Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Config	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	H	Open	123	301	1.27	1 / 0	18.75	17.87	0.061	38.45	-20.58	20.02	0.101	40.61	-20.58
	QPSK	836.5	H	Open	112	292	1.31	1 / 0	19.39	**18.55**	0.072	38.45	-19.90	**20.70**	0.117	40.61	-19.91
	QPSK	844.0	H	Open	119	298	1.35	1 / 49	18.23	17.43	0.055	38.45	-21.02	19.58	0.091	40.61	-21.03
	16-QAM	836.5	H	Open	112	292	1.31	1 / 0	18.35	17.51	0.056	38.45	-20.94	19.66	0.092	40.61	-20.95
5 MHz	QPSK	829.0	H	Open	123	301	1.26	1 / 12	18.58	17.69	0.059	38.45	-20.76	19.84	0.096	40.61	-20.76
	QPSK	836.5	H	Open	112	292	1.31	1 / 12	19.43	**18.59**	0.072	38.45	-19.86	**20.74**	0.119	40.61	-19.86
	QPSK	844.0	H	Open	119	298	1.36	1 / 12	18.41	17.62	0.058	38.45	-20.83	19.77	0.095	40.61	-20.84
	16-QAM	836.5	H	Open	112	292	1.31	1 / 12	18.21	17.38	0.055	38.45	-21.08	19.53	0.090	40.61	-21.08
3 MHz	QPSK	829.0	H	Open	123	301	1.26	1 / 7	18.42	17.53	0.057	38.45	-20.92	19.68	0.093	40.61	-20.93
	QPSK	836.5	H	Open	112	292	1.31	1 / 7	19.45	**18.61**	0.073	38.45	-19.84	**20.76**	0.119	40.61	-19.85
	QPSK	844.0	H	Open	119	298	1.36	1 / 7	18.29	17.51	0.056	38.45	-20.94	19.66	0.092	40.61	-20.95
	16-QAM	836.5	H	Open	112	292	1.31	1 / 7	18.36	17.52	0.056	38.45	-20.93	19.67	0.093	40.61	-20.94
1.4 MHz	QPSK	829.0	H	Open	123	301	1.25	1 / 3	18.47	17.58	0.057	38.45	-20.87	19.73	0.094	40.61	-20.88
	QPSK	836.5	H	Open	112	292	1.31	1 / 5	19.40	**18.56**	0.072	38.45	-19.89	**20.71**	0.118	40.61	-19.90
	QPSK	844.0	H	Open	119	298	1.37	1 / 3	18.24	17.46	0.056	38.45	-20.99	19.61	0.091	40.61	-21.00
	16-QAM	836.5	H	Open	112	292	1.31	1 / 5	18.25	17.41	0.055	38.45	-21.04	19.56	0.090	40.61	-21.04
10 MHz	QPSK (Opposite Pol.)	836.5	V	Open	140	256	1.31	1 / 0	17.41	16.57	0.045	38.45	-21.88	18.72	0.074	40.61	-21.89
	QPSK (WCP)	836.5	H	Open	112	259	1.31	1 / 25	16.21	15.37	0.034	38.45	-23.08	17.52	0.056	40.61	-23.09
	QPSK	836.5	H	Half	115	53	1.27	1 / 0	17.93	17.05	0.051	38.45	-21.40	19.20	0.083	40.61	-21.40

Table 7-8. ERP Data (LTE Band 5)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Config	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	834.0	H	Open	117	289	1.30	1 / 26	18.81	17.96	0.062	38.45	-20.49	20.11	0.103	40.61	-20.50
	π/2 BPSK	836.5	H	Open	114	292	1.31	1 / 53	18.60	17.76	0.060	38.45	-20.69	19.91	0.098	40.61	-20.70
	π/2 BPSK	839.0	H	Open	112	289	1.32	1 / 26	19.07	18.24	0.067	38.45	-20.21	20.39	0.109	40.61	-20.21
	QPSK	834.0	H	Open	117	289	1.30	1 / 26	18.80	17.95	0.062	38.45	-20.50	20.10	0.102	40.61	-20.51
	QPSK	836.5	H	Open	114	292	1.31	1 / 26	18.66	17.82	0.061	38.45	-20.63	19.97	0.099	40.61	-20.64
	QPSK	839.0	H	Open	112	289	1.32	1 / 26	19.09	**18.26**	0.067	38.45	-20.19	**20.41**	0.110	40.61	-20.19
	16-QAM	839.0	H	Open	112	289	1.32	1 / 26	18.19	17.36	0.054	38.45	-21.09	19.51	0.089	40.61	-21.09
15 MHz	π/2 BPSK	831.5	H	Open	117	289	1.29	1 / 77	19.04	18.17	0.066	38.45	-20.28	20.32	0.108	40.61	-20.28
	π/2 BPSK	836.5	H	Open	114	292	1.31	1 / 77	18.86	18.02	0.063	38.45	-20.43	20.17	0.104	40.61	-20.43
	π/2 BPSK	841.5	H	Open	112	289	1.33	1 / 77	19.19	**18.38**	0.069	38.45	-20.07	**20.53**	0.113	40.61	-20.08
	QPSK	831.5	H	Open	117	289	1.29	1 / 77	18.68	17.82	0.061	38.45	-20.63	19.97	0.099	40.61	-20.64
	QPSK	836.5	H	Open	114	292	1.31	1 / 77	18.72	17.88	0.061	38.45	-20.57	20.03	0.101	40.61	-20.57
	QPSK	841.5	H	Open	112	289	1.33	1 / 77	19.01	18.20	0.066	38.45	-20.25	20.35	0.108	40.61	-20.26
	16-QAM	841.5	H	Open	112	289	1.33	1 / 77	17.88	17.06	0.051	38.45	-21.39	19.21	0.083	40.61	-21.39
10 MHz	π/2 BPSK	829.0	H	Open	117	289	1.27	1 / 25	18.61	17.73	0.059	38.45	-20.72	19.88	0.097	40.61	-20.73
	π/2 BPSK	836.5	H	Open	114	292	1.31	1 / 50	18.52	17.68	0.059	38.45	-20.77	19.83	0.096	40.61	-20.77
	π/2 BPSK	844.0	H	Open	112	289	1.35	1 / 25	18.71	17.90	0.062	38.45	-20.55	20.05	0.101	40.61	-20.55
	QPSK	829.0	H	Open	117	289	1.27	1 / 25	18.40	17.52	0.057	38.45	-20.93	19.67	0.093	40.61	-20.93
	QPSK	836.5	H	Open	114	292	1.31	1 / 50	18.50	17.66	0.058	38.45	-20.79	19.81	0.096	40.61	-20.80
	QPSK	844.0	H	Open	112	289	1.35	1 / 25	18.92	**18.11**	0.065	38.45	-20.34	**20.26**	0.106	40.61	-20.34
	16-QAM	844.0	H	Open	112	289	1.35	1 / 25	17.85	17.04	0.051	38.45	-21.41	19.19	0.083	40.61	-21.41
5 MHz	π/2 BPSK	829.0	H	Open	117	289	1.26	1 / 12	18.69	17.80	0.060	38.45	-20.65	19.95	0.099	40.61	-20.65
	π/2 BPSK	836.5	H	Open	114	292	1.31	1 / 12	18.46	17.62	0.058	38.45	-20.83	19.77	0.095	40.61	-20.84
	π/2 BPSK	844.0	H	Open	112	289	1.36	1 / 12	19.13	**18.33**	0.068	38.45	-20.12	**20.48**	0.112	40.61	-20.12
	QPSK	829.0	H	Open	117	289	1.26	1 / 12	18.29	17.41	0.055	38.45	-21.05	19.56	0.090	40.61	-21.05
	QPSK	836.5	H	Open	114	292	1.31	1 / 12	18.78	17.95	0.062	38.45	-20.51	20.10	0.102	40.61	-20.51
	QPSK	844.0	H	Open	112	289	1.36	1 / 12	18.95	18.16	0.065	38.45	-20.29	20.31	0.107	40.61	-20.30
	16-QAM	844.0	H	Open	112	289	1.36	1 / 12	18.53	17.73	0.059	38.45	-20.72	19.88	0.097	40.61	-20.72
20 MHz	QPSK (CP-OFDM)	839.0	H	Open	112	294	1.32	0.00	17.51	**16.68**	0.047	38.45	-21.77	18.83	0.076	40.61	-21.77
	QPSK (Opposite Pol.)	839.0	V	Open	145	292	1.32	0.00	18.88	18.05	0.064	38.45	-20.40	20.20	0.105	40.61	-20.40
	QPSK (WCP)	839.0	H	Open	114	282	1.32	0.00	16.83	16.00	0.040	38.45	-22.45	18.15	0.065	40.61	-22.45
	QPSK	839.0	H	Half	150	309	1.31	1 / 26	18.90	18.06	0.064	38.45	-20.39	20.21	0.105	40.61	-20.40

