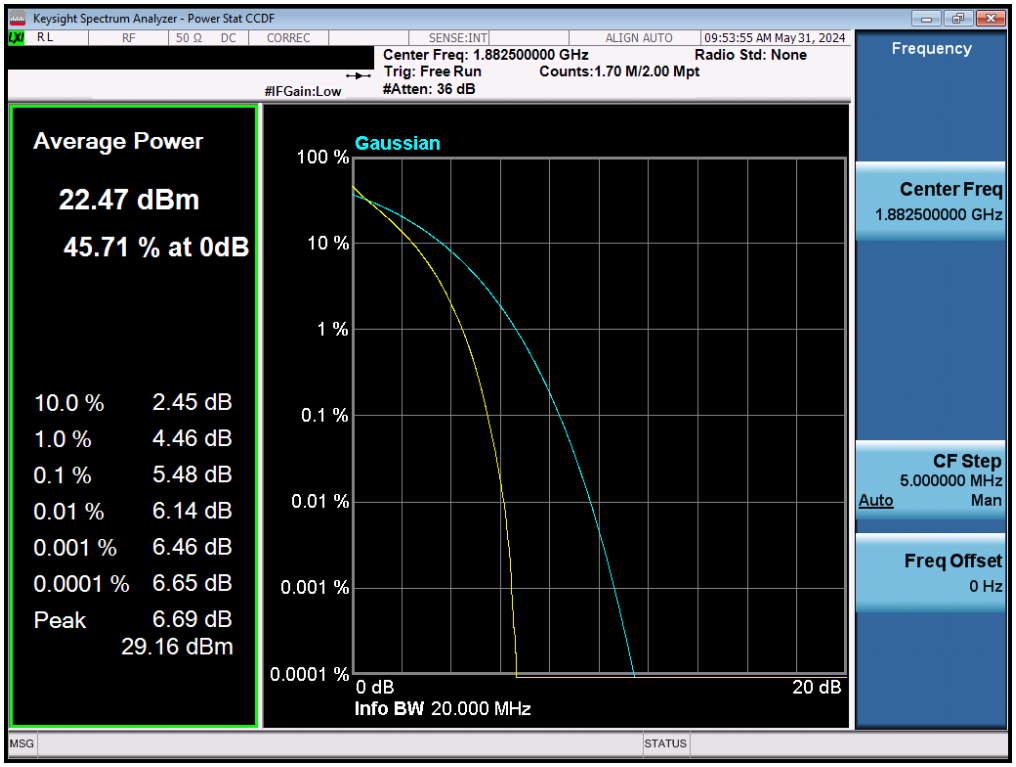
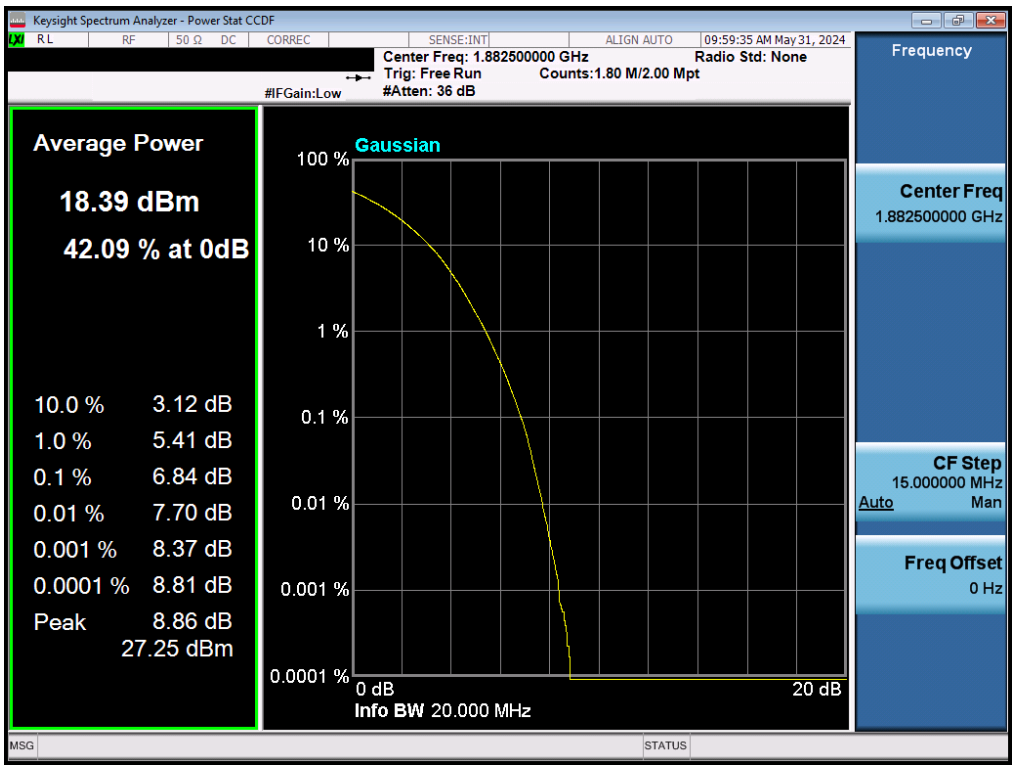
LTE Band 25/2 – Ant2

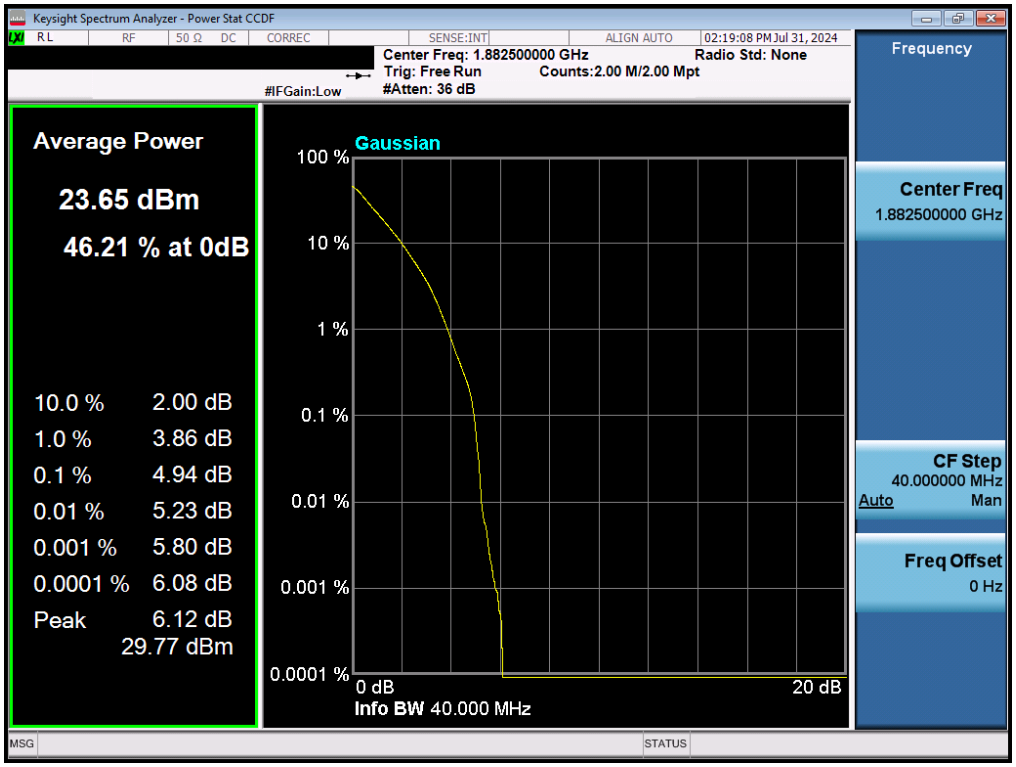


Plot 7-87. PAR Plot (LTE Band 25/2 - 20MHz QPSK - Full RB - Ant2)

