7.4 Band Edge Emissions at Antenna Terminal

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

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 for Band 7 and 41 is as noted in the Test Notes on the following page.

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

Test Procedure Used

KDB 971168 D01 v02r02 – Section 6.0

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1% of the emission bandwidth
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x 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.

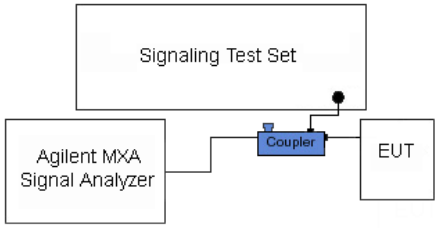


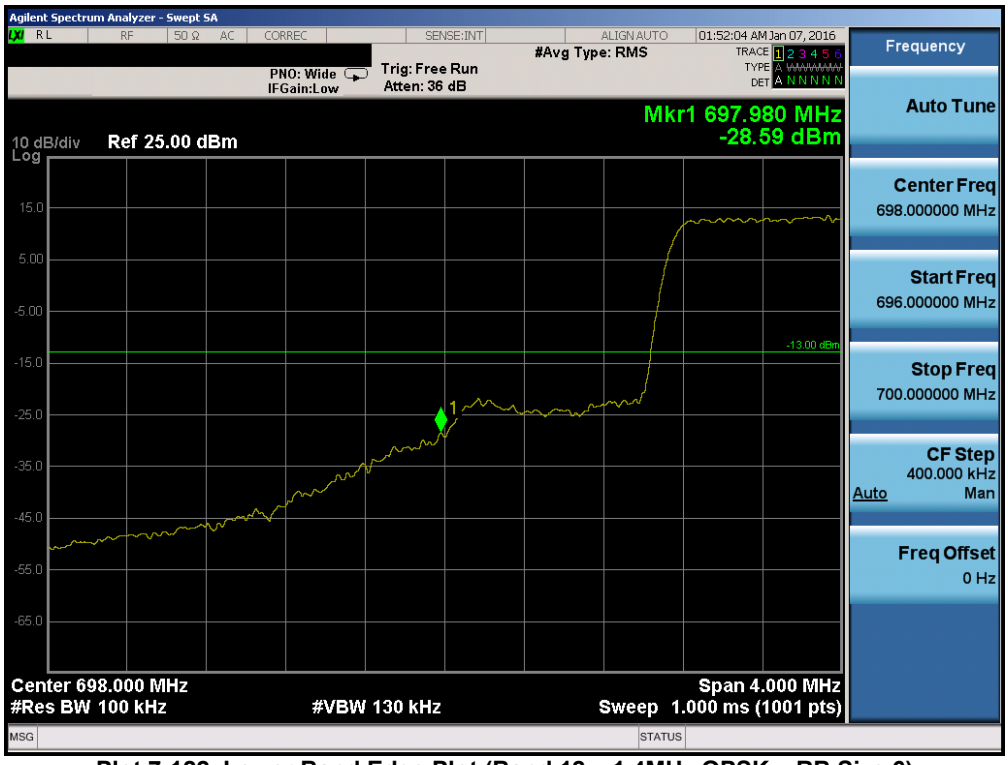
Figure 7-3. Test Instrument & Measurement Setup

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.

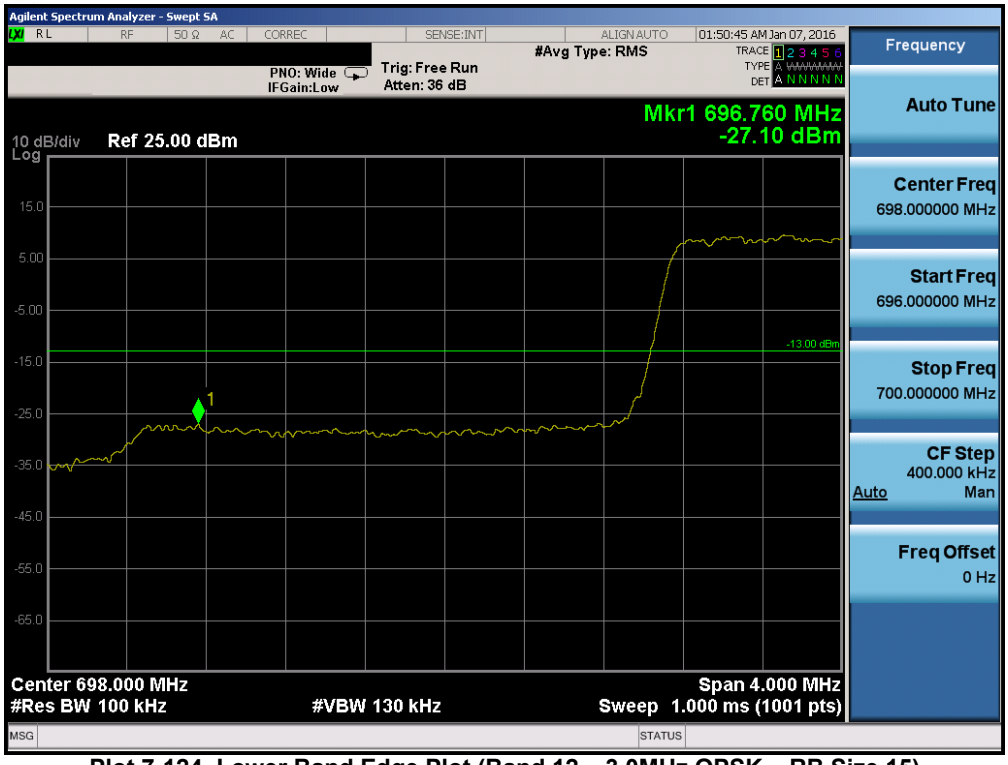
Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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.



Plot 7-122. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

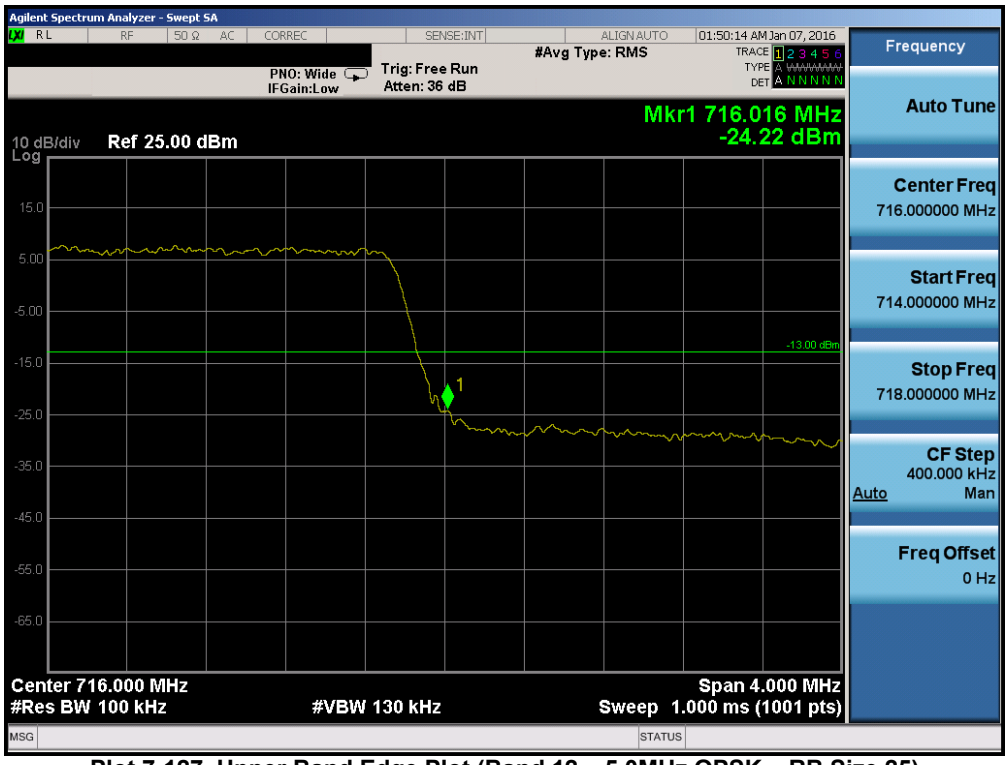
Plot 7-123. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



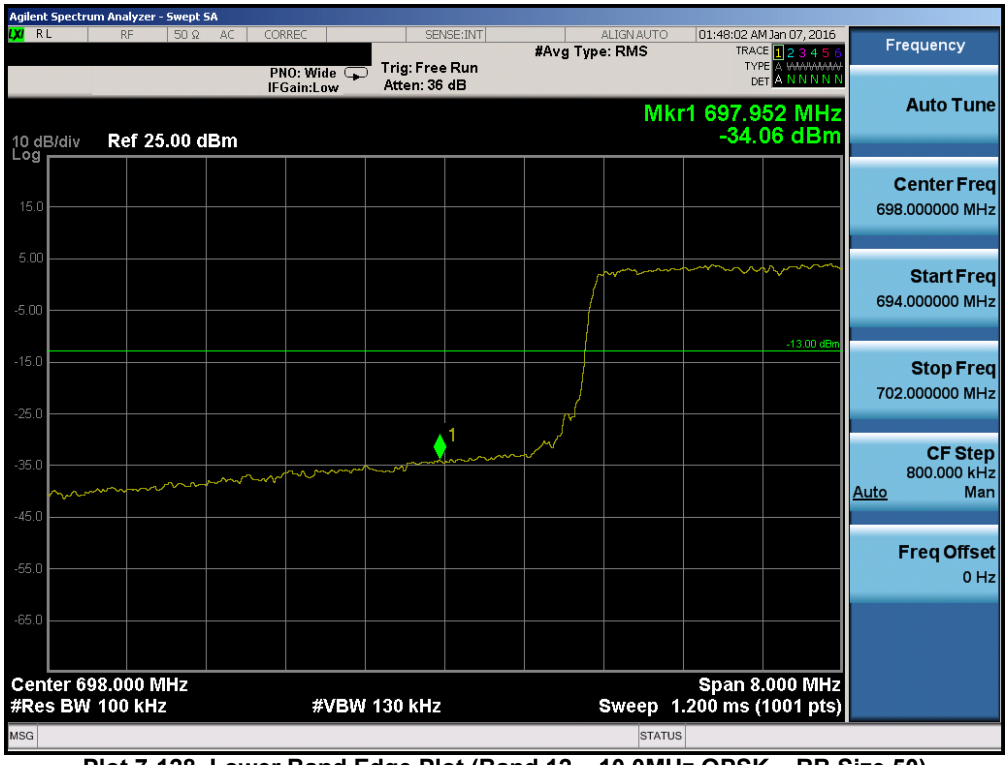
Plot 7-124. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

Plot 7-125. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

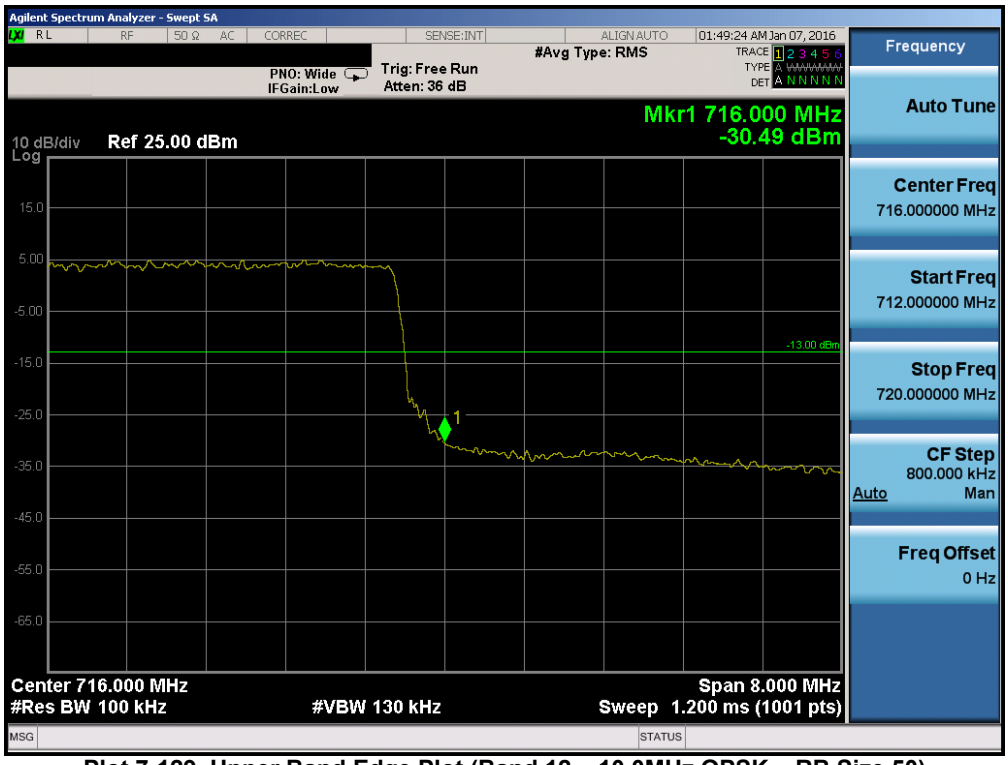
Plot 7-126. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



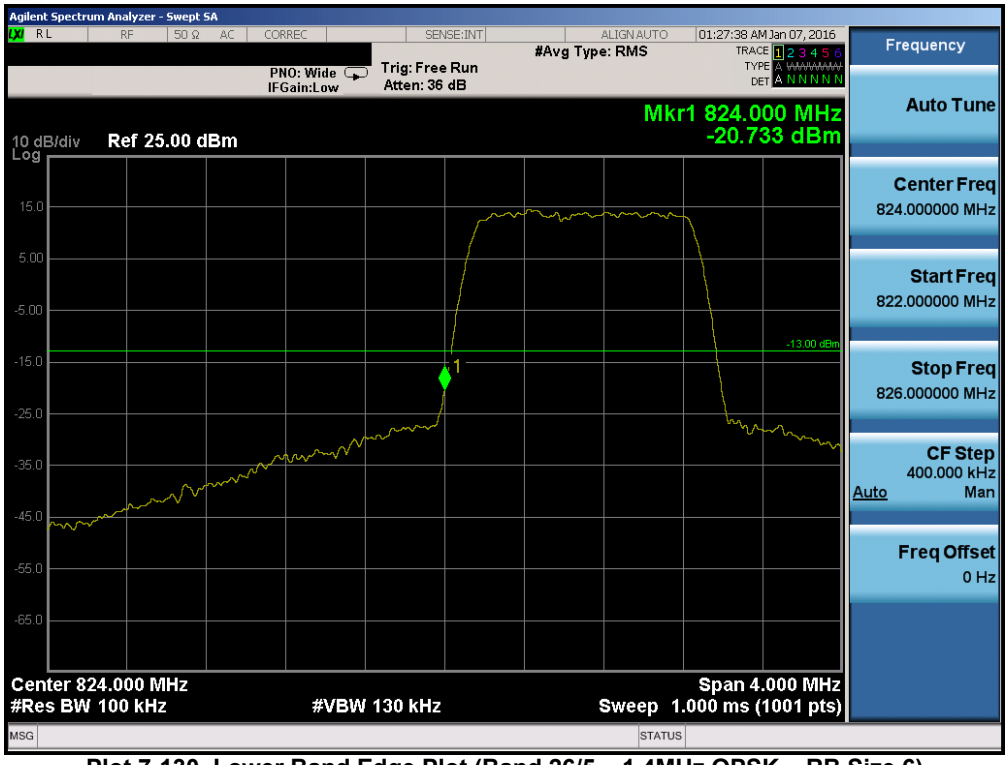
Plot 7-127. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



Plot 7-128. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

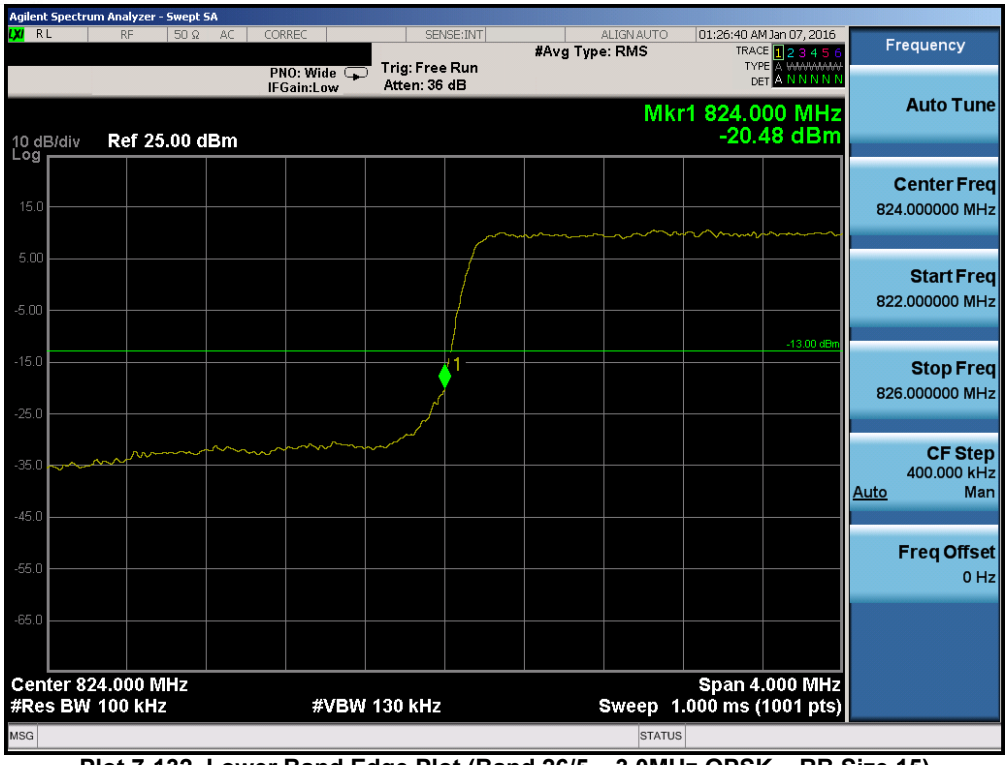


Plot 7-129. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



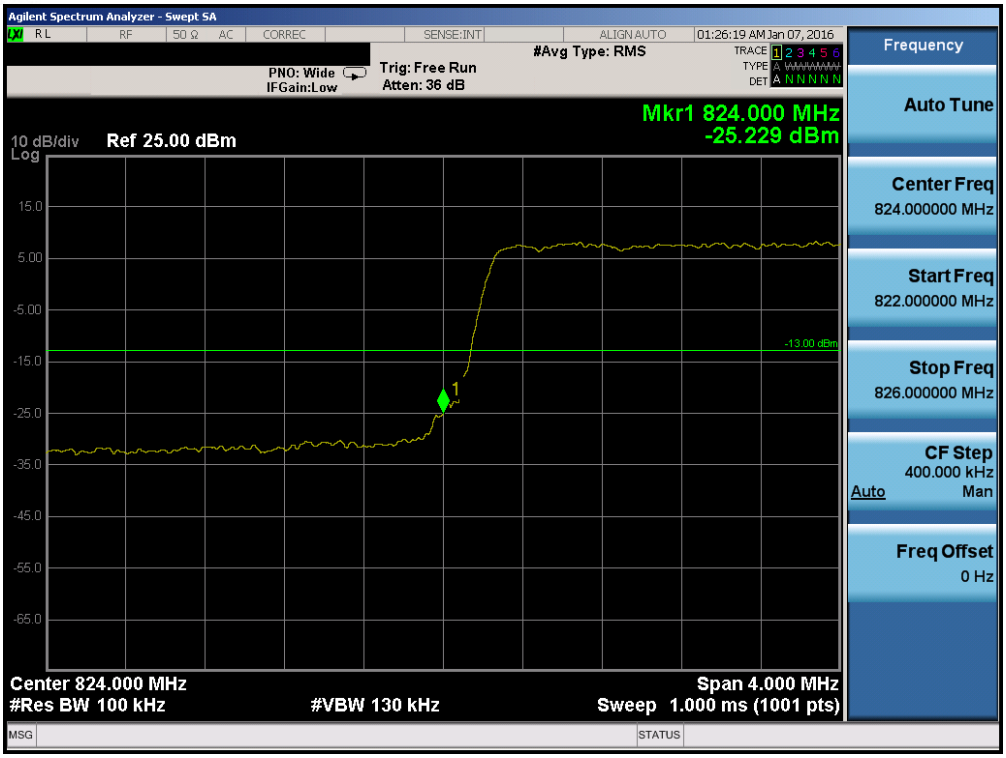
Plot 7-130. Lower Band Edge Plot (Band 26/5 – 1.4MHz QPSK – RB Size 6)

Plot 7-131. Upper Band Edge Plot (Band 26/5 – 1.4MHz QPSK – RB Size 6)



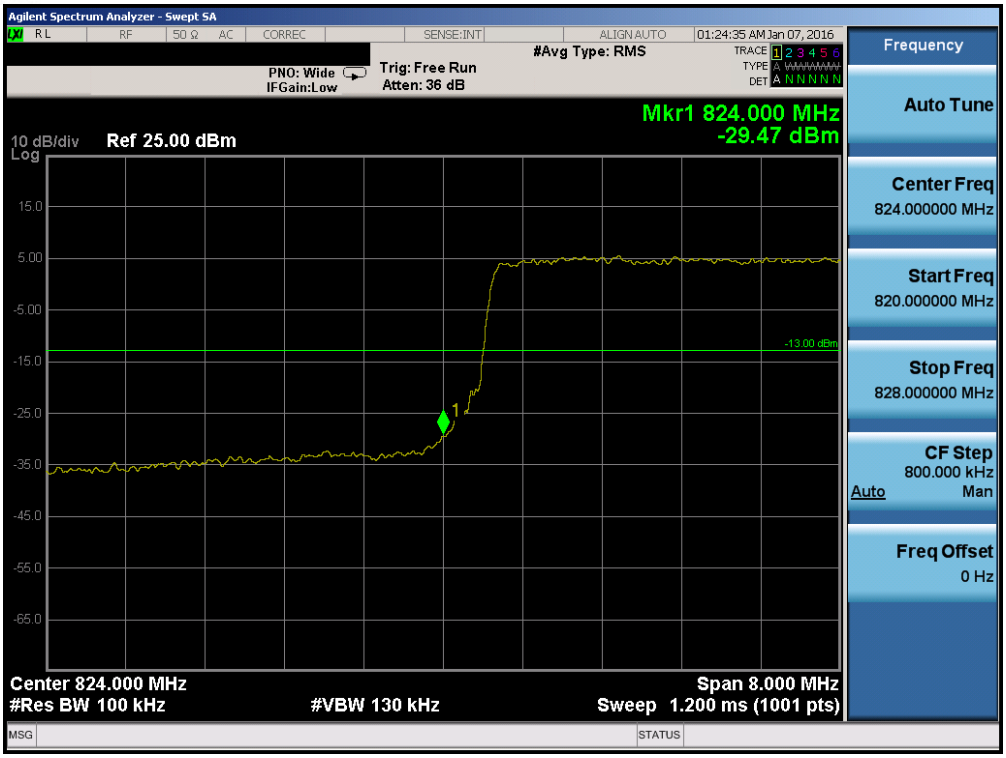
Plot 7-132. Lower Band Edge Plot (Band 26/5 – 3.0MHz QPSK – RB Size 15)

Plot 7-133. Upper Band Edge Plot (Band 26/5 – 3.0MHz QPSK – RB Size 15)

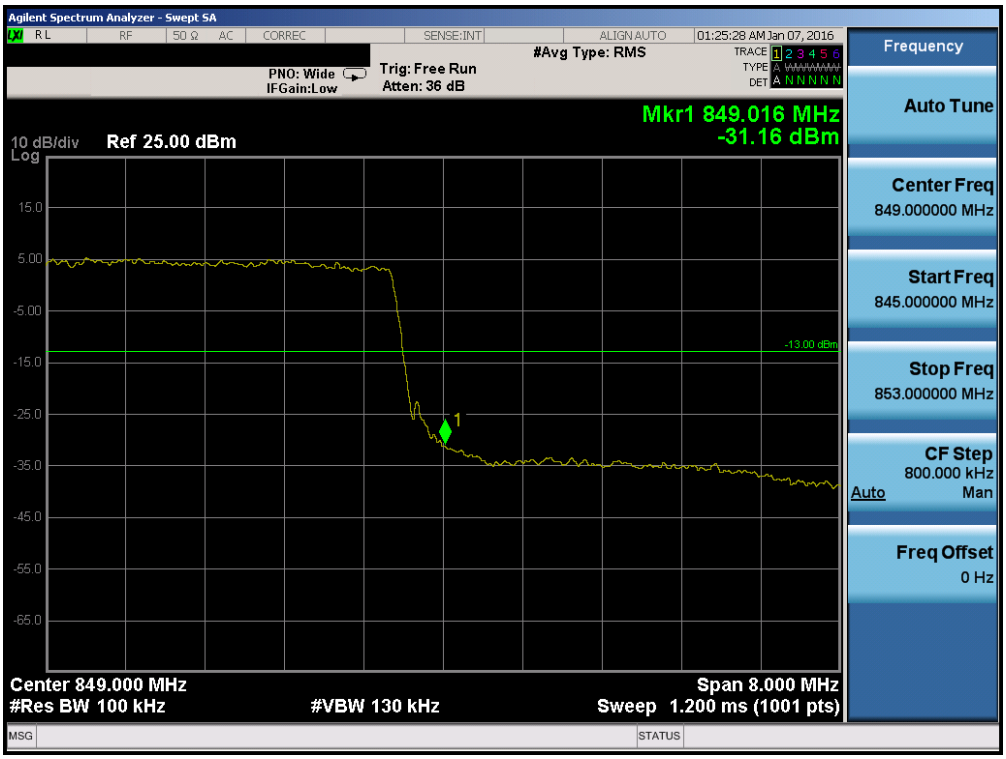


Plot 7-134. Lower Band Edge Plot (Band 26/5 – 5.0MHz QPSK – RB Size 25)

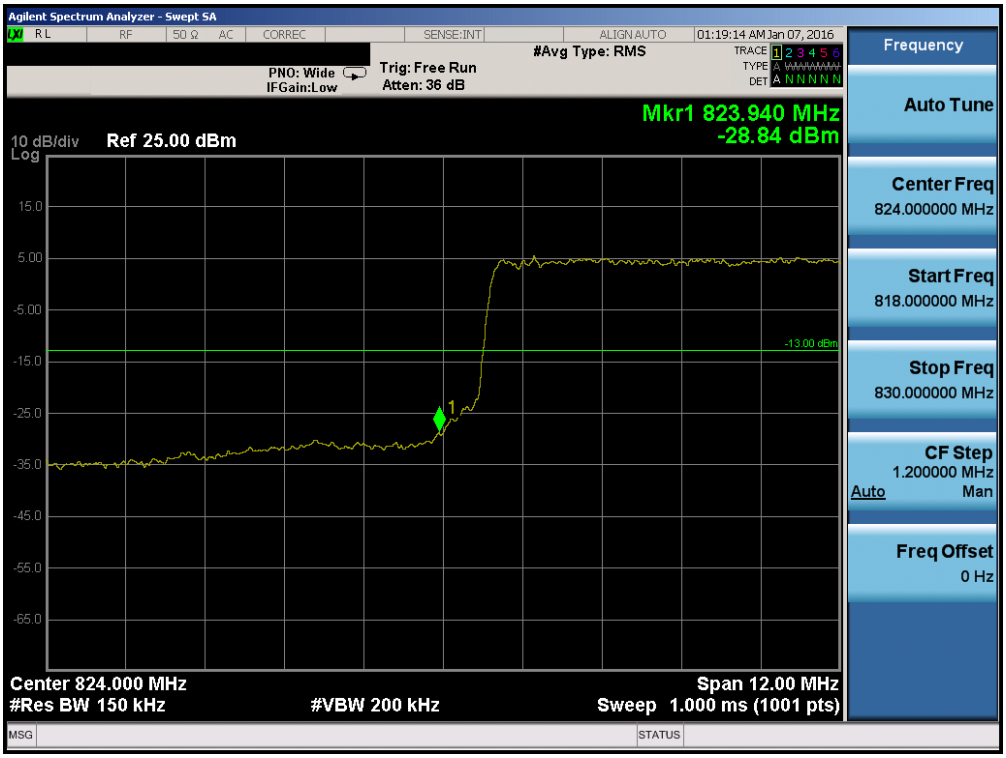
Plot 7-135. Upper Band Edge Plot (Band 26/5 – 5.0MHz QPSK – RB Size 25)



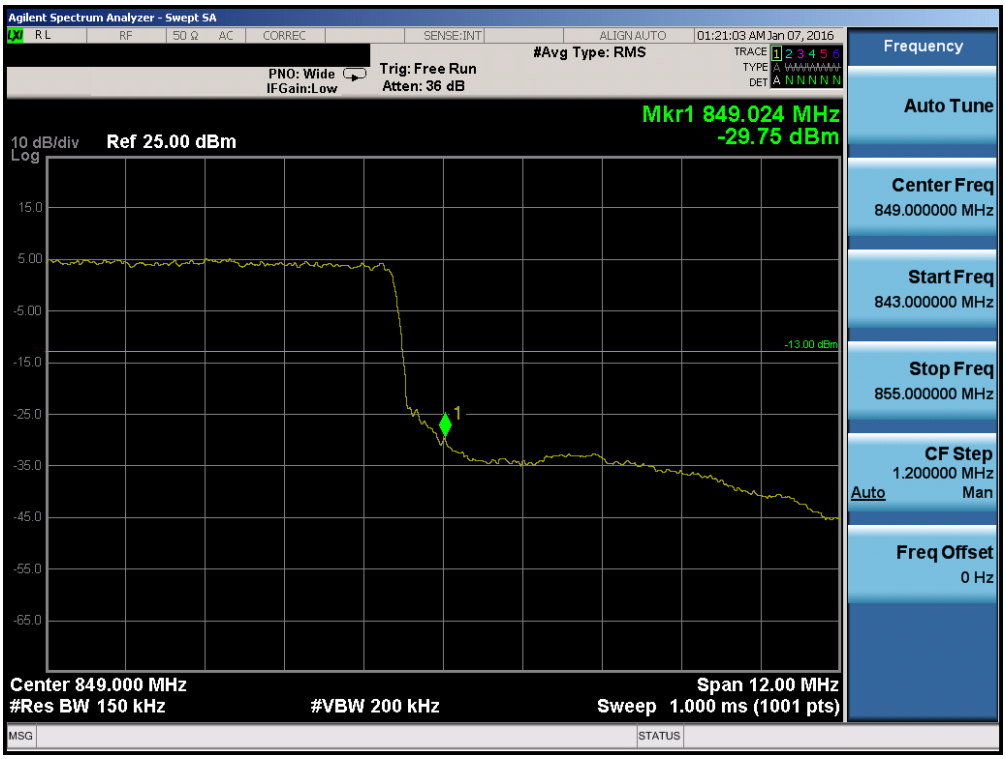
Plot 7-136. Lower Band Edge Plot (Band 26/5 – 10.0MHz QPSK – RB Size 50)



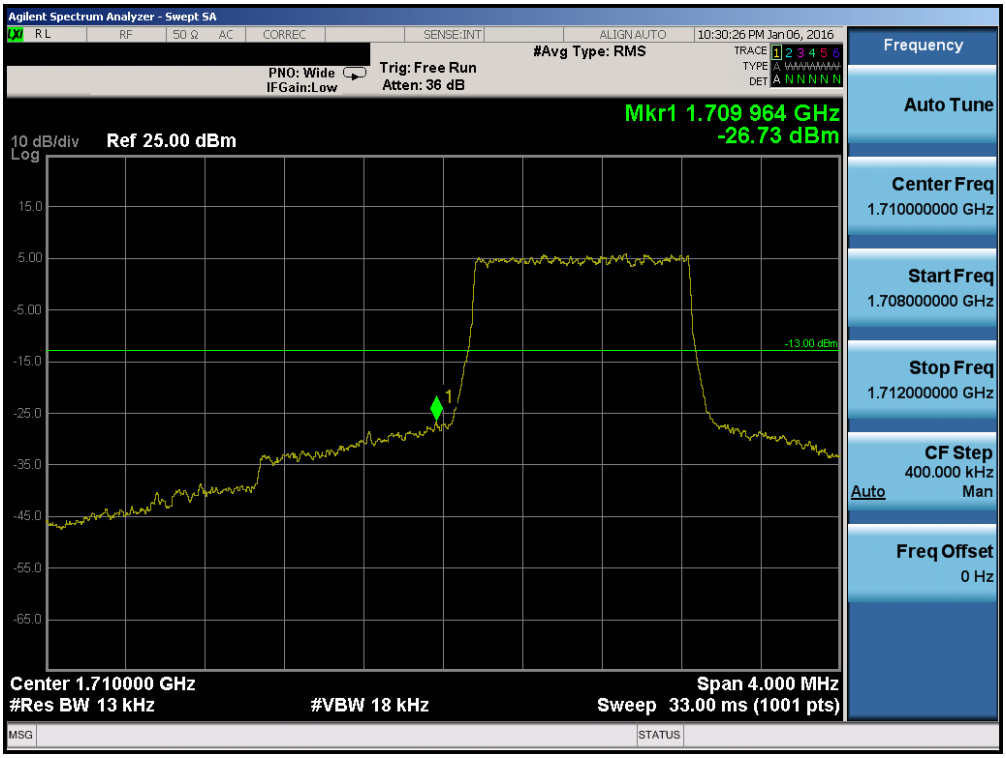
Plot 7-137. Upper Band Edge Plot (Band 26/5 – 10.0MHz QPSK – RB Size 50)



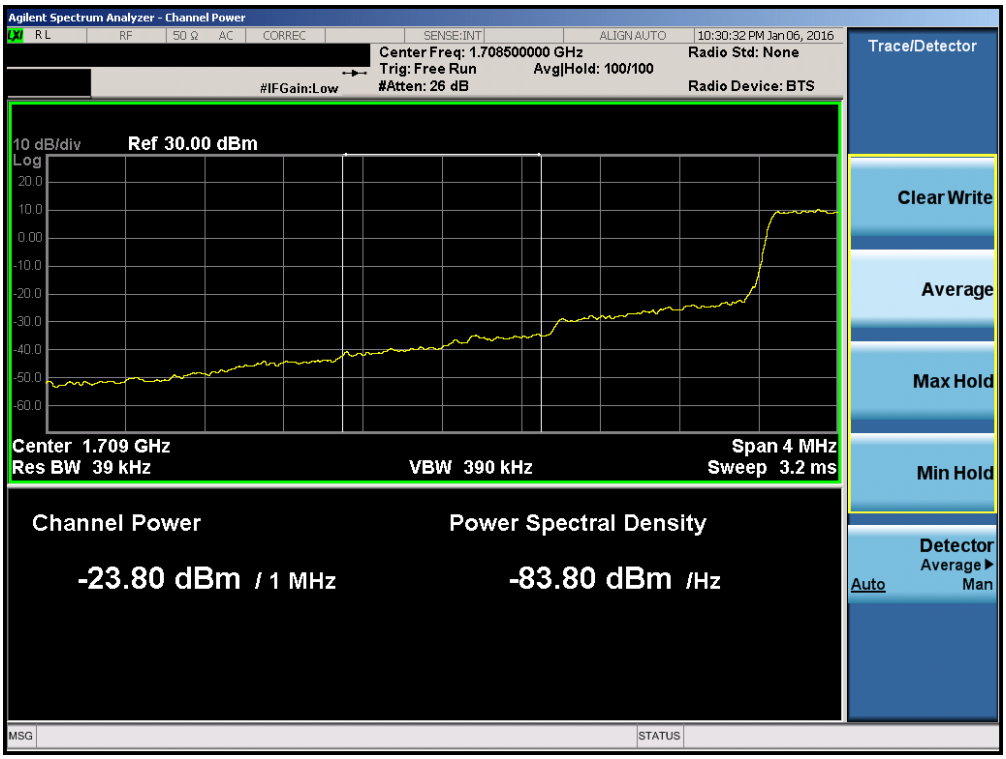
Plot 7-138. Lower Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)



Plot 7-139. Upper Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)

