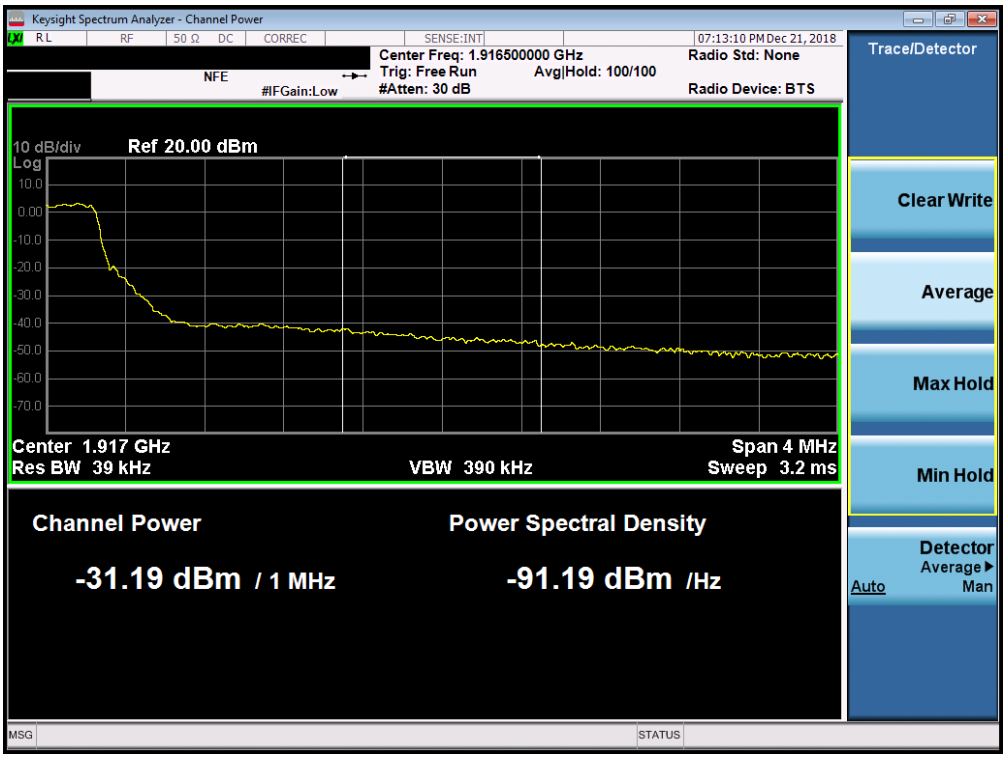
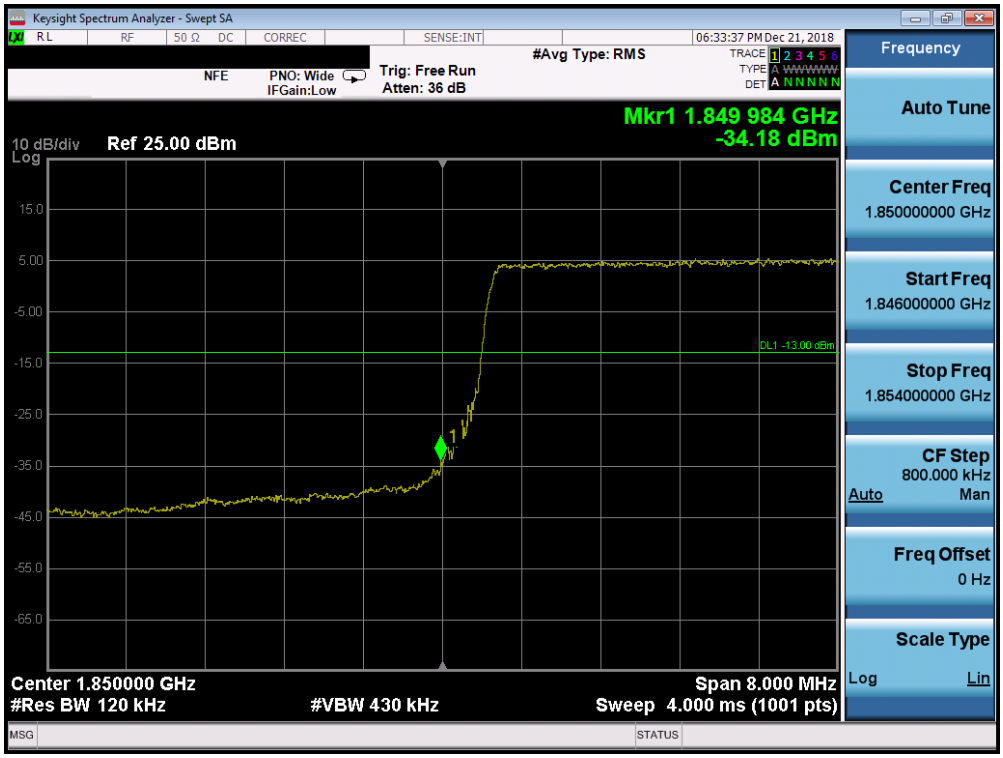
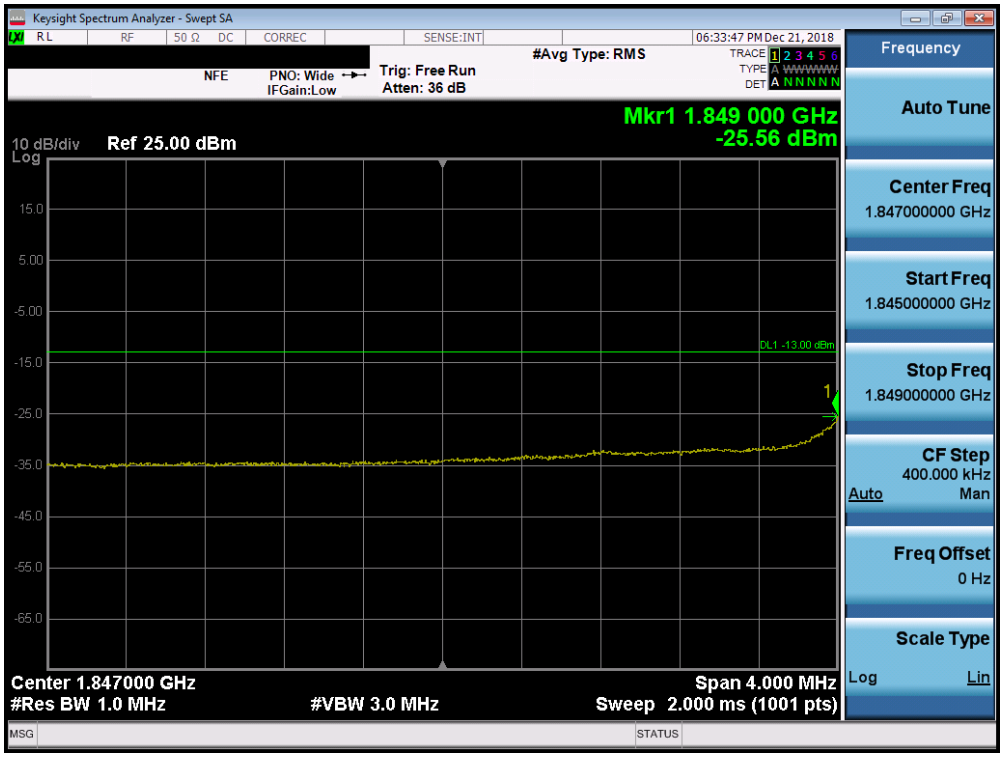
Plot 7-219. Upper Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)



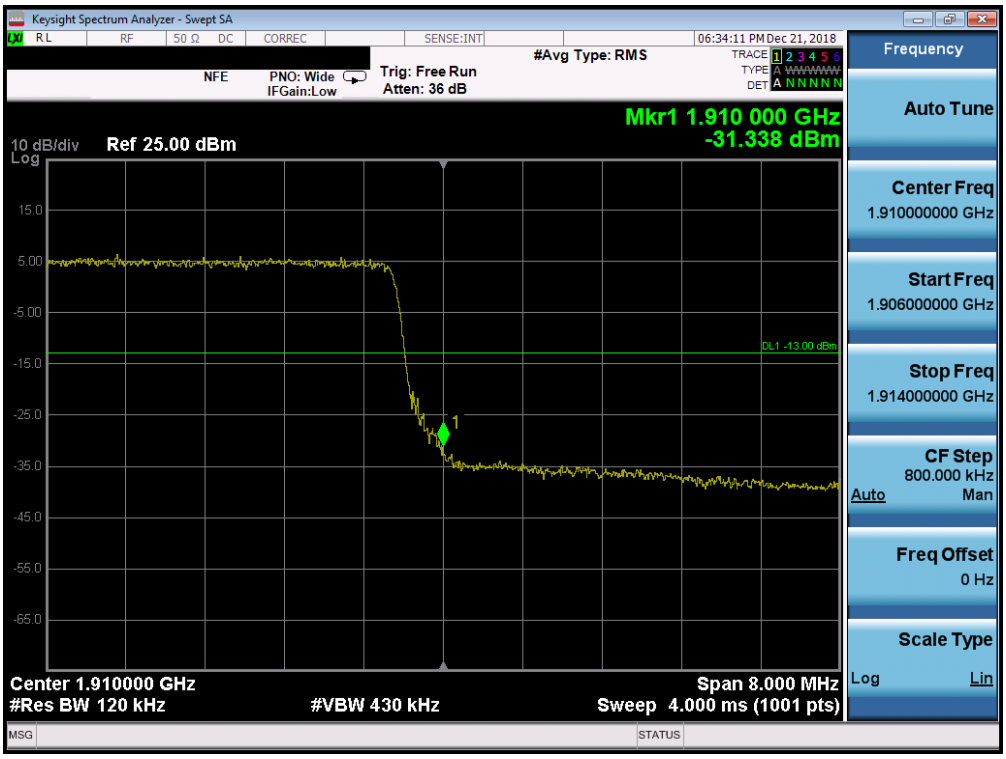
Plot 7-220. Upper Extended Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-221. Lower Band Edge Plot (Band 25/2 - 10MHz QPSK - Full RB Configuration)



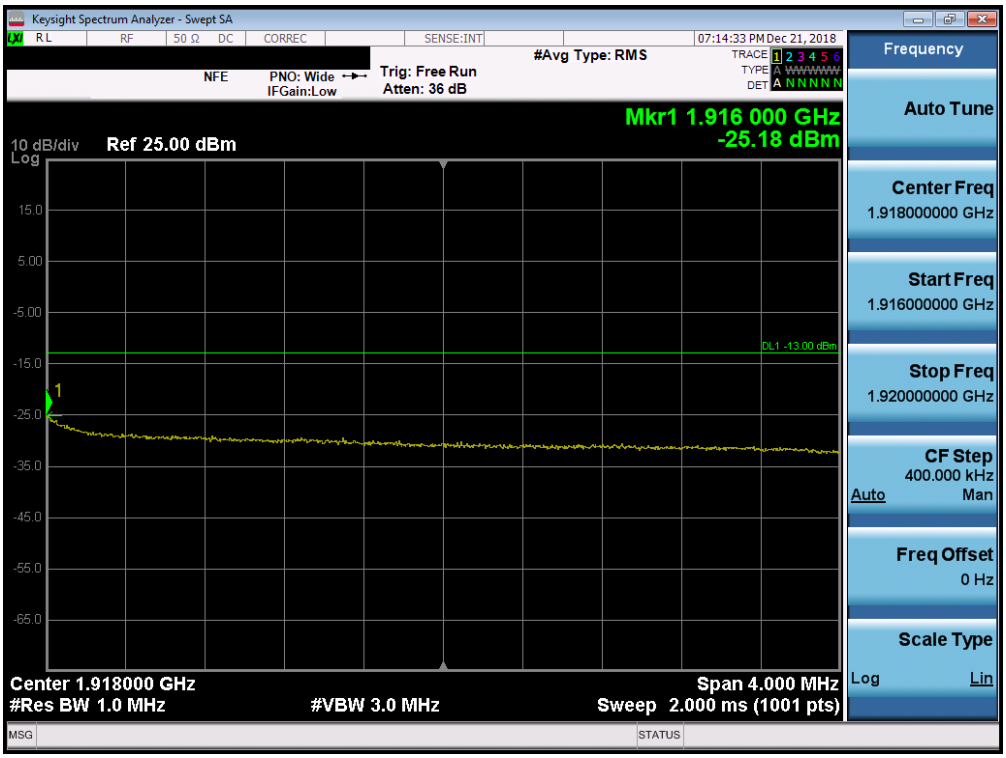
Plot 7-222. Lower Extended Band Edge Plot (Band 25/2 - 10MHz QPSK - Full RB Configuration)



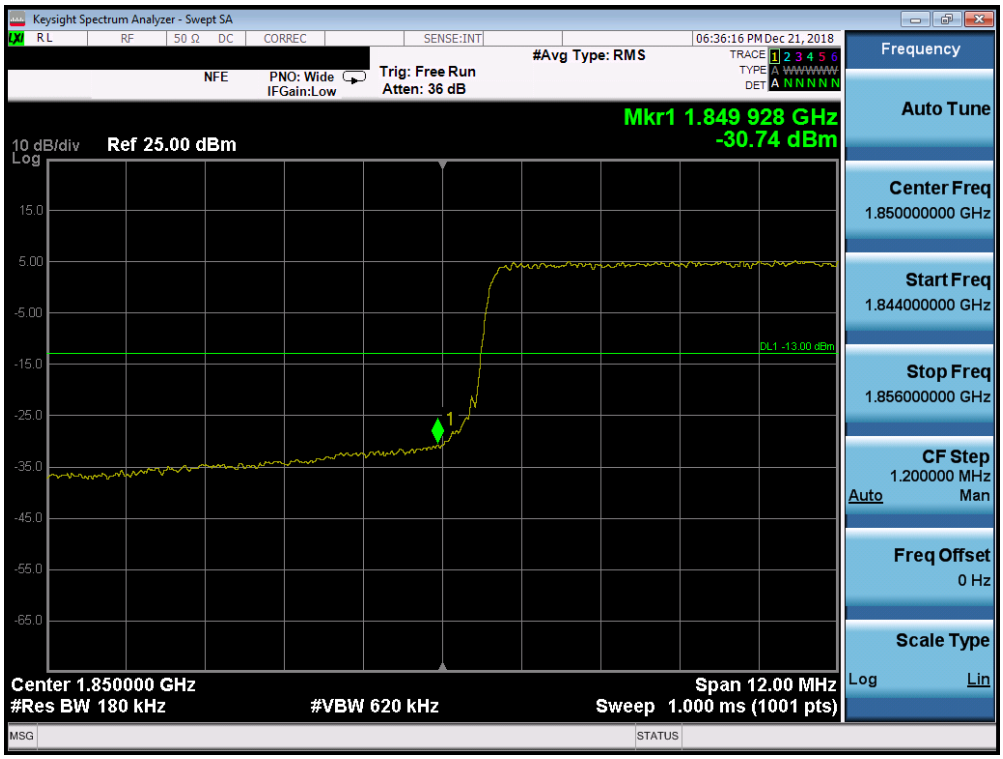
Plot 7-223. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

Plot 7-224. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

Plot 7-225. Upper Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)

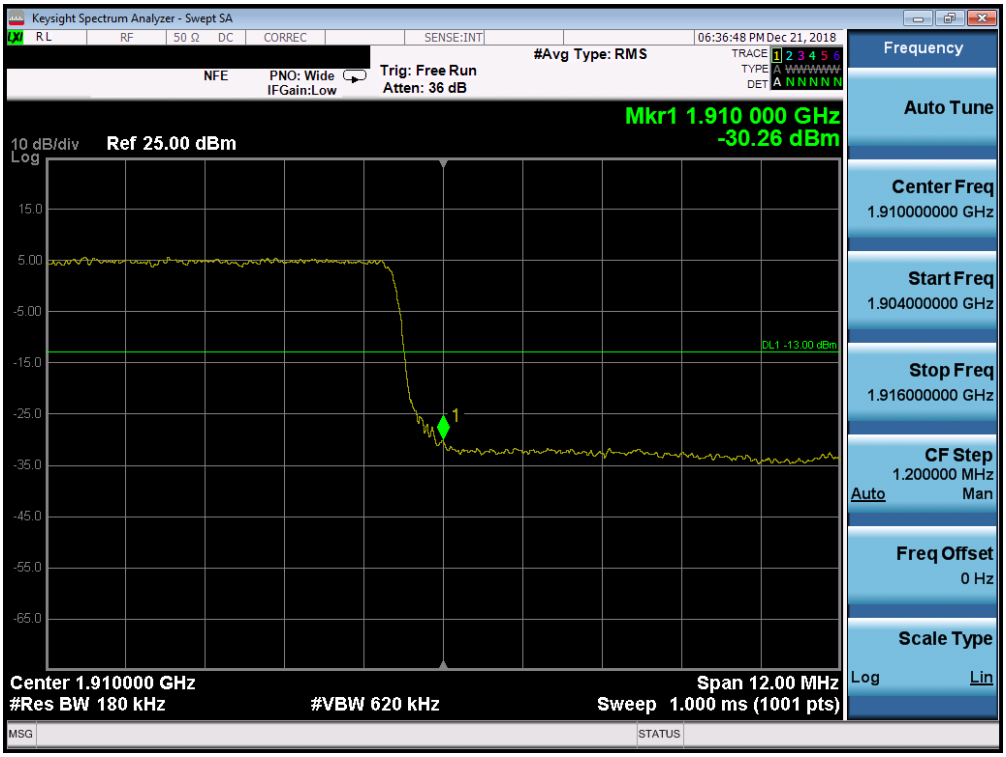


Plot 7-226. Upper Extended Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)

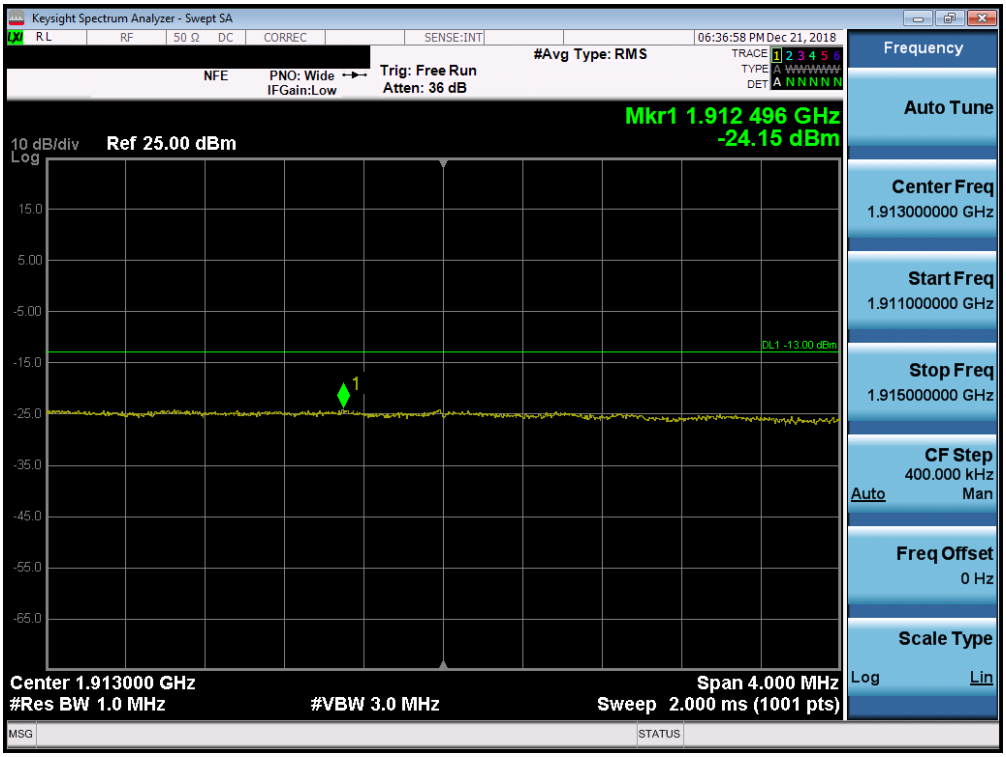


Plot 7-227. Lower Band Edge Plot (Band 25/2 - 15MHz QPSK - Full RB Configuration)

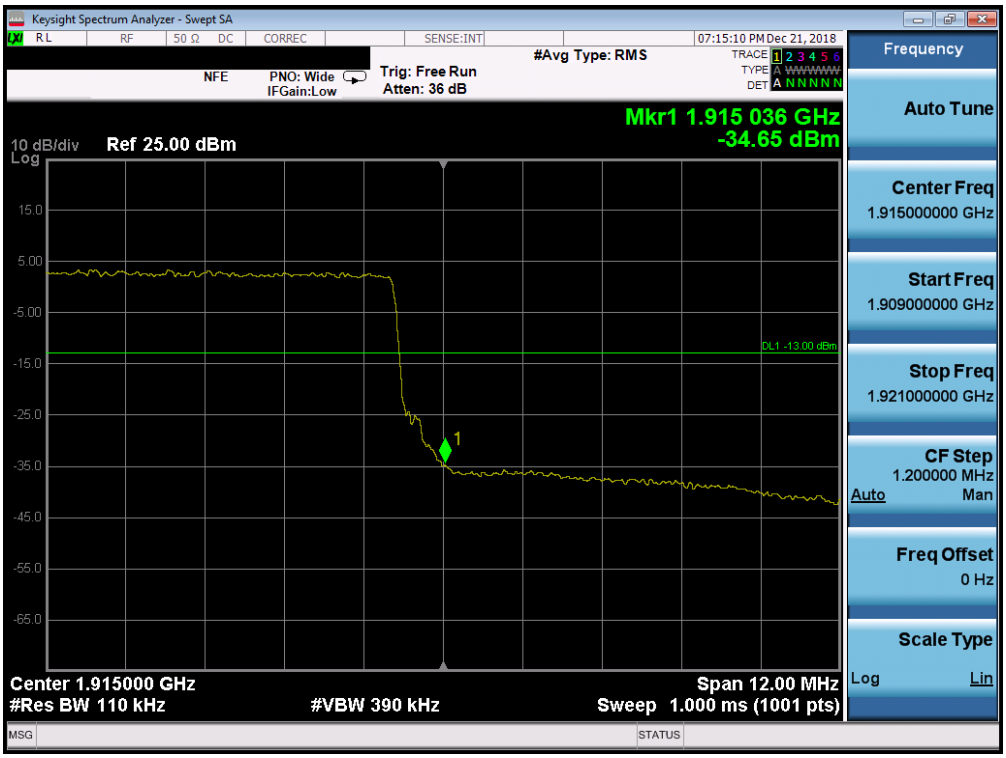
Plot 7-228. Lower Extended Band Edge Plot (Band 25/2 - 15MHz QPSK - Full RB Configuration)



