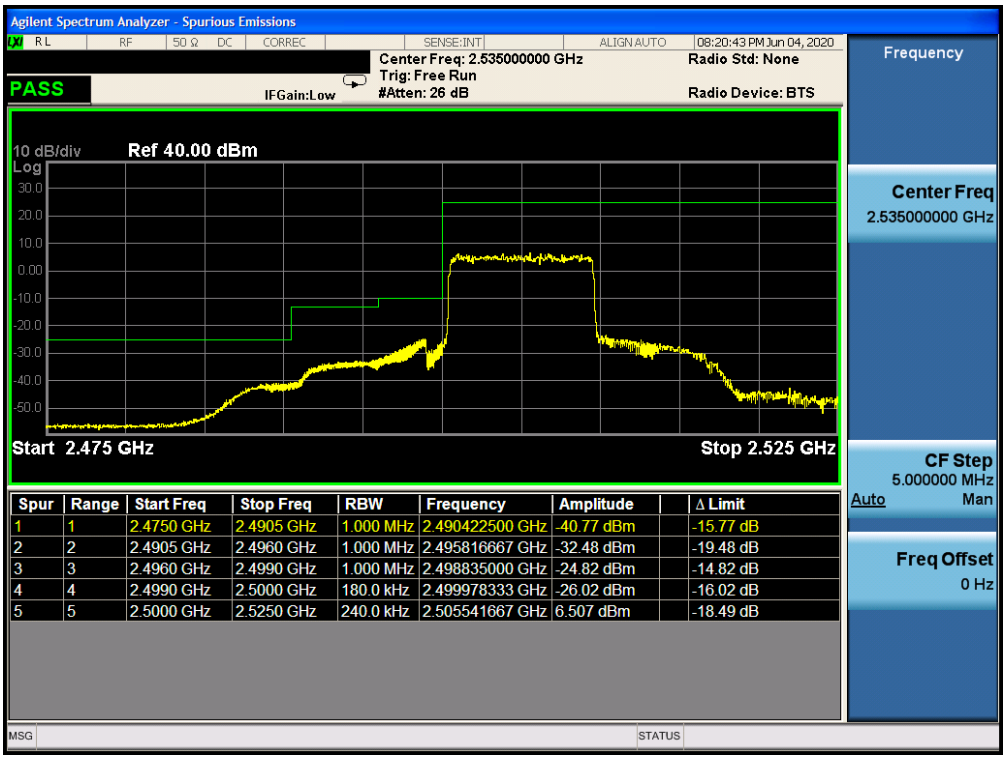
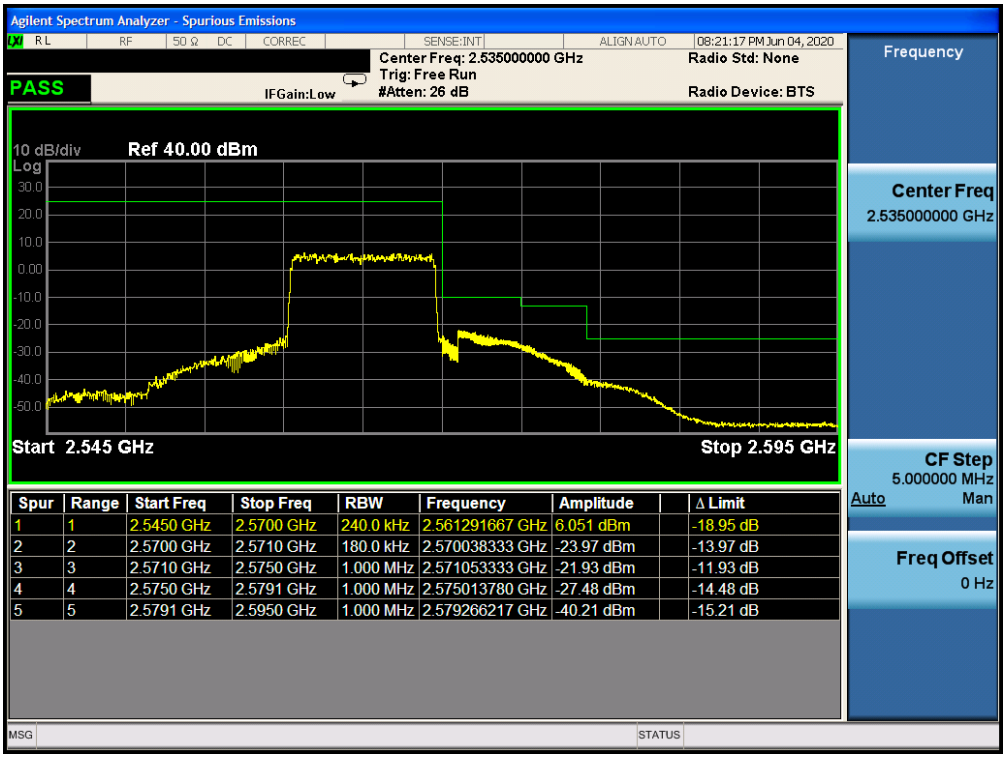


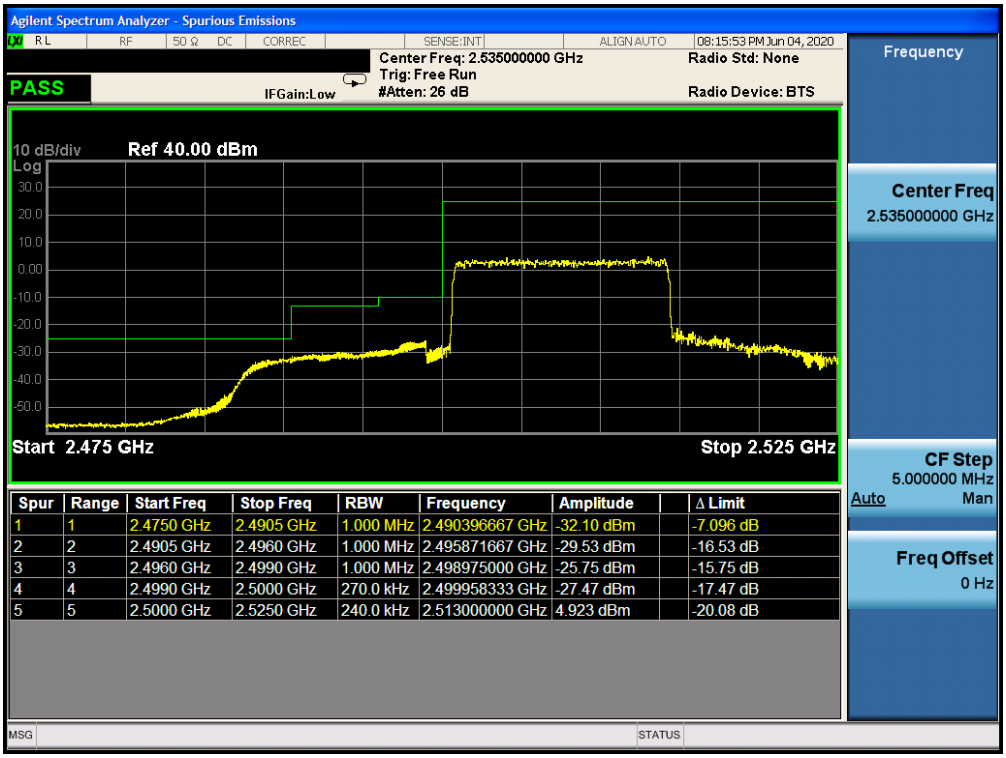
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490422500 GHz	-40.77 dBm	-15.77 dB
2	2	2.4905 GHz	2.4960 GHz	1.000 MHz	2.495816667 GHz	-32.48 dBm	-19.48 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.498835000 GHz	-24.82 dBm	-14.82 dB
4	4	2.4990 GHz	2.5000 GHz	180.0 kHz	2.499978333 GHz	-26.02 dBm	-16.02 dB
5	5	2.5000 GHz	2.5250 GHz	240.0 kHz	2.505541667 GHz	6.507 dBm	-18.49 dB

Plot 7-208. Lower ACP Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)

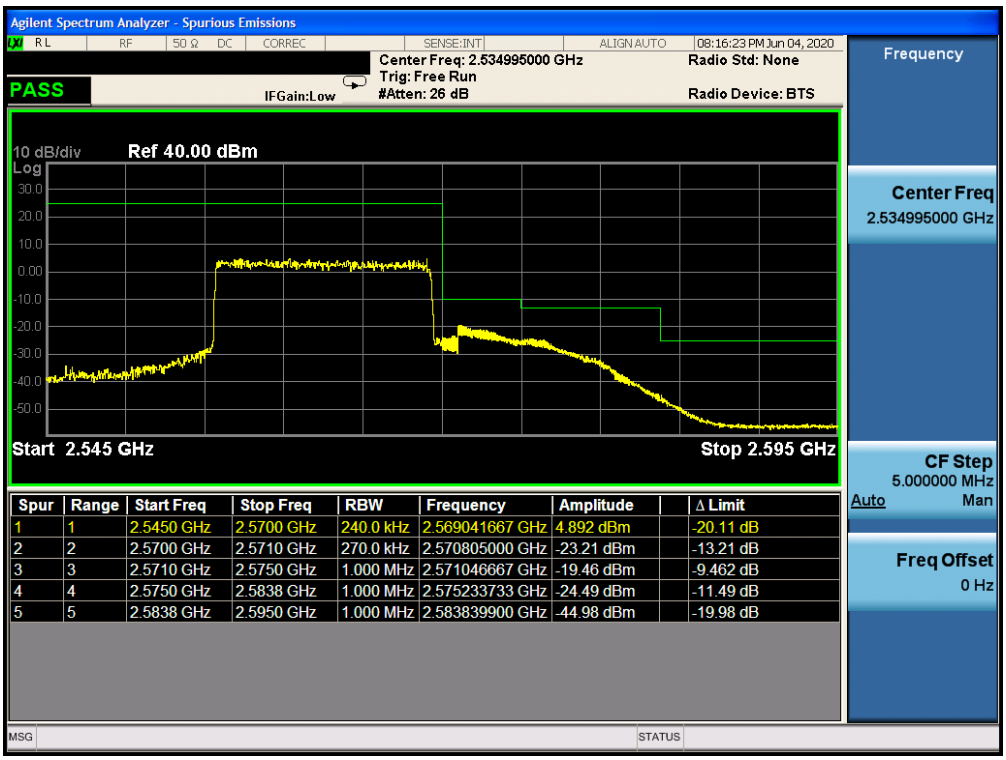


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5450 GHz	2.5700 GHz	240.0 kHz	2.561291667 GHz	6.051 dBm	-18.95 dB
2	2	2.5700 GHz	2.5710 GHz	180.0 kHz	2.570038333 GHz	-23.97 dBm	-13.97 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571053333 GHz	-21.93 dBm	-11.93 dB
4	4	2.5750 GHz	2.5791 GHz	1.000 MHz	2.575013780 GHz	-27.48 dBm	-14.48 dB
5	5	2.5791 GHz	2.5950 GHz	1.000 MHz	2.579266217 GHz	-40.21 dBm	-15.21 dB

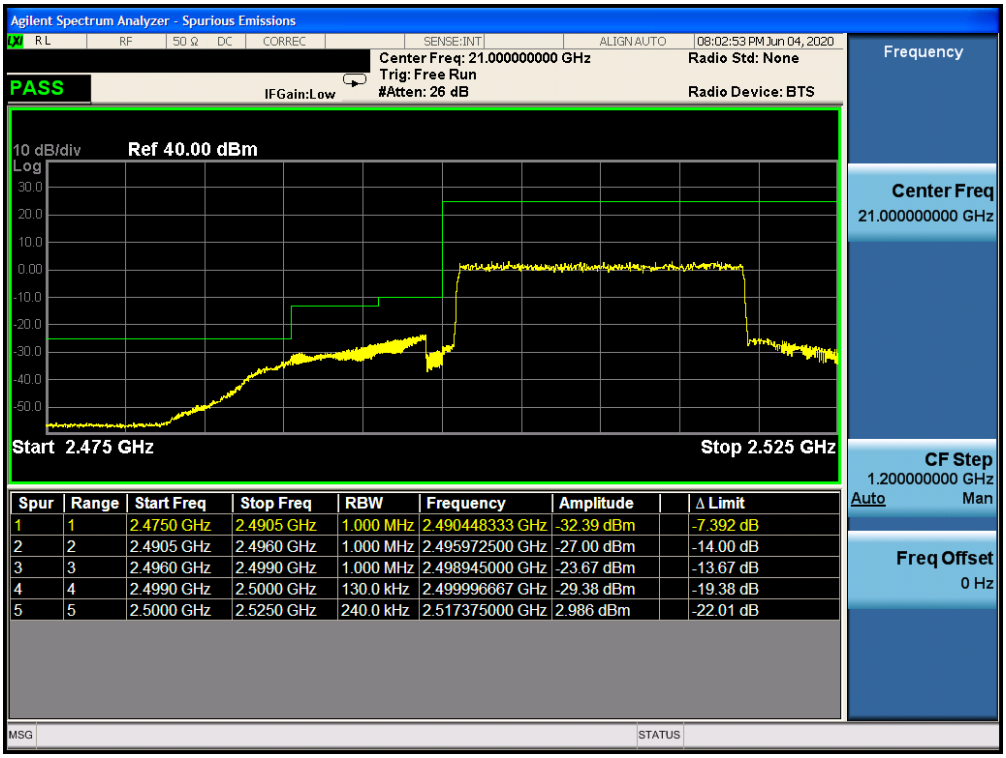
Plot 7-209. Upper ACP Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-210. Lower ACP Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-211. Upper ACP Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)



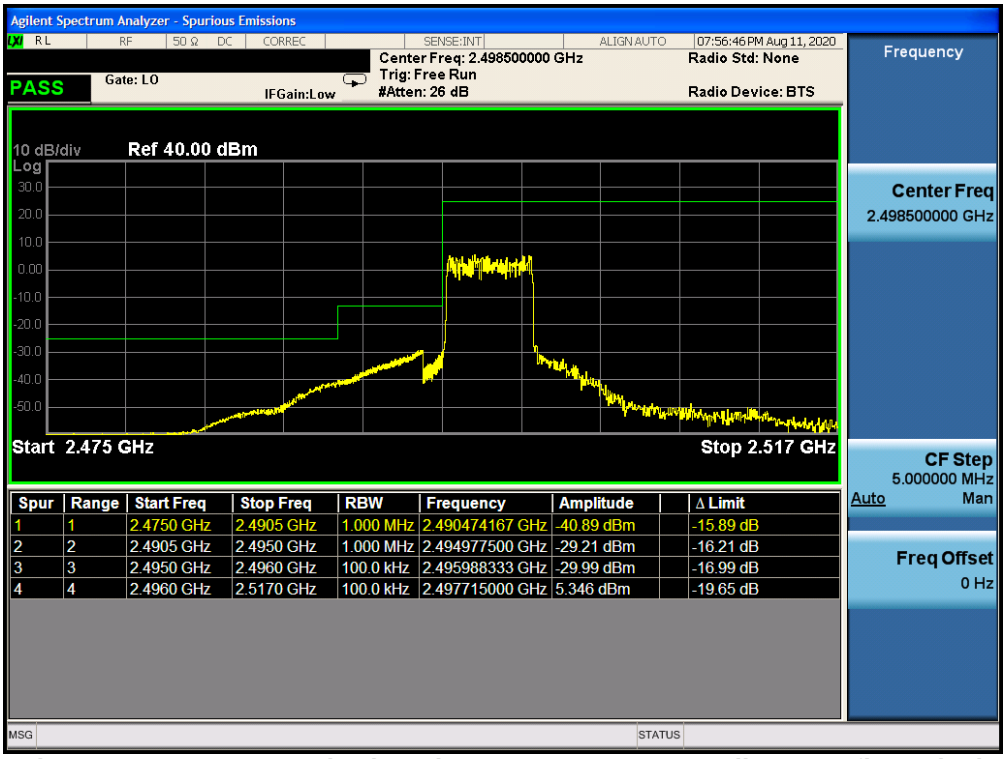
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490448333 GHz	-32.39 dBm	-7.392 dB
2	2	2.4905 GHz	2.4960 GHz	1.000 MHz	2.495972500 GHz	-27.00 dBm	-14.00 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.498945000 GHz	-23.67 dBm	-13.67 dB
4	4	2.4990 GHz	2.5000 GHz	130.0 kHz	2.499996667 GHz	-29.38 dBm	-19.38 dB
5	5	2.5000 GHz	2.5250 GHz	240.0 kHz	2.517375000 GHz	2.986 dBm	-22.01 dB

Plot 7-212. Lower ACP Plot (Band 7 - 20.0MHz 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	2.552166667 GHz	4.117 dBm	-20.88 dB
2	2	2.5700 GHz	2.5710 GHz	130.0 kHz	2.570080000 GHz	-27.53 dBm	-17.53 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571013333 GHz	-20.71 dBm	-10.71 dB
4	4	2.5750 GHz	2.5767 GHz	1.000 MHz	2.575086500 GHz	-24.48 dBm	-11.48 dB
5	5	2.5767 GHz	2.5950 GHz	1.000 MHz	2.577217200 GHz	-26.83 dBm	-1.828 dB

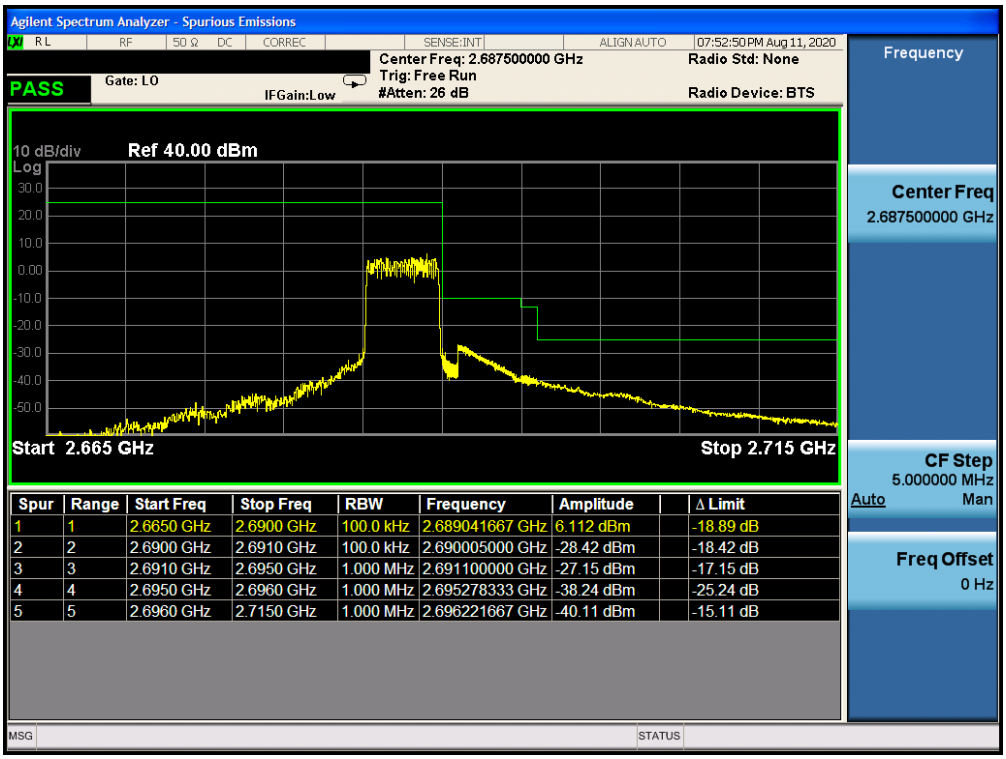
Plot 7-213. Upper ACP Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration)

Band 41



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490474167 GHz	-40.89 dBm	-15.89 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494977500 GHz	-29.21 dBm	-16.21 dB
3	3	2.4950 GHz	2.4960 GHz	100.0 kHz	2.495988333 GHz	-29.99 dBm	-16.99 dB
4	4	2.4960 GHz	2.5170 GHz	100.0 kHz	2.497715000 GHz	5.346 dBm	-19.65 dB

Plot 7-346. Lower ACP Plot (Band 41 - 5.0MHz QPSK - Full RB Configuration)

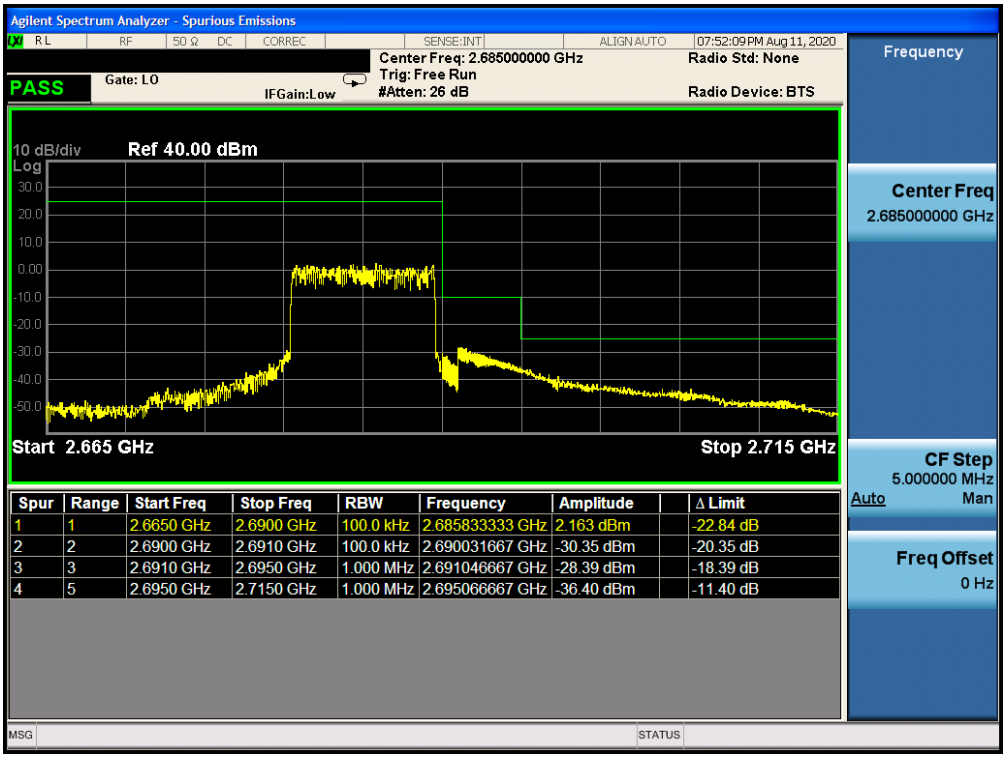


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	100.0 kHz	2.689041667 GHz	6.112 dBm	-18.89 dB
2	2	2.6900 GHz	2.6910 GHz	100.0 kHz	2.690005000 GHz	-28.42 dBm	-18.42 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691100000 GHz	-27.15 dBm	-17.15 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695278333 GHz	-38.24 dBm	-25.24 dB
5	5	2.6960 GHz	2.7150 GHz	1.000 MHz	2.696221667 GHz	-40.11 dBm	-15.11 dB

Plot 7-347. Upper ACP Plot (Band 41 - 5.0MHz QPSK - Full RB Configuration)

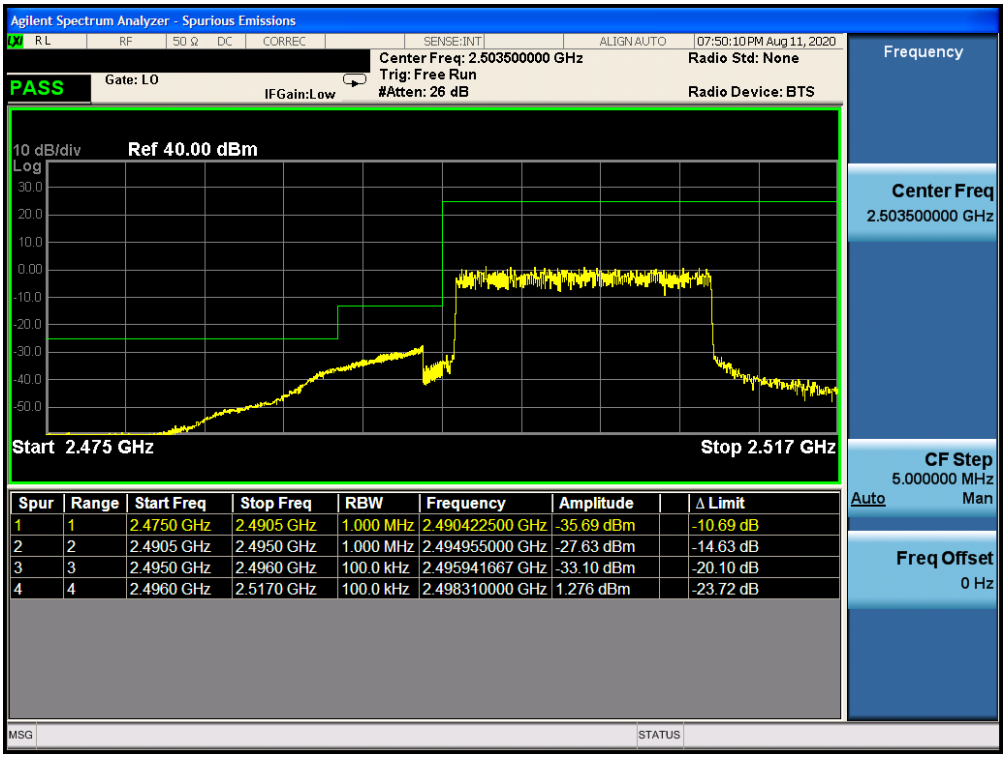
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490370833 GHz	-37.52 dBm	-12.52 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494857500 GHz	-27.67 dBm	-14.67 dB
3	3	2.4950 GHz	2.4960 GHz	100.0 kHz	2.495903333 GHz	-30.43 dBm	-17.43 dB
4	4	2.4960 GHz	2.5170 GHz	100.0 kHz	2.502230000 GHz	4.047 dBm	-20.95 dB

Plot 7-348. Lower ACP Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)

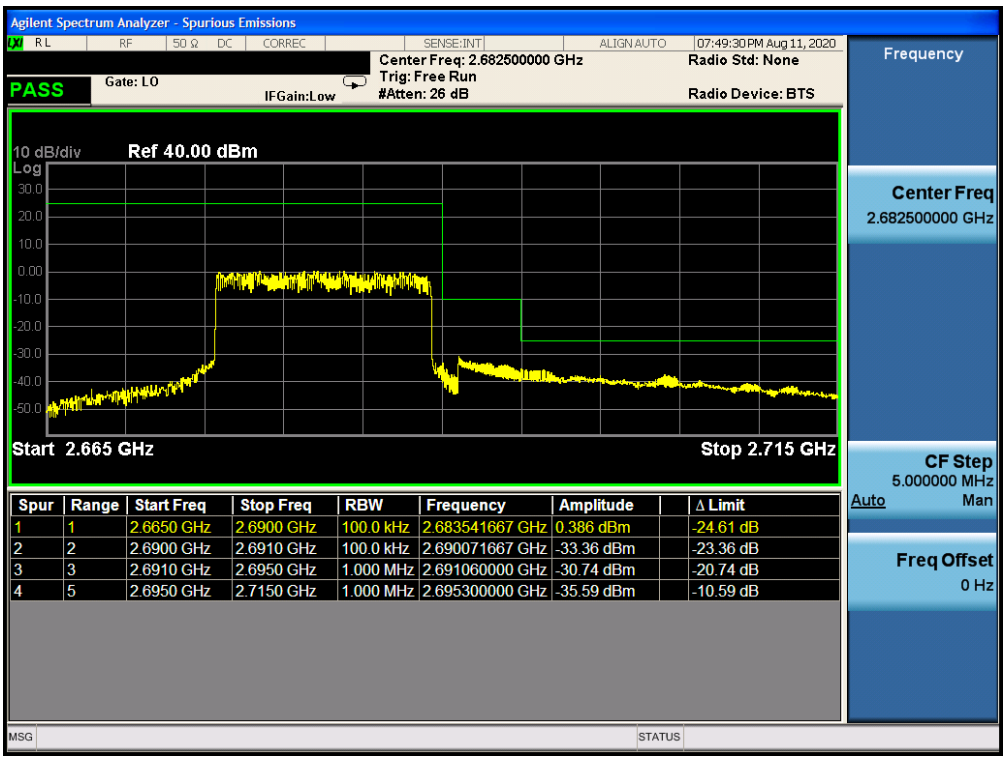


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	100.0 kHz	2.685833333 GHz	2.163 dBm	-22.84 dB
2	2	2.6900 GHz	2.6910 GHz	100.0 kHz	2.690031667 GHz	-30.35 dBm	-20.35 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691046667 GHz	-28.39 dBm	-18.39 dB
4	5	2.6950 GHz	2.7150 GHz	1.000 MHz	2.695066667 GHz	-36.40 dBm	-11.40 dB

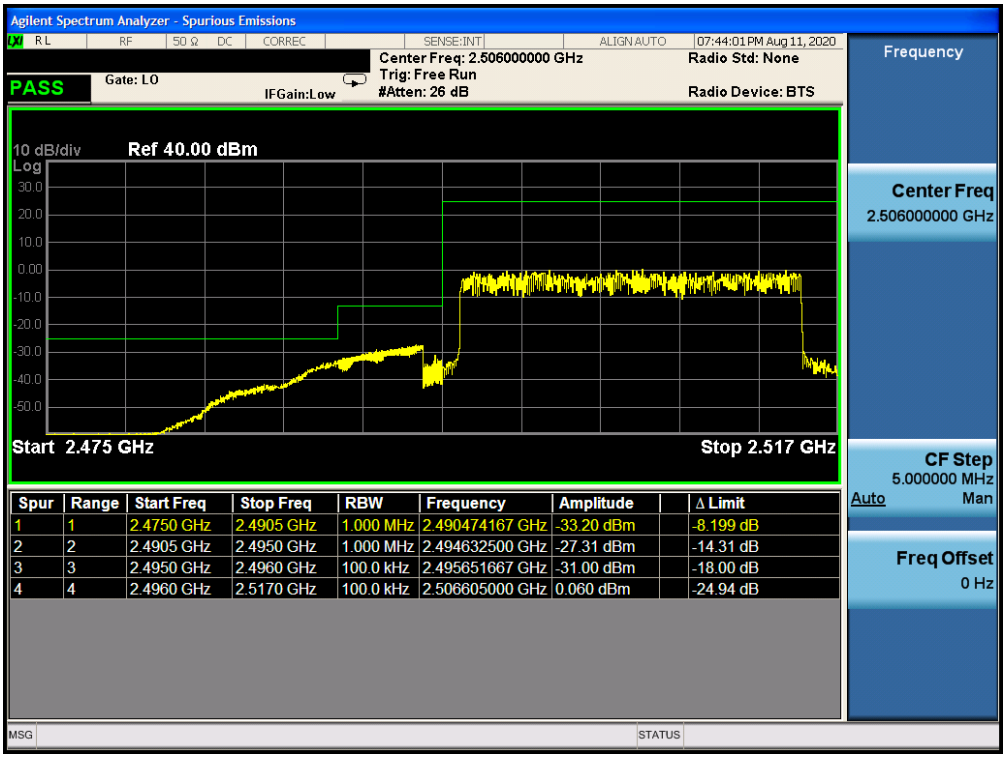
Plot 7-349. Upper ACP Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-350. Lower ACP Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-351. Upper ACP Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-352. Lower ACP Plot (Band 41 - 20.0MHz QPSK - Full RB Configuration)

Plot 7-353. Upper ACP Plot (Band 41 - 20.0MHz QPSK - Full RB Configuration)

7.5 Peak-Average Ratio

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.7.1

Test Settings

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

Test Setup

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

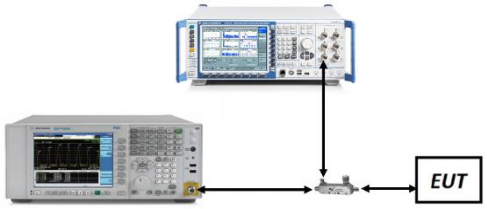


Figure 7-4. Test Instrument & Measurement Setup

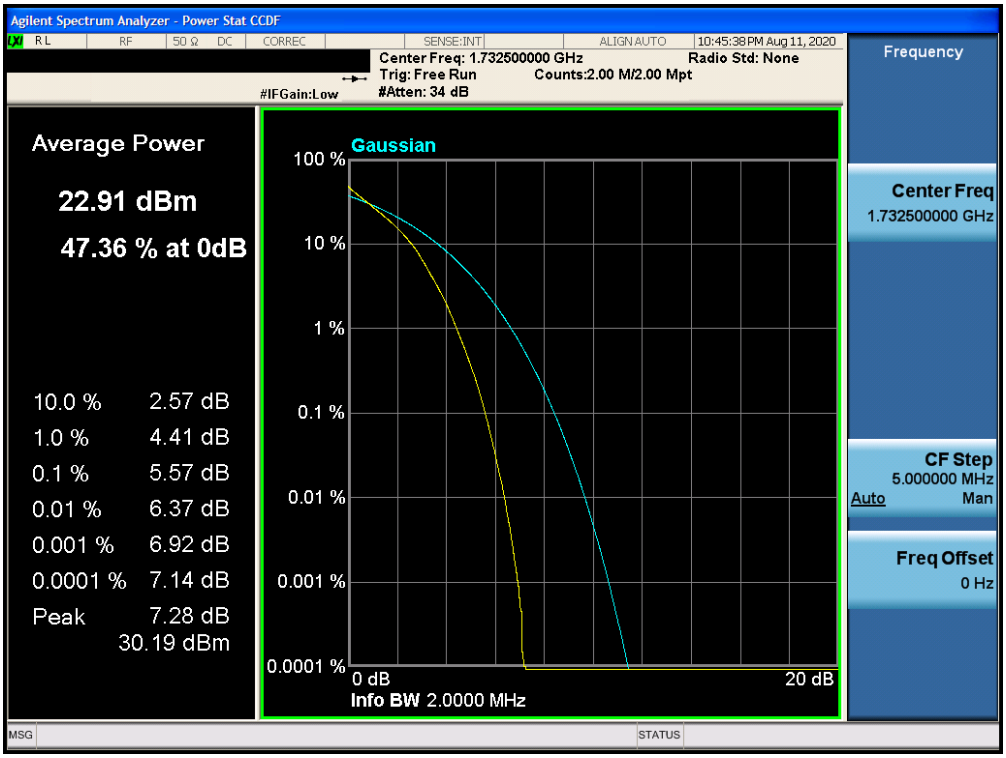
Test Notes

1. This device only supports 27RBs or less for 16-QAM uplink.
2. All RB sizes have been investigated and Full RB configuration was found and reported as worst case.

