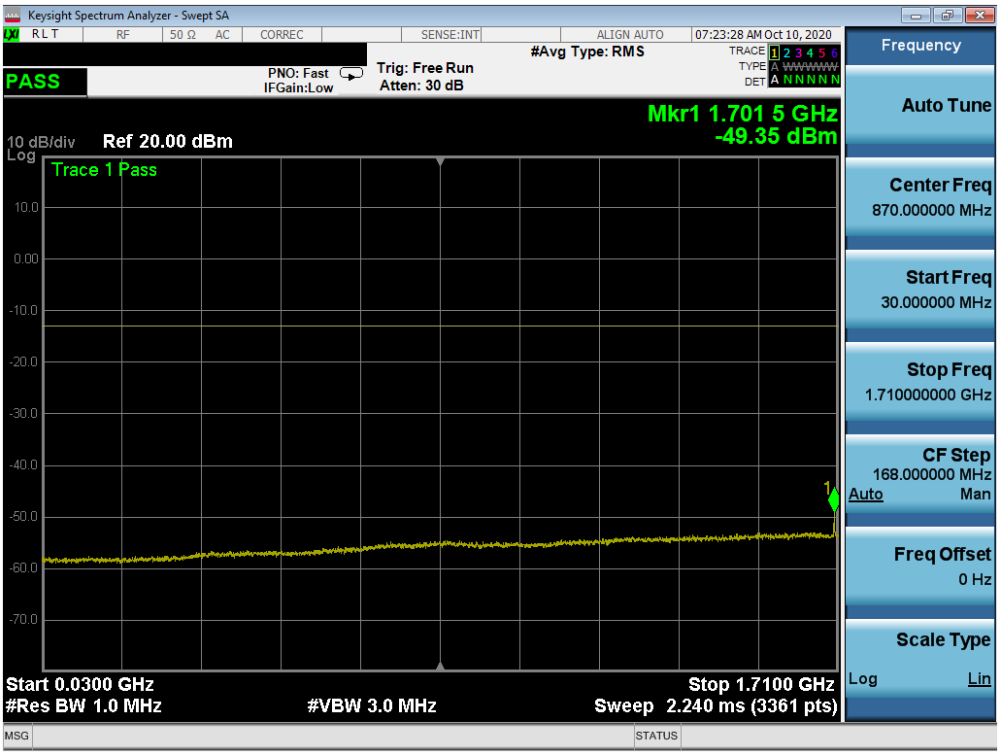
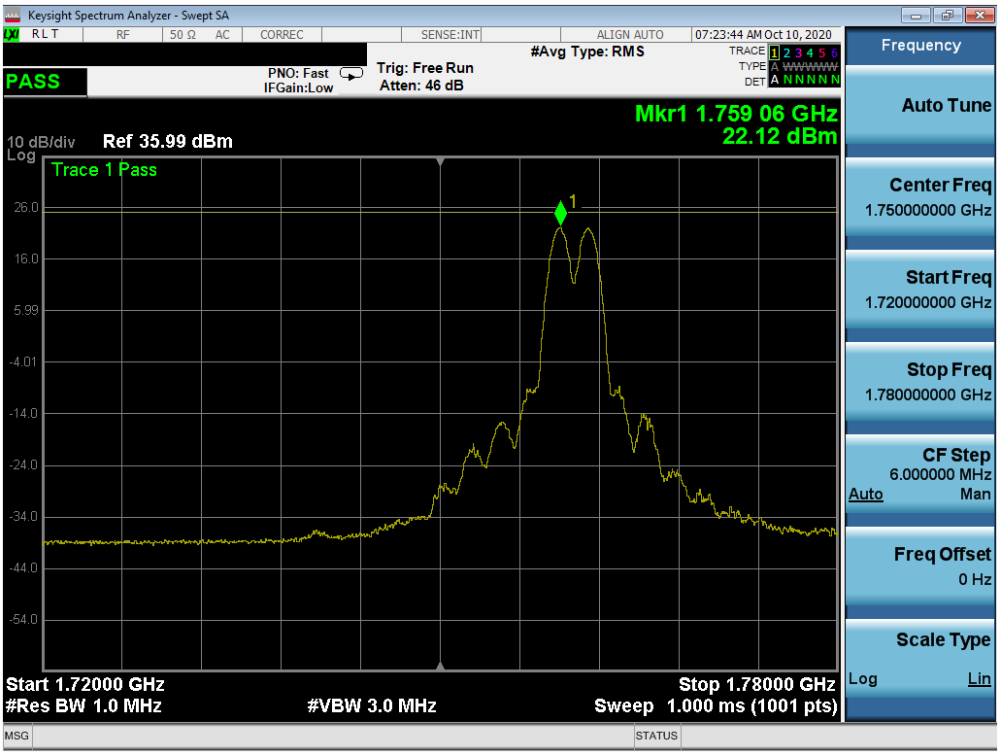
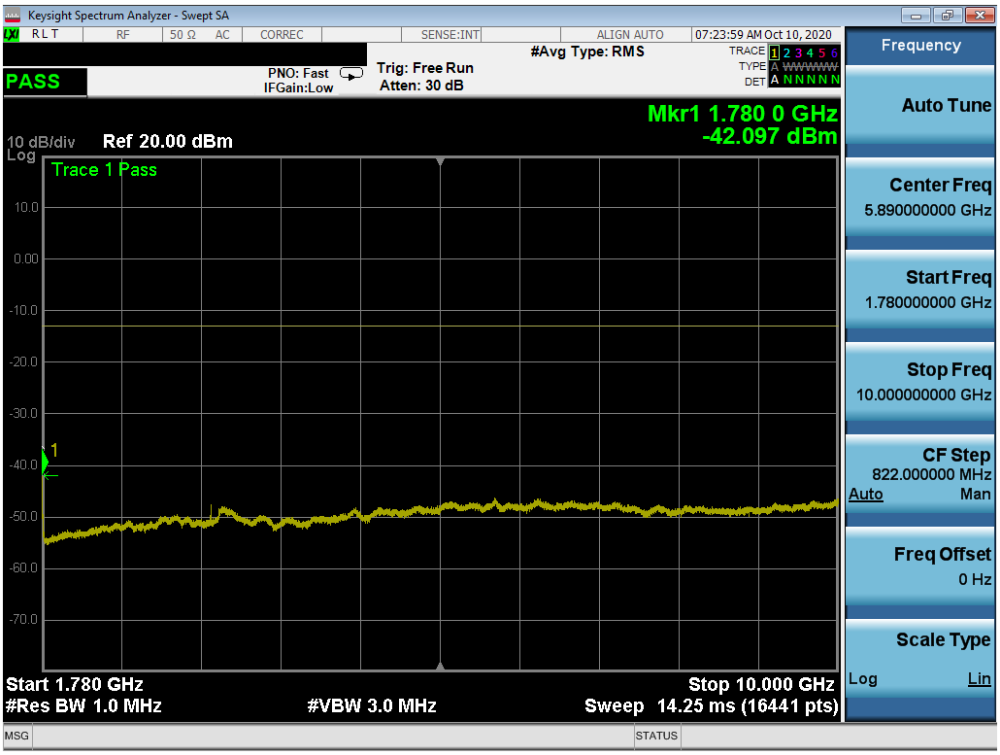


