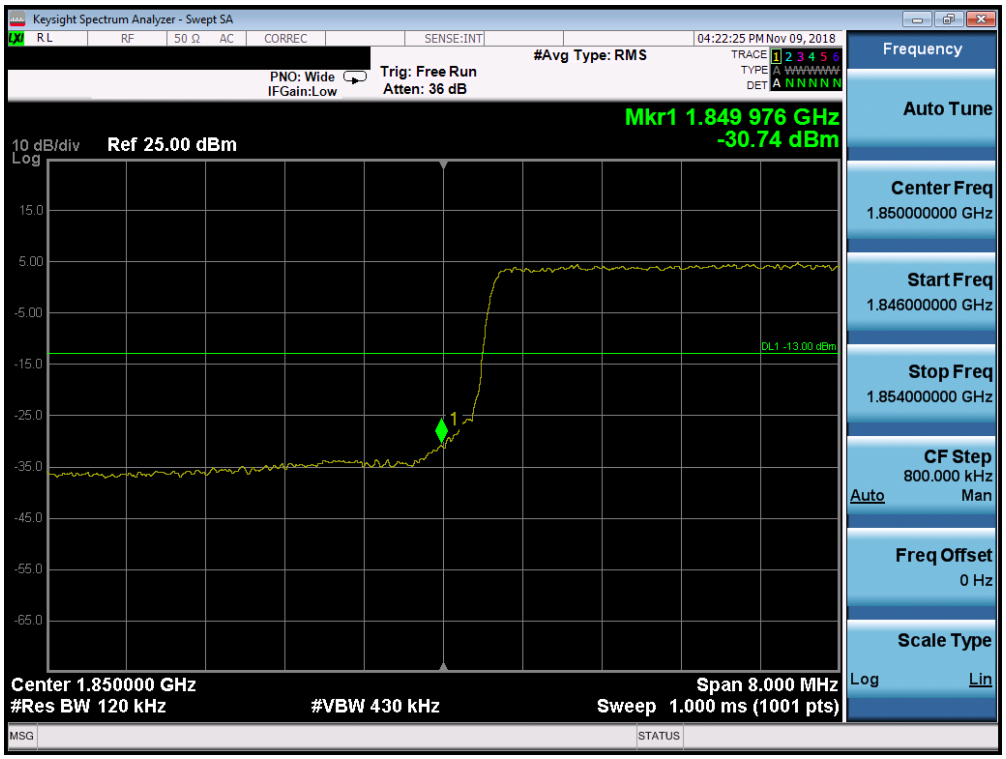
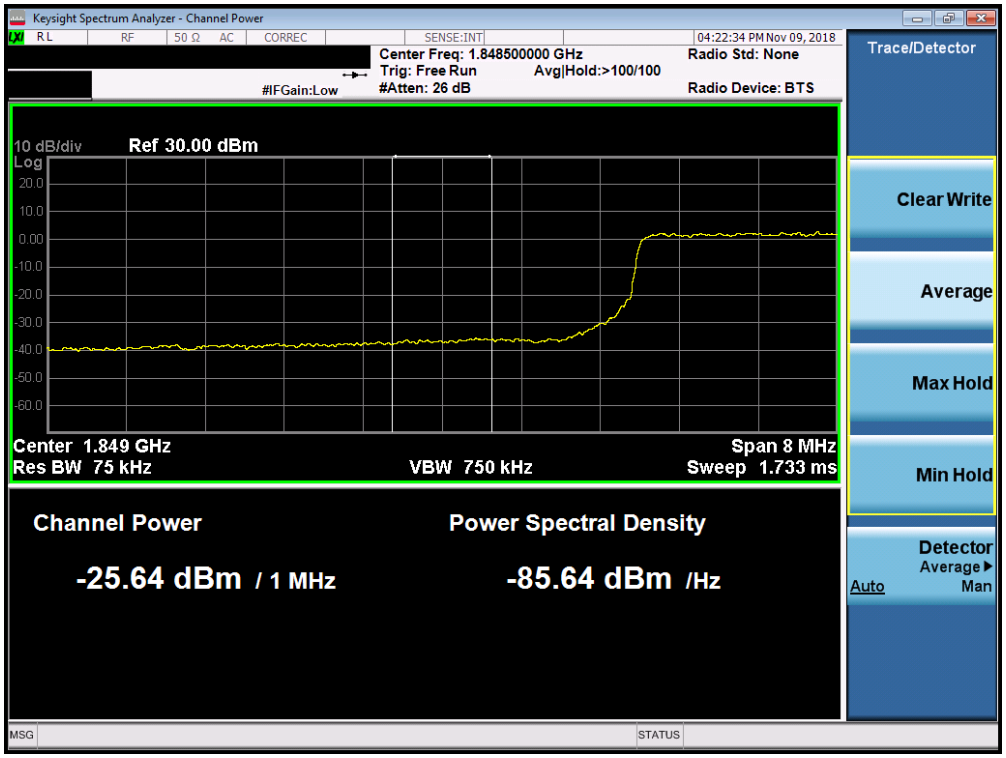
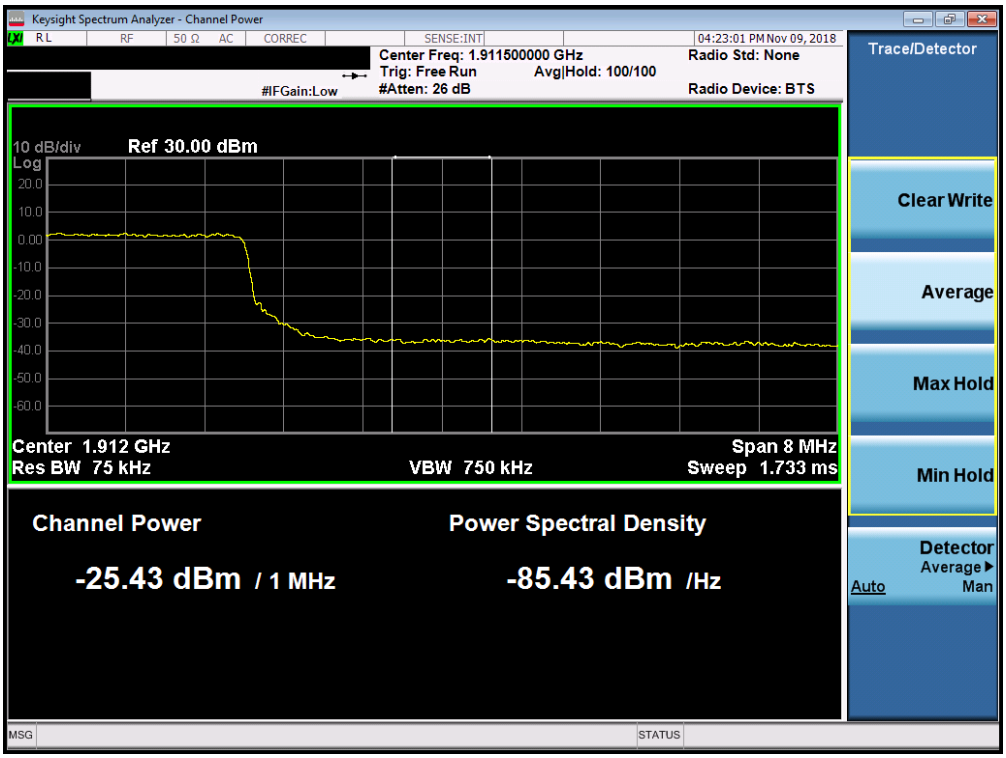


Plot 7-198. Lower Band Edge Plot (Band 25/2 – 10.0MHz QPSK - Full RB Configuration)

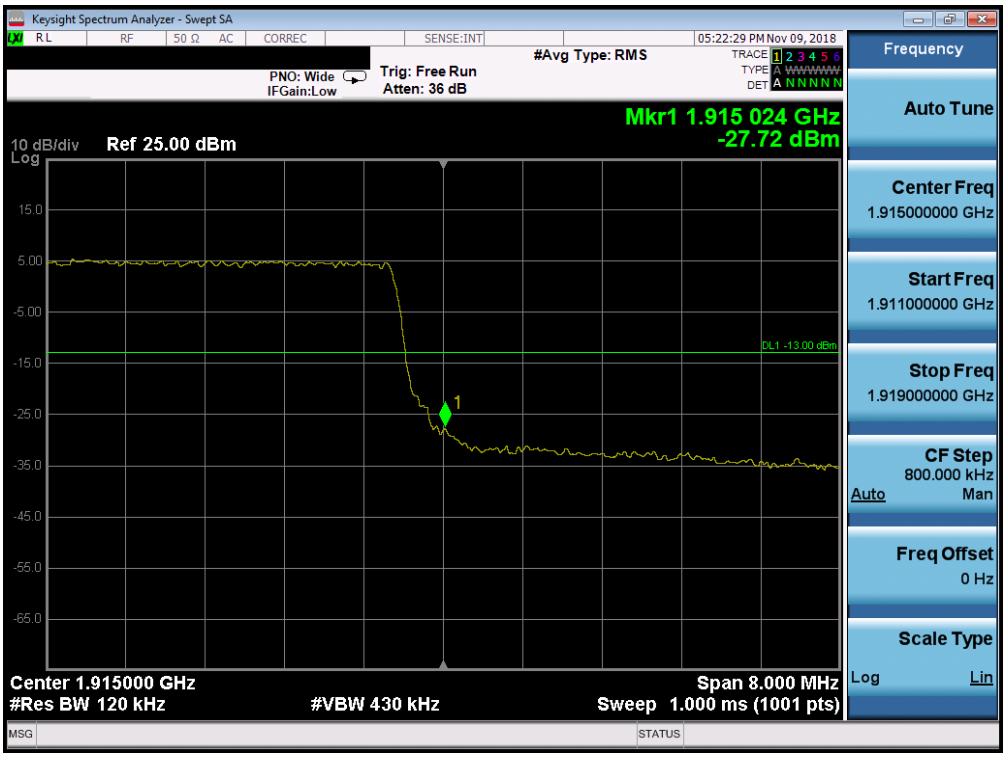


Plot 7-199. Lower Extended Band Edge Plot (Band 25/2 – 10.0MHz QPSK - Full RB Configuration)

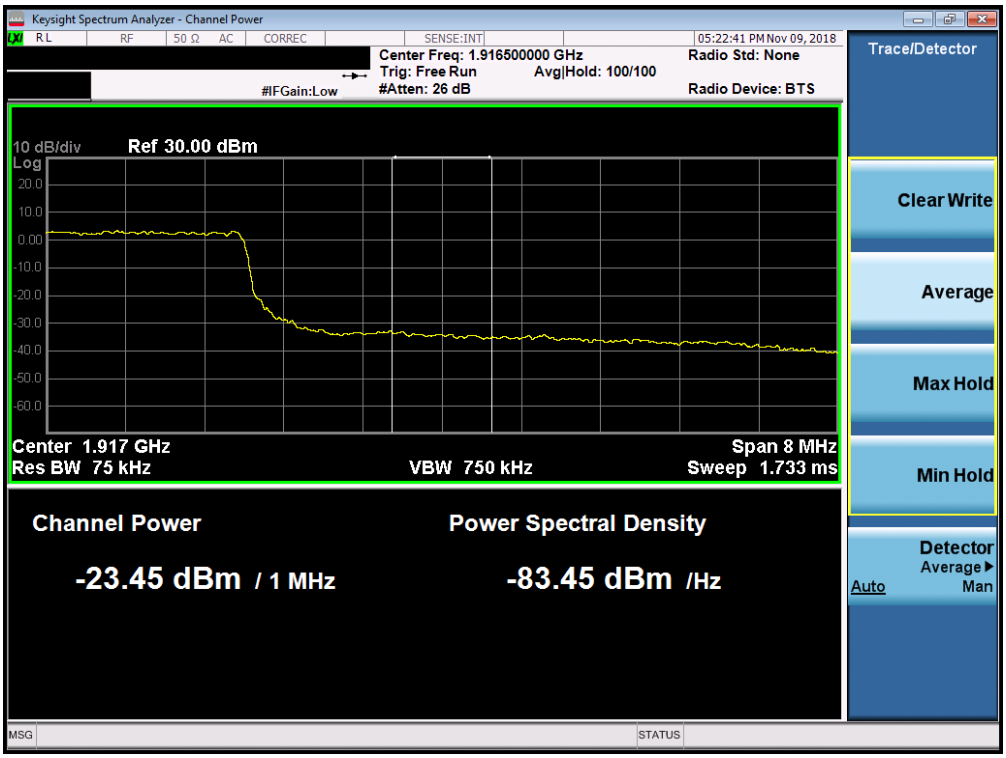
Plot 7-200. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



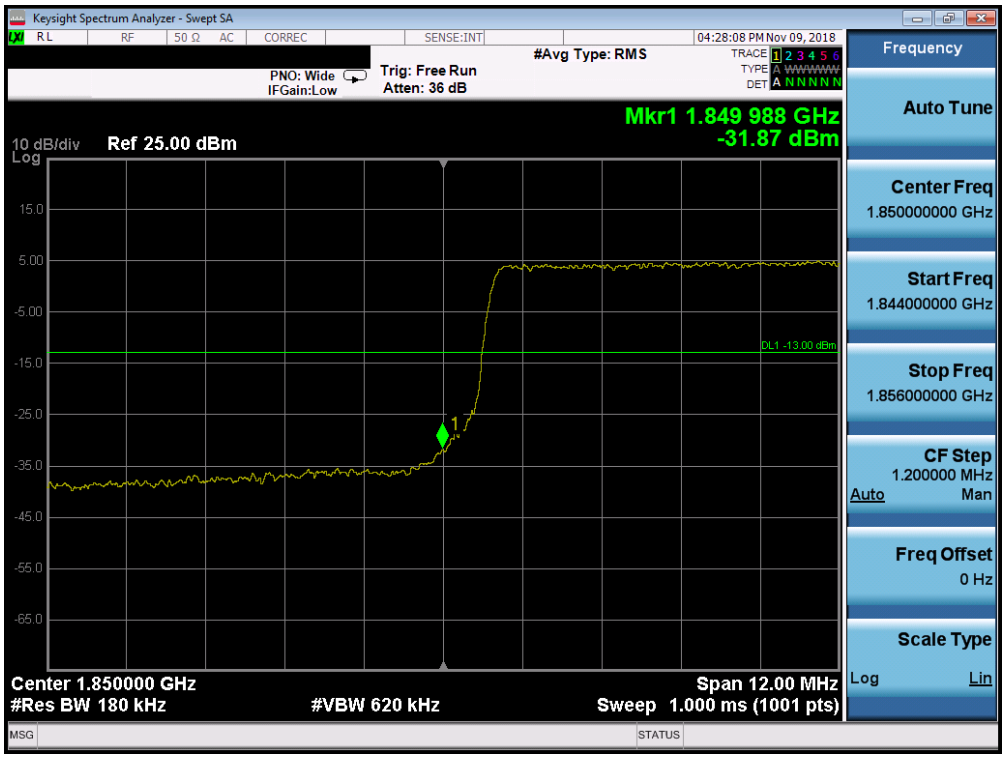
Plot 7-201. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



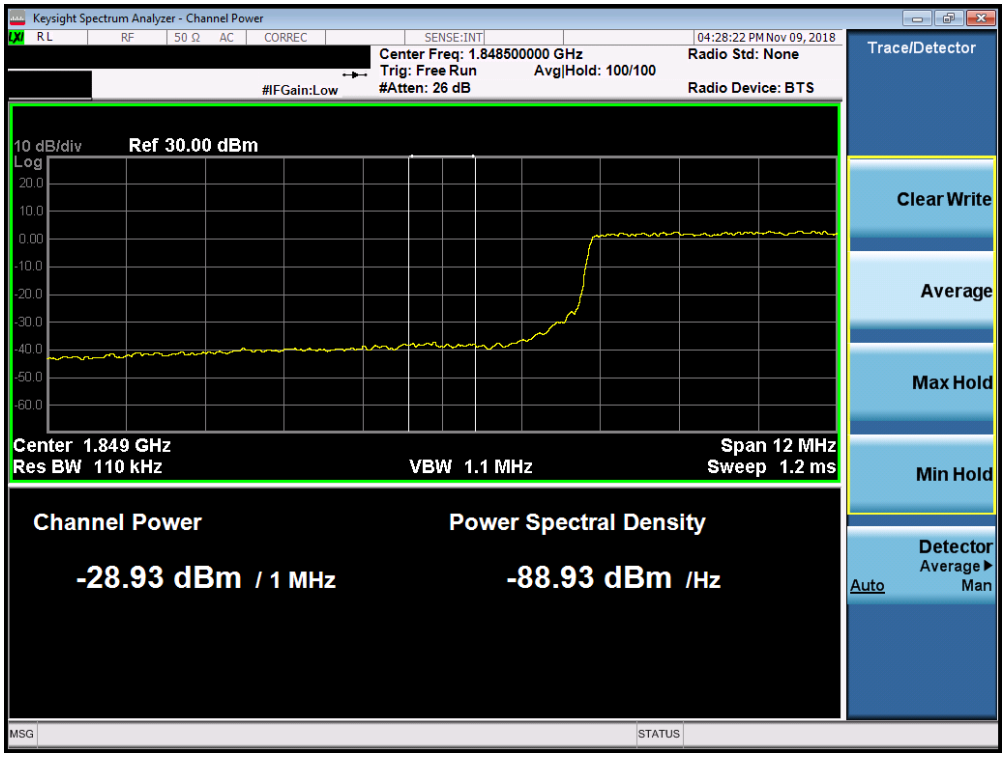
Plot 7-202. Upper Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)



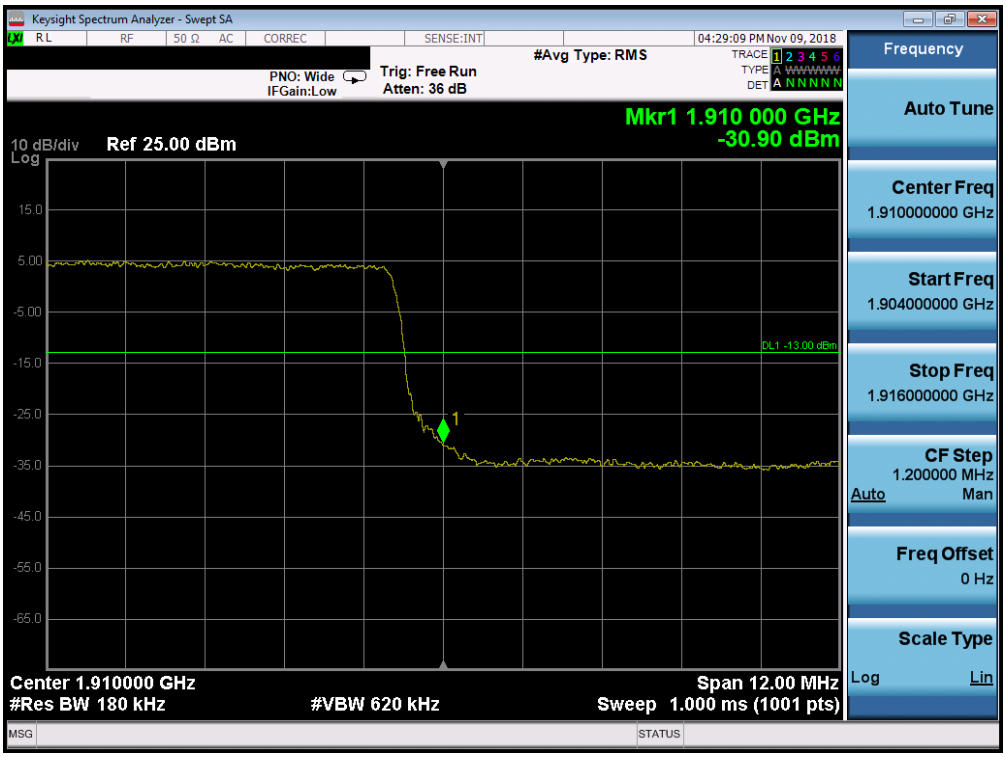
Plot 7-203. Upper Extended Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)



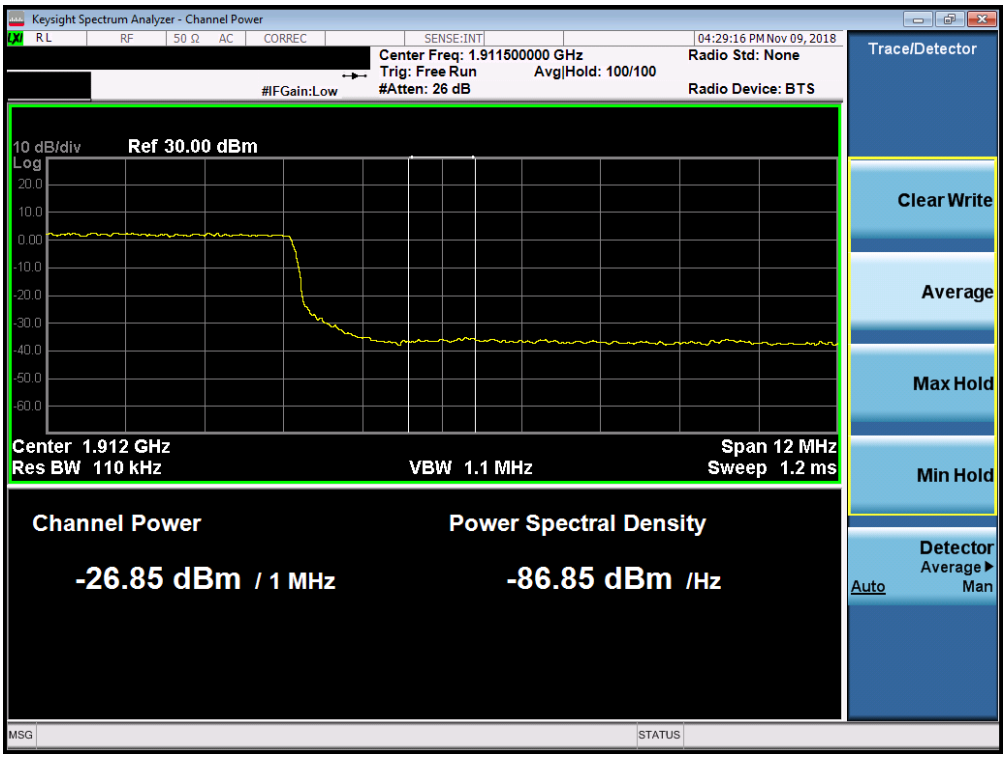
Plot 7-204. Lower Band Edge Plot (Band 25/2 – 15.0MHz QPSK - Full RB Configuration)



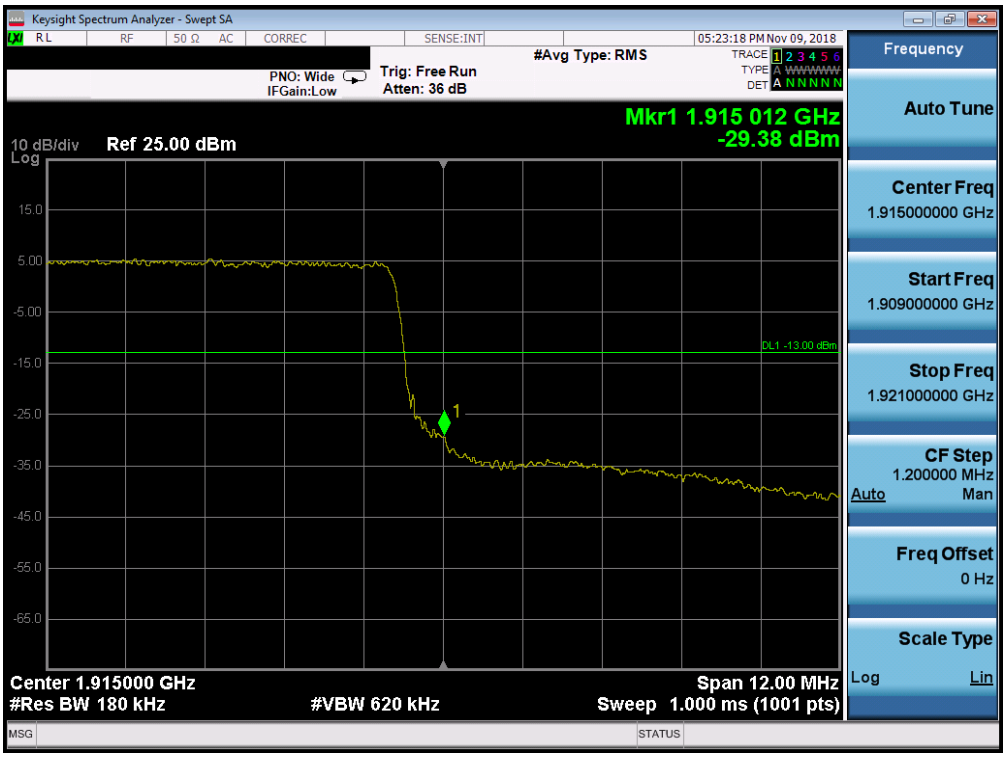
Plot 7-205. Lower Extended Band Edge Plot (Band 25/2 – 15.0MHz QPSK - Full RB Configuration)



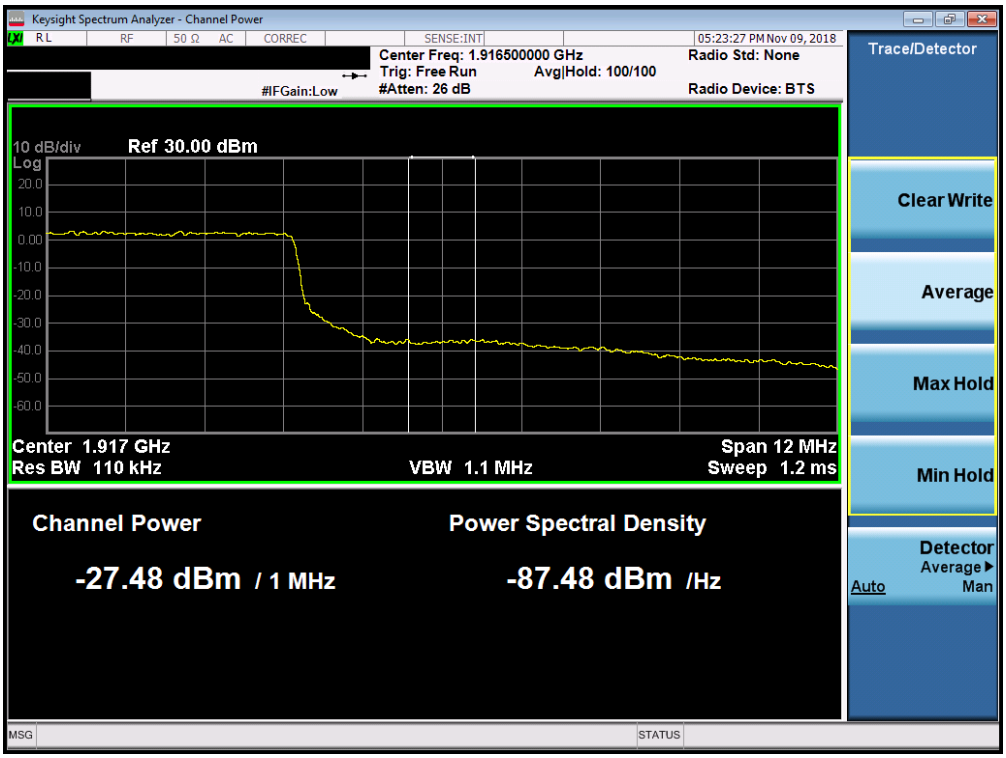
Plot 7-206. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



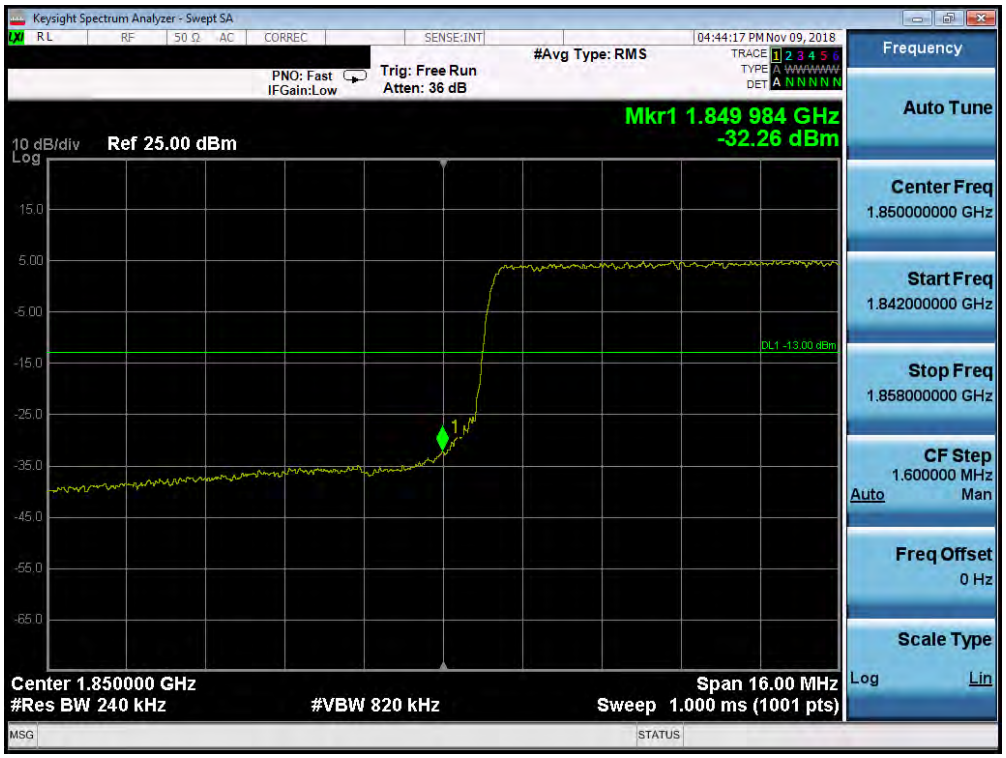
Plot 7-207. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



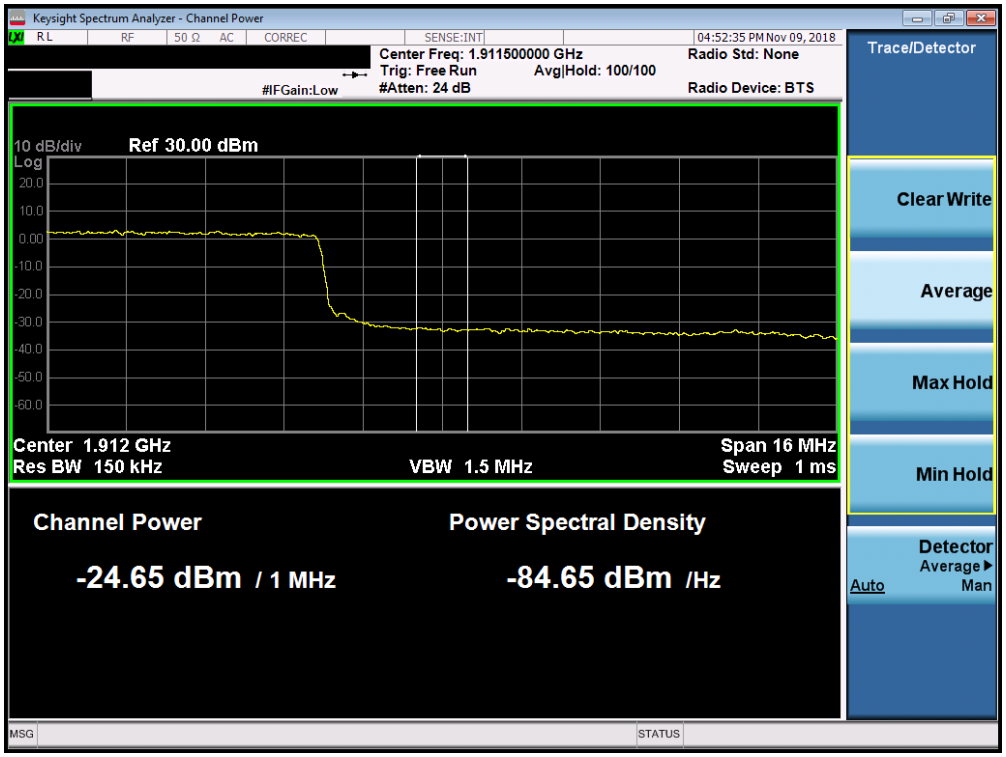
Plot 7-208. Upper Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)



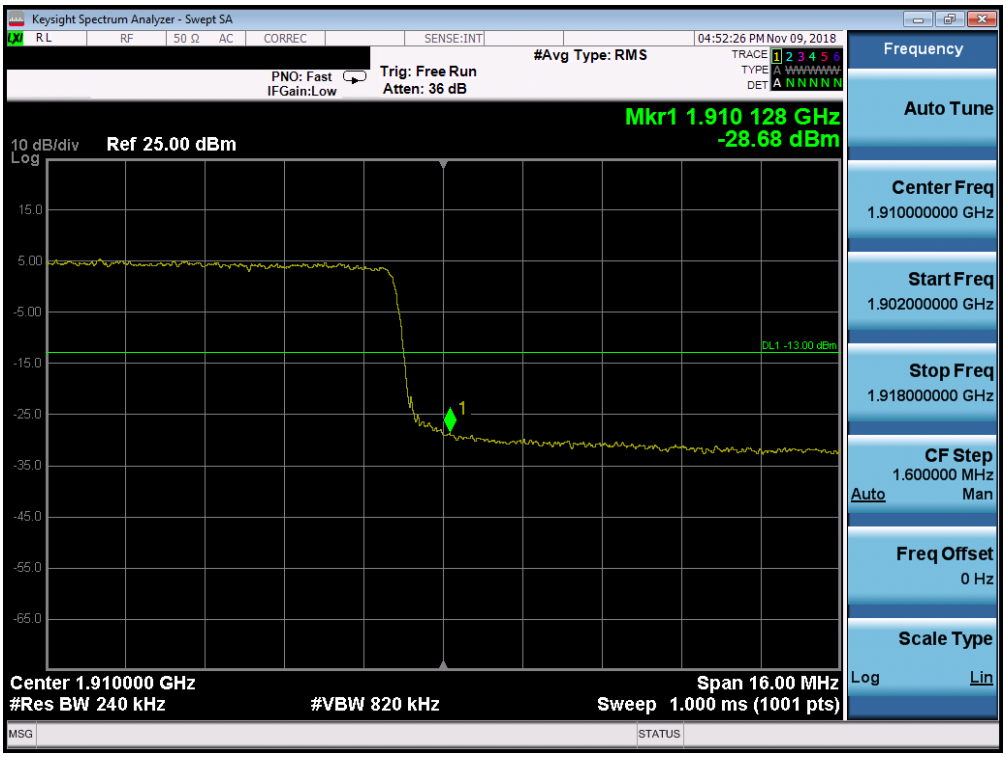
Plot 7-209. Upper Extended Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)



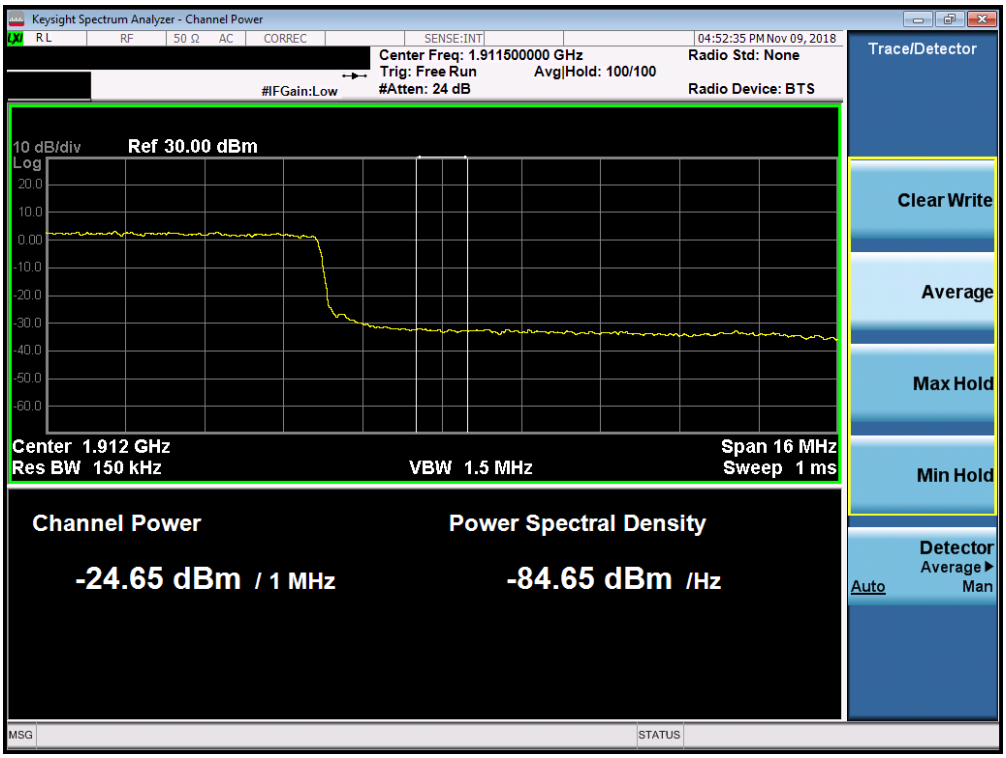
Plot 7-210. Lower Band Edge Plot (Band 25/2 – 20.0MHz QPSK - Full RB Configuration)



