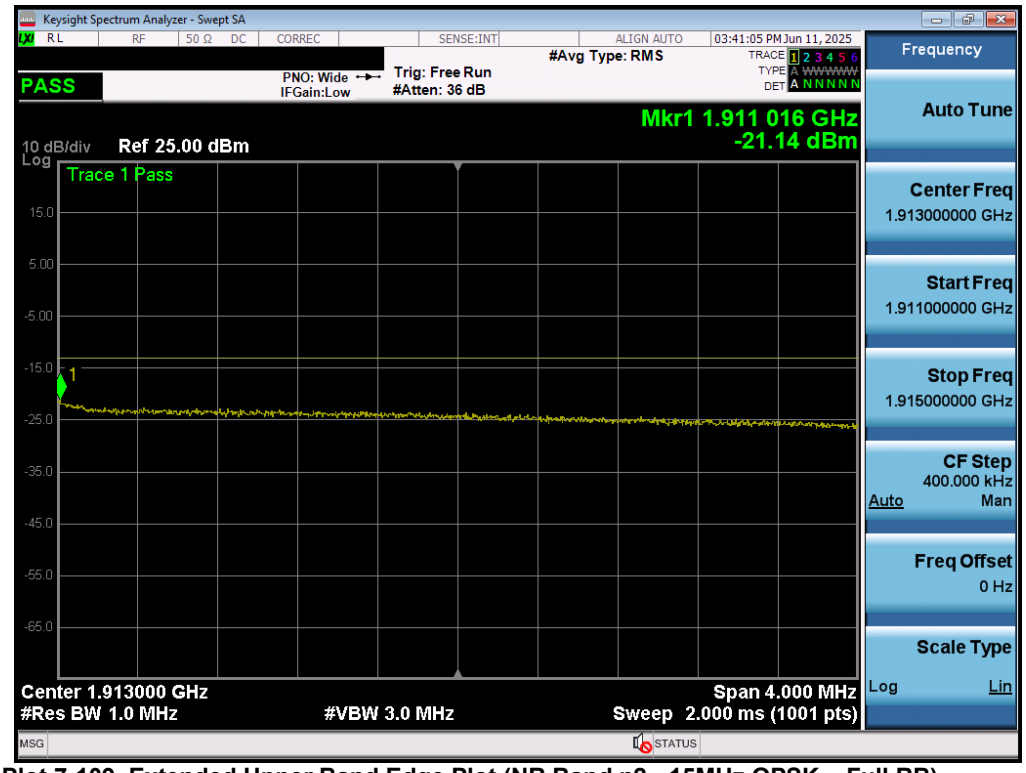
Plot 7-106. Lower Band Edge Plot (NR Band n25/2 - 15MHz QPSK – Full RB)

Plot 7-107. Extended Lower Band Edge Plot (NR Band n25/2 - 15MHz QPSK – Full RB)

Plot 7-108. Upper Band Edge Plot (NR Band n2 - 15MHz QPSK – Full RB)



Plot 7-109. Extended Upper Band Edge Plot (NR Band n2 - 15MHz QPSK – Full RB)

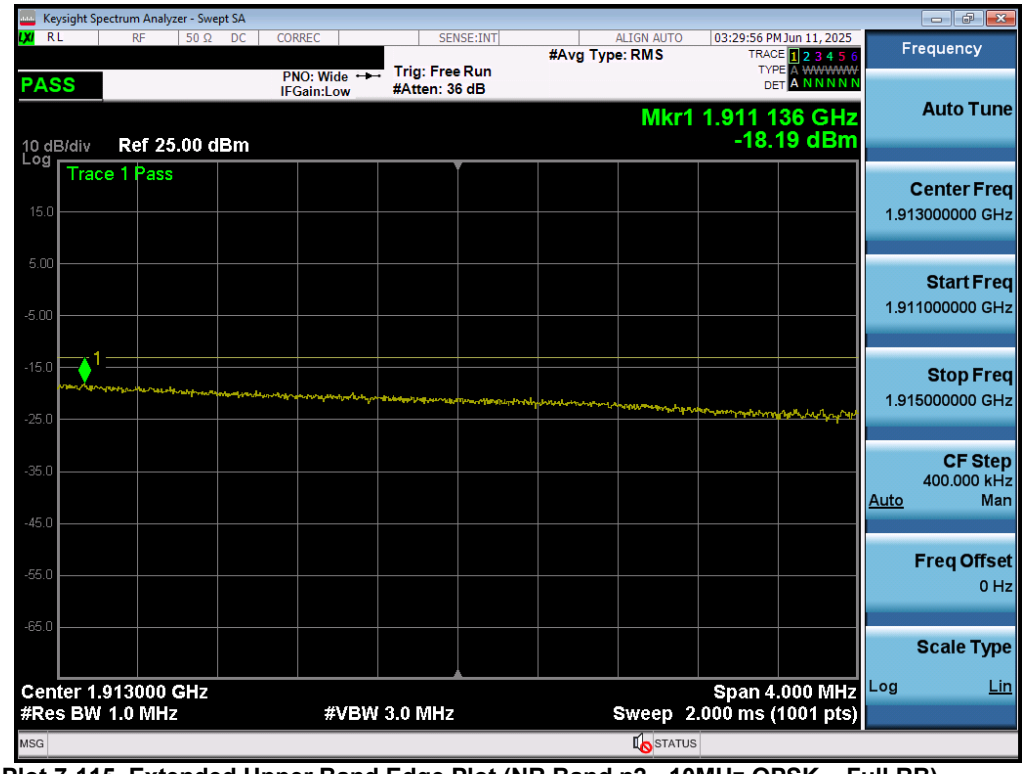
Plot 7-110. Upper Band Edge Plot (NR Band n25 - 15MHz QPSK – Full RB)

Plot 7-111. Extended Upper Band Edge Plot (NR Band n25 - 15MHz QPSK – Full RB)

Plot 7-112. Lower Band Edge Plot (NR Band n25/2 - 10MHz QPSK – Full RB)

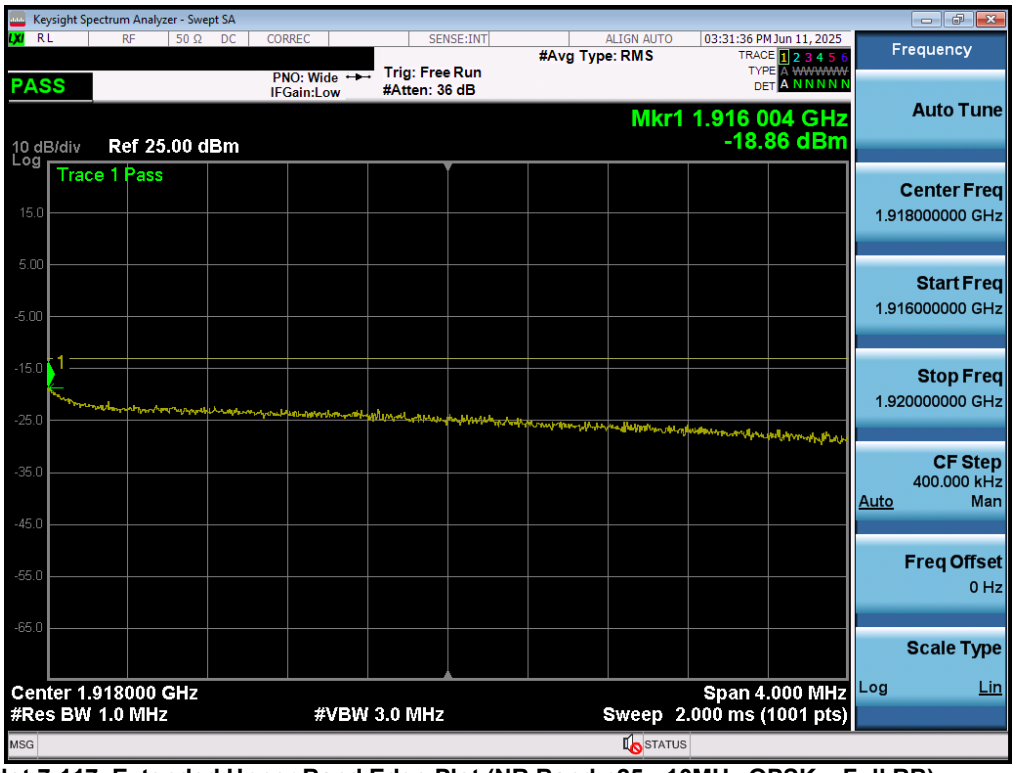
Plot 7-113. Extended Lower Band Edge Plot (NR Band n25/2 - 10MHz QPSK – Full RB)

Plot 7-114. Upper Band Edge Plot (NR Band n2 - 10MHz QPSK – Full RB)

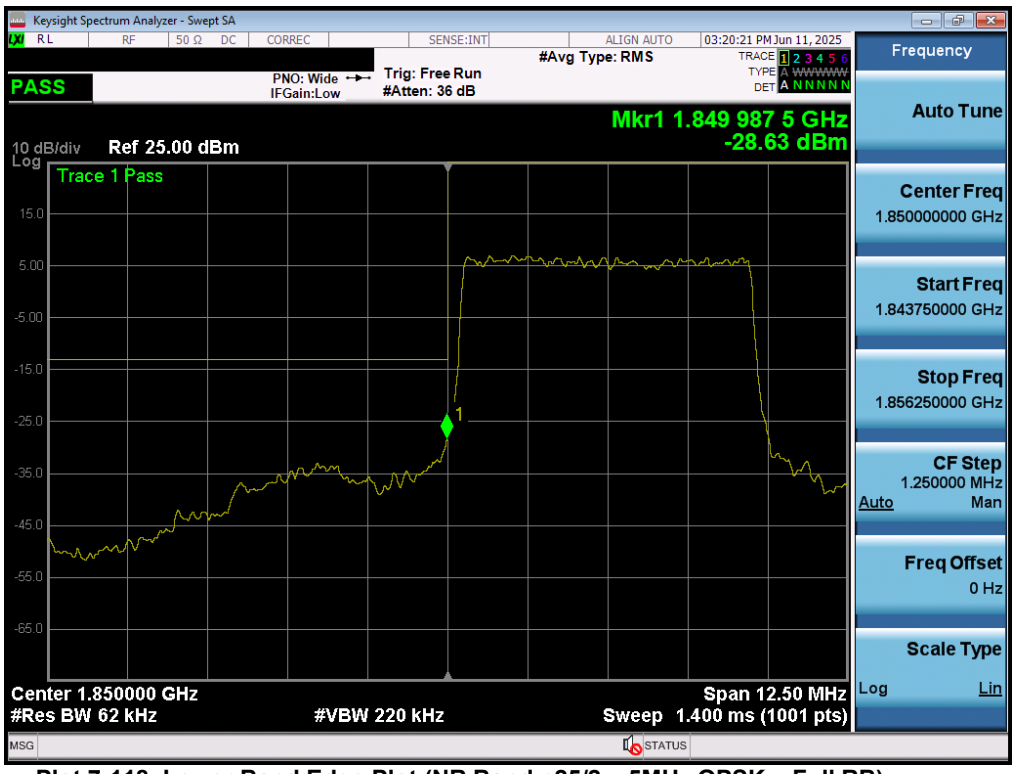


Plot 7-115. Extended Upper Band Edge Plot (NR Band n2 - 10MHz QPSK – Full RB)

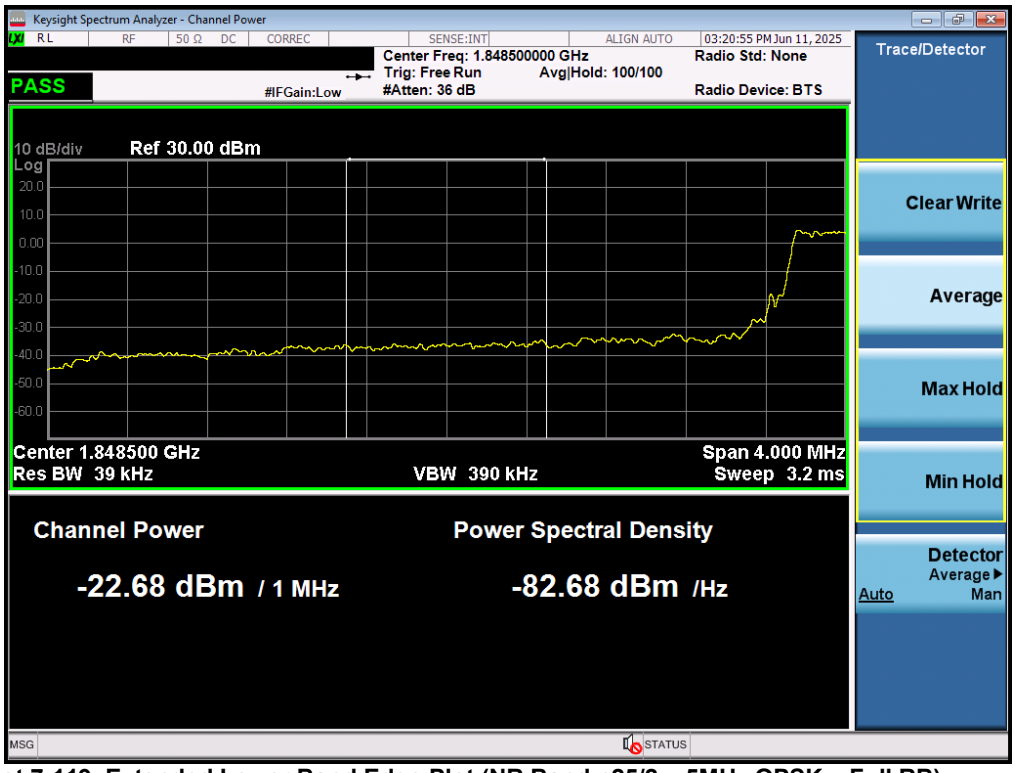
Plot 7-116. Upper Band Edge Plot (NR Band n25 - 10MHz QPSK – Full RB)



Plot 7-117. Extended Upper Band Edge Plot (NR Band n25 - 10MHz QPSK – Full RB)

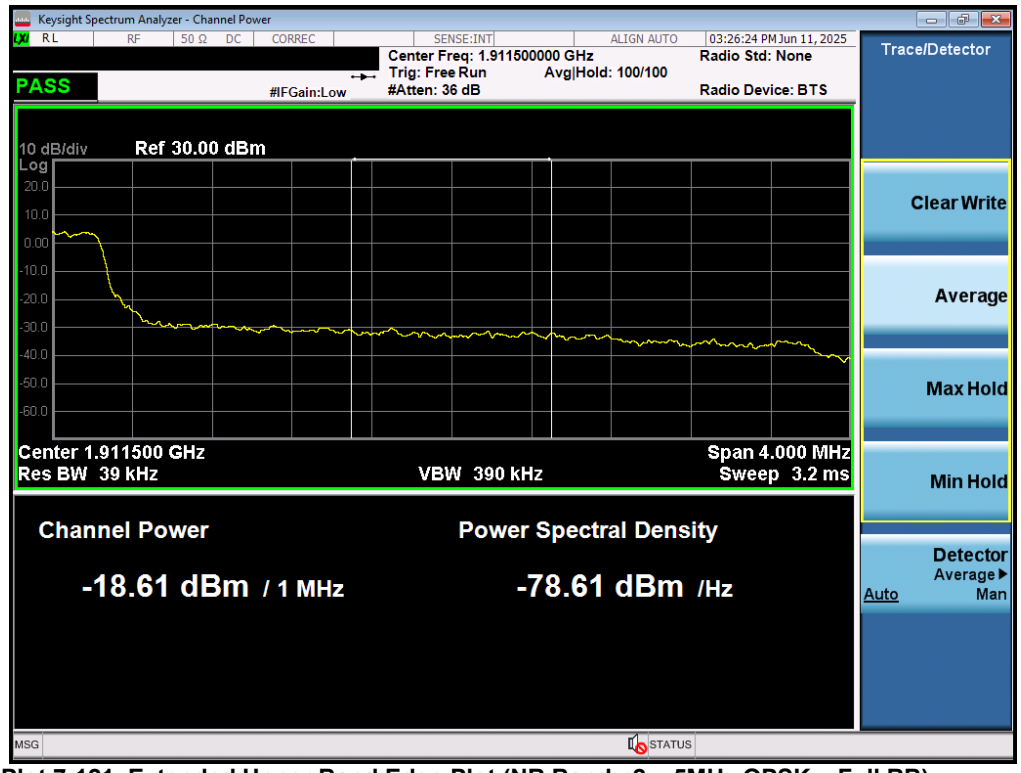


Plot 7-118. Lower Band Edge Plot (NR Band n25/2 – 5MHz QPSK – Full RB)



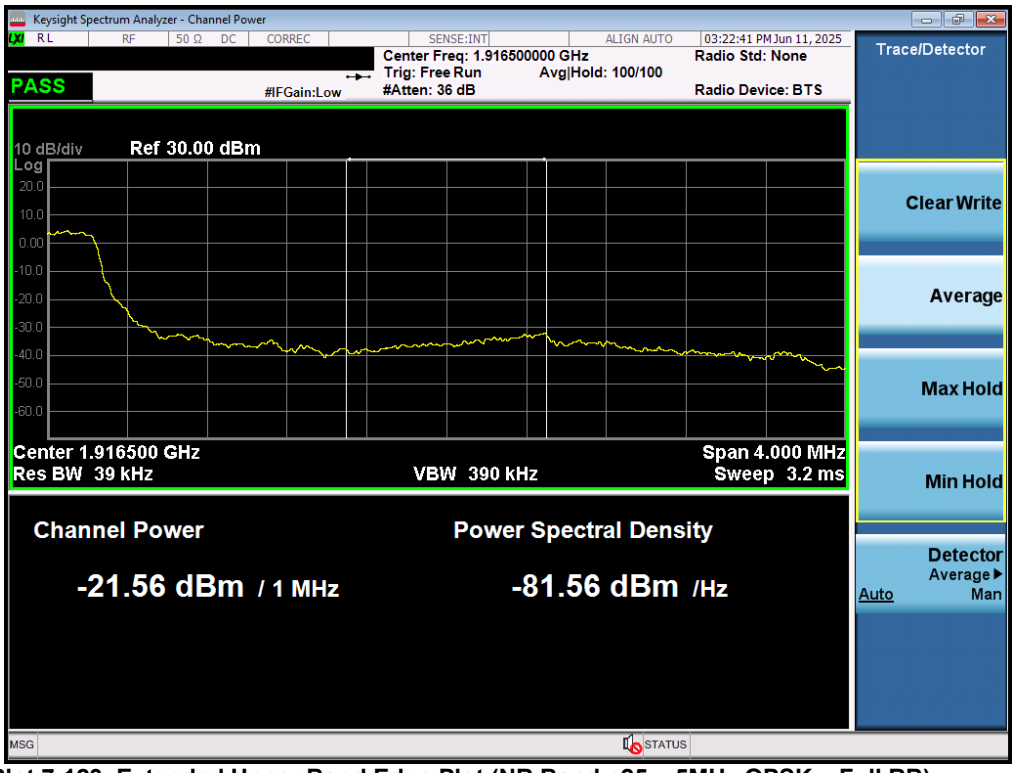
Plot 7-119. Extended Lower Band Edge Plot (NR Band n25/2 – 5MHz QPSK – Full RB)

Plot 7-120. Upper Band Edge Plot (NR Band n2 – 5MHz QPSK – Full RB)



