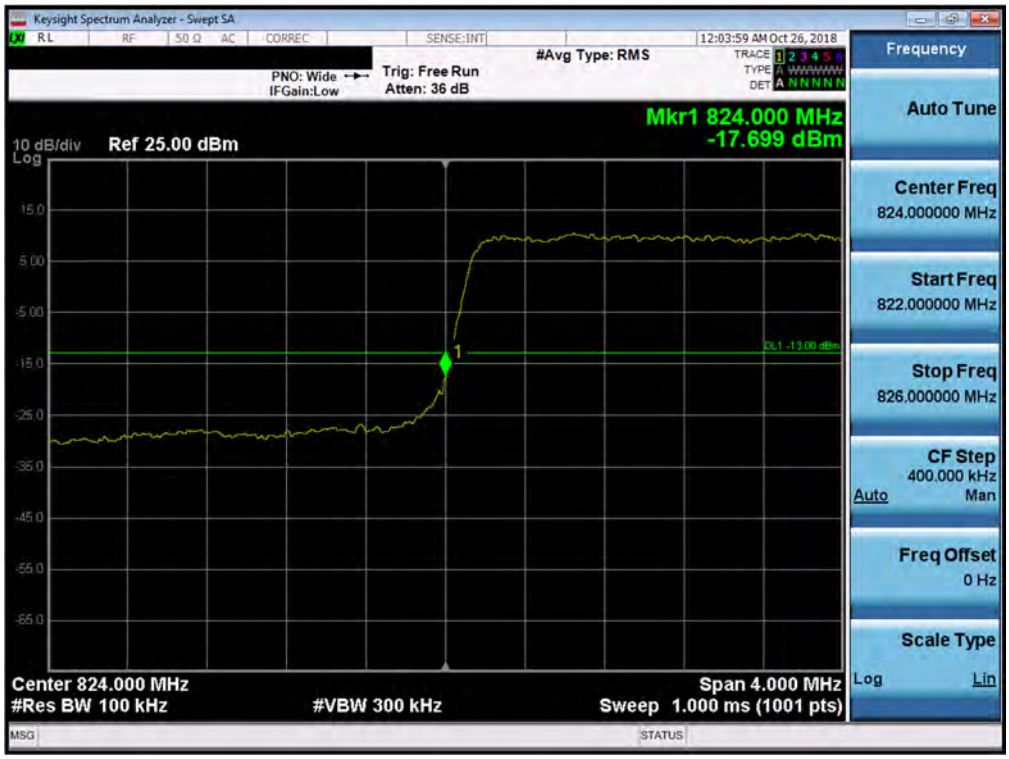
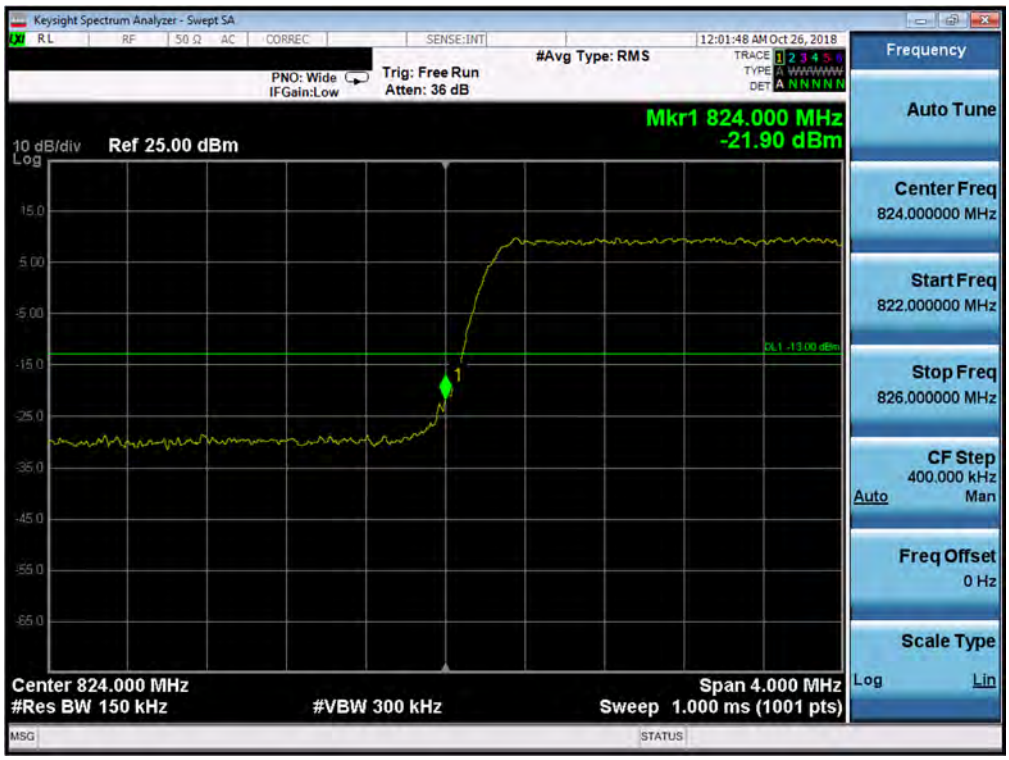


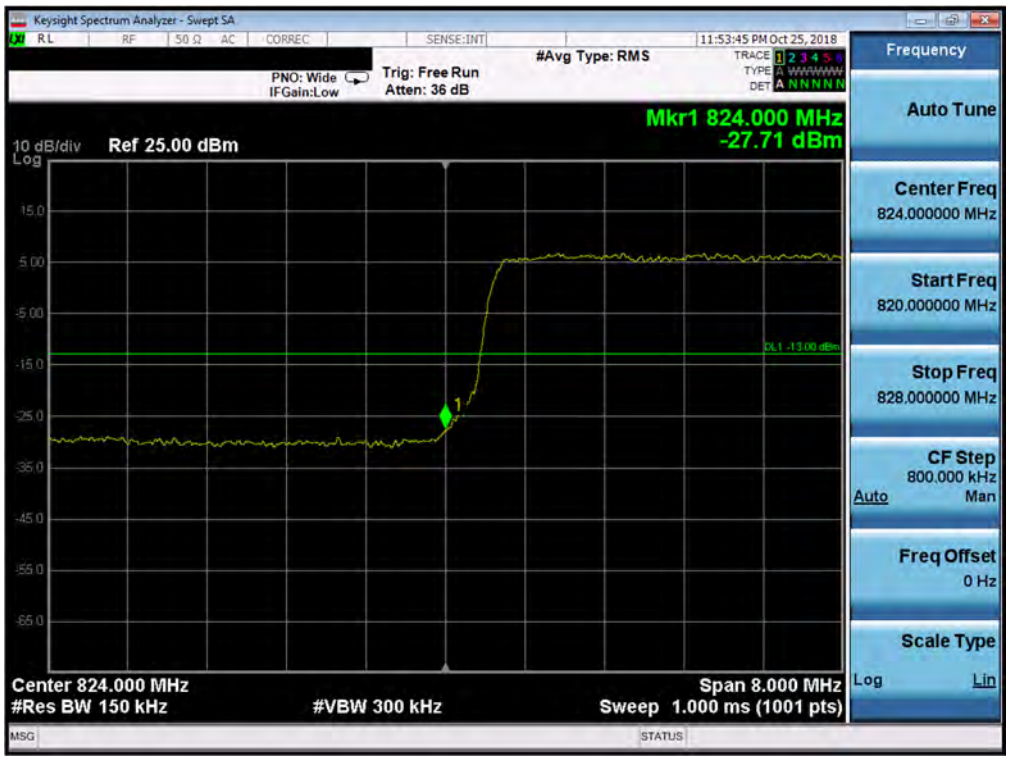
Plot 7-148. Lower Band Edge Plot (Band 26/5 - 3.0MHz QPSK - Full RB Configuration)

Plot 7-149. Upper Band Edge Plot (Band 26/5 - 3.0MHz QPSK - Full RB Configuration)

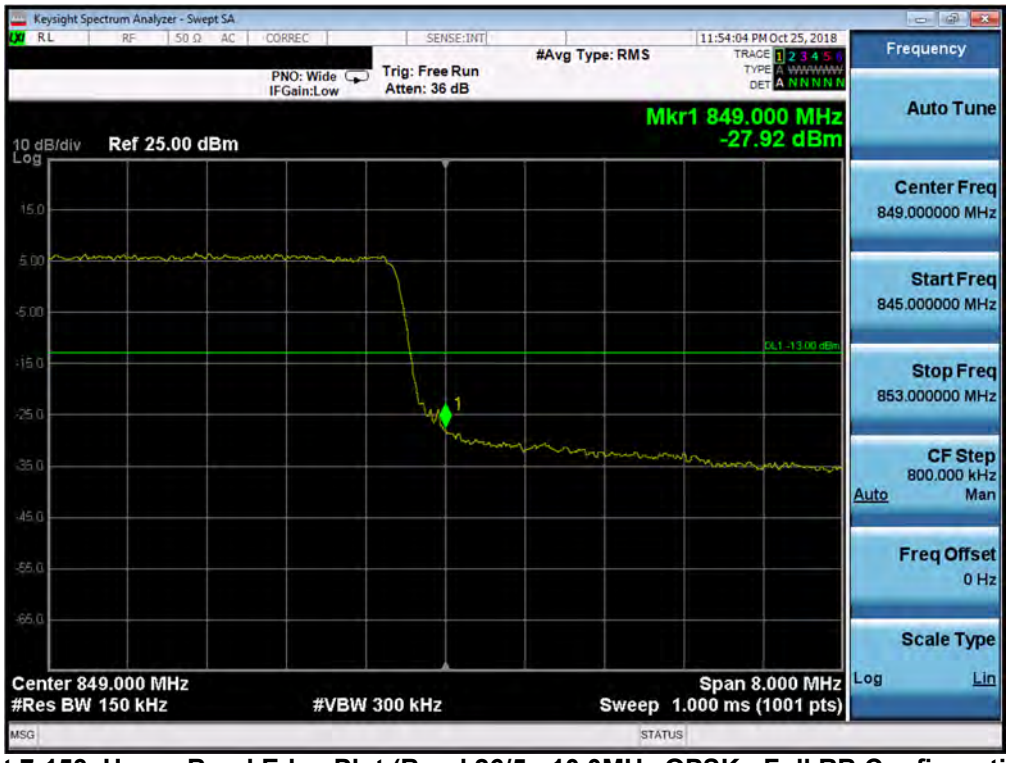


Plot 7-150. Lower Band Edge Plot (Band 26/5 - 5.0MHz QPSK - Full RB Configuration)

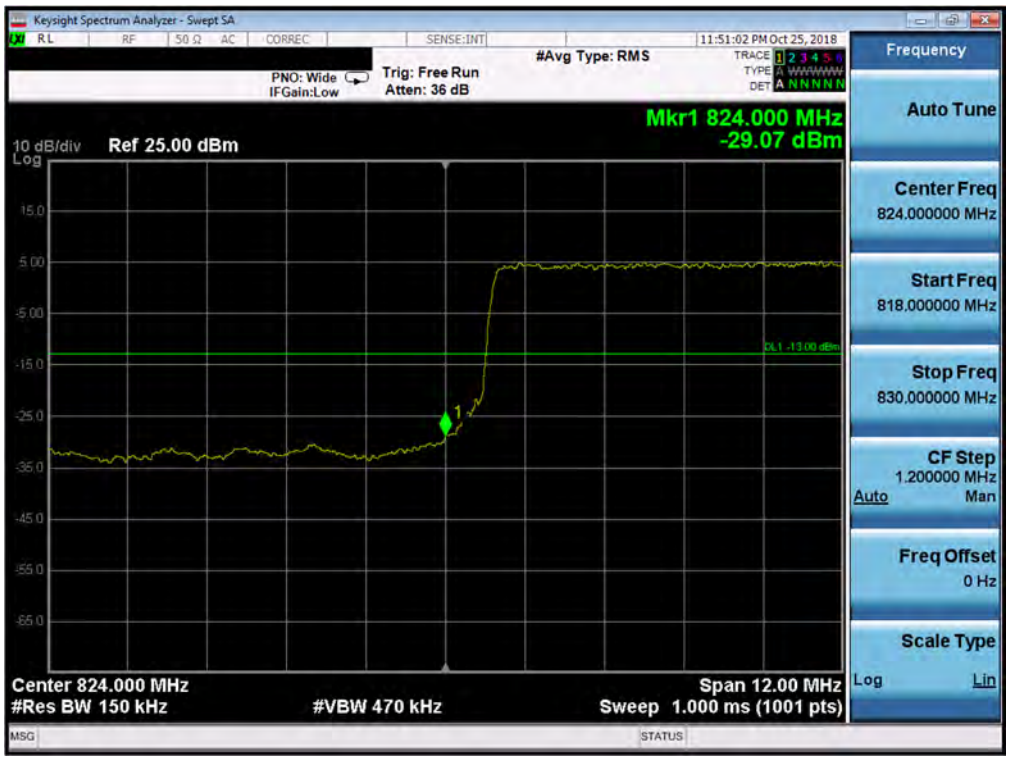
Plot 7-151. Upper Band Edge Plot (Band 26/5 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-152. Lower Band Edge Plot (Band 26/5 - 10.0MHz QPSK - Full RB Configuration)



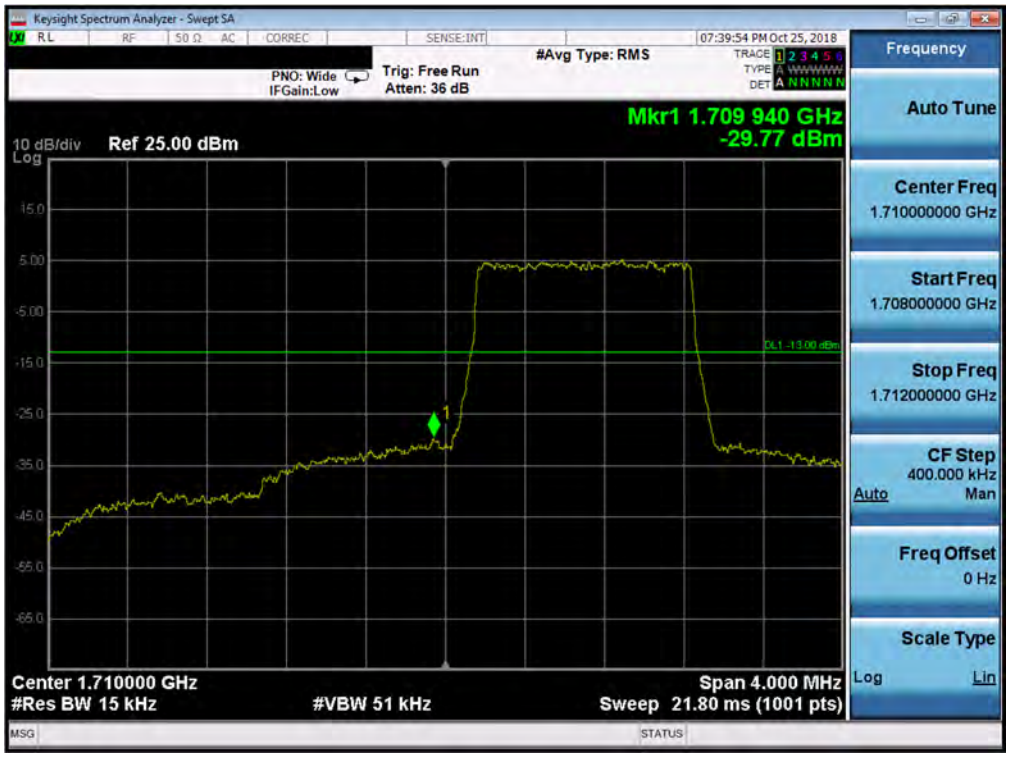
Plot 7-153. Upper Band Edge Plot (Band 26/5 - 10.0MHz QPSK - Full RB Configuration)



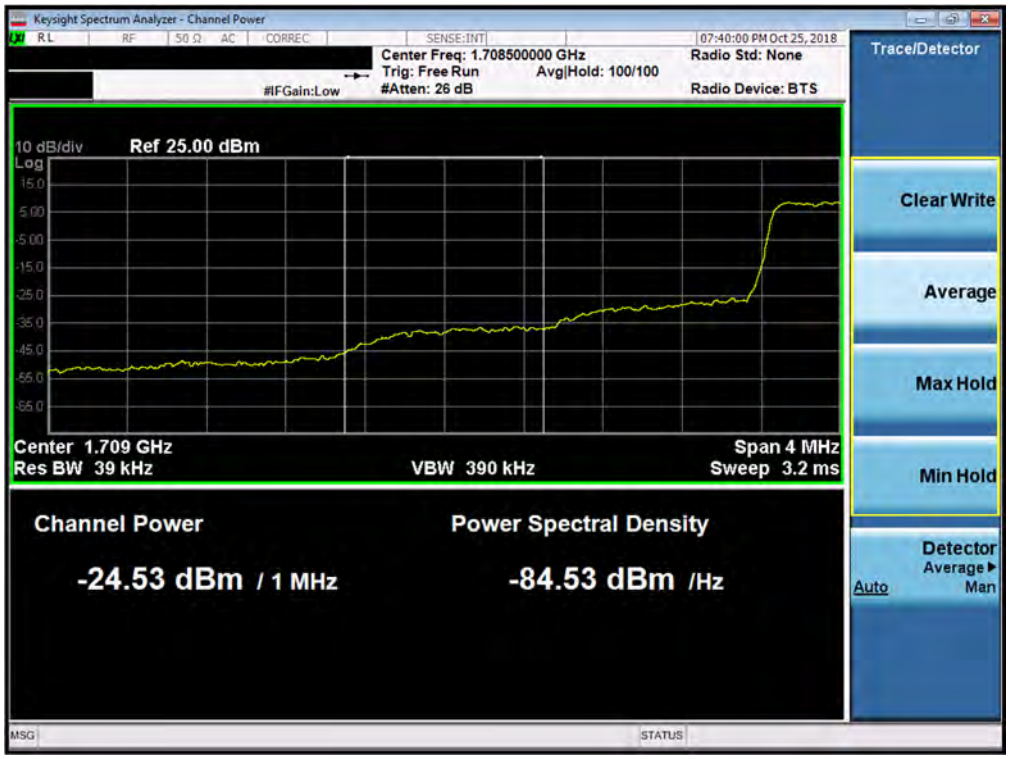
Plot 7-154. Lower Band Edge Plot (Band 26 - 15.0MHz QPSK - Full RB Configuration)

Plot 7-155. Upper Band Edge Plot (Band 26 - 15.0MHz QPSK - Full RB Configuration)

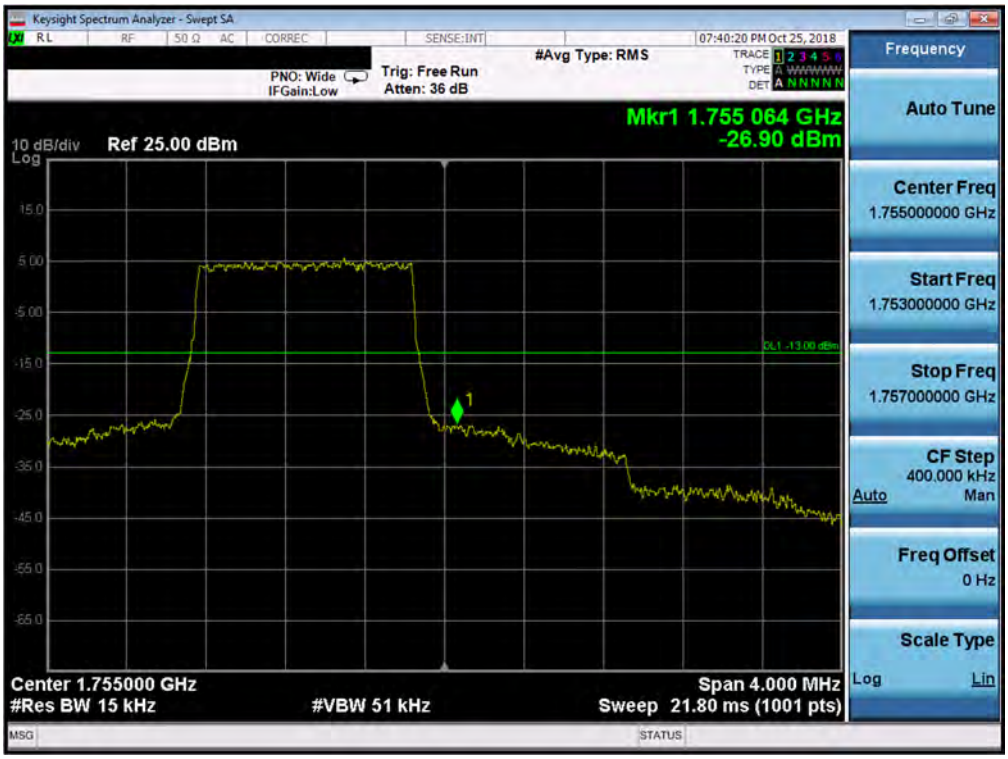
Band 4



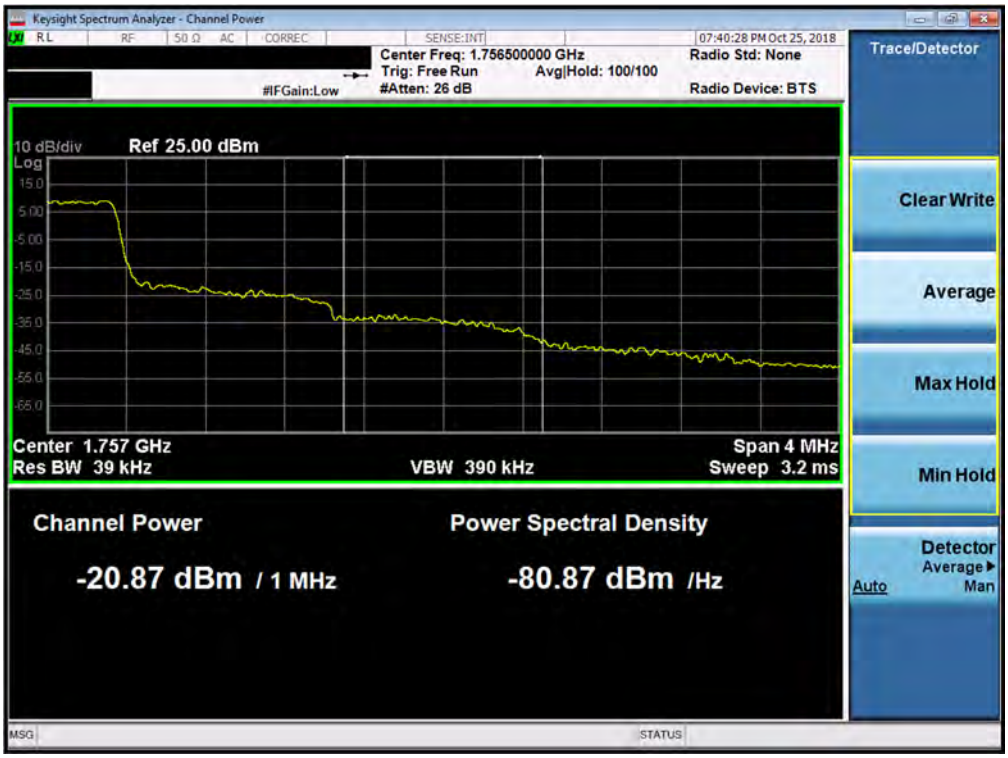
Plot 7-156. Lower Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



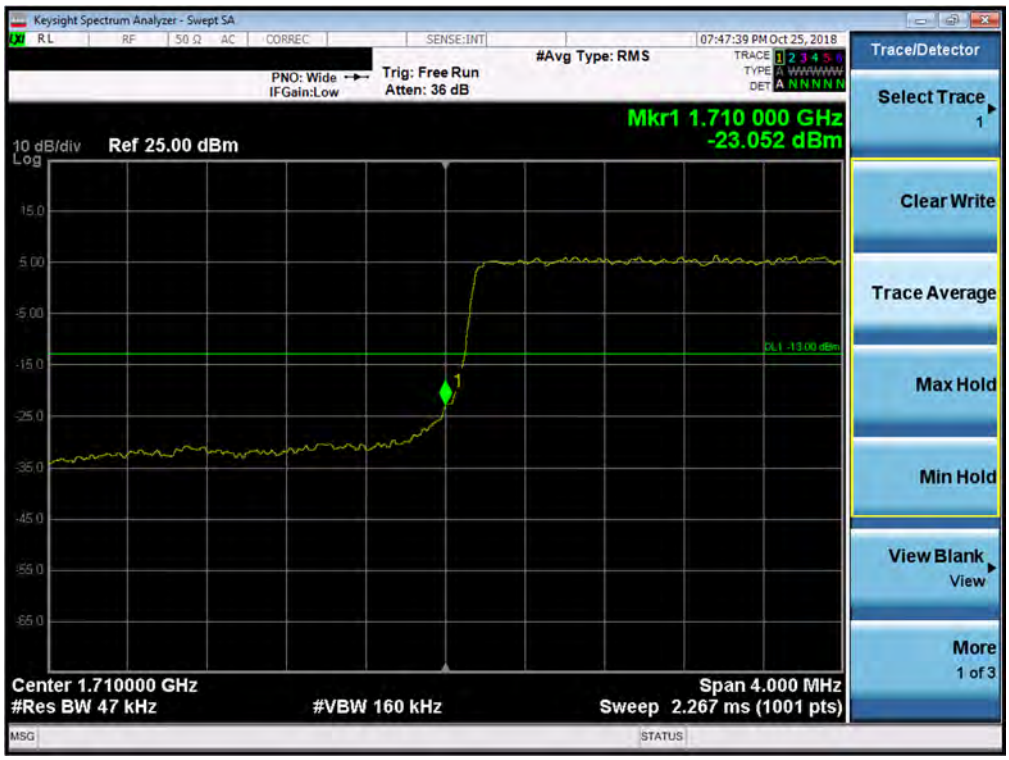
Plot 7-157. Lower Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



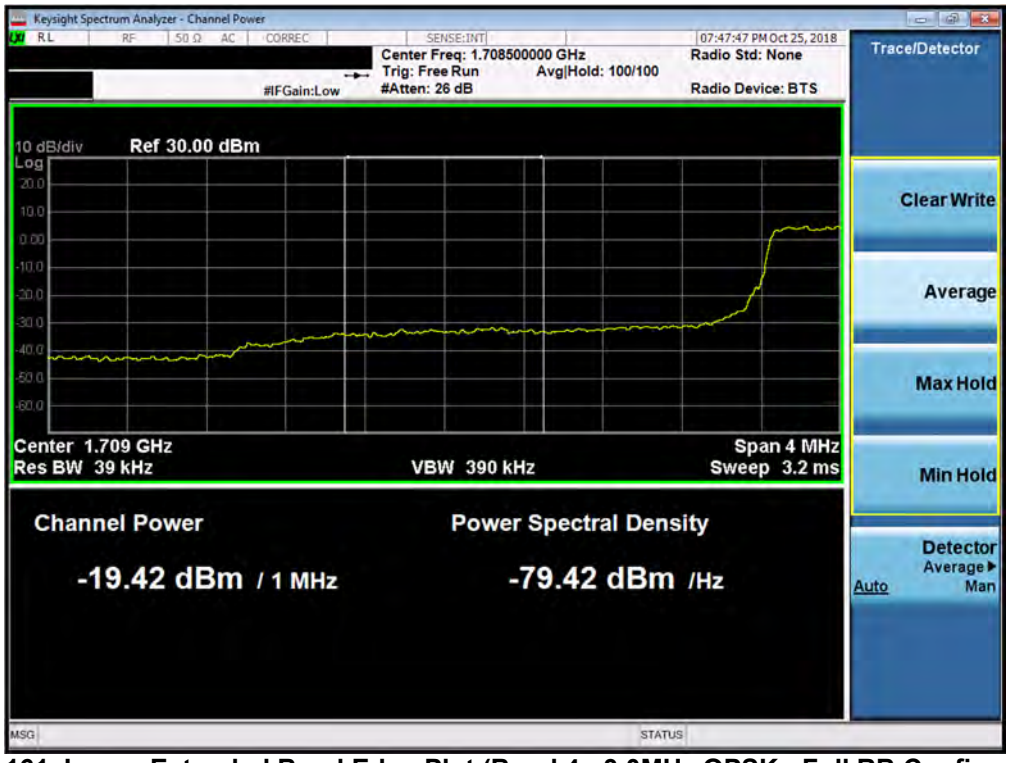
Plot 7-158. Upper Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



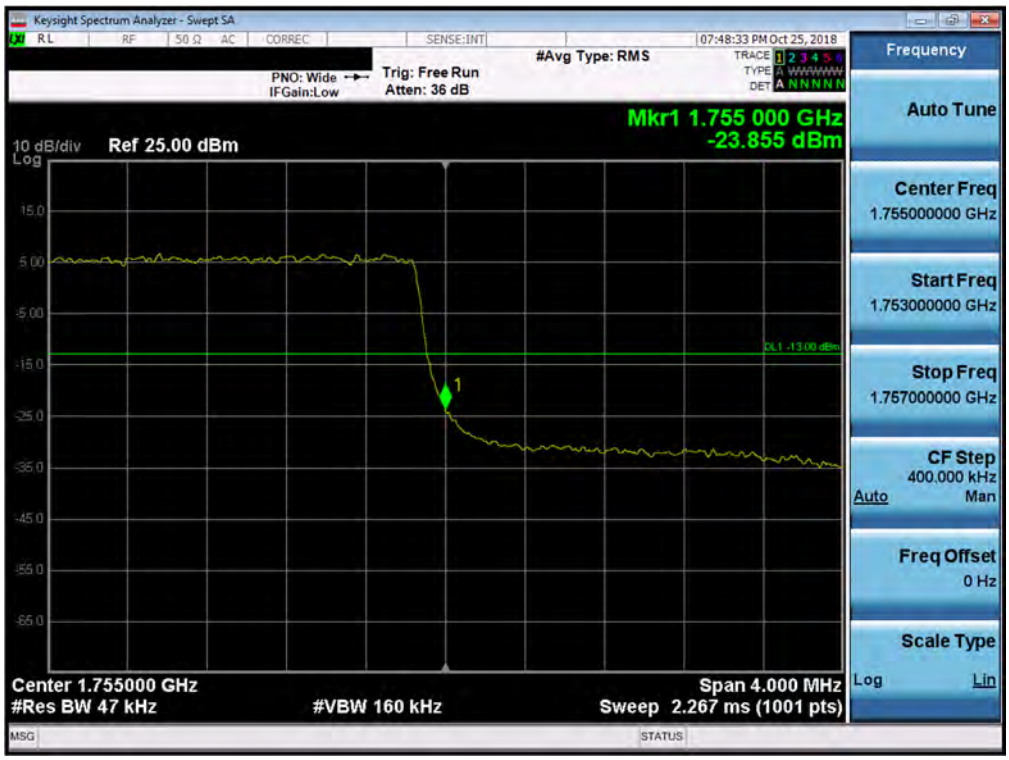
Plot 7-159. Upper Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



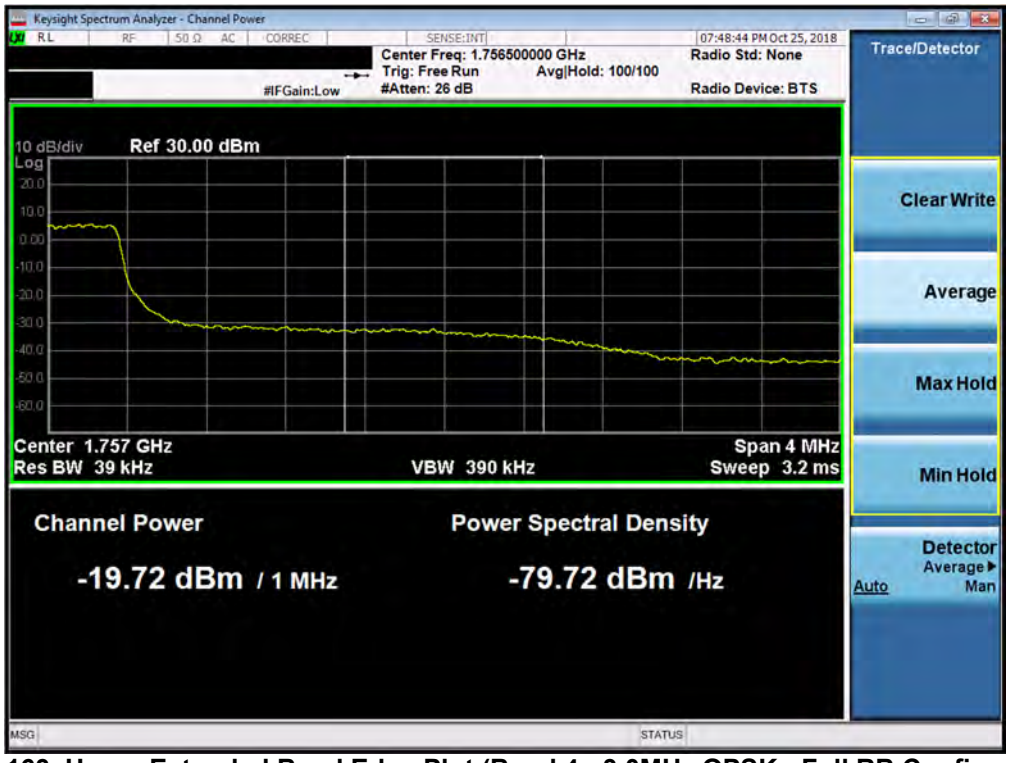
Plot 7-160. Lower Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



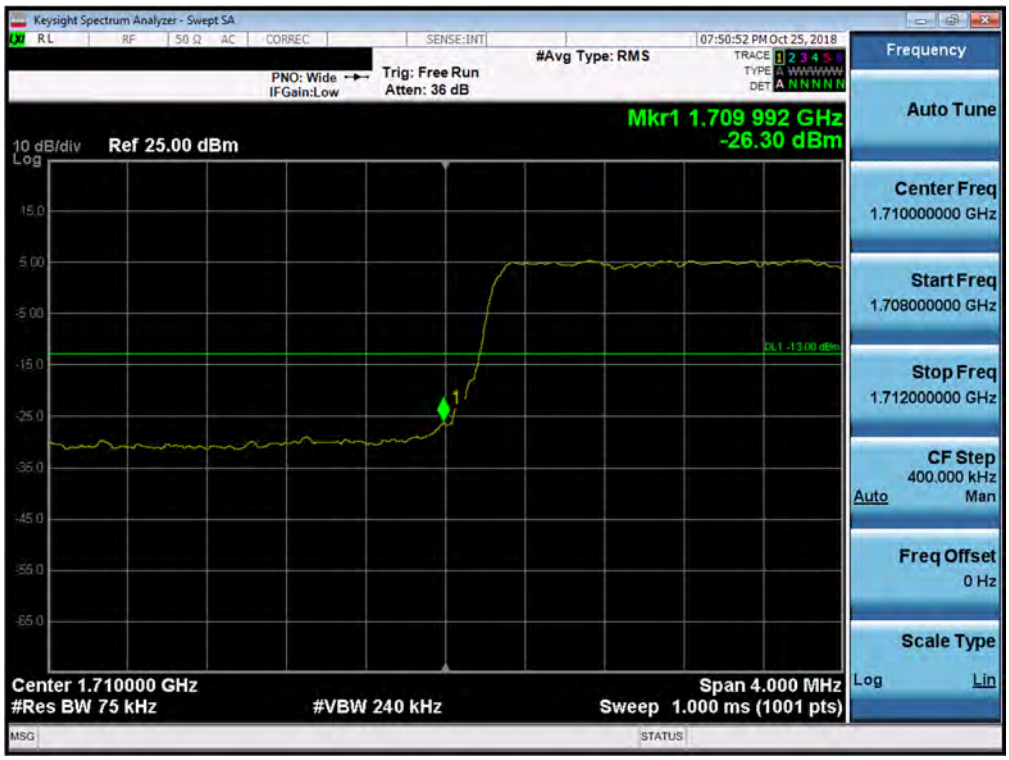
Plot 7-161. Lower Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



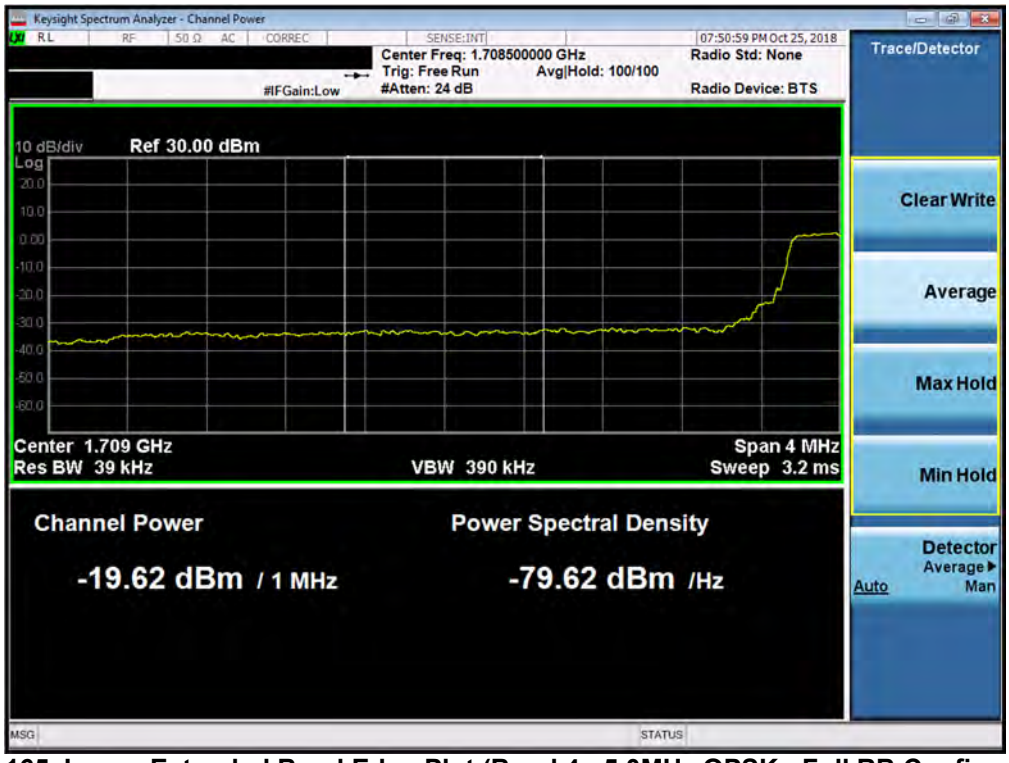
Plot 7-162. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-163. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

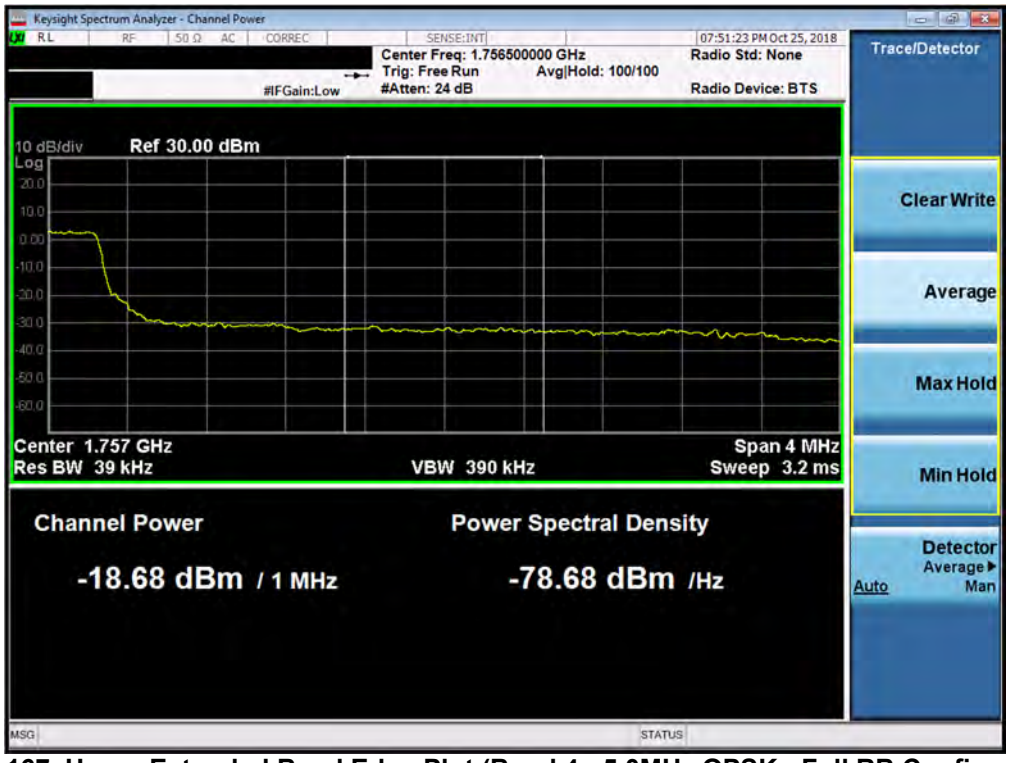


Plot 7-164. Lower Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

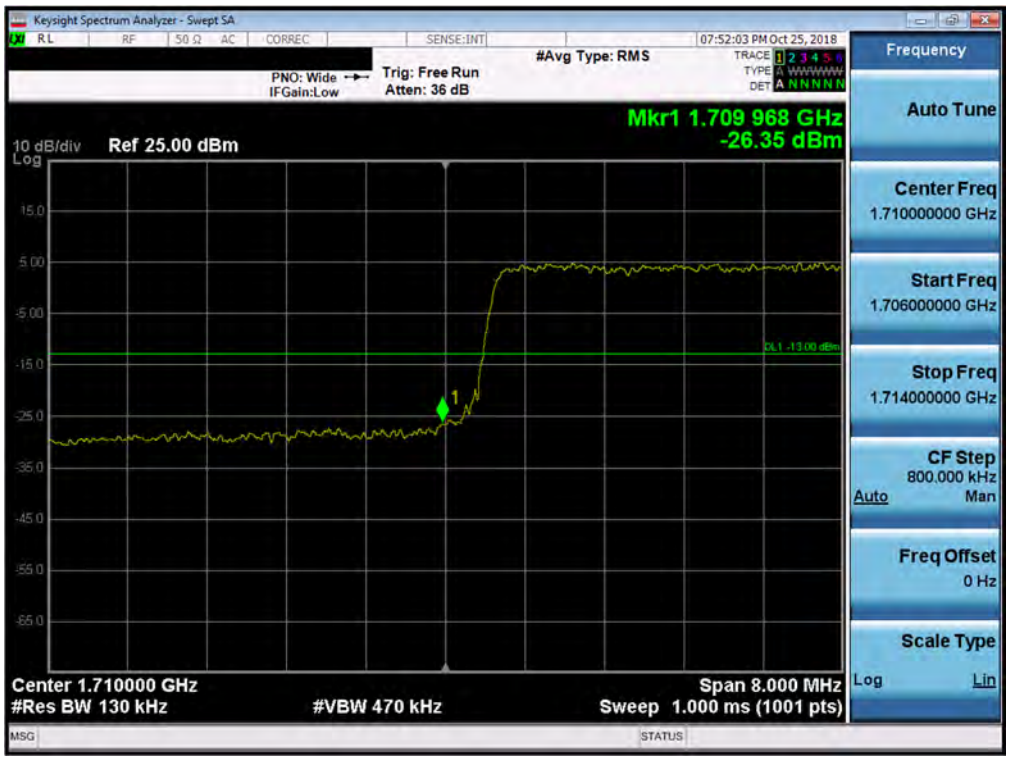


Plot 7-165. Lower Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

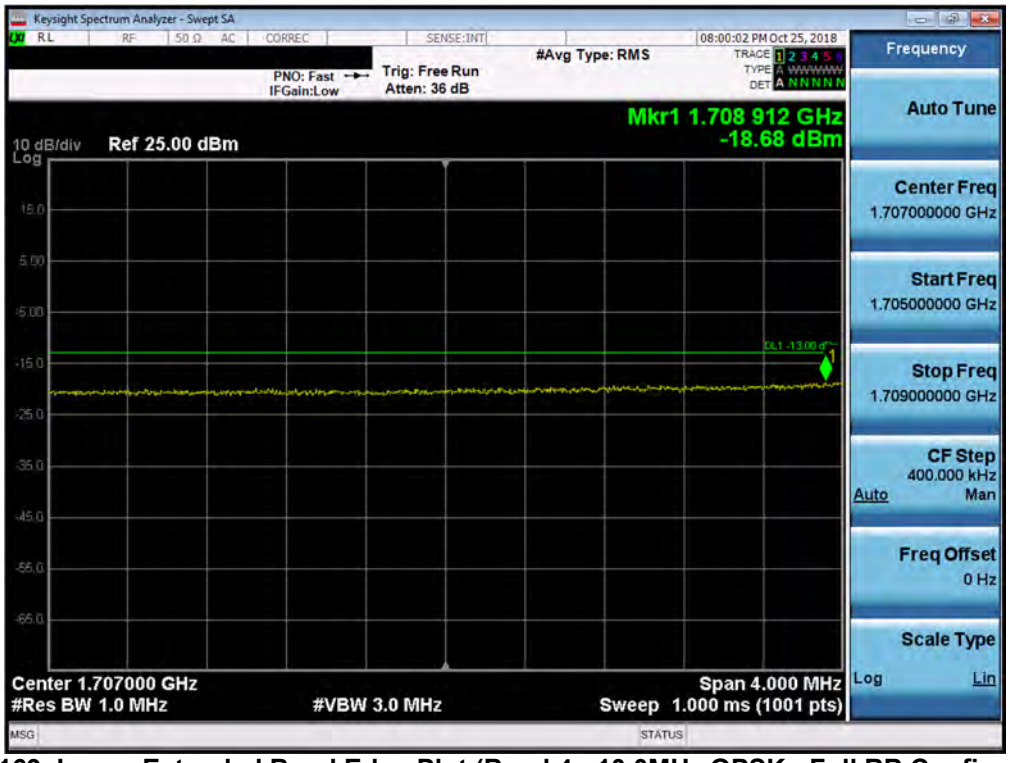
Plot 7-166. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-167. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