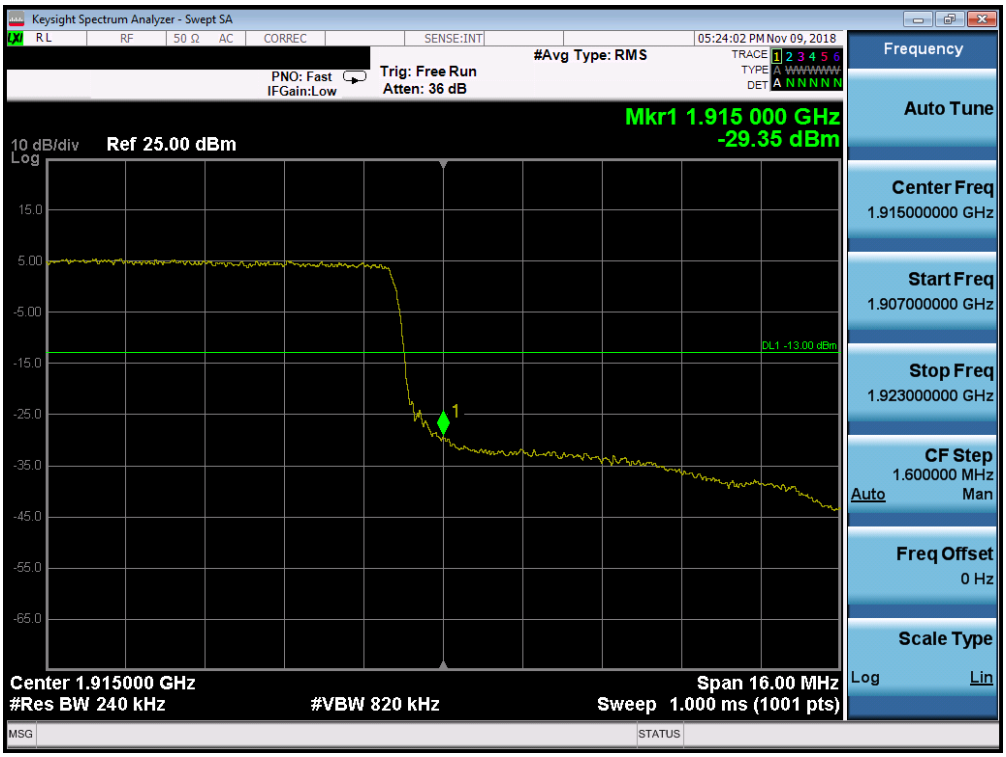
Plot 7-211. Lower Extended Band Edge Plot (Band 25/2 – 20.0MHz QPSK - Full RB Configuration)



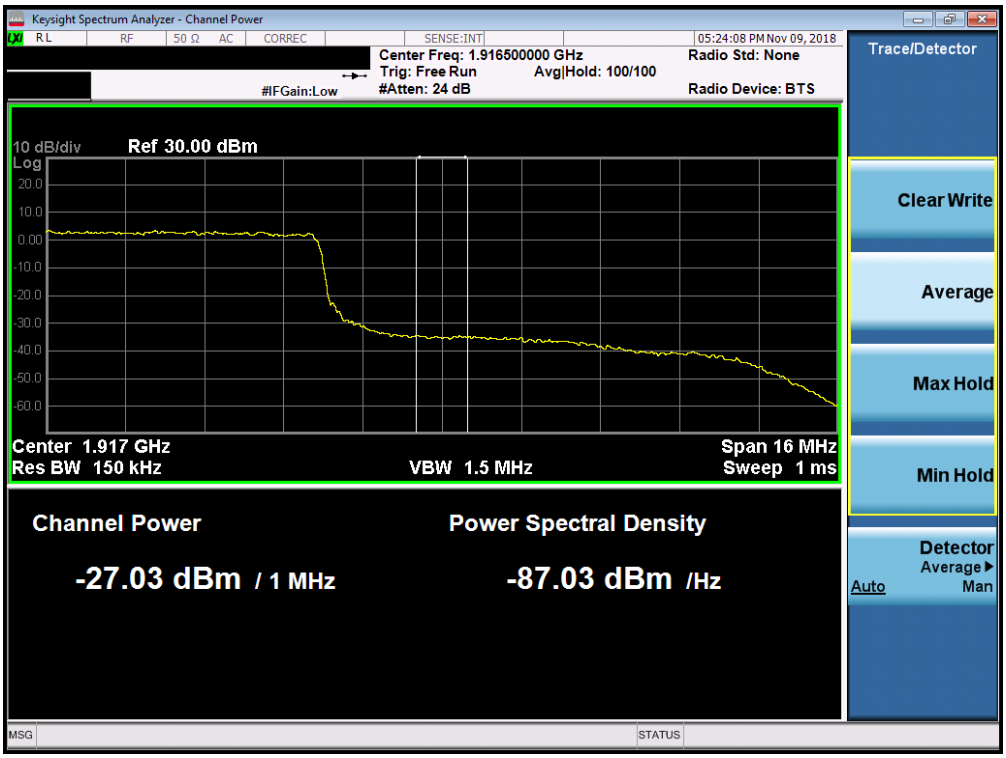
Plot 7-212. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



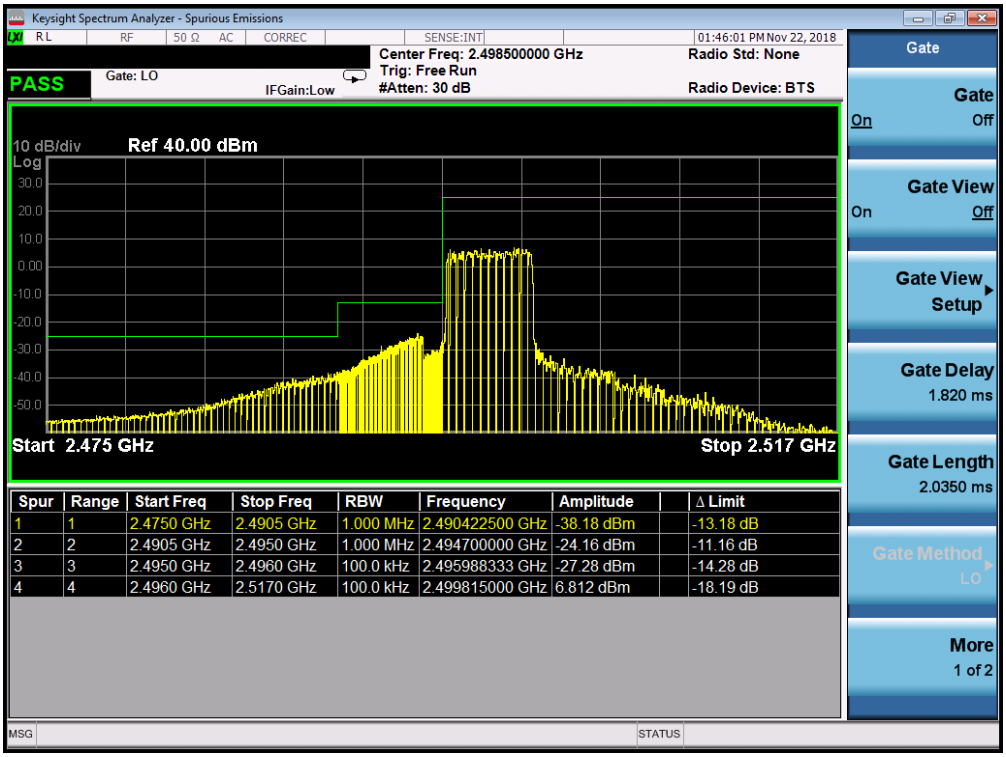
Plot 7-213. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



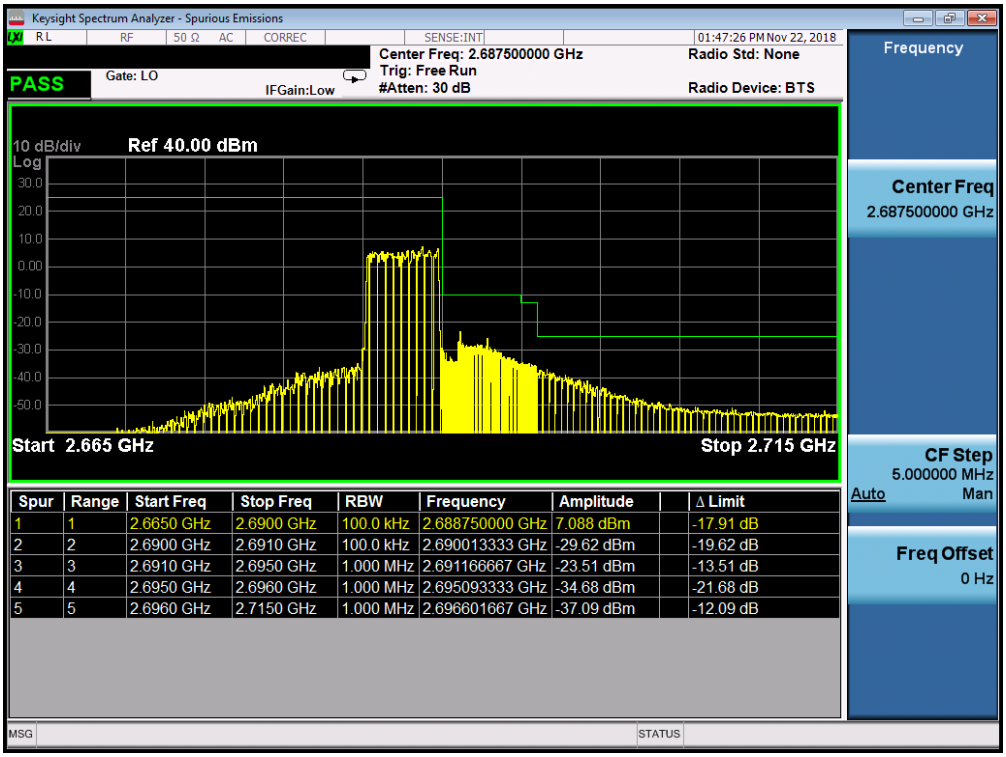
Plot 7-214. Upper Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)



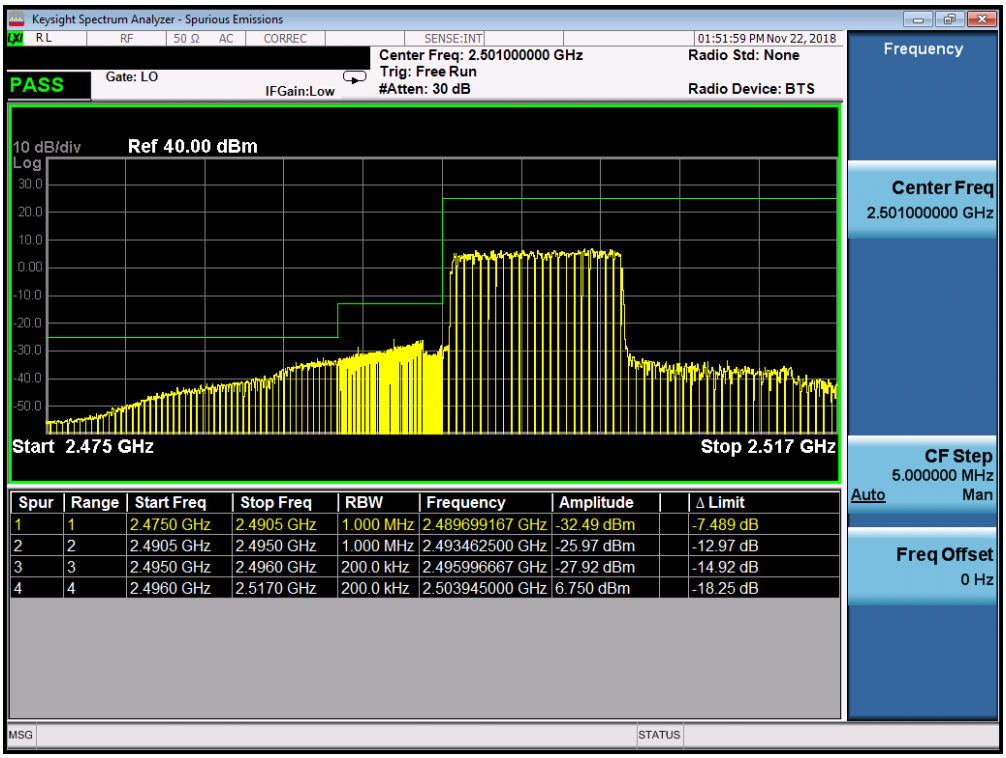
Plot 7-215. Upper Extended Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-216. Lower ACP Plot at 2496 MHz (Band 41 - 5.0MHz QPSK - Full RB Configuration)

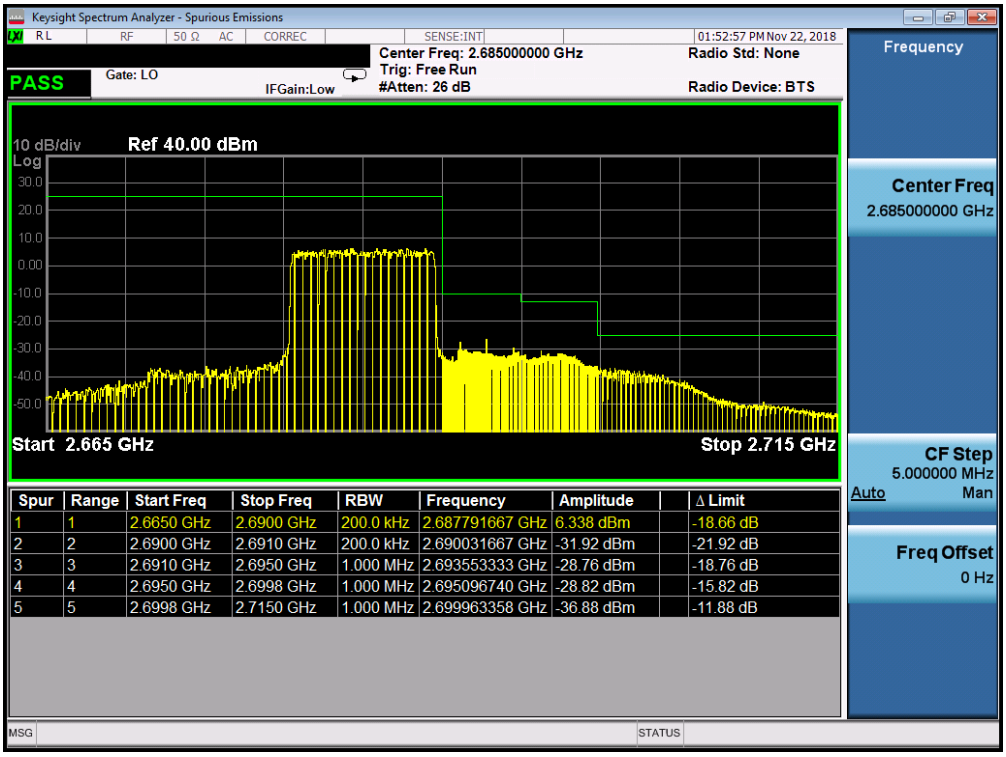


Plot 7-217. Upper ACP Plot (Band 41 - 5.0MHz QPSK - Full RB Configuration)



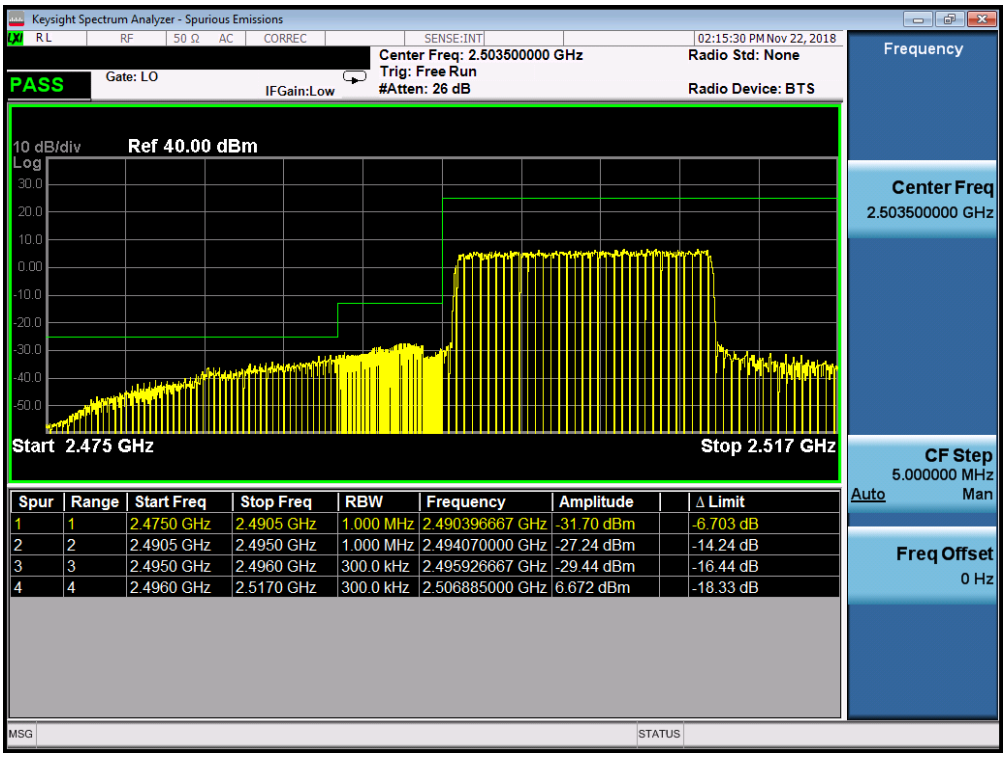
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489699167 GHz	-32.49 dBm	-7.489 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.493462500 GHz	-25.97 dBm	-12.97 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495996667 GHz	-27.92 dBm	-14.92 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.503945000 GHz	6.750 dBm	-18.25 dB

Plot 7-218. Lower ACP Plot at 2496 MHz (Band 41 - 10.0MHz QPSK - Full RB Configuration)

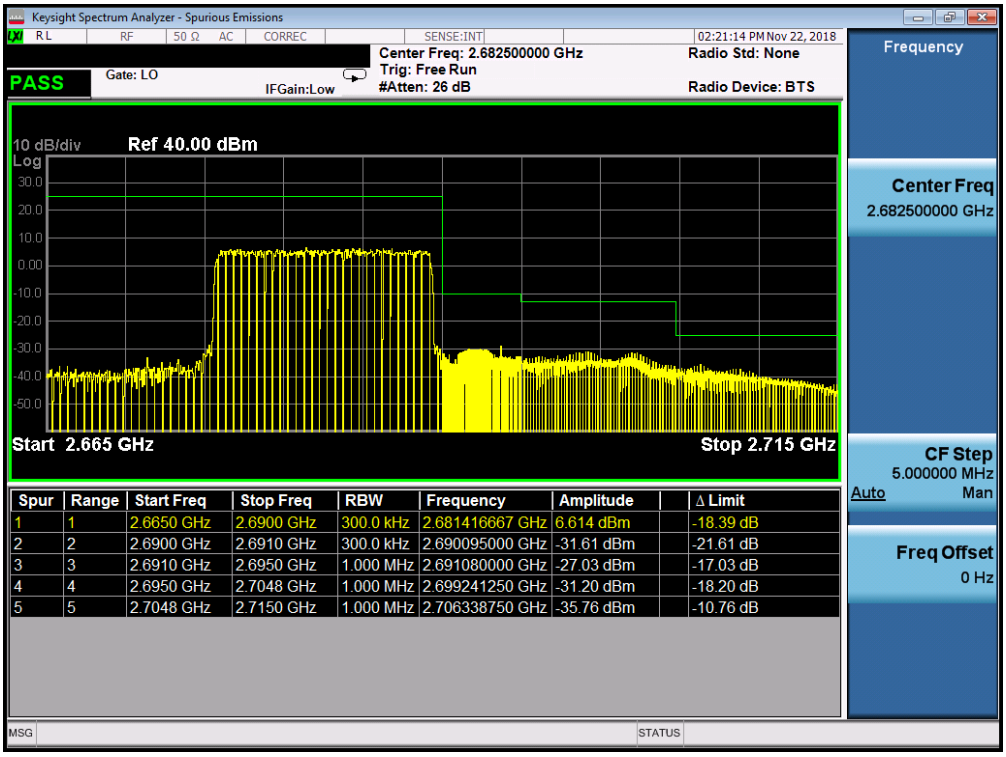


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	200.0 kHz	2.687791667 GHz	6.338 dBm	-18.66 dB
2	2	2.6900 GHz	2.6910 GHz	200.0 kHz	2.690031667 GHz	-31.92 dBm	-21.92 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.693553333 GHz	-28.76 dBm	-18.76 dB
4	4	2.6950 GHz	2.6998 GHz	1.000 MHz	2.695096740 GHz	-28.82 dBm	-15.82 dB
5	5	2.6998 GHz	2.7150 GHz	1.000 MHz	2.699963358 GHz	-36.88 dBm	-11.88 dB

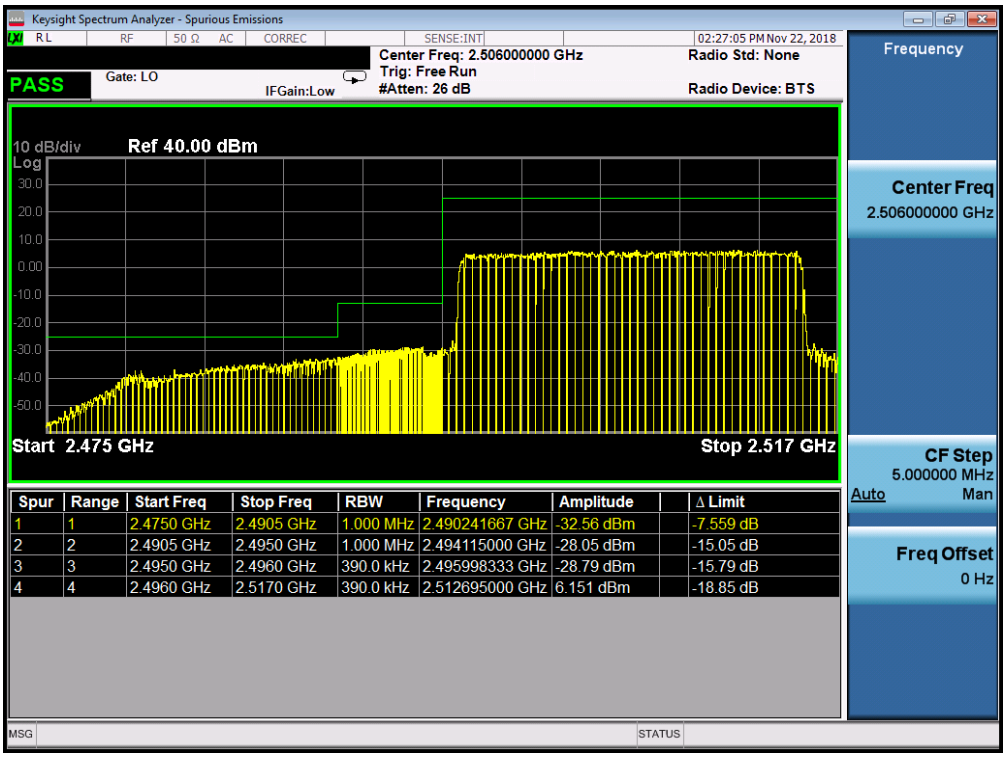
Plot 7-219. Upper ACP Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)



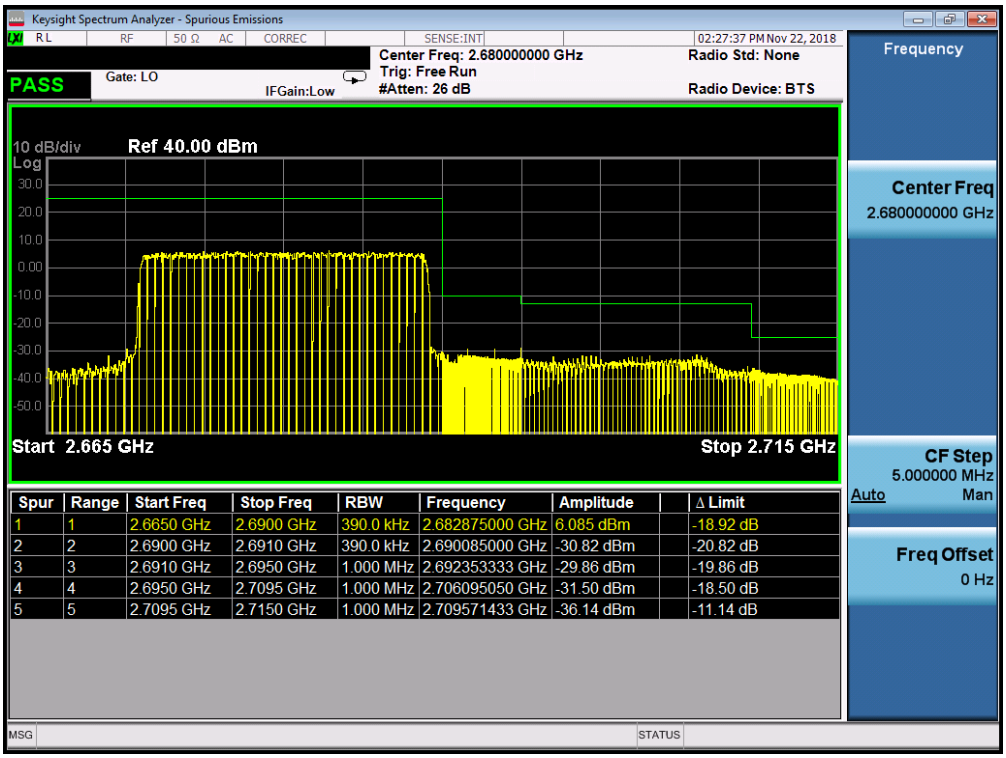
Plot 7-220. Lower ACP Plot at 2496 MHz (Band 41 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-221. Upper ACP Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-222. Lower ACP Plot at 2496 MHz (Band 41 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-223. Upper ACP Plot (Band 41 - 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.

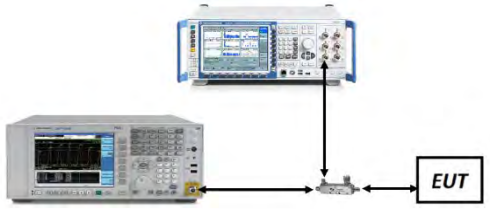
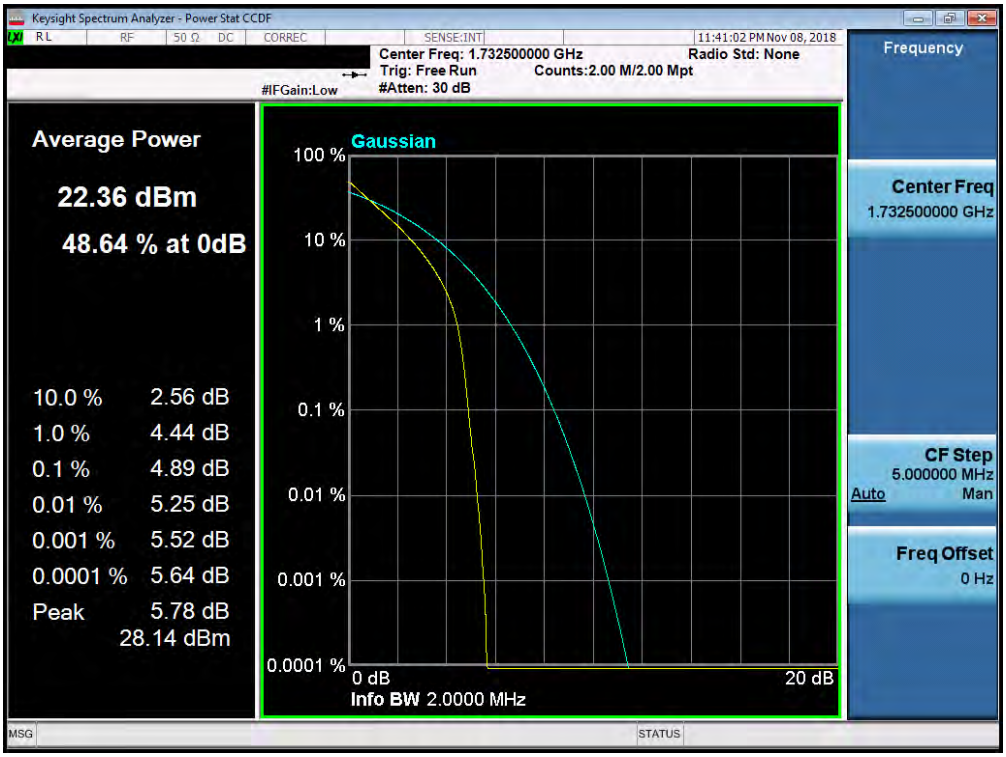


Figure 7-4. Test Instrument & Measurement Setup

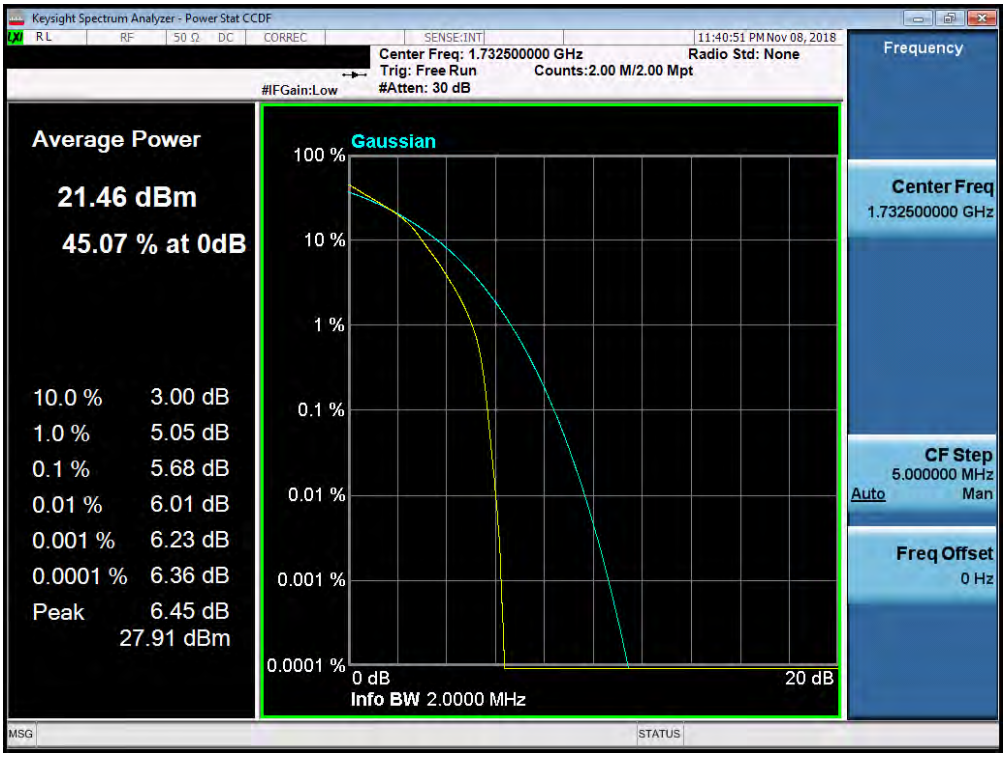
Test Notes

None.

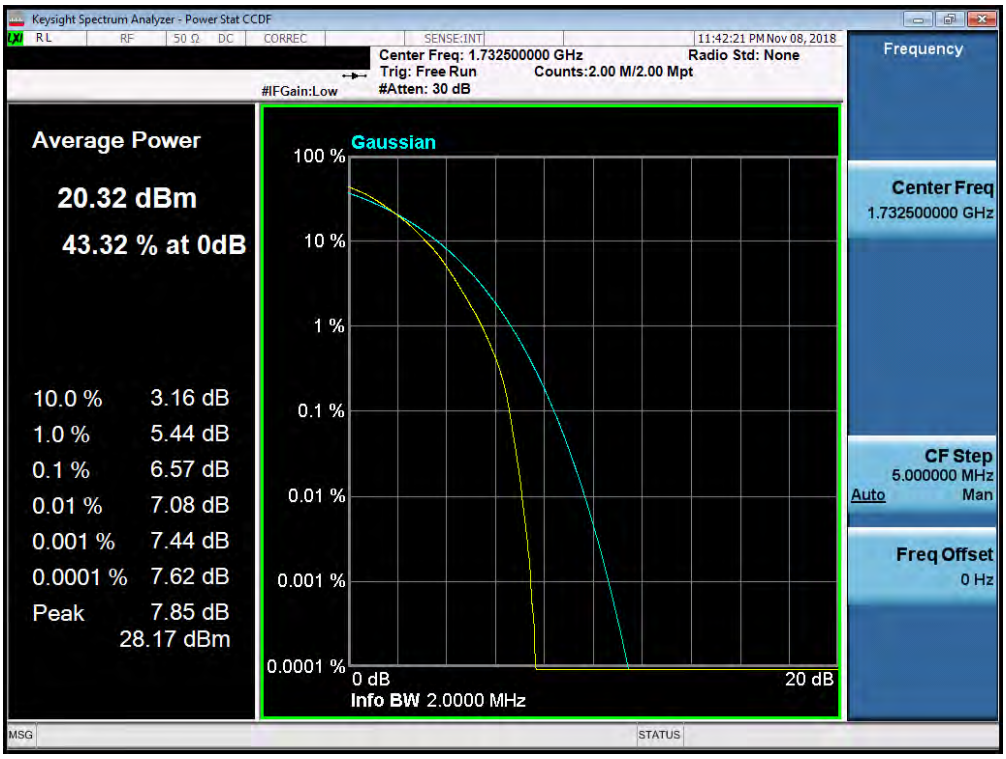
Band 4



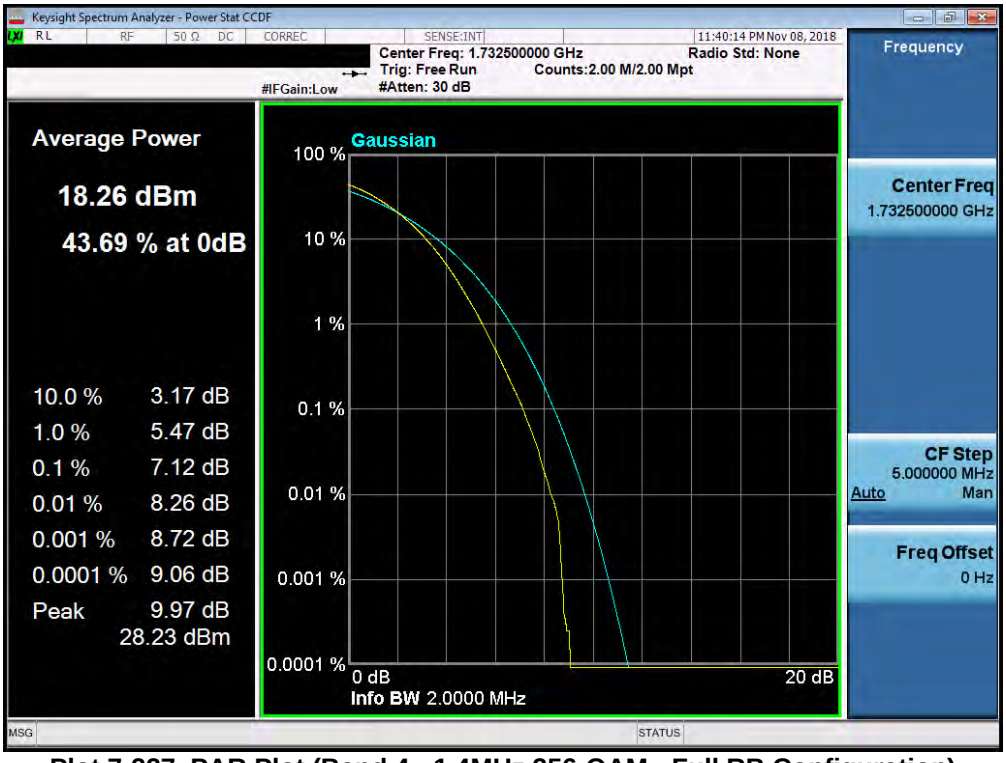
Plot 7-224. PAR Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



