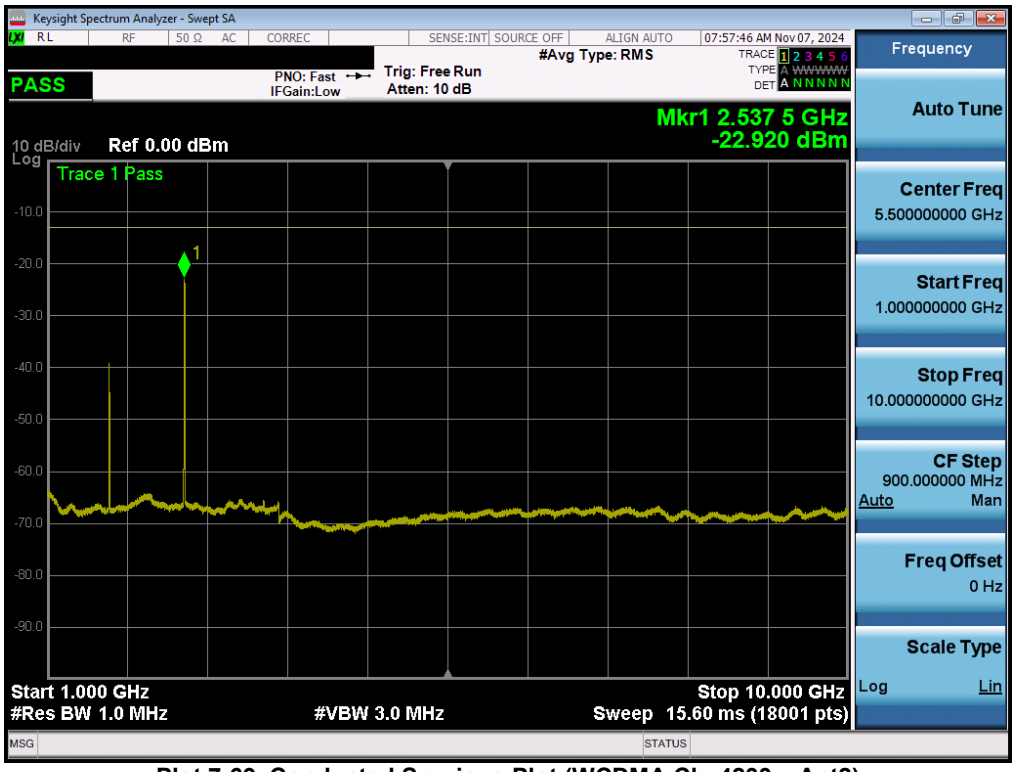
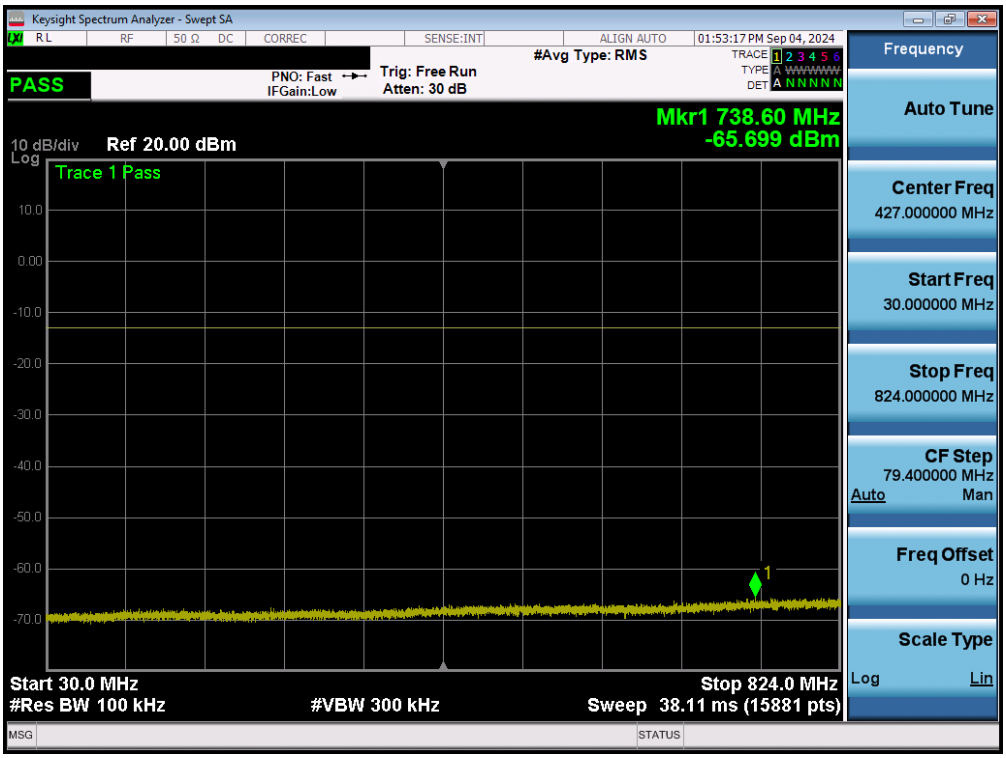
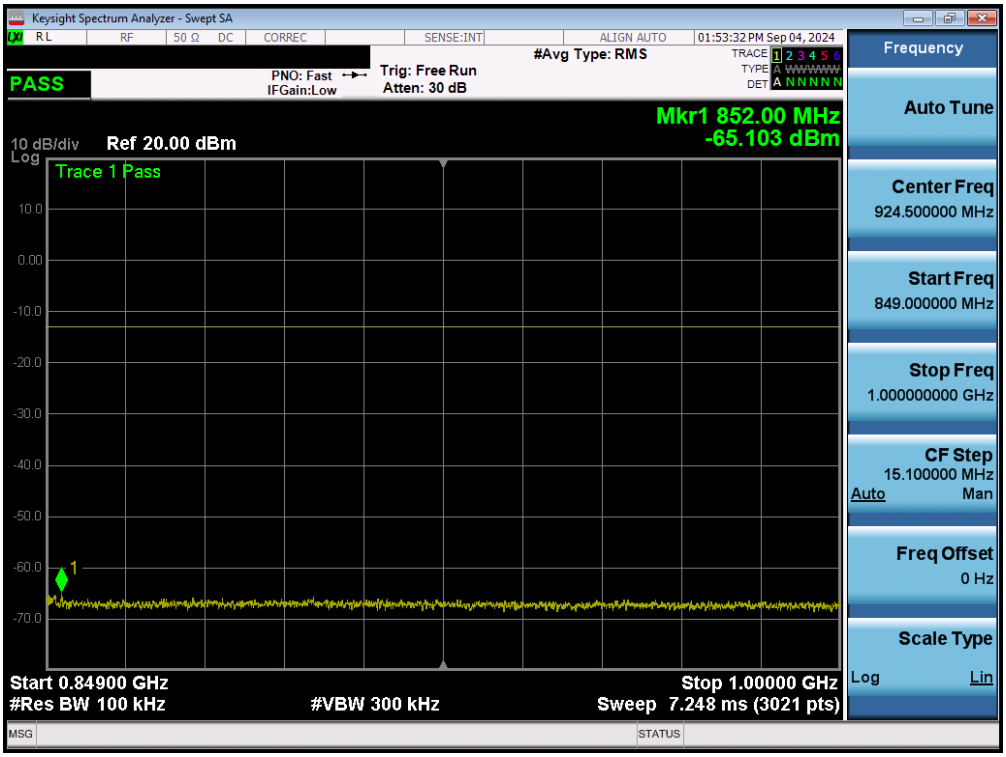


Plot 7-69. Conducted Spurious Plot (WCDMA Ch. 4233 – Ant2)

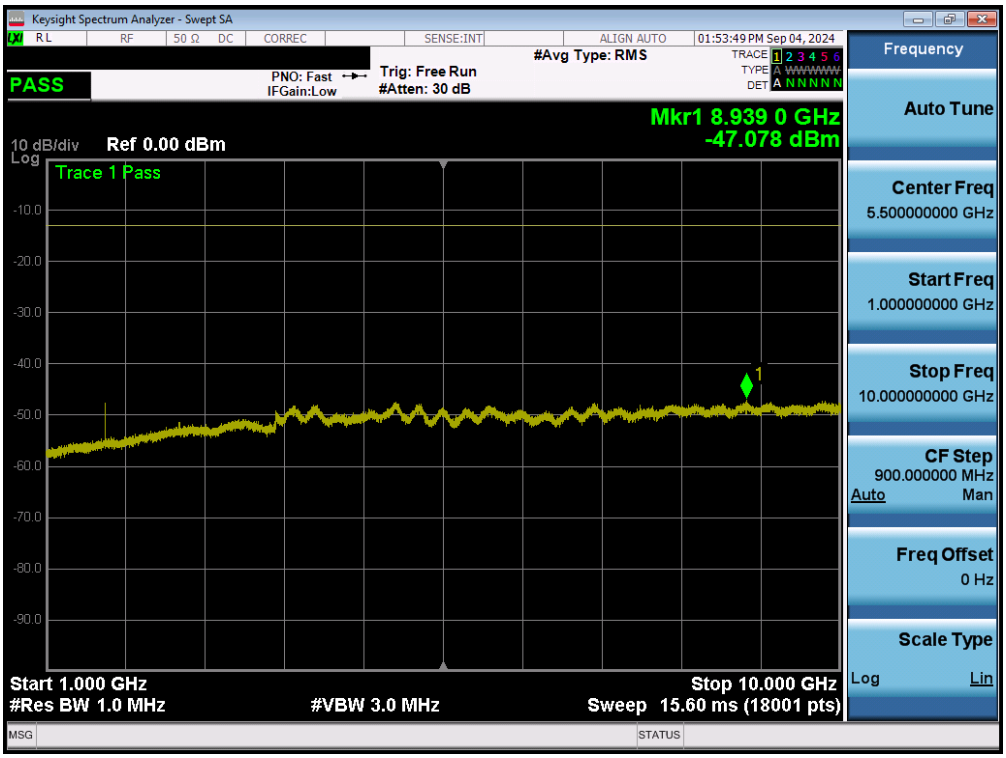
LTE Band 26/5 – Ant2



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

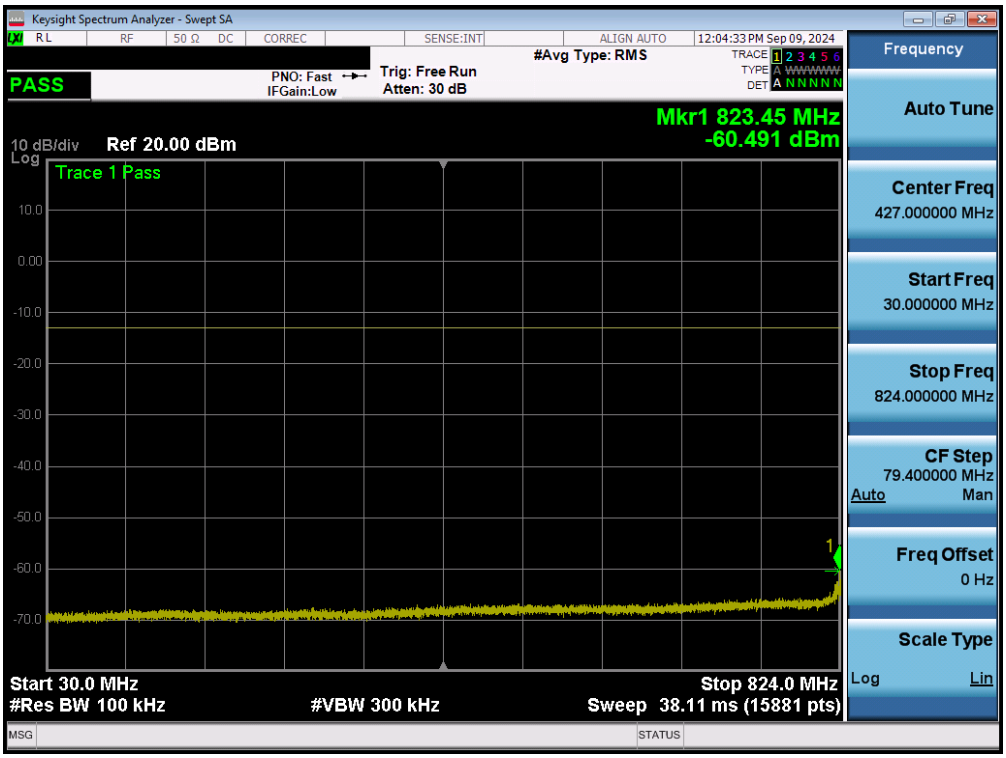


Plot 7-71. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel – Ant2)

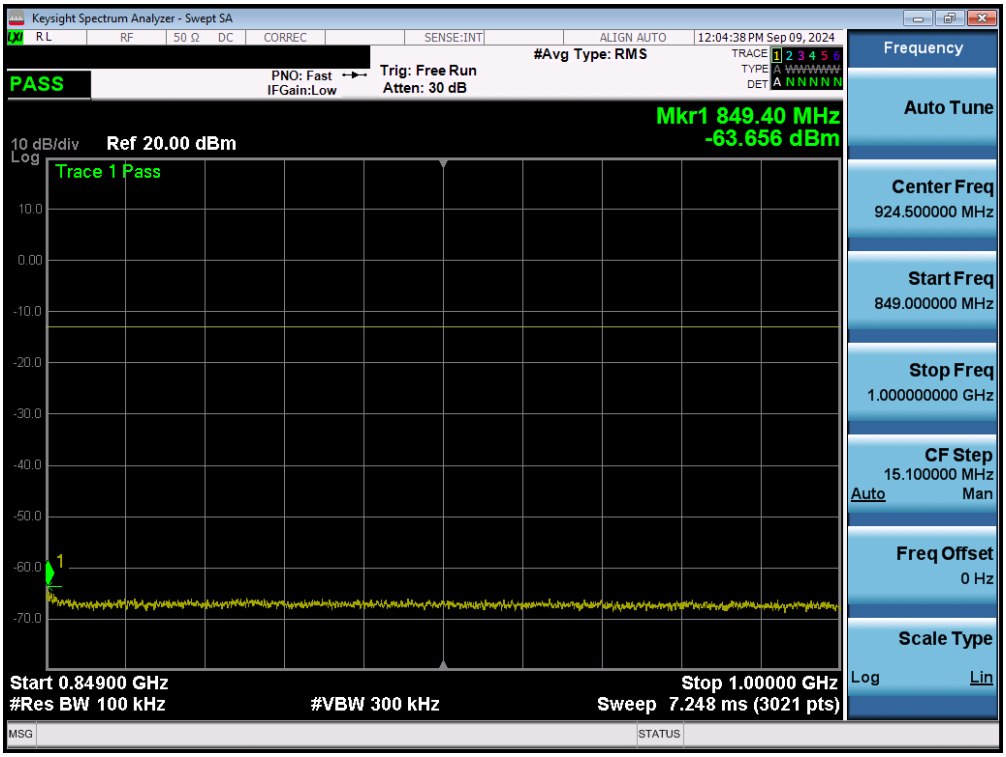


Plot 7-72. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel – Ant2)

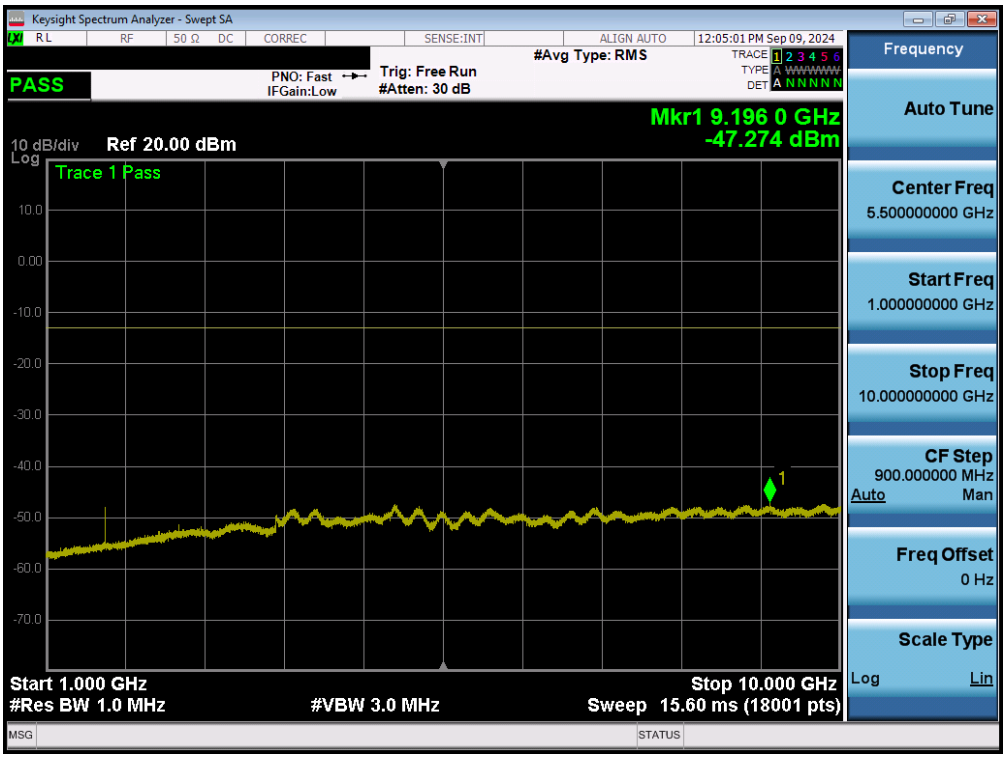
NR Band n26/5 – Ant2



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



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



Plot 7-75. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Low 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.

