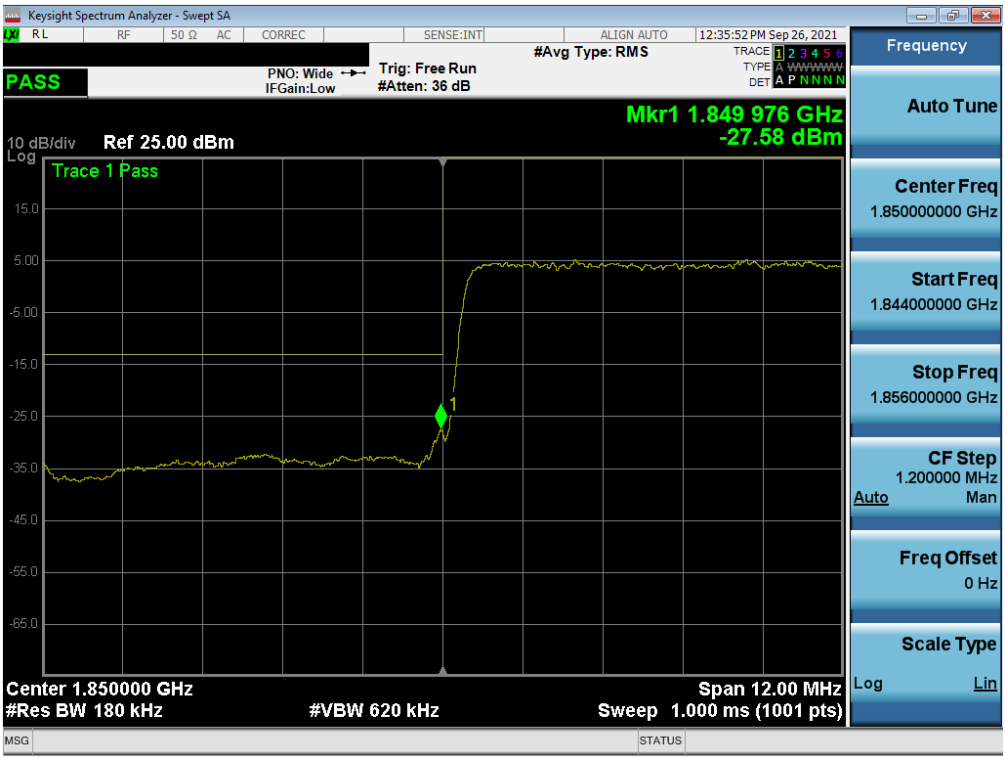
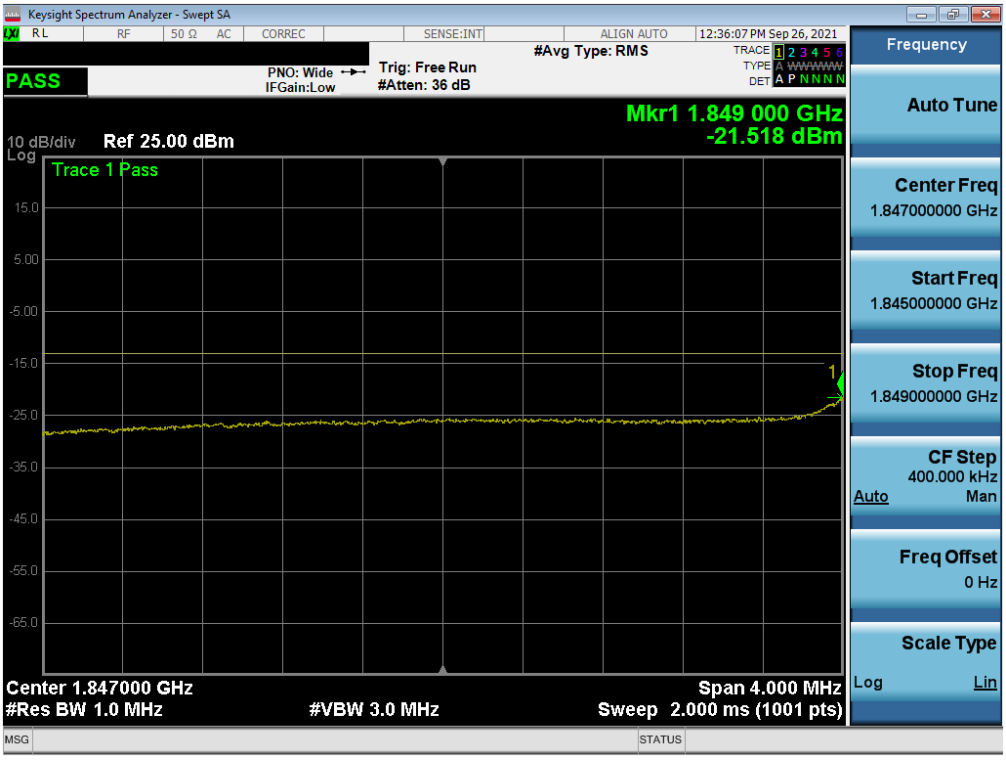
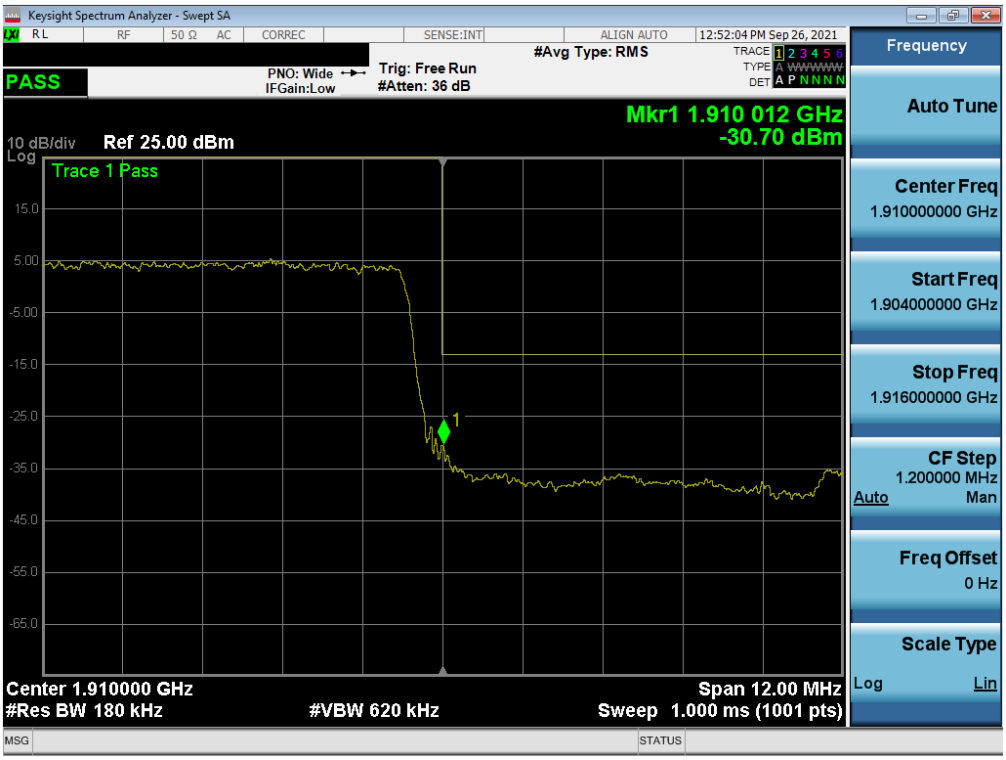


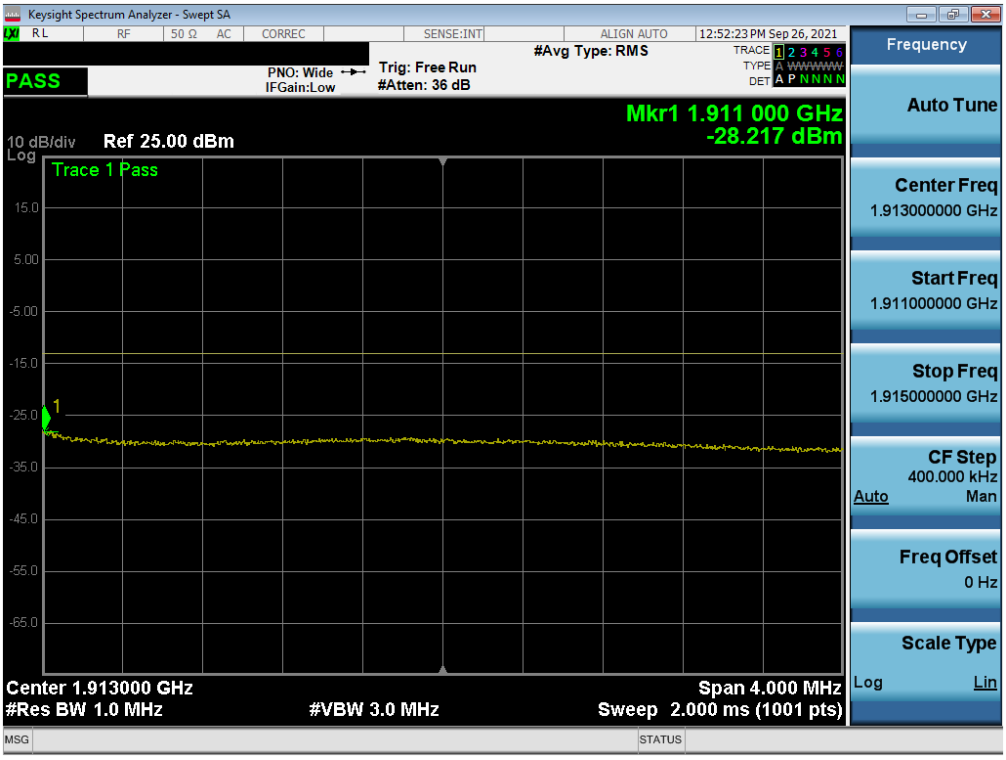
Plot 7-126. Lower Band Edge Plot (NR Band n25/2 - 15MHz QPSK – Full RB)



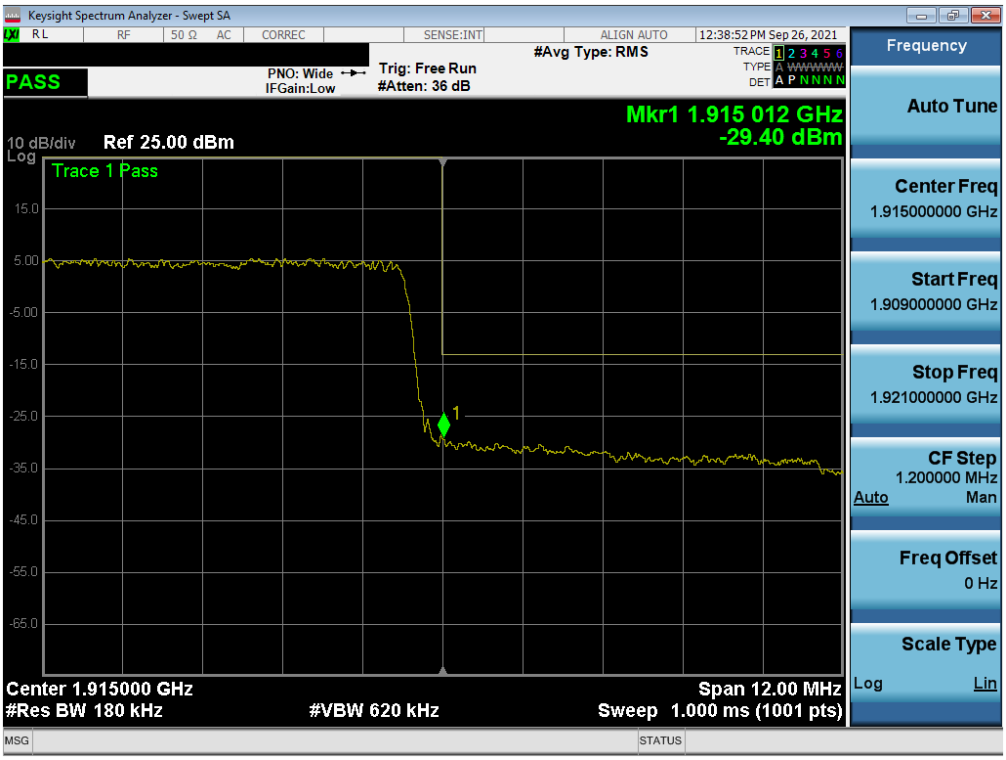
Plot 7-127. Extended Lower Band Edge Plot (NR Band n25/2 - 15MHz QPSK – Full RB)



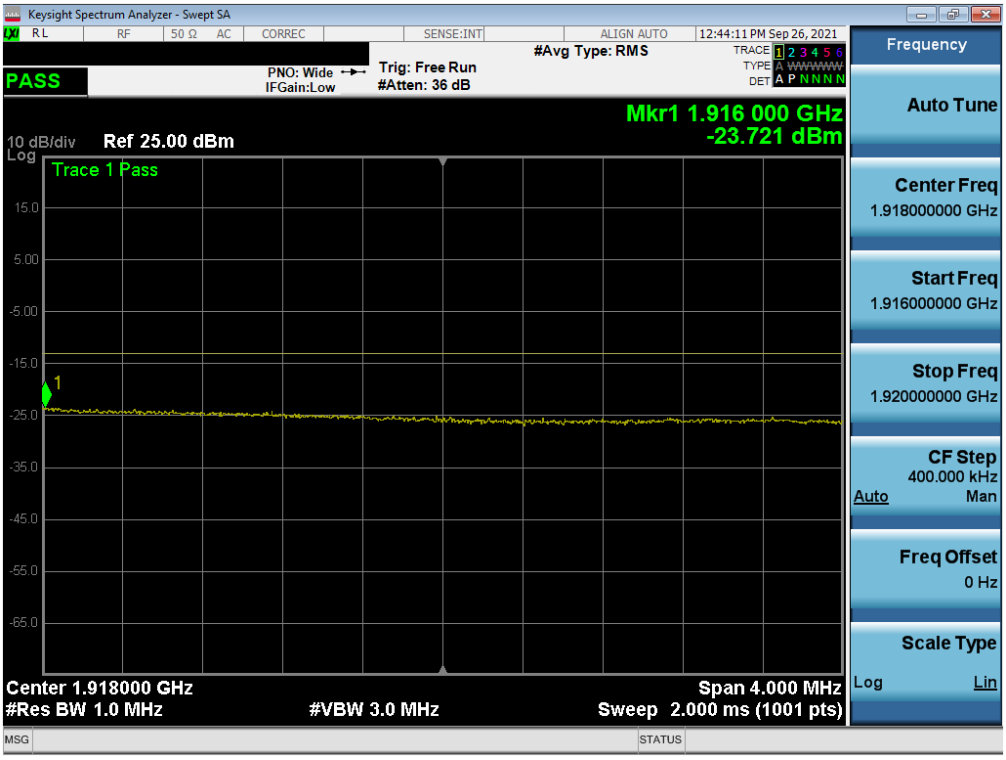
Plot 7-128. Upper Band Edge Plot (NR Band n2 - 15MHz QPSK – Full RB)



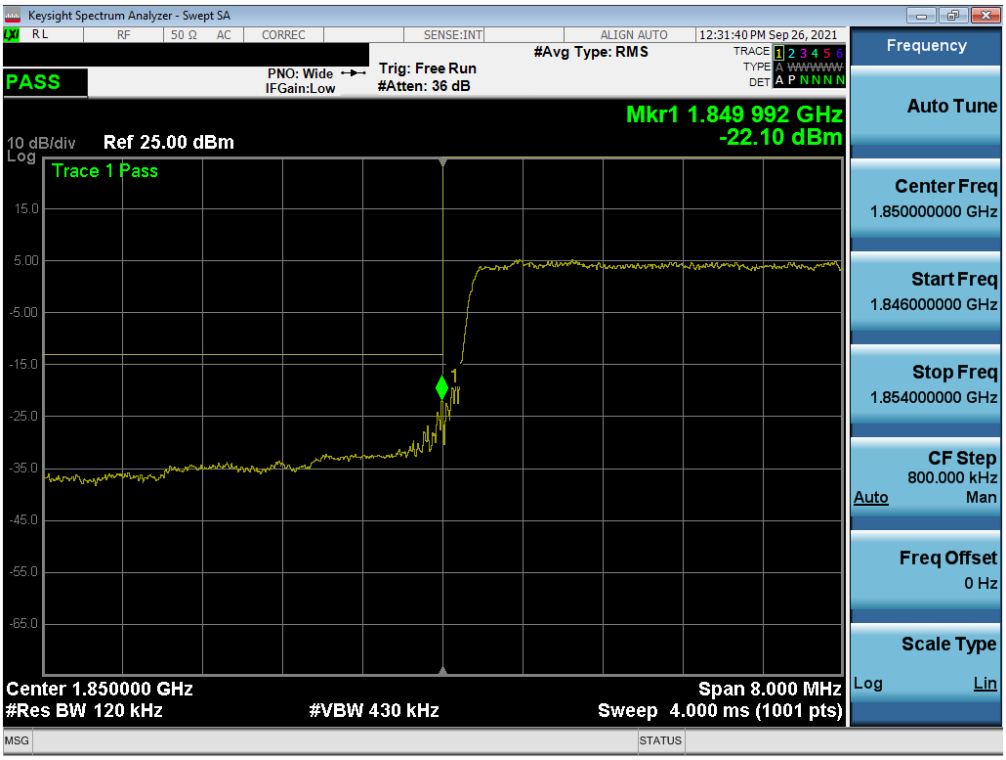
Plot 7-129. Extended Upper Band Edge Plot (NR Band n2 - 15MHz QPSK – Full RB)



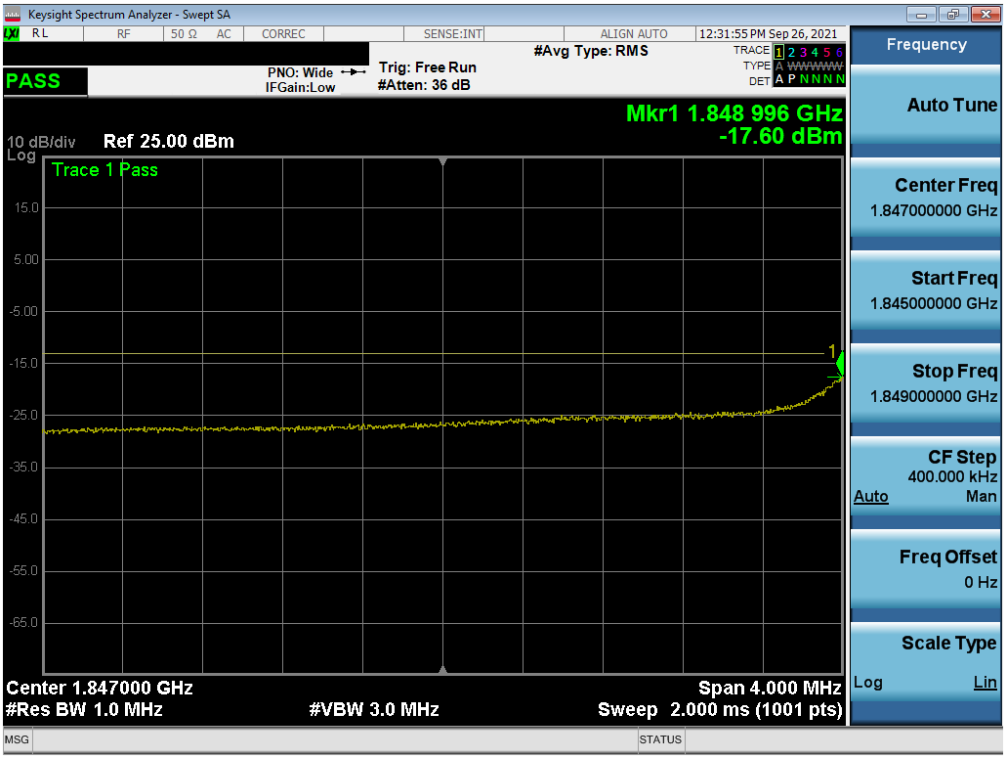
Plot 7-130. Upper Band Edge Plot (NR Band n25 - 15MHz QPSK – Full RB)



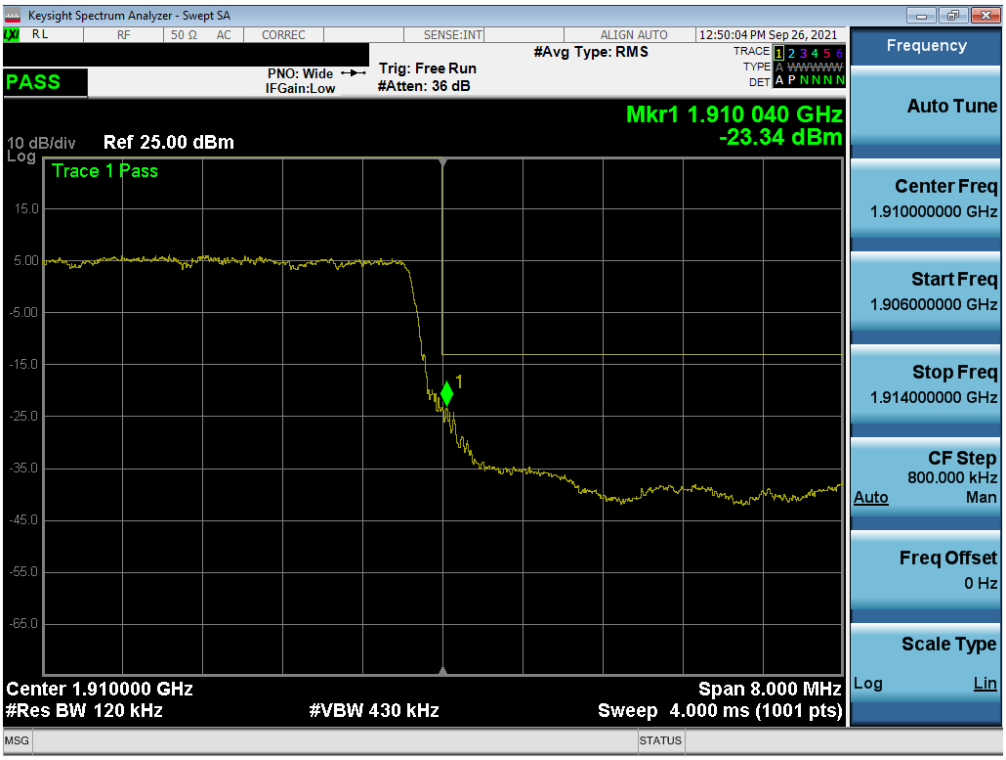
Plot 7-131. Extended Upper Band Edge Plot (NR Band n25 - 15MHz QPSK – Full RB)