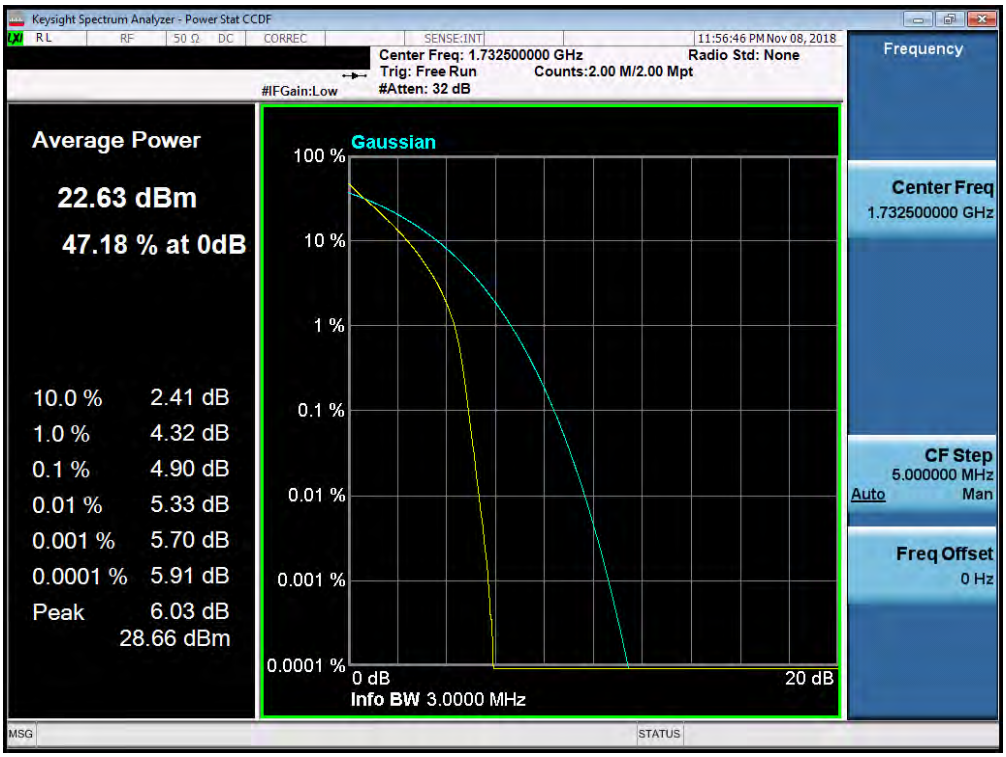
Plot 7-225. PAR Plot (Band 4 - 1.4MHz 16-QAM - Full RB Configuration)



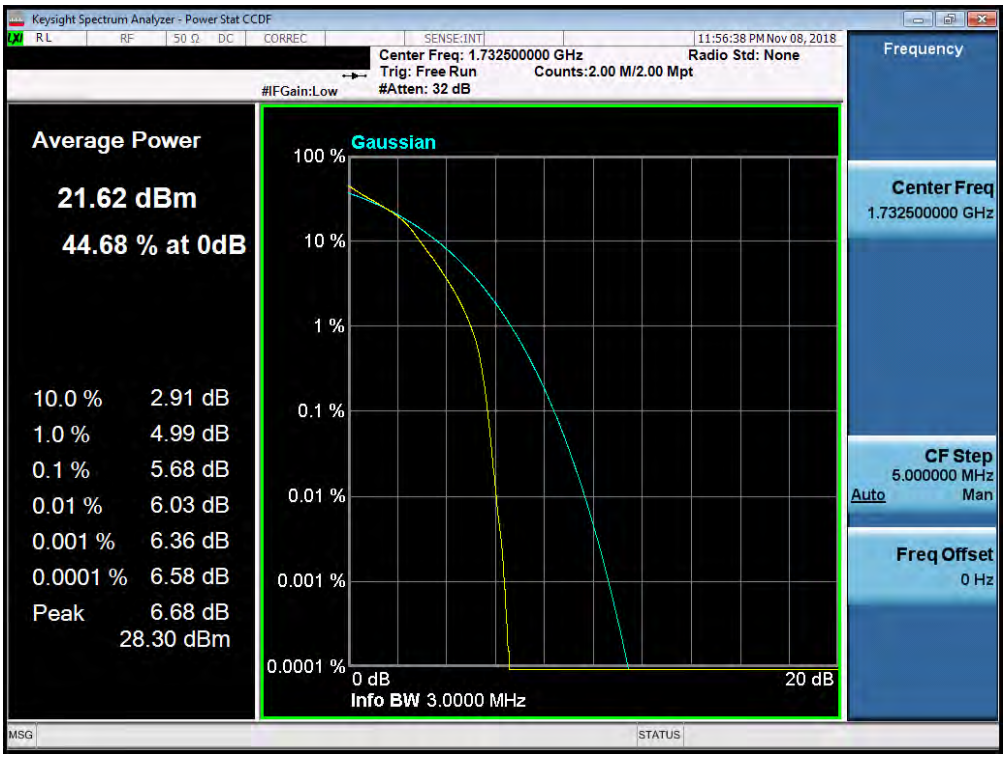
Plot 7-226. PAR Plot (Band 4 - 1.4MHz 64-QAM - Full RB Configuration)



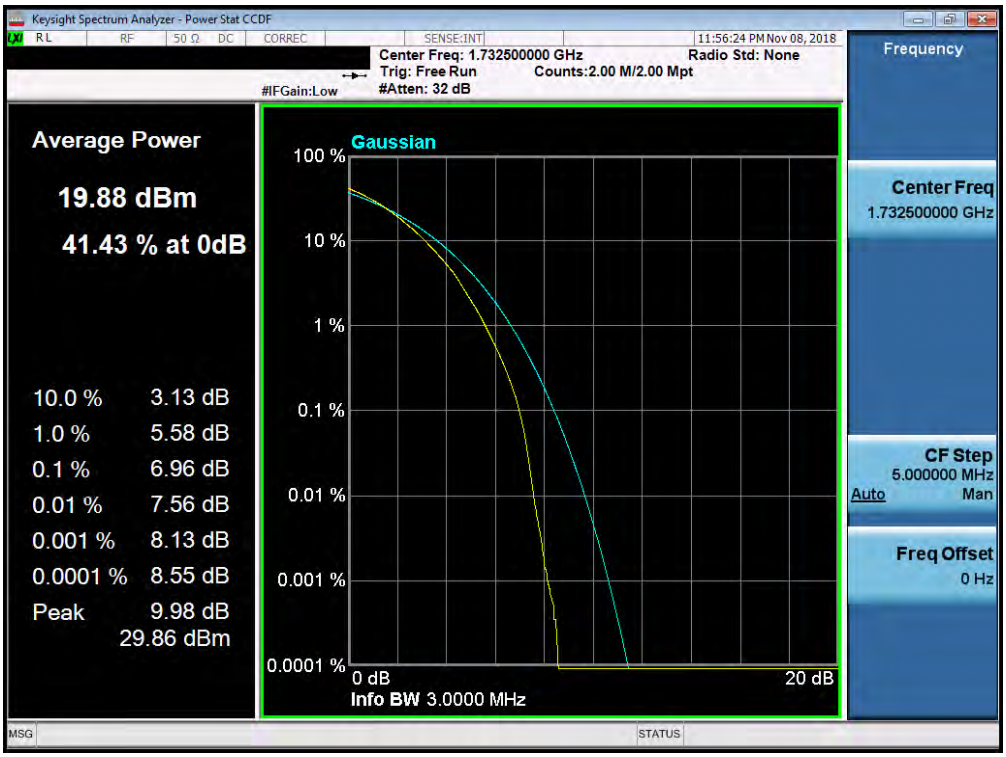
Plot 7-227. PAR Plot (Band 4 - 1.4MHz 256-QAM - Full RB Configuration)



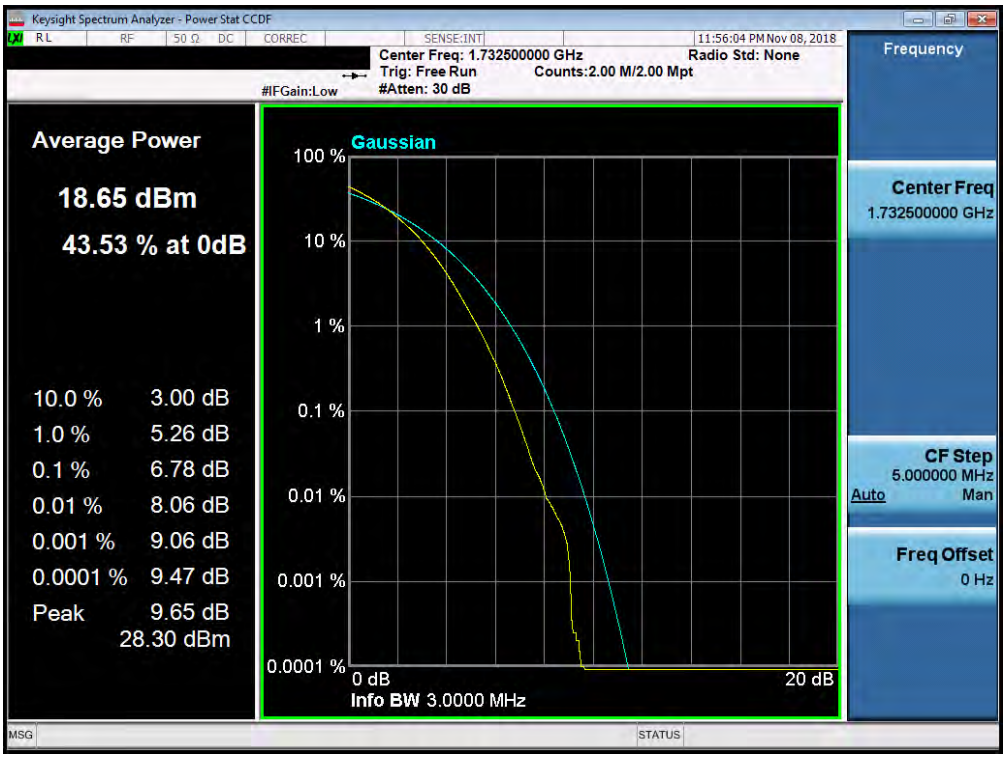
Plot 7-228. PAR Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



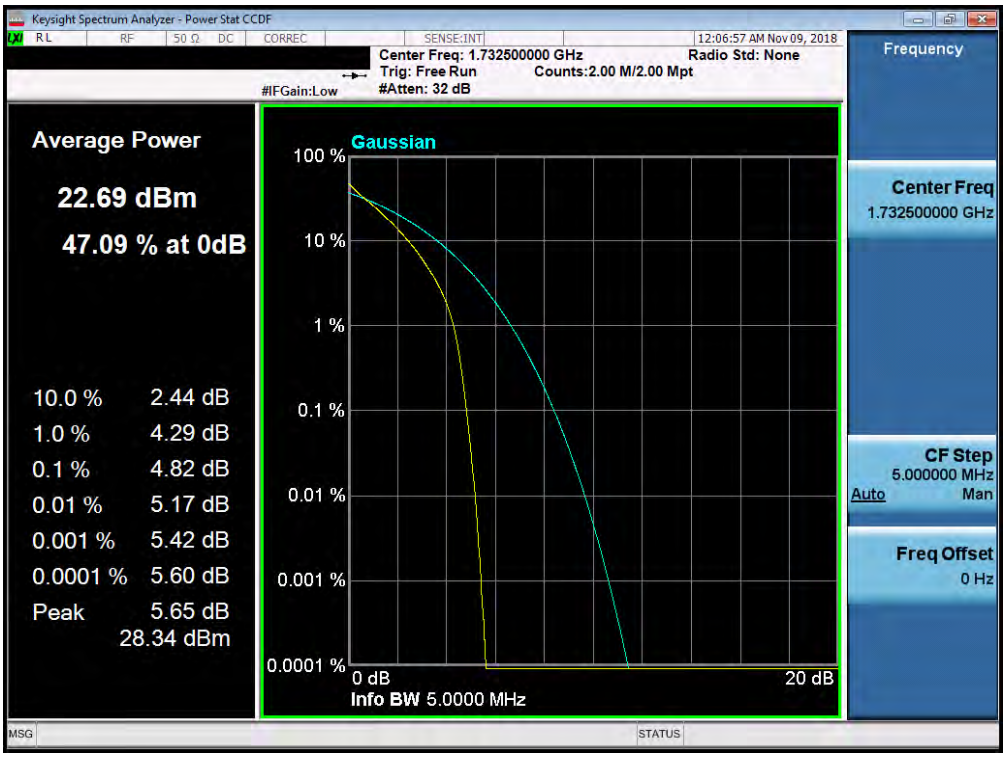
Plot 7-229. PAR Plot (Band 4 - 3.0MHz 16-QAM - Full RB Configuration)



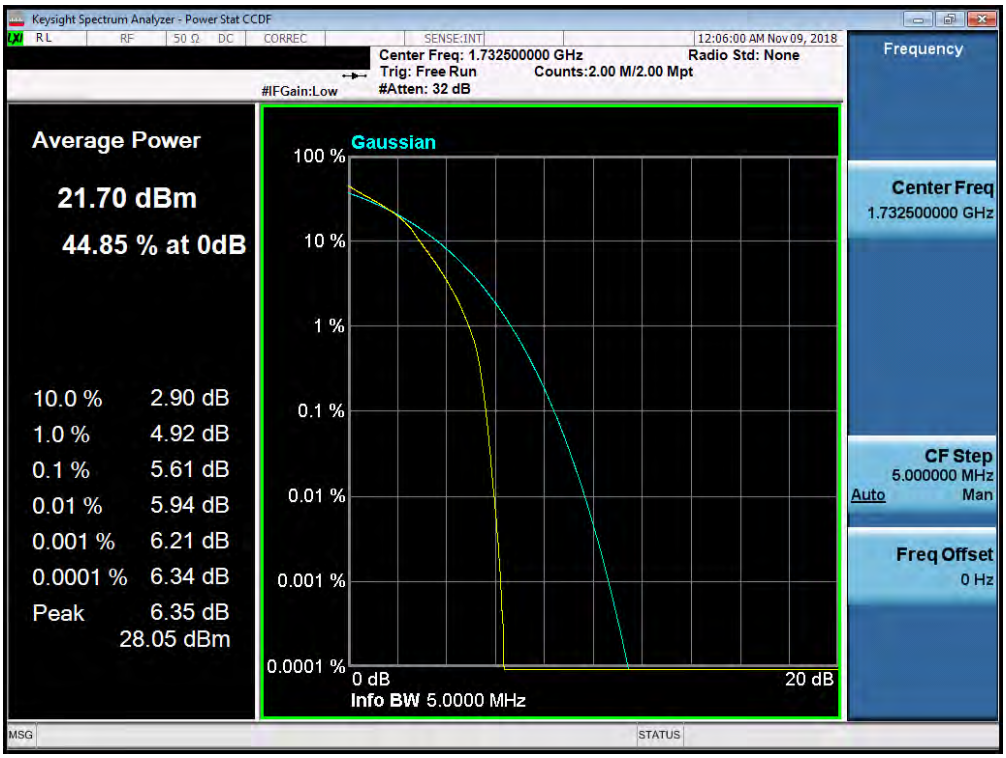
Plot 7-230. PAR Plot (Band 4 - 3.0MHz 64-QAM - Full RB Configuration)



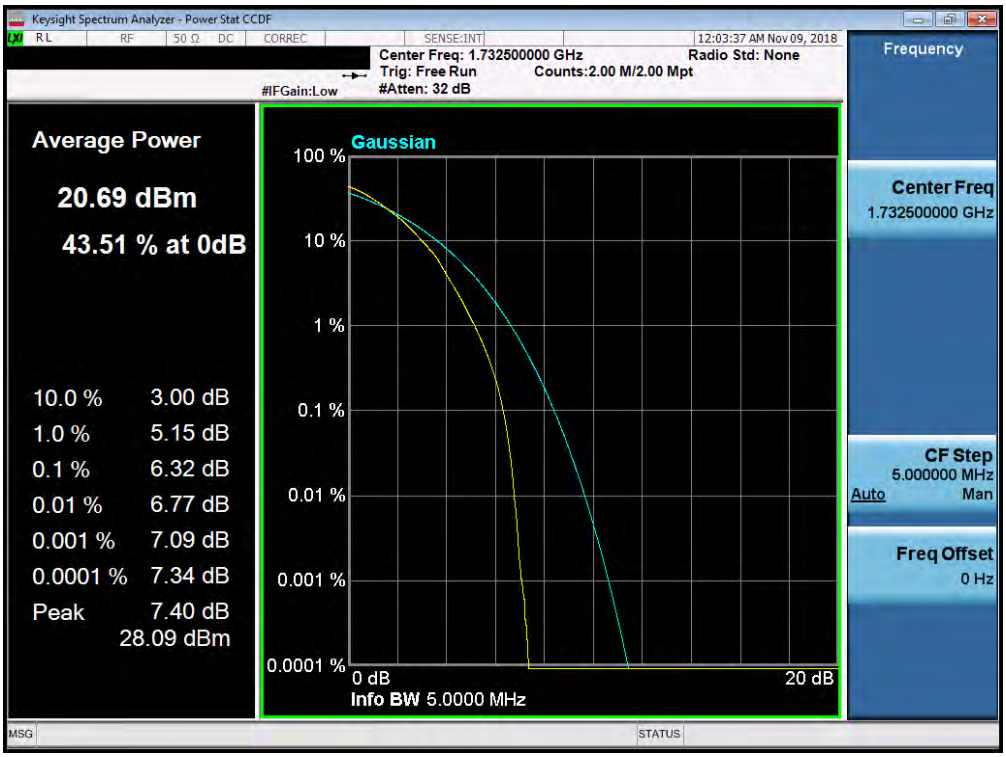
Plot 7-231. PAR Plot (Band 4 - 3.0MHz 256-QAM - Full RB Configuration)



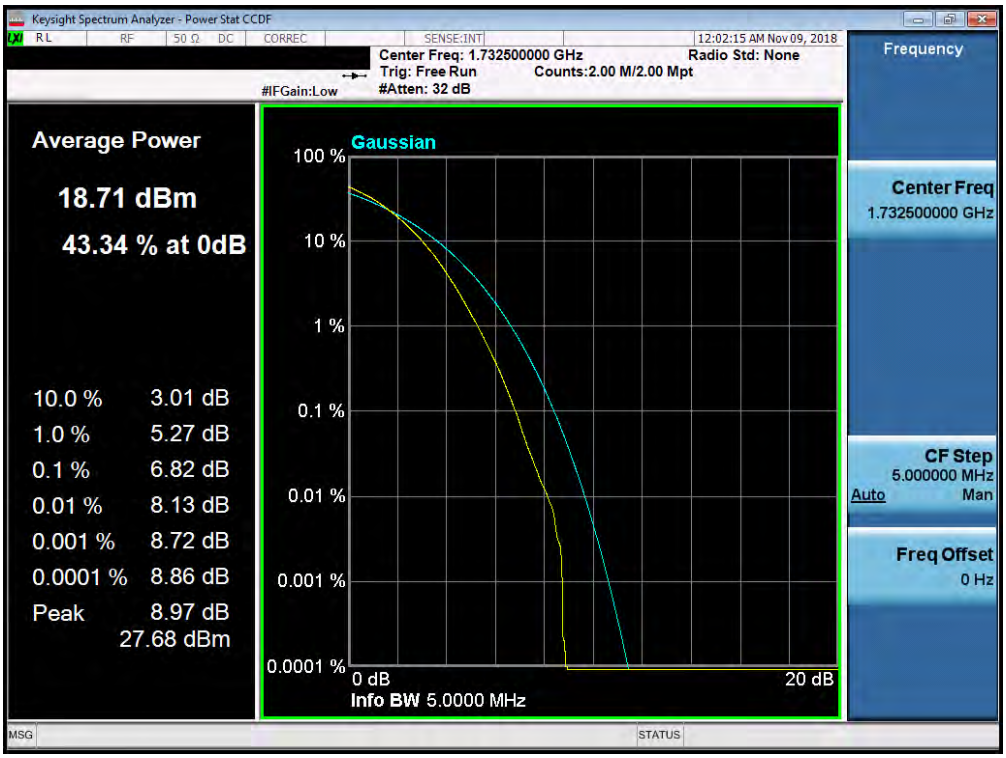
Plot 7-232. PAR Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



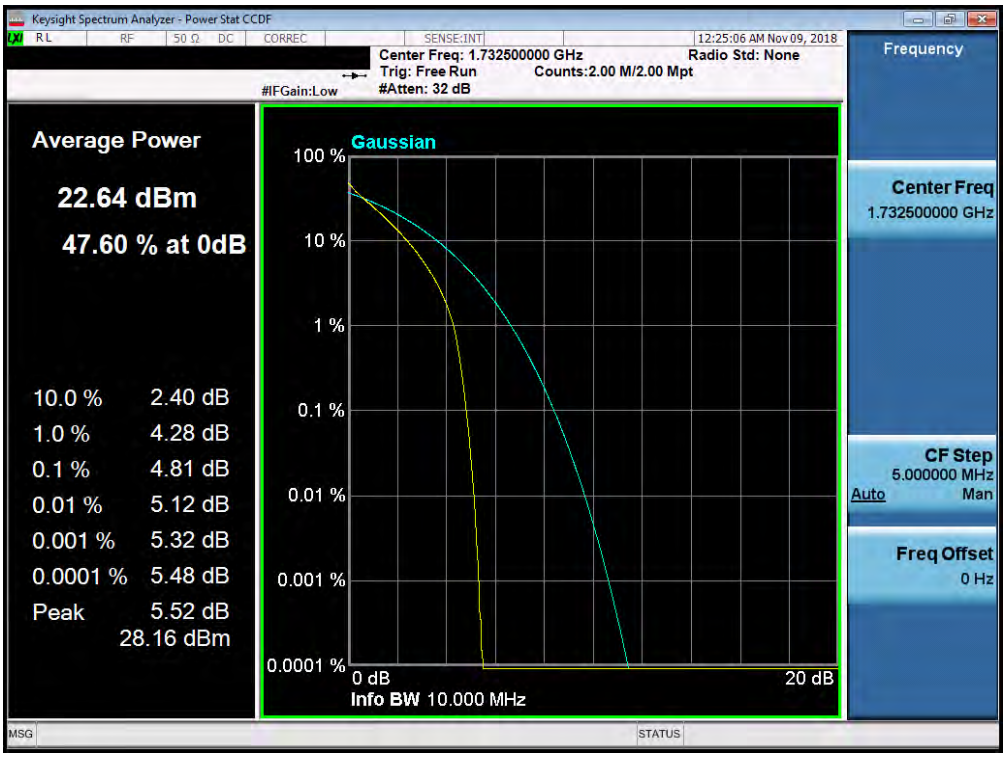
Plot 7-233. PAR Plot (Band 4 - 5.0MHz 16-QAM - Full RB Configuration)



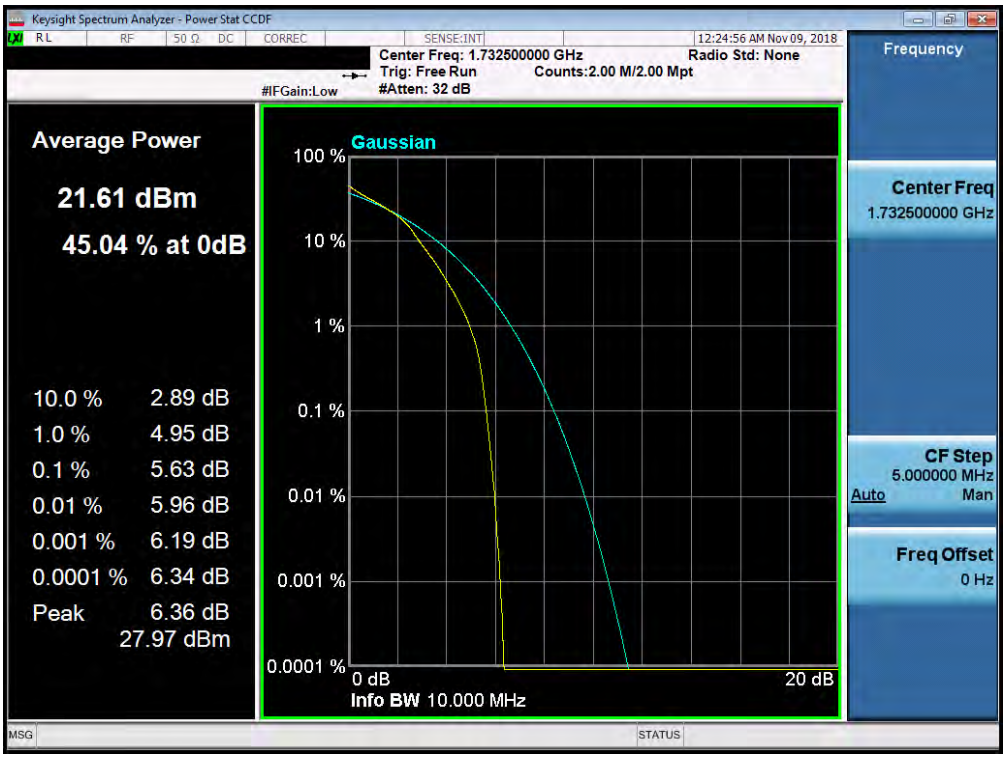
Plot 7-234. PAR Plot (Band 4 - 5.0MHz 64-QAM - Full RB Configuration)



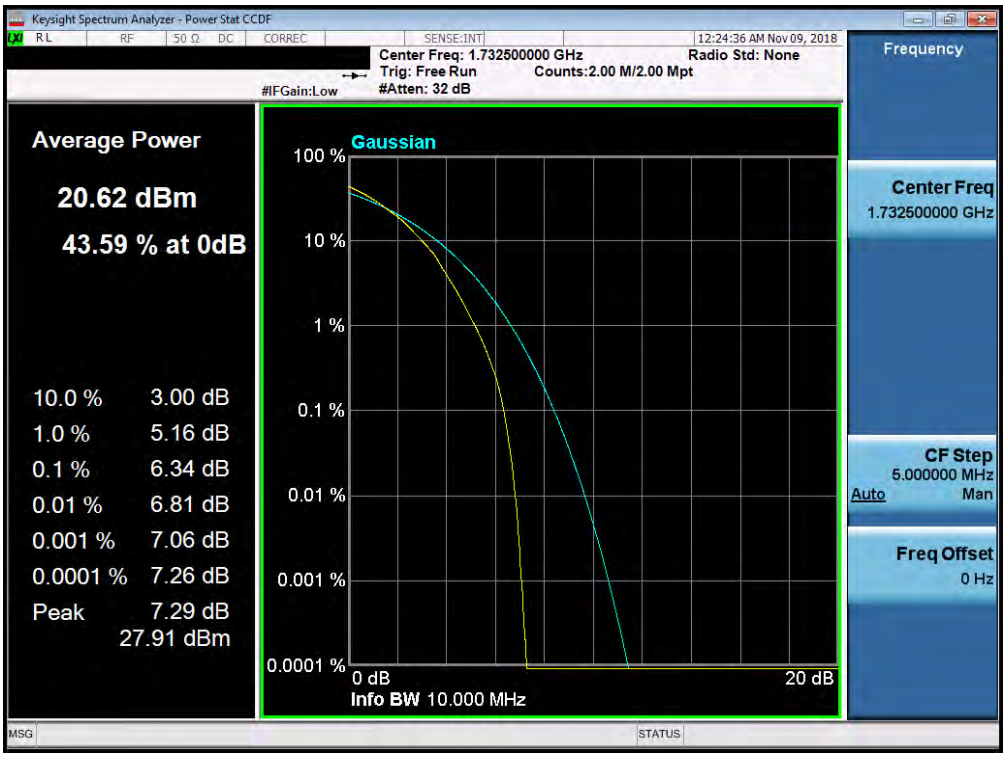
Plot 7-235. PAR Plot (Band 4 - 5.0MHz 256-QAM - Full RB Configuration)



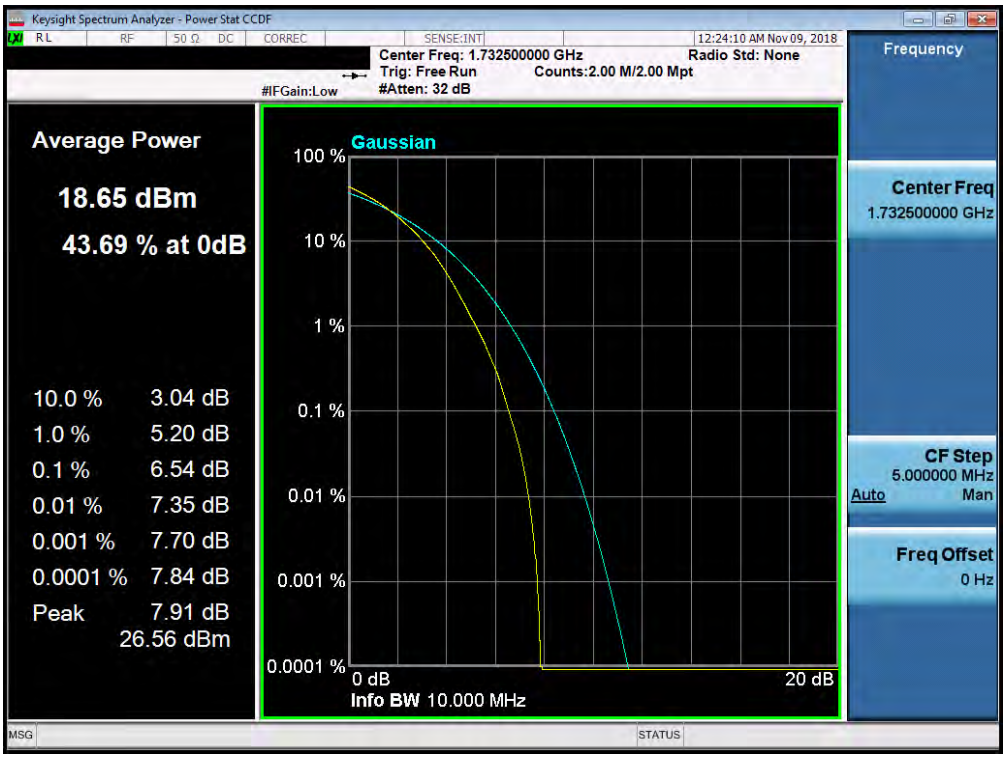
Plot 7-236. PAR Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



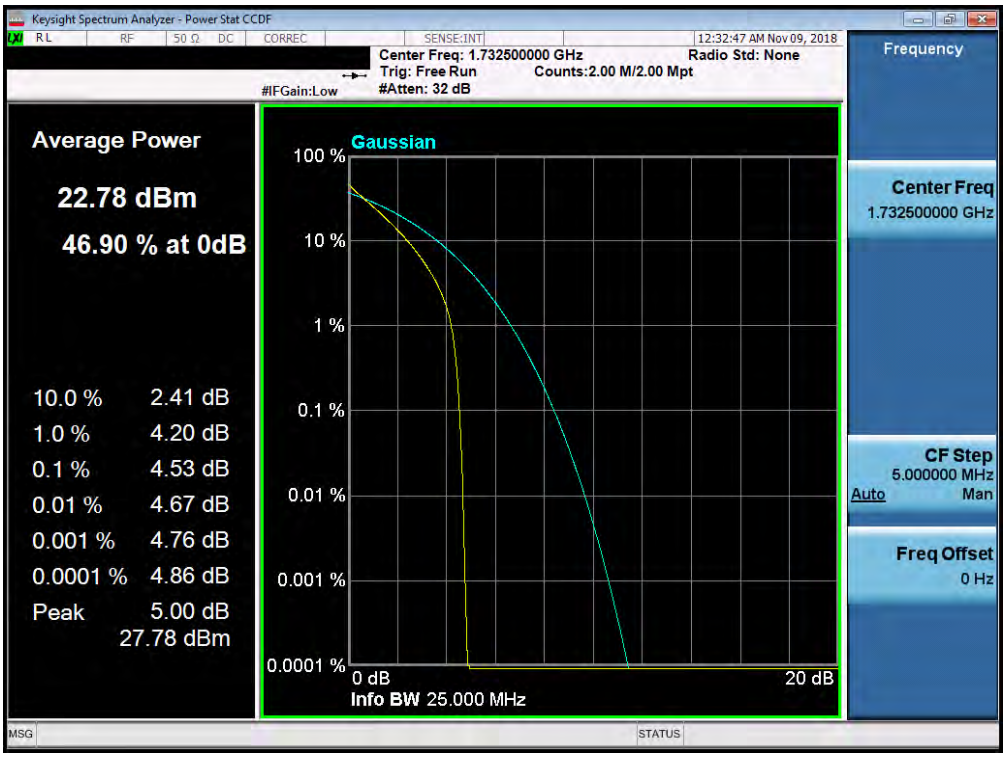
Plot 7-237. PAR Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)



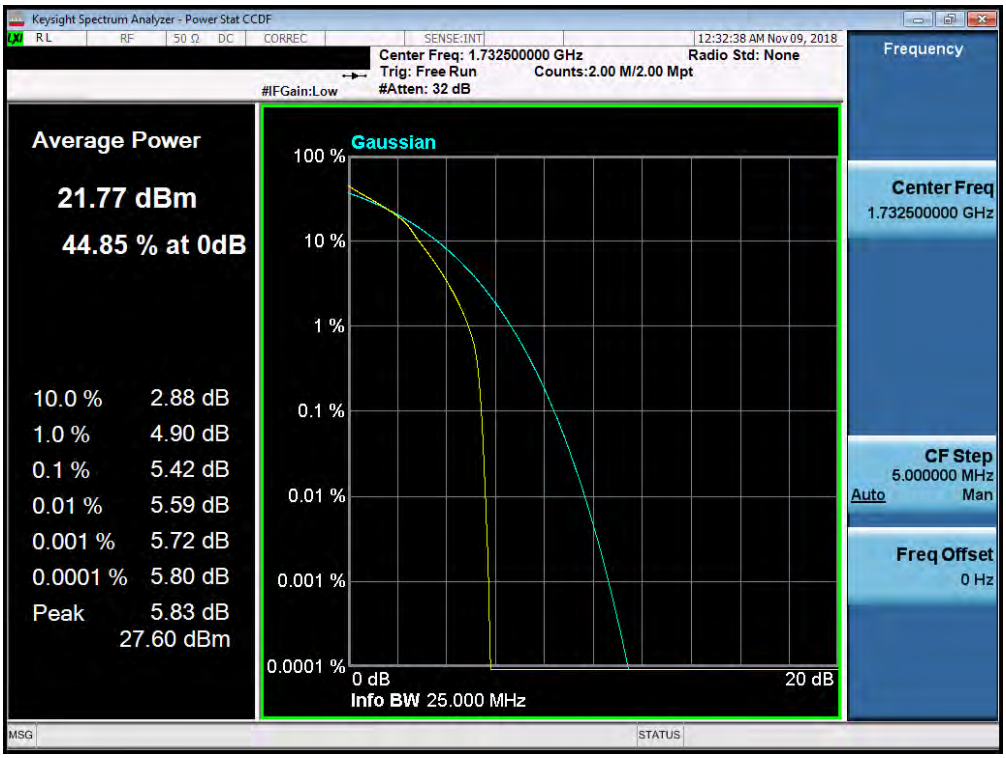
Plot 7-238. PAR Plot (Band 4 - 10.0MHz 64-QAM - Full RB Configuration)



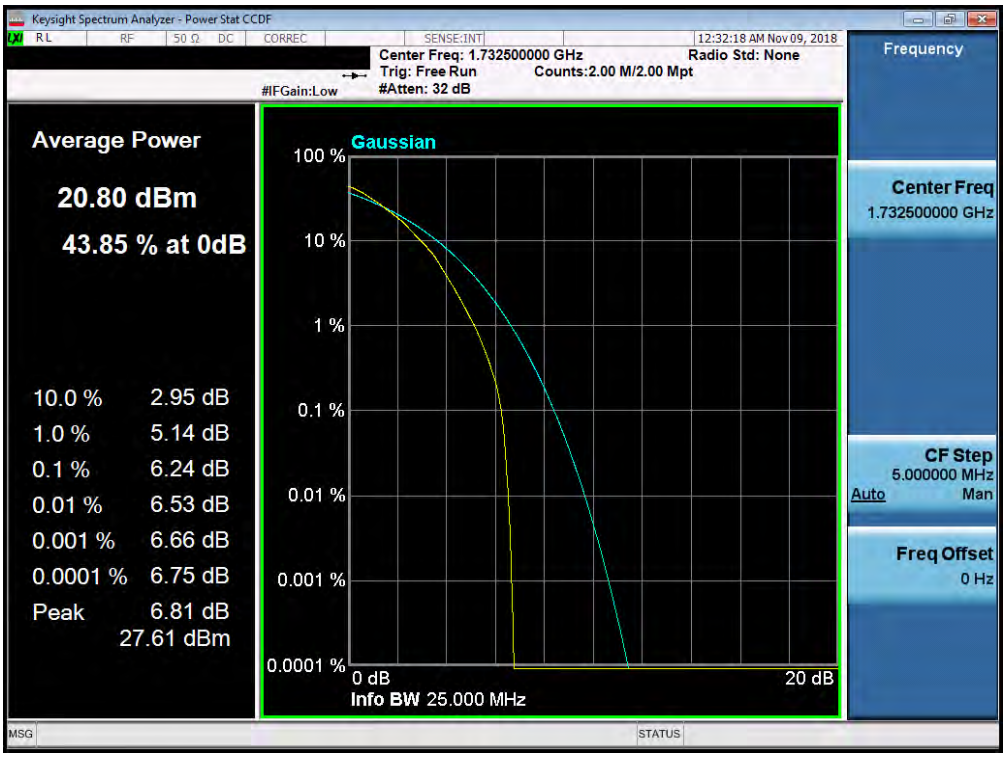
Plot 7-239. PAR Plot (Band 4 - 10.0MHz 256-QAM - Full RB Configuration)