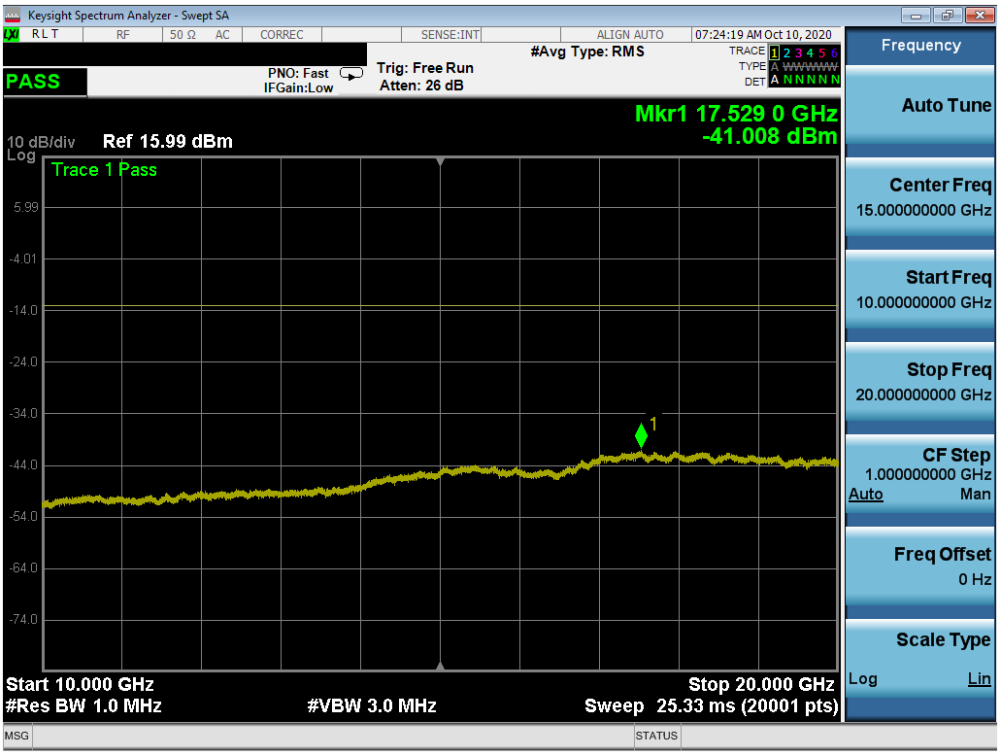
Plot 7-429. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