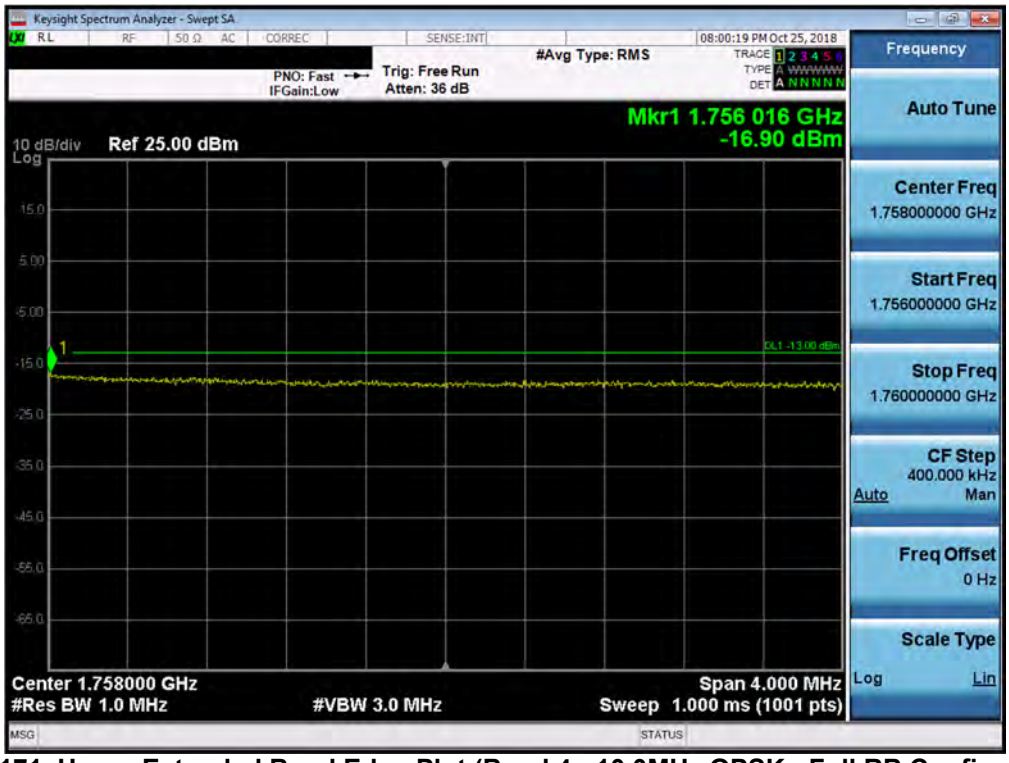


Plot 7-168. Lower Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

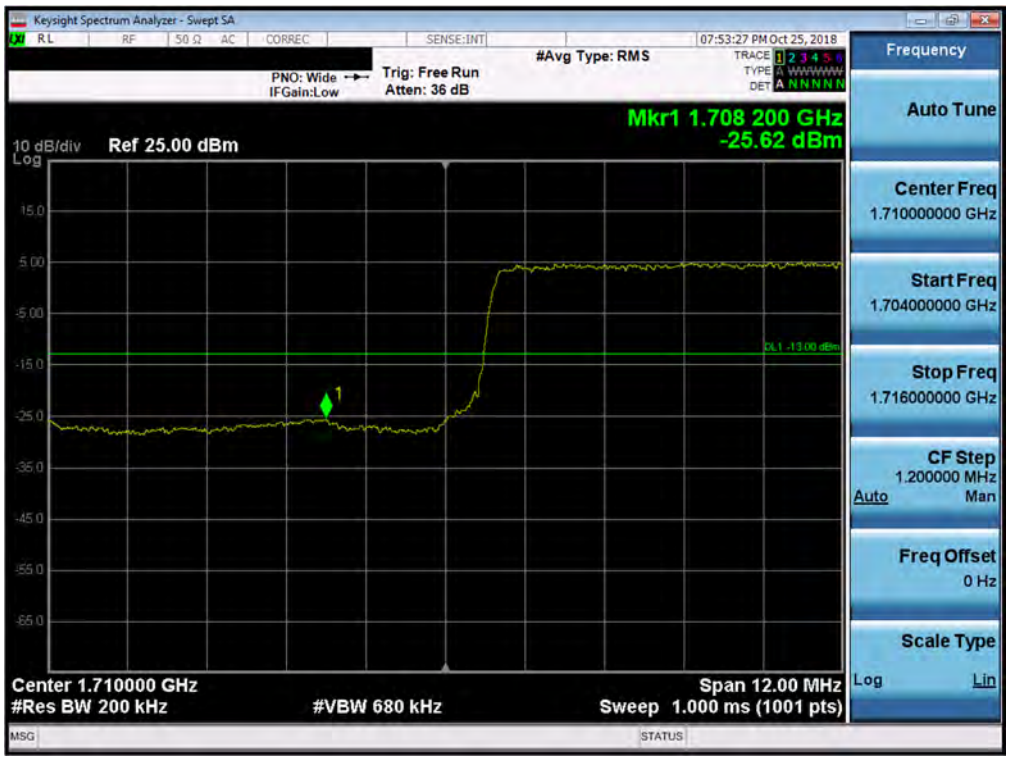


Plot 7-169. Lower Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

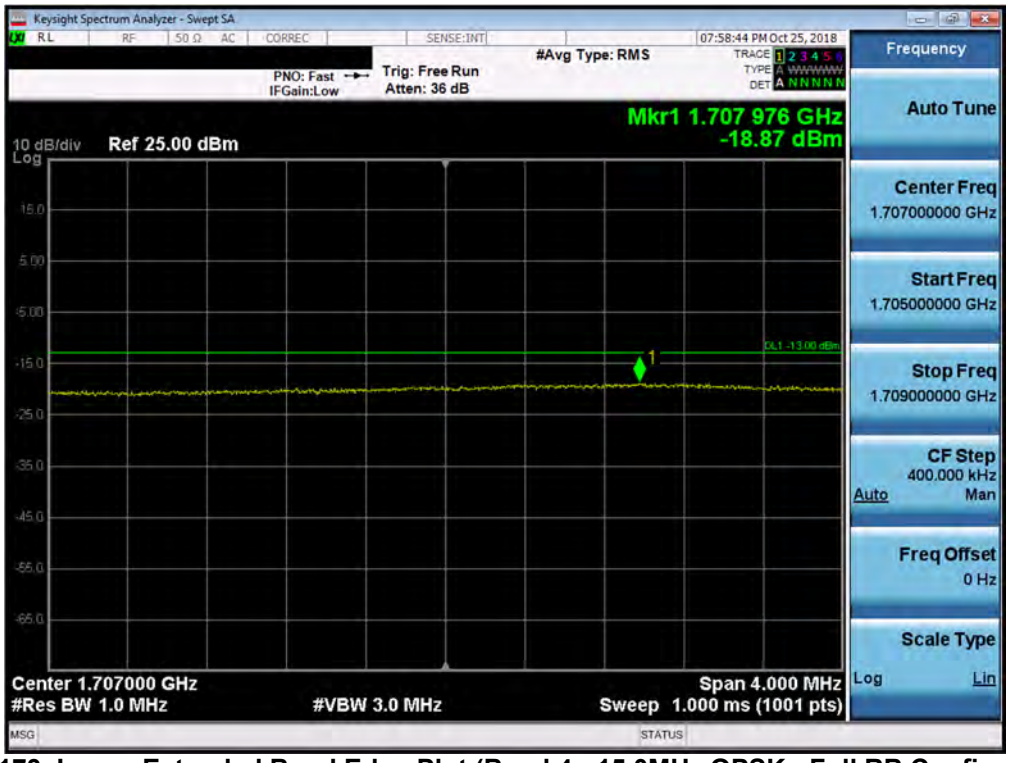
Plot 7-170. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-171. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

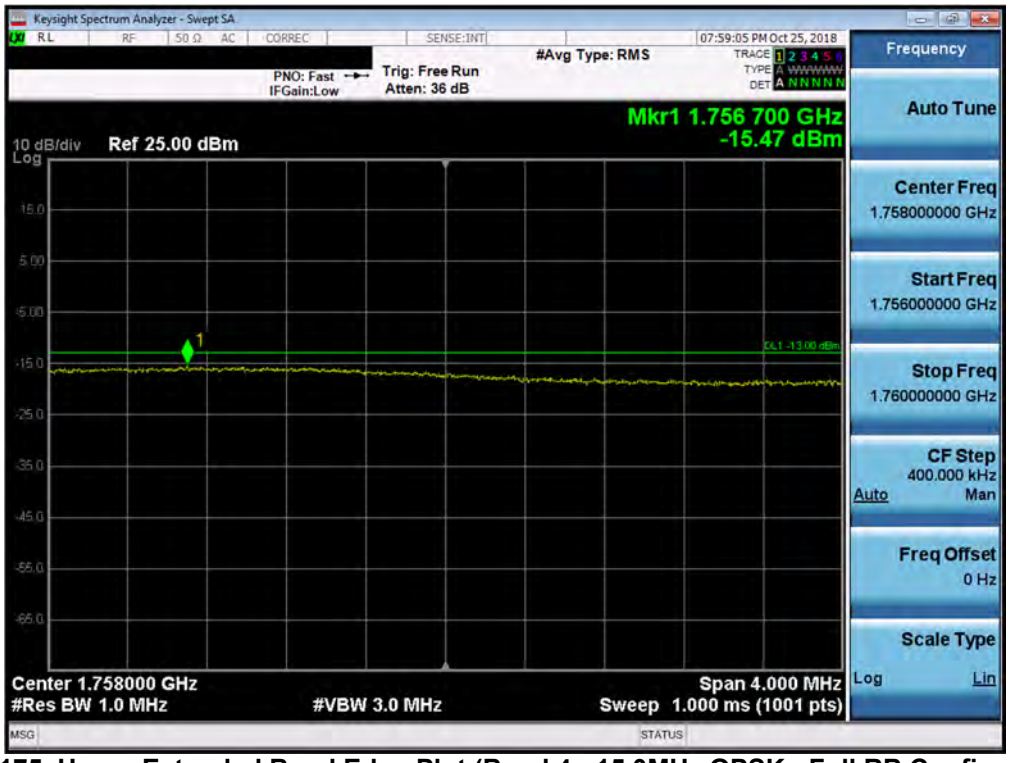


Plot 7-172. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

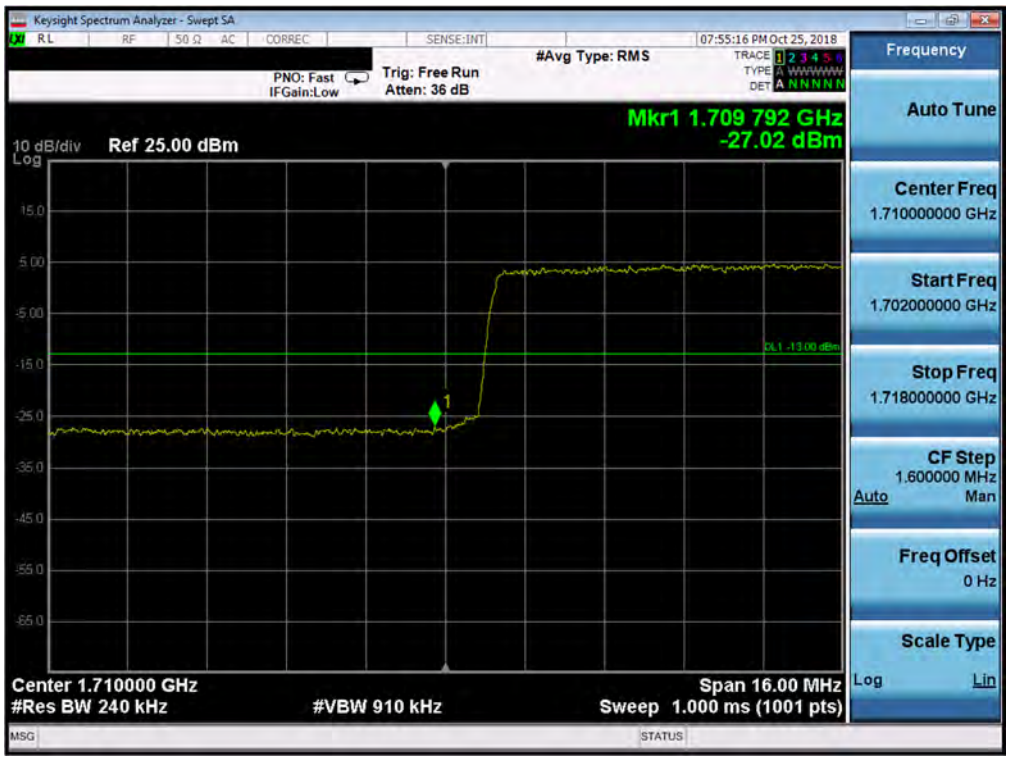


Plot 7-173. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

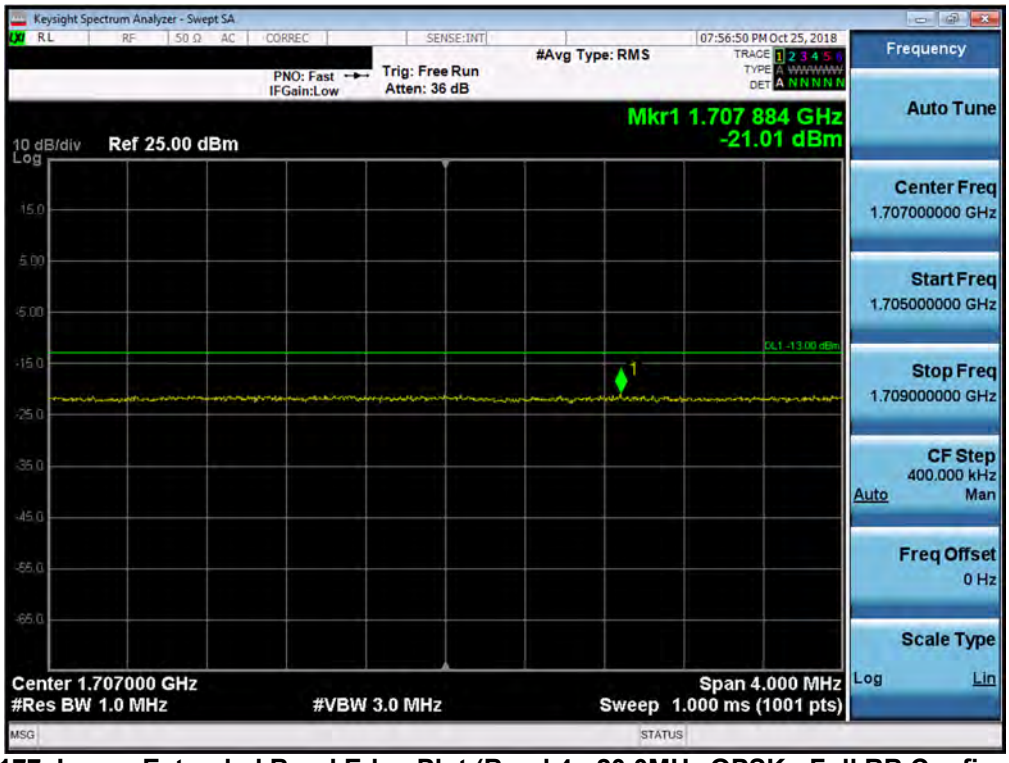
Plot 7-174. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



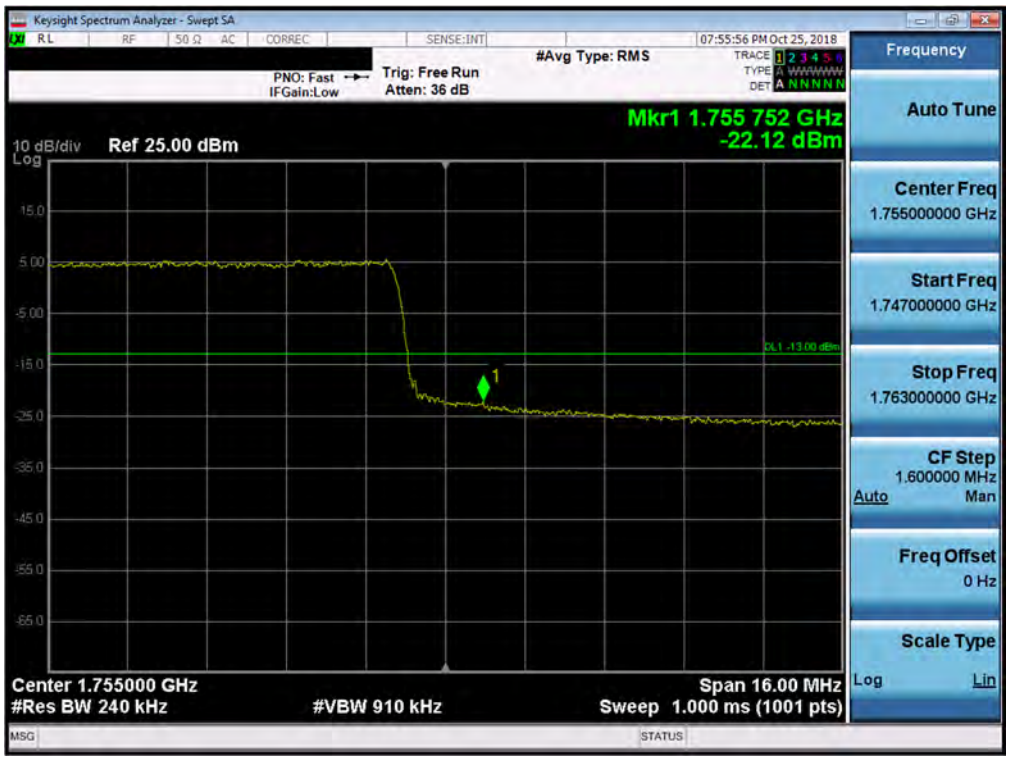
Plot 7-175. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-176. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

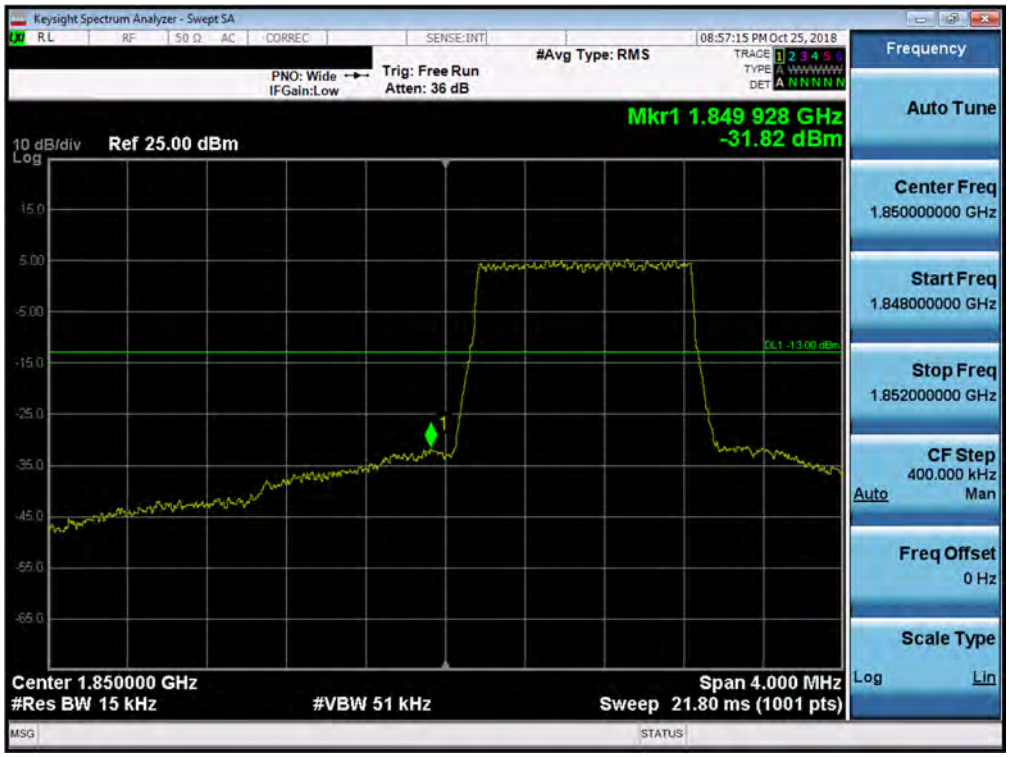


Plot 7-177. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

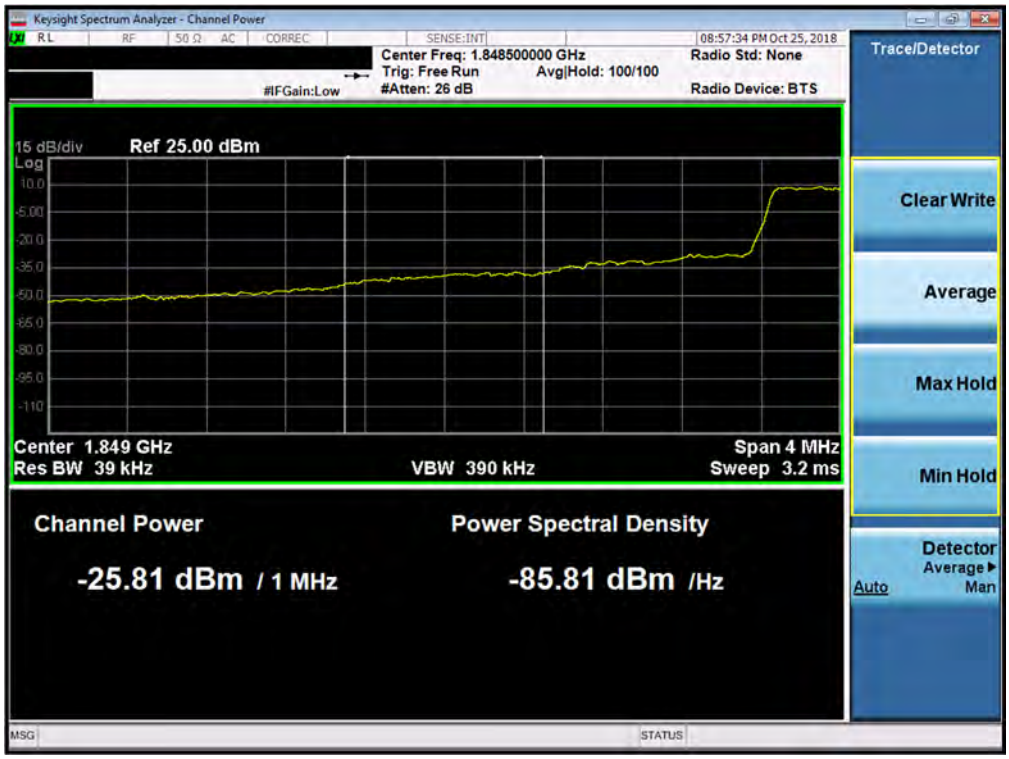


Plot 7-178. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

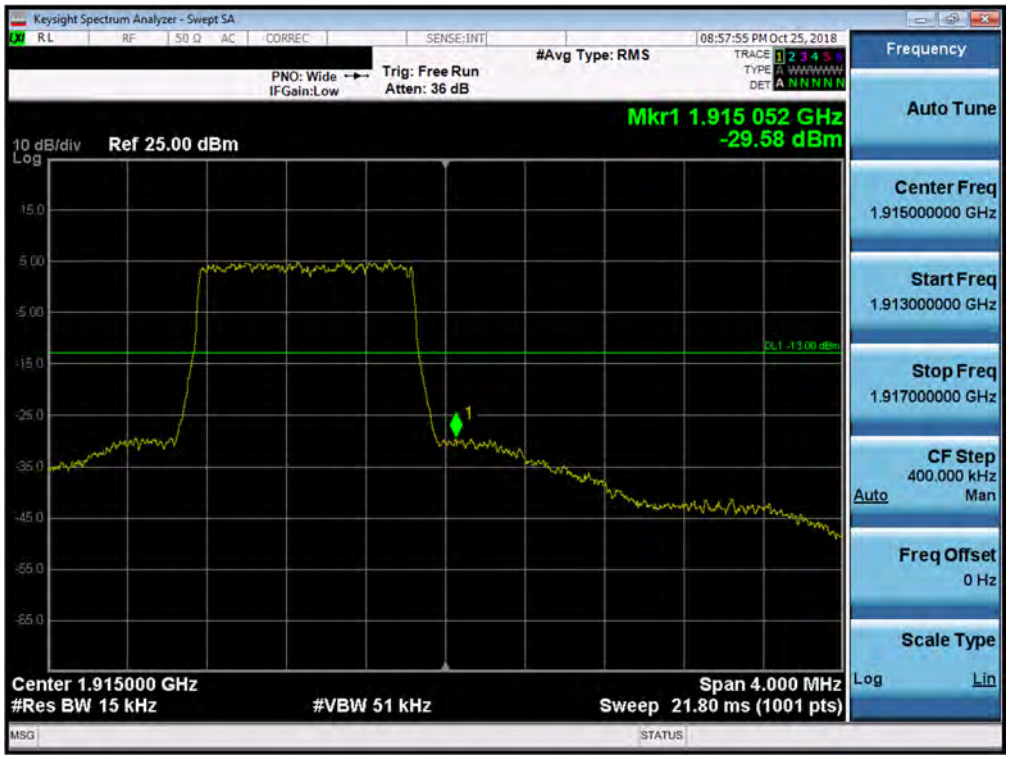
Plot 7-179. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



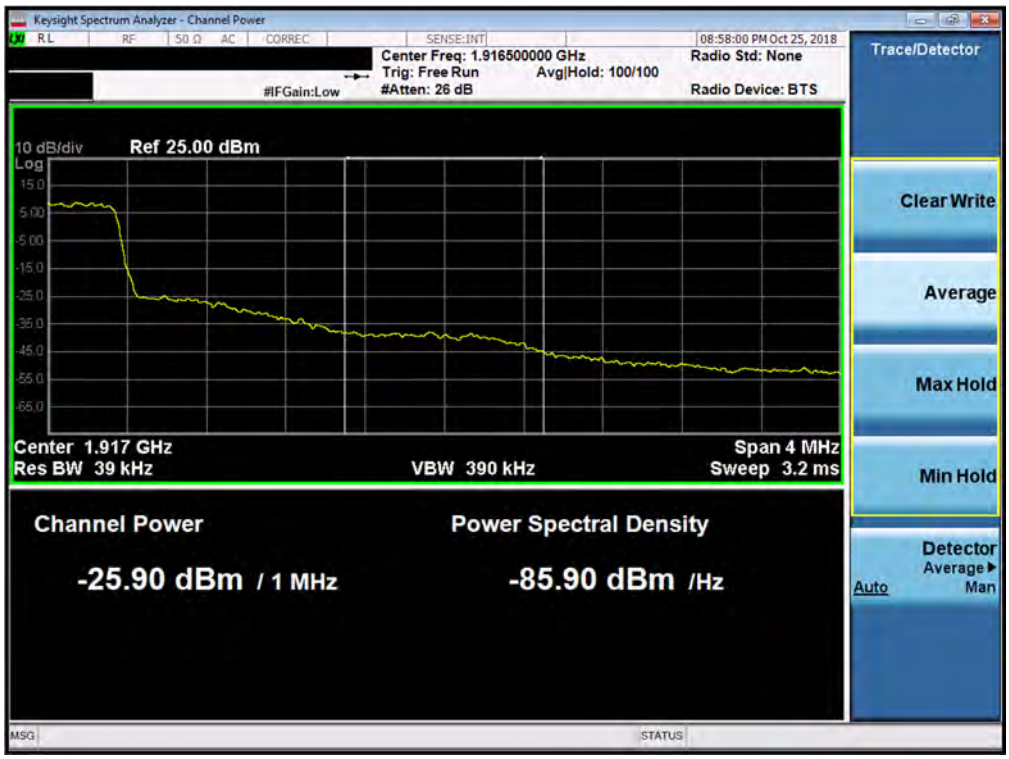
Plot 7-180. Lower Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



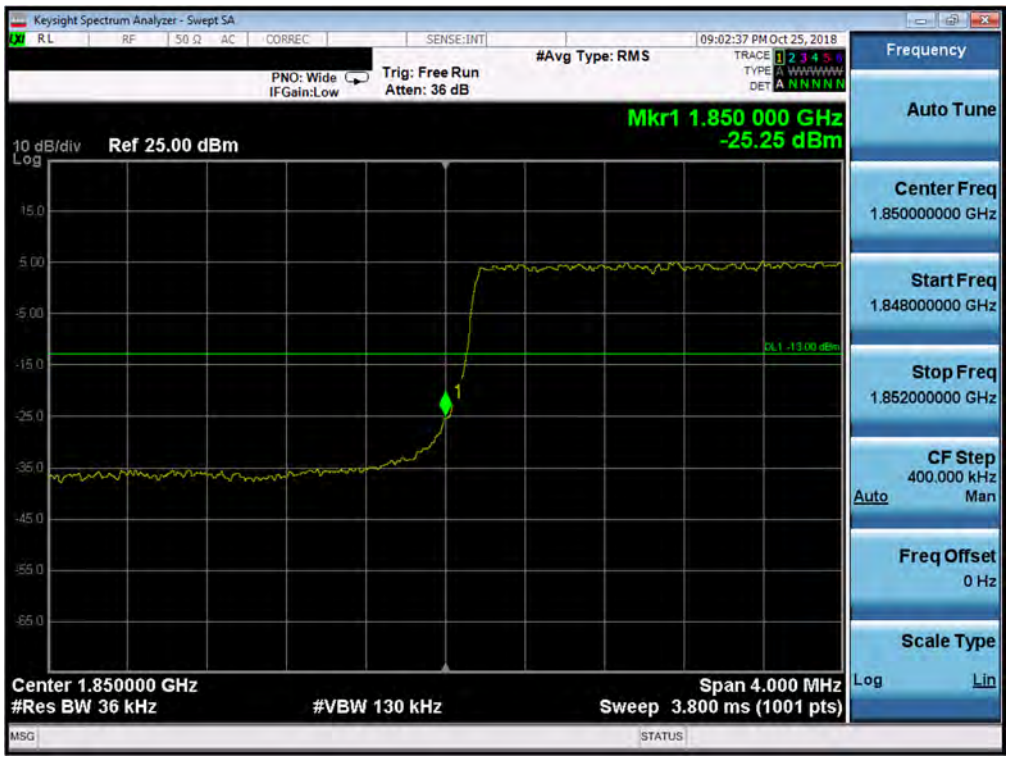
Plot 7-181. Lower Extended Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



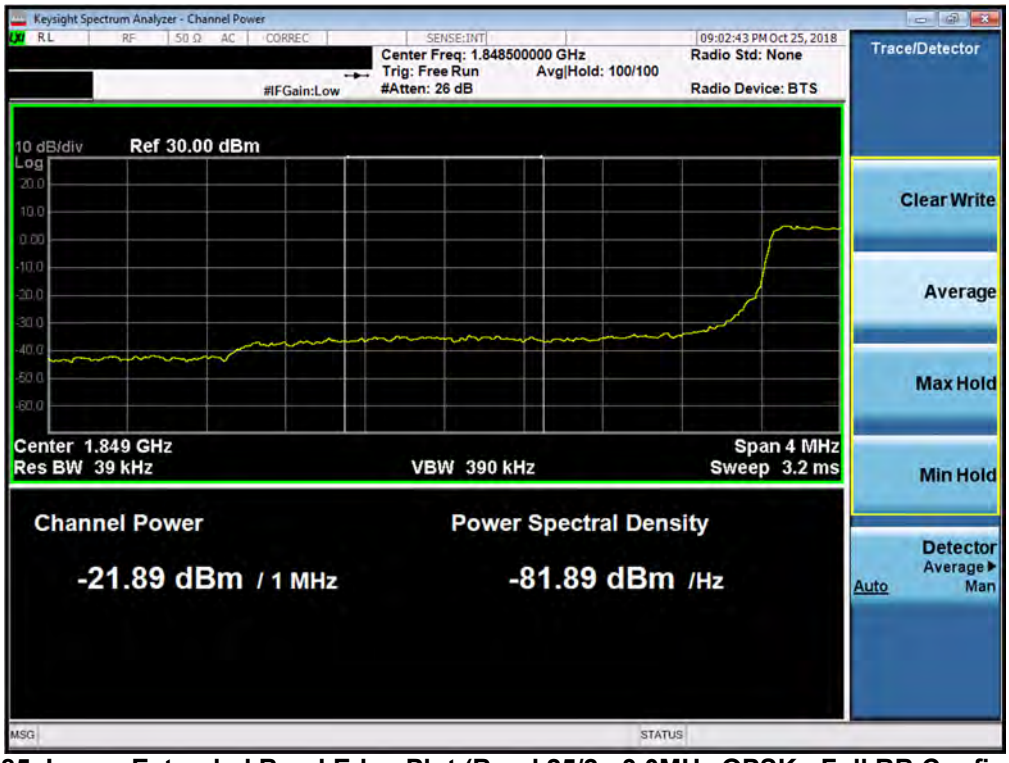
Plot 7-182. Upper Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-183. Upper Extended Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)

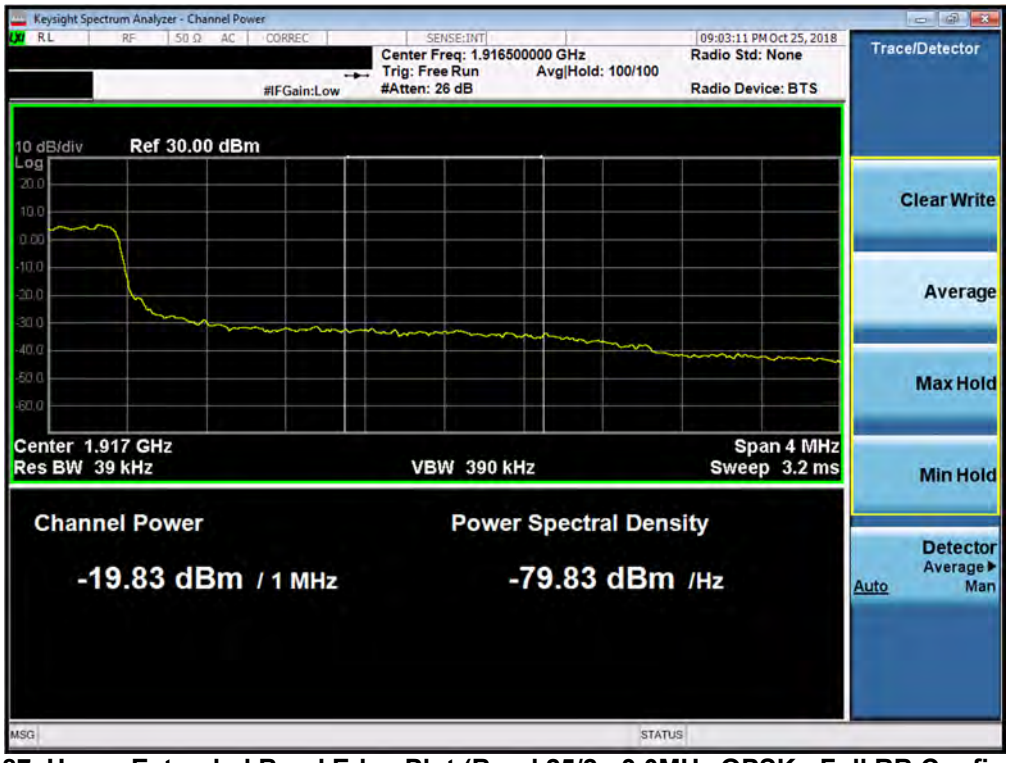


Plot 7-184. Lower Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)

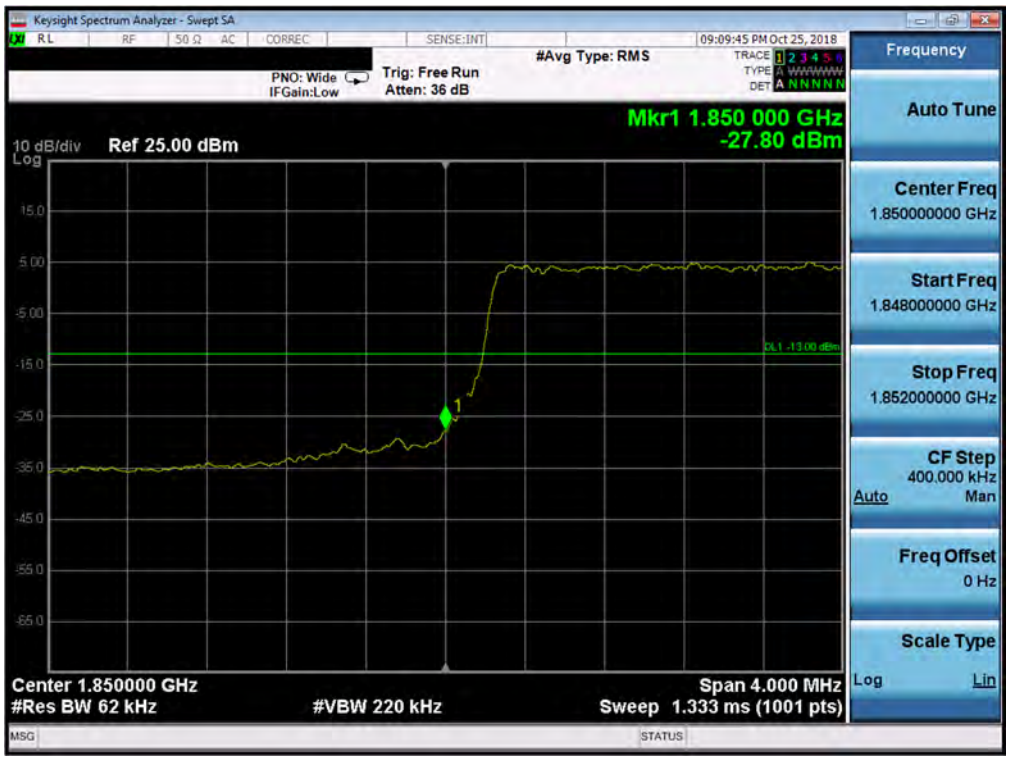


Plot 7-185. Lower Extended Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)

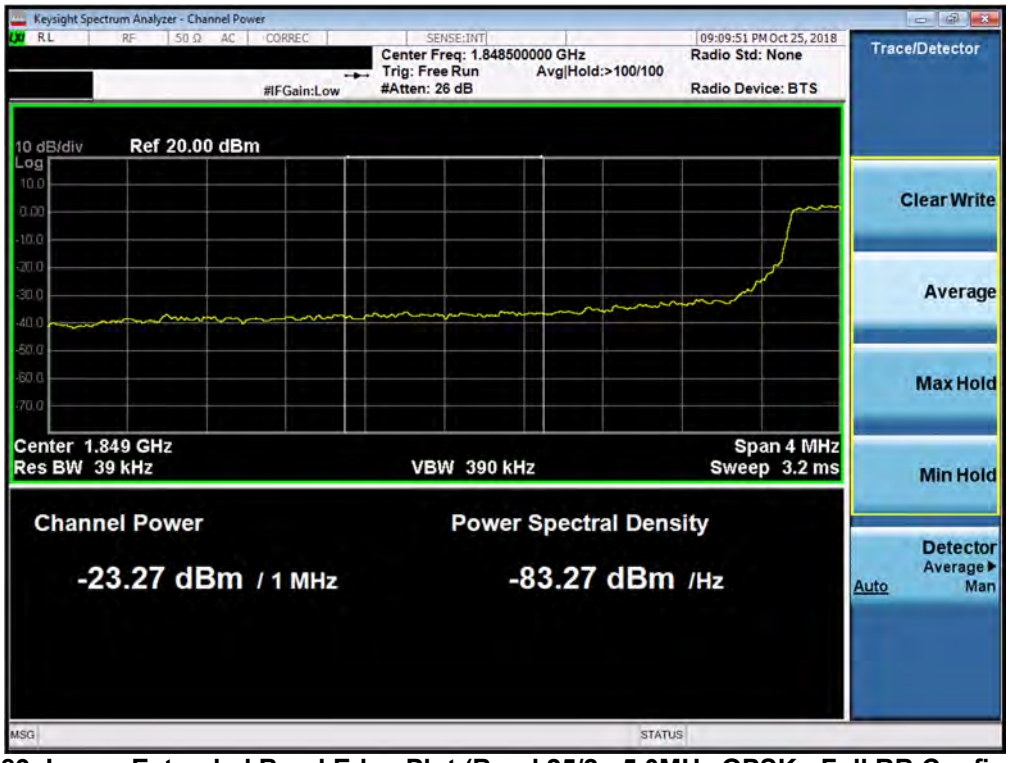
Plot 7-186. Upper Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-187. Upper Extended Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)