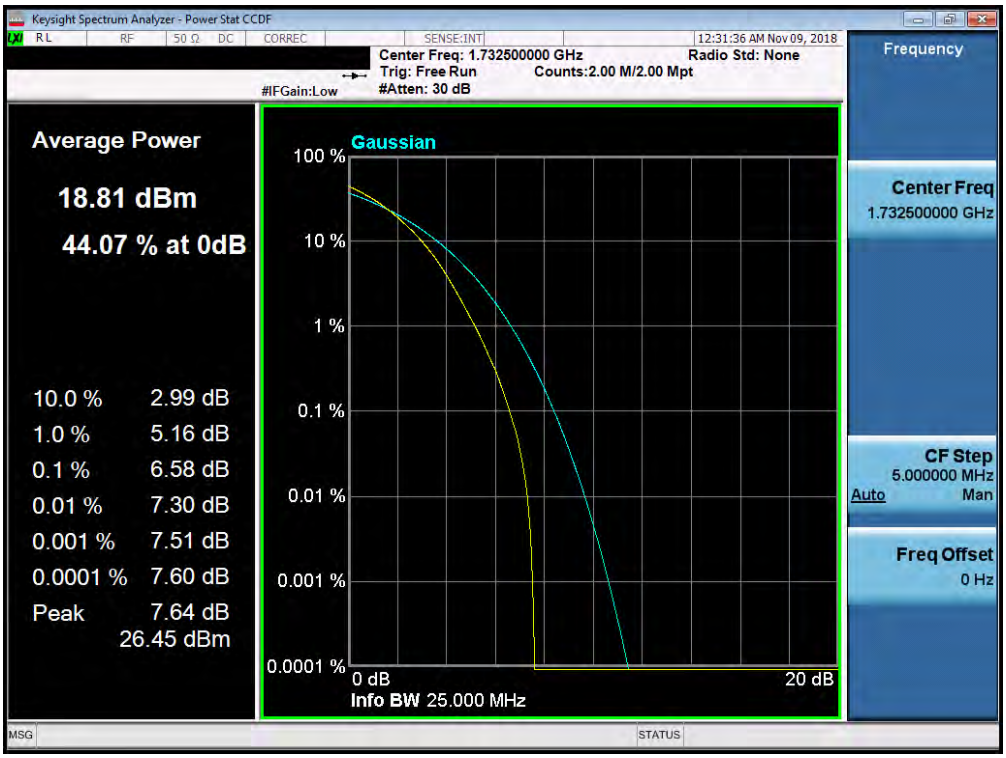
Plot 7-240. PAR Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



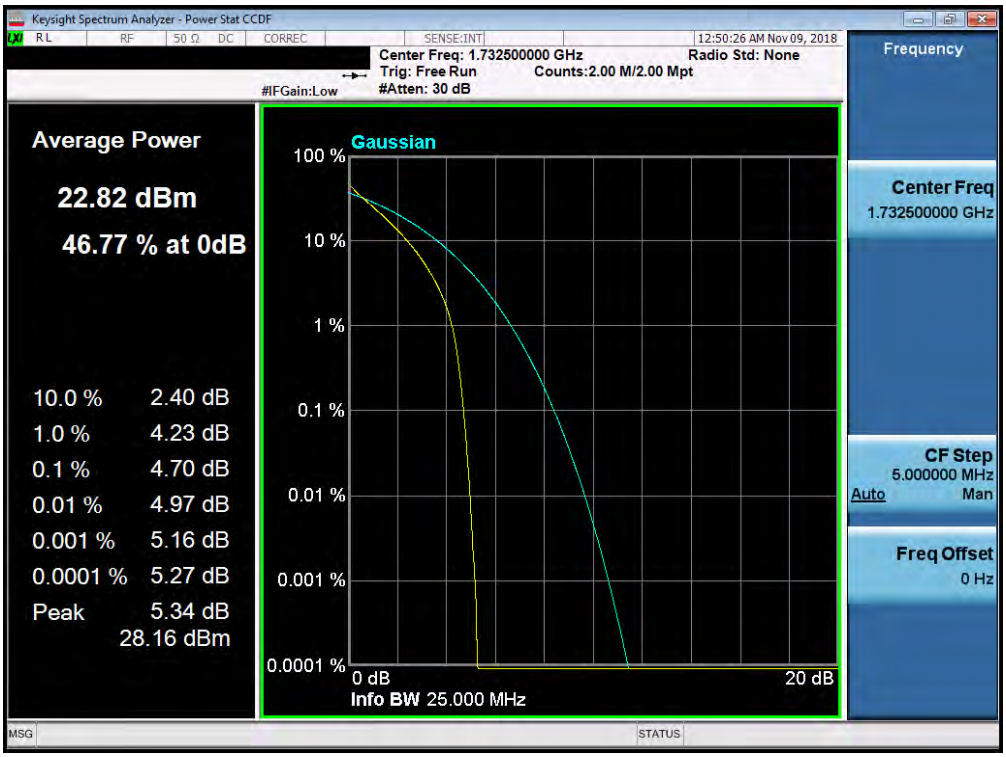
Plot 7-241. PAR Plot (Band 4 - 15.0MHz 16-QAM - Full RB Configuration)



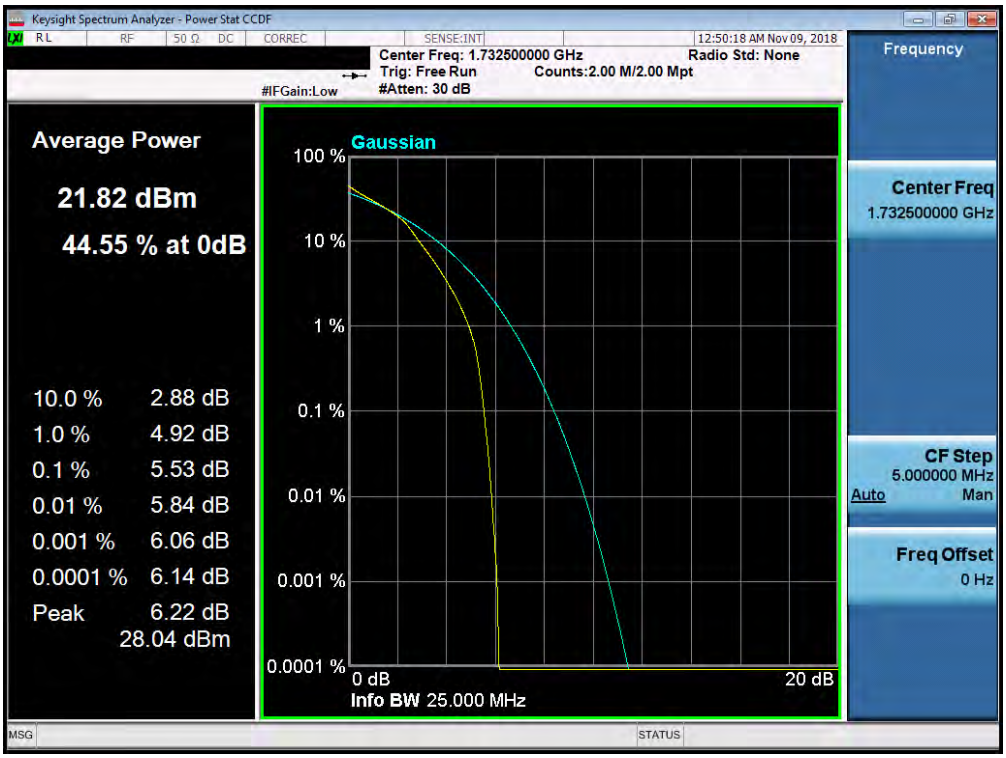
Plot 7-242. PAR Plot (Band 4 - 15.0MHz 64-QAM - Full RB Configuration)



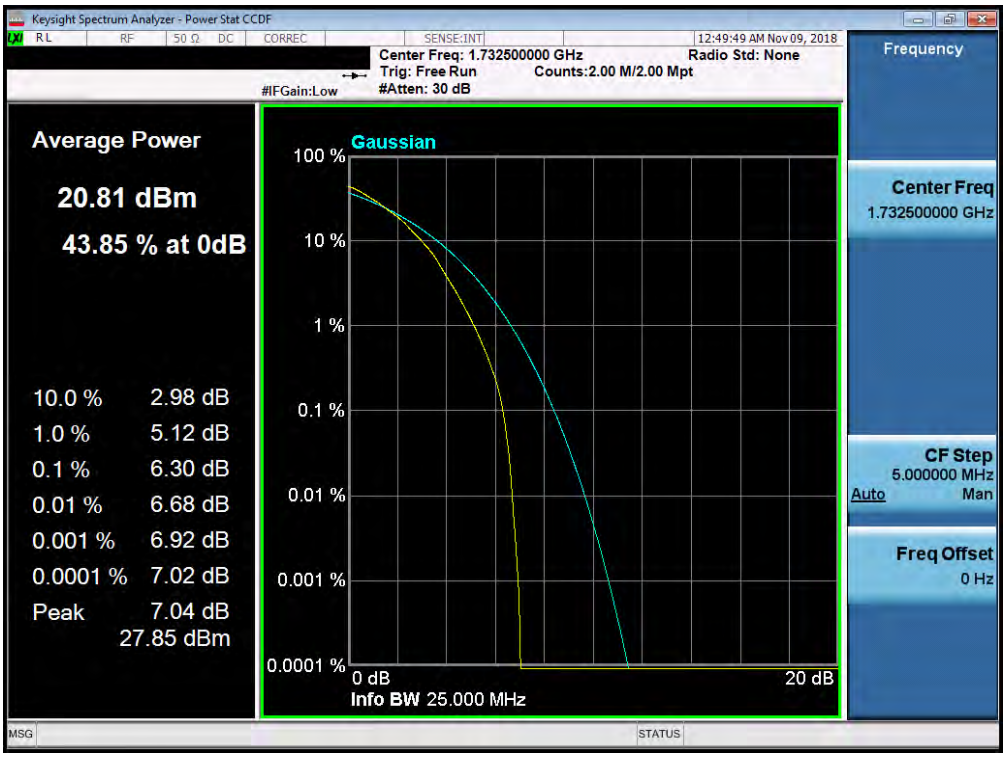
Plot 7-243. PAR Plot (Band 4 - 15.0MHz 256-QAM - Full RB Configuration)



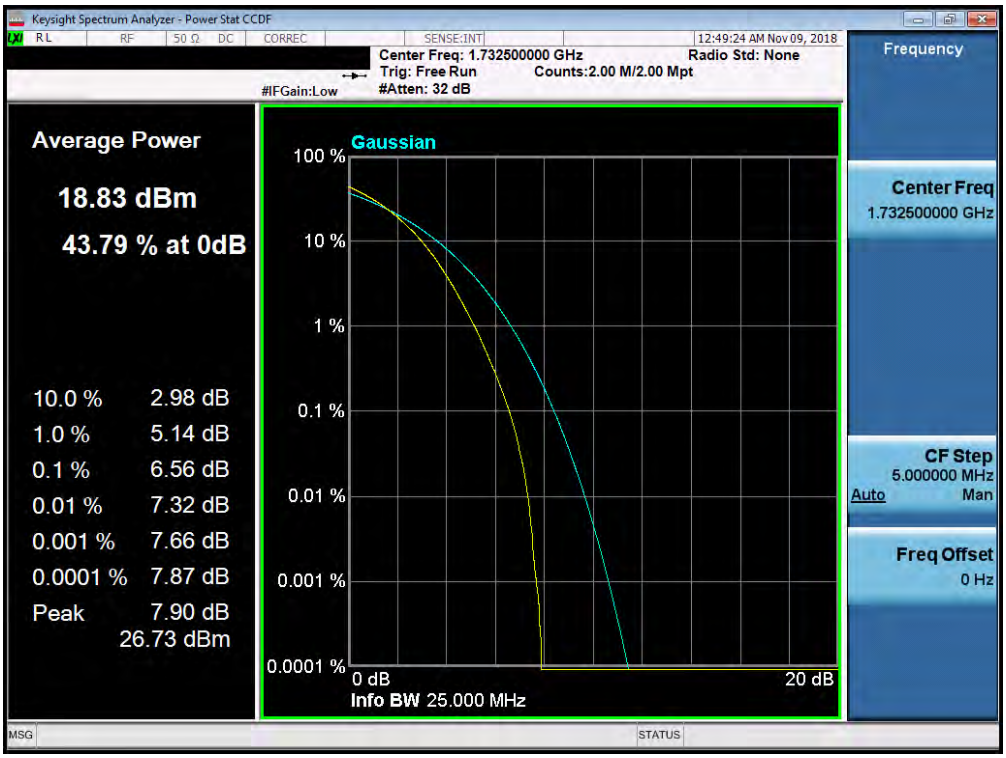
Plot 7-244. PAR Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-245. PAR Plot (Band 4 - 20.0MHz 16-QAM - Full RB Configuration)

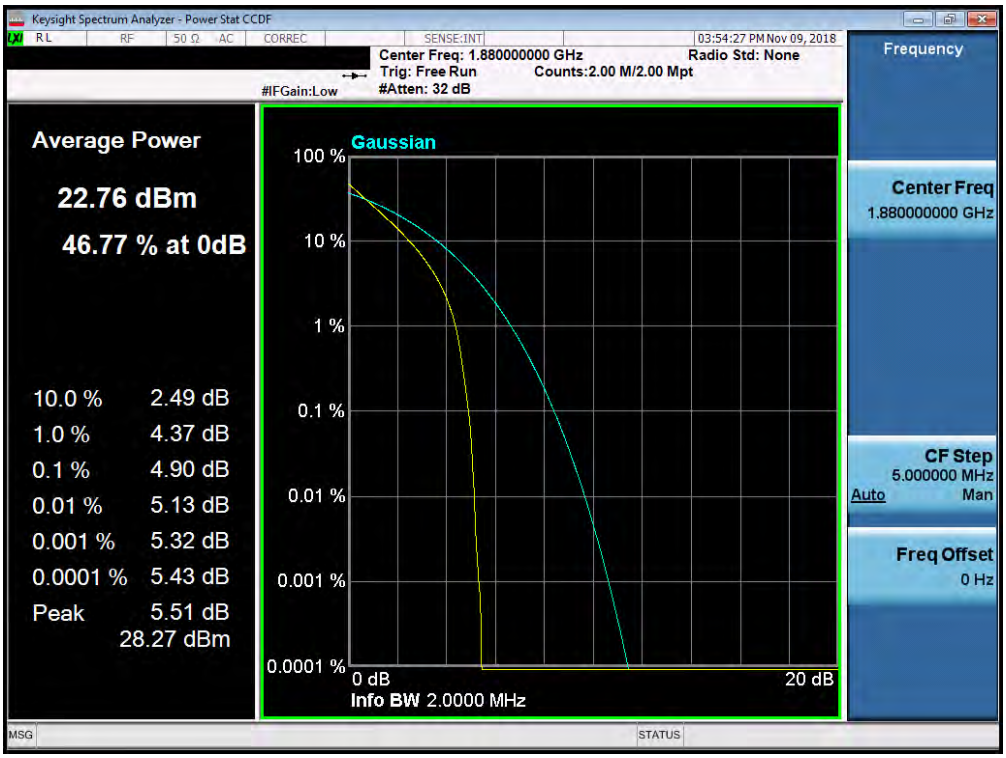


Plot 7-246. PAR Plot (Band 4 - 20.0MHz 64-QAM - Full RB Configuration)

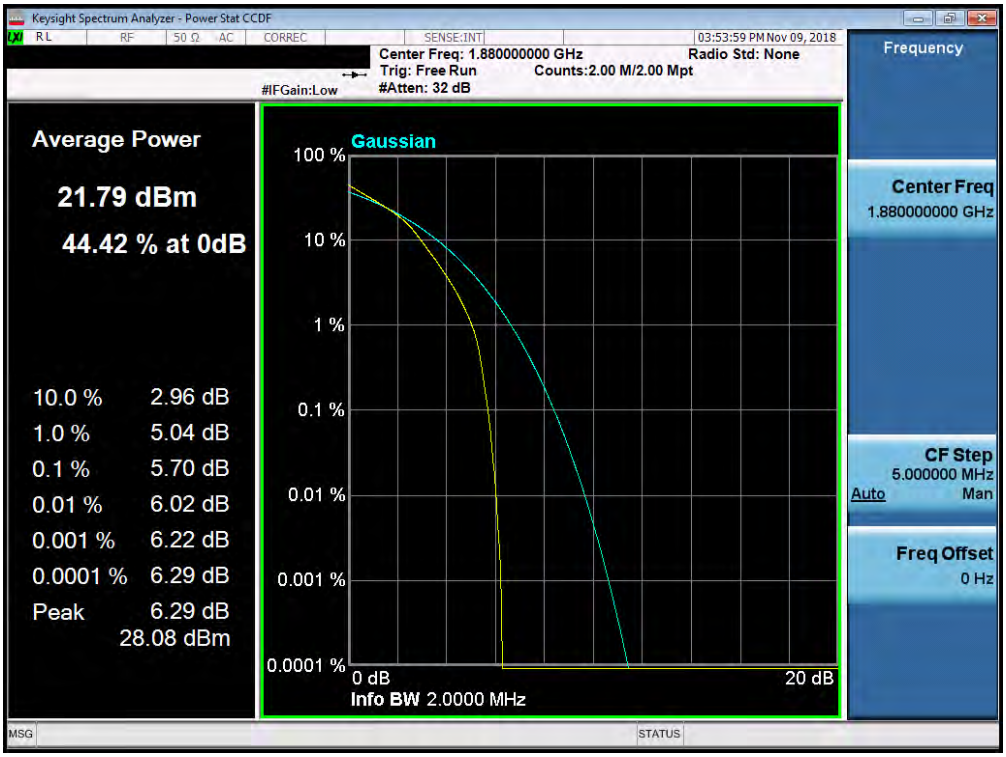


Plot 7-247. PAR Plot (Band 4 - 20.0MHz 256-QAM - Full RB Configuration)

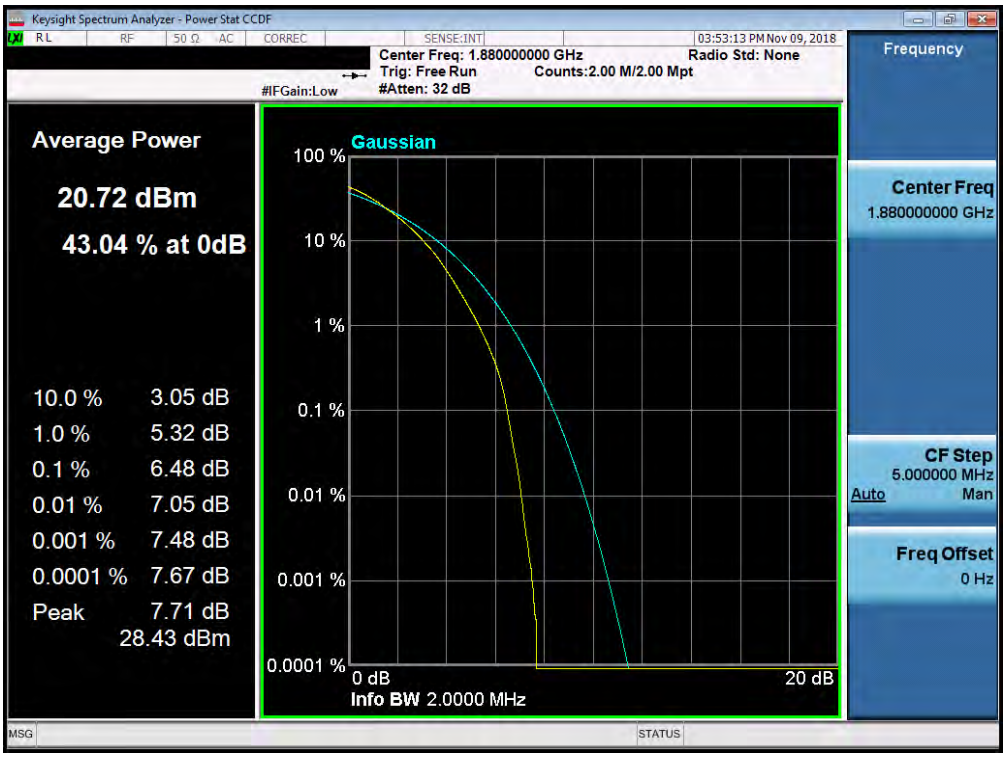
Band 25/2



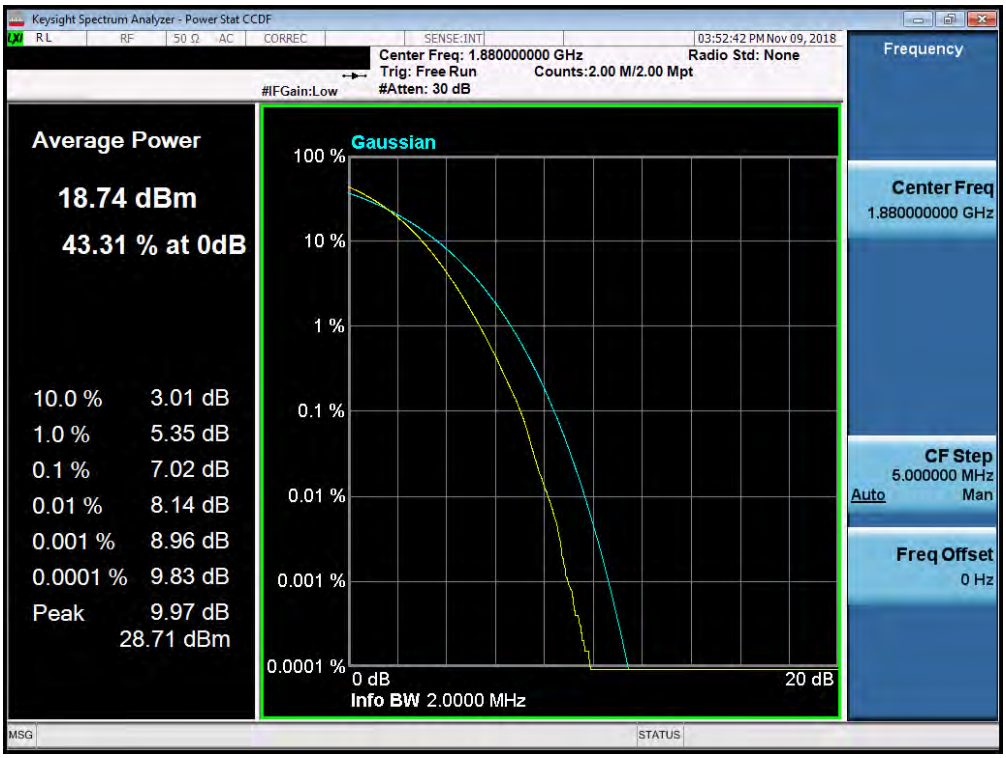
Plot 7-248. PAR Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



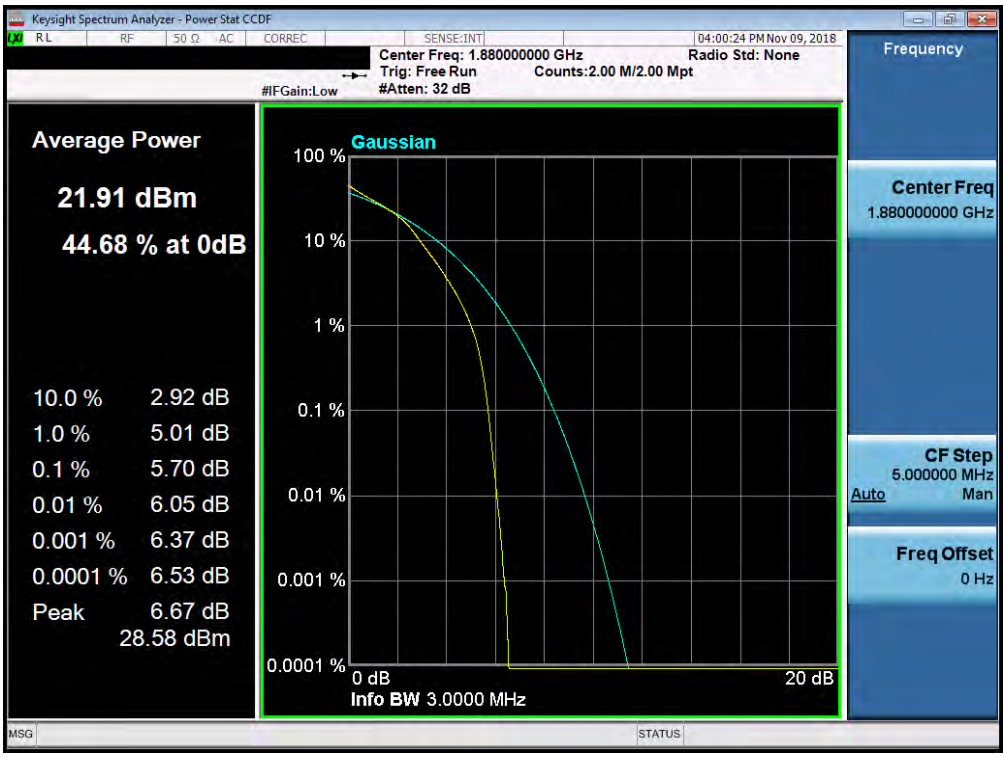
Plot 7-249. PAR Plot (Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)



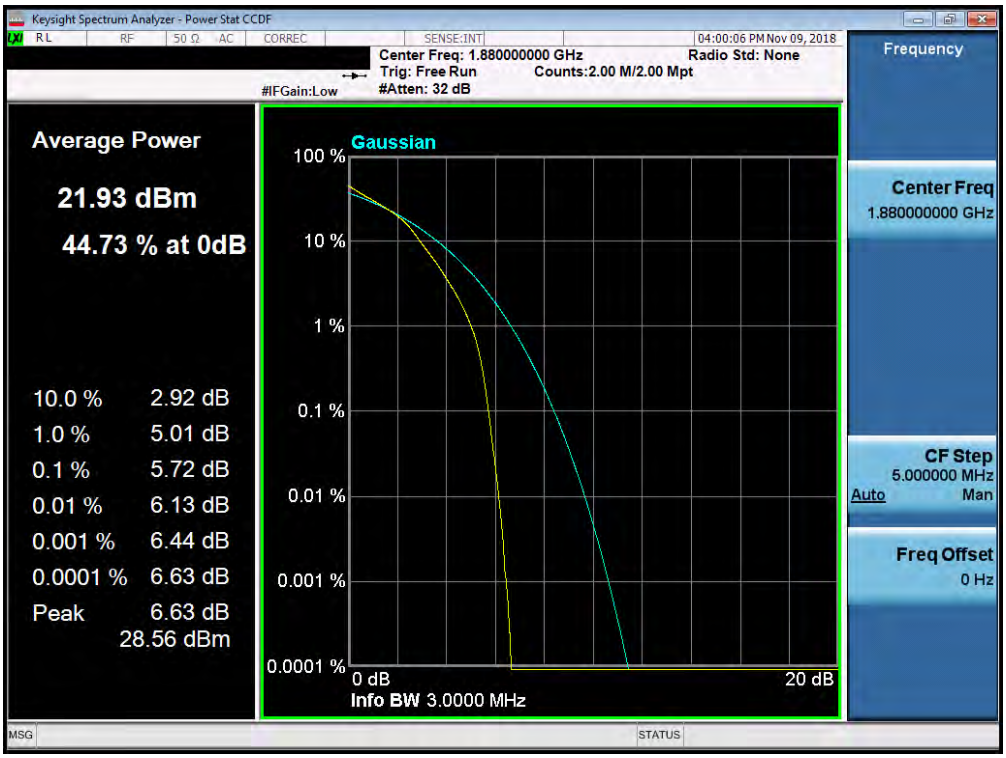
Plot 7-250. PAR Plot (Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)



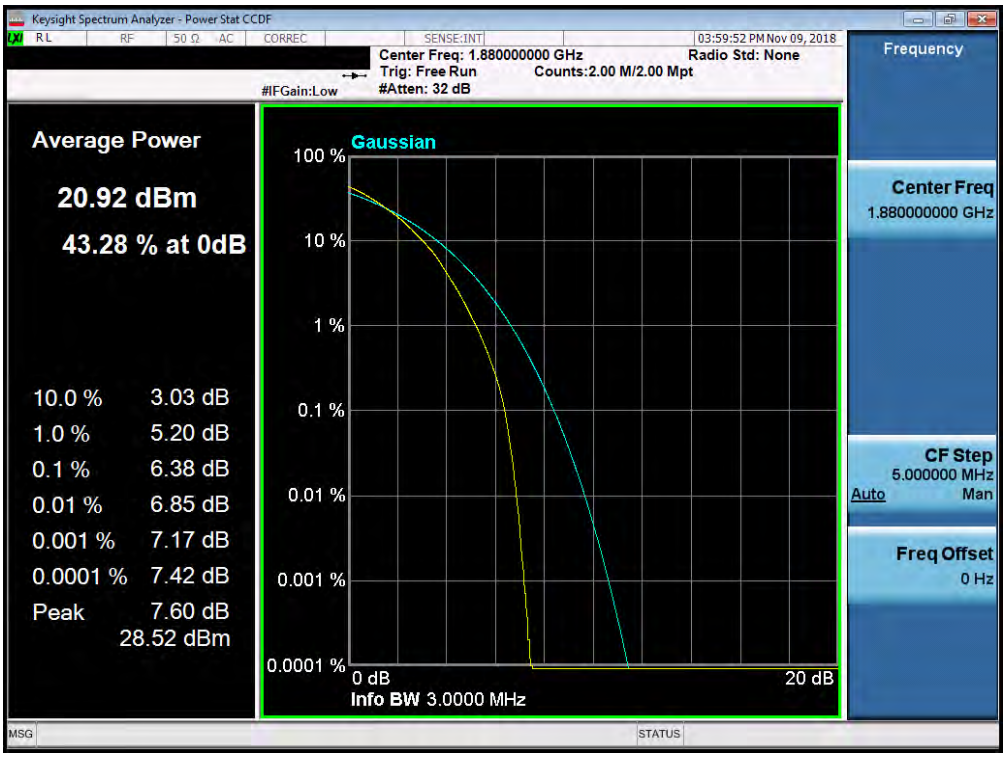
Plot 7-251. PAR Plot (Band 25/2 - 1.4MHz 256-QAM - Full RB Configuration)



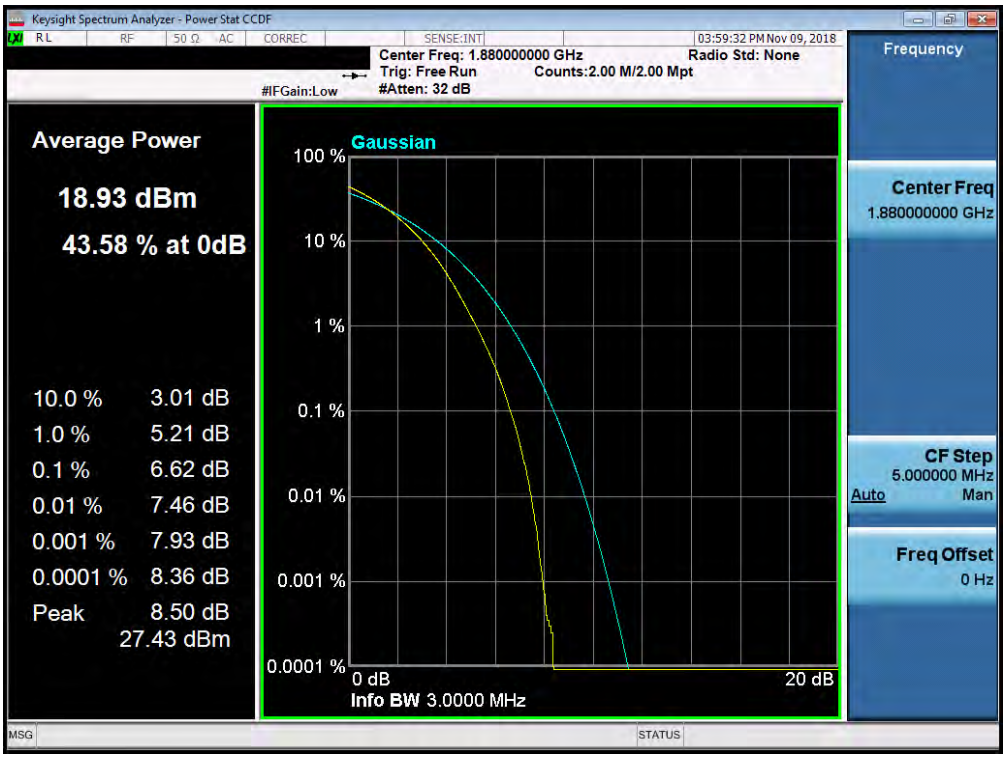
Plot 7-252. PAR Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



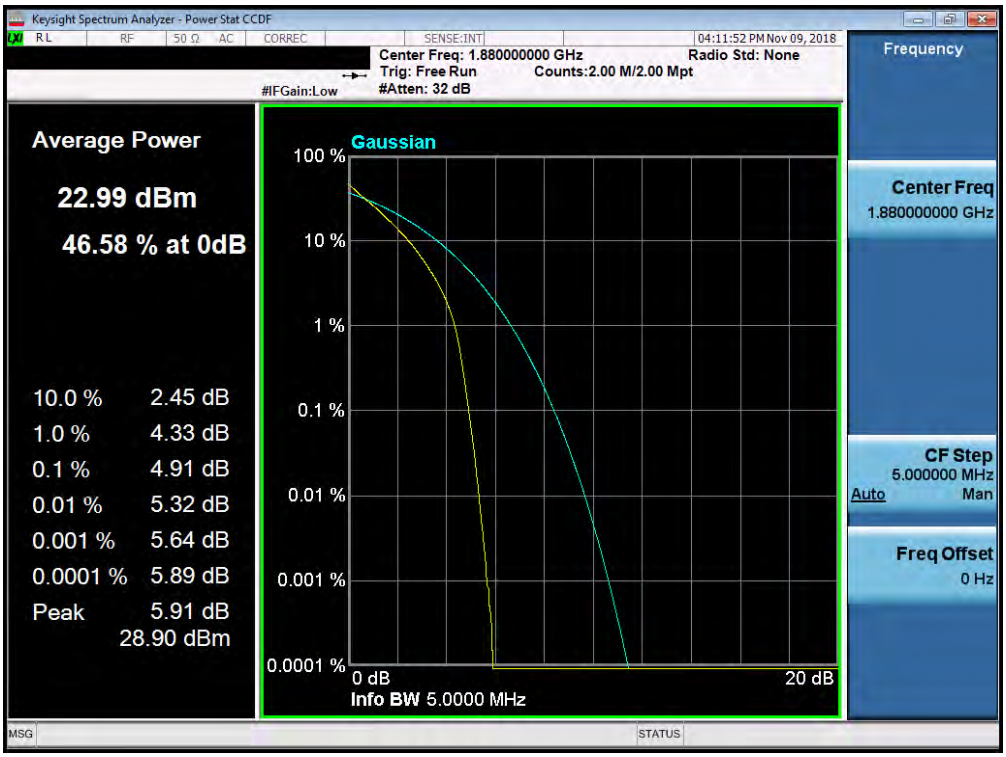
Plot 7-253. PAR Plot (Band 25/2 - 3.0MHz 16-QAM - Full RB Configuration)



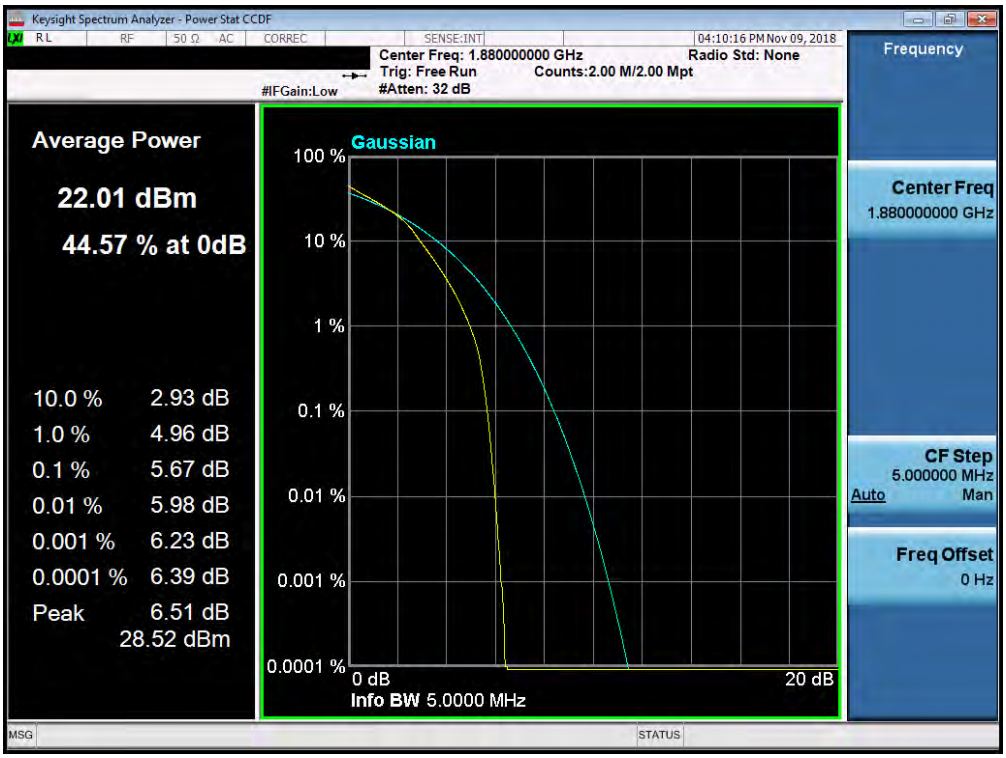
Plot 7-254. PAR Plot (Band 25/2 - 3.0MHz 64-QAM - Full RB Configuration)



