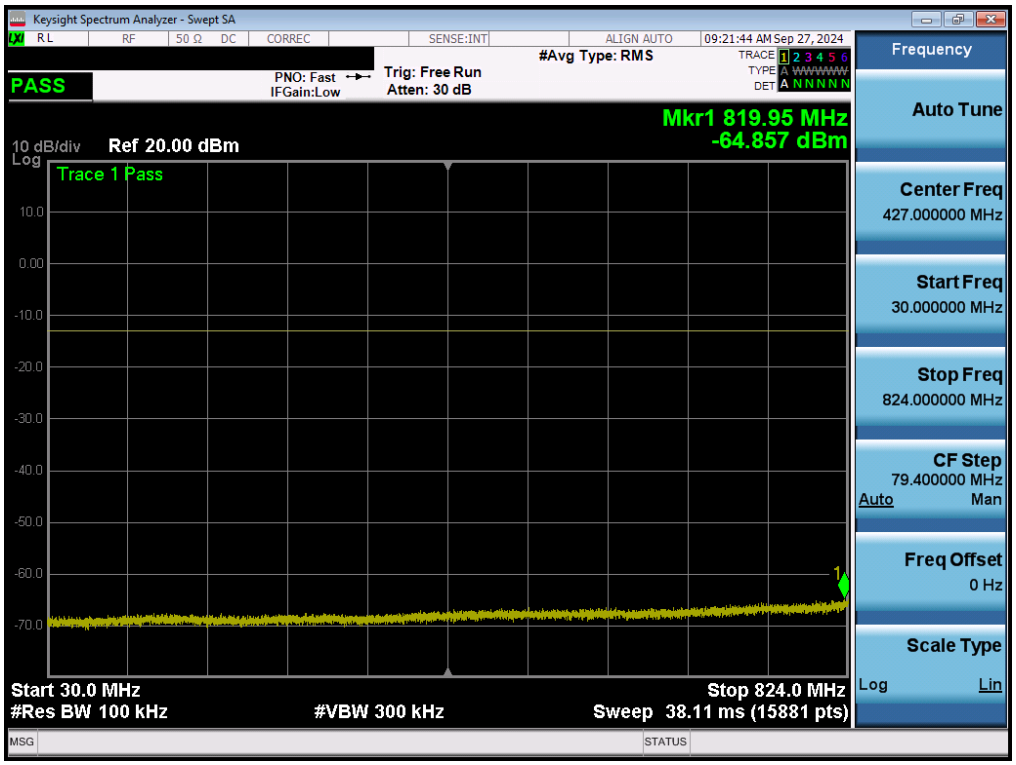
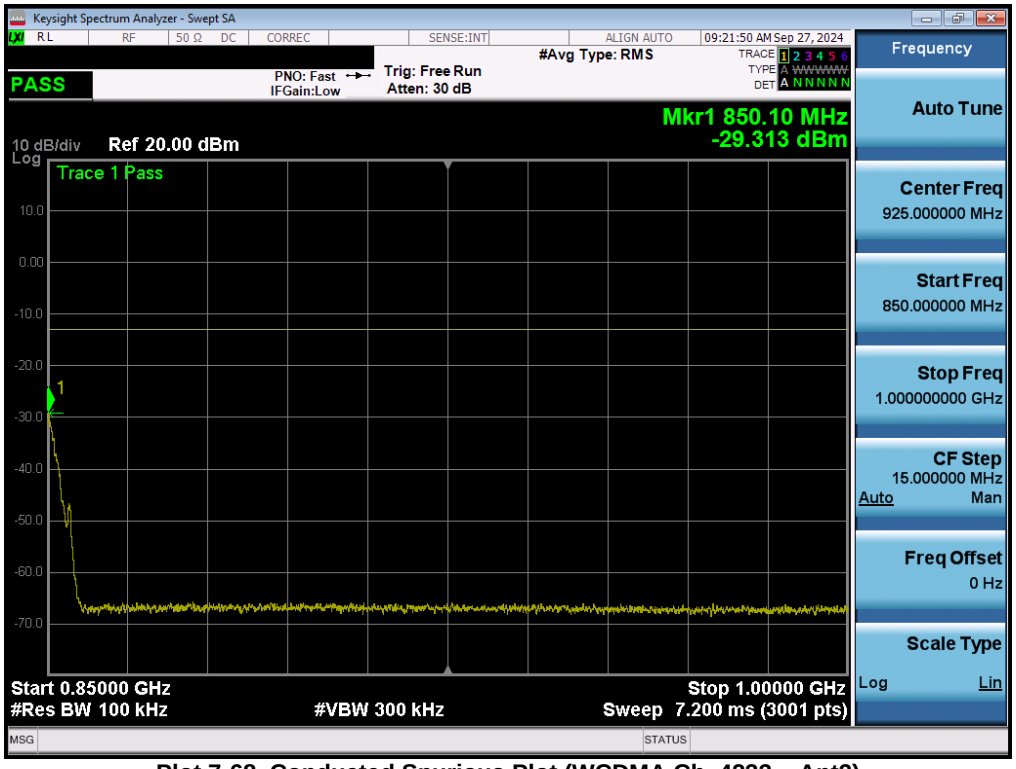
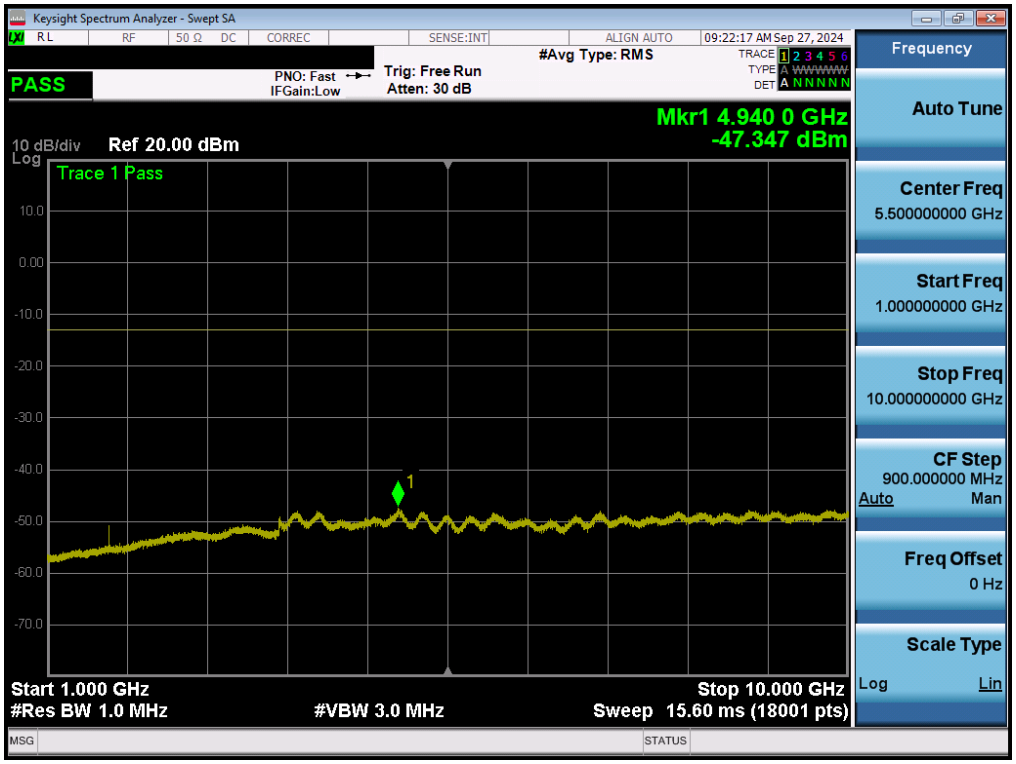
WCDMA Cell – Ant2



Plot 7-67. Conducted Spurious Plot (WCDMA Ch. 4233 – Ant2)

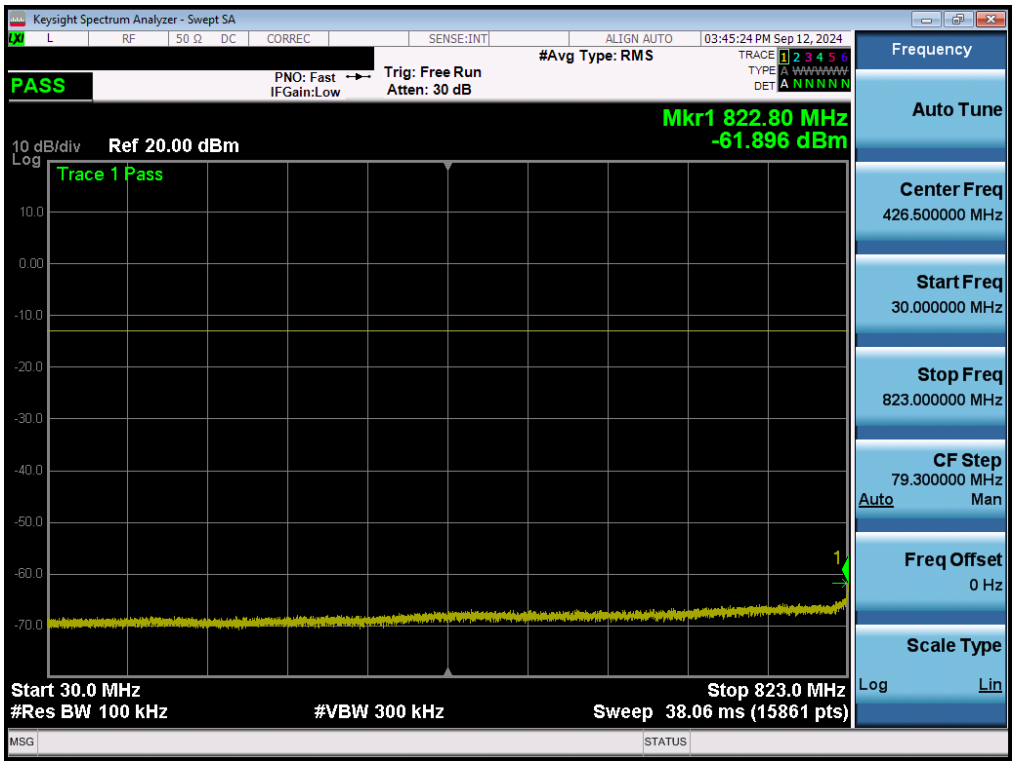


Plot 7-68. Conducted Spurious Plot (WCDMA Ch. 4233 – Ant2)

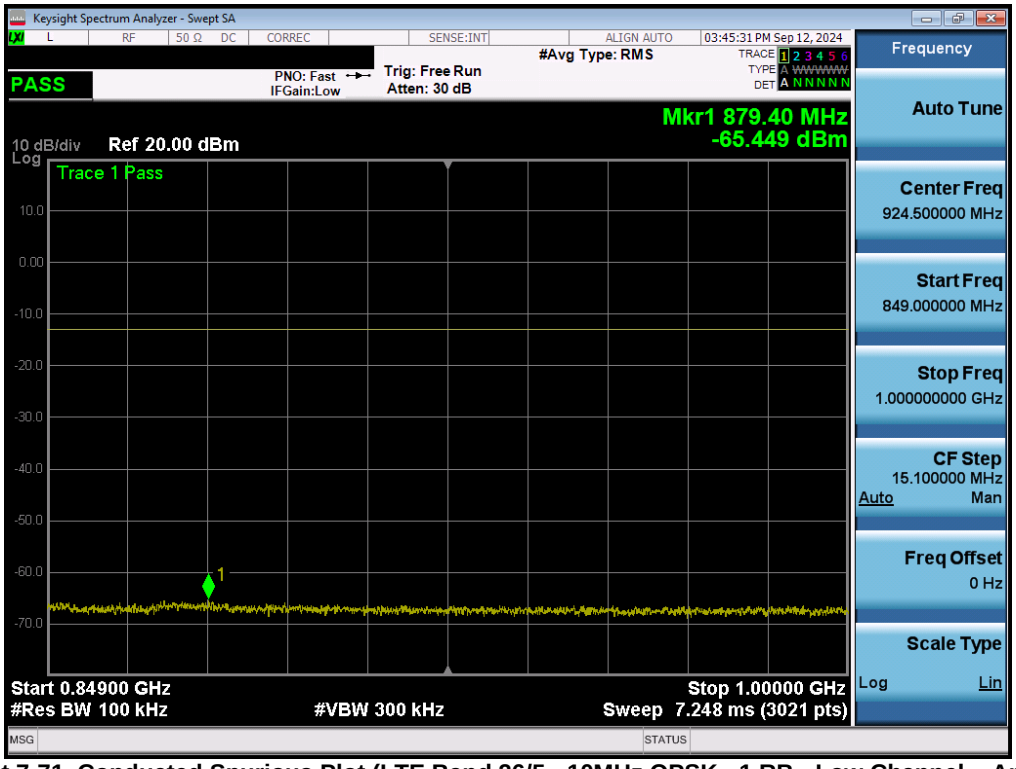


Plot 7-69. Conducted Spurious Plot (WCDMA Ch. 4233 – Ant2)

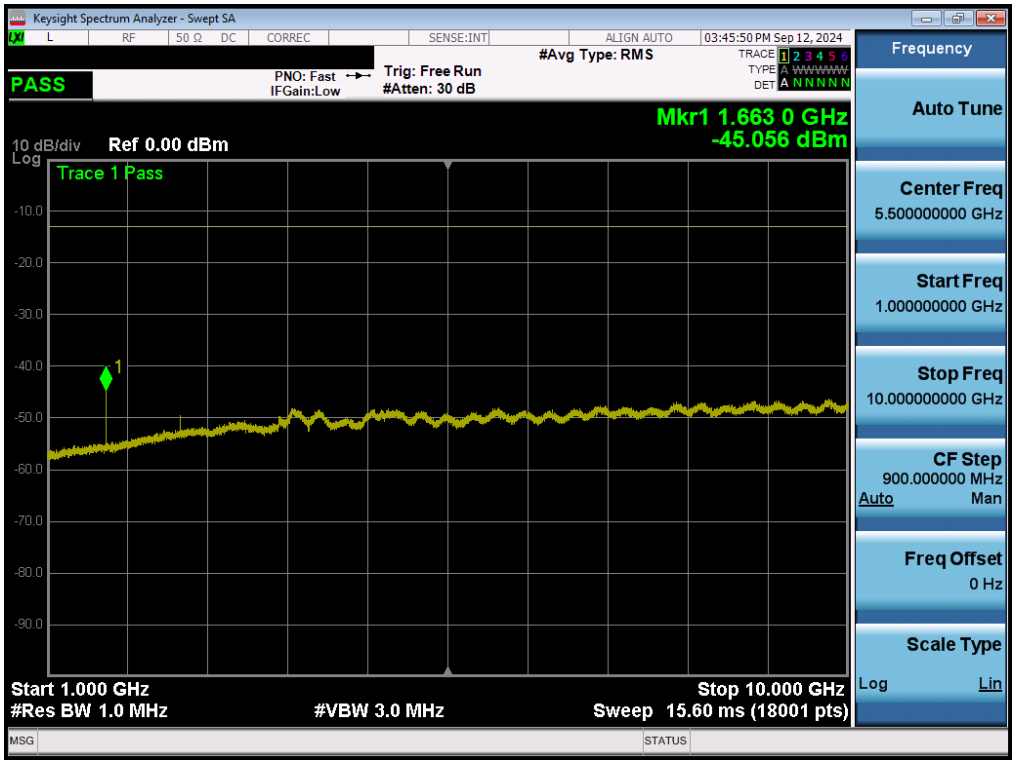
LTE Band 26/5 – Ant2



Plot 7-70. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel – Ant2)