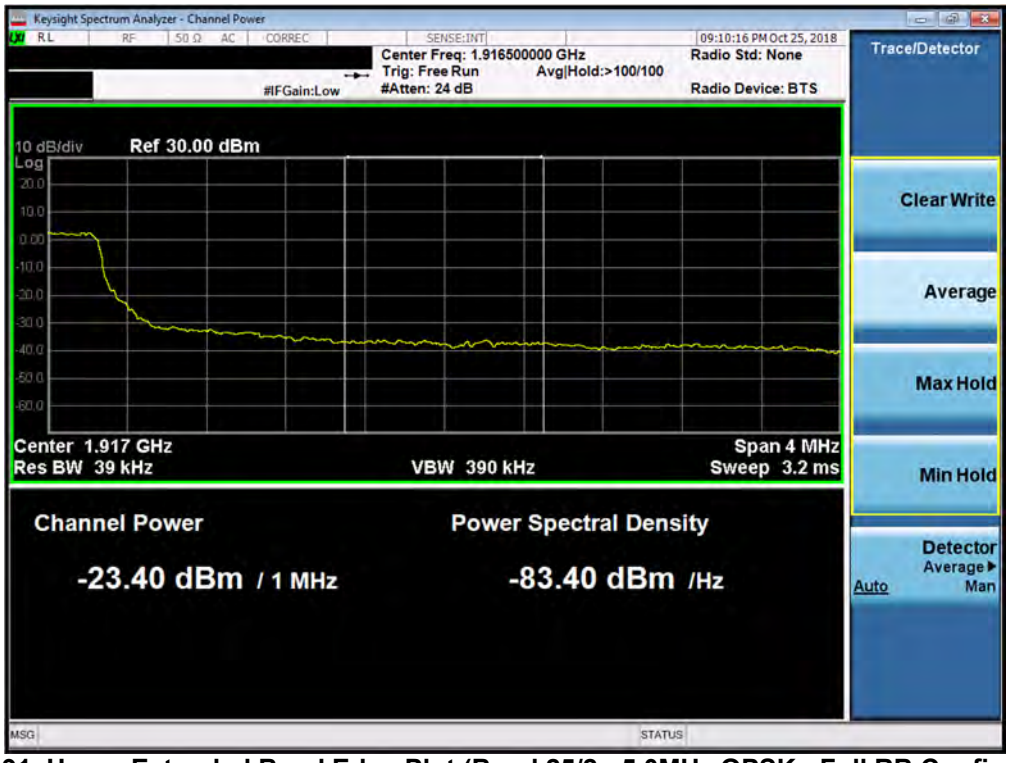


Plot 7-188. Lower Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)

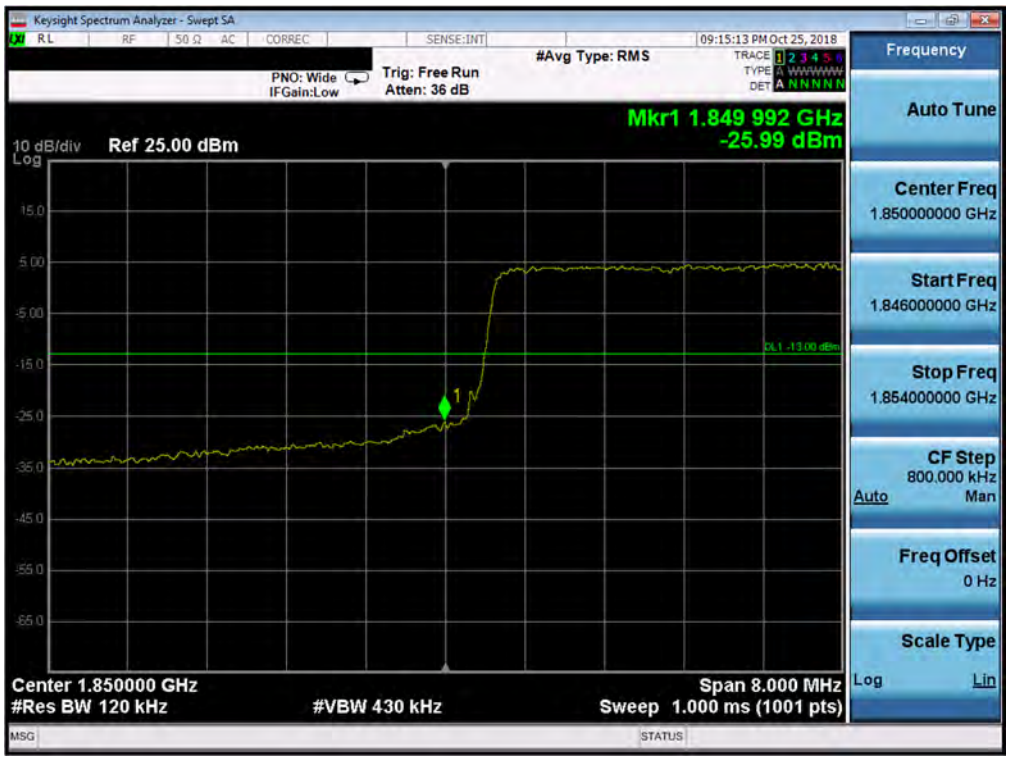


Plot 7-189. Lower Extended Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)

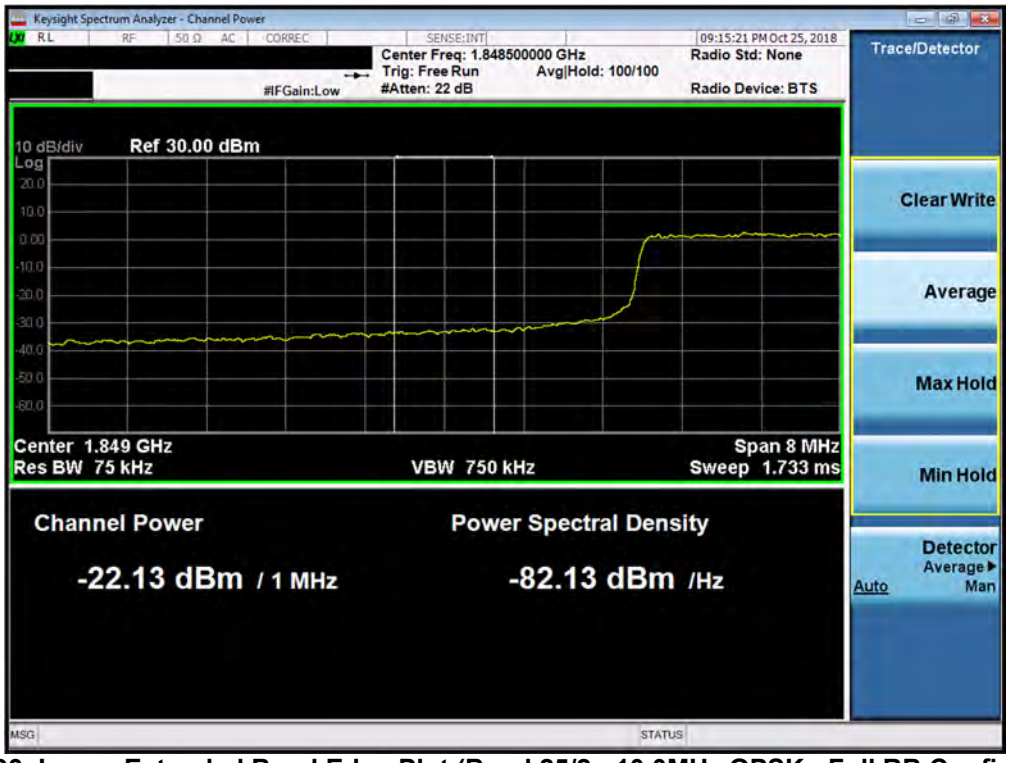
Plot 7-190. Upper Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



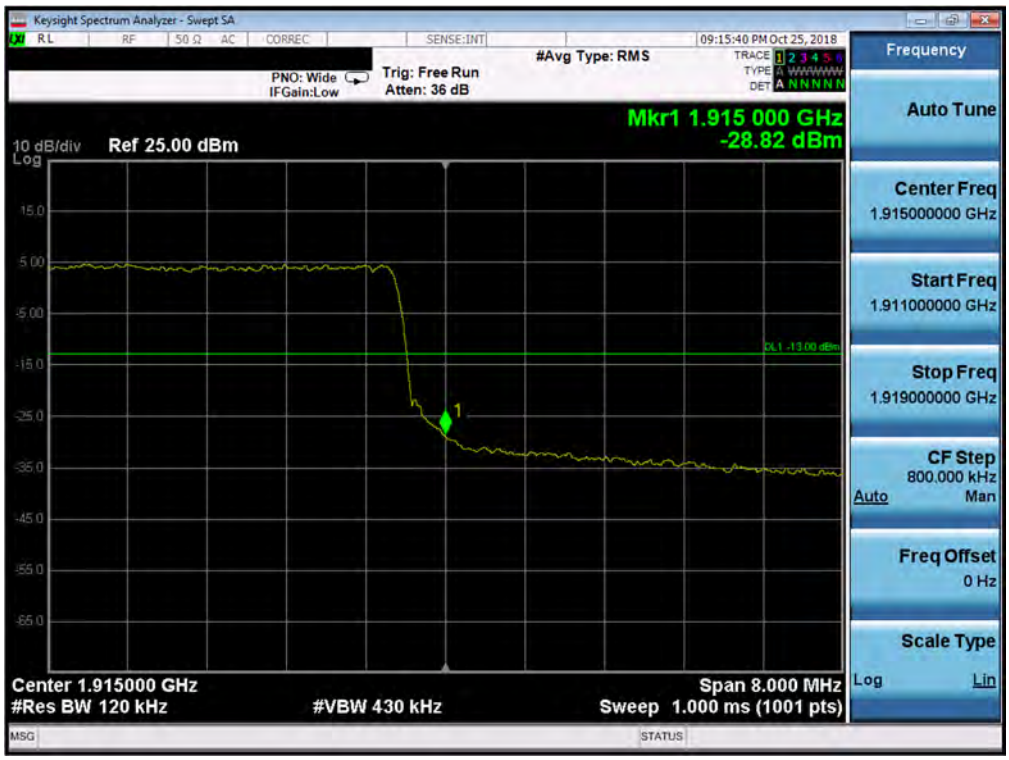
Plot 7-191. Upper Extended Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



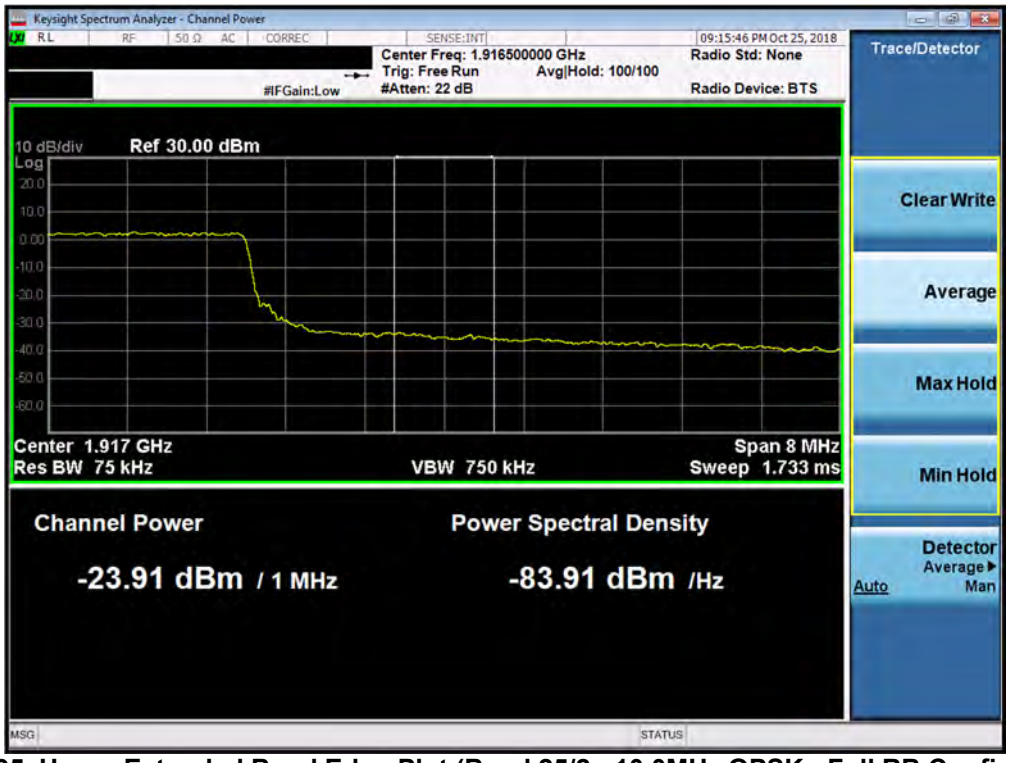
Plot 7-192. Lower Band Edge Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



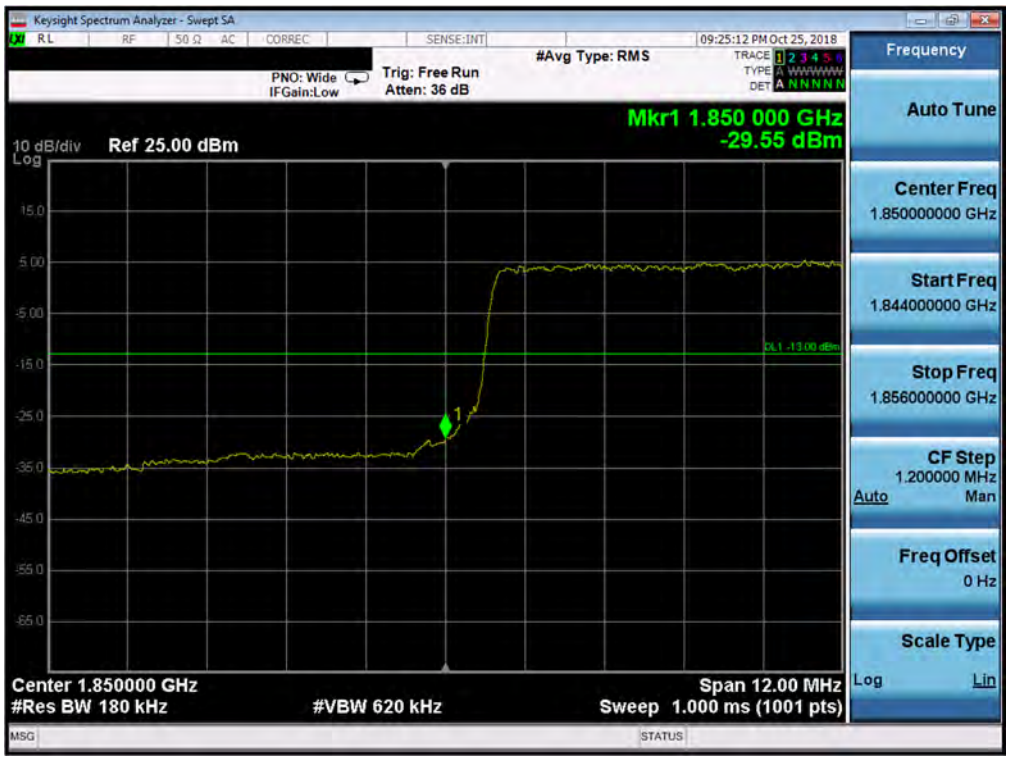
Plot 7-193. Lower Extended Band Edge Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



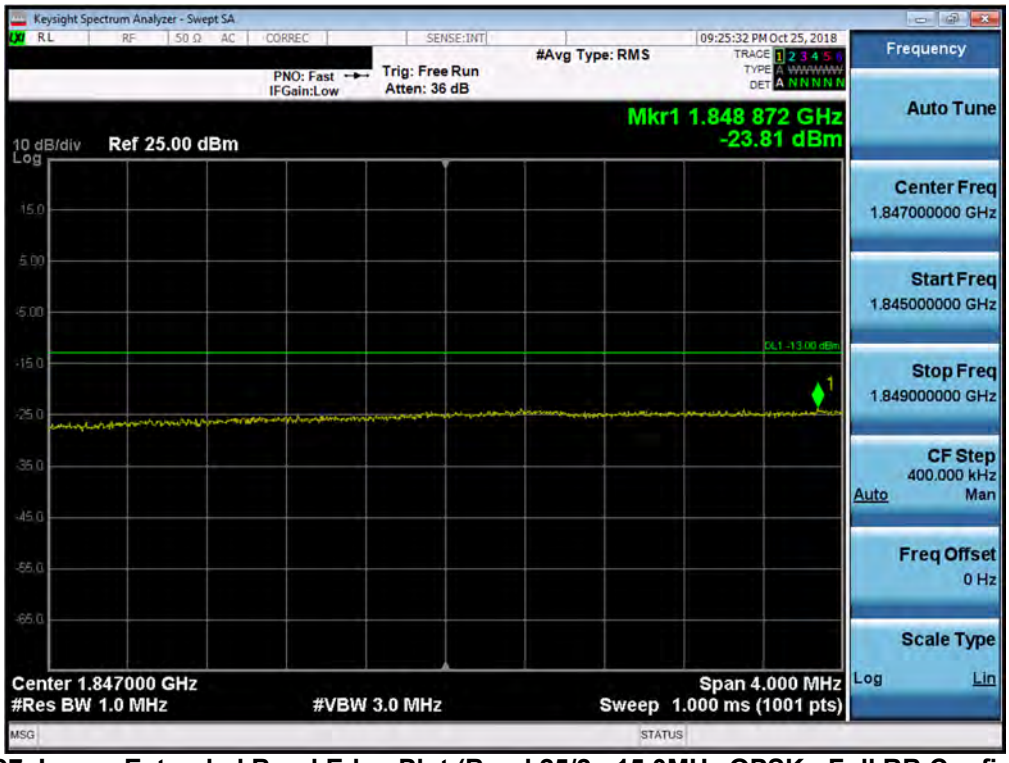
Plot 7-194. Upper Band Edge Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



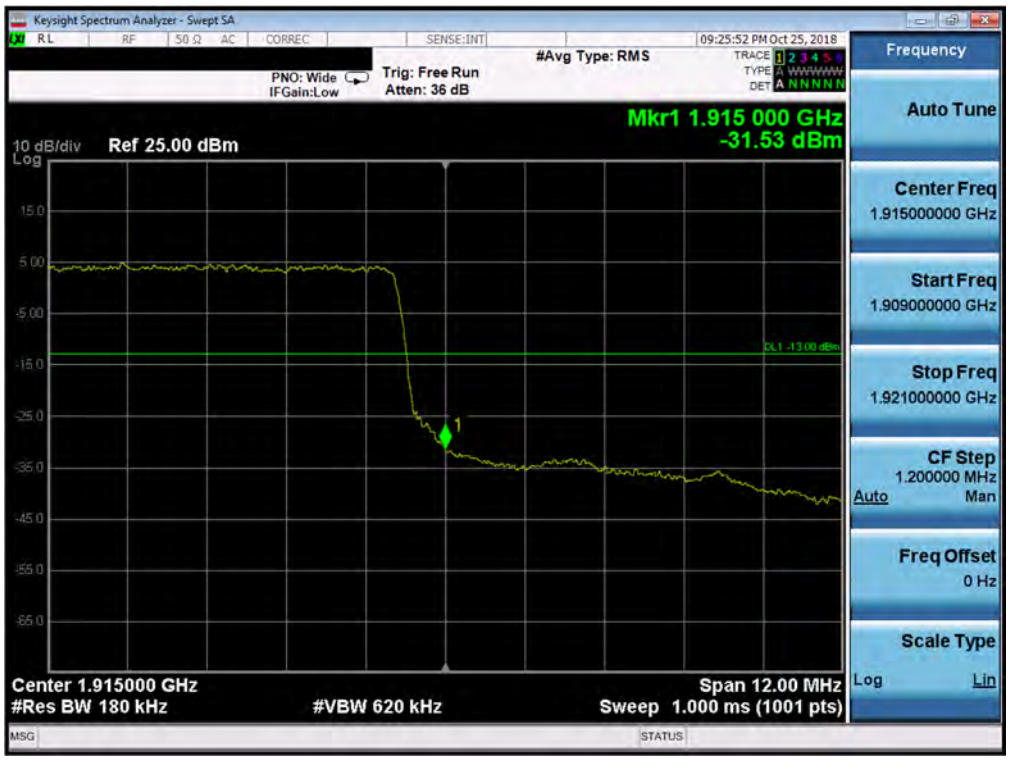
Plot 7-195. Upper Extended Band Edge Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-196. Lower Band Edge Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)

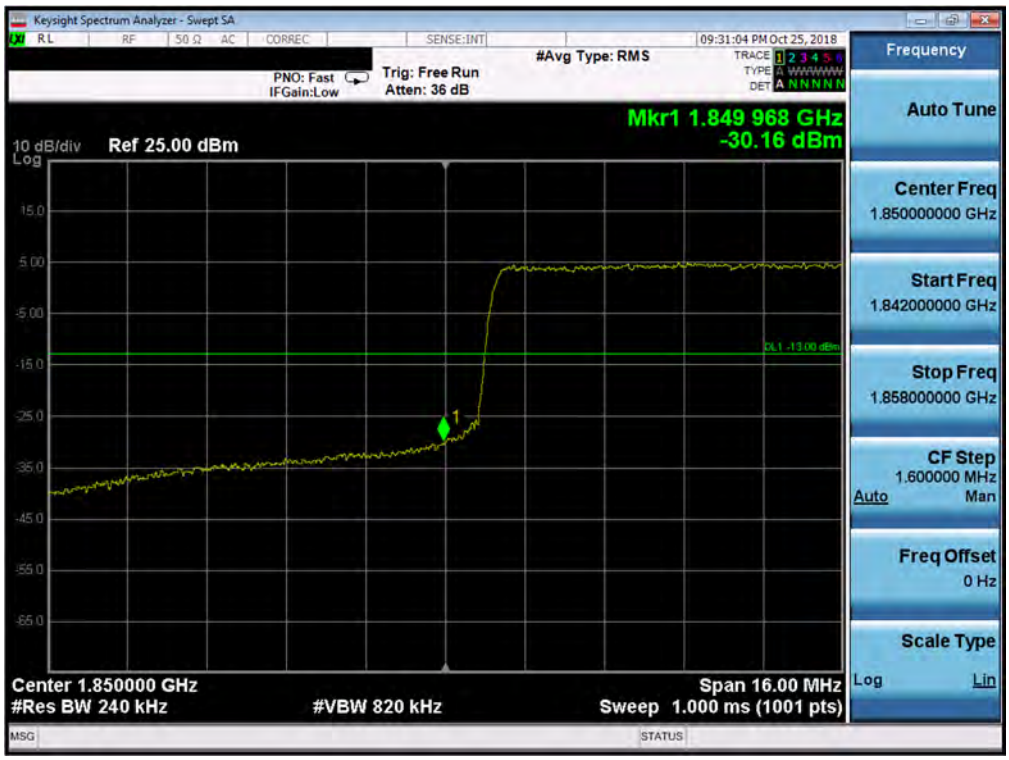


Plot 7-197. Lower Extended Band Edge Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



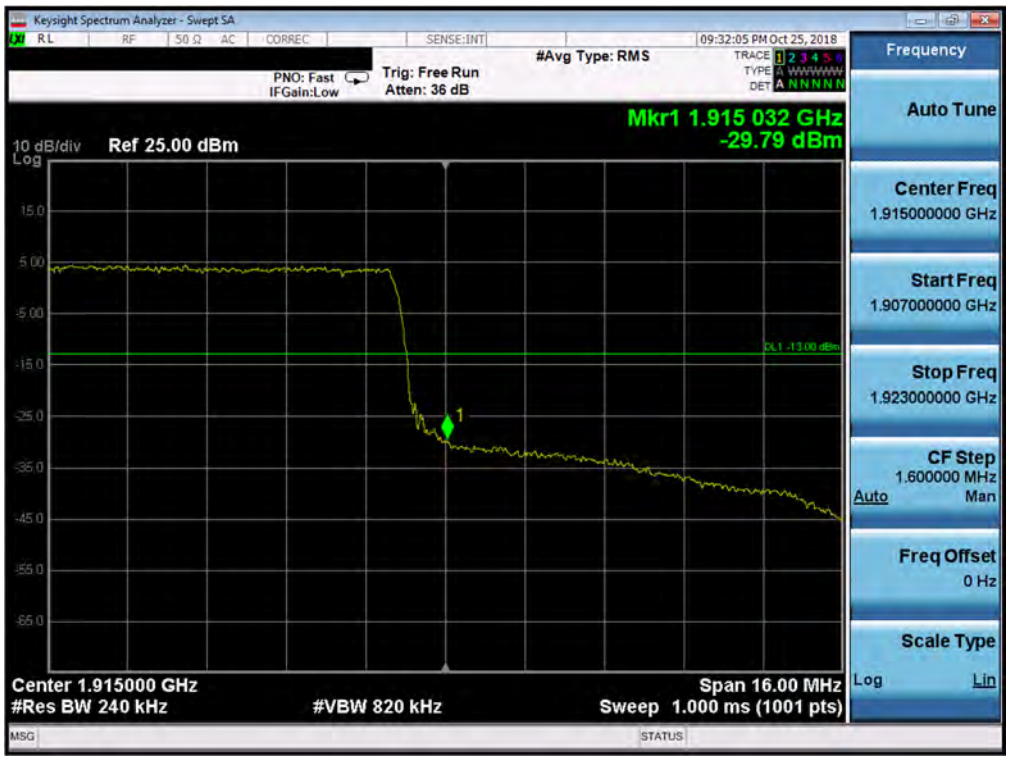
Plot 7-198. Upper Band Edge Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)

Plot 7-199. Upper Extended Band Edge Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



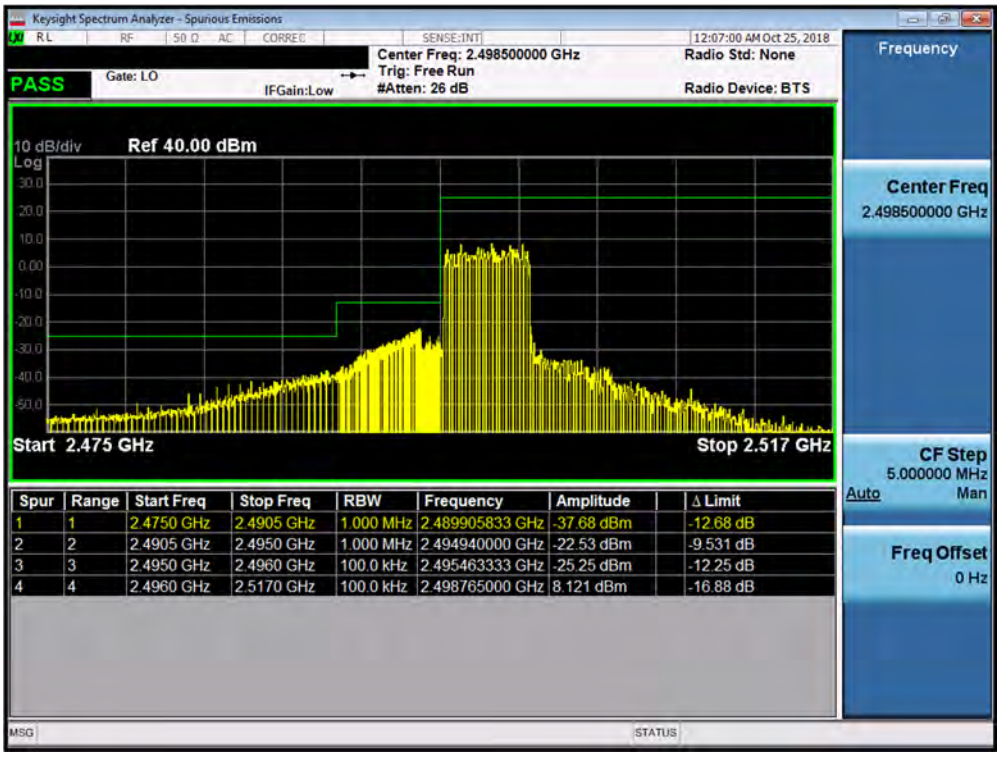
Plot 7-200. Lower Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

Plot 7-201. Lower Extended Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



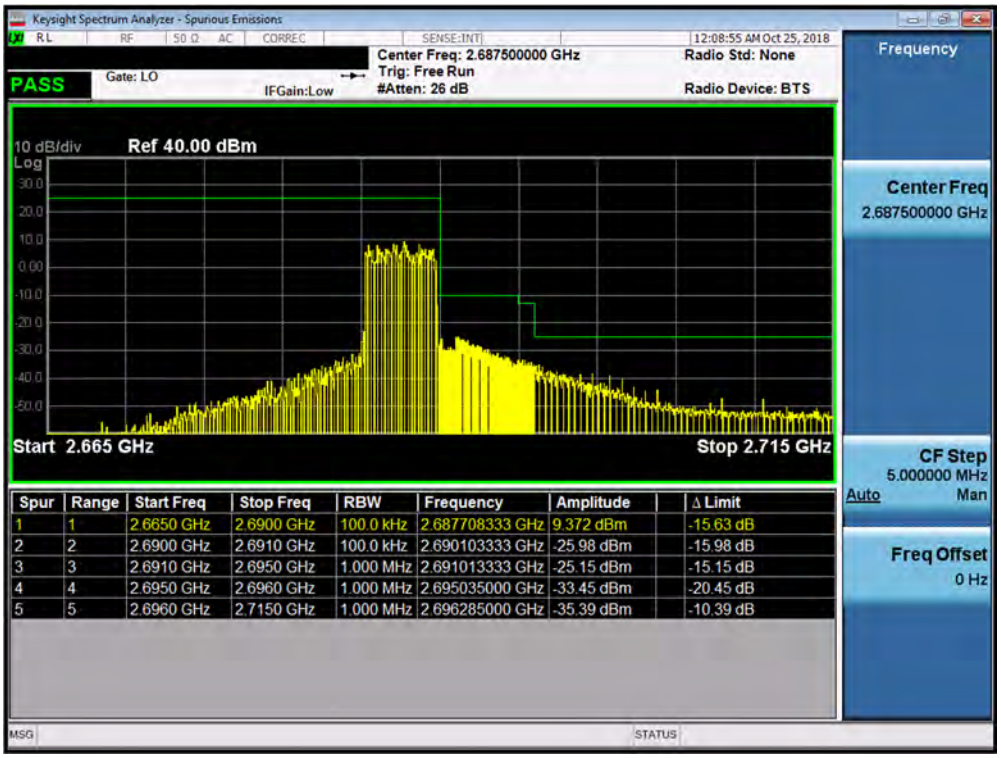
Plot 7-202. Upper Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

Plot 7-203. Upper Extended Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



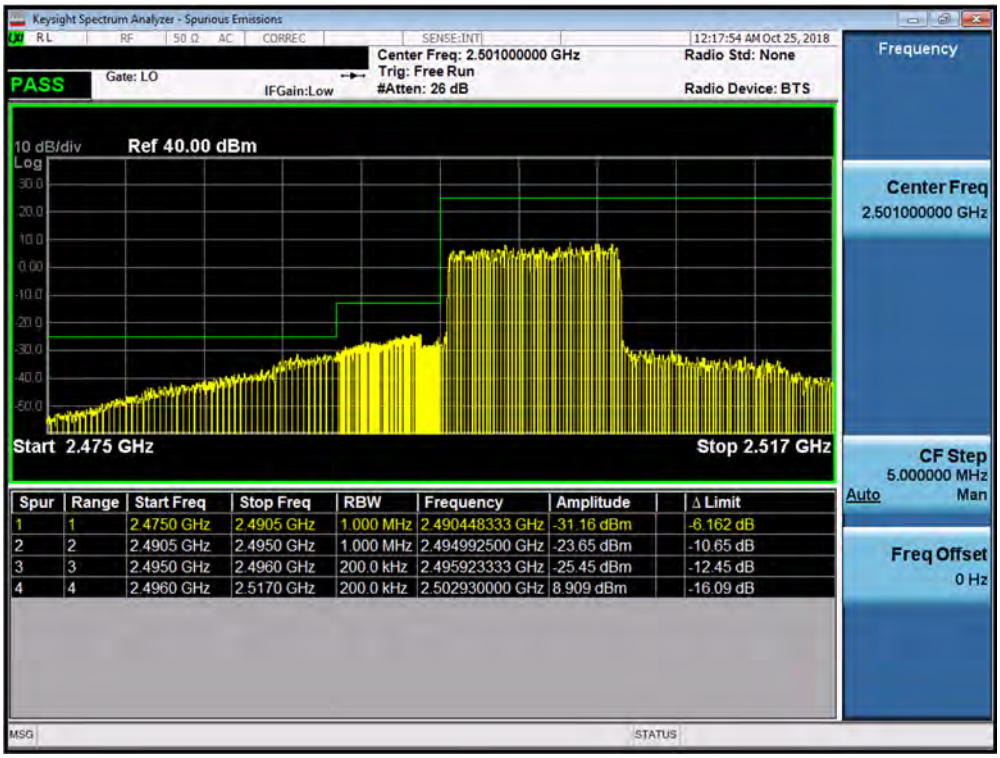
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489905833 GHz	-37.68 dBm	-12.68 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494940000 GHz	-22.53 dBm	-9.531 dB
3	3	2.4950 GHz	2.4960 GHz	100.0 kHz	2.495463333 GHz	-25.25 dBm	-12.25 dB
4	4	2.4960 GHz	2.5170 GHz	100.0 kHz	2.498765000 GHz	8.121 dBm	-16.88 dB

Plot 7-204. Lower ACP Plot (Band 41 PC3 - 5.0MHz QPSK - Full RB Configuration)

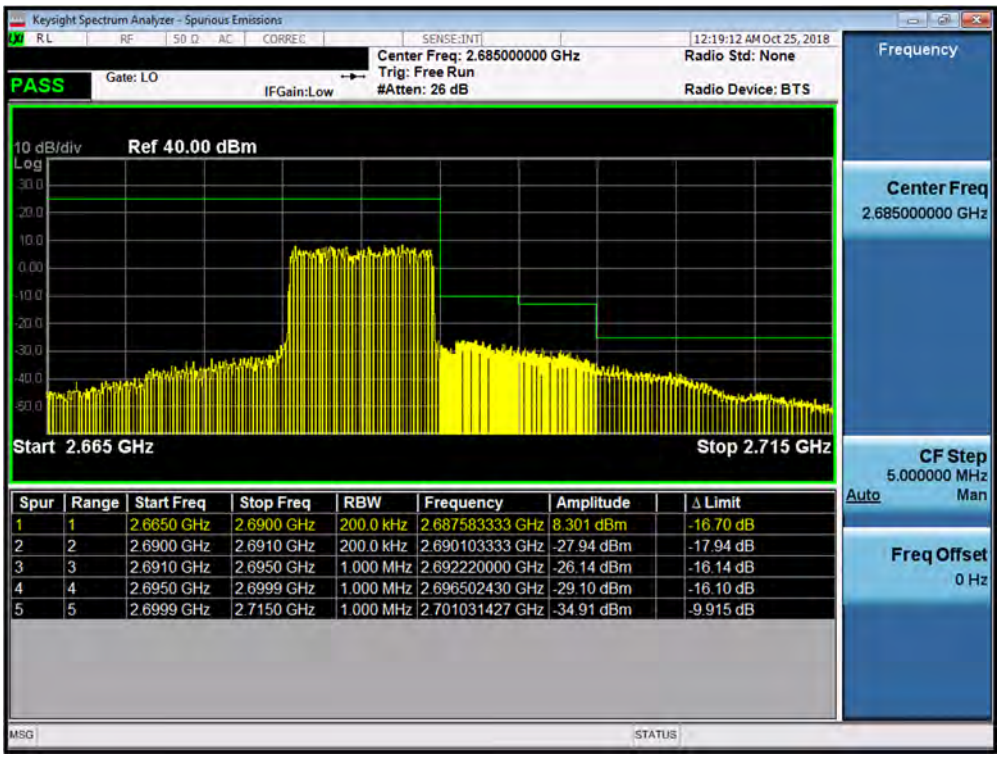


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	100.0 kHz	2.687708333 GHz	9.372 dBm	-15.63 dB
2	2	2.6900 GHz	2.6910 GHz	100.0 kHz	2.690103333 GHz	-25.98 dBm	-15.98 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691013333 GHz	-25.15 dBm	-15.15 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695035000 GHz	-33.45 dBm	-20.45 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696285000 GHz	-35.39 dBm	-10.39 dB

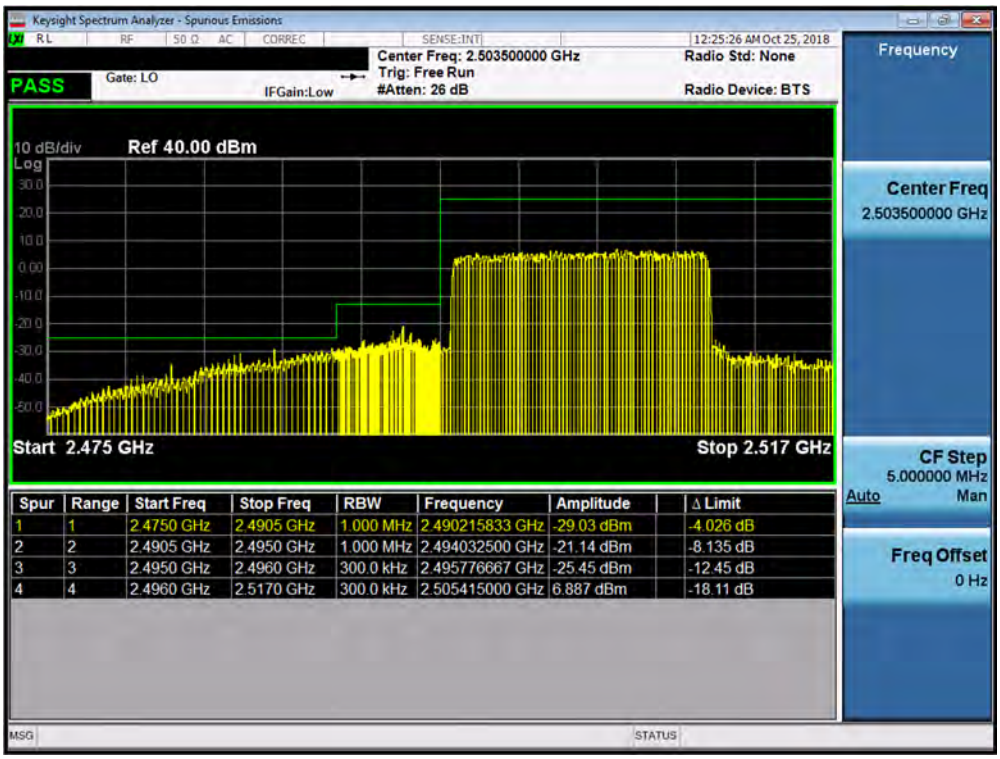
Plot 7-205. Upper ACP Plot (Band 41 PC3 - 5.0MHz QPSK - Full RB Configuration)



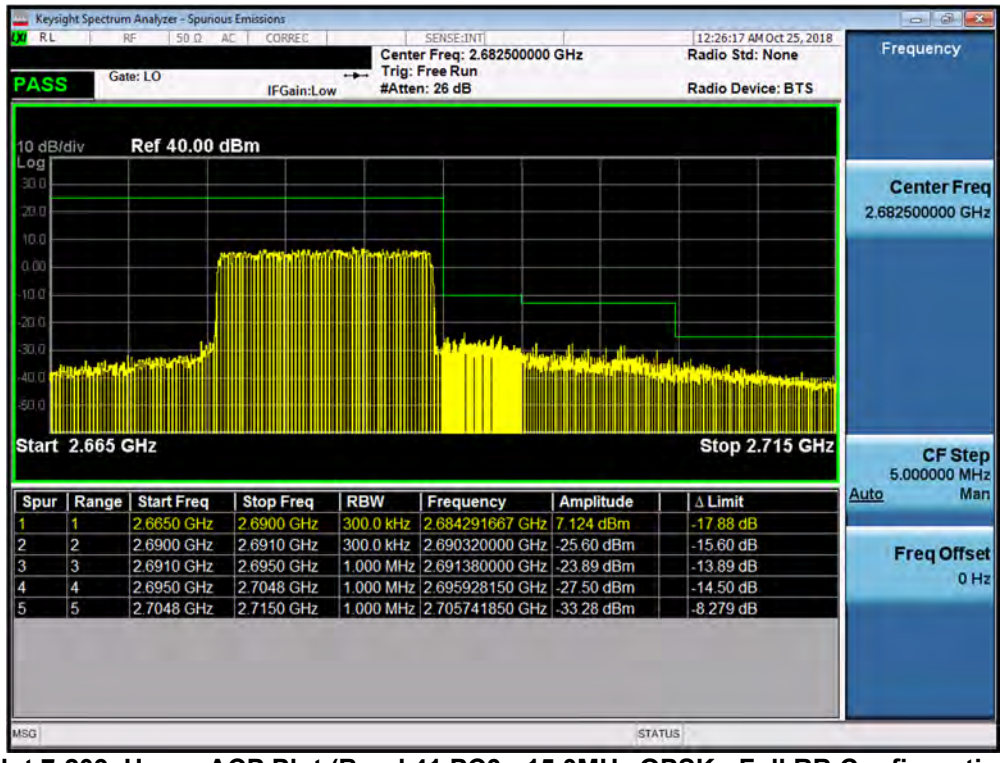
Plot 7-206. Lower ACP Plot (Band 41 PC3- 10.0MHz QPSK - Full RB Configuration)



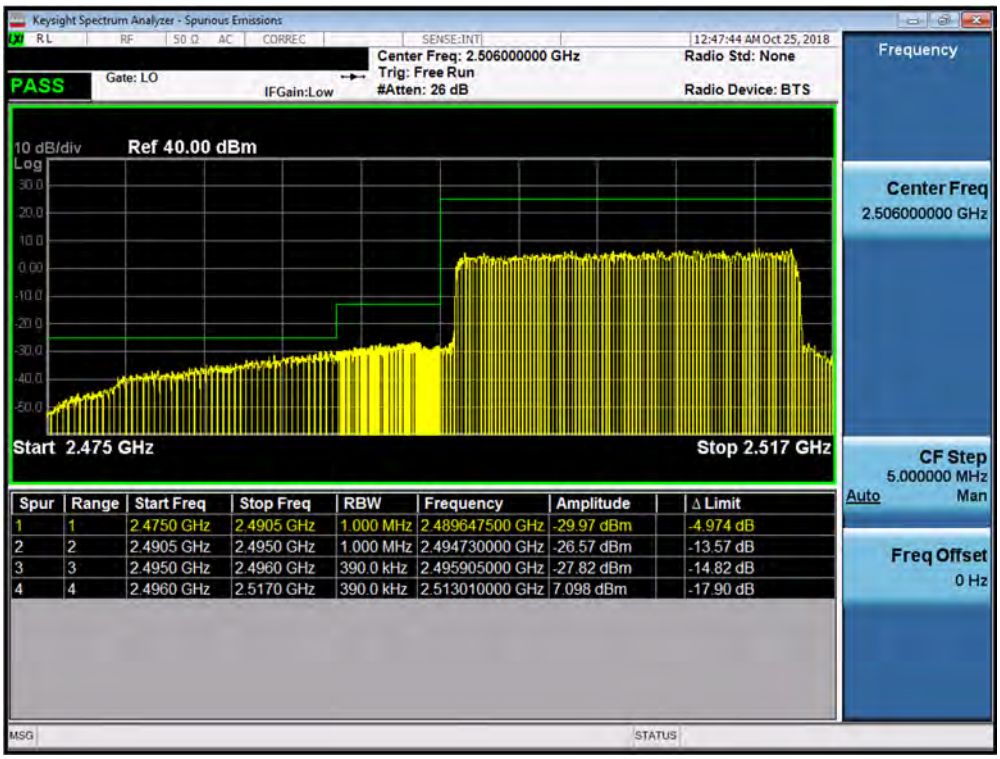
Plot 7-207. Upper ACP Plot (Band 41 PC3- 10.0MHz QPSK - Full RB Configuration)



Plot 7-208. Lower ACP Plot (Band 41 PC3 - 15.0MHz QPSK - Full RB Configuration)

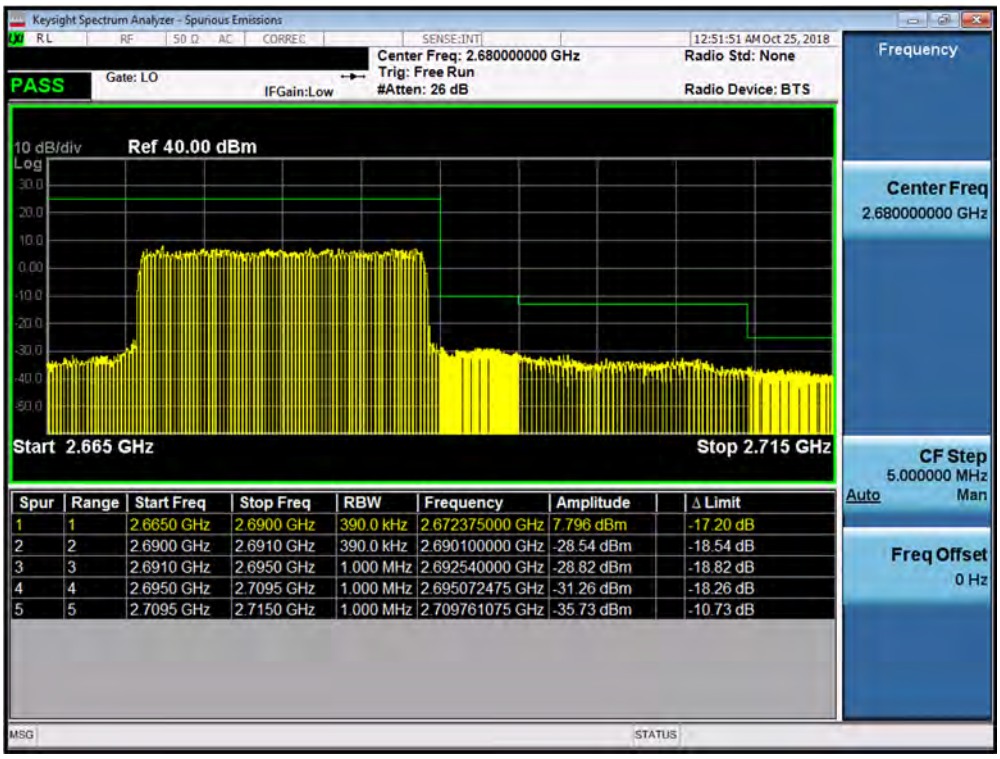


Plot 7-209. Upper ACP Plot (Band 41 PC3 - 15.0MHz QPSK - Full RB Configuration)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489647500 GHz	-29.97 dBm	-4.974 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494730000 GHz	-26.57 dBm	-13.57 dB
3	3	2.4950 GHz	2.4960 GHz	390.0 kHz	2.495905000 GHz	-27.82 dBm	-14.82 dB
4	4	2.4960 GHz	2.5170 GHz	390.0 kHz	2.513010000 GHz	7.098 dBm	-17.90 dB

Plot 7-210. Lower ACP Plot (Band 41 PC3 - 20.0MHz QPSK - Full RB Configuration)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	390.0 kHz	2.672375000 GHz	7.796 dBm	-17.20 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690100000 GHz	-28.54 dBm	-18.54 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.692540000 GHz	-28.82 dBm	-18.82 dB
4	4	2.6950 GHz	2.7095 GHz	1.000 MHz	2.695072475 GHz	-31.26 dBm	-18.26 dB
5	5	2.7095 GHz	2.7150 GHz	1.000 MHz	2.709761075 GHz	-35.73 dBm	-10.73 dB

Plot 7-211. Upper ACP Plot (Band 41 PC3 - 20.0MHz QPSK - Full RB Configuration)

7.5 Peak-Average Ratio

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW ≥ OBW or specified reference bandwidth
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Setup

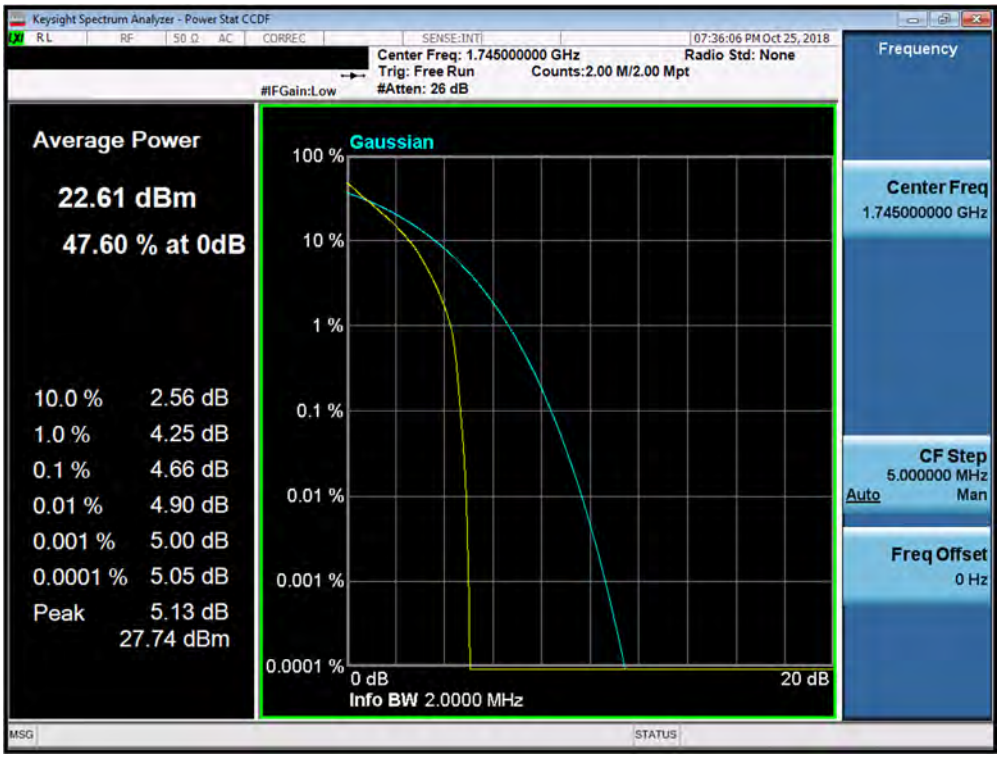
The EUT and measurement equipment were set up as shown in the diagram below.