Table 7-9. ERP Data (NR Band n5)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	EUT Config	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.20	GSM850	H	Open	117	291	26.04	1.25	**25.14**	**0.327**	38.45	-13.31	**27.29**	**0.536**	40.61	-13.32
836.60	GSM850	H	Open	113	290	25.38	1.31	24.54	0.284	38.45	-13.91	26.69	0.467	40.61	-13.92
848.80	GSM850	H	Open	115	283	25.53	1.37	24.75	0.298	38.45	-13.70	26.90	0.490	40.61	-13.71
824.20	GSM850	V	Open	151	293	25.97	1.25	25.07	0.321	38.45	-13.38	27.22	0.527	40.61	-13.39
824.20	EDGE850	H	Open	117	291	20.84	1.25	**19.94**	0.099	38.45	-18.51	**22.09**	**0.162**	40.61	-18.52
824.20	GSM850 (WCP)	H	Open	120	269	23.29	1.25	22.39	0.173	38.45	-16.06	24.54	0.284	40.61	-16.07
824.20	GSM850	H	Half	151	316	26.00	1.25	25.10	0.324	38.45	-13.35	27.25	0.531	40.61	-13.36

Table 7-10. ERP Data (GPRS Cell)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	EUT Config	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	H	Open	114	294	18.89	1.26	18.00	0.063	38.45	-20.45	20.15	0.104	40.61	-20.46
836.60	WCDMA850	H	Open	112	290	19.17	1.31	**18.33**	**0.068**	38.45	-20.12	**20.48**	**0.112**	40.61	-20.13
846.60	WCDMA850	H	Open	113	287	18.92	1.36	18.13	0.065	38.45	-20.32	20.28	0.107	40.61	-20.33
836.60	WCDMA850	V	Open	137	305	17.79	1.31	16.95	0.050	38.45	-21.50	19.10	0.081	40.61	-21.51
836.60	WCDMA850 (WCP)	H	Open	112	286	18.68	1.31	17.84	0.061	38.45	-20.61	19.99	0.100	40.61	-20.62
836.60	WCDMA850 (WCP)	H	Half	113	62	17.84	1.26	16.95	0.050	38.45	-21.50	19.10	0.081	40.61	-21.51

Table 7-11. ERP Data (WCDMA Cell)

7.6 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.

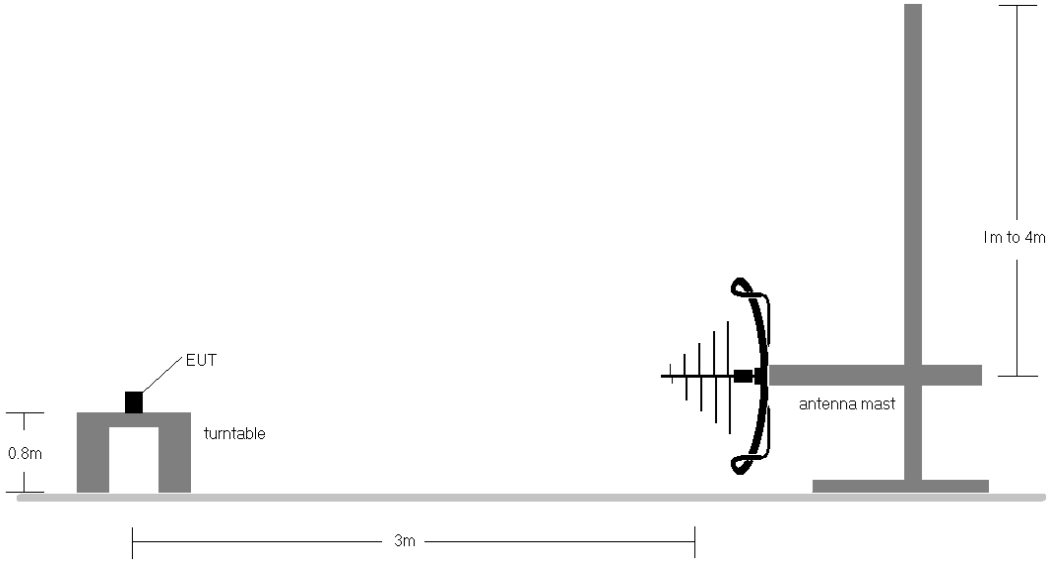


Figure 7-6. Test Instrument & Measurement Setup < 1GHz

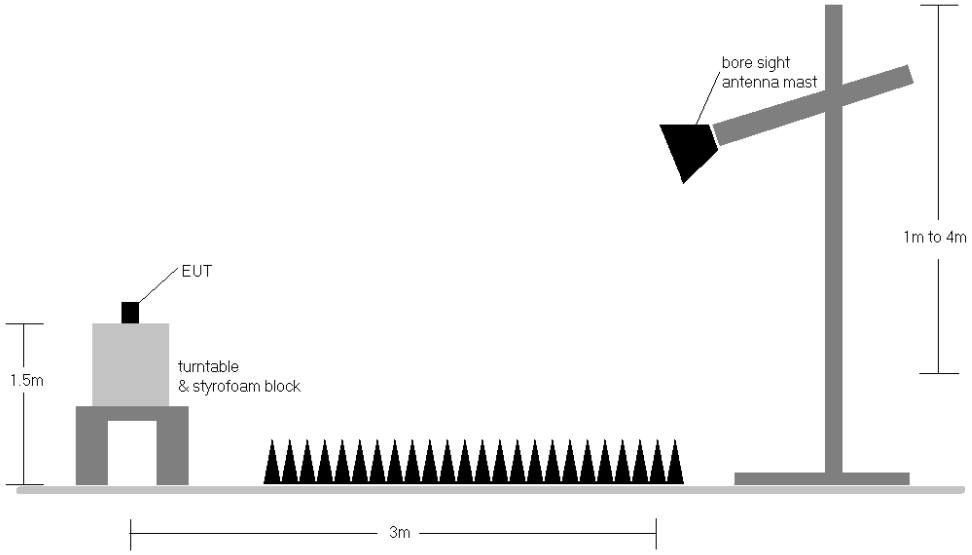


Figure 7-7. Test Instrument & Measurement Setup > 1GHz

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.

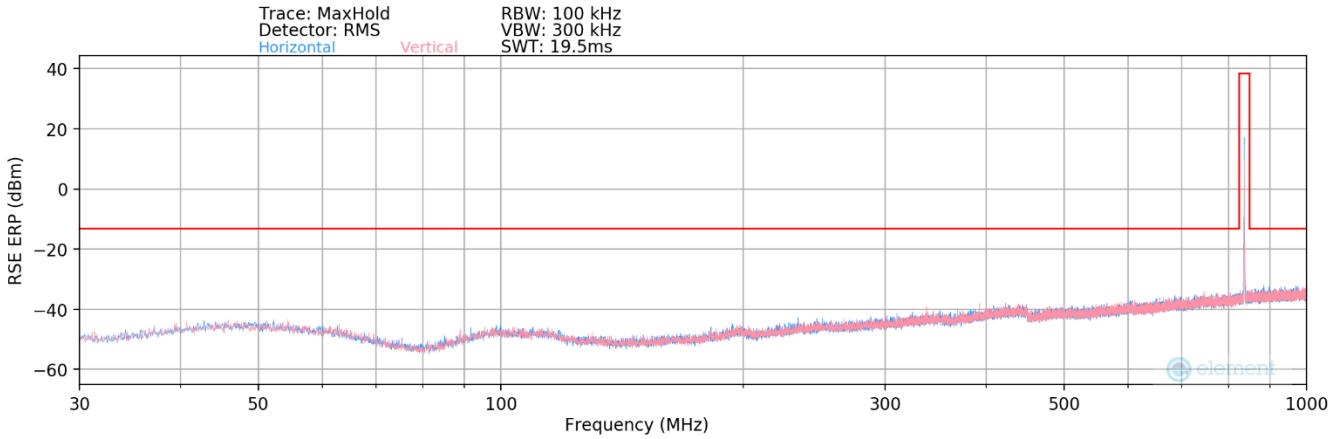
7) Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.

