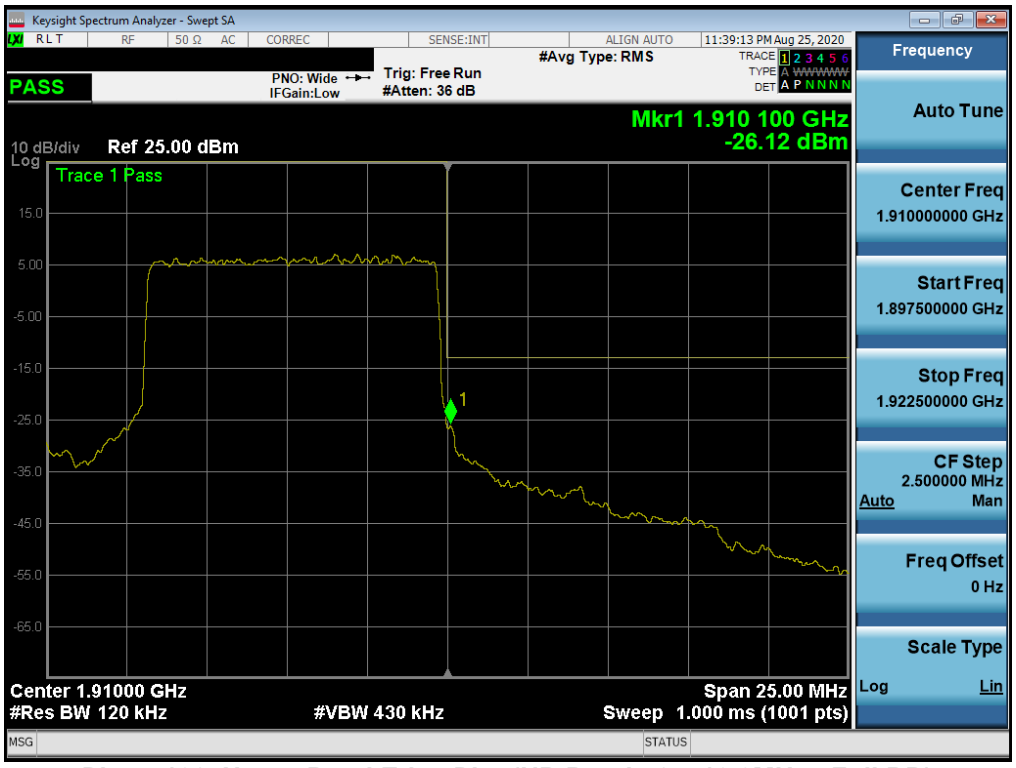
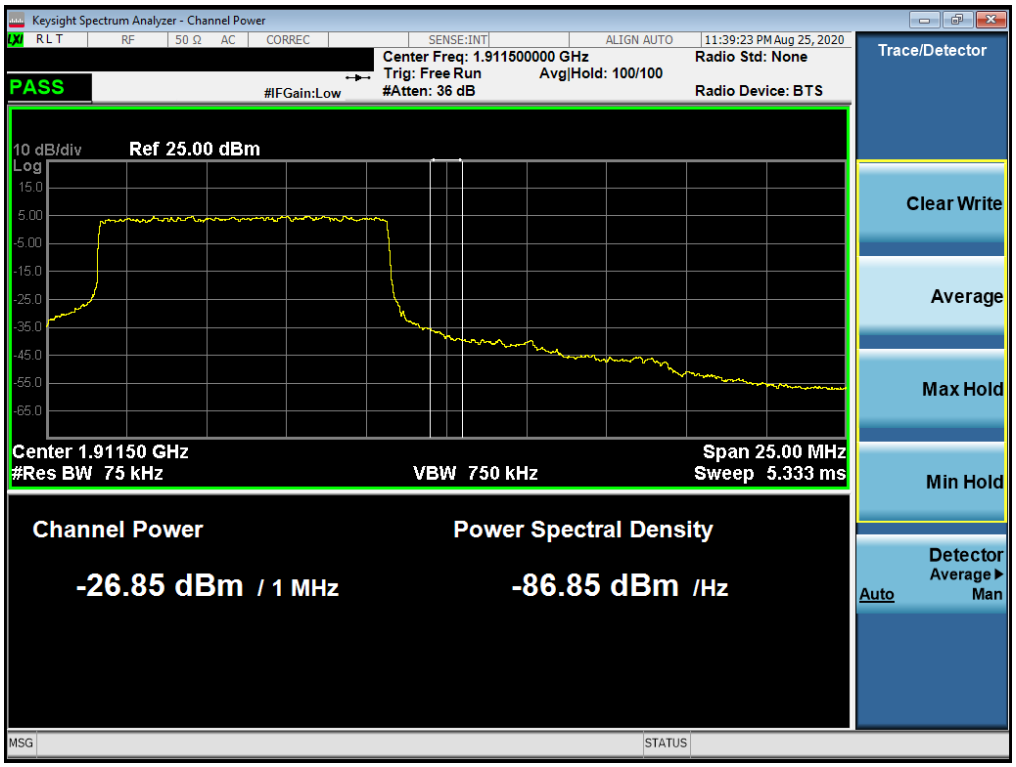
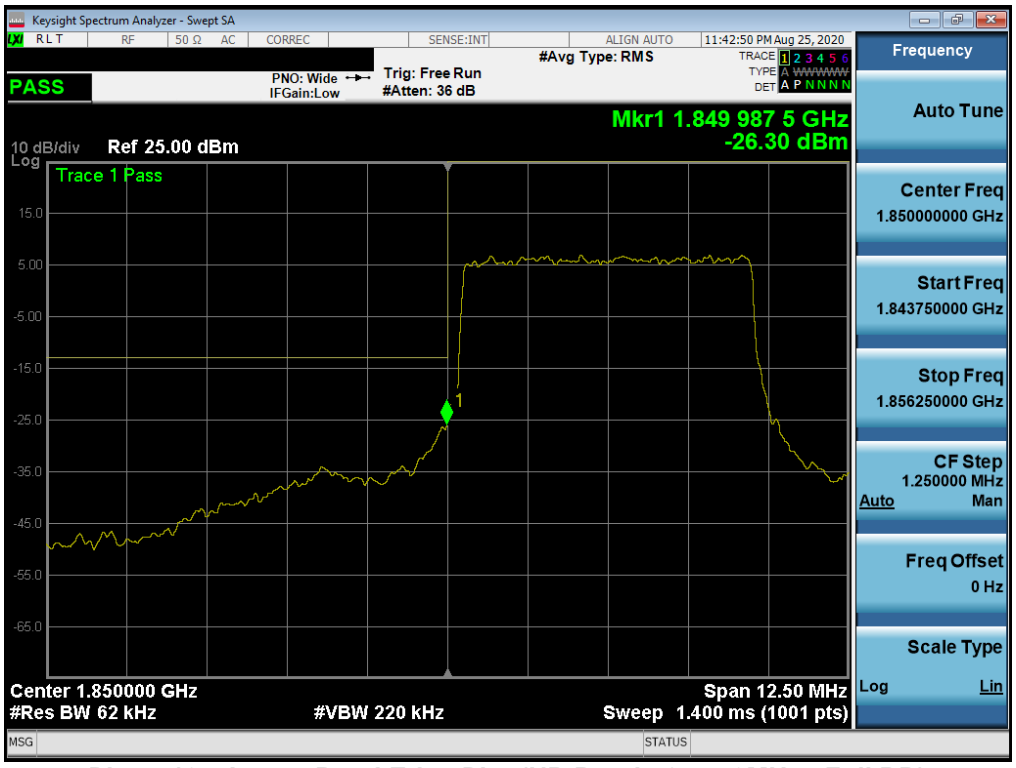


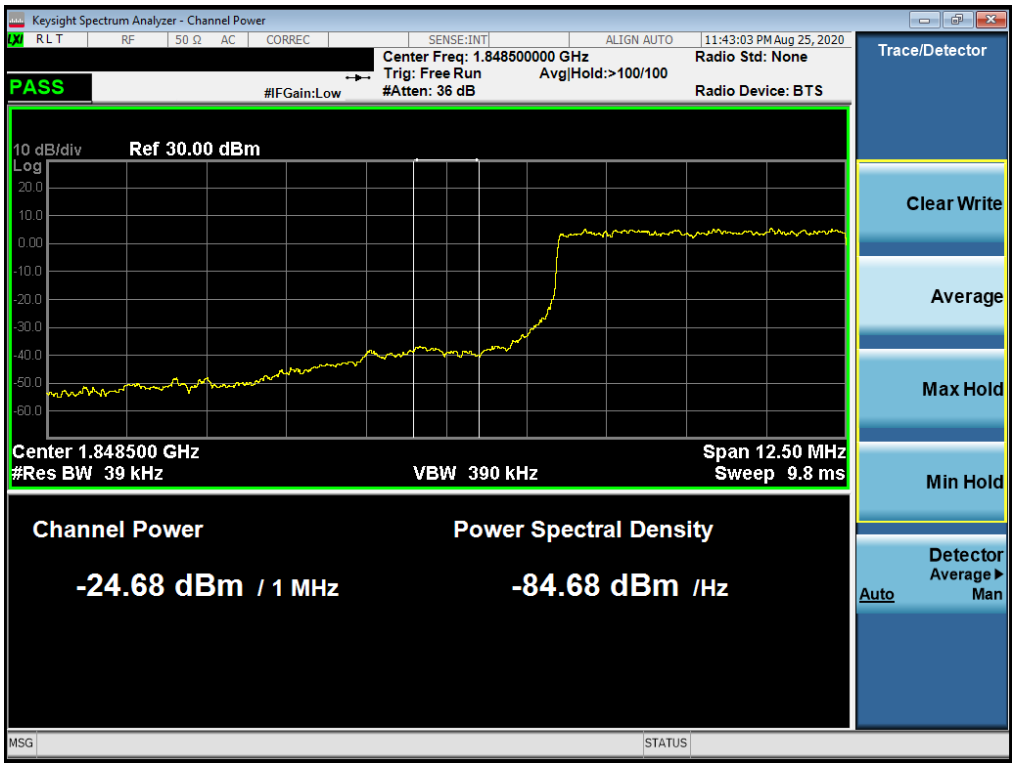
Plot 7-102. Upper Band Edge Plot (NR Band n2 – 10.0MHz - Full RB)



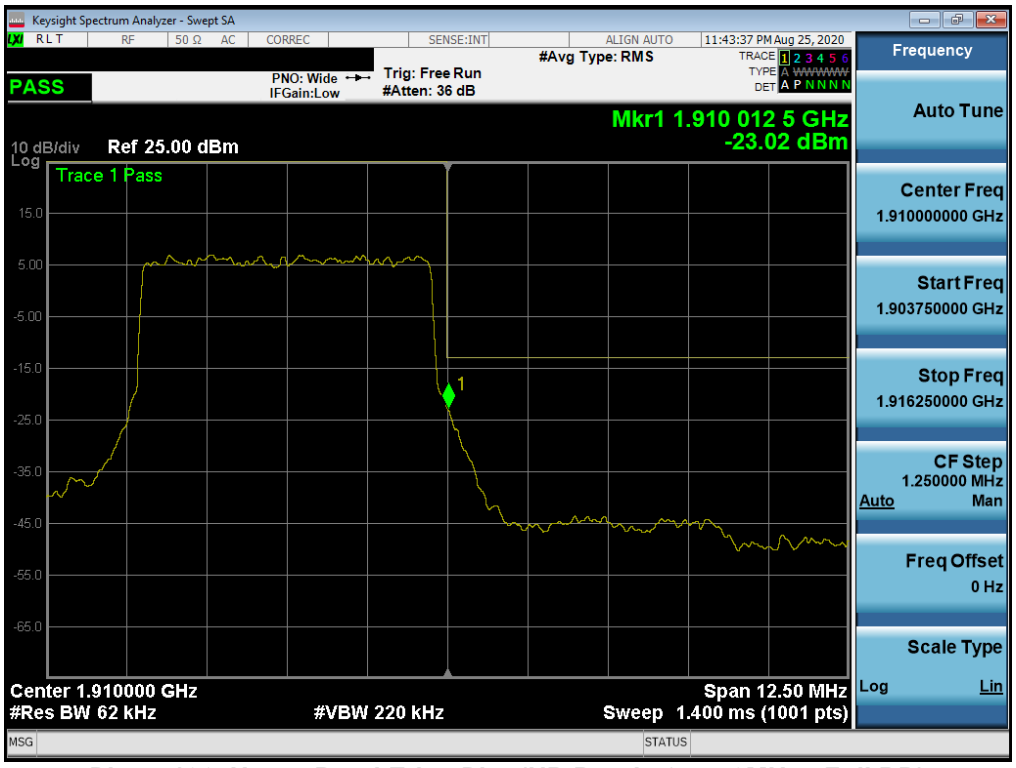
Plot 7-103. Upper Extended Band Edge Plot (NR Band n2 – 10.0MHz - Full RB)



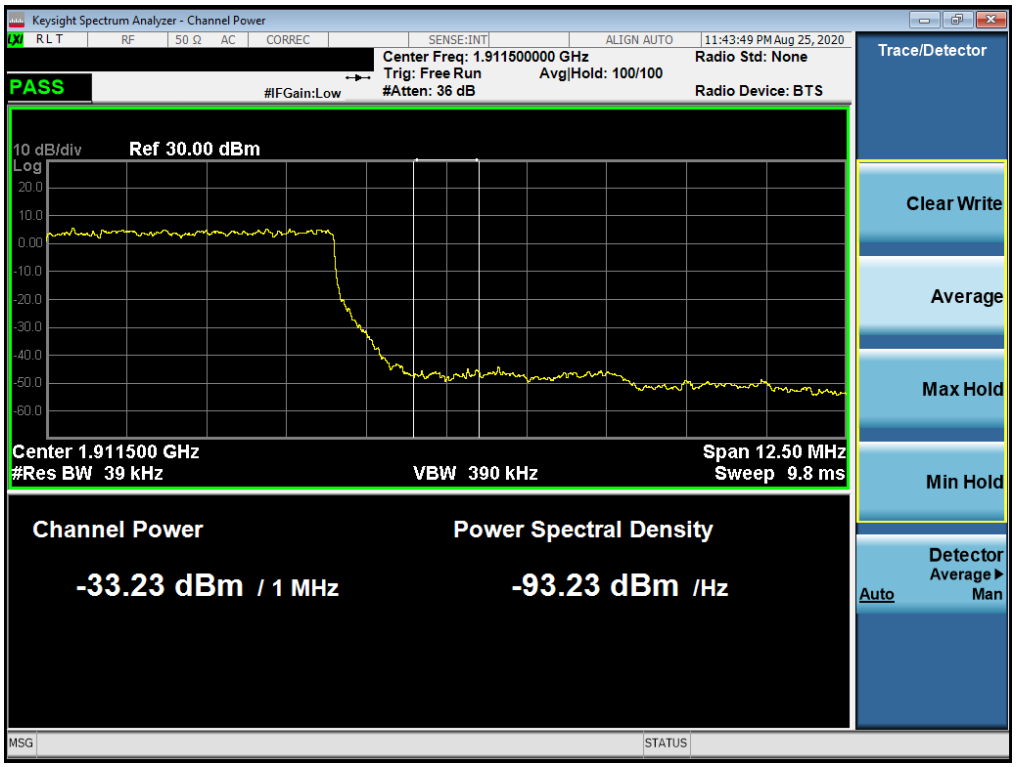
Plot 7-104. Lower Band Edge Plot (NR Band n2 – 5.0MHz - Full RB)



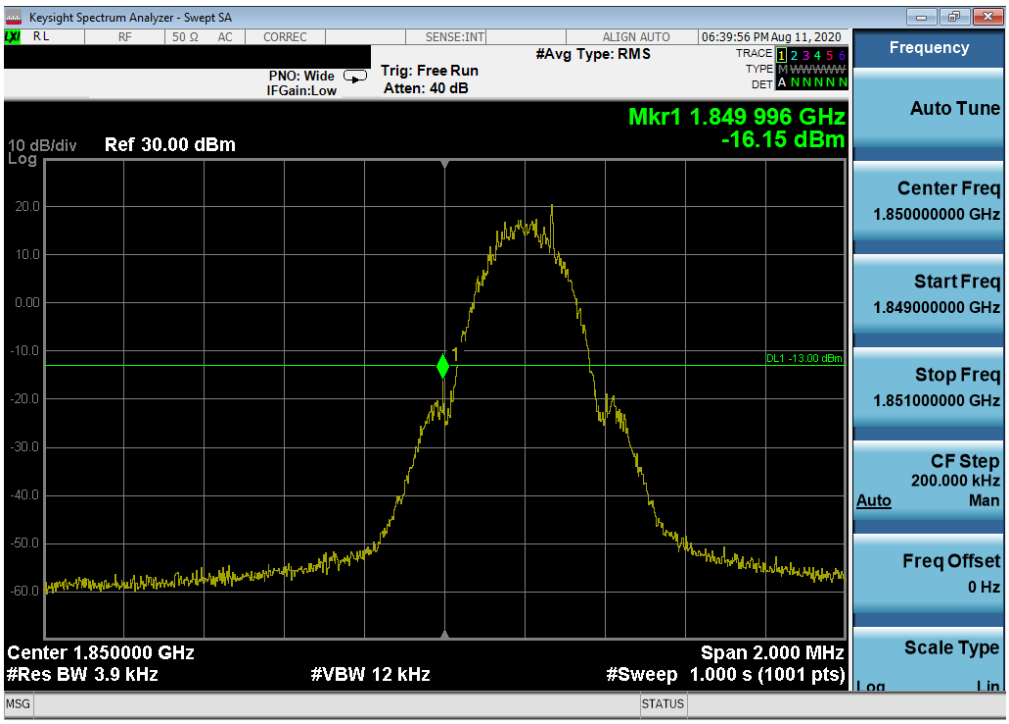
Plot 7-105. Lower Extended Band Edge Plot (NR Band n2 – 5.0MHz - Full RB)



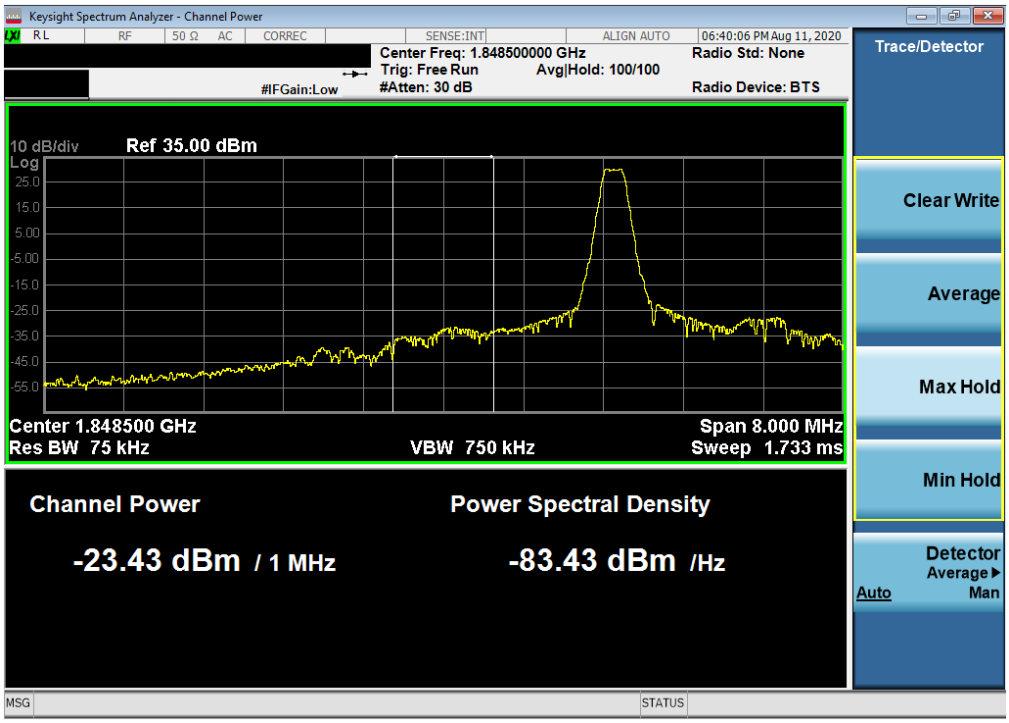
Plot 7-106. Upper Band Edge Plot (NR Band n2 – 5.0MHz - Full RB)



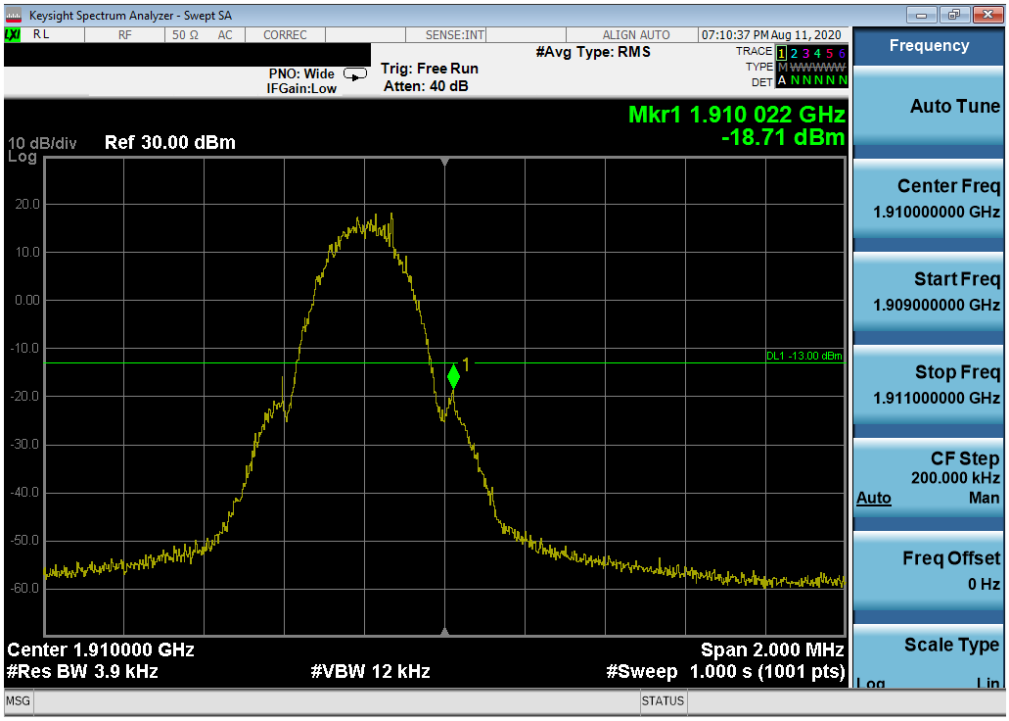
Plot 7-107. Upper Extended Band Edge Plot (NR Band n2 – 5.0MHz - Full RB)