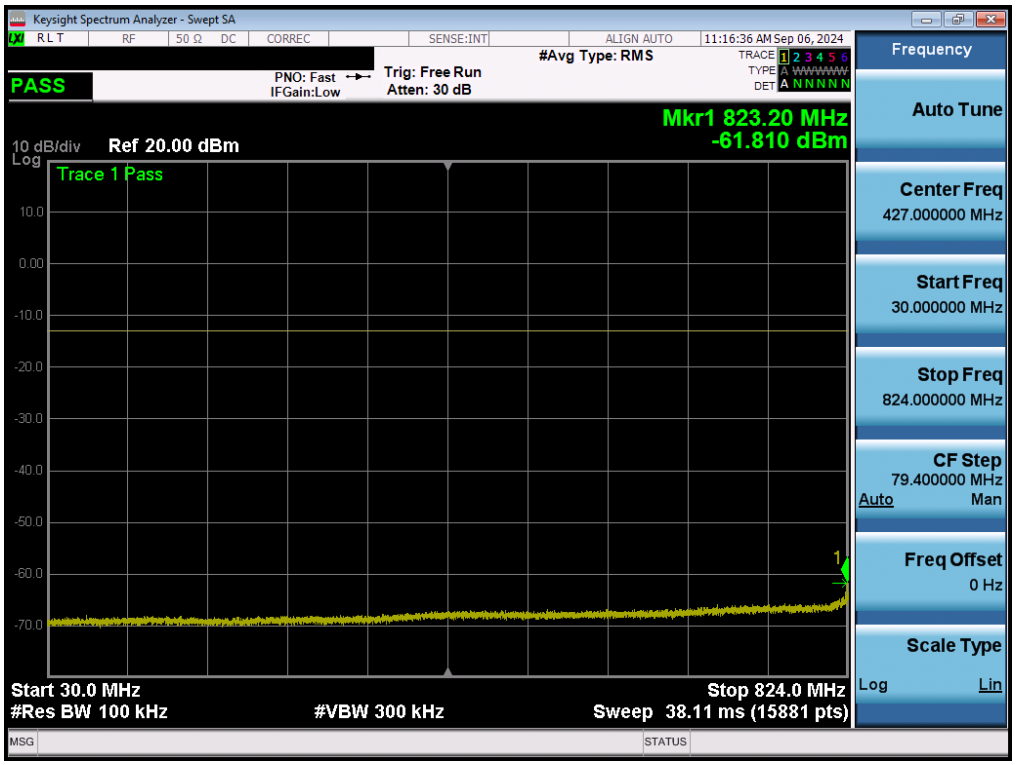


Plot 7-71. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel – Ant2)

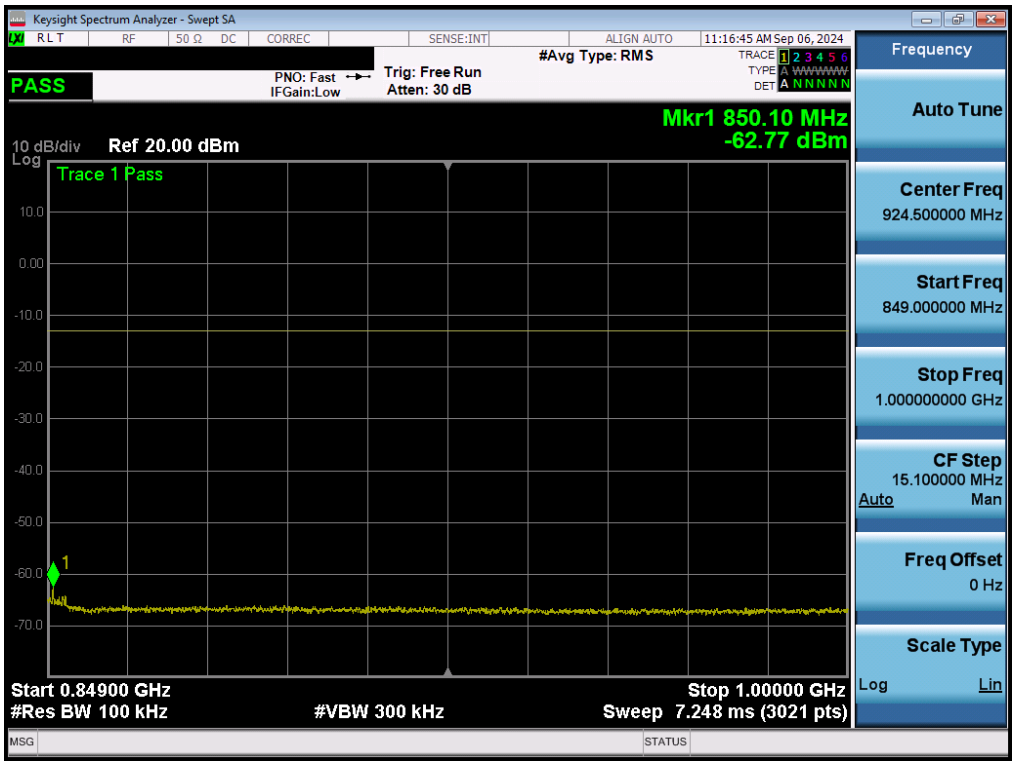


Plot 7-72. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel – Ant2)

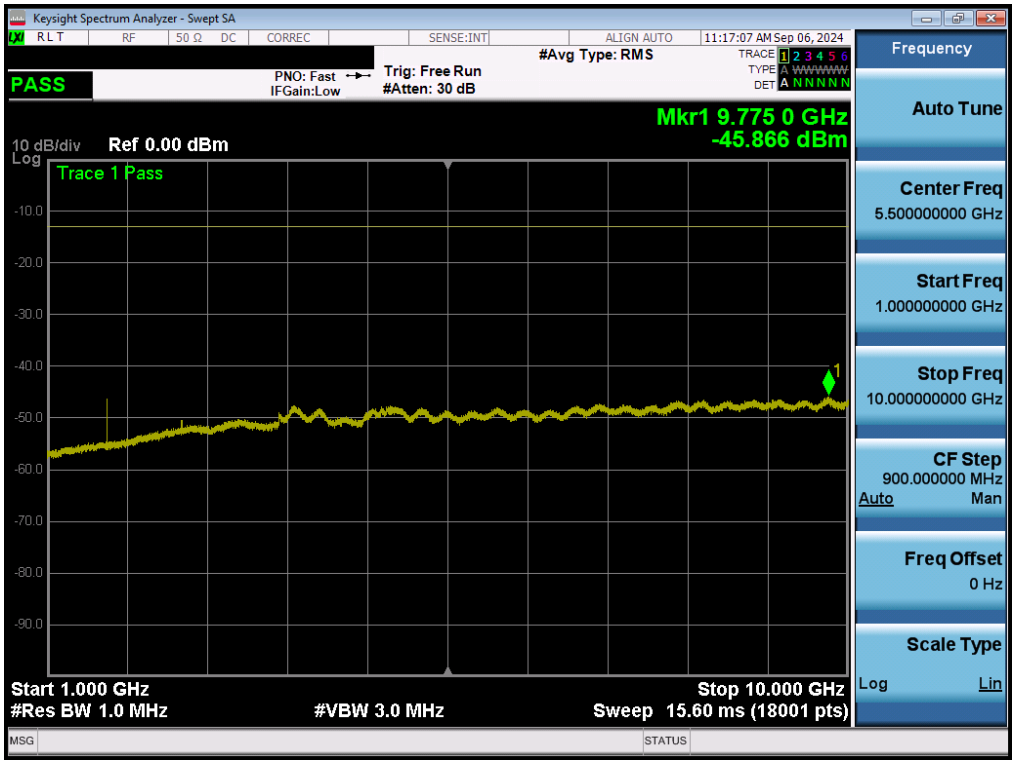
NR Band n26/5 – Ant2



Plot 7-73. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Mid Channel - Ant2)



Plot 7-74. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Mid Channel - Ant2)



Plot 7-75. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Mid Channel - Ant2)

7.4 Band Edge Emissions at Antenna Terminal

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates 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.

The minimum permissible attenuation level of any spurious emission is 43 + 10 $log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.3

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1% of the emission bandwidth
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Setup

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

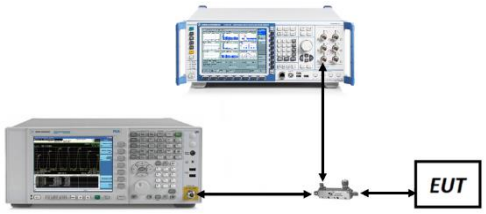


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

1. Per 22.917(b) and RSS-132(5.5), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

2. 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.

Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
GSM-Cell	250kHz	Low	Band Edge	-22.04	-13	-9.04
		High	Band Edge	-17.60	-13	-4.60
WCDMA-Cell	5MHz	Low	Band Edge	-18.64	-13	-5.64
		High	Band Edge	-19.23	-13	-6.23
LTE-B26-5	15 MHz	Low	Band Edge	-24.55	-13	-11.55
		High	Band Edge	-27.98	-13	-14.98
	10 MHz	Low	Band Edge	-23.01	-13	-10.01
		High	Band Edge	-25.47	-13	-12.47
	5 MHz	Low	Band Edge	-19.56	-13	-6.56
		High	Band Edge	-20.24	-13	-7.24
	3 MHz	Low	Band Edge	-15.35	-13	-2.35
		High	Band Edge	-17.72	-13	-4.72
	1.4 MHz	Low	Band Edge	-15.21	-13	-2.21
		High	Band Edge	-17.73	-13	-4.73
NR-n26-5	20 MHz	Low	Band Edge	-24.98	-13	-11.98
		High	Band Edge	-27.31	-13	-14.31
	15 MHz	Low	Band Edge	-25.68	-13	-12.68
		High	Band Edge	-27.44	-13	-14.44
	10 MHz	Low	Band Edge	-23.84	-13	-10.84
		High	Band Edge	-24.99	-13	-11.99
	5 MHz	Low	Band Edge	-19.44	-13	-6.44
		High	Band Edge	-20.33	-13	-7.33

Table 7-10. Conducted Band Edge Results – Ant1

GSM/GPRS Cell – Ant1

Plot 7-76. Lower Band Edge Plot (GPRS Cell – Ch. 128 – Ant1)

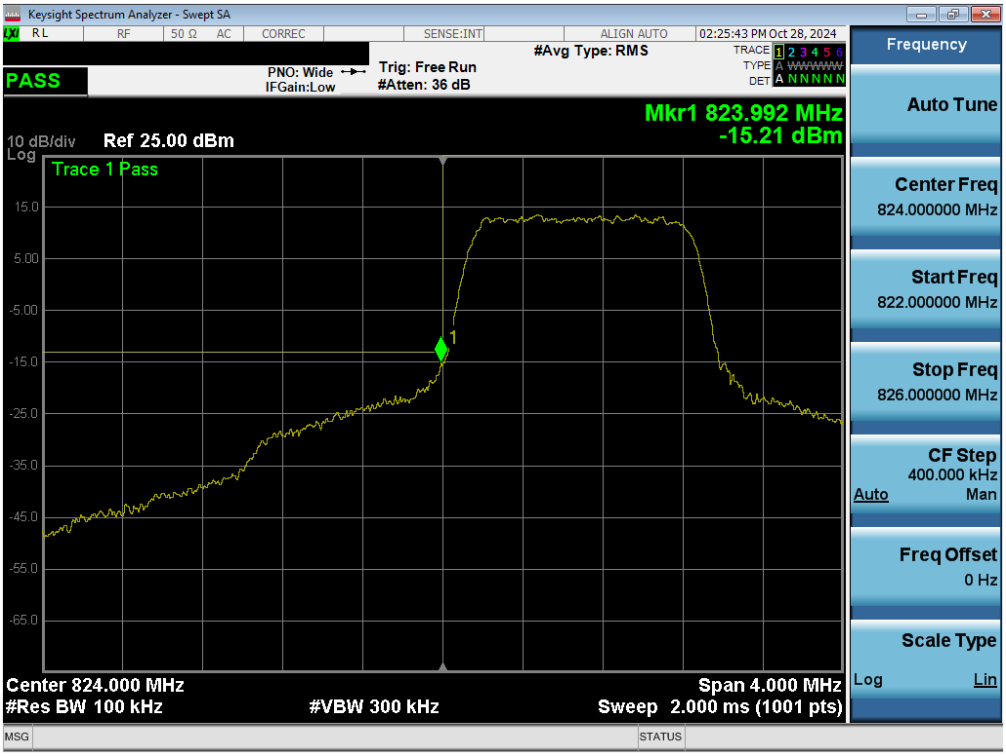
Plot 7-77. Upper Band Edge Plot (GPRS Cell – Ch. 251 – Ant1)

WCDMA Cell – Ant1

Plot 7-78. Lower Band Edge Plot (WCDMA Cell – Ch. 4132 – Ant1)

Plot 7-79. Upper Band Edge Plot (WCDMA Cell – Ch. 4233 – Ant1)

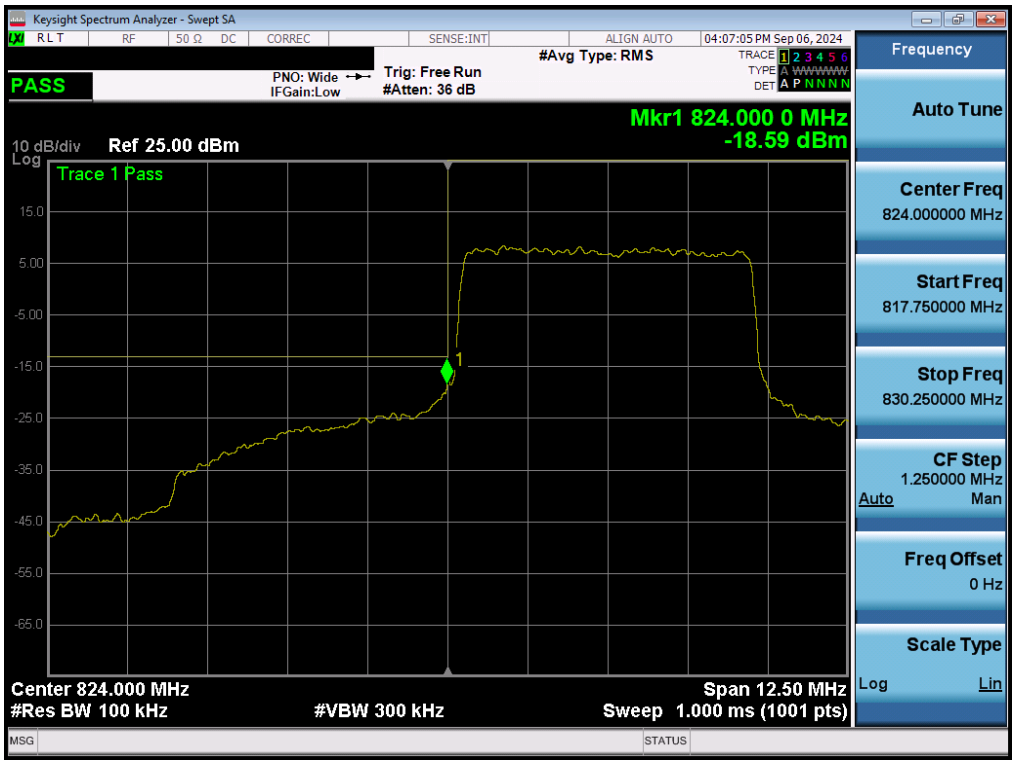
LTE Band 26/5 – Ant1



Plot 7-80. Lower Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB - Ant1)

