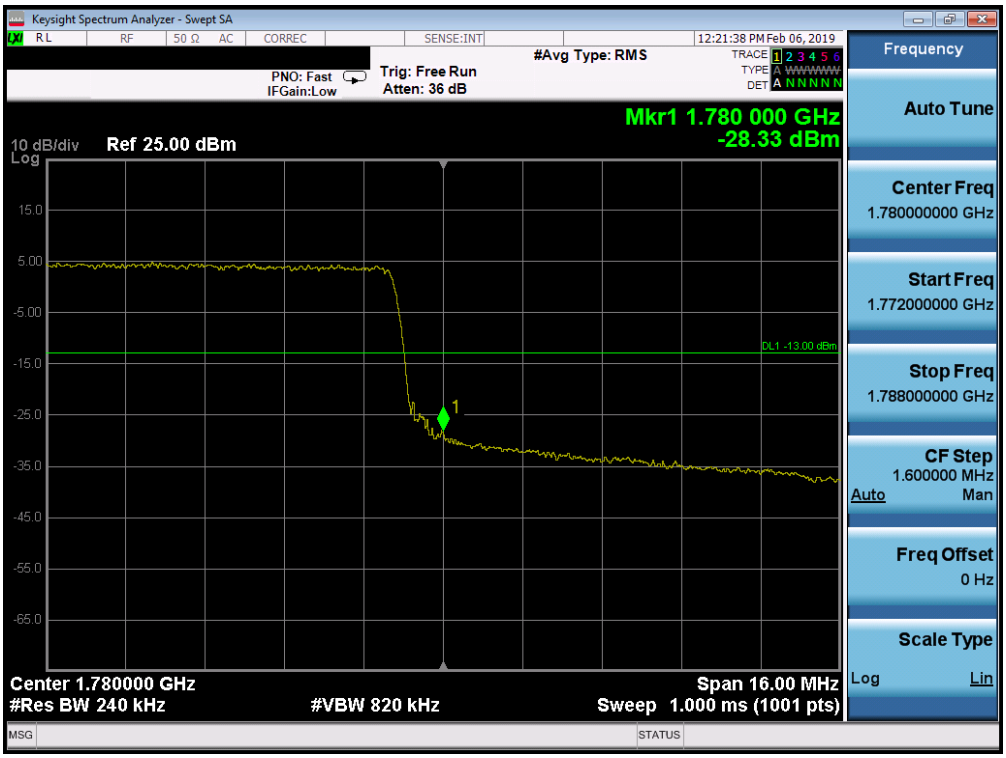
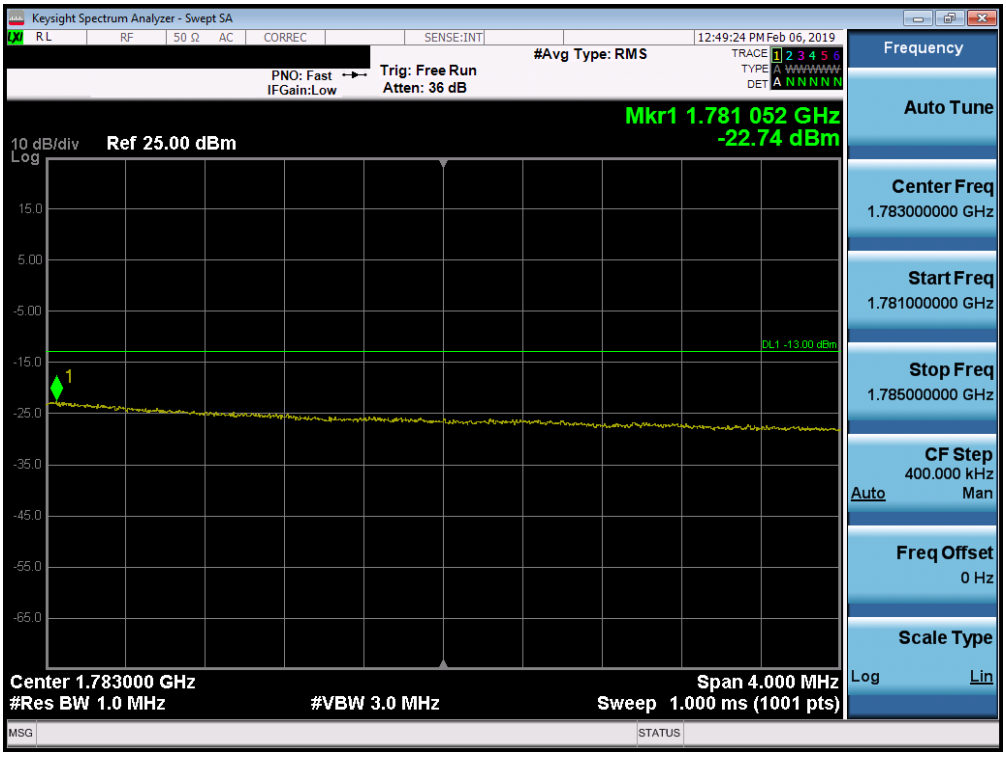


Plot 7-192. Upper Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-193. Upper Extended Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)

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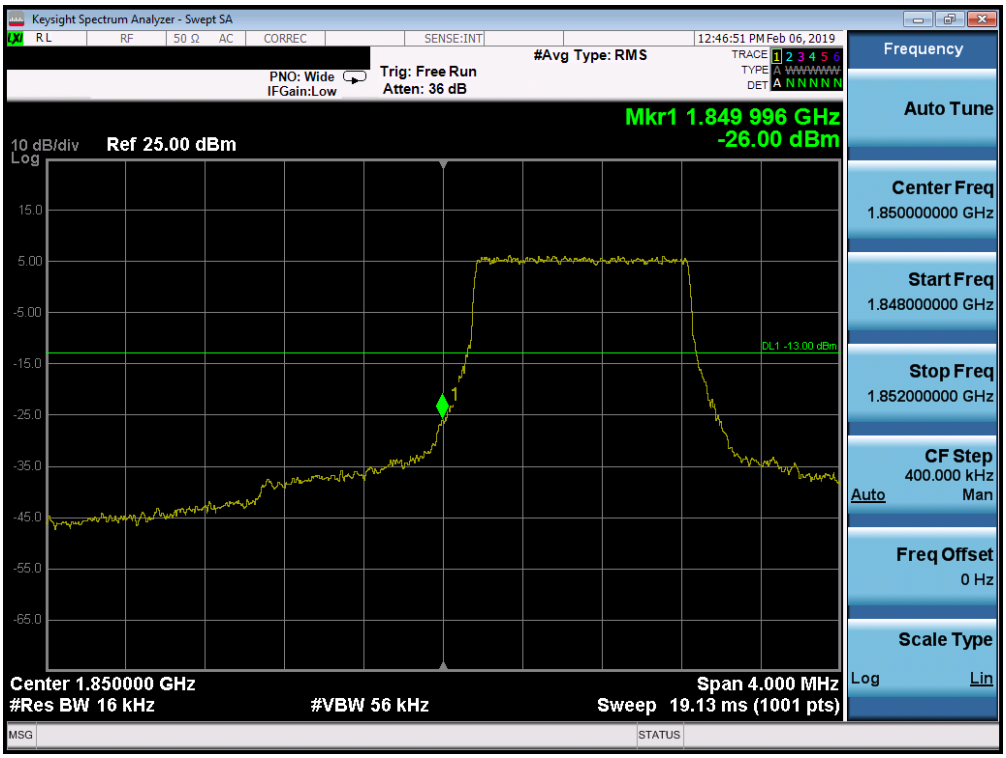
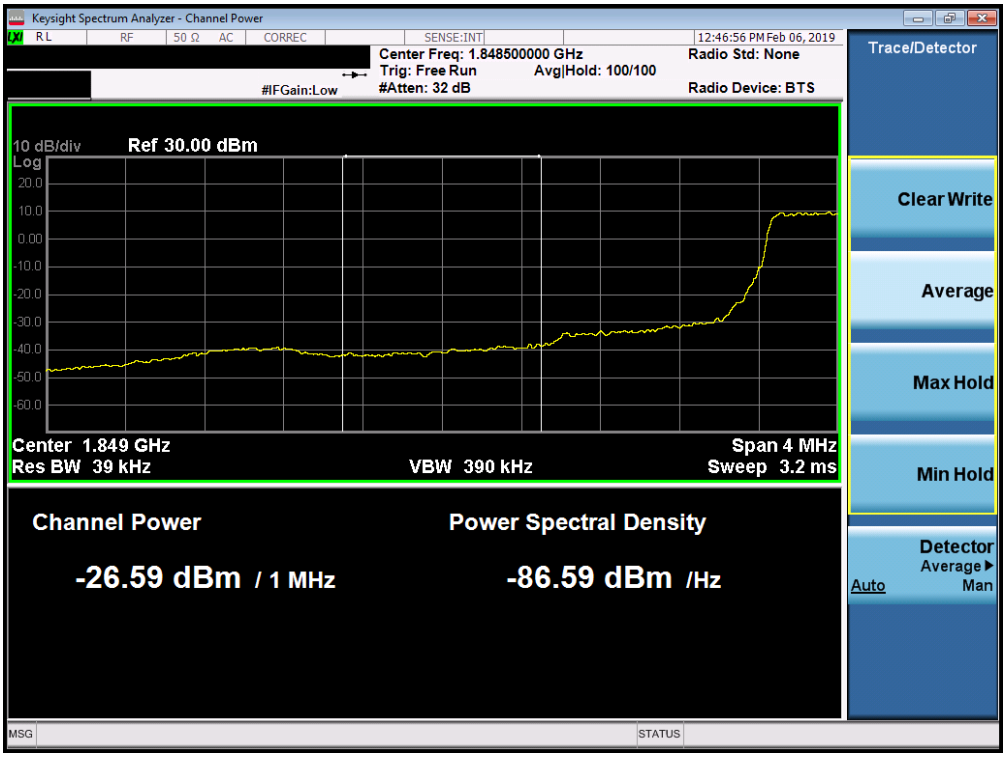
Band 25/2



Plot 7-194. Lower Band Edge Plot (Band 25/2- 1.4MHz QPSK - Full RB Configuration)



Plot 7-195. Lower Extended Band Edge Plot (Band 25/2- 1.4MHz QPSK - Full RB Configuration)

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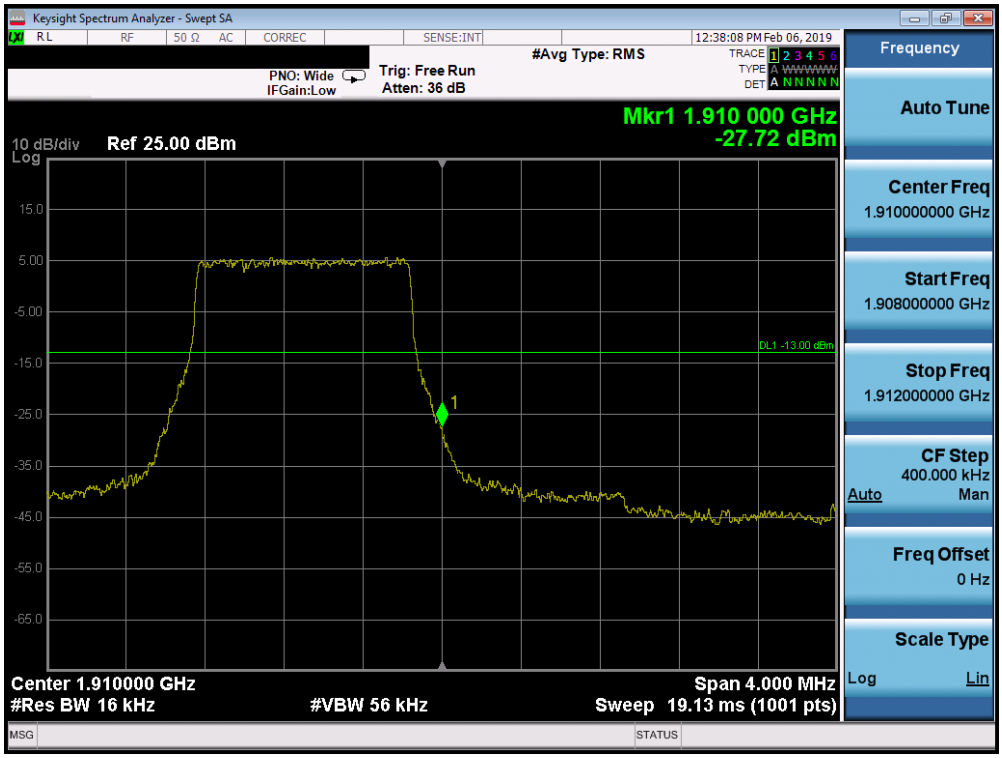
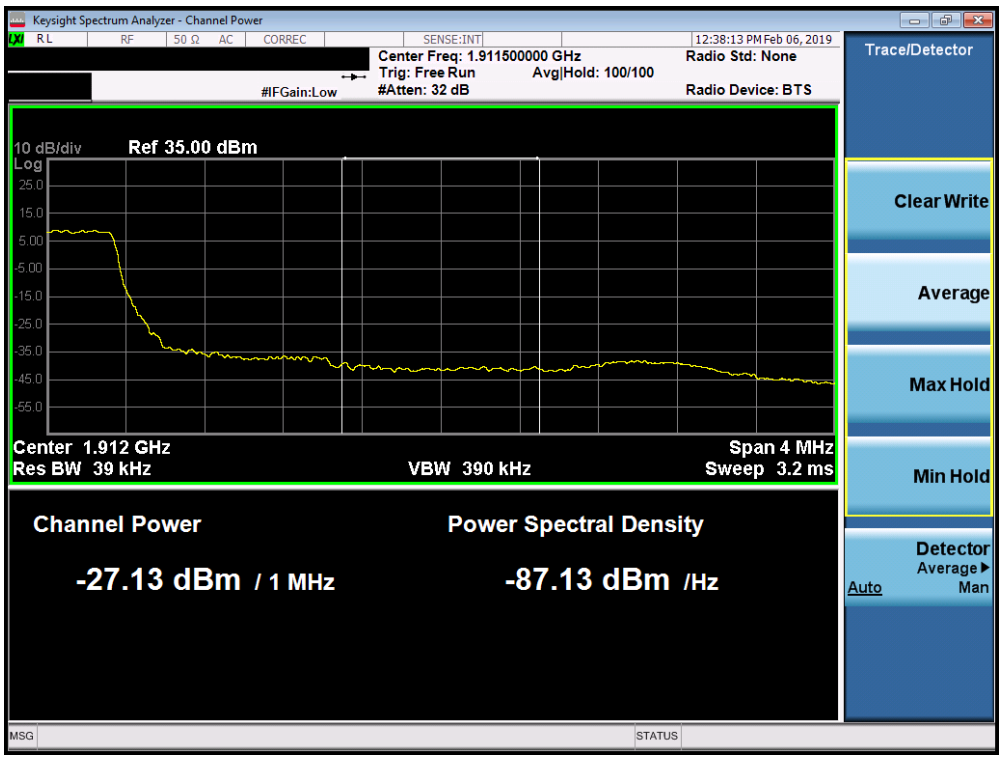


Plot 7-196. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-197. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

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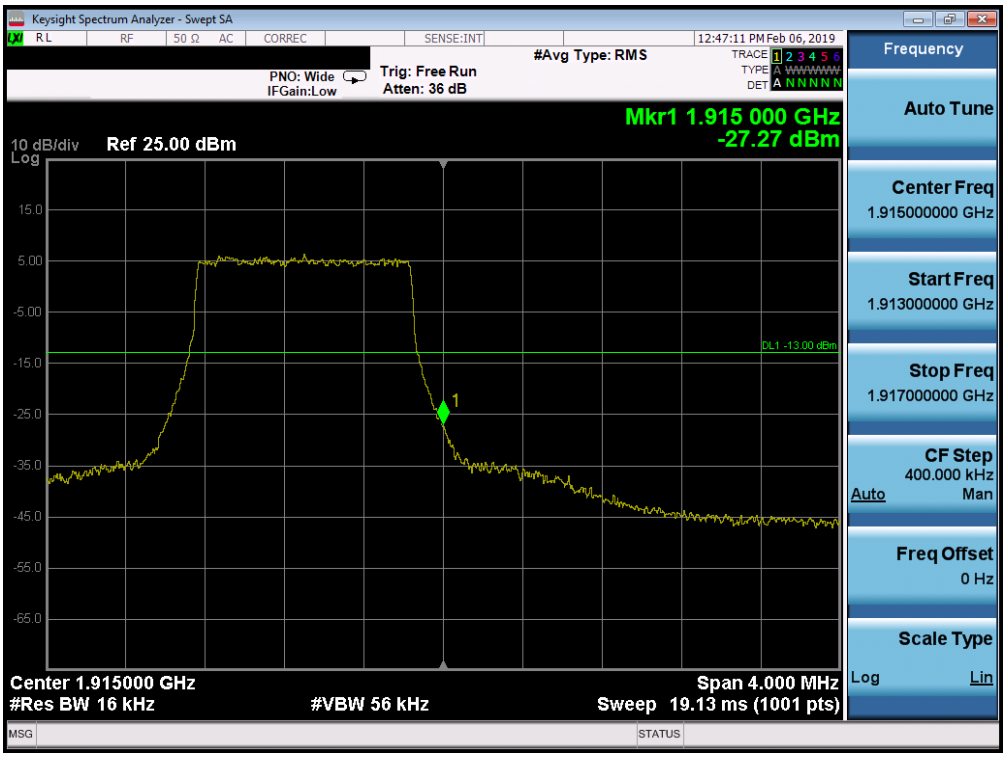
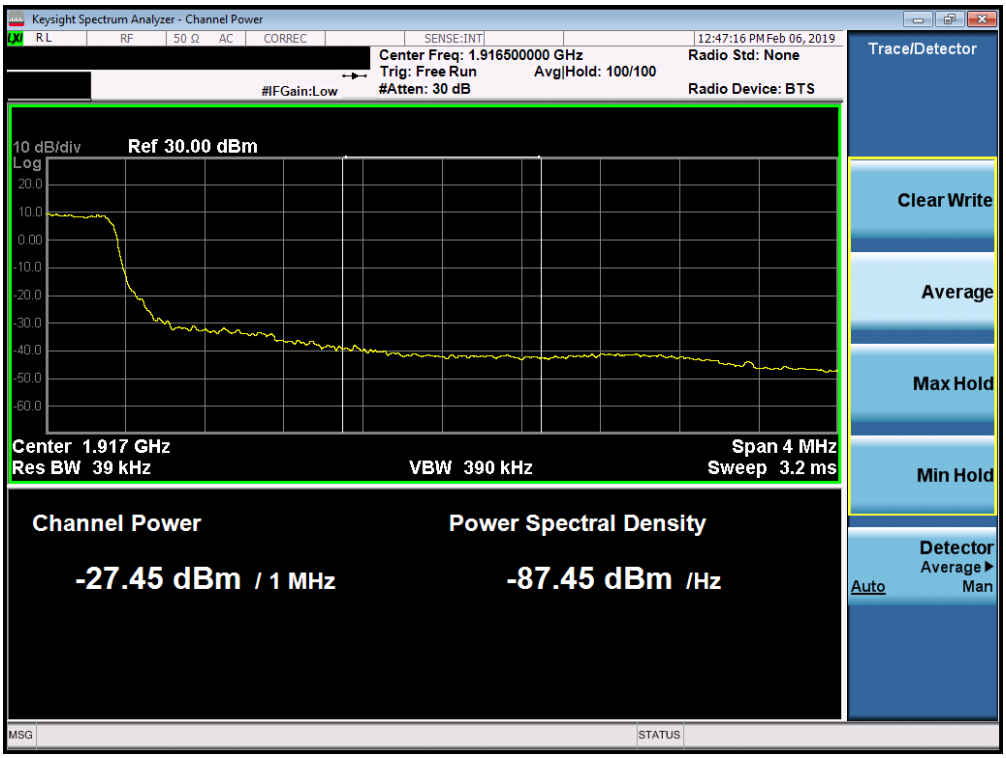


Plot 7-198. Upper Band Edge Plot (Band 25 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-199. Upper Extended Band Edge Plot (Band 25 - 1.4MHz QPSK - Full RB Configuration)

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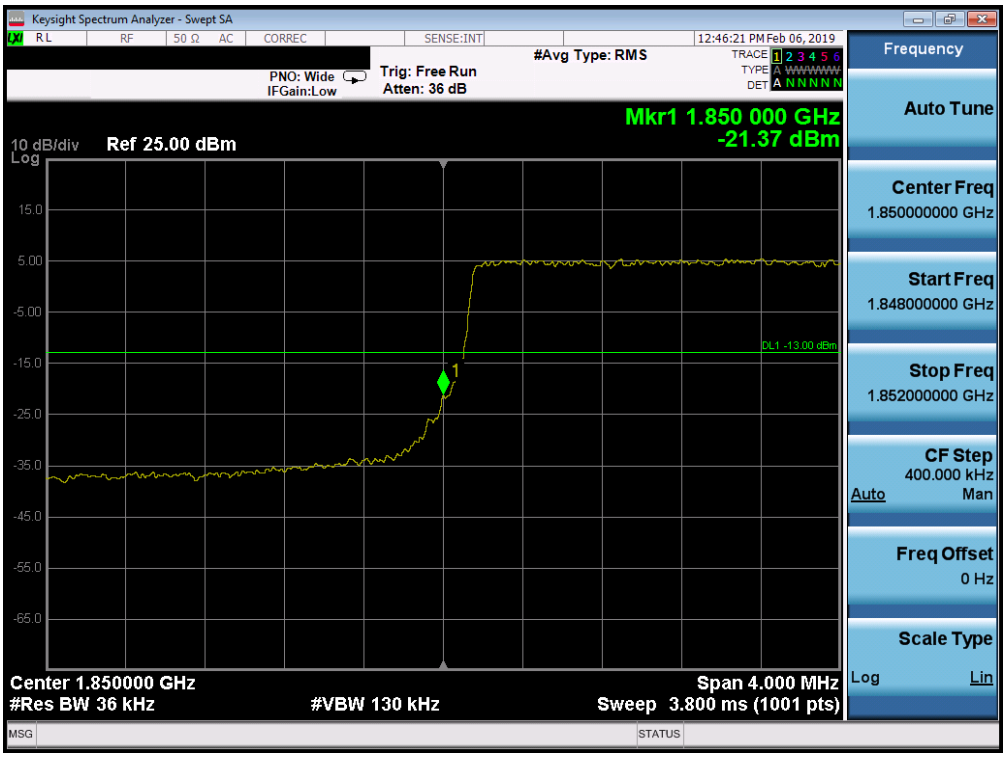
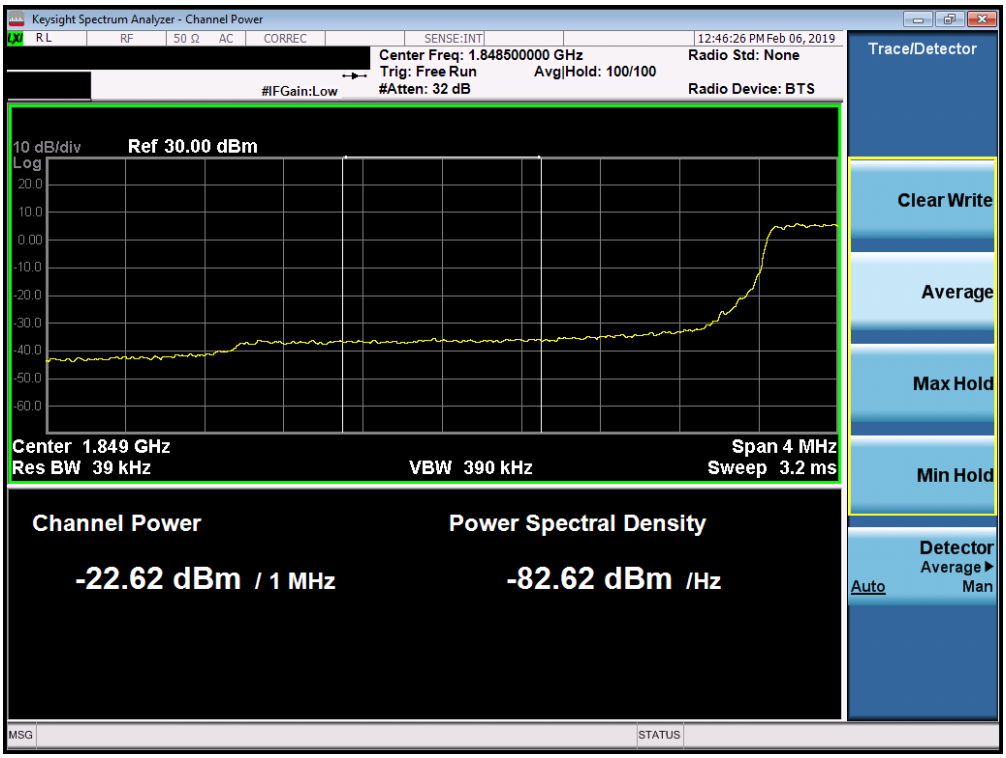


Plot 7-200. Lower Band Edge Plot (Band 25/2- 3.0MHz QPSK - Full RB Configuration)



Plot 7-201. Lower Extended Band Edge Plot (Band 25/2- 3.0MHz QPSK - Full RB Configuration)

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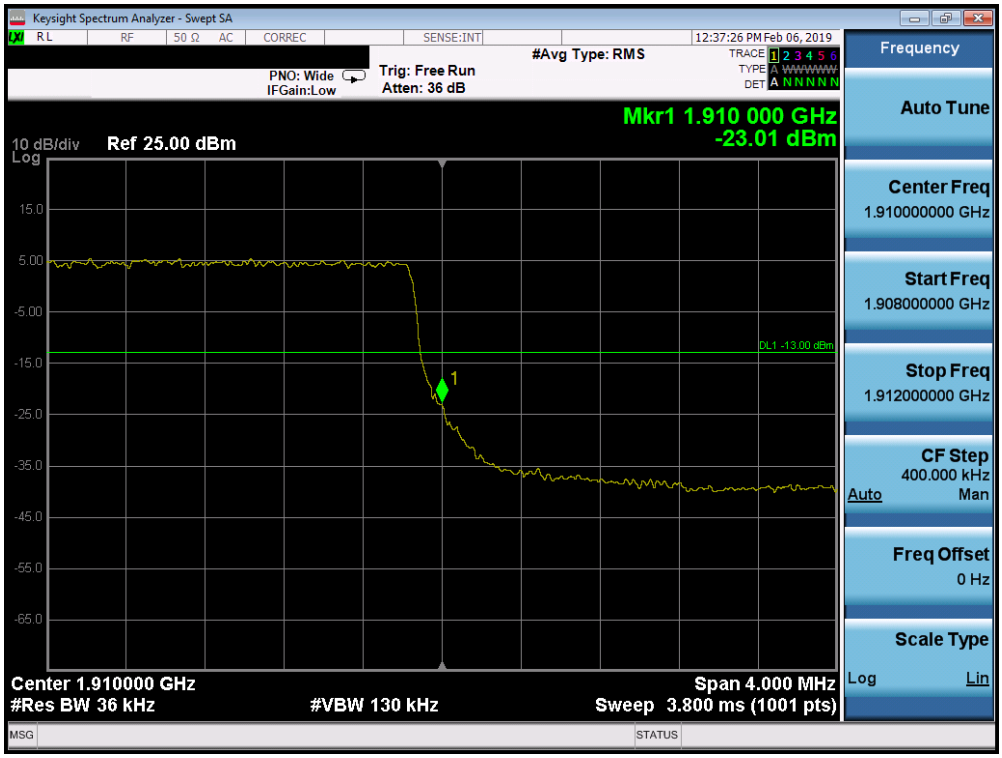
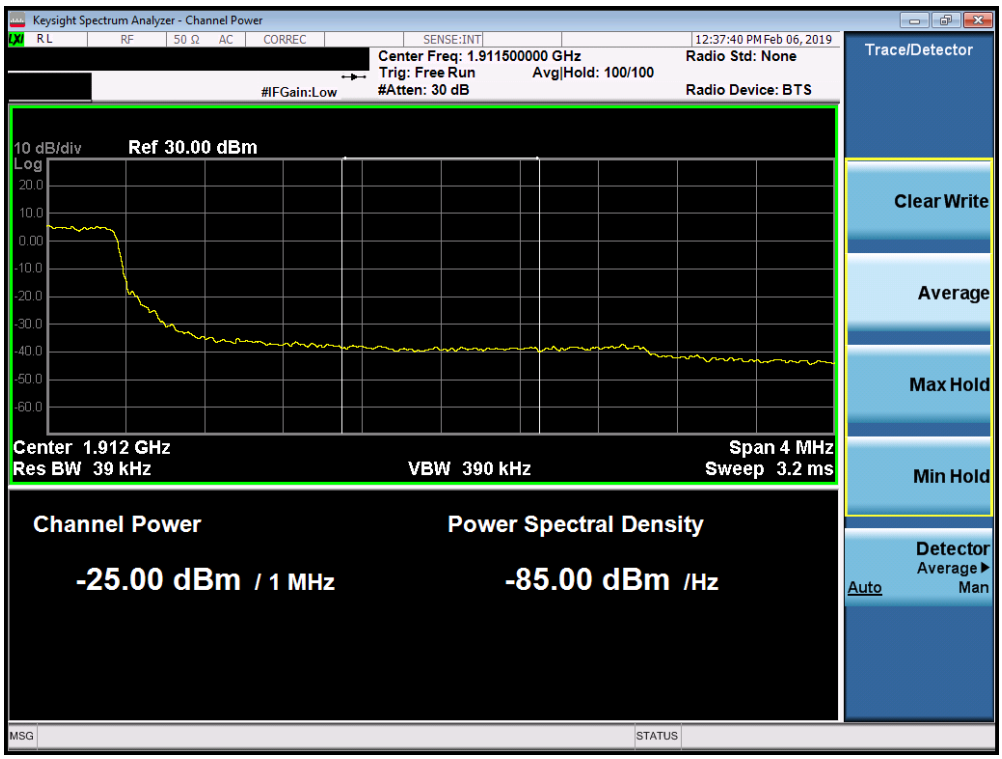


Plot 7-202. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK - Full RB Configuration)



Plot 7-203. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK - Full RB Configuration)