Plot 7-430. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

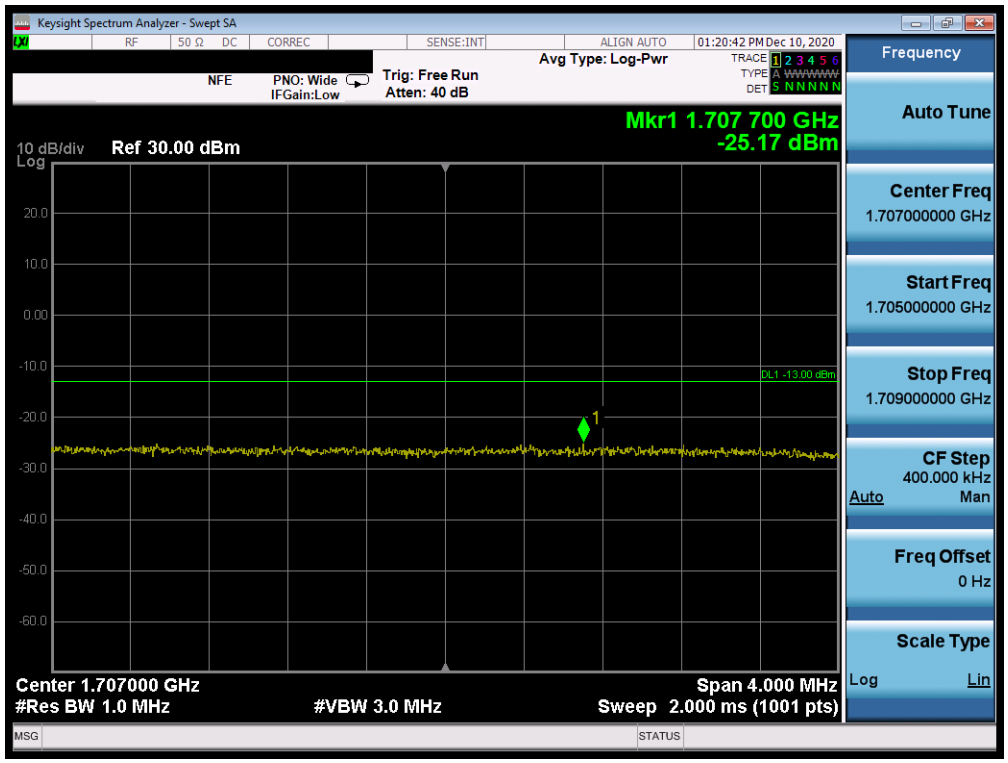


Plot 7-431. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



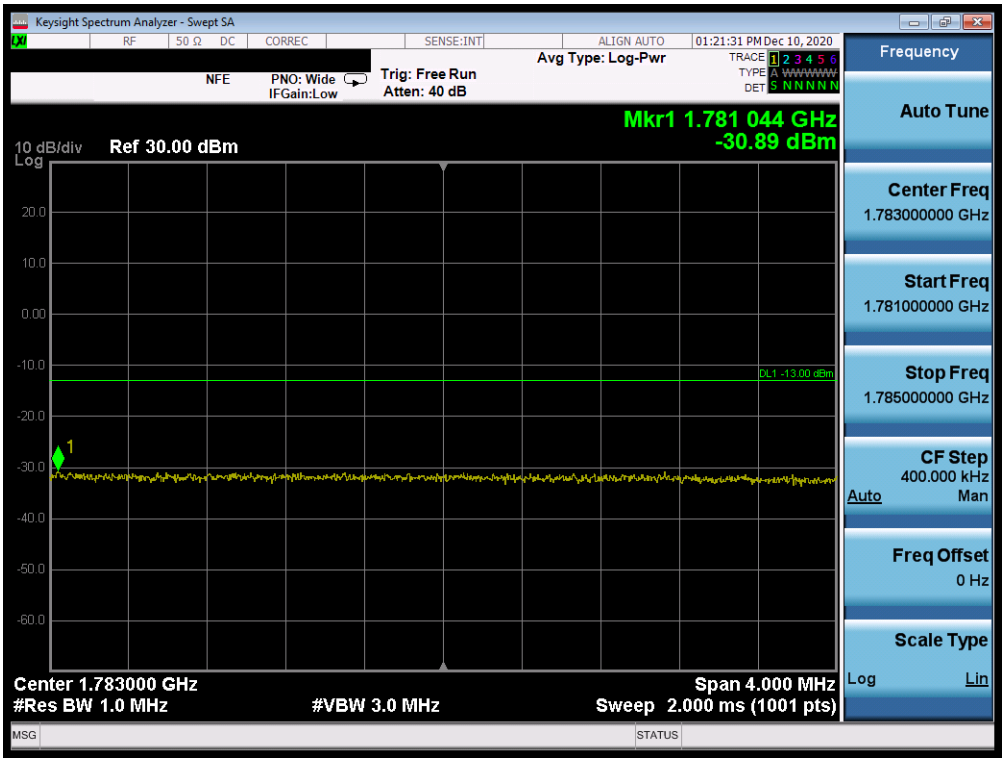
Plot 7-432. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

Plot 7-433. Lower Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Plot 7-434. Extended Lower Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

Plot 7-435. Upper Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Plot 7-436. Extended Upper Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

7.7 Radiated Power (EIRP)

Test Overview

Effective Radiated Power (ERP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
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".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Setup

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

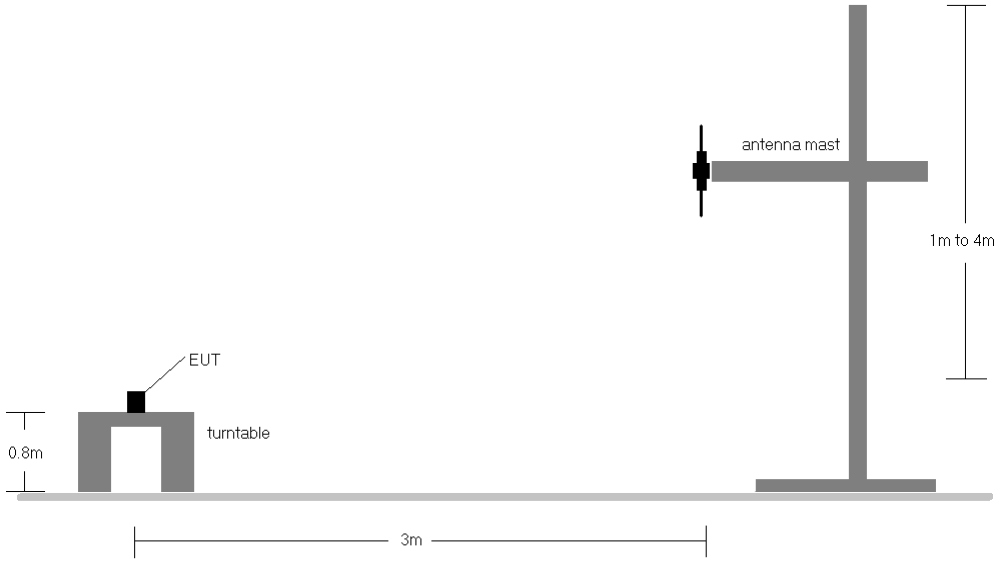


Figure 7-6. Radiated Test Setup <1GHz

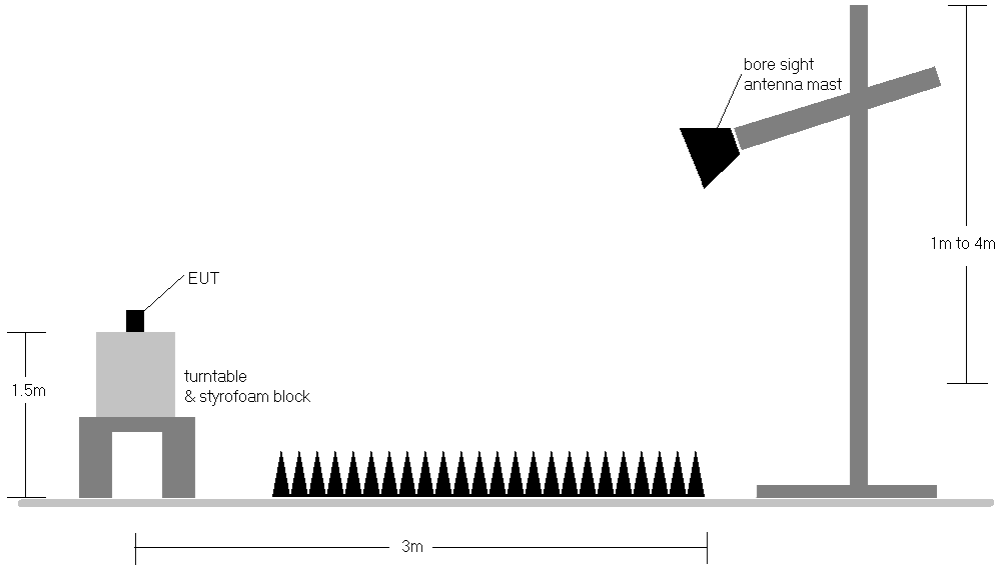


Figure 7-7. Radiated Test Setup >1GHz

Test Notes

1) 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.

