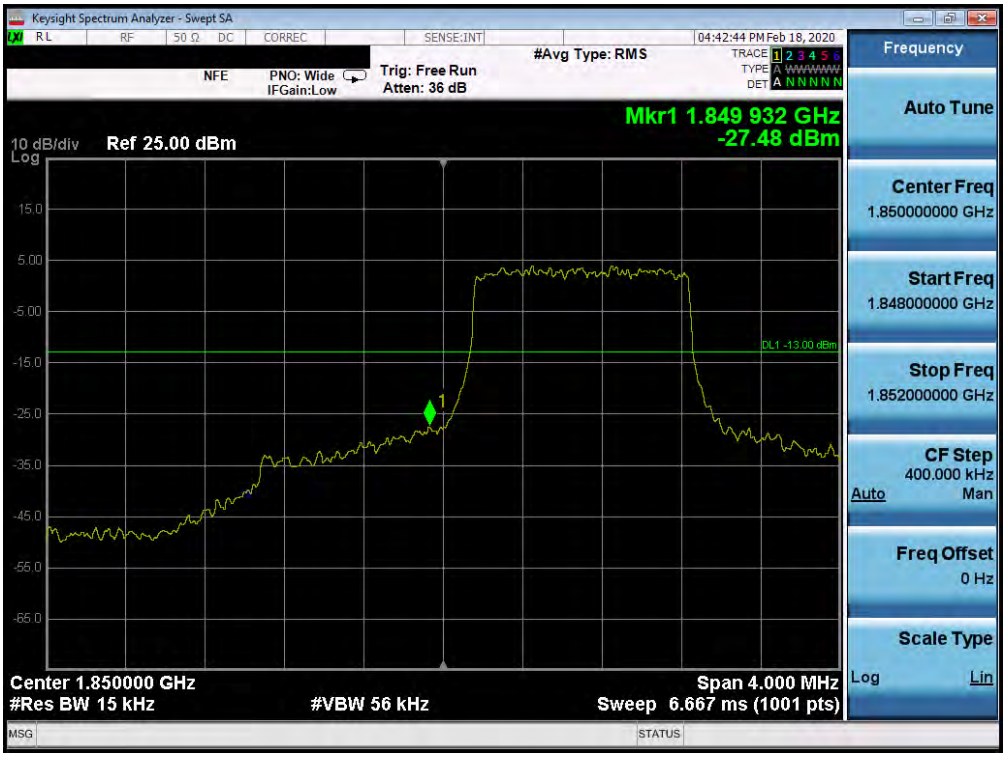
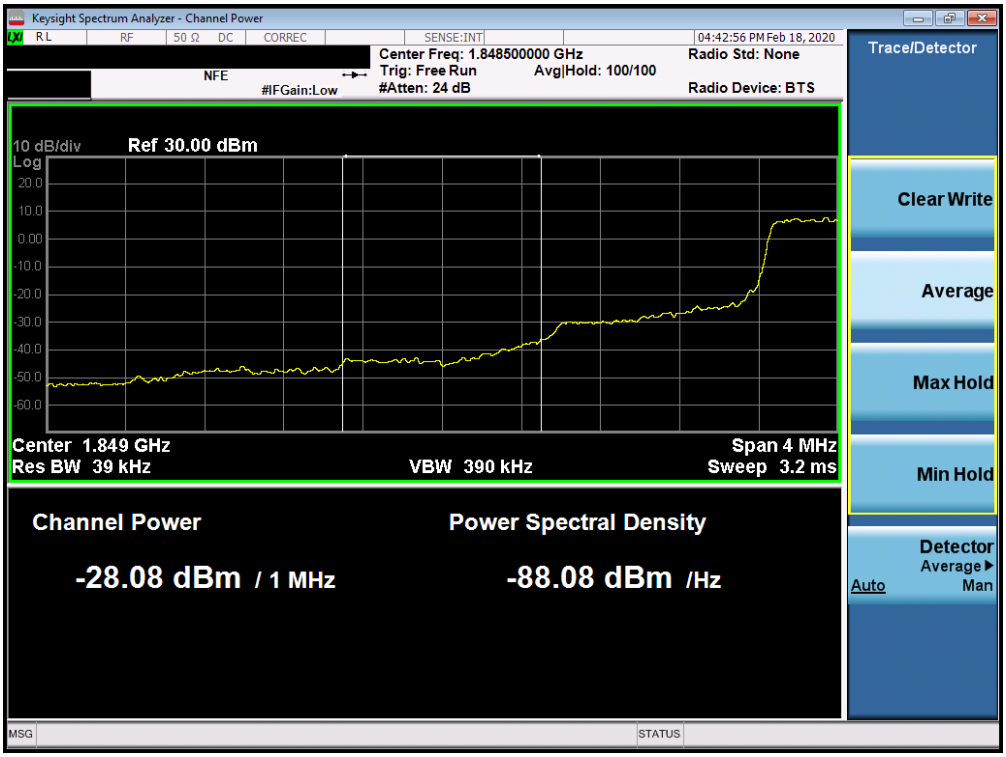
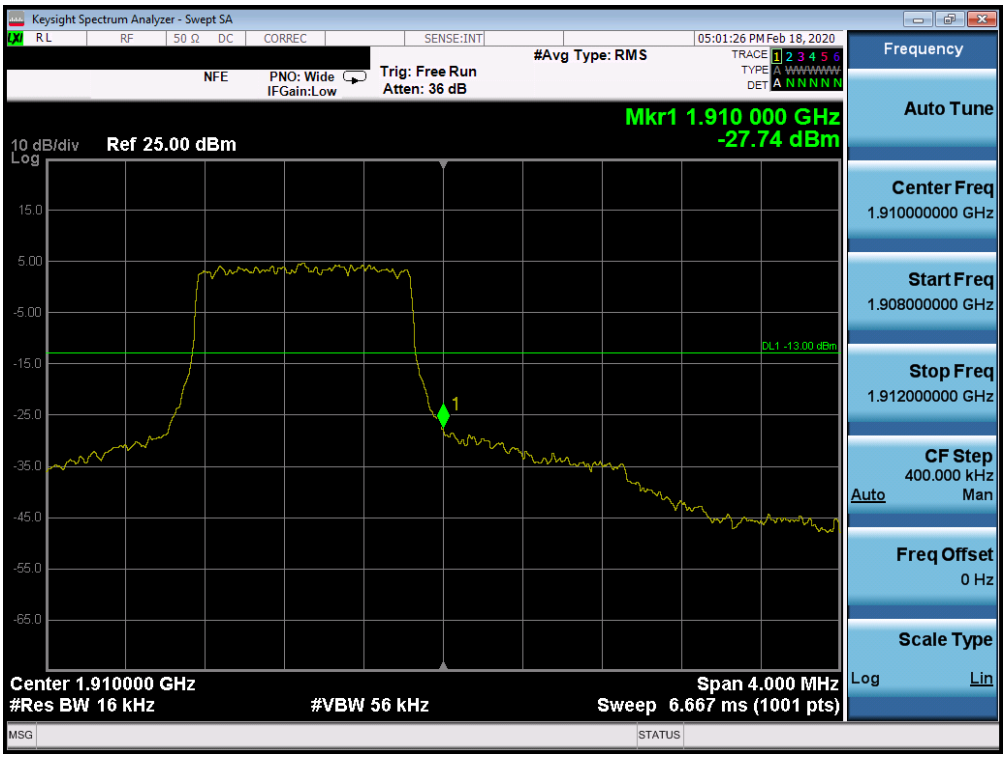
Band 25/2



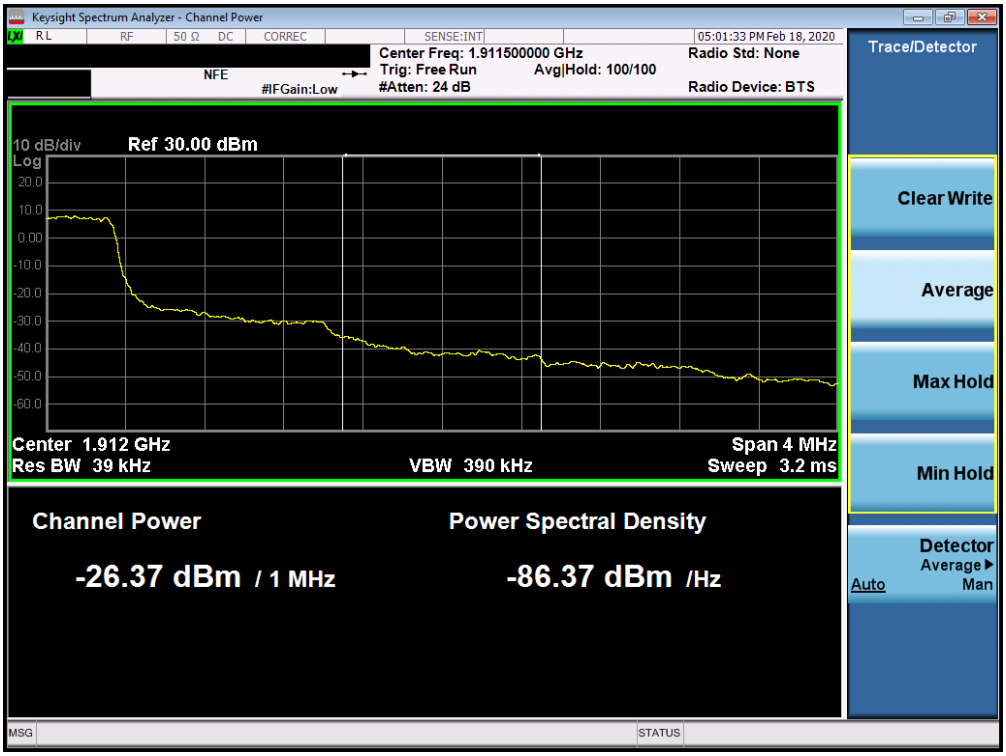
Plot 7-170. Lower Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-171. Lower Extended Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)

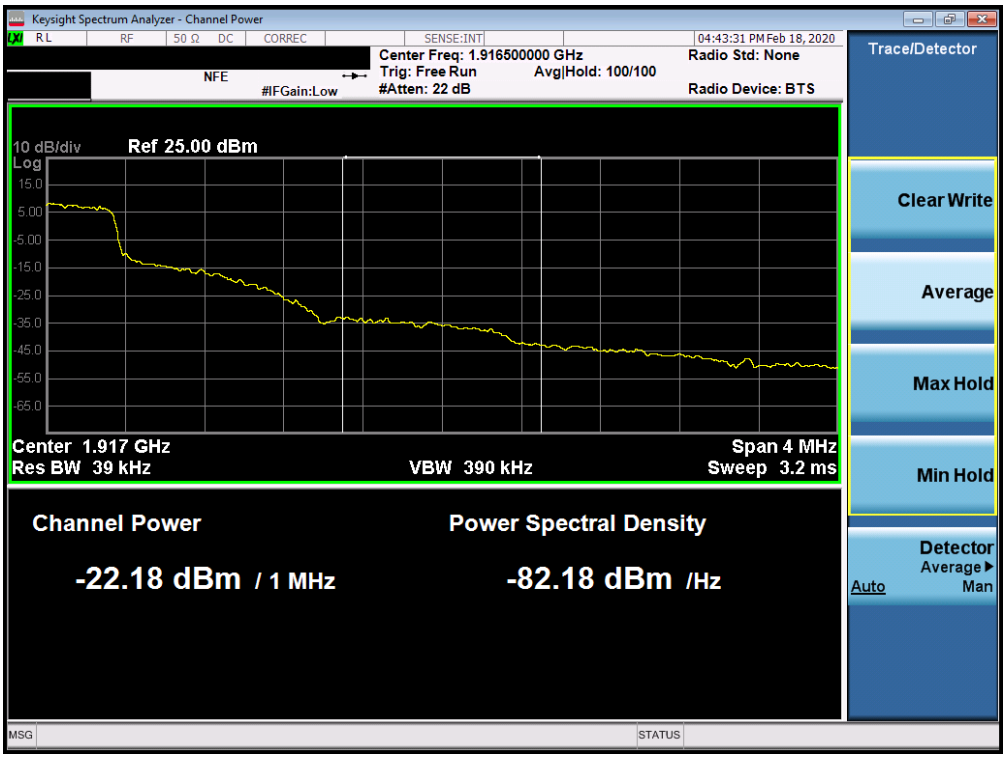


Plot 7-172. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

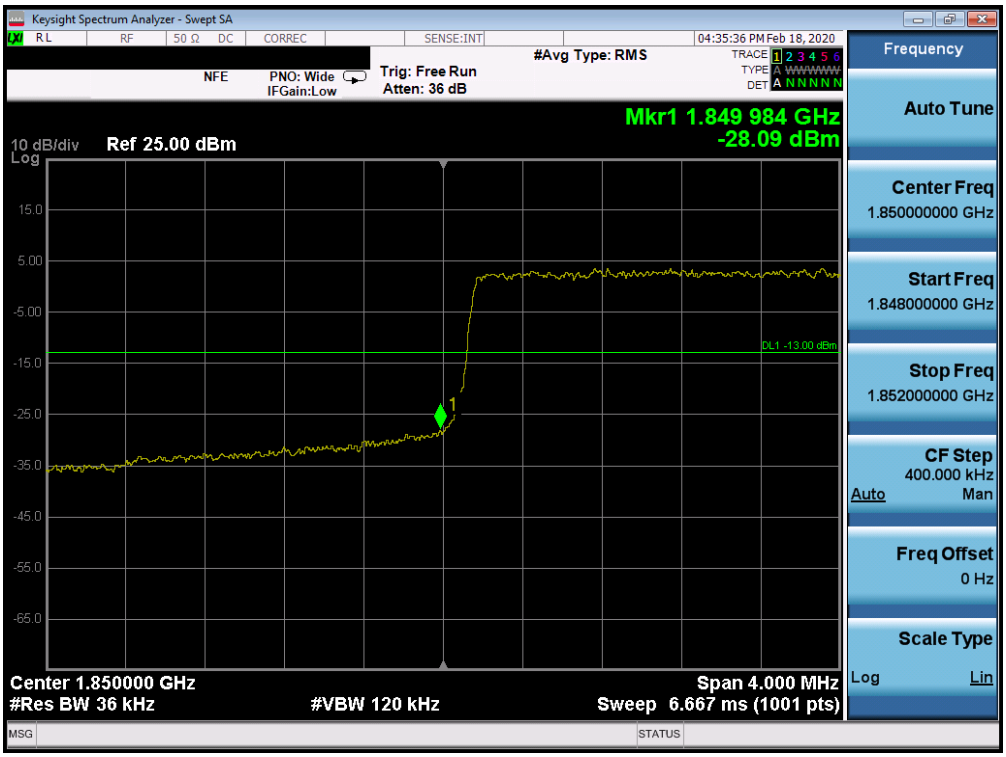


Plot 7-173. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

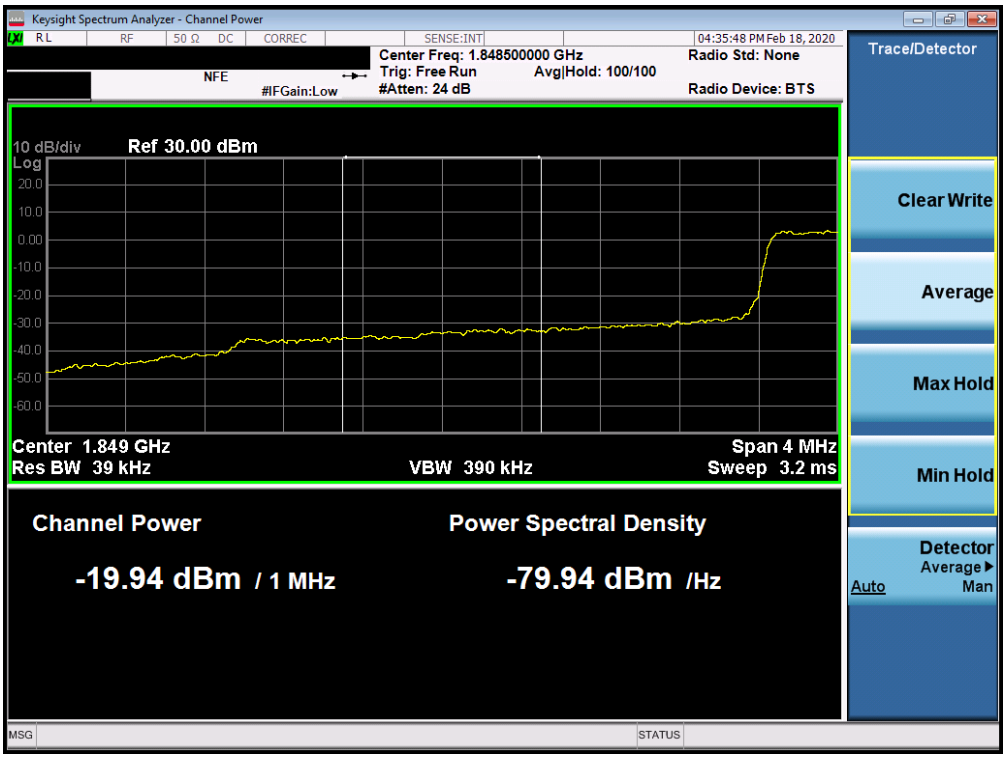
Plot 7-174. Upper Band Edge Plot (Band 25 - 1.4MHz QPSK - Full RB Configuration)



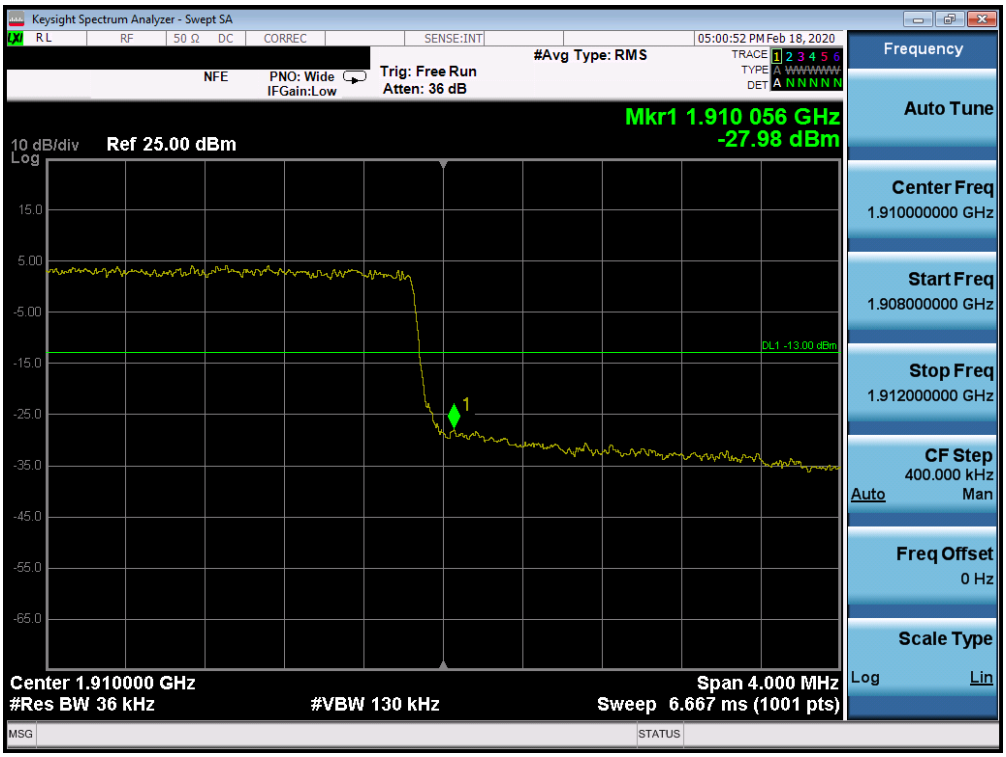
Plot 7-175. Upper Extended Band Edge Plot (Band 25 - 1.4MHz QPSK - Full RB Configuration)



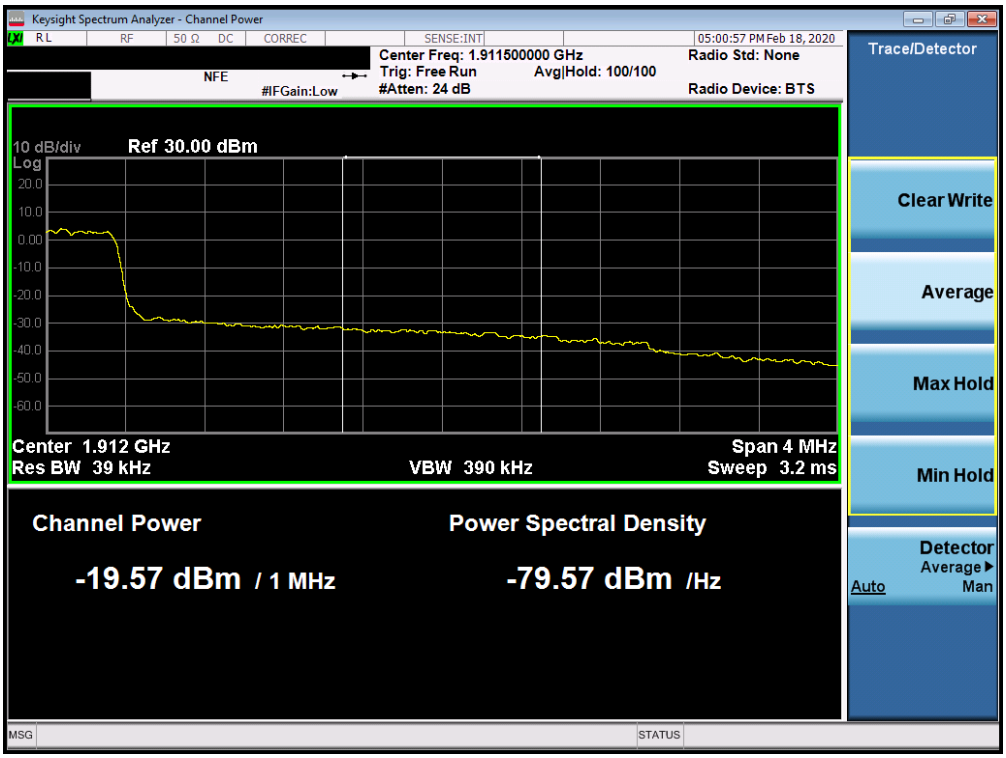
Plot 7-176. Lower Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-177. Lower Extended Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)