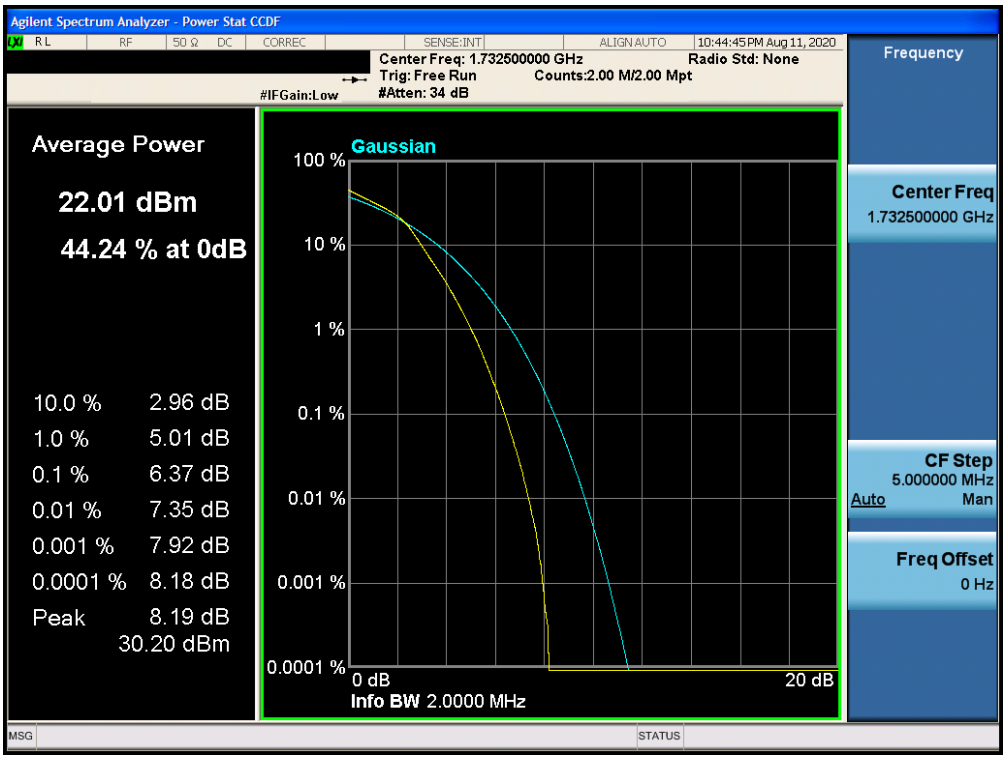
LTE	BW (MHz)	Modulation	Average Power [dBm]	PAR at 0.1% [dB]	Limit [dB]	Margin [dB]
Band 4	1.4	QPSK	22.91	5.57	13	-7.43
Band 4	1.4	16QAM	22.01	6.37	13	-6.63
Band 4	3	QPSK	22.92	5.64	13	-7.36
Band 4	3	16QAM	21.96	6.48	13	-6.52
Band 4	5	QPSK	23.06	5.62	13	-7.38
Band 4	5	16QAM	22.07	6.39	13	-6.61
Band 4	10	QPSK	23.16	5.58	13	-7.42
Band 4	10	16QAM	22.18	6.30	13	-6.70
Band 4	15	QPSK	23.16	5.64	13	-7.36
Band 4	15	16QAM	22.03	6.21	13	-6.79
Band 4	20	QPSK	23.33	5.30	13	-7.70
Band 4	20	16QAM	21.98	6.20	13	-6.80
Band 66	1.4	QPSK	22.99	5.44	13	-7.56
Band 66	1.4	16QAM	22.04	6.23	13	-6.77
Band 66	3	QPSK	22.99	5.62	13	-7.38
Band 66	3	16QAM	21.95	6.33	13	-6.67
Band 66	5	QPSK	22.93	5.61	13	-7.39
Band 66	5	16QAM	21.97	6.30	13	-6.70
Band 66	10	QPSK	23.01	5.57	13	-7.43
Band 66	10	16QAM	22.04	6.19	13	-6.81
Band 66	15	QPSK	23.02	5.60	13	-7.40
Band 66	15	16QAM	22.05	6.17	13	-6.83
Band 66	20	QPSK	23.22	5.41	13	-7.59
Band 66	20	16QAM	22.19	6.19	13	-6.81
Band 2	1.4	QPSK	23.00	5.46	13	-7.54
Band 2	1.4	16QAM	22.13	6.27	13	-6.73
Band 2	3	QPSK	23.01	5.63	13	-7.37
Band 2	3	16QAM	22.02	6.43	13	-6.57
Band 2	5	QPSK	23.00	5.65	13	-7.35
Band 2	5	16QAM	22.01	6.38	13	-6.62
Band 2	10	QPSK	23.04	5.56	13	-7.44
Band 2	10	16QAM	22.12	6.28	13	-6.72
Band 2	15	QPSK	23.06	5.68	13	-7.32
Band 2	15	16QAM	21.91	6.26	13	-6.74
Band 2	20	QPSK	22.97	5.46	13	-7.54
Band 2	20	16QAM	22.03	6.24	13	-6.76
Band 25	1.4	QPSK	23.05	5.50	13	-7.50
Band 25	1.4	16QAM	22.11	6.22	13	-6.78
Band 25	3	QPSK	23.02	5.68	13	-7.32
Band 25	3	16QAM	21.91	6.54	13	-6.46
Band 25	5	QPSK	23.13	5.60	13	-7.40
Band 25	5	16QAM	22.15	6.30	13	-6.70
Band 25	10	QPSK	23.07	5.52	13	-7.48
Band 25	10	16QAM	22.08	6.26	13	-6.74
Band 25	15	QPSK	23.20	5.71	13	-7.29
Band 25	15	16QAM	22.20	6.22	13	-6.78
Band 25	20	QPSK	23.30	5.40	13	-7.60
Band 25	20	16QAM	22.28	6.18	13	-6.82

Table 7-6. PAR Results (Mid Bands)

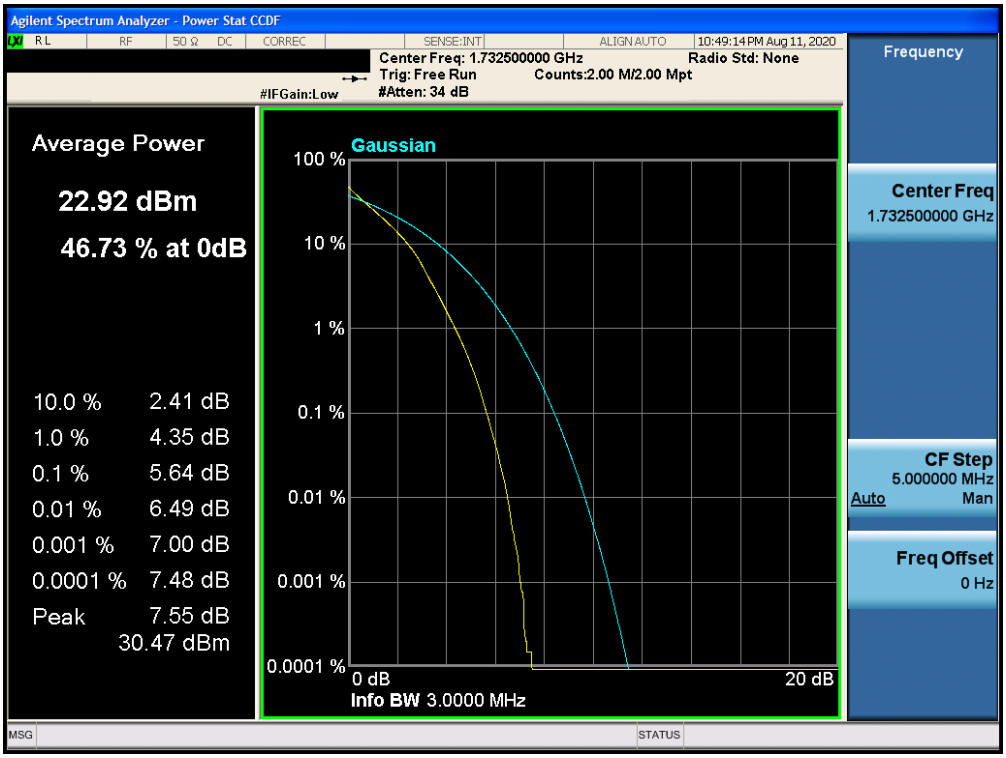
Band 4



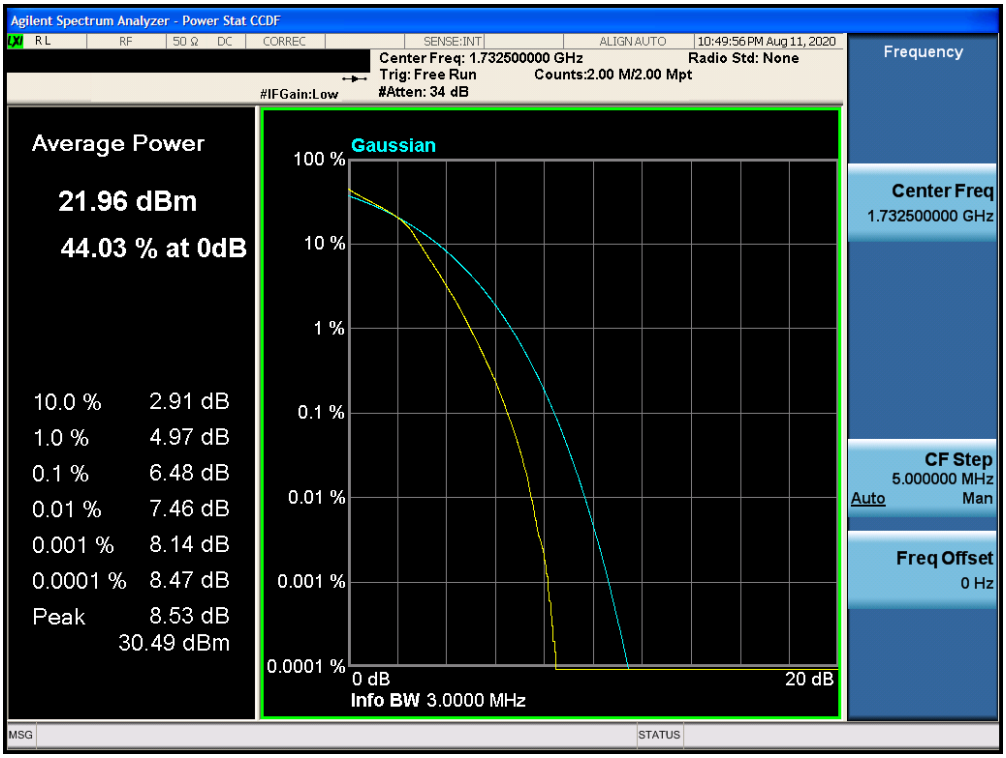
Plot 7-214. PAR Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



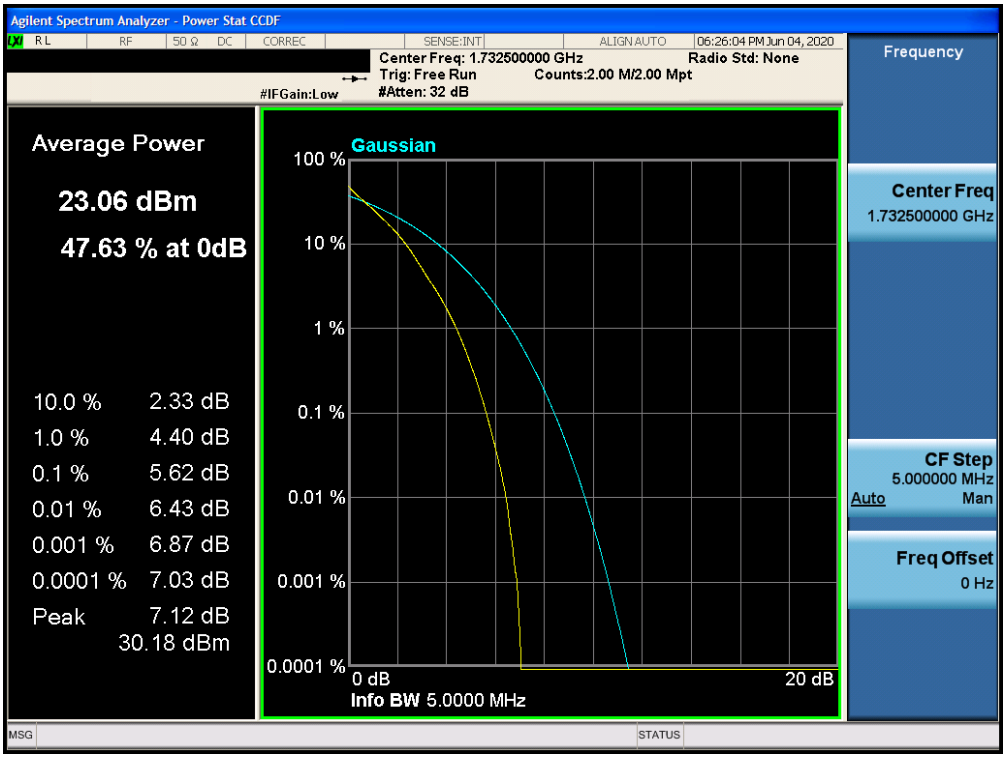
Plot 7-215. PAR Plot (Band 4 - 1.4MHz 16-QAM - Full RB Configuration)



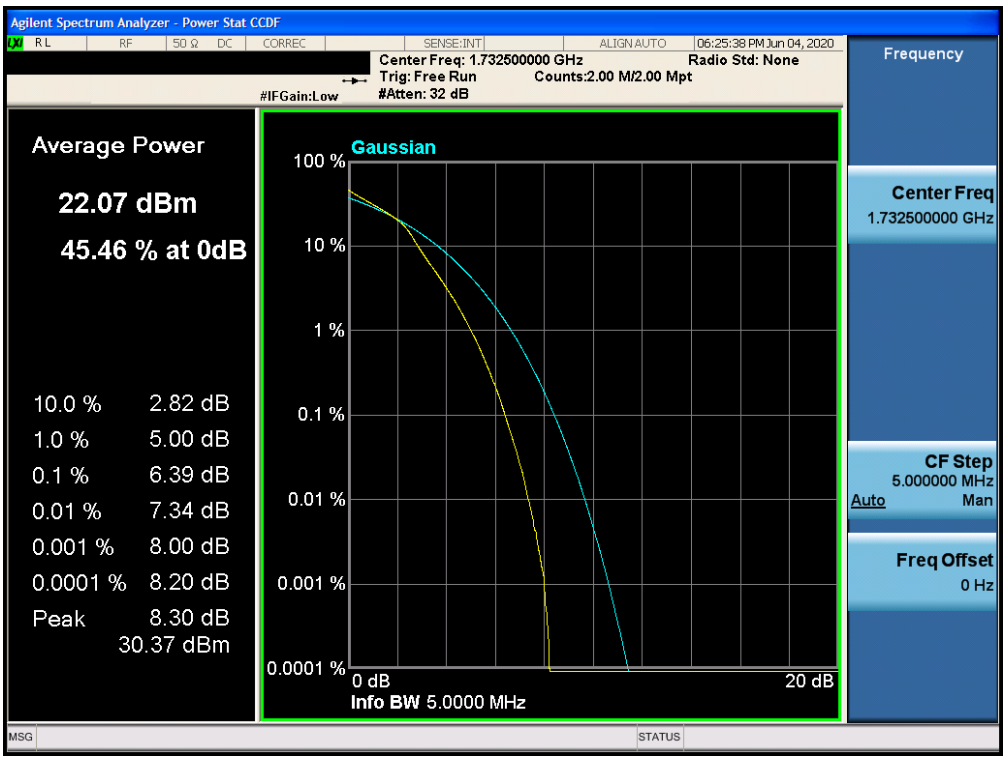
Plot 7-216. PAR Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



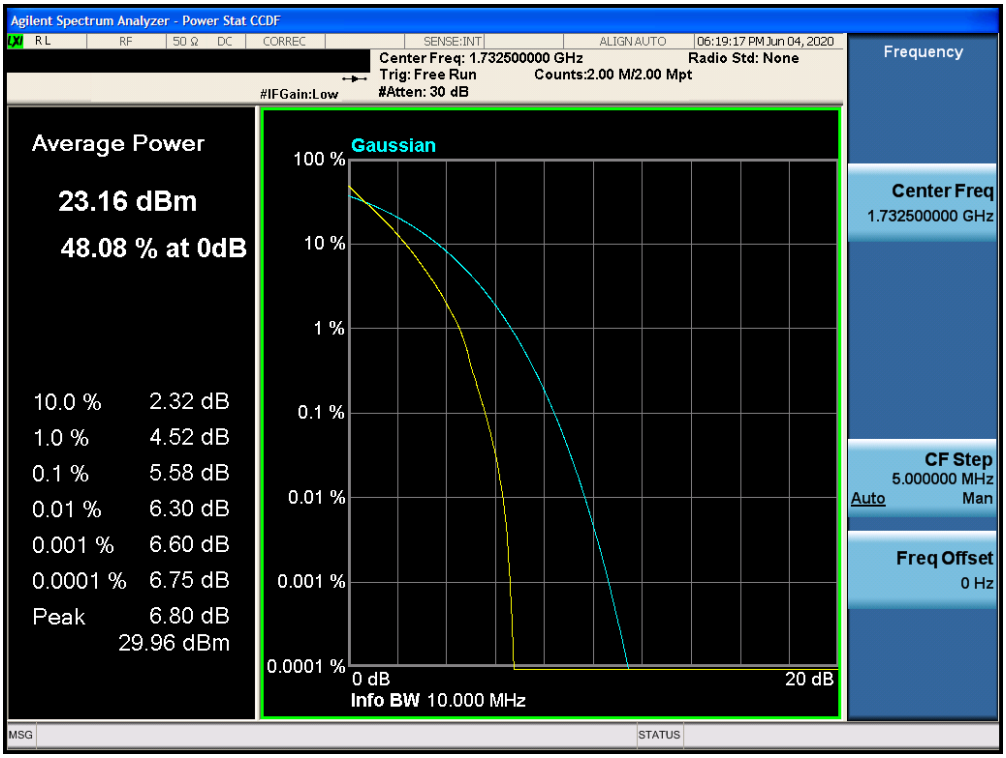
Plot 7-217. PAR Plot (Band 4 - 3.0MHz 16-QAM - Full RB Configuration)



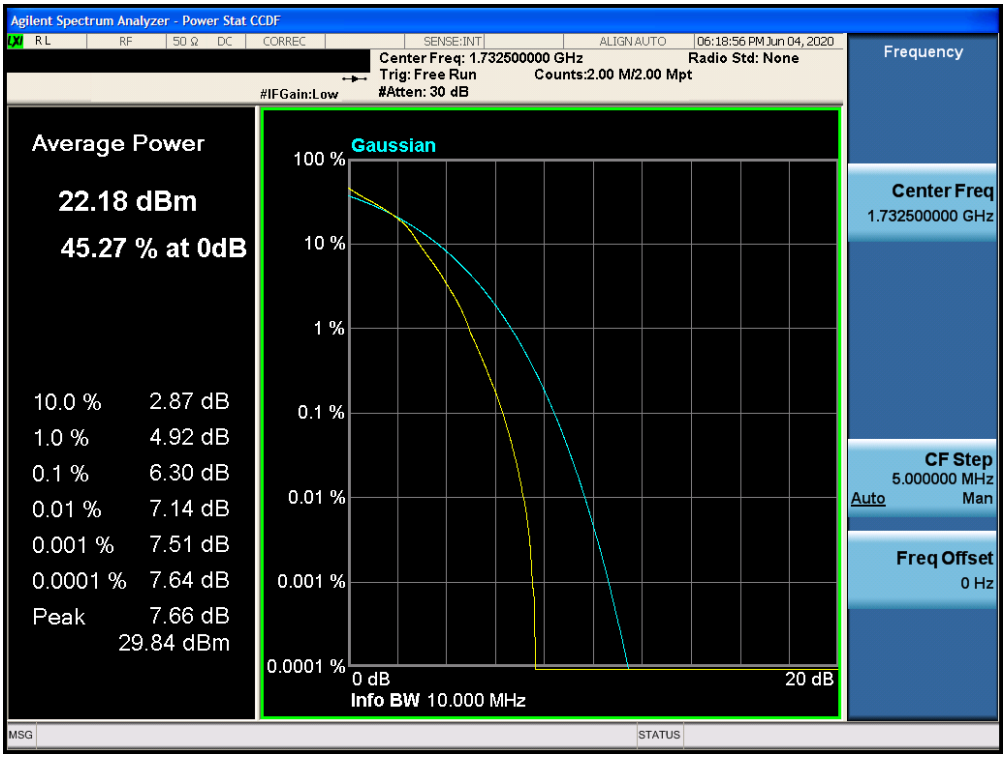
Plot 7-218. PAR Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



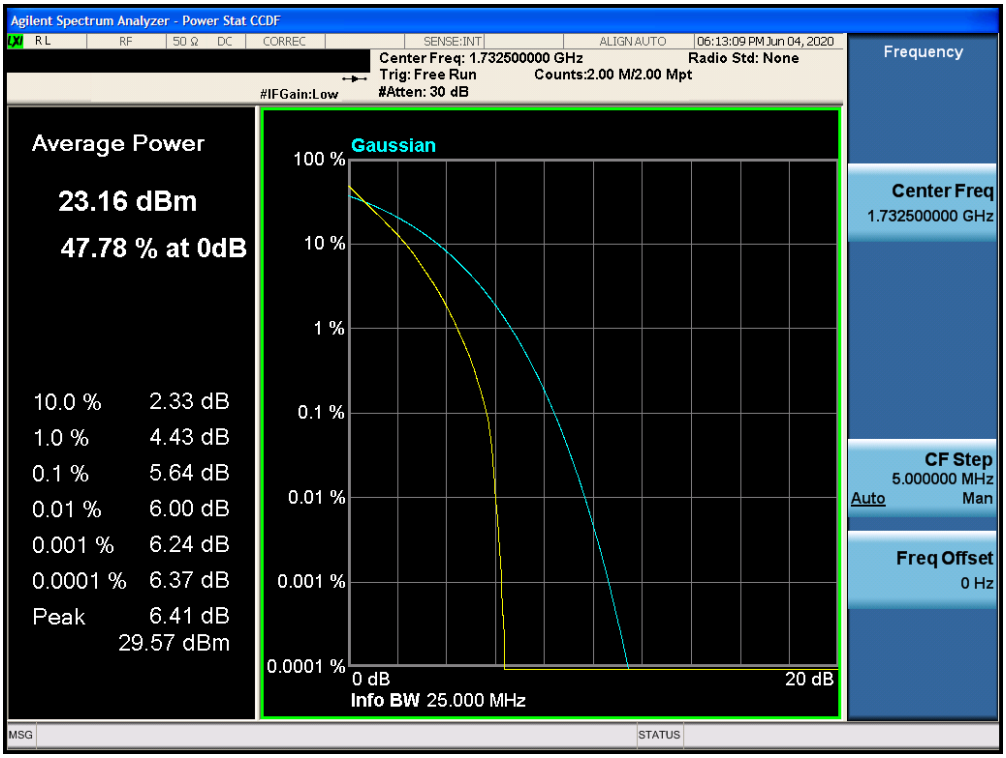
Plot 7-219. PAR Plot (Band 4 - 5.0MHz 16-QAM - Full RB Configuration)



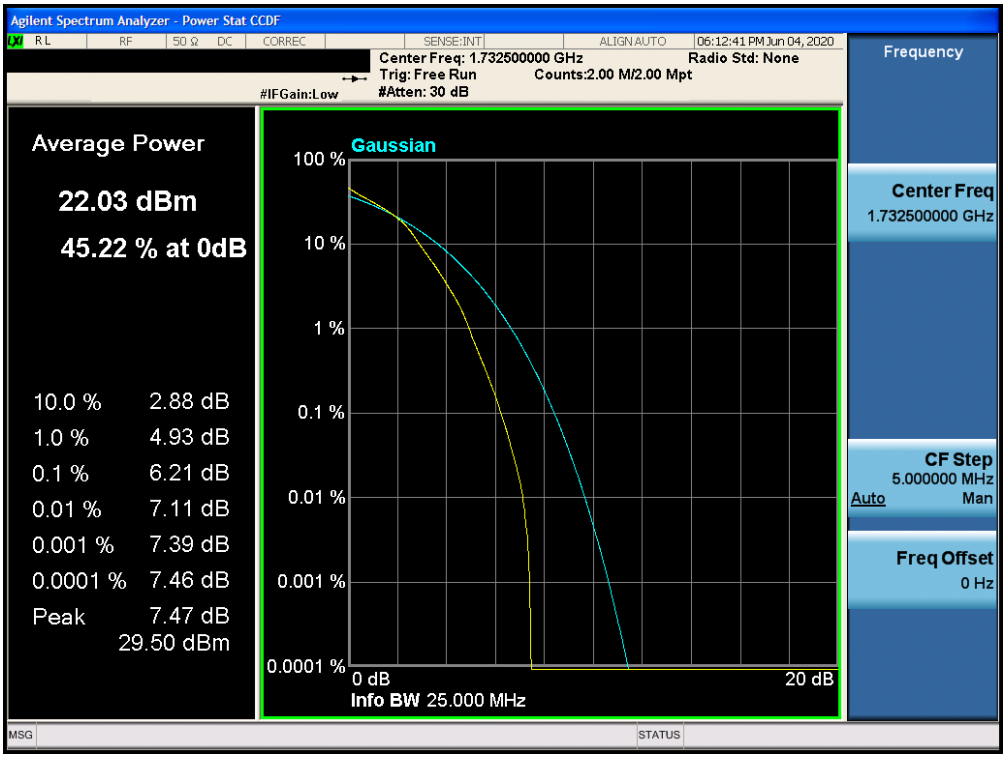
Plot 7-220. PAR Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