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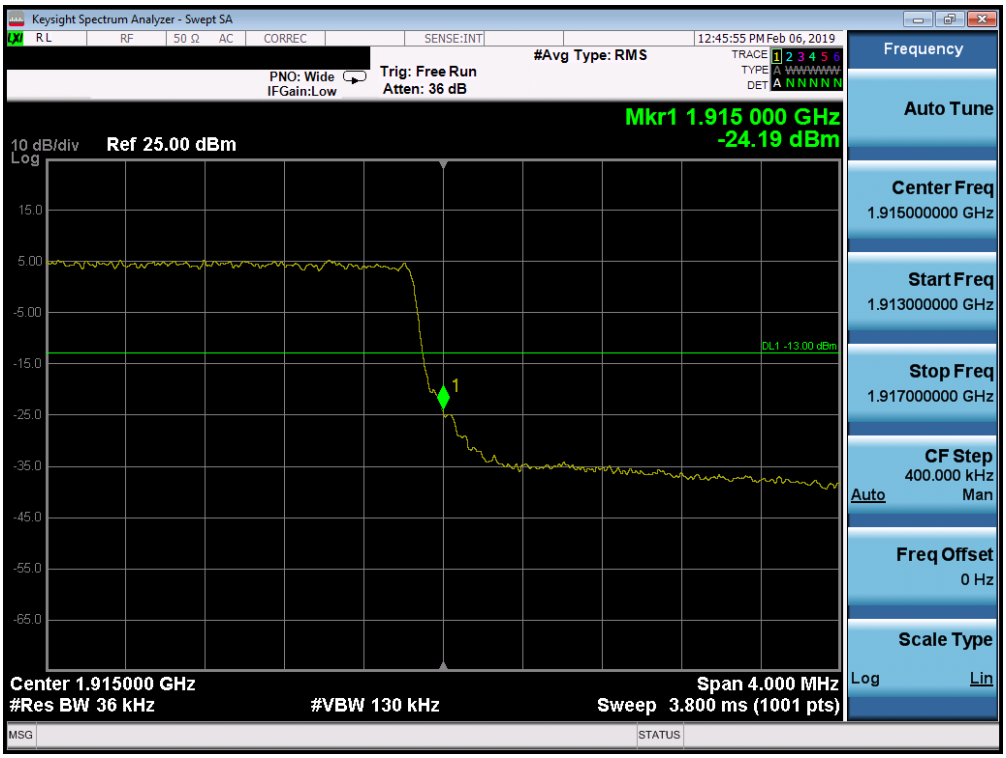
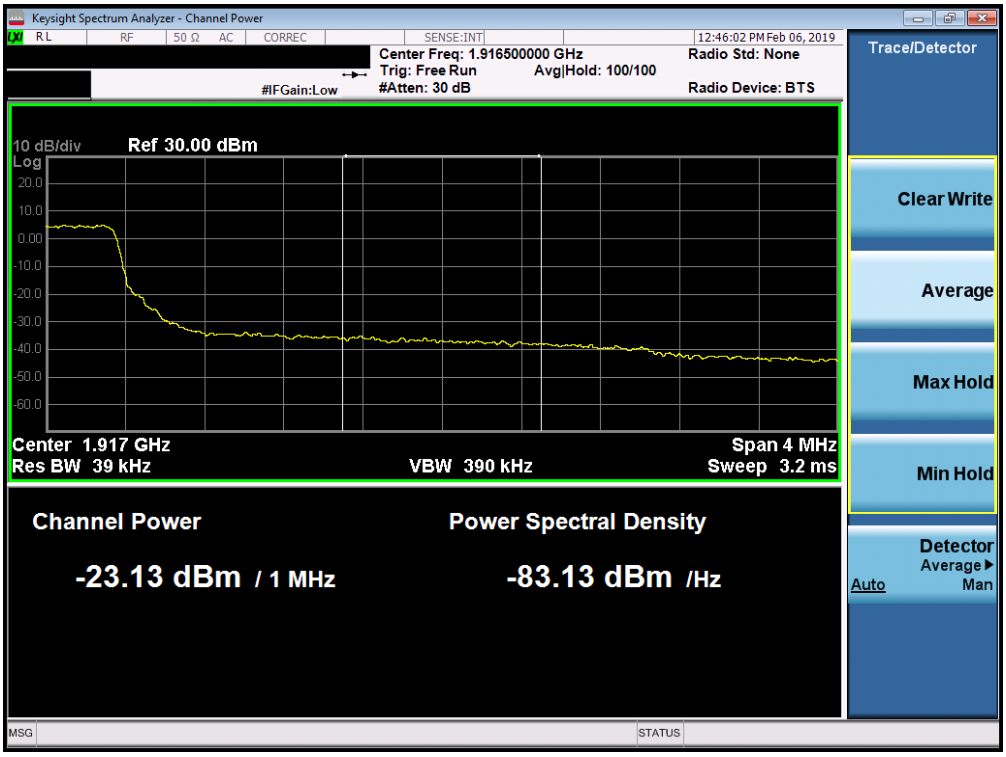


Plot 7-204. Upper Band Edge Plot (Band 25 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-205. Upper Extended Band Edge Plot (Band 25 - 3.0MHz QPSK - Full RB Configuration)

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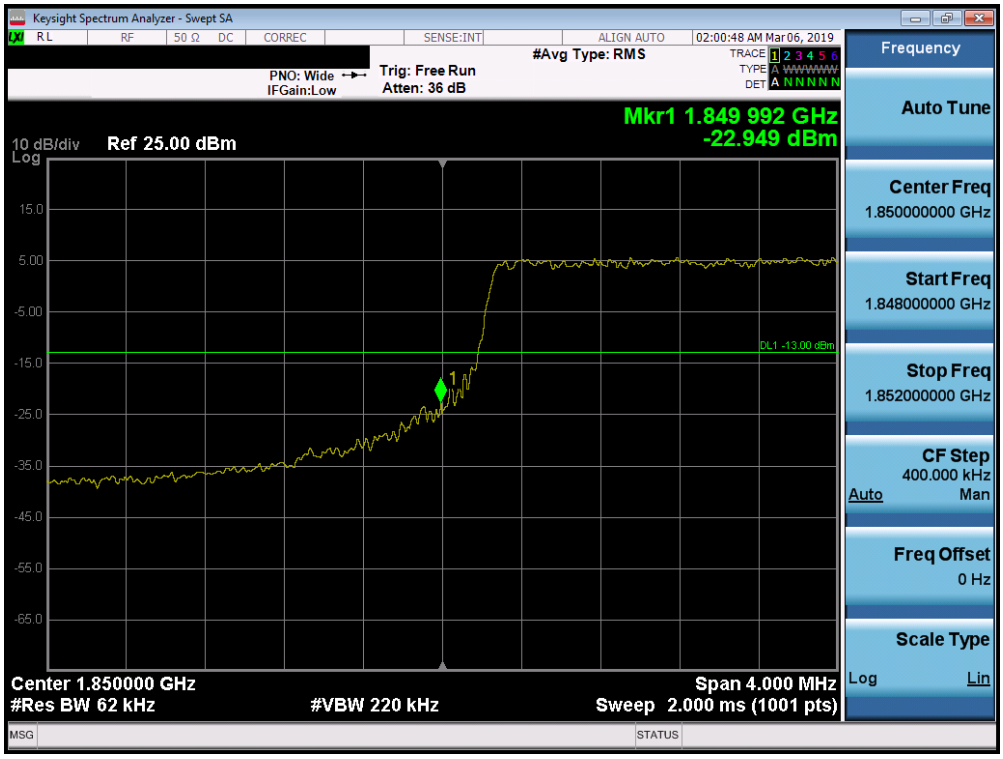
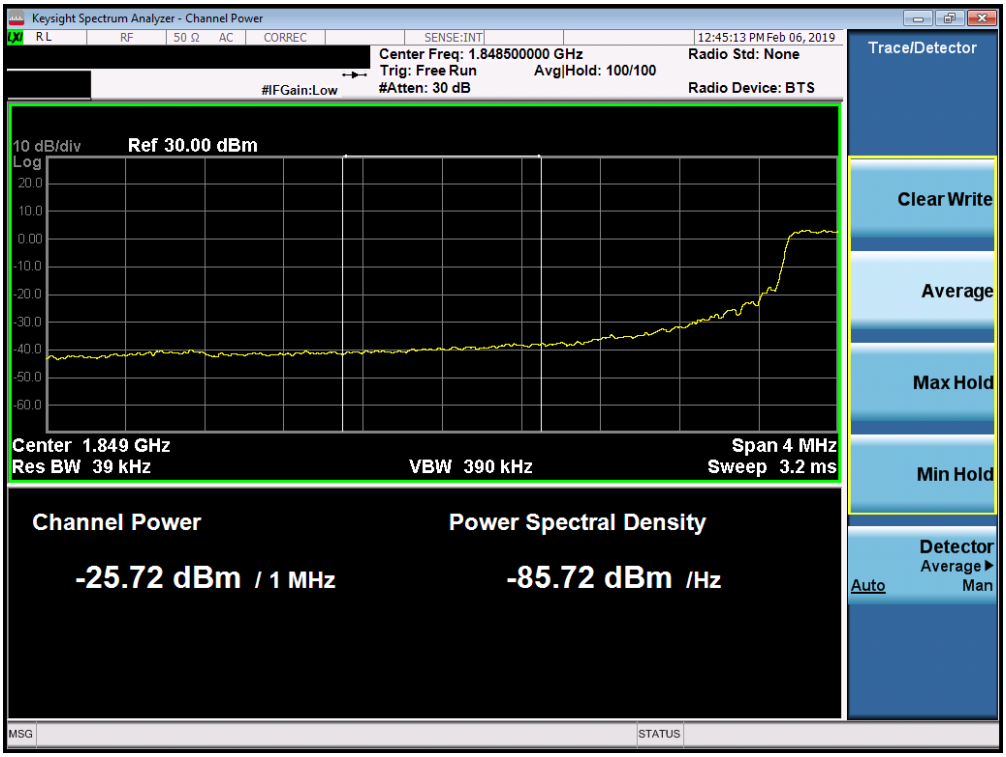


Plot 7-206. Lower Band Edge Plot (Band 25/2- 5.0MHz QPSK - Full RB Configuration)



Plot 7-207. Lower Extended Band Edge Plot (Band 25/2- 5.0MHz QPSK - Full RB Configuration)

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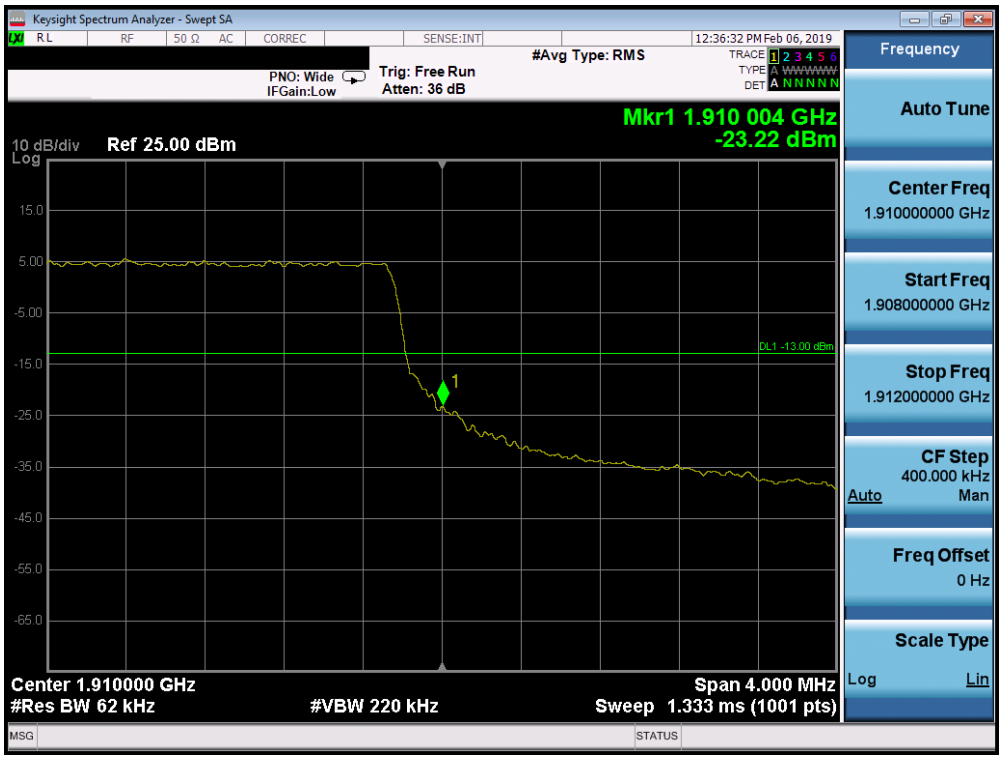
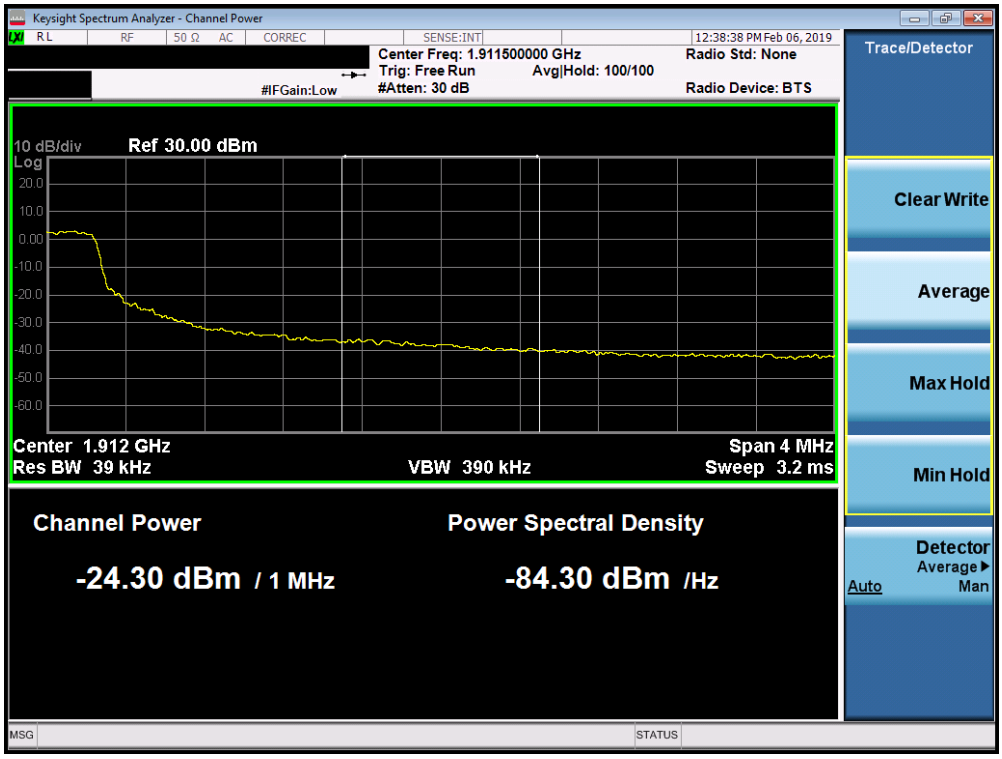


Plot 7-208. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK - Full RB Configuration)



Plot 7-209. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK - Full RB Configuration)

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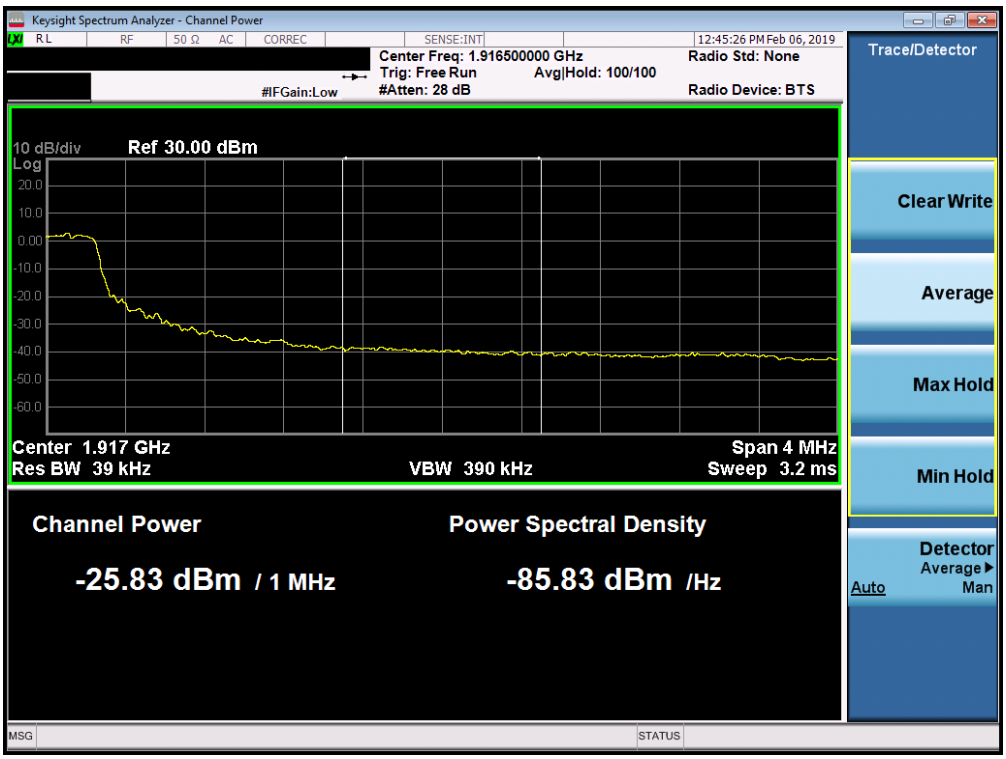
Plot 7-210. Upper Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-211. Upper Extended Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)

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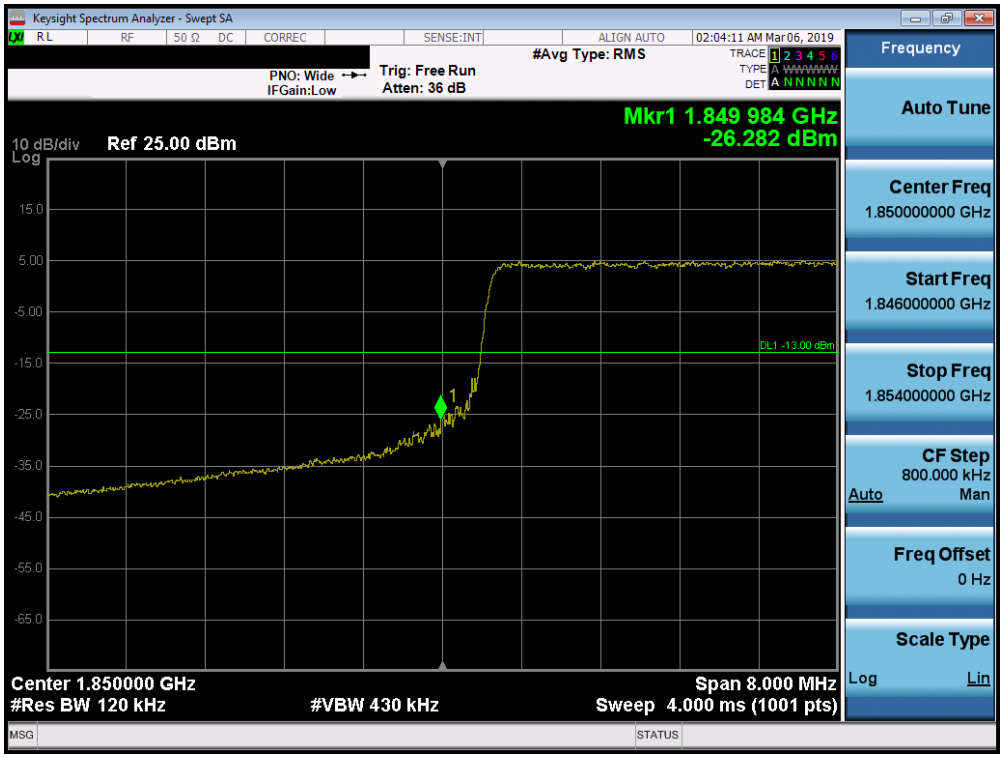
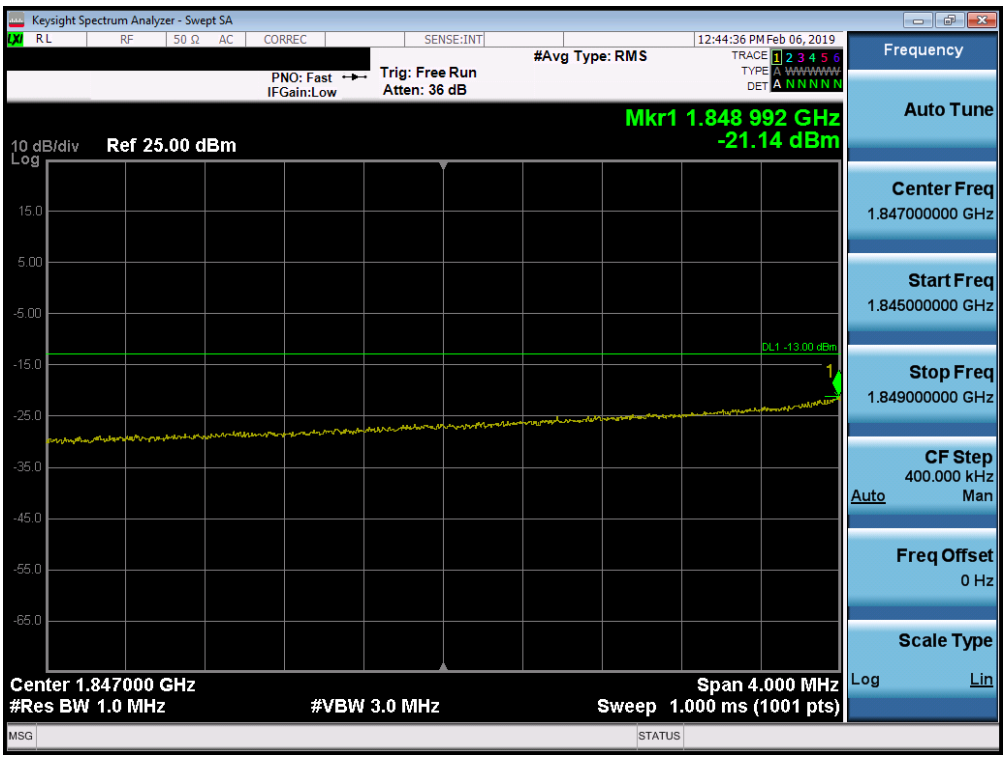


Plot 7-212. Lower Band Edge Plot (Band 25/2- 10.0MHz QPSK - Full RB Configuration)



Plot 7-213. Lower Extended Band Edge Plot (Band 25/2- 10.0MHz QPSK - Full RB Configuration)

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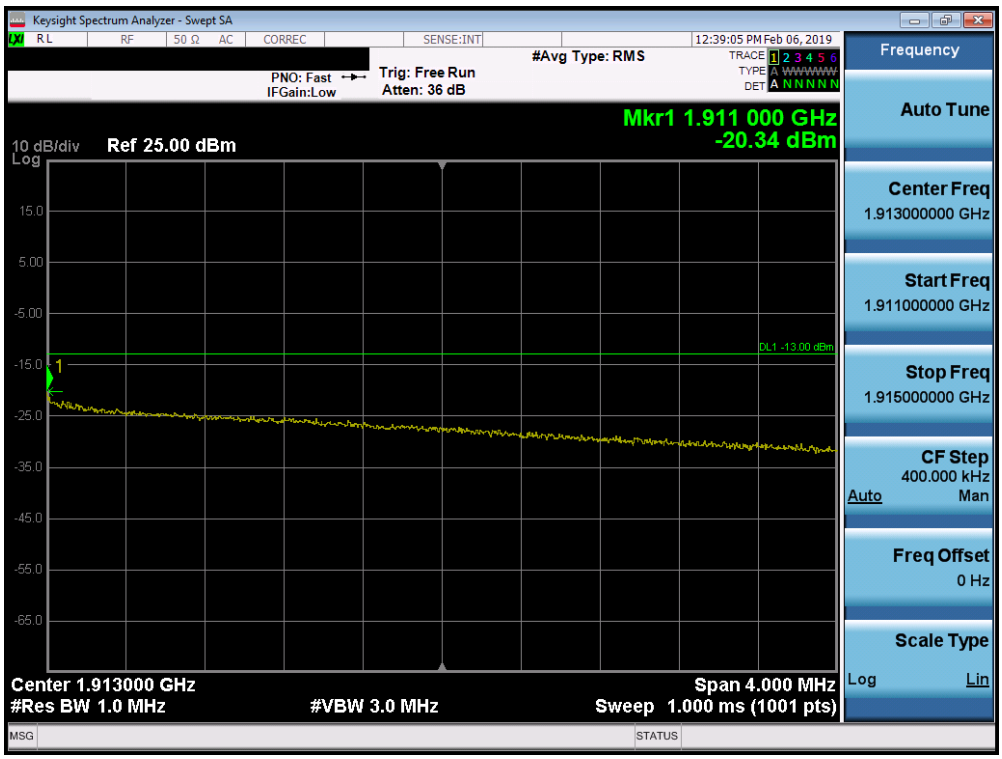
Plot 7-214. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-215. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

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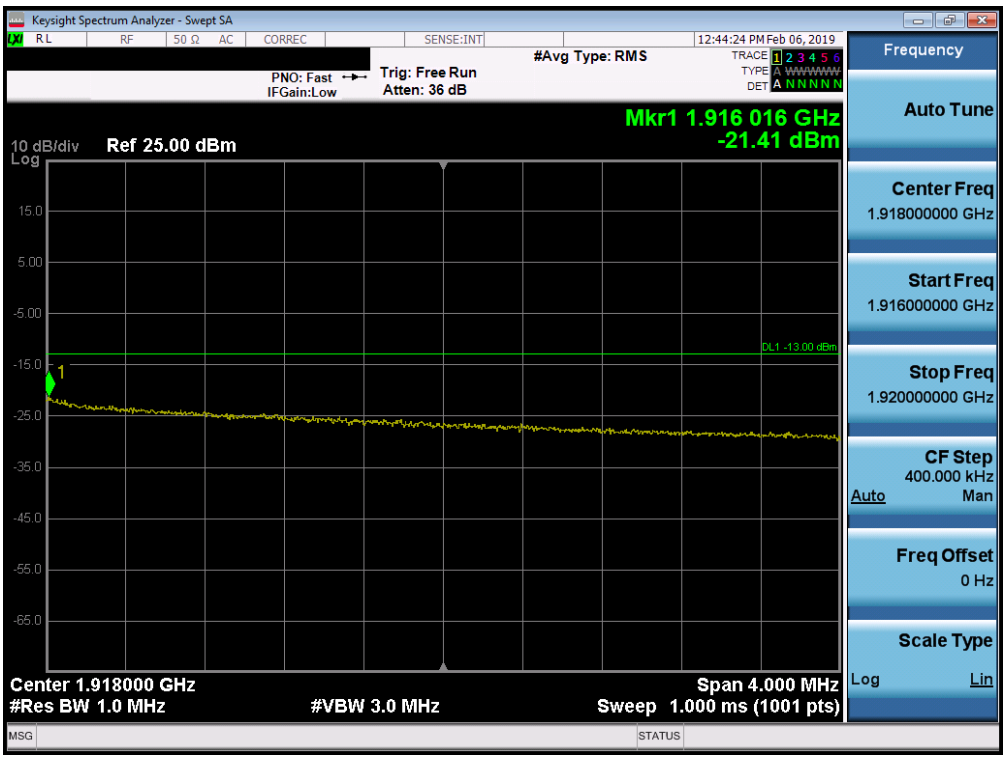
Plot 7-216. Upper Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-217. Upper Extended Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)

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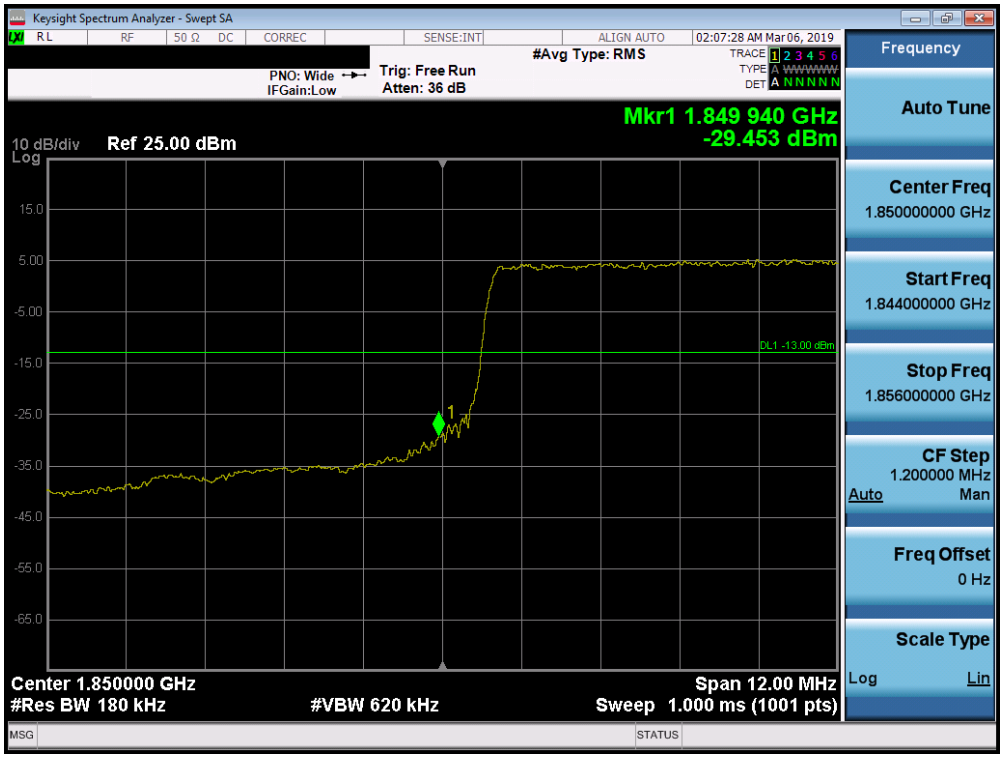
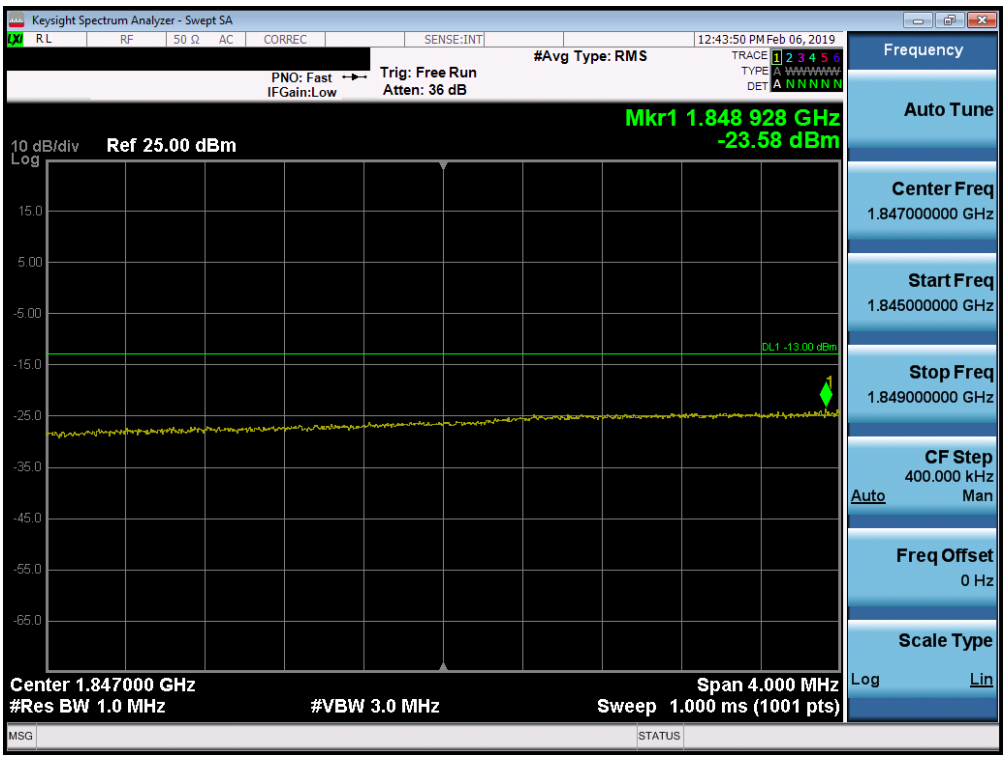


Plot 7-218. Lower Band Edge Plot (Band 25/2- 15.0MHz QPSK - Full RB Configuration)