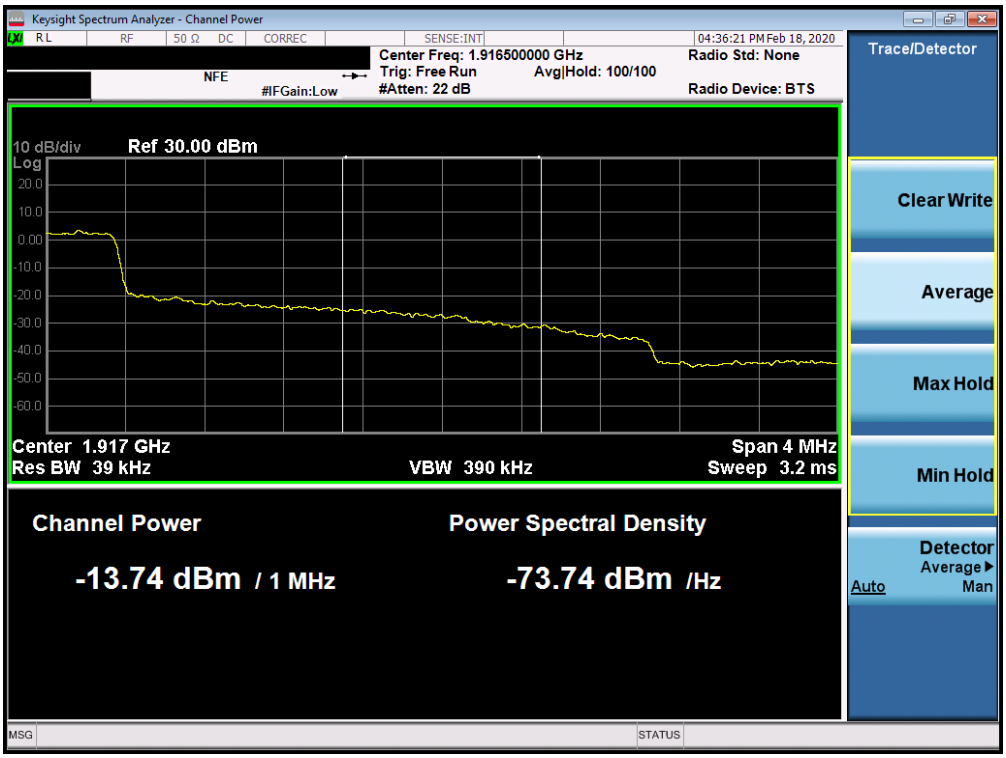


Plot 7-178. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

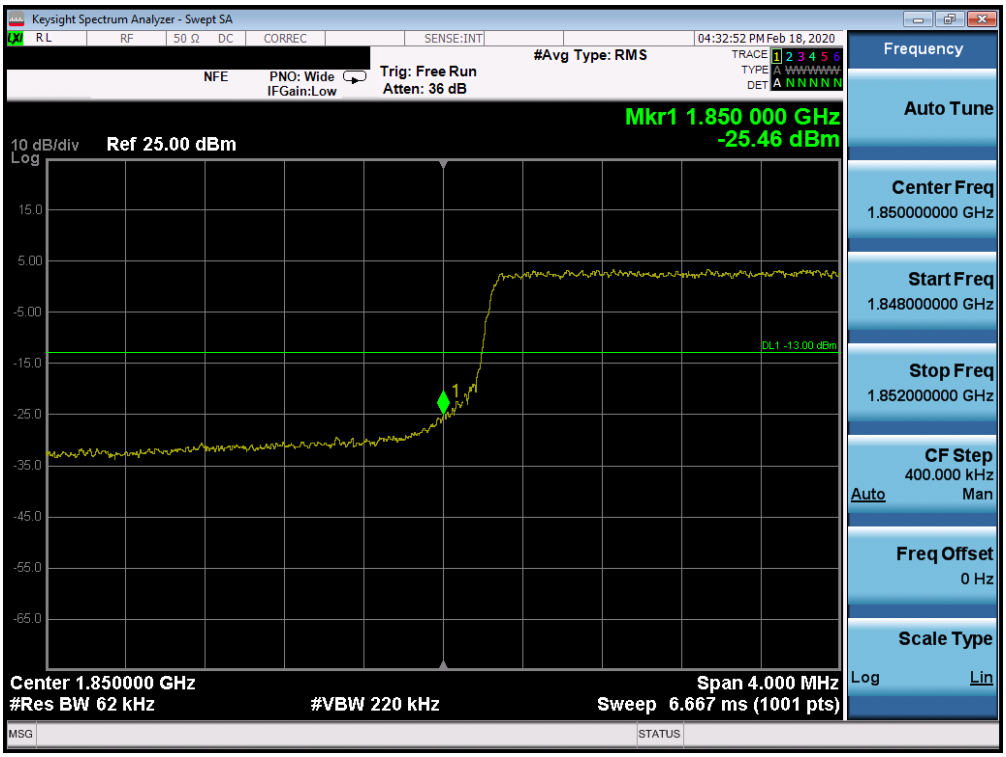


Plot 7-179. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

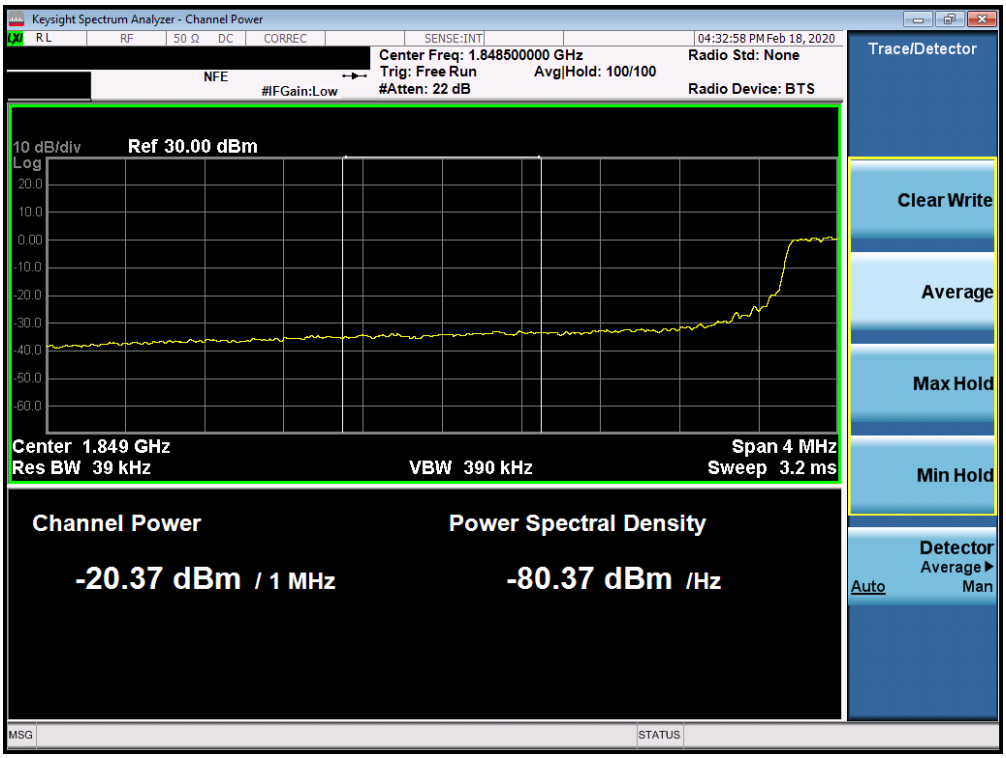
Plot 7-180. Upper Band Edge Plot (Band 25 - 3.0MHz QPSK - Full RB Configuration)



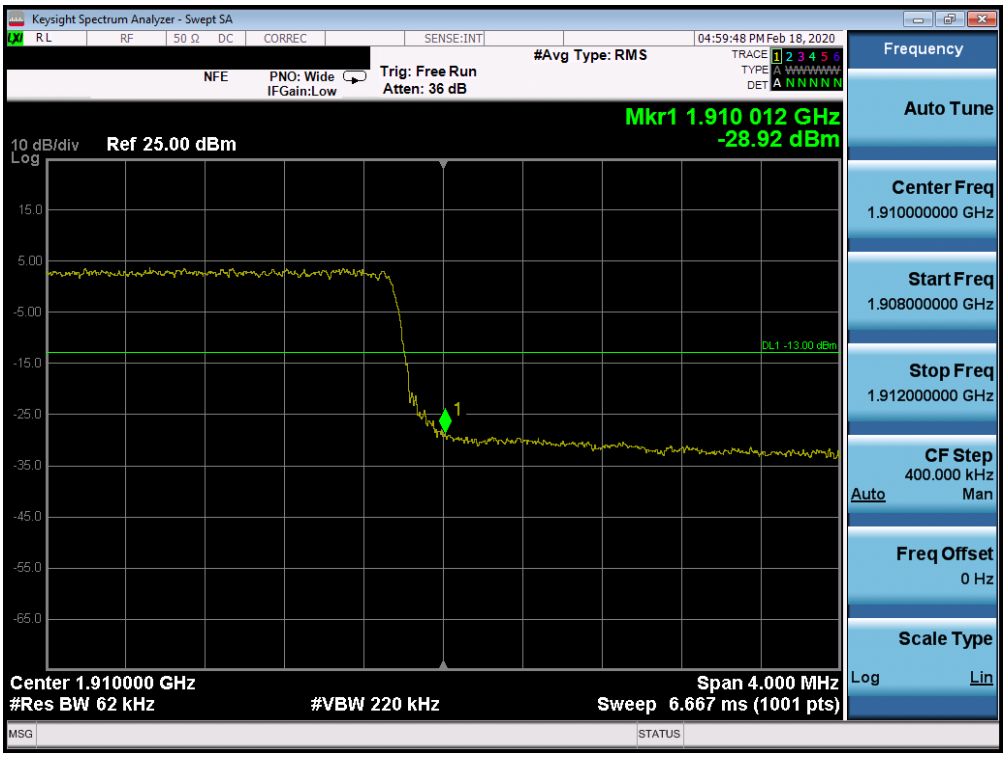
Plot 7-181. Upper Extended Band Edge Plot (Band 25 - 3.0MHz QPSK - Full RB Configuration)



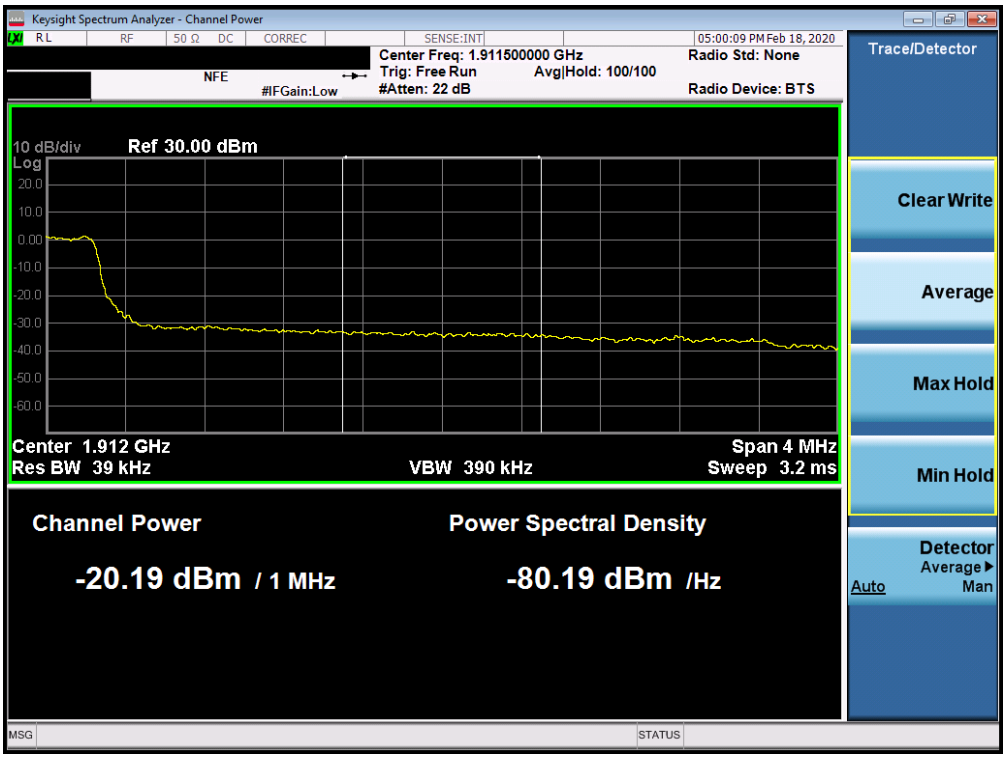
Plot 7-182. Lower Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-183. Lower Extended Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)

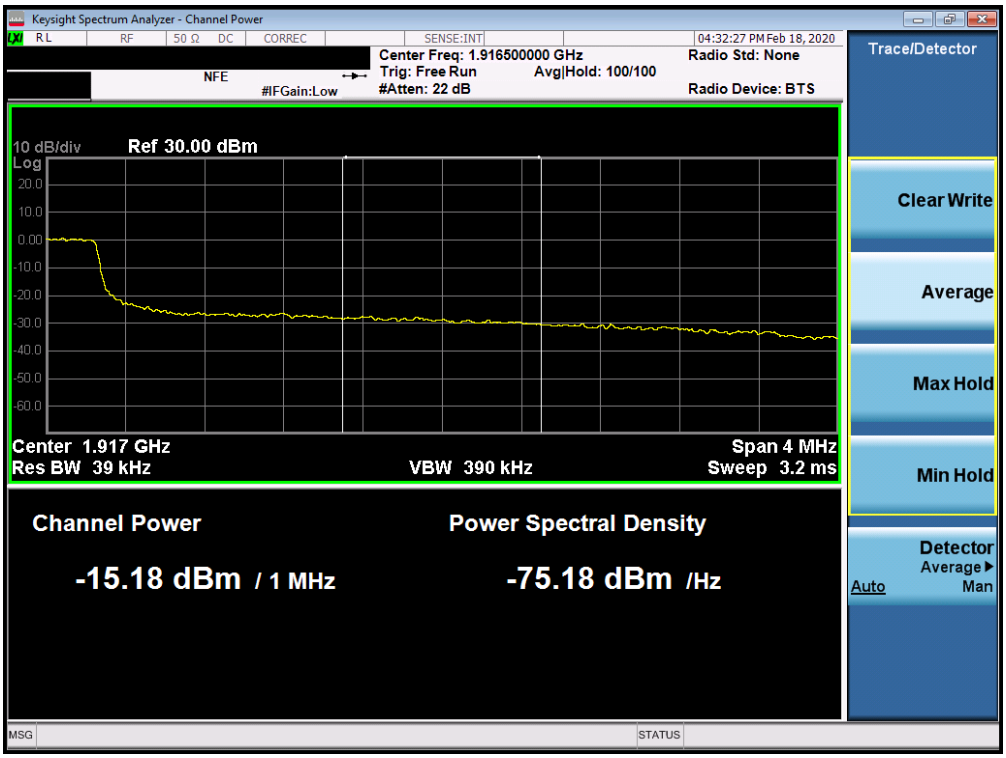


Plot 7-184. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

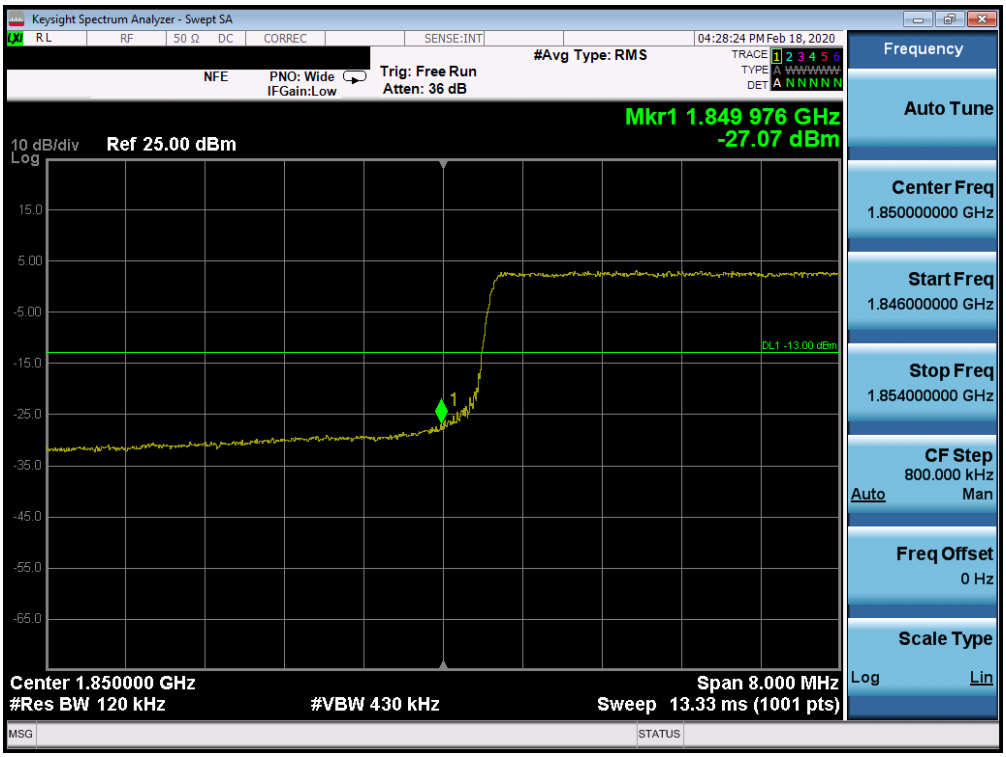


Plot 7-185. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

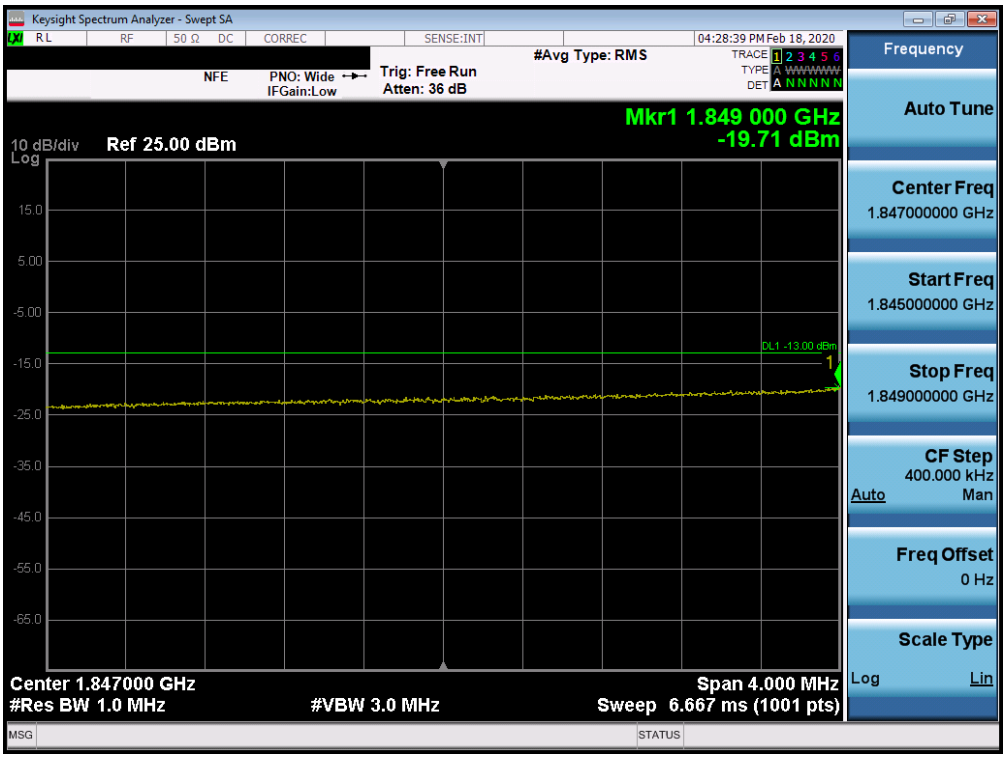
Plot 7-186. Upper Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-187. Upper Extended Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)

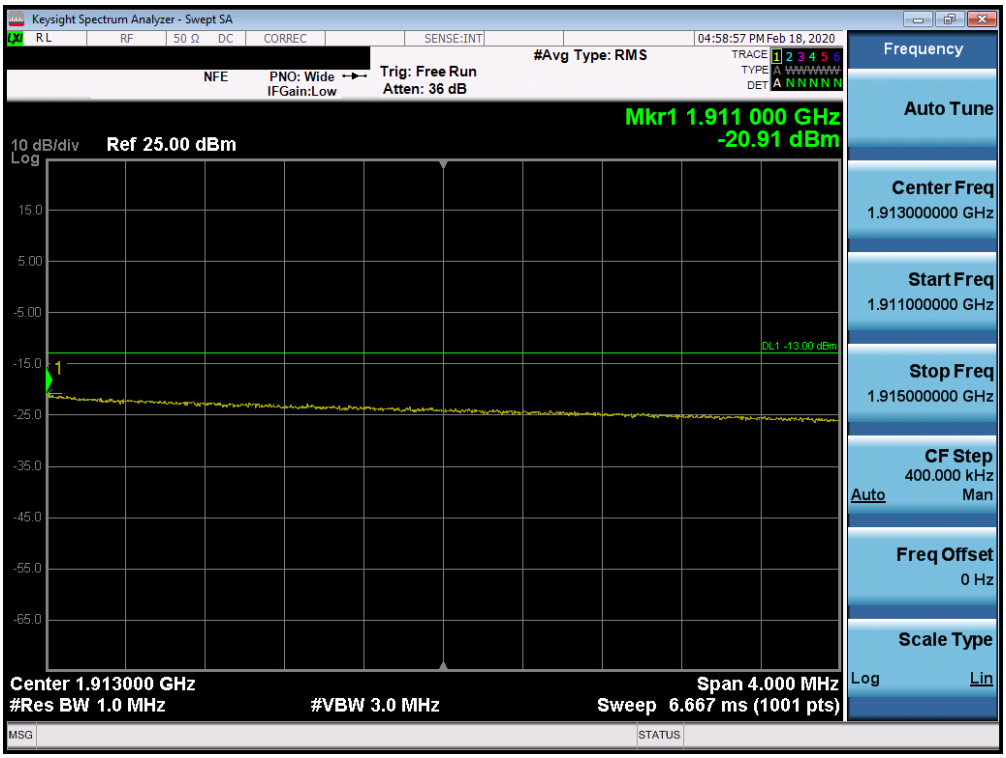


Plot 7-188. Lower Band Edge Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



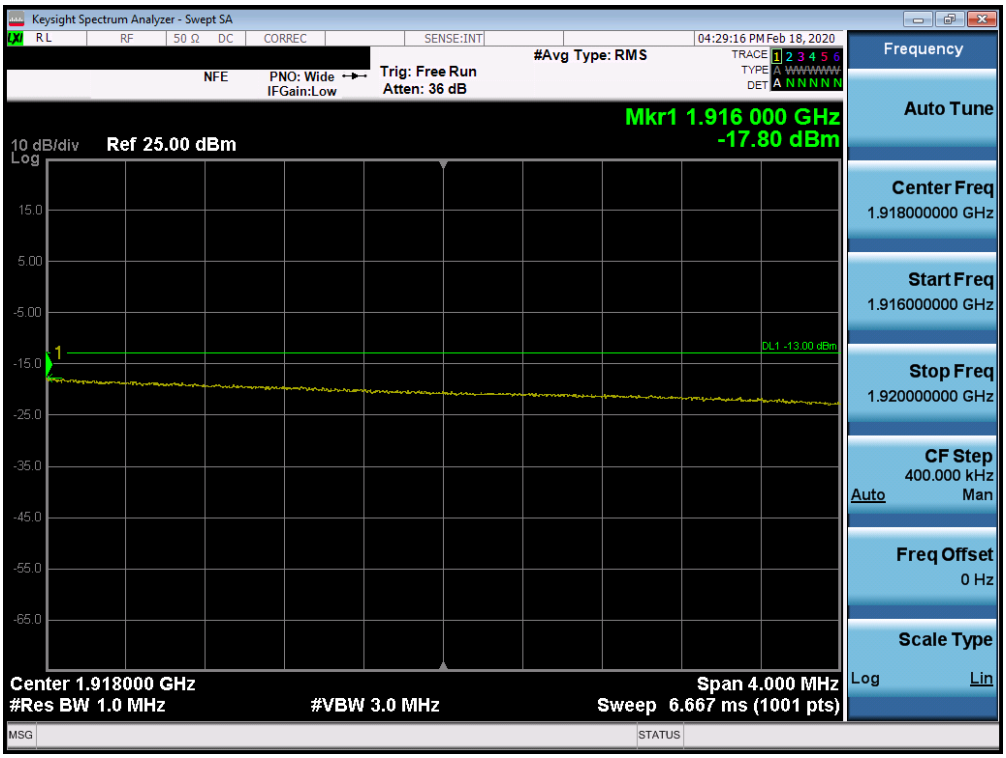
Plot 7-189. Lower Extended Band Edge Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)

Plot 7-190. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

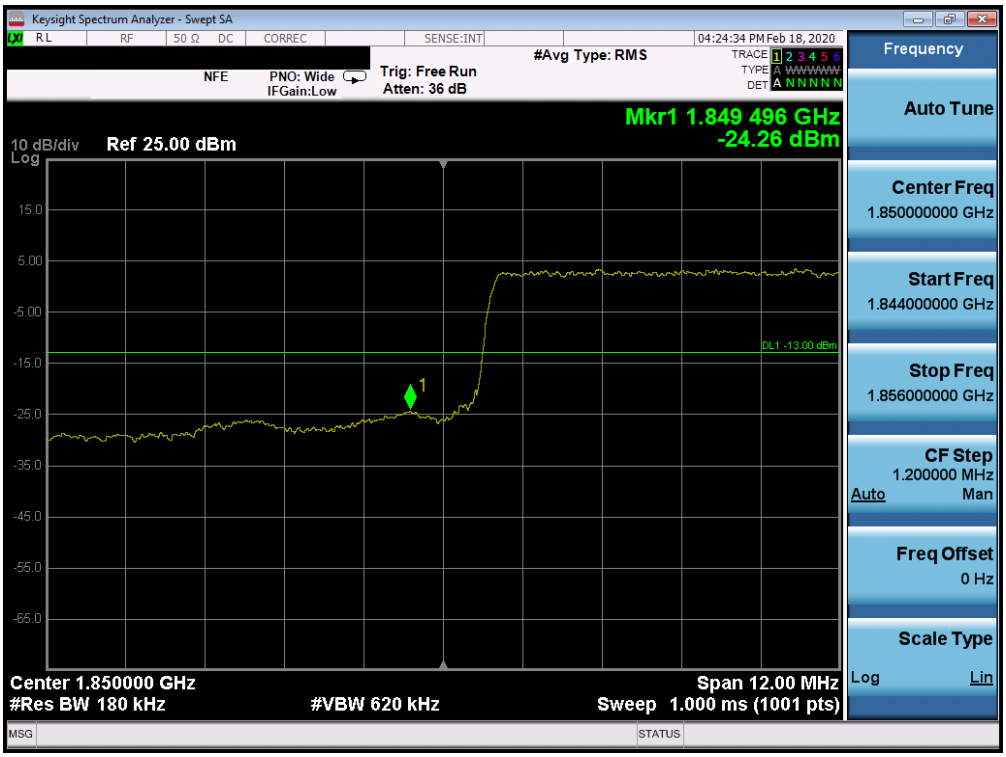


Plot 7-191. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

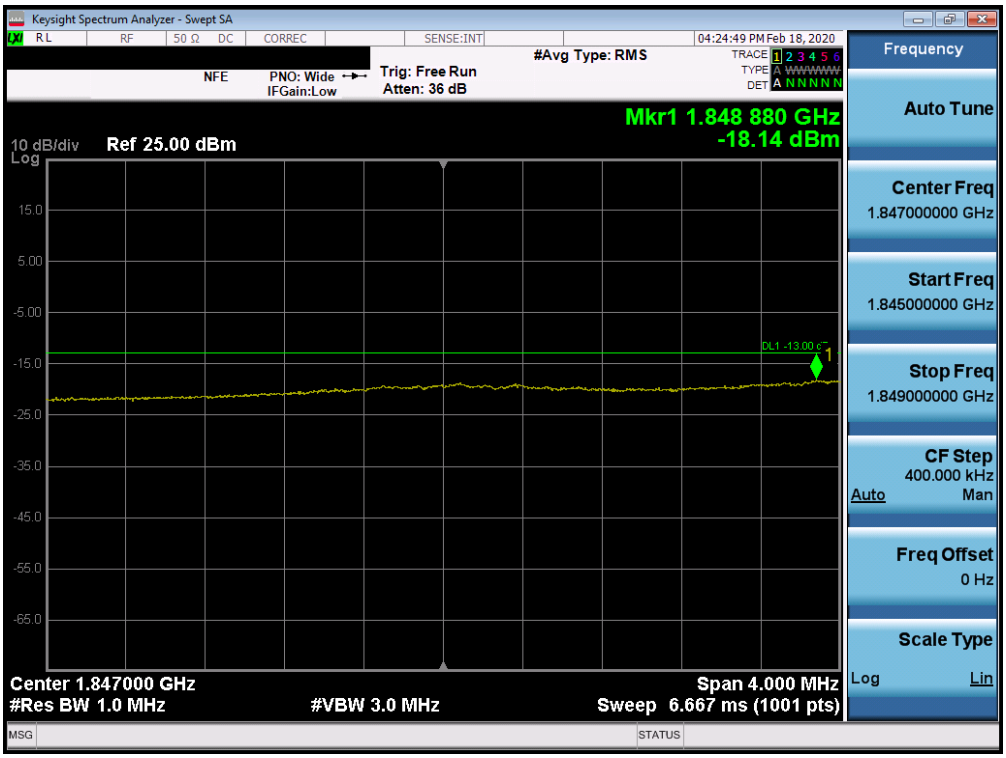
Plot 7-192. Upper Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)