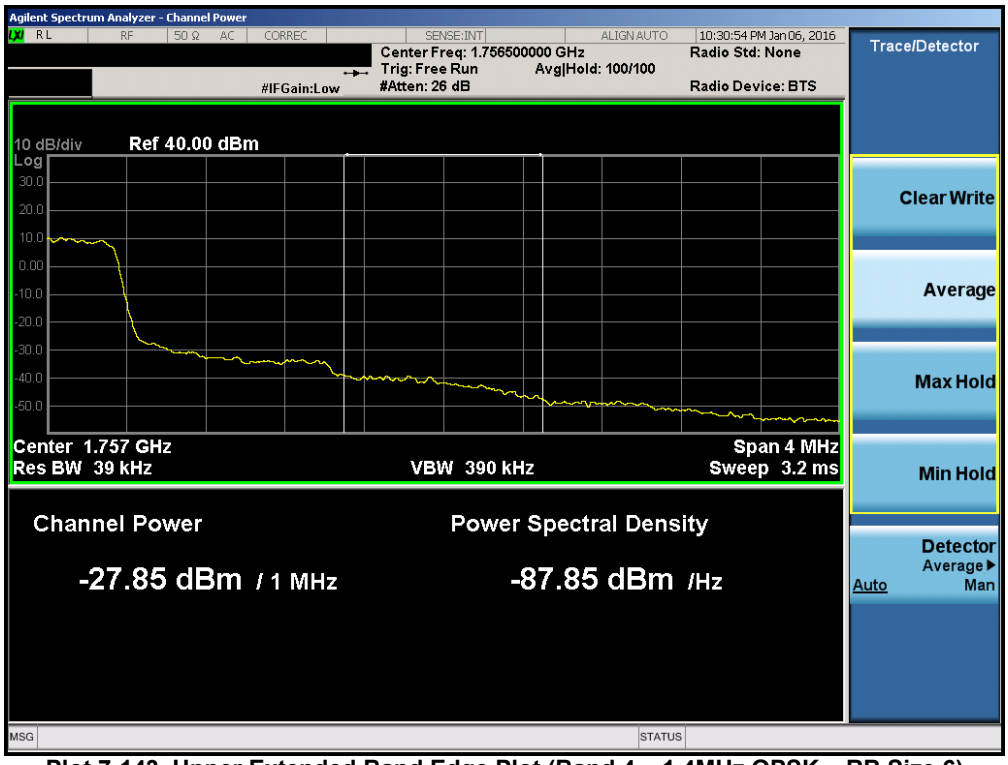


Plot 7-140. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



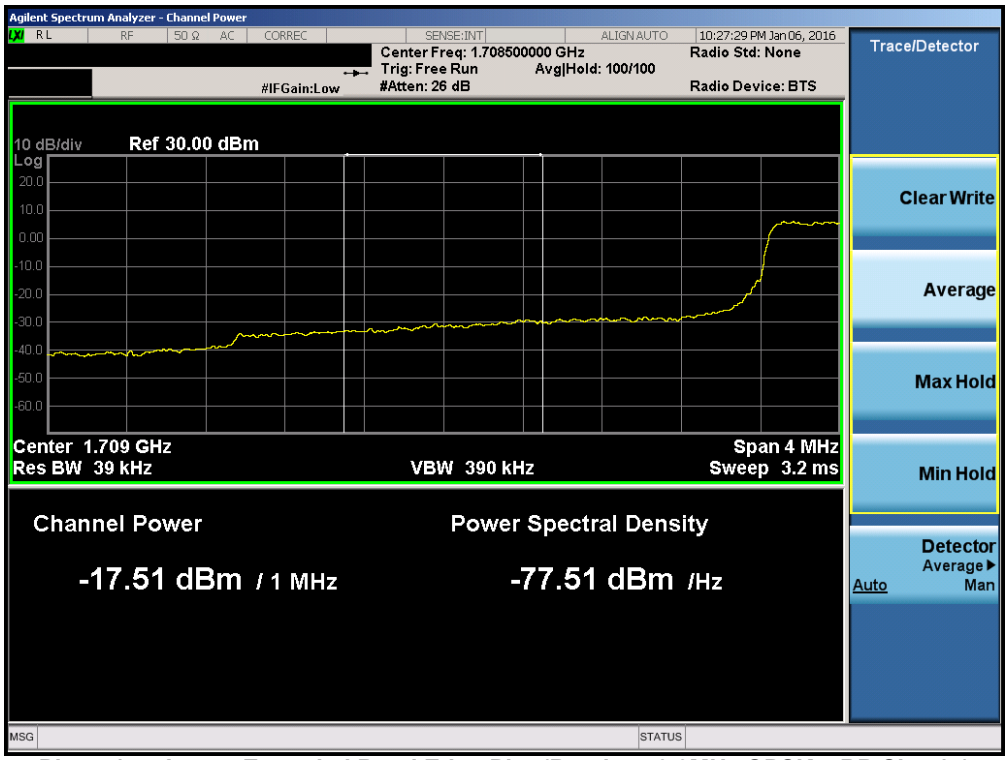
Plot 7-141. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

Plot 7-142. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

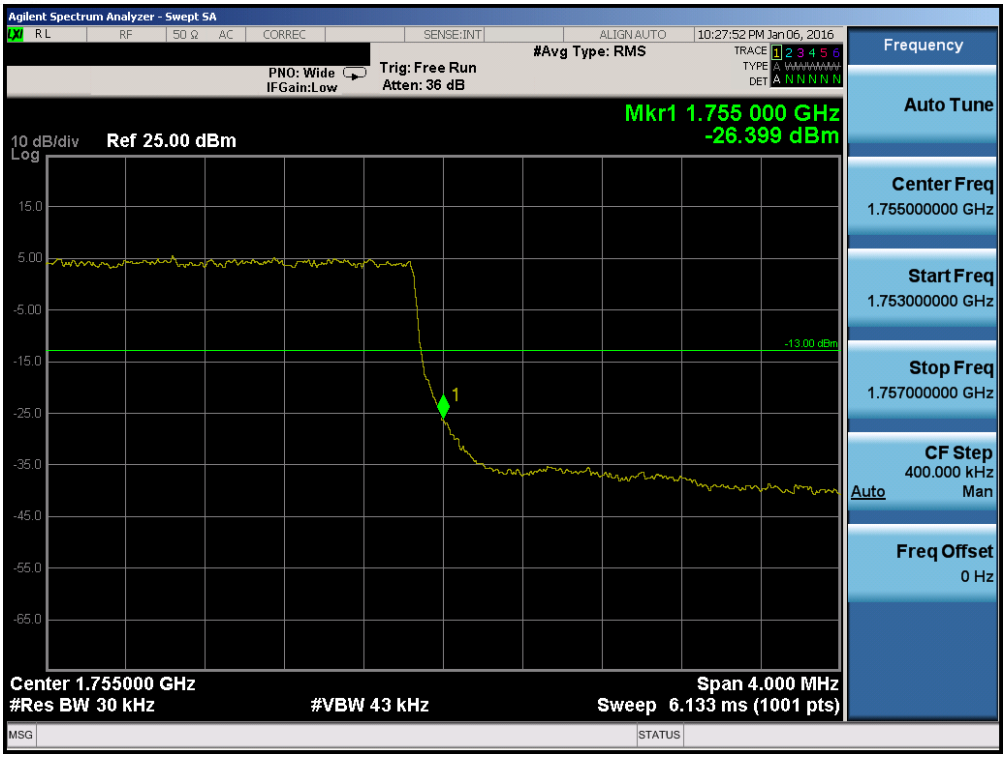


Plot 7-143. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

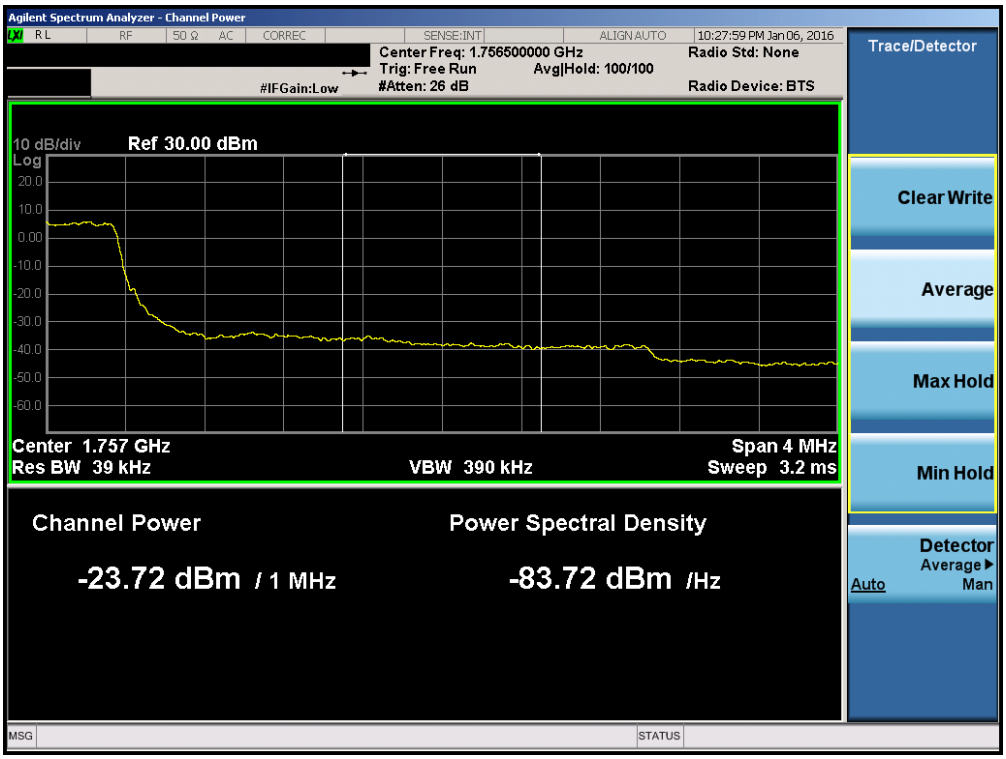
Plot 7-144. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



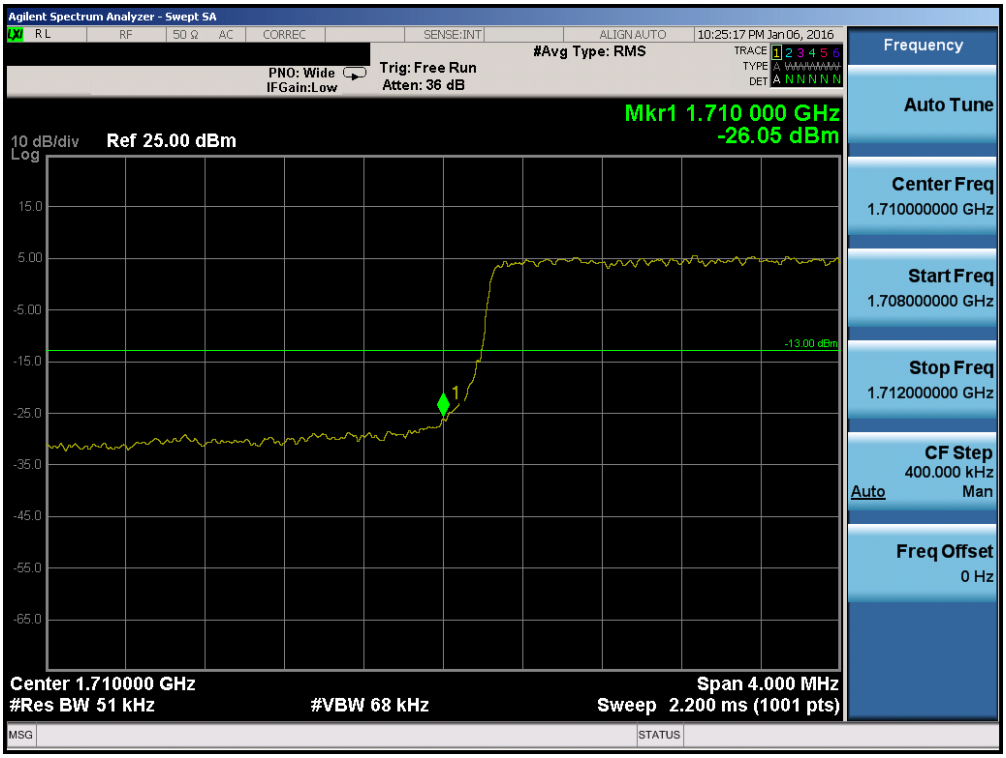
Plot 7-145. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



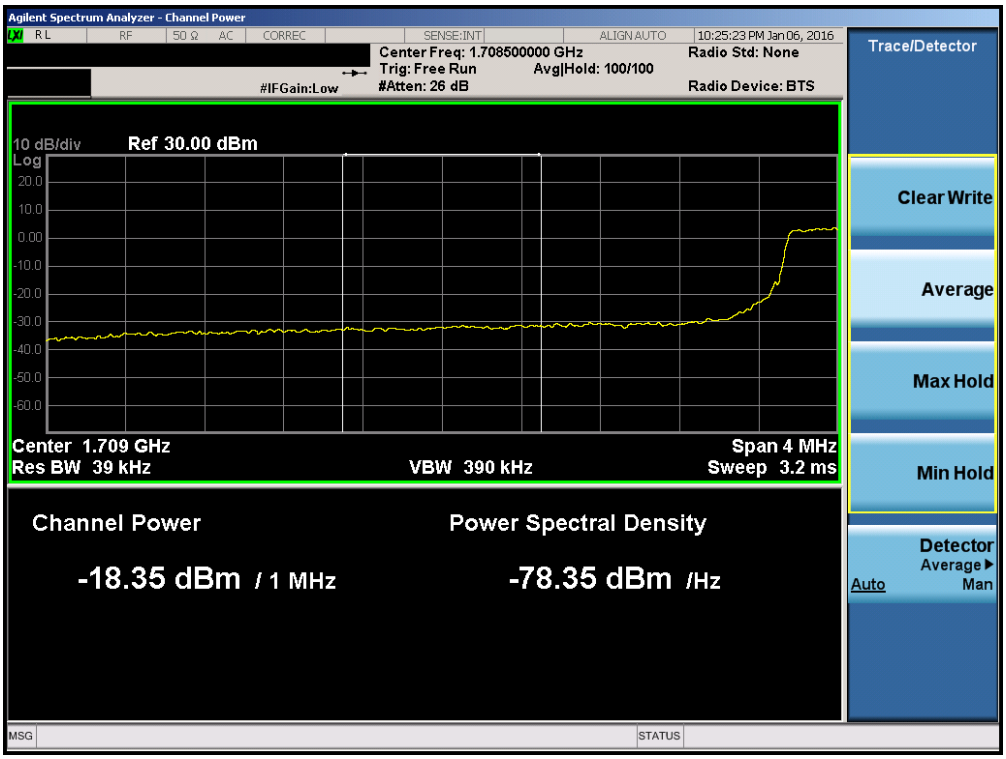
Plot 7-146. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-147. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

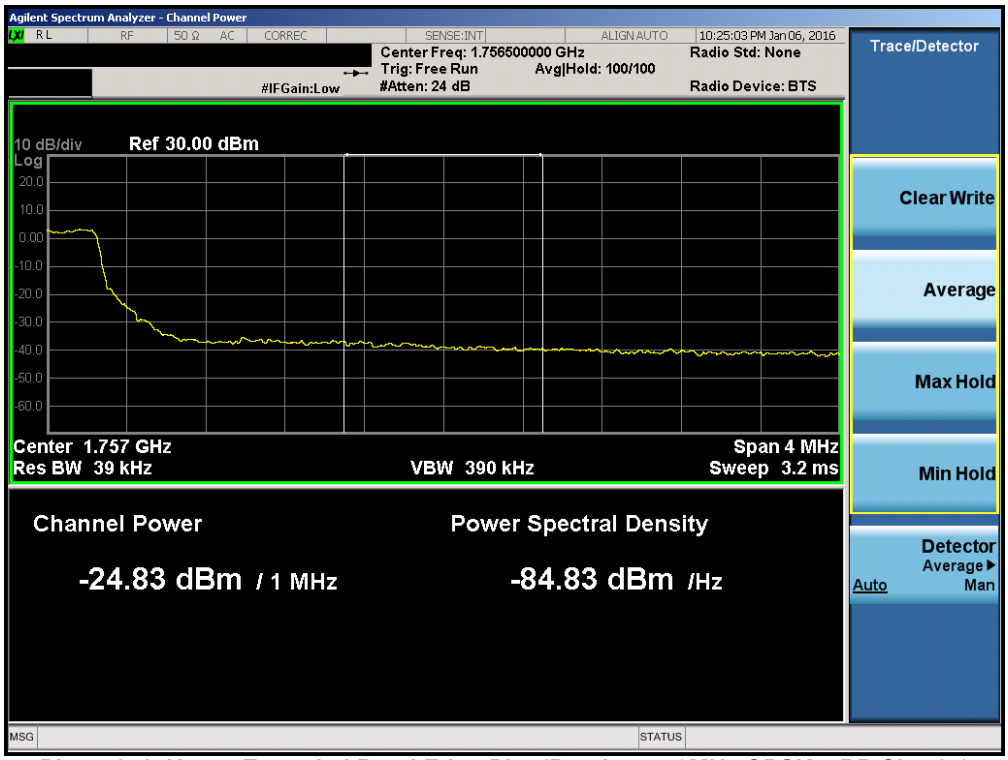


Plot 7-148. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

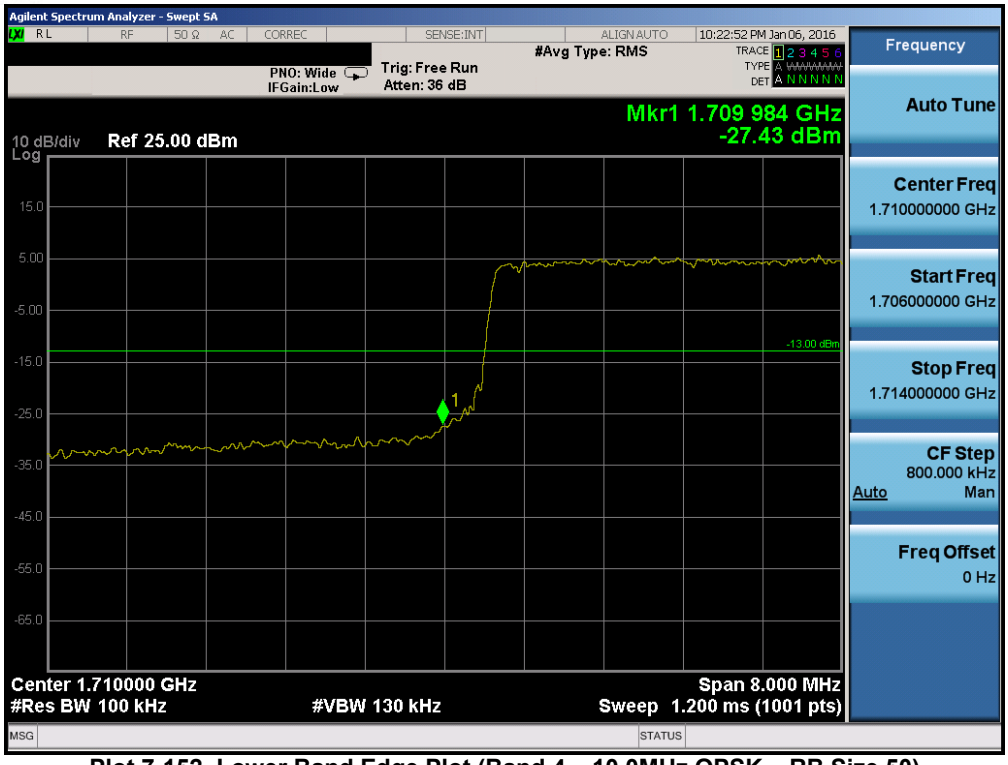


Plot 7-149. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

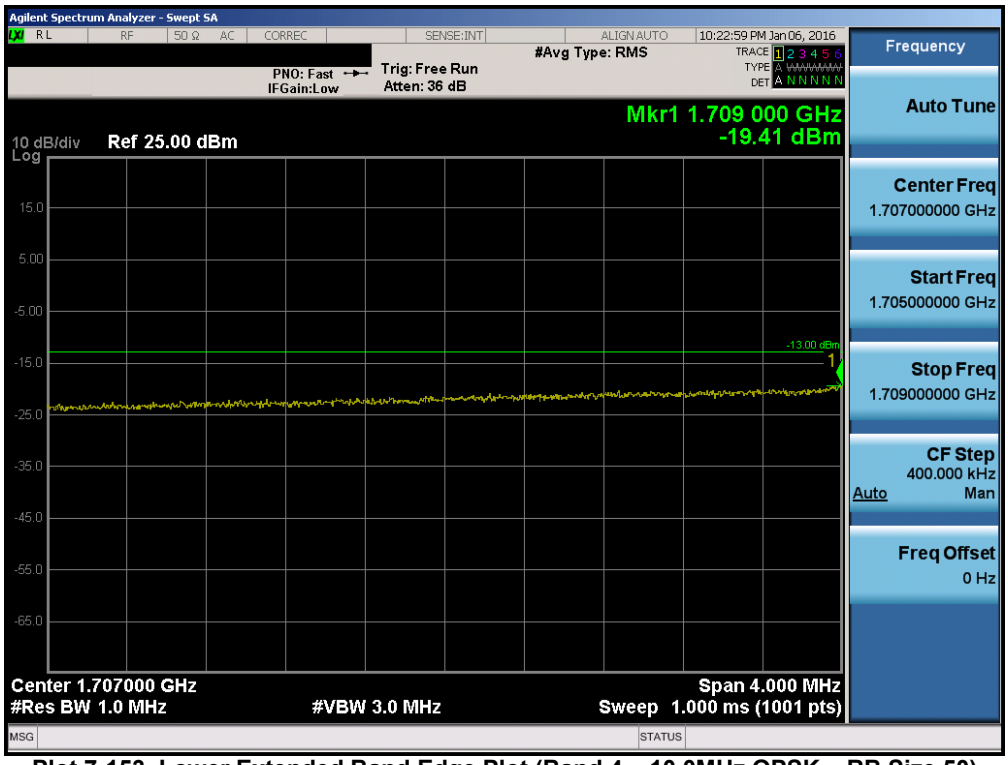
Plot 7-150. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



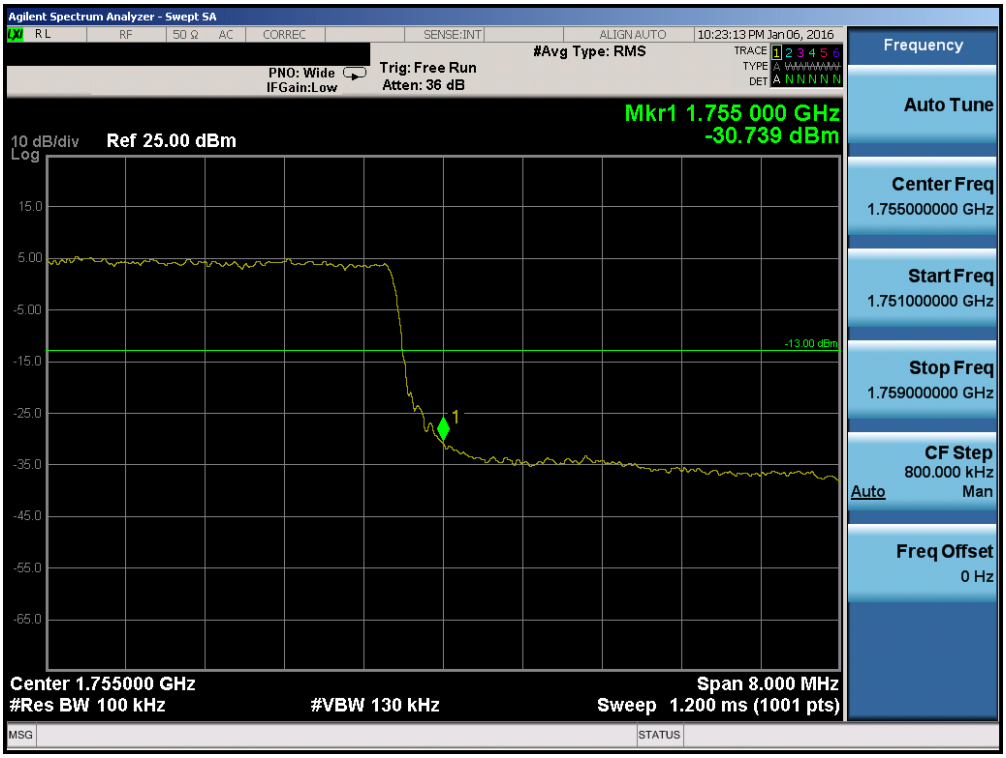
Plot 7-151. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



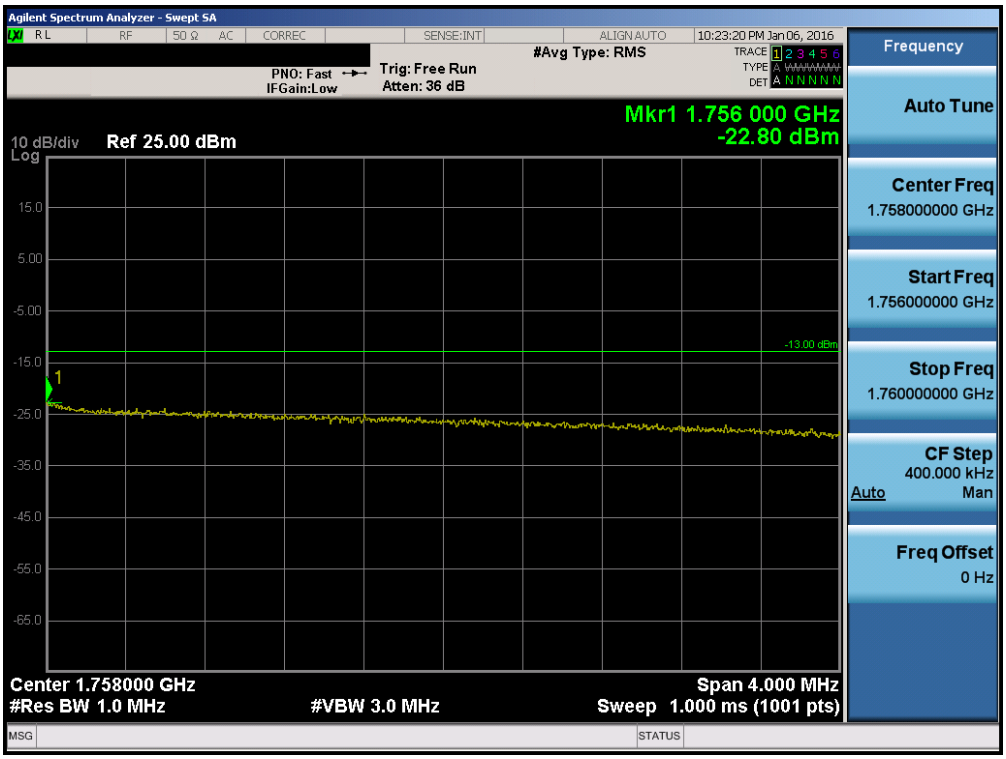
Plot 7-152. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



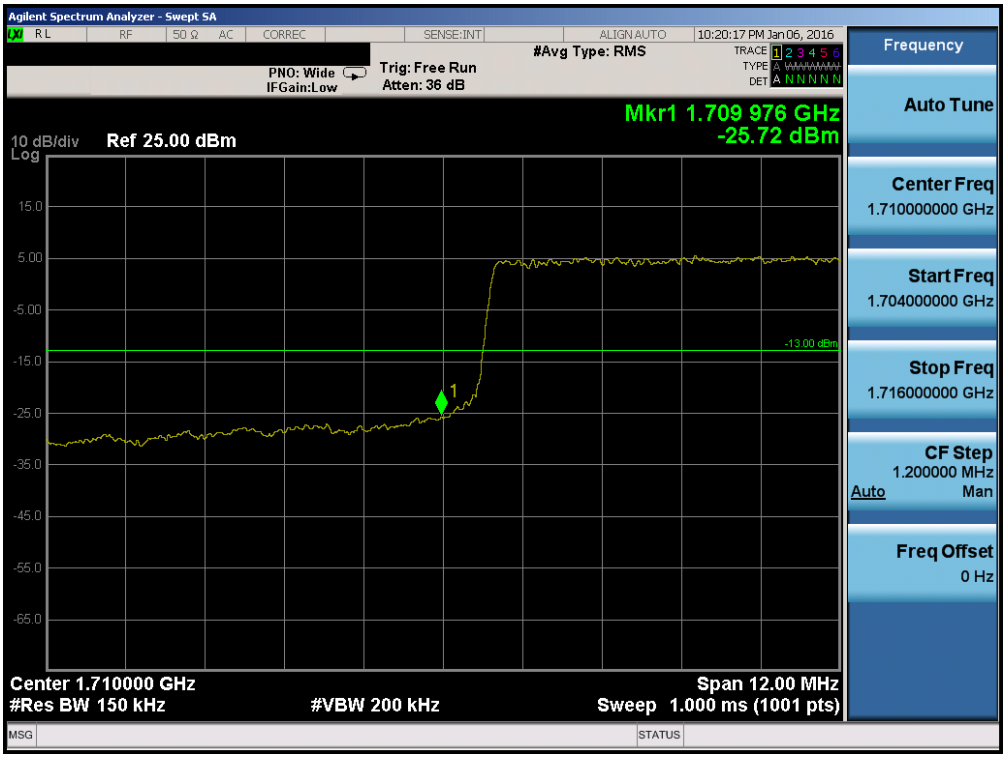
Plot 7-153. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



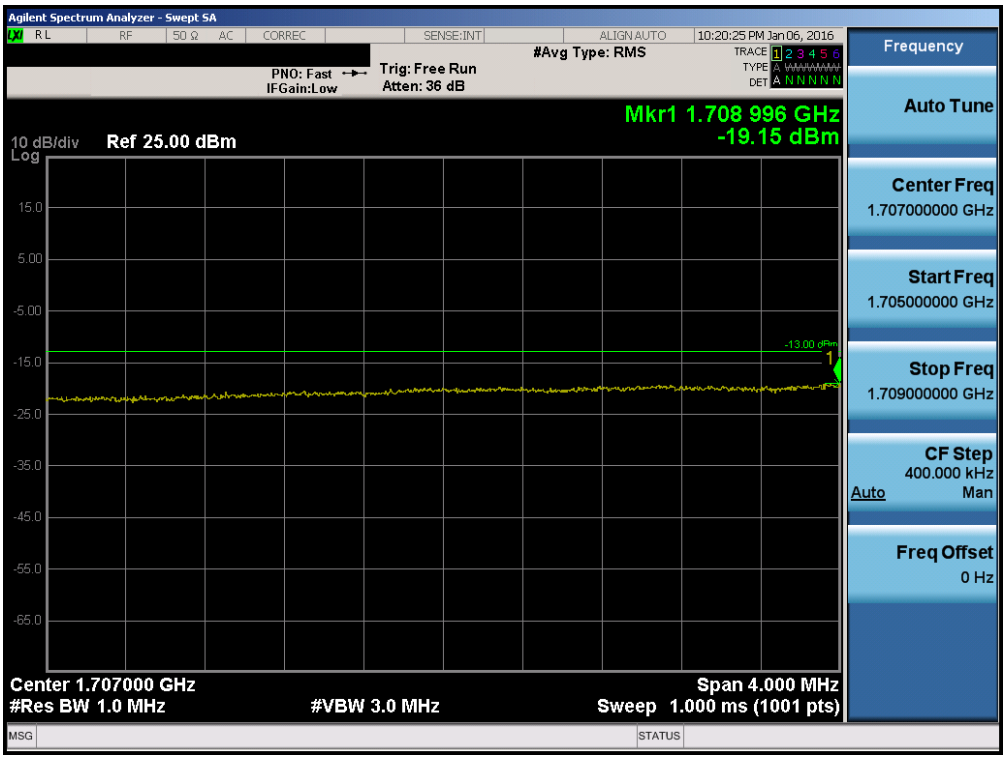
Plot 7-154. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



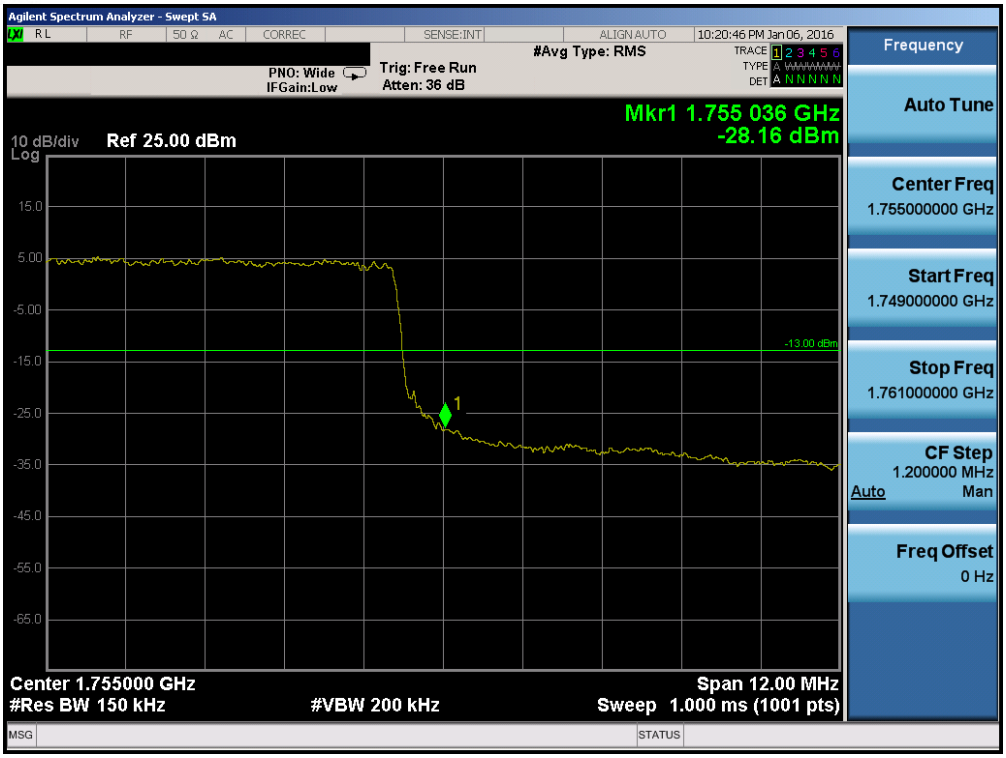
Plot 7-155. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



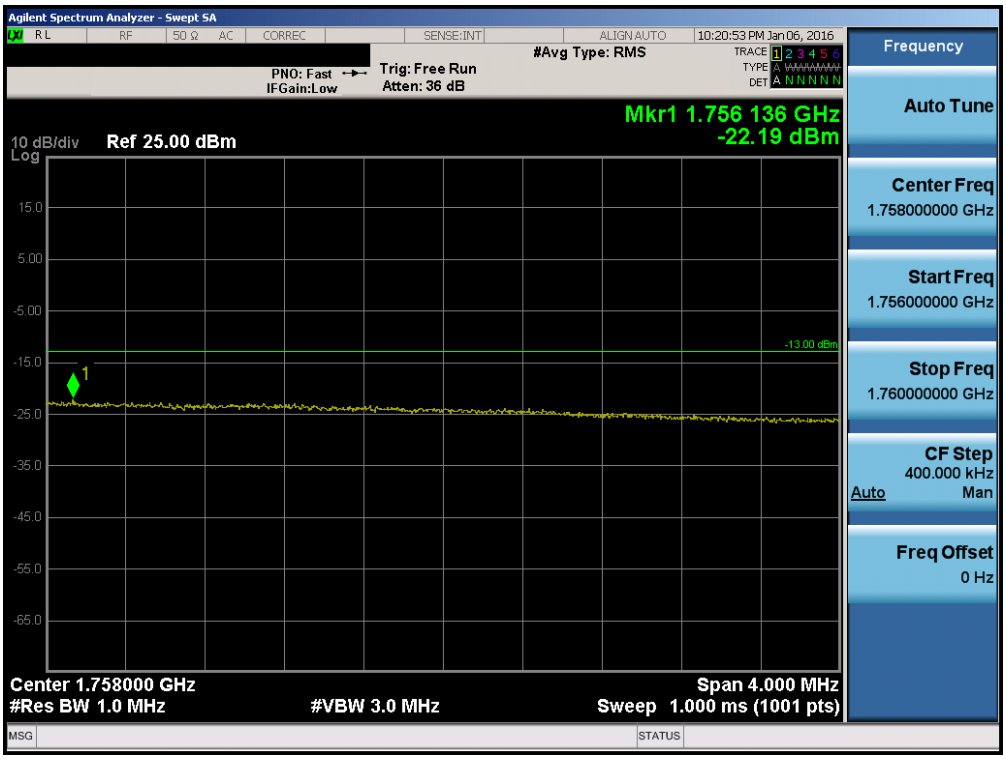
Plot 7-156. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