Plot 7-219. Lower Extended Band Edge Plot (Band 25/2- 15.0MHz QPSK - Full RB Configuration)

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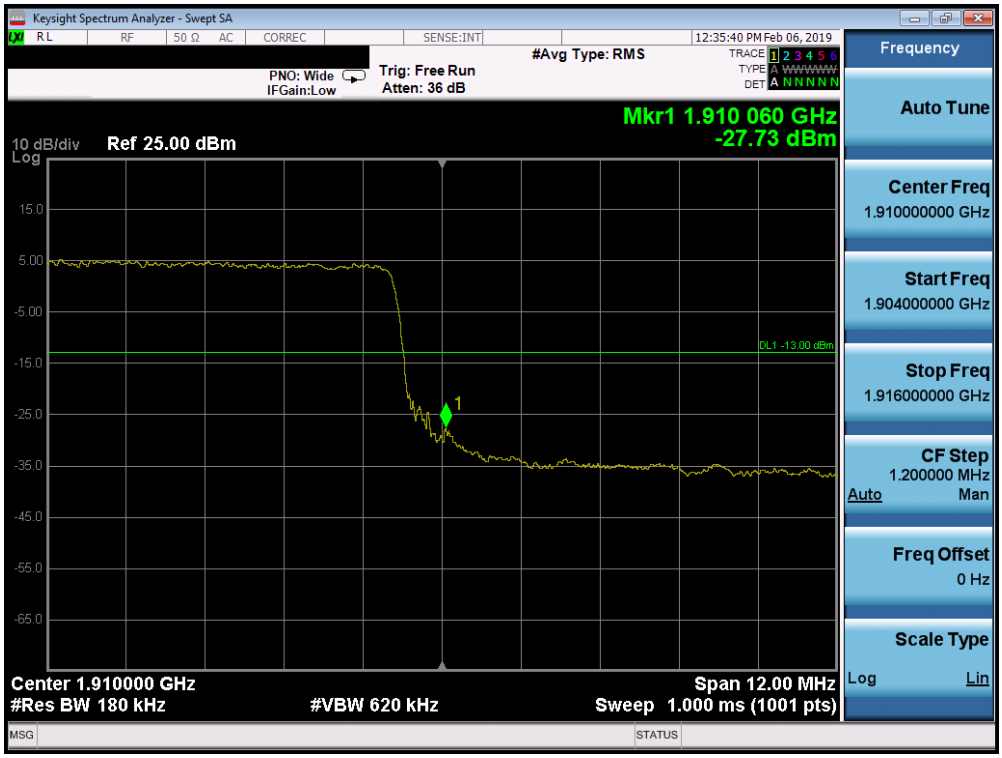
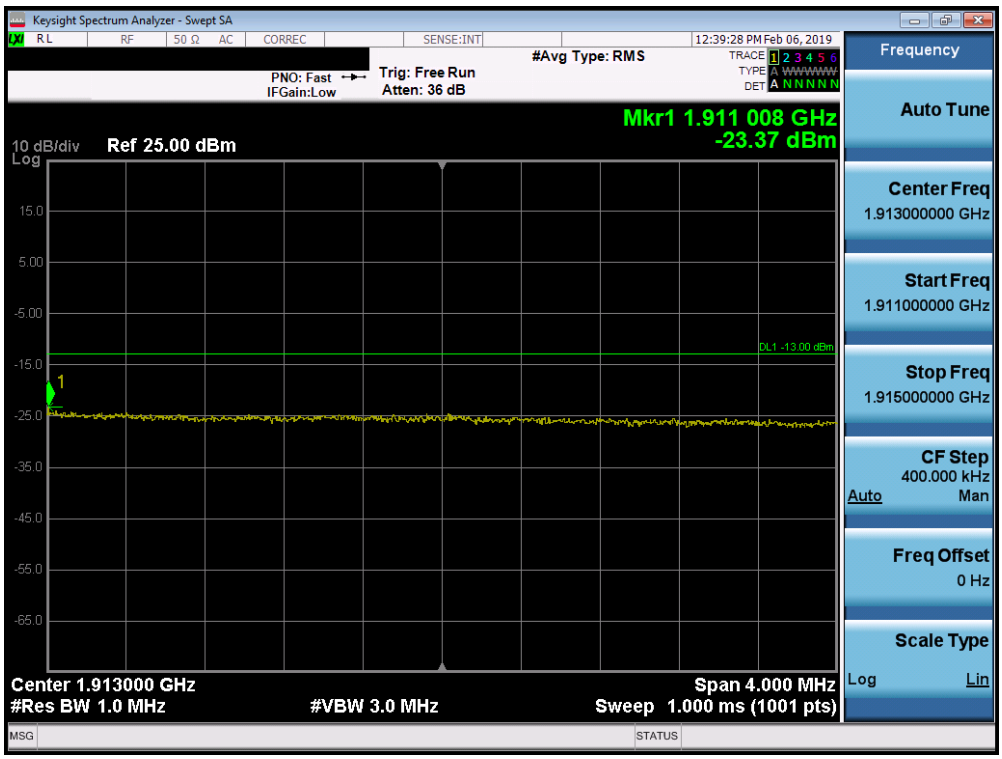


Plot 7-220. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-221. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

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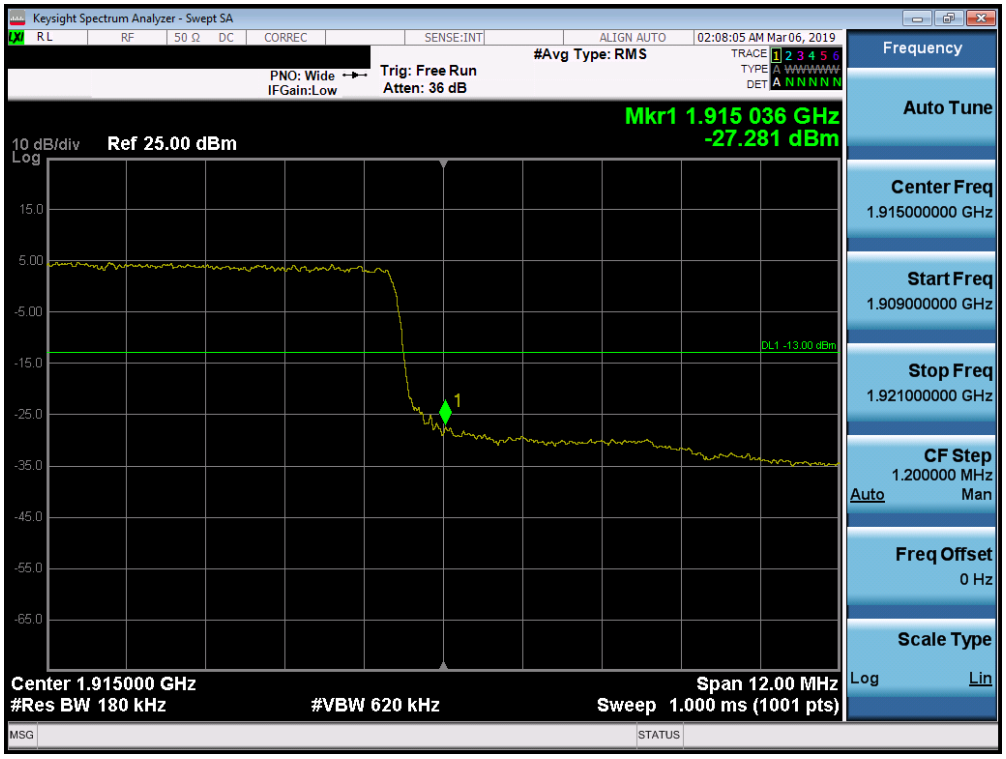

Plot 7-222. Upper Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)

Plot 7-223. Upper Extended Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)

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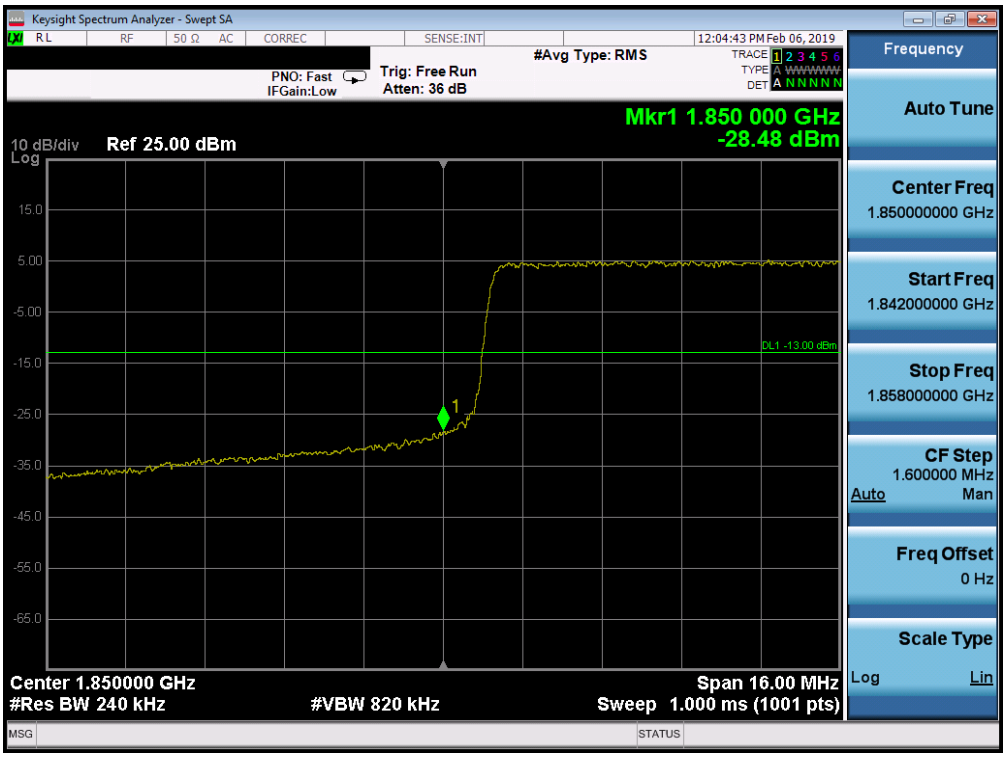
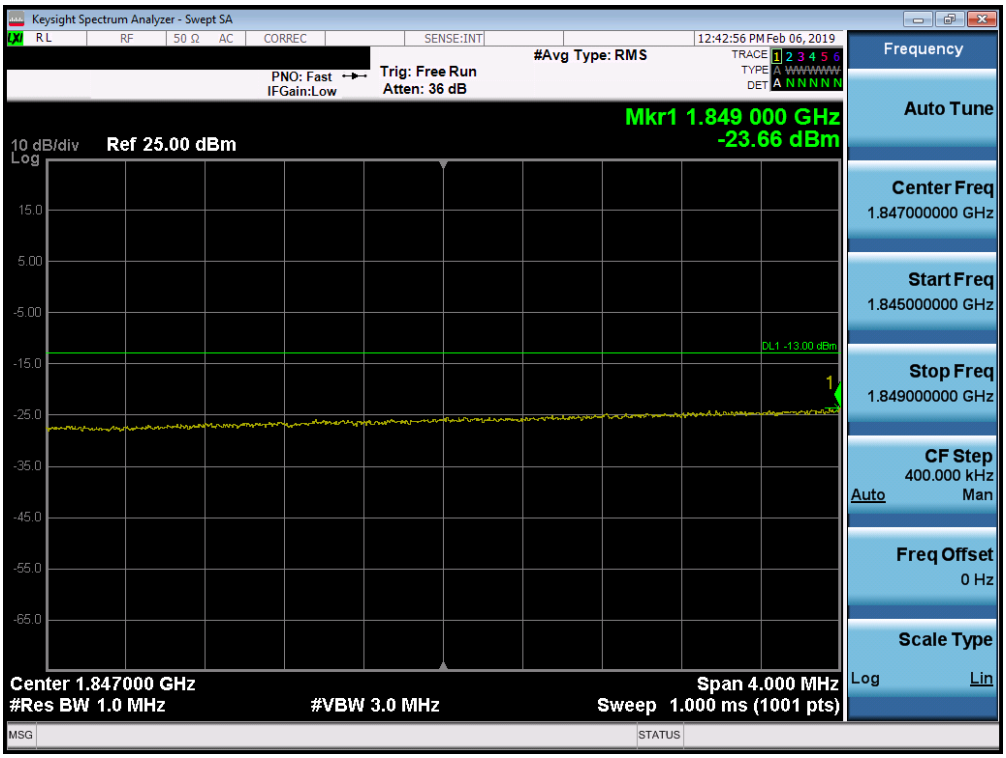


Plot 7-224. Lower Band Edge Plot (Band 25/2- 20.0MHz QPSK - Full RB Configuration)



Plot 7-225. Lower Extended Band Edge Plot (Band 25/2- 20.0MHz QPSK - Full RB Configuration)

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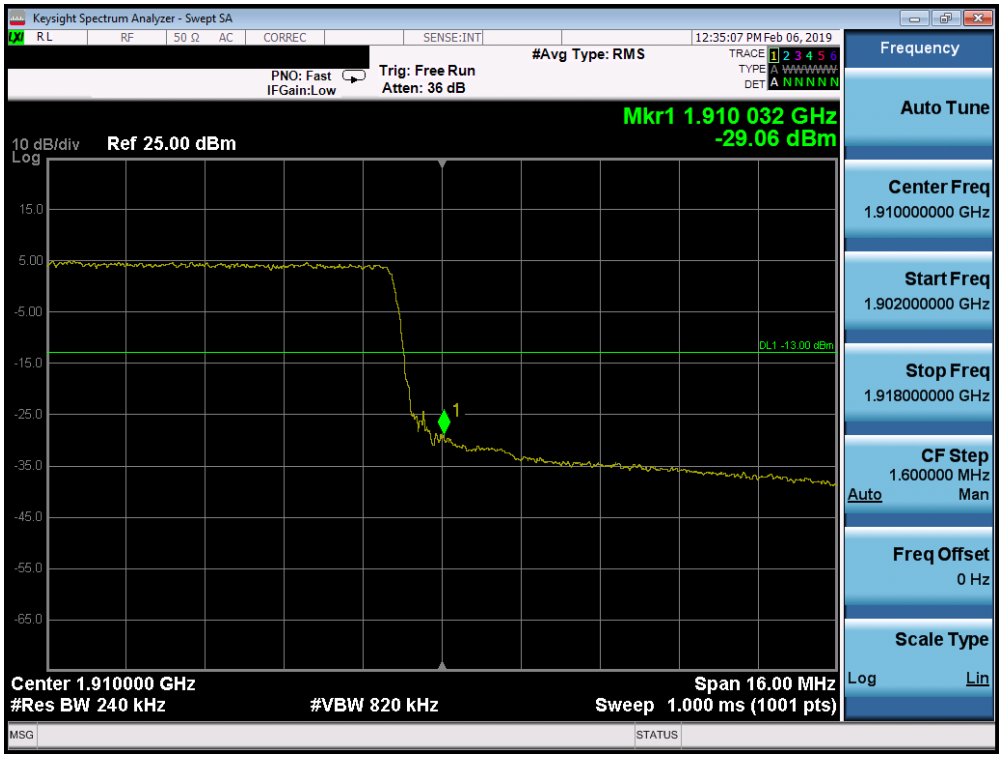
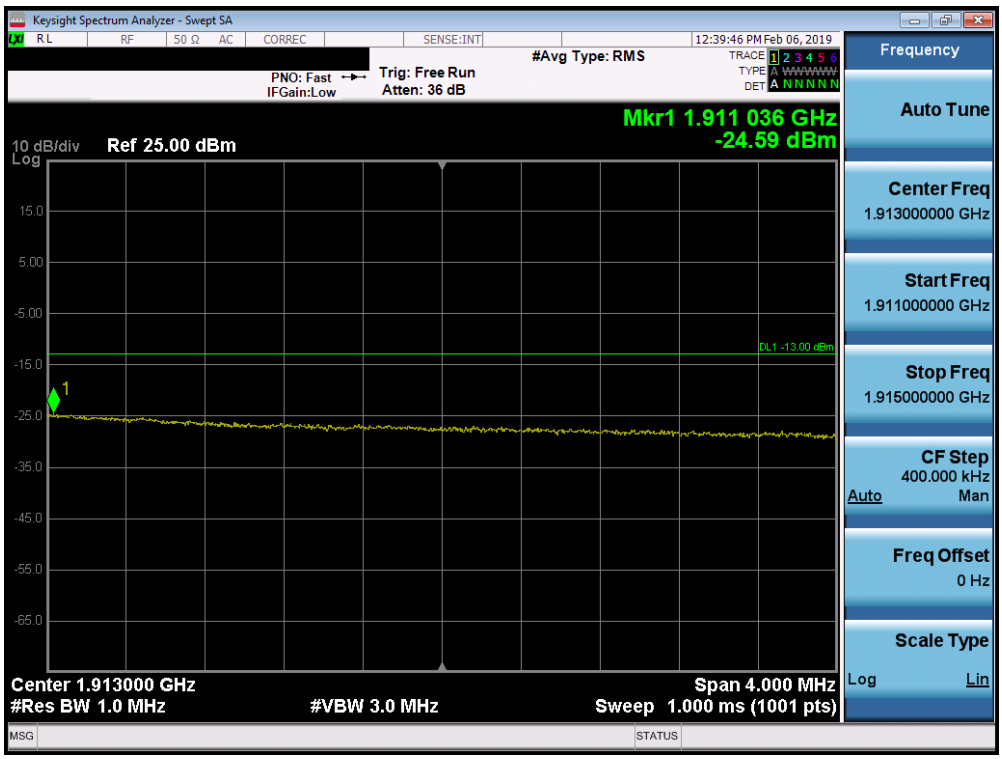


Plot 7-226. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-227. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK - Full RB Configuration)

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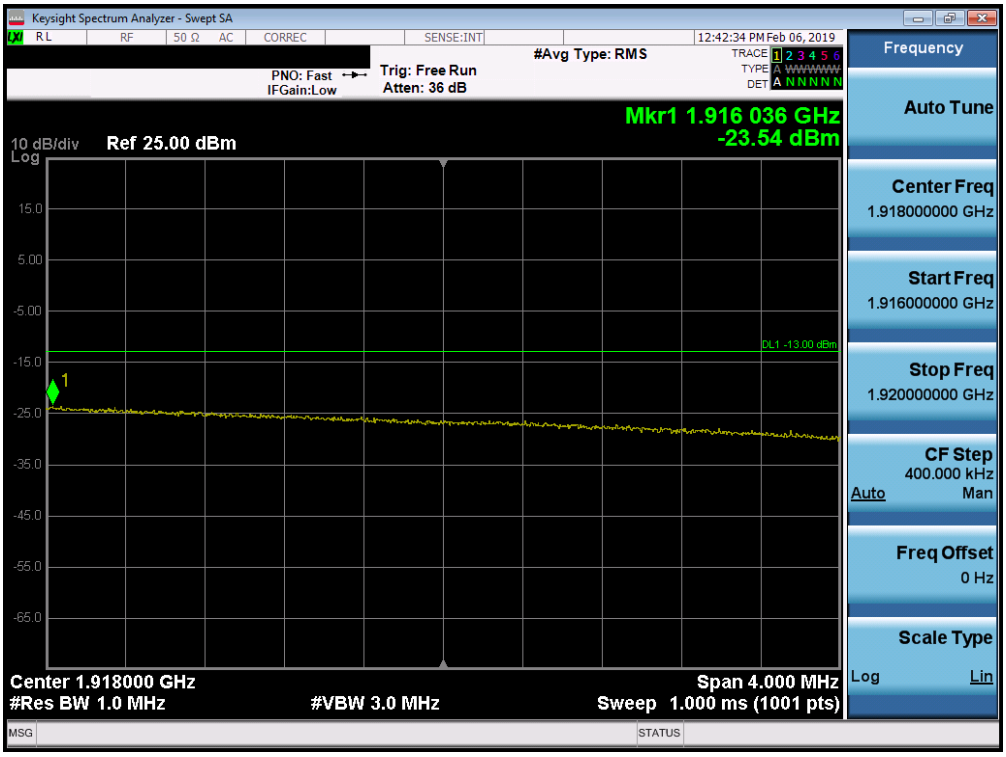
Plot 7-228. Upper Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-229. Upper Extended Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)

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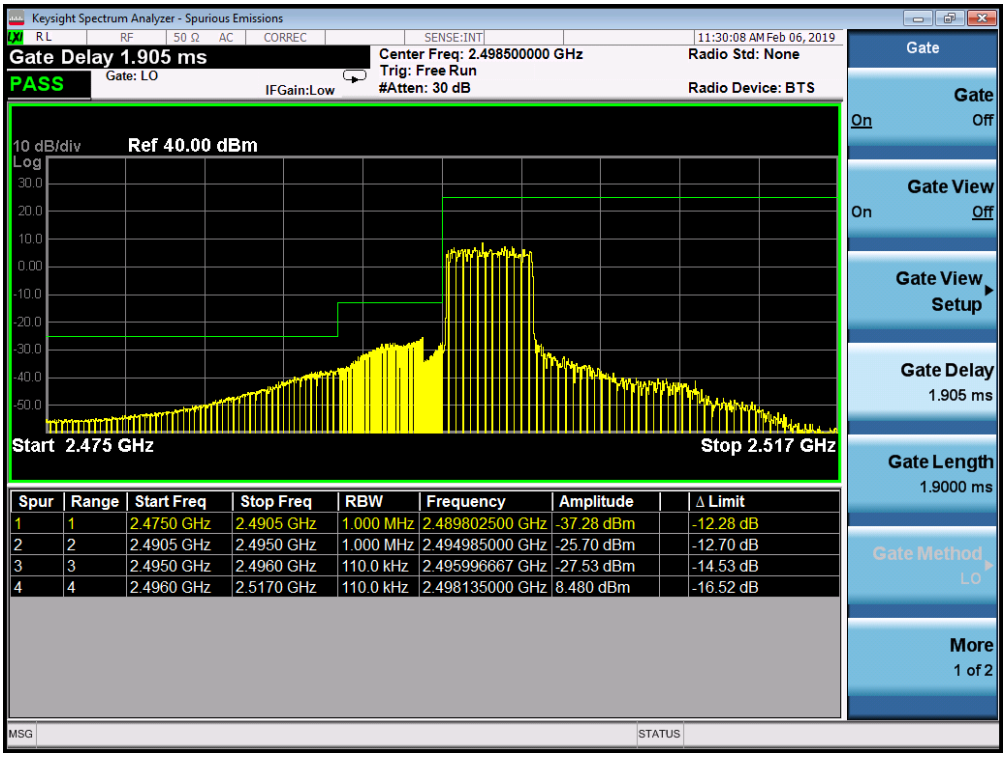
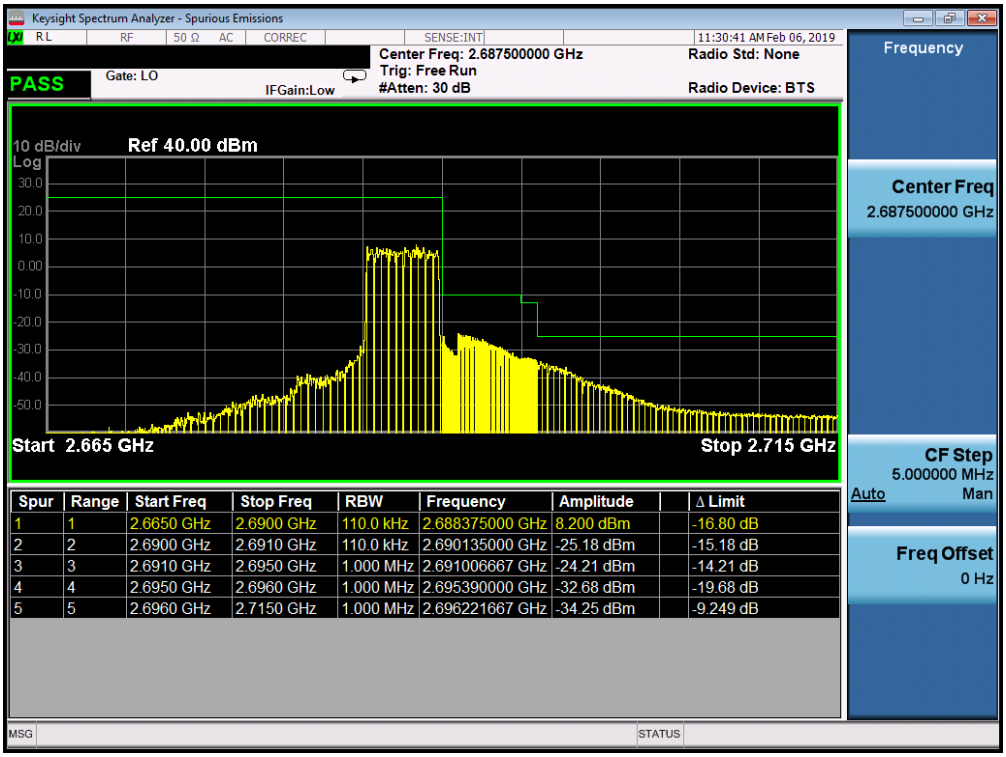
Band 41



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489802500 GHz	-37.28 dBm	-12.28 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494985000 GHz	-25.70 dBm	-12.70 dB
3	3	2.4950 GHz	2.4960 GHz	110.0 kHz	2.495996667 GHz	-27.53 dBm	-14.53 dB
4	4	2.4960 GHz	2.5170 GHz	110.0 kHz	2.498135000 GHz	8.480 dBm	-16.52 dB

Plot 7-230. Lower ACP Plot at 2496 MHz (Band 41 - 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	110.0 kHz	2.688375000 GHz	8.200 dBm	-16.80 dB
2	2	2.6900 GHz	2.6910 GHz	110.0 kHz	2.690135000 GHz	-25.18 dBm	-15.18 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691006667 GHz	-24.21 dBm	-14.21 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695390000 GHz	-32.68 dBm	-19.68 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696221667 GHz	-34.25 dBm	-9.249 dB

Plot 7-231. Upper ACP Plot (Band 41 - 5.0MHz QPSK - Full RB Configuration)

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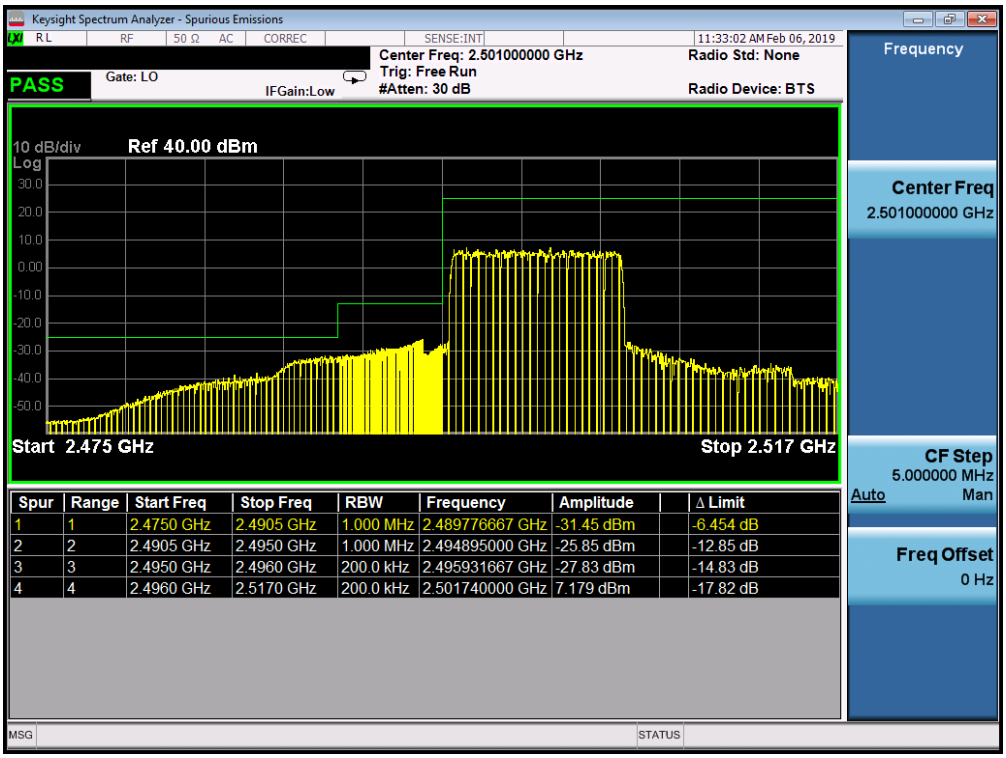
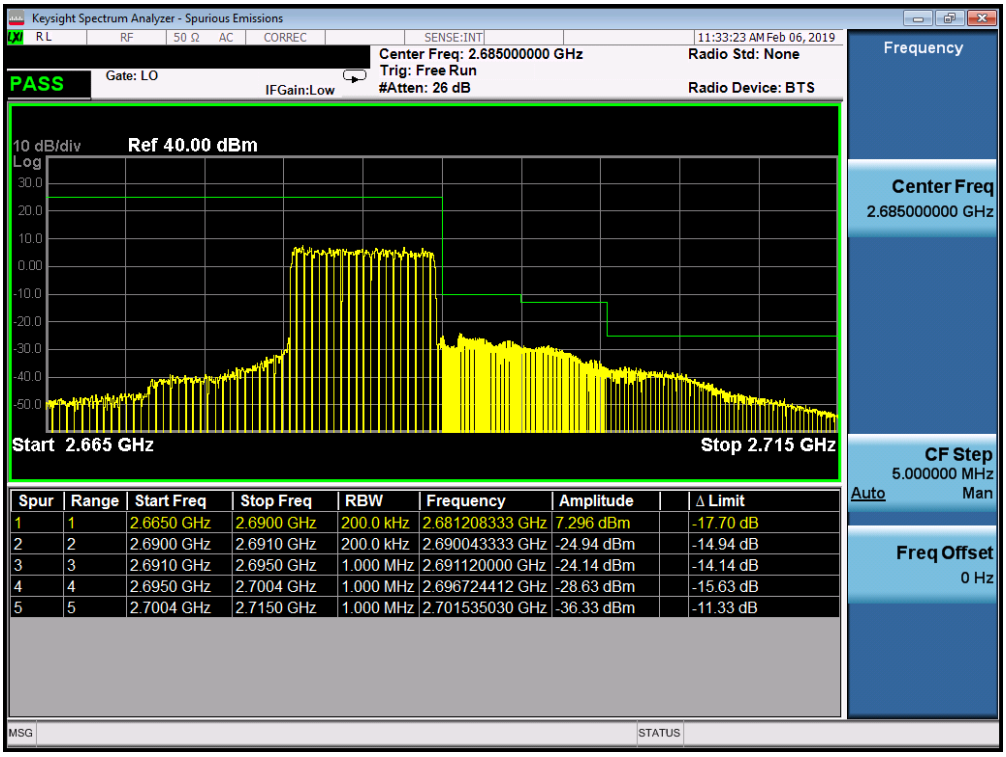


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489776667 GHz	-31.45 dBm	-6.454 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494895000 GHz	-25.85 dBm	-12.85 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495931667 GHz	-27.83 dBm	-14.83 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.501740000 GHz	7.179 dBm	-17.82 dB

Plot 7-232. 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	2.681208333 GHz	7.296 dBm	-17.70 dB
2	2	2.6900 GHz	2.6910 GHz	200.0 kHz	2.690043333 GHz	-24.94 dBm	-14.94 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691120000 GHz	-24.14 dBm	-14.14 dB
4	4	2.6950 GHz	2.7004 GHz	1.000 MHz	2.696724412 GHz	-28.63 dBm	-15.63 dB
5	5	2.7004 GHz	2.7150 GHz	1.000 MHz	2.701535030 GHz	-36.33 dBm	-11.33 dB