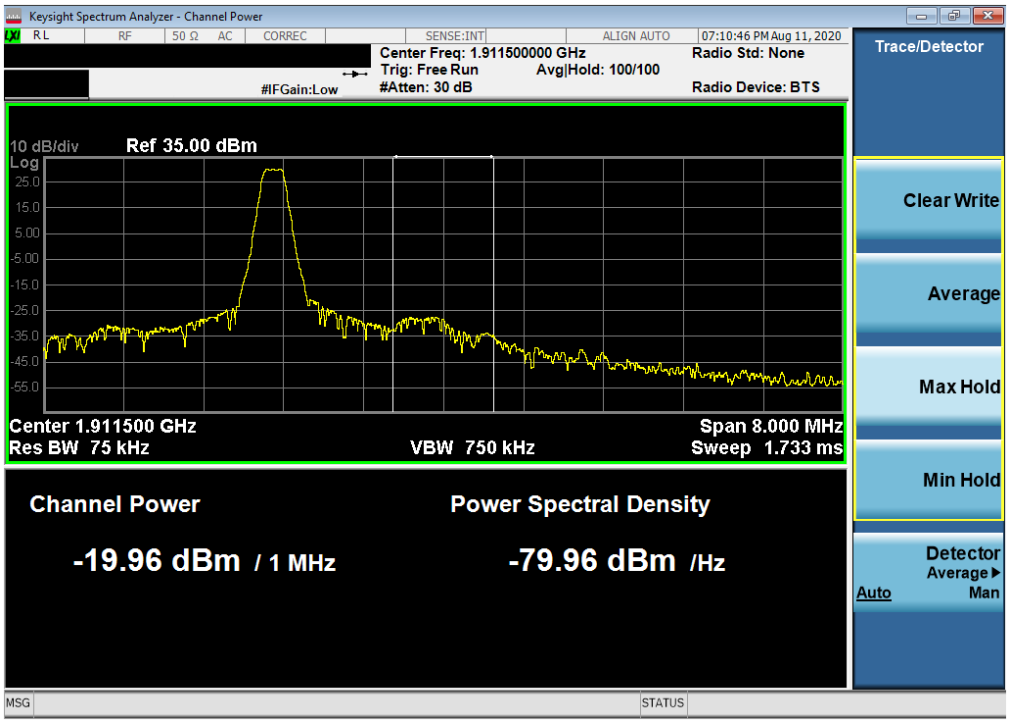
Plot 7-108. Lower Band Edge Plot (GPRS PCS – Ch. 512)



Plot 7-109. Extended Lower Band Edge Plot (GPRS PCS – Ch. 512)

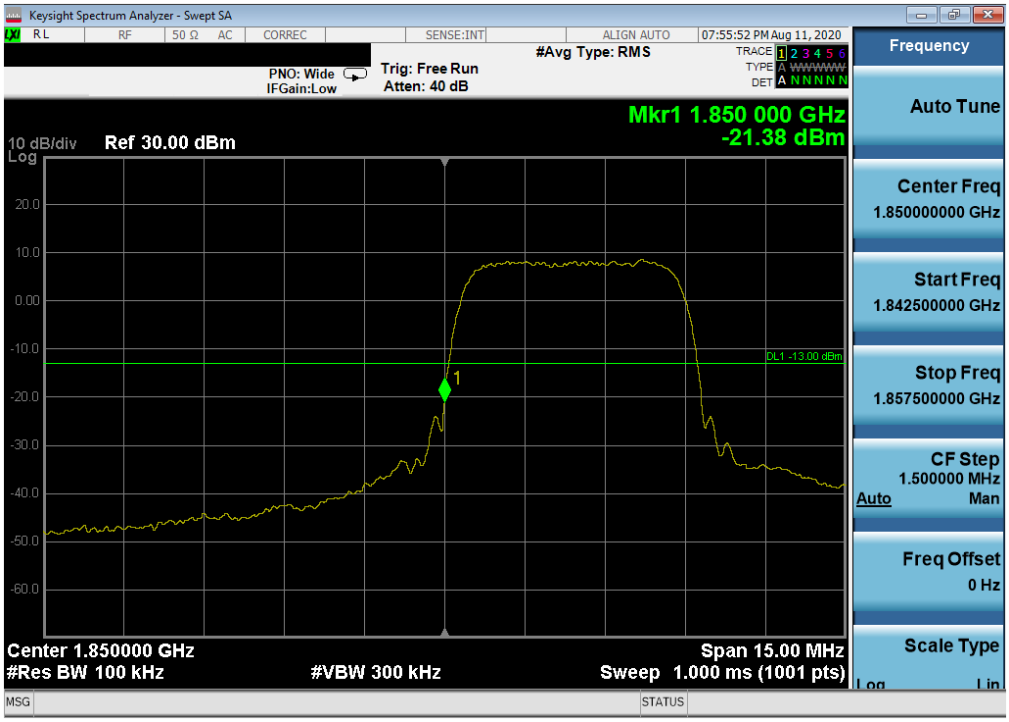


Plot 7-110. Upper Band Edge Plot (GPRS PCS – Ch. 810)

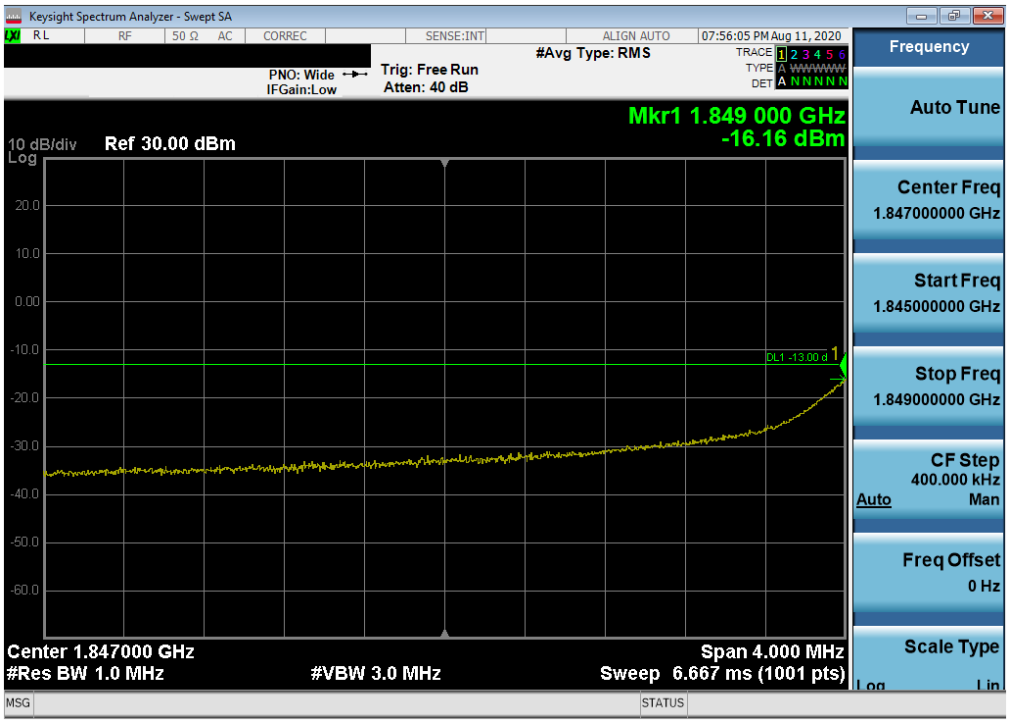


Plot 7-111. Extended Upper Band Edge Plot (GPRS PCS – Ch. 810)

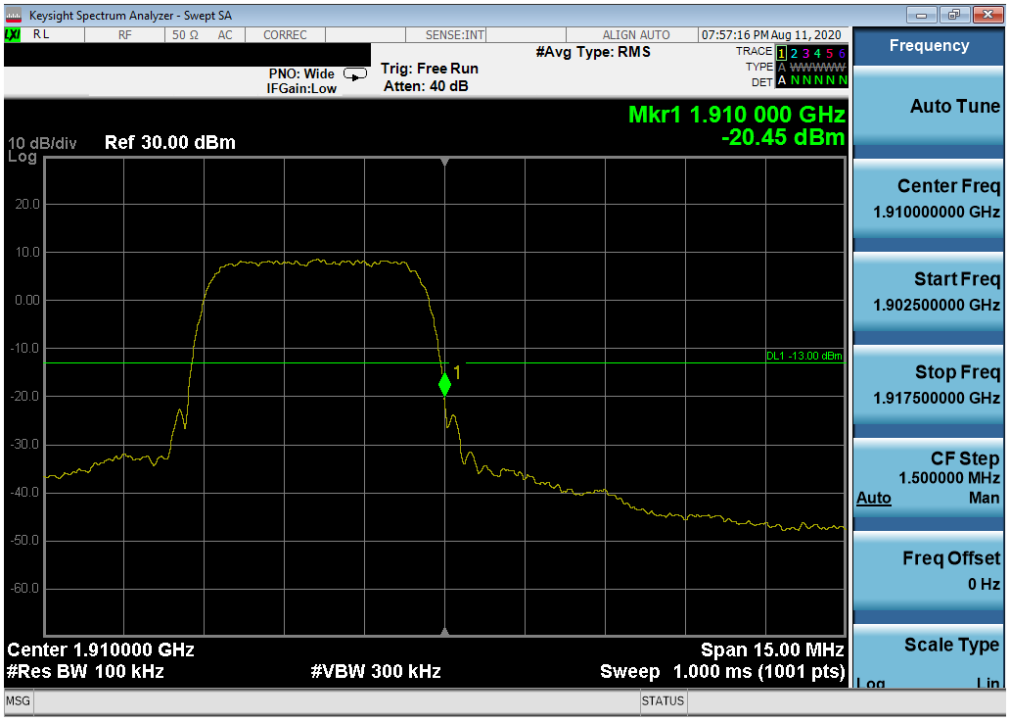
WCDMA PCS



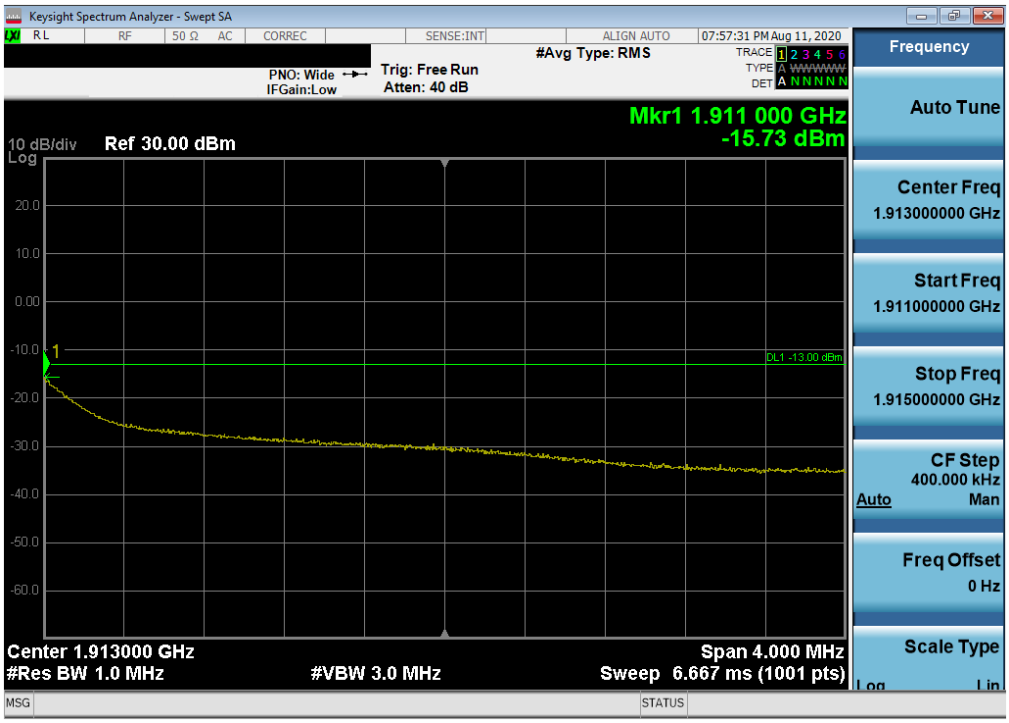
Plot 7-112. Lower Band Edge Plot (WCDMA PCS – Ch. 9262)



Plot 7-113. Extended Lower Band Edge Plot (WCDMA PCS – Ch. 9262)



Plot 7-114. Upper Band Edge Plot (WCDMA PCS – Ch. 9538)



Plot 7-115. Extended Upper Band Edge Plot (WCDMA PCS – Ch. 9538)

7.6 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.

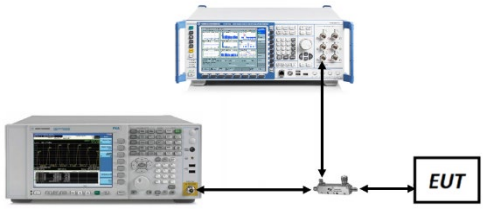
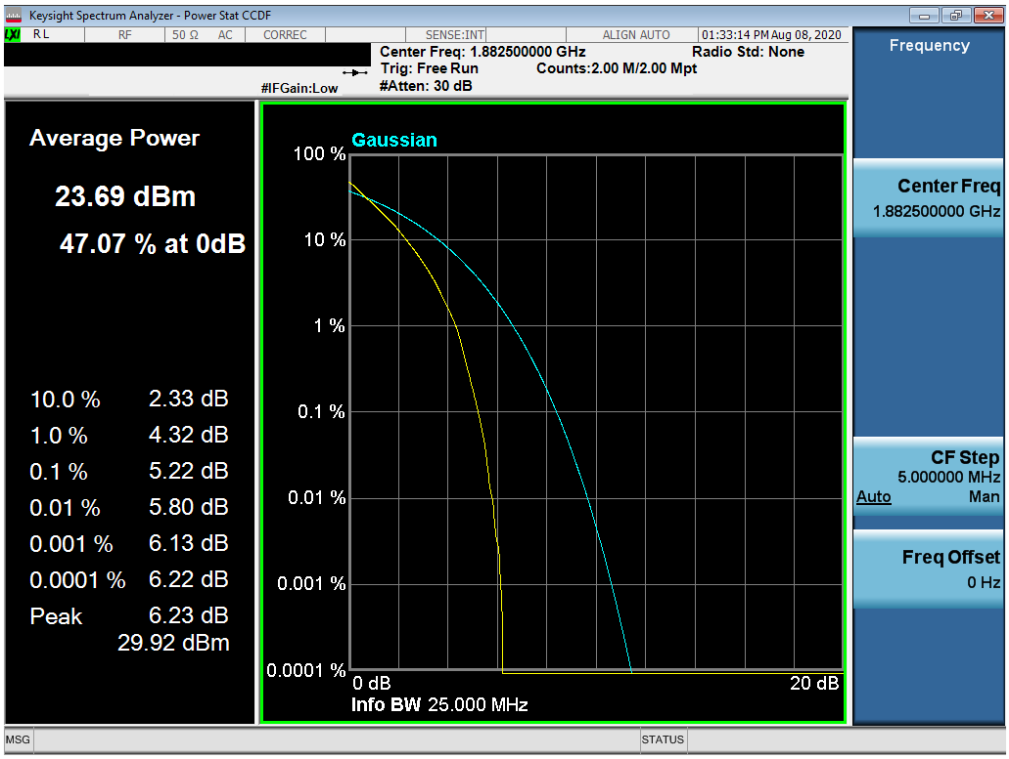


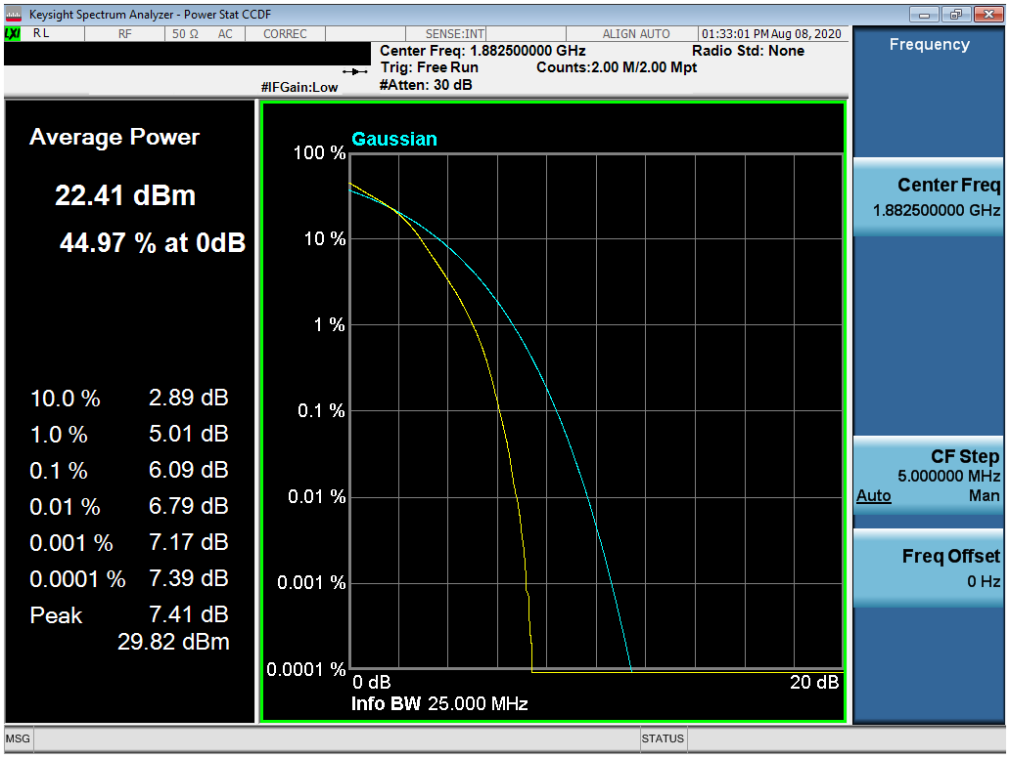
Figure 7-5. Test Instrument & Measurement Setup

Test Notes

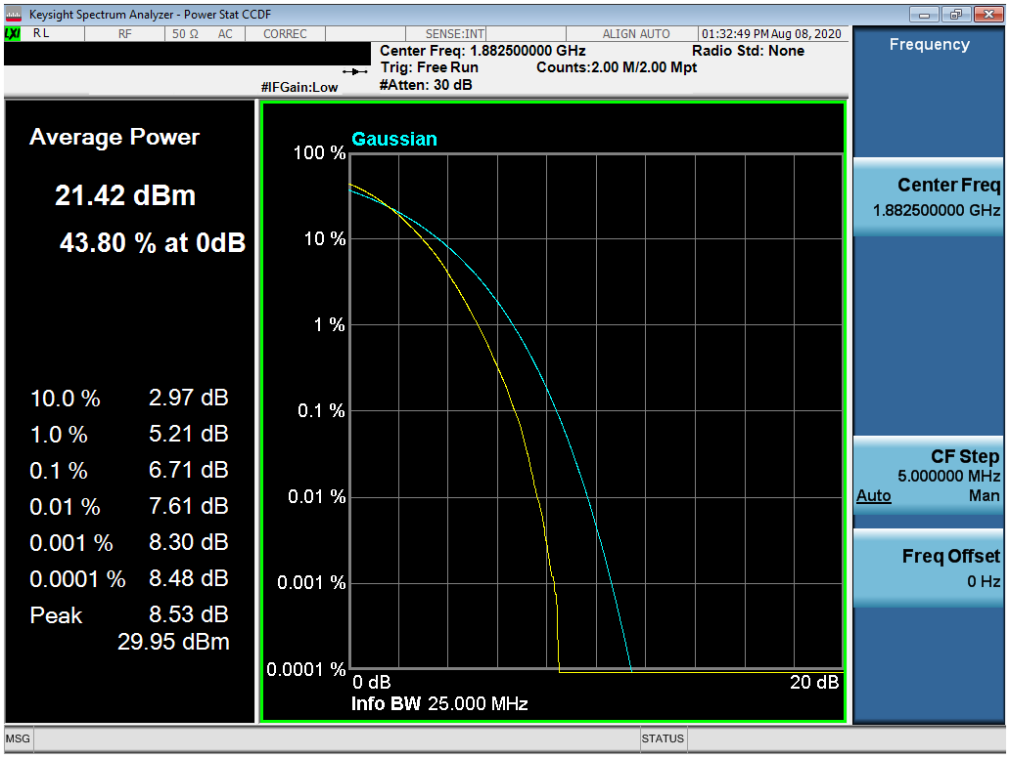
None.