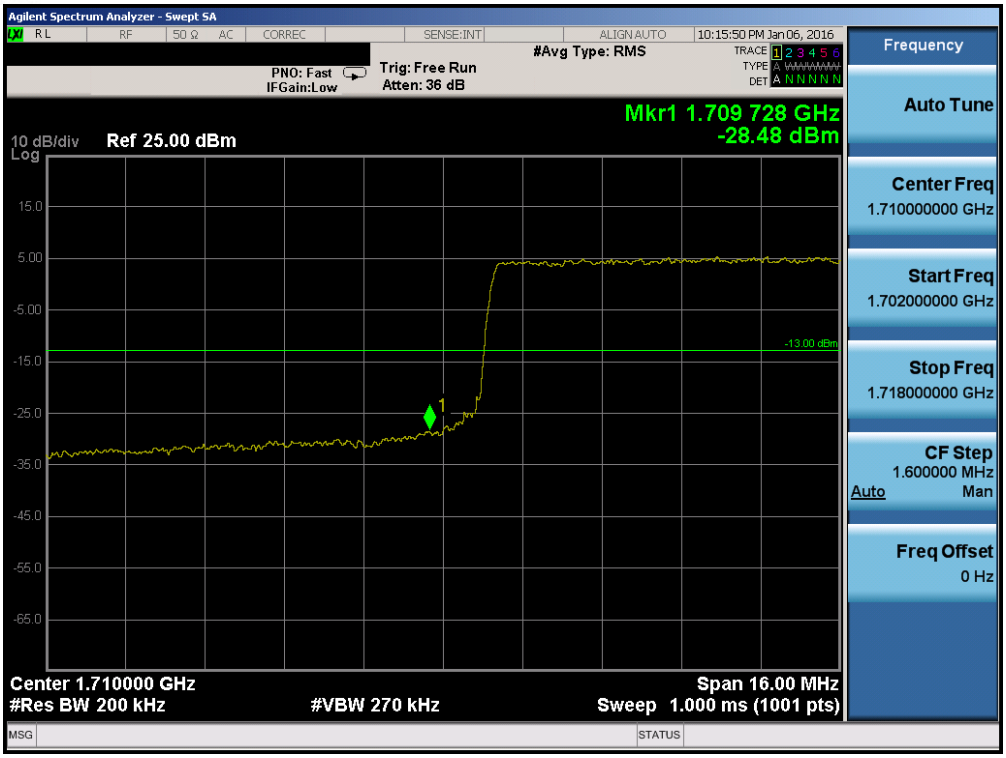
Plot 7-157. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



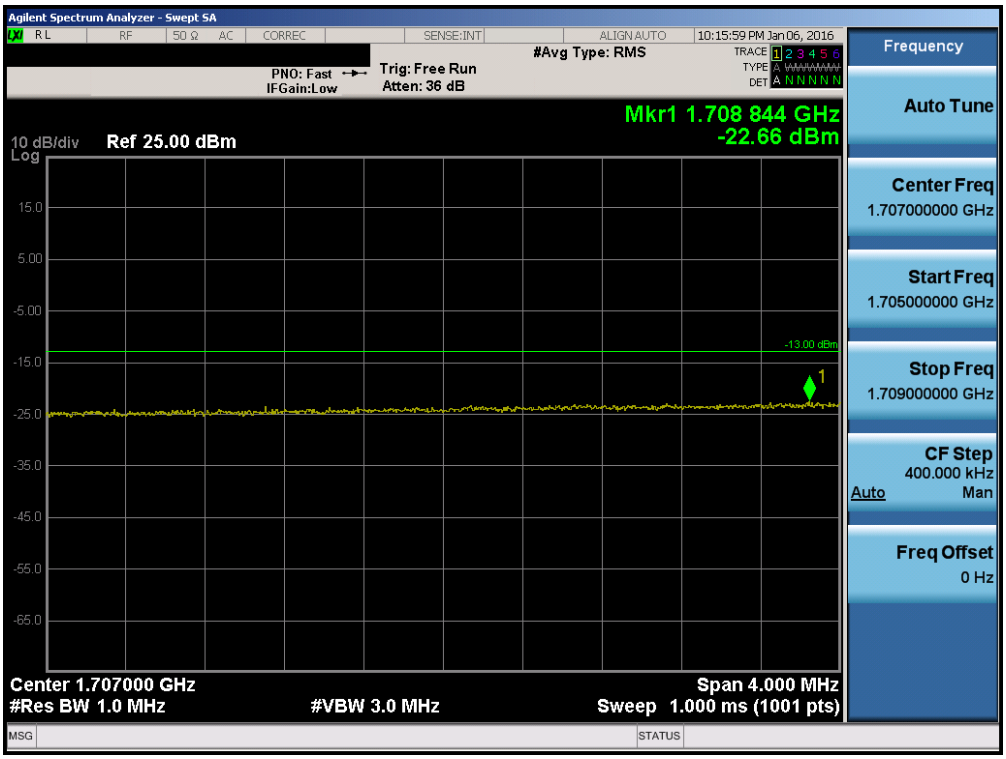
Plot 7-158. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



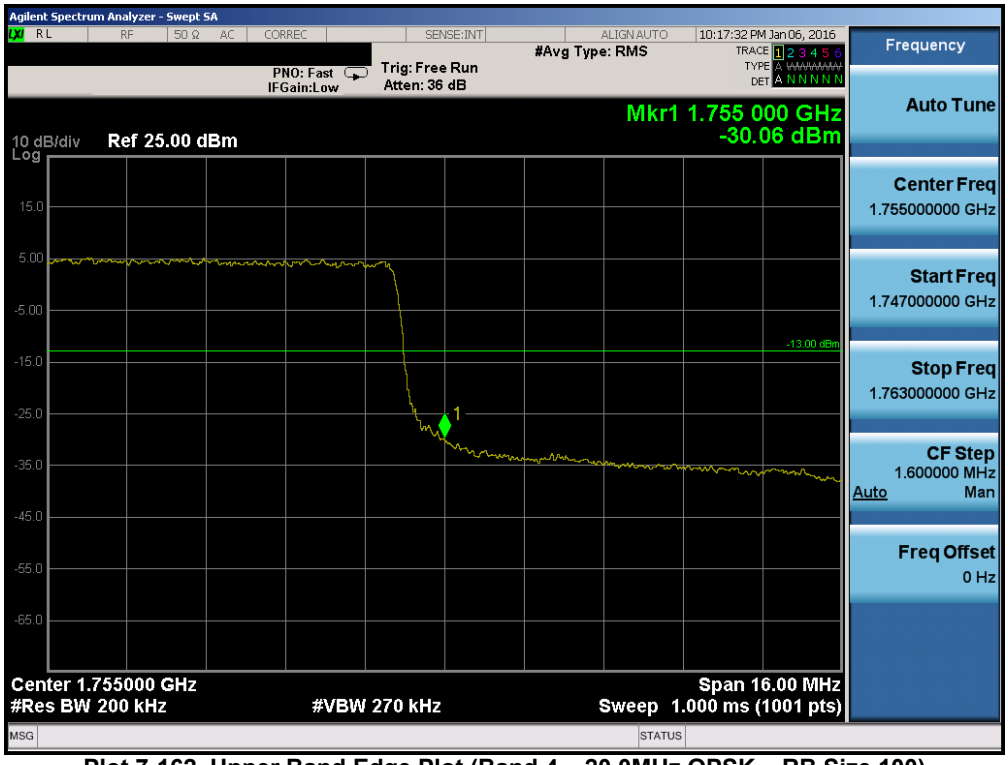
Plot 7-159. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



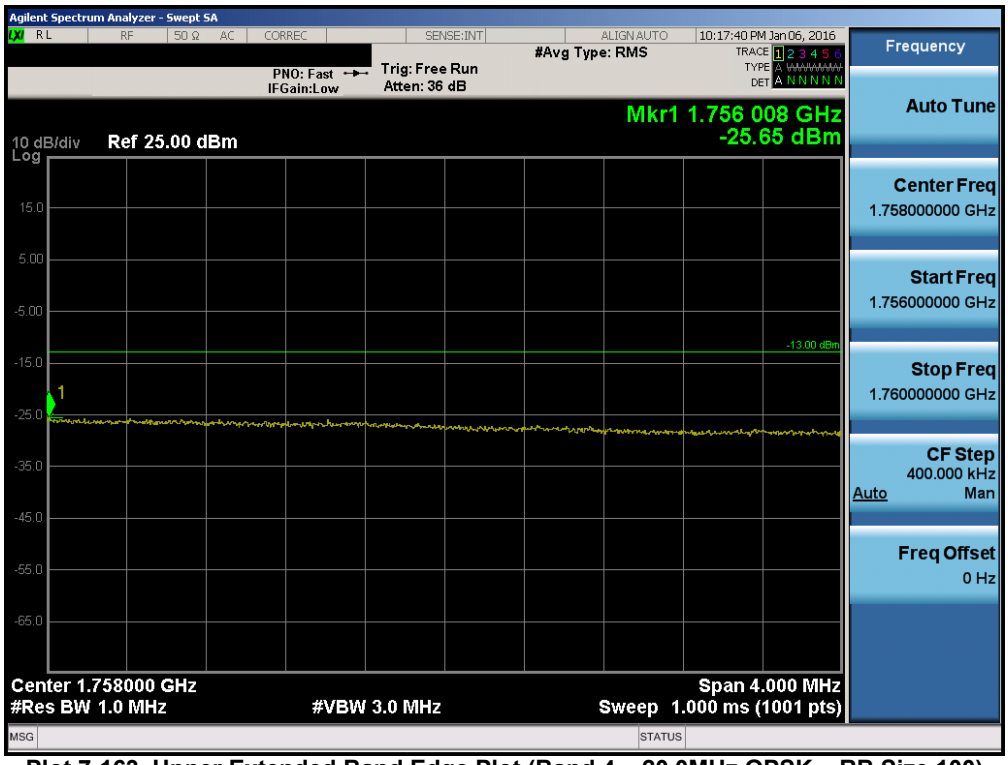
Plot 7-160. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



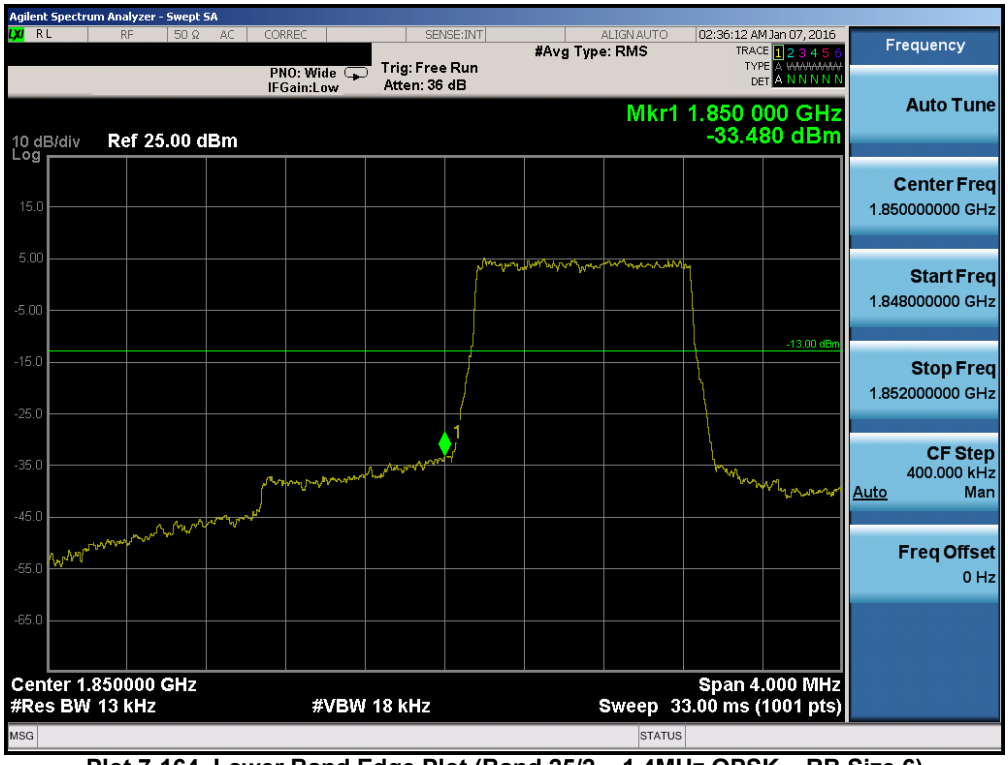
Plot 7-161. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



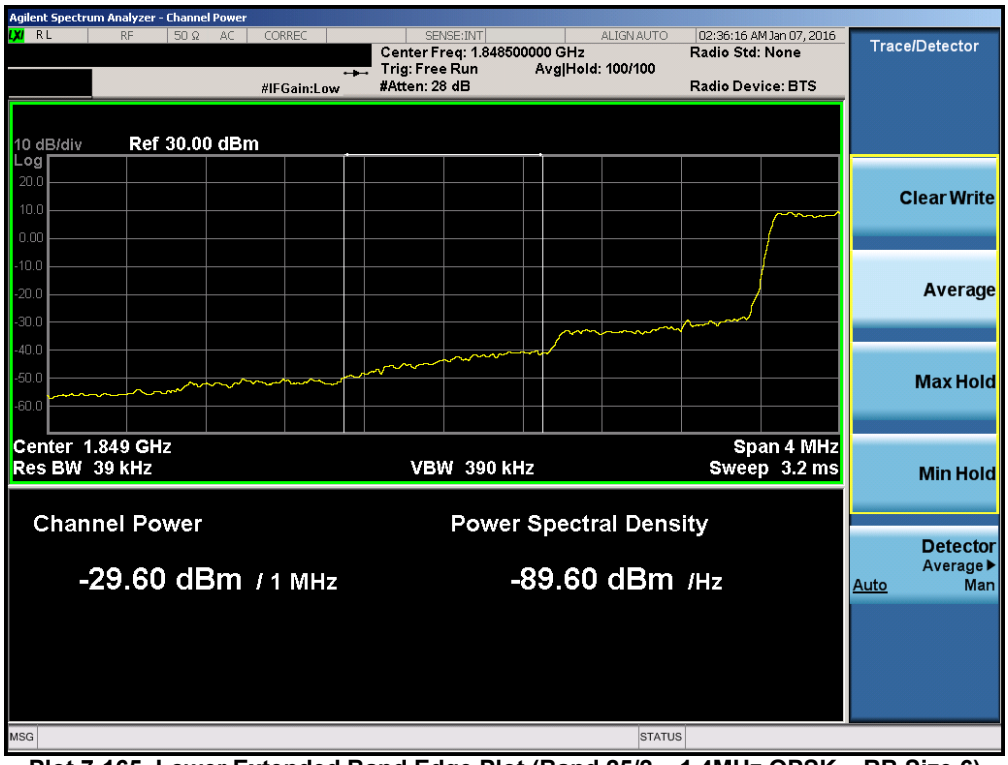
Plot 7-162. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



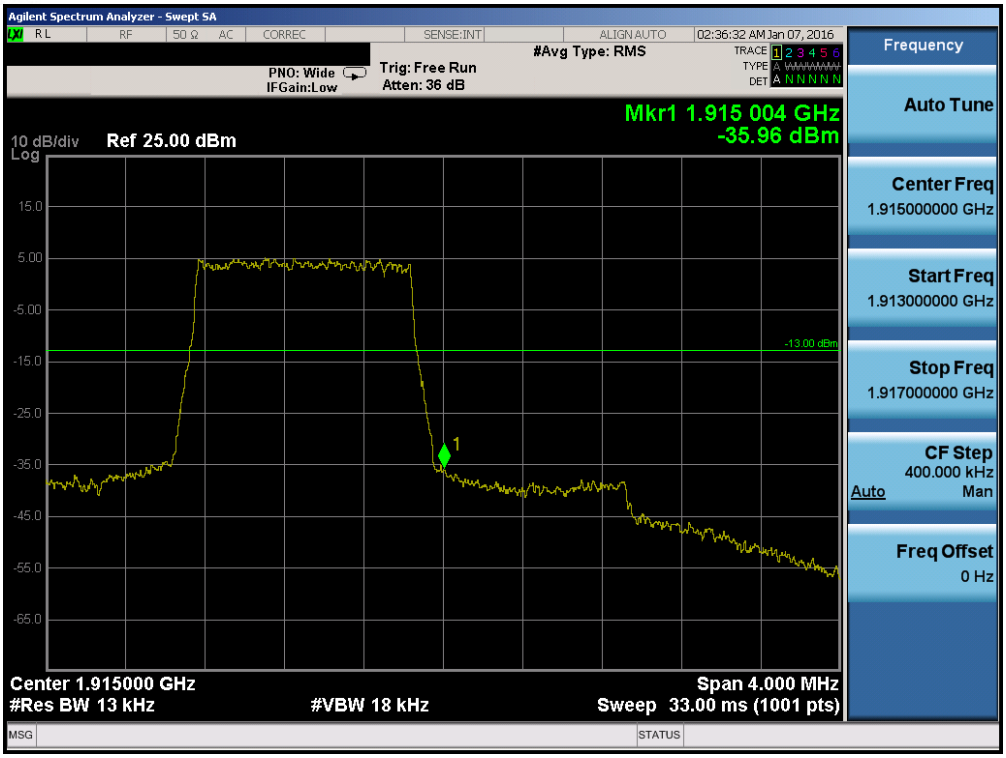
Plot 7-163. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



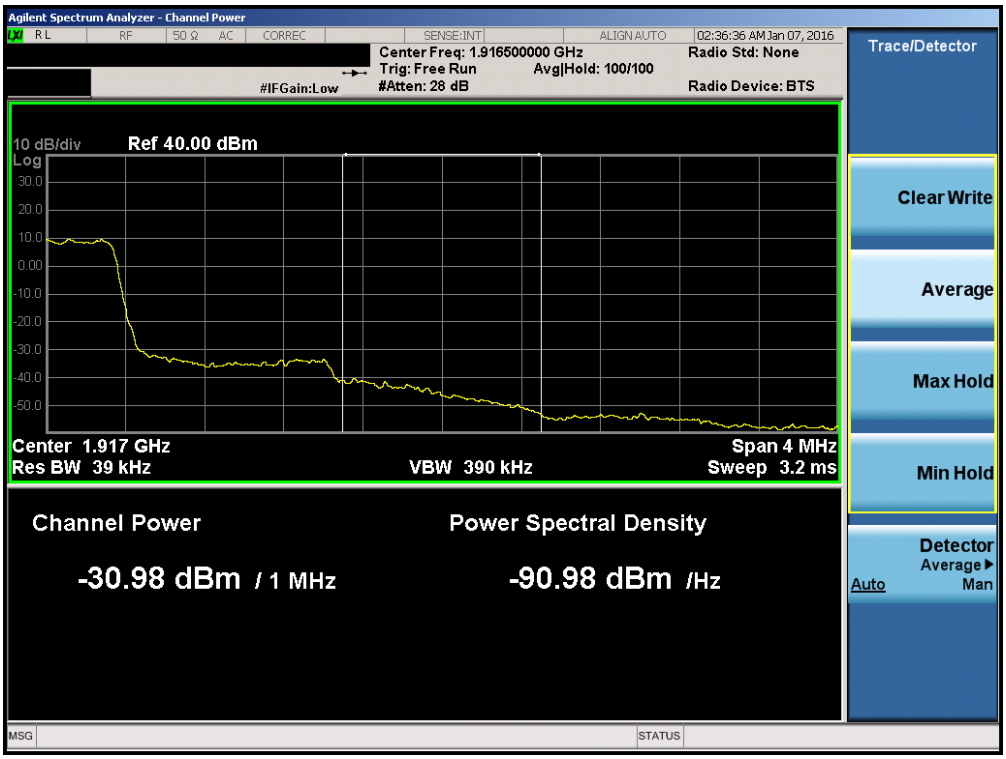
Plot 7-164. Lower Band Edge Plot (Band 25/2 – 1.4MHz QPSK – RB Size 6)



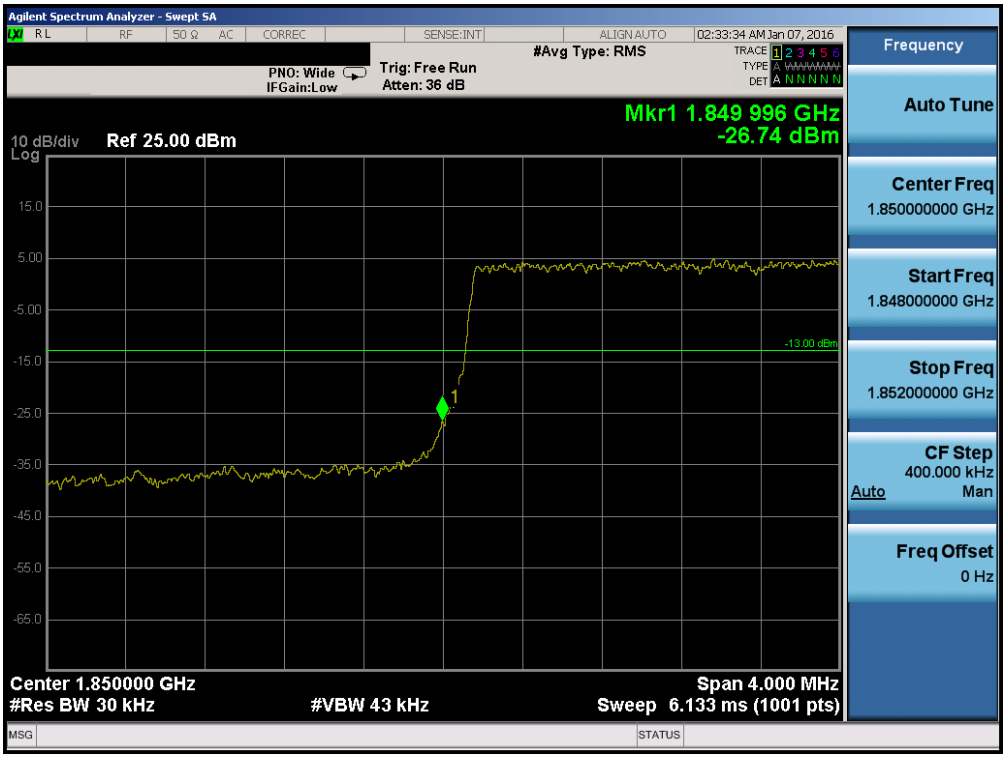
Plot 7-165. Lower Extended Band Edge Plot (Band 25/2 – 1.4MHz QPSK – RB Size 6)



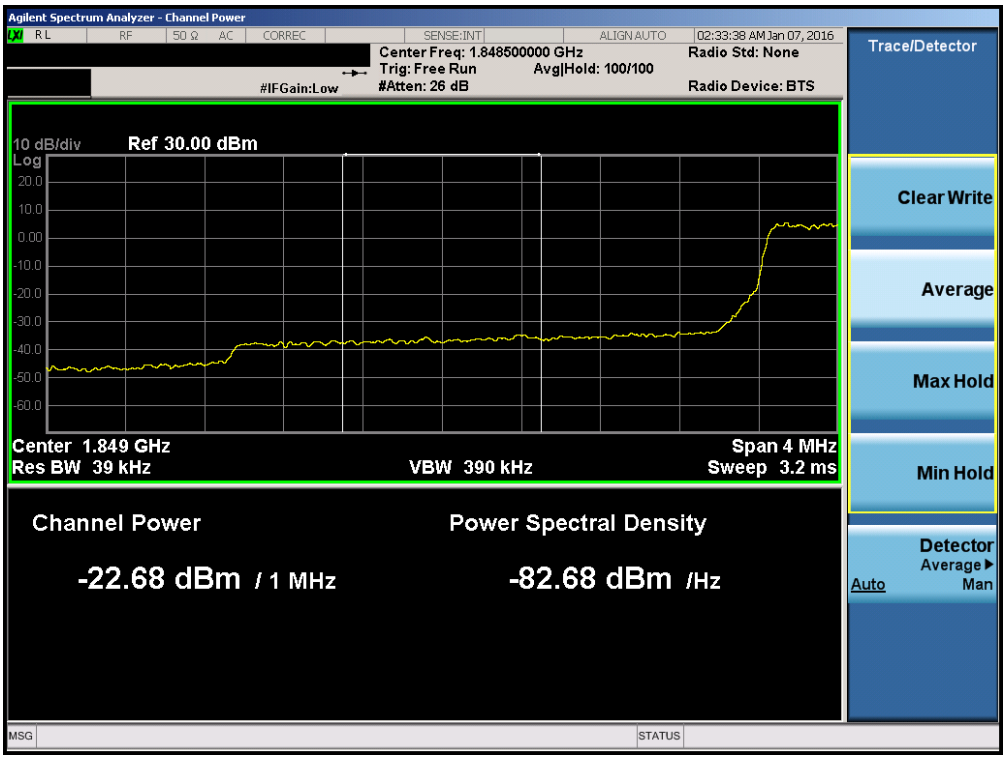
Plot 7-166. Upper Band Edge Plot (Band 25/2 – 1.4MHz QPSK – RB Size 6)



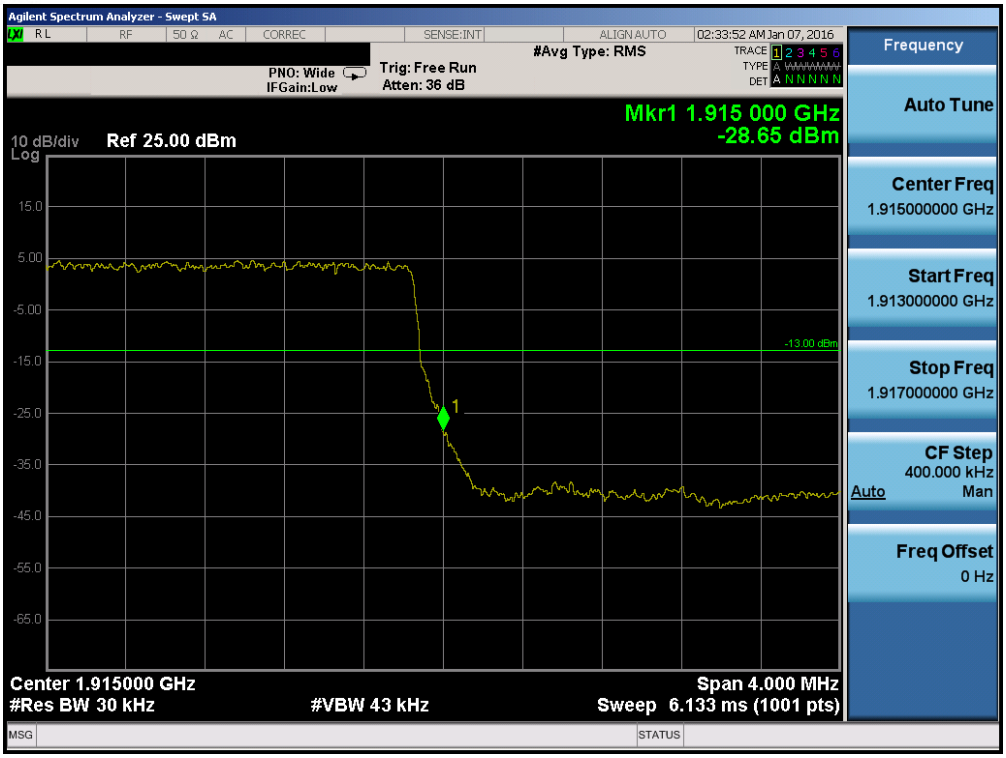
Plot 7-167. Upper Extended Band Edge Plot (Band 25/2 – 1.4MHz QPSK – RB Size 6)



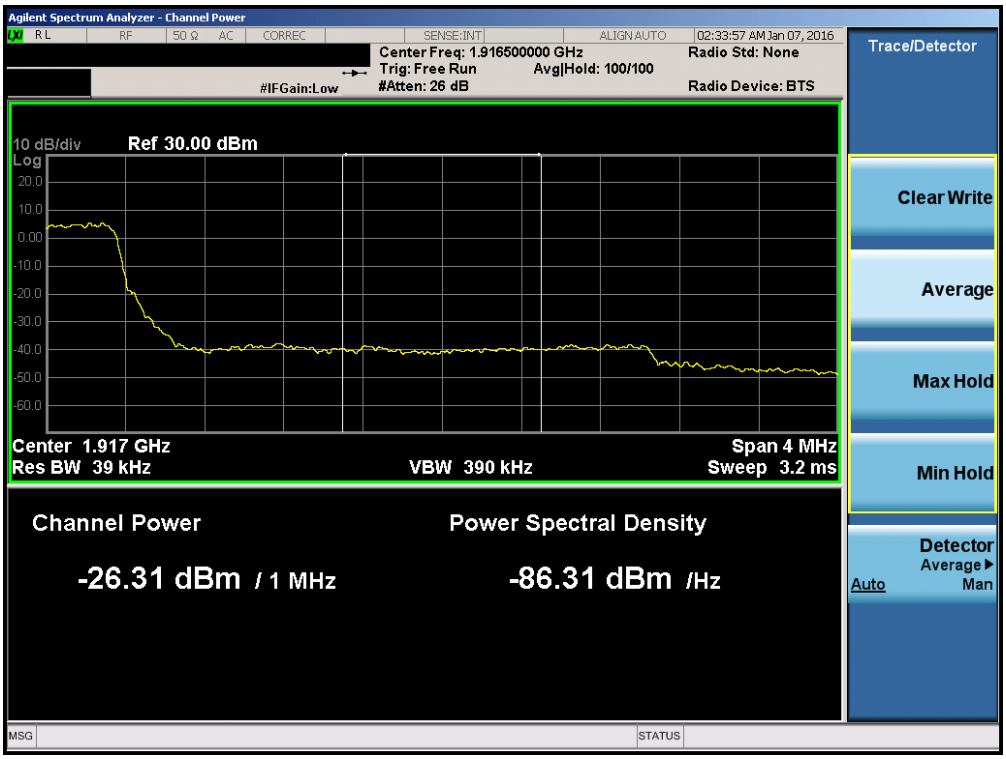
Plot 7-168. Lower Band Edge Plot (Band 25/2 – 3.0MHz QPSK – RB Size 15)



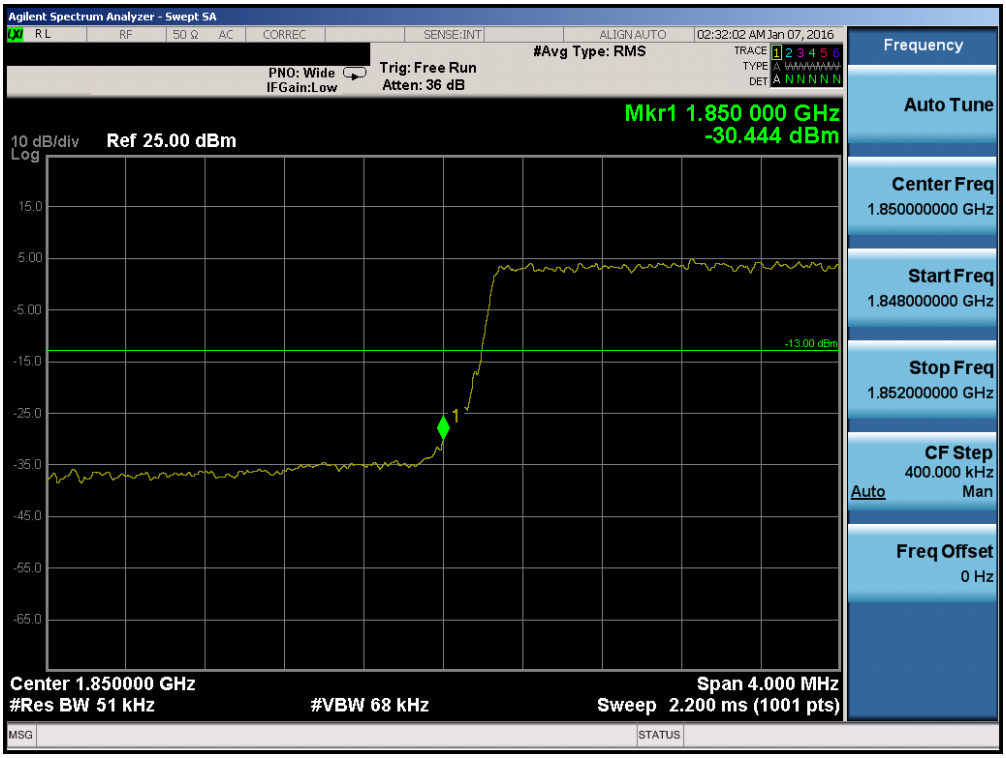
Plot 7-169. Lower Extended Band Edge Plot (Band 25/2 – 3.0MHz QPSK – RB Size 15)



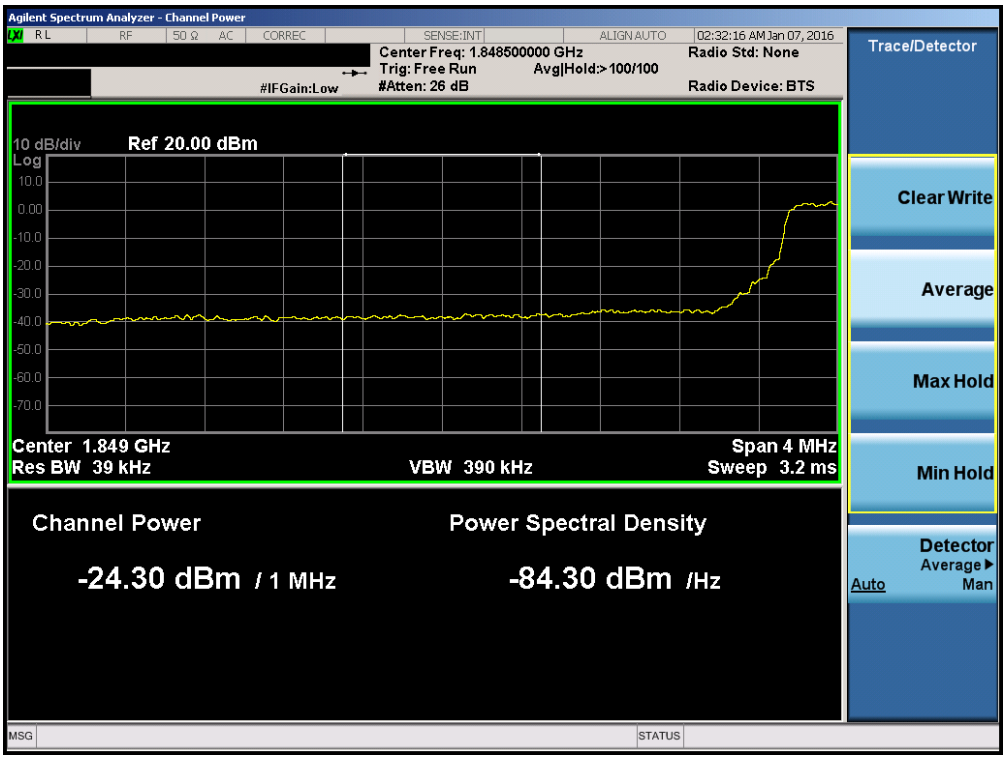
Plot 7-170. Upper Band Edge Plot (Band 25/2 – 3.0MHz QPSK – RB Size 15)



