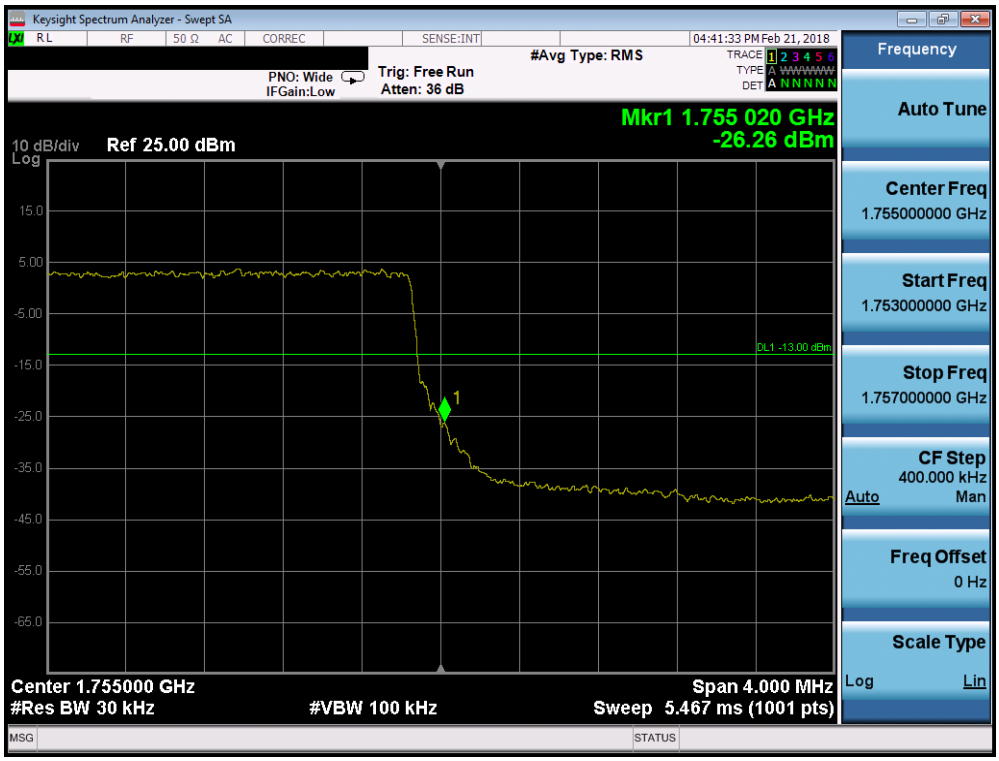
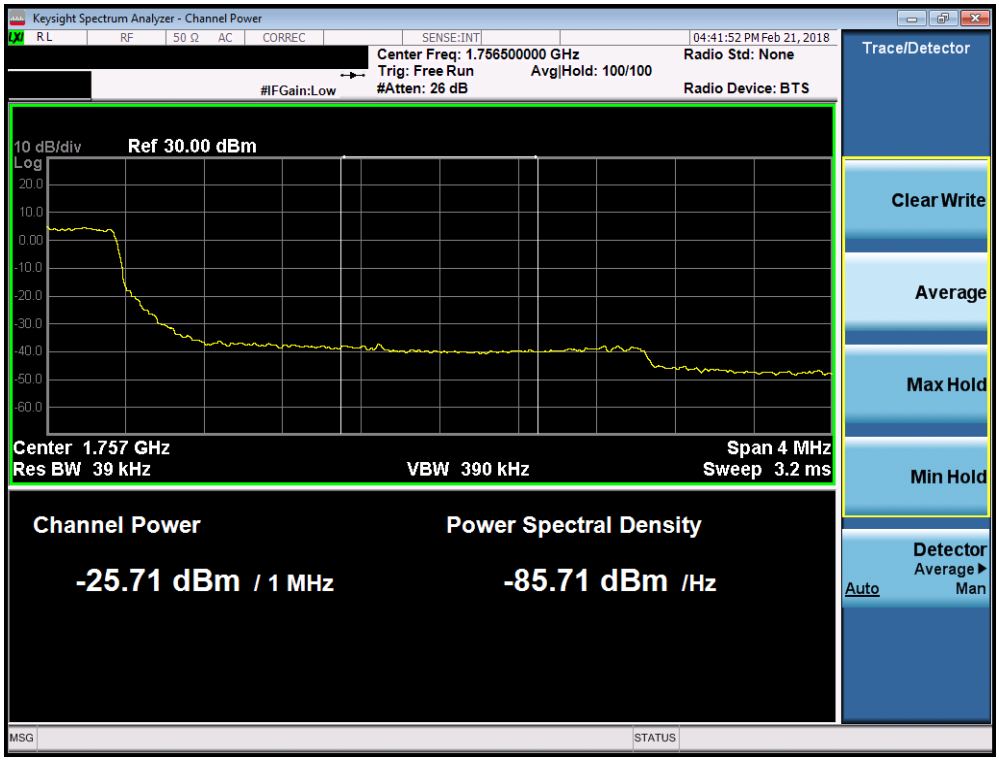
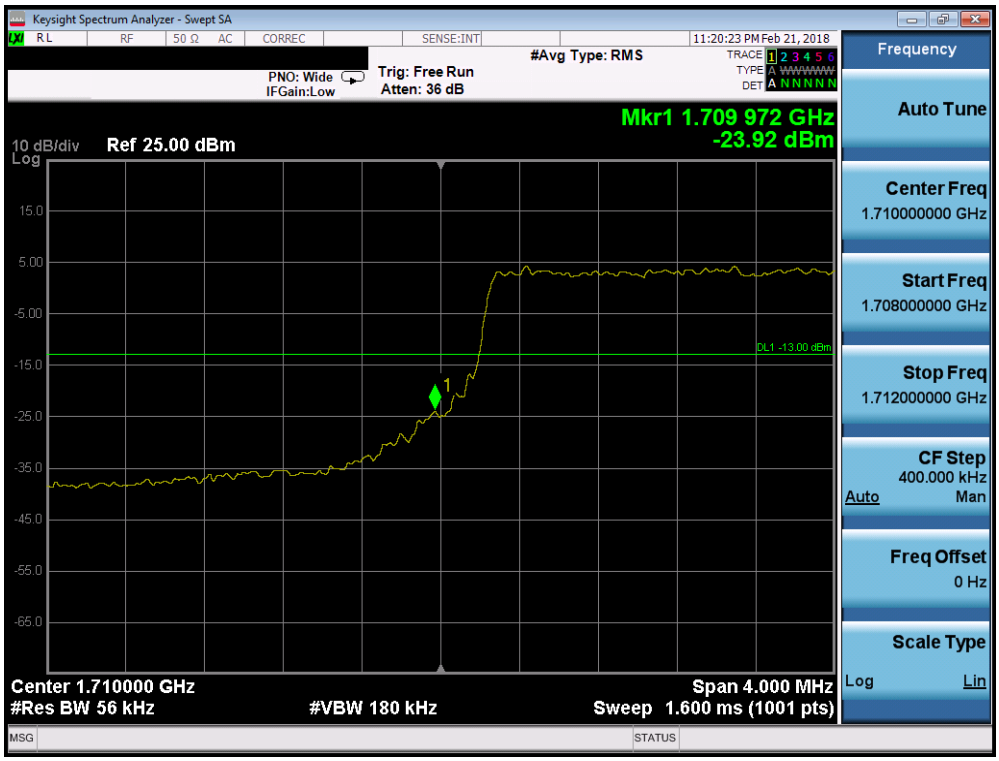


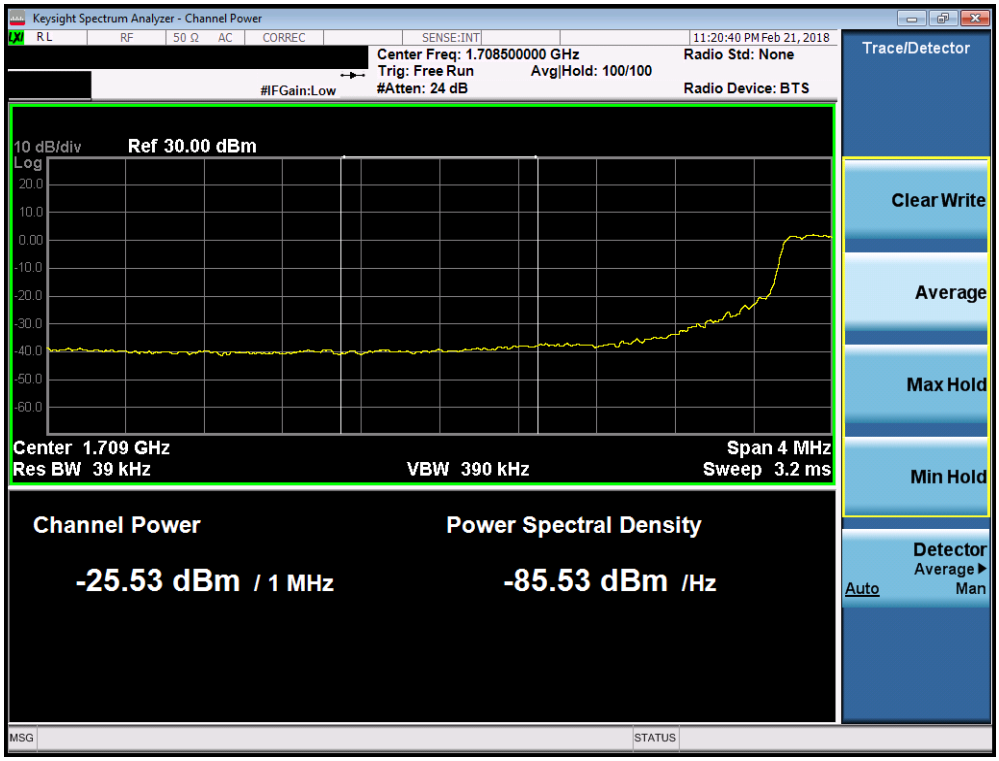
Plot 7-120. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-121. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

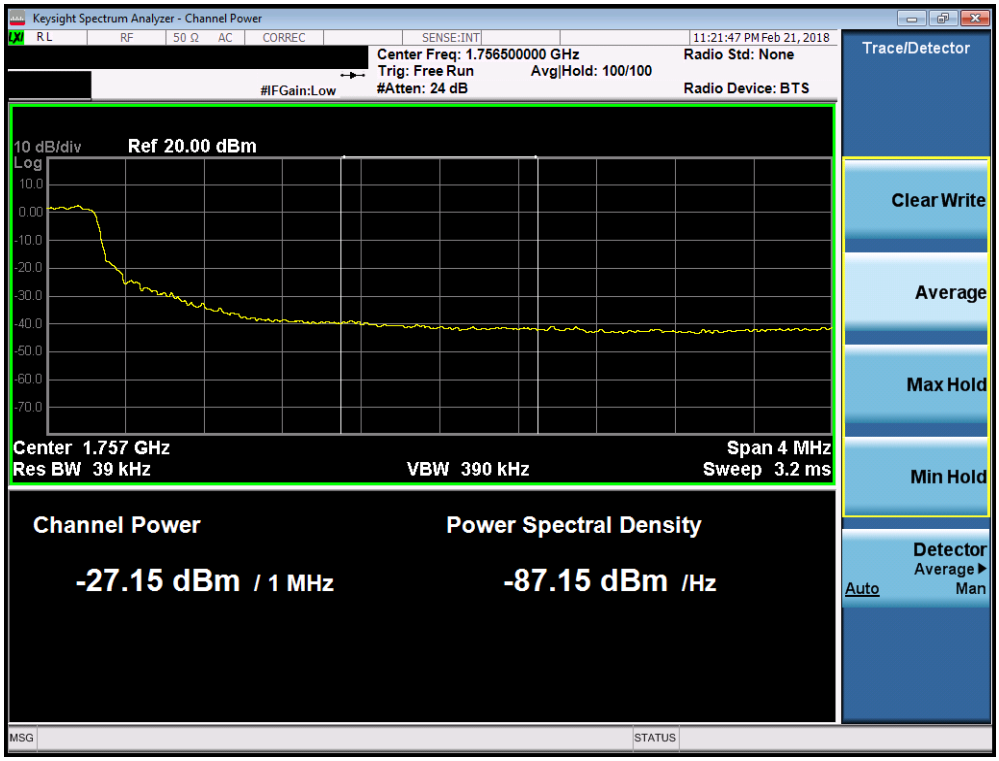


Plot 7-122. Lower Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

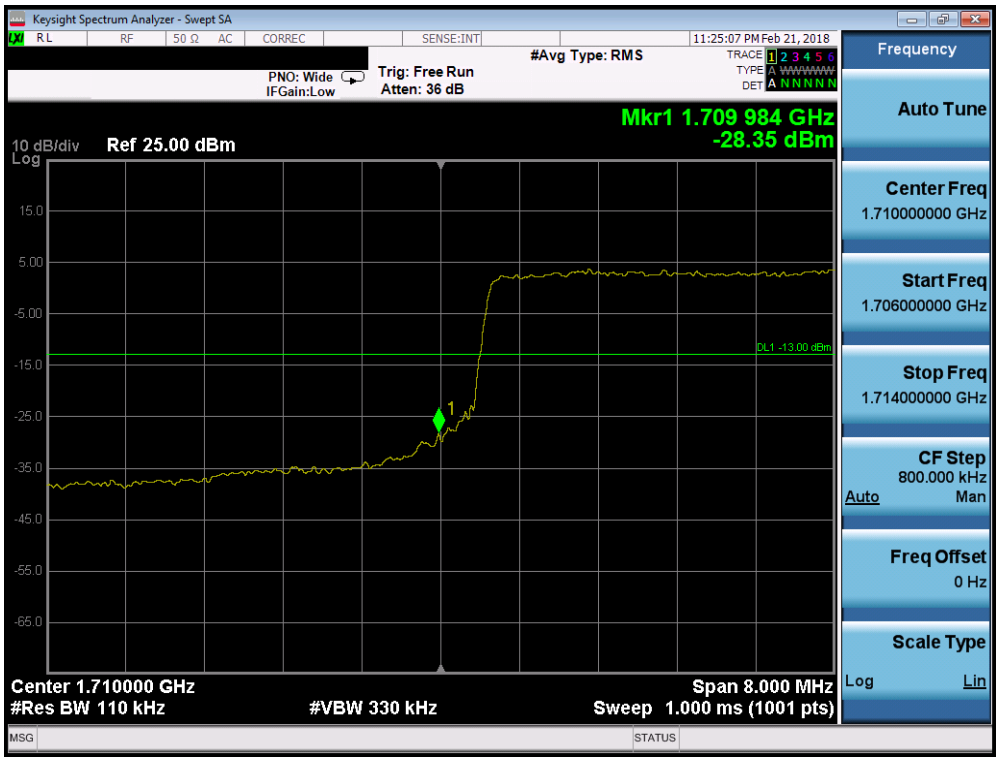


Plot 7-123. Lower Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

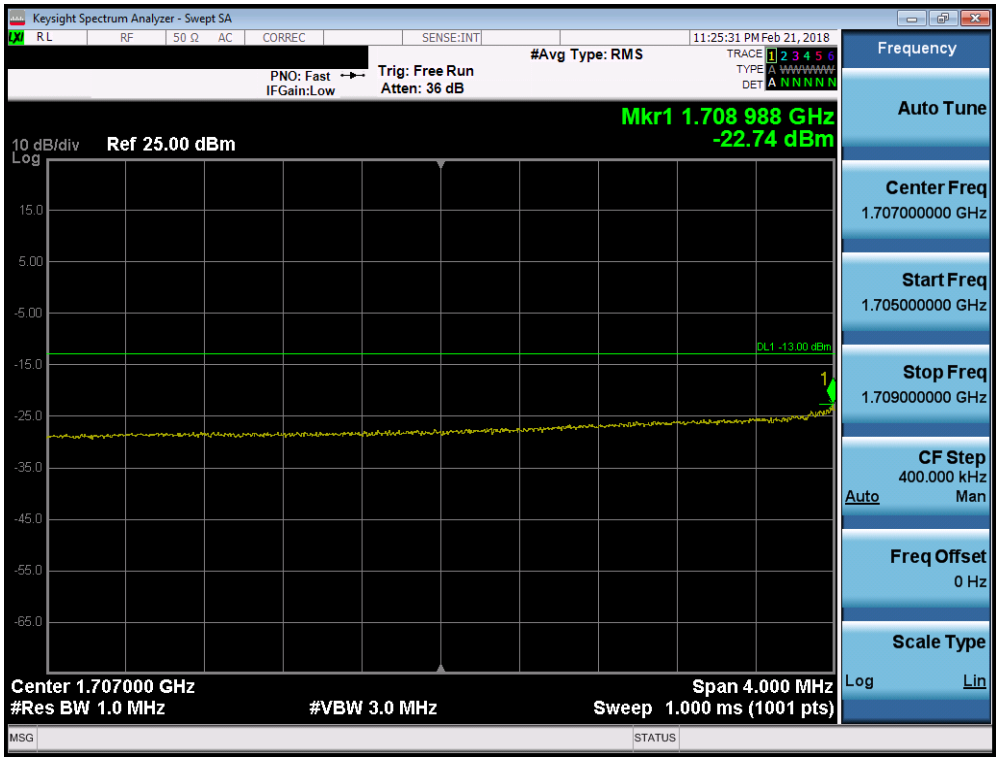
Plot 7-124. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



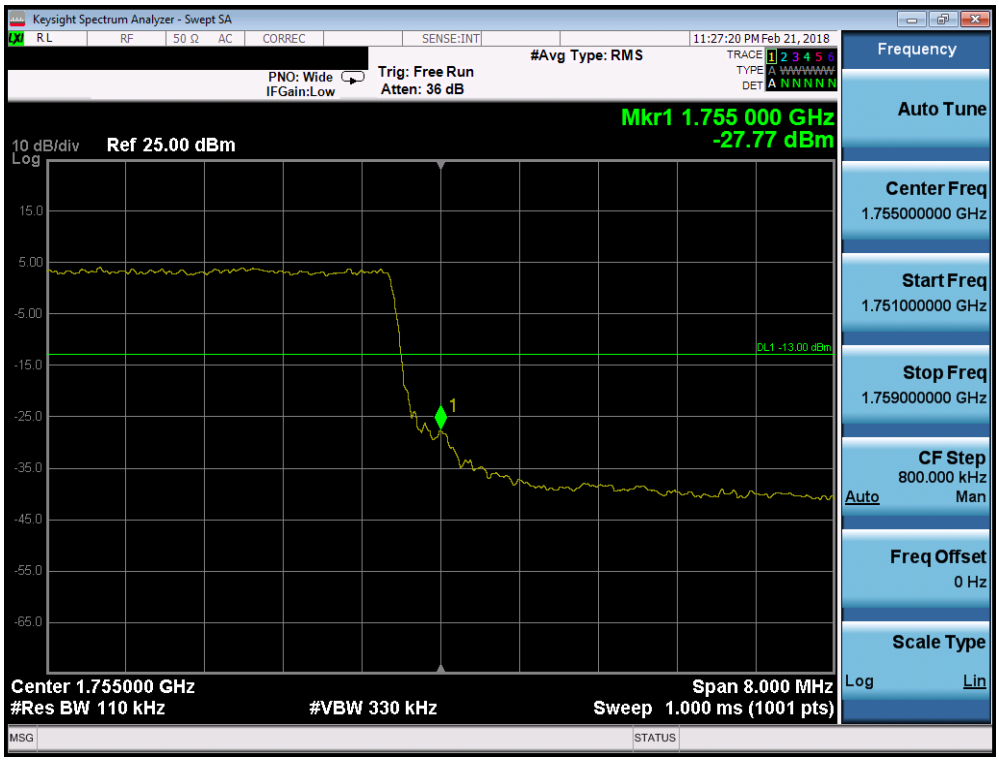
Plot 7-125. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



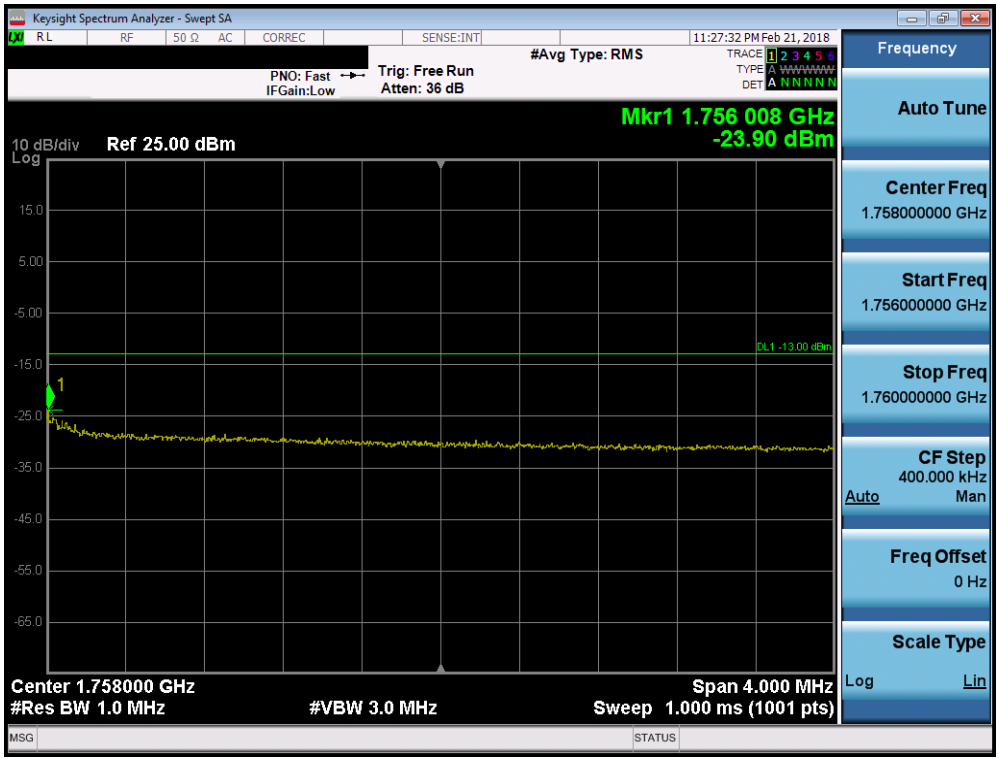
Plot 7-126. Lower Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



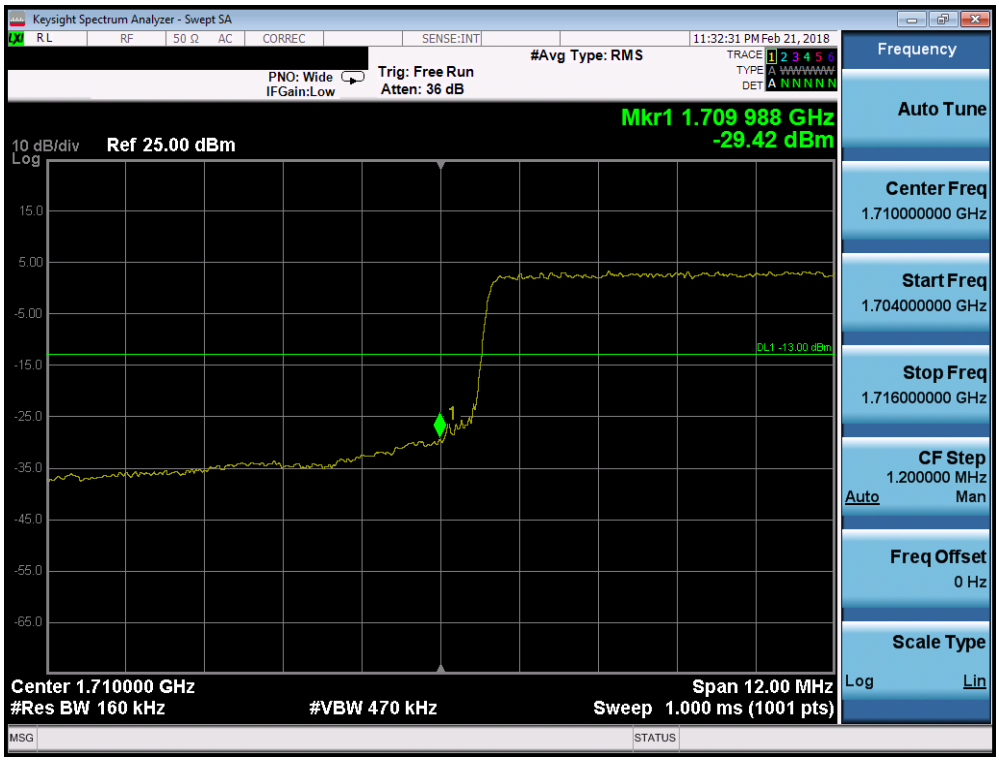
Plot 7-127. Lower Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



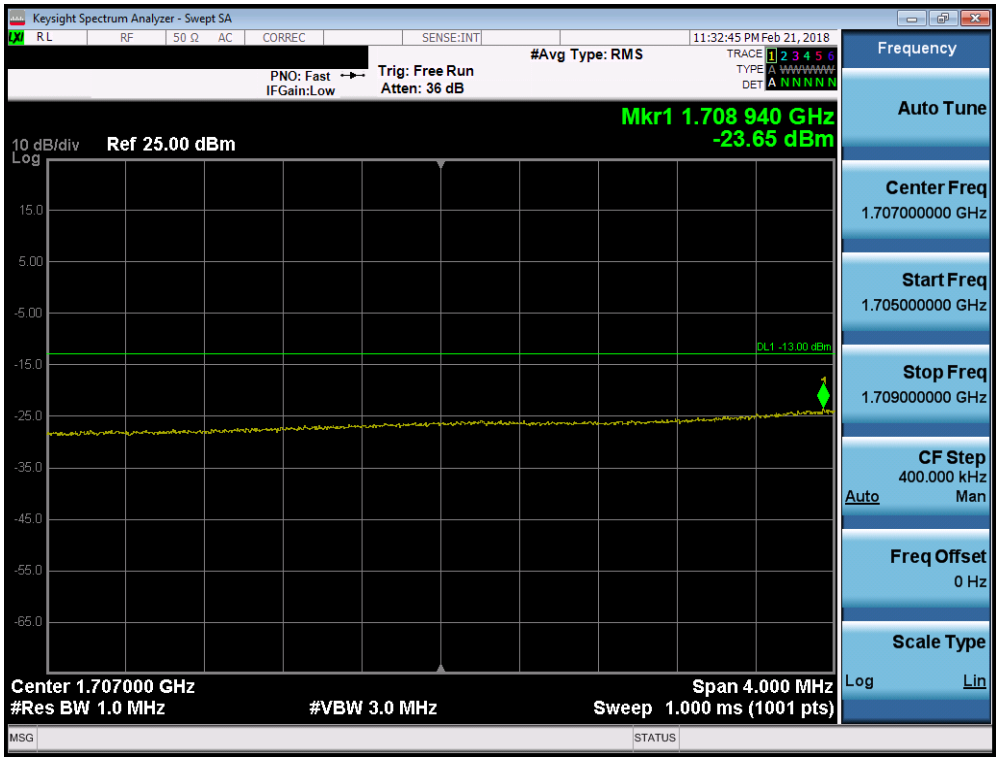
Plot 7-128. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



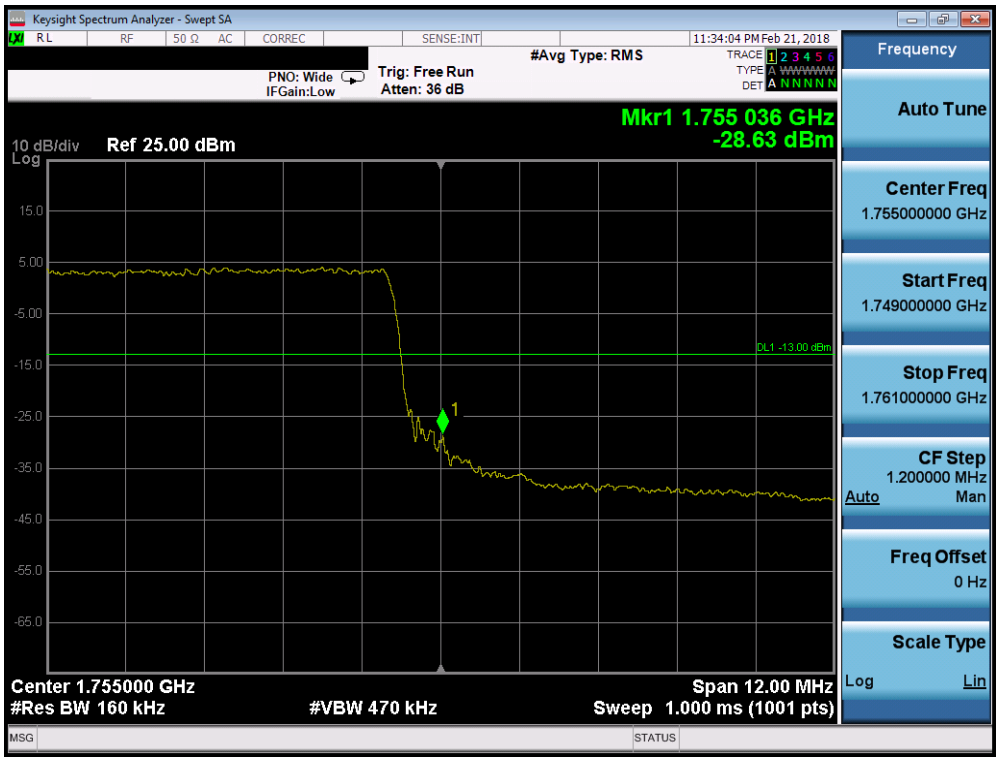
Plot 7-129. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



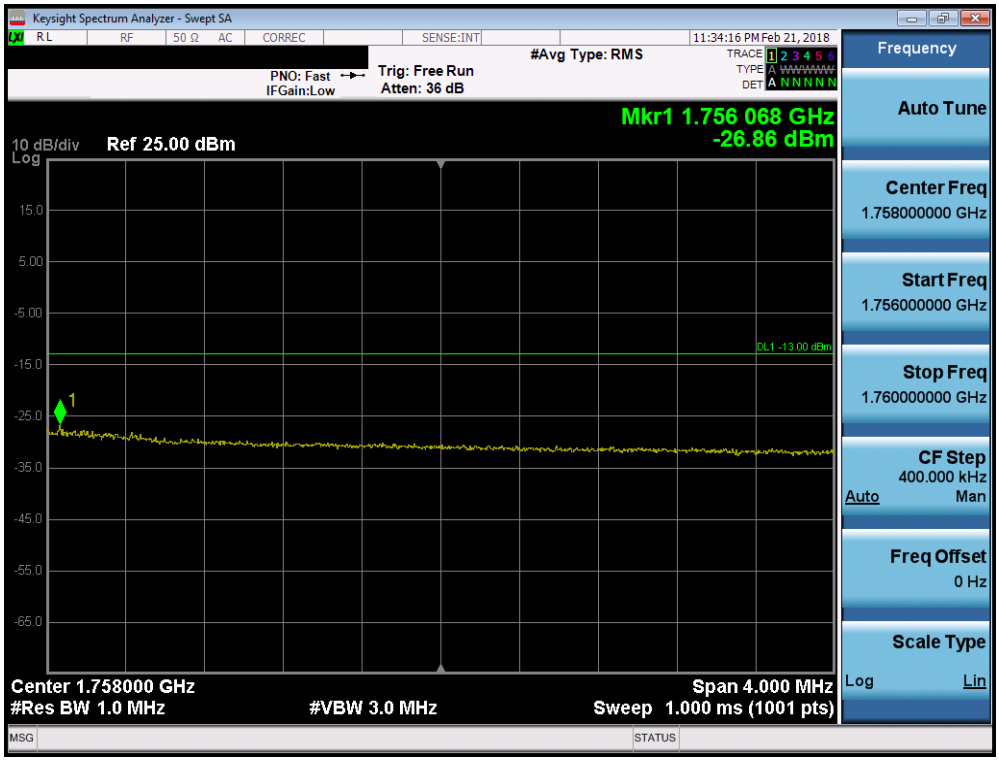
Plot 7-130. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



