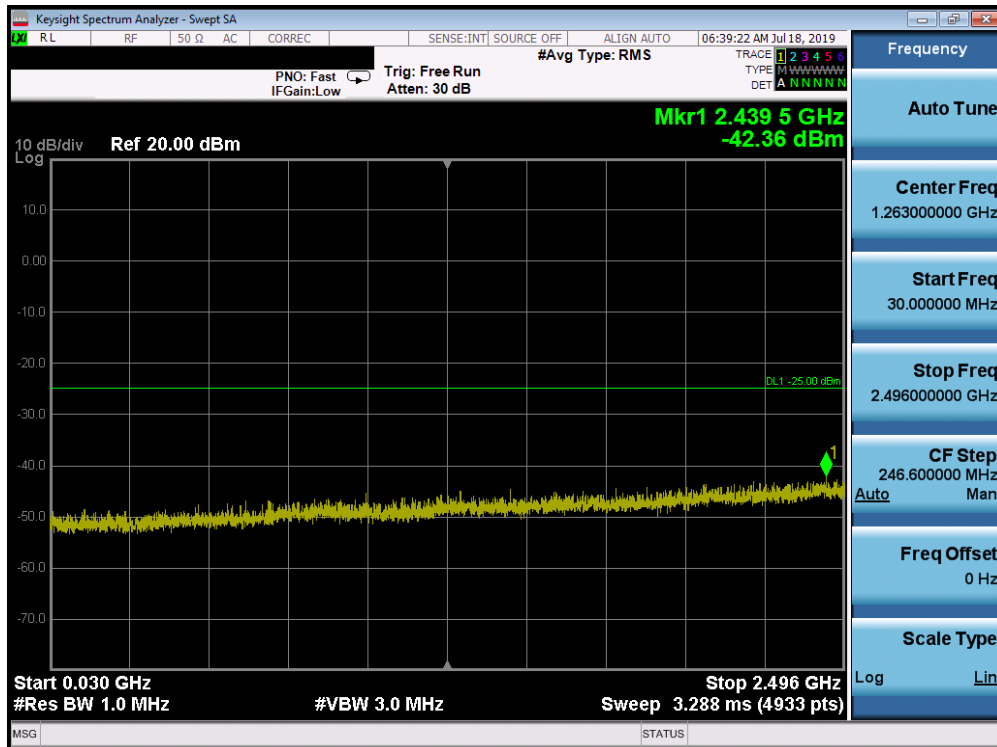
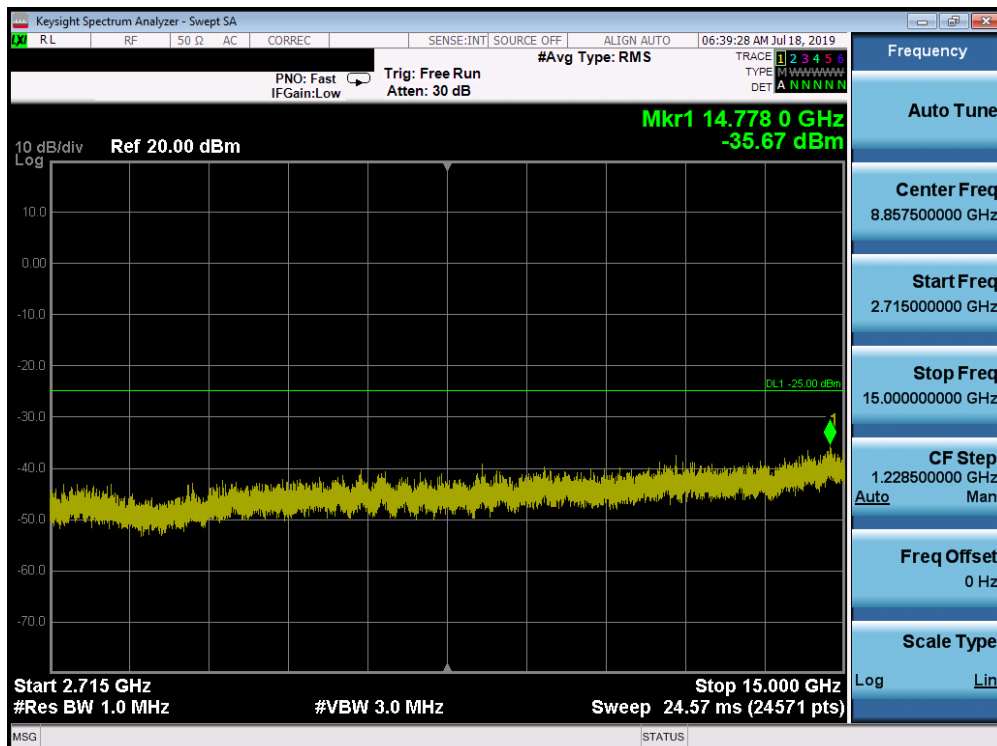


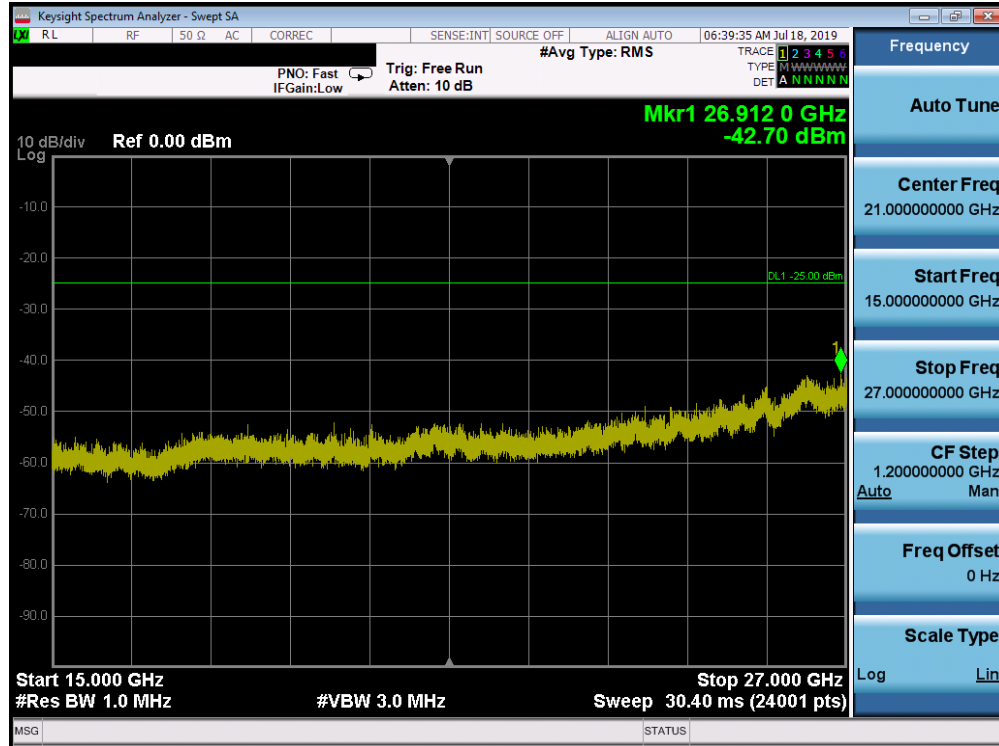


Plot 7-97. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-98. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Plot 7-99. Conducted Spurious Plot (Band 41 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.4 Band Edge Emissions at Antenna Terminal

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

The minimum permissible attenuation level for Band 41 is as noted in the Test Notes on the following page.

Test Procedure Used

KDB 971168 D01 v03r01 – 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 for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Setup

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

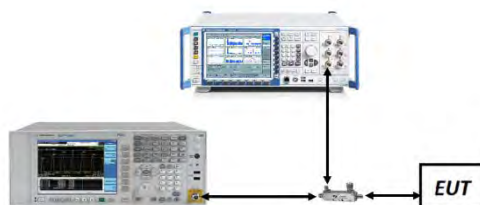


Figure 7-3. Test Instrument & Measurement Setup

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Test Notes

Per 22.917(b) 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.

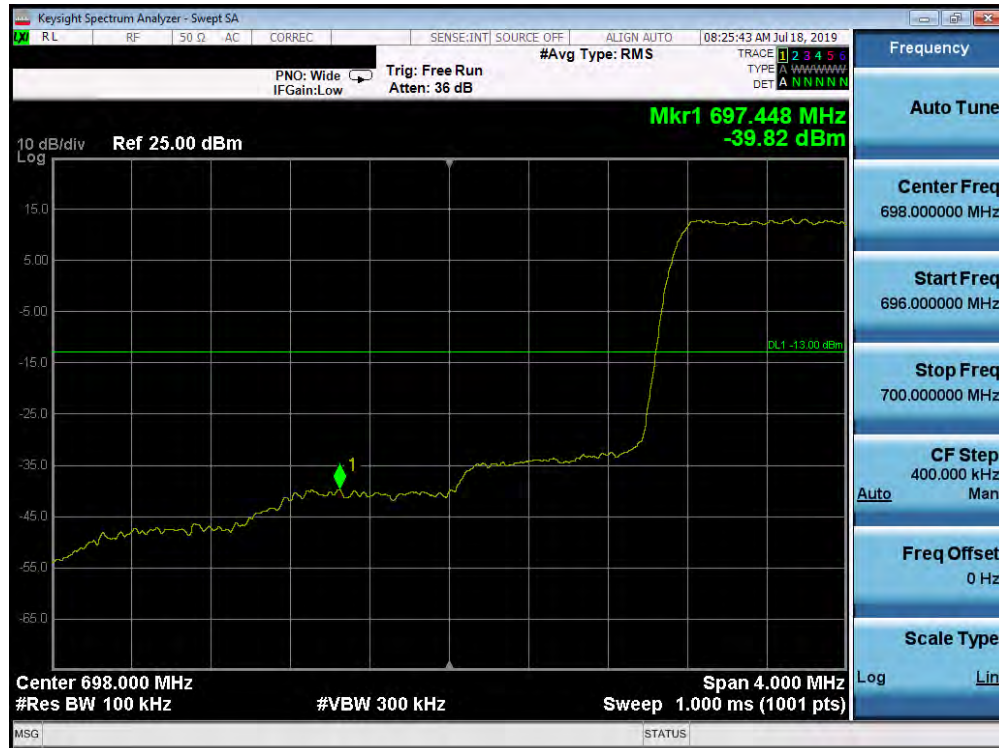
Per 27.53(c)(5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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.

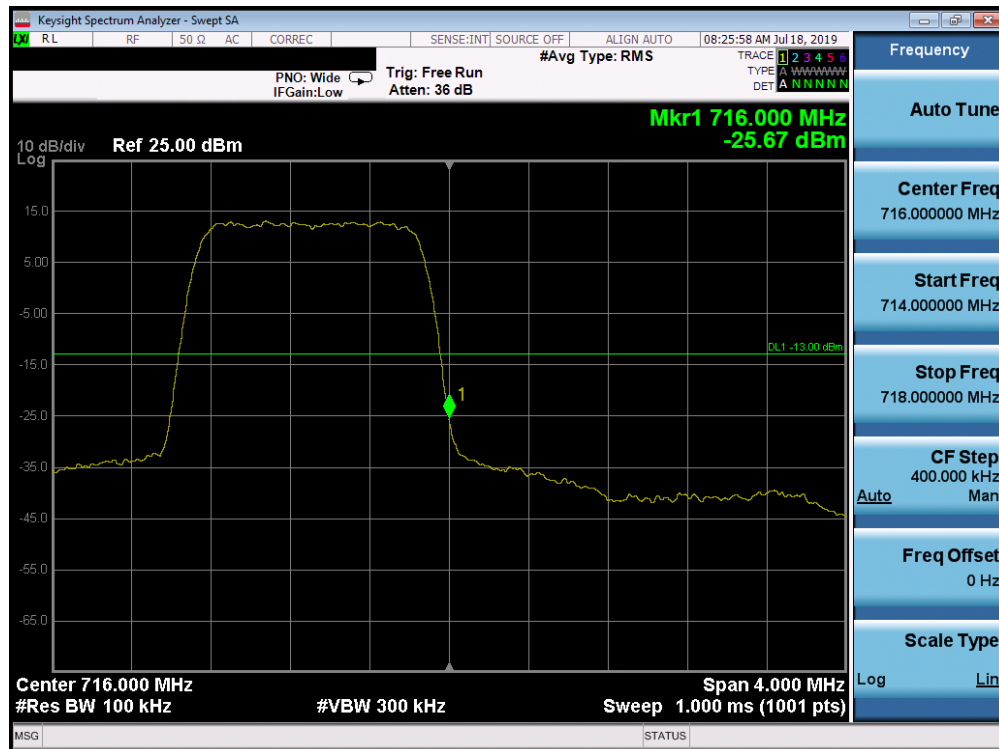
Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz.

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 12

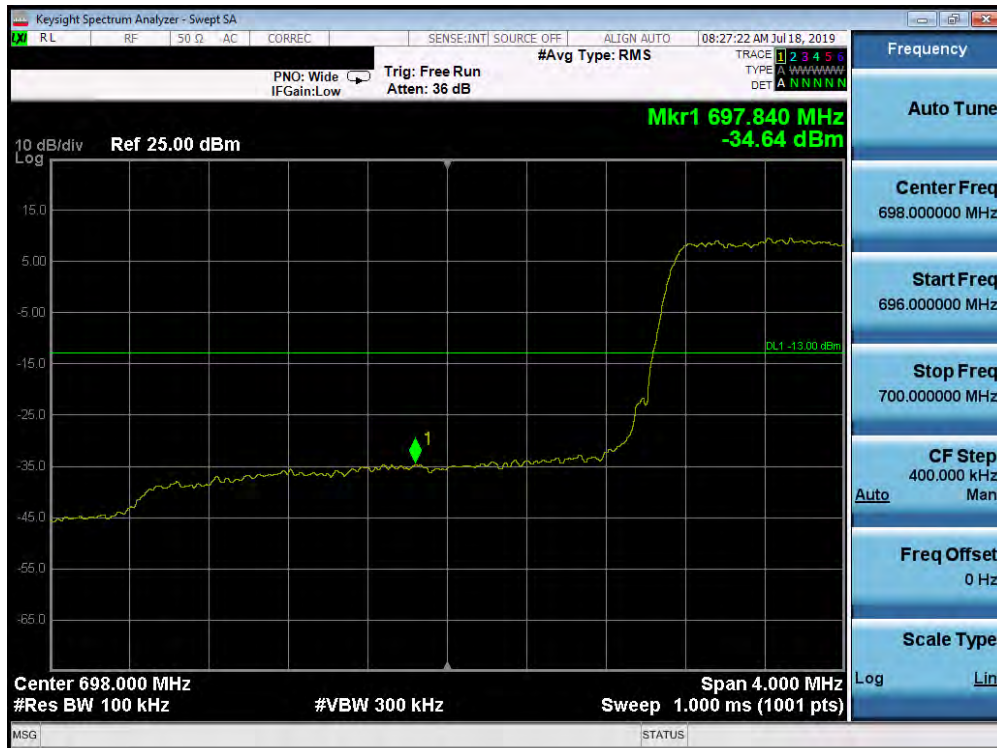


Plot 7-100. Lower Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

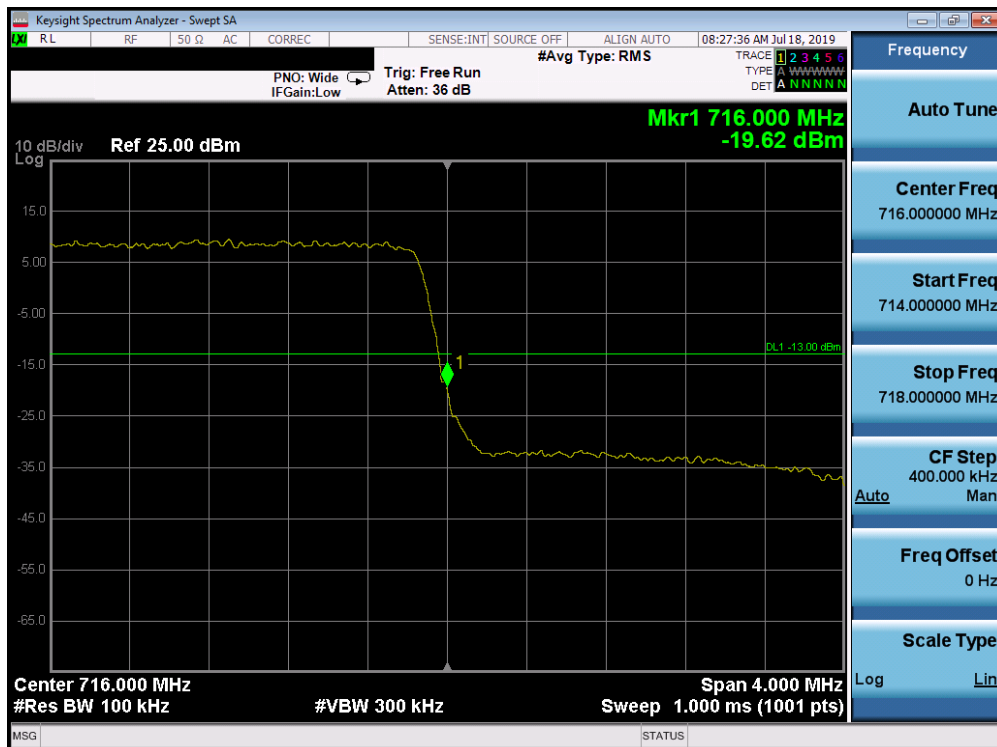


Plot 7-101. Upper Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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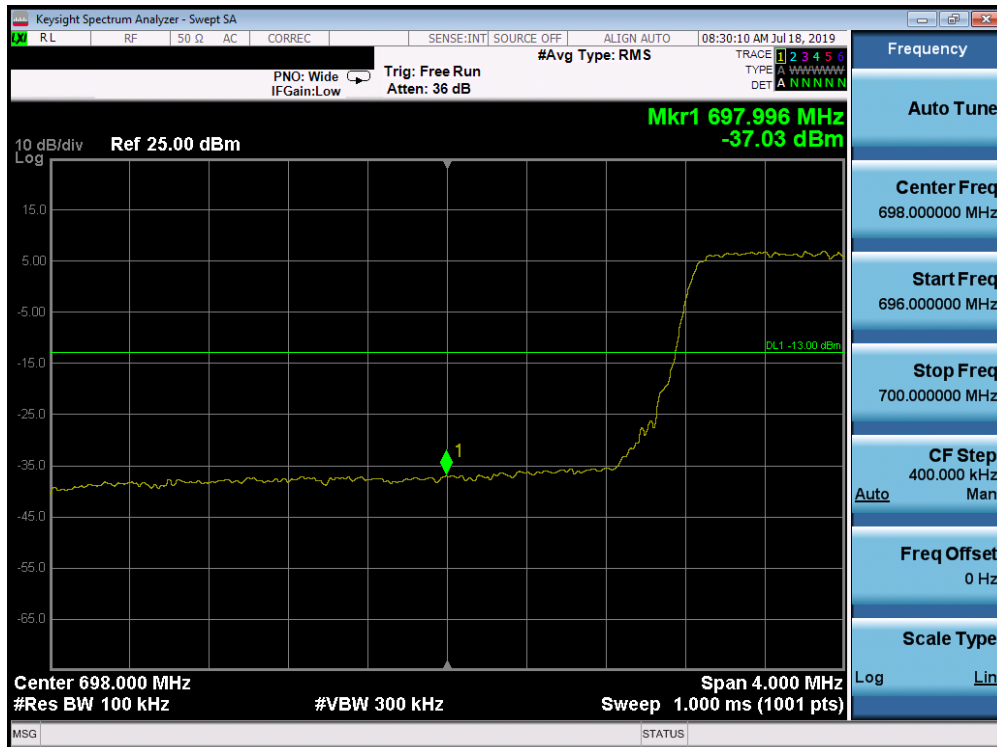


Plot 7-102. Lower Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-103. Upper Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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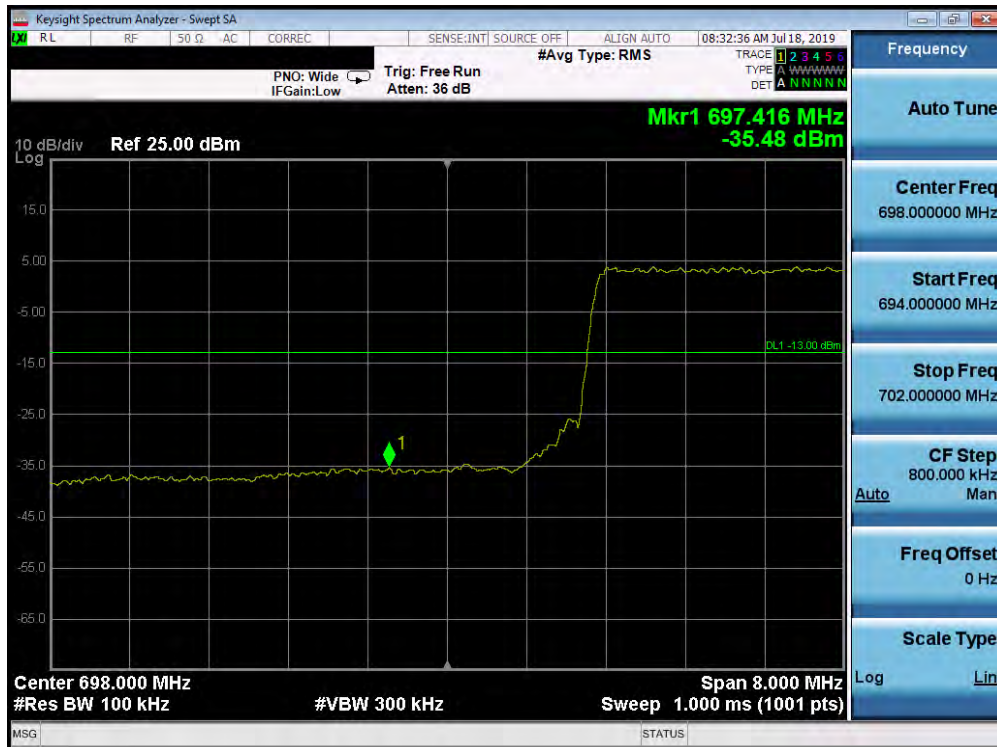


Plot 7-104. Lower Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)

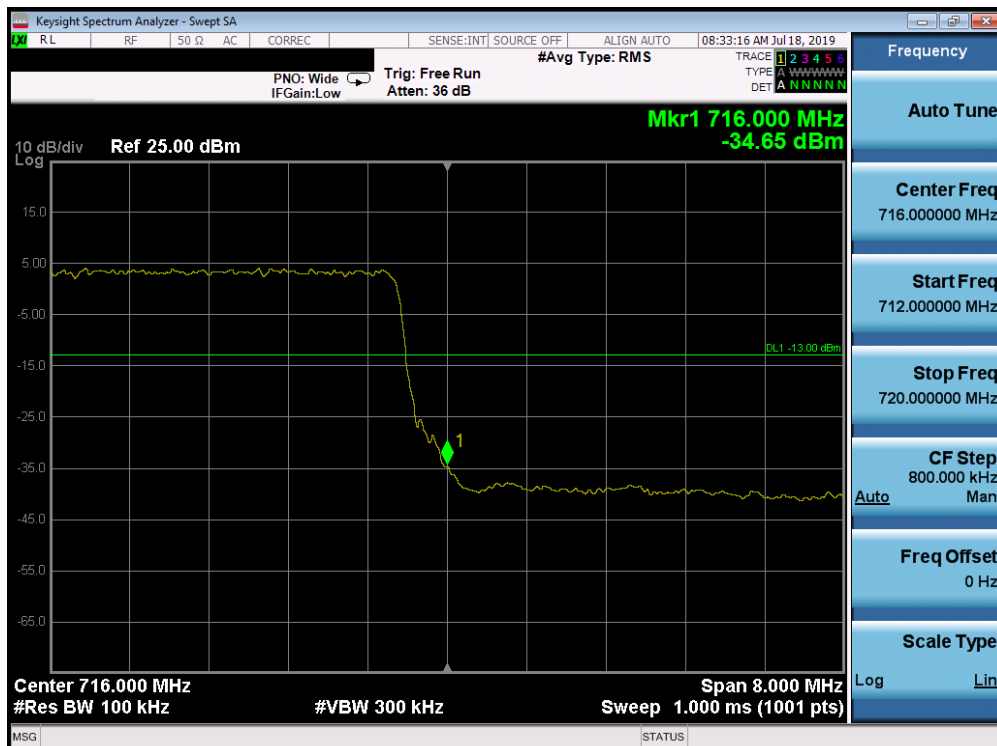


Plot 7-105. Upper Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 74 of 154



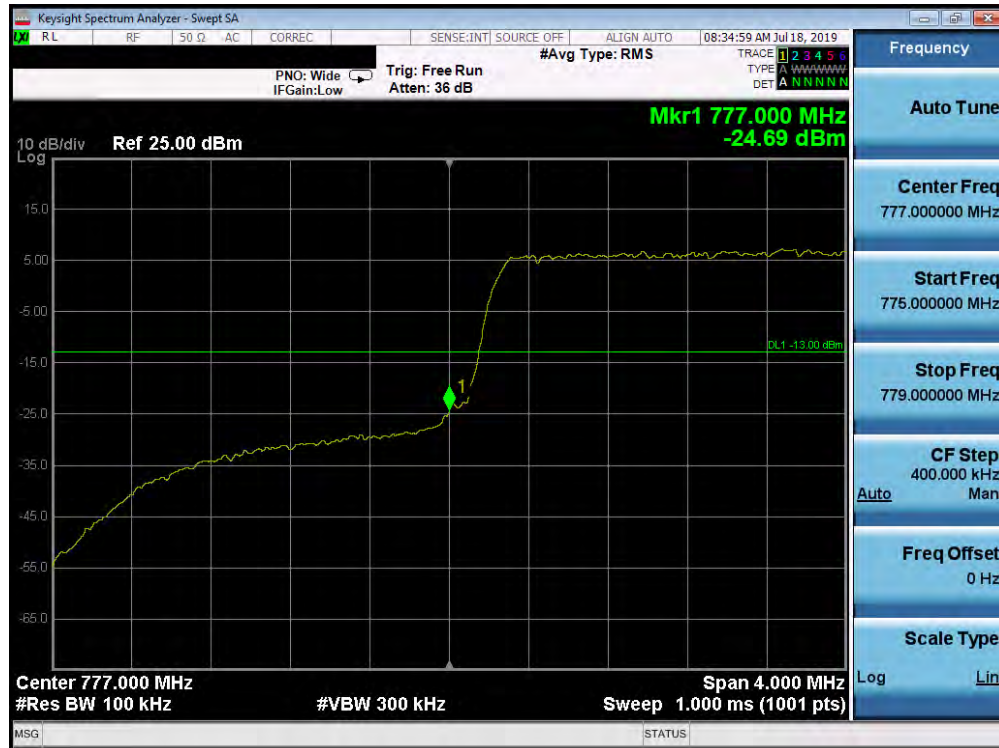
Plot 7-106. Lower Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)



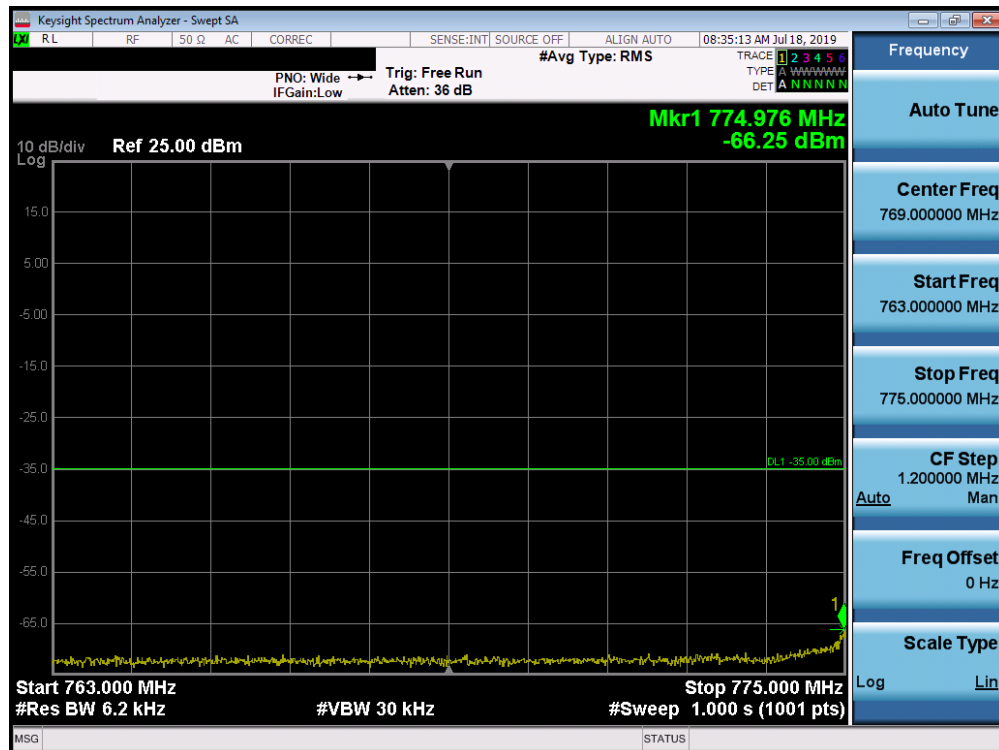
Plot 7-107. Upper Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 75 of 154

Band 13

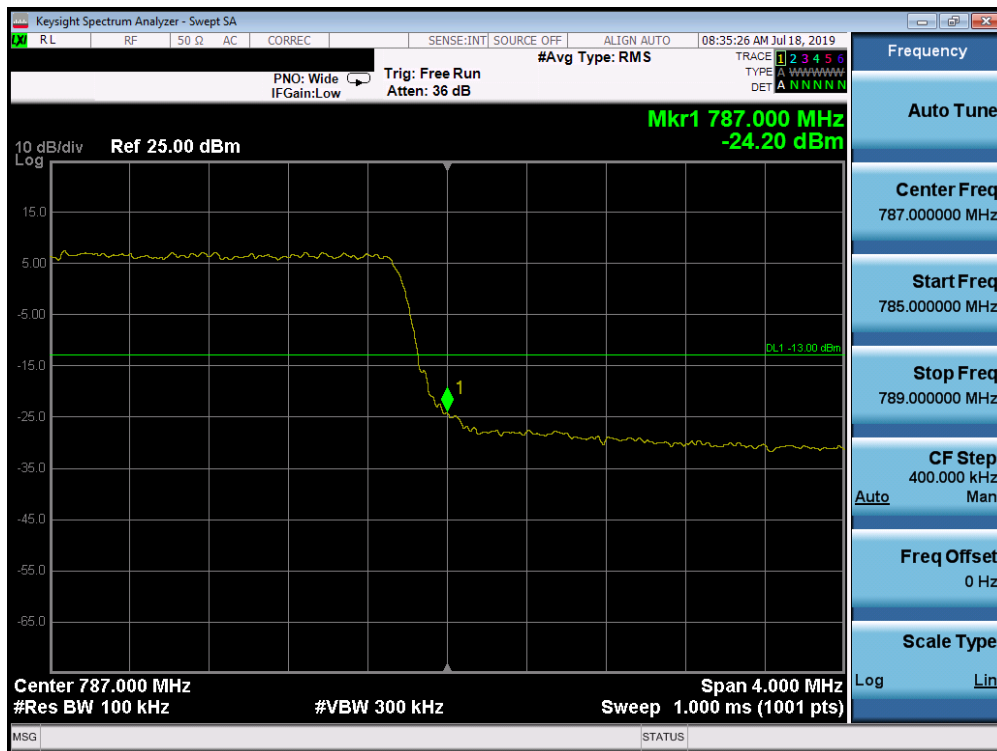


Plot 7-108. Lower Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-109. Lower Emission Mask Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-110. Upper Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-111. Upper Emission Mask Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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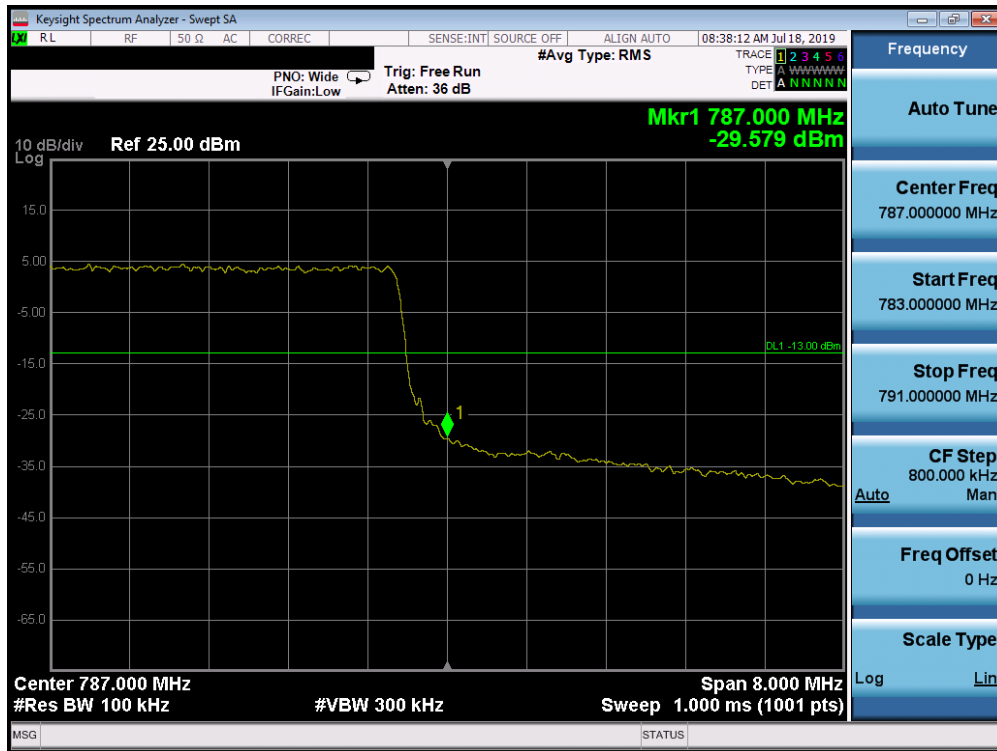