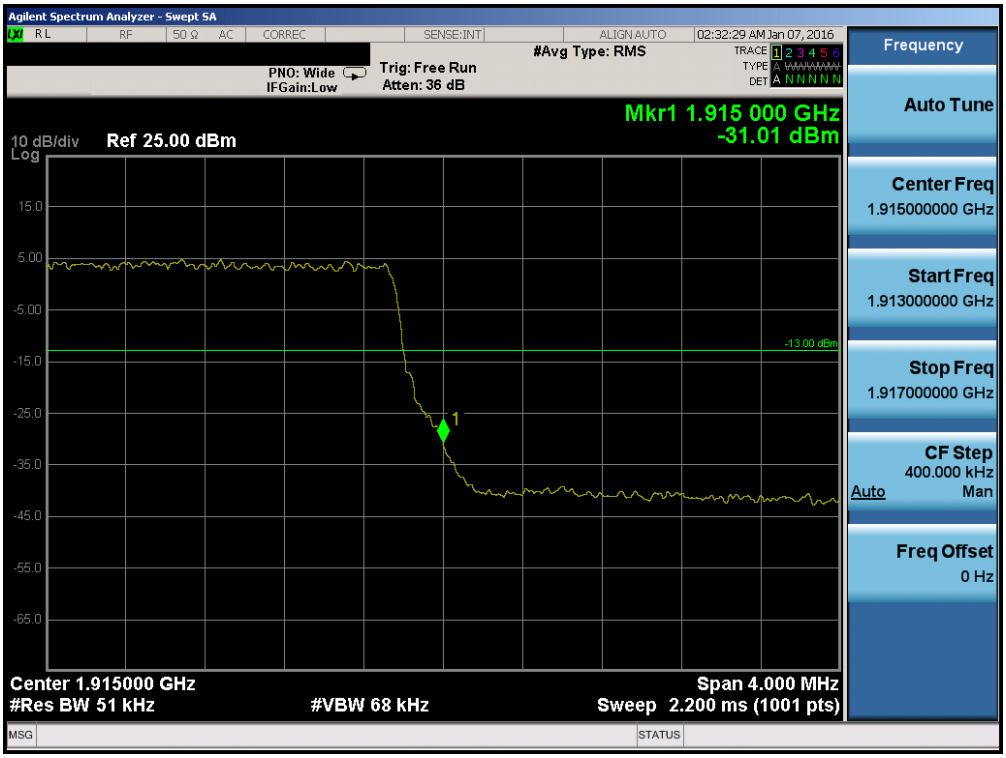
Plot 7-171. Upper Extended Band Edge Plot (Band 25/2 – 3.0MHz QPSK – RB Size 15)



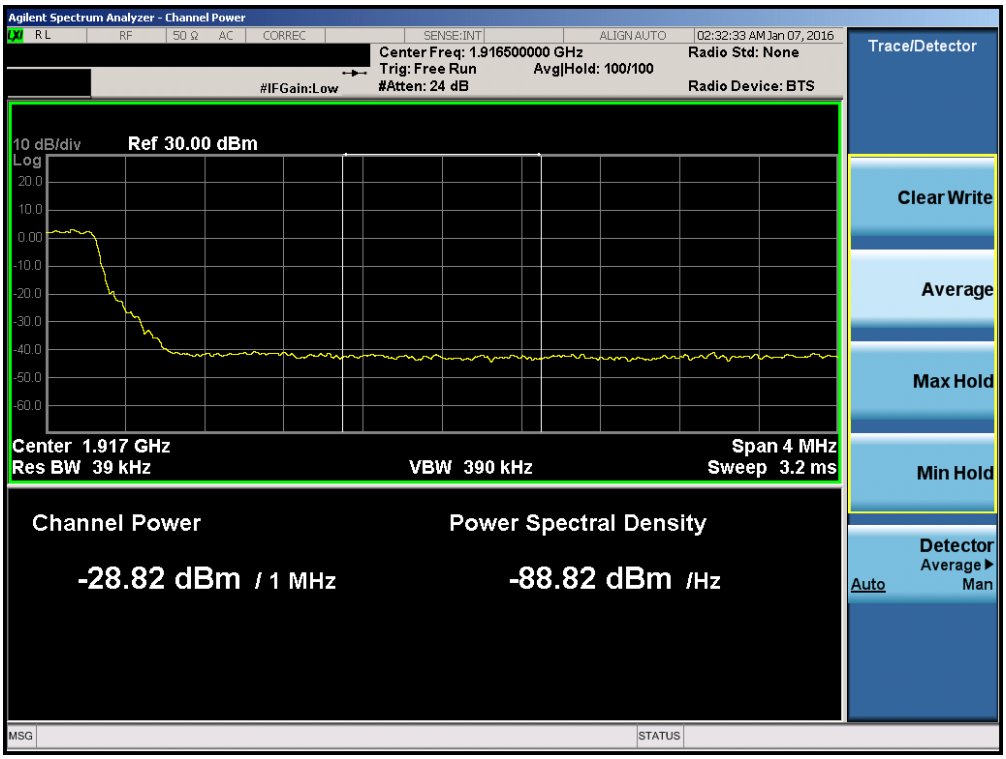
Plot 7-172. Lower Band Edge Plot (Band 25/2 – 5.0MHz QPSK – RB Size 25)



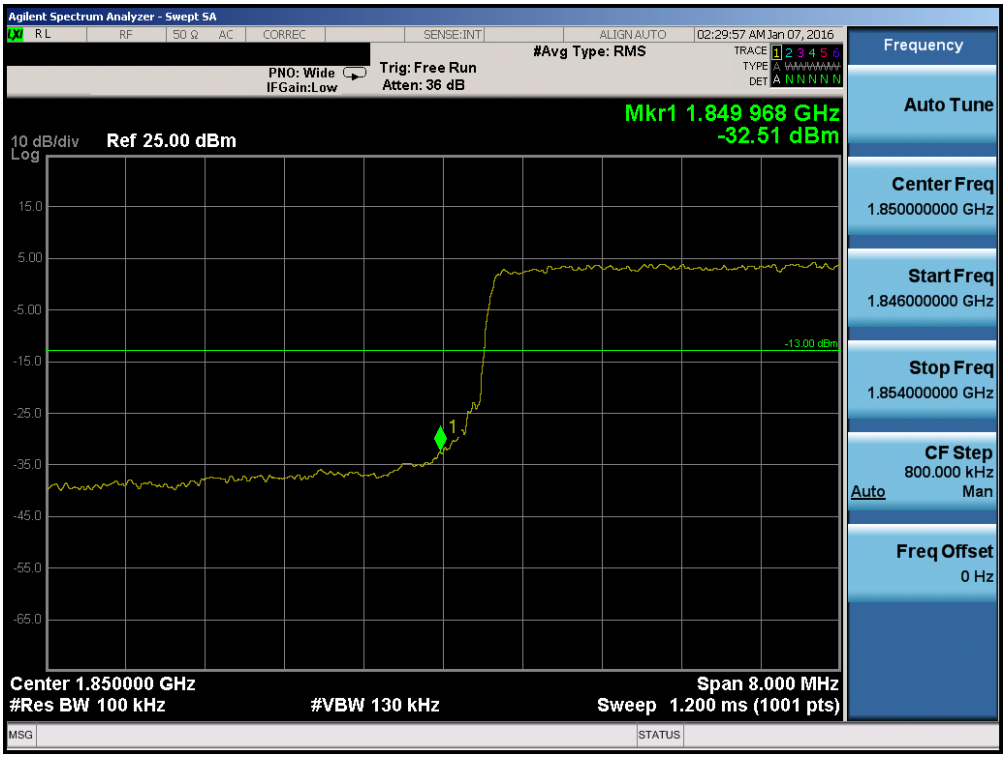
Plot 7-173. Lower Extended Band Edge Plot (Band 25/2 – 5.0MHz QPSK – RB Size 25)



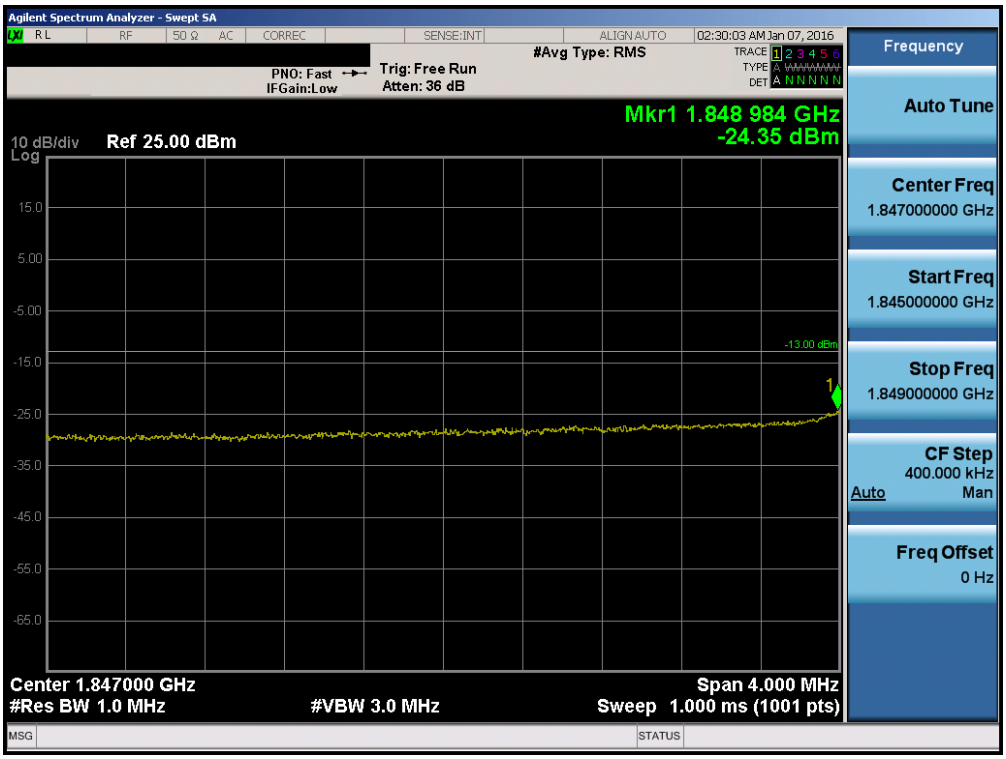
Plot 7-174. Upper Band Edge Plot (Band 25/2 – 5.0MHz QPSK – RB Size 25)



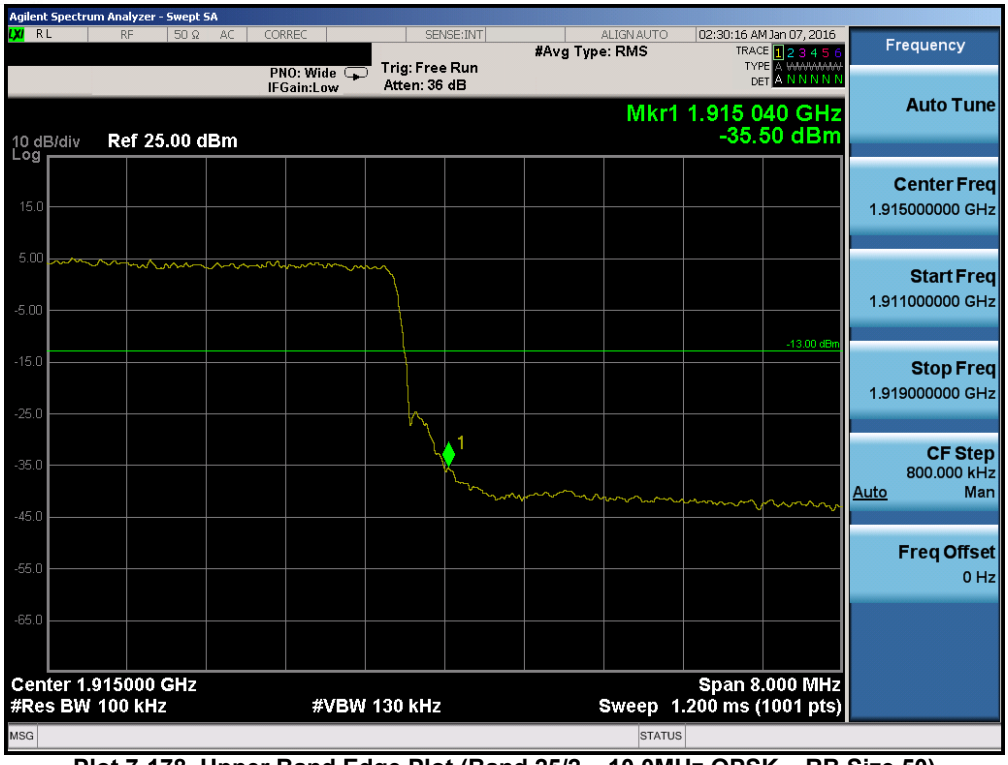
Plot 7-175. Upper Extended Band Edge Plot (Band 25/2 – 5.0MHz QPSK – RB Size 25)



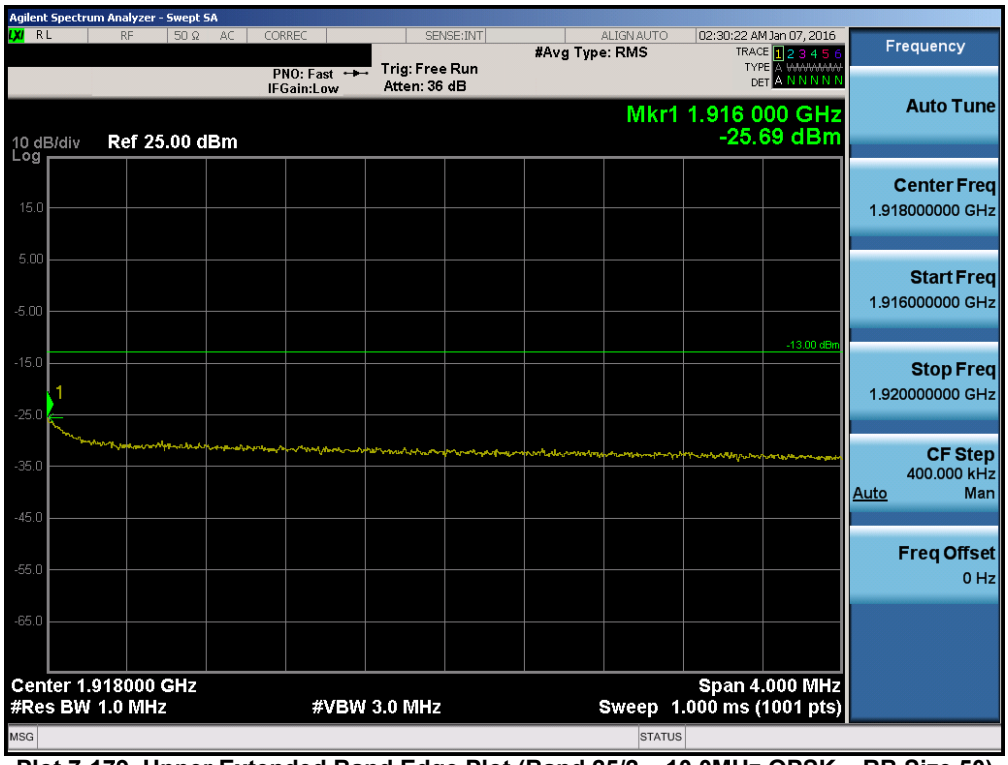
Plot 7-176. Lower Band Edge Plot (Band 25/2 – 10.0MHz QPSK – RB Size 50)



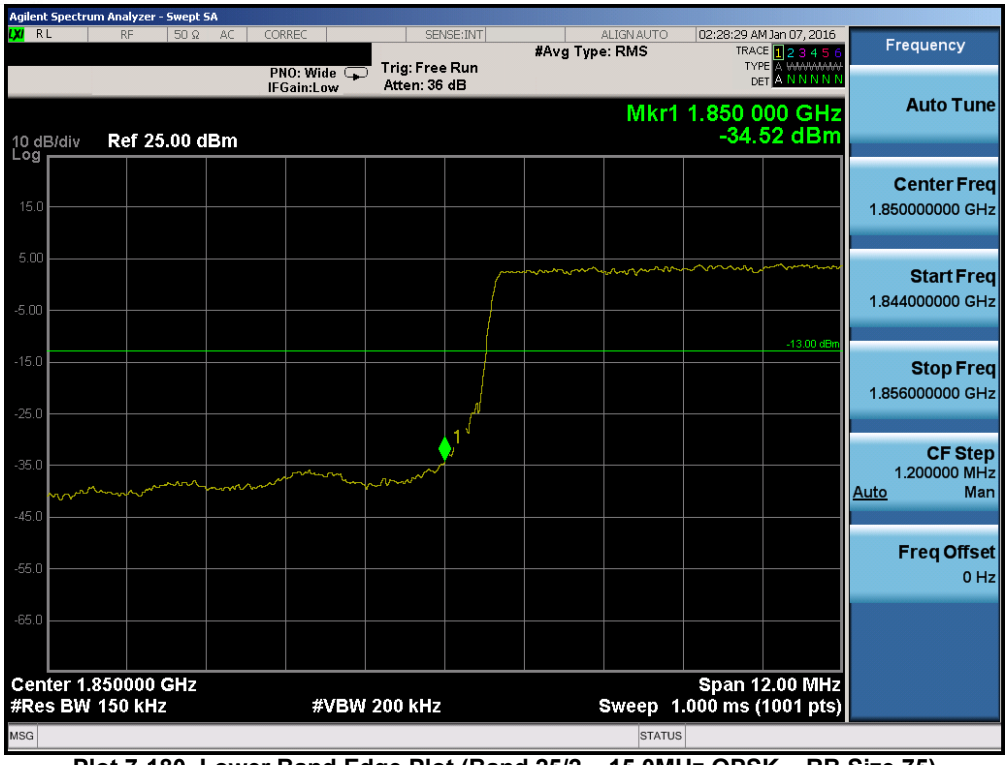
Plot 7-177. Lower Extended Band Edge Plot (Band 25/2 – 10.0MHz QPSK – RB Size 50)



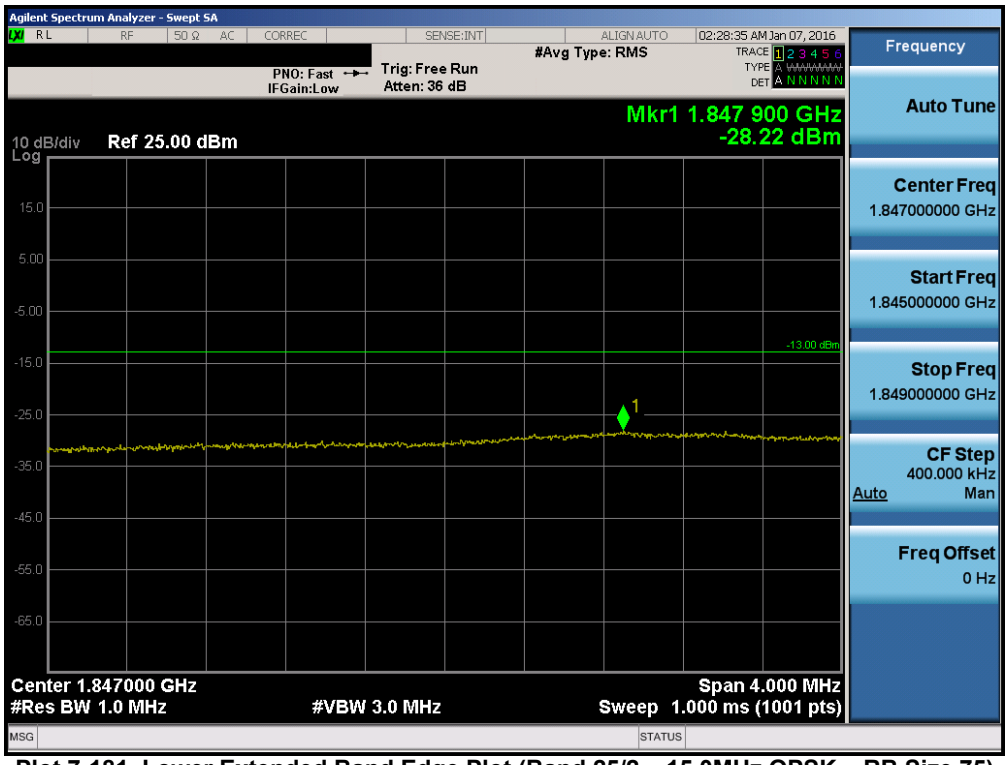
Plot 7-178. Upper Band Edge Plot (Band 25/2 – 10.0MHz QPSK – RB Size 50)



Plot 7-179. Upper Extended Band Edge Plot (Band 25/2 – 10.0MHz QPSK – RB Size 50)

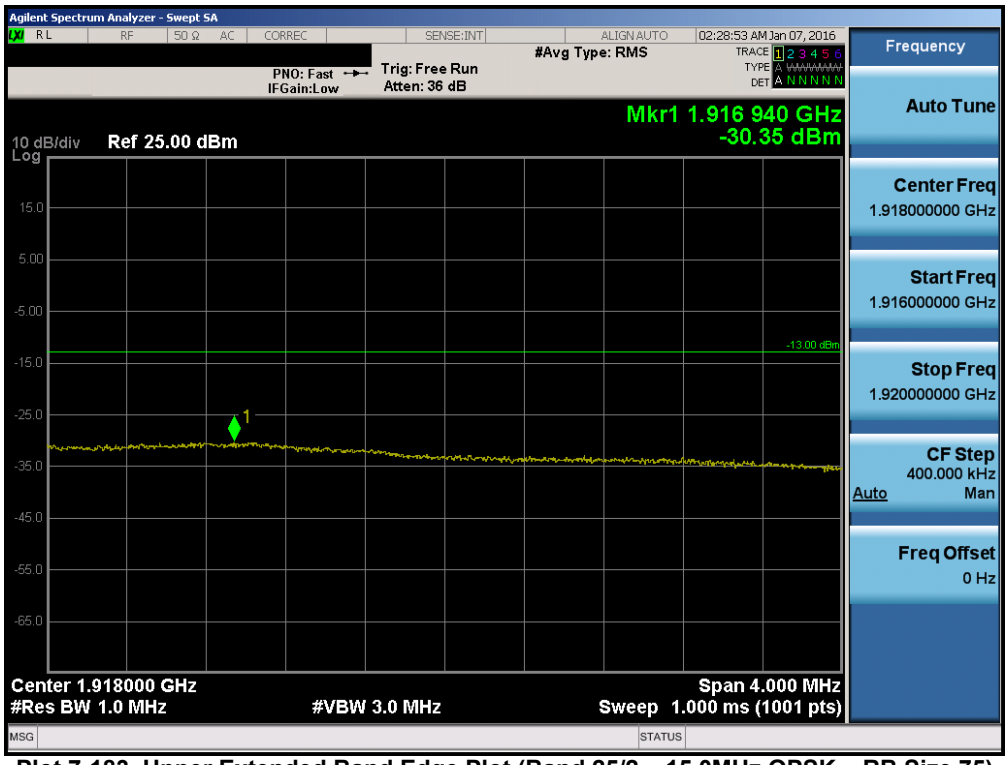


Plot 7-180. Lower Band Edge Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)

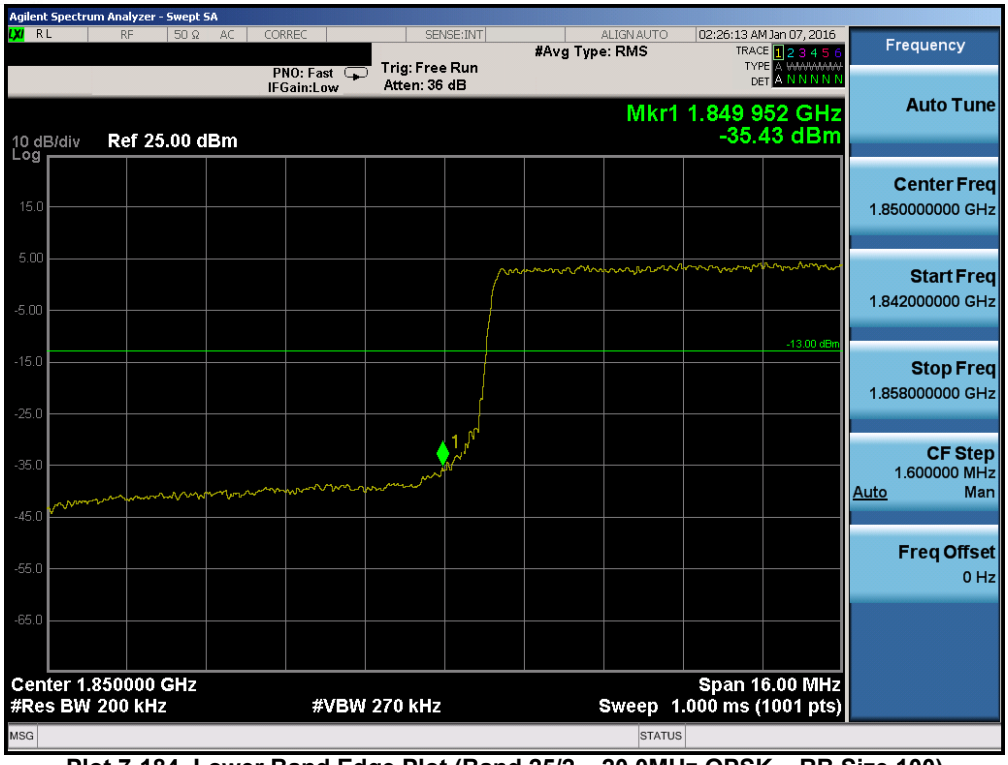


Plot 7-181. Lower Extended Band Edge Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)

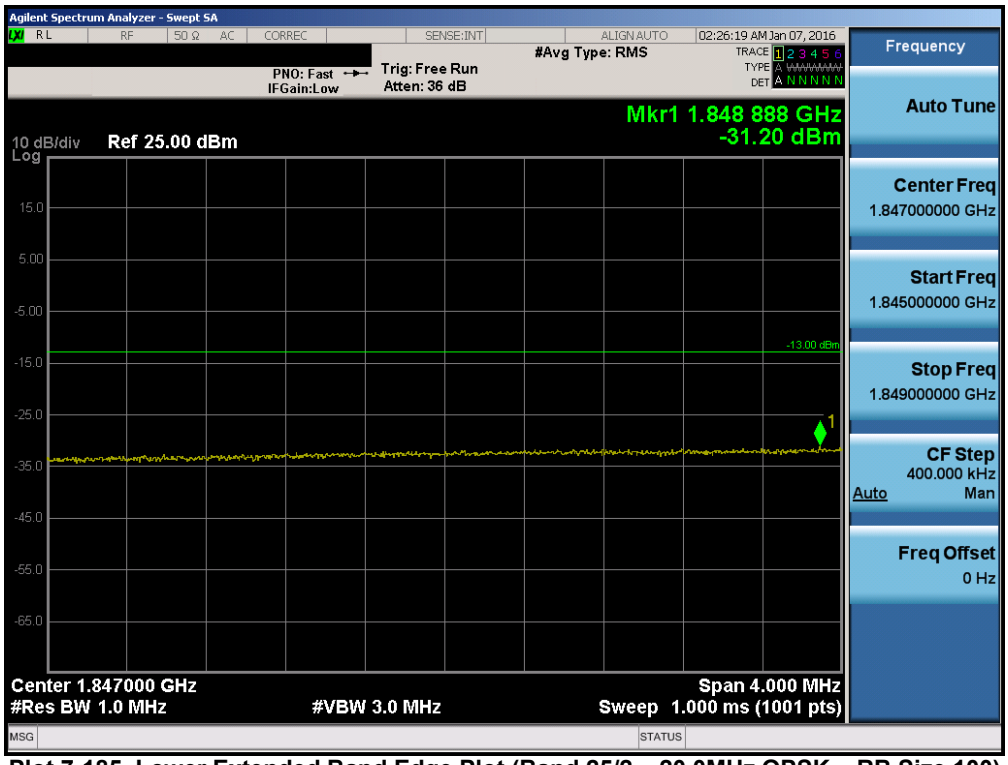
Plot 7-182. Upper Band Edge Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)



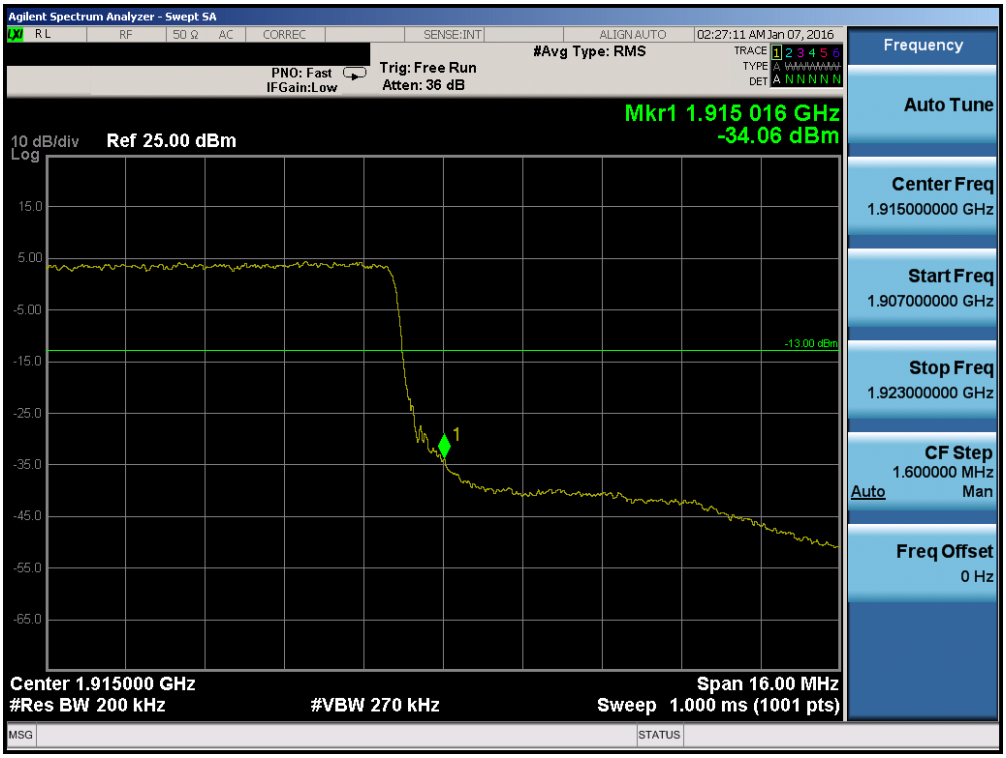
Plot 7-183. Upper Extended Band Edge Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)



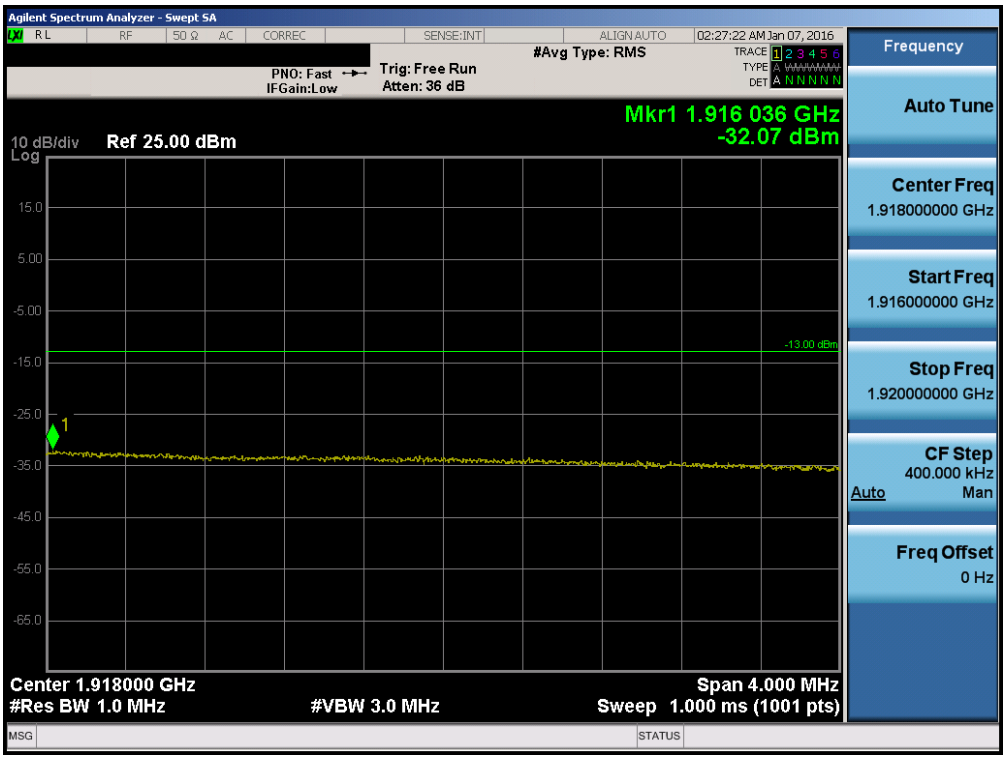
Plot 7-184. Lower Band Edge Plot (Band 25/2 – 20.0MHz QPSK – RB Size 100)



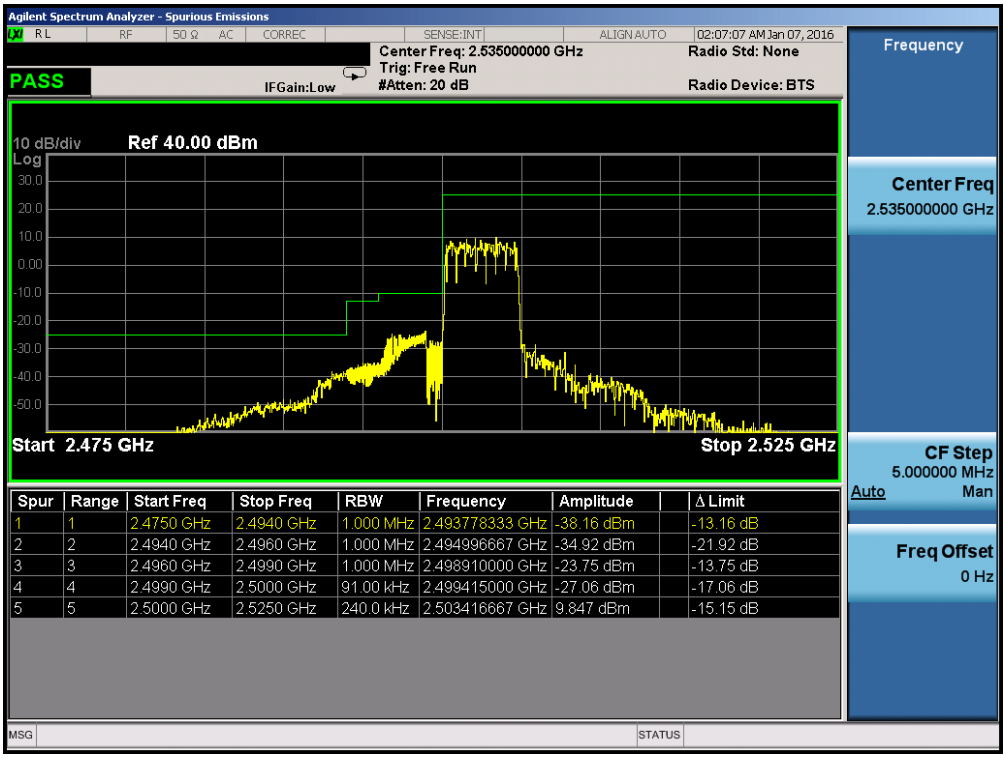
Plot 7-185. Lower Extended Band Edge Plot (Band 25/2 – 20.0MHz QPSK – RB Size 100)



Plot 7-186. Upper Band Edge Plot (Band 25/2 – 20.0MHz QPSK – RB Size 100)

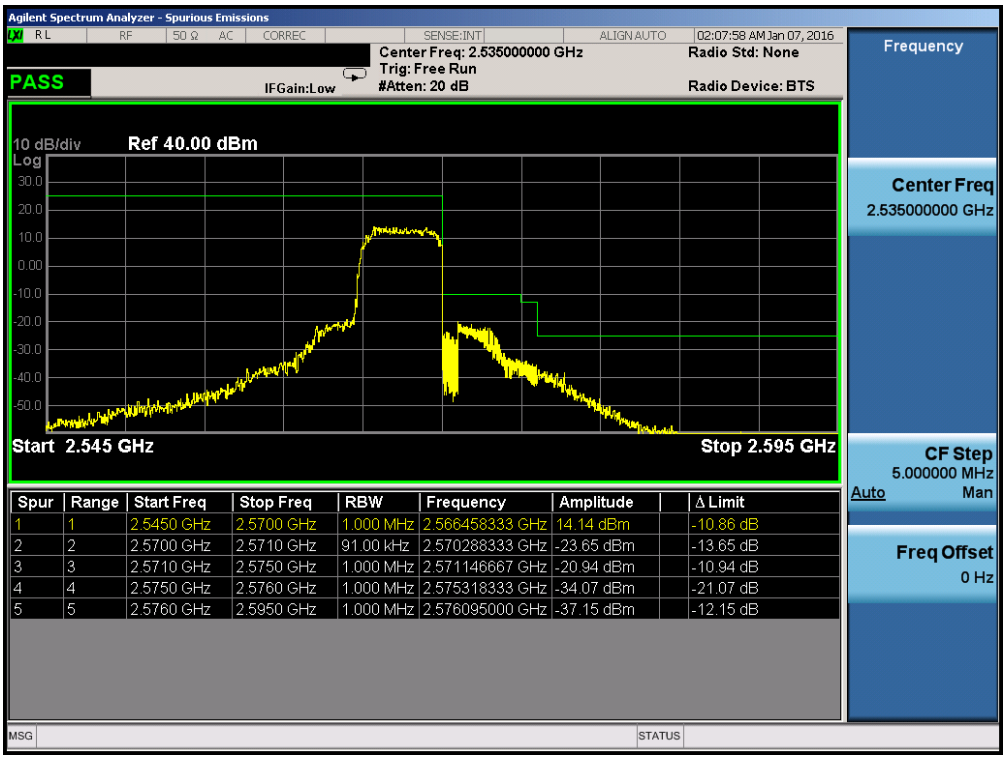


Plot 7-187. Upper Extended Band Edge Plot (Band 25/2 – 20.0MHz QPSK – RB Size 100)