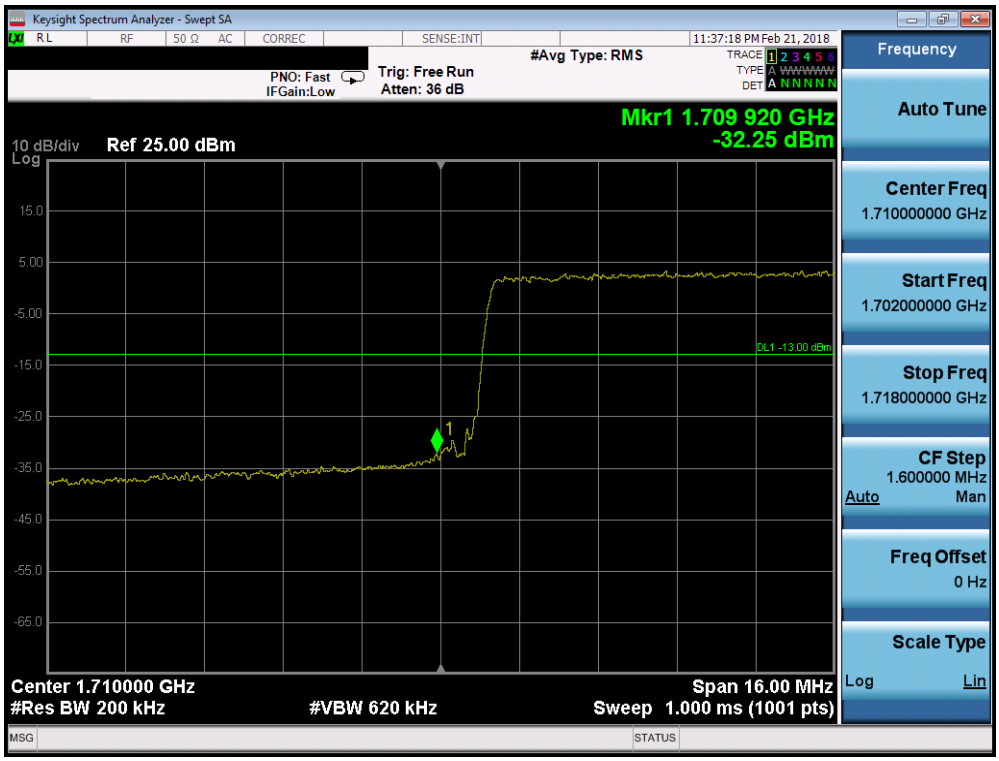
Plot 7-131. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



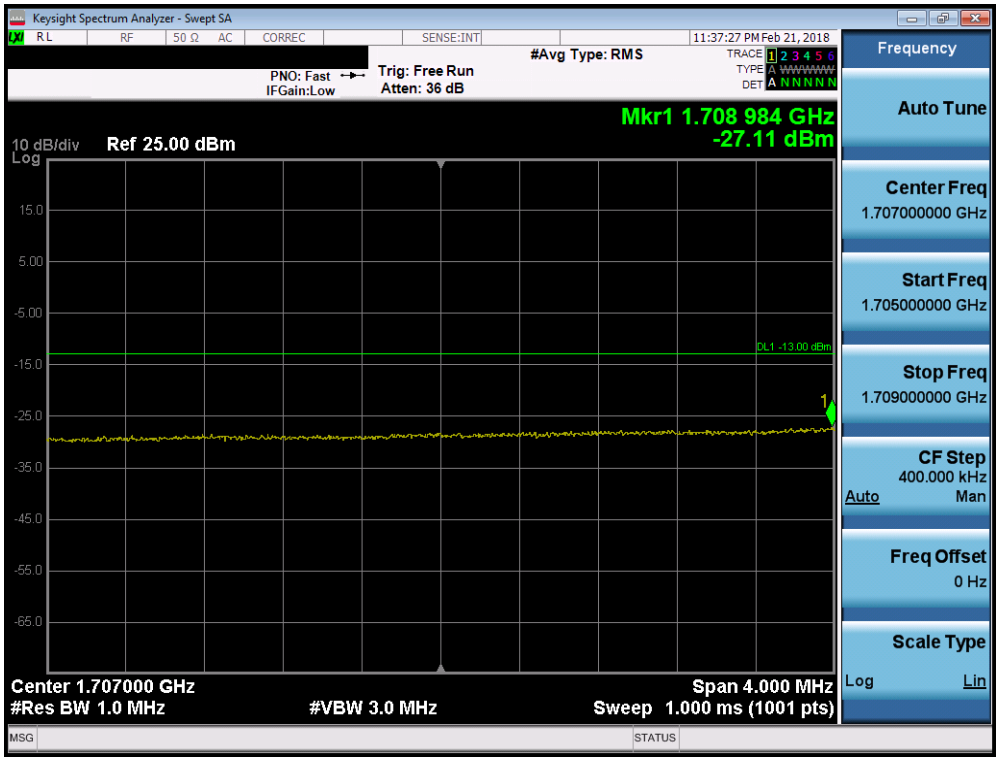
Plot 7-132. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



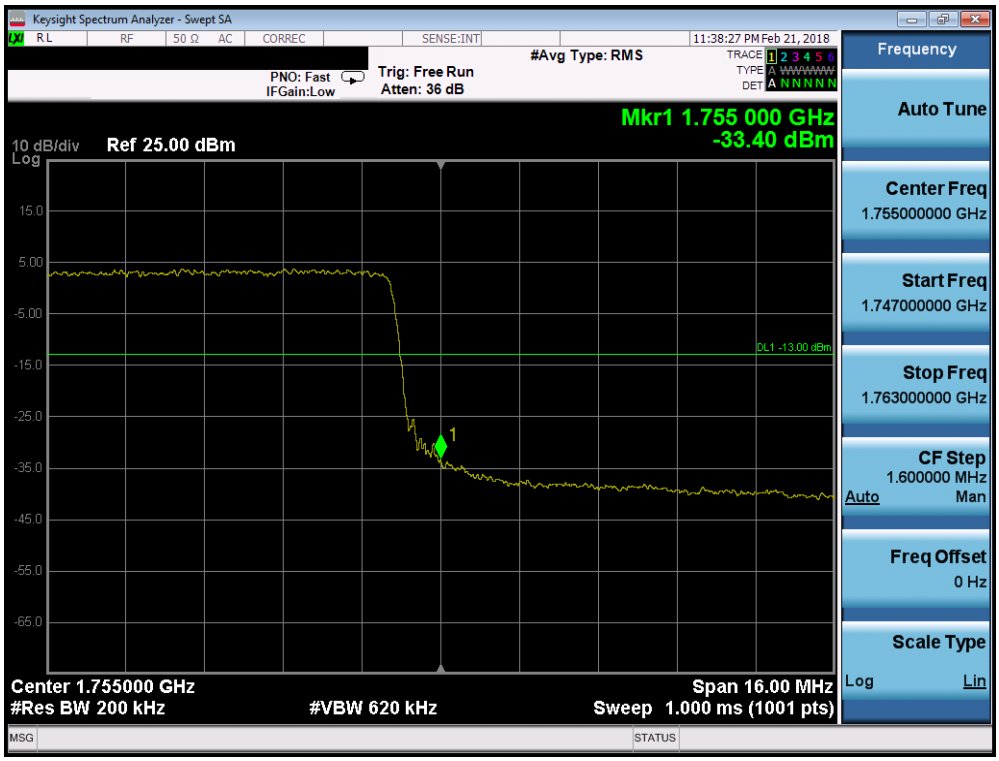
Plot 7-133. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



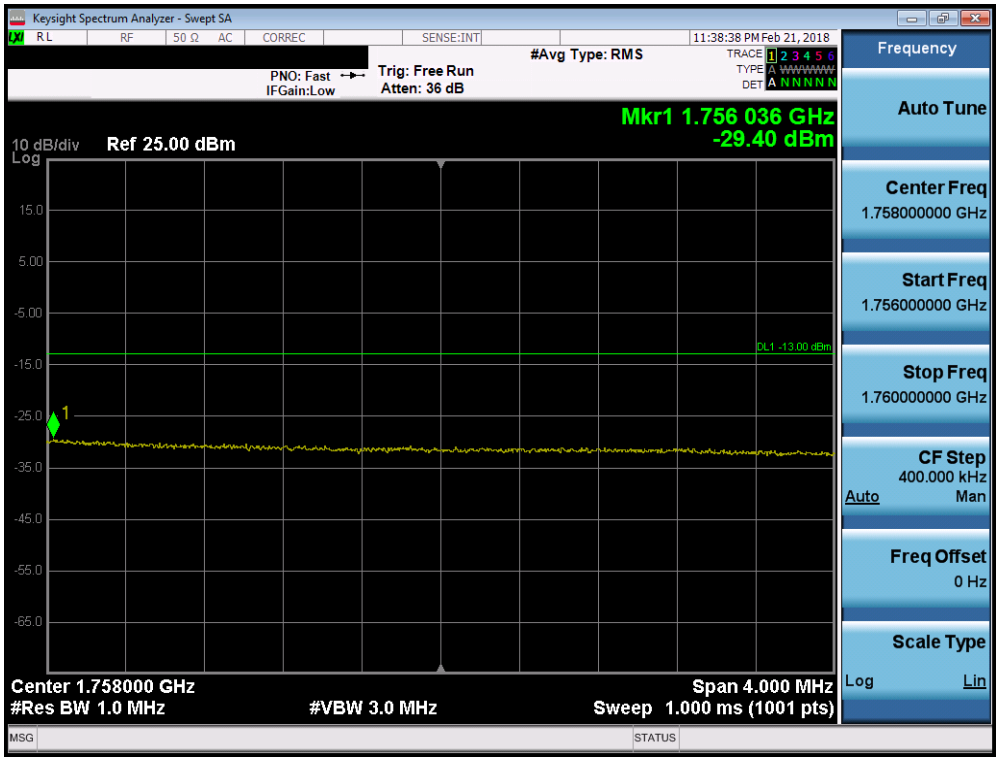
Plot 7-134. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-135. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

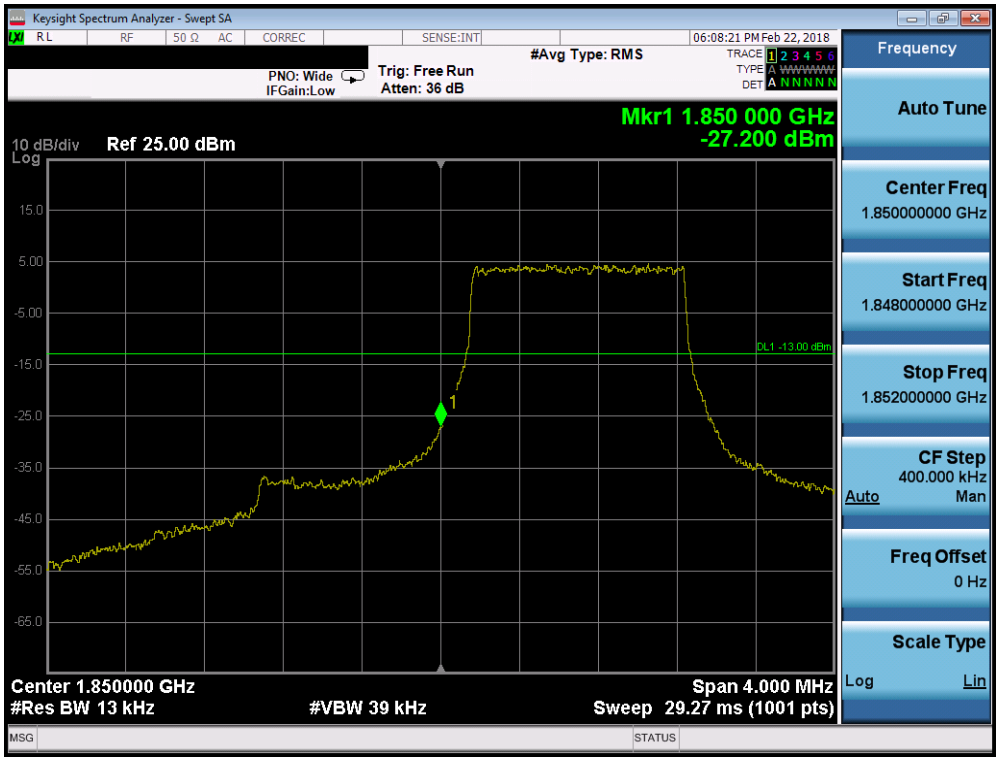


Plot 7-136. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

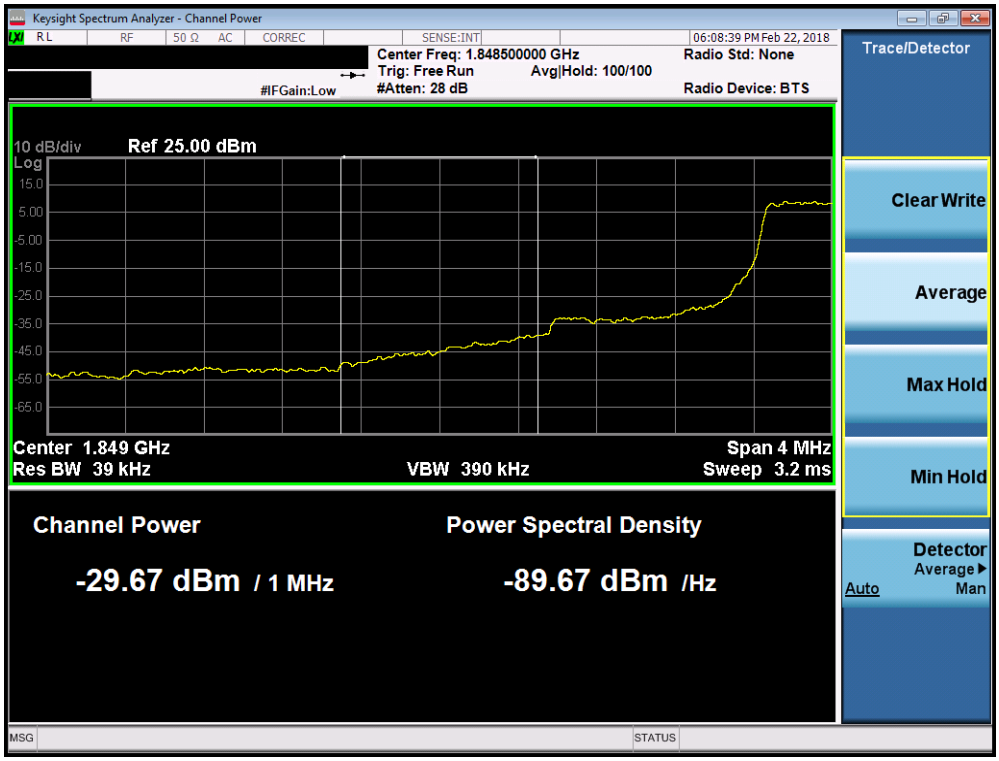


Plot 7-137. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

Band 25/2

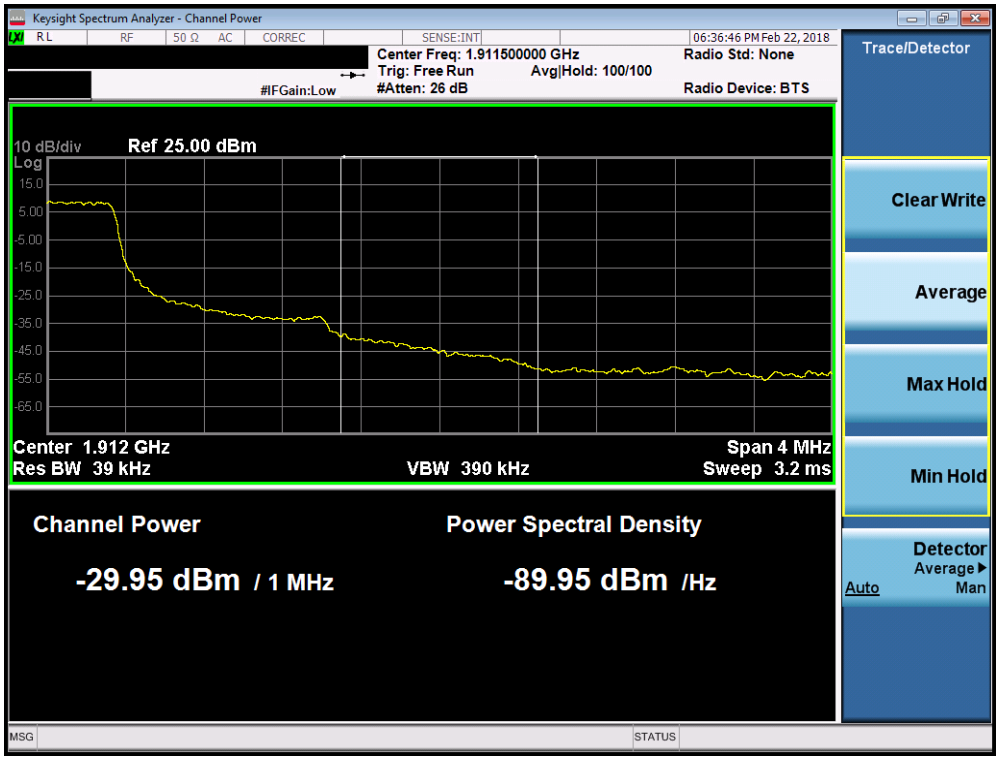


Plot 7-138. Lower Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



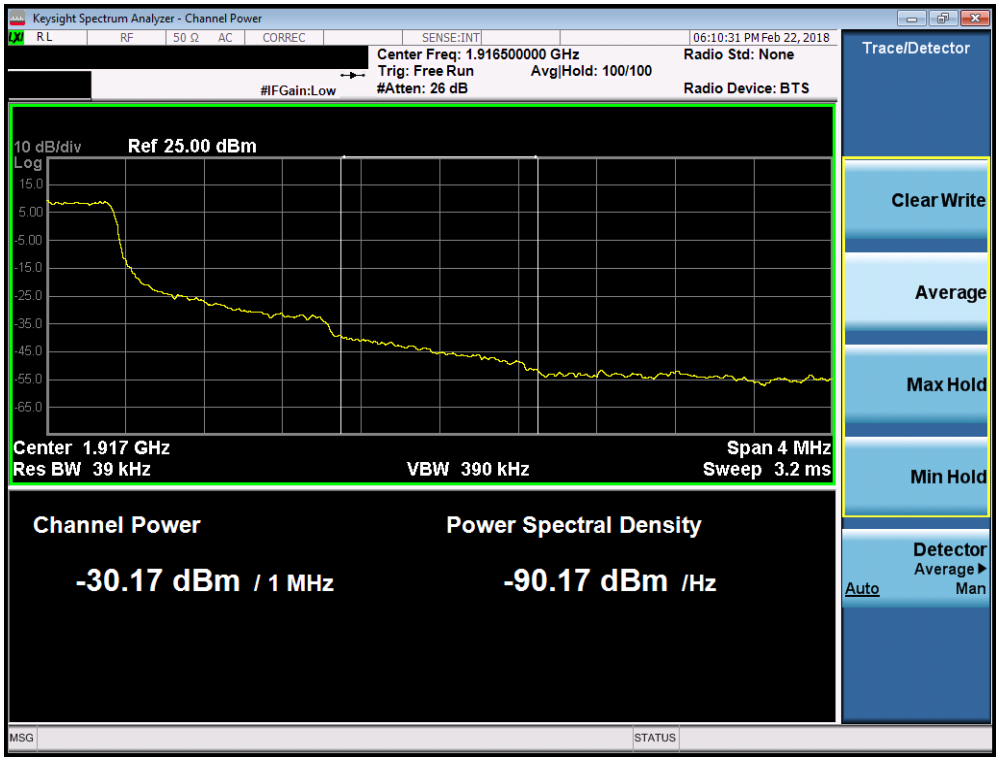
Plot 7-139. Lower Extended Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)

Plot 7-140. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

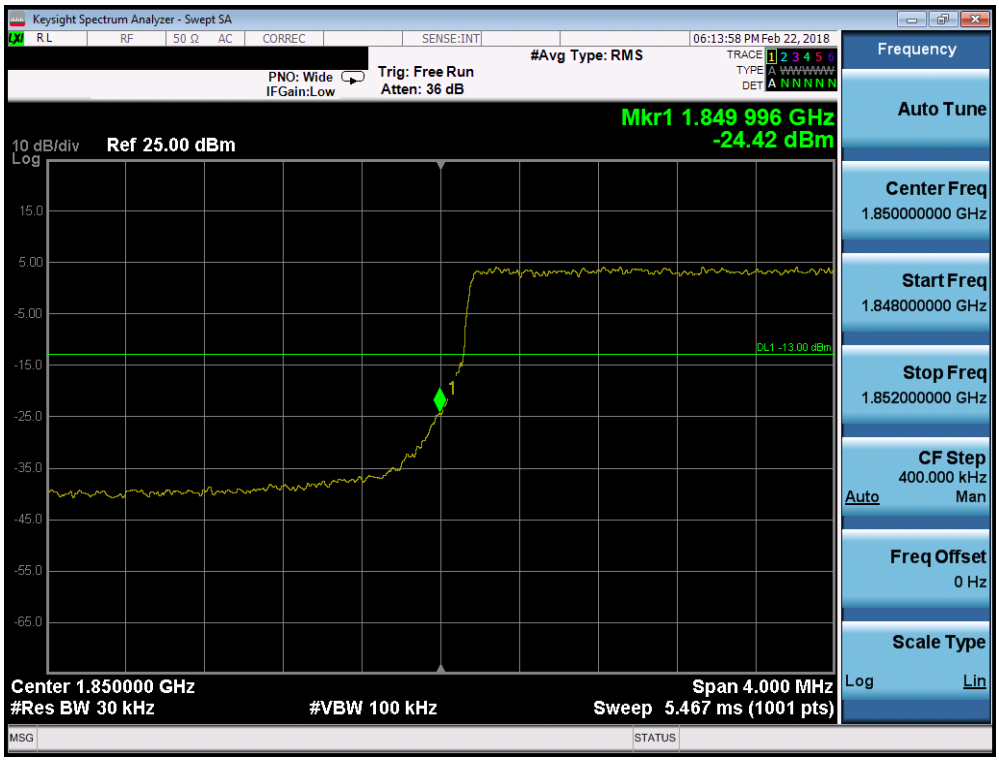


Plot 7-141. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

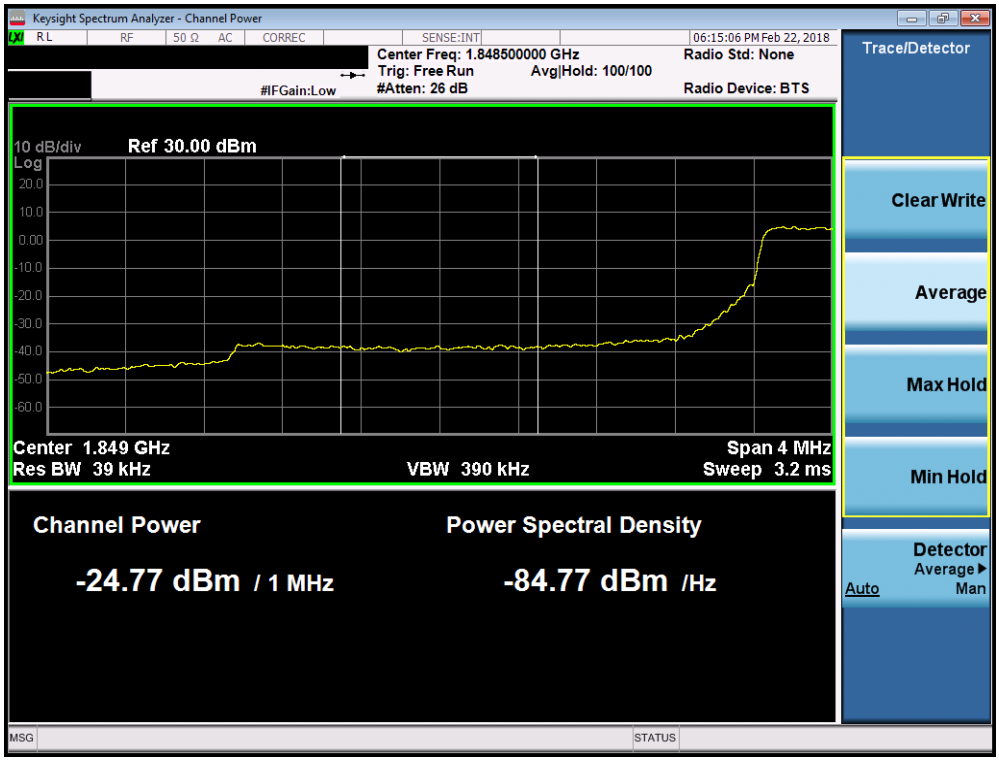
Plot 7-142. Upper Band Edge Plot (Band 25 - 1.4MHz QPSK - Full RB Configuration)



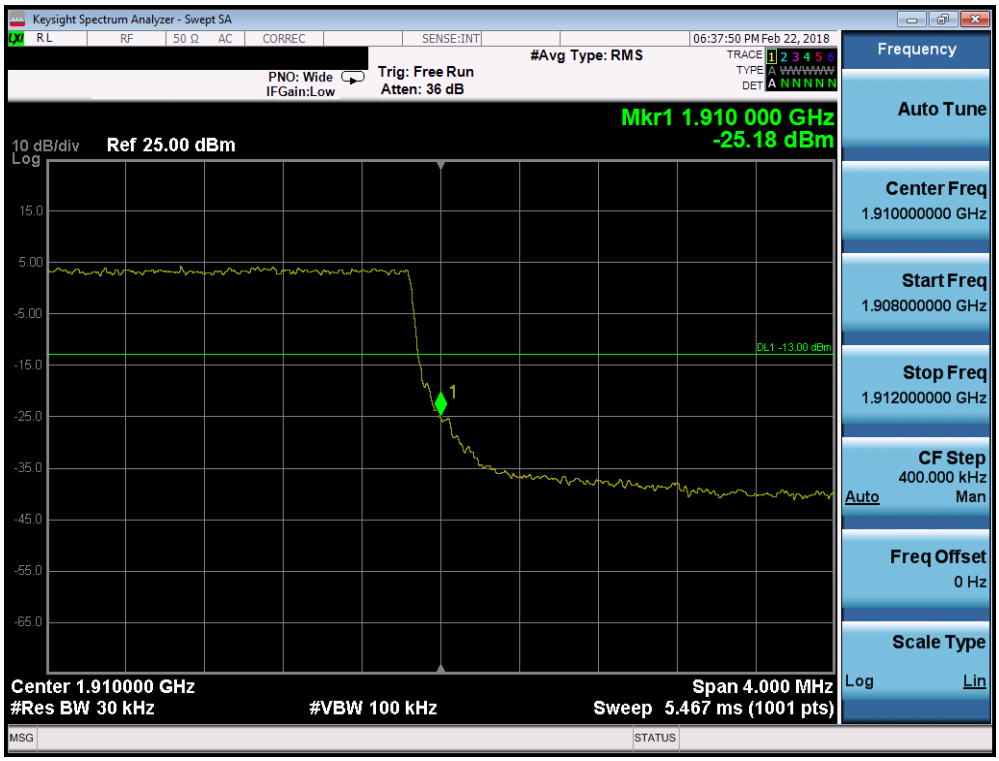
Plot 7-143. Upper Extended Band Edge Plot (Band 25 - 1.4MHz QPSK - Full RB Configuration)



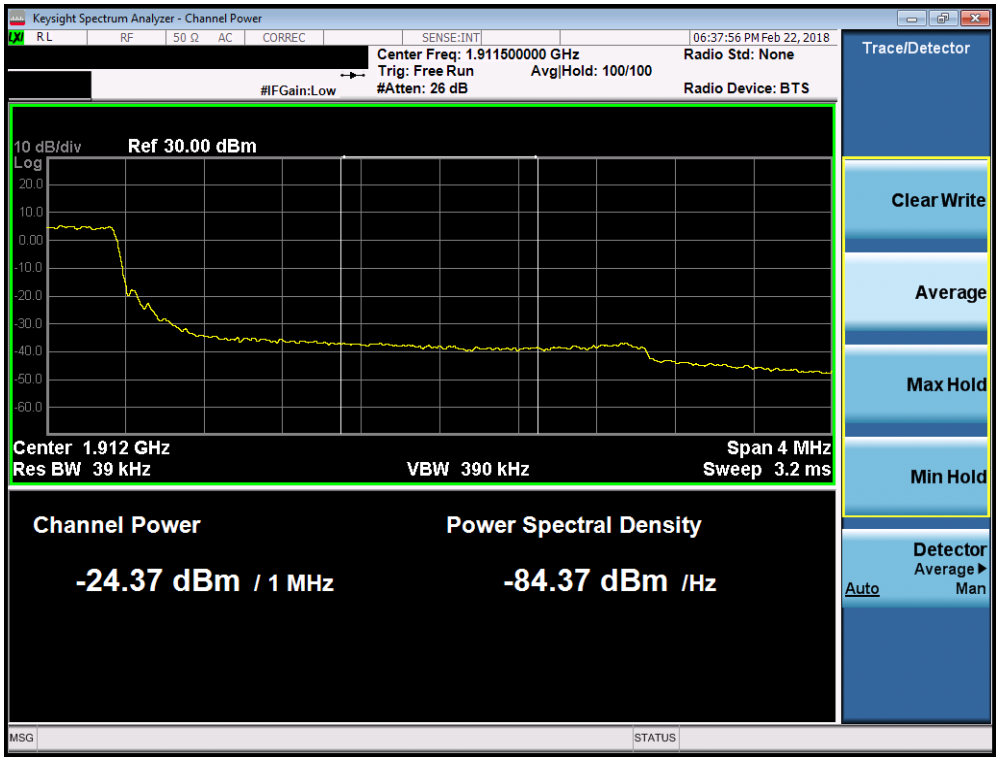
Plot 7-144. Lower Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



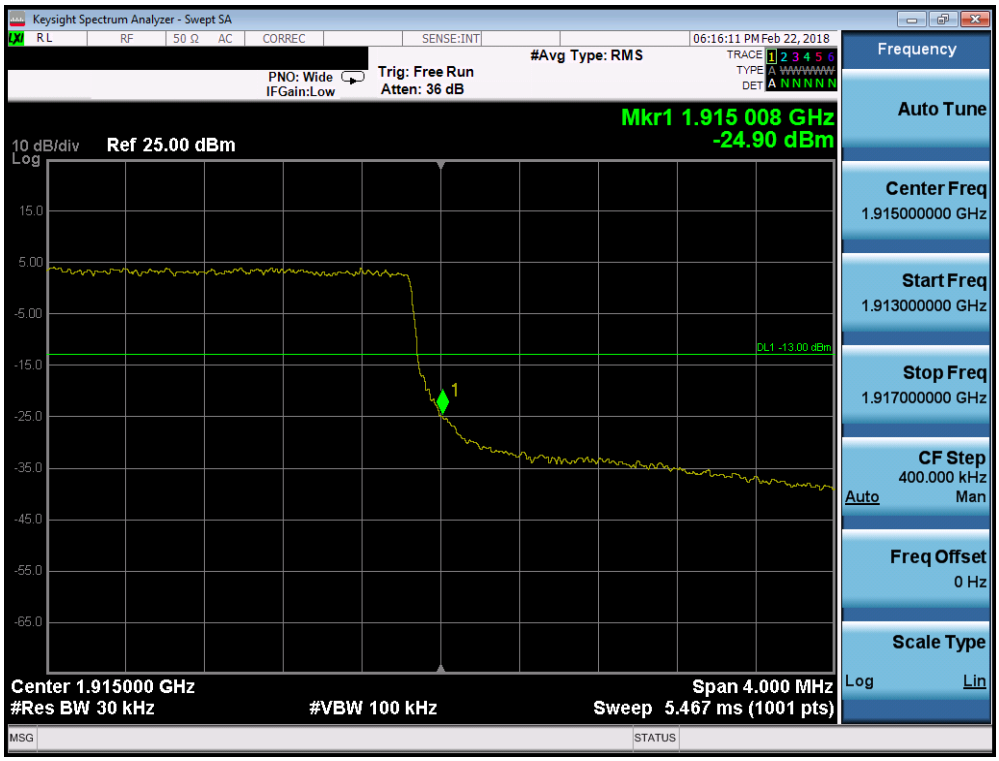
Plot 7-145. Lower Extended Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