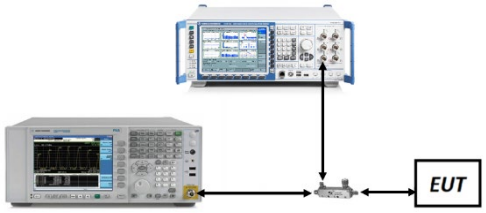


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

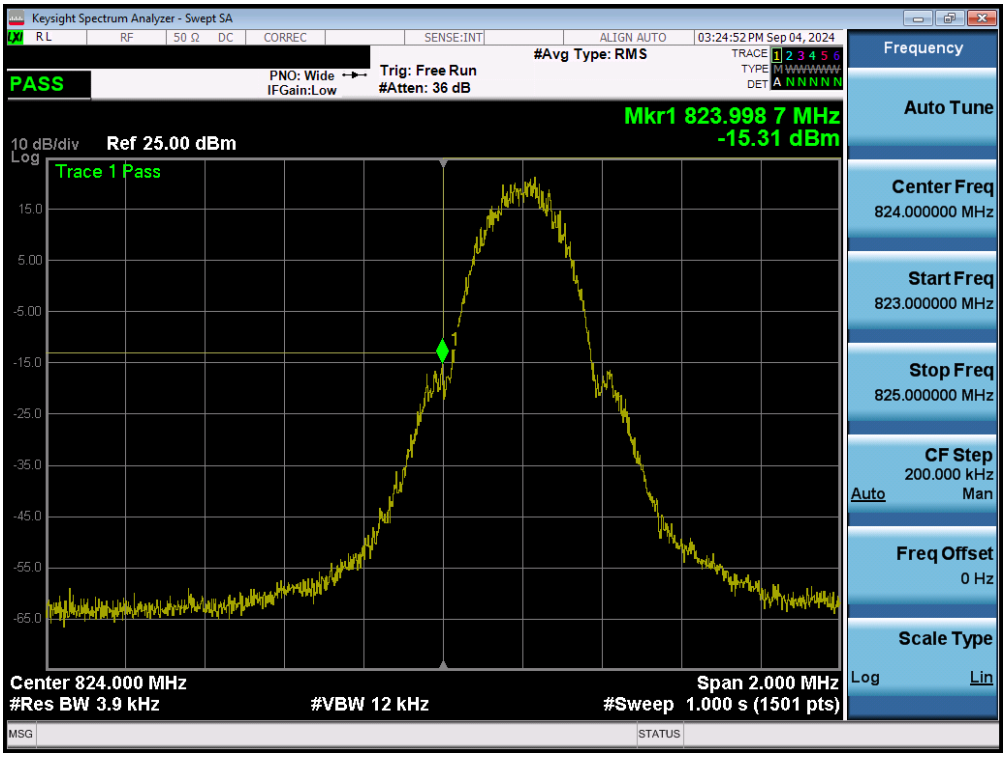
1. Per 22.917(b) and RSS-132(5.5), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions 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.

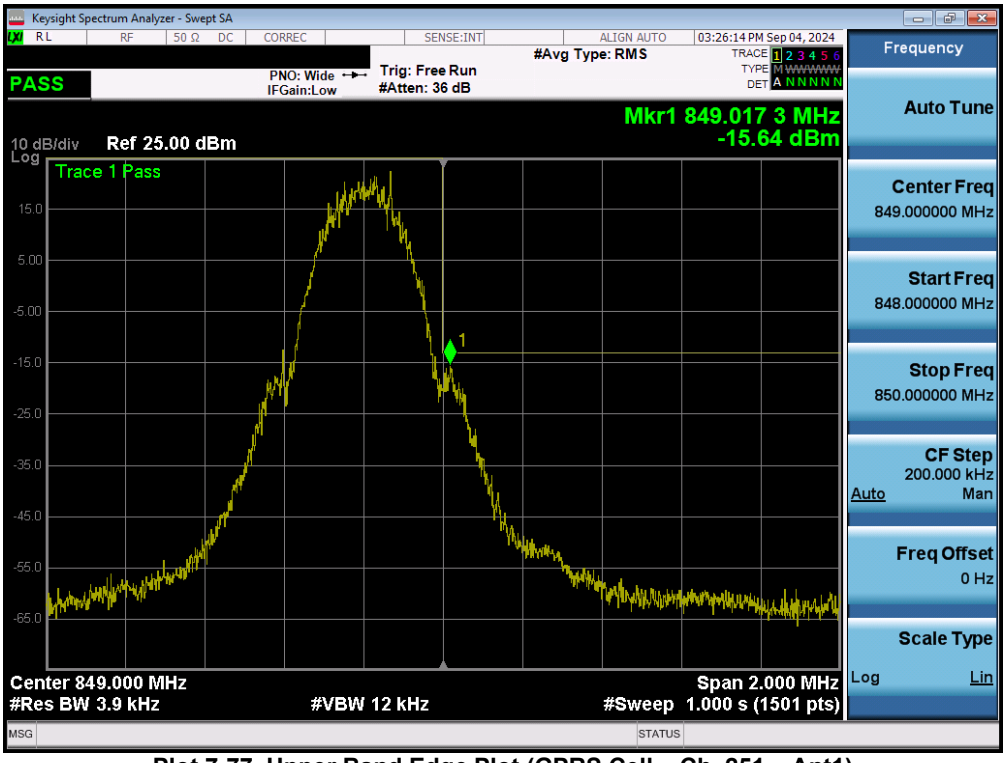
Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
GSM-Cell	250kHz	Low	Band Edge	-15.31	-13	-2.31
		High	Band Edge	-15.64	-13	-2.64
WCDMA-Cell	5MHz	Low	Band Edge	-25.20	-13	-12.20
		High	Band Edge	-18.94	-13	-5.94
LTE-B26-5	15 MHz	Low	Band Edge	-27.53	-13	-14.53
		High	Band Edge	-25.32	-13	-12.32
	10 MHz	Low	Band Edge	-25.67	-13	-12.67
		High	Band Edge	-25.98	-13	-12.98
	5 MHz	Low	Band Edge	-22.43	-13	-9.43
		High	Band Edge	-21.07	-13	-8.07
	3 MHz	Low	Band Edge	-18.29	-13	-5.29
		High	Band Edge	-17.92	-13	-4.92
	1.4 MHz	Low	Band Edge	-15.91	-13	-2.91
		High	Band Edge	-15.55	-13	-2.55
NR-n26-5	20 MHz	Low	Band Edge	-29.92	-13	-16.92
		High	Band Edge	-30.89	-13	-17.89
	15 MHz	Low	Band Edge	-27.94	-13	-14.94
		High	Band Edge	-30.26	-13	-17.26
	10 MHz	Low	Band Edge	-25.20	-13	-12.20
		High	Band Edge	-27.97	-13	-14.97
	5 MHz	Low	Band Edge	-20.85	-13	-7.85
		High	Band Edge	-18.17	-13	-5.17

Table 7-10. Conducted Band Edge Results – Ant1

GSM/GPRS Cell – Ant1

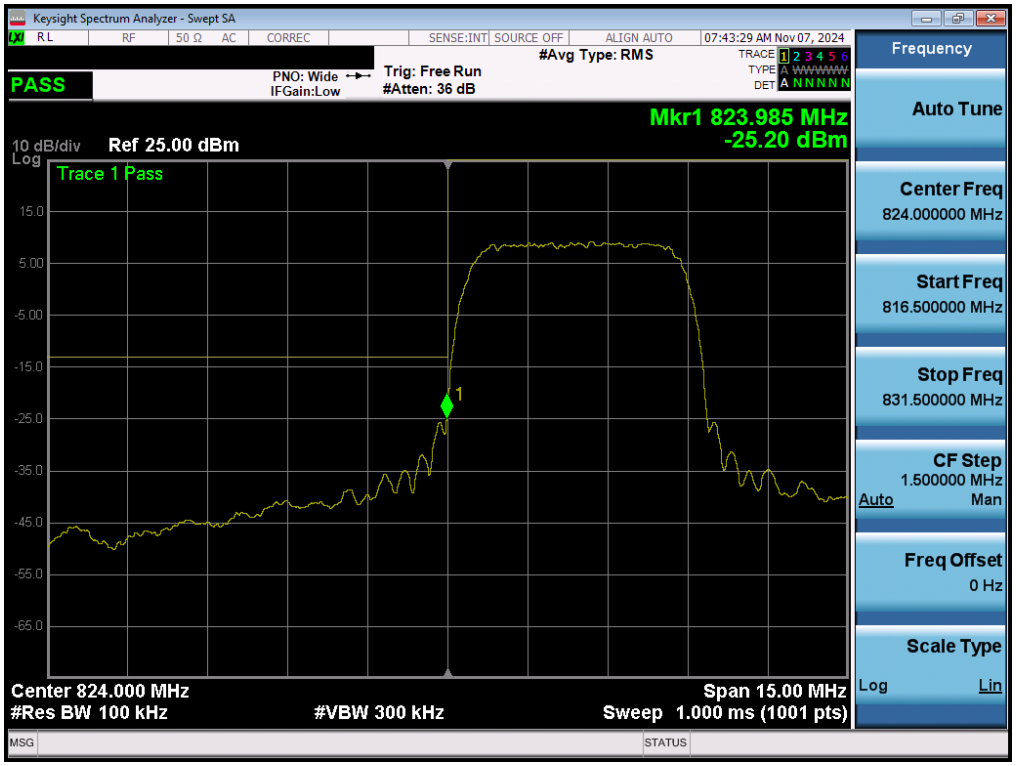


Plot 7-76. Lower Band Edge Plot (GPRS Cell – Ch. 128 – Ant1)



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)

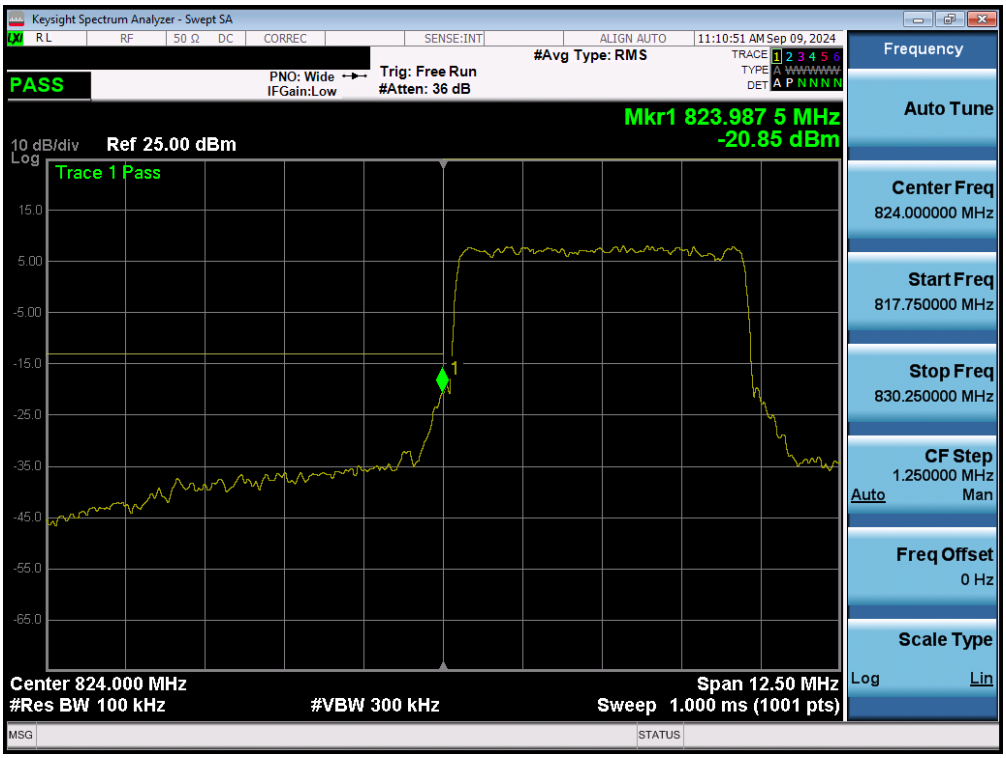
Plot 7-79. Upper Band Edge Plot (WCDMA Cell – Ch. 4233 – Ant1)

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



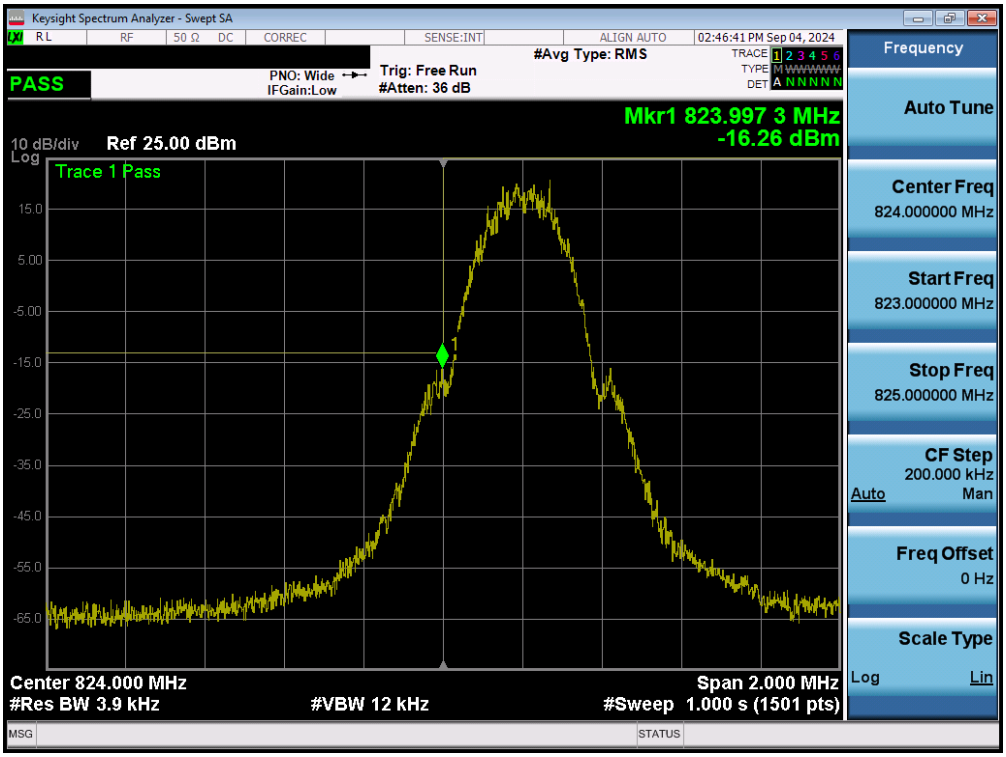
Plot 7-82. Lower Band Edge Plot (NR Band n26/5 – 5.0MHz - Full RB - Ant1)