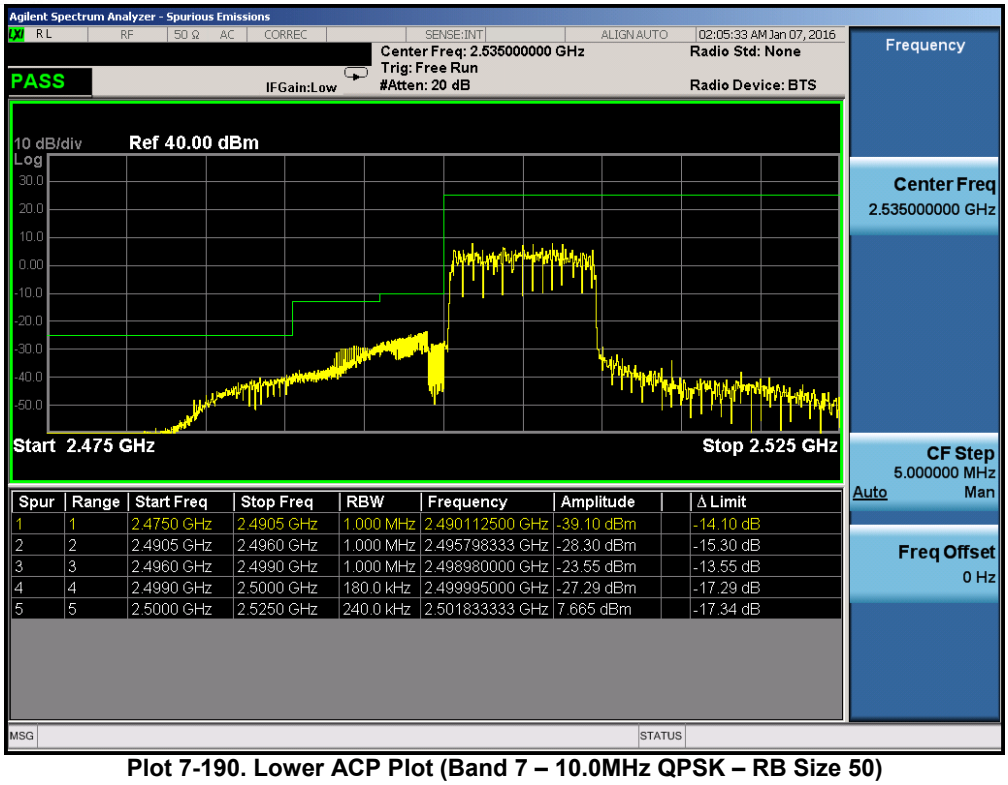
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4940 GHz	1.000 MHz	2.493778333 GHz	-38.16 dBm	-13.16 dB
2	2	2.4940 GHz	2.4960 GHz	1.000 MHz	2.494996667 GHz	-34.92 dBm	-21.92 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.498910000 GHz	-23.75 dBm	-13.75 dB
4	4	2.4990 GHz	2.5000 GHz	91.00 kHz	2.499415000 GHz	-27.06 dBm	-17.06 dB
5	5	2.5000 GHz	2.5250 GHz	240.0 kHz	2.503416667 GHz	9.847 dBm	-15.15 dB

Plot 7-188. Lower ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)

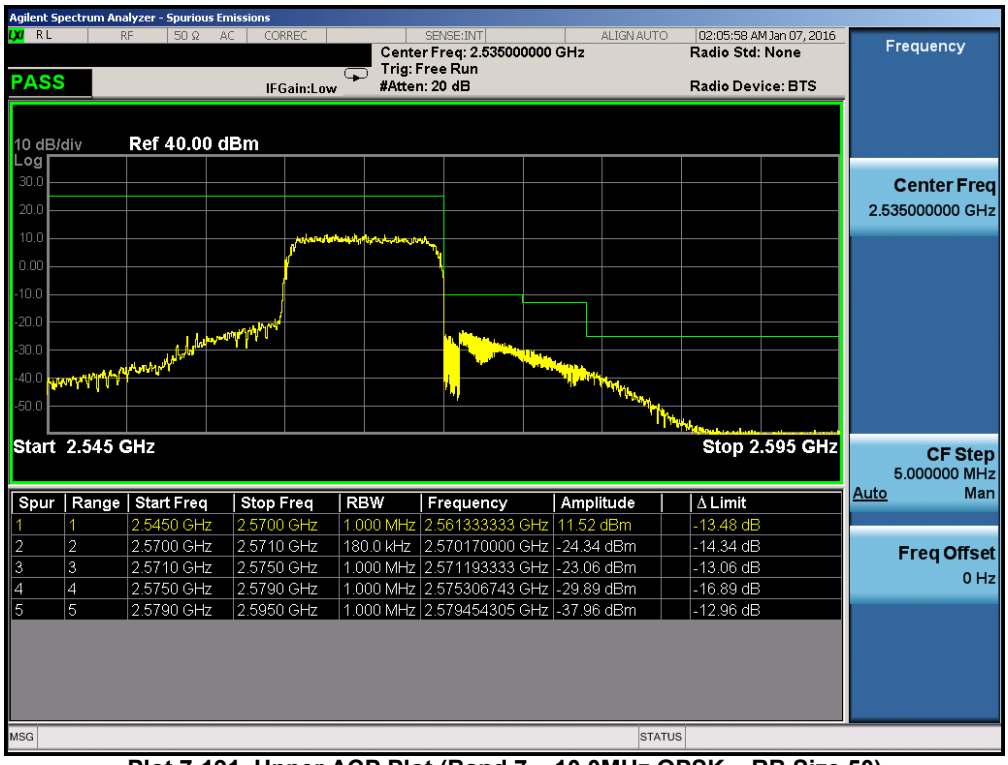


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5450 GHz	2.5700 GHz	1.000 MHz	2.566458333 GHz	14.14 dBm	-10.86 dB
2	2	2.5700 GHz	2.5710 GHz	91.00 kHz	2.570288333 GHz	-23.65 dBm	-13.65 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571146667 GHz	-20.94 dBm	-10.94 dB
4	4	2.5750 GHz	2.5760 GHz	1.000 MHz	2.575318333 GHz	-34.07 dBm	-21.07 dB
5	5	2.5760 GHz	2.5950 GHz	1.000 MHz	2.576095000 GHz	-37.15 dBm	-12.15 dB

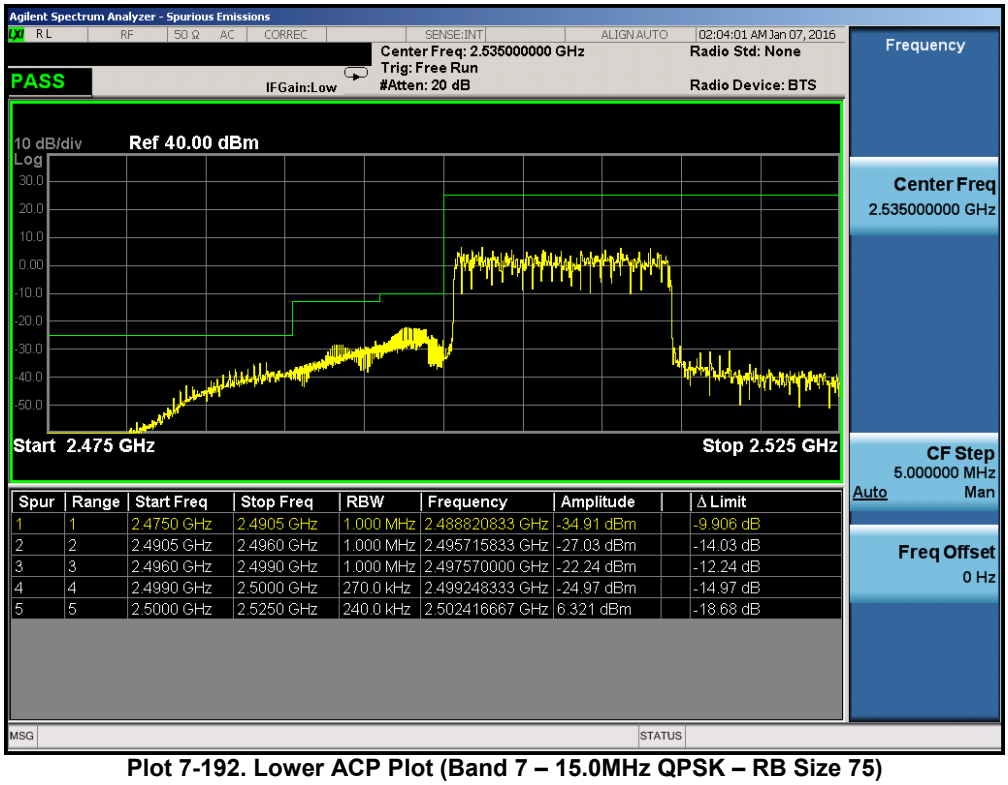
Plot 7-189. Upper ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)



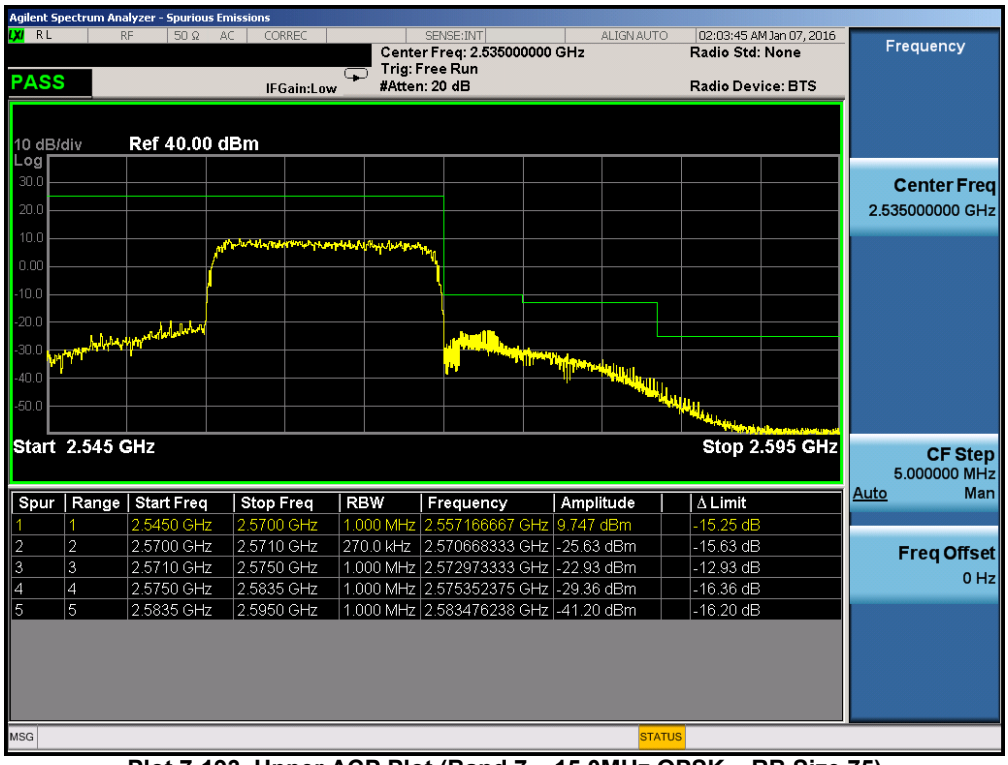
Plot 7-190. Lower ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)



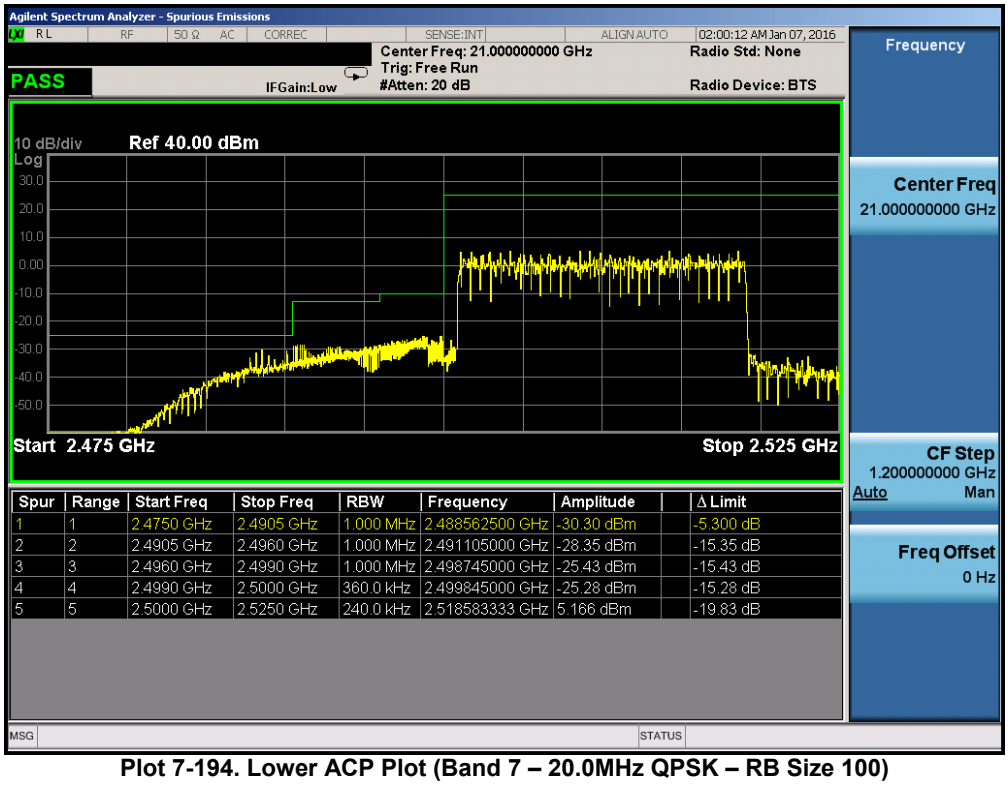
Plot 7-191. Upper ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)



Plot 7-192. Lower ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)

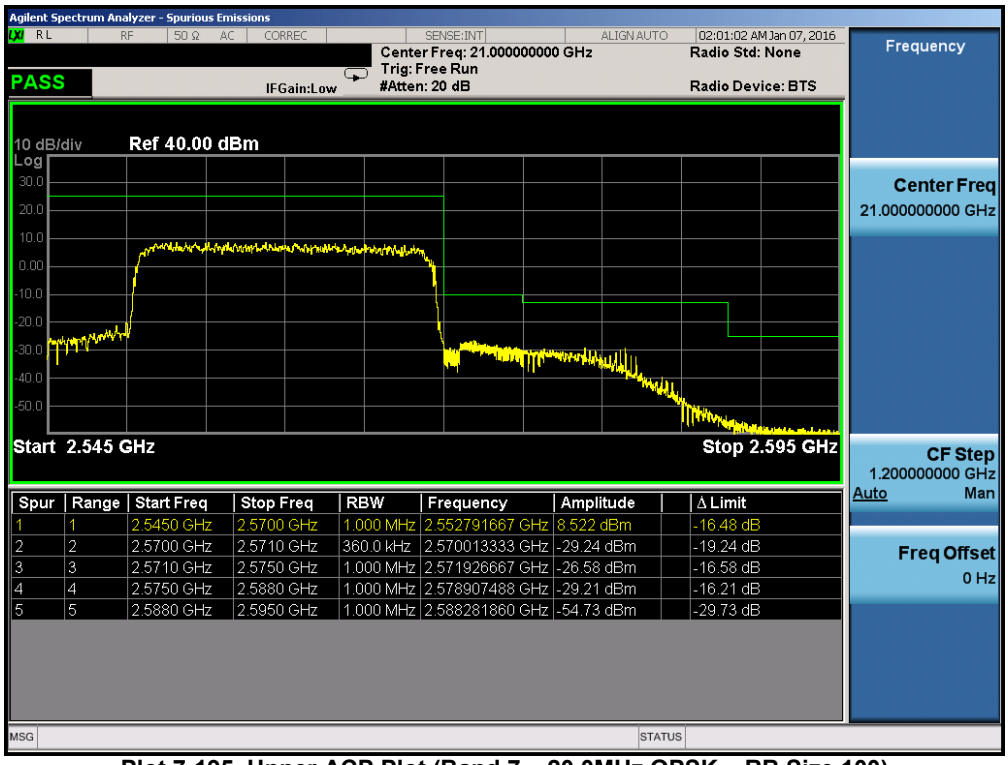


Plot 7-193. Upper ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)



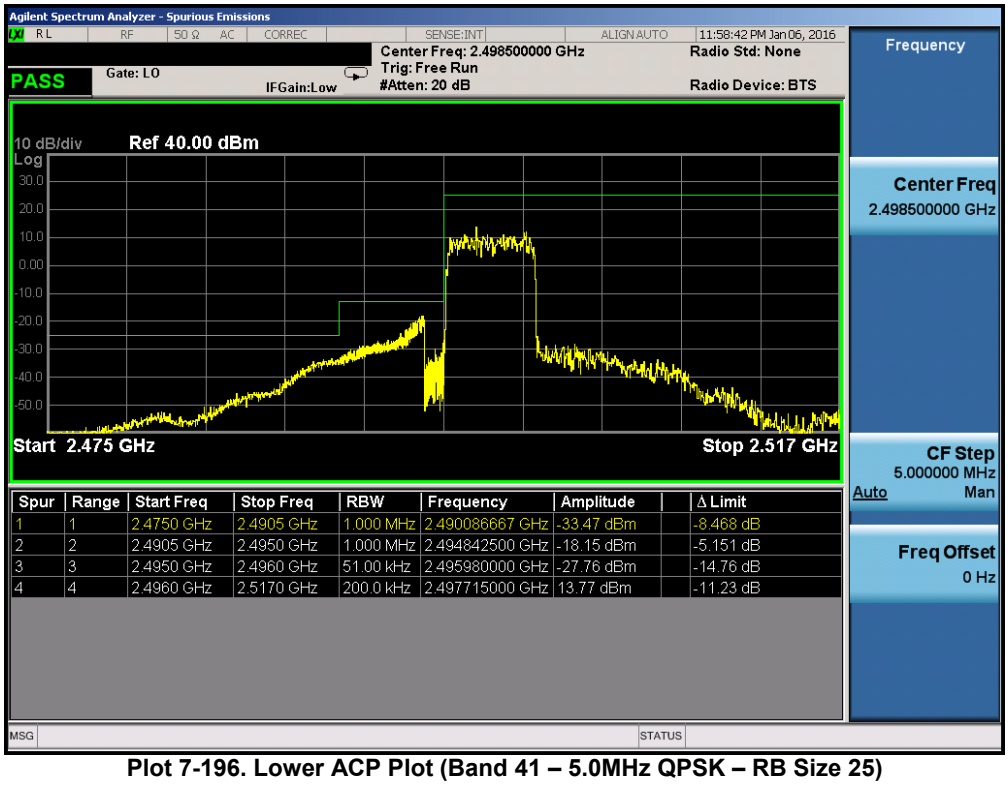
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.488562500 GHz	-30.30 dBm	-5.300 dB
2	2	2.4905 GHz	2.4960 GHz	1.000 MHz	2.491105000 GHz	-28.35 dBm	-15.35 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.498745000 GHz	-25.43 dBm	-15.43 dB
4	4	2.4990 GHz	2.5000 GHz	360.0 kHz	2.499845000 GHz	-25.28 dBm	-15.28 dB
5	5	2.5000 GHz	2.5250 GHz	240.0 kHz	2.518583333 GHz	5.166 dBm	-19.83 dB

Plot 7-194. Lower ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)



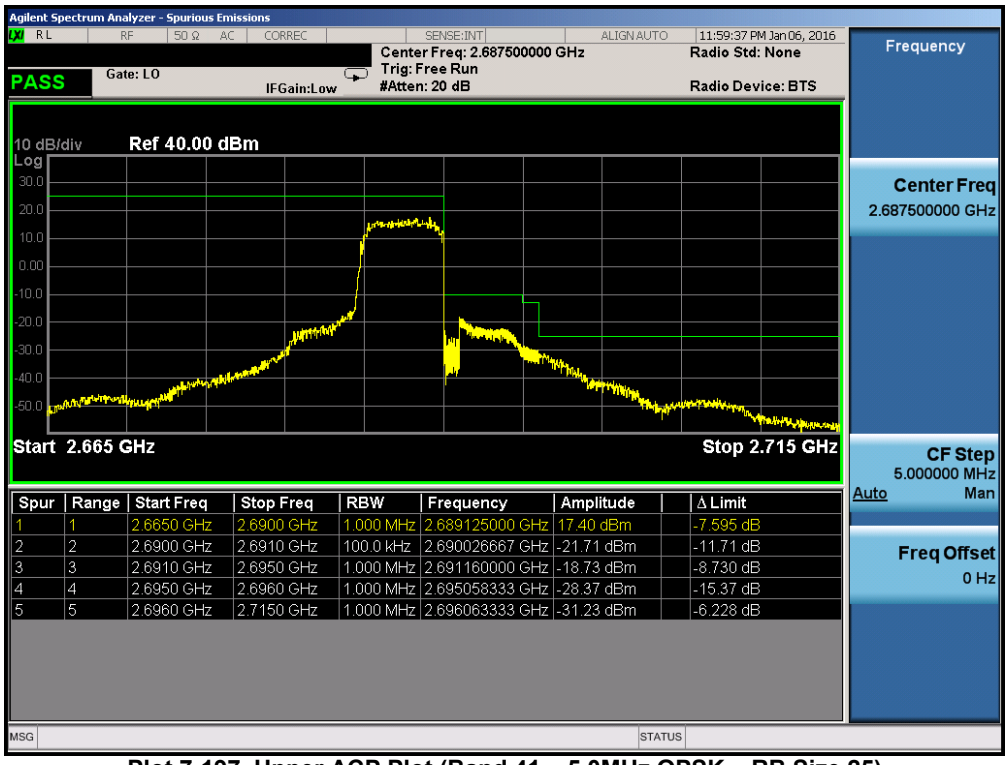
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5450 GHz	2.5700 GHz	1.000 MHz	2.552791667 GHz	8.522 dBm	-16.48 dB
2	2	2.5700 GHz	2.5710 GHz	360.0 kHz	2.570013333 GHz	-29.24 dBm	-19.24 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571926667 GHz	-26.58 dBm	-16.58 dB
4	4	2.5750 GHz	2.5880 GHz	1.000 MHz	2.578907488 GHz	-29.21 dBm	-16.21 dB
5	5	2.5880 GHz	2.5950 GHz	1.000 MHz	2.588281860 GHz	-54.73 dBm	-29.73 dB

Plot 7-195. Upper ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)



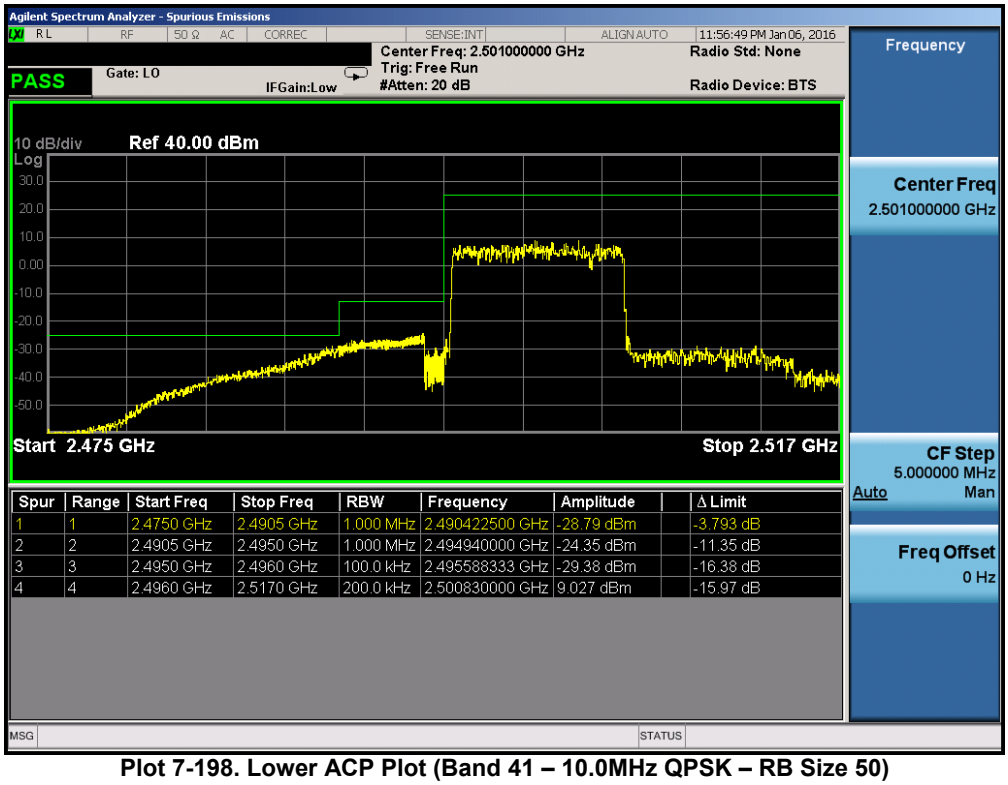
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490086667 GHz	-33.47 dBm	-8.468 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494842500 GHz	-18.15 dBm	-5.151 dB
3	3	2.4950 GHz	2.4960 GHz	51.00 kHz	2.495980000 GHz	-27.76 dBm	-14.76 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.497715000 GHz	13.77 dBm	-11.23 dB

Plot 7-196. Lower ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

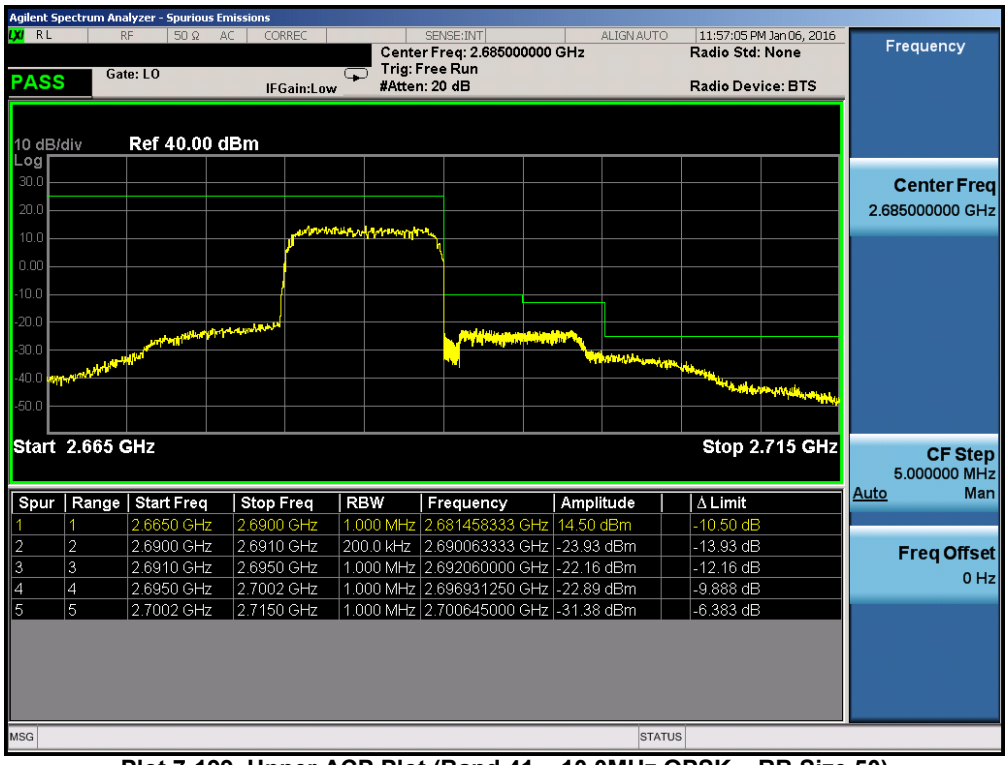


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.689125000 GHz	17.40 dBm	-7.595 dB
2	2	2.6900 GHz	2.6910 GHz	100.0 kHz	2.690026667 GHz	-21.71 dBm	-11.71 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691160000 GHz	-18.73 dBm	-8.730 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695058333 GHz	-28.37 dBm	-15.37 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696063333 GHz	-31.23 dBm	-6.228 dB

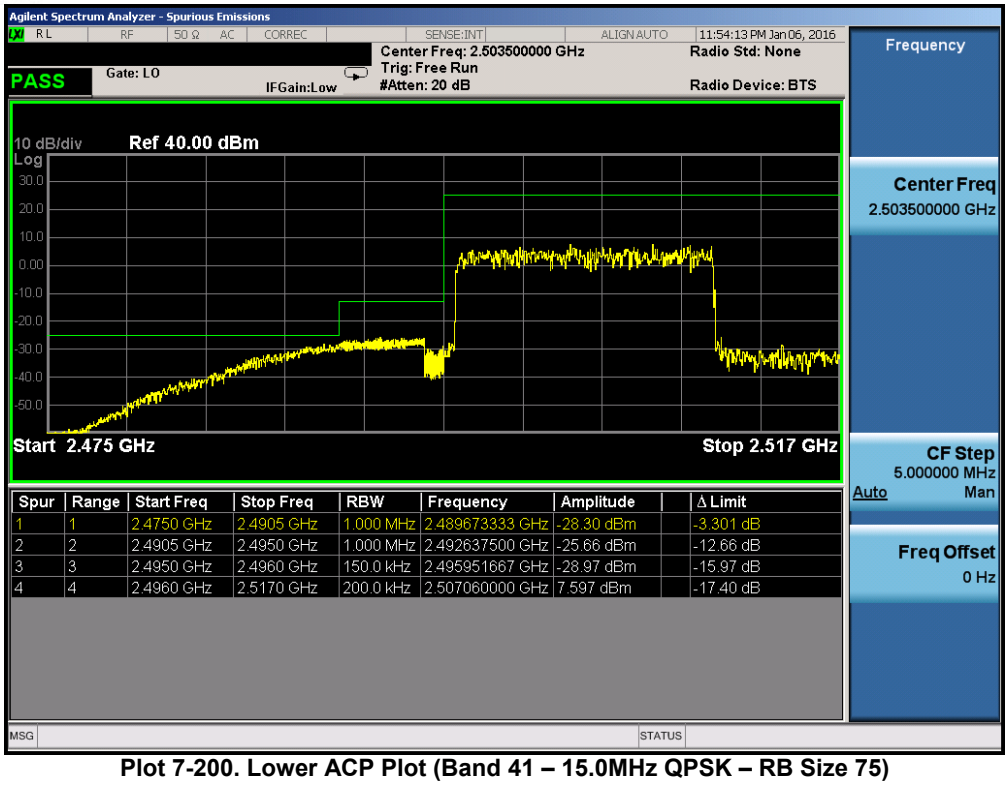
Plot 7-197. Upper ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)



Plot 7-198. Lower ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)

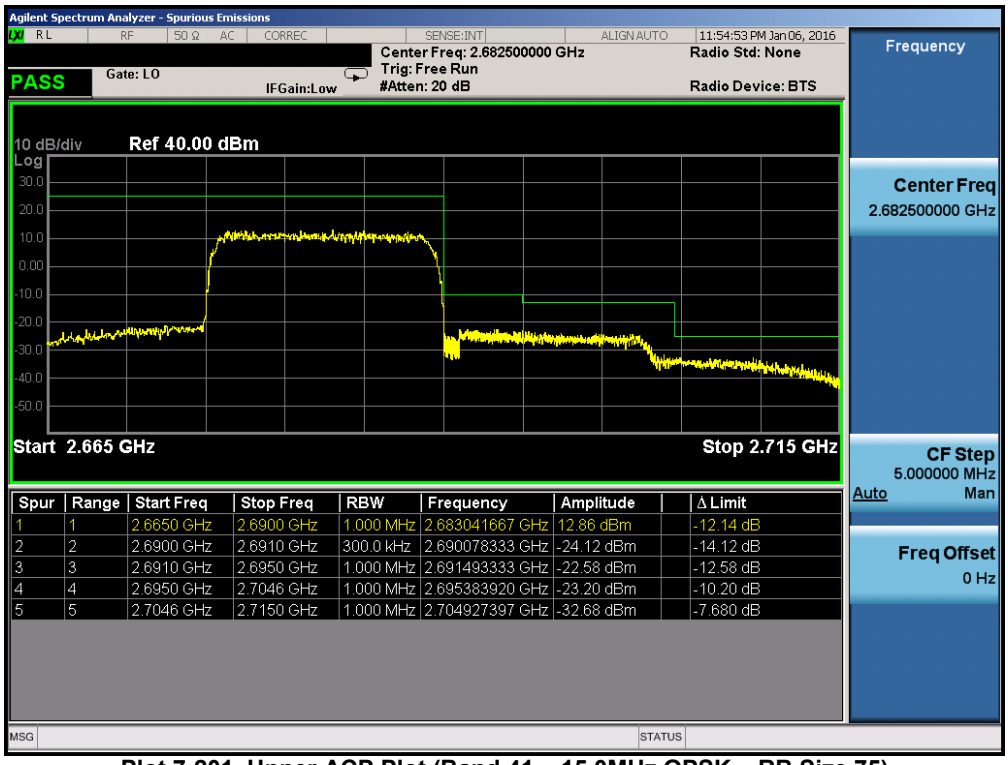


Plot 7-199. Upper ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



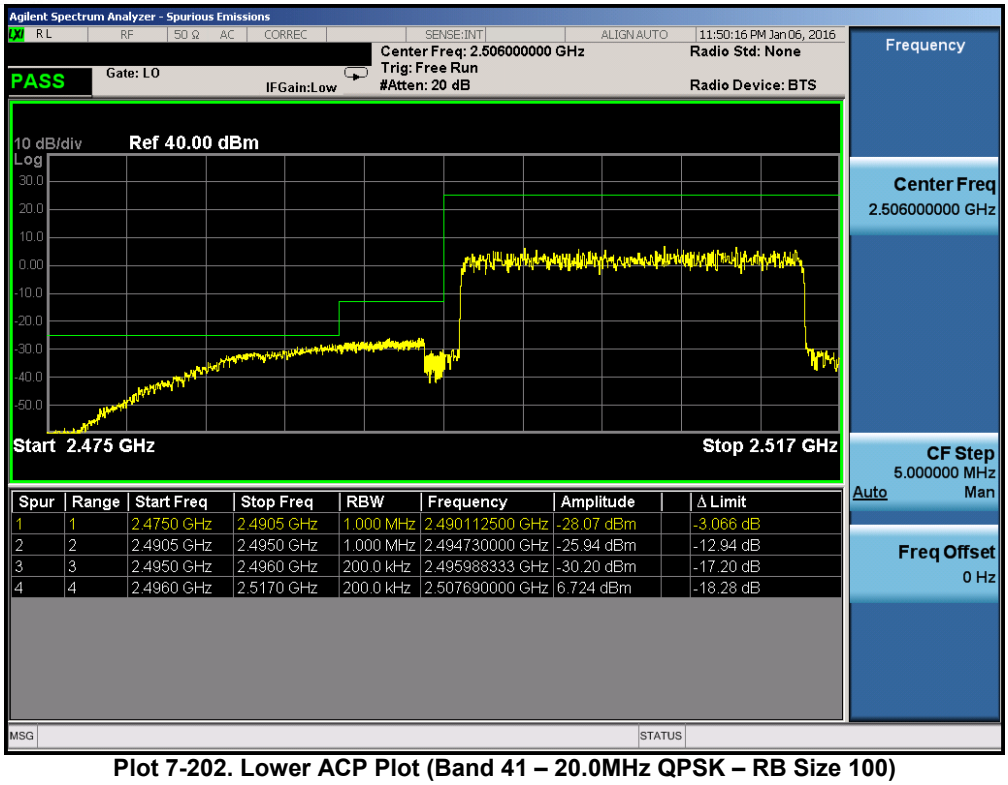
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489673333 GHz	-28.30 dBm	-3.301 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.492637500 GHz	-25.66 dBm	-12.66 dB
3	3	2.4950 GHz	2.4960 GHz	150.0 kHz	2.495951667 GHz	-28.97 dBm	-15.97 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.507060000 GHz	7.597 dBm	-17.40 dB

Plot 7-200. Lower ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



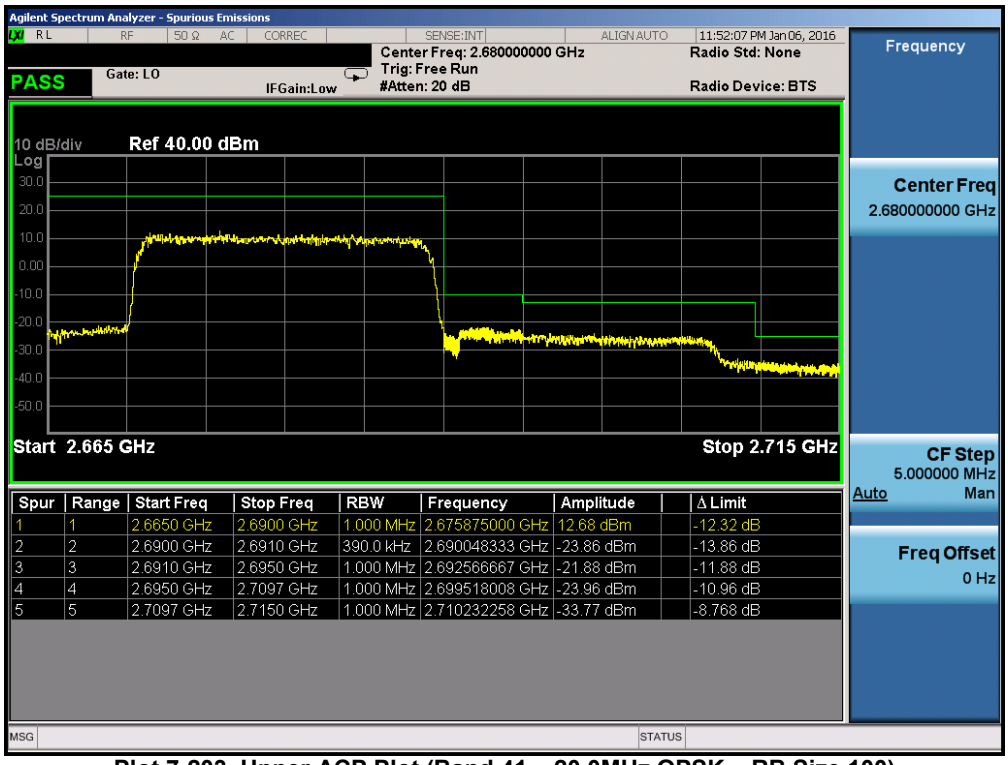
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.683041667 GHz	12.86 dBm	-12.14 dB
2	2	2.6900 GHz	2.6910 GHz	300.0 kHz	2.690078333 GHz	-24.12 dBm	-14.12 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691493333 GHz	-22.58 dBm	-12.58 dB
4	4	2.6950 GHz	2.7046 GHz	1.000 MHz	2.695383920 GHz	-23.20 dBm	-10.20 dB
5	5	2.7046 GHz	2.7150 GHz	1.000 MHz	2.704927397 GHz	-32.68 dBm	-7.680 dB

Plot 7-201. Upper ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490112500 GHz	-28.07 dBm	-3.066 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494730000 GHz	-25.94 dBm	-12.94 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495988333 GHz	-30.20 dBm	-17.20 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.507690000 GHz	6.724 dBm	-18.28 dB

Plot 7-202. Lower ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	1.000 MHz	2.675875000 GHz	12.68 dBm	-12.32 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690048333 GHz	-23.86 dBm	-13.86 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.692566667 GHz	-21.88 dBm	-11.88 dB
4	4	2.6950 GHz	2.7097 GHz	1.000 MHz	2.699518008 GHz	-23.96 dBm	-10.96 dB
5	5	2.7097 GHz	2.7150 GHz	1.000 MHz	2.710232258 GHz	-33.77 dBm	-8.768 dB

Plot 7-203. Upper ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)

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. 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.