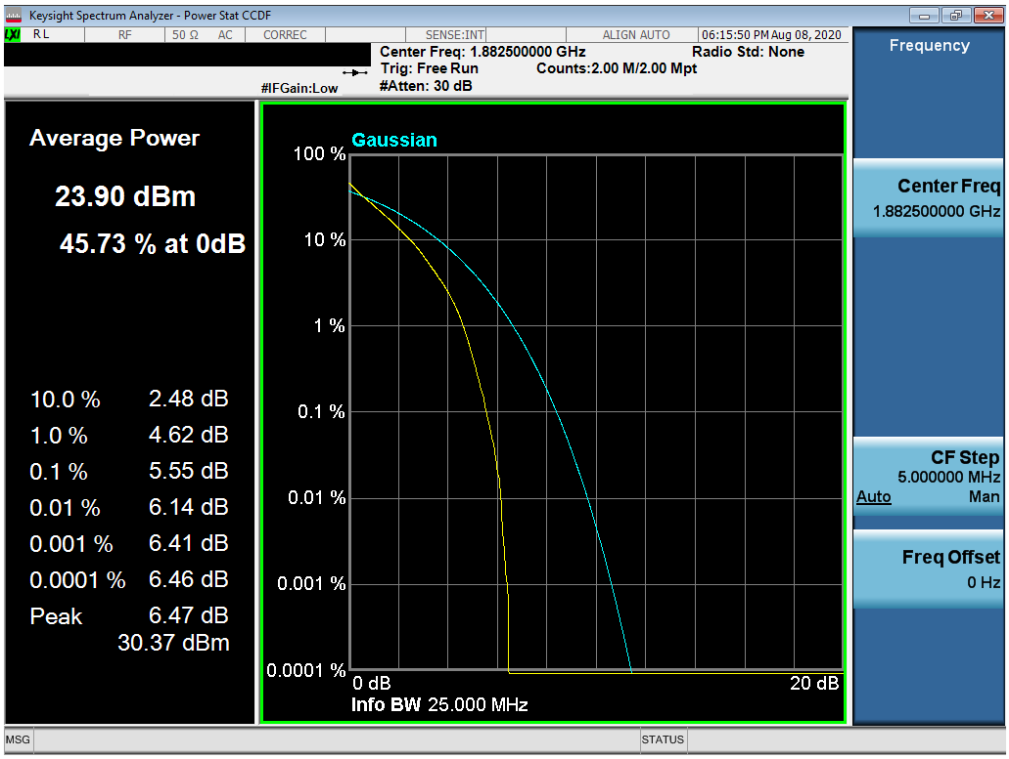
Plot 7-116. PAR Plot (LTE Band 25/2 - 20MHz QPSK - Full RB Configuration)



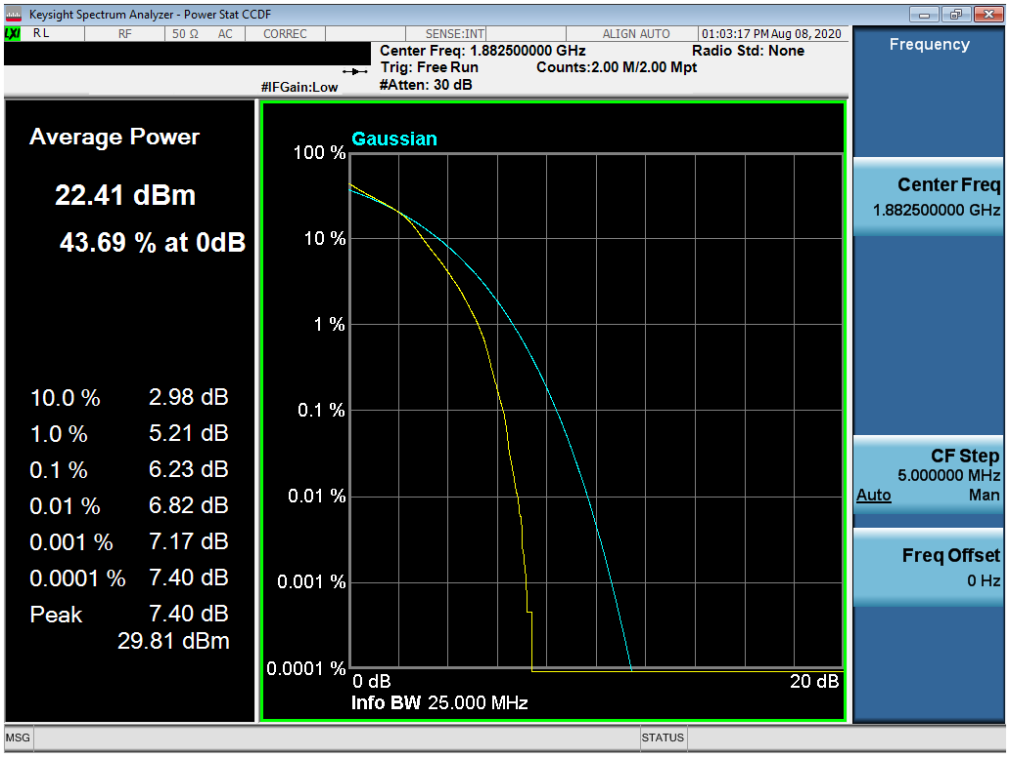
Plot 7-117. PAR Plot (LTE Band 25/2 - 20MHz 16-QAM - Full RB Configuration)



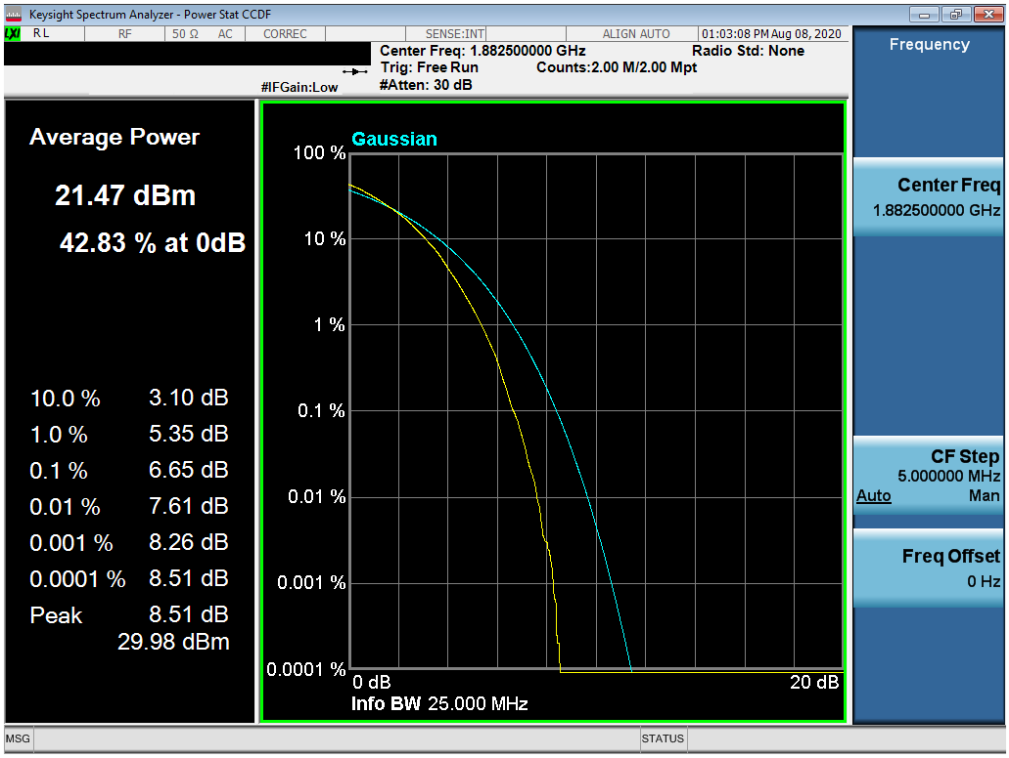
Plot 7-118. PAR Plot (LTE Band 25/2 - 20MHz 64-QAM - Full RB Configuration)



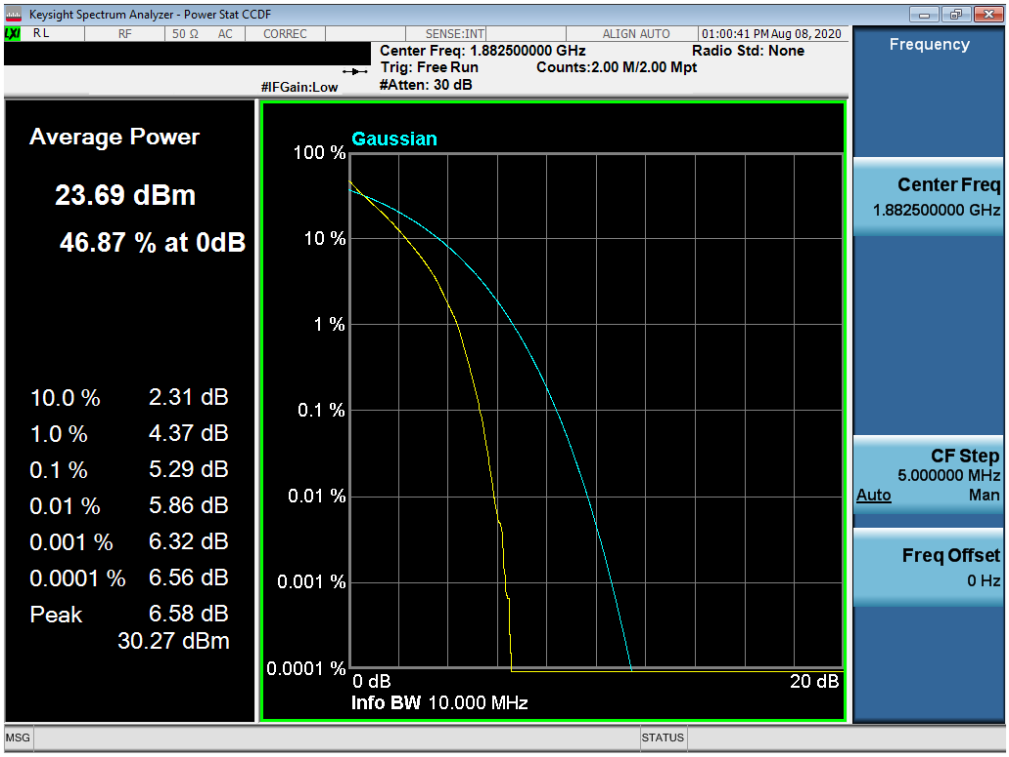
Plot 7-119. PAR Plot (LTE Band 25/2 - 15MHz QPSK - Full RB Configuration)



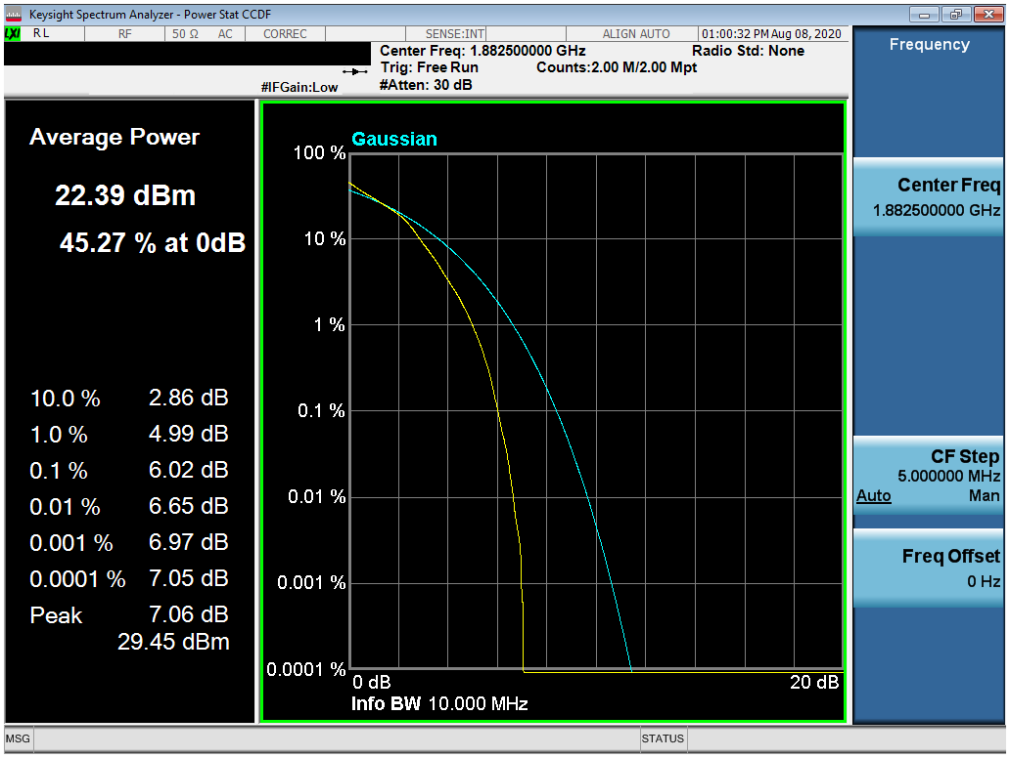
Plot 7-120. PAR Plot (LTE Band 25/2 - 15MHz 16-QAM - Full RB Configuration)



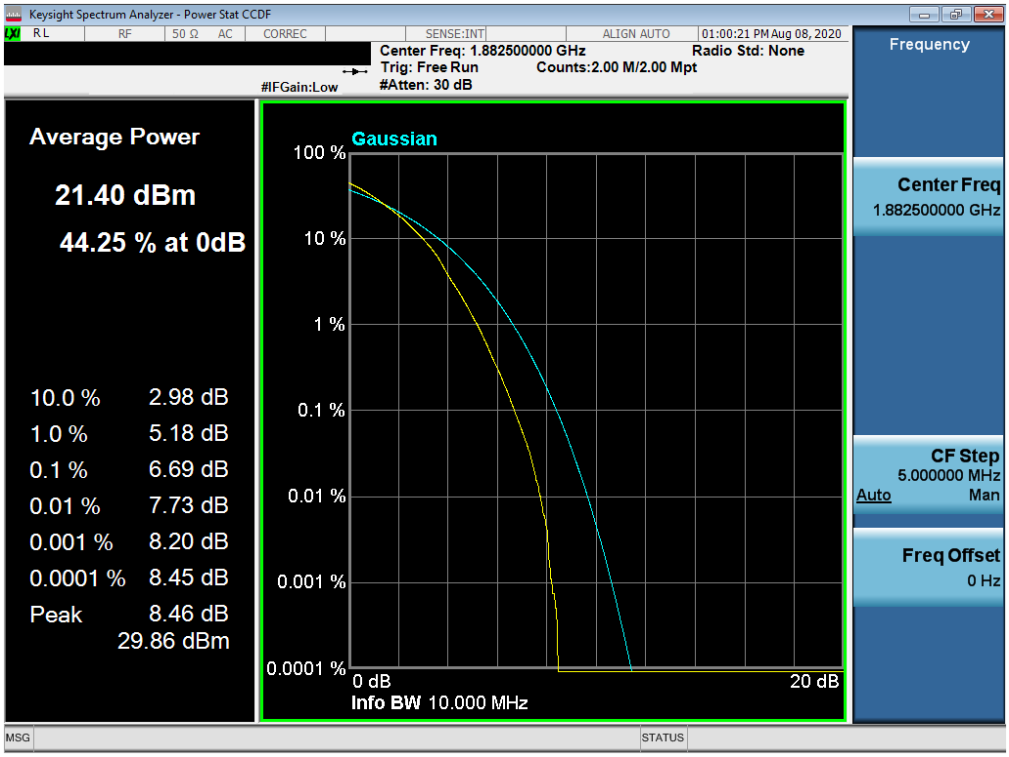
Plot 7-121. PAR Plot (LTE Band 25/2 - 15MHz 64-QAM - Full RB Configuration)



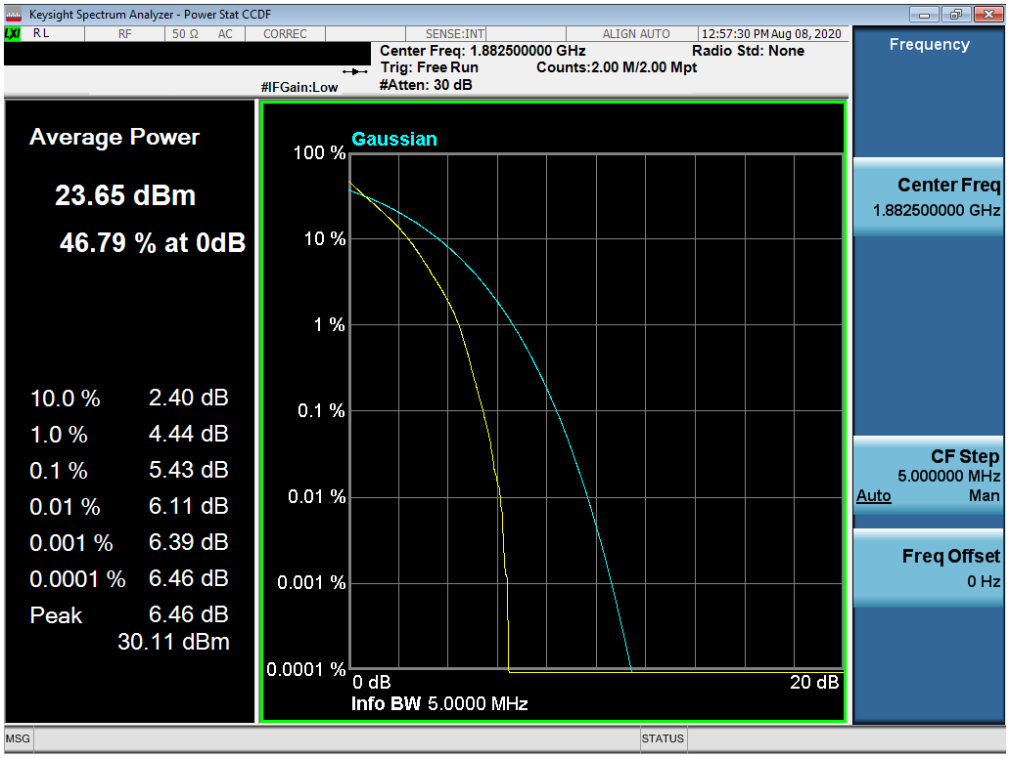
Plot 7-122. PAR Plot (LTE Band 25/2 - 10MHz QPSK - Full RB Configuration)



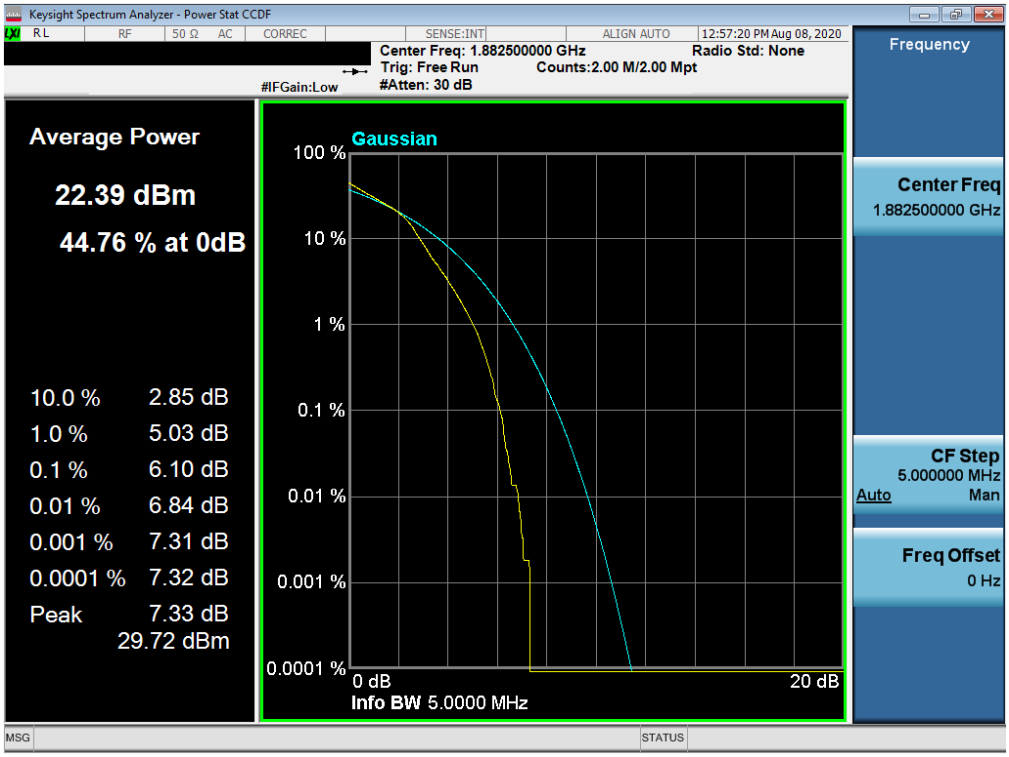
Plot 7-123. PAR Plot (LTE Band 25/2 - 10MHz 16-QAM - Full RB Configuration)