Figure 7-4. Test Instrument & Measurement Setup

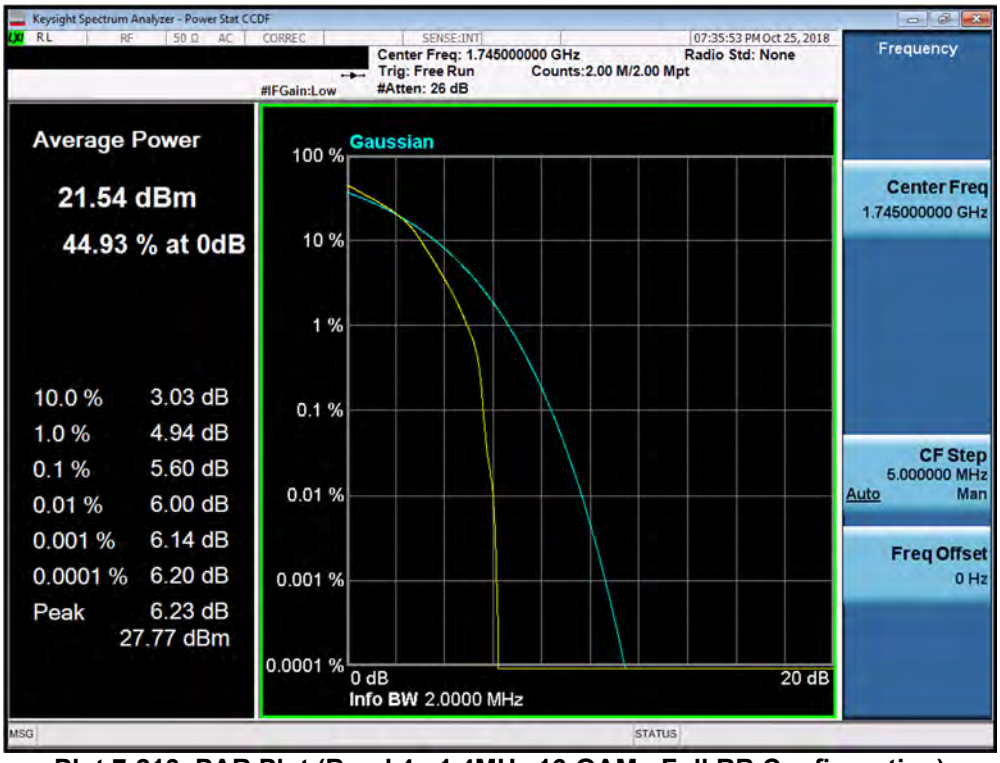
Test Notes

None.

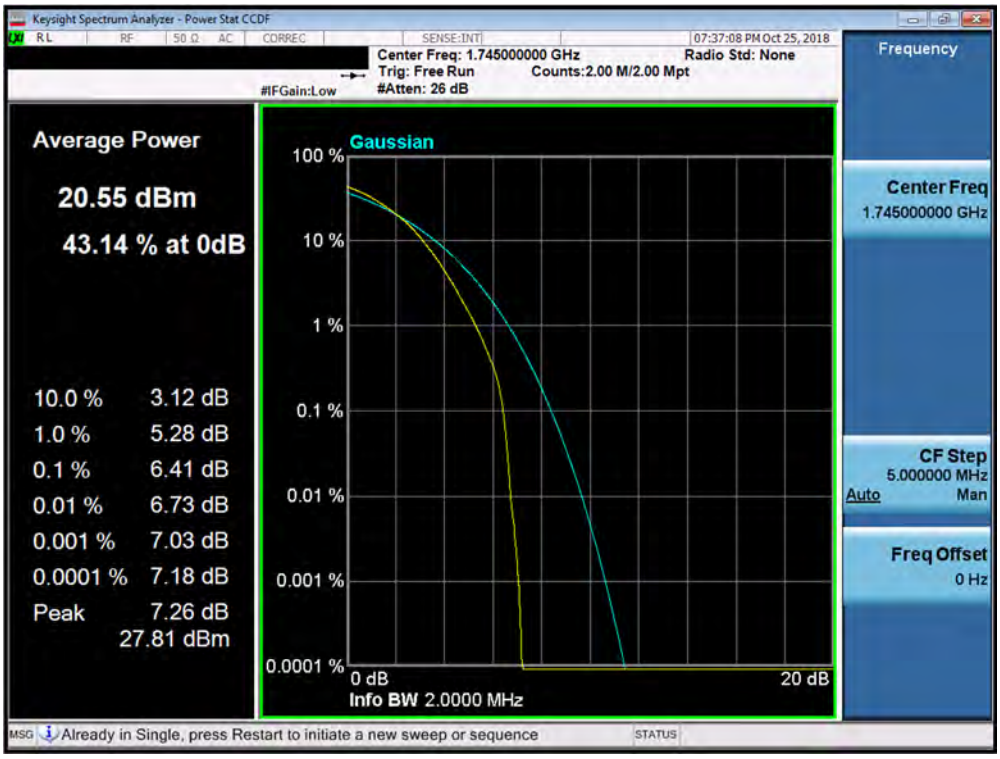
Band 4



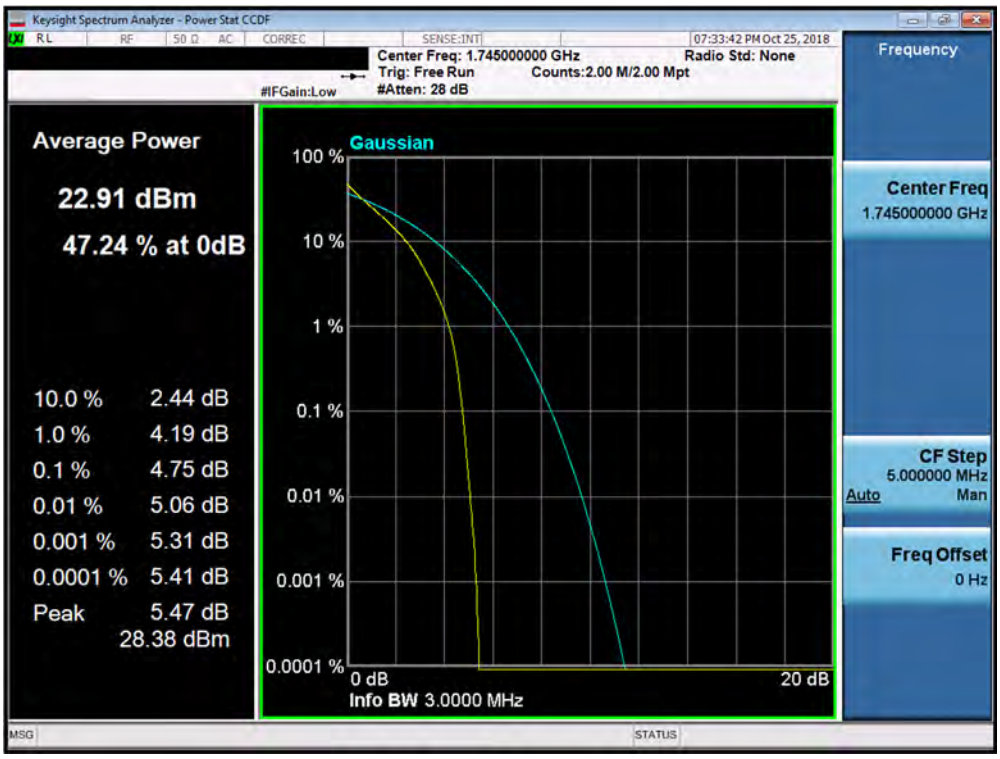
Plot 7-212. PAR Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



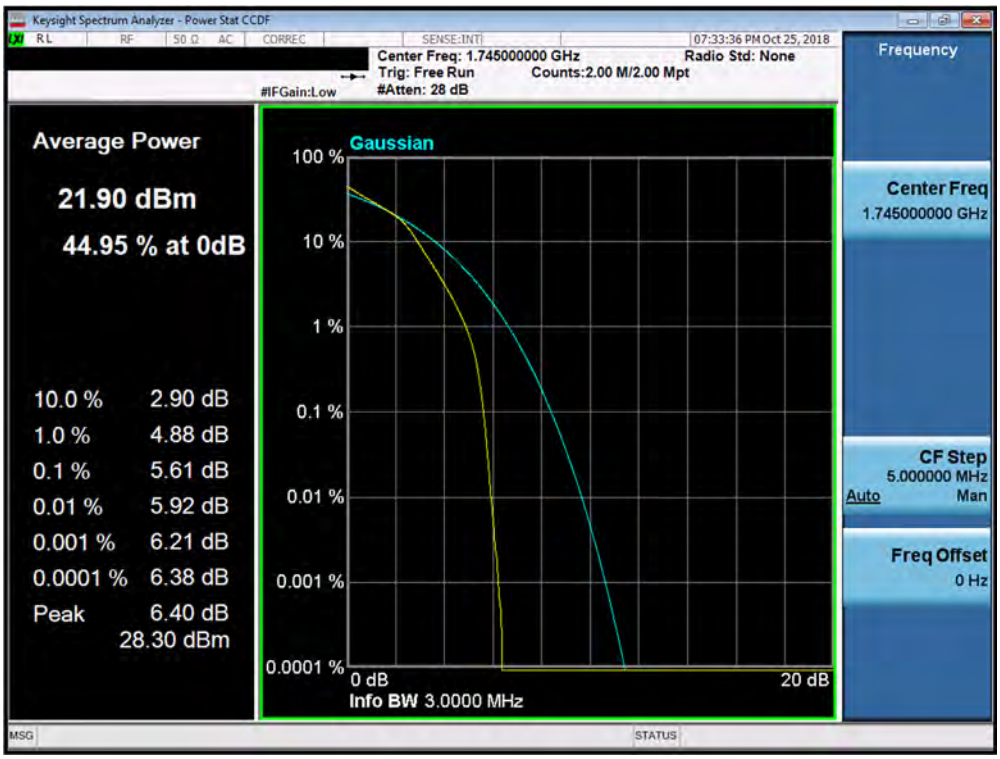
Plot 7-213. PAR Plot (Band 4 - 1.4MHz 16-QAM - Full RB Configuration)



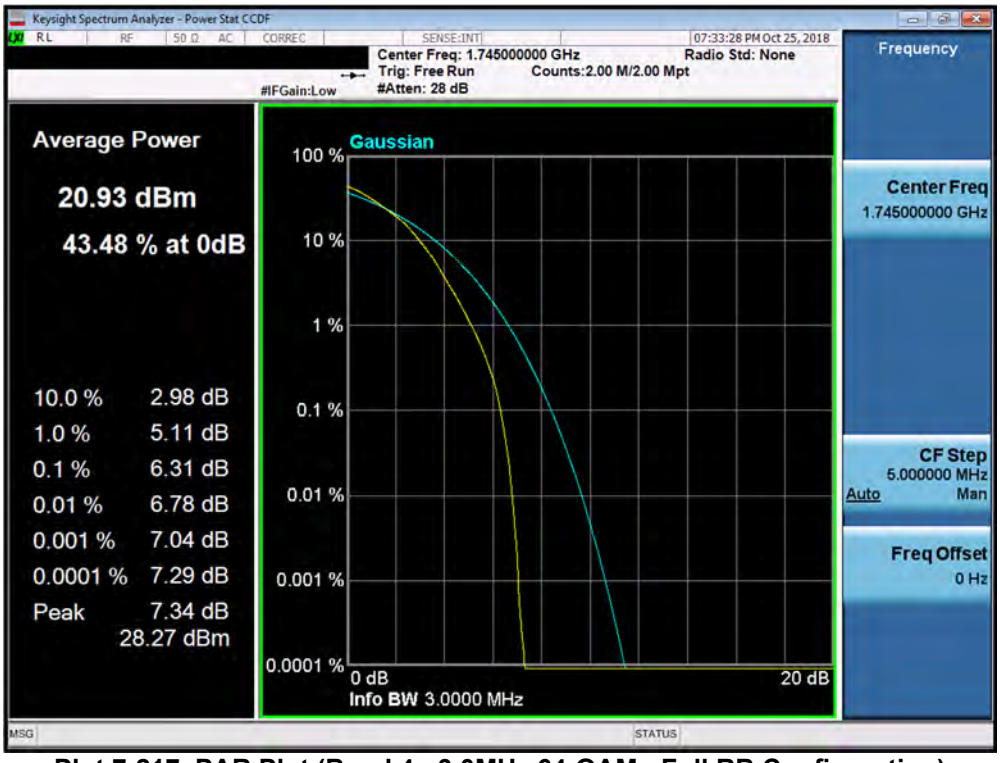
Plot 7-214. PAR Plot (Band 4 - 1.4MHz 64-QAM - Full RB Configuration)



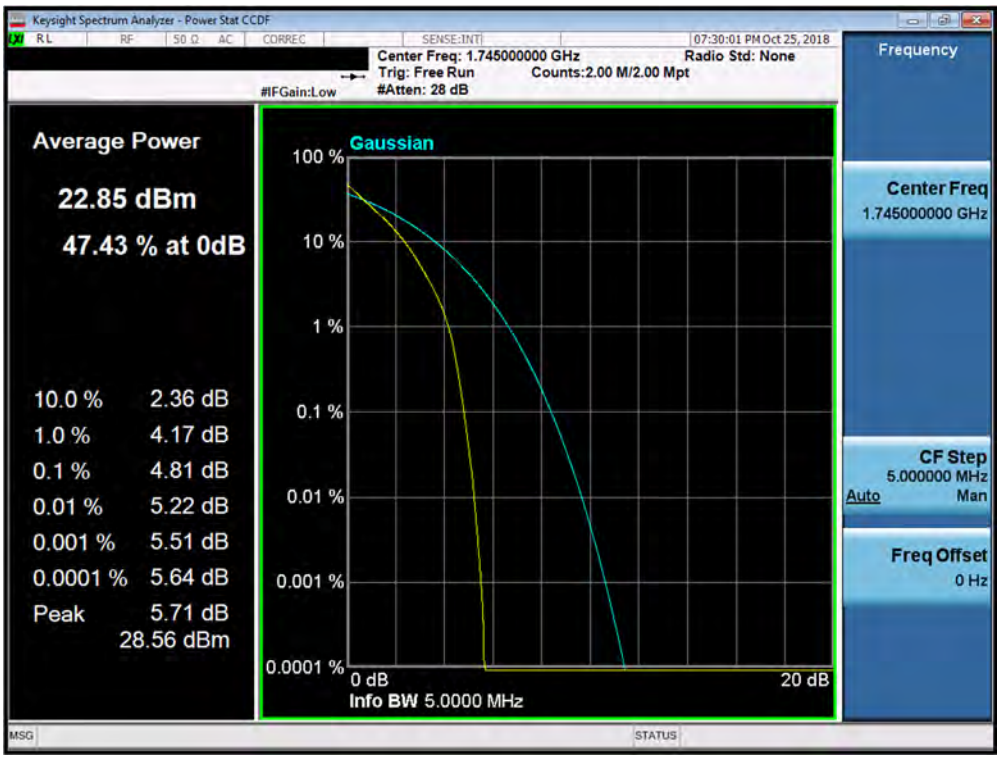
Plot 7-215. PAR Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



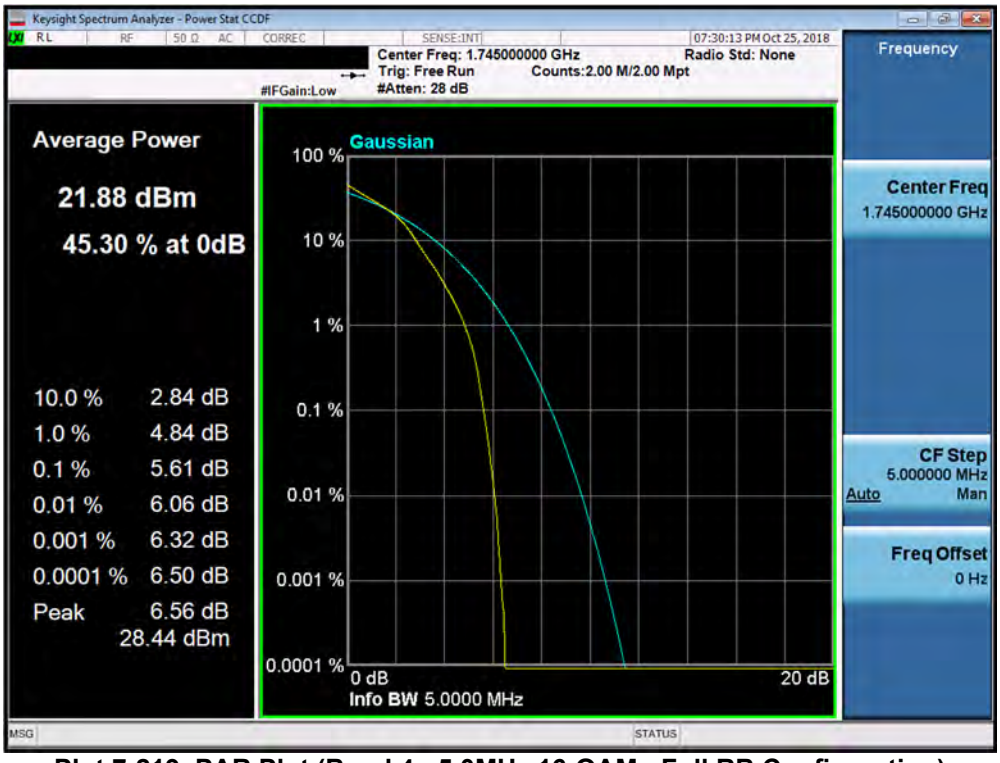
Plot 7-216. PAR Plot (Band 4 - 3.0MHz 16-QAM - Full RB Configuration)



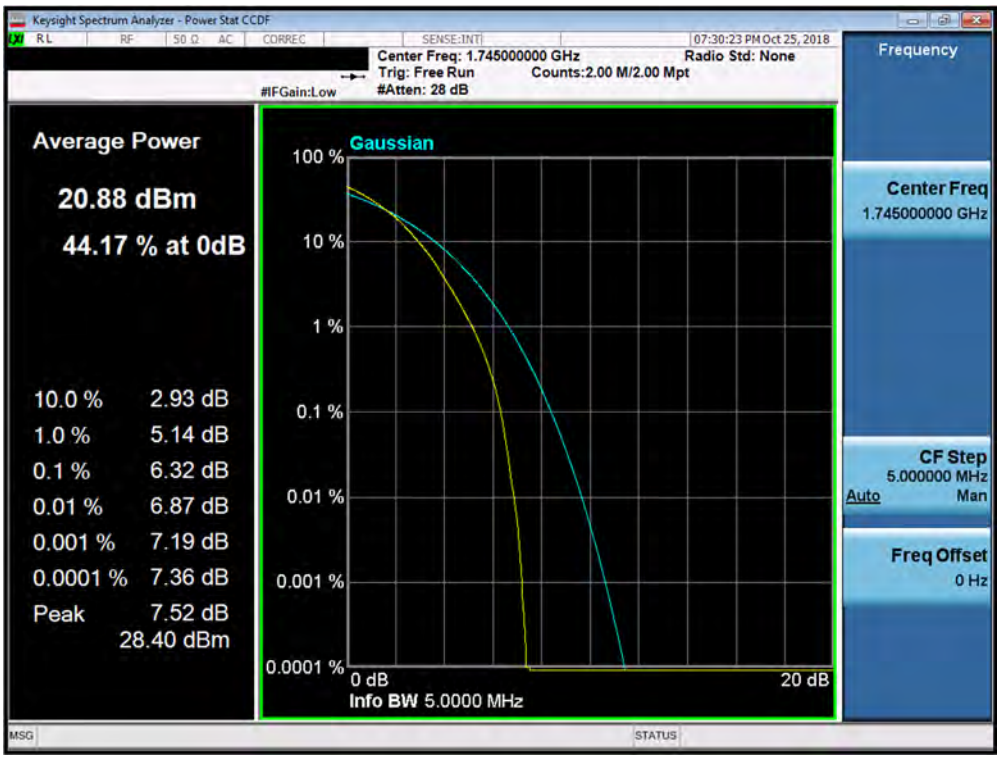
Plot 7-217. PAR Plot (Band 4 - 3.0MHz 64-QAM - Full RB Configuration)



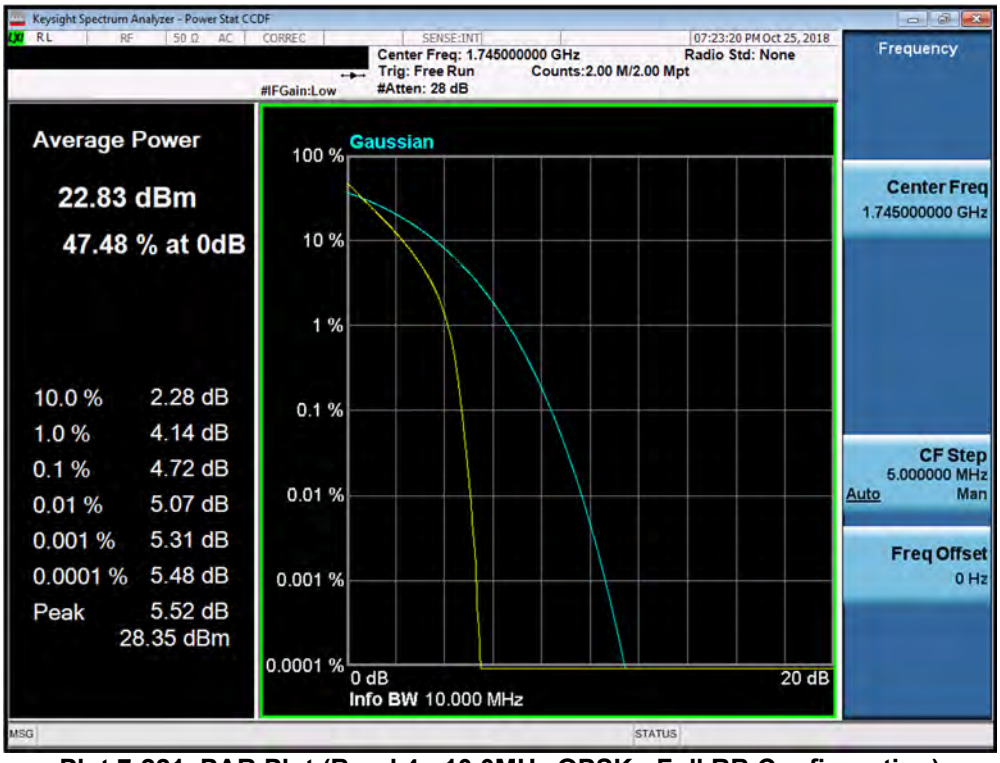
Plot 7-218. PAR Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



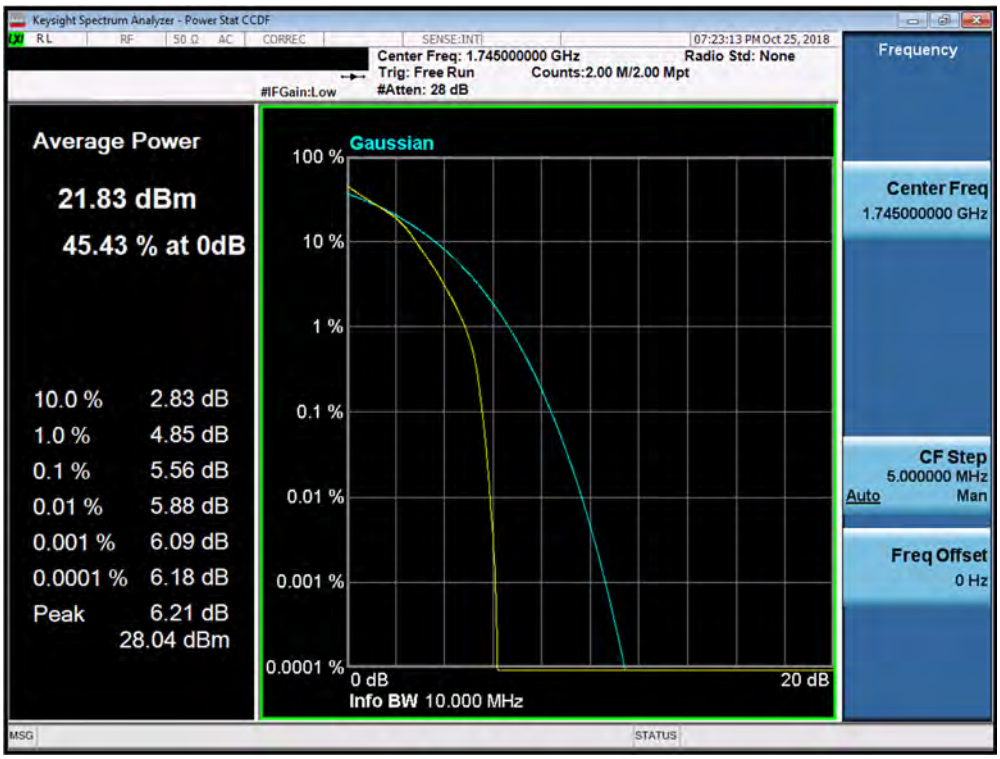
Plot 7-219. PAR Plot (Band 4 - 5.0MHz 16-QAM - Full RB Configuration)



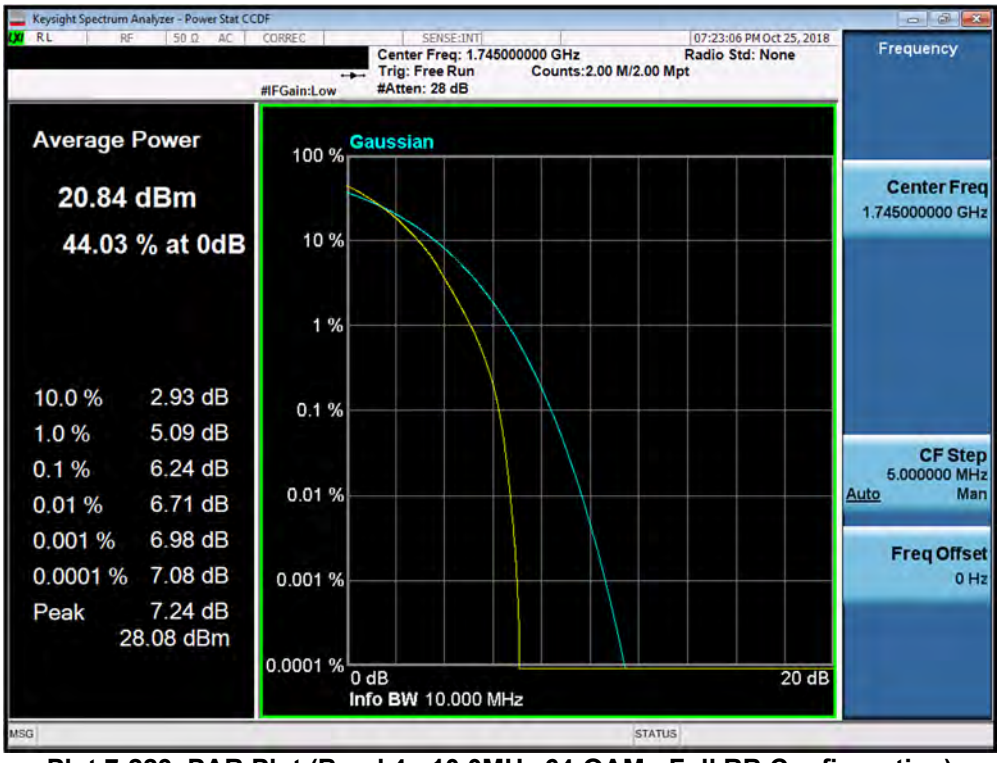
Plot 7-220. PAR Plot (Band 4 - 5.0MHz 64-QAM - Full RB Configuration)



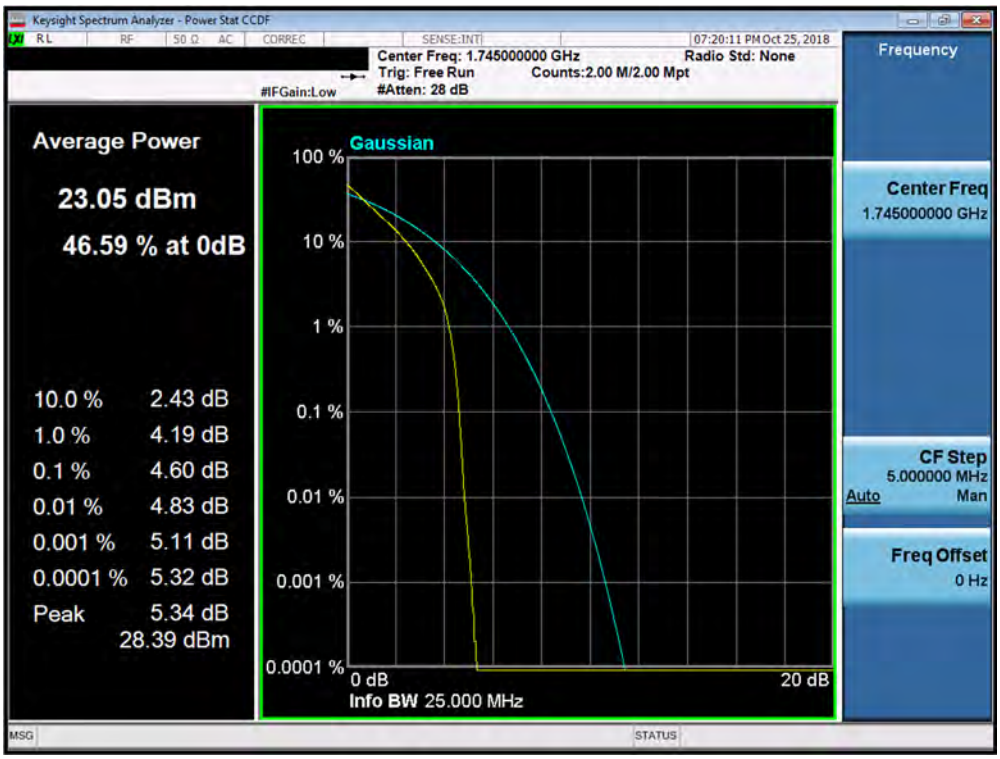
Plot 7-221. PAR Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



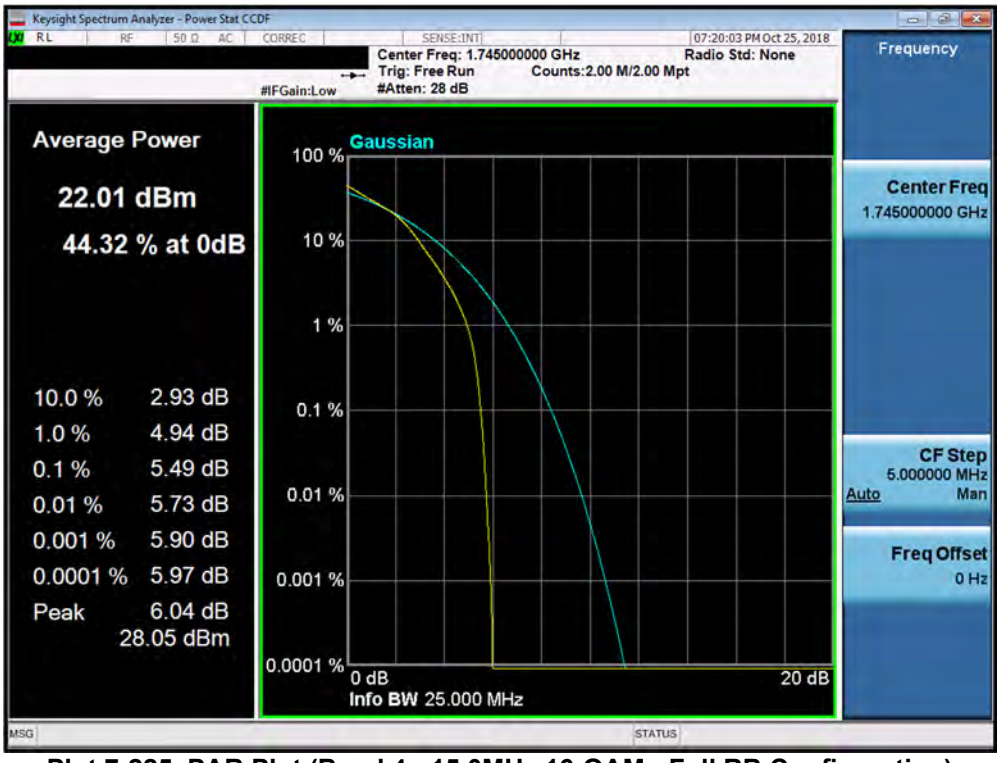
Plot 7-222. PAR Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)



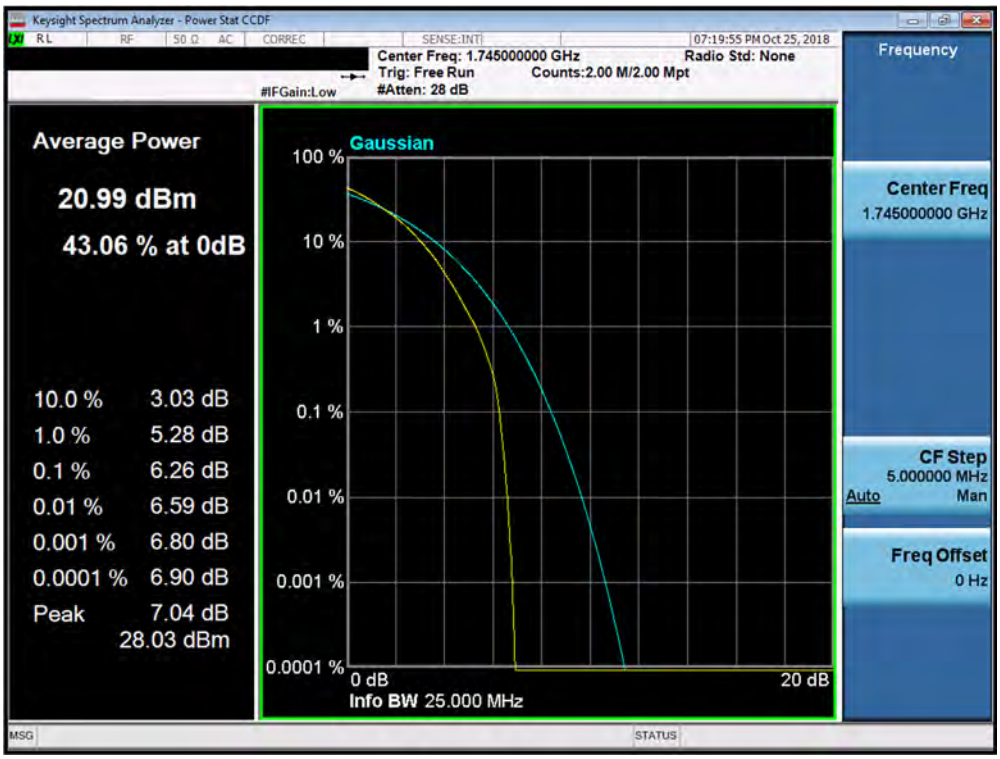
Plot 7-223. PAR Plot (Band 4 - 10.0MHz 64-QAM - Full RB Configuration)



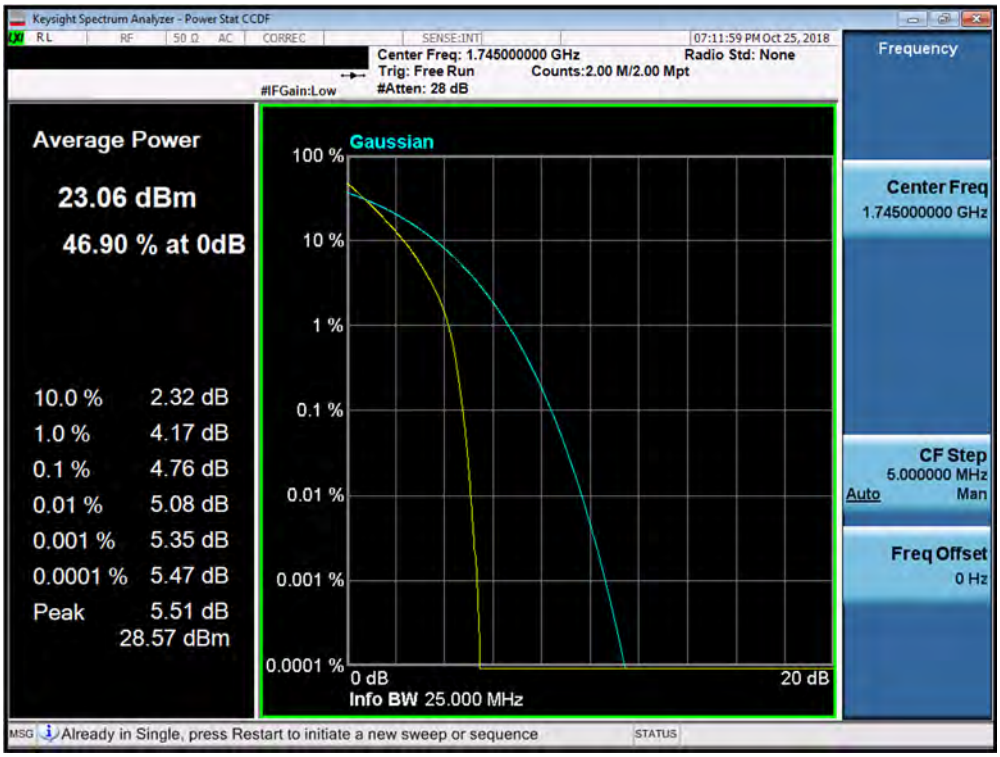
Plot 7-224. PAR Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