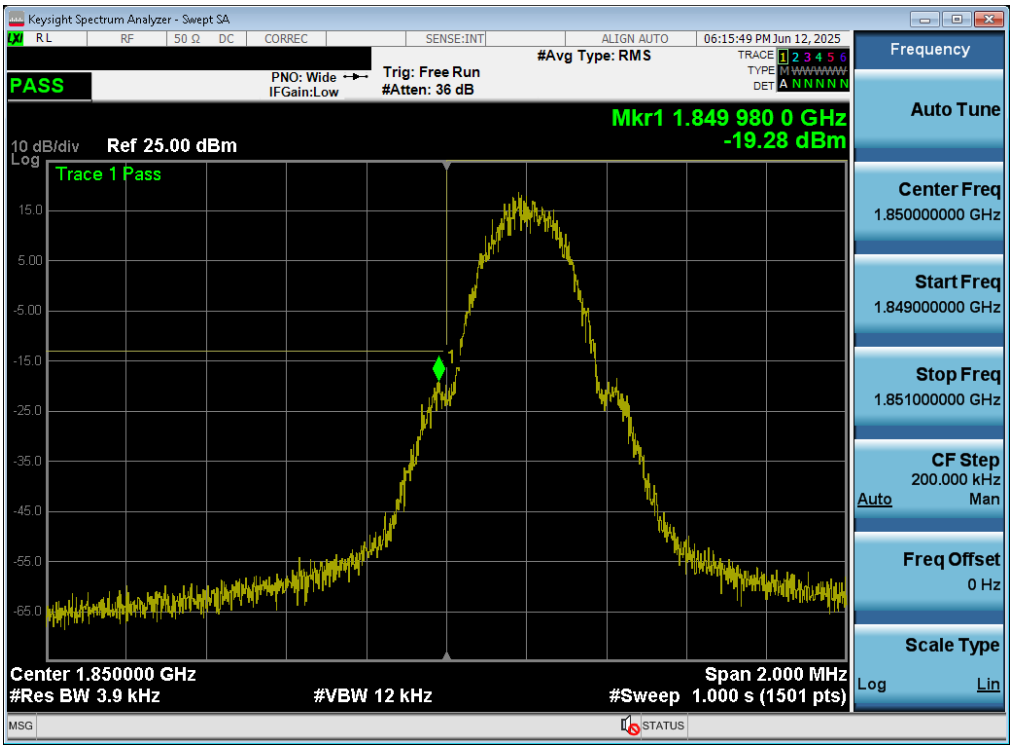
Plot 7-121. Extended Upper Band Edge Plot (NR Band n2 – 5MHz QPSK – Full RB)

Plot 7-122. Upper Band Edge Plot (NR Band n25 – 5MHz QPSK – Full RB)

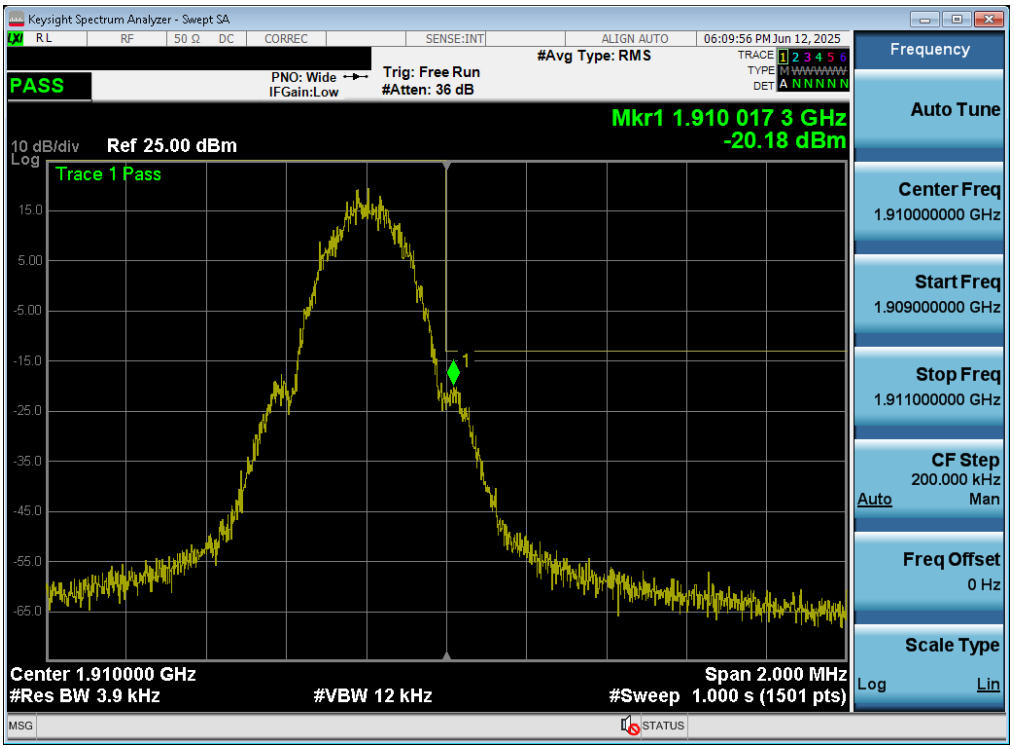


Plot 7-123. Extended Upper Band Edge Plot (NR Band n25 – 5MHz QPSK – Full RB)

GSM/GPRS PCS

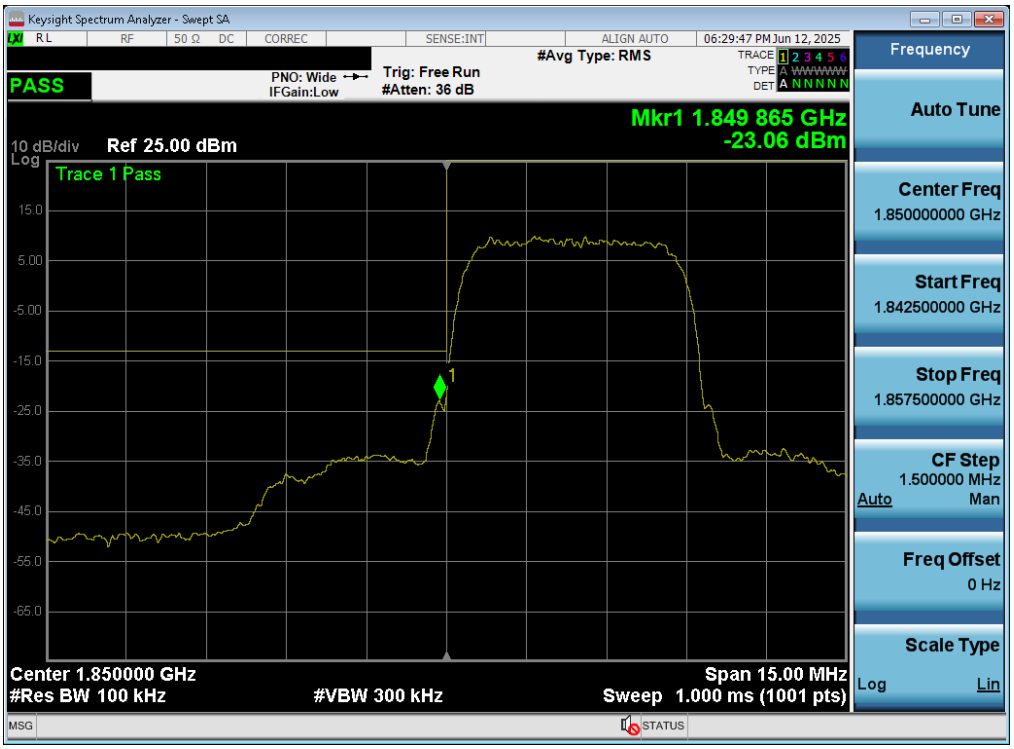


Plot 7-124. Lower Band Edge Plot (GPRS PCS – Ch. 512)

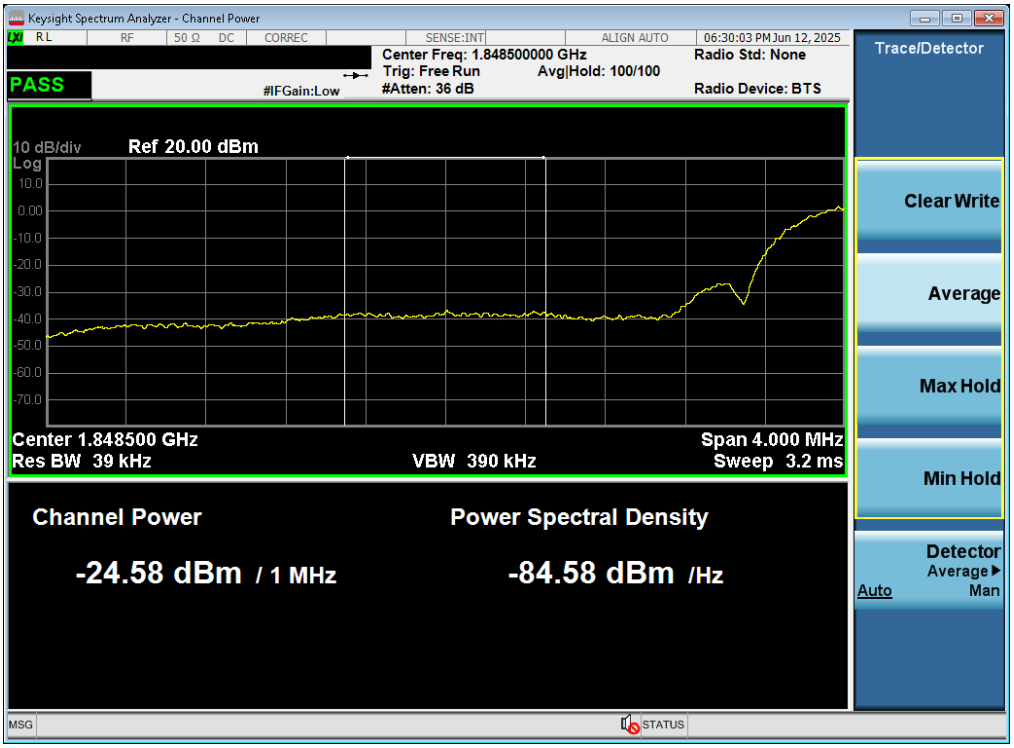


Plot 7-125. Upper Band Edge Plot (GPRS PCS – Ch. 810)

WCDMA PCS

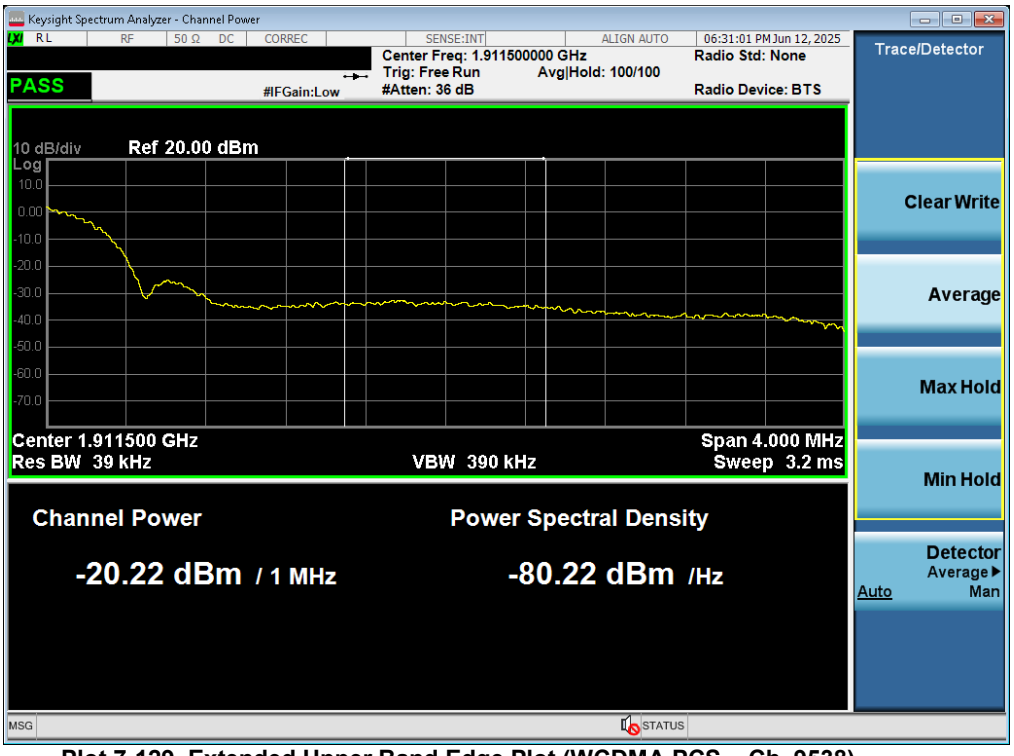


Plot 7-126. Lower Band Edge Plot (WCDMA PCS – Ch. 9262)



Plot 7-127. Extended Lower Band Edge Plot (WCDMA PCS – Ch. 9262)

Plot 7-128. Upper Band Edge Plot (WCDMA PCS – Ch. 9538)



Plot 7-129. Extended Upper Band Edge Plot (WCDMA PCS – Ch. 9538)

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.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

Test Procedure Used

ANSI C63.26-2015 – Section 5.2.3.4

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.

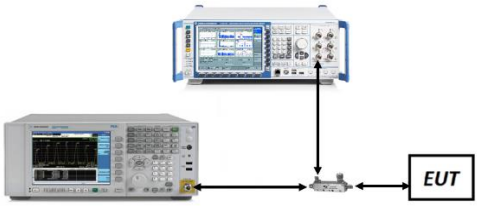
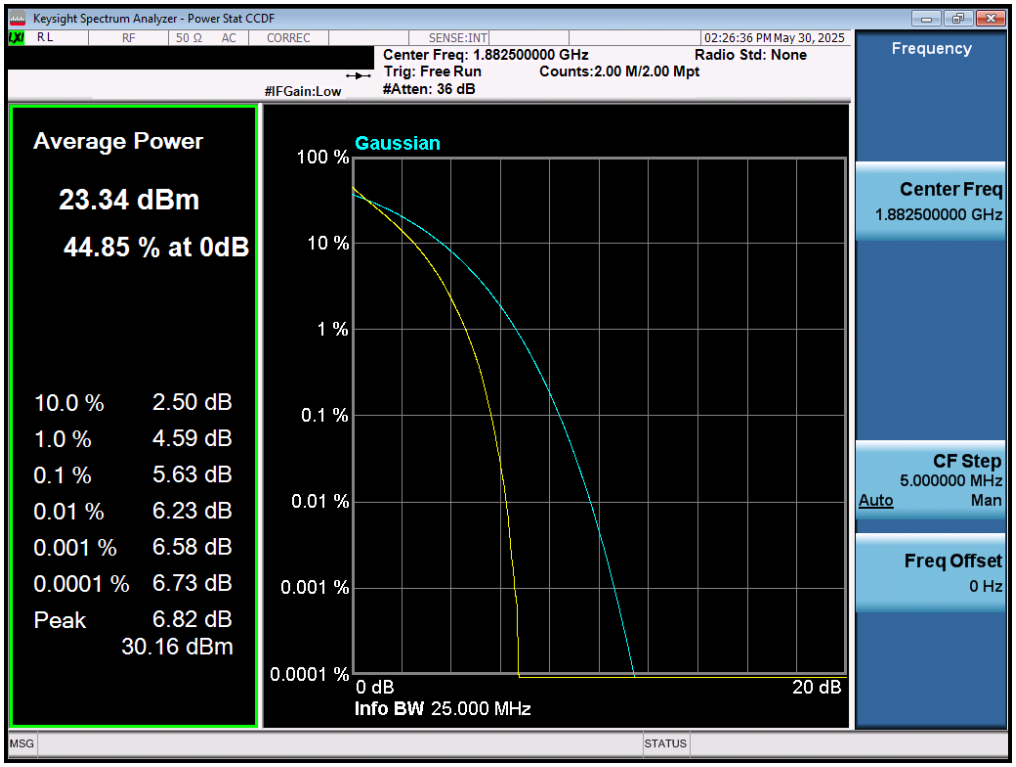


Figure 7-4. Test Instrument & Measurement Setup

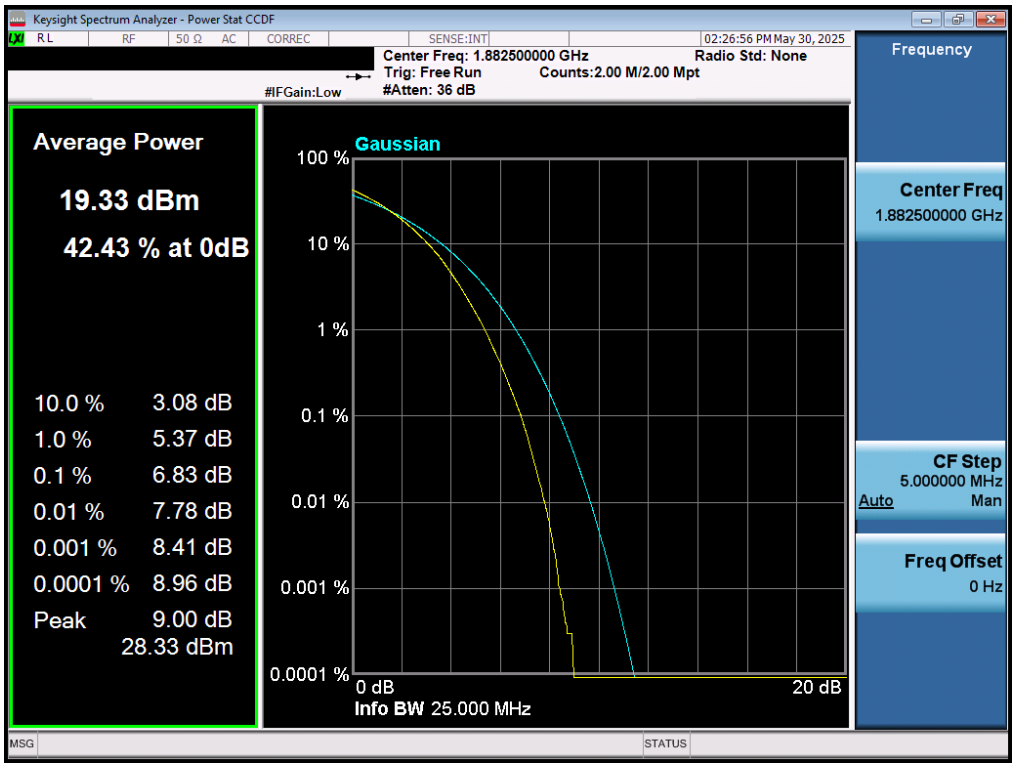
Test Notes

For the QAM modulations, 256QAM was found to have the worst-case peak-to-average ratio so it is the only QAM measurement included in this section.