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

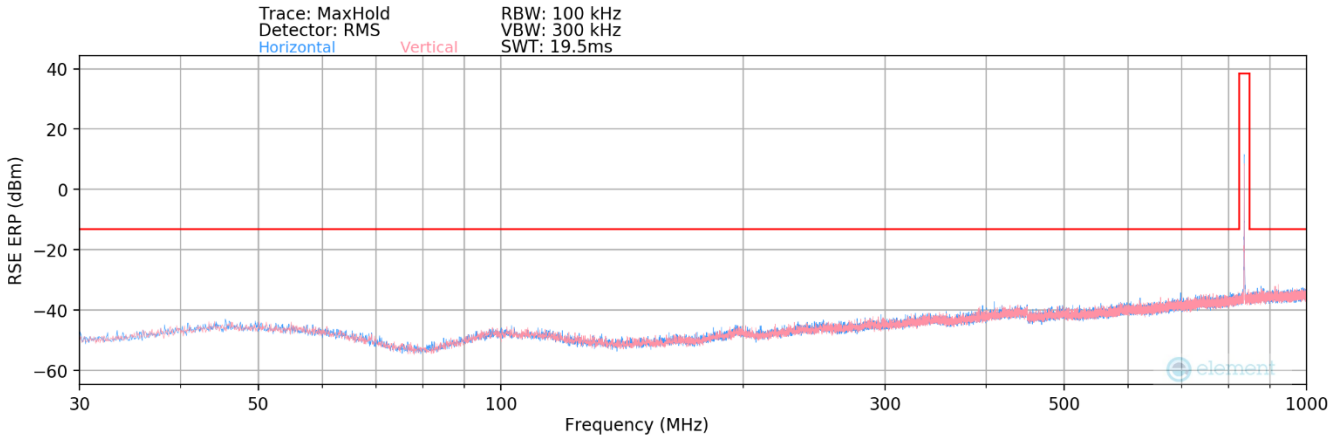
9) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

10) Spurious emission in EN-DC Operating mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor) has been checked. The EUT was configured through software to transmit in a standalone mode as this was found to produce the worst case emissions.

LTE Band 5



Plot 7-44. Radiated Spurious Plot Below 1GHz (LTE Band 5) – OPEN

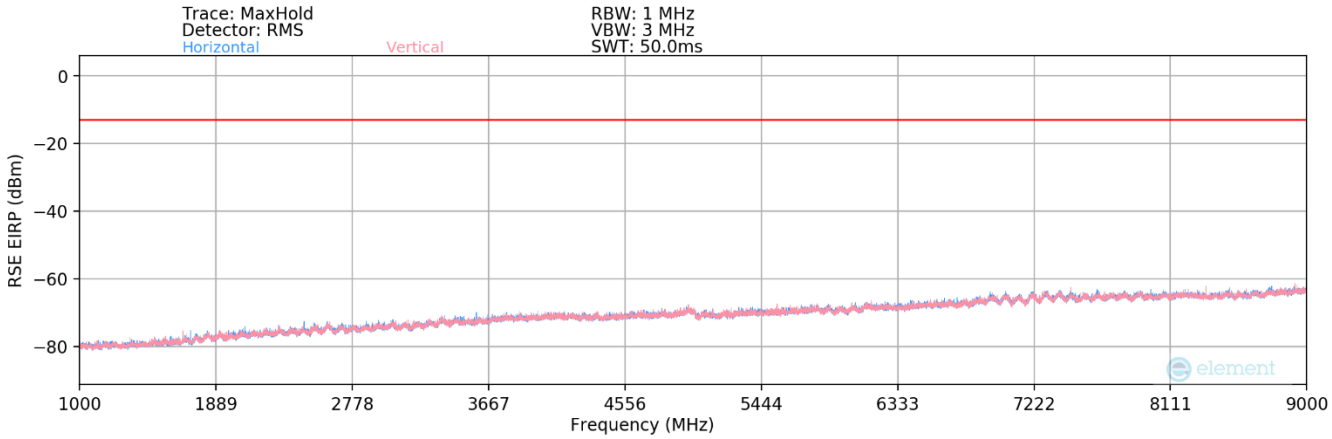


Plot 7-45. Radiated Spurious Plot Below 1GHz (LTE Band 5) – HALF OPEN

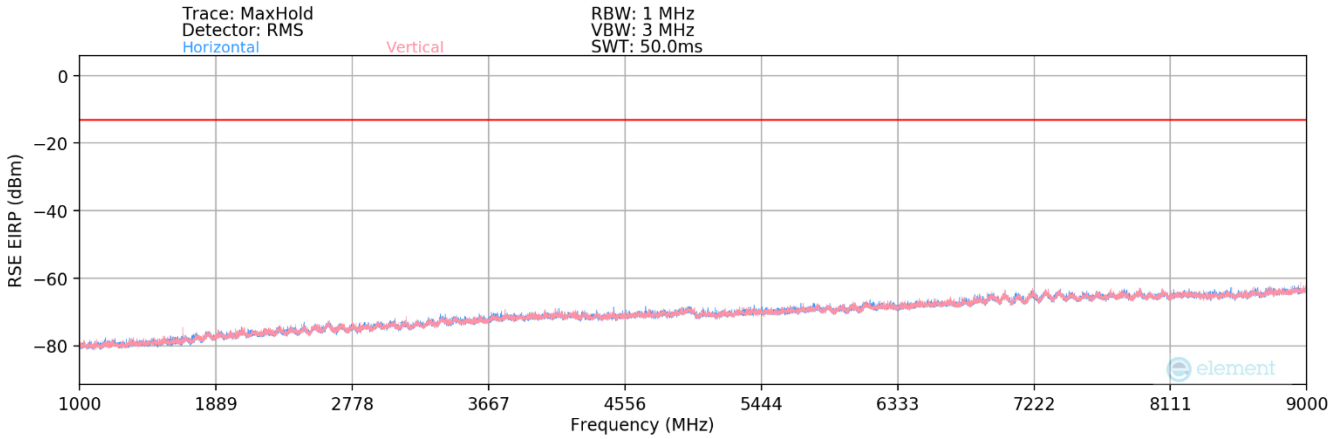
Bandwidth (MHz):	10
Frequency (MHz):	844
RB / Offset:	1 / 25

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]
460.32	H	-	-	-90.14	23.61	40.47	-56.94	-13.00	-43.94
787.24	H	-	-	-92.03	28.78	43.75	-53.65	-13.00	-40.65
910.31	H	-	-	-91.79	30.49	45.70	-51.71	-13.00	-38.71

Table 7-12. Radiated Spurious Data Below 1GHz (LTE Band 5) – OPEN



Plot 7-46. Radiated Spurious Plot Above 1GHz (LTE Band 5) – OPEN



Plot 7-47. Radiated Spurious Plot Above 1GHz (LTE Band 5) – HALF OPEN

Bandwidth (MHz):	10
Frequency (MHz):	829
RB / Offset:	1 / 25

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]
1658.00	H	122	332	-73.53	-9.06	24.41	-70.85	-13.00	-57.85
2487.00	H	139	347	-74.73	-5.22	27.05	-68.21	-13.00	-55.21
3316.00	H	-	-	-75.95	-1.83	29.22	-66.04	-13.00	-53.04
4145.00	H	-	-	-75.54	-0.26	31.20	-64.06	-13.00	-51.06
4974.00	H	-	-	-76.04	1.37	32.33	-62.92	-13.00	-49.92
5803.00	H	-	-	-76.80	3.06	33.26	-61.99	-13.00	-48.99
6632.00	H	-	-	-77.35	5.06	34.71	-60.55	-13.00	-47.55

Table 7-13. Radiated Spurious Data Above 1GHz (LTE Band 5 – Low Channel) – OPEN

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 25

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]
1673.00	H	118	323	-70.15	-8.86	27.99	-67.27	-13.00	-54.27
2509.50	H	110	317	-74.50	-4.96	27.54	-67.72	-13.00	-54.72
3346.00	H	-	-	-75.29	-1.42	30.29	-64.97	-13.00	-51.97
4182.50	H	-	-	-75.91	0.08	31.17	-64.09	-13.00	-51.09
5019.00	H	-	-	-76.15	0.77	31.62	-63.64	-13.00	-50.64
5855.50	H	-	-	-76.08	1.86	32.78	-62.48	-13.00	-49.48
6692.00	H	-	-	-76.78	4.68	34.90	-60.36	-13.00	-47.36