Plot 7-81. Upper Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB - Ant1)

NR Band n26/5 – Ant1



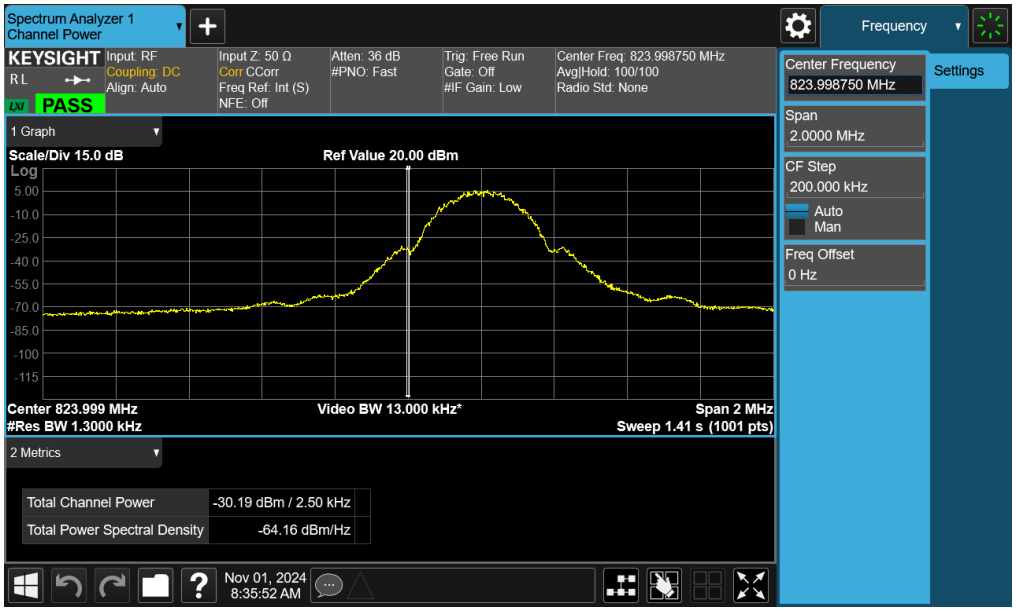
Plot 7-82. Lower Band Edge Plot (NR Band n26/5 – 5.0MHz - Full RB - Ant1)

Plot 7-83. Upper Band Edge Plot (NR Band n26/5 – 5.0MHz - Full RB - Ant1)

Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
GSM-Cell	250kHz	Low	Band Edge	-30.19	-13	-17.19
		High	Band Edge	-39.22	-13	-26.22
WCDMA-Cell	5MHz	Low	Band Edge	-18.29	-13	-5.29
		High	Band Edge	-19.29	-13	-6.29
LTE-B26-5	15 MHz	Low	Band Edge	-24.90	-13	-11.90
		High	Band Edge	-27.90	-13	-14.90
	10 MHz	Low	Band Edge	-22.68	-13	-9.68
		High	Band Edge	-26.29	-13	-13.29
	5 MHz	Low	Band Edge	-18.75	-13	-5.75
		High	Band Edge	-21.04	-13	-8.04
	3 MHz	Low	Band Edge	-16.21	-13	-3.21
		High	Band Edge	-17.61	-13	-4.61
	1.4 MHz	Low	Band Edge	-15.56	-13	-2.56
		High	Band Edge	-16.83	-13	-3.83
NR-n26-5	20 MHz	Low	Band Edge	-25.68	-13	-12.68
		High	Band Edge	-27.75	-13	-14.75
	15 MHz	Low	Band Edge	-24.67	-13	-11.67
		High	Band Edge	-27.43	-13	-14.43
	10 MHz	Low	Band Edge	-23.77	-13	-10.77
		High	Band Edge	-25.12	-13	-12.12
	5 MHz	Low	Band Edge	-18.82	-13	-5.82
		High	Band Edge	-19.30	-13	-6.30

Table 7-11. Conducted Band Edge Results – Ant2

GSM/GPRS Cell – Ant2



Plot 7-84. Lower Band Edge Plot (GPRS Cell – Ch. 128 – Ant2)

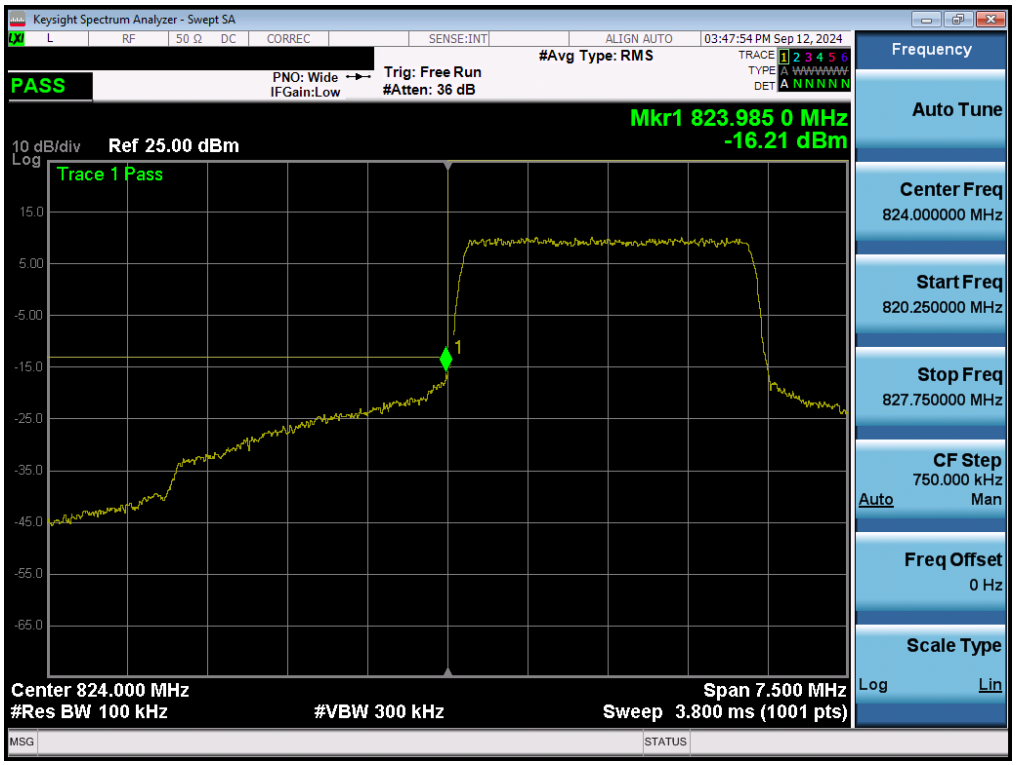
Plot 7-85. Upper Band Edge Plot (GPRS Cell – Ch. 251 – Ant2)

WCDMA Cell – Ant2

Plot 7-86. Lower Band Edge Plot (WCDMA Cell – Ch. 4132 – Ant2)

Plot 7-87. Upper Band Edge Plot (WCDMA Cell – Ch. 4233 – Ant2)

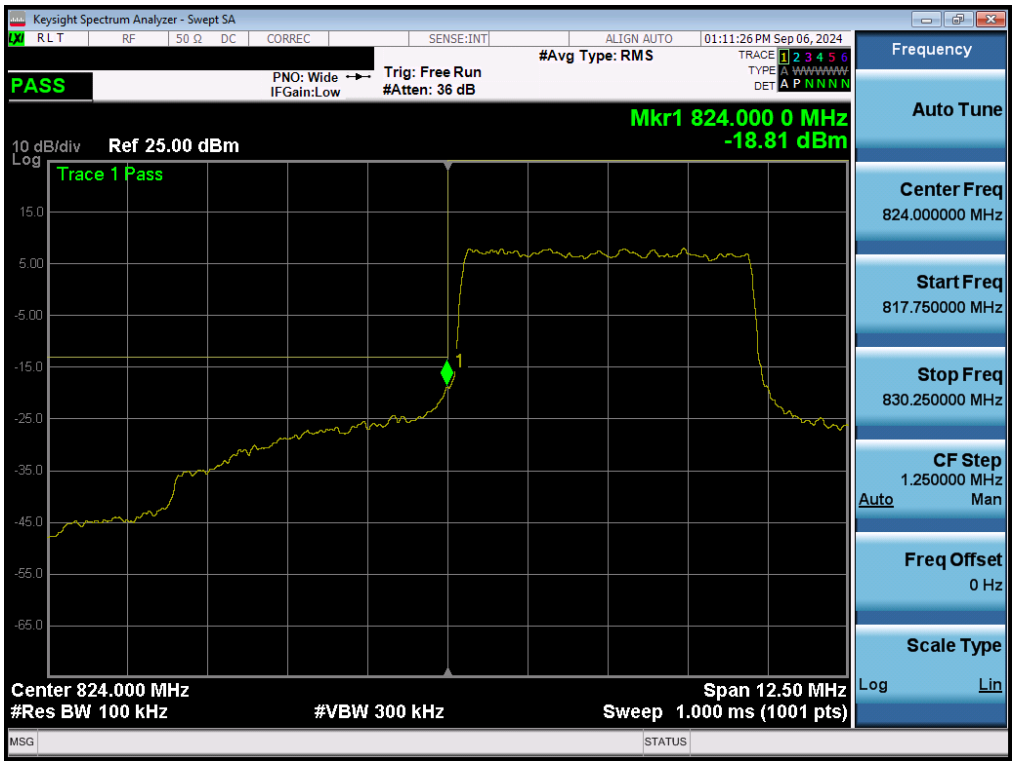
LTE Band 26/5 – Ant2



Plot 7-88. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB - Ant2)

Plot 7-89. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB - Ant2)

NR Band n26/5 – Ant2



Plot 7-90. Lower Band Edge Plot (NR Band n26/5 – 5.0MHz - Full RB - Ant2)

Plot 7-91. Upper Band Edge Plot (NR Band n26/5 – 5.0MHz - Full RB - Ant2)

7.5 Radiated Power (ERP)

Test Overview

Effective Radiated Power (ERP) 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.

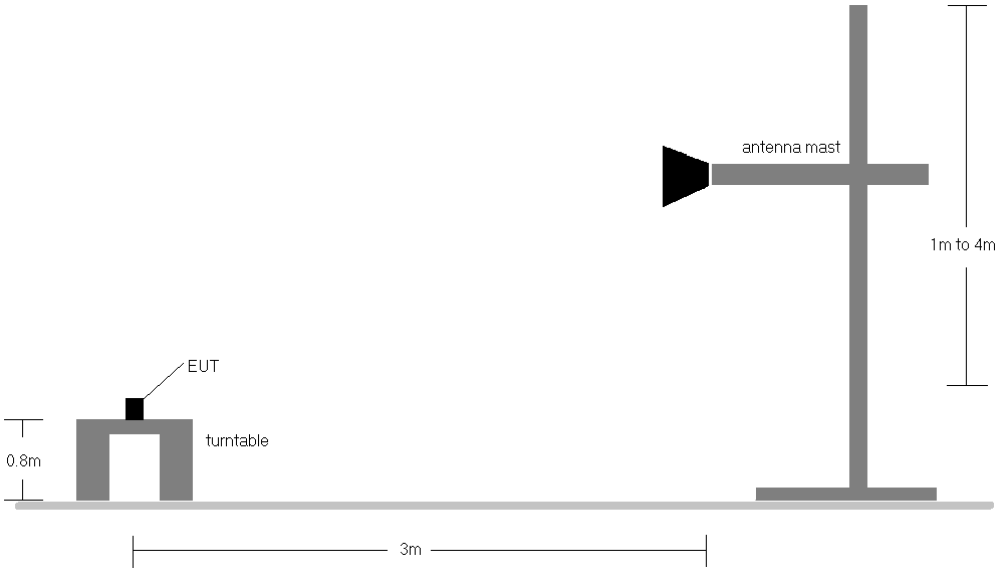


Figure 7-4. Radiated Test Setup < 1GHz

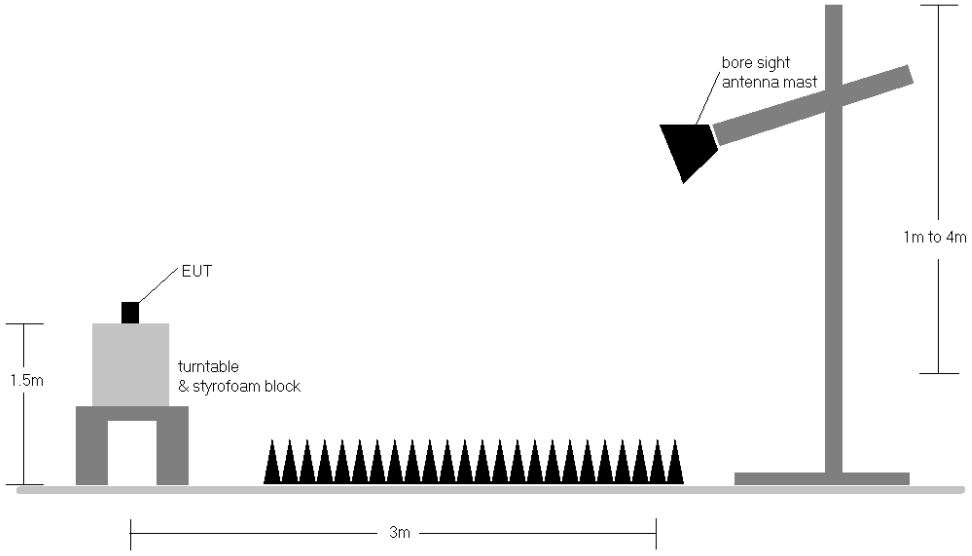


Figure 7-5. Radiated Test Setup > 1GHz

Test Notes

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

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

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst-case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

4) This unit was tested with its standard battery.