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

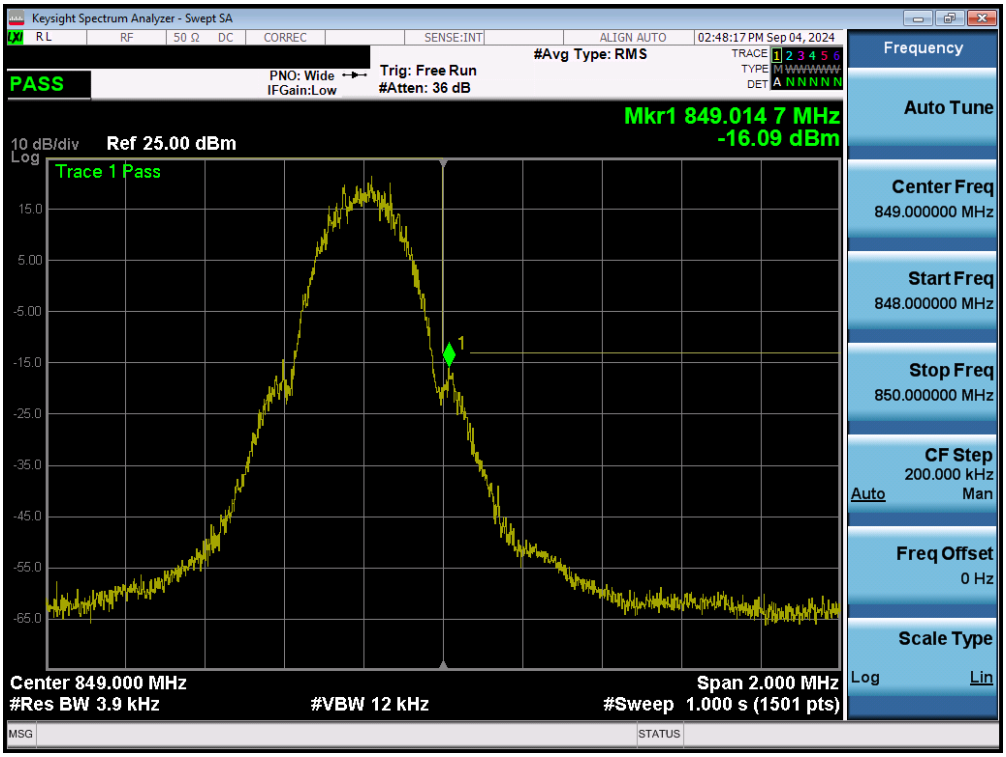
Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
GSM-Cell	250kHz	Low	Band Edge	-16.26	-13	-3.26
		High	Band Edge	-16.09	-13	-3.09
WCDMA-Cell	5MHz	Low	Band Edge	-25.20	-13	-12.20
		High	Band Edge	-19.38	-13	-6.38
LTE-B26-5	15 MHz	Low	Band Edge	-28.07	-13	-15.07
		High	Band Edge	-28.36	-13	-15.36
	10 MHz	Low	Band Edge	-25.89	-13	-12.89
		High	Band Edge	-27.63	-13	-14.63
	5 MHz	Low	Band Edge	-20.88	-13	-7.88
		High	Band Edge	-20.60	-13	-7.60
	3 MHz	Low	Band Edge	-18.01	-13	-5.01
		High	Band Edge	-17.16	-13	-4.16
	1.4 MHz	Low	Band Edge	-17.55	-13	-4.55
		High	Band Edge	-17.27	-13	-4.27
NR-n26-5	20 MHz	Low	Band Edge	-29.21	-13	-16.21
		High	Band Edge	-31.73	-13	-18.73
	15 MHz	Low	Band Edge	-26.40	-13	-13.40
		High	Band Edge	-30.19	-13	-17.19
	10 MHz	Low	Band Edge	-26.31	-13	-13.31
		High	Band Edge	-27.46	-13	-14.46
	5 MHz	Low	Band Edge	-21.68	-13	-8.68
		High	Band Edge	-22.13	-13	-9.13

Table 7-11. Conducted Band Edge Results – Ant2

GSM/GPRS Cell – Ant2

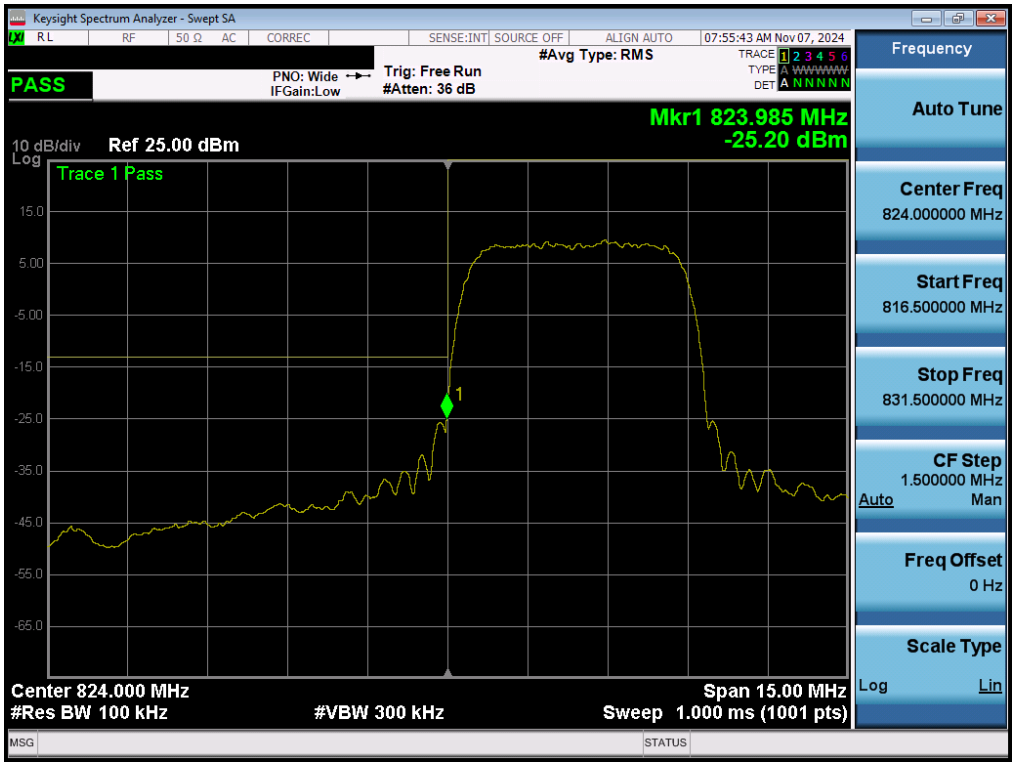


Plot 7-84. Lower Band Edge Plot (GPRS Cell – Ch. 128 – Ant2)



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

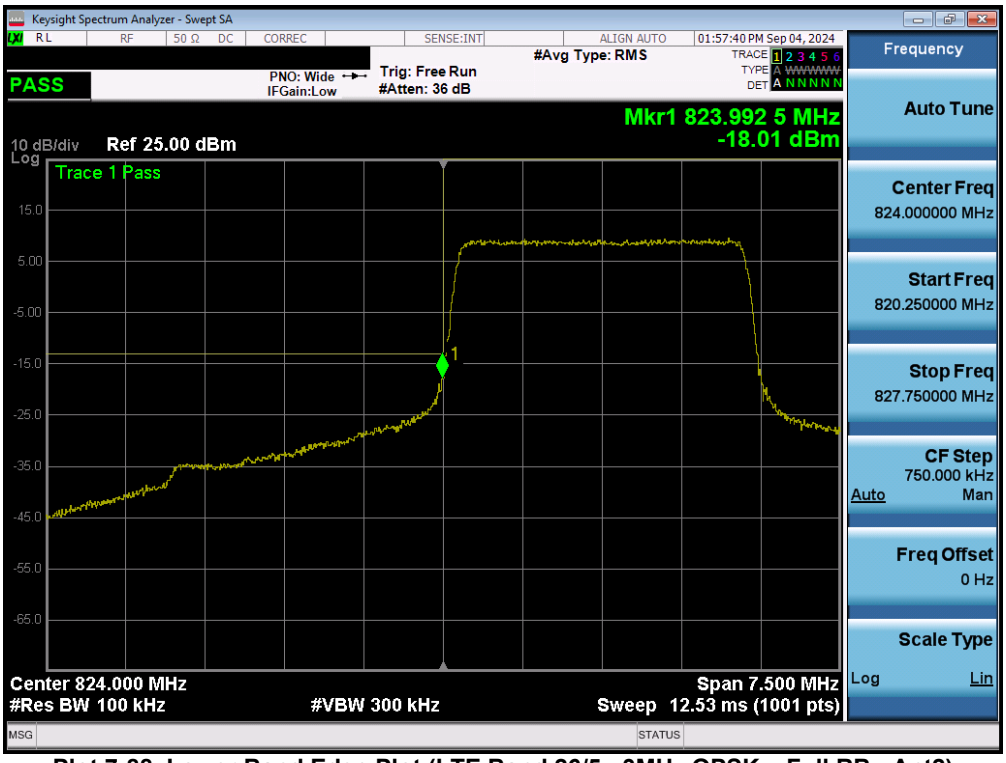
WCDMA Cell – Ant2



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

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

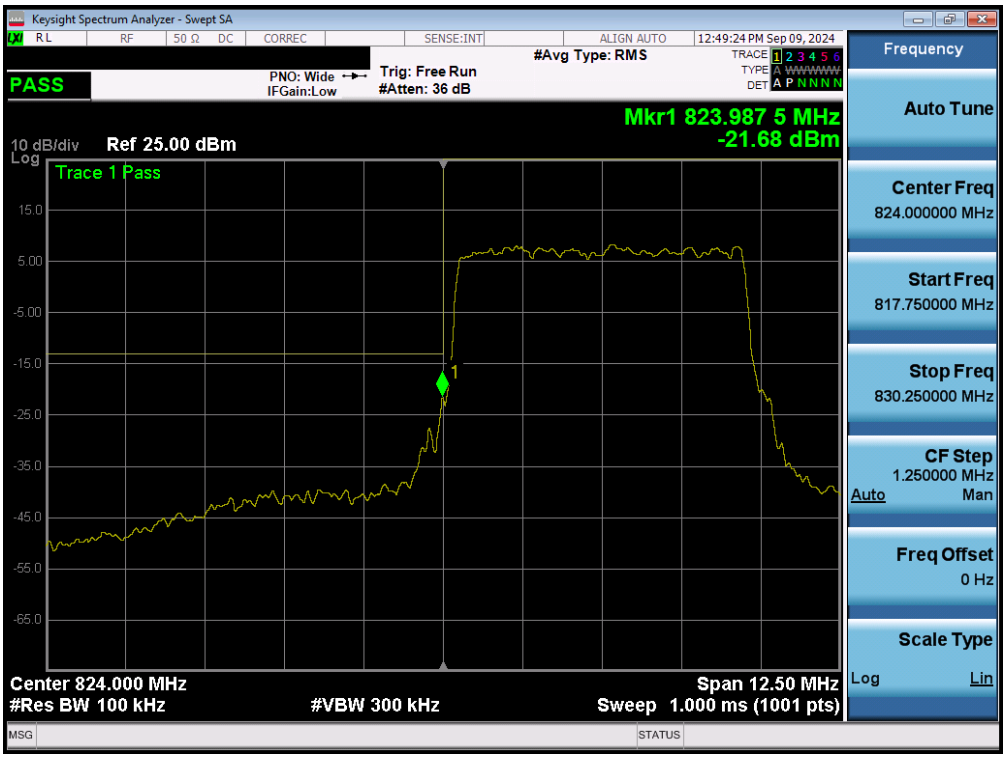
LTE Band 26/5 – Ant2



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.

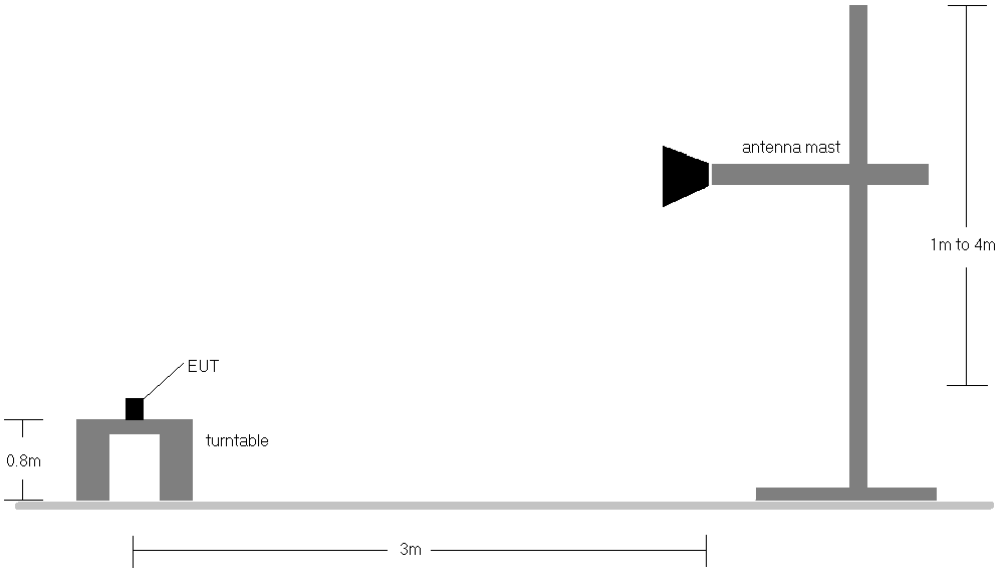


Figure 7-4. Radiated Test Setup < 1GHz

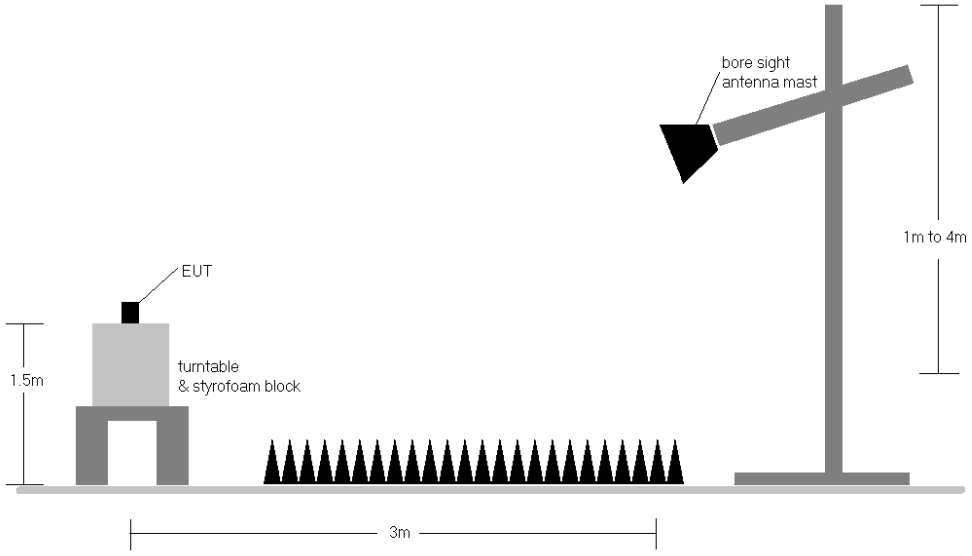


Figure 7-5. Radiated Test Setup > 1GHz

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	H	219	247	28.05	1.54	**27.44**	**0.555**	38.45	-11.01
836.60	GSM850	H	202	258	27.28	1.54	26.67	0.465	38.45	-11.78
848.80	GSM850	H	209	248	26.41	1.54	25.80	0.380	38.45	-12.65
824.20	GSM850	V	124	196	26.48	1.35	25.68	0.370	38.45	-12.77
824.20	EDGE850	H	219	247	27.73	1.54	**27.12**	0.516	38.45	-11.33
824.20	GSM850 (WCP)	H	104	302	26.90	1.54	26.29	0.426	38.45	-12.16