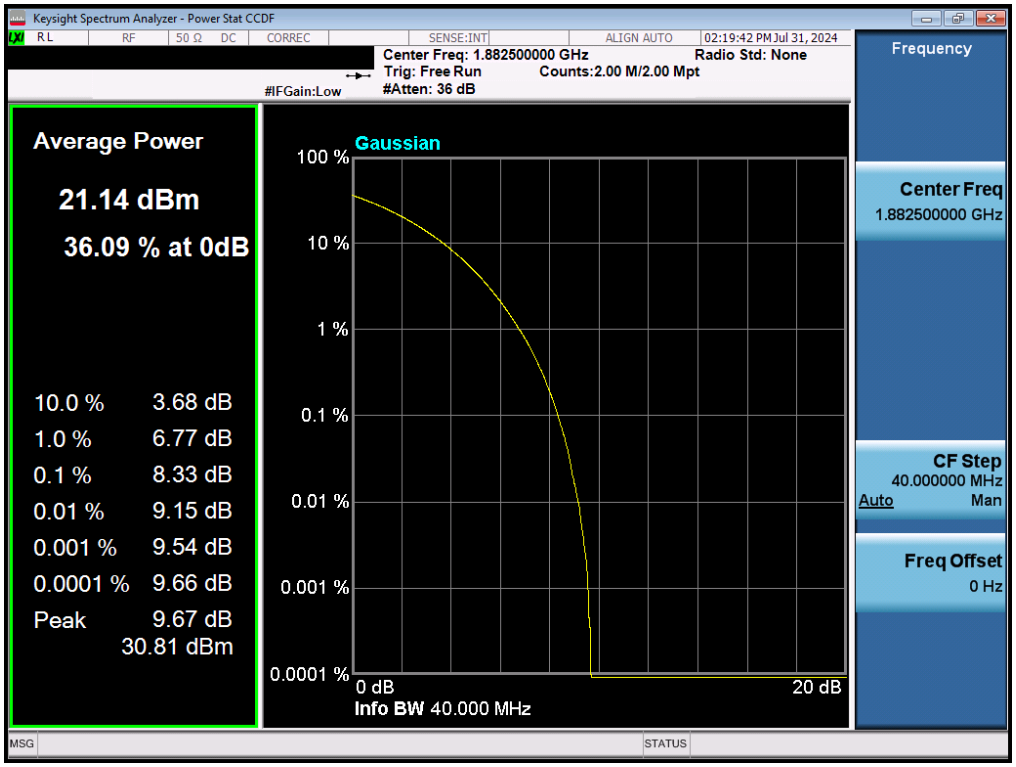


Plot 7-88. PAR Plot (LTE Band 25/2 - 20MHz 256-QAM - Full RB - Ant2)

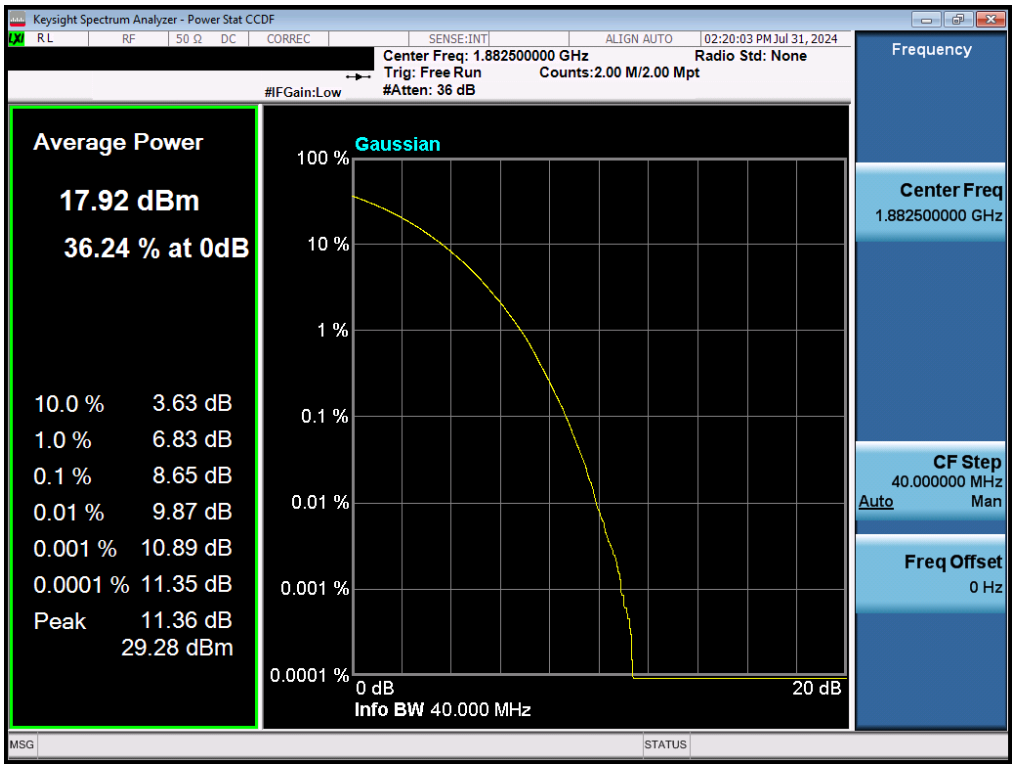
NR Band n25/2 – Ant1



Plot 7-89. PAR Plot (NR Band n25/2 - 40.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)



Plot 7-90. PAR Plot (NR Band n25/2 - 40.0MHz CP-OFDM QPSK - Full RB - ANT1)



Plot 7-91. PAR Plot (NR Band n25/2 - 40.0MHz CP-OFDM 256-QAM - Full RB - ANT1)

7.7 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.

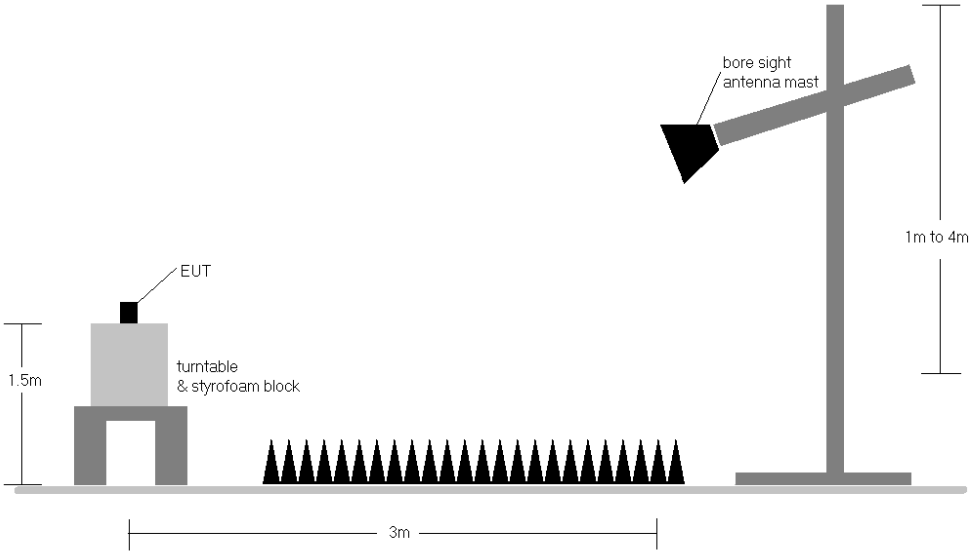


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

1) 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”.

2) 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.

3) This unit was tested with its standard battery.

4) 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]	EUT Pol.	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	H	Z	170	35	2.65	1 / 99	20.75	23.40	0.219	33.01	-9.61
	QPSK	1882.50	H	Z	176	39	2.65	1 / 50	21.49	**24.14**	0.259	33.01	-8.87
	QPSK	1905.00	H	Z	163	32	2.65	1 / 0	20.71	23.36	0.217	33.01	-9.65
	16-QAM	1882.50	H	Z	176	39	2.65	1 / 50	20.76	23.41	0.219	33.01	-9.60
15 MHz	QPSK	1857.50	H	Z	170	35	2.65	1 / 0	20.78	23.43	0.220	33.01	-9.58
	QPSK	1882.50	H	Z	176	39	2.65	1 / 0	21.57	**24.22**	0.264	33.01	-8.79
	QPSK	1907.50	H	Z	163	32	2.65	1 / 0	20.74	23.39	0.218	33.01	-9.62
	16-QAM	1882.50	H	Z	176	39	2.65	1 / 0	20.79	23.44	0.221	33.01	-9.57
10 MHz	QPSK	1855.00	H	Z	170	35	2.65	1 / 0	20.79	23.44	0.221	33.01	-9.57
	QPSK	1882.50	H	Z	176	39	2.65	1 / 0	21.48	**24.13**	0.259	33.01	-8.88
	QPSK	1910.00	H	Z	163	32	2.65	1 / 0	20.67	23.32	0.215	33.01	-9.69
	16-QAM	1882.50	H	Z	176	39	2.65	1 / 0	20.68	23.33	0.215	33.01	-9.68
5 MHz	QPSK	1852.50	H	Z	170	35	2.65	1 / 0	20.80	23.45	0.221	33.01	-9.56
	QPSK	1882.50	H	Z	176	39	2.65	1 / 0	21.50	**24.15**	0.260	33.01	-8.86
	QPSK	1912.50	H	Z	163	32	2.65	1 / 0	20.71	23.36	0.217	33.01	-9.65
	16-QAM	1882.50	H	Z	176	39	2.65	1 / 0	21.06	23.71	0.235	33.01	-9.30
3 MHz	QPSK	1851.50	H	Z	170	35	2.65	1 / 14	20.83	23.48	0.223	33.01	-9.53
	QPSK	1882.50	H	Z	176	39	2.65	1 / 0	21.44	**24.09**	0.257	33.01	-8.92
	QPSK	1913.50	H	Z	163	32	2.65	1 / 7	20.79	23.44	0.221	33.01	-9.57
	16-QAM	1882.50	H	Z	176	39	2.65	1 / 14	20.62	23.27	0.212	33.01	-9.74
1.4 MHz	QPSK	1850.70	H	Z	170	35	2.65	1 / 3	20.82	23.47	0.222	33.01	-9.54
	QPSK	1882.50	H	Z	176	39	2.65	1 / 0	21.43	**24.08**	0.256	33.01	-8.93
	QPSK	1914.30	H	Z	163	32	2.65	1 / 3	20.66	23.31	0.214	33.01	-9.70
	16-QAM	1882.50	H	Z	176	39	2.65	1 / 0	20.70	23.35	0.216	33.01	-9.66
20 MHz	Opposite Pol.	1882.50	V	Y	116	80	2.32	1 / 50	19.43	21.75	0.150	33.01	-11.26