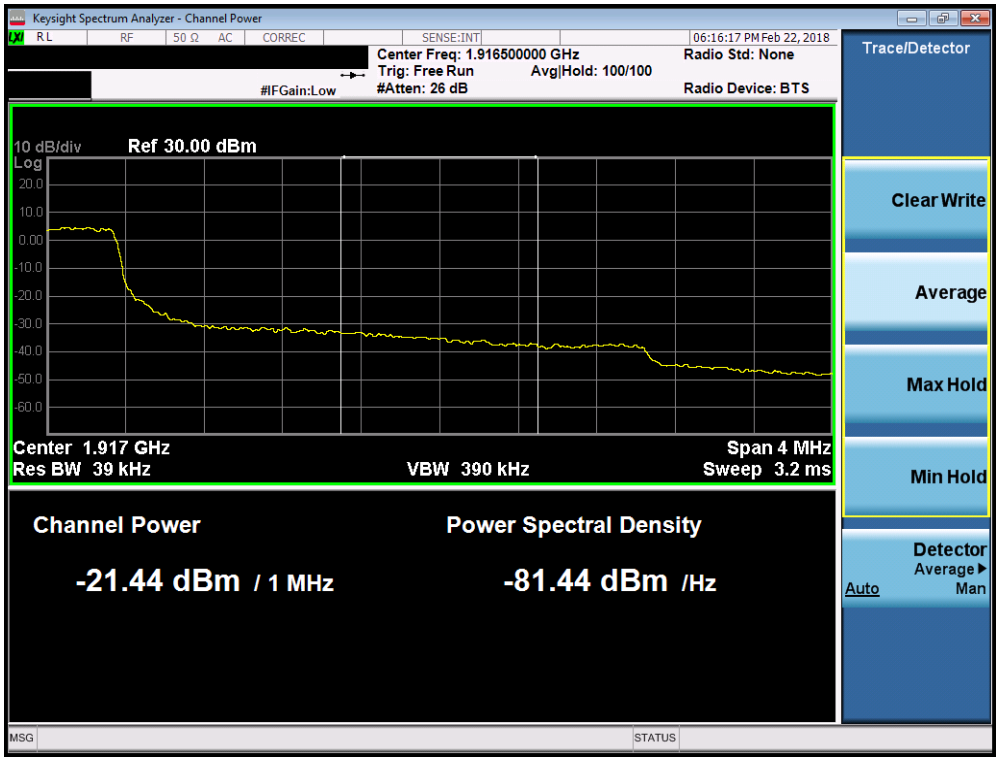
Plot 7-146. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



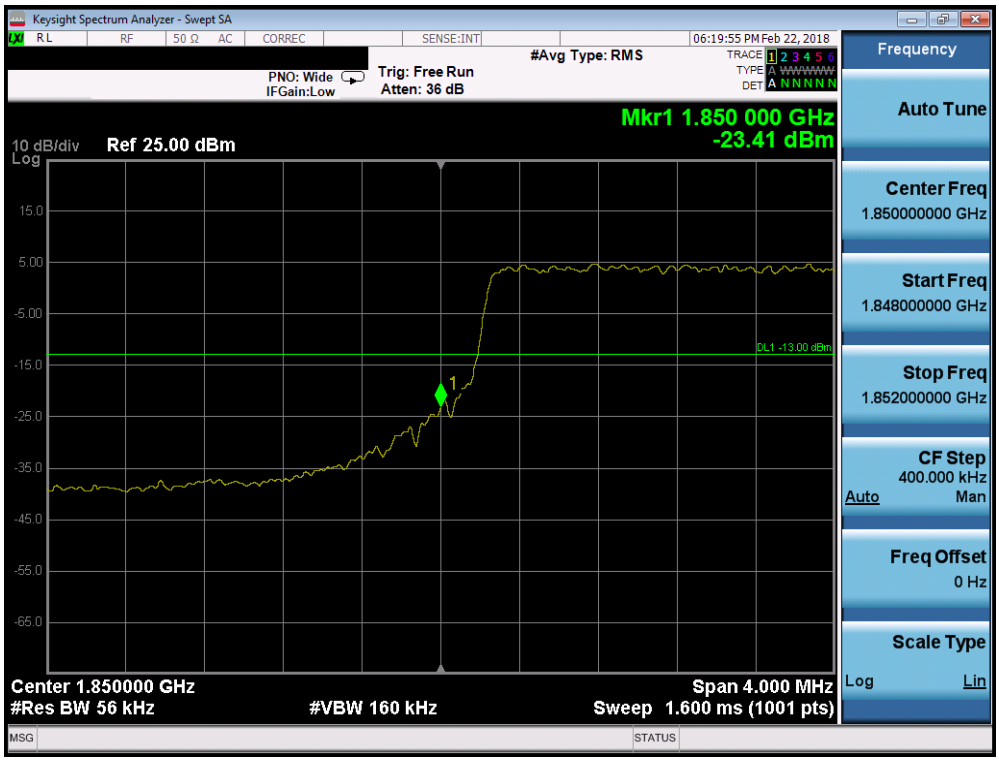
Plot 7-147. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



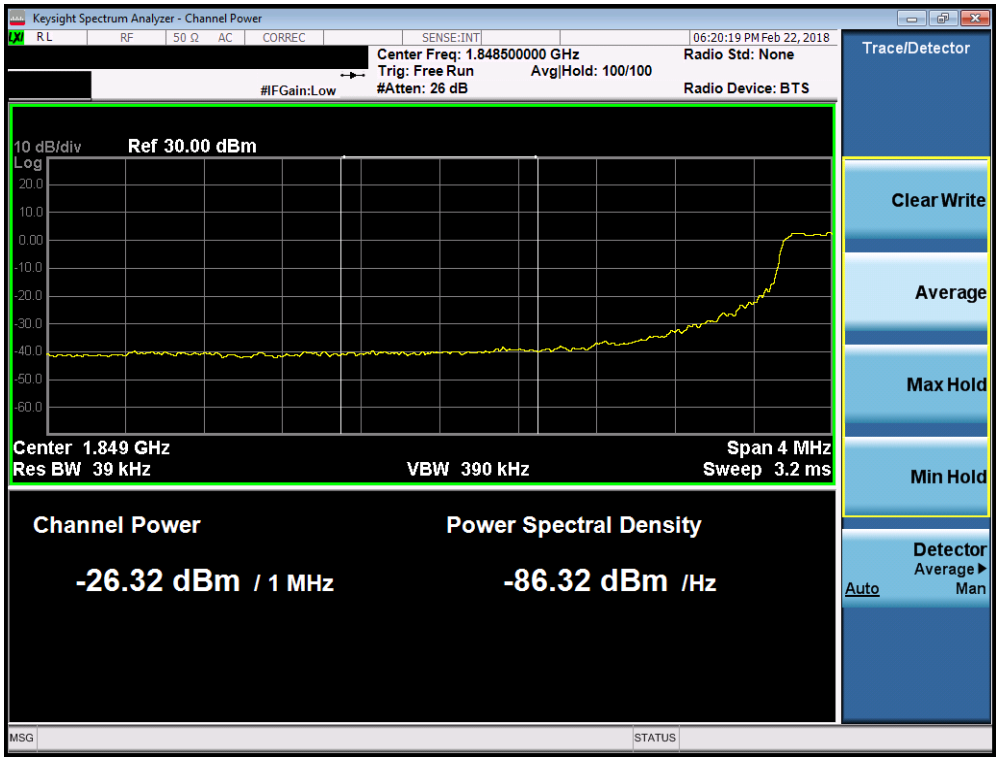
Plot 7-148. Upper Band Edge Plot (Band 25 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-149. Upper Extended Band Edge Plot (Band 25 - 3.0MHz QPSK - Full RB Configuration)

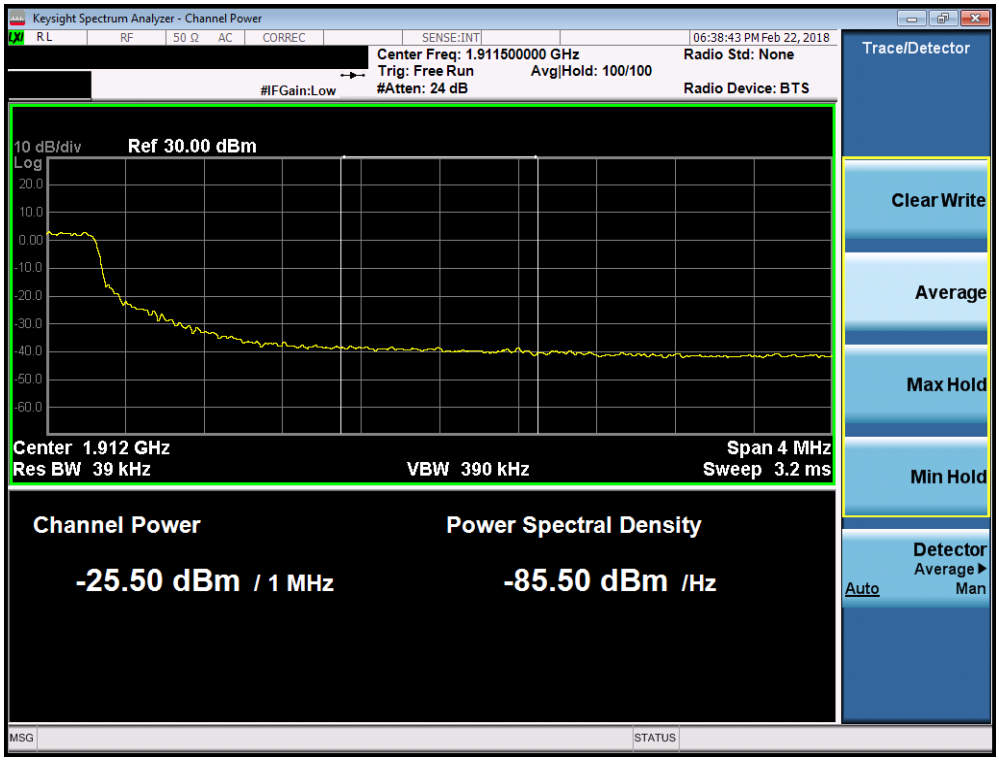


Plot 7-150. Lower Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



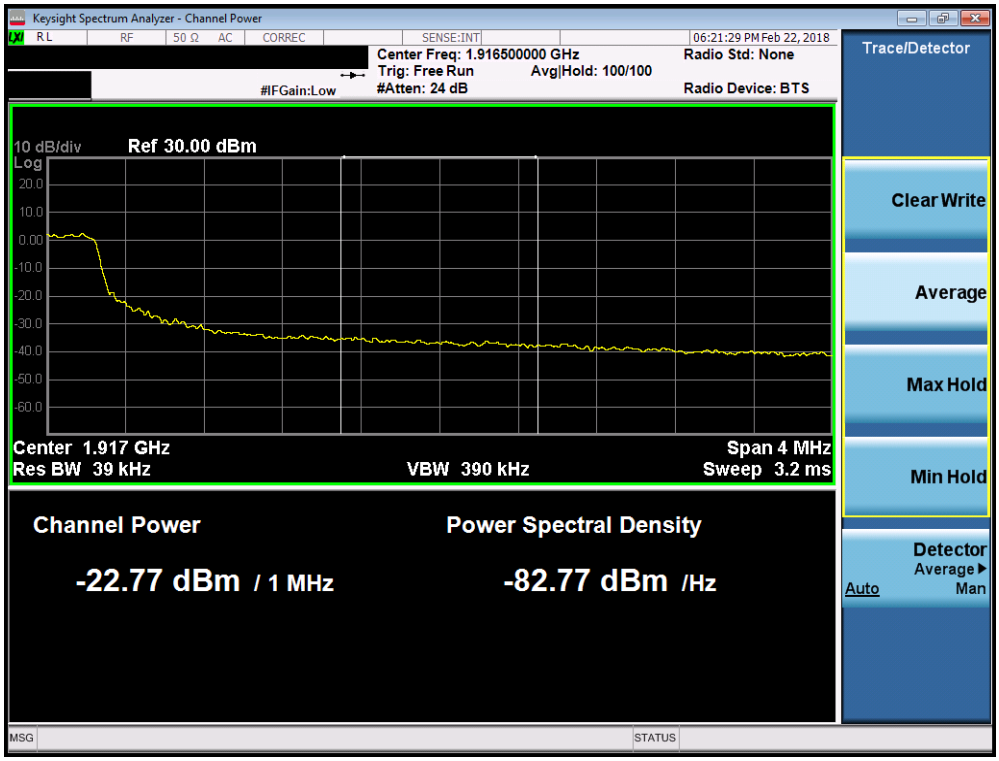
Plot 7-151. Lower Extended Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)

Plot 7-152. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

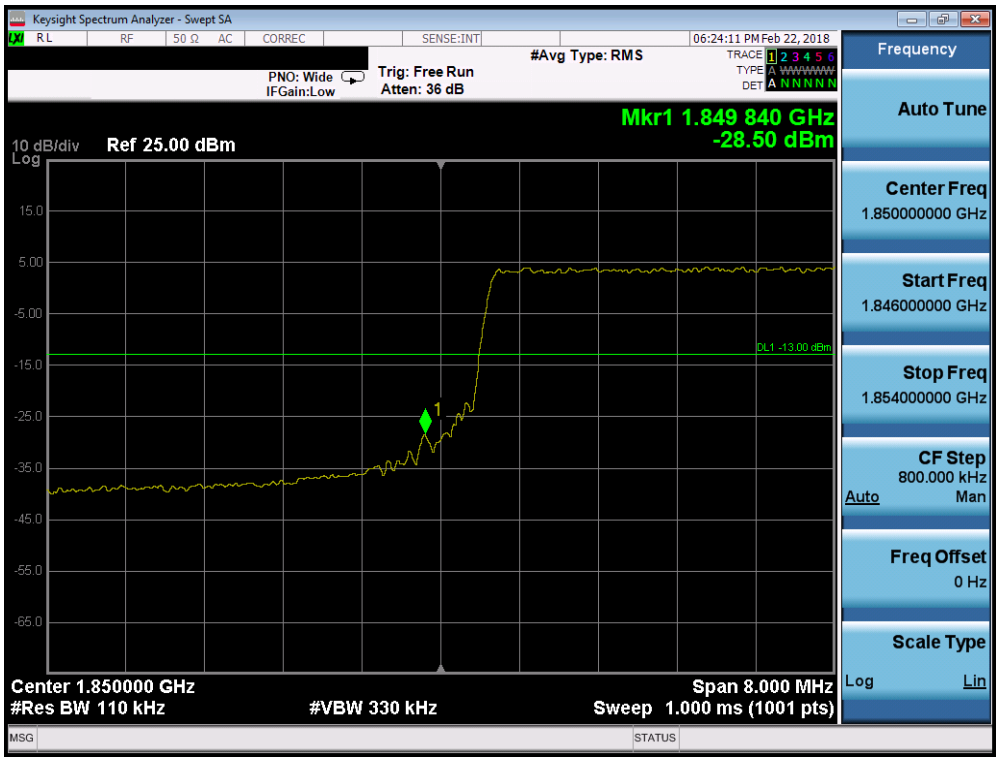


Plot 7-153. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

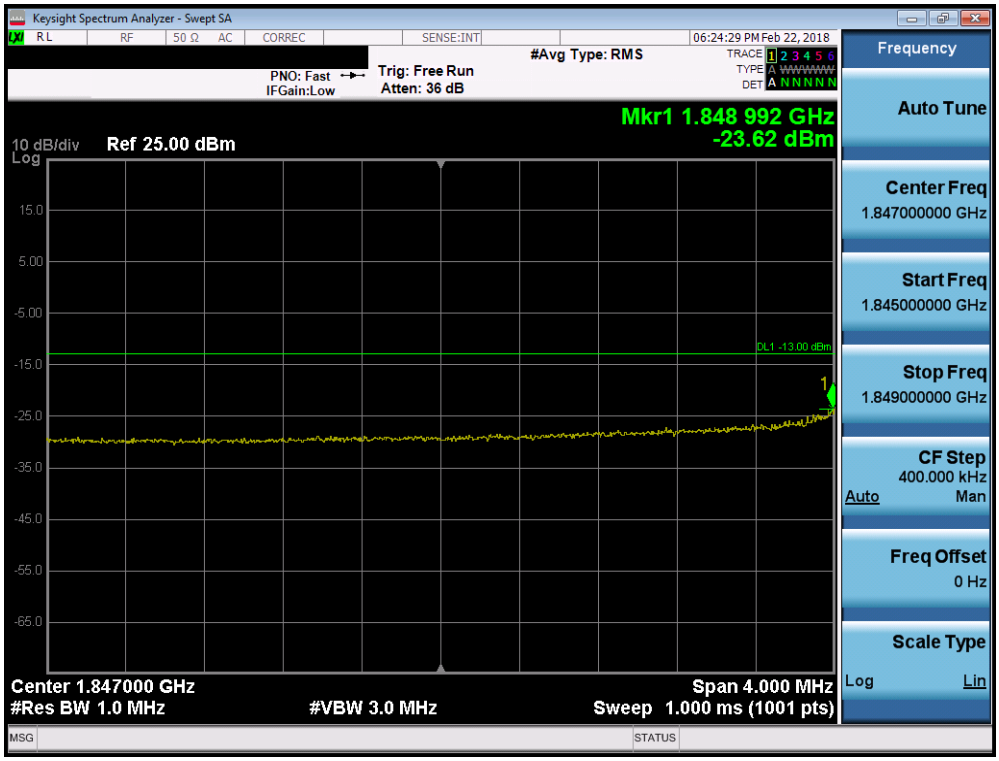
Plot 7-154. Upper Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-155. Upper Extended Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)

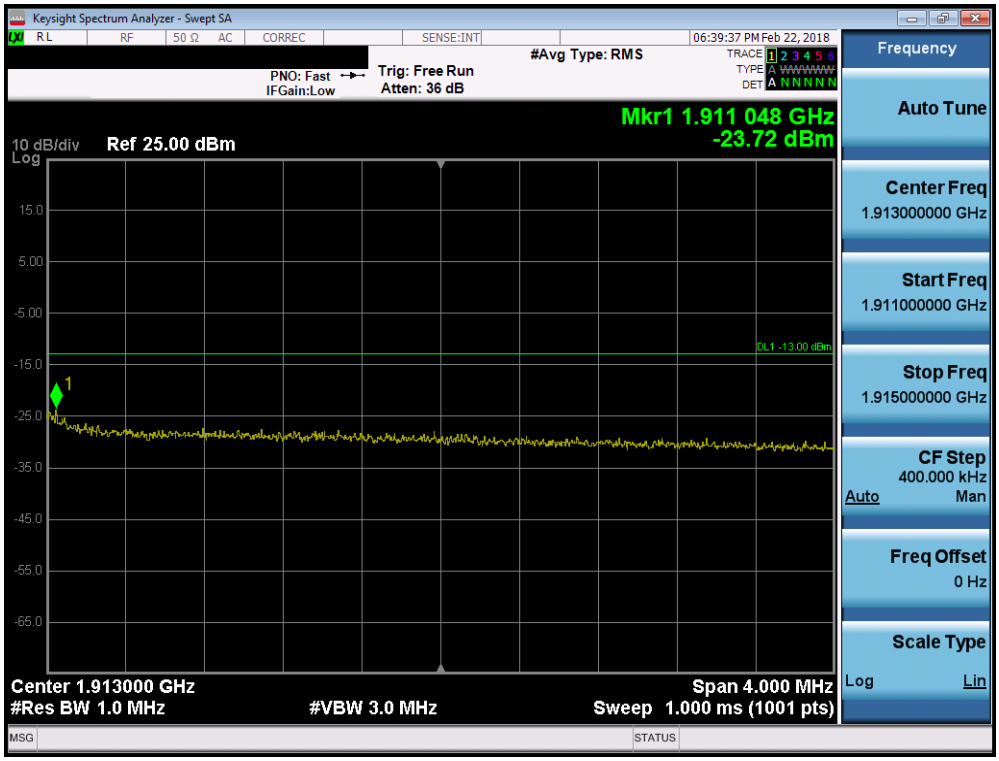


Plot 7-156. Lower Band Edge Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



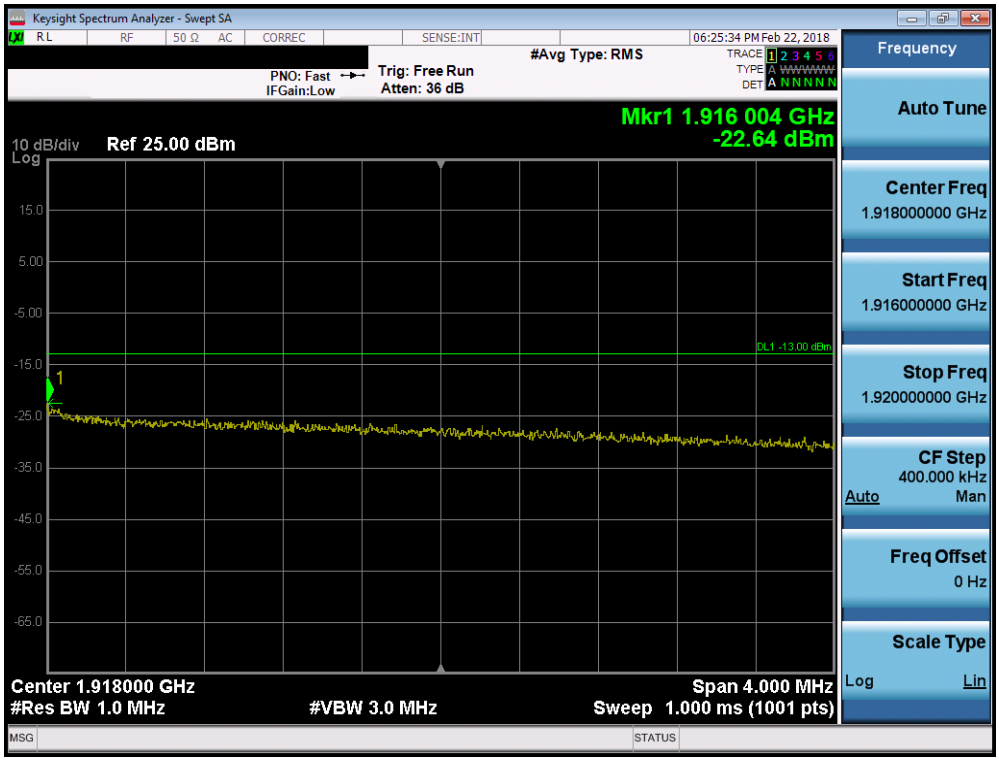
Plot 7-157. Lower Extended Band Edge Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)

Plot 7-158. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

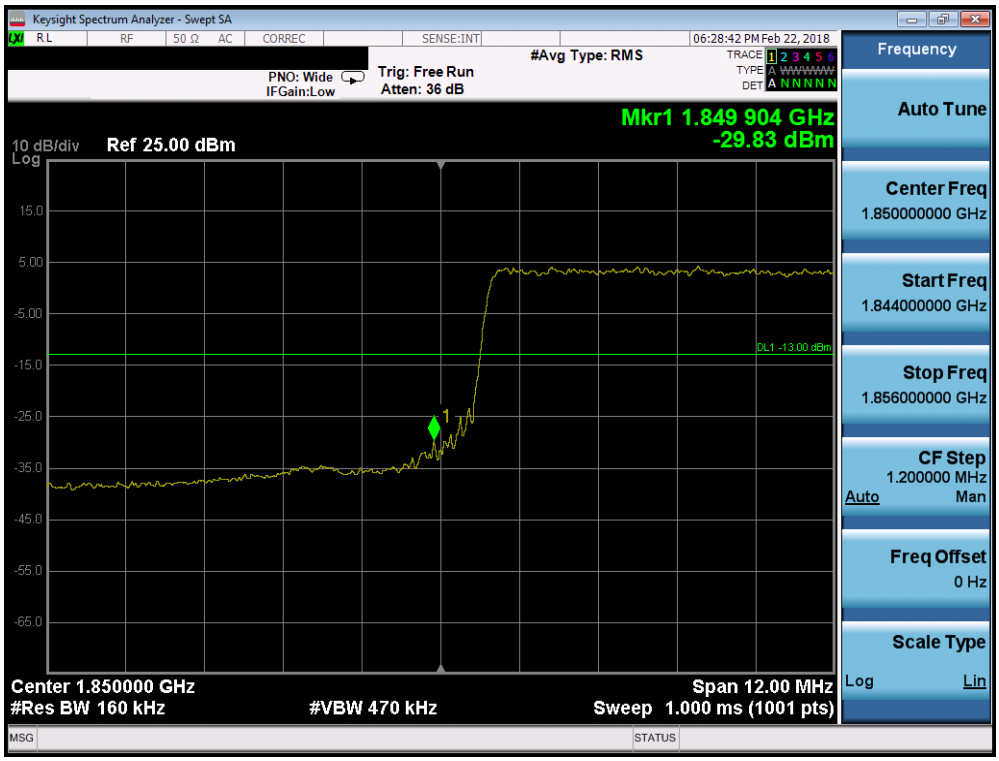


Plot 7-159. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

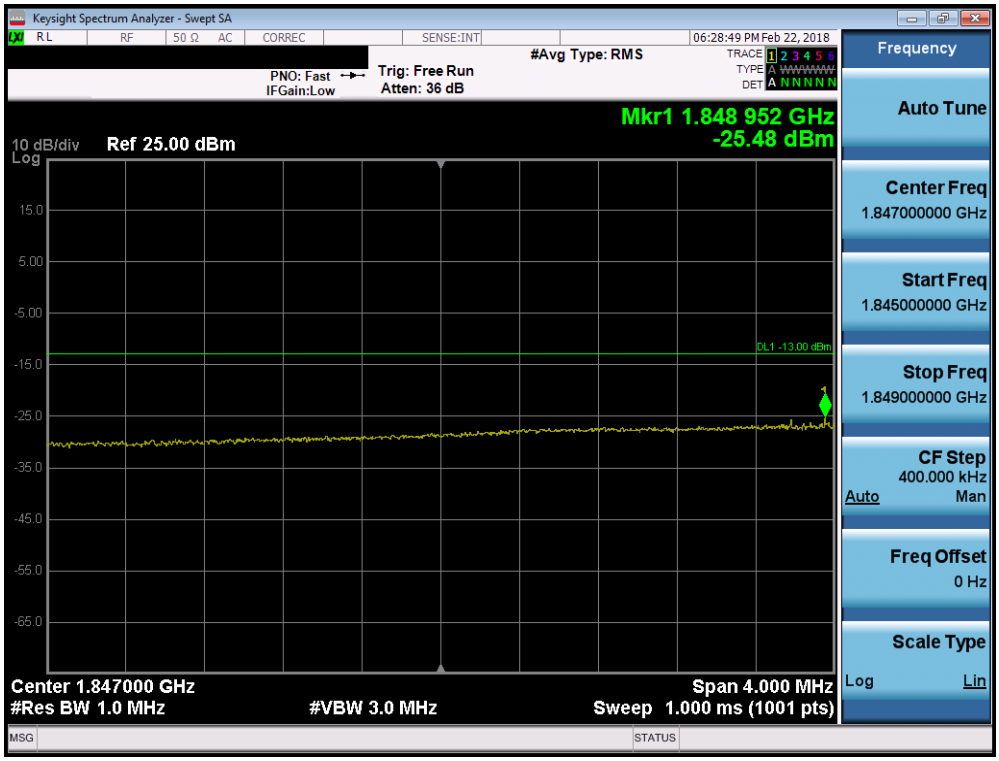
Plot 7-160. Upper Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)



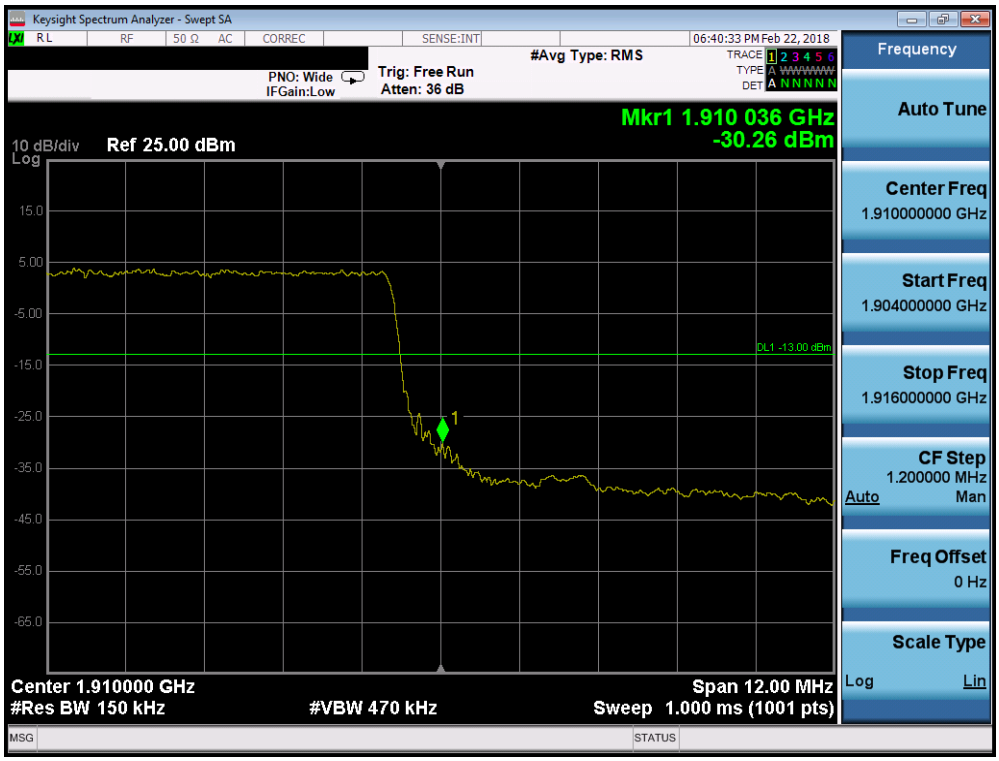
Plot 7-161. Upper Extended Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)



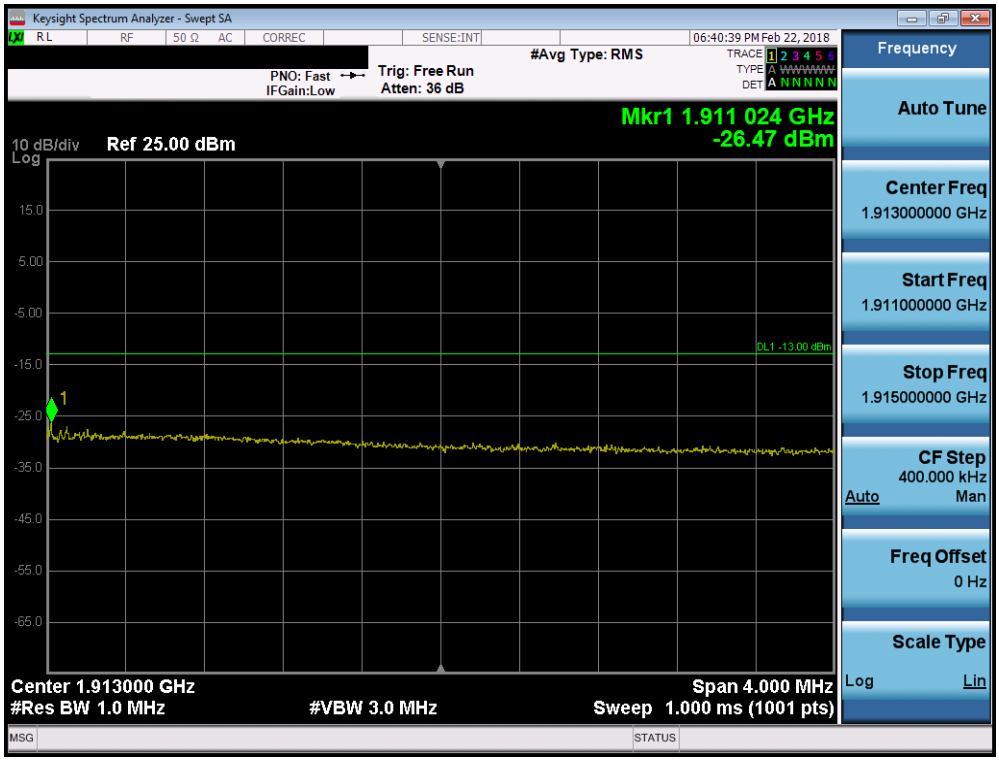
Plot 7-162. Lower Band Edge Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