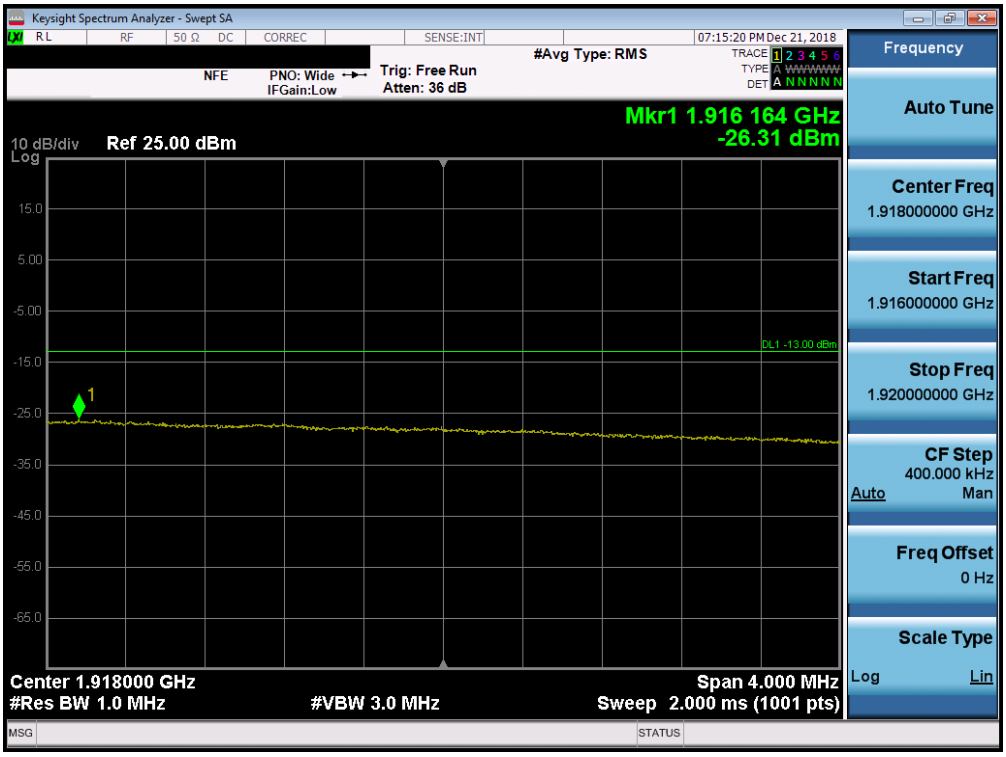
Plot 7-229. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



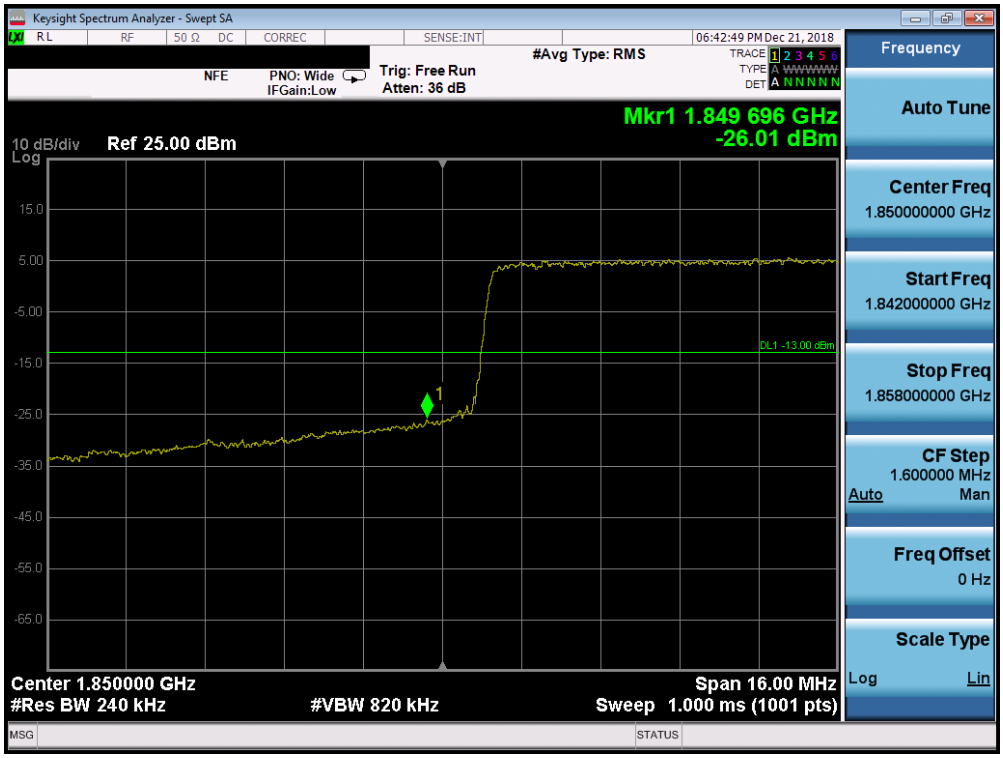
Plot 7-230. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



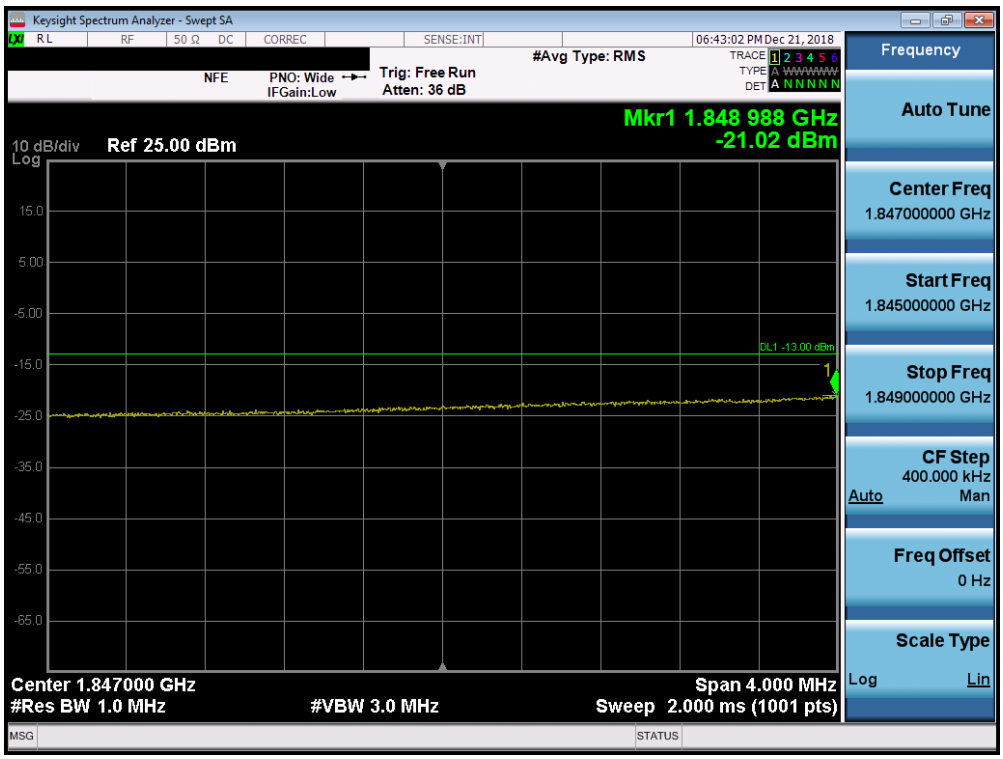
Plot 7-231. Upper Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)



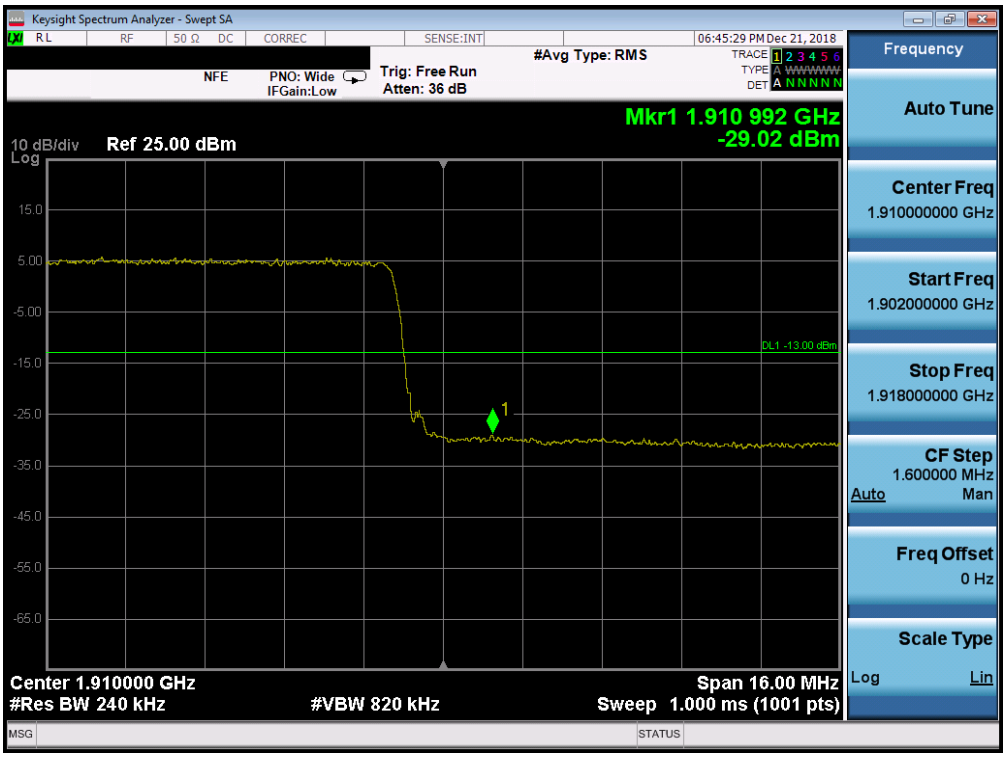
Plot 7-232. Upper Extended Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)



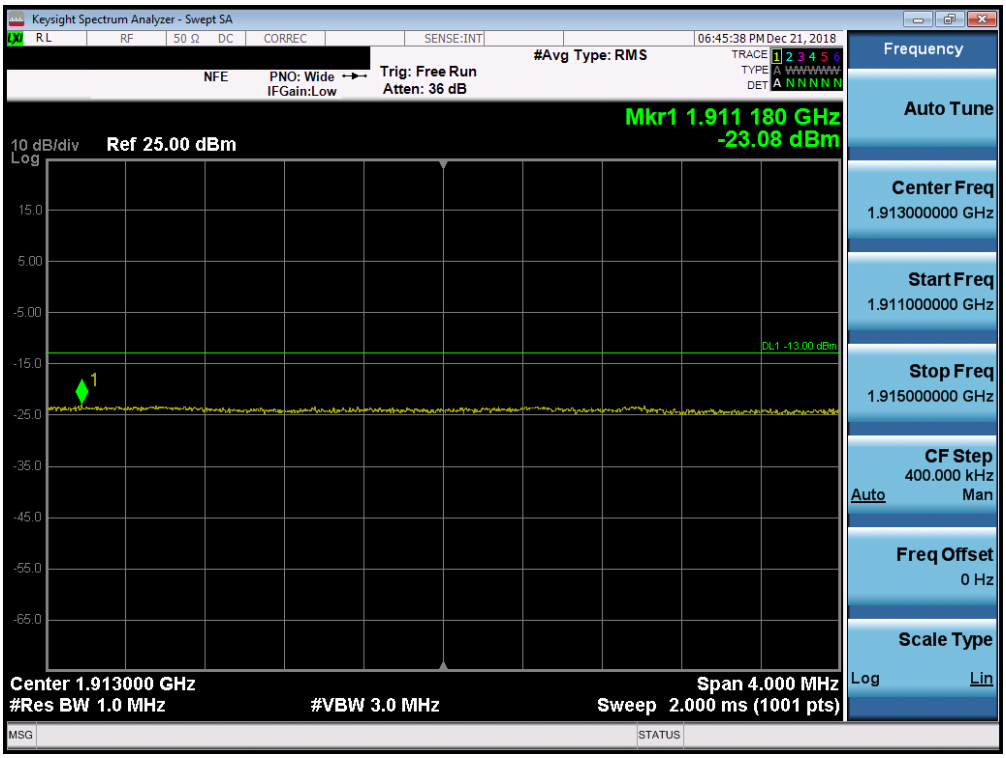
Plot 7-233. Lower Band Edge Plot (Band 25/2 – 20MHz QPSK - Full RB Configuration)



Plot 7-234. Lower Extended Band Edge Plot (Band 25/2 - 20MHz QPSK - Full RB Configuration)

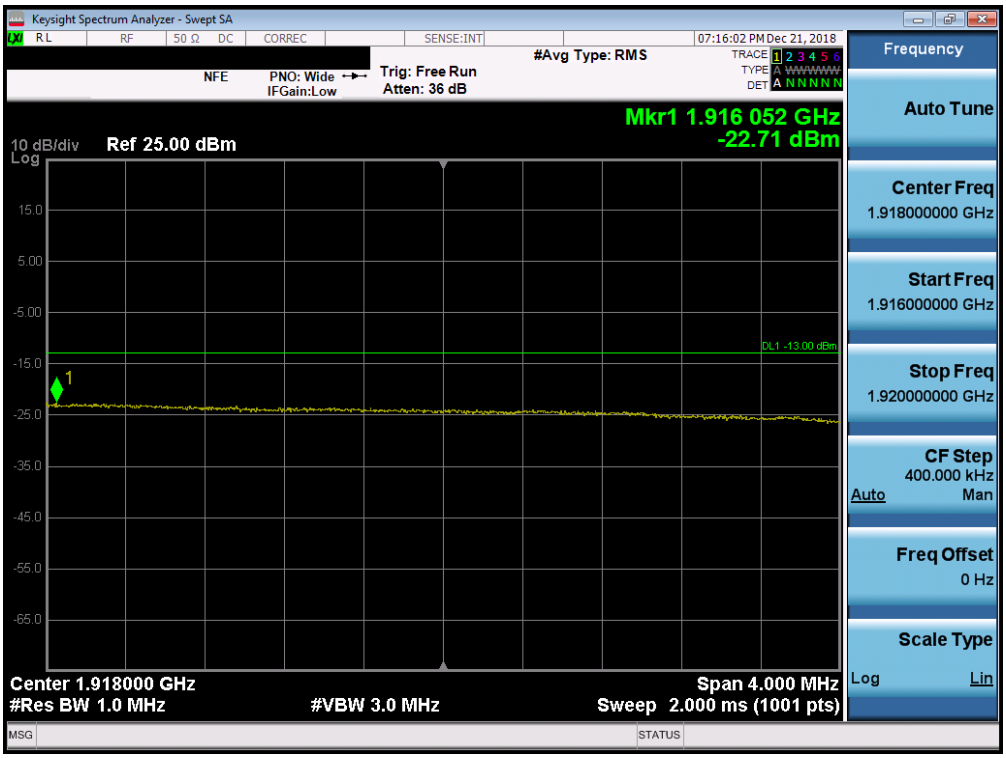


Plot 7-235. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

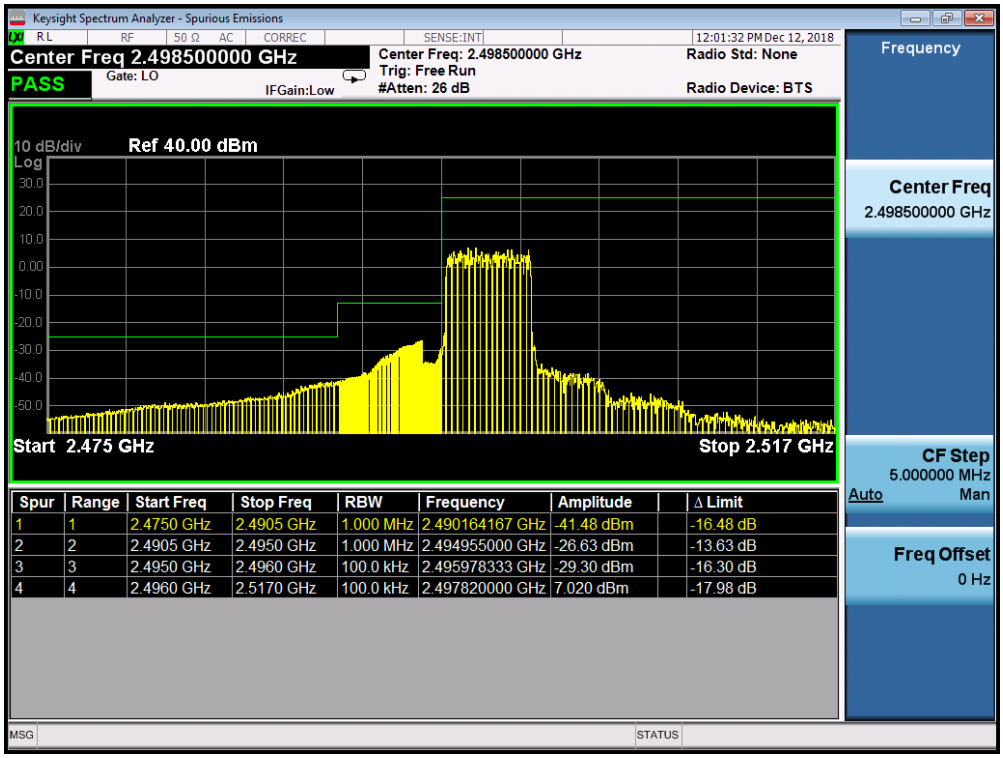


Plot 7-236. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

Plot 7-237. Upper Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)

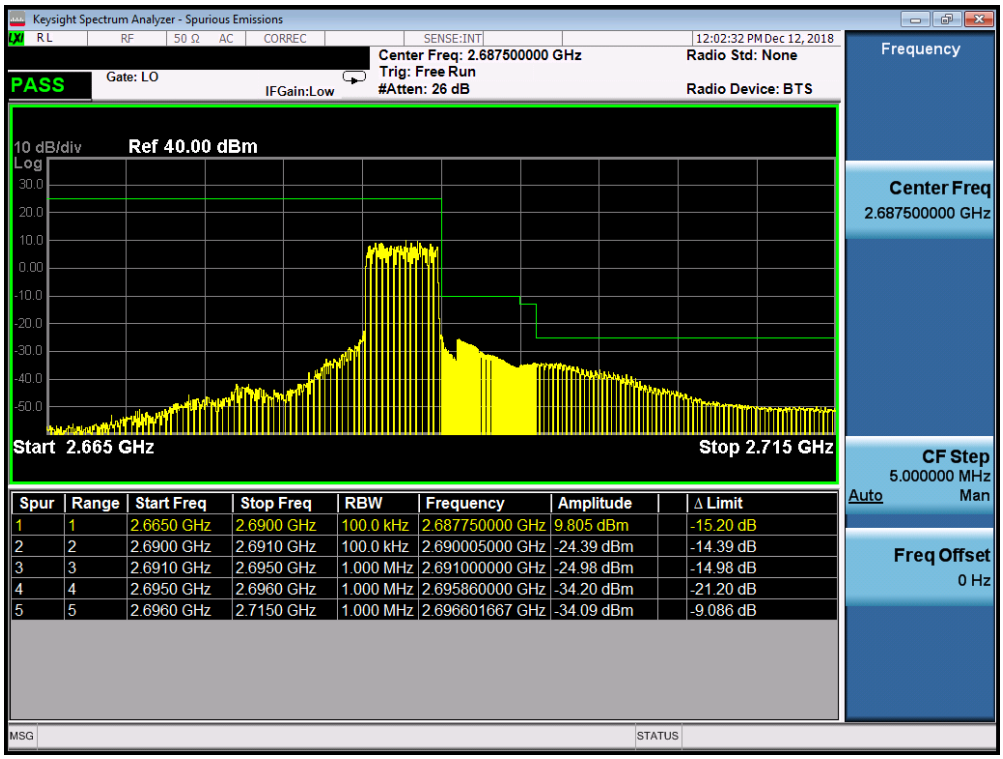


Plot 7-238. Upper Extended Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)



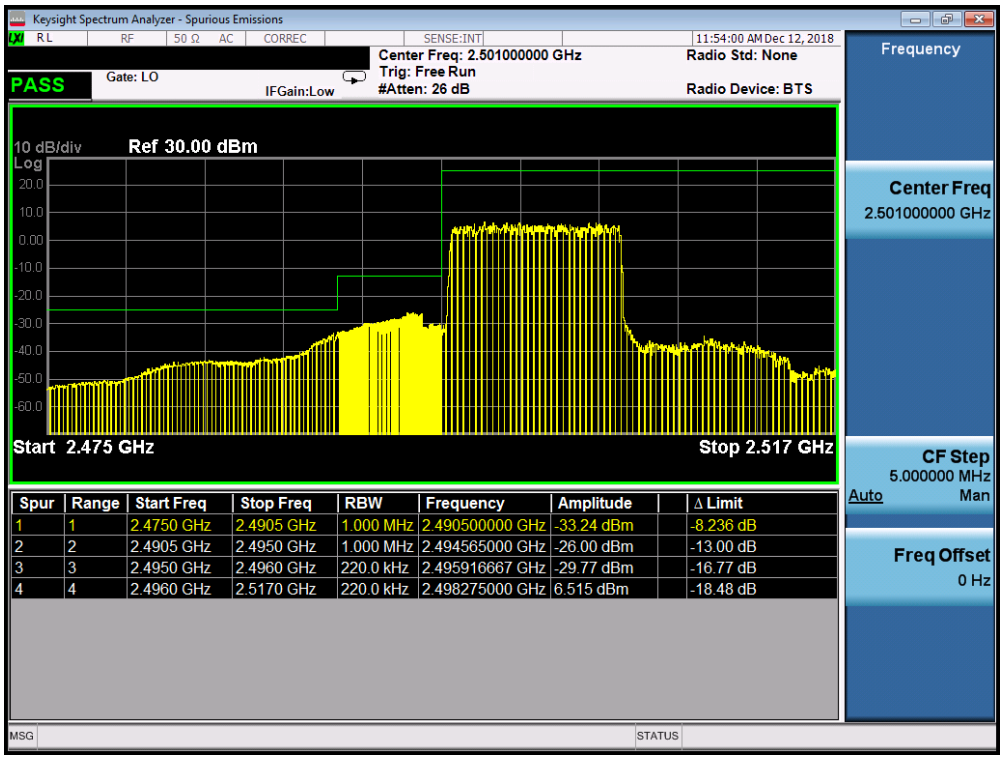
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490164167 GHz	-41.48 dBm	-16.48 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494955000 GHz	-26.63 dBm	-13.63 dB
3	3	2.4950 GHz	2.4960 GHz	100.0 kHz	2.495978333 GHz	-29.30 dBm	-16.30 dB
4	4	2.4960 GHz	2.5170 GHz	100.0 kHz	2.497820000 GHz	7.020 dBm	-17.98 dB

Plot 7-239. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 5.0MHz QPSK - Full RB Configuration)