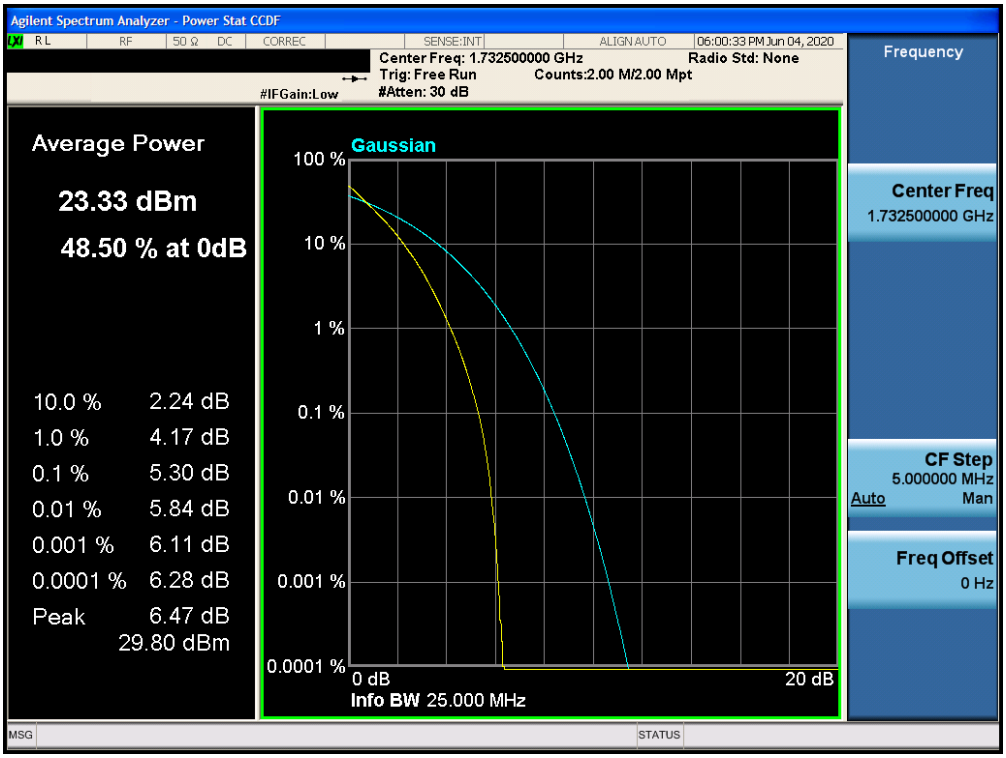
Plot 7-221. PAR Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)



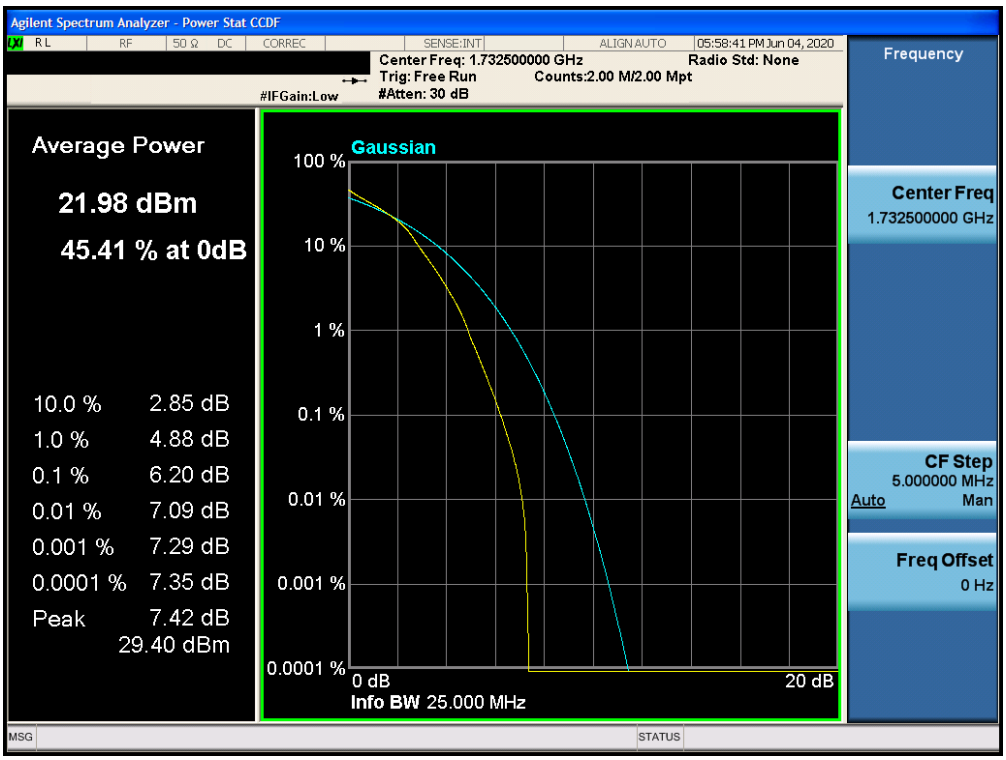
Plot 7-222. PAR Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-223. PAR Plot (Band 4 - 15.0MHz 16-QAM - Full RB Configuration)

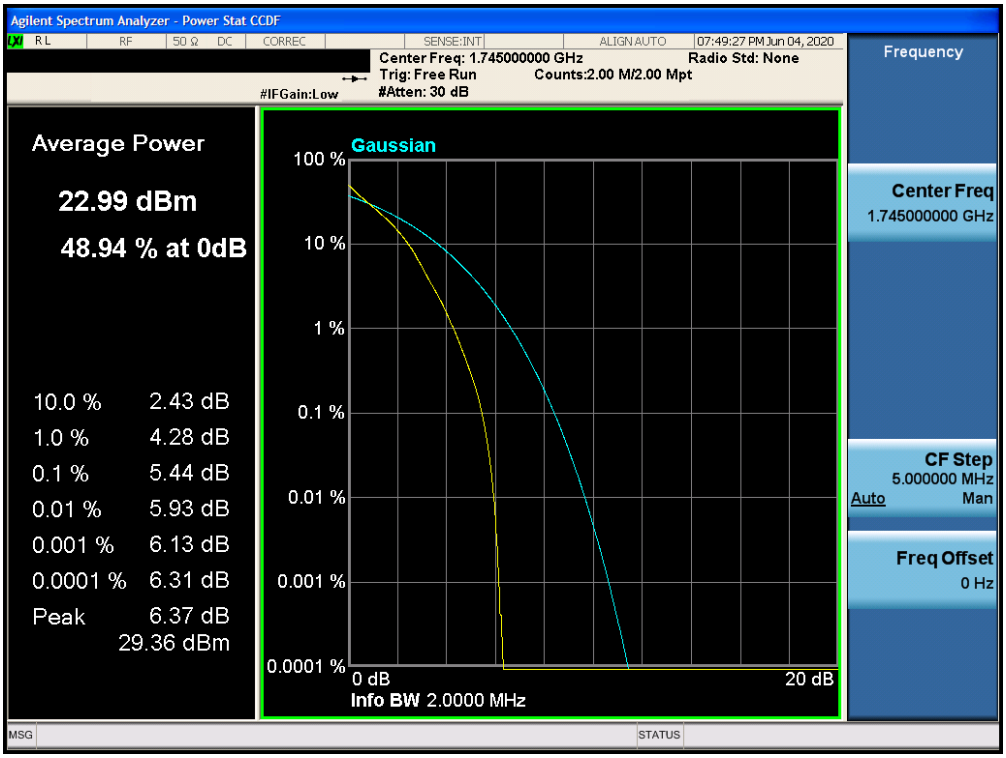


Plot 7-224. PAR Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

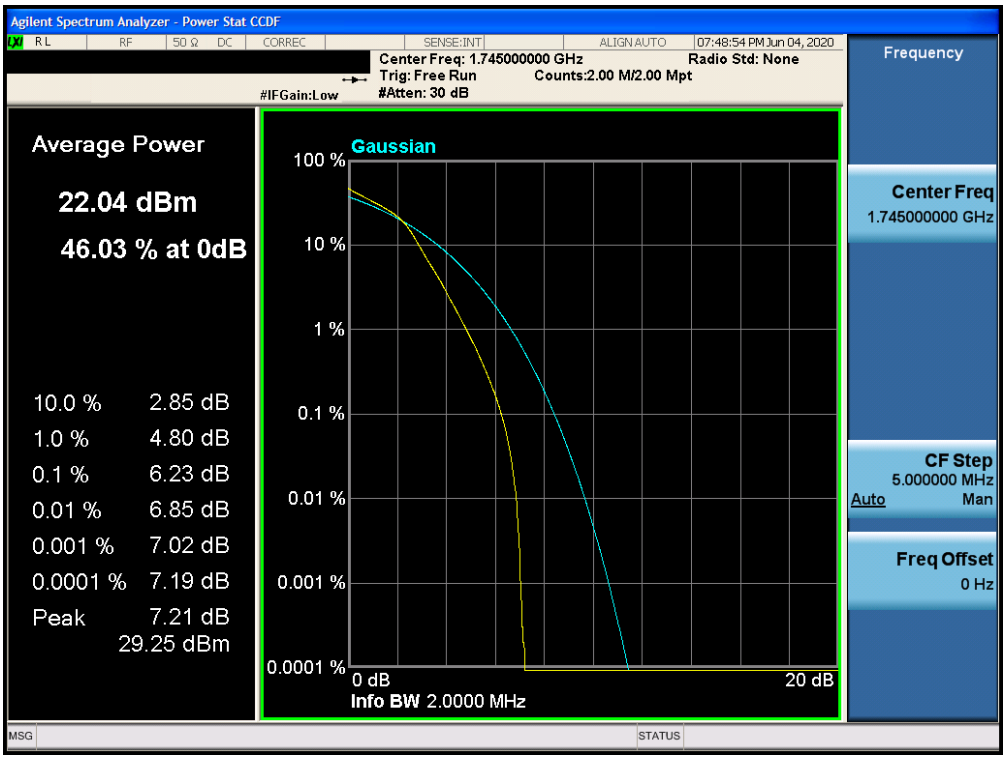


Plot 7-225. PAR Plot (Band 4 - 20.0MHz 16-QAM - Full RB Configuration)

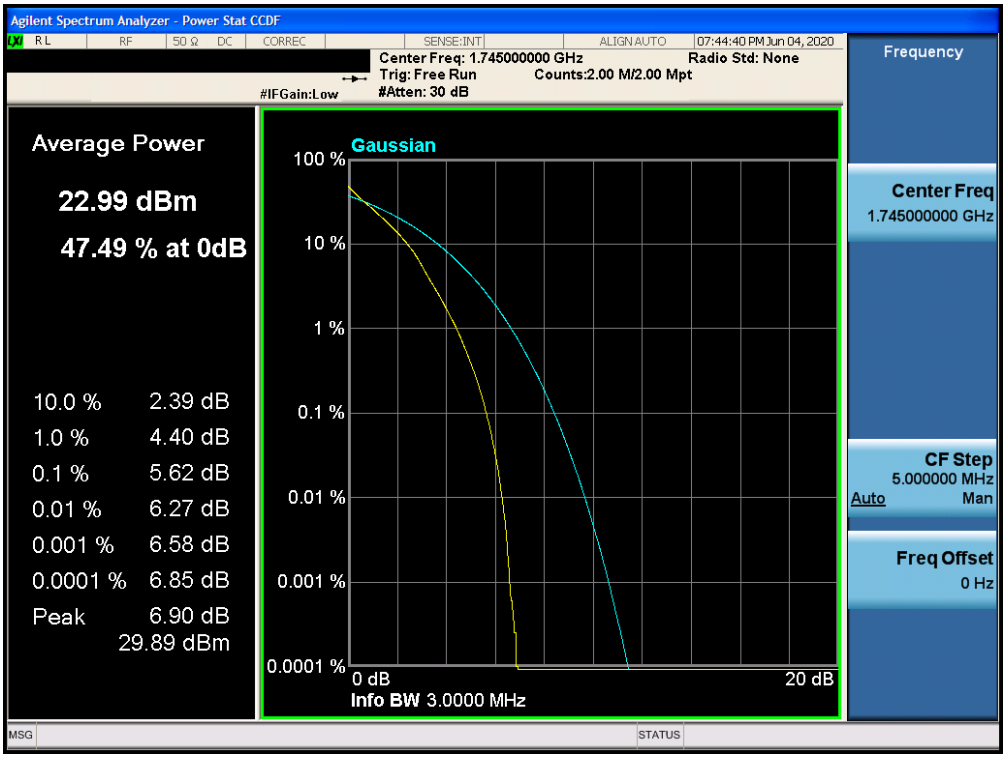
Band 66



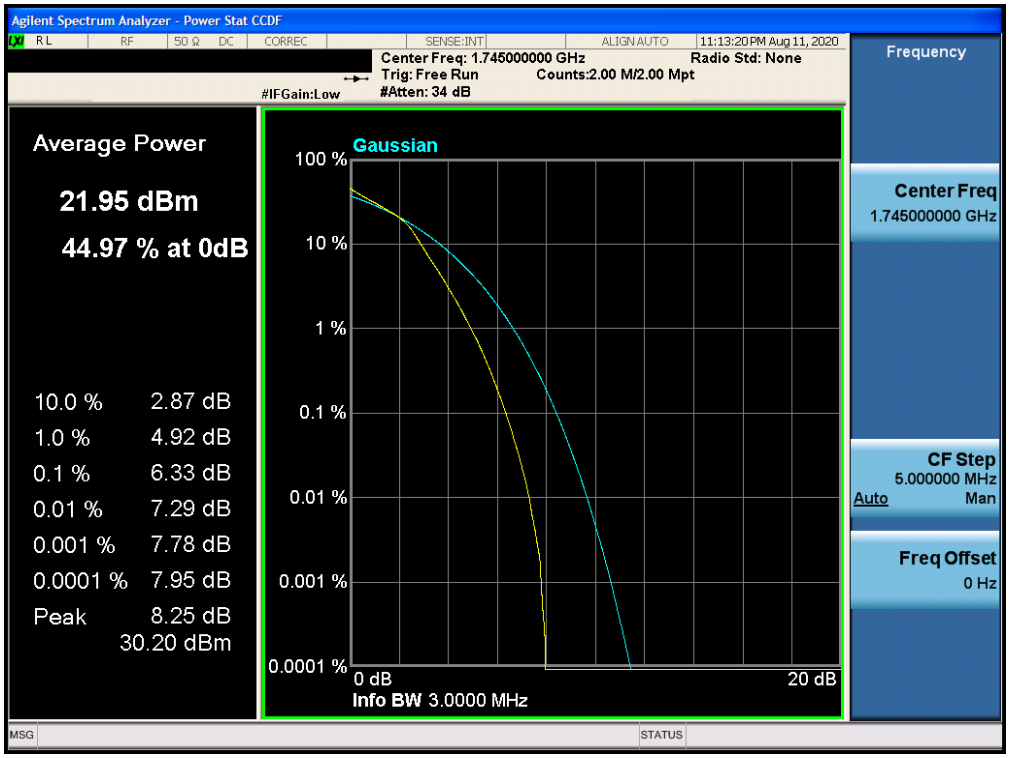
Plot 7-226. PAR Plot (Band 66 - 1.4MHz QPSK - Full RB Configuration)



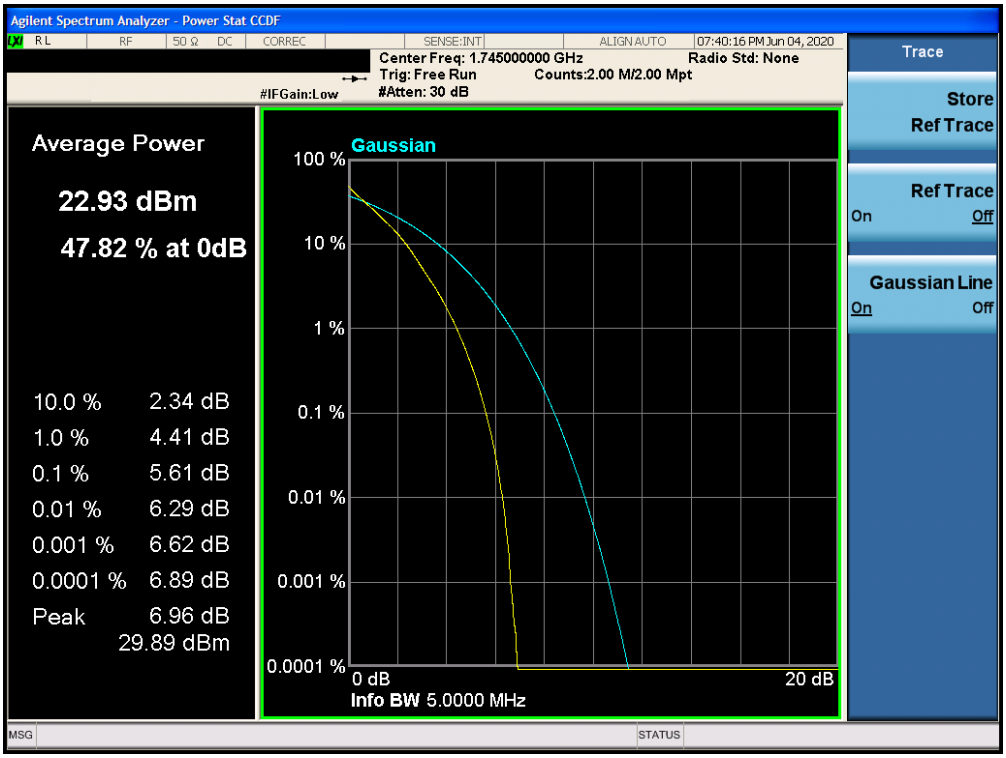
Plot 7-227. PAR Plot (Band 66 - 1.4MHz 16-QAM - Full RB Configuration)



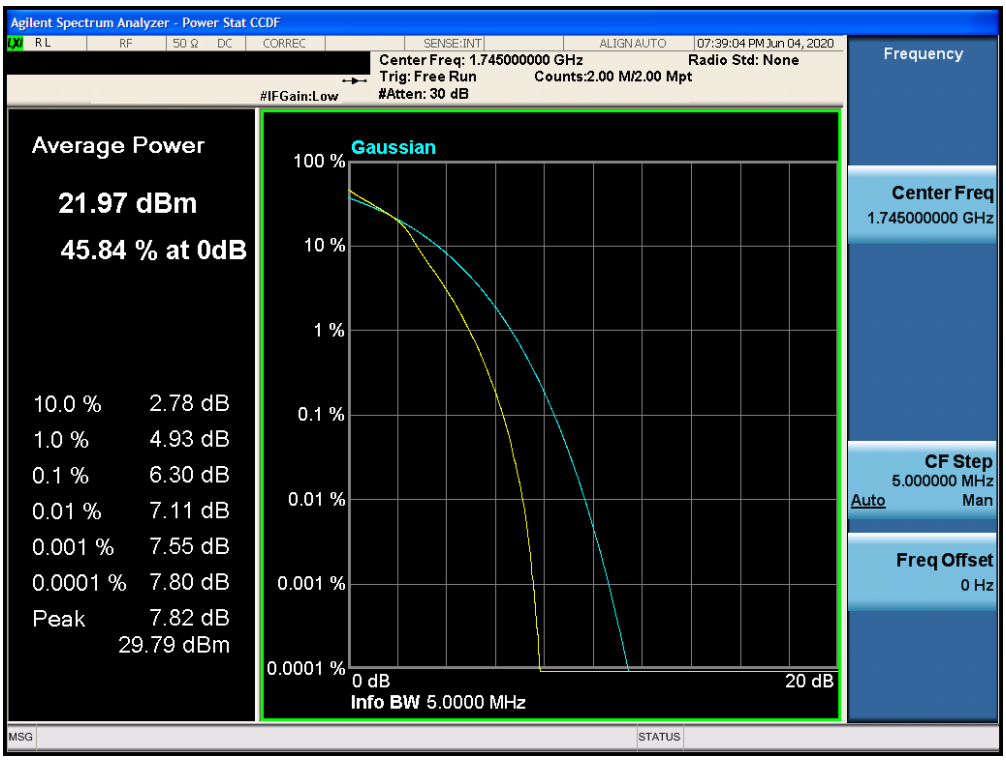
Plot 7-228. PAR Plot (Band 66 - 3.0MHz QPSK - Full RB Configuration)



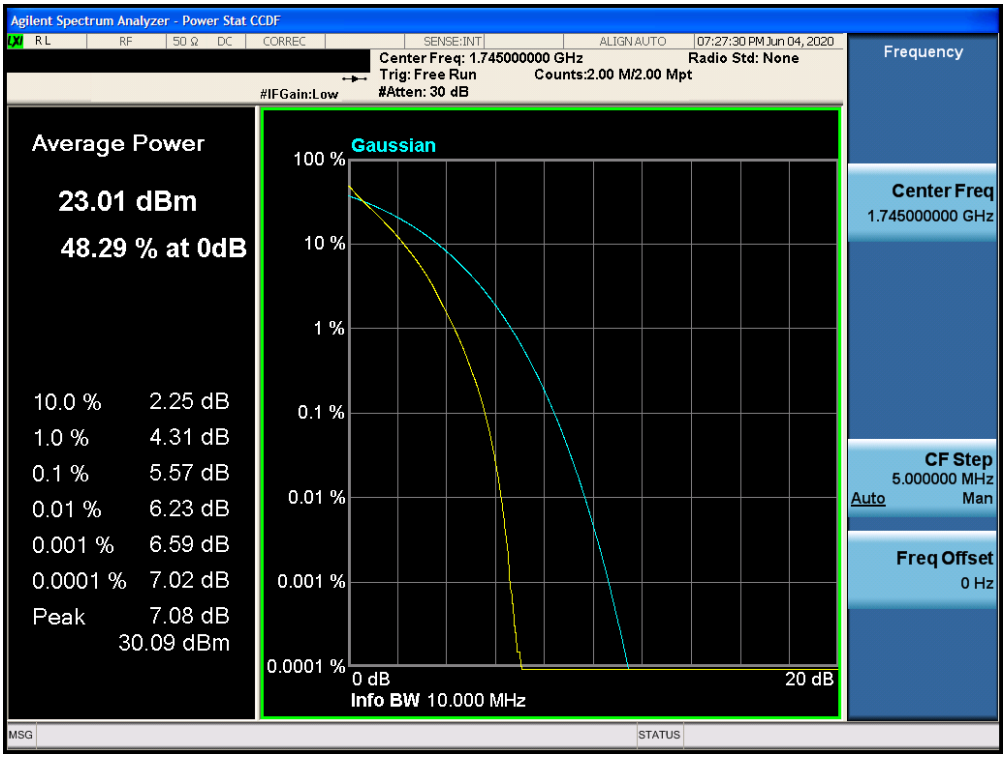
Plot 7-229. PAR Plot (Band 66 - 3.0MHz 16-QAM - Full RB Configuration)



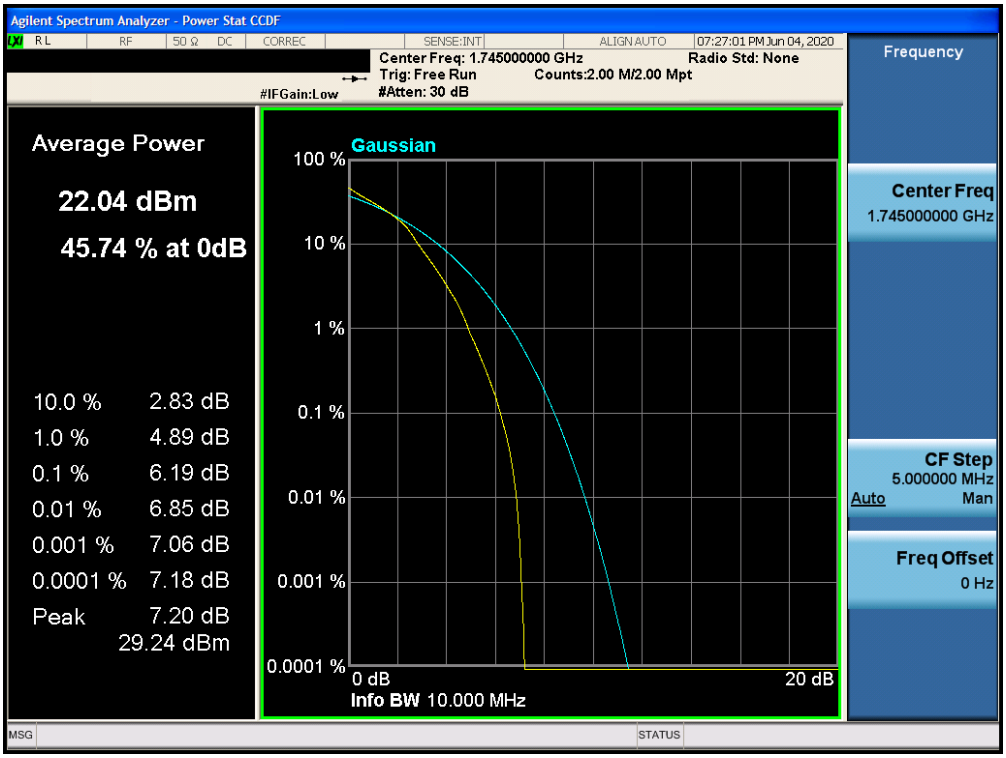
Plot 7-230. PAR Plot (Band 66 - 5.0MHz QPSK - Full RB Configuration)



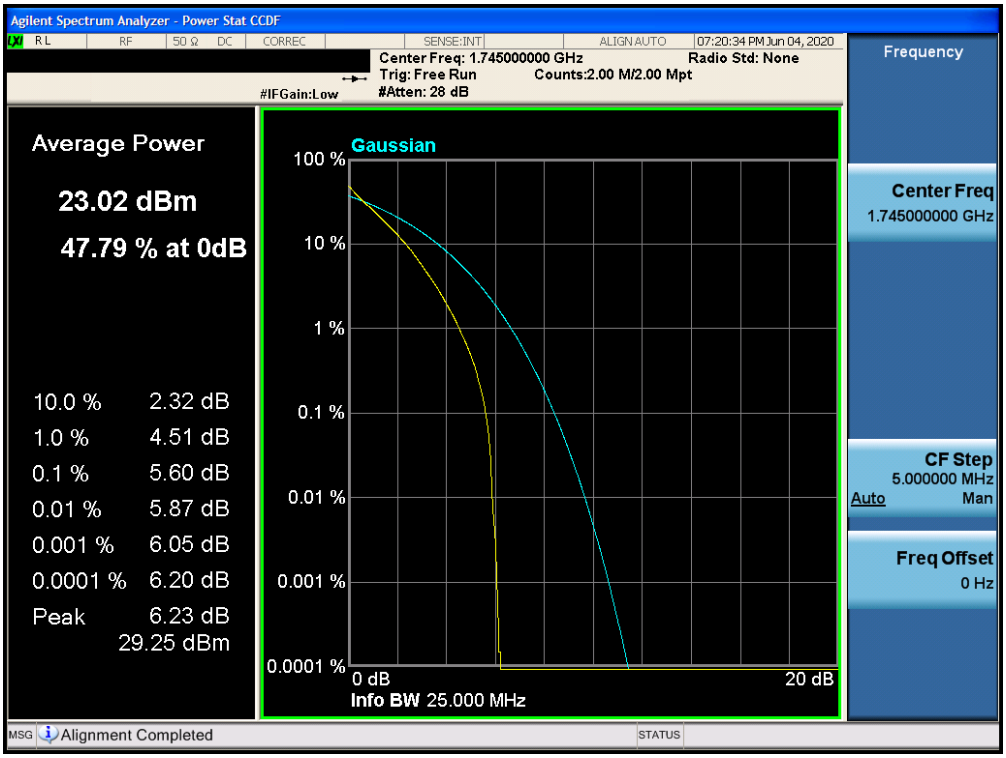
Plot 7-231. PAR Plot (Band 66 - 5.0MHz 16-QAM - Full RB Configuration)



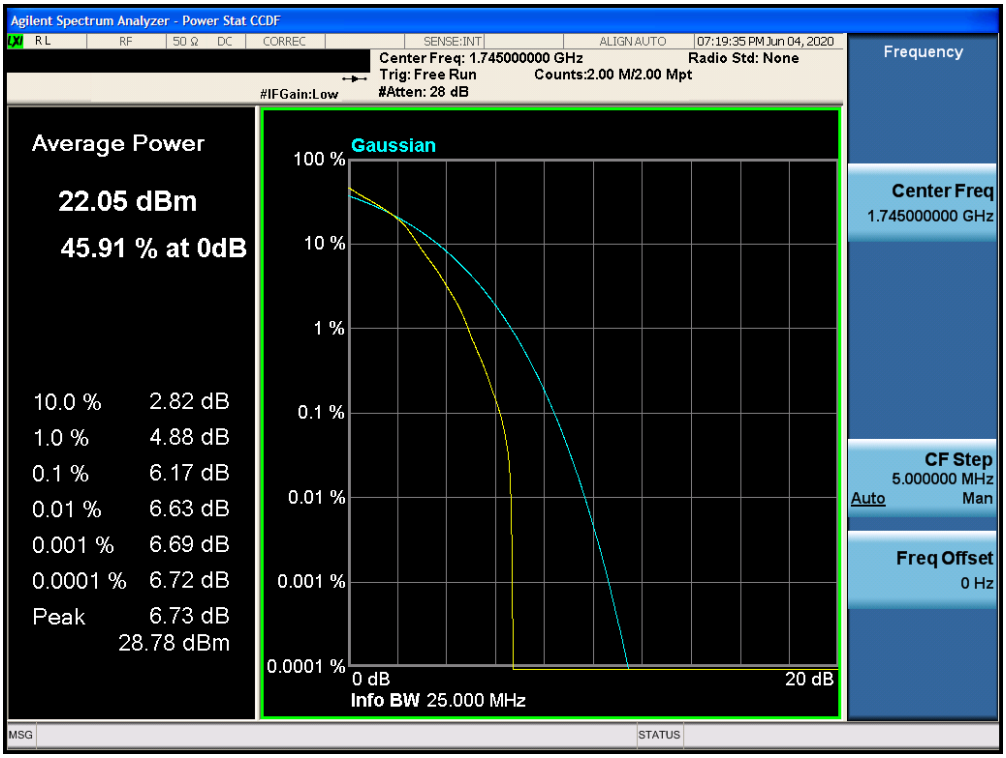
Plot 7-232. PAR Plot (Band 66 - 10.0MHz QPSK - Full RB Configuration)