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

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

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	QPSK	673.0	V	Z	183.0	270.0	4.09	1 / 99	15.15	17.09	0.051	34.77	-17.68
		680.5	V	Z	180.0	276.0	4.24	1 / 50	15.25	**17.34**	0.054	34.77	-17.44
		688.0	V	Z	169.0	285.0	4.48	1 / 0	14.93	17.26	0.053	34.77	-17.51
	16-QAM	680.5	V	Z	180.0	276.0	4.24	1 / 50	14.55	**16.64**	0.046	34.77	-18.14
	64-QAM	680.5	V	Z	180.0	276.0	4.24	1 / 50	13.56	**15.65**	0.037	34.77	-19.13
	256-QAM	680.5	V	Z	180.0	276.0	4.24	1 / 50	10.98	**13.07**	0.020	34.77	-21.71
15 MHz	QPSK	670.5	V	Z	183.0	270.0	3.96	1 / 0	15.62	**17.43**	0.055	34.77	-17.34
		680.5	V	Z	180.0	276.0	4.24	1 / 0	15.24	17.33	0.054	34.77	-17.45
		690.5	V	Z	169.0	285.0	4.41	1 / 0	14.82	17.08	0.051	34.77	-17.69
	16-QAM	690.5	V	Z	169.0	285.0	4.41	1 / 0	14.38	**16.64**	0.046	34.77	-18.13
	64-QAM	690.5	V	Z	169.0	285.0	4.41	1 / 0	13.28	**15.54**	0.036	34.77	-19.23
	256-QAM	680.5	V	Z	180.0	276.0	4.24	1 / 0	10.75	**12.84**	0.019	34.77	-21.94
10 MHz	QPSK	668.0	V	Z	183.0	270.0	3.82	1 / 49	15.66	**17.34**	0.054	34.77	-17.43
		680.5	V	Z	180.0	276.0	4.24	1 / 0	15.24	17.33	0.054	34.77	-17.45
		693.0	V	Z	169.0	285.0	4.44	1 / 0	14.71	17.00	0.050	34.77	-17.77
	16-QAM	693.0	V	Z	169.0	285.0	4.44	1 / 0	14.30	**16.59**	0.046	34.77	-18.18
	64-QAM	680.5	V	Z	180.0	276.0	4.24	1 / 0	13.31	**15.40**	0.035	34.77	-19.38
	256-QAM	680.5	V	Z	180.0	276.0	4.24	1 / 0	10.73	**12.82**	0.019	34.77	-21.96
5 MHz	QPSK	665.5	V	Z	183.0	270.0	3.79	1 / 24	15.74	17.38	0.055	34.77	-17.39
		680.5	V	Z	180.0	276.0	4.24	1 / 12	15.35	**17.44**	0.055	34.77	-17.34
		695.5	V	Z	169.0	285.0	4.58	1 / 12	14.31	16.73	0.047	34.77	-18.04
	16-QAM	680.5	V	Z	180.0	276.0	4.24	1 / 12	14.60	**16.69**	0.047	34.77	-18.09
	64-QAM	680.5	V	Z	180.0	276.0	4.24	1 / 12	13.67	**15.76**	0.038	34.77	-19.02
	256-QAM	680.5	V	Z	180.0	276.0	4.24	1 / 12	11.09	**13.18**	0.021	34.77	-21.60
	Opposite Pol.	680.5	H	X	155.0	294.0	4.24	1 / 50	13.19	15.28	0.034	34.77	-19.50
	WCP	680.5	H	WCP	169.0	222.0	4.24	1 / 50	12.19	14.28	0.027	34.77	-20.50

Table 7-3. ERP Data (LTE Band 71)