Plot 7-112. Lower Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-113. Lower Emission Mask Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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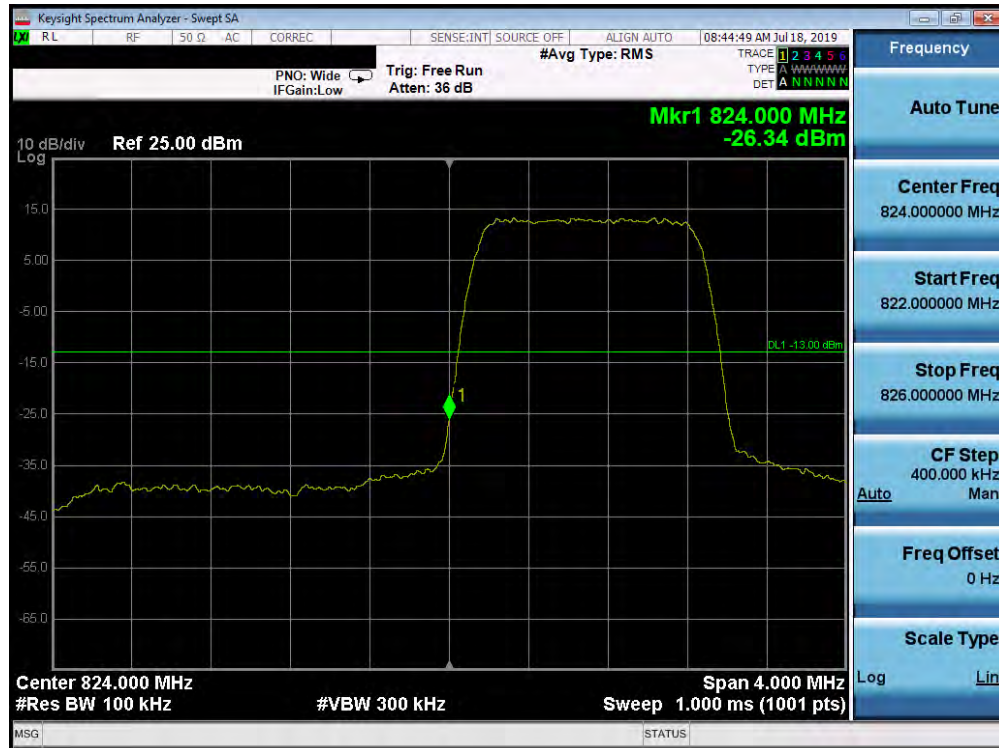
Plot 7-114. Upper Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-115. Upper Emission Mask Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 79 of 154

Band 5

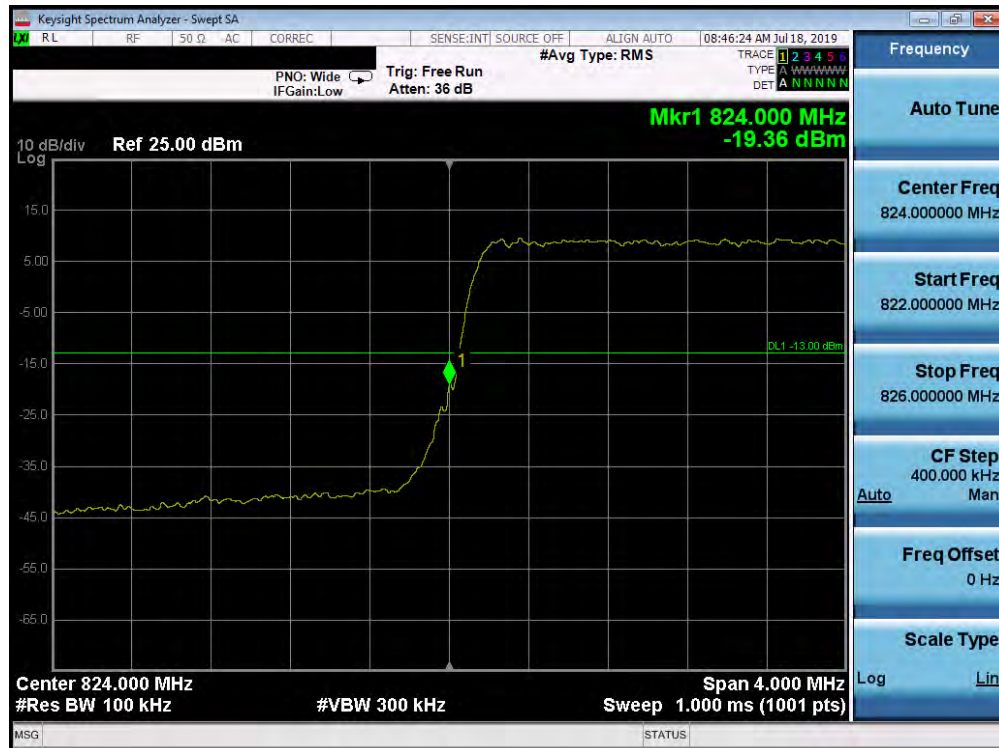


Plot 7-116. Lower Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-117. Upper Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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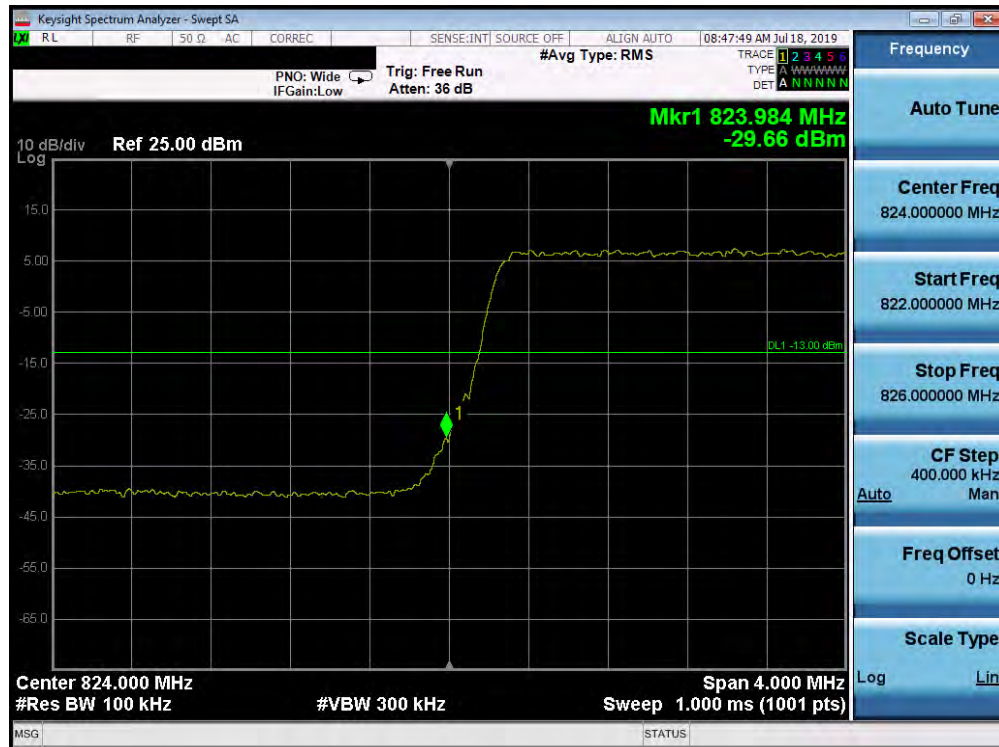


Plot 7-118. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

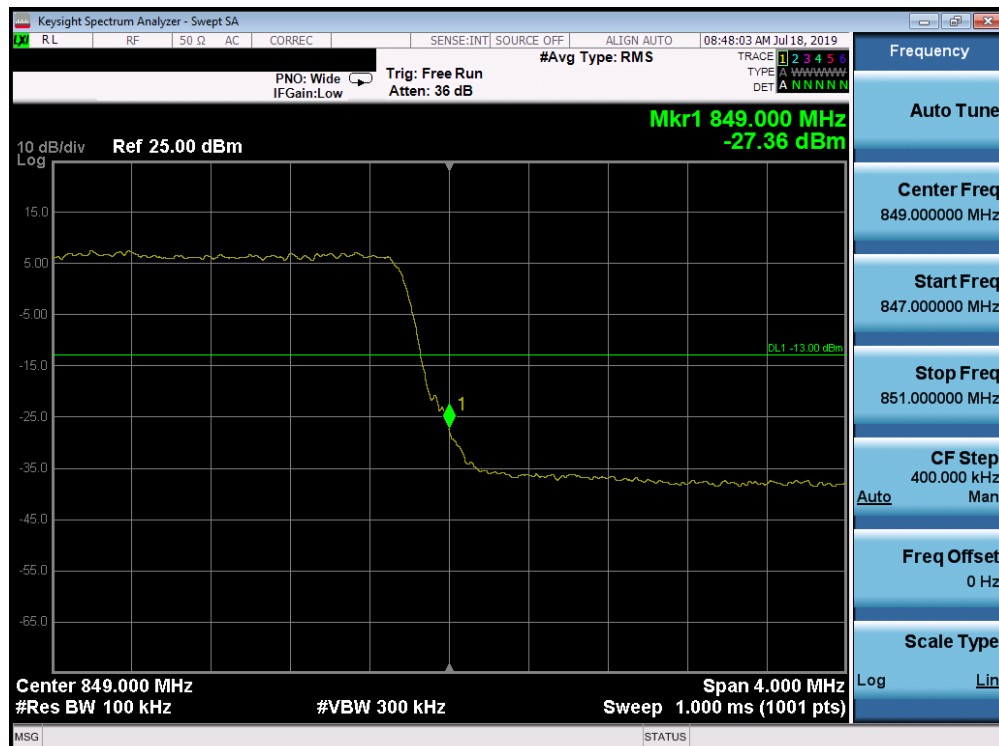


Plot 7-119. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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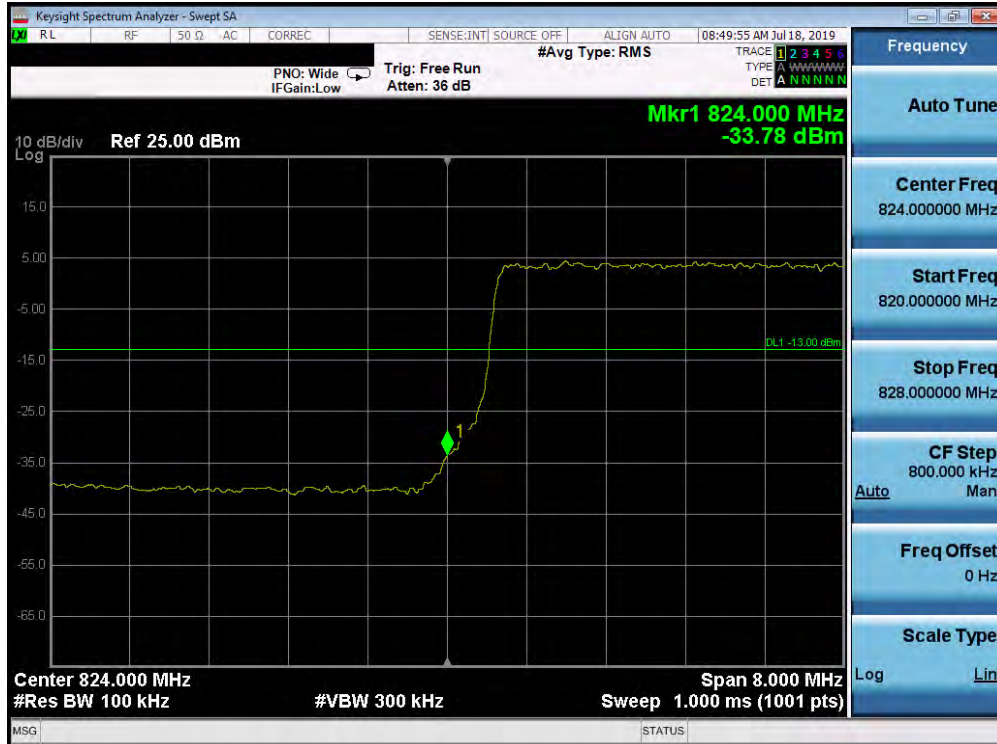


Plot 7-120. Lower Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

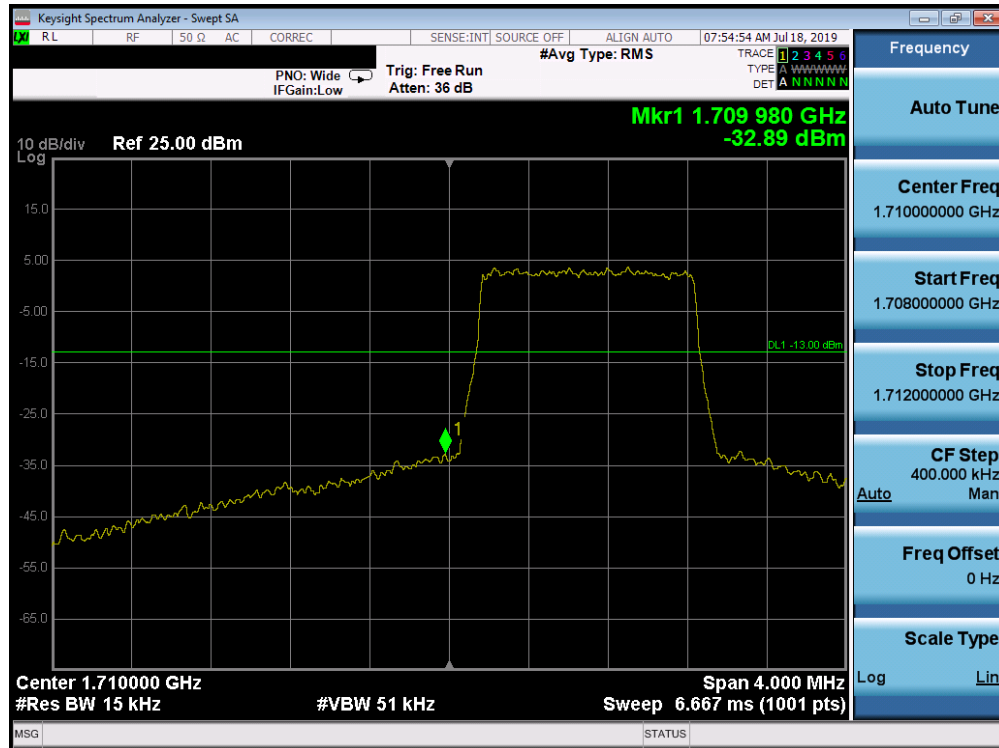


Plot 7-121. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

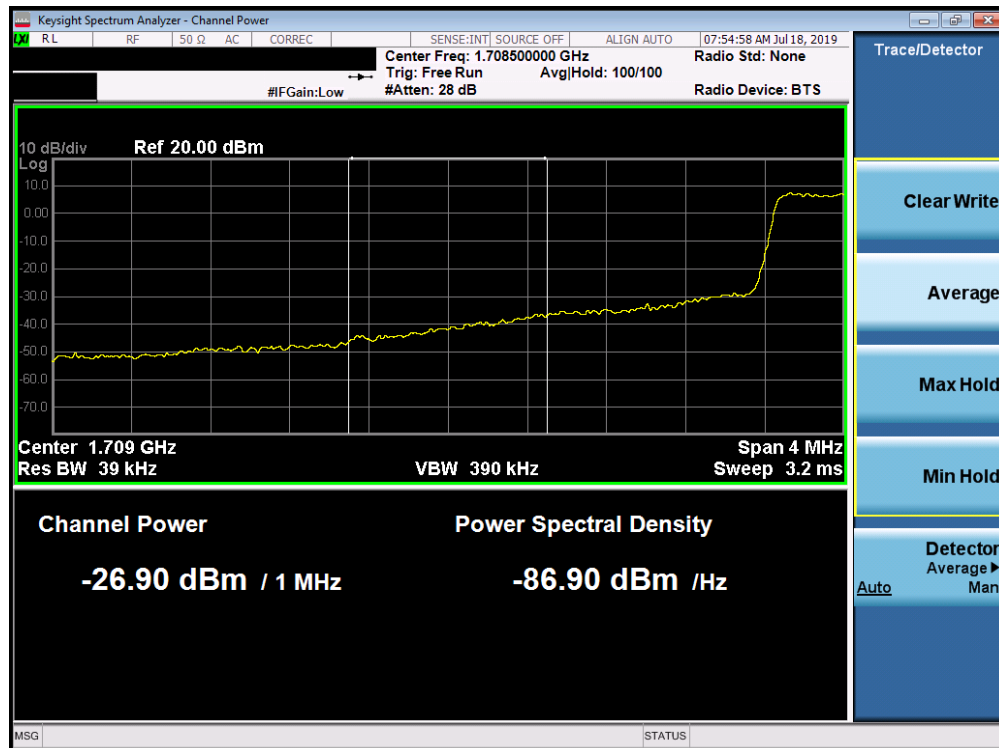
FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 82 of 154



Band 4



Plot 7-124. Lower Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

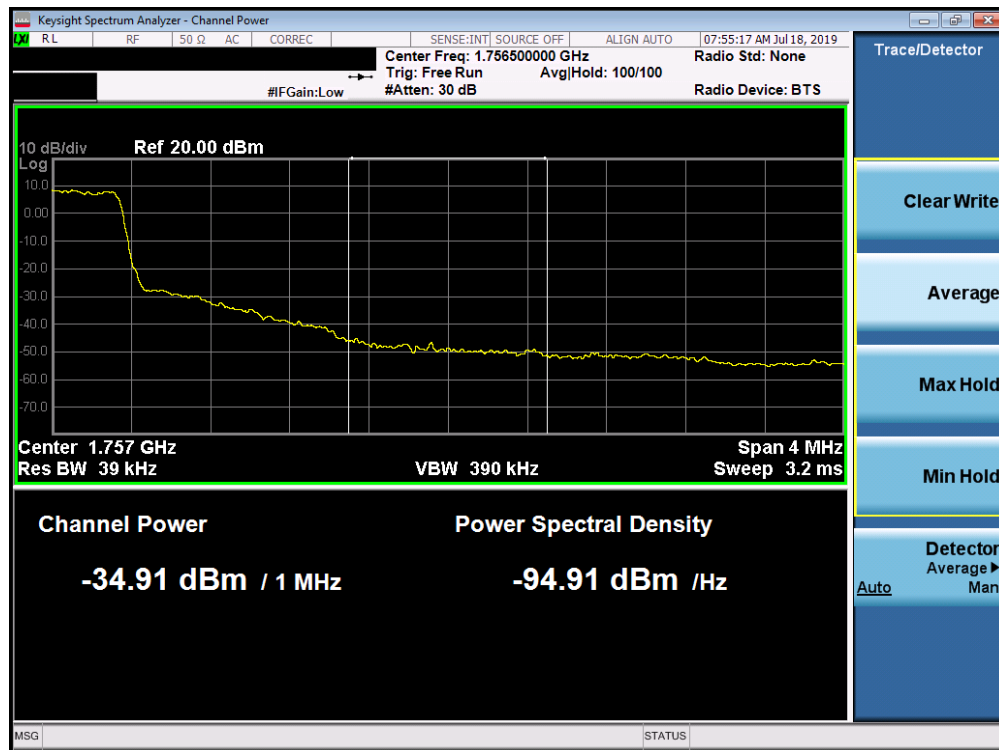


Plot 7-125. Lower Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 84 of 154

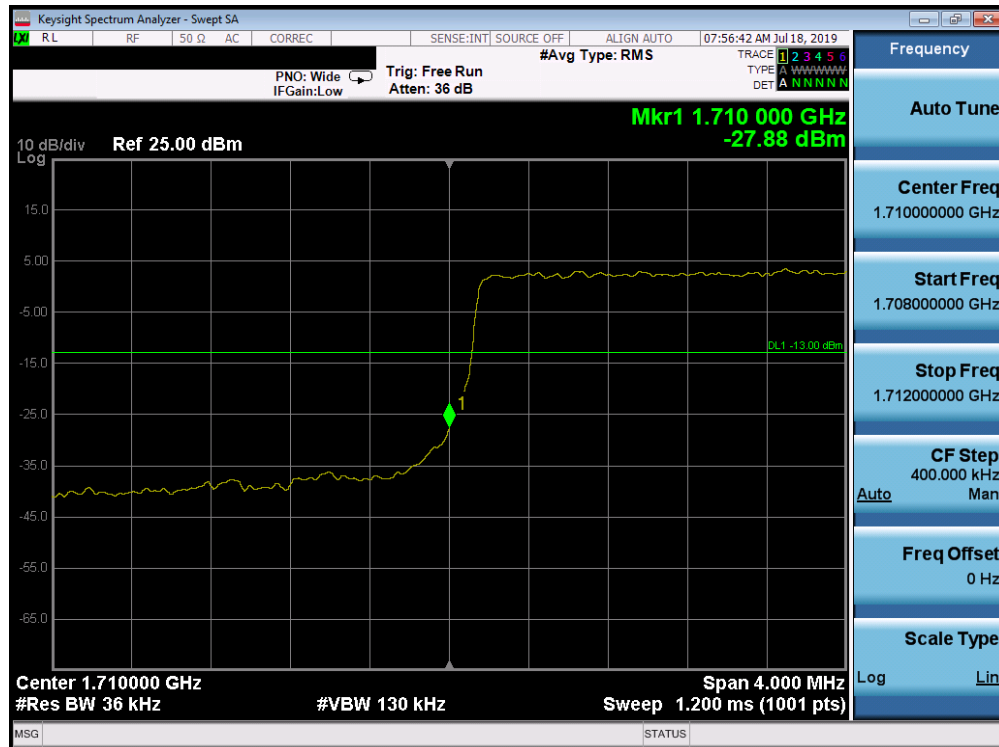


Plot 7-126. Upper Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

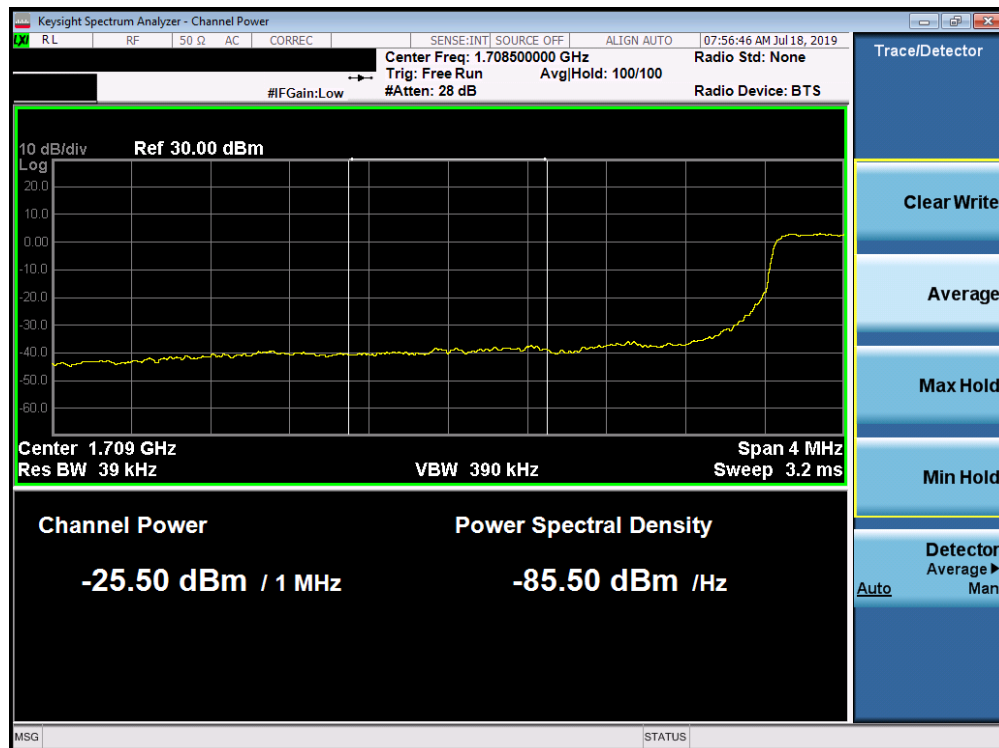


Plot 7-127. Upper Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 85 of 154

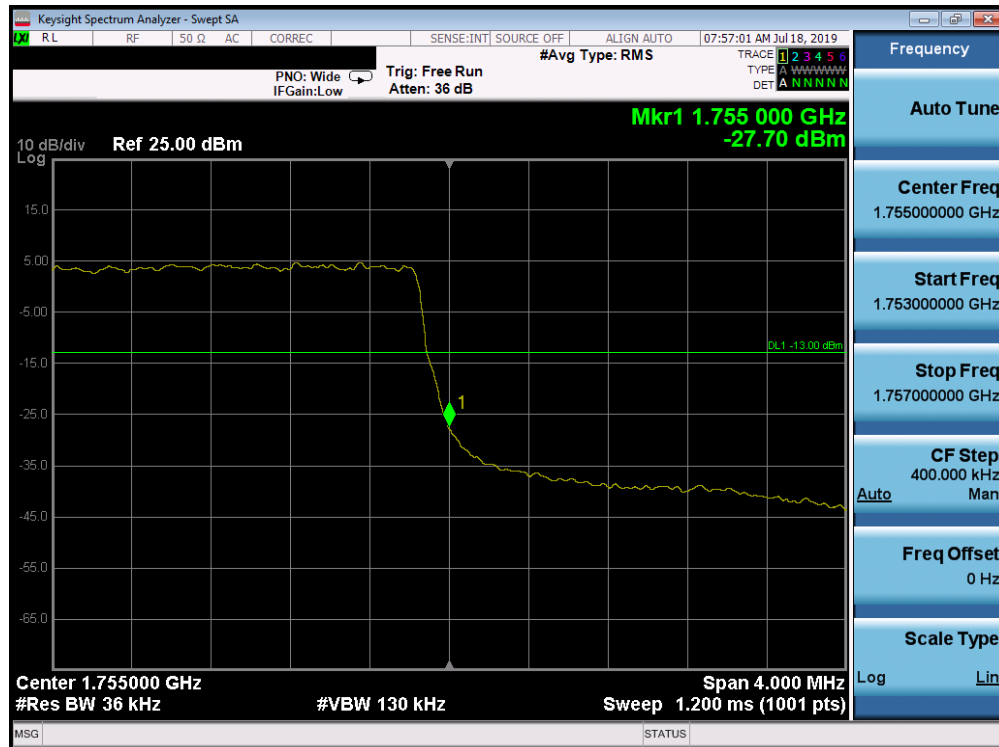


Plot 7-128. Lower Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

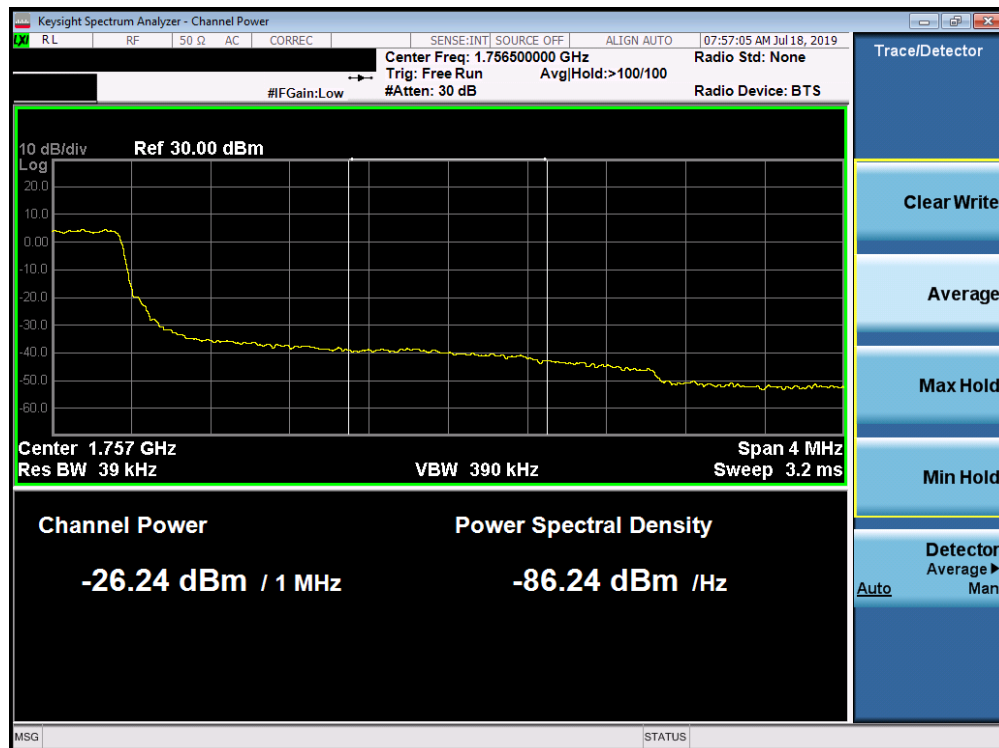


Plot 7-129. Lower Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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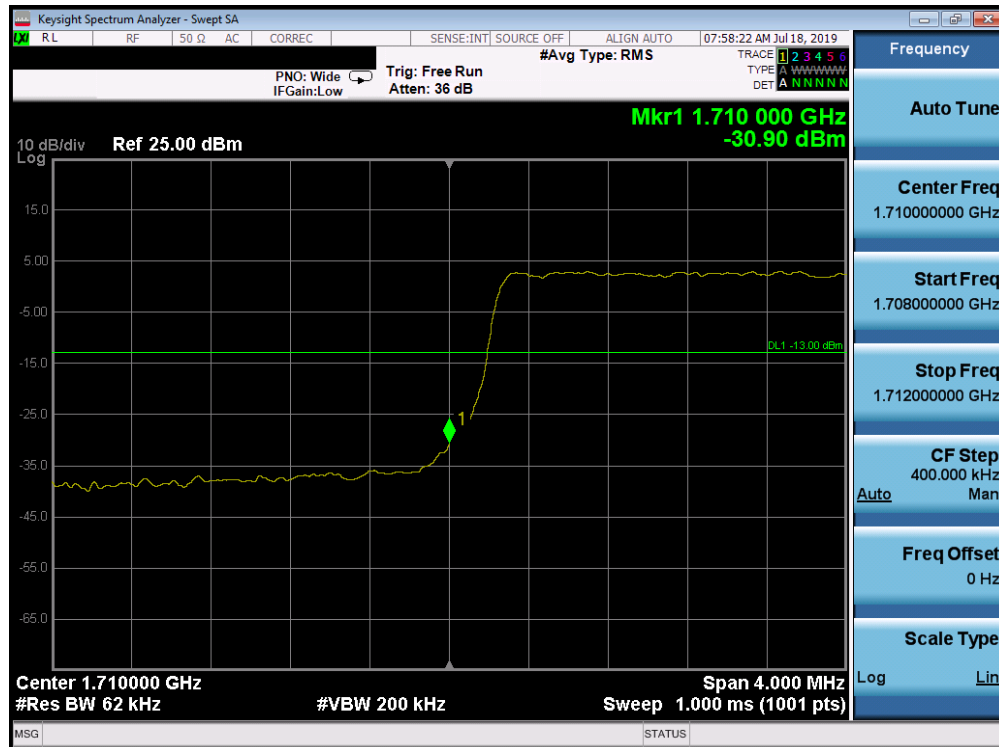


Plot 7-130. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

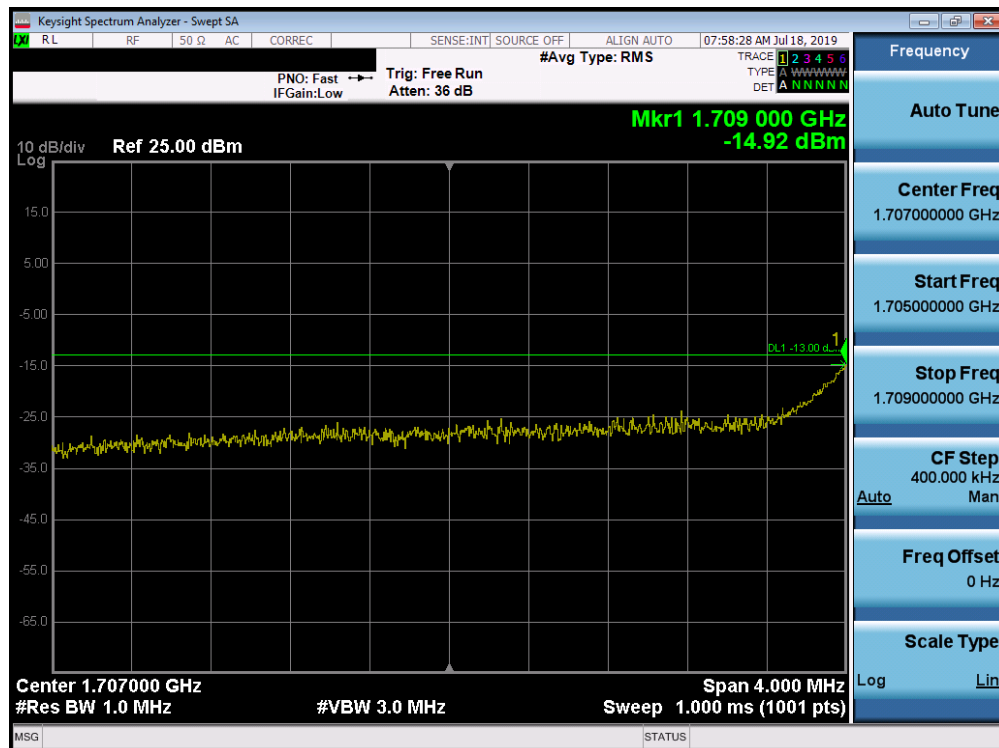


Plot 7-131. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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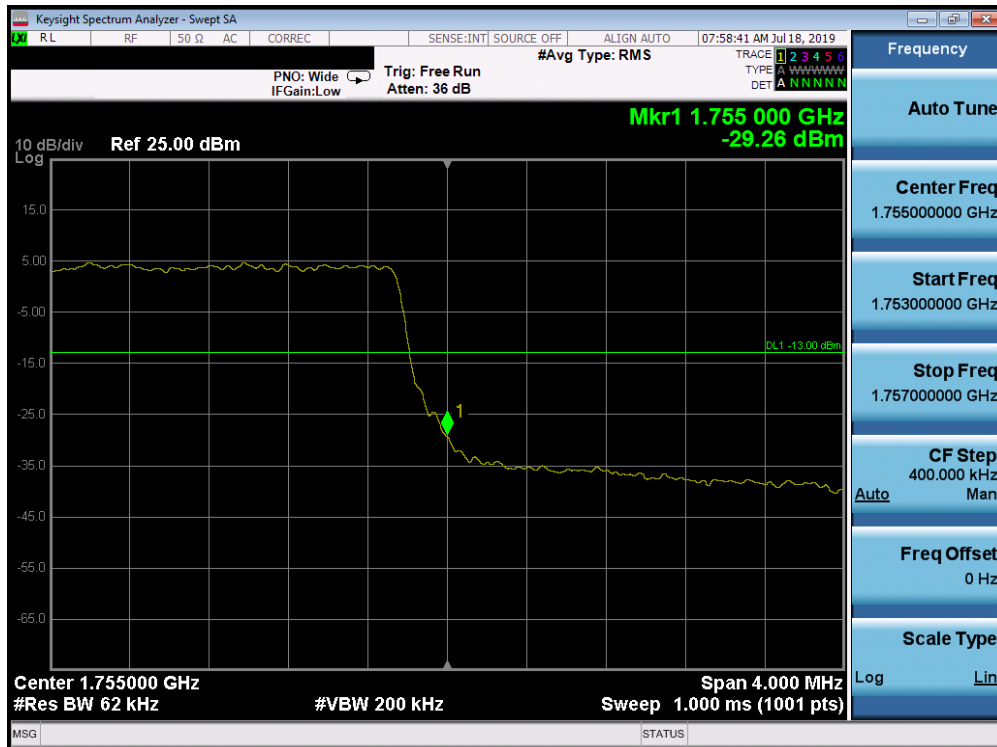