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

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GSM850	V	202	189	30.41	1.09	29.35	0.862	38.45	-9.10
836.60	GSM850	V	183	195	30.53	1.36	**29.74**	**0.941**	38.45	-8.72
848.80	GSM850	V	188	191	29.92	1.61	29.38	0.867	38.45	-9.07
836.60	EDGE850	V	183	195	23.38	1.36	**22.59**	0.181	38.45	-15.87
836.60	GSM850 (WCP)	V	197	261	29.50	1.36	28.71	0.742	38.45	-9.75

Table 7-12. ERP Data (GPRS Cell – Ant1)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	H	222	250	19.97	1.38	19.20	0.083	38.45	-19.25
836.60	WCDMA850	H	225	254	20.22	1.54	19.61	0.092	38.45	-18.84
846.60	WCDMA850	H	215	256	20.14	1.71	**19.70**	**0.093**	38.45	-18.75
846.60	WCDMA850	V	115	282	19.21	1.56	18.62	0.073	38.45	-19.83
846.60	WCDMA850 (WCP)	H	124	190	18.73	1.71	18.29	0.067	38.45	-20.16

Table 7-13. ERP Data (WCDMA Cell – Ant1)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
15MHz (Band 26 only)	QPSK	831.50	H	218	241	1.46	1 / 37	21.24	20.55	0.114	38.45	-17.90
	QPSK	836.50	H	221	241	1.54	1 / 0	21.32	20.71	0.118	38.45	-17.74
	QPSK	841.50	H	221	241	1.62	1 / 37	21.33	**20.80**	0.120	38.45	-17.65
	16-QAM	841.50	H	221	241	1.62	1 / 37	20.55	20.02	0.101	38.45	-18.43
10 MHz	QPSK	829.00	H	218	241	1.42	1 / 25	21.25	20.52	0.113	38.45	-17.93
	QPSK	836.50	H	221	241	1.54	1 / 25	21.37	**20.76**	0.119	38.45	-17.69
	QPSK	844.00	H	221	241	1.66	1 / 0	21.17	20.69	0.117	38.45	-17.76
	16-QAM	844.00	H	221	241	1.66	1 / 25	20.67	20.19	0.104	38.45	-18.26
5 MHz	QPSK	826.50	H	218	241	1.38	1 / 0	21.55	20.78	0.120	38.45	-17.67
	QPSK	836.50	H	221	241	1.54	1 / 12	21.40	**20.80**	0.120	38.45	-17.65
	QPSK	846.50	H	221	241	1.70	1 / 24	21.15	20.71	0.118	38.45	-17.74
	16-QAM	846.50	H	221	241	1.70	1 / 24	20.78	20.33	0.108	38.45	-18.12
3 MHz	QPSK	825.50	H	218	241	1.36	1 / 7	21.37	20.58	0.114	38.45	-17.87
	QPSK	836.50	H	221	241	1.54	1 / 0	21.50	**20.89**	0.123	38.45	-17.56
	QPSK	847.50	H	221	241	1.72	1 / 0	21.25	20.82	0.121	38.45	-17.63
	16-QAM	847.50	H	221	241	1.72	1 / 0	20.63	20.20	0.105	38.45	-18.25
1.4 MHz	QPSK	824.70	H	218	241	1.35	1 / 0	21.49	20.69	0.117	38.45	-17.76
	QPSK	836.50	H	221	241	1.54	1 / 5	21.22	20.62	0.115	38.45	-17.84
	QPSK	848.30	H	221	241	1.73	1 / 0	21.31	**20.89**	0.123	38.45	-17.56
	16-QAM	848.30	H	221	241	1.73	1 / 0	20.53	20.11	0.103	38.45	-18.34
15MHz	QPSK (Opposite Pol.)	841.50	V	137	245	1.46	1 / 37	20.98	20.29	0.107	38.45	-18.16
	QPSK (WCP)	841.50	H	336	213	1.62	1 / 74	17.29	16.76	0.047	38.45	-21.69

Table 7-14. ERP Data (LTE Band 26/5 – Ant1)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	834.00	H	222	243	1.50	1 / 104	20.84	20.19	0.105	38.45	-18.26
	π/2 BPSK	836.50	H	225	235	1.54	1 / 53	20.83	20.22	0.105	38.45	-18.23
	π/2 BPSK	839.00	H	222	234	1.58	1 / 53	20.97	**20.40**	0.110	38.45	-18.05
	QPSK	834.00	H	222	243	1.50	1 / 104	20.74	20.09	0.102	38.45	-18.36
	QPSK	836.50	H	225	235	1.54	1 / 53	20.78	20.17	0.104	38.45	-18.28
	QPSK	839.00	H	222	234	1.58	1 / 53	20.82	20.25	0.106	38.45	-18.20
	16-QAM	839.00	H	222	234	1.58	1 / 53	19.71	19.14	0.082	38.45	-19.31
15 MHz	π/2 BPSK	831.50	H	222	243	1.46	1 / 1	20.94	20.25	0.106	38.45	-18.20
	π/2 BPSK	836.50	H	225	235	1.54	1 / 1	20.82	20.22	0.105	38.45	-18.24
	π/2 BPSK	841.50	H	222	234	1.62	1 / 77	20.99	**20.46**	0.111	38.45	-17.99
	QPSK	831.50	H	222	243	1.46	1 / 1	20.84	20.15	0.103	38.45	-18.30
	QPSK	836.50	H	225	235	1.54	1 / 1	20.82	20.21	0.105	38.45	-18.24
	QPSK	841.50	H	222	234	1.62	1 / 77	20.93	20.41	0.110	38.45	-18.04
	16-QAM	836.50	H	225	235	1.54	1 / 1	19.85	19.24	0.084	38.45	-19.21
10 MHz	π/2 BPSK	829.00	H	222	243	1.42	1 / 50	21.07	20.34	0.108	38.45	-18.11
	π/2 BPSK	836.50	H	225	235	1.54	1 / 1	20.98	20.37	0.109	38.45	-18.08
	π/2 BPSK	844.00	H	222	234	1.66	1 / 1	20.92	**20.44**	0.111	38.45	-18.01
	QPSK	829.00	H	222	243	1.42	1 / 50	21.05	20.32	0.108	38.45	-18.13
	QPSK	836.50	H	225	235	1.54	1 / 1	21.01	20.41	0.110	38.45	-18.04
	QPSK	844.00	H	222	234	1.66	1 / 1	20.67	20.19	0.104	38.45	-18.27
	16-QAM	836.50	H	225	235	1.54	1 / 1	19.90	19.30	0.085	38.45	-19.15
5 MHz	π/2 BPSK	829.00	H	222	243	1.38	1 / 1	21.13	20.36	0.109	38.45	-18.09
	π/2 BPSK	836.50	H	225	235	1.54	1 / 1	21.00	20.39	0.109	38.45	-18.06
	π/2 BPSK	844.00	H	222	234	1.70	1 / 12	21.03	**20.58**	0.114	38.45	-17.87
	QPSK	829.00	H	222	243	1.38	1 / 1	20.92	20.15	0.104	38.45	-18.30
	QPSK	836.50	H	225	235	1.54	1 / 1	21.01	20.41	0.110	38.45	-18.05
	QPSK	844.00	H	222	234	1.70	1 / 12	20.82	20.37	0.109	38.45	-18.08
	16-QAM	836.50	H	225	235	1.54	1 / 1	19.96	19.36	0.086	38.45	-19.10
20 MHz	QPSK (CP-OFDM)	839.00	H	222	244	1.58	1 / 104	19.26	**18.69**	0.074	38.45	-19.76
	QPSK (Opposite Pol.)	839.00	V	130	296	1.41	1 / 104	19.62	18.88	0.077	38.45	-19.58
	QPSK (WCP)	839.00	H	219	235	1.58	1 / 53	20.42	19.85	0.097	38.45	-18.60

Table 7-15. ERP Data (NR Band n26/5 – Ant1)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GSM850	V	209	330	27.47	1.09	**26.41**	**0.438**	38.45	-12.04
836.60	GSM850	V	209	330	25.79	1.36	25.00	0.316	38.45	-13.46
848.80	GSM850	V	196	323	25.17	1.61	24.63	0.290	38.45	-13.82
824.20	EDGE850	V	209	330	22.40	1.36	**21.61**	0.145	38.45	-16.85
824.20	GSM850 (WCP)	V	209	49	26.55	1.36	25.76	0.376	38.45	-12.70

Table 7-16. ERP Data (GPRS Cell – Ant2)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	H	217	60	18.97	1.38	**18.20**	**0.066**	38.45	-20.25
836.60	WCDMA850	H	224	67	18.17	1.54	17.56	0.057	38.45	-20.89
846.60	WCDMA850	H	224	67	18.19	1.71	17.75	0.060	38.45	-20.70
826.40	WCDMA850	V	146	121	18.45	1.36	17.66	0.058	38.45	-20.80
826.40	WCDMA850 (WCP)	H	224	62	17.72	1.54	17.11	0.051	38.45	-21.34

Table 7-17. ERP Data (WCDMA Cell – Ant2)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
15MHz (Band 26 only)	QPSK	831.50	V	136	101	1.34	1 / 37	17.94	17.13	0.052	38.45	-21.32
	QPSK	836.50	V	143	101	1.44	1 / 37	18.24	17.53	0.057	38.45	-20.92
	QPSK	841.50	V	142	96	1.54	1 / 37	18.22	**17.61**	0.058	38.45	-20.84
	16-QAM	841.50	V	142	96	1.54	1 / 37	17.09	16.48	0.044	38.45	-21.97
10 MHz	QPSK	829.00	V	136	101	1.29	1 / 0	17.78	16.92	0.049	38.45	-21.53
	QPSK	836.50	V	143	101	1.44	1 / 25	18.12	17.41	0.055	38.45	-21.04
	QPSK	844.00	V	142	96	1.59	1 / 0	18.03	**17.47**	0.056	38.45	-20.98
	16-QAM	844.00	V	142	96	1.59	1 / 49	17.16	16.60	0.046	38.45	-21.85
5 MHz	QPSK	826.50	V	136	101	1.24	1 / 24	18.00	17.09	0.051	38.45	-21.36
	QPSK	836.50	V	143	101	1.44	1 / 12	18.11	17.40	0.055	38.45	-21.05
	QPSK	846.50	V	142	96	1.64	1 / 12	18.03	**17.52**	0.057	38.45	-20.93
	16-QAM	846.50	V	142	96	1.64	1 / 12	17.22	16.71	0.047	38.45	-21.74
3 MHz	QPSK	825.50	V	136	101	1.22	1 / 7	18.15	17.22	0.053	38.45	-21.23
	QPSK	836.50	V	143	101	1.44	1 / 0	18.13	17.43	0.055	38.45	-21.03
	QPSK	847.50	V	142	96	1.66	1 / 7	18.03	**17.54**	0.057	38.45	-20.91
	16-QAM	825.50	V	136	101	1.22	1 / 0	17.56	16.63	0.046	38.45	-21.82
1.4 MHz	QPSK	824.70	V	136	101	1.20	1 / 0	18.11	17.16	0.052	38.45	-21.29
	QPSK	836.50	V	143	101	1.44	1 / 3	18.10	17.39	0.055	38.45	-21.06
	QPSK	848.30	V	142	96	1.67	1 / 0	17.97	**17.49**	0.056	38.45	-20.96
	16-QAM	824.70	V	136	101	1.20	1 / 3	17.46	16.51	0.045	38.45	-21.94
15MHz	QPSK (Opposite Pol.)	841.50	H	211	64	1.44	1 / 0	16.37	15.66	0.037	38.45	-22.79
	QPSK (WCP)	841.50	V	186	68	1.44	1 / 37	8.47	7.76	0.006	38.45	-30.69

Table 7-18. ERP Data (LTE Band 26/5 – Ant2)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	834.00	V	137	96	1.30	1 / 53	17.14	**16.29**	0.043	38.45	-22.16
	π/2 BPSK	836.50	V	140	98	1.35	1 / 53	16.98	16.18	0.042	38.45	-22.27
	π/2 BPSK	839.00	V	140	98	1.41	1 / 53	16.91	16.17	0.041	38.45	-22.29
	QPSK	834.00	V	137	96	1.30	1 / 53	16.97	16.12	0.041	38.45	-22.33
	QPSK	836.50	V	140	98	1.35	1 / 53	17.05	16.25	0.042	38.45	-22.20
	QPSK	839.00	V	140	98	1.41	1 / 53	16.86	16.12	0.041	38.45	-22.34
	16-QAM	834.00	V	137	96	1.30	1 / 53	15.97	15.12	0.033	38.45	-23.33
15 MHz	π/2 BPSK	831.50	V	137	96	1.25	1 / 39	17.42	**16.52**	0.045	38.45	-21.94
	π/2 BPSK	836.50	V	140	98	1.35	1 / 39	17.15	16.35	0.043	38.45	-22.10
	π/2 BPSK	841.50	V	140	98	1.46	1 / 77	16.87	16.18	0.042	38.45	-22.27
	QPSK	831.50	V	137	96	1.25	1 / 39	17.25	16.35	0.043	38.45	-22.10
	QPSK	836.50	V	140	98	1.35	1 / 39	17.06	16.27	0.042	38.45	-22.18
	QPSK	841.50	V	140	98	1.46	1 / 77	16.79	16.09	0.041	38.45	-22.36
	16-QAM	836.50	V	140	98	1.35	1 / 39	16.42	15.63	0.037	38.45	-22.83
10 MHz	π/2 BPSK	829.00	V	137	96	1.20	1 / 1	17.49	**16.54**	0.045	38.45	-21.91
	π/2 BPSK	836.50	V	140	98	1.35	1 / 50	17.16	16.36	0.043	38.45	-22.09
	π/2 BPSK	844.00	V	140	98	1.51	1 / 50	17.11	16.47	0.044	38.45	-21.98
	QPSK	829.00	V	137	96	1.20	1 / 1	17.28	16.32	0.043	38.45	-22.13
	QPSK	836.50	V	140	98	1.35	1 / 50	17.22	16.42	0.044	38.45	-22.03
	QPSK	844.00	V	140	98	1.51	1 / 50	17.02	16.38	0.043	38.45	-22.07
	16-QAM	836.50	V	140	98	1.35	1 / 50	16.17	15.38	0.034	38.45	-23.08
5 MHz	π/2 BPSK	829.00	V	137	96	1.14	1 / 1	17.49	16.48	0.044	38.45	-21.97
	π/2 BPSK	836.50	V	140	98	1.35	1 / 1	17.06	16.26	0.042	38.45	-22.19
	π/2 BPSK	844.00	V	140	98	1.56	1 / 12	17.13	**16.54**	0.045	38.45	-21.91
	QPSK	829.00	V	137	96	1.14	1 / 1	17.41	16.40	0.044	38.45	-22.05
	QPSK	836.50	V	140	98	1.35	1 / 1	17.07	16.27	0.042	38.45	-22.18
	QPSK	844.00	V	140	98	1.56	1 / 12	16.80	16.21	0.042	38.45	-22.24
	16-QAM	829.00	V	137	96	1.14	1 / 1	16.40	15.39	0.035	38.45	-23.06
20 MHz	QPSK (CP-OFDM)	834.00	V	146	104	1.30	1 / 53	15.46	**14.61**	0.029	38.45	-23.84
	QPSK (Opposite Pol.)	834.00	H	221	76	1.50	1 / 53	16.65	16.00	0.040	38.45	-22.45
	QPSK (WCP)	834.00	V	179	66	1.30	1 / 53	10.69	9.84	0.010	38.45	-28.61

Table 7-19. ERP Data (NR Band n26/5 – Ant2)

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.