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	673.0	H	X	134.0	275.0	4.09	1 / 50	16.20	18.14	0.065	34.77	-16.63
		680.5	H	X	142.0	269.0	4.24	1 / 50	16.43	18.52	0.071	34.77	-16.26
		688.0	H	X	150.0	266.0	4.48	1 / 0	16.55	**18.88**	0.077	34.77	-15.89
	QPSK	673.0	H	X	134.0	275.0	4.09	1 / 50	16.32	18.26	0.067	34.77	-16.51
		680.5	H	X	142.0	269.0	4.24	1 / 50	16.52	18.61	0.073	34.77	-16.17
		688.0	H	X	150.0	266.0	4.48	1 / 0	16.66	**18.99**	0.079	34.77	-15.78
	16-QAM	688.0	H	X	150.0	266.0	4.48	1 / 0	15.88	**18.21**	0.066	34.77	-16.56
	64-QAM	688.0	H	X	150.0	266.0	4.48	1 / 0	13.84	**16.17**	0.041	34.77	-18.60
	256-QAM	688.0	H	X	150.0	266.0	4.48	1 / 0	12.03	**14.36**	0.027	34.77	-20.41
15 MHz	π/2 BPSK	670.5	H	X	134.0	275.0	3.96	1 / 0	16.46	18.27	0.067	34.77	-16.50
		680.5	H	X	142.0	269.0	4.24	1 / 0	16.52	18.61	0.073	34.77	-16.17
		690.5	H	X	150.0	266.0	4.41	1 / 0	16.71	**18.97**	0.079	34.77	-15.80
	QPSK	670.5	H	X	134.0	275.0	3.96	1 / 0	16.44	18.25	0.067	34.77	-16.52
		680.5	H	X	142.0	269.0	4.24	1 / 0	16.46	18.55	0.072	34.77	-16.23
		690.5	H	X	150.0	266.0	4.41	1 / 0	16.62	**18.88**	0.077	34.77	-15.89
	16-QAM	680.5	H	X	142.0	269.0	4.24	1 / 0	15.87	**17.96**	0.062	34.77	-16.82
	64-QAM	680.5	H	X	142.0	269.0	4.24	1 / 0	14.06	**16.15**	0.041	34.77	-18.63
	256-QAM	680.5	H	X	142.0	269.0	4.24	1 / 0	12.26	**14.35**	0.027	34.77	-20.43
10 MHz	π/2 BPSK	668.0	H	X	134.0	275.0	3.82	1 / 0	15.80	17.48	0.056	34.77	-17.29
		680.5	H	X	142.0	269.0	4.24	1 / 0	15.89	17.98	0.063	34.77	-16.80
		693.0	H	X	150.0	266.0	4.44	1 / 0	15.88	**18.17**	0.066	34.77	-16.60
	QPSK	668.0	H	X	134.0	275.0	3.82	1 / 0	15.72	17.40	0.055	34.77	-17.37
		680.5	H	X	142.0	269.0	4.24	1 / 0	15.72	17.81	0.060	34.77	-16.97
		693.0	H	X	150.0	266.0	4.44	1 / 0	15.88	**18.17**	0.066	34.77	-16.60
	16-QAM	680.5	H	X	142.0	269.0	4.24	1 / 0	15.98	**18.07**	0.064	34.77	-16.71
	64-QAM	680.5	H	X	142.0	269.0	4.24	1 / 0	13.91	**16.00**	0.040	34.77	-18.78
	256-QAM	680.5	H	X	142.0	269.0	4.24	1 / 0	11.70	**13.79**	0.024	34.77	-20.99
5 MHz	π/2 BPSK	665.5	H	X	134.0	275.0	3.79	1 / 0	16.59	18.23	0.067	34.77	-16.54
		680.5	H	X	142.0	269.0	4.24	1 / 0	16.62	18.71	0.074	34.77	-16.07
		695.5	H	X	150.0	266.0	4.58	1 / 0	16.65	**19.07**	0.081	34.77	-15.70
	QPSK	665.5	H	X	134.0	275.0	3.79	1 / 0	16.01	17.65	0.058	34.77	-17.12
		680.5	H	X	142.0	269.0	4.24	1 / 0	15.90	17.99	0.063	34.77	-16.79
		695.5	H	X	150.0	266.0	4.58	1 / 0	16.21	**18.63**	0.073	34.77	-16.14
	16-QAM	680.5	H	X	142.0	269.0	4.24	1 / 0	16.00	**18.09**	0.064	34.77	-16.69
	64-QAM	680.5	H	X	142.0	269.0	4.24	1 / 0	13.52	**15.61**	0.036	34.77	-19.17
	256-QAM	680.5	H	X	142.0	269.0	4.24	1 / 0	12.16	14.25	0.027	34.77	-20.53
	QPSK (CP-OFDM)	688.0	H	X	150.0	266.0	4.48	1 / 0	14.81	**17.14**	0.052	34.77	-17.63
	QPSK (Opposite Pol.)	688.0	V	Z	286.0	85.0	4.48	1 / 0	15.36	17.69	0.059	34.77	-17.08
	QPSK (WCP)	688.0	V	WCP	247.0	66.0	4.48	1 / 0	15.01	17.34	0.054	34.77	-17.43

Table 7-4. ERP Data (NR Band n71)

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]
10 MHz	QPSK	704.0	V	Z	150.0	279.0	4.58	1 / 49	15.21	17.64	0.058	34.77	-17.13
		707.5	V	Z	153.0	272.0	4.62	1 / 49	15.66	18.13	0.065	34.77	-16.64
		711.0	V	Z	153.0	268.0	4.67	1 / 49	15.96	**18.48**	0.070	34.77	-16.29
	16-QAM	711.0	V	Z	153.0	268.0	4.67	1 / 49	15.24	**17.76**	0.060	34.77	-17.01
	64-QAM	711.0	V	Z	153.0	268.0	4.67	1 / 49	14.17	**16.69**	0.047	34.77	-18.08
	256-QAM	711.0	V	Z	153.0	268.0	4.67	1 / 49	11.18	**13.70**	0.023	34.77	-21.07
5 MHz	QPSK	701.5	V	Z	150.0	279.0	4.60	1 / 12	15.17	17.62	0.058	34.77	-17.15
		707.5	V	Z	153.0	272.0	4.62	1 / 12	15.76	18.23	0.067	34.77	-16.54
		713.5	V	Z	153.0	268.0	4.70	1 / 12	15.97	**18.52**	0.071	34.77	-16.25
	16-QAM	713.5	V	Z	153.0	268.0	4.70	1 / 12	15.28	**17.83**	0.061	34.77	-16.94
	64-QAM	713.5	V	Z	153.0	268.0	4.70	1 / 12	14.36	**16.91**	0.049	34.77	-17.86
	256-QAM	713.5	V	Z	153.0	268.0	4.70	1 / 12	11.27	**13.82**	0.024	34.77	-20.95
3 MHz	QPSK	700.5	V	Z	150.0	279.0	4.59	1 / 0	15.12	17.56	0.057	34.77	-17.21
		707.5	V	Z	153.0	272.0	4.62	1 / 14	15.65	18.12	0.065	34.77	-16.65
		714.5	V	Z	153.0	268.0	4.71	1 / 14	16.00	**18.56**	0.072	34.77	-16.21
	16-QAM	714.5	V	Z	153.0	268.0	4.71	1 / 14	15.37	**17.93**	0.062	34.77	-16.84
	64-QAM	714.5	V	Z	153.0	268.0	4.71	1 / 14	14.76	**17.32**	0.054	34.77	-17.45
	256-QAM	714.5	V	Z	153.0	268.0	4.71	1 / 14	11.29	**13.85**	0.024	34.77	-20.92
1.4 MHz	QPSK	699.7	V	Z	150.0	279.0	4.56	1 / 2	15.13	17.54	0.057	34.77	-17.23
		707.5	V	Z	153.0	272.0	4.62	1 / 2	15.53	18.00	0.063	34.77	-16.77
		715.3	V	Z	153.0	268.0	4.72	1 / 2	16.15	**18.72**	0.074	34.77	-16.05
	16-QAM	715.3	V	Z	153.0	268.0	4.72	1 / 2	15.18	**17.75**	0.060	34.77	-17.02
	64-QAM	715.3	V	Z	153.0	268.0	4.72	1 / 2	14.58	**17.15**	0.052	34.77	-17.62
	256-QAM	715.3	V	Z	153.0	268.0	4.72	1 / 2	11.24	**13.81**	0.024	34.77	-20.96
	Opposite Pol.	711.0	H	X	159.0	299.0	4.67	1 / 49	15.66	18.18	0.066	34.77	-16.59
	WCP	711.0	H	WCP	169.0	214.0	4.67	1 / 49	14.43	16.95	0.050	34.77	-17.82

