Graph (Band 5)

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Band 4 Frequency Stability Measurements

§2.1055 §27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,500,016	16	0.0000009
100 %		- 30	1,732,499,797	-203	-0.0000117
100 %		- 20	1,732,499,902	-98	-0.0000057
100 %		- 10	1,732,499,766	-234	-0.0000135
100 %		0	1,732,500,252	252	0.0000145
100 %		+ 10	1,732,499,891	-109	-0.0000063
100 %		+ 20	1,732,499,515	-485	-0.0000280
100 %		+ 30	1,732,500,065	65	0.0000038
100 %		+ 40	1,732,499,606	-394	-0.0000227
100 %		+ 50	1,732,500,014	14	0.0000008
BATT. ENDPOINT	3.45	+ 20	1,732,499,823	-177	-0.0000102

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

§2.1055 §§27.54

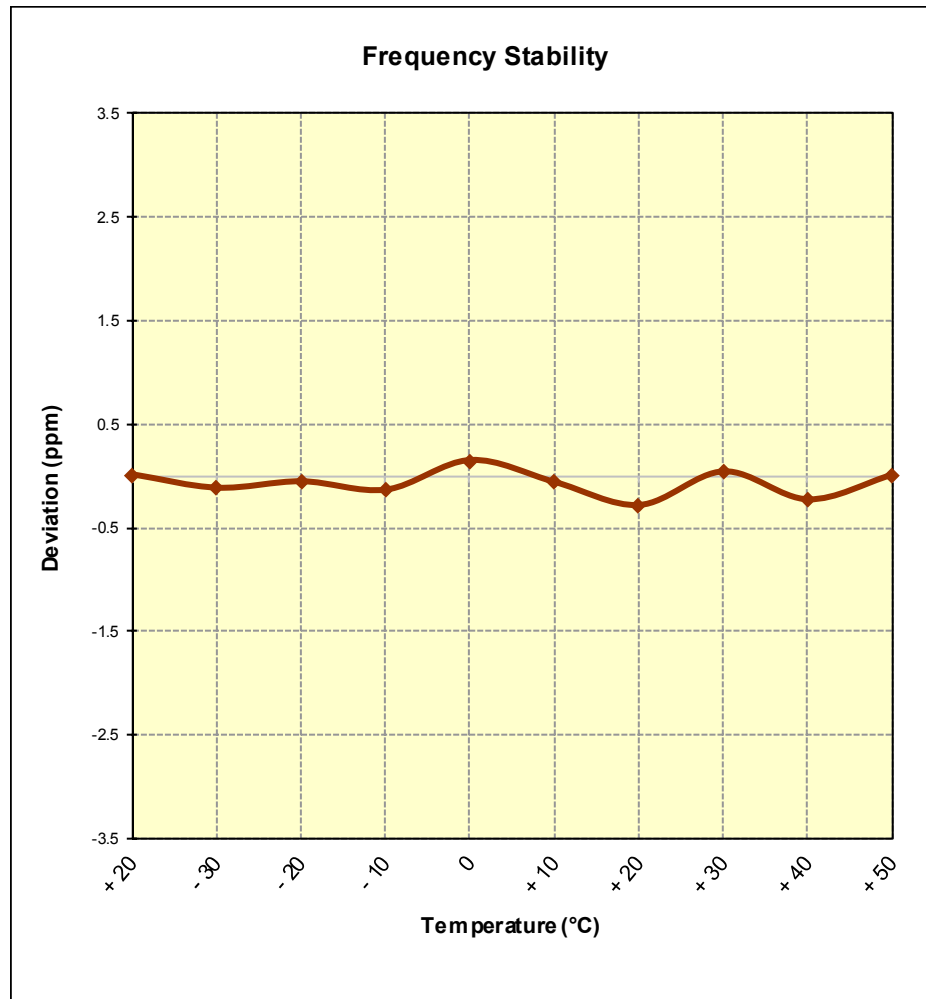


Figure 7-10. Frequency Stability Graph (Band 4)

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Band 2/25 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY: 1,882,500,000 Hz