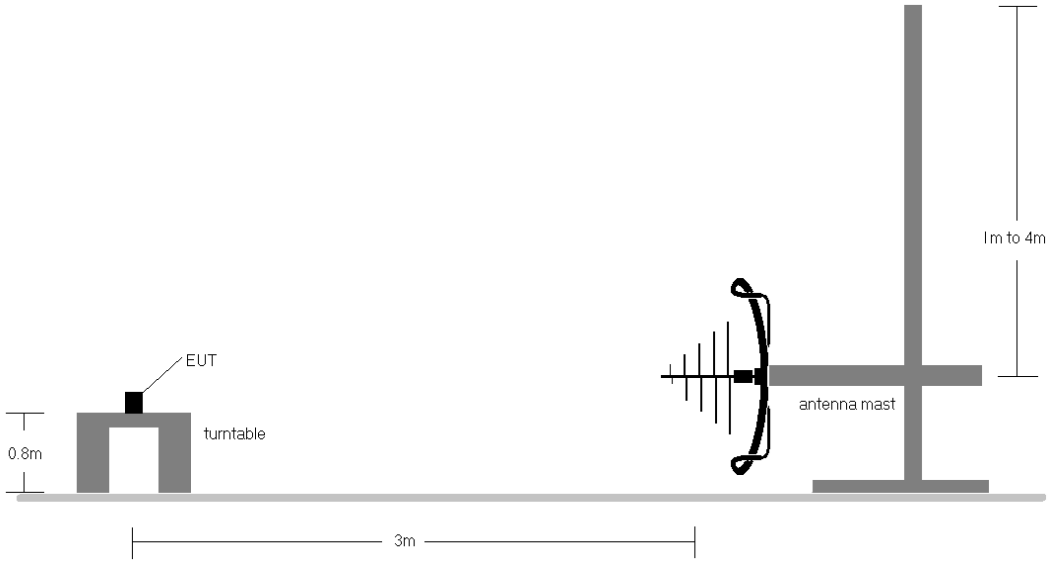


Figure 7-6. Test Instrument & Measurement Setup < 1GHz

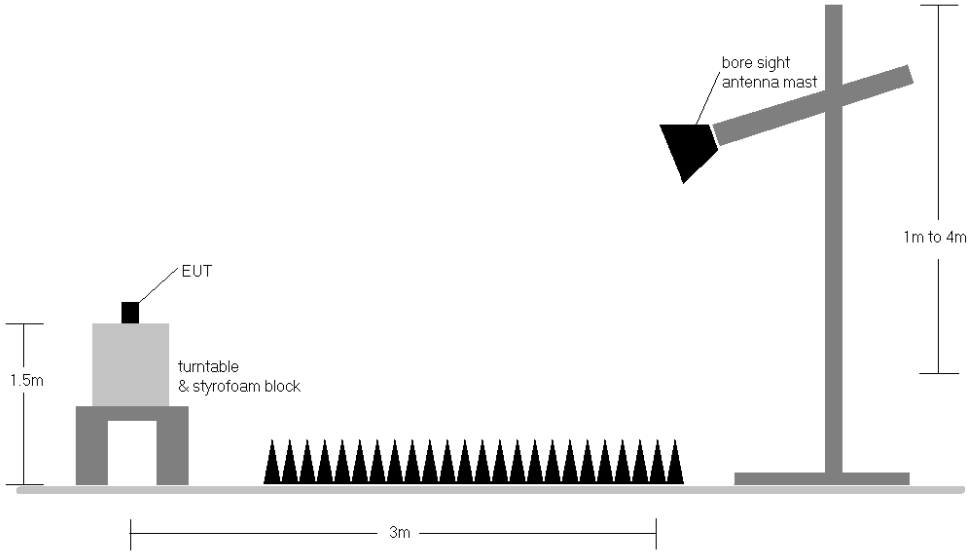


Figure 7-7. Test Instrument & Measurement Setup > 1GHz

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.

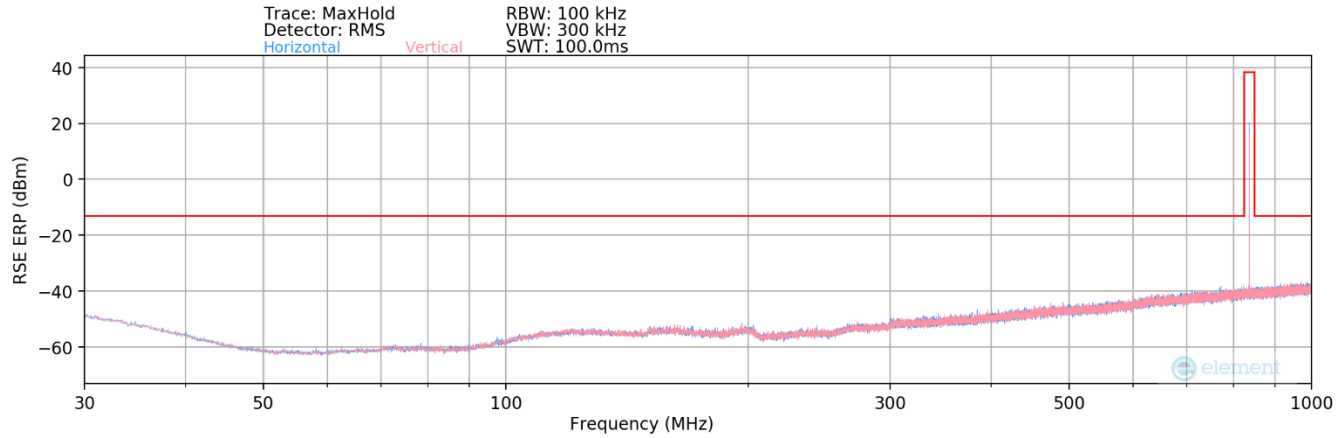
7) Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.

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

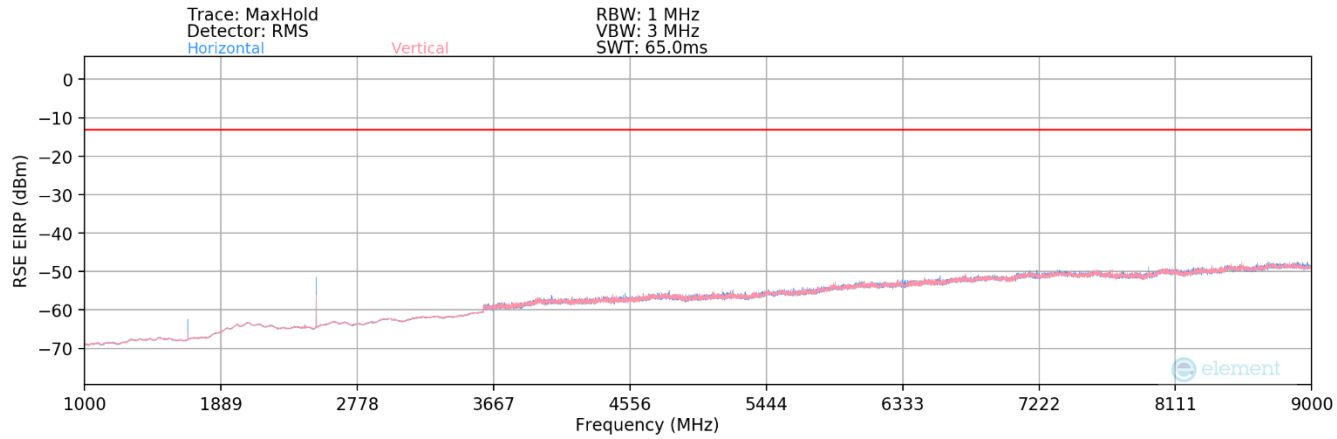
9) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

10) Spurious 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 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.

GPRS Cell – Ant1



Plot 7-92. Radiated Spurious Plot Below 1GHz (GPRS Cell) – Ant1



Plot 7-93. Radiated Spurious Plot Above 1GHz (GPRS Cell) – Ant1

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	160	211	-64.40	-7.26	35.34	-59.92	-13.00	-46.92
2472.60	H	151	175	-54.27	-4.18	48.55	-46.71	-13.00	-33.71
3296.80	H	-	-	-80.25	-0.97	25.78	-69.47	-13.00	-56.47
4121.00	H	-	-	-82.29	1.74	26.45	-68.81	-13.00	-55.81
4945.20	H	-	-	-82.59	2.56	26.97	-68.28	-13.00	-55.28

Table 7-20. Radiated Spurious Data (GPRS Cell – Low Channel) – Ant1

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	148	233	-65.52	-6.99	34.49	-60.77	-13.00	-47.77
2509.80	H	155	6	-63.75	-3.93	39.32	-55.94	-13.00	-42.94
3346.40	H	-	-	-80.06	-1.19	25.75	-69.51	-13.00	-56.51
4183.00	H	-	-	-82.58	1.72	26.14	-69.12	-13.00	-56.12
5019.60	H	-	-	-83.31	3.05	26.74	-68.52	-13.00	-55.52

Table 7-21. Radiated Spurious Data (GPRS Cell – Mid Channel) – Ant1

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	155	234	-62.20	-6.66	38.14	-57.12	-13.00	-44.12
2546.40	H	149	358	-56.35	-3.18	47.47	-47.79	-13.00	-34.79
3395.20	H	-	-	-80.28	-1.03	25.69	-69.56	-13.00	-56.56
4244.00	H	-	-	-82.00	1.69	26.69	-68.56	-13.00	-55.56
5092.80	H	-	-	-83.29	3.32	27.03	-68.23	-13.00	-55.23

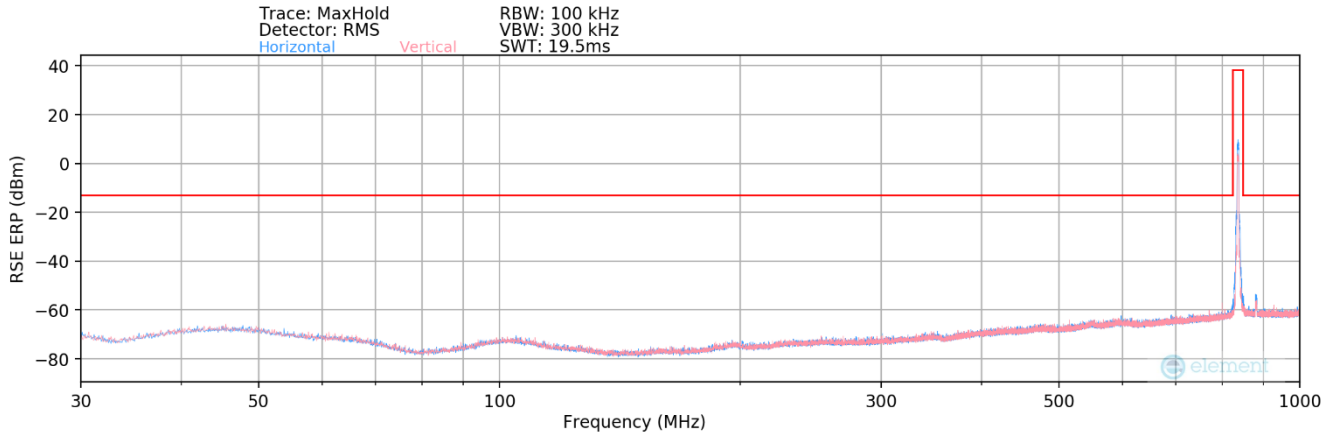
Table 7-22. Radiated Spurious Data (GPRS Cell – High Channel) – Ant1

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

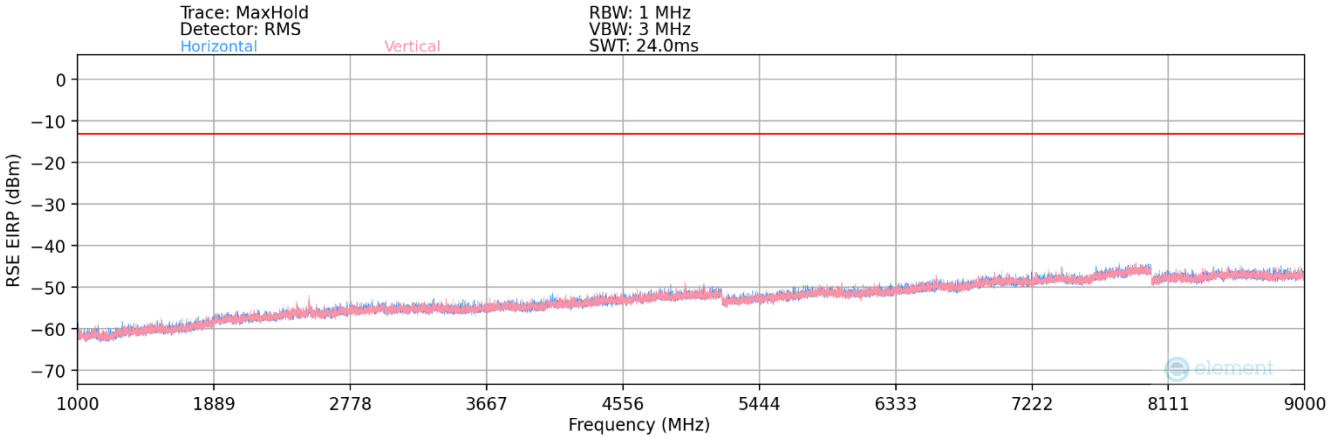
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
796.00	H	-	-	-89.75	29.78	47.03	-50.38	-13.00	-37.38

Table 7-23. Radiated Spurious Data (GPRS Cell) – Ant1

WCDMA Cell – Ant1



Plot 7-94. Radiated Spurious Plot Below 1GHz (WCDMA Cell) – Ant1



Plot 7-95. Radiated Spurious Plot Above 1GHz (WCDMA Cell) – Ant1

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	V	189	180	-76.07	-1.23	29.70	-65.56	-13.00	-52.56
2479.20	V	-	-	-77.33	2.93	32.60	-62.65	-13.00	-49.65
3305.60	V	-	-	-78.63	4.50	32.87	-62.39	-13.00	-49.39
4132.00	V	-	-	-79.39	5.84	33.45	-61.81	-13.00	-48.81

Table 7-24. Radiated Spurious Data (WCDMA Cell – Low Channel) – Ant1

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	V	108	176	-75.88	-1.28	29.84	-65.42	-13.00	-52.42
2509.80	V	156	276	-74.20	3.17	35.97	-59.29	-13.00	-46.29
3346.40	V	-	-	-78.02	4.95	33.93	-61.33	-13.00	-48.33
4183.00	V	-	-	-78.78	5.52	33.74	-61.51	-13.00	-48.51
5019.60	V	-	-	-79.10	6.93	34.83	-60.43	-13.00	-47.43

Table 7-25. Radiated Spurious Data (WCDMA Cell – Mid Channel) – Ant1

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	V	202	180	-76.42	-1.19	29.39	-65.87	-13.00	-52.87
2539.80	V	115	255	-75.03	2.75	34.72	-60.54	-13.00	-47.54
3386.40	V	-	-	-78.51	4.67	33.16	-62.10	-13.00	-49.10
4233.00	V	-	-	-78.85	5.65	33.80	-61.46	-13.00	-48.46
5079.60	V	-	-	-79.30	7.17	34.87	-60.39	-13.00	-47.39