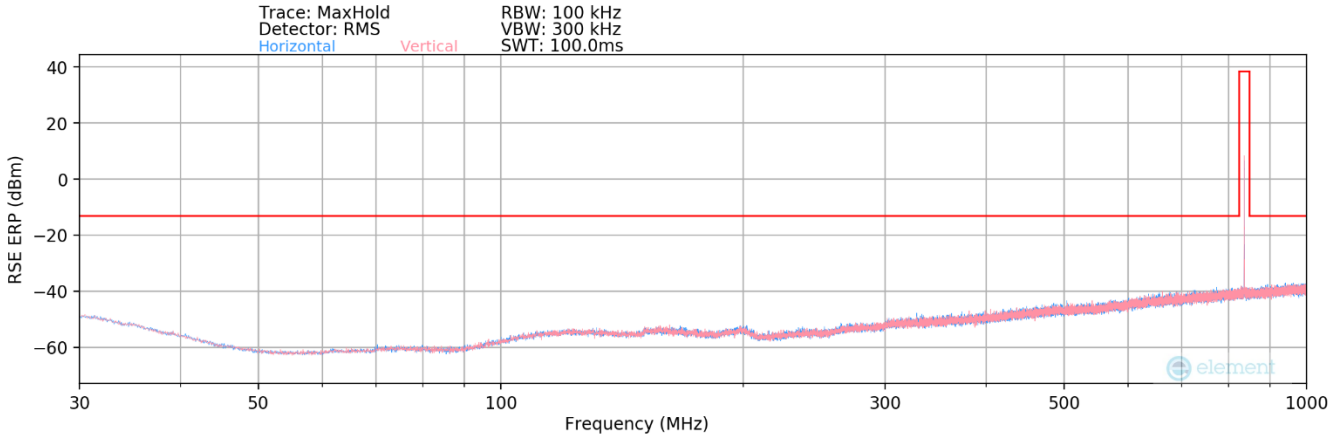
Table 7-14. Radiated Spurious Data Above 1GHz (LTE Band 5 – Mid Channel) – OPEN

Bandwidth (MHz):	10
Frequency (MHz):	844
RB / Offset:	1 / 25

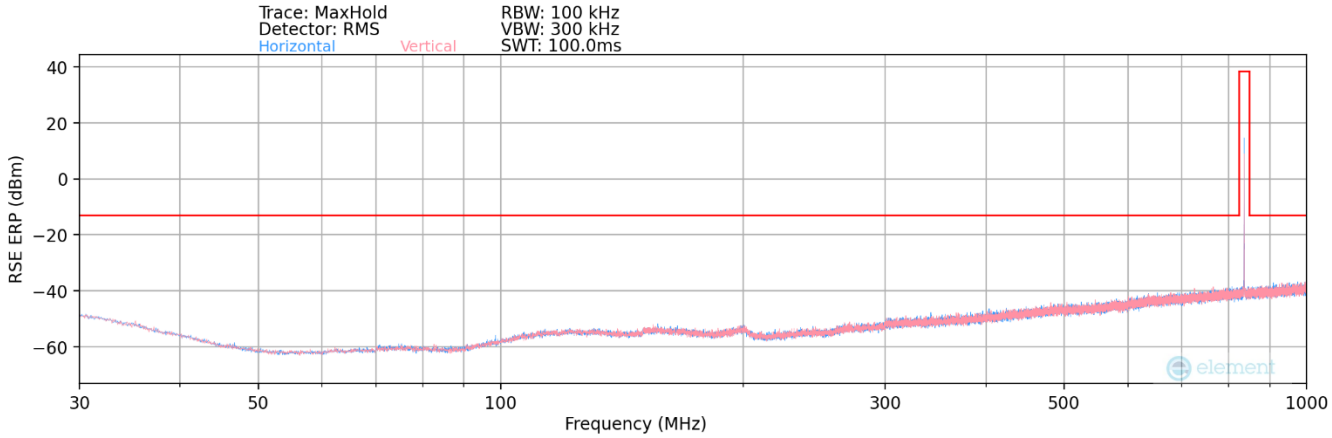
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.00	H	116	316	-68.59	-8.64	29.77	-65.49	-13.00	-52.49
2532.00	H	-	-	-74.27	-4.54	28.19	-67.07	-13.00	-54.07
3376.00	H	-	-	-75.20	-1.18	30.62	-64.64	-13.00	-51.64
4220.00	H	-	-	-75.46	-0.31	31.23	-64.02	-13.00	-51.02
5064.00	H	-	-	-75.88	1.14	32.26	-63.00	-13.00	-50.00
5908.00	H	-	-	-76.18	1.61	32.43	-62.83	-13.00	-49.83

Table 7-15. Radiated Spurious Data Above 1GHz (LTE Band 5 – High Channel) – OPEN

NR Band n5



Plot 7-48. Radiated Spurious Plot Below 1GHz (NR Band n5) – OPEN

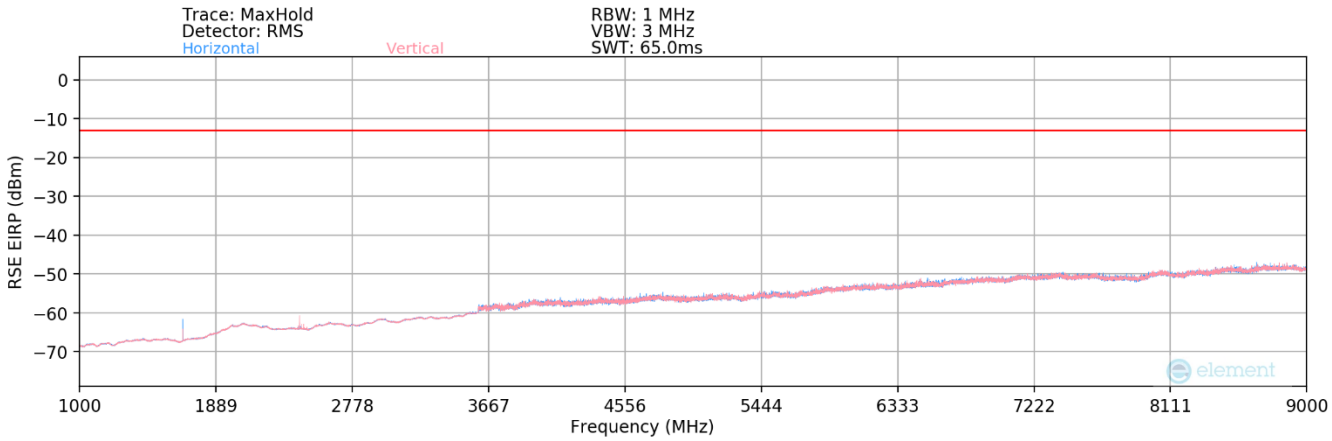


Plot 7-49. Radiated Spurious Plot Below 1GHz (NR Band n5) – HALF OPEN

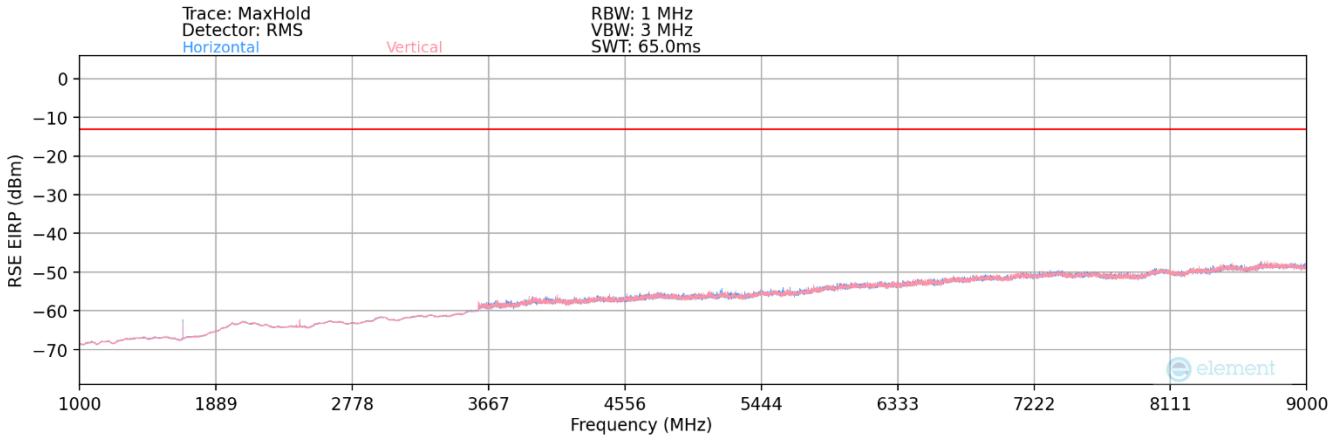
Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 53