Plot 7-132. Lower Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

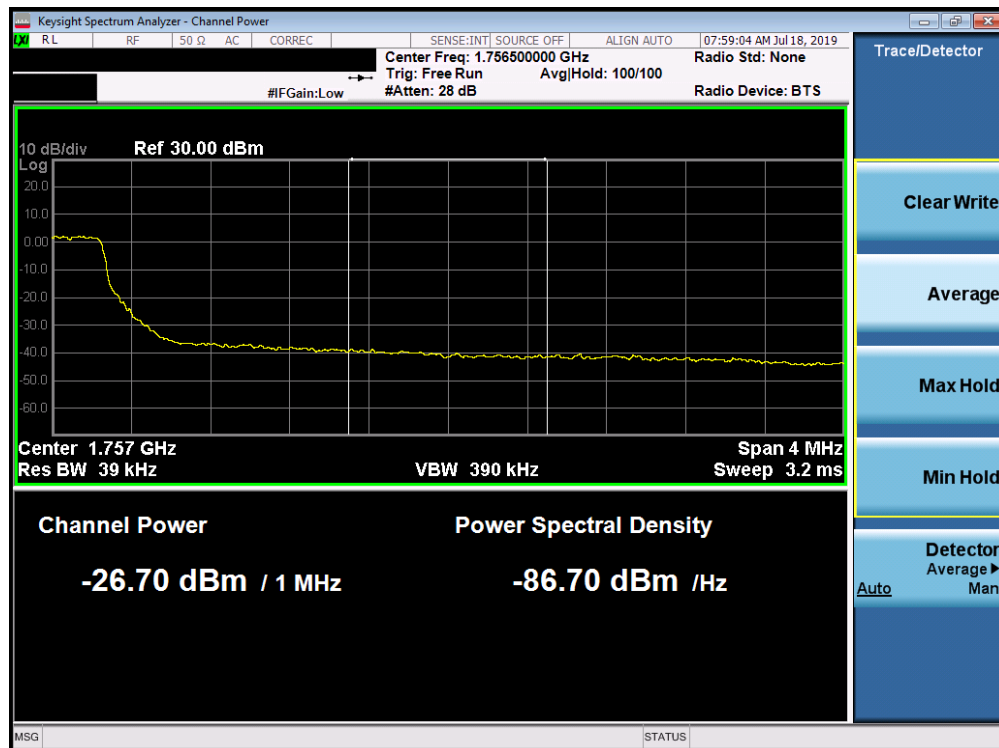


Plot 7-133. Lower Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 88 of 154

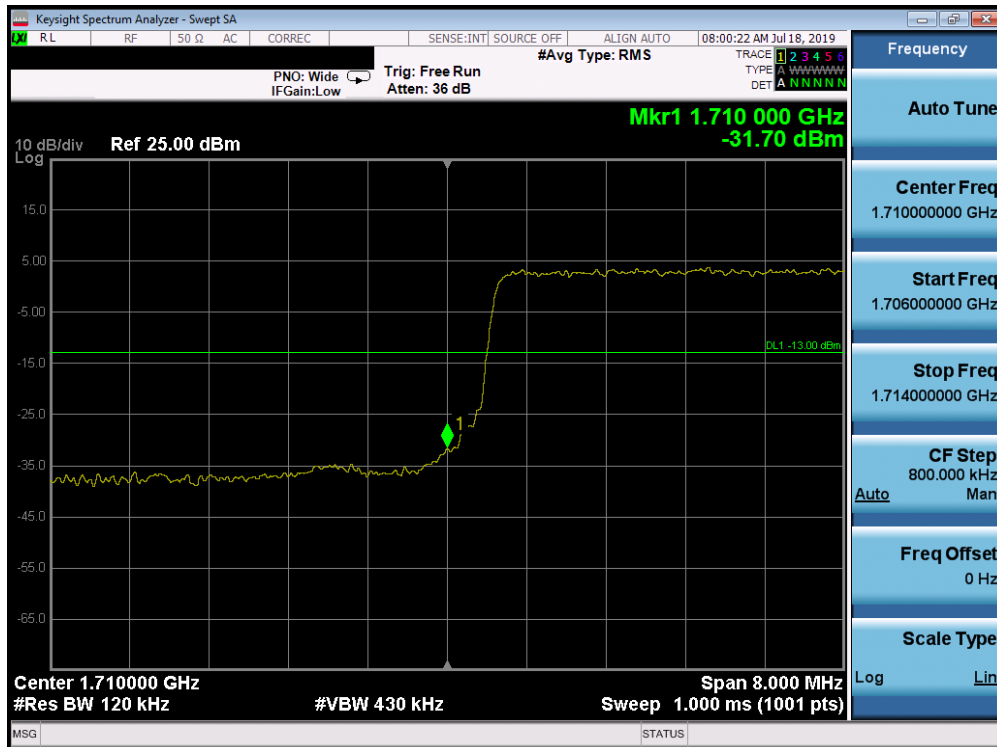


Plot 7-134. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

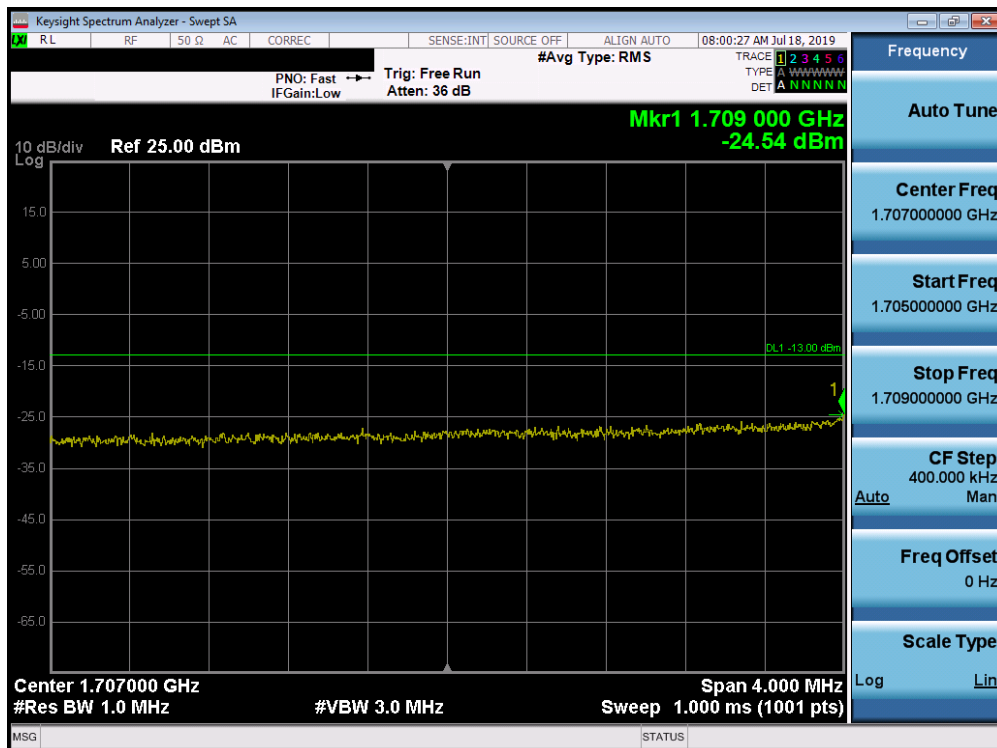


Plot 7-135. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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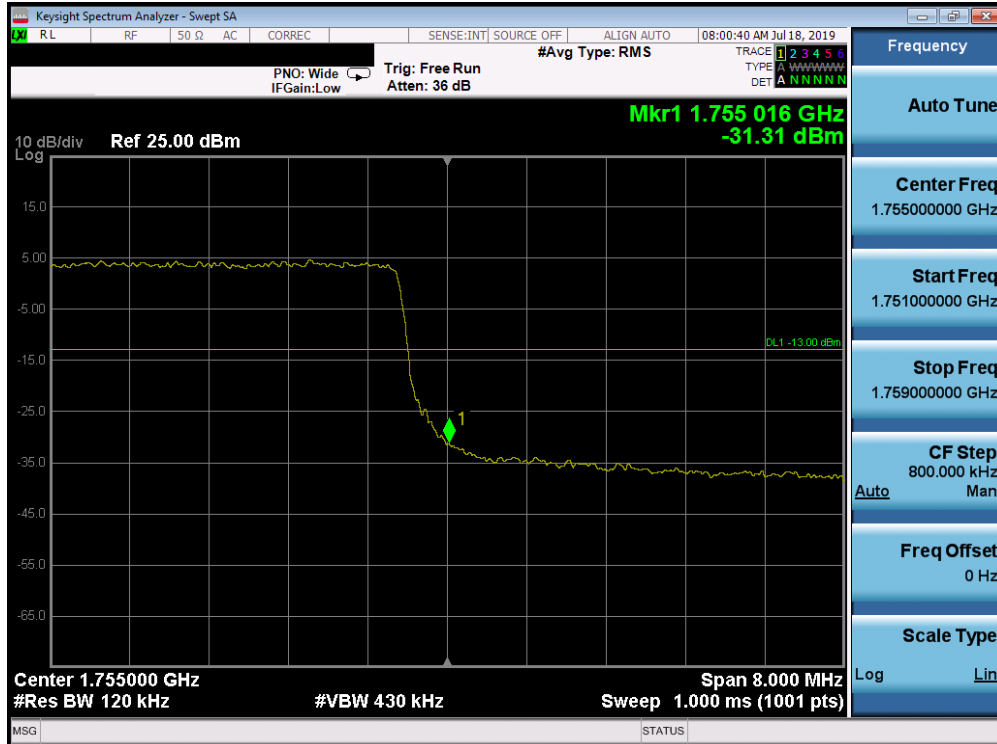


Plot 7-136. Lower Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

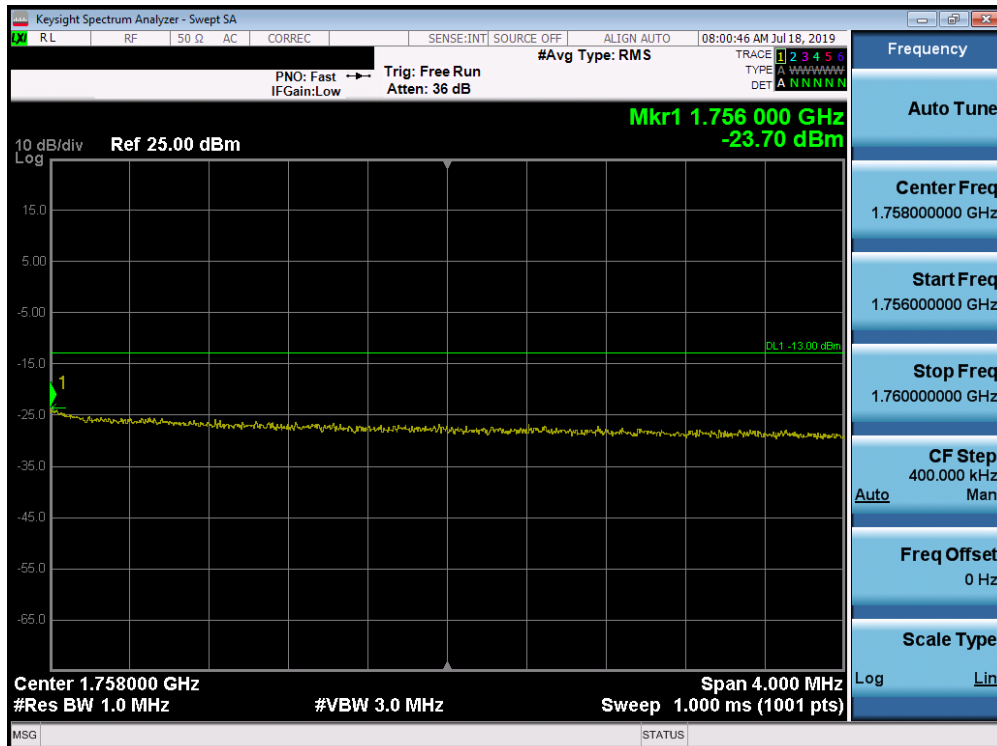


Plot 7-137. Lower Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 90 of 154

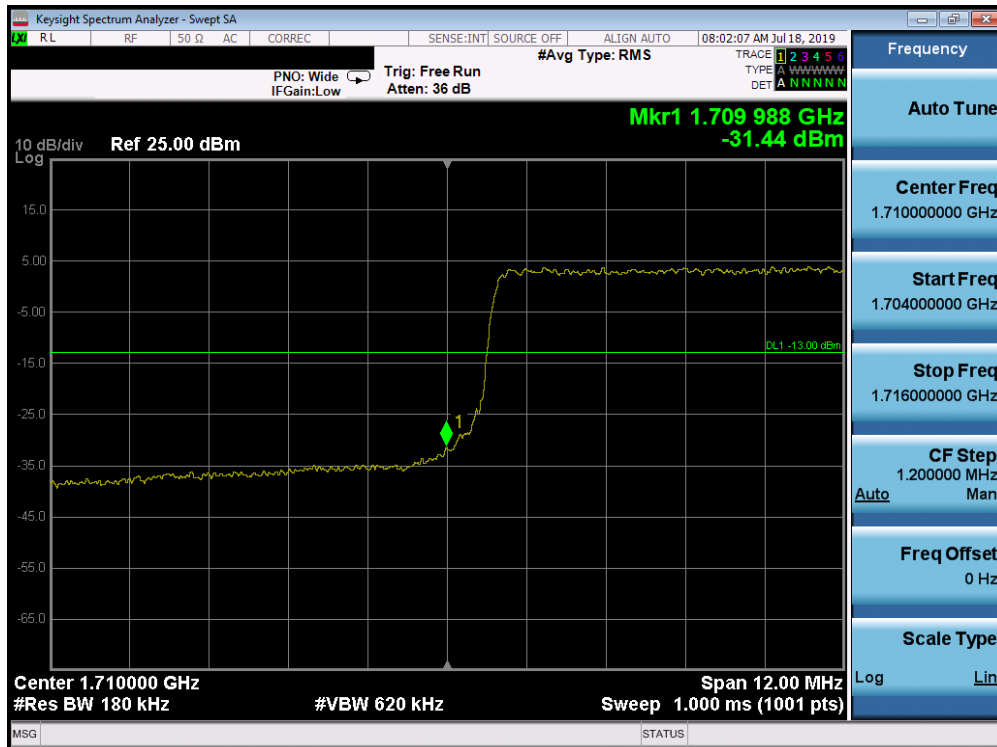


Plot 7-138. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

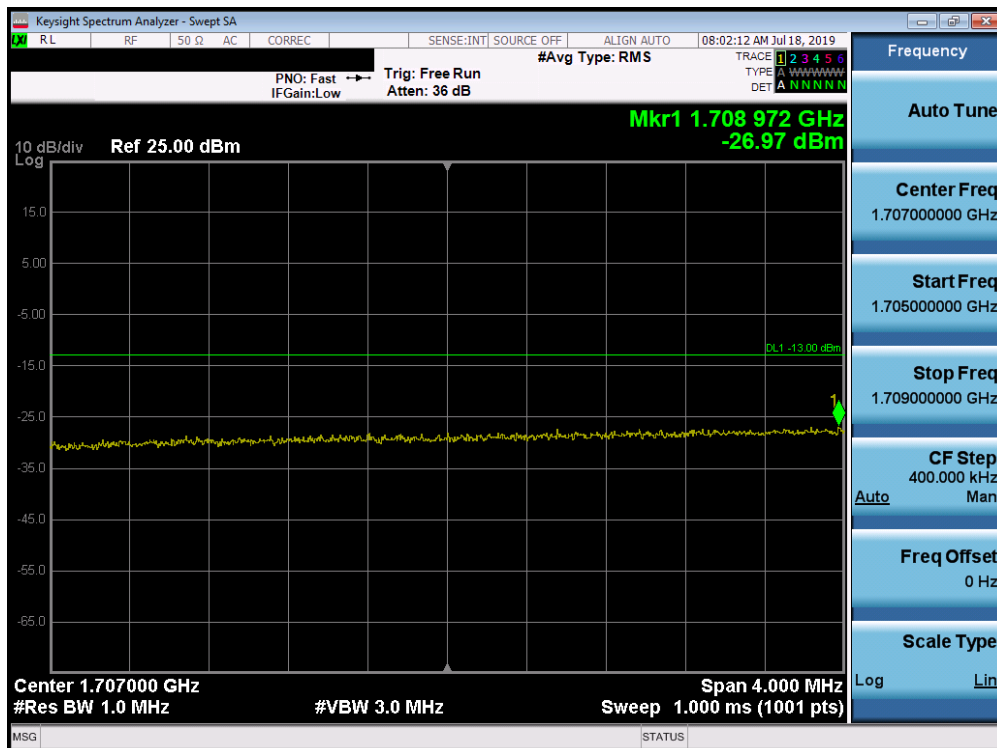


Plot 7-139. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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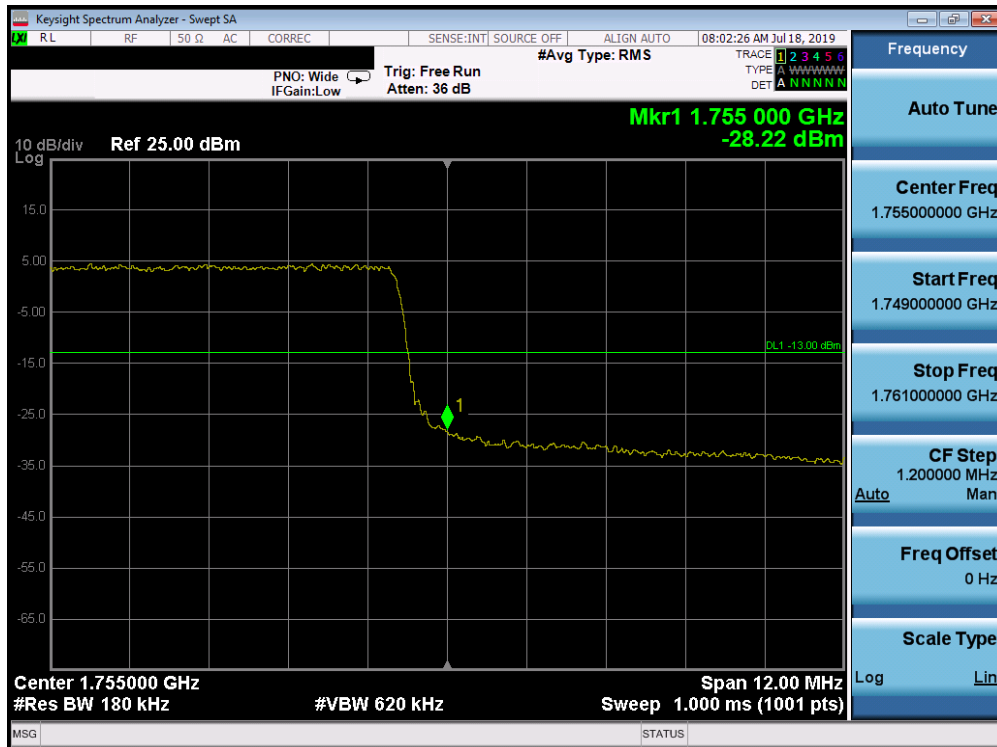


Plot 7-140. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

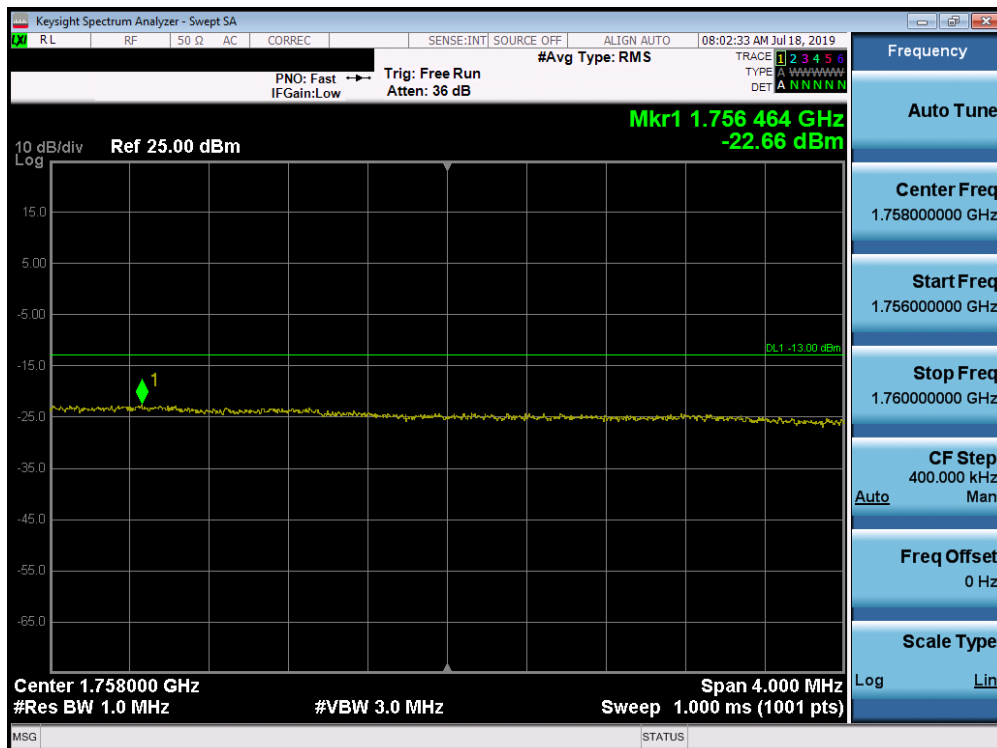


Plot 7-141. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 92 of 154

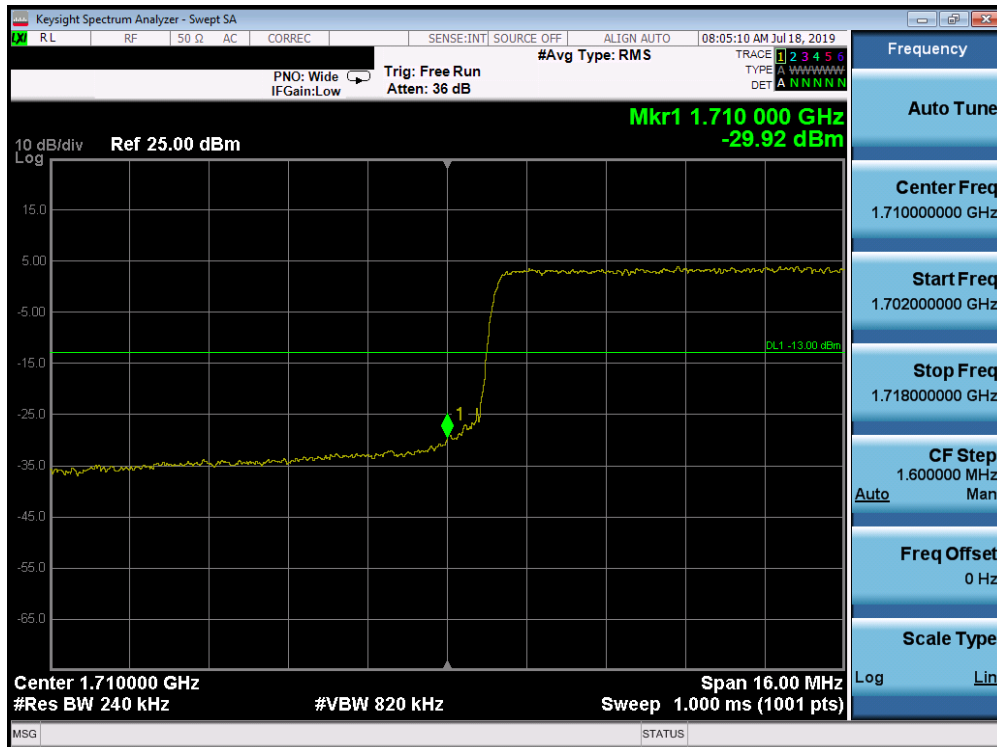


Plot 7-142. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

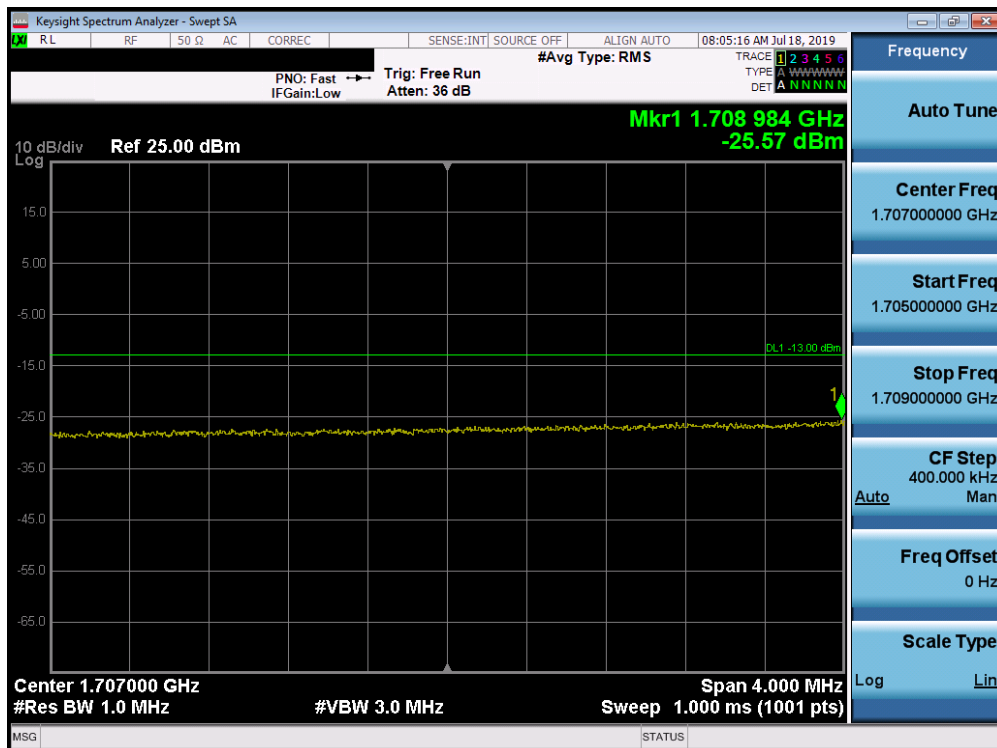


Plot 7-143. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 93 of 154

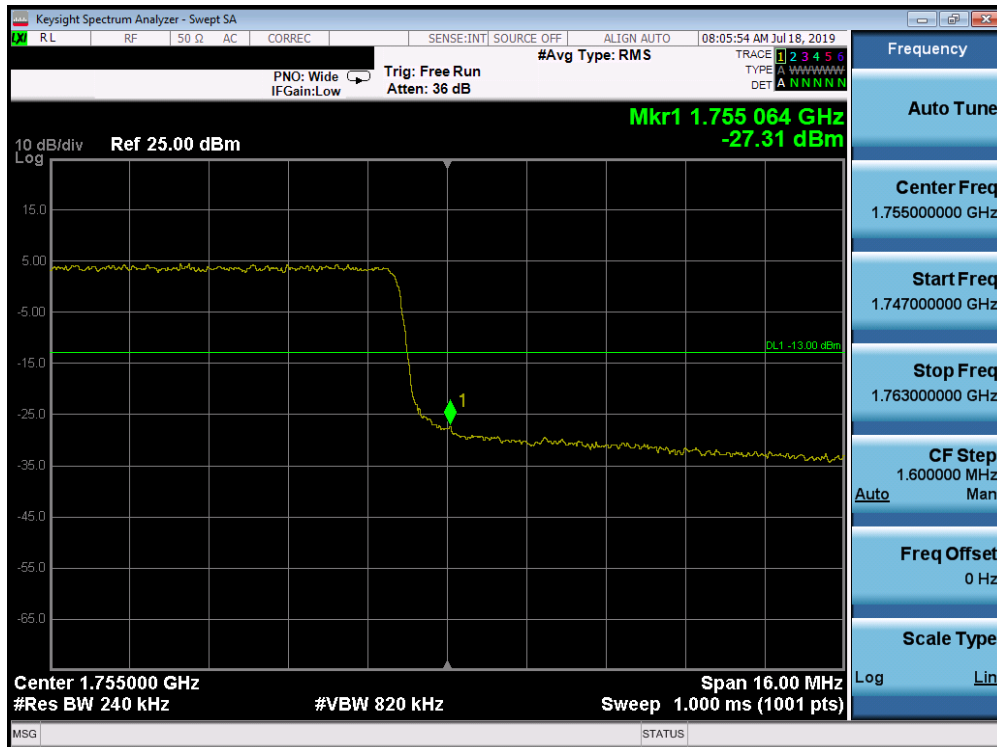


Plot 7-144. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

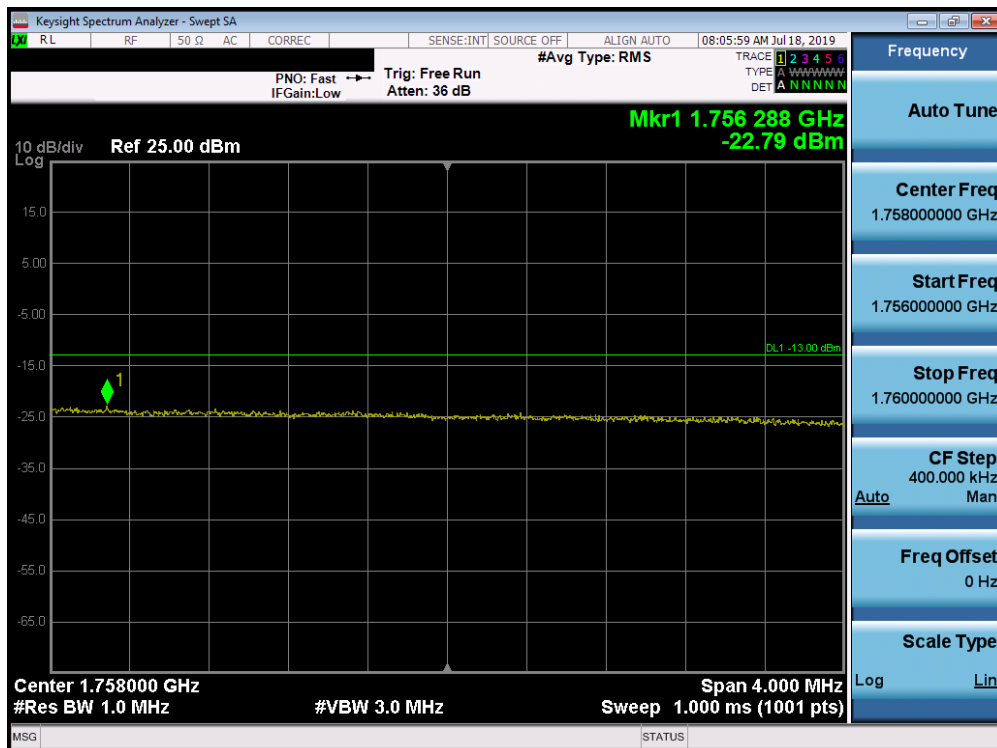


Plot 7-145. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 94 of 154



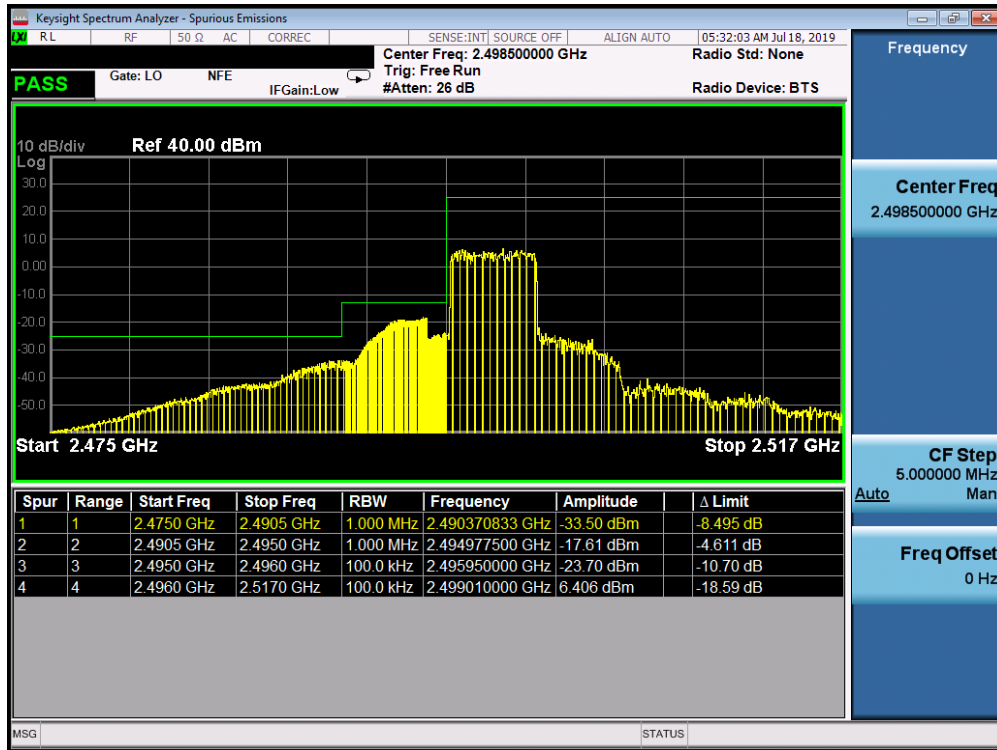
Plot 7-146. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