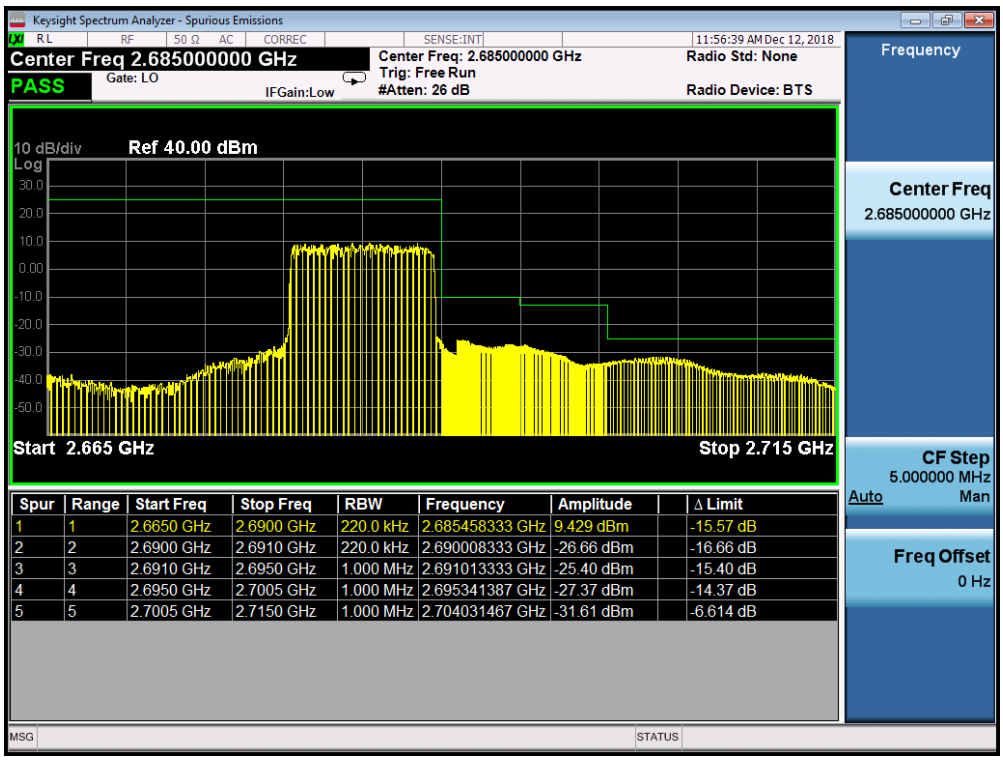
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	100.0 kHz	2.687750000 GHz	9.805 dBm	-15.20 dB
2	2	2.6900 GHz	2.6910 GHz	100.0 kHz	2.690005000 GHz	-24.39 dBm	-14.39 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691000000 GHz	-24.98 dBm	-14.98 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695860000 GHz	-34.20 dBm	-21.20 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696601667 GHz	-34.09 dBm	-9.086 dB

Plot 7-240. Upper ACP Plot (Band 41 PC2 - 5.0MHz QPSK - Full RB Configuration)



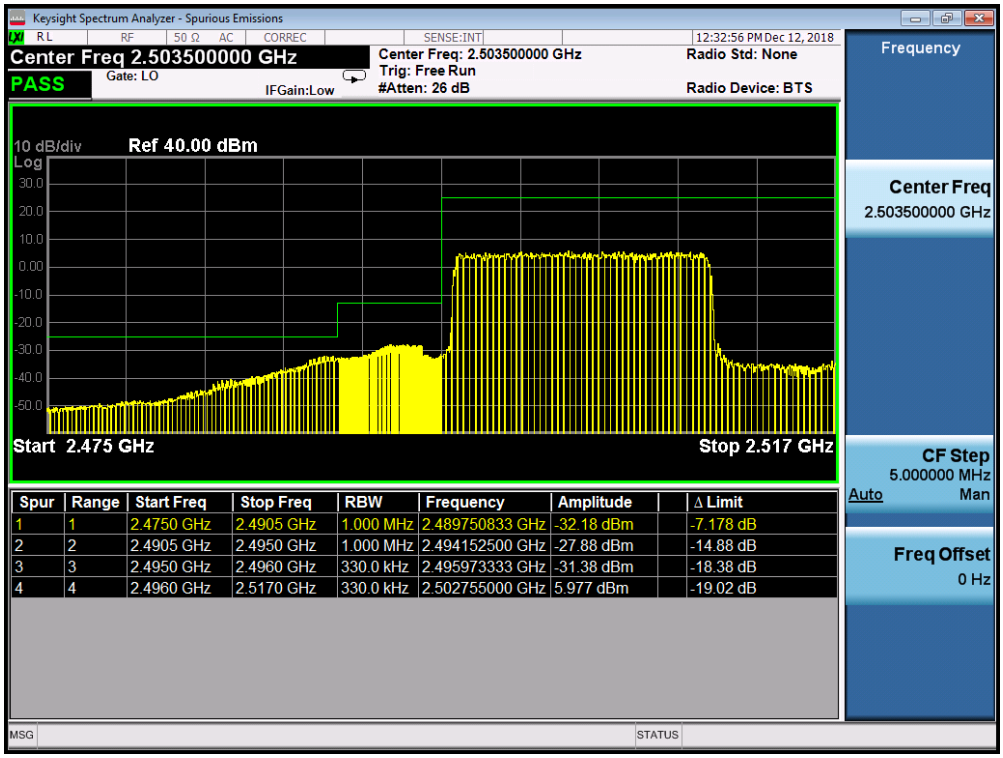
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-33.24 dBm	-8.236 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494565000 GHz	-26.00 dBm	-13.00 dB
3	3	2.4950 GHz	2.4960 GHz	220.0 kHz	2.495916667 GHz	-29.77 dBm	-16.77 dB
4	4	2.4960 GHz	2.5170 GHz	220.0 kHz	2.498275000 GHz	6.515 dBm	-18.48 dB

Plot 7-241. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 10.0MHz QPSK - Full RB Configuration)



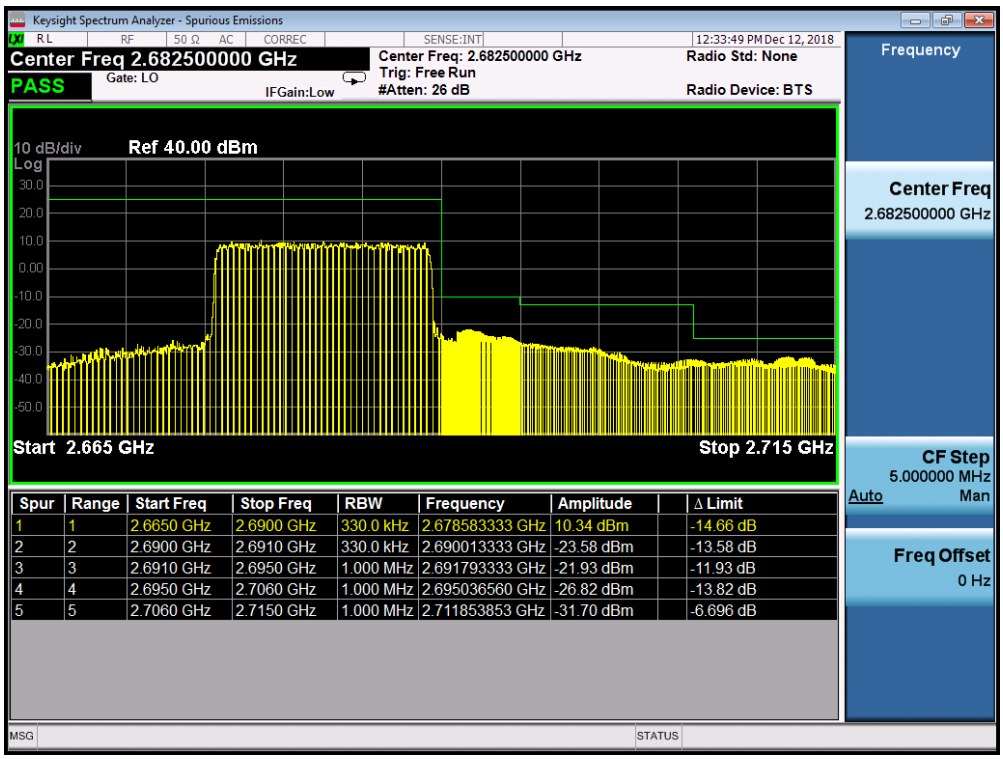
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	220.0 kHz	2.685458333 GHz	9.429 dBm	-15.57 dB
2	2	2.6900 GHz	2.6910 GHz	220.0 kHz	2.690008333 GHz	-26.66 dBm	-16.66 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691013333 GHz	-25.40 dBm	-15.40 dB
4	4	2.6950 GHz	2.7005 GHz	1.000 MHz	2.695341387 GHz	-27.37 dBm	-14.37 dB
5	5	2.7005 GHz	2.7150 GHz	1.000 MHz	2.704031467 GHz	-31.61 dBm	-6.614 dB

Plot 7-242. Upper ACP Plot (Band 41 PC2 - 10.0MHz QPSK - Full RB Configuration)



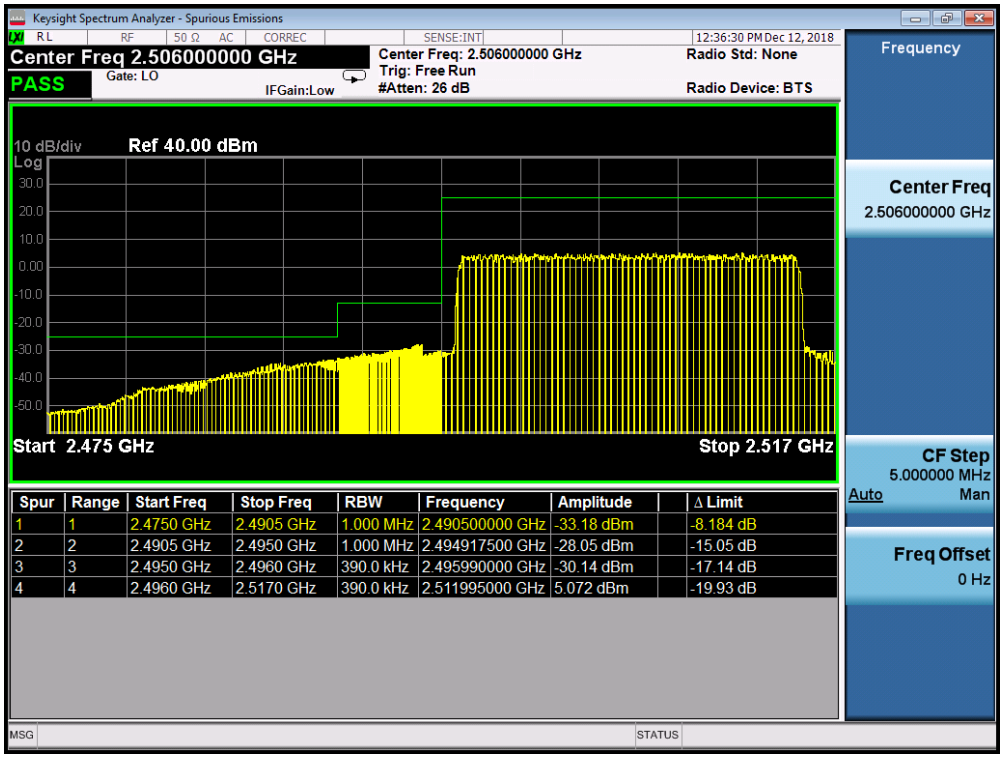
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489750833 GHz	-32.18 dBm	-7.178 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494152500 GHz	-27.88 dBm	-14.88 dB
3	3	2.4950 GHz	2.4960 GHz	330.0 kHz	2.495973333 GHz	-31.38 dBm	-18.38 dB
4	4	2.4960 GHz	2.5170 GHz	330.0 kHz	2.502755000 GHz	5.977 dBm	-19.02 dB

Plot 7-243. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 15.0MHz QPSK - Full RB Configuration)

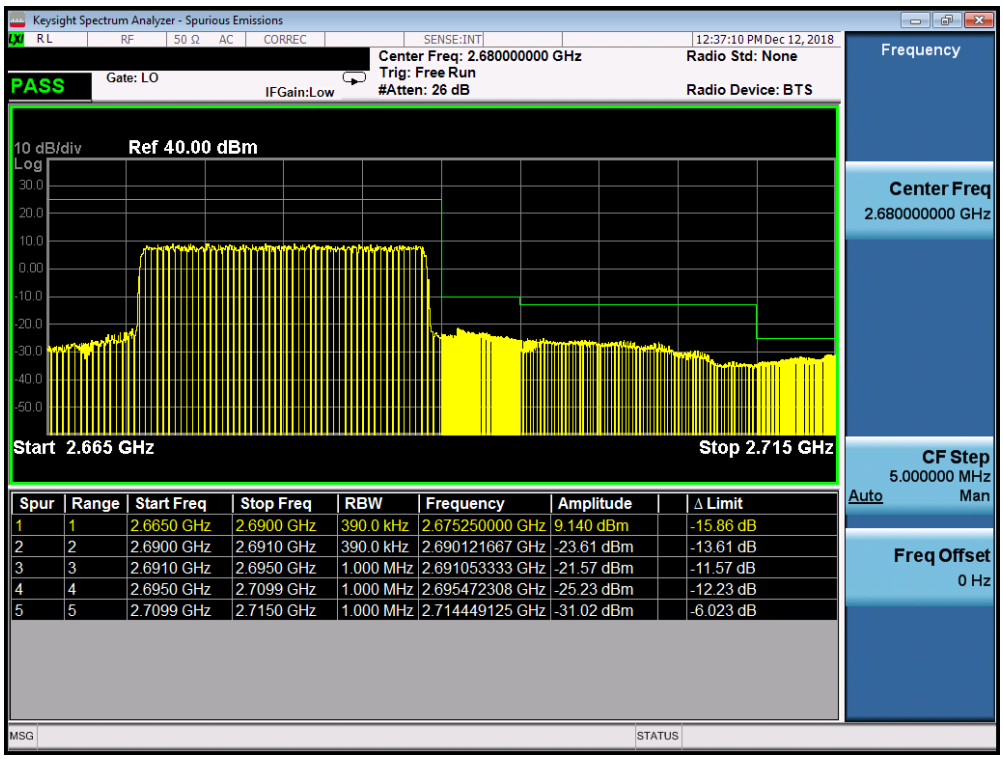


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	330.0 kHz	2.678583333 GHz	10.34 dBm	-14.66 dB
2	2	2.6900 GHz	2.6910 GHz	330.0 kHz	2.690013333 GHz	-23.58 dBm	-13.58 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691793333 GHz	-21.93 dBm	-11.93 dB
4	4	2.6950 GHz	2.7060 GHz	1.000 MHz	2.695036560 GHz	-26.82 dBm	-13.82 dB
5	5	2.7060 GHz	2.7150 GHz	1.000 MHz	2.711853853 GHz	-31.70 dBm	-6.696 dB

Plot 7-244. Upper ACP Plot (Band 41 PC2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-245. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-246. Upper ACP Plot (Band 41 PC2 - 20.0MHz QPSK - Full RB Configuration)

7.5 Peak-Average Ratio

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.7.1

Test Settings

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

Test Setup

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

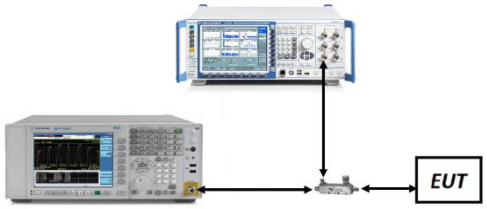
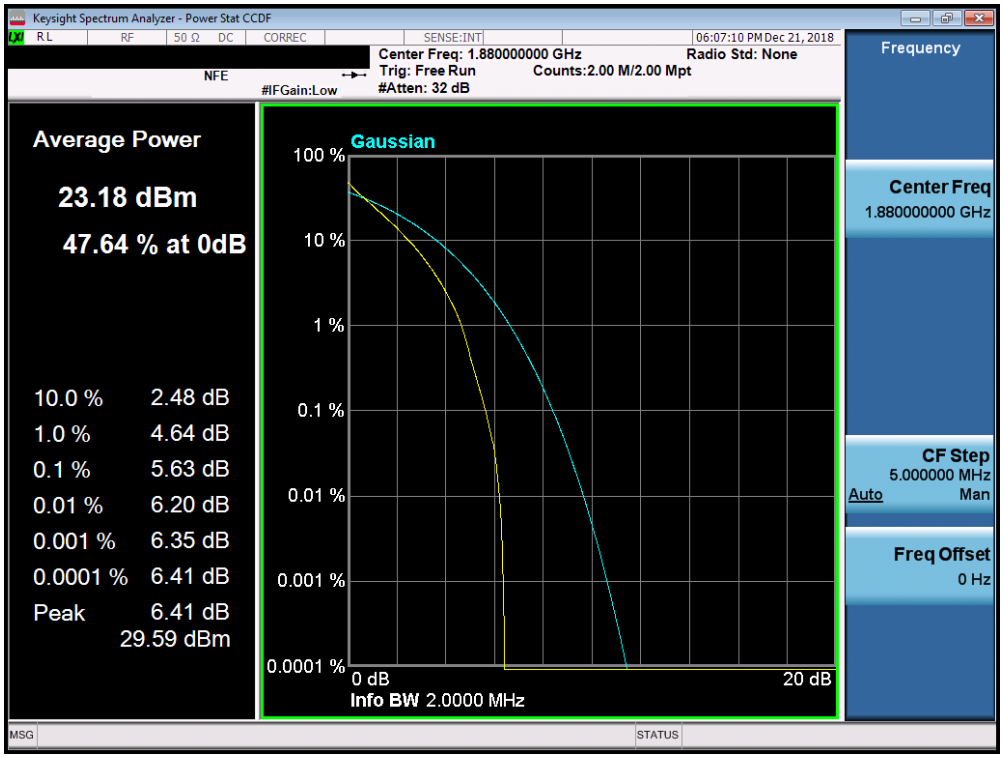


Figure 7-4. Test Instrument & Measurement Setup

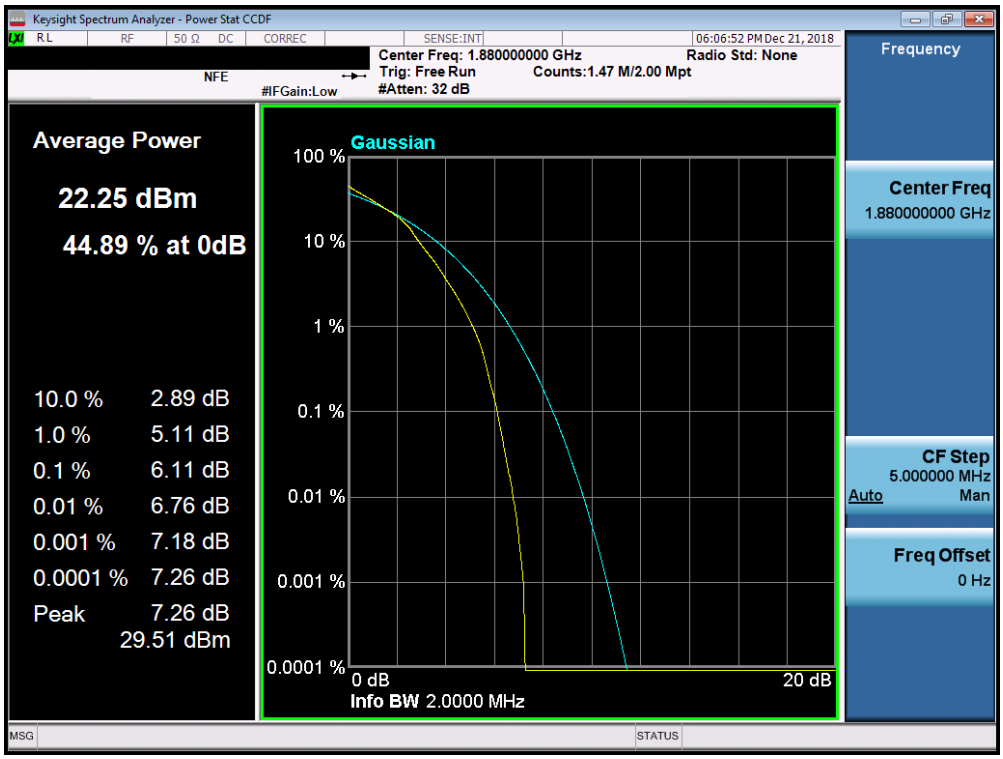
Test Notes

None.