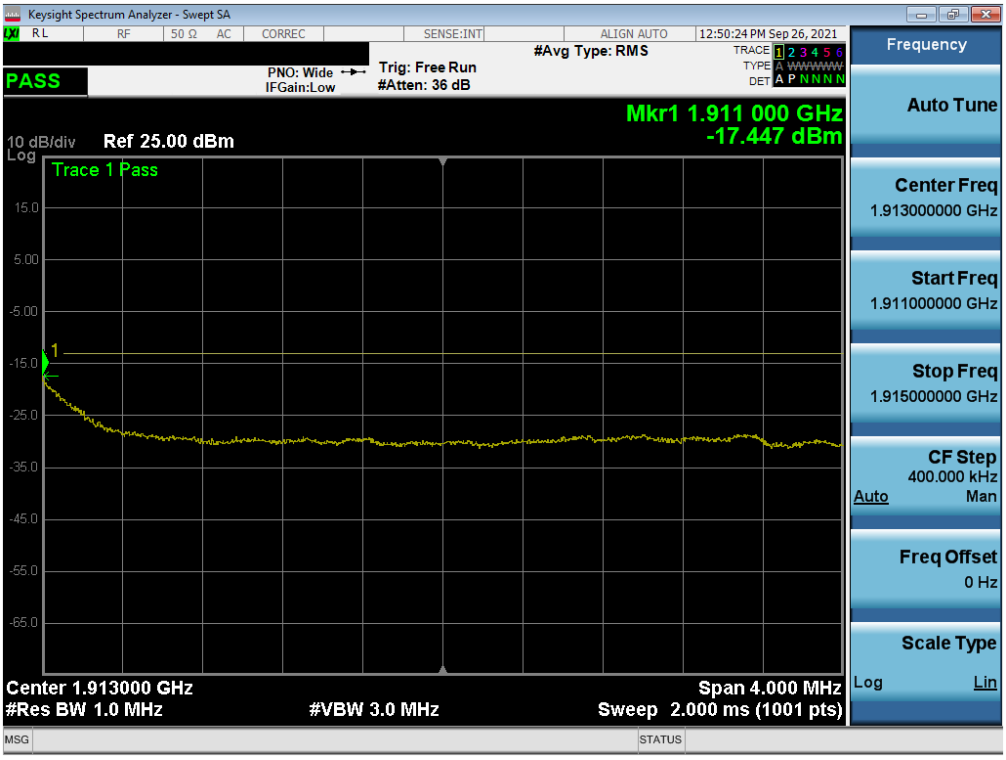
Plot 7-132. Lower Band Edge Plot (NR Band n25/2 - 10MHz QPSK – Full RB)



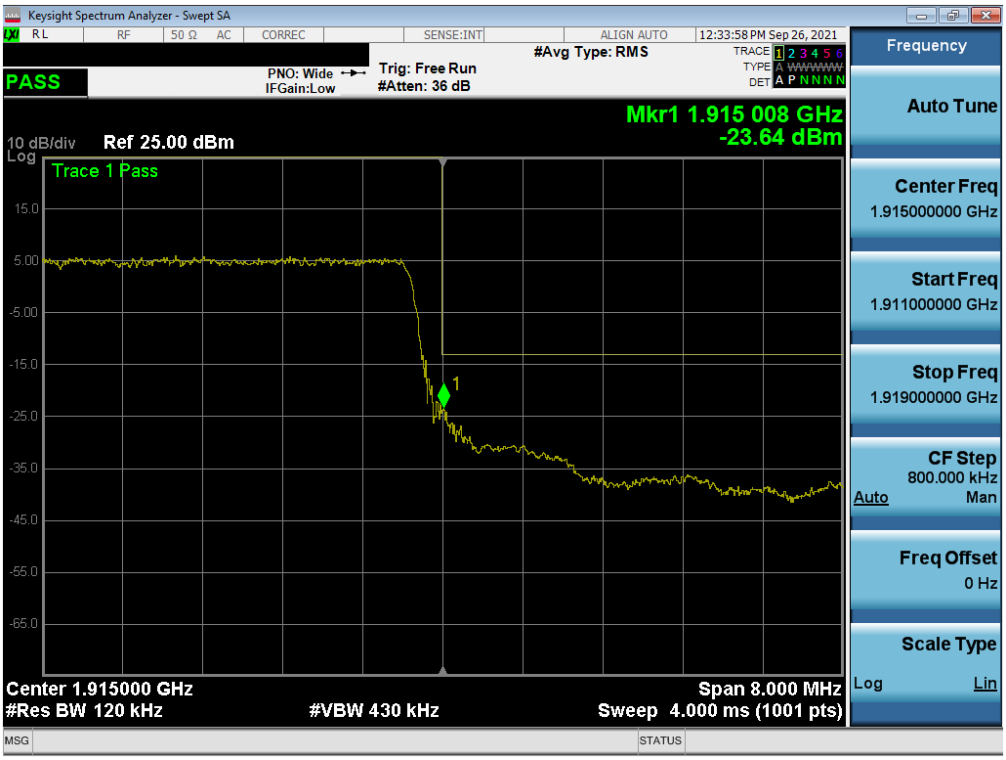
Plot 7-133. Extended Lower Band Edge Plot (NR Band n25/2 - 10MHz QPSK – Full RB)



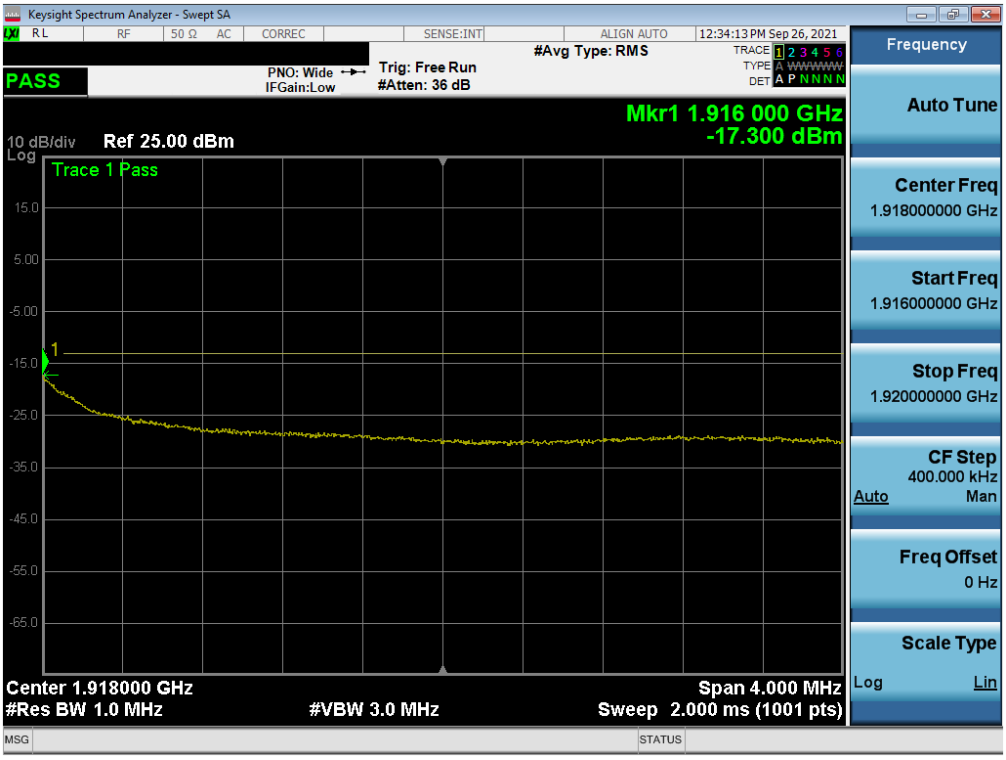
Plot 7-134. Upper Band Edge Plot (NR Band n2 - 10MHz QPSK – Full RB)



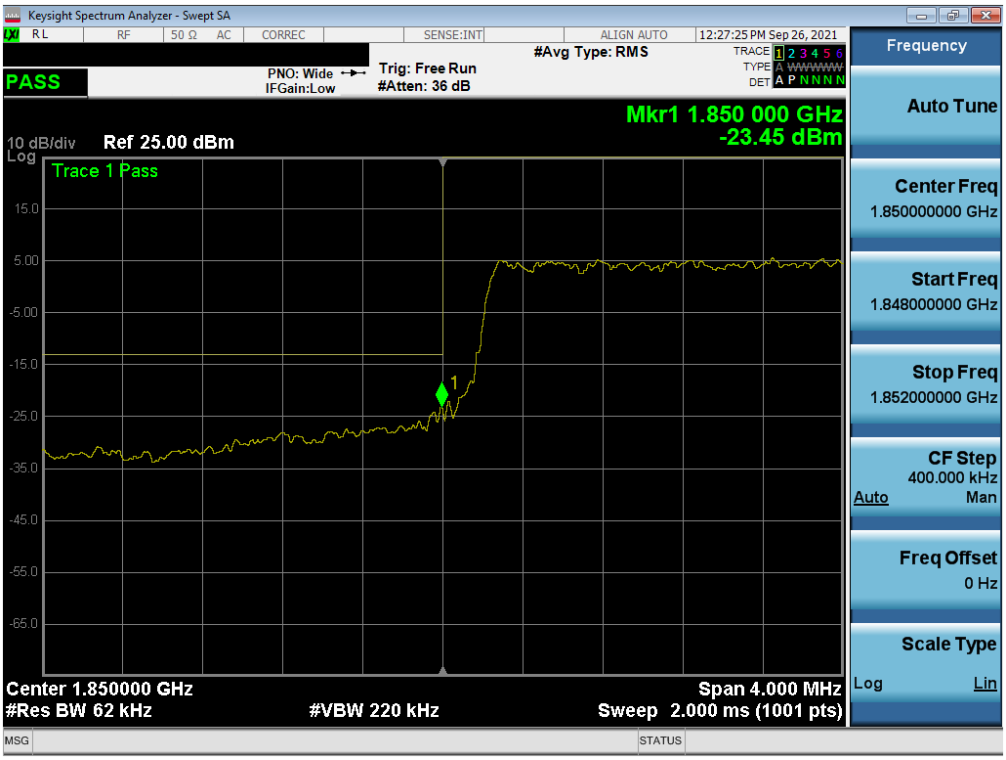
Plot 7-135. Extended Upper Band Edge Plot (NR Band n2 - 10MHz QPSK – Full RB)



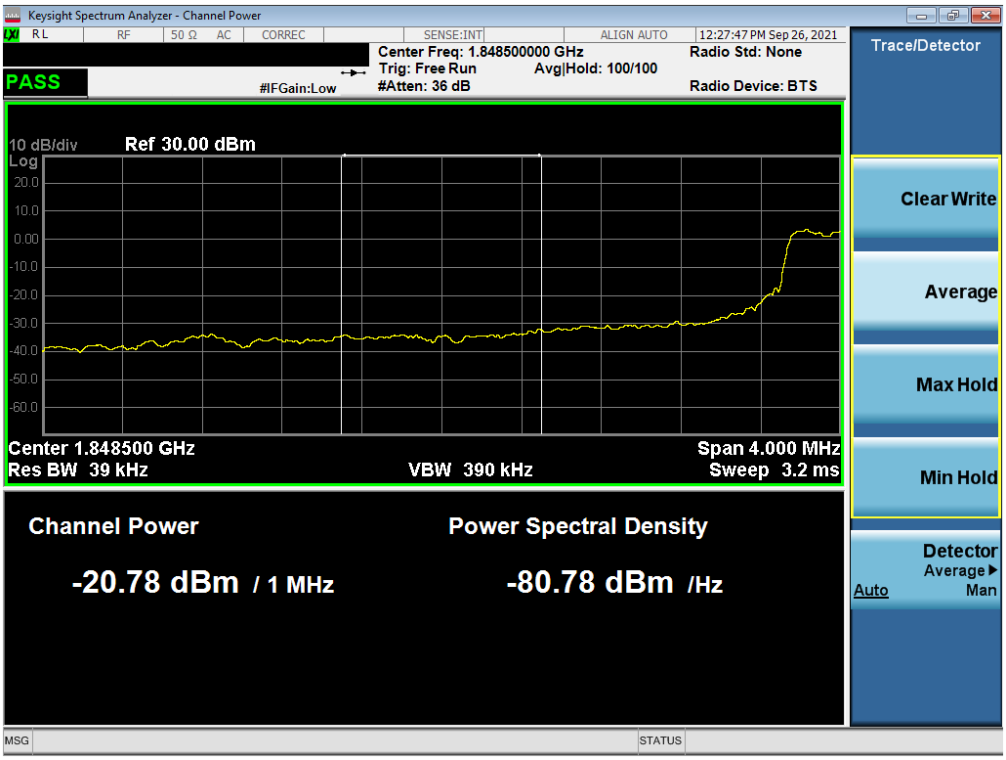
Plot 7-136. Upper Band Edge Plot (NR Band n25 - 10MHz QPSK – Full RB)



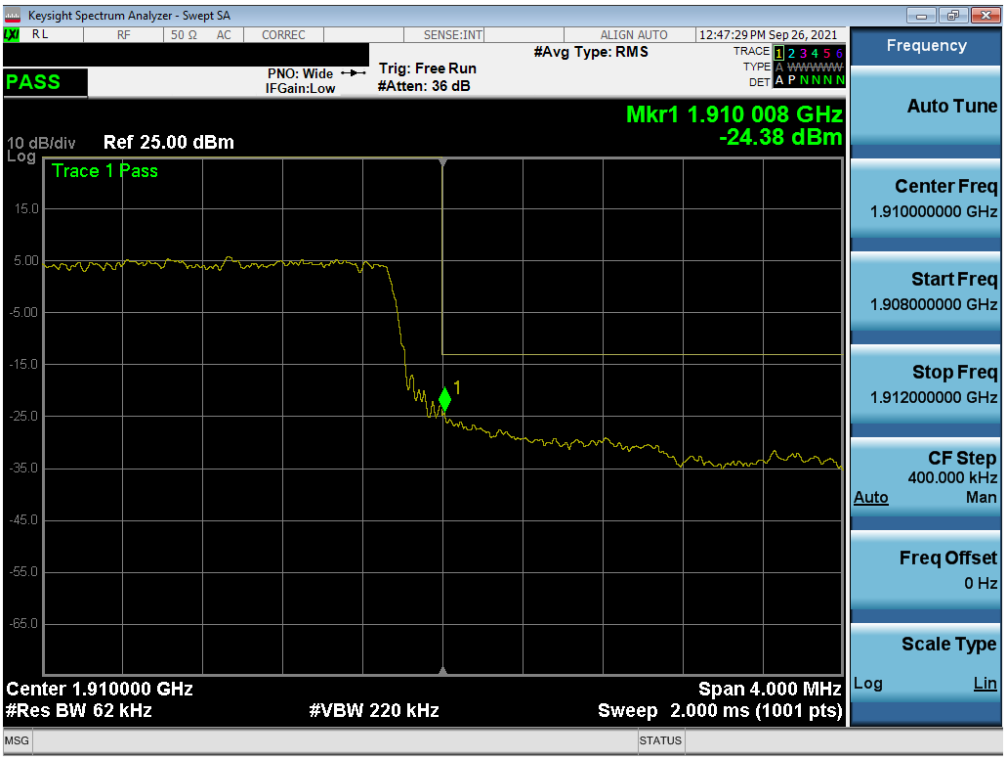
Plot 7-137. Extended Upper Band Edge Plot (NR Band n25 - 10MHz QPSK – Full RB)



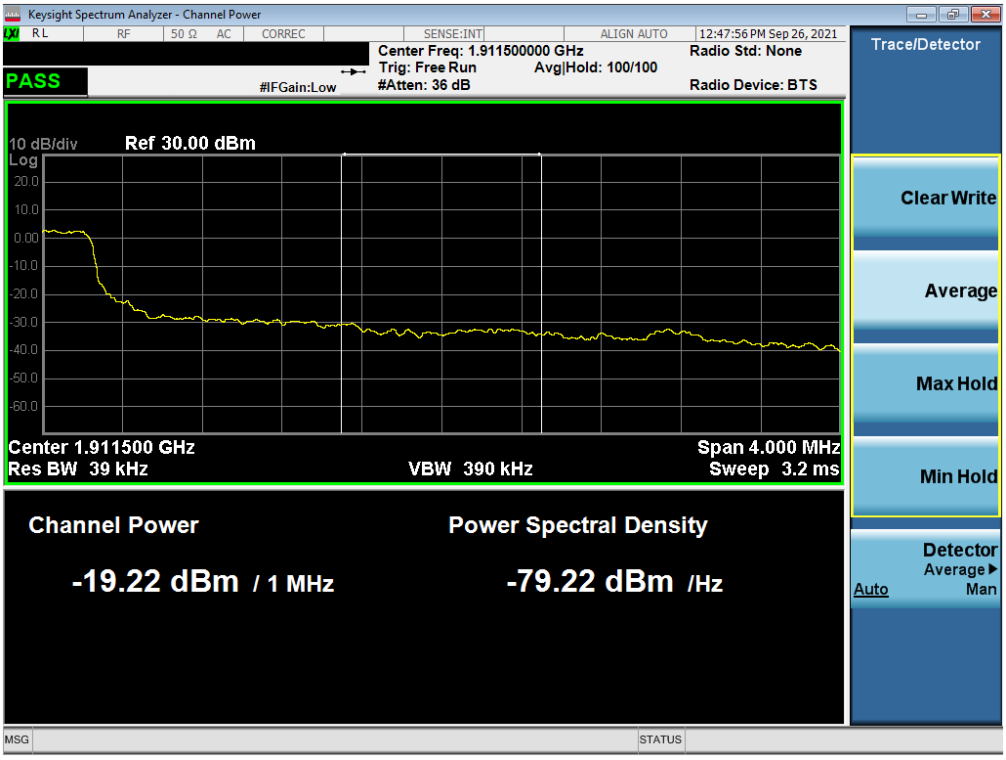
Plot 7-138. Lower Band Edge Plot (NR Band n25/2 – 5MHz QPSK – Full RB)



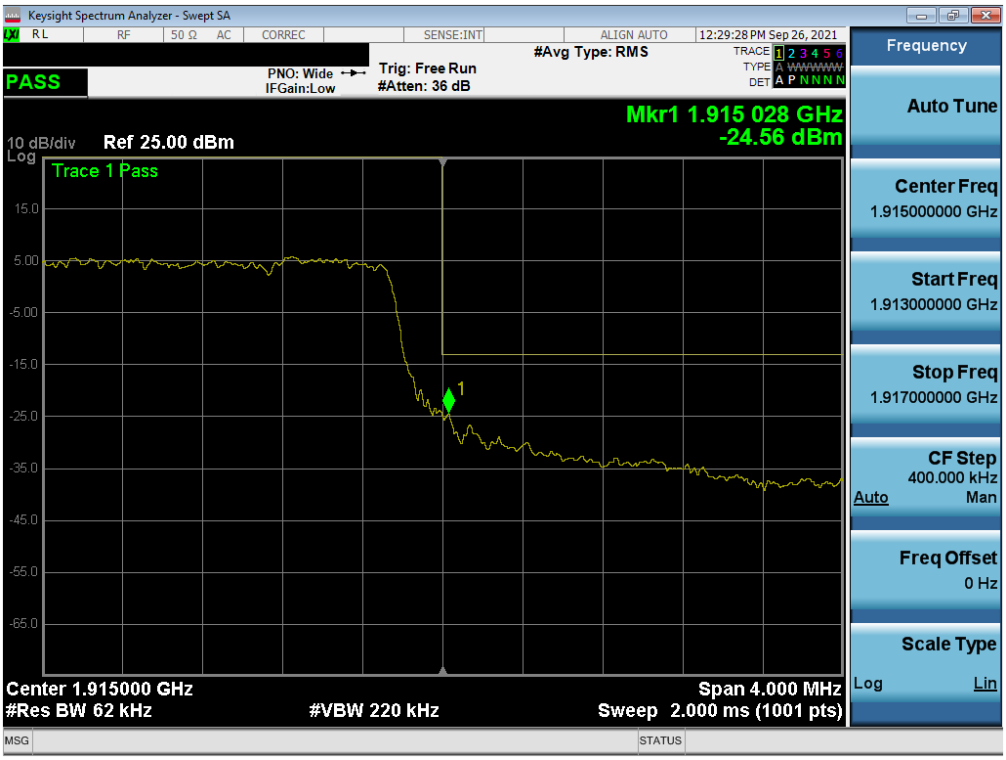
Plot 7-139. Extended Lower Band Edge Plot (NR Band n25/2 – 5MHz QPSK – Full RB)