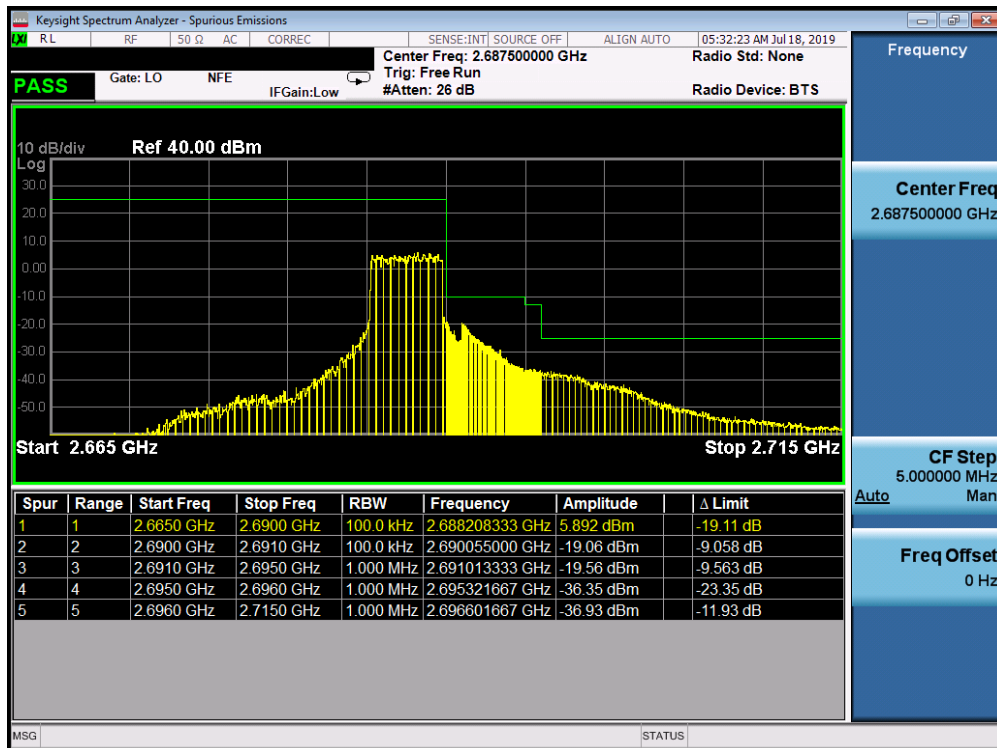
Plot 7-147. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 95 of 154

Band 41

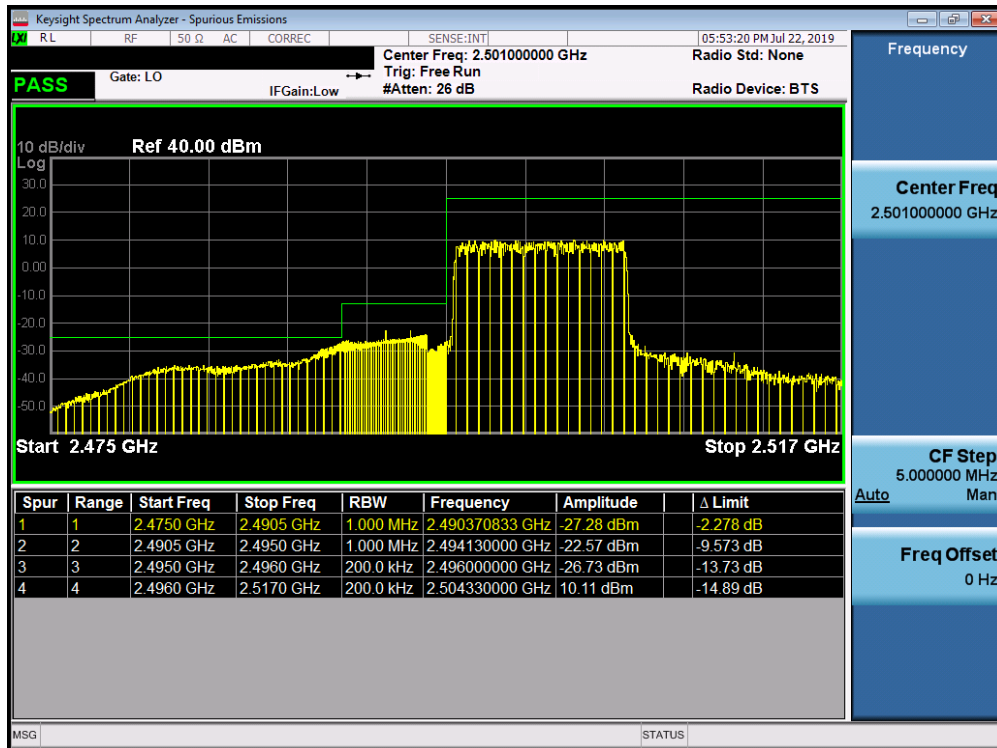


Plot 7-148. Lower ACP Plot at 2496 MHz (Band 41 - 5.0MHz QPSK - Full RB Configuration)

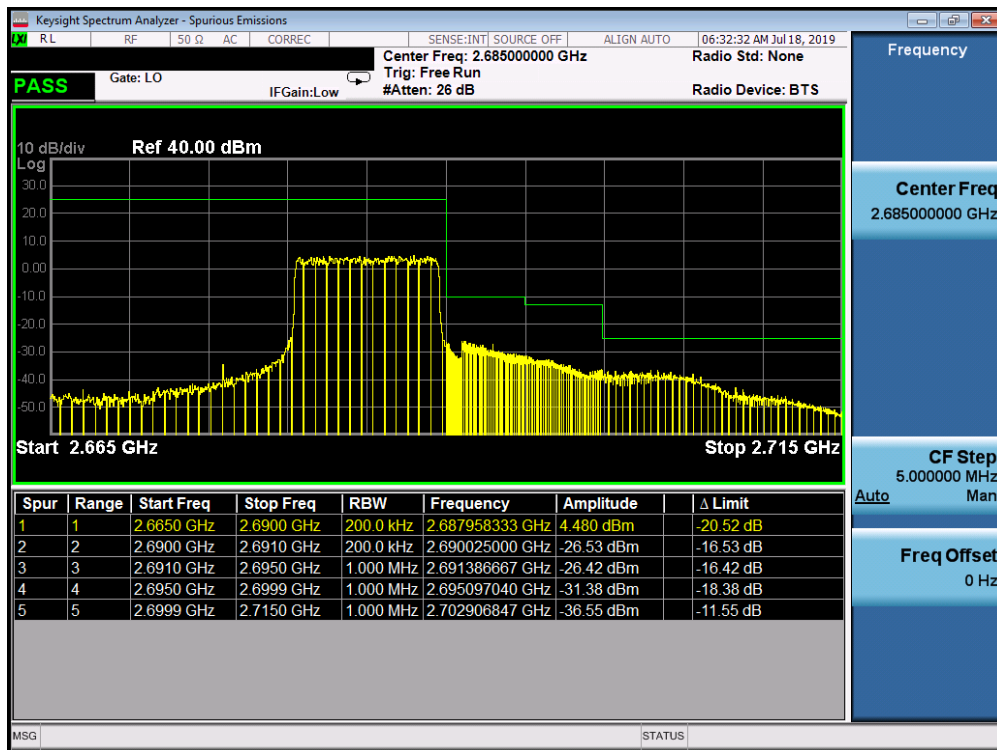


Plot 7-149. Upper ACP Plot (Band 41 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 96 of 154		

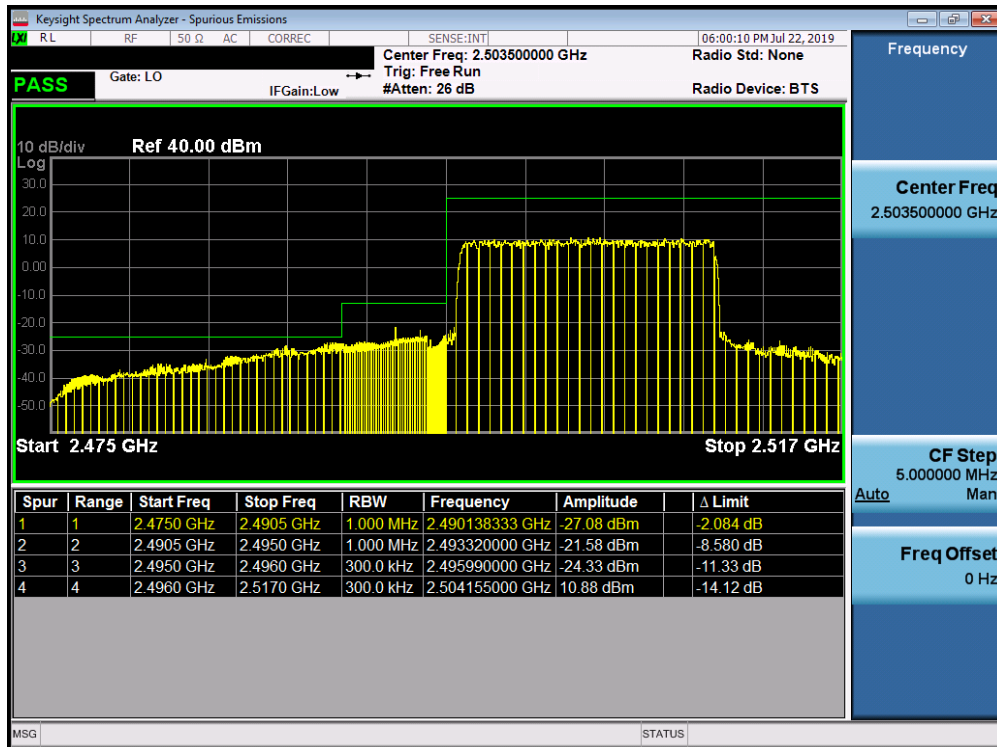


Plot 7-150. Lower ACP Plot at 2496 MHz (Band 41 - 10.0MHz QPSK - Full RB Configuration)

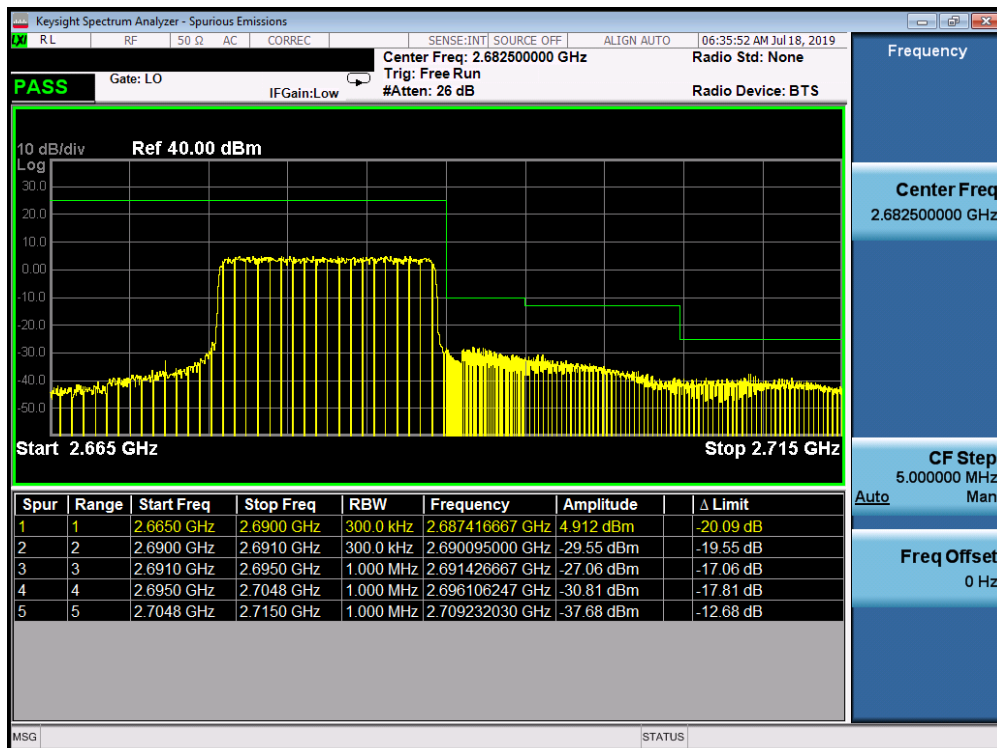


Plot 7-151. Upper ACP Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 97 of 154		

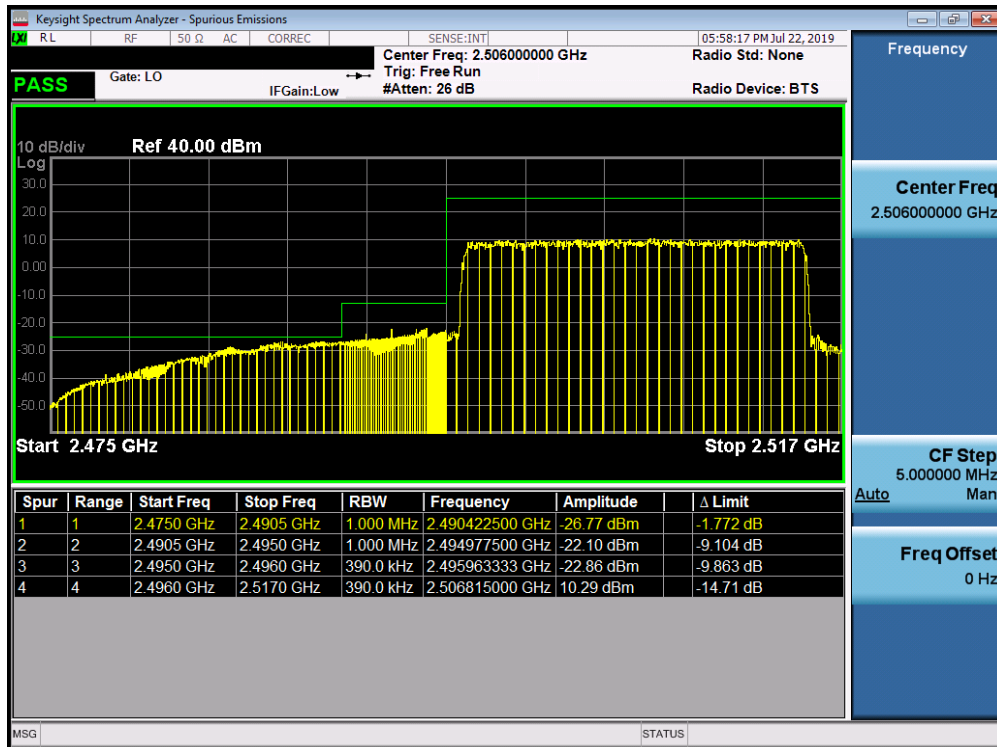


Plot 7-152. Lower ACP Plot at 2496 MHz (Band 41 - 15.0MHz QPSK - Full RB Configuration)

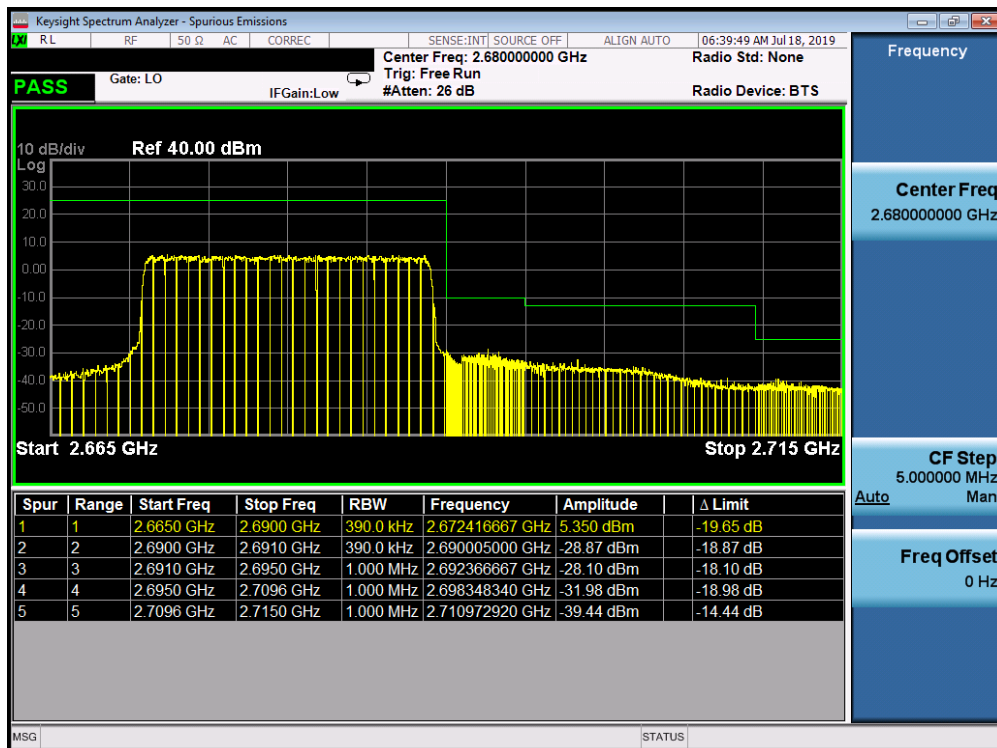


Plot 7-153. Upper ACP Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 98 of 154



Plot 7-154. Lower ACP Plot at 2496 MHz (Band 41 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-155. Upper ACP Plot (Band 41 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 99 of 154	

7.5 Peak-Average Ratio

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 v03r01 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW $\geq$ OBW or specified reference bandwidth
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. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Setup

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

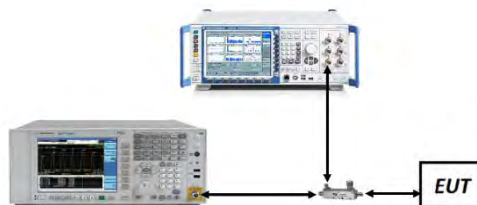


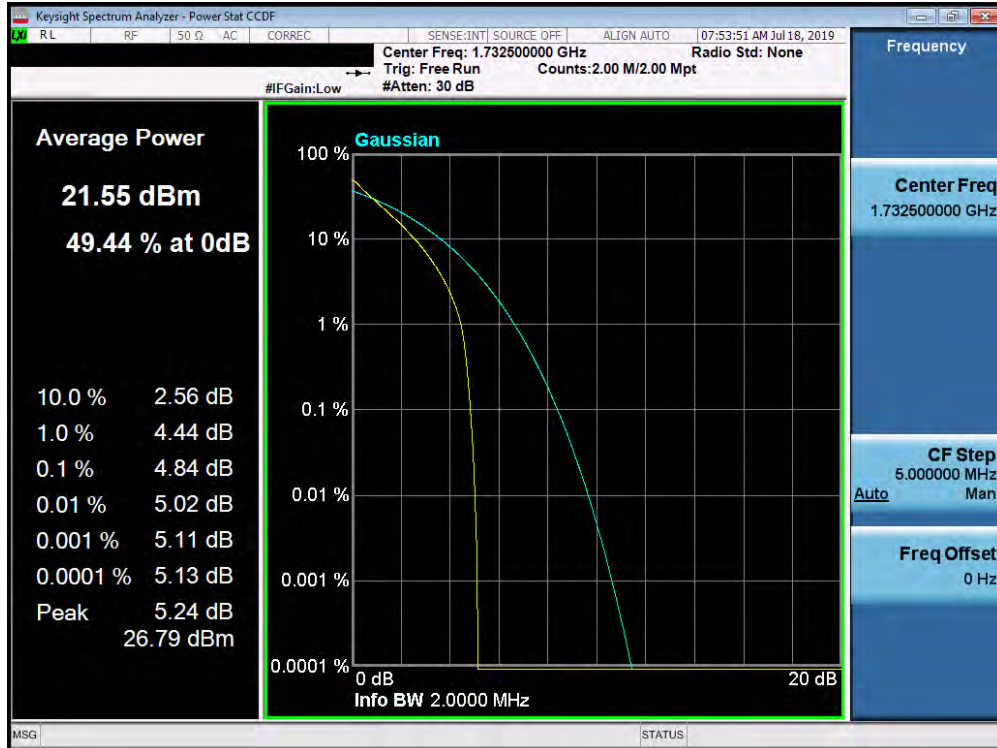
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

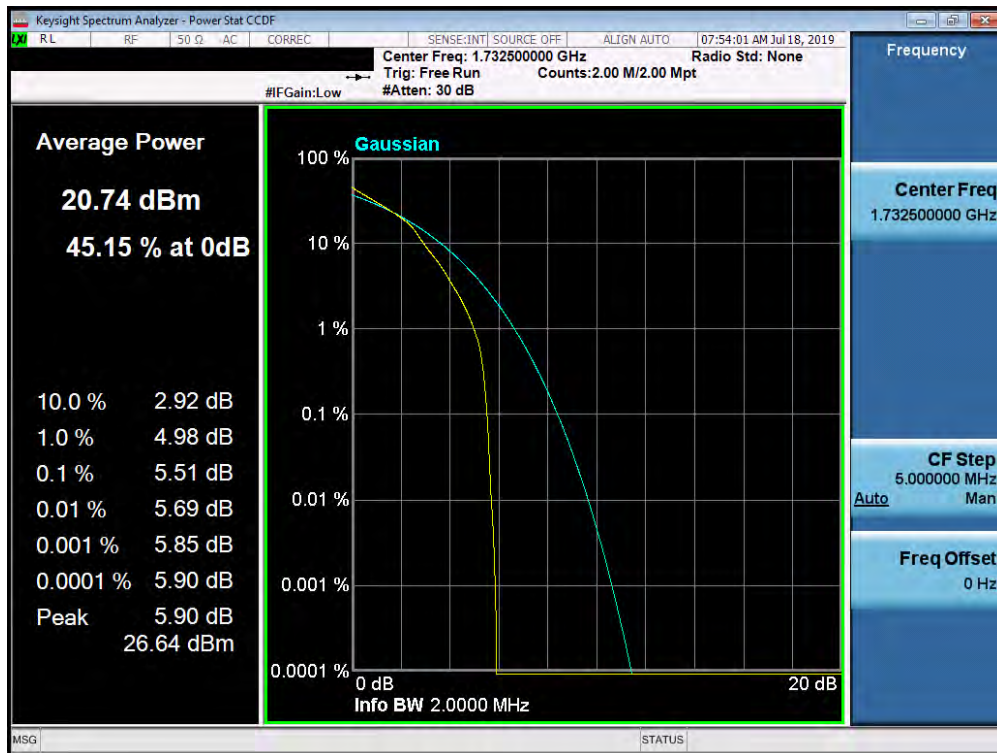
None.

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 100 of 154

Band 4

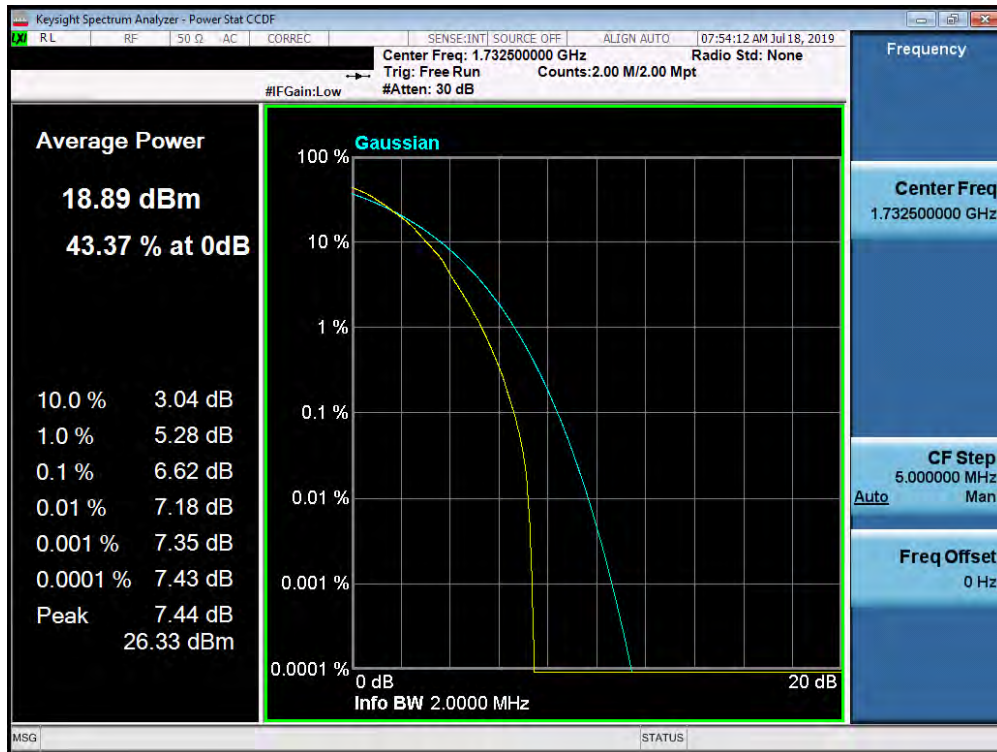


Plot 7-156. PAR Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

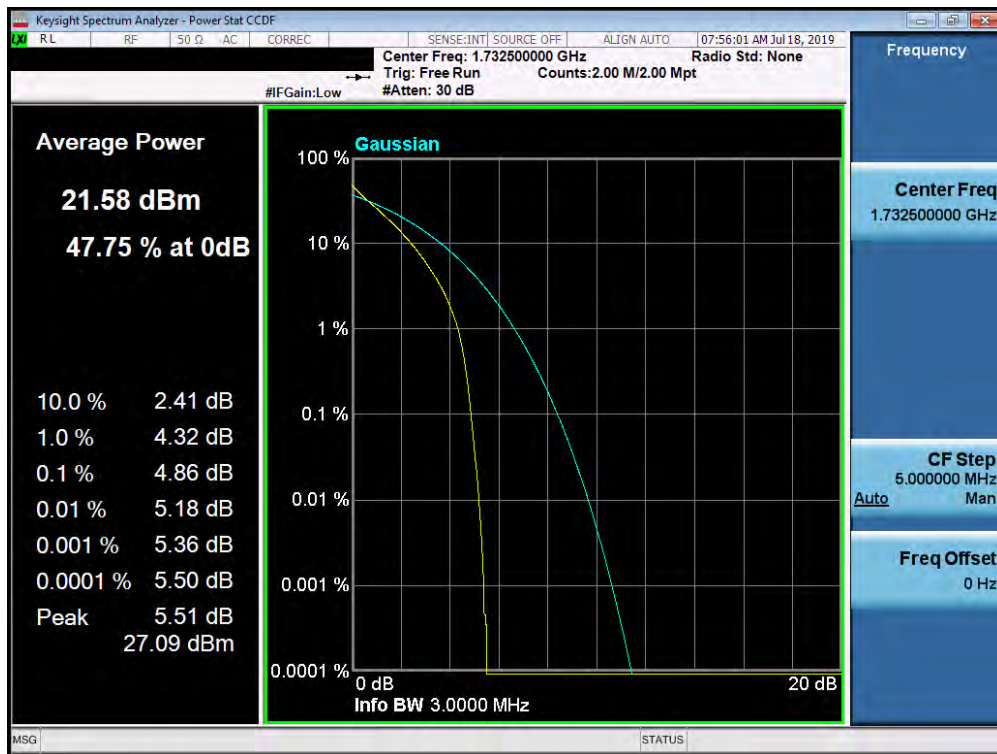


Plot 7-157. PAR Plot (Band 4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 101 of 154

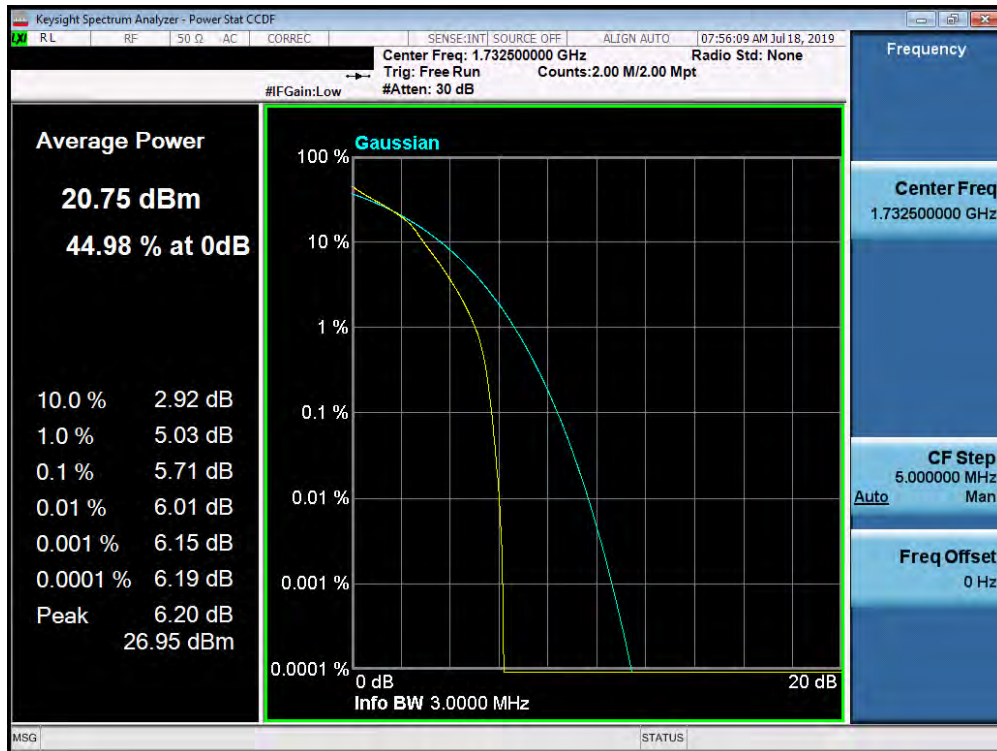


Plot 7-158. PAR Plot (Band 4 - 1.4MHz 64-QAM - Full RB Configuration)