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

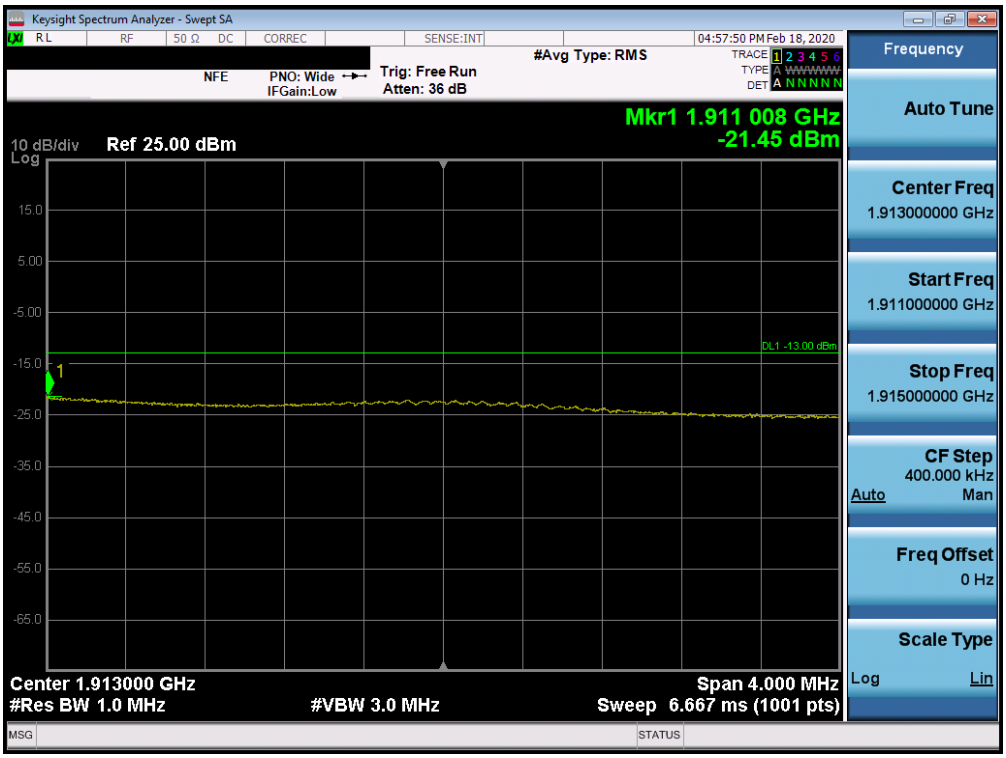


Plot 7-194. Lower Band Edge Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)

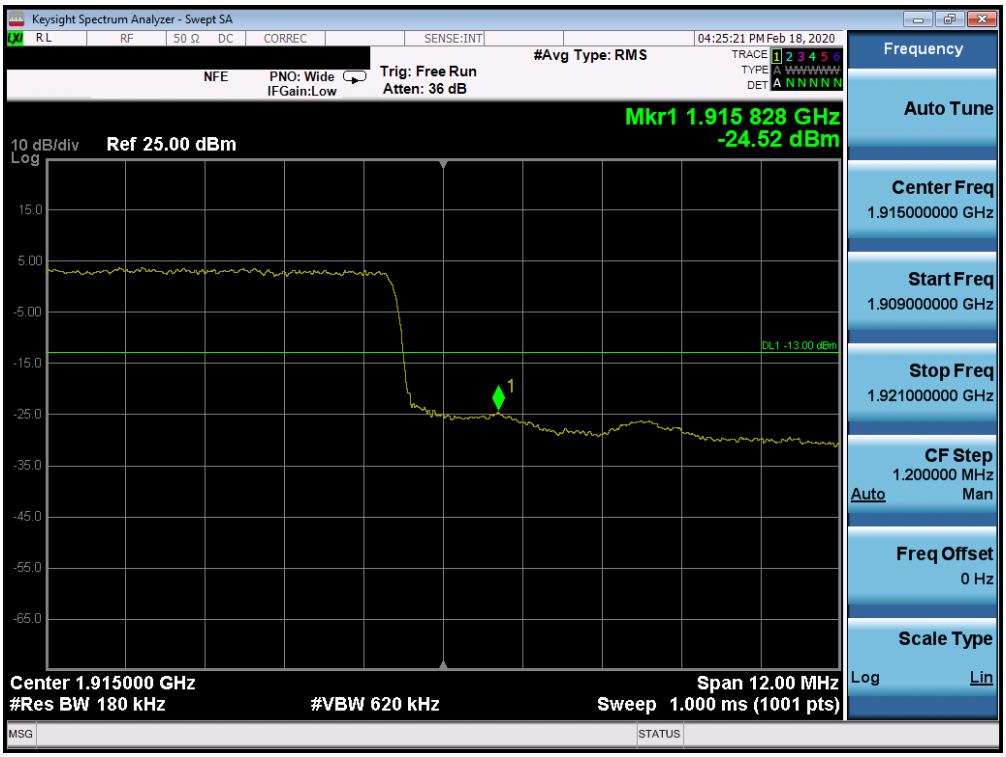


Plot 7-195. Lower Extended Band Edge Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)

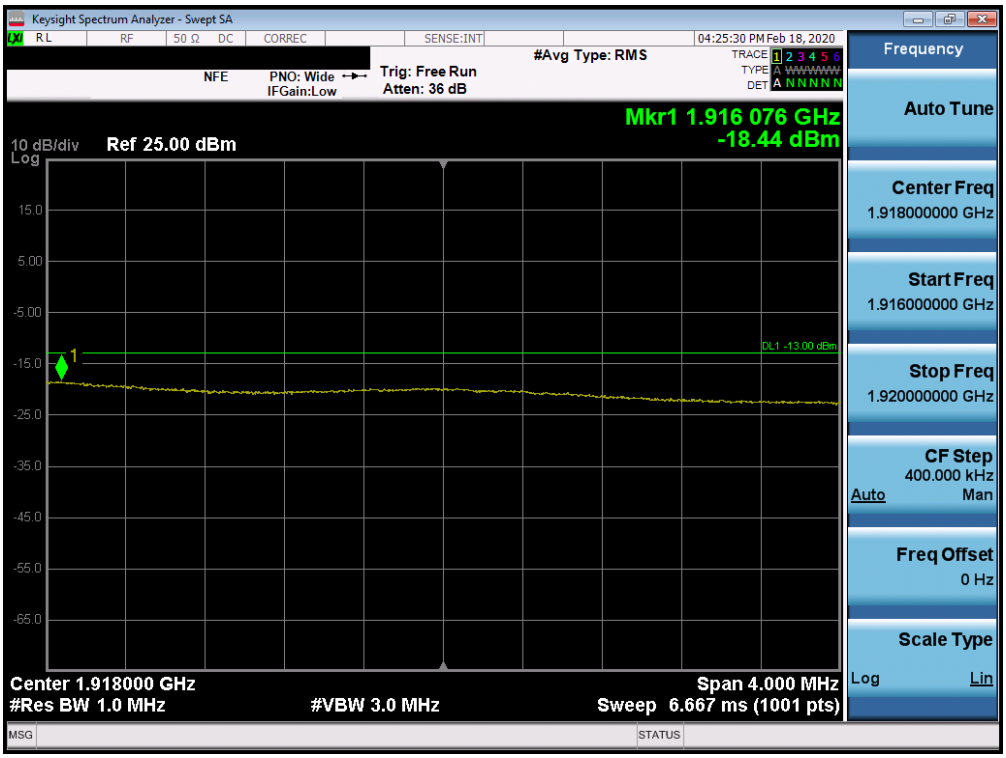
Plot 7-196. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



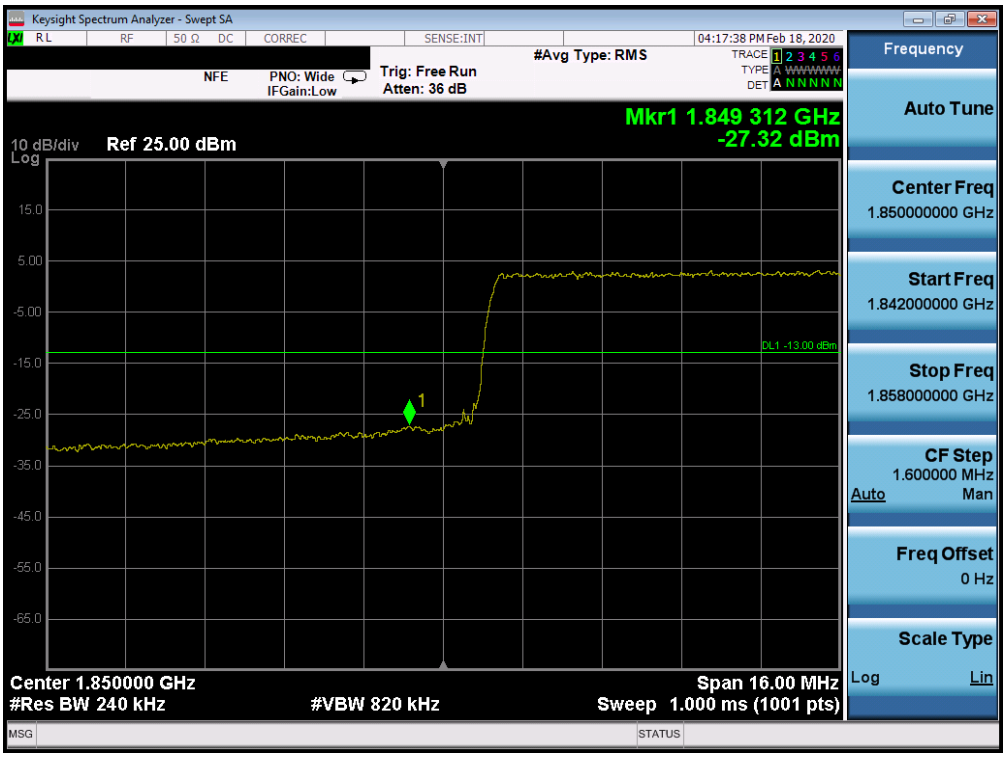
Plot 7-197. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



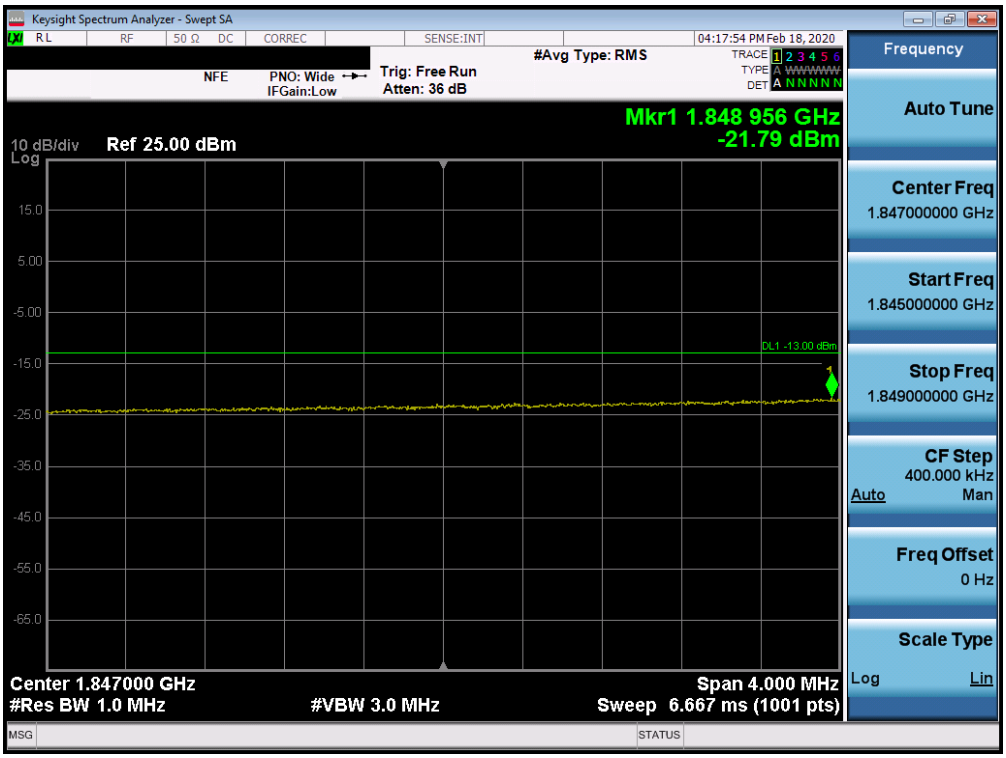
Plot 7-198. Upper Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)



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

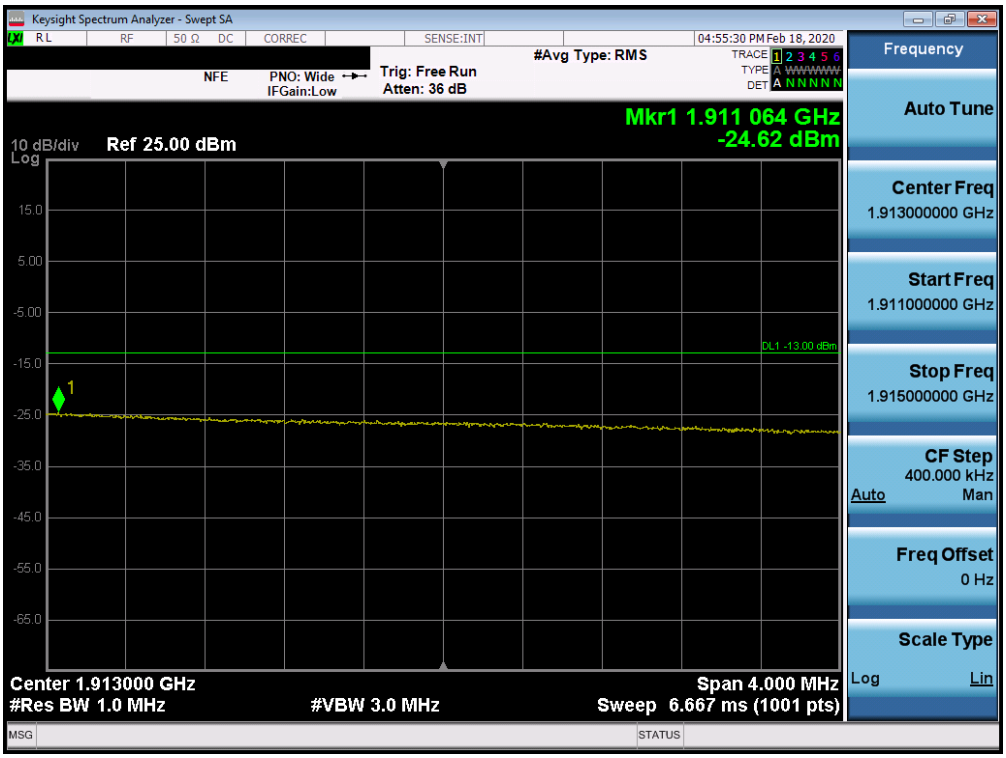


Plot 7-200. Lower Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



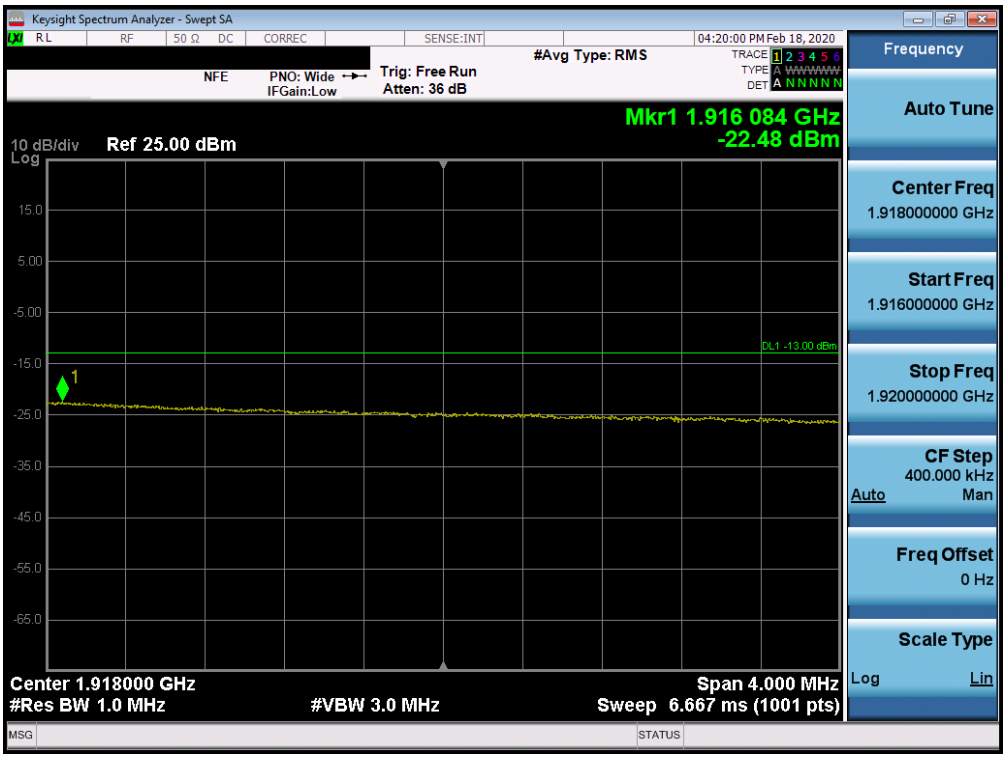
Plot 7-201. Lower Extended Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

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



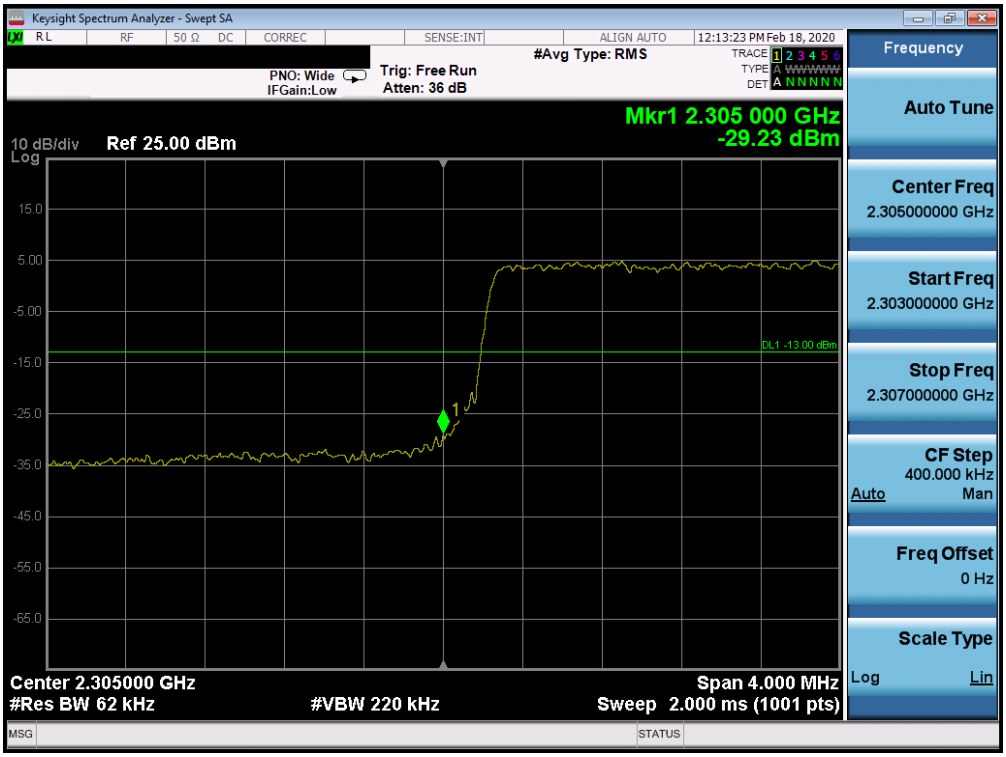
Plot 7-203. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

Plot 7-204. Upper Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)



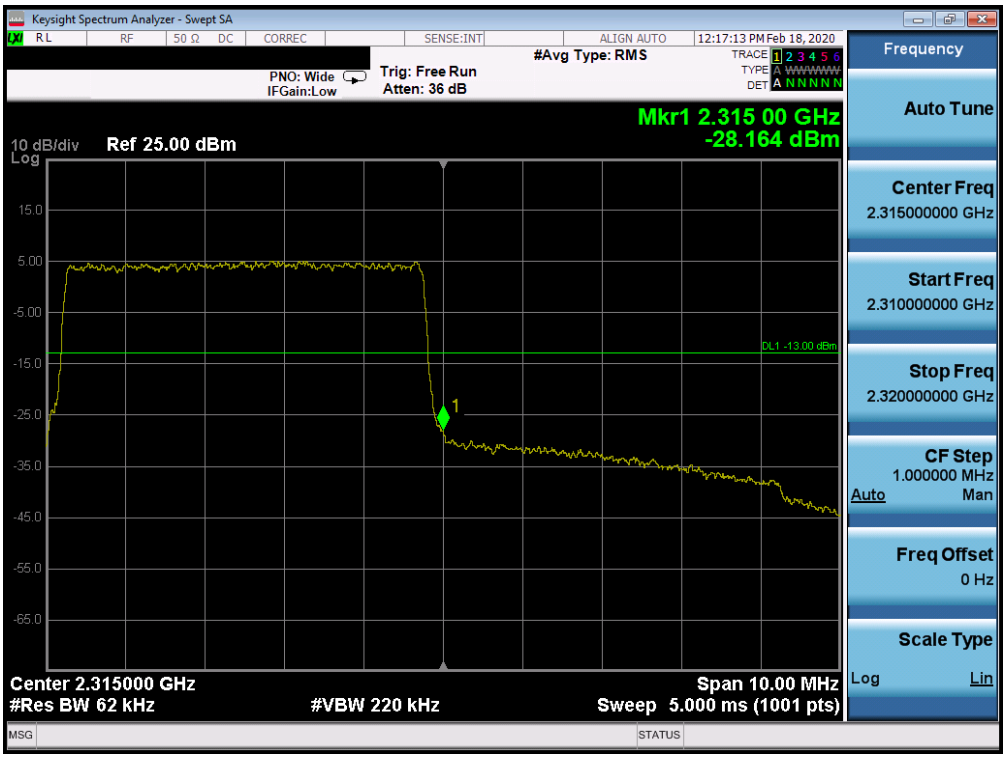
Plot 7-205. Upper Extended Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)

Band 30



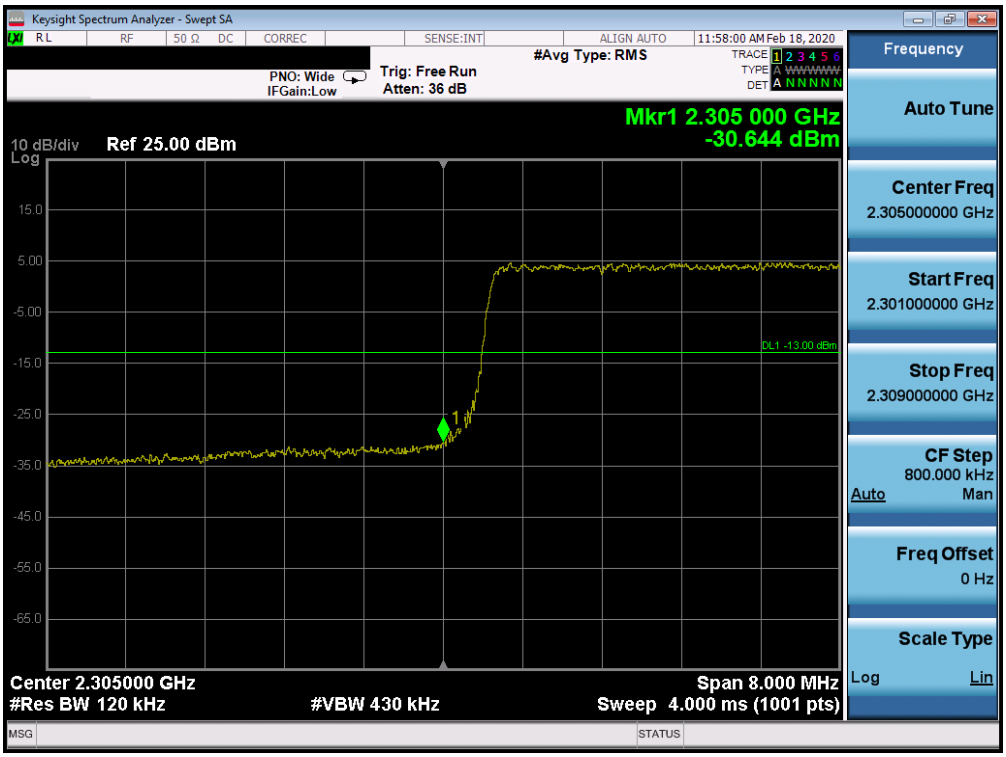
Plot 7-206. Lower Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