Plot 7-233. Upper ACP Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)

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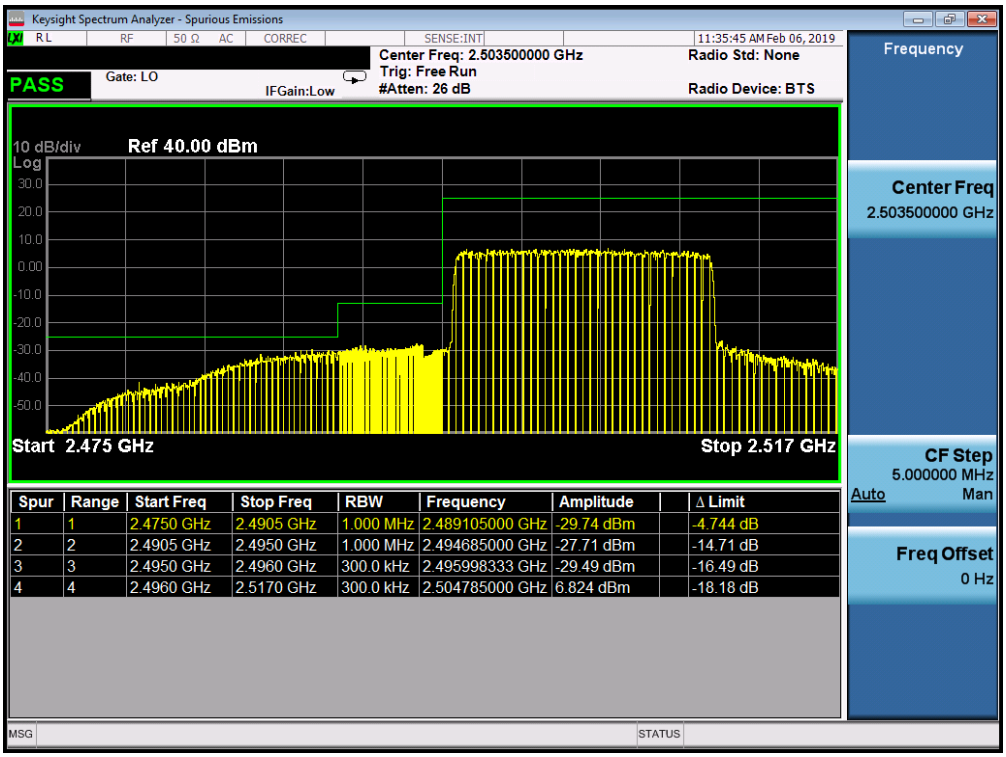
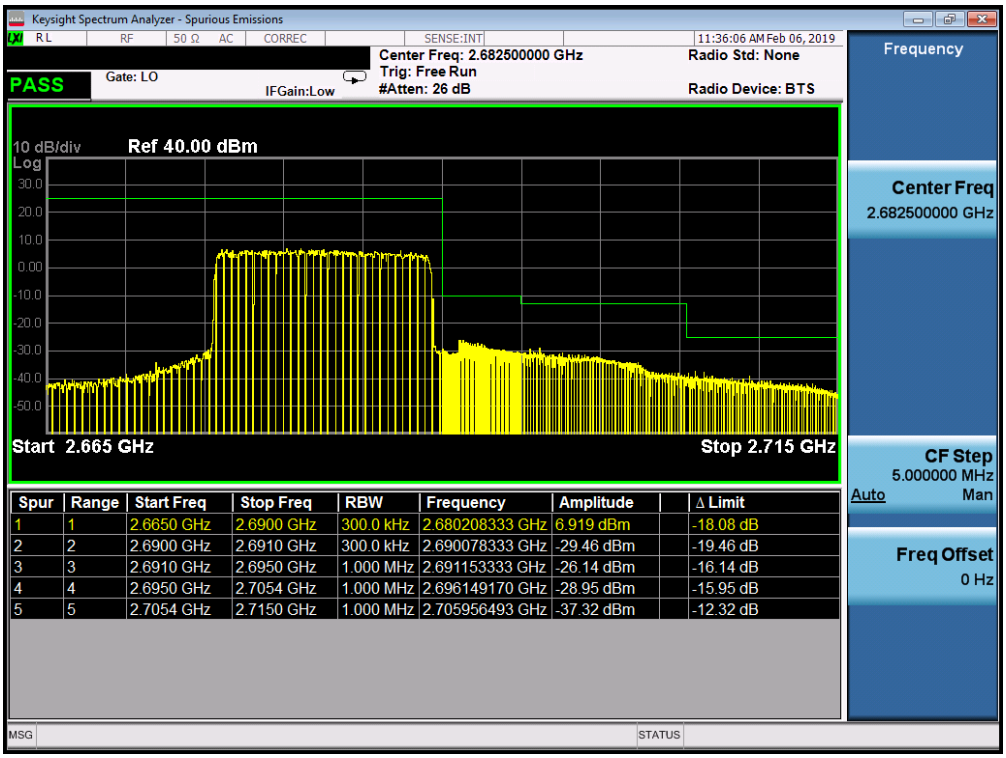


Plot 7-234. Lower ACP Plot at 2496 MHz (Band 41 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-235. Upper ACP Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)

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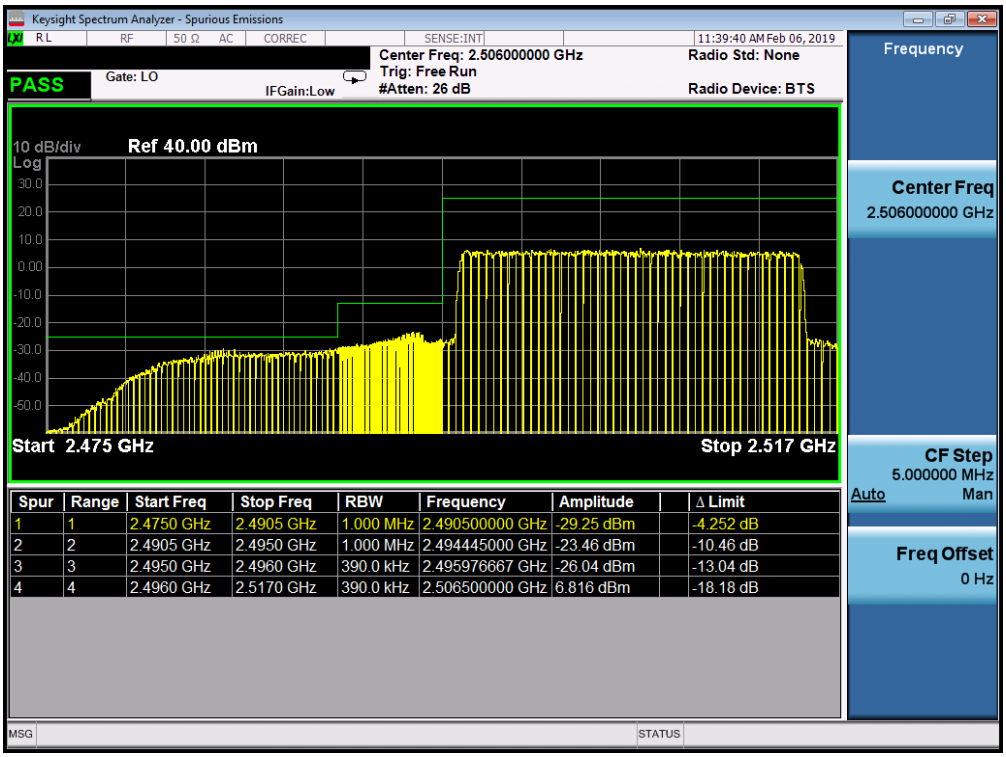
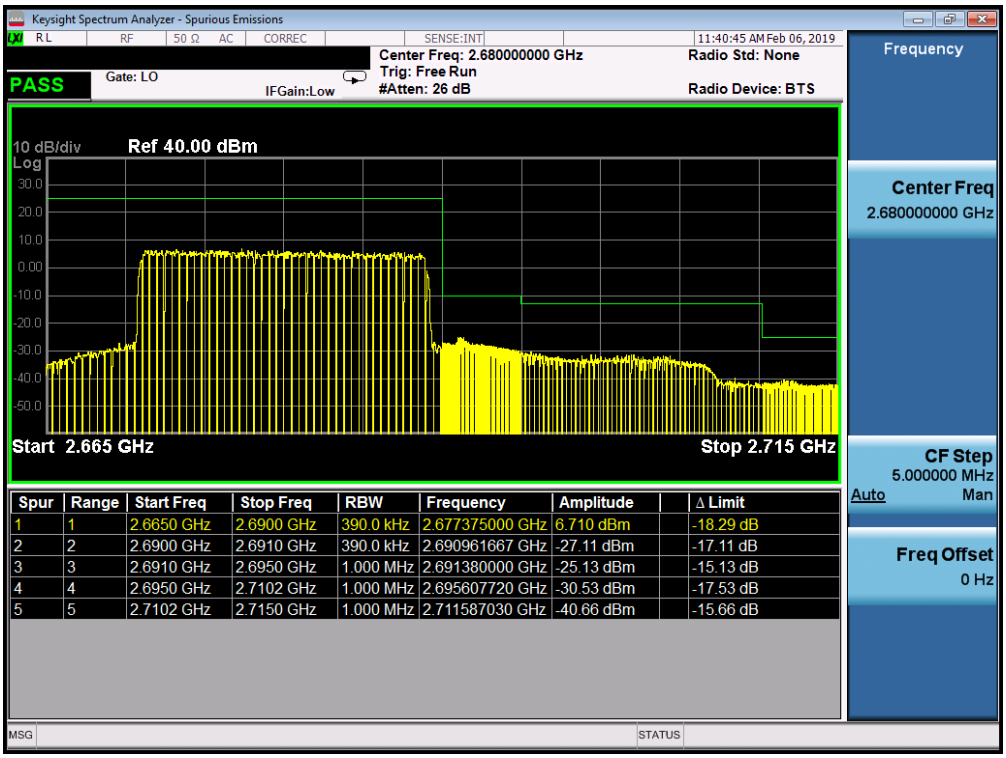


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-29.25 dBm	-4.252 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494445000 GHz	-23.46 dBm	-10.46 dB
3	3	2.4950 GHz	2.4960 GHz	390.0 kHz	2.495976667 GHz	-26.04 dBm	-13.04 dB
4	4	2.4960 GHz	2.5170 GHz	390.0 kHz	2.506500000 GHz	6.816 dBm	-18.18 dB

Plot 7-236. Lower ACP Plot at 2496 MHz (Band 41 - 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	2.677375000 GHz	6.710 dBm	-18.29 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690961667 GHz	-27.11 dBm	-17.11 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691380000 GHz	-25.13 dBm	-15.13 dB
4	4	2.6950 GHz	2.7102 GHz	1.000 MHz	2.695607720 GHz	-30.53 dBm	-17.53 dB
5	5	2.7102 GHz	2.7150 GHz	1.000 MHz	2.711587030 GHz	-40.66 dBm	-15.66 dB

Plot 7-237. Upper ACP Plot (Band 41 - 20.0MHz QPSK - Full RB Configuration)

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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.

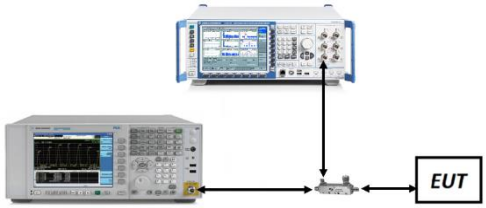

Figure 7-4. Test Instrument & Measurement Setup

Test Notes

None.

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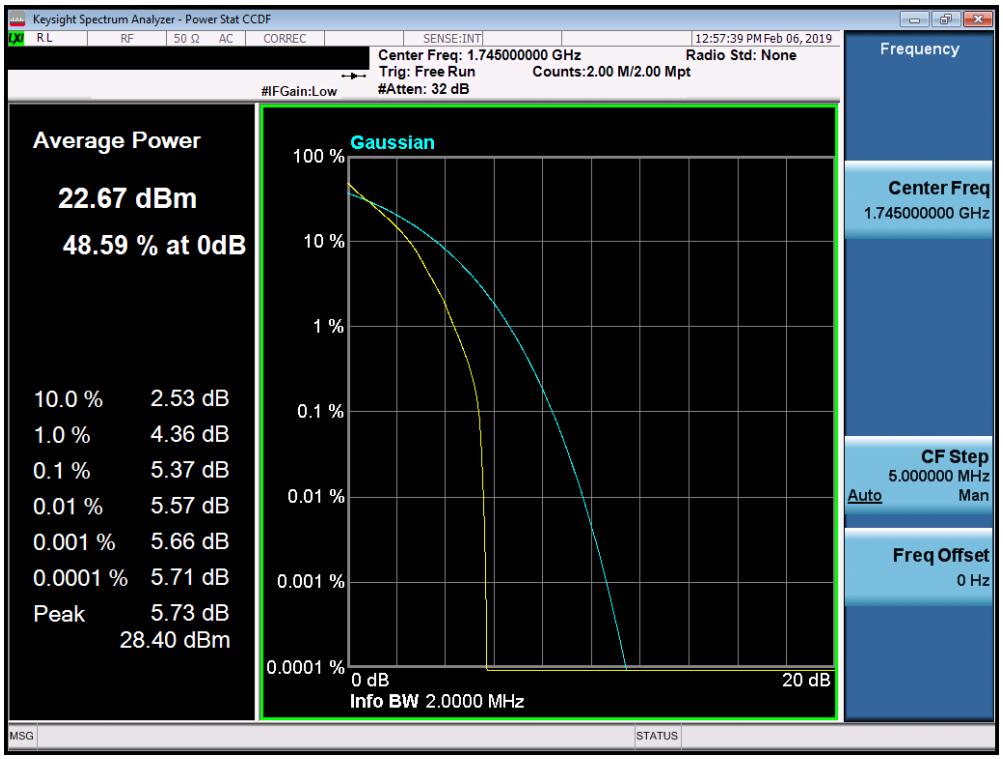
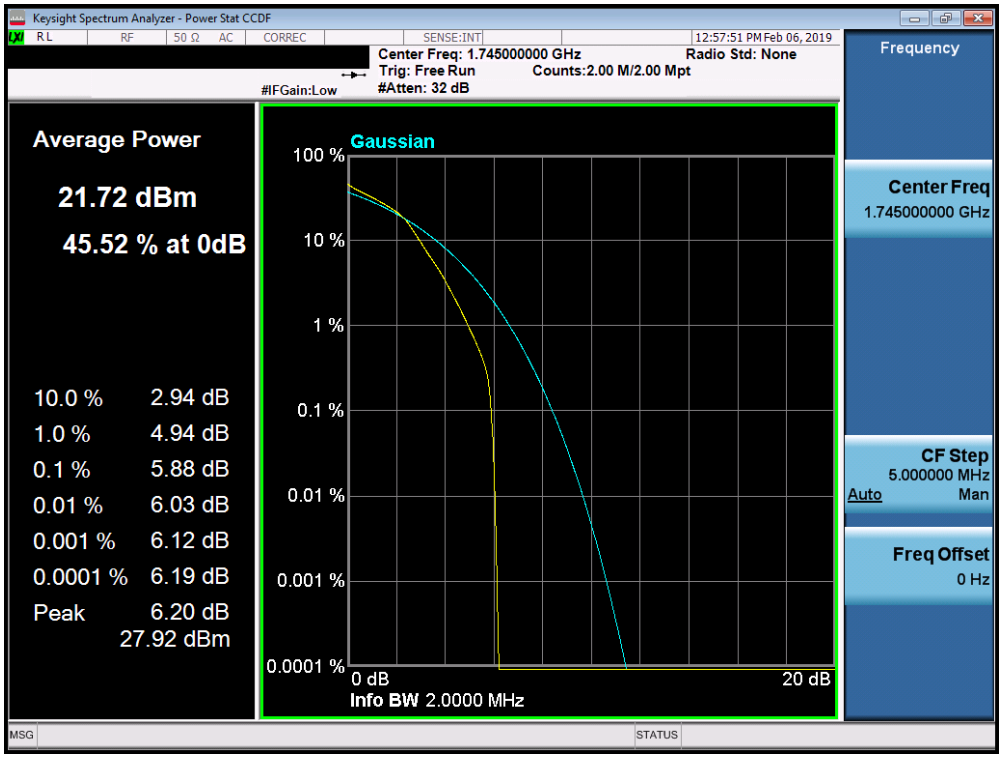
Band 66/4



Plot 7-238. PAR Plot (Band 66/4 – 1.4MHz QPSK - Full RB Configuration)



Plot 7-239. PAR Plot (Band 66/4 – 1.4MHz 16-QAM - Full RB Configuration)

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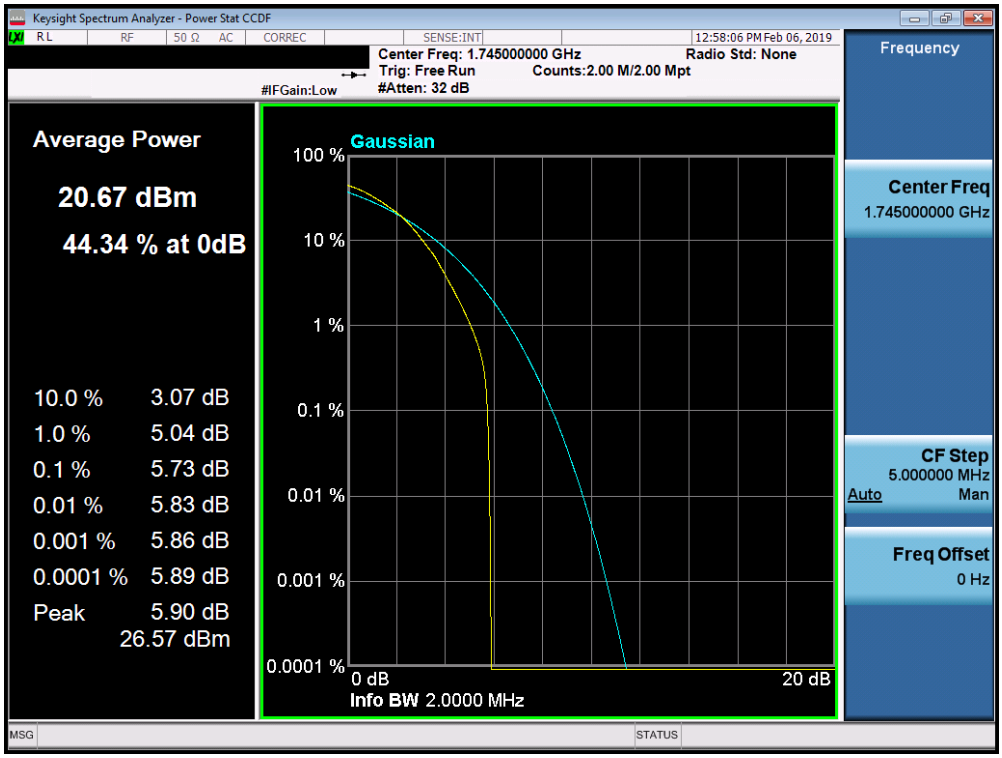
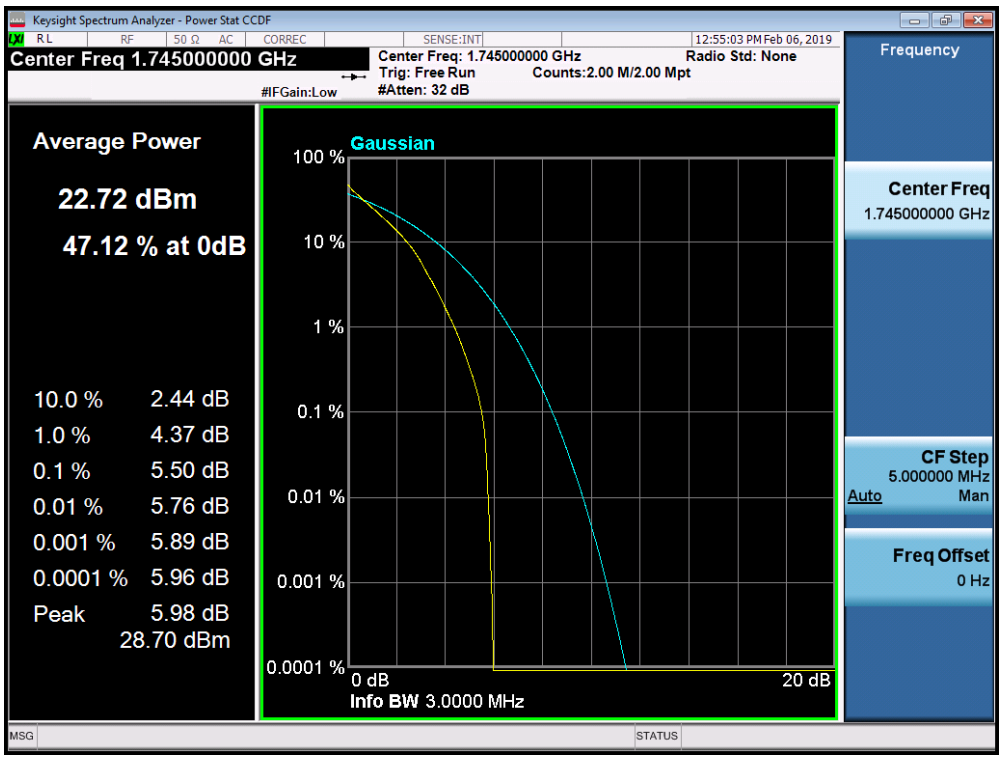


Plot 7-240. PAR Plot (Band 66/4 – 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-241. PAR Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

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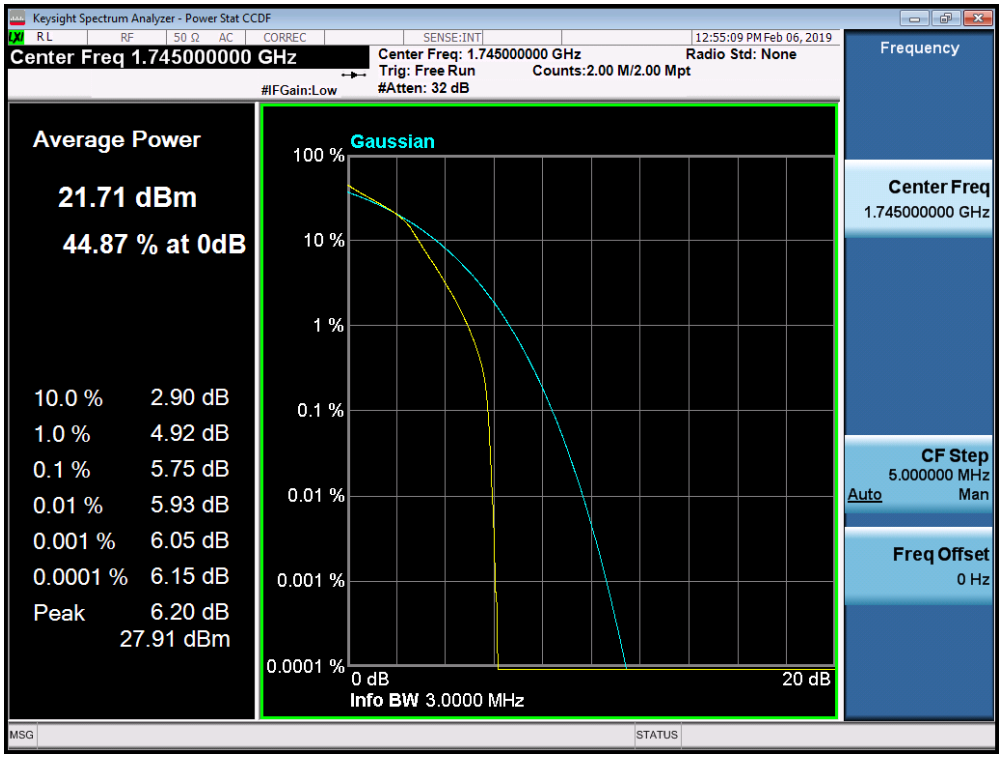
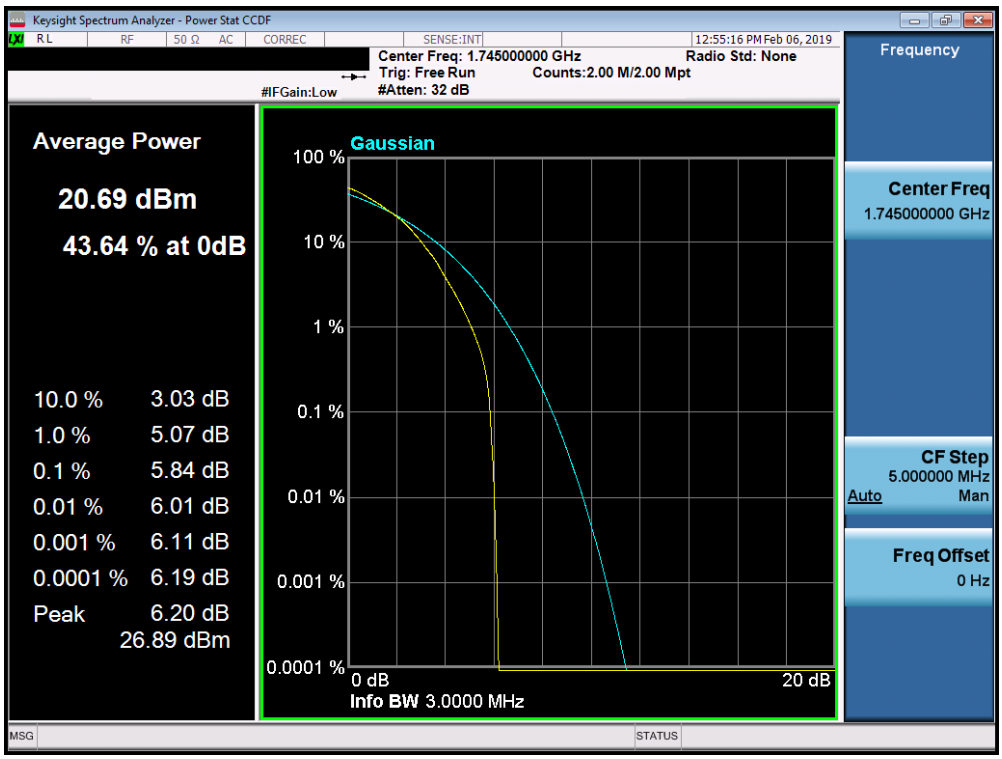


Plot 7-242. PAR Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-243. PAR Plot (Band 66/4 - 3.0MHz 64-QAM - Full RB Configuration)

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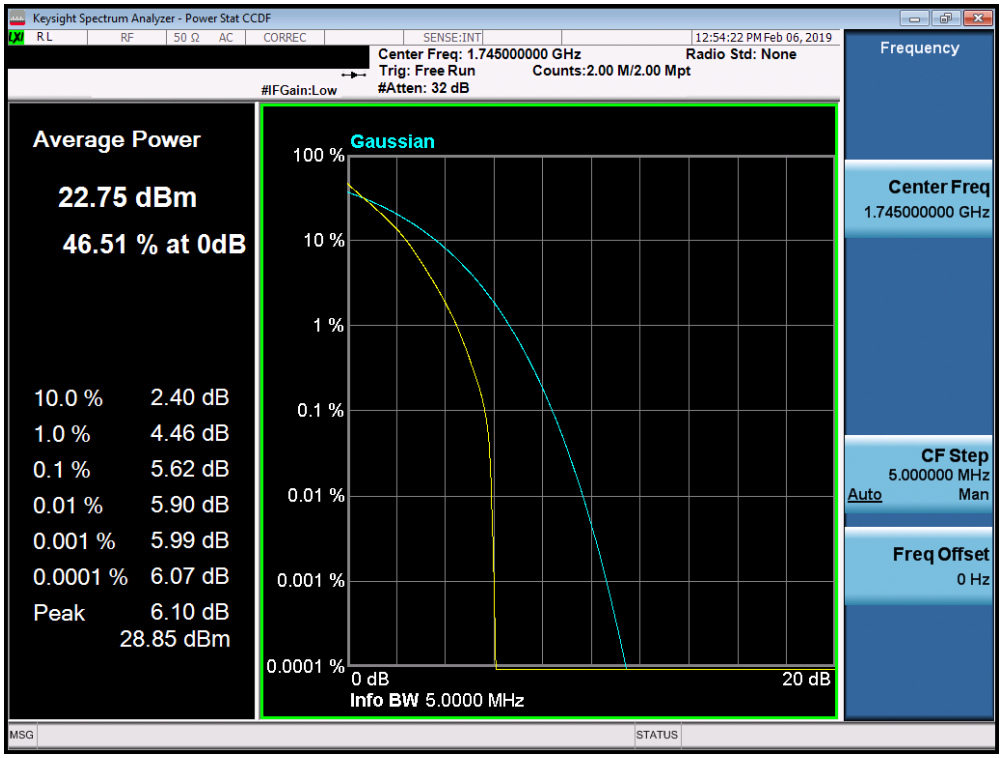
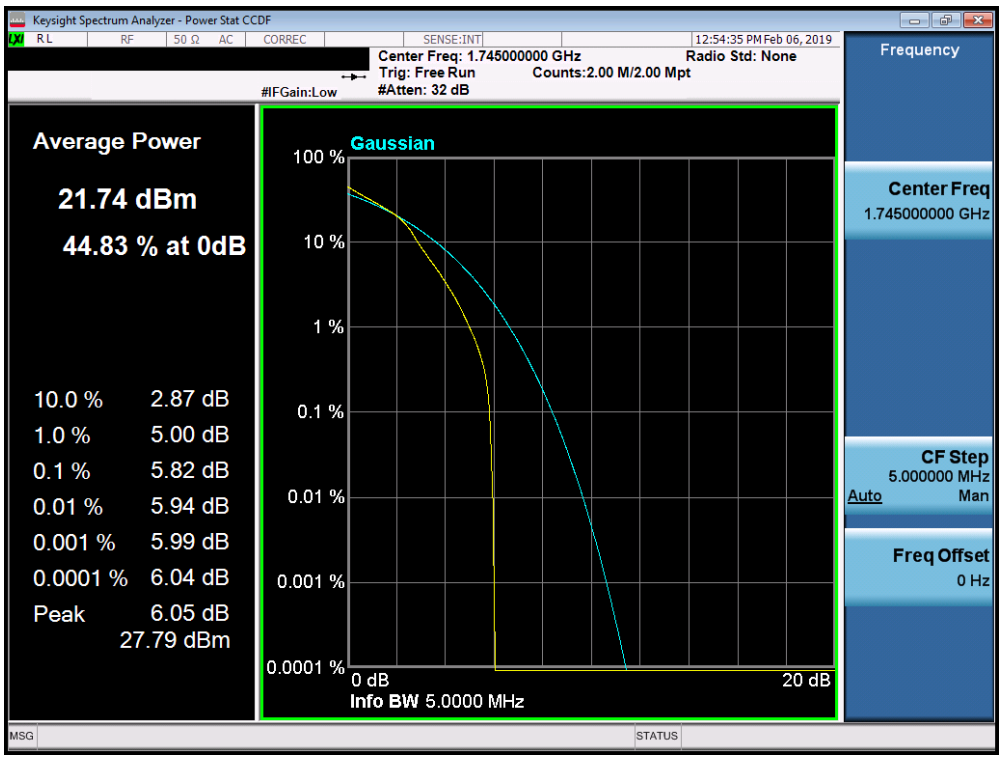