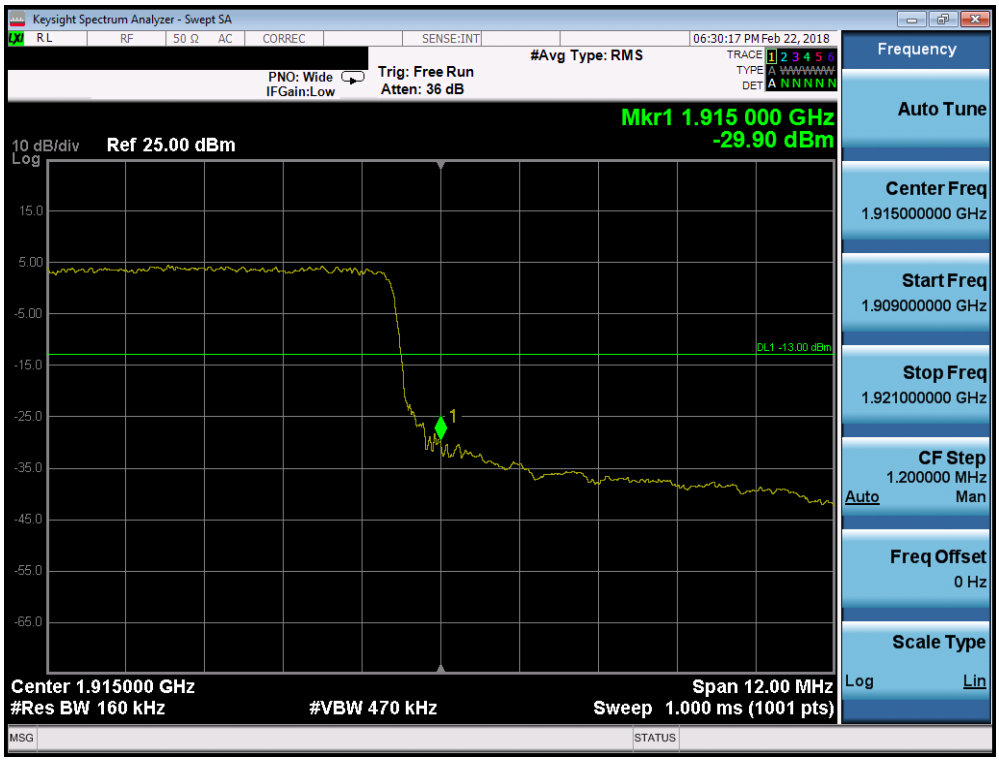
Plot 7-163. Lower Extended Band Edge Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-164. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

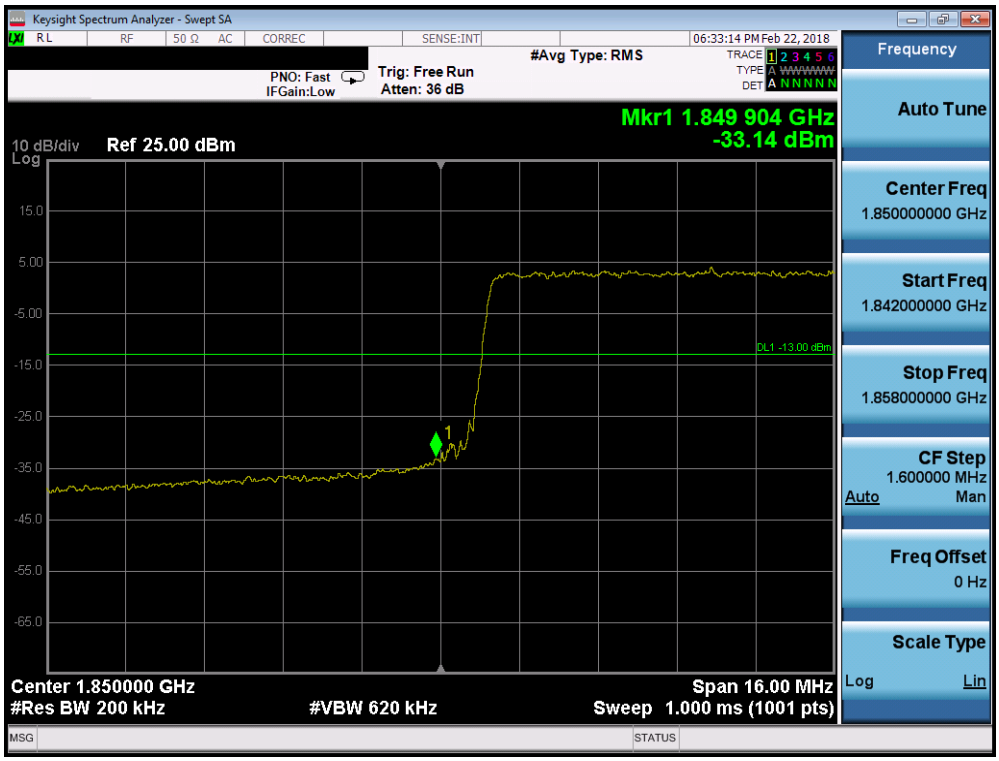


Plot 7-165. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

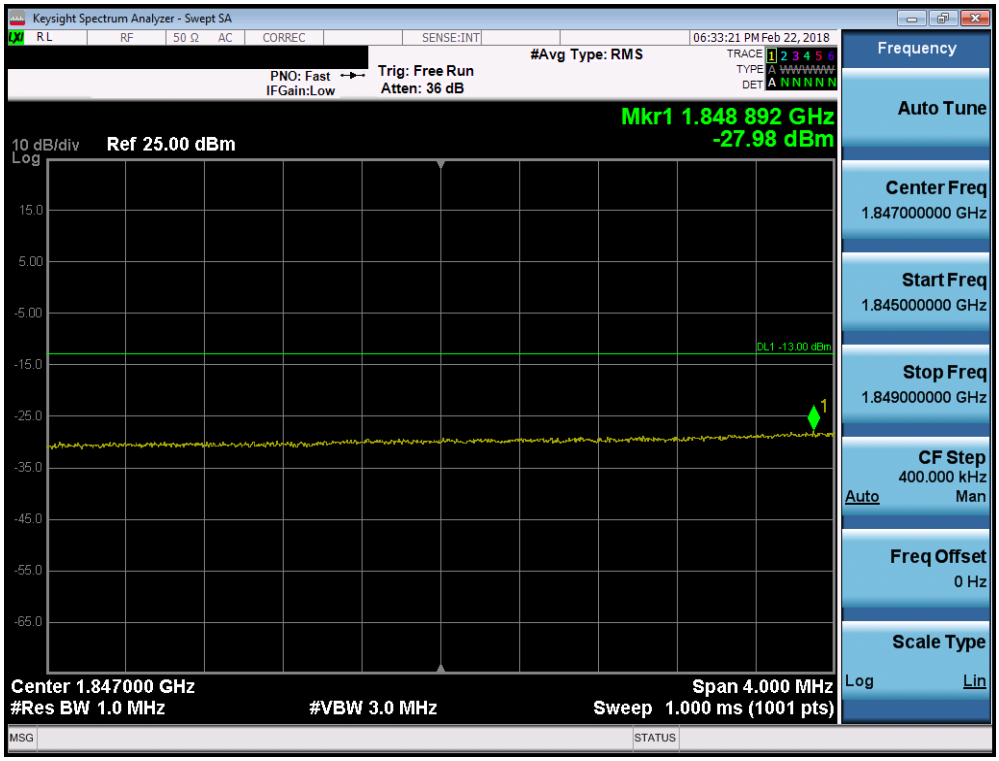


Plot 7-166. Upper Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)

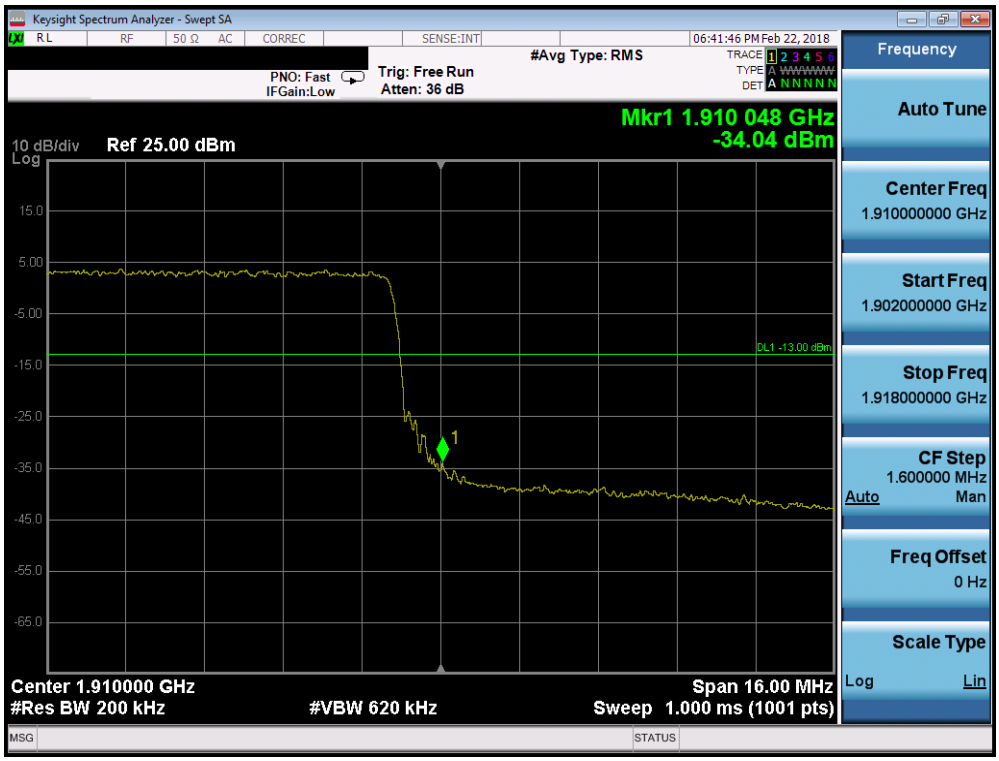
Plot 7-167. Upper Extended Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)



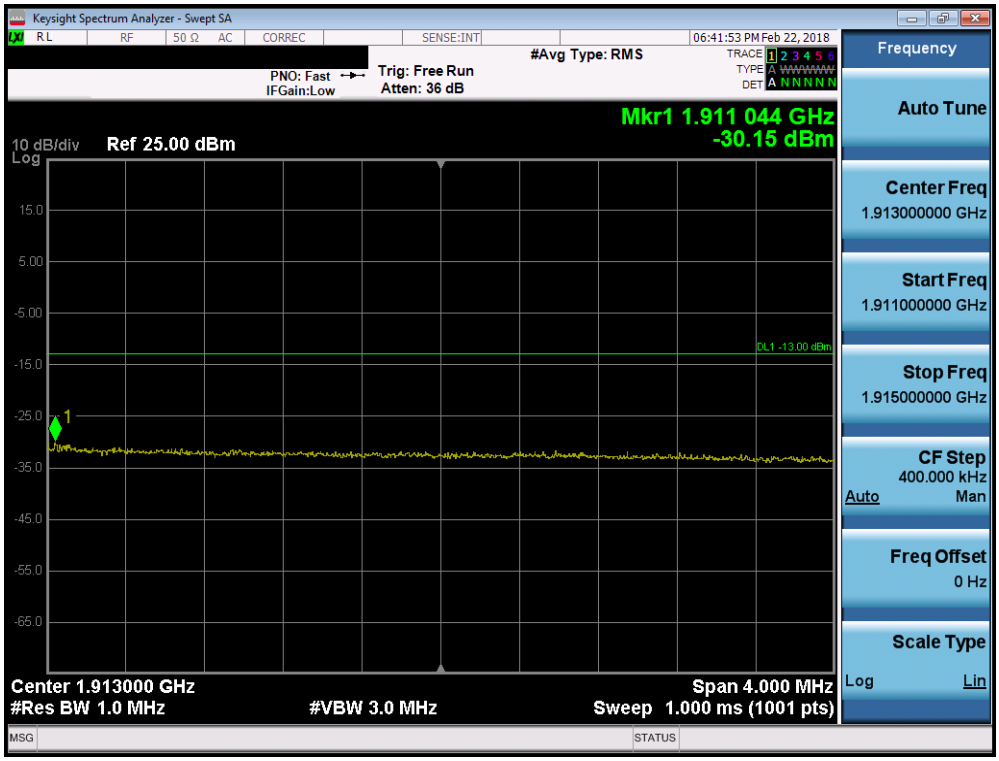
Plot 7-168. Lower Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



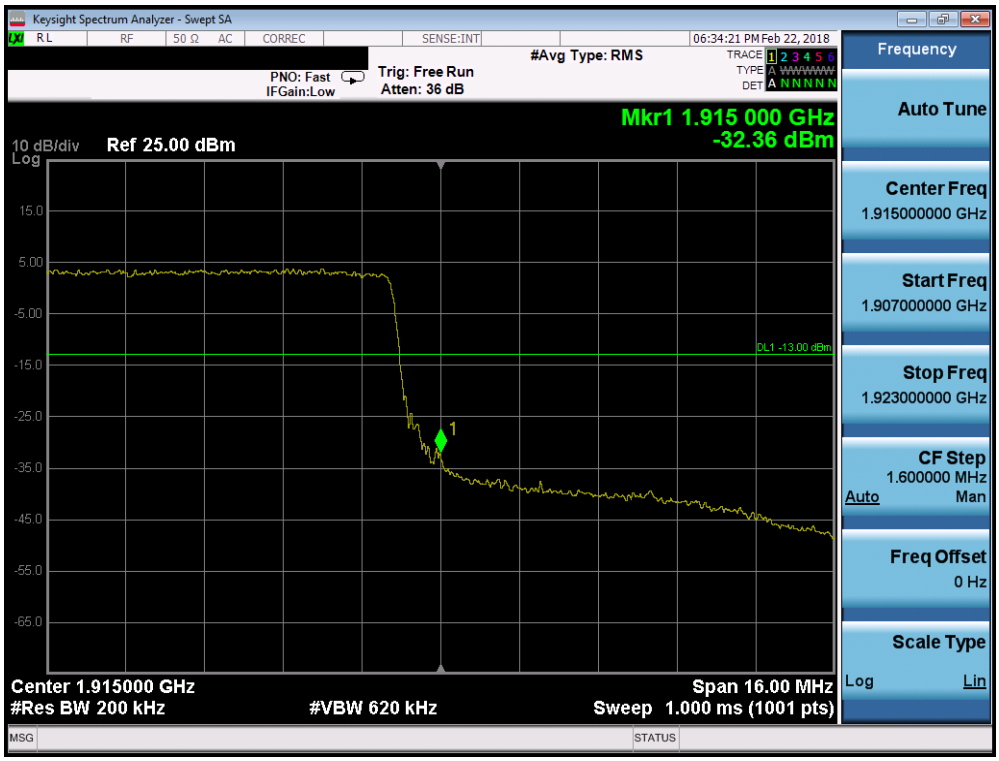
Plot 7-169. Lower Extended Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



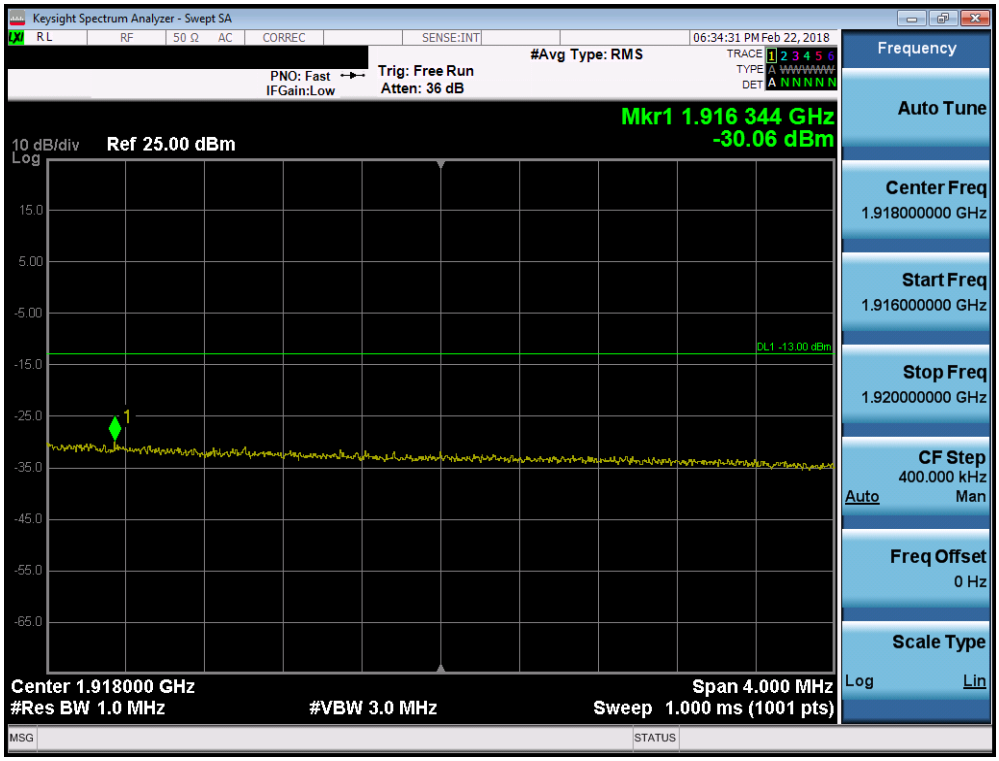
Plot 7-170. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-171. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

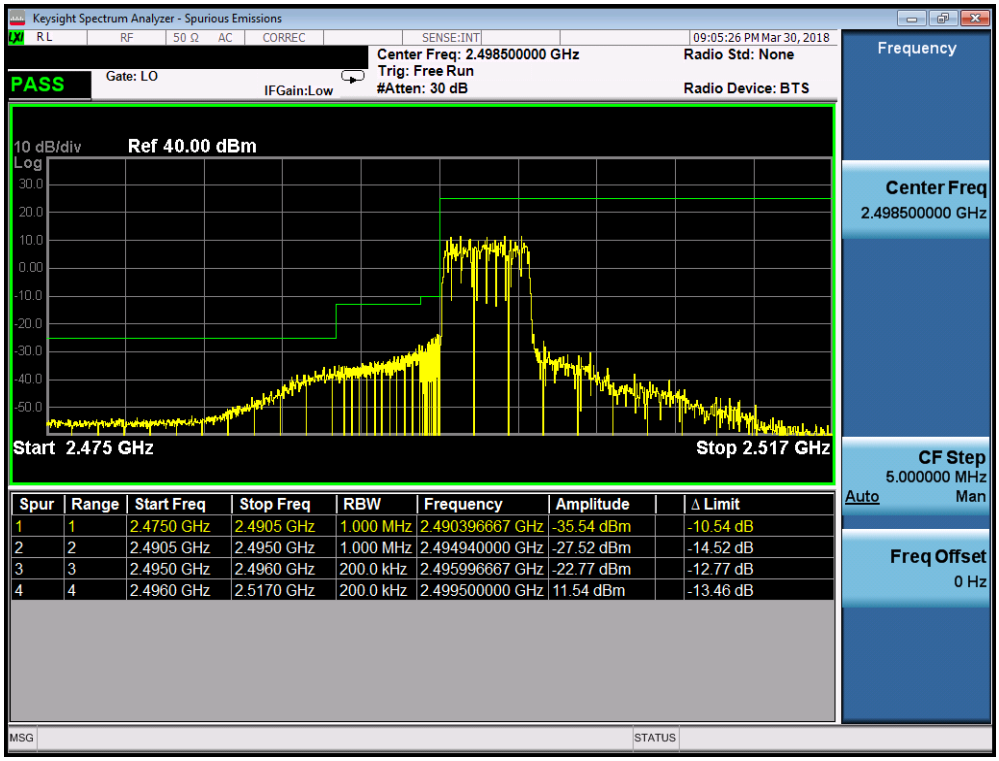


Plot 7-172. Upper Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)



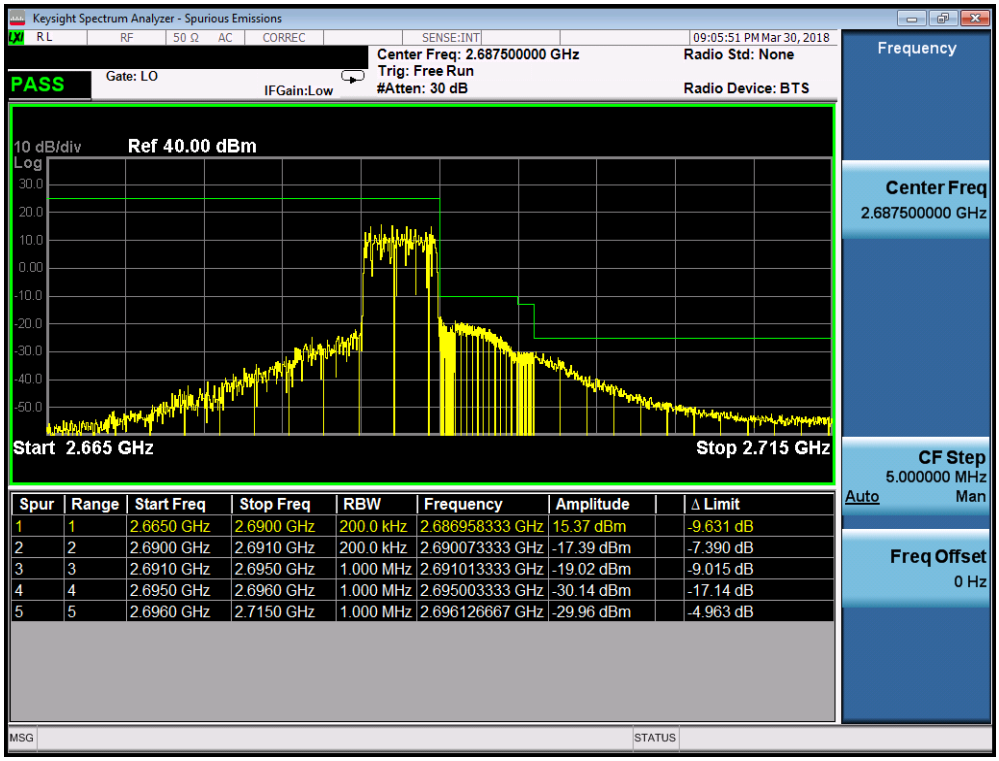
Plot 7-173. Upper Extended Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)

Band 41(PC2)



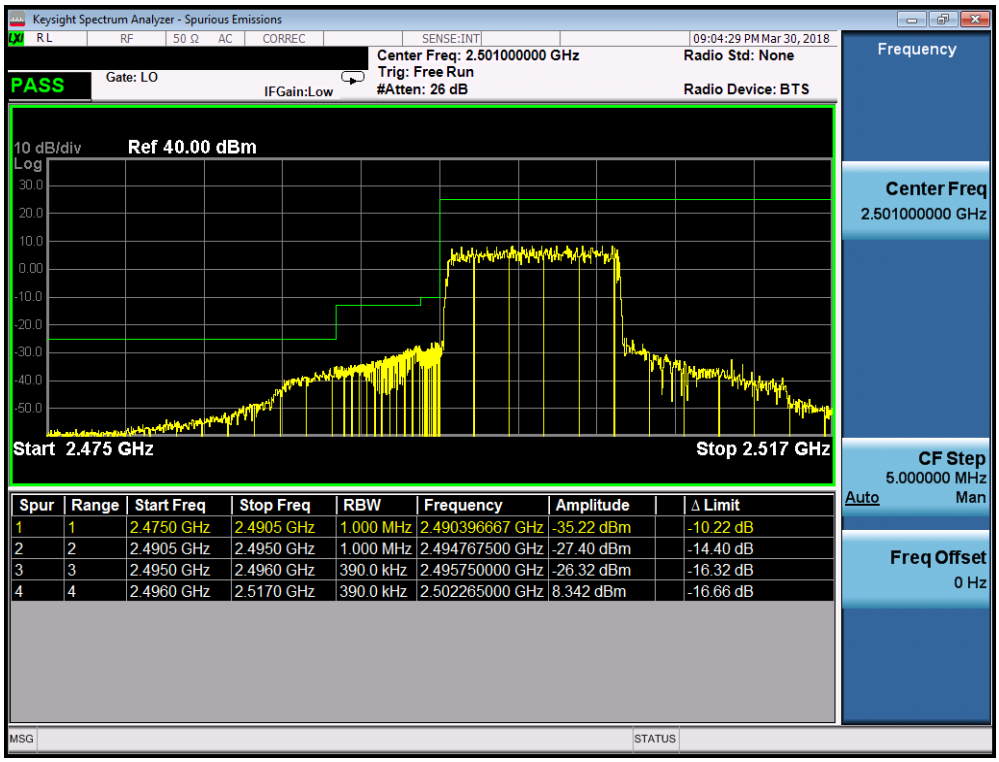
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490396667 GHz	-35.54 dBm	-10.54 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494940000 GHz	-27.52 dBm	-14.52 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495996667 GHz	-22.77 dBm	-12.77 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.499500000 GHz	11.54 dBm	-13.46 dB

Plot 7-174. Lower ACP Plot at 2496 MHz (Band 41 - 5.0MHz QPSK - RB Size 25)



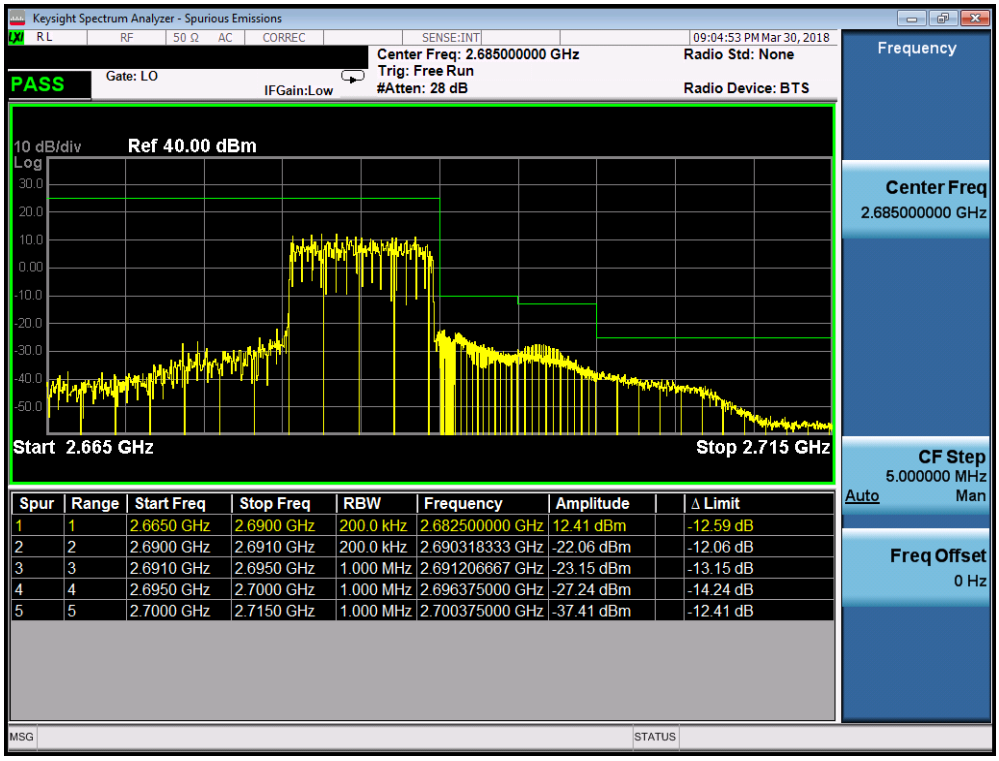
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	200.0 kHz	2.686958333 GHz	15.37 dBm	-9.631 dB
2	2	2.6900 GHz	2.6910 GHz	200.0 kHz	2.690073333 GHz	-17.39 dBm	-7.390 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691013333 GHz	-19.02 dBm	-9.015 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695003333 GHz	-30.14 dBm	-17.14 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696126667 GHz	-29.96 dBm	-4.963 dB

Plot 7-175. Upper ACP Plot (Band 41 - 5.0MHz QPSK - RB Size 25)



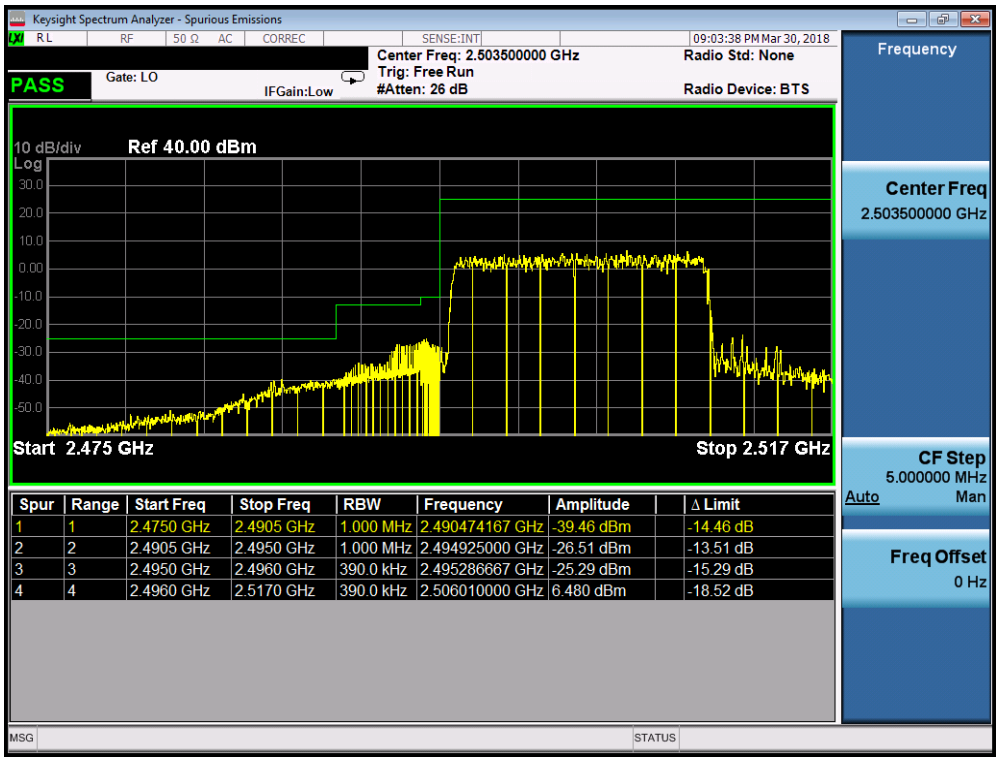
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490396667 GHz	-35.22 dBm	-10.22 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494767500 GHz	-27.40 dBm	-14.40 dB
3	3	2.4950 GHz	2.4960 GHz	390.0 kHz	2.495750000 GHz	-26.32 dBm	-16.32 dB
4	4	2.4960 GHz	2.5170 GHz	390.0 kHz	2.502265000 GHz	8.342 dBm	-16.66 dB

Plot 7-176. Lower ACP Plot at 2496 MHz (Band 41 - 10.0MHz QPSK - RB Size 25)

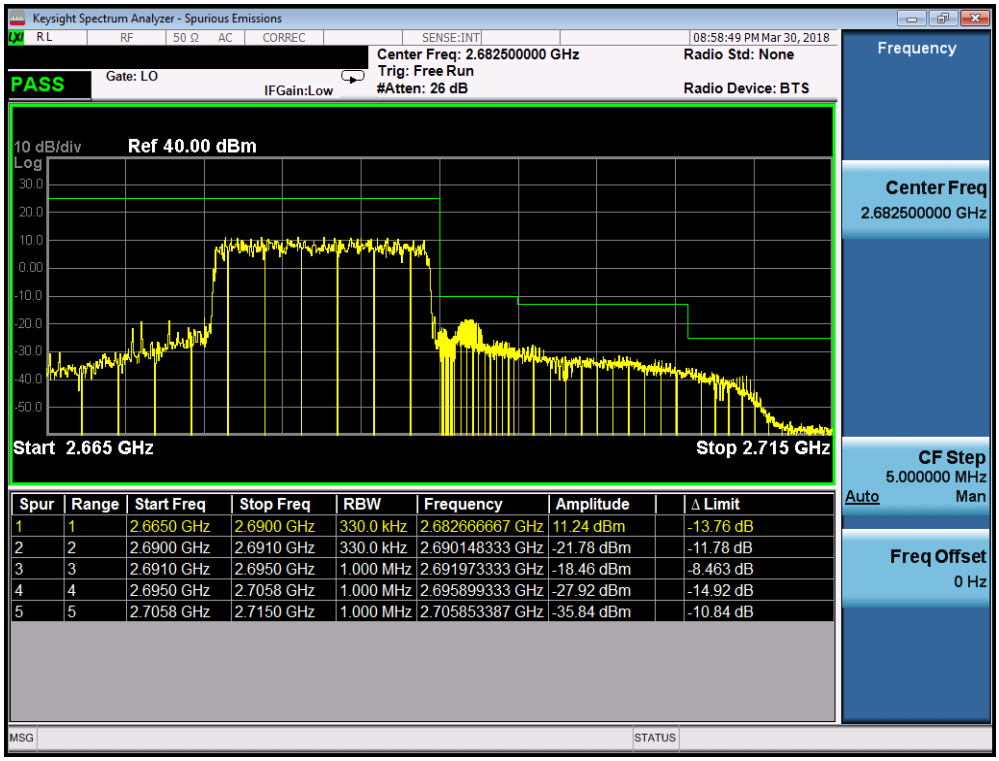


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	200.0 kHz	2.682500000 GHz	12.41 dBm	-12.59 dB
2	2	2.6900 GHz	2.6910 GHz	200.0 kHz	2.690318333 GHz	-22.06 dBm	-12.06 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691206667 GHz	-23.15 dBm	-13.15 dB
4	4	2.6950 GHz	2.7000 GHz	1.000 MHz	2.696375000 GHz	-27.24 dBm	-14.24 dB
5	5	2.7000 GHz	2.7150 GHz	1.000 MHz	2.700375000 GHz	-37.41 dBm	-12.41 dB