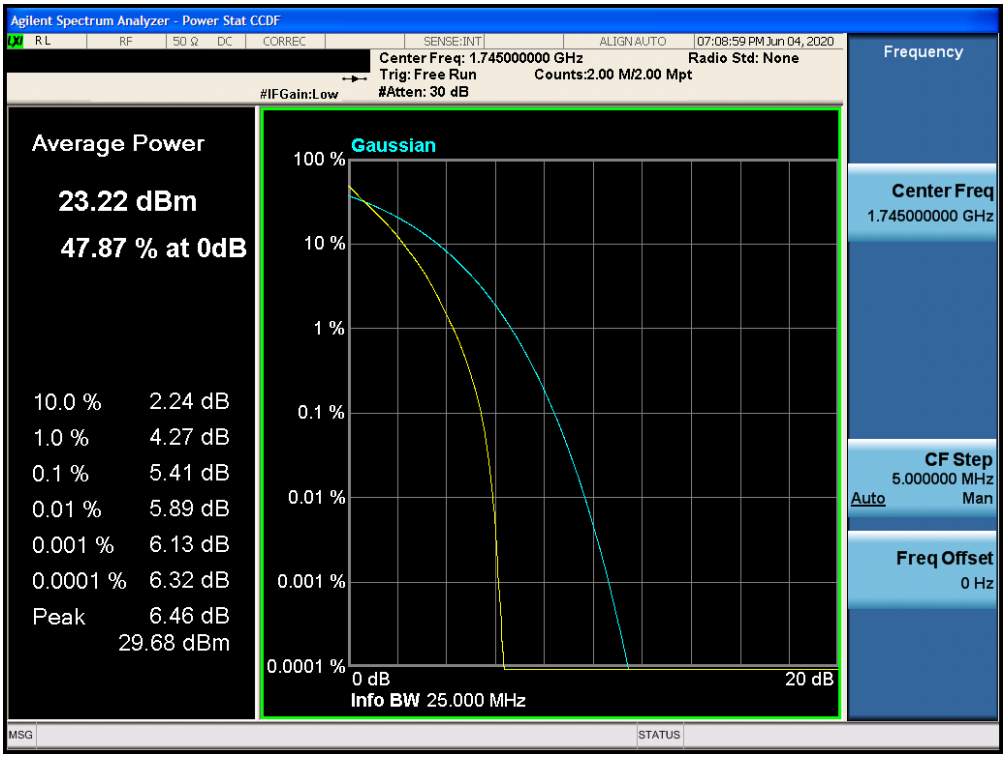
Plot 7-233. PAR Plot (Band 66 - 10.0MHz 16-QAM - Full RB Configuration)



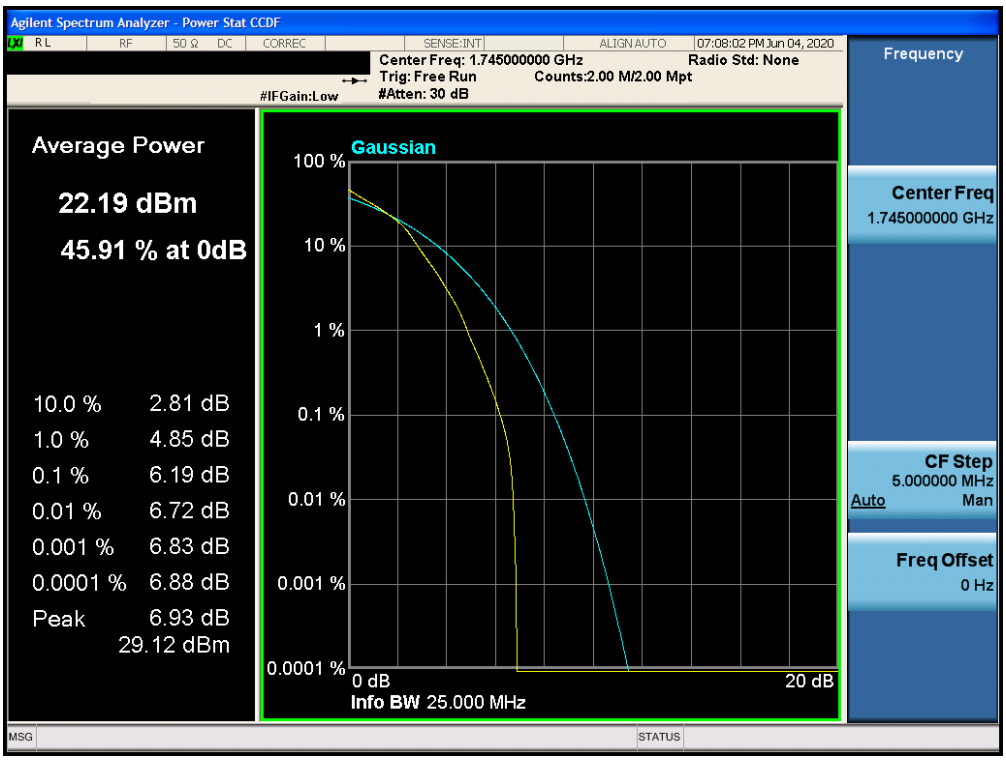
Plot 7-234. PAR Plot (Band 66 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-235. PAR Plot (Band 66 - 15.0MHz 16-QAM - Full RB Configuration)

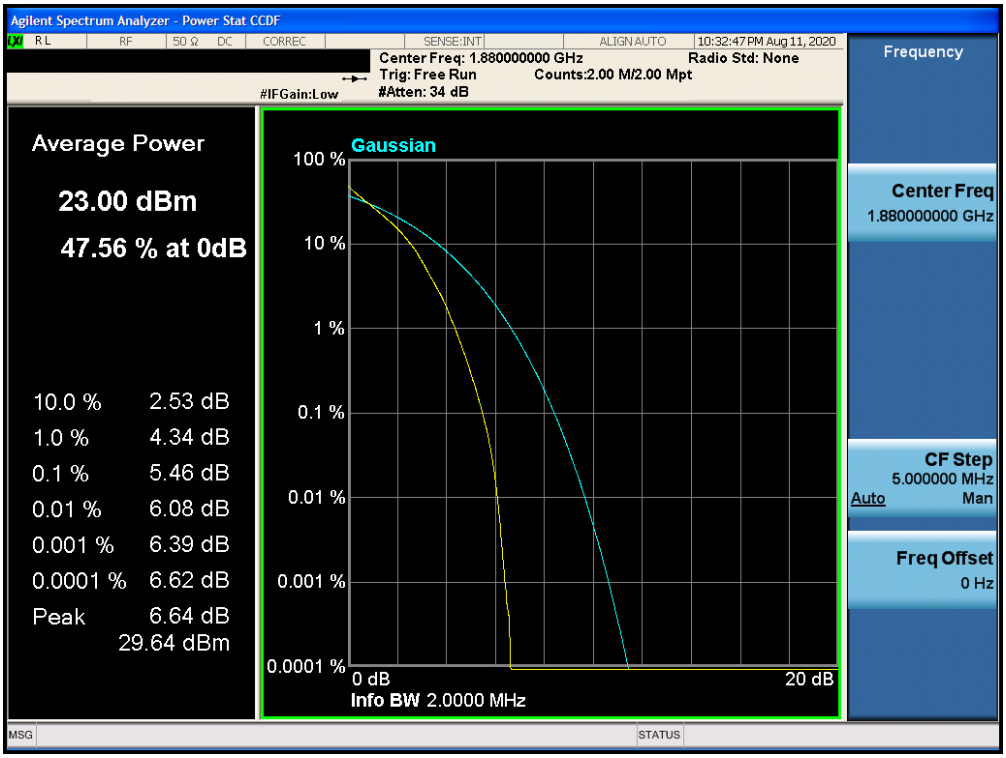


Plot 7-236. PAR Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)

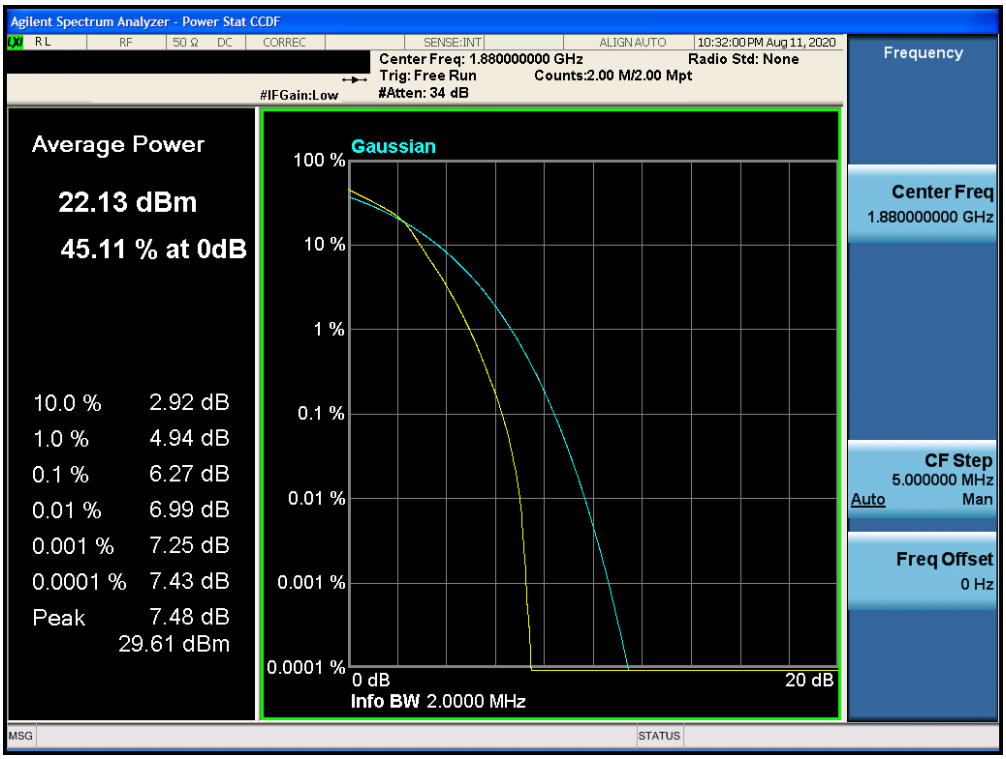


Plot 7-237. PAR Plot (Band 66 - 20.0MHz 16-QAM - Full RB Configuration)

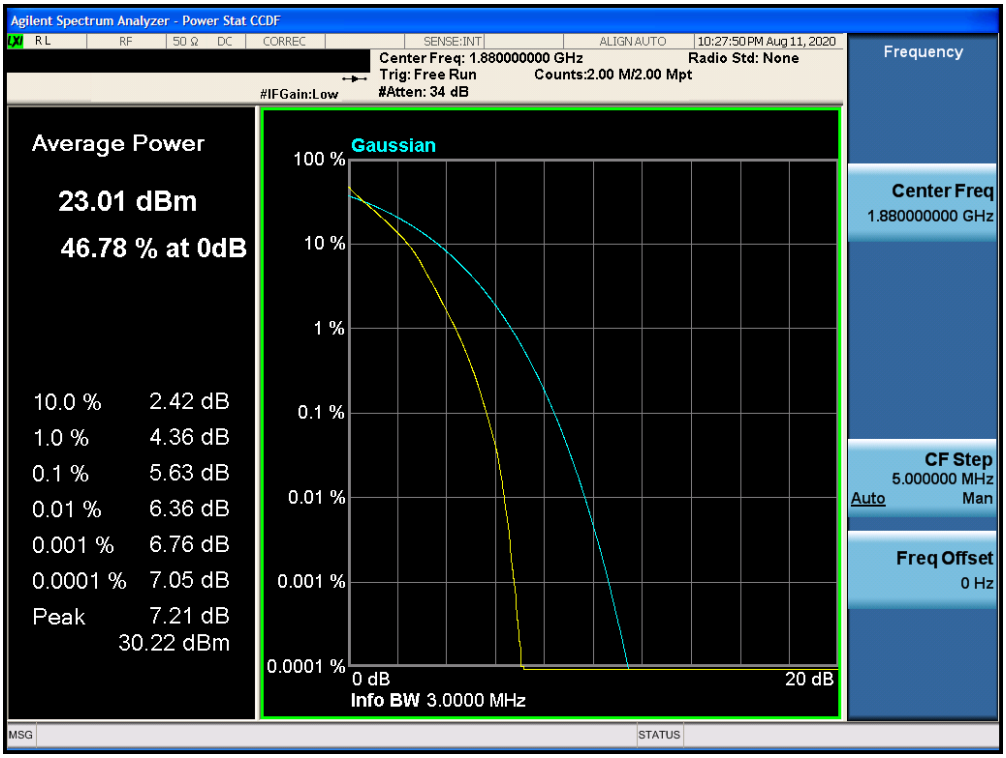
Band 2



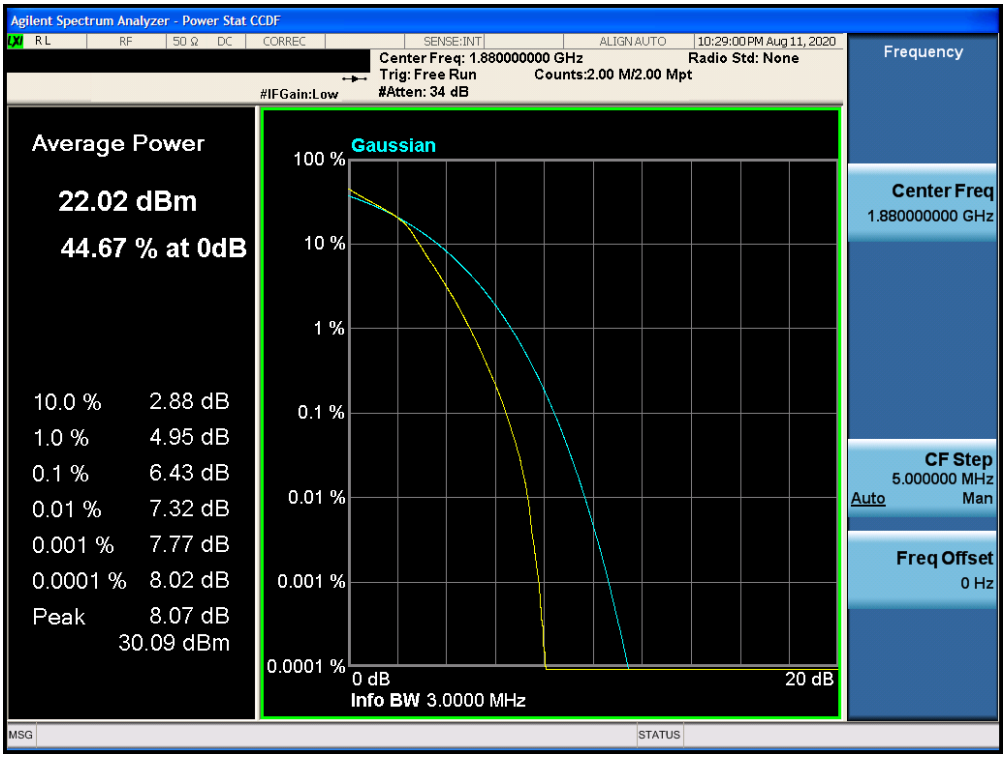
Plot 7-238. PAR Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



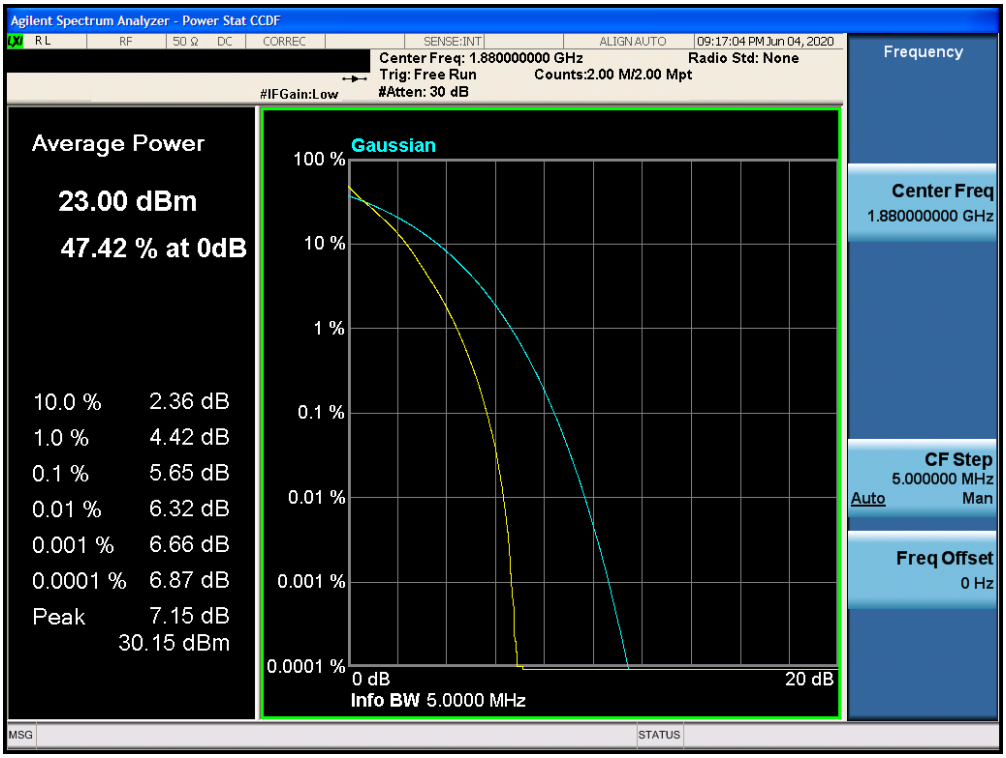
Plot 7-239. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)



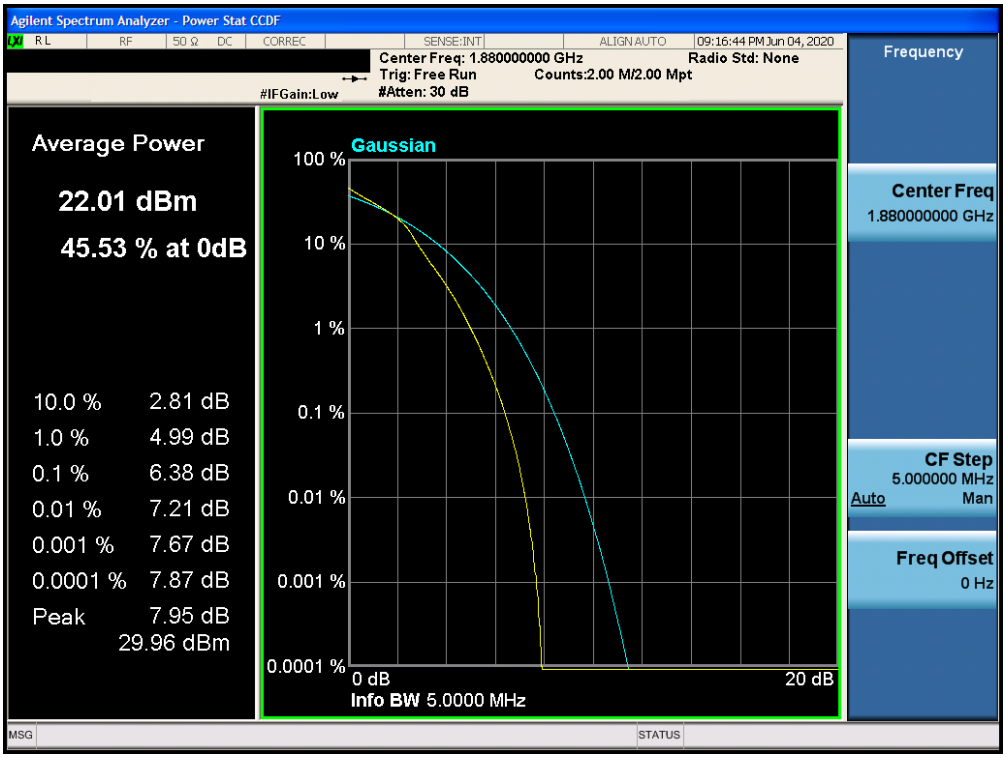
Plot 7-240. PAR Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



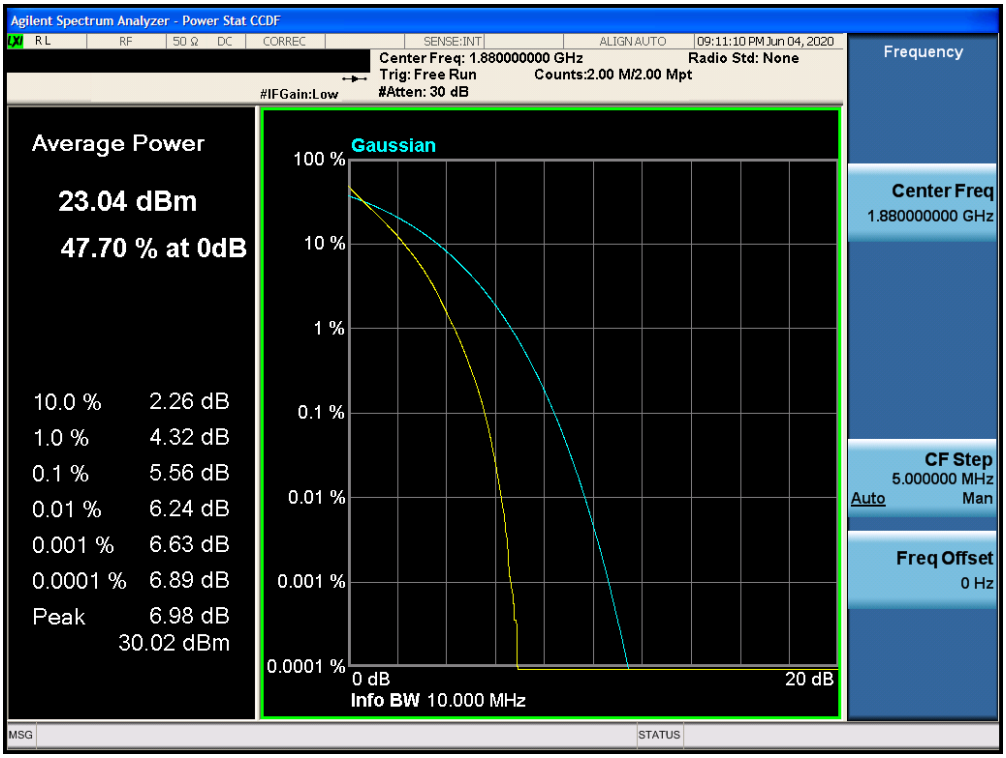
Plot 7-241. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)



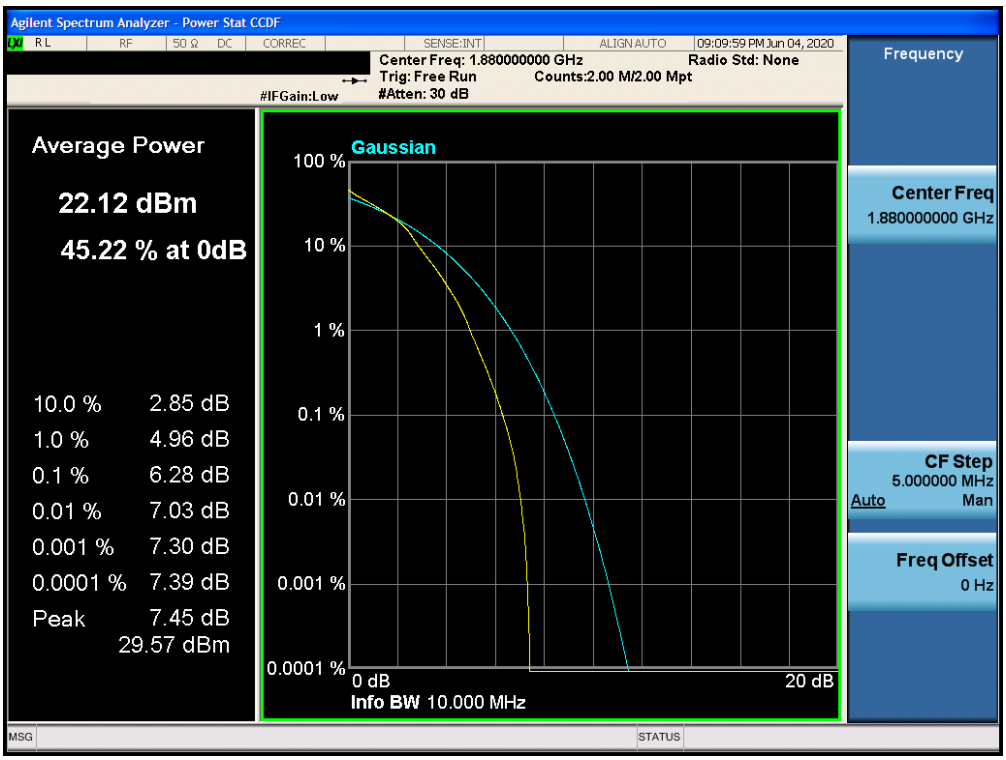
Plot 7-242. PAR Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



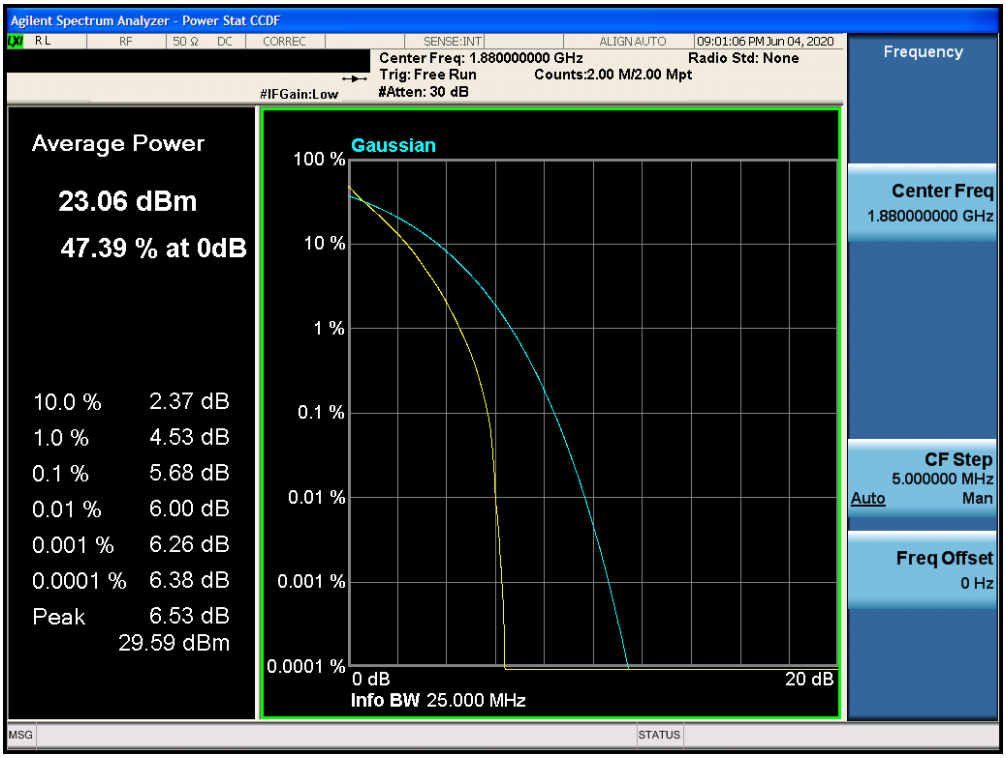
Plot 7-243. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)



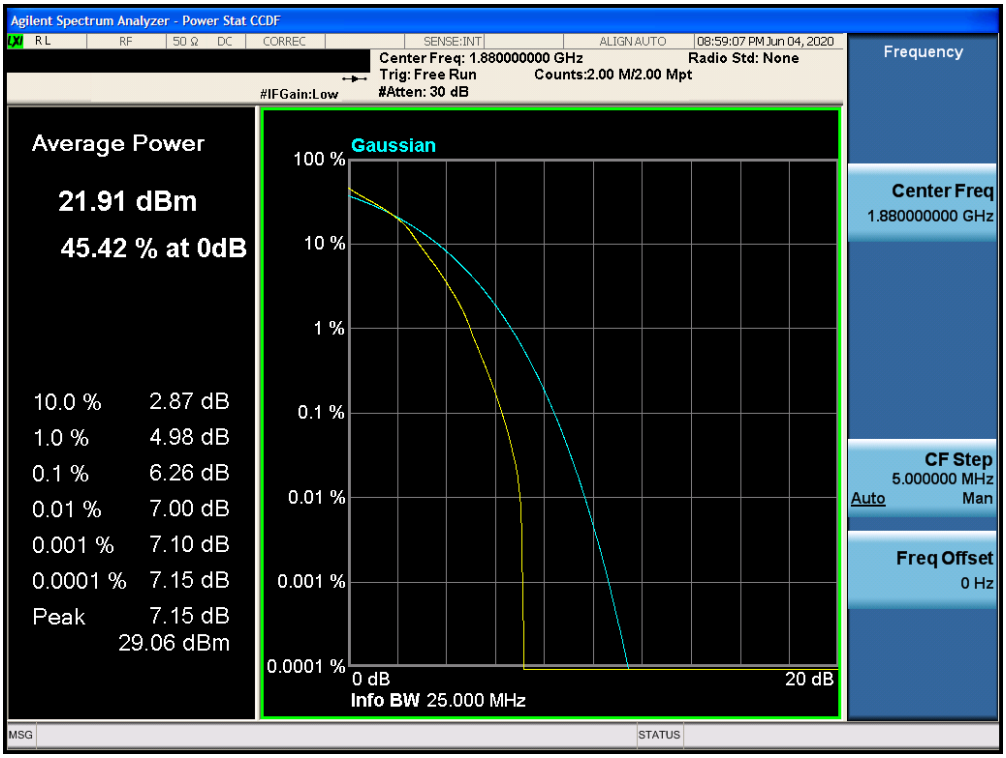
Plot 7-244. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