Plot 7-207. Lower Extended Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)



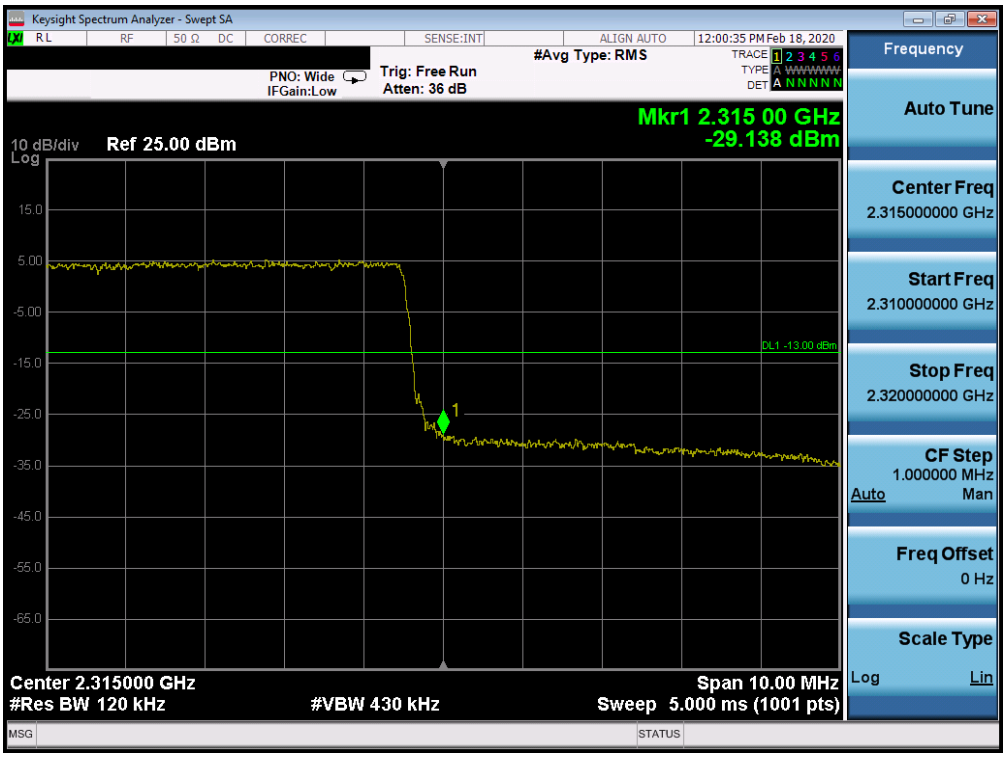
Plot 7-208. Upper Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

Plot 7-209. Upper Extended Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

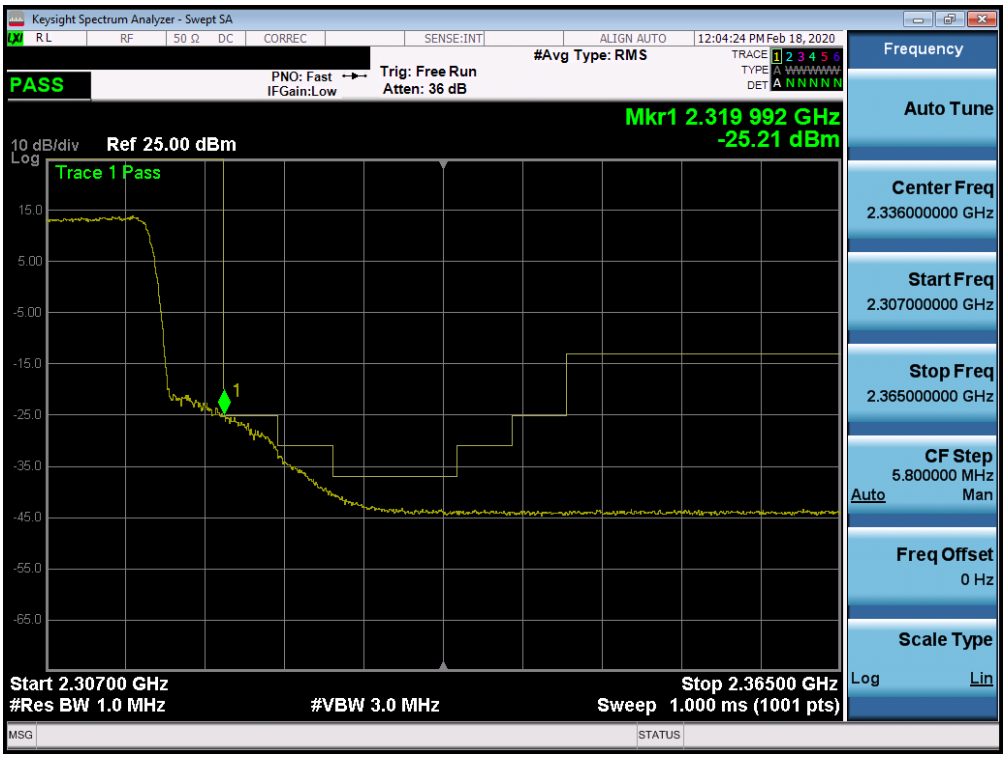


Plot 7-210. Lower Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

Plot 7-211. Lower Extended Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

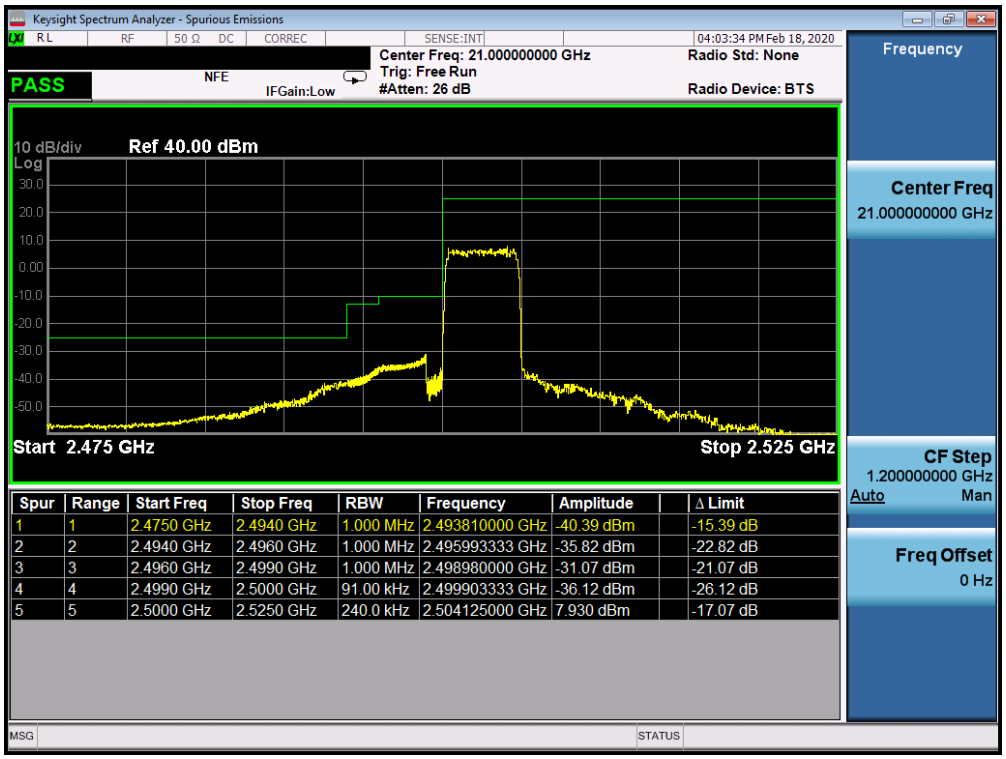


Plot 7-212. Upper Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)



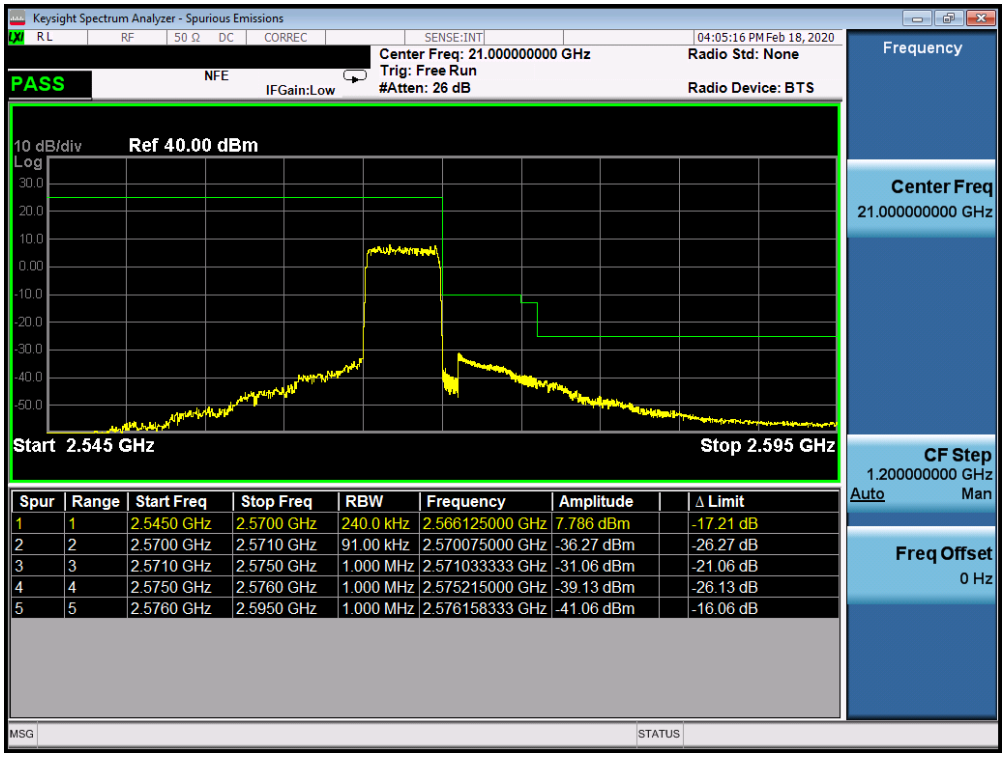
Plot 7-213. Upper Extended Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

Band 7



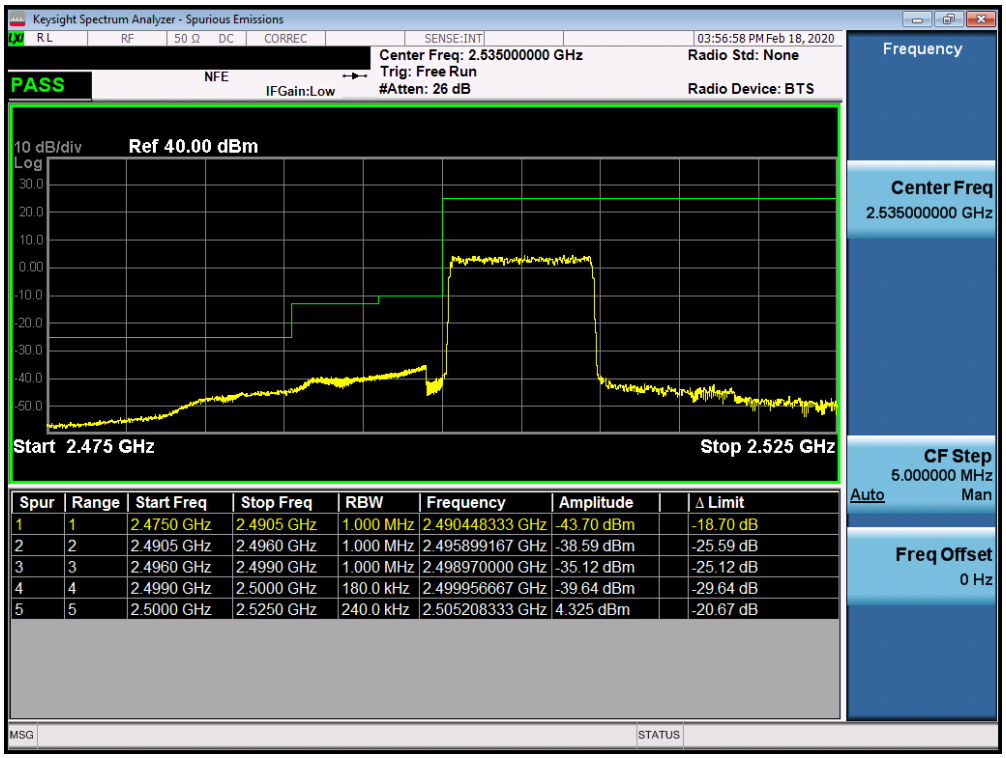
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4940 GHz	1.000 MHz	2.493810000 GHz	-40.39 dBm	-15.39 dB
2	2	2.4940 GHz	2.4960 GHz	1.000 MHz	2.495993333 GHz	-35.82 dBm	-22.82 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.498980000 GHz	-31.07 dBm	-21.07 dB
4	4	2.4990 GHz	2.5000 GHz	91.00 kHz	2.499903333 GHz	-36.12 dBm	-26.12 dB
5	5	2.5000 GHz	2.5250 GHz	240.0 kHz	2.504125000 GHz	7.930 dBm	-17.07 dB

Plot 7-214. Lower ACP Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)



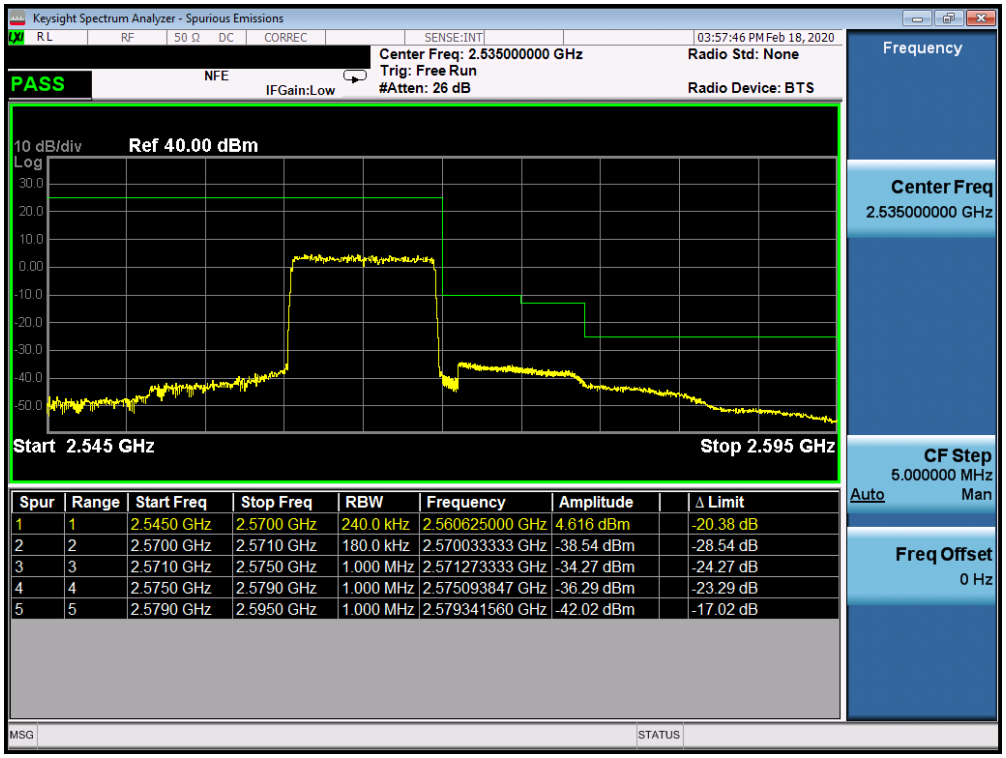
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5450 GHz	2.5700 GHz	240.0 kHz	2.566125000 GHz	7.786 dBm	-17.21 dB
2	2	2.5700 GHz	2.5710 GHz	91.00 kHz	2.570075000 GHz	-36.27 dBm	-26.27 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571033333 GHz	-31.06 dBm	-21.06 dB
4	4	2.5750 GHz	2.5760 GHz	1.000 MHz	2.575215000 GHz	-39.13 dBm	-26.13 dB
5	5	2.5760 GHz	2.5950 GHz	1.000 MHz	2.576158333 GHz	-41.06 dBm	-16.06 dB

Plot 7-215. Higher ACP Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)



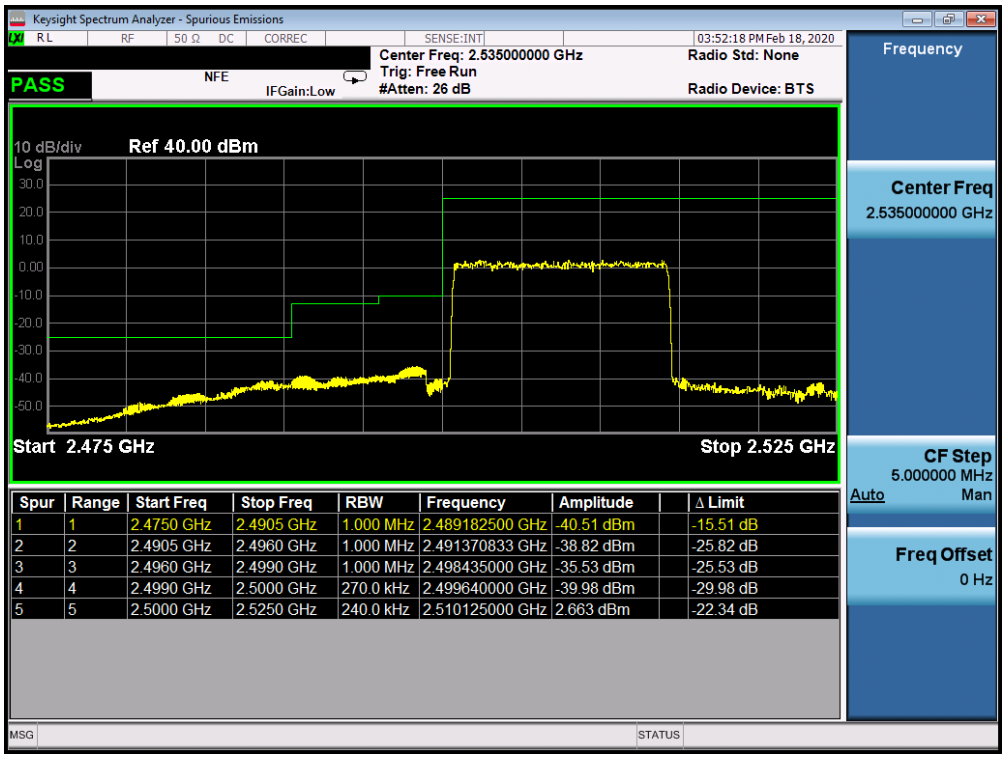
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490448333 GHz	-43.70 dBm	-18.70 dB
2	2	2.4905 GHz	2.4960 GHz	1.000 MHz	2.495899167 GHz	-38.59 dBm	-25.59 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.498970000 GHz	-35.12 dBm	-25.12 dB
4	4	2.4990 GHz	2.5000 GHz	180.0 kHz	2.499956667 GHz	-39.64 dBm	-29.64 dB
5	5	2.5000 GHz	2.5250 GHz	240.0 kHz	2.505208333 GHz	4.325 dBm	-20.67 dB

Plot 7-216. Lower ACP Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)



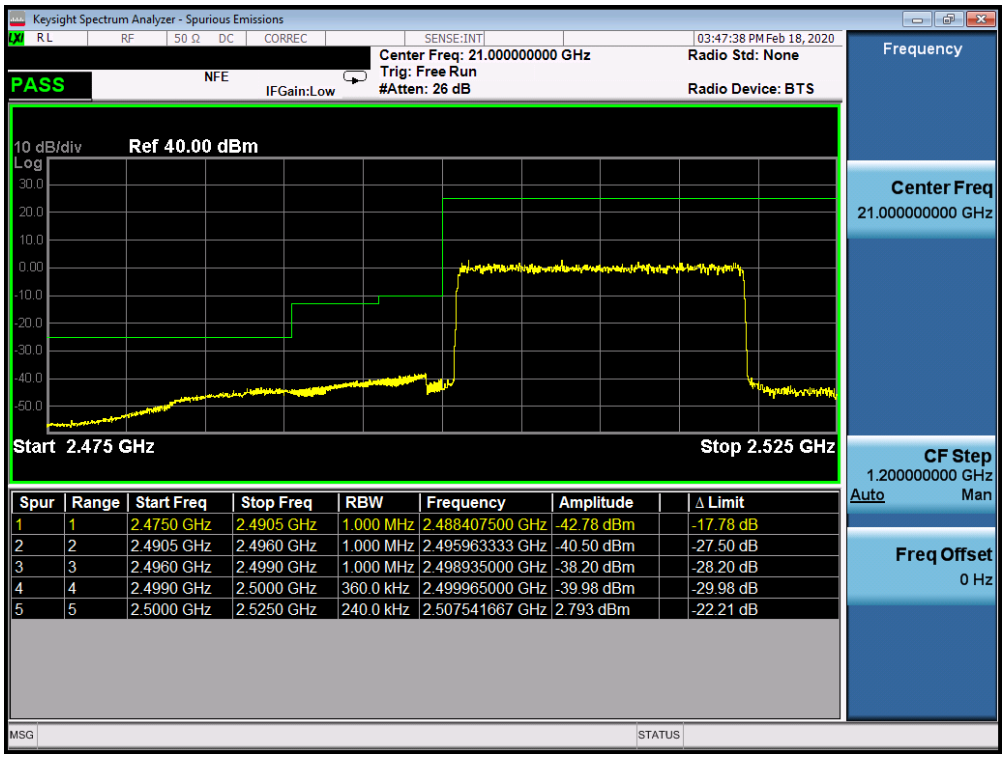
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5450 GHz	2.5700 GHz	240.0 kHz	2.560625000 GHz	4.616 dBm	-20.38 dB
2	2	2.5700 GHz	2.5710 GHz	180.0 kHz	2.570033333 GHz	-38.54 dBm	-28.54 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571273333 GHz	-34.27 dBm	-24.27 dB
4	4	2.5750 GHz	2.5790 GHz	1.000 MHz	2.575093847 GHz	-36.29 dBm	-23.29 dB
5	5	2.5790 GHz	2.5950 GHz	1.000 MHz	2.579341560 GHz	-42.02 dBm	-17.02 dB

Plot 7-217. Higher ACP Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)

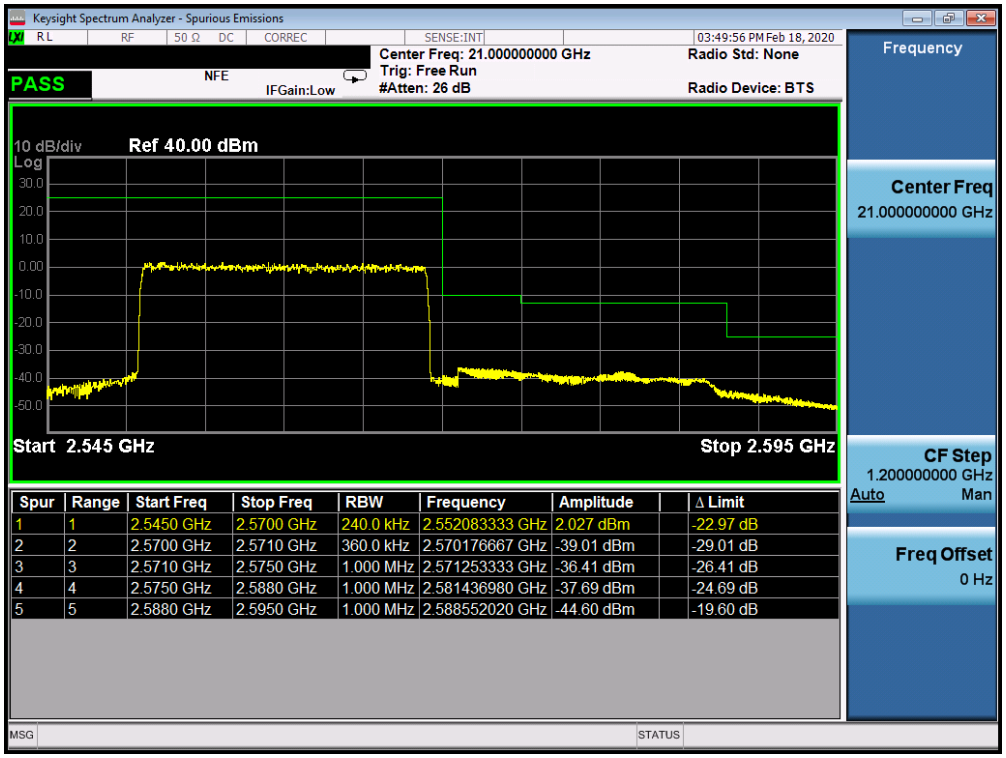


Plot 7-218. Lower ACP Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)

Plot 7-219. Higher ACP Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-220. Lower ACP Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-221. Higher ACP Plot (Band 7 - 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.