Plot 7-244. PAR Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-245. PAR Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

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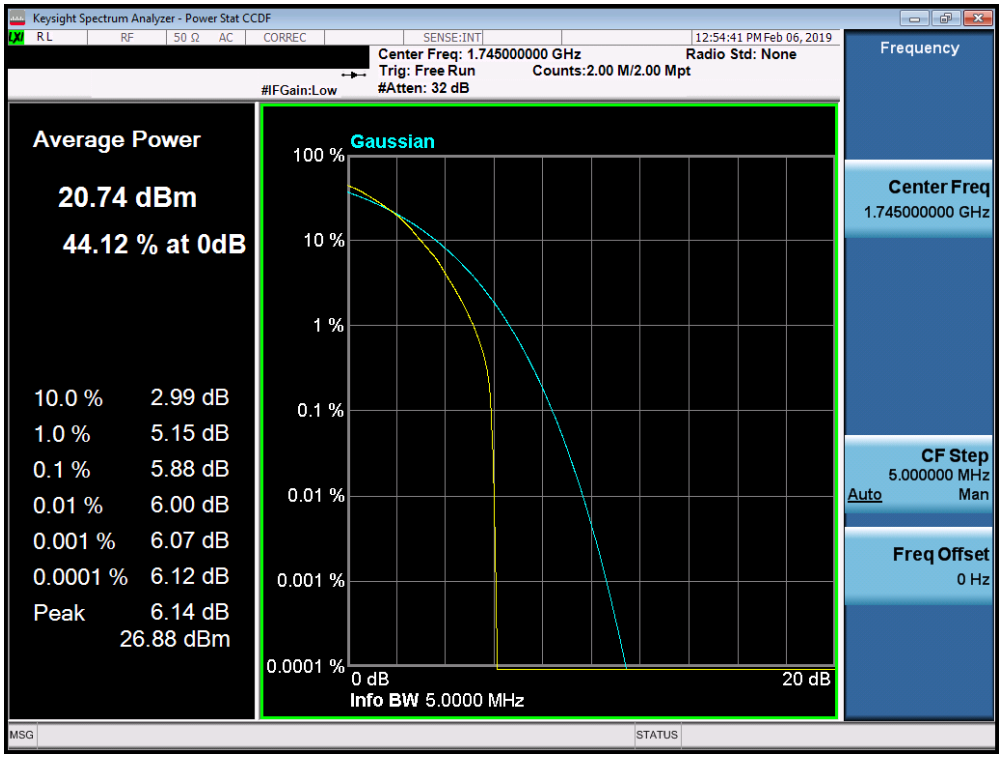
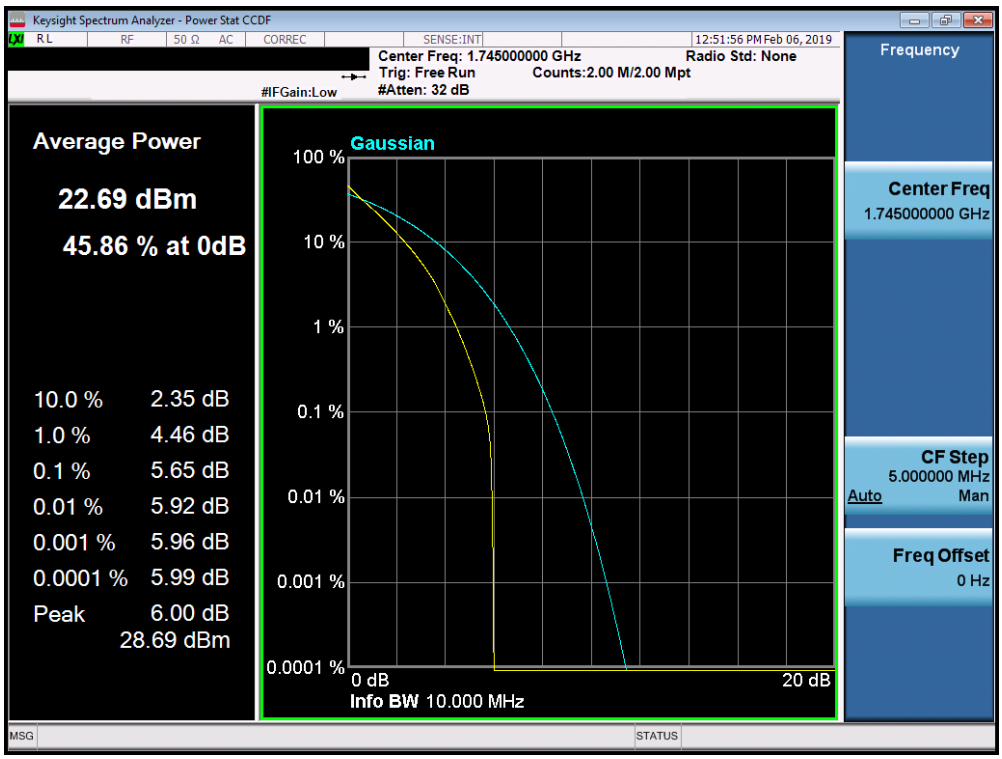


Plot 7-246. PAR Plot (Band 66/4 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-247. PAR Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

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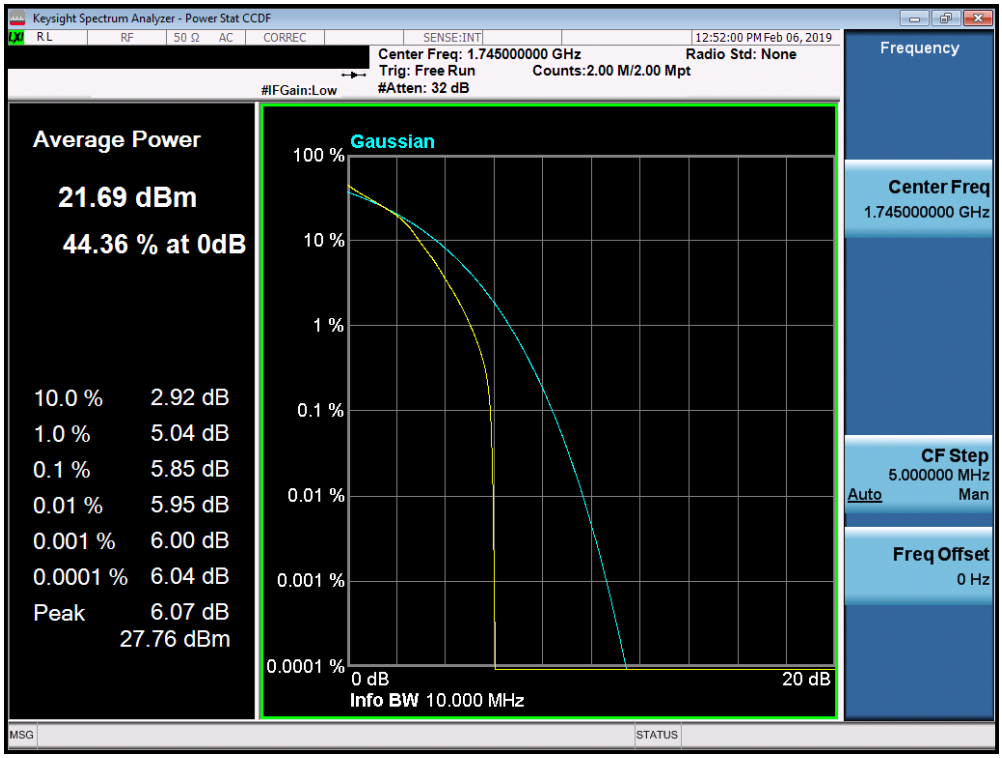
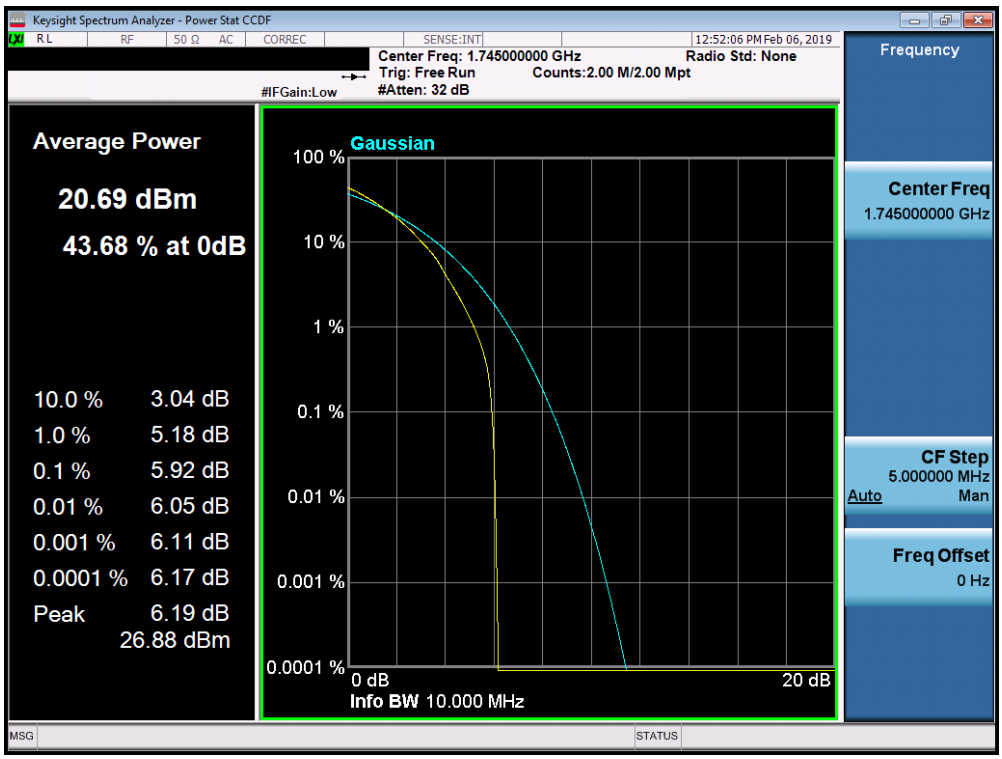


Plot 7-248. PAR Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-249. PAR Plot (Band 66/4 - 10.0MHz 64-QAM - Full RB Configuration)

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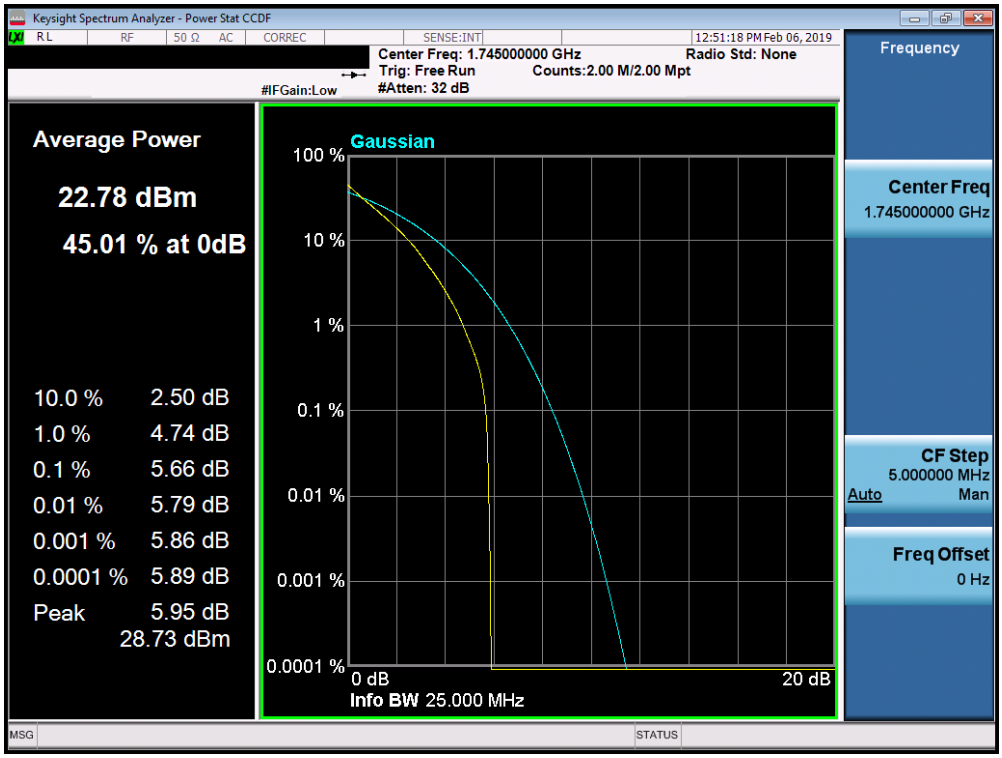
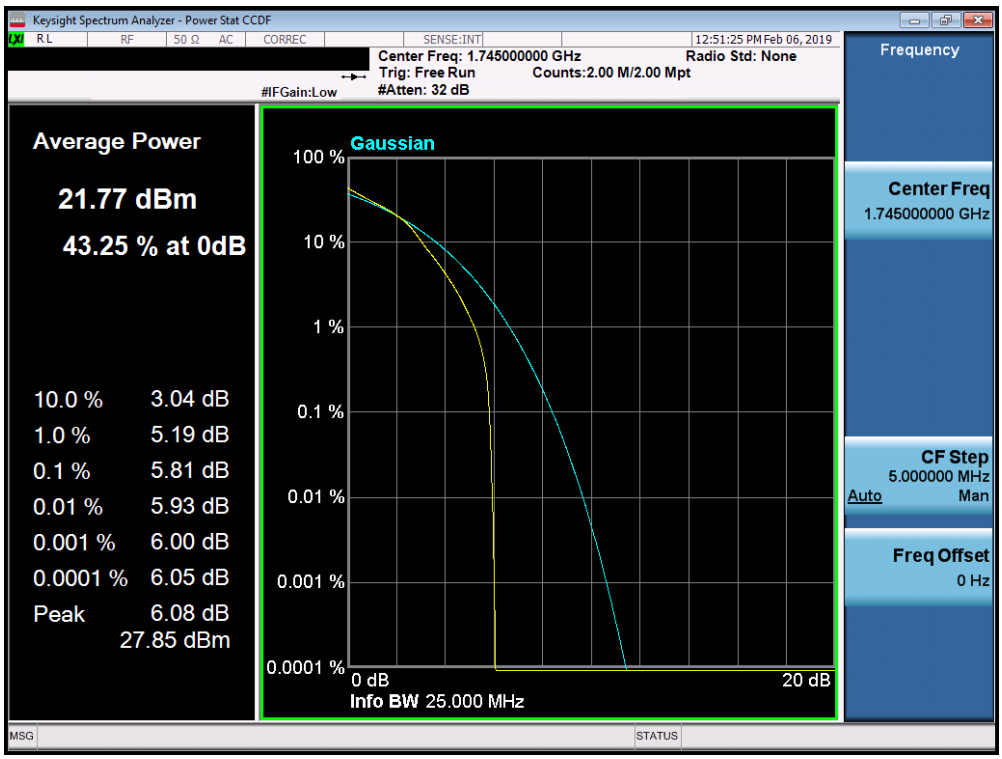


Plot 7-250. PAR Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-251. PAR Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

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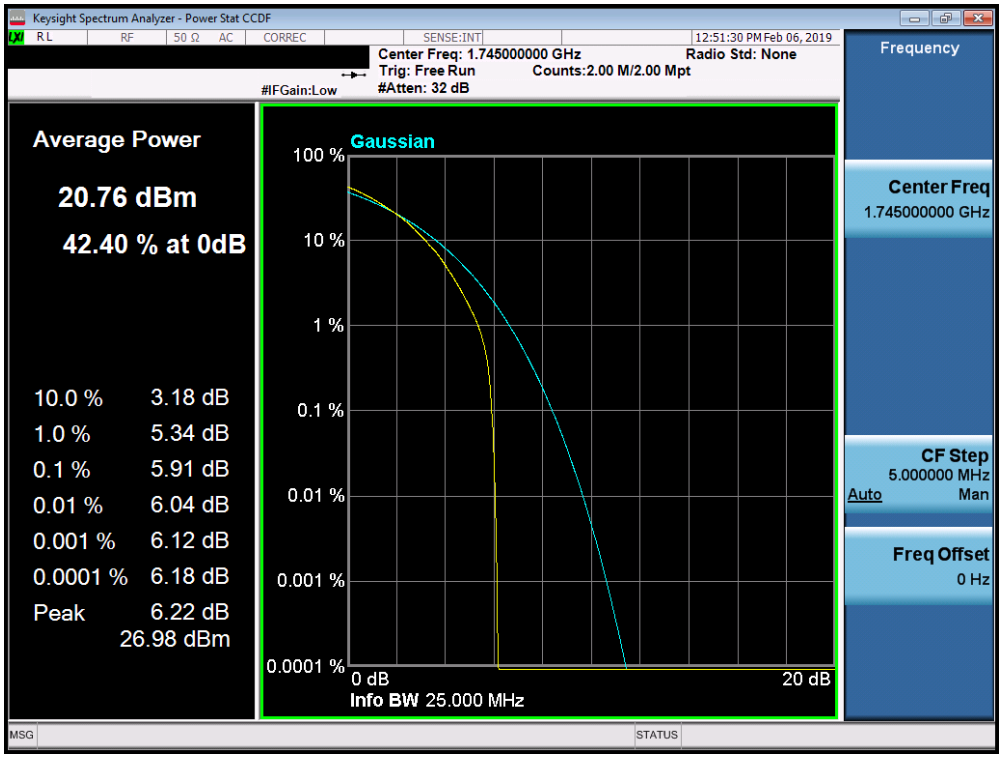
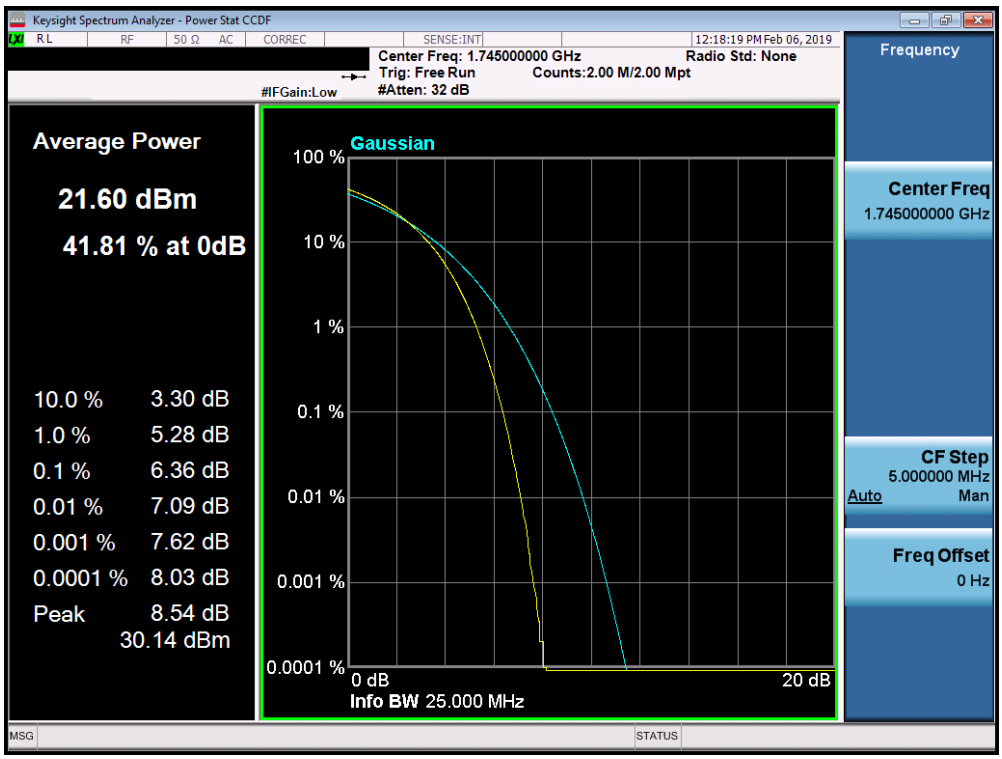


Plot 7-252. PAR Plot (Band 66/4 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-253. PAR Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

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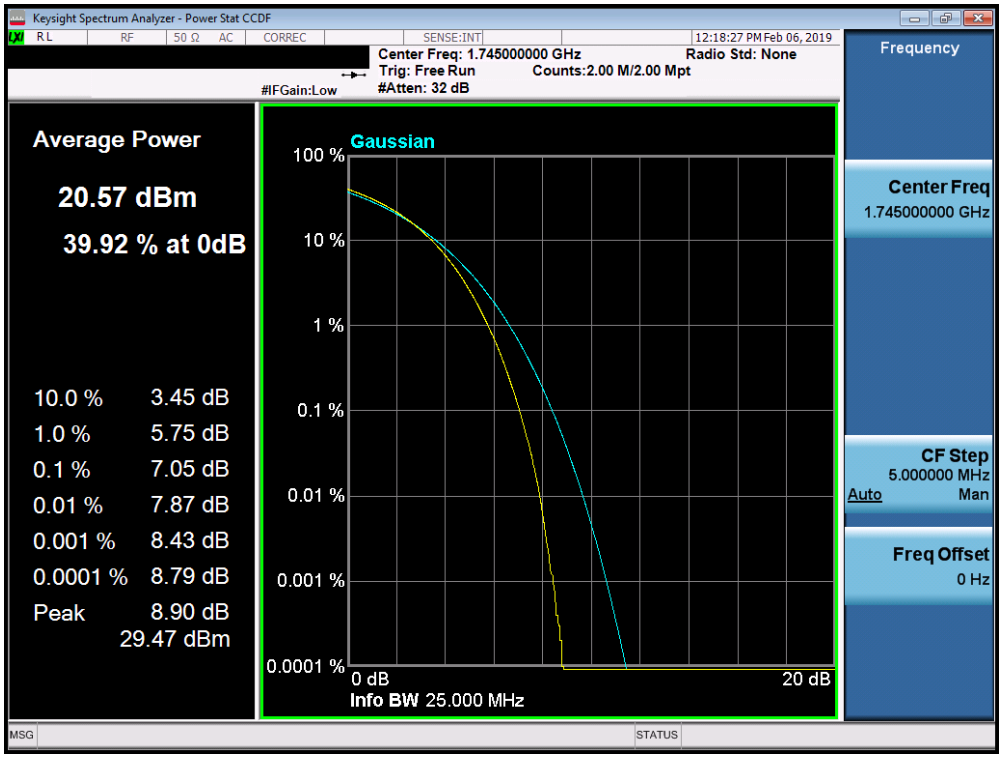
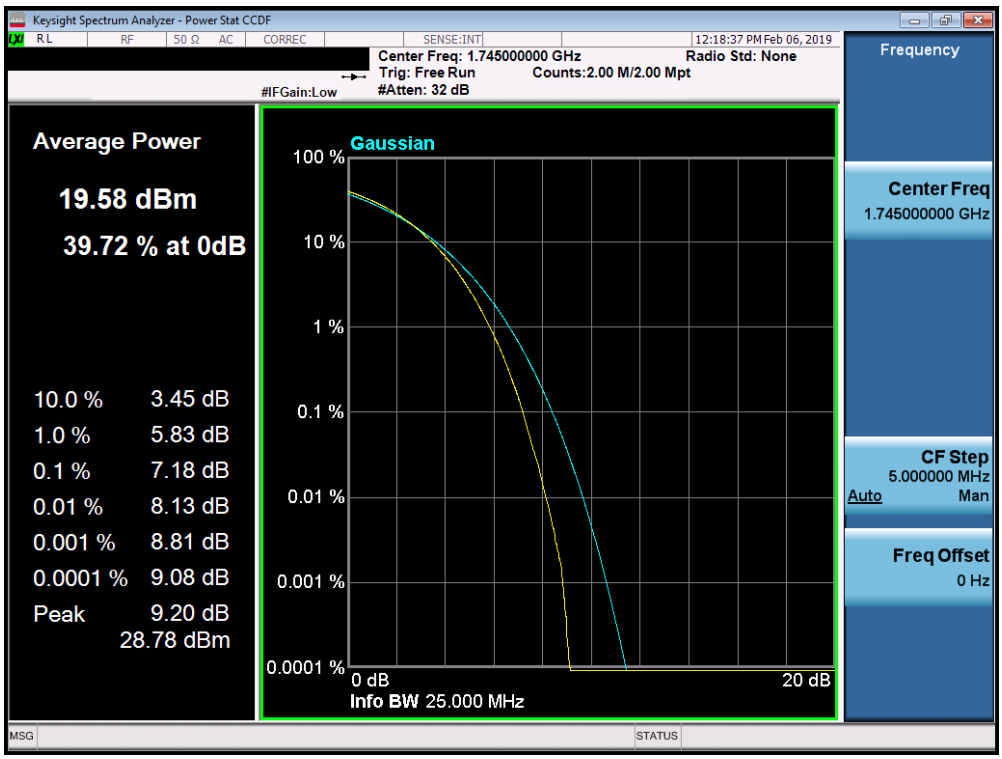


Plot 7-254. PAR Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-255. PAR Plot (Band 66/4 - 20.0MHz 64-QAM - Full RB Configuration)

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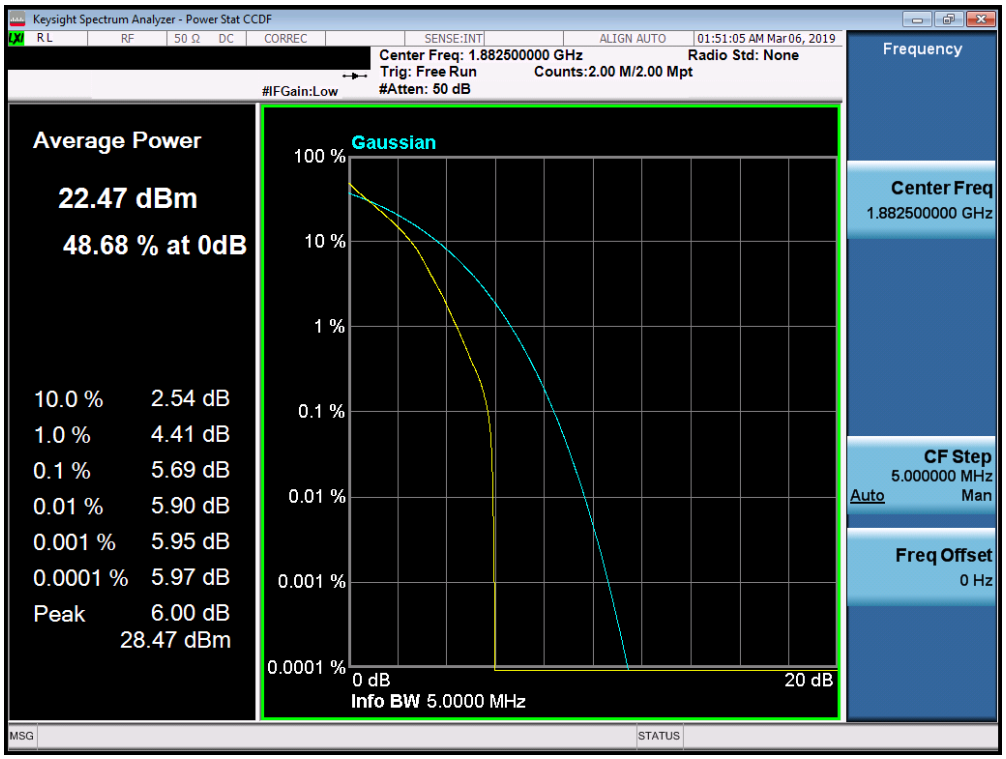
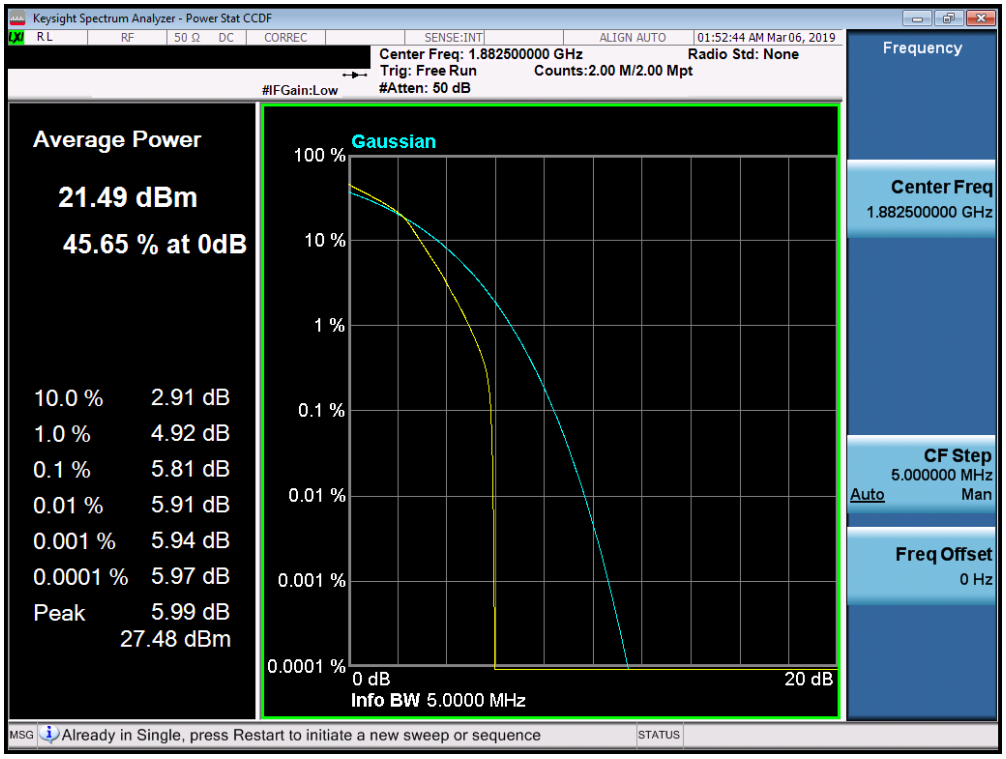
Band 25/2



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



Plot 7-257. PAR Plot (Band 25/2– 1.4MHz 16-QAM - Full RB Configuration)