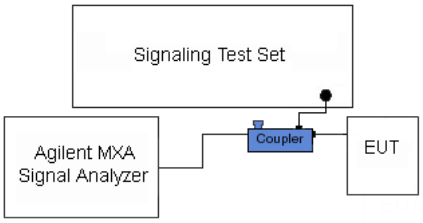
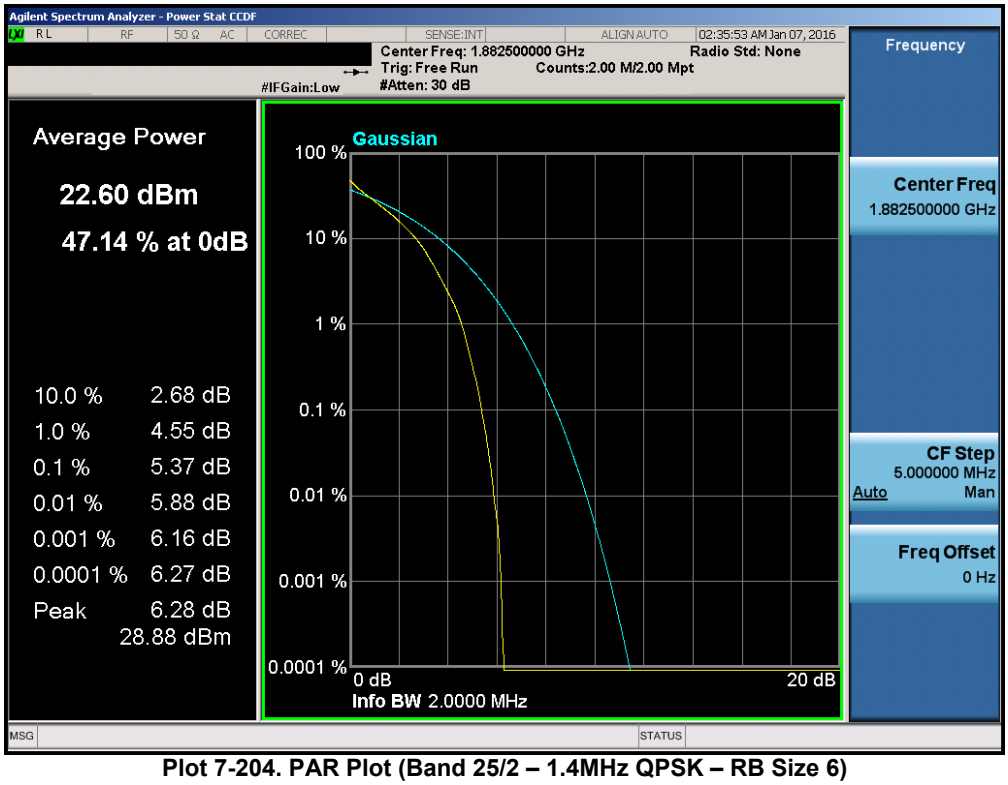


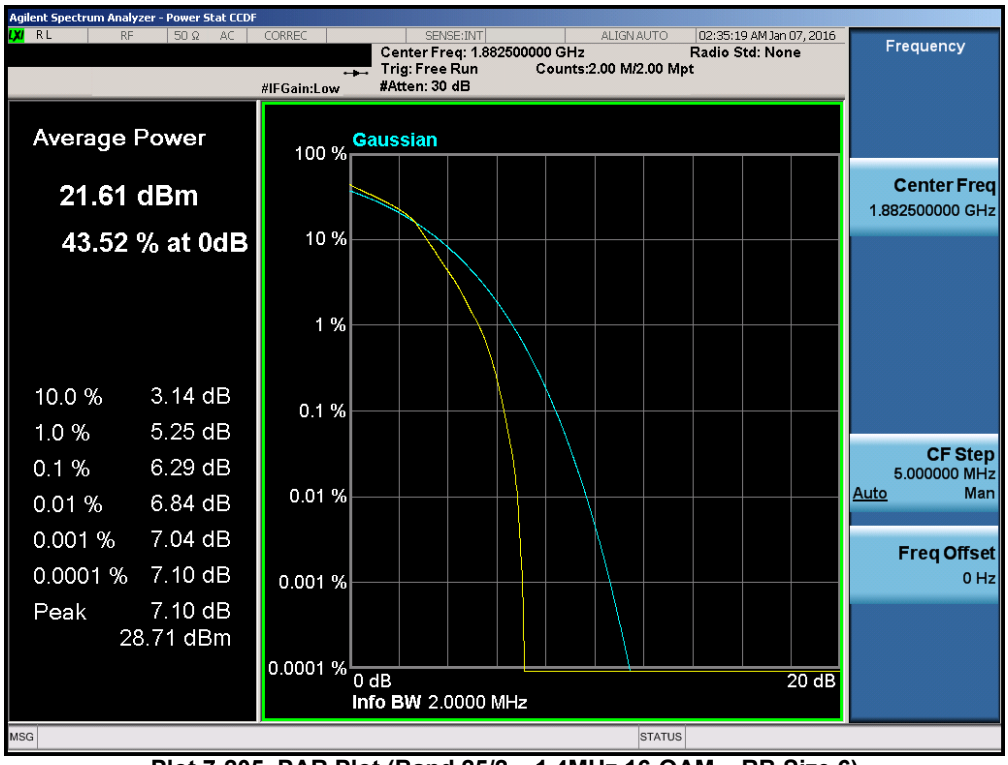
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

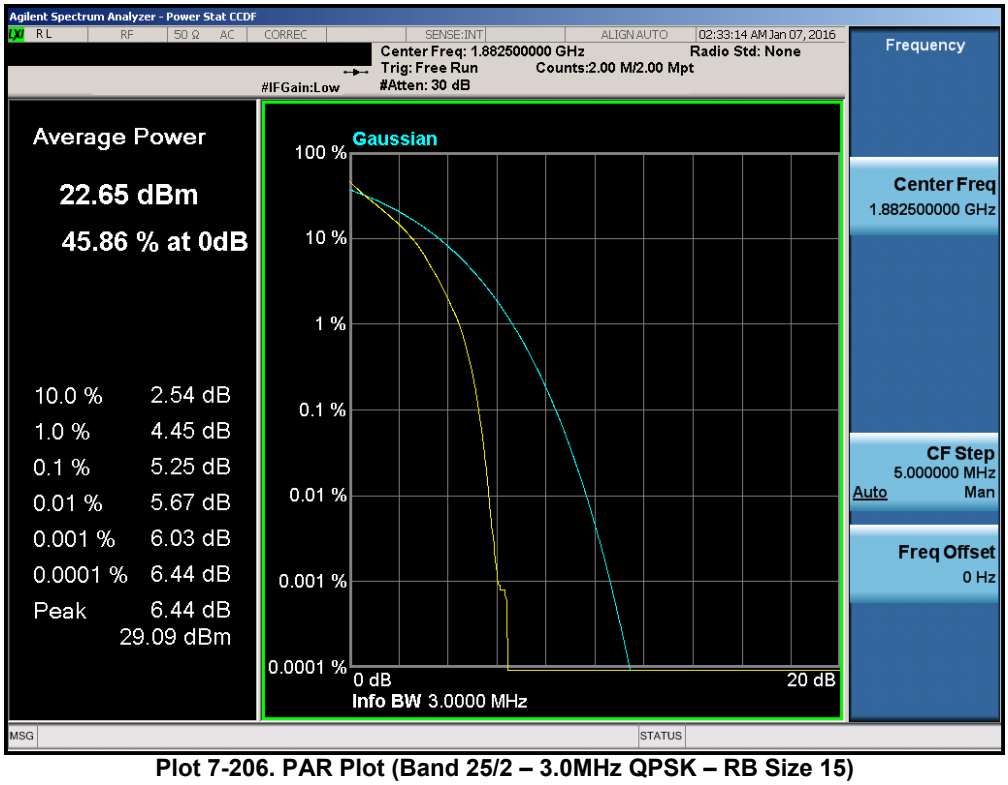
None.



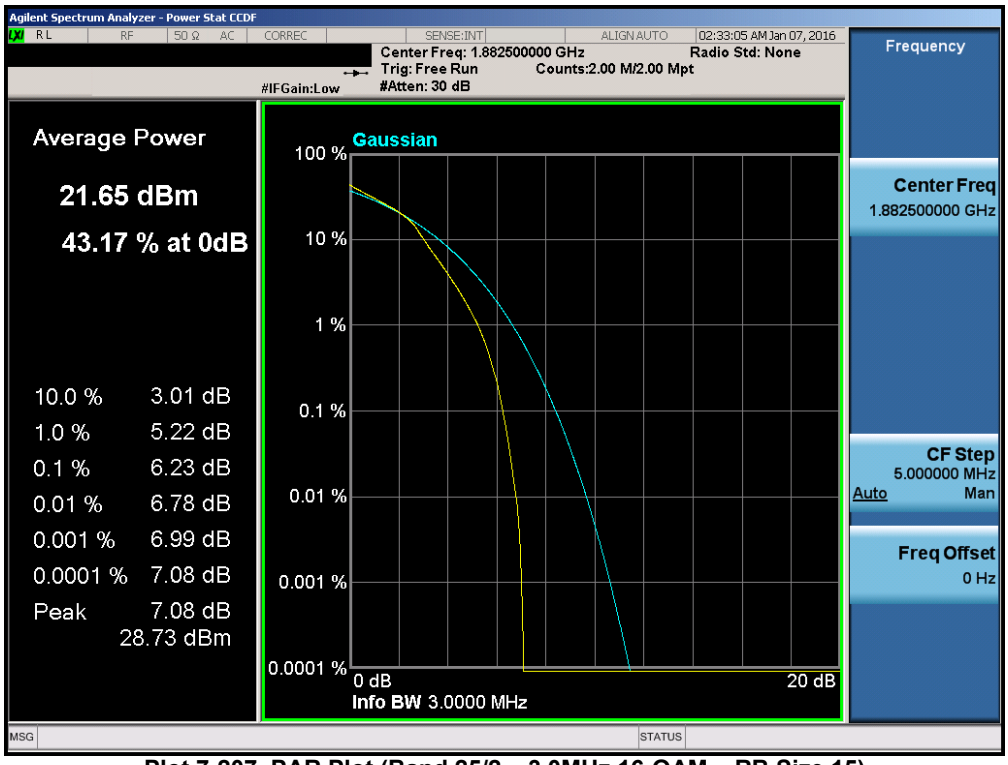
Plot 7-204. PAR Plot (Band 25/2 – 1.4MHz QPSK – RB Size 6)



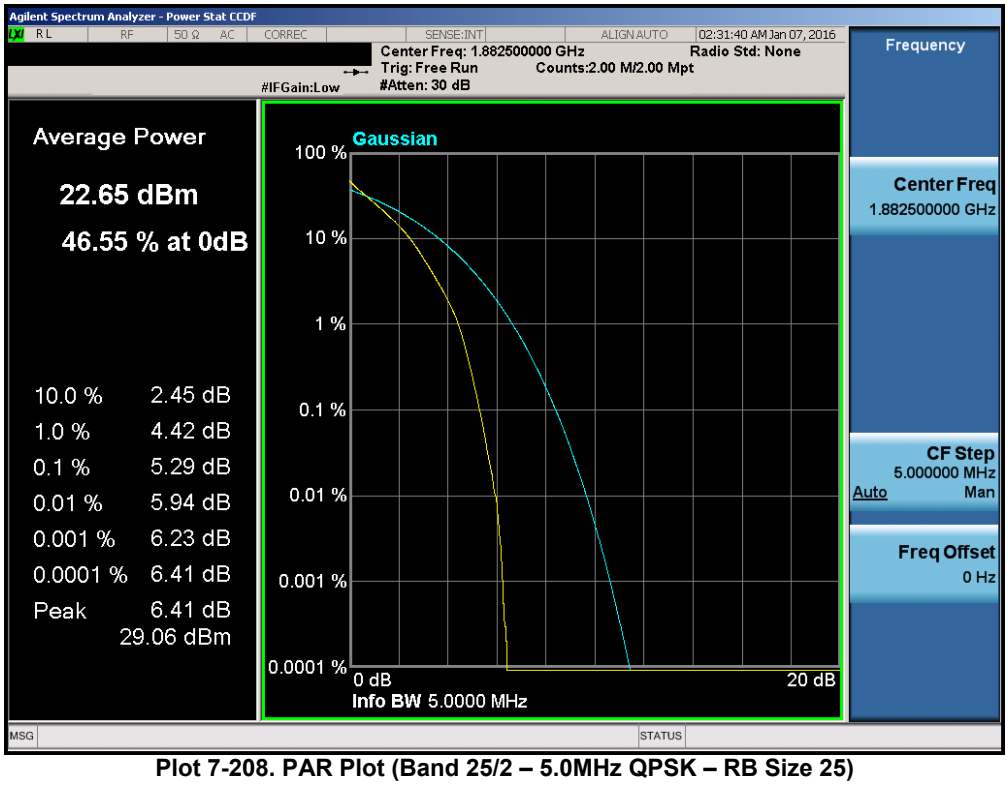
Plot 7-205. PAR Plot (Band 25/2 – 1.4MHz 16-QAM – RB Size 6)



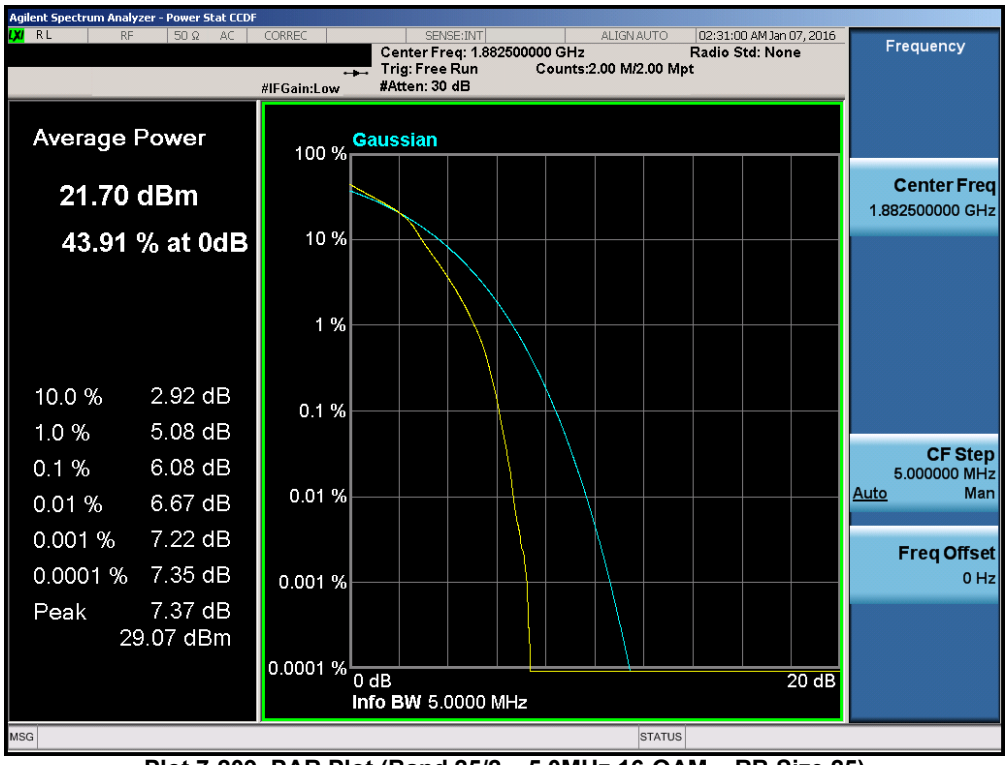
Plot 7-206. PAR Plot (Band 25/2 – 3.0MHz QPSK – RB Size 15)



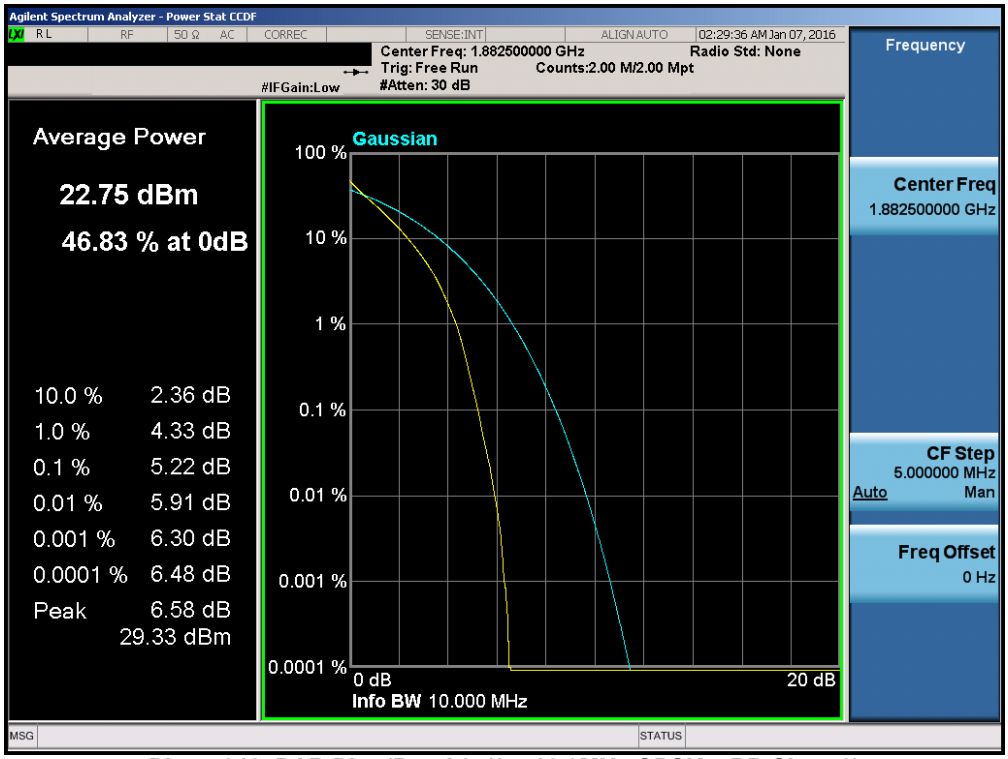
Plot 7-207. PAR Plot (Band 25/2 – 3.0MHz 16-QAM – RB Size 15)



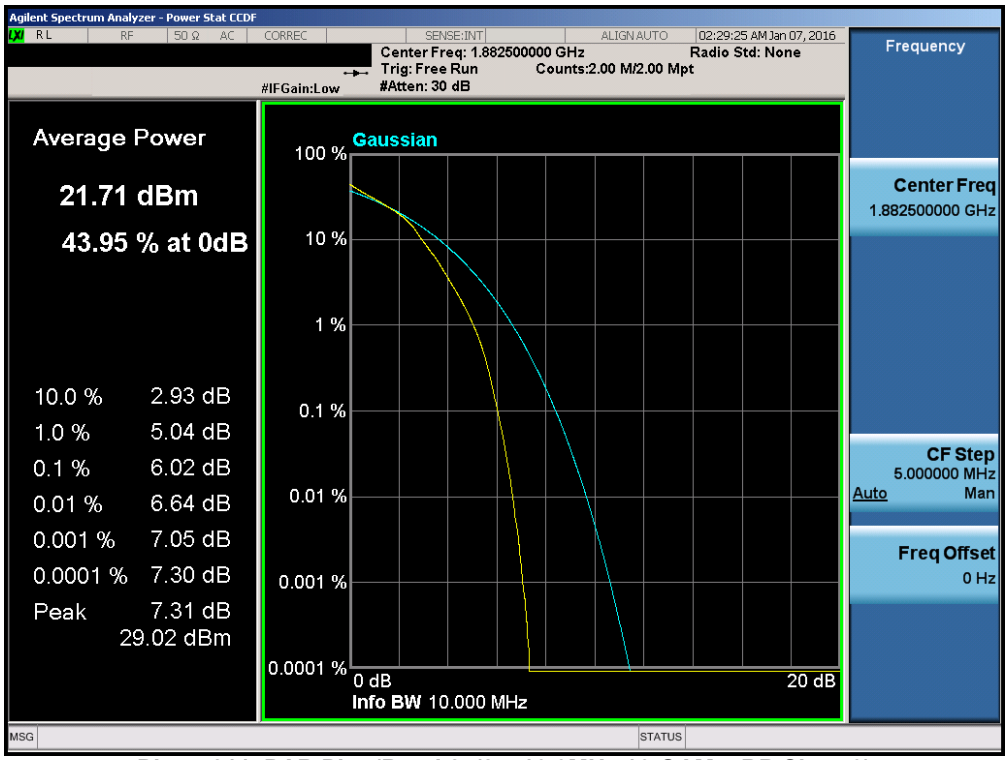
Plot 7-208. PAR Plot (Band 25/2 – 5.0MHz QPSK – RB Size 25)



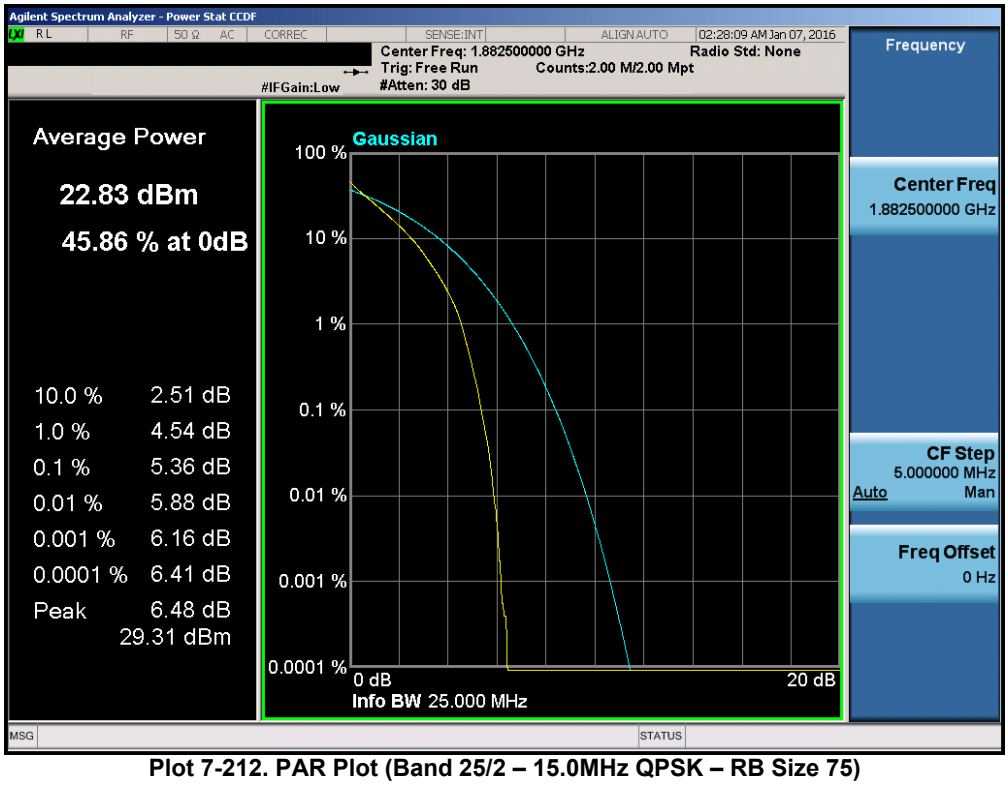
Plot 7-209. PAR Plot (Band 25/2 – 5.0MHz 16-QAM – RB Size 25)



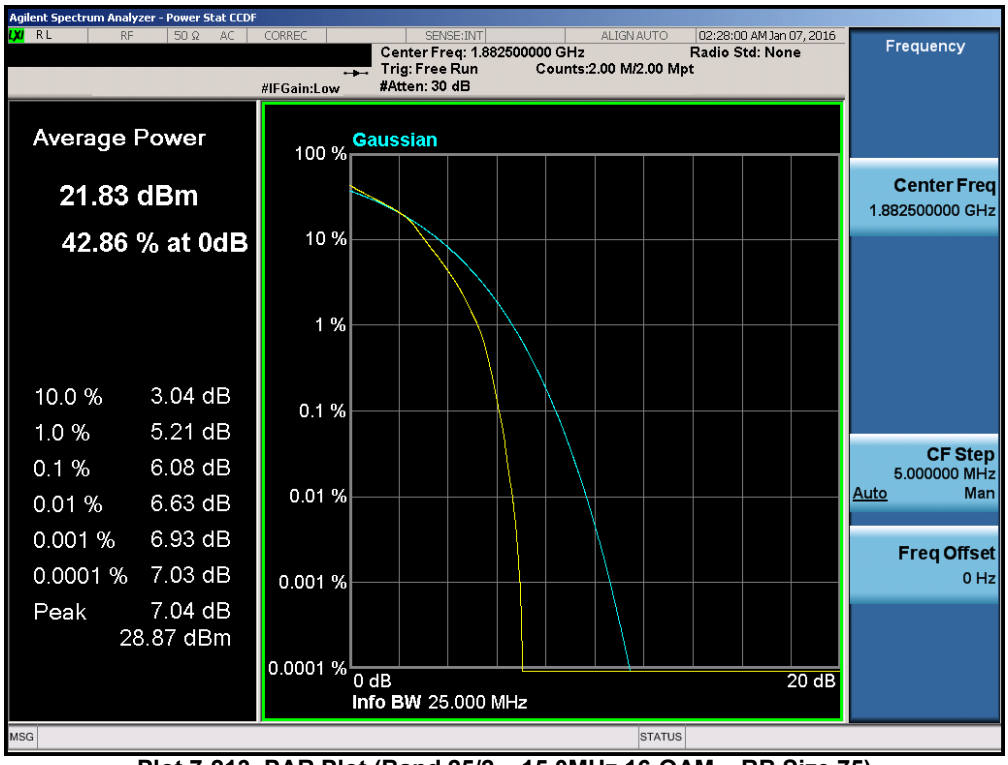
Plot 7-210. PAR Plot (Band 25/2 – 10.0MHz QPSK – RB Size 50)



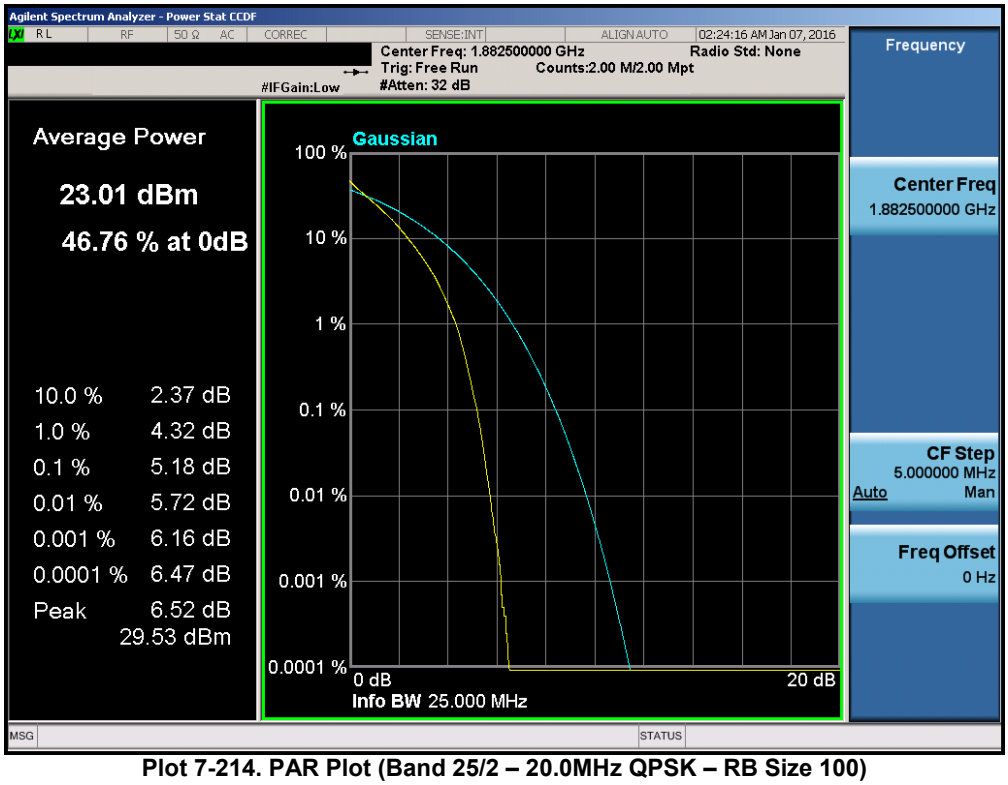
Plot 7-211. PAR Plot (Band 25/2 – 10.0MHz 16-QAM – RB Size 50)



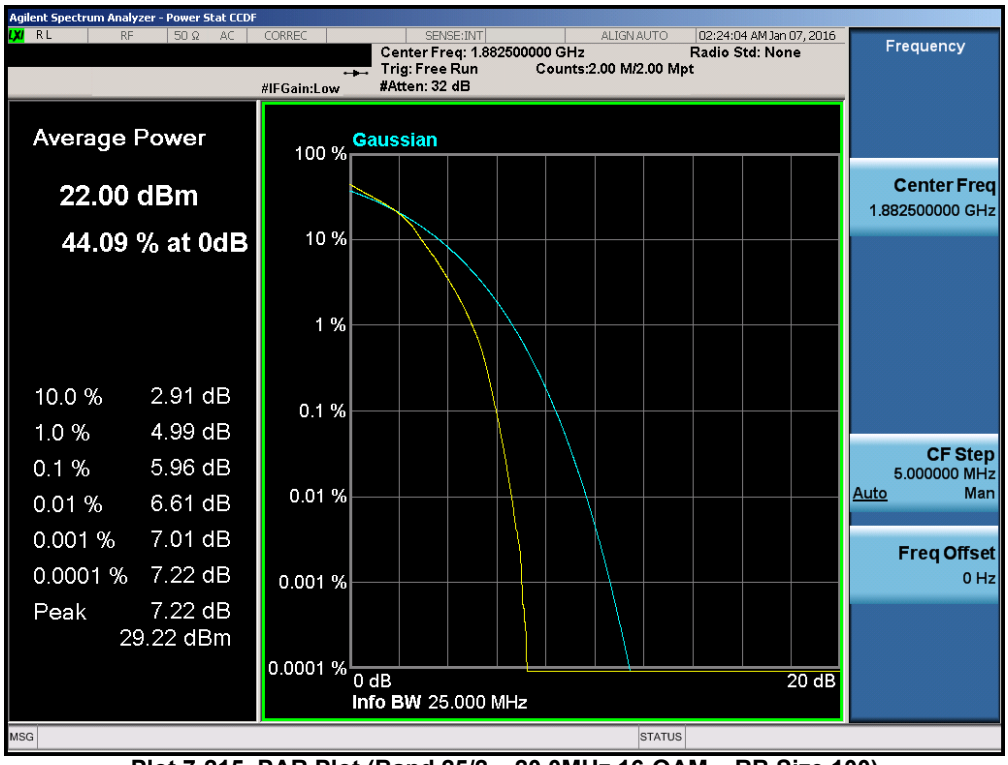
Plot 7-212. PAR Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)



Plot 7-213. PAR Plot (Band 25/2 – 15.0MHz 16-QAM – RB Size 75)



Plot 7-214. PAR Plot (Band 25/2 – 20.0MHz QPSK – RB Size 100)



Plot 7-215. PAR Plot (Band 25/2 – 20.0MHz 16-QAM – RB Size 100)

7.6 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §27.50(h.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-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.2.1

ANSI/TIA-603-C-2004 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. 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 ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". 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

Test Setup

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

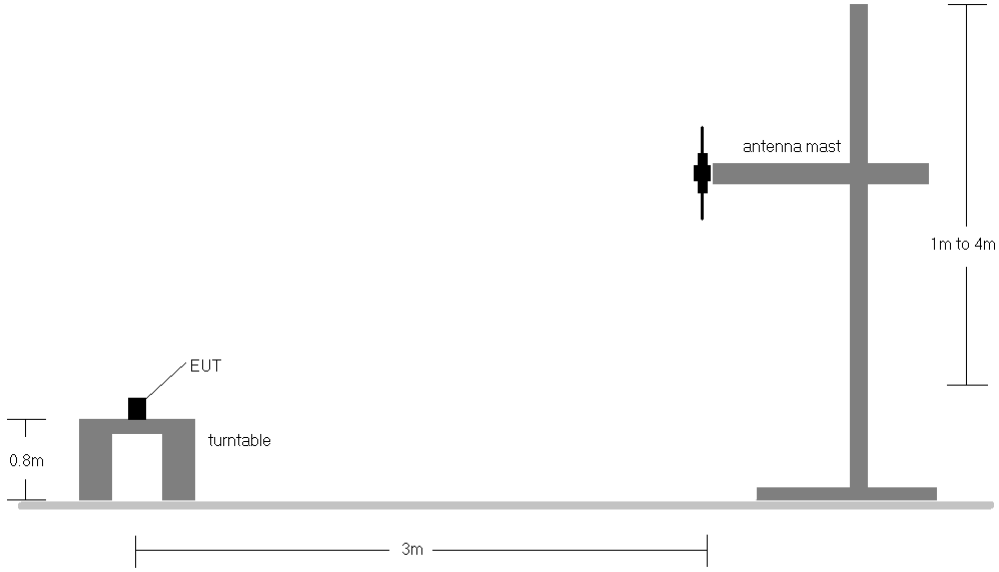


Figure 7-5. Radiated Test Setup <1GHz

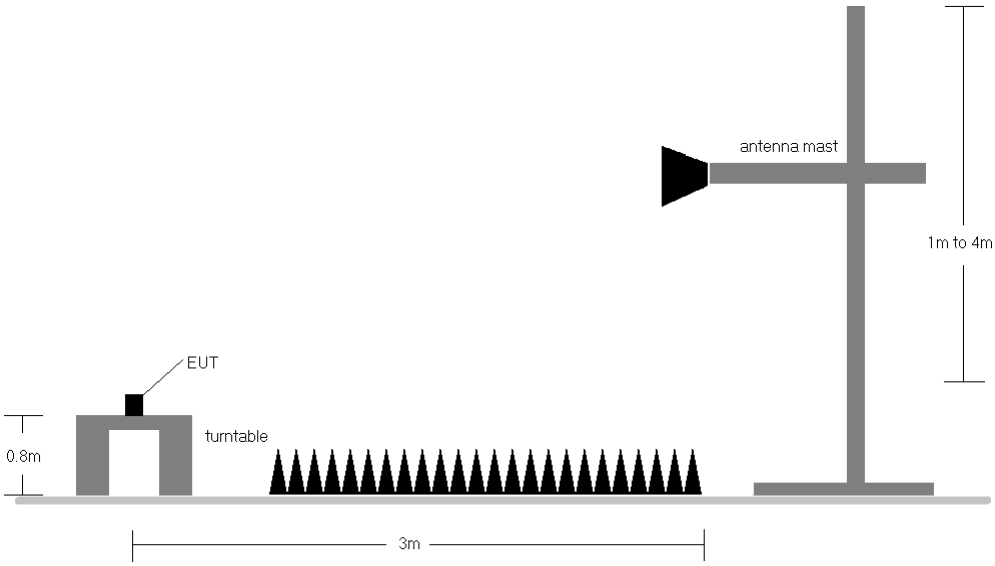


Figure 7-6. Radiated Test Setup >1GHz

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.