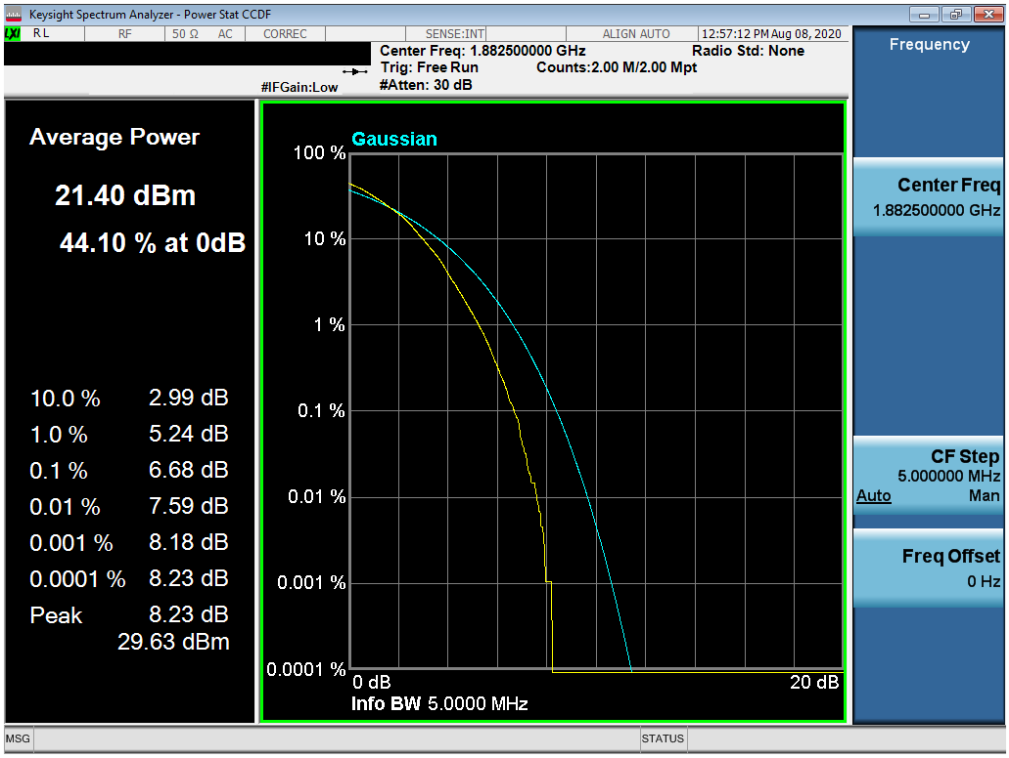
Plot 7-124. PAR Plot (LTE Band 25/2 - 10MHz 64-QAM - Full RB Configuration)



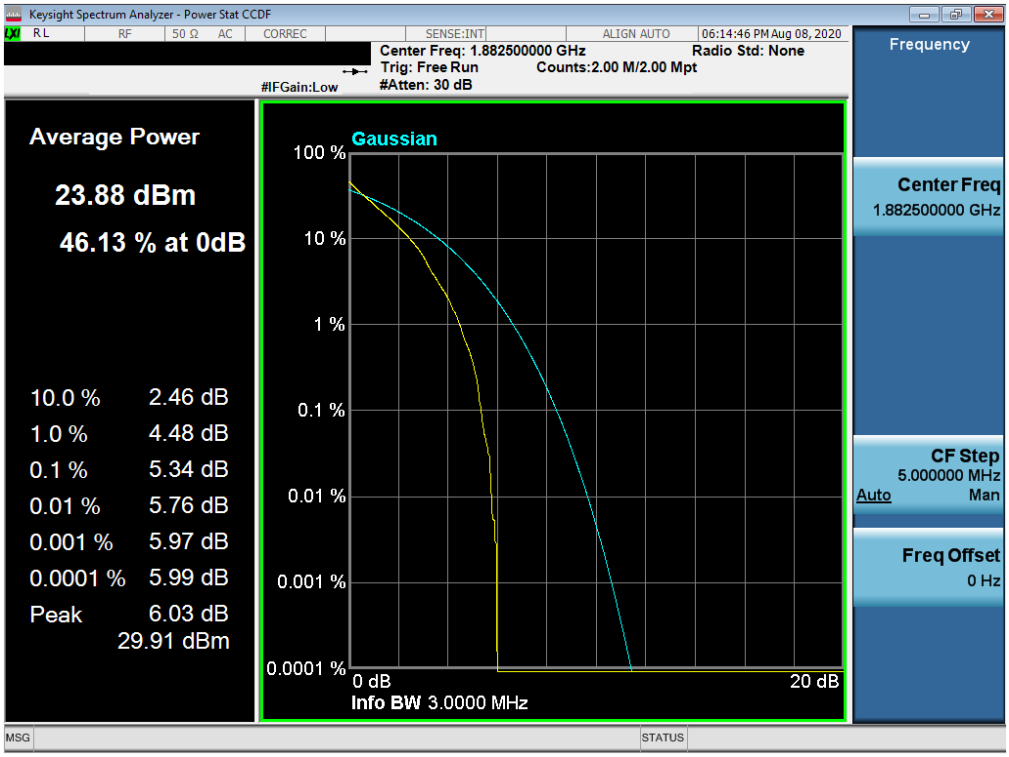
Plot 7-125. PAR Plot (LTE Band 25/2 - 5MHz QPSK - Full RB Configuration)



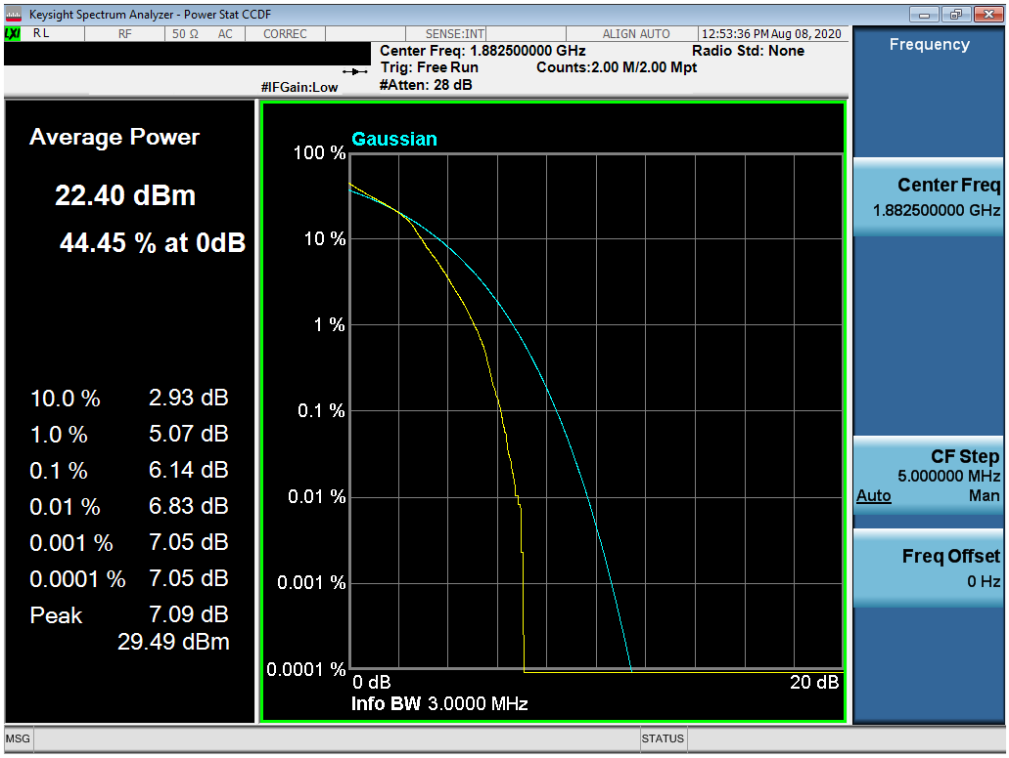
Plot 7-126. PAR Plot (LTE Band 25/2 - 5MHz 16-QAM - Full RB Configuration)



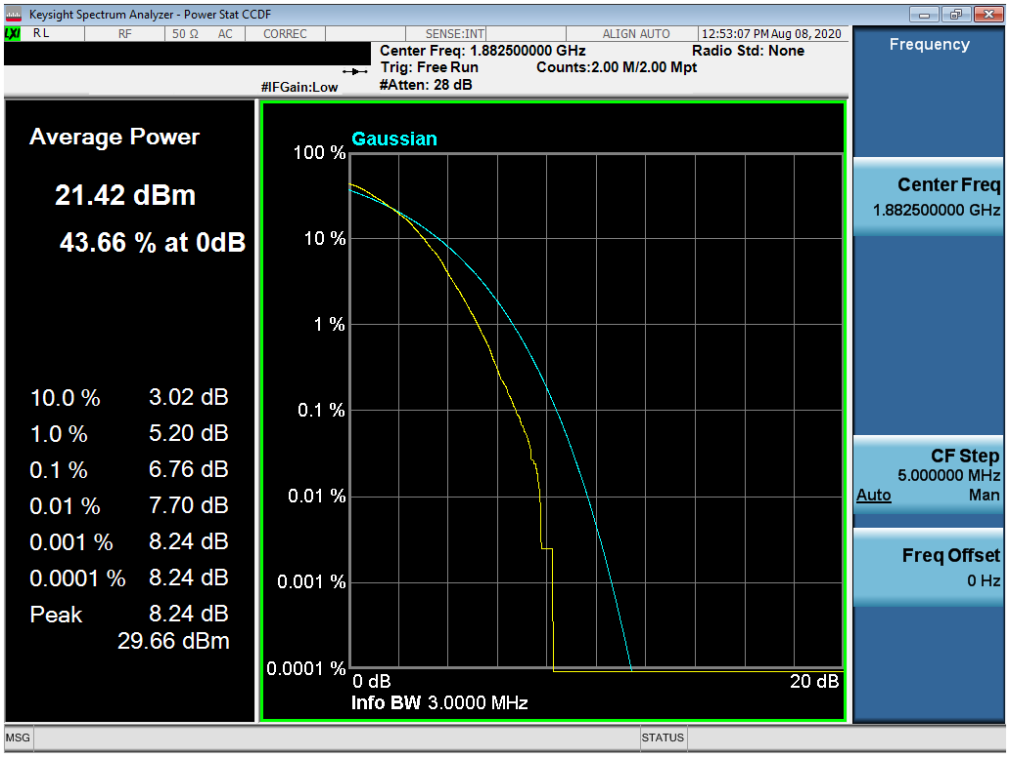
Plot 7-127. PAR Plot (LTE Band 25/2 - 5MHz 64-QAM - Full RB Configuration)



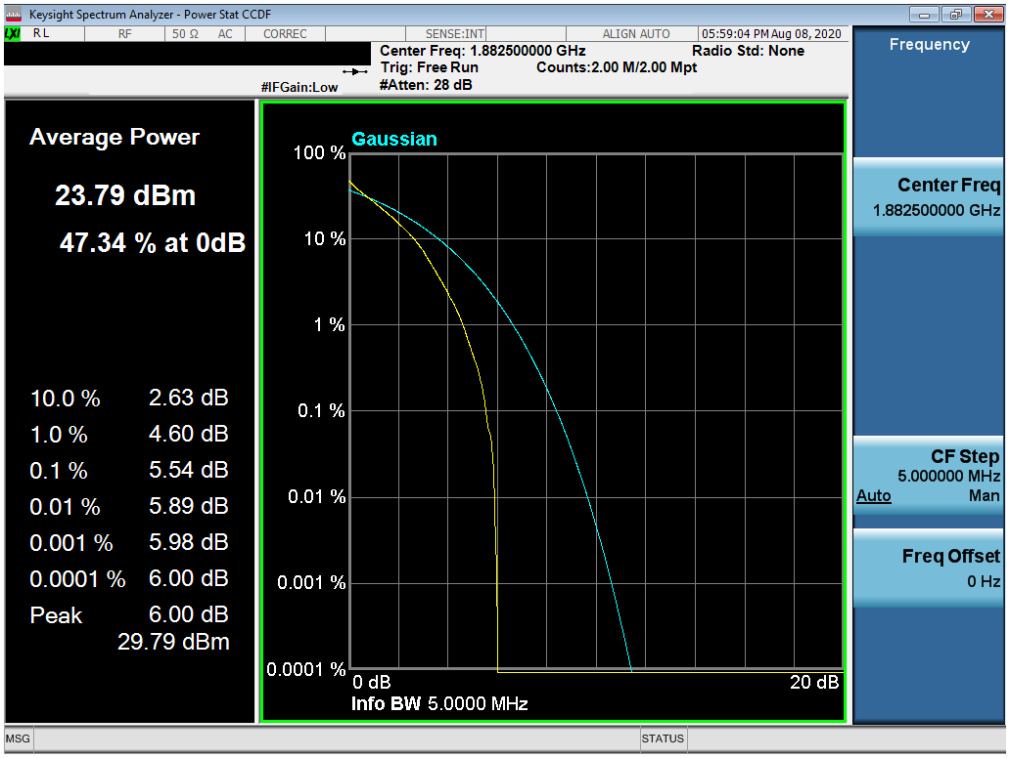
Plot 7-128. PAR Plot (LTE Band 25/2 - 3MHz QPSK - Full RB Configuration)



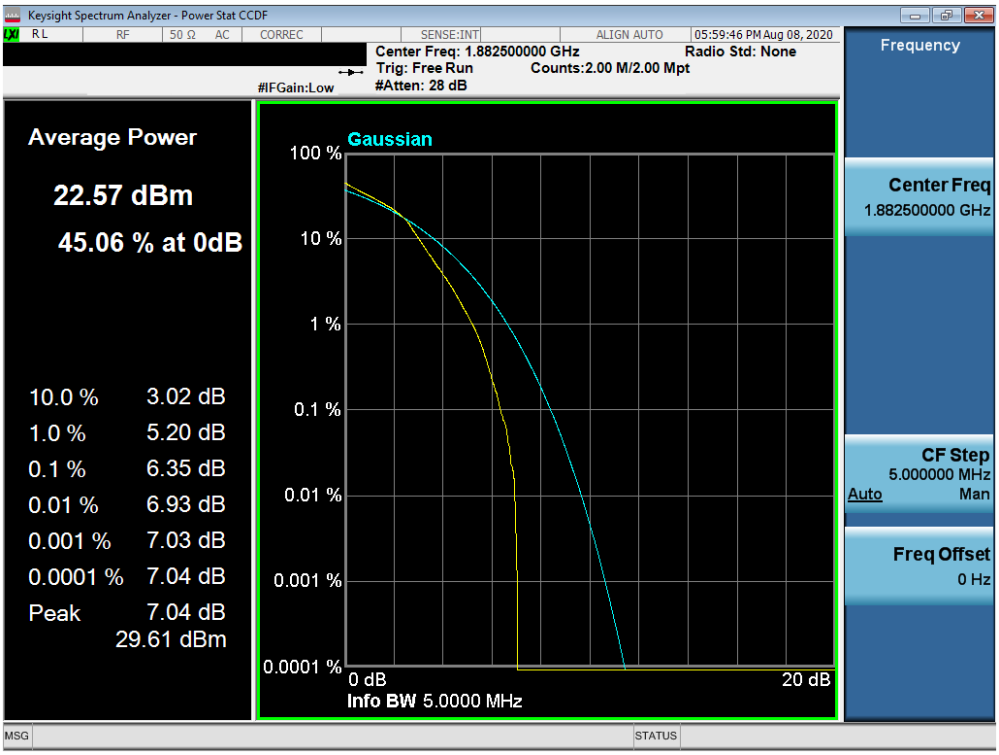
Plot 7-129. PAR Plot (LTE Band 25/2 - 3MHz 16-QAM - Full RB Configuration)



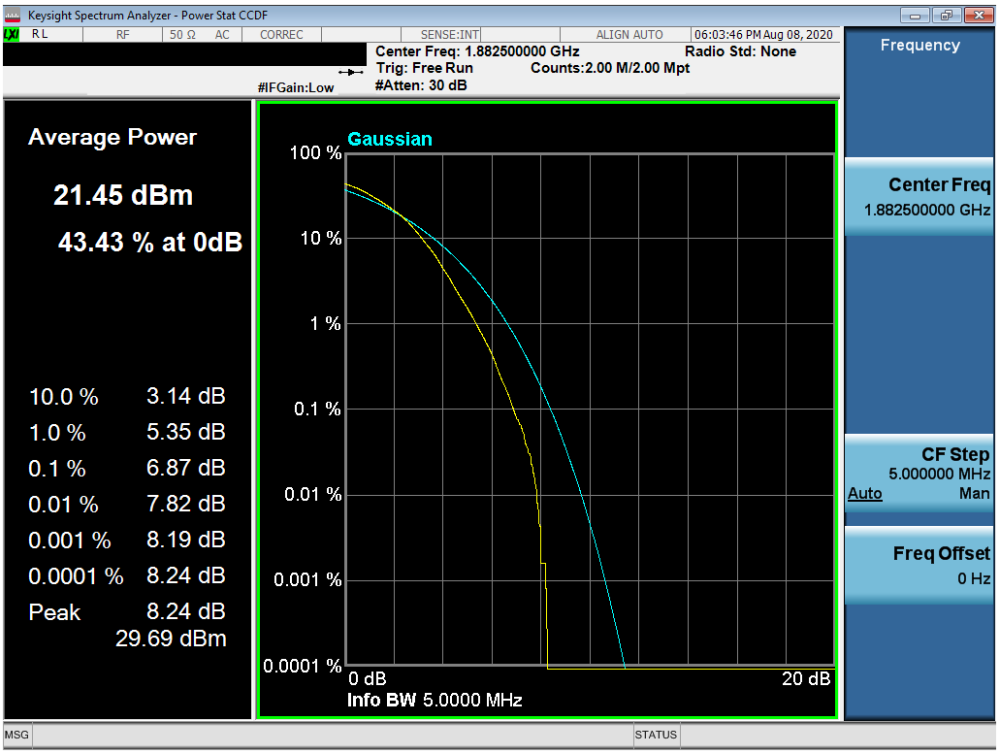
Plot 7-130. PAR Plot (LTE Band 25/2 - 3MHz 64-QAM - Full RB



Plot 7-131. PAR Plot (LTE Band 25/2 - 1.4MHz QPSK - Full RB Configuration)

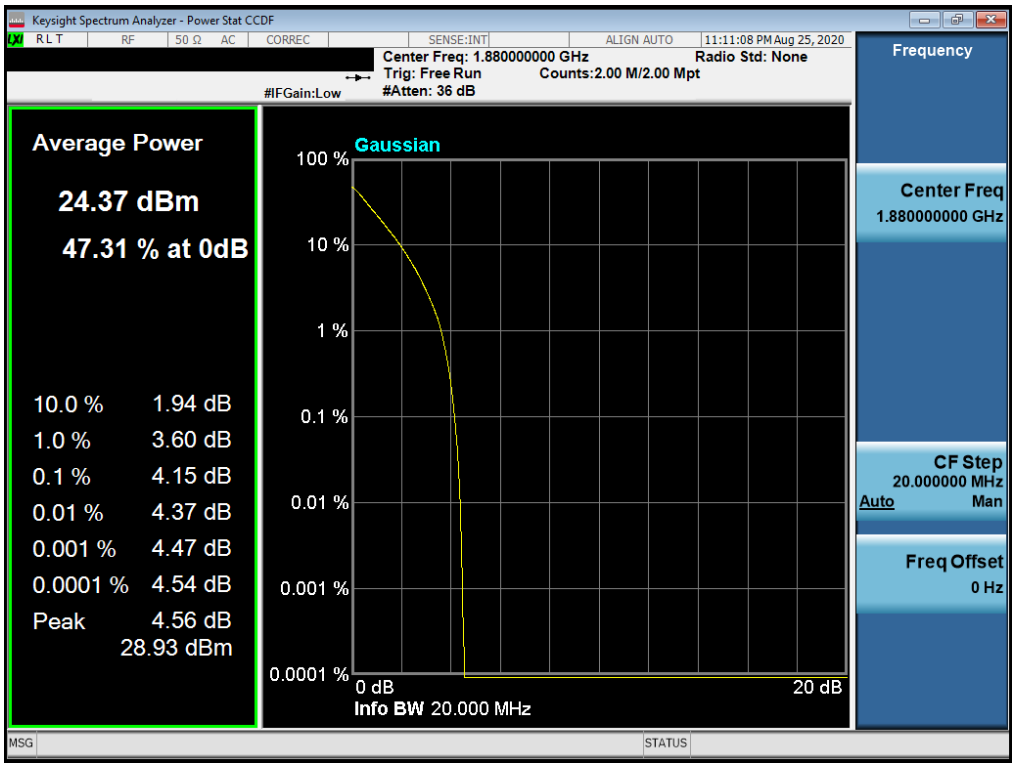


Plot 7-132. PAR Plot (LTE Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)

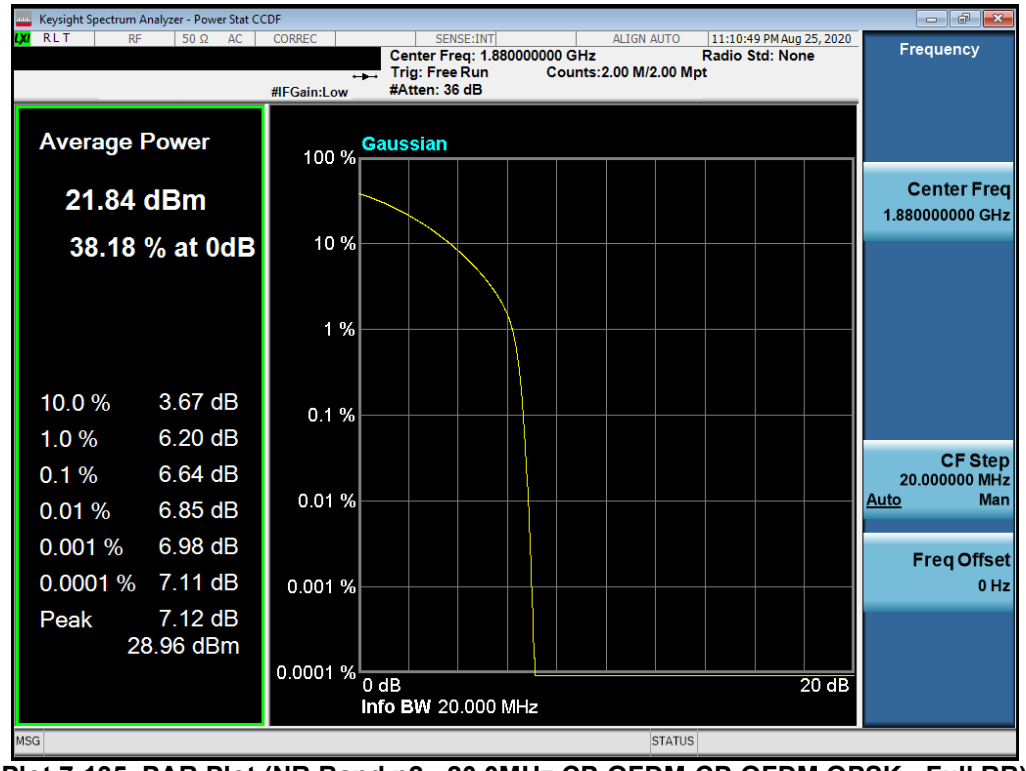


Plot 7-133. PAR Plot (LTE Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)