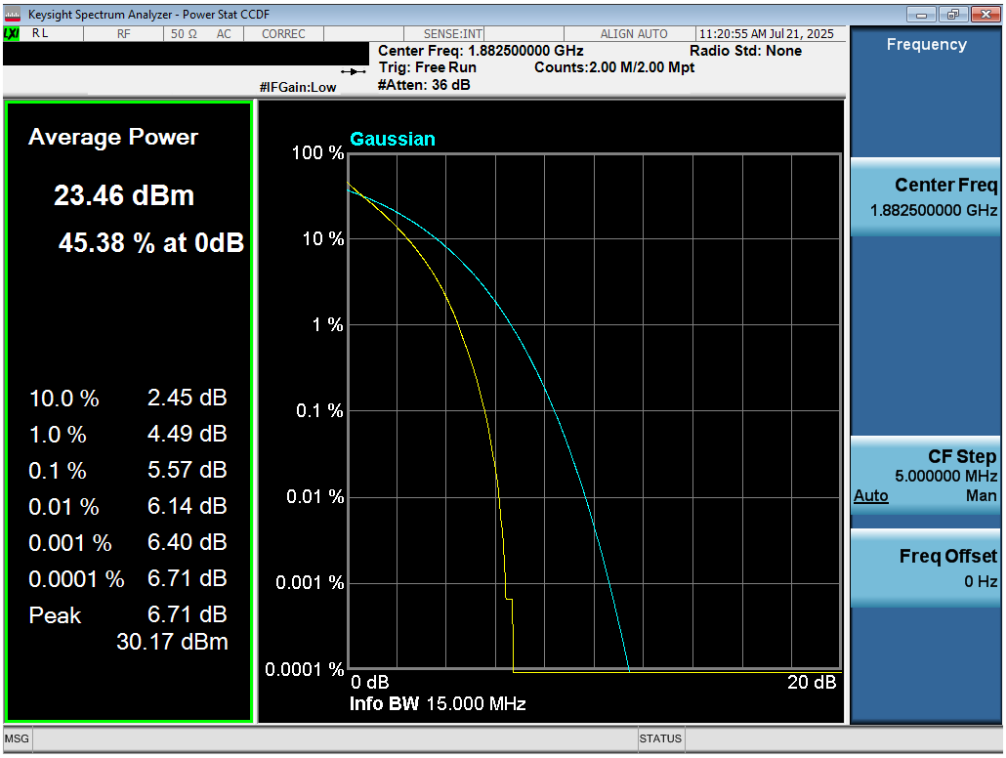
LTE Band 25/2



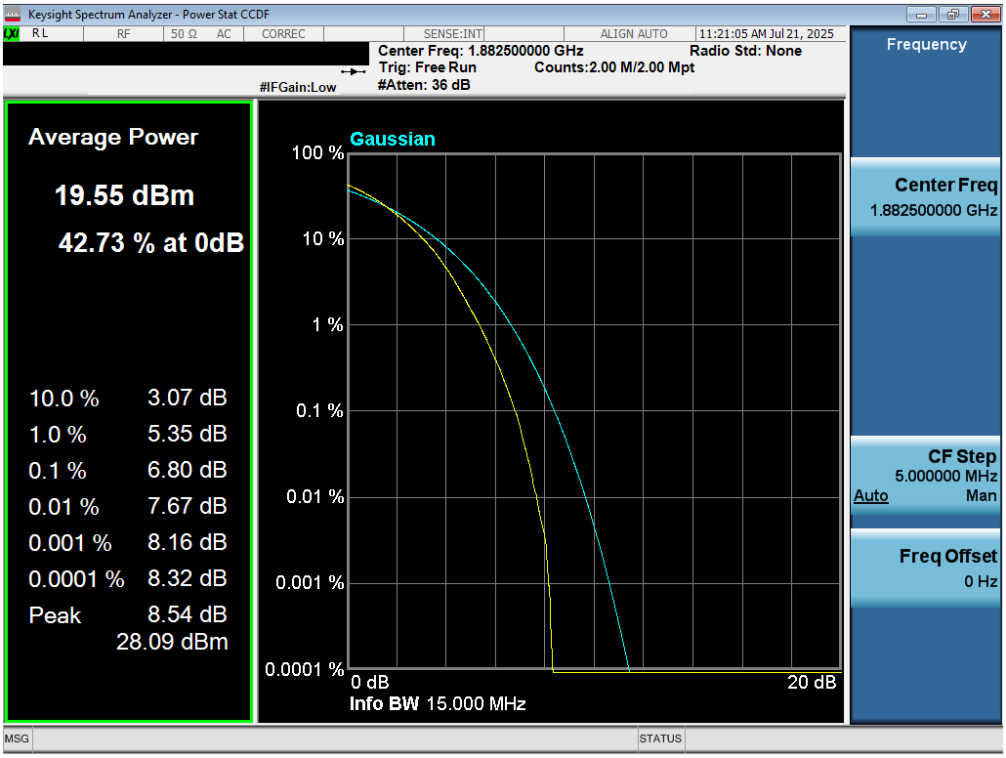
Plot 7-130. PAR Plot (LTE Band 25/2 - 20MHz QPSK - Full RB)



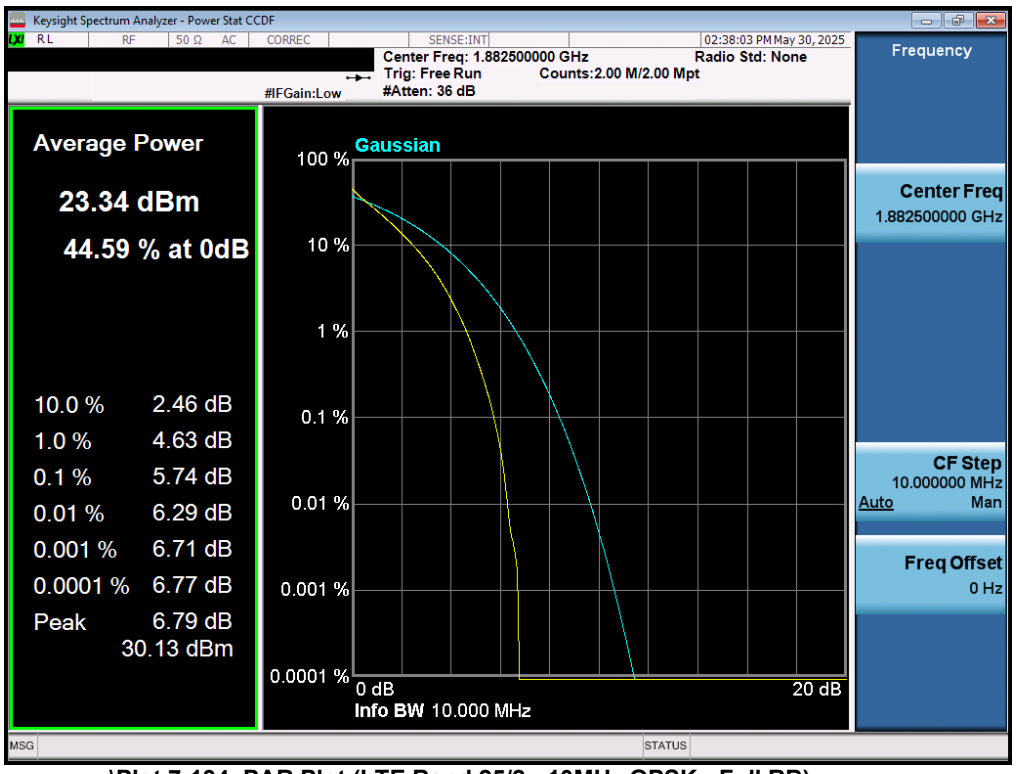
Plot 7-131. PAR Plot (LTE Band 25/2 - 20MHz 256QAM - Full RB)



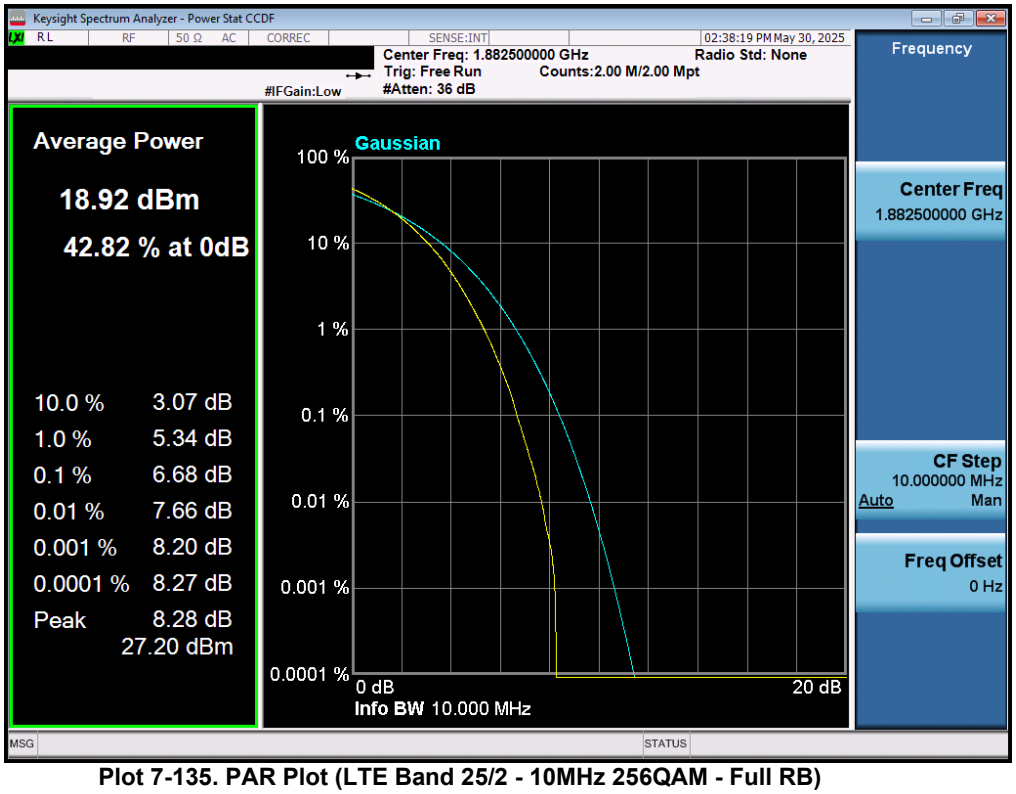
Plot 7-132. PAR Plot (LTE Band 25/2 - 15MHz QPSK - Full RB)



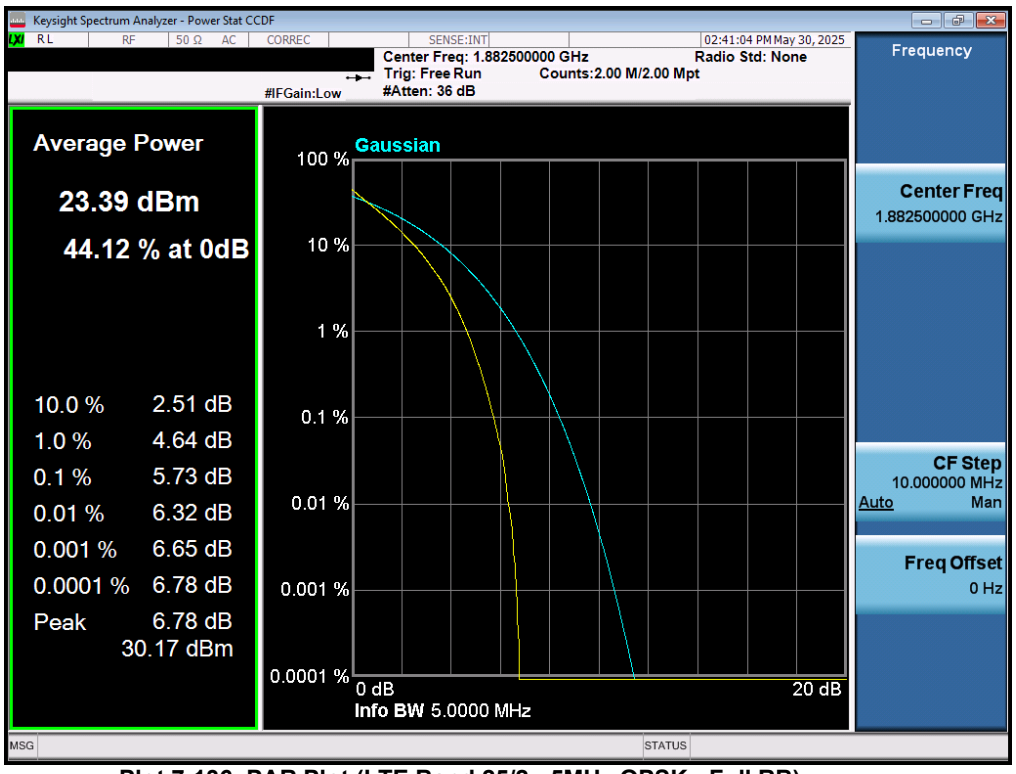
Plot 7-133. PAR Plot (LTE Band 25/2 - 15MHz 256QAM - Full RB)



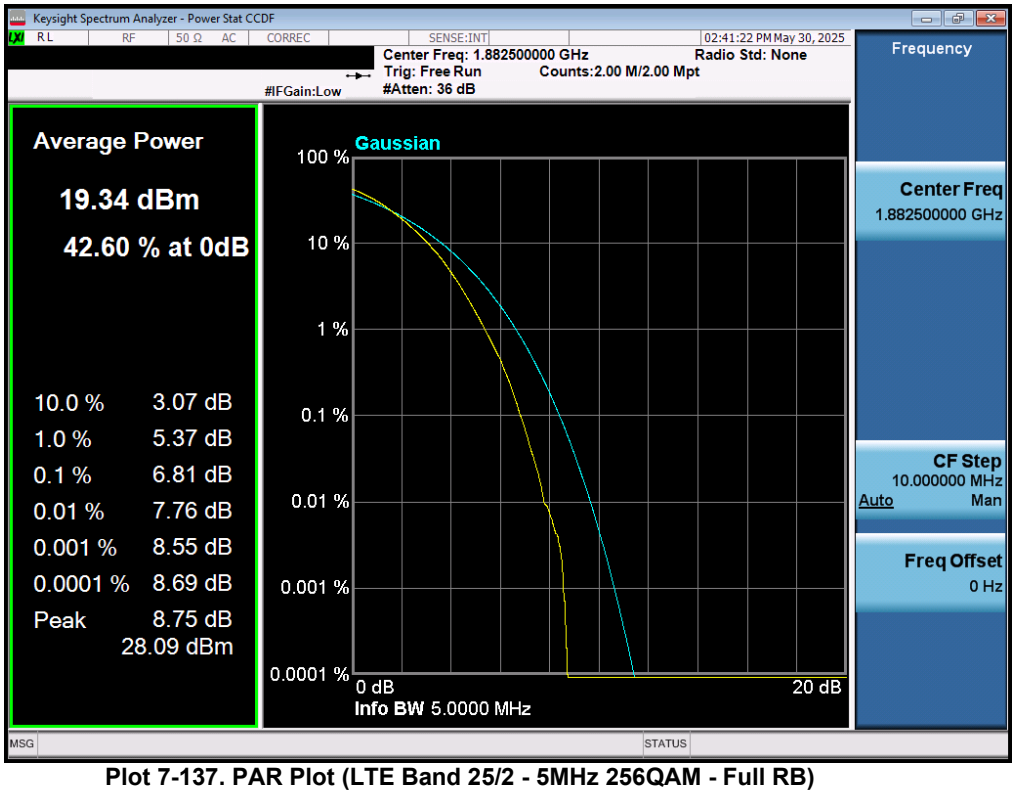
\Plot 7-134. PAR Plot (LTE Band 25/2 - 10MHz QPSK - Full RB)



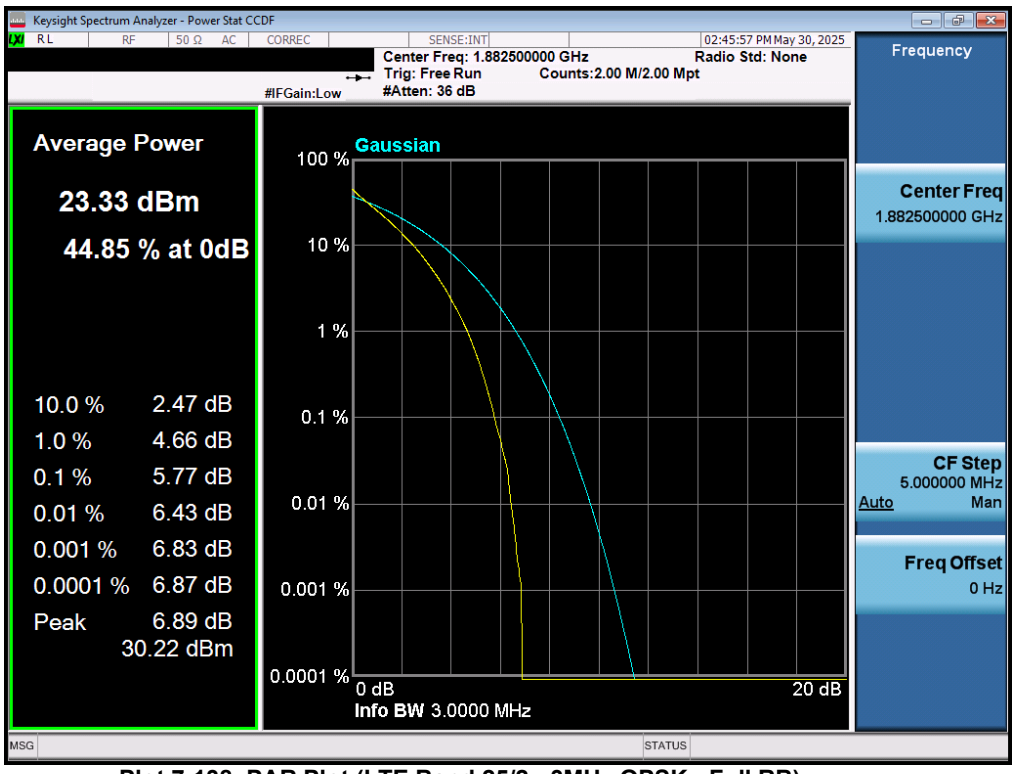
Plot 7-135. PAR Plot (LTE Band 25/2 - 10MHz 256QAM - Full RB)



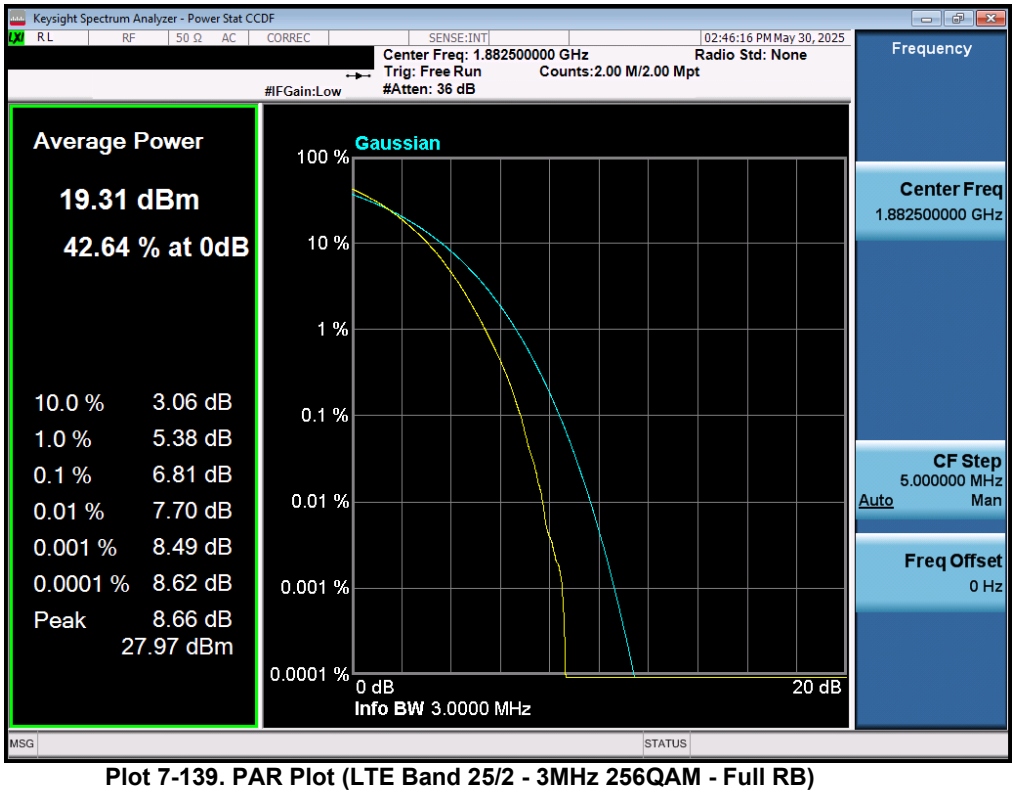
Plot 7-136. PAR Plot (LTE Band 25/2 - 5MHz QPSK - Full RB)