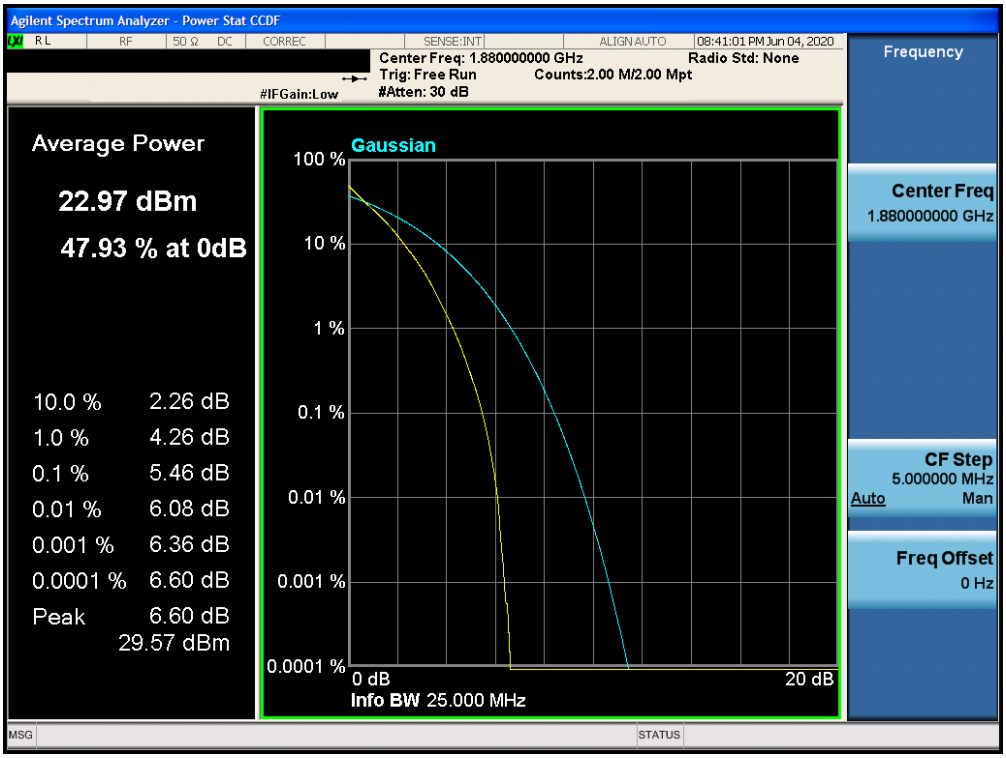
Plot 7-245. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)



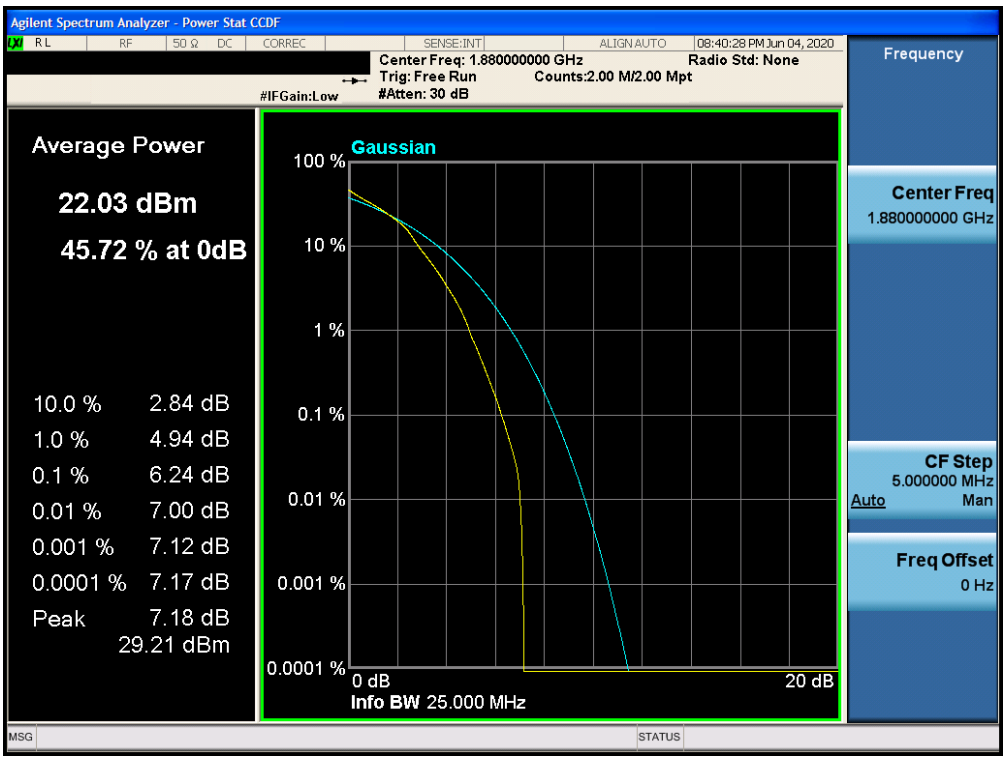
Plot 7-246. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-247. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

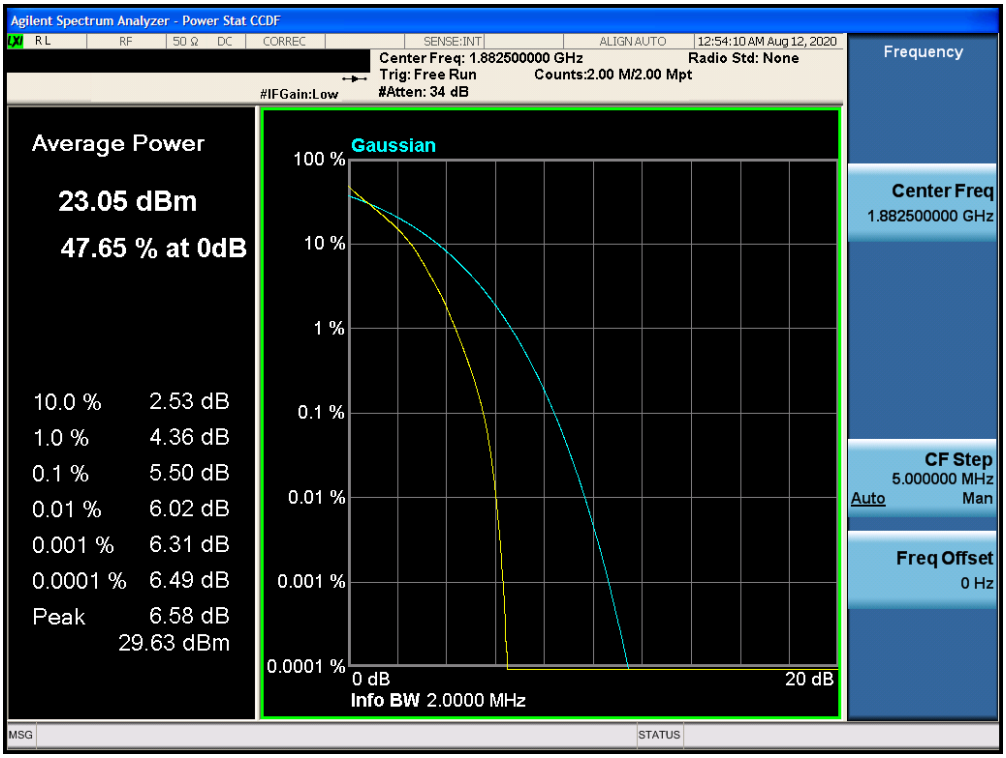


Plot 7-248. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

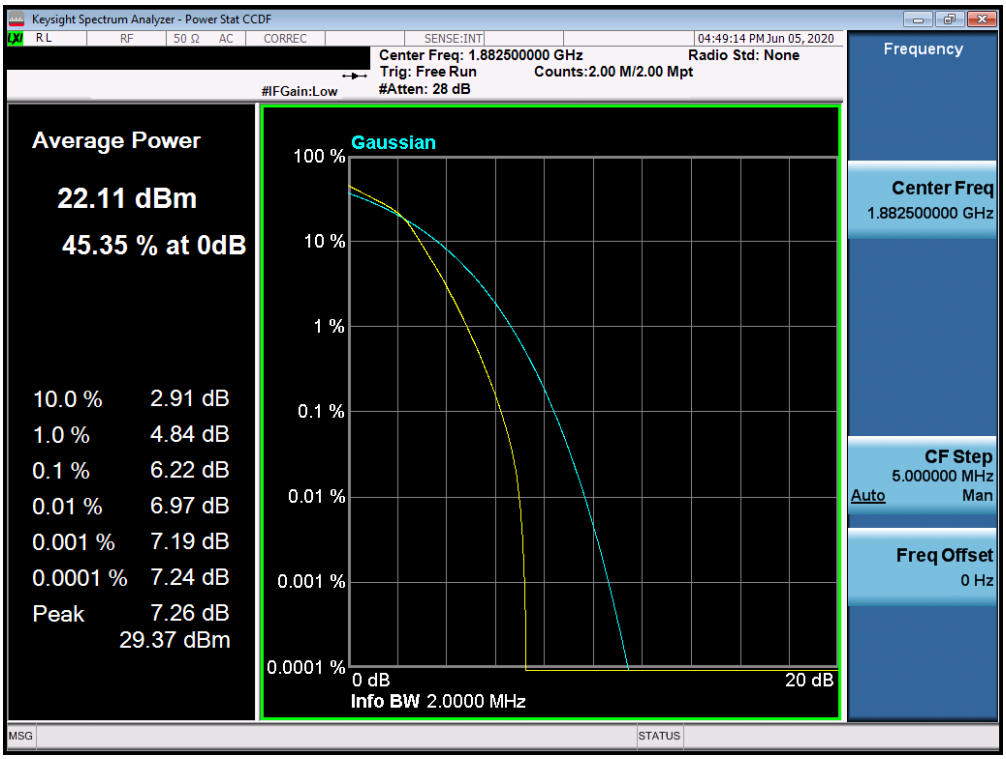


Plot 7-249. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

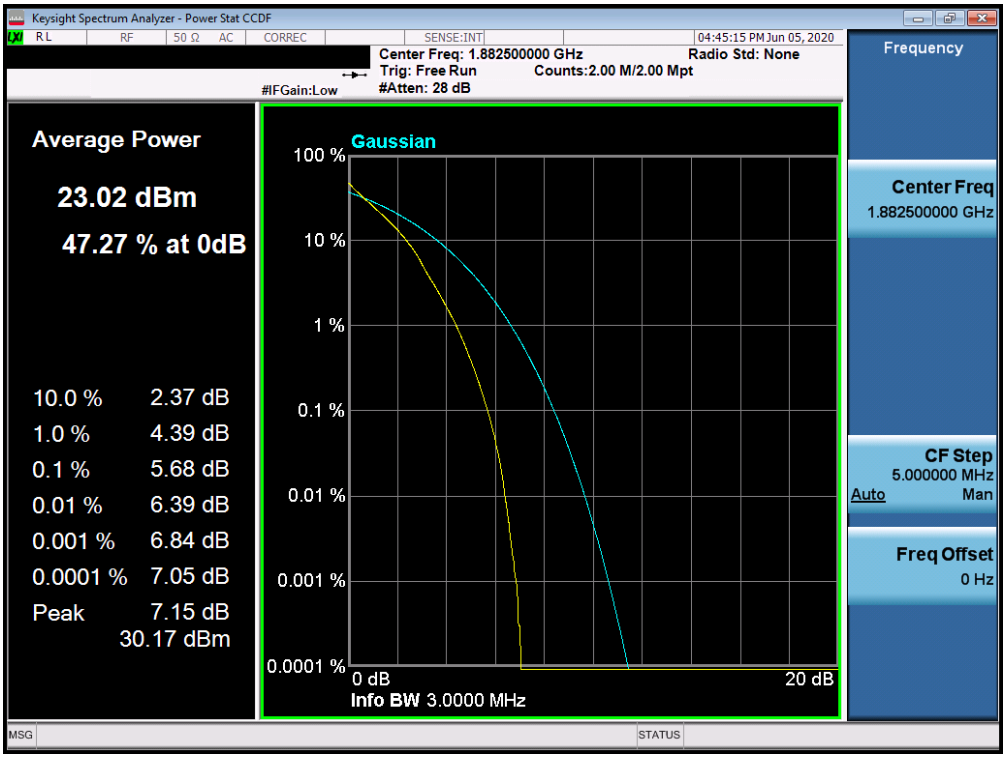
Band 25



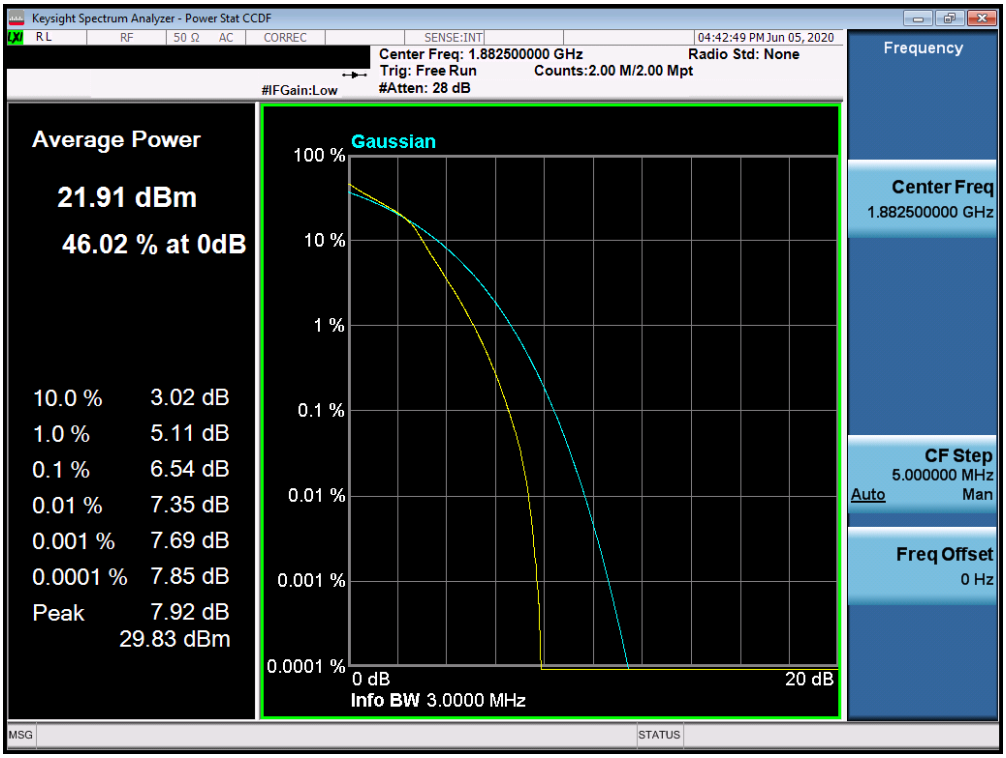
Plot 7-250. PAR Plot (Band 25 - 1.4MHz QPSK - Full RB Configuration)



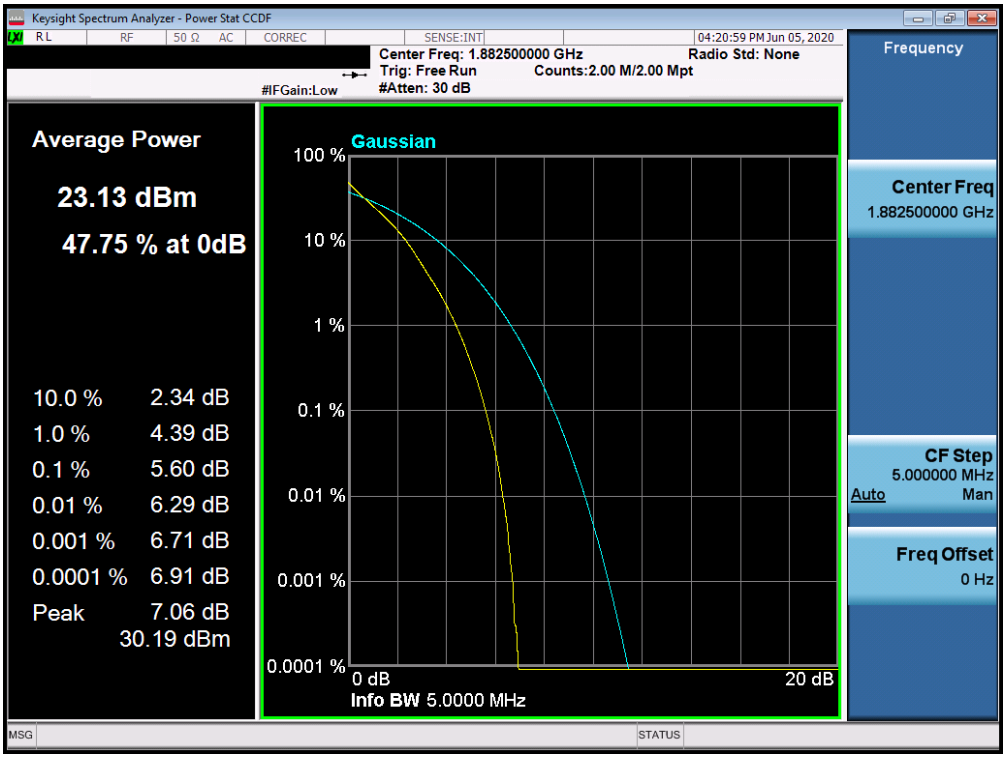
Plot 7-251. PAR Plot (Band 25 - 1.4MHz 16-QAM - Full RB Configuration)



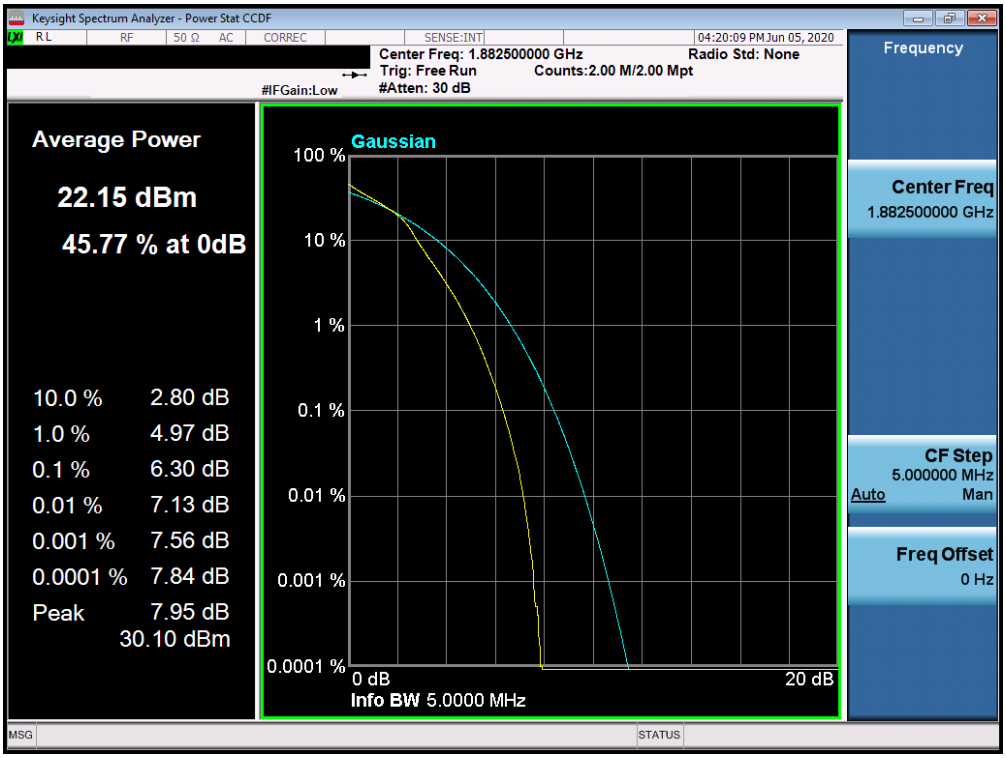
Plot 7-252. PAR Plot (Band 25 - 3.0MHz QPSK - Full RB Configuration)



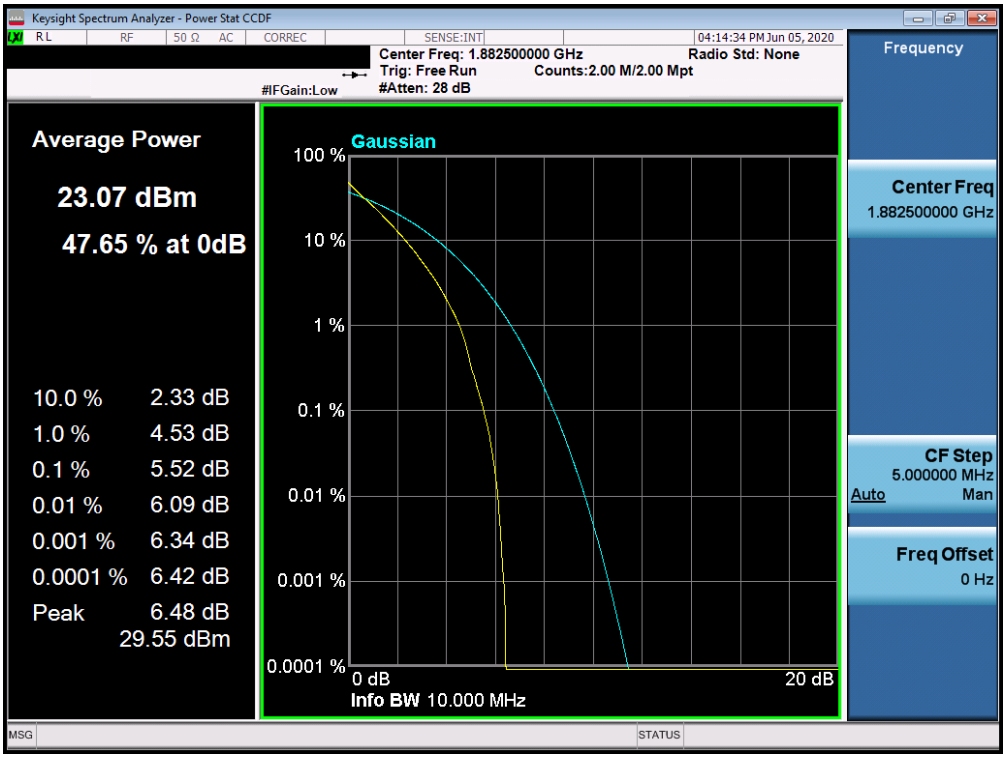
Plot 7-253. PAR Plot (Band 25 - 3.0MHz 16-QAM - Full RB Configuration)



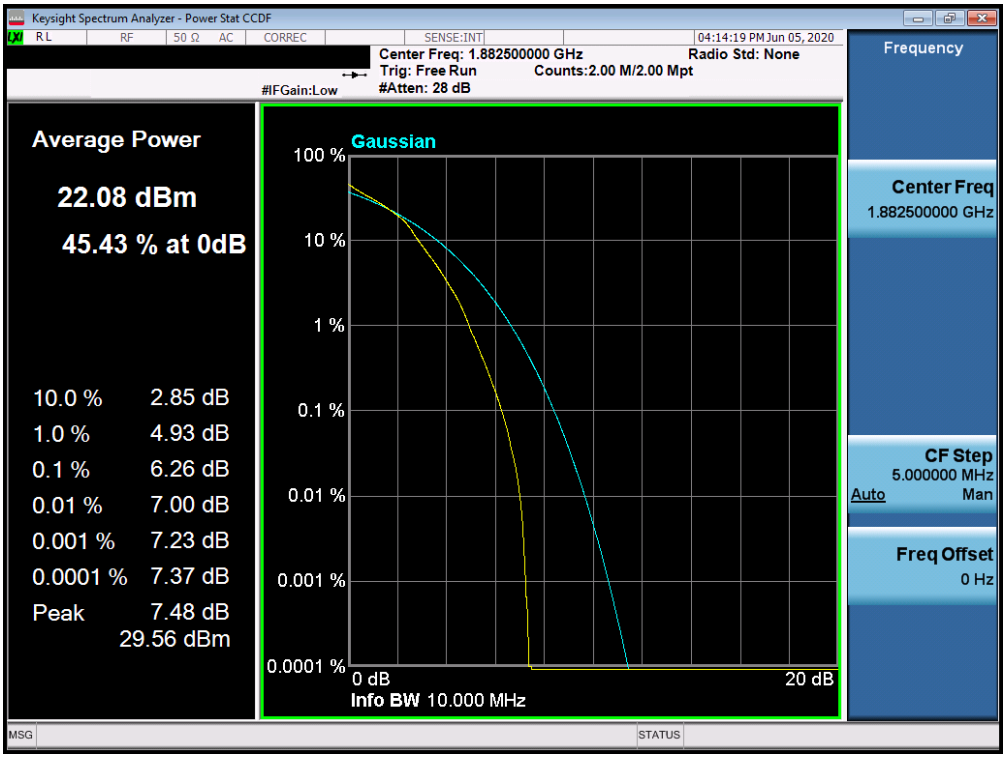
Plot 7-254. PAR Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)



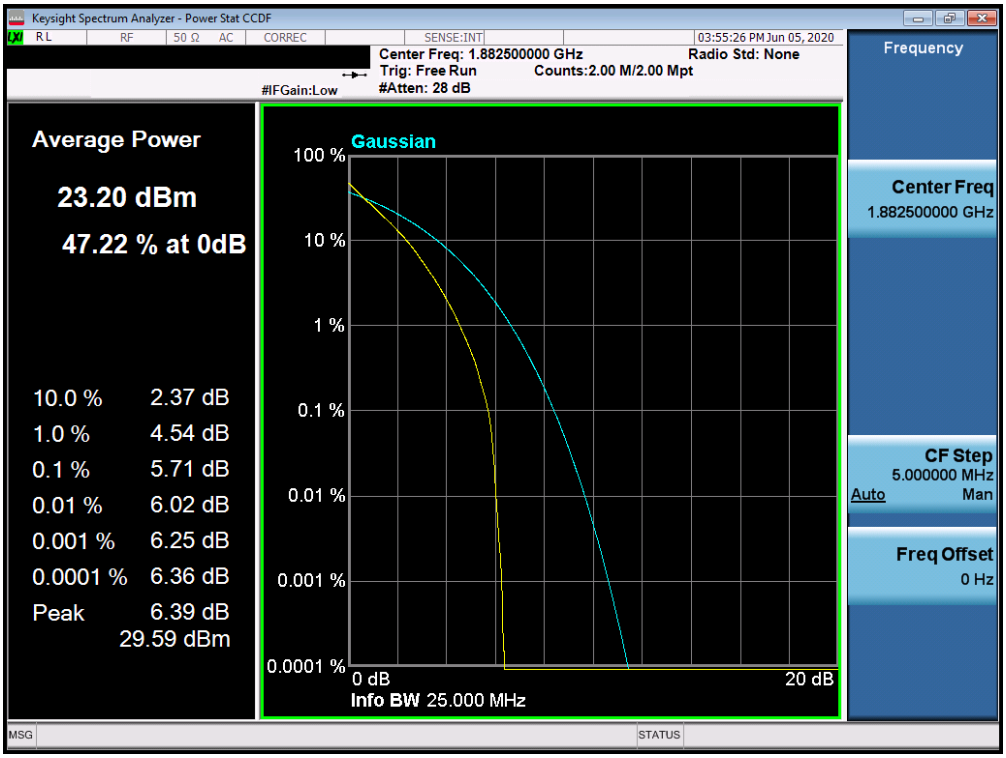
Plot 7-255. PAR Plot (Band 25 - 5.0MHz 16-QAM - Full RB Configuration)



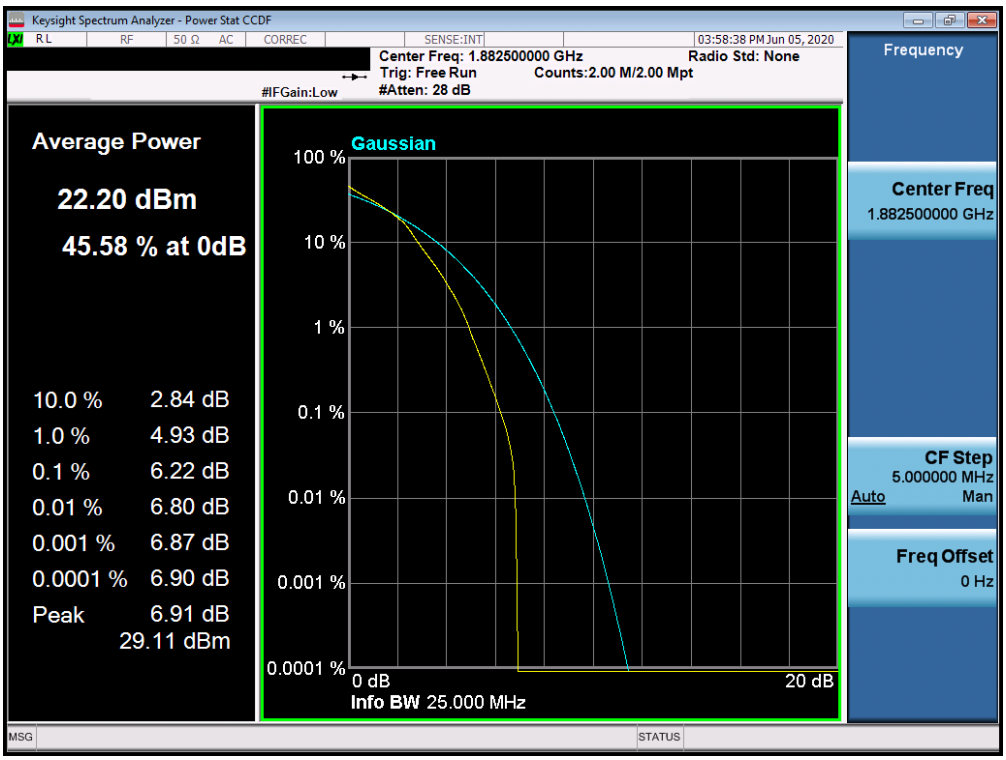
Plot 7-256. PAR Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)