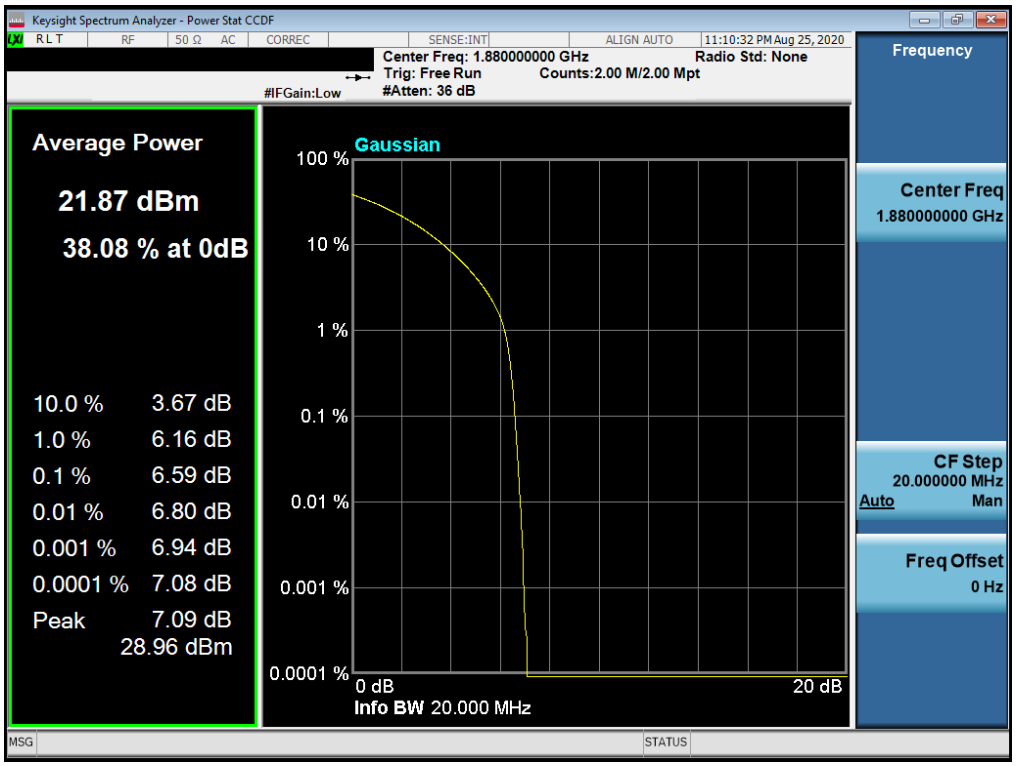
NR Band n2



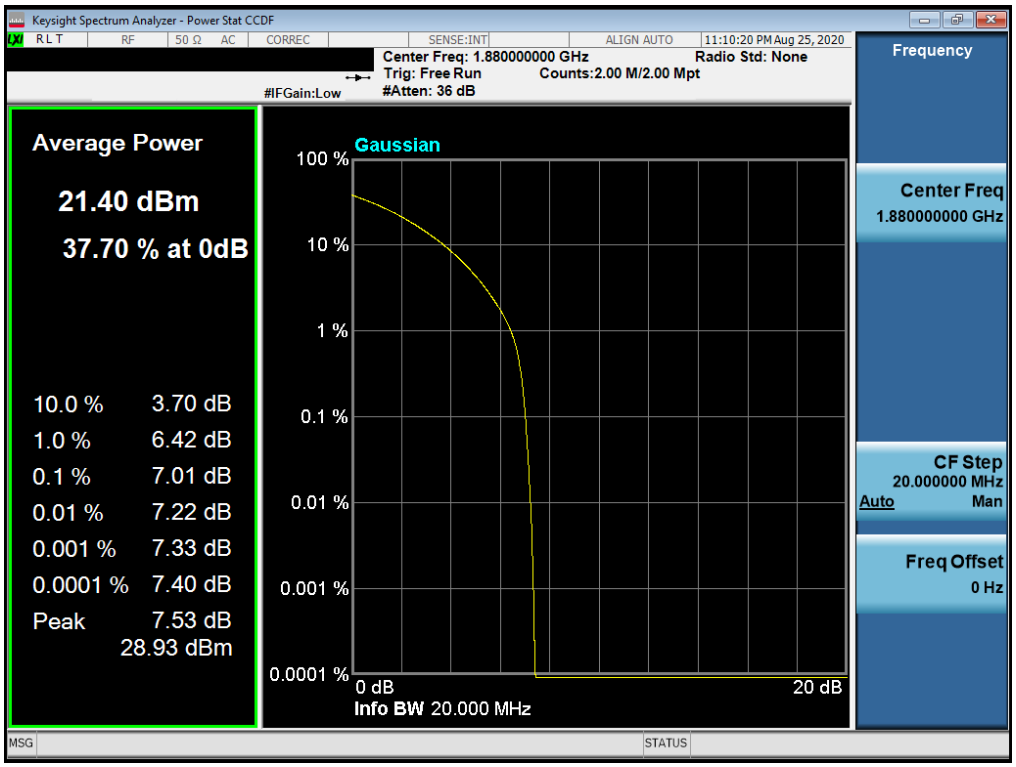
Plot 7-134. PAR Plot (NR Band n2 - 20.0MHz DFT-s-OFDM BPSK - Full RB)



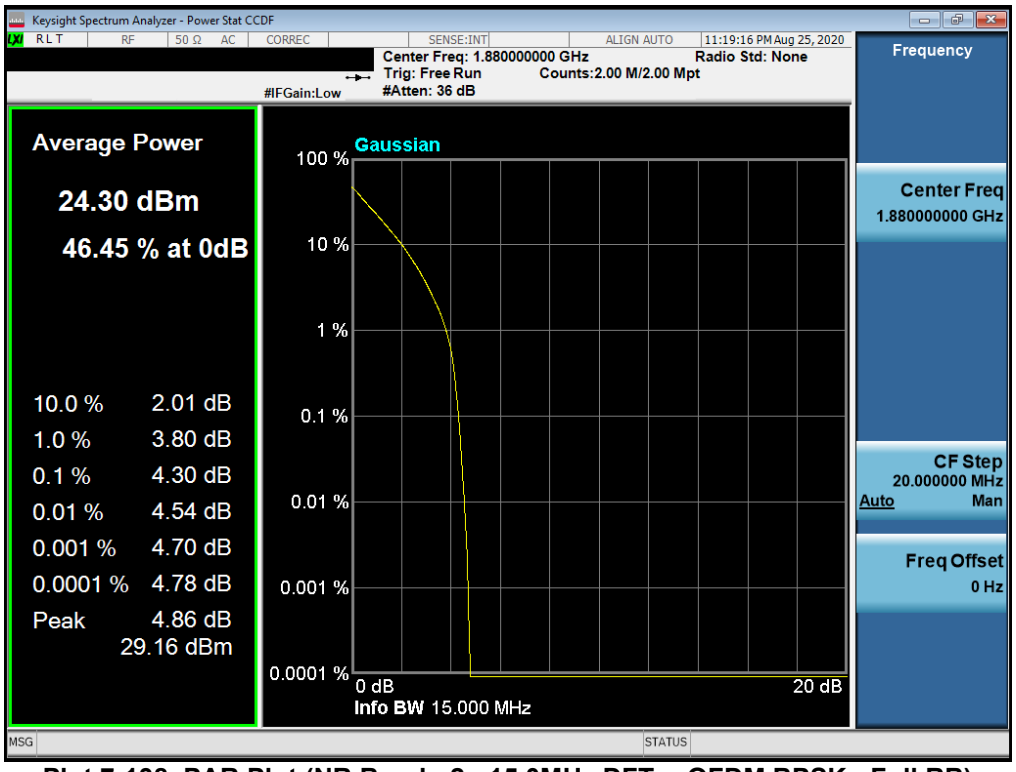
Plot 7-135. PAR Plot (NR Band n2 - 20.0MHz CP-OFDM-CP-OFDM QPSK - Full RB)



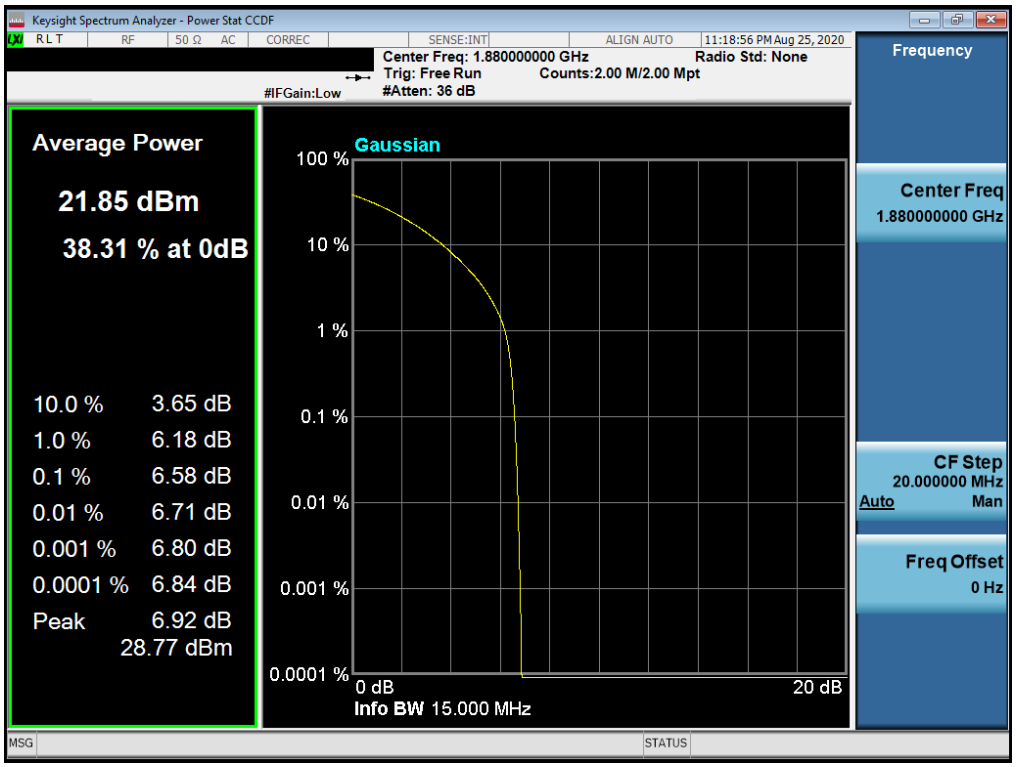
Plot 7-136. PAR Plot (NR Band n2 - 20.0MHz CP-OFDM-CP-OFDM 16-QAM - Full RB)



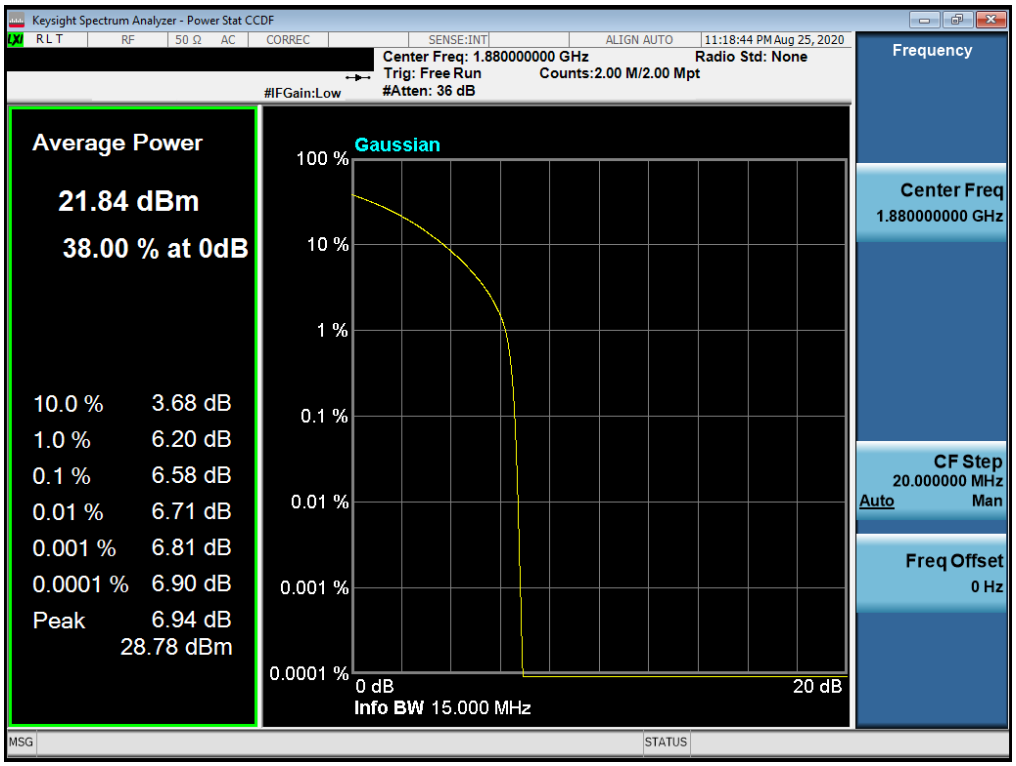
Plot 7-137. PAR Plot (NR Band n2 - 20.0MHz CP-OFDM-CP-OFDM 64-QAM - Full RB)



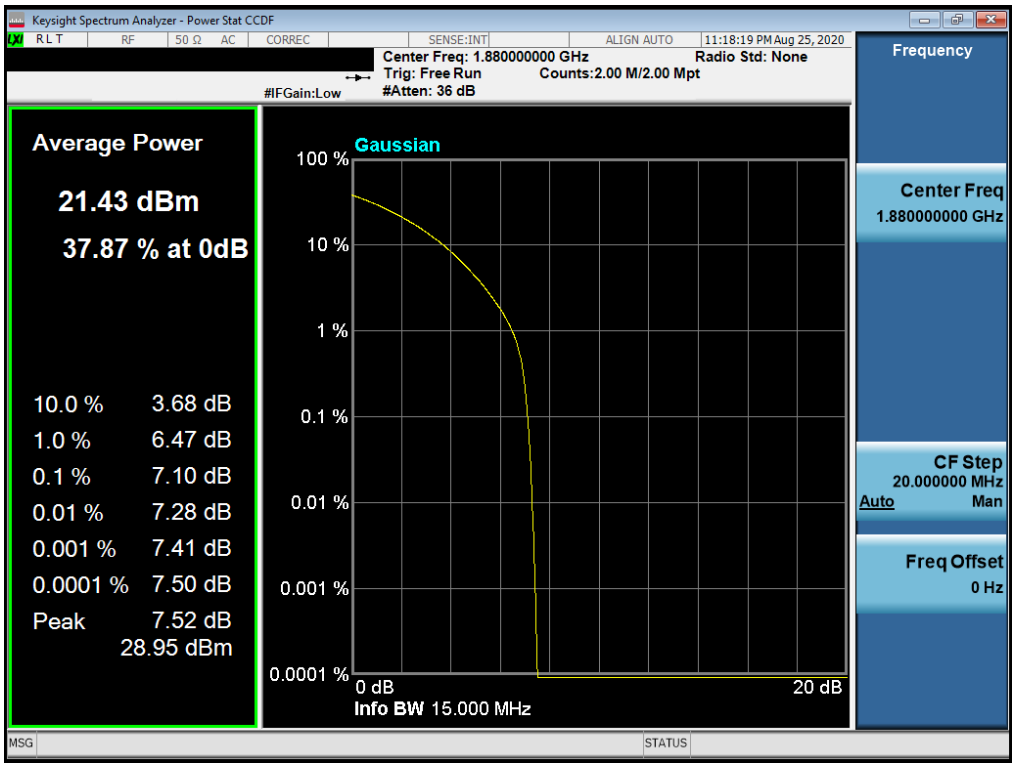
Plot 7-138. PAR Plot (NR Band n2 - 15.0MHz DFT-s-OFDM BPSK - Full RB)



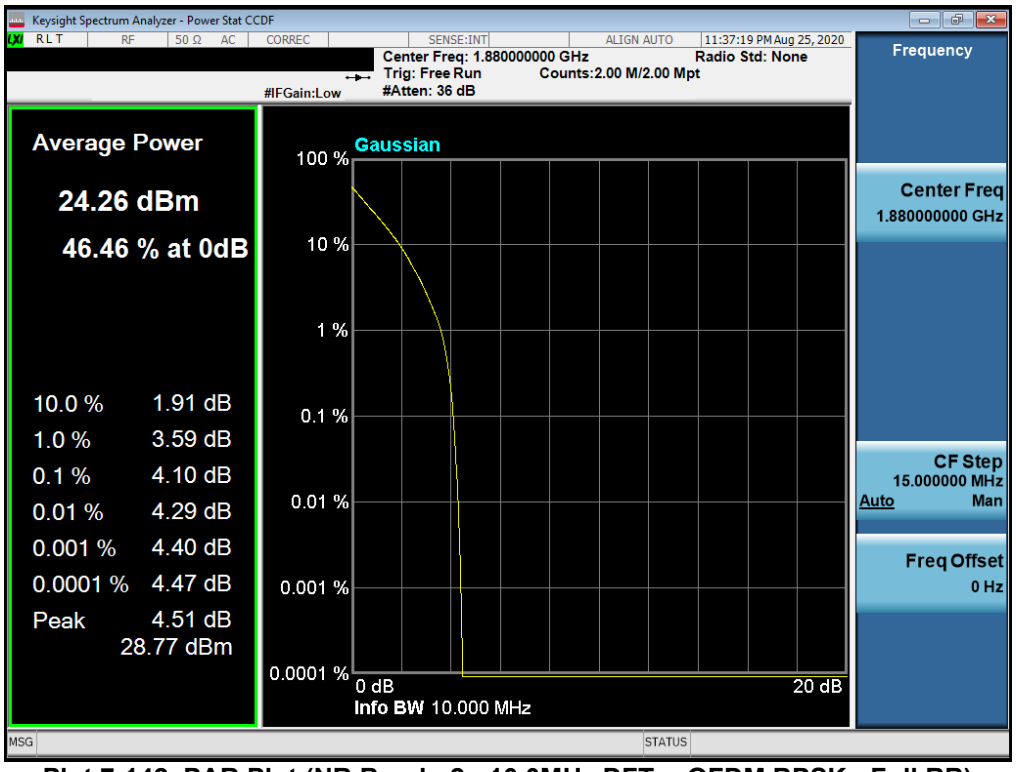
Plot 7-139. PAR Plot (NR Band n2 - 15.0MHz CP-OFDM-CP-OFDM QPSK - Full RB)



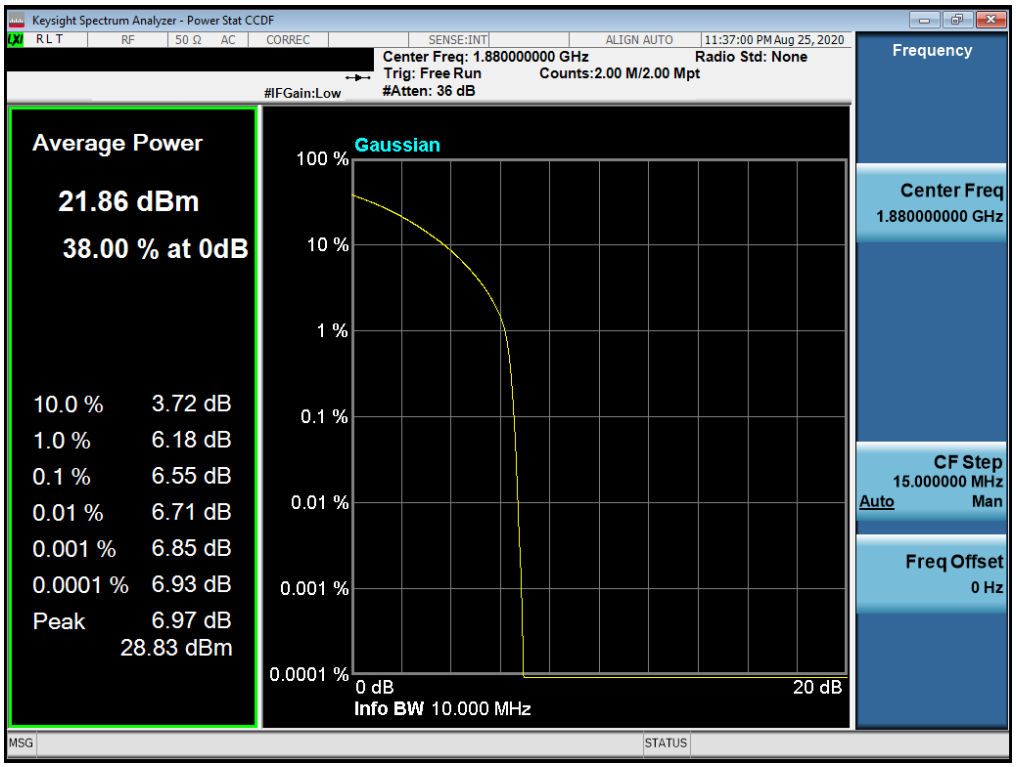
Plot 7-140. PAR Plot (NR Band n2 - 15.0MHz CP-OFDM-CP-OFDM 16-QAM - Full RB)