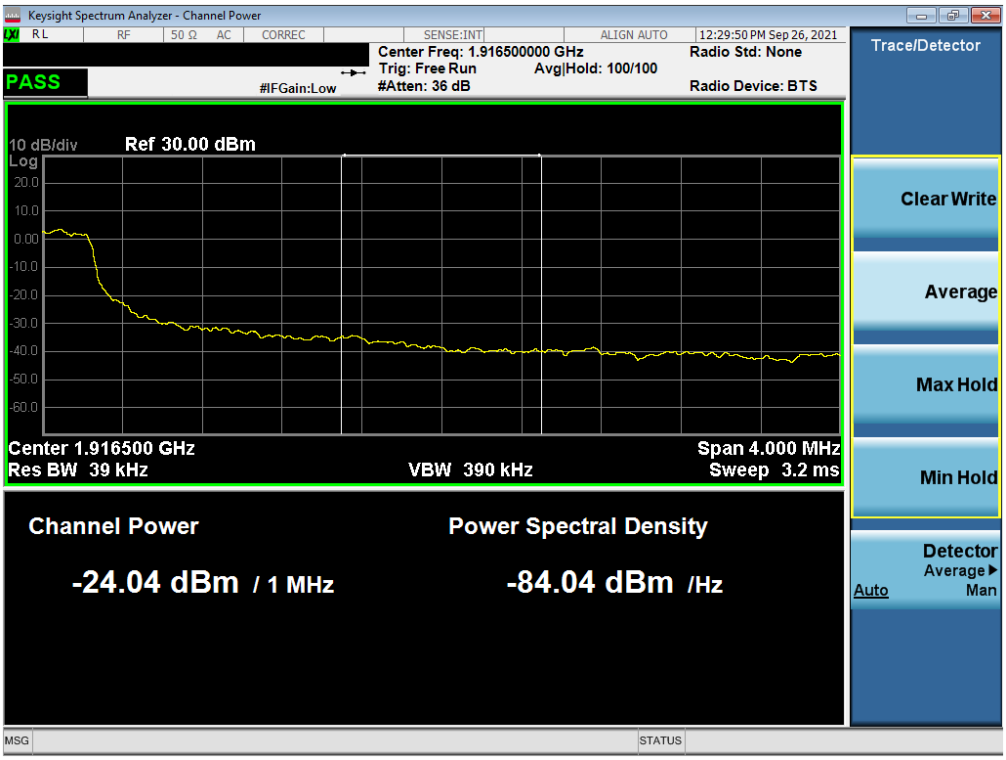
Plot 7-140. Upper Band Edge Plot (NR Band n2 – 5MHz QPSK – Full RB)



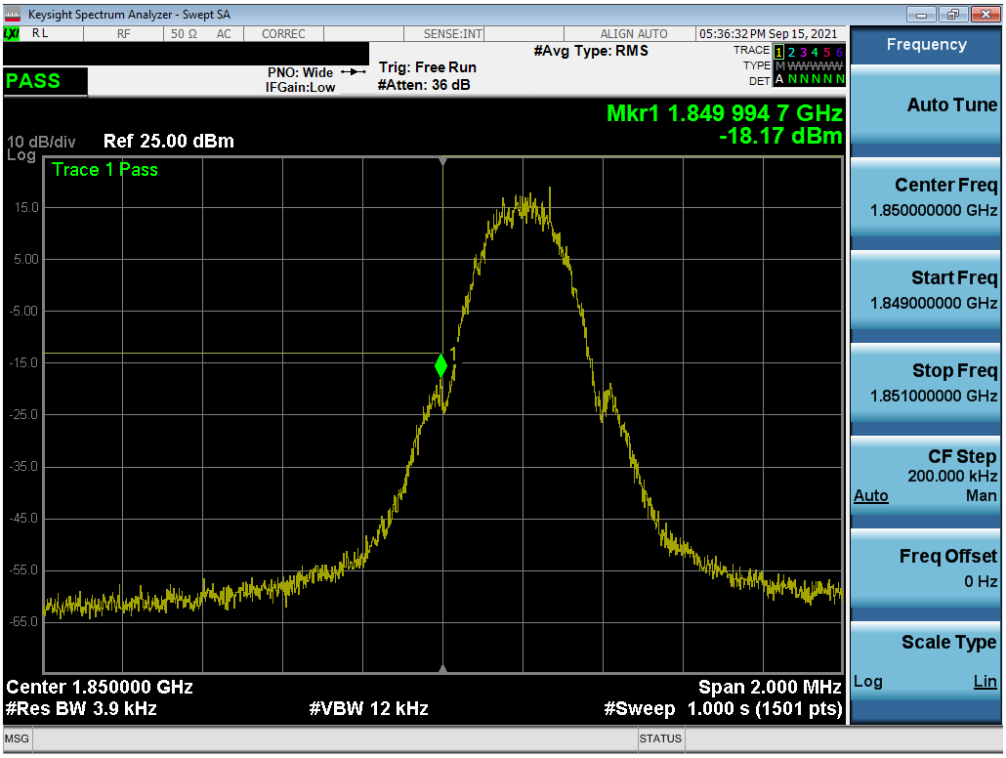
Plot 7-141. Extended Upper Band Edge Plot (NR Band n2 – 5MHz QPSK – Full RB)



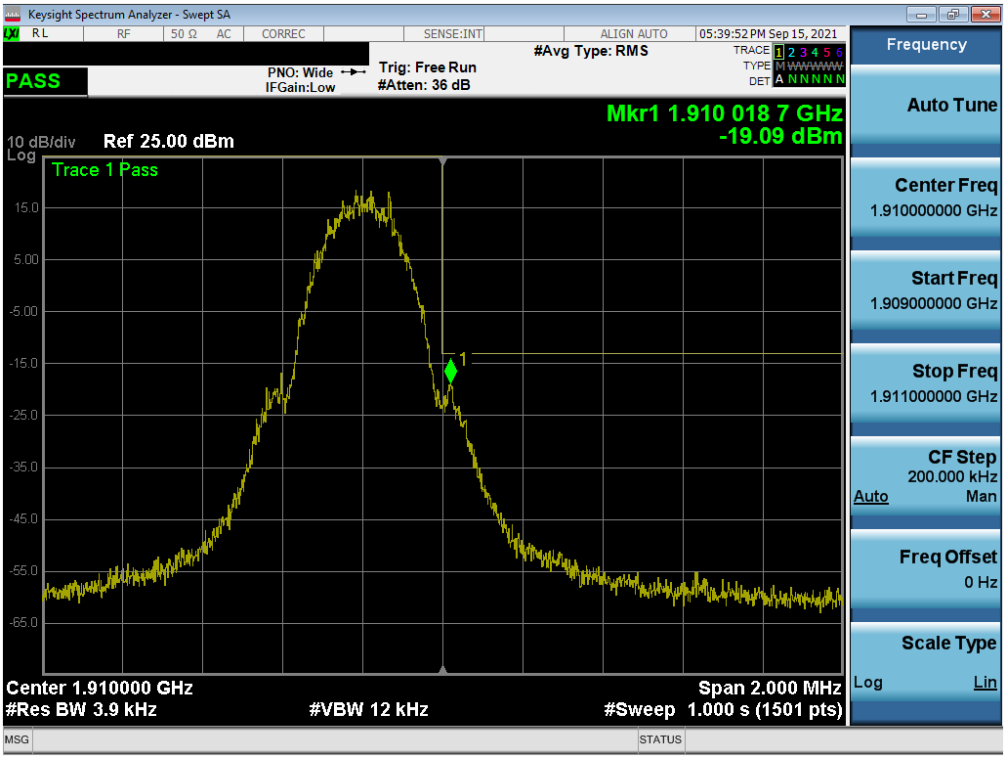
Plot 7-142. Upper Band Edge Plot (NR Band n25 – 5MHz QPSK – Full RB)



Plot 7-143. Extended Upper Band Edge Plot (NR Band n25 – 5MHz QPSK – Full RB)

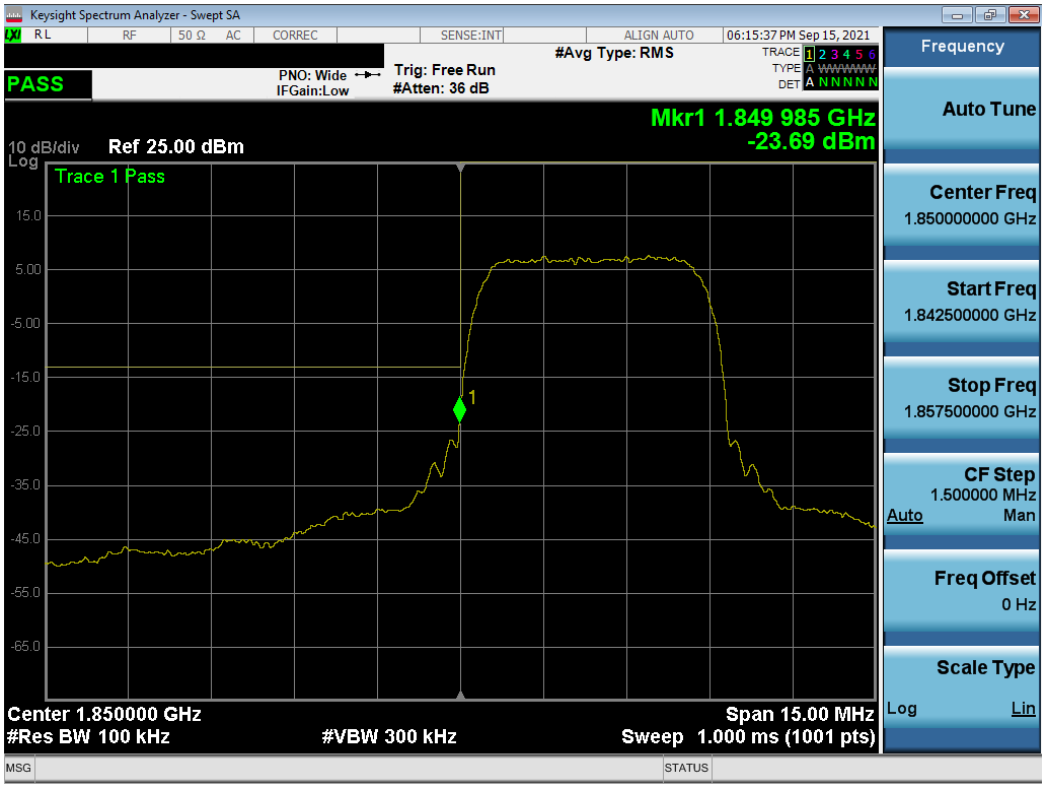


Plot 7-144. Lower Band Edge Plot (GPRS PCS – Ch. 512)

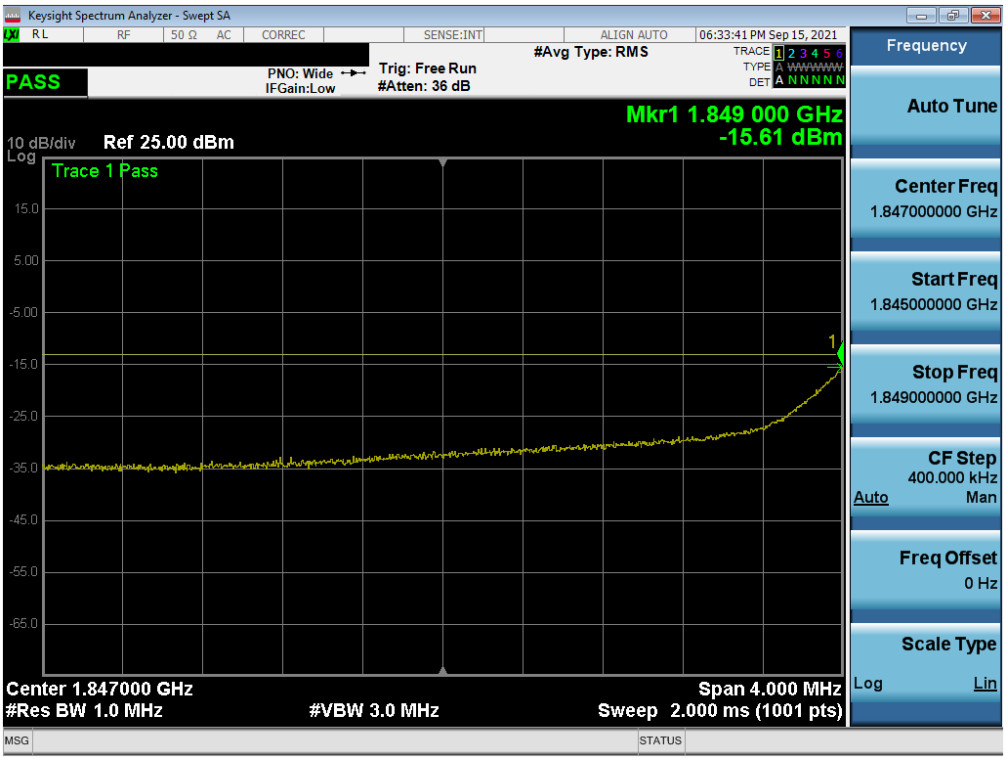


Plot 7-145. Upper Band Edge Plot (GPRS PCS – Ch. 810)

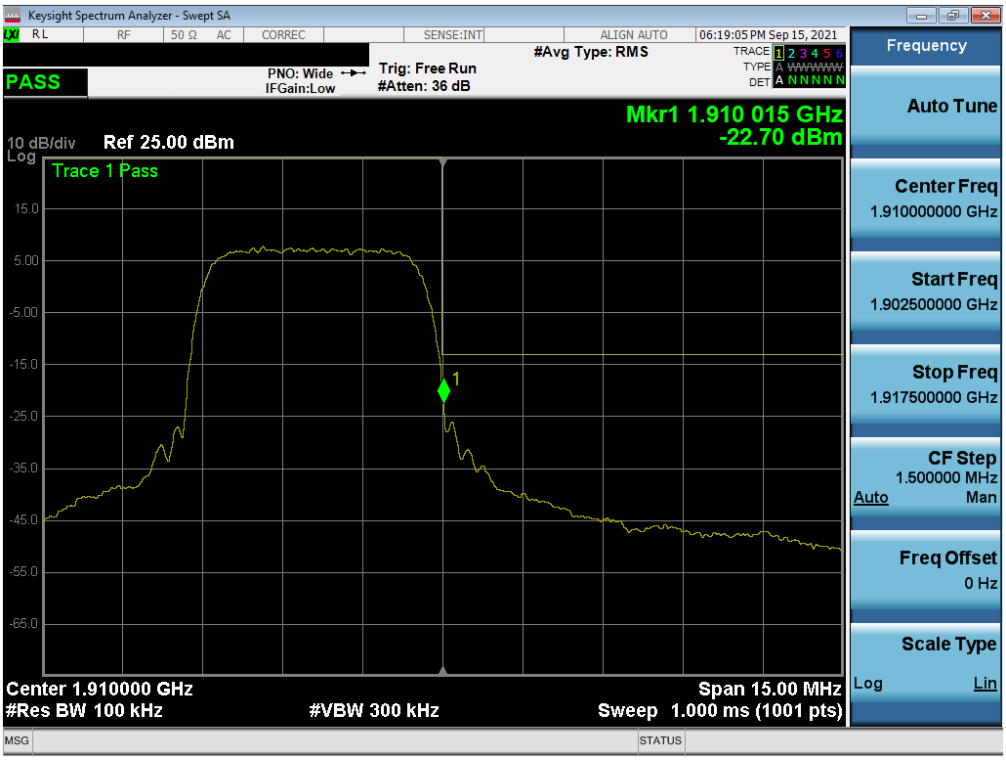
WCDMA PCS



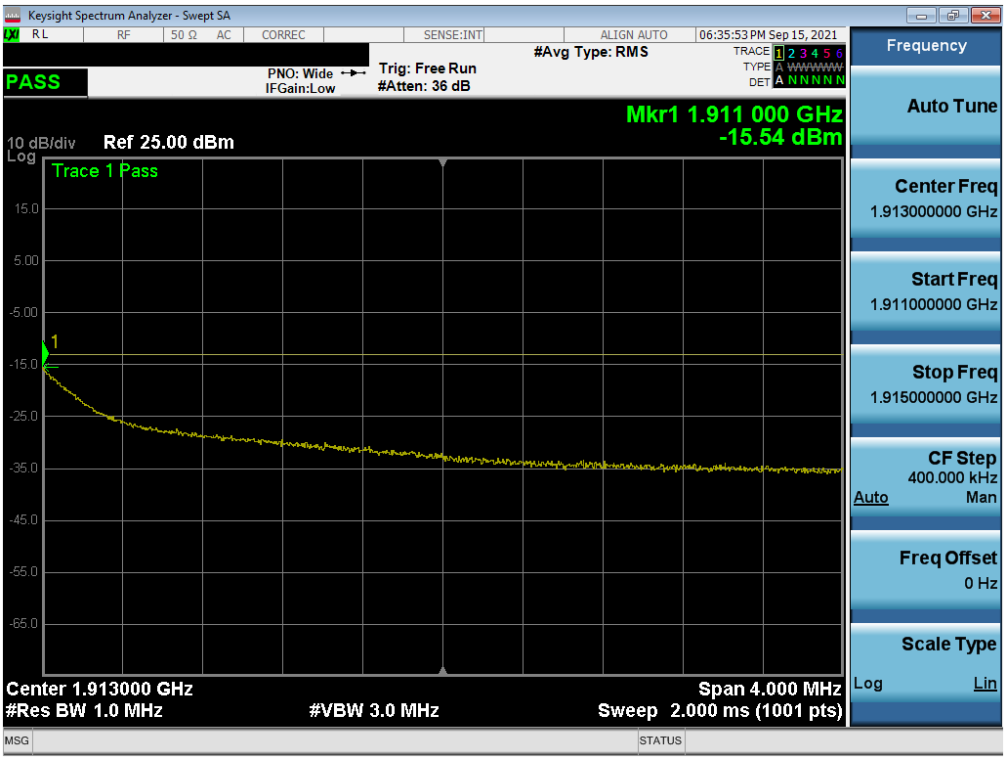
Plot 7-146. Lower Band Edge Plot (WCDMA PCS – Ch. 9262)



Plot 7-147. Extended Lower Band Edge Plot (WCDMA PCS – Ch. 9262)



Plot 7-148. Upper Band Edge Plot (WCDMA PCS – Ch. 9538)



Plot 7-149. 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.

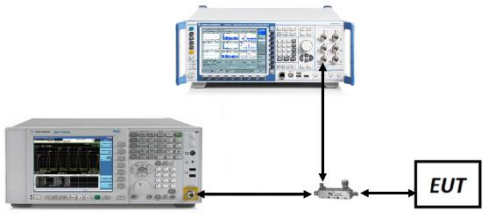
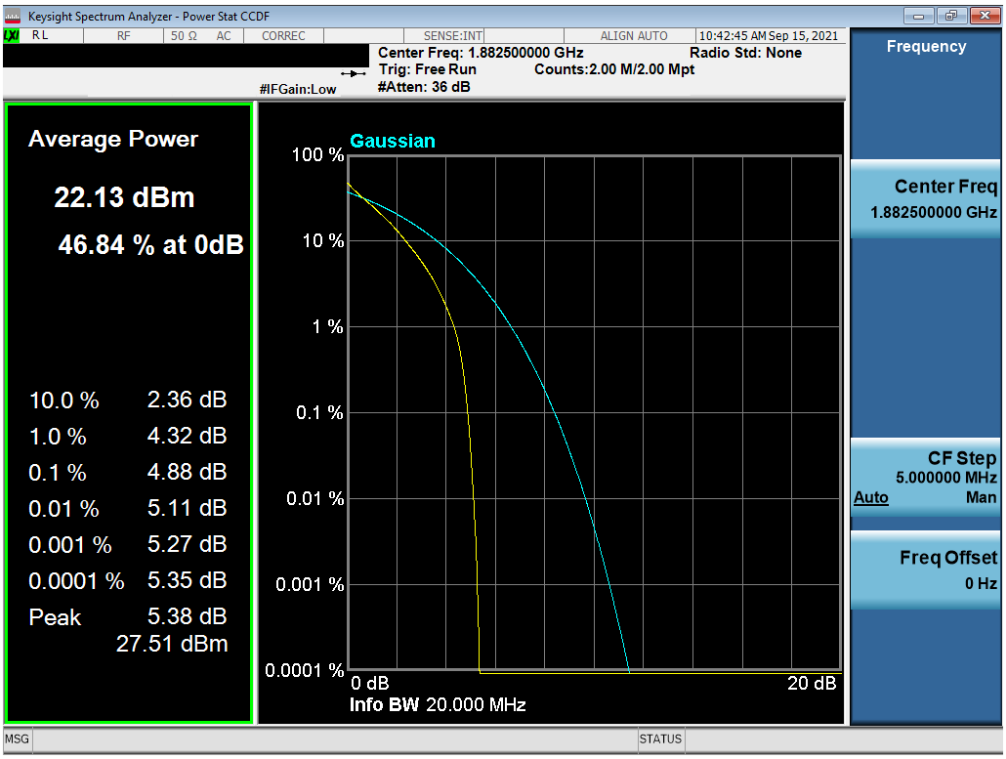


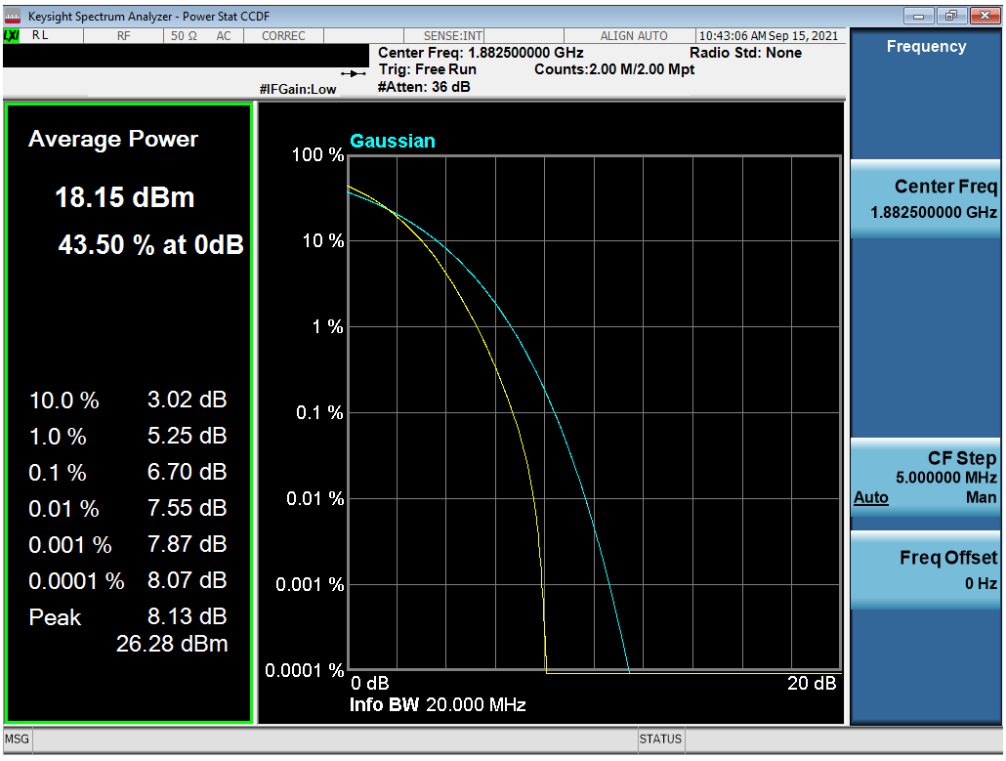
Figure 7-5. Test Instrument & Measurement Setup

Test Notes

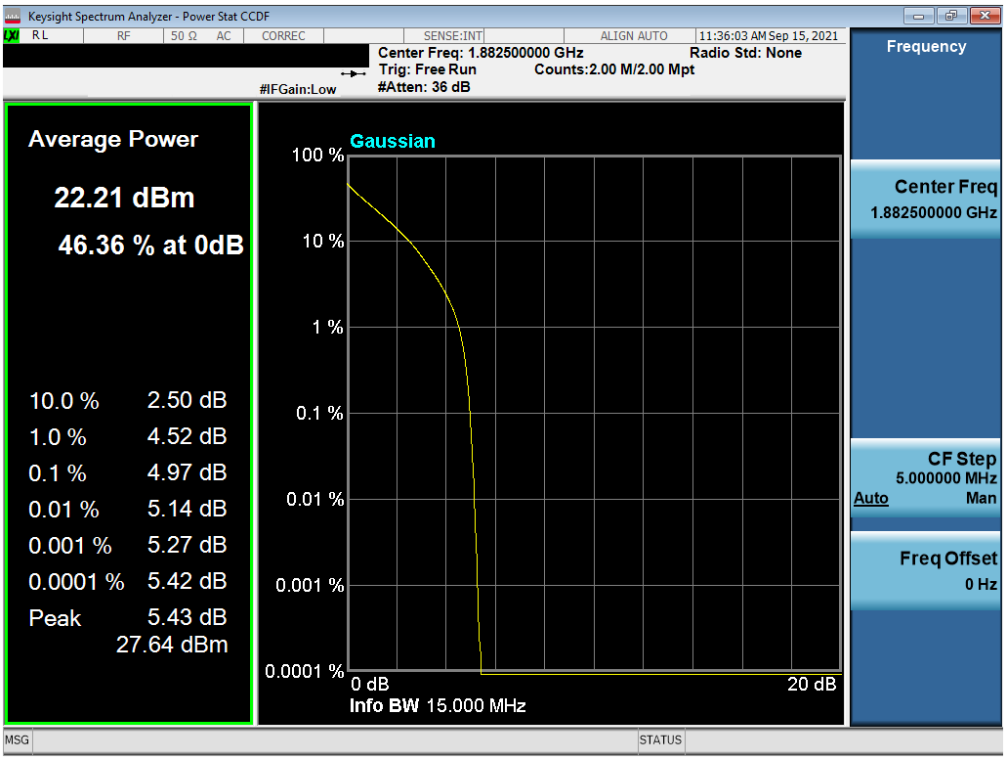
None.