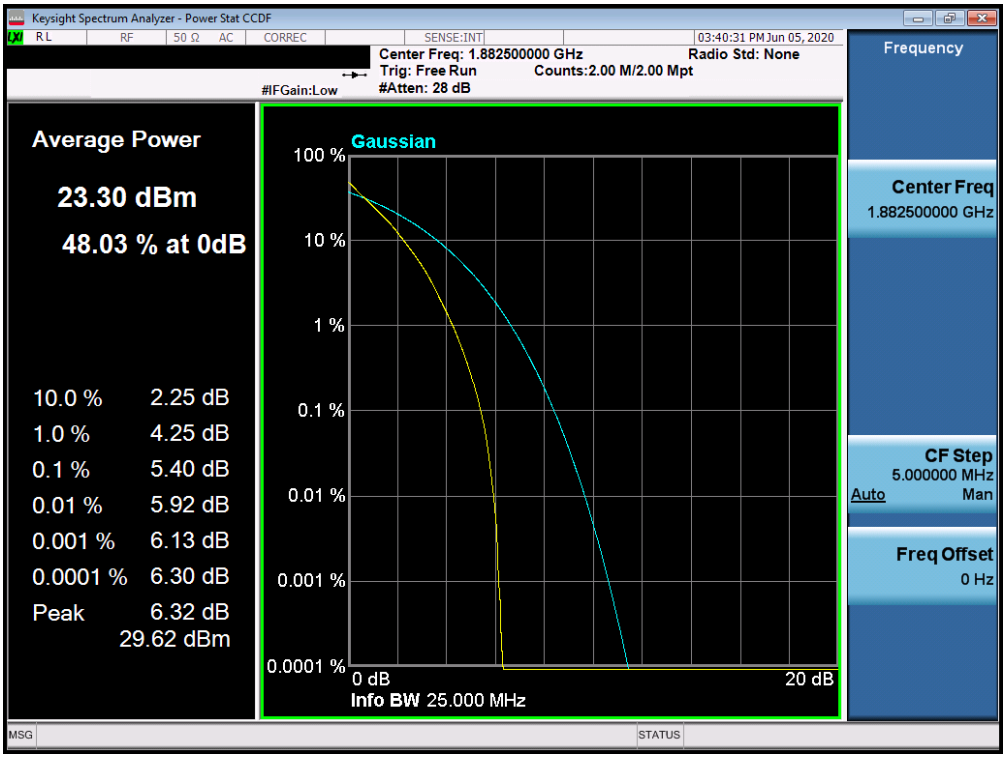
Plot 7-257. PAR Plot (Band 25 - 10.0MHz 16-QAM - Full RB Configuration)



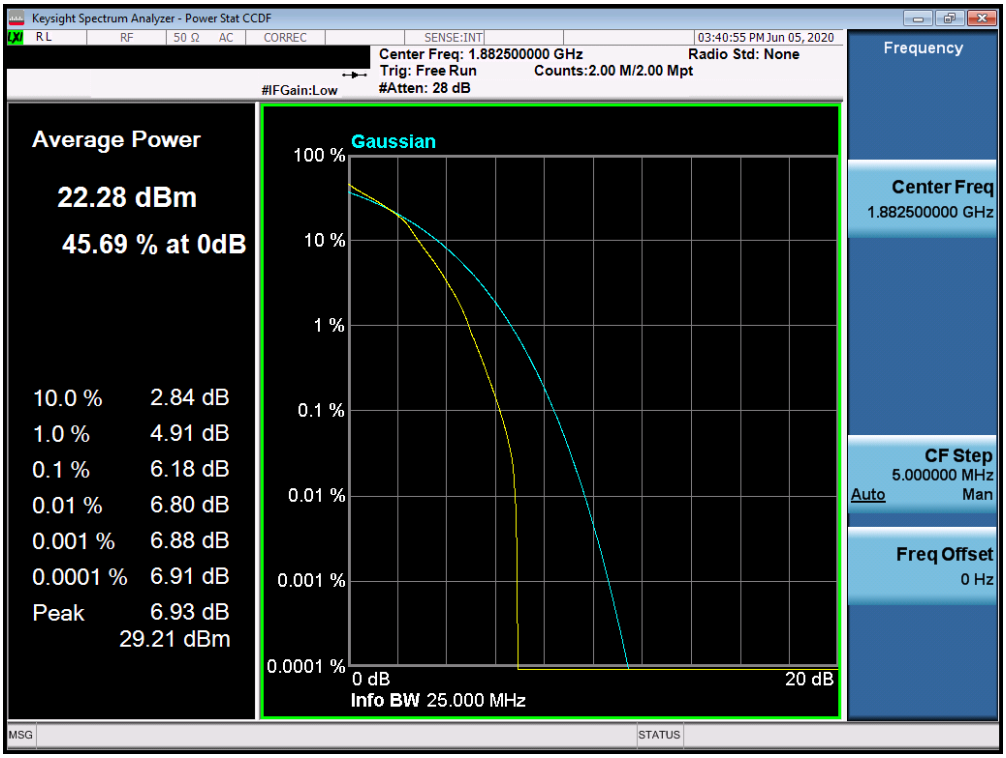
Plot 7-258. PAR Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-259. PAR Plot (Band 25 - 15.0MHz 16-QAM - Full RB Configuration)



Plot 7-260. PAR Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-261. PAR Plot (Band 25 - 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 calculated by adding highest antenna gain to maximum measured conducted output power. 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 C63.26-2015 – Section 5.2.5.5

Test Settings

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured is:

ERP/EIRP = PMeas – LC + GT

Where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm)

PMeas = measured transmitter output power or PSD, in dBW or dBm

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

Test Setup

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

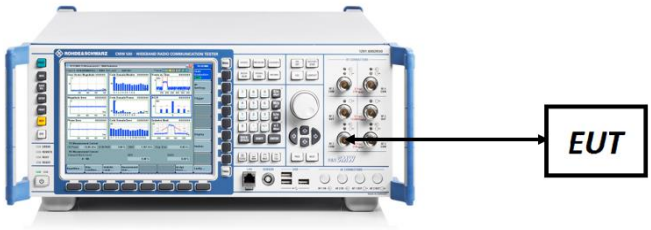


Figure 7-5. ERP/EIRP Measurement Setup

Test Notes

1) The EUT was tested in all possible test configurations. The worst case emissions are reported with the EUT 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 Level (dBm) readings in the table were taken with a correction table loaded into the base station simulator. The correction table was used to account for the signal attenuation in the connecting cable between the transmitter and antenna.
4) The Ant. Gains (GT) are listed in dBi.
5) This device only supports 27RBs or less for 16-QAM uplink.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [mW]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [mW]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	1 / 0	24.96	-28.90	-6.09	0.246	38.45	-44.54	-3.94	0.404	40.61	-44.55
836.50	1.4	QPSK	1 / 5	24.94	-28.90	-6.11	0.245	38.45	-44.56	-3.96	0.402	40.61	-44.57
848.30	1.4	QPSK	1 / 5	25.00	-28.90	**-6.05**	**0.248**	38.45	-44.50	**-3.90**	**0.407**	40.61	-44.51
848.30	1.4	16-QAM	1 / 5	24.19	-28.90	-6.86	0.206	38.45	-45.31	-4.71	0.338	40.61	-45.32
825.50	3	QPSK	1 / 7	24.92	-28.90	-6.13	0.244	38.45	-44.58	-3.98	0.400	40.61	-44.59
836.50	3	QPSK	1 / 7	25.00	-28.90	**-6.05**	**0.248**	38.45	-44.50	**-3.90**	**0.407**	40.61	-44.51
847.50	3	QPSK	1 / 7	24.93	-28.90	-6.12	0.244	38.45	-44.57	-3.97	0.401	40.61	-44.58
836.50	3	16-QAM	1 / 7	24.54	-28.90	**-6.51**	0.223	38.45	-44.96	**-4.36**	0.366	40.61	-44.97
826.50	5	QPSK	1 / 0	24.84	-28.90	-6.21	0.239	38.45	-44.66	-4.06	0.393	40.61	-44.67
836.50	5	QPSK	1 / 0	25.00	-28.90	**-6.05**	**0.248**	38.45	-44.50	**-3.90**	**0.407**	40.61	-44.51
846.50	5	QPSK	1 / 24	24.93	-28.90	-6.12	0.244	38.45	-44.57	-3.97	0.401	40.61	-44.58
836.50	5	16-QAM	1 / 12	24.32	-28.90	**-6.73**	0.212	38.45	-45.18	**-4.58**	0.348	40.61	-45.19
829.00	10	QPSK	1 / 49	25.00	-28.90	**-6.05**	**0.248**	38.45	-44.50	**-3.90**	**0.407**	40.61	-44.51
836.50	10	QPSK	1 / 0	24.97	-28.90	-6.08	0.247	38.45	-44.53	-3.93	0.405	40.61	-44.54
844.00	10	QPSK	1 / 49	25.00	-28.90	**-6.05**	**0.248**	38.45	-44.50	**-3.90**	**0.407**	40.61	-44.51
829.00	10	16-QAM	1 / 0	24.58	-28.90	**-6.47**	0.225	38.45	-44.92	**-4.32**	0.370	40.61	-44.93

Table 7-7. ERP/EIRP Data (Band 5)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [mW]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [mW]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	1 / 0	24.93	-28.90	-6.12	0.244	38.45	-44.57	-3.97	0.401	40.61	-44.58
836.50	1.4	QPSK	1 / 5	24.98	-28.90	-6.07	0.247	38.45	-44.52	-3.92	0.406	40.61	-44.53
848.30	1.4	QPSK	1 / 5	25.00	-28.90	**-6.05**	**0.248**	38.45	-44.50	**-3.90**	**0.407**	40.61	-44.51
848.30	1.4	16-QAM	1 / 0	24.11	-28.90	-6.94	0.202	38.45	-45.39	-4.79	0.332	40.61	-45.40
825.50	3	QPSK	1 / 7	24.88	-28.90	-6.17	0.242	38.45	-44.62	-4.02	0.396	40.61	-44.63
836.50	3	QPSK	1 / 7	25.00	-28.90	**-6.05**	**0.248**	38.45	-44.50	**-3.90**	**0.407**	40.61	-44.51
847.50	3	QPSK	1 / 7	24.96	-28.90	-6.09	0.246	38.45	-44.54	-3.94	0.404	40.61	-44.55
836.50	3	16-QAM	1 / 7	24.48	-28.90	**-6.57**	0.220	38.45	-45.02	**-4.42**	0.361	40.61	-45.03
826.50	5	QPSK	1 / 12	24.99	-28.90	-6.06	0.248	38.45	-44.51	-3.91	0.406	40.61	-44.52
836.50	5	QPSK	1 / 12	25.00	-28.90	**-6.05**	**0.248**	38.45	-44.50	**-3.90**	**0.407**	40.61	-44.51
846.50	5	QPSK	1 / 24	24.95	-28.90	-6.10	0.245	38.45	-44.55	-3.95	0.403	40.61	-44.56
836.50	5	16-QAM	1 / 12	24.42	-28.90	**-6.63**	0.217	38.45	-45.08	**-4.48**	0.356	40.61	-45.09
829.00	10	QPSK	1 / 49	25.00	-28.90	**-6.05**	**0.248**	38.45	-44.50	**-3.90**	**0.407**	40.61	-44.51
836.50	10	QPSK	1 / 25	24.99	-28.90	-6.06	0.248	38.45	-44.51	-3.91	0.406	40.61	-44.52
844.00	10	QPSK	1 / 25	24.99	-28.90	-6.06	0.248	38.45	-44.51	-3.91	0.406	40.61	-44.52
829.00	10	16-QAM	1 / 27	24.39	-28.90	**-6.66**	0.216	38.45	-45.11	**-4.51**	0.354	40.61	-45.12

Table 7-8. ERP/EIRP Data (Band 26)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [mW]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	1 / 0	23.79	-12.50	11.29	13.459	30.00	-18.71
1732.50	1.4	QPSK	1 / 0	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1754.30	1.4	QPSK	1 / 0	23.97	-12.50	11.47	14.028	30.00	-18.53
1732.50	1.4	16-QAM	1 / 5	23.54	-12.50	**11.04**	12.706	30.00	-18.96
1711.50	3	QPSK	1 / 14	23.82	-12.50	11.32	13.552	30.00	-18.68
1732.50	3	QPSK	1 / 7	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1753.50	3	QPSK	1 / 0	23.89	-12.50	11.39	13.772	30.00	-18.61
1732.50	3	16-QAM	1 / 7	23.62	-12.50	**11.12**	12.942	30.00	-18.88
1712.50	5	QPSK	1 / 24	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1732.50	5	QPSK	1 / 0	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1752.50	5	QPSK	1 / 0	23.73	-12.50	11.23	13.274	30.00	-18.77
1712.50	5	16-QAM	1 / 24	23.29	-12.50	10.79	11.995	30.00	-19.21
1715.00	10	QPSK	1 / 49	23.99	-12.50	11.49	14.093	30.00	-18.51
1732.50	10	QPSK	1 / 0	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1750.00	10	QPSK	1 / 25	23.87	-12.50	11.37	13.709	30.00	-18.63
1732.50	10	16-QAM	1 / 0	23.51	-12.50	**11.01**	12.618	30.00	-18.99
1717.50	15	QPSK	1 / 74	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1732.50	15	QPSK	1 / 0	23.83	-12.50	11.33	13.583	30.00	-18.67
1747.50	15	QPSK	1 / 36	23.65	-12.50	11.15	13.032	30.00	-18.85
1717.50	15	16-QAM	1 / 27	23.02	-12.50	10.52	11.272	30.00	-19.48
1720.00	20	QPSK	1 / 99	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1732.50	20	QPSK	1 / 0	23.84	-12.50	11.34	13.614	30.00	-18.66
1745.00	20	QPSK	1 / 0	23.94	-12.50	11.44	13.932	30.00	-18.56
1720.00	20	16-QAM	1 / 27	23.27	-12.50	10.77	11.940	30.00	-19.23

Table 7-9. EIRP Data (Band 4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [mW]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	1 / 0	23.90	-12.50	11.40	13.804	30.00	-18.60
1745.00	1.4	QPSK	1 / 0	23.99	-12.50	11.49	14.093	30.00	-18.51
1779.30	1.4	QPSK	1 / 0	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1779.30	1.4	16-QAM	1 / 5	23.16	-12.50	10.66	11.641	30.00	-19.34
1711.50	3	QPSK	1 / 14	23.90	-12.50	11.40	13.804	30.00	-18.60
1745.00	3	QPSK	1 / 7	23.99	-12.50	**11.49**	14.093	30.00	-18.51
1778.50	3	QPSK	1 / 7	23.99	-12.50	**11.49**	14.093	30.00	-18.51
1745.00	3	16-QAM	1 / 7	23.41	-12.50	10.91	12.331	30.00	-19.09
1712.50	5	QPSK	1 / 24	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1745.00	5	QPSK	1 / 24	23.98	-12.50	11.48	14.060	30.00	-18.52
1777.50	5	QPSK	1 / 12	23.96	-12.50	11.46	13.996	30.00	-18.54
1712.50	5	16-QAM	1 / 12	23.35	-12.50	10.85	12.162	30.00	-19.15
1715.00	10	QPSK	1 / 49	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1745.00	10	QPSK	1 / 49	23.96	-12.50	11.46	13.996	30.00	-18.54
1775.00	10	QPSK	1 / 49	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1715.00	10	16-QAM	1 / 0	23.28	-12.50	10.78	11.967	30.00	-19.22
1717.50	15	QPSK	1 / 74	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1745.00	15	QPSK	1 / 74	23.73	-12.50	11.23	13.274	30.00	-18.77
1772.50	15	QPSK	1 / 36	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1717.50	15	16-QAM	1 / 27	23.10	-12.50	10.60	11.482	30.00	-19.40
1720.00	20	QPSK	1 / 99	24.00	-12.50	**11.50**	**14.125**	30.00	-18.50
1745.00	20	QPSK	1 / 0	23.97	-12.50	11.47	14.028	30.00	-18.53
1770.00	20	QPSK	1 / 99	23.95	-12.50	11.45	13.964	30.00	-18.55
1720.00	20	16-QAM	1 / 27	23.16	-12.50	10.66	11.641	30.00	-19.34

Table 7-10. EIRP Data (Band 66)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [mW]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	1 / 0	24.00	-14.00	**10.00**	**10.000**	33.01	-23.01
1880.00	1.4	QPSK	1 / 0	23.92	-14.00	9.92	9.817	33.01	-23.09
1909.30	1.4	QPSK	1 / 5	23.99	-14.00	9.99	9.977	33.01	-23.02
1850.70	1.4	16-QAM	1 / 5	23.39	-14.00	9.39	8.690	33.01	-23.62
1851.50	3	QPSK	1 / 7	24.00	-14.00	**10.00**	**10.000**	33.01	-23.01
1880.00	3	QPSK	1 / 7	23.88	-14.00	9.88	9.727	33.01	-23.13
1908.50	3	QPSK	1 / 14	24.00	-14.00	**10.00**	**10.000**	33.01	-23.01
1851.50	3	16-QAM	1 / 14	23.47	-14.00	**9.47**	8.851	33.01	-23.54
1852.50	5	QPSK	1 / 24	24.00	-14.00	**10.00**	**10.000**	33.01	-23.01
1880.00	5	QPSK	1 / 0	23.87	-14.00	9.87	9.705	33.01	-23.14
1907.50	5	QPSK	1 / 24	23.99	-14.00	9.99	9.977	33.01	-23.02
1852.50	5	16-QAM	1 / 0	23.37	-14.00	**9.37**	8.650	33.01	-23.64
1855.00	10	QPSK	1 / 0	24.00	-14.00	**10.00**	**10.000**	33.01	-23.01
1880.00	10	QPSK	1 / 0	23.98	-14.00	9.98	9.954	33.01	-23.03
1905.00	10	QPSK	1 / 0	23.94	-14.00	9.94	9.863	33.01	-23.07
1855.00	10	16-QAM	1 / 27	23.40	-14.00	9.40	8.710	33.01	-23.61
1857.50	15	QPSK	1 / 0	24.00	-14.00	**10.00**	**10.000**	33.01	-23.01
1880.00	15	QPSK	1 / 74	23.70	-14.00	9.70	9.333	33.01	-23.31
1902.50	15	QPSK	1 / 0	23.71	-14.00	9.71	9.354	33.01	-23.30
1857.50	15	16-QAM	1 / 27	23.10	-14.00	9.10	8.128	33.01	-23.91
1860.00	20	QPSK	1 / 0	24.00	-14.00	**10.00**	**10.000**	33.01	-23.01
1880.00	20	QPSK	1 / 50	23.94	-14.00	9.94	9.863	33.01	-23.07
1900.00	20	QPSK	1 / 0	23.94	-14.00	9.94	9.863	33.01	-23.07
1860.00	20	16-QAM	1 / 0	23.20	-14.00	9.20	8.318	33.01	-23.81

Table 7-11. EIRP Data (Band 2)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [mW]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	1 / 0	23.67	-14.00	**9.67**	9.268	33.01	-23.34
1882.50	1.4	QPSK	1 / 5	23.58	-14.00	9.58	9.078	33.01	-23.43
1914.30	1.4	QPSK	1 / 0	23.62	-14.00	9.62	9.162	33.01	-23.39
1850.70	1.4	16-QAM	1 / 0	23.11	-14.00	**9.11**	8.147	33.01	-23.90
1851.50	3	QPSK	1 / 7	23.68	-14.00	**9.68**	9.290	33.01	-23.33
1882.50	3	QPSK	1 / 7	23.58	-14.00	9.58	9.078	33.01	-23.43
1913.50	3	QPSK	1 / 0	23.50	-14.00	9.50	8.913	33.01	-23.51
1851.50	3	16-QAM	1 / 7	23.11	-14.00	**9.11**	8.147	33.01	-23.90
1852.50	5	QPSK	1 / 24	23.82	-14.00	9.82	9.594	33.01	-23.19
1882.50	5	QPSK	1 / 12	24.00	-14.00	**10.00**	**10.000**	33.01	-23.01
1912.50	5	QPSK	1 / 0	23.89	-14.00	9.89	9.750	33.01	-23.12
1882.50	5	16-QAM	1 / 12	23.43	-14.00	**9.43**	8.770	33.01	-23.58
1855.00	10	QPSK	1 / 0	23.69	-14.00	**9.69**	9.311	33.01	-23.32
1882.50	10	QPSK	1 / 49	23.63	-14.00	9.63	9.183	33.01	-23.38
1910.00	10	QPSK	1 / 0	23.56	-14.00	9.56	9.036	33.01	-23.45
1855.00	10	16-QAM	1 / 0	23.13	-14.00	9.13	8.185	33.01	-23.88
1857.50	15	QPSK	1 / 36	23.90	-14.00	**9.90**	9.772	33.01	-23.11
1882.50	15	QPSK	1 / 74	23.66	-14.00	9.66	9.247	33.01	-23.35
1907.50	15	QPSK	1 / 36	23.54	-14.00	9.54	8.995	33.01	-23.47
1857.50	15	16-QAM	1 / 0	23.07	-14.00	9.07	8.072	33.01	-23.94
1860.00	20	QPSK	1 / 0	23.81	-14.00	**9.81**	9.572	33.01	-23.20
1882.50	20	QPSK	1 / 99	23.64	-14.00	9.64	9.204	33.01	-23.37
1905.00	20	QPSK	1 / 0	23.79	-14.00	9.79	9.528	33.01	-23.22
1860.00	20	16-QAM	1 / 13	23.18	-14.00	**9.18**	8.279	33.01	-23.83

Table 7-12. EIRP Data (Band 25)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [mW]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	1 / 0	23.50	-7.10	**16.40**	**43.652**	33.01	-16.61
2535.00	5	QPSK	1 / 24	23.50	-7.10	**16.40**	**43.652**	33.01	-16.61
2567.50	5	QPSK	1 / 24	23.50	-7.10	**16.40**	**43.652**	33.01	-16.61
2502.50	5	16-QAM	1 / 0	22.86	-7.10	**15.76**	37.670	33.01	-17.25
2505.00	10	QPSK	1 / 49	23.50	-7.10	**16.40**	**43.652**	33.01	-16.61
2535.00	10	QPSK	1 / 49	23.46	-7.10	16.36	43.251	33.01	-16.65
2565.00	10	QPSK	1 / 49	23.50	-7.10	**16.40**	**43.652**	33.01	-16.61
2505.00	10	16-QAM	1 / 27	22.94	-7.10	**15.84**	38.371	33.01	-17.17
2507.50	15	QPSK	1 / 74	23.50	-7.10	**16.40**	**43.652**	33.01	-16.61
2535.00	15	QPSK	1 / 74	23.42	-7.10	16.32	42.855	33.01	-16.69
2562.50	15	QPSK	1 / 0	23.32	-7.10	16.22	41.879	33.01	-16.79
2507.50	15	16-QAM	1 / 27	22.71	-7.10	15.61	36.392	33.01	-17.40
2510.00	20	QPSK	1 / 99	23.50	-7.10	**16.40**	**43.652**	33.01	-16.61
2535.00	20	QPSK	1 / 99	23.43	-7.10	16.33	42.954	33.01	-16.68
2560.00	20	QPSK	1 / 99	23.47	-7.10	16.37	43.351	33.01	-16.64
2510.00	20	16-QAM	1 / 27	22.83	-7.10	**15.73**	37.411	33.01	-17.28

Table 7-13. EIRP Data (Band 7)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [mW]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	1 / 12	23.06	-7.10	**15.96**	**39.446**	33.01	-17.05
2593.00	5	QPSK	1 / 12	22.94	-7.10	15.84	38.371	33.01	-17.17
2687.50	5	QPSK	1 / 24	22.80	-7.10	15.70	37.154	33.01	-17.31
2687.50	5	16-QAM	1 / 24	21.95	-7.10	**14.85**	30.549	33.01	-18.16
2501.00	10	QPSK	1 / 25	23.03	-7.10	15.93	39.174	33.01	-17.08
2593.00	10	QPSK	1 / 25	22.99	-7.10	15.89	38.815	33.01	-17.12
2685.00	10	QPSK	1 / 49	22.97	-7.10	15.87	38.637	33.01	-17.14
2501.00	10	16-QAM	1 / 0	22.11	-7.10	**15.01**	31.696	33.01	-18.00
2503.50	15	QPSK	1 / 0	22.96	-7.10	15.86	38.548	33.01	-17.15
2593.00	15	QPSK	1 / 36	22.84	-7.10	15.74	37.497	33.01	-17.27
2682.50	15	QPSK	1 / 0	22.92	-7.10	15.82	38.194	33.01	-17.19
2682.50	15	16-QAM	1 / 13	22.03	-7.10	14.93	31.117	33.01	-18.08
2506.00	20	QPSK	1 / 0	22.98	-7.10	15.88	38.726	33.01	-17.13
2593.00	20	QPSK	1 / 99	22.92	-7.10	15.82	38.194	33.01	-17.19
2680.00	20	QPSK	1 / 0	22.99	-7.10	**15.89**	38.815	33.01	-17.12
2680.00	20	16-QAM	1 / 0	21.88	-7.10	14.78	30.061	33.01	-18.23

Table 7-14. EIRP Data (Band 41)

7.7 Radiated Spurious Emissions

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI C63.26-2015/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 C63.26-2015

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.

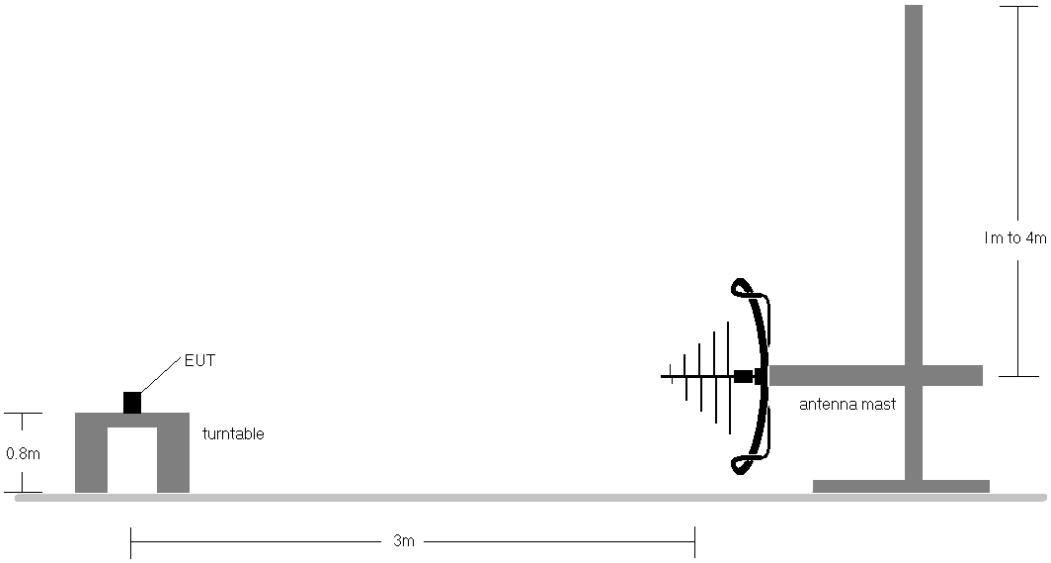


Figure 7-6. Radiated Measurement Setup < 1GHz

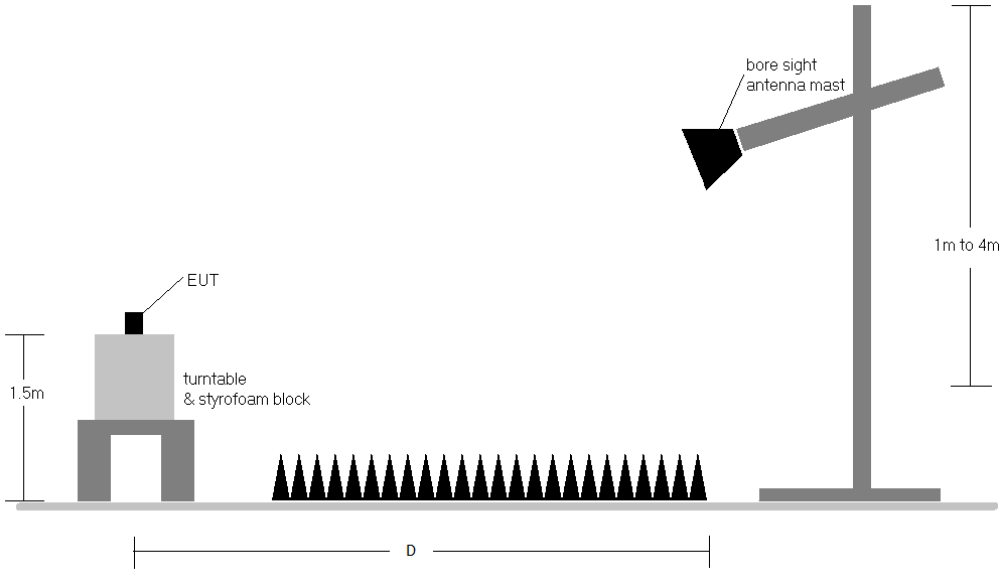


Figure 7-7. Radiated Measurement Setup > 1GHz

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 modulations, offsets and channel bandwidth configurations in this section. QPSK/10MHz/1RB was found and reported as worst case configuration for low bands and QPSK/20MHz/1RB was found and reported as worst case configuration for mid/high bands.

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) “D” is 3 meter distance for 1GHz – 18GHz measurements and 1 meter distance for above 18GHz with the application of a distance correction factor.