Table 7-17. EIRP Data (LTE Band 25/2 – Ant1)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	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	H	Z	175	37	2.79	1 / 0	18.65	**21.44**	0.139	33.01	-11.57
	QPSK	1882.50	H	Z	169	34	2.65	1 / 0	17.71	20.36	0.109	33.01	-12.65
	QPSK	1905.00	H	Z	162	32	2.54	1 / 50	18.30	20.84	0.121	33.01	-12.17
	16-QAM	1860.00	H	Z	175	37	2.79	1 / 0	17.99	20.78	0.120	33.01	-12.23
15 MHz	QPSK	1857.50	H	Z	175	37	2.81	1 / 37	18.69	**21.50**	0.141	33.01	-11.51
	QPSK	1882.50	H	Z	169	34	2.65	1 / 74	17.75	20.39	0.110	33.01	-12.62
	QPSK	1907.50	H	Z	162	32	2.54	1 / 0	18.17	20.72	0.118	33.01	-12.29
	16-QAM	1857.50	H	Z	175	37	2.81	1 / 74	18.03	20.84	0.121	33.01	-12.17
10 MHz	QPSK	1855.00	H	Z	175	37	2.82	1 / 25	18.80	**21.62**	0.145	33.01	-11.39
	QPSK	1882.50	H	Z	169	34	2.65	1 / 49	17.85	20.50	0.112	33.01	-12.51
	QPSK	1910.00	H	Z	162	32	2.55	1 / 25	18.27	20.82	0.121	33.01	-12.19
	16-QAM	1855.00	H	Z	175	37	2.82	1 / 25	18.02	20.85	0.121	33.01	-12.17
5 MHz	QPSK	1852.50	H	Z	175	37	2.84	1 / 12	18.76	**21.61**	0.145	33.01	-11.40
	QPSK	1882.50	H	Z	169	34	2.65	1 / 12	17.86	20.51	0.113	33.01	-12.50
	QPSK	1912.50	H	Z	162	32	2.55	1 / 0	18.30	20.85	0.122	33.01	-12.16
	16-QAM	1852.50	H	Z	175	37	2.84	1 / 12	18.13	20.97	0.125	33.01	-12.04
3 MHz	QPSK	1851.50	H	Z	175	37	2.85	1 / 0	18.63	**21.48**	0.141	33.01	-11.53
	QPSK	1882.50	H	Z	169	34	2.65	1 / 7	17.85	20.50	0.112	33.01	-12.51
	QPSK	1913.50	H	Z	162	32	2.55	1 / 0	18.21	20.76	0.119	33.01	-12.25
	16-QAM	1851.50	H	Z	175	37	2.85	1 / 0	18.10	20.95	0.124	33.01	-12.06
1.4 MHz	QPSK	1850.70	H	Z	175	37	2.85	1 / 3	18.67	**21.52**	0.142	33.01	-11.49
	QPSK	1882.50	H	Z	169	34	2.65	1 / 5	17.78	20.43	0.110	33.01	-12.58
	QPSK	1914.30	H	Z	162	32	2.55	1 / 0	18.14	20.69	0.117	33.01	-12.32
	16-QAM	1850.70	H	Z	175	37	2.85	1 / 3	18.20	21.05	0.127	33.01	-11.96
20 MHz	Opposite Pol.	1860.00	V	Y	326	264	2.53	1 / 0	17.42	19.95	0.099	33.01	-13.06

Table 7-18. EIRP Data (LTE Band 25/2 – Ant2)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	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	1870.00	H	Z	192	29	2.73	1 / 108	20.18	**22.91**	0.195	33.01	-10.10
	π/2 BPSK	1882.50	H	Z	192	23	2.65	1 / 1	20.24	22.89	0.195	33.01	-10.12
	π/2 BPSK	1895.00	H	Z	146	27	2.57	1 / 108	19.64	22.21	0.166	33.01	-10.80
	QPSK	1870.00	H	Z	192	29	2.73	1 / 108	20.13	22.86	0.193	33.01	-10.15
	QPSK	1882.50	H	Z	192	23	2.65	1 / 1	20.23	22.88	0.194	33.01	-10.13
	QPSK	1895.00	H	Z	146	27	2.57	1 / 108	19.68	22.25	0.168	33.01	-10.76
	16-QAM	1870.00	H	Z	192	29	2.73	1 / 108	19.11	21.84	0.153	33.01	-11.17
35 MHz	π/2 BPSK	1867.50	H	Z	192	29	2.74	1 / 94	20.48	**23.23**	0.210	33.01	-9.78
	π/2 BPSK	1882.50	H	Z	192	23	2.65	1 / 94	20.33	22.98	0.199	33.01	-10.03
	π/2 BPSK	1897.50	H	Z	146	27	2.56	1 / 1	19.54	22.10	0.162	33.01	-10.92
	QPSK	1867.50	H	Z	192	29	2.74	1 / 94	20.42	23.17	0.207	33.01	-9.84
	QPSK	1882.50	H	Z	192	23	2.65	1 / 94	20.48	23.12	0.205	33.01	-9.89
	QPSK	1897.50	H	Z	146	27	2.56	1 / 186	19.74	22.30	0.170	33.01	-10.71
	16-QAM	1867.50	H	Z	192	29	2.74	1 / 94	19.52	22.26	0.168	33.01	-10.75
30 MHz	π/2 BPSK	1865.00	H	Z	192	29	2.76	1 / 1	20.23	22.99	0.199	33.01	-10.02
	π/2 BPSK	1882.50	H	Z	192	23	2.65	1 / 80	20.28	22.93	0.196	33.01	-10.09
	π/2 BPSK	1900.00	H	Z	146	27	2.54	1 / 80	19.76	22.30	0.170	33.01	-10.71
	QPSK	1865.00	H	Z	192	29	2.76	1 / 1	20.25	**23.01**	0.200	33.01	-10.00
	QPSK	1882.50	H	Z	192	23	2.65	1 / 80	20.30	22.95	0.197	33.01	-10.06
	QPSK	1900.00	H	Z	146	27	2.54	1 / 80	19.80	22.33	0.171	33.01	-10.68
	16-QAM	1865.00	H	Z	192	29	2.76	1 / 1	19.19	21.96	0.157	33.01	-11.05
25 MHz	π/2 BPSK	1862.50	H	Z	192	29	2.78	1 / 1	20.31	**23.09**	0.204	33.01	-9.92
	π/2 BPSK	1882.50	H	Z	192	23	2.65	1 / 131	20.24	22.89	0.195	33.01	-10.12
	π/2 BPSK	1902.50	H	Z	146	27	2.54	1 / 131	19.56	22.11	0.162	33.01	-10.90
	QPSK	1862.50	H	Z	192	29	2.78	1 / 1	20.27	23.04	0.202	33.01	-9.97
	QPSK	1882.50	H	Z	192	23	2.65	1 / 131	20.36	23.01	0.200	33.01	-10.00
	QPSK	1902.50	H	Z	146	27	2.54	1 / 131	19.88	22.42	0.175	33.01	-10.59
	16-QAM	1862.50	H	Z	192	29	2.78	1 / 1	19.06	21.84	0.153	33.01	-11.17
20 MHz	π/2 BPSK	1860.00	H	Z	192	29	2.79	1 / 53	20.26	23.06	0.202	33.01	-9.96
	π/2 BPSK	1882.50	H	Z	192	23	2.65	1 / 1	20.33	22.98	0.199	33.01	-10.03
	π/2 BPSK	1905.00	H	Z	146	27	2.54	1 / 1	19.74	22.28	0.169	33.01	-10.73
	QPSK	1860.00	H	Z	192	29	2.79	1 / 53	20.31	**23.10**	0.204	33.01	-9.91
	QPSK	1882.50	H	Z	192	23	2.65	1 / 1	20.23	22.88	0.194	33.01	-10.13
	QPSK	1905.00	H	Z	146	27	2.54	1 / 1	19.82	22.36	0.172	33.01	-10.65
	16-QAM	1860.00	H	Z	192	29	2.79	1 / 53	19.12	21.91	0.155	33.01	-11.10
15 MHz	π/2 BPSK	1857.50	H	Z	192	29	2.81	1 / 77	20.18	22.99	0.199	33.01	-10.02
	π/2 BPSK	1882.50	H	Z	192	23	2.65	1 / 39	20.24	22.89	0.195	33.01	-10.12
	π/2 BPSK	1907.50	H	Z	146	27	2.54	1 / 77	19.55	22.10	0.162	33.01	-10.91
	QPSK	1857.50	H	Z	192	29	2.81	1 / 77	20.13	22.94	0.197	33.01	-10.07
	QPSK	1882.50	H	Z	192	23	2.65	1 / 39	20.37	**23.02**	0.200	33.01	-9.99
	QPSK	1907.50	H	Z	146	27	2.54	1 / 77	19.78	22.33	0.171	33.01	-10.68
	16-QAM	1882.50	H	Z	192	23	2.65	1 / 39	19.14	21.79	0.151	33.01	-11.22
10 MHz	π/2 BPSK	1855.00	H	Z	192	29	2.82	1 / 26	20.08	22.90	0.195	33.01	-10.11
	π/2 BPSK	1882.50	H	Z	192	23	2.65	1 / 1	20.35	**23.00**	0.199	33.01	-10.01
	π/2 BPSK	1910.00	H	Z	146	27	2.55	1 / 50	19.63	22.18	0.165	33.01	-10.83
	QPSK	1855.00	H	Z	192	29	2.82	1 / 26	19.90	22.72	0.187	33.01	-10.29
	QPSK	1882.50	H	Z	192	23	2.65	1 / 1	19.22	21.87	0.154	33.01	-11.14
	QPSK	1910.00	H	Z	146	27	2.55	1 / 50	19.85	22.40	0.174	33.01	-10.61
	16-QAM	1855.00	H	Z	192	29	2.82	1 / 26	18.80	21.62	0.145	33.01	-11.39
5 MHz	π/2 BPSK	1852.50	H	Z	192	29	2.84	1 / 23	20.05	22.89	0.195	33.01	-10.12
	π/2 BPSK	1882.50	H	Z	192	23	2.65	1 / 12	20.29	22.94	0.197	33.01	-10.07
	π/2 BPSK	1912.50	H	Z	146	27	2.55	1 / 12	19.67	22.22	0.167	33.01	-10.79
	QPSK	1852.50	H	Z	192	29	2.84	1 / 23	20.17	**23.01**	0.200	33.01	-10.00
	QPSK	1882.50	H	Z	192	23	2.65	1 / 12	20.15	22.80	0.191	33.01	-10.21
	QPSK	1912.50	H	Z	146	27	2.55	1 / 12	19.84	22.38	0.173	33.01	-10.63
	16-QAM	1882.50	H	Z	192	23	2.65	1 / 12	19.19	21.84	0.153	33.01	-11.17
40 MHz	QPSK (CP-OFDM)	1870.00	H	Z	189	26	2.73	1 / 108	18.60	21.33	0.136	33.01	-11.68