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
79.24	H	-	-	-83.44	14.53	38.09	-57.17	-13.00	-44.17
190.14	H	-	-	-83.33	18.93	42.60	-52.66	-13.00	-39.66
493.66	H	-	-	-83.23	25.88	49.65	-45.61	-13.00	-32.61

Table 7-16. Radiated Spurious Data Below 1GHz (NR Band n5) – OPEN



Plot 7-50. Radiated Spurious Plot Above 1GHz (NR Band n5) – OPEN



Plot 7-51. Radiated Spurious Plot Above 1GHz (NR Band n5) – HALF OPEN

Bandwidth (MHz):	20
Frequency (MHz):	834
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]
1668.00	H	268	287	-65.98	-7.20	33.82	-61.44	-13.00	-48.44
2502.00	H	305	110	-76.01	-4.19	26.80	-68.45	-13.00	-55.45
3336.00	H	-	-	-76.57	-1.27	29.16	-66.10	-13.00	-53.10
4170.00	H	-	-	-77.29	1.37	31.08	-64.18	-13.00	-51.18
5004.00	H	-	-	-77.86	2.88	32.02	-63.24	-13.00	-50.24

Table 7-17. Radiated Spurious Data Above 1GHz (NR Band n5 – Low Channel) – OPEN

Bandwidth (MHz):	20
Frequency (MHz):	836.5
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]
1673.00	H	271	282	-66.06	-7.13	33.81	-61.45	-13.00	-48.45
2509.50	H	137	120	-75.03	-4.07	27.90	-67.36	-13.00	-54.36
3346.00	H	-	-	-76.39	-1.25	29.36	-65.90	-13.00	-52.90
4182.50	H	-	-	-77.11	1.39	31.28	-63.98	-13.00	-50.98
5019.00	H	-	-	-78.14	2.98	31.84	-63.42	-13.00	-50.42

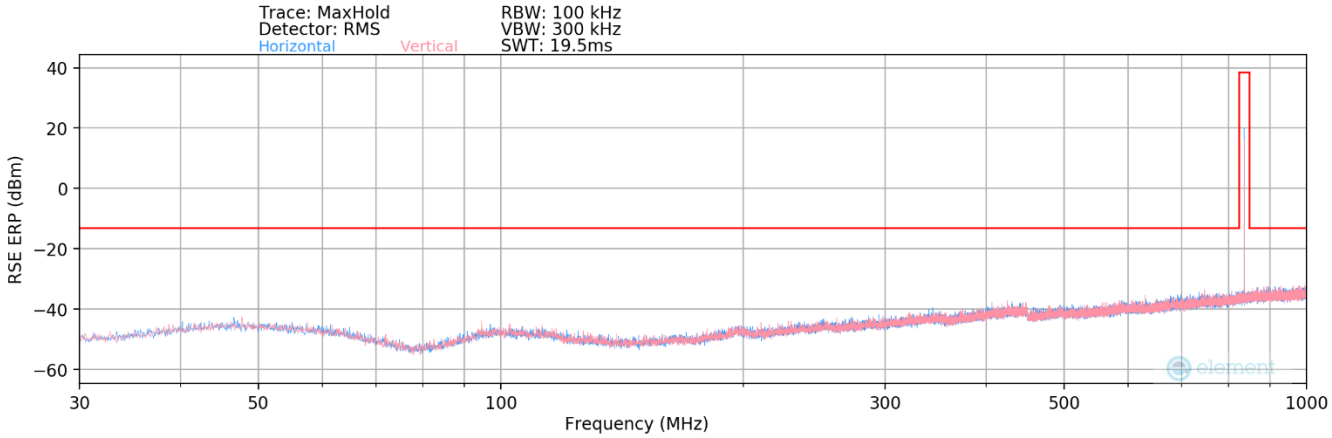
Table 7-18. Radiated Spurious Data Above 1GHz (NR Band n5 – Mid Channel) – OPEN

Bandwidth (MHz):	20
Frequency (MHz):	839
RB / Offset:	1 / 53

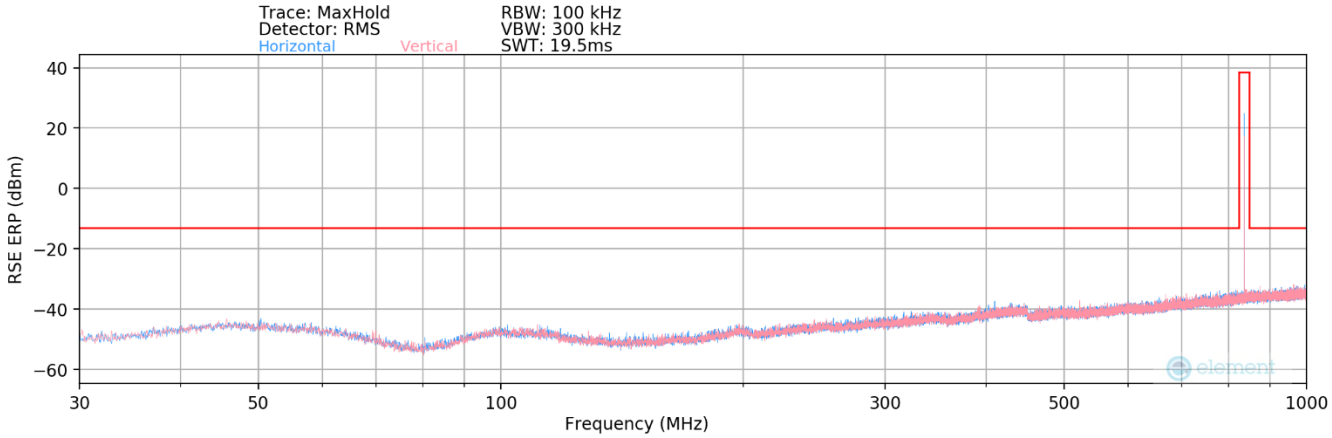
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1678.00	H	142	323	-66.69	-7.07	33.24	-62.02	-13.00	-49.02
2517.00	H	247	132	-75.10	-3.93	27.97	-67.29	-13.00	-54.29
3356.00	H	-	-	-76.23	-1.22	29.55	-65.70	-13.00	-52.70
4195.00	H	-	-	-76.98	1.30	31.32	-63.94	-13.00	-50.94
5034.00	H	-	-	-78.15	3.03	31.88	-63.37	-13.00	-50.37