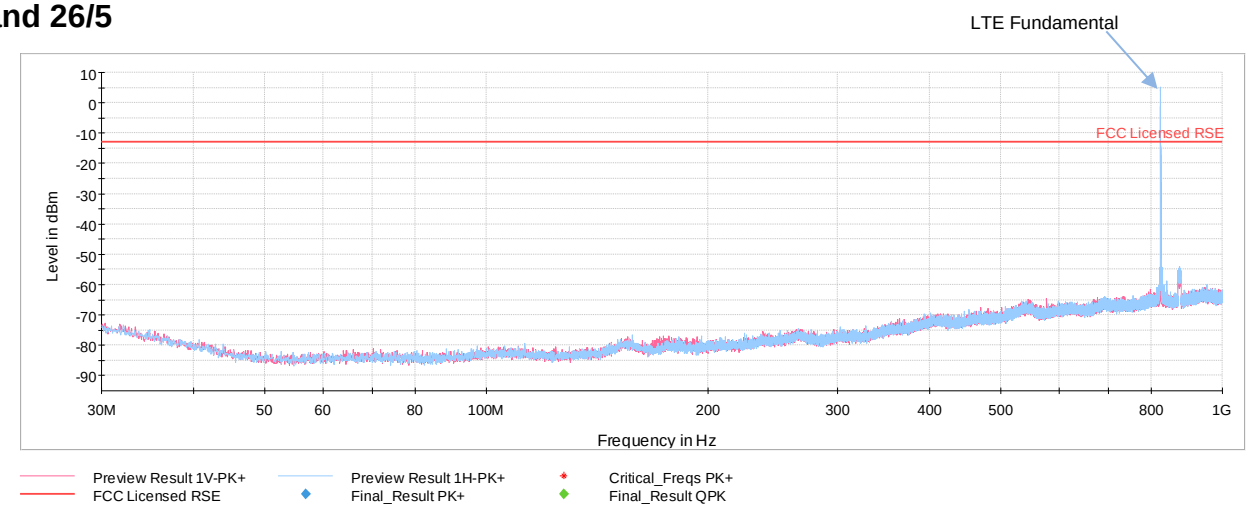
5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

6) No significant emissions were found for below 1GHz and Above 18GHz measurement.

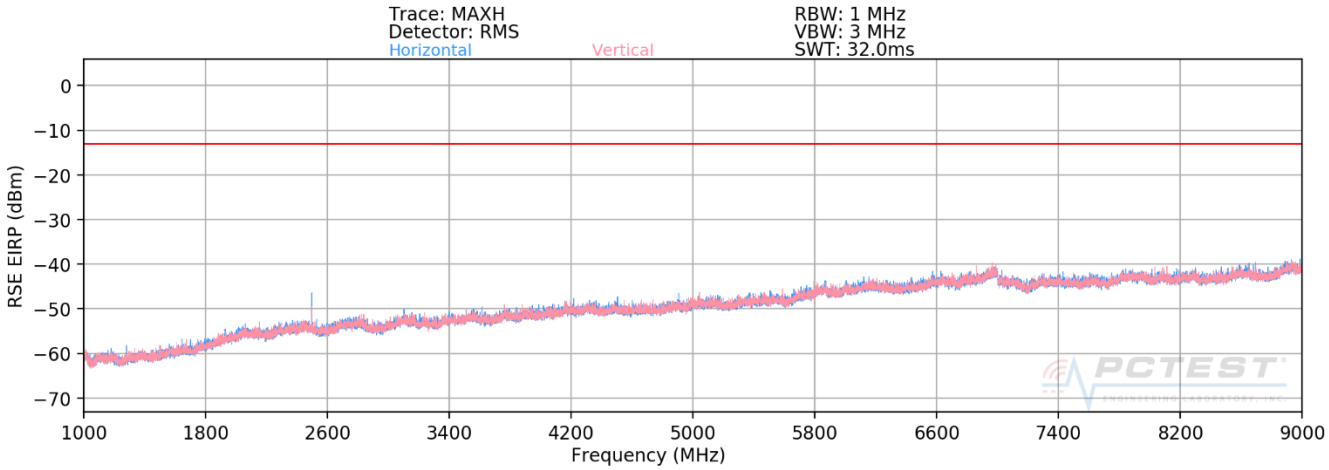
7) The intermodulation emissions were tested against the less stringent limit across all rule parts applicable to simultaneous transmitters.

8) All harmonics have been measured with the worst case simultaneous configuration and no emissions have been found at UWB and WLAN 2.4GHz harmonic frequencies.

Band 26/5



Plot 7-262. Radiated Spurious Emissions below 1GHz (Band 26/5)



Plot 7-263. Radiated Spurious Emissions 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]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1658.00	V	-	-	-72.69	3.80	-68.88	-55.9
2487.00	V	352	292	-52.60	4.34	-48.26	-35.3
3316.00	V	-	-	-69.66	6.51	-63.15	-50.1
4145.00	V	-	-	-69.91	7.88	-62.03	-49.0
4974.00	V	-	-	-68.78	8.83	-59.94	-46.9

Table 7-15. 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]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	11	350	-71.56	3.69	-67.86	-54.9
2509.50	H	347	110	-63.29	4.20	-59.10	-46.1
3346.00	V	-	-	-68.13	6.55	-61.57	-48.6
4182.50	V	-	-	-68.26	7.97	-60.29	-47.3
5019.00	V	-	-	-68.25	8.86	-59.39	-46.4

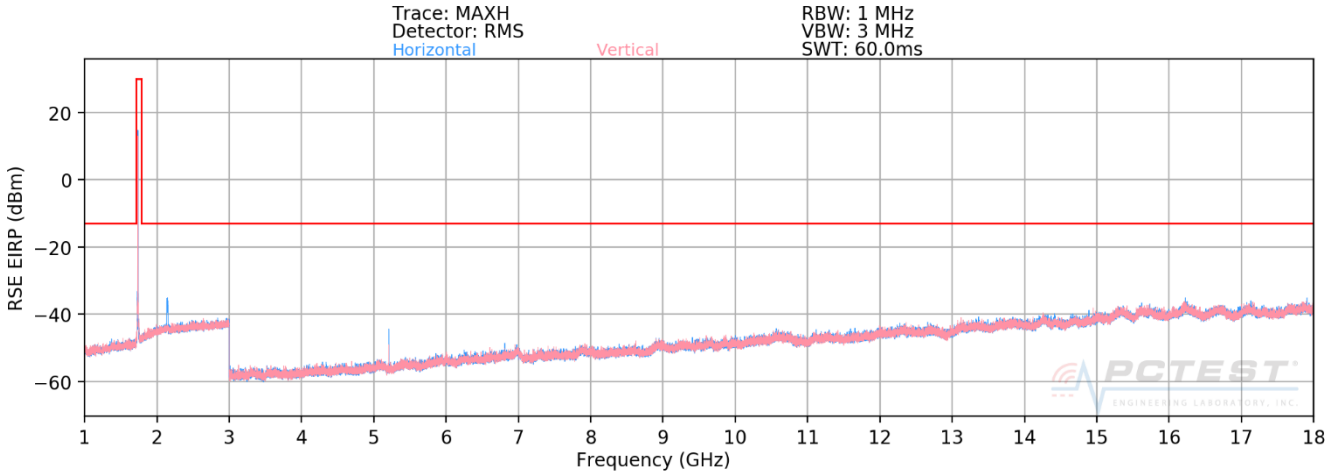
Table 7-16. Radiated Spurious Data (Band 26/5 – Mid Channel)

OPERATING FREQUENCY:	844.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1688.00	V	88	42	-71.46	3.70	-67.76	-54.8
2532.00	V	124	174	-53.76	4.36	-49.40	-36.4
3376.00	V	-	-	-67.76	6.60	-61.17	-48.2
4220.00	V	81	366	-67.51	8.03	-59.48	-46.5
5064.00	V	-	-	-68.78	8.93	-59.85	-46.9
5908.00	V	-	-	-67.57	9.58	-57.98	-45.0

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

Band 66/4



Plot 7-264. Radiated Spurious Emissions above 1GHz (Band 66/4)

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

Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3440.00	H	150	74	-67.95	6.69	-61.26	-48.3
5160.00	H	150	29	-60.61	9.08	-51.53	-38.5
6880.00	H	-	-	-66.29	9.54	-56.74	-43.7
8600.00	H	-	-	-65.40	9.65	-55.74	-42.7
10320.00	H	-	-	-62.62	9.56	-53.06	-40.1

Table 7-18. Radiated Spurious Data (Band 66/4 – 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]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	-	-	-69.61	6.79	-62.83	-49.8
5235.00	V	150	156	-62.39	9.16	-53.23	-40.2
6980.00	V	-	-	-65.01	9.49	-55.52	-42.5
8725.00	V	-	-	-65.76	9.63	-56.13	-43.1

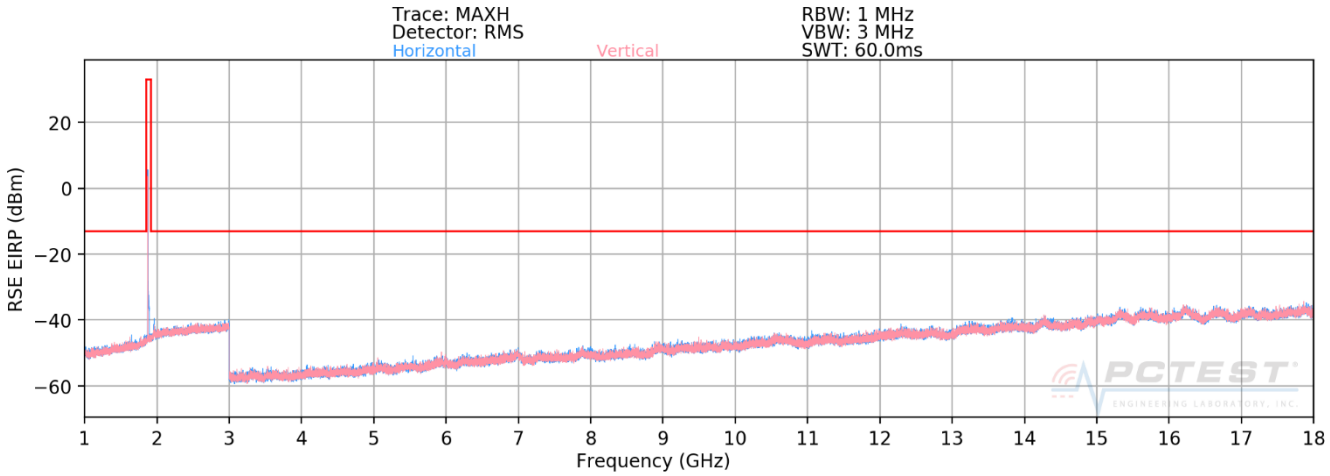
Table 7-19. Radiated Spurious Data (Band 66/4 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3540.00	H	150	215	-66.48	6.80	-59.68	-46.7
5310.00	H	150	326	-63.16	9.11	-54.04	-41.0
7080.00	H	-	-	-67.39	9.46	-57.94	-44.9
8850.00	H	-	-	-65.60	9.58	-56.02	-43.0
10620.00	H	-	-	-61.19	9.42	-51.78	-38.8

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

Band 25/2



Plot 7-265. Radiated Spurious Emissions above 1GHz (Band 25/2)

OPERATING FREQUENCY:	1860.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3720.00	H	50	80	-68.64	7.29	-61.35	-48.4
5580.00	H	62	309	-64.43	9.37	-55.06	-42.1
7440.00	H	-	-	-65.63	9.44	-56.19	-43.2
9300.00	H	-	-	-62.72	9.53	-53.19	-40.2
11160.00	H	-	-	-60.92	9.74	-51.18	-38.2

Table 7-21. Radiated Spurious Data (Band 25/2 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	-	-	-69.78	7.30	-62.48	-49.5
5647.50	H	97	147	-67.43	9.37	-58.06	-45.1
7530.00	H	-	-	-66.73	9.44	-57.28	-44.3
9412.50	H	-	-	-63.56	9.56	-54.01	-41.0
11295.00	H	-	-	-61.06	9.63	-51.43	-38.4

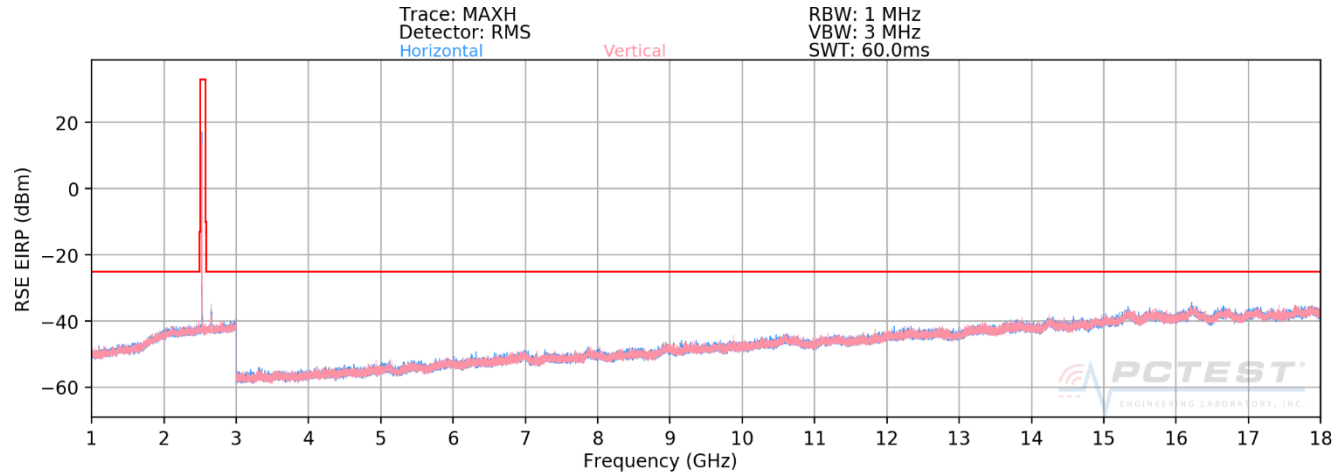
Table 7-22. Radiated Spurious Data (Band 25/2 – Mid Channel)

OPERATING FREQUENCY:	1905.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

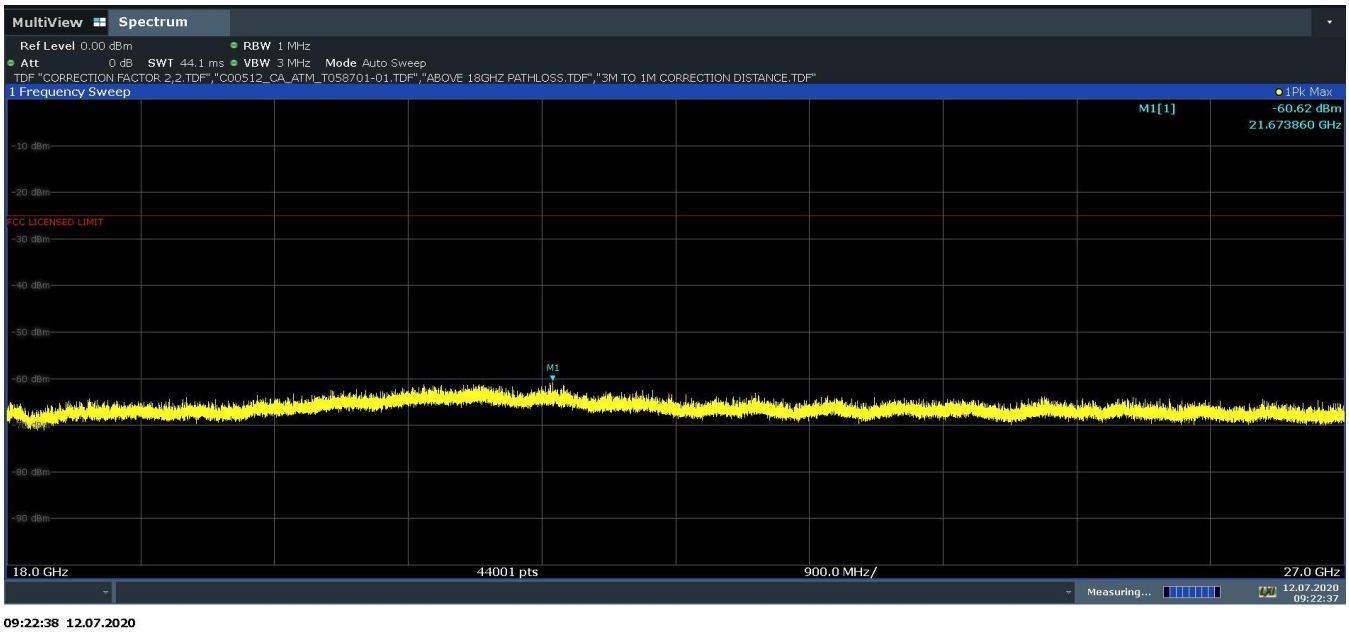
Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3810.00	H	121	14	-68.46	7.37	-61.08	-48.1
5715.00	H	73	52	-67.64	9.38	-58.26	-45.3
7620.00	H	-	-	-65.67	9.38	-56.29	-43.3
9525.00	H	-	-	-62.79	9.56	-53.23	-40.2
11430.00	H	-	-	-60.08	9.54	-50.54	-37.5

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

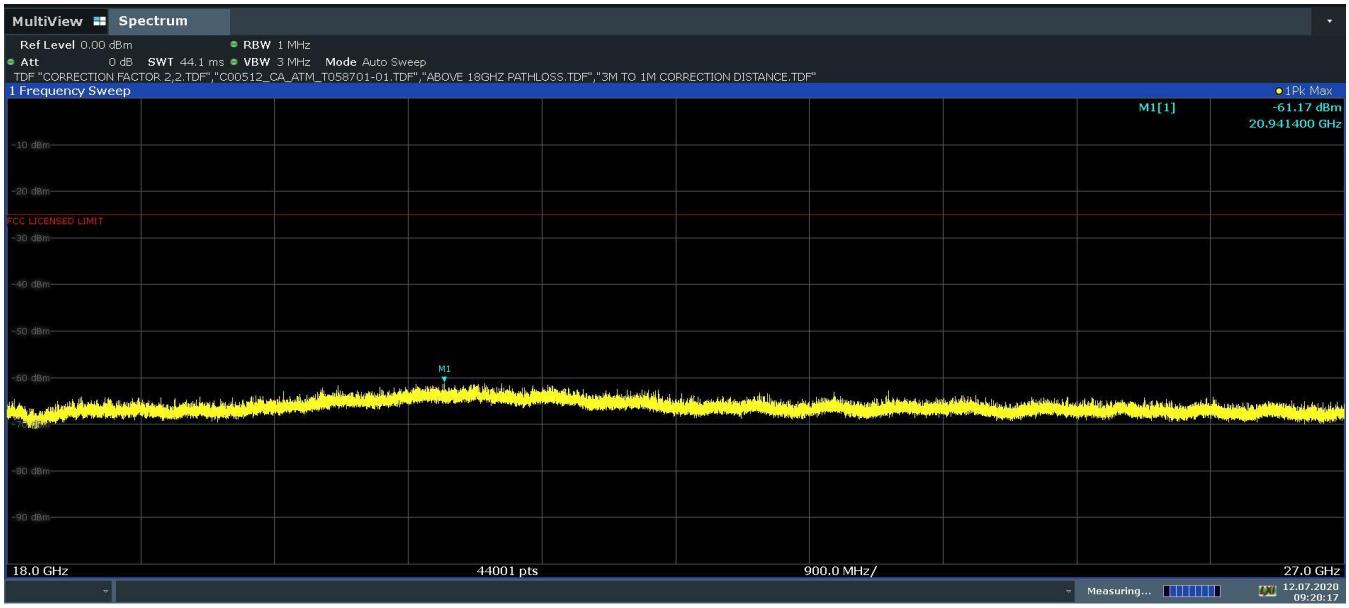
Band 7



Plot 7-266. Radiated Spurious Emissions 1GHz - 18GHz (Band 7)



Plot 7-267. Radiated Spurious Emissions 18GHz – 27GHz (Band 7, Pol. H)



09:20:18 12.07.2020

Plot 7-268. Radiated Spurious Emissions 18GHz – 27GHz (Band 7, Pol. V)

OPERATING FREQUENCY:	2510.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5020.00	V	90	2	-69.30	8.86	-60.44	-35.4
7530.00	V	-	-	-66.73	9.44	-57.28	-32.3
10040.00	V	-	-	-62.87	9.55	-53.31	-28.3
12550.00	V	-	-	-59.37	9.30	-50.06	-25.1

Table 7-24. 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]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5070.00	V	-	-	-67.75	8.94	-58.81	-33.8
7605.00	V	-	-	-65.97	9.37	-56.60	-31.6
10140.00	V	-	-	-61.61	9.59	-52.02	-27.0

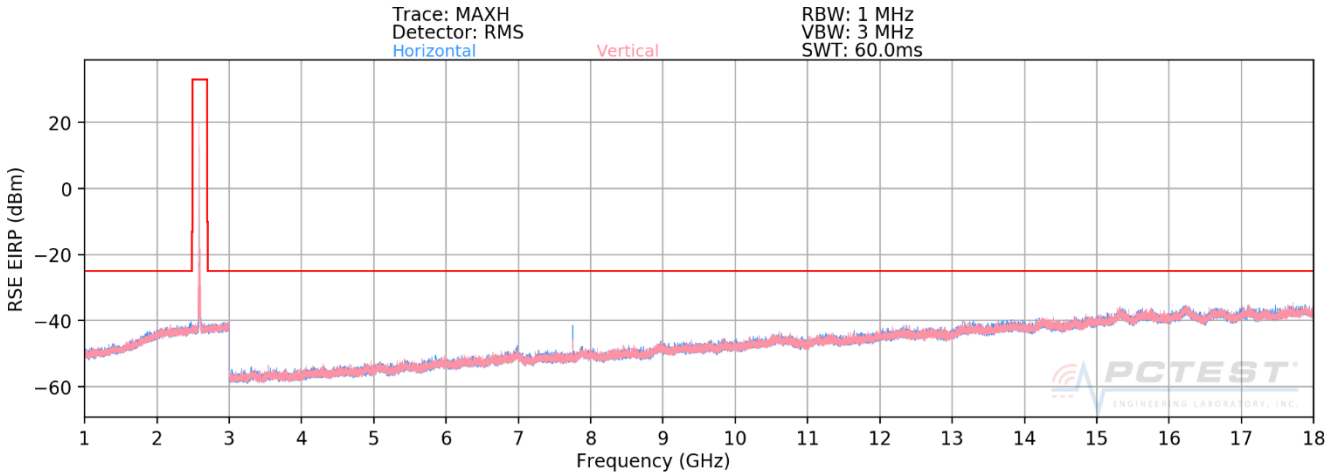
Table 7-25. Radiated Spurious Data (Band 7 – Mid Channel)

OPERATING FREQUENCY:	2560.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

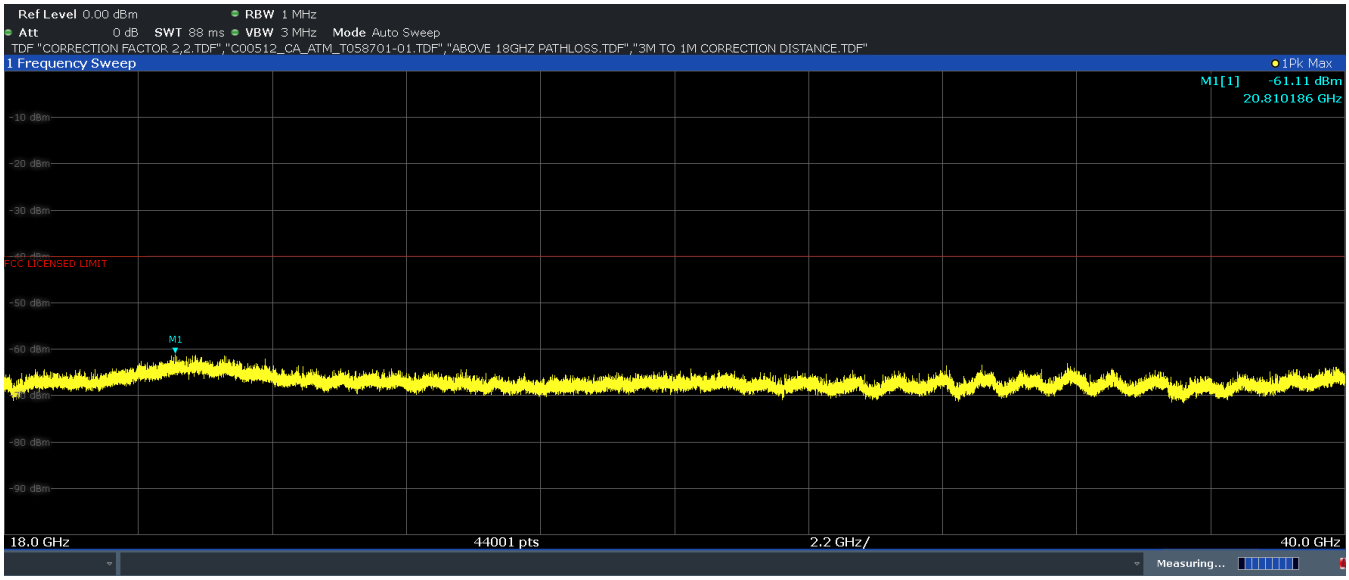
Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5120.00	V	-	-	-68.96	9.01	-59.95	-34.9
7680.00	V	-	-	-65.92	9.40	-56.51	-31.5
10240.00	V	-	-	-62.43	9.56	-52.87	-27.9

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

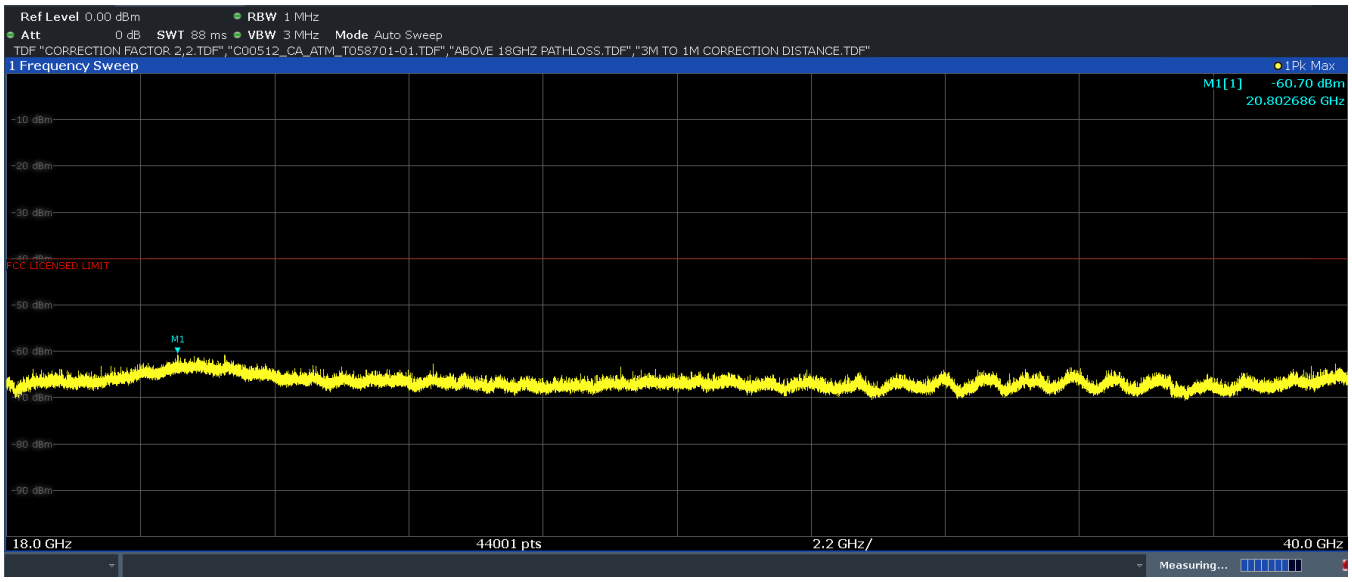
Band 41



Plot 7-269. Radiated Spurious Emissions 1GHz - 18GHz (Band 41)



Plot 7-270. Radiated Spurious Emissions 18GHz – 27GHz (Band 41, Pol. H)



Plot 7-271. Radiated Spurious Emissions 18GHz – 27GHz (Band 41, Pol. V)

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

Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5012.00	V	125	224	-59.52	8.85	-50.67	-25.7
7518.00	V	308	29	-57.15	9.44	-47.71	-22.7
10024.00	V	-	-	-56.74	9.54	-47.20	-22.2
12530.00	V	-	-	-53.18	9.29	-43.89	-18.9
15036.00	V	-	-	-49.36	9.09	-40.27	-15.3

Table 7-27. 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]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	V	356	242	-58.84	9.13	-49.71	-24.7
7779.00	V	323	31	-51.66	9.38	-42.29	-17.3
10372.00	V	-	-	-56.29	9.52	-46.77	-21.8
12965.00	V	-	-	-53.14	9.17	-43.98	-19.0
15558.00	V	-	-	-48.07	8.75	-39.32	-14.3

Table 7-28. 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

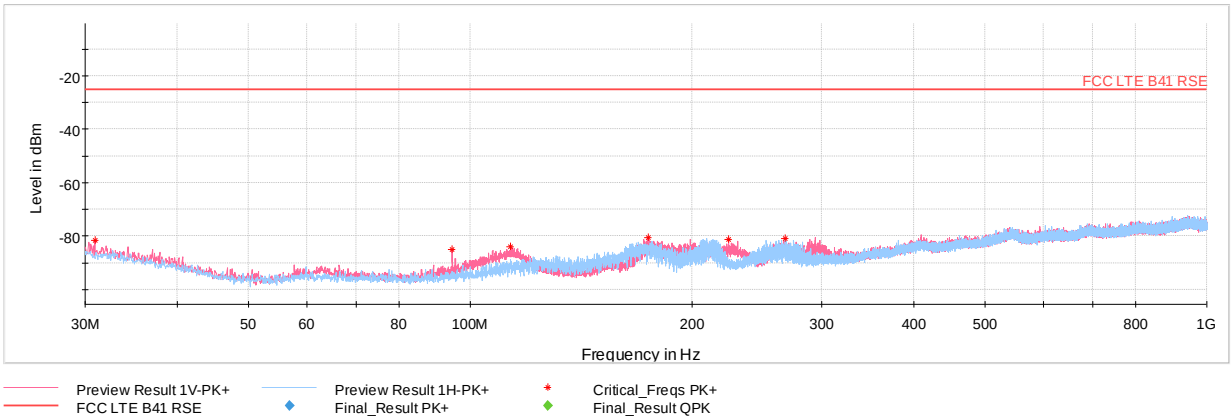
Frequency [MHz]	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5360.00	V	209	55	-58.30	9.13	-49.17	-24.2
8040.00	V	33	33	-57.86	9.41	-48.45	-23.5
10720.00	V	-	-	-54.37	9.49	-44.88	-19.9
13400.00	V	-	-	-51.13	9.03	-42.10	-17.1
16080.00	V	-	-	-46.81	9.01	-37.81	-12.8