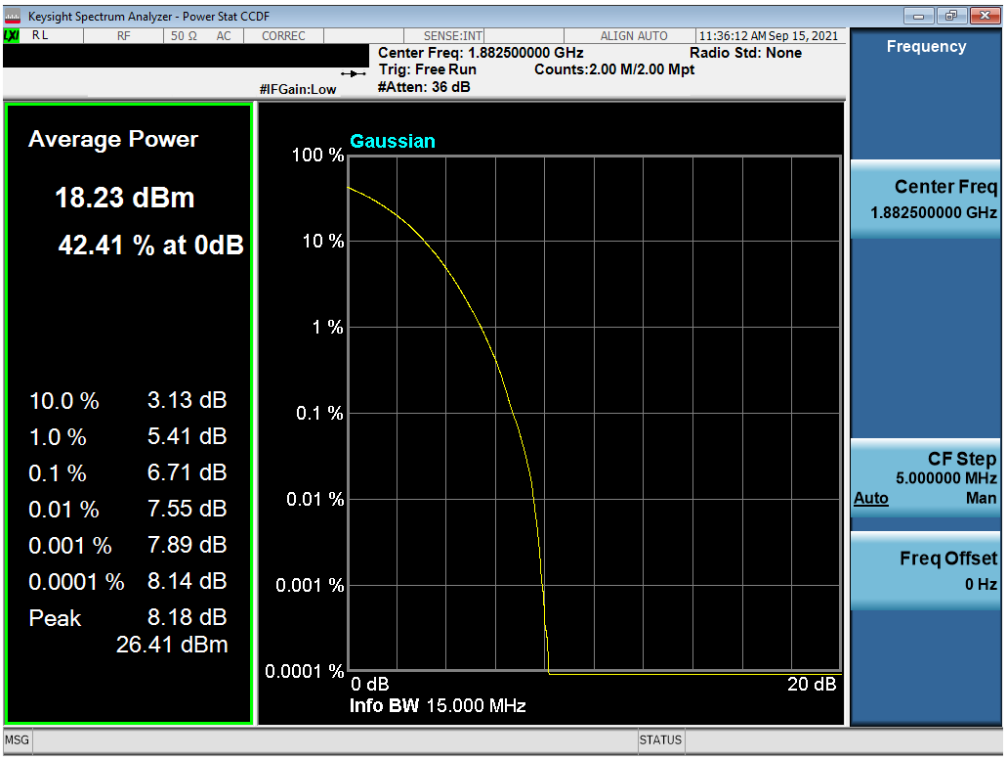
Plot 7-150. PAR Plot (LTE Band 25/2 - 20MHz QPSK - Full RB)



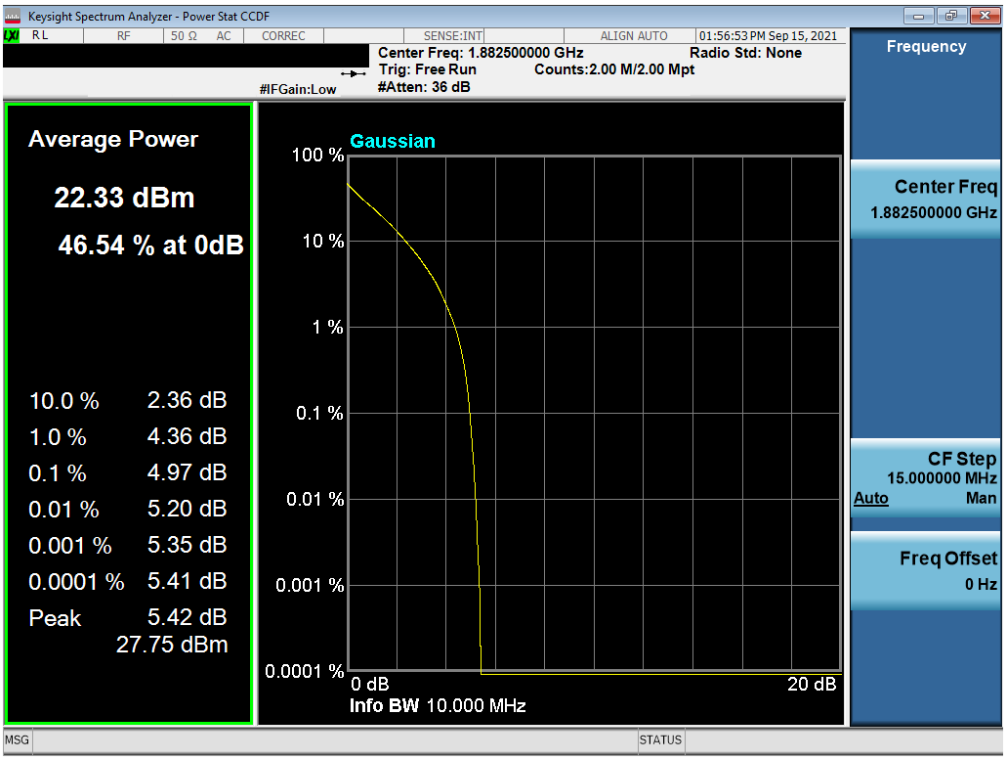
Plot 7-151. PAR Plot (LTE Band 25/2 - 20MHz 256-QAM - Full RB)



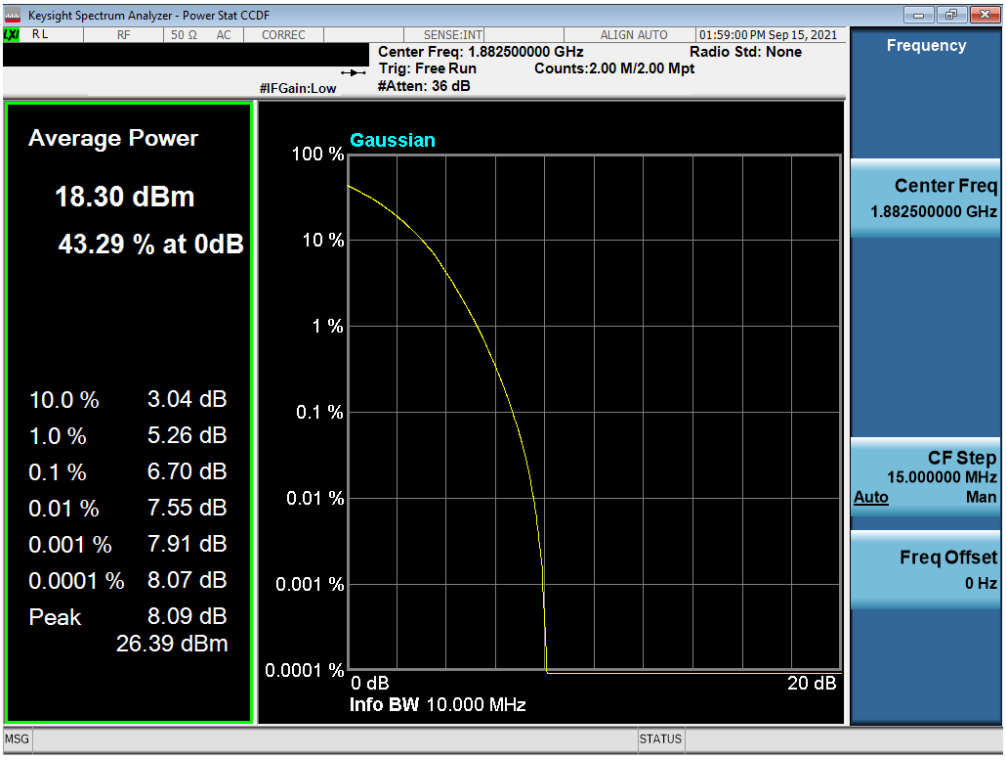
Plot 7-152. PAR Plot (LTE Band 25/2 - 15MHz QPSK - Full RB)



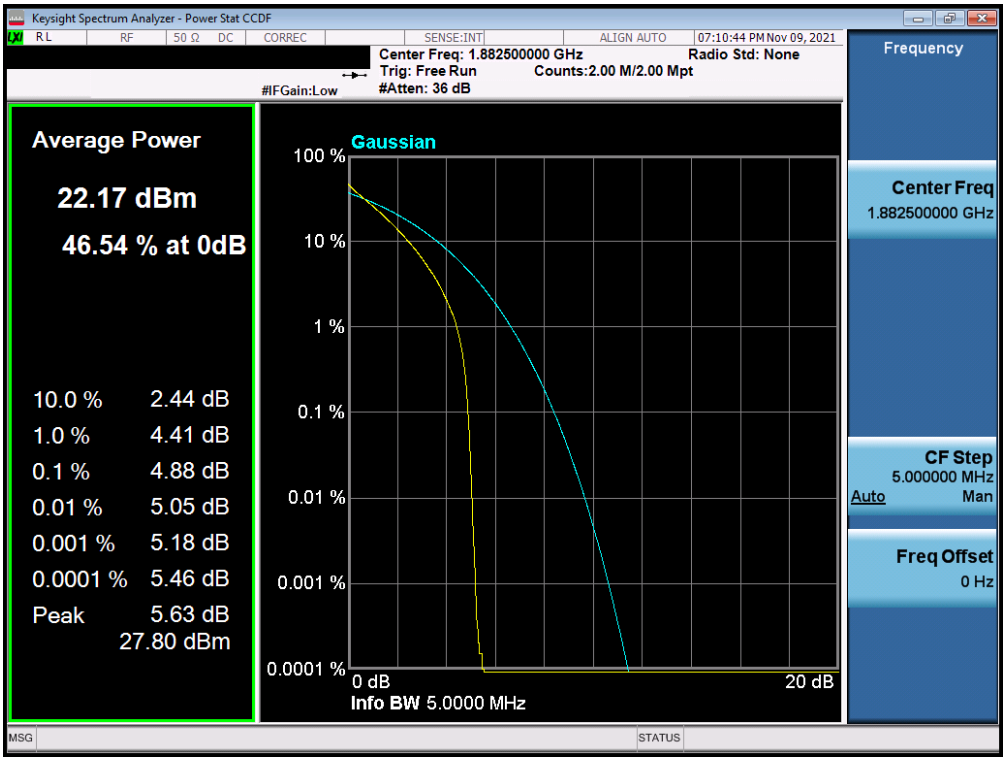
Plot 7-153. PAR Plot (LTE Band 25/2 - 15MHz 256-QAM - Full RB)



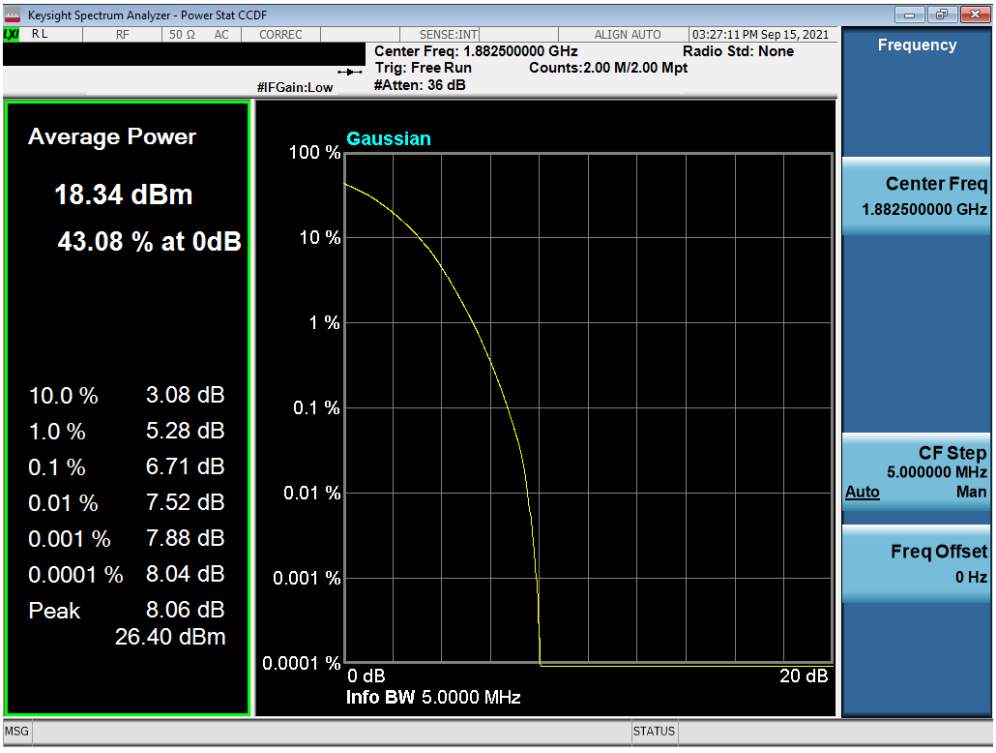
Plot 7-154. PAR Plot (LTE Band 25/2 - 10MHz QPSK - Full RB)



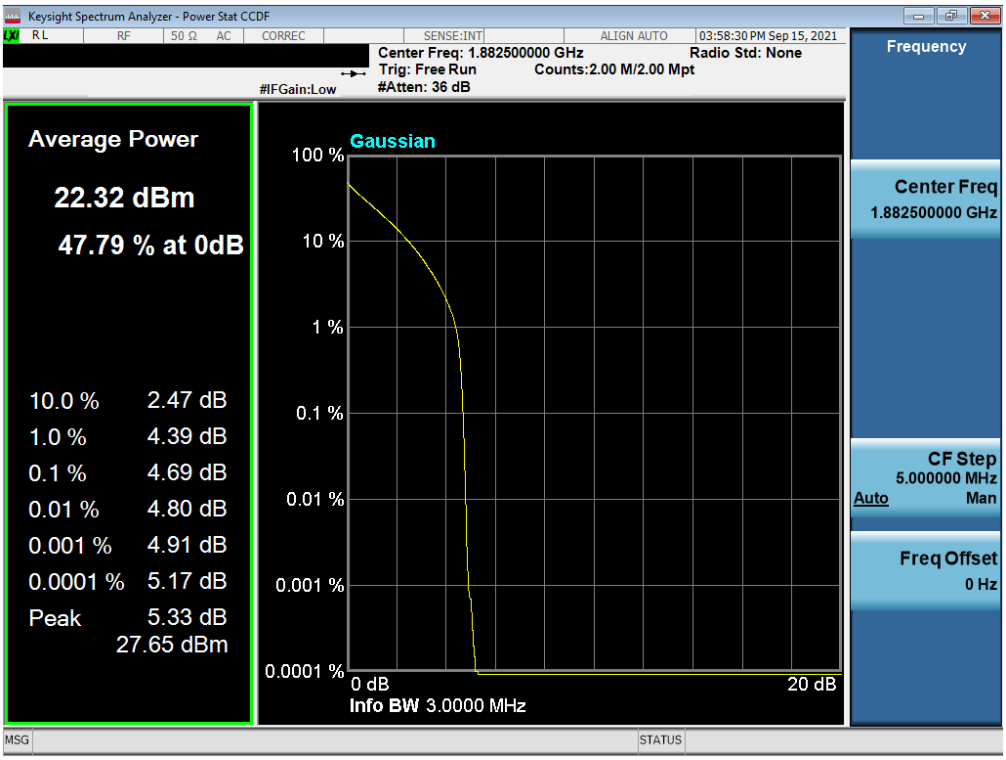
Plot 7-155. PAR Plot (LTE Band 25/2 - 10MHz 256-QAM - Full RB)



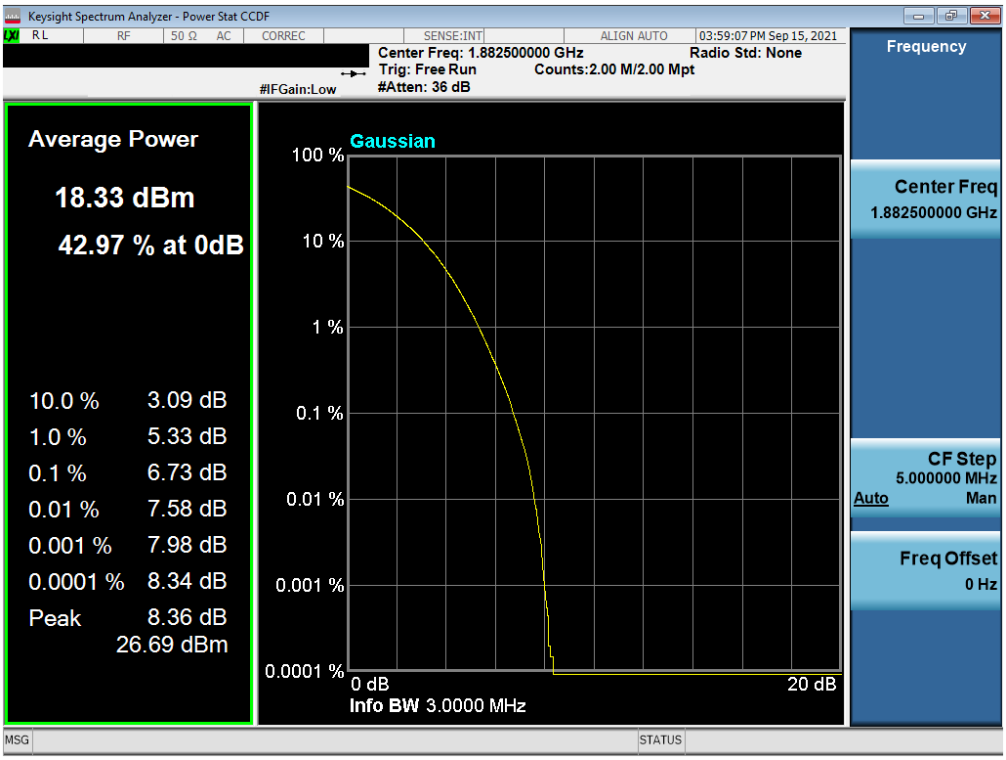
Plot 7-156. PAR Plot (LTE Band 25/2 - 5MHz QPSK - Full RB)