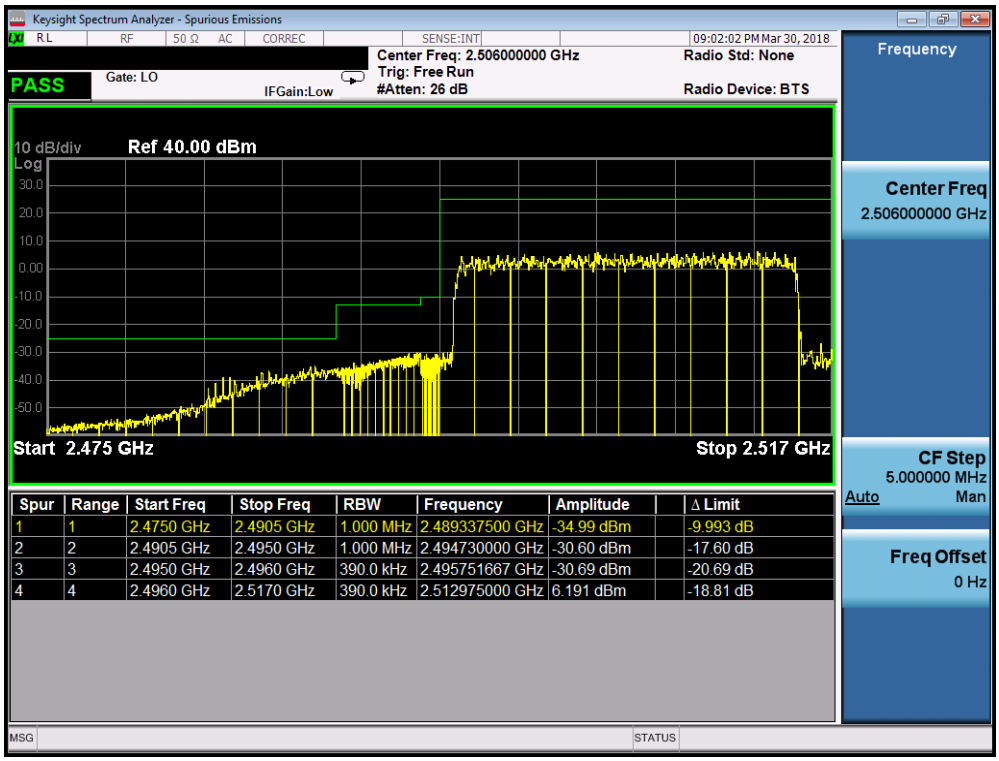
Plot 7-177. Upper ACP Plot (Band 41 - 10.0MHz QPSK - RB Size 25)



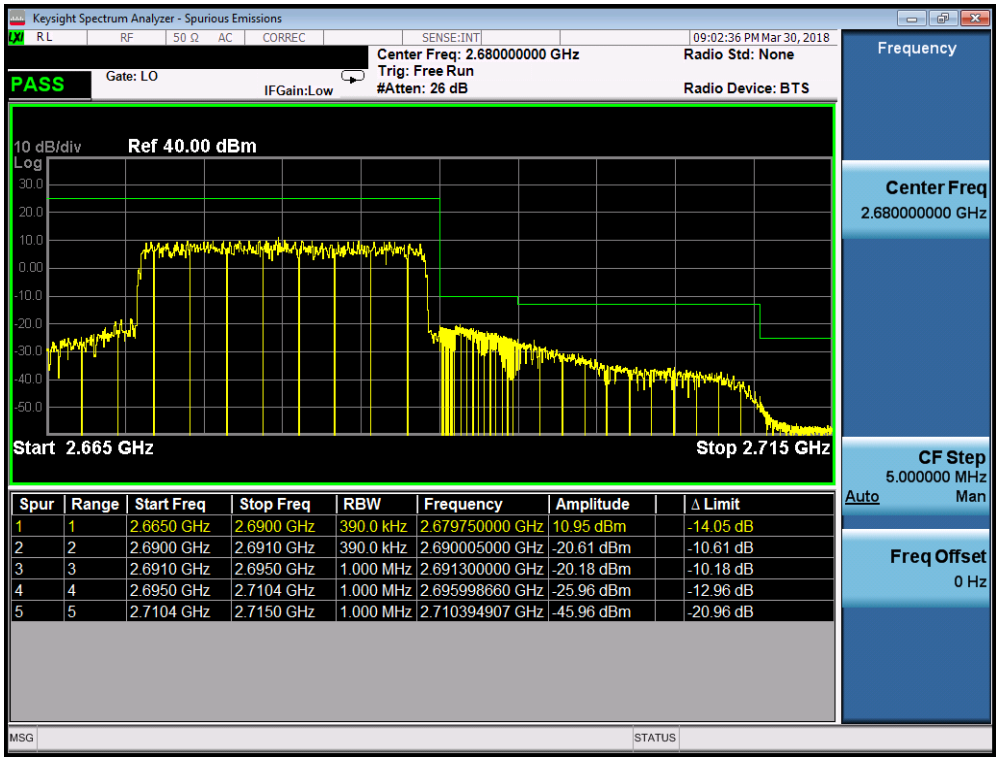
Plot 7-178. Lower ACP Plot at 2496 MHz (Band 41 - 15.0MHz QPSK - RB Size 25)



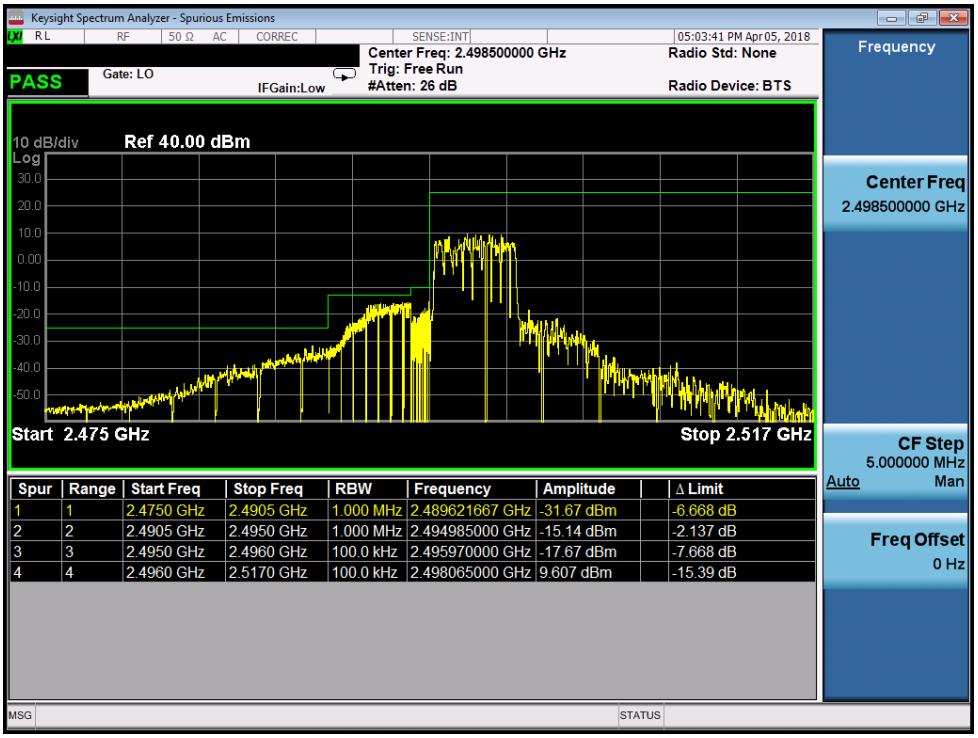
Plot 7-179. Upper ACP Plot (Band 41 - 15.0MHz QPSK - RB Size 25)



Plot 7-180. Lower ACP Plot at 2496 MHz (Band 41 - 20.0MHz QPSK - RB Size 25)

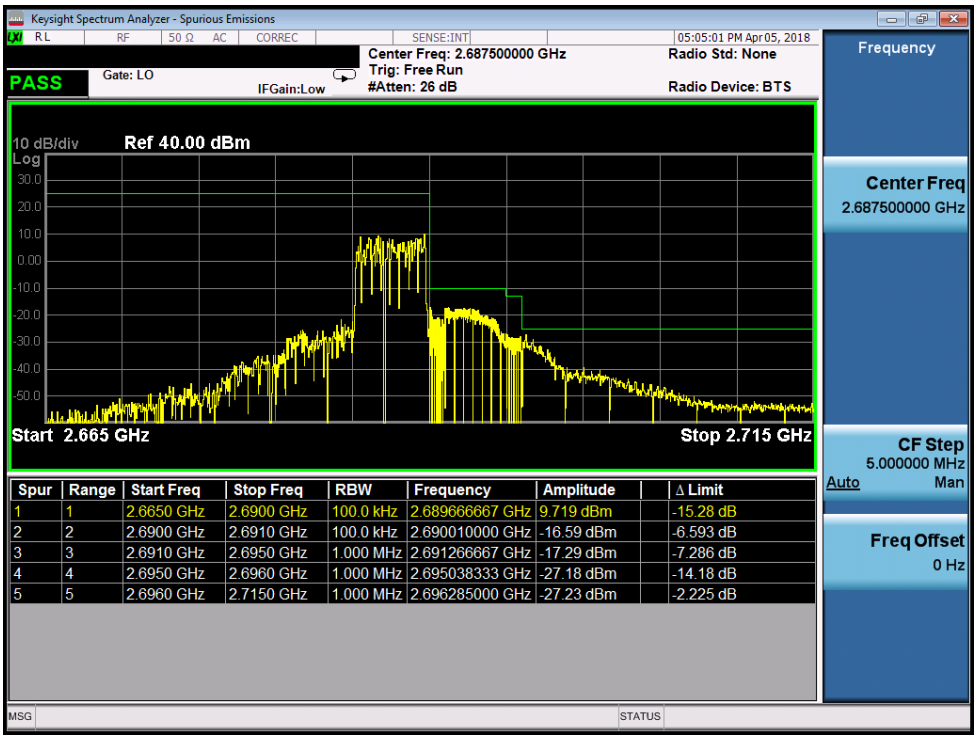


Plot 7-181. Upper ACP Plot (Band 41 - 20.0MHz QPSK - RB Size 25)



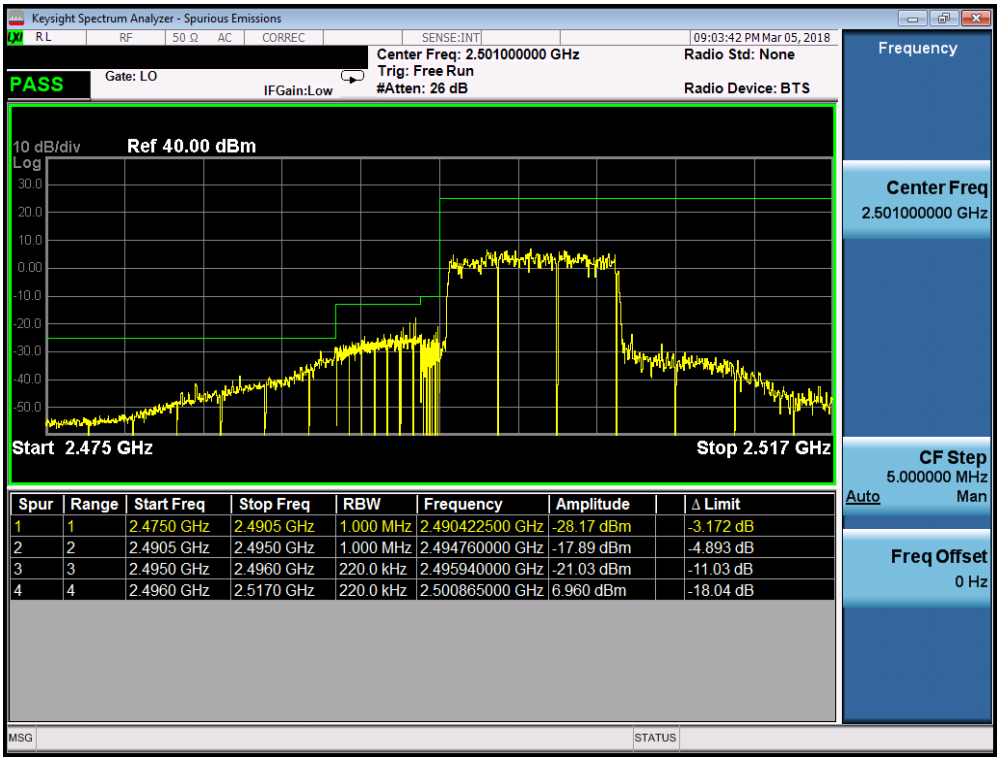
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489621667 GHz	-31.67 dBm	-6.668 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494985000 GHz	-15.14 dBm	-2.137 dB
3	3	2.4950 GHz	2.4960 GHz	100.0 kHz	2.495970000 GHz	-17.67 dBm	-7.668 dB
4	4	2.4960 GHz	2.5170 GHz	100.0 kHz	2.498065000 GHz	9.607 dBm	-15.39 dB

Plot 7-182. Lower ACP Plot at 2496 MHz (Band 41 - 5.0MHz QPSK - RB Size 25)



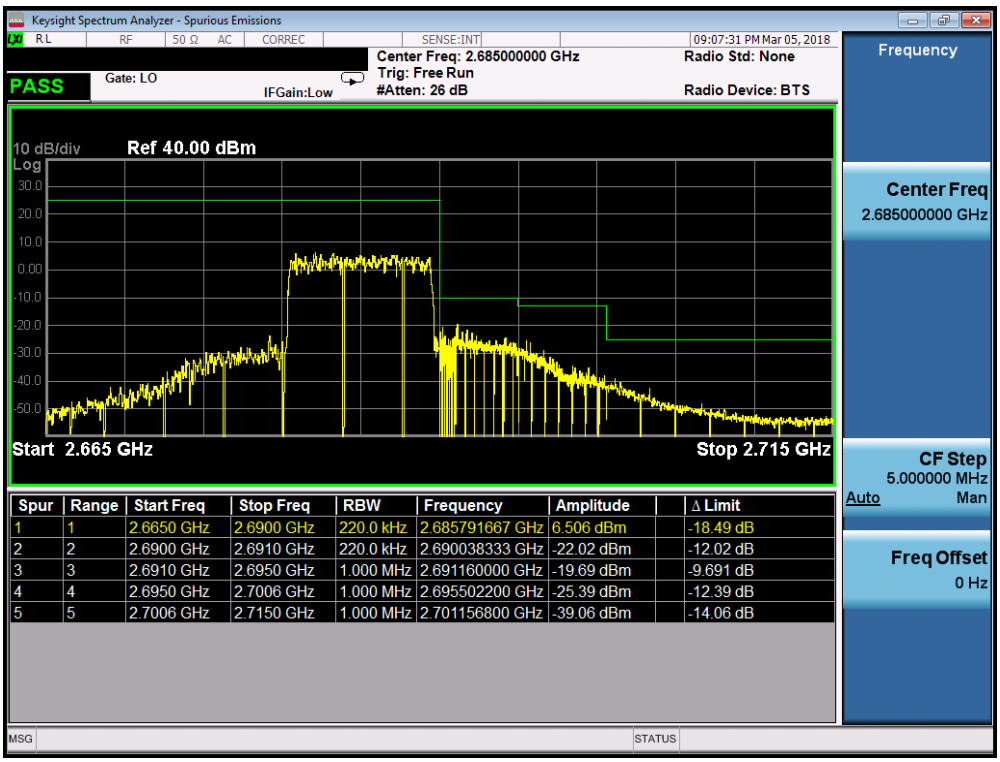
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	100.0 kHz	2.689666667 GHz	9.719 dBm	-15.28 dB
2	2	2.6900 GHz	2.6910 GHz	100.0 kHz	2.690010000 GHz	-16.59 dBm	-6.593 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691266667 GHz	-17.29 dBm	-7.286 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695038333 GHz	-27.18 dBm	-14.18 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696285000 GHz	-27.23 dBm	-2.225 dB

Plot 7-183. Upper ACP Plot (Band 41 - 5.0MHz QPSK - RB Size 25)



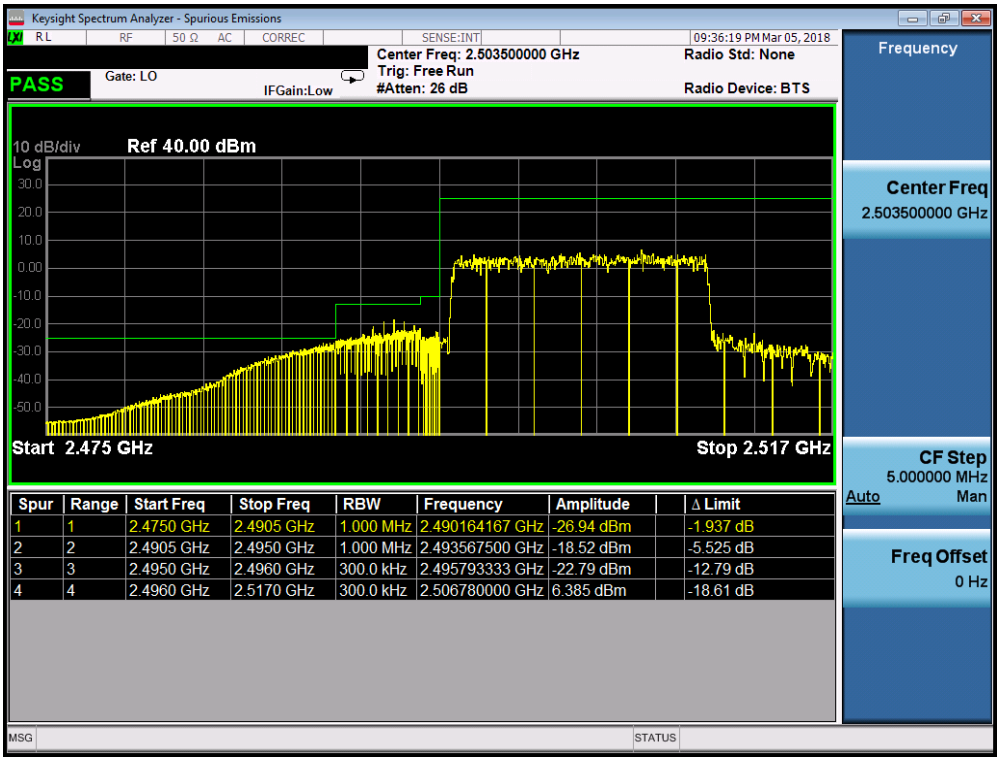
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490422500 GHz	-28.17 dBm	-3.172 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494760000 GHz	-17.89 dBm	-4.893 dB
3	3	2.4950 GHz	2.4960 GHz	220.0 kHz	2.495940000 GHz	-21.03 dBm	-11.03 dB
4	4	2.4960 GHz	2.5170 GHz	220.0 kHz	2.500865000 GHz	6.960 dBm	-18.04 dB

Plot 7-184. Lower ACP Plot at 2496 MHz (Band 41 - 10.0MHz QPSK - RB Size 25)

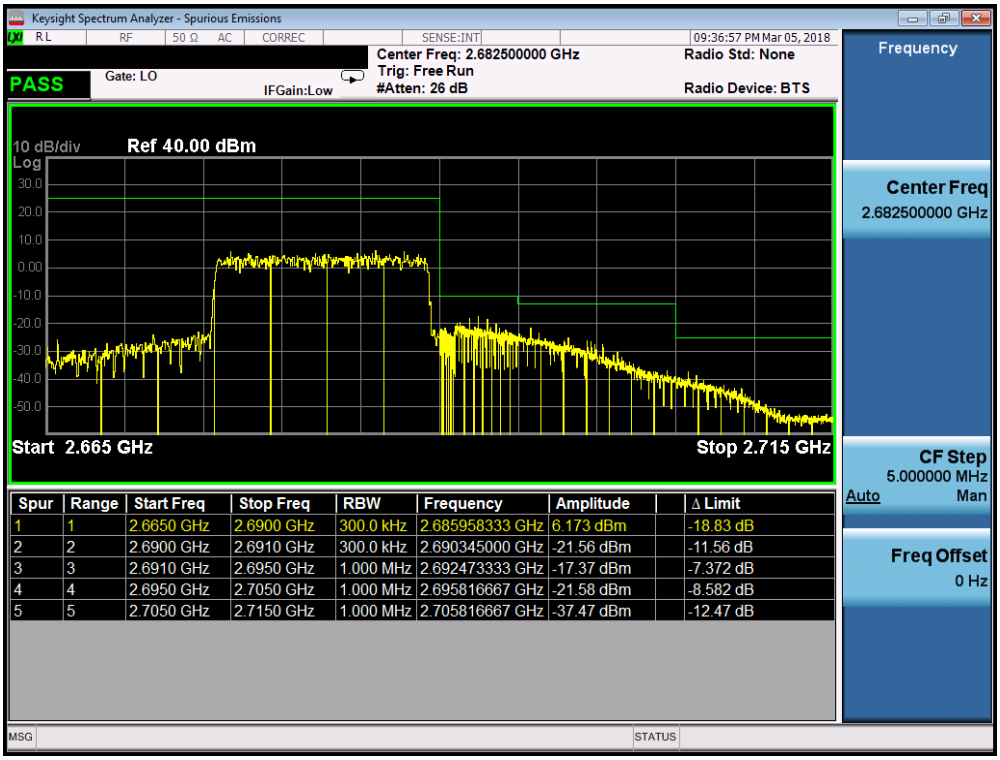


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	220.0 kHz	2.685791667 GHz	6.506 dBm	-18.49 dB
2	2	2.6900 GHz	2.6910 GHz	220.0 kHz	2.690038333 GHz	-22.02 dBm	-12.02 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691160000 GHz	-19.69 dBm	-9.691 dB
4	4	2.6950 GHz	2.7006 GHz	1.000 MHz	2.695502200 GHz	-25.39 dBm	-12.39 dB
5	5	2.7006 GHz	2.7150 GHz	1.000 MHz	2.701156800 GHz	-39.06 dBm	-14.06 dB

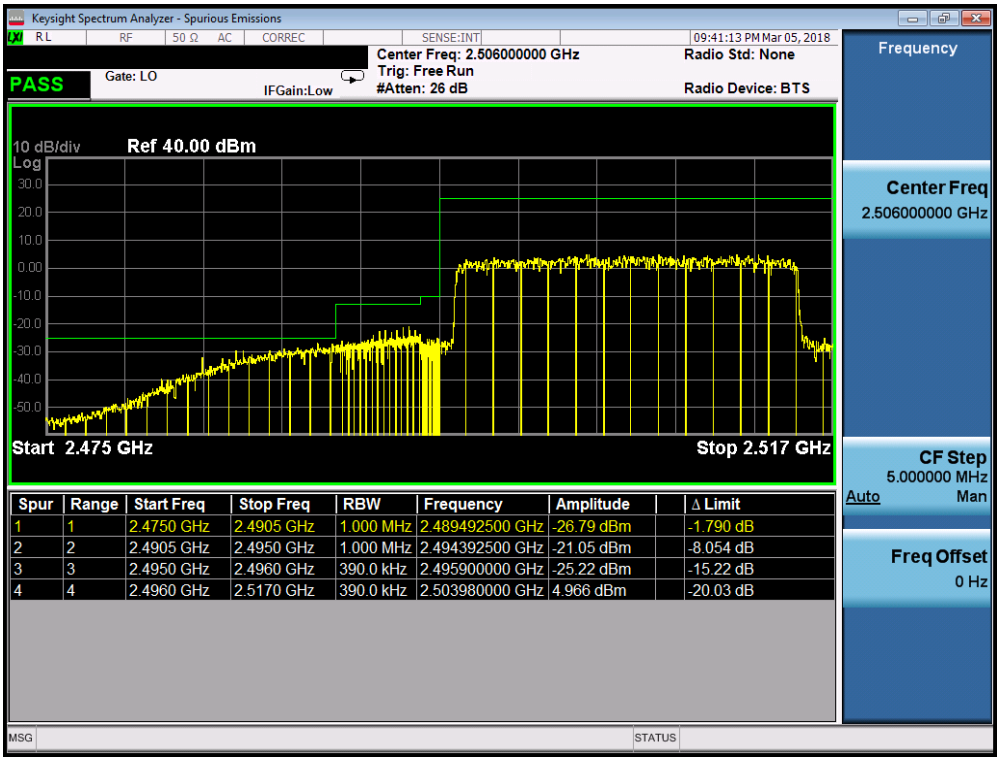
Plot 7-185. Upper ACP Plot (Band 41 - 10.0MHz QPSK - RB Size 25)



Plot 7-186. Lower ACP Plot at 2496 MHz (Band 41 - 15.0MHz QPSK - RB Size 25)

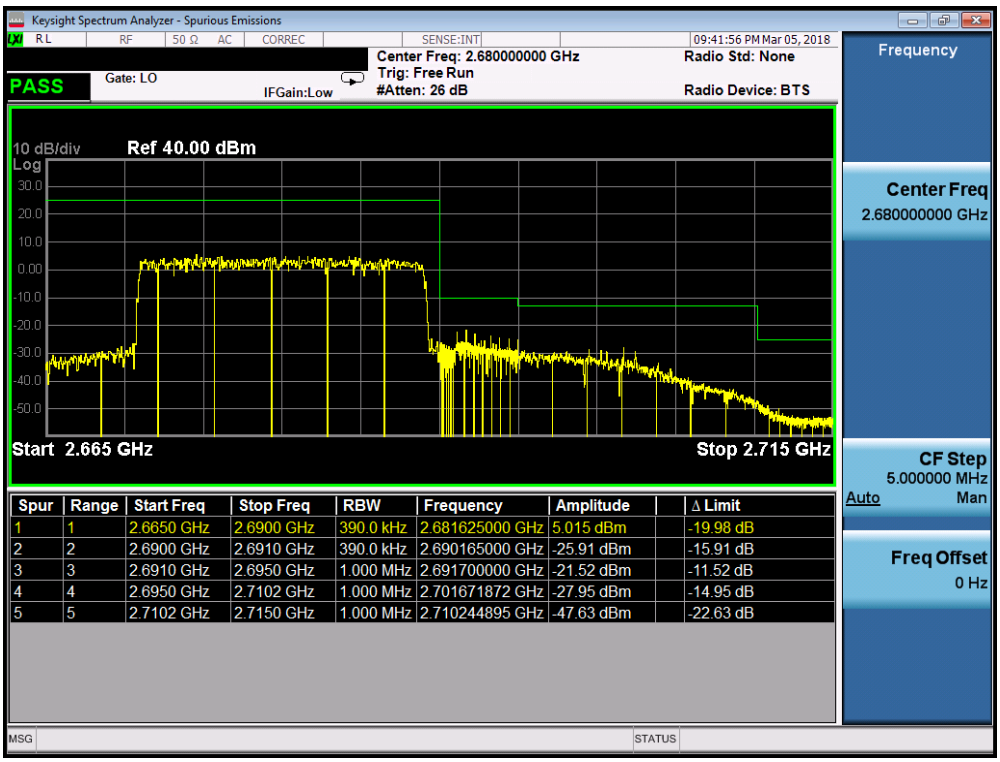


Plot 7-187. Upper ACP Plot (Band 41 - 15.0MHz QPSK - RB Size 25)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489492500 GHz	-26.79 dBm	-1.790 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494392500 GHz	-21.05 dBm	-8.054 dB
3	3	2.4950 GHz	2.4960 GHz	390.0 kHz	2.495900000 GHz	-25.22 dBm	-15.22 dB
4	4	2.4960 GHz	2.5170 GHz	390.0 kHz	2.503980000 GHz	4.966 dBm	-20.03 dB

Plot 7-188. Lower ACP Plot at 2496 MHz (Band 41 - 20.0MHz QPSK - RB Size 25)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	390.0 kHz	2.681625000 GHz	5.015 dBm	-19.98 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690165000 GHz	-25.91 dBm	-15.91 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691700000 GHz	-21.52 dBm	-11.52 dB
4	4	2.6950 GHz	2.7102 GHz	1.000 MHz	2.701671872 GHz	-27.95 dBm	-14.95 dB
5	5	2.7102 GHz	2.7150 GHz	1.000 MHz	2.710244895 GHz	-47.63 dBm	-22.63 dB

Plot 7-189. Upper ACP Plot (Band 41 - 20.0MHz QPSK - RB Size 25)

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 v03 – 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.