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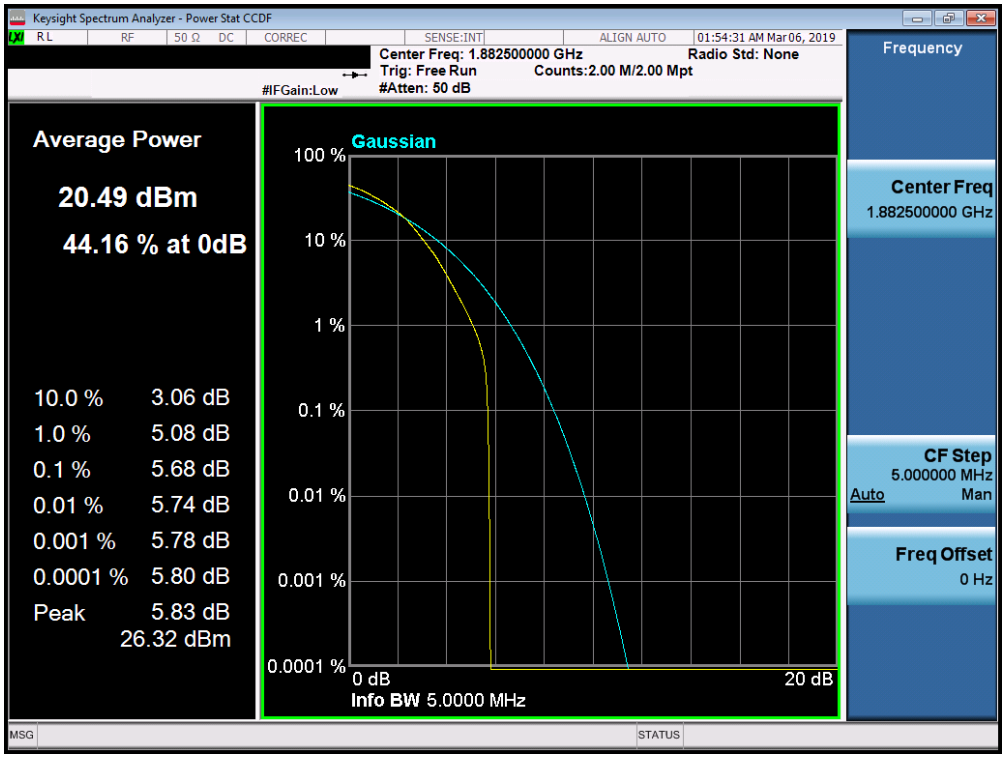
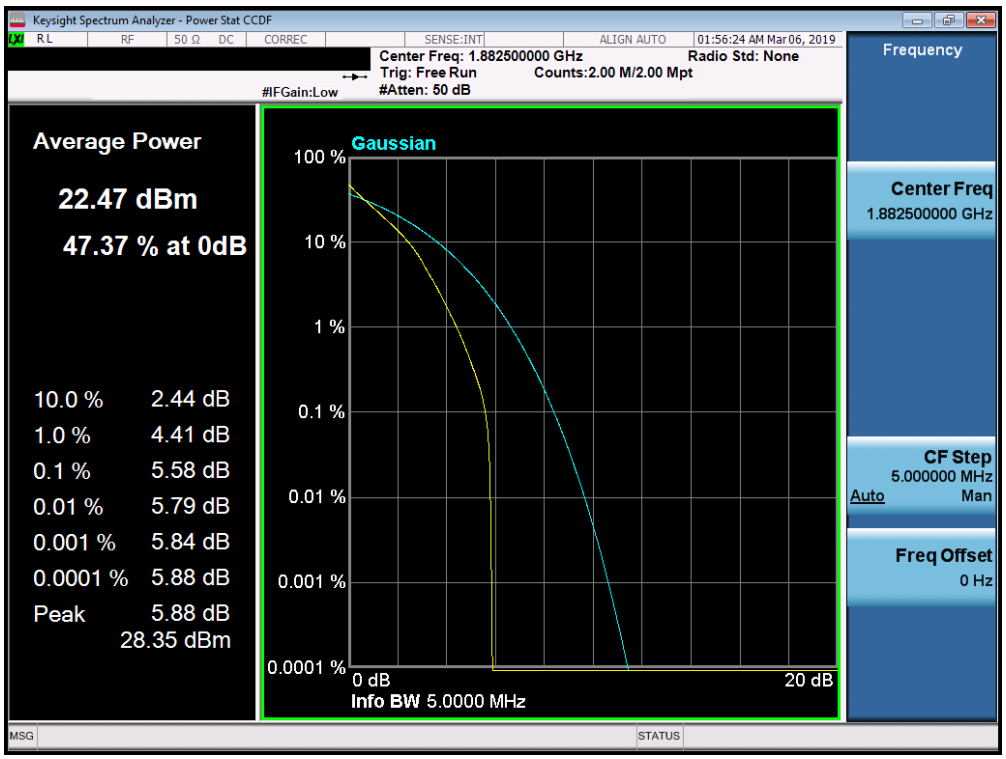


Plot 7-258. PAR Plot (Band 25/2– 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-259. PAR Plot (Band 25/2- 3.0MHz QPSK - Full RB Configuration)

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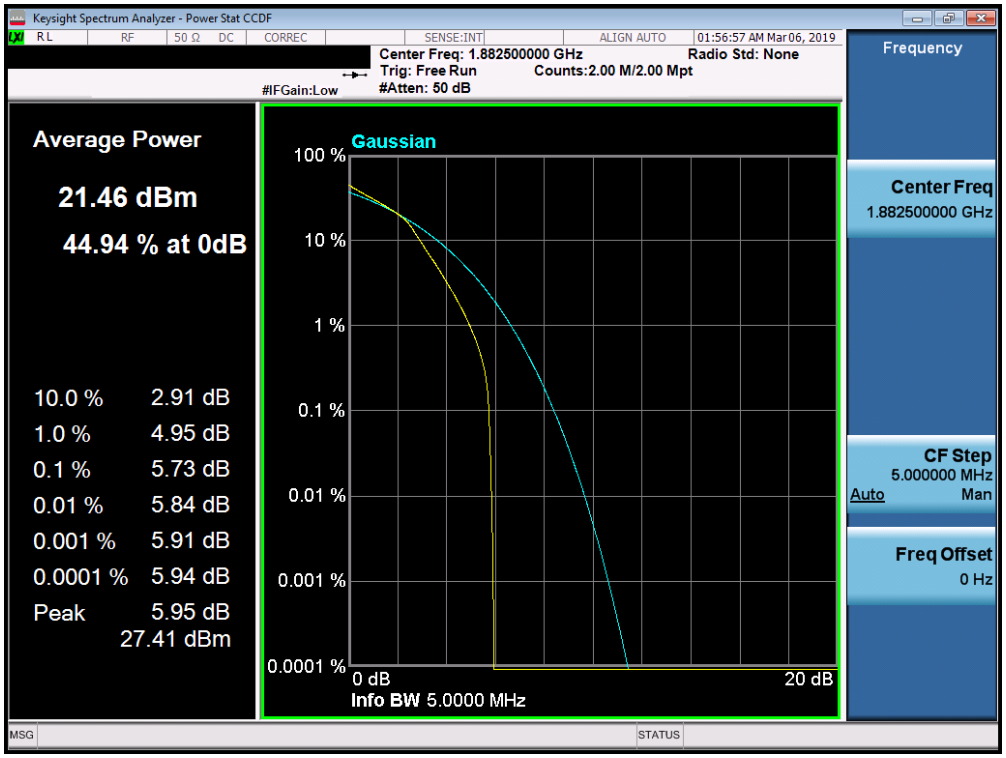
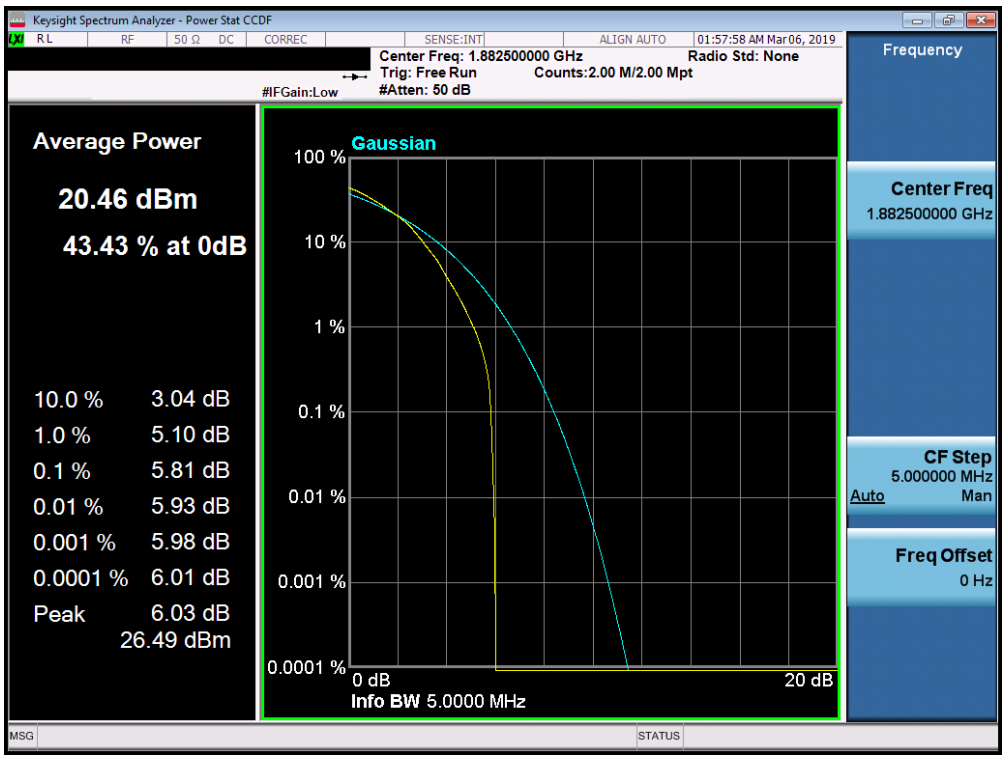


Plot 7-260. PAR Plot (Band 25/2- 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-261. PAR Plot (Band 25/2- 3.0MHz 64-QAM - Full RB Configuration)

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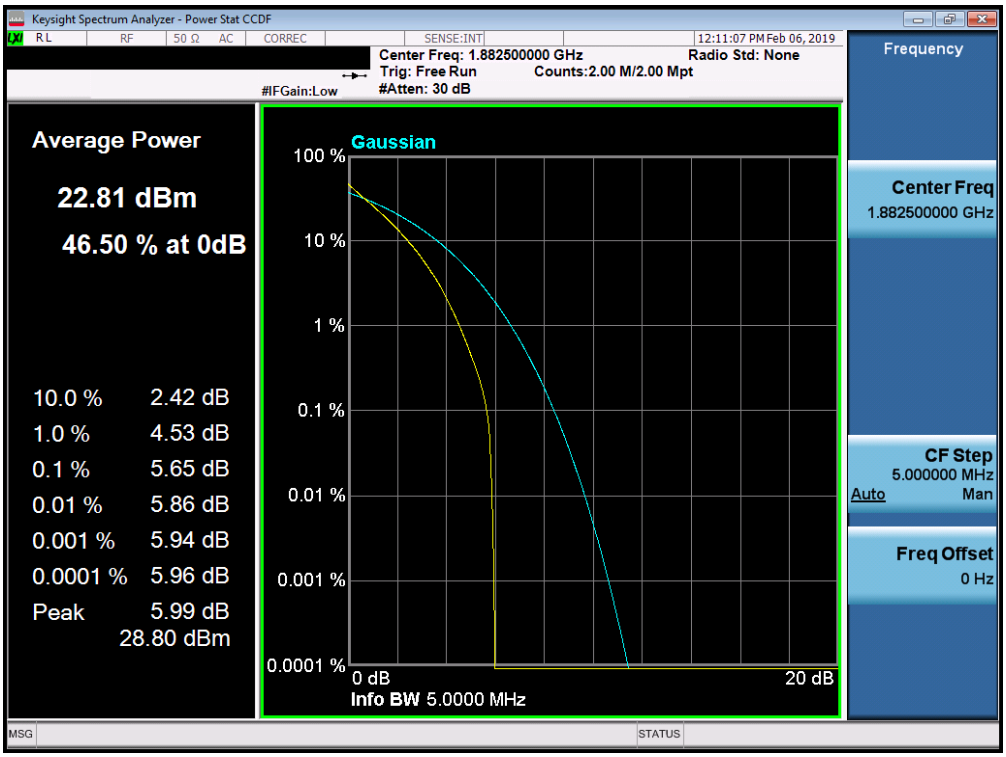
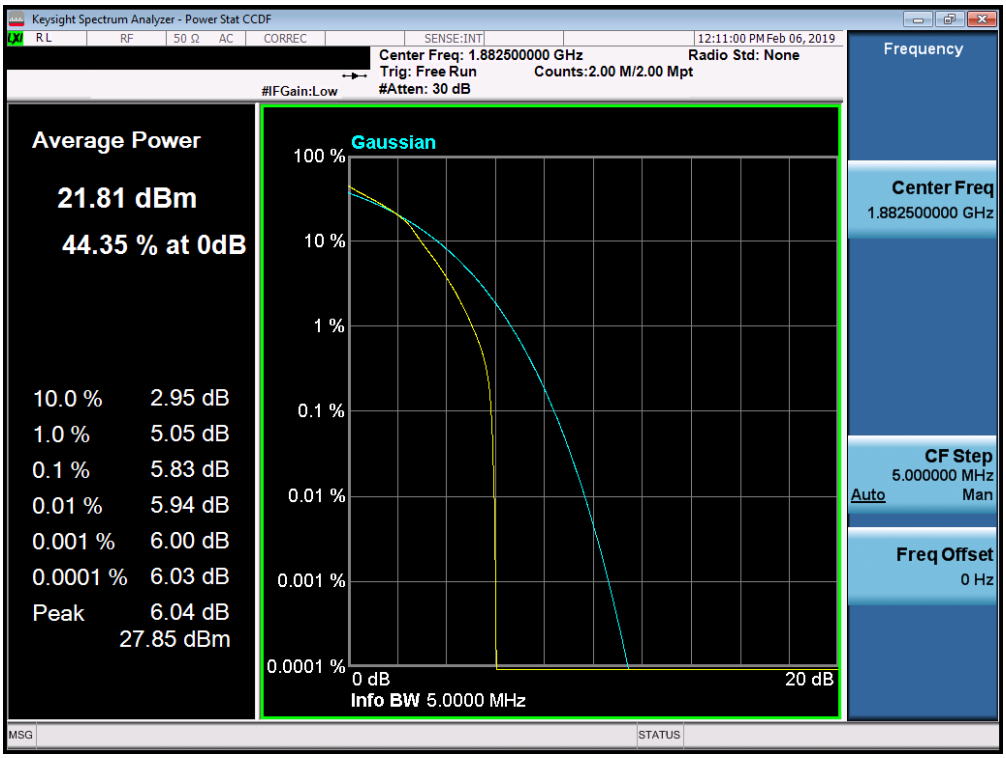


Plot 7-262. PAR Plot (Band 25/2- 5.0MHz QPSK - Full RB Configuration)



Plot 7-263. PAR Plot (Band 25/2- 5.0MHz 16-QAM - Full RB Configuration)

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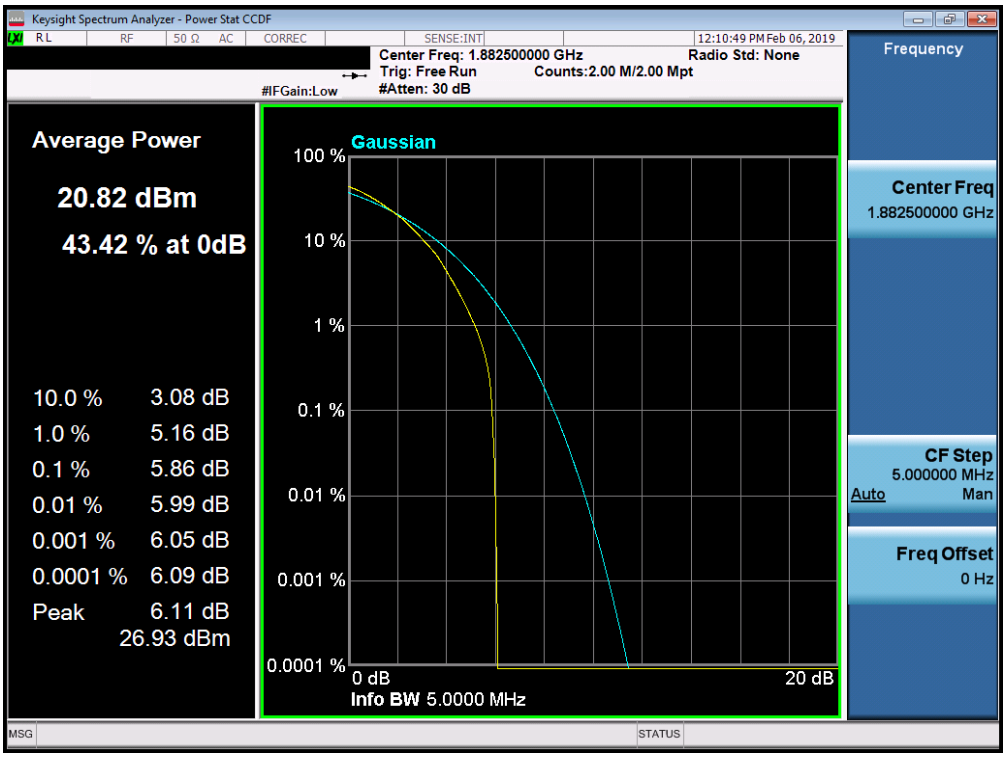
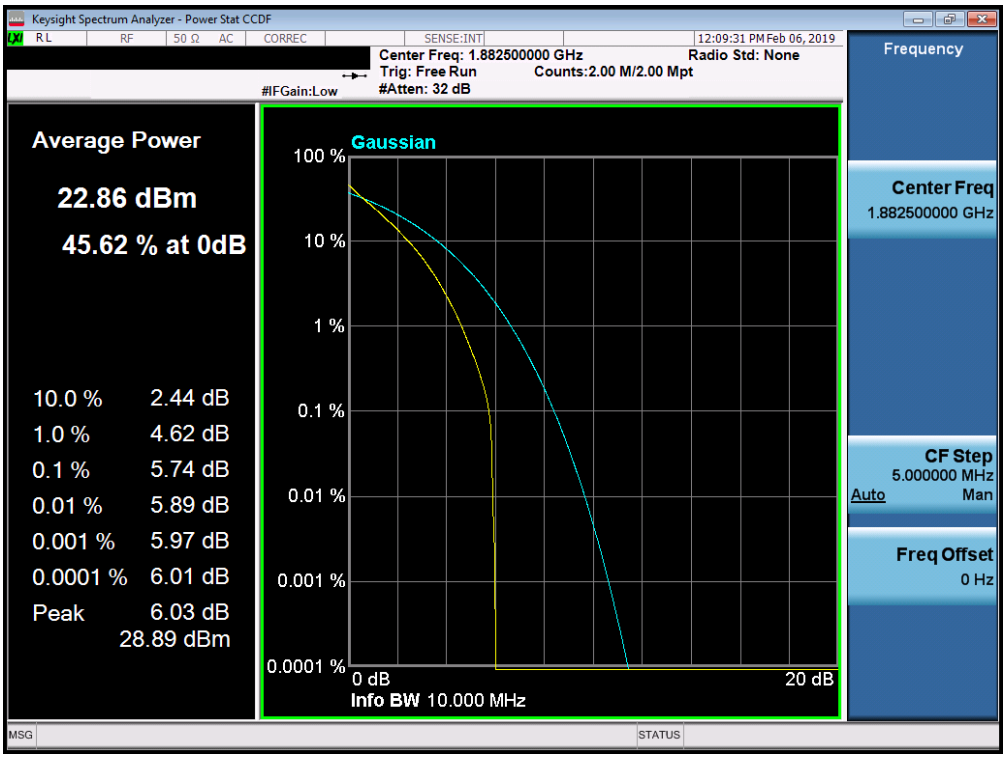


Plot 7-264. PAR Plot (Band 25/2- 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-265. PAR Plot (Band 25/2- 10.0MHz QPSK - Full RB Configuration)

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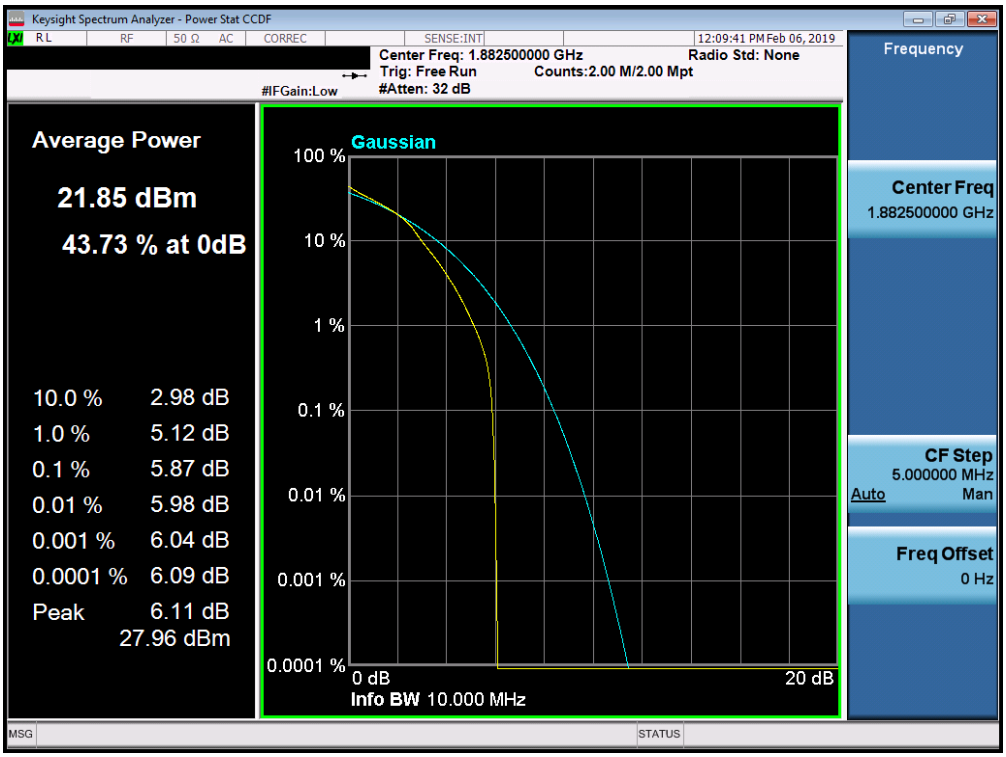
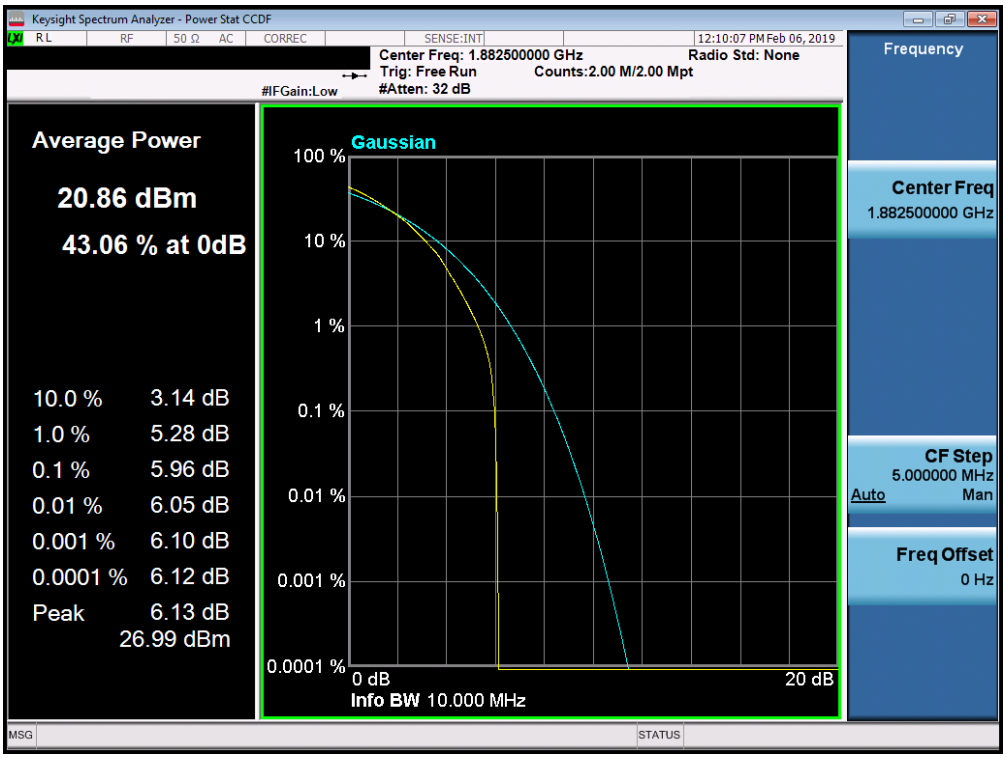


Plot 7-266. PAR Plot (Band 25/2- 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-267. PAR Plot (Band 25/2- 10.0MHz 64-QAM - Full RB Configuration)

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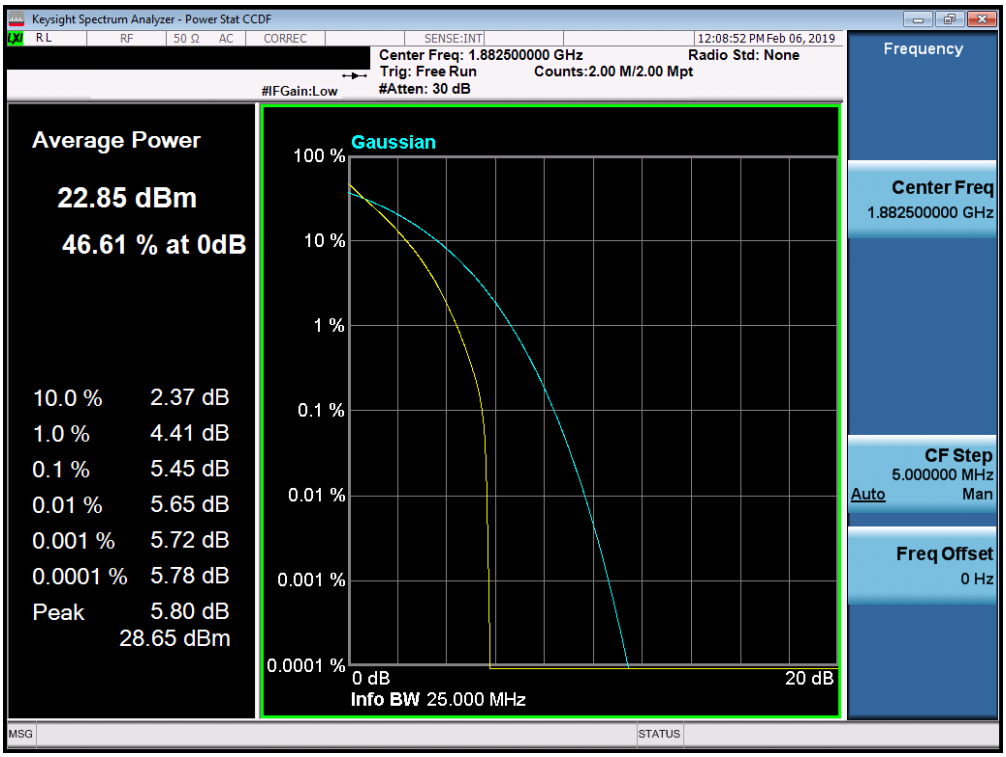
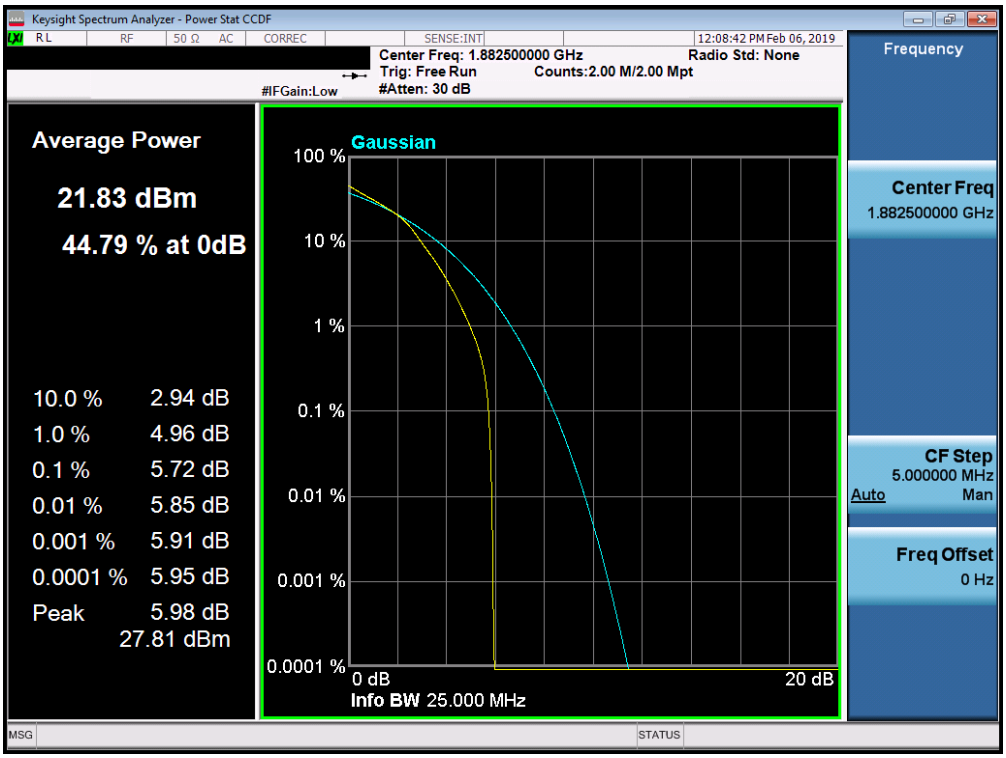


Plot 7-268. PAR Plot (Band 25/2- 15.0MHz QPSK - Full RB Configuration)



Plot 7-269. PAR Plot (Band 25/2- 15.0MHz 16-QAM - Full RB Configuration)

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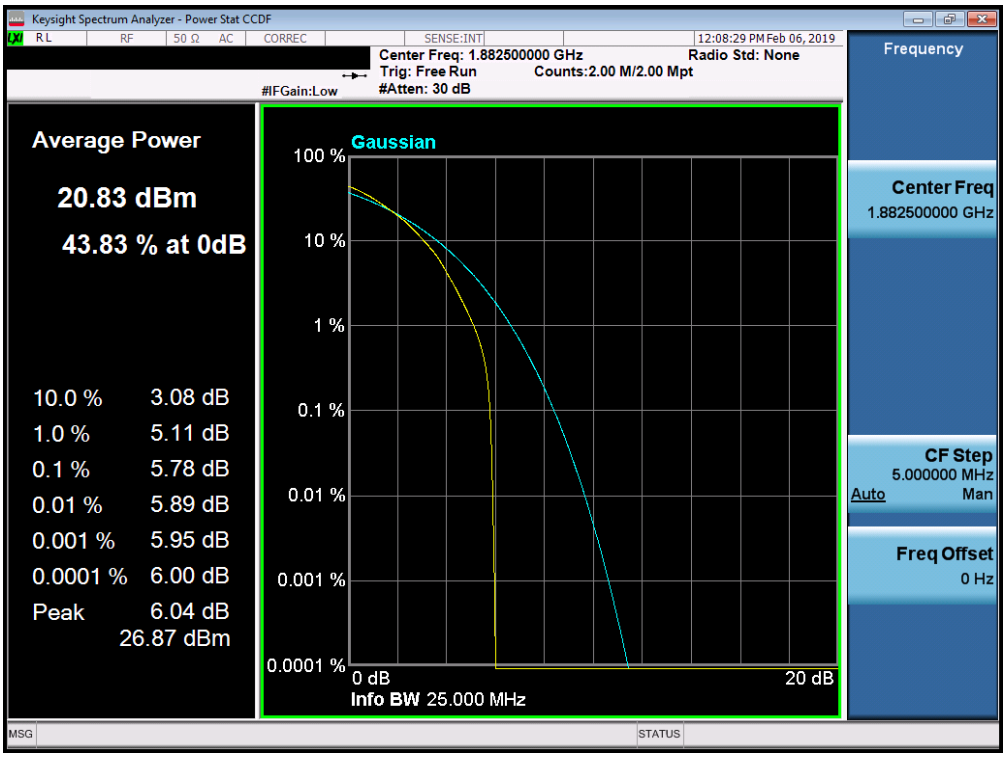
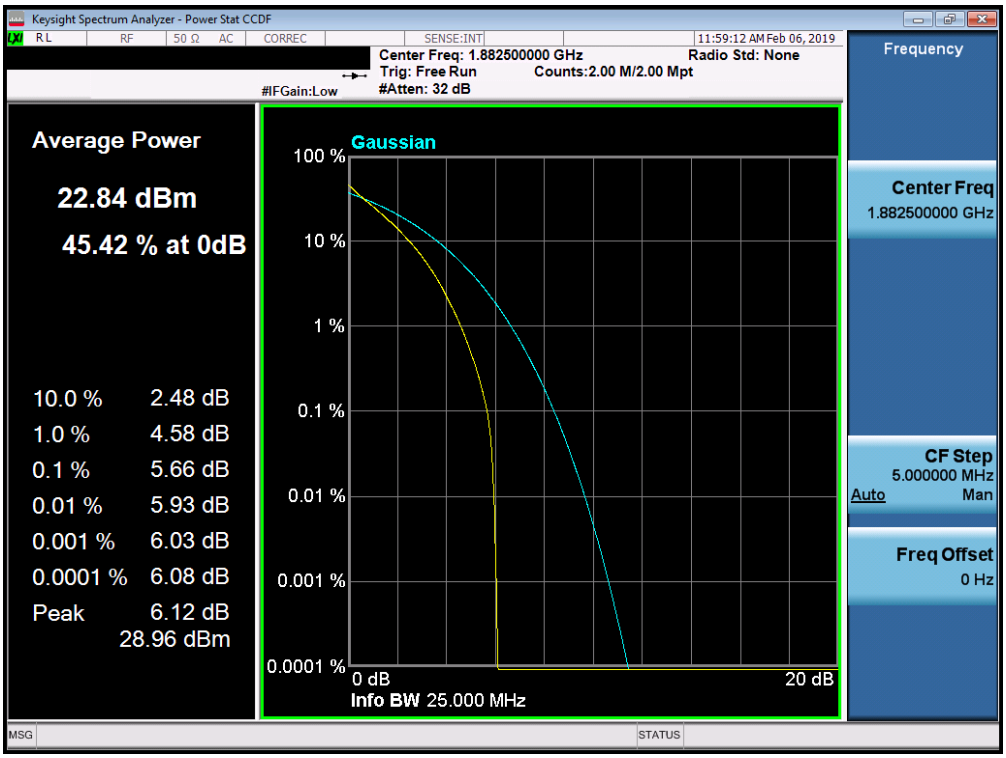