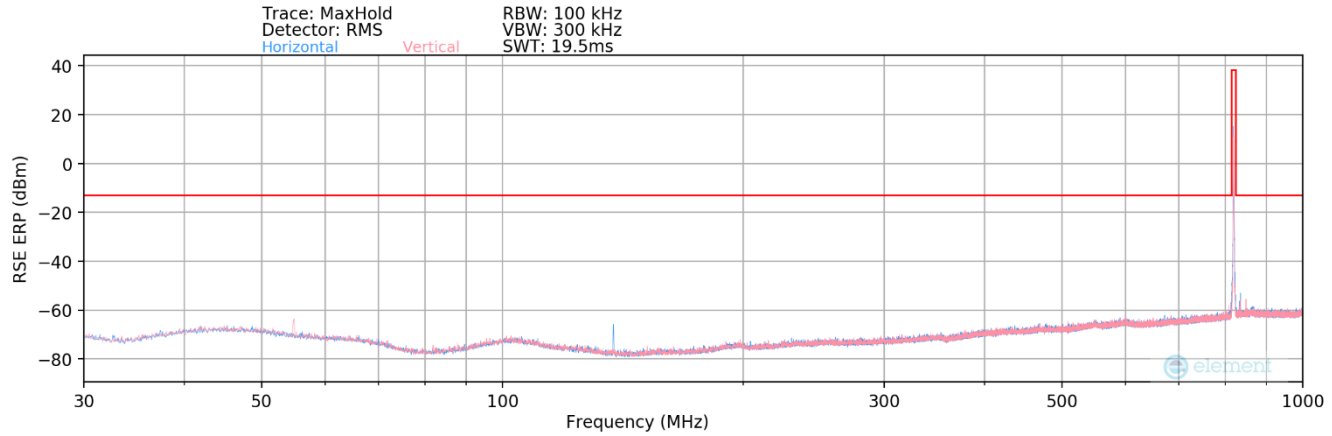
Table 7-26. Radiated Spurious Data (WCDMA Cell – High Channel) – Ant1

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

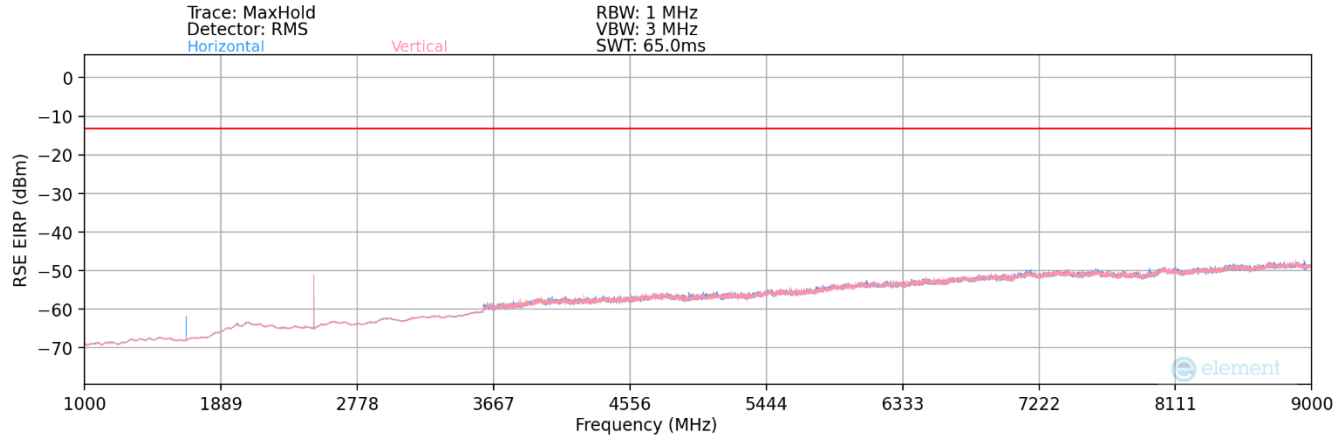
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
97.96	H	243	239	-78.76	-13.84	14.40	-83.01	-13.00	-70.01

Table 7-27. Radiated Spurious Data (WCDMA Cell) - Ant1

LTE Band 26/5 – Ant1



Plot 7-96. Radiated Spurious Plot Below 1GHz (LTE Band 26/5) – Ant1



Plot 7-97. Radiated Spurious Plot Above 1GHz (LTE Band 26/5) – Ant1

Bandwidth (MHz):	15
Frequency (MHz):	831.5
RB / Offset:	1 / 37

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]
1663.00	V	385	261	-70.45	-7.11	29.44	-65.81	-13.00	-52.81
2494.50	V	287	254	-60.66	-4.23	42.11	-53.15	-13.00	-40.15
3326.00	V	-	-	-78.16	-1.15	27.69	-67.57	-13.00	-54.57
4157.50	V	-	-	-78.19	1.73	30.54	-64.71	-13.00	-51.71
4989.00	V	-	-	-78.77	2.82	31.05	-64.21	-13.00	-51.21

Table 7-28. Radiated Spurious Data (LTE Band 26/5 – Low Channel) – Ant1

Bandwidth (MHz):	15
Frequency (MHz):	836.5
RB / Offset:	1 / 37

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	V	351	91	-74.15	-6.99	25.86	-69.40	-13.00	-56.40
2509.50	V	129	265	-55.98	-3.94	47.08	-48.18	-13.00	-35.18
3346.00	V	-	-	-77.45	-1.19	28.36	-66.90	-13.00	-53.90
4182.50	V	-	-	-78.08	1.72	30.64	-64.62	-13.00	-51.62
5019.00	V	-	-	-78.72	3.05	31.33	-63.93	-13.00	-50.93

Table 7-29. Radiated Spurious Data (LTE Band 26/5 – Mid Channel) – Ant1

Bandwidth (MHz):	15
Frequency (MHz):	841.5
RB / Offset:	1 / 37

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]
1683.00	V	121	97	-73.47	-6.88	26.65	-68.61	-13.00	-55.61
2524.50	V	202	264	-57.72	-3.61	45.67	-49.59	-13.00	-36.59
3366.00	V	-	-	-77.43	-1.10	28.47	-66.79	-13.00	-53.79
4207.50	V	-	-	-77.61	1.65	31.04	-64.22	-13.00	-51.22
5049.00	V	-	-	-78.92	3.24	31.32	-63.94	-13.00	-50.94

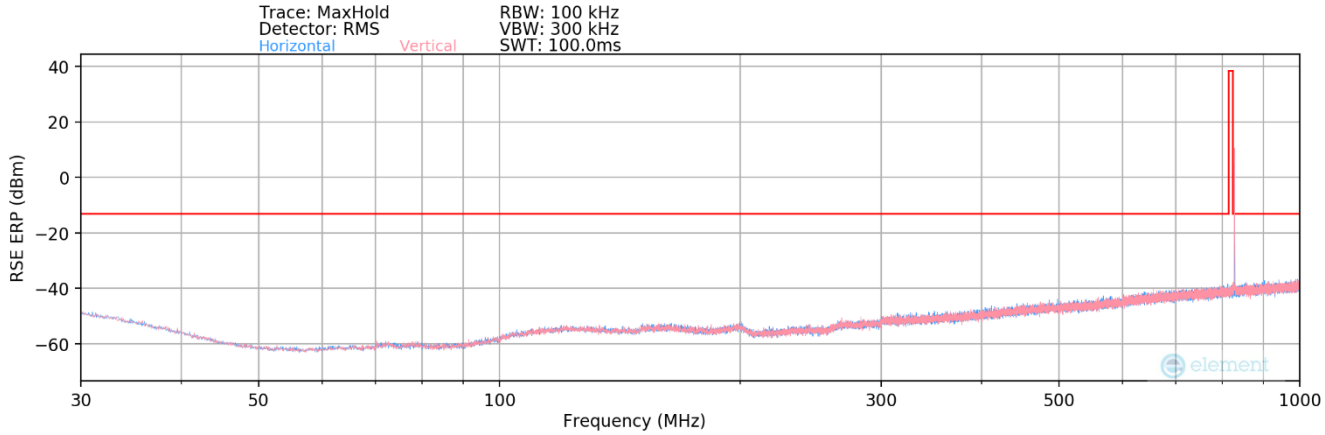
Table 7-30. Radiated Spurious Data (LTE Band 26/5 – High Channel) – Ant1

Bandwidth (MHz):	15
Frequency (MHz):	836.5
RB / Offset:	1 / 37

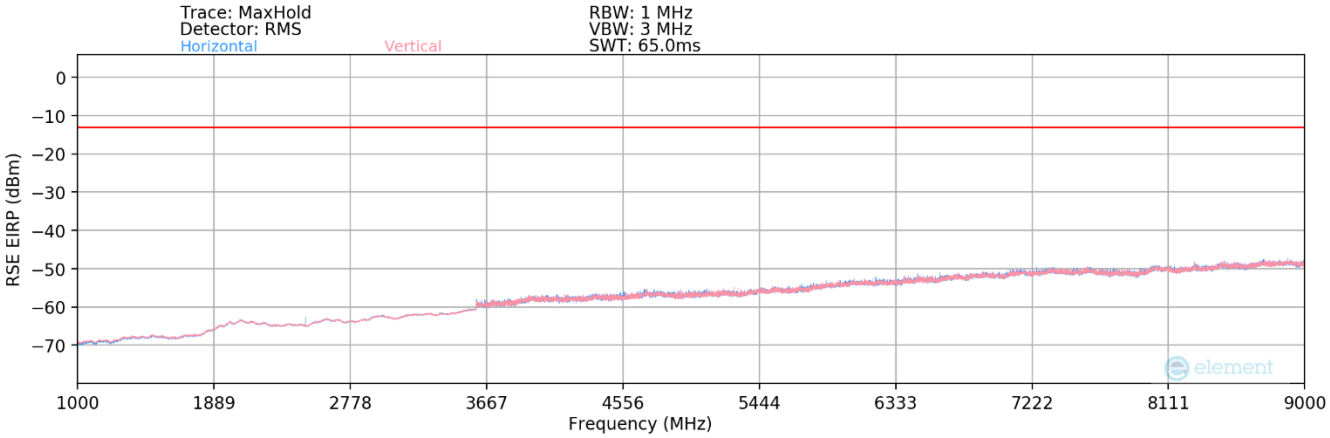
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
69.60	H	-	-	-89.72	14.70	31.98	-65.43	-13.00	-52.43
177.50	H	-	-	-89.91	18.99	36.08	-61.33	-13.00	-48.33
292.90	H	-	-	-89.81	21.06	38.25	-59.16	-13.00	-46.16

Table 7-31. Radiated Spurious Data (LTE Band 26/5 – Mid Channel) – Ant1

NR Band n26/5 – Ant1



Plot 7-98. Radiated Spurious Plot Below 1GHz (NR Band n26/5) – Ant1



Plot 7-99. Radiated Spurious Plot Above 1GHz (NR Band n26/5) – Ant1

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	V	152	164	-62.77	0.33	44.56	-50.70	-13.00	-37.70
2502.00	V	150	155	-59.22	4.04	51.82	-43.43	-13.00	-30.43
3336.00	V	-	-	-77.94	6.93	35.99	-59.27	-13.00	-46.27
4170.00	V	-	-	-77.89	8.20	37.31	-57.95	-13.00	-44.95
5004.00	V	-	-	-77.18	10.49	40.31	-54.95	-13.00	-41.95

Table 7-32. Radiated Spurious Data (NR Band n26/5 – Low Channel) – Ant1

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	V	119	242	-63.20	0.43	44.23	-51.03	-13.00	-38.03
2509.50	V	127	241	-55.12	4.07	55.95	-39.31	-13.00	-26.31
3346.00	V	-	-	-77.93	6.78	35.85	-59.41	-13.00	-46.41
4182.50	V	-	-	-77.89	8.24	37.35	-57.91	-13.00	-44.91
5019.00	V	-	-	-77.30	10.55	40.25	-55.01	-13.00	-42.01

Table 7-33. Radiated Spurious Data (NR Band n26/5 – Mid Channel) – Ant1

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	V	146	238	-63.24	0.51	44.27	-50.99	-13.00	-37.99
2517.00	V	135	246	-56.89	4.33	54.44	-40.82	-13.00	-27.82
3356.00	V	-	-	-77.87	6.64	35.77	-59.49	-13.00	-46.49
4195.00	V	-	-	-77.70	8.25	37.55	-57.71	-13.00	-44.71
5034.00	V	-	-	-77.27	10.64	40.37	-54.89	-13.00	-41.89

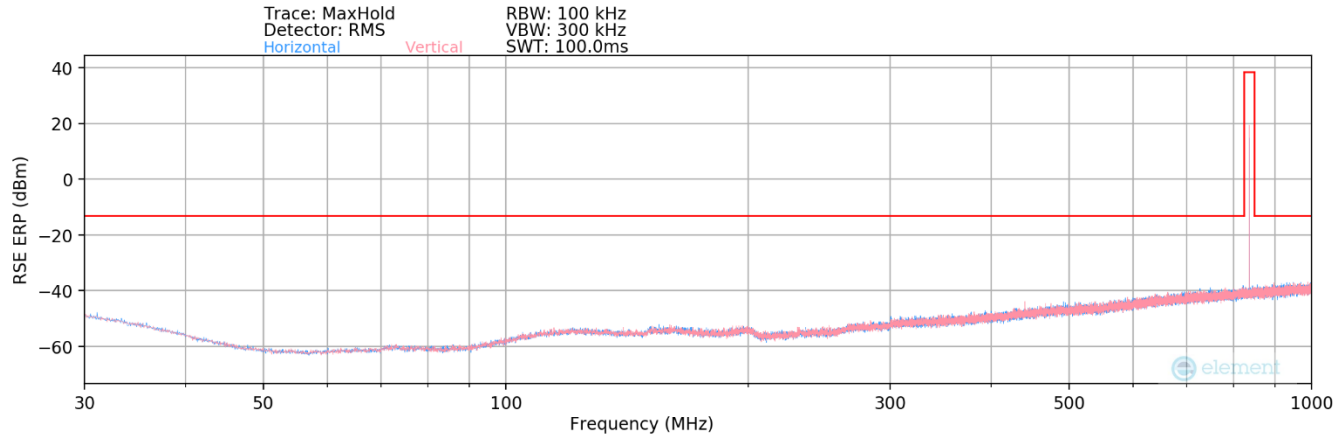
Table 7-34. Radiated Spurious Data (NR Band n26/5 – High Channel) – Ant1

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

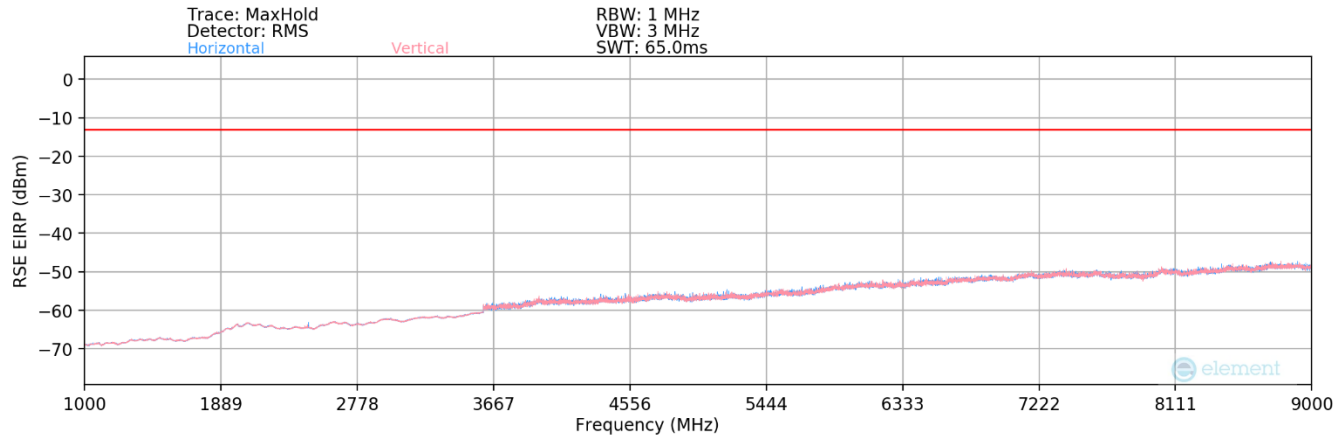
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
103.73	V	362	179	-78.41	-13.51	15.08	-82.33	-13.00	-69.33