Table 7-5. ERP Data (LTE Band 12)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
15 MHz	BPSK	704.0	V	Z	153.0	274.0	4.61	1 / 49	15.70	20.31	0.107	36.99	-16.68	18.16	0.065	34.77	-16.61
		707.5	V	Z	155.0	236.0	4.62	1 / 49	15.97	**20.59**	0.115	36.99	-16.40	**18.44**	0.070	34.77	-16.33
		711.0	V	Z	156.0	280.0	4.64	1 / 49	15.90	20.54	0.113	36.99	-16.45	18.39	0.069	34.77	-16.39
	QPSK	704.0	V	Z	153.0	274.0	4.61	1 / 49	15.91	20.52	0.113	36.99	-16.47	18.37	0.069	34.77	-16.40
		707.5	V	Z	155.0	236.0	4.62	1 / 49	16.13	**20.75**	0.119	36.99	-16.24	**18.60**	0.073	34.77	-16.17
		711.0	V	Z	156.0	280.0	4.64	1 / 49	16.05	20.69	0.117	36.99	-16.30	18.54	0.071	34.77	-16.24
	16-QAM	707.5	V	Z	155.0	236.0	4.62	1 / 49	15.32	**19.94**	0.099	36.99	-17.05	**17.79**	0.060	34.77	-16.98
	64-QAM	707.5	V	Z	155.0	236.0	4.62	1 / 49	13.75	**18.37**	0.069	36.99	-18.62	**16.22**	0.042	34.77	-18.55
	256-QAM	707.5	V	Z	155.0	236.0	4.62	1 / 49	11.90	**16.52**	0.045	36.99	-20.47	**14.37**	0.027	34.77	-20.40
10 MHz	BPSK	707.5	V	Z	155.0	236.0	4.62	1 / 49	15.97	**20.71**	0.118	36.99	-16.28	**18.56**	0.072	34.77	-16.21
	QPSK	707.5	V	Z	155.0	236.0	4.62	1 / 49	16.13	20.67	0.117	36.99	-16.32	18.52	0.071	34.77	-16.25
	16-QAM	707.5	V	Z	155.0	236.0	4.62	1 / 49	15.32	19.77	0.095	36.99	-17.22	17.62	0.058	34.77	-17.15
	64-QAM	707.5	V	Z	155.0	236.0	4.62	1 / 49	13.75	**18.64**	0.073	36.99	-18.35	**16.49**	0.045	34.77	-18.28
	256-QAM	707.5	V	Z	155.0	236.0	4.62	1 / 49	11.90	**16.49**	0.045	36.99	-20.50	**14.34**	0.027	34.77	-20.43
5 MHz	BPSK	707.5	V	Z	155.0	236.0	4.62	1 / 38	16.10	**20.72**	0.118	36.99	-16.27	**18.57**	0.072	34.77	-16.20
	QPSK	707.5	V	Z	155.0	236.0	4.62	1 / 38	16.03	**20.65**	0.116	36.99	-16.34	**18.50**	0.071	34.77	-16.27
	16-QAM	707.5	V	Z	155.0	236.0	4.62	1 / 38	15.29	**19.91**	0.098	36.99	-17.08	**17.76**	0.060	34.77	-17.01
	64-QAM	707.5	V	Z	155.0	236.0	4.62	1 / 38	13.80	**18.42**	0.070	36.99	-18.57	**16.27**	0.042	34.77	-18.50
	256-QAM	707.5	V	Z	155.0	236.0	4.62	1 / 38	11.77	**16.39**	0.044	36.99	-20.60	**14.24**	0.027	34.77	-20.53
	Opposite Pol.	707.5	H	X	247.0	51.0	4.62	1 / 49	15.41	20.03	0.101	36.99	-16.96	17.88	0.061	34.77	-16.89
	WCP	707.5	V	WCP	214.0	66.0	4.62	1 / 49	14.25	18.87	0.077	36.99	-18.12	16.72	0.047	34.77	-18.05

Table 7-6. ERP Data (NR Band n12)

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]
10 MHz	QPSK	782.0	H	X	224.0	287.0	5.79	1 / 49	16.46	**20.10**	0.102	34.77	-14.67
	16-QAM	782.0	H	X	224.0	287.0	5.79	1 / 49	15.56	**19.20**	0.083	34.77	-15.57
	64-QAM	782.0	H	X	224.0	287.0	5.79	1 / 49	14.56	**18.20**	0.066	34.77	-16.57
	256-QAM	782.0	H	X	224.0	287.0	5.79	1 / 49	11.36	**15.00**	0.032	34.77	-19.77
5 MHz	QPSK	779.5	H	X	224.0	287.0	5.77	1 / 0	16.63	**20.24**	0.106	34.77	-14.53
		782.0	H	X	224.0	287.0	5.79	1 / 12	16.60	**20.24**	0.106	34.77	-14.53
		784.5	H	X	224.0	287.0	5.82	1 / 12	16.38	20.05	0.101	34.77	-14.72
	16-QAM	782.0	H	X	224.0	287.0	5.79	1 / 12	15.63	**19.27**	0.085	34.77	-15.50
	64-QAM	779.5	H	X	224.0	287.0	5.77	1 / 0	14.98	**18.59**	0.072	34.77	-16.18
	256-QAM	779.5	H	X	224.0	287.0	5.77	1 / 0	11.59	**15.20**	0.033	34.77	-19.57
	Opposite Pol.	782.0	V	Z	224.0	256.0	5.89	1 / 49	13.71	17.45	0.056	34.77	-17.32
	WCP	782.0	V	WCP	210.0	286.0	5.89	1 / 49	12.99	16.73	0.047	34.77	-18.04