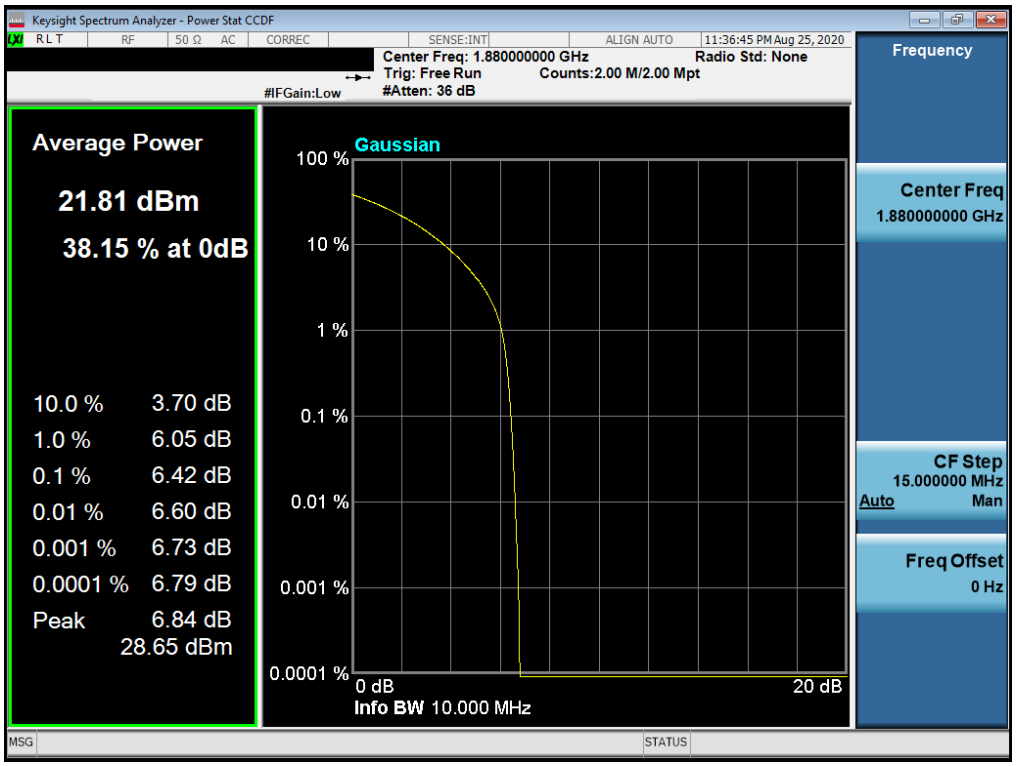
Plot 7-141. PAR Plot (NR Band n2 - 15.0MHz CP-OFDM-CP-OFDM 64-QAM - Full RB)



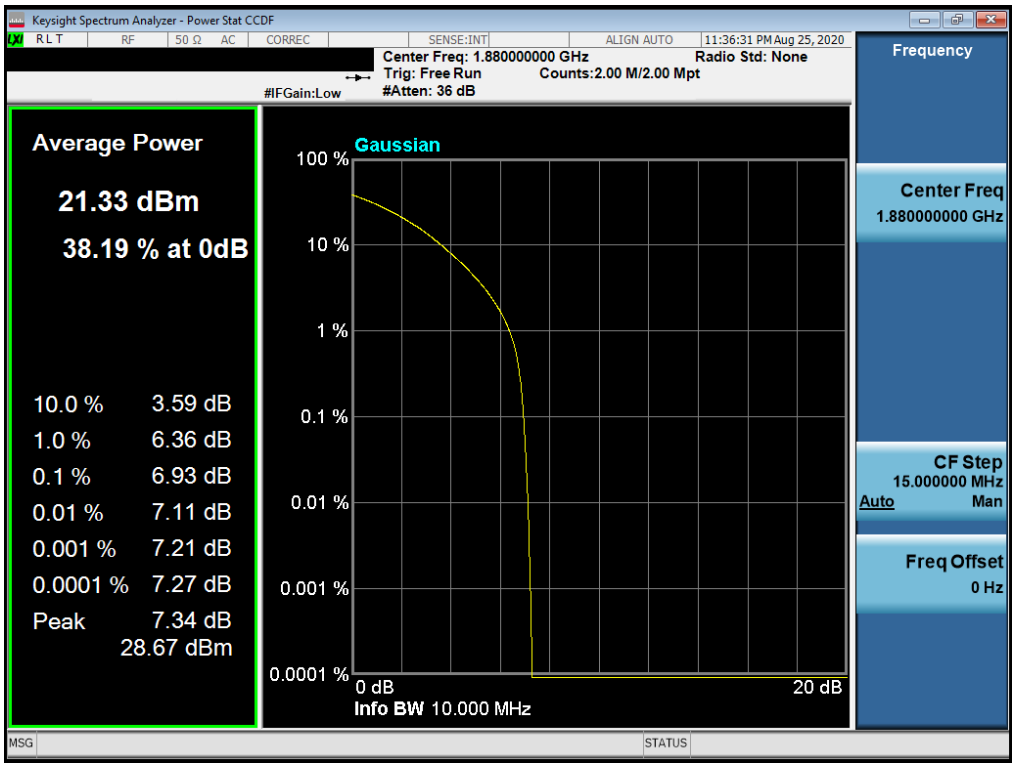
Plot 7-142. PAR Plot (NR Band n2 - 10.0MHz DFT-s-OFDM BPSK - Full RB)



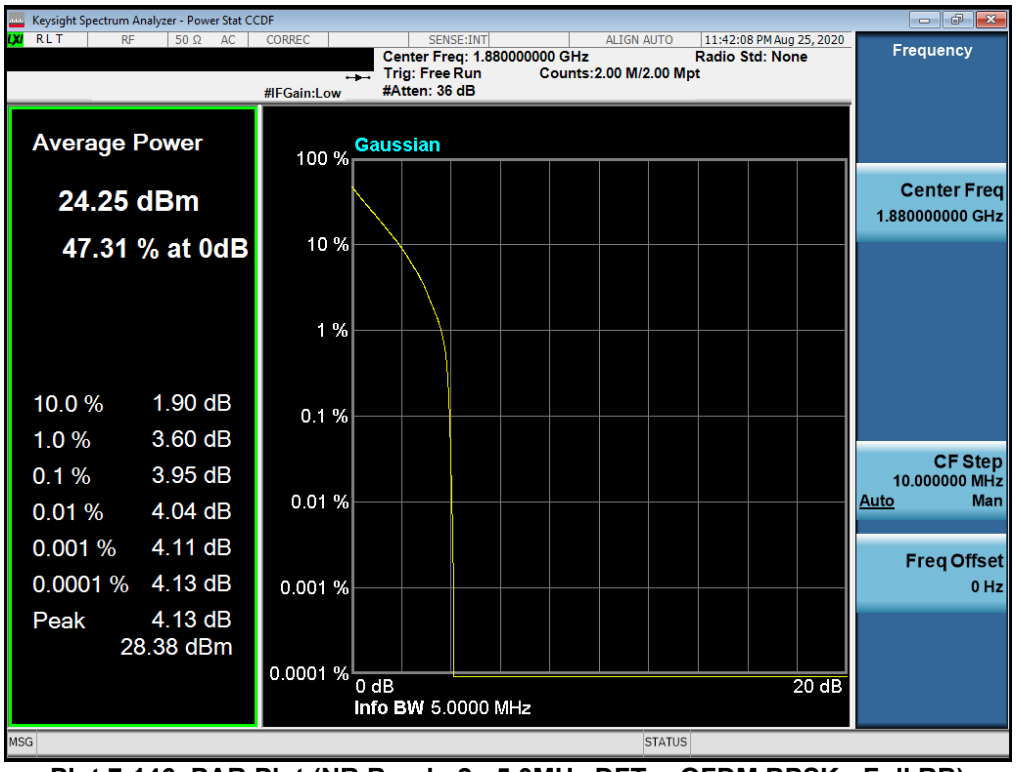
Plot 7-143. PAR Plot (NR Band n2 - 10.0MHz CP-OFDM-CP-OFDM QPSK - Full RB)



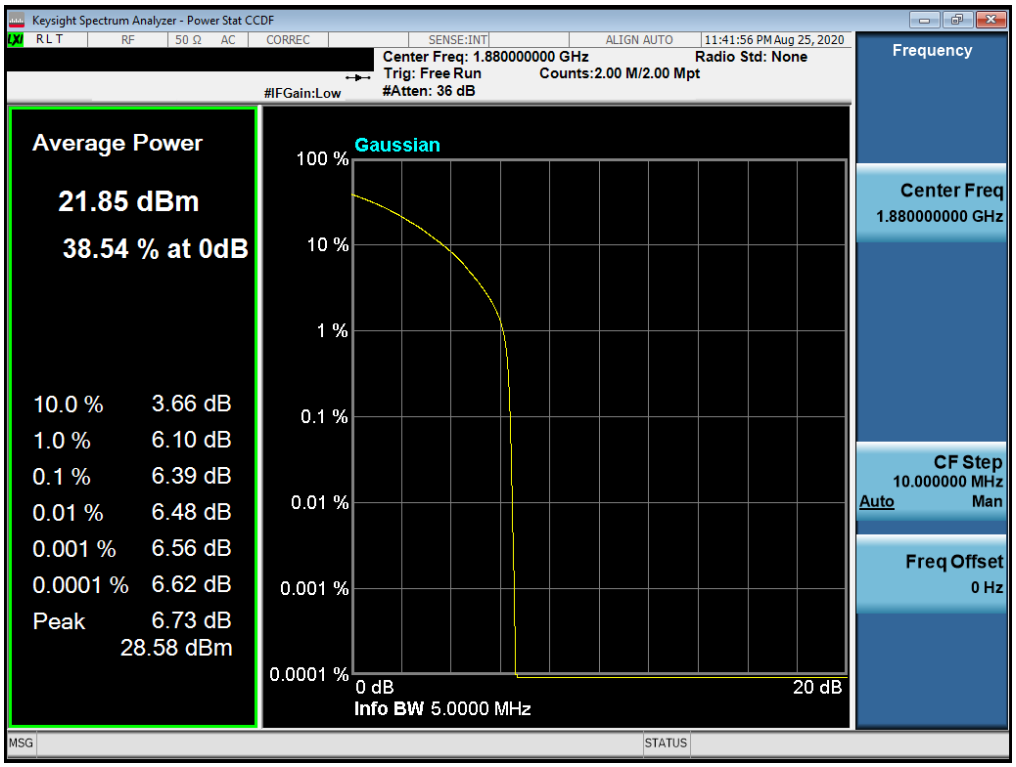
Plot 7-144. PAR Plot (NR Band n2 - 10.0MHz CP-OFDM-CP-OFDM 16-QAM - Full RB)



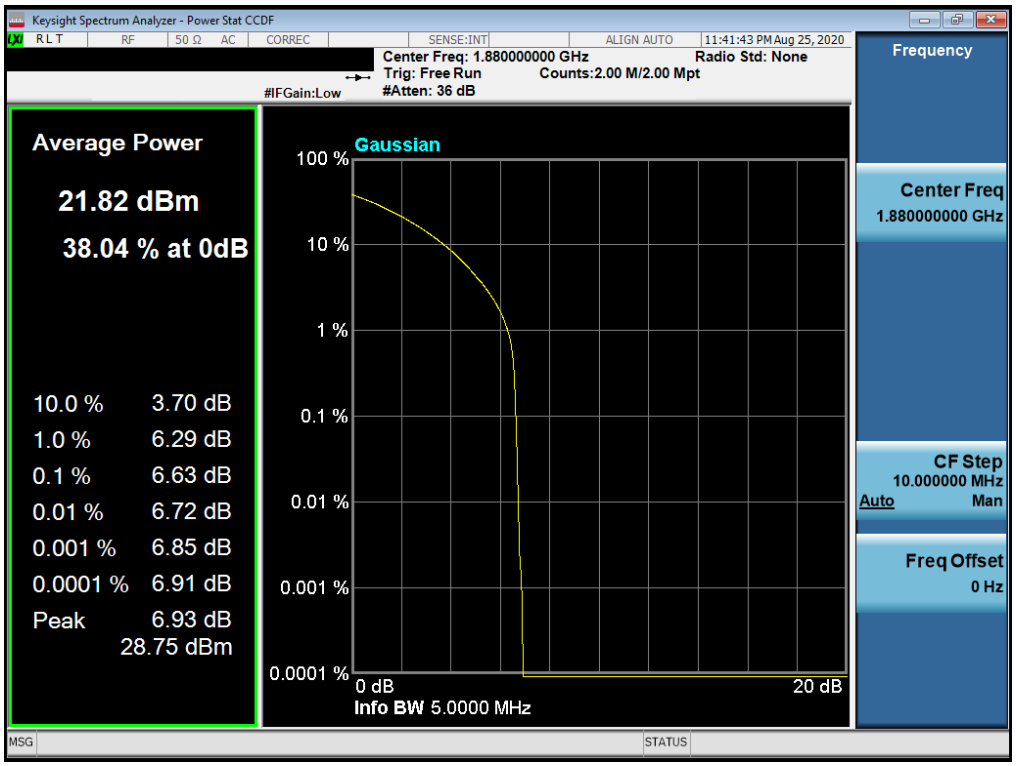
Plot 7-145. PAR Plot (NR Band n2 - 10.0MHz CP-OFDM-CP-OFDM 64-QAM - Full RB)



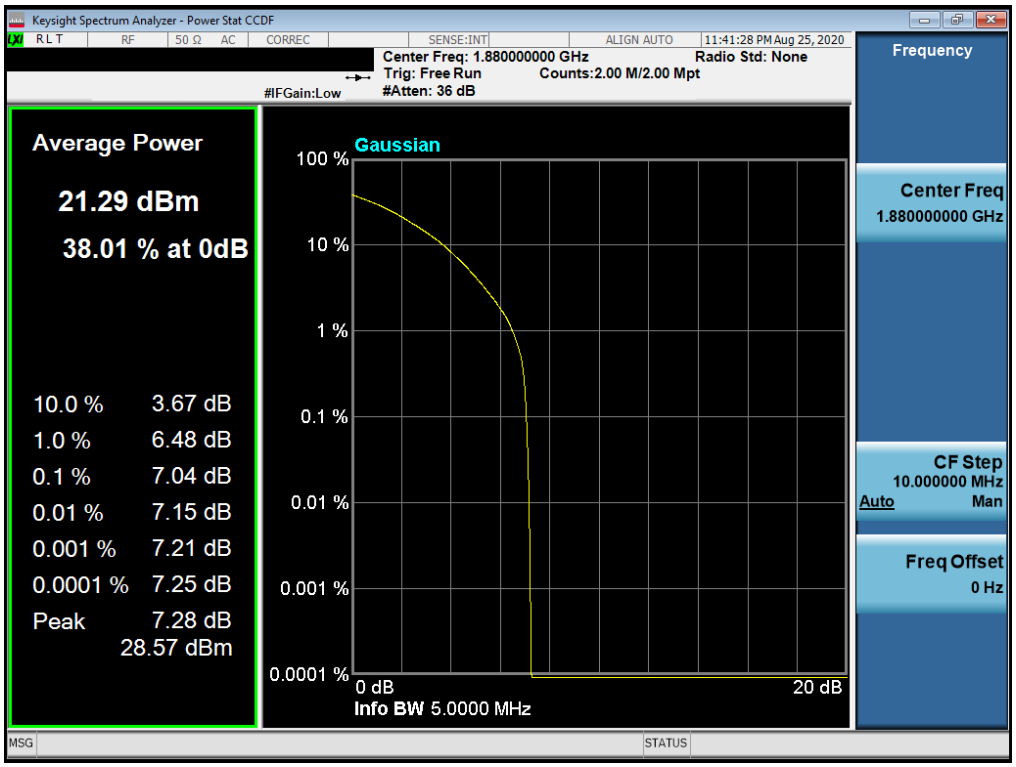
Plot 7-146. PAR Plot (NR Band n2 - 5.0MHz DFT-s-OFDM BPSK - Full RB)



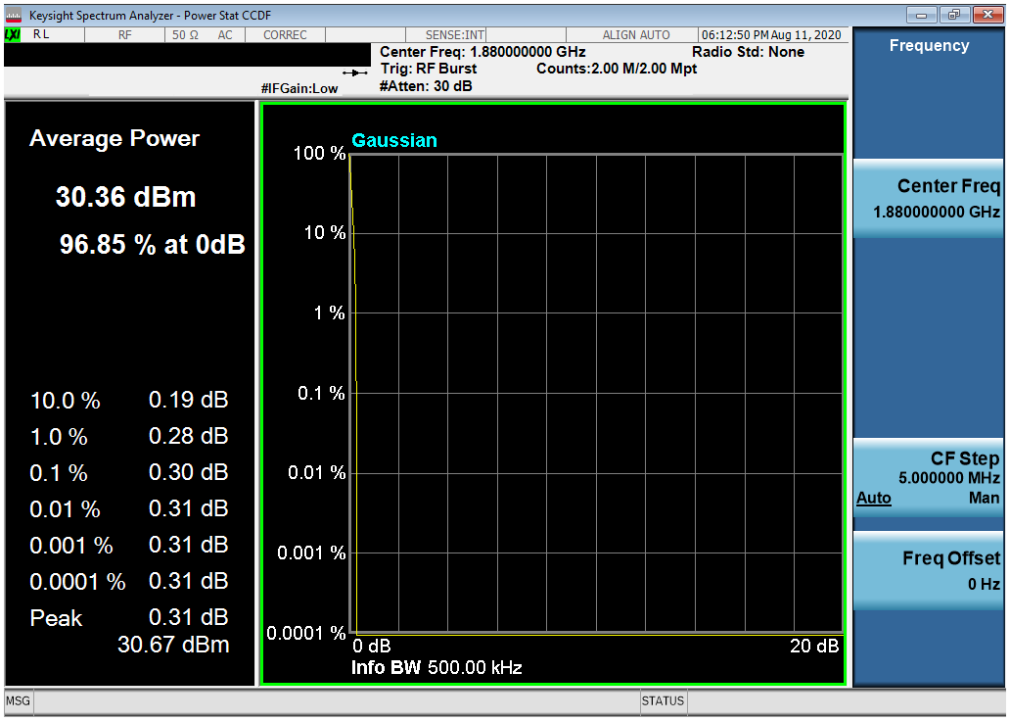
Plot 7-147. PAR Plot (NR Band n2 - 5.0MHz CP-OFDM-CP-OFDM QPSK - Full RB)



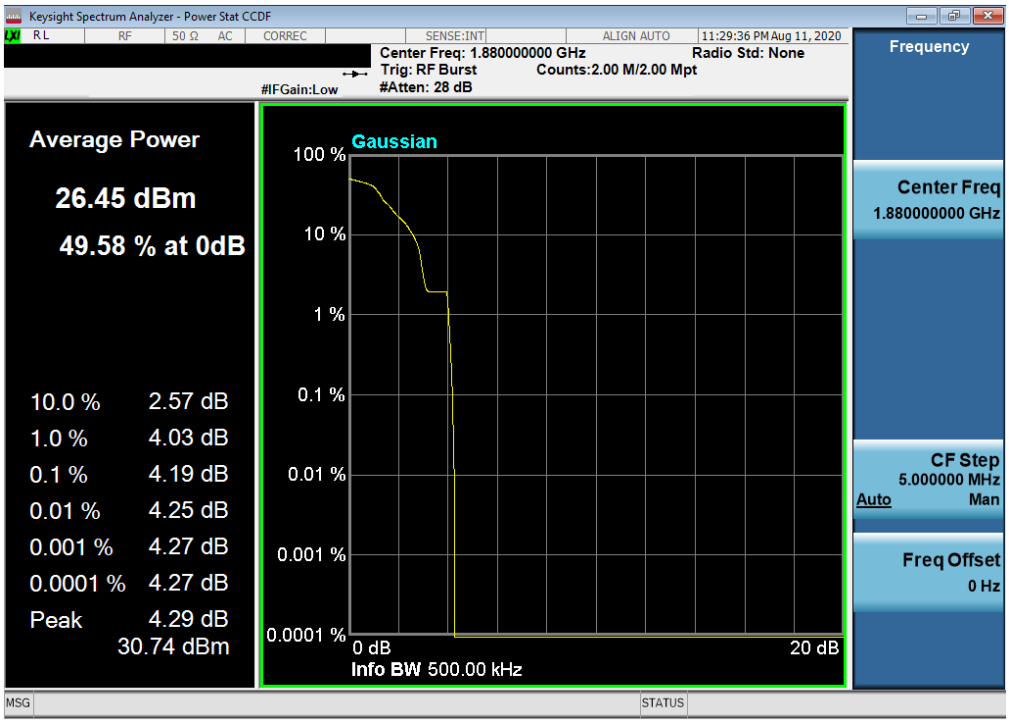
Plot 7-148. PAR Plot (NR Band n2 - 5.0MHz CP-OFDM-CP-OFDM 16-QAM - Full RB)



Plot 7-149. PAR Plot (NR Band n2 - 5.0MHz CP-OFDM-CP-OFDM 64-QAM - Full RB)

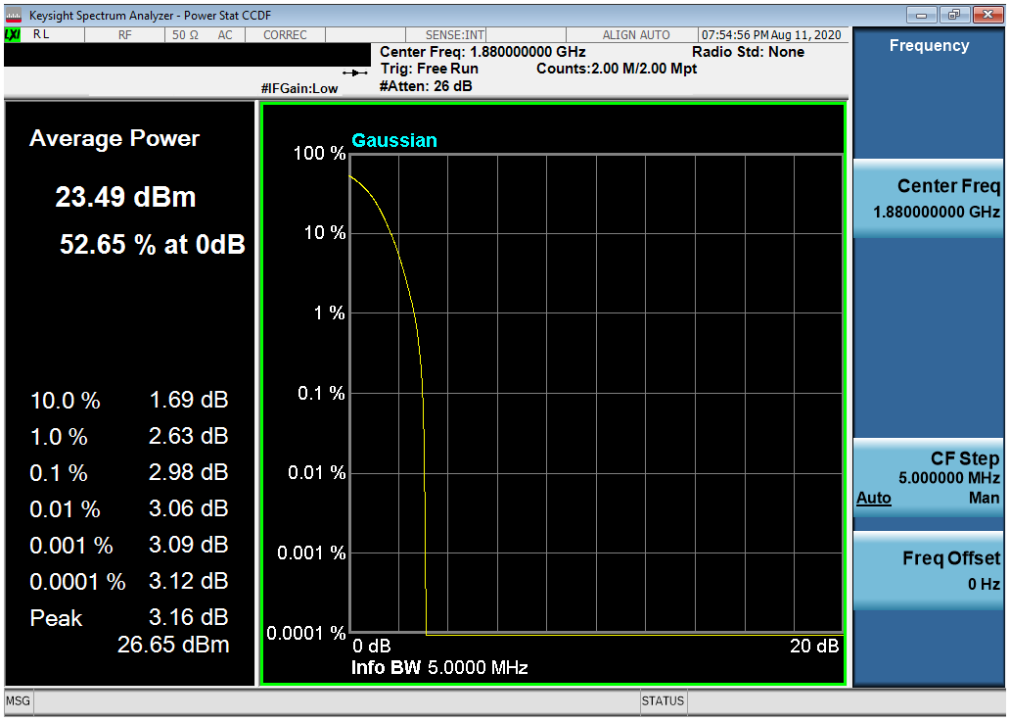


Plot 7-150. PAR Plot (GPRS, Ch. 661)



Plot 7-151. PAR Plot (EDGE, Ch. 661)

WCDMA PCS



Plot 7-152. PAR Plot (WCDMA, Ch. 9400)

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 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.