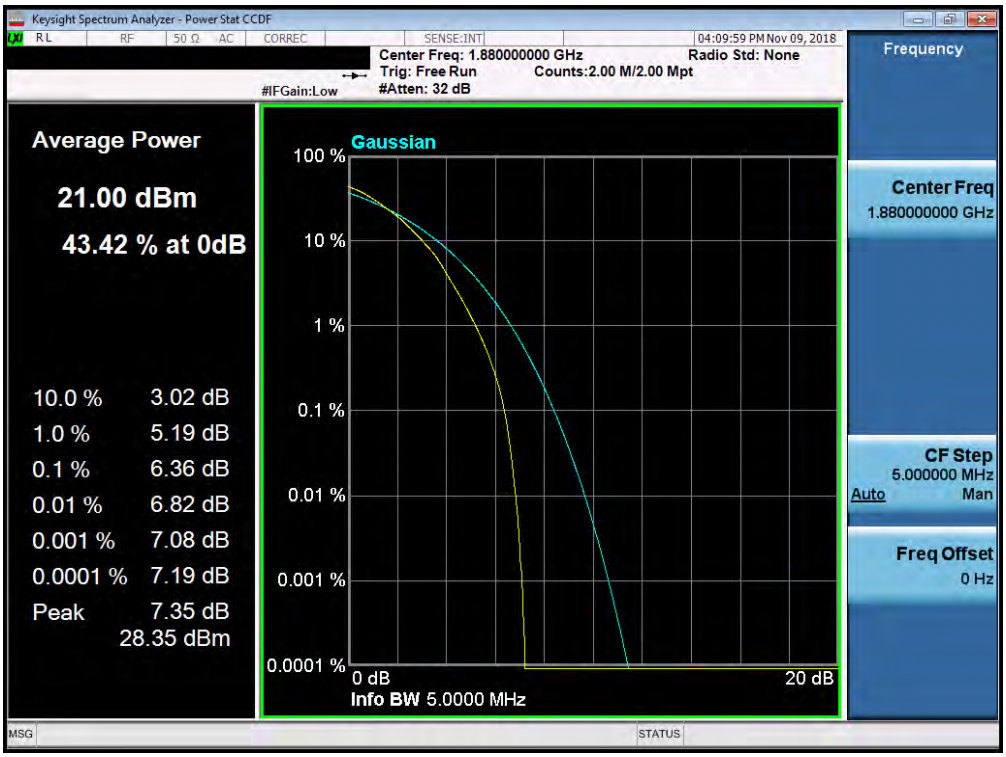
Plot 7-255. PAR Plot (Band 25/2 - 3.0MHz 256-QAM - Full RB Configuration)



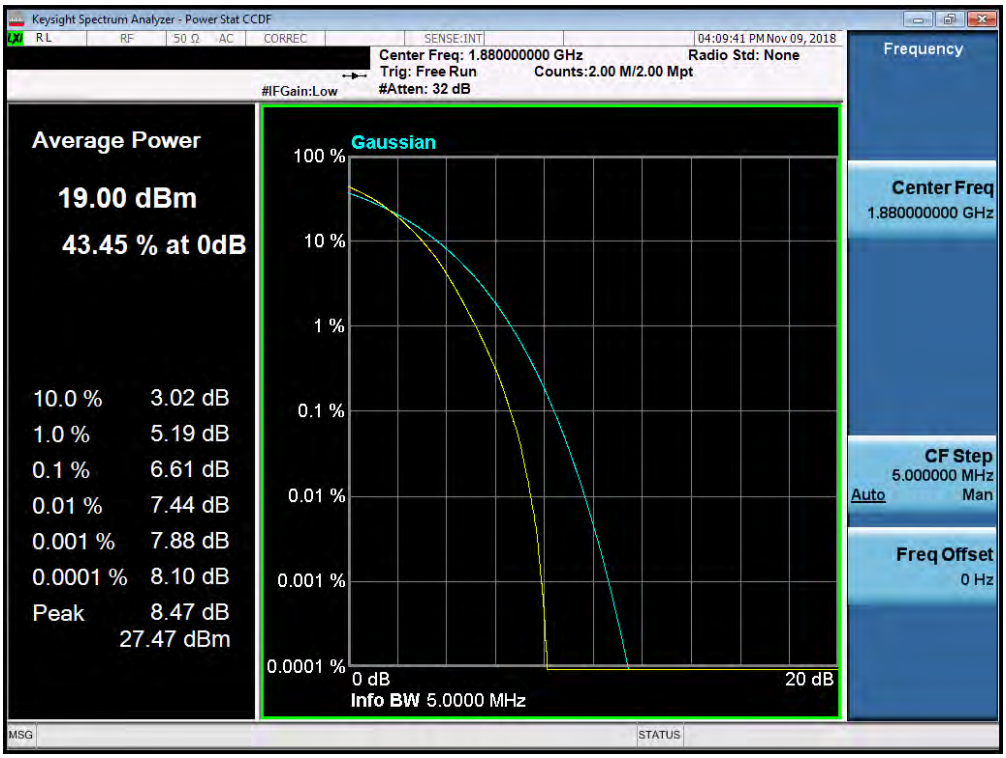
Plot 7-256. PAR Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



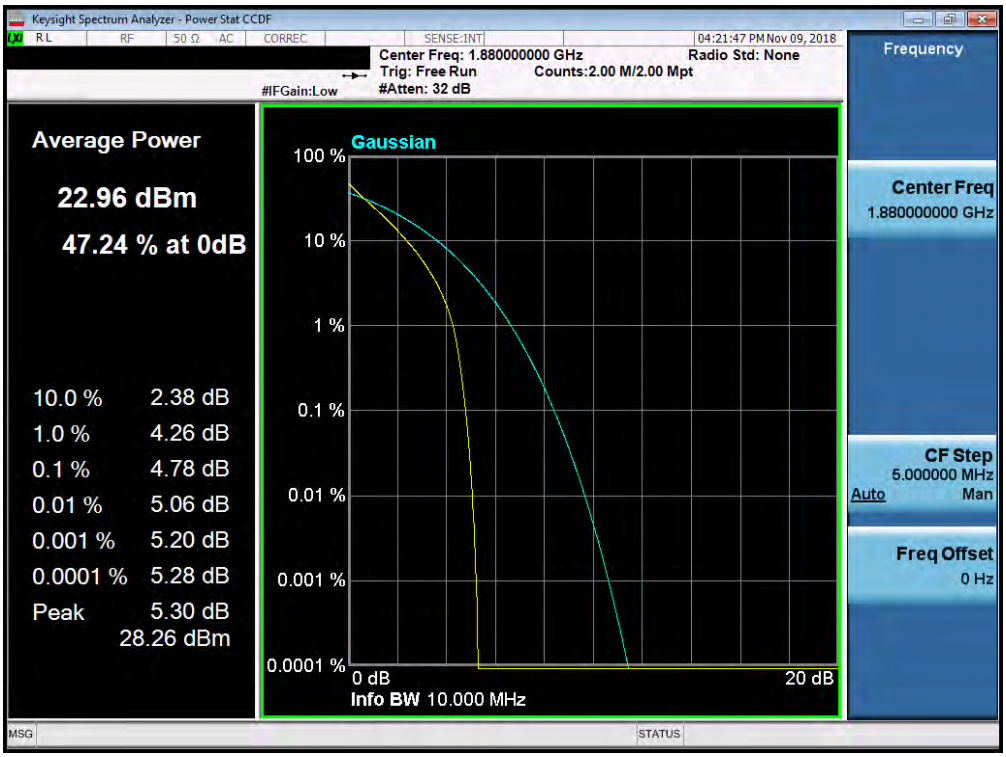
Plot 7-257. PAR Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)



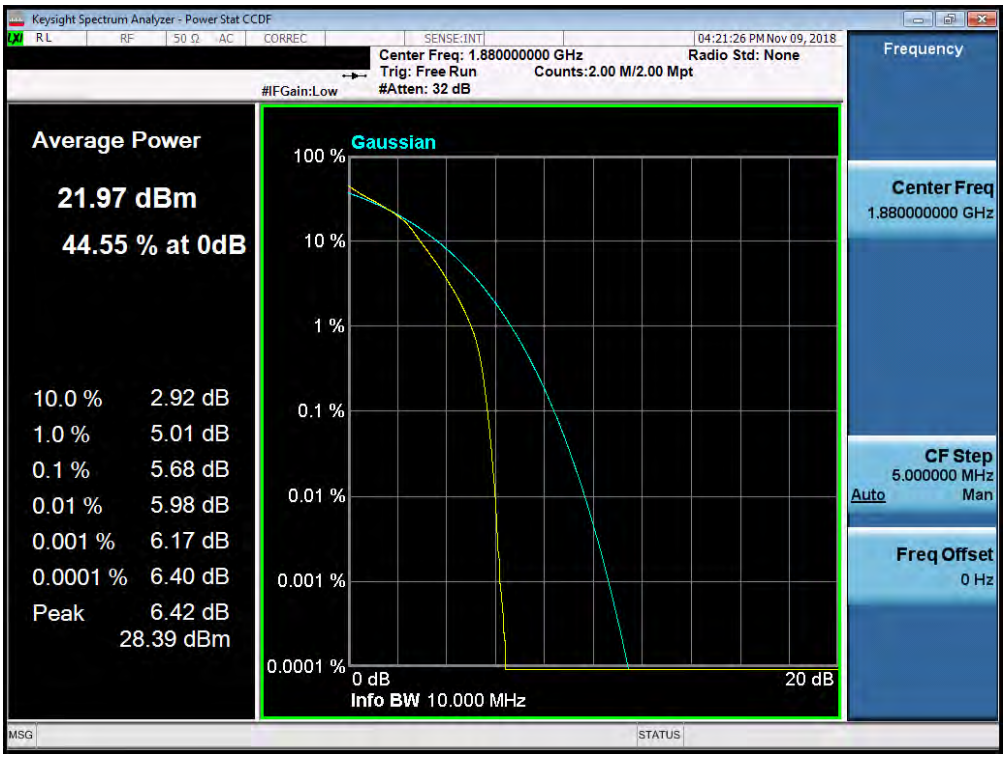
Plot 7-258. PAR Plot (Band 25/2 - 5.0MHz 64-QAM - Full RB Configuration)



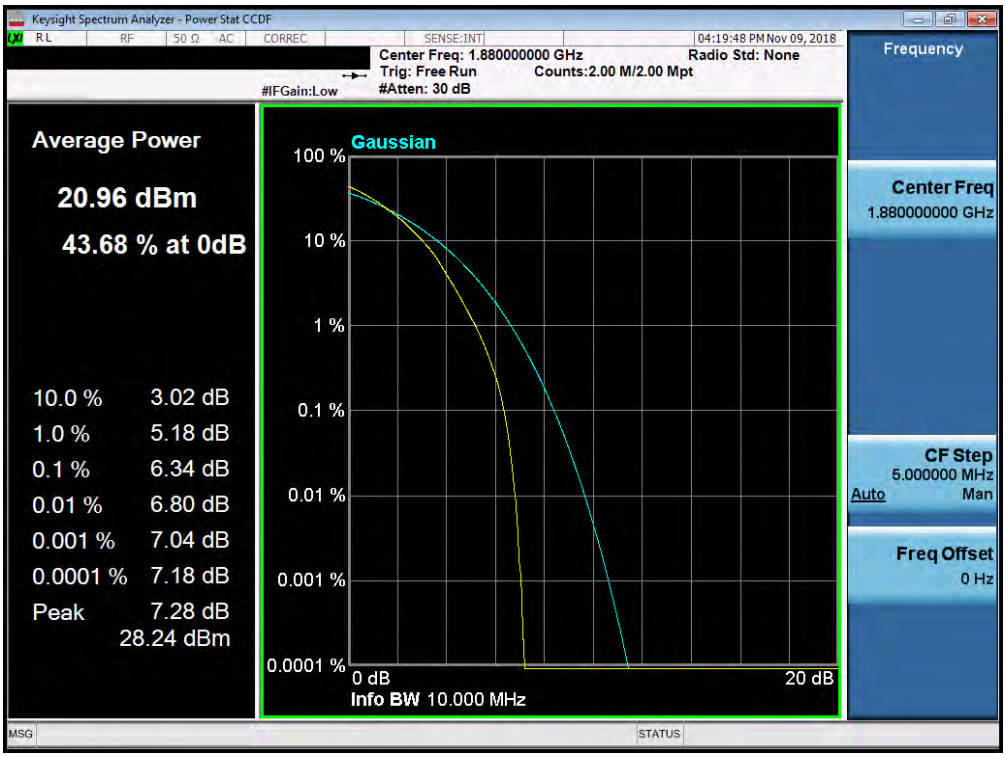
Plot 7-259. PAR Plot (Band 25/2 - 5.0MHz 256-QAM - Full RB Configuration)



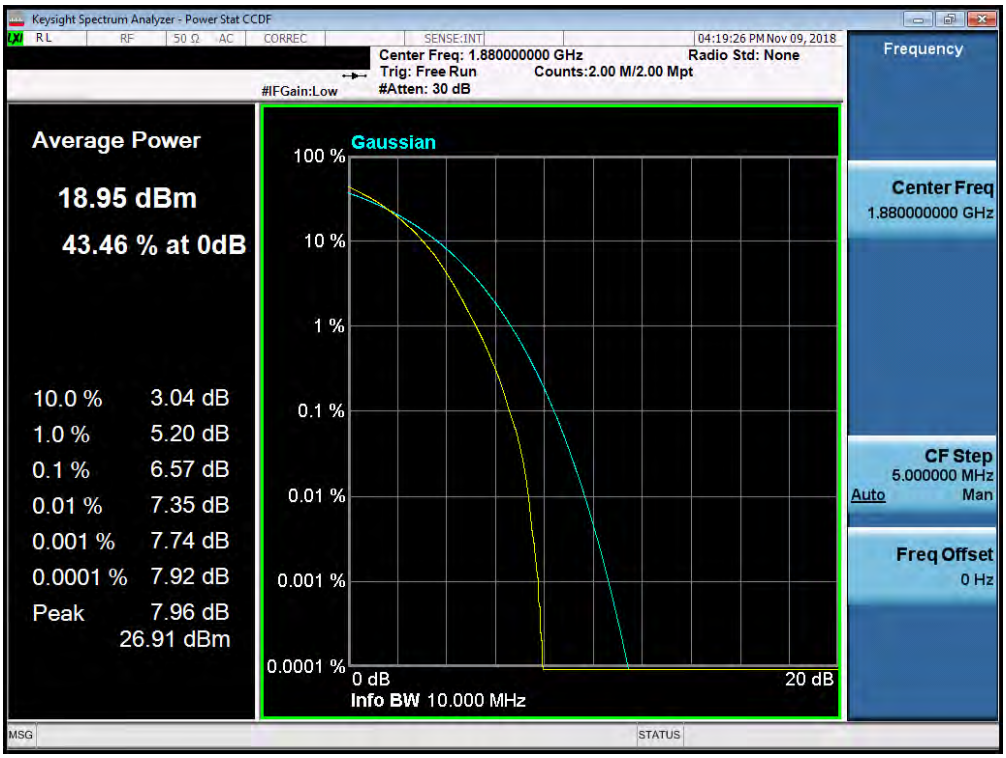
Plot 7-260. PAR Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



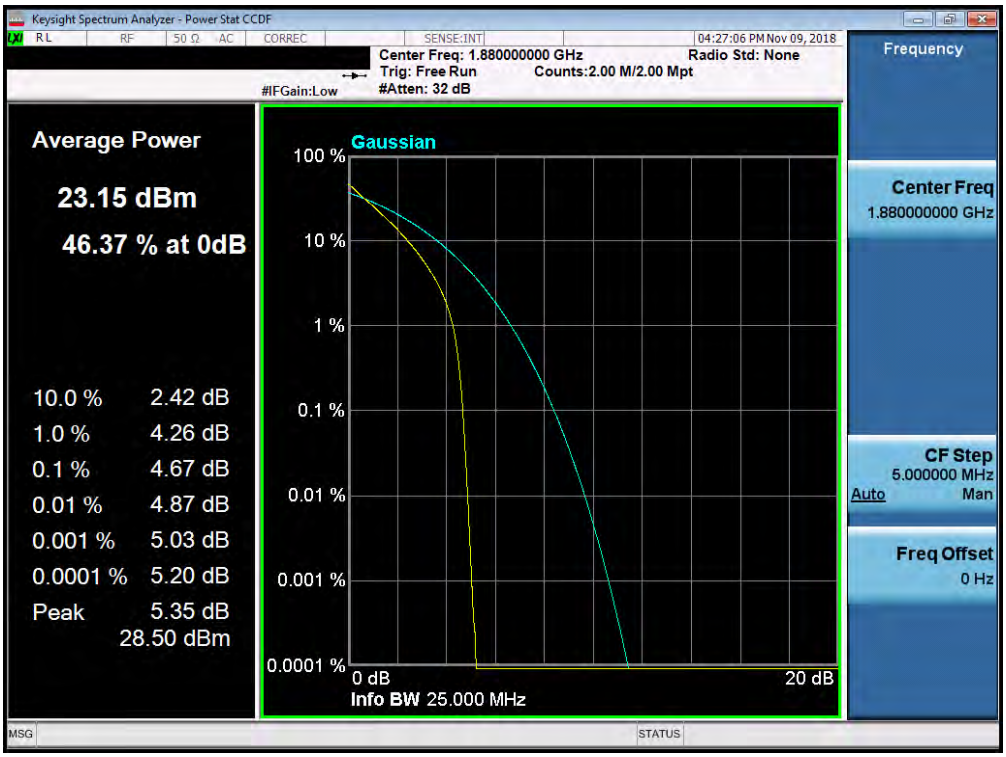
Plot 7-261. PAR Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)



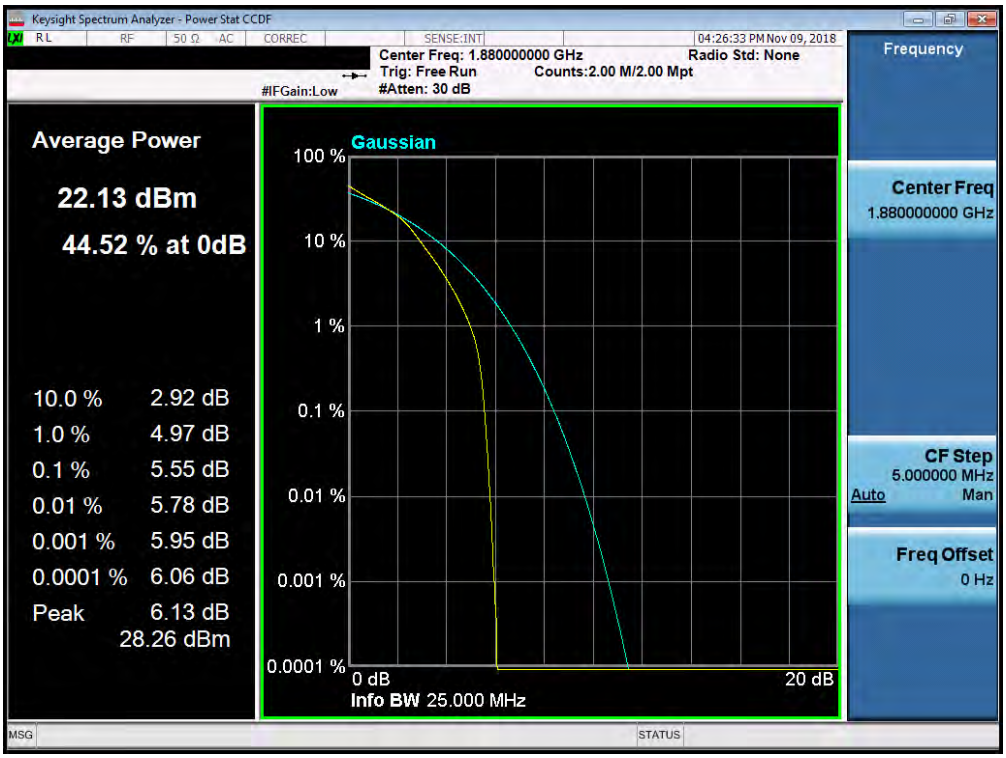
Plot 7-262. PAR Plot (Band 25/2 - 10.0MHz 64-QAM - Full RB Configuration)



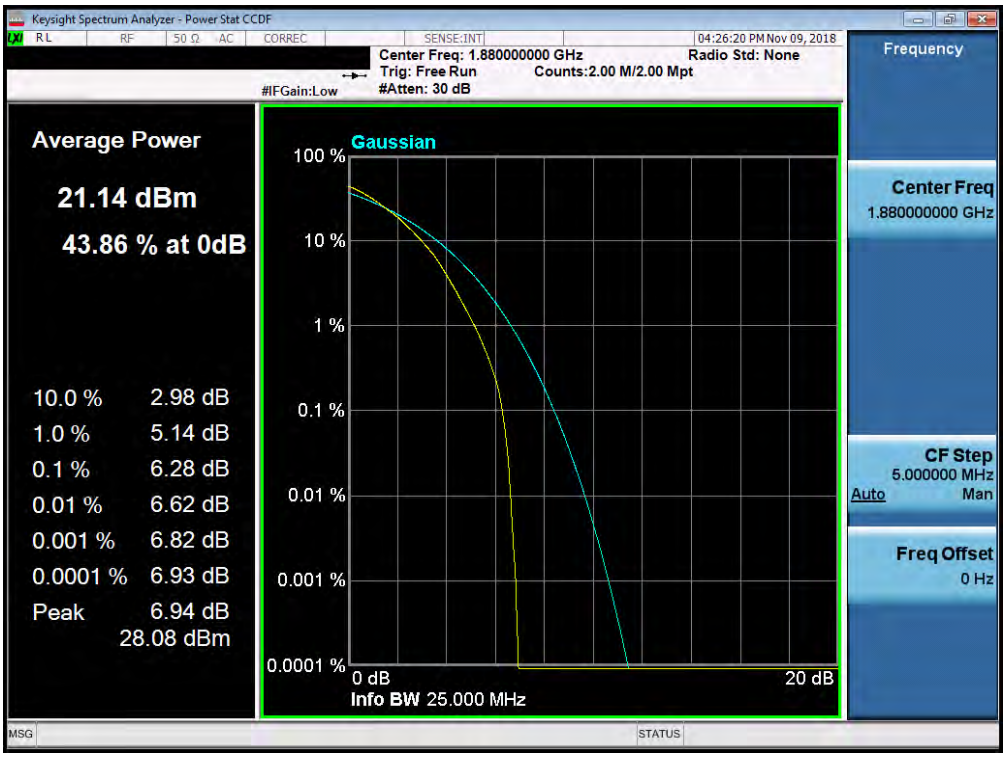
Plot 7-263. PAR Plot (Band 25/2 - 10.0MHz 256-QAM - Full RB Configuration)



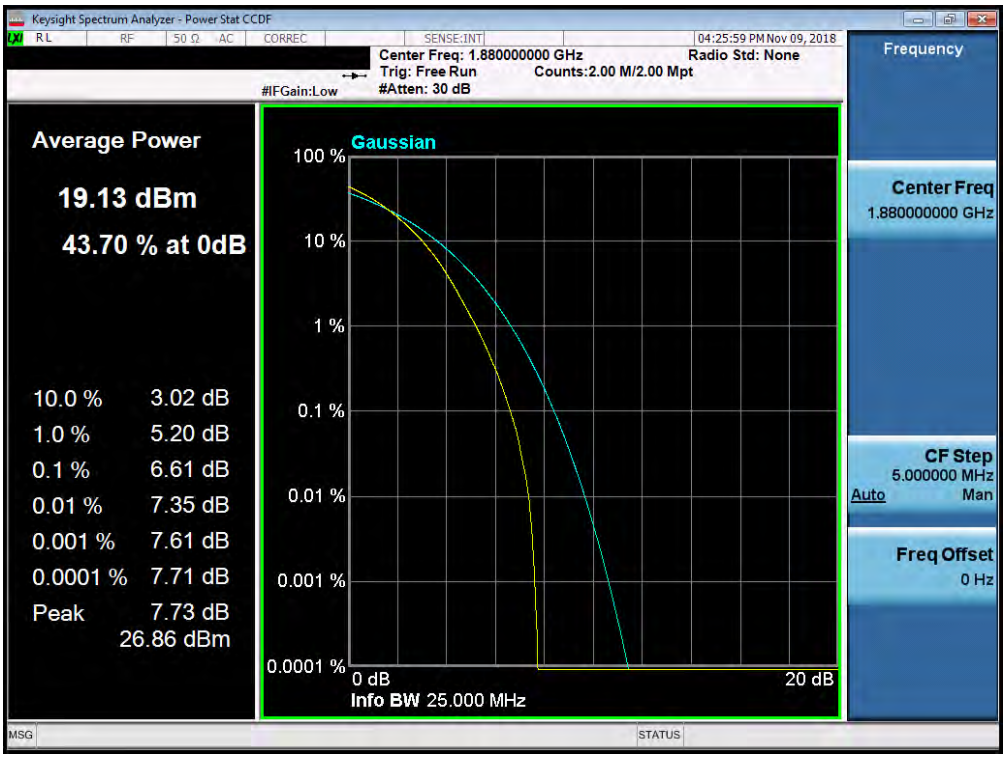
Plot 7-264. PAR Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



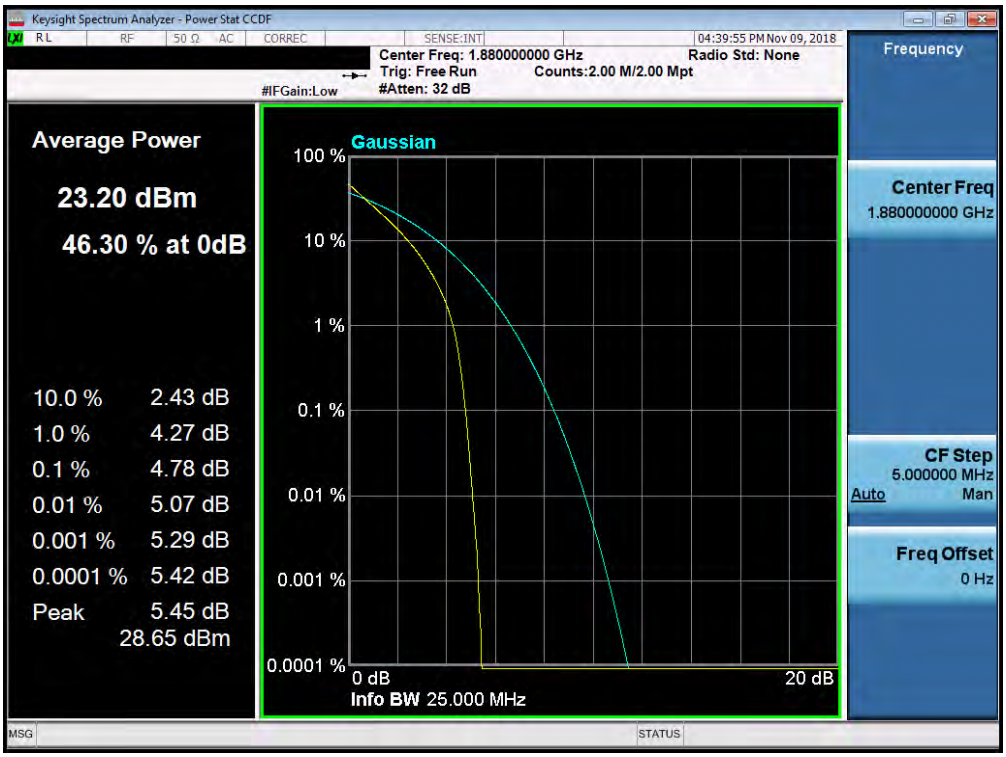
Plot 7-265. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)



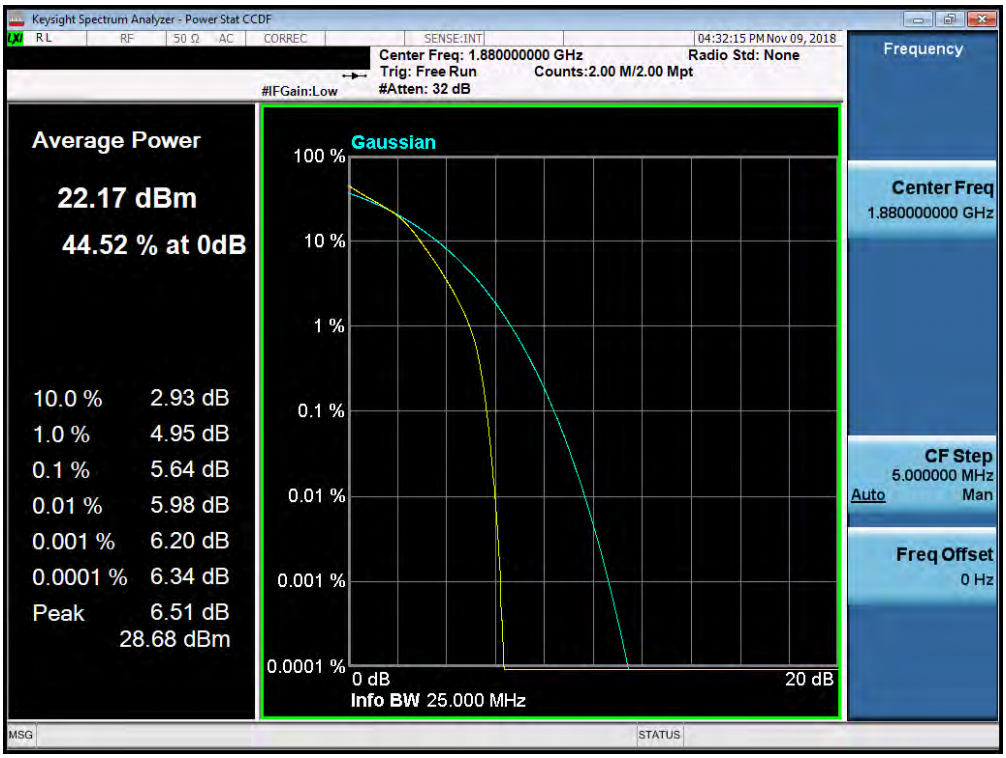
Plot 7-266. PAR Plot (Band 25/2 - 15.0MHz 64-QAM - Full RB Configuration)



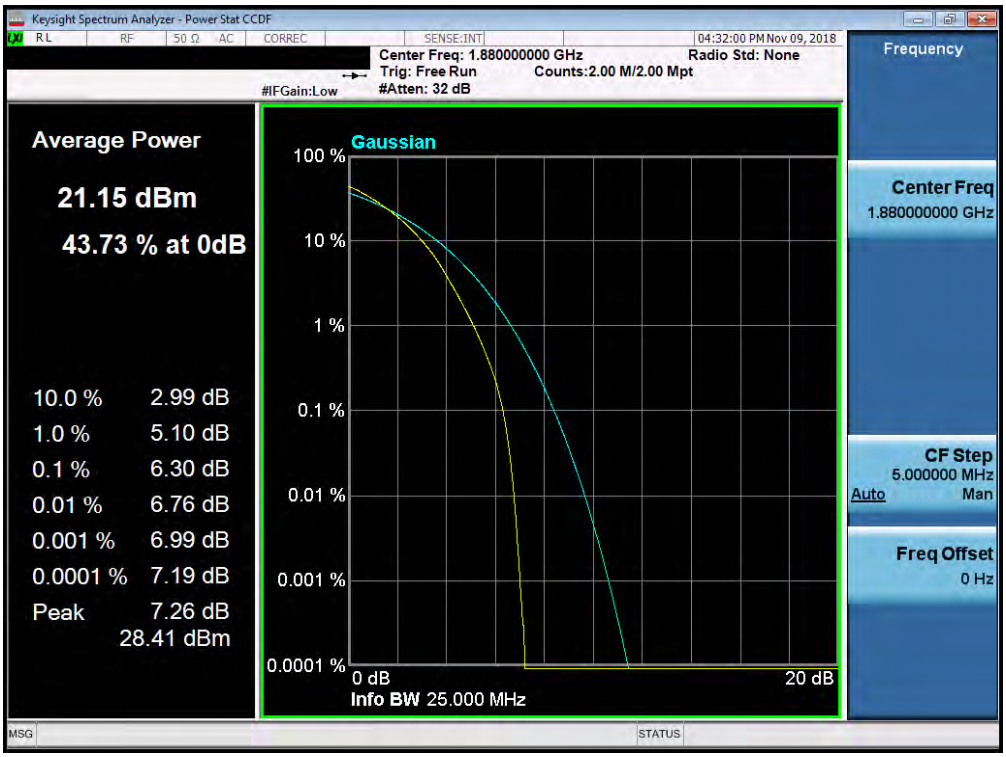
Plot 7-267. PAR Plot (Band 25/2 - 15.0MHz 256-QAM - Full RB Configuration)



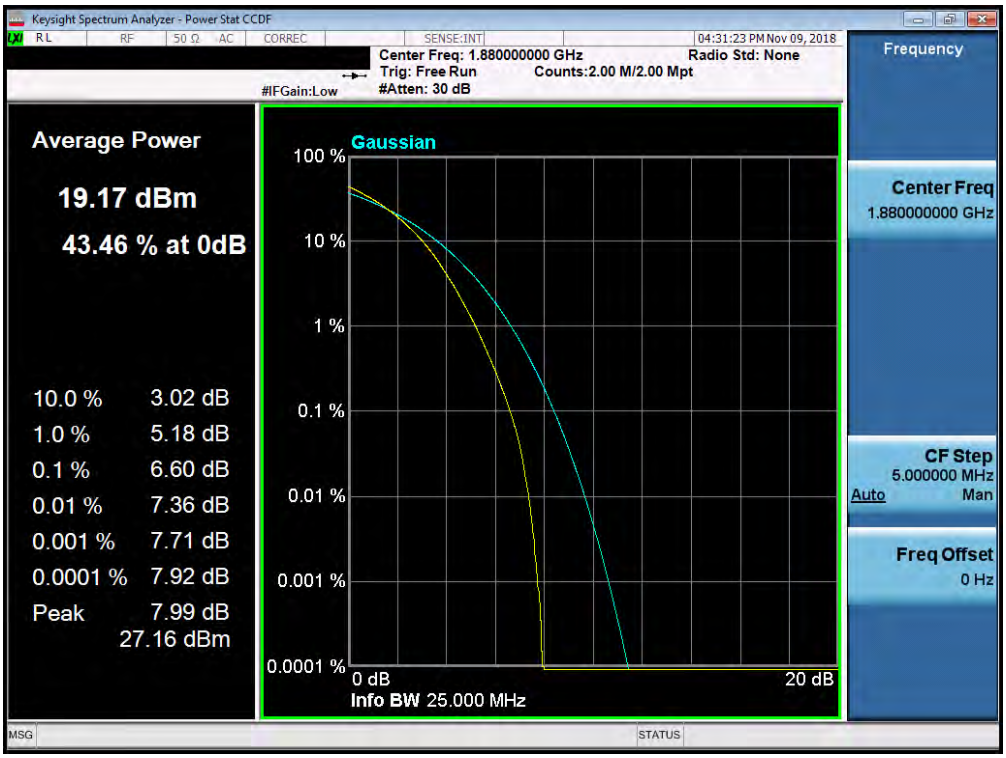
Plot 7-268. PAR Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-269. PAR Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-270. PAR Plot (Band 25/2 - 20.0MHz 64-QAM - Full RB Configuration)



Plot 7-271. PAR Plot (Band 25/2 - 20.0MHz 256-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 7-4, 7-6, 7-8, and 7-10 below, with both carriers set to transmit using 1RB.