Test Setup

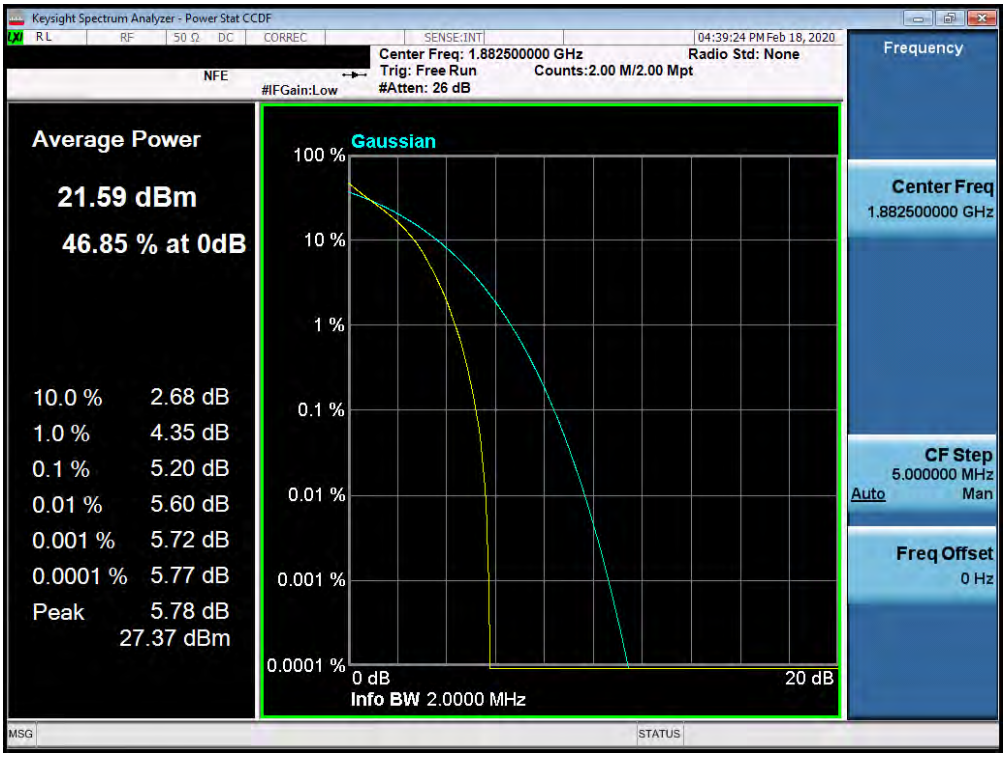
The EUT and measurement equipment were set up as shown in the diagram below.

Figure 7-4. Test Instrument & Measurement Setup

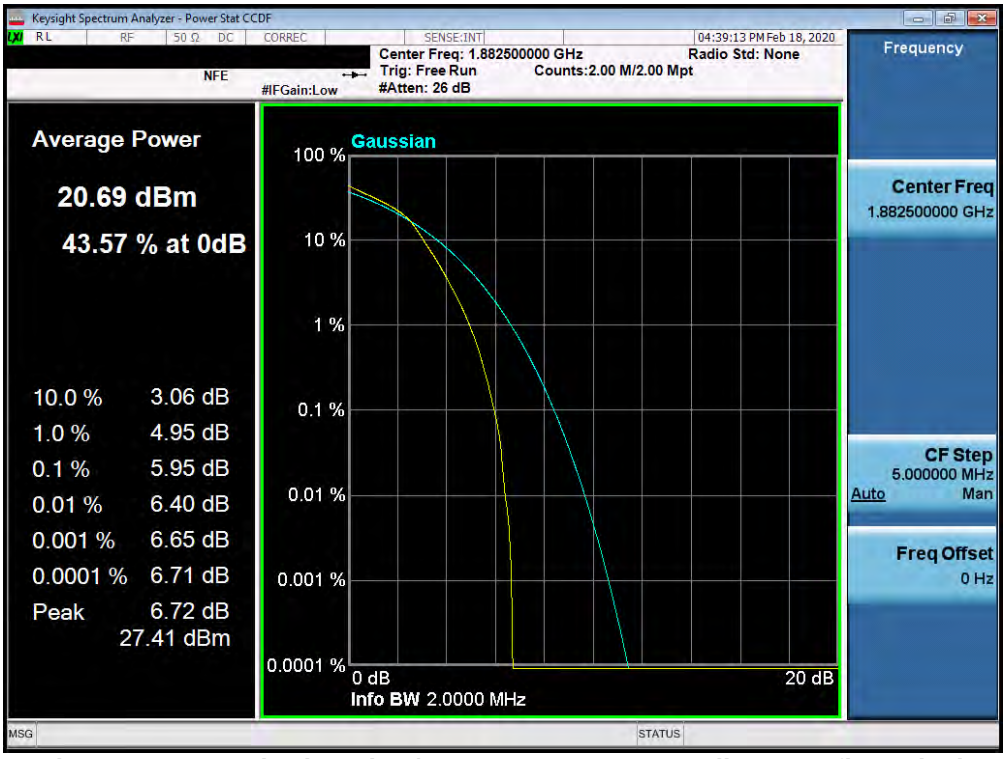
Test Notes

None.

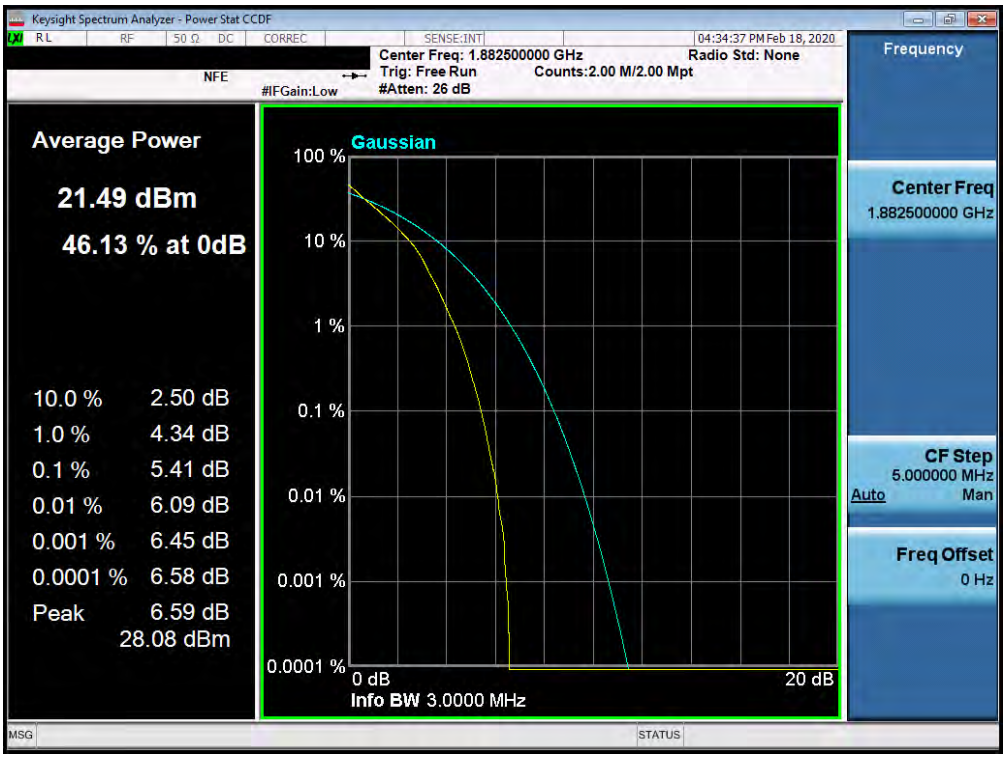
Band 25/2



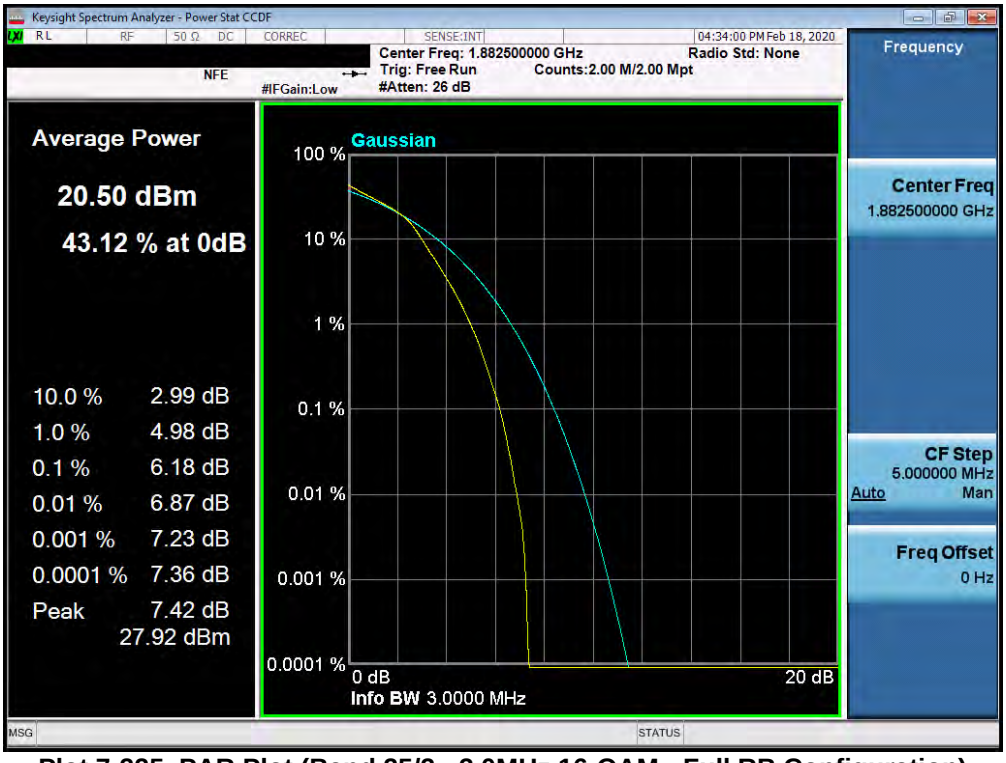
Plot 7-222. PAR Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



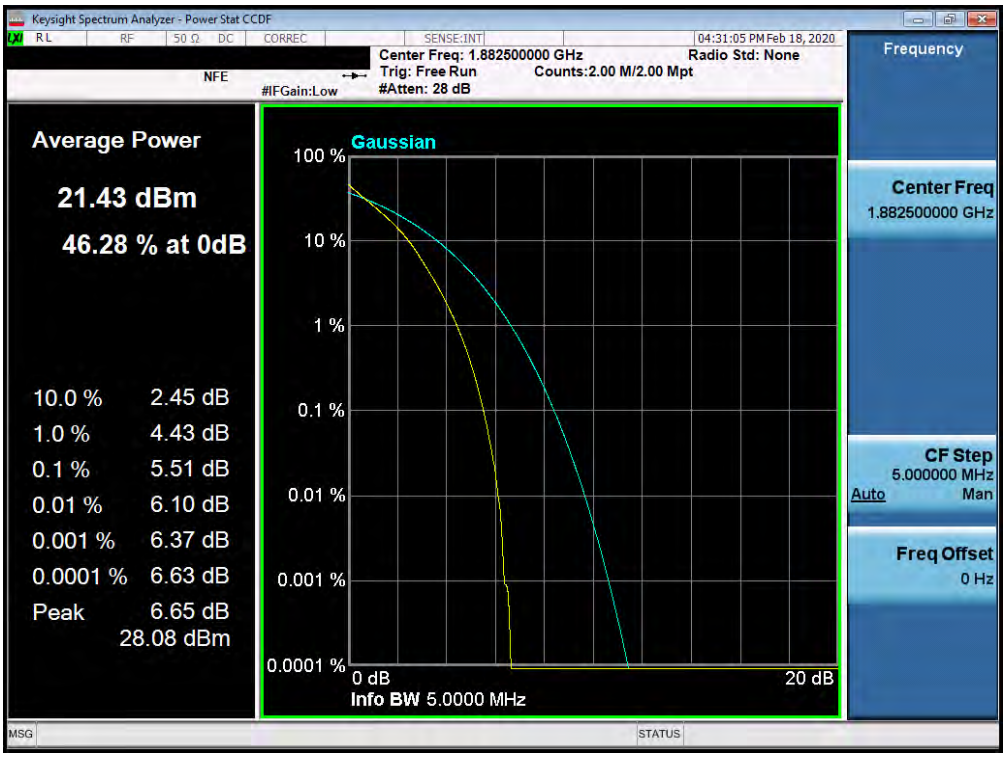
Plot 7-223. PAR Plot (Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)



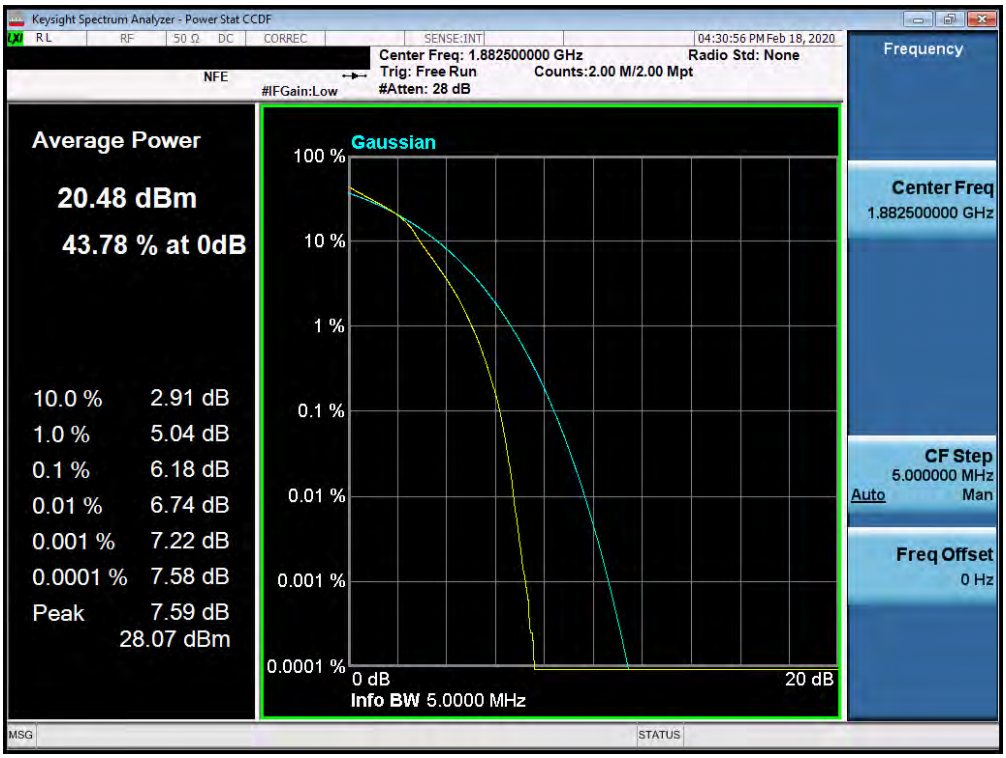
Plot 7-224. PAR Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



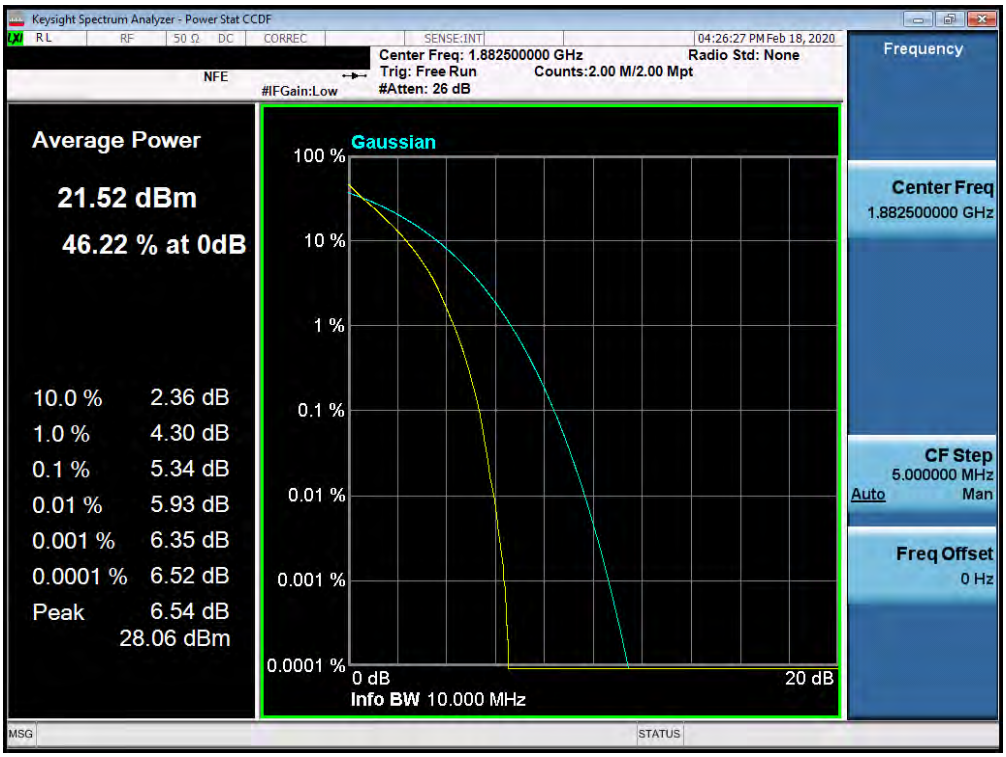
Plot 7-225. PAR Plot (Band 25/2 - 3.0MHz 16-QAM - Full RB Configuration)



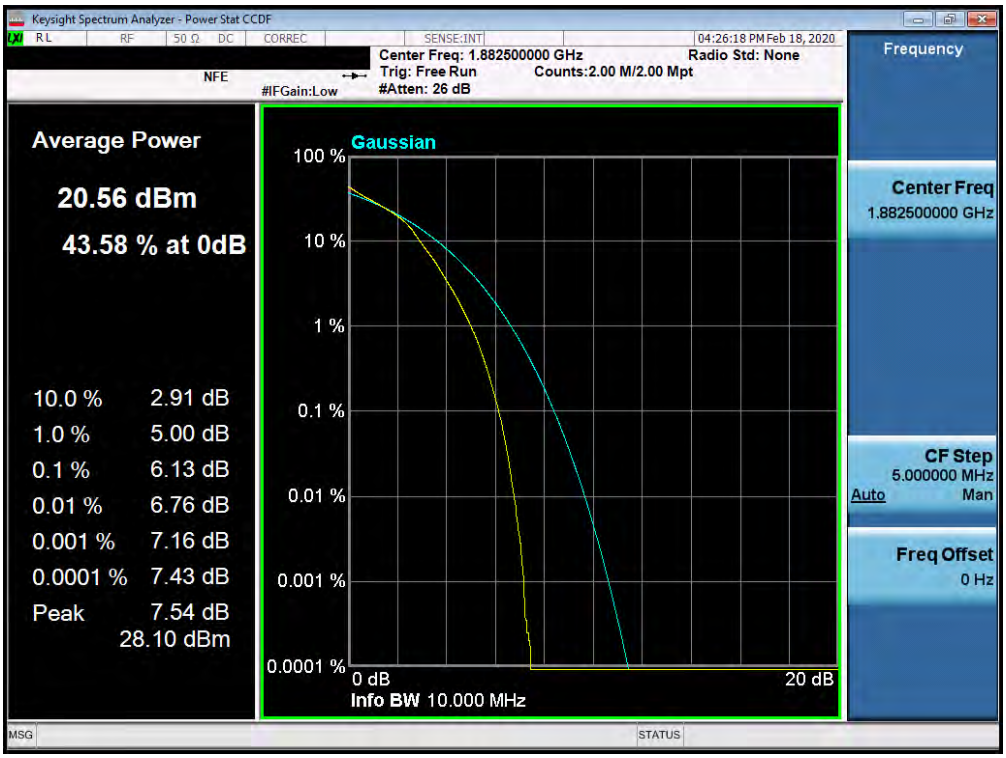
Plot 7-226. PAR Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



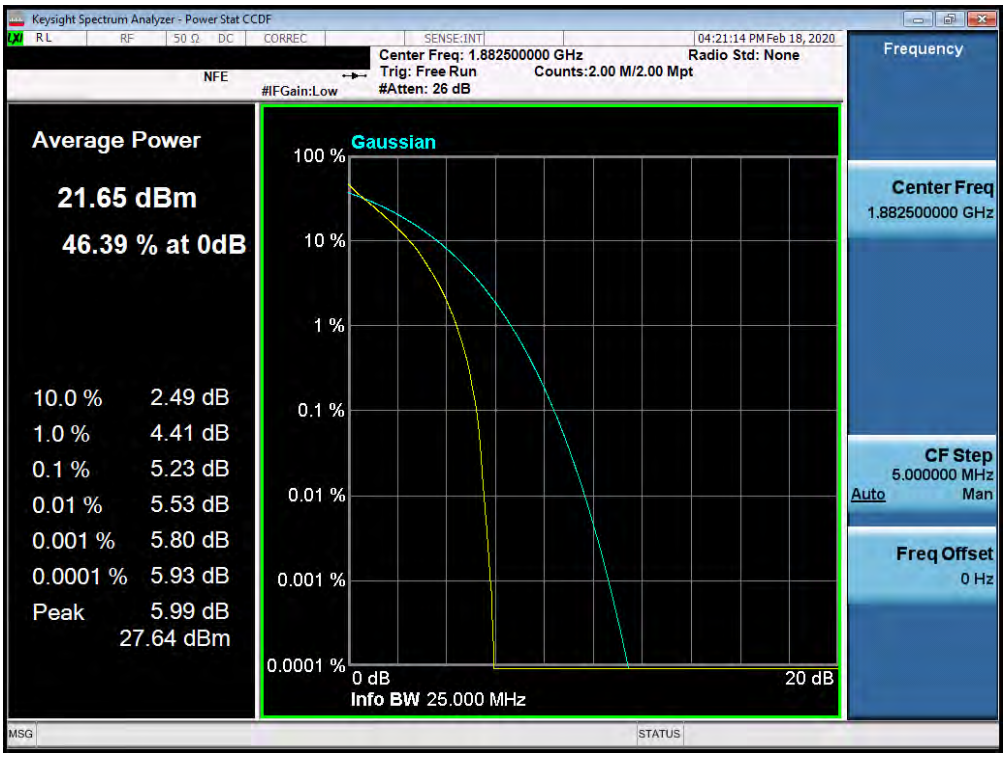
Plot 7-227. PAR Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)



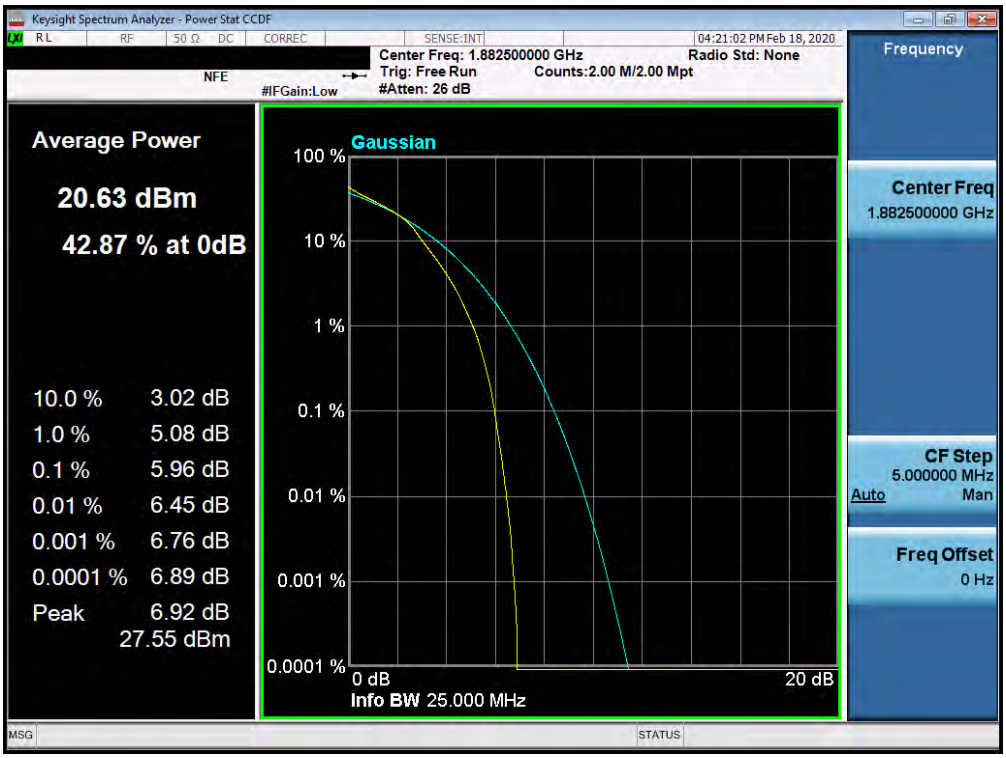
Plot 7-228. PAR Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