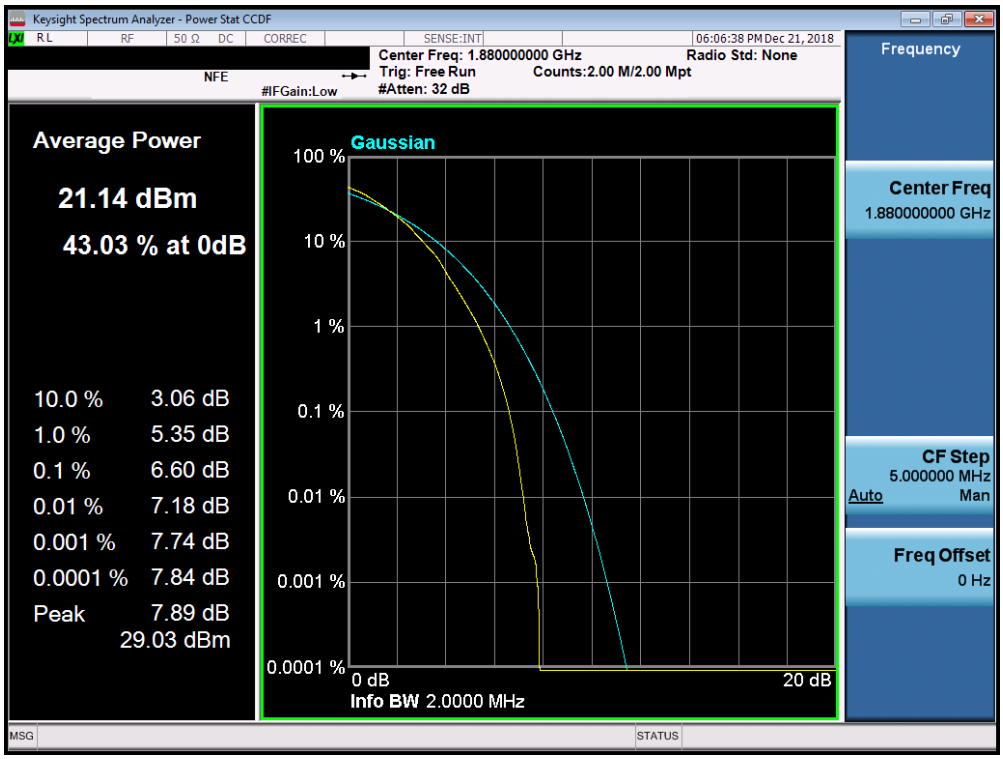
Band 25/2



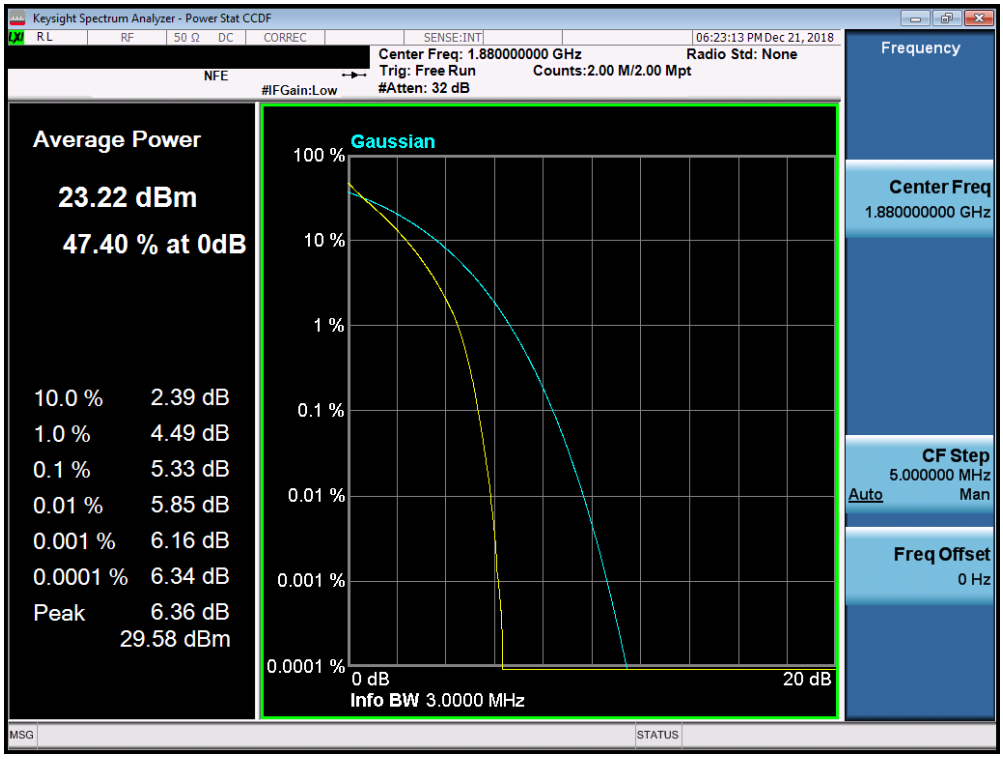
Plot 7-247. PAR Plot (Band 2/25- 1.4MHz QPSK - Full RB Configuration)



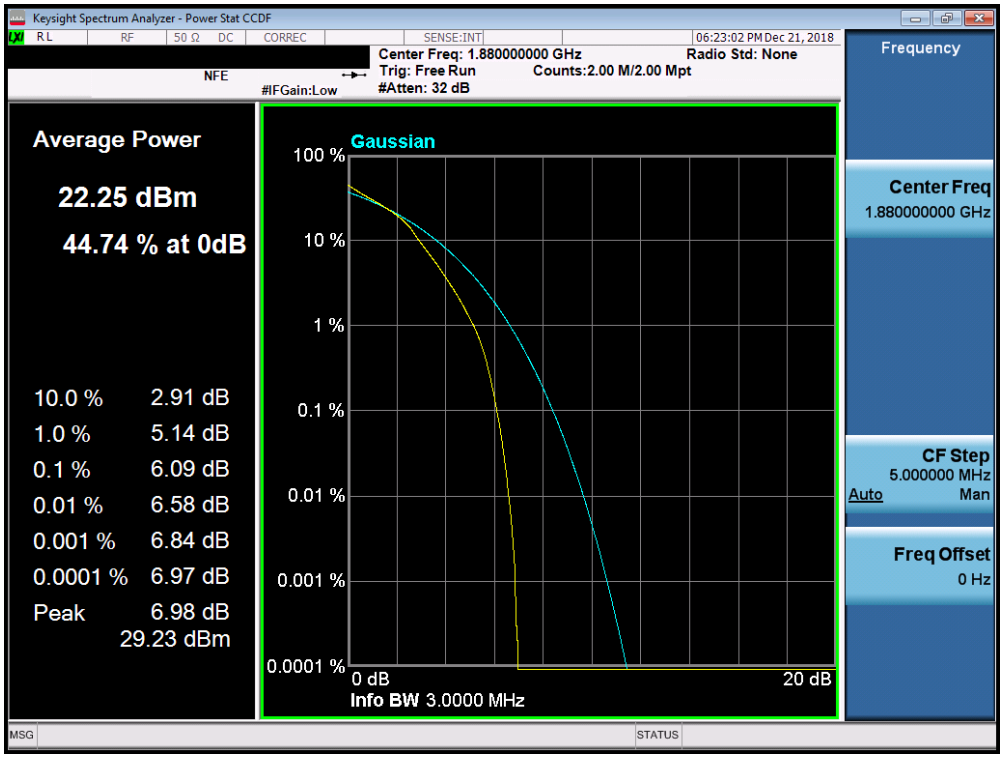
Plot 7-248. PAR Plot (Band 2/25 - 1.4MHz 16-QAM - Full RB Configuration)



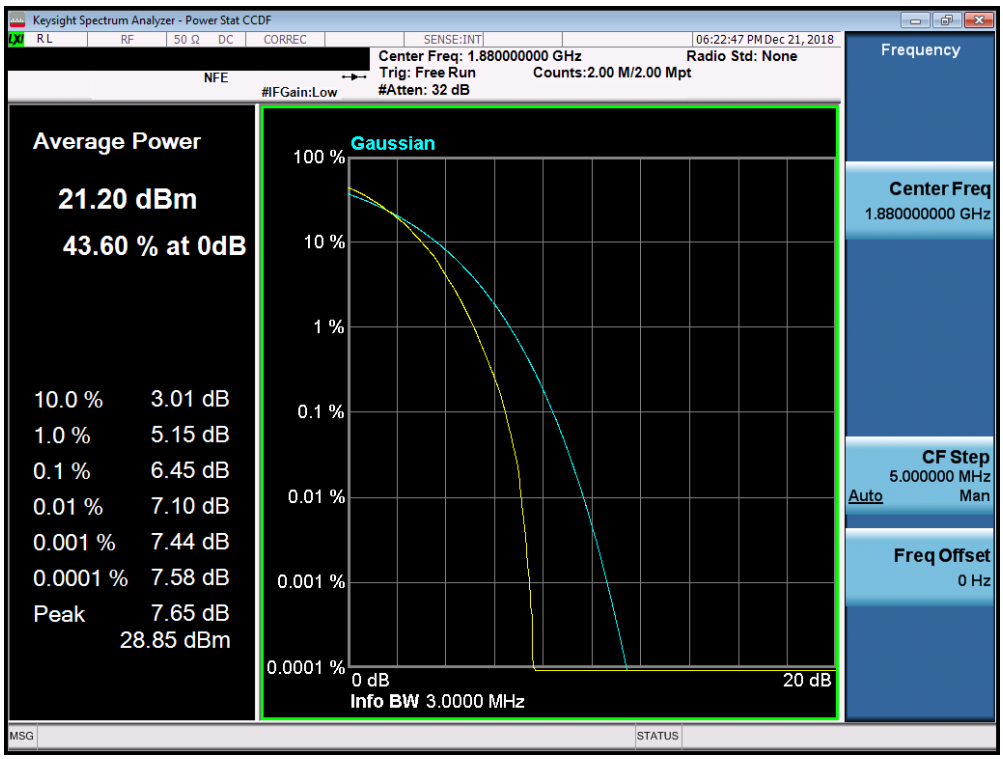
Plot 7-249. PAR Plot (Band 2/25 - 1.4MHz 64-QAM - Full RB Configuration)



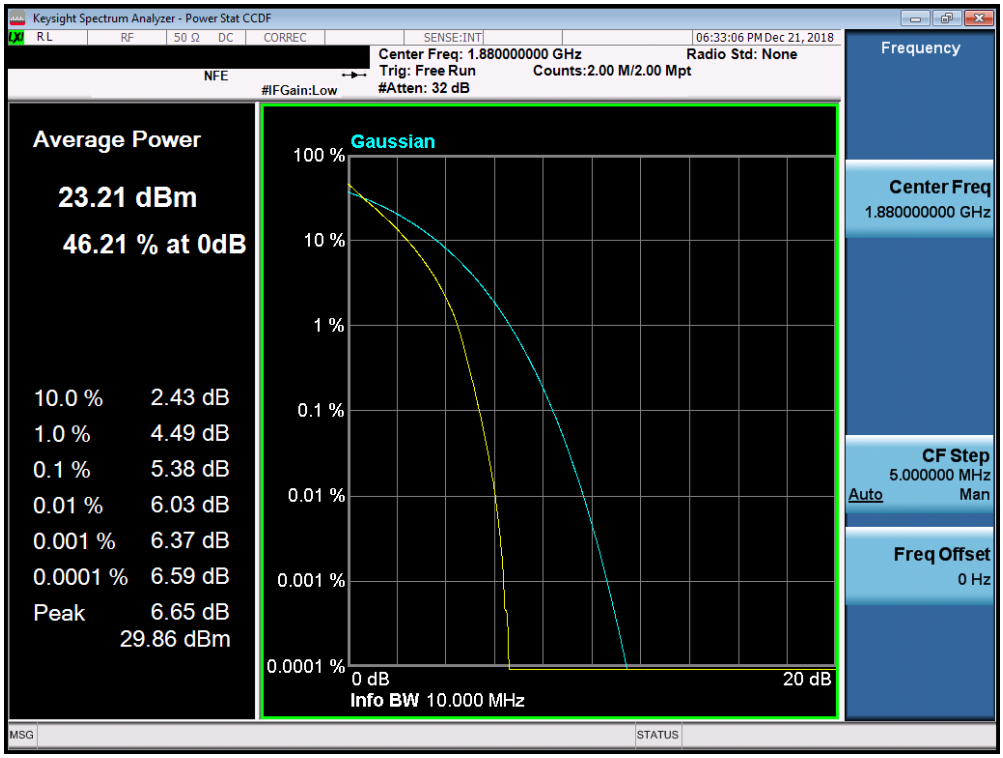
Plot 7-250. PAR Plot (Band 2/25 - 3.0MHz QPSK - Full RB Configuration)



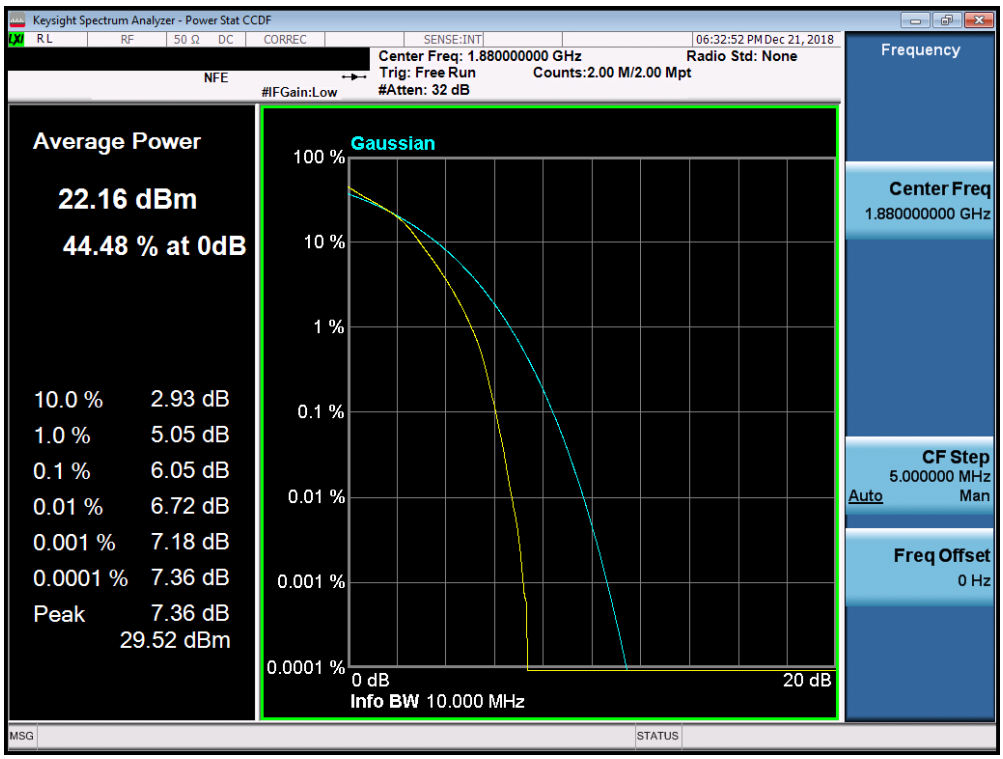
Plot 7-251. PAR Plot (Band 2/25 - 3.0MHz 16-QAM - Full RB Configuration)



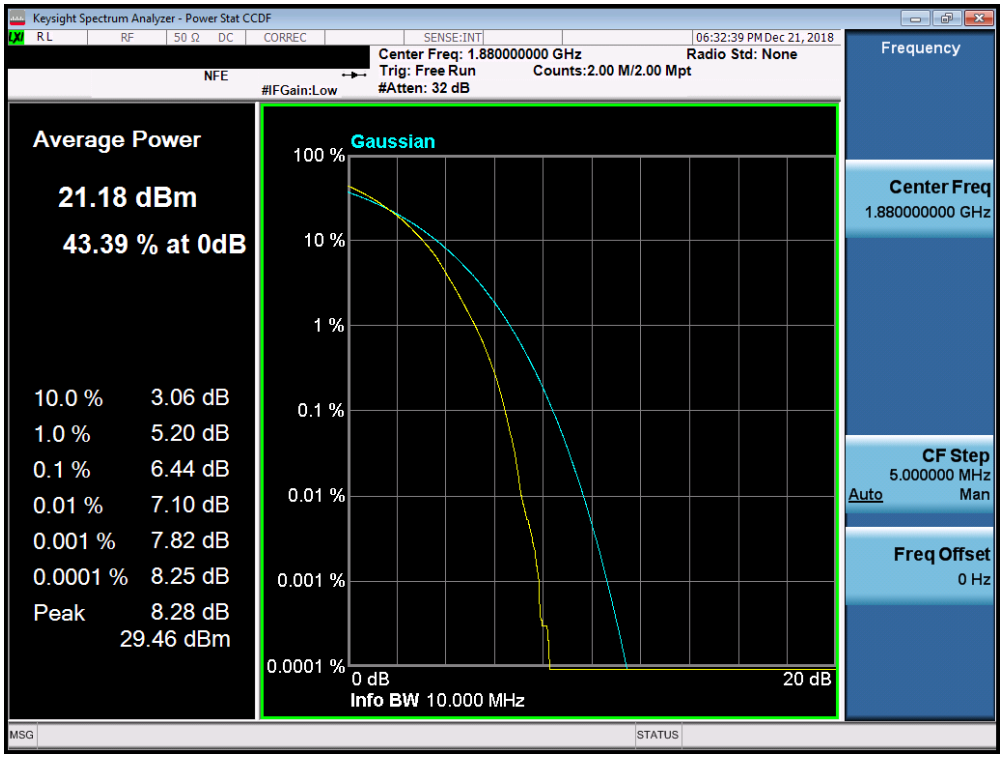
Plot 7-252. PAR Plot (Band 2/25 - 3.0MHz 64-QAM - Full RB Configuration)



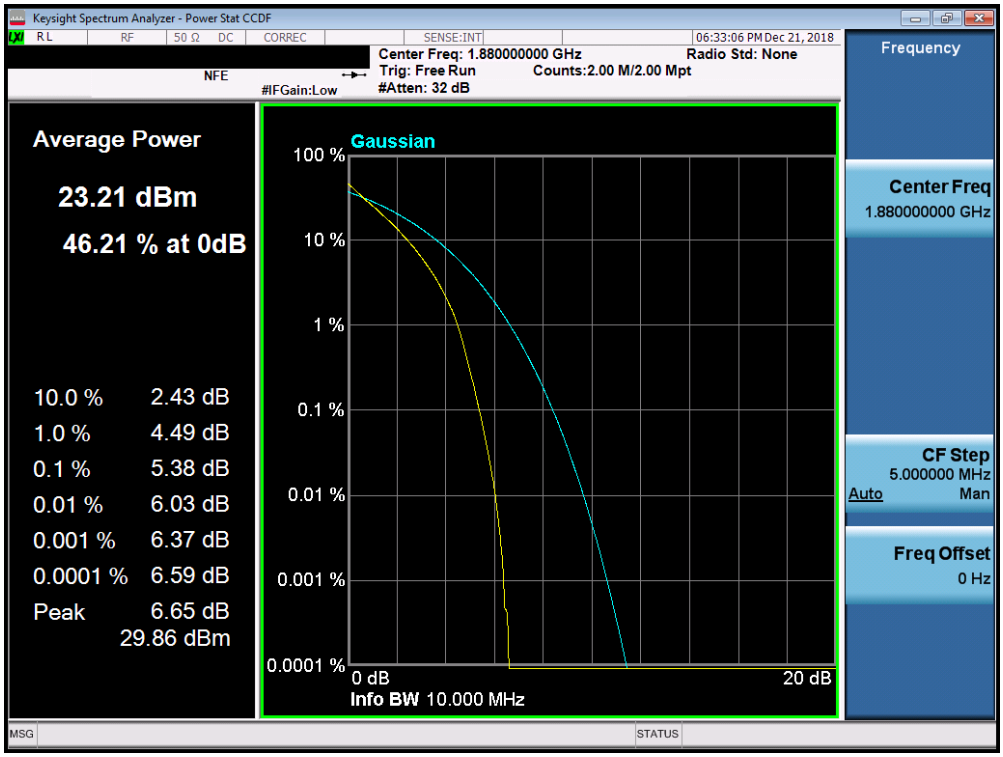
Plot 7-253. PAR Plot (Band 2/25 - 5.0MHz QPSK - Full RB Configuration)



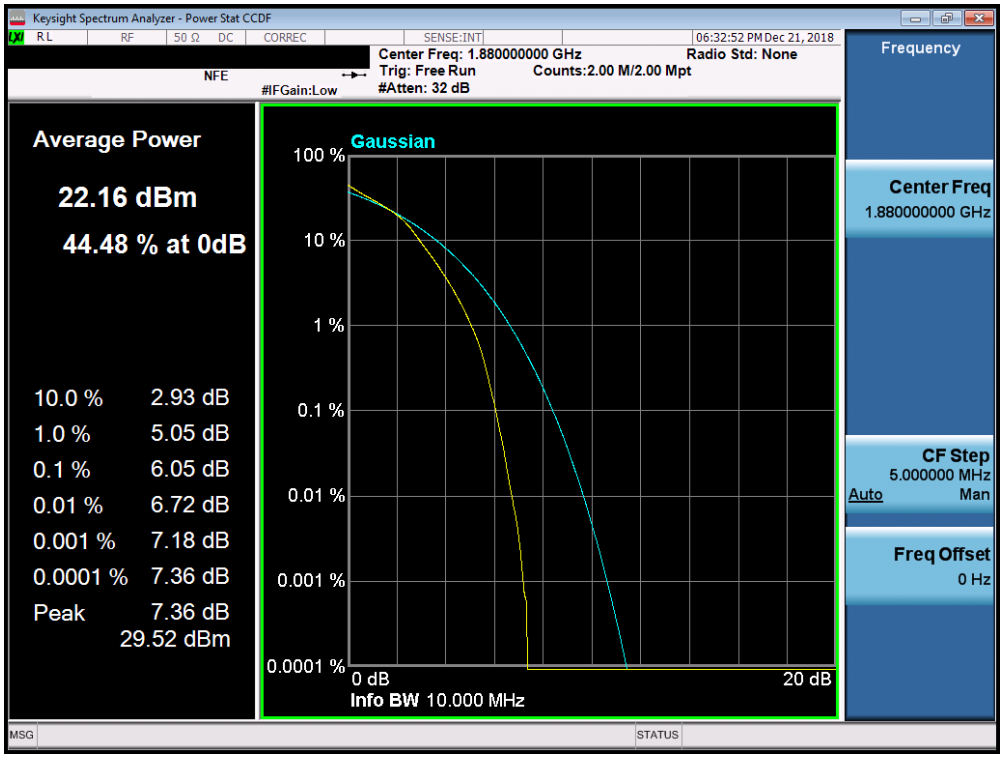
Plot 7-254. PAR Plot (Band 2/25 - 5.0MHz 16-QAM - Full RB Configuration)



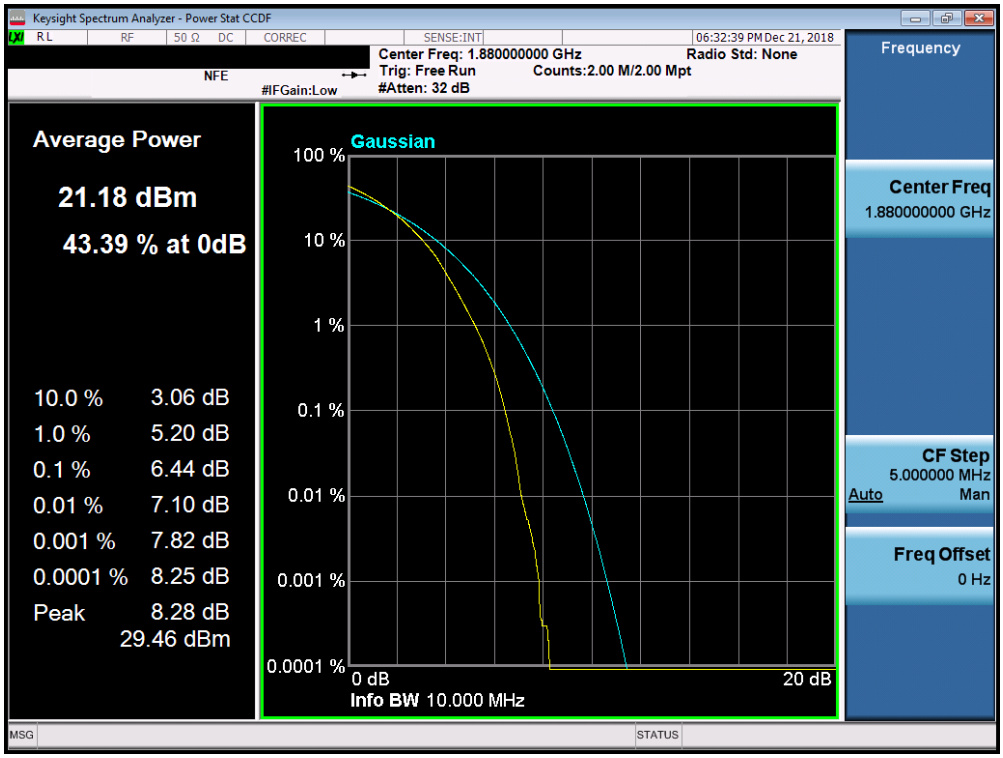
Plot 7-255. PAR Plot (Band 2/25 - 5.0MHz 64-QAM - Full RB Configuration)