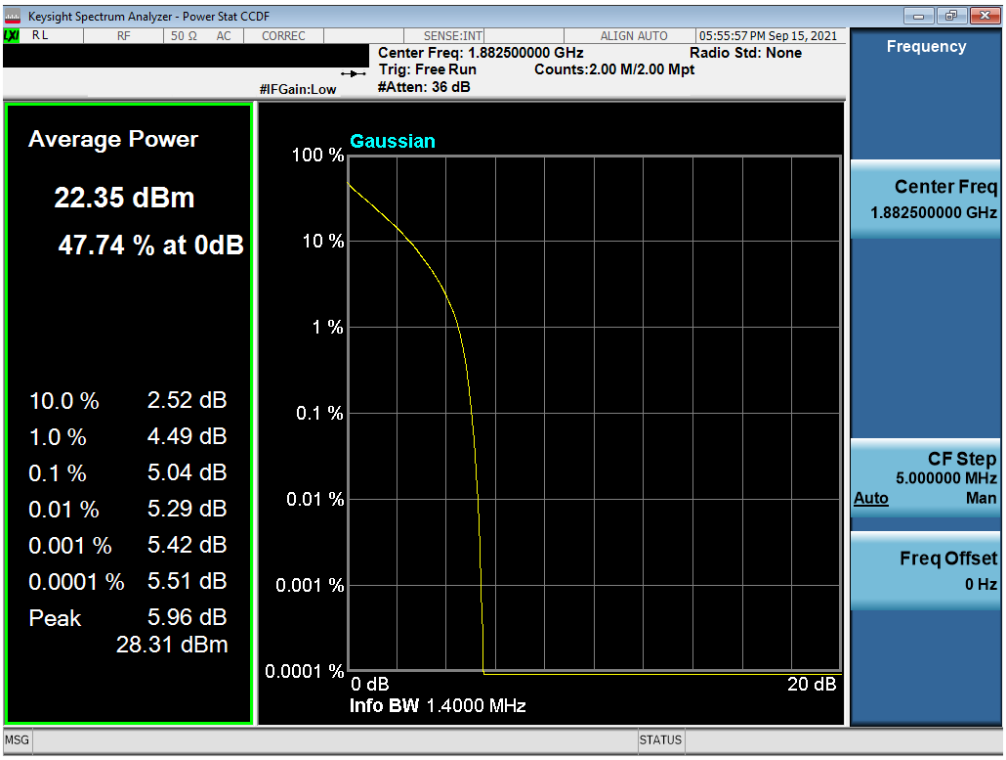
Plot 7-157. PAR Plot (LTE Band 25/2 - 5MHz 256-QAM - Full RB)



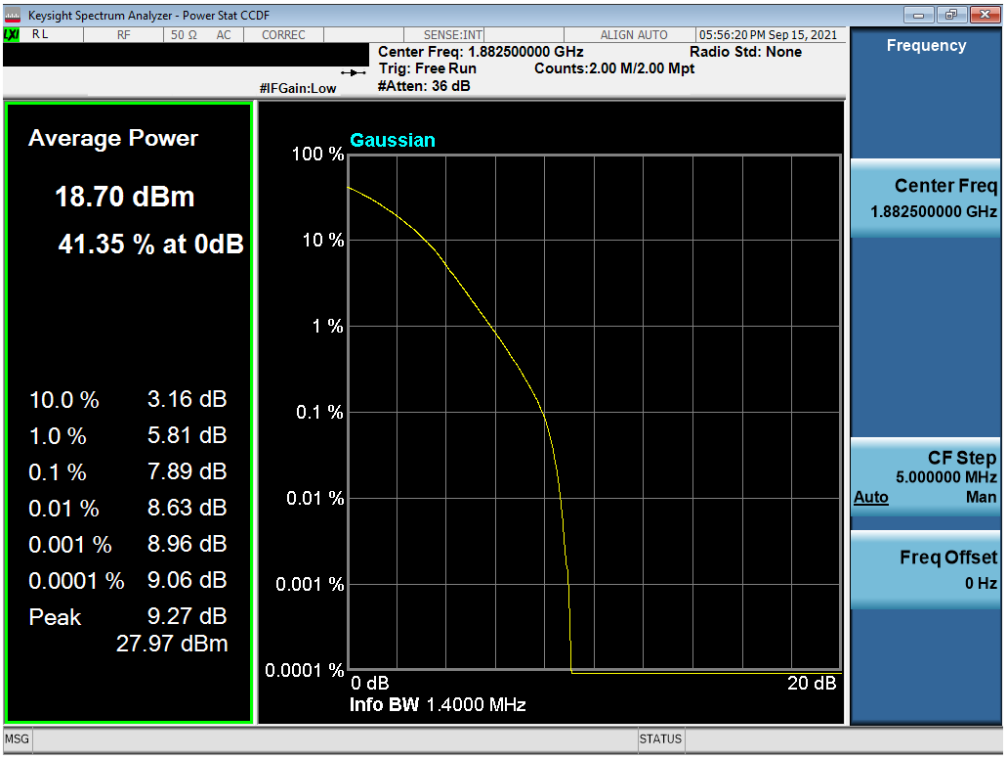
Plot 7-158. PAR Plot (LTE Band 25/2 - 3MHz QPSK - Full RB)



Plot 7-159. PAR Plot (LTE Band 25/2 - 3MHz 256-QAM - Full RB)



Plot 7-160. PAR Plot (LTE Band 25/2 - 1.4MHz QPSK - Full RB)



Plot 7-161. PAR Plot (LTE Band 25/2 - 1.4MHz 256-QAM - Full RB)

NR Band n25/2

Plot 7-162. PAR Plot (NR Band n25/2 - 40.0MHz DFT-s-OFDM BPSK - Full RB)

Plot 7-163. PAR Plot (NR Band n25/2 - 40.0MHz CP-OFDM QPSK - Full RB)

Plot 7-164. PAR Plot (NR Band n25/2 - 40.0MHz CP-OFDM 256-QAM - Full RB)

Plot 7-165. PAR Plot (NR Band n25/2 - 30.0MHz DFT-s-OFDM BPSK - Full RB)

Plot 7-166. PAR Plot (NR Band n25/2 - 30.0MHz CP-OFDM QPSK - Full RB)

Plot 7-167. PAR Plot (NR Band n25/2 - 30.0MHz CP-OFDM 256-QAM - Full RB)

Plot 7-168. PAR Plot (NR Band n25/2 - 25.0MHz DFT-s-OFDM BPSK - Full RB)

Plot 7-169. PAR Plot (NR Band n25/2 - 25.0MHz CP-OFDM QPSK - Full RB)

Plot 7-170. PAR Plot (NR Band n25/2 - 25MHz CP-OFDM 256-QAM - Full RB)

Plot 7-171. PAR Plot (NR Band n25/2 - 20.0MHz DFT-s-OFDM BPSK - Full RB)

Plot 7-172. PAR Plot (NR Band n25/2 - 20.0MHz CP-OFDM QPSK - Full RB)

Plot 7-173. PAR Plot (NR Band n25/2 - 20.0MHz CP-OFDM 256-QAM - Full RB)

Plot 7-174. PAR Plot (NR Band n25/2 - 15.0MHz DFT-s-OFDM BPSK - Full RB)

Plot 7-175. PAR Plot (NR Band n25/2 - 15.0MHz CP-OFDM QPSK - Full RB)

Plot 7-176. PAR Plot (NR Band n25/2 - 15.0MHz CP-OFDM 256-QAM - Full RB)

Plot 7-177. PAR Plot (NR Band n25/2 - 10.0MHz DFT-s-OFDM BPSK - Full RB)

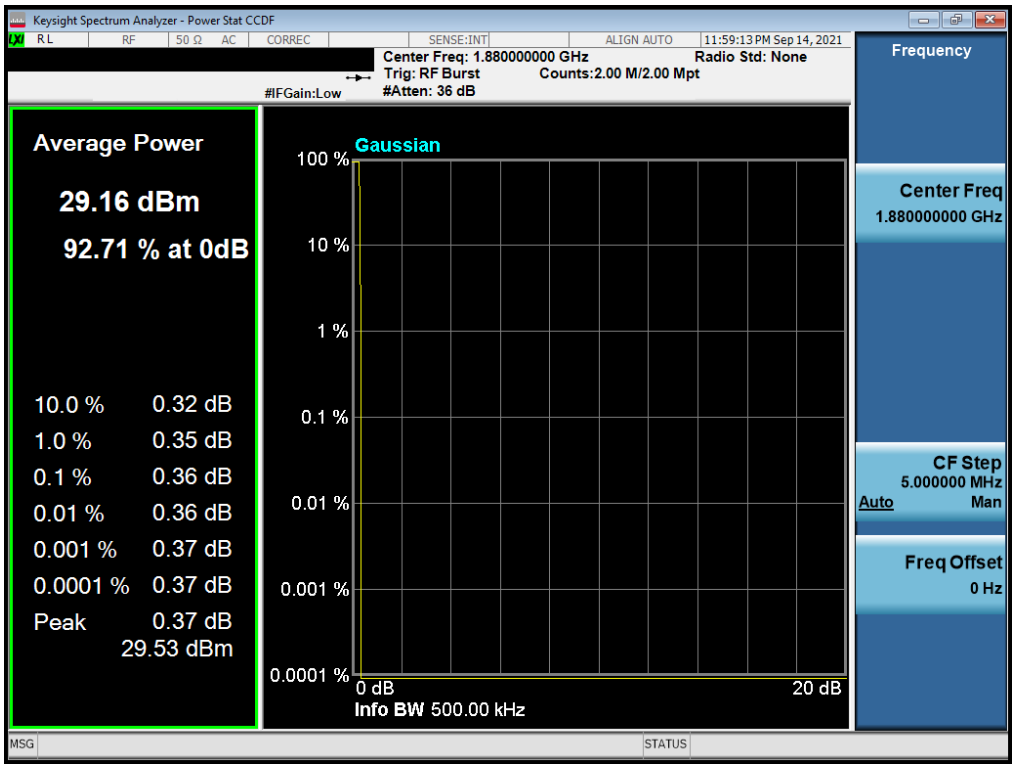
Plot 7-178. PAR Plot (NR Band n25/2 - 10.0MHz CP-OFDM QPSK - Full RB)

Plot 7-179. PAR Plot (NR Band n25/2 - 10.0MHz CP-OFDM 256-QAM - Full RB)

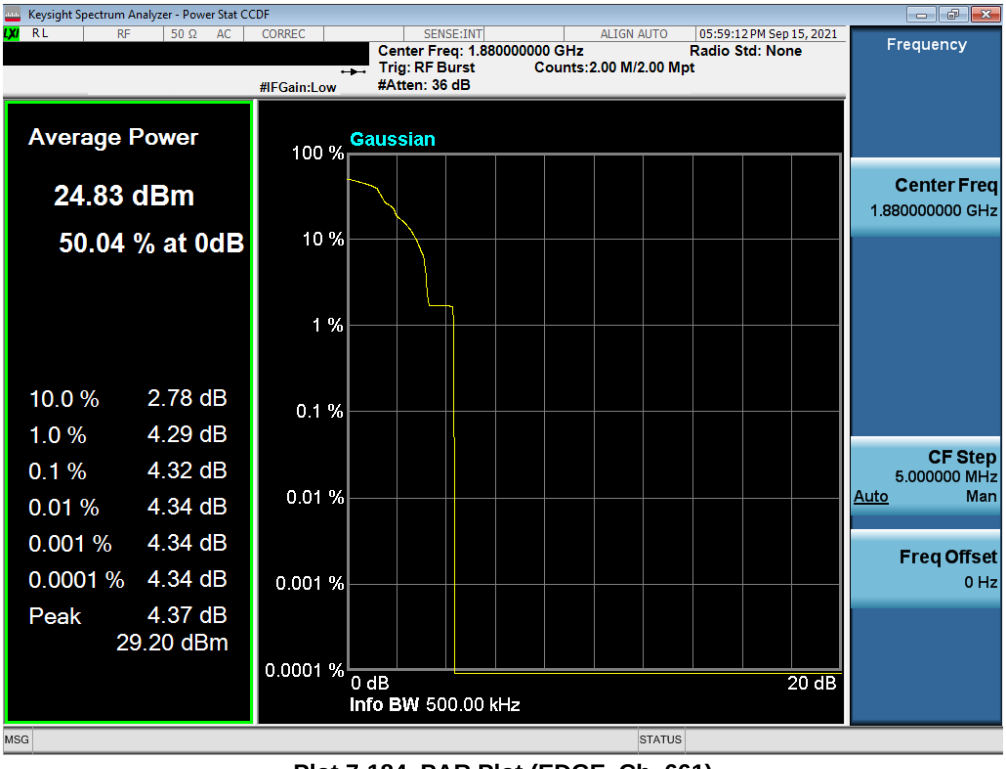
Plot 7-180. PAR Plot (NR Band n25/2 - 5.0MHz DFT-s-OFDM BPSK - Full RB)

Plot 7-181. PAR Plot (NR Band n25/2 - 5.0MHz CP-OFDM QPSK - Full RB)

Plot 7-182. PAR Plot (NR Band n25/2 - 5.0MHz CP-OFDM 256-QAM - Full RB)

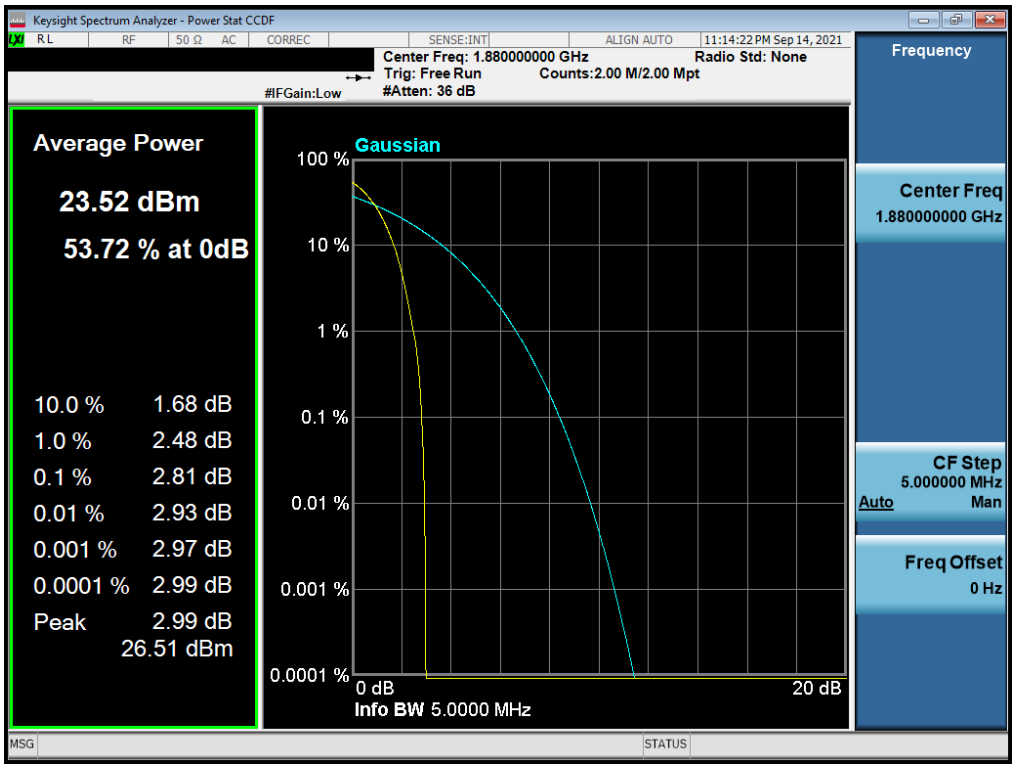


Plot 7-183. PAR Plot (GPRS, Ch. 661)



Plot 7-184. PAR Plot (EDGE, Ch. 661)

WCDMA PCS



Plot 7-185. 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.

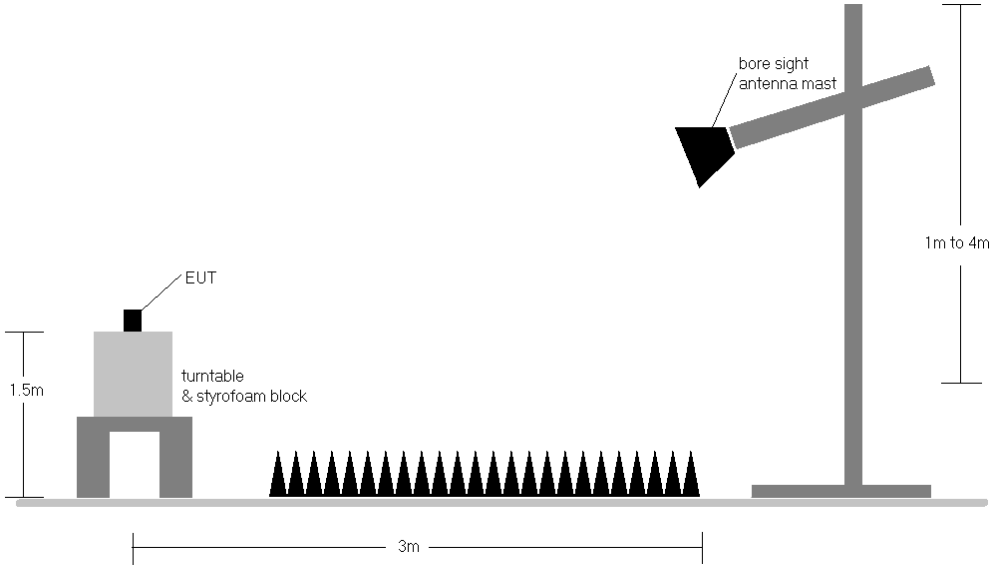


Figure 7-6. Radiated Test Setup >1GHz

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) 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	V	123	272	9.55	1 / 50	13.91	23.46	0.222	33.01	-9.55
	QPSK	1882.5	V	115	267	9.83	1 / 0	13.93	**23.76**	0.238	33.01	-9.25
	QPSK	1905.0	V	138	276	10.16	1 / 0	13.18	23.34	0.216	33.01	-9.67
	16-QAM	1882.5	V	115	267	9.83	1 / 0	13.15	22.98	0.199	33.01	-10.03
15 MHz	QPSK	1857.5	V	123	272	9.51	1 / 37	14.00	23.52	0.225	33.01	-9.49
	QPSK	1882.5	V	115	267	9.83	1 / 37	13.86	**23.69**	0.234	33.01	-9.32
	QPSK	1907.5	V	138	276	10.21	1 / 37	13.11	23.31	0.214	33.01	-9.70
	16-QAM	1857.5	V	123	272	9.51	1 / 74	13.44	22.96	0.197	33.01	-10.05
10 MHz	QPSK	1855.0	V	123	272	9.48	1 / 25	14.14	23.62	0.230	33.01	-9.39
	QPSK	1882.5	V	115	267	9.83	1 / 25	14.30	**24.13**	0.259	33.01	-8.88
	QPSK	1910.0	V	138	276	10.25	1 / 25	13.02	23.27	0.212	33.01	-9.74
	16-QAM	1882.5	V	115	267	9.83	1 / 25	13.07	22.90	0.195	33.01	-10.11
5 MHz	QPSK	1852.5	V	123	272	9.44	1 / 0	14.53	23.98	0.250	33.01	-9.03
	QPSK	1882.5	V	115	267	9.83	1 / 12	14.41	**24.24**	0.266	33.01	-8.77
	QPSK	1912.5	V	138	276	10.28	1 / 12	13.65	23.93	0.247	33.01	-9.08
	16-QAM	1852.5	V	123	272	9.44	1 / 12	13.84	23.28	0.213	33.01	-9.73
3 MHz	QPSK	1851.5	V	123	272	9.43	1 / 7	14.04	23.47	0.223	33.01	-9.54
	QPSK	1882.5	V	115	267	9.83	1 / 7	14.21	**24.05**	0.254	33.01	-8.96
	QPSK	1913.5	V	138	276	10.29	1 / 14	13.42	23.70	0.235	33.01	-9.31
	16-QAM	1851.5	V	123	272	9.43	1 / 14	13.65	23.08	0.203	33.01	-9.93
1.4 MHz	QPSK	1850.7	V	123	272	9.42	1 / 3	14.16	23.58	0.228	33.01	-9.43
	QPSK	1882.5	V	115	267	9.83	1 / 3	14.06	**23.89**	0.245	33.01	-9.12
	QPSK	1914.3	V	138	276	10.30	1 / 3	12.97	23.27	0.212	33.01	-9.74
	16-QAM	1850.7	V	123	272	9.42	1 / 5	13.85	23.27	0.212	33.01	-9.74
20 MHz	Opposite Pol.	1882.5	H	101	169	9.83	1 / 50	13.09	22.92	0.196	33.01	-10.09
	WCP	1882.5	H	188	136	9.83	1 / 0	13.18	23.01	0.200	33.01	-10.00