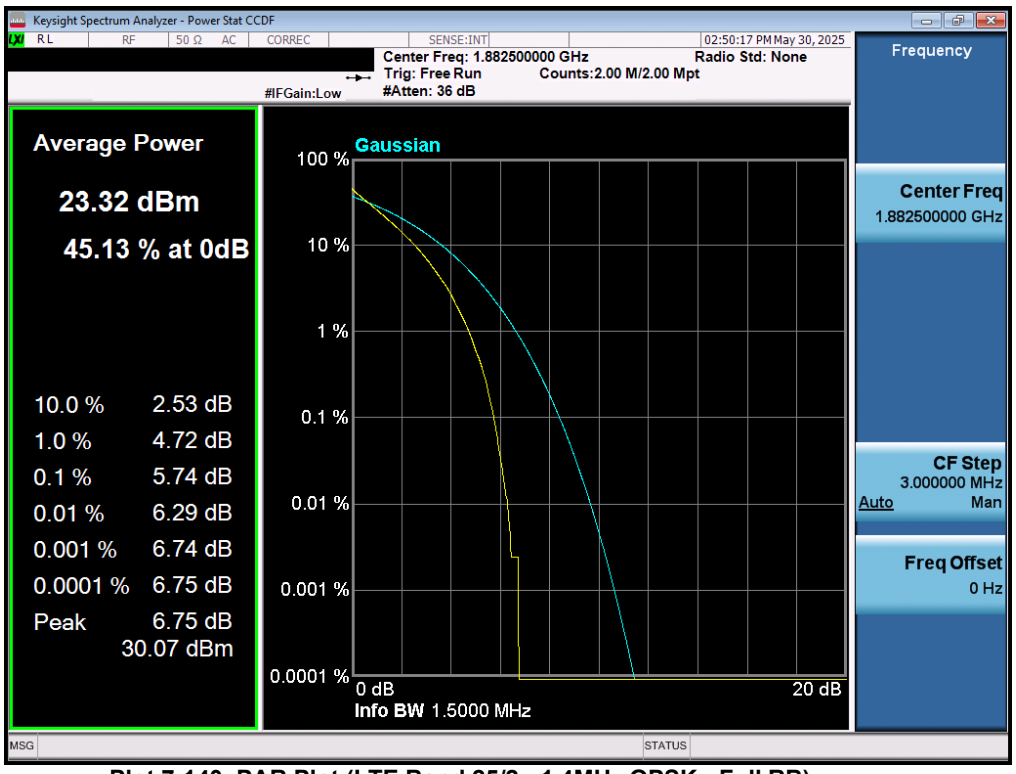
Plot 7-137. PAR Plot (LTE Band 25/2 - 5MHz 256QAM - Full RB)



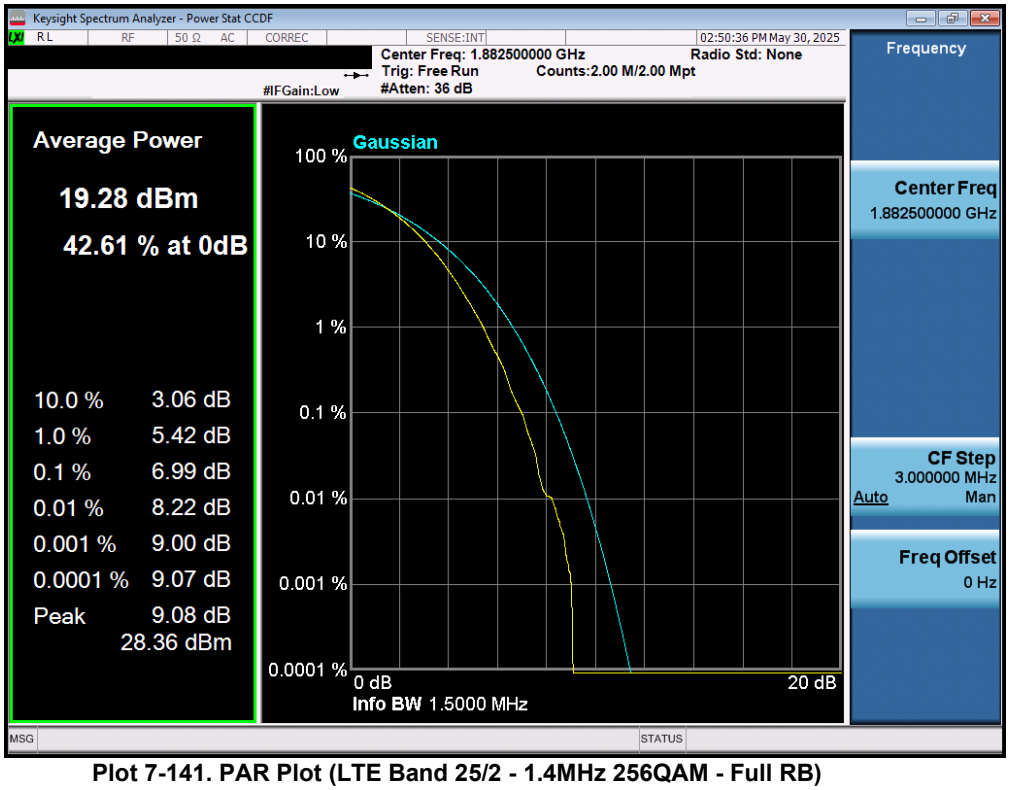
Plot 7-138. PAR Plot (LTE Band 25/2 - 3MHz QPSK - Full RB)



Plot 7-139. PAR Plot (LTE Band 25/2 - 3MHz 256QAM - Full RB)

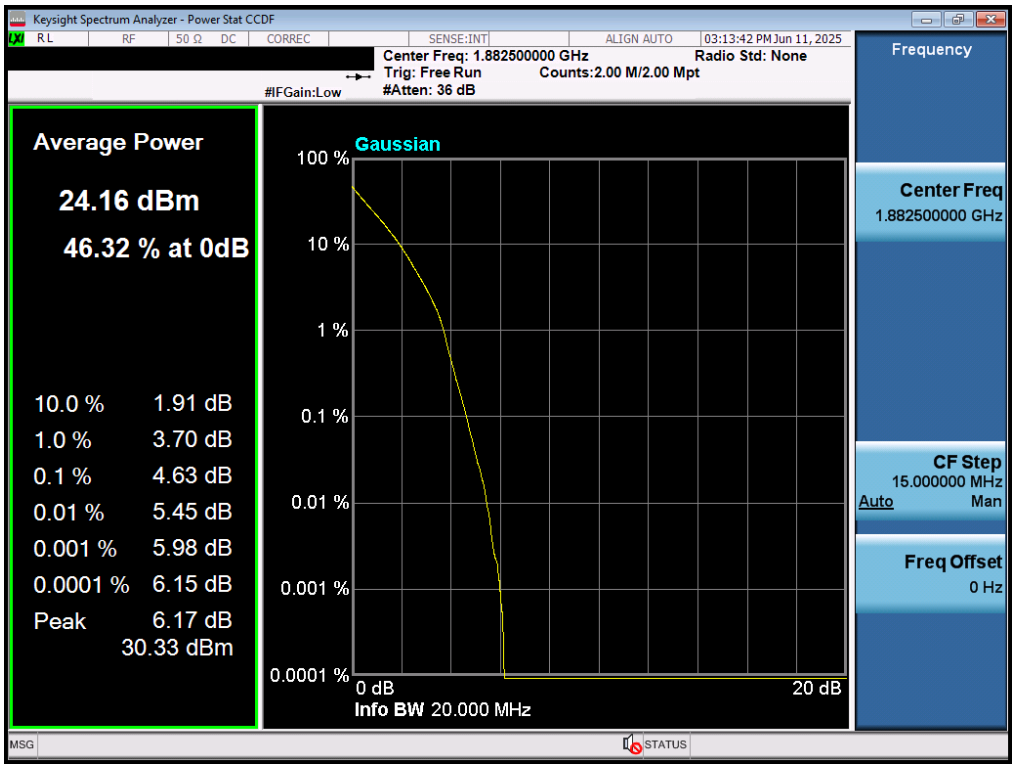


Plot 7-140. PAR Plot (LTE Band 25/2 - 1.4MHz QPSK - Full RB)

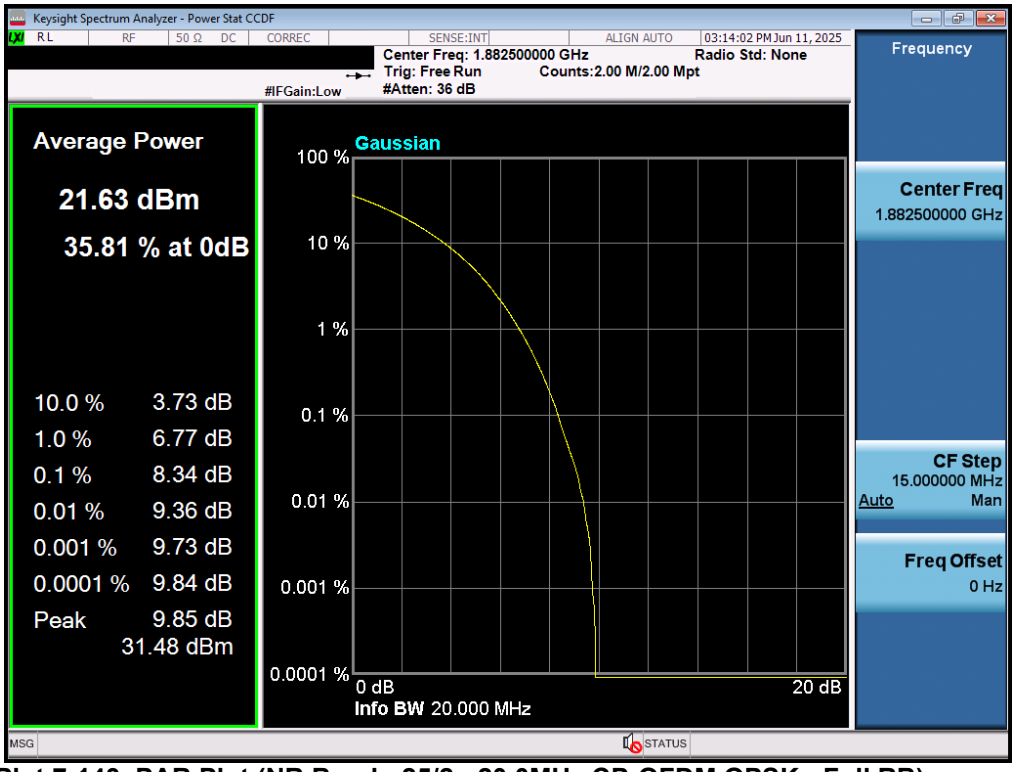


Plot 7-141. PAR Plot (LTE Band 25/2 - 1.4MHz 256QAM - Full RB)

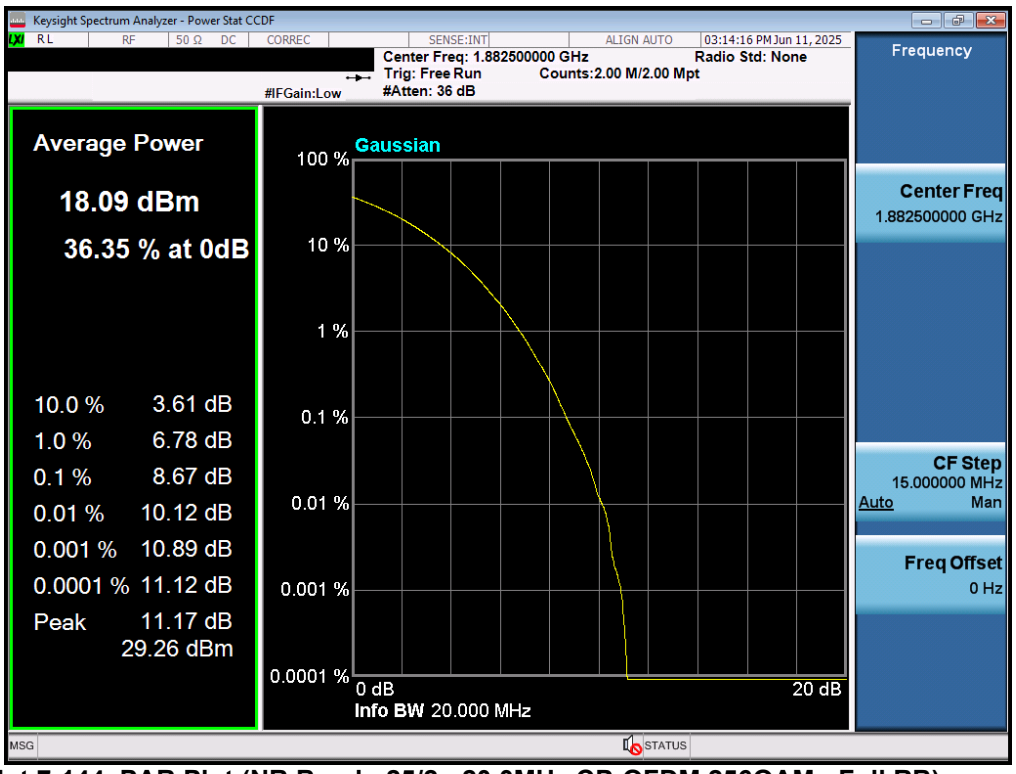
NR Band n25/2



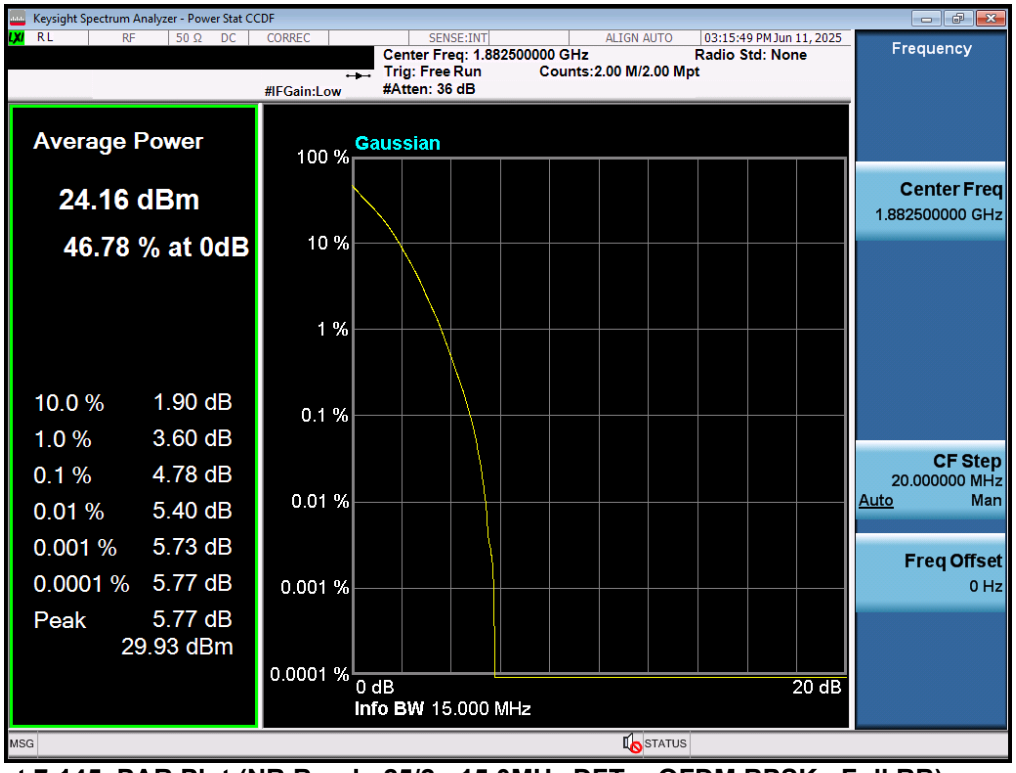
Plot 7-142. PAR Plot (NR Band n25/2 - 20.0MHz DFT-s-OFDM BPSK - Full RB)



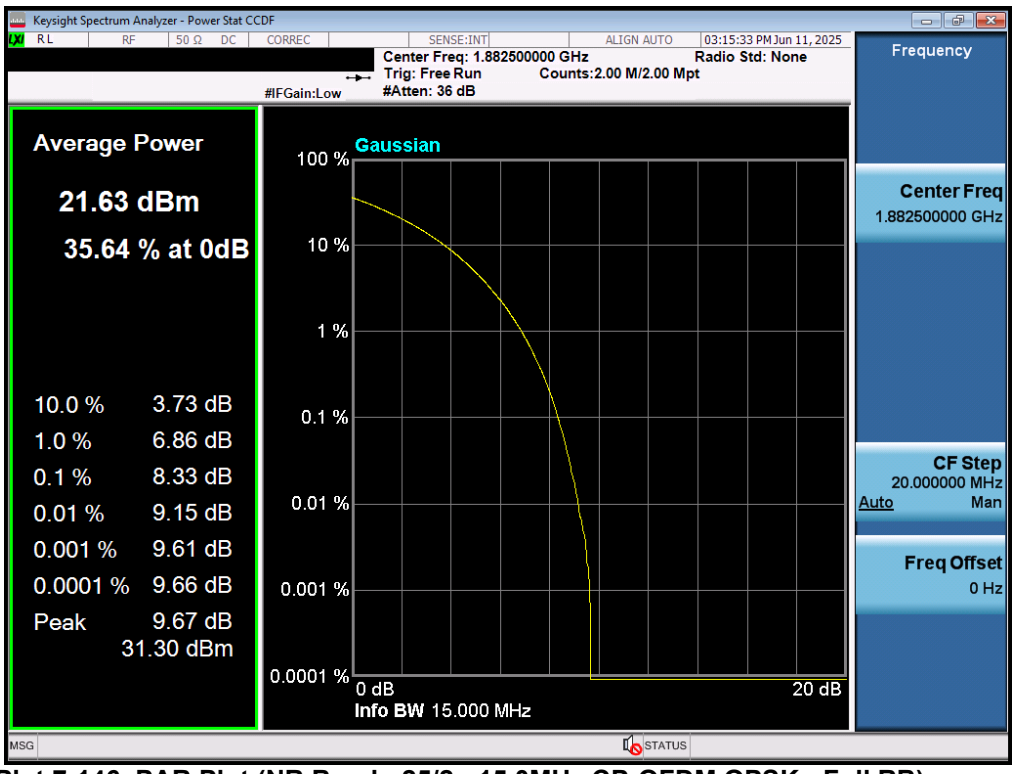
Plot 7-143. PAR Plot (NR Band n25/2 - 20.0MHz CP-OFDM QPSK - Full RB)



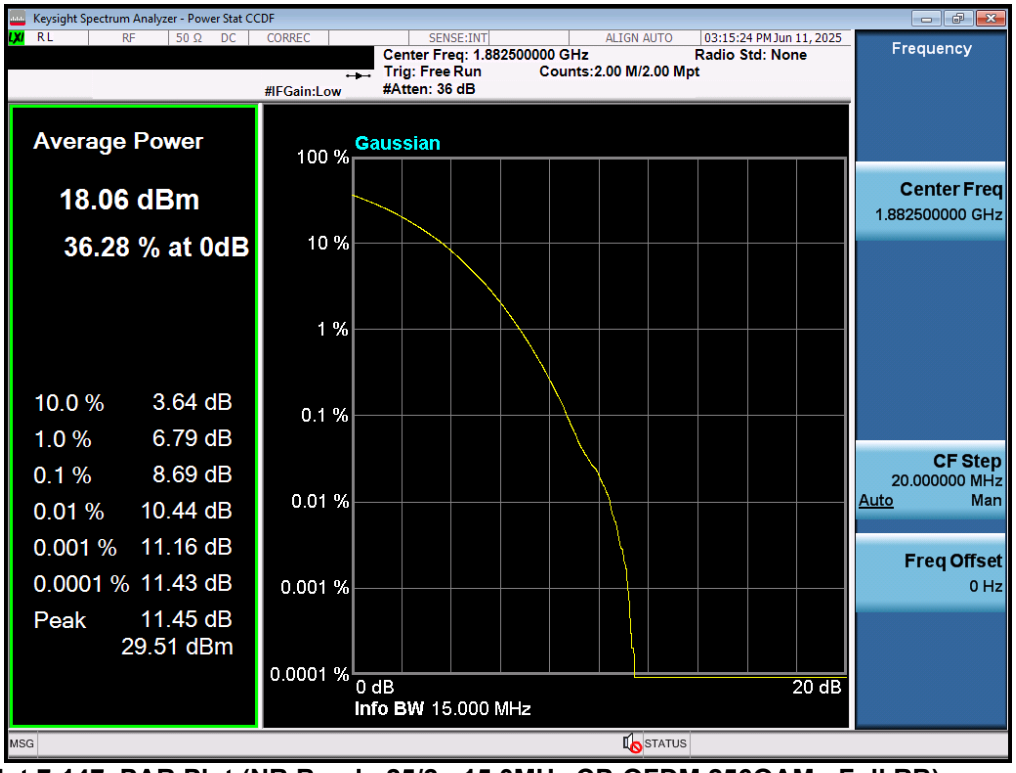
Plot 7-144. PAR Plot (NR Band n25/2 - 20.0MHz CP-OFDM 256QAM - Full RB)