Table 7-7. ERP Data (LTE Band 13)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	V	144	351	14.62	9.37	**23.99**	**0.250**	30.00	-6.01
1732.60	WCDMA1700	V	155	2	13.95	9.22	23.17	0.208	30.00	-6.83
1752.60	WCDMA1700	V	129	5	12.31	9.11	21.42	0.139	30.00	-8.58
1712.40	WCDMA1700	H	286	186	14.55	9.37	23.92	0.246	30.00	-6.08
1712.40	WCDMA1700 (WCP)	V	247	116	14.38	9.37	23.75	0.237	30.00	-6.25

Table 7-8. EIRP Data (WCDMA AWS)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	QPSK	1720.0	V	Y	159.0	254.0	9.31	1 / 99	13.46	22.77	0.189	30.00	-7.23
		1745.0	V	Y	144.0	240.0	9.14	1 / 99	13.91	**23.05**	0.202	30.00	-6.95
		1770.0	V	Y	172.0	268.0	9.17	1 / 50	12.88	22.05	0.160	30.00	-7.95
	16-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 50	13.22	**22.36**	0.172	30.00	-7.64
	64-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 50	12.21	**21.35**	0.136	30.00	-8.65
	256-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 50	8.79	**17.93**	0.062	30.00	-12.07
15 MHz	QPSK	1717.5	V	Y	159.0	254.0	9.33	1 / 36	13.51	22.84	0.192	30.00	-7.16
		1745.0	V	Y	144.0	240.0	9.14	1 / 36	13.89	**23.03**	0.201	30.00	-6.97
		1772.5	V	Y	172.0	268.0	9.18	1 / 0	13.07	22.25	0.168	30.00	-7.75
	16-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 36	13.03	**22.17**	0.165	30.00	-7.83
	64-QAM	1717.5	V	Y	159.0	254.0	9.33	1 / 36	11.63	**20.96**	0.125	30.00	-9.04
	256-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 36	8.79	**17.93**	0.062	30.00	-12.07
10 MHz	QPSK	1715.0	V	Y	159.0	254.0	9.35	1 / 25	13.23	22.58	0.181	30.00	-7.42
		1745.0	V	Y	144.0	240.0	9.14	1 / 25	13.80	**22.94**	0.197	30.00	-7.06
		1775.0	V	Y	172.0	268.0	9.18	1 / 25	12.92	22.11	0.163	30.00	-7.89
	16-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 25	12.89	**22.03**	0.160	30.00	-7.97
	64-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 25	11.44	**20.58**	0.114	30.00	-9.42
	256-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 25	8.83	**17.97**	0.063	30.00	-12.03
5 MHz	QPSK	1712.5	V	Y	159.0	254.0	9.37	1 / 12	13.42	**22.78**	0.190	30.00	-7.22
		1745.0	V	Y	144.0	240.0	9.14	1 / 12	13.62	22.76	0.189	30.00	-7.24
		1777.5	V	Y	172.0	268.0	9.19	1 / 12	12.88	22.07	0.161	30.00	-7.93
	16-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 12	13.48	**22.62**	0.183	30.00	-7.38
	64-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 12	11.83	**20.97**	0.125	30.00	-9.03
	256-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 12	8.86	**18.00**	0.063	30.00	-12.00
3 MHz	QPSK	1711.5	V	Y	159.0	254.0	9.37	1 / 0	13.37	22.74	0.188	30.00	-7.26
		1745.0	V	Y	144.0	240.0	9.14	1 / 0	13.87	**23.01**	0.200	30.00	-6.99
		1778.5	V	Y	172.0	268.0	9.20	1 / 0	12.92	22.12	0.163	30.00	-7.88
	16-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 0	13.04	**22.18**	0.165	30.00	-7.82
	64-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 0	11.55	**20.69**	0.117	30.00	-9.31
	256-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 0	8.89	**18.03**	0.063	30.00	-11.97
1.4 MHz	QPSK	1710.7	V	Y	159.0	254.0	9.38	1 / 2	13.29	22.67	0.185	30.00	-7.33
		1745.0	V	Y	144.0	240.0	9.14	1 / 2	13.81	**22.95**	0.197	30.00	-7.05
		1779.3	V	Y	172.0	268.0	9.20	1 / 2	13.06	22.26	0.168	30.00	-7.74
	16-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 2	12.90	**22.04**	0.160	30.00	-7.96
	64-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 2	11.54	**20.68**	0.117	30.00	-9.32
	256-QAM	1745.0	V	Y	144.0	240.0	9.14	1 / 2	8.84	**17.98**	0.063	30.00	-12.02
	Opposite Pol.	1745.0	H	X	128.0	187.0	9.14	1 / 50	13.45	22.59	0.181	30.00	-7.41
	WCP	1745.0	H	WCP	125.0	180.0	9.14	1 / 50	12.79	21.93	0.156	30.00	-8.07