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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	V	153	306	19.54	1.14	18.53	0.071	38.45	-19.92	20.68	0.117	40.61	-19.93
836.60	WCDMA850	V	140	297	20.13	1.36	**19.34**	**0.086**	38.45	-19.12	**21.49**	**0.141**	40.61	-19.12
846.60	WCDMA850	V	143	350	19.20	1.56	18.61	0.073	38.45	-19.84	20.76	0.119	40.61	-19.84
836.60	WCDMA850 (WCP)	V	277	62	4.80	1.36	4.01	0.003	38.45	-34.45	6.16	0.004	40.61	-34.45

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]	EIRP [dBm]
15MHz (Band 26 only)	QPSK	831.50	H	204	341	1.54	1 / 0	18.73	18.12	0.065	38.45	-20.33	20.27
	QPSK	836.50	H	202	345	1.54	1 / 0	18.87	**18.26**	0.067	38.45	-20.19	**20.41**
	QPSK	841.50	H	193	345	1.54	1 / 74	16.71	16.10	0.041	38.45	-22.35	18.25
	16-QAM	836.50	H	202	345	1.54	1 / 0	17.94	17.33	0.054	38.45	-21.12	19.48
10 MHz	QPSK	829.00	H	204	341	1.54	1 / 25	18.94	18.34	0.068	38.45	-20.11	20.49
	QPSK	836.50	H	202	345	1.54	1 / 25	19.13	**18.52**	0.071	38.45	-19.93	**20.67**
	QPSK	844.00	H	193	345	1.54	1 / 0	16.72	16.12	0.041	38.45	-22.33	18.27
	16-QAM	836.50	H	202	345	1.54	1 / 49	18.30	17.70	0.059	38.45	-20.75	19.85
5 MHz	QPSK	826.50	H	204	341	1.54	1 / 24	18.68	18.07	0.064	38.45	-20.38	20.22
	QPSK	836.50	H	202	345	1.54	1 / 24	18.99	**18.38**	0.069	38.45	-20.07	**20.53**
	QPSK	846.50	H	193	345	1.54	1 / 12	16.69	16.08	0.041	38.45	-22.37	18.23
	16-QAM	836.50	H	202	345	1.54	1 / 0	18.50	17.89	0.062	38.45	-20.56	20.04
3 MHz	QPSK	825.50	H	204	341	1.54	1 / 7	18.52	17.91	0.062	38.45	-20.54	20.06
	QPSK	836.50	H	202	345	1.54	1 / 7	19.12	**18.51**	0.071	38.45	-19.94	**20.66**
	QPSK	847.50	H	193	345	1.54	1 / 7	16.74	16.13	0.041	38.45	-22.32	18.28
	16-QAM	836.50	H	202	345	1.54	1 / 0	18.35	17.74	0.059	38.45	-20.71	19.89
1.4 MHz	QPSK	824.70	H	204	341	1.54	1 / 3	18.70	18.09	0.064	38.45	-20.36	20.24
	QPSK	836.50	H	202	345	1.54	1 / 3	19.18	**18.57**	0.072	38.45	-19.88	**20.72**
	QPSK	848.30	H	193	345	1.54	1 / 5	16.81	16.21	0.042	38.45	-22.24	18.36
	16-QAM	836.50	H	202	345	1.54	1 / 3	18.31	17.71	0.059	38.45	-20.74	19.86
15MHz	QPSK (Opposite Pol.)	836.50	V	133	358	1.35	1 / 74	17.34	16.54	0.045	38.45	-21.91	18.69
	QPSK (WCP)	836.50	H	188	258	1.54	1 / 74	18.77	18.16	0.066	38.45	-20.29	20.31

Table 7-14. ERP Data (LTE Band 26/5 – 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]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	834.00	V	Z	130	288	1.30	1 / 53	21.45	**20.60**	0.115	38.45	-17.85
	π/2 BPSK	836.50	V	Z	130	286	1.35	1 / 53	21.06	20.26	0.106	38.45	-18.19
	π/2 BPSK	839.00	V	Z	130	284	1.41	1 / 53	20.94	20.20	0.105	38.45	-18.26
	QPSK	834.00	V	Z	130	288	1.30	1 / 53	21.25	20.40	0.110	38.45	-18.05
	QPSK	836.50	V	Z	130	286	1.35	1 / 53	21.23	20.43	0.110	38.45	-18.02
	QPSK	839.00	V	Z	130	284	1.41	1 / 53	20.77	20.03	0.101	38.45	-18.43
	16-QAM	834.00	V	Z	130	288	1.30	1 / 53	20.42	19.57	0.091	38.45	-18.88
15 MHz	π/2 BPSK	831.50	V	Z	130	288	1.25	1 / 1	21.40	**20.50**	0.112	38.45	-17.95
	π/2 BPSK	836.50	V	Z	130	286	1.35	1 / 77	21.08	20.28	0.107	38.45	-18.17
	π/2 BPSK	841.50	V	Z	130	284	1.46	1 / 77	21.08	20.39	0.109	38.45	-18.06
	QPSK	831.50	V	Z	130	288	1.25	1 / 1	21.18	20.28	0.107	38.45	-18.17
	QPSK	836.50	V	Z	130	286	1.35	1 / 77	21.07	20.28	0.107	38.45	-18.17
	QPSK	841.50	V	Z	130	284	1.46	1 / 77	20.66	19.97	0.099	38.45	-18.48
	16-QAM	836.50	V	Z	130	286	1.35	1 / 77	20.03	19.23	0.084	38.45	-19.22
10 MHz	π/2 BPSK	829.00	V	Z	130	288	1.20	1 / 1	21.55	**20.60**	0.115	38.45	-17.85
	π/2 BPSK	836.50	V	Z	130	286	1.35	1 / 50	20.99	20.19	0.104	38.45	-18.26
	π/2 BPSK	844.00	V	Z	130	284	1.51	1 / 1	20.96	20.32	0.108	38.45	-18.14
	QPSK	829.00	V	Z	130	288	1.20	1 / 1	21.24	20.29	0.107	38.45	-18.17
	QPSK	836.50	V	Z	130	286	1.35	1 / 50	21.31	20.51	0.113	38.45	-17.94
	QPSK	844.00	V	Z	130	284	1.51	1 / 1	20.29	19.65	0.092	38.45	-18.80
	16-QAM	836.50	V	Z	130	286	1.35	1 / 50	20.15	19.35	0.086	38.45	-19.10
5 MHz	π/2 BPSK	829.00	V	Z	130	288	1.14	1 / 1	21.61	**20.60**	0.115	38.45	-17.85
	π/2 BPSK	836.50	V	Z	130	286	1.35	1 / 23	21.23	20.43	0.110	38.45	-18.02
	π/2 BPSK	844.00	V	Z	130	284	1.56	1 / 12	21.10	20.52	0.113	38.45	-17.94
	QPSK	829.00	V	Z	130	288	1.14	1 / 1	21.00	19.99	0.100	38.45	-18.46
	QPSK	836.50	V	Z	130	286	1.35	1 / 23	21.11	20.31	0.107	38.45	-18.14
	QPSK	844.00	V	Z	130	284	1.56	1 / 12	20.74	20.15	0.103	38.45	-18.30
	16-QAM	844.00	V	Z	130	284	1.56	1 / 12	19.99	19.40	0.087	38.45	-19.05
20 MHz	QPSK (CP-OFDM)	834.00	V		133	290	1.30	1 / 53	19.65	**18.80**	0.076	38.45	-19.65
	QPSK (Opposite Pol.)	834.00	H	Y	202	209	1.50	1 / 53	18.55	17.90	0.062	38.45	-20.55
	QPSK (WCP)	834.00	V	X	207	21	1.30	1 / 53	16.92	16.07	0.040	38.45	-22.38

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	137	230	27.33	1.35	26.53	0.450	38.45	-11.92
836.60	GSM850	V	145	230	27.44	1.35	**26.64**	**0.462**	38.45	-11.81
848.80	GSM850	V	136	232	27.26	1.35	26.46	0.443	38.45	-11.99
836.60	GSM850	H	205	284	19.19	1.54	18.58	0.072	38.45	-19.87
836.60	EDGE850	V	145	230	21.32	1.35	**20.52**	0.113	38.45	-17.93
836.60	GSM850 (WCP)	V	179	147	12.27	1.35	11.47	0.014	38.45	-26.98

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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	V	186	247	19.15	1.14	**18.14**	**0.065**	38.45	-20.31	**20.29**	**0.107**	40.61	-20.32
836.60	WCDMA850	V	165	257	17.99	1.36	17.20	0.052	38.45	-21.26	19.35	0.086	40.61	-21.26
846.60	WCDMA850	V	267	225	18.11	1.56	17.52	0.057	38.45	-20.93	19.67	0.093	40.61	-20.93
826.40	WCDMA850 (WCP)	V	329	164	7.13	1.36	6.34	0.004	38.45	-32.12	8.49	0.007	40.61	-32.12

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	134	256	1.25	1 / 0	18.77	17.87	0.061	38.45	-20.58
	QPSK	836.50	V	145	256	1.35	1 / 37	18.76	**17.96**	0.063	38.45	-20.49
	QPSK	841.50	V	136	247	1.46	1 / 37	17.46	16.77	0.048	38.45	-21.68
	16-QAM	836.50	V	145	256	1.35	1 / 37	18.01	17.21	0.053	38.45	-21.24
10 MHz	QPSK	829.00	V	134	256	1.20	1 / 25	18.80	**17.84**	0.061	38.45	-20.61
	QPSK	836.50	V	145	256	1.35	1 / 25	18.63	17.84	0.061	38.45	-20.61
	QPSK	844.00	V	136	247	1.51	1 / 0	17.72	17.08	0.051	38.45	-21.38
	16-QAM	829.00	V	134	256	1.20	1 / 25	18.25	17.29	0.054	38.45	-21.16
5 MHz	QPSK	826.50	V	134	256	1.14	1 / 12	18.89	**17.88**	0.061	38.45	-20.57
	QPSK	836.50	V	145	256	1.35	1 / 12	18.67	17.87	0.061	38.45	-20.58
	QPSK	846.50	V	136	247	1.56	1 / 12	17.55	16.96	0.050	38.45	-21.49
	16-QAM	826.50	V	134	256	1.14	1 / 0	18.27	17.26	0.053	38.45	-21.19
3 MHz	QPSK	825.50	V	134	256	1.12	1 / 0	18.86	**17.83**	0.061	38.45	-20.62
	QPSK	836.50	V	145	256	1.35	1 / 7	18.54	17.74	0.059	38.45	-20.71
	QPSK	847.50	V	136	247	1.58	1 / 7	17.45	16.88	0.049	38.45	-21.57
	16-QAM	836.50	V	145	256	1.35	1 / 14	18.19	17.40	0.055	38.45	-21.05
1.4 MHz	QPSK	824.70	V	134	256	1.11	1 / 3	18.72	17.67	0.058	38.45	-20.78
	QPSK	836.50	V	145	256	1.35	1 / 5	18.56	**17.76**	0.060	38.45	-20.69
	QPSK	848.30	V	136	247	1.60	1 / 5	17.29	16.74	0.047	38.45	-21.71
	16-QAM	836.50	V	145	256	1.35	1 / 3	17.89	17.10	0.051	38.45	-21.35
15MHz	QPSK (Opposite Pol.)	836.50	H	210	295	1.54	0.00	17.12	16.51	0.045	38.45	-21.94
	QPSK (WCP)	836.50	V	152	138	1.35	0.00	7.85	7.05	0.005	38.45	-31.40

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	143	251	1.30	1 / 53	19.34	18.49	0.071	38.45	-19.96
	π/2 BPSK	836.50	V	143	246	1.35	1 / 53	19.46	18.66	0.074	38.45	-19.79
	π/2 BPSK	839.00	V	143	252	1.41	1 / 53	19.51	18.77	0.075	38.45	-19.69
	QPSK	834.00	V	143	251	1.30	1 / 53	19.39	18.54	0.071	38.45	-19.91
	QPSK	836.50	V	143	246	1.35	1 / 53	19.54	18.74	0.075	38.45	-19.71
	QPSK	839.00	V	143	252	1.41	1 / 53	19.62	**18.88**	0.077	38.45	-19.58
	16-QAM	836.50	V	143	246	1.35	1 / 53	18.53	17.73	0.059	38.45	-20.72
15 MHz	π/2 BPSK	831.50	V	143	251	1.25	1 / 77	19.37	18.47	0.070	38.45	-19.98
	π/2 BPSK	836.50	V	143	246	1.35	1 / 77	19.53	18.73	0.075	38.45	-19.72
	π/2 BPSK	841.50	V	143	252	1.46	1 / 77	19.56	18.87	0.077	38.45	-19.58
	QPSK	831.50	V	143	251	1.25	1 / 77	19.53	18.63	0.073	38.45	-19.82
	QPSK	836.50	V	143	246	1.35	1 / 77	19.63	18.83	0.076	38.45	-19.62
	QPSK	841.50	V	143	252	1.46	1 / 77	19.72	**19.02**	0.080	38.45	-19.43
	16-QAM	831.50	V	143	251	1.25	1 / 77	18.72	17.82	0.061	38.45	-20.63
10 MHz	π/2 BPSK	829.00	V	143	251	1.20	1 / 50	19.36	18.41	0.069	38.45	-20.04
	π/2 BPSK	836.50	V	143	246	1.35	1 / 50	19.39	18.60	0.072	38.45	-19.85
	π/2 BPSK	844.00	V	143	252	1.51	1 / 50	19.50	18.86	0.077	38.45	-19.59
	QPSK	829.00	V	143	251	1.20	1 / 50	19.50	18.55	0.072	38.45	-19.90
	QPSK	836.50	V	143	246	1.35	1 / 50	19.67	18.87	0.077	38.45	-19.58
	QPSK	844.00	V	143	252	1.51	1 / 50	19.56	**18.92**	0.078	38.45	-19.53
	16-QAM	836.50	V	143	246	1.35	1 / 50	18.84	18.04	0.064	38.45	-20.41
5 MHz	π/2 BPSK	829.00	V	143	251	1.14	1 / 23	19.42	18.42	0.069	38.45	-20.03
	π/2 BPSK	836.50	V	143	246	1.35	1 / 23	19.43	18.64	0.073	38.45	-19.81
	π/2 BPSK	844.00	V	143	252	1.56	1 / 23	19.32	18.73	0.075	38.45	-19.72
	QPSK	829.00	V	143	251	1.14	1 / 23	19.59	18.59	0.072	38.45	-19.87
	QPSK	836.50	V	143	246	1.35	1 / 23	19.57	18.78	0.075	38.45	-19.67
	QPSK	844.00	V	143	252	1.56	1 / 23	19.55	**18.96**	0.079	38.45	-19.49
	16-QAM	836.50	V	143	246	1.35	1 / 23	18.96	18.16	0.066	38.45	-20.29
20 MHz	QPSK (CP-OFDM)	839.00	V	146	245	1.41	1 / 53	17.91	**17.17**	0.052	38.45	-21.29
	QPSK (Opposite Pol.)	839.00	H	221	288	1.58	1 / 1	18.37	17.80	0.060	38.45	-20.65
	QPSK (WCP)	839.00	V	208	351	1.41	1 / 1	15.41	14.67	0.029	38.45	-23.79

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.