Table 7-19. EIRP Data (NR Band n25/2 – Ant1)

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	115	129	19.99	2.84	**22.83**	**0.192**	33.01	-10.18
1880.00	WCDMA1900	H	189	113	20.03	2.67	22.70	0.186	33.01	-10.32
1907.60	WCDMA1900	H	136	114	19.91	2.54	22.45	0.176	33.01	-10.56

Table 7-20. EIRP Data (WCDMA PCS – Ant1)

7.8 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.

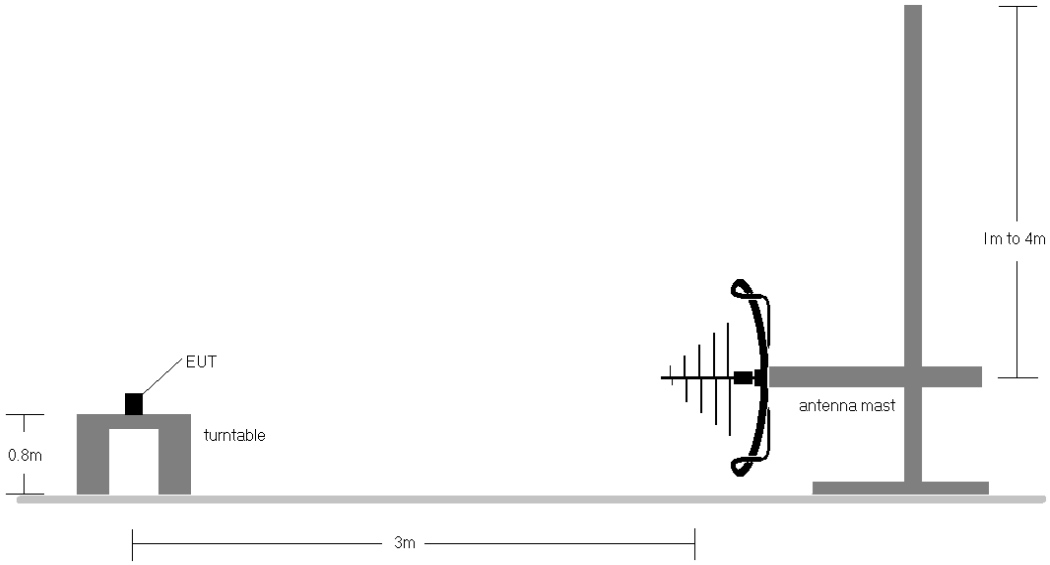


Figure 7-7. Test Instrument & Measurement Setup < 1GHz

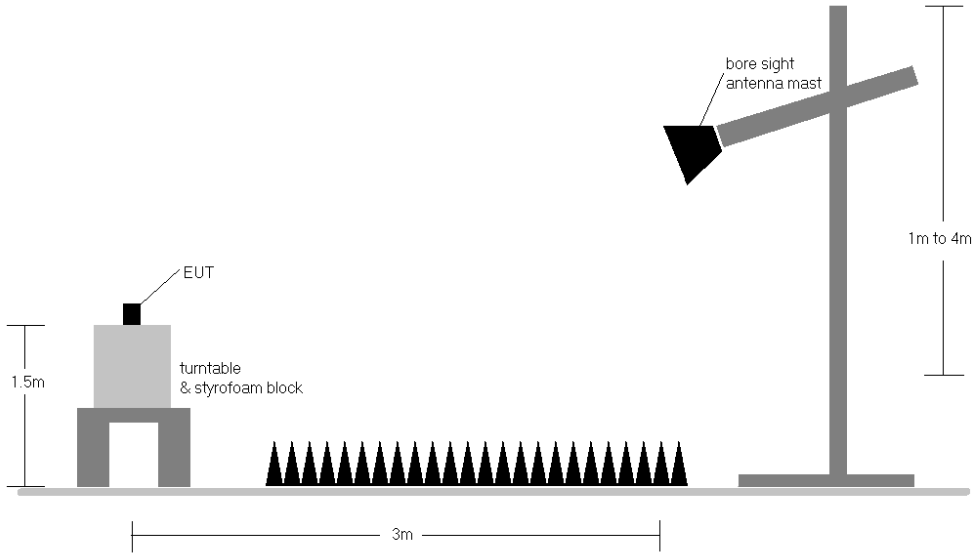


Figure 7-8. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in 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 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) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