Plot 7-270. PAR Plot (Band 25/2- 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-271. PAR Plot (Band 25/2- 20.0MHz QPSK - Full RB Configuration)

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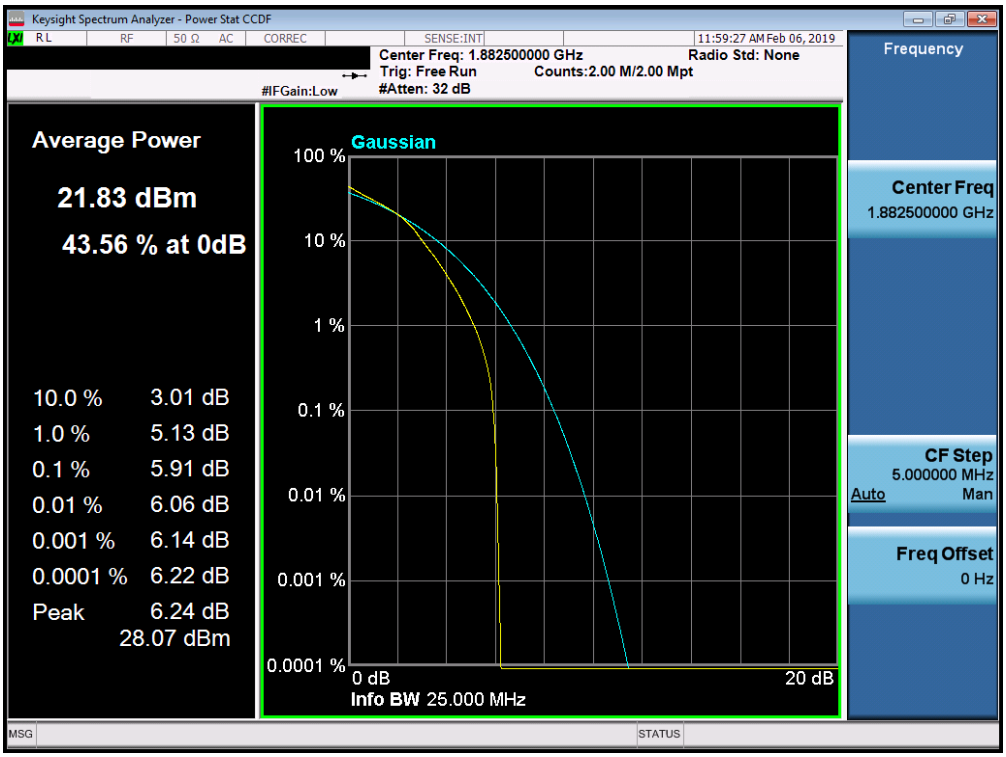
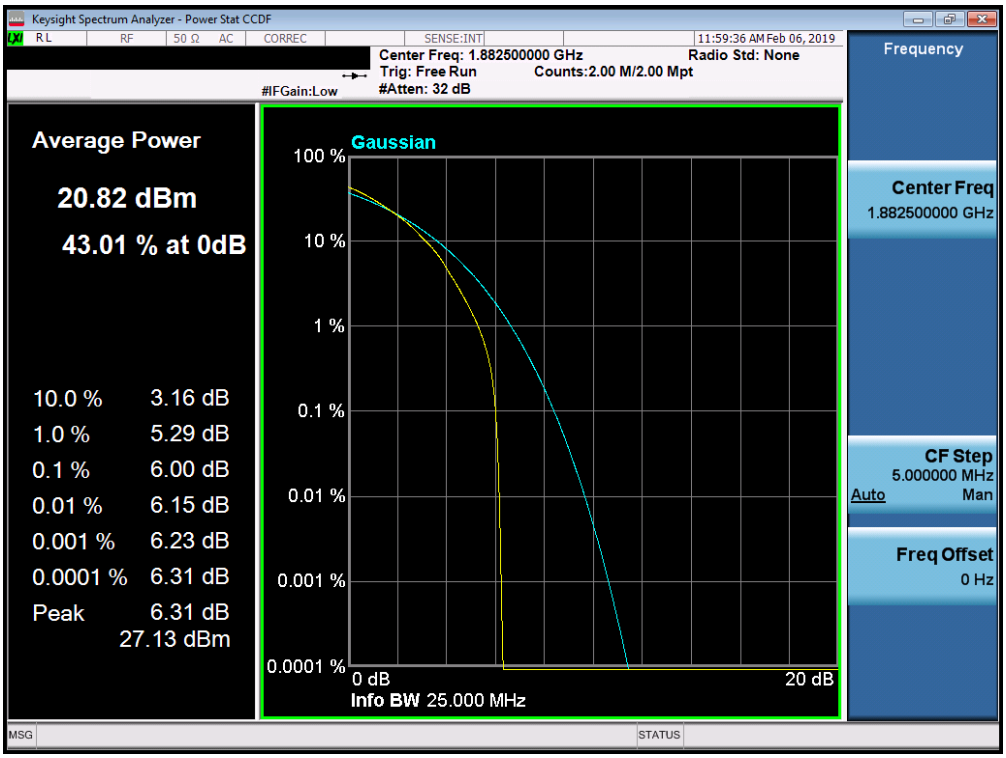


Plot 7-272. PAR Plot (Band 25/2- 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-273. PAR Plot (Band 25/2- 20.0MHz 64-QAM - Full RB Configuration)

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7.6 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

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Test Setup

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

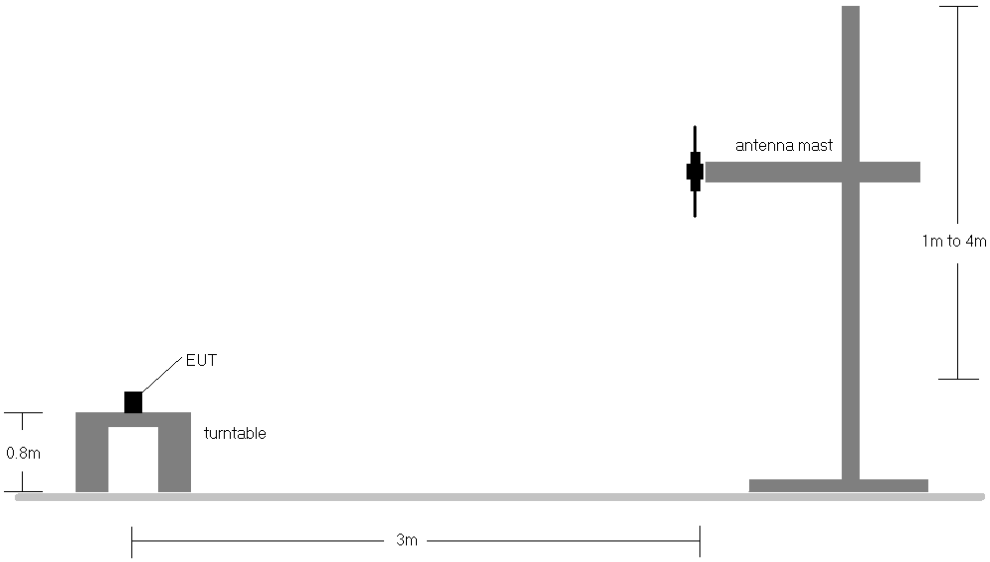

Figure 7-5. Radiated Test Setup <1GHz

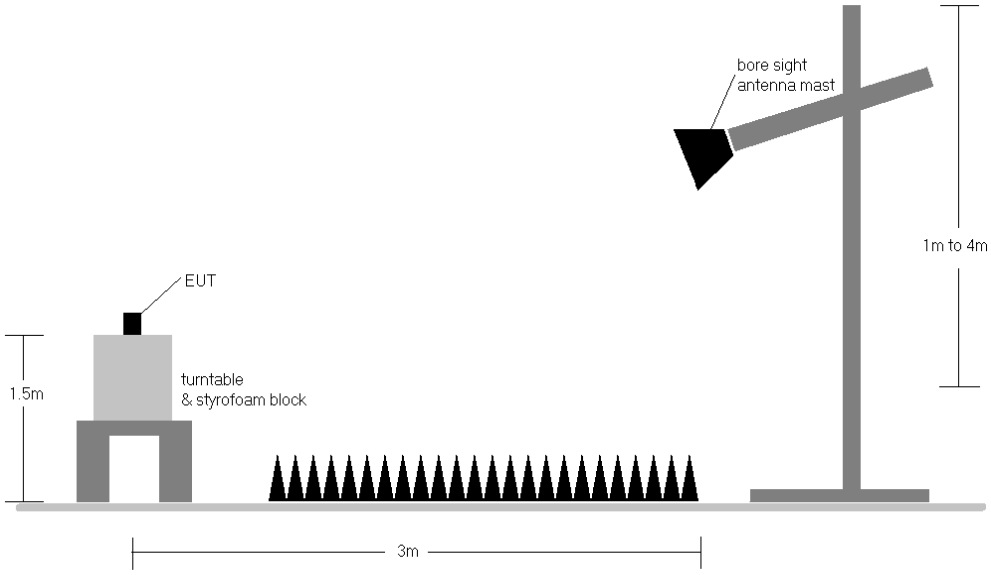

Figure 7-6. Radiated Test Setup >1GHz

Test Notes

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

2) This unit was tested with its standard battery.

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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	291	340	1 / 3	12.82	4.00	14.67	0.029	34.77	-20.10	16.82	0.048	36.99	-20.17
707.50	1.4	QPSK	H	303	346	1 / 3	12.87	4.22	**14.94**	0.031	34.77	-19.84	**17.09**	0.051	36.99	-19.90
715.30	1.4	QPSK	H	305	338	1 / 3	12.10	4.44	14.39	0.027	34.77	-20.38	16.54	0.045	36.99	-20.45
707.50	1.4	16-QAM	H	303	346	1 / 3	12.00	4.22	**14.07**	0.026	34.77	-20.71	**16.22**	0.042	36.99	-20.77
707.50	1.4	64-QAM	H	303	346	1 / 3	10.95	4.22	**13.02**	0.020	34.77	-21.76	**15.17**	0.033	36.99	-21.82
700.50	3	QPSK	H	294	349	1 / 7	12.87	4.01	14.73	0.030	34.77	-20.04	16.88	0.049	36.99	-20.11
707.50	3	QPSK	H	294	356	1 / 7	12.80	4.22	**14.87**	0.031	34.77	-19.91	**17.02**	0.050	36.99	-19.97
714.50	3	QPSK	H	305	345	1 / 7	12.17	4.41	14.43	0.028	34.77	-20.34	16.58	0.046	36.99	-20.41
707.50	3	16-QAM	H	294	356	1 / 7	11.65	4.22	**13.72**	0.024	34.77	-21.06	**15.87**	0.039	36.99	-21.12
700.50	3	64-QAM	H	294	349	1 / 7	10.96	4.01	**12.82**	0.019	34.77	-21.95	**14.97**	0.031	36.99	-22.02

Table 7-3. ERP Data (Band 12)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
701.50	5	QPSK	H	290	348	1 / 12	12.95	4.04	14.84	0.031	34.77	-19.93	16.99	0.050	36.99	-20.00
707.50	5	QPSK	H	303	351	1 / 12	12.91	4.22	**14.98**	0.031	34.77	-19.80	**17.13**	0.052	36.99	-19.86
713.50	5	QPSK	H	291	347	1 / 24	12.13	4.39	14.37	0.027	34.77	-20.40	16.52	0.045	36.99	-20.47
701.50	5	16-QAM	H	290	348	1 / 12	12.06	4.04	**13.95**	0.025	34.77	-20.82	**16.10**	0.041	36.99	-20.89
701.50	5	64-QAM	H	290	348	1 / 12	11.40	4.04	**13.29**	0.021	34.77	-21.48	**15.44**	0.035	36.99	-21.55
704.00	10	QPSK	H	295	203	1 / 25	13.01	4.12	14.98	0.031	34.77	-19.80	17.13	0.052	36.99	-19.86
707.50	10	QPSK	H	291	353	1 / 25	12.95	4.22	**15.02**	**0.032**	34.77	-19.76	**17.17**	**0.052**	36.99	-19.82
711.00	10	QPSK	H	284	202	1 / 49	12.08	4.32	14.25	0.027	34.77	-20.53	16.40	0.044	36.99	-20.59
704.00	10	16-QAM	H	295	203	1 / 25	12.03	4.12	**14.00**	0.025	34.77	-20.78	**16.15**	0.041	36.99	-20.84
707.50	10	64-QAM	H	291	353	1 / 25	11.10	4.22	**13.17**	0.021	34.77	-21.61	**15.32**	0.034	36.99	-21.67
707.50	10	QPSK	V	301	358	12.95	11.79	4.22	13.86	0.024	34.77	-20.92	16.01	0.040	36.99	-20.98
707.50	10	QPSK (WCP)	H	117	202	12.95	12.65	4.22	14.72	0.030	34.77	-20.06	16.87	0.049	36.99	-20.12

Table 7-4. ERP Data (Band 12/17)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	214	355	1 / 24	11.03	6.18	15.06	0.032	34.77	-19.72	17.21	0.053	36.99	-19.78
782.00	5	QPSK	H	224	341	1 / 12	11.18	6.24	**15.27**	0.034	34.77	-19.50	**17.42**	0.055	36.99	-19.57
784.50	5	QPSK	H	220	349	1 / 12	10.54	6.30	14.69	0.029	34.77	-20.08	16.84	0.048	36.99	-20.15
782.00	5	16-QAM	H	224	341	1 / 12	10.19	6.24	**14.28**	0.027	34.77	-20.49	**16.43**	0.044	36.99	-20.56
782.00	5	64-QAM	H	224	341	1 / 12	9.28	6.24	**13.37**	0.022	34.77	-21.40	**15.52**	0.036	36.99	-21.47
782.00	10	QPSK	H	218	348	1 / 25	11.23	6.24	**15.32**	**0.034**	34.77	-19.45	**17.47**	**0.056**	36.99	-19.52
782.00	10	16-QAM	H	218	348	1 / 25	10.06	6.24	**14.15**	0.026	34.77	-20.62	**16.30**	0.043	36.99	-20.69
782.00	10	64-QAM	H	218	348	1 / 25	9.33	6.24	**13.42**	0.022	34.77	-21.35	**15.57**	0.036	36.99	-21.42
782.00	10	QPSK	V	322	113	1 / 12	11.03	6.24	15.12	0.033	34.77	-19.65	17.27	0.053	36.99	-19.72
782.00	10	QPSK (WCP)	H	127	228	1 / 12	10.86	6.24	14.95	0.031	34.77	-19.82	17.10	0.051	36.99	-19.89

Table 7-5. ERP Data (Band 13)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	225	196	1 / 5	10.51	6.75	15.11	0.032	38.45	-23.34	17.26	0.053	40.61	-23.35
836.50	1.4	QPSK	H	214	201	1 / 5	10.56	6.78	15.19	0.033	38.45	-23.27	17.34	0.054	40.61	-23.27
848.30	1.4	QPSK	H	208	195	1 / 5	11.01	6.80	**15.66**	0.037	38.45	-22.79	**17.81**	0.060	40.61	-22.80
848.30	1.4	16-QAM	H	208	195	1 / 5	10.16	6.80	**14.81**	0.030	38.45	-23.64	**16.96**	0.050	40.61	-23.65
848.30	1.4	64-QAM	H	208	195	1 / 5	9.27	6.80	**13.92**	0.025	38.45	-24.53	**16.07**	0.040	40.61	-24.54
825.50	3	QPSK	H	221	206	8 / 4	10.64	6.75	15.24	0.033	38.45	-23.21	17.39	0.055	40.61	-23.21
836.50	3	QPSK	H	200	186	8 / 4	10.59	6.78	15.22	0.033	38.45	-23.24	17.37	0.055	40.61	-23.24
847.50	3	QPSK	H	144	351	1 / 14	11.44	6.80	**16.09**	0.041	38.45	-22.36	**18.24**	0.067	40.61	-22.37
847.50	3	16-QAM	H	144	351	1 / 14	10.70	6.80	**15.35**	0.034	38.45	-23.10	**17.50**	0.056	40.61	-23.11
847.50	3	64-QAM	H	144	351	1 / 14	10.05	6.80	**14.70**	0.029	38.45	-23.75	**16.85**	0.048	40.61	-23.76
826.50	5	QPSK	H	224	210	1 / 12	10.74	6.76	15.35	0.034	38.45	-23.11	17.50	0.056	40.61	-23.11
836.50	5	QPSK	H	148	199	1 / 12	10.64	6.78	15.27	0.034	38.45	-23.19	17.42	0.055	40.61	-23.19
846.50	5	QPSK	H	142	345	1 / 24	11.64	6.80	**16.29**	**0.043**	38.45	-22.17	**18.44**	**0.070**	40.61	-22.17
846.50	5	16-QAM	H	142	345	1 / 24	10.84	6.80	**15.49**	0.035	38.45	-22.97	**17.64**	0.058	40.61	-22.97
846.50	5	64-QAM	H	142	345	1 / 24	9.81	6.80	**14.46**	0.028	38.45	-24.00	**16.61**	0.046	40.61	-24.00
829.00	10	QPSK	H	220	205	1 / 25	10.77	6.76	15.38	0.035	38.45	-23.07	17.53	0.057	40.61	-23.08
836.50	10	QPSK	H	158	211	1 / 25	10.59	6.78	15.22	0.033	38.45	-23.24	17.37	0.055	40.61	-23.24
844.00	10	QPSK	H	150	341	1 / 25	11.45	6.79	**16.09**	0.041	38.45	-22.36	**18.24**	0.067	40.61	-22.37
844.00	10	16-QAM	H	150	341	1 / 25	10.34	6.79	**14.98**	0.031	38.45	-23.47	**17.13**	0.052	40.61	-23.48
844.00	10	64-QAM	H	150	341	1 / 25	9.15	6.79	**13.79**	0.024	38.45	-24.66	**15.94**	0.039	40.61	-24.67
846.50	5	QPSK	V	154	40	11.64	9.87	6.80	14.52	0.028	38.45	-23.94	16.67	0.046	40.61	-23.94

Table 7-6. ERP Data (Band 26/5)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	231	203	1 / 36	10.82	6.77	15.44	0.035	38.45	-23.02	17.59	0.057	40.61	-23.02
836.50	15	QPSK	H	221	209	1 / 36	10.78	6.78	15.41	0.035	38.45	-23.05	17.56	0.057	40.61	-23.05
841.50	15	QPSK	H	219	209	1 / 36	11.52	6.79	**16.16**	0.041	38.45	-22.30	**18.31**	0.068	40.61	-22.30
841.50	15	16-QAM	H	219	209	1 / 36	10.89	6.79	**15.53**	0.036	38.45	-22.93	**17.68**	0.059	40.61	-22.93
841.50	15	64-QAM	H	219	209	1 / 36	9.73	6.79	**14.37**	0.027	38.45	-24.09	**16.52**	0.045	40.61	-24.09

Table 7-7. ERP Data (Band 26)

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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	109	200	1 / 0	12.19	8.19	20.38	0.109	30.00	-9.62
1745.00	1.4	QPSK	H	114	201	1 / 0	11.83	8.19	20.02	0.101	30.00	-9.98
1779.30	1.4	QPSK	H	117	198	1 / 0	12.82	8.19	**21.01**	**0.126**	30.00	-8.99
1779.30	1.4	16-QAM	H	117	198	1 / 0	11.90	8.19	**20.09**	0.102	30.00	-9.91
1779.30	1.4	64-QAM	H	117	198	1 / 0	10.86	8.19	**19.05**	0.080	30.00	-10.95
1711.50	3	QPSK	H	119	189	1 / 0	11.40	8.19	19.59	0.091	30.00	-10.41
1745.00	3	QPSK	H	115	201	1 / 0	11.64	8.19	19.83	0.096	30.00	-10.17
1778.50	3	QPSK	H	117	198	1 / 0	12.52	8.19	**20.71**	0.118	30.00	-9.29
1778.50	3	16-QAM	H	117	198	1 / 0	11.64	8.19	**19.83**	0.096	30.00	-10.17
1778.50	3	64-QAM	H	117	198	1 / 0	10.63	8.19	**18.82**	0.076	30.00	-11.18
1712.50	5	QPSK	H	120	201	1 / 0	11.64	8.19	19.83	0.096	30.00	-10.17
1745.00	5	QPSK	H	123	194	1 / 0	11.87	8.19	20.06	0.101	30.00	-9.94
1777.50	5	QPSK	H	119	199	1 / 0	12.74	8.19	**20.93**	0.124	30.00	-9.07
1777.50	5	16-QAM	H	119	199	1 / 0	11.86	8.19	**20.05**	0.101	30.00	-9.95
1777.50	5	64-QAM	H	119	199	1 / 0	11.00	8.19	**19.19**	0.083	30.00	-10.81
1715.00	10	QPSK	H	120	195	1 / 0	11.16	8.19	19.35	0.086	30.00	-10.65
1745.00	10	QPSK	H	123	187	1 / 0	11.62	8.19	19.81	0.096	30.00	-10.19
1775.00	10	QPSK	H	118	189	1 / 0	12.71	8.19	**20.90**	0.123	30.00	-9.10
1775.00	10	16-QAM	H	118	189	1 / 0	11.64	8.19	**19.83**	0.096	30.00	-10.17
1775.00	10	64-QAM	H	118	189	1 / 0	10.76	8.19	**18.95**	0.079	30.00	-11.05
1717.50	15	QPSK	H	123	201	1 / 74	11.42	8.19	19.61	0.092	30.00	-10.39
1745.00	15	QPSK	H	124	194	1 / 74	10.60	8.19	18.79	0.076	30.00	-11.21
1772.50	15	QPSK	H	117	191	1 / 74	12.03	8.19	**20.22**	0.105	30.00	-9.78
1772.50	15	16-QAM	H	117	191	1 / 74	11.10	8.19	**19.29**	0.085	30.00	-10.71
1772.50	15	64-QAM	H	117	191	1 / 74	10.36	8.19	**18.55**	0.072	30.00	-11.45
1720.00	20	QPSK	H	108	213	1 / 99	11.11	8.19	19.30	0.085	30.00	-10.70
1745.00	20	QPSK	H	109	216	1 / 0	11.59	8.19	19.78	0.095	30.00	-10.22
1770.00	20	QPSK	H	115	197	1 / 99	11.87	8.19	**20.06**	0.101	30.00	-9.94
1770.00	20	16-QAM	H	115	197	1 / 99	11.22	8.19	**19.41**	0.087	30.00	-10.59
1770.00	20	64-QAM	H	115	197	1 / 99	10.10	8.19	**18.29**	0.068	30.00	-11.71
1779.30	1.4	QPSK	V	139	36	1 / 0	11.11	8.19	19.30	0.085	30.00	-10.70
1779.30	1.4	QPSK (WCP)	V	121	211	1 / 0	10.74	8.19	18.93	0.078	30.00	-11.07

Table 7-8. EIRP Data (Band 66/4)

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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	136	331	1 / 0	12.60	8.37	20.97	0.125	33.01	-12.04
1882.50	1.4	QPSK	H	138	328	1 / 0	13.36	8.42	**21.78**	0.151	33.01	-11.23
1914.30	1.4	QPSK	H	135	328	1 / 0	12.50	8.47	20.97	0.125	33.01	-12.04
1882.50	1.4	16-QAM	H	138	328	1 / 0	12.38	8.42	**20.80**	0.120	33.01	-12.21
1882.50	1.4	64-QAM	H	138	328	1 / 0	11.60	8.42	**20.02**	0.100	33.01	-12.99
1851.50	3	QPSK	H	145	337	1 / 0	12.60	8.37	20.97	0.125	33.01	-12.04
1882.50	3	QPSK	H	142	335	1 / 0	13.50	8.42	**21.92**	0.156	33.01	-11.09
1913.50	3	QPSK	H	140	328	1 / 0	12.70	8.47	21.17	0.131	33.01	-11.84
1882.50	3	16-QAM	H	142	335	1 / 0	12.58	8.42	**21.00**	0.126	33.01	-12.01
1882.50	3	64-QAM	H	142	335	1 / 0	11.49	8.42	**19.91**	0.098	33.01	-13.10
1852.50	5	QPSK	H	136	328	1 / 0	12.82	8.37	21.19	0.131	33.01	-11.82
1882.50	5	QPSK	H	139	330	1 / 0	13.50	8.42	**21.92**	0.156	33.01	-11.09
1912.50	5	QPSK	H	135	331	1 / 0	12.58	8.47	21.05	0.127	33.01	-11.96
1882.50	5	16-QAM	H	139	330	1 / 0	12.40	8.42	**20.82**	0.121	33.01	-12.19
1882.50	5	64-QAM	H	139	330	1 / 0	11.49	8.42	**19.91**	0.098	33.01	-13.10
1855.00	10	QPSK	H	140	331	1 / 0	12.58	8.37	20.95	0.124	33.01	-12.06
1882.50	10	QPSK	H	141	329	1 / 0	13.70	8.42	**22.12**	**0.163**	33.01	-10.89
1910.00	10	QPSK	H	144	333	1 / 0	12.52	8.47	20.99	0.126	33.01	-12.02
1882.50	10	16-QAM	H	141	329	1 / 0	12.93	8.42	**21.35**	0.136	33.01	-11.66
1882.50	10	64-QAM	H	141	329	1 / 0	11.90	8.42	**20.32**	0.108	33.01	-12.69
1857.50	15	QPSK	H	143	332	1 / 0	12.69	8.37	21.06	0.128	33.01	-11.95
1882.50	15	QPSK	H	146	337	1 / 0	13.57	8.42	**21.99**	0.158	33.01	-11.02
1907.50	15	QPSK	H	144	331	1 / 0	12.46	8.47	20.93	0.124	33.01	-12.08
1882.50	15	16-QAM	H	146	337	1 / 0	12.72	8.42	**21.14**	0.130	33.01	-11.87
1882.50	15	64-QAM	H	146	337	1 / 0	11.96	8.42	**20.38**	0.109	33.01	-12.63
1860.00	20	QPSK	H	147	334	1 / 99	13.06	8.37	21.43	0.139	33.01	-11.58
1882.50	20	QPSK	H	144	329	1 / 0	13.64	8.42	**22.06**	0.161	33.01	-10.95
1905.00	20	QPSK	H	137	325	1 / 0	12.57	8.47	21.04	0.127	33.01	-11.97
1882.50	20	16-QAM	H	144	329	1 / 0	12.74	8.42	**21.16**	0.131	33.01	-11.85
1882.50	20	64-QAM	H	144	329	1 / 0	11.83	8.42	**20.25**	0.106	33.01	-12.76
1882.50	10	QPSK	V	189	111	1 / 0	12.71	8.47	21.18	0.131	33.01	-11.83
1882.50	10	QPSK (WCP)	H	151	322	1 / 0	12.46	8.47	20.93	0.124	33.01	-12.08

Table 7-9. EIRP Data (Band 25/2)

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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	158	324	12 / 6	8.05	8.53	16.58	0.045	33.01	-16.43
2593.00	5	QPSK	H	169	330	12 / 6	10.52	8.54	**19.06**	0.081	33.01	-13.95
2687.50	5	QPSK	H	171	237	12 / 6	5.26	8.83	14.09	0.026	33.01	-18.92
2593.00	5	16-QAM	H	169	330	12 / 6	9.85	8.54	**18.39**	0.069	33.01	-14.62
2593.00	5	64-QAM	H	169	330	12 / 6	8.26	8.54	**16.80**	0.048	33.01	-16.21
2501.00	10	QPSK	H	159	329	1 / 0	8.45	8.52	16.97	0.050	33.01	-16.04
2593.00	10	QPSK	H	167	332	1 / 0	10.62	8.54	**19.16**	0.082	33.01	-13.85
2685.00	10	QPSK	H	176	240	1 / 0	6.79	8.82	15.61	0.036	33.01	-17.40
2593.00	10	16-QAM	H	167	332	1 / 0	9.09	8.54	**17.63**	0.058	33.01	-15.38
2593.00	10	64-QAM	H	167	332	1 / 0	8.95	8.54	**17.49**	0.056	33.01	-15.52
2503.50	15	QPSK	H	155	321	1 / 0	8.10	8.51	16.61	0.046	33.01	-16.40
2593.00	15	QPSK	H	169	334	1 / 0	11.68	8.54	**20.22**	**0.105**	33.01	-12.79
2682.50	15	QPSK	H	172	231	1 / 0	6.91	8.82	15.73	0.037	33.01	-17.28
2593.00	15	16-QAM	H	169	334	1 / 0	9.73	8.54	**18.27**	0.067	33.01	-14.74
2593.00	15	64-QAM	H	169	334	1 / 0	9.38	8.54	**17.92**	0.062	33.01	-15.09
2506.00	20	QPSK	H	153	334	1 / 0	10.81	8.51	19.32	0.085	33.01	-13.69
2593.00	20	QPSK	H	177	337	1 / 0	11.67	8.54	**20.21**	0.105	33.01	-12.80
2680.00	20	QPSK	H	155	225	1 / 0	7.13	8.82	15.95	0.039	33.01	-17.07
2593.00	20	16-QAM	H	177	337	1 / 0	9.36	8.54	**17.90**	0.062	33.01	-15.11
2593.00	20	64-QAM	H	177	337	1 / 0	8.95	8.54	**17.49**	0.056	33.01	-15.52
2593.00	15	QPSK	V	120	188	1 / 0	9.00	8.54	17.54	0.057	33.01	-15.47

Table 7-10. EIRP Data (Band 41)

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7.7 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

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Test Setup

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

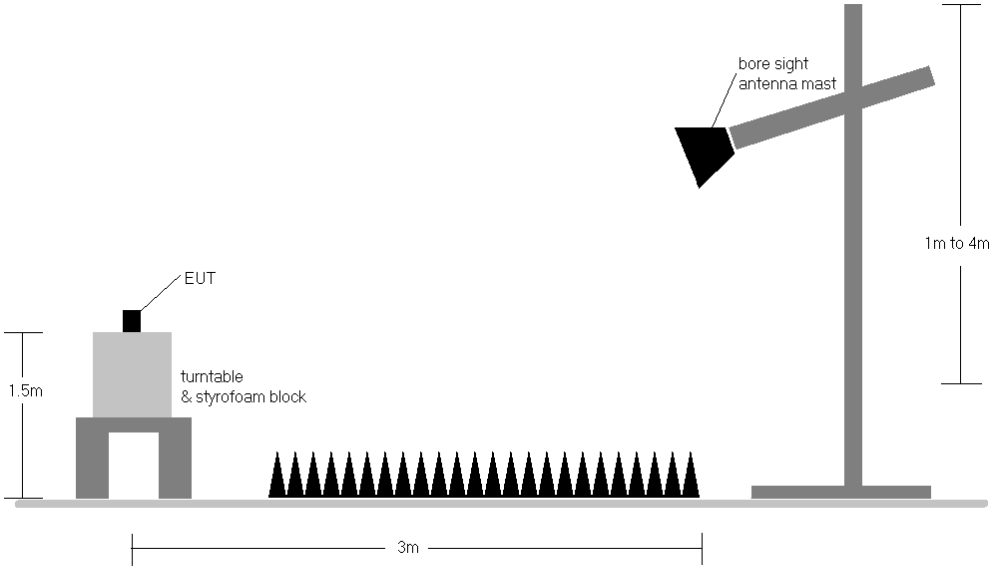

Figure 7-7. Test Instrument & Measurement Setup

Test Notes

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

2) This unit was tested with its standard battery.