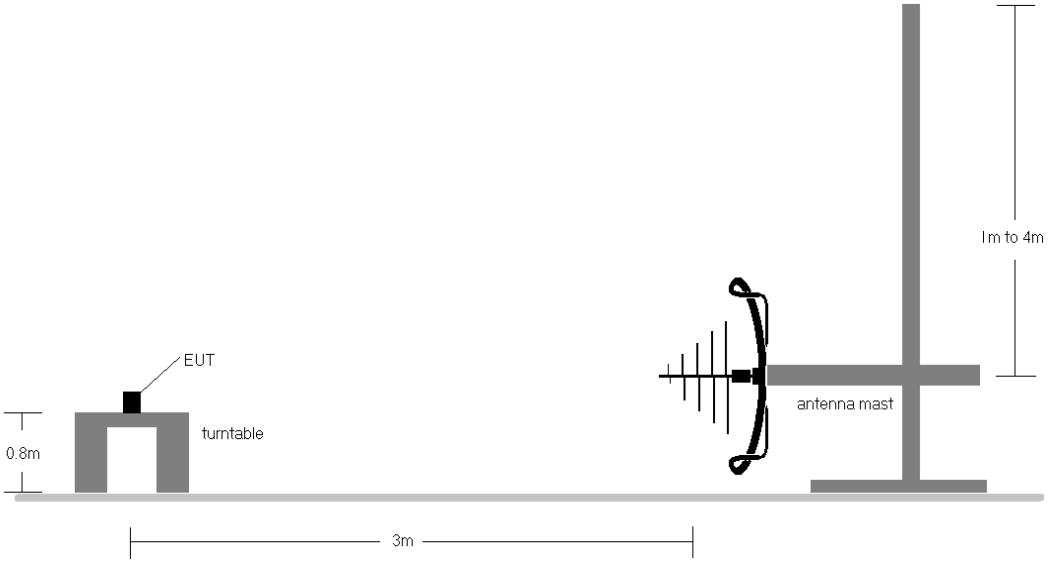


Figure 7-6. Test Instrument & Measurement Setup < 1GHz

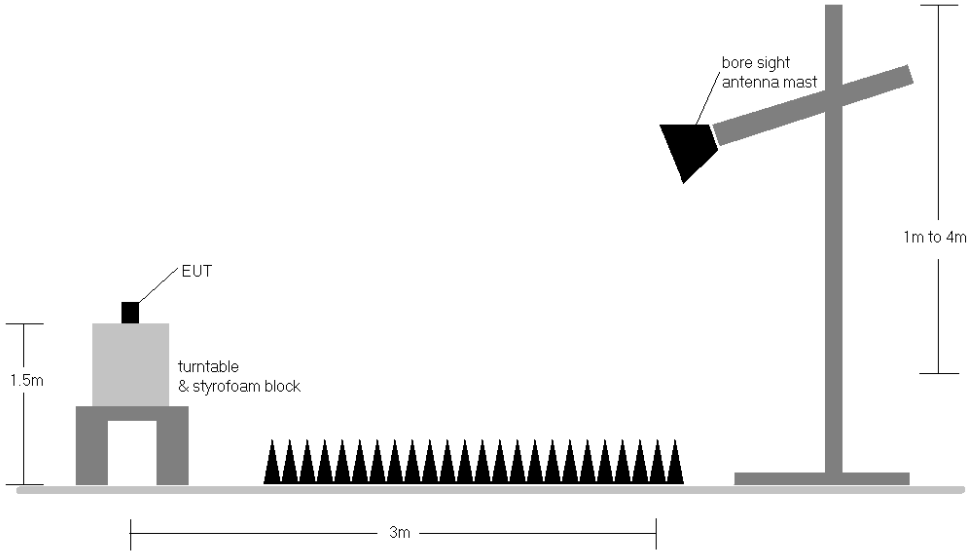


Figure 7-7. Test Instrument & Measurement Setup > 1GHz

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.

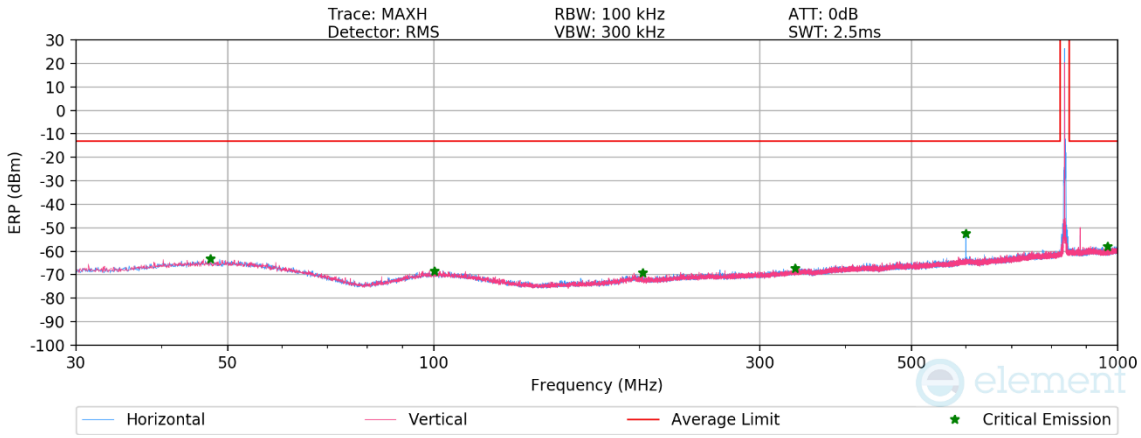
7. Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.

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

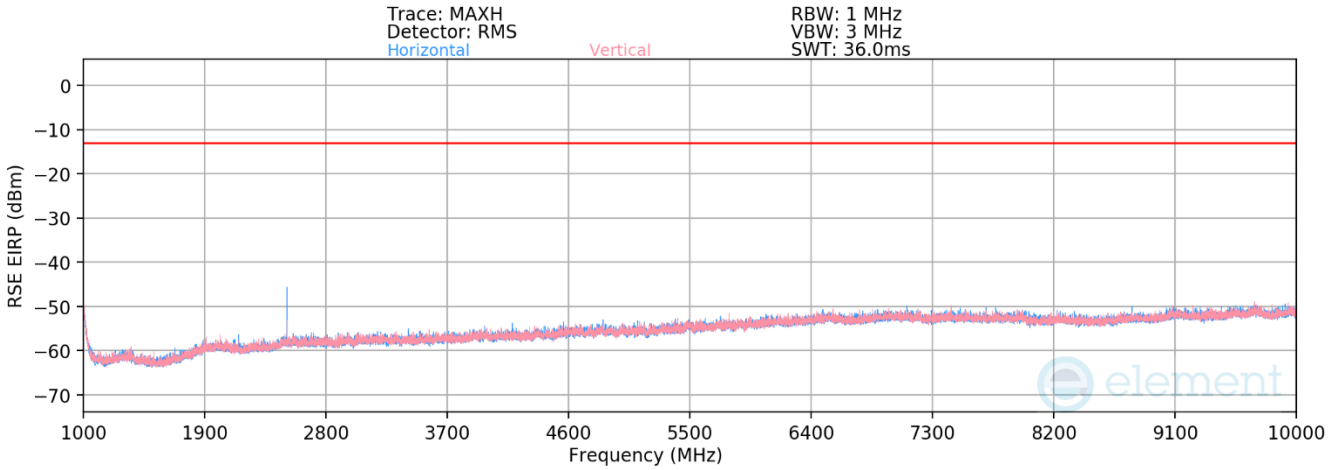
9. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

10. Spurious 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.

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
Detector / Trace Mode:	RMS / Max Hold
RBW / VBW:	100kHz / 300kHz

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]
47.1	H	-	-	-71.42	-1.05	34.53	-63.23	-13.00	-50.23
100.3	H	-	-	-74.38	-3.30	29.32	-68.44	-13.00	-55.44
202.2	V	-	-	-75.11	-3.27	28.62	-69.13	-13.00	-56.13
337.5	H	-	-	-77.61	1.08	30.47	-67.29	-13.00	-54.29
599.8	H	-	-	-68.47	6.71	45.24	-52.52	-13.00	-39.52
966.8	V	-	-	-78.75	11.57	39.82	-57.94	-13.00	-44.94

Table 7-20. Radiated Spurious Data (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]
1648.4	H	124	152	-74.53	-2.58	29.89	-65.37	-13.00	-52.37
2472.6	H	122	214	-60.36	2.05	48.69	-46.57	-13.00	-33.57
3296.8	H	250	0	-78.43	4.13	32.69	-62.56	-13.00	-49.56
4121.0	H	250	0	-79.17	5.81	33.65	-61.61	-13.00	-48.61
4945.2	H	250	0	-80.27	7.79	34.52	-60.74	-13.00	-47.74

Table 7-21. 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]
1673.2	H	163	217	-74.08	-1.95	30.97	-64.29	-13.00	-51.29
2509.8	H	126	211	-59.54	2.69	50.16	-45.10	-13.00	-32.10
3346.4	H	250	0	-78.22	4.13	32.91	-62.35	-13.00	-49.35
4183.0	H	250	0	-79.56	6.29	33.74	-61.52	-13.00	-48.52
5019.6	H	250	0	-80.23	7.93	34.70	-60.56	-13.00	-47.56

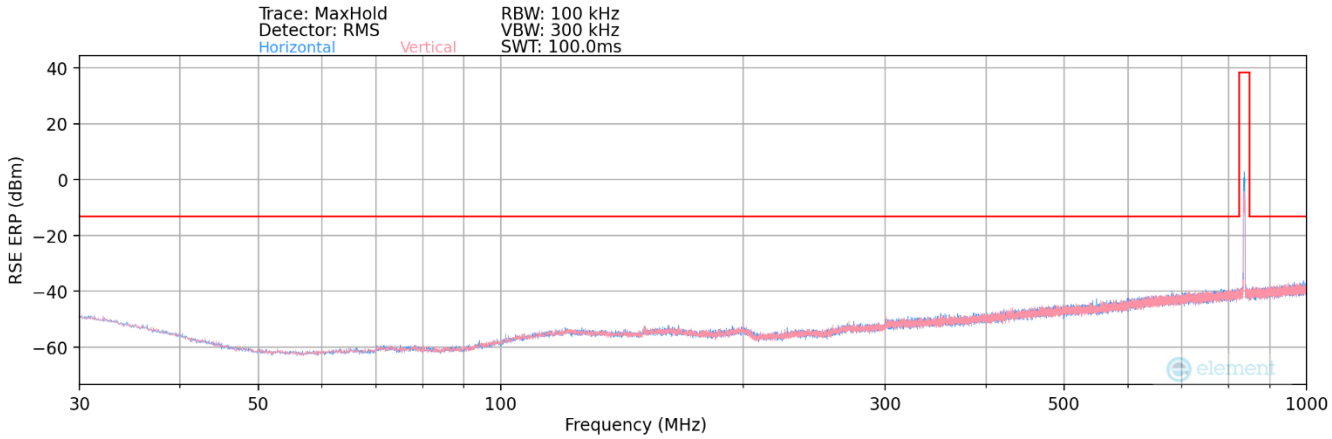
Table 7-22. Radiated Spurious Data (GPRS Cell – Mid Channel) – Ant1

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

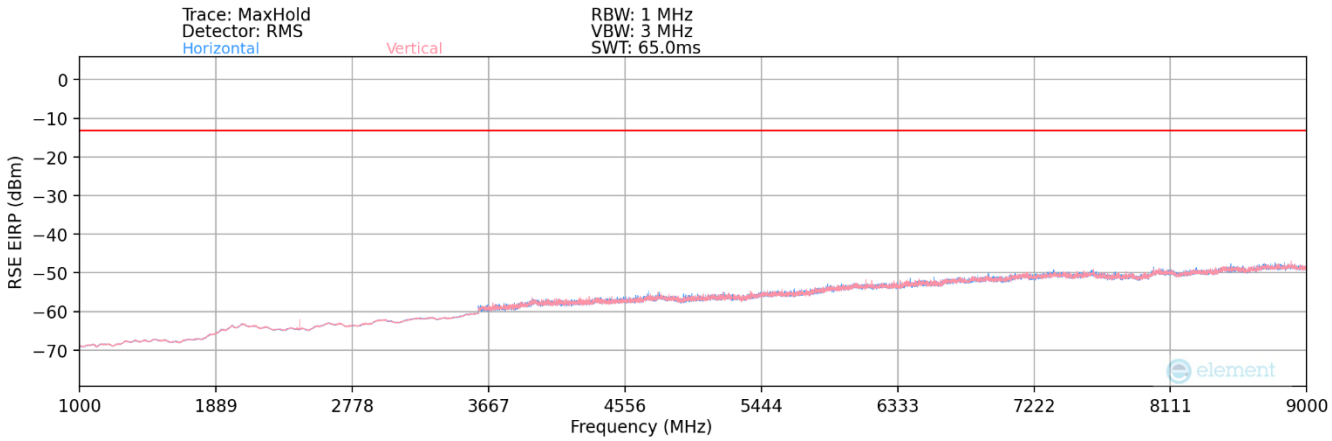
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1697.6	H	250	0	-76.57	-1.57	28.86	-66.39	-13.00	-53.39
2546.4	H	250	0	-77.34	2.70	32.36	-62.89	-13.00	-49.89
3395.2	H	250	0	-78.16	4.02	32.86	-62.40	-13.00	-49.40

Table 7-23. Radiated Spurious Data (GPRS Cell – High Channel) – 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:	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]
54.20	V	-	-	-108.29	14.28	12.99	-84.42	-13.00	-71.42
148.46	V	-	-	-107.38	19.71	19.33	-78.08	-13.00	-65.08
290.58	V	-	-	-108.56	20.92	19.36	-78.05	-13.00	-65.05

Table 7-24. Radiated Spurious Data (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	-	-	-76.85	-7.22	22.93	-72.32	-13.00	-59.32
2479.20	V	-	-	-76.84	-4.22	25.94	-69.31	-13.00	-56.31
3305.60	V	-	-	-77.80	-1.00	28.20	-67.05	-13.00	-54.05