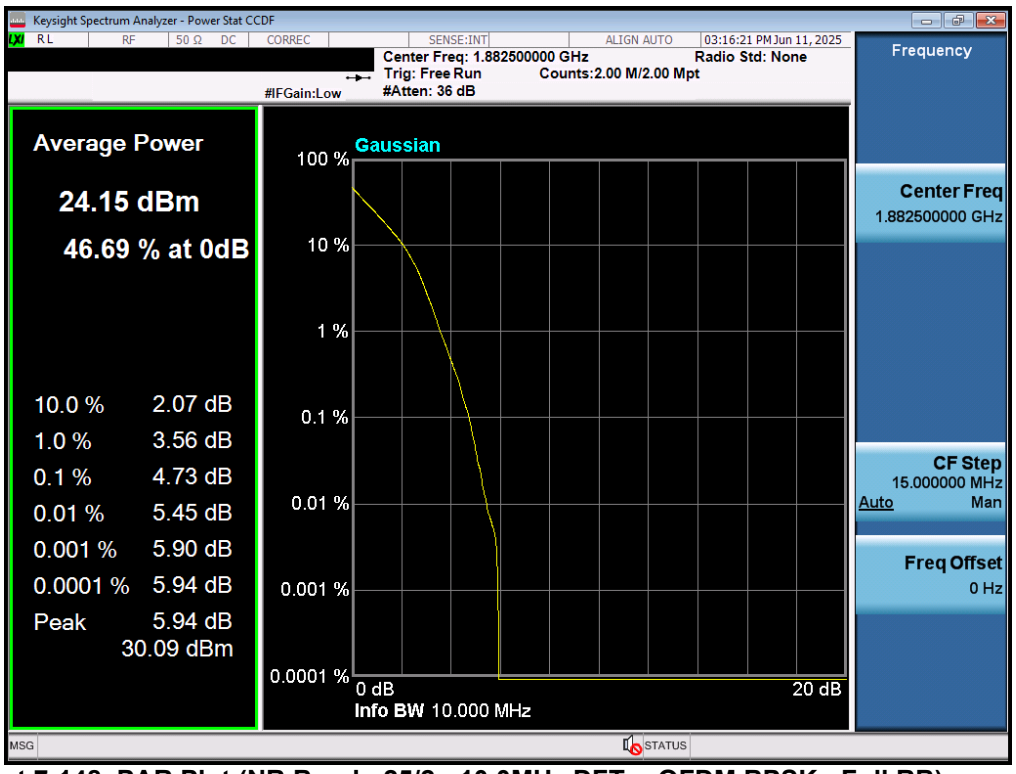
Plot 7-145. PAR Plot (NR Band n25/2 - 15.0MHz DFT-s-OFDM BPSK - Full RB)



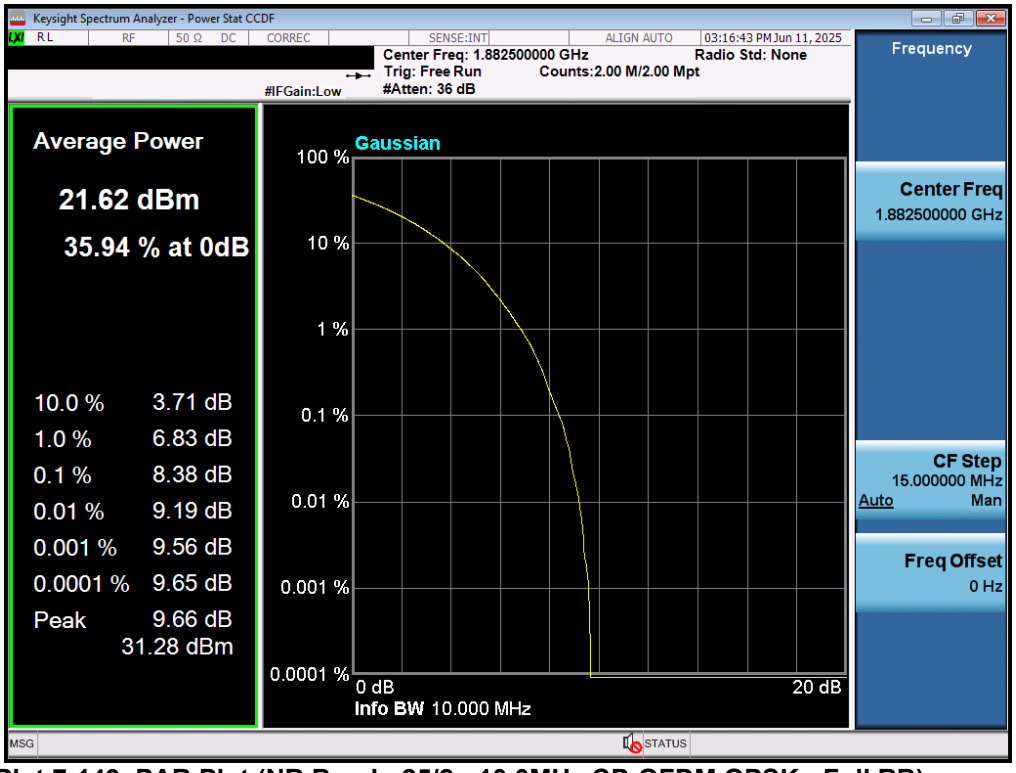
Plot 7-146. PAR Plot (NR Band n25/2 - 15.0MHz CP-OFDM QPSK - Full RB)



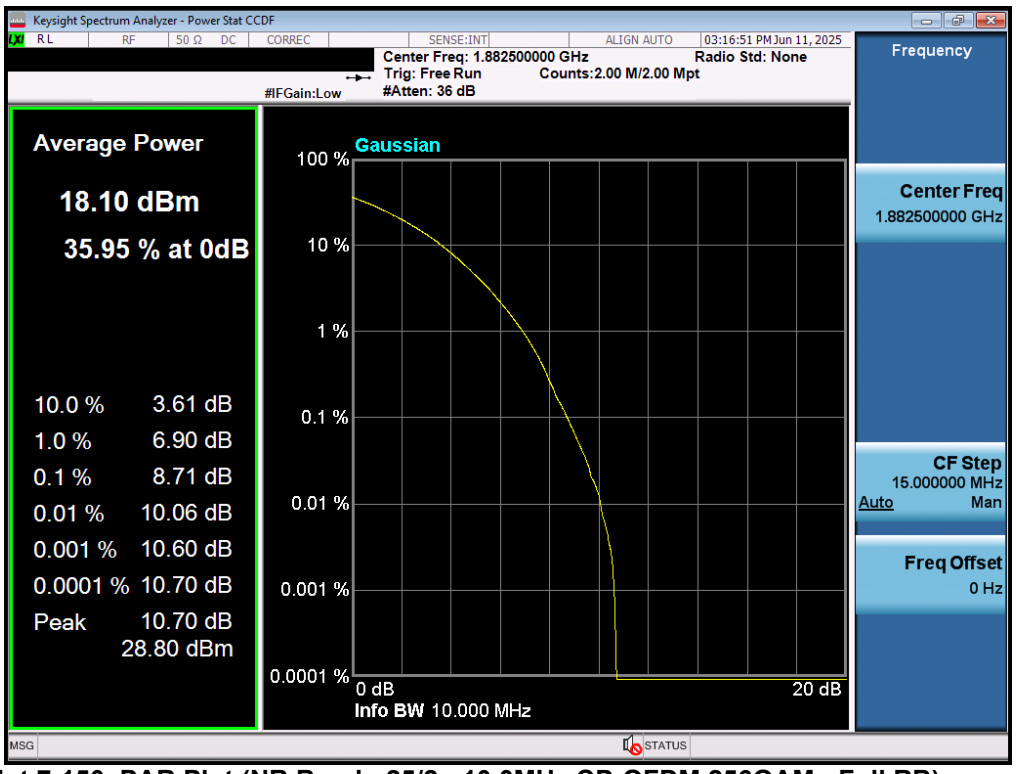
Plot 7-147. PAR Plot (NR Band n25/2 - 15.0MHz CP-OFDM 256QAM - Full RB)



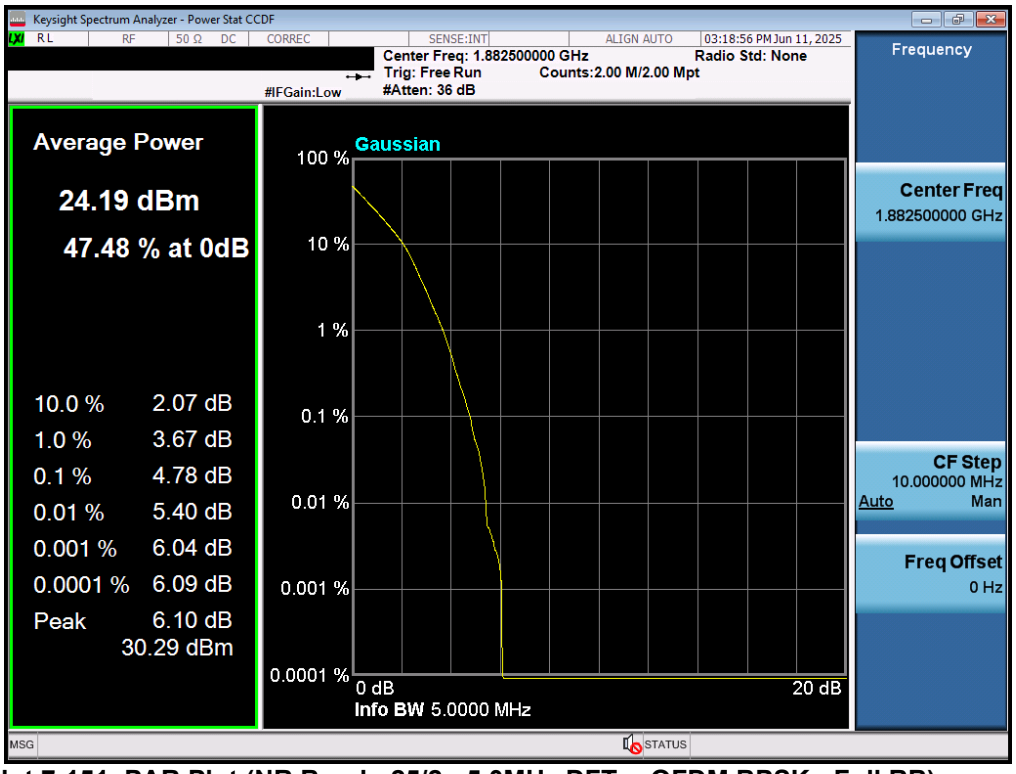
Plot 7-148. PAR Plot (NR Band n25/2 - 10.0MHz DFT-s-OFDM BPSK - Full RB)



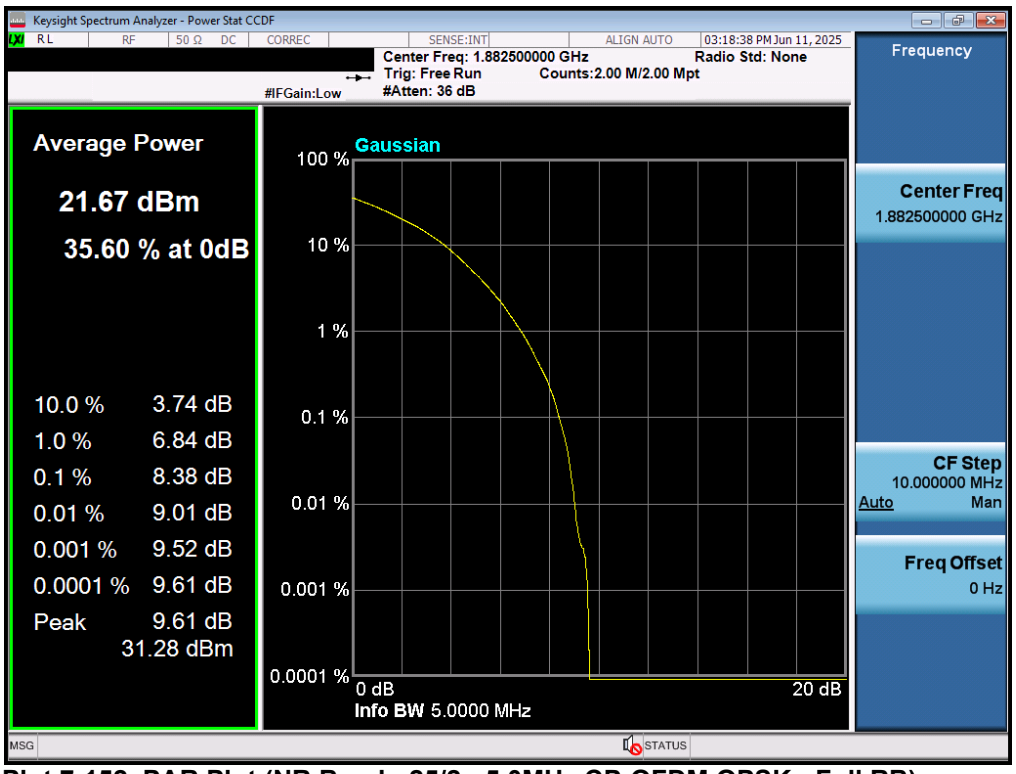
Plot 7-149. PAR Plot (NR Band n25/2 - 10.0MHz CP-OFDM QPSK - Full RB)



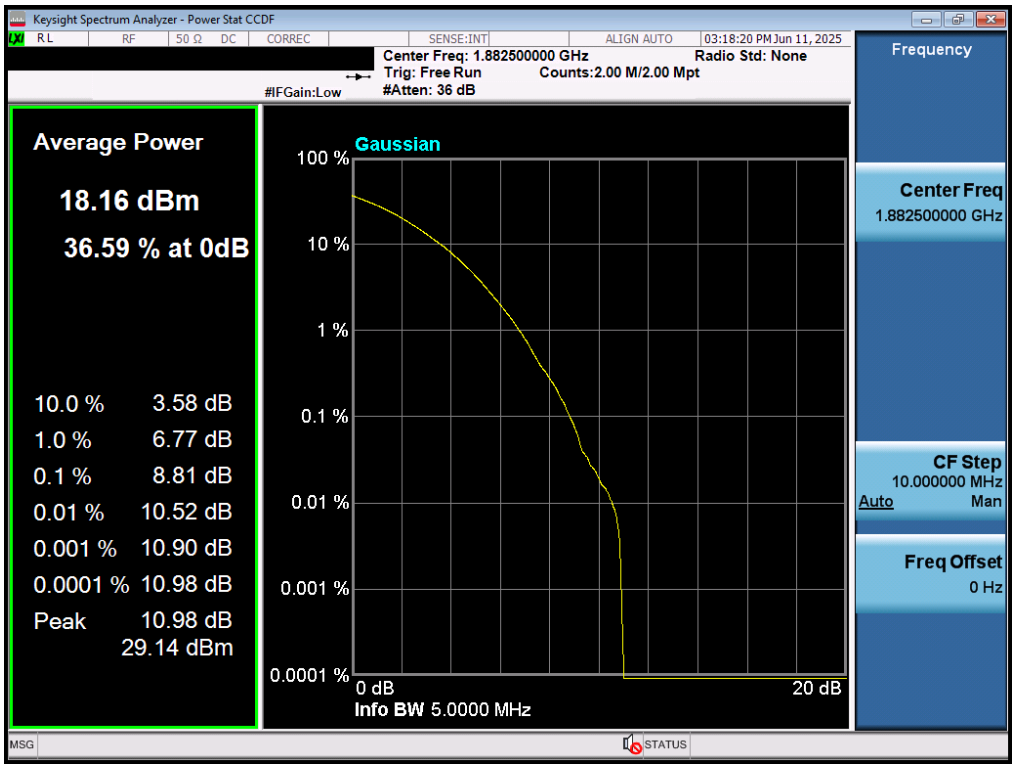
Plot 7-150. PAR Plot (NR Band n25/2 - 10.0MHz CP-OFDM 256QAM - Full RB)



Plot 7-151. PAR Plot (NR Band n25/2 - 5.0MHz DFT-s-OFDM BPSK - Full RB)

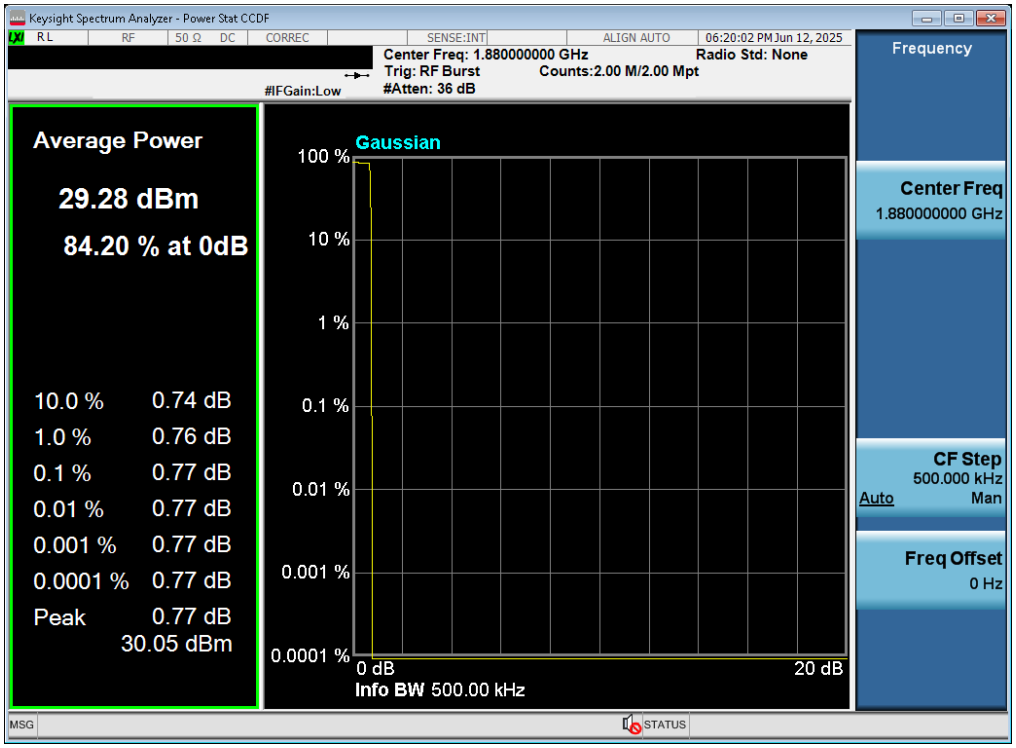


Plot 7-152. PAR Plot (NR Band n25/2 - 5.0MHz CP-OFDM QPSK - Full RB)