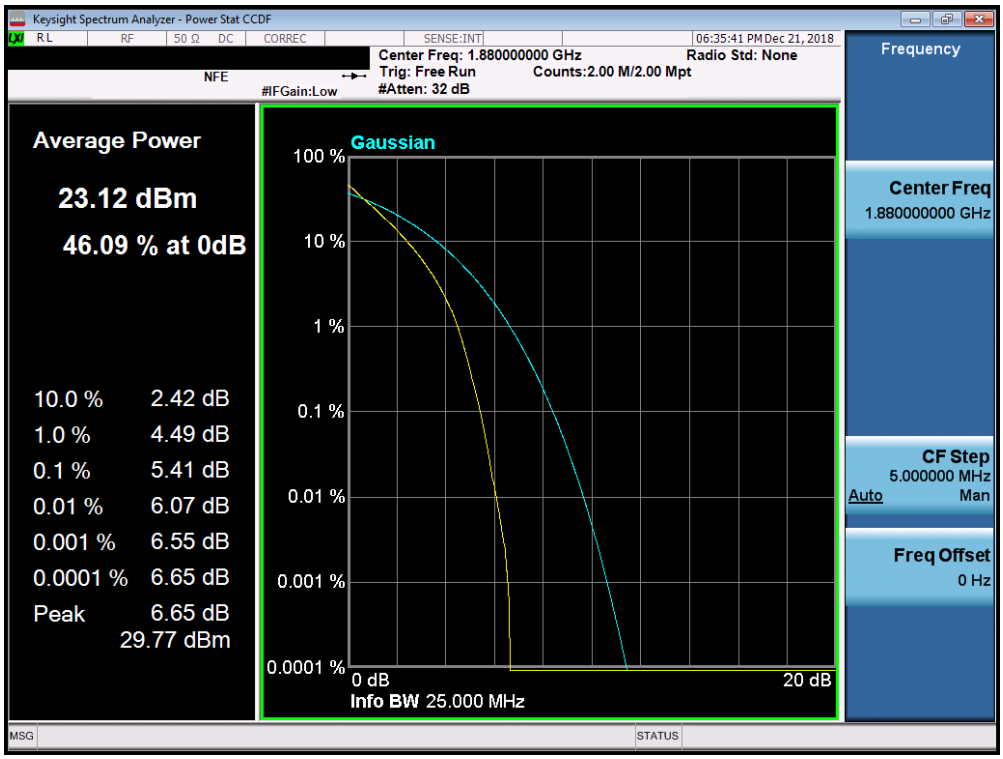
Plot 7-256. PAR Plot (Band 2/25 - 10.0MHz QPSK - Full RB Configuration)



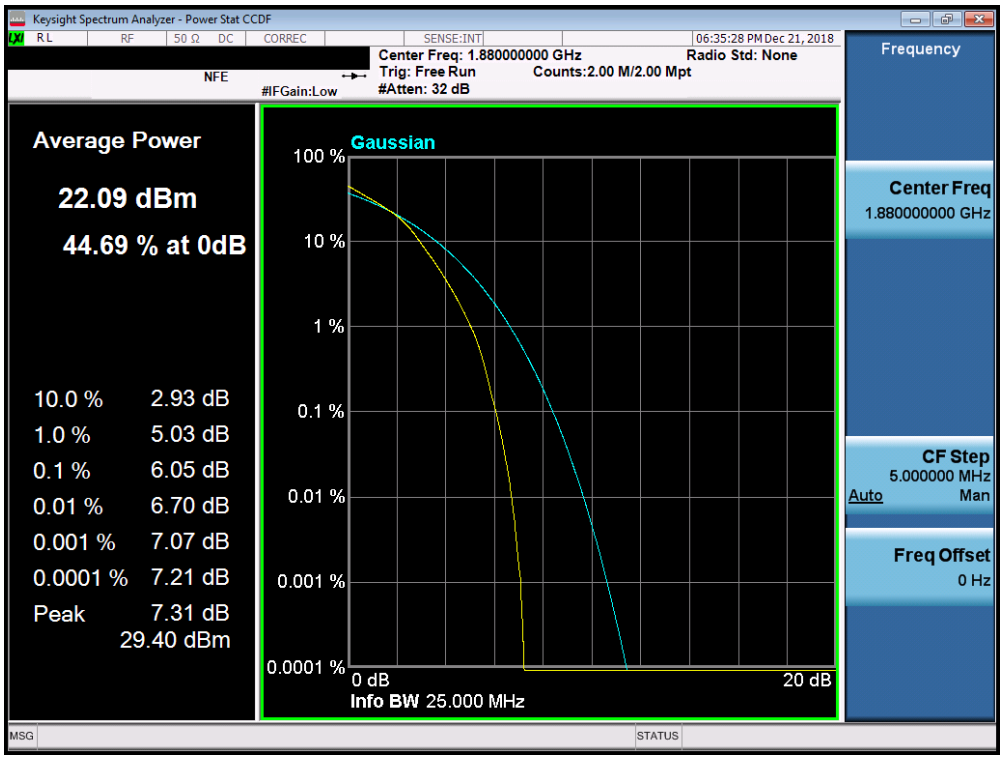
Plot 7-257. PAR Plot (Band 2/25 - 10.0MHz 16-QAM - Full RB Configuration)



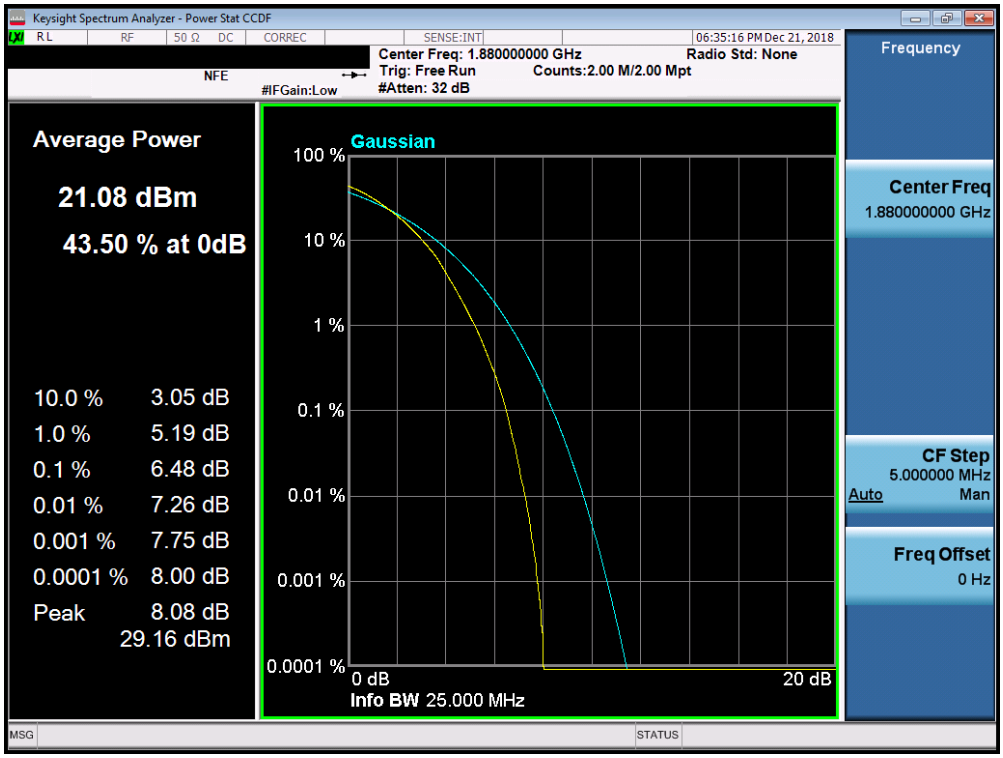
Plot 7-258. PAR Plot (Band 2/25 - 10.0MHz 64-QAM - Full RB Configuration)



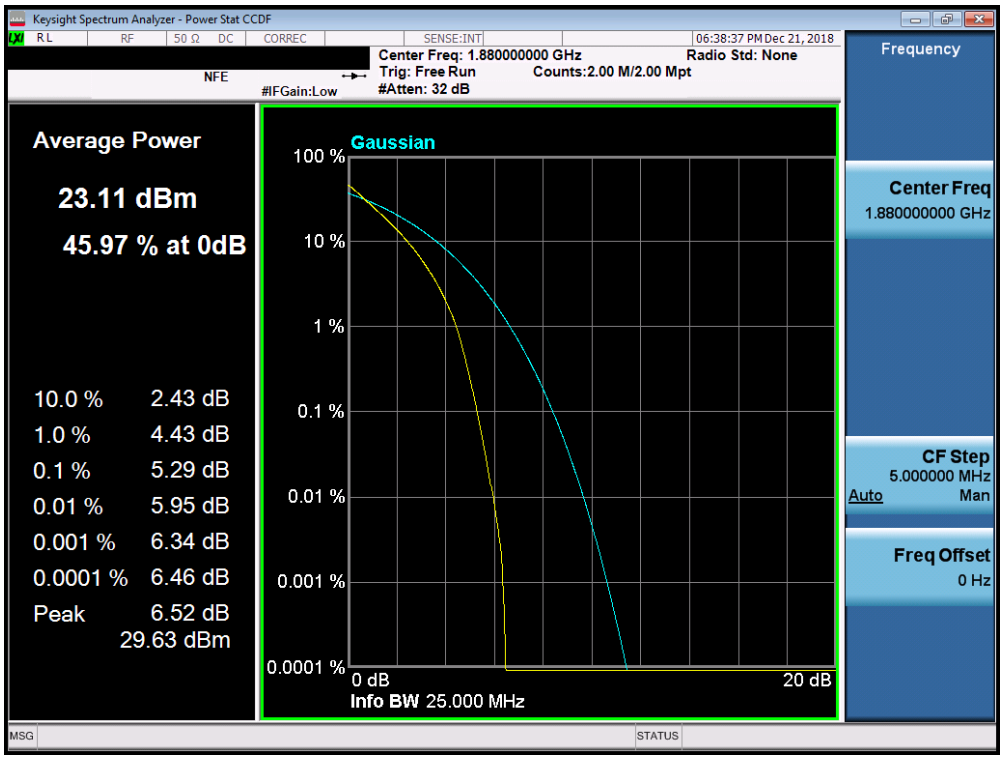
Plot 7-259. PAR Plot (Band 2/25 - 15.0MHz QPSK - Full RB Configuration)



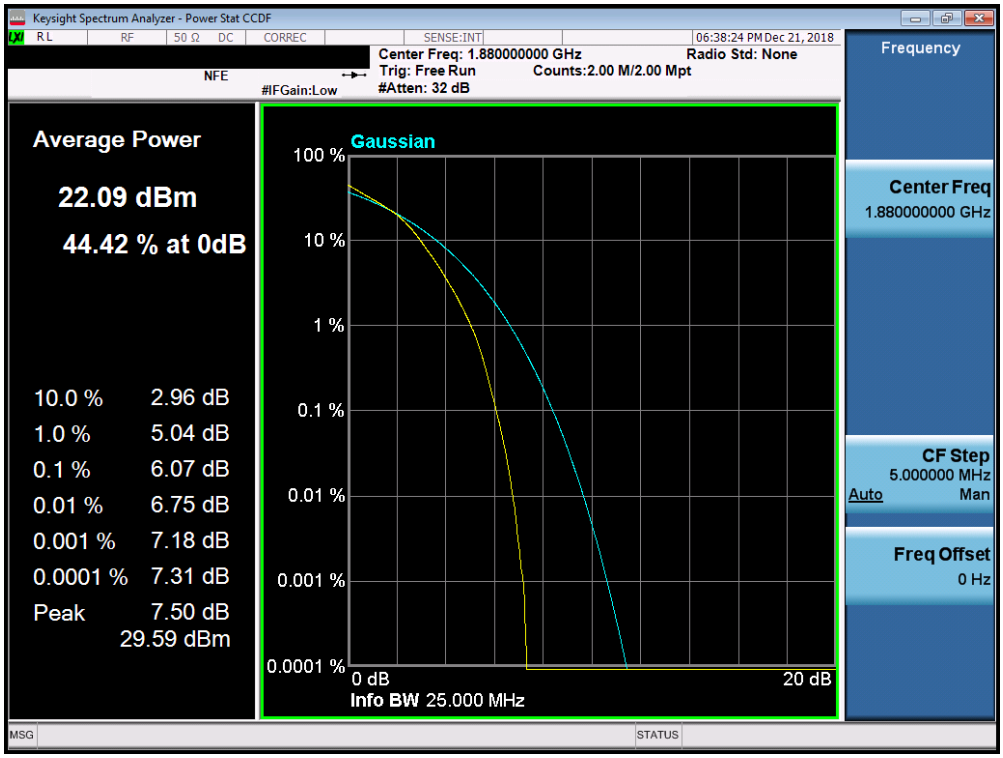
Plot 7-260. PAR Plot (Band 2/25 - 15.0MHz 16-QAM - Full RB Configuration)



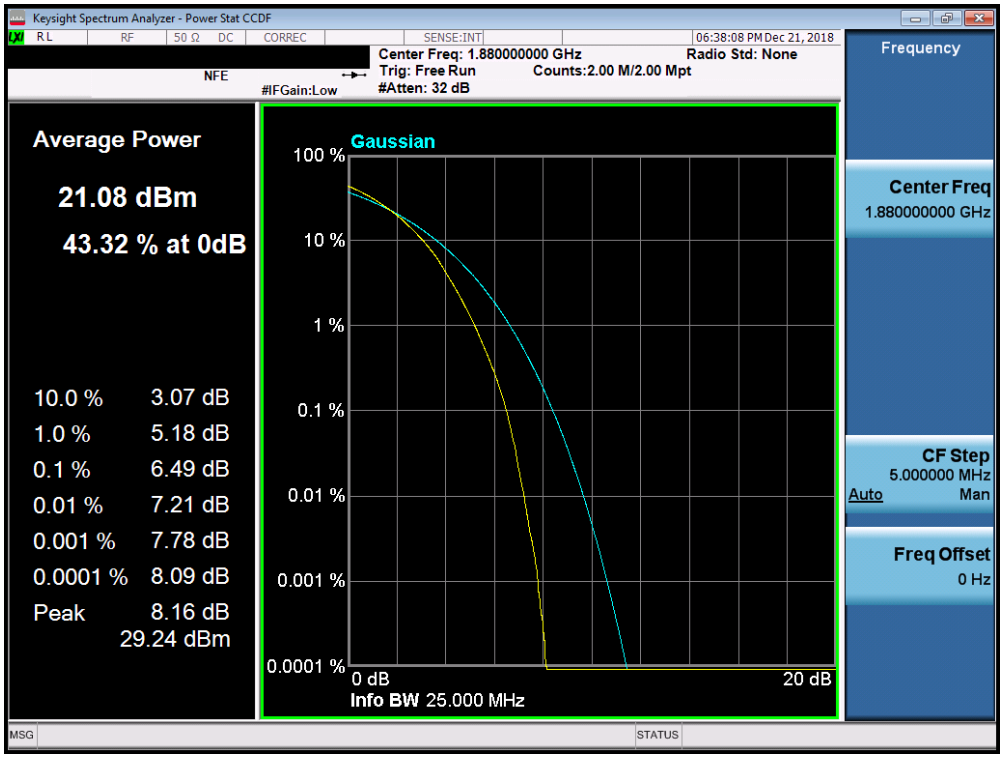
Plot 7-261. PAR Plot (Band 2/25 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-262. PAR Plot (Band 2/25 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-263. PAR Plot (Band 2/25 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-264. PAR Plot (Band 2/25 - 20.0MHz 64-QAM - Full RB Configuration)

7.6 Additional Maximum Power Reduction (A-MPR)

§2.1046

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.2.2

Test Settings

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

Test Setup

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

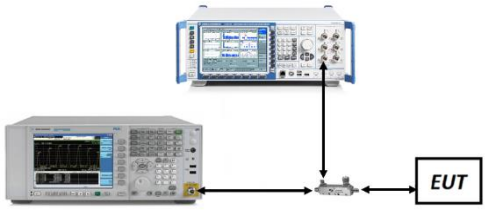


Figure 7-5. Test Instrument & Measurement Setup

Test Notes

None.

Test Case	NS	MCC	MNC	Channel BW [MHz]	Channel Number	Channel Frequency [MHz]	Modulation	RB Size	RB Offset	MPR [dB]	A-MPR [dB]	Measured Power [dBm]	Lowest Typical Power [dBm]	Delta [dB]
1				5	39675	2498.5	QPSK	1	0	0	≤ 3	24.05	23.8	**0.30**
							16-QAM			≤ 1		22.97	22.8	**0.22**
							64-QAM			≤ 2		21.83	21.8	**0.08**
2				5	39675	2498.5	QPSK	1	9	0	0	27.00	26.8	**0.25**
							16-QAM			≤ 1		25.79	25.8	**0.04**
							64-QAM			≤ 2		24.85	24.8	**0.10**
3				10	39700	2501	QPSK	1	0	0	≤ 5	21.94	21.8	**0.19**
							16-QAM	1	0	≤ 1		21.09	20.8	**0.34**
							64-QAM	1	0	≤ 2		19.89	19.8	**0.14**
4				10	39700	2501	QPSK	20	0	0	≤ 2	23.93	23.8	**0.18**
							16-QAM	20	0	≤ 1		22.85	22.8	**0.10**
							64-QAM	20	0	≤ 2		21.97	21.8	**0.22**
5				10	39700	2501	QPSK	50	0	0	≤ 3	22.80	22.8	**0.05**
							16-QAM	50	0	≤ 1		21.87	21.8	**0.12**
							64-QAM	50	0	≤ 2		20.85	20.8	**0.10**
6				10	39700	2501	QPSK	25	20	0	≤ 1	24.83	24.8	**0.08**
							16-QAM	25	20	≤ 1		23.87	23.8	**0.12**
							64-QAM	25	20	≤ 2		22.94	22.8	**0.19**
7				10	39700	2501	QPSK	1	36	0	0	26.84	26.8	**0.09**
							16-QAM	1	36	≤ 1		25.96	25.8	**0.21**
							64-QAM	1	36	≤ 2		24.78	24.8	**0.03**
8				15	39725	2503.5	QPSK	1	0	0	≤ 5	21.98	21.8	**0.23**
							16-QAM	1	0	≤ 1		21.01	20.8	**0.26**
							64-QAM	1	0	≤ 2		20.02	19.8	**0.27**
9	01	312	530	15	39725	2503.5	QPSK	20	0	0	≤ 2	24.12	23.8	**0.37**
							16-QAM	20	0	≤ 1		23.03	22.8	**0.28**
							64-QAM	20	0	≤ 2		22.15	21.8	**0.40**
10				15	39725	2503.5	QPSK	75	0	0	≤ 4	22.00	21.8	**0.25**
							16-QAM	75	0	≤ 1		21.03	20.8	**0.28**
							64-QAM	75	0	≤ 2		20.01	19.8	**0.26**
11				15	39725	2503.5	QPSK	50	15	0	≤ 3	23.21	22.8	**0.46**
							16-QAM	50	15	≤ 1		22.20	21.8	**0.45**
							64-QAM	50	15	≤ 2		21.20	20.8	**0.45**
12				15	39725	2503.5	QPSK	1	60	0	0	27.27	26.8	**0.52**
							16-QAM	1	60	≤ 1		26.31	25.8	**0.56**
							64-QAM	1	60	≤ 2		25.01	24.8	**0.26**
13				20	39750	2506	QPSK	1	0	0	≤ 5	22.65	21.8	**0.90**
							16-QAM	1	0	≤ 1		21.76	20.8	**1.01**
							64-QAM	1	0	≤ 2		20.52	19.8	**0.77**
14				20	39750	2506	QPSK	20	0	0	≤ 2	24.26	23.8	**0.51**
							16-QAM	20	0	≤ 1		23.18	22.8	**0.43**
							64-QAM	20	0	≤ 2		22.31	21.8	**0.56**
15				20	39750	2506	QPSK	100	0	0	≤ 4	22.21	21.8	**0.46**
							16-QAM	100	0	≤ 1		21.20	20.8	**0.45**
							64-QAM	100	0	≤ 2		20.19	19.8	**0.44**
16				20	39750	2506	QPSK	75	24	0	≤ 3	23.12	22.8	**0.37**
							16-QAM	75	24	≤ 1		22.12	21.8	**0.37**
							64-QAM	75	24	≤ 2		21.11	20.8	**0.36**
17				20	39750	2506	QPSK	1	77	0	0	27.42	26.8	**0.67**
							16-QAM	1	77	≤ 1		26.37	25.8	**0.62**
							64-QAM	1	77	≤ 2		25.18	24.8	**0.43**
18	01	311	490	5	39675	2498.5	QPSK	1	0	0	≤ 3	24.10	23.8	**0.35**
							16-QAM			≤ 1		22.99	22.8	**0.24**
							64-QAM			≤ 2		21.87	21.8	**0.12**
19	01	001	01	5	39675	2498.5	QPSK	1	0	0	0	27.09	26.8	**0.34**
							16-QAM			≤ 1		26.01	25.8	**0.26**
							64-QAM			≤ 2		24.8	24.8	**0.05**