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

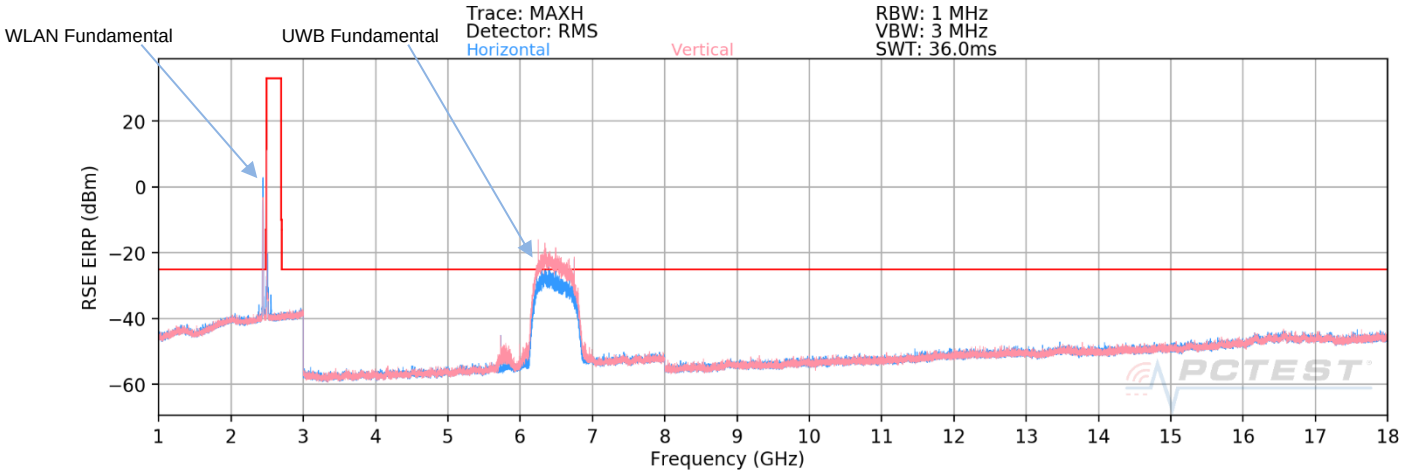
7.7.1 Simultaneous Tx Radiated Spurious Emissions Measurements

Description	WLAN	LTE (Band 41)	UWB
Antenna	FCM	FCM	FCM
Channel	6	39750	5
Operating Frequency (MHz)	2437	2506	6500
Mode/Modulation	802.11 b	QPSK/1RB/20MHz	Config 3/Payload 125

Table 7-30. Worst Case Simultaneous Transmission Configuration

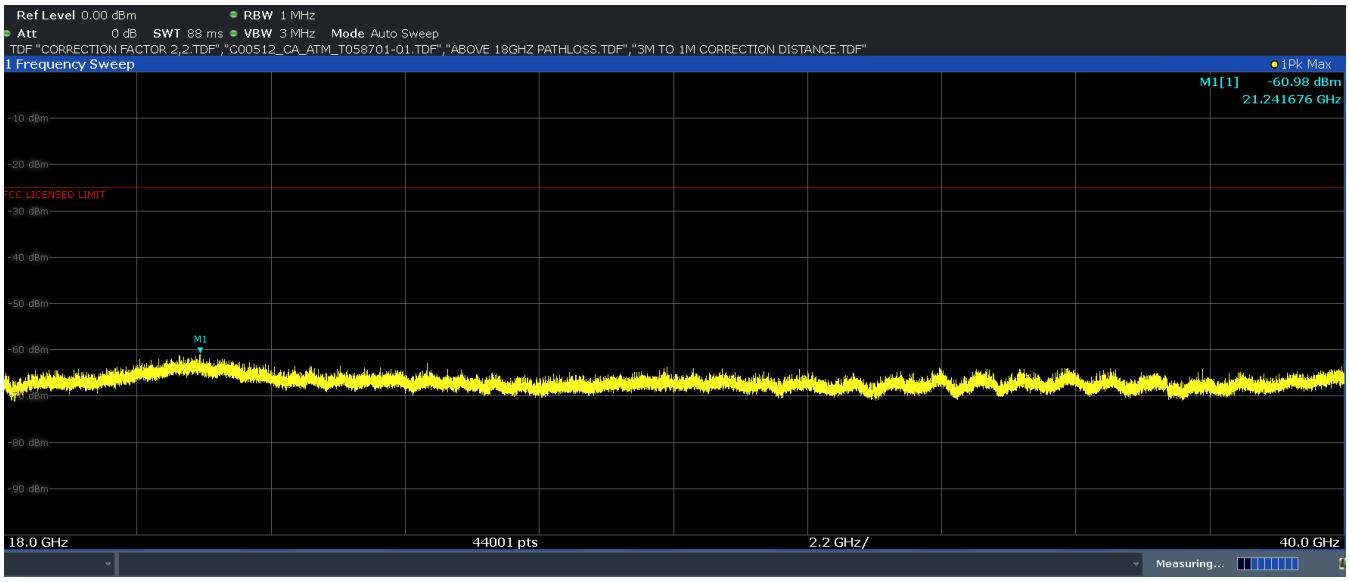


Plot 7-272. Radiated Spurious Emissions – Simultaneous Transmission 30MHz – 1GHz

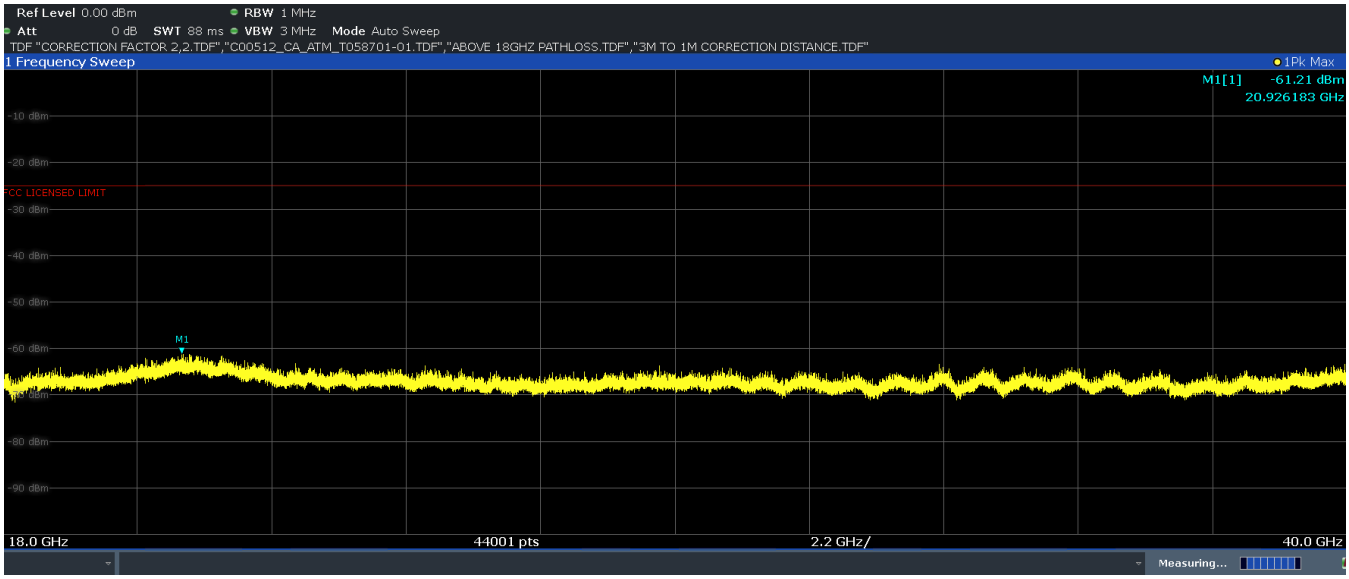


Plot 7-273. Radiated Spurious Emissions - Simultaneous Transmission 1-18GHz

Note: Only the LTE B41 limit was shown in the plot above. The 2 other fundamentals are WLAN and UWB.



Plot 7-274. Radiated Spurious Emissions - Simultaneous Transmission 18GHz-40GHz Pol. H



Plot 7-275. Radiated Spurious Emission - Simultaneous Transmission 18GHz-40GHz Pol. V

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	EIRP Level at Sub Ant Port [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5012.00	Avg	V	318	192	-62.05	10.15	-51.90	-25.0	-26.90
7518.00	Avg	H	-	-	-62.75	12.11	-50.65	-25.0	-25.65
10024.00	Avg	H	-	-	-63.77	13.33	-50.44	-25.0	-25.44
12530.00	Avg	H	-	-	-61.41	13.36	-48.05	-25.0	-23.05
2387.00	Avg	V	135	179	-45.06	6.16	-38.89	-25.0	-13.89

Table 7-31. LTE Harmonics and Intermodulation Emissions Measurements Simultaneous Transmission Mode

7.8 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015/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

TIA-603-E-2016

ANSI C63.26-2015

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 wideband radio communication tester with the EUT placed inside an environmental chamber.

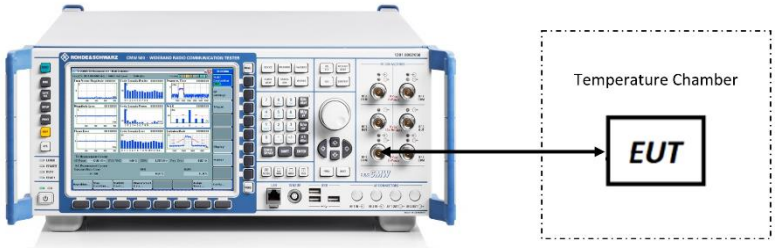


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

None

Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	836,500,001	1.1	0.00000013
100 %		- 20	836,500,001	1.1	0.00000014
100 %		- 10	836,500,001	1.0	0.00000012
100 %		0	836,500,001	0.9	0.00000010
100 %		+ 10	836,500,001	0.7	0.00000009
100 %		+ 20	836,500,001	0.8	0.00000009
100 %		+ 30	836,500,001	1.1	0.00000013
100 %		+ 40	836,500,001	1.1	0.00000014
100 %		+ 50	836,500,002	1.5	0.00000018
BATT. ENDPOINT	3.40	+ 20	836,500,001	1.0	0.00000012

Table 7-32. Frequency Stability Data (Band 26/5) – 10MHz QPSK – Full RB Configuration

Band 26/5 Frequency Stability Measurements

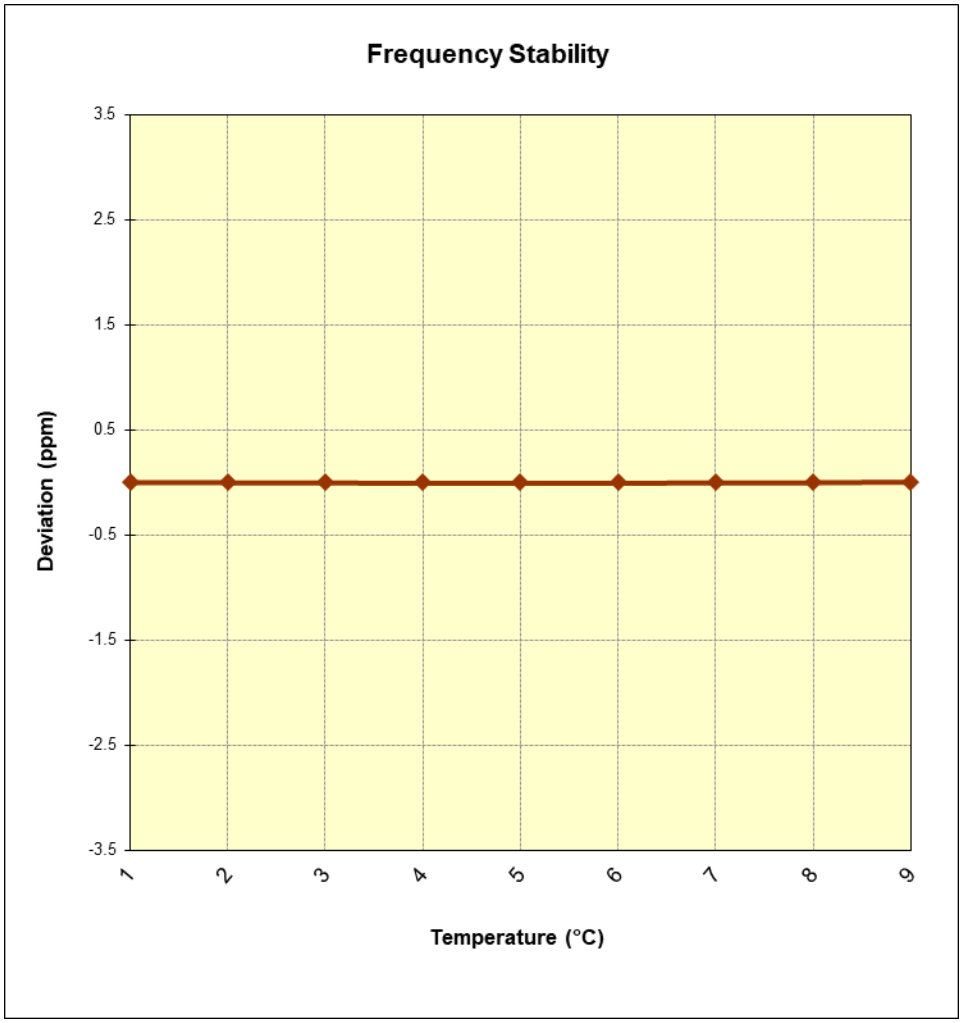


Figure 7-9. Frequency Stability Graph (Band 26/5) – 10MHz QPSK – Full RB Configuration

Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	1,745,000,001	0.6	0.00000004
100 %		- 20	1,745,000,000	0.4	0.00000002
100 %		- 10	1,744,999,999	-1.2	-0.00000007
100 %		0	1,744,999,999	-1.0	-0.00000006
100 %		+ 10	1,745,000,001	0.9	0.00000005
100 %		+ 20	1,745,000,000	-0.4	-0.00000003
100 %		+ 30	1,744,999,999	-0.5	-0.00000003
100 %		+ 40	1,744,999,999	-0.6	-0.00000004
100 %		+ 50	1,744,999,999	-1.2	-0.00000007
BATT. ENDPOINT	3.40	+ 20	1,744,999,999	-1.2	-0.00000007

Table 7-33. Frequency Stability Data (Band 66/4) – 20MHz QPSK – Full RB Configuration

Band 66/4 Frequency Stability Measurements

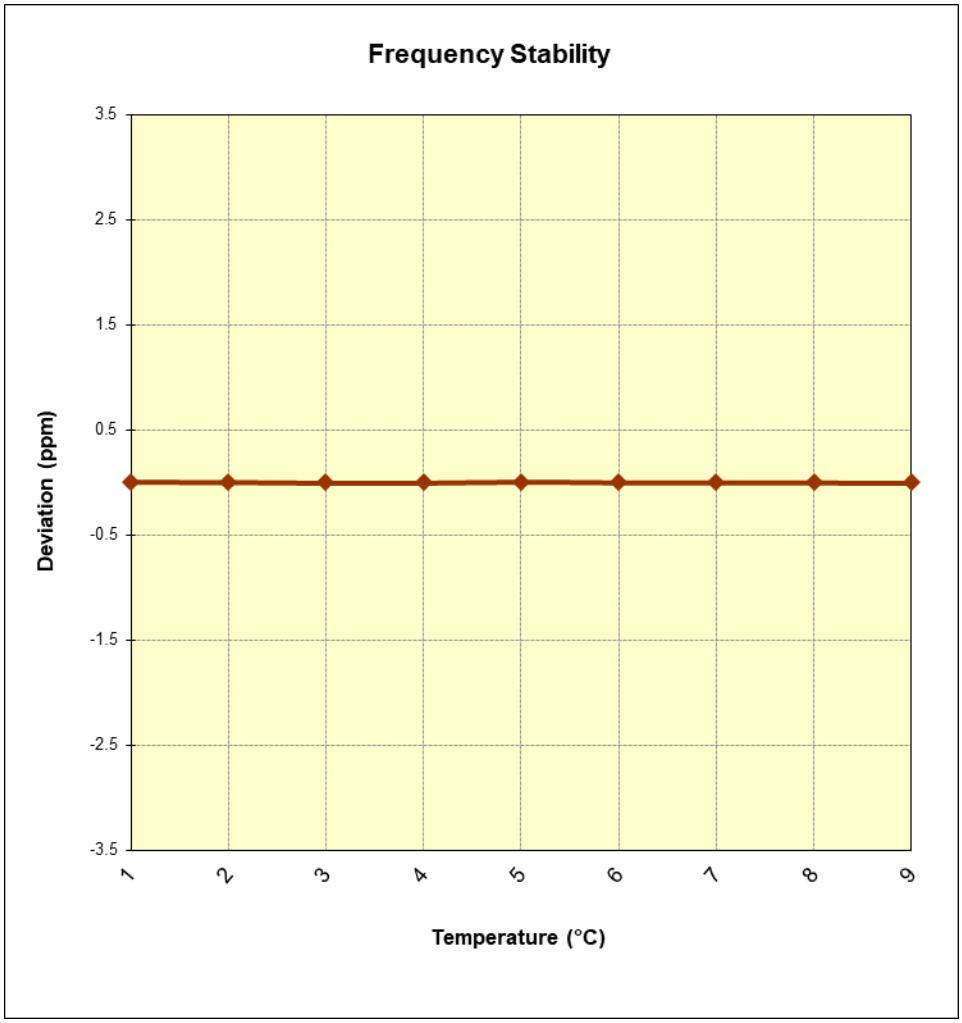


Figure 7-10. Frequency Stability Graph (Band 66/4) – 20MHz QPSK – Full RB Configuration

Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	1,882,500,001	1.3	0.00000007
100 %		- 20	1,882,500,001	1.1	0.00000006
100 %		- 10	1,882,500,000	0.4	0.00000002
100 %		0	1,882,500,002	1.6	0.00000008
100 %		+ 10	1,882,500,002	1.8	0.00000009
100 %		+ 20	1,882,500,001	0.8	0.00000004
100 %		+ 30	1,882,499,999	-1.4	-0.00000008
100 %		+ 40	1,882,499,999	-0.5	-0.00000003
100 %		+ 50	1,882,500,001	1.3	0.00000007
BATT. ENDPOINT	3.40	+ 20	1,882,500,001	1.0	0.00000005

Table 7-34. Frequency Stability Data (Band 25/2) – 20MHz QPSK – Full RB Configuration

Band 25/2 Frequency Stability Measurements

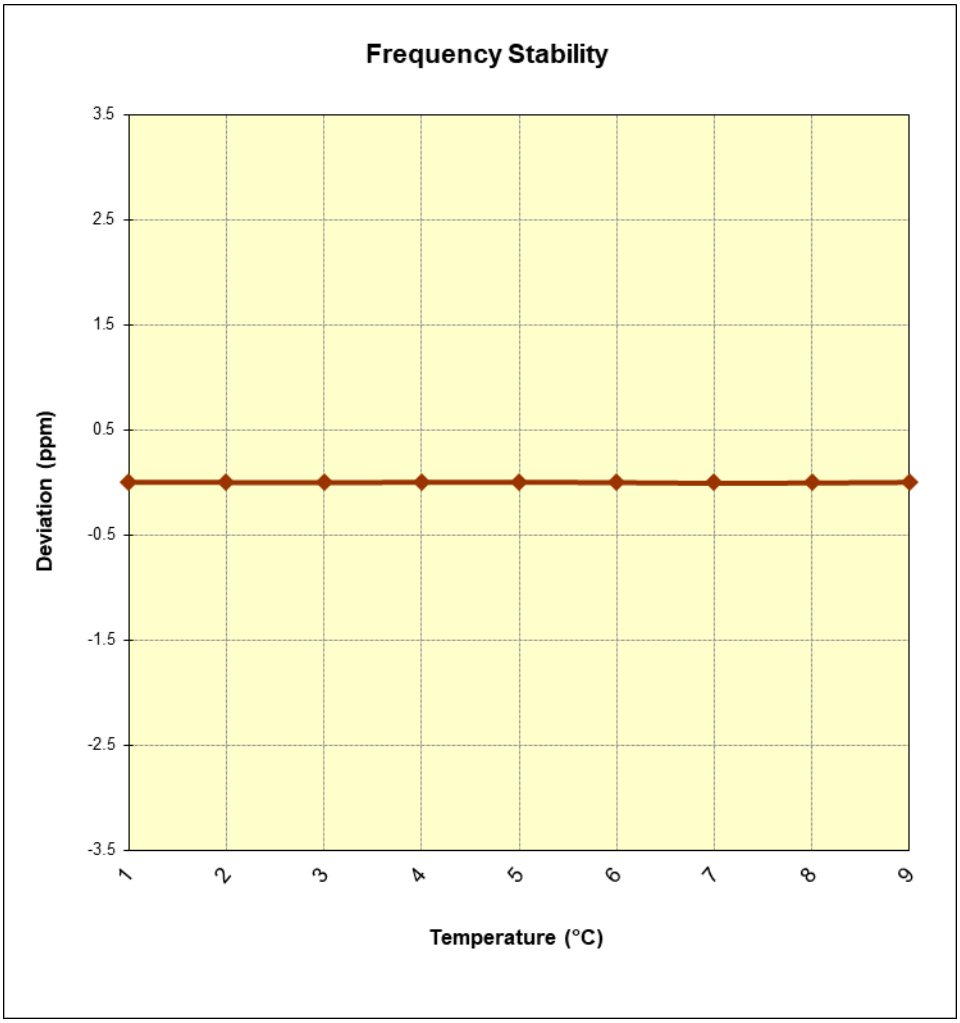


Figure 7-11. Frequency Stability Graph (Band 25/2) – 20MHz QPSK – Full RB Configuration

Band 7 Frequency Stability Measurements

OPERATING FREQUENCY:	2,535,000,000	Hz
CHANNEL:	21100	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	2,535,000,002	1.8	0.00000007
100 %		- 20	2,535,000,001	0.8	0.00000003
100 %		- 10	2,534,999,999	-1.3	-0.00000005
100 %		0	2,535,000,002	1.9	0.00000008
100 %		+ 10	2,535,000,002	1.9	0.00000008
100 %		+ 20	2,535,000,002	1.9	0.00000008
100 %		+ 30	2,535,000,003	2.8	0.00000011
100 %		+ 40	2,535,000,003	3.2	0.00000013
100 %		+ 50	2,535,000,003	2.6	0.00000010
BATT. ENDPOINT	3.40	+ 20	2,535,000,002	2.0	0.00000008

Table 7-35. Frequency Stability Data (Band 7) – 20MHz QPSK – Full RB Configuration

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

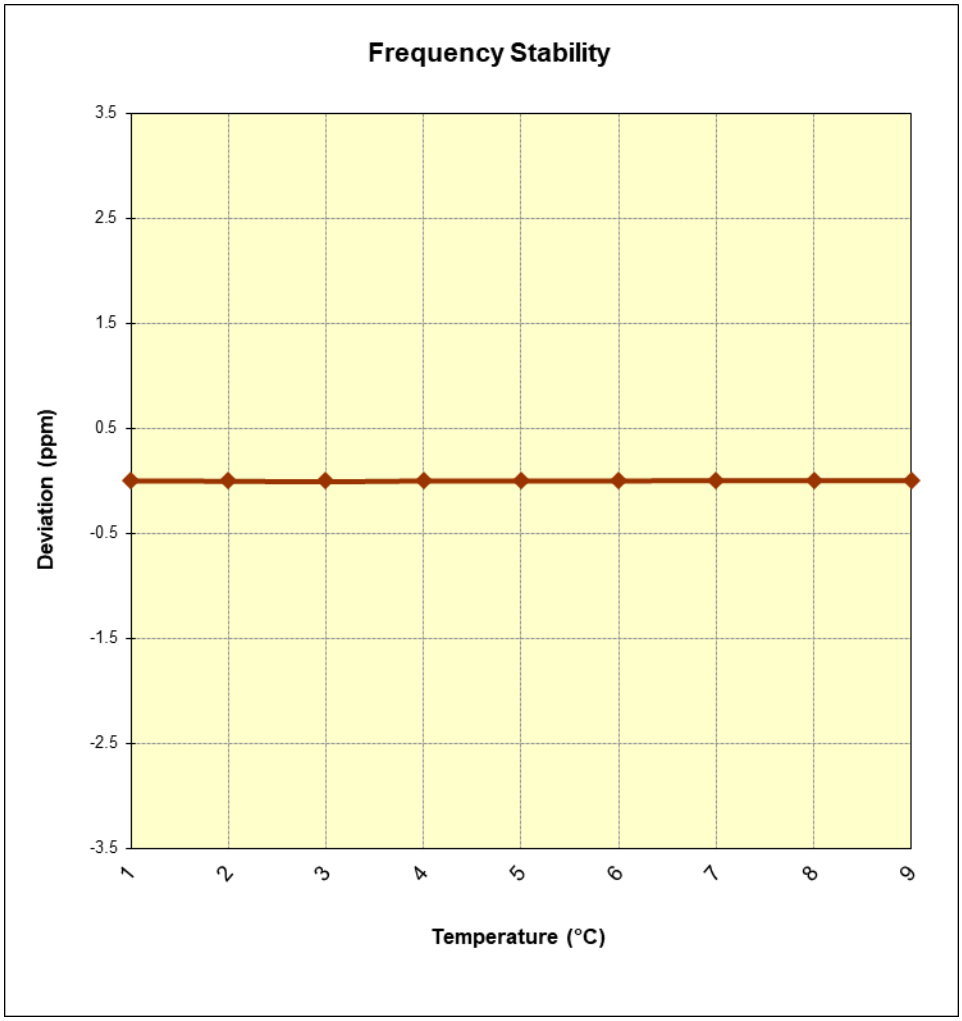


Figure 7-12. Frequency Stability Graph (Band 7) – 20MHz QPSK – Full RB Configuration

Band 41 Frequency Stability Measurements

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	2,593,000,008	8.1	0.0000003
100 %		- 20	2,592,999,981	-19.1	-0.0000007
100 %		- 10	2,592,999,984	-16.1	-0.0000006
100 %		0	2,593,000,007	7.3	0.0000003
100 %		+ 10	2,593,000,007	7.0	0.0000003
100 %		+ 20	2,593,000,008	8.0	0.0000003
100 %		+ 30	2,593,000,007	7.3	0.0000003
100 %		+ 40	2,593,000,007	7.3	0.0000003
100 %		+ 50	2,593,000,009	9.4	0.0000004
BATT. ENDPOINT	3.40	+ 20	2,593,000,008	8.0	0.0000003

Table 7-36. Frequency Stability Data (Band 41) – 20MHz QPSK – Full RB Configuration

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

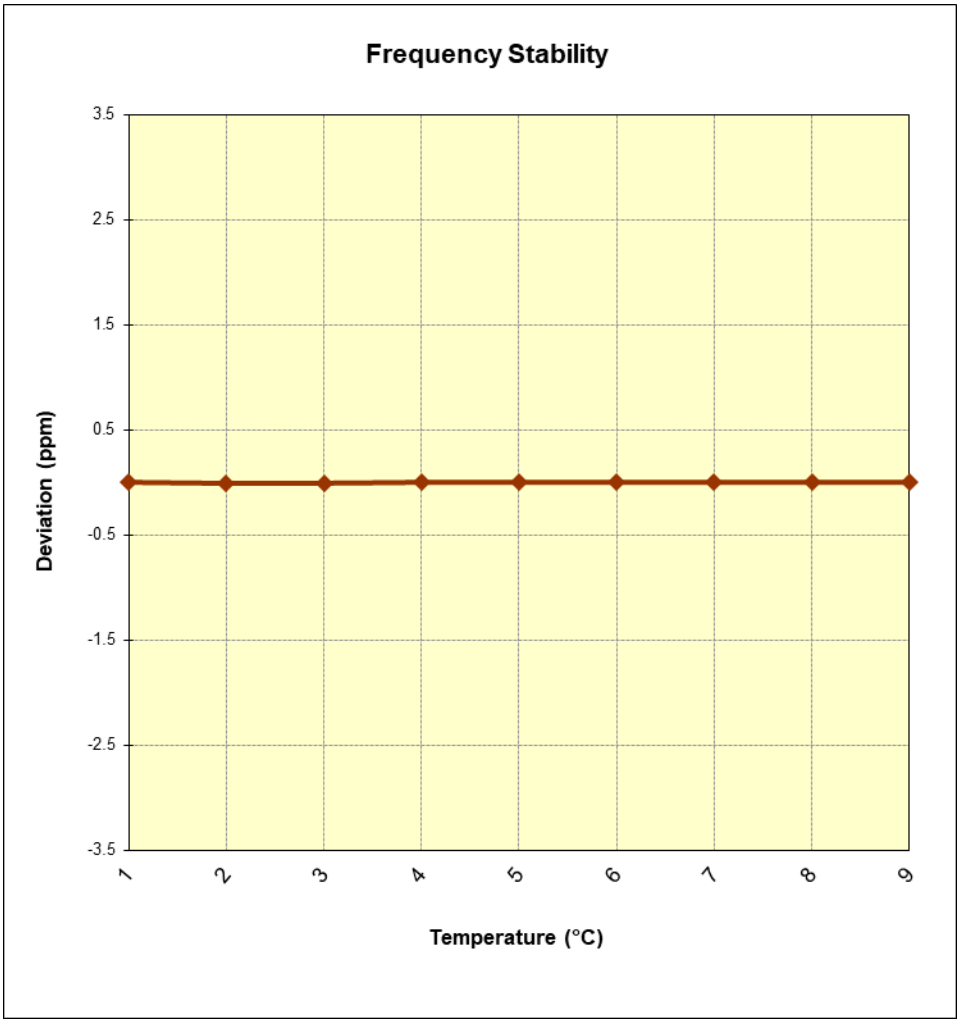


Figure 7-13. Frequency Stability Graph (Band 41) – 20MHz QPSK – Full RB Configuration

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Apple Watch FCC ID: BCG-A2375** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.