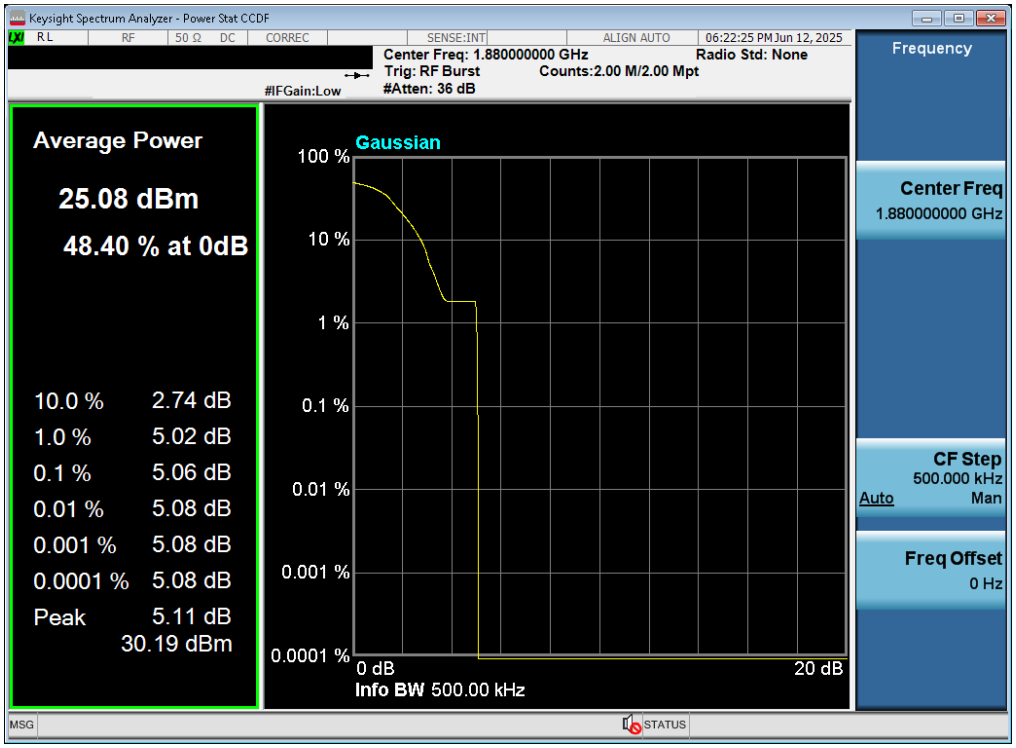


Plot 7-153. PAR Plot (NR Band n25/2 - 5.0MHz CP-OFDM 256QAM - Full RB)

GSM/GPRS PCS

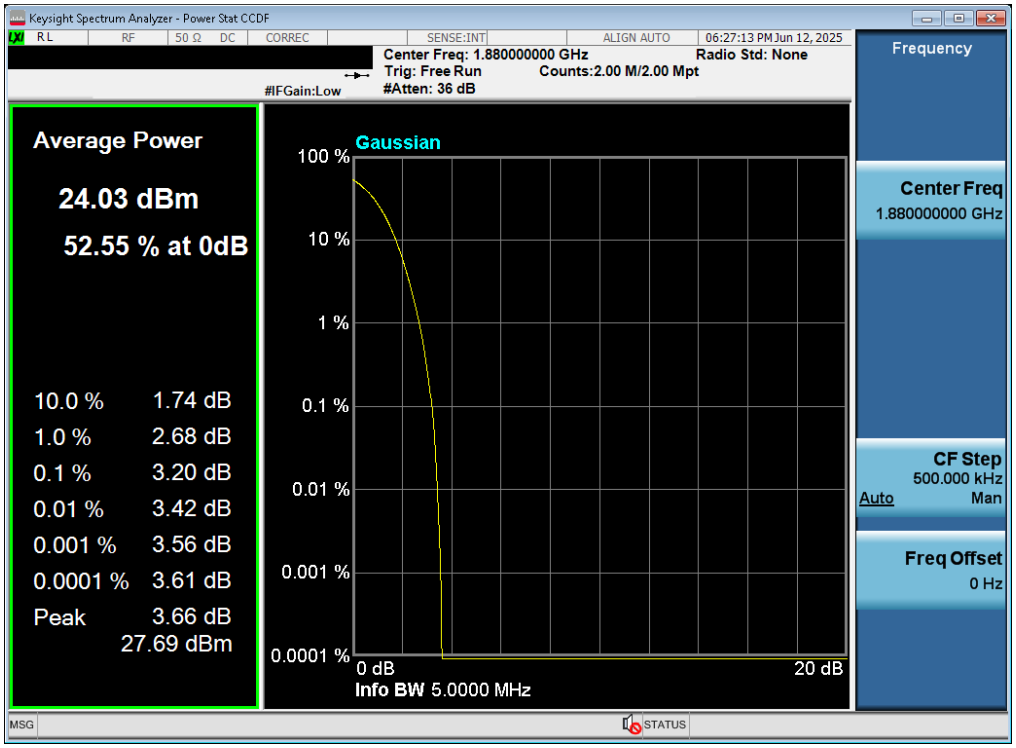


Plot 7-154. PAR Plot (GPRS, Ch. 661)



Plot 7-155. PAR Plot (EDGE, Ch. 661)

WCDMA PCS



Plot 7-156. PAR Plot (WCDMA, Ch. 9400)

7.6 Radiated Power (EIRP)

Test Overview

Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements 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

ANSI C63.26-2015 – Section 5.2.4.4

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.

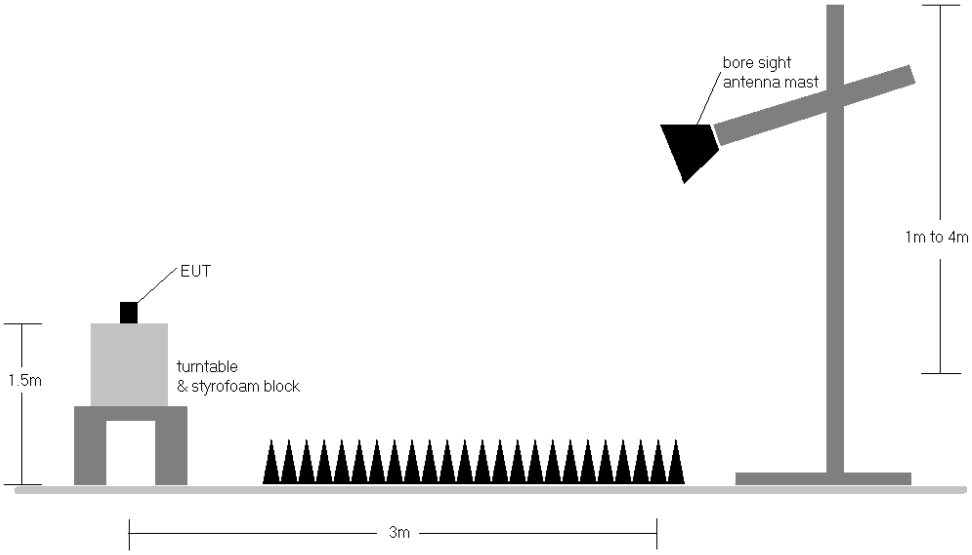


Figure 7-5. Radiated Test Setup >1GHz

Test Notes

1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers are 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 powers are 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) 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	1860.00	V	368	133	2.53	1 / 99	20.32	**22.85**	0.193	33.01	-10.16
	QPSK	1882.50	V	362	135	2.32	1 / 99	20.40	22.72	0.187	33.01	-10.29
	QPSK	1905.00	V	364	133	2.19	1 / 50	20.37	22.56	0.180	33.01	-10.45
	16-QAM	1860.00	V	368	133	2.53	1 / 99	19.70	22.23	0.167	33.01	-10.78
	16-QAM	1882.50	V	362	135	2.32	1 / 99	19.62	21.94	0.156	33.01	-11.07
	16-QAM	1905.00	V	364	133	2.19	1 / 50	19.74	21.93	0.156	33.01	-11.08
15 MHz	QPSK	1857.50	V	368	133	2.55	1 / 0	20.30	**22.86**	0.193	33.01	-10.15
	QPSK	1882.50	V	362	135	2.32	1 / 74	20.48	22.80	0.190	33.01	-10.22
	QPSK	1907.50	V	364	133	2.20	1 / 74	20.20	22.41	0.174	33.01	-10.60
	16-QAM	1857.50	V	368	133	2.55	1 / 0	19.34	21.90	0.155	33.01	-11.11
	16-QAM	1882.50	V	362	135	2.32	1 / 74	19.54	21.86	0.153	33.01	-11.15
	16-QAM	1907.50	V	364	133	2.20	1 / 74	19.50	21.70	0.148	33.01	-11.31
10 MHz	QPSK	1855.00	V	368	133	2.58	1 / 49	20.31	22.89	0.195	33.01	-10.12
	QPSK	1882.50	V	362	135	2.32	1 / 0	20.60	**22.91**	0.196	33.01	-10.10
	QPSK	1910.00	V	364	133	2.22	1 / 0	20.23	22.45	0.176	33.01	-10.56
	16-QAM	1855.00	V	368	133	2.58	1 / 49	19.18	21.76	0.150	33.01	-11.25
	16-QAM	1882.50	V	362	135	2.32	1 / 0	19.80	22.12	0.163	33.01	-10.89
	16-QAM	1910.00	V	364	133	2.22	1 / 0	19.89	22.12	0.163	33.01	-10.90
5 MHz	QPSK	1852.50	V	368	133	2.60	1 / 12	20.27	**22.87**	0.194	33.01	-10.14
	QPSK	1882.50	V	362	135	2.32	1 / 24	20.54	22.85	0.193	33.01	-10.16
	QPSK	1912.50	V	364	133	2.24	1 / 24	20.27	22.51	0.178	33.01	-10.50
	16-QAM	1852.50	V	368	133	2.60	1 / 12	19.12	21.72	0.149	33.01	-11.29
	16-QAM	1882.50	V	362	135	2.32	1 / 24	20.01	22.33	0.171	33.01	-10.68
	16-QAM	1912.50	V	364	133	2.24	1 / 24	19.65	21.89	0.155	33.01	-11.12
3 MHz	QPSK	1851.50	V	368	133	2.61	1 / 0	20.24	**22.85**	0.193	33.01	-10.16
	QPSK	1882.50	V	362	135	2.32	1 / 14	20.46	22.78	0.190	33.01	-10.23
	QPSK	1913.50	V	364	133	2.25	1 / 14	20.20	22.44	0.176	33.01	-10.57
	16-QAM	1851.50	V	368	133	2.61	1 / 0	19.10	21.71	0.148	33.01	-11.30
	16-QAM	1882.50	V	362	135	2.32	1 / 14	19.56	21.88	0.154	33.01	-11.13
	16-QAM	1913.50	V	364	133	2.25	1 / 14	19.43	21.68	0.147	33.01	-11.33
1.4 MHz	QPSK	1850.70	V	368	133	2.62	1 / 5	19.98	22.60	0.182	33.01	-10.41
	QPSK	1882.50	V	362	135	2.32	1 / 0	20.39	**22.70**	0.186	33.01	-10.31
	QPSK	1914.30	V	364	133	2.25	1 / 0	20.08	22.33	0.171	33.01	-10.68
	16-QAM	1850.70	V	368	133	2.62	1 / 5	19.04	21.66	0.147	33.01	-11.35
	16-QAM	1882.50	V	362	135	2.32	1 / 0	19.76	22.07	0.161	33.01	-10.94
	16-QAM	1914.30	V	364	133	2.25	1 / 0	19.24	21.49	0.141	33.01	-11.52
20 MHz	Opposite Pol.	1860.00	H	118	149	2.79	1 / 99	19.32	22.11	0.163	33.01	-10.90

Table 7-2. 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	1860.00	H	112	52	2.79	1 / 1	20.94	23.73	0.236	33.01	-9.28
	π/2 BPSK	1882.50	H	112	334	2.65	1 / 1	21.23	**23.88**	0.244	33.01	-9.13
	π/2 BPSK	1905.00	H	107	334	2.54	1 / 1	20.71	23.25	0.211	33.01	-9.76
	QPSK	1860.00	H	112	52	2.79	1 / 1	20.87	23.66	0.232	33.01	-9.35
	QPSK	1882.50	H	112	334	2.65	1 / 1	21.14	23.79	0.239	33.01	-9.22
	QPSK	1905.00	H	107	334	2.54	1 / 1	20.64	23.18	0.208	33.01	-9.83
	16-QAM	1860.00	H	112	52	2.79	1 / 1	20.11	22.90	0.195	33.01	-10.11
	16-QAM	1882.50	H	112	334	2.65	1 / 1	20.49	23.14	0.206	33.01	-9.87
	16-QAM	1905.00	H	107	334	2.54	1 / 1	19.99	22.53	0.179	33.01	-10.48
15 MHz	π/2 BPSK	1857.50	H	112	52	2.81	1 / 77	20.90	23.71	0.235	33.01	-9.30
	π/2 BPSK	1882.50	H	112	52	2.65	1 / 1	21.25	**23.90**	0.245	33.01	-9.11
	π/2 BPSK	1907.50	H	112	52	2.54	1 / 1	20.68	23.22	0.210	33.01	-9.79
	QPSK	1857.50	H	112	52	2.81	1 / 77	20.88	23.69	0.234	33.01	-9.32
	QPSK	1882.50	H	112	52	2.65	1 / 1	21.12	23.77	0.238	33.01	-9.24
	QPSK	1907.50	H	112	52	2.54	1 / 1	20.63	23.17	0.208	33.01	-9.84
	16-QAM	1857.50	H	112	52	2.81	1 / 1	20.08	22.89	0.195	33.01	-10.12
	16-QAM	1882.50	H	112	52	2.65	1 / 1	20.50	23.15	0.207	33.01	-9.86
	16-QAM	1907.50	H	112	52	2.54	1 / 1	19.86	22.40	0.174	33.01	-10.61
10 MHz	π/2 BPSK	1855.00	H	112	52	2.82	1 / 1	20.89	23.71	0.235	33.01	-9.30
	π/2 BPSK	1882.50	H	112	52	2.65	1 / 1	21.27	**23.92**	0.247	33.01	-9.09
	π/2 BPSK	1910.00	H	112	52	2.55	1 / 50	20.78	23.32	0.215	33.01	-9.69
	QPSK	1855.00	H	112	52	2.82	1 / 1	20.91	23.73	0.236	33.01	-9.28
	QPSK	1882.50	H	112	52	2.65	1 / 1	21.18	23.83	0.242	33.01	-9.18
	QPSK	1910.00	H	112	52	2.55	1 / 1	20.71	23.25	0.211	33.01	-9.76
	16-QAM	1855.00	H	112	52	2.82	1 / 1	20.19	23.01	0.200	33.01	-10.00
	16-QAM	1882.50	H	112	52	2.65	1 / 1	20.54	23.19	0.208	33.01	-9.82
	16-QAM	1910.00	H	112	52	2.55	1 / 1	20.05	22.59	0.182	33.01	-10.42
5 MHz	π/2 BPSK	1852.50	H	112	52	2.84	1 / 23	20.76	23.60	0.229	33.01	-9.41
	π/2 BPSK	1882.50	H	112	52	2.65	1 / 1	21.27	**23.92**	0.247	33.01	-9.09
	π/2 BPSK	1912.50	H	112	52	2.55	1 / 1	20.58	23.13	0.206	33.01	-9.88
	QPSK	1852.50	H	112	52	2.84	1 / 1	20.79	23.63	0.231	33.01	-9.38
	QPSK	1882.50	H	112	52	2.65	1 / 1	21.19	23.84	0.242	33.01	-9.17
	QPSK	1912.50	H	112	52	2.55	1 / 1	20.49	23.04	0.202	33.01	-9.97
	16-QAM	1852.50	H	112	52	2.84	1 / 1	20.04	22.88	0.194	33.01	-10.13
	16-QAM	1882.50	H	112	52	2.65	1 / 1	20.51	23.16	0.207	33.01	-9.85
	16-QAM	1912.50	H	112	52	2.55	1 / 1	19.83	22.38	0.173	33.01	-10.63
20 MHz	QPSK (CP-OFDM)	1882.50	H	112	336	2.65	1 / 1	19.12	21.77	0.150	33.01	-11.24

Table 7-3. EIRP Data (NR Band n25/2)

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	GSM1900	V	146	21	25.91	2.86	**28.77**	**0.753**	33.01	-4.24
1880.00	GSM1900	V	359	115	25.28	2.67	27.95	0.623	33.01	-5.07
1909.80	GSM1900	V	133	49	25.29	2.55	27.84	0.608	33.01	-5.17
1850.20	EDGE1900	V	146	21	20.73	2.86	**23.59**	0.228	33.01	-9.42

Table 7-4. 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	150	25	19.51	2.84	**22.35**	**0.172**	33.01	-10.66
1880.00	WCDMA1900	H	244	44	19.43	2.67	22.10	0.162	33.01	-10.92
1907.60	WCDMA1900	H	146	61	19.48	2.54	22.02	0.159	33.01	-10.99

Table 7-5. EIRP Data (WCDMA PCS)

7.7 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using hybrid (biconical/log) antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

ANSI C63.26-2015 – Section 5.5.4

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.

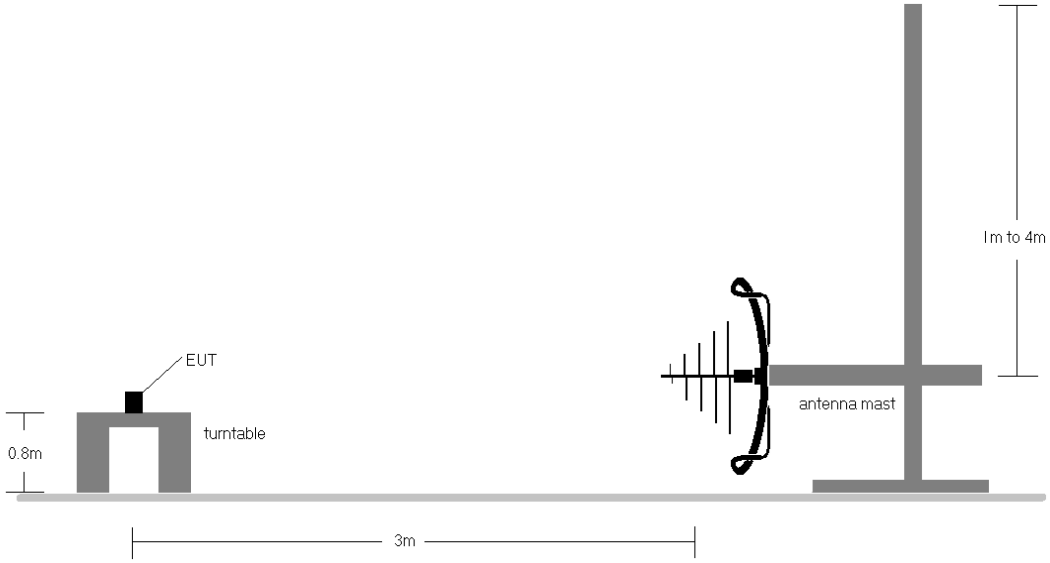


Figure 7-6. Test Instrument & Measurement Setup < 1GHz

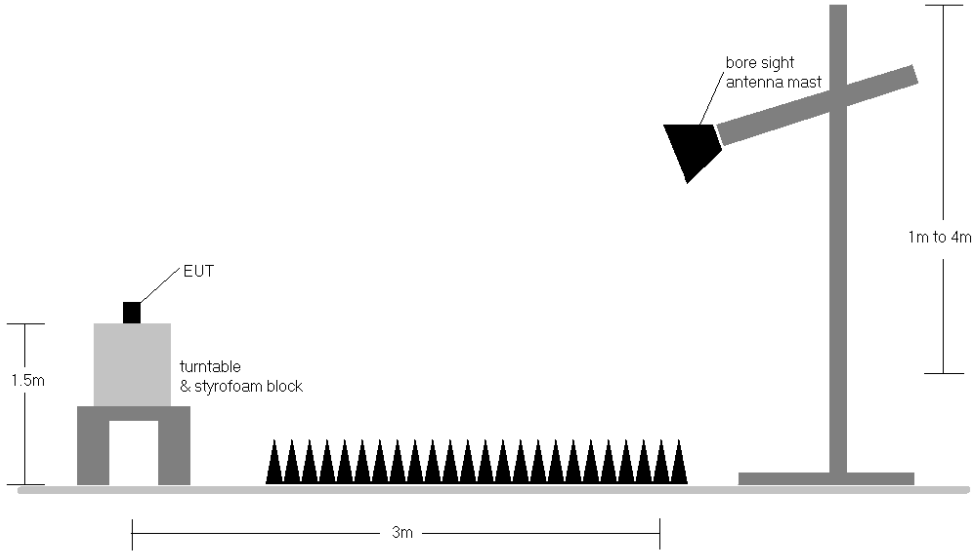


Figure 7-7. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
   a) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   b) 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 are 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 powers are reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to “1”.