Table 7-3. A-MPR Conducted Power Measurements

7.7 Radiated Power (ERP/EIRP)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Setup

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

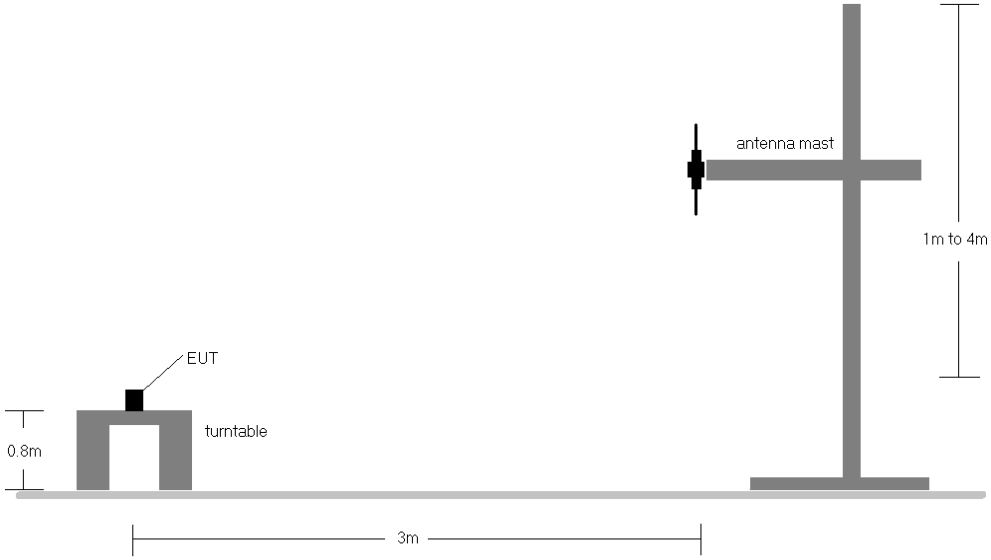


Figure 7-6. Radiated Test Setup <1GHz

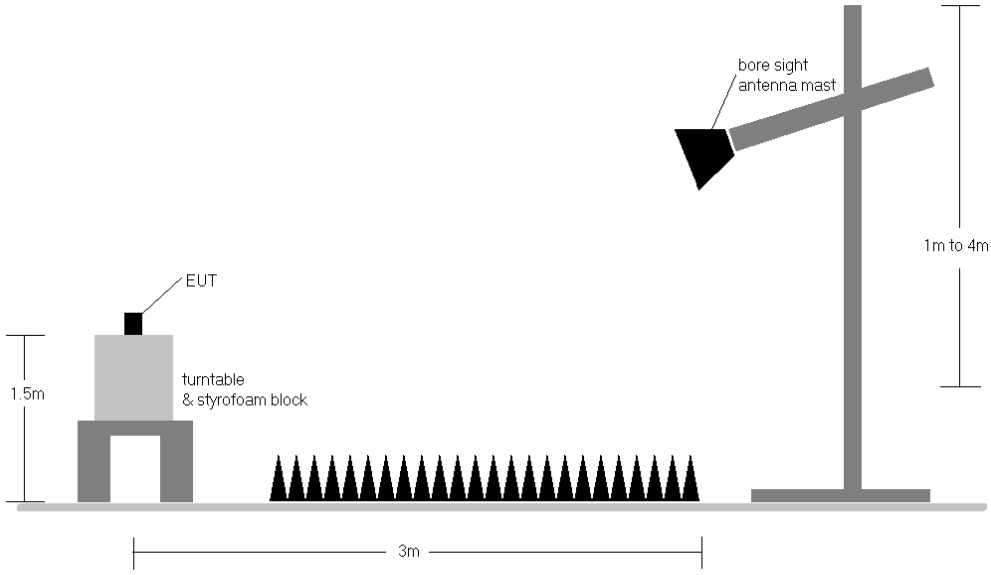


Figure 7-7. Radiated Test Setup >1GHz

Test Notes

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

2) This unit was tested with its standard battery.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	153	274	1 / 5	12.45	4.00	14.30	0.027	34.77	-20.47	16.45	0.044	36.99	-20.54
707.50	1.4	QPSK	H	152	267	1 / 5	12.75	4.22	14.82	0.030	34.77	-19.96	16.97	0.050	36.99	-20.02
715.30	1.4	QPSK	H	168	270	1 / 5	13.24	4.44	**15.53**	0.036	34.77	-19.24	**17.68**	0.059	36.99	-19.31
715.30	1.4	16-QAM	H	168	270	1 / 5	12.32	4.44	**14.61**	0.029	34.77	-20.16	**16.76**	0.047	36.99	-20.23
715.30	1.4	64-QAM	H	168	270	1 / 5	11.43	4.44	**13.72**	0.024	34.77	-21.05	**15.87**	0.039	36.99	-21.12
700.50	3	QPSK	H	159	272	1 / 14	13.28	4.01	15.14	0.033	34.77	-19.63	17.29	0.054	36.99	-19.70
707.50	3	QPSK	H	158	260	1 / 14	13.60	4.22	15.67	0.037	34.77	-19.11	17.82	0.060	36.99	-19.17
714.50	3	QPSK	H	168	278	1 / 14	13.80	4.41	**16.06**	0.040	34.77	-18.71	**18.21**	0.066	36.99	-18.78
714.50	3	16-QAM	H	168	278	1 / 14	12.73	4.41	**14.99**	0.032	34.77	-19.78	**17.14**	0.052	36.99	-19.85
714.50	3	64-QAM	H	168	278	1 / 14	11.80	4.41	**14.06**	0.025	34.77	-20.71	**16.21**	0.042	36.99	-20.78
701.50	5	QPSK	H	268	271	1 / 24	13.50	4.04	15.39	0.035	34.77	-19.38	17.54	0.057	36.99	-19.45
707.50	5	QPSK	H	267	269	1 / 24	13.94	4.22	16.01	0.040	34.77	-18.77	18.16	0.065	36.99	-18.83
713.50	5	QPSK	H	274	275	1 / 24	14.01	4.39	**16.25**	0.042	34.77	-18.52	**18.40**	0.069	36.99	-18.59
713.50	5	16-QAM	H	274	275	1 / 24	12.90	4.39	**15.14**	0.033	34.77	-19.63	**17.29**	0.054	36.99	-19.70
713.50	5	64-QAM	H	274	275	1 / 24	11.98	4.39	**14.22**	0.026	34.77	-20.55	**16.37**	0.043	36.99	-20.62
704.00	10	QPSK	H	276	272	1 / 49	14.25	4.12	16.22	0.042	34.77	-18.56	18.37	0.069	36.99	-18.62
707.50	10	QPSK	H	275	265	1 / 49	14.35	4.22	**16.42**	**0.044**	34.77	-18.36	**18.57**	**0.072**	36.99	-18.42
711.00	10	QPSK	H	269	277	1 / 49	13.97	4.32	16.14	0.041	34.77	-18.64	18.29	0.067	36.99	-18.70
704.00	10	16-QAM	H	276	272	1 / 49	13.10	4.12	**15.07**	0.032	34.77	-19.71	**17.22**	0.053	36.99	-19.77
704.00	10	64-QAM	H	276	272	1 / 49	12.10	4.12	**14.07**	0.025	34.77	-20.71	**16.22**	0.042	36.99	-20.77
707.50	10	QPSK	V	269	400	1 / 49	8.39	4.22	10.46	0.011	34.77	-24.32	12.61	0.018	36.99	-24.38

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	253	282	1 / 24	13.97	6.18	18.00	0.063	34.77	-16.78	20.15	0.103	36.99	-16.84
782.00	5	QPSK	H	253	286	1 / 24	13.97	6.24	18.06	0.064	34.77	-16.71	20.21	0.105	36.99	-16.78
784.50	5	QPSK	H	254	291	1 / 24	14.11	6.30	**18.26**	0.067	34.77	-16.51	**20.41**	0.110	36.99	-16.58
784.50	5	16-QAM	H	254	291	1 / 24	13.02	6.30	**17.17**	0.052	34.77	-17.60	**19.32**	0.086	36.99	-17.67
784.50	5	64-QAM	H	254	291	1 / 24	12.03	6.30	**16.18**	0.042	34.77	-18.59	**18.33**	0.068	36.99	-18.66
782.00	10	QPSK	H	258	292	1 / 49	14.19	6.24	**18.28**	0.067	34.77	-16.49	**20.43**	0.110	36.99	-16.56
782.00	10	16-QAM	H	258	292	1 / 49	13.12	6.24	**17.21**	0.053	34.77	-17.56	**19.36**	0.086	36.99	-17.63
782.00	10	64-QAM	H	258	292	1 / 49	12.02	6.24	**16.11**	0.041	34.77	-18.66	**18.26**	0.067	36.99	-18.73
782.00	10	QPSK	V	198	260	1 / 49	8.04	6.24	12.13	0.016	34.77	-22.64	14.28	0.027	36.99	-22.71

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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	179	303	1 / 5	20.45	1.65	19.95	0.099	38.45	-18.50	22.10	0.162	40.61	-18.51
836.50	1.4	QPSK	H	109	308	1 / 5	20.87	1.57	**20.29**	0.107	38.45	-18.16	**22.44**	0.176	40.61	-18.16
848.30	1.4	QPSK	H	110	314	1 / 5	20.50	1.50	19.85	0.097	38.45	-18.60	22.00	0.159	40.61	-18.60
836.50	1.4	16-QAM	H	109	308	1 / 5	20.07	1.57	**19.49**	0.089	38.45	-18.96	**21.64**	0.146	40.61	-18.96
836.50	1.4	64-QAM	H	109	308	1 / 5	19.54	1.57	**18.96**	0.079	38.45	-19.49	**21.11**	0.129	40.61	-19.49
825.50	3	QPSK	H	186	297	1 / 14	20.20	1.64	19.69	0.093	38.45	-18.76	21.84	0.153	40.61	-18.77
836.50	3	QPSK	H	113	302	1 / 14	20.85	1.57	**20.27**	0.107	38.45	-18.18	**22.42**	0.175	40.61	-18.18
847.50	3	QPSK	H	113	313	1 / 14	20.46	1.51	19.82	0.096	38.45	-18.63	21.97	0.157	40.61	-18.64
836.50	3	16-QAM	H	113	302	1 / 14	19.75	1.57	**19.17**	0.083	38.45	-19.28	**21.32**	0.136	40.61	-19.28
836.50	3	64-QAM	H	113	302	1 / 14	19.14	1.57	**18.56**	0.072	38.45	-19.89	**20.71**	0.118	40.61	-19.89
826.50	5	QPSK	H	176	300	1 / 24	20.35	1.63	19.83	0.096	38.45	-18.62	21.98	0.158	40.61	-18.62
836.50	5	QPSK	H	107	304	1 / 24	20.79	1.57	**20.21**	0.105	38.45	-18.24	**22.36**	0.172	40.61	-18.24
846.50	5	QPSK	H	100	312	1 / 24	20.17	1.51	19.53	0.090	38.45	-18.92	21.68	0.147	40.61	-18.92
836.50	5	16-QAM	H	107	304	1 / 24	20.03	1.57	**19.45**	0.088	38.45	-19.00	**21.60**	0.145	40.61	-19.00
836.50	5	64-QAM	H	107	304	1 / 24	19.49	1.57	**18.91**	0.078	38.45	-19.54	**21.06**	0.128	40.61	-19.54
829.00	10	QPSK	H	110	338	1 / 49	20.93	1.62	**20.40**	**0.110**	38.45	-18.05	**22.55**	**0.180**	40.61	-18.06
836.50	10	QPSK	H	109	298	1 / 49	20.88	1.57	20.30	0.107	38.45	-18.15	22.45	0.176	40.61	-18.15
844.00	10	QPSK	H	108	326	1 / 49	20.12	1.53	19.50	0.089	38.45	-18.95	21.65	0.146	40.61	-18.96
829.00	10	16-QAM	H	110	338	1 / 49	20.08	1.62	**19.55**	0.090	38.45	-18.90	**21.70**	0.148	40.61	-18.91
829.00	10	64-QAM	H	110	338	1 / 49	19.59	1.62	**19.06**	0.081	38.45	-19.39	**21.21**	0.132	40.61	-19.40
831.50	15	QPSK	H	174	302	1 / 74	20.57	1.60	**20.02**	0.101	38.45	-18.43	**22.17**	0.165	40.61	-18.43
836.50	15	QPSK	H	174	306	1 / 74	20.35	1.57	19.77	0.095	38.45	-18.68	21.92	0.156	40.61	-18.68
841.50	15	QPSK	H	105	307	1 / 74	20.36	1.54	19.75	0.094	38.45	-18.70	21.90	0.155	40.61	-18.70
831.50	15	16-QAM	H	174	302	1 / 74	19.70	1.60	**19.15**	0.082	38.45	-19.30	**21.30**	0.135	40.61	-19.30
831.50	15	64-QAM	H	174	302	1 / 74	18.89	1.60	**18.34**	0.068	38.45	-20.11	**20.49**	0.112	40.61	-20.11
829.00	10	QPSK	V	171	202	1 / 49	14.64	1.62	14.11	0.026	38.45	-24.34	16.26	0.042	40.61	-24.35

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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	V	141	345	1 / 5	8.88	8.16	17.04	0.051	30.00	-12.96
1745.00	1.4	QPSK	V	140	330	1 / 5	9.70	8.19	**17.89**	0.062	30.00	-12.11
1779.30	1.4	QPSK	V	126	332	1 / 5	9.23	8.25	17.48	0.056	30.00	-12.52
1745.00	1.4	16-QAM	V	140	330	1 / 5	9.63	8.19	**17.82**	0.061	30.00	-12.18
1745.00	1.4	64-QAM	V	140	330	1 / 5	9.13	8.19	**17.32**	0.054	30.00	-12.68
1711.50	3	QPSK	V	338	139	1 / 14	9.47	8.16	17.63	0.058	30.00	-12.37
1745.00	3	QPSK	V	144	336	1 / 14	10.48	8.19	**18.67**	0.074	30.00	-11.33
1778.50	3	QPSK	V	124	334	1 / 14	9.80	8.25	18.05	0.064	30.00	-11.95
1745.00	3	16-QAM	V	144	336	1 / 14	10.28	8.19	**18.47**	0.070	30.00	-11.53
1745.00	3	64-QAM	V	144	336	1 / 14	10.63	8.19	**18.82**	0.076	30.00	-11.18
1712.50	5	QPSK	V	141	337	1 / 24	9.86	8.16	18.02	0.063	30.00	-11.98
1745.00	5	QPSK	V	138	333	1 / 24	11.54	8.19	**19.73**	0.094	30.00	-10.27
1777.50	5	QPSK	V	136	34	1 / 24	10.88	8.25	19.13	0.082	30.00	-10.87
1745.00	5	16-QAM	V	138	333	1 / 24	11.13	8.19	**19.32**	0.086	30.00	-10.68
1745.00	5	64-QAM	V	138	333	1 / 24	10.73	8.19	**18.92**	0.078	30.00	-11.08
1715.00	10	QPSK	V	142	336	1 / 49	9.08	8.16	17.24	0.053	30.00	-12.76
1745.00	10	QPSK	V	141	332	1 / 49	11.94	8.19	**20.13**	0.103	30.00	-9.87
1775.00	10	QPSK	V	127	335	1 / 49	10.53	8.24	18.77	0.075	30.00	-11.23
1745.00	10	16-QAM	V	141	332	1 / 49	11.63	8.19	**19.82**	0.096	30.00	-10.18
1745.00	10	64-QAM	V	141	332	1 / 49	11.13	8.19	**19.32**	0.086	30.00	-10.68
1717.50	15	QPSK	V	145	338	1 / 74	9.73	8.16	17.89	0.062	30.00	-12.11
1745.00	15	QPSK	V	142	336	1 / 74	12.58	8.19	**20.77**	**0.120**	30.00	-9.23
1772.50	15	QPSK	V	132	334	1 / 74	10.72	8.24	18.96	0.079	30.00	-11.04
1745.00	15	16-QAM	V	142	336	1 / 74	12.18	8.19	**20.37**	0.109	30.00	-9.63
1745.00	15	64-QAM	V	142	336	1 / 74	11.63	8.19	**19.82**	0.096	30.00	-10.18
1720.00	20	QPSK	V	151	217	1 / 99	10.01	8.17	18.18	0.066	30.00	-11.82
1745.00	20	QPSK	V	144	330	1 / 99	12.30	8.19	**20.49**	0.112	30.00	-9.51
1770.00	20	QPSK	V	143	36	1 / 99	11.89	8.23	20.12	0.103	30.00	-9.88
1745.00	20	16-QAM	V	144	330	1 / 99	11.88	8.19	**20.07**	0.102	30.00	-9.93
1745.00	20	64-QAM	V	144	330	1 / 99	11.38	8.19	**19.57**	0.091	30.00	-10.43
1745.00	15	QPSK	H	169	226	1 / 74	9.93	8.19	18.12	0.065	30.00	-11.88

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	149	228	1 / 5	9.71	8.37	**18.08**	0.064	33.01	-14.93
1882.50	1.4	QPSK	H	146	226	1 / 5	8.54	8.42	16.96	0.050	33.01	-16.05
1914.30	1.4	QPSK	H	142	230	1 / 5	8.11	8.47	16.58	0.045	33.01	-16.43
1850.70	1.4	16-QAM	H	149	228	1 / 5	9.41	8.37	**17.78**	0.060	33.01	-15.23
1882.50	1.4	64-QAM	H	146	226	1 / 5	8.46	8.42	**16.88**	0.049	33.01	-16.13
1851.50	3	QPSK	H	149	228	1 / 14	9.71	8.37	**18.08**	0.064	33.01	-14.93
1882.50	3	QPSK	H	113	230	1 / 14	8.85	8.42	17.27	0.053	33.01	-15.74
1913.50	3	QPSK	H	144	233	1 / 14	8.88	8.47	17.35	0.054	33.01	-15.66
1851.50	3	16-QAM	H	149	228	1 / 14	9.65	8.37	**18.02**	0.063	33.01	-14.99
1851.50	3	64-QAM	H	149	228	1 / 14	9.21	8.37	**17.58**	0.057	33.01	-15.43
1852.50	5	QPSK	H	151	232	1 / 0	10.73	8.37	**19.10**	0.081	33.01	-13.91
1882.50	5	QPSK	H	146	226	1 / 24	10.12	8.42	18.54	0.071	33.01	-14.47
1912.50	5	QPSK	H	100	239	1 / 0	9.81	8.47	18.28	0.067	33.01	-14.73
1852.50	5	16-QAM	H	151	232	1 / 0	10.77	8.37	**19.14**	0.082	33.01	-13.87
1852.50	5	64-QAM	H	151	232	1 / 0	10.06	8.37	**18.43**	0.070	33.01	-14.58
1855.00	10	QPSK	H	197	225	1 / 0	10.07	8.37	18.44	0.070	33.01	-14.57
1882.50	10	QPSK	H	188	226	1 / 0	10.39	8.42	**18.81**	0.076	33.01	-14.20
1910.00	10	QPSK	H	184	229	1 / 0	9.61	8.46	18.07	0.064	33.01	-14.94
1882.50	10	16-QAM	H	188	226	1 / 0	10.21	8.42	**18.63**	0.073	33.01	-14.38
1882.50	10	64-QAM	H	188	226	1 / 0	9.71	8.42	**18.13**	0.065	33.01	-14.88
1857.50	15	QPSK	H	151	233	1 / 0	11.25	8.38	**19.63**	**0.092**	33.01	-13.38
1882.50	15	QPSK	H	146	223	1 / 74	10.81	8.42	19.23	0.084	33.01	-13.78
1907.50	15	QPSK	H	105	233	1 / 0	10.65	8.46	19.11	0.081	33.01	-13.90
1857.50	15	16-QAM	H	151	233	1 / 0	11.16	8.38	**19.54**	0.090	33.01	-13.47
1857.50	15	64-QAM	H	151	233	1 / 0	10.71	8.38	**19.09**	0.081	33.01	-13.92
1860.00	20	QPSK	H	147	235	1 / 0	11.12	8.38	**19.50**	0.089	33.01	-13.51
1882.50	20	QPSK	H	146	225	1 / 99	10.78	8.42	19.20	0.083	33.01	-13.81
1905.00	20	QPSK	H	100	236	1 / 99	10.53	8.45	18.98	0.079	33.01	-14.03
1882.50	20	16-QAM	H	146	225	1 / 99	10.67	8.42	**19.09**	0.081	33.01	-13.92
1882.50	20	64-QAM	H	146	225	1 / 99	9.95	8.42	**18.37**	0.069	33.01	-14.64
1857.50	15	QPSK	V	100	222	1 / 0	9.84	8.38	18.22	0.066	33.01	-14.79

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

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	V	110	32	1 / 0	16.40	7.90	**24.30**	0.269	33.01	-8.71
2593.00	5	QPSK	V	110	28	1 / 0	16.17	7.71	23.88	0.244	33.01	-9.13
2687.50	5	QPSK	V	113	45	1 / 0	13.75	7.52	21.27	0.134	33.01	-11.74
2593.00	5	16-QAM	V	110	28	1 / 0	16.53	7.71	**24.24**	0.265	33.01	-8.77
2687.50	5	64-QAM	V	113	45	1 / 0	16.68	7.52	**24.20**	0.263	33.01	-8.81
2501.00	10	QPSK	V	150	33	1 / 0	15.92	7.90	**23.82**	0.241	33.01	-9.19
2593.00	10	QPSK	V	116	27	1 / 0	15.95	7.71	23.66	0.232	33.01	-9.35
2685.00	10	QPSK	V	102	44	1 / 0	13.74	7.53	21.27	0.134	33.01	-11.74
2593.00	10	16-QAM	V	116	27	1 / 0	15.69	7.71	**23.40**	0.219	33.01	-9.61
2593.00	10	64-QAM	V	116	27	1 / 0	15.48	7.71	**23.19**	0.208	33.01	-9.82
2503.50	15	QPSK	V	159	33	1 / 0	16.78	7.89	**24.67**	0.293	33.01	-8.34
2593.00	15	QPSK	V	166	31	1 / 0	16.01	7.71	23.72	0.235	33.01	-9.29
2682.50	15	QPSK	V	152	40	1 / 0	14.87	7.53	22.40	0.174	33.01	-10.61
2503.50	15	16-QAM	V	159	33	1 / 0	16.48	7.89	**24.37**	0.274	33.01	-8.64
2503.50	15	64-QAM	V	159	33	1 / 0	16.28	7.89	**24.17**	0.261	33.01	-8.84
2506.00	20	QPSK	V	141	38	1 / 0	17.13	7.89	**25.02**	0.317	33.01	-7.99
2593.00	20	QPSK	V	166	33	1 / 0	16.14	7.71	23.85	0.243	33.01	-9.16
2680.00	20	QPSK	V	100	51	1 / 0	16.68	7.54	24.22	0.264	33.01	-8.80
2506.00	20	16-QAM	V	141	38	1 / 0	16.18	7.89	24.07	0.255	33.01	-8.94
2506.00	20	64-QAM	V	141	38	1 / 0	16.02	7.89	**23.91**	0.246	33.01	-9.10
2510.00	20	QPSK	H	138	20	1 / 0	16.85	7.88	24.73	0.297	33.01	-8.28

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

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2510.00	20	QPSK	V	149	319	1 / 0	13.60	7.88	21.48	**0.141**	33.01	-11.53
2506.00	20	16-QAM	V	100	51	1 / 0	13.28	7.89	21.17	0.131	33.01	-11.84
2506.00	20	64-QAM	V	101	300	1 / 0	12.78	7.89	**20.67**	**0.117**	33.01	-12.34

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

7.8 Radiated Spurious Emissions Measurements

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

Test Setup

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

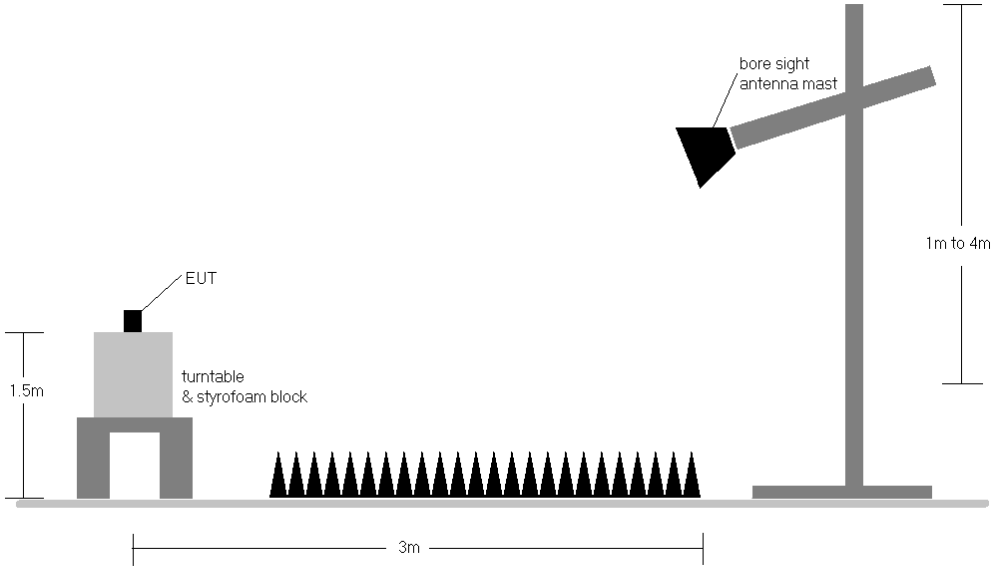


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

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

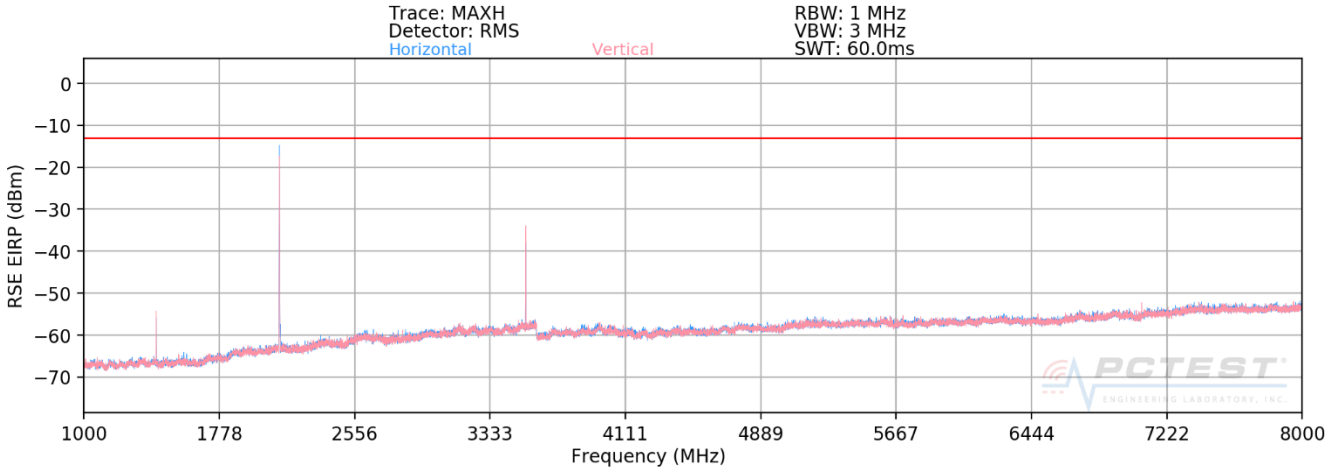
2) This unit was tested with its standard battery.