Table 7-19. Radiated Spurious Data Above 1GHz (NR Band n5 – High Channel) – OPEN

GSM/GPRS Cell



Plot 7-52. Radiated Spurious Plot Below 1GHz (GPRS Cell) – CLOSE

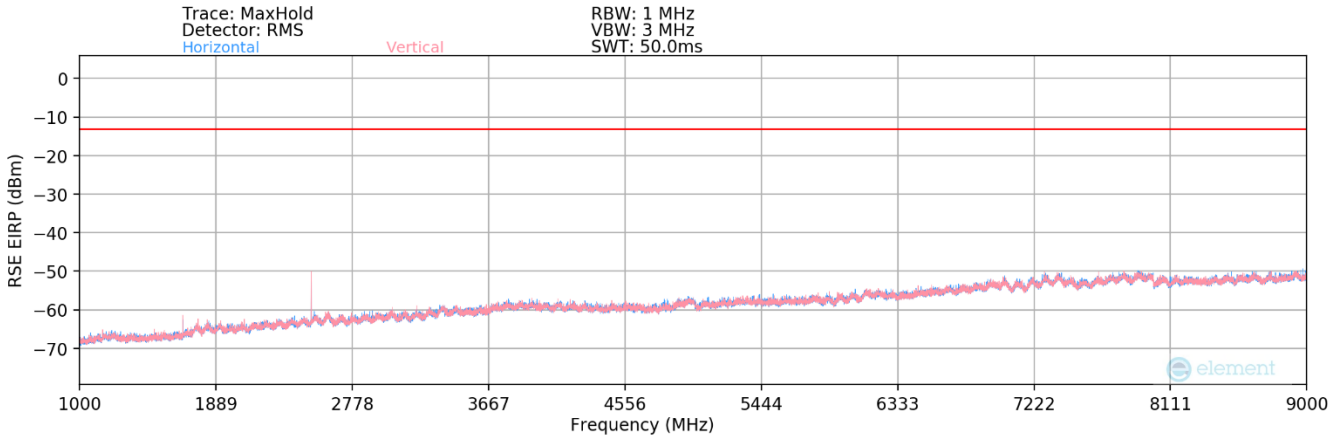


Plot 7-53. Radiated Spurious Plot Below 1Ghz (GPRS Cell) – OPEN

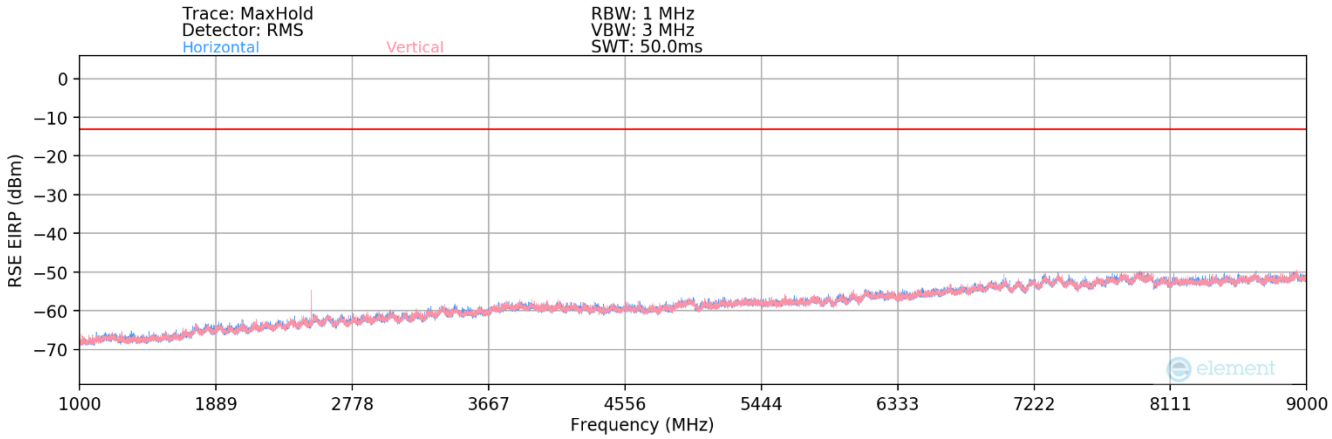
Mode:	GPRS 1 Tx Slot
Channel:	251
Frequency (MHz):	848.8

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]
495.55	H	-	-	-80.42	24.67	51.25	-46.16	-13.00	-33.16
787.93	H	-	-	-80.88	28.80	54.92	-42.49	-13.00	-29.49
914.86	H	-	-	-81.08	30.58	56.50	-40.90	-13.00	-27.90

Table 7-20. Radiated Spurious Data Below 1GHz (GPRS Cell) – CLOSE



Plot 7-54. Radiated Spurious Plot Above 1GHz (GPRS Cell) – CLOSE



Plot 7-55. Radiated Spurious Plot Above 1Ghz (GPRS Cell) – OPEN

Mode:	GPRS 1 Tx Slot
Channel:	128
Frequency (MHz):	824.2

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]
1648.40	H	150	325	-64.61	-9.16	33.23	-62.02	-13.00	-49.02
2472.60	H	151	324	-58.85	-5.34	42.81	-52.44	-13.00	-39.44
3296.80	H	-	-	-66.55	-2.19	38.26	-57.00	-13.00	-44.00
4121.00	H	-	-	-67.46	0.02	39.56	-55.70	-13.00	-42.70
4945.20	H	-	-	-68.20	0.98	39.78	-55.47	-13.00	-42.47
5769.40	H	-	-	-68.21	2.91	41.70	-53.56	-13.00	-40.56
6593.60	H	-	-	-68.61	4.70	43.09	-52.17	-13.00	-39.17

Table 7-21. Radiated Spurious Data Above 18GHz (GPRS Cell – Low Channel) – CLOSE

Mode:	GPRS 1 Tx Slot
Channel:	190
Frequency (MHz):	836.6

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]
1673.20	H	146	324	-64.02	-8.86	34.12	-61.14	-13.00	-48.14
2509.80	H	136	309	-63.89	-4.96	38.15	-57.10	-13.00	-44.10
3346.40	H	-	-	-67.27	-1.41	38.32	-56.94	-13.00	-43.94
4183.00	H	-	-	-67.76	0.08	39.32	-55.94	-13.00	-42.94
5019.60	H	-	-	-68.18	0.76	39.58	-55.68	-13.00	-42.68
5856.20	H	-	-	-67.92	1.88	40.96	-54.29	-13.00	-41.29
6692.80	H	-	-	-68.40	4.68	43.28	-51.98	-13.00	-38.98

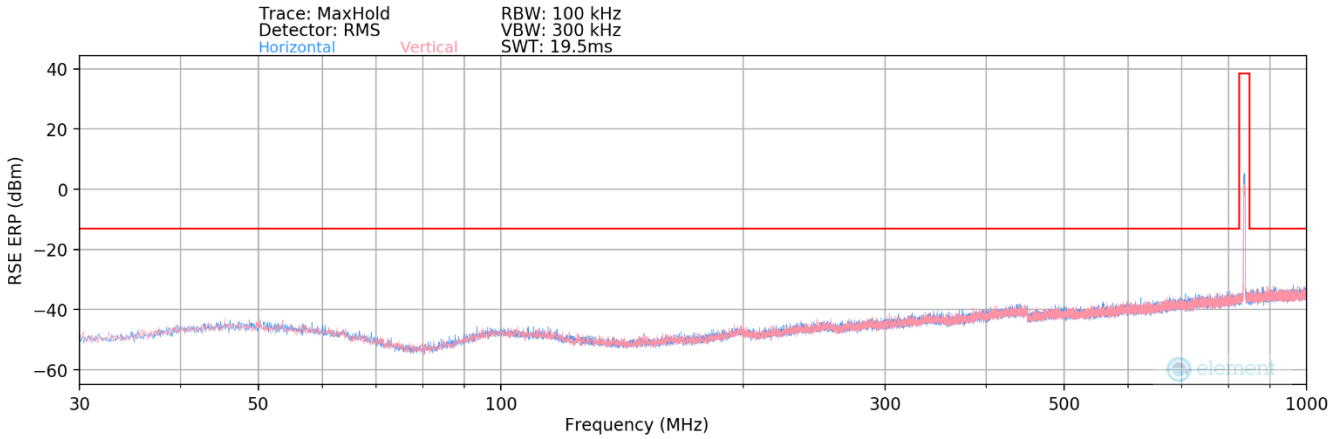
Table 7-22. Radiated Spurious Data Above 18GHz (GPRS Cell – Mid Channel) – CLOSE

Mode:	GPRS 1 Tx Slot
Channel:	251
Frequency (MHz):	848.8

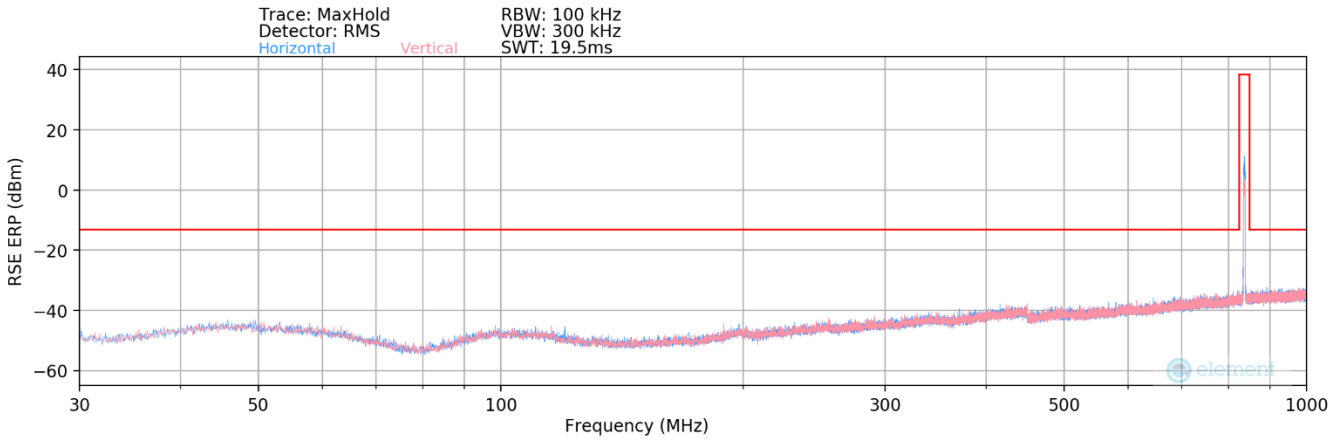
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1697.60	H	144	321	-62.79	-8.52	35.69	-59.57	-13.00	-46.57
2546.40	H	151	324	-59.97	-4.50	42.53	-52.73	-13.00	-39.73
3395.20	H	-	-	-67.83	-1.26	37.91	-57.35	-13.00	-44.35
4244.00	H	-	-	-67.55	-0.63	38.82	-56.44	-13.00	-43.44
5092.80	H	-	-	-67.34	1.06	40.72	-54.54	-13.00	-41.54
5941.60	H	-	-	-67.91	2.60	41.69	-53.57	-13.00	-40.57
6790.40	H	-	-	-68.91	5.09	43.18	-52.08	-13.00	-39.08