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

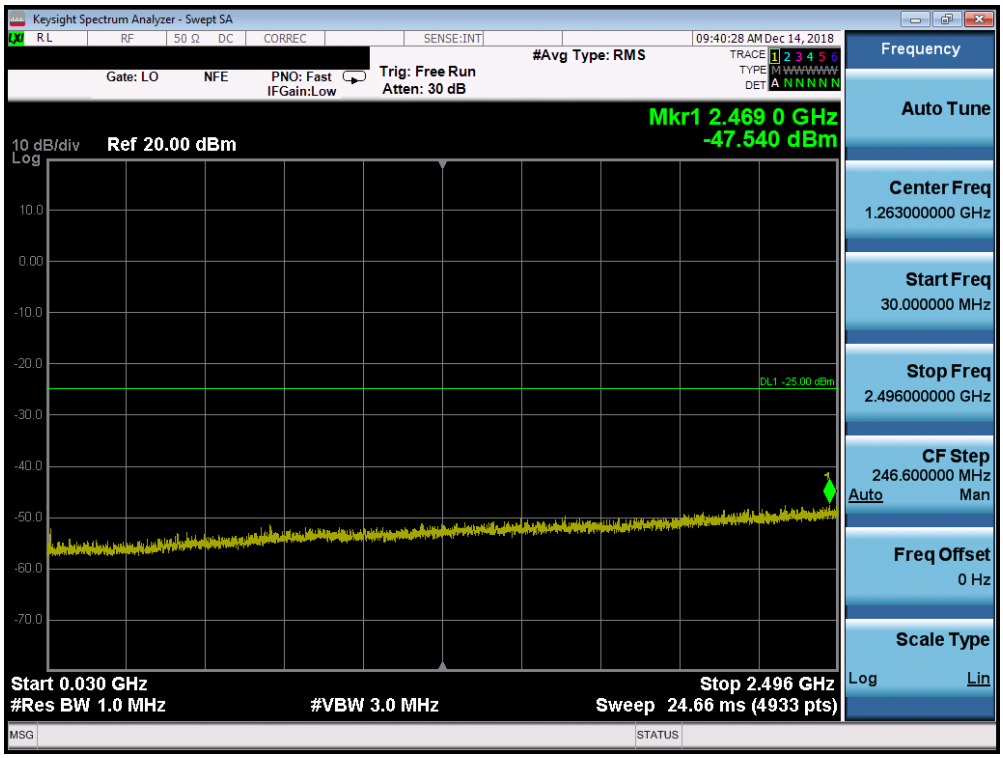
Uplink CA Cofiguration 41C

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	39750	2506	QPSK	1	0	LTE B41	20	39948	2525.8	QPSK	1	0	20.55
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	99	17.50
Max	LTE B41	20	39750	2506	QPSK	1	0	LTE B41	20	39948	2525.8	QPSK	1	99	14.10
Max	LTE B41	20	39750	2506	QPSK	1	50	LTE B41	20	39948	2525.8	QPSK	1	50	21.26
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	25.28
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	QPSK	100	0	22.74
Max	LTE B41	20	39750	2506	16-QAM	100	0	LTE B41	20	39948	2525.8	16-QAM	100	0	21.65
Max	LTE B41	20	39750	2506	64-QAM	100	0	LTE B41	20	39948	2525.8	64-QAM	100	0	20.38
Max	LTE B41	20	39750	2506	256-QAM	100	0	LTE B41	20	39948	2525.8	256-QAM	100	0	19.28

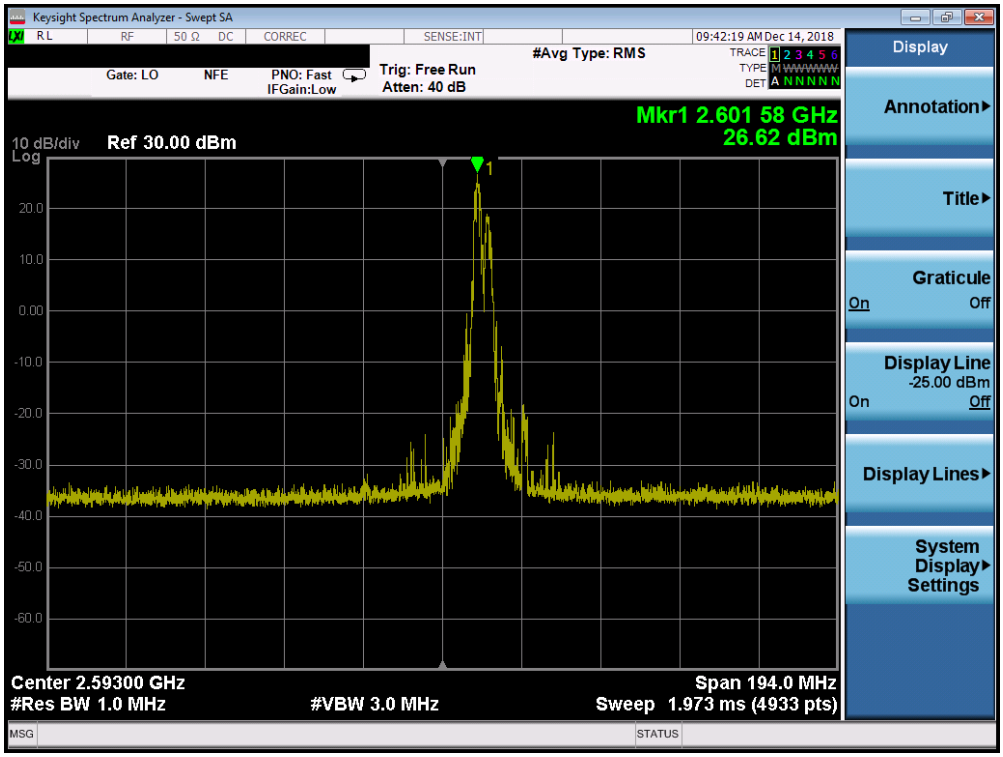
Table 7-3. Conducted Powers (B41 – PCC: RB Size 1 Offset Max SCC: RB Size 1 Offset 0)

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	25.16
Max	LTE B41	10	39700	2501	QPSK	1	49	LTE B41	15	39820	2513	QPSK	1	0	24.35
Max	LTE B41	10	39700	2501	QPSK	1	49	LTE B41	20	39844	2515.4	QPSK	1	0	24.47
Max	LTE B41	15	39725	2503.5	QPSK	1	74	LTE B41	10	39845	2515.5	QPSK	1	0	24.34
Max	LTE B41	15	39725	2503.5	QPSK	1	74	LTE B41	15	39875	2518.5	QPSK	1	0	24.38
Max	LTE B41	15	39725	2503.5	QPSK	1	74	LTE B41	20	39896	2520.6	QPSK	1	0	24.27
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	5	39867	2517.7	QPSK	1	0	24.27
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	10	39894	2520.4	QPSK	1	0	24.38
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	15	39921	2523.1	QPSK	1	0	24.41
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	24.15
Max	LTE B41	10	40620	2593	QPSK	1	49	LTE B41	15	40740	2605	QPSK	1	0	24.14
Max	LTE B41	10	40620	2593	QPSK	1	49	LTE B41	20	40764	2607.4	QPSK	1	0	24.23
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	10	40740	2605	QPSK	1	0	24.12
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	15	40770	2608	QPSK	1	0	24.16
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	20	40791	2610.1	QPSK	1	0	24.06
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	5	40737	2604.7	QPSK	1	0	24.12
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	10	40764	2607.4	QPSK	1	0	24.13
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	15	40791	2610.1	QPSK	1	0	24.18
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	23.90
Max	LTE B41	5	41565	2687.5	QPSK	1	0	LTE B41	20	41448	2675.8	QPSK	1	99	25.28
Max	LTE B41	10	41540	2685	QPSK	1	0	LTE B41	15	41420	2673	QPSK	1	74	24.11
Max	LTE B41	10	41540	2685	QPSK	1	0	LTE B41	20	41396	2670.6	QPSK	1	99	24.17
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	24.12
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	24.16
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	10	41346	2665.6	QPSK	1	49	24.21
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	15	41319	2662.9	QPSK	1	74	24.23
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	24.17

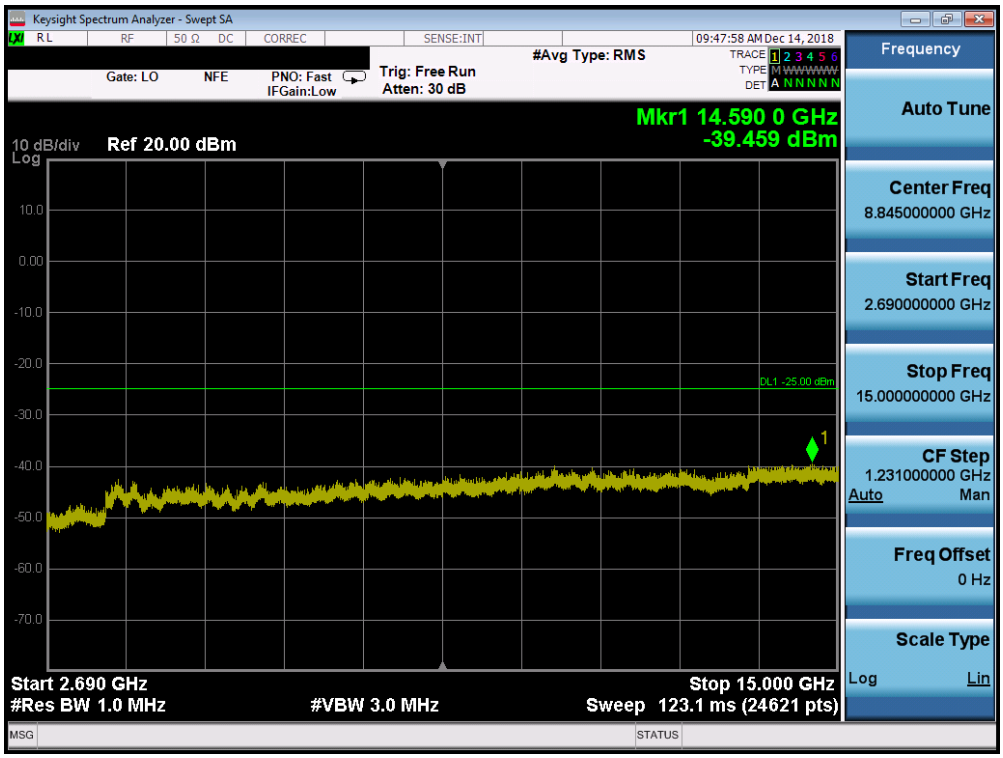
Table 7-4. Conducted Powers (B41 with Various Combinations for 20MHz Channel Bandwidth)



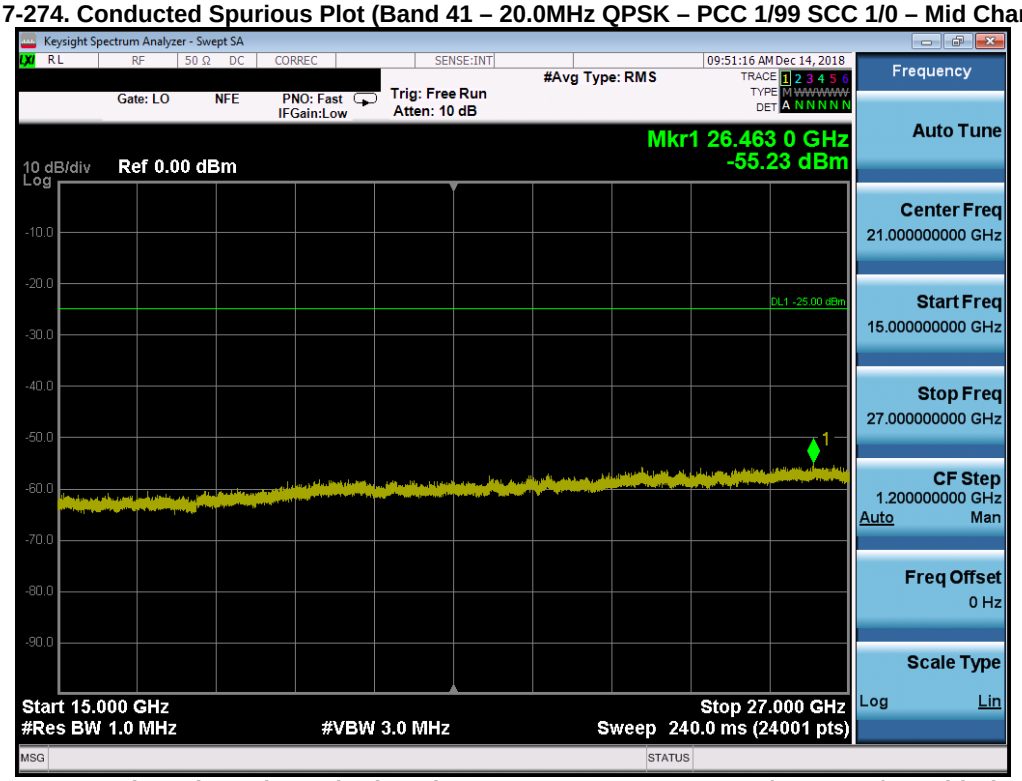
Plot 7-272. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



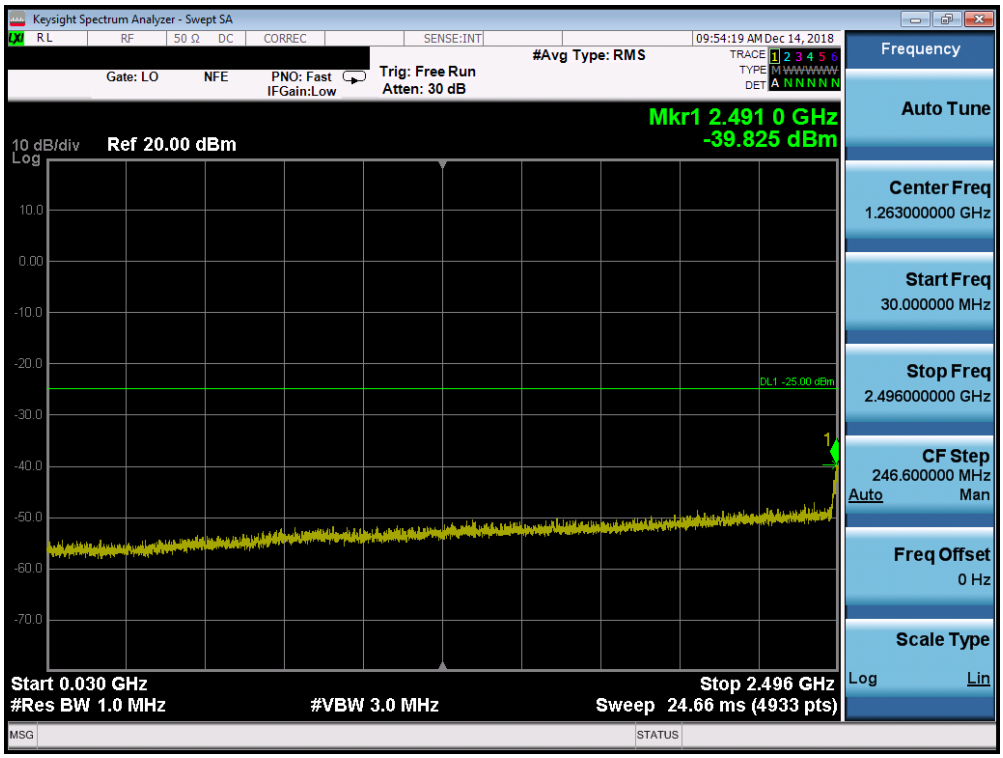
Plot 7-273. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



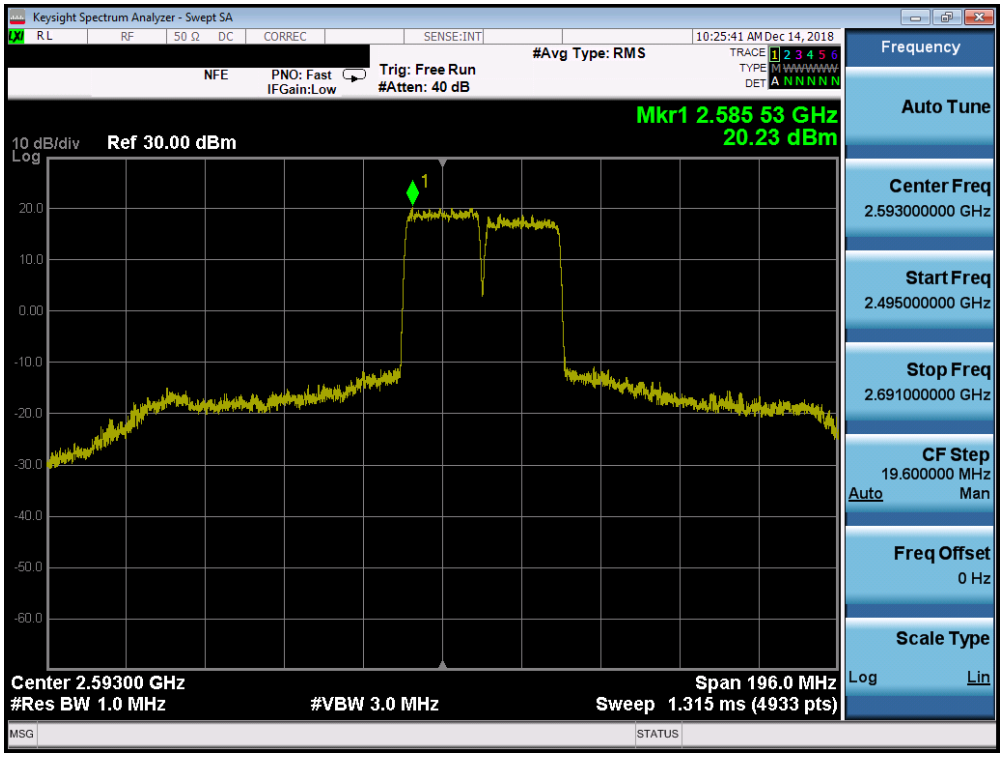
Plot 7-274. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



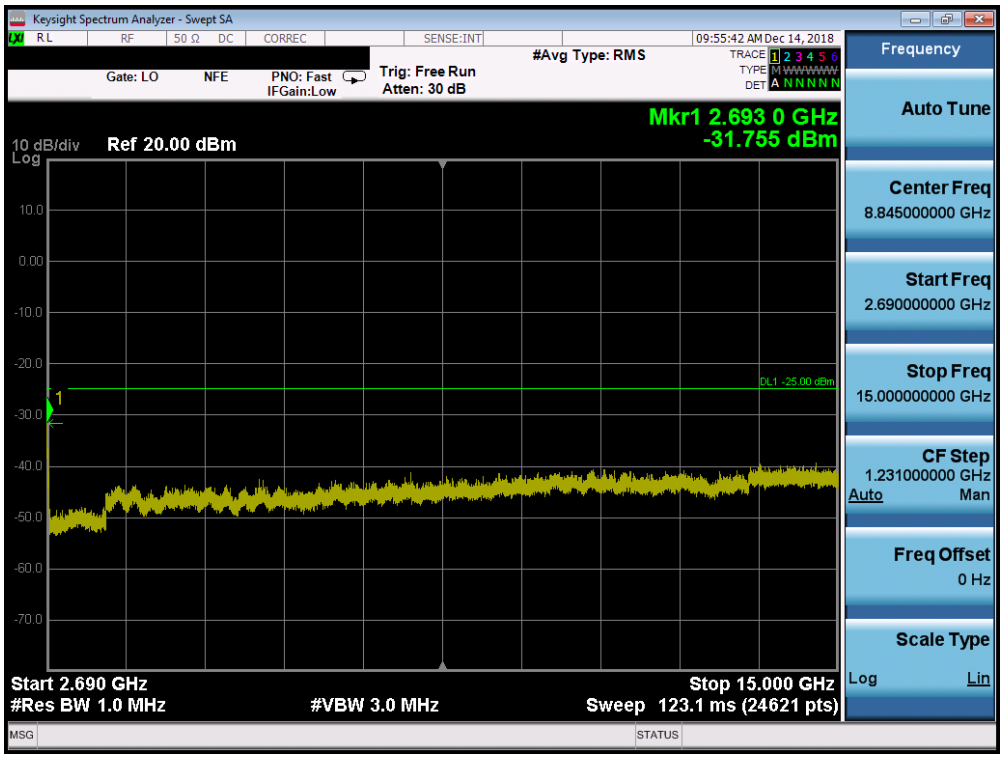
Plot 7-275. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



Plot 7-276. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

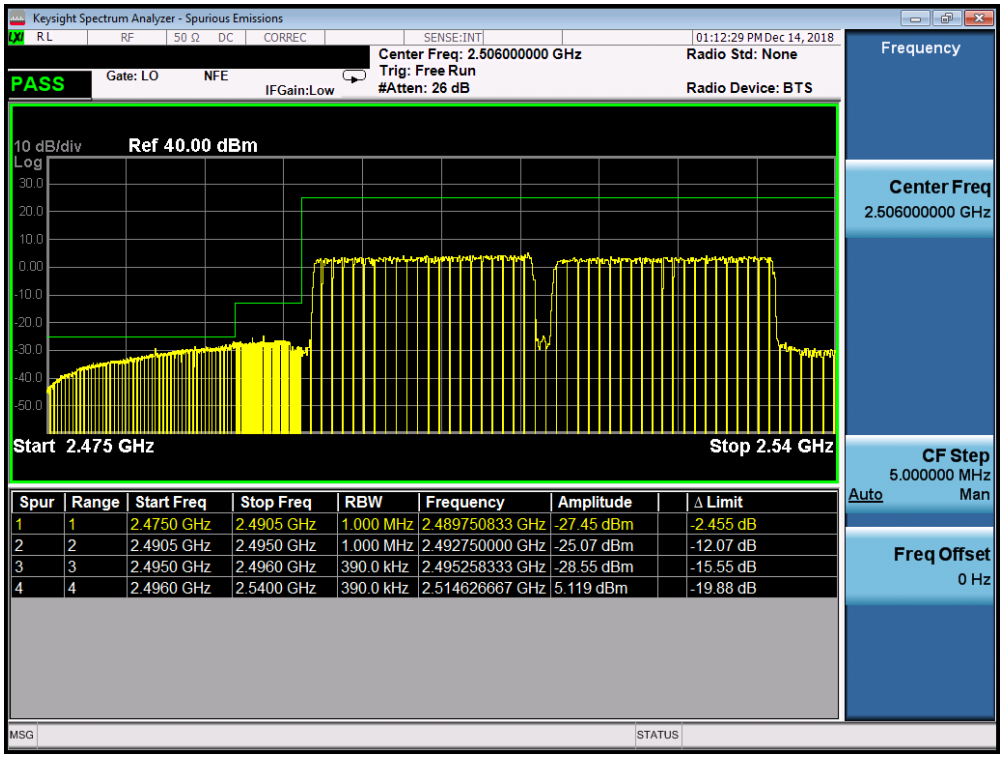


Plot 7-277. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



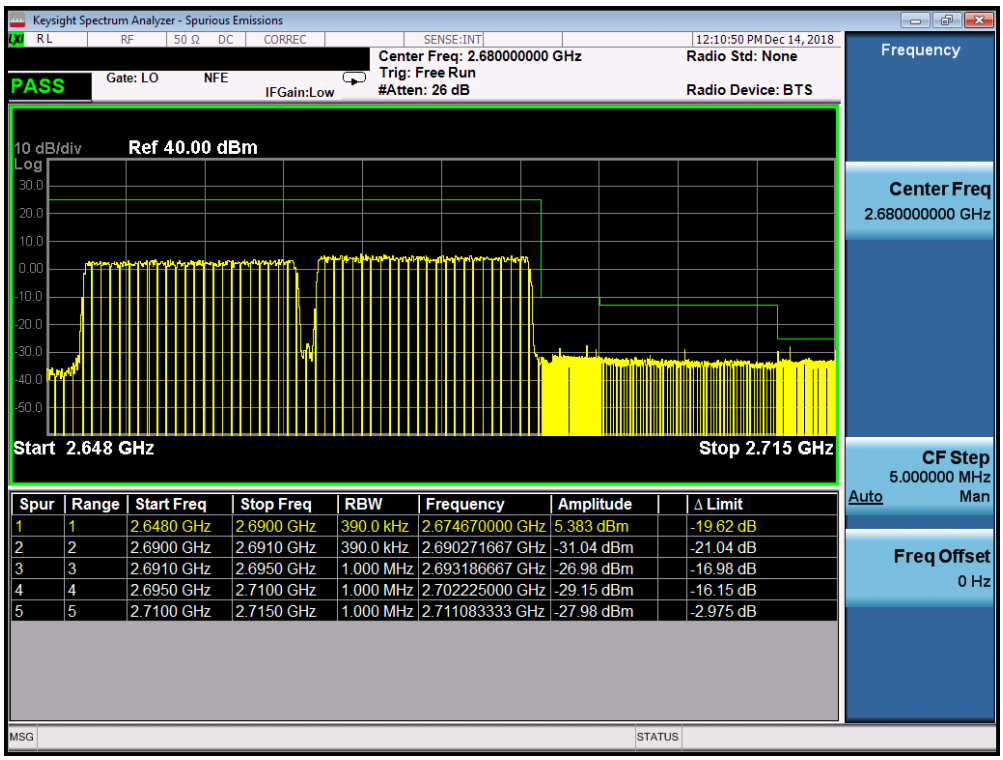
Plot 7-278. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

Plot 7-279. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489750833 GHz	-27.45 dBm	-2.455 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.492750000 GHz	-25.07 dBm	-12.07 dB
3	3	2.4950 GHz	2.4960 GHz	390.0 kHz	2.495258333 GHz	-28.55 dBm	-15.55 dB
4	4	2.4960 GHz	2.5400 GHz	390.0 kHz	2.514626667 GHz	5.119 dBm	-19.88 dB

Plot 7-280. Lower Band Edge Plot (Band 41 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6480 GHz	2.6900 GHz	390.0 kHz	2.674670000 GHz	5.383 dBm	-19.62 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690271667 GHz	-31.04 dBm	-21.04 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.693186667 GHz	-26.98 dBm	-16.98 dB
4	4	2.6950 GHz	2.7100 GHz	1.000 MHz	2.702225000 GHz	-29.15 dBm	-16.15 dB
5	5	2.7100 GHz	2.7150 GHz	1.000 MHz	2.711083333 GHz	-27.98 dBm	-2.975 dB

Plot 7-281. Upper Band Edge Plot (Band 41 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

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.

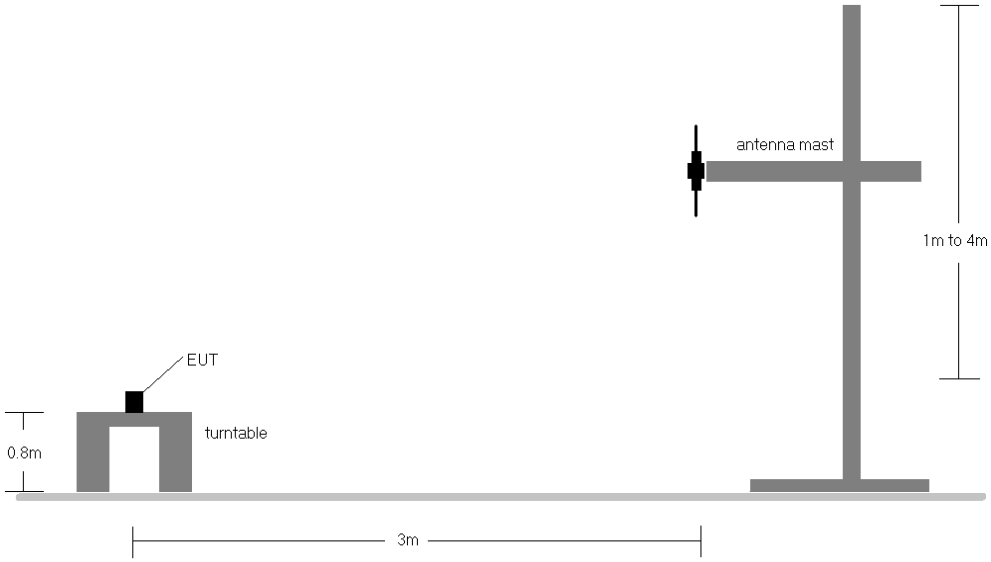


Figure 7-6. Radiated Test Setup <1GHz

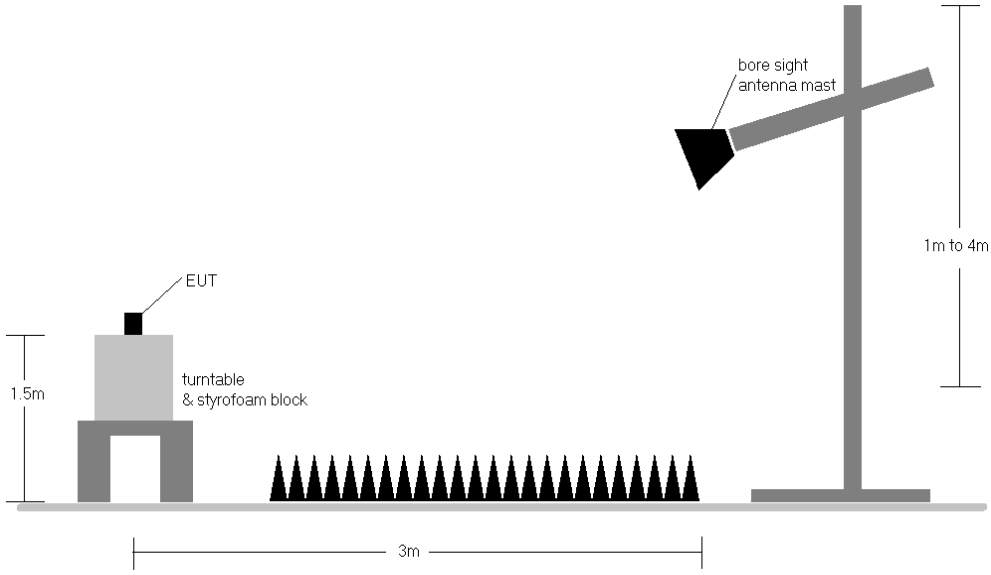


Figure 7-7. Radiated Test Setup >1GHz

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.

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]
699.70	1.4	QPSK	H	165	346	1 / 0	14.48	4.00	16.33	0.043	34.77	-18.44
707.50	1.4	QPSK	H	165	346	1 / 0	14.39	4.22	**16.46**	0.044	34.77	-18.32
715.30	1.4	QPSK	H	165	346	1 / 5	13.93	4.44	16.22	0.042	34.77	-18.55
707.50	1.4	16-QAM	H	165	346	1 / 0	13.66	4.22	**15.73**	0.037	34.77	-19.05
707.50	1.4	64-QAM	H	165	346	1 / 0	12.68	4.22	**14.75**	0.030	34.77	-20.03
700.50	3	QPSK	H	313	7	1 / 14	13.57	4.01	15.43	0.035	34.77	-19.34
707.50	3	QPSK	H	313	7	1 / 14	13.87	4.22	**15.94**	0.039	34.77	-18.84
714.50	3	QPSK	H	313	7	1 / 14	13.59	4.41	15.85	0.038	34.77	-18.92
707.50	3	16-QAM	H	313	7	1 / 14	13.07	4.22	**15.14**	0.033	34.77	-19.64
707.50	3	64-QAM	H	313	7	1 / 14	12.10	4.22	**14.17**	0.026	34.77	-20.61
701.50	5	QPSK	H	161	353	1 / 24	14.11	4.04	16.00	0.040	34.77	-18.77
707.50	5	QPSK	H	161	353	1 / 24	14.48	4.22	**16.55**	0.045	34.77	-18.23
713.50	5	QPSK	H	161	353	1 / 24	13.70	4.39	15.94	0.039	34.77	-18.83
707.50	5	16-QAM	H	161	353	1 / 24	13.79	4.22	**15.86**	0.039	34.77	-18.92
707.50	5	64-QAM	H	161	353	1 / 24	12.81	4.22	**14.88**	0.031	34.77	-19.90
704.00	10	QPSK	H	168	360	1 / 49	14.11	4.12	16.08	0.041	34.77	-18.70
707.50	10	QPSK	H	168	360	1 / 49	14.43	4.22	**16.50**	0.045	34.77	-18.28
711.00	10	QPSK	H	168	360	1 / 49	14.02	4.32	16.19	0.042	34.77	-18.59
707.50	10	16-QAM	H	168	360	1 / 49	13.52	4.22	**15.59**	0.036	34.77	-19.19
707.50	10	64-QAM	H	168	360	1 / 49	12.58	4.22	**14.65**	0.029	34.77	-20.13
707.50	5	QPSK	V	100	267	1 / 24	15.55	4.22	17.62	**0.058**	34.77	-17.16
707.50	5 (WCP)	QPSK	H	125	238	1 / 24	14.16	4.22	16.23	0.042	34.77	-18.55

Table 7-5. ERP Data (Band 12)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	261	327	1 / 24	11.68	6.18	15.71	0.037	34.77	-19.07
782.00	5	QPSK	H	261	327	1 / 24	12.56	6.24	**16.65**	**0.046**	34.77	-18.12
784.50	5	QPSK	H	261	327	1 / 0	11.78	6.30	15.93	0.039	34.77	-18.84
782.00	5	16-QAM	H	261	327	1 / 24	11.81	6.24	**15.90**	0.039	34.77	-18.87
782.00	5	64-QAM	H	261	327	1 / 24	10.82	6.24	**14.91**	0.031	34.77	-19.86
782.00	10	QPSK	H	168	341	1 / 49	11.53	6.24	**15.62**	0.036	34.77	-19.15
782.00	10	16-QAM	H	168	341	1 / 49	10.68	6.24	**14.77**	0.030	34.77	-20.00
782.00	10	64-QAM	H	168	341	1 / 49	9.81	6.24	**13.90**	0.025	34.77	-20.87
782.00	5	QPSK	V	141	102	1 / 24	11.95	6.24	16.04	0.040	34.77	-18.73
782.00	5 (WCP)	QPSK	H	163	237	1 / 24	11.88	6.24	15.97	0.040	34.77	-18.80

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]
824.70	1.4	QPSK	H	211	309	3 / 2	15.60	6.75	20.20	0.105	38.45	-18.25
836.50	1.4	QPSK	H	223	286	3 / 2	16.25	6.78	**20.88**	**0.122**	38.45	-17.58
848.30	1.4	QPSK	H	217	321	1 / 0	13.36	6.80	18.01	0.063	38.45	-20.44
836.50	1.4	16-QAM	H	223	286	1 / 0	15.47	6.78	**20.10**	0.102	38.45	-18.36
836.50	1.4	64-QAM	H	223	286	3 / 2	14.48	6.78	**19.11**	0.081	38.45	-19.35
825.50	3	QPSK	H	214	296	1 / 14	15.67	6.75	20.27	0.106	38.45	-18.18
836.50	3	QPSK	H	226	274	1 / 0	16.38	6.78	**21.01**	**0.126**	38.45	-17.45
847.50	3	QPSK	H	200	305	1 / 0	13.98	6.80	18.63	0.073	38.45	-19.82
836.50	3	16-QAM	H	226	274	1 / 14	15.61	6.78	**20.24**	0.106	38.45	-18.22
836.50	3	64-QAM	H	226	274	1 / 0	14.48	6.78	**19.11**	0.081	38.45	-19.35
826.50	5	QPSK	H	209	299	1 / 24	15.64	6.76	20.25	0.106	38.45	-18.21
836.50	5	QPSK	H	213	289	1 / 0	16.20	6.78	**20.83**	0.121	38.45	-17.63
846.50	5	QPSK	H	218	316	1 / 0	13.48	6.80	18.13	0.065	38.45	-20.33
836.50	5	16-QAM	H	213	289	1 / 24	15.51	6.78	**20.14**	0.103	38.45	-18.32
836.50	5	64-QAM	H	213	289	1 / 0	14.39	6.78	**19.02**	0.080	38.45	-19.44
829.00	10	QPSK	H	218	298	1 / 0	15.13	6.76	19.74	0.094	38.45	-18.71
836.50	10	QPSK	H	226	279	1 / 0	15.71	6.78	**20.34**	**0.108**	38.45	-18.12
844.00	10	QPSK	H	227	318	1 / 0	13.13	6.79	17.77	0.060	38.45	-20.68
836.50	10	16-QAM	H	226	279	1 / 0	14.98	6.78	**19.61**	0.091	38.45	-18.85
836.50	10	64-QAM	H	226	279	1 / 0	14.02	6.78	**18.65**	0.073	38.45	-19.81
836.50	3	QPSK	V	140	262	1 / 0	13.81	6.78	**18.44**	**0.070**	38.45	-20.02
836.50	3 (WCP)	QPSK	H	156	281	1 / 0	12.98	6.78	17.61	0.058	38.45	-20.85

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]
831.50	15	QPSK	H	100	277	1 / 74	14.84	6.77	19.46	0.088	38.45	-19.00
836.50	15	QPSK	H	104	288	1 / 74	15.64	6.78	**20.27**	**0.106**	38.45	-18.19
841.50	15	QPSK	H	101	263	1 / 0	10.85	6.79	15.49	0.035	38.45	-22.97
836.50	15	16-QAM	H	104	288	1 / 0	15.03	6.78	**19.66**	0.092	38.45	-18.80
836.50	15	64-QAM	H	104	288	1 / 0	14.02	6.78	**18.65**	0.073	38.45	-19.81