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

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

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

Band 12/17



Plot 7-265. 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	H	113	328	-66.08	8.07	-58.00	-45.0
2112.00	H	202	189	-38.07	8.28	-29.80	-16.8
2816.00	H	112	225	-70.87	7.29	-63.58	-50.6
3520.00	H	377	33	-55.08	6.84	-48.23	-35.2
4224.00	H	-	-	-69.03	6.01	-63.02	-50.0

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

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	H	174	293	-63.66	8.06	-55.60	-42.6
2122.50	H	148	292	-30.79	8.25	-22.54	-9.5
2830.00	H	114	71	-69.27	7.27	-62.00	-49.0
3537.50	H	119	35	-50.40	6.71	-43.69	-30.7
4245.00	H	-	-	-69.57	6.08	-63.49	-50.5

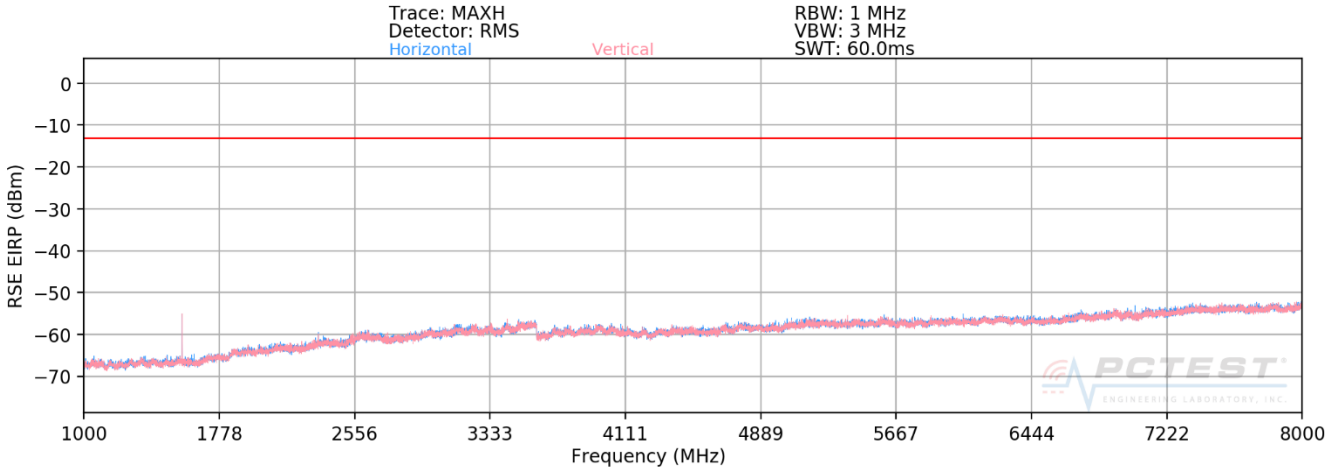
Table 7-12. Radiated Spurious Data (Band 12/17 – Mid Channel)

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	H	165	279	-70.40	8.05	-62.35	-49.4
2133.00	H	145	190	-28.83	8.22	-20.62	-7.6
2844.00	H	157	141	-68.21	7.25	-60.96	-48.0
3555.00	H	369	32	-51.85	6.57	-45.28	-32.3
4266.00	H	-	-	-69.31	6.17	-63.13	-50.1

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

Band 13



Plot 7-266. 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	H	114	89	-69.61	7.90	-61.71	-48.7
3128.00	H	400	126	-70.57	7.00	-63.57	-50.6
3910.00	H	116	230	-67.51	5.16	-62.35	-49.3
4692.00	H	-	-	-68.98	6.74	-62.24	-49.2

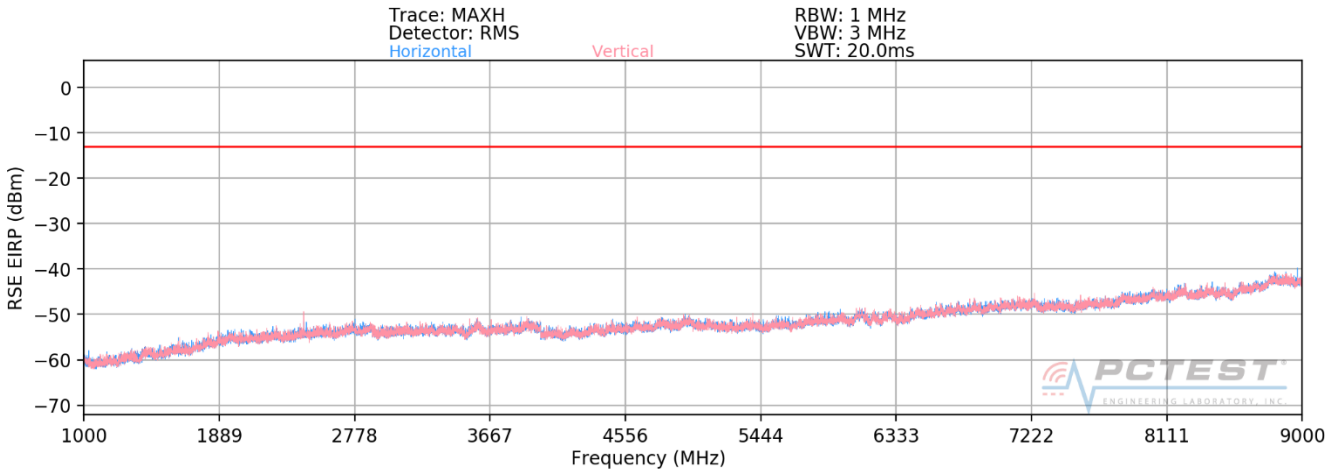
Table 7-14. Radiated Spurious Data (Band 13 – Mid Channel)

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	H	122	303	-66.31	8.06	-58.25	-18.2

Table 7-15. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

Band 26/5



Plot 7-267. Radiated Spurious Plot above 1GHz (Band 26/5)

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	123	5	-58.74	8.09	-50.64	-37.6
2487.00	H	122	197	-56.34	7.90	-48.44	-35.4
3316.00	H	-	-	-54.98	7.00	-47.98	-35.0
4145.00	H	-	-	-50.90	5.73	-45.17	-32.2

Table 7-16. Radiated Spurious Data (Band 26/5 – 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	160	320	-58.35	8.11	-50.23	-37.2
2509.50	H	155	167	-57.02	7.88	-49.14	-36.1
3346.00	H	-	-	-55.38	7.00	-48.38	-35.4
4182.50	H	-	-	-52.01	5.86	-46.15	-33.1

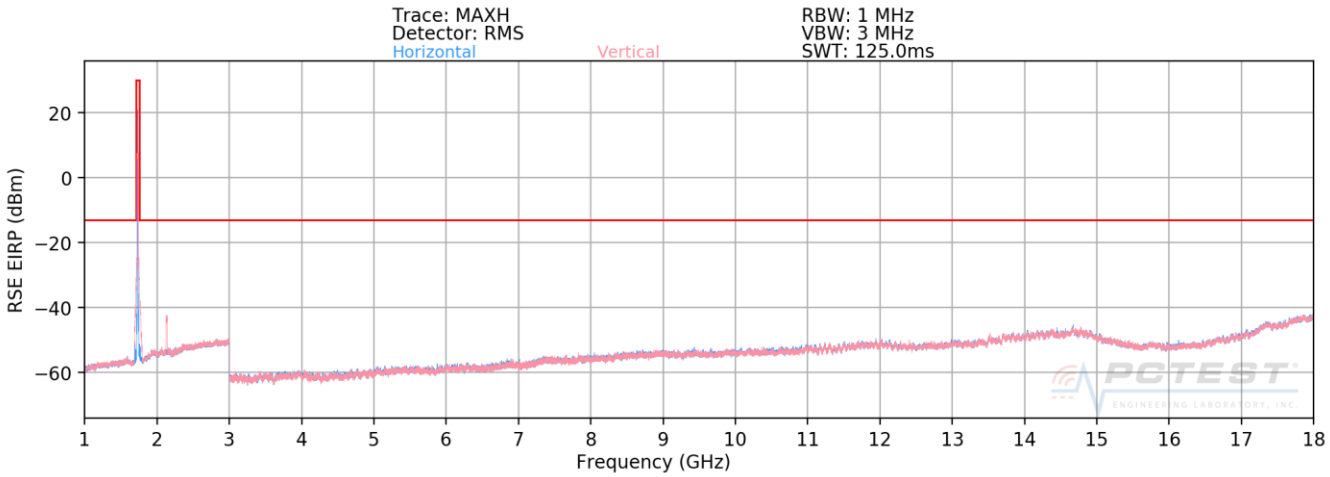
Table 7-17. Radiated Spurious Data (Band 26/5 – Mid Channel)

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	165	317	-54.76	8.13	-46.63	-33.6
2532.00	H	172	241	-52.14	7.83	-44.30	-31.3
3376.00	H	169	139	-52.71	7.00	-45.71	-32.7
4220.00	H	-	-	-51.11	5.99	-45.12	-32.1
5064.00	H	-	-	-50.23	8.84	-41.38	-28.4

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

Band 66/4



Plot 7-268. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY:	1717.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3435.00	V	133	345	-65.22	9.84	-55.38	-42.4
5152.50	V	114	24	-70.43	10.70	-59.73	-46.7
6870.00	V	-	-	-70.29	11.67	-58.63	-45.6

Table 7-19. Radiated Spurious Data (Band 66/4 – Low Channel)

OPERATING FREQUENCY:	1745.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	V	134	350	-67.88	9.91	-57.97	-45.0
5235.00	V	400	357	-71.59	10.73	-60.86	-47.9
6980.00	V	388	339	-68.37	11.82	-56.55	-43.5
8725.00	V	115	23	-65.22	11.00	-54.22	-41.2
10470.00	V	221	41	-65.95	12.58	-53.36	-40.4
12215.00	V	-	-	-64.82	13.11	-51.71	-38.7

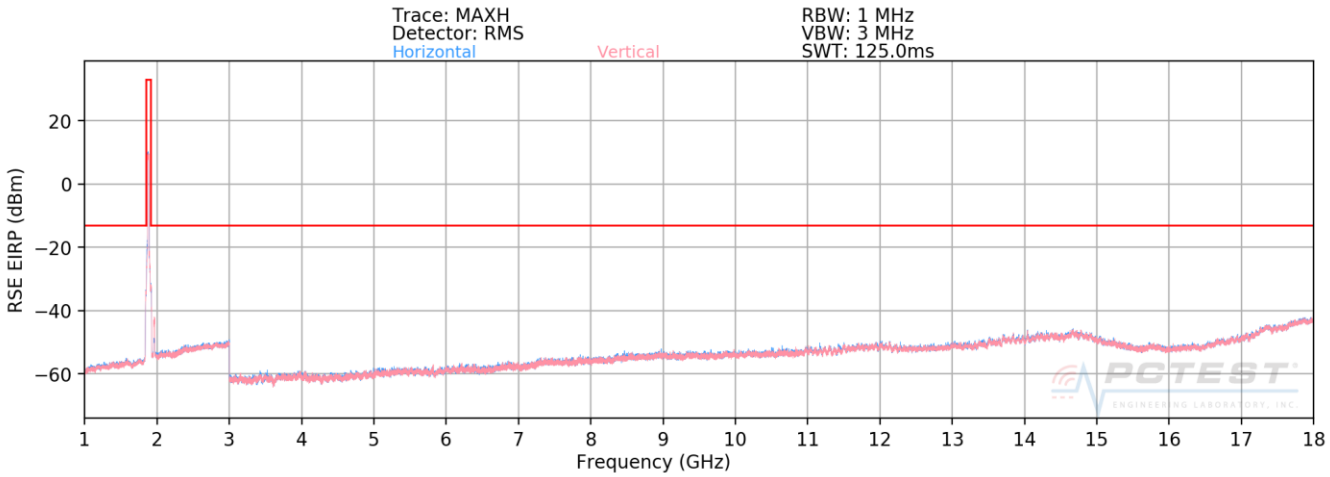
Table 7-20. Radiated Spurious Data (Band 66/4 – Mid Channel)

OPERATING FREQUENCY:	1772.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3545.00	V	129	344	-71.05	9.89	-61.16	-48.2
5317.50	V	-	-	-71.60	10.69	-60.91	-47.9

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

Band 25/2



Plot 7-269. Radiated Spurious Plot above 1GHz (Band 25/2)

OPERATING FREQUENCY:	1857.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3715.00	H	162	215	-64.19	5.36	-58.83	-45.8
5572.50	H	-	-	-70.26	9.51	-60.75	-47.8

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

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	158	218	-64.34	5.11	-59.24	-46.2
5647.50	H	-	-	-70.15	9.72	-60.43	-47.4

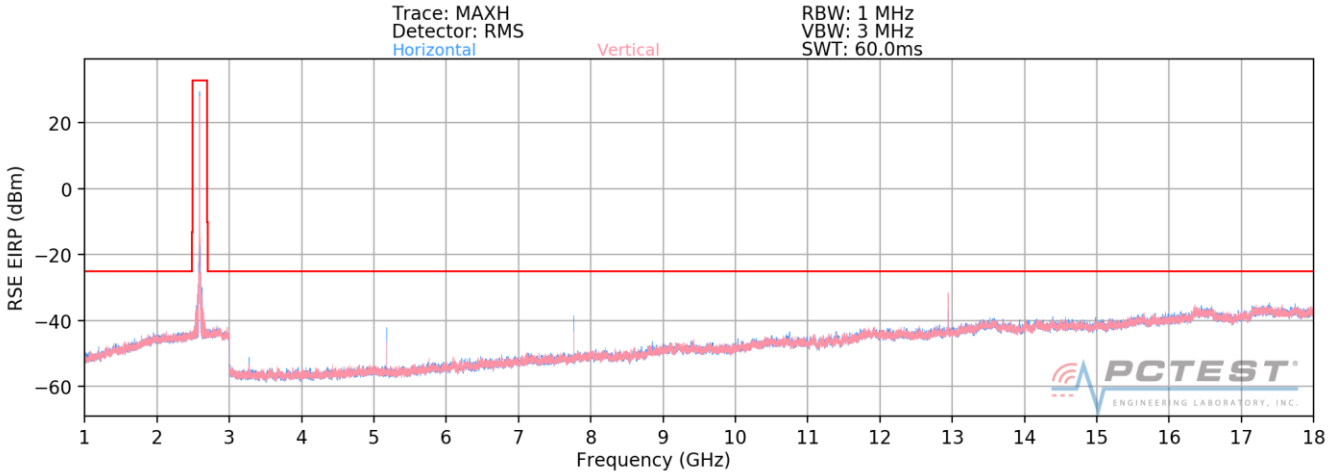
Table 7-23. Radiated Spurious Data (Band 25/2 – Mid Channel)

OPERATING FREQUENCY:	1907.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

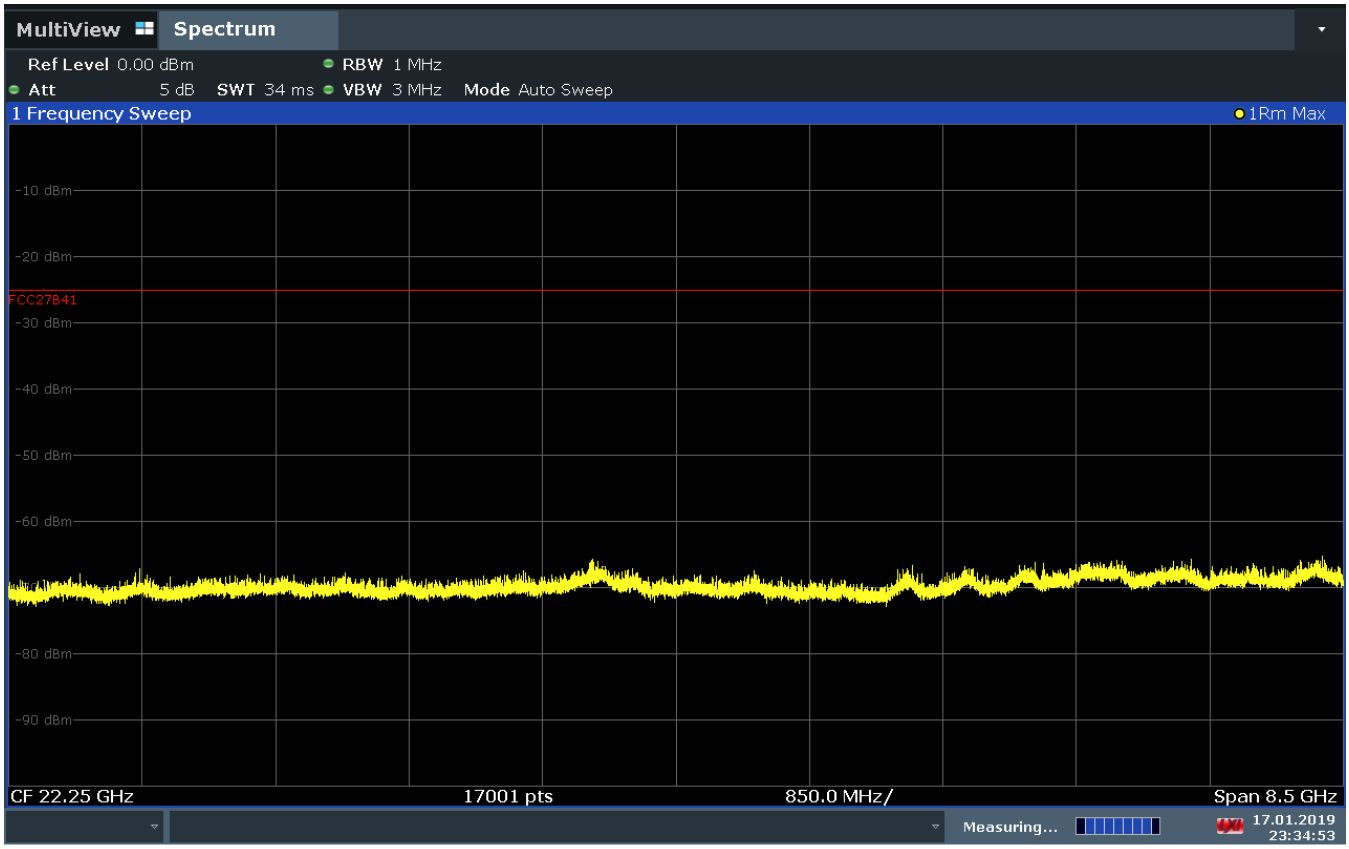
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3815.00	H	114	115	-62.54	5.13	-57.42	-44.4
5722.50	H	-	-	-70.85	9.92	-60.93	-47.9

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

Band 41



Plot 7-270. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



23:34:53 17.01.2019

Plot 7-271. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41)

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	282	1	-63.46	10.88	-52.58	-27.6
7530.00	V	207	30	-54.15	11.13	-43.01	-18.0
10040.00	V	-	-	-60.32	11.99	-48.33	-23.3

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

OPERATING FREQUENCY:	2593.00	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]
5186.00	V	310	1	-58.18	10.74	-47.44	-22.4
7779.00	V	160	30	-56.13	11.44	-44.69	-19.7
10372.00	V	384	4	-64.88	12.42	-52.45	-27.5
12965.00	V	184	322	-48.42	13.29	-35.12	-10.1
15558.00	V	-	-	-68.24	16.33	-51.92	-26.9

Table 7-26. Radiated Spurious Data (Band 41 – Mid Channel)

OPERATING FREQUENCY:	2680.00	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]
5360.00	V	100	200	-55.86	10.70	-45.16	-20.2
8040.00	V	108	320	-54.70	11.16	-43.54	-18.5
10720.00	V	196	346	-60.60	12.59	-48.01	-23.0
13400.00	V	100	325	-44.17	12.59	-31.57	-6.6
16080.00	V	-	-	-67.95	16.68	-51.27	-26.3

Table 7-27. Radiated Spurious Data (Band 41 – High Channel)

7.9 Frequency Stability / Temperature Variation

Test Overview and Limit

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

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

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

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24, Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None

Band 12/17 Frequency Stability Measurements

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	707,499,888	-112	-0.0000158
100 %		- 20	707,499,827	-173	-0.0000245
100 %		- 10	707,499,811	-189	-0.0000267
100 %		0	707,499,956	-44	-0.0000062
100 %		+ 10	707,499,881	-119	-0.0000168
100 %		+ 20	707,500,149	149	0.0000211
100 %		+ 30	707,500,255	255	0.0000360
100 %		+ 40	707,500,204	204	0.0000288
100 %		+ 50	707,500,209	209	0.0000295
BATT. ENDPOINT	3.40	+ 20	707,499,710	-290	-0.0000410