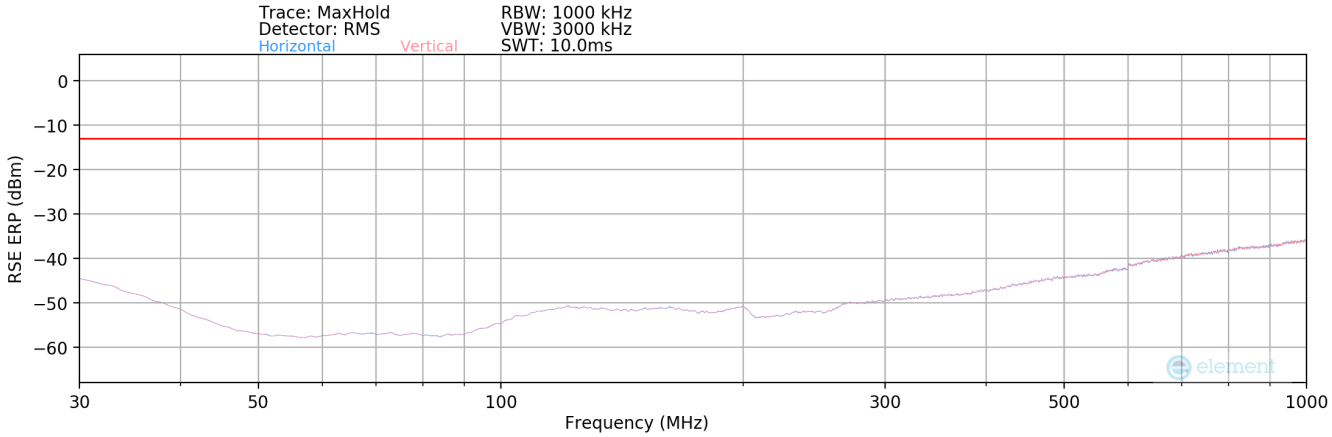
6) Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

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

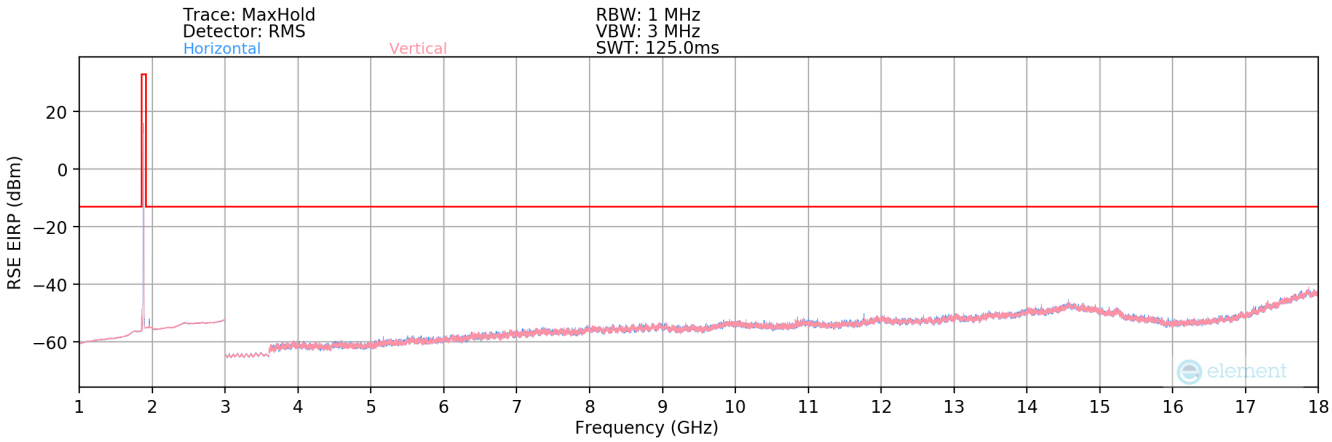
8) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

9) Spurious emission in EN-DC Operating mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor) has been checked and was found to not to be the worst case. Spurious emissions from the NR carrier device are subject to the rules under which the NR carrier operates. Spurious emissions caused by the LTE carrier must meet the requirements of the rules under which the LTE carrier operates.

WCDMA PCS – Ant1



Plot 7-92. Radiated Spurious Plot (WCDMA PCS - Ant1)



Plot 7-93. Radiated Spurious Plot (WCDMA PCS - Ant1)

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]
105.12	H	-	-	-84.19	18.79	41.60	-55.81	-13.00	-42.81
322.35	H	-	-	-84.03	21.50	44.47	-52.94	-13.00	-39.94
503.44	H	-	-	-83.98	25.93	48.95	-48.45	-13.00	-35.45

Table 7-21. Radiated Spurious Data (WCDMA PCS – Ant1)

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	H	-	-	-77.86	1.93	31.07	-64.19	-13.00	-51.19
5557.20	H	-	-	-78.10	4.78	33.68	-61.58	-13.00	-48.58
7409.60	H	-	-	-79.03	8.69	36.66	-58.60	-13.00	-45.60
9262.00	H	-	-	-79.22	9.96	37.74	-57.52	-13.00	-44.52

Table 7-22. Radiated Spurious Data (WCDMA PCS – Low Channel - Ant1)

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	H	-	-	-77.70	1.94	31.24	-64.02	-13.00	-51.02
5640.00	H	-	-	-78.41	4.83	33.42	-61.84	-13.00	-48.84
7520.00	H	-	-	-79.12	8.48	36.36	-58.90	-13.00	-45.90
9400.00	H	-	-	-79.93	11.10	38.17	-57.09	-13.00	-44.09

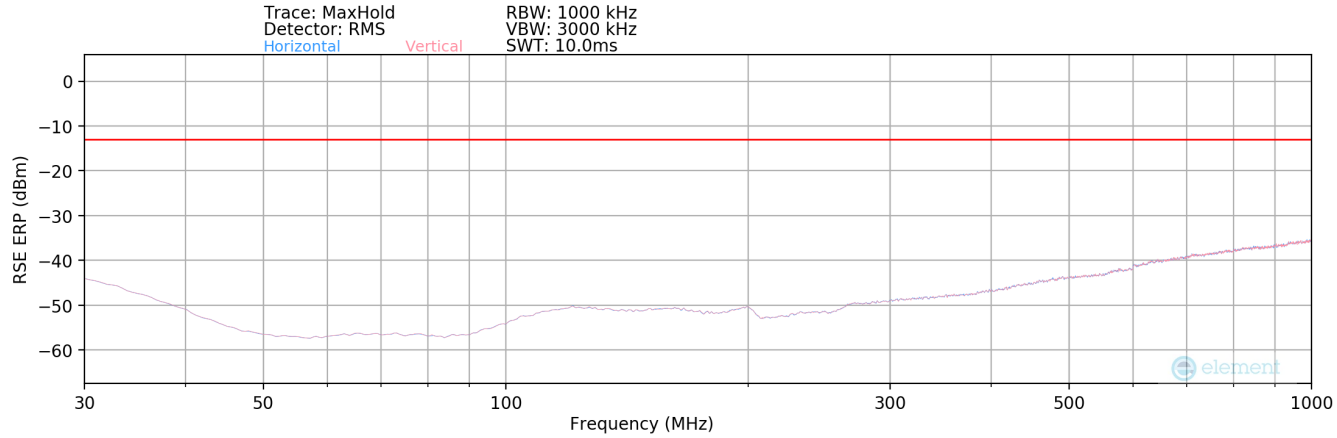
Table 7-23. Radiated Spurious Data (WCDMA PCS – Mid Channel - Ant1)

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

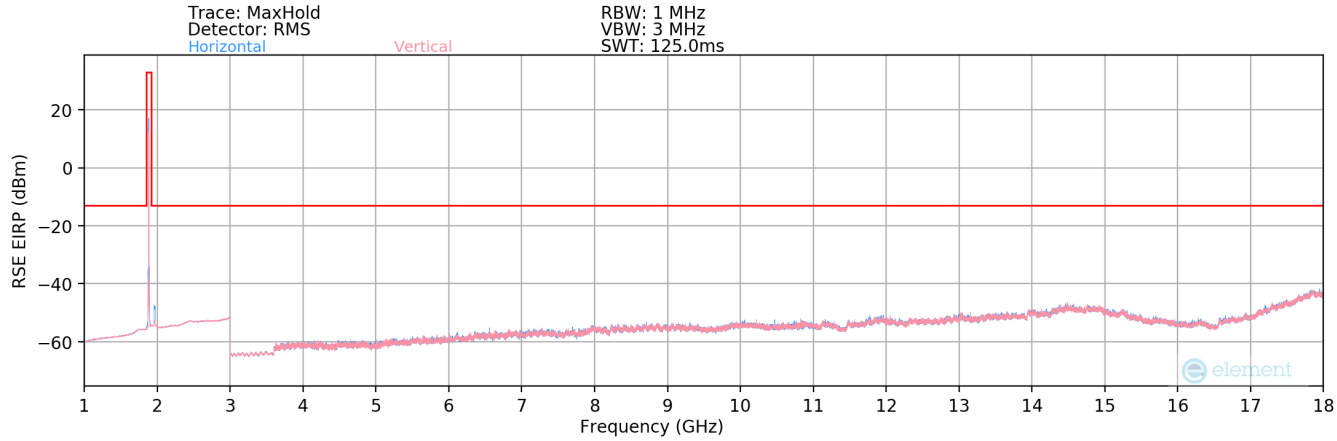
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3815.20	H	-	-	-77.86	2.20	31.34	-63.92	-13.00	-50.92
5722.80	H	-	-	-78.54	4.78	33.24	-62.02	-13.00	-49.02
7630.40	H	-	-	-79.21	8.65	36.44	-58.82	-13.00	-45.82
9538.00	H	-	-	-80.22	11.11	37.89	-57.37	-13.00	-44.37