Table 7-3. 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]
40 MHz	π/2 BPSK	1870.0	V	145	307	9.75	1 / 54	12.59	**22.34**	0.172	33.01	-10.67
	π/2 BPSK	1882.5	V	139	2	9.99	1 / 54	10.54	20.53	0.113	33.01	-12.48
	π/2 BPSK	1895.0	V	145	102	10.12	1 / 54	11.28	21.40	0.138	33.01	-11.61
	QPSK	1870.0	V	145	307	9.75	1 / 54	12.28	22.03	0.160	33.01	-10.98
	16-QAM	1870.0	V	145	307	9.75	1 / 54	11.45	21.20	0.132	33.01	-11.81
30 MHz	π/2 BPSK	1865.0	V	145	307	9.72	1 / 119	12.65	**22.37**	0.172	33.01	-10.64
	π/2 BPSK	1882.5	V	139	2	9.99	1 / 80	11.49	21.48	0.141	33.01	-11.53
	π/2 BPSK	1900.0	V	145	102	10.16	1 / 40	11.37	21.53	0.142	33.01	-11.48
	QPSK	1865.0	V	145	307	9.72	1 / 119	12.57	22.29	0.169	33.01	-10.73
	16-QAM	1865.0	V	145	307	9.72	1 / 119	11.50	21.21	0.132	33.01	-11.80
25 MHz	π/2 BPSK	1862.5	V	145	307	9.70	1 / 99	13.04	**22.74**	0.188	33.01	-10.27
	π/2 BPSK	1882.5	V	139	2	9.99	1 / 66	11.89	21.88	0.154	33.01	-11.13
	π/2 BPSK	1902.5	V	145	102	10.17	1 / 33	11.60	21.77	0.150	33.01	-11.24
	QPSK	1862.5	V	145	307	9.70	1 / 99	12.78	22.48	0.177	33.01	-10.53
	16-QAM	1862.5	V	145	307	9.70	1 / 99	11.68	21.37	0.137	33.01	-11.64
20 MHz	π/2 BPSK	1860.0	V	145	307	9.68	1 / 53	12.55	**22.23**	0.167	33.01	-10.78
	π/2 BPSK	1882.5	V	139	2	9.99	1 / 26	11.45	21.44	0.139	33.01	-11.57
	π/2 BPSK	1905.0	V	145	102	10.18	1 / 26	11.14	21.32	0.136	33.01	-11.69
	QPSK	1860.0	V	145	307	9.68	1 / 53	12.50	22.18	0.165	33.01	-10.83
	16-QAM	1860.0	V	145	307	9.68	1 / 53	11.55	21.22	0.133	33.01	-11.79
15 MHz	π/2 BPSK	1857.5	V	145	307	9.66	1 / 58	12.75	**22.41**	0.174	33.01	-10.60
	π/2 BPSK	1882.5	V	139	2	9.99	1 / 20	11.47	21.46	0.140	33.01	-11.55
	π/2 BPSK	1907.5	V	145	102	10.19	1 / 58	11.39	21.58	0.144	33.01	-11.43
	QPSK	1857.5	V	145	307	9.66	1 / 58	12.54	22.20	0.166	33.01	-10.81
	16-QAM	1857.5	V	145	307	9.66	1 / 58	11.60	21.26	0.134	33.01	-11.75
10 MHz	π/2 BPSK	1855.0	V	145	307	9.64	1 / 13	12.68	**22.33**	0.171	33.01	-10.68
	π/2 BPSK	1882.5	V	139	2	9.99	1 / 13	11.52	21.50	0.141	33.01	-11.51
	π/2 BPSK	1910.0	V	145	102	10.20	1 / 26	11.45	21.65	0.146	33.01	-11.36
	QPSK	1855.0	V	145	307	9.64	1 / 13	12.56	22.20	0.166	33.01	-10.81
	16-QAM	1855.0	V	145	307	9.64	1 / 13	11.71	21.35	0.137	33.01	-11.66
5 MHz	π/2 BPSK	1852.5	V	145	307	9.63	1 / 12	12.76	**22.38**	0.173	33.01	-10.63
	π/2 BPSK	1882.5	V	139	2	9.99	1 / 6	11.50	21.49	0.141	33.01	-11.52
	π/2 BPSK	1912.5	V	145	102	10.21	1 / 6	11.34	21.55	0.143	33.01	-11.46
	QPSK	1852.5	V	145	307	9.63	1 / 12	12.57	22.19	0.166	33.01	-10.82
	16-QAM	1852.5	V	145	307	9.63	1 / 12	11.51	21.13	0.130	33.01	-11.88
40 MHz	QPSK (CP-OFDM)	1870.0	V	125	331	9.75	1 / 54	9.97	19.72	0.094	33.01	-13.29
	QPSK (Opposite Pol.)	1870.0	H	109	64	9.66	1 / 54	12.56	22.22	0.167	33.01	-10.79
	QPSK (WCP)	1870.0	V	137	133	9.75	1 / 54	8.56	18.31	0.068	33.01	-14.70

Table 7-4. EIRP Data (NR Band n25/2 - Ant A)

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]
40 MHz	π/2 BPSK	1870.0	V	104	279	9.75	1 / 54	15.16	24.91	0.310	33.01	-8.10
	π/2 BPSK	1882.5	V	100	265	9.99	1 / 54	11.95	21.94	0.156	33.01	-11.07
	π/2 BPSK	1895.0	V	100	279	10.12	1 / 161	13.32	23.44	0.221	33.01	-9.57
	QPSK	1870.0	V	104	279	9.75	1 / 54	15.31	**25.06**	0.321	33.01	-7.95
	16-QAM	1870.0	V	104	279	9.75	1 / 54	14.08	23.83	0.242	33.01	-9.18
30 MHz	π/2 BPSK	1865.0	V	104	279	9.72	1 / 40	15.02	24.73	0.297	33.01	-8.28
	π/2 BPSK	1882.5	V	100	265	9.99	1 / 80	11.69	21.67	0.147	33.01	-11.34
	π/2 BPSK	1900.0	V	100	279	10.16	1 / 80	13.84	24.00	0.251	33.01	-9.01
	QPSK	1865.0	V	104	279	9.72	1 / 40	15.28	**24.99**	0.316	33.01	-8.02
	16-QAM	1865.0	V	104	279	9.72	1 / 40	14.32	24.03	0.253	33.01	-8.98
25 MHz	π/2 BPSK	1862.5	V	104	279	9.70	1 / 33	14.71	24.41	0.276	33.01	-8.60
	π/2 BPSK	1882.5	V	100	265	9.99	1 / 99	11.29	21.27	0.134	33.01	-11.74
	π/2 BPSK	1902.5	V	100	279	10.17	1 / 99	13.49	23.66	0.232	33.01	-9.35
	QPSK	1862.5	V	104	279	9.70	1 / 33	14.78	**24.48**	0.280	33.01	-8.53
	16-QAM	1862.5	V	104	279	9.70	1 / 33	13.72	23.42	0.220	33.01	-9.59
20 MHz	π/2 BPSK	1860.0	V	104	279	9.68	1 / 79	14.58	**24.25**	0.266	33.01	-8.76
	π/2 BPSK	1882.5	V	100	265	9.99	1 / 79	11.15	21.14	0.130	33.01	-11.87
	π/2 BPSK	1905.0	V	100	279	10.18	1 / 79	13.19	23.37	0.217	33.01	-9.64
	QPSK	1860.0	V	104	279	9.68	1 / 79	14.55	24.23	0.265	33.01	-8.78
	16-QAM	1860.0	V	104	279	9.68	1 / 79	13.36	23.04	0.201	33.01	-9.97
15 MHz	π/2 BPSK	1857.5	V	104	279	9.66	1 / 58	14.63	24.29	0.269	33.01	-8.72
	π/2 BPSK	1882.5	V	100	265	9.99	1 / 20	11.09	21.08	0.128	33.01	-11.93
	π/2 BPSK	1907.5	V	100	279	10.19	1 / 39	13.33	23.52	0.225	33.01	-9.49
	QPSK	1857.5	V	104	279	9.66	1 / 58	15.01	**24.67**	0.293	33.01	-8.34
	16-QAM	1857.5	V	104	279	9.66	1 / 58	13.68	23.34	0.216	33.01	-9.67
10 MHz	π/2 BPSK	1855.0	V	104	279	9.64	1 / 38	14.63	24.28	0.268	33.01	-8.73
	π/2 BPSK	1882.5	V	100	265	9.99	1 / 38	11.06	21.04	0.127	33.01	-11.97
	π/2 BPSK	1910.0	V	100	279	10.20	1 / 26	13.29	23.50	0.224	33.01	-9.51
	QPSK	1855.0	V	104	279	9.64	1 / 38	14.70	**24.34**	0.272	33.01	-8.67
	16-QAM	1855.0	V	104	279	9.64	1 / 38	13.64	23.28	0.213	33.01	-9.73
5 MHz	π/2 BPSK	1852.5	V	104	279	9.63	1 / 6	14.36	23.99	0.251	33.01	-9.02
	π/2 BPSK	1882.5	V	100	265	9.99	1 / 18	11.08	21.07	0.128	33.01	-11.94
	π/2 BPSK	1912.5	V	100	279	10.21	1 / 6	13.12	23.32	0.215	33.01	-9.69
	QPSK	1852.5	V	104	279	9.63	1 / 6	14.55	**24.18**	0.262	33.01	-8.83
	16-QAM	1852.5	V	104	279	9.63	1 / 6	13.23	22.86	0.193	33.01	-10.15
40 MHz	QPSK (CP-OFDM)	1870.0	V	101	279	9.75	1 / 161	14.14	23.89	0.245	33.01	-9.12
	QPSK (Opposite Pol.)	1870.0	H	227	164	9.66	1 / 108	15.23	24.89	0.309	33.01	-8.12
	QPSK (WCP)	1870.0	V	114	335	9.75	1 / 54	10.02	19.77	0.095	33.01	-13.24

Table 7-5. EIRP Data (NR Band n25/2 - Ant J)

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	H	115	7	18.18	9.41	27.59	0.574	33.01	-5.42
1880.00	GSM1900	H	107	7	19.04	9.79	**28.83**	**0.765**	33.01	-4.18
1909.80	GSM1900	H	109	8	18.07	10.25	28.32	0.679	33.01	-4.69
1880.00	GSM1900	V	109	274	18.49	9.79	28.28	0.674	33.01	-4.73
1880.00	EDGE1900	H	107	7	14.09	9.79	**23.88**	0.245	33.01	-9.13
1880.00	GSM1900 (WCP)	H	158	178	16.93	9.79	26.72	0.470	33.01	-6.29

Table 7-6. 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	V	123	272	13.56	9.63	23.19	0.208	33.01	-9.83
1880.00	WCDMA1900	V	109	269	13.94	9.96	23.90	0.245	33.01	-9.11
1907.60	WCDMA1900	V	109	281	14.23	10.19	**24.42**	**0.277**	33.01	-8.59
1907.60	WCDMA1900	H	148	172	14.05	10.21	24.26	0.267	33.01	-8.75
1907.60	WCDMA1900 (WCP)	V	104	272	12.81	10.19	23.00	0.200	33.01	-10.01

Table 7-7. 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 RMS 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.

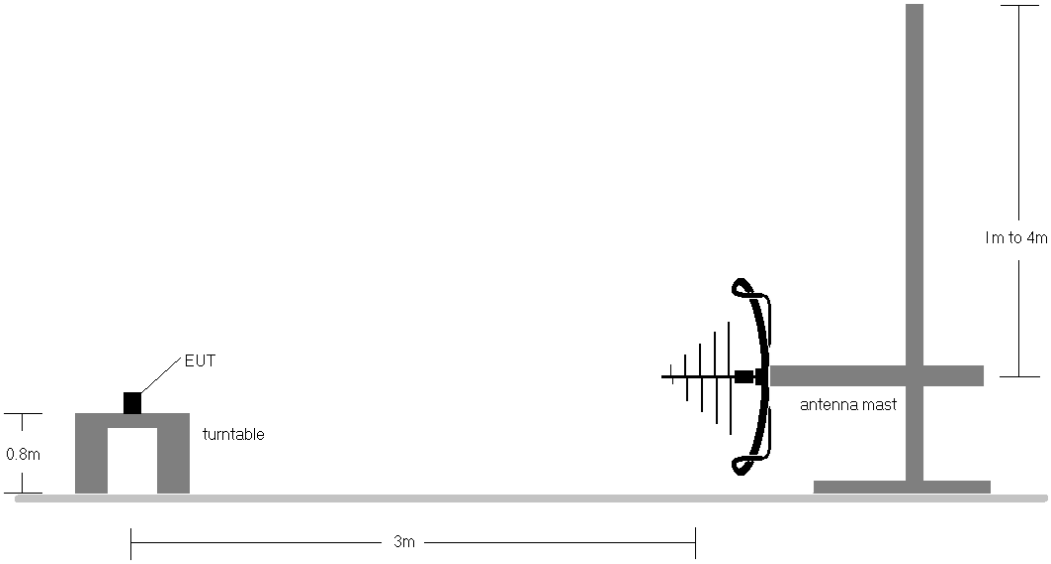


Figure 7-7. Test Instrument & Measurement Setup < 1GHz

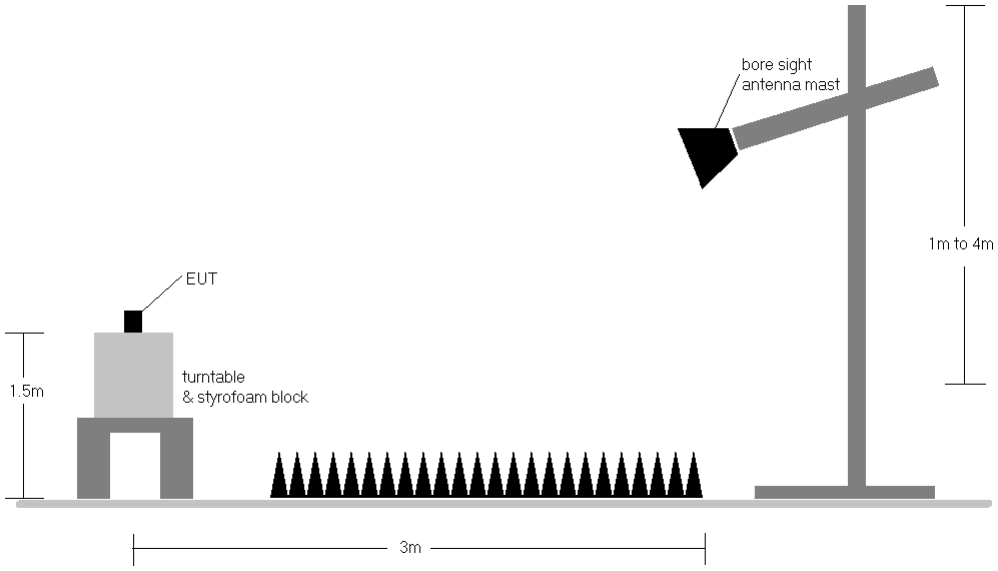


Figure 7-8. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
   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 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) 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.

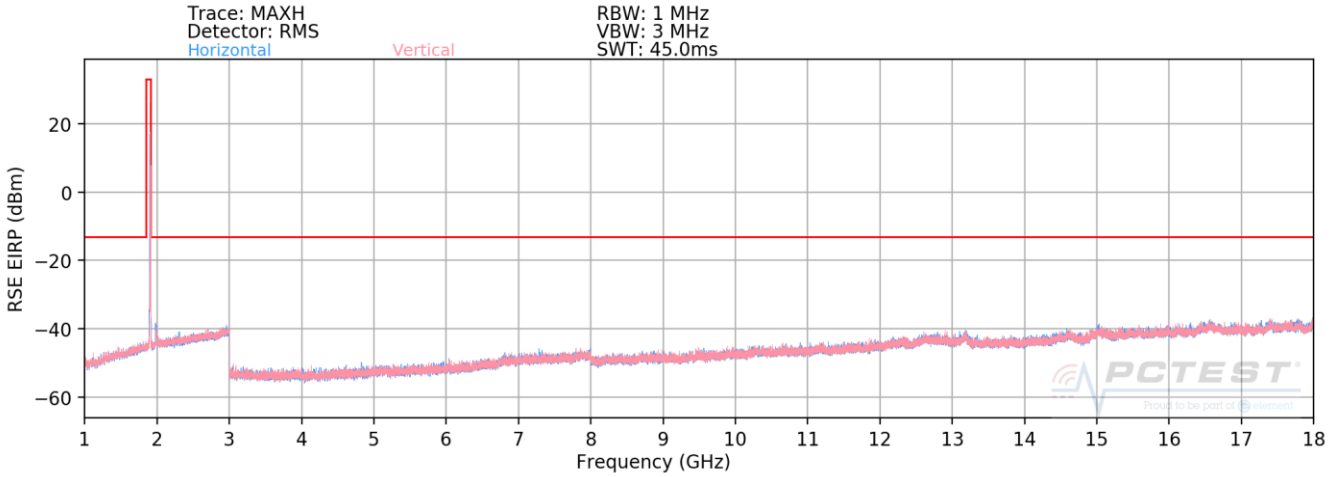
8) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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.

10) 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.

11) Spurious emissions measurements are included in this section to address compliance of the NR FR1 ULCA capability. The EUT was set to transmit at the widest bandwidth and on the middle channel of each band.

LTE Band 25/2



Plot 7-186. 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	-	-	-78.28	7.26	35.98	-59.28	-13.00	-46.28
5580.00	V	-	-	-79.31	9.89	37.58	-57.68	-13.00	-44.68
7440.00	V	-	-	-80.15	13.91	40.76	-54.50	-13.00	-41.50
9300.00	V	-	-	-81.46	15.18	40.72	-54.54	-13.00	-41.54

Table 7-8. 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	-	-	-78.74	8.10	36.36	-58.90	-13.00	-45.90
5647.50	V	-	-	-79.67	9.85	37.18	-58.08	-13.00	-45.08
7530.00	V	-	-	-80.13	13.87	40.74	-54.52	-13.00	-41.52
9412.50	V	-	-	-81.78	15.76	40.98	-54.28	-13.00	-41.28

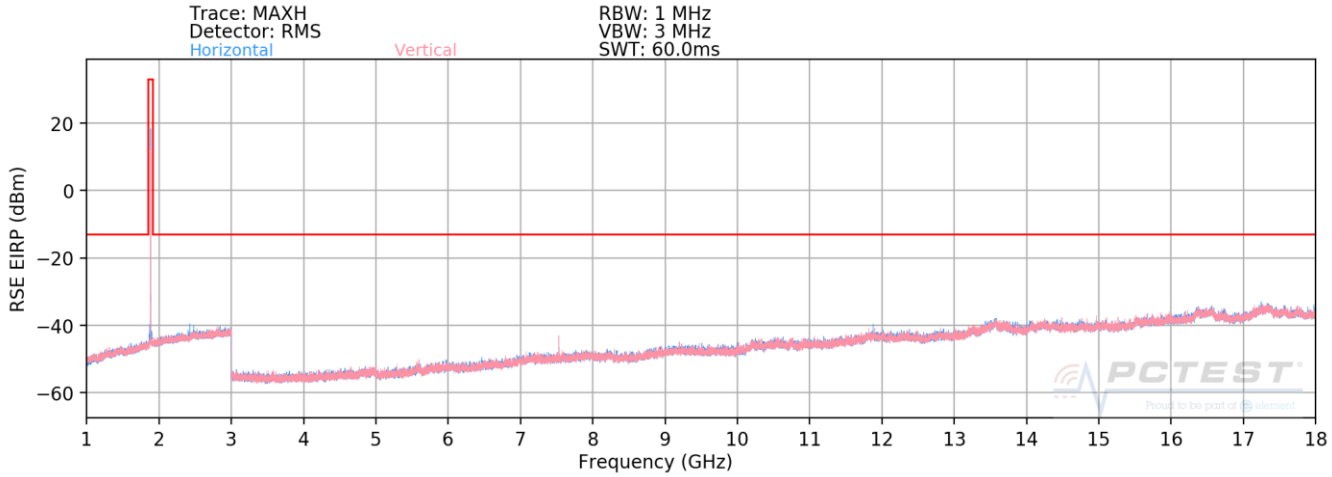
Table 7-9. Radiated Spurious Data (LTE Band 25/2 – Mid Channel)

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	-	-	-78.53	7.55	36.02	-59.24	-13.00	-46.24
5715.00	V	-	-	-79.36	10.11	37.75	-57.51	-13.00	-44.51
7620.00	V	-	-	-80.30	14.13	40.83	-54.43	-13.00	-41.43
9525.00	V	-	-	-81.53	15.58	41.05	-54.20	-13.00	-41.20

Table 7-10. Radiated Spurious Data (LTE Band 25/2 – High Channel)

NR Band n25/2 - Ant A



Plot 7-187. Radiated Spurious Plot (NR Band n25/2 - Ant A)

Bandwidth (MHz):	40
Frequency (MHz):	1870
RB / Offset:	1 / 108
Mode:	Stand Alone
Note:	BOTTOM ANTENNA

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]
3740.00	H	103	279	-79.62	7.76	35.14	-60.12	-13.00	-47.12
5610.00	H	-	-	-81.62	11.53	36.91	-58.35	-13.00	-45.35
7480.00	H	100	257	-75.82	15.69	46.87	-48.38	-13.00	-35.38
9350.00	H	-	-	-84.04	18.66	41.62	-53.63	-13.00	-40.63
11220.00	H	-	-	-84.45	21.62	44.17	-51.09	-13.00	-38.09

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

Bandwidth (MHz):	40
Frequency (MHz):	1882.5
RB / Offset:	1 / 108
Mode:	Stand Alone
Note:	BOTTOM ANTENNA

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	115	248	-80.17	8.08	34.91	-60.35	-13.00	-47.35
5647.50	H	-	-	-81.54	11.00	36.46	-58.79	-13.00	-45.79
7530.00	H	102	254	-74.94	15.71	47.77	-47.49	-13.00	-34.49
9412.50	H	-	-	-83.79	18.88	42.09	-53.17	-13.00	-40.17
11295.00	H	-	-	-84.17	21.42	44.25	-51.01	-13.00	-38.01

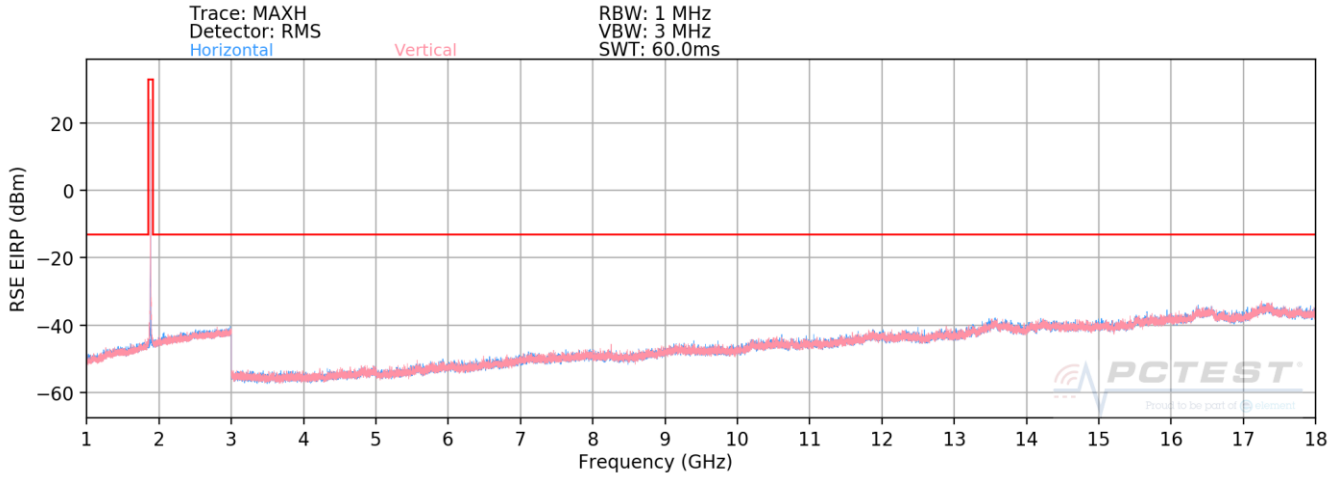
Table 7-12. Radiated Spurious Data (NR Band n25/2 – Mid Channel - Ant A)

Bandwidth (MHz):	40
Frequency (MHz):	1895
RB / Offset:	1 / 108
Mode:	Stand Alone
Note:	BOTTOM ANTENNA