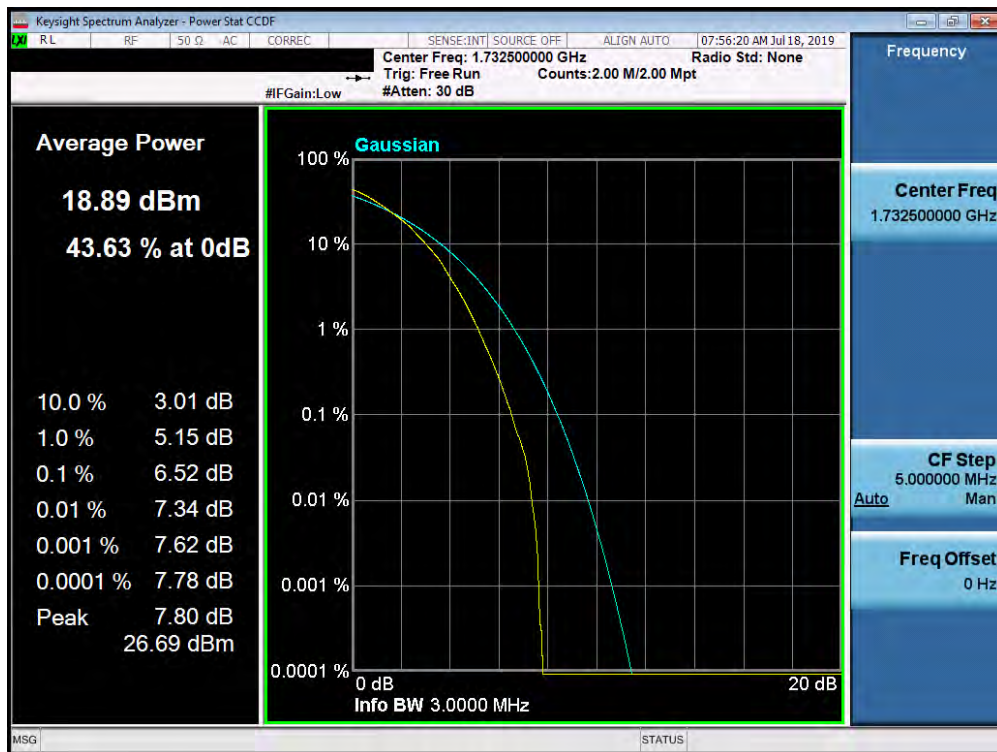


Plot 7-159. PAR Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 102 of 154

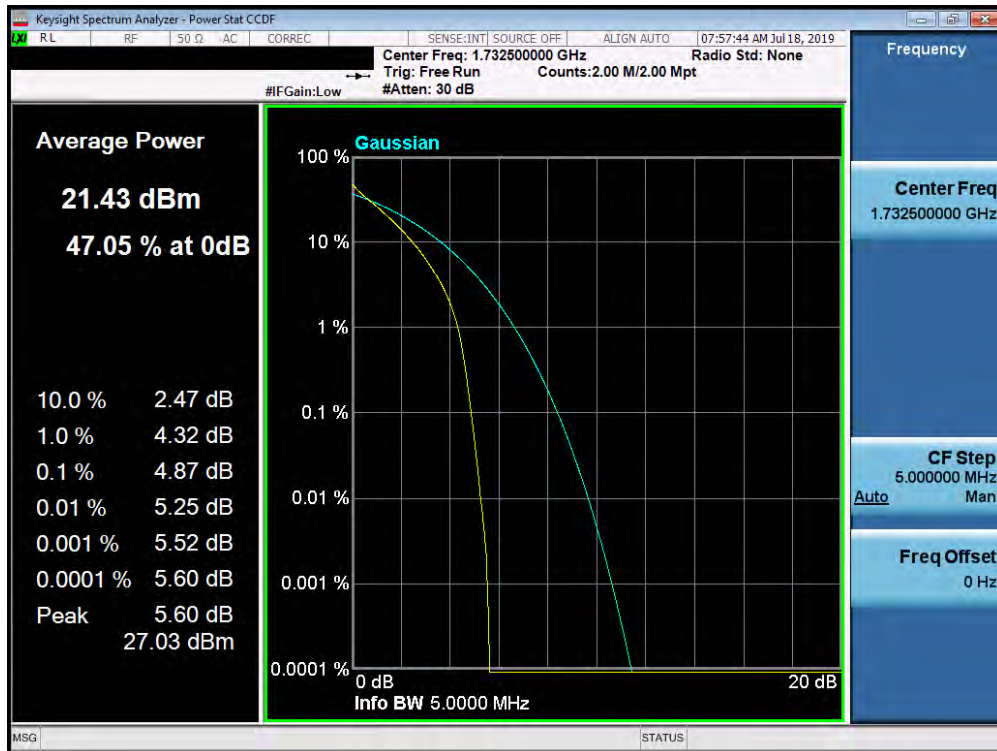


Plot 7-160. PAR Plot (Band 4 – 3.0MHz 16-QAM - Full RB Configuration)

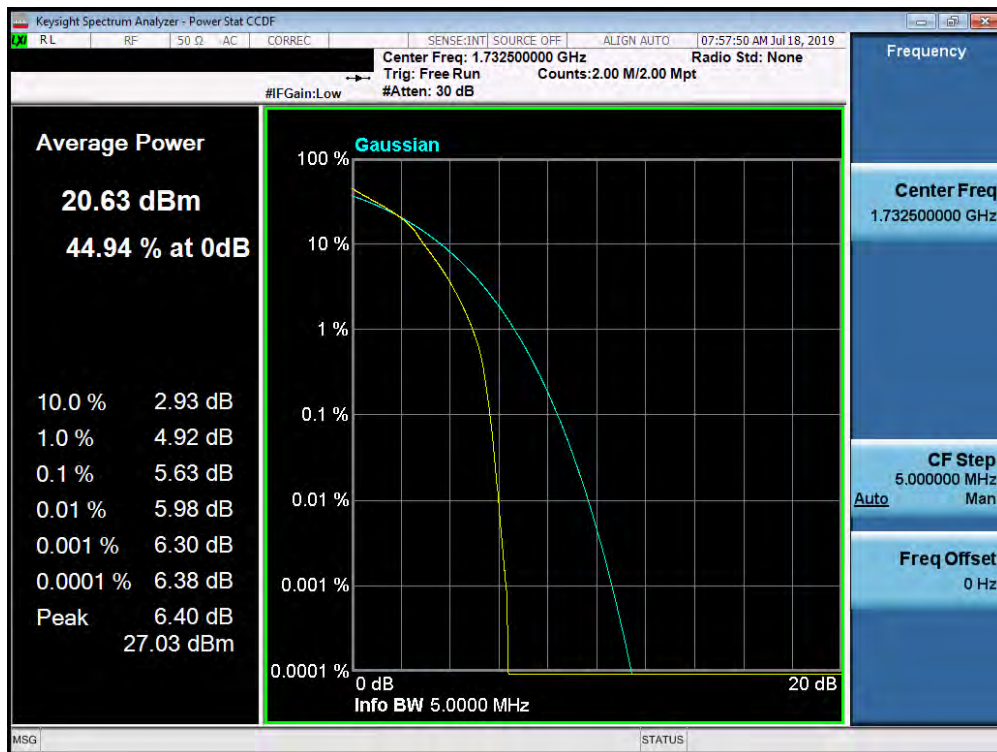


Plot 7-161. PAR Plot (Band 4 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 103 of 154

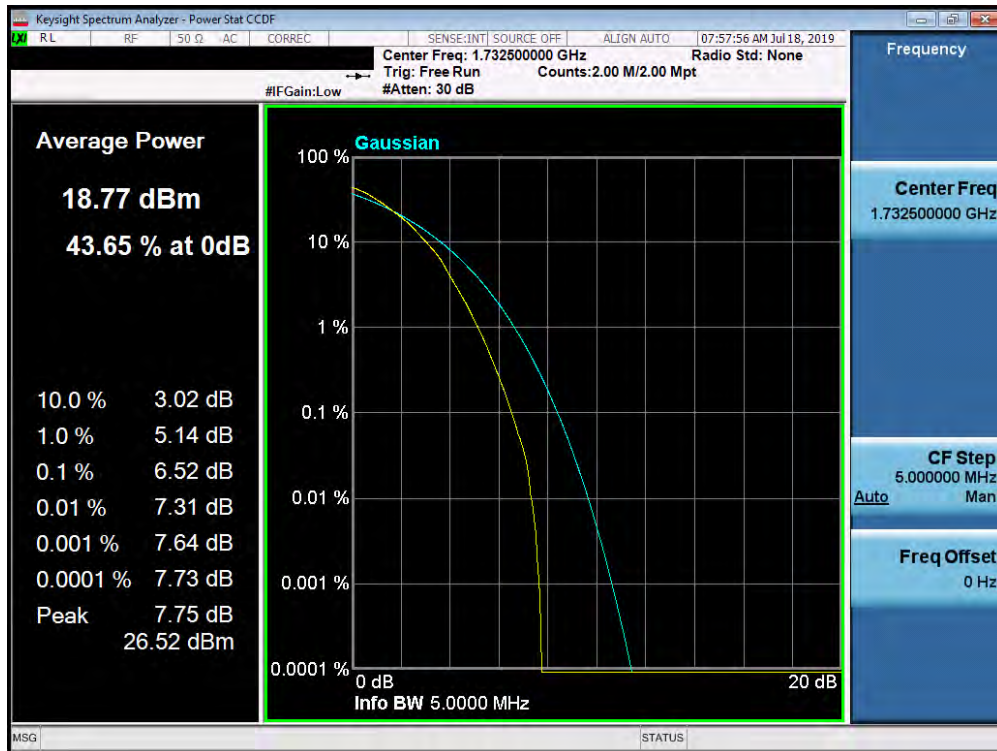


Plot 7-162. PAR Plot (Band 4 – 5.0MHz QPSK - Full RB Configuration)

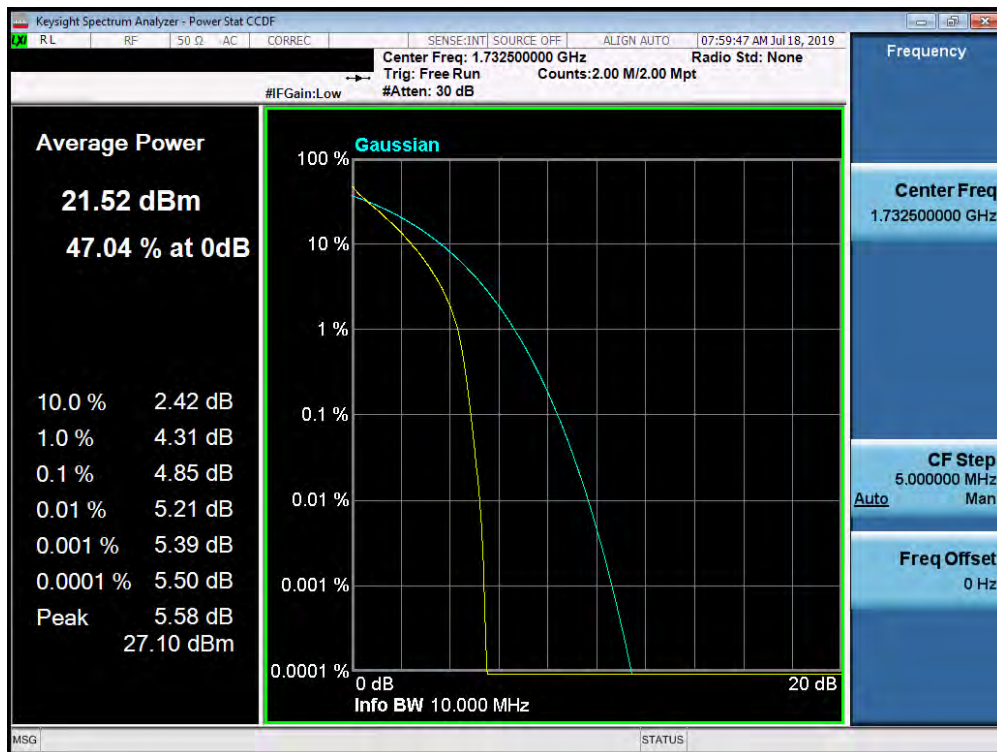


Plot 7-163. PAR Plot (Band 4 – 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 104 of 154

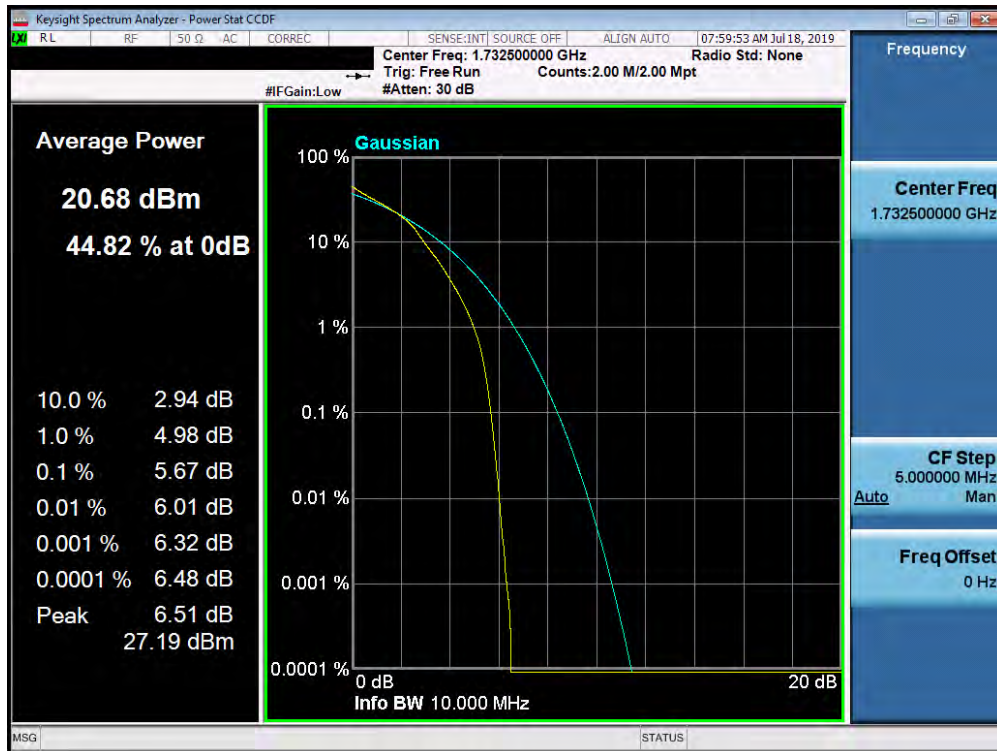


Plot 7-164. PAR Plot (Band 4 – 5.0MHz 64-QAM - Full RB Configuration)

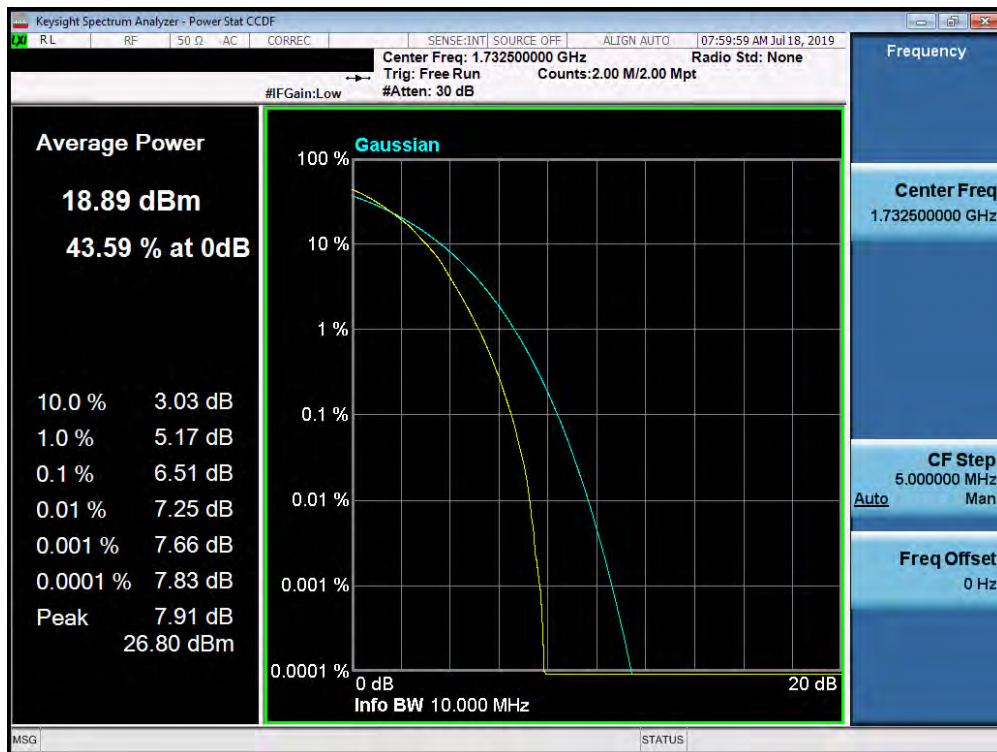


Plot 7-165. PAR Plot (Band 4 – 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 105 of 154

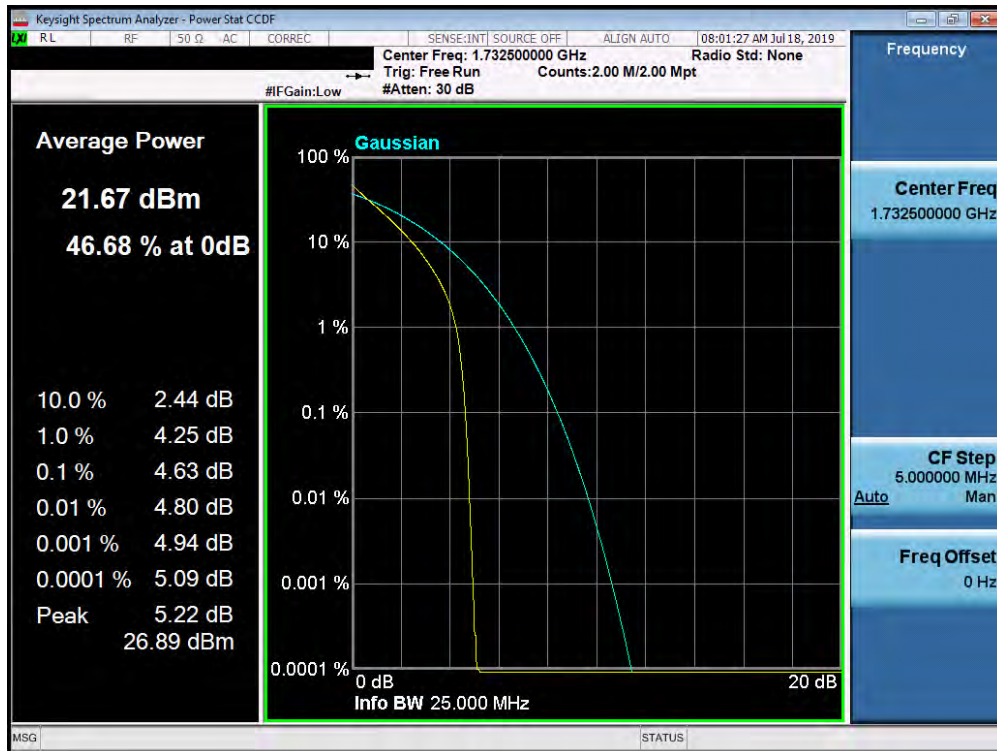


Plot 7-166. PAR Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)

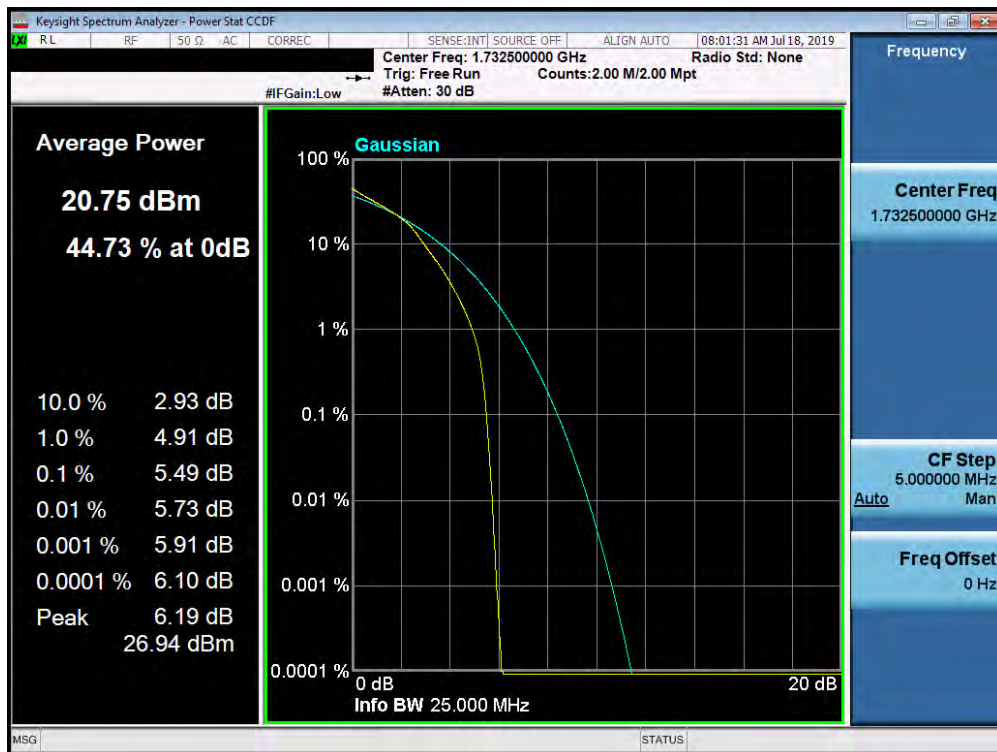


Plot 7-167. PAR Plot (Band 4 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 106 of 154

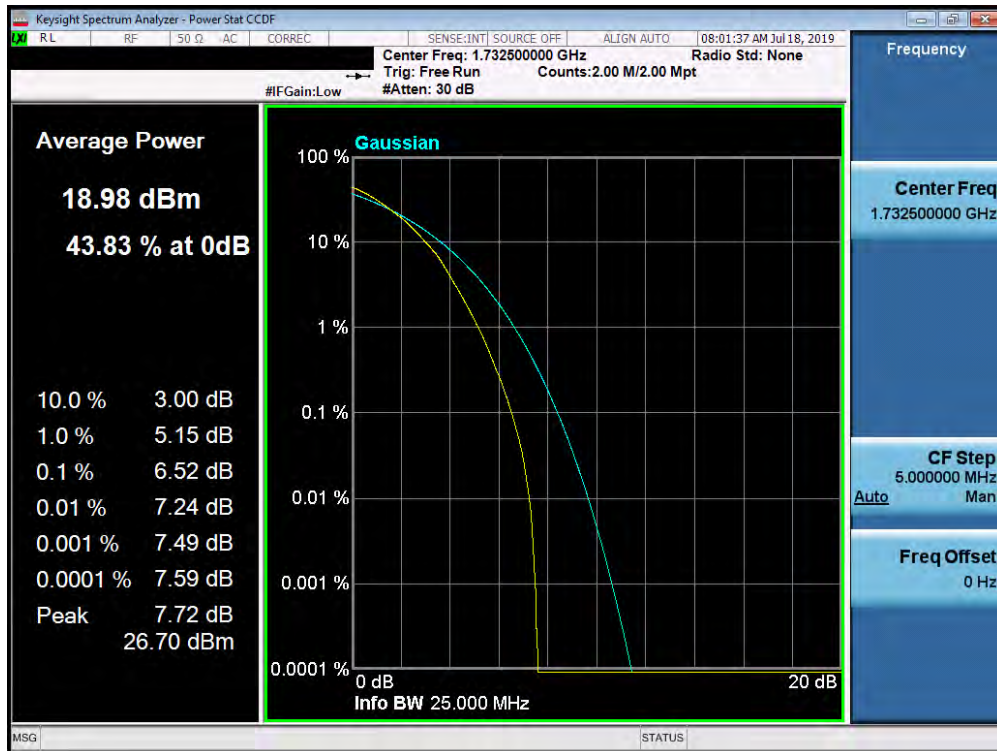


Plot 7-168. PAR Plot (Band 4 – 15.0MHz QPSK - Full RB Configuration)

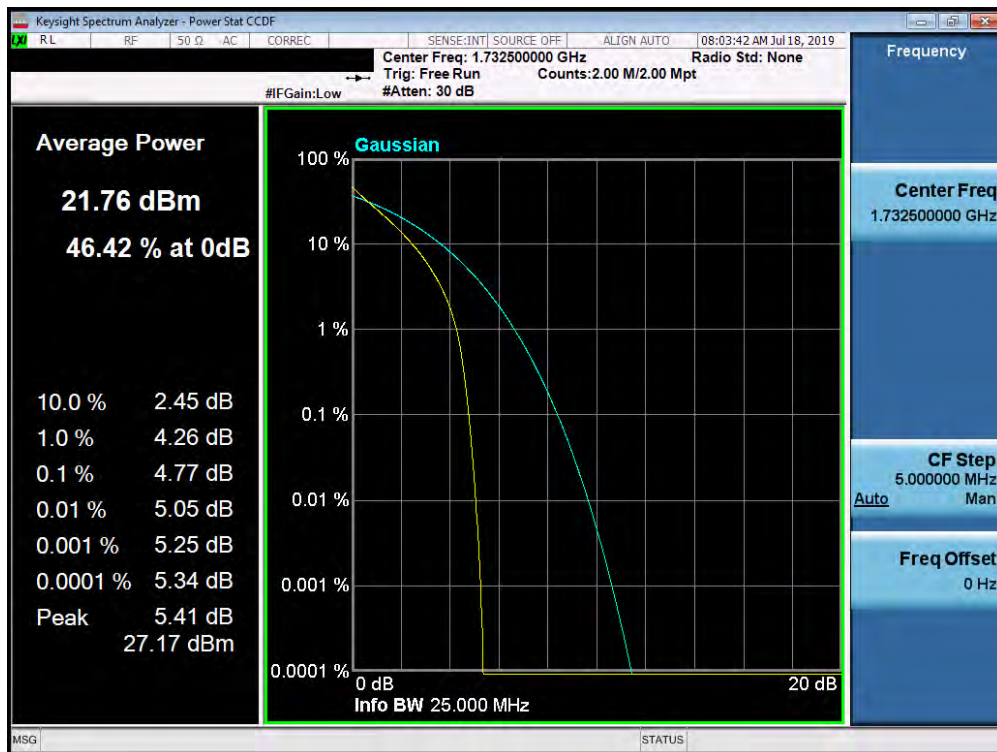


Plot 7-169. PAR Plot (Band 4 – 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 107 of 154

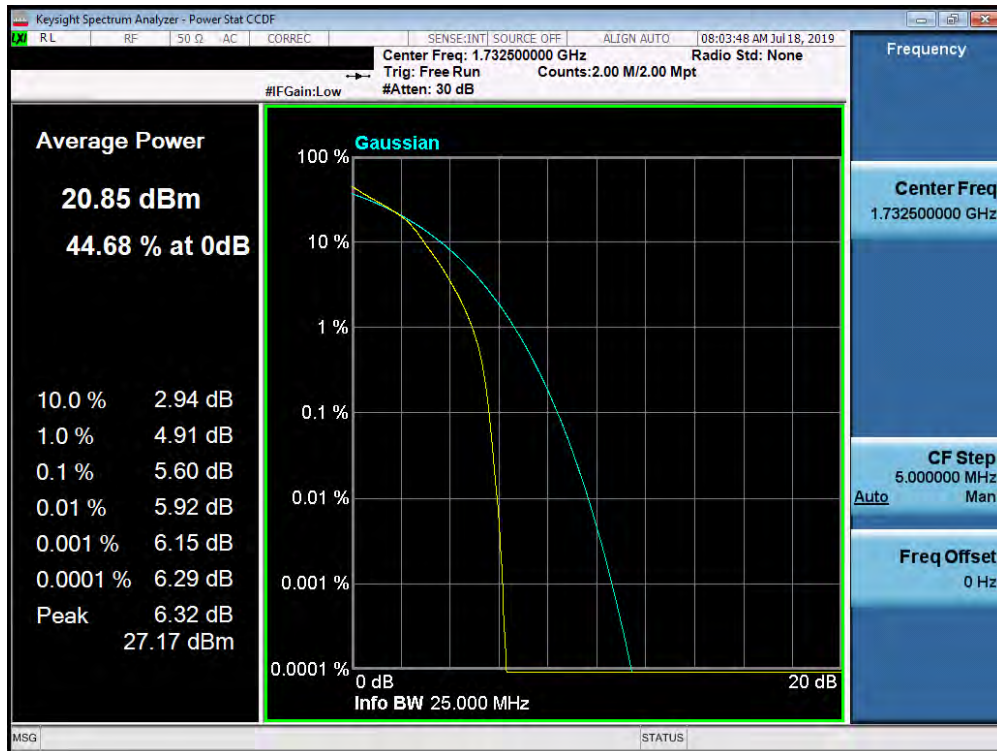


Plot 7-170. PAR Plot (Band 4 – 15.0MHz 64-QAM - Full RB Configuration)

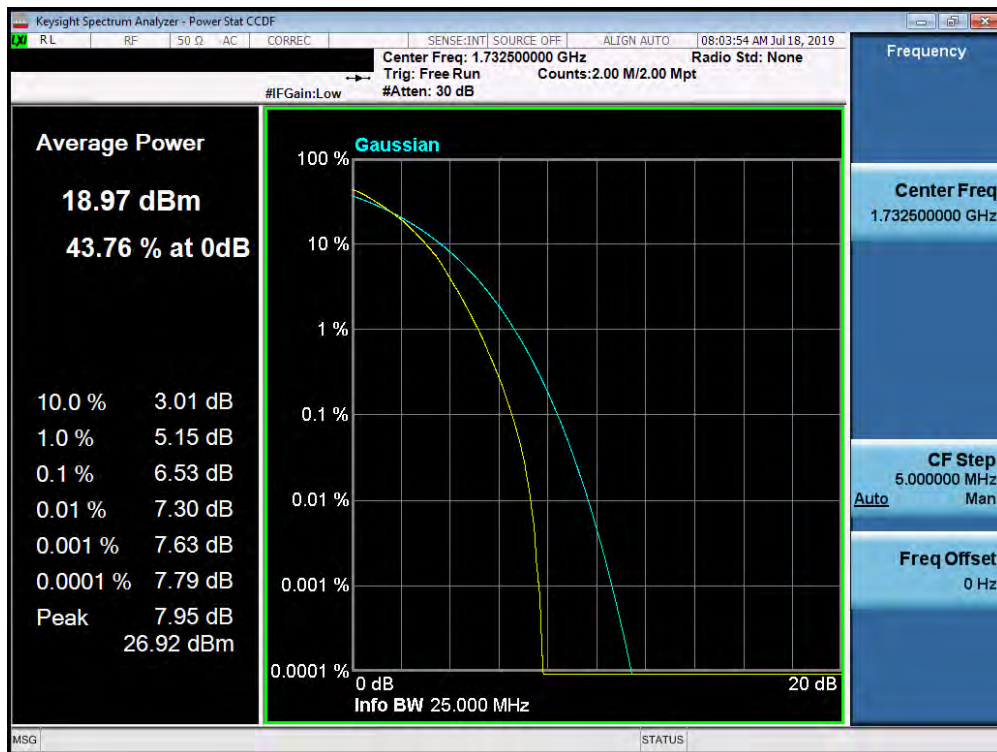


Plot 7-171. PAR Plot (Band 4 – 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 108 of 154



Plot 7-172. PAR Plot (Band 4 – 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-173. PAR Plot (Band 4 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 109 of 154

7.6 Uplink Carrier Aggregation

§27.53(m)

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers 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.

For Band 41, the minimum permissible attenuation level of any spurious emission is $55 + 10 \log_{10}(P_{\text{Watts}})$.

Test Procedure Used

KDB 971168 D01 v03r01 – 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 for continuous emissions, max hold for pulse emissions
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.

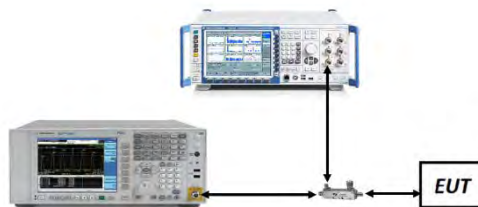


Figure 7-5. Test Instrument & Measurement Setup

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 110 of 154

Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.
2. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation, as shown in Table 7-503 and 7-504 below, with both carriers set to transmit using 1RB.
3. 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.