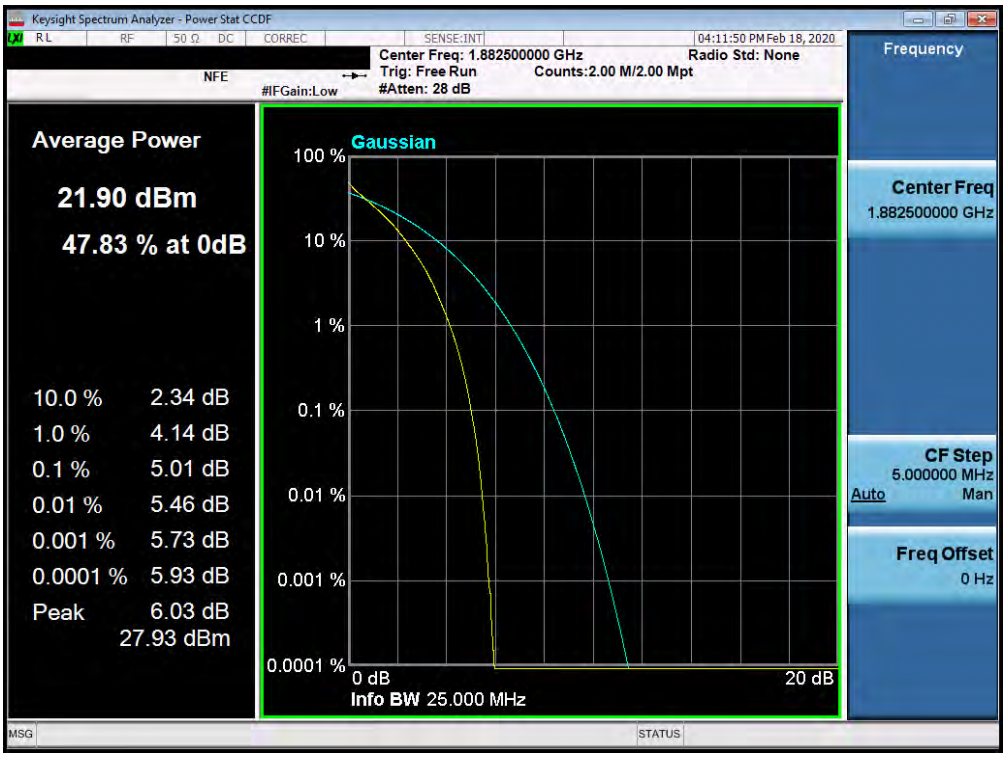
Plot 7-229. PAR Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)



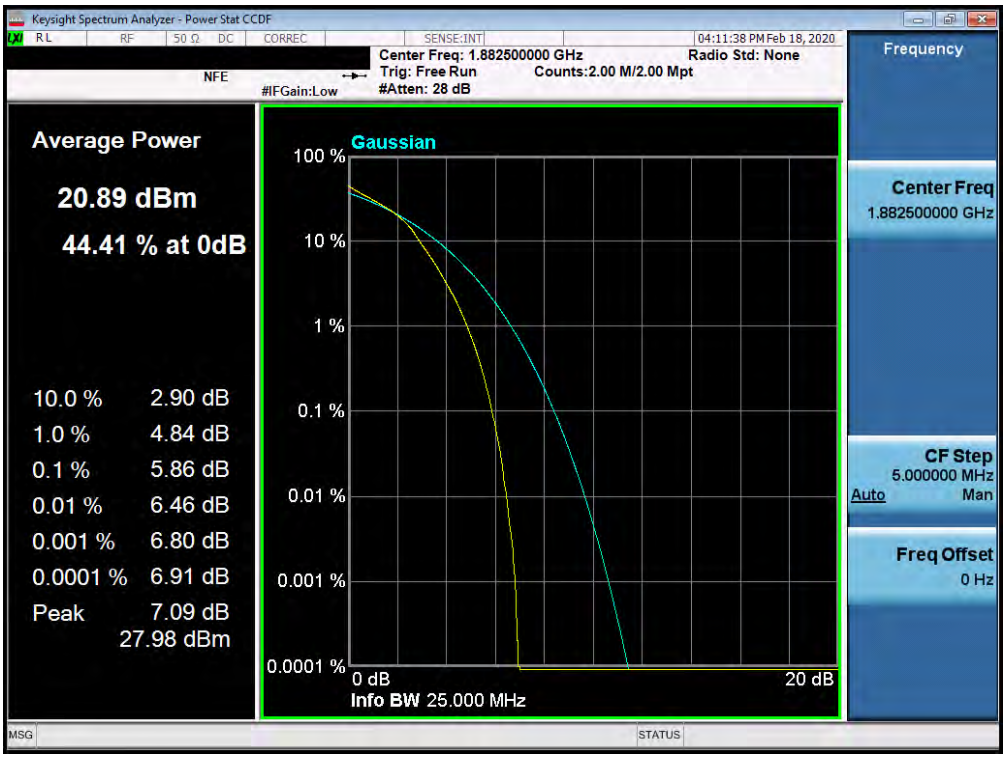
Plot 7-230. PAR Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-231. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)



Plot 7-232. PAR Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-233. PAR Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)

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.
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".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Setup

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

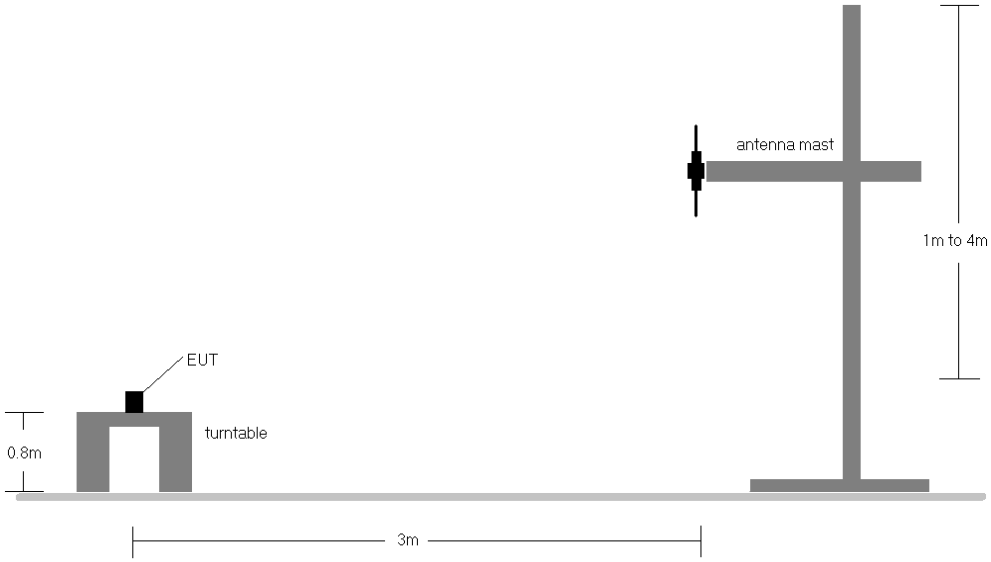


Figure 7-5. Radiated Test Setup <1GHz

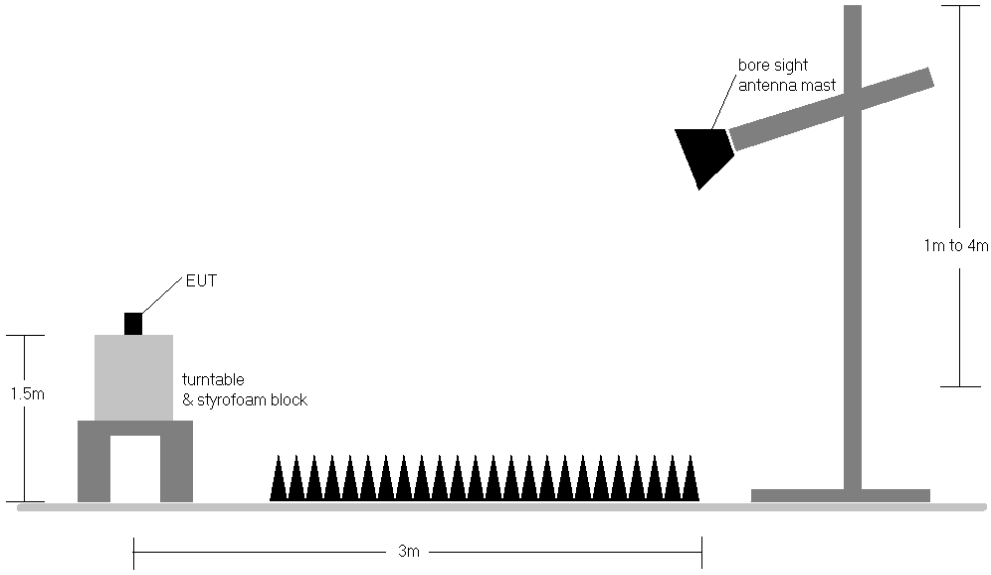


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

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

2) This unit was tested with its standard battery.

Frequency [MHz]	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	V	161	9	1 / 3	15.87	4.50	**18.22**	0.066	34.77	-16.55
707.50	1.4	QPSK	V	172	6	1 / 3	15.43	4.60	17.88	0.061	34.77	-16.89
715.30	1.4	QPSK	V	174	6	1 / 3	14.59	4.63	17.07	0.051	34.77	-17.70
699.70	1.4	16-QAM	V	161	9	1 / 3	15.10	4.50	**17.45**	0.056	34.77	-17.32
700.50	3	QPSK	V	165	9	1 / 8	15.90	4.55	**18.30**	**0.068**	34.77	-16.47
707.50	3	QPSK	V	173	3	1 / 0	15.39	4.60	17.84	0.061	34.77	-16.93
714.50	3	QPSK	V	167	4	1 / 14	14.74	4.60	17.19	0.052	34.77	-17.58
700.50	3	16-QAM	V	165	9	1 / 8	15.03	4.55	**17.43**	0.055	34.77	-17.34

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]
701.50	5	QPSK	V	166	12	1 / 12	15.75	4.60	**18.20**	0.066	34.77	-16.57
707.50	5	QPSK	V	177	15	1 / 0	15.09	4.60	17.54	0.057	34.77	-17.23
713.50	5	QPSK	V	173	5	1 / 0	14.60	4.60	17.05	0.051	34.77	-17.72
701.50	5	16-QAM	V	166	12	1 / 12	15.00	4.60	**17.45**	0.056	34.77	-17.32
704.00	10	QPSK	V	174	6	1 / 25	15.74	4.50	**18.09**	0.064	34.77	-16.68
707.50	10	QPSK	V	168	10	1 / 0	15.58	4.60	18.03	0.064	34.77	-16.74
711.00	10	QPSK	V	180	10	1 / 0	15.23	4.60	17.68	0.059	34.77	-17.09
704.00	10	16-QAM	V	174	6	1 / 25	14.83	4.50	**17.18**	0.052	34.77	-17.59
701.50	5	QPSK	H	120	168	1 / 12	13.33	3.40	14.58	0.029	34.77	-20.19

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]
779.50	5	QPSK	V	143	188	1 / 24	14.50	5.70	18.05	0.064	34.77	-16.72
782.00	5	QPSK	V	152	183	1 / 12	14.73	5.80	18.38	0.069	34.77	-16.39
784.50	5	QPSK	V	151	187	1 / 12	14.97	5.80	**18.62**	**0.073**	34.77	-16.15
784.50	5	16-QAM	V	151	187	1 / 12	14.10	5.80	**17.75**	0.060	34.77	-17.02
782.00	10	QPSK	V	143	190	1 / 49	14.89	5.80	**18.54**	0.071	34.77	-16.23
782.00	10	16-QAM	V	143	190	1 / 49	14.05	5.80	**17.70**	0.059	34.77	-17.07
784.50	5	QPSK	H	103	302	1 / 12	13.20	5.90	16.95	0.050	34.77	-17.82

Table 7-5. 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	235	309	1 / 3	12.79	6.70	17.34	0.054	38.45	-21.11
836.50	1.4	QPSK	H	221	315	1 / 3	12.79	6.70	17.34	0.054	38.45	-21.11
848.30	1.4	QPSK	H	227	314	1 / 3	13.27	6.70	**17.82**	0.061	38.45	-20.63
848.30	1.4	16-QAM	H	227	314	1 / 3	12.43	6.70	**16.98**	0.050	38.45	-21.47
825.50	3	QPSK	H	224	315	1 / 0	12.49	6.70	17.04	0.051	38.45	-21.41
836.50	3	QPSK	H	224	303	1 / 8	12.93	6.70	17.48	0.056	38.45	-20.97
847.50	3	QPSK	H	227	311	1 / 8	13.26	6.65	**17.76**	0.060	38.45	-20.69
847.50	3	16-QAM	H	227	311	1 / 8	12.38	6.65	**16.88**	0.049	38.45	-21.57
826.50	5	QPSK	H	233	312	1 / 12	12.56	6.70	17.11	0.051	38.45	-21.34
836.50	5	QPSK	H	218	310	1 / 12	13.09	6.70	17.64	0.058	38.45	-20.81
846.50	5	QPSK	H	231	308	1 / 12	13.62	6.60	**18.07**	0.064	38.45	-20.38
846.50	5	16-QAM	H	231	308	1 / 12	12.89	6.60	**17.34**	0.054	38.45	-21.11
829.00	10	QPSK	H	221	314	1 / 25	13.11	6.70	17.66	0.058	38.45	-20.79
836.50	10	QPSK	H	226	305	1 / 49	13.33	6.70	17.88	0.061	38.45	-20.57
844.00	10	QPSK	H	226	311	1 / 25	13.72	6.60	**18.17**	**0.066**	38.45	-20.28
844.00	10	16-QAM	H	226	311	1 / 25	12.96	6.60	**17.41**	0.055	38.45	-21.04
844.00	10	QPSK	V	134	188	1 / 25	13.07	6.40	17.32	0.054	38.45	-21.13

Table 7-6. ERP Data (Band 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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	142	20	1 / 3	13.74	9.44	23.18	0.208	30.00	-6.82
1745.00	1.4	QPSK	H	137	23	1 / 3	14.18	9.23	**23.41**	0.219	30.00	-6.59
1779.30	1.4	QPSK	H	132	13	1 / 3	14.09	9.26	23.35	0.216	30.00	-6.65
1745.00	1.4	16-QAM	H	137	23	1 / 3	13.24	9.23	**22.47**	0.177	30.00	-7.53
1711.50	3	QPSK	H	138	17	1 / 8	13.60	9.44	23.04	0.201	30.00	-6.96
1745.00	3	QPSK	H	138	21	1 / 8	14.11	9.23	23.34	0.216	30.00	-6.66
1778.50	3	QPSK	H	138	17	1 / 0	14.20	9.26	**23.46**	0.222	30.00	-6.54
1778.50	3	16-QAM	H	138	17	1 / 0	13.28	9.26	**22.54**	0.179	30.00	-7.46
1712.50	5	QPSK	H	143	21	1 / 12	13.92	9.43	23.35	0.216	30.00	-6.65
1745.00	5	QPSK	H	140	17	1 / 12	14.09	9.23	23.32	0.215	30.00	-6.68
1777.50	5	QPSK	H	135	17	1 / 12	14.28	9.26	**23.54**	0.226	30.00	-6.46
1777.50	5	16-QAM	H	135	17	1 / 12	13.38	9.26	**22.64**	0.183	30.00	-7.36
1715.00	10	QPSK	H	146	24	1 / 25	14.15	9.42	23.57	0.227	30.00	-6.43
1745.00	10	QPSK	H	141	28	1 / 25	14.09	9.23	23.32	0.215	30.00	-6.68
1775.00	10	QPSK	H	140	15	1 / 25	14.50	9.25	**23.75**	0.237	30.00	-6.25
1775.00	10	16-QAM	H	140	15	1 / 25	13.61	9.25	**22.86**	0.193	30.00	-7.14
1717.50	15	QPSK	H	145	19	1 / 36	14.37	9.40	**23.77**	0.238	30.00	-6.23
1745.00	15	QPSK	H	137	27	1 / 36	14.49	9.23	23.72	0.236	30.00	-6.28
1772.50	15	QPSK	H	130	16	1 / 36	14.16	9.25	23.41	0.219	30.00	-6.59
1717.50	15	16-QAM	H	145	19	1 / 36	13.59	9.40	**22.99**	0.199	30.00	-7.01
1720.00	20	QPSK	H	114	22	1 / 50	14.73	9.38	24.11	0.258	30.00	-5.89
1745.00	20	QPSK	H	101	18	1 / 50	15.50	9.23	**24.73**	**0.297**	30.00	-5.27
1770.00	20	QPSK	H	129	19	1 / 50	14.55	9.24	23.79	0.239	30.00	-6.21
1745.00	20	16-QAM	H	101	18	1 / 50	14.67	9.23	**23.90**	0.246	30.00	-6.10
1745.00	20	QPSK	V	129	71	1 / 50	14.17	9.11	23.28	0.213	30.00	-6.72

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

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	267	16	1 / 3	15.16	9.48	**24.64**	0.291	33.01	-8.37
1882.50	1.4	QPSK	H	259	15	1 / 3	14.22	9.94	24.16	0.260	33.01	-8.86
1914.30	1.4	QPSK	H	244	20	1 / 3	13.85	10.29	24.14	0.260	33.01	-8.87
1850.70	1.4	16-QAM	H	267	16	1 / 3	14.32	9.48	**23.80**	0.240	33.01	-9.21
1851.50	3	QPSK	H	260	15	1 / 8	14.67	9.50	**24.17**	0.261	33.01	-8.84
1882.50	3	QPSK	H	263	12	1 / 8	14.21	9.94	24.15	0.260	33.01	-8.87
1913.50	3	QPSK	H	252	19	1 / 8	13.88	10.29	24.17	0.261	33.01	-8.85
1851.50	3	16-QAM	H	260	15	1 / 8	13.73	9.50	**23.23**	0.210	33.01	-9.78
1852.50	5	QPSK	H	267	15	1 / 12	15.29	9.51	**24.80**	**0.302**	33.01	-8.21
1882.50	5	QPSK	H	259	9	1 / 0	14.34	9.94	24.28	0.268	33.01	-8.74
1912.50	5	QPSK	H	245	21	1 / 12	13.88	10.28	24.16	0.260	33.01	-8.85
1852.50	5	16-QAM	H	267	15	1 / 12	14.41	9.51	**23.92**	0.247	33.01	-9.09
1855.00	10	QPSK	H	267	19	1 / 25	14.96	9.55	**24.51**	0.282	33.01	-8.50
1882.50	10	QPSK	H	259	10	1 / 25	14.36	9.94	24.30	0.269	33.01	-8.72
1910.00	10	QPSK	H	252	16	1 / 25	13.84	10.26	24.10	0.257	33.01	-8.91
1855.00	10	16-QAM	H	267	19	1 / 25	14.01	9.55	**23.56**	0.227	33.01	-9.45
1857.50	15	QPSK	H	268	13	1 / 0	14.82	9.58	**24.40**	0.275	33.01	-8.61
1882.50	15	QPSK	H	257	16	1 / 0	13.88	9.94	23.82	0.241	33.01	-9.20
1907.50	15	QPSK	H	254	18	1 / 36	13.51	10.24	23.75	0.237	33.01	-9.26
1857.50	15	16-QAM	H	268	13	1 / 0	13.90	9.58	**23.48**	0.223	33.01	-9.53
1860.00	20	QPSK	H	251	21	1 / 50	14.15	9.62	23.77	0.238	33.01	-9.24
1882.50	20	QPSK	H	259	14	1 / 50	14.66	9.94	**24.60**	0.288	33.01	-8.42
1905.00	20	QPSK	H	237	15	1 / 99	13.65	10.22	23.87	0.244	33.01	-9.14
1882.50	20	16-QAM	H	259	14	1 / 50	13.79	9.94	**23.73**	0.236	33.01	-9.29
1852.50	5	QPSK	V	138	125	1 / 12	13.85	9.89	23.74	0.237	33.01	-9.27

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

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2307.50	5	QPSK	H	112	164	1 / 12	11.21	10.31	**21.52**	**0.142**	23.98	-2.46
2312.50	5	QPSK	H	107	171	1 / 24	10.97	10.31	21.28	0.134	23.98	-2.70
2307.50	5	16-QAM	H	112	164	1 / 12	10.19	10.31	**20.50**	0.112	23.98	-3.48
2310.00	10	QPSK	H	115	172	1 / 25	10.82	10.31	**21.13**	0.130	23.98	-2.85
2310.00	10	16-QAM	H	115	172	1 / 25	9.90	10.31	**20.21**	0.105	23.98	-3.77
2307.50	5	QPSK	V	132	266	1 / 12	10.98	10.23	21.21	0.132	23.98	-2.77

Table 7-9. EIRP Data (Band 30)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	H	155	223	1 / 12	10.61	9.43	20.04	0.101	33.01	-12.97
2535.00	5	QPSK	H	152	232	1 / 12	11.36	9.39	20.75	0.119	33.01	-12.26
2567.50	5	QPSK	H	144	225	1 / 12	11.60	9.45	**21.05**	0.127	33.01	-11.96
2567.50	5	16-QAM	H	144	225	1 / 12	10.81	9.45	**20.26**	0.106	33.01	-12.75
2505.00	10	QPSK	H	152	218	1 / 25	10.66	9.43	20.09	0.102	33.01	-12.92
2535.00	10	QPSK	H	152	229	1 / 25	11.42	9.39	20.81	0.121	33.01	-12.20
2565.00	10	QPSK	H	141	229	1 / 25	11.86	9.44	**21.30**	0.135	33.01	-11.71
2565.00	10	16-QAM	H	141	229	1 / 25	11.08	9.44	**20.52**	0.113	33.01	-12.49
2507.50	15	QPSK	H	152	228	1 / 36	10.54	9.42	19.96	0.099	33.01	-13.05
2535.00	15	QPSK	H	150	234	1 / 36	11.86	9.39	21.25	0.133	33.01	-11.76
2562.50	15	QPSK	H	145	227	1 / 36	12.17	9.43	**21.60**	0.145	33.01	-11.41
2562.50	15	16-QAM	H	145	227	1 / 36	11.39	9.43	**20.82**	0.121	33.01	-12.19
2510.00	20	QPSK	H	153	223	1 / 50	11.13	9.42	20.55	0.114	33.01	-12.46
2535.00	20	QPSK	H	150	231	1 / 50	11.97	9.39	21.36	0.137	33.01	-11.65
2560.00	20	QPSK	H	142	225	1 / 50	12.27	9.42	**21.69**	**0.148**	33.01	-11.32
2560.00	20	16-QAM	H	142	225	1 / 50	11.54	9.42	**20.96**	0.125	33.01	-12.05
2560.00	20	QPSK	V	115	216	1 / 50	10.62	9.42	20.04	0.101	33.01	-12.97

Table 7-10. EIRP Data (Band 7)

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

Test Setup

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

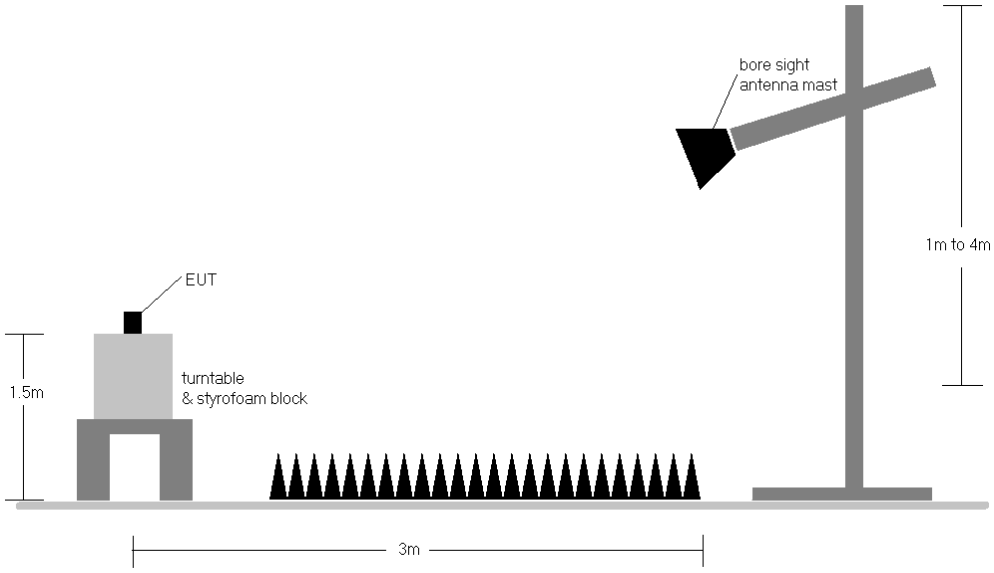


Figure 7-7. Test Instrument & Measurement Setup

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.

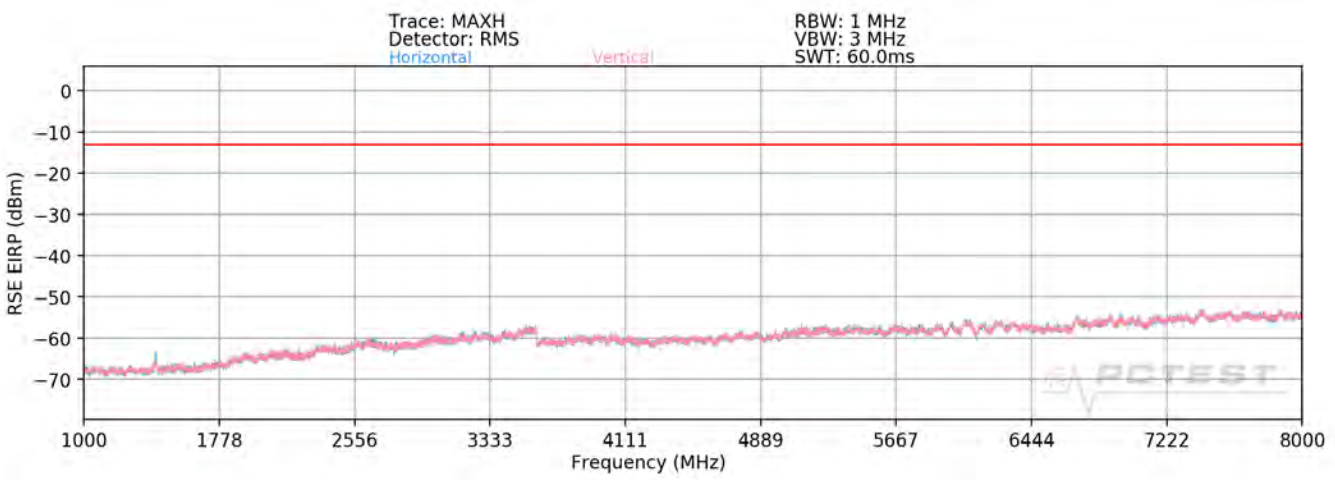
2) This unit was tested with its standard battery.

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.