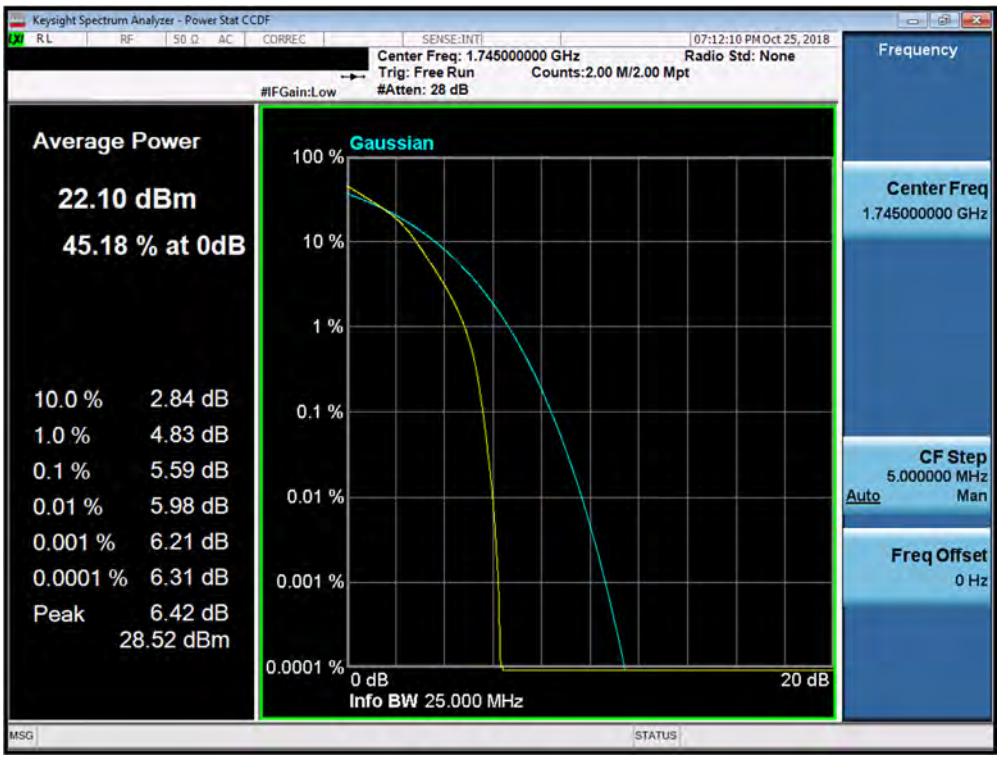
Plot 7-225. PAR Plot (Band 4 - 15.0MHz 16-QAM - Full RB Configuration)



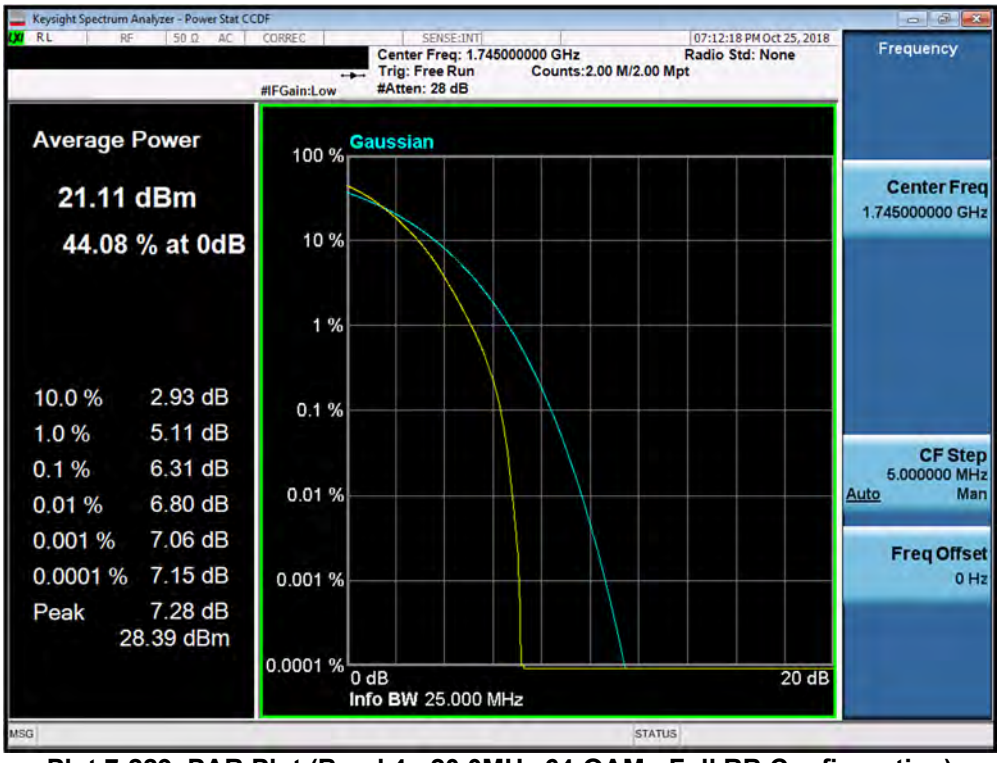
Plot 7-226. PAR Plot (Band 4 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-227. PAR Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

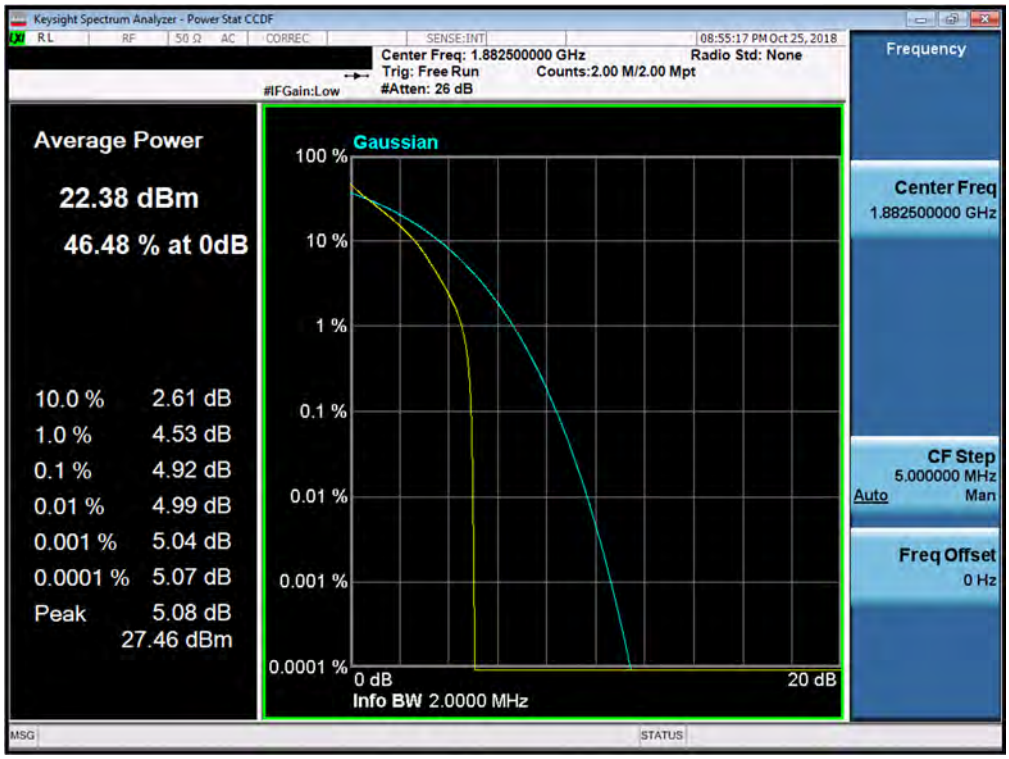


Plot 7-228. PAR Plot (Band 4 - 20.0MHz 16-QAM - Full RB Configuration)

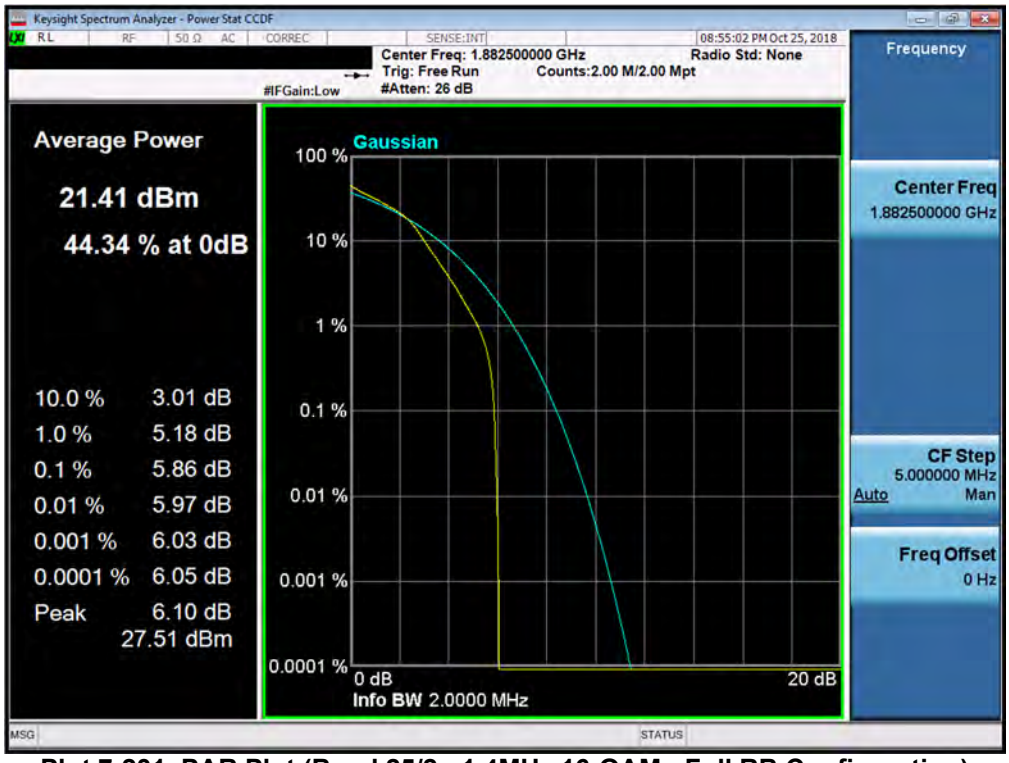


Plot 7-229. PAR Plot (Band 4 - 20.0MHz 64-QAM - Full RB Configuration)

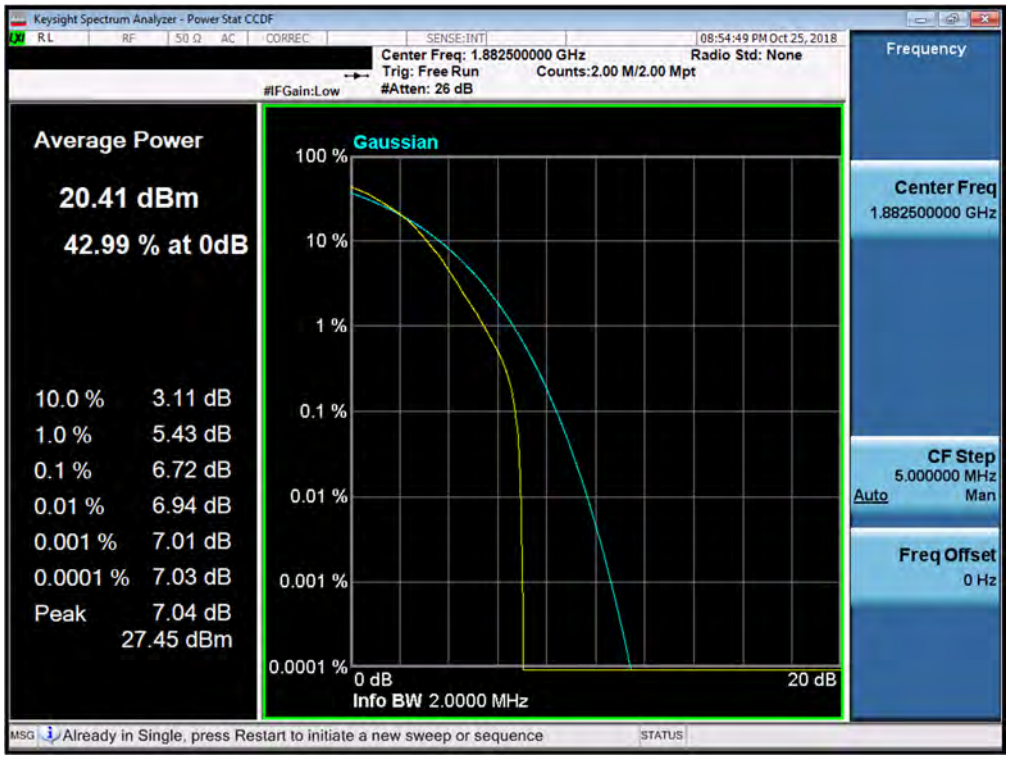
Band 25/2



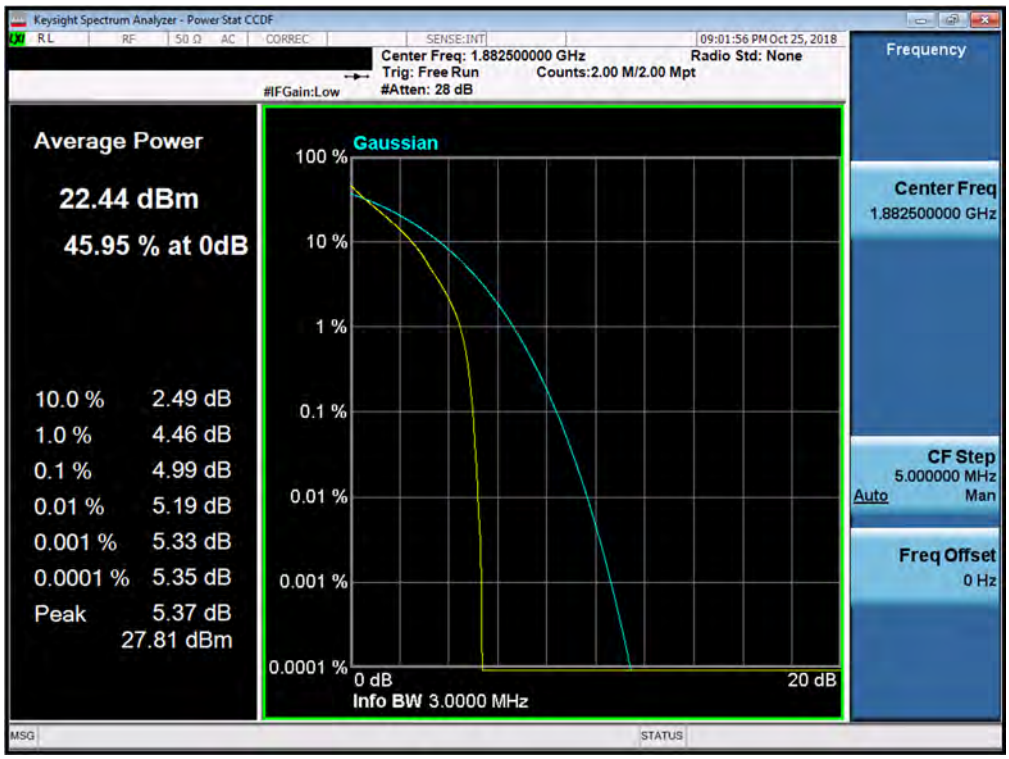
Plot 7-230. PAR Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



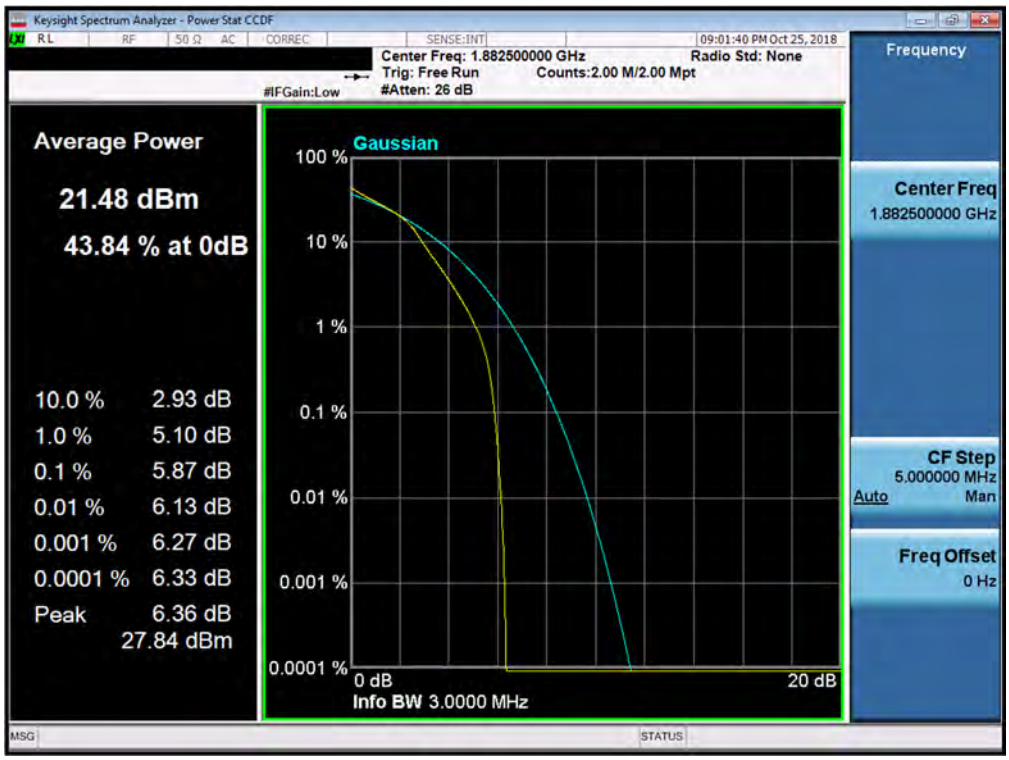
Plot 7-231. PAR Plot (Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)



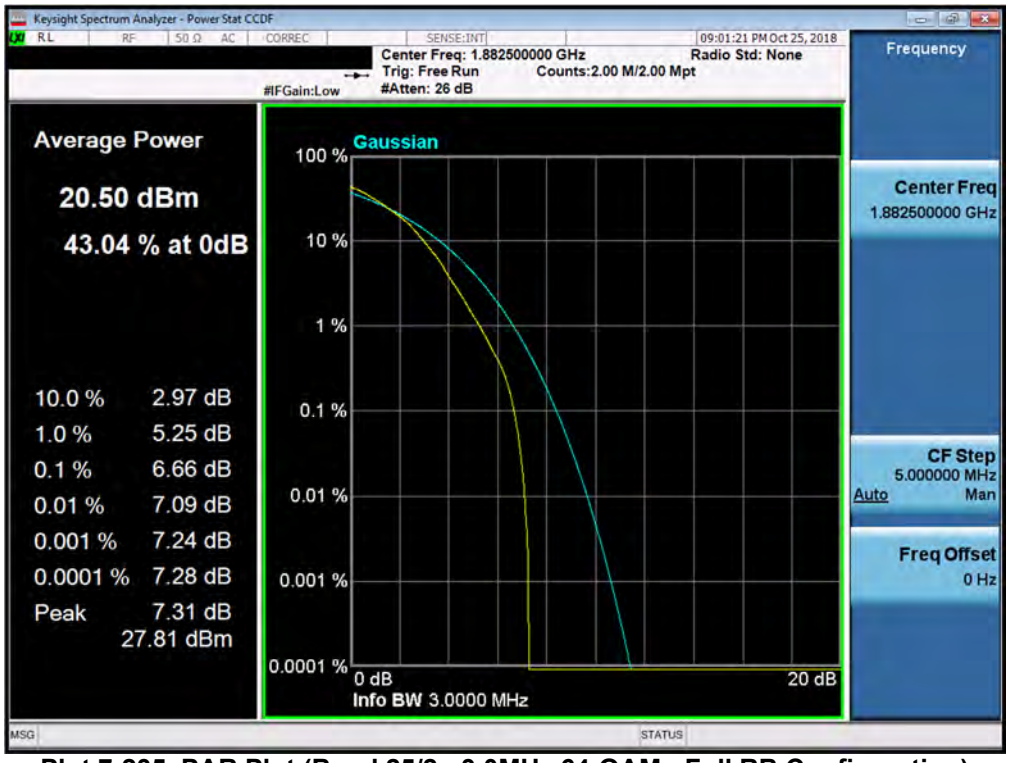
Plot 7-232. PAR Plot (Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)



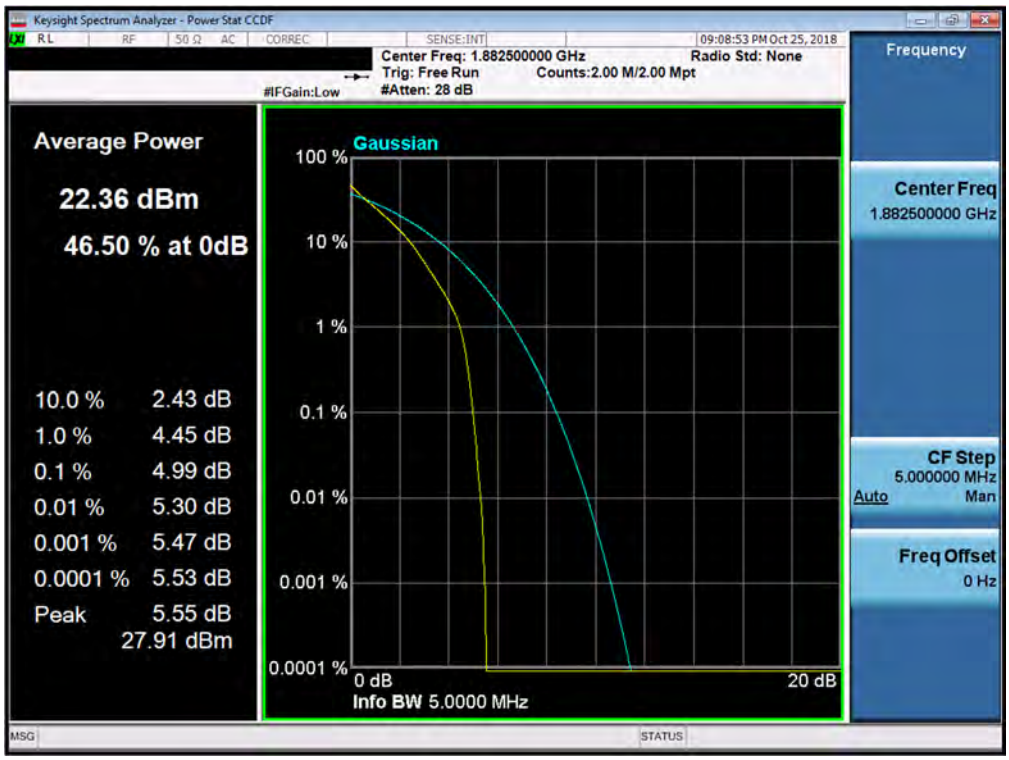
Plot 7-233. PAR Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



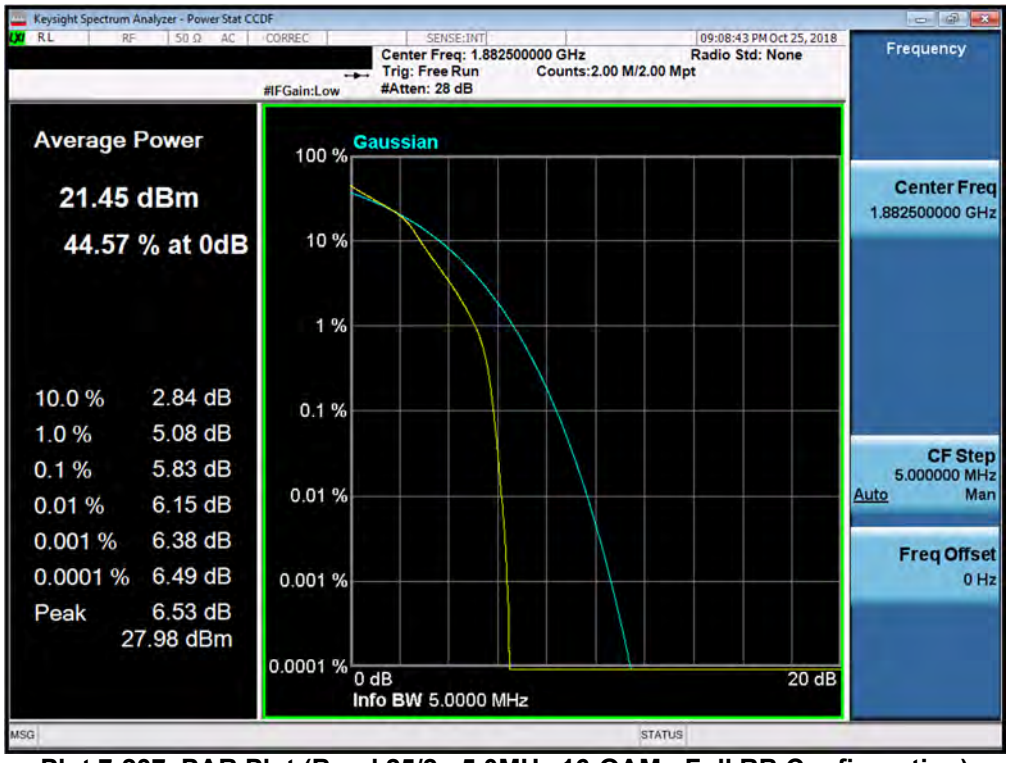
Plot 7-234. PAR Plot (Band 25/2 - 3.0MHz 16-QAM - Full RB Configuration)



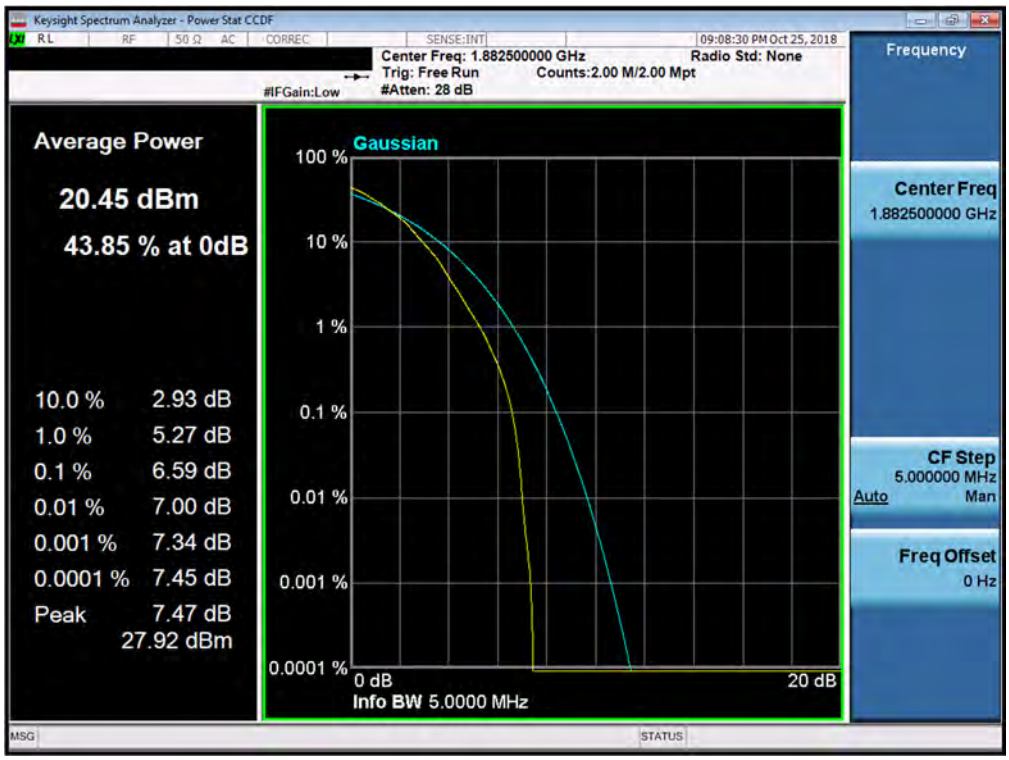
Plot 7-235. PAR Plot (Band 25/2 - 3.0MHz 64-QAM - Full RB Configuration)



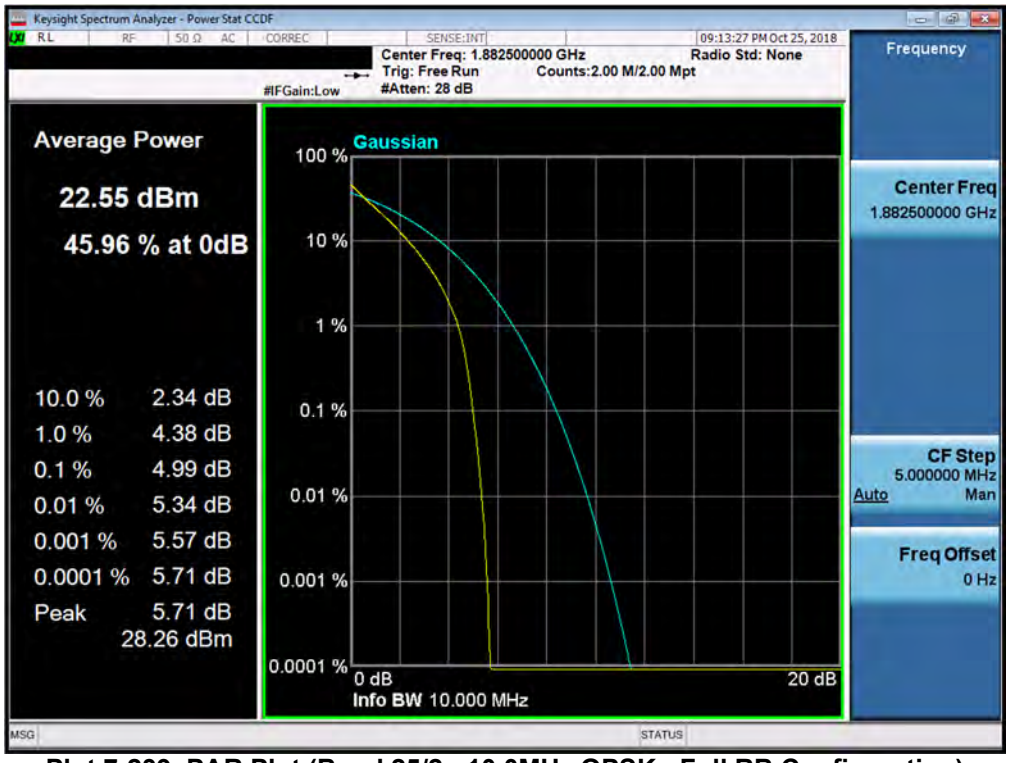
Plot 7-236. PAR Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



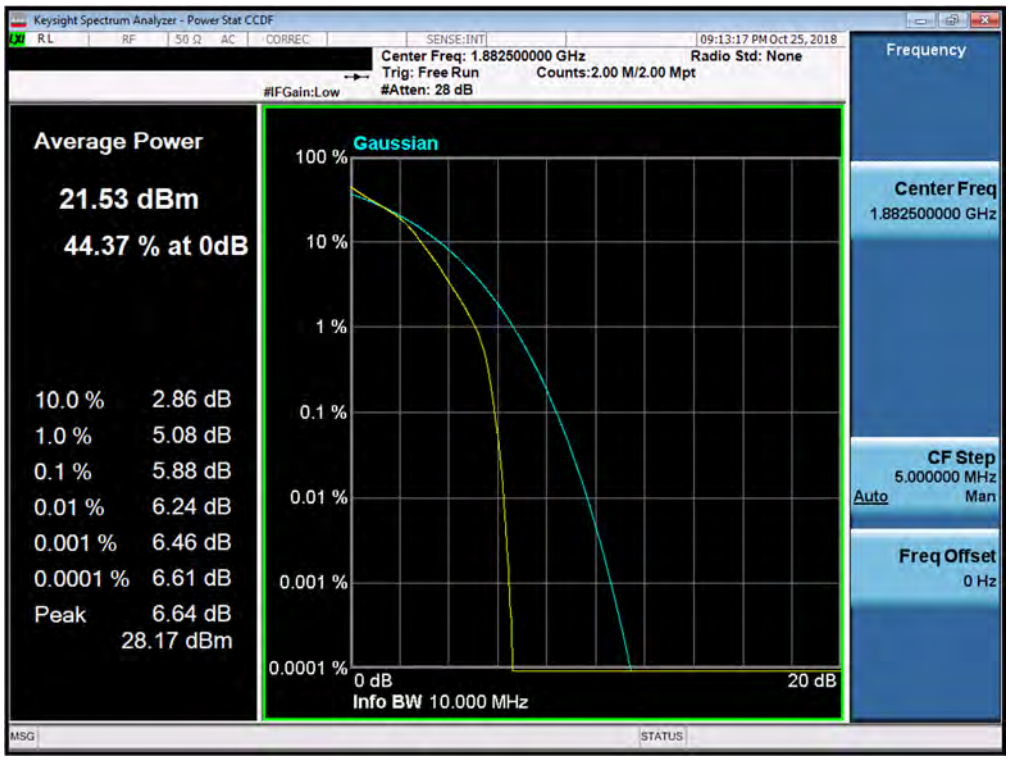
Plot 7-237. PAR Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)



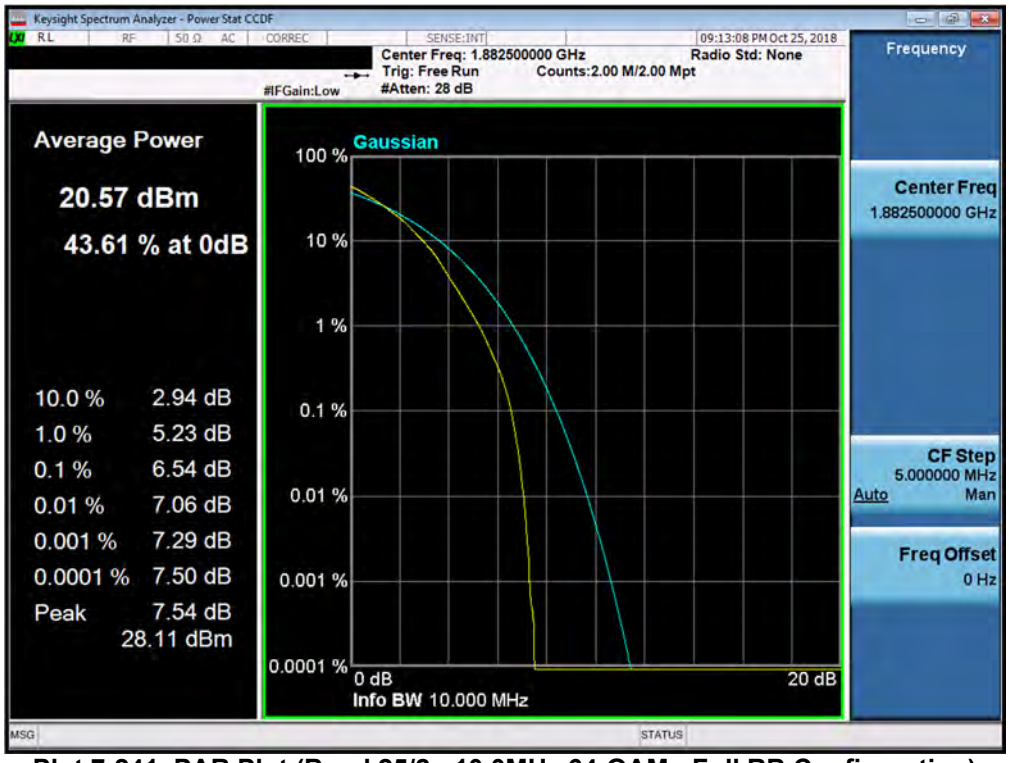
Plot 7-238. PAR Plot (Band 25/2 - 5.0MHz 64-QAM - Full RB Configuration)



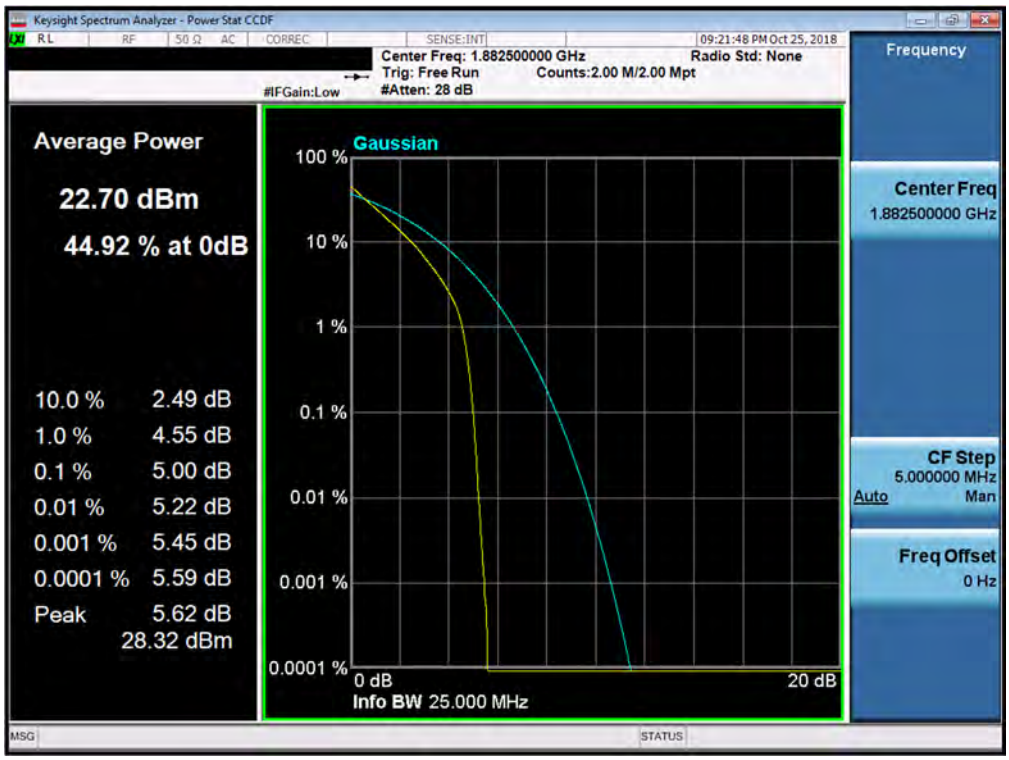
Plot 7-239. PAR Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



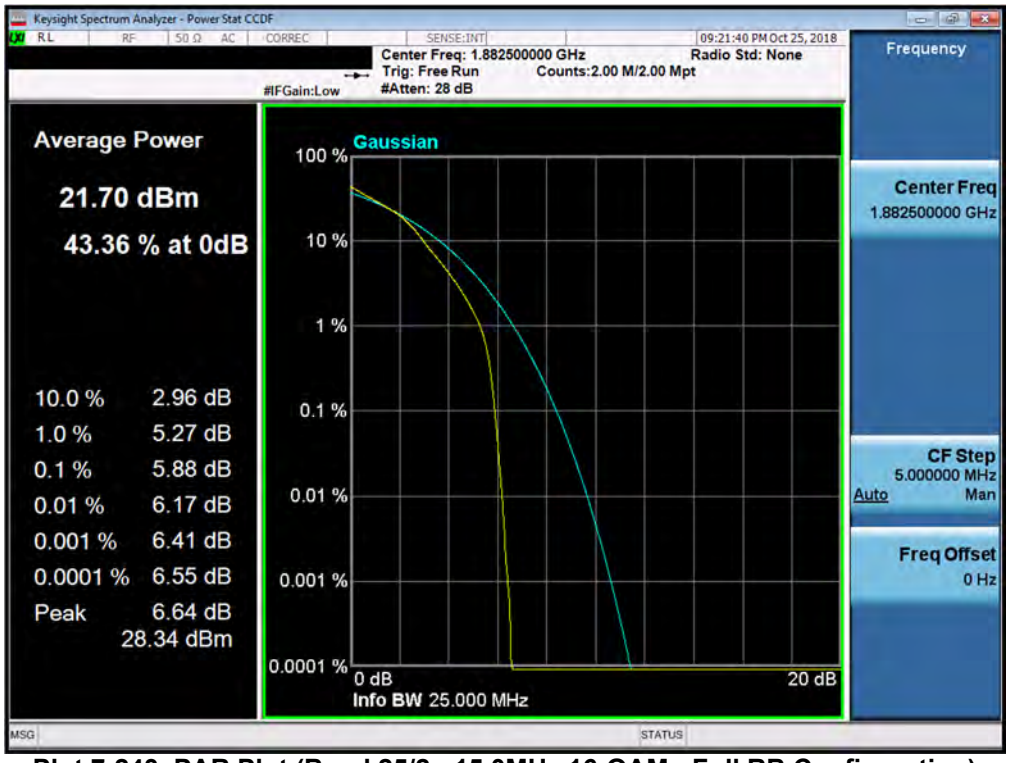
Plot 7-240. PAR Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)



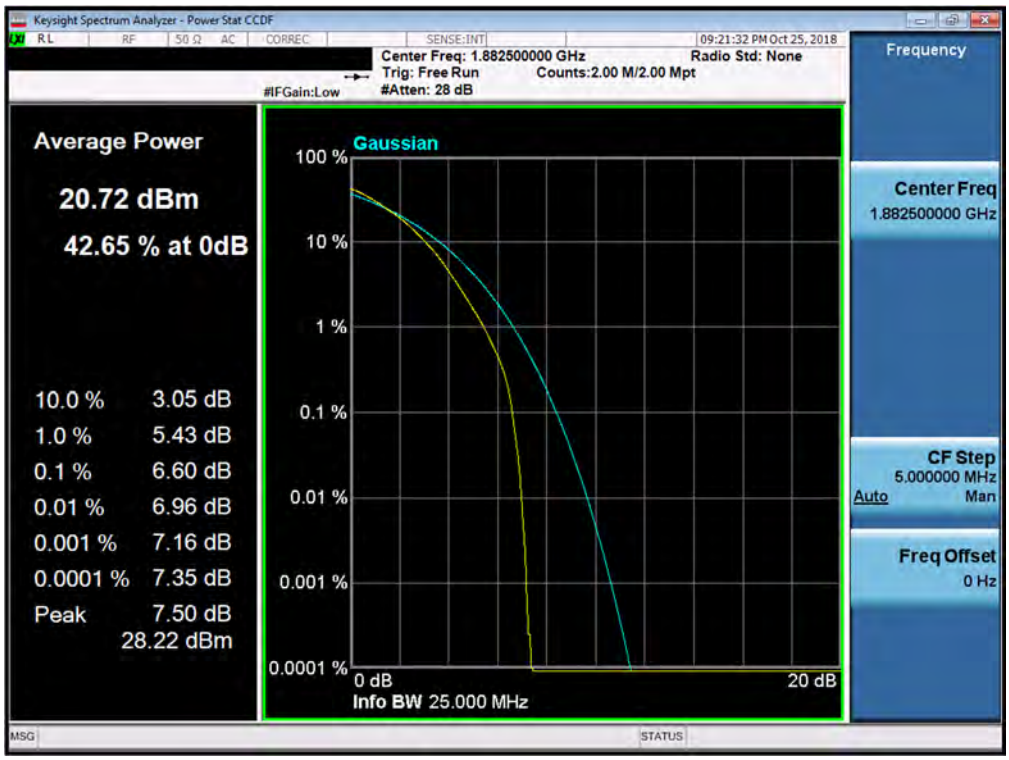
Plot 7-241. PAR Plot (Band 25/2 - 10.0MHz 64-QAM - Full RB Configuration)



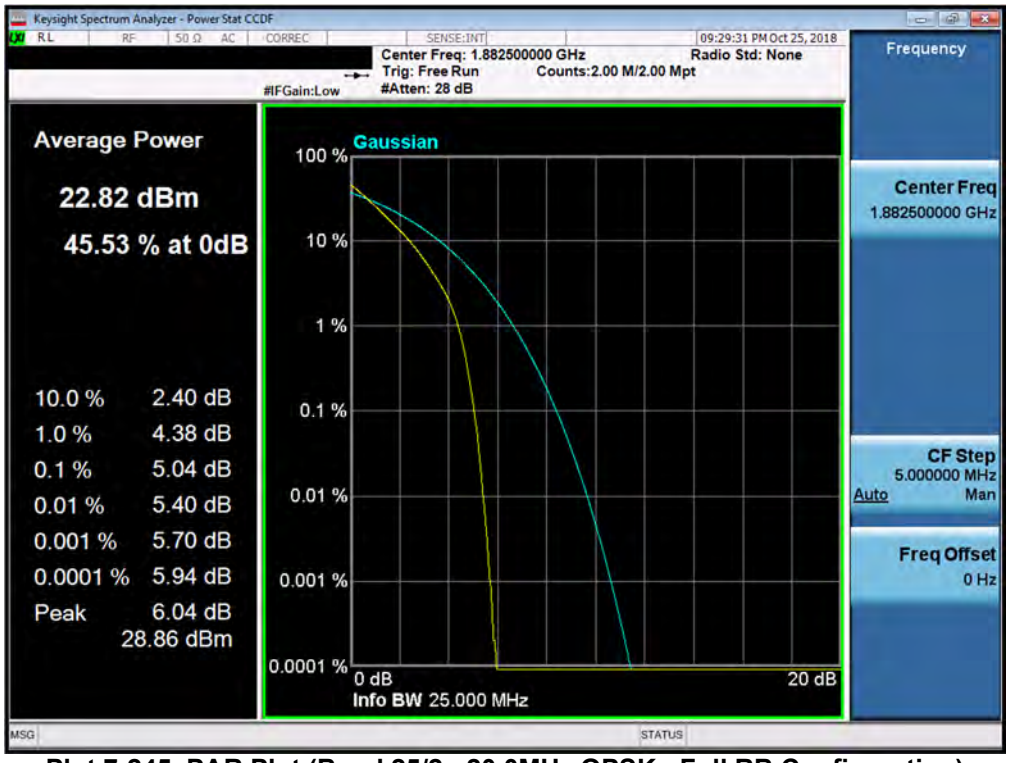
Plot 7-242. PAR Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



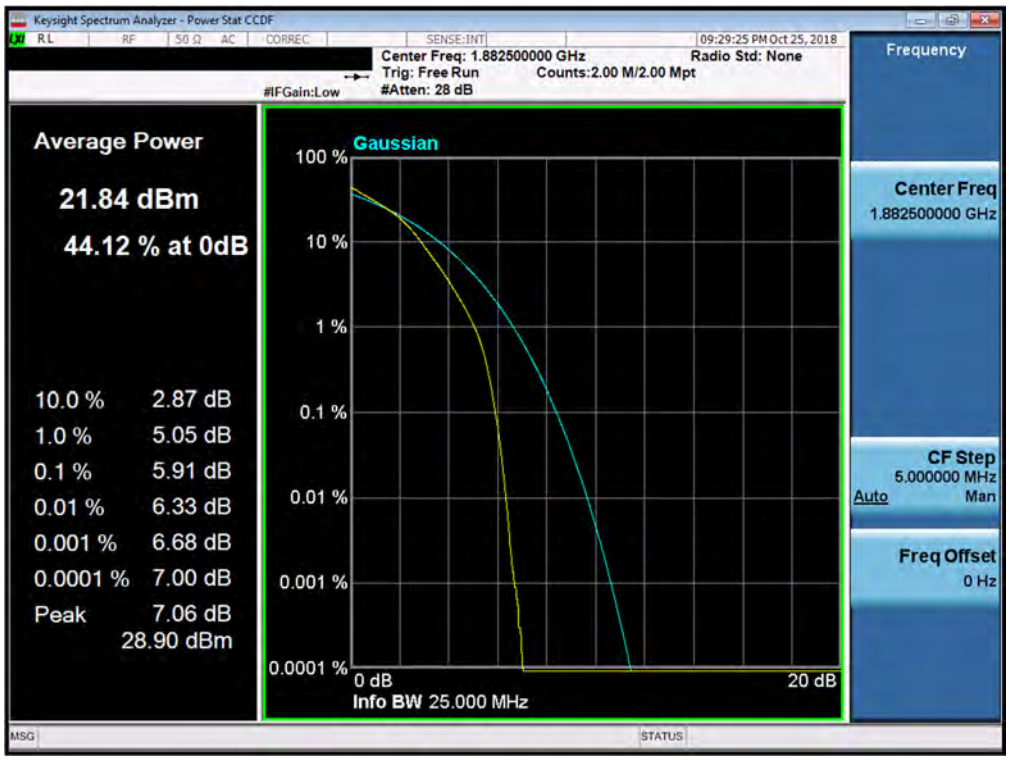
Plot 7-243. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)



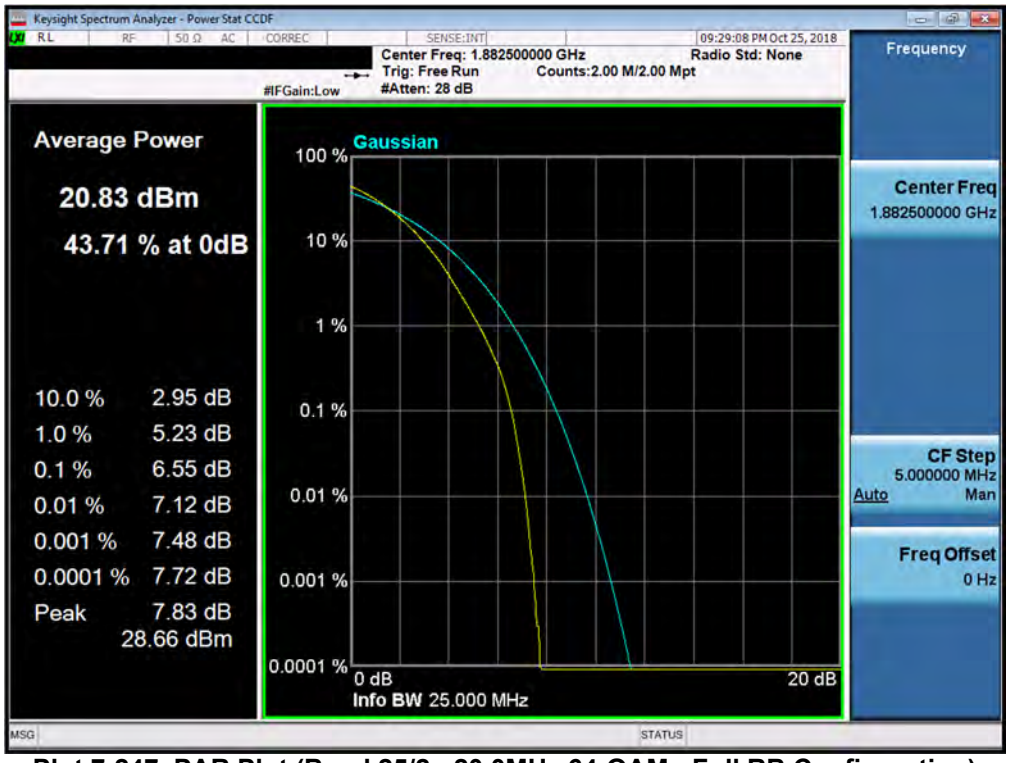
Plot 7-244. PAR Plot (Band 25/2 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-245. PAR Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-246. PAR Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-247. PAR Plot (Band 25/2 - 20.0MHz 64-QAM - Full RB Configuration)

7.6 Uplink Carrier Aggregation

§27.53(m)

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

For Band 41, the minimum permissible attenuation level of any spurious emission is 55 + 10log$_{10}$(P$_{[Watts]}$).