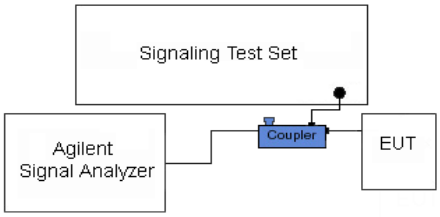
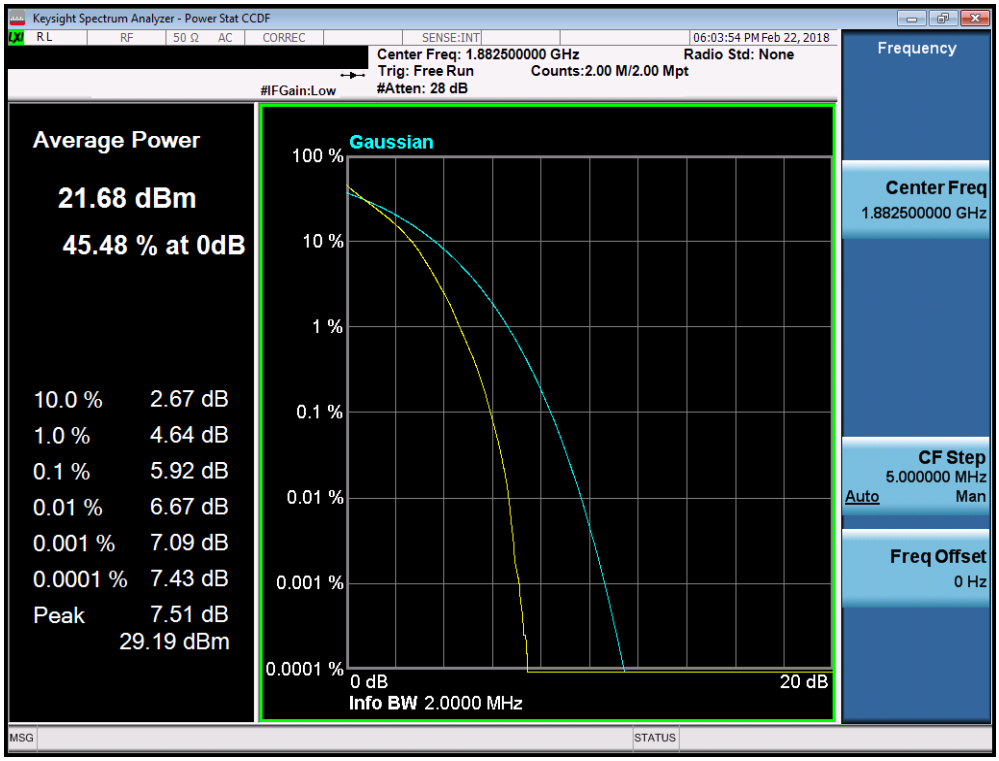


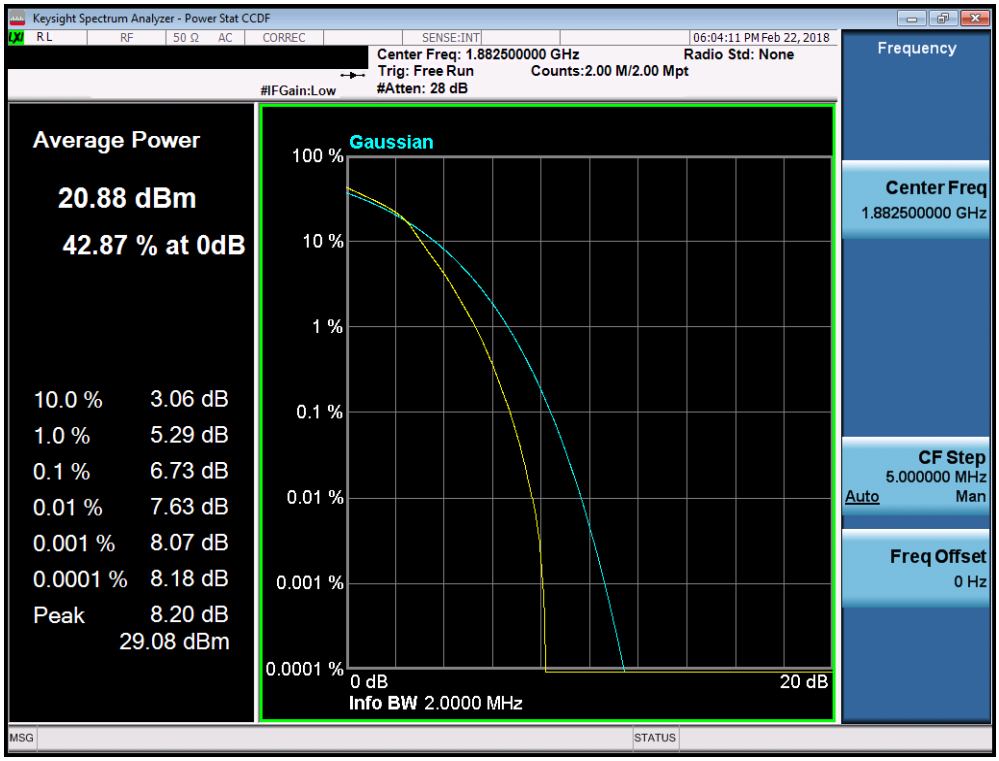
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

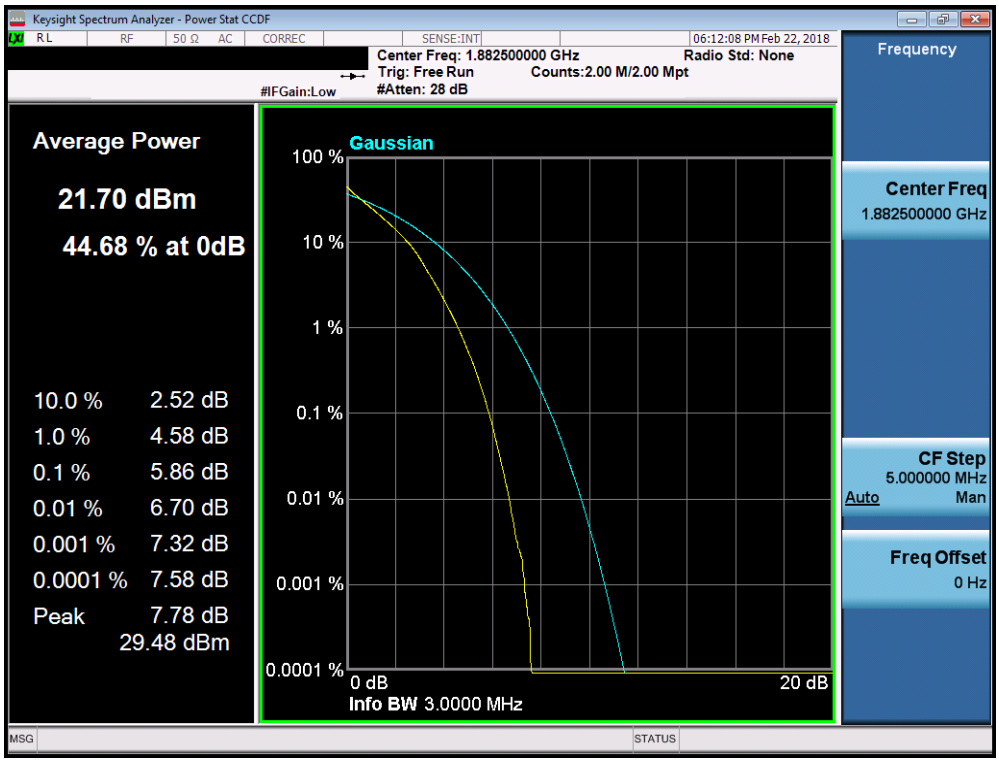
None.



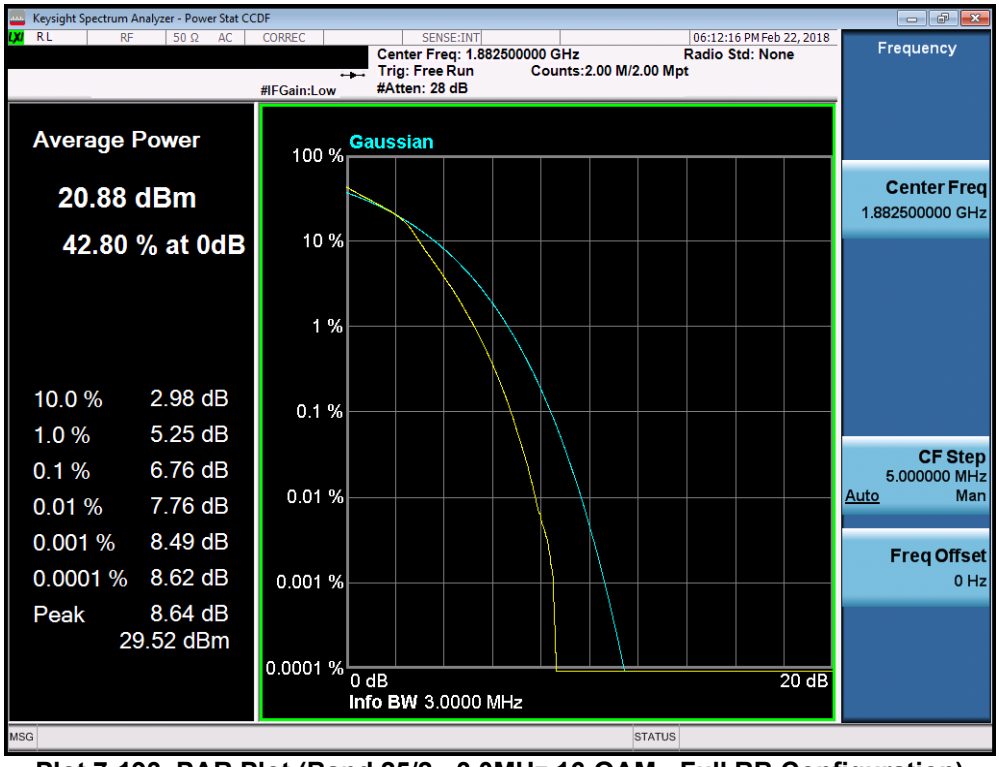
Plot 7-190. PAR Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



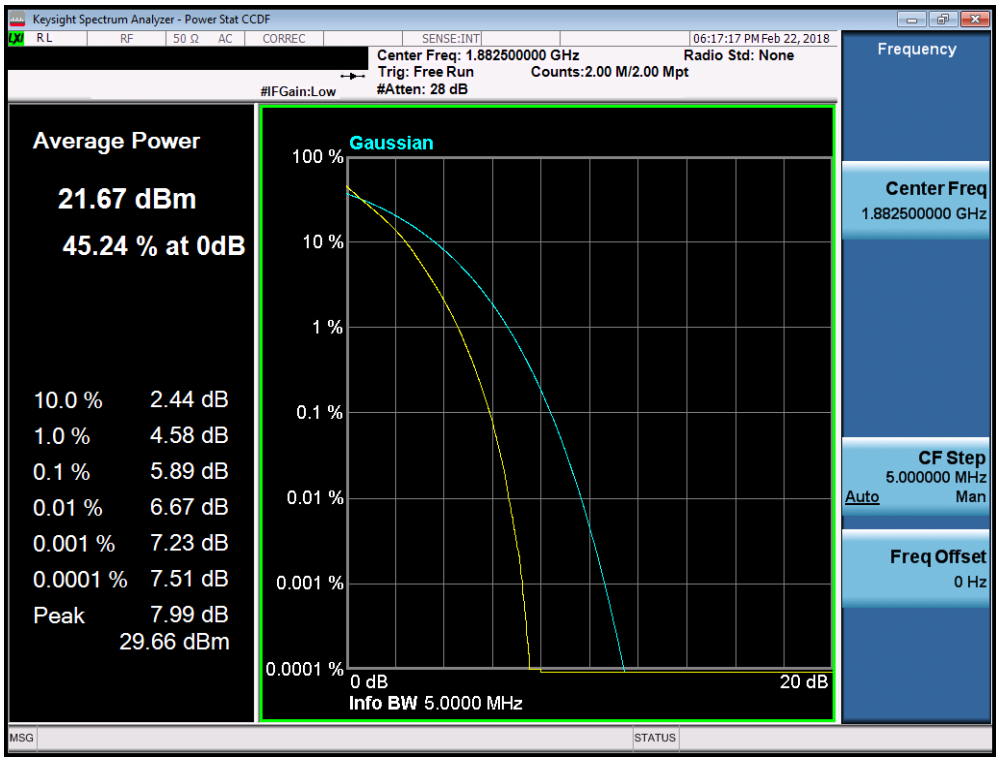
Plot 7-191. PAR Plot (Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)



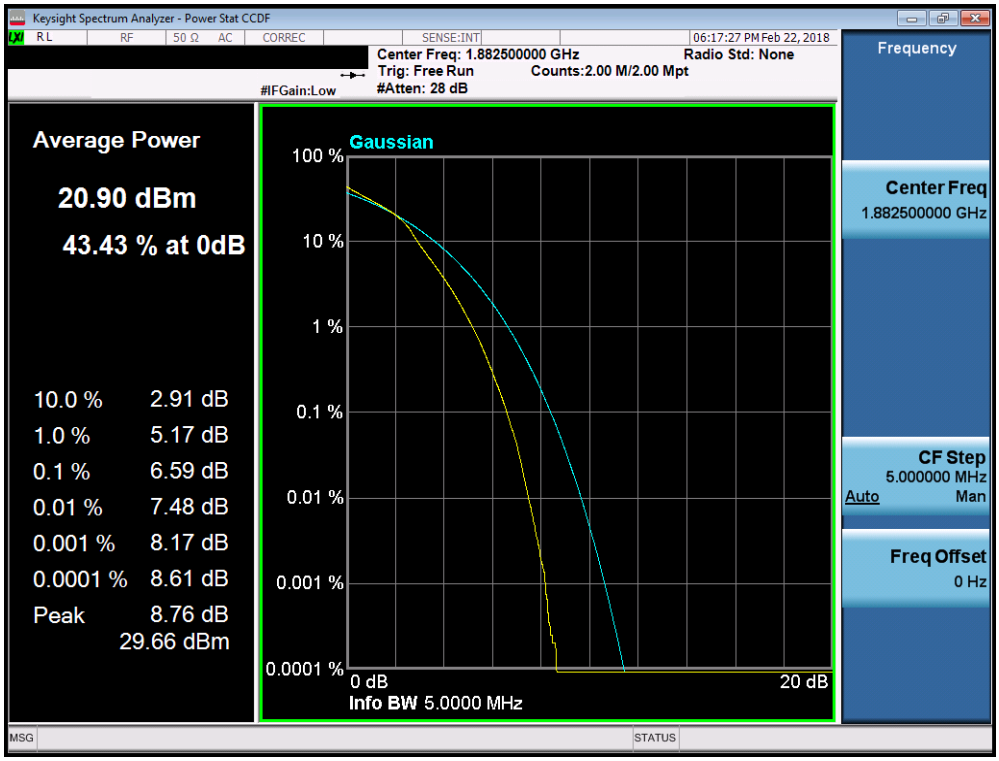
Plot 7-192. PAR Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



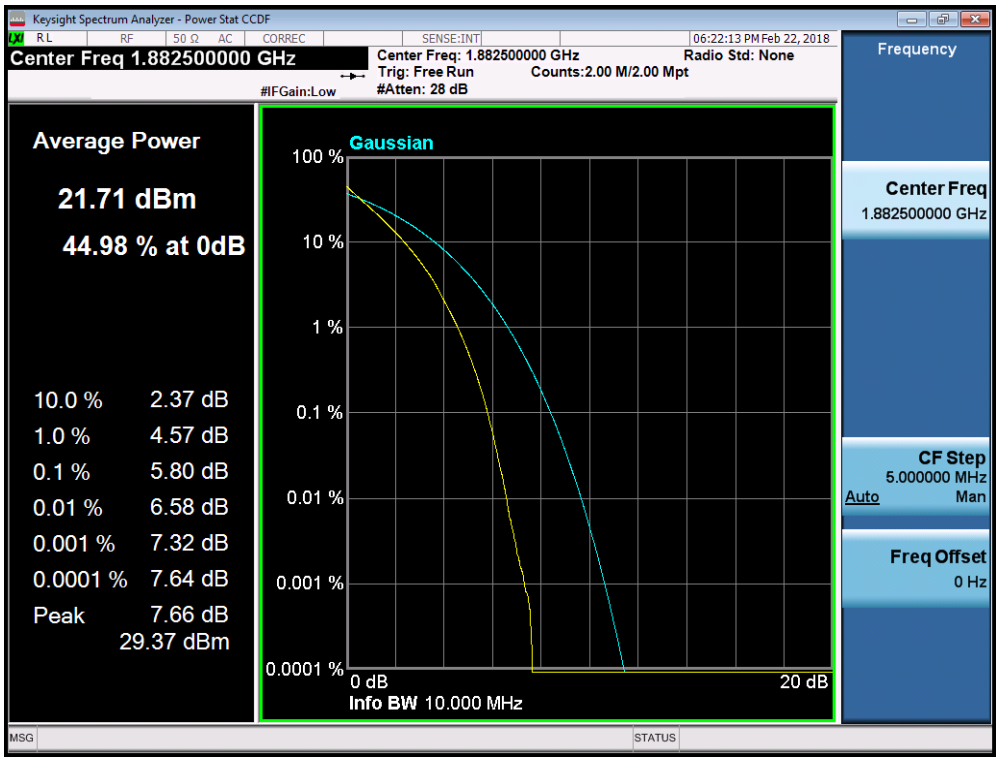
Plot 7-193. PAR Plot (Band 25/2 - 3.0MHz 16-QAM - Full RB Configuration)



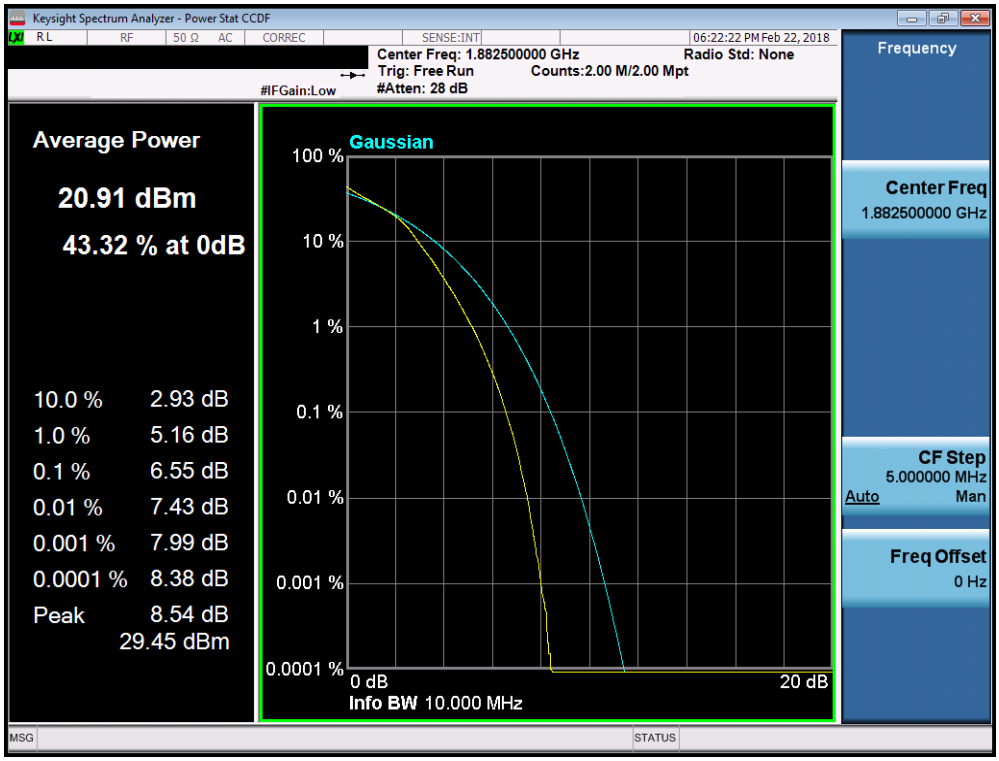
Plot 7-194. PAR Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



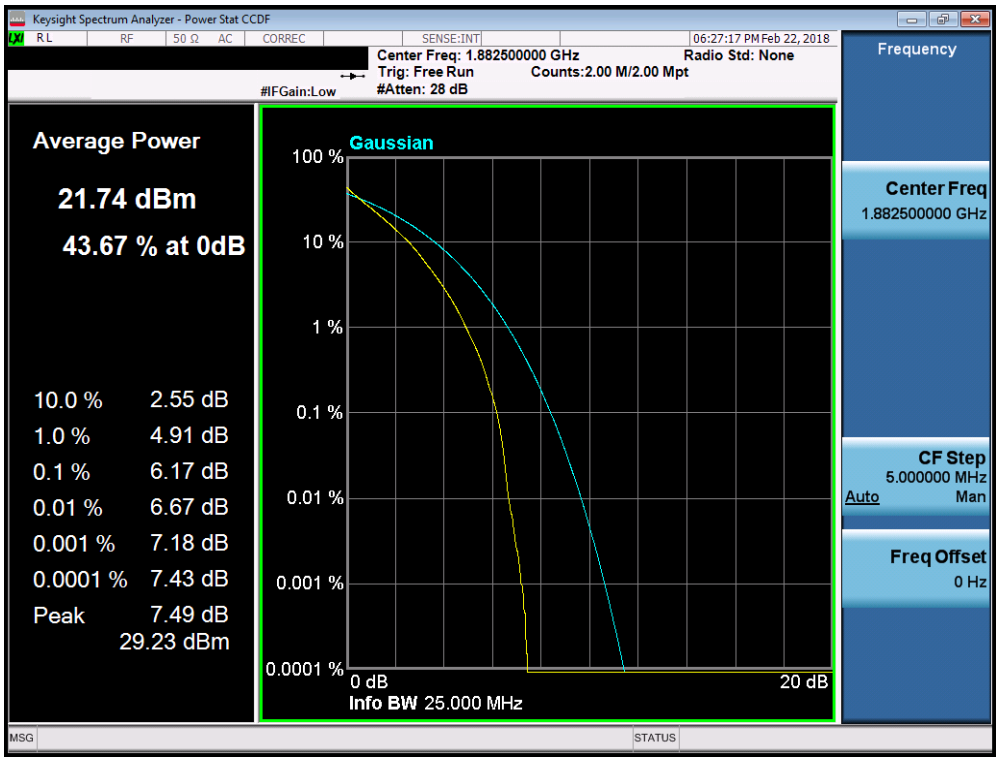
Plot 7-195. PAR Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)



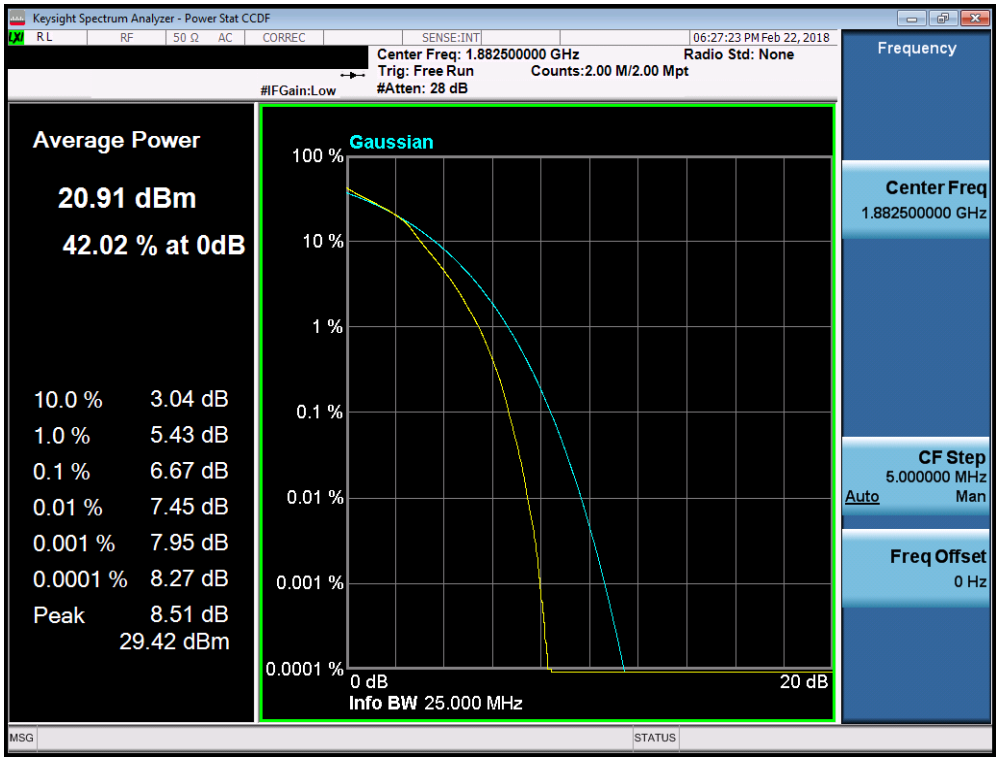
Plot 7-196. PAR Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



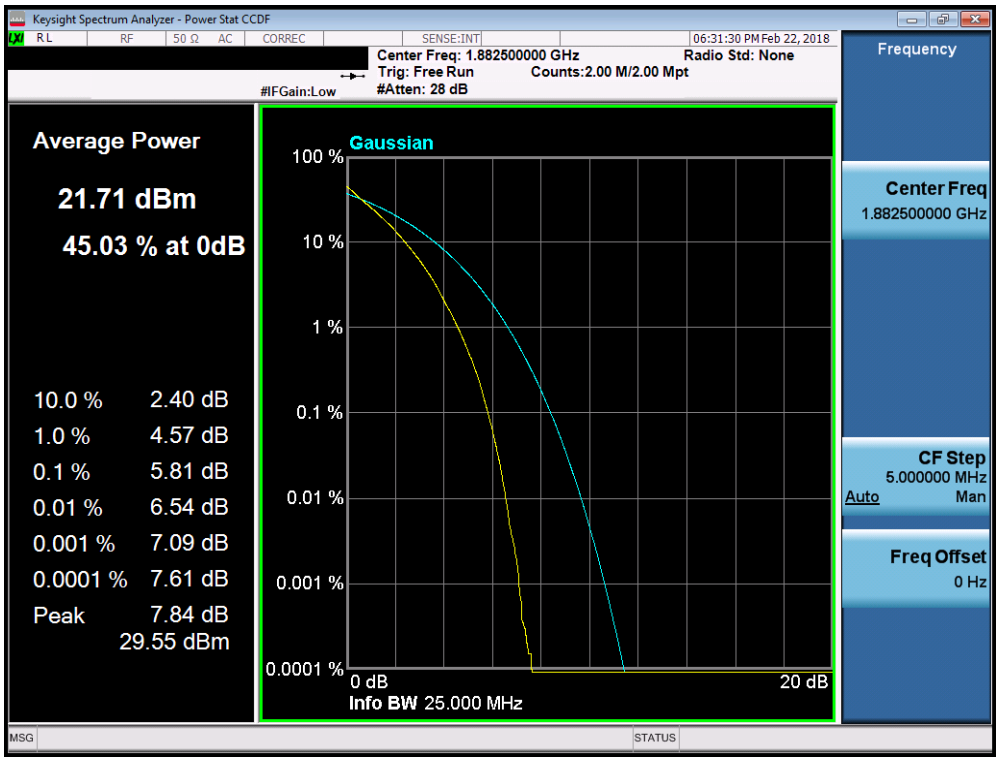
Plot 7-197. PAR Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)



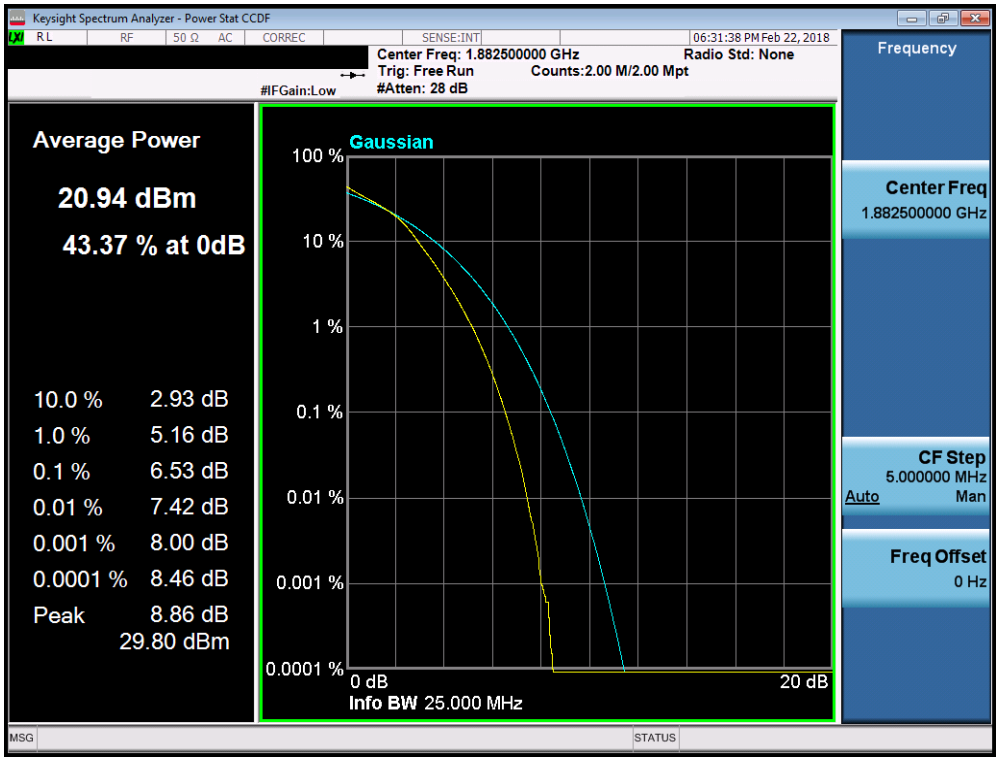
Plot 7-198. PAR Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-199. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)



Plot 7-200. PAR Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-201. PAR Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)

7.6 Additional Maximum Power Reduction (A-MPR)

§2.1046

Test Overview

A-MPR is implemented in this device when operating at Power Class 2 in LTE Band 41 per the A-MPR specification in 3GPP TS 36.101. The conducted powers are shown herein to cover the different A-MPR levels specified in the standard. Measurement equipment was set up with triggering/gating on the spectrum analyzer such that powers were measured only during the on-time of the signal.

Test Procedure Used

KDB 971168 D01 v03 – Section 5.2.2

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. RBW = 1% to 5% of the OBW
3. Number of measurement points in sweep ≥ 2 x span / RBW
4. Sweep = auto-couple (less than transmission burst duration)
5. Detector = RMS (power)
6. Trigger was set to enable power measurements only on full power bursts
7. Trace was allowed to stabilize
8. Spectrum analyzer's "Channel Power" function was used to compute the power by integrating the spectrum across the OBW of the signal

Test Setup

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

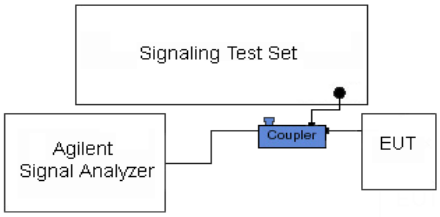


Figure 7-5. Test Instrument & Measurement Setup

Test Notes

None.

Test Case	NS	MCC	MNC	Channel BW [MHz]	Channel Number	Channel Frequency [MHz]	Modulation	RB Size	RB Offset	MPR [dB]	MPR [dB]	A-MPR [dB]	A-MPR [dB]	Measured Power [dBm]	Lowest Typical Power [dBm]	Delta [dB]
1	01	312	530	5	39675	2498.5	QPSK	1	0	0	0	≤ 3	3	23.21	23.0	**0.21**
							16-QAM			≤ 1	1		3	22.27	22.0	**0.27**
2				5	39675	2498.5	QPSK	1	9	0	0	0	0	26.23	26.0	**0.23**
							16-QAM			≤ 1	1		0	25.22	25.0	**0.22**
3				10	39700	2501	QPSK	1	0	0	0	≤ 5	5	21.12	21.0	**0.12**
							16-QAM	1	0	≤ 1	1		5	20.02	20.0	**0.02**
4				10	39700	2501	QPSK	20	0	0	1	≤ 2	2	23.08	23.0	**0.08**
							16-QAM	20	0	≤ 1	2		2	22.08	22.0	**0.08**
5				10	39700	2501	QPSK	50	0	0	1	≤ 3	3	22.06	22.0	**0.06**
							16-QAM	50	0	≤ 1	2		3	21.01	21.0	**0.01**
6				10	39700	2501	QPSK	25	20	0	1	≤ 1	1	24.06	24.0	**0.06**
							16-QAM	25	20	≤ 1	2		1	23.05	23.0	**0.05**
7				10	39700	2501	QPSK	1	36	0	0	0	0	26.30	26.0	**0.30**
							16-QAM	1	36	≤ 1	1		0	25.01	25.0	**0.01**
8				15	39725	2503.5	QPSK	1	0	0	0	≤ 5	5	21.24	21.0	**0.24**
							16-QAM	1	0	≤ 1	1		5	20.01	20.0	**0.01**
9				15	39725	2503.5	QPSK	20	0	0	1	≤ 2	2	23.11	23.0	**0.11**
							16-QAM	20	0	≤ 1	2		2	22.10	22.0	**0.10**
10				15	39725	2503.5	QPSK	75	0	0	1	≤ 4	4	21.07	21.0	**0.07**
							16-QAM	75	0	≤ 1	2		4	20.10	20.0	**0.10**
11				15	39725	2503.5	QPSK	50	15	0	1	≤ 3	3	22.13	22.0	**0.13**
							16-QAM	50	15	≤ 1	2		3	21.07	21.0	**0.07**
12				15	39725	2503.5	QPSK	1	60	0	0	0	0	26.36	26.0	**0.36**
							16-QAM	1	60	≤ 1	1		0	25.01	25.0	**0.01**
13				20	39750	2506	QPSK	1	0	0	0	≤ 5	5	21.43	21.0	**0.43**
							16-QAM	1	0	≤ 1	1		5	20.15	20.0	**0.15**
14				20	39750	2506	QPSK	20	0	0	1	≤ 2	2	23.18	23.0	**0.18**
							16-QAM	20	0	≤ 1	2		2	22.21	22.0	**0.21**
15				20	39750	2506	QPSK	100	0	0	1	≤ 4	4	21.17	21.0	**0.17**
							16-QAM	100	0	≤ 1	2		4	20.17	20.0	**0.17**
16				20	39750	2506	QPSK	75	24	0	1	≤ 3	3	22.21	22.0	**0.21**
							16-QAM	75	24	≤ 1	2		3	21.17	21.0	**0.17**
17				20	39750	2506	QPSK	1	77	0	0	0	0	26.52	26.0	**0.52**
							16-QAM	1	77	≤ 1	1		0	25.01	25.0	**0.01**
18	01	311	490	5	39675	2498.5	QPSK	1	0	0	0	≤ 3	3	23.44	23.0	**0.44**
							16-QAM			≤ 1	1		3	22.05	22.0	**0.05**
19	01	001	01	5	39675	2498.5	QPSK	1	0	0	0	0	0	26.32	26.0	**0.32**
							16-QAM			≤ 1	1		0	25.14	25.0	**0.14**

Table 7-3. A-MPR Conducted Power Measurements

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 v03 – 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 ≥ 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.