Table 7-25. 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	-	-	-76.81	-6.99	23.20	-72.06	-13.00	-59.06
2509.80	V	-	-	-76.44	-3.93	26.63	-68.63	-13.00	-55.63
3346.40	V	-	-	-77.62	-1.19	28.19	-67.07	-13.00	-54.07

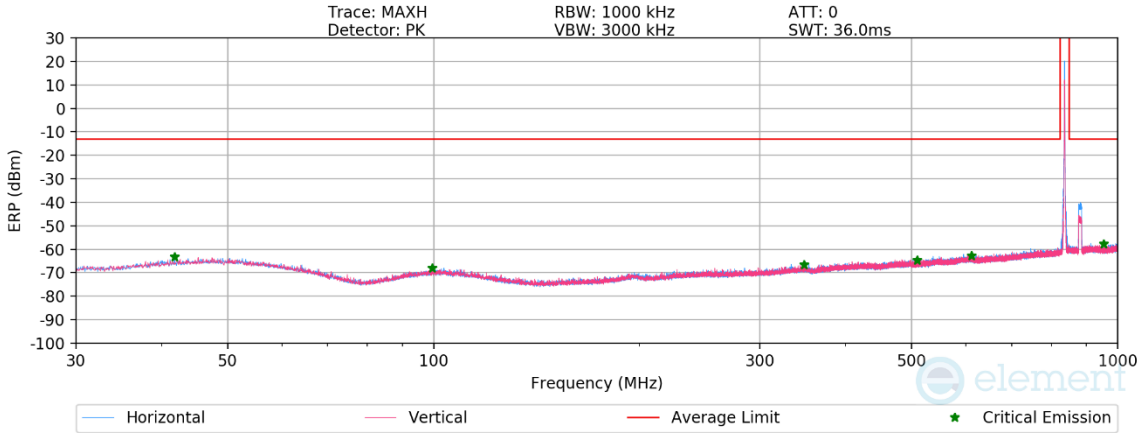
Table 7-26. Radiated Spurious Data (WCDMA Cell – Mid Channel) – Ant1

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

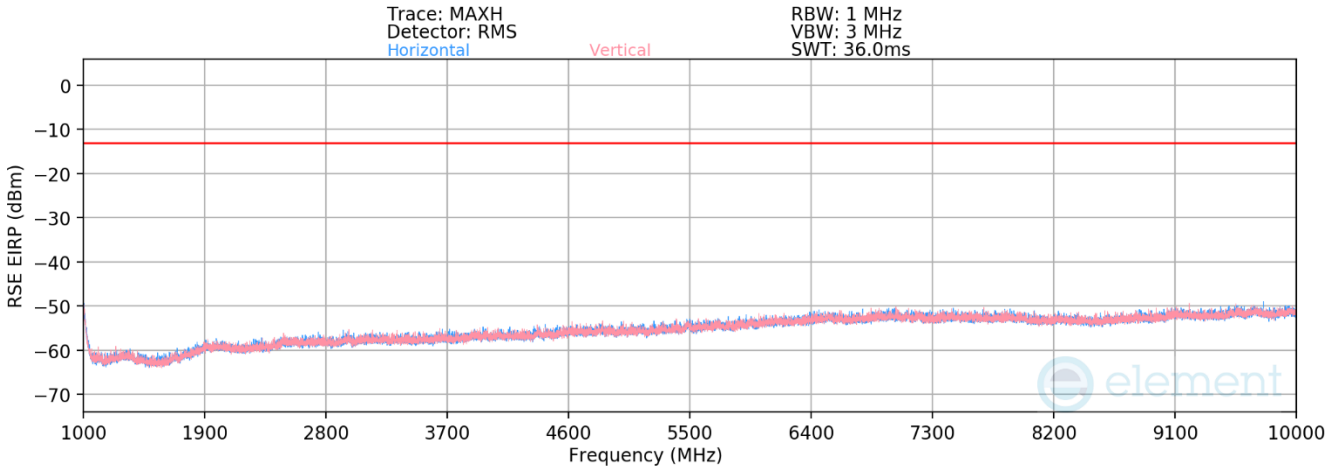
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.20	V	-	-	-76.75	-6.73	23.52	-71.74	-13.00	-58.74
2539.80	V	-	-	-76.92	-3.31	26.77	-68.48	-13.00	-55.48
3386.40	V	-	-	-77.68	-1.04	28.28	-66.98	-13.00	-53.98

Table 7-27. Radiated Spurious Data (WCDMA Cell – High Channel) – 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):	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]
45.4	V	-	-	-70.89	-1.98	34.13	-63.28	-13.00	-50.28
118.1	V	-	-	-74.32	-3.37	29.31	-68.10	-13.00	-55.10
185.2	V	-	-	-76.88	0.90	31.02	-66.39	-13.00	-53.39
337.4	V	-	-	-78.14	4.42	33.28	-64.13	-13.00	-51.13
477.3	H	-	-	-78.87	7.39	35.52	-61.89	-13.00	-48.89
948.2	H	-	-	-78.78	11.46	39.68	-57.73	-13.00	-44.73

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

Bandwidth (MHz):	10
Frequency (MHz):	829.0
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]
1658.0	-	-	-	-76.88	-1.95	28.17	-67.08	-13.00	-54.08
2487.0	-	-	-	-77.41	2.37	31.96	-63.30	-13.00	-50.30
3316.0	-	-	-	-78.75	4.23	32.48	-62.78	-13.00	-49.78

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

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]
1673.0	-	-	-	-76.80	-1.95	28.25	-67.01	-13.00	-54.01
2509.5	V	248	100	-75.37	2.69	34.32	-60.94	-13.00	-47.94
3346.0	-	-	-	-78.72	4.23	32.51	-62.75	-13.00	-49.75
4182.5	-	-	-	-80.06	6.29	33.24	-62.02	-13.00	-49.02
5019.0	-	-	-	-80.97	7.93	33.97	-61.29	-13.00	-48.29

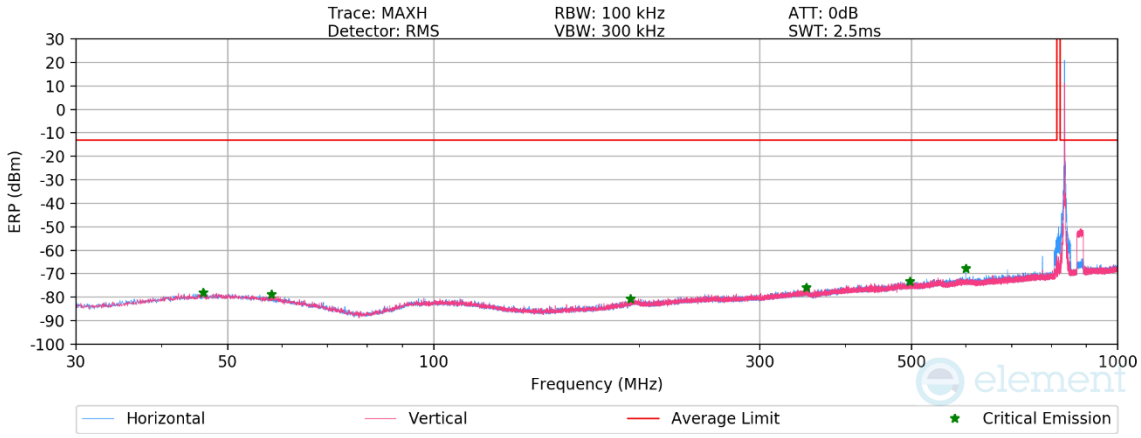
Table 7-30. Radiated Spurious Data (LTE Band 26/5 – Mid Channel) – Ant1

Bandwidth (MHz):	10
Frequency (MHz):	844.0
RB / Offset:	1 / 25

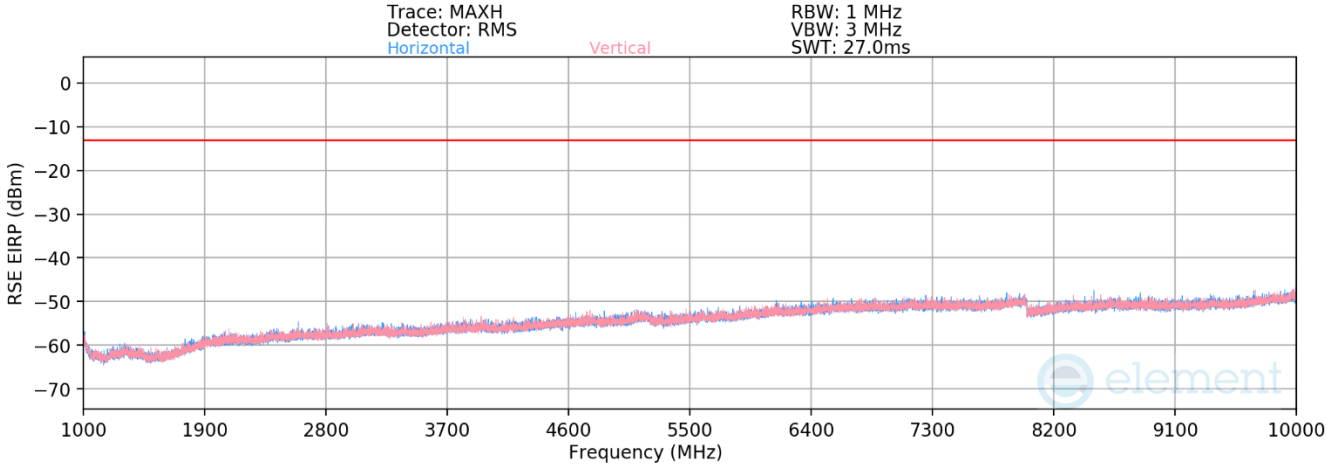
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.0	-	-	-	-76.94	-1.95	28.11	-67.14	-13.00	-54.14
2532.0	-	-	-	-78.01	2.66	31.65	-63.61	-13.00	-50.61
3376.0	-	-	-	-79.00	4.18	32.18	-63.07	-13.00	-50.07

Table 7-31. Radiated Spurious Data (LTE Band 26/5 – High 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):	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]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
46.00	V	200	-	-81.45	-5.91	19.64	-78.11	-13.00	-65.11
57.90	H	200	-	-81.07	-6.99	18.93	-78.82	-13.00	-65.82
193.95	H	200	-	-82.20	-7.63	17.17	-80.59	-13.00	-67.59
350.65	V	200	-	-82.08	-2.96	21.96	-75.79	-13.00	-62.79
496.90	H	200	-	-82.68	0.18	24.50	-73.26	-13.00	-60.26
599.65	H	200	-	-79.80	2.81	30.01	-67.75	-13.00	-54.75

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

Bandwidth (MHz):	20
Frequency (MHz):	834.0
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]
1691.9	H	-	-	-78.83	-0.83	27.34	-67.92	-13.00	-54.92
2486.2	H	-	-	-79.92	4.07	31.15	-64.11	-13.00	-51.11
3350.3	H	-	-	-80.95	6.05	32.10	-63.16	-13.00	-50.16

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

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]
1671.7	H	-	-	-79.04	-0.79	27.17	-68.09	-13.00	-55.09
2523.9	H	-	-	-79.91	4.05	31.15	-64.11	-13.00	-51.11
3355.8	V	-	-	-80.82	6.05	32.22	-63.03	-13.00	-50.03

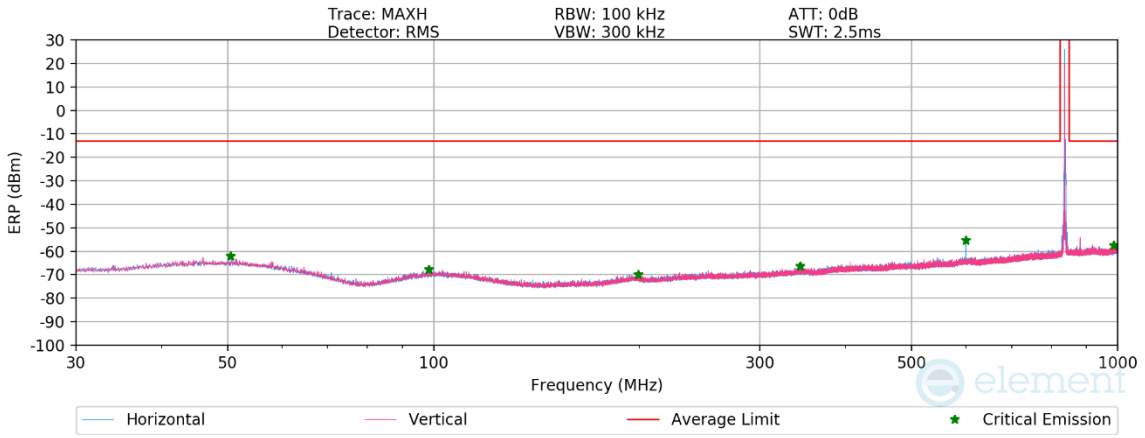
Table 7-34. Radiated Spurious Data (NR Band n26/5 – Mid Channel) – Ant1

Bandwidth (MHz):	20
Frequency (MHz):	839.0
RB / Offset:	1 / 50

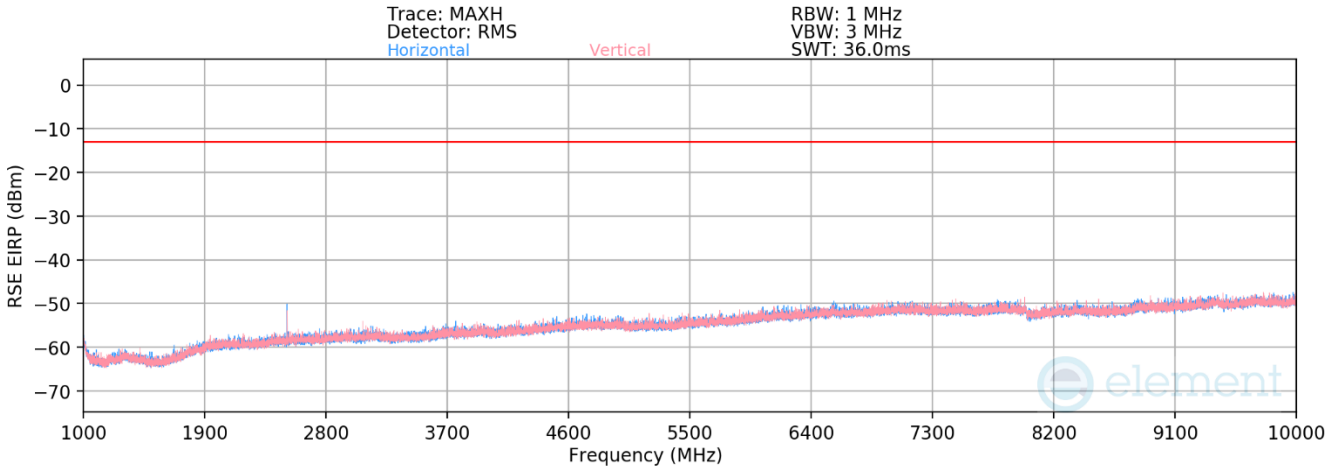
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1699.2	H	-	-	-78.91	-0.81	27.28	-67.98	-13.00	-54.98
2533.5	H	-	-	-79.71	4.09	31.38	-63.88	-13.00	-50.88
3357.7	H	-	-	-80.98	6.05	32.06	-63.19	-13.00	-50.19

Table 7-35. Radiated Spurious Data (NR Band n26/5 – High Channel) – 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:	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]
50.52	H	200	-	-70.28	-0.95	35.77	-61.98	-13.00	-48.98
98.32	V	200	-	-73.49	-3.51	30.00	-67.76	-13.00	-54.76
199.27	V	200	-	-76.28	-2.92	27.80	-69.96	-13.00	-56.96
343.06	H	200	-	-76.92	1.40	31.48	-66.28	-13.00	-53.28
599.90	H	200	-	-71.36	6.71	42.35	-55.41	-13.00	-42.41
987.58	H	200	-	-78.92	12.18	40.26	-57.50	-13.00	-44.50