Table 7-23. Radiated Spurious Data Above 18GHz (GPRS Cell – High Channel) – CLOSE

WCDMA Cell



Plot 7-56. Radiated Spurious Plot Below 1GHz (WCDMA Cell) – HALF OPEN

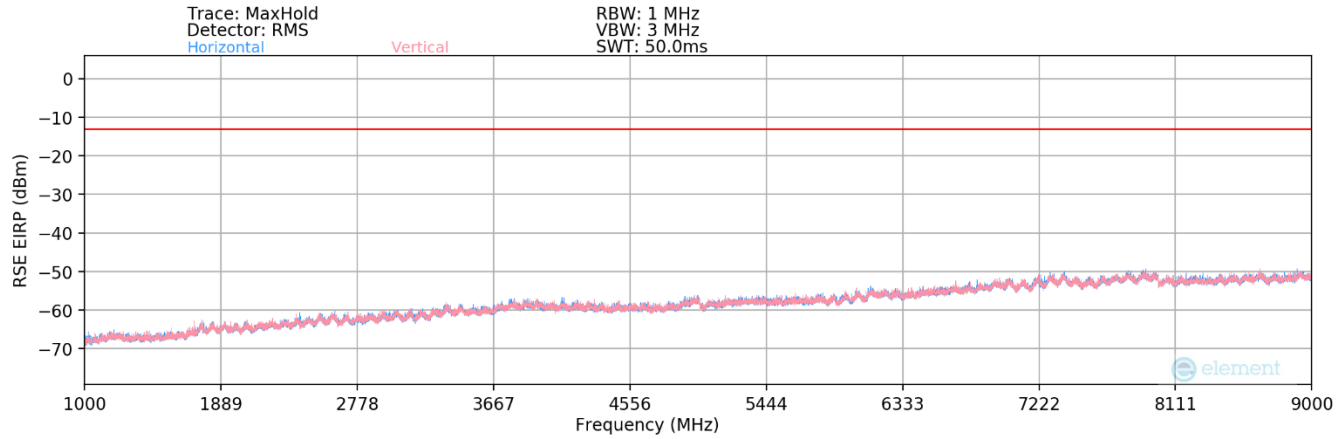


Plot 7-57. Radiated Spurious Plot Below 1GHz (WCDMA Cell) – OPEN

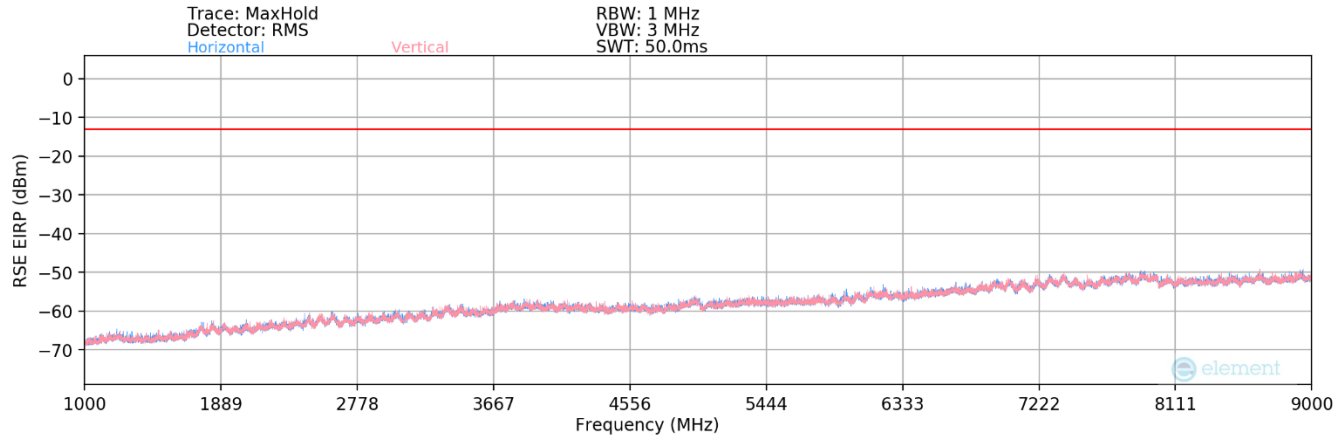
Mode:	WCDMA RMC
Channel:	4233
Frequency (MHz):	846.6

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]
460.67	H	-	-	-80.05	23.62	50.57	-46.84	-13.00	-33.84
553.94	H	-	-	-82.40	25.42	50.02	-47.39	-13.00	-34.39
861.32	H	-	-	-82.09	30.13	55.04	-42.36	-13.00	-29.36

Table 7-24. Radiated Spurious Data Below 1GHz (WCDMA Cell) – HALF OPEN



Plot 7-58. Radiated Spurious Plot Above 1GHz (WCDMA Cell) – HALF OPEN



Plot 7-59. Radiated Spurious Plot Above 1GHz (WCDMA Cell) – OPEN

Mode:	WCDMA RMC
Channel:	4132
Frequency (MHz):	826.4

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]
1652.80	H	239	205	-74.56	-9.11	23.33	-71.93	-13.00	-58.93
2479.20	H	-	-	-75.18	-5.28	26.54	-68.72	-13.00	-55.72
3305.60	H	-	-	-75.97	-2.01	29.02	-66.24	-13.00	-53.24
4132.00	H	-	-	-75.51	-0.16	31.33	-63.93	-13.00	-50.93
4958.40	H	-	-	-76.62	1.20	31.58	-63.68	-13.00	-50.68
5784.80	H	-	-	-77.11	3.05	32.94	-62.32	-13.00	-49.32

Table 7-25. Radiated Spurious Data Above 1GHz (WCDMA Cell) – HALF OPEN

Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6

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]
1673.20	H	244	203	-72.94	-8.86	25.20	-70.06	-13.00	-57.06
2509.80	H	-	-	-75.63	-4.96	26.41	-68.84	-13.00	-55.84
3346.40	H	-	-	-75.56	-1.41	30.03	-65.23	-13.00	-52.23
4183.00	H	-	-	-76.29	0.08	30.79	-64.47	-13.00	-51.47
5019.60	H	-	-	-76.23	0.76	31.53	-63.73	-13.00	-50.73
5856.20	H	-	-	-76.73	1.88	32.15	-63.10	-13.00	-50.10

Table 7-26. Radiated Spurious Data Above 1GHz (WCDMA Cell – Mid Channel) – HALF OPEN

Mode:	WCDMA RMC
Channel:	4233
Frequency (MHz):	846.6

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]
1693.20	H	243	201	-71.82	-8.57	26.61	-68.65	-13.00	-55.65
2539.80	H	-	-	-74.60	-4.50	27.90	-67.36	-13.00	-54.36
3386.40	H	-	-	-76.00	-1.23	29.77	-65.49	-13.00	-52.49
4233.00	H	-	-	-75.41	-0.46	31.13	-64.12	-13.00	-51.12
5079.60	H	-	-	-76.03	1.12	32.09	-63.16	-13.00	-50.16
5926.20	H	-	-	-76.55	1.83	32.28	-62.98	-13.00	-49.98

Table 7-27. Radiated Spurious Data Above 1GHz (WCDMA Cell – High Channel) – HALF OPEN

7.7 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 22 and RSS-132, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency.