Uplink CA Configuration 41

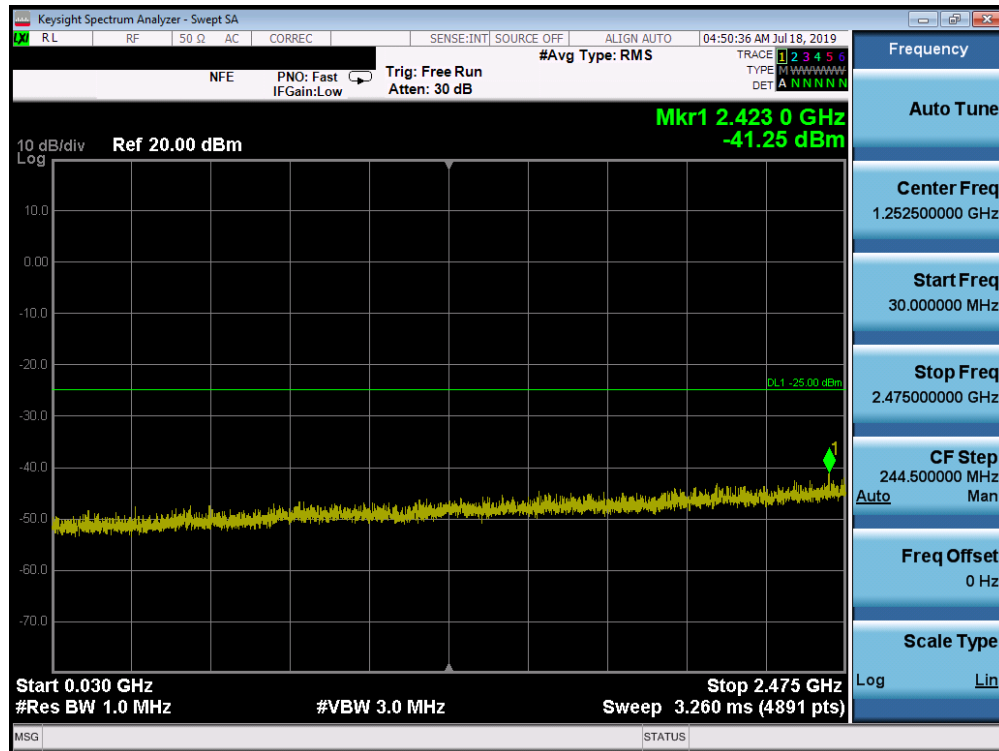
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	22.46
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	22.82
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	22.65

Table 7-3. Conducted Powers (B41 –20MHz + 20MHz Channel Bandwidth- PCC/SCC: 1RB)

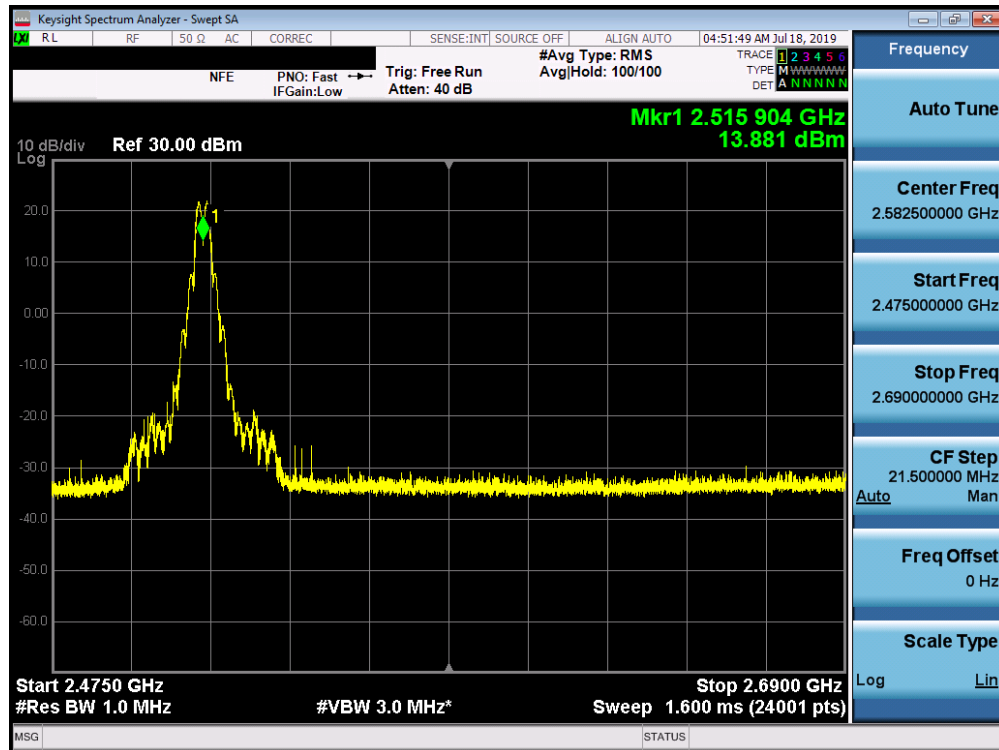
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	
Max	LTE B41	20	40620	2593	QPSK	100	0	LTE B41	20	40818	2612.8	QPSK	100	0	20.60
Max	LTE B41	20	40620	2593	16-QAM	100	0	LTE B41	20	40818	2612.8	16-QAM	100	0	19.68
Max	LTE B41	20	40620	2593	64-QAM	100	0	LTE B41	20	40818	2612.8	64-QAM	100	0	19.63
Max	LTE B41	20	40620	2593	256-QAM	100	0	LTE B41	20	40818	2612.8	256-QAM	100	0	17.67

Table 7-4. Conducted Powers (B41 with Various Combinations for 20MHz + 20MHz Channel Bandwidth)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 111 of 154

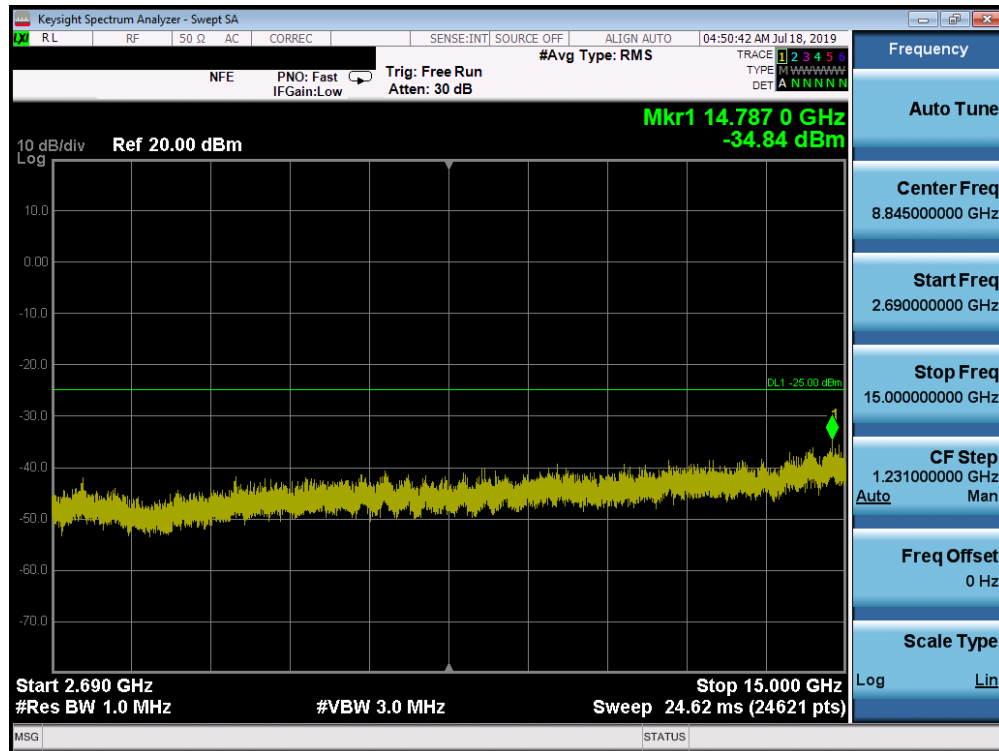


Plot 7-174. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

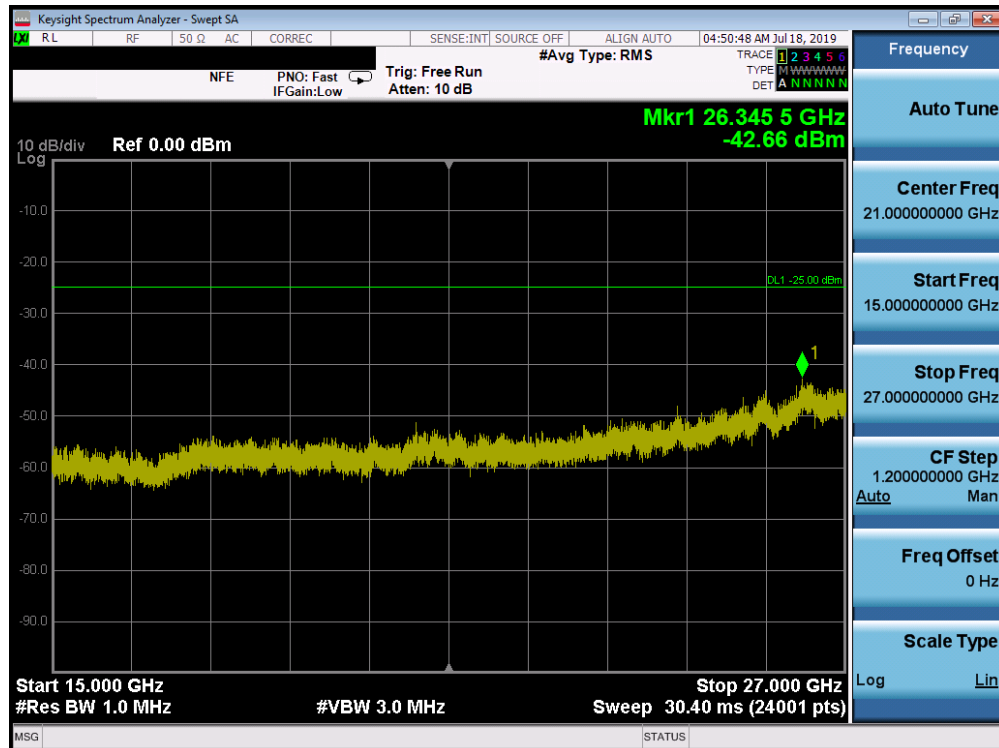


Plot 7-175. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 112 of 154

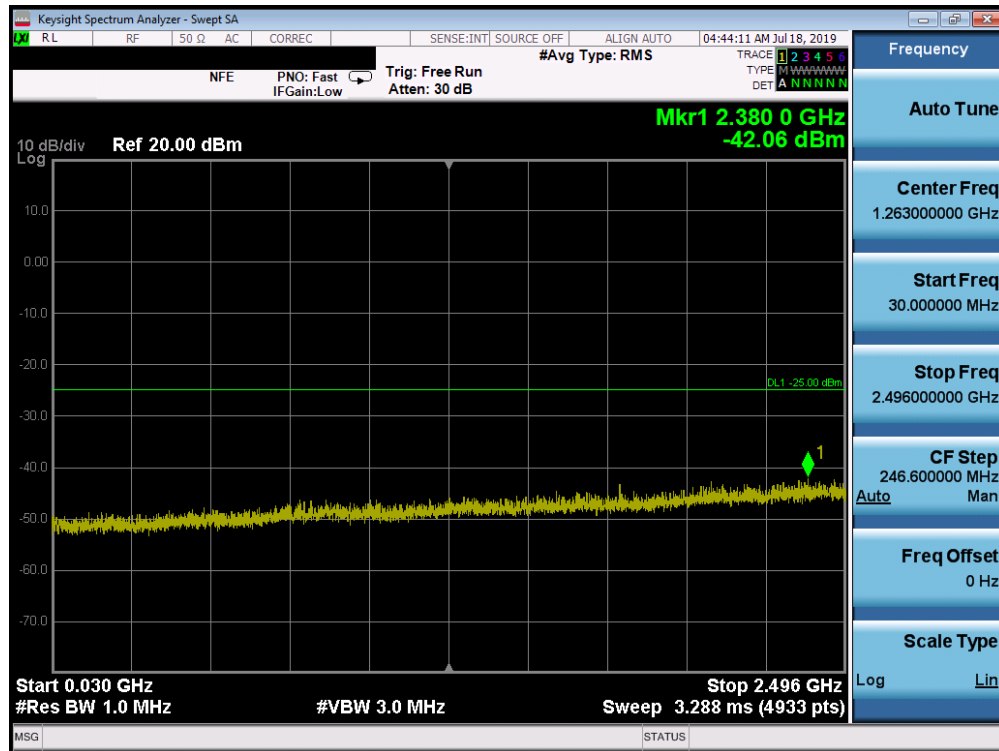


Plot 7-176. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

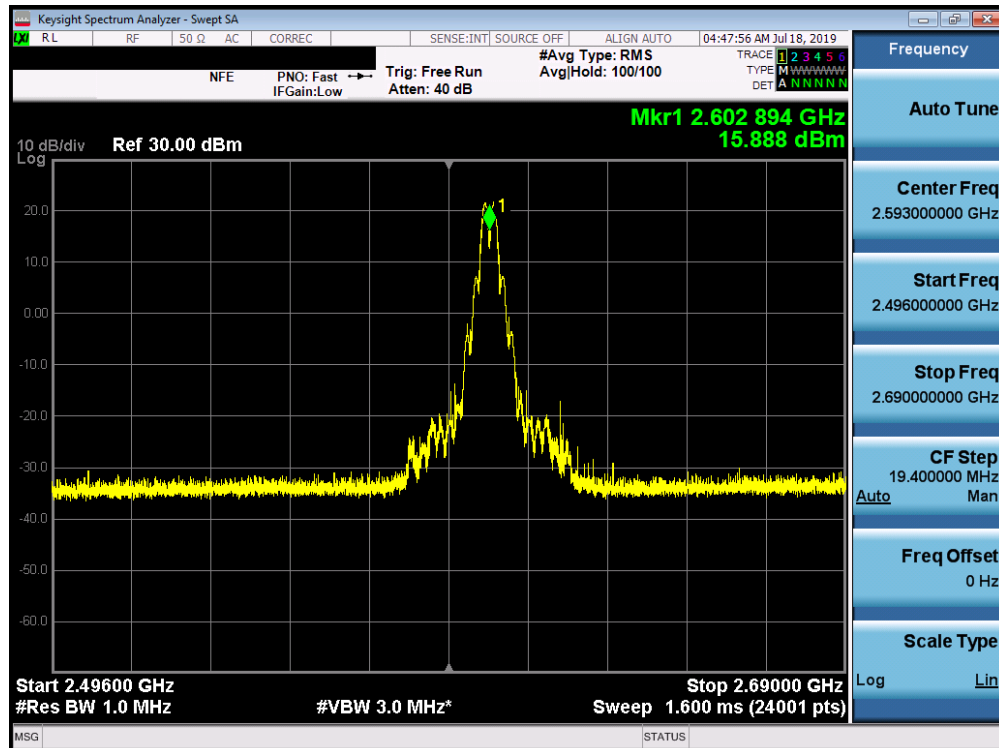


Plot 7-177. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 113 of 154

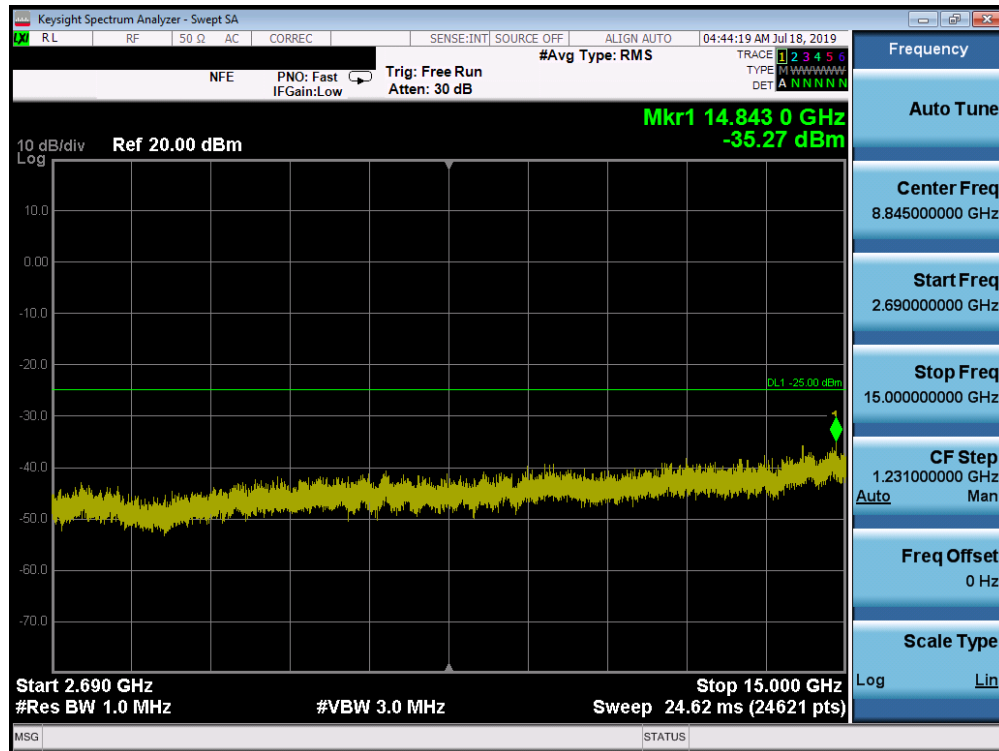


Plot 7-178. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

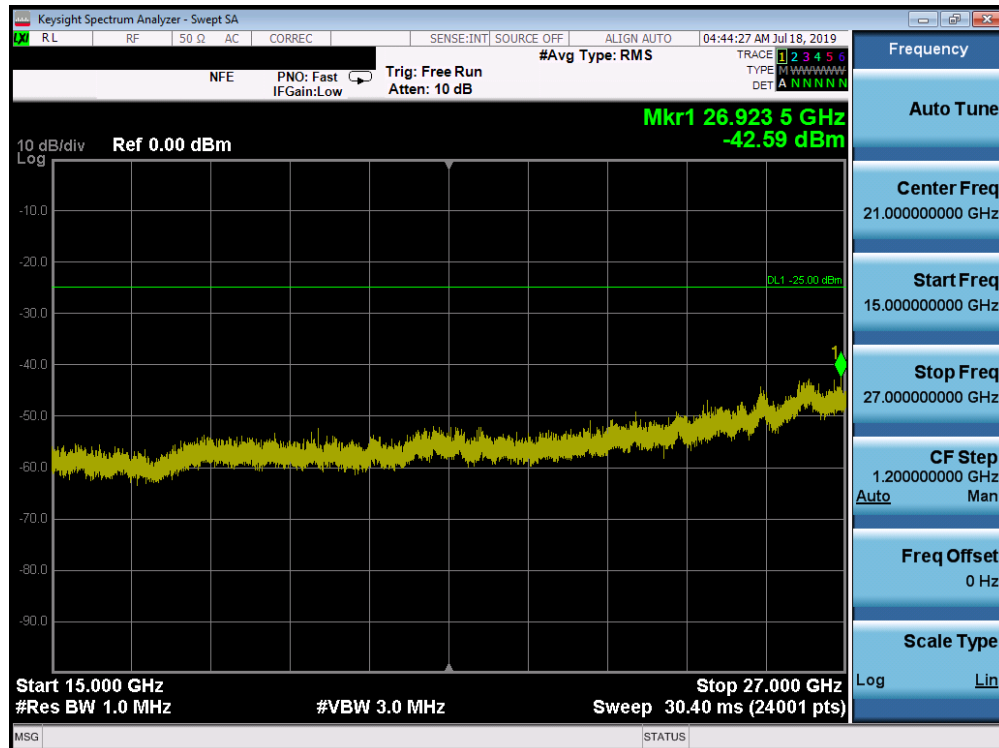


Plot 7-179. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 114 of 154

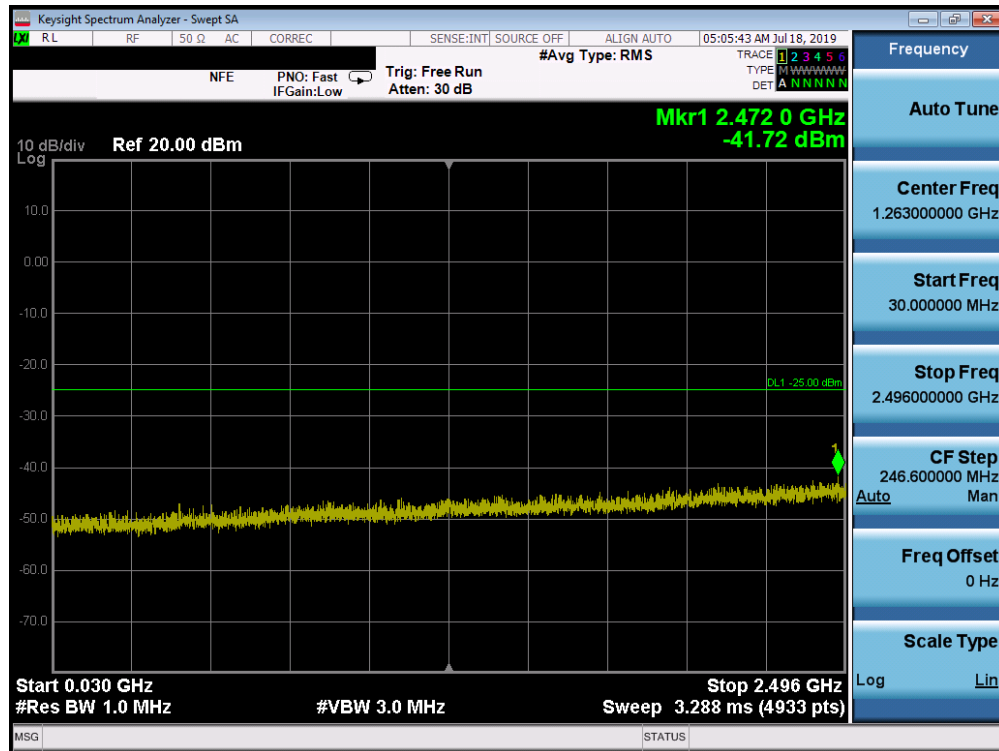


Plot 7-180. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

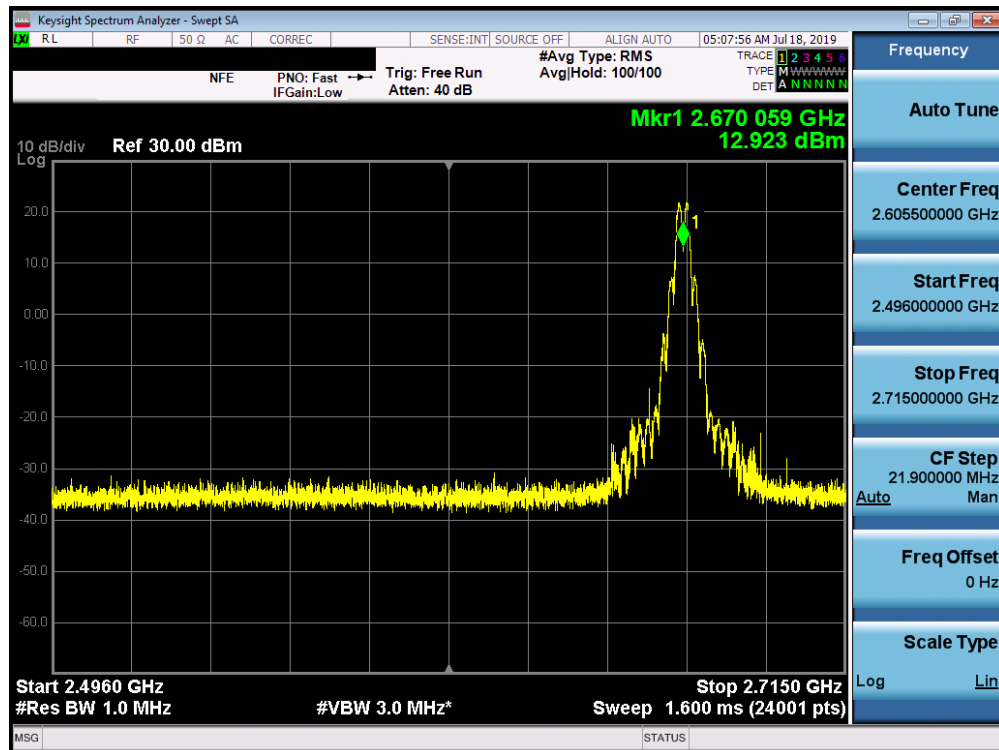


Plot 7-181. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 115 of 154

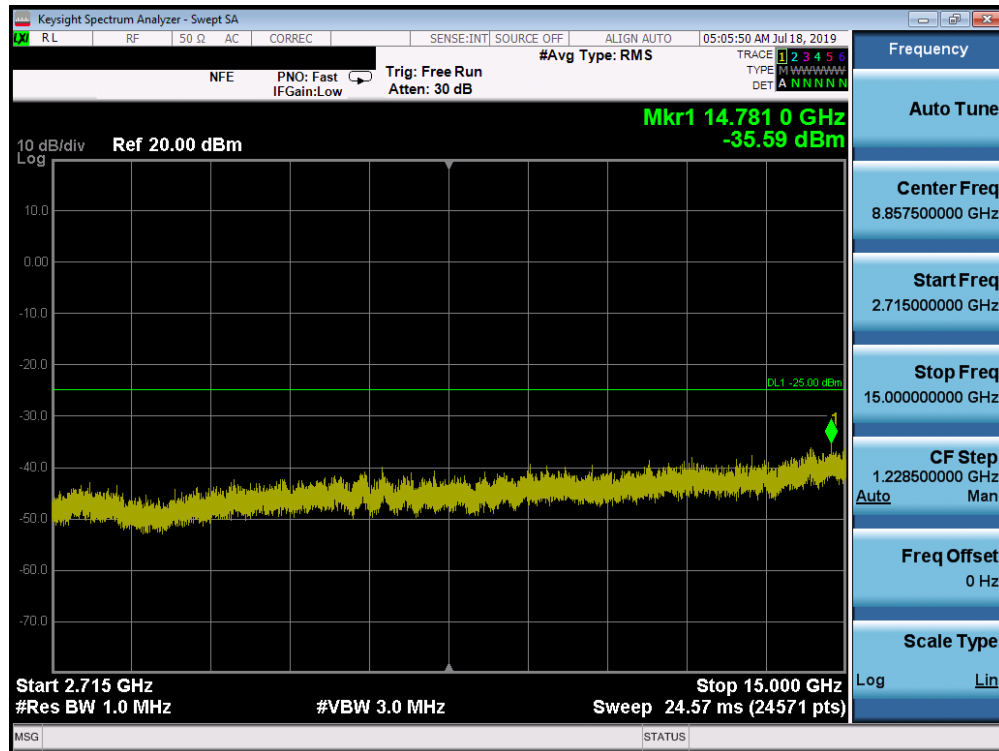


Plot 7-182. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

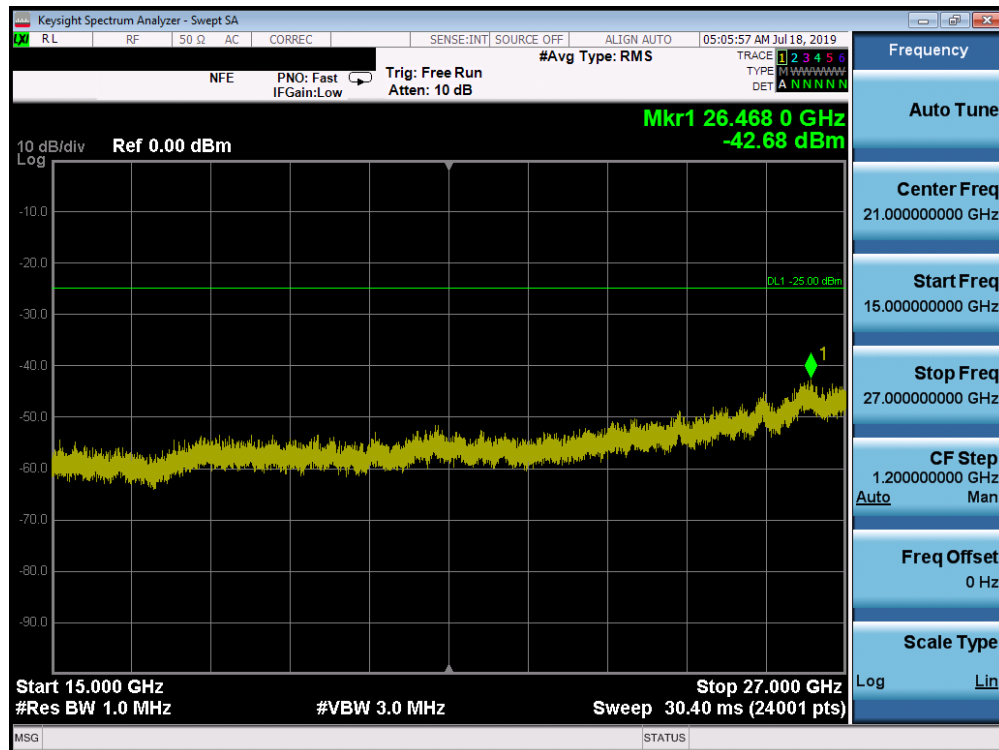


Plot 7-183. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 116 of 154

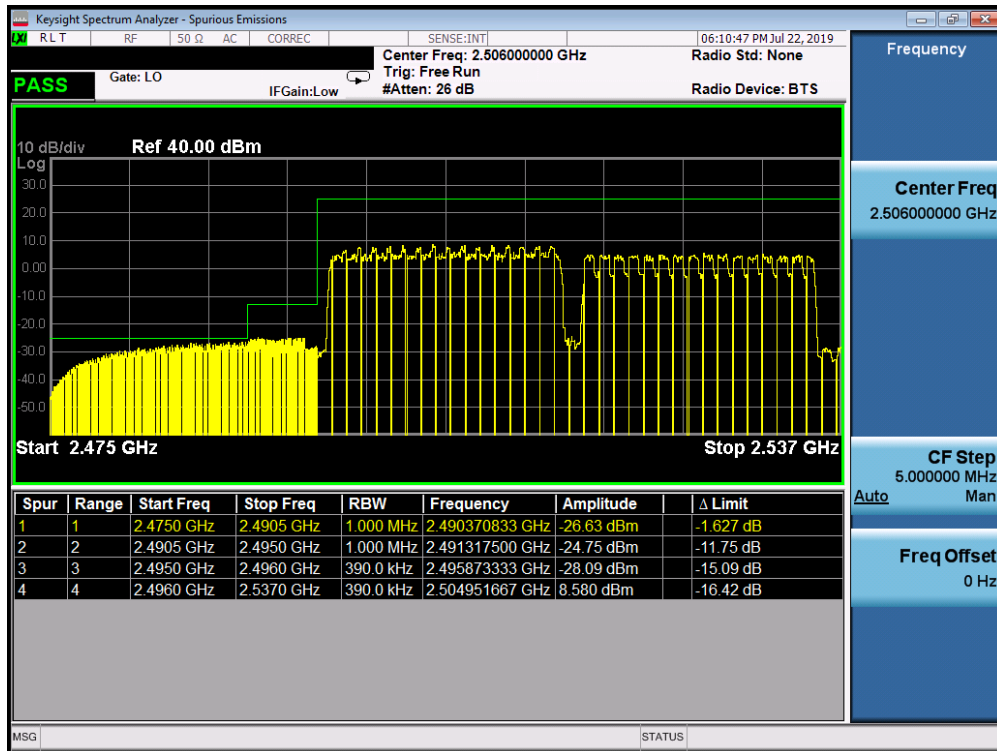


Plot 7-184. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

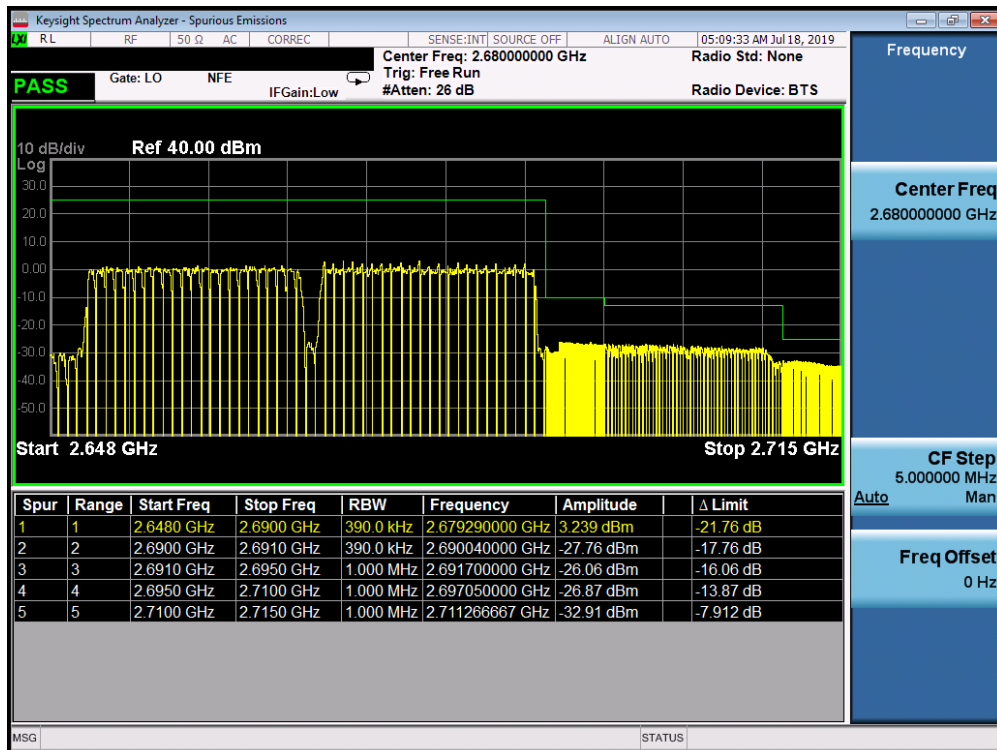


Plot 7-185. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 117 of 154



Plot 7-186. Lower ACP Plot (Band 41- QPSK - PCC: 20 MHz SCC:20 MHz - Full RB)



Plot 7-187. Upper ACP Plot (Band 41- QPSK - PCC: 20 MHz SCC:20 MHz - Full RB)

FCC ID: A3LSMN975JPN	MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 118 of 154

7.7 Radiated Power (ERP/EIRP)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 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 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – 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. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
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". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

FCC ID: A3LSMN975JPN		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.