Table 7-28. Frequency Stability Data (Band 12)

Note:

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

Band 12/17 Frequency Stability Measurements

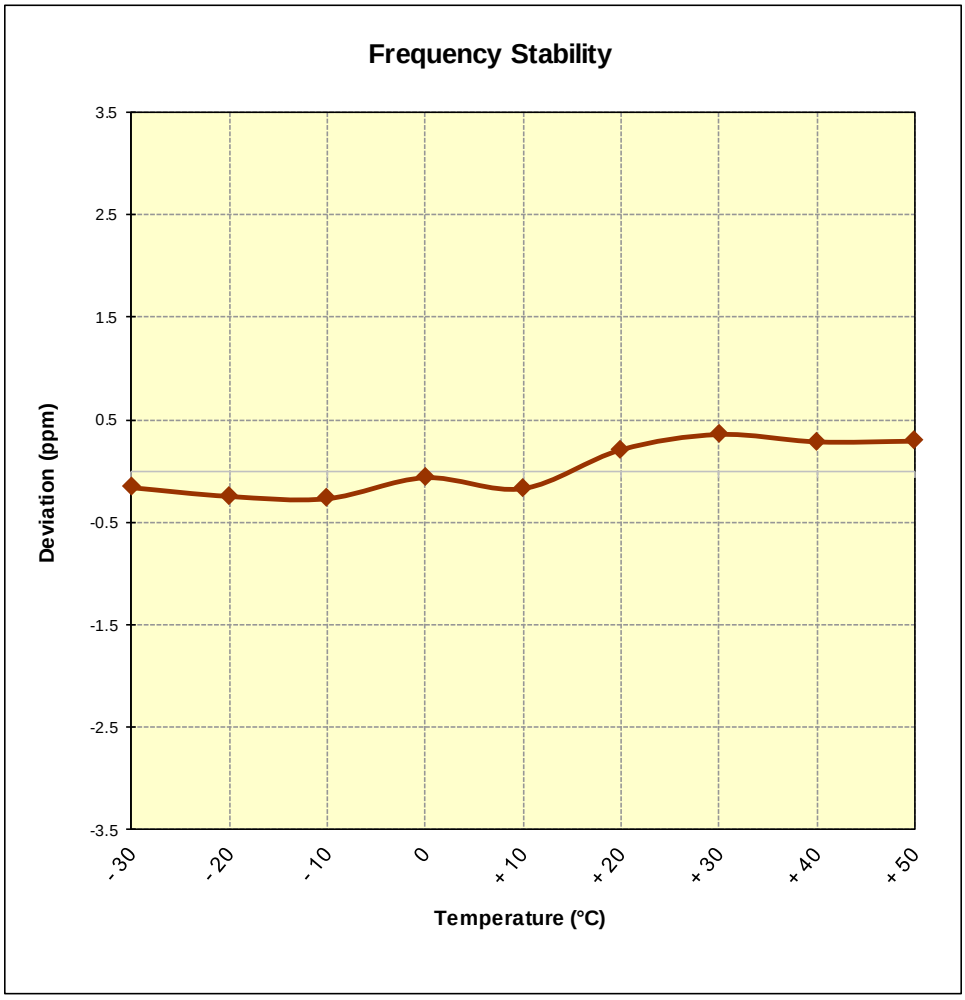


Figure 7-9. Frequency Stability Graph (Band 12)

Band 13 Frequency Stability Measurements

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	782,000,190	190	0.0000243
100 %		- 20	781,999,990	-10	-0.0000013
100 %		- 10	782,000,000	0	0.0000000
100 %		0	782,000,147	147	0.0000188
100 %		+ 10	781,999,978	-22	-0.0000028
100 %		+ 20	781,999,848	-152	-0.0000194
100 %		+ 30	782,000,087	87	0.0000111
100 %		+ 40	782,000,033	33	0.0000042
100 %		+ 50	781,999,908	-92	-0.0000118
BATT. ENDPOINT	3.40	+ 20	781,999,953	-47	-0.0000060

Table 7-29. 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

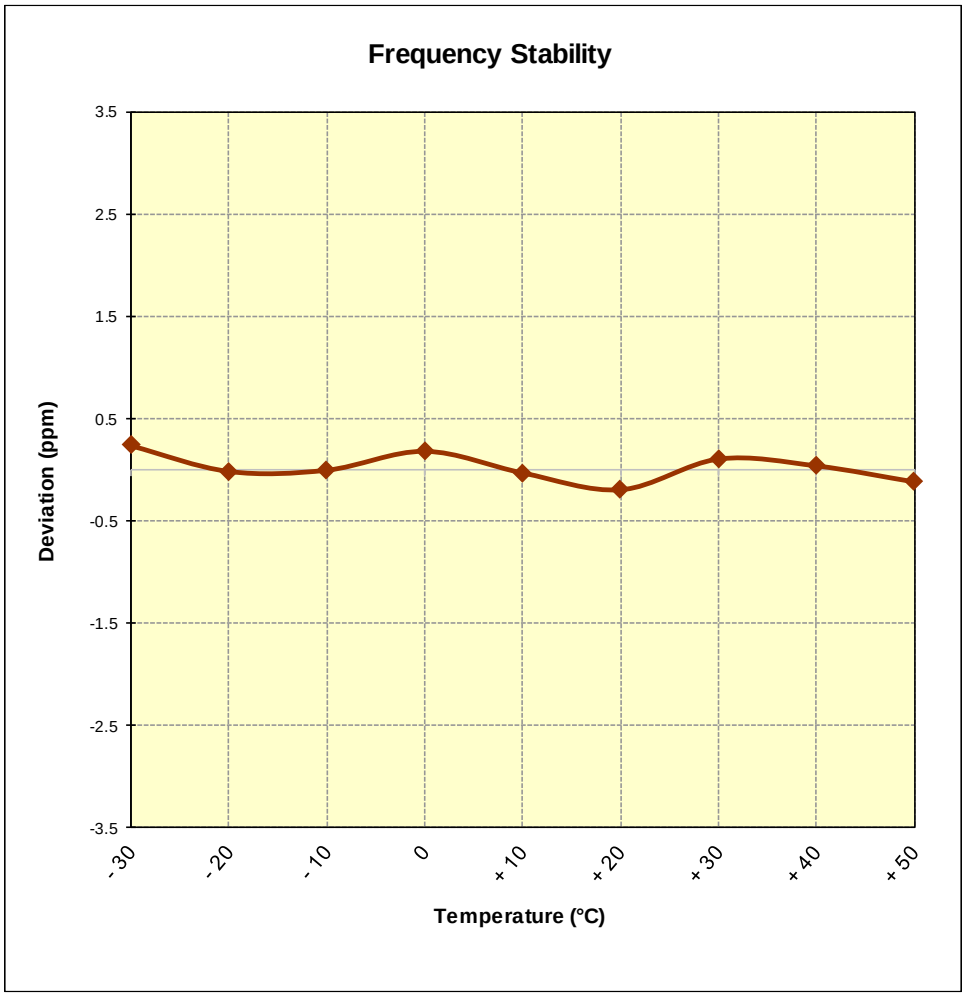


Figure 7-10. Frequency Stability Graph (Band 13)

Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	831,500,141	141	0.0000170
100 %		- 20	831,500,099	99	0.0000119
100 %		- 10	831,499,981	-19	-0.0000023
100 %		0	831,500,139	139	0.0000167
100 %		+ 10	831,499,762	-238	-0.0000286
100 %		+ 20	831,499,956	-44	-0.0000053
100 %		+ 30	831,499,627	-373	-0.0000449
100 %		+ 40	831,500,183	183	0.0000220
100 %		+ 50	831,499,807	-193	-0.0000232
BATT. ENDPOINT	3.40	+ 20	831,499,854	-146	-0.0000176

Table 7-30. Frequency Stability Data (Band 26/5)

Band 26/5 Frequency Stability Measurements

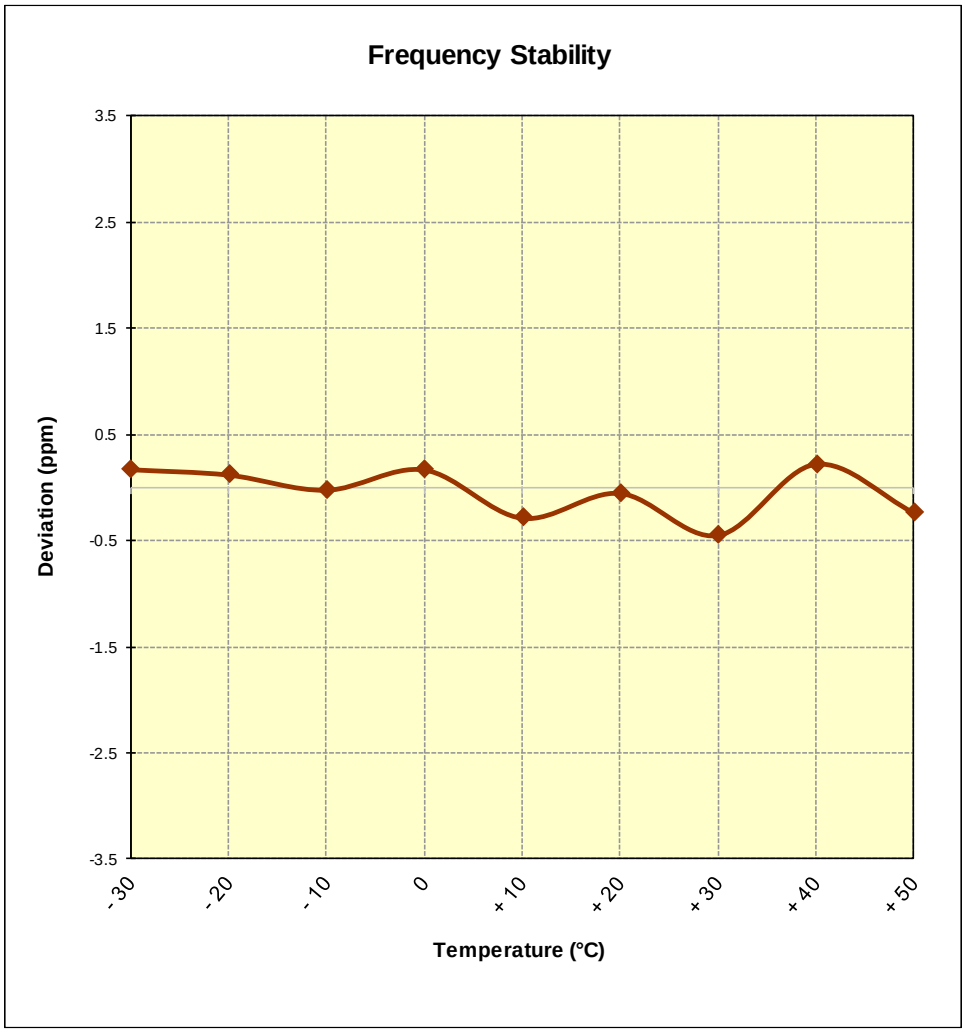


Figure 7-11. Frequency Stability Graph (Band 26/5)

Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,745,000,016	16	0.0000009
100 %		- 20	1,745,000,133	133	0.0000076
100 %		- 10	1,744,999,869	-131	-0.0000075
100 %		0	1,744,999,967	-33	-0.0000019
100 %		+ 10	1,745,000,177	177	0.0000101
100 %		+ 20	1,744,999,703	-297	-0.0000170
100 %		+ 30	1,745,000,225	225	0.0000129
100 %		+ 40	1,745,000,029	29	0.0000017
100 %		+ 50	1,745,000,031	31	0.0000018
BATT. ENDPOINT	3.40	+ 20	1,745,000,394	394	0.0000226

Table 7-31. 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

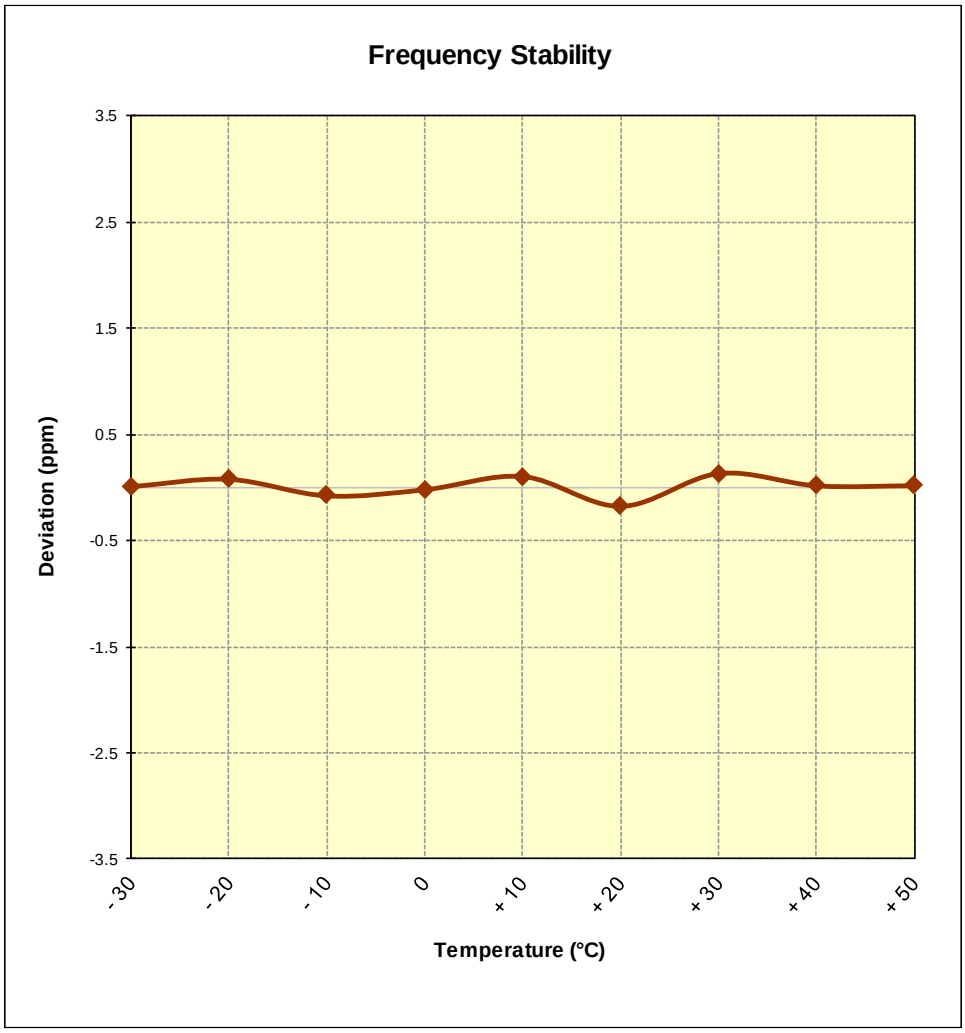


Figure 7-12. Frequency Stability Graph (Band 66/4)

Band 25 Frequency Stability Measurements

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,882,500,310	310	0.0000165
100 %		- 20	1,882,500,285	285	0.0000151
100 %		- 10	1,882,499,842	-158	-0.0000084
100 %		0	1,882,500,155	155	0.0000082
100 %		+ 10	1,882,500,076	76	0.0000040
100 %		+ 20	1,882,499,891	-109	-0.0000058
100 %		+ 30	1,882,500,034	34	0.0000018
100 %		+ 40	1,882,500,041	41	0.0000022
100 %		+ 50	1,882,499,918	-82	-0.0000044
BATT. ENDPOINT	3.40	+ 20	1,882,499,829	-171	-0.0000091

Table 7-32. 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 Frequency Stability Measurements

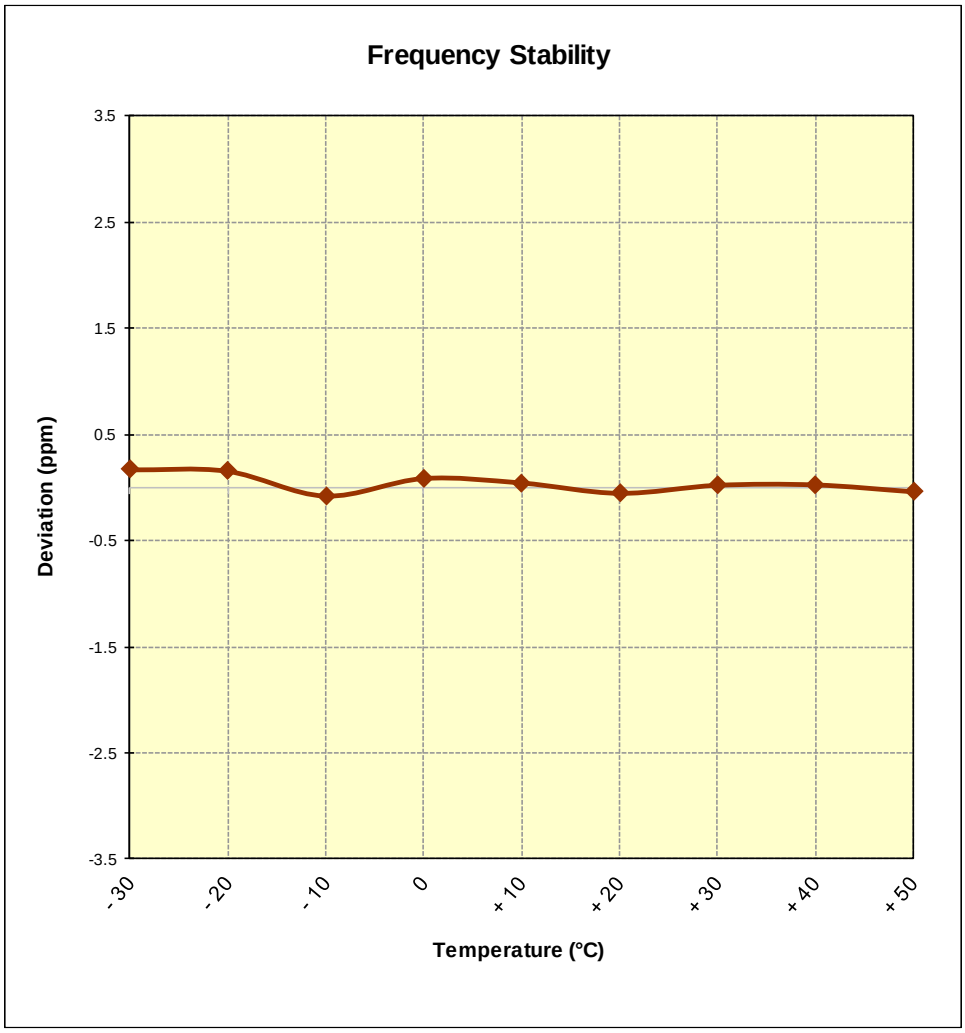


Figure 7-13. Frequency Stability Graph (Band 25/2)

Band 41 Frequency Stability Measurements

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	2,592,999,949	-51	-0.0000020
100 %		- 20	2,593,000,334	334	0.0000129
100 %		- 10	2,593,000,103	103	0.0000040
100 %		0	2,592,999,914	-86	-0.0000033
100 %		+ 10	2,593,000,210	210	0.0000081
100 %		+ 20	2,593,000,258	258	0.0000099
100 %		+ 30	2,592,999,930	-70	-0.0000027
100 %		+ 40	2,592,999,624	-376	-0.0000145
100 %		+ 50	2,592,999,729	-271	-0.0000105
BATT. ENDPOINT	3.40	+ 20	2,592,999,614	-386	-0.0000149

Table 7-33. Frequency Stability Data (Band 41)

Note:

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

Band 41 Frequency Stability Measurements

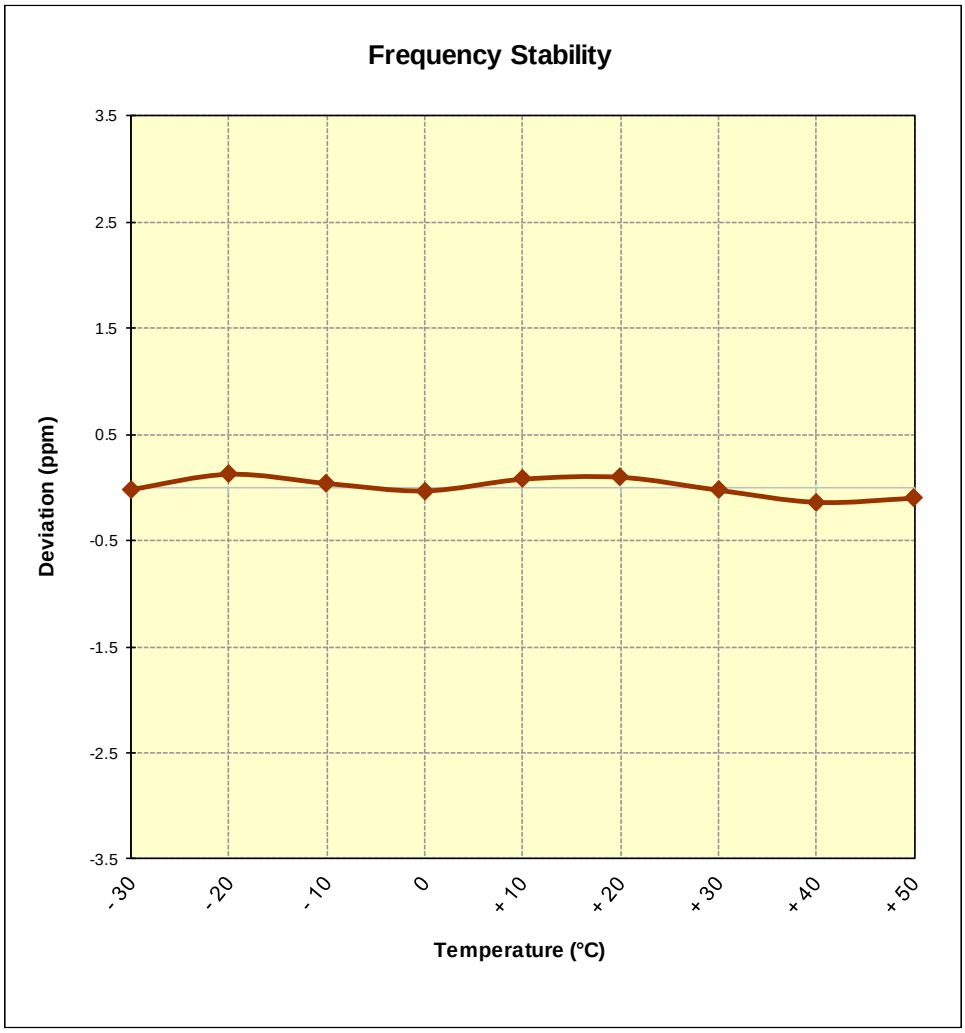


Figure 7-14. Frequency Stability Graph (Band 41)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFQ850QM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.