Table 7-36. Radiated Spurious Data (GPRS Cell – Mid Channel) – 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]
1648.4	H	147	160	-76.99	-1.14	28.87	-66.38	-13.00	-53.38
2472.6	H	153	11	-76.93	4.03	34.11	-61.15	-13.00	-48.15
3296.8	H	-	-	-80.08	5.62	32.53	-62.72	-13.00	-49.72
4121.0	H	-	-	-81.21	7.87	33.66	-61.59	-13.00	-48.59
4945.2	H	-	-	-81.75	9.72	34.97	-60.28	-13.00	-47.28

Table 7-37. 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]
1673.2	H	353	179	-76.42	-0.79	29.79	-65.47	-13.00	-52.47
2509.8	H	105	1	-74.33	3.97	36.64	-58.62	-13.00	-45.62
3346.4	V	-	-	-79.99	5.67	32.68	-62.57	-13.00	-49.57
4183.0	H	-	-	-80.95	7.87	33.91	-61.34	-13.00	-48.34
5019.6	V	-	-	-81.64	9.82	35.17	-60.08	-13.00	-47.08

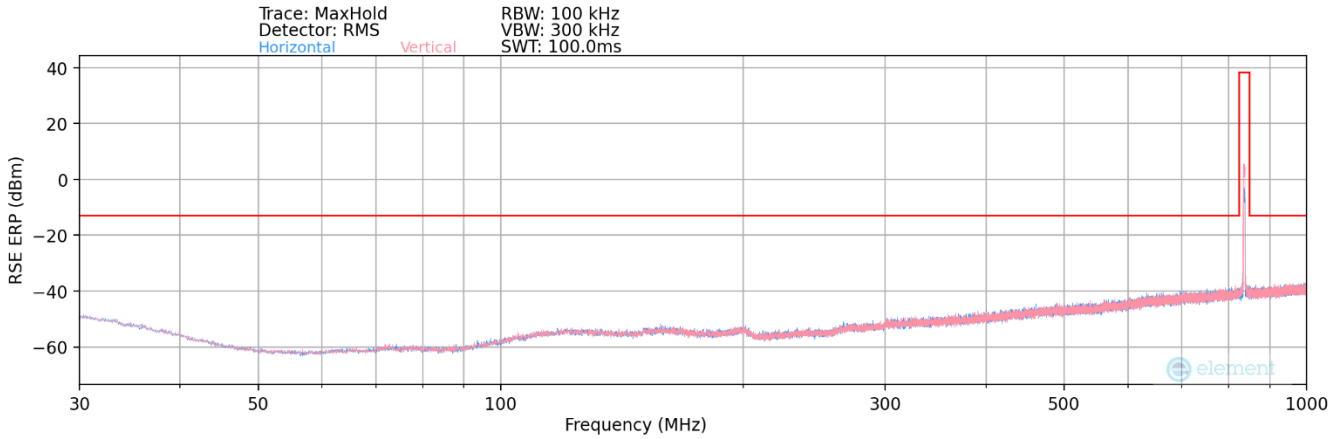
Table 7-38. Radiated Spurious Data (GPRS Cell – Mid Channel) – Ant2

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

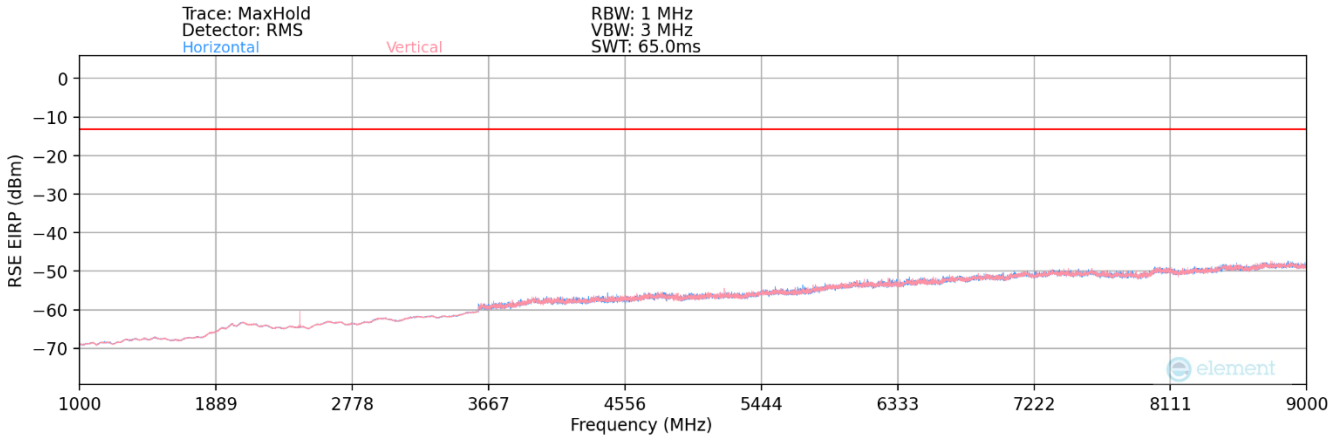
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1697.6	H	117	214	-75.78	-0.81	30.41	-64.85	-13.00	-51.85
2546.4	H	255	184	-75.17	4.09	35.92	-59.34	-13.00	-46.34
3395.2	H	-	-	-80.50	6.09	32.59	-62.67	-13.00	-49.67
4244.0	H	-	-	-81.31	8.11	33.80	-61.46	-13.00	-48.46
5092.8	H	-	-	-82.14	10.08	34.94	-60.32	-13.00	-47.32

Table 7-39. Radiated Spurious Data (GPRS Cell – High 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:	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]
74.56	V	-	-	-107.14	14.49	14.35	-83.06	-13.00	-70.06
148.52	V	-	-	-107.21	19.72	19.51	-77.90	-13.00	-64.90
287.78	V	-	-	-107.83	20.86	20.03	-77.38	-13.00	-64.38

Table 7-40. Radiated Spurious Data (WCDMA Cell – Mid Channel) – 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	V	-	-	-76.84	-7.22	22.94	-72.31	-13.00	-59.31
2479.20	V	-	-	-77.24	-4.22	25.54	-69.71	-13.00	-56.71
3305.60	V	-	-	-77.64	-1.00	28.36	-66.89	-13.00	-53.89

Table 7-41. 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	V	-	-	-76.64	-6.99	23.37	-71.89	-13.00	-58.89
2509.80	V	-	-	-77.30	-3.93	25.77	-69.49	-13.00	-56.49
3346.40	V	-	-	-77.53	-1.19	28.28	-66.98	-13.00	-53.98

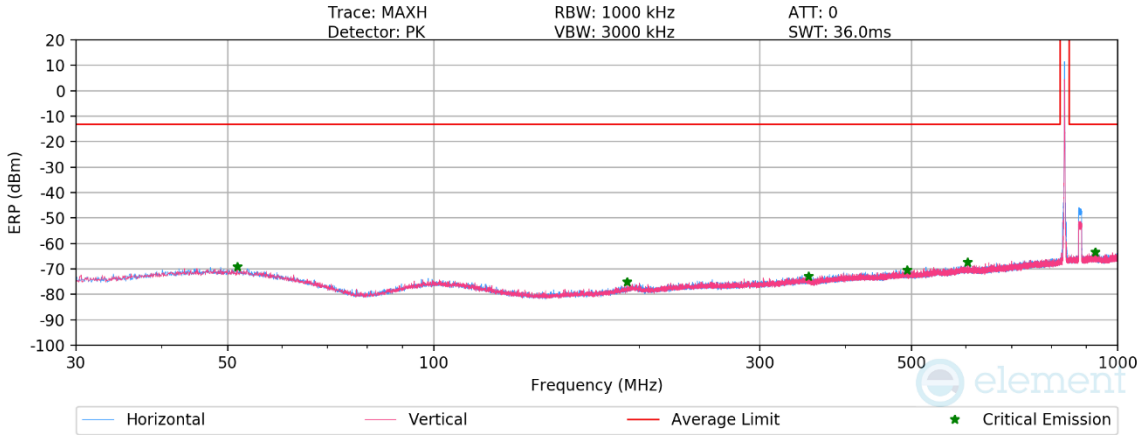
Table 7-42. Radiated Spurious Data (WCDMA Cell – Mid Channel) – Ant2

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

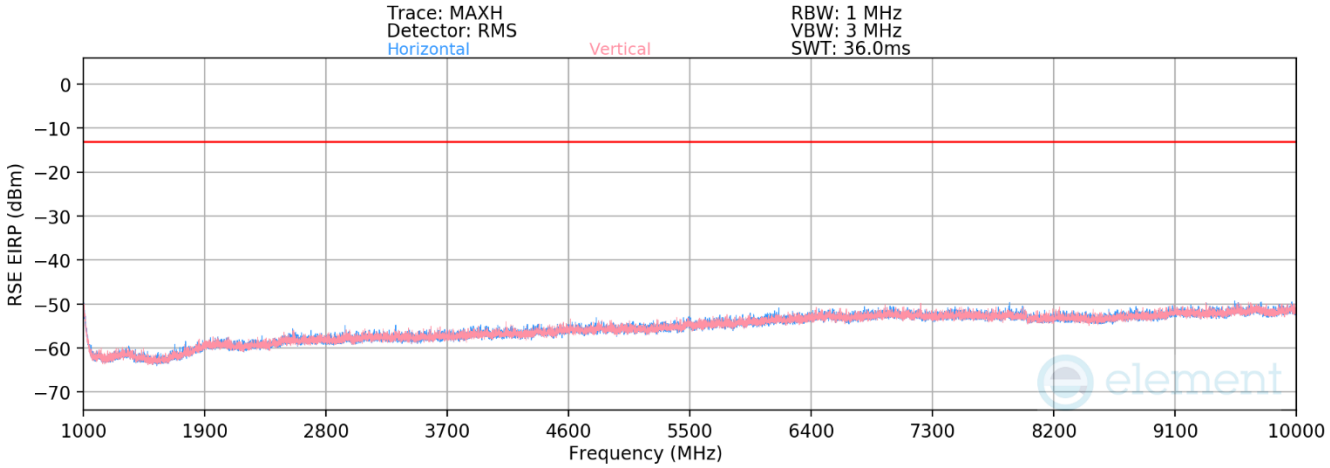
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.20	V	-	-	-76.63	-6.73	23.64	-71.62	-13.00	-58.62
2539.80	V	-	-	-76.81	-3.31	26.88	-68.37	-13.00	-55.37
3386.40	V	-	-	-77.40	-1.04	28.56	-66.70	-13.00	-53.70

Table 7-43. 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):	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]
51.62	V	200	-	-71.38	-6.95	28.67	-69.09	-13.00	-56.09
191.72	V	200	-	-75.09	-9.16	22.75	-75.01	-13.00	-62.01
345.81	H	200	-	-77.30	-4.51	25.19	-72.57	-13.00	-59.57
492.20	H	200	-	-77.91	-1.71	27.38	-70.38	-13.00	-57.38
603.90	H	200	-	-77.33	0.71	30.38	-67.38	-13.00	-54.38
929.98	V	200	-	-79.19	5.72	33.53	-64.22	-13.00	-51.22

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

Bandwidth (MHz):	10
Frequency (MHz):	829.0
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]
1658.0	V	-	-	-76.97	-1.98	28.05	-67.21	-13.00	-54.21
2487.0	V	-	-	-77.87	2.47	31.61	-63.65	-13.00	-50.65
3316.0	V	-	-	-78.94	4.13	32.19	-63.07	-13.00	-50.07

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

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]
1673.0	V	-	-	-77.02	-1.98	28.00	-67.26	-13.00	-54.26
2509.5	H	-	-	-77.95	2.37	31.41	-63.84	-13.00	-50.84
3346.0	H	-	-	-78.97	4.23	32.26	-63.00	-13.00	-50.00

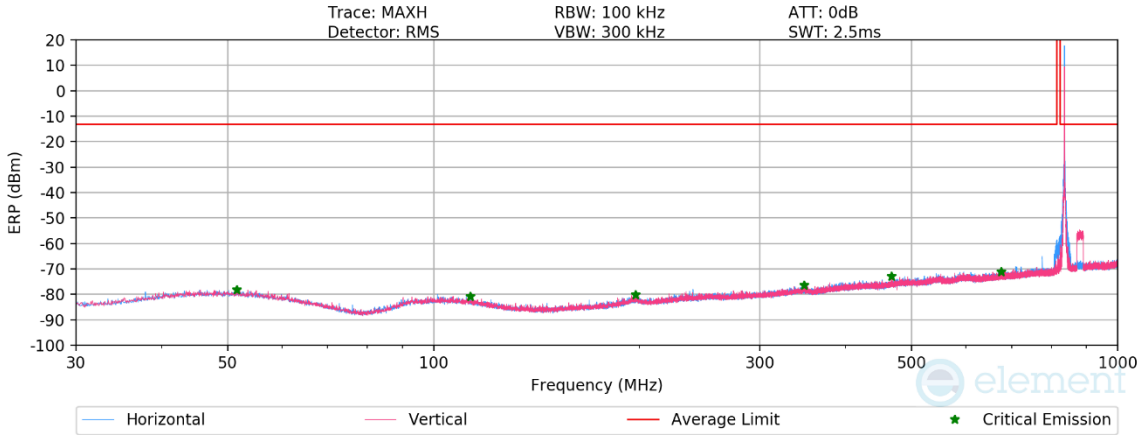
Table 7-46. Radiated Spurious Data (LTE Band 26/5 – Mid Channel) – Ant2

Bandwidth (MHz):	10
Frequency (MHz):	844.0
RB / Offset:	1 / 25

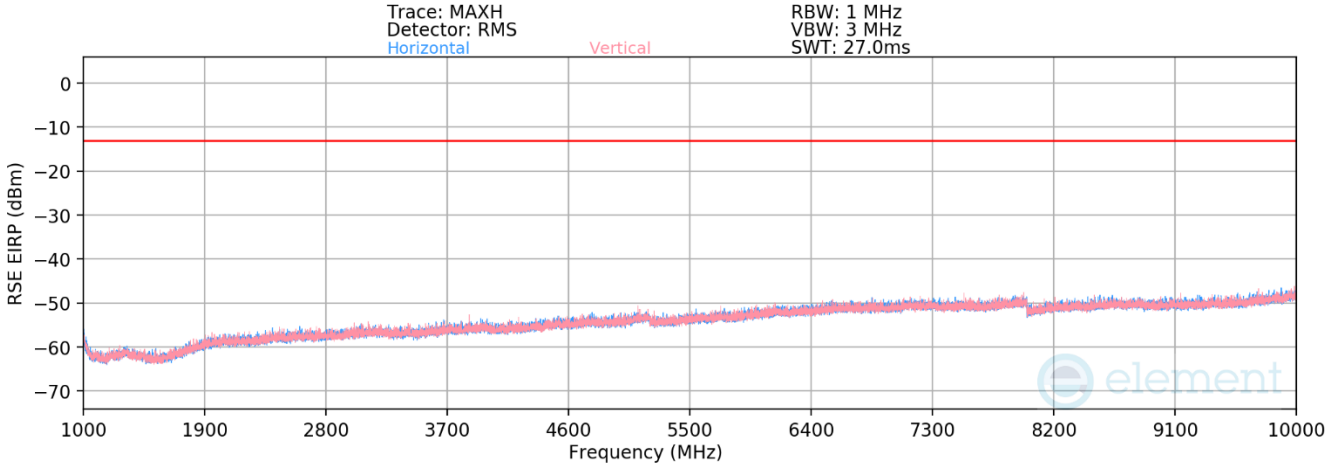
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.0	H	-	-	-76.93	-2.01	28.06	-67.19	-13.00	-54.19
2532.0	H	-	-	-77.99	2.66	31.67	-63.59	-13.00	-50.59
3376.0	H	-	-	-79.03	4.26	32.22	-63.03	-13.00	-50.03