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]
3790.00	H	-	-	-80.13	8.06	34.93	-60.33	-13.00	-47.33
5685.00	H	-	-	-81.48	11.06	36.58	-58.67	-13.00	-45.67
7580.00	H	106	278	-73.91	16.38	49.47	-45.79	-13.00	-32.79
9475.00	H	-	-	-84.27	19.01	41.74	-53.52	-13.00	-40.52
11370.00	H	-	-	-85.50	21.58	43.08	-52.18	-13.00	-39.18

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

NR Band n25/2 - Ant J



Plot 7-188. Radiated Spurious Plot (NR Band n25/2 - Ant J)

Bandwidth (MHz):	40
Frequency (MHz):	1870
RB / Offset:	1 / 50
Mode:	Stand Alone
Note:	TOP ANTENNA

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]
3740.00	H	-	-	-79.94	7.87	34.93	-60.33	-13.00	-47.33
5610.00	H	-	-	-81.80	12.12	37.32	-57.93	-13.00	-44.93
7480.00	H	-	-	-82.43	15.55	40.12	-55.14	-13.00	-42.14

Table 7-14. Radiated Spurious Data (NR Band n25/2 – Low Channel - Ant J)

Bandwidth (MHz):	40
Frequency (MHz):	1882.5
RB / Offset:	1 / 50
Mode:	Stand Alone
Note:	TOP ANTENNA

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	-	-	-80.01	8.08	35.07	-60.19	-13.00	-47.19
5647.50	H	-	-	-81.59	11.00	36.41	-58.84	-13.00	-45.84
7530.00	H	-	-	-82.50	15.71	40.21	-55.05	-13.00	-42.05

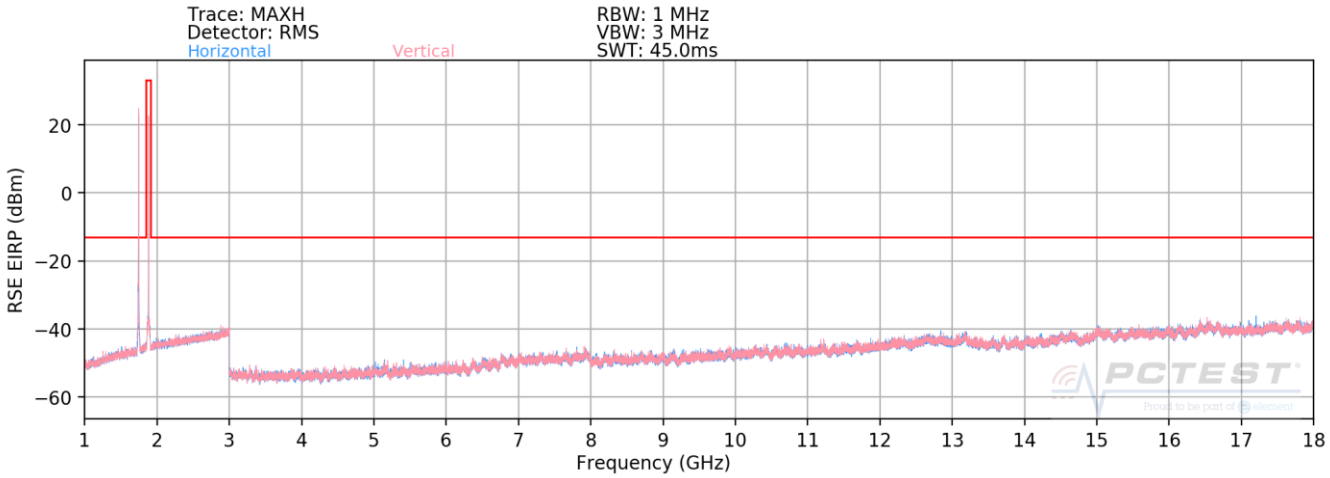
Table 7-15. Radiated Spurious Data (NR Band n25/2 – Mid Channel - Ant J)

Bandwidth (MHz):	40
Frequency (MHz):	1895
RB / Offset:	1 / 50
Mode:	Stand Alone
Note:	TOP ANTENNA

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]
3790.00	H	-	-	-80.62	8.08	34.46	-60.80	-13.00	-47.80
5685.00	H	-	-	-81.44	11.57	37.13	-58.13	-13.00	-45.13
7580.00	H	-	-	-82.98	16.11	40.13	-55.13	-13.00	-42.13

Table 7-16. Radiated Spurious Data (NR Band n25/2 – High Channel - Ant J)

EN-DC NR Band n25/2 (Ant J) – B66



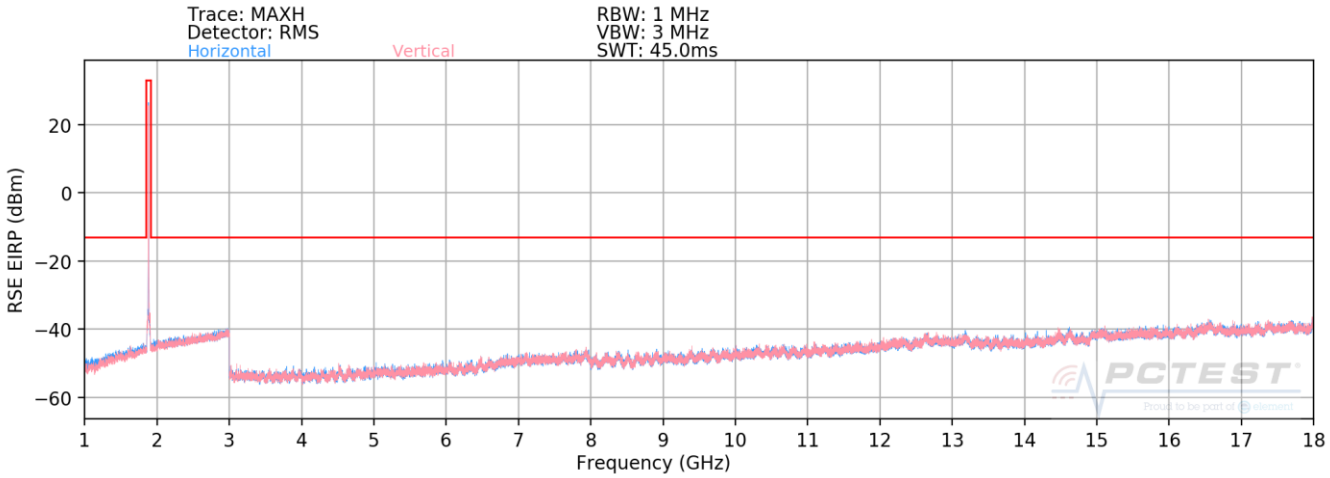
Plot 7-189. Radiated Spurious Plot (NR Band n25/2 (Ant J) – B66 – 1-18 GHz)

Bandwidth (MHz):	20 / 40
Frequency (MHz):	1882.5 / 1745
RB / Offset:	1/50 / 1/108
Mode:	EN-DC
Anchor Band:	Band 66

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]
1195.00	V	-	-	-68.07	7.41	46.34	-48.92	-13.00	-35.92
1332.00	V	-	-	-67.74	8.65	47.91	-47.34	-13.00	-34.34
1470.00	V	-	-	-67.98	9.78	48.80	-46.45	-13.00	-33.45
1607.00	V	-	-	-68.33	10.78	49.45	-45.81	-13.00	-32.81
2020.00	V	-	-	-68.73	36.94	75.21	-20.05	-13.00	-7.05
2157.00	V	-	-	-68.33	13.94	52.61	-42.65	-13.00	-29.65
2295.00	V	-	-	-68.88	13.66	51.78	-43.47	-13.00	-30.47
2432.00	V	-	-	-68.61	14.01	52.40	-42.85	-13.00	-29.85

Table 7-17. Radiated Spurious Data (NR Band n25/2 (Ant J) – B66)

EN-DC NR Band n25 (Ant A) – B12



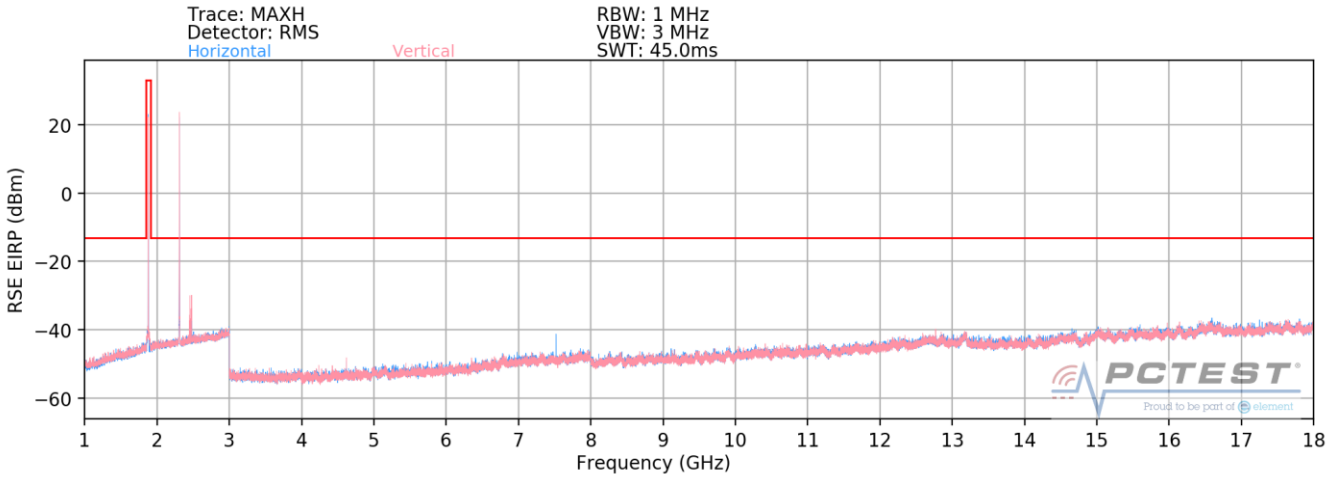
Plot 7-190. Radiated Spurious Plot (NR Band n25 (Ant A) – B12 – 1-18 GHz)

Bandwidth (MHz):	40 / 10
Frequency (MHz):	1882.5 / 707.5
RB / Offset:	1/108 / 1/25
Mode:	EN-DC
Anchor Band:	Band 12

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]
1642.00	V	-	-	-68.10	11.43	50.33	-44.93	-13.00	-31.93
2817.00	V	-	-	-68.38	14.69	53.31	-41.95	-13.00	-28.95
3057.00	V	-	-	-69.11	15.59	53.48	-41.78	-13.00	-28.78
3992.50	V	-	-	-69.69	16.73	54.04	-41.21	-13.00	-28.21
4232.00	V	-	-	-70.36	17.06	53.70	-41.56	-13.00	-28.56
5407.00	V	-	-	-70.53	18.76	55.23	-40.03	-13.00	-27.03
6582.00	V	-	-	-70.62	21.19	57.57	-37.69	-13.00	-24.69

Table 7-18. Radiated Spurious Data (NR Band n25 (Ant A) – B12)

EN-DC NR Band n2 (Ant J) – B30



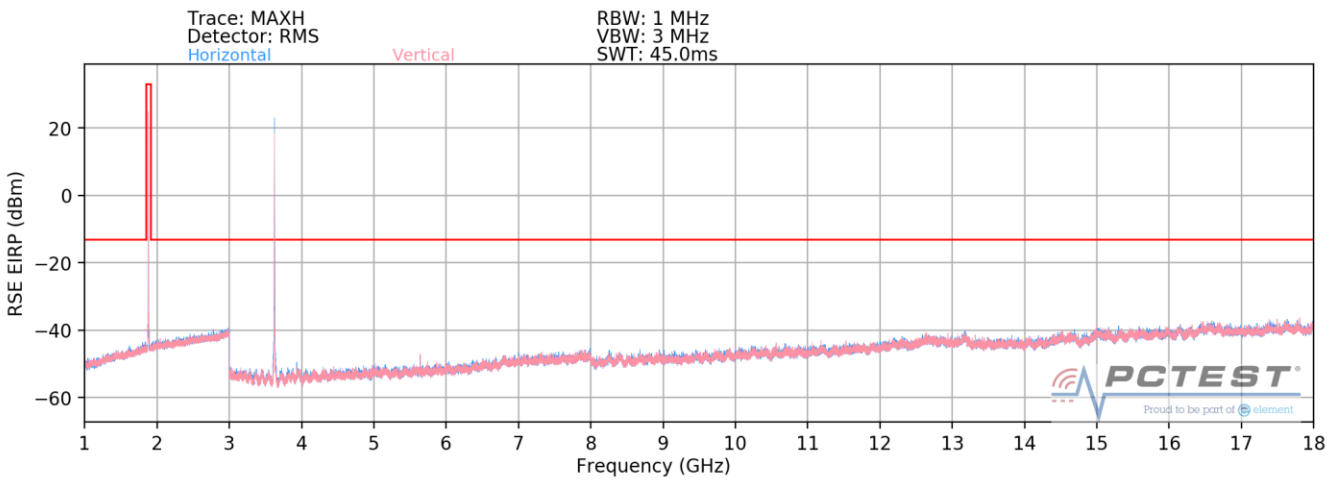
Plot 7-191. Radiated Spurious Plot (NR Band n2 (Ant J) – B30 – 1-18 GHz)

Bandwidth (MHz):	40 / 10
Frequency (MHz):	1880 / 2310
RB / Offset:	1/108 / 1/25
Mode:	EN-DC
Anchor Band:	Band 30

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]
1455.00	H	-	-	-67.81	0.76	39.95	-55.30	-13.00	-42.30
2740.00	H	197	301	-68.31	8.88	47.57	-47.69	-13.00	-34.69
3165.00	H	-	-	-69.56	8.57	46.01	-49.25	-13.00	-36.25
3592.00	H	-	-	-69.83	10.08	47.25	-48.01	-13.00	-35.01
4020.00	H	-	-	-70.50	10.94	47.44	-47.82	-13.00	-34.82
7605.00	H	-	-	-70.60	15.32	51.72	-43.53	-13.00	-30.53

Table 7-19. Radiated Spurious Data (NR Band n2 (Ant J) – B30)

EN-DC NR Band n2 (Ant A) – B48



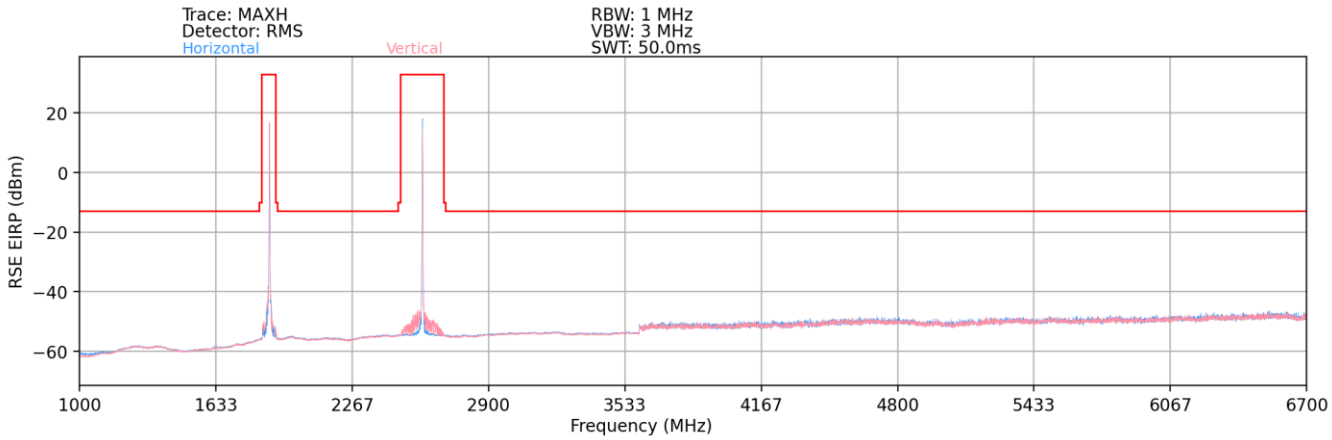
Plot 7-192. Radiated Spurious Plot (NR Band n2 (Ant A) – B48 – 1-18 GHz)

Bandwidth (MHz):	20 / 20
Frequency (MHz):	1880 / 3625
RB / Offset:	1/53 / 1/50
Mode:	EN-DC
Anchor Band:	LTE Band 48

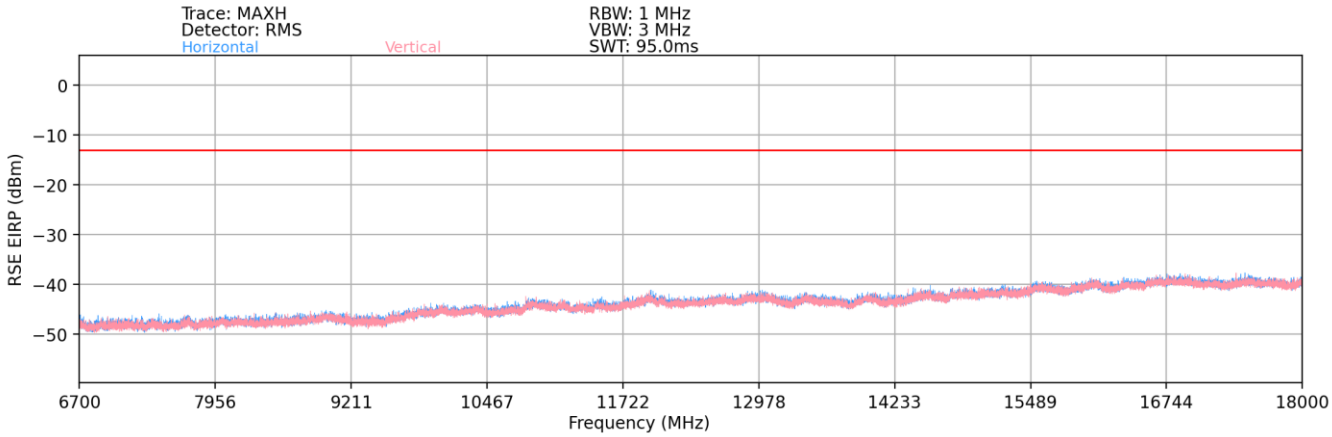
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1610.00	V	-	-	-69.83	11.63	48.80	-46.46	-13.00	-33.46
3355.00	V	-	-	-71.43	16.17	51.74	-43.51	-13.00	-30.51
5100.00	V	-	-	-72.74	20.31	54.57	-40.69	-13.00	-27.69
5370.00	V	-	-	-73.16	21.14	54.98	-40.28	-13.00	-27.28
5640.00	V	-	-	-73.27	21.30	55.03	-40.23	-13.00	-27.23
7115.00	V	-	-	-73.77	24.85	58.08	-37.18	-13.00	-24.18
8860.00	V	-	-	-74.17	27.74	60.57	-34.69	-13.00	-21.69
10605.00	V	-	-	-75.64	31.82	63.18	-32.08	-13.00	-19.08

Table 7-20. Radiated Spurious Data (NR Band n2 (Ant A) – B48)

NR FR1 ULCA: NR n25 - n41



Plot 7-193. Radiated Spurious Plot (NR Bands n25 – n41 – 1- 6.7 GHz)



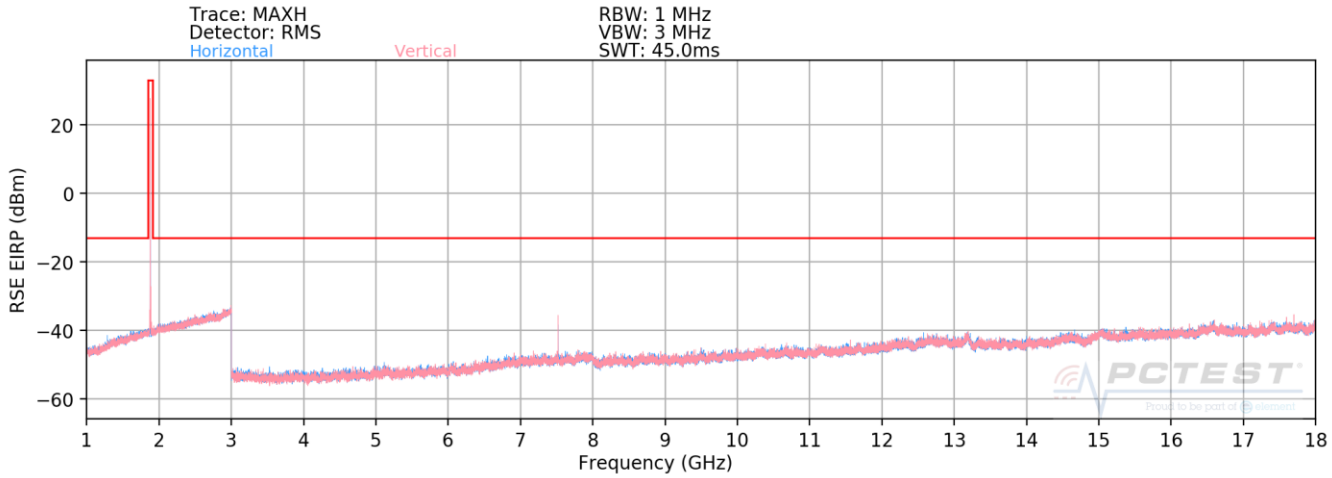
Plot 7-194. Radiated Spurious Plot (NR Bands n25 – n41 – 6.7 - 18 GHz)

Case:	n25 & n41
Bandwidth (MHz):	40MHz & 100MHz
Frequency (MHz):	1882.5MHz & 2593MHz
RB / Offset:	1 / 108 & 1/136
Mode:	FR1 ULCA

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]
1172.00	V	-	-	-76.72	5.65	35.93	-59.32	-13.00	-46.32
1421.00	V	-	-	-76.83	6.60	36.77	-58.49	-13.00	-45.49
3303.50	V	-	-	-77.12	12.41	42.29	-52.97	-13.00	-39.97
4475.50	V	-	-	-77.57	14.42	43.85	-51.41	-13.00	-38.41
5896.50	V	-	-	-78.83	16.35	44.52	-50.74	-13.00	-37.74

Table 7-21. Radiated Spurious Data (NR Bands n25 – n41)