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

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

Figure 7-5. Test Instrument & Measurement Setup

Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.

2. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation, as shown in Table 7-3 and 7-4 below, with both carriers set to transmit using 1RB.

3. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

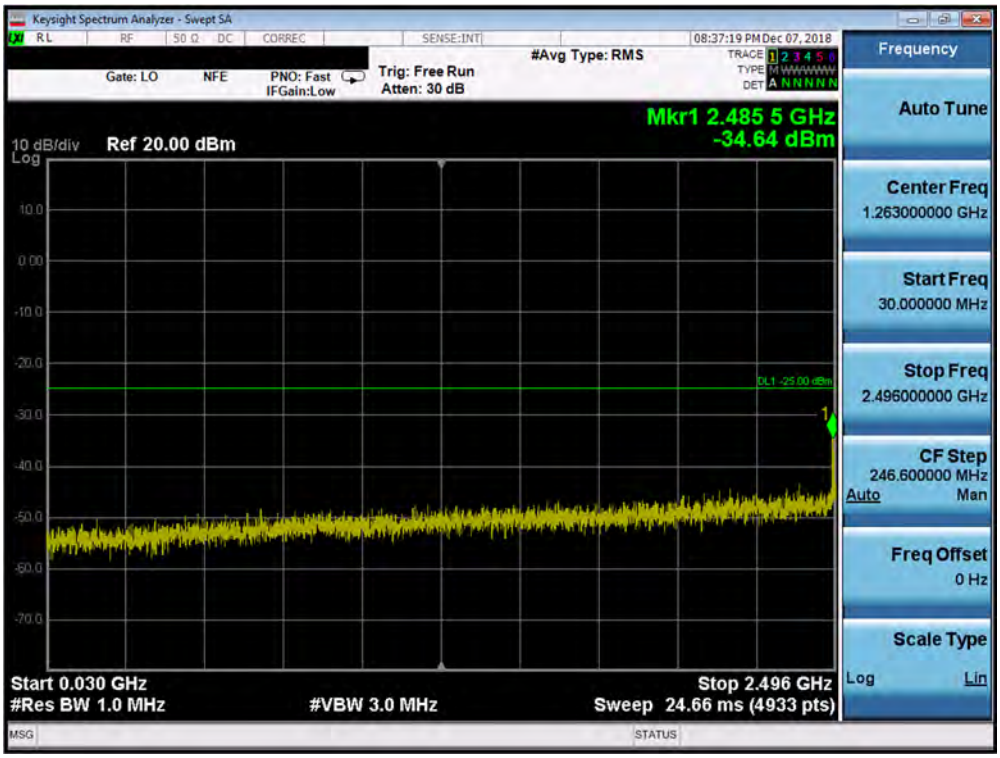
Band 41C – PC3

Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	5	39675	2498.5	QPSK	1	24	LTE B41	20	39792	2510.2	QPSK	1	0	24.46
Max	LTE B41	10	39700	2501	QPSK	1	49	LTE B41	15	39820	2513	QPSK	1	0	24.41
Max	LTE B41	10	39700	2501	QPSK	1	49	LTE B41	20	39844	2515.4	QPSK	1	0	24.38
Max	LTE B41	15	39725	2503.5	QPSK	1	74	LTE B41	10	39845	2515.5	QPSK	1	0	24.63
Max	LTE B41	15	39725	2503.5	QPSK	1	74	LTE B41	15	39875	2518.5	QPSK	1	0	24.54
Max	LTE B41	15	39725	2503.5	QPSK	1	74	LTE B41	20	39896	2520.6	QPSK	1	0	24.49
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	5	39867	2517.7	QPSK	1	0	24.06
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	10	39894	2520.4	QPSK	1	0	24.51
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	15	39921	2523.1	QPSK	1	0	24.66
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	24.28
Max	LTE B41	5	40620	2593	QPSK	1	24	LTE B41	20	40737	2604.7	QPSK	1	0	24.72
Max	LTE B41	10	40620	2593	QPSK	1	49	LTE B41	15	40740	2605	QPSK	1	0	24.22
Max	LTE B41	10	40620	2593	QPSK	1	49	LTE B41	20	40764	2607.4	QPSK	1	0	24.19
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	10	40740	2605	QPSK	1	0	24.25
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	15	40770	2608	QPSK	1	0	24.14
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	20	40791	2610.1	QPSK	1	0	24.17
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	5	40737	2604.7	QPSK	1	0	24.29
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	10	40764	2607.4	QPSK	1	0	24.21
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	15	40791	2610.1	QPSK	1	0	24.25
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	24.74
Max	LTE B41	5	41565	2687.5	QPSK	1	0	LTE B41	20	41448	2675.8	QPSK	1	99	24.30
Max	LTE B41	10	41540	2685	QPSK	1	0	LTE B41	15	41420	2673	QPSK	1	74	24.28
Max	LTE B41	10	41540	2685	QPSK	1	0	LTE B41	20	41396	2670.6	QPSK	1	99	24.33
Max	LTE B41	15	41515	2682.5	QPSK	1	0	LTE B41	10	41395	2670.5	QPSK	1	49	24.12
Max	LTE B41	15	41515	2682.5	QPSK	1	0	LTE B41	15	41365	2667.5	QPSK	1	74	24.14
Max	LTE B41	15	41515	2682.5	QPSK	1	0	LTE B41	20	41344	2665.4	QPSK	1	99	24.17
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	5	41373	2668.3	QPSK	1	24	24.04
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	10	41346	2665.6	QPSK	1	49	24.06
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	15	41319	2662.9	QPSK	1	74	24.13
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	24.16

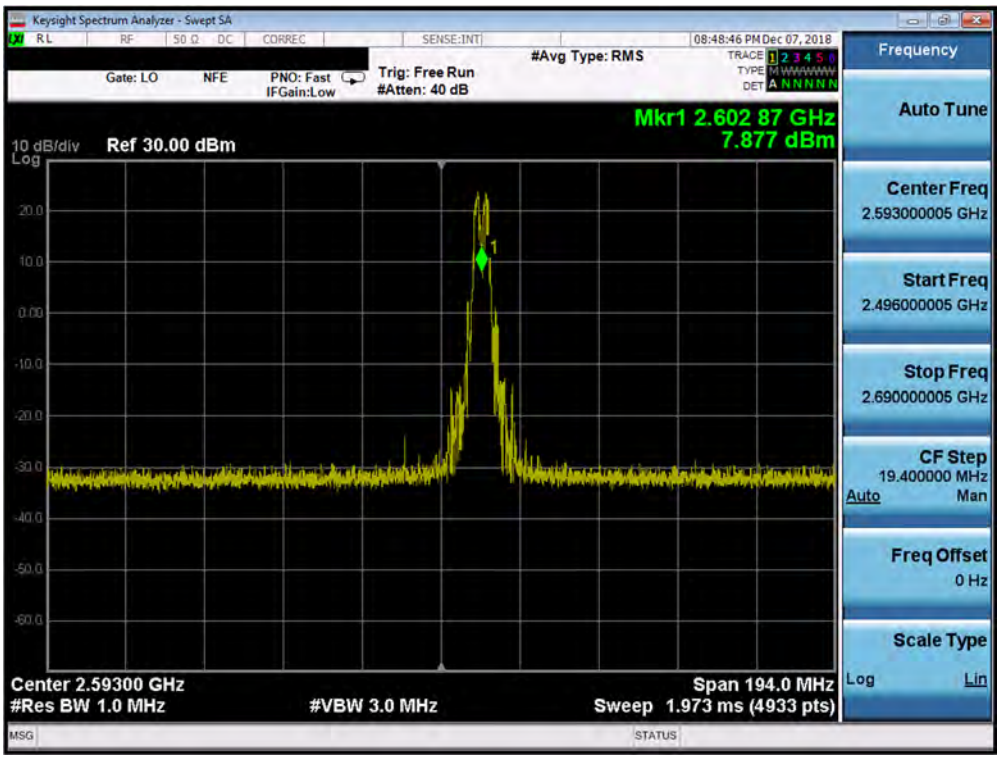
Table 7-3. Conducted Powers (41C – PC3)

Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	40620	2593	QPSK	1	0	LTE B41	20	40818	2612.8	QPSK	1	0	18.57
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	99	18.59
Max	LTE B41	20	40620	2593	QPSK	1	0	LTE B41	20	40818	2612.8	QPSK	1	99	15.91
Max	LTE B41	20	40620	2593	QPSK	1	50	LTE B41	20	40818	2612.8	QPSK	1	50	20.02
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	24.74
Max	LTE B41	20	40620	2593	QPSK	100	0	LTE B41	20	40818	2612.8	QPSK	100	0	22.87
Max	LTE B41	20	40620	2593	16-QAM	100	0	LTE B41	20	40818	2612.8	16-QAM	100	0	21.79
Max	LTE B41	20	40620	2593	64-QAM	100	0	LTE B41	20	40818	2612.8	64-QAM	100	0	21.09

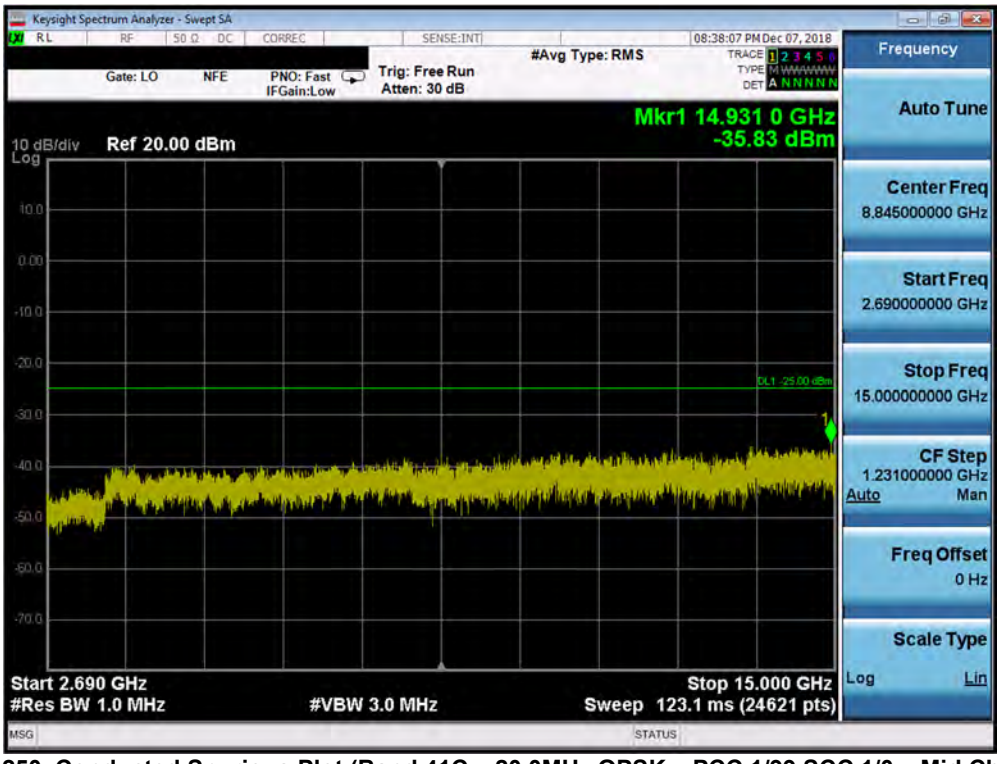
Table 7-4. Conducted Powers (41C – PC3 with Various Combinations for 20MHz Channel Bandwidth)



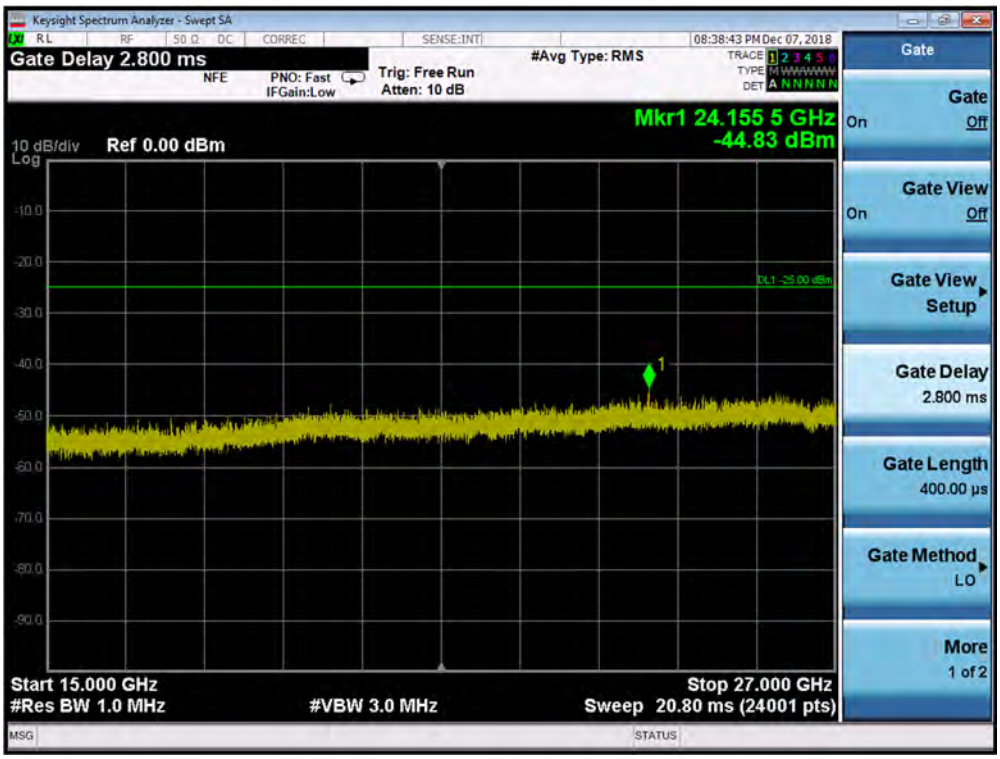
Plot 7-248. Conducted Spurious Plot (Band 41C – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



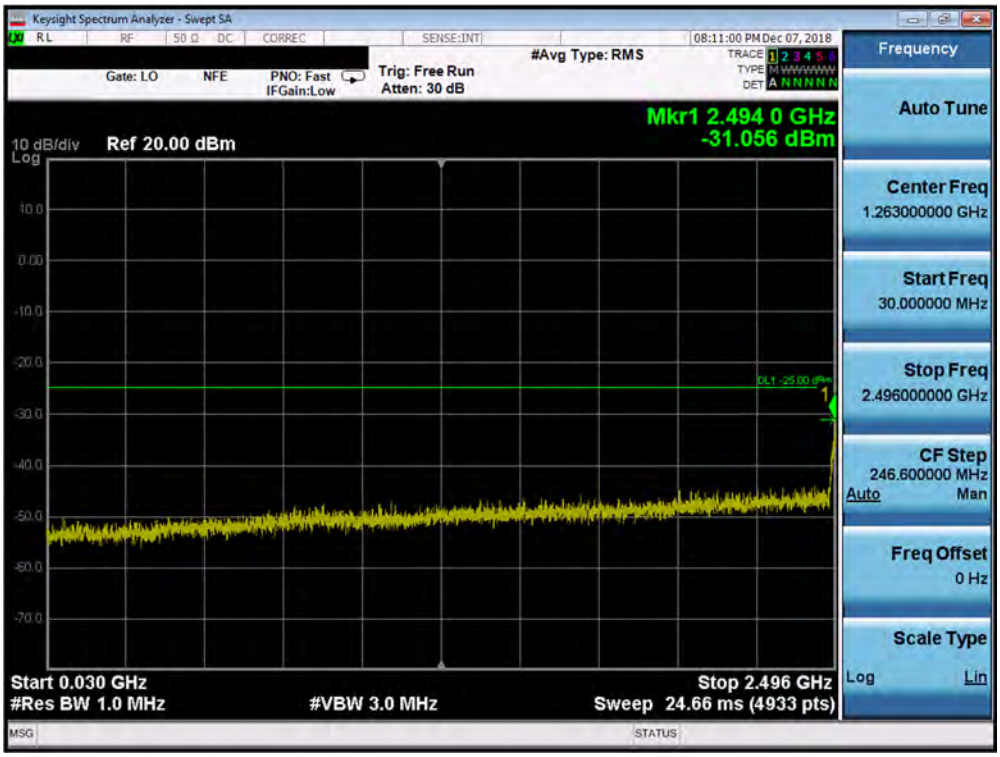
Plot 7-249. Conducted Spurious Plot (Band 41C – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



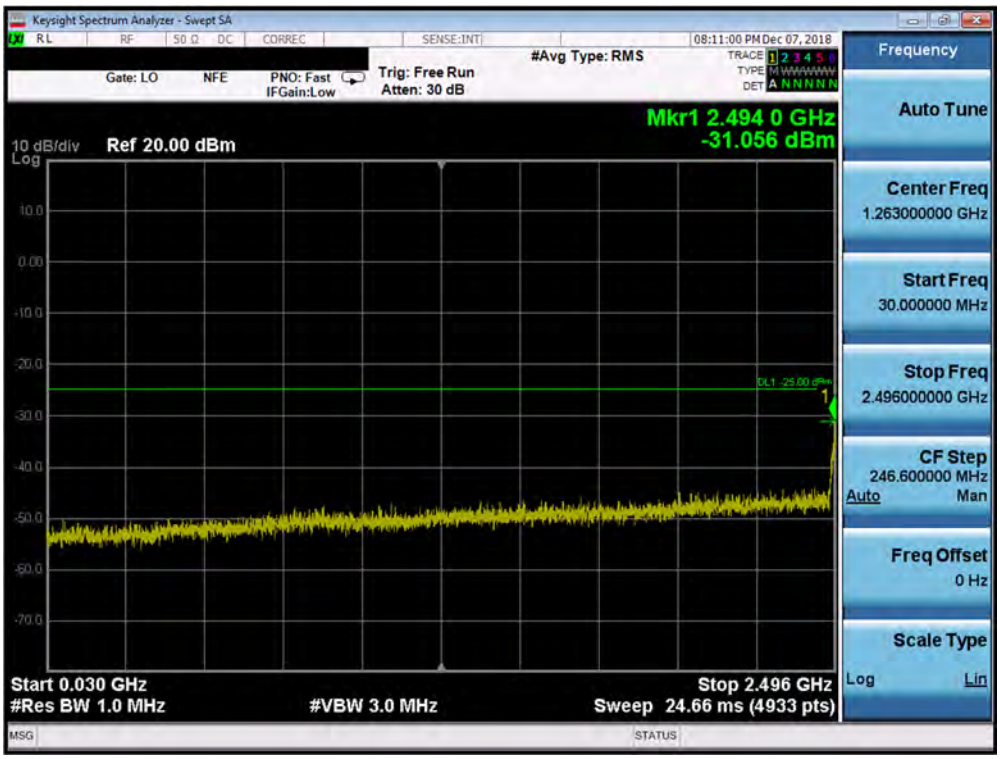
Plot 7-250. Conducted Spurious Plot (Band 41C – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



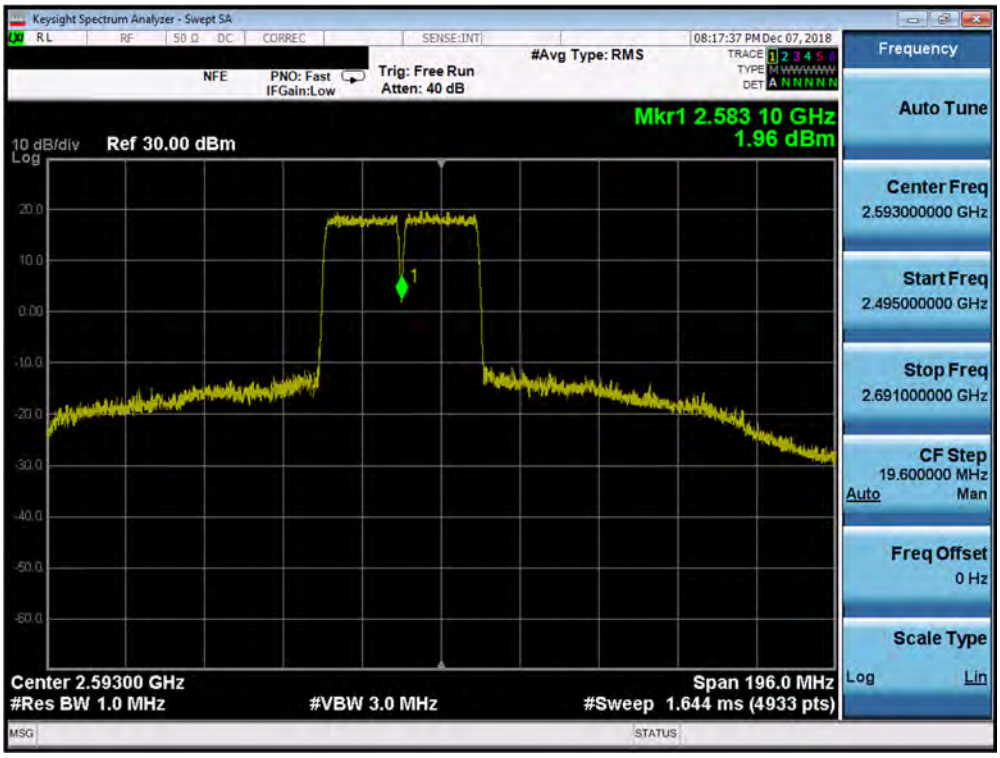
Plot 7-251. Conducted Spurious Plot (Band 41C – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



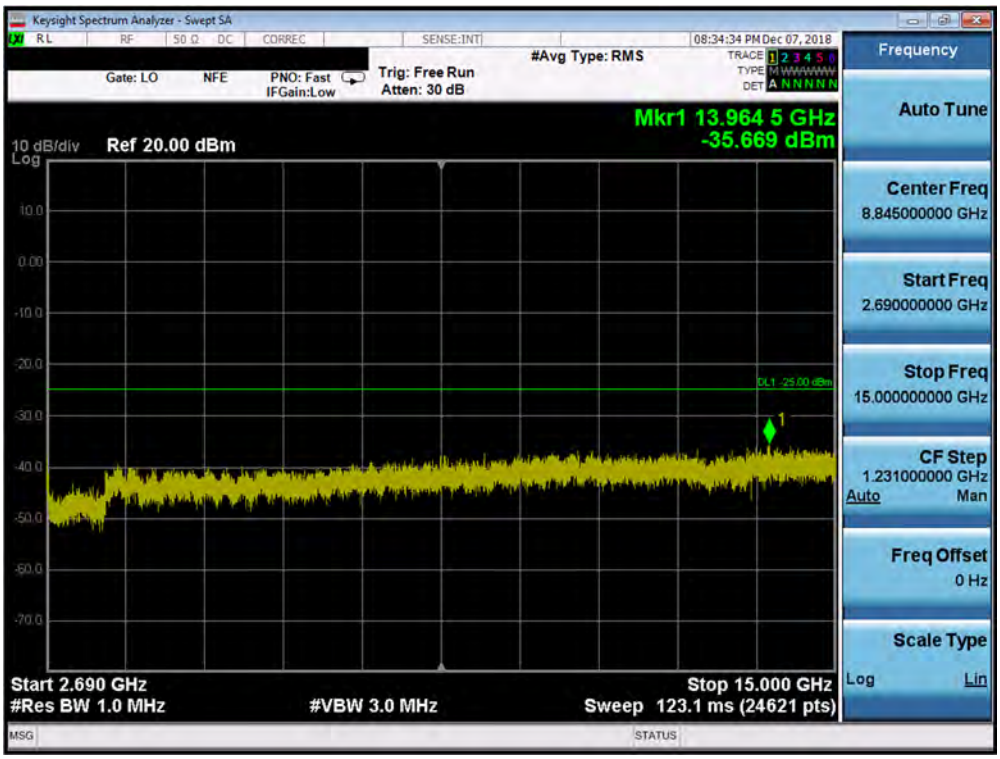
Plot 7-252. Conducted Spurious Plot (Band 41C – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



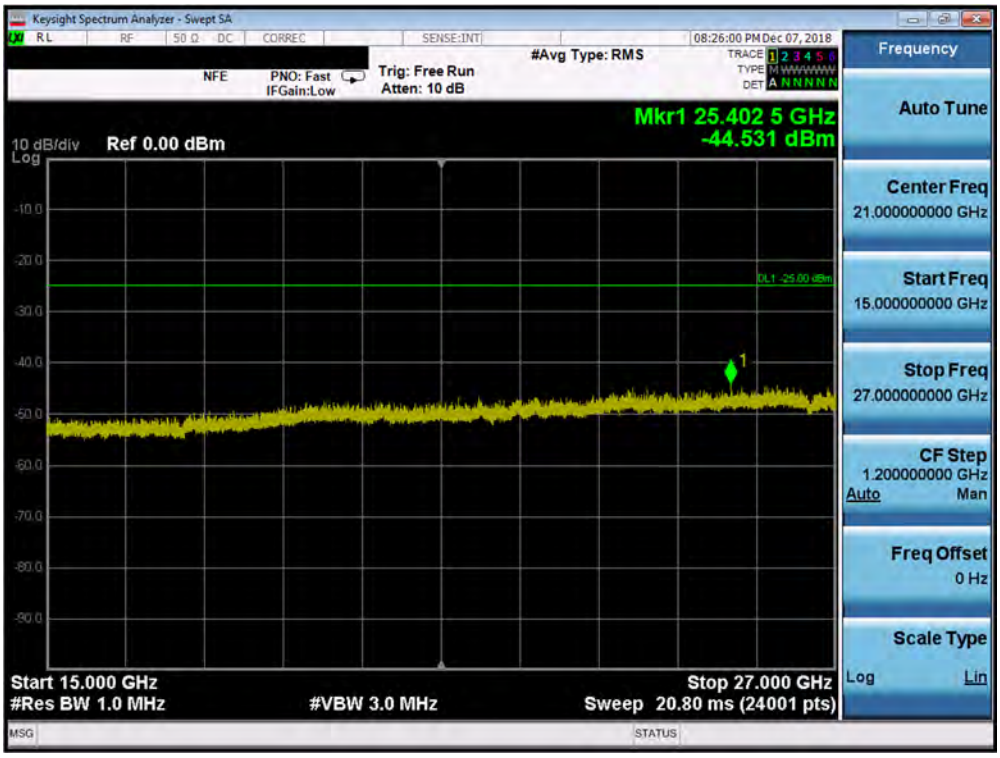
Plot 7-253. Conducted Spurious Plot (Band 41C – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



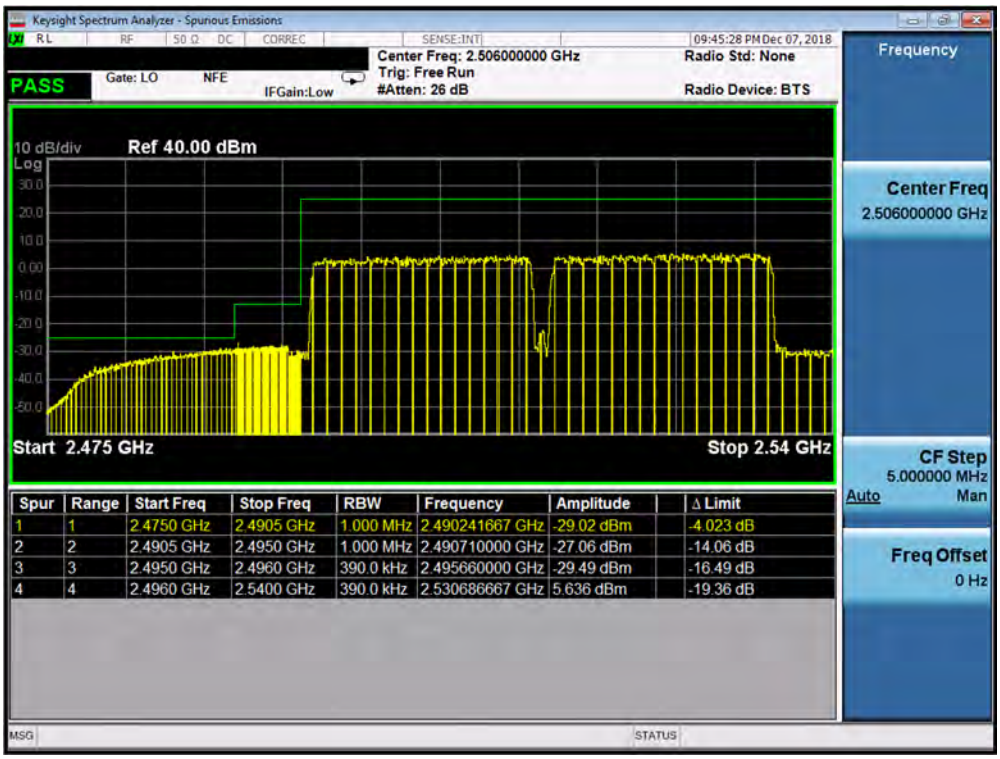
Plot 7-254. Conducted Spurious Plot (Band 41C – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



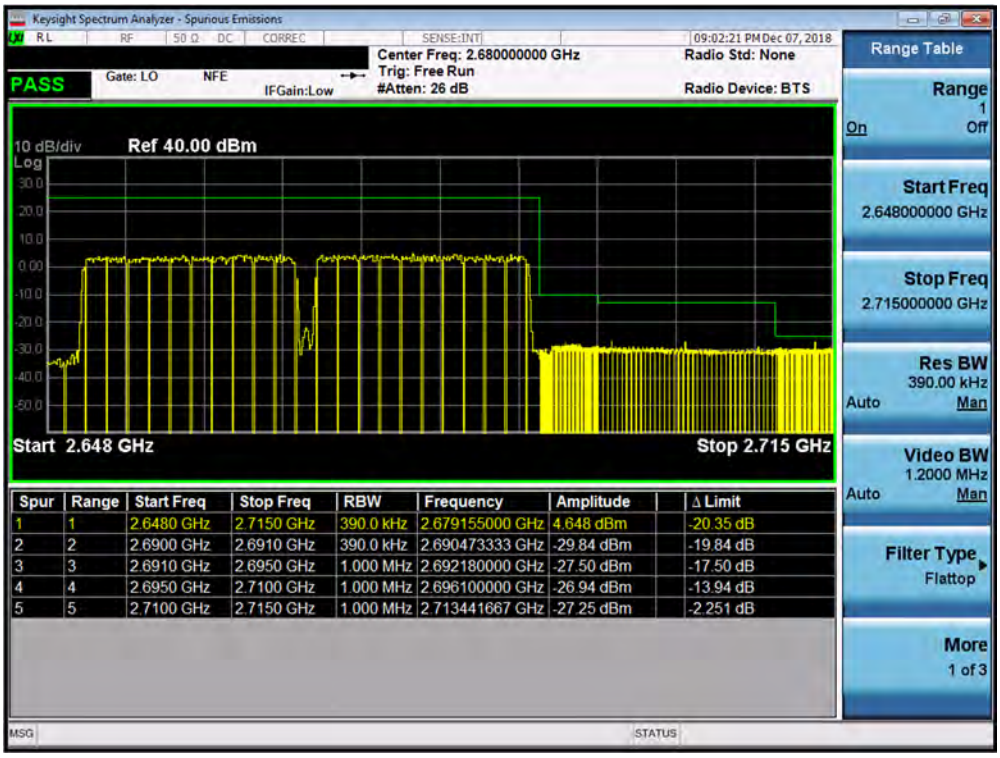
Plot 7-255. Conducted Spurious Plot (Band 41C – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



Plot 7-256. Conducted Spurious Plot (Band 41C – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



Plot 7-257. Lower ACP Plot (Band 41C – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



Plot 7-258. Upper ACP Plot (Band 41C – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

7.7 Radiated Power (ERP/EIRP)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 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.

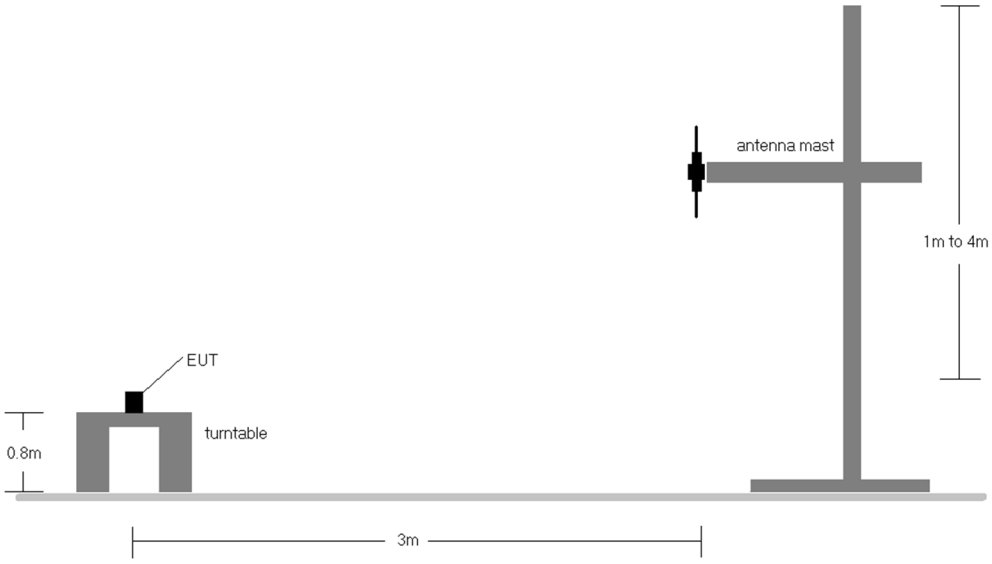


Figure 7-6. Radiated Test Setup <1GHz

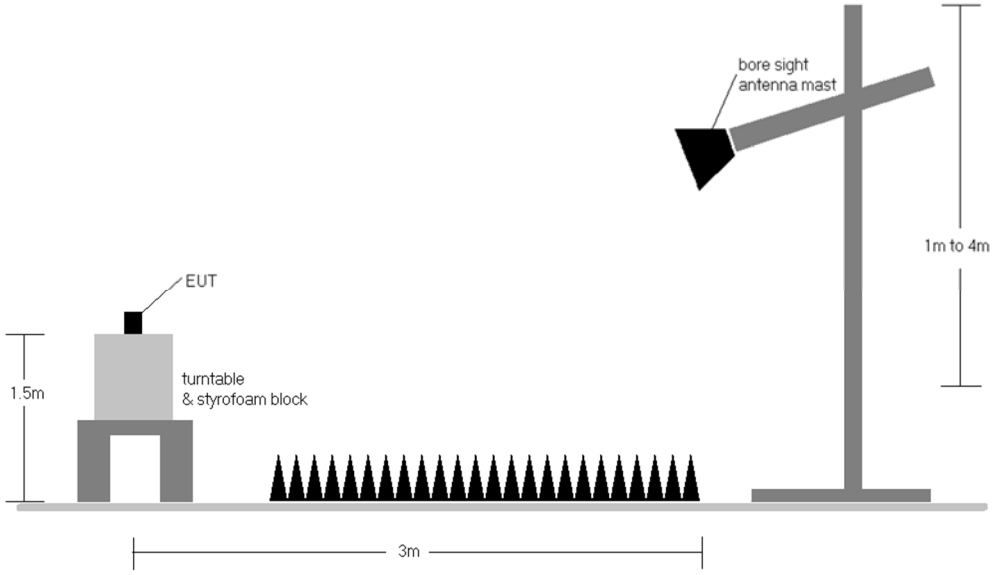


Figure 7-7. Radiated Test Setup >1GHz

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.