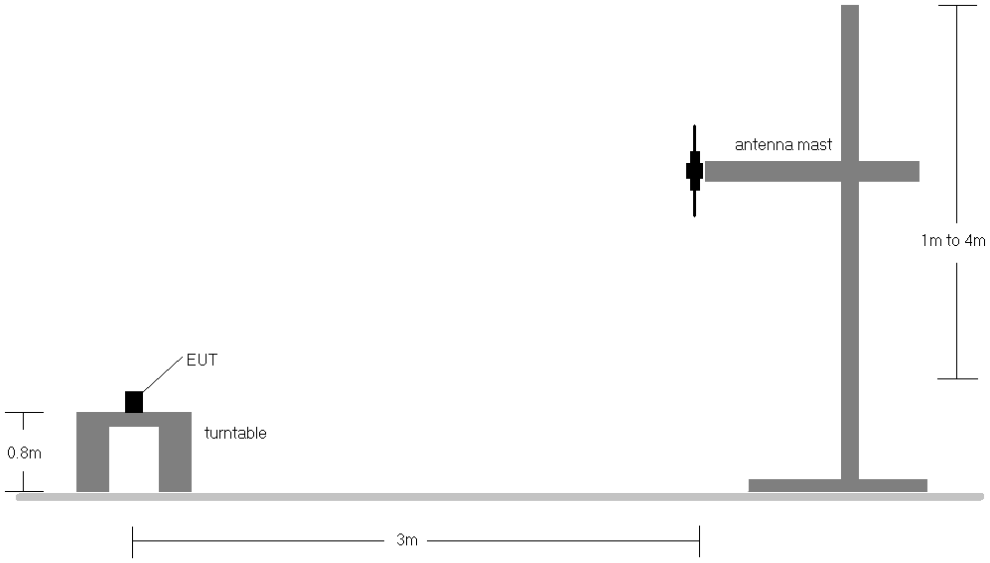


Figure 7-6. Radiated Test Setup <1GHz

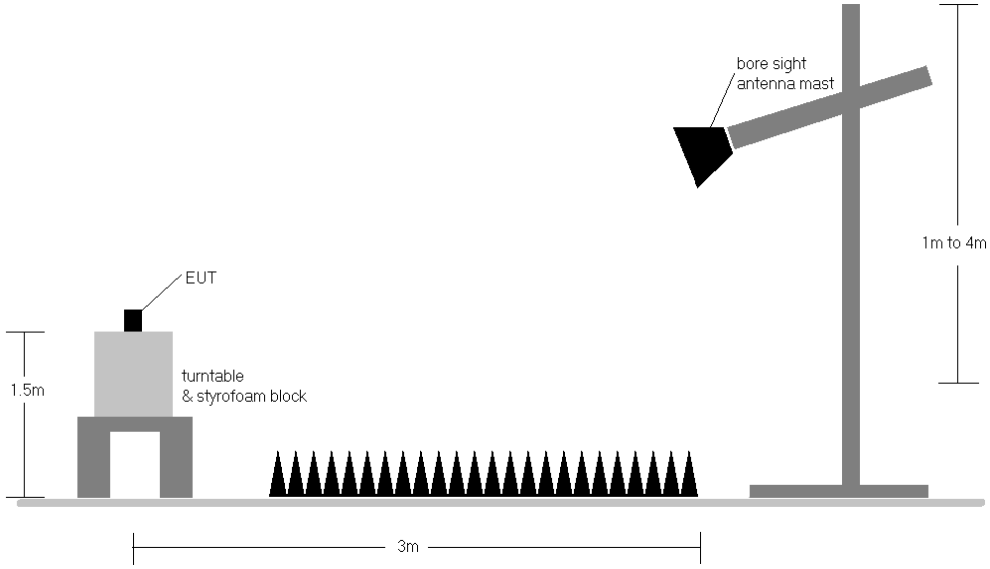


Figure 7-7. Radiated Test Setup >1GHz

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.

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	150	351	1 / 5	20.45	1.10	19.40	0.087	34.77	-15.37	21.55	0.143	36.99	-15.44
707.50	1.4	QPSK	V	150	349	1 / 5	20.81	1.13	**19.79**	0.095	34.77	-14.98	**21.94**	0.156	36.99	-15.05
715.30	1.4	QPSK	V	150	359	1 / 5	20.13	1.16	19.14	0.082	34.77	-15.63	21.29	0.135	36.99	-15.70
707.50	1.4	16-QAM	V	150	349	1 / 5	19.55	1.13	**18.53**	0.071	34.77	-16.24	**20.68**	0.117	36.99	-16.31
700.50	3	QPSK	V	150	342	1 / 14	20.73	1.10	19.68	0.093	34.77	-15.09	21.83	0.152	36.99	-15.16
707.50	3	QPSK	V	150	4	1 / 14	21.09	1.13	**20.07**	0.102	34.77	-14.70	**22.22**	0.167	36.99	-14.77
714.50	3	QPSK	V	150	354	1 / 14	20.10	1.16	19.11	0.081	34.77	-15.66	21.26	0.134	36.99	-15.73
707.50	3	16-QAM	V	150	4	1 / 14	19.95	1.13	**18.93**	0.078	34.77	-15.84	**21.08**	0.128	36.99	-15.91
701.50	5	QPSK	V	150	6	1 / 24	20.38	1.11	19.34	0.086	34.77	-15.44	21.49	0.141	36.99	-15.50
707.50	5	QPSK	V	150	358	1 / 24	20.94	1.13	**19.92**	0.098	34.77	-14.85	**22.07**	0.161	36.99	-14.92
713.50	5	QPSK	V	150	357	1 / 24	19.78	1.15	18.78	0.076	34.77	-15.99	20.93	0.124	36.99	-16.06
707.50	5	16-QAM	V	150	358	1 / 24	19.73	1.13	**18.71**	0.074	34.77	-16.06	**20.86**	0.122	36.99	-16.13
704.00	10	QPSK	V	150	4	1 / 49	20.95	1.12	19.92	0.098	34.77	-14.85	22.07	0.161	36.99	-14.92
707.50	10	QPSK	V	150	2	1 / 49	21.22	1.13	**20.20**	**0.105**	34.77	-14.57	**22.35**	**0.172**	36.99	-14.64
711.00	10	QPSK	V	150	2	1 / 49	20.91	1.14	19.90	0.098	34.77	-14.87	22.05	0.160	36.99	-14.94
707.50	10	16-QAM	V	150	2	1 / 49	20.28	1.13	**19.26**	0.084	34.77	-15.51	**21.41**	0.138	36.99	-15.58
707.50	10	QPSK	H	150	60	1 / 74	20.06	1.13	19.04	0.080	34.77	-15.73	21.19	0.132	36.99	-15.80

Table 7-4. 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]
824.70	1.4	QPSK	H	150	2	1 / 5	20.72	1.50	20.07	0.102	38.45	-18.39	22.22	0.167	40.61	-18.39
836.50	1.4	QPSK	H	150	7	1 / 5	21.27	1.50	**20.62**	0.115	38.45	-17.83	**22.77**	0.189	40.61	-17.84
848.30	1.4	QPSK	H	150	7	1 / 5	21.08	1.50	20.43	0.110	38.45	-18.02	22.58	0.181	40.61	-18.03
848.30	1.4	16-QAM	H	150	7	1 / 5	20.04	1.50	**19.39**	0.087	38.45	-19.06	**21.54**	0.143	40.61	-19.07
825.50	3	QPSK	H	150	6	1 / 14	20.85	1.50	20.20	0.105	38.45	-18.25	22.35	0.172	40.61	-18.26
836.50	3	QPSK	H	150	12	1 / 14	21.11	1.50	**20.46**	0.111	38.45	-17.99	**22.61**	0.182	40.61	-18.00
847.50	3	QPSK	H	150	1	1 / 14	20.78	1.50	20.13	0.103	38.45	-18.32	22.28	0.169	40.61	-18.33
836.50	3	16-QAM	H	150	12	1 / 14	19.96	1.50	**19.31**	0.085	38.45	-19.14	**21.46**	0.140	40.61	-19.15
826.50	5	QPSK	H	150	12	1 / 24	20.81	1.50	20.16	0.104	38.45	-18.29	22.31	0.170	40.61	-18.30
836.50	5	QPSK	H	150	10	1 / 24	21.16	1.50	**20.51**	0.112	38.45	-17.94	**22.66**	0.185	40.61	-17.95
846.50	5	QPSK	H	150	10	1 / 24	20.78	1.50	20.13	0.103	38.45	-18.32	22.28	0.169	40.61	-18.33
846.50	5	16-QAM	H	150	10	1 / 24	20.46	1.50	**19.81**	0.096	38.45	-18.64	**21.96**	0.157	40.61	-18.64
829.00	10	QPSK	H	150	6	1 / 49	21.05	1.50	20.40	0.110	38.45	-18.05	22.55	0.180	40.61	-18.06
836.50	10	QPSK	H	150	8	1 / 49	21.50	1.50	**20.85**	**0.122**	38.45	-17.60	**23.00**	**0.200**	40.61	-17.61
844.00	10	QPSK	H	150	4	1 / 49	21.14	1.50	20.49	0.112	38.45	-17.96	22.64	0.184	40.61	-17.96
836.50	10	16-QAM	H	150	8	1 / 49	20.48	1.50	**19.83**	0.096	38.45	-18.62	**21.98**	0.158	40.61	-18.62
836.50	10	QPSK	V	150	353	1 / 74	21.05	1.50	20.40	0.110	38.45	-18.05	22.55	0.180	40.61	-18.06

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

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]
831.50	15	QPSK	H	150	4	1 / 74	20.58	1.50	19.93	0.098	38.45	-18.52	22.08	0.162	40.61	-18.52
836.50	15	QPSK	H	150	6	1 / 74	20.86	1.50	**20.21**	0.105	38.45	-18.24	**22.36**	0.172	40.61	-18.25
841.50	15	QPSK	H	150	5	1 / 74	20.35	1.50	19.70	0.093	38.45	-18.75	21.85	0.153	40.61	-18.76
836.50	15	16-QAM	H	150	6	1 / 74	19.80	1.50	**19.15**	0.082	38.45	-19.30	**21.30**	0.135	40.61	-19.31

Table 7-6. ERP Data (Band 26)

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	H	150	4	1 / 0	18.53	5.56	**24.09**	**0.256**	30.00	-5.91
1732.50	1.4	QPSK	H	150	3	3 / 2	18.65	5.41	24.06	0.255	30.00	-5.94
1754.30	1.4	QPSK	H	150	2	1 / 0	18.72	5.26	23.98	0.250	30.00	-6.02
1710.70	1.4	16-QAM	H	150	4	1 / 0	17.99	5.56	**23.55**	0.226	30.00	-6.45
1711.50	3	QPSK	H	150	2	1 / 14	18.53	5.55	**24.08**	0.256	30.00	-5.92
1732.50	3	QPSK	H	150	1	1 / 14	18.57	5.41	23.97	0.250	30.00	-6.03
1753.50	3	QPSK	H	150	3	1 / 0	18.55	5.26	23.82	0.241	30.00	-6.18
1753.50	3	16-QAM	H	150	3	1 / 14	17.71	5.26	**22.97**	0.198	30.00	-7.03
1712.50	5	QPSK	H	150	4	1 / 0	18.53	5.55	**24.07**	0.255	30.00	-5.93
1732.50	5	QPSK	H	150	3	1 / 0	18.56	5.41	23.97	0.249	30.00	-6.03
1752.50	5	QPSK	H	150	358	1 / 0	18.41	5.27	23.68	0.233	30.00	-6.32
1712.50	5	16-QAM	H	150	4	1 / 0	17.37	5.55	**22.92**	0.196	30.00	-7.08
1715.00	10	QPSK	H	150	2	1 / 0	18.47	5.53	**24.00**	0.251	30.00	-6.00
1732.50	10	QPSK	H	150	1	1 / 0	18.51	5.41	23.91	0.246	30.00	-6.09
1750.00	10	QPSK	H	150	360	1 / 0	18.48	5.29	23.76	0.238	30.00	-6.24
1732.50	10	16-QAM	H	150	1	1 / 0	17.69	5.41	**23.10**	0.204	30.00	-6.90
1717.50	15	QPSK	H	150	3	1 / 0	18.37	5.51	23.88	0.244	30.00	-6.12
1732.50	15	QPSK	H	150	5	1 / 0	18.50	5.41	**23.91**	0.246	30.00	-6.09
1747.50	15	QPSK	H	150	1	1 / 0	18.54	5.31	23.85	0.242	30.00	-6.15
1732.50	15	16-QAM	H	150	5	1 / 0	17.63	5.41	**23.04**	0.201	30.00	-6.96
1720.00	20	QPSK	H	150	4	1 / 0	18.55	5.49	**24.05**	0.254	30.00	-5.95
1732.50	20	QPSK	H	150	2	1 / 0	18.61	5.41	24.01	0.252	30.00	-5.99
1745.00	20	QPSK	H	150	358	1 / 0	18.39	5.32	23.71	0.235	30.00	-6.29
1720.00	20	16-QAM	H	150	4	1 / 0	17.58	5.49	**23.07**	0.203	30.00	-6.93
1710.70	1.4	QPSK	V	150	98	1 / 0	17.73	5.65	23.38	0.218	30.00	-6.62

Table 7-7. EIRP Data (Band 4)

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]
1850.70	1.4	QPSK	V	150	358	1 / 0	19.69	4.79	**24.48**	0.281	33.01	-8.53
1882.50	1.4	QPSK	V	150	357	1 / 0	19.41	4.85	24.25	0.266	33.01	-8.76
1914.30	1.4	QPSK	V	150	356	1 / 0	19.35	4.85	24.20	0.263	33.01	-8.82
1882.50	1.4	16-QAM	V	150	357	1 / 0	18.56	4.85	**23.41**	0.219	33.01	-9.60
1851.50	3	QPSK	V	150	355	1 / 14	19.66	4.79	**24.45**	0.279	33.01	-8.56
1882.50	3	QPSK	V	150	357	1 / 14	19.42	4.85	24.27	0.267	33.01	-8.74
1913.50	3	QPSK	V	150	356	1 / 14	19.23	4.85	24.08	0.256	33.01	-8.93
1851.50	3	16-QAM	V	150	355	1 / 14	18.73	4.79	**23.51**	0.225	33.01	-9.50
1852.50	5	QPSK	V	150	355	1 / 24	19.48	4.79	**24.27**	0.267	33.01	-8.74
1882.50	5	QPSK	V	150	357	1 / 24	19.26	4.85	24.11	0.257	33.01	-8.90
1912.50	5	QPSK	V	150	360	1 / 24	18.90	4.85	23.76	0.237	33.01	-9.25
1852.50	5	16-QAM	V	150	355	1 / 24	18.60	4.79	**23.39**	0.218	33.01	-9.62
1855.00	10	QPSK	V	150	358	1 / 49	19.80	4.80	**24.60**	**0.288**	33.01	-8.41
1882.50	10	QPSK	V	150	360	1 / 49	19.34	4.85	24.19	0.262	33.01	-8.82
1910.00	10	QPSK	V	150	358	1 / 49	19.32	4.86	24.18	0.262	33.01	-8.83
1855.00	10	16-QAM	V	150	358	1 / 49	18.92	4.80	**23.72**	0.235	33.01	-9.29
1857.50	15	QPSK	V	150	354	1 / 74	19.59	4.80	**24.39**	0.275	33.01	-8.62
1882.50	15	QPSK	V	150	359	1 / 74	19.42	4.85	24.27	0.267	33.01	-8.74
1907.50	15	QPSK	V	150	359	1 / 74	19.26	4.87	24.12	0.258	33.01	-8.89
1857.50	15	16-QAM	V	150	354	1 / 74	18.75	4.80	**23.55**	0.227	33.01	-9.46
1860.00	20	QPSK	V	150	1	1 / 99	19.24	4.81	24.04	0.254	33.01	-8.97
1882.50	20	QPSK	V	150	353	1 / 99	19.16	4.85	24.00	0.251	33.01	-9.01
1905.00	20	QPSK	V	150	359	1 / 99	19.18	4.87	**24.05**	0.254	33.01	-8.96
1860.00	20	16-QAM	V	150	1	1 / 99	18.44	4.81	**23.25**	0.211	33.01	-9.77
1855.00	10	QPSK	H	150	232	1/49	18.88	4.81	23.69	0.234	33.01	-9.33

Table 7-8. EIRP Data (Band 25/2)

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	150	347	1 / 24	21.86	5.73	27.59	0.574	33.01	-5.42
2502.50	5	QPSK	H	150	341	1 / 24	21.75	5.74	27.49	0.561	33.01	-5.52
2593.00	5	QPSK	H	150	346	1 / 24	21.93	6.07	28.00	0.631	33.01	-5.01
2687.50	5	QPSK	H	150	341	1 / 24	21.86	6.48	**28.34**	0.683	33.01	-4.67
2593.00	5	16-QAM	H	150	346	1 / 24	20.65	6.07	**26.72**	0.470	33.01	-6.29
2501.00	10	QPSK	H	150	339	1 / 49	21.35	5.73	27.08	0.511	33.01	-5.93
2505.00	10	QPSK	H	150	347	1 / 49	21.23	5.75	26.98	0.499	33.01	-6.03
2593.00	10	QPSK	H	150	344	1 / 49	22.27	6.07	**28.34**	0.683	33.01	-4.67
2685.00	10	QPSK	H	150	348	1 / 49	21.72	6.47	28.19	0.660	33.01	-4.82
2593.00	10	16-QAM	H	150	344	1 / 49	20.40	6.07	**26.47**	0.444	33.01	-6.54
2503.50	15	QPSK	H	150	347	1 / 0	21.67	5.74	27.41	0.551	33.01	-5.60
2507.50	15	QPSK	H	150	348	1 / 0	21.85	5.76	27.61	0.577	33.01	-5.40
2593.00	15	QPSK	H	150	346	1 / 0	21.86	6.07	27.93	0.621	33.01	-5.08
2682.50	15	QPSK	H	150	346	1 / 0	22.13	6.46	**28.59**	**0.723**	33.01	-4.42
2503.50	15	16-QAM	H	150	347	1 / 0	21.11	5.74	**26.85**	0.485	33.01	-6.16
2506.00	20	QPSK	H	150	339	1 / 99	20.98	5.75	26.73	0.471	33.01	-6.28
2510.00	20	QPSK	H	150	344	1 / 99	21.39	5.77	27.16	0.520	33.01	-5.85
2593.00	20	QPSK	H	150	346	1 / 99	22.38	6.07	**28.45**	0.700	33.01	-4.56
2680.00	20	QPSK	H	150	342	1 / 99	21.72	6.45	28.17	0.656	33.01	-4.84
2593.00	20	16-QAM	H	150	346	1 / 99	20.44	6.07	**26.51**	0.448	33.01	-6.50
2682.50	15	QPSK	V	150	254	1 / 99	21.43	6.27	27.70	0.589	33.01	-5.31

Table 7-9. EIRP Data (Band 41 PC2)

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	150	345	1 / 24	19.00	5.73	24.73	0.297	33.01	-8.28
2502.50	5	QPSK	H	150	339	1 / 0	19.72	5.74	25.46	0.352	33.01	-7.55
2593.00	5	QPSK	H	150	344	1 / 24	19.70	6.07	**25.77**	**0.378**	33.01	-7.24
2687.50	5	QPSK	H	150	344	1 / 0	18.33	6.48	24.81	0.303	33.01	-8.20
2593.00	5	16-QAM	H	150	344	1 / 24	18.71	6.07	**24.78**	0.301	33.01	-8.23
2501.00	10	QPSK	H	150	347	1 / 49	19.27	5.73	25.00	0.317	33.01	-8.01
2505.00	10	QPSK	H	150	345	1 / 49	19.60	5.75	**25.35**	0.343	33.01	-7.66
2593.00	10	QPSK	H	150	342	1 / 49	19.02	6.07	25.09	0.323	33.01	-7.92
2685.00	10	QPSK	H	150	336	1 / 49	18.28	6.47	24.75	0.299	33.01	-8.26
2501.00	10	16-QAM	H	150	347	1 / 49	18.37	5.73	**24.10**	0.257	33.01	-8.91
2503.50	15	QPSK	H	150	342	1 / 74	19.20	5.74	24.94	0.312	33.01	-8.07
2507.50	15	QPSK	H	150	345	1 / 74	19.12	5.76	24.88	0.307	33.01	-8.13
2593.00	15	QPSK	H	150	344	1 / 74	19.45	6.07	**25.52**	0.357	33.01	-7.49
2682.50	15	QPSK	H	150	343	1 / 74	19.04	6.46	25.50	0.355	33.01	-7.51
2682.50	15	16-QAM	H	150	343	1 / 74	18.60	6.46	**25.06**	0.321	33.01	-7.95
2506.00	20	QPSK	H	150	346	1 / 99	19.17	5.75	24.92	0.311	33.01	-8.09
2510.00	20	QPSK	H	150	341	1 / 99	19.70	5.77	25.47	0.352	33.01	-7.54
2593.00	20	QPSK	H	150	344	1 / 99	19.52	6.07	**25.59**	0.362	33.01	-7.42
2680.00	20	QPSK	H	150	340	1 / 99	18.91	6.45	25.36	0.344	33.01	-7.65
2593.00	20	16-QAM	H	150	344	1 / 99	18.45	6.07	**24.52**	0.283	33.01	-8.49
2593.00	5	QPSK	V	150	106	1 / 0	18.46	6.27	24.73	0.297	33.01	-8.28

Table 7-10. EIRP Data (Band 41 PC3)

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 v03 – 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 ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

Test Setup

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

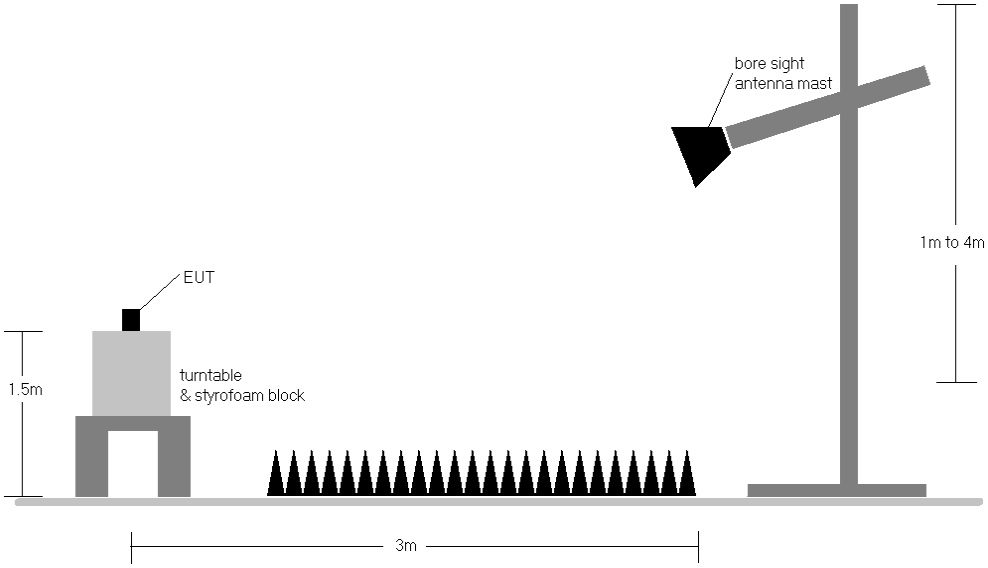


Figure 7-8. Test Instrument & Measurement Setup

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.

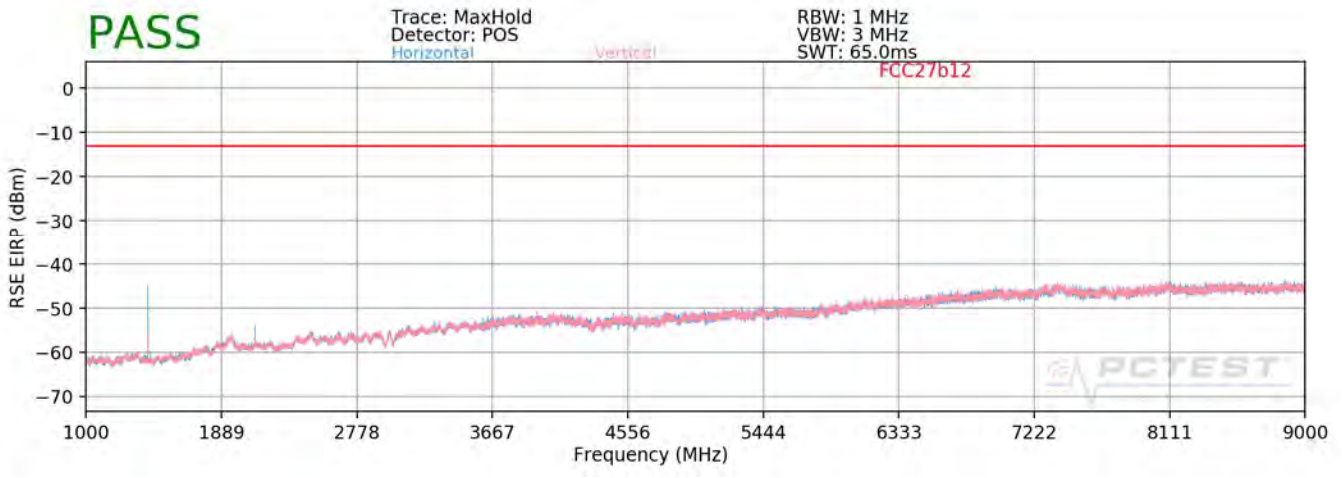
2) This unit was tested with its standard battery.

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.

Band 12



Plot 7-202. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY:	704.00	MHz
CHANNEL:	23060	
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	150	348	-44.99	3.84	-41.15	-28.2
2112.00	H	150	323	-66.05	4.79	-61.25	-48.3
2816.00	H	-	-	-63.99	5.69	-58.30	-45.3
3520.00	H	-	-	-64.15	6.57	-57.58	-44.6

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

OPERATING FREQUENCY:	707.50	MHz
CHANNEL:	23095	
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	150	5	-47.65	3.90	-43.75	-30.7
2122.50	H	150	334	-62.98	4.78	-58.19	-45.2
2830.00	H	-	-	-64.37	5.73	-58.64	-45.6

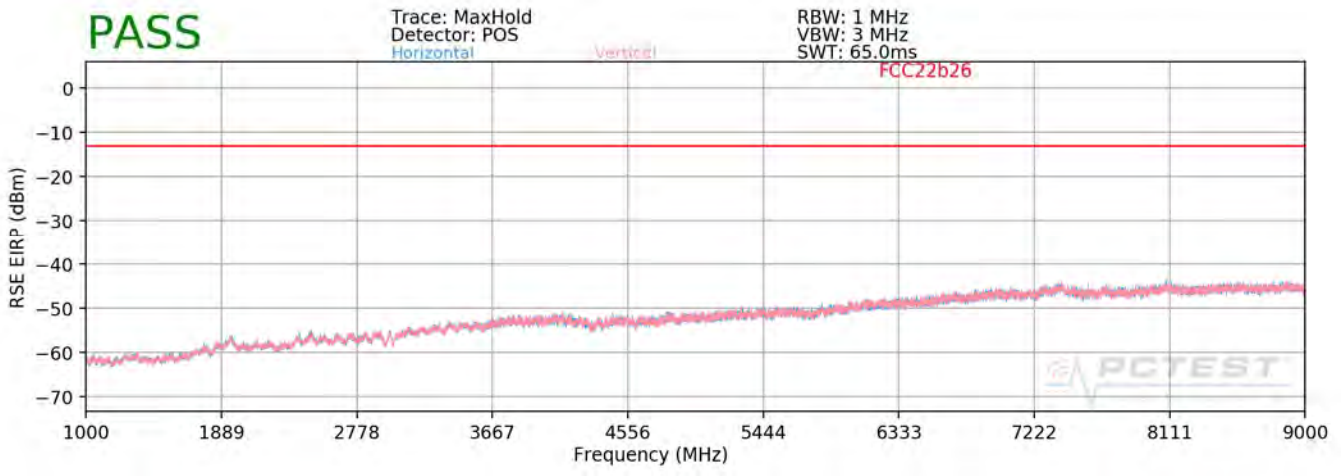
Table 7-12. Radiated Spurious Data (Band 12 – Mid Channel)

OPERATING FREQUENCY:	711.00	MHz
CHANNEL:	23130	
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	150	6	-45.25	3.97	-41.28	-28.3
2133.00	H	150	20	-65.35	4.78	-60.57	-47.6
2844.00	H	-	-	-64.10	5.77	-58.32	-45.3

Table 7-13. Radiated Spurious Data (Band 12 – High Channel)

Band 26/5



Plot 7-203. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY:	824.70	MHz
CHANNEL:	26797	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	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]
1649.40	H	150	347	-74.17	8.88	-65.29	-52.3
2474.10	H	150	339	-73.98	9.66	-64.32	-51.3
3298.80	H	-	-	-70.70	9.65	-61.06	-48.1
4123.50	H	-	-	-66.11	10.20	-55.92	-42.9

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

OPERATING FREQUENCY:	836.50	MHz
CHANNEL:	26915	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	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	150	340	-75.21	8.92	-66.29	-53.3
2509.50	H	150	321	-73.89	9.80	-64.09	-51.1
3346.00	H	-	-	-71.56	9.68	-61.88	-48.9

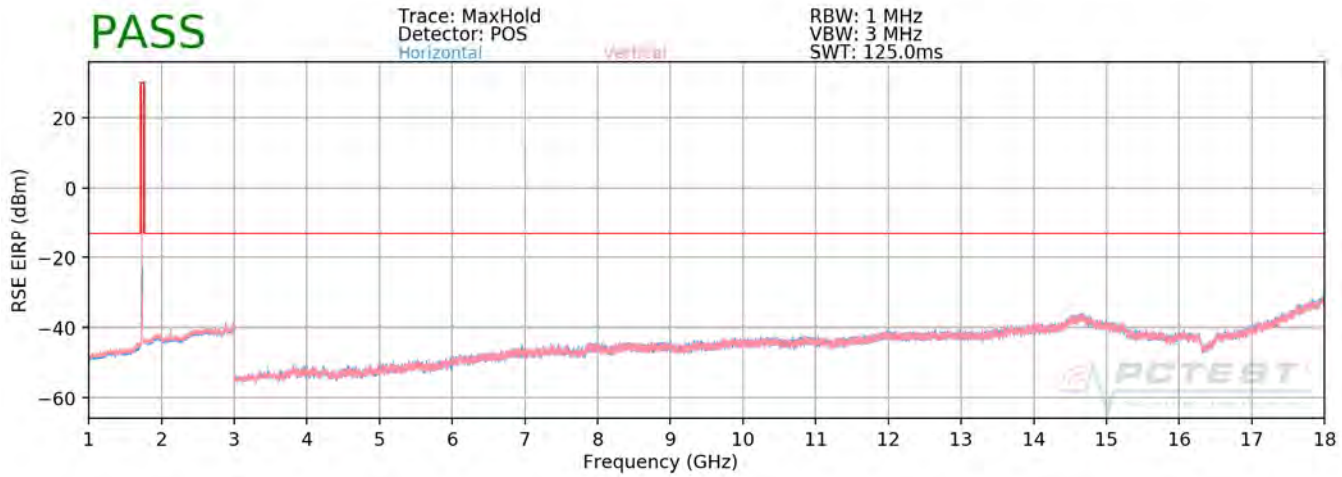
Table 7-15. Radiated Spurious Data (Band 26/5 – Mid Channel)

OPERATING FREQUENCY:	848.30	MHz
CHANNEL:	27033	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	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]
1696.60	H	150	16	-73.42	8.95	-64.47	-51.5
2544.90	H	150	310	-74.38	9.76	-64.62	-51.6
3393.20	H	-	-	-71.50	9.71	-61.79	-48.8

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

Band 4



Plot 7-204. Radiated Spurious Plot above 1GHz (Band 4)

OPERATING FREQUENCY:	1712.50	MHz
CHANNEL:	19975	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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]
3425.00	H	150	342	-59.63	6.47	-53.16	-40.2
5137.50	H	150	86	-60.20	8.43	-51.77	-38.8
6850.00	H	-	-	-63.11	8.71	-54.40	-41.4
8562.50	H	-	-	-63.77	9.62	-54.15	-41.1

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

OPERATING FREQUENCY:	1732.50	MHz
CHANNEL:	20175	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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	150	336	-61.68	6.56	-55.12	-42.1
5197.50	H	150	84	-60.49	8.45	-52.03	-39.0
6930.00	H	-	-	-63.13	8.67	-54.46	-41.5