4) 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.

5) This unit was tested with its standard battery.

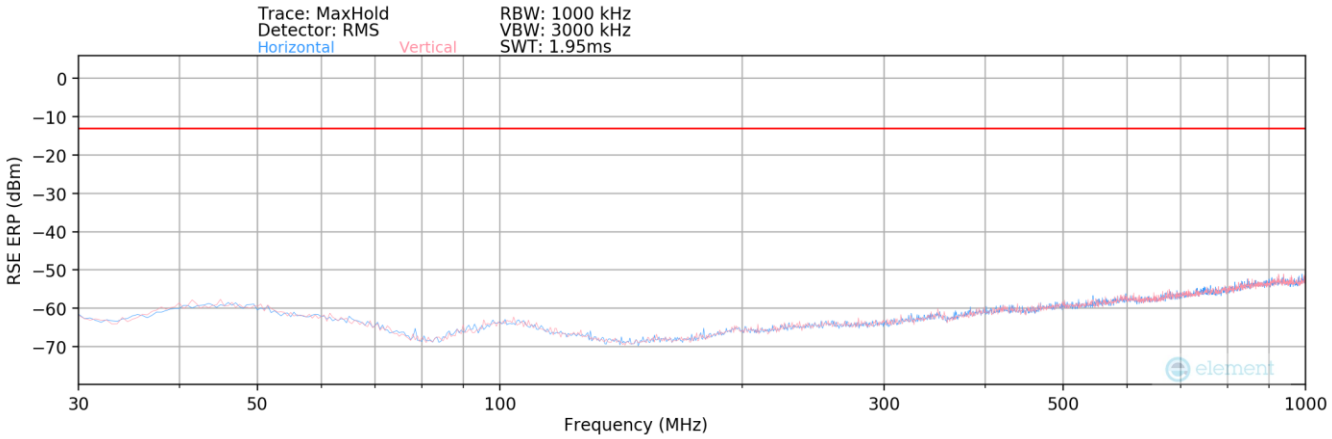
6) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

7) 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.

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

9) 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.

LTE Band 25/2

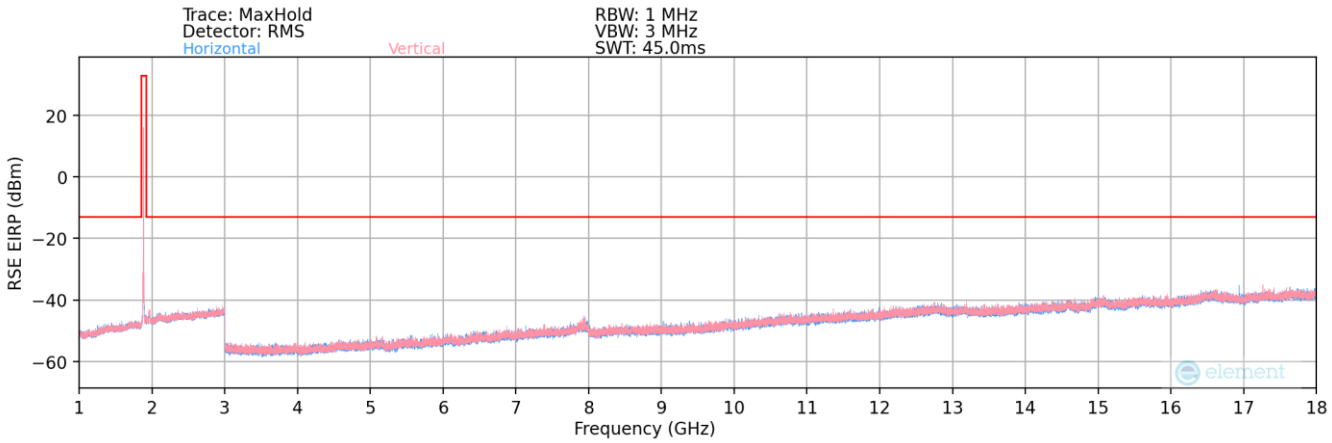


Plot 7-157. Radiated Spurious Plot (LTE Band 25/2)

Bandwidth (MHz):	20
Frequency (MHz):	1882.5
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
635.60	V	-	-	-76.21	-4.59	26.20	-71.21	-13.00	-58.21

Table 7-6. Radiated Spurious Data (LTE Band 25/2 – Mid Channel)



Plot 7-158. Radiated Spurious Plot (LTE Band 25/2)

Bandwidth (MHz):	20
Frequency (MHz):	1860
RB / Offset:	1 / 50

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]
3720.00	V	-	-	-82.83	5.46	29.63	-65.63	-13.00	-52.63
5580.00	V	-	-	-82.00	8.50	33.50	-61.76	-13.00	-48.76
7440.00	V	-	-	-81.47	12.70	38.23	-57.02	-13.00	-44.02
9300.00	V	-	-	-82.43	14.62	39.19	-56.07	-13.00	-43.07
11160.00	V	-	-	-81.37	17.75	43.38	-51.88	-13.00	-38.88

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

Bandwidth (MHz):	20
Frequency (MHz):	1882.5
RB / Offset:	1 / 50

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]
3765.00	V	-	-	-82.22	5.68	30.46	-64.80	-13.00	-51.80
5647.50	V	-	-	-81.41	8.29	33.88	-61.38	-13.00	-48.38
7530.00	V	-	-	-81.43	13.00	38.57	-56.69	-13.00	-43.69
9412.50	V	-	-	-82.08	15.53	40.45	-54.80	-13.00	-41.80
11295.00	V	-	-	-81.63	18.25	43.62	-51.64	-13.00	-38.64

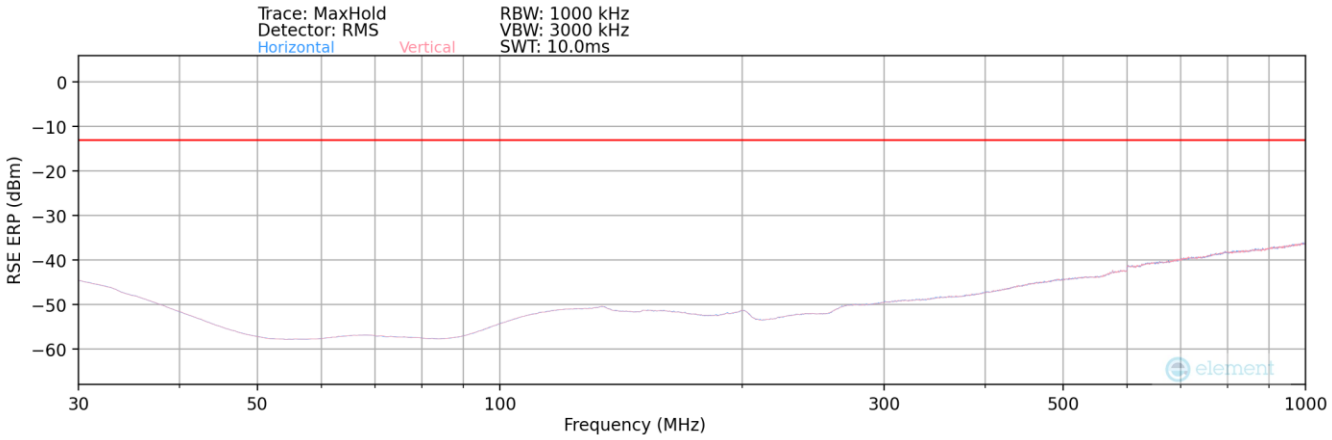
Table 7-8. Radiated Spurious Data (LTE Band 25/2 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1905
RB / Offset:	1 / 50

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	V	-	-	-82.41	5.87	30.46	-64.80	-13.00	-51.80
5715.00	V	-	-	-80.92	8.47	34.55	-60.70	-13.00	-47.70
7620.00	V	-	-	-81.58	12.67	38.09	-57.17	-13.00	-44.17
9525.00	V	-	-	-82.43	14.64	39.21	-56.05	-13.00	-43.05
11430.00	V	-	-	-81.09	18.17	44.08	-51.18	-13.00	-38.18

Table 7-9. Radiated Spurious Data (LTE Band 25/2 – High Channel)

NR Band n25/2

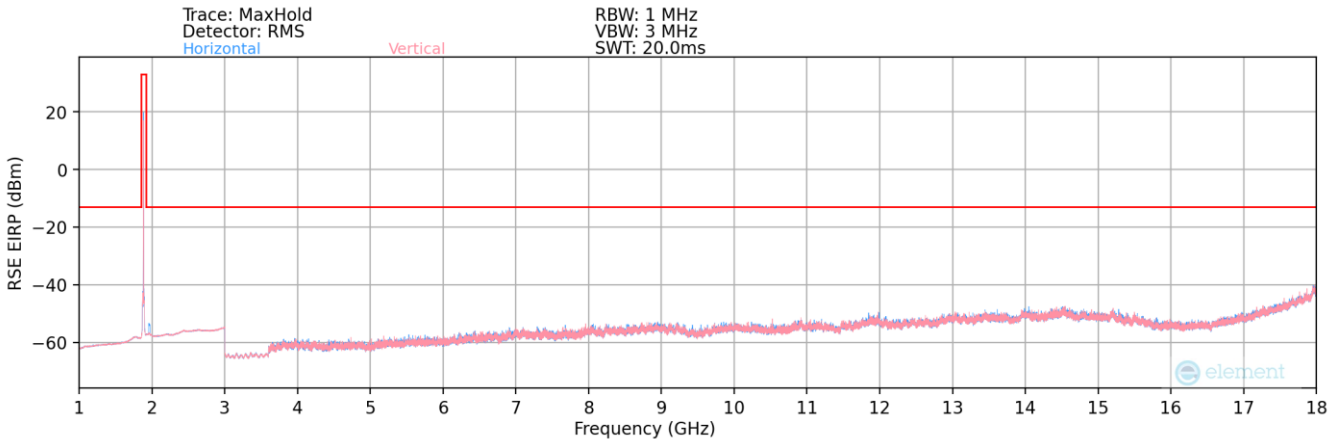


Plot 7-159. Radiated Spurious Plot (NR Band n25/2)

Bandwidth (MHz):	20
Frequency (MHz):	1860
RB / Offset:	1 / 53

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
76.20	H	-	-	-83.61	14.37	37.76	-59.64	-13.00	-46.64
184.37	H	-	-	-84.03	18.21	41.18	-56.23	-13.00	-43.23
321.23	H	-	-	-83.91	21.39	44.48	-52.92	-13.00	-39.92

Table 7-10. Radiated Spurious Data (NR Band n25/2 – Low Channel)



Plot 7-160. Radiated Spurious Plot (NR Band n25/2)

Bandwidth (MHz):	20
Frequency (MHz):	1860
RB / Offset:	1 / 53

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]
3720.00	H	127	155	-72.86	-1.81	32.33	-62.93	-13.00	-49.93
5580.00	H	-	-	-74.51	0.29	32.78	-62.48	-13.00	-49.48
7440.00	H	-	-	-76.03	4.06	35.03	-60.23	-13.00	-47.23
9300.00	H	-	-	-78.38	8.03	36.65	-58.61	-13.00	-45.61

Table 7-11. Radiated Spurious Data (NR Band n25/2 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1882.5
RB / Offset:	1 / 53

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]
3765.00	H	141	362	-74.56	-1.50	30.94	-64.31	-13.00	-51.31
5647.50	H	-	-	-74.90	0.55	32.65	-62.61	-13.00	-49.61
7530.00	H	-	-	-75.87	3.97	35.10	-60.16	-13.00	-47.16
9412.50	H	-	-	-77.39	7.24	36.85	-58.40	-13.00	-45.40

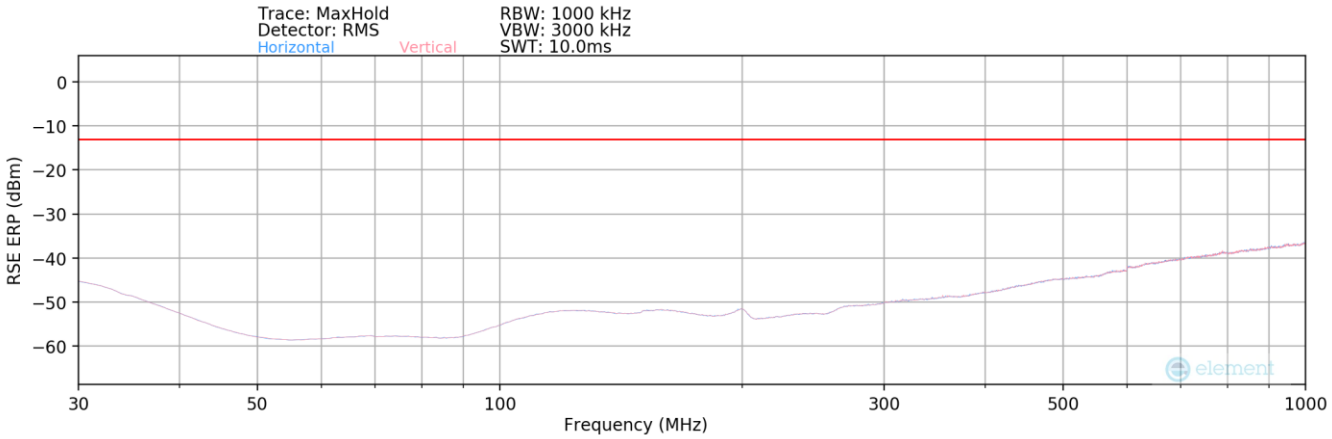
Table 7-12. Radiated Spurious Data (NR Band n25/2 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1905
RB / Offset:	1 / 53

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	173	204	-73.92	-0.97	32.11	-63.15	-13.00	-50.15
5715.00	H	-	-	-75.21	0.67	32.46	-62.80	-13.00	-49.80
7620.00	H	-	-	-76.21	4.41	35.20	-60.06	-13.00	-47.06
9525.00	H	-	-	-77.43	6.95	36.52	-58.74	-13.00	-45.74

Table 7-13. Radiated Spurious Data (NR Band n25/2 – High Channel)

GSM/GPRS PCS

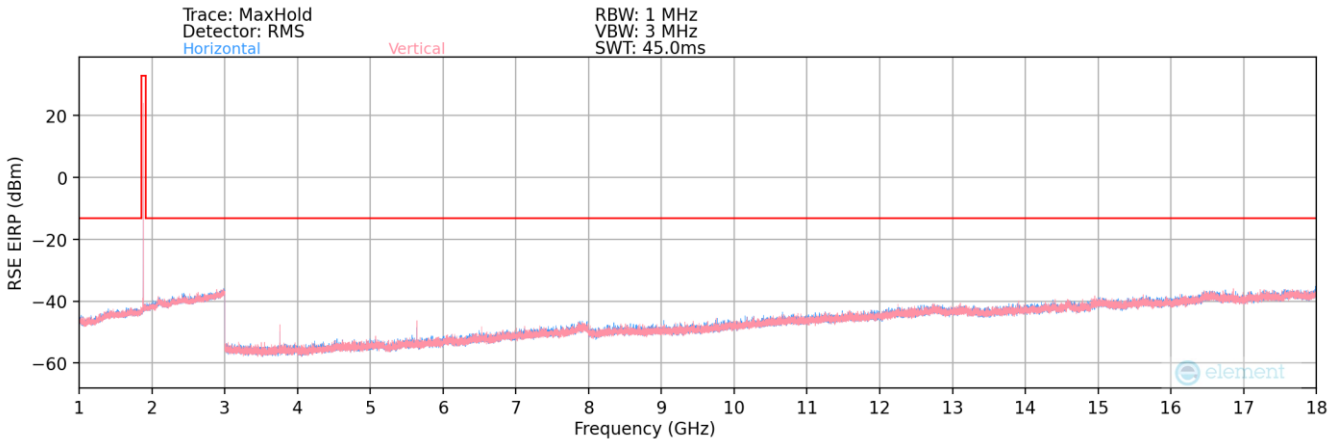


Plot 7-161. Radiated Spurious Plot (GPRS PCS)

Mode:	GPRS 1 Tx Slot
Channel:	661
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]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
670.00	V	-	-	-89.81	28.49	45.68	-51.73	-13.00	-38.73

Table 7-14. Radiated Spurious Data (GPRS PCS – Mid Channel)



Plot 7-162. Radiated Spurious Plot (GPRS PCS)

Mode:	GPRS 1 Tx Slot
Channel:	512
Frequency (MHz):	1850.2

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]
3700.40	V	208	11	-65.02	5.25	47.23	-48.03	-13.00	-35.03
5550.60	V	264	20	-67.52	8.67	48.15	-47.11	-13.00	-34.11
7400.80	V	-	-	-78.54	12.85	41.31	-53.95	-13.00	-40.95
9251.00	V	-	-	-79.22	14.62	42.40	-52.85	-13.00	-39.85
11101.20	V	-	-	-79.11	17.65	45.54	-49.72	-13.00	-36.72
12951.40	V	-	-	-78.16	19.81	48.65	-46.61	-13.00	-33.61

Table 7-15. Radiated Spurious Data (GPRS PCS – Low Channel)

Mode:	GPRS 1 Tx Slot
Channel:	661
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]
3760.00	V	191	8	-63.81	5.64	48.83	-46.43	-13.00	-33.43
5640.00	V	166	3	-65.24	8.23	49.99	-45.27	-13.00	-32.27
7520.00	V	-	-	-79.50	12.93	40.43	-54.83	-13.00	-41.83
9400.00	V	-	-	-79.32	15.42	43.10	-52.16	-13.00	-39.16
11280.00	V	-	-	-78.79	18.17	46.38	-48.87	-13.00	-35.87
13160.00	V	-	-	-78.69	20.47	48.78	-46.48	-13.00	-33.48

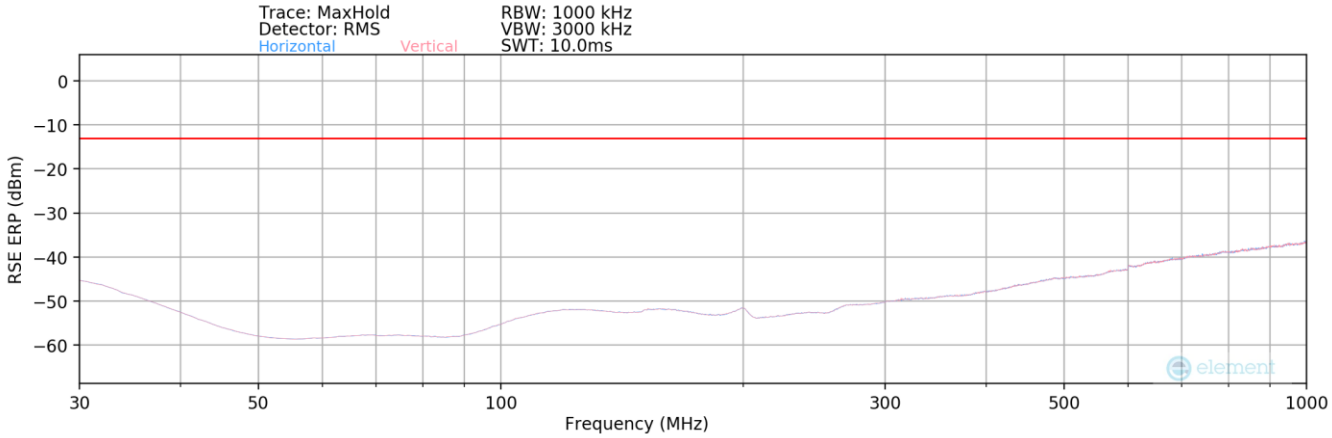
Table 7-16. Radiated Spurious Data (GPRS PCS – Mid Channel)