Table 7-35. Radiated Spurious Data (NR Band n26/5) – Ant1

GPRS Cell – Ant2



Plot 7-100. Radiated Spurious Plot Below 1GHz (GPRS Cell) – Ant2



Plot 7-101. Radiated Spurious Plot Above 1GHz (GPRS Cell) – Ant2

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	V	-	-	-71.20	-7.26	28.54	-66.72	-13.00	-53.72
2472.60	V	-	-	-71.54	-4.18	31.28	-63.98	-13.00	-50.98
3296.80	V	-	-	-71.80	-0.97	34.23	-61.02	-13.00	-48.02

Table 7-36. Radiated Spurious Data (GPRS Cell – Low Channel) – Ant2

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	V	-	-	-71.26	-6.99	28.75	-66.51	-13.00	-53.51
2509.80	V	-	-	-72.09	-3.93	30.98	-64.28	-13.00	-51.28
3346.40	V	-	-	-71.85	-1.19	33.96	-61.30	-13.00	-48.30

Table 7-37. Radiated Spurious Data (GPRS Cell – Mid Channel) – Ant2

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	V	-	-	-71.53	-6.66	28.81	-66.45	-13.00	-53.45
2546.40	V	-	-	-71.61	-3.18	32.21	-63.05	-13.00	-50.05
3395.20	V	-	-	-72.18	-1.03	33.79	-61.46	-13.00	-48.46

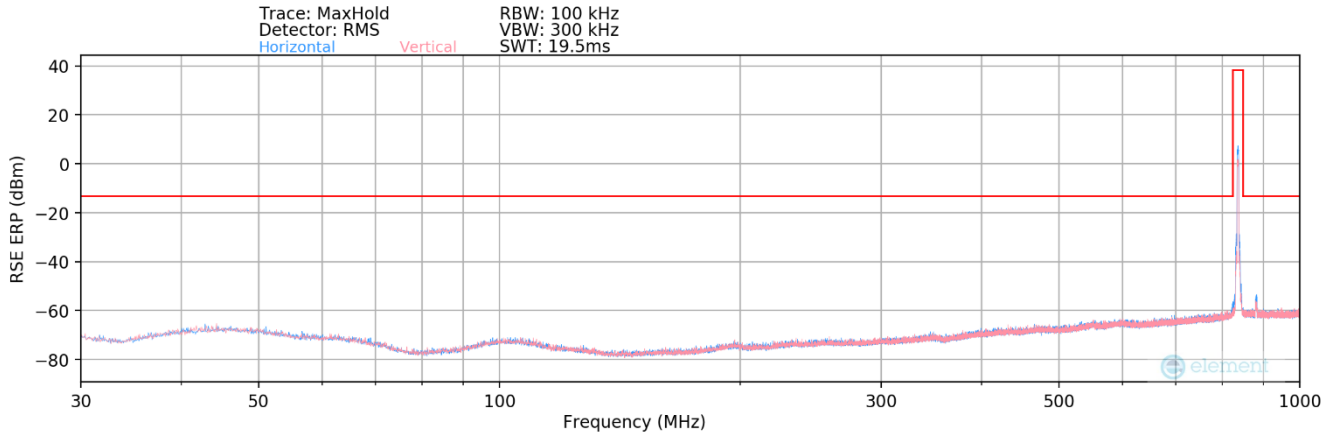
Table 7-38. Radiated Spurious Data (GPRS Cell – High Channel) – Ant2

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

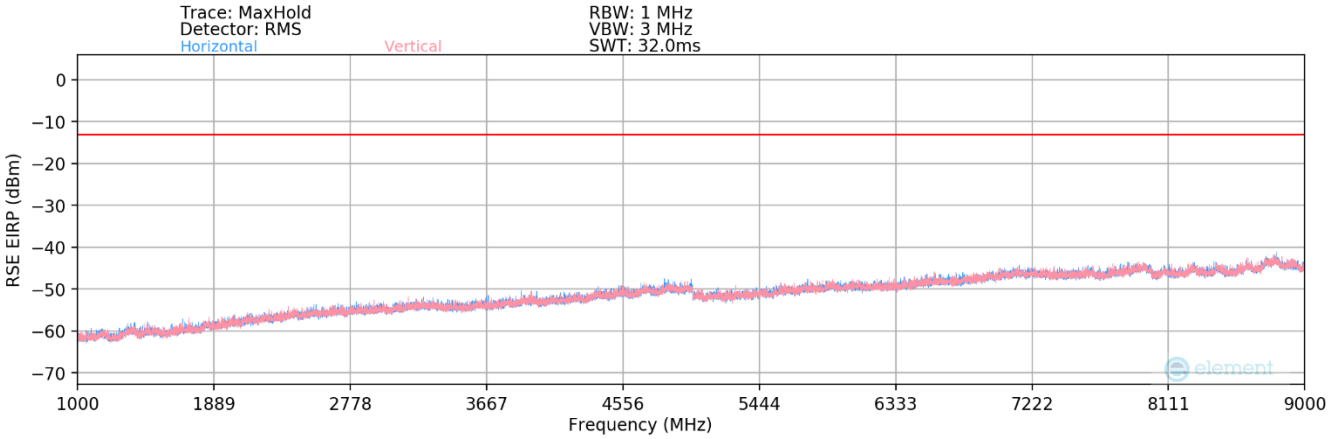
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
412.00	V	-	-	-90.43	23.77	40.34	-57.07	-13.00	-44.07

Table 7-39. Radiated Spurious Data (GPRS Cell – Mid Channel) – Ant2

WCDMA Cell – Ant2



Plot 7-102. Radiated Spurious Plot Below 1GHz (WCDMA Cell) – Ant2



Plot 7-103. Radiated Spurious Plot Above 1GHz (WCDMA Cell) – Ant2

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	-	-	-76.96	-0.13	29.91	-65.35	-13.00	-52.35
2479.20	H	-	-	-79.18	3.93	31.75	-63.51	-13.00	-50.51
3305.60	H	-	-	-77.70	6.70	36.00	-59.25	-13.00	-46.25

Table 7-40. Radiated Spurious Data (WCDMA Cell – Low Channel) – Ant2

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	-	-	-77.02	0.43	30.41	-64.84	-13.00	-51.84
2509.80	H	-	-	-77.22	4.07	33.85	-61.40	-13.00	-48.40
3346.40	H	-	-	-77.98	6.77	35.79	-59.46	-13.00	-46.46

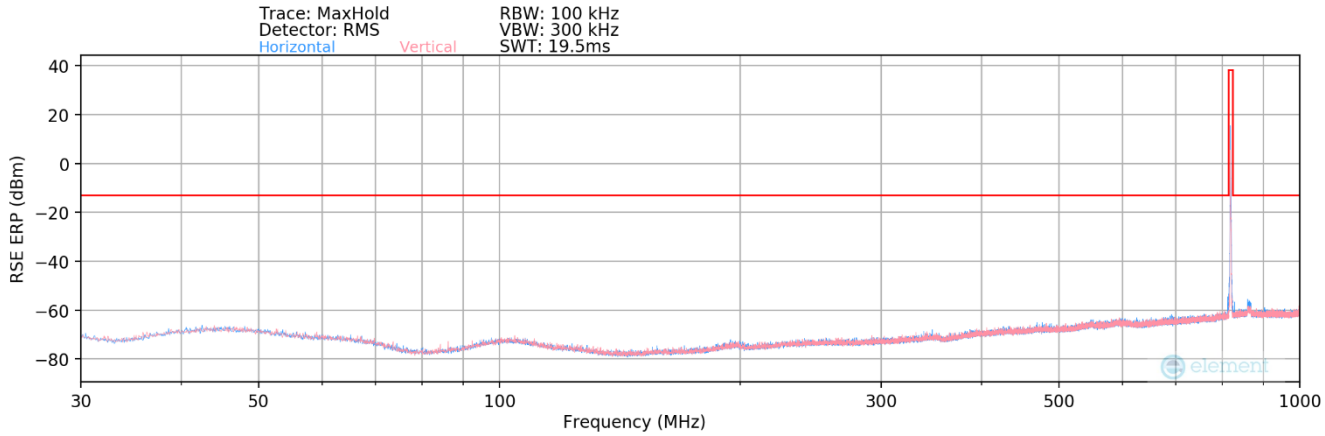
Table 7-41. Radiated Spurious Data (WCDMA Cell – Mid Channel) – Ant2

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

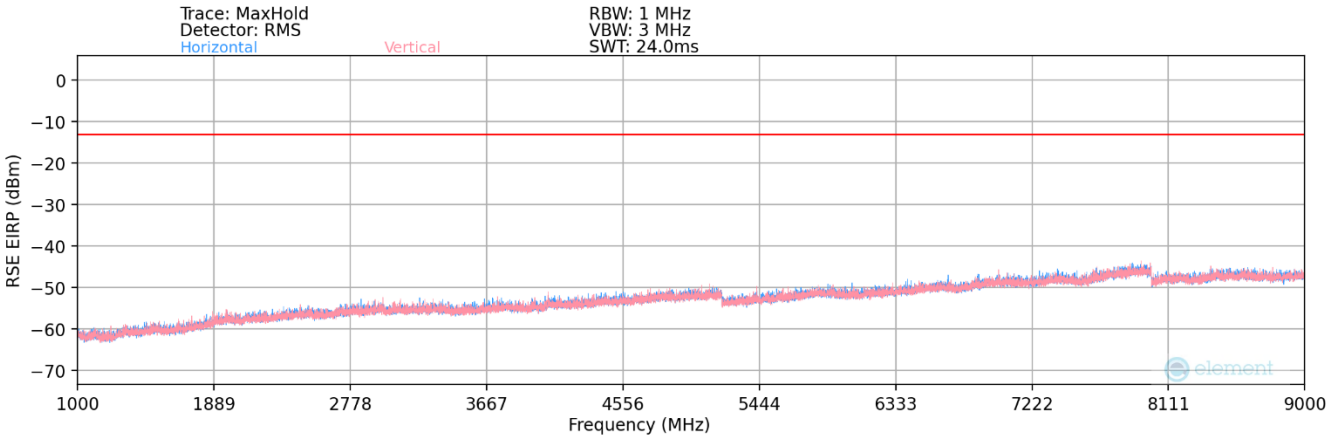
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.20	H	-	-	-77.26	0.56	30.30	-64.96	-13.00	-51.96
2539.80	H	-	-	-76.94	4.54	34.60	-60.66	-13.00	-47.66
3386.40	H	-	-	-77.98	6.35	35.37	-59.89	-13.00	-46.89

Table 7-42. Radiated Spurious Data (WCDMA Cell – High Channel) – Ant2

LTE Band 26/5 – Ant2



Plot 7-104. Radiated Spurious Plot Below 1GHz (LTE Band 26/5) – Ant2



Plot 7-105. Radiated Spurious Plot Above 1GHz (LTE Band 26/5) – Ant2

Bandwidth (MHz):	15
Frequency (MHz):	831.5
RB / Offset:	1 / 37

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]
1663.00	H	-	-	-77.25	-7.11	22.64	-72.61	-13.00	-59.61
2494.50	H	-	-	-77.71	-4.23	25.06	-70.20	-13.00	-57.20
3326.00	H	-	-	-78.15	-1.15	27.70	-67.56	-13.00	-54.56

Table 7-43. Radiated Spurious Data (LTE Band 26/5 – Low Channel) – Ant2

Bandwidth (MHz):	15
Frequency (MHz):	836.5
RB / Offset:	1 / 37

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	-	-	-77.05	-6.99	22.96	-72.30	-13.00	-59.30
2509.50	H	-	-	-77.01	-3.94	26.05	-69.21	-13.00	-56.21
3346.00	H	-	-	-78.48	-1.19	27.33	-67.93	-13.00	-54.93

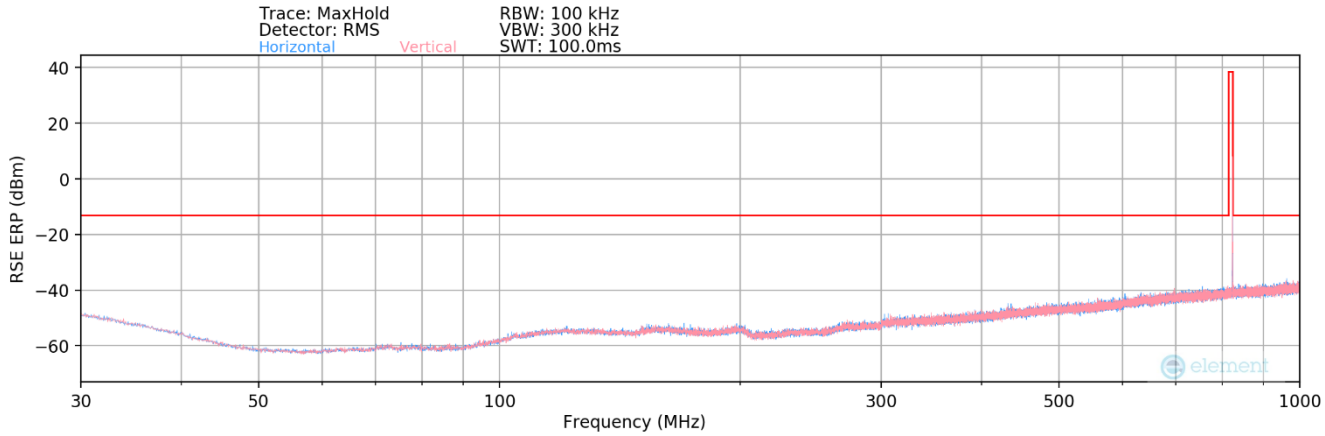
Table 7-44. Radiated Spurious Data (LTE Band 26/5 – Mid Channel) – Ant2

Bandwidth (MHz):	15
Frequency (MHz):	841.5
RB / Offset:	1 / 37

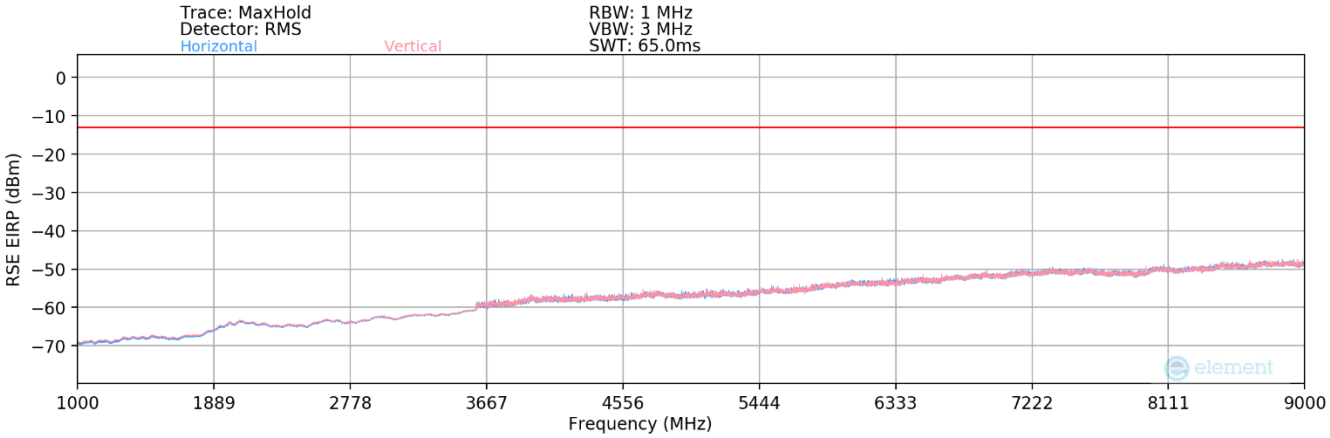
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1683.00	H	-	-	-77.12	-6.88	23.00	-72.26	-13.00	-59.26
2524.50	H	-	-	-77.03	-3.61	26.36	-68.90	-13.00	-55.90
3366.00	H	-	-	-77.80	-1.10	28.10	-67.16	-13.00	-54.16