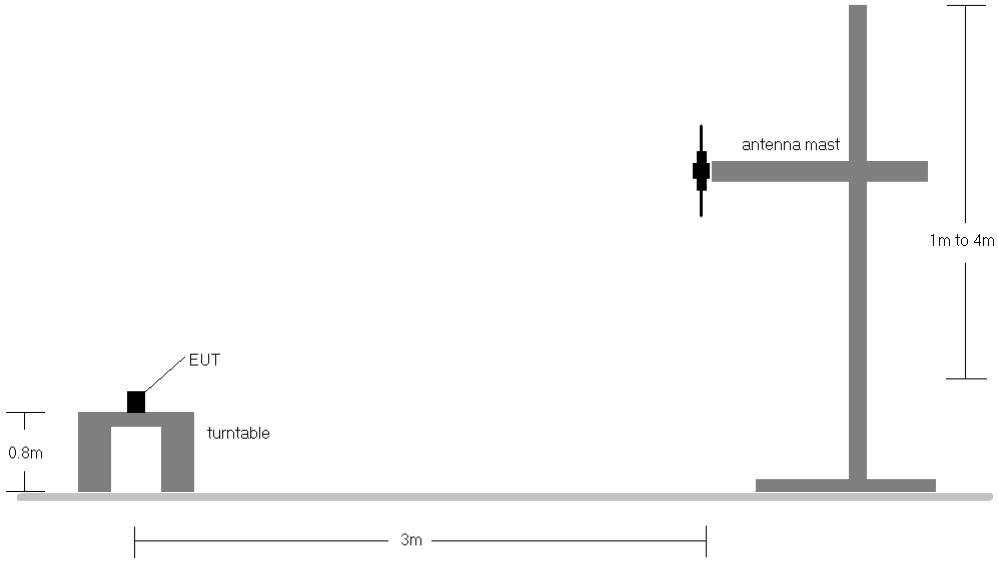


Figure 7-6. Radiated Test Setup <1GHz

Test Notes

1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.

2) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".

3) 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.

4) This unit was tested with its standard battery.

5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

6) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	QPSK	1860.0	H	128.0	5.0	9.98	1 / 0	10.19	20.17	0.104	33.01	-12.84
		1882.5	H	113.0	13.0	9.96	1 / 99	11.51	21.47	0.140	33.01	-11.54
		1905.0	H	155.0	18.0	10.31	1 / 50	11.82	**22.13**	0.163	33.01	-10.88
	16-QAM	1905.0	H	155.0	18.0	10.31	1 / 50	11.01	**21.32**	0.136	33.01	-11.69
	64-QAM	1905.0	H	155.0	18.0	10.31	1 / 50	10.10	**20.41**	0.110	33.01	-12.60
15 MHz	QPSK	1857.5	H	128.0	5.0	9.98	1 / 36	10.27	20.25	0.106	33.01	-12.76
		1882.5	H	113.0	13.0	9.96	1 / 0	11.43	21.39	0.138	33.01	-11.62
		1907.5	H	155.0	18.0	10.31	1 / 36	12.00	**22.31**	0.170	33.01	-10.70
	16-QAM	1907.5	H	155.0	18.0	10.31	1 / 36	11.09	**21.40**	0.138	33.01	-11.61
	64-QAM	1907.5	H	155.0	18.0	10.31	1 / 36	10.08	**20.39**	0.109	33.01	-12.62
10 MHz	QPSK	1855.0	H	128.0	5.0	9.98	1 / 0	10.09	20.07	0.102	33.01	-12.94
		1882.5	H	113.0	13.0	9.96	1 / 0	11.45	21.41	0.138	33.01	-11.60
		1910.0	H	155.0	18.0	10.31	1 / 49	11.96	**22.27**	0.169	33.01	-10.74
	16-QAM	1910.0	H	155.0	18.0	10.31	1 / 49	11.13	**21.44**	0.139	33.01	-11.57
	64-QAM	1910.0	H	155.0	18.0	10.31	1 / 49	10.01	**20.32**	0.108	33.01	-12.69
5 MHz	QPSK	1852.5	H	128.0	5.0	9.98	1 / 12	10.22	20.20	0.105	33.01	-12.81
		1882.5	H	113.0	13.0	9.96	1 / 12	11.56	21.52	0.142	33.01	-11.49
		1912.5	H	155.0	18.0	10.31	1 / 0	11.91	**22.22**	0.167	33.01	-10.79
	16-QAM	1912.5	H	155.0	18.0	10.31	1 / 0	10.94	**21.25**	0.133	33.01	-11.76
	64-QAM	1912.5	H	155.0	18.0	10.31	1 / 0	9.59	**19.90**	0.098	33.01	-13.11
3 MHz	QPSK	1851.5	H	128.0	5.0	9.98	1 / 7	10.18	20.16	0.104	33.01	-12.85
		1882.5	H	113.0	13.0	9.96	1 / 14	11.49	21.45	0.140	33.01	-11.56
		1913.5	H	155.0	18.0	10.31	1 / 14	11.99	**22.30**	0.170	33.01	-10.71
	16-QAM	1913.5	H	155.0	18.0	10.31	1 / 14	11.01	**21.32**	0.136	33.01	-11.69
	64-QAM	1913.5	H	155.0	18.0	10.31	1 / 14	9.94	**20.25**	0.106	33.01	-12.76
1.4 MHz	QPSK	1850.7	H	128.0	5.0	9.98	1 / 2	10.00	19.98	0.100	33.01	-13.03
		1882.5	H	113.0	13.0	9.96	1 / 2	11.54	21.50	0.141	33.01	-11.51
		1914.3	H	155.0	18.0	10.31	1 / 2	11.95	**22.26**	0.168	33.01	-10.75
	16-QAM	1882.5	H	113.0	13.0	9.98	1 / 2	10.97	**20.95**	0.125	33.01	-12.06
	64-QAM	1882.5	H	113.0	13.0	9.98	1 / 2	9.86	**19.84**	0.096	33.01	-13.17
	Opposite Pol.	1905.0	V	135.0	95.0	10.31	1 / 50	10.73	21.04	0.127	33.01	-11.97

Table 7-12. EIRP Data (LTE Band 25/2)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	1860.0	V	107.0	87.0	9.64	1 / 0	6.57	16.21	0.042	33.01	-16.80
		1880.0	V	139.0	90.0	9.93	1 / 50	8.05	17.98	0.063	33.01	-15.03
		1900.0	V	100.0	97.0	10.20	1 / 50	8.00	**18.20**	0.066	33.01	-14.81
	QPSK	1860.0	V	107.0	87.0	9.64	1 / 99	7.64	17.28	0.054	33.01	-15.73
		1880.0	V	139.0	90.0	9.93	1 / 99	8.31	18.24	0.067	33.01	-14.77
		1900.0	V	100.0	97.0	10.20	1 / 50	8.10	**18.30**	0.068	33.01	-14.71
	16-QAM	1900.0	V	100.0	97.0	10.20	1 / 50	7.31	**17.51**	0.056	33.01	-15.50
	64-QAM	1880.0	V	139.0	90.0	9.93	1 / 99	6.44	**16.37**	0.043	33.01	-16.64
15 MHz	π/2 BPSK	1857.5	V	107.0	87.0	9.61	1 / 37	6.20	15.80	0.038	33.01	-17.21
		1880.0	V	139.0	90.0	9.93	1 / 37	7.98	**17.91**	0.062	33.01	-15.10
		1902.5	V	100.0	97.0	10.22	1 / 37	7.49	17.71	0.059	33.01	-15.30
	QPSK	1857.5	V	107.0	87.0	9.61	1 / 37	7.31	16.91	0.049	33.01	-16.10
		1880.0	V	139.0	90.0	9.93	1 / 37	8.15	**18.07**	0.064	33.01	-14.94
		1902.5	V	100.0	97.0	10.22	1 / 37	7.74	17.96	0.063	33.01	-15.05
	16-QAM	1880.0	V	139.0	90.0	9.93	1 / 37	7.24	**17.16**	0.052	33.01	-15.85
	64-QAM	1880.0	V	139.0	90.0	9.93	1 / 37	6.76	**16.68**	0.047	33.01	-16.33
10 MHz	π/2 BPSK	1855.0	V	107.0	87.0	9.57	1 / 25	6.35	15.92	0.039	33.01	-17.09
		1880.0	V	139.0	90.0	9.93	1 / 25	8.02	**17.95**	0.062	33.01	-15.06
		1905.0	V	100.0	97.0	10.24	1 / 25	7.58	17.82	0.061	33.01	-15.19
	QPSK	1855.0	V	107.0	87.0	9.57	1 / 25	7.60	17.17	0.052	33.01	-15.84
		1880.0	V	139.0	90.0	9.93	1 / 25	8.33	**18.26**	0.067	33.01	-14.75
		1905.0	V	100.0	97.0	10.24	1 / 25	7.91	18.15	0.065	33.01	-14.86
	16-QAM	1880.0	V	139.0	90.0	9.93	1 / 25	7.12	**17.05**	0.051	33.01	-15.96
	64-QAM	1880.0	V	139.0	90.0	9.93	1 / 25	6.62	**16.54**	0.045	33.01	-16.47
5 MHz	π/2 BPSK	1852.5	V	107.0	87.0	9.54	1 / 12	6.43	15.96	0.039	33.01	-17.05
		1880.0	V	139.0	90.0	9.93	1 / 12	8.03	**17.96**	0.062	33.01	-15.05
		1907.5	V	100.0	97.0	10.26	1 / 12	7.42	17.68	0.059	33.01	-15.33
	QPSK	1852.5	V	107.0	87.0	9.54	1 / 12	7.30	16.83	0.048	33.01	-16.18
		1880.0	V	139.0	90.0	9.93	1 / 12	8.24	**18.16**	0.066	33.01	-14.85
		1907.5	V	100.0	97.0	10.26	1 / 12	7.65	17.91	0.062	33.01	-15.10
	16-QAM	1880.0	V	139.0	90.0	9.93	1 / 12	7.08	**17.00**	0.050	33.01	-16.01
	64-QAM	1880.0	V	139.0	90.0	9.93	1 / 12	6.60	**16.52**	0.045	33.01	-16.49
	QPSK (CP-OFDM)	1900.0	V	100.0	97.0	10.20	1 / 50	4.41	14.61	0.029	33.01	-18.40
	QPSK (Opposite Pol.)	1900.0	H	107.0	127.0	10.20	1 / 50	6.73	16.93	0.049	33.01	-16.08

Table 7-13. EIRP Data (NR Band n2)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GPRS1900	H	236	1	16.26	9.51	25.77	0.377	33.01	-7.24
1880.00	GPRS1900	H	106	19	16.49	9.93	26.42	0.438	33.01	-6.59
1909.80	GPRS1900	H	217	10	17.12	10.28	**27.40**	**0.550**	33.01	-5.61
1909.80	GPRS1900	V	109	93	16.36	10.28	26.64	0.461	33.01	-6.37
1909.80	EDGE1900	H	217	10	12.04	10.28	**22.32**	0.171	33.01	-10.69

Table 7-14. EIRP Data (GPRS PCS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	H	133	14	13.02	9.54	22.56	0.180	33.01	-10.45
1880.00	WCDMA1900	H	119	14	13.88	9.93	**23.81**	**0.240**	33.01	-9.20
1907.60	WCDMA1900	H	147	6	12.74	10.26	23.00	0.200	33.01	-10.01
1880.00	WCDMA1900	V	101	91	13.14	9.93	23.07	0.203	33.01	-9.94

Table 7-15. EIRP Data (WCDMA PCS)

7.8 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

Test Settings

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

Test Setup

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

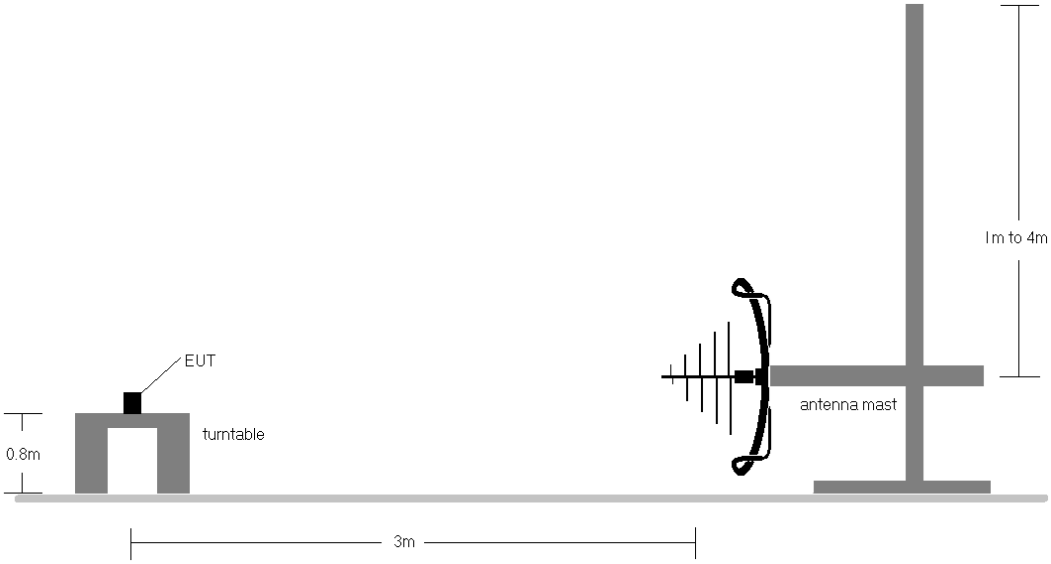


Figure 7-7. Test Instrument & Measurement Setup < 1GHz

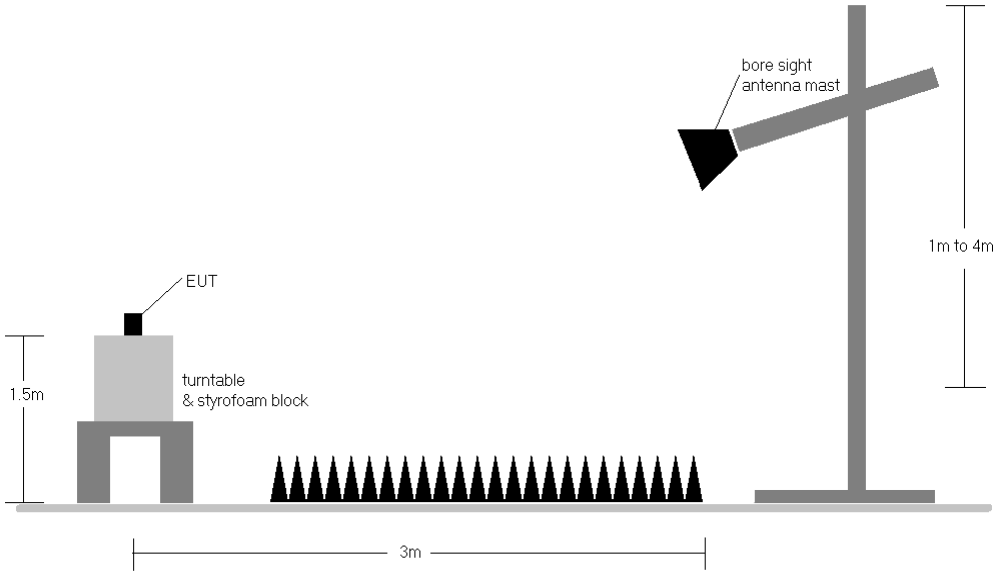


Figure 7-8. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
   b) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   d) EIRP (dBm) = E(dBµV/m) + 20logD – 104.8; where D is the measurement distance in meters.

2) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.

3) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to “1”.

4) For CDMA, this device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.

5) 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.

6) This unit was tested with its standard battery.

7) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

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

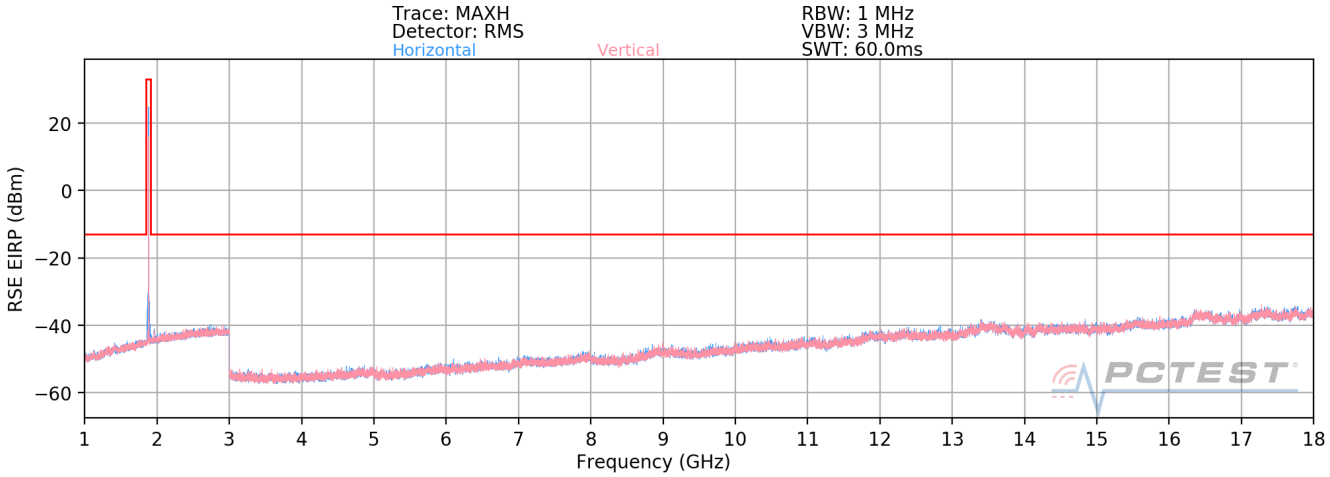
9) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

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

11) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

12) Spurious emissions shown in this section are measured while operating in EN-DC mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor). Spurious emissions from the NR carrier device, is subject to the rules under which the NR carrier operates. Spurious emission caused by the LTE carrier must meet the requirements of the rules under which the LTE carrier operates.