CHANNEL: 26365

REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,882,499,969	-31	-0.0000016
100 %		- 30	1,882,499,952	-48	-0.0000025
100 %		- 20	1,882,499,921	-79	-0.0000042
100 %		- 10	1,882,500,225	225	0.0000120
100 %		0	1,882,500,103	103	0.0000055
100 %		+ 10	1,882,500,067	67	0.0000036
100 %		+ 20	1,882,499,818	-182	-0.0000097
100 %		+ 30	1,882,499,896	-104	-0.0000055
100 %		+ 40	1,882,500,266	266	0.0000141
100 %		+ 50	1,882,499,996	-4	-0.0000002
BATT. ENDPOINT	3.45	+ 20	1,882,500,042	42	0.0000022

Table 7-21. Frequency Stability Data (Band 2/25)

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 2/25 Frequency Stability Measurements

§2.1055 §24.235

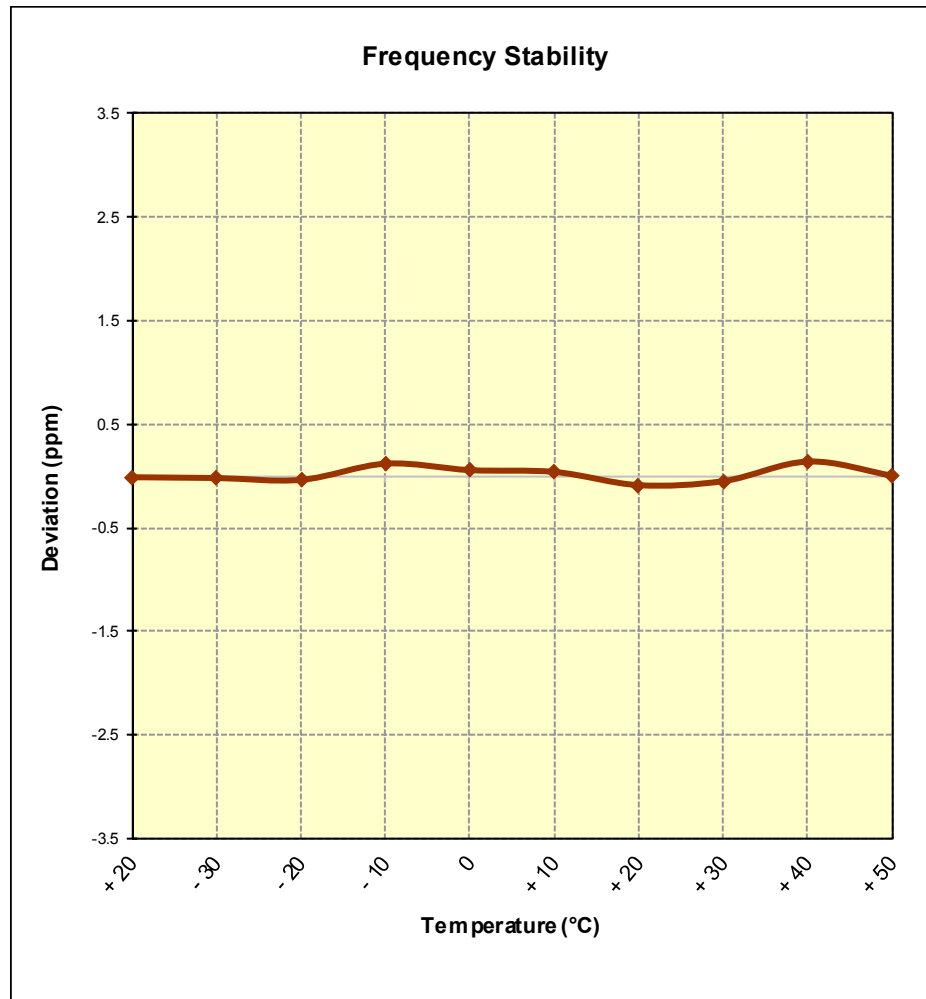


Figure 7-11. Frequency Stability Graph (Band 2/25)

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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: A3LSMJ727R4** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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