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]
699.70	1.4	QPSK	H	298	281	1 / 5	14.98	4.00	16.83	0.048	34.77	-17.94	18.98	0.079	36.99	-18.01
707.50	1.4	QPSK	H	298	281	1 / 0	14.72	4.22	16.79	0.048	34.77	-17.99	18.94	0.078	36.99	-18.05
715.30	1.4	QPSK	H	298	281	1 / 5	15.03	4.44	**17.32**	0.054	34.77	-17.45	**19.47**	0.088	36.99	-17.52
715.30	1.4	16-QAM	H	298	281	1 / 5	14.51	4.44	**16.80**	0.048	34.77	-17.97	**18.95**	0.078	36.99	-18.04
715.30	1.4	64-QAM	H	298	281	1 / 5	13.10	4.44	**15.39**	0.035	34.77	-19.38	**17.54**	0.057	36.99	-19.45
700.50	3	QPSK	H	296	279	1 / 14	15.47	4.01	17.33	0.054	34.77	-17.44	19.48	0.089	36.99	-17.51
707.50	3	QPSK	H	296	279	1 / 0	15.30	4.22	17.37	0.055	34.77	-17.41	19.52	0.089	36.99	-17.47
714.50	3	QPSK	H	296	279	1 / 14	15.38	4.41	**17.64**	0.058	34.77	-17.13	**19.79**	0.095	36.99	-17.20
714.50	3	16-QAM	H	296	279	1 / 14	14.48	4.41	**16.74**	0.047	34.77	-18.03	**18.89**	0.078	36.99	-18.10
714.50	3	64-QAM	H	296	279	1 / 0	13.49	4.41	**15.75**	0.038	34.77	-19.02	**17.90**	0.062	36.99	-19.09
701.50	5	QPSK	H	296	286	1 / 24	15.49	4.04	17.38	0.055	34.77	-17.39	19.53	0.090	36.99	-17.46
707.50	5	QPSK	H	300	287	1 / 24	15.61	4.22	17.68	0.059	34.77	-17.10	19.83	0.096	36.99	-17.16
713.50	5	QPSK	H	302	282	1 / 24	15.54	4.39	**17.78**	**0.060**	34.77	-16.99	**19.93**	**0.098**	36.99	-17.06
713.50	5	16-QAM	H	302	282	1 / 24	14.75	4.39	**16.99**	0.050	34.77	-17.78	**19.14**	0.082	36.99	-17.85
713.50	5	64-QAM	H	302	282	1 / 24	13.15	4.39	**15.39**	0.035	34.77	-19.38	**17.54**	0.057	36.99	-19.45
704.00	10	QPSK	H	300	272	1 / 49	14.56	4.12	16.53	0.045	34.77	-18.25	18.68	0.074	36.99	-18.31
707.50	10	QPSK	H	300	272	1 / 49	14.82	4.22	16.89	0.049	34.77	-17.89	19.04	0.080	36.99	-17.95
711.00	10	QPSK	H	300	272	1 / 49	15.33	4.32	**17.50**	0.056	34.77	-17.28	**19.65**	0.092	36.99	-17.34
711.00	10	16-QAM	H	300	272	1 / 49	14.26	4.32	**16.43**	0.044	34.77	-18.35	**18.58**	0.072	36.99	-18.41
711.00	10	64-QAM	H	300	272	1 / 49	13.12	4.32	**15.29**	0.034	34.77	-19.49	**17.44**	0.055	36.99	-19.55
713.50	5	QPSK	V	115	217	1 / 24	13.32	4.39	15.56	0.036	34.77	-19.21	17.71	0.059	36.99	-19.28
713.50	5 (WCP)	QPSK	V	276	251	1 / 24	12.72	4.39	14.96	0.031	34.77	-19.81	17.11	0.051	36.99	-19.88

Table 7-5. ERP Data (Band 12)

Band 13

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	V	183	241	1 / 24	14.89	5.71	18.45	0.070	34.77	-16.32	20.60	0.115	36.99	-16.39
782.00	5	QPSK	V	183	241	1 / 0	14.86	5.77	18.48	0.071	34.77	-16.29	20.63	0.116	36.99	-16.36
784.50	5	QPSK	V	183	241	1 / 0	14.88	5.83	**18.56**	**0.072**	34.77	-16.21	**20.71**	**0.118**	36.99	-16.28
784.50	5	16-QAM	V	183	241	1 / 0	14.10	5.83	**17.78**	0.060	34.77	-16.99	**19.93**	0.098	36.99	-17.06
784.50	5	64-QAM	V	183	241	1 / 0	13.19	5.83	**16.87**	0.049	34.77	-17.90	**19.02**	0.080	36.99	-17.97
782.00	10	QPSK	V	179	238	1 / 0	14.89	5.77	**18.51**	0.071	34.77	-16.26	**20.66**	0.117	36.99	-16.33
782.00	10	16-QAM	V	179	238	1 / 0	14.10	5.77	**17.72**	0.059	34.77	-17.05	**19.87**	0.097	36.99	-17.12
782.00	10	64-QAM	V	179	238	1 / 0	13.49	5.77	**17.11**	0.051	34.77	-17.66	**19.26**	0.084	36.99	-17.73
784.50	5	QPSK	H	250	336	1 / 0	12.22	5.83	15.90	0.039	34.77	-18.87	18.05	0.064	36.99	-18.94
784.50	5 (WCP)	QPSK	H	166	121	1 / 0	9.78	5.83	13.46	0.022	34.77	-21.31	15.61	0.036	36.99	-21.38

Table 7-6. ERP Data (Band 13)

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	V	317	316	1 / 0	13.62	6.75	**18.22**	0.066	38.45	-20.23	**20.37**	0.109	40.61	-20.24
836.50	1.4	QPSK	V	317	316	3 / 2	13.55	6.78	18.18	0.066	38.45	-20.28	20.33	0.108	40.61	-20.28
848.30	1.4	QPSK	V	317	316	1 / 0	12.65	6.80	17.30	0.054	38.45	-21.15	19.45	0.088	40.61	-21.16
824.70	1.4	16-QAM	V	317	316	1 / 0	12.85	6.75	**17.45**	0.056	38.45	-21.00	**19.60**	0.091	40.61	-21.01
824.70	1.4	64-QAM	V	317	316	1 / 0	12.06	6.75	**16.66**	0.046	38.45	-21.79	**18.81**	0.076	40.61	-21.80
825.50	3	QPSK	V	135	6	1 / 0	13.95	6.75	**18.55**	0.072	38.45	-19.90	**20.70**	0.118	40.61	-19.90
836.50	3	QPSK	V	135	6	1 / 0	13.54	6.78	18.17	0.066	38.45	-20.29	20.32	0.108	40.61	-20.29
847.50	3	QPSK	V	135	6	1 / 0	13.54	6.80	18.19	0.066	38.45	-20.26	20.34	0.108	40.61	-20.27
825.50	3	16-QAM	V	135	6	1 / 0	13.20	6.75	**17.80**	0.060	38.45	-20.65	**19.95**	0.099	40.61	-20.65
825.50	3	64-QAM	V	135	6	1 / 0	12.55	6.75	**17.15**	0.052	38.45	-21.30	**19.30**	0.085	40.61	-21.30
826.50	5	QPSK	V	217	8	1 / 0	13.79	6.76	**18.40**	0.069	38.45	-20.06	**20.55**	0.113	40.61	-20.06
836.50	5	QPSK	V	217	8	1 / 0	13.54	6.78	18.17	0.066	38.45	-20.29	20.32	0.108	40.61	-20.29
846.50	5	QPSK	V	217	8	1 / 24	13.36	6.80	18.01	0.063	38.45	-20.45	20.16	0.104	40.61	-20.45
826.50	5	16-QAM	V	217	8	1 / 0	13.06	6.76	**17.67**	0.058	38.45	-20.79	**19.82**	0.096	40.61	-20.79
826.50	5	64-QAM	V	217	8	1 / 0	12.33	6.76	**16.94**	0.049	38.45	-21.52	**19.09**	0.081	40.61	-21.52
829.00	10	QPSK	V	305	141	1 / 0	14.80	6.76	**19.41**	**0.087**	38.45	-19.04	**21.56**	**0.143**	40.61	-19.05
836.50	10	QPSK	V	305	141	1 / 0	14.09	6.78	18.72	0.074	38.45	-19.74	20.87	0.122	40.61	-19.74
844.00	10	QPSK	V	305	141	1 / 0	13.94	6.79	18.58	0.072	38.45	-19.87	20.73	0.118	40.61	-19.88
829.00	10	16-QAM	V	305	141	1 / 0	13.87	6.76	**18.48**	0.070	38.45	-19.97	**20.63**	0.116	40.61	-19.98
829.00	10	64-QAM	V	305	141	1 / 0	12.96	6.76	**17.57**	0.057	38.45	-20.88	**19.72**	0.094	40.61	-20.89
829.00	10	QPSK	H	133	260	1 / 0	11.62	6.76	16.23	0.042	38.45	-22.22	18.38	0.069	40.61	-22.23
829.00	10 (WCP)	QPSK	V	151	90	1 / 0	13.64	6.76	18.25	0.067	38.45	-20.20	20.40	0.110	40.61	-20.21

Table 7-7. 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	V	211	363	1 / 0	14.06	6.77	**18.68**	0.074	38.45	-19.78	**20.83**	0.121	40.61	-19.78
836.50	15	QPSK	V	211	363	1 / 0	13.96	6.78	18.59	0.072	38.45	-19.87	20.74	0.118	40.61	-19.87
841.50	15	QPSK	V	211	363	1 / 0	13.82	6.79	18.46	0.070	38.45	-20.00	20.61	0.115	40.61	-20.00
831.50	15	16-QAM	V	211	363	1 / 0	13.30	6.77	**17.92**	0.062	38.45	-20.54	**20.07**	0.102	40.61	-20.54
831.50	15	64-QAM	V	211	363	1 / 0	12.59	6.77	**17.21**	0.053	38.45	-21.25	**19.36**	0.086	40.61	-21.25

Table 7-8. 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	130	85	1 / 0	11.70	8.16	19.86	0.097	30.00	-10.14
1732.50	1.4	QPSK	H	130	85	1 / 0	12.36	8.18	**20.54**	0.113	30.00	-9.46
1754.30	1.4	QPSK	H	130	85	1 / 0	11.62	8.21	19.83	0.096	30.00	-10.17
1732.50	1.4	16-QAM	H	130	85	1 / 0	11.67	8.18	**19.85**	0.097	30.00	-10.15
1732.50	1.4	64-QAM	H	130	85	1 / 0	11.03	8.18	**19.21**	0.083	30.00	-10.79
1711.50	3	QPSK	H	127	88	1 / 0	11.74	8.16	19.90	0.098	30.00	-10.10
1732.50	3	QPSK	H	127	88	1 / 0	12.29	8.18	**20.47**	0.111	30.00	-9.53
1753.50	3	QPSK	H	127	88	1 / 0	11.60	8.21	19.81	0.096	30.00	-10.19
1732.50	3	16-QAM	H	127	88	1 / 0	11.31	8.18	**19.49**	0.089	30.00	-10.51
1732.50	3	64-QAM	H	127	88	1 / 0	10.46	8.18	**18.64**	0.073	30.00	-11.36
1712.50	5	QPSK	H	263	89	1 / 0	11.34	8.16	19.50	0.089	30.00	-10.50
1732.50	5	QPSK	H	263	89	1 / 0	12.01	8.18	**20.19**	0.104	30.00	-9.81
1752.50	5	QPSK	H	263	89	1 / 0	11.54	8.20	19.74	0.094	30.00	-10.26
1732.50	5	16-QAM	H	263	89	1 / 0	11.29	8.18	**19.47**	0.089	30.00	-10.53
1732.50	5	64-QAM	H	263	89	1 / 0	10.31	8.18	**18.49**	0.071	30.00	-11.51
1715.00	10	QPSK	H	125	81	1 / 0	11.78	8.16	19.94	0.099	30.00	-10.06
1732.50	10	QPSK	H	125	81	1 / 0	12.77	8.18	**20.95**	0.124	30.00	-9.05
1750.00	10	QPSK	H	125	81	1 / 0	11.98	8.20	20.18	0.104	30.00	-9.82
1732.50	10	16-QAM	H	125	81	1 / 0	12.19	8.18	**20.37**	0.109	30.00	-9.63
1732.50	10	64-QAM	H	125	81	1 / 0	11.31	8.18	**19.49**	0.089	30.00	-10.51
1717.50	15	QPSK	H	398	79	1 / 0	11.91	8.16	20.07	0.102	30.00	-9.93
1732.50	15	QPSK	H	398	79	1 / 0	12.41	8.18	**20.59**	0.115	30.00	-9.41
1747.50	15	QPSK	H	398	79	1 / 0	12.29	8.20	20.49	0.112	30.00	-9.51
1732.50	15	16-QAM	H	398	79	1 / 0	11.86	8.18	**20.04**	0.101	30.00	-9.96
1732.50	15	64-QAM	H	398	79	1 / 0	11.20	8.18	**19.38**	0.087	30.00	-10.62
1720.00	20	QPSK	H	106	81	1 / 0	11.43	8.17	19.60	0.091	30.00	-10.40
1732.50	20	QPSK	H	106	81	1 / 0	13.01	8.18	**21.19**	**0.132**	30.00	-8.81
1745.00	20	QPSK	H	106	81	1 / 0	11.28	8.19	19.47	0.089	30.00	-10.53
1732.50	20	16-QAM	H	106	81	1 / 0	11.48	8.18	**19.66**	0.092	30.00	-10.34
1732.50	20	64-QAM	H	106	81	1 / 0	10.89	8.18	**19.07**	0.081	30.00	-10.93
1732.50	20	QPSK	V	149	255	1 / 0	11.65	8.18	19.83	0.096	30.00	-10.17
1732.50	20 (WCP)	QPSK	H	144	271	1 / 0	12.29	8.18	20.47	0.111	30.00	-9.53

Table 7-9. 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	100	134	1 / 5	13.91	8.37	22.28	0.169	33.01	-10.73
1882.50	1.4	QPSK	V	100	134	1 / 5	14.28	8.42	**22.70**	0.186	33.01	-10.31
1914.30	1.4	QPSK	V	100	134	1 / 5	13.74	8.47	22.21	0.166	33.01	-10.80
1882.50	1.4	16-QAM	V	100	134	1 / 5	13.49	8.42	**21.91**	0.155	33.01	-11.10
1882.50	1.4	64-QAM	V	100	134	1 / 5	12.90	8.42	**21.32**	0.135	33.01	-11.69
1851.50	3	QPSK	V	151	132	1 / 0	14.07	8.37	**22.44**	0.175	33.01	-10.57
1882.50	3	QPSK	V	15	132	1 / 14	13.57	8.42	21.99	0.158	33.01	-11.02
1913.50	3	QPSK	V	151	132	1 / 0	12.47	8.47	20.94	0.124	33.01	-12.07
1851.50	3	16-QAM	V	151	132	1 / 14	13.85	8.37	**22.22**	0.167	33.01	-10.79
1851.50	3	64-QAM	V	151	132	1 / 14	12.95	8.37	**21.32**	0.135	33.01	-11.69
1852.50	5	QPSK	V	105	129	1 / 24	14.37	8.37	**22.74**	0.188	33.01	-10.27
1882.50	5	QPSK	V	105	129	1 / 24	14.05	8.42	22.47	0.177	33.01	-10.54
1912.50	5	QPSK	V	105	129	1 / 24	12.84	8.47	21.31	0.135	33.01	-11.70
1852.50	5	16-QAM	V	105	129	1 / 24	13.57	8.37	**21.94**	0.156	33.01	-11.07
1852.50	5	64-QAM	V	105	129	1 / 24	12.98	8.37	**21.35**	0.136	33.01	-11.66
1855.00	10	QPSK	V	102	305	1 / 49	12.98	8.37	21.35	0.137	33.01	-11.66
1882.50	10	QPSK	V	102	305	1 / 49	13.89	8.42	**22.31**	0.170	33.01	-10.70
1910.00	10	QPSK	V	102	305	1 / 49	13.09	8.46	21.55	0.143	33.01	-11.46
1882.50	10	16-QAM	V	102	305	1 / 49	13.08	8.42	**21.50**	0.141	33.01	-11.51
1882.50	10	64-QAM	V	102	305	1 / 49	12.28	8.42	**20.70**	0.117	33.01	-12.31
1857.50	15	QPSK	V	136	313	1 / 0	13.81	8.38	**22.19**	0.166	33.01	-10.82
1882.50	15	QPSK	V	136	313	1 / 0	13.72	8.42	22.14	0.164	33.01	-10.87
1907.50	15	QPSK	V	136	313	1 / 74	12.37	8.46	20.83	0.121	33.01	-12.18
1857.50	15	16-QAM	V	136	313	1 / 0	13.03	8.38	**21.41**	0.138	33.01	-11.60
1857.50	15	64-QAM	V	136	313	1 / 0	12.20	8.38	**20.58**	0.114	33.01	-12.43
1860.00	20	QPSK	V	152	307	1 / 0	14.68	8.38	**23.06**	**0.202**	33.01	-9.95
1882.50	20	QPSK	V	152	307	1 / 0	13.89	8.42	22.31	0.170	33.01	-10.70
1905.00	20	QPSK	V	152	307	1 / 99	13.29	8.45	21.74	0.149	33.01	-11.27
1882.50	20	16-QAM	V	152	307	1 / 0	13.05	8.42	**21.47**	0.140	33.01	-11.54
1882.50	20	64-QAM	V	152	307	1 / 0	12.42	8.42	**20.84**	0.121	33.01	-12.17
1860.00	20	QPSK	H	149	275	1 / 0	13.23	8.38	21.61	0.145	33.01	-11.40
1860.00	20 (WCP)	QPSK	H	149	28	1 / 0	13.61	8.38	21.99	0.158	33.01	-11.02

Table 7-10. 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]
2502.50	5	QPSK	H	119	132	1 / 24	12.36	7.89	20.25	0.106	33.01	-12.76
2593.00	5	QPSK	H	114	118	1 / 0	12.81	7.71	**20.52**	0.113	33.01	-12.49
2687.50	5	QPSK	H	111	131	1 / 24	12.01	7.52	19.53	0.090	33.01	-13.48
2593.00	5	16-QAM	H	114	118	1 / 0	11.90	7.71	**19.61**	0.091	33.01	-13.40
2593.00	5	64-QAM	H	114	118	1 / 0	10.93	7.71	**18.64**	0.073	33.01	-14.37
2505.00	10	QPSK	H	127	204	1 / 49	13.73	7.89	**21.62**	0.145	33.01	-11.39
2593.00	10	QPSK	H	108	198	1 / 49	12.18	7.71	19.89	0.097	33.01	-13.12
2685.00	10	QPSK	H	158	244	1 / 49	13.00	7.53	20.53	0.113	33.01	-12.48
2505.00	10	16-QAM	H	127	204	1 / 49	13.02	7.89	**20.91**	0.123	33.01	-12.10
2505.00	10	64-QAM	H	127	204	1 / 49	11.98	7.89	**19.87**	0.097	33.01	-13.14
2507.50	15	QPSK	H	127	205	1 / 74	13.74	7.88	**21.62**	0.145	33.01	-11.39
2593.00	15	QPSK	H	113	200	1 / 74	12.23	7.71	19.94	0.099	33.01	-13.07
2682.50	15	QPSK	H	158	242	1 / 74	11.41	7.53	18.94	0.078	33.01	-14.07
2507.50	15	16-QAM	H	127	205	1 / 74	13.00	7.88	**20.88**	0.123	33.01	-12.13
2507.50	15	64-QAM	H	127	205	1 / 74	12.10	7.88	**19.98**	0.100	33.01	-13.03
2510.00	20	QPSK	H	125	199	1 / 99	14.78	7.88	**22.66**	**0.184**	33.01	-10.35
2593.00	20	QPSK	H	111	202	1 / 99	12.43	7.71	20.14	0.103	33.01	-12.87
2680.00	20	QPSK	H	155	240	1 / 99	11.61	7.54	19.15	0.082	33.01	-13.87
2510.00	20	16-QAM	H	125	199	1 / 99	13.20	7.88	**21.08**	0.128	33.01	-11.93
2510.00	20	64-QAM	H	125	199	1 / 99	12.50	7.88	**20.38**	0.109	33.01	-12.63
2510.00	20	QPSK	V	108	98	1 / 99	11.91	7.88	19.79	0.095	33.01	-13.22
2510.00	20 (WCP)	QPSK	H	127	155	1 / 99	10.37	7.88	18.25	0.067	33.01	-14.76

Table 7-11. EIRP Data (Band 41)

7.8 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 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.

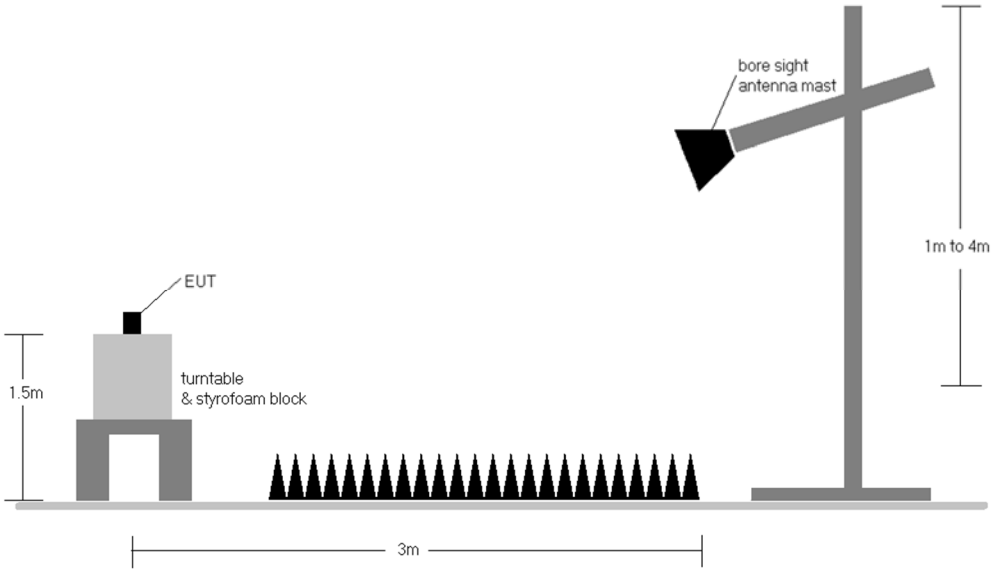


Figure 7-8. Test Instrument & Measurement Setup

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.

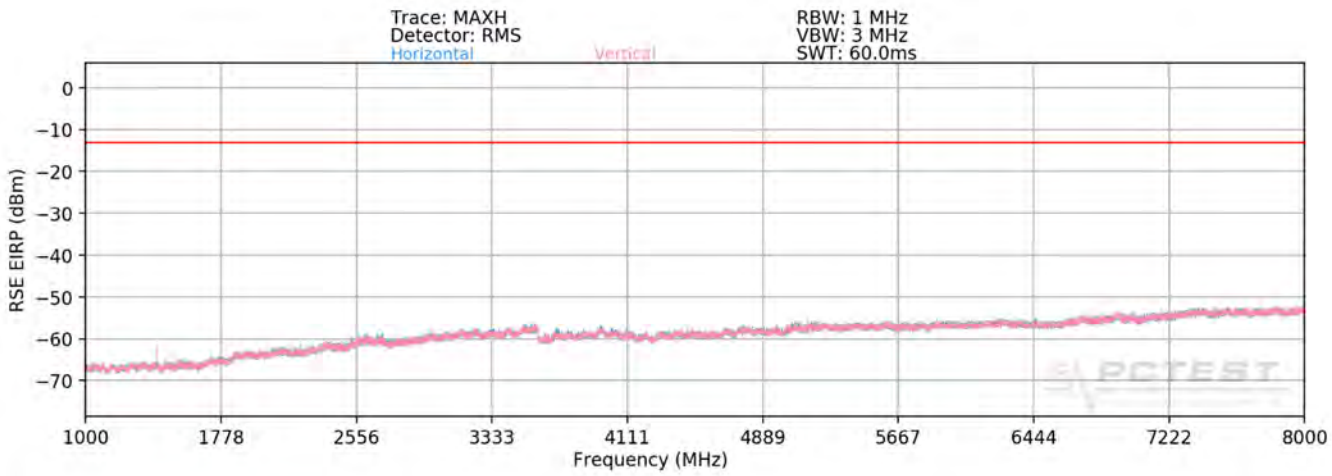
2) This unit was tested with its standard battery.

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 7-259. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY:	700.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
1401.00	H	-	-	-64.00	2.63	-61.37	-48.4
2101.50	H	-	-	-60.40	3.56	-56.83	-43.8

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

OPERATING FREQUENCY:	701.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
1403.00	H	-	-	-64.14	2.65	-61.48	-48.5
2104.50	H	-	-	-60.64	3.56	-57.08	-44.1

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

OPERATING FREQUENCY:	713.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
1427.00	H	-	-	-64.79	2.94	-61.85	-48.9
2140.50	H	-	-	-60.02	3.59	-56.43	-43.4

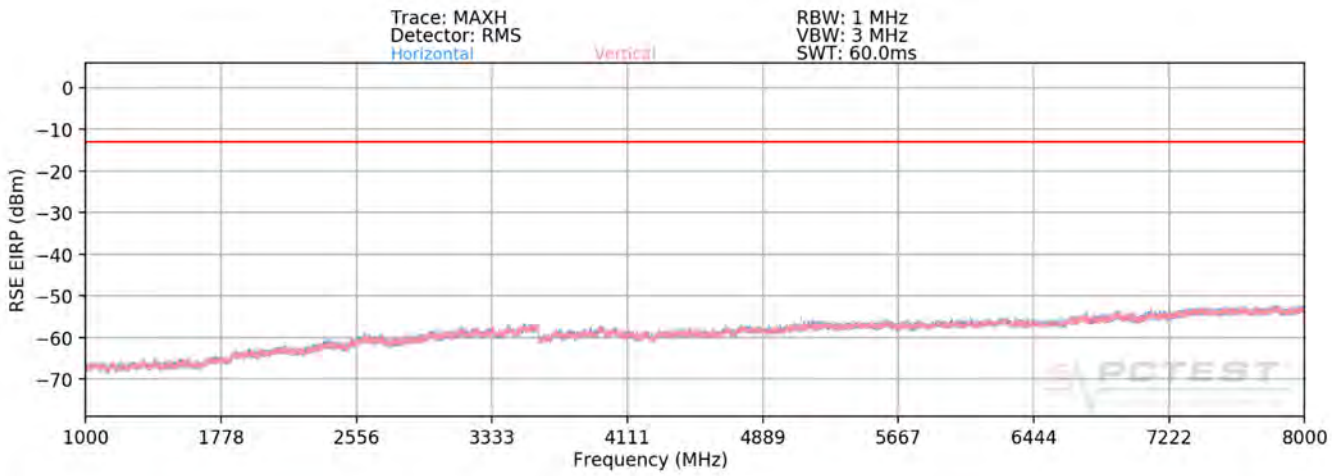
Table 7-14. Radiated Spurious Data (Band 12 – High Channel)

OPERATING FREQUENCY:	713.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
1427.00	H	-	-	-64.02	2.94	-61.08	-48.1
2140.50	H	-	-	-59.99	3.59	-56.40	-43.4

Table 7-15. Radiated Spurious Data with WCP (Band 12 – High Channel)

Band 13



Plot 7-260. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY:	779.50	MHz
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]
2338.50	H	-	-	-62.29	3.99	-58.30	-45.3
3118.00	H	-	-	-61.77	5.37	-56.40	-43.4

Table 7-16. Radiated Spurious Data (Band 13 – Low Channel)

OPERATING FREQUENCY:	782.00	MHz
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]
2346.00	H	-	-	-62.22	4.00	-58.21	-45.2
3128.00	H	-	-	-61.68	5.38	-56.29	-43.3

Table 7-17. Radiated Spurious Data (Band 13 – Mid Channel)

OPERATING FREQUENCY:	784.50	MHz
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]
2353.50	H	-	-	-62.30	4.02	-58.28	-45.3
3138.00	H	-	-	-61.67	5.40	-56.28	-43.3

Table 7-18. Radiated Spurious Data (Band 13 – High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	H	-	-	-65.84	3.53	-62.32	-22.3
1564.00	H	-	-	-65.96	3.53	-62.43	-22.4
1569.00	H	-	-	-65.77	3.53	-62.23	-22.2

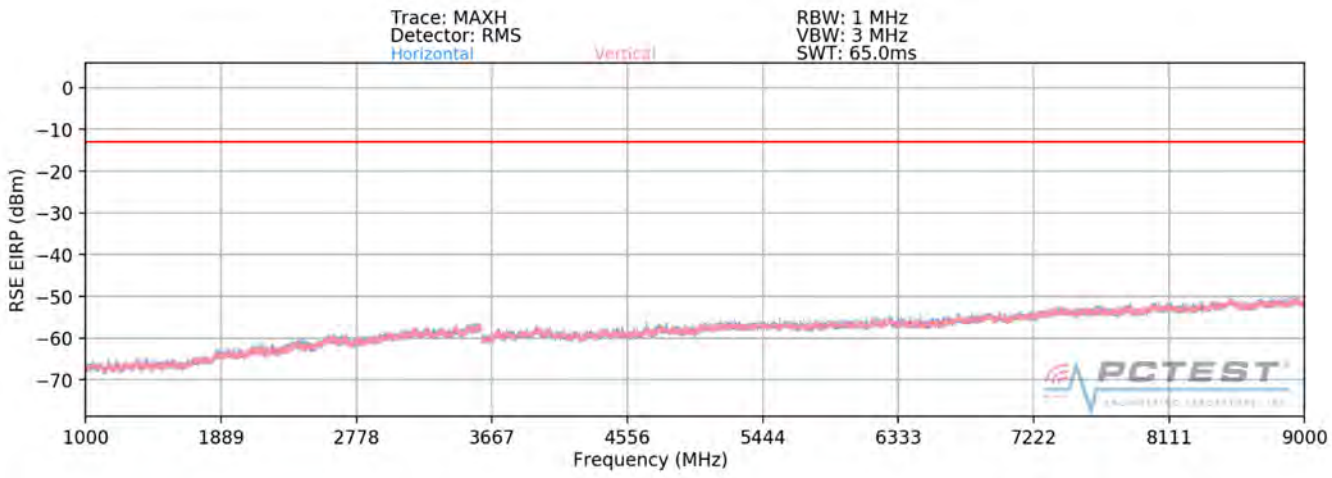
Table 7-19. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

OPERATING FREQUENCY:	784.50	MHz
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]
2353.50	H	-	-	-62.00	4.02	-57.98	-45.0
3138.00	H	-	-	-61.61	5.40	-56.22	-43.2

Table 7-20. Radiated Spurious Data with WCP (Band 13 – High Channel)

Band 26



Plot 7-261. Radiated Spurious Plot above 1GHz (Band 26)

OPERATING FREQUENCY:	826.50	MHz
CHANNEL:	26815	
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]
1653.00	H	-	-	-64.88	3.61	-61.27	-48.3
2479.50	H	-	-	-61.45	4.23	-57.22	-44.2

Table 7-21. Radiated Spurious Data (Band 26 – Low Channel)

OPERATING FREQUENCY:	836.50	MHz
CHANNEL:	26915	
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]
1673.00	H	-	-	-64.90	3.62	-61.28	-48.3
2509.50	H	-	-	-61.16	4.33	-56.82	-43.8

Table 7-22. Radiated Spurious Data (Band 26 – Mid Channel)

OPERATING FREQUENCY:	846.50	MHz
CHANNEL:	27015	
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]
1693.00	H	147	178	-61.04	3.63	-57.41	-44.4
2539.50	H	-	-	-62.42	4.52	-57.91	-44.9
3386.00	H	-	-	-62.60	6.09	-56.51	-43.5

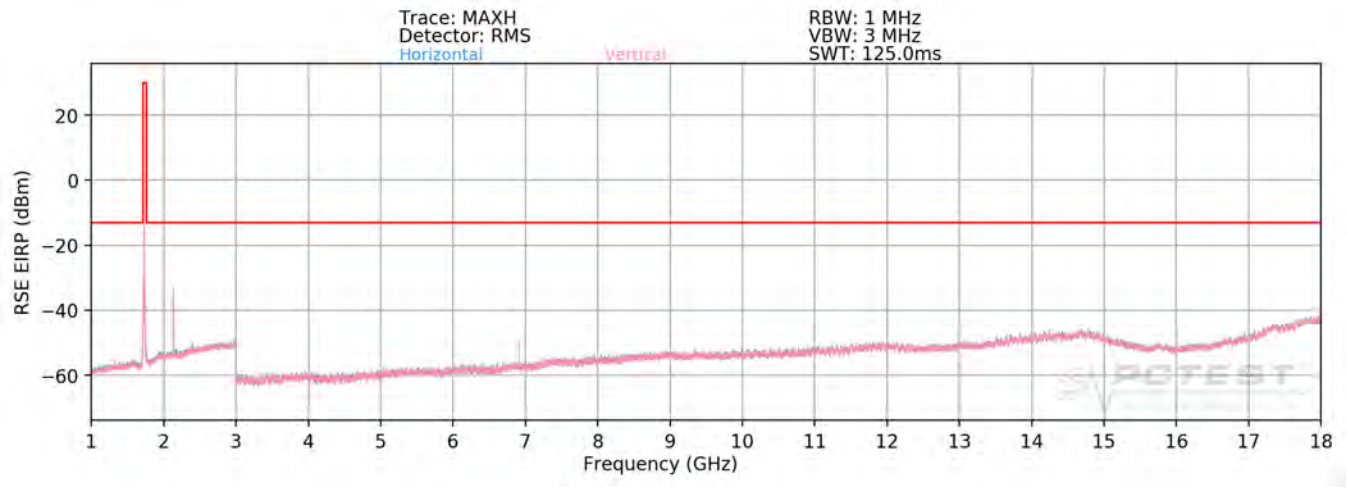
Table 7-23. Radiated Spurious Data (Band 26 – High Channel)

OPERATING FREQUENCY:	846.50	MHz
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]
1693.00	H	147	178	-61.75	3.63	-58.12	-45.1
2539.50	H	-	-	-61.76	4.52	-57.25	-44.2
3386.00	H	-	-	-62.96	6.09	-56.87	-43.9

Table 7-24. Radiated Spurious Data with WCP (Band 26 – High Channel)

Band 4



Plot 7-262. Radiated Spurious Plot above 1GHz (Band 4)

OPERATING FREQUENCY:	1720.00	MHz
CHANNEL:	20050	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3440.00	V	-	-	-61.43	6.22	-55.22	-42.2
5160.00	V	203	337	-61.04	8.68	-52.37	-39.4
6880.00	V	101	330	-54.28	8.76	-45.52	-32.5
8600.00	V	-	-	-58.37	9.17	-49.20	-36.2
10320.00	V	-	-	-57.16	9.64	-47.52	-34.5

Table 7-25. Radiated Spurious Data (Band 4 – Low Channel)

OPERATING FREQUENCY:	1732.50	MHz
CHANNEL:	20175	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3465.00	V	400	287	-61.01	6.27	-54.75	-41.7
5197.50	V	-	-	-62.65	8.71	-53.94	-40.9
6930.00	V	100	341	-56.22	8.72	-47.51	-34.5
8662.50	V	-	-	-58.24	9.27	-48.97	-36.0
10395.00	V	-	-	-56.79	9.61	-47.18	-34.2

Table 7-26. Radiated Spurious Data (Band 4 – Mid Channel)

OPERATING FREQUENCY:	1745.00	MHz
CHANNEL:	20300	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	V	387	252	-61.59	6.32	-55.27	-42.3
5235.00	V	-	-	-62.48	8.71	-53.76	-40.8
6980.00	V	-	-	-59.58	8.74	-50.85	-37.8

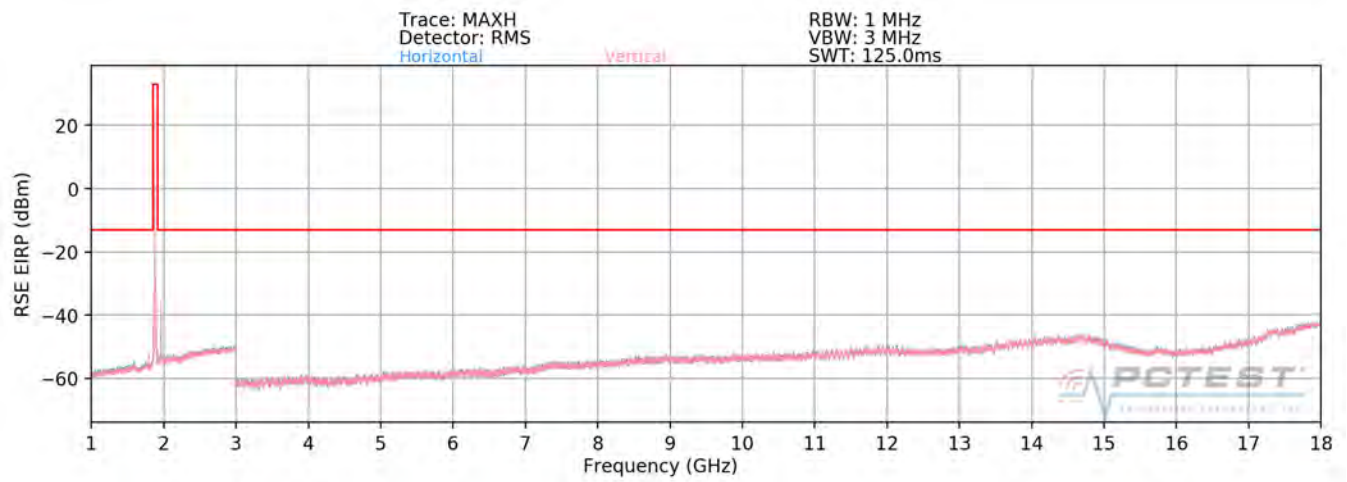
Table 7-27. Radiated Spurious Data (Band 4 – High Channel)

OPERATING FREQUENCY:	1732.50	MHz
CHANNEL:	20175	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3465.00	H	127	41	-60.45	6.27	-54.19	-41.2
5197.50	H	-	-	-63.05	8.71	-54.34	-41.3
6930.00	H	222	152	-57.36	8.72	-48.65	-35.6
8662.50	H	-	-	-58.70	9.27	-49.43	-36.4
10395.00	H	-	-	-56.79	9.61	-47.18	-34.2

Table 7-28. Radiated Spurious Data with WCP (Band 4 – Mid Channel)

Band 25



Plot 7-263. Radiated Spurious Plot above 1GHz (Band 25)

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	V	-	-	-62.40	6.58	-55.82	-42.8
5580.00	V	-	-	-61.79	8.74	-53.06	-40.1

Table 7-29. Radiated Spurious Data (Band 25 – 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	V	-	-	-61.87	6.70	-55.18	-42.2
5647.50	V	277	169	-60.34	8.83	-51.51	-38.5
7530.00	V	304	164	-54.92	8.46	-46.47	-33.5
9412.50	V	-	-	-55.82	9.32	-46.49	-33.5

Table 7-30. Radiated Spurious Data (Band 25 – 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	V	-	-	-61.78	6.94	-54.84	-41.8
5715.00	V	-	-	-62.47	8.77	-53.71	-40.7

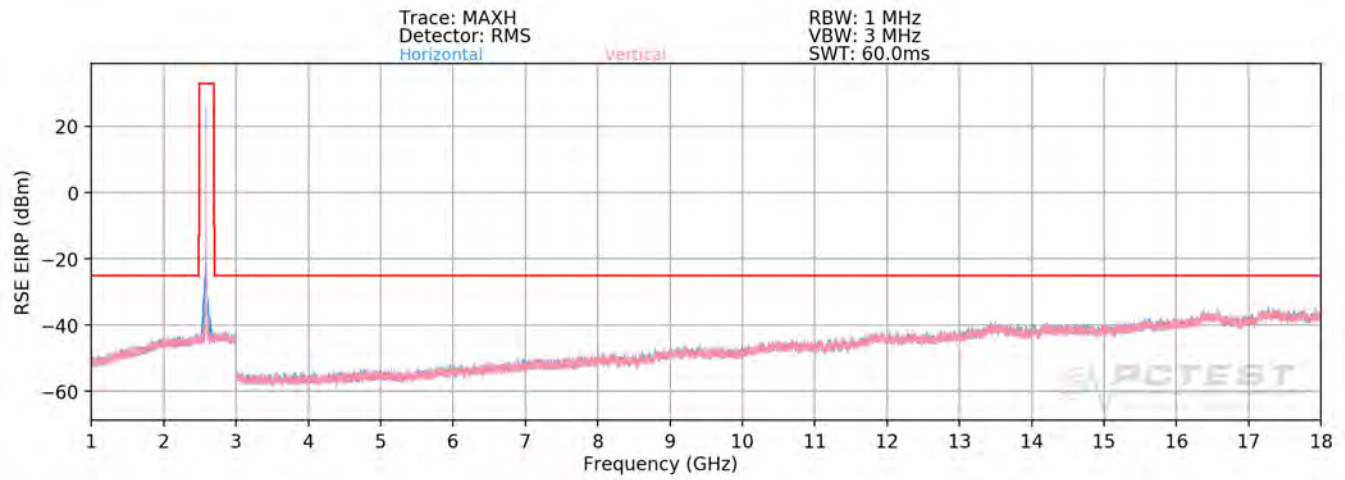
Table 7-31. Radiated Spurious Data (Band 25 – High Channel)

OPERATING FREQUENCY:	1882.50	MHz
CHANNEL:	26365	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

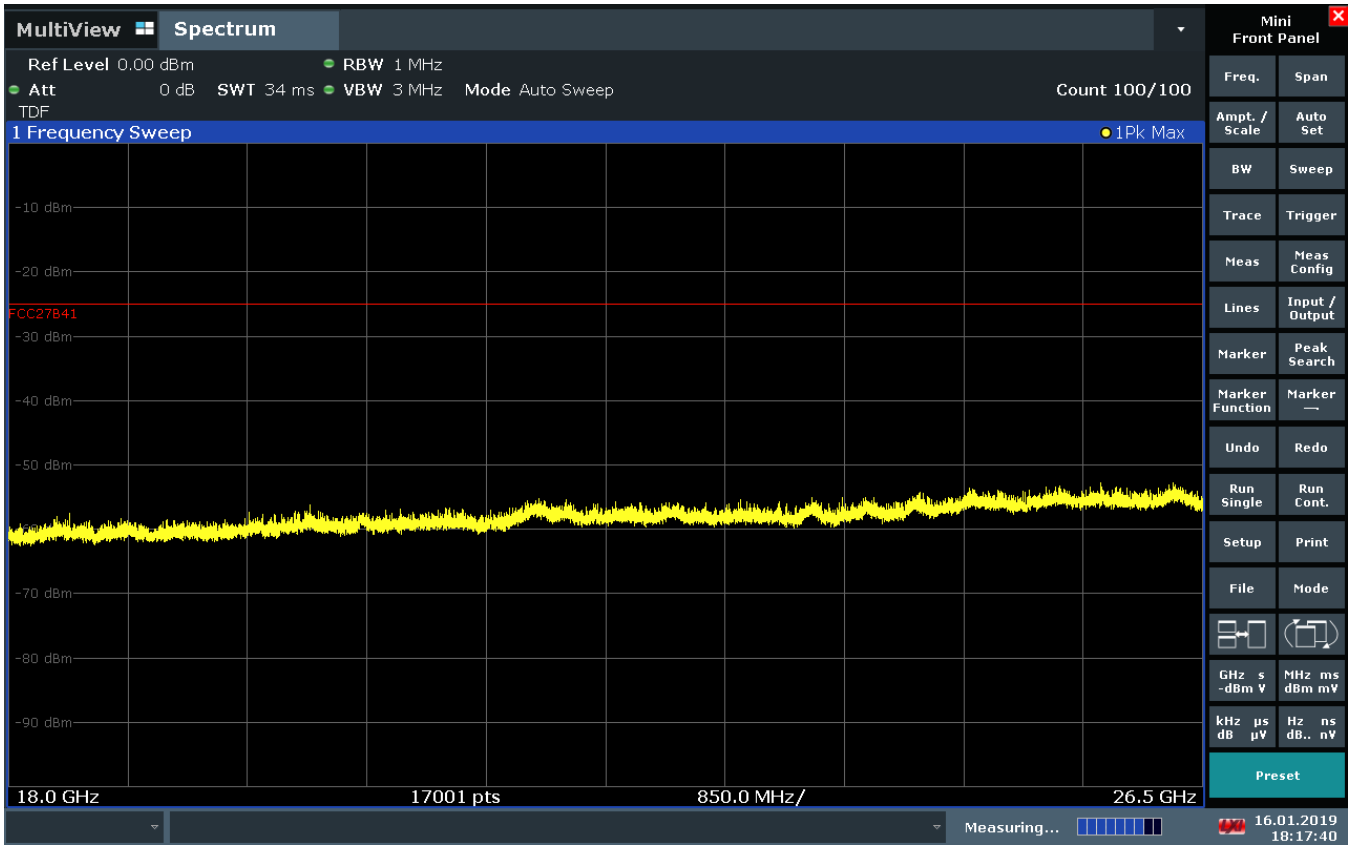
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	-	-	-62.18	6.70	-55.48	-42.5
5647.50	H	-	-	-62.24	8.83	-53.42	-40.4

Table 7-32. Radiated Spurious Data with WCP (Band 25 – Mid Channel)