GSM/GPRS PCS



Plot 7-195. 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	-	-	-72.88	7.22	41.34	-53.92	-13.00	-40.92
5550.60	V	104	307	-70.67	10.31	46.64	-48.61	-13.00	-35.61
7400.80	V	119	32	-65.64	13.68	55.04	-40.21	-13.00	-27.21
9251.00	V	295	350	-72.68	14.72	49.04	-46.22	-13.00	-33.22
11101.20	V	250	313	-73.83	17.40	50.57	-44.68	-13.00	-31.68
12951.40	V	215	333	-78.77	19.61	47.84	-47.41	-13.00	-34.41
14801.60	V	-	-	-80.42	22.05	48.63	-46.63	-13.00	-33.63
16651.80	V	-	-	-80.21	25.24	52.03	-43.23	-13.00	-30.23

Table 7-22. 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	-	-	-74.10	7.95	40.85	-54.41	-13.00	-41.41
5640.00	V	112	246	-71.76	9.90	45.14	-50.11	-13.00	-37.11
7520.00	V	107	34	-60.38	13.83	60.45	-34.81	-13.00	-21.81
9400.00	V	242	348	-72.61	16.00	50.39	-44.87	-13.00	-31.87
11280.00	V	245	341	-75.18	17.75	49.57	-45.69	-13.00	-32.69
13160.00	V	-	-	-79.86	21.09	48.23	-47.03	-13.00	-34.03
15040.00	V	-	-	-79.07	22.49	50.42	-44.84	-13.00	-31.84
16920.00	V	-	-	-79.86	24.23	51.37	-43.88	-13.00	-30.88

Table 7-23. 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	-	-	-72.83	7.53	41.70	-53.56	-13.00	-40.56
5729.40	V	155	360	-70.17	10.17	47.00	-48.25	-13.00	-35.25
7639.20	V	101	22	-58.48	13.96	62.48	-32.78	-13.00	-19.78
9549.00	V	273	341	-71.22	15.52	51.30	-43.96	-13.00	-30.96
11458.80	V	-	-	-79.43	18.07	45.64	-49.62	-13.00	-36.62
13368.60	V	-	-	-79.54	20.36	47.82	-47.43	-13.00	-34.43
15278.40	V	-	-	-80.55	22.08	48.53	-46.72	-13.00	-33.72

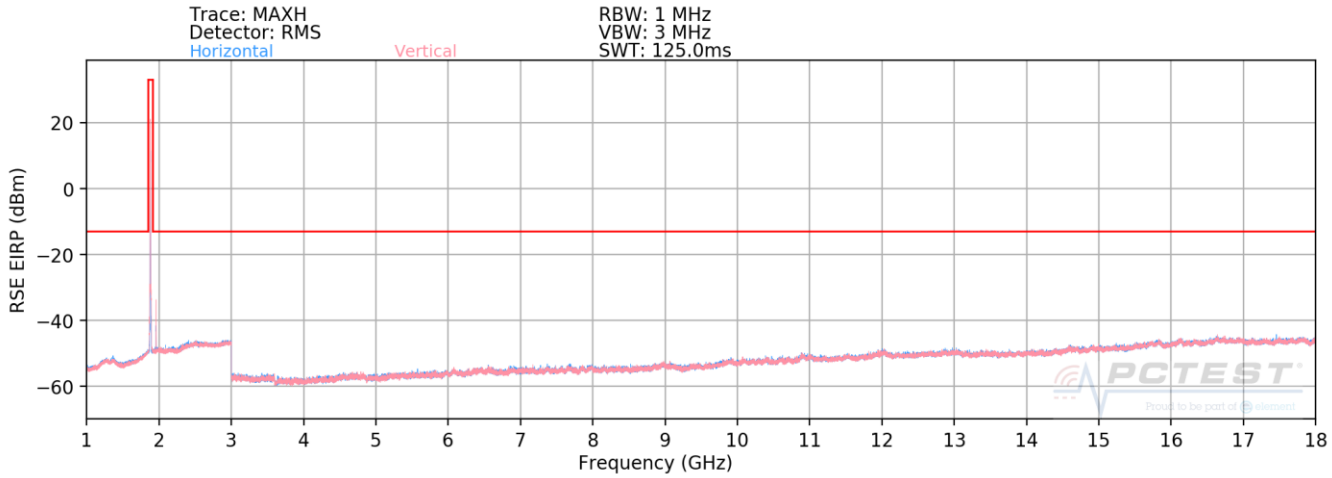
Table 7-24. Radiated Spurious Data (GPRS PCS – High Channel)

Case:	w/ Wireless Charging Pad
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	-	-	-73.29	7.53	41.24	-54.02	-13.00	-41.02
5729.40	V	102	111	-69.98	10.17	47.19	-48.06	-13.00	-35.06
7639.20	V	133	108	-60.14	13.96	60.82	-34.44	-13.00	-21.44
9549.00	V	144	234	-72.17	15.52	50.35	-44.91	-13.00	-31.91
11458.80	V	114	212	-73.75	18.07	51.32	-43.94	-13.00	-30.94
13368.60	V	-	-	-79.83	20.36	47.53	-47.72	-13.00	-34.72
15278.40	V	-	-	-79.48	22.08	49.60	-45.65	-13.00	-32.65
17188.20	V	-	-	-80.75	24.96	51.21	-44.04	-13.00	-31.04

Table 7-25. Radiated Spurious Data with WCP (GPRS PCS)

WCDMA PCS



Plot 7-196. 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	-	-	-79.56	4.50	31.94	-63.31	-13.00	-50.31
5557.20	V	-	-	-79.18	6.32	34.14	-61.12	-13.00	-48.12
7409.60	V	-	-	-80.34	8.28	34.94	-60.32	-13.00	-47.32
9262.00	V	-	-	-81.33	9.57	35.24	-60.02	-13.00	-47.02
11114.40	V	-	-	-81.85	12.81	37.96	-57.29	-13.00	-44.29

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]
3760.00	V	-	-	-79.33	4.31	31.98	-63.28	-13.00	-50.28
5640.00	V	-	-	-79.75	6.83	34.08	-61.18	-13.00	-48.18
7520.00	V	-	-	-81.11	8.50	34.39	-60.86	-13.00	-47.86
9400.00	V	-	-	-82.19	10.48	35.29	-59.97	-13.00	-46.97
11280.00	V	-	-	-81.82	12.50	37.68	-57.58	-13.00	-44.58

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]
3815.20	V	-	-	-78.85	4.20	32.35	-62.91	-13.00	-49.91
5722.80	V	-	-	-79.62	6.65	34.03	-61.23	-13.00	-48.23
7630.40	V	-	-	-81.12	8.78	34.66	-60.60	-13.00	-47.60
9538.00	V	-	-	-81.57	10.25	35.68	-59.58	-13.00	-46.58
11445.60	V	-	-	-82.78	13.01	37.23	-58.03	-13.00	-45.03

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

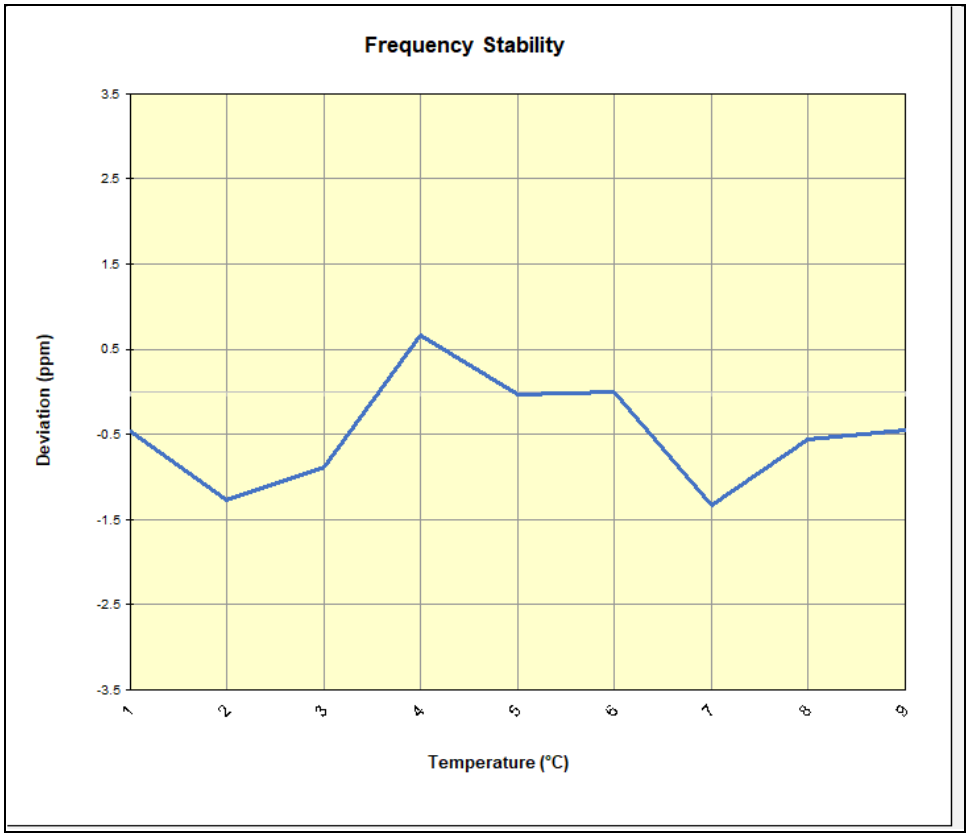
The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None

LTE Band 25/2					
Operating Frequency (Hz):	1,882,500,000				
Ref. Voltage (VDC):	4.43				
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Frequency (Hz)**	**Freq. Dev. (Hz)**	**Deviation (%)**
100 %	4.43	- 30	1,882,458,955	-868	-0.0000461
		- 20	1,882,457,439	-2,384	-0.0001266
		- 10	1,882,458,173	-1,650	-0.0000877
		0	1,882,461,069	1,246	0.0000662
		+ 10	1,882,459,755	-68	-0.0000036
		+ 20 (Ref)	1,882,459,823	0	0.0000000
		+ 30	1,882,457,330	-2,493	-0.0001324
		+ 40	1,882,458,772	-1,051	-0.0000558
		+ 50	1,882,458,982	-841	-0.0000447
Battery Endpoint	3.36	+ 20	1,882,459,887	64	0.0000034

Table 7-29. LTE Band 25/2 Frequency Stability Data

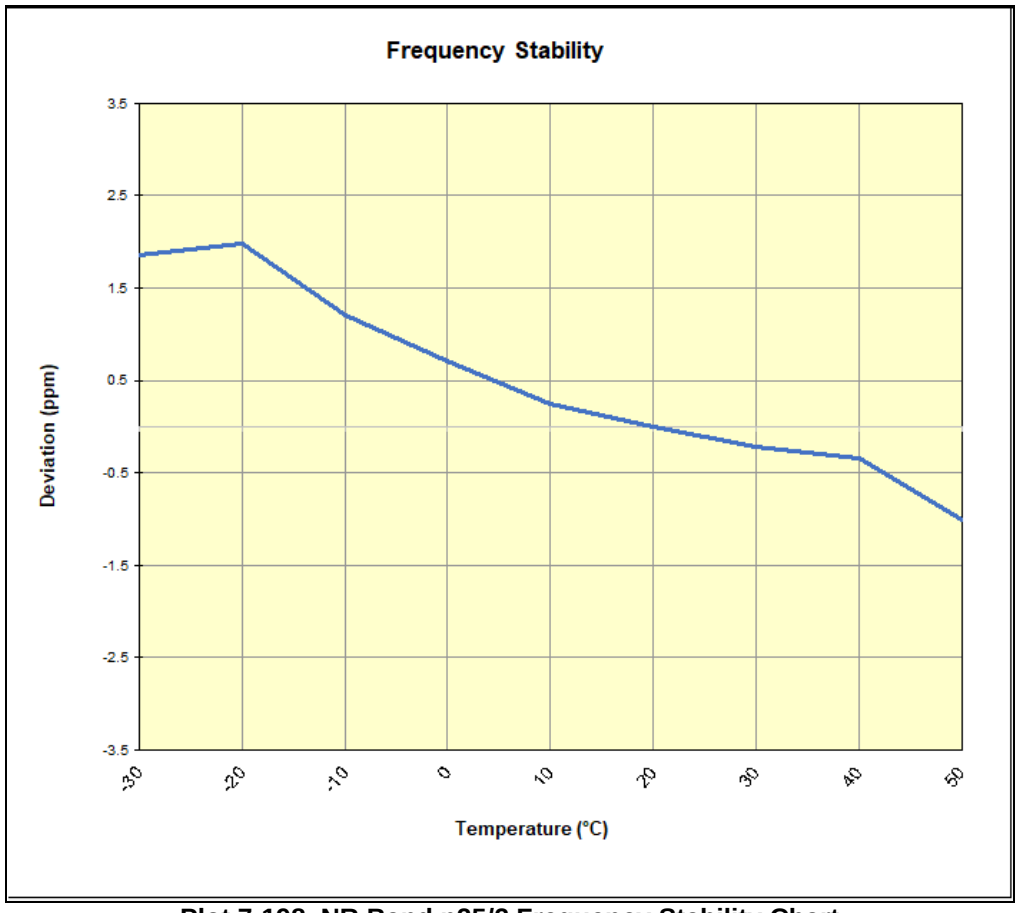


Plot 7-197. LTE Band 25/2 Frequency Stability Chart

NR Band n25/2	
Operating Frequency (Hz):	1,882,500,000
Ref. Voltage (VDC):	4.38

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	1,882,586,017	3,499	0.0001859
		- 20	1,882,586,262	3,744	0.0001989
		- 10	1,882,584,803	2,285	0.0001214
		0	1,882,583,871	1,353	0.0000719
		+ 10	1,882,582,998	480	0.0000255
		+ 20 (Ref)	1,882,582,518	0	0.0000000
		+ 30	1,882,582,107	-411	-0.0000218
		+ 40	1,882,581,886	-632	-0.0000336
		+ 50	1,882,580,618	-1,900	-0.0001009
Battery Endpoint	3.48	+ 20	1,882,582,478	-40	-0.0000021

Table 7-30. NR Band n25/2 Frequency Stability Data



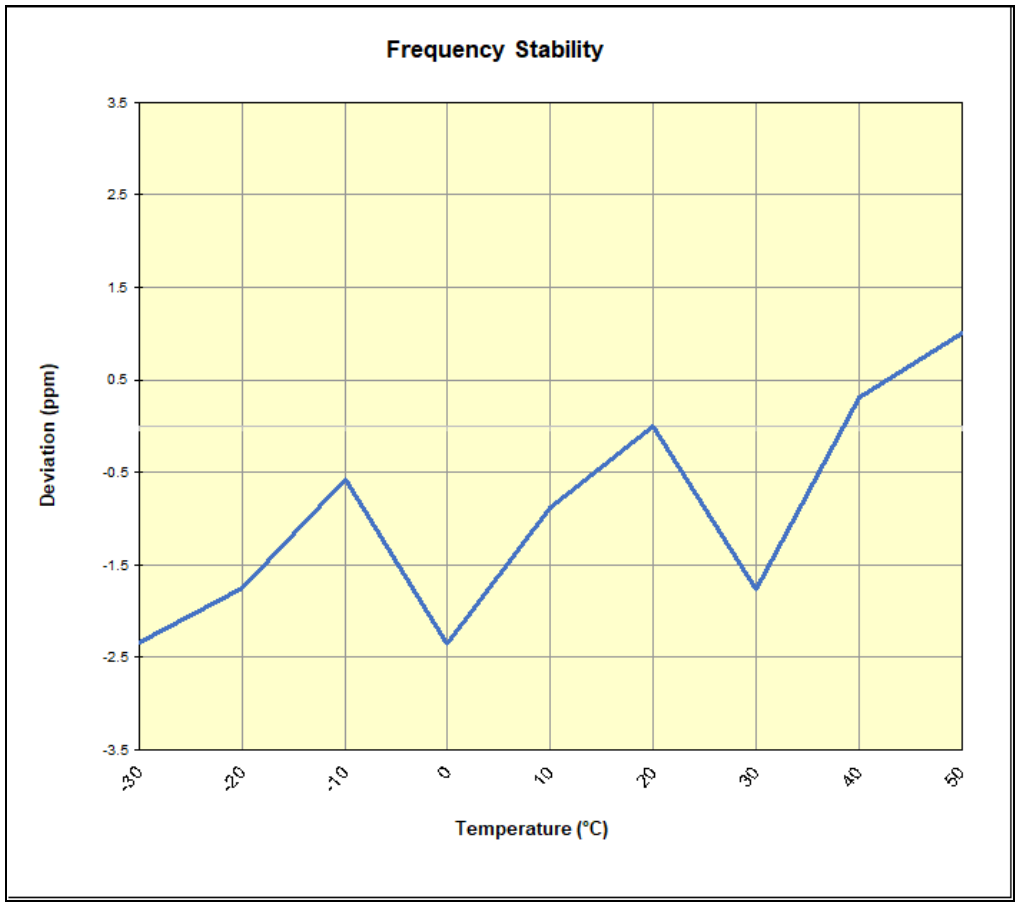
Plot 7-198. NR Band n25/2 Frequency Stability Chart

GSM/GPRS PCS

Operating Frequency (Hz):	1,880,000,000
Ref. Voltage (VDC):	4.38

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	1,879,994,979	-4,397	-0.0002339
		- 20	1,879,996,087	-3,289	-0.0001750
		- 10	1,879,998,311	-1,065	-0.0000567
		0	1,879,994,946	-4,431	-0.0002357
		+ 10	1,879,997,714	-1,662	-0.0000884
		+ 20 (Ref)	1,879,999,376	0	0.0000000
		+ 30	1,879,996,045	-3,331	-0.0001772
		+ 40	1,879,999,962	585	0.0000311
		+ 50	1,880,001,268	1,891	0.0001006
Battery Endpoint	3.48	+ 20	1,880,000,538	1,162	0.0000618

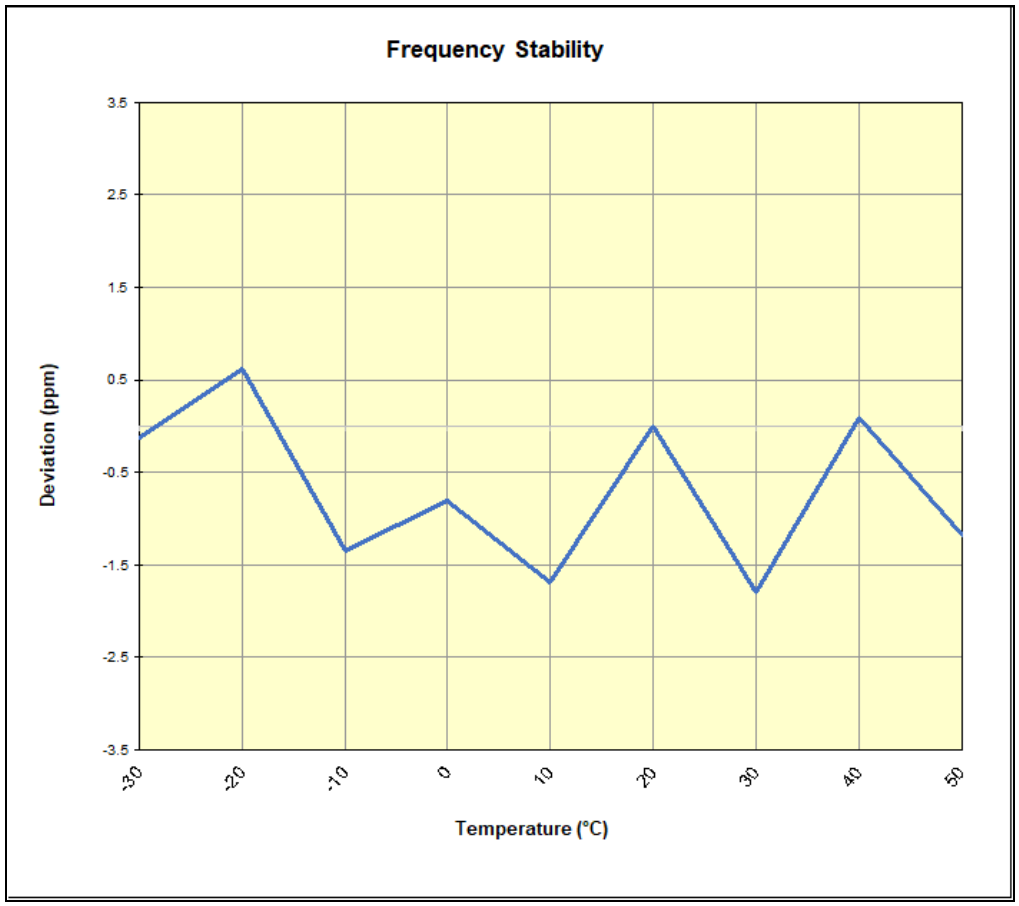
Table 7-31. GSM/GPRS PCS Frequency Stability Data



Plot 7-199. GSM/GPRS PCS Frequency Stability Chart

WCDMA PCS					
Operating Frequency (Hz):	1,880,000,000				
Ref. Voltage (VDC):	4.38				
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Frequency (Hz)**	**Freq. Dev. (Hz)**	**Deviation (%)**
100 %	4.38	- 30	1,880,034,950	-221	-0.0000117
		- 20	1,880,036,344	1,174	0.0000624
		- 10	1,880,032,625	-2,545	-0.0001354
		0	1,880,033,645	-1,525	-0.0000811
		+ 10	1,880,032,002	-3,168	-0.0001685
		+ 20 (Ref)	1,880,035,170	0	0.0000000
		+ 30	1,880,031,801	-3,369	-0.0001792
		+ 40	1,880,035,336	166	0.0000088
		+ 50	1,880,032,947	-2,223	-0.0001183
Battery Endpoint	3.48	+ 20	1,880,034,972	-199	-0.0000106

Table 7-32. WCDMA PCS Frequency Stability Data



Plot 7-200. WCDMA PCS Frequency Stability Chart

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the Samsung **Portable Handset FCC ID: A3LSMS908U** complies with all the requirements of Part 24 of the FCC rules.