Table 7-24. Radiated Spurious Data (WCDMA PCS – High Channel - Ant1)

LTE Band 25/2 – Ant1



Plot 7-94. Radiated Spurious Plot (LTE Band 25/2 - Ant1)



Plot 7-95. Radiated Spurious Plot (LTE Band 25/2 - Ant1)

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]
522.00	H	-	-	-89.56	26.04	43.48	-53.93	-13.00	-40.93

Table 7-25. Radiated Spurious Data (LTE Band 25/2 – Ant1)

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	H	-	-	-78.50	1.93	30.43	-64.83	-13.00	-51.83
5580.00	H	290	248	-77.79	4.83	34.04	-61.22	-13.00	-48.22
7440.00	H	-	-	-79.78	8.53	35.75	-59.51	-13.00	-46.51
9300.00	H	-	-	-80.42	10.25	36.83	-58.43	-13.00	-45.43
11160.00	H	-	-	-81.06	12.07	38.01	-57.25	-13.00	-44.25

Table 7-26. Radiated Spurious Data (LTE Band 25/2 – Low Channel - Ant1)

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	H	-	-	-78.45	1.94	30.49	-64.77	-13.00	-51.77
5647.50	H	358	255	-70.74	4.87	41.13	-54.12	-13.00	-41.12
7530.00	H	-	-	-79.71	8.50	35.79	-59.47	-13.00	-46.47
9412.50	H	-	-	-81.15	11.09	36.94	-58.31	-13.00	-45.31
11295.00	H	-	-	-81.52	12.14	37.62	-57.64	-13.00	-44.64

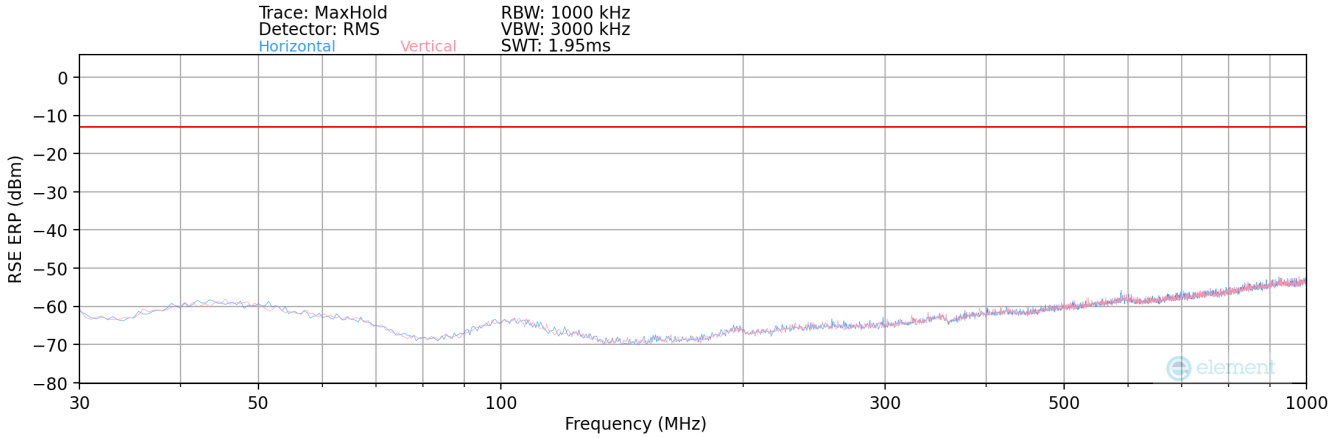
Table 7-27. Radiated Spurious Data (LTE Band 25/2 – Mid Channel - Ant1)

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

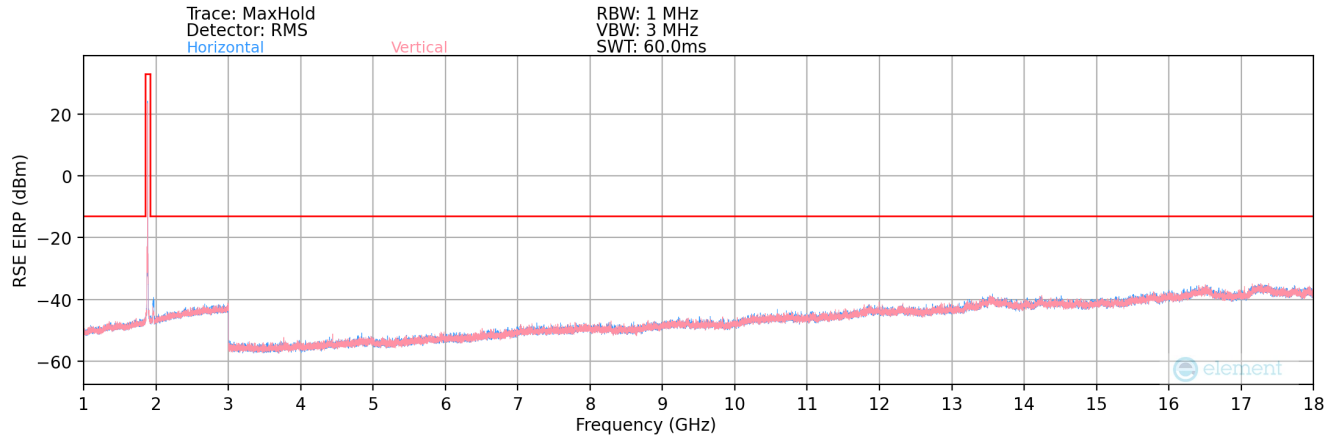
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3810.00	H	-	-	-78.52	2.18	30.66	-64.60	-13.00	-51.60
5715.00	H	135	12	-76.98	4.74	34.76	-60.50	-13.00	-47.50
7620.00	H	-	-	-80.05	8.87	35.82	-59.44	-13.00	-46.44
9525.00	H	-	-	-81.49	11.06	36.57	-58.69	-13.00	-45.69
11430.00	H	-	-	-81.82	12.58	37.76	-57.50	-13.00	-44.50

Table 7-28. Radiated Spurious Data (LTE Band 25/2 – High Channel - Ant1)

LTE Band 25/2 – Ant2



Plot 7-96. Radiated Spurious Plot (LTE Band 25/2 - Ant2)



Plot 7-97. Radiated Spurious Plot (LTE Band 25/2 - Ant2)

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]
324.00	V	-	-	-74.18	-10.46	22.36	-75.05	-13.00	-62.05

Table 7-29. Radiated Spurious Data (LTE Band 25/2 – Ant2)

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	171	157	-74.45	7.65	40.20	-55.06	-13.00	-42.06
5580.00	V	-	-	-81.57	11.46	36.89	-58.37	-13.00	-45.37
7440.00	V	-	-	-82.57	15.33	39.76	-55.50	-13.00	-42.50
9300.00	V	-	-	-83.19	17.79	41.60	-53.66	-13.00	-40.66

Table 7-30. Radiated Spurious Data (LTE Band 25/2 – Low Channel - Ant2)

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	159	157	-74.22	8.01	40.79	-54.46	-13.00	-41.46
5647.50	V	131	210	-79.63	11.43	38.80	-56.46	-13.00	-43.46
7530.00	V	-	-	-82.54	15.54	40.00	-55.26	-13.00	-42.26
9412.50	V	-	-	-83.15	17.94	41.79	-53.47	-13.00	-40.47
11295.00	V	-	-	-83.83	20.86	44.03	-51.22	-13.00	-38.22