Band 12/17



Plot 7-234. Radiated Spurious Plot above 1GHz (Band 12/17)

OPERATING FREQUENCY:	701.50	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]
1403.00	H	149	326	-58.50	7.45	-51.05	-38.1
2104.50	H	-	-	-72.36	8.84	-63.52	-50.5
2806.00	H	-	-	-72.86	10.14	-62.72	-49.7

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

OPERATING FREQUENCY:	707.50	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]
1415.00	H	102	323	-59.47	7.63	-51.84	-38.8
2122.50	H	-	-	-72.70	8.86	-63.84	-50.8
2830.00	H	-	-	-72.08	10.10	-61.99	-49.0

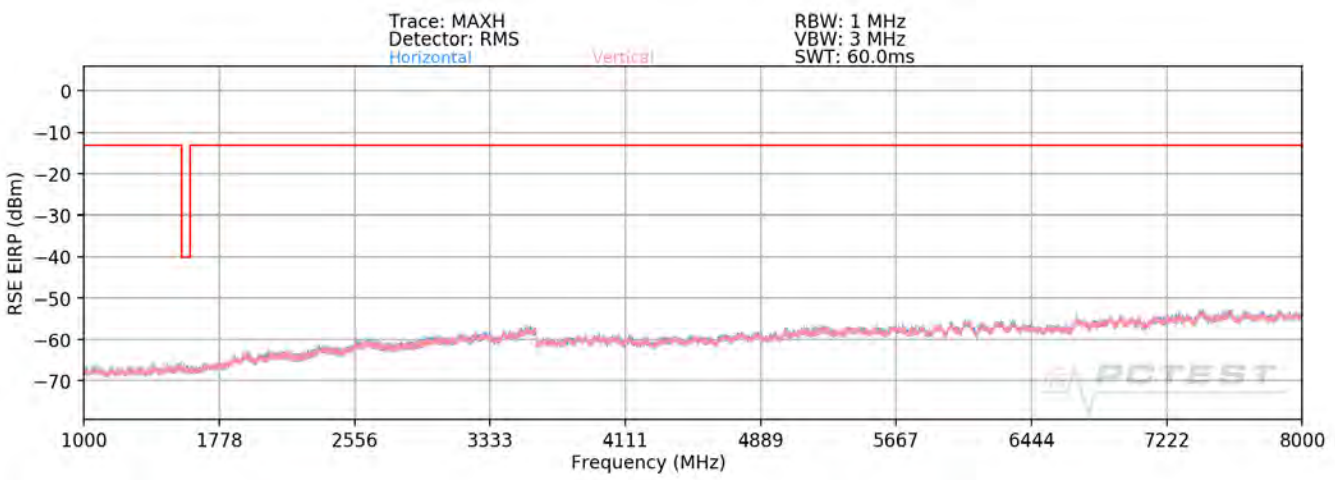
Table 7-12. Radiated Spurious Data (Band 12/17 – Mid Channel)

OPERATING FREQUENCY:	713.50	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]
1427.00	H	102	320	-61.43	7.81	-53.61	-40.6
2140.50	H	-	-	-72.50	8.88	-63.61	-50.6
2854.00	H	-	-	-72.60	10.04	-62.56	-49.6

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

Band 13



Plot 7-235. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY:	779.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2338.50	V	358	308	-72.14	9.47	-62.67	-49.7
3118.00	V	-	-	-71.11	9.35	-61.76	-48.8
3897.50	V	-	-	-70.89	9.35	-61.54	-48.5

Table 7-14. Radiated Spurious Data (Band 13 – Low Channel)

OPERATING FREQUENCY:	782.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	V	316	307	-72.46	9.43	-63.03	-50.0
3128.00	V	-	-	-71.20	9.34	-61.85	-48.9
3910.00	V	-	-	-70.52	9.37	-61.15	-48.1

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

OPERATING FREQUENCY:	784.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2353.50	V	393	264	-71.67	9.41	-62.26	-49.3
3138.00	V	-	-	-71.14	9.33	-61.81	-48.8
3922.50	V	-	-	-70.57	9.40	-61.18	-48.2

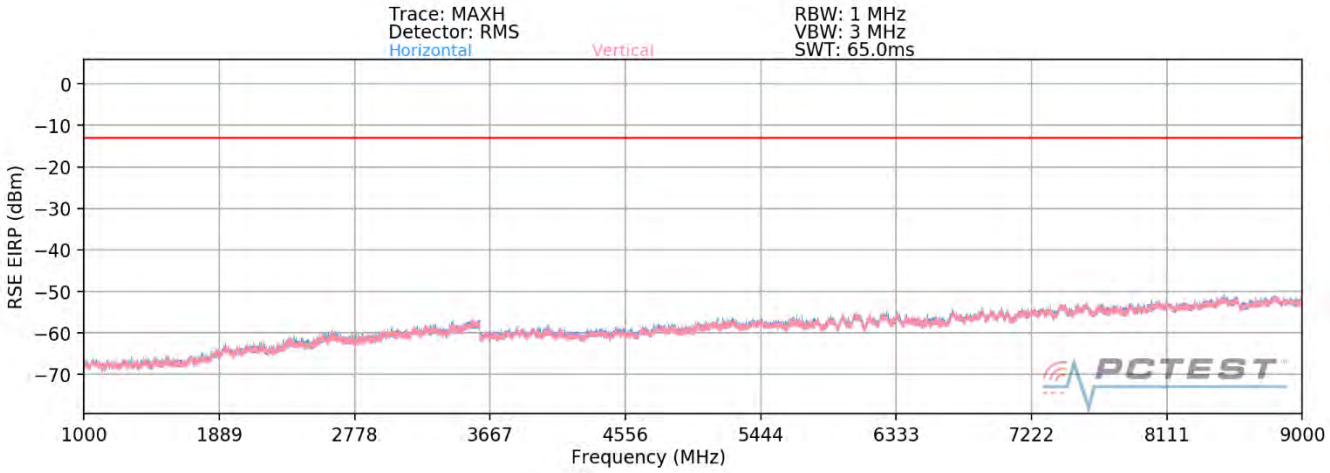
Table 7-16. Radiated Spurious Data (Band 13 – High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	V	367	291	-71.79	8.51	-63.28	-23.3
1564.00	V	380	223	-71.78	8.53	-63.25	-23.3
1569.00	V	228	304	-72.87	8.55	-64.33	-24.3

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

Band 5



Plot 7-236. Radiated Spurious Plot above 1GHz (Band 5)

OPERATING FREQUENCY:	829.00	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]
1658.00	H	168	206	-79.98	8.95	-71.03	-58.0
2487.00	H	-	-	-78.50	9.70	-68.79	-55.8
3316.00	H	-	-	-74.62	9.59	-65.03	-52.0

Table 7-18. Radiated Spurious Data (Band 5 – Low Channel)

OPERATING FREQUENCY:	836.50	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]
1673.00	H	149	52	-79.58	8.95	-70.63	-57.6
2509.50	H	-	-	-77.95	9.75	-68.20	-55.2
3346.00	H	-	-	-75.23	9.60	-65.63	-52.6

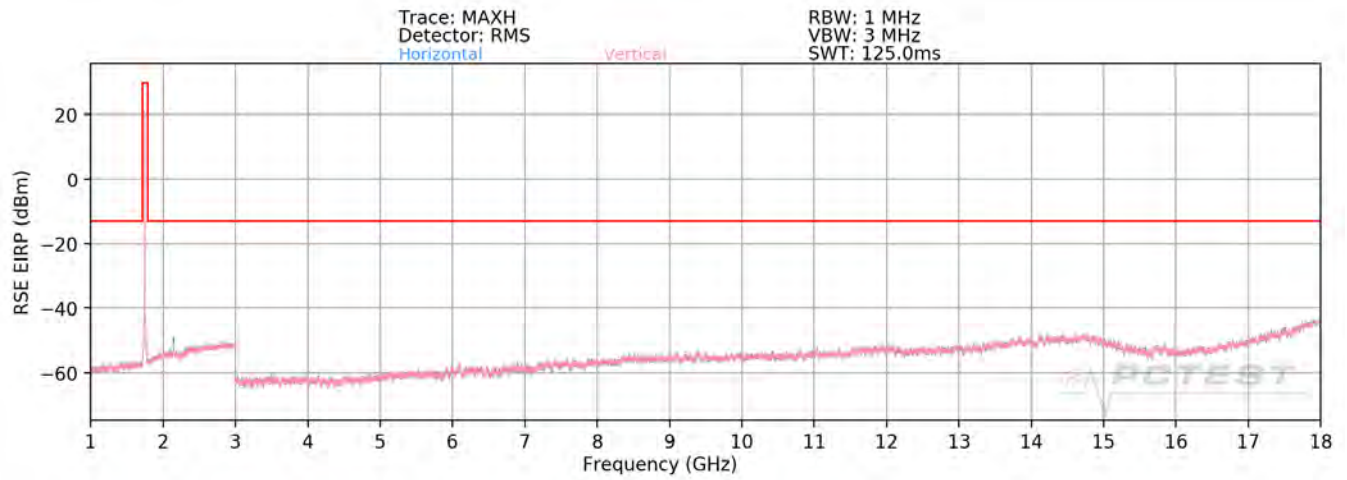
Table 7-19. Radiated Spurious Data (Band 5 – Mid Channel)

OPERATING FREQUENCY:	844.00	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]
1688.00	H	255	8	-79.06	8.95	-70.10	-57.1
2532.00	H	-	-	-77.36	9.75	-67.61	-54.6
3376.00	H	-	-	-75.40	9.71	-65.70	-52.7

Table 7-20. Radiated Spurious Data (Band 5 – High Channel)

Band 66



Plot 7-237. Radiated Spurious Plot above 1GHz (Band 66)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3440.00	H	312	26	-71.97	9.84	-62.12	-49.1
5160.00	H	-	-	-73.82	10.71	-63.11	-50.1
6880.00	H	-	-	-71.59	11.68	-59.91	-46.9
8600.00	H	-	-	-68.44	11.08	-57.36	-44.4

Table 7-21. Radiated Spurious Data (Band 66 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	136	66	-69.21	9.91	-59.29	-46.3
5235.00	H	-	-	-73.09	10.73	-62.36	-49.4
6980.00	H	-	-	-72.39	11.82	-60.57	-47.6
8725.00	H	-	-	-67.92	11.00	-56.92	-43.9

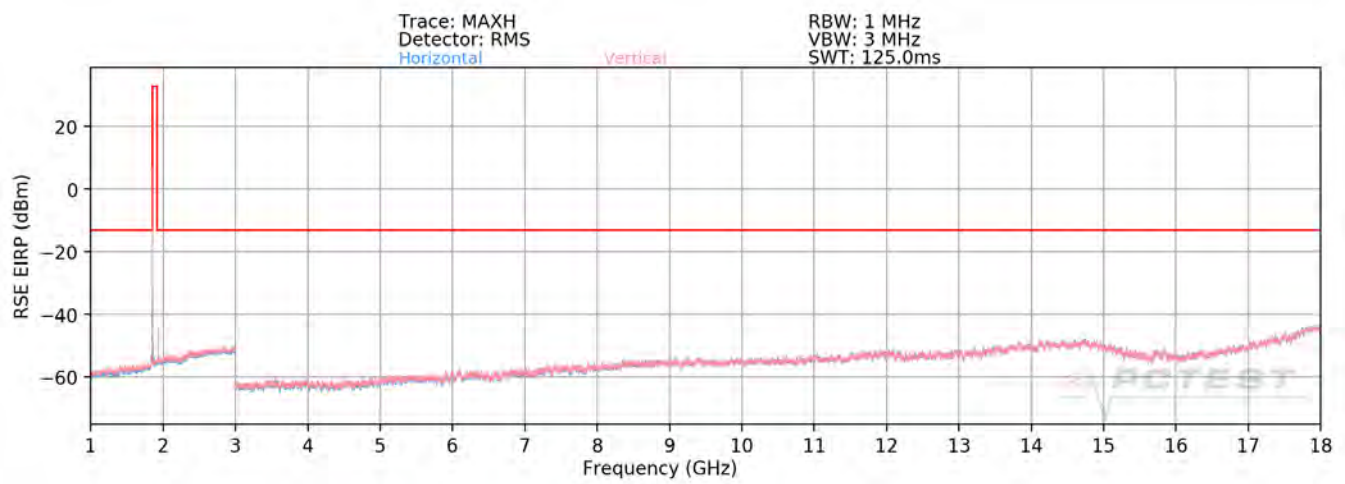
Table 7-22. Radiated Spurious Data (Band 66 – Mid Channel)

OPERATING FREQUENCY:	1770.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3540.00	H	301	139	-67.43	9.89	-57.54	-44.5
5310.00	H	-	-	-73.39	10.69	-62.71	-49.7
7080.00	H	-	-	-72.60	11.79	-60.82	-47.8
8850.00	H	-	-	-67.65	11.00	-56.65	-43.7

Table 7-23. Radiated Spurious Data (Band 66 – High Channel)

Band 25/2



Plot 7-238. Radiated Spurious Plot above 1GHz (Band 25/2)

OPERATING FREQUENCY:	1852.50	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]
3705.00	H	203	27	-73.25	9.57	-63.68	-50.7
5557.50	H	136	322	-73.10	10.95	-62.14	-49.1
7410.00	H	-	-	-69.20	10.96	-58.24	-45.2
9262.50	H	-	-	-68.49	11.63	-56.86	-43.9

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

OPERATING FREQUENCY:	1882.50	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]
3765.00	H	194	359	-72.33	9.36	-62.97	-50.0
5647.50	H	-	-	-72.47	11.19	-61.27	-48.3
7530.00	H	-	-	-69.67	11.13	-58.54	-45.5
9412.50	H	-	-	-67.06	11.57	-55.49	-42.5

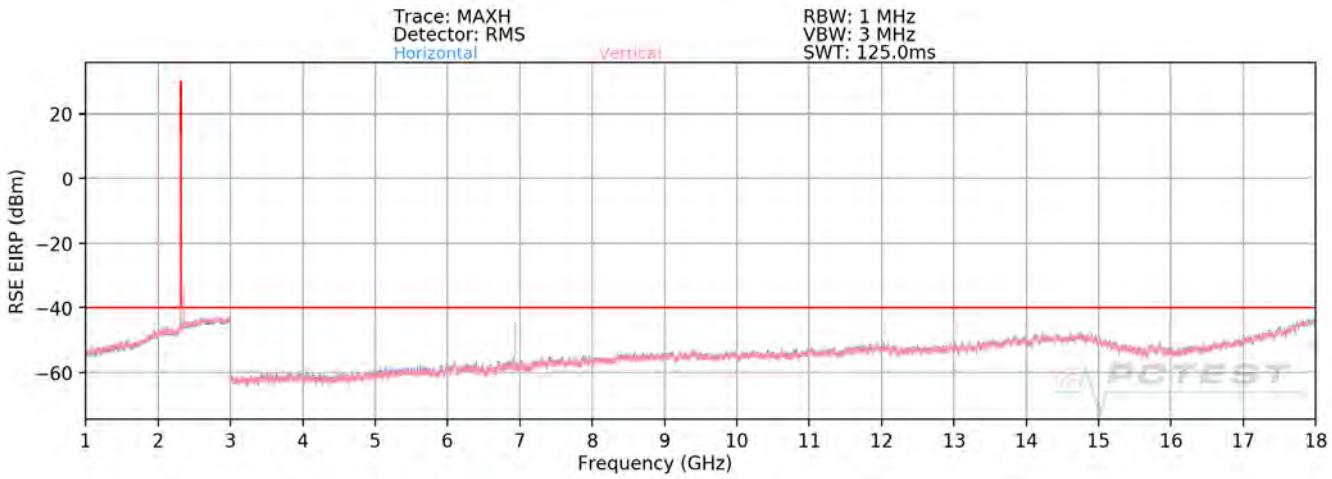
Table 7-25. Radiated Spurious Data (Band 25/2 – Mid Channel)

OPERATING FREQUENCY:	1912.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

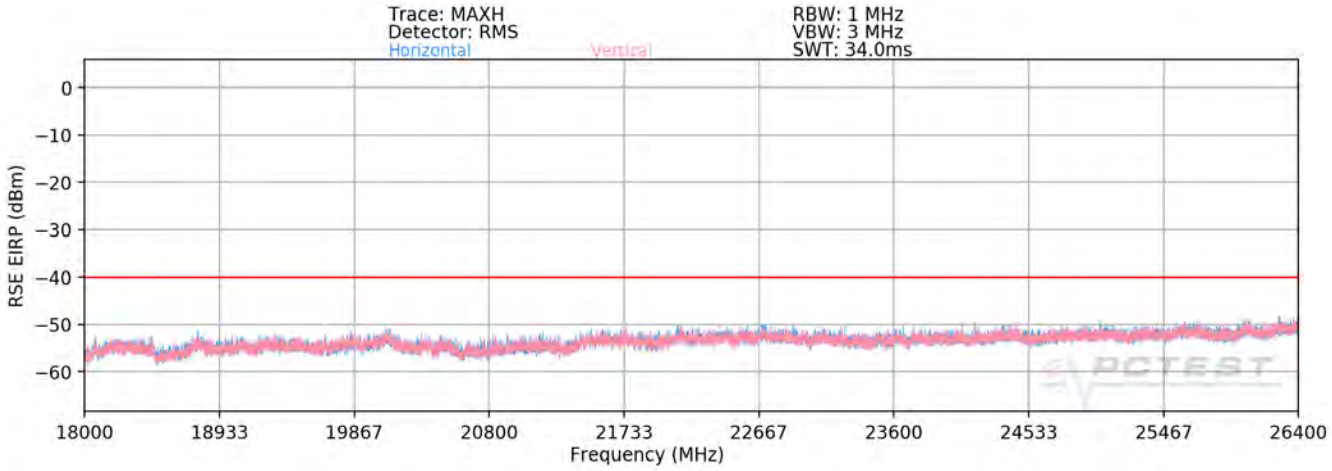
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3825.00	H	137	31	-69.25	9.31	-59.94	-46.9
5737.50	H	-	-	-73.94	11.41	-62.53	-49.5
7650.00	H	-	-	-70.51	11.36	-59.15	-46.2
9562.50	H	-	-	-66.33	11.81	-54.52	-41.5

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

Band 30



Plot 7-239. Radiated Spurious Plot 1GHz - 18GHz (Band 30)



Plot 7-240. Radiated Spurious Plot 18GHz – 26.5GHz (Band 30)

OPERATING FREQUENCY:	2307.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	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]
4615.00	H	182	216	-74.41	10.91	-63.49	-23.5
6922.50	H	115	26	-64.55	11.73	-52.81	-12.8
9230.00	H	-	-	-68.05	11.61	-56.44	-16.4
11537.50	H	-	-	-66.79	12.72	-54.07	-14.1

Table 7-27. Radiated Spurious Data (Band 30 – Low Channel)

OPERATING FREQUENCY:	2310.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	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]
4620.00	H	229	153	-74.94	10.92	-64.02	-24.0
6930.00	H	117	1	-60.02	11.74	-48.28	-8.3
9240.00	H	-	-	-68.24	11.62	-56.62	-16.6
11550.00	H	-	-	-66.96	12.72	-54.24	-14.2

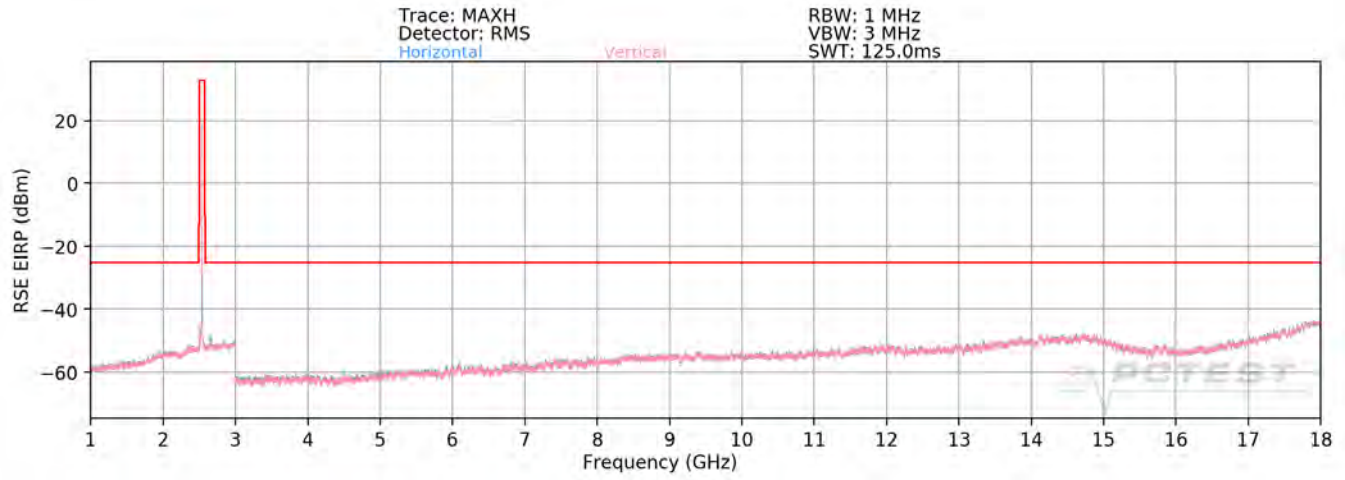
Table 7-28. Radiated Spurious Data (Band 30 – Mid Channel)

OPERATING FREQUENCY:	2312.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	dBm

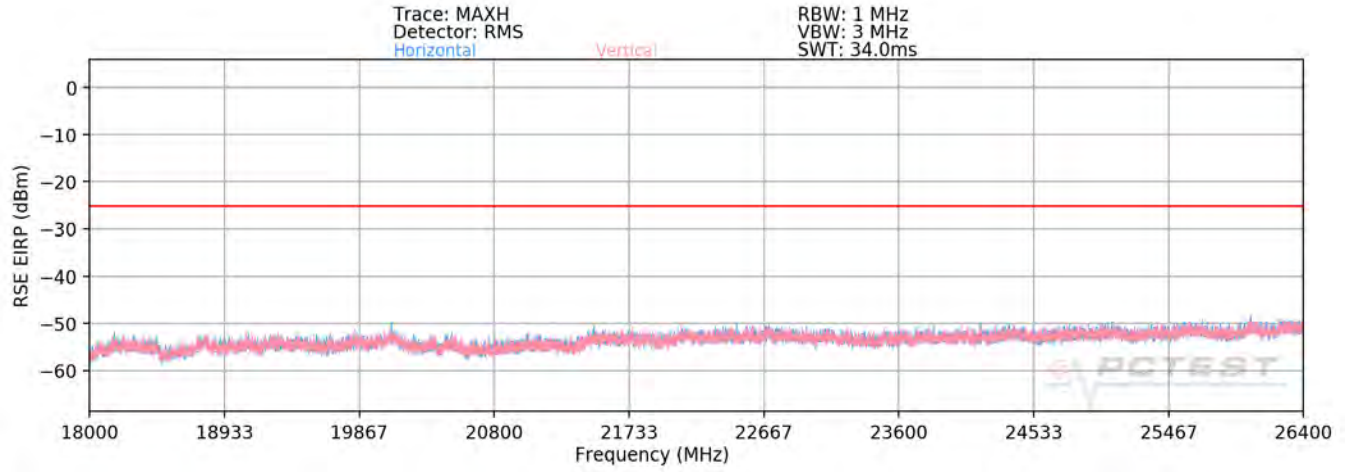
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4625.00	H	159	218	-74.25	10.92	-63.33	-23.3
6937.50	H	112	6	-66.85	11.75	-55.10	-15.1
9250.00	H	-	-	-68.43	11.63	-56.80	-16.8
11562.50	H	-	-	-67.14	12.71	-54.43	-14.4

Table 7-29. Radiated Spurious Data (Band 30 – High Channel)

Band 7



Plot 7-241. Radiated Spurious Plot 1GHz - 18GHz (Band 7)



Plot 7-242. Radiated Spurious Plot 18GHz – 26.5GHz (Band 7)

OPERATING FREQUENCY:	2510.00	MHz
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	V	157	267	-72.84	10.88	-61.95	-37.0
7530.00	V	322	28	-65.31	11.13	-54.18	-29.2
10040.00	V	-	-	-68.29	11.99	-56.31	-31.3
12550.00	V	-	-	-67.82	13.56	-54.26	-29.3

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

OPERATING FREQUENCY:	2535.00	MHz
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]
5070.00	V	292	141	-72.52	10.75	-61.77	-36.8
7605.00	V	306	38	-64.45	11.25	-53.20	-28.2
10140.00	V	-	-	-67.58	12.07	-55.51	-30.5
12675.00	V	-	-	-68.06	13.66	-54.40	-29.4

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

OPERATING FREQUENCY:	2560.00	MHz
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]
5120.00	V	143	142	-72.05	10.68	-61.37	-36.4
7680.00	V	115	1	-66.04	11.39	-54.65	-29.6
10240.00	V	-	-	-68.06	12.18	-55.88	-30.9
12800.00	V	-	-	-67.35	13.50	-53.84	-28.8

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

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

Band 12/17 Frequency Stability Measurements

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	- 30	707,500,105	105	0.0000148
100 %		- 20	707,500,101	101	0.0000143
100 %		- 10	707,499,900	-100	-0.0000141
100 %		0	707,499,961	-39	-0.0000055
100 %		+ 10	707,500,139	139	0.0000196
100 %		+ 20	707,499,863	-137	-0.0000194
100 %		+ 30	707,499,841	-159	-0.0000225
100 %		+ 40	707,499,729	-271	-0.0000383
100 %		+ 50	707,499,649	-351	-0.0000496
BATT. ENDPOINT	3.57	+ 20	707,500,043	43	0.0000061

Table 7-33. 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.