Table 7-47. 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):	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]
51.55	V	200	-	-81.55	-5.88	19.57	-78.19	-13.00	-65.19
113.20	H	200	-	-81.74	-8.40	16.87	-80.89	-13.00	-67.89
197.40	H	200	-	-82.34	-7.10	17.56	-80.20	-13.00	-67.20
347.90	V	200	-	-82.84	-2.87	21.29	-76.47	-13.00	-63.47
466.75	V	200	-	-81.45	-0.58	24.97	-72.79	-13.00	-59.79
675.25	H	200	-	-84.27	3.91	26.64	-71.12	-13.00	-58.12

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

Bandwidth (MHz):	20
Frequency (MHz):	834.0
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]
1692.1	V	-	-	-78.80	-0.83	27.37	-67.89	-13.00	-54.89
2488.5	V	-	-	-79.66	4.07	31.41	-63.85	-13.00	-50.85
3336.8	V	-	-	-80.46	5.71	32.25	-63.00	-13.00	-50.00

Table 7-49. 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]
1696.9	H	-	-	-78.75	-0.83	27.42	-67.84	-13.00	-54.84
2522.2	V	-	-	-79.65	4.05	31.40	-63.85	-13.00	-50.85
3320.4	V	-	-	-80.29	5.67	32.38	-62.88	-13.00	-49.88

Table 7-50. Radiated Spurious Data (NR Band n26/5 – Mid Channel) – Ant2

Bandwidth (MHz):	20
Frequency (MHz):	839.0
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]
1698.3	V	-	-	-78.45	-0.81	27.74	-67.52	-13.00	-54.52
2538.7	V	-	-	-79.83	4.09	31.26	-64.00	-13.00	-51.00
3346.5	V	-	-	-80.45	5.80	32.35	-62.91	-13.00	-49.91

Table 7-51. 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

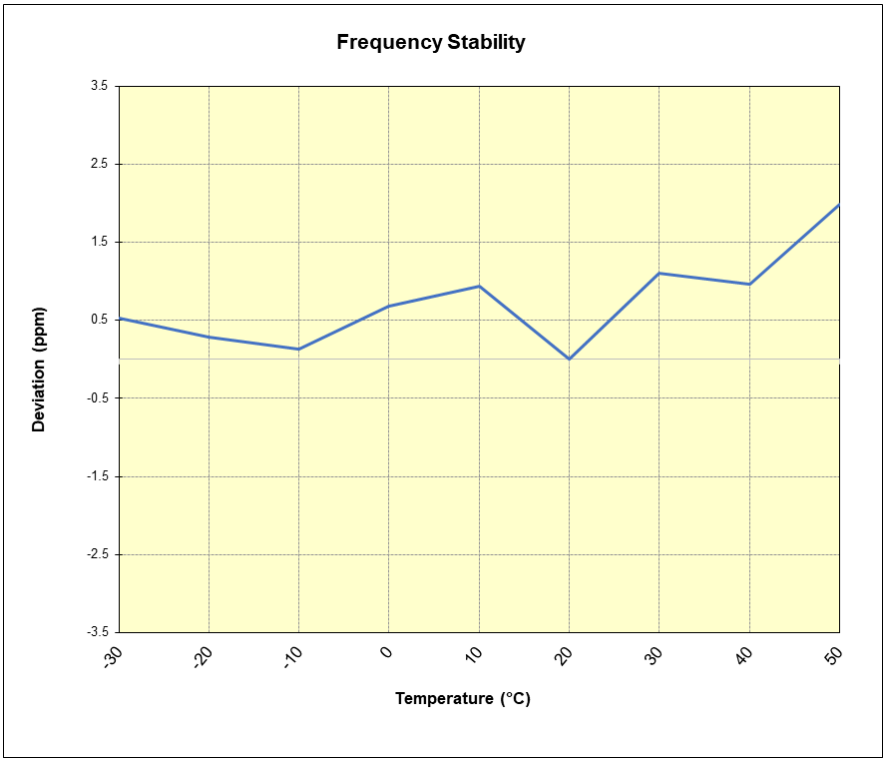
None

GSM/GPRS Cellular

Operating Frequency (Hz):	836,600,000
Ref. Voltage (VDC):	3.86
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.86	- 30	836,599,778	-222	-0.0000265
		- 20	836,599,574	-426	-0.0000509
		- 10	836,599,441	-559	-0.0000668
		0	836,599,902	-98	-0.0000117
		+ 10	836,600,114	114	0.0000136
		+ 20 (Ref)	836,599,333	0	0.0000000
		+ 30	836,600,255	255	0.0000305
		+ 40	836,600,144	144	0.0000172
		+ 50	836,600,993	993	0.0001187
Battery Endpoint	3.17	+ 20	836,600,411	411	0.0000491

Table 7-52. GPRS Cell Frequency Stability Data



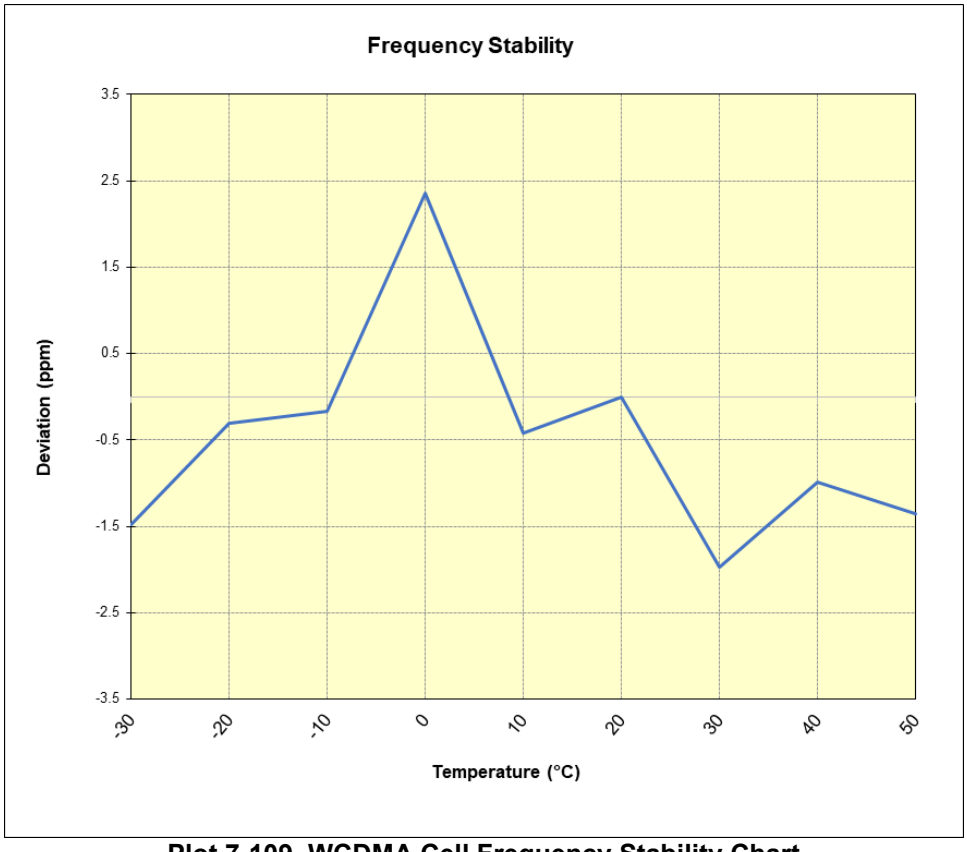
Plot 7-108. GPRS Cell Frequency Stability Chart

WCDMA Cellular

Operating Frequency (Hz):	836,600,000
Ref. Voltage (VDC):	3.863
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.863	- 30	836,598,014	-1,233	-0.0001474
		- 20	836,598,987	-260	-0.0000311
		- 10	836,599,109	-138	-0.0000165
		0	836,601,222	1,975	0.0002361
		+ 10	836,598,899	-348	-0.0000416
		+ 20 (Ref)	836,599,247	0	0.0000000
		+ 30	836,597,599	-1,648	-0.0001970
		+ 40	836,598,418	-829	-0.0000991
		+ 50	836,598,117	-1,130	-0.0001351
Battery Endpoint	3.174	+ 20	836,597,556	-1,691	-0.0002021

Table 7-53. WCDMA Cell Frequency Stability Data



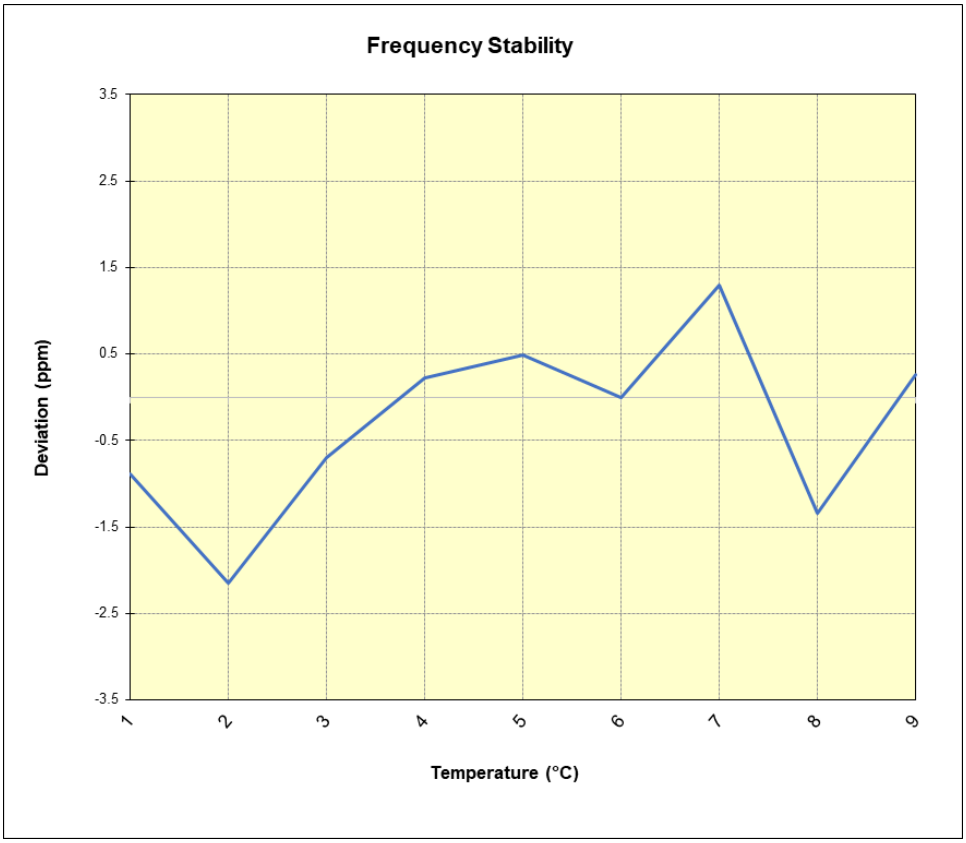
Plot 7-109. WCDMA Cell Frequency Stability Chart

LTE Band 26/5

Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	3.863
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.863	- 30	836,702,288	-746	-0.0000892
		- 20	836,701,238	-1,796	-0.0002147
		- 10	836,702,448	-586	-0.0000700
		0	836,703,217	183	0.0000219
		+ 10	836,703,446	412	0.0000492
		+ 20 (Ref)	836,703,034	0	0.0000000
		+ 30	836,704,118	1,084	0.0001296
		+ 40	836,701,908	-1,126	-0.0001346
		+ 50	836,703,255	221	0.0000264
Battery Endpoint	3.174	+ 20	836,703,211	177	0.0000212

Table 7-54. LTE Band 26/5 Frequency Stability Data



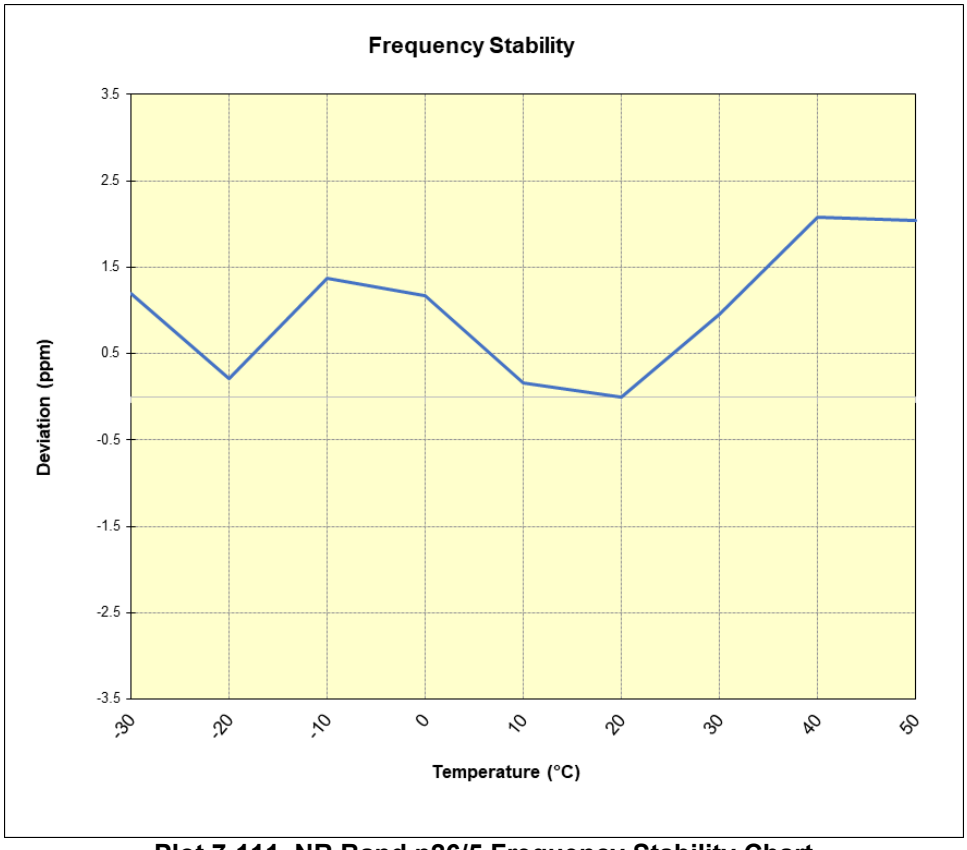
Plot 7-110. LTE Band 26/5 Frequency Stability Chart

NR Band n26/5

Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	3.863
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.863	- 30	836,592,307	1,000	0.0001195
		- 20	836,591,489	182	0.0000218
		- 10	836,592,456	1,149	0.0001373
		0	836,592,282	975	0.0001165
		+ 10	836,591,444	137	0.0000164
		+ 20 (Ref)	836,591,307	0	0.0000000
		+ 30	836,592,111	804	0.0000961
		+ 40	836,593,049	1,742	0.0002082
		+ 50	836,593,011	1,704	0.0002037
Battery Endpoint	3.174	+ 20	836,591,428	121	0.0000145

Table 7-55. 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: A3LSMS936B** complies with all the requirements of Part 22 of the FCC rules.