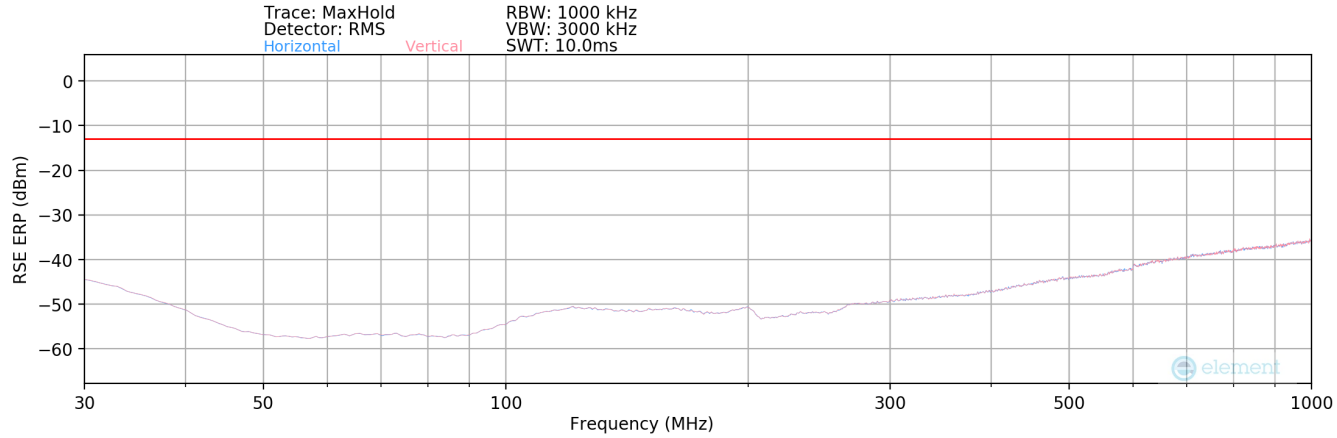
Table 7-31. Radiated Spurious Data (LTE Band 25/2 – Mid Channel - Ant2)

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

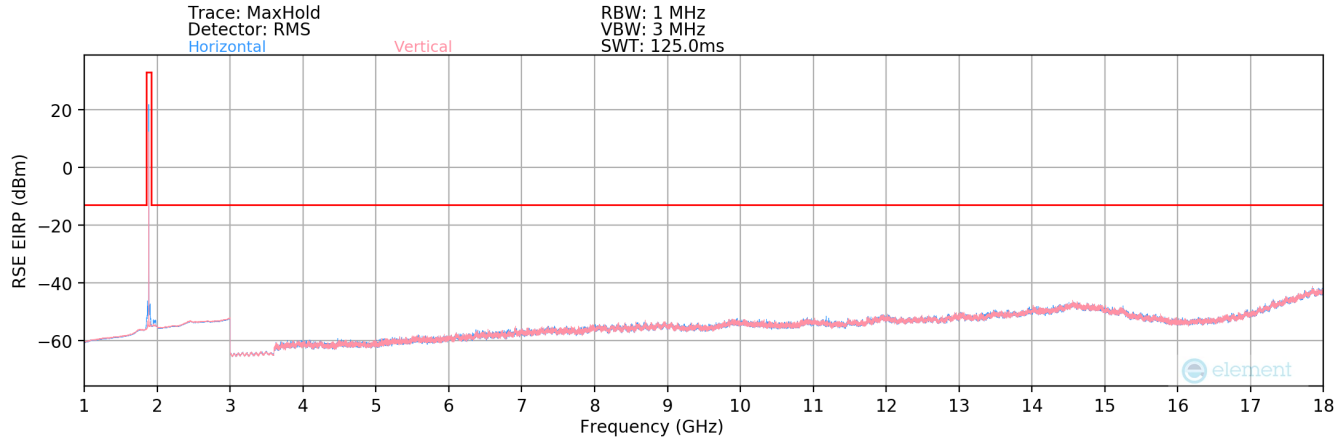
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3810.00	V	177	162	-77.53	8.09	37.56	-57.69	-13.00	-44.69
5715.00	V	-	-	-81.34	11.32	36.98	-58.28	-13.00	-45.28
7620.00	V	-	-	-82.57	15.76	40.19	-55.07	-13.00	-42.07
9525.00	V	-	-	-83.10	18.05	41.95	-53.31	-13.00	-40.31

Table 7-32. Radiated Spurious Data (LTE Band 25/2 – High Channel - Ant2)

NR Band n25/2 – Ant1



Plot 7-98. Radiated Spurious Plot (NR Band n25/2 - Ant1)



Plot 7-99. Radiated Spurious Plot (NR Band n25/2 - Ant1)

Bandwidth (MHz):	40
Frequency (MHz):	1882.5
RB / Offset:	1 / 108

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]
122.91	V	-	-	-84.08	20.67	43.59	-53.82	-13.00	-40.82
190.94	V	-	-	-83.97	18.94	41.97	-55.44	-13.00	-42.44
318.99	V	-	-	-83.92	21.58	44.66	-52.75	-13.00	-39.75

Table 7-33. Radiated Spurious Data (NR Band n25/2 – Ant1)

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

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	V	-	-	-78.09	1.93	30.84	-64.42	-13.00	-51.42
5610.00	V	343	301	-77.26	4.69	34.43	-60.83	-13.00	-47.83
7480.00	V	-	-	-78.88	8.35	36.47	-58.79	-13.00	-45.79
9350.00	V	-	-	-79.75	11.01	38.26	-56.99	-13.00	-43.99
11220.00	V	-	-	-80.04	12.12	39.08	-56.17	-13.00	-43.17

Table 7-34. Radiated Spurious Data (NR Band n25/2 – Low Channel - Ant1)

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

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	-	-	-77.69	1.94	31.25	-64.01	-13.00	-51.01
5647.50	V	344	291	-76.70	4.87	35.17	-60.08	-13.00	-47.08
7530.00	V	-	-	-78.70	8.50	36.80	-58.46	-13.00	-45.46
9412.50	V	-	-	-79.89	11.09	38.20	-57.05	-13.00	-44.05
11295.00	V	-	-	80.20	12.14	199.34	104.08	-13.00	117.08

Table 7-35. Radiated Spurious Data (NR Band n25/2 – Mid Channel - Ant1)

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

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	V	-	-	-77.74	2.08	31.34	-63.92	-13.00	-50.92
5685.00	V	270	296	-77.22	4.75	34.53	-60.73	-13.00	-47.73
7580.00	V	-	-	-79.27	8.81	36.54	-58.72	-13.00	-45.72
9475.00	V	-	-	-80.11	10.92	37.81	-57.44	-13.00	-44.44
11370.00	V	-	-	-80.35	12.12	38.77	-56.49	-13.00	-43.49

Table 7-36. Radiated Spurious Data (NR Band n25/2 – High Channel - Ant1)

7.9 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

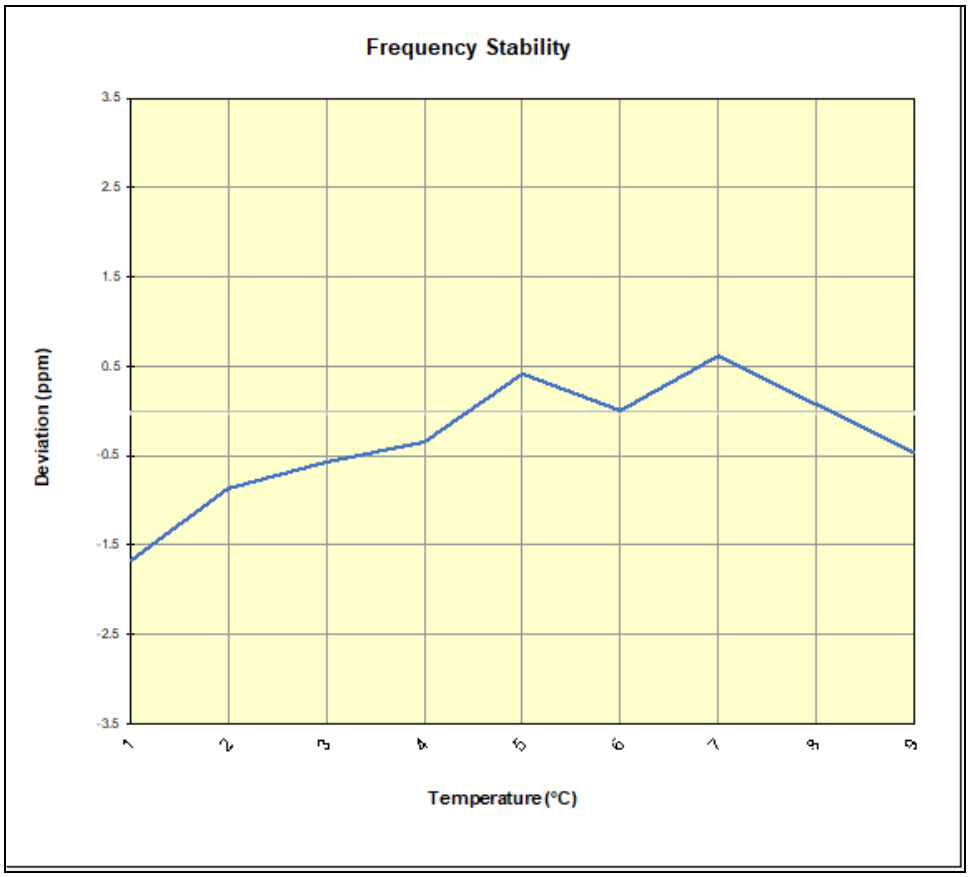
None

LTE Band 25/2

Operating Frequency (Hz):	1,882,500,000
Ref. Voltage (VDC):	3.86

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.86	- 30	1,882,717,190	-3,129	-0.0001662
		- 20	1,882,718,666	-1,653	-0.0000878
		- 10	1,882,719,256	-1,063	-0.0000565
		0	1,882,719,666	-653	-0.0000347
		+ 10	1,882,721,111	792	0.0000421
		+ 20 (Ref)	1,882,720,319	0	0.0000000
		+ 30	1,882,721,477	1,158	0.0000615
		+ 40	1,882,720,477	158	0.0000084
		+ 50	1,882,719,467	-852	-0.0000453
Battery Endpoint	3.174	+ 20	1,882,719,456	-863	-0.0000458