Band 12/17 Frequency Stability Measurements

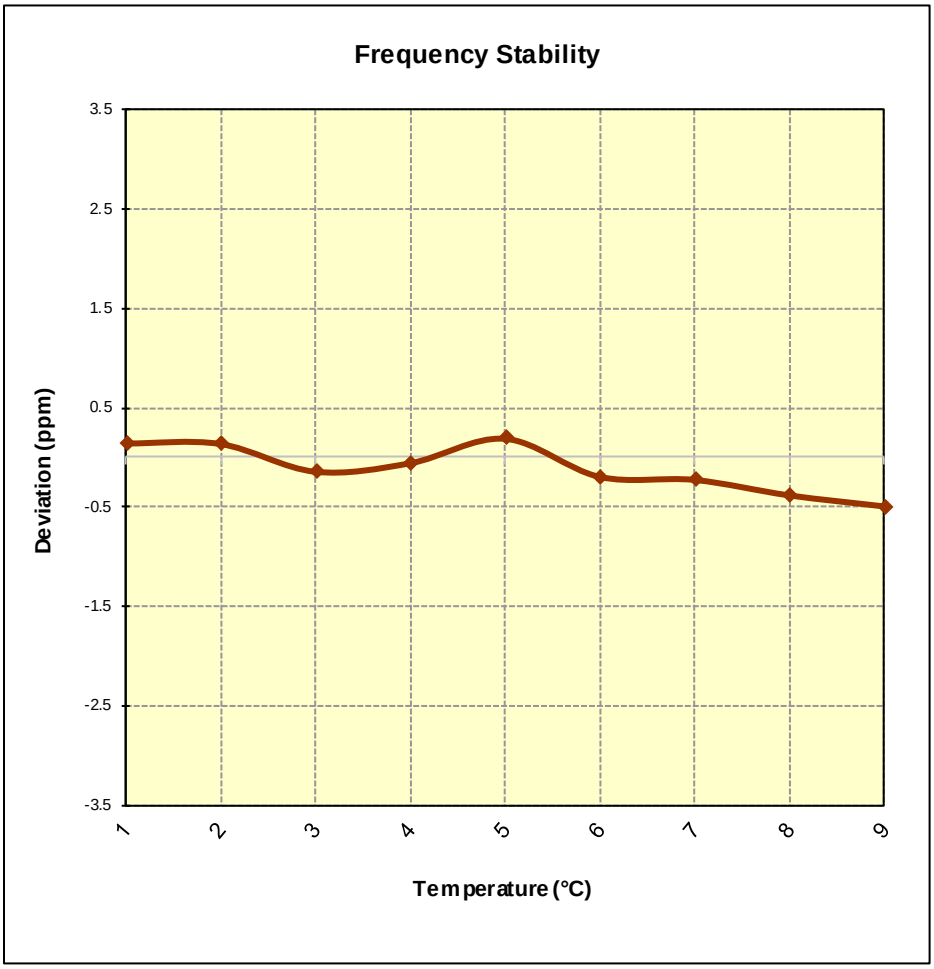


Figure 7-8. Frequency Stability Graph (Band 12/17)

Band 13 Frequency Stability Measurements

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	- 30	782,000,275	275	0.0000352
100 %		- 20	781,999,897	-103	-0.0000132
100 %		- 10	781,999,892	-108	-0.0000138
100 %		0	781,999,627	-373	-0.0000477
100 %		+ 10	781,999,857	-143	-0.0000183
100 %		+ 20	781,999,916	-84	-0.0000107
100 %		+ 30	781,999,999	-1	-0.0000001
100 %		+ 40	781,999,997	-3	-0.0000004
100 %		+ 50	781,999,984	-16	-0.0000020
BATT. ENDPOINT	3.57	+ 20	782,000,030	30	0.0000038

Table 7-34. 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

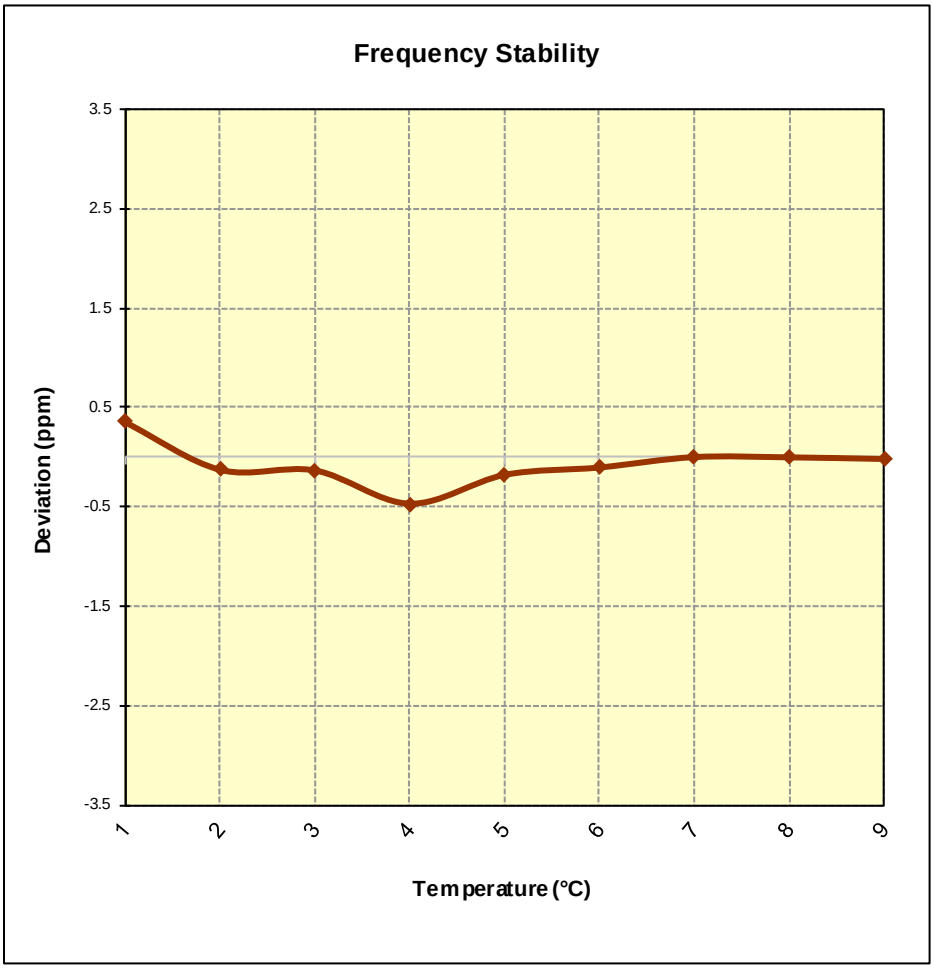


Figure 7-9. Frequency Stability Graph (Band 13)

Band 5 Frequency Stability Measurements

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	20525	
REFERENCE VOLTAGE:	4.30	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	- 30	836,500,216	216	0.0000258
100 %		- 20	836,500,355	355	0.0000424
100 %		- 10	836,500,244	244	0.0000292
100 %		0	836,500,226	226	0.0000270
100 %		+ 10	836,500,161	161	0.0000192
100 %		+ 20	836,499,903	-97	-0.0000116
100 %		+ 30	836,500,206	206	0.0000246
100 %		+ 40	836,500,027	27	0.0000032
100 %		+ 50	836,499,921	-79	-0.0000094
BATT. ENDPOINT	3.57	+ 20	836,500,362	362	0.0000433

Table 7-35. Frequency Stability Data (Band 5)

Band 5 Frequency Stability Measurements

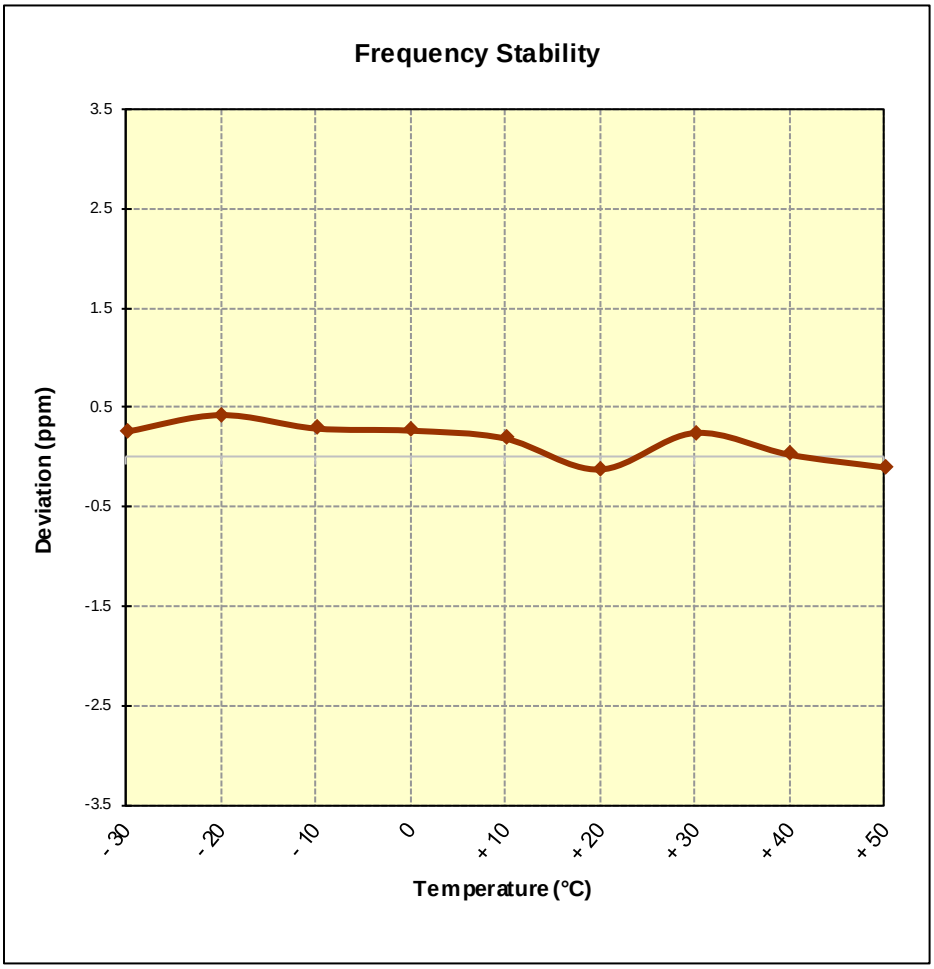


Figure 7-10. Frequency Stability Graph (Band 5)

Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	- 30	1,744,999,936	-64	-0.0000037
100 %		- 20	1,744,999,658	-342	-0.0000196
100 %		- 10	1,745,000,368	368	0.0000211
100 %		0	1,745,000,095	95	0.0000054
100 %		+ 10	1,744,999,850	-150	-0.0000086
100 %		+ 20	1,745,000,114	114	0.0000065
100 %		+ 30	1,745,000,037	37	0.0000021
100 %		+ 40	1,744,999,740	-260	-0.0000149
100 %		+ 50	1,745,000,108	108	0.0000062
BATT. ENDPOINT	3.57	+ 20	1,745,000,045	45	0.0000026

Table 7-36. Frequency Stability Data (Band 66/4)

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 66/4 Frequency Stability Measurements

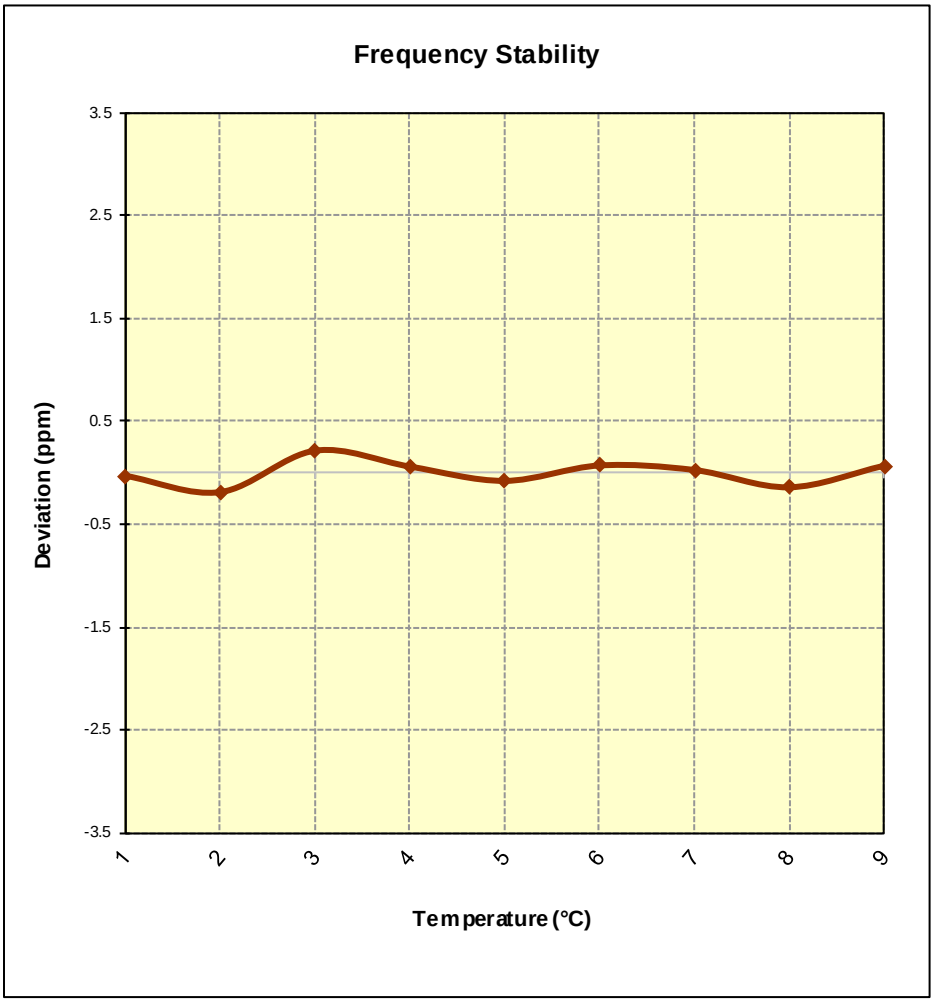


Figure 7-11. Frequency Stability Graph (Band 66/4)

Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	- 30	1,882,500,032	32	0.0000017
100 %		- 20	1,882,500,021	21	0.0000011
100 %		- 10	1,882,499,708	-292	-0.0000155
100 %		0	1,882,499,723	-277	-0.0000147
100 %		+ 10	1,882,499,905	-95	-0.0000050
100 %		+ 20	1,882,499,627	-373	-0.0000198
100 %		+ 30	1,882,500,218	218	0.0000116
100 %		+ 40	1,882,500,006	6	0.0000003
100 %		+ 50	1,882,500,085	85	0.0000045
BATT. ENDPOINT	3.57	+ 20	1,882,499,839	-161	-0.0000086

Table 7-37. Frequency Stability Data (Band 25/2)

Note:

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

Band 25/2 Frequency Stability Measurements

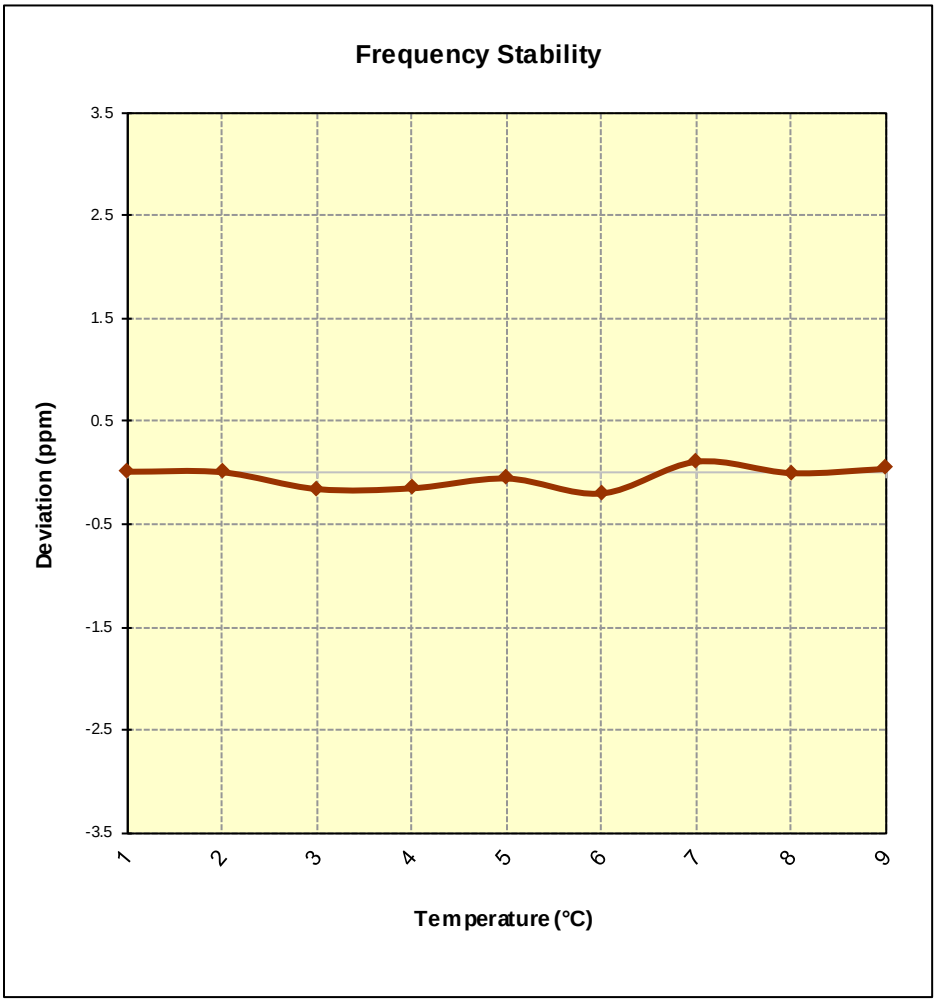


Figure 7-12. Frequency Stability Graph (Band 25/2)

Band 30 Frequency Stability Measurements

OPERATING FREQUENCY:	2,310,000,000	Hz
CHANNEL:	27710	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	- 30	2,310,000,297	297	0.0000129
100 %		- 20	2,309,999,997	-3	-0.0000001
100 %		- 10	2,310,000,238	238	0.0000103
100 %		0	2,310,000,103	103	0.0000045
100 %		+ 10	2,309,999,848	-152	-0.0000066
100 %		+ 20	2,309,999,777	-223	-0.0000097
100 %		+ 30	2,310,000,241	241	0.0000104
100 %		+ 40	2,309,999,847	-153	-0.0000066
100 %		+ 50	2,309,999,912	-88	-0.0000038
BATT. ENDPOINT	3.57	+ 20	2,309,999,635	-365	-0.0000158

Table 7-38. Frequency Stability Data (Band 30)

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 30 Frequency Stability Measurements

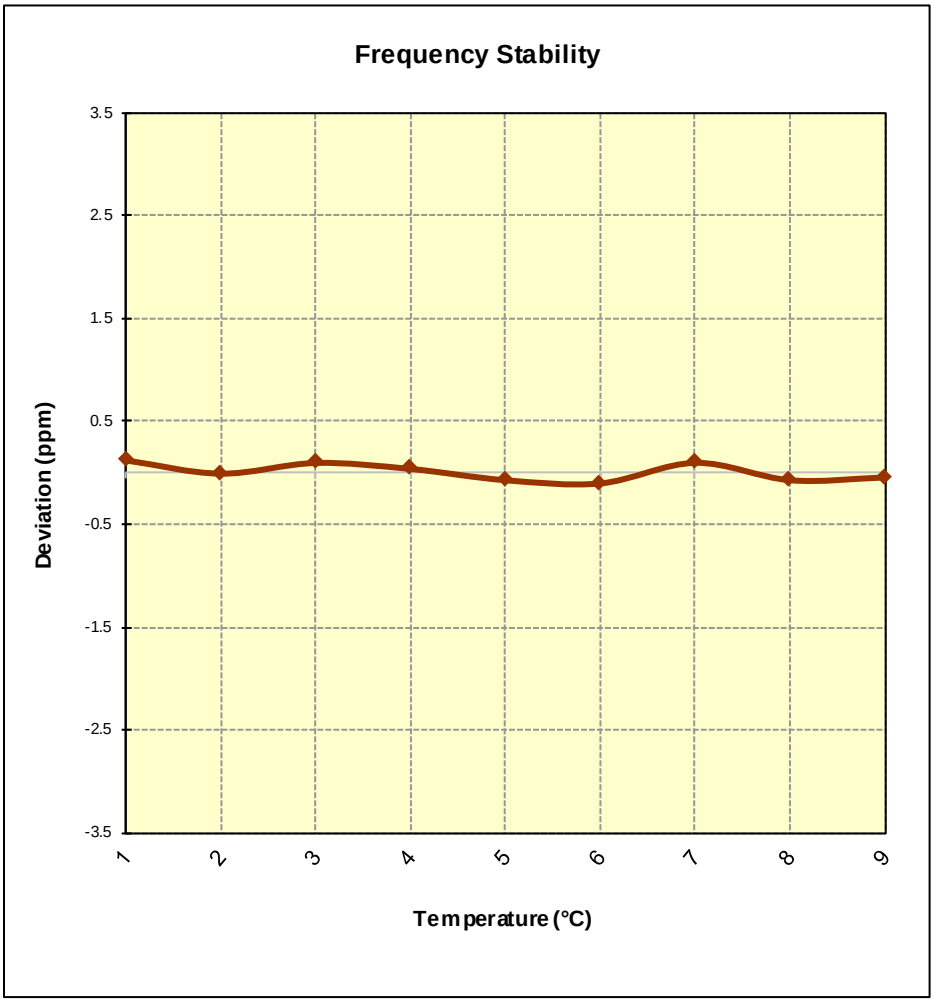


Figure 7-13. Frequency Stability Graph (Band 30)

Band 7 Frequency Stability Measurements

OPERATING FREQUENCY:	2,535,000,000	Hz
CHANNEL:	21100	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	- 30	2,535,000,013	13	0.0000005
100 %		- 20	2,535,000,277	277	0.0000109
100 %		- 10	2,534,999,912	-88	-0.0000035
100 %		0	2,534,999,895	-105	-0.0000041
100 %		+ 10	2,535,000,300	300	0.0000118
100 %		+ 20	2,534,999,715	-285	-0.0000112
100 %		+ 30	2,534,999,812	-188	-0.0000074
100 %		+ 40	2,535,000,352	352	0.0000139
100 %		+ 50	2,535,000,182	182	0.0000072
BATT. ENDPOINT	3.57	+ 20	2,534,999,737	-263	-0.0000104

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

Note:

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

Band 7 Frequency Stability Measurements

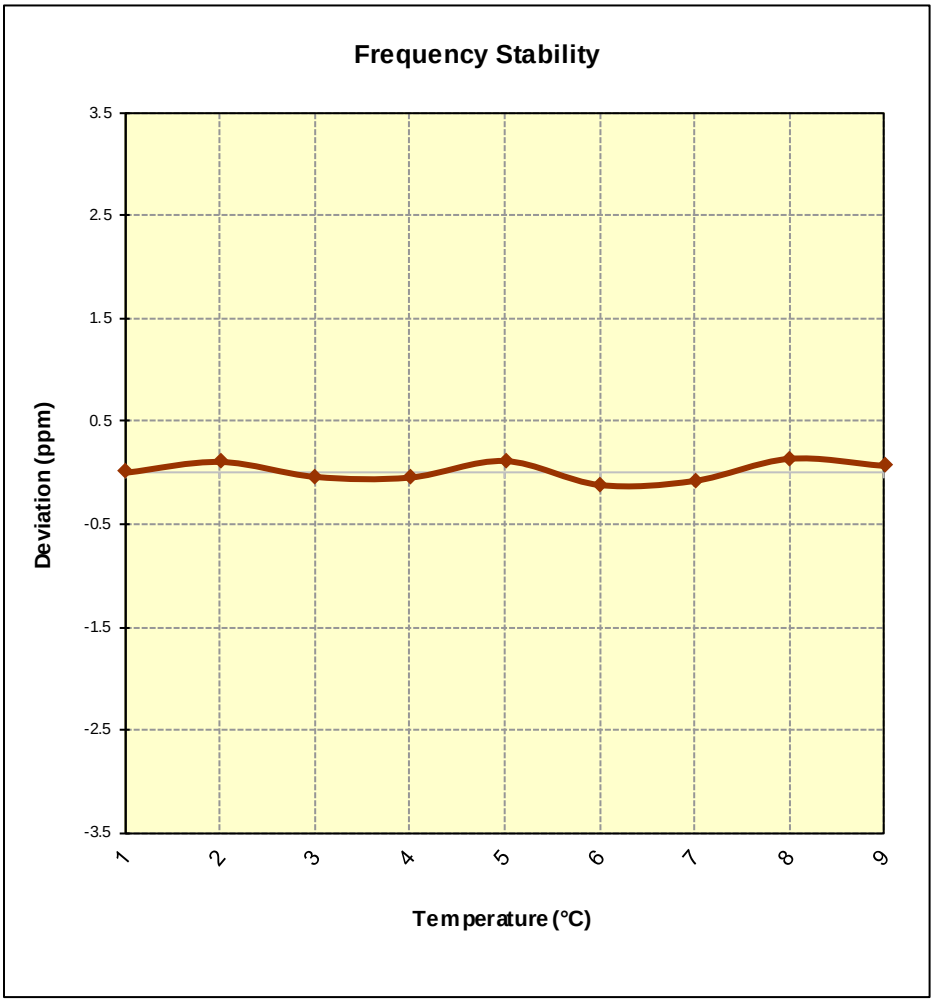


Figure 7-14. Frequency Stability Graph (Band 7)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFQ630UM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.