LTE Band 25/2



Plot 7-153. Radiated Spurious Plot (LTE Band 25/2)

Bandwidth (MHz):	20
Frequency (MHz):	1860.0
RB / Offset:	1 / 50
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3720.0	H	-	-	-69.44	5.55	43.11	-52.15	-13.00	-39.15
5580.0	H	-	-	-71.89	7.59	42.70	-52.55	-13.00	-39.55
7440.0	H	-	-	-72.98	11.92	45.94	-49.31	-13.00	-36.31

Table 7-16. Radiated Spurious Data (LTE Band 25/2 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1882.5
RB / Offset:	1 / 50
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3765.0	H	-	-	-69.36	5.91	43.55	-51.71	-13.00	-38.71
5647.5	H	-	-	-71.96	7.64	42.68	-52.57	-13.00	-39.57
7530.0	H	-	-	-73.28	11.65	45.37	-49.89	-13.00	-36.89

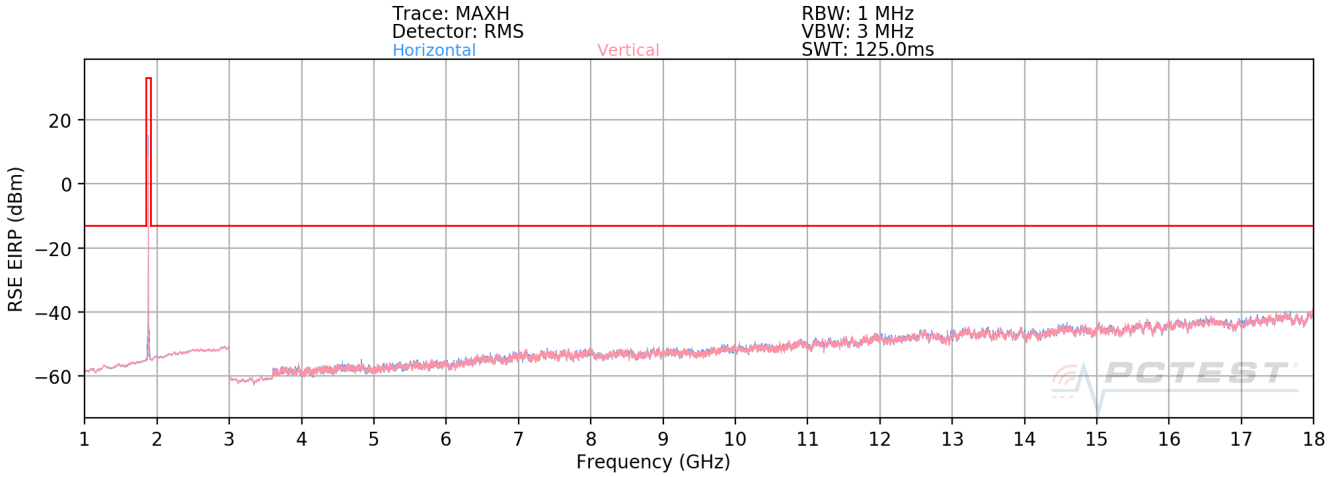
Table 7-17. Radiated Spurious Data (LTE Band 25/2 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1905.0
RB / Offset:	1 / 50
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

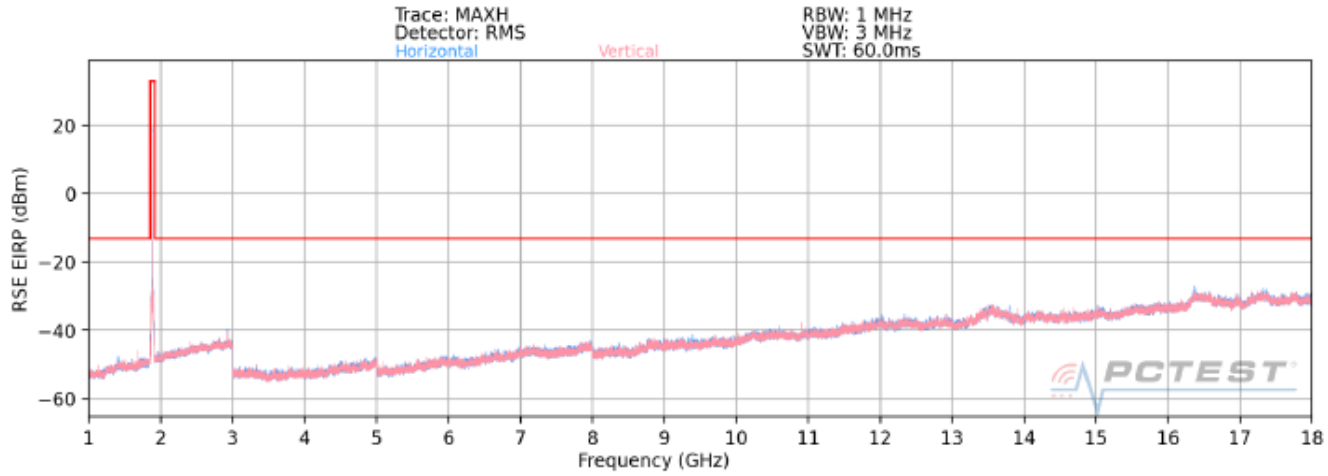
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3810.00	H	-	-	-70.01	5.33	42.32	-52.94	-13.00	-39.94
5715.00	H	-	-	-72.01	8.01	43.00	-52.26	-13.00	-39.26
7620.00	H	-	-	-73.31	12.49	46.18	-49.07	-13.00	-36.07

Table 7-18. Radiated Spurious Data (LTE Band 25/2 – High Channel)

NR Band n2



Plot 7-154. Radiated Spurious Plot (NR Band n2)



Plot 7-155. Radiated Spurious Plot (NE Band n2 + B5)

Bandwidth (MHz):	20
Frequency (MHz):	1860.0
RB / Offset:	1 / 50
Mode:	Standalone
Anchor Band:	-

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3720.0	V	-	-	-79.05	5.87	33.82	-61.44	-13.00	-48.44
5580.0	V	-	-	-79.60	7.92	35.32	-59.94	-13.00	-46.94

Table 7-19. Radiated Spurious Data (NR Band n2 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1880.0
RB / Offset:	1 / 50
Mode:	Standalone
Anchor Band:	-

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3760.0	V	-	-	-79.45	6.04	33.59	-61.66	-13.00	-48.66
5640.0	V	-	-	-79.95	8.14	35.19	-60.07	-13.00	-47.07

Table 7-20. Radiated Spurious Data (NR Band n2 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1900.0
RB / Offset:	1 / 50
Mode:	Standalone
Anchor Band:	-

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3800.0	V	-	-	-79.32	5.59	33.27	-61.98	-13.00	-48.98
5700.0	V	-	-	-79.94	8.25	35.31	-59.95	-13.00	-46.95

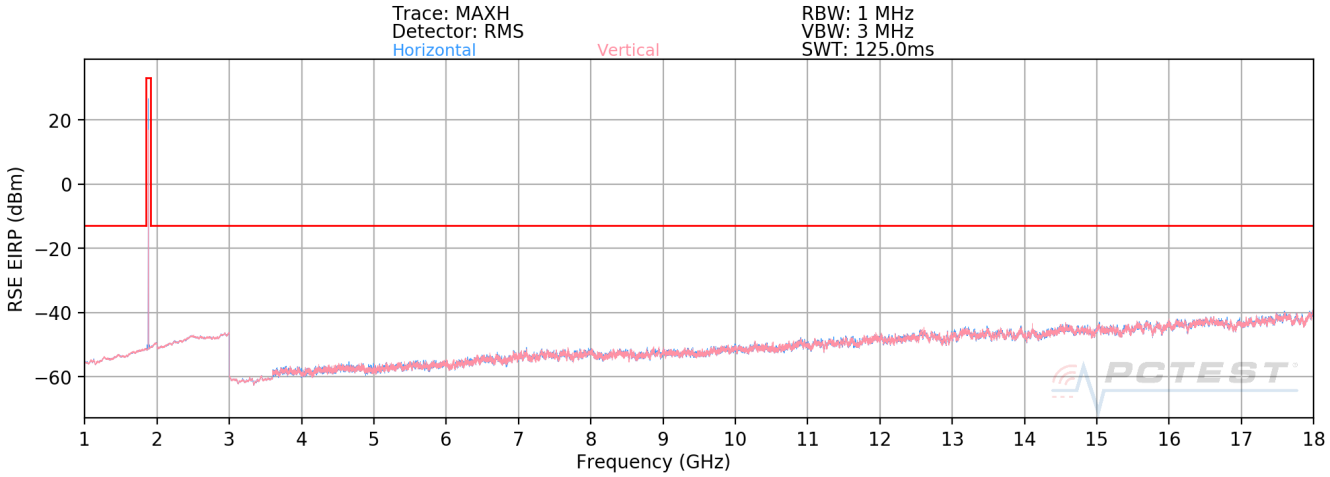
Table 7-21. Radiated Spurious Data (NR Band n2 – High Channel)

Bandwidth (MHz):	20
RB / Offset:	1 / 50
Mode:	EN-DC
Anchor Band:	5

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1273.0	V	-	-	-75.72	-1.81	29.47	-65.79	-13.00	-52.79
2324.0	V	-	-	-68.25	2.85	41.60	-53.66	-13.00	-40.66
3375.0	V	164	353	-65.98	5.41	46.43	-48.83	-13.00	-35.83
3982.0	V	-	-	-67.40	4.53	44.13	-51.13	-13.00	-38.13

Table 7-22. Radiated Spurious Data (NR Band n2 – B5 – Mid Channel)

GSM/GPRS PCS



Plot 7-156. Radiated Spurious Plot (GPRS PCS)

Mode:	GPRS 1 Tx Slot
Channel:	512
Frequency (MHz):	1850.2
Detector / Trace Mode:	RMS / Max Hold
RBW / VBW:	1MHz / 3MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3700.4	H	-	-	-71.22	1.18	36.96	-58.30	-13.00	-45.30
5550.6	H	-	-	-72.90	4.41	38.51	-56.75	-13.00	-43.75
7400.8	H	-	-	-74.53	8.51	40.98	-54.28	-13.00	-41.28

Table 7-23. Radiated Spurious Data (GPRS PCS – Low Channel)

Mode:	GPRS 1 Tx Slot
Channel:	661
Frequency (MHz):	1880
Detector / Trace Mode:	RMS / Max Hold
RBW / VBW:	1MHz / 3MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3760.0	H	-	-	-70.29	1.79	38.50	-56.76	-13.00	-43.76
5640.0	H	-	-	-68.07	4.56	43.49	-51.77	-13.00	-38.77
7520.0	H	-	-	-68.70	8.29	46.59	-48.66	-13.00	-35.66

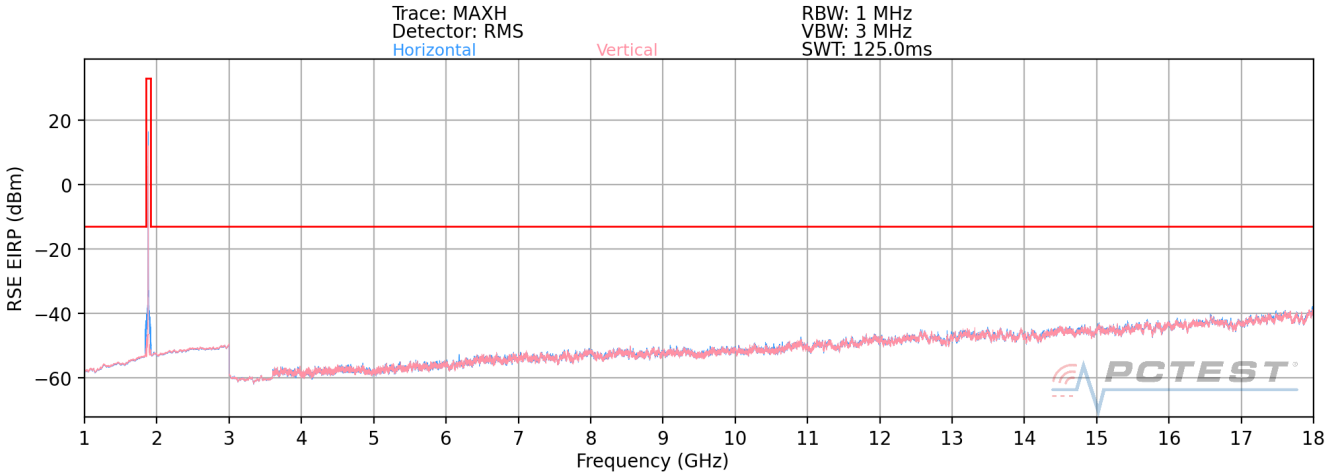
Table 7-24. Radiated Spurious Data (GPRS PCS – Mid Channel)

Mode:	GPRS 1 Tx Slot
Channel:	810
Frequency (MHz):	1909.8
Detector / Trace Mode:	RMS / Max Hold
RBW / VBW:	1MHz / 3MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3819.6	H	-	-	-71.01	1.52	37.51	-57.74	-13.00	-44.74
5729.4	H	-	-	-68.00	4.51	43.51	-51.75	-13.00	-38.75
7639.2	H	-	-	-67.98	8.96	47.98	-47.28	-13.00	-34.28

Table 7-25. Radiated Spurious Data (GPRS PCS – High Channel)

WCDMA PCS



Plot 7-157. Radiated Spurious Plot (WCDMA PCS)

Mode:	WCDMA RMC
Channel:	9262
Frequency (MHz):	1852.4

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3704.8	H	-	-	-70.84	1.21	37.37	-57.89	-13.00	-44.89
5557.2	H	-	-	-68.21	4.52	43.31	-51.95	-13.00	-38.95
7409.6	H	-	-	-68.14	8.47	47.33	-47.93	-13.00	-34.93

Table 7-26. Radiated Spurious Data (WCDMA PCS – Low Channel)

Mode:	WCDMA RMC
Channel:	9400
Frequency (MHz):	1880

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3760.0	H	-	-	-70.46	1.79	38.33	-56.93	-13.00	-43.93
5640.0	H	-	-	-67.98	4.56	43.58	-51.68	-13.00	-38.68
7520.0	H	-	-	-68.00	8.29	47.29	-47.96	-13.00	-34.96

Table 7-27. Radiated Spurious Data (WCDMA PCS – Mid Channel)

Mode:	WCDMA RMC
Channel:	9538
Frequency (MHz):	1907.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3815.2	H	-	-	-70.17	1.49	38.32	-56.93	-13.00	-43.93
5722.8	H	-	-	-68.23	4.44	43.21	-52.05	-13.00	-39.05
7630.4	H	-	-	-68.44	8.81	47.37	-47.88	-13.00	-34.88

Table 7-28. Radiated Spurious Data (WCDMA PCS – 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.

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

LTE Band 25/2

Operating Frequency (Hz):	1,882,500,000
Ref. Voltage (VDC):	4.36
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.36	- 30	1,882,499,973	56	0.0000030
		- 20	1,882,500,170	253	0.0000134
		- 10	1,882,499,972	55	0.0000029
		0	1,882,500,290	373	0.0000198
		+ 10	1,882,500,389	472	0.0000251
		+ 20 (Ref)	1,882,499,917	0	0.0000000
		+ 30	1,882,499,927	10	0.0000005
		+ 40	1,882,499,760	-157	-0.0000083
		+ 50	1,882,499,922	5	0.0000003
Battery Endpoint	3.60	+ 20	1,882,499,896	-21	-0.0000011

Table 7-9. LTE Band 25/2 Frequency Stability Data

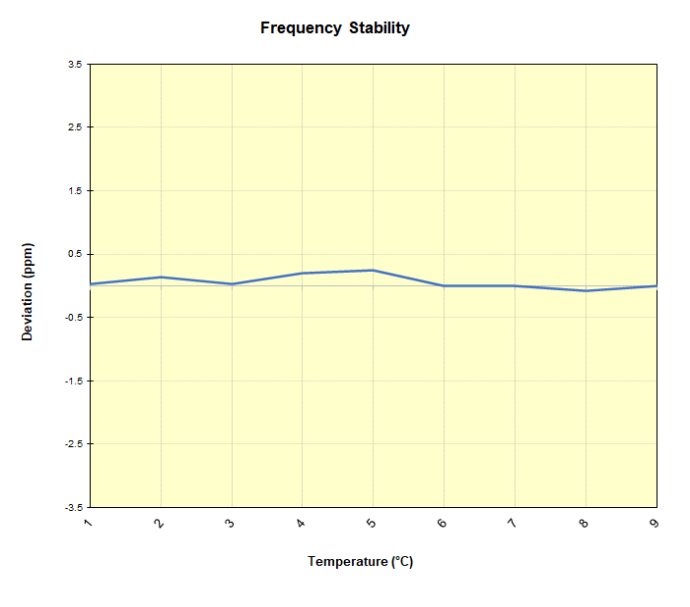


Table 7-9. LTE Band 25/2 Frequency Stability Chart

NR Band n2

Operating Frequency (Hz):	1,880,000,000
Ref. Voltage (VDC):	4.36
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.36	- 30	1,882,500,143	105	0.0000056
		- 20	1,882,499,956	-82	-0.0000044
		- 10	1,882,500,057	19	0.0000010
		0	1,882,500,296	258	0.0000137
		+ 10	1,882,500,011	-27	-0.0000014
		+ 20 (Ref)	1,882,500,038	0	0.0000000
		+ 30	1,882,499,816	-222	-0.0000118
		+ 40	1,882,499,996	-42	-0.0000022
		+ 50	1,882,499,891	-147	-0.0000078
Battery Endpoint	3.60	+ 20	1,882,499,954	-84	-0.0000045

Table 7-9. NR Band n2 Frequency Stability Data

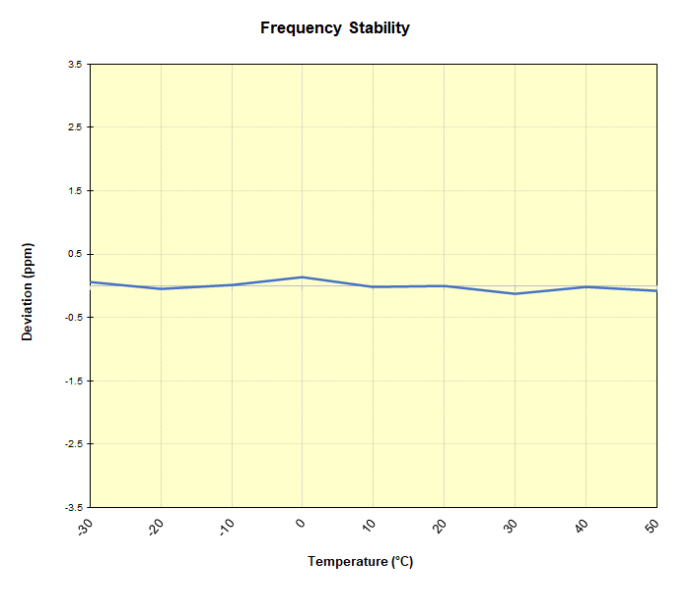


Table 7-9. NR Band n2 Frequency Stability Chart

GSM/GPRS PCS

Operating Frequency (Hz):	1,880,000,000
Ref. Voltage (VDC):	4.36
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.36	- 30	1,879,999,918	-108	-0.0000057
		- 20	1,880,000,018	-8	-0.0000004
		- 10	1,879,999,996	-30	-0.0000016
		0	1,879,999,928	-98	-0.0000052
		+ 10	1,879,999,911	-115	-0.0000061
		+ 20 (Ref)	1,880,000,026	0	0.0000000
		+ 30	1,880,000,216	190	0.0000101
		+ 40	1,880,000,008	-18	-0.0000010
		+ 50	1,879,999,688	-338	-0.0000180
Battery Endpoint	3.60	+ 20	1,879,999,615	-411	-0.0000219

Table 7-9. GSM/GPRS PCS Frequency Stability Data

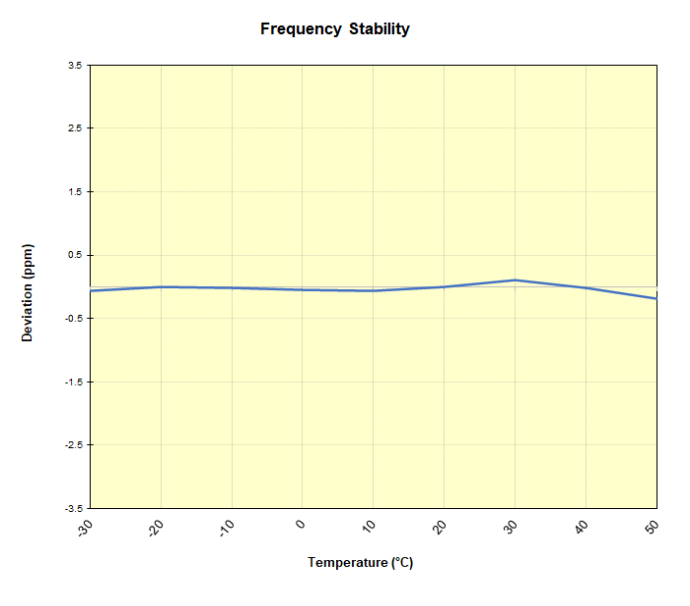


Table 7-9. GSM/GPRS PCS Frequency Stability Chart

WCDMA PCS

Operating Frequency (Hz):	1,880,000,000
Ref. Voltage (VDC):	4.36
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.36	- 30	1,879,999,965	-194	-0.0000103
		- 20	1,880,000,038	-121	-0.0000064
		- 10	1,880,000,178	19	0.0000010
		0	1,880,000,405	246	0.0000131
		+ 10	1,879,999,987	-172	-0.0000091
		+ 20 (Ref)	1,880,000,159	0	0.0000000
		+ 30	1,879,999,817	-342	-0.0000182
		+ 40	1,879,999,892	-267	-0.0000142
		+ 50	1,879,999,626	-533	-0.0000284
Battery Endpoint	3.60	+ 20	1,879,999,811	-348	-0.0000185

Table 7-9. WCDMA PCS Frequency Stability Data

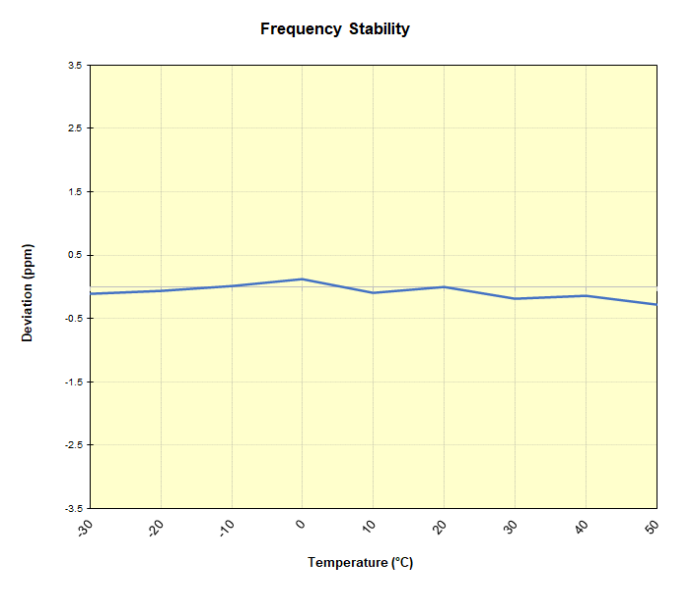


Table 7-9. WCDMA PCS Frequency Stability Chart

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the SONY **Portable Handset FCC ID: PY7-57441Y** complies with all the requirements of Part 24 of the FCC rules.