Table 7-37. LTE Band 25/2 Frequency Stability Data



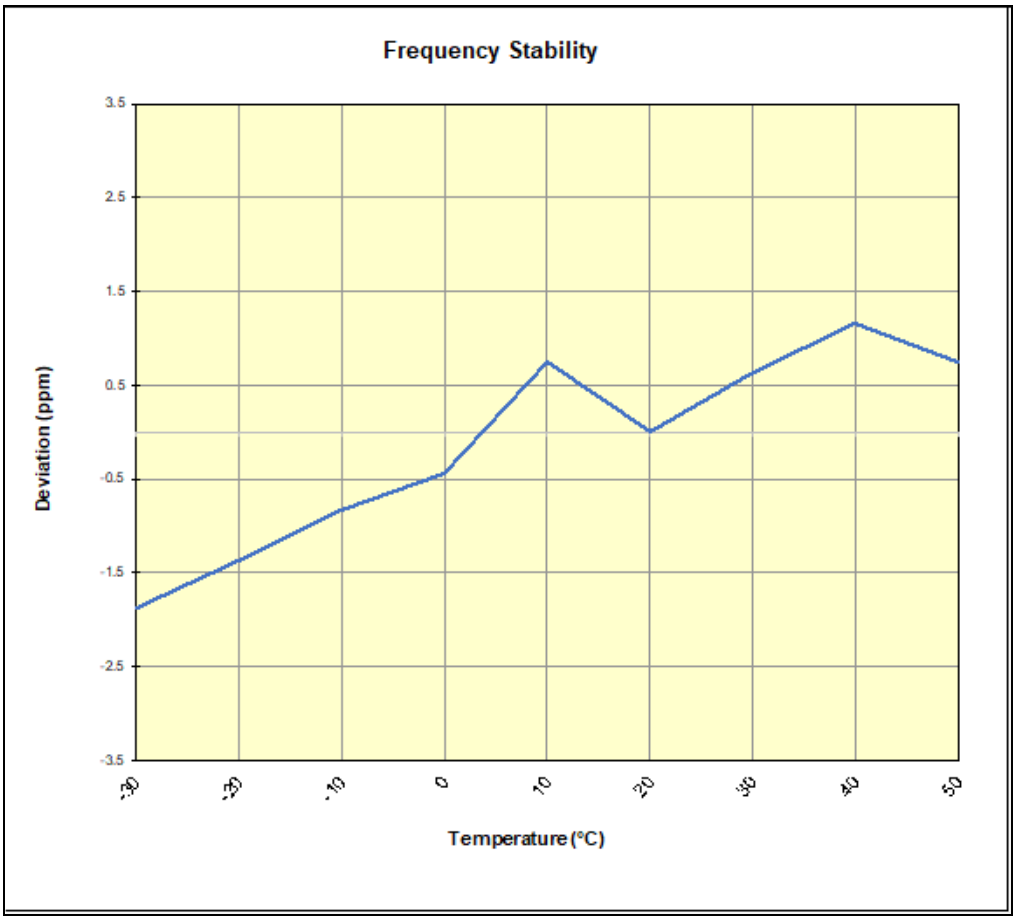
Plot 7-100. LTE Band 25/2 Frequency Stability Chart

NR Band n25/2

Operating Frequency (Hz):	1,882,500,000
Ref. Voltage (VDC):	3.863

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.863	- 30	1,882,631,530	-3,519	-0.0001869
		- 20	1,882,632,456	-2,593	-0.0001377
		- 10	1,882,633,478	-1,571	-0.0000834
		0	1,882,634,221	-828	-0.0000440
		+ 10	1,882,636,447	1,398	0.0000743
		+ 20 (Ref)	1,882,635,049	0	0.0000000
		+ 30	1,882,636,247	1,198	0.0000636
		+ 40	1,882,637,244	2,195	0.0001166
		+ 50	1,882,636,441	1,392	0.0000739
Battery Endpoint	3.174	+ 20	1,882,636,017	968	0.0000514

Table 7-38. NR Band n25/2 Frequency Stability Data



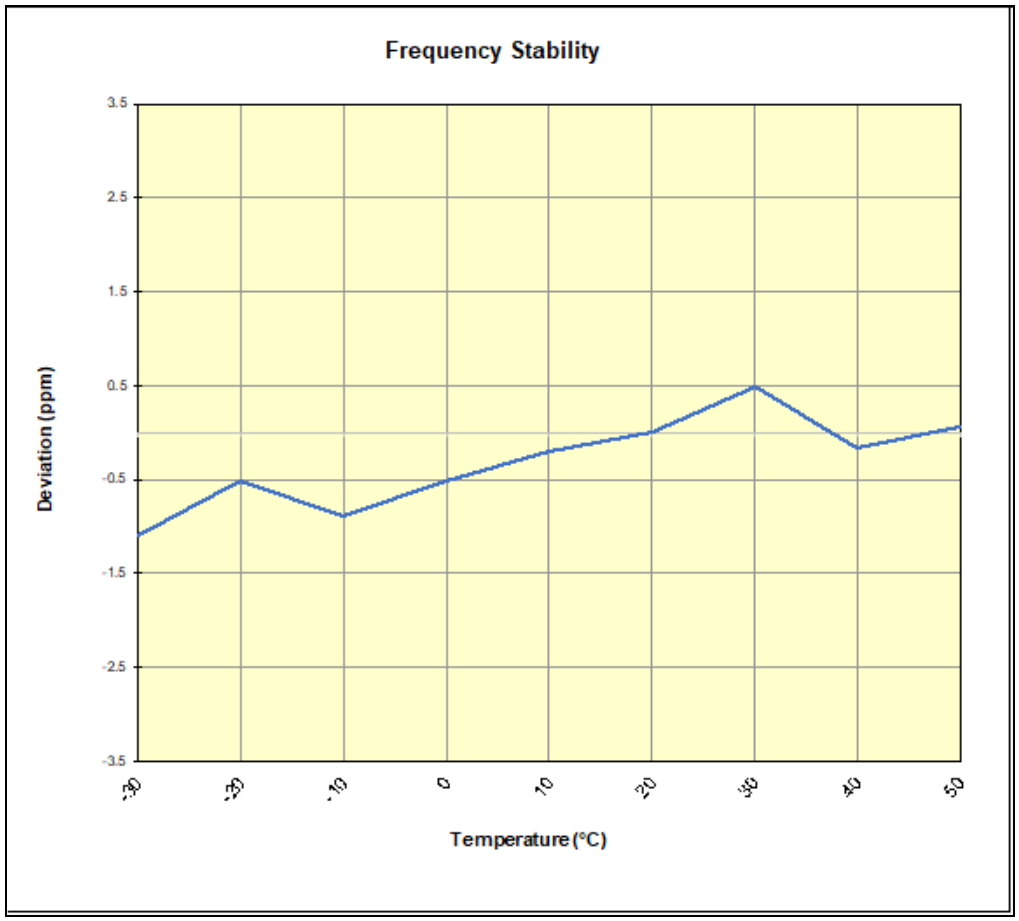
Plot 7-101. NR Band n25/2 Frequency Stability Chart

WCDMA PCS

Operating Frequency (Hz):	1,880,000,000
Ref. Voltage (VDC):	3.86

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.86	- 30	1,880,142,514	-2,041	-0.0001086
		- 20	1,880,143,599	-956	-0.0000508
		- 10	1,880,142,896	-1,659	-0.0000882
		0	1,880,143,577	-978	-0.0000520
		+ 10	1,880,144,177	-378	-0.0000201
		+ 20 (Ref)	1,880,144,555	0	0.0000000
		+ 30	1,880,145,477	922	0.0000490
		+ 40	1,880,144,258	-297	-0.0000158
		+ 50	1,880,144,669	114	0.0000061
Battery Endpoint	3.174	+ 20	1,880,144,211	-344	-0.0000183

Table 7-39. WCDMA PCS Frequency Stability Data



Plot 7-102. 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: A3LSMX828U** complies with all the requirements of Part 24 of the FCC rules.