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	V	103	138	1 / 5	12.91	8.16	21.07	0.128	30.00	-8.93
1732.50	1.4	QPSK	V	140	144	1 / 5	14.11	8.18	**22.29**	**0.169**	30.00	-7.71
1754.30	1.4	QPSK	V	120	145	1 / 5	14.02	8.21	22.23	0.167	30.00	-7.77
1732.50	1.4	16-QAM	V	140	144	1 / 5	13.33	8.18	**21.51**	0.142	30.00	-8.49
1732.50	1.4	64-QAM	V	140	144	1 / 5	12.36	8.18	**20.54**	0.113	30.00	-9.46
1711.50	3	QPSK	V	154	315	1 / 14	13.08	8.16	21.24	0.133	30.00	-8.76
1732.50	3	QPSK	V	154	315	1 / 14	13.47	8.18	**21.65**	0.146	30.00	-8.35
1753.50	3	QPSK	V	154	315	1 / 0	13.41	8.21	21.62	0.145	30.00	-8.38
1732.50	3	16-QAM	V	154	315	1 / 14	12.69	8.18	**20.87**	0.122	30.00	-9.13
1732.50	3	64-QAM	V	154	315	1 / 14	11.69	8.18	**19.87**	0.097	30.00	-10.13
1712.50	5	QPSK	V	158	310	1 / 24	12.75	8.16	20.91	0.123	30.00	-9.09
1732.50	5	QPSK	V	158	310	1 / 24	12.73	8.18	**20.91**	0.123	30.00	-9.09
1752.50	5	QPSK	V	158	310	1 / 24	12.66	8.20	20.86	0.122	30.00	-9.14
1732.50	5	16-QAM	V	158	310	1 / 24	12.03	8.18	**20.21**	0.105	30.00	-9.79
1732.50	5	64-QAM	V	158	310	1 / 24	10.99	8.18	**19.17**	0.083	30.00	-10.83
1715.00	10	QPSK	V	151	305	1 / 0	13.62	8.16	21.78	0.151	30.00	-8.22
1732.50	10	QPSK	V	151	305	1 / 0	13.64	8.18	**21.82**	0.152	30.00	-8.18
1750.00	10	QPSK	V	151	305	1 / 0	13.12	8.20	21.32	0.136	30.00	-8.68
1732.50	10	16-QAM	V	151	305	1 / 0	12.82	8.18	**21.00**	0.126	30.00	-9.00
1732.50	10	64-QAM	V	151	305	1 / 0	11.87	8.18	20.05	0.101	30.00	-9.95
1717.50	15	QPSK	V	143	46	1 / 0	12.72	8.16	20.88	0.123	30.00	-9.12
1732.50	15	QPSK	V	143	46	1 / 74	13.16	8.18	**21.34**	0.136	30.00	-8.66
1747.50	15	QPSK	V	143	46	1 / 0	12.40	8.20	20.60	0.115	30.00	-9.40
1732.50	15	16-QAM	V	143	46	1 / 74	12.38	8.18	**20.56**	0.114	30.00	-9.44
1732.50	15	64-QAM	V	143	46	1 / 74	11.50	8.18	**19.68**	0.093	30.00	-10.32
1720.00	20	QPSK	V	143	56	1 / 0	12.60	8.17	20.77	0.119	30.00	-9.23
1732.50	20	QPSK	V	143	56	1 / 0	12.65	8.18	**20.83**	0.121	30.00	-9.17
1745.00	20	QPSK	V	143	56	1 / 0	12.33	8.19	20.52	0.113	30.00	-9.48
1732.50	20	16-QAM	V	143	56	1 / 0	11.87	8.18	**20.05**	0.101	30.00	-9.95
1732.50	20	64-QAM	V	143	56	1 / 0	10.90	8.18	**19.08**	0.081	30.00	-10.92
1732.50	1.4	QPSK	H	135	96	1 / 5	12.80	8.18	20.98	0.125	30.00	-9.02
1732.50	1.4 (WCP)	QPSK	H	137	128	1 / 5	13.59	8.18	21.77	0.150	30.00	-8.23

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	H	108	356	3 / 2	13.63	8.46	22.09	0.162	33.01	-10.92
1882.50	1.4	QPSK	H	130	354	3 / 2	14.13	8.60	**22.73**	0.188	33.01	-10.28
1914.30	1.4	QPSK	H	107	5	3 / 2	13.40	8.74	22.14	0.164	33.01	-10.87
1882.50	1.4	16-QAM	H	130	354	1 / 0	13.47	8.60	**22.07**	0.161	33.01	-10.94
1882.50	1.4	64-QAM	H	130	354	3 / 2	12.46	8.60	**21.06**	0.128	33.01	-11.95
1851.50	3	QPSK	H	109	11	1 / 0	13.61	8.46	22.07	0.161	33.01	-10.94
1882.50	3	QPSK	H	119	7	1 / 0	14.23	8.60	**22.83**	0.192	33.01	-10.18
1913.50	3	QPSK	H	114	1	1 / 0	13.41	8.74	22.15	0.164	33.01	-10.86
1882.50	3	16-QAM	H	119	7	1 / 0	13.53	8.60	**22.13**	0.163	33.01	-10.88
1882.50	3	64-QAM	H	119	7	1 / 0	12.48	8.60	**21.08**	0.128	33.01	-11.93
1852.50	5	QPSK	H	124	5	1 / 0	13.69	8.47	22.16	0.164	33.01	-10.85
1882.50	5	QPSK	H	131	10	1 / 0	14.22	8.60	**22.82**	0.191	33.01	-10.19
1912.50	5	QPSK	H	119	13	1 / 24	13.41	8.73	22.14	0.164	33.01	-10.87
1882.50	5	16-QAM	H	131	10	1 / 0	13.53	8.60	**22.13**	0.163	33.01	-10.88
1882.50	5	64-QAM	H	131	10	1 / 0	12.47	8.60	**21.07**	0.128	33.01	-11.94
1855.00	10	QPSK	H	118	10	1 / 0	13.70	8.48	22.18	0.165	33.01	-10.83
1882.50	10	QPSK	H	123	5	1 / 0	14.36	8.60	**22.96**	0.198	33.01	-10.05
1910.00	10	QPSK	H	121	18	1 / 0	13.43	8.72	22.15	0.164	33.01	-10.86
1882.50	10	16-QAM	H	123	5	1 / 0	13.61	8.60	**22.21**	0.166	33.01	-10.80
1882.50	10	64-QAM	H	123	5	1 / 0	12.55	8.60	**21.15**	0.130	33.01	-11.86
1857.50	15	QPSK	H	108	356	1 / 74	13.82	8.49	22.31	0.170	33.01	-10.70
1882.50	15	QPSK	H	153	352	1 / 0	14.51	8.60	**23.11**	**0.205**	33.01	-9.90
1907.50	15	QPSK	H	106	359	1 / 0	13.61	8.71	22.32	0.171	33.01	-10.69
1882.50	15	16-QAM	H	153	352	1 / 0	13.58	8.60	**22.18**	0.165	33.01	-10.83
1882.50	15	64-QAM	H	153	352	1 / 0	12.58	8.60	**21.18**	0.131	33.01	-11.83
1860.00	20	QPSK	H	124	15	1 / 0	13.63	8.50	22.13	0.163	33.01	-10.88
1882.50	20	QPSK	H	125	12	1 / 0	14.37	8.60	**22.97**	0.198	33.01	-10.04
1905.00	20	QPSK	H	114	6	1 / 0	13.52	8.70	22.22	0.167	33.01	-10.79
1882.50	20	16-QAM	H	125	12	1 / 0	13.60	8.60	**22.20**	0.166	33.01	-10.81
1882.50	20	64-QAM	H	125	12	1 / 0	12.60	8.60	**21.20**	0.132	33.01	-11.81
1882.50	15	QPSK	V	142	265	1 / 0	12.43	8.71	21.14	0.130	33.01	-11.87
1882.50	15 (WCP)	QPSK	H	123	228	1 / 0	12.29	8.71	21.00	0.126	33.01	-12.01

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]
2498.50	5	QPSK	H	121	40	1 / 0	13.90	7.90	**21.80**	**0.151**	33.01	-11.21
2593.00	5	QPSK	H	109	54	1 / 0	13.55	7.71	21.26	0.134	33.01	-11.75
2687.50	5	QPSK	H	118	57	1 / 0	13.67	7.52	21.19	0.132	33.01	-11.82
2498.50	5	16-QAM	H	121	40	1 / 0	11.97	7.90	**19.87**	0.097	33.01	-13.14
2498.50	5	64-QAM	H	121	40	1 / 0	11.31	7.90	**19.21**	0.083	33.01	-13.80
2501.00	10	QPSK	H	129	64	1 / 0	13.83	7.90	**21.73**	0.149	33.01	-11.28
2593.00	10	QPSK	H	112	45	1 / 0	12.97	7.71	20.68	0.117	33.01	-12.33
2685.00	10	QPSK	H	124	48	1 / 0	13.45	7.53	20.98	0.125	33.01	-12.03
2501.00	10	16-QAM	H	129	64	1 / 0	12.79	7.90	**20.69**	0.117	33.01	-12.32
2501.00	10	64-QAM	H	129	64	1 / 0	12.20	7.90	**20.10**	0.102	33.01	-12.91
2503.50	15	QPSK	H	135	60	1 / 0	13.49	7.89	**21.38**	0.137	33.01	-11.63
2593.00	15	QPSK	H	105	53	1 / 0	13.17	7.71	20.88	0.122	33.01	-12.13
2682.50	15	QPSK	H	115	39	1 / 0	13.06	7.53	20.59	0.115	33.01	-12.42
2503.50	15	16-QAM	H	135	60	1 / 0	11.84	7.89	**19.73**	0.094	33.01	-13.28
2503.50	15	64-QAM	H	135	60	1 / 0	10.89	7.89	**18.78**	0.076	33.01	-14.23
2506.00	20	QPSK	H	120	57	1 / 0	13.50	7.89	**21.39**	0.138	33.01	-11.62
2593.00	20	QPSK	H	102	44	1 / 0	12.83	7.71	20.54	0.113	33.01	-12.47
2680.00	20	QPSK	H	113	42	1 / 0	12.94	7.54	20.48	0.112	33.01	-12.54
2510.00	20	16-QAM	H	120	57	1 / 0	11.75	7.88	**19.63**	0.092	33.01	-13.38
2506.00	20	64-QAM	H	120	57	1 / 0	10.50	7.89	**18.39**	0.069	33.01	-14.62
2498.50	5	QPSK	V	121	40	1 / 0	13.16	7.90	21.06	0.128	33.01	-11.95
2498.50	5 (WCP)	QPSK	H	111	45	1 / 0	11.53	7.90	19.43	0.088	33.01	-13.58

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.

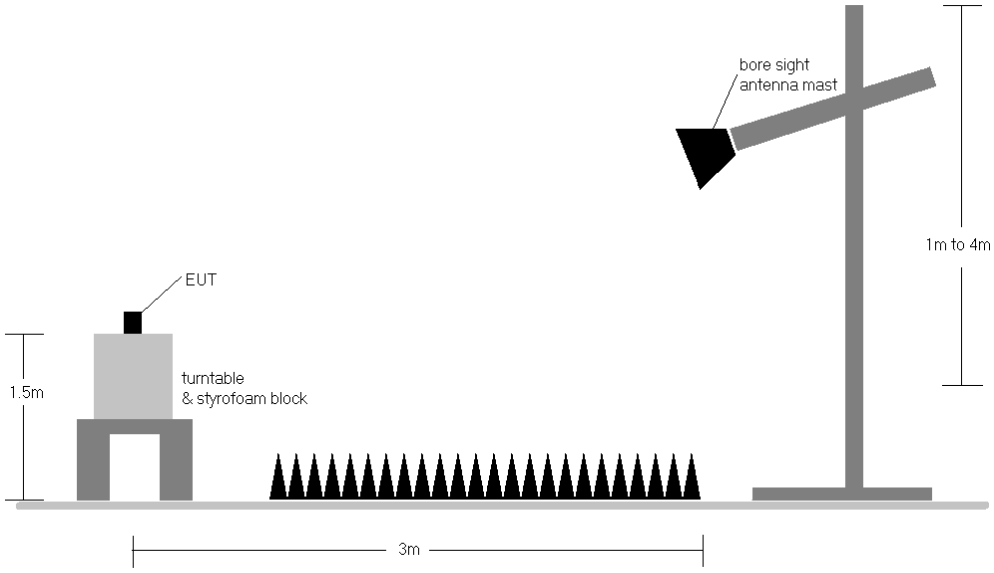


Figure 7-8. Test Instrument & Measurement Setup

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.

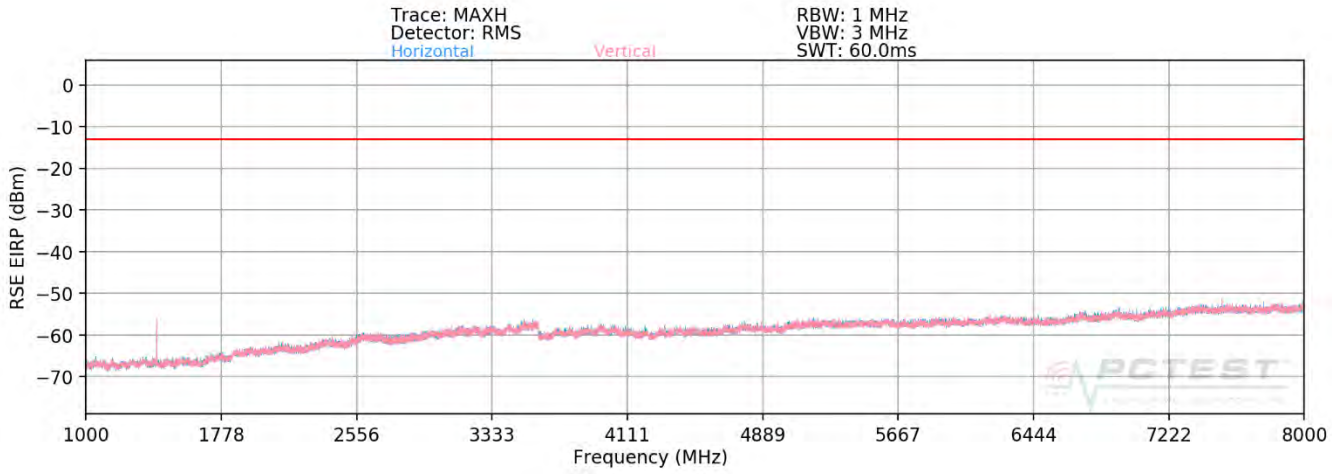
2) This unit was tested with its standard battery.

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 7-282. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY:	704.00	MHz
CHANNEL:	23035	
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]
1408.00	H	172	308	-71.84	7.54	-64.30	-51.3
2112.00	H	142	165	-74.41	8.85	-65.56	-52.6
2816.00	H	-	-	-76.03	10.12	-65.91	-52.9

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

OPERATING FREQUENCY:	707.50	MHz
CHANNEL:	23095	
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]
1415.00	H	151	200	-69.19	7.63	-61.56	-48.6
2122.50	H	147	178	-74.53	8.86	-65.67	-52.7
2830.00	H	-	-	-75.95	10.10	-65.86	-52.9

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

OPERATING FREQUENCY:	711.00	MHz
CHANNEL:	23155	
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]
1422.00	H	144	203	-66.24	7.72	-58.52	-45.5
2133.00	H	135	203	-74.56	8.87	-65.69	-52.7
2844.00	H	-	-	-75.80	10.07	-65.73	-52.7

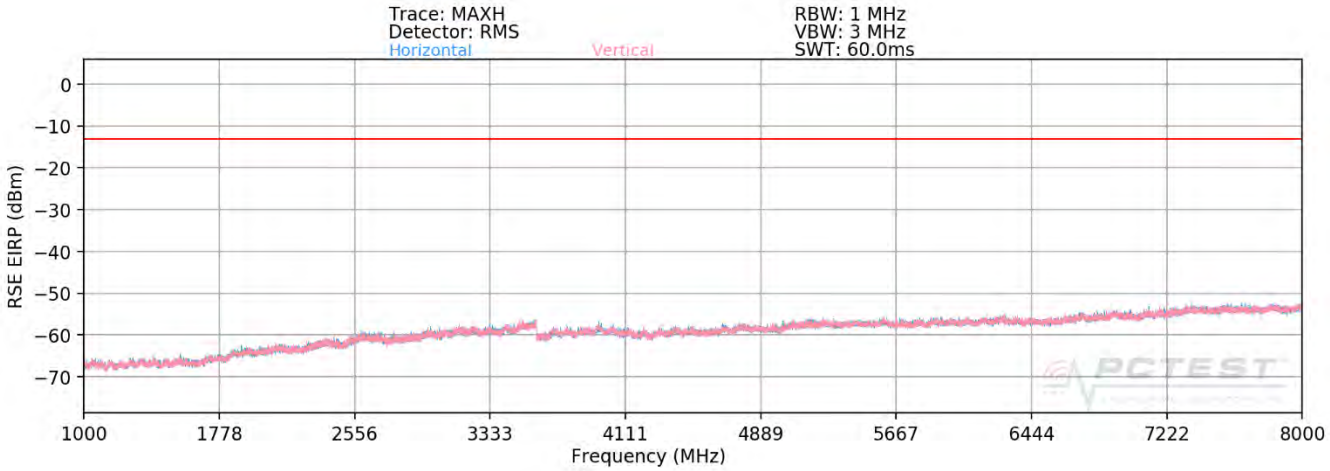
Table 7-14. Radiated Spurious Data (Band 12 – High Channel)

OPERATING FREQUENCY:	711.00	MHz
CHANNEL:	23155	
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]
1422.00	H	160	162	-71.36	7.72	-63.64	-50.6
2133.00	H	-	-	-75.95	8.87	-67.08	-54.1

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

Band 13



Plot 7-283. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY:	782.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	10	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	115	194	-75.54	8.53	-67.01	-54.0
3128.00	H	151	140	-67.79	9.43	-58.36	-45.4
3910.00	H	-	-	-73.40	9.34	-64.06	-51.1
4692.00	H	-	-	-72.02	9.37	-62.65	-49.6

Table 7-16. Radiated Spurious Data (Band 13 – Mid 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]
1564.00	H	115	194	-75.54	8.53	-67.01	-27.0

Table 7-17. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

OPERATING FREQUENCY:	782.00	MHz
MODULATION SIGNAL:		
BANDWIDTH:		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	112	346	-76.14	9.43	-66.71	-53.7
3128.00	H	-	-	-73.60	9.34	-64.26	-51.3
3910.00	H	-	-	-72.07	9.37	-62.70	-49.7

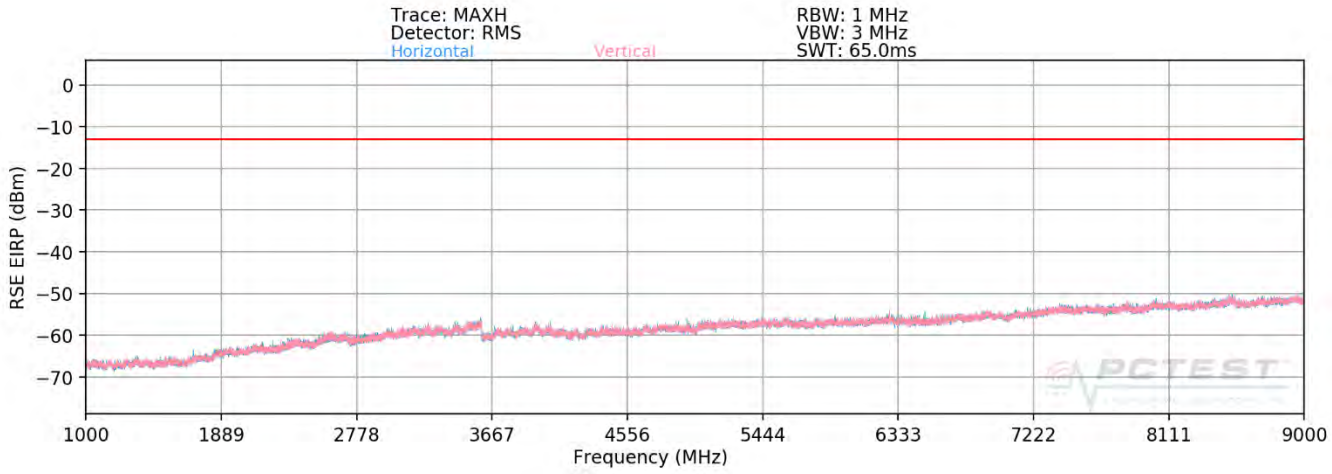
Table 7-18. Radiated Spurious Data with WCP (Band 13 – 1559-1610MHz Band)

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]
1564.00	H	119	187	-75.17	8.53	-66.64	-26.6

Table 7-19. Radiated Spurious Data with WCP (Band 13 – Mid Channel)

Band 26/5



Plot 7-284. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY:	829.00	MHz
CHANNEL:	26805	
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]
1658.00	H	-	-	-78.57	8.95	-69.62	-56.6
2487.00	H	138	15	-56.69	9.70	-46.99	-34.0
3316.00	H	-	-	-73.30	9.59	-63.71	-50.7

Table 7-20. Radiated Spurious Data (Band 26/5 – Low Channel)

OPERATING FREQUENCY:	836.50	MHz
CHANNEL:	26915	
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]
1673.00	H	-	-	-79.11	8.95	-70.15	-57.2
2509.50	H	114	12	-57.47	9.75	-47.72	-34.7
3346.00	H	-	-	-72.86	9.60	-63.25	-50.3

Table 7-21. Radiated Spurious Data (Band 26/5 – Mid Channel)

OPERATING FREQUENCY:	844.00	MHz
CHANNEL:	27025	
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]
1688.00	H	-	-	-79.89	8.95	-70.94	-57.9
2532.00	H	137	357	-64.88	9.75	-55.13	-42.1
3376.00	H	-	-	-72.24	9.71	-62.53	-49.5

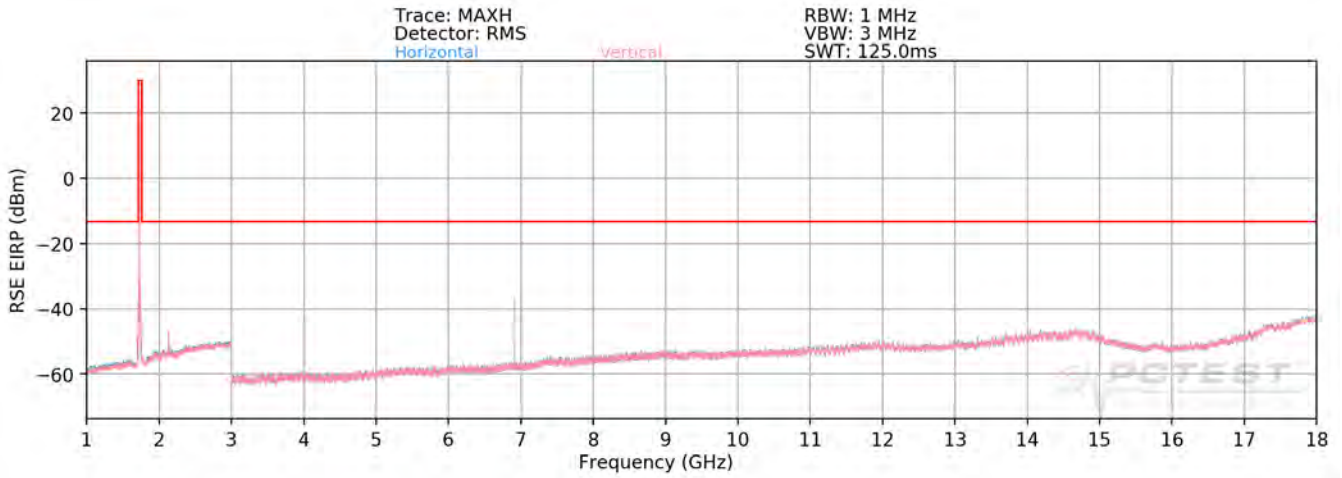
Table 7-22. Radiated Spurious Data (Band 26/5 – High Channel)

OPERATING FREQUENCY:	829.00	MHz
CHANNEL:	26805	
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]
1658.00	H	119	179	-67.24	8.95	-58.29	-45.3
2487.00	H	113	179	-62.97	9.70	-53.27	-40.3
3316.00	H	-	-	-65.49	9.59	-55.90	-42.9

Table 7-23. Radiated Spurious Data with WCP (Band 26/5 – Low Channel)

Band 4



Plot 7-285. Radiated Spurious Plot above 1GHz (Band 4)

OPERATING FREQUENCY:	1715.00	MHz
CHANNEL:	19957	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3430.00	V	-	-	-63.60	9.83	-53.77	-40.8
5145.00	V	113	3	-62.48	10.69	-51.78	-38.8
6860.00	V	214	342	-51.95	11.65	-40.30	-27.3
8575.00	V	400	32	-59.54	11.12	-48.42	-35.4
10290.00	V	-	-	-62.04	12.23	-49.81	-36.8

Table 7-24. Radiated Spurious Data (Band 4 – Low Channel)

OPERATING FREQUENCY:	1732.50	MHz
CHANNEL:	20175	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3465.00	V	120	125	-60.71	9.88	-50.84	-37.8
5197.50	V	115	361	-65.93	10.76	-55.17	-42.2
6930.00	V	226	348	-52.69	11.74	-40.94	-27.9
8662.50	V	327	29	-60.30	11.02	-49.28	-36.3
10395.00	V	-	-	-62.02	12.44	-49.58	-36.6

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

OPERATING FREQUENCY:	1750.00	MHz
CHANNEL:	20393	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3500.00	V	139	124	-57.97	9.93	-48.05	-35.0
5250.00	V	117	8	-64.78	10.72	-54.06	-41.1
7000.00	V	243	357	-58.15	11.87	-46.28	-33.3
8750.00	V	-	-	-62.29	10.97	-51.31	-38.3

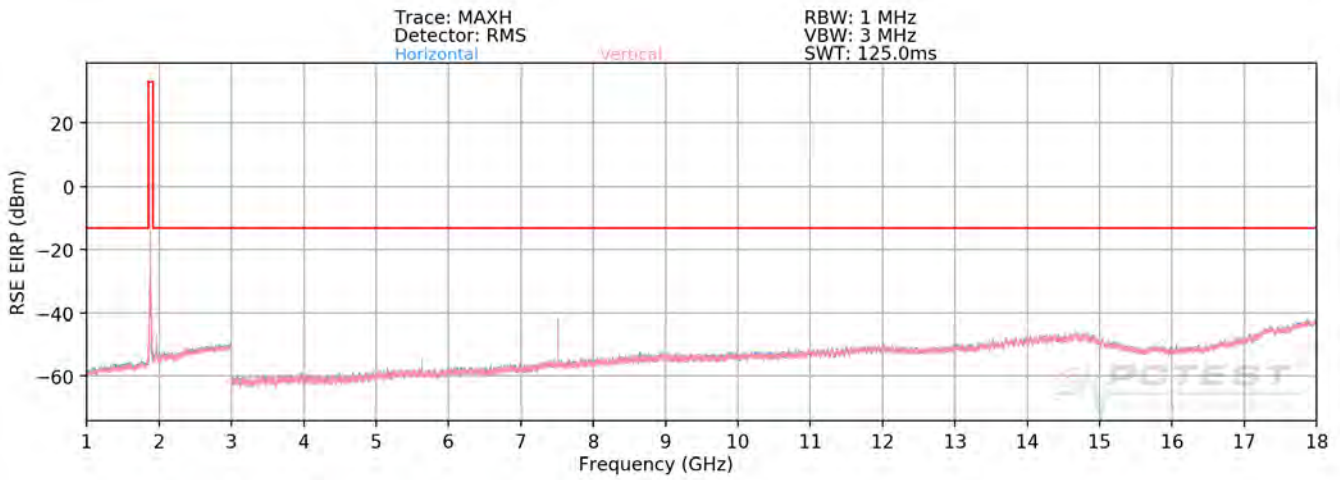
Table 7-26. Radiated Spurious Data (Band 4 – High Channel)

OPERATING FREQUENCY:	1715.00	MHz
CHANNEL:	19957	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3430.00	H	116	226	-56.80	9.83	-46.97	-34.0
5145.00	H	161	167	-65.64	10.69	-54.94	-41.9
6860.00	H	112	228	-56.51	11.65	-44.86	-31.9
8575.00	H	-	-	-60.79	11.12	-49.67	-36.7

Table 7-27. Radiated Spurious Data with WCP (Band 4 – Low Channel)

Band 25/2



Plot 7-286. Radiated Spurious Plot above 1GHz (Band 25/2)

OPERATING FREQUENCY:	1855.00	MHz
CHANNEL:	26115	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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]
3710.00	H	400	326	-65.38	9.55	-55.84	-42.8
5565.00	H	393	307	-66.05	10.96	-55.08	-42.1
7420.00	H	115	51	-62.00	10.97	-51.03	-38.0
9275.00	H	-	-	-62.30	11.62	-50.68	-37.7

Table 7-28. Radiated Spurious Data (Band 25/2 – Low Channel)

OPERATING FREQUENCY:	1882.50	MHz
CHANNEL:	26365	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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	-	-	-67.73	9.36	-58.38	-45.4
5647.50	H	-	-	-67.17	11.19	-55.97	-43.0
7530.00	H	345	64	-60.31	11.13	-49.18	-36.2
9412.50	H	-	-	-60.87	11.57	-49.30	-36.3

Table 7-29. Radiated Spurious Data (Band 25/2 – Mid Channel)

OPERATING FREQUENCY:	1910.00	MHz
CHANNEL:	26615	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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]
3820.00	H	-	-	-67.87	9.31	-58.56	-45.6
5730.00	H	-	-	-67.41	11.39	-56.02	-43.0

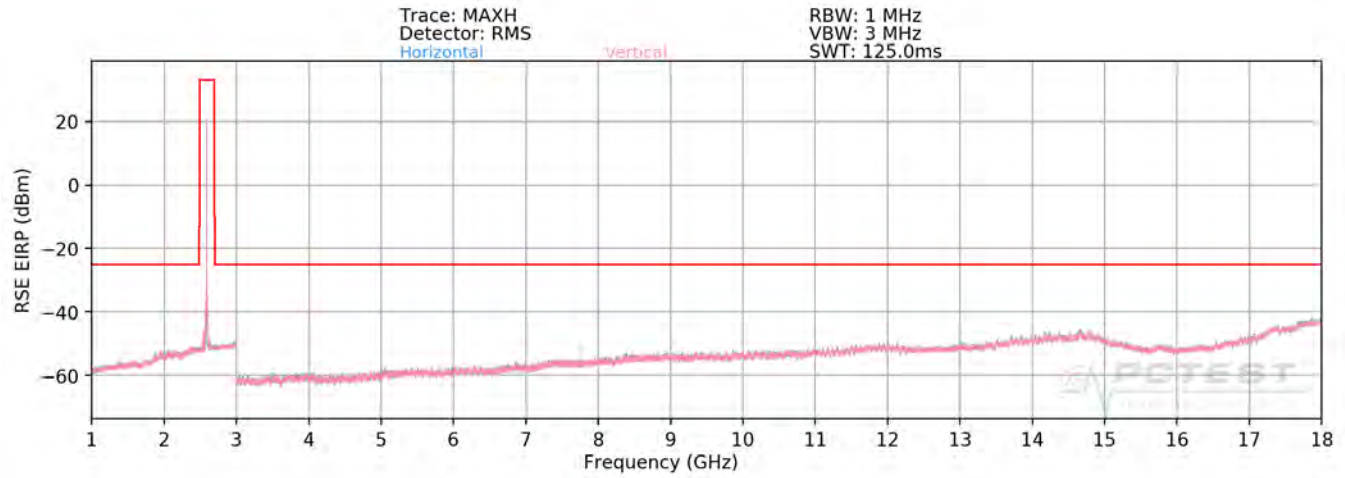
Table 7-30. Radiated Spurious Data (Band 25/2 – High Channel)

OPERATING FREQUENCY:	1882.50	MHz
CHANNEL:	26365	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

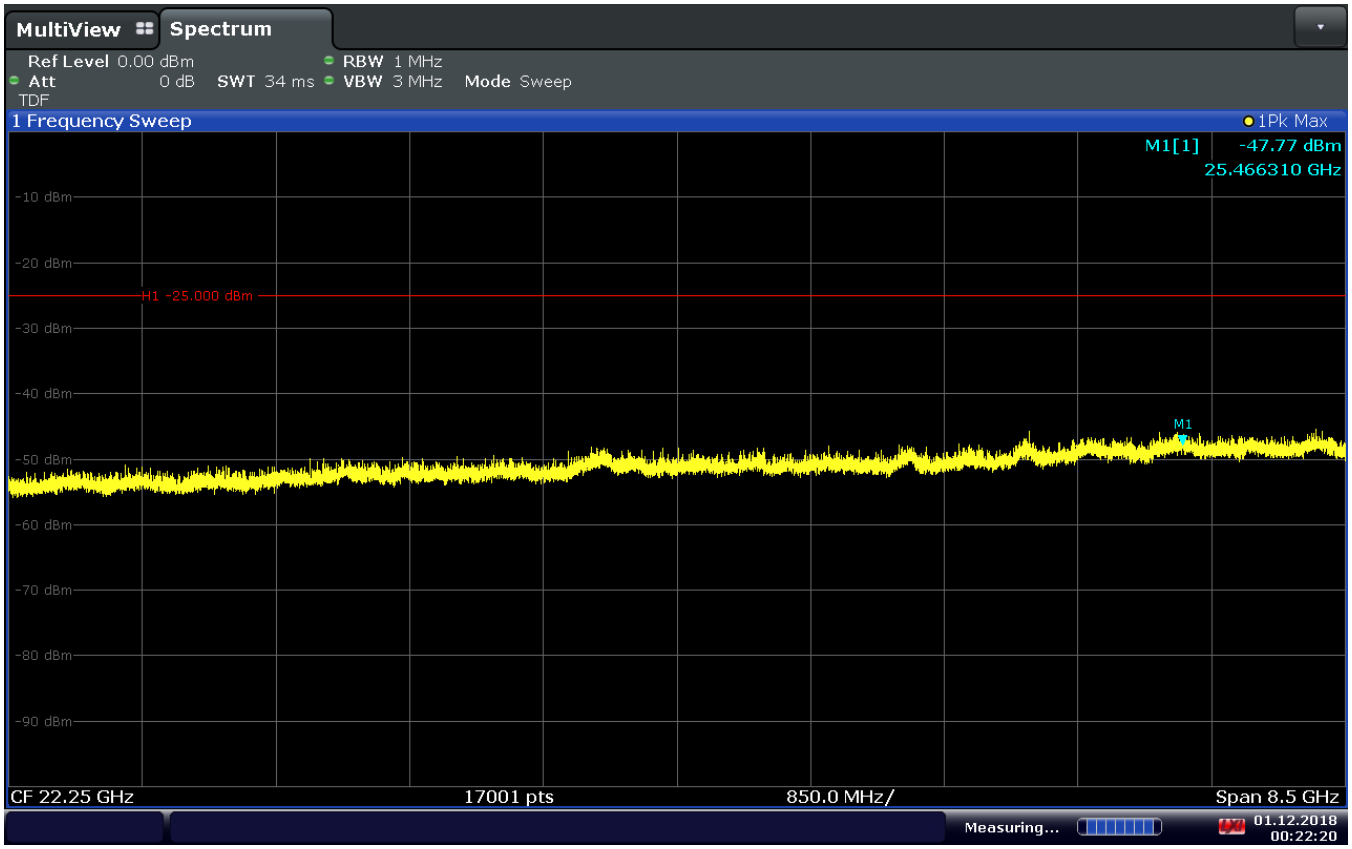
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	395	33	-65.84	9.36	-56.49	-43.5
5647.50	H	228	159	-57.68	11.19	-46.48	-33.5
7530.00	H	121	167	-61.08	11.13	-49.95	-36.9
9412.50	H	-	-	-60.88	11.57	-49.31	-36.3

Table 7-31. Radiated Spurious Data with WCP (Band 25/2 – Mid Channel)

Band 41



Plot 7-287. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



Plot 7-288. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41)

OPERATING FREQUENCY:	2506.00	MHz
CHANNEL:	39790	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5012.00	H	-	-	-63.31	10.90	-52.40	-27.4
7518.00	H	106	34	-55.27	11.11	-44.17	-19.2
10024.00	H	-	-	-57.66	11.99	-45.67	-20.7

Table 7-32. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY:	2593.00	MHz
CHANNEL:	40620	
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	-	-	-62.92	10.74	-52.18	-27.2
7779.00	H	104	35	-57.09	11.44	-45.65	-20.7
10372.00	H	-	-	-56.41	12.42	-43.99	-19.0

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

OPERATING FREQUENCY:	2680.00	MHz
CHANNEL:	41490	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5360.00	H	-	-	-62.39	10.70	-51.69	-26.7
8040.00	H	-	-	-58.93	11.16	-47.77	-22.8

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

OPERATING FREQUENCY:	2506.00	MHz
CHANNEL:	39675	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5012.00	H	-	-	-63.16	10.90	-52.25	-27.3
7518.00	H	115	170	-55.61	11.11	-44.51	-19.5
10024.00	H	-	-	-58.07	11.99	-46.08	-21.1

Table 7-35. Radiated Spurious Data with WCP (Band 41 – Low Channel)

7.9 Uplink Carrier Aggregation Radiated Measurements

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.

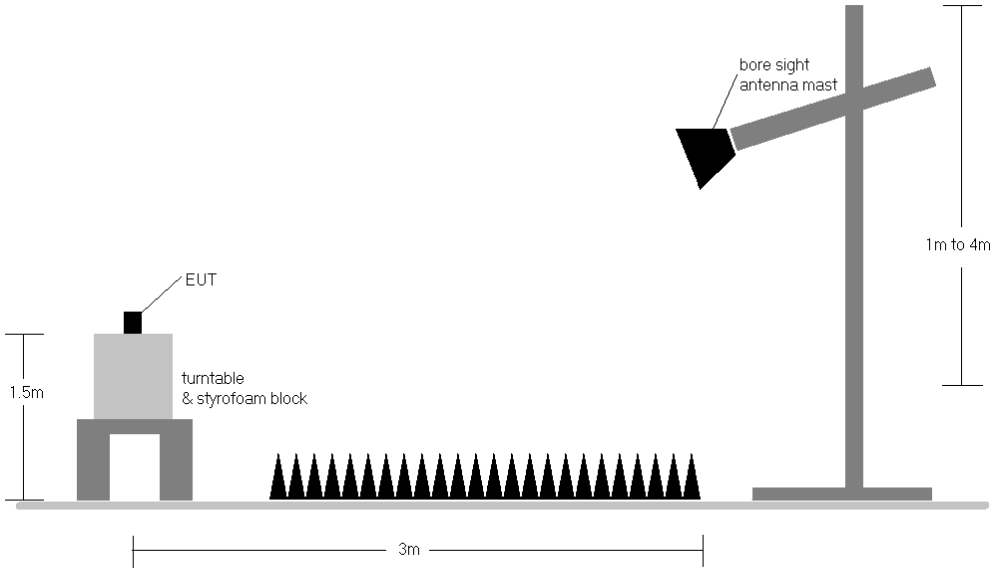


Figure 7-9. Test Instrument & Measurement Setup

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.