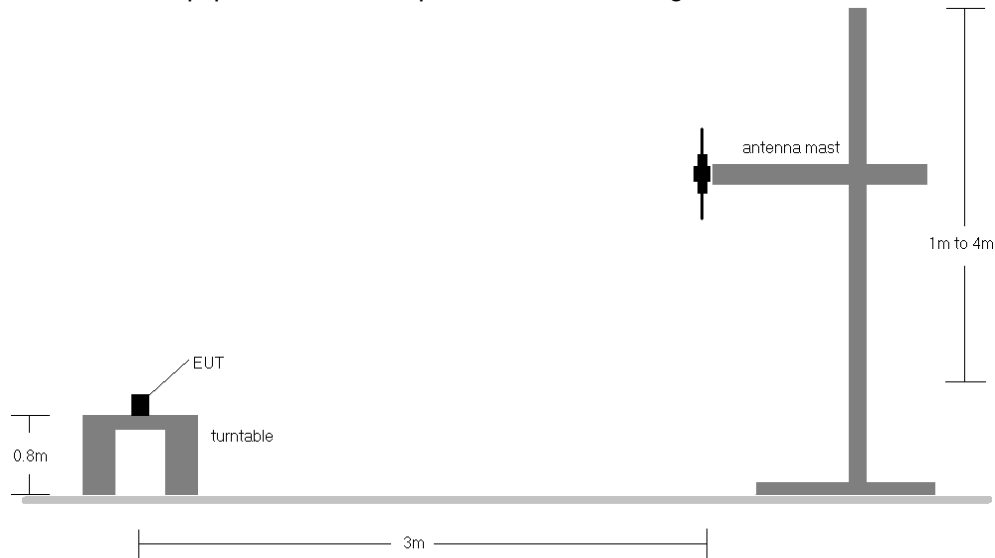


Figure 7-6. Radiated Test Setup <1GHz

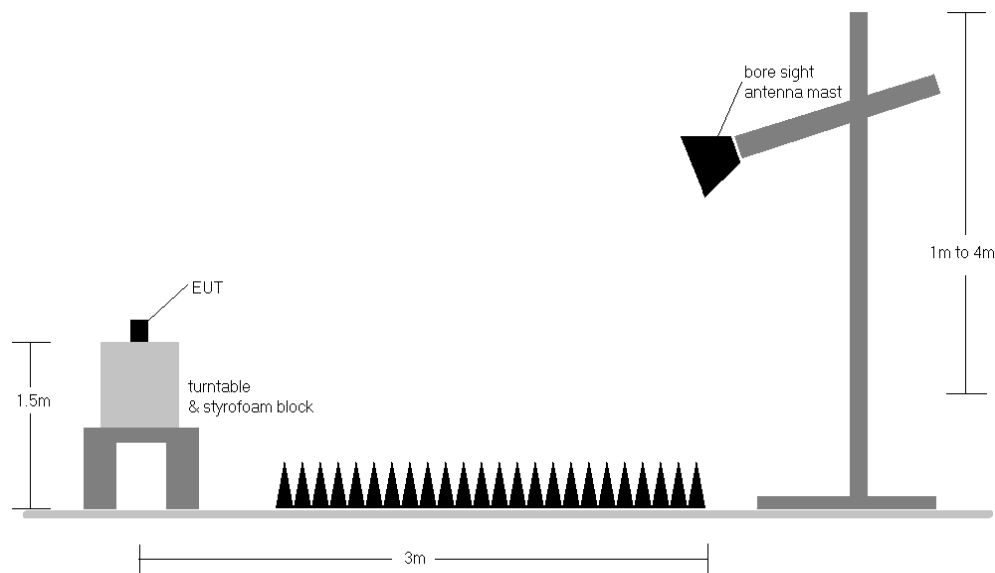


Figure 7-7. Radiated Test Setup >1GHz

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: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 120 of 154

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]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	V	172	234	1 / 0	14.76	4.50	17.11	0.051	34.77	-17.66	19.26	0.084	36.99	-17.73
707.50	1.4	QPSK	V	186	233	1 / 0	13.46	4.60	15.91	0.039	34.77	-18.86	18.06	0.064	36.99	-18.93
715.30	1.4	QPSK	V	160	222	1 / 5	12.49	4.63	14.97	0.031	34.77	-19.80	17.12	0.052	36.99	-19.87
699.70	1.4	16-QAM	V	172	234	1 / 0	13.94	4.50	16.29	0.043	34.77	-18.48	18.44	0.070	36.99	-18.55
699.70	1.4	64-QAM	V	172	234	1 / 0	12.97	4.50	15.32	0.034	34.77	-19.45	17.47	0.056	36.99	-19.52
700.50	3	QPSK	V	100	244	1 / 0	14.02	4.55	16.42	0.044	34.77	-18.35	18.57	0.072	36.99	-18.42
707.50	3	QPSK	V	104	240	1 / 14	13.43	4.60	15.88	0.039	34.77	-18.89	18.03	0.064	36.99	-18.96
714.50	3	QPSK	V	100	222	1 / 14	14.50	4.60	16.95	0.050	34.77	-17.82	19.10	0.081	36.99	-17.89
714.50	3	16-QAM	V	100	222	1 / 14	13.59	4.60	16.04	0.040	34.77	-18.73	18.19	0.066	36.99	-18.80
714.50	3	64-QAM	V	100	222	1 / 0	12.50	4.60	14.95	0.031	34.77	-19.82	17.10	0.051	36.99	-19.89
701.50	5	QPSK	V	169	313	1 / 0	14.54	4.60	16.99	0.050	34.77	-17.78	19.14	0.082	36.99	-17.85
707.50	5	QPSK	V	178	301	1 / 0	14.01	4.60	16.46	0.044	34.77	-18.31	18.61	0.073	36.99	-18.38
713.50	5	QPSK	V	163	299	1 / 24	12.48	4.60	14.93	0.031	34.77	-19.84	17.08	0.051	36.99	-19.91
701.50	5	16-QAM	V	169	313	1 / 0	13.86	4.60	16.31	0.043	34.77	-18.46	18.46	0.070	36.99	-18.53
701.50	5	64-QAM	V	169	313	1 / 0	12.82	4.60	15.27	0.034	34.77	-19.50	17.42	0.055	36.99	-19.57
704.00	10	QPSK	V	100	328	1 / 49	13.71	4.50	16.06	0.040	34.77	-18.71	18.21	0.066	36.99	-18.78
707.50	10	QPSK	V	103	326	1 / 49	14.29	4.60	16.74	0.047	34.77	-18.03	18.89	0.077	36.99	-18.10
711.00	10	QPSK	V	100	328	1 / 49	13.73	4.60	16.18	0.041	34.77	-18.59	18.33	0.068	36.99	-18.66
707.50	10	16-QAM	V	103	326	1 / 49	13.41	4.60	15.86	0.039	34.77	-18.91	18.01	0.063	36.99	-18.98
707.50	10	64-QAM	V	103	326	1 / 49	12.41	4.60	14.86	0.031	34.77	-19.91	17.01	0.050	36.99	-19.98
699.70	1.4	QPSK	H	262	289	1 / 0	14.15	3.65	15.65	0.037	34.77	-19.12	17.80	0.060	36.99	-19.19

Table 7-5. ERP Data (Band 12)

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]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	102	293	1 / 0	13.36	5.80	17.01	0.050	34.77	-17.76	19.16	0.082	36.99	-17.83
782.00	5	QPSK	H	104	295	1 / 0	12.99	5.80	16.64	0.046	34.77	-18.13	18.79	0.076	36.99	-18.20
784.50	5	QPSK	H	101	297	1 / 0	12.75	5.90	16.50	0.045	34.77	-18.27	18.65	0.073	36.99	-18.34
784.50	5	16-QAM	H	101	297	1 / 0	12.52	5.90	16.27	0.042	34.77	-18.50	18.42	0.070	36.99	-18.57
779.50	5	64-QAM	H	102	293	1 / 0	11.63	5.80	15.28	0.034	34.77	-19.49	17.43	0.055	36.99	-19.56
782.00	10	QPSK	H	102	296	1 / 0	13.72	5.80	17.37	0.055	34.77	-17.40	19.52	0.090	36.99	-17.47
782.00	10	16-QAM	H	102	296	1 / 0	12.78	5.80	16.43	0.044	34.77	-18.34	18.58	0.072	36.99	-18.41
782.00	10	64-QAM	H	102	296	1 / 0	11.77	5.80	15.42	0.035	34.77	-19.35	17.57	0.057	36.99	-19.42
782.00	10	QPSK	V	159	271	1 / 0	11.93	5.80	15.58	0.036	34.77	-19.19	17.73	0.059	36.99	-19.26

Table 7-6. ERP Data (Band 13)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 121 of 154

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]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	216	298	1 / 0	11.66	6.70	16.21	0.042	38.45	-22.24
836.50	1.4	QPSK	H	204	284	1 / 5	11.42	6.70	15.97	0.040	38.45	-22.48
848.30	1.4	QPSK	H	207	289	1 / 5	11.57	6.70	16.12	0.041	38.45	-22.33
824.70	1.4	16-QAM	H	216	298	1 / 0	10.80	6.70	15.35	0.034	38.45	-23.10
824.70	1.4	64-QAM	H	216	298	1 / 0	9.79	6.70	14.34	0.027	38.45	-24.11
825.50	3	QPSK	H	209	292	1 / 14	11.42	6.70	15.97	0.040	38.45	-22.48
836.50	3	QPSK	H	200	298	1 / 0	10.84	6.70	15.39	0.035	38.45	-23.06
847.50	3	QPSK	H	211	279	1 / 14	11.49	6.65	15.99	0.040	38.45	-22.46
825.50	3	16-QAM	H	209	292	1 / 0	10.61	6.70	15.16	0.033	38.45	-23.29
825.50	3	64-QAM	H	209	292	1 / 0	9.61	6.70	14.16	0.026	38.45	-24.29
826.50	5	QPSK	H	221	288	1 / 0	11.81	6.70	16.36	0.043	38.45	-22.09
836.50	5	QPSK	H	208	283	1 / 24	11.26	6.70	15.81	0.038	38.45	-22.64
846.50	5	QPSK	H	206	287	1 / 24	11.78	6.60	16.23	0.042	38.45	-22.22
826.50	5	16-QAM	H	221	288	1 / 0	11.01	6.70	15.56	0.036	38.45	-22.89
826.50	5	64-QAM	H	221	288	1 / 0	9.97	6.70	14.52	0.028	38.45	-23.93
829.00	10	QPSK	H	100	301	1 / 0	11.94	6.70	16.49	0.045	38.45	-21.96
836.50	10	QPSK	H	101	299	1 / 0	11.59	6.70	16.14	0.041	38.45	-22.31
844.00	10	QPSK	H	104	300	1 / 0	11.04	6.60	15.49	0.035	38.45	-22.96
844.00	10	16-QAM	H	104	300	1 / 0	11.45	6.60	15.90	0.039	38.45	-22.55
829.00	10	64-QAM	H	100	301	1 / 0	10.44	6.70	14.99	0.032	38.45	-23.46
829.00	10	QPSK	V	133	277	1 / 0	11.35	6.40	15.60	0.036	38.45	-22.85

Table 7-7. ERP Data (Band 5)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 122 of 154

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 [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	V	126	344	1 / 5	11.41	9.35	20.76	0.119	30.00	-9.24
1732.50	1.4	QPSK	V	141	335	1 / 5	12.78	9.20	21.98	0.158	30.00	-8.02
1754.30	1.4	QPSK	V	135	332	1 / 5	13.59	9.09	22.68	0.185	30.00	-7.32
1754.30	1.4	16-QAM	V	135	332	1 / 5	12.62	9.09	21.71	0.148	30.00	-8.29
1754.30	1.4	64-QAM	V	135	332	1 / 5	11.63	9.09	20.72	0.118	30.00	-9.28
1711.50	3	QPSK	V	161	337	1 / 14	11.32	9.34	20.66	0.116	30.00	-9.34
1732.50	3	QPSK	V	151	338	1 / 14	12.74	9.20	21.94	0.156	30.00	-8.06
1753.50	3	QPSK	V	163	347	1 / 14	12.32	9.09	21.41	0.138	30.00	-8.59
1732.50	3	16-QAM	V	151	338	1 / 14	11.96	9.20	21.16	0.130	30.00	-8.84
1732.50	3	64-QAM	V	151	338	1 / 14	10.67	9.20	19.87	0.097	30.00	-10.13
1712.50	5	QPSK	V	132	344	1 / 24	11.12	9.34	20.46	0.111	30.00	-9.54
1732.50	5	QPSK	V	147	335	1 / 24	12.91	9.20	22.11	0.162	30.00	-7.89
1752.50	5	QPSK	V	136	335	1 / 24	13.65	9.08	22.73	0.188	30.00	-7.27
1752.50	5	16-QAM	V	136	335	1 / 24	12.73	9.08	21.81	0.152	30.00	-8.19
1752.50	5	64-QAM	V	136	335	1 / 24	11.81	9.08	20.89	0.123	30.00	-9.11
1715.00	10	QPSK	V	194	344	1 / 0	12.11	9.32	21.43	0.139	30.00	-8.57
1732.50	10	QPSK	V	180	340	1 / 49	12.08	9.20	21.28	0.134	30.00	-8.72
1750.00	10	QPSK	V	185	345	1 / 49	12.26	9.07	21.33	0.136	30.00	-8.67
1715.00	10	16-QAM	V	194	344	1 / 0	11.29	9.32	20.61	0.115	30.00	-9.39
1750.00	10	64-QAM	V	185	345	1 / 49	10.25	9.07	19.32	0.086	30.00	-10.68
1717.50	15	QPSK	V	147	332	1 / 74	12.09	9.30	21.39	0.138	30.00	-8.61
1732.50	15	QPSK	V	141	336	1 / 74	13.47	9.20	22.67	0.185	30.00	-7.33
1747.50	15	QPSK	V	135	341	1 / 74	13.74	9.09	22.83	0.192	30.00	-7.17
1747.50	15	16-QAM	V	135	341	1 / 74	12.88	9.09	21.97	0.157	30.00	-8.03
1747.50	15	64-QAM	V	135	341	1 / 74	11.86	9.09	20.95	0.124	30.00	-9.05
1720.00	20	QPSK	V	114	338	1 / 99	13.84	9.28	23.12	0.205	30.00	-6.88
1732.50	20	QPSK	V	114	342	1 / 99	13.91	9.20	23.11	0.204	30.00	-6.89
1745.00	20	QPSK	V	100	338	1 / 99	14.85	9.11	23.96	0.249	30.00	-6.04
1745.00	20	16-QAM	V	100	338	1 / 99	13.93	9.11	23.04	0.201	30.00	-6.96
1745.00	20	64-QAM	V	100	338	1 / 99	13.10	9.11	22.21	0.166	30.00	-7.79
1745.00	20	QPSK	H	102	14	1 / 99	13.21	9.23	22.44	0.175	30.00	-7.56

Table 7-8. EIRP Data (Band 4)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 123 of 154

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 [Watts]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	H	102	228	1 / 24	12.94	9.43	22.37	0.173	33.01	-10.64
2593.00	5	QPSK	H	100	232	1 / 24	12.76	9.55	22.31	0.170	33.01	-10.70
2687.50	5	QPSK	H	100	230	1 / 24	12.86	9.82	22.68	0.185	33.01	-10.33
2687.50	5	16-QAM	H	100	230	1 / 0	12.20	9.82	22.02	0.159	33.01	-10.99
2687.50	5	64-QAM	H	100	230	1 / 0	11.37	9.82	21.19	0.131	33.01	-11.82
2501.00	10	QPSK	H	100	228	1 / 49	13.01	9.43	22.44	0.175	33.01	-10.57
2593.00	10	QPSK	H	101	224	1 / 49	13.33	9.55	22.88	0.194	33.01	-10.13
2685.00	10	QPSK	H	102	235	1 / 49	12.40	9.82	22.22	0.167	33.01	-10.79
2593.00	10	16-QAM	H	101	224	1 / 49	12.31	9.55	21.86	0.154	33.01	-11.15
2593.00	10	64-QAM	H	101	224	1 / 49	11.37	9.55	20.92	0.124	33.01	-12.09
2503.50	15	QPSK	H	103	231	1 / 74	12.73	9.43	22.16	0.164	33.01	-10.85
2593.00	15	QPSK	H	100	230	1 / 0	12.82	9.55	22.37	0.173	33.01	-10.64
2682.50	15	QPSK	H	100	233	1 / 74	13.04	9.83	22.87	0.194	33.01	-10.14
2682.50	15	16-QAM	H	100	233	1 / 0	11.73	9.83	21.56	0.143	33.01	-11.45
2682.50	15	64-QAM	H	100	233	1 / 74	11.39	9.83	21.22	0.132	33.01	-11.79
2506.00	20	QPSK	H	100	229	1 / 0	12.85	9.42	22.27	0.169	33.01	-10.74
2593.00	20	QPSK	H	100	226	1 / 99	12.71	9.55	22.26	0.168	33.01	-10.75
2680.00	20	QPSK	H	100	223	1 / 99	12.80	9.83	22.63	0.183	33.01	-10.38
2680.00	20	16-QAM	H	100	223	1 / 99	11.88	9.83	21.71	0.148	33.01	-11.30
2593.00	20	64-QAM	H	100	226	1 / 0	11.23	9.55	20.78	0.120	33.01	-12.23
2593.00	10	QPSK	V	376	279	1 / 49	12.39	9.68	22.07	0.161	33.01	-10.94

Table 7-9. EIRP Data (Band 41)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 124 of 154

7.8 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 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.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – 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: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 125 of 154

Test Setup

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

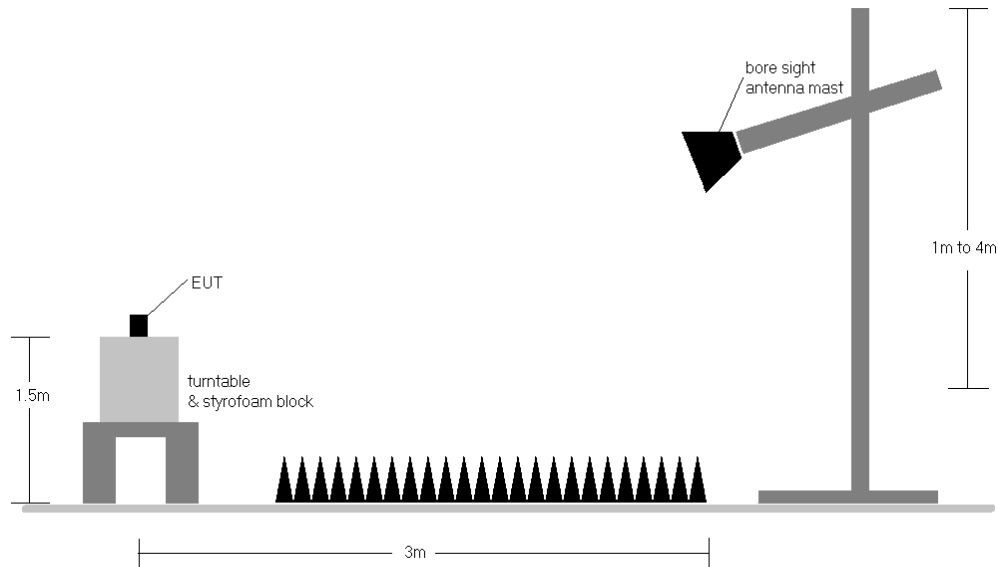


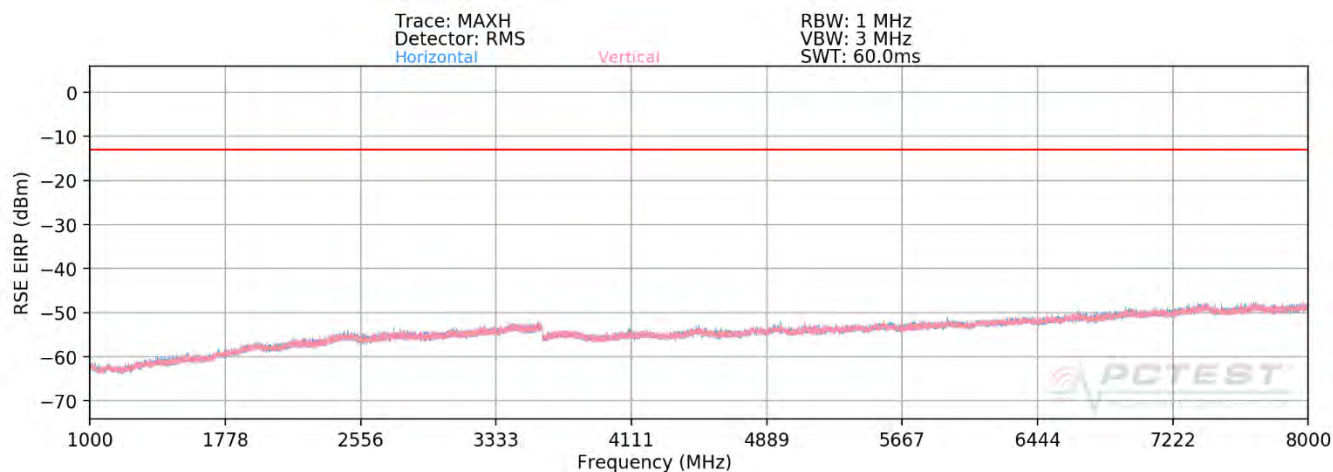
Figure 7-8. Test Instrument & Measurement Setup

Test Notes

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

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 126 of 154

Band 12



Plot 7-188. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY: 704.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 10.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

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]	Margin [dB]
1408.00	H	-	-	-73.57	2.30	-71.27	-58.3
2112.00	H	179	251	-71.54	3.12	-68.42	-55.4
2816.00	H	-	-	-71.87	4.82	-67.05	-54.1
3520.00	H	-	-	-71.48	6.48	-65.00	-52.0
4224.00	H	-	-	-71.47	7.89	-63.58	-50.6

Table 7-10. Radiated Spurious Data (Band 12 – Low Channel)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 127 of 154

OPERATING FREQUENCY: 707.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]	Margin [dB]
1415.00	H	149	211	-71.81	2.39	-69.42	-56.4
2122.50	H	217	295	-71.65	3.14	-68.51	-55.5
2830.00	H	-	-	-71.95	4.87	-67.09	-54.1
3537.50	H	-	-	-71.46	6.45	-65.00	-52.0
4245.00	H	-	-	-71.65	7.98	-63.67	-50.7

Table 7-11. Radiated Spurious Data (Band 12 – Mid Channel)

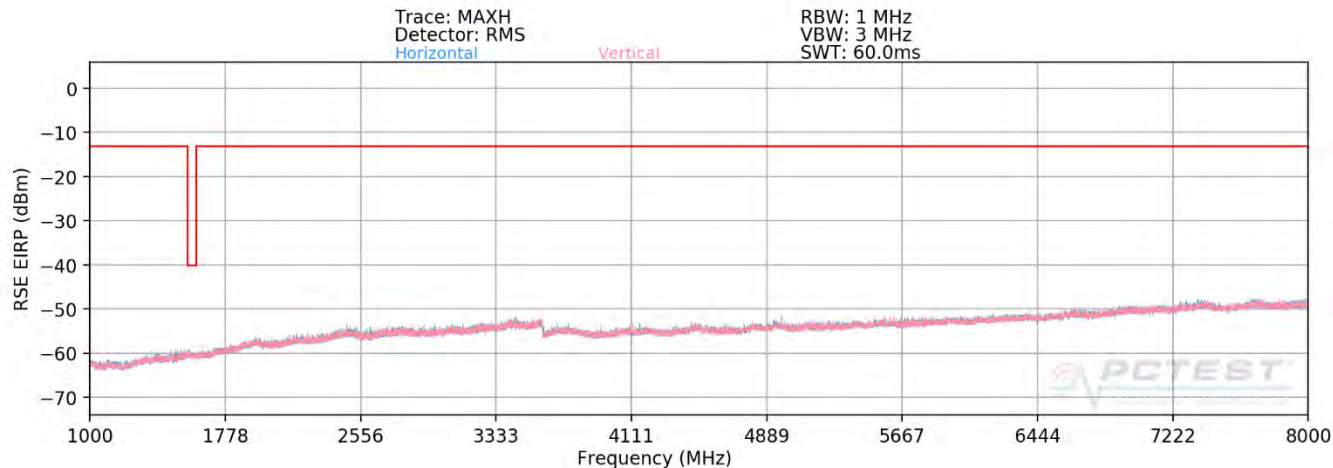
OPERATING FREQUENCY: 711.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]	Margin [dB]
1422.00	H	147	204	-71.65	2.53	-69.12	-56.1
2133.00	H	102	297	-71.53	3.11	-68.43	-55.4
2844.00	H	-	-	-72.08	4.91	-67.18	-54.2
3555.00	H	-	-	-71.18	6.46	-64.72	-51.7
4266.00	H	-	-	-71.90	8.00	-63.91	-50.9

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

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 128 of 154

Band 13



Plot 7-189. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY: 782.00 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 10.0 MHz

DISTANCE: 3 meters

LIMIT: -13 dBm

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]	Margin [dB]
2346.00	V	113	177	-46.47	3.64	-42.84	-29.8
3128.00	V	-	-	-57.80	5.73	-52.06	-39.1
3910.00	V	-	-	-58.91	7.25	-51.66	-38.7
4692.00	V	-	-	-59.06	8.47	-50.59	-37.6

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

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 129 of 154

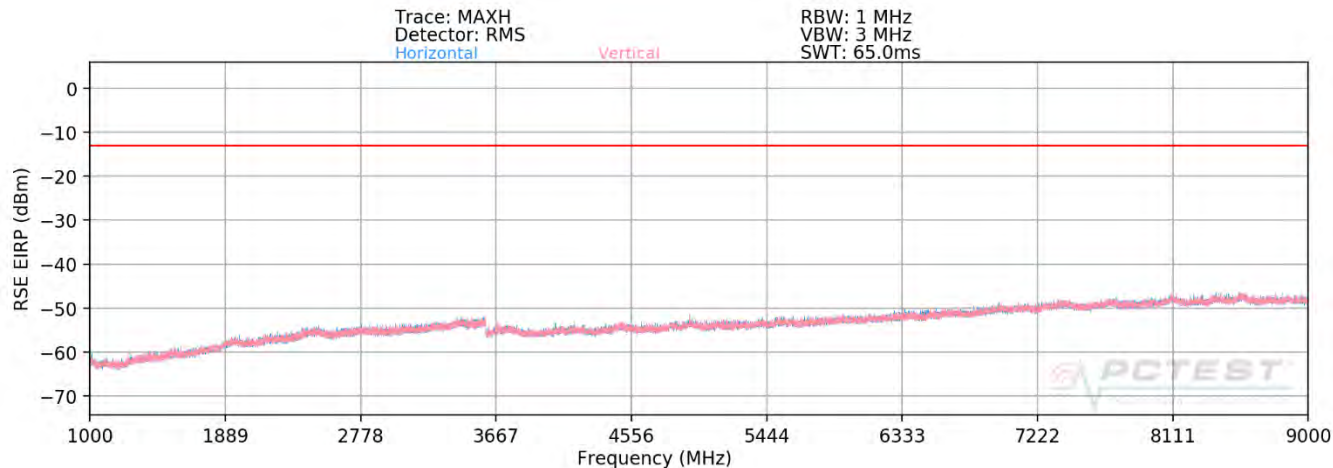
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	V	-	-	-60.06	2.93	-57.12	-17.1

Table 7-14. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 130 of 154

Band 5



Plot 7-190. Radiated Spurious Plot above 1GHz (Band 5)

OPERATING FREQUENCY: 829.00 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 10.0 MHz

DISTANCE: 3 meters

LIMIT: -13 dBm

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]	Margin [dB]
1658.00	H	-	-	-74.50	3.12	-71.38	-58.4
2487.00	H	-	-	-72.33	3.87	-68.46	-55.5
3316.00	H	-	-	-71.33	6.01	-65.32	-52.3

Table 7-15. Radiated Spurious Data (Band 5 – Low Channel)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 131 of 154

OPERATING FREQUENCY: 836.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]	Margin [dB]
1673.00	H	145	142	-74.14	3.10	-71.04	-58.0
2509.50	H	-	-	-72.53	4.02	-68.51	-55.5
3346.00	H	-	-	-71.58	6.03	-65.55	-52.6
4182.50	H	-	-	-72.67	7.79	-64.88	-51.9

Table 7-16. Radiated Spurious Data (Band 5 – Mid Channel)

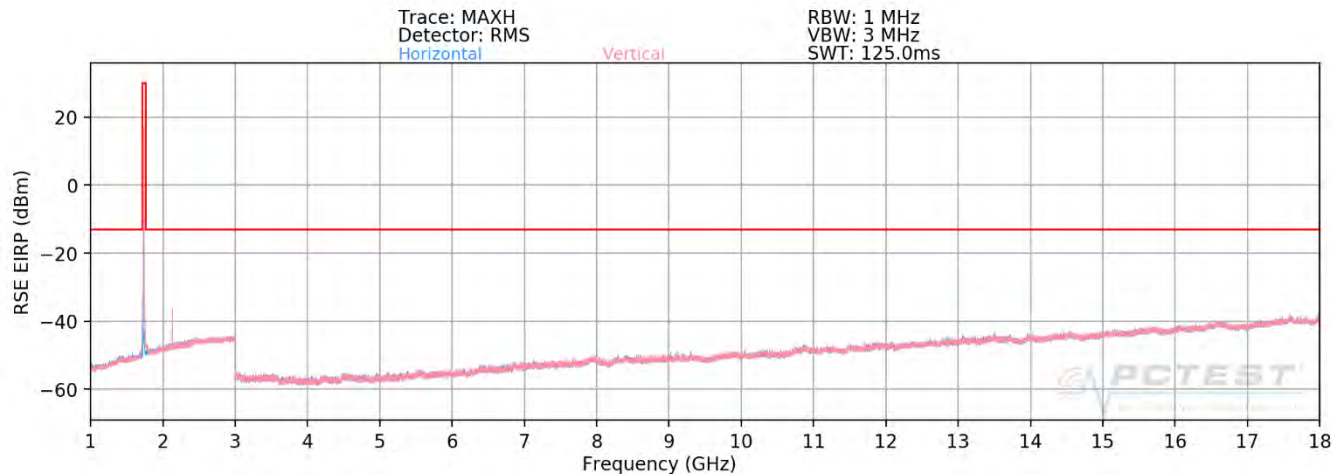
OPERATING FREQUENCY: 844.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]	Margin [dB]
1688.00	H	-	-	-77.30	3.18	-74.12	-61.1
2532.00	H	-	-	-71.82	4.10	-67.73	-54.7
3376.00	H	-	-	-71.34	6.15	-65.19	-52.2

Table 7-17. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 132 of 154

Band 4



Plot 7-191. Radiated Spurious Plot above 1GHz (Band 4)

OPERATING FREQUENCY: 1720.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

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]	Margin [dB]
3440.00	H	-	-	-66.63	6.28	-60.35	-47.4
5160.00	H	321	27	-62.64	8.98	-53.66	-40.7
6880.00	H	-	-	-66.12	9.42	-56.70	-43.7
8600.00	H	-	-	-65.11	9.62	-55.49	-42.5
10320.00	H	166	10	-60.82	9.56	-51.26	-38.3
12040.00	H	-	-	-60.04	9.24	-50.80	-37.8
13760.00	H	-	-	-57.38	8.72	-48.66	-35.7

Table 7-18. Radiated Spurious Data (Band 4 – Low Channel)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset			Page 133 of 154

OPERATING FREQUENCY: 1732.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]	Margin [dB]
3465.00	H	-	-	-67.02	6.35	-60.66	-47.7
5197.50	H	346	62	-60.10	9.05	-51.05	-38.1
6930.00	H	-	-	-65.84	9.38	-56.46	-43.5
8662.50	H	-	-	-64.52	9.58	-54.94	-41.9
10395.00	H	102	356	-59.37	9.48	-49.89	-36.9
12127.50	H	-	-	-59.70	9.15	-50.55	-37.5
13860.00	H	-	-	-58.00	8.74	-49.26	-36.3

Table 7-19. Radiated Spurious Data (Band 4 – Mid Channel)

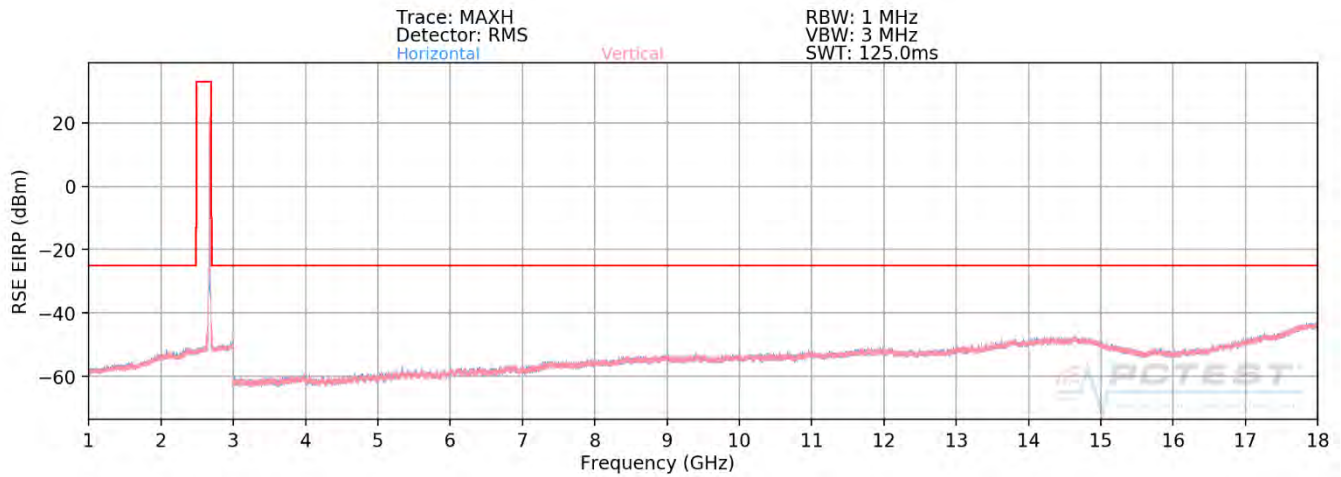
OPERATING FREQUENCY: 1745.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]	Margin [dB]
3490.00	H	-	-	-66.96	6.47	-60.49	-47.5
5235.00	H	286	27	-54.26	8.97	-45.29	-32.3
6980.00	H	-	-	-66.09	9.23	-56.86	-43.9
8725.00	H	250	336	-64.17	9.59	-54.58	-41.6
10470.00	H	105	11	-61.13	9.43	-51.70	-38.7
12215.00	H	-	-	-60.05	9.17	-50.88	-37.9
13960.00	H	-	-	-57.34	8.59	-48.76	-35.8

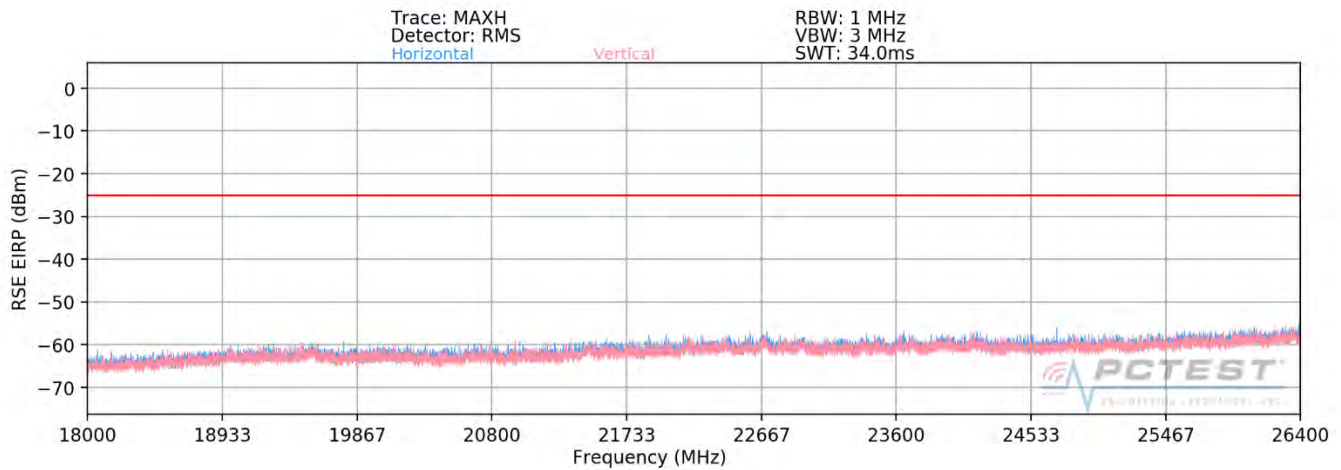
Table 7-20. Radiated Spurious Data (Band 4 – High Channel)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 134 of 154