Mode:	GPRS 1 Tx Slot
Channel:	810
Frequency (MHz):	1909.8

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]
3819.60	V	174	5	-65.50	5.85	47.35	-47.91	-13.00	-34.91
5729.40	V	204	10	-63.26	8.57	52.31	-42.94	-13.00	-29.94
7639.20	V	-	-	-78.98	12.57	40.59	-54.67	-13.00	-41.67
9549.00	V	-	-	-79.05	14.58	42.53	-52.73	-13.00	-39.73
11458.80	V	-	-	-79.04	18.39	46.35	-48.90	-13.00	-35.90
13368.60	V	-	-	-78.41	20.54	49.13	-46.13	-13.00	-33.13

Table 7-17. Radiated Spurious Data (GPRS PCS – High Channel)

WCDMA PCS

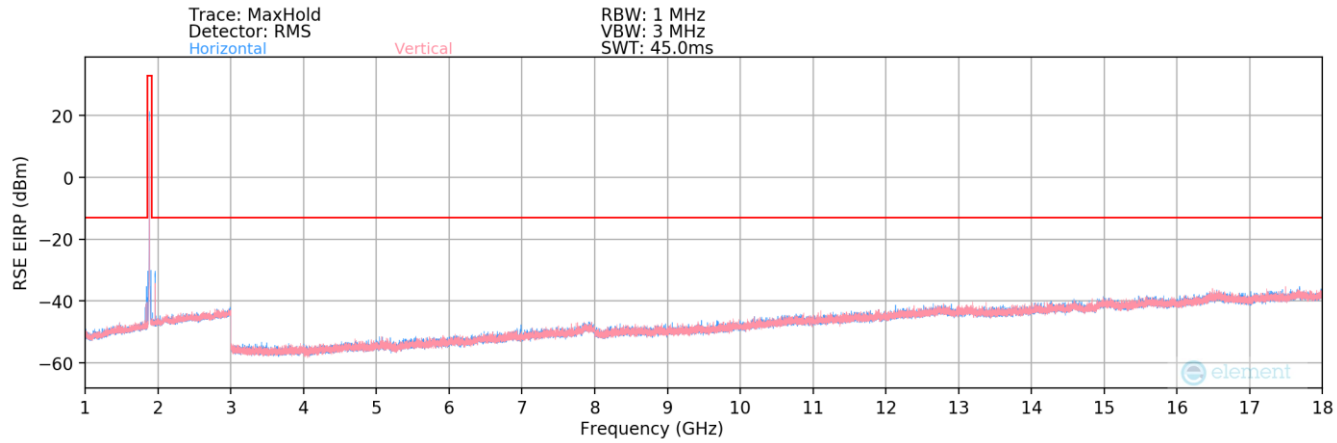


Plot 7-163. Radiated Spurious Plot (WCDMA PCS)

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]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
778.50	V	-	-	-90.42	29.77	46.35	-51.05	-13.00	-38.05

Table 7-18. Radiated Spurious Data (WCDMA PCS – Mid Channel)



Plot 7-164. 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]
3704.80	V	-	-	-78.19	5.32	34.13	-61.13	-13.00	-48.13
5557.20	V	-	-	-78.34	8.65	37.31	-57.95	-13.00	-44.95
7409.60	V	-	-	-78.02	12.73	41.71	-53.55	-13.00	-40.55
9262.00	V	-	-	-79.32	14.67	42.35	-52.91	-13.00	-39.91
11114.40	V	-	-	-79.64	17.66	45.02	-50.24	-13.00	-37.24

Table 7-19. 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]
3760.00	V	-	-	-78.05	5.64	34.59	-60.67	-13.00	-47.67
5640.00	V	-	-	-78.52	8.23	36.71	-58.55	-13.00	-45.55
7520.00	V	-	-	-78.71	12.93	41.22	-54.04	-13.00	-41.04
9400.00	V	-	-	-80.49	15.42	41.93	-53.33	-13.00	-40.33
11280.00	V	-	-	-78.71	18.17	46.46	-48.79	-13.00	-35.79

Table 7-20. 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]
3815.20	V	-	-	-77.57	5.86	35.29	-59.97	-13.00	-46.97
5722.80	V	-	-	-78.05	8.55	37.50	-57.75	-13.00	-44.75
7630.40	V	-	-	-78.36	12.61	41.25	-54.01	-13.00	-41.01
9538.00	V	-	-	-79.03	14.50	42.47	-52.78	-13.00	-39.78
11445.60	V	-	-	-79.76	18.27	45.51	-49.75	-13.00	-36.75

Table 7-21. Radiated Spurious Data (WCDMA PCS – High Channel)

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. 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 24, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI C63.26-2015 – Section 5.6

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

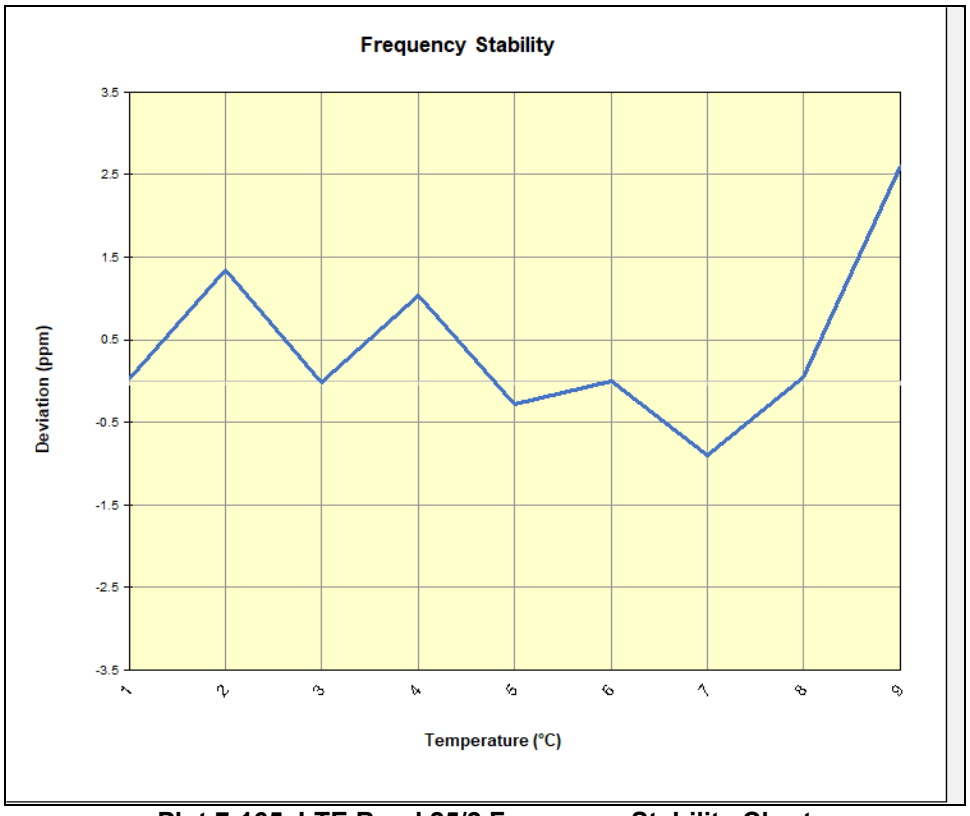
None

LTE Band 25/2

LTE Band 25/2	
Operating Frequency (Hz):	1,882,500,000
Ref. Voltage (VDC):	4.436

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.436	- 30	1,882,582,972	58	0.0000031
		- 20	1,882,585,443	2,529	0.0001343
		- 10	1,882,582,887	-27	-0.0000014
		0	1,882,584,862	1,948	0.0001035
		+ 10	1,882,582,389	-525	-0.0000279
		+ 20 (Ref)	1,882,582,914	0	0.0000000
		+ 30	1,882,581,230	-1,684	-0.0000894
		+ 40	1,882,582,989	75	0.0000040
		+ 50	1,882,587,808	4,894	0.0002600
Battery Endpoint	3.67	+ 20	1,882,582,642	-272	-0.0000144

Table 7-22. LTE Band 25/2 Frequency Stability Data



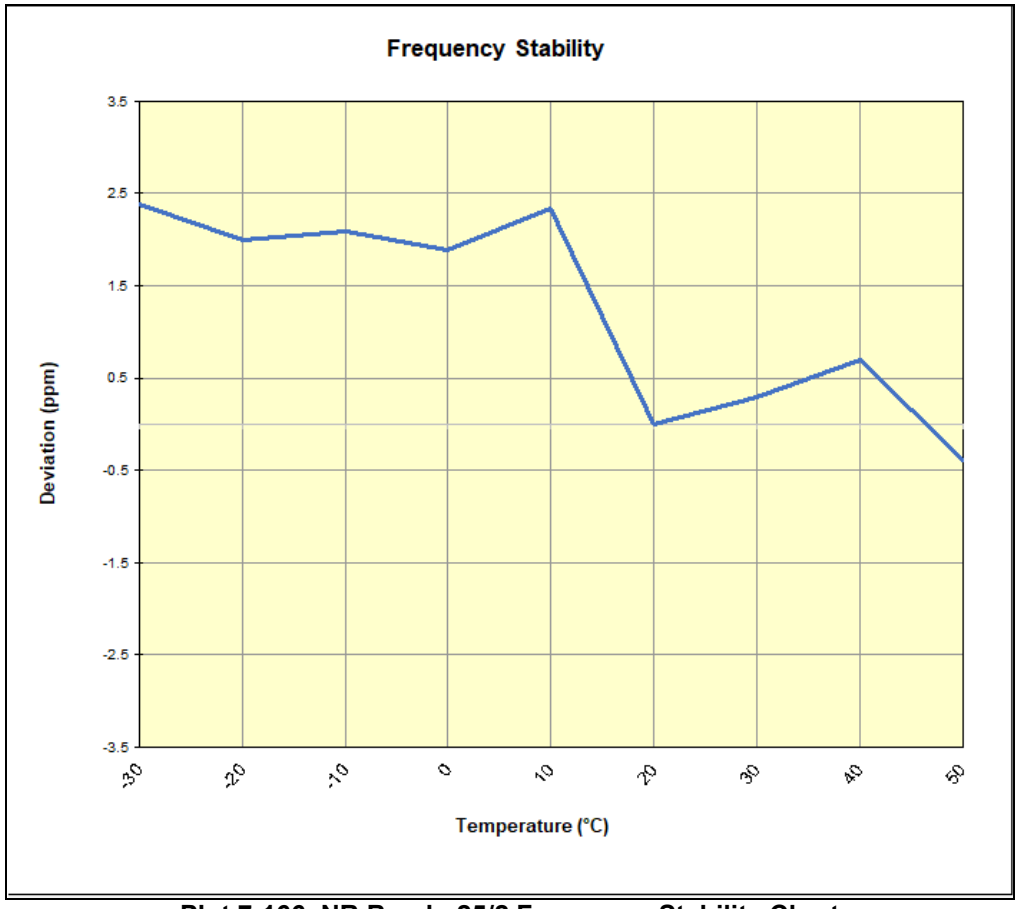
Plot 7-165. LTE Band 25/2 Frequency Stability Chart

NR Band n25/2

NR Band n25/2	
Operating Frequency (Hz):	1,882,500,000
Ref. Voltage (VDC):	4.436

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.436	- 30	1,882,401,560	4,498	0.0002389
		- 20	1,882,400,834	3,772	0.0002004
		- 10	1,882,400,998	3,935	0.0002091
		0	1,882,400,616	3,554	0.0001888
		+ 10	1,882,401,473	4,411	0.0002343
		+ 20 (Ref)	1,882,397,062	0	0.0000000
		+ 30	1,882,397,628	566	0.0000300
		+ 40	1,882,398,360	1,298	0.0000689
		+ 50	1,882,396,345	-717	-0.0000381
Battery Endpoint	3.713	+ 20	1,882,400,727	3,665	0.0001947

Table 7-23. NR Band n25/2 Frequency Stability Data



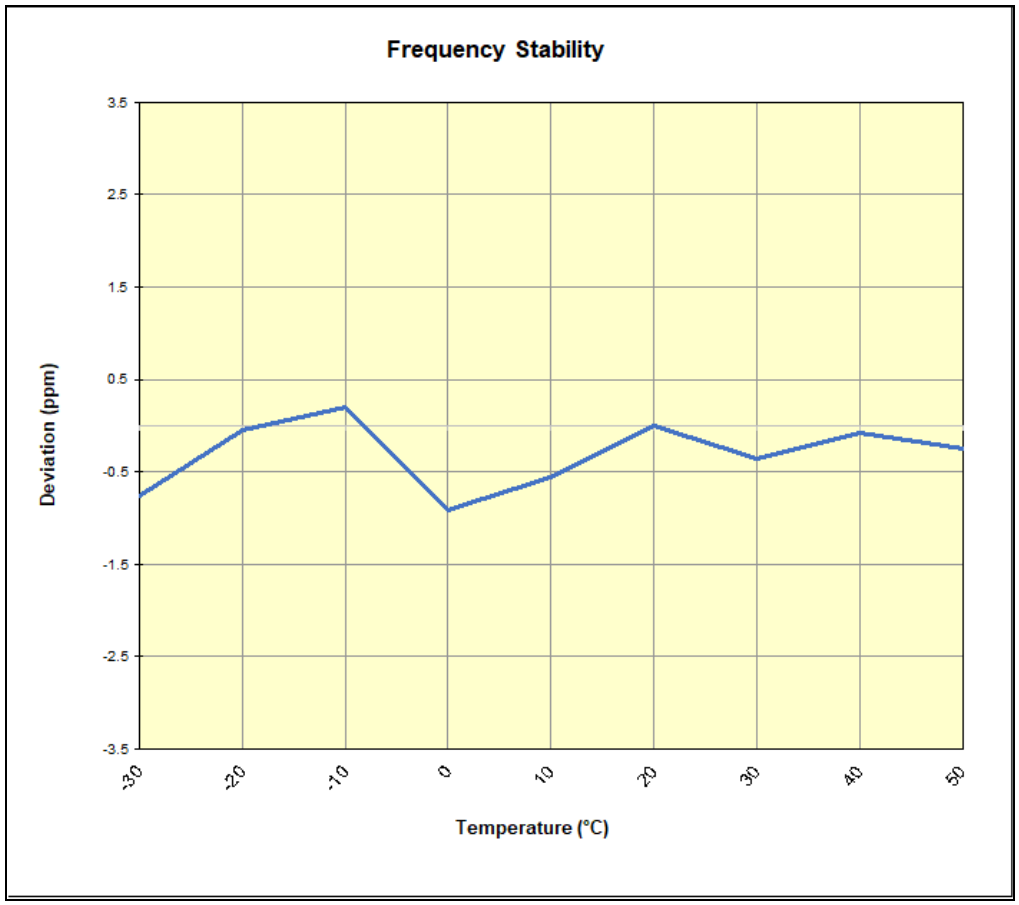
Plot 7-166. NR Band n25/2 Frequency Stability Chart

GSM/GPRS PCS

GSM/GPRS PCS	
Operating Frequency (Hz):	1,880,000,000
Ref. Voltage (VDC):	4.436

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.436	- 30	1,880,136,808	-1,435	-0.0000763
		- 20	1,880,138,161	-82	-0.0000044
		- 10	1,880,138,634	391	0.0000208
		0	1,880,136,527	-1,716	-0.0000913
		+ 10	1,880,137,191	-1,052	-0.0000560
		+ 20 (Ref)	1,880,138,243	0	0.0000000
		+ 30	1,880,137,583	-660	-0.0000351
		+ 40	1,880,138,093	-151	-0.0000080
		+ 50	1,880,137,787	-457	-0.0000243
Battery Endpoint	3.713	+ 20	1,880,137,671	-572	-0.0000304

Table 7-24. GSM/GPRS PCS Frequency Stability Data



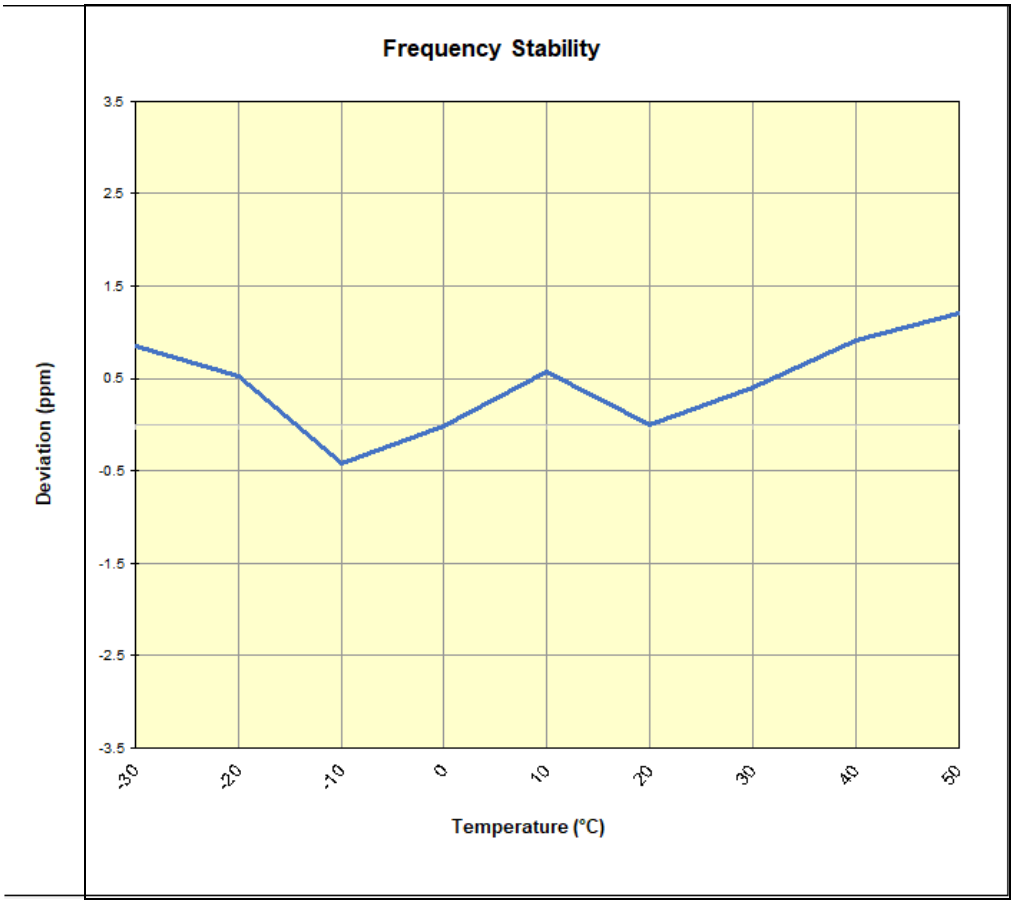
Plot 7-167. GSM/GPRS PCS Frequency Stability Chart

WCDMA PCS

WCDMA PCS	
Operating Frequency (Hz):	1,880,000,000
Ref. Voltage (VDC):	4.436

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.436	- 30	1,881,007,245	1,600	0.0000851
		- 20	1,881,006,630	985	0.0000523
		- 10	1,881,004,851	-793	-0.0000422
		0	1,881,005,608	-37	-0.0000020
		+ 10	1,881,006,711	1,066	0.0000567
		+ 20 (Ref)	1,881,005,645	0	0.0000000
		+ 30	1,881,006,408	763	0.0000406
		+ 40	1,881,007,348	1,704	0.0000906
		+ 50	1,881,007,919	2,274	0.0001209
Battery Endpoint	3.713	+ 20	1,881,005,911	266	0.0000141

Table 7-25. WCDMA PCS Frequency Stability Data



Plot 7-168. WCDMA PCS Frequency Stability Chart

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Tablet FCC ID: A3LSMX736B** complies with all the requirements of Part 24 of the FCC rules.