Frequency [MHz]	Antenna	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	Main	1.4	QPSK	V	149	313	1 / 0	15.65	2.72	18.37	34.77	-16.40
707.50	Main	1.4	QPSK	V	149	345	1 / 5	16.91	2.88	19.79	34.77	-14.98
715.30	Main	1.4	QPSK	V	149	358	1 / 0	16.30	3.06	19.36	34.77	-15.41
699.70	Main	1.4	16-QAM	V	149	313	1 / 0	14.41	2.72	17.13	34.77	-17.64
707.50	Main	1.4	16-QAM	V	149	345	1 / 5	16.17	2.88	19.05	34.77	-15.72
715.30	Main	1.4	16-QAM	V	149	358	1 / 0	15.59	3.06	18.65	34.77	-16.12
700.50	Main	3	QPSK	V	149	316	1 / 0	15.75	2.72	18.47	34.77	-16.30
707.50	Main	3	QPSK	V	149	340	1 / 14	17.04	2.88	19.92	34.77	-14.85
714.50	Main	3	QPSK	V	149	360	1 / 0	16.49	3.04	19.53	34.77	-15.24
700.50	Main	3	16-QAM	V	149	316	1 / 0	14.66	2.72	17.38	34.77	-17.39
707.50	Main	3	16-QAM	V	149	340	1 / 14	16.41	2.88	19.29	34.77	-15.48
714.50	Main	3	16-QAM	V	149	360	1 / 0	15.76	3.04	18.80	34.77	-15.97
701.50	Main	5	QPSK	V	149	311	1 / 0	16.33	2.75	19.08	34.77	-15.69
707.50	Main	5	QPSK	V	149	339	1 / 24	16.94	2.88	19.82	34.77	-14.95
713.50	Main	5	QPSK	V	149	363	1 / 24	17.38	3.02	20.40	34.77	-14.37
701.50	Main	5	16-QAM	V	149	311	1 / 0	15.21	2.75	17.96	34.77	-16.81
707.50	Main	5	16-QAM	V	149	339	1 / 24	16.01	2.88	18.89	34.77	-15.88
713.50	Main	5	16-QAM	V	149	363	1 / 24	16.49	3.02	19.51	34.77	-15.26
704.00	Main	10	QPSK	V	149	314	1 / 49	16.18	2.80	18.98	34.77	-15.79
707.50	Main	10	QPSK	V	149	336	1 / 49	15.61	2.88	18.49	34.77	-16.28
711.00	Main	10	QPSK	V	149	363	1 / 49	16.60	2.96	19.56	34.77	-15.21
704.00	Main	10	16-QAM	V	149	314	1 / 49	15.17	2.80	17.97	34.77	-16.80
707.50	Main	10	16-QAM	V	149	336	1 / 49	14.47	2.88	17.35	34.77	-17.42
711.00	Main	10	16-QAM	V	149	363	1 / 49	15.74	2.96	18.70	34.77	-16.07
701.50	CM	5	QPSK	V	156	341	1 / 0	18.84	2.75	21.59	34.77	-13.18
707.50	CM	5	QPSK	V	156	351	1 / 74	19.39	2.88	22.27	34.77	-12.50
713.50	CM	5	QPSK	V	156	356	1 / 74	19.50	3.02	22.52	34.77	-12.25
701.50	CM	5	16-QAM	V	156	341	1 / 0	17.78	2.75	20.53	34.77	-14.24
707.50	CM	5	16-QAM	V	156	351	1 / 74	18.30	2.88	21.18	34.77	-13.59
713.50	CM	5	16-QAM	V	156	356	1 / 74	18.55	3.02	21.57	34.77	-13.20

Table 7-2. ERP Data (Band 12)

Frequency [MHz]	Antenna	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	Main	1.4	QPSK	V	134	309	1 / 0	14.68	4.95	19.63	38.45	-18.83
836.50	Main	1.4	QPSK	V	134	304	1 / 5	15.25	5.00	20.25	38.45	-18.20
848.30	Main	1.4	QPSK	V	134	267	1 / 0	15.43	5.05	20.48	38.45	-17.97
824.70	Main	1.4	16-QAM	V	134	309	1 / 0	14.10	4.95	19.05	38.45	-19.41
836.50	Main	1.4	16-QAM	V	134	304	1 / 5	14.58	5.00	19.58	38.45	-18.87
848.30	Main	1.4	16-QAM	V	134	267	1 / 0	14.77	5.05	19.82	38.45	-18.63
825.50	Main	3	QPSK	V	134	308	1 / 0	14.98	4.95	19.93	38.45	-18.52
836.50	Main	3	QPSK	V	134	298	1 / 14	15.43	5.00	20.43	38.45	-18.02
847.50	Main	3	QPSK	V	134	261	1 / 0	15.69	5.05	20.74	38.45	-17.71
825.50	Main	3	16-QAM	V	134	308	1 / 0	14.23	4.95	19.18	38.45	-19.27
836.50	Main	3	16-QAM	V	134	298	1 / 14	14.72	5.00	19.72	38.45	-18.73
847.50	Main	3	16-QAM	V	134	261	1 / 0	14.97	5.05	20.02	38.45	-18.43
826.50	Main	5	QPSK	V	134	303	1 / 24	15.01	4.95	19.96	38.45	-18.49
836.50	Main	5	QPSK	V	134	295	1 / 24	15.70	5.00	20.70	38.45	-17.75
846.50	Main	5	QPSK	V	134	266	1 / 0	16.11	5.04	21.15	38.45	-17.30
826.50	Main	5	16-QAM	V	134	303	1 / 24	14.08	4.95	19.03	38.45	-19.42
836.50	Main	5	16-QAM	V	134	295	1 / 24	15.05	5.00	20.05	38.45	-18.40
846.50	Main	5	16-QAM	V	134	266	1 / 0	15.55	5.04	20.59	38.45	-17.86
829.00	Main	10	QPSK	V	134	306	1 / 49	14.81	4.96	19.77	38.45	-18.68
836.50	Main	10	QPSK	V	134	296	1 / 49	15.61	5.00	20.61	38.45	-17.84
844.00	Main	10	QPSK	V	134	271	1 / 0	15.90	5.03	20.93	38.45	-17.52
829.00	Main	10	16-QAM	V	134	306	1 / 49	14.20	4.96	19.16	38.45	-19.29
836.50	Main	10	16-QAM	V	134	296	1 / 49	14.85	5.00	19.85	38.45	-18.60
844.00	Main	10	16-QAM	V	134	271	1 / 0	14.83	5.03	19.86	38.45	-18.59
826.50	CM	5	QPSK	V	138	231	1 / 99	11.12	4.95	16.07	38.45	-22.38
836.50	CM	5	QPSK	V	137	341	1 / 99	11.99	5.00	16.99	38.45	-21.46
846.50	CM	5	QPSK	V	138	338	1 / 0	12.60	5.04	17.64	38.45	-20.81
826.50	CM	5	16-QAM	V	138	231	1 / 99	10.19	4.95	15.14	38.45	-23.31
836.50	CM	5	16-QAM	V	137	341	1 / 99	11.42	5.00	16.42	38.45	-22.03
846.50	CM	5	16-QAM	V	138	338	1 / 0	12.08	5.04	17.12	38.45	-21.33

Table 7-3. ERP Data (Band 26/5)

Frequency [MHz]	Antenna	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]
831.50	Main	15	QPSK	V	134	307	1 / 74	12.40	4.98	17.38	38.45	-21.08
836.50	Main	15	QPSK	V	134	298	1 / 74	12.91	5.00	17.91	38.45	-20.54
841.50	Main	15	QPSK	V	134	273	1 / 74	12.57	5.02	17.59	38.45	-20.86
831.50	Main	15	16-QAM	V	134	307	1 / 74	11.57	4.98	16.55	38.45	-21.91
836.50	Main	15	16-QAM	V	134	298	1 / 74	11.66	5.00	16.66	38.45	-21.79
841.50	Main	15	16-QAM	V	134	273	1 / 74	11.78	5.02	16.80	38.45	-21.65

Table 7-4. ERP Data (Band 26)

Frequency [MHz]	Antenna	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	Main	1.4	QPSK	V	206	289	1 / 0	8.93	9.67	18.60	30.00	-11.40
1732.50	Main	1.4	QPSK	V	132	268	1 / 5	9.93	9.53	19.46	30.00	-10.54
1754.30	Main	1.4	QPSK	V	227	277	1 / 5	9.61	9.39	19.00	30.00	-11.00
1710.70	Main	1.4	16-QAM	V	206	289	1 / 0	8.43	9.67	18.10	30.00	-11.90
1732.50	Main	1.4	16-QAM	V	132	268	1 / 5	8.93	9.53	18.46	30.00	-11.54
1754.30	Main	1.4	16-QAM	V	227	277	1 / 5	8.93	9.39	18.32	30.00	-11.68
1711.50	Main	3	QPSK	V	196	285	1 / 0	9.41	9.67	19.08	30.00	-10.92
1732.50	Main	3	QPSK	V	134	269	1 / 0	10.40	9.53	19.93	30.00	-10.07
1753.50	Main	3	QPSK	V	224	273	1 / 0	10.01	9.40	19.41	30.00	-10.59
1711.50	Main	3	16-QAM	V	196	285	1 / 0	8.46	9.67	18.13	30.00	-11.87
1732.50	Main	3	16-QAM	V	134	269	1 / 0	9.66	9.53	19.19	30.00	-10.81
1753.50	Main	3	16-QAM	V	224	273	1 / 0	9.14	9.40	18.54	30.00	-11.46
1712.50	Main	5	QPSK	V	202	290	1 / 0	8.24	9.66	17.90	30.00	-12.10
1732.50	Main	5	QPSK	V	214	266	1 / 24	10.37	9.53	19.90	30.00	-10.10
1752.50	Main	5	QPSK	V	216	280	1 / 24	9.85	9.40	19.25	30.00	-10.75
1712.50	Main	5	16-QAM	V	202	290	1 / 0	7.63	9.66	17.29	30.00	-12.71
1732.50	Main	5	16-QAM	V	214	266	1 / 24	9.79	9.53	19.32	30.00	-10.68
1752.50	Main	5	16-QAM	V	216	280	1 / 24	9.02	9.40	18.42	30.00	-11.58
1715.00	Main	10	QPSK	V	205	293	1 / 0	7.94	9.64	17.58	30.00	-12.42
1732.50	Main	10	QPSK	V	209	269	1 / 49	9.93	9.53	19.46	30.00	-10.54
1750.00	Main	10	QPSK	V	210	273	1 / 49	9.71	9.42	19.13	30.00	-10.87
1715.00	Main	10	16-QAM	V	205	293	1 / 0	7.13	9.64	16.77	30.00	-13.23
1732.50	Main	10	16-QAM	V	209	269	1 / 49	9.02	9.53	18.55	30.00	-11.45
1750.00	Main	10	16-QAM	V	210	273	1 / 49	9.05	9.42	18.47	30.00	-11.53
1717.50	Main	15	QPSK	V	212	284	1 / 74	8.26	9.63	17.89	30.00	-12.11
1732.50	Main	15	QPSK	V	203	278	1 / 74	9.34	9.53	18.87	30.00	-11.13
1747.50	Main	15	QPSK	V	220	272	1 / 0	9.48	9.43	18.91	30.00	-11.09
1717.50	Main	15	16-QAM	V	212	284	1 / 74	7.60	9.63	17.23	30.00	-12.77
1732.50	Main	15	16-QAM	V	203	278	1 / 74	8.66	9.53	18.19	30.00	-11.81
1747.50	Main	15	16-QAM	V	220	272	1 / 0	8.67	9.43	18.10	30.00	-11.90
1720.00	Main	20	QPSK	V	207	287	1 / 99	9.31	9.61	18.92	30.00	-11.08
1732.50	Main	20	QPSK	V	202	281	1 / 99	9.28	9.53	18.81	30.00	-11.19
1745.00	Main	20	QPSK	V	221	278	1 / 0	9.66	9.45	19.11	30.00	-10.89
1720.00	Main	20	16-QAM	V	207	287	1 / 99	8.71	9.61	18.32	30.00	-11.68
1732.50	Main	20	16-QAM	V	202	281	1 / 99	8.65	9.53	18.18	30.00	-11.82
1745.00	Main	20	16-QAM	V	221	278	1 / 0	9.03	9.45	18.48	30.00	-11.52
1711.50	CM	3	QPSK	V	201	277	1 / 0	8.93	9.67	18.60	30.00	-11.40
1732.50	CM	3	QPSK	V	208	273	1 / 0	9.93	9.53	19.46	30.00	-10.54
1753.50	CM	3	QPSK	V	202	291	1 / 0	9.56	9.40	18.96	30.00	-11.04
1711.50	CM	3	16-QAM	V	201	277	1 / 0	7.97	9.67	17.64	30.00	-12.36
1732.50	CM	3	16-QAM	V	208	273	1 / 0	9.15	9.53	18.68	30.00	-11.32
1753.50	CM	3	16-QAM	V	202	291	1 / 0	8.69	9.40	18.09	30.00	-11.91

Table 7-5. EIRP Data (Band 4)

Frequency [MHz]	Antenna	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	Main	1.4	QPSK	V	148	272	1 / 0	12.38	9.21	21.59	33.01	-11.42
1882.50	Main	1.4	QPSK	V	143	274	1 / 0	13.67	9.28	22.95	33.01	-10.06
1914.30	Main	1.4	QPSK	V	185	261	1 / 0	12.76	9.39	22.15	33.01	-10.86
1850.70	Main	1.4	16-QAM	V	148	272	1 / 0	11.77	9.21	20.98	33.01	-12.03
1882.50	Main	1.4	16-QAM	V	143	274	1 / 0	13.13	9.28	22.41	33.01	-10.60
1914.30	Main	1.4	16-QAM	V	185	261	1 / 0	11.90	9.39	21.29	33.01	-11.72
1851.50	Main	3	QPSK	V	158	276	1 / 0	13.00	9.21	22.21	33.01	-10.80
1882.50	Main	3	QPSK	V	134	269	1 / 0	14.34	9.28	23.62	33.01	-9.39
1913.50	Main	3	QPSK	V	179	268	1 / 0	13.44	9.39	22.83	33.01	-10.18
1851.50	Main	3	16-QAM	V	158	276	1 / 0	12.23	9.21	21.44	33.01	-11.57
1882.50	Main	3	16-QAM	V	134	269	1 / 0	13.82	9.28	23.10	33.01	-9.91
1913.50	Main	3	16-QAM	V	179	268	1 / 0	12.53	9.39	21.92	33.01	-11.09
1852.50	Main	5	QPSK	V	152	277	1 / 0	13.19	9.22	22.41	33.01	-10.60
1882.50	Main	5	QPSK	V	131	266	1 / 0	14.35	9.28	23.63	33.01	-9.38
1912.50	Main	5	QPSK	V	171	269	1 / 24	13.30	9.38	22.68	33.01	-10.33
1852.50	Main	5	16-QAM	V	152	277	1 / 0	12.55	9.22	21.77	33.01	-11.24
1882.50	Main	5	16-QAM	V	131	266	1 / 0	13.86	9.28	23.14	33.01	-9.87
1912.50	Main	5	16-QAM	V	171	269	1 / 24	12.55	9.38	21.93	33.01	-11.08
1855.00	Main	10	QPSK	V	158	270	1 / 0	12.82	9.22	22.04	33.01	-10.97
1882.50	Main	10	QPSK	V	134	269	1 / 0	13.90	9.28	23.18	33.01	-9.83
1910.00	Main	10	QPSK	V	164	267	1 / 49	13.33	9.37	22.70	33.01	-10.31
1855.00	Main	10	16-QAM	V	158	270	1 / 0	12.05	9.22	21.27	33.01	-11.74
1882.50	Main	10	16-QAM	V	134	269	1 / 0	13.24	9.28	22.52	33.01	-10.49
1910.00	Main	10	16-QAM	V	164	267	1 / 49	12.34	9.37	21.71	33.01	-11.30
1857.50	Main	15	QPSK	V	153	265	1 / 74	12.79	9.23	22.02	33.01	-10.99
1882.50	Main	15	QPSK	V	149	264	1 / 0	13.76	9.28	23.04	33.01	-9.97
1907.50	Main	15	QPSK	V	156	269	1 / 74	13.02	9.35	22.37	33.01	-10.64
1857.50	Main	15	16-QAM	V	153	265	1 / 74	12.04	9.23	21.27	33.01	-11.74
1882.50	Main	15	16-QAM	V	149	264	1 / 0	13.02	9.28	22.30	33.01	-10.71
1907.50	Main	15	16-QAM	V	156	269	1 / 74	12.09	9.35	21.44	33.01	-11.57
1860.00	Main	20	QPSK	V	145	273	1 / 0	12.78	9.23	22.01	33.01	-11.00
1882.50	Main	20	QPSK	V	147	266	1 / 0	13.84	9.28	23.12	33.01	-9.89
1905.00	Main	20	QPSK	V	148	265	1 / 99	13.02	9.34	22.36	33.01	-10.65
1860.00	Main	20	16-QAM	V	145	273	1 / 0	12.21	9.23	21.44	33.01	-11.57
1882.50	Main	20	16-QAM	V	147	266	1 / 0	13.11	9.28	22.39	33.01	-10.62
1905.00	Main	20	16-QAM	V	148	265	1 / 99	12.46	9.34	21.80	33.01	-11.21
1852.50	CM	5	QPSK	V	122	276	1 / 0	12.80	9.22	22.02	33.01	-10.99
1882.50	CM	5	QPSK	V	127	286	1 / 0	13.91	9.28	23.19	33.01	-9.82
1912.50	CM	5	QPSK	V	135	281	1 / 99	12.90	9.38	22.28	33.01	-10.73
1852.50	CM	5	16-QAM	V	122	276	1 / 0	12.26	9.22	21.48	33.01	-11.53
1882.50	CM	5	16-QAM	V	127	286	1 / 0	13.16	9.28	22.44	33.01	-10.57
1912.50	CM	5	16-QAM	V	135	281	1 / 99	12.05	9.38	21.43	33.01	-11.58

Table 7-6. EIRP Data (Band 25/2)

Frequency [MHz]	Antenna	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]
2502.50	Main	5	QPSK	V	264	242	1 / 24	11.59	8.51	20.10	33.01	-12.91
2535.00	Main	5	QPSK	V	235	288	1 / 0	12.50	8.60	21.10	33.01	-11.91
2567.50	Main	5	QPSK	V	235	219	1 / 24	13.11	8.70	21.81	33.01	-11.20
2502.50	Main	5	16-QAM	V	264	242	1 / 24	11.11	8.51	19.62	33.01	-13.39
2535.00	Main	5	16-QAM	V	235	288	1 / 0	11.58	8.60	20.18	33.01	-12.83
2567.50	Main	5	16-QAM	V	235	219	1 / 24	12.39	8.70	21.09	33.01	-11.92
2505.00	Main	10	QPSK	V	289	273	1 / 49	11.73	8.51	20.24	33.01	-12.77
2535.00	Main	10	QPSK	V	236	250	1 / 0	12.25	8.60	20.85	33.01	-12.16
2565.00	Main	10	QPSK	V	211	233	1 / 49	12.92	8.69	21.61	33.01	-11.40
2505.00	Main	10	16-QAM	V	289	273	1 / 49	10.77	8.51	19.28	33.01	-13.73
2535.00	Main	10	16-QAM	V	236	250	1 / 0	11.43	8.60	20.03	33.01	-12.98
2565.00	Main	10	16-QAM	V	211	233	1 / 49	12.06	8.69	20.75	33.01	-12.26
2507.50	Main	15	QPSK	V	283	254	1 / 74	10.06	8.52	18.58	33.01	-14.43
2535.00	Main	15	QPSK	V	259	271	1 / 0	11.82	8.60	20.42	33.01	-12.59
2562.50	Main	15	QPSK	V	241	255	1 / 74	12.67	8.69	21.36	33.01	-11.65
2507.50	Main	15	16-QAM	V	283	254	1 / 74	9.06	8.52	17.58	33.01	-15.43
2535.00	Main	15	16-QAM	V	259	271	1 / 0	10.92	8.60	19.52	33.01	-13.49
2562.50	Main	15	16-QAM	V	241	255	1 / 74	11.58	8.69	20.27	33.01	-12.74
2510.00	Main	20	QPSK	V	250	282	1 / 99	11.48	8.53	20.01	33.01	-13.00
2535.00	Main	20	QPSK	V	204	288	1 / 99	11.38	8.60	19.98	33.01	-13.03
2560.00	Main	20	QPSK	V	210	291	1 / 99	12.62	8.68	21.30	33.01	-11.71
2510.00	Main	20	16-QAM	V	250	282	1 / 99	10.88	8.53	19.41	33.01	-13.60
2535.00	Main	20	16-QAM	V	204	288	1 / 99	10.75	8.60	19.35	33.01	-13.66
2560.00	Main	20	16-QAM	V	210	291	1 / 99	10.97	8.68	19.65	33.01	-13.36
2502.50	CM	5	QPSK	V	195	277	1 / 99	6.26	8.51	14.77	33.01	-18.24
2535.00	CM	5	QPSK	V	181	256	1 / 0	8.03	8.60	16.63	33.01	-16.38
2567.50	CM	5	QPSK	V	185	286	1 / 99	7.72	8.70	16.42	33.01	-16.59

Table 7-7. EIRP Data (Band 7)

Frequency [MHz]	Antenna	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]
2498.50	Main	5	QPSK	V	202	292	1 / 0	8.86	8.51	17.37	33.01	-15.64
2593.00	Main	5	QPSK	V	195	285	1 / 0	12.16	8.78	20.94	33.01	-12.07
2687.50	Main	5	QPSK	V	226	215	1 / 0	10.93	8.93	19.86	33.01	-13.15
2498.50	Main	5	16-QAM	V	202	292	1 / 0	8.25	8.51	16.76	33.01	-16.25
2593.00	Main	5	16-QAM	V	195	285	1 / 0	11.72	8.78	20.50	33.01	-12.51
2687.50	Main	5	16-QAM	V	226	215	1 / 0	9.82	8.93	18.75	33.01	-14.26
2501.00	Main	10	QPSK	V	201	280	1 / 0	9.06	8.50	17.56	33.01	-15.45
2593.00	Main	10	QPSK	V	175	281	1 / 0	12.23	8.78	21.01	33.01	-12.00
2685.00	Main	10	QPSK	V	237	225	1 / 0	11.05	8.93	19.98	33.01	-13.03
2501.00	Main	10	16-QAM	V	201	280	1 / 0	8.39	8.50	16.89	33.01	-16.12
2593.00	Main	10	16-QAM	V	175	281	1 / 0	11.68	8.78	20.46	33.01	-12.55
2685.00	Main	10	16-QAM	V	237	225	1 / 0	9.85	8.93	18.78	33.01	-14.23
2503.50	Main	15	QPSK	V	199	283	1 / 0	9.17	8.51	17.68	33.01	-15.33
2593.00	Main	15	QPSK	V	181	291	1 / 0	12.36	8.78	21.14	33.01	-11.87
2682.50	Main	15	QPSK	V	237	218	1 / 0	11.05	8.92	19.97	33.01	-13.04
2503.50	Main	15	16-QAM	V	199	283	1 / 0	8.50	8.51	17.01	33.01	-16.00
2593.00	Main	15	16-QAM	V	181	291	1 / 0	10.44	8.78	19.22	33.01	-13.79
2682.50	Main	15	16-QAM	V	237	218	1 / 0	10.02	8.92	18.94	33.01	-14.07
2506.00	Main	20	QPSK	V	208	266	1 / 0	9.24	8.52	17.76	33.01	-15.25
2593.00	Main	20	QPSK	V	201	277	1 / 0	12.49	8.78	21.27	33.01	-11.74
2680.00	Main	20	QPSK	V	257	232	1 / 0	11.17	8.92	20.09	33.01	-12.92
2506.00	Main	20	16-QAM	V	208	266	1 / 0	8.66	8.52	17.18	33.01	-15.83
2593.00	Main	20	16-QAM	V	201	277	1 / 0	11.50	8.78	20.28	33.01	-12.73
2680.00	Main	20	16-QAM	V	257	232	1 / 0	10.20	8.92	19.12	33.01	-13.89
2506.00	CM	20	QPSK	V	176	288	1 / 0	3.30	8.52	11.82	33.01	-21.19
2593.00	CM	20	QPSK	V	188	264	1 / 0	6.16	8.78	14.94	33.01	-18.07
2680.00	CM	20	QPSK	V	199	254	1 / 0	5.10	8.92	14.02	33.01	-18.99

Table 7-8. EIRP Data (Band 41)

7.7 Radiated Spurious Emissions Measurements

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

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-C-2004 – Section 2.2.12

Test Settings

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

Test Setup

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

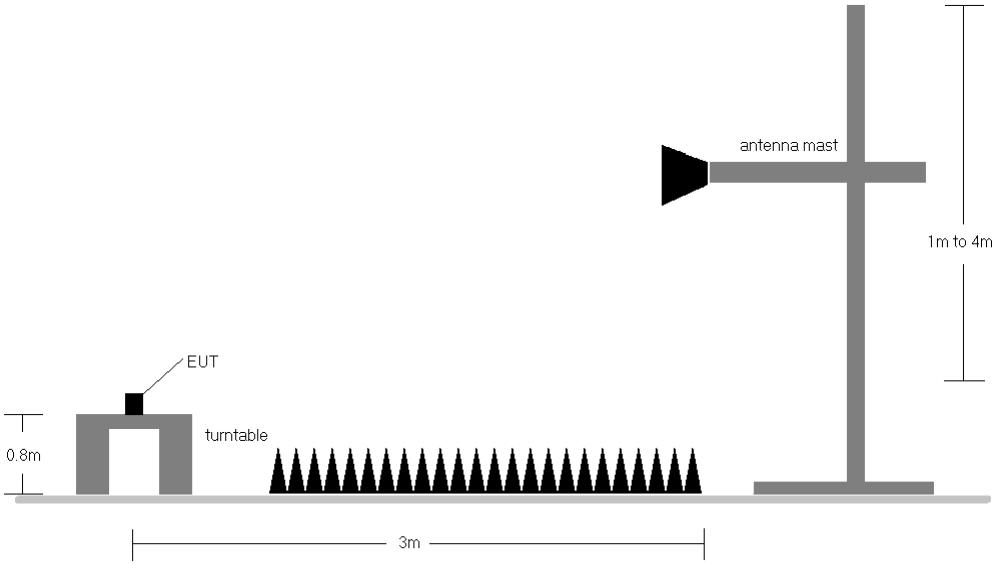


Figure 7-7. Test Instrument & Measurement Setup

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.

OPERATING FREQUENCY:	701.50	MHz		
CHANNEL:	23035			
MEASURED OUTPUT POWER:	19.08	dBm	=	0.081 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.08	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	107	178	-55.99	2.45	-53.53	72.6
2104.50	H	176	156	-52.10	2.96	-49.14	68.2
2806.00	H	-	-	-57.30	4.75	-52.55	71.6

Table 7-9. Radiated Spurious Data (Band 12 – Low Channel)

OPERATING FREQUENCY:	707.50	MHz		
CHANNEL:	23095			
MEASURED OUTPUT POWER:	19.82	dBm	=	0.096 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.82	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	167	190	-57.78	2.59	-55.20	75.0
2122.50	H	220	227	-49.20	3.02	-46.19	66.0
2830.00	H	223	260	-57.48	4.74	-52.74	72.6

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

OPERATING FREQUENCY:	713.50	MHz		
CHANNEL:	23155			
MEASURED OUTPUT POWER:	20.40	dBm	=	0.110 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.40	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	164	166	-57.54	2.72	-54.82	75.2
2140.50	H	343	224	-55.90	3.07	-52.83	73.2
2854.00	H	-	-	-57.80	4.73	-53.08	73.5

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

OPERATING FREQUENCY:	713.50	MHz		
CHANNEL:	23155			
MEASURED OUTPUT POWER:	22.52	dBm	=	0.178 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.52	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	101	148	-57.91	2.72	-55.19	77.7
2140.50	H	116	142	-47.68	3.07	-44.61	67.1
2854.00	H	-	-	-59.10	4.73	-54.38	76.9

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

OPERATING FREQUENCY:	826.50	MHz		
CHANNEL:	26815			
MEASURED OUTPUT POWER:	19.96	dBm	=	0.099 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.96	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]
1653.00	H	132	143	-59.81	3.60	-56.21	76.2
2479.50	H	-	-	-58.25	3.57	-54.68	74.6
3306.00	H	-	-	-59.54	5.68	-53.85	73.8

Table 7-13. Radiated Spurious Data (Band 26/5 – Low Channel)

OPERATING FREQUENCY:	836.50	MHz		
CHANNEL:	26915			
MEASURED OUTPUT POWER:	20.70	dBm	=	0.117 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.70	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	169	151	-60.34	3.53	-56.82	77.5
2509.50	H	-	-	-58.30	3.57	-54.73	75.4
3346.00	H	-	-	-59.87	5.78	-54.08	74.8

Table 7-14. Radiated Spurious Data (Band 26/5 – Mid Channel)

OPERATING FREQUENCY:	846.50	MHz		
CHANNEL:	27015			
MEASURED OUTPUT POWER:	21.15	dBm	=	0.130 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.15	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.00	H	124	156	-58.10	3.46	-54.64	75.8
2539.50	H	-	-	-57.98	3.63	-54.35	75.5
3386.00	H	-	-	-60.37	5.89	-54.48	75.6

Table 7-15. Radiated Spurious Data (Band 26/5 – High Channel)

OPERATING FREQUENCY:	846.50	MHz		
CHANNEL:	27015			
MEASURED OUTPUT POWER:	17.64	dBm	=	0.058 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	30.64	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.00	H	101	225	-61.71	3.46	-58.25	75.9
2539.50	H	101	40	-42.35	3.63	-38.72	56.4
3386.00	H	-	-	-59.22	5.89	-53.33	71.0

Table 7-16. Radiated Spurious Data with CM Accessory (Band 26/5 – High Channel)

OPERATING FREQUENCY:	1711.50	MHz		
CHANNEL:	19965			
MEASURED OUTPUT POWER:	19.08	dBm	=	0.081 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.08	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]
3423.00	H	183	141	-50.82	8.15	-42.67	61.7
5134.50	H	115	325	-54.21	10.26	-43.95	63.0
6846.00	H	115	130	-54.01	11.38	-42.62	61.7
8557.50	H	-	-	-53.23	13.02	-40.21	59.3

Table 7-17. Radiated Spurious Data (Band 4 – Low Channel)

OPERATING FREQUENCY:	1732.50	MHz		
CHANNEL:	20175			
MEASURED OUTPUT POWER:	19.93	dBm	=	0.098 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.93	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	129	150	-47.36	8.29	-39.08	59.0
5197.50	H	-	-	-54.40	10.35	-44.05	64.0
6930.00	H	179	10	-53.37	11.49	-41.89	61.8
8662.50	H	-	-	-53.99	13.02	-40.97	60.9

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

OPERATING FREQUENCY:	1753.50	MHz		
CHANNEL:	20385			
MEASURED OUTPUT POWER:	19.41	dBm	=	0.087 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.41	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]
3507.00	H	171	133	-42.77	8.41	-34.37	53.8
5260.50	H	-	-	-54.73	10.36	-44.37	63.8
7014.00	H	139	98	-50.60	11.57	-39.03	58.4
8767.50	H	-	-	-54.25	13.02	-41.23	60.6

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

OPERATING FREQUENCY:	1732.50	MHz		
CHANNEL:	20175			
MEASURED OUTPUT POWER:	19.46	dBm	=	0.088 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	3.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.46	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	120	149	-53.11	8.29	-44.83	64.3
5197.50	H	121	323	-55.58	10.35	-45.23	64.7
6930.00	H	-	-	-55.21	11.49	-43.73	63.2
8662.50	H	-	-	-55.25	13.02	-42.23	61.7

Table 7-20. Radiated Spurious Data with CM Accessory (Band 4 – Mid Channel)

OPERATING FREQUENCY:	1852.50	MHz		
CHANNEL:	26065			
MEASURED OUTPUT POWER:	22.41	dBm	=	0.174 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.41	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3705.00	H	124	137	-46.86	8.40	-38.47	60.9
5557.50	H	164	355	-58.03	10.57	-47.46	69.9
7410.00	H	-	-	-57.37	12.06	-45.31	67.7
9262.50	H	-	-	-56.03	13.22	-42.82	65.2

Table 7-21. Radiated Spurious Data (Band 25/2 – Low Channel)

OPERATING FREQUENCY:	1882.50	MHz		
CHANNEL:	26365			
MEASURED OUTPUT POWER:	23.63	dBm	=	0.231 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	36.63	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3765.00	H	119	138	-48.07	8.38	-39.69	63.3
5647.50	H	127	222	-56.14	10.70	-45.44	69.1
7530.00	H	-	-	-56.51	12.11	-44.39	68.0
9412.50	H	-	-	-55.94	13.19	-42.75	66.4