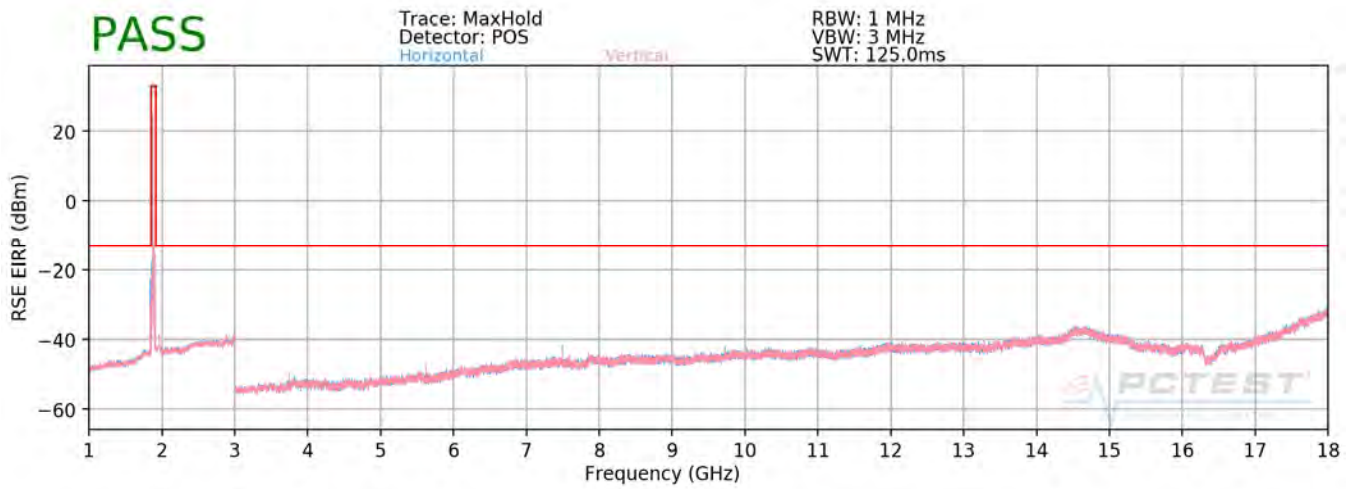
Table 7-18. Radiated Spurious Data (Band 4 – Mid Channel)

OPERATING FREQUENCY:	1752.50	MHz
CHANNEL:	20375	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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]
3505.00	H	150	339	-64.70	6.59	-58.11	-45.1
5257.50	H	150	113	-59.48	8.41	-51.07	-38.1
7010.00	H	150	96	-62.98	8.58	-54.40	-41.4
8762.50	H	-	-	-64.67	9.94	-54.73	-41.7

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

Band 25/2



Plot 7-205. Radiated Spurious Plot above 1GHz (Band 25/2)

OPERATING FREQUENCY:	1860.00	MHz
CHANNEL:	26140	
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]
3720.00	H	150	141	-63.07	6.78	-56.29	-43.3
5580.00	H	150	162	-56.45	8.45	-48.01	-35.0
7440.00	H	150	323	-55.65	8.33	-47.31	-34.3
9300.00	H	-	-	-63.31	9.85	-53.46	-40.5

Table 7-20. Radiated Spurious Data (Band 25/2 – Low Channel)

OPERATING FREQUENCY:	1882.50	MHz
CHANNEL:	26365	
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]
3765.00	H	150	129	-61.79	6.85	-54.94	-41.9
5647.50	H	150	158	-58.38	8.53	-49.85	-36.9
7530.00	H	150	129	-58.40	8.45	-49.96	-37.0
9412.50	H	-	-	-62.92	9.79	-53.13	-40.1

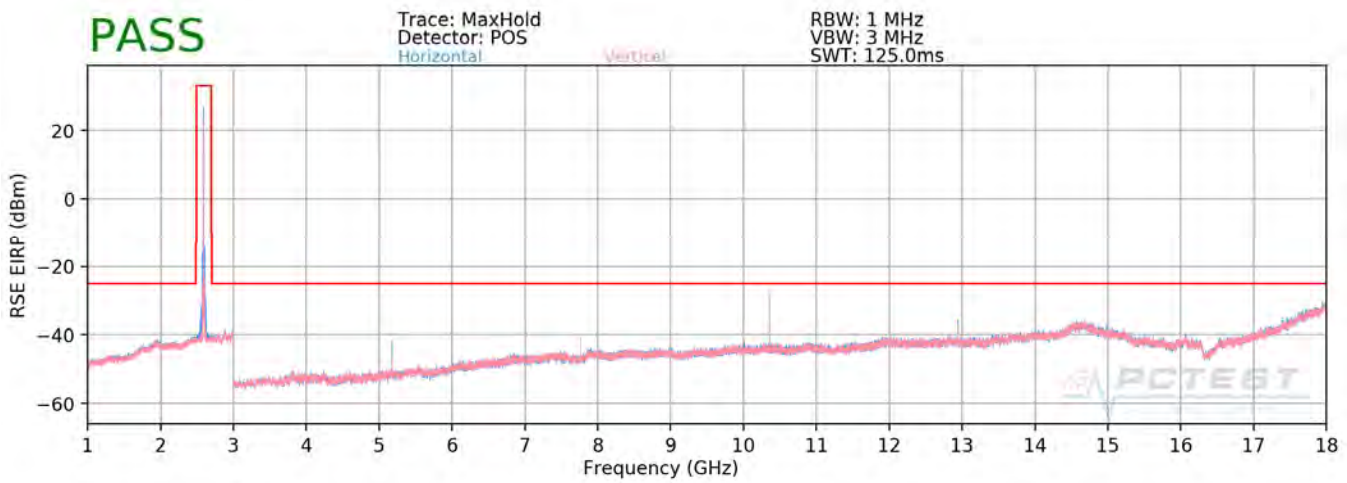
Table 7-21. Radiated Spurious Data (Band 25/2 – Mid Channel)

OPERATING FREQUENCY:	1905.00	MHz
CHANNEL:	26590	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

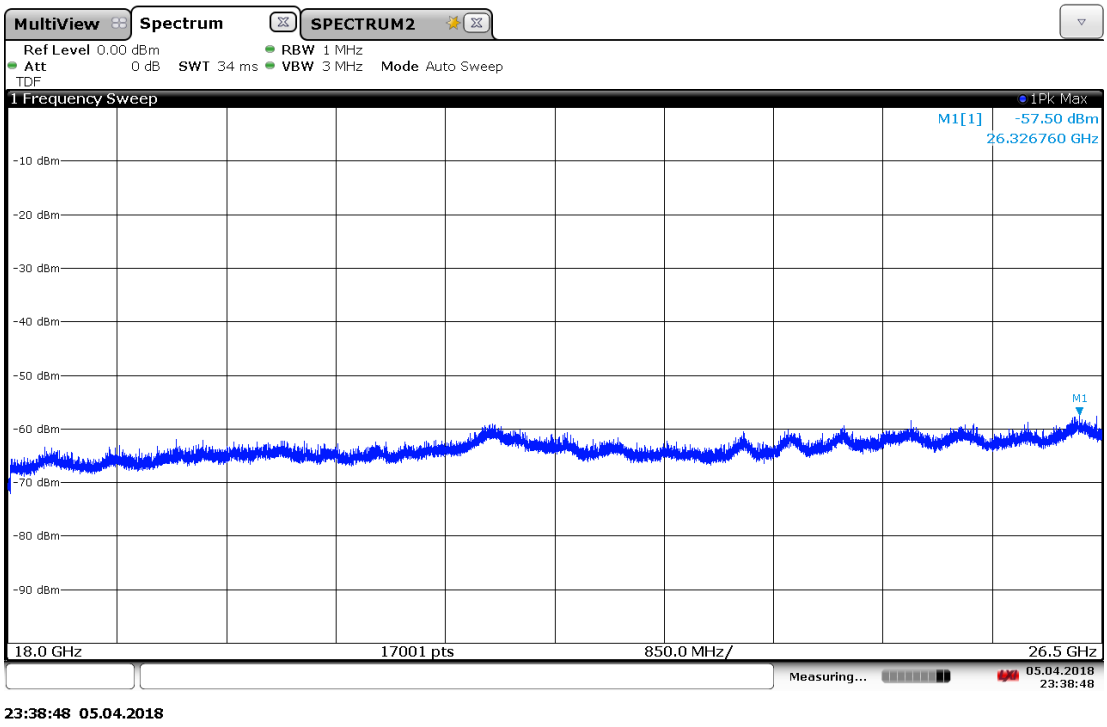
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3810.00	H	150	327	-64.53	6.97	-57.56	-44.6
5715.00	H	150	156	-59.42	8.57	-50.85	-37.8
7620.00	H	150	324	-55.09	8.53	-46.56	-33.6
9525.00	H	-	-	-62.57	9.80	-52.76	-39.8

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

Band 41 (PC2)



Plot 7-206. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



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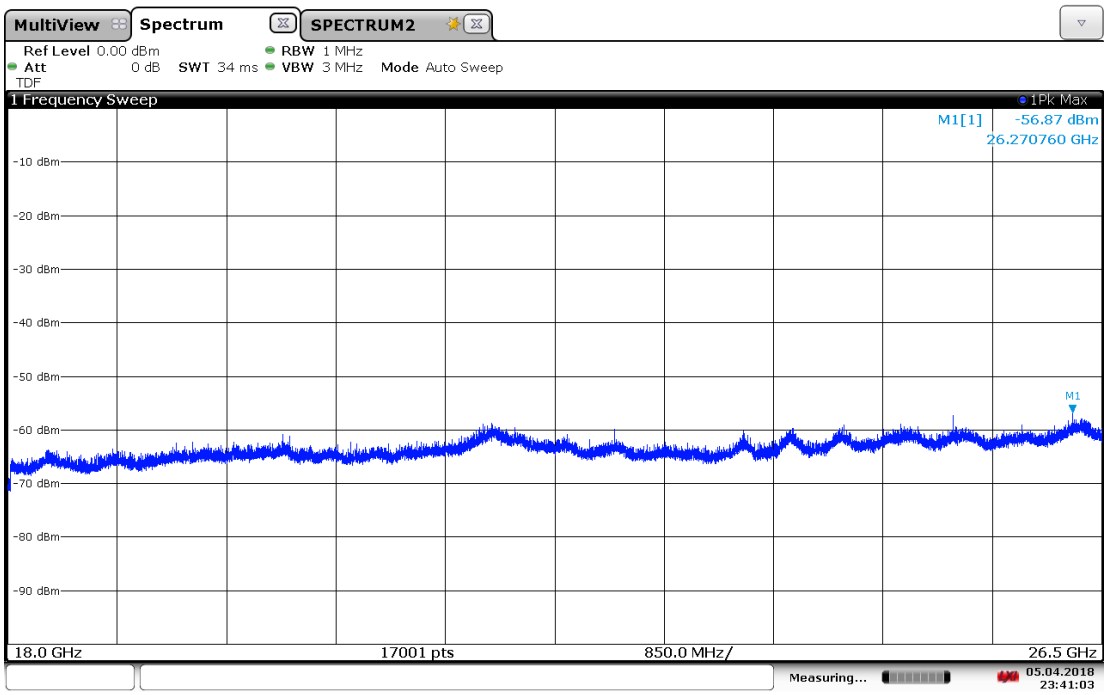
Plot 7-207. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41 Ant. Pol. H)



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Plot 7-208. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41 Ant. Pol. V)

OPERATING FREQUENCY:	2505.00	MHz
CHANNEL:	39740	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	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]
5010.00	H	121	296	-59.48	10.10	-49.38	-24.4
7515.00	H	100	147	-63.38	12.11	-51.28	-26.3
10020.00	H	110	222	-56.57	13.18	-43.40	-18.4
12525.00	H	116	174	-51.53	13.24	-38.29	-13.3
15030.00	H	261	25	-64.91	14.08	-50.83	-25.8
17535.00	H	-	-	-57.80	14.01	-43.79	-18.8

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

OPERATING FREQUENCY:	2593.00	MHz
CHANNEL:	40620	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	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	113	305	-56.89	10.27	-46.62	-21.6
7779.00	H	119	50	-61.86	12.28	-49.58	-24.6
10372.00	H	121	12	-53.82	13.12	-40.70	-15.7
12965.00	H	110	150	-58.68	13.38	-45.30	-20.3
15558.00	H	117	130	-63.62	14.04	-49.57	-24.6
18151.00	H	-	-	-58.77	15.31	-43.46	-18.5

Table 7-24. Radiated Spurious Data (Band 41 – Mid Channel)

OPERATING FREQUENCY:	2685.00	MHz
CHANNEL:	41540	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	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]
5370.00	H	112	10	-64.71	10.42	-54.29	-29.3
8055.00	H	218	359	-61.09	12.60	-48.49	-23.5
10740.00	H	115	316	-56.24	13.12	-43.12	-18.1
13425.00	H	113	360	-57.00	13.94	-43.06	-18.1
16110.00	H	109	178	-64.76	13.62	-51.14	-26.1
18795.00	H	-	-	-58.72	15.37	-43.35	-18.3

Table 7-25. Radiated Spurious Data (Band 41 – High Channel)

7.9 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 ±0.00025% (±2.5 ppm) of the center frequency. For Part 24, 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

Band 12 Frequency Stability Measurements

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	707,500,030	30	0.0000042
100 %		- 30	707,500,145	145	0.0000205
100 %		- 20	707,499,962	-38	-0.0000054
100 %		- 10	707,500,054	54	0.0000076
100 %		0	707,499,964	-36	-0.0000051
100 %		+ 10	707,499,961	-39	-0.0000055
100 %		+ 20	707,500,170	170	0.0000240
100 %		+ 30	707,499,972	-28	-0.0000040
100 %		+ 40	707,500,104	104	0.0000147
100 %		+ 50	707,500,039	39	0.0000055
BATT. ENDPOINT	3.70	+ 20	707,500,165	165	0.0000233

Table 7-26. 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

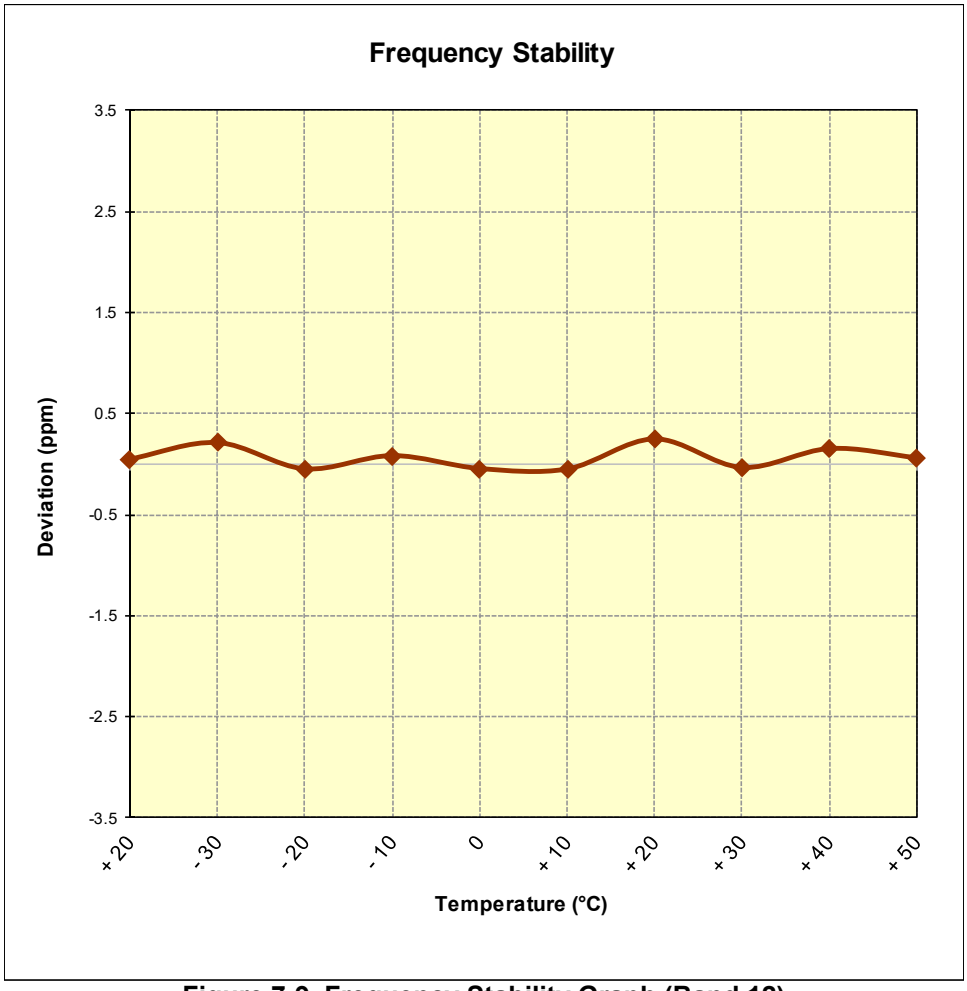

Figure 7-9. Frequency Stability Graph (Band 12)

Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	4.30	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	831,499,543	-457	-0.0000550
100 %		- 30	831,499,966	-34	-0.0000041
100 %		- 20	831,499,932	-68	-0.0000082
100 %		- 10	831,500,228	228	0.0000274
100 %		0	831,499,656	-344	-0.0000414
100 %		+ 10	831,499,929	-71	-0.0000085
100 %		+ 20	831,499,838	-162	-0.0000195
100 %		+ 30	831,500,312	312	0.0000375
100 %		+ 40	831,500,083	83	0.0000100
100 %		+ 50	831,500,311	311	0.0000374
BATT. ENDPOINT	3.70	+ 20	831,499,959	-41	-0.0000049

Table 7-27. Frequency Stability Data (Band 26/5)

Band 26/5 Frequency Stability Measurements

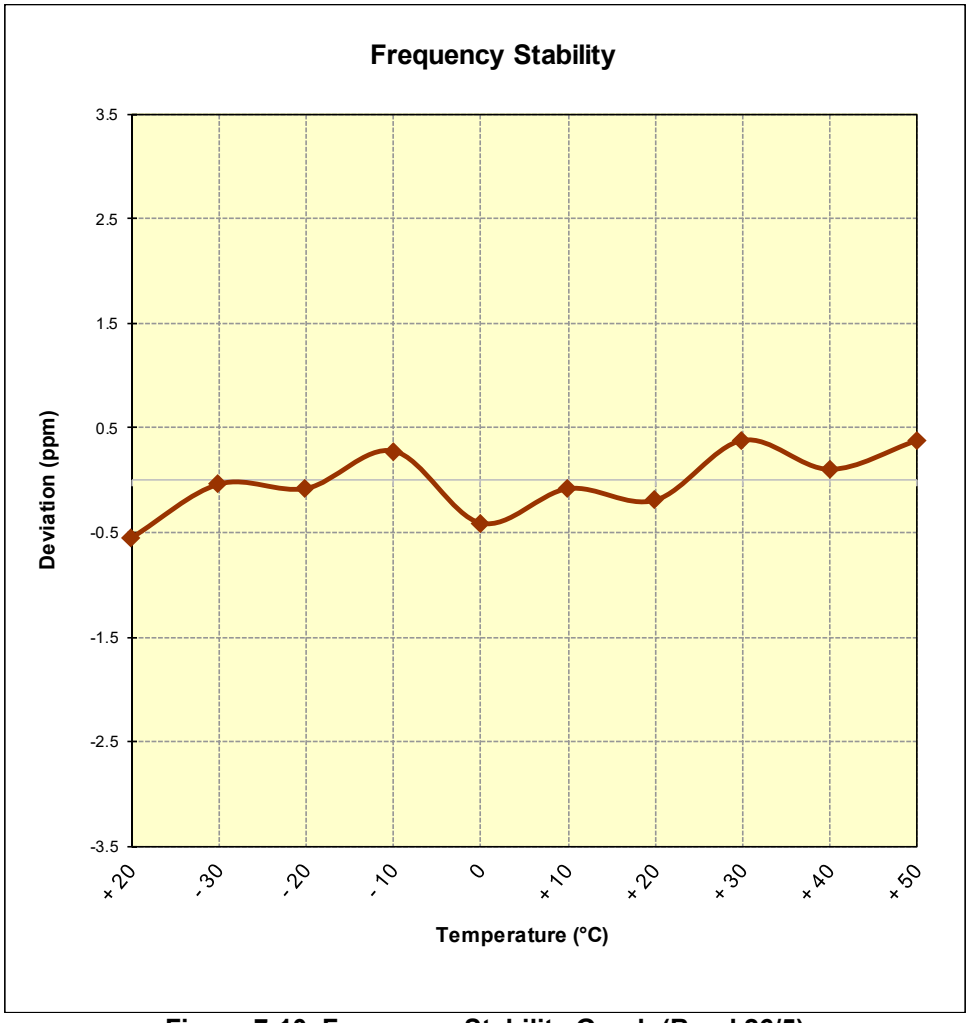

Figure 7-10. Frequency Stability Graph (Band 26/5)

Band 4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	1,732,499,763	-237	-0.0000137
100 %		- 30	1,732,499,953	-47	-0.0000027
100 %		- 20	1,732,500,179	179	0.0000103
100 %		- 10	1,732,499,885	-115	-0.0000066
100 %		0	1,732,500,129	129	0.0000074
100 %		+ 10	1,732,499,709	-291	-0.0000168
100 %		+ 20	1,732,499,837	-163	-0.0000094
100 %		+ 30	1,732,499,935	-65	-0.0000038
100 %		+ 40	1,732,499,935	-65	-0.0000038
100 %		+ 50	1,732,500,147	147	0.0000085
BATT. ENDPOINT	3.70	+ 20	1,732,500,063	63	0.0000036

Table 7-28. 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

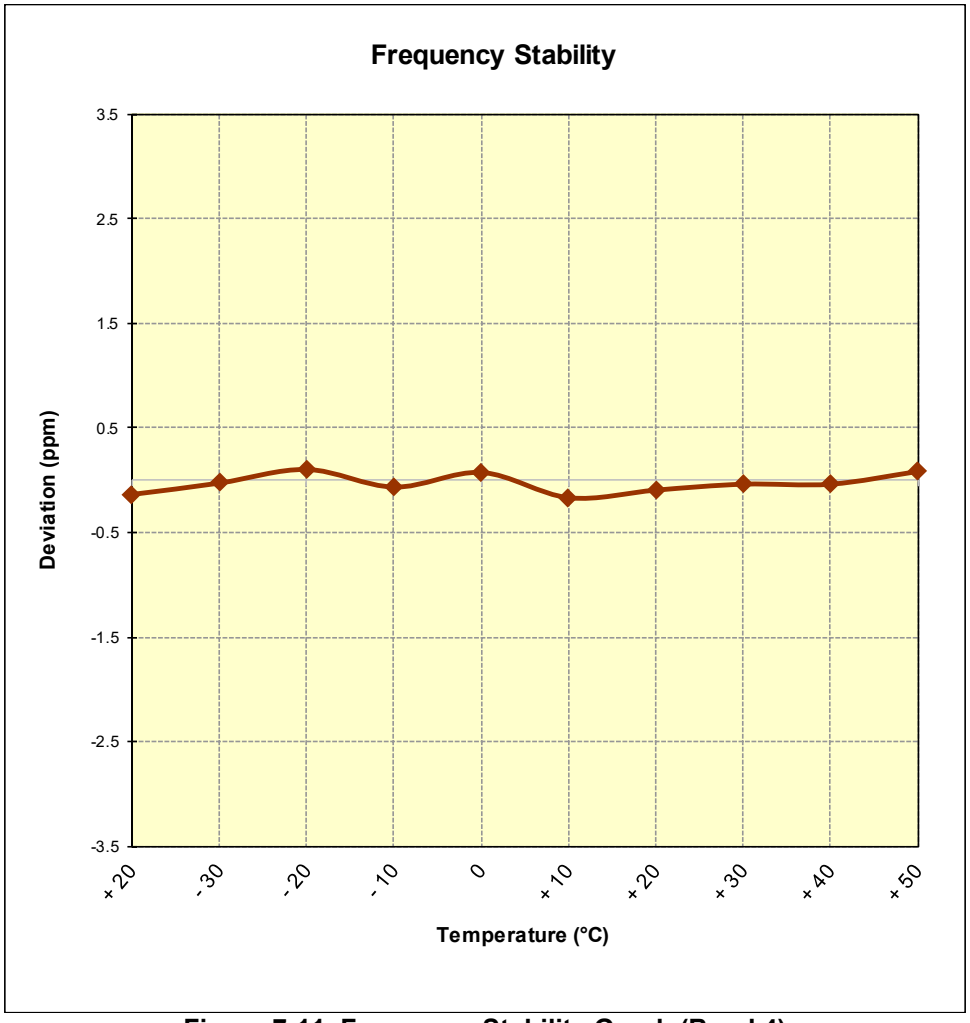

Figure 7-11. Frequency Stability Graph (Band 4)

Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	4.30	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	1,882,499,959	-41	-0.0000022
100 %		- 30	1,882,499,935	-65	-0.0000035
100 %		- 20	1,882,500,014	14	0.0000007
100 %		- 10	1,882,500,114	114	0.0000061
100 %		0	1,882,500,140	140	0.0000074
100 %		+ 10	1,882,500,122	122	0.0000065
100 %		+ 20	1,882,500,070	70	0.0000037
100 %		+ 30	1,882,499,984	-16	-0.0000008
100 %		+ 40	1,882,499,668	-332	-0.0000176
100 %		+ 50	1,882,499,820	-180	-0.0000096
BATT. ENDPOINT	3.70	+ 20	1,882,500,195	195	0.0000104

Table 7-29. Frequency Stability Data (Band 25/2)

Band 25/2 Frequency Stability Measurements

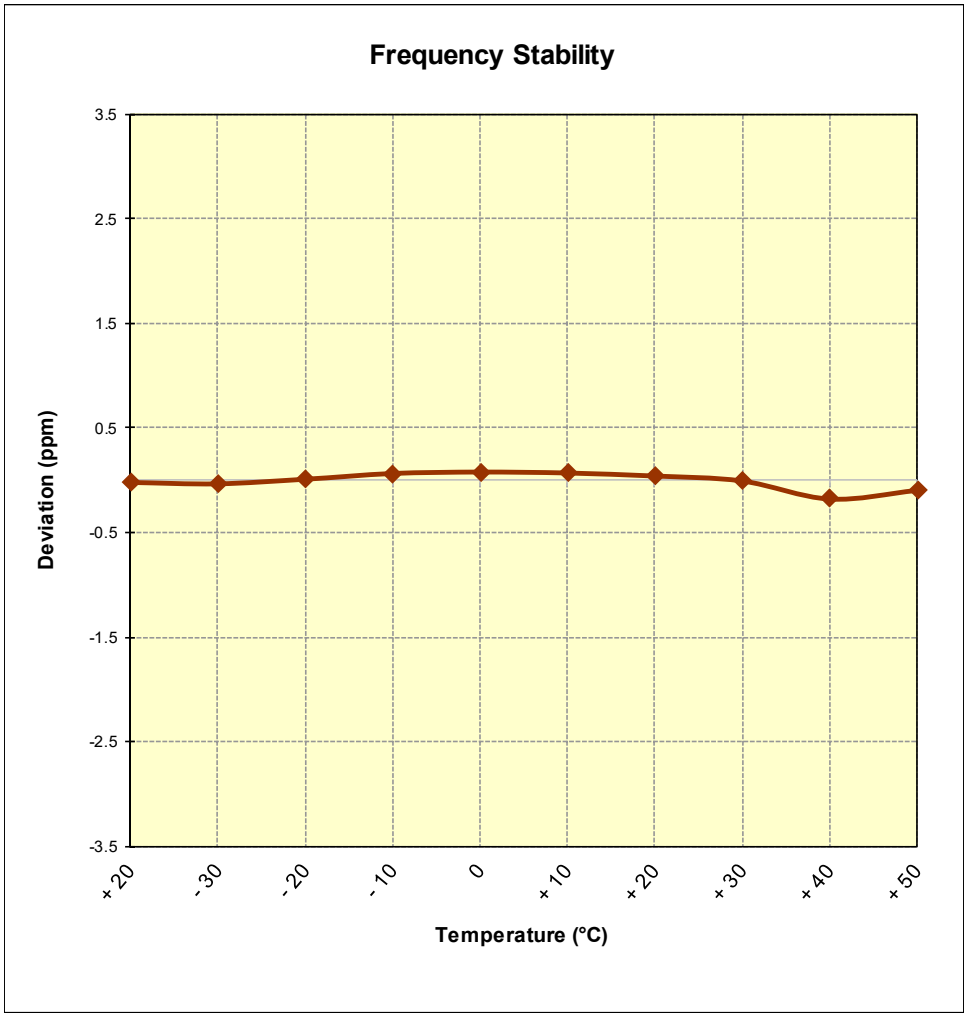

Figure 7-12. Frequency Stability Graph (Band 25/2)

Band 41 Frequency Stability Measurements

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	2,592,999,797	-203	-0.0000078
100 %		- 30	2,593,000,142	142	0.0000055
100 %		- 20	2,593,000,101	101	0.0000039
100 %		- 10	2,593,000,067	67	0.0000026
100 %		0	2,592,999,880	-120	-0.0000046
100 %		+ 10	2,593,000,338	338	0.0000130
100 %		+ 20	2,593,000,227	227	0.0000088
100 %		+ 30	2,592,999,855	-145	-0.0000056
100 %		+ 40	2,593,000,086	86	0.0000033
100 %		+ 50	2,592,999,994	-6	-0.0000002
BATT. ENDPOINT	3.70	+ 20	2,593,000,251	251	0.0000097

Table 7-30. 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

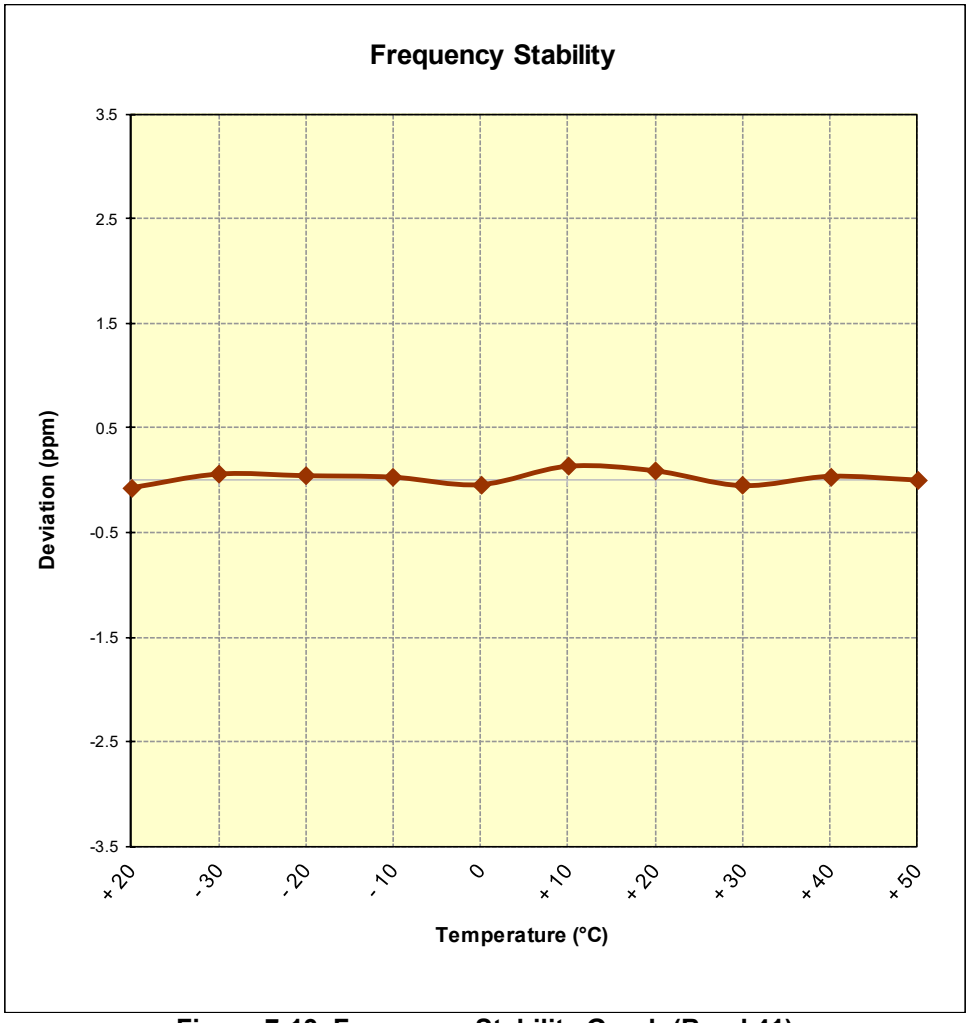

Figure 7-13. Frequency Stability Graph (Band 41)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMJ737P** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.