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

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

5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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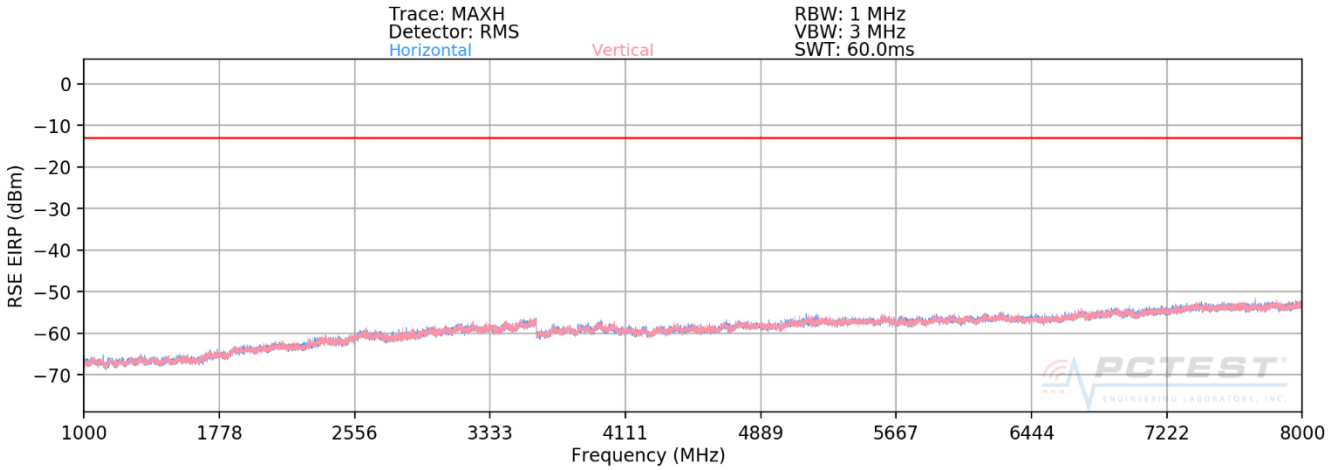
Band 12/17



Plot 7-274. Radiated Spurious Plot above 1GHz (Band 12/17)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1408.00	V	130	273	-71.31	7.56	-63.75	-50.8
2112.00	V	113	39	-68.57	7.74	-60.83	-47.8
2816.00	V	114	12	-68.89	10.54	-58.34	-45.3
3520.00	V	400	13	-74.31	10.86	-63.45	-50.4
4224.00	V	-	-	-74.12	10.60	-63.53	-50.5

Table 7-11. Radiated Spurious Data (Band 12/17 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	V	114	257	-72.66	7.63	-65.03	-52.0
2122.50	V	108	0	-74.46	7.88	-66.58	-53.6
2830.00	V	118	7	-72.63	10.57	-62.06	-49.1
3537.50	V	-	-	-74.24	10.86	-63.38	-50.4

Table 7-12. Radiated Spurious Data (Band 12/17 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1422.00	V	180	218	-77.03	7.70	-69.33	-56.3
2133.00	V	114	26	-70.41	8.02	-62.39	-49.4
2844.00	V	150	81	-76.63	10.61	-66.03	-53.0
3555.00	V	-	-	-75.45	10.87	-64.58	-51.6

Table 7-13. Radiated Spurious Data (Band 12/17 – High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1408.00	V	118	115	-75.00	7.56	-67.44	-54.4
2112.00	V	117	155	-72.02	7.74	-64.28	-51.3
2816.00	V	122	159	-69.28	10.54	-58.73	-45.7
3520.00	V	112	175	-70.56	10.86	-59.70	-46.7
4224.00	V	-	-	-74.58	10.60	-63.99	-51.0

Table 7-14. Radiated Spurious Data with WCP (Band 12/17 – Low Channel)

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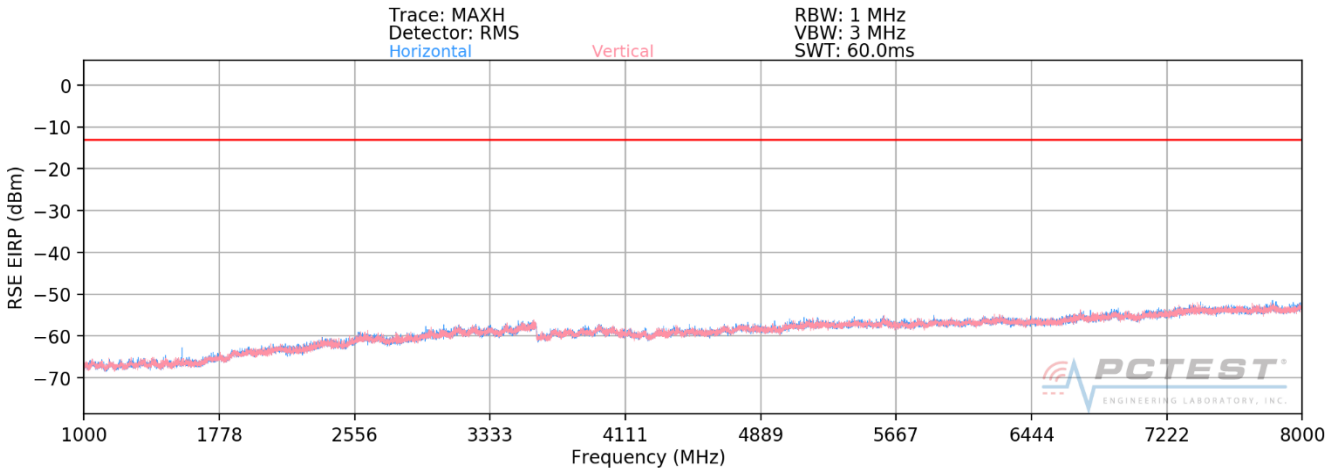
Band 13



Plot 7-275. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY:	782.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	V	-	-	-72.43	10.00	-62.43	-49.4
3128.00	V	112	237	-78.48	10.58	-67.89	-54.9
3910.00	V	-	-	-77.51	10.28	-67.24	-54.2

Table 7-15. Radiated Spurious Data (Band 13 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	V	-	-	-81.12	8.62	-72.50	-32.5

Table 7-16. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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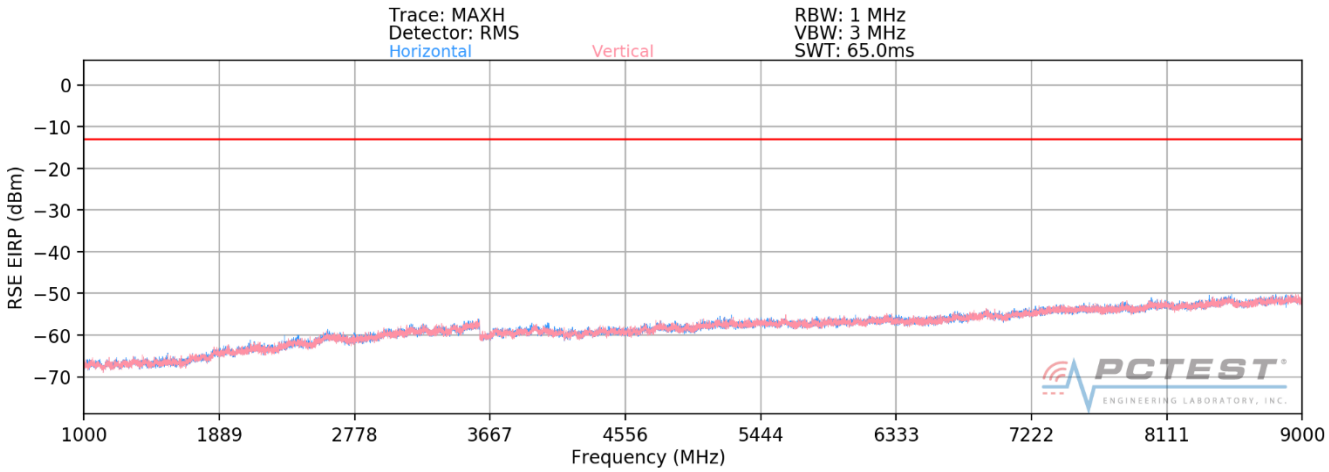
Band 26/5



Plot 7-276. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY:	826.50	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]
1653.00	H	-	-	-69.40	3.09	-66.31	-53.3
2479.50	H	-	-	-66.47	3.91	-62.56	-49.6

Table 7-17. Radiated Spurious Data (Band 26/5 – Low Channel)

OPERATING FREQUENCY:	836.50	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]
1673.00	H	-	-	-69.61	3.10	-66.51	-53.5
2509.50	H	-	-	-66.31	4.02	-62.29	-49.3

Table 7-18. Radiated Spurious Data (Band 26/5 – Mid Channel)

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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	-	-	-69.23	3.17	-66.06	-53.1
2539.50	H	-	-	-65.89	4.12	-61.77	-48.8

Table 7-19. Radiated Spurious Data (Band 26/5 – High Channel)

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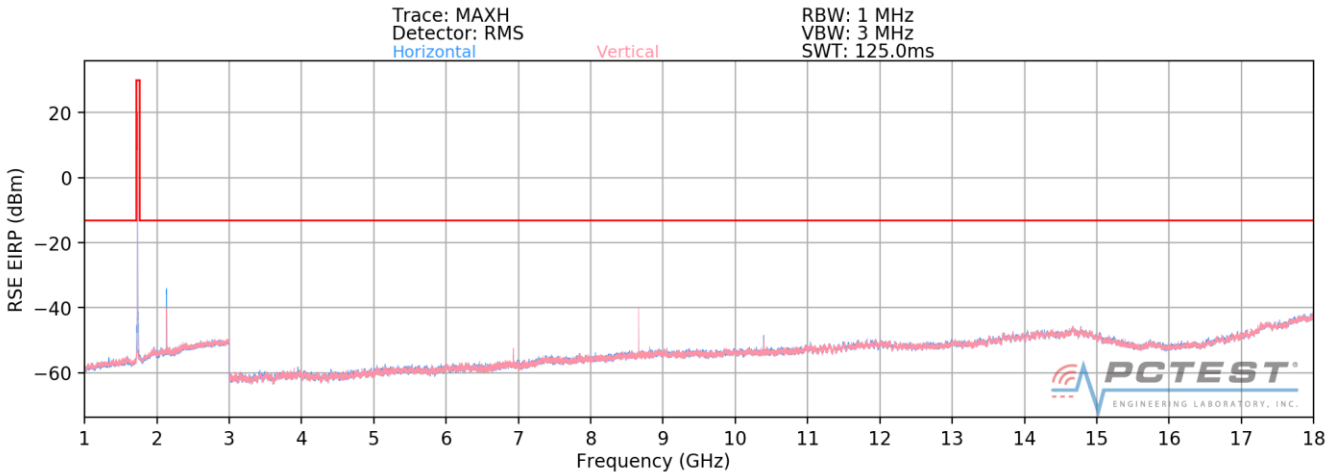
Band 66/4



Plot 7-277. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY:	1710.70	MHz
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]
3421.40	H	-	-	-43.63	6.19	-37.44	-24.4
5132.10	H	-	-	-46.67	8.66	-38.01	-25.0
6842.80	H	100	292	-59.52	8.78	-50.74	-37.7
8553.50	H	105	65	-45.46	9.11	-36.35	-23.3
10264.20	H	102	334	-43.73	9.64	-34.09	-21.1
11974.90	H	103	357	-56.87	9.31	-47.56	-34.6
13685.60	H	-	-	-57.31	8.99	-48.33	-35.3

Table 7-20. Radiated Spurious Data (Band 66/4 – Low Channel)

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OPERATING FREQUENCY: 1745.00 MHz
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]
3490.00	H	-	-	-43.88	6.32	-37.56	-24.6
5235.00	H	-	-	-47.26	8.71	-38.55	-25.5
6980.00	H	105	285	-58.55	8.74	-49.82	-36.8
8725.00	H	100	61	-46.53	9.42	-37.12	-24.1
10470.00	H	108	336	-45.84	9.62	-36.22	-23.2
12215.00	H	102	12	-55.92	9.09	-46.83	-33.8
13960.00	H	-	-	-57.64	8.90	-48.73	-35.7

Table 7-21. Radiated Spurious Data (Band 66/4 – Mid Channel)

OPERATING FREQUENCY: 1779.30 MHz
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]
3558.60	H	-	-	-67.12	6.32	-60.80	-47.8
5337.90	H	-	-	-67.62	8.71	-58.91	-45.9
7117.20	H	115	283	-60.33	8.63	-51.70	-38.7
8896.50	H	100	64	-45.26	9.56	-35.70	-22.7
10675.80	H	240	358	-51.27	9.42	-41.85	-28.9
12455.10	H	100	5	-56.45	9.04	-47.42	-34.4
14234.40	H	-	-	-56.96	8.82	-48.14	-35.1

Table 7-22. Radiated Spurious Data (Band 66/4 – High Channel)

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OPERATING FREQUENCY:	1710.70	MHz
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]
3421.40	H	-	-	-66.69	6.19	-60.50	-47.5
5132.10	H	-	-	-67.95	8.66	-59.29	-46.3
6842.80	H	149	294	-57.06	8.78	-48.28	-35.3
8553.50	H	146	164	-48.68	9.11	-39.57	-26.6
10264.20	H	149	239	-46.18	9.64	-36.54	-23.5
11974.90	H	127	228	-57.47	9.31	-48.16	-35.2
13685.60	H	-	-	-56.99	8.99	-48.00	-35.0

Table 7-23. Radiated Spurious Data with WCP (Band 66/4 – Low Channel)

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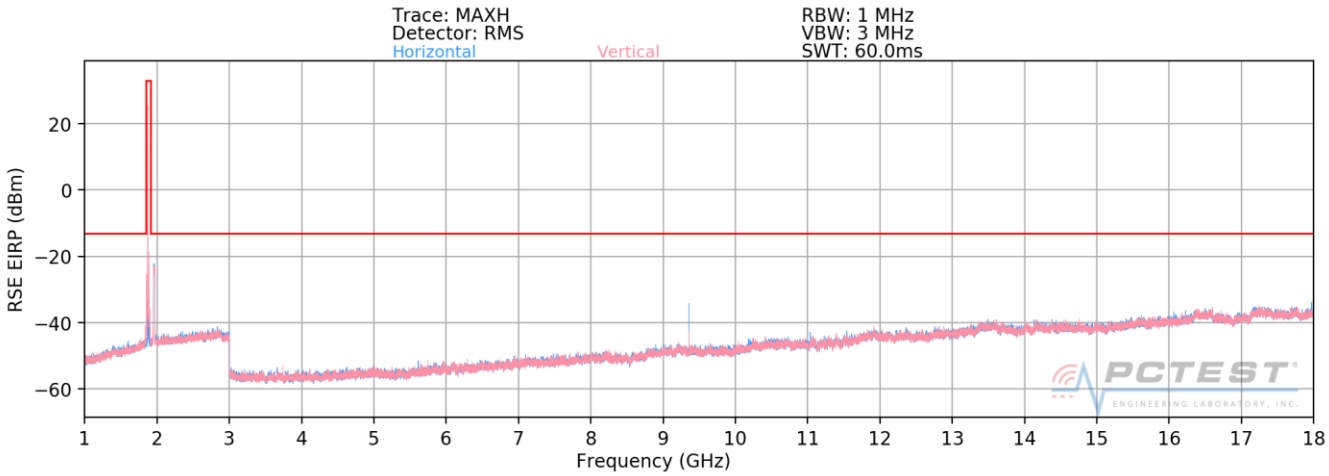
Band 25/2



Plot 7-278. Radiated Spurious Plot above 1GHz (Band 25)

OPERATING FREQUENCY:	1855.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3710.00	H	-	-	-67.97	6.57	-61.40	-48.4
5565.00	H	-	-	-67.09	8.73	-58.36	-45.4
7420.00	H	103	11	-61.70	8.41	-53.29	-40.3
9275.00	H	100	333	-52.50	9.40	-43.10	-30.1
11130.00	H	-	-	-60.10	9.32	-50.78	-37.8

Table 7-24. Radiated Spurious Data (Band 25/2– Low Channel)

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OPERATING FREQUENCY:	1882.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	-	-	-67.41	6.70	-60.71	-47.7
5647.50	H	-	-	-67.60	8.83	-58.77	-45.8
7530.00	H	110	4	-60.97	8.46	-52.52	-39.5
9412.50	H	100	338	-49.53	9.32	-40.21	-27.2
11295.00	H	231	325	-59.08	9.23	-49.85	-36.9
13177.50	H	-	-	-57.97	9.08	-48.88	-35.9

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

OPERATING FREQUENCY:	1910.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3820.00	H	-	-	-67.81	7.00	-60.81	-47.8
5730.00	H	-	-	-67.05	8.77	-58.28	-45.3
7640.00	H	107	9	-61.50	8.54	-52.96	-40.0
9550.00	H	102	342	-49.36	9.43	-39.93	-26.9
11460.00	H	-	-	-59.23	9.17	-50.06	-37.1

Table 7-26. Radiated Spurious Data (Band 25/2– High Channel)

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OPERATING FREQUENCY:	1882.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	-	-	-67.46	6.70	-60.76	-47.8
5647.50	H	-	-	-67.26	8.83	-58.43	-45.4
7530.00	H	168	187	-62.19	8.46	-53.74	-40.7
9412.50	H	196	247	-50.79	9.32	-41.47	-28.5
11295.00	H	117	245	-60.42	9.23	-51.19	-38.2
13177.50	H	-	-	-58.08	9.08	-48.99	-36.0

Table 7-27. Radiated Spurious Data with WCP (Band 25/2– Mid Channel)

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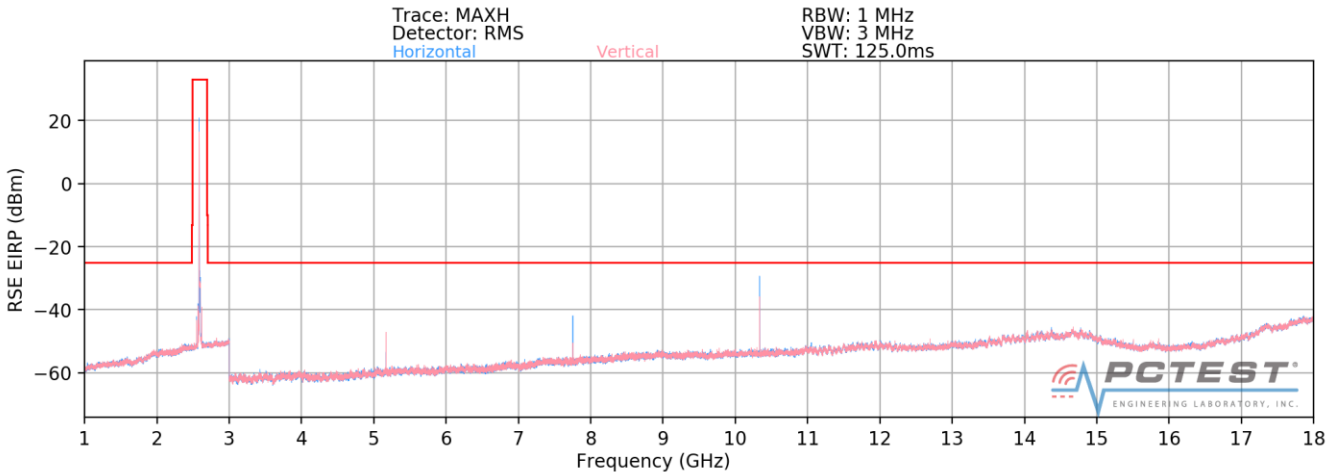
Band 41



Plot 7-279. Radiated Spurious Plot 1GHz - 18GHz (Band 41)

OPERATING FREQUENCY:	2507.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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]
5015.00	V	113	354	-55.76	8.56	-47.20	-22.2
7522.50	V	384	15	-54.92	8.48	-46.44	-21.4
10030.00	H	124	20	-38.51	9.85	-28.66	-3.7
12537.50	V	146	28	-54.47	9.06	-45.41	-20.4
15045.00	V	157	38	-52.87	8.76	-44.10	-19.1

Table 7-28. Radiated Spurious Data (Band 41 – Low Channel)

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OPERATING FREQUENCY: 2593.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 15.0 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	122	353	-50.14	8.70	-41.44	-16.4
7779.00	V	127	9	-50.09	8.69	-41.41	-16.4
10372.00	H	110	58	-37.64	9.62	-28.02	-3.0
12965.00	V	-	-	-57.94	8.99	-48.95	-24.0
15558.00	V	160	38	-52.19	8.32	-43.87	-18.9

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

OPERATING FREQUENCY: 2682.50 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 15.0 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]
5365.00	V	145	44	-56.42	8.69	-47.73	-22.7
8047.50	V	111	2	-54.64	8.96	-45.68	-20.7
10730.00	H	144	309	-40.84	9.31	-31.53	-6.5
13412.50	V	-	-	-56.46	8.76	-47.70	-22.7

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

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OPERATING FREQUENCY:	2593.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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	133	111	-62.76	11.79	-50.98	-26.0
7779.00	V	120	123	-56.44	10.95	-45.49	-20.5
10372.00	V	258	181	-40.57	11.98	-28.60	-3.6
12965.00	V	364	182	-62.73	13.14	-49.58	-24.6

Table 7-31. Radiated Spurious Data with WCP (Band 41 – Mid Channel)

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7.8 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

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Band 12/17 Frequency Stability Measurements

OPERATING FREQUENCY: 707,500,000 Hz

CHANNEL: 23790

REFERENCE VOLTAGE: 4.20 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.20	- 30	707,500,237	237	0.0000335
100 %		- 20	707,500,000	0	0.0000000
100 %		- 10	707,499,771	-229	-0.0000324
100 %		0	707,499,621	-379	-0.0000536
100 %		+ 10	707,499,688	-312	-0.0000441
100 %		+ 20	707,499,678	-322	-0.0000455
100 %		+ 30	707,500,093	93	0.0000131
100 %		+ 40	707,500,431	431	0.0000609
100 %		+ 50	707,500,080	80	0.0000113
BATT. ENDPOINT	3.82	+ 20	707,500,011	11	0.0000016

Table 7-32. Frequency Stability Data (Band 12/17)

Note:

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

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Band 12/17 Frequency Stability Measurements

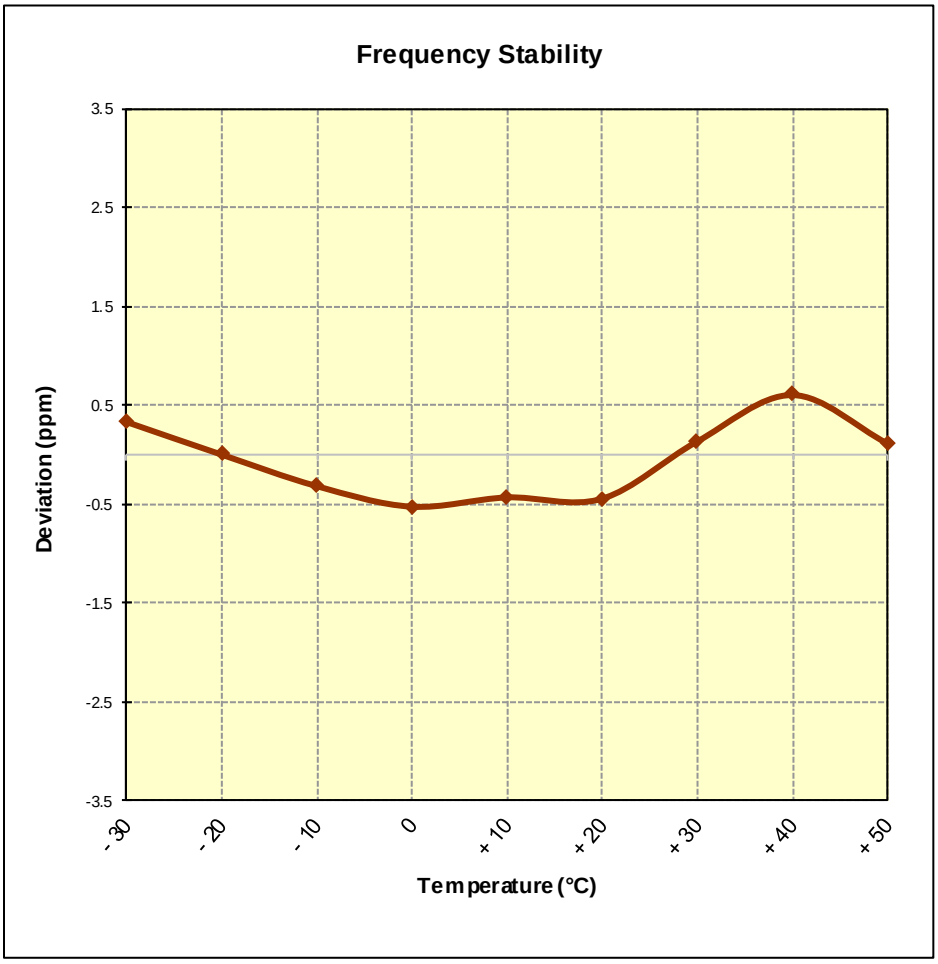

Figure 7-8. Frequency Stability Graph (Band 12/17)

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Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz

CHANNEL: 23230

REFERENCE VOLTAGE: 4.20 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.20	- 30	781,999,917	-83	-0.0000106
100 %		- 20	782,000,290	290	0.0000371
100 %		- 10	781,999,722	-278	-0.0000355
100 %		0	781,999,793	-207	-0.0000265
100 %		+ 10	782,000,344	344	0.0000440
100 %		+ 20	781,999,868	-132	-0.0000169
100 %		+ 30	781,999,992	-8	-0.0000010
100 %		+ 40	782,000,210	210	0.0000269
100 %		+ 50	781,999,838	-162	-0.0000207
BATT. ENDPOINT	3.82	+ 20	782,000,255	255	0.0000326

Table 7-33. 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.

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Band 13 Frequency Stability Measurements

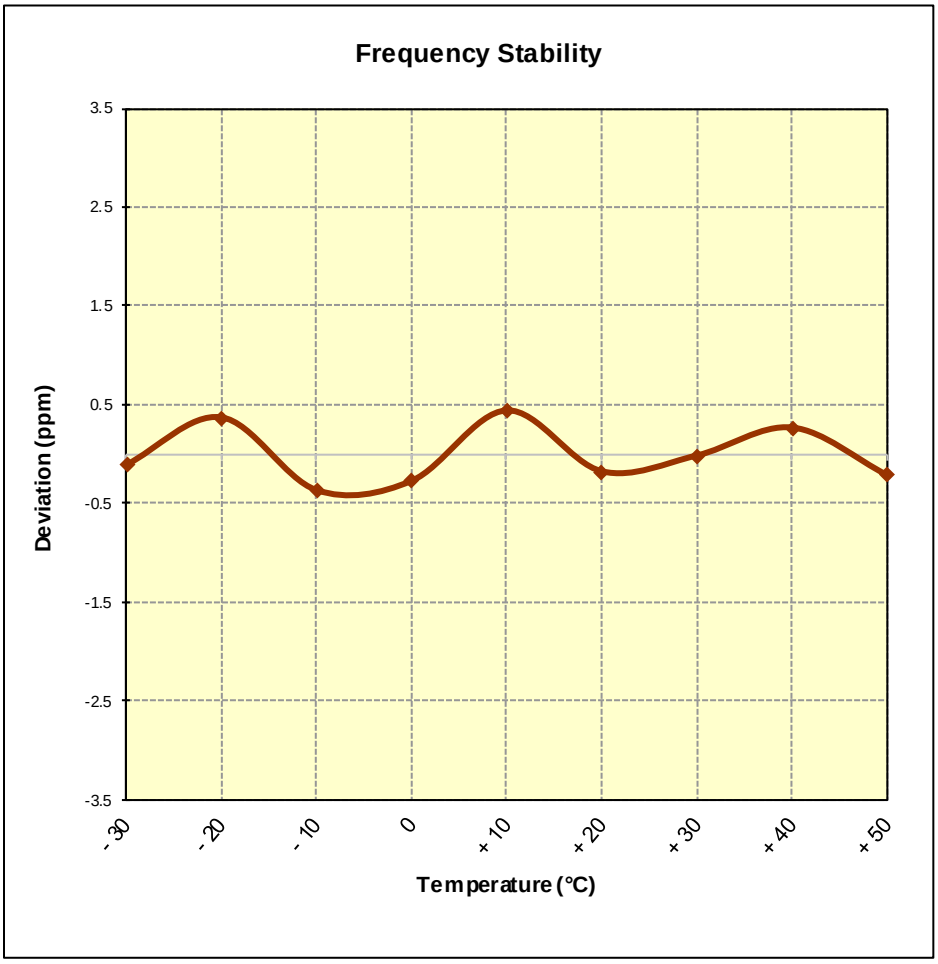

Figure 7-9. Frequency Stability Graph (Band 13)

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Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY: 831,500,000 Hz

CHANNEL: 26865

REFERENCE VOLTAGE: 4.20 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.20	- 30	831,500,048	48	0.0000058
100 %		- 20	831,500,032	32	0.0000038
100 %		- 10	831,500,277	277	0.0000333
100 %		0	831,500,030	30	0.0000036
100 %		+ 10	831,499,999	-1	-0.0000001
100 %		+ 20	831,500,140	140	0.0000168
100 %		+ 30	831,499,803	-197	-0.0000237
100 %		+ 40	831,499,945	-55	-0.0000066
100 %		+ 50	831,499,934	-66	-0.0000079
BATT. ENDPOINT	3.82	+ 20	831,499,965	-35	-0.0000042

Table 7-34. Frequency Stability Data (Band 26/5)

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