Table 7-45. Radiated Spurious Data (LTE Band 26/5 – High Channel) – Ant2

NR Band n26/5 – Ant2



Plot 7-106. Radiated Spurious Plot Below 1GHz (NR Band n26/5) – Ant2



Plot 7-107. Radiated Spurious Plot Above 1GHz (NR Band n26/5) – Ant2

Bandwidth (MHz):	20
Frequency (MHz):	834
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]
1668.00	V	-	-	-76.88	0.33	30.45	-64.81	-13.00	-51.81
2502.00	V	-	-	-77.08	4.04	33.96	-61.29	-13.00	-48.29
3336.00	V	-	-	-78.03	6.93	35.90	-59.36	-13.00	-46.36

Table 7-46. Radiated Spurious Data (NR Band n26/5 – Low Channel) – Ant2

Bandwidth (MHz):	20
Frequency (MHz):	836.5
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]
1673.00	V	-	-	-77.14	0.43	30.29	-64.97	-13.00	-51.97
2509.50	V	-	-	-77.19	4.07	33.88	-61.38	-13.00	-48.38
3346.00	V	-	-	-77.80	6.78	35.98	-59.28	-13.00	-46.28

Table 7-47. Radiated Spurious Data (NR Band n26/5 – Mid Channel) – Ant2

Bandwidth (MHz):	20
Frequency (MHz):	839
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]
1678.00	V	-	-	-77.14	0.51	30.37	-64.89	-13.00	-51.89
2517.00	V	-	-	-76.89	4.33	34.44	-60.82	-13.00	-47.82
3356.00	V	-	-	-77.96	6.64	35.68	-59.58	-13.00	-46.58

Table 7-48. Radiated Spurious Data (NR Band n26/5 – High Channel) – Ant2

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

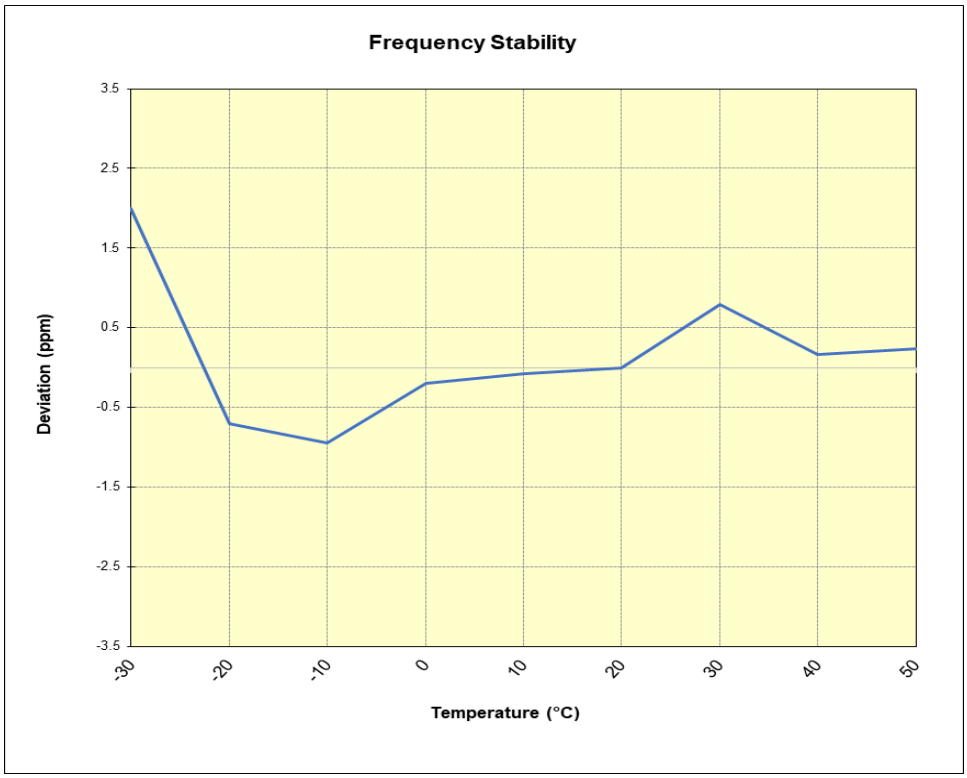
GPRS Cell

GSM/GPRS Cellular

Operating Frequency (Hz):	836,600,000
Ref. Voltage (VDC):	3.85
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	836,502,669	1,670	0.0001996
		- 20	836,500,414	-585	-0.0000699
		- 10	836,500,211	-788	-0.0000942
		0	836,500,838	-161	-0.0000192
		+ 10	836,500,933	-66	-0.0000079
		+ 20 (Ref)	836,500,999	0	0.0000000
		+ 30	836,501,665	666	0.0000796
		+ 40	836,501,139	140	0.0000167
		+ 50	836,501,200	201	0.0000240
Battery Endpoint	3.21	+ 20	836,502,114	1,115	0.0001333

Table 7-49. GPRS Cell Frequency Stability Data



Plot 7-108. GPRS Cell Frequency Stability Chart

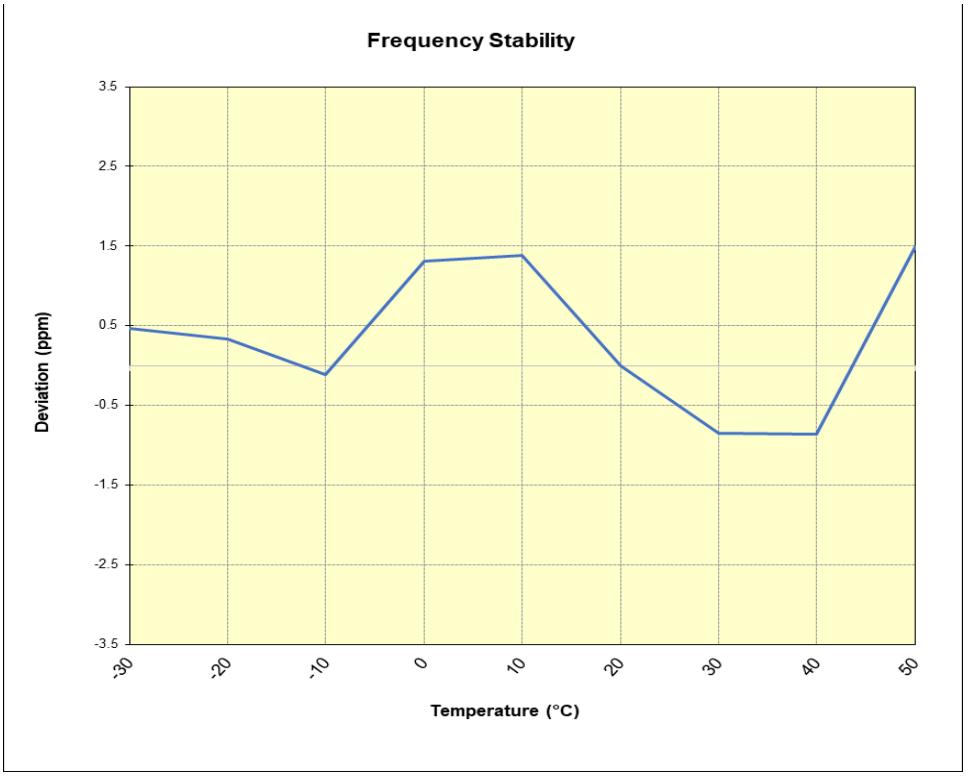
WCDMA Cell

WCDMA Cellular

Operating Frequency (Hz):	836,600,000
Ref. Voltage (VDC):	3.85
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	836,502,114	386	0.0000461
		- 20	836,502,004	276	0.0000330
		- 10	836,501,633	-95	-0.0000114
		0	836,502,827	1,099	0.0001314
		+ 10	836,502,882	1,154	0.0001380
		+ 20 (Ref)	836,501,728	0	0.0000000
		+ 30	836,501,020	-708	-0.0000846
		+ 40	836,501,012	-716	-0.0000856
		+ 50	836,502,974	1,246	0.0001490
Battery Endpoint	3.21	+ 20	836,503,011	1,283	0.0001534

Table 7-50. WCDMA Cell Frequency Stability Data



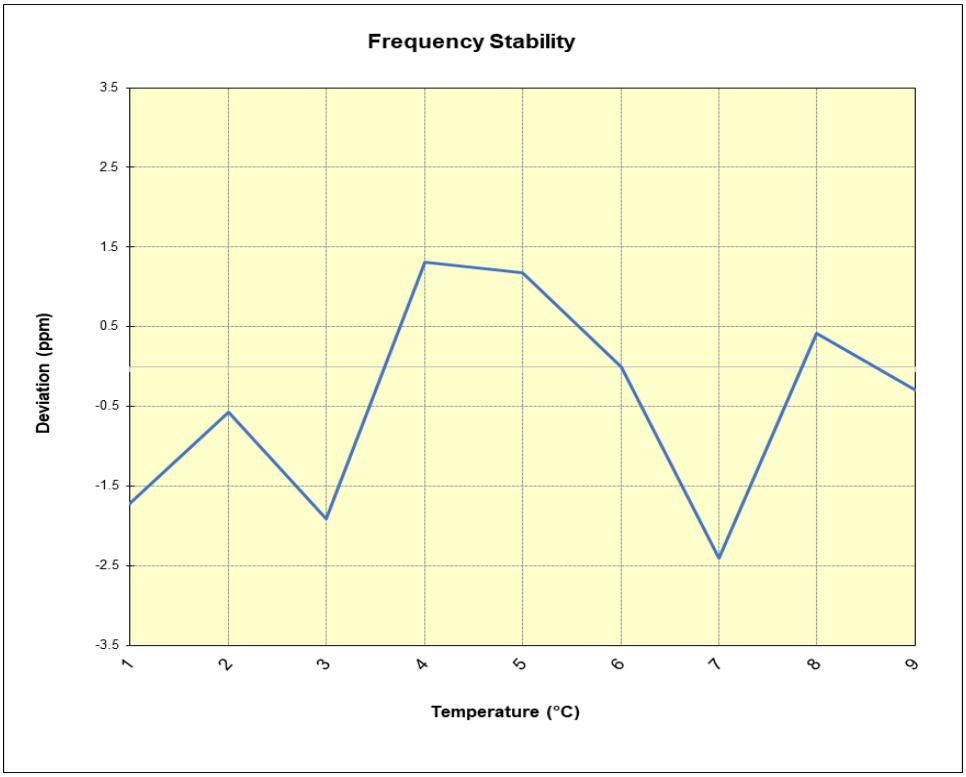
Plot 7-109. WCDMA Cell Frequency Stability Chart

LTE Band 26/5

LTE Band 26/5	
Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	3.85
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	836,504,301	-1,433	-0.0001713
		- 20	836,505,256	-478	-0.0000571
		- 10	836,504,138	-1,596	-0.0001908
		0	836,506,827	1,093	0.0001307
		+ 10	836,506,718	984	0.0001176
		+ 20 (Ref)	836,505,734	0	0.0000000
		+ 30	836,503,721	-2,013	-0.0002406
		+ 40	836,506,085	351	0.0000420
		+ 50	836,505,490	-244	-0.0000292
Battery Endpoint	3.21	+ 20	836,505,998	264	0.0000316

Table 7-51. LTE Band 26/5 Frequency Stability Data



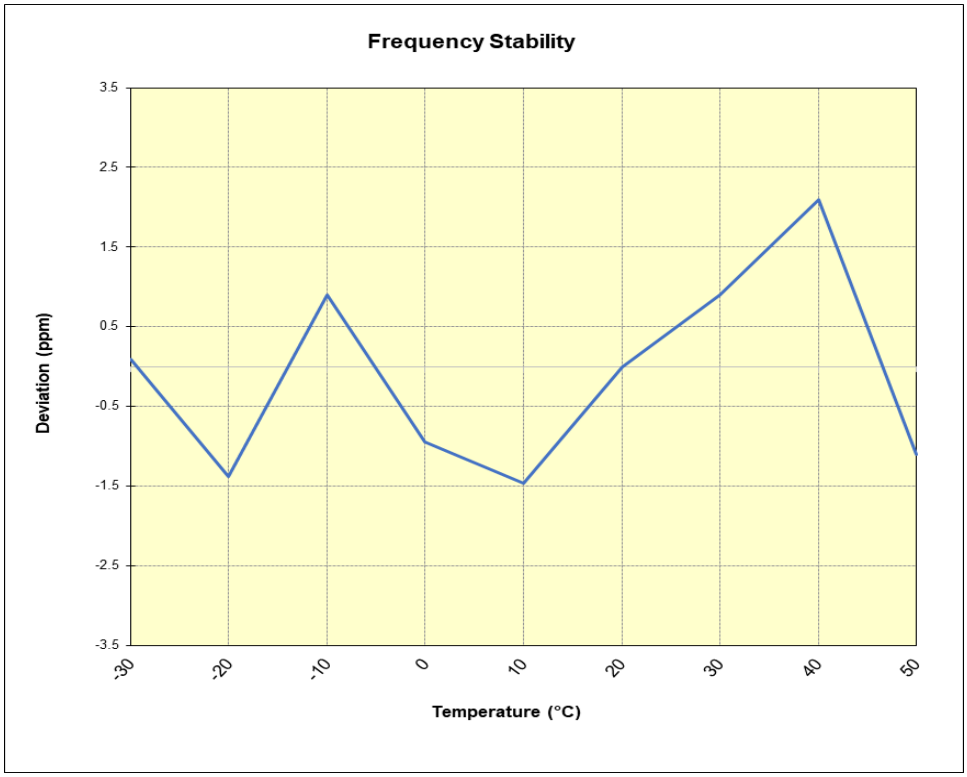
Plot 7-110. LTE Band 26/5 Frequency Stability Chart

NR Band n26/5

NR Band n26/5	
Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	3.85
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	836,501,442	78	0.0000093
		- 20	836,500,211	-1,153	-0.0001378
		- 10	836,502,114	750	0.0000897
		0	836,500,569	-795	-0.0000950
		+ 10	836,500,144	-1,220	-0.0001458
		+ 20 (Ref)	836,501,364	0	0.0000000
		+ 30	836,502,114	750	0.0000897
		+ 40	836,503,114	1,750	0.0002092
		+ 50	836,500,447	-917	-0.0001096
Battery Endpoint	3.21	+ 20	836,501,224	-140	-0.0000167

Table 7-52. NR Band n26/5 Frequency Stability Data



Plot 7-111. NR Band n26/5 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: A3LSMS938B** complies with all the requirements of Part 22 of the FCC rules.