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

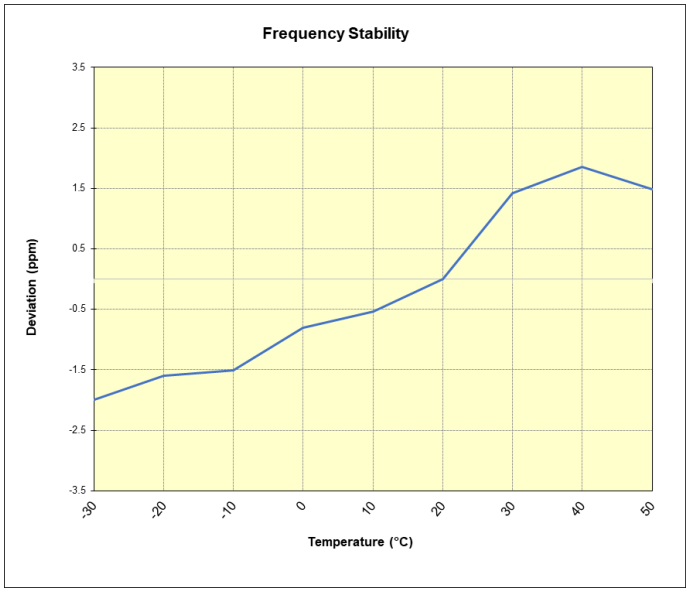
None

LTE Band 5

LTE Band 5	
Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	4.15
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.15	- 30	836,547,259	-1,666	-0.0001992
		- 20	836,547,589	-1,336	-0.0001597
		- 10	836,547,666	-1,259	-0.0001505
		0	836,548,249	-676	-0.0000808
		+ 10	836,548,479	-446	-0.0000533
		+ 20 (Ref)	836,548,925	0	0.0000000
		+ 30	836,550,111	1,186	0.0001418
		+ 40	836,550,479	1,554	0.0001858
		+ 50	836,550,170	1,245	0.0001488
Battery Endpoint	3.71	+ 20	836,549,847	922	0.0001102

Table 7-28. LTE Band 5 Frequency Stability Data



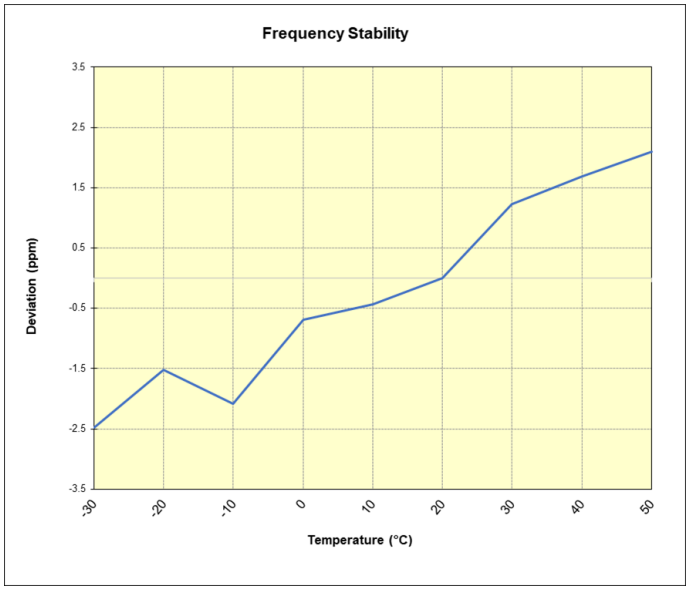
Plot 7-60. LTE Band 5 Frequency Stability Chart

NR Band n5

NR Band n5	
Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	4.15
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.15	- 30	836,512,147	-2,075	-0.0002481
		- 20	836,512,947	-1,275	-0.0001524
		- 10	836,512,478	-1,744	-0.0002085
		0	836,513,647	-575	-0.0000687
		+ 10	836,513,861	-361	-0.0000432
		+ 20 (Ref)	836,514,222	0	0.0000000
		+ 30	836,515,247	1,025	0.0001225
		+ 40	836,515,634	1,412	0.0001688
		+ 50	836,515,978	1,756	0.0002099
Battery Endpoint	3.71	+ 20	836,515,474	1,252	0.0001497

Table 7-29. NR Band n5 Frequency Stability Data



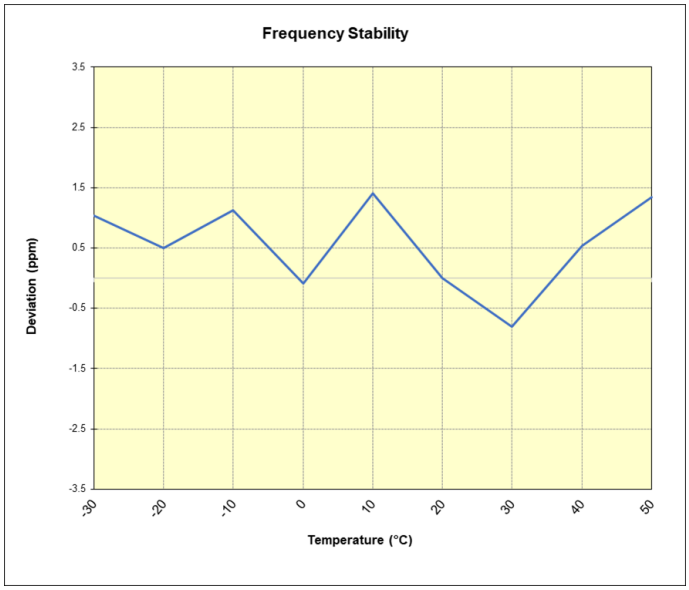
Plot 7-61. NR Band n5 Frequency Stability Chart

GSM/GPRS Cellular

Operating Frequency (Hz):	836,600,000
Ref. Voltage (VDC):	4.15
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.15	- 30	836,617,989	870	0.0001040
		- 20	836,617,541	422	0.0000504
		- 10	836,618,066	947	0.0001132
		0	836,617,044	-75	-0.0000090
		+ 10	836,618,299	1,180	0.0001410
		+ 20 (Ref)	836,617,119	0	0.0000000
		+ 30	836,616,444	-675	-0.0000807
		+ 40	836,617,569	450	0.0000538
		+ 50	836,618,247	1,128	0.0001348
Battery Endpoint	3.71	+ 20	836,618,427	1,308	0.0001563

Table 7-30. GSM/GPRS Cell Frequency Stability Data



Plot 7-62. GSM/GPRS Cell Frequency Stability Chart

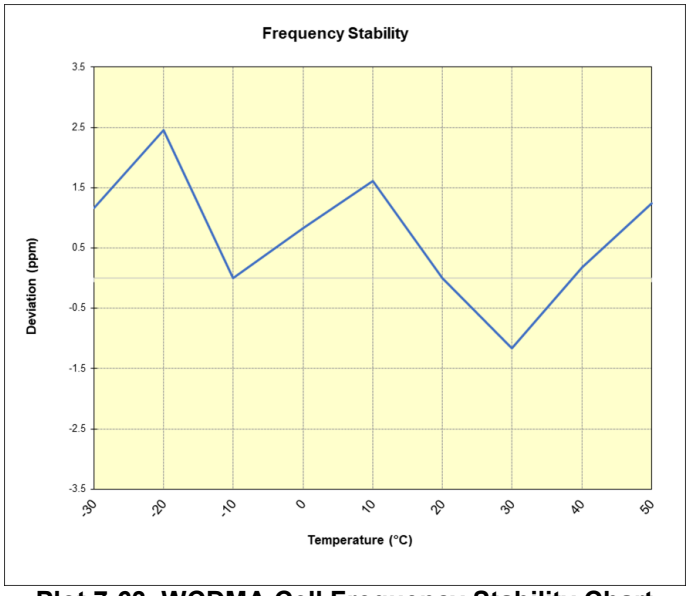
WCDMA Cell

WCDMA Cellular

Operating Frequency (Hz):	836,600,000
Ref. Voltage (VDC):	4.15
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.15	- 30	836,490,522	975	0.0001166
		- 20	836,491,599	2,052	0.0002453
		- 10	836,489,544	-3	-0.0000004
		0	836,490,245	698	0.0000834
		+ 10	836,490,899	1,352	0.0001616
		+ 20 (Ref)	836,489,547	0	0.0000000
		+ 30	836,488,578	-969	-0.0001158
		+ 40	836,489,699	152	0.0000182
		+ 50	836,490,589	1,042	0.0001246
Battery Endpoint	3.71	+ 20	836,490,874	1,327	0.0001586

Table 7-31. WCDMA Cell Frequency Stability Data



Plot 7-63. WCDMA Cell 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: A3LSMF731JPN** complies with all the requirements of Part 22 of the FCC rules.