Band 41



Plot 7-192. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



Plot 7-193. Radiated Spurious Plot 18GHz - 26.5GHz (Band 41)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 135 of 154

OPERATING FREQUENCY: 2510.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

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]	Margin [dB]
5020.00	V	256	31	-62.56	8.78	-53.77	-28.8
7530.00	V	-	-	-62.96	9.31	-53.65	-28.7
10040.00	V	100	356	-56.66	9.78	-46.88	-21.9
12550.00	V	-	-	-57.23	8.80	-48.43	-23.4
15060.00	V	-	-	-54.84	8.89	-45.96	-21.0

Table 7-21. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

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]	Margin [dB]
5186.00	V	108	9	-56.67	9.03	-47.65	-22.6
7779.00	V	-	-	-63.03	9.29	-53.74	-28.7
10372.00	V	302	341	-54.81	9.50	-45.31	-20.3
12965.00	V	-	-	-56.50	8.75	-47.74	-22.7
15558.00	V	-	-	-54.13	8.47	-45.66	-20.7

Table 7-22. Radiated Spurious Data (Band 41 – Mid Channel)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 136 of 154

OPERATING FREQUENCY: 2680.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

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]	Margin [dB]
5360.00	V	110	43	-62.32	8.99	-53.33	-28.3
8040.00	V	-	-	-62.67	9.35	-53.32	-28.3
10720.00	V	291	342	-57.88	9.39	-48.49	-23.5
13400.00	V	-	-	-56.32	8.67	-47.65	-22.6
16080.00	V	-	-	-52.67	8.46	-44.21	-19.2

Table 7-23. Radiated Spurious Data (Band 41 – High Channel)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 137 of 154

7.9 Uplink Carrier Aggregation Radiated Measurements

§2.1053, §27.53(m)

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. No. of sweep points $\geq 2 \times$ span / RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. The trace was allowed to stabilize

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset		Page 138 of 154

Test Setup

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

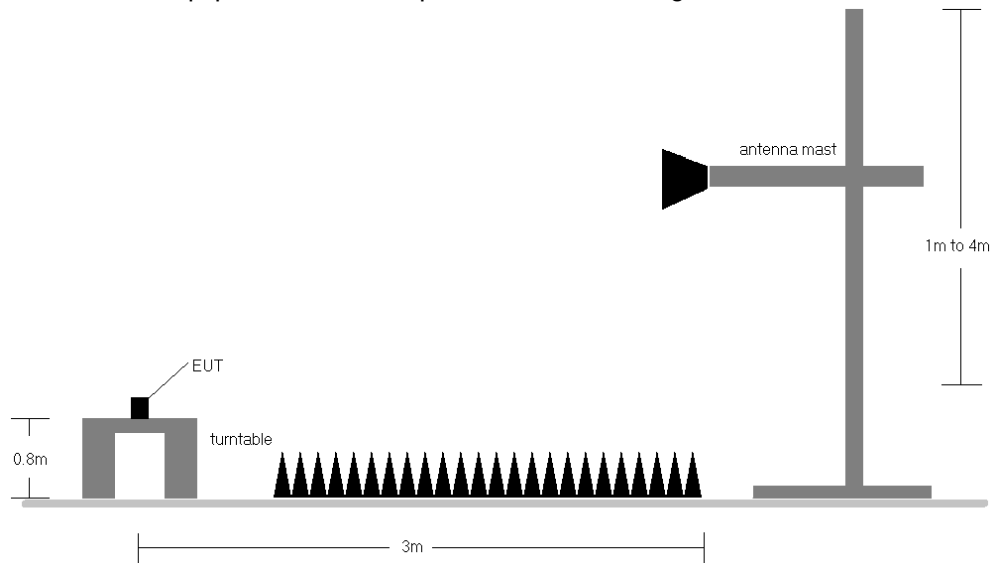


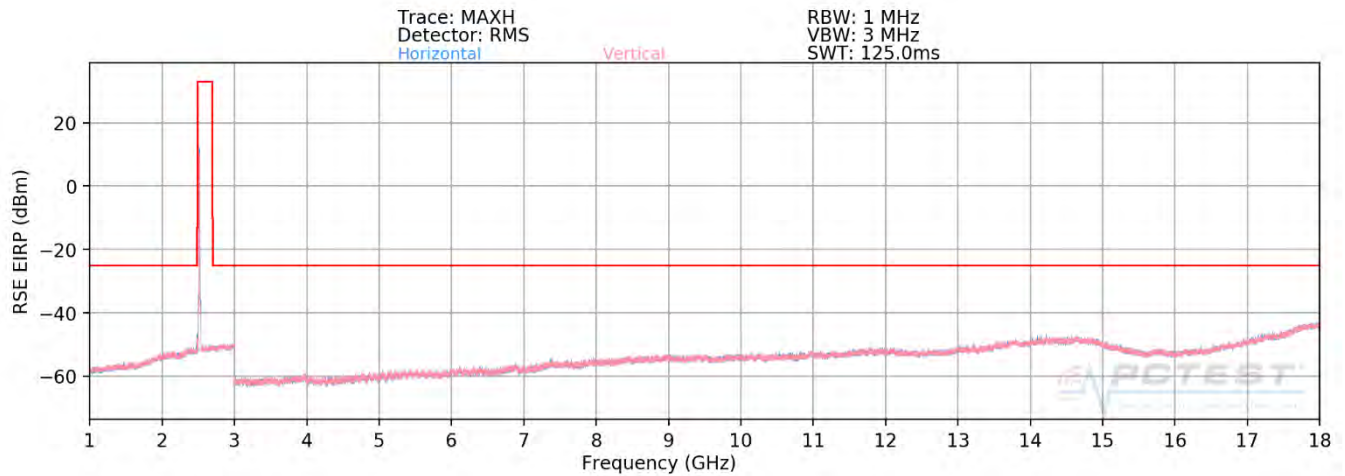
Figure 7-9. Test Instrument & Measurement Setup

Test Notes

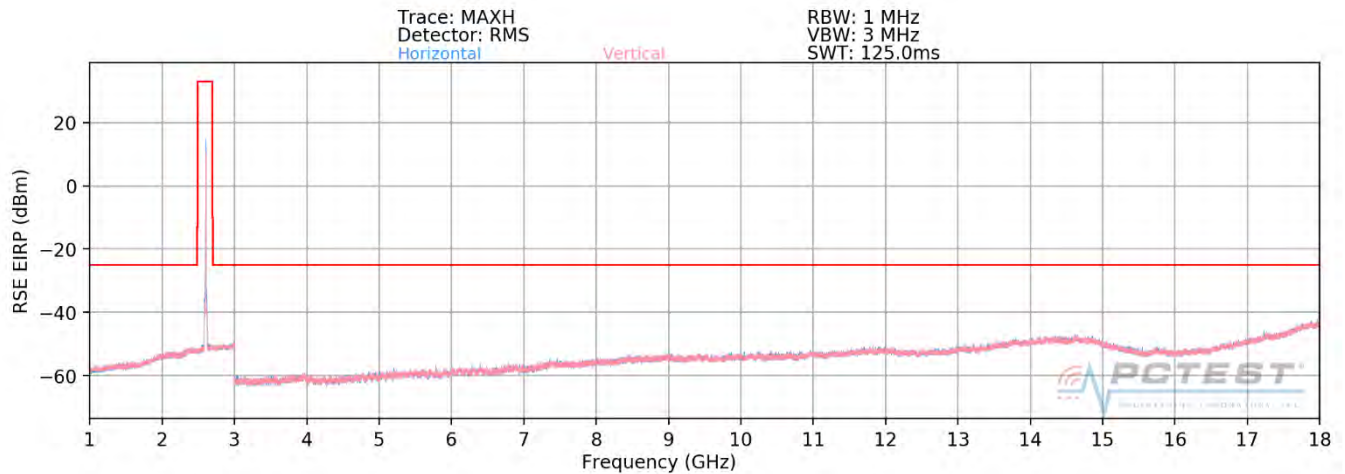
- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) 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.
- 6) No significant emissions were found as a result of two uplink carriers operating contiguously.

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 139 of 154

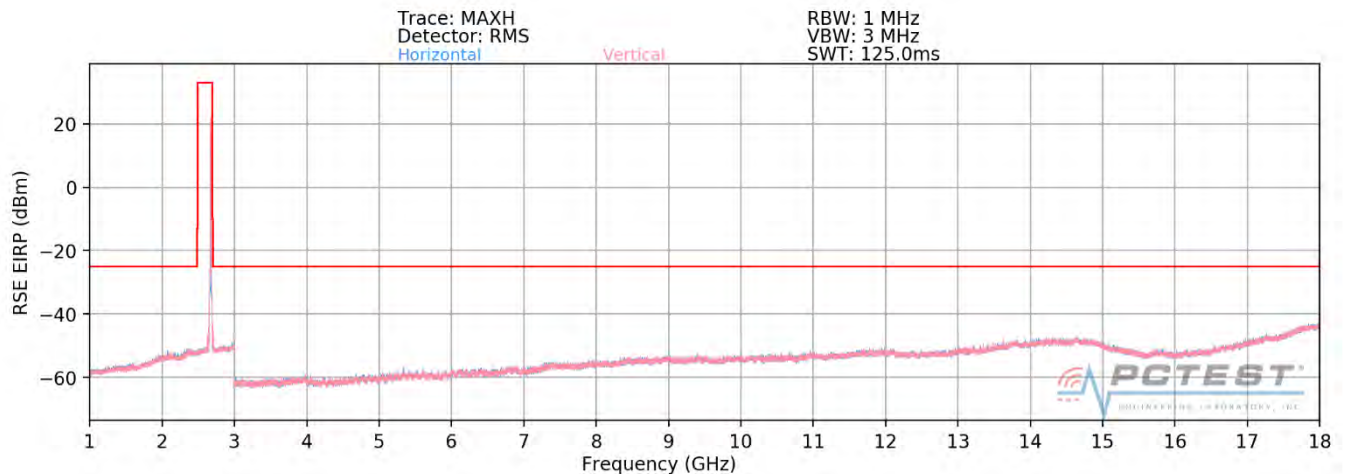
ULCA Band 41



Plot 7-194. Radiated Spurious Plot above 1GHz (ULCA Band 41 Low Channel – PCC/SCC: 1RB)

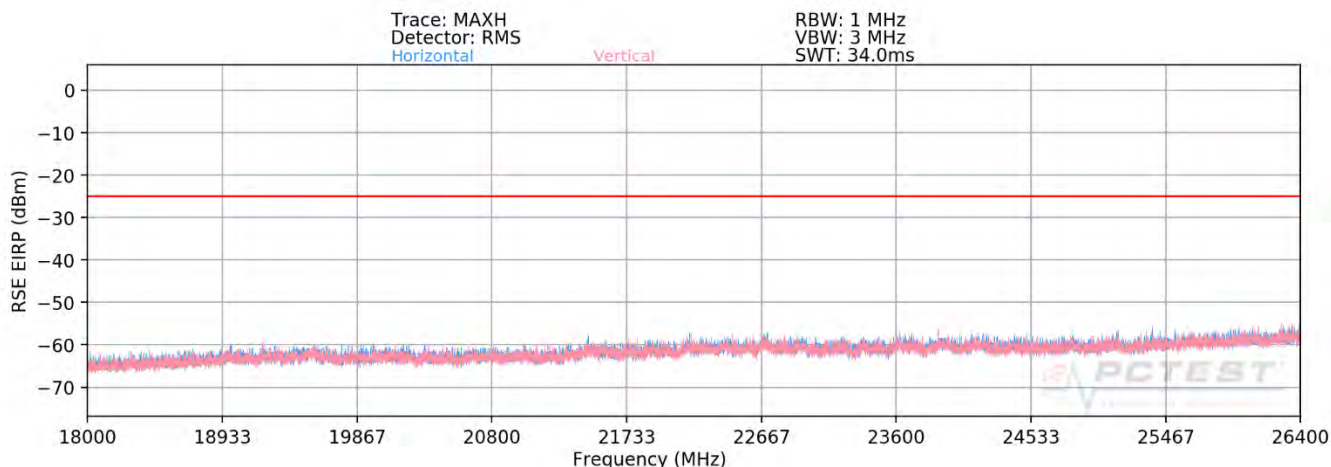


Plot 7-195. Radiated Spurious Plot above 1GHz (ULCA Band 41 Mid Channel – PCC/SCC: 1RB)



Plot 7-196. Radiated Spurious Plot above GHz (ULCA Band 41 High Channel – PCC/SCC: 1RB)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 140 of 154



Plot 7-197. Radiated Spurious Plot 18GHz – 26.5GHz (ULCA Band 41)

OPERATING FREQUENCY (PCC): 2506.00 MHz
 OPERATING FREQUENCY (SCC): 2525.80 MHz
 CHANNEL (PCC): 39750
 CHANNEL (SCC): 39948
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

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]	Margin [dB]
5012.00	H	116	3	-67.48	8.75	-58.73	-58.7
7518.00	H	114	50	-65.63	9.32	-56.32	-56.3
10024.00	H	264	349	-60.86	9.80	-51.06	-51.1
12530.00	H	-	-	-63.22	8.87	-54.35	-54.4
15036.00	H	-	-	-60.05	8.84	-51.20	-51.2

Table 7-24. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0- Low Channel)

FCC ID: A3LSMN975JPN	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1907090122-03.A3L	Test Dates: 7/15 - 8/9/2019	EUT Type: Portable Handset	Page 141 of 154

OPERATING FREQUENCY (PCC): 2593.00 MHz
 OPERATING FREQUENCY (SCC): 2612.80 MHz
 CHANNEL (PCC): 40620
 CHANNEL (SCC): 40818
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

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]	Margin [dB]
5186.00	H	116	45	-64.51	9.03	-55.49	-55.5
7779.00	H	111	4	-61.95	9.29	-52.66	-52.7
10372.00	H	260	49	-56.33	9.50	-46.83	-46.8
12965.00	H	-	-	-62.20	8.75	-53.45	-53.4
15558.00	H	-	-	-62.41	8.47	-53.94	-53.9

Table 7-25. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0- Mid Channel)

OPERATING FREQUENCY (PCC): 2680.00 MHz
 OPERATING FREQUENCY (SCC): 2660.20 MHz
 CHANNEL (PCC): 41490
 CHANNEL (SCC): 41292
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

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]	Margin [dB]
5360.00	H	123	350	-64.14	8.99	-55.15	-55.2
8040.00	H	120	357	-64.37	9.35	-55.01	-55.0
10720.00	H	235	64	-62.75	9.39	-53.36	-53.4
13400.00	H	-	-	-61.32	8.67	-52.65	-52.6
16080.00	H	-	-	-61.83	8.46	-53.38	-53.4

Table 7-26. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99- High Channel)

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7.10 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. 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 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-E-2016

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

OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23790
 REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	707,499,766	-234	-0.0000331
100 %		- 20	707,499,798	-202	-0.0000286
100 %		- 10	707,499,635	-365	-0.0000516
100 %		0	707,500,038	38	0.0000054
100 %		+ 10	707,500,094	94	0.0000133
100 %		+ 20	707,500,247	247	0.0000349
100 %		+ 30	707,499,850	-150	-0.0000212
100 %		+ 40	707,500,134	134	0.0000189
100 %		+ 50	707,499,791	-209	-0.0000295
BATT. ENDPOINT	3.38	+ 20	707,500,237	237	0.0000335

Table 7-27. Frequency Stability Data (Band 12)

Note:

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

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Band 12 Frequency Stability Measurements

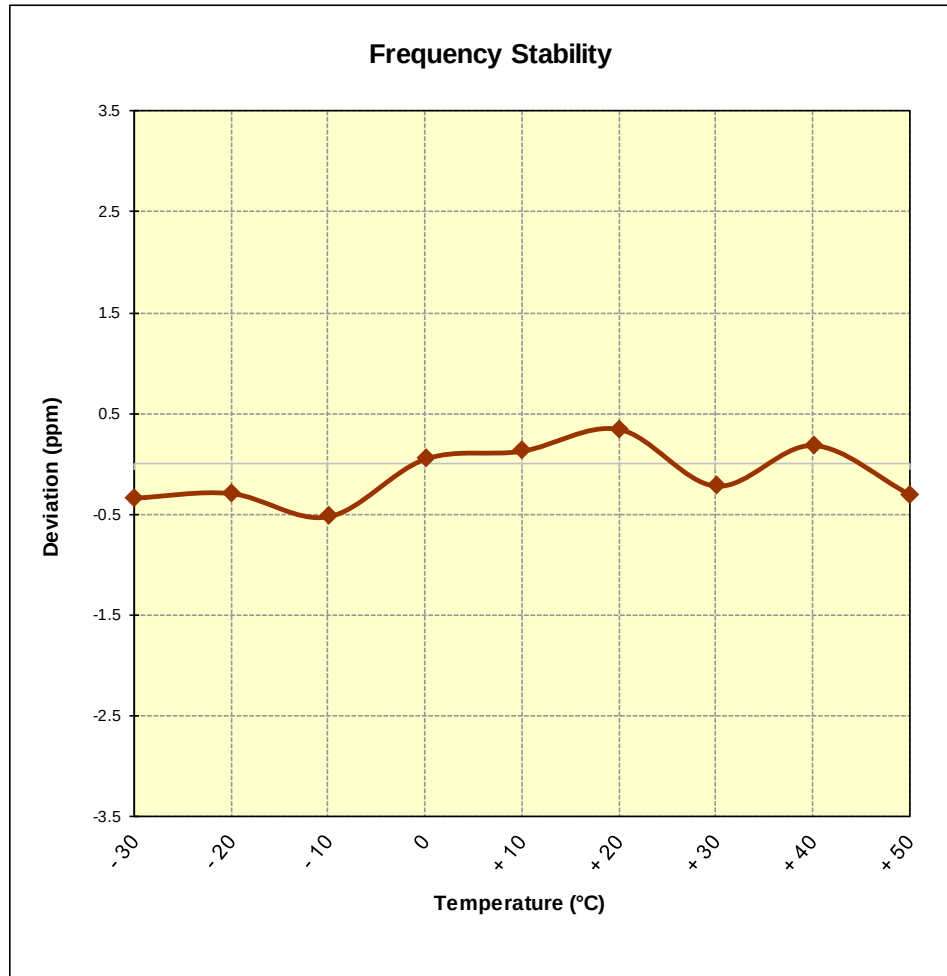


Figure 7-10. Frequency Stability Graph (Band 12)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz
 CHANNEL: 23230
 REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	782,000,479	479	0.0000613
100 %		- 20	782,000,140	140	0.0000179
100 %		- 10	781,999,745	-255	-0.0000326
100 %		0	782,000,059	59	0.0000075
100 %		+ 10	781,999,943	-57	-0.0000073
100 %		+ 20	781,999,744	-256	-0.0000327
100 %		+ 30	781,999,934	-66	-0.0000084
100 %		+ 40	782,000,038	38	0.0000049
100 %		+ 50	782,000,087	87	0.0000111
BATT. ENDPOINT	3.38	+ 20	781,999,797	-203	-0.0000260

Table 7-28. 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.

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 13 Frequency Stability Measurements

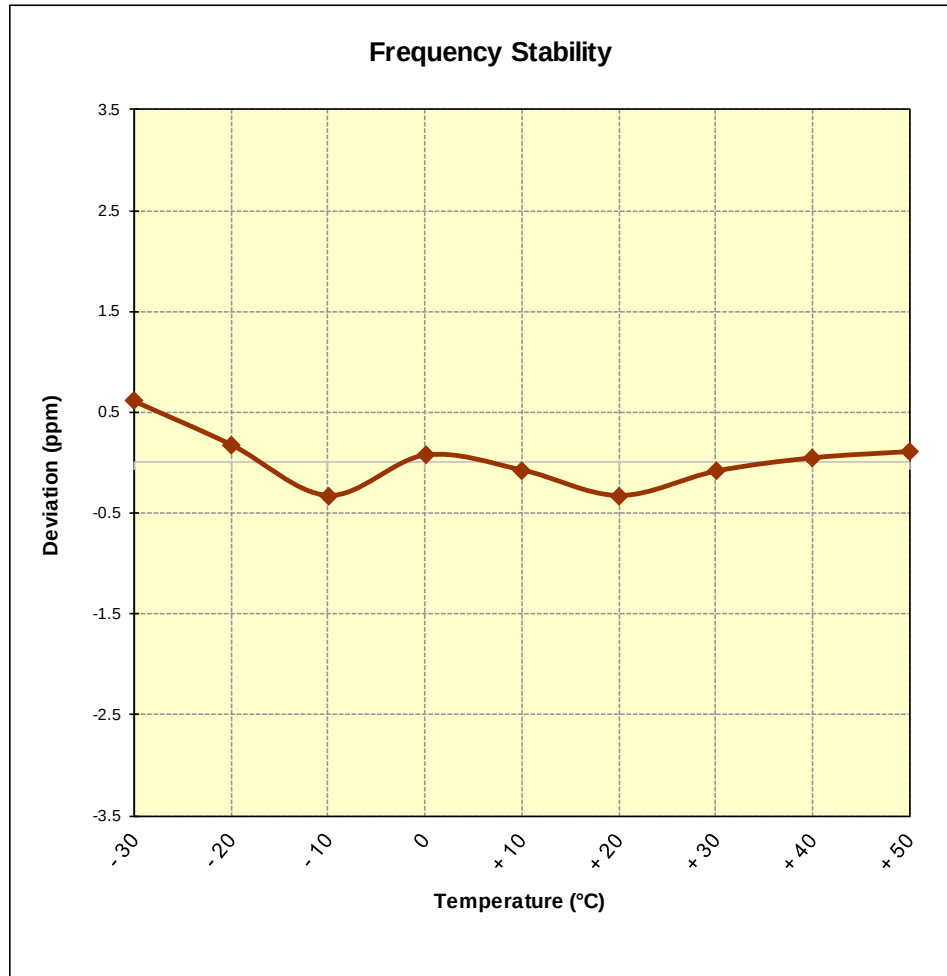


Figure 7-11. Frequency Stability Graph (Band 13)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 5 Frequency Stability Measurements

OPERATING FREQUENCY: 836,500,000 Hz
 CHANNEL: 20525
 REFERENCE VOLTAGE: 4.25 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	836,499,946	-54	-0.0000065
100 %		- 20	836,500,024	24	0.0000029
100 %		- 10	836,499,888	-112	-0.0000134
100 %		0	836,500,147	147	0.0000176
100 %		+ 10	836,500,391	391	0.0000467
100 %		+ 20	836,500,269	269	0.0000322
100 %		+ 30	836,500,136	136	0.0000163
100 %		+ 40	836,499,938	-62	-0.0000074
100 %		+ 50	836,499,909	-91	-0.0000109
BATT. ENDPOINT	3.38	+ 20	836,499,962	-38	-0.0000045

Table 7-29. Frequency Stability Data (Band 5)

FCC ID: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 5 Frequency Stability Measurements

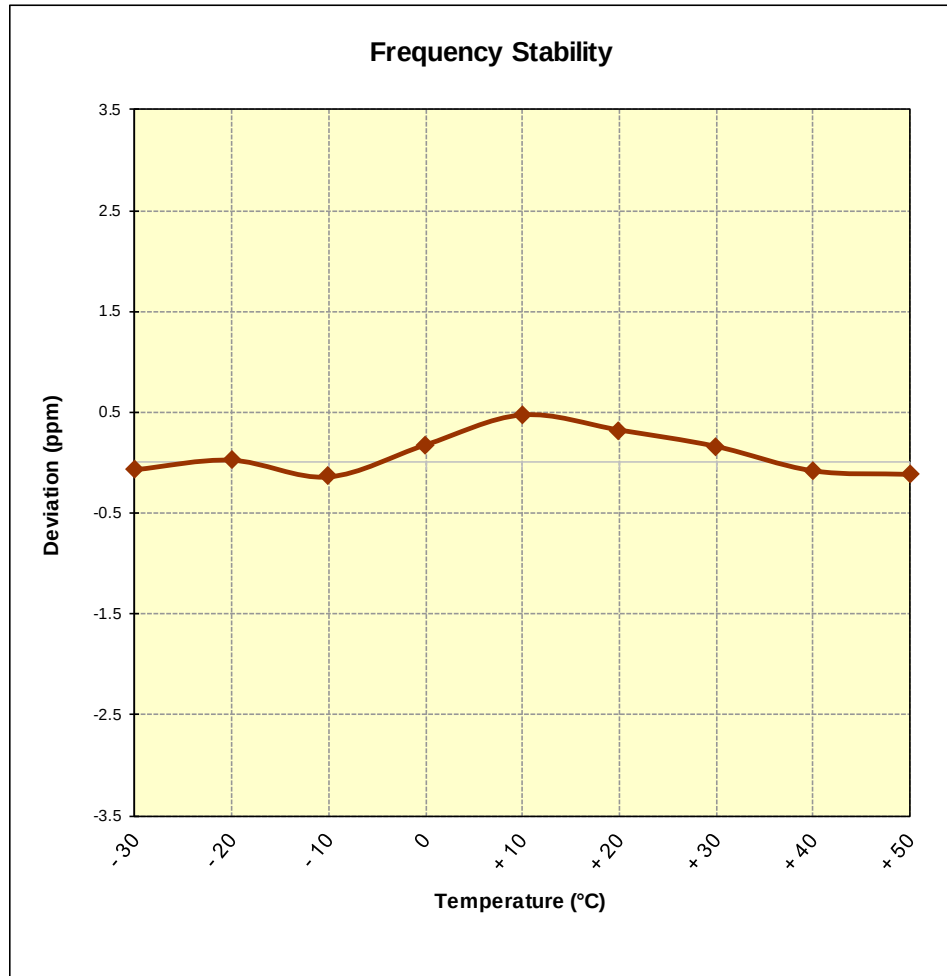


Figure 7-12. Frequency Stability Graph (Band 5)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 4 Frequency Stability Measurements

OPERATING FREQUENCY: 1,732,500,000 Hz
 CHANNEL: 20175
 REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	1,732,499,994	-6	-0.0000003
100 %		- 20	1,732,500,107	107	0.0000062
100 %		- 10	1,732,500,040	40	0.0000023
100 %		0	1,732,499,807	-193	-0.0000111
100 %		+ 10	1,732,499,855	-145	-0.0000084
100 %		+ 20	1,732,500,043	43	0.0000025
100 %		+ 30	1,732,500,092	92	0.0000053
100 %		+ 40	1,732,499,900	-100	-0.0000058
100 %		+ 50	1,732,500,133	133	0.0000077
BATT. ENDPOINT	3.38	+ 20	1,732,500,087	87	0.0000050

Table 7-30. 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

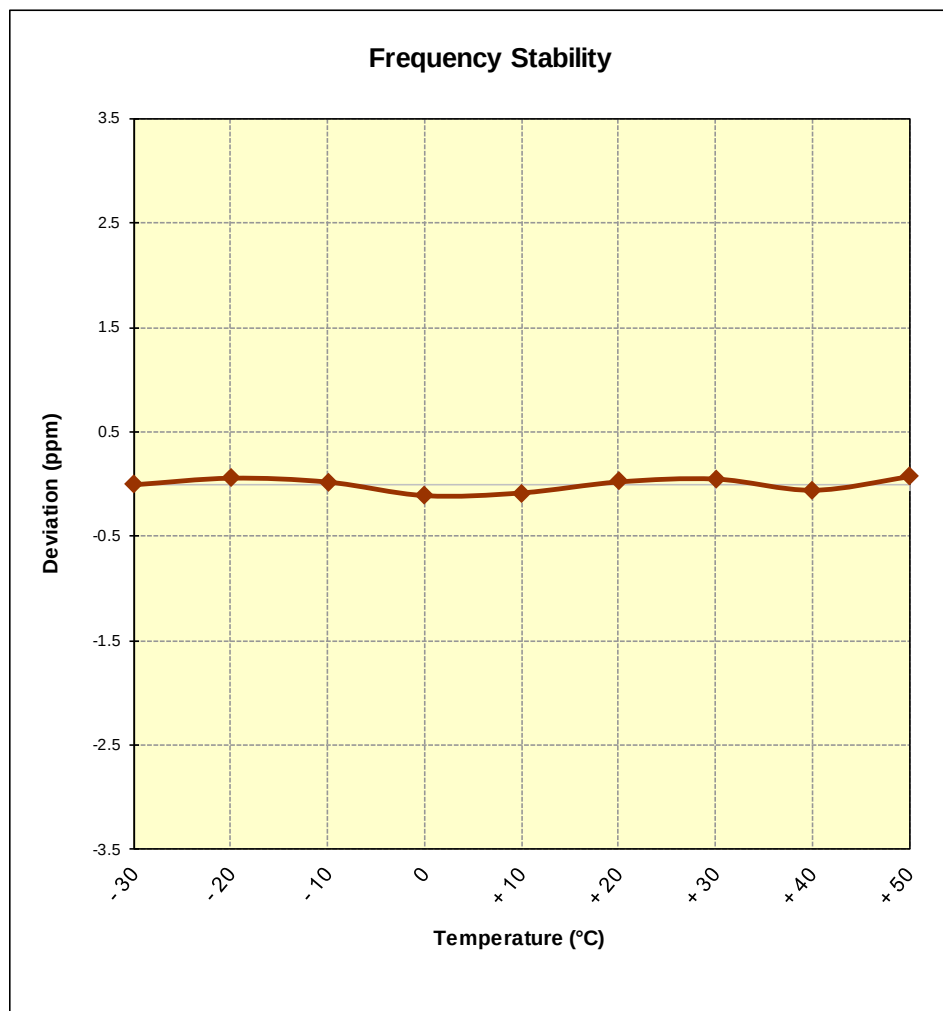


Figure 7-13. Frequency Stability Graph (Band 4)

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Band 41 Frequency Stability Measurements

OPERATING FREQUENCY: 2,593,000,000 Hz
 CHANNEL: 40620
 REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	2,592,999,886	-114	-0.0000044
100 %		- 20	2,592,999,850	-150	-0.0000058
100 %		- 10	2,592,999,851	-149	-0.0000057
100 %		0	2,593,000,031	31	0.0000012
100 %		+ 10	2,593,000,246	246	0.0000095
100 %		+ 20	2,592,999,882	-118	-0.0000046
100 %		+ 30	2,592,999,985	-15	-0.0000006
100 %		+ 40	2,592,999,931	-69	-0.0000027
100 %		+ 50	2,593,000,123	123	0.0000047
BATT. ENDPOINT	3.38	+ 20	2,592,999,985	-15	-0.0000006

Table 7-31. Frequency Stability Data (Band 41)

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: A3LSMN975JPN	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 41 Frequency Stability Measurements

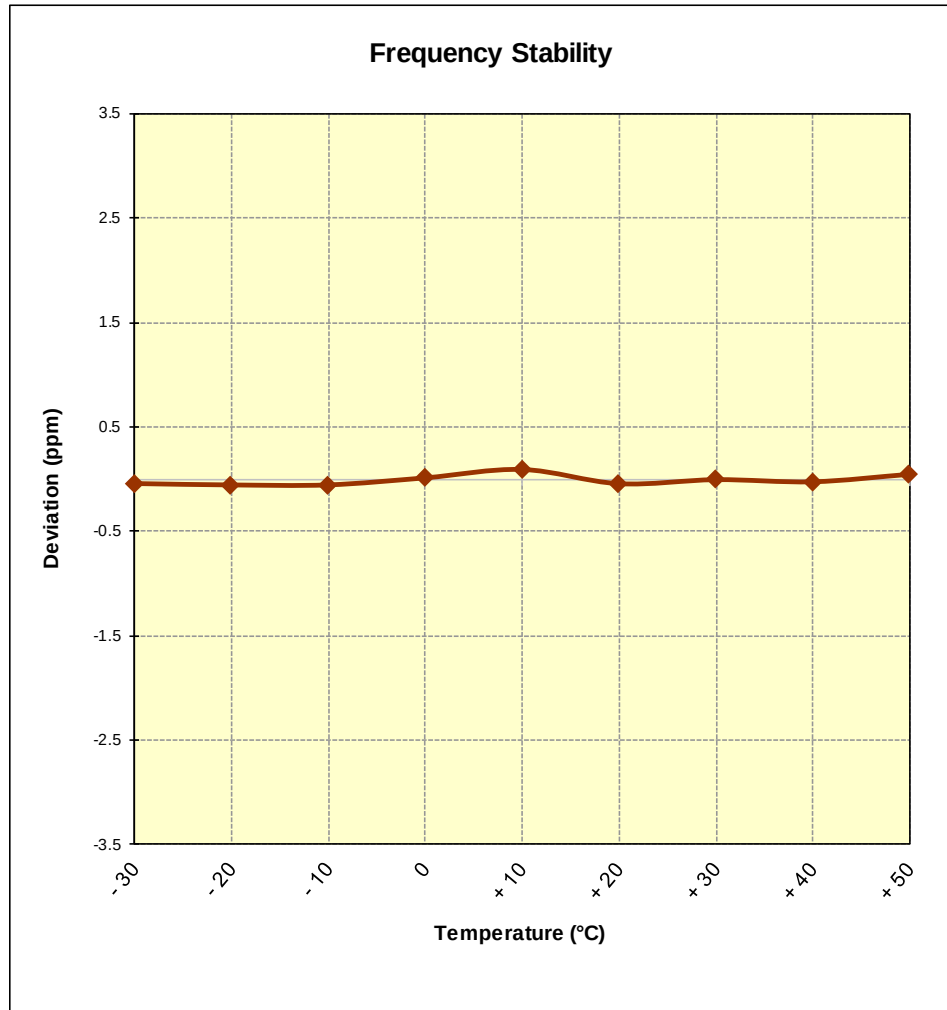


Figure 7-14. Frequency Stability Graph (Band 41)

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMN975JPN** complies with all the requirements of Part 22 & 27 of the FCC Rules for LTE operation only.

FCC ID: A3LSMN975JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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