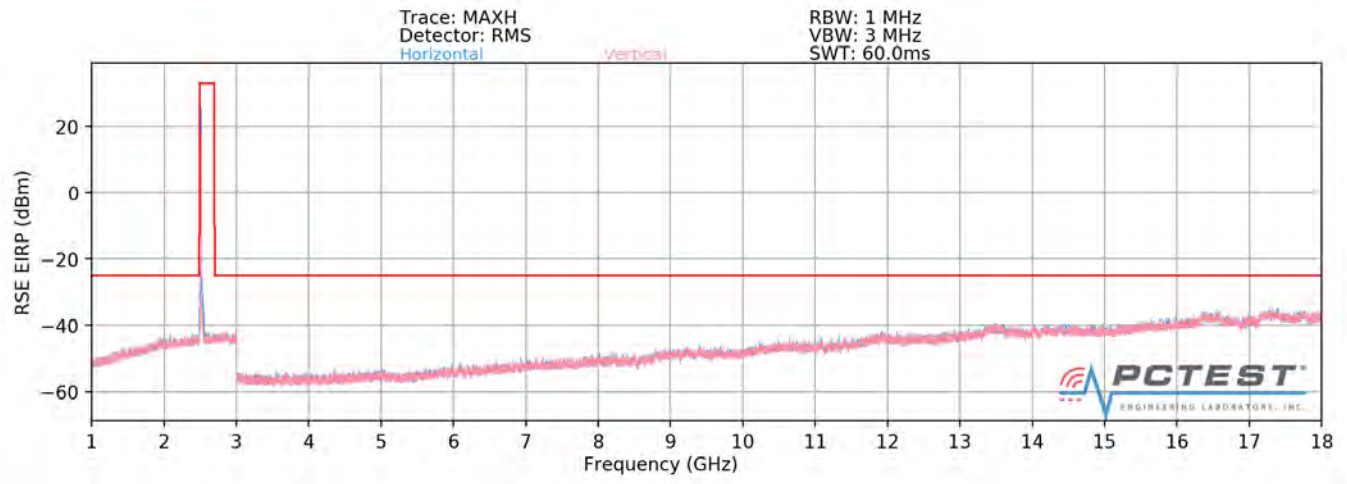
2) This unit was tested with its standard battery.

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.

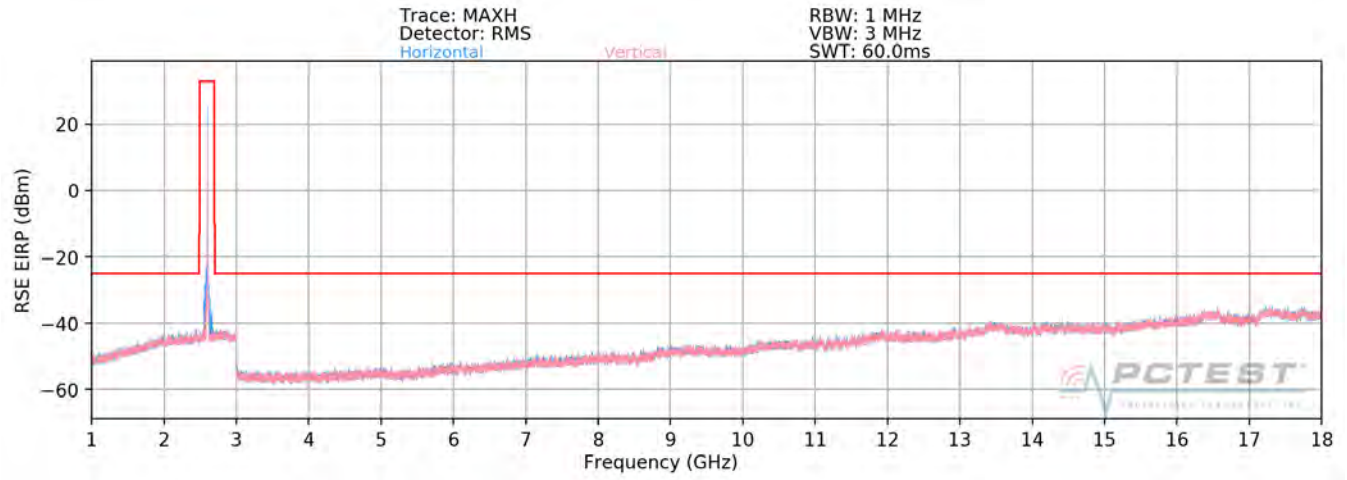
4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

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.

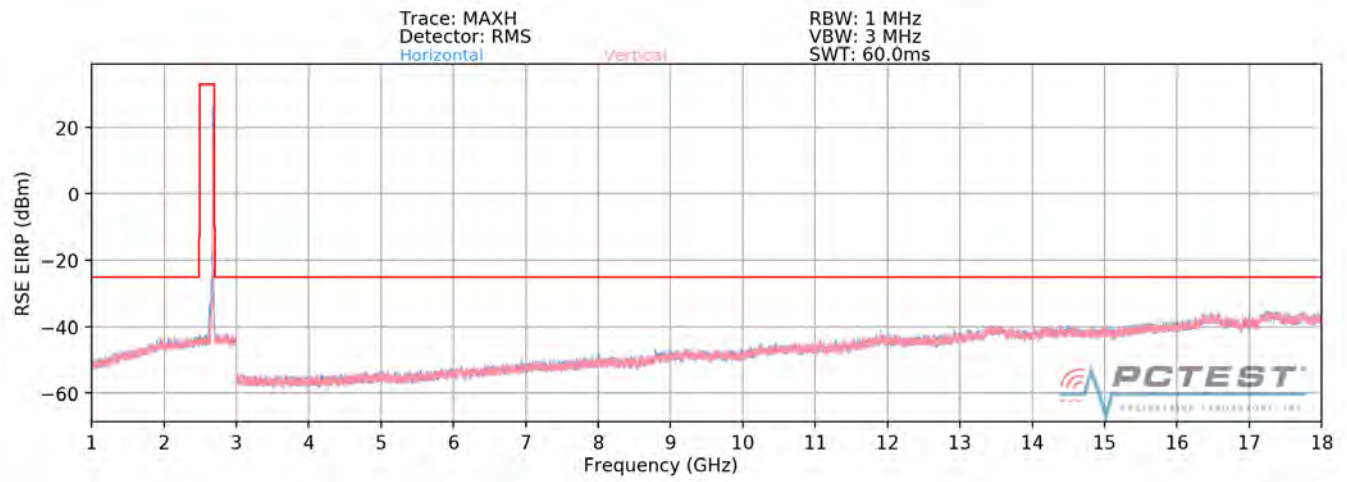
Uplink CA Configuration 41C



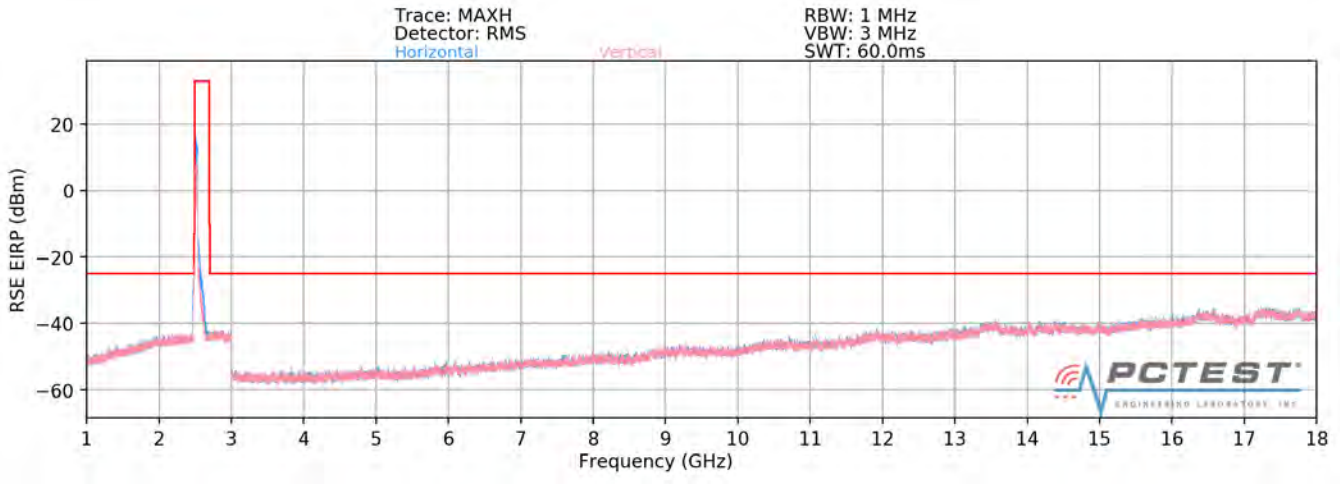
Plot 7-289. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)



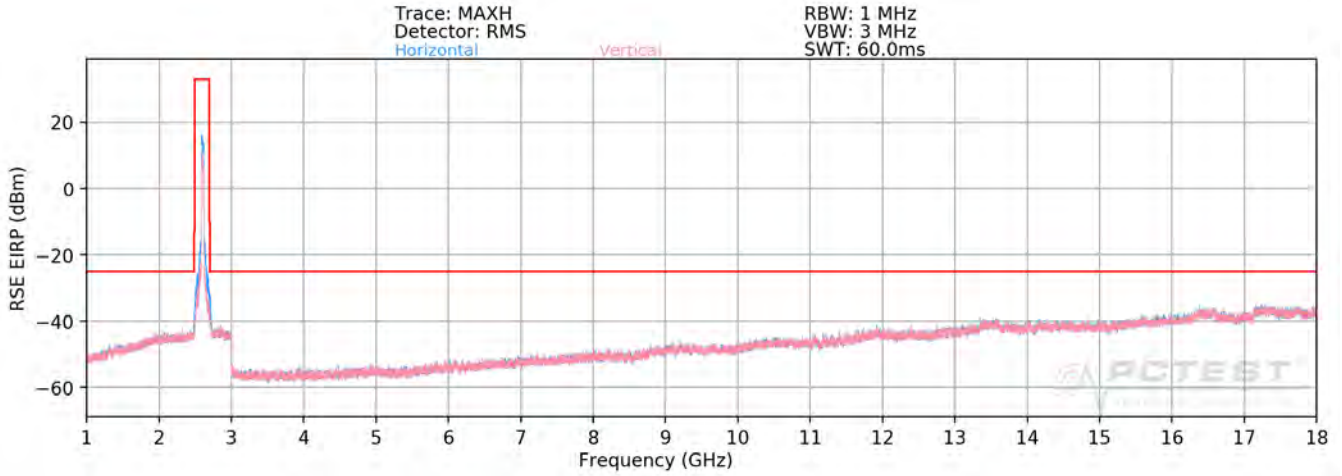
Plot 7-290. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)



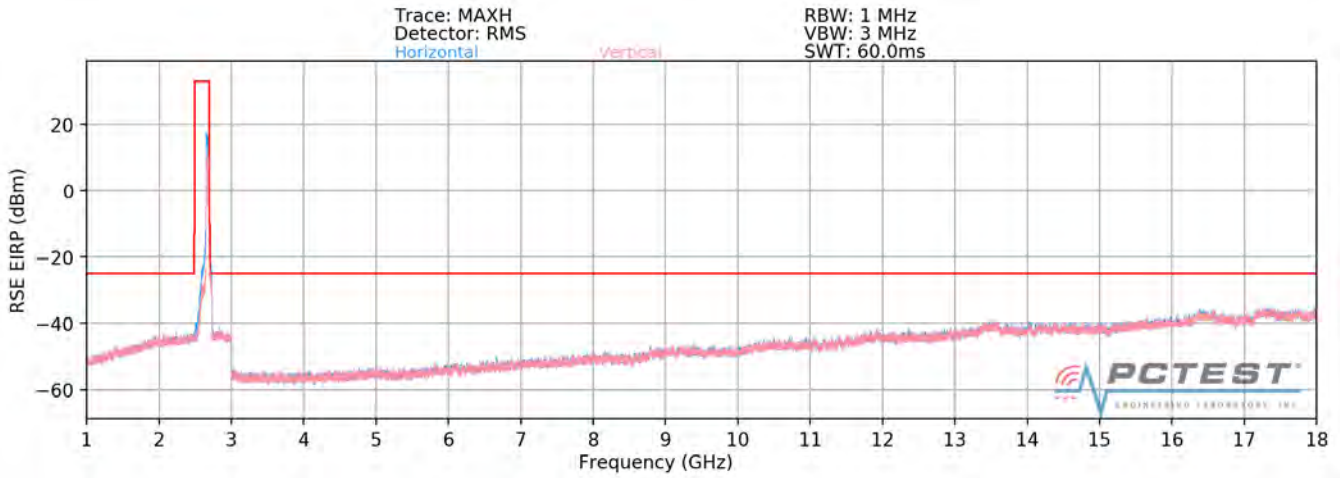
Plot 7-291. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)



Plot 7-292. Radiated Spruious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Low Channel)



Plot 7-293. Radiated Spruious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Mid Channel)



Plot 7-294. Radiated Spruious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – High Channel)

OPERATING FREQUENCY (PCC):	2506.00	MHz
OPERATING FREQUENCY (SCC):	2525.80	
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]
5020.00	H	-	-	-59.01	8.35	-50.67	-25.7
7530.00	H	-	-	-55.77	8.45	-47.32	-22.3

Table 7-36. Radiated Spurious Data (ULCA B41 PCC: RB 1 Offset 24, SCC: RB 1 Offset 0 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	-	-	-59.94	8.45	-51.49	-26.5
7779.00	H	100	157	-55.16	8.75	-46.41	-21.4
10372.00	H	-	-	-54.44	9.73	-44.72	-19.7

Table 7-37. Radiated Spurious Data (ULCA B41 PCC: RB 1 Offset 24, SCC: RB 1 Offset 0 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5360.00	H	-	-	-60.28	8.40	-51.88	-26.9
8040.00	H	-	-	-54.74	9.19	-45.56	-20.6

Table 7-38. Radiated Spurious Data (ULCA B41 PCC: RB 1 Offset 24, SCC: RB 1 Offset 0 – High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	V	-	-	-60.30	8.45	-51.85	-26.8
7779.00	V	-	-	-56.00	8.75	-47.25	-22.3

Table 7-39. Radiated Spurious Data with WCP (ULCA B41 PCC: RB 1 Offset 1, SCC: RB 24 Offset 0 – 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:	4.29	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	707,500,198	198	0.0000280
100 %		- 20	707,500,140	140	0.0000198
100 %		- 10	707,499,937	-63	-0.0000089
100 %		0	707,499,958	-42	-0.0000059
100 %		+ 10	707,500,095	95	0.0000134
100 %		+ 20	707,499,670	-330	-0.0000466
100 %		+ 30	707,500,033	33	0.0000047
100 %		+ 40	707,499,946	-54	-0.0000076
100 %		+ 50	707,499,883	-117	-0.0000165
BATT. ENDPOINT	3.67	+ 20	707,499,982	-18	-0.0000025

Table 7-40. 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

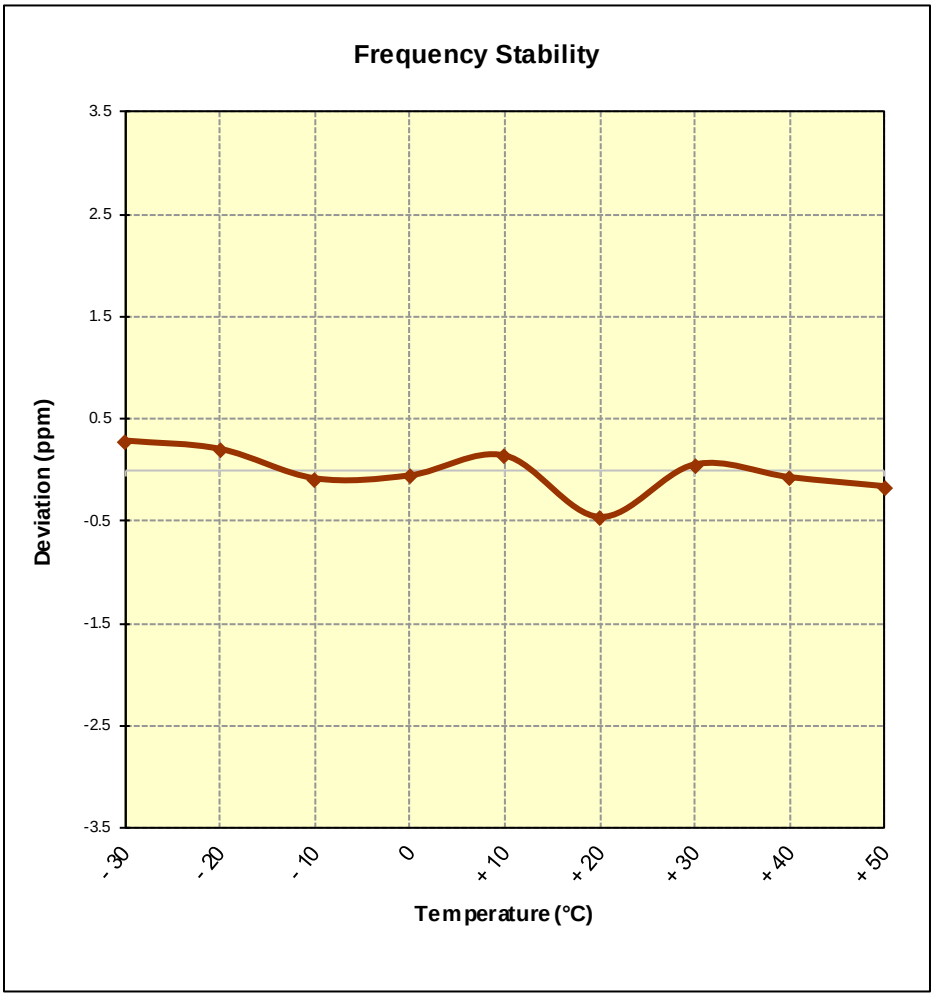


Figure 7-10. Frequency Stability Graph (Band 12)

Band 13 Frequency Stability Measurements

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	4.29	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	781,999,935	-65	-0.0000083
100 %		- 20	781,999,952	-48	-0.0000061
100 %		- 10	781,999,995	-5	-0.0000006
100 %		0	781,999,797	-203	-0.0000260
100 %		+ 10	782,000,020	20	0.0000026
100 %		+ 20	781,999,861	-139	-0.0000178
100 %		+ 30	781,999,863	-137	-0.0000175
100 %		+ 40	781,999,628	-372	-0.0000476
100 %		+ 50	782,000,485	485	0.0000620
BATT. ENDPOINT	3.67	+ 20	782,000,055	55	0.0000070

Table 7-41. 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

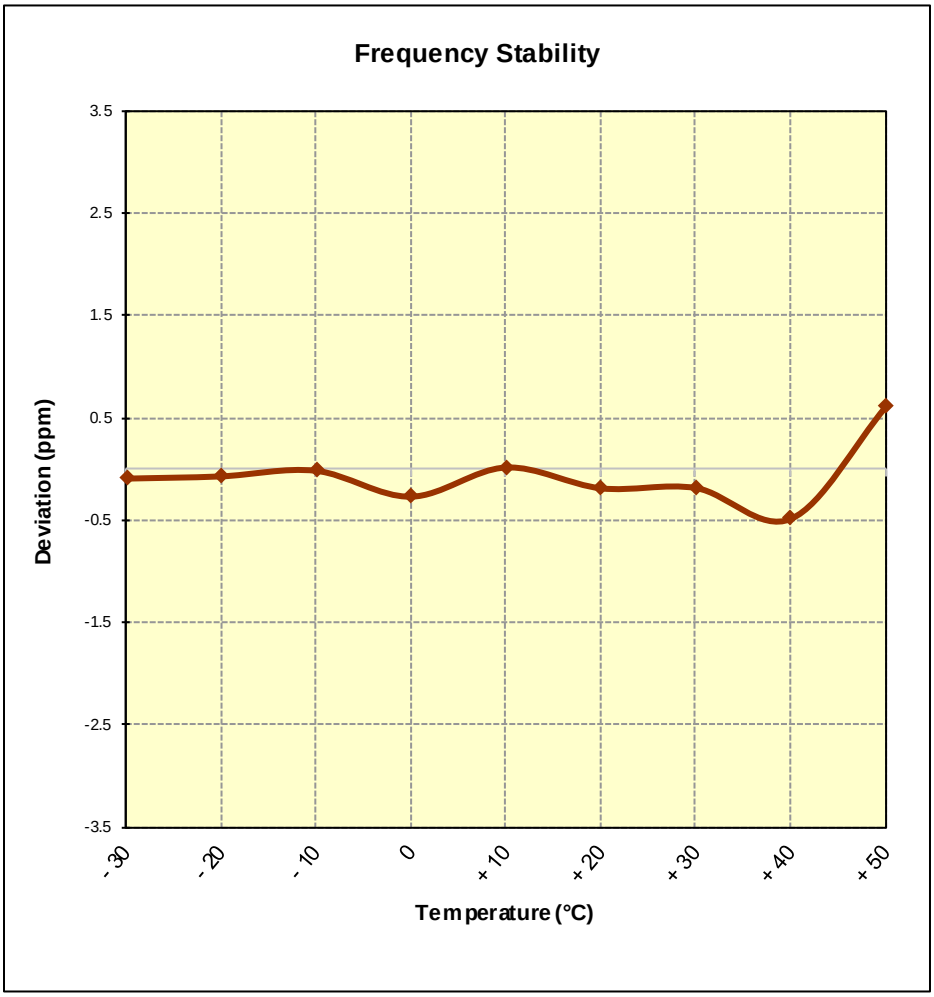


Figure 7-11. Frequency Stability Graph (Band 13)

Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	4.29	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	831,500,103	103	0.0000124
100 %		- 20	831,499,813	-187	-0.0000225
100 %		- 10	831,500,479	479	0.0000576
100 %		0	831,499,886	-114	-0.0000137
100 %		+ 10	831,500,068	68	0.0000082
100 %		+ 20	831,500,028	28	0.0000034
100 %		+ 30	831,499,642	-358	-0.0000431
100 %		+ 40	831,500,413	413	0.0000497
100 %		+ 50	831,500,369	369	0.0000444
BATT. ENDPOINT	3.67	+ 20	831,500,202	202	0.0000243

Table 7-42. Frequency Stability Data (Band 26/5)

Band 26/5 Frequency Stability Measurements

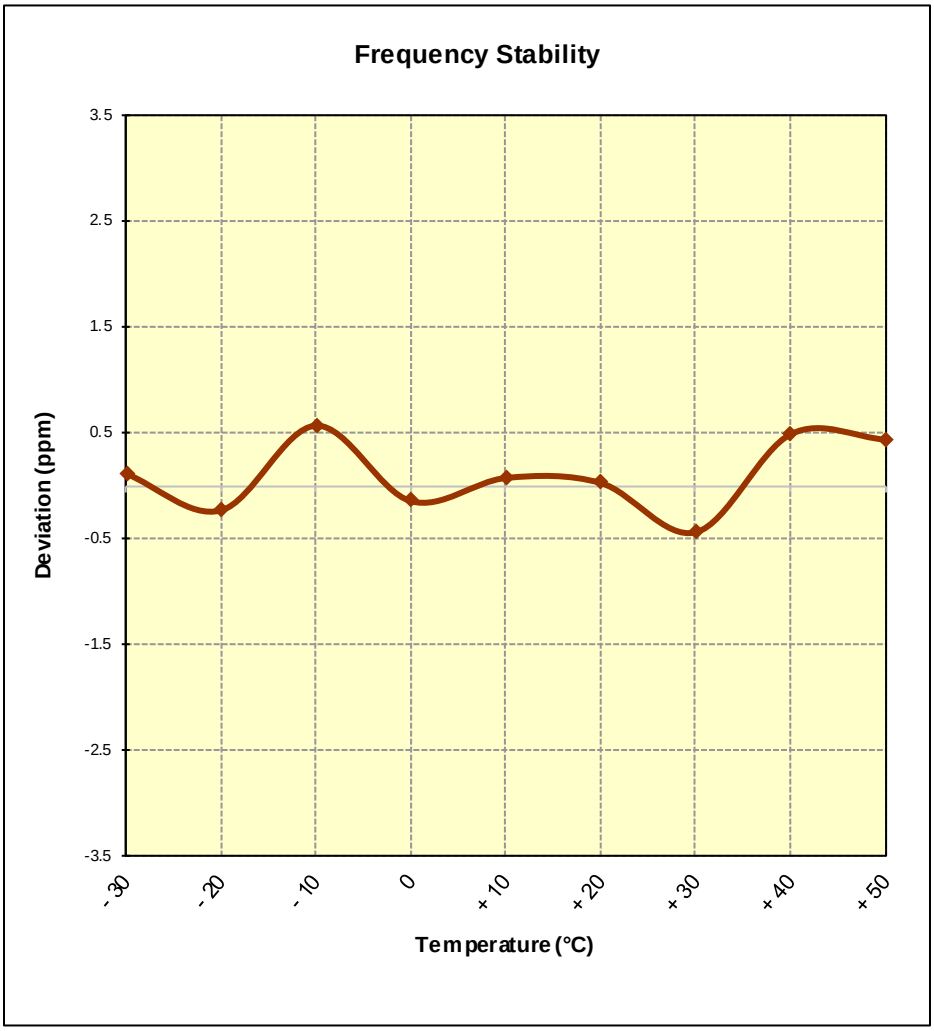


Figure 7-12. Frequency Stability Graph (Band 26/5)

Band 4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	
REFERENCE VOLTAGE:	4.29	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	1,744,999,963	-37	-0.0000021
100 %		- 20	1,744,999,896	-104	-0.0000060
100 %		- 10	1,745,000,295	295	0.0000169
100 %		0	1,744,999,747	-253	-0.0000145
100 %		+ 10	1,744,999,877	-123	-0.0000070
100 %		+ 20	1,745,000,152	152	0.0000087
100 %		+ 30	1,744,999,936	-64	-0.0000037
100 %		+ 40	1,744,999,684	-316	-0.0000181
100 %		+ 50	1,744,999,945	-55	-0.0000032
BATT. ENDPOINT	3.67	+ 20	1,744,999,505	-495	-0.0000284

Table 7-43. 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

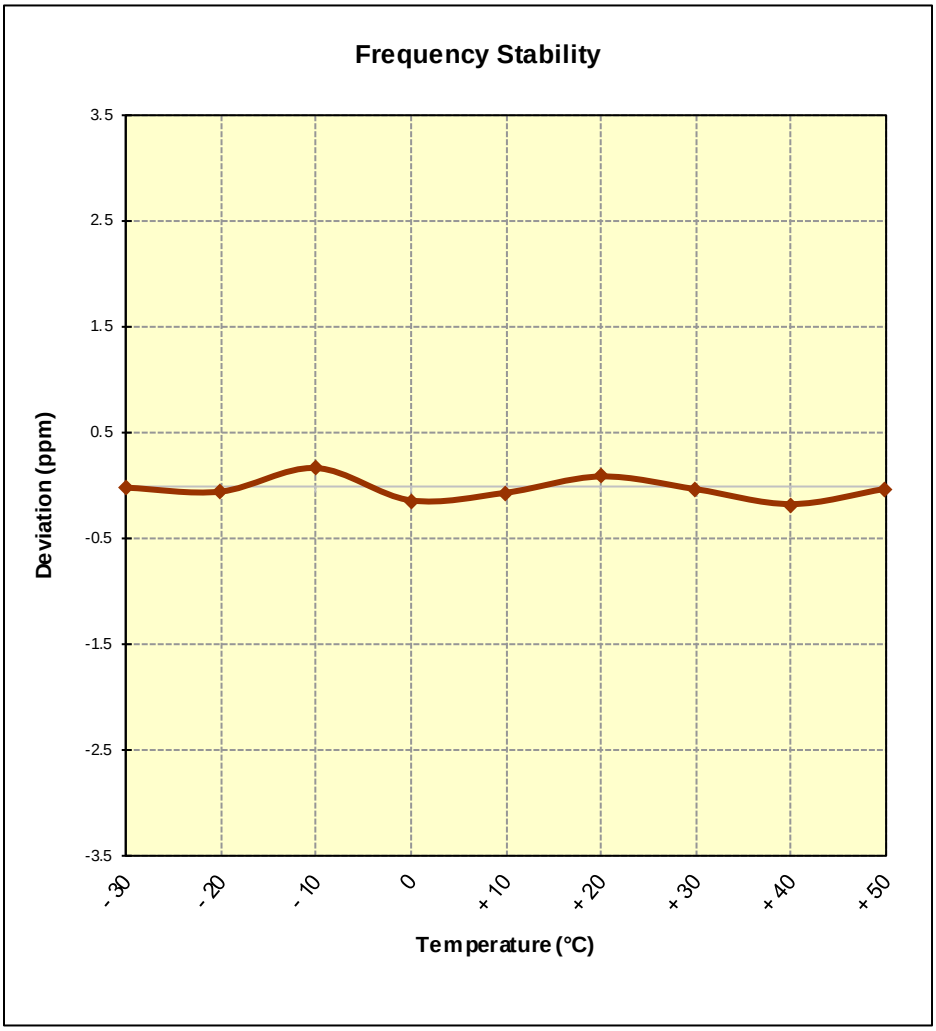


Figure 7-13. Frequency Stability Graph (Band 4)

Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	4.29	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	1,882,499,819	-181	-0.0000096
100 %		- 20	1,882,499,958	-42	-0.0000022
100 %		- 10	1,882,499,994	-6	-0.0000003
100 %		0	1,882,500,156	156	0.0000083
100 %		+ 10	1,882,499,926	-74	-0.0000039
100 %		+ 20	1,882,500,133	133	0.0000071
100 %		+ 30	1,882,499,965	-35	-0.0000019
100 %		+ 40	1,882,499,814	-186	-0.0000099
100 %		+ 50	1,882,500,052	52	0.0000028
BATT. ENDPOINT	3.67	+ 20	1,882,500,133	133	0.0000071

Table 7-44. Frequency Stability Data (Band 25/2)

Band 25/2 Frequency Stability Measurements

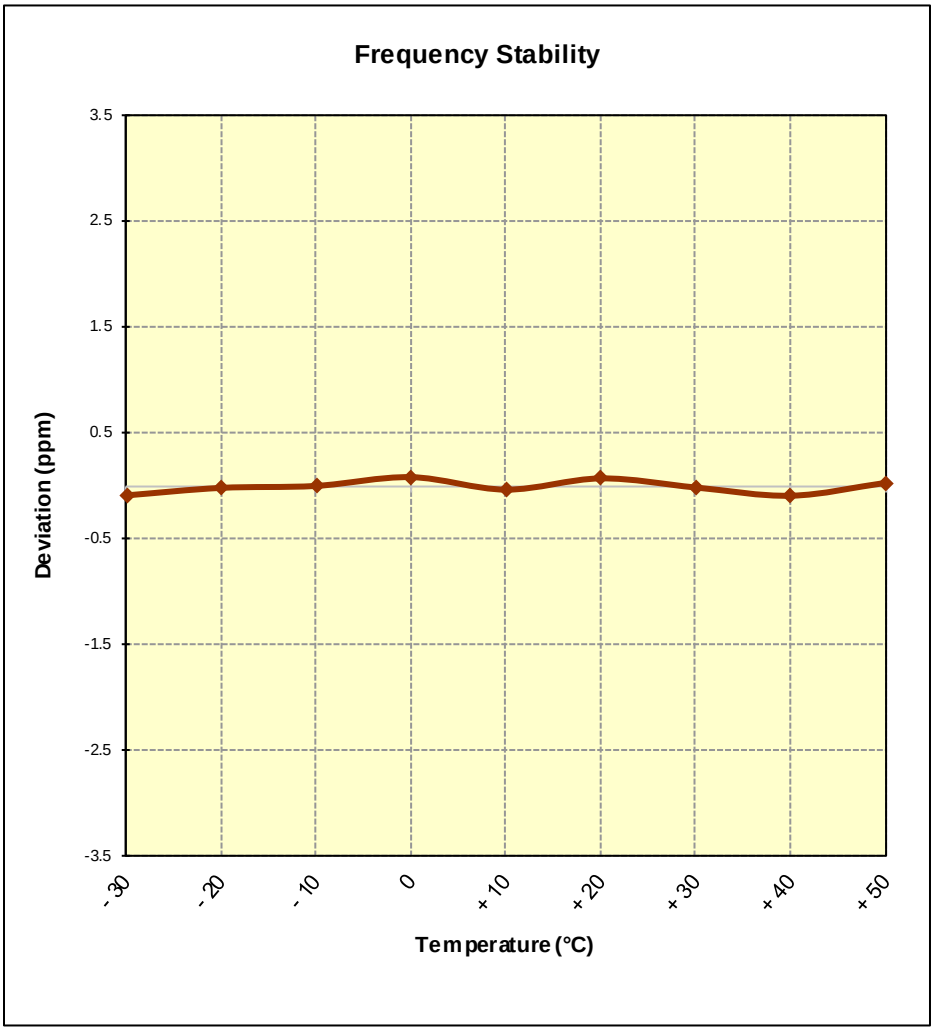


Figure 7-14. Frequency Stability Graph (Band 25/2)

Band 41 Frequency Stability Measurements

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	4.29	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	2,593,000,061	61	0.0000024
100 %		- 20	2,593,000,081	81	0.0000031
100 %		- 10	2,593,000,097	97	0.0000037
100 %		0	2,592,999,954	-46	-0.0000018
100 %		+ 10	2,593,000,113	113	0.0000044
100 %		+ 20	2,593,000,148	148	0.0000057
100 %		+ 30	2,593,000,044	44	0.0000017
100 %		+ 40	2,592,999,734	-266	-0.0000103
100 %		+ 50	2,593,000,128	128	0.0000049
BATT. ENDPOINT	3.67	+ 20	2,593,000,068	68	0.0000026

Table 7-45. 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

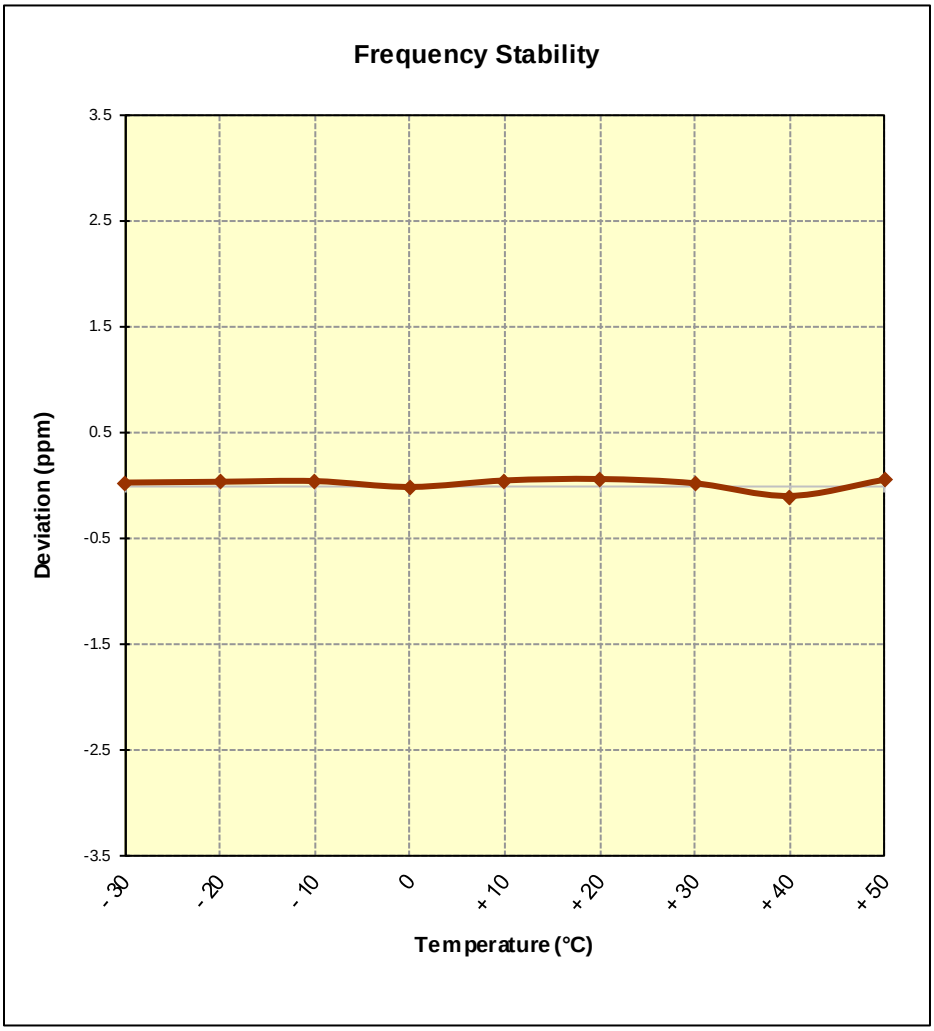


Figure 7-15. Frequency Stability Graph (Band 41)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG9750** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.