Table 7-22. Radiated Spurious Data (Band 25/2 – Mid Channel)

OPERATING FREQUENCY:	1912.50	MHz		
CHANNEL:	26665			
MEASURED OUTPUT POWER:	22.68	dBm	=	0.185 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.68	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]
3825.00	H	179	145	-47.24	8.41	-38.83	61.5
5737.50	H	101	154	-53.95	10.76	-43.19	65.9
7650.00	H	-	-	-54.50	12.23	-42.27	65.0
9562.50	H	-	-	-53.18	13.18	-40.00	62.7

Table 7-23. Radiated Spurious Data (Band 25/2 – High Channel)

OPERATING FREQUENCY:	1882.50	MHz		
CHANNEL:	26365			
MEASURED OUTPUT POWER:	23.19	dBm	=	0.208 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	36.19	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	101	215	-38.19	8.38	-29.81	53.0
5647.50	H	137	64	-54.05	10.70	-43.35	66.5
7530.00	H	-	-	-55.96	12.11	-43.84	67.0
9412.50	H	-	-	-54.26	13.19	-41.07	64.3

Table 7-24. Radiated Spurious Data with CM Accessory (Band 25/2 – Mid Channel)

OPERATING FREQUENCY:	2502.50	MHz		
CHANNEL:	20775			
MEASURED OUTPUT POWER:	20.10	dBm	=	0.102 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	45.10	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]
5005.00	H	122	204	-40.97	10.15	-30.82	50.9
7507.50	H	-	-	-57.09	12.09	-44.99	65.1
10010.00	H	105	282	-53.59	13.26	-40.34	60.4
12512.50	H	-	-	-50.97	13.19	-37.79	57.9

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

OPERATING FREQUENCY:	2535.00	MHz		
CHANNEL:	21100			
MEASURED OUTPUT POWER:	21.10	dBm	=	0.129 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	46.10	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]
5070.00	H	122	198	-51.59	10.19	-41.40	62.5
7605.00	H	-	-	-57.20	12.18	-45.01	66.1
10140.00	H	-	-	-55.08	13.29	-41.79	62.9
12675.00	H	-	-	-50.63	13.19	-37.44	58.5

Table 7-26. Radiated Spurious Data (Band 7 – Mid Channel)

OPERATING FREQUENCY:	2567.50	MHz		
CHANNEL:	21425			
MEASURED OUTPUT POWER:	21.81	dBm	=	0.152 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	46.81	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]
5135.00	H	174	179	-49.63	10.26	-39.37	61.2
7702.50	H	-	-	-57.18	12.29	-44.89	66.7
10270.00	H	-	-	-53.76	13.27	-40.49	62.3
12837.50	H	-	-	-50.69	13.29	-37.40	59.2

Table 7-27. Radiated Spurious Data (Band 7 – High Channel)

OPERATING FREQUENCY:	2567.50	MHz		
CHANNEL:	21425			
MEASURED OUTPUT POWER:	16.42	dBm	=	0.044 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	41.42	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]
5135.00	H	128	88	-39.81	10.26	-29.55	46.0
7702.50	H	130	192	-54.68	12.29	-42.39	58.8
10270.00	H	114	159	-51.63	13.27	-38.36	54.8
12837.50	H	-	-	-50.41	13.29	-37.12	53.5

Table 7-28. Radiated Spurious Data with CM Accessory (Band 7 – High Channel)

OPERATING FREQUENCY:	2506.00	MHz			
CHANNEL:	39750				
MEASURED OUTPUT POWER:	17.76	dBm	=	0.060	W
MODULATION SIGNAL:	QPSK				
BANDWIDTH:	20.0	MHz			
DISTANCE:	3	meters			
LIMIT:	55 + 10 log10 (W)	42.76	dBc		

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5012.00	H	124	226	-54.56	10.15	-44.41	62.2
7518.00	H	112	216	-52.06	12.10	-39.95	57.7
10024.00	H	-	-	-52.38	13.26	-39.12	56.9

Table 7-29. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY:	2593.00	MHz			
CHANNEL:	40620				
MEASURED OUTPUT POWER:	21.27	dBm	=	0.134	W
MODULATION SIGNAL:	QPSK				
BANDWIDTH:	20.0	MHz			
DISTANCE:	3	meters			
LIMIT:	55 + 10 log10 (W)	46.27	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]
5186.00	H	186	4	-52.38	10.33	-42.05	63.3
7779.00	H	196	276	-50.10	12.32	-37.78	59.0
10372.00	H	-	-	-53.25	13.18	-40.07	61.3

Table 7-30. Radiated Spurious Data (Band 41 – Mid Channel)

OPERATING FREQUENCY:	2680.00	MHz		
CHANNEL:	41490			
MEASURED OUTPUT POWER:	20.09	dBm	=	0.102 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	45.09	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]
5360.00	H	171	232	-51.48	10.37	-41.12	61.2
8040.00	H	169	298	-48.88	12.58	-36.30	56.4
10720.00	H	-	-	-51.05	12.92	-38.13	58.2

Table 7-31. Radiated Spurious Data (Band 41 – High Channel)

OPERATING FREQUENCY:	2593.00	MHz		
CHANNEL:	40620			
MEASURED OUTPUT POWER:	14.94	dBm	=	0.031 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	20.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	39.94	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]
5186.00	H	119	352	-48.38	10.33	-38.05	53.0
7779.00	H	120	243	-54.21	12.32	-41.89	56.8
10372.00	H	101	167	-50.99	13.18	-37.81	52.7

Table 7-32. Radiated Spurious Data with CM Accessory (Band 41 – Mid Channel)

7.8 Frequency Stability / Temperature Variation

§2.1055 §22.355 §24.235 §27.54

Test Overview and Limit

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

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

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

Test Procedure Used

ANSI/TIA-603-C-2004

Test Settings

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

Test Setup

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

Test Notes

None

Band 12 Frequency Stability Measurements

§2.1055 §27.54

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)	707,500,144	144	0.0000204
100 %		- 30	707,499,969	-31	-0.0000044
100 %		- 20	707,499,913	-87	-0.0000123
100 %		- 10	707,499,914	-86	-0.0000122
100 %		0	707,499,988	-12	-0.0000017
100 %		+ 10	707,500,372	372	0.0000526
100 %		+ 20	707,499,915	-85	-0.0000120
100 %		+ 30	707,499,938	-62	-0.0000088
100 %		+ 40	707,499,775	-225	-0.0000318
100 %		+ 50	707,499,989	-11	-0.0000016
BATT. ENDPOINT	3.45	+ 20	707,500,088	88	0.0000124

Table 7-33. 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.

Band 12 Frequency Stability Measurements

§2.1055 §27.54

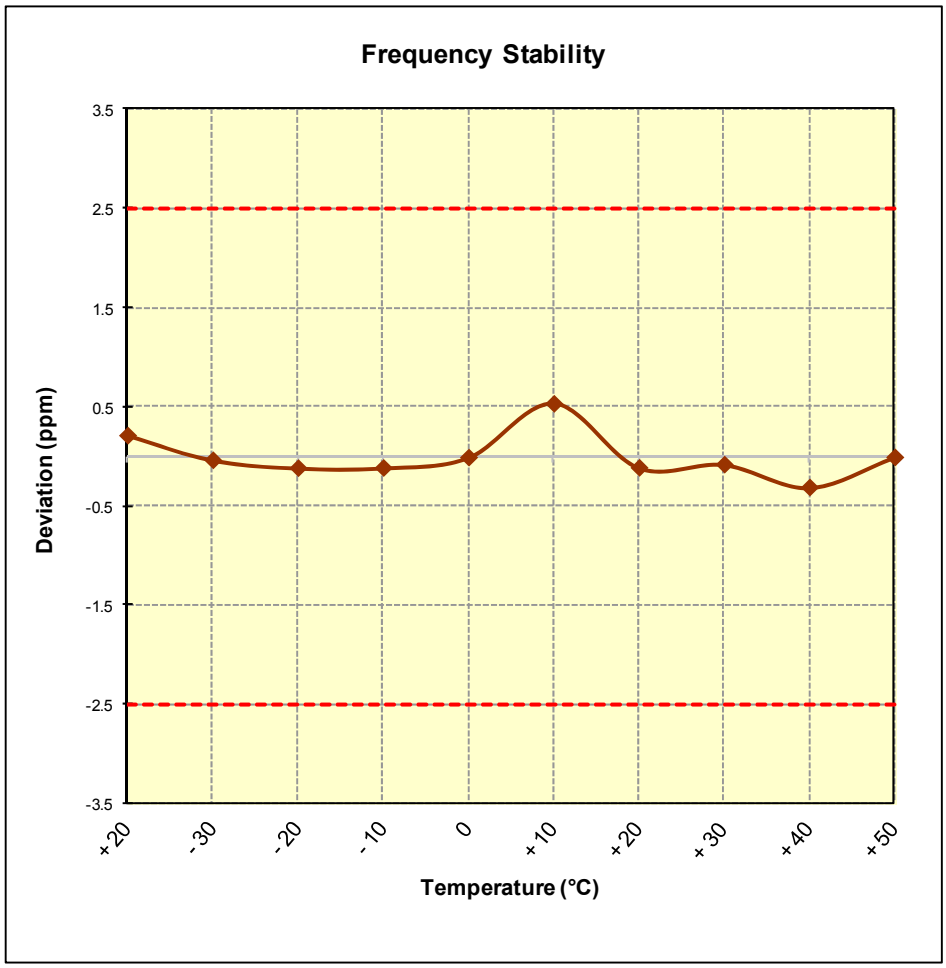


Figure 7-8. Frequency Stability Graph (Band 12)

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)	836,499,951	-49	-0.0000059
100 %		- 30	836,500,004	4	0.0000005
100 %		- 20	836,499,996	-4	-0.0000005
100 %		- 10	836,499,854	-146	-0.0000175
100 %		0	836,500,364	364	0.0000435
100 %		+ 10	836,500,034	34	0.0000041
100 %		+ 20	836,499,912	-88	-0.0000105
100 %		+ 30	836,500,058	58	0.0000069
100 %		+ 40	836,500,116	116	0.0000139
100 %		+ 50	836,499,972	-28	-0.0000033
BATT. ENDPOINT	3.45	+ 20	836,499,918	-82	-0.0000098

Table 7-34. Frequency Stability Data (Band 5)

Band 5 Frequency Stability Measurements

§2.1055 §22.355

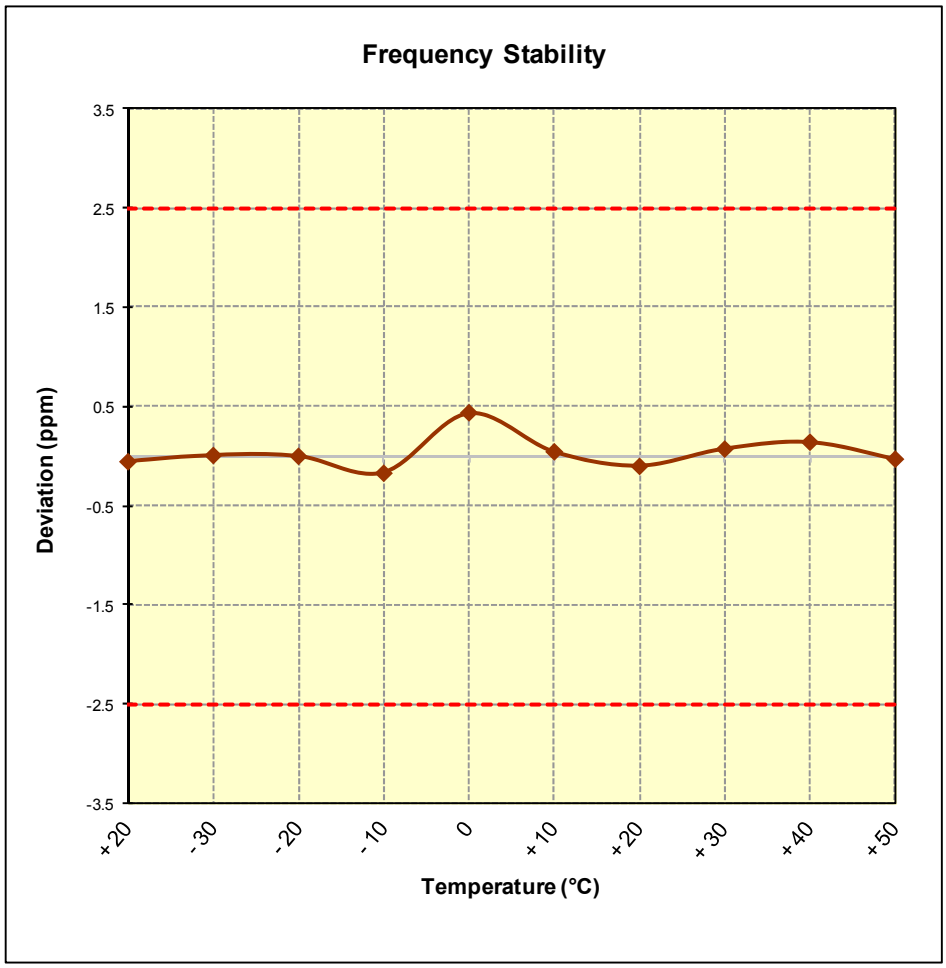


Figure 7-9. Frequency Stability Graph (Band 5)

Band 26 Frequency Stability Measurements

§2.1055 §22.355

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
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)	831,499,999	-1	-0.0000001
100 %		- 30	831,499,789	-211	-0.0000254
100 %		- 20	831,500,052	52	0.0000063
100 %		- 10	831,500,467	467	0.0000562
100 %		0	831,499,917	-83	-0.0000100
100 %		+ 10	831,500,125	125	0.0000150
100 %		+ 20	831,500,211	211	0.0000254
100 %		+ 30	831,500,076	76	0.0000091
100 %		+ 40	831,500,176	176	0.0000212
100 %		+ 50	831,499,950	-50	-0.0000060
BATT. ENDPOINT	3.45	+ 20	831,500,023	23	0.0000028

Table 7-35. Frequency Stability Data (Band 26)

Band 26 Frequency Stability Measurements

§2.1055 §22.355

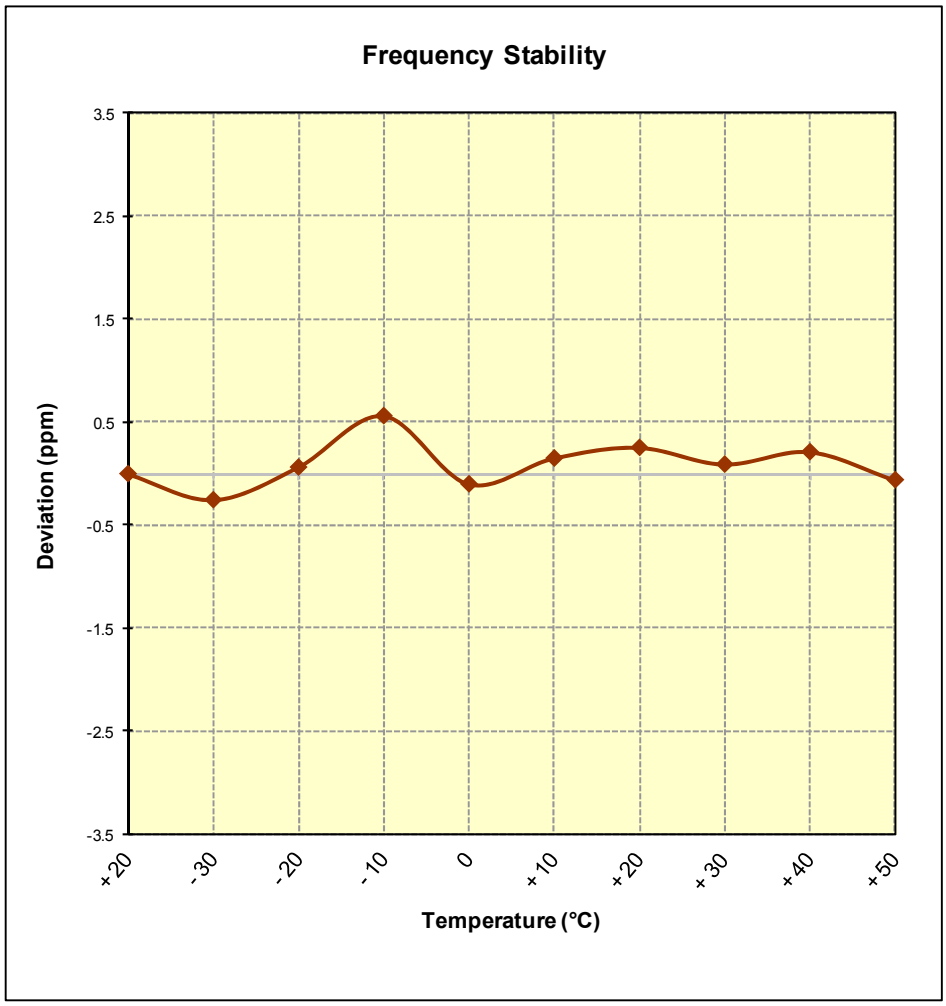


Figure 7-10. Frequency Stability Graph (Band 26)

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)	1,732,500,113	113	0.0000065
100 %		- 30	1,732,500,166	166	0.0000096
100 %		- 20	1,732,499,928	-72	-0.0000042
100 %		- 10	1,732,500,153	153	0.0000088
100 %		0	1,732,500,219	219	0.0000126
100 %		+ 10	1,732,499,962	-38	-0.0000022
100 %		+ 20	1,732,499,733	-267	-0.0000154
100 %		+ 30	1,732,499,852	-148	-0.0000085
100 %		+ 40	1,732,500,156	156	0.0000090
100 %		+ 50	1,732,500,015	15	0.0000009
BATT. ENDPOINT	3.45	+ 20	1,732,500,266	266	0.0000154

Table 7-36. 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.

Band 4 Frequency Stability Measurements

§2.1055 §§27.54

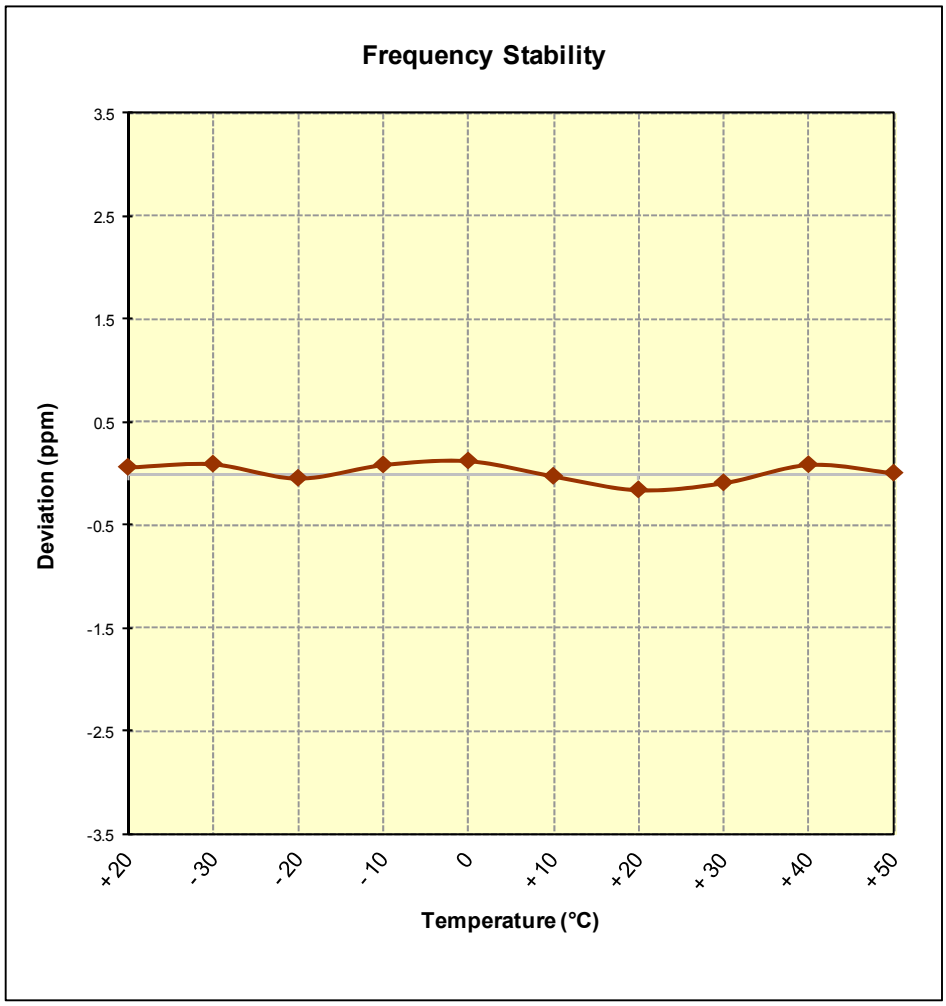


Figure 7-11. Frequency Stability Graph (Band 4)

Band 2 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,917	-83	-0.0000044
100 %		- 30	1,880,000,026	26	0.0000014
100 %		- 20	1,880,000,118	118	0.0000063
100 %		- 10	1,880,000,115	115	0.0000061
100 %		0	1,880,000,027	27	0.0000014
100 %		+ 10	1,879,999,600	-400	-0.0000213
100 %		+ 20	1,879,999,827	-173	-0.0000092
100 %		+ 30	1,879,999,738	-262	-0.0000139
100 %		+ 40	1,879,999,964	-36	-0.0000019
100 %		+ 50	1,879,999,848	-152	-0.0000081
BATT. ENDPOINT	3.45	+ 20	1,880,000,053	53	0.0000028

Table 7-37. Frequency Stability Data (Band 2)

Note:

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

Band 2 Frequency Stability Measurements

§2.1055 §24.235

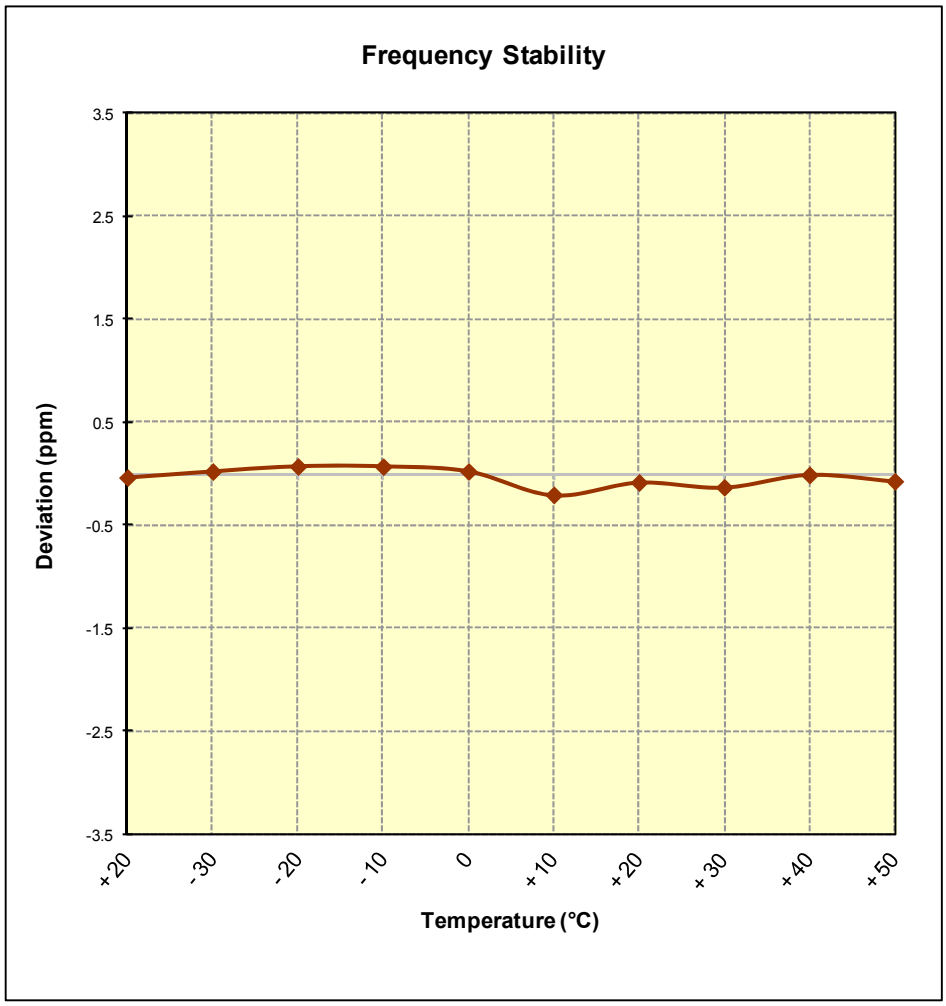


Figure 7-12. Frequency Stability Graph (Band 2)

Band 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)	1,882,500,109	109	0.0000058
100 %		- 30	1,882,500,068	68	0.0000036
100 %		- 20	1,882,499,726	-274	-0.0000146
100 %		- 10	1,882,499,595	-405	-0.0000215
100 %		0	1,882,499,699	-301	-0.0000160
100 %		+ 10	1,882,499,834	-166	-0.0000088
100 %		+ 20	1,882,499,960	-40	-0.0000021
100 %		+ 30	1,882,499,526	-474	-0.0000252
100 %		+ 40	1,882,499,958	-42	-0.0000022
100 %		+ 50	1,882,499,982	-18	-0.0000010
BATT. ENDPOINT	3.45	+ 20	1,882,499,776	-224	-0.0000119

Table 7-38. Frequency Stability Data (Band 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.

Band 25 Frequency Stability Measurements

§2.1055 §24.235

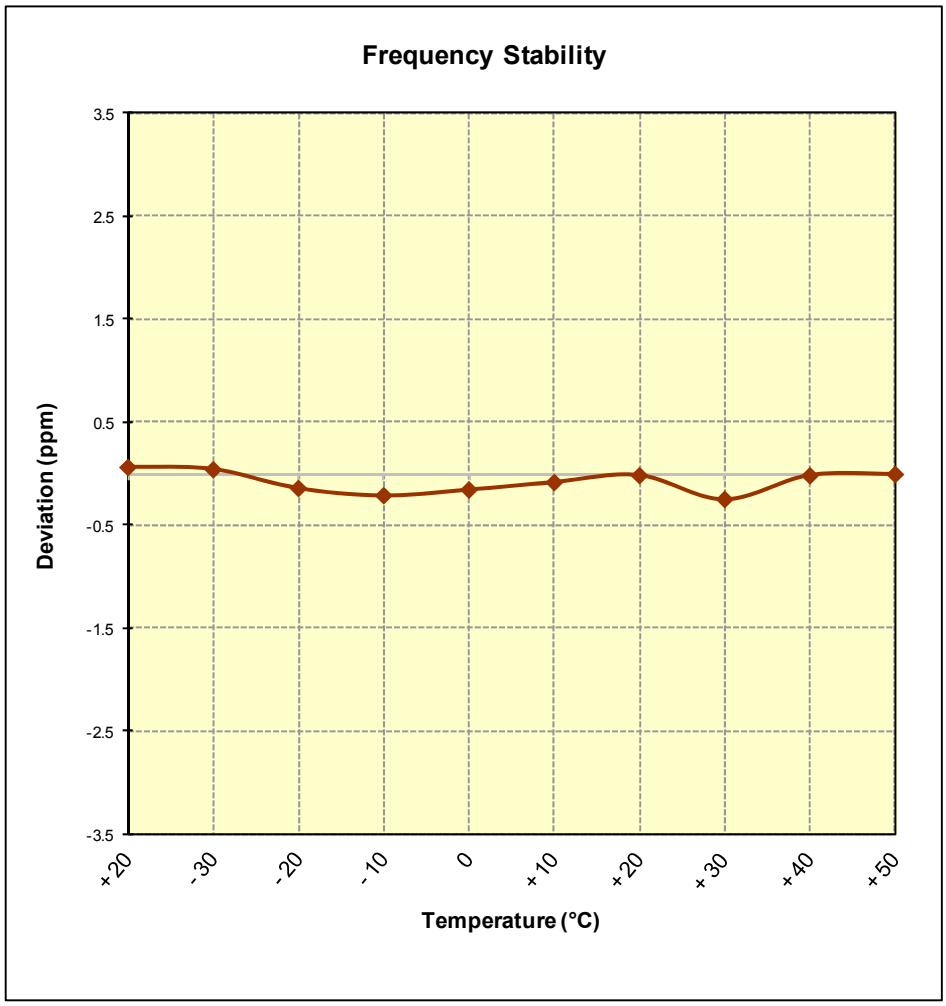


Figure 7-13. Frequency Stability Graph (Band 25)

Band 7 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	2,535,000,000	Hz
CHANNEL:	21100	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,535,000,235	235	0.0000093
100 %		- 30	2,534,999,935	-65	-0.0000026
100 %		- 20	2,535,000,020	20	0.0000008
100 %		- 10	2,535,000,083	83	0.0000033
100 %		0	2,535,000,282	282	0.0000111
100 %		+ 10	2,535,000,061	61	0.0000024
100 %		+ 20	2,534,999,947	-53	-0.0000021
100 %		+ 30	2,534,999,960	-40	-0.0000016
100 %		+ 40	2,534,999,989	-11	-0.0000004
100 %		+ 50	2,535,000,197	197	0.0000078
BATT. ENDPOINT	3.45	+ 20	2,534,999,915	-85	-0.0000034

Table 7-39. Frequency Stability Data (Band 7)

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.

Band 7 Frequency Stability Measurements

§2.1055 §27.54

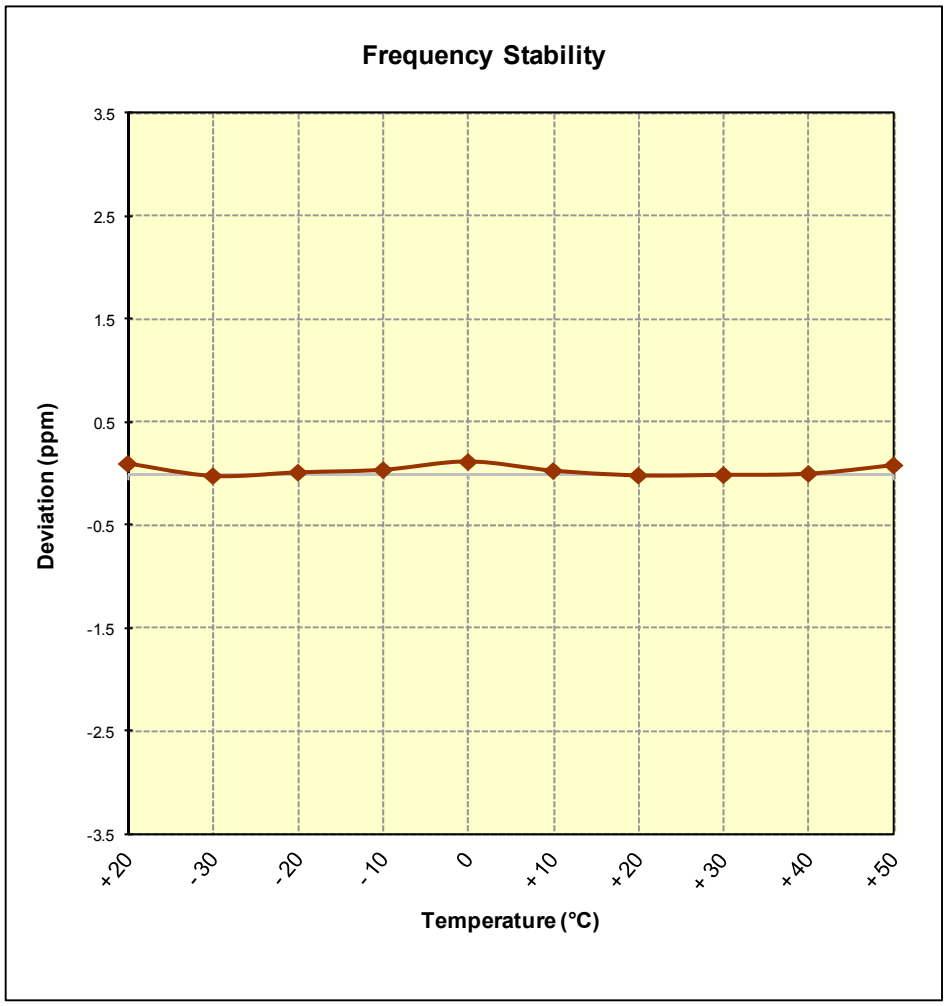


Figure 7-14. Frequency Stability Graph (Band 7)

Band 41 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,592,999,960	-40	-0.0000015
100 %		- 30	2,592,999,876	-124	-0.0000048
100 %		- 20	2,592,999,996	-4	-0.0000002
100 %		- 10	2,592,999,826	-174	-0.0000067
100 %		0	2,592,999,996	-4	-0.0000002
100 %		+ 10	2,593,000,020	20	0.0000008
100 %		+ 20	2,592,999,817	-183	-0.0000071
100 %		+ 30	2,592,999,894	-106	-0.0000041
100 %		+ 40	2,592,999,984	-16	-0.0000006
100 %		+ 50	2,592,999,848	-152	-0.0000059
BATT. ENDPOINT	3.45	+ 20	2,592,999,919	-81	-0.0000031

Table 7-40. 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.

Band 41 Frequency Stability Measurements

§2.1055 §27.54

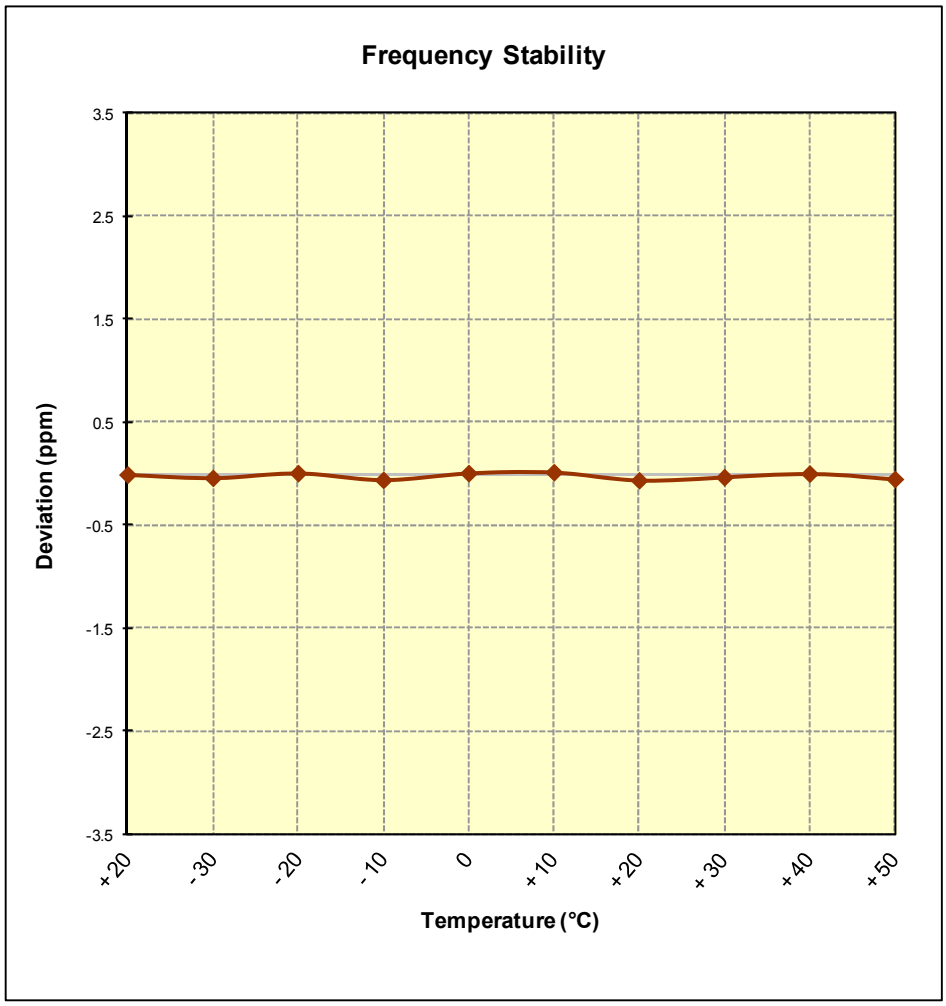


Figure 7-15. Frequency Stability Graph (Band 41)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Electronics MobileComm U.S.A Portable Handset FCC ID: ZNFLS992** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.