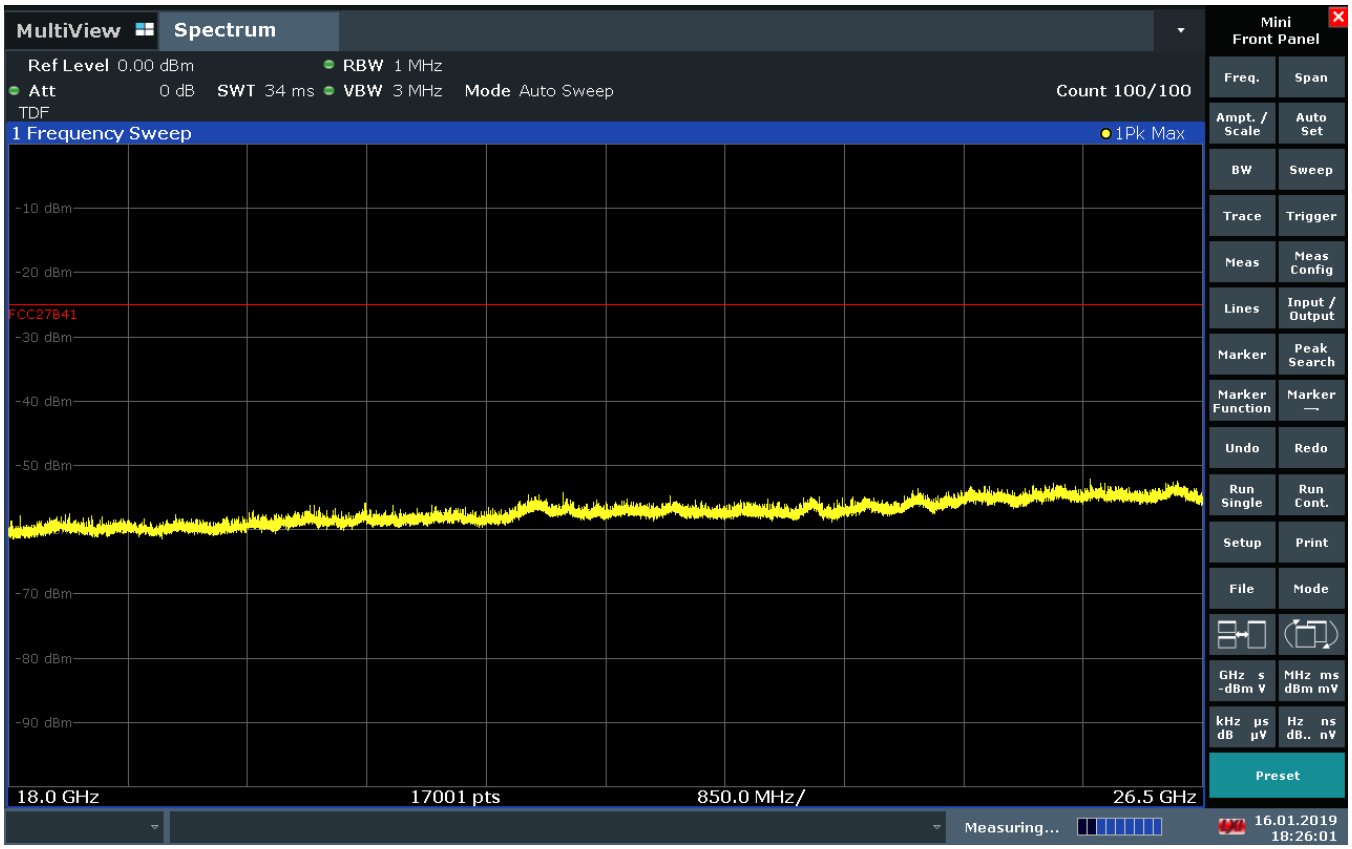
Band 41



Plot 7-264. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



Plot 7-265. Radiated Spurious Plot >18GHz – H (Band 41)



Plot 7-266. Radiated Spurious Plot 1GHz ->18GHz – V (Band 41)

OPERATING FREQUENCY:	2498.50	MHz
CHANNEL:	39715	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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]
4997.00	H	-	-	-62.52	8.56	-53.96	-29.0
7495.50	H	-	-	-58.10	8.53	-49.57	-24.6
9994.00	H	-	-	-57.52	9.84	-47.69	-22.7

Table 7-33. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY:	2593.00	MHz
CHANNEL:	40620	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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	-	-	-62.74	8.70	-54.04	-29.0
7779.00	H	110	231	-52.78	8.69	-44.10	-19.1
10372.00	H	-	-	-55.20	9.62	-45.57	-20.6
12965.00	H	-	-	-51.95	8.99	-42.96	-18.0

Table 7-34. Radiated Spurious Data (Band 41 – Mid Channel)

OPERATING FREQUENCY:	2687.50	MHz
CHANNEL:	41565	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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]
5375.00	H	-	-	-62.21	8.69	-53.52	-28.5
8062.50	H	-	-	-57.66	8.97	-48.68	-23.7
10750.00	H	-	-	-54.17	9.29	-44.88	-19.9

Table 7-35. Radiated Spurious Data (Band 41 – High Channel)

OPERATING FREQUENCY:	2593.00	MHz
CHANNEL:	40620	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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	-	-	-62.85	8.70	-54.15	-29.1
7779.00	H	136	242	-55.25	8.69	-46.57	-21.6
10372.00	H	-	-	-55.70	9.62	-46.07	-21.1
12965.00	H	-	-	-52.11	8.99	-43.12	-18.1

Table 7-36. Radiated Spurious Data with WCP (Band 41 – Mid Channel)

7.9 Uplink Carrier Aggregation Radiated Measurements

§2.1053, §27.53(m)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. No. of sweep points ≥ 2 x span / RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. The trace was allowed to stabilize

Test Setup

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

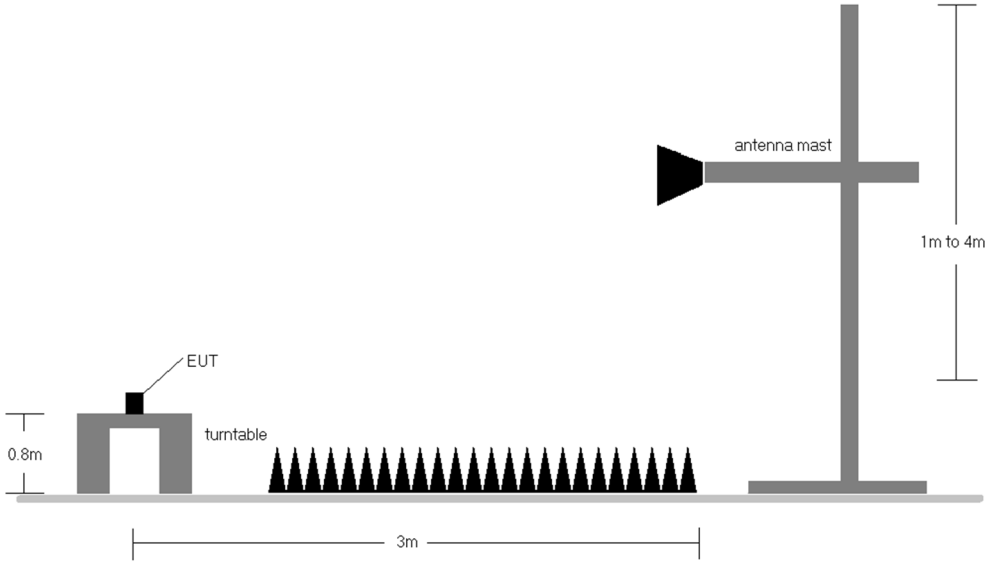


Figure 7-9. Test Instrument & Measurement Setup

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

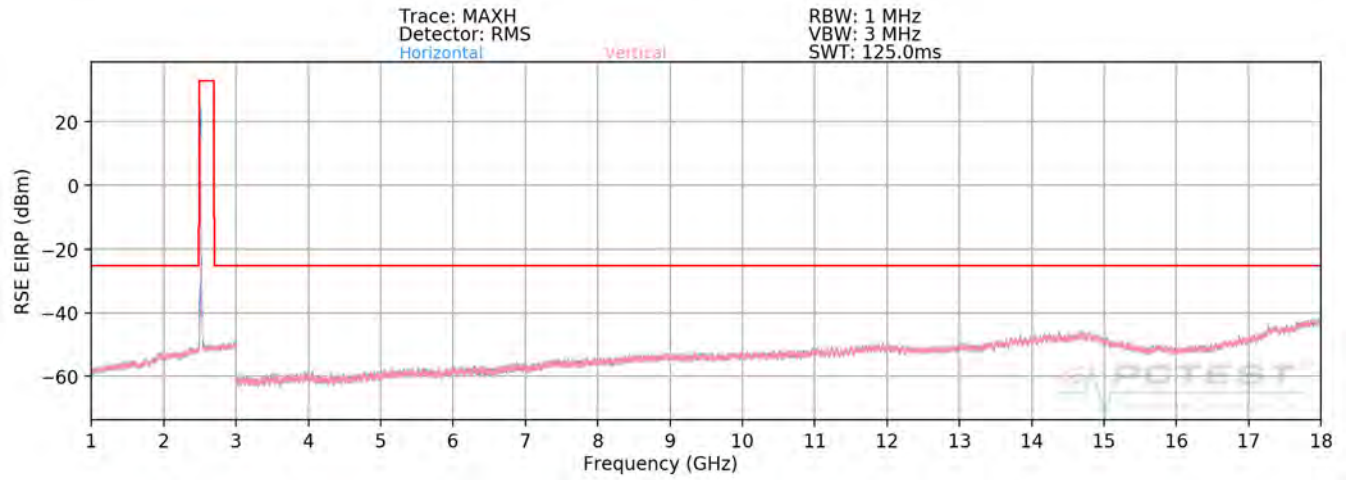
2) This unit was tested with its standard battery.

3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.

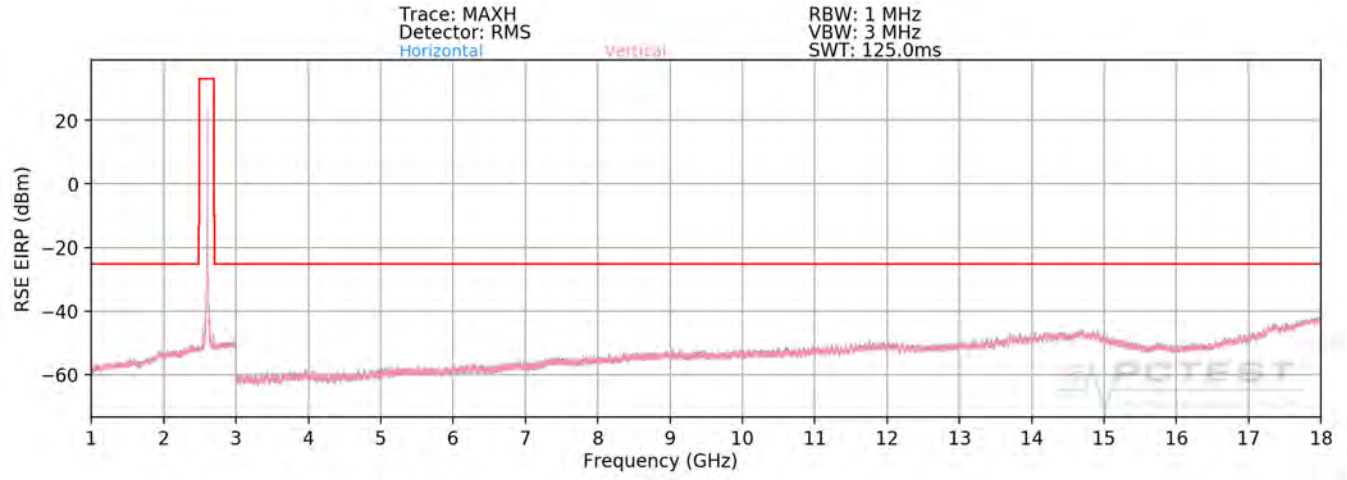
4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

5) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

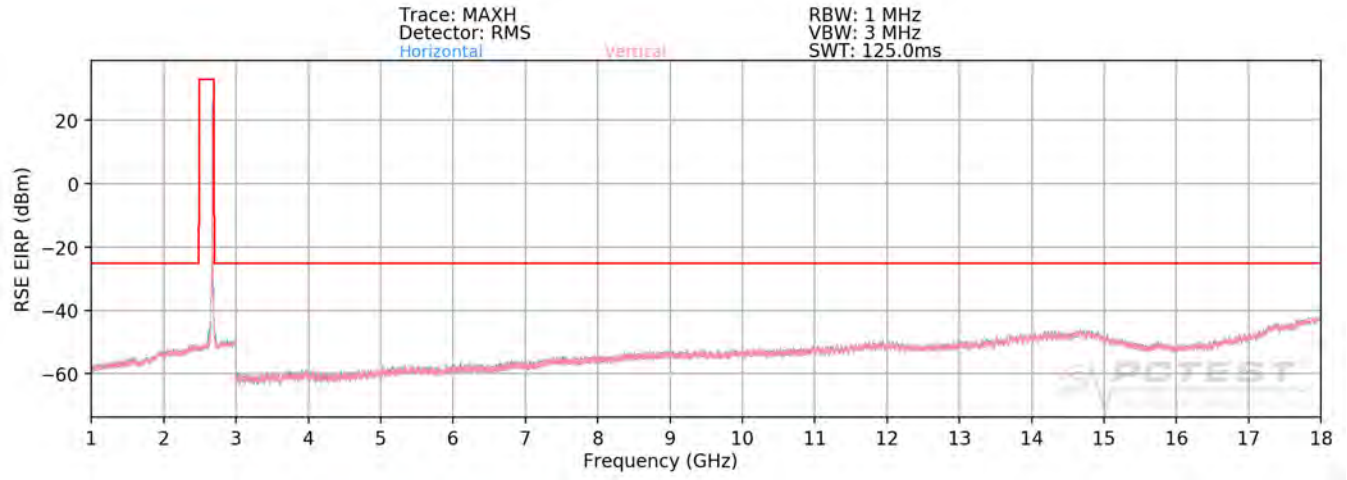
6) No significant emissions were found as a result of two uplink carriers operating contiguously.



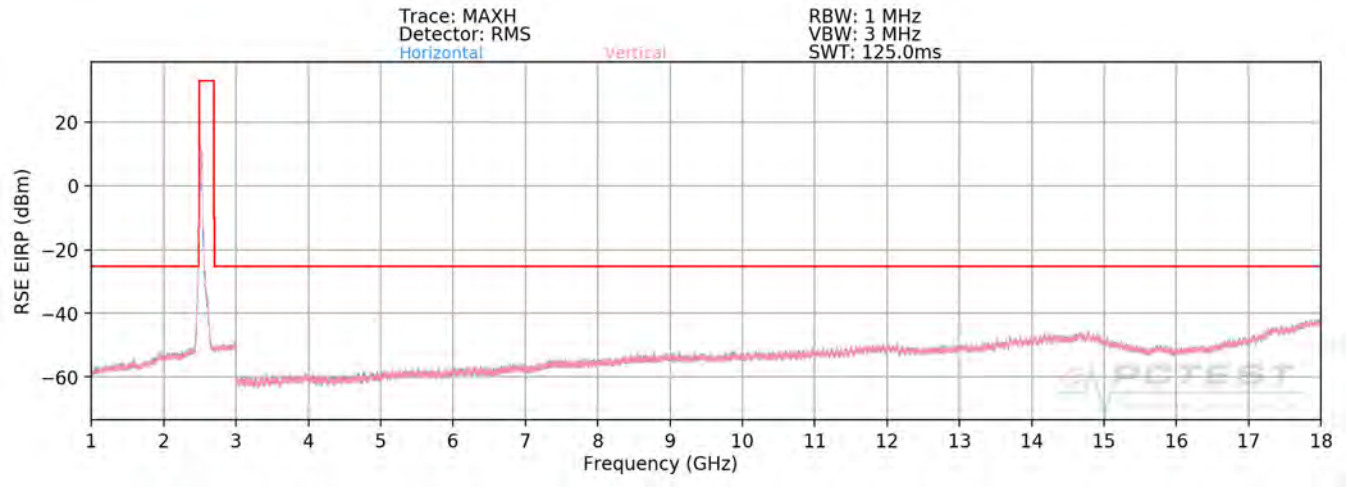
Plot 7-37. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)



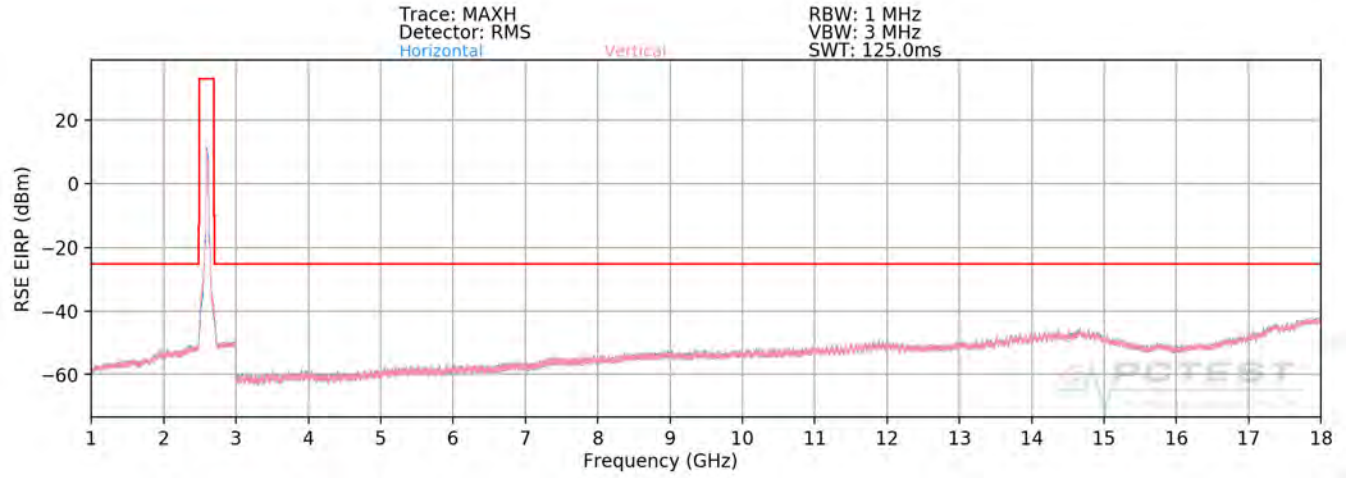
Plot 7-38. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)



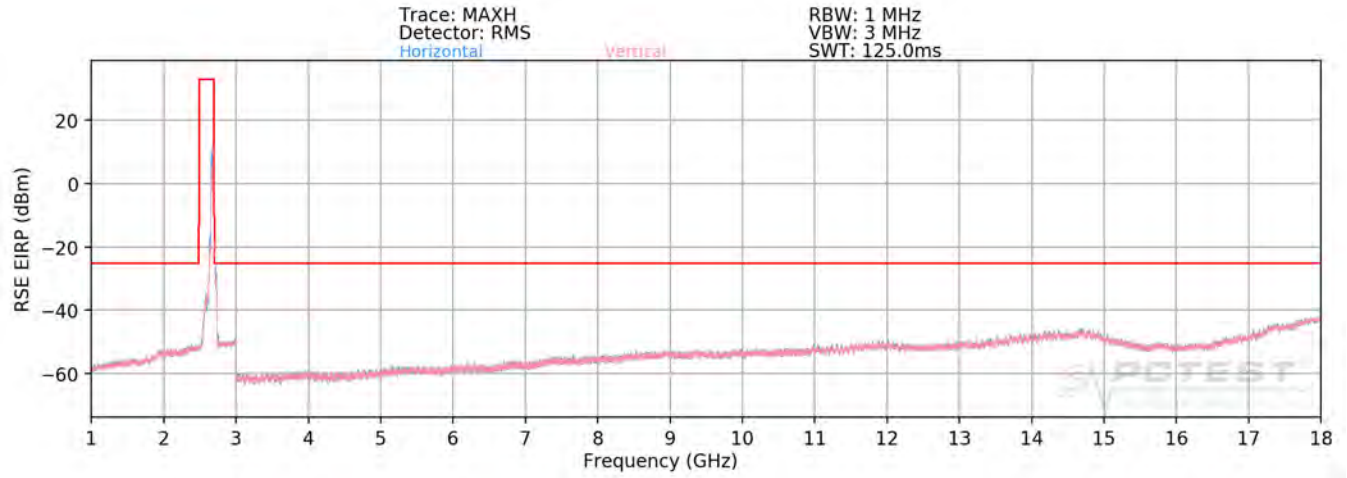
Plot 7-39. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)



Plot 7-40. Radiated Spruious Plot (ULCA B41 PCC: RB 100, SCC: RB 100 – 20MHz - Low Channel)



Plot 7-41. Radiated Spruious Plot (ULCA B41 PCC: RB 100, SCC: RB 100 — 20MHz - Mid Channel)



Plot 7-42. Radiated Spruious Plot (ULCA B41 PCC: RB 100, SCC: RB 100 — 20MHz - High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5012.00	V	-	-	-68.52	8.75	-59.77	-34.8
7518.00	V	266	350	-51.31	9.32	-42.00	-17.0
10024.00	V	-	-	-64.07	9.80	-54.26	-29.3
12530.00	V	-	-	-58.88	8.87	-50.01	-25.0

Table 7-43. Radiated Spruious Data (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	-	-	-70.24	9.03	-61.22	-36.2
7779.00	H	-	-	-66.98	9.29	-57.69	-32.7
10372.00	H	-	-	-63.16	9.50	-53.66	-28.7

Table 7-44. Radiated Spruious Data (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)

OPERATING FREQUENCY PCC:	2687.50	MHz
OPERATING FREQUENCY SCC:	2660.20	MHz
CHANNEL:	41490	
CHANNEL:	41292	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5375.00	H	121	83	-60.08	8.99	-51.09	-26.1
8062.50	H	-	-	-65.27	9.38	-55.89	-30.9
10750.00	H	-	-	-61.20	9.36	-51.85	-26.8

Table 7-45. Radiated Spruious Data (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5012.00	V	-	-	-69.32	8.75	-60.57	-35.6
7518.00	V	251	1	-54.55	9.32	-45.23	-20.2
10024.00	V	-	-	-62.81	9.80	-53.01	-28.0
12530.00	V	-	-	-58.29	8.87	-49.43	-24.4

Table 7-46. Radiated Spruious Data with WCP (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)

7.10 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

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

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

For Part 22, the frequency stability of the transmitter shall be maintained within ±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:	4.31	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	707,500,082	82	0.0000116
100 %		- 20	707,500,352	352	0.0000498
100 %		- 10	707,500,293	293	0.0000414
100 %		0	707,500,095	95	0.0000134
100 %		+ 10	707,499,669	-331	-0.0000468
100 %		+ 20	707,500,183	183	0.0000259
100 %		+ 30	707,500,137	137	0.0000194
100 %		+ 40	707,500,252	252	0.0000356
100 %		+ 50	707,500,234	234	0.0000331
BATT. ENDPOINT	3.48	+ 20	707,499,812	-188	-0.0000266

Table 7-47. 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

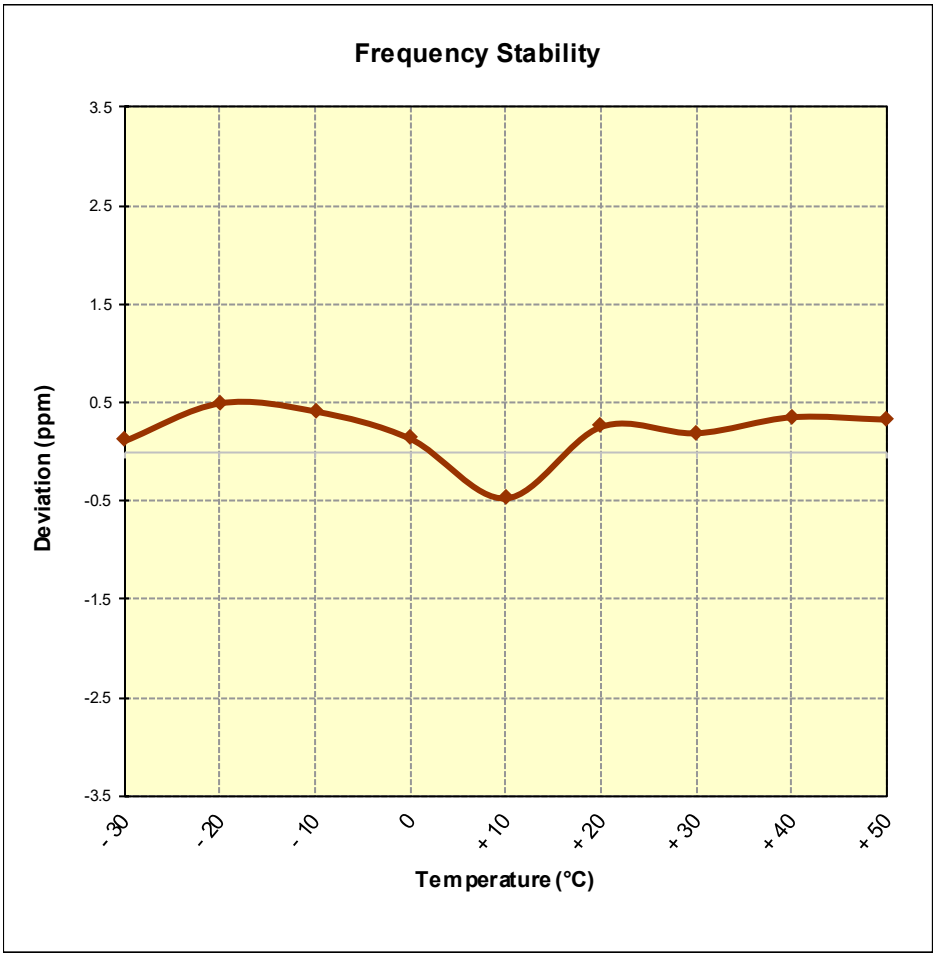


Figure 7-10. Frequency Stability Graph (Band 12)

Band 13 Frequency Stability Measurements

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	4.31	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	781,999,934	-66	-0.0000084
100 %		- 20	782,000,478	478	0.0000611
100 %		- 10	782,000,239	239	0.0000306
100 %		0	781,999,954	-46	-0.0000059
100 %		+ 10	782,000,084	84	0.0000107
100 %		+ 20	782,000,087	87	0.0000111
100 %		+ 30	781,999,649	-351	-0.0000449
100 %		+ 40	782,000,004	4	0.0000005
100 %		+ 50	781,999,986	-14	-0.0000018
BATT. ENDPOINT	3.48	+ 20	781,999,863	-137	-0.0000175

Table 7-48. Frequency Stability Data (Band 13)

Note:

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

Band 13 Frequency Stability Measurements

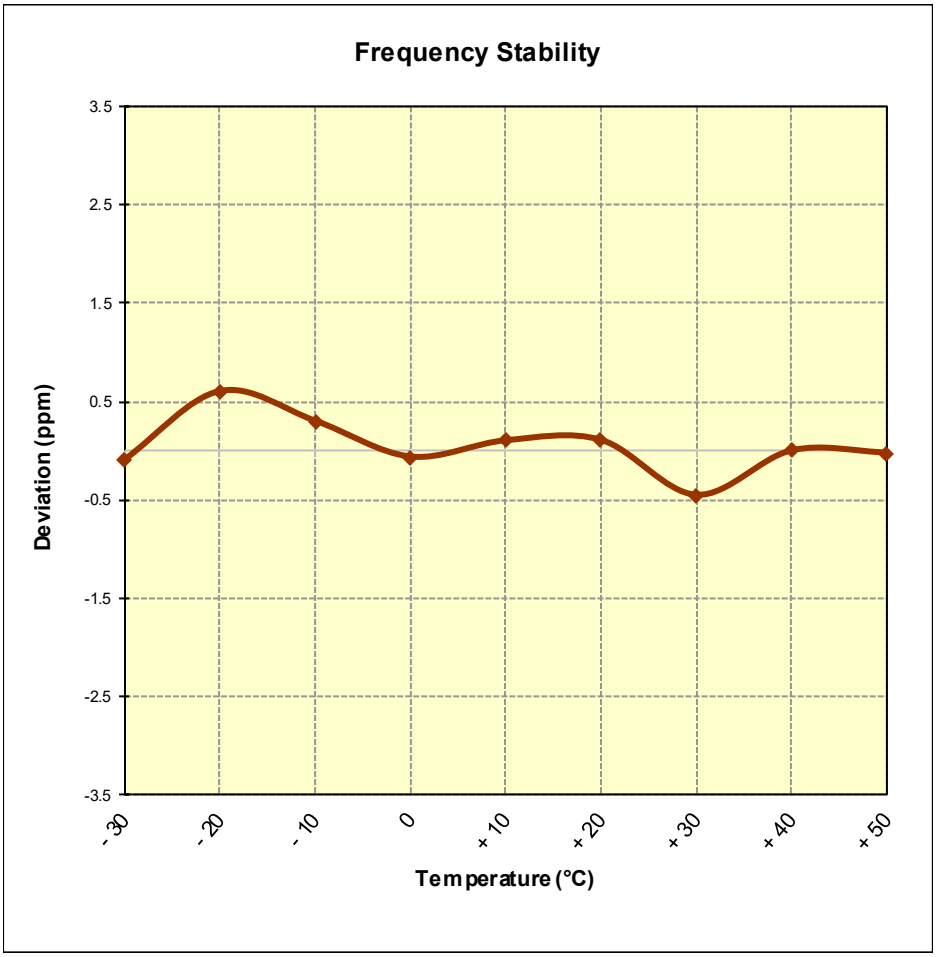


Figure 7-11. Frequency Stability Graph (Band 13)

Band 26 Frequency Stability Measurements

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	4.31	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	831,500,091	91	0.0000109
100 %		- 20	831,499,663	-337	-0.0000405
100 %		- 10	831,499,994	-6	-0.0000007
100 %		0	831,499,869	-131	-0.0000158
100 %		+ 10	831,499,786	-214	-0.0000257
100 %		+ 20	831,499,883	-117	-0.0000141
100 %		+ 30	831,499,826	-174	-0.0000209
100 %		+ 40	831,499,930	-70	-0.0000084
100 %		+ 50	831,499,611	-389	-0.0000468
BATT. ENDPOINT	3.48	+ 20	831,500,381	381	0.0000458

Table 7-49. Frequency Stability Data (Band 26)

Band 26 Frequency Stability Measurements

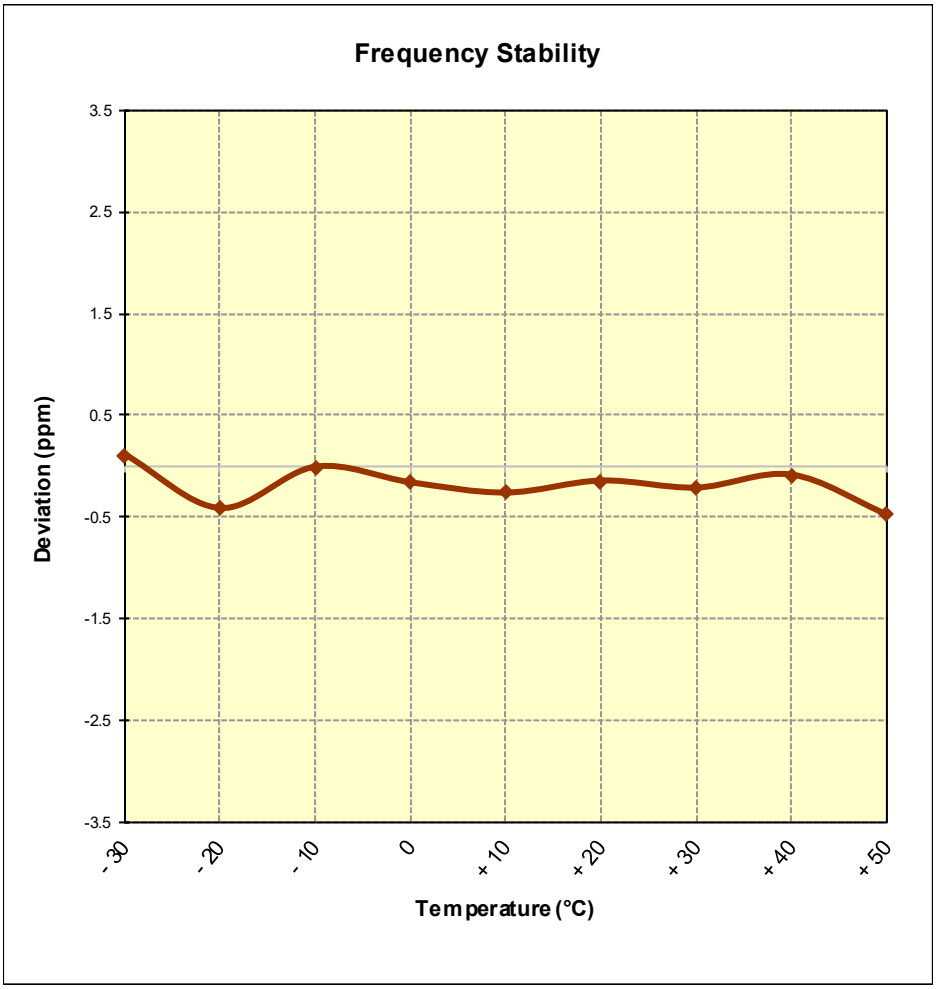


Figure 7-12. Frequency Stability Graph (Band 26)

Band 4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	
REFERENCE VOLTAGE:	4.31	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	1,732,499,930	-70	-0.0000040
100 %		- 20	1,732,499,905	-95	-0.0000055
100 %		- 10	1,732,499,955	-45	-0.0000026
100 %		0	1,732,499,764	-236	-0.0000136
100 %		+ 10	1,732,499,901	-99	-0.0000057
100 %		+ 20	1,732,500,384	384	0.0000222
100 %		+ 30	1,732,500,144	144	0.0000083
100 %		+ 40	1,732,500,055	55	0.0000032
100 %		+ 50	1,732,499,899	-101	-0.0000058
BATT. ENDPOINT	3.48	+ 20	1,732,500,310	310	0.0000179

Table 7-50. 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

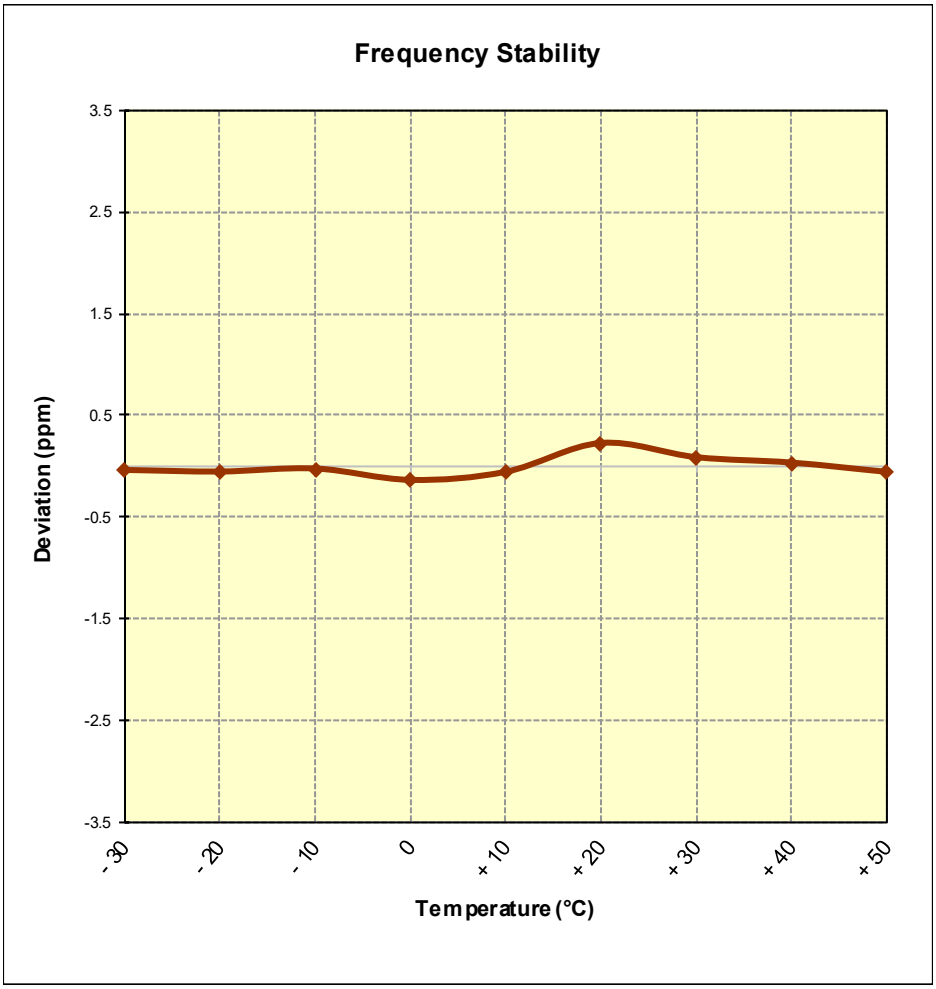


Figure 7-13. Frequency Stability Graph (Band 4)

Band 25 Frequency Stability Measurements

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	4.31	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	1,882,500,051	51	0.0000027
100 %		- 20	1,882,499,907	-93	-0.0000049
100 %		- 10	1,882,499,904	-96	-0.0000051
100 %		0	1,882,499,896	-104	-0.0000055
100 %		+ 10	1,882,499,520	-480	-0.0000255
100 %		+ 20	1,882,499,775	-225	-0.0000120
100 %		+ 30	1,882,499,893	-107	-0.0000057
100 %		+ 40	1,882,499,846	-154	-0.0000082
100 %		+ 50	1,882,499,995	-5	-0.0000003
BATT. ENDPOINT	3.48	+ 20	1,882,500,397	397	0.0000211

Table 7-51. Frequency Stability Data (Band 25)

Band 25 Frequency Stability Measurements

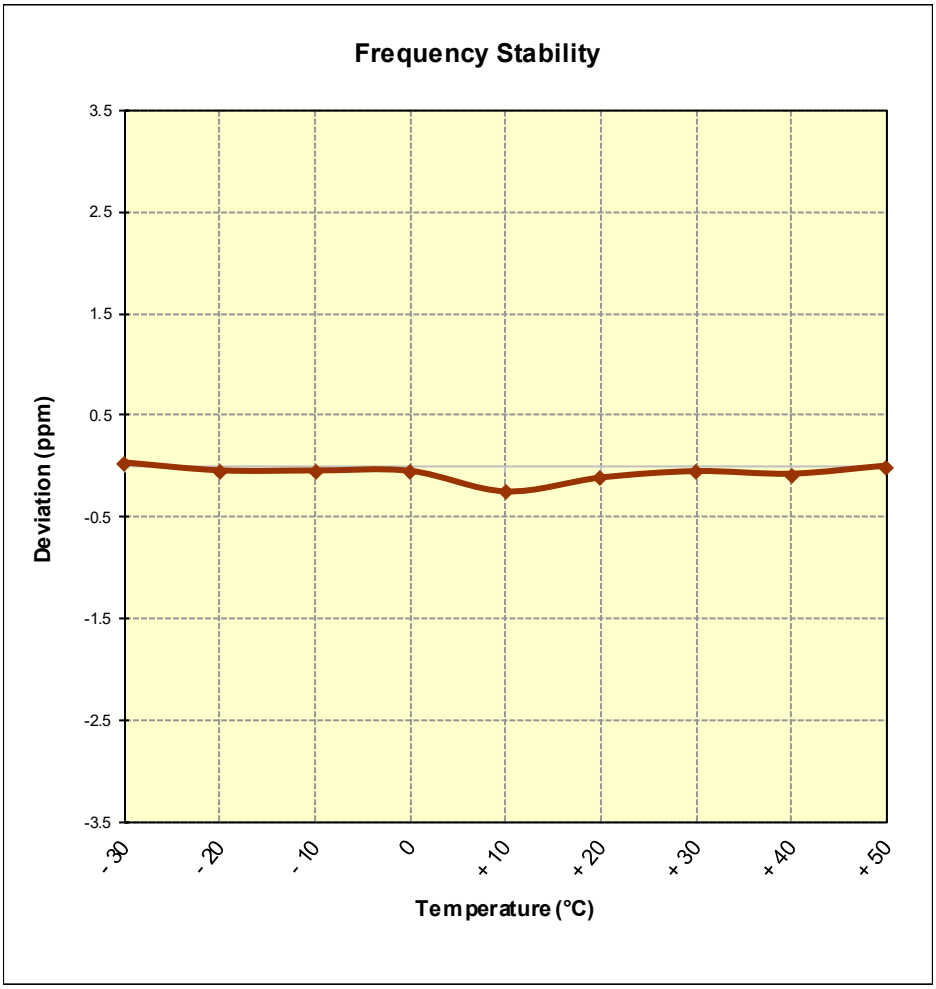


Figure 7-14. Frequency Stability Graph (Band 25)

Band 41 Frequency Stability Measurements

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	4.31	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	2,592,999,897	-103	-0.0000040
100 %		- 20	2,592,999,828	-172	-0.0000066
100 %		- 10	2,593,000,171	171	0.0000066
100 %		0	2,593,000,037	37	0.0000014
100 %		+ 10	2,592,999,991	-9	-0.0000003
100 %		+ 20	2,592,999,949	-51	-0.0000020
100 %		+ 30	2,592,999,979	-21	-0.0000008
100 %		+ 40	2,593,000,041	41	0.0000016
100 %		+ 50	2,592,999,722	-278	-0.0000107
BATT. ENDPOINT	3.48	+ 20	2,592,999,741	-259	-0.0000100

Table 7-52. 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

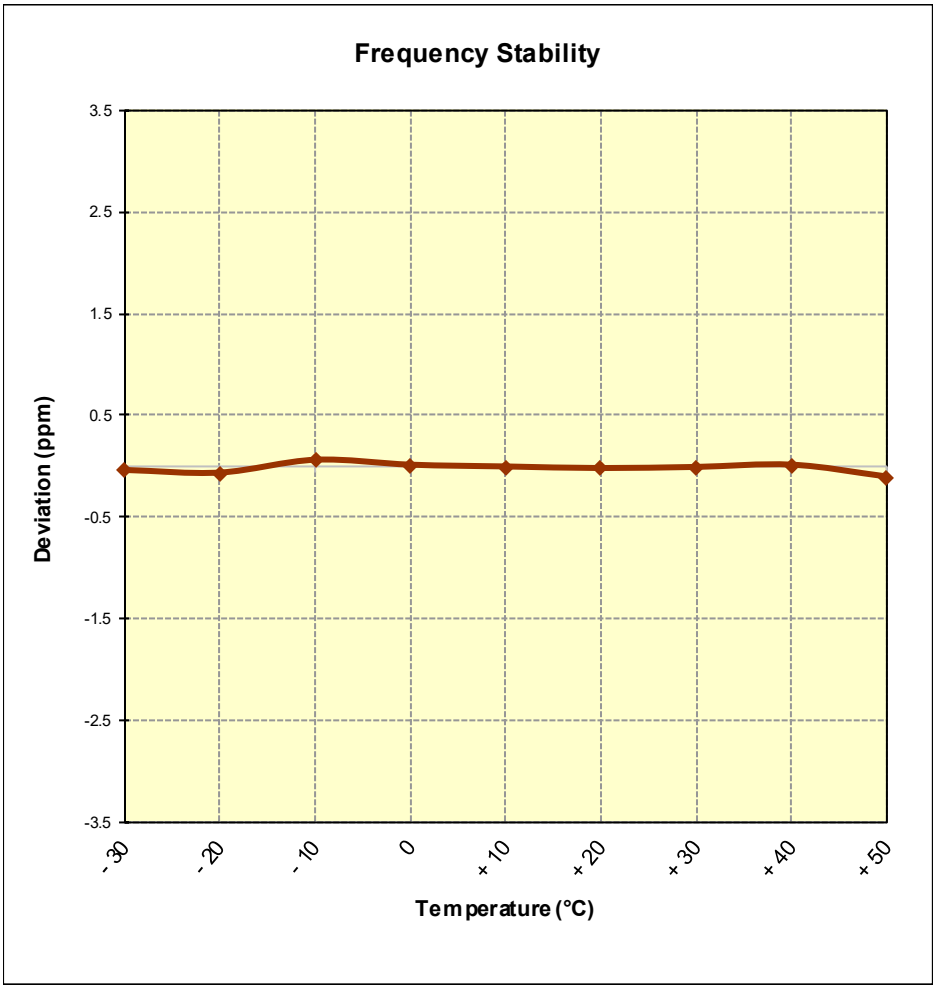


Figure 7-15. Frequency Stability Graph (Band 41)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG9730** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.