Table 7-9. EIRP Data (LTE Band 66/4)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
40 MHz	π/2 BPSK	1730.0	H	X	126.0	196.0	9.31	1 / 161	14.14	**23.23**	0.211	30.00	-6.77
		1745.0	H	X	169.0	203.0	9.14	1 / 108	13.97	23.02	0.200	30.00	-6.98
		1760.0	H	X	118.0	170.0	9.17	1 / 161	13.19	22.33	0.171	30.00	-7.67
	QPSK	1730.0	H	X	126.0	196.0	9.31	1 / 161	14.18	**23.16**	0.207	30.00	-6.84
		1745.0	H	X	169.0	203.0	9.14	1 / 108	13.98	22.69	0.186	30.00	-7.31
		1760.0	H	X	118.0	170.0	9.17	1 / 161	13.33	22.35	0.172	30.00	-7.65
	16-QAM	1730.0	H	X	126.0	196.0	9.31	1 / 161	13.05	**22.10**	0.162	30.00	-7.90
	64-QAM	1730.0	H	X	126.0	196.0	9.31	1 / 161	11.41	**19.93**	0.098	30.00	-10.07
	256-QAM	1730.0	H	X	126.0	196.0	9.31	1 / 161	9.86	**18.42**	0.070	30.00	-11.58
30 MHz	π/2 BPSK	1725.0	H	X	126.0	196.0	9.31	1 / 159	14.14	23.00	0.200	30.00	-7.00
		1745.0	H	X	169.0	203.0	9.14	1 / 159	13.97	**23.10**	0.204	30.00	-6.90
		1765.0	H	X	118.0	170.0	9.17	1 / 159	13.19	22.08	0.161	30.00	-7.92
	QPSK	1725.0	H	X	126.0	196.0	9.31	1 / 159	14.18	**22.83**	0.192	30.00	-7.17
		1745.0	H	X	169.0	203.0	9.14	1 / 159	13.98	22.69	0.186	30.00	-7.31
		1765.0	H	X	118.0	170.0	9.17	1 / 159	13.33	22.00	0.158	30.00	-8.00
	16-QAM	1725.0	H	X	126.0	196.0	9.31	1 / 159	13.05	**21.96**	0.157	30.00	-8.04
	64-QAM	1725.0	H	X	126.0	196.0	9.31	1 / 159	11.41	**19.44**	0.088	30.00	-10.56
	256-QAM	1725.0	H	X	126.0	196.0	9.31	1 / 159	9.86	**18.35**	0.068	30.00	-11.65
20 MHz	π/2 BPSK	1720.0	H	X	126.0	196.0	9.31	1 / 99	14.14	**23.45**	0.221	30.00	-6.55
		1745.0	H	X	169.0	203.0	9.14	1 / 50	13.97	23.11	0.205	30.00	-6.89
		1770.0	H	X	118.0	170.0	9.17	1 / 99	13.19	22.36	0.172	30.00	-7.64
	QPSK	1720.0	H	X	126.0	196.0	9.31	1 / 99	14.18	**23.49**	0.223	30.00	-6.51
		1745.0	H	X	169.0	203.0	9.14	1 / 50	13.98	23.12	0.205	30.00	-6.88
		1770.0	H	X	118.0	170.0	9.17	1 / 99	13.33	22.50	0.178	30.00	-7.50
	16-QAM	1720.0	H	X	126.0	196.0	9.31	1 / 99	13.05	**22.36**	0.172	30.00	-7.64
	64-QAM	1720.0	H	X	126.0	196.0	9.31	1 / 99	11.41	**20.72**	0.118	30.00	-9.28
	256-QAM	1720.0	H	X	126.0	196.0	9.31	1 / 99	9.86	**19.17**	0.083	30.00	-10.83
15 MHz	π/2 BPSK	1717.5	H	X	126.0	196.0	9.33	1 / 78	14.03	**23.36**	0.217	30.00	-6.64
		1745.0	H	X	169.0	203.0	9.14	1 / 36	14.02	23.16	0.207	30.00	-6.84
		1772.5	H	X	118.0	170.0	9.18	1 / 78	13.04	22.22	0.167	30.00	-7.78
	QPSK	1717.5	H	X	126.0	196.0	9.33	1 / 78	13.89	**23.22**	0.210	30.00	-6.78
		1745.0	H	X	169.0	203.0	9.14	1 / 36	13.77	22.91	0.195	30.00	-7.09
		1772.5	H	X	118.0	170.0	9.18	1 / 78	13.28	22.46	0.176	30.00	-7.54
	16-QAM	1717.5	H	X	126.0	196.0	9.33	1 / 78	13.00	**22.33**	0.171	30.00	-7.67
	64-QAM	1717.5	H	X	126.0	196.0	9.33	1 / 78	11.35	**20.68**	0.117	30.00	-9.32
	256-QAM	1717.5	H	X	126.0	196.0	9.33	1 / 78	9.84	**19.17**	0.083	30.00	-10.83
10 MHz	π/2 BPSK	1715.0	H	X	126.0	196.0	9.35	1 / 51	14.07	**23.42**	0.220	30.00	-6.58
		1745.0	H	X	169.0	203.0	9.14	1 / 51	13.97	23.11	0.205	30.00	-6.89
		1775.0	H	X	118.0	170.0	9.18	1 / 51	13.10	22.29	0.169	30.00	-7.71
	QPSK	1715.0	H	X	126.0	196.0	9.35	1 / 51	14.11	**23.46**	0.222	30.00	-6.54
		1745.0	H	X	169.0	203.0	9.14	1 / 51	13.66	22.80	0.190	30.00	-7.20
		1775.0	H	X	118.0	170.0	9.18	1 / 51	13.07	22.26	0.168	30.00	-7.74
	16-QAM	1715.0	H	X	126.0	196.0	9.35	1 / 51	12.85	**22.19**	0.166	30.00	-7.81
	64-QAM	1715.0	H	X	126.0	196.0	9.35	1 / 51	11.15	**20.50**	0.112	30.00	-9.50
	256-QAM	1715.0	H	X	126.0	196.0	9.35	1 / 51	9.81	**19.16**	0.082	30.00	-10.84
5 MHz	π/2 BPSK	1712.5	H	X	126.0	196.0	9.37	1 / 24	13.94	**23.30**	0.214	30.00	-6.70
		1745.0	H	X	169.0	203.0	9.14	1 / 12	14.00	23.14	0.206	30.00	-6.86
		1777.5	H	X	118.0	170.0	9.19	1 / 12	13.05	22.24	0.167	30.00	-7.76
	QPSK	1712.5	H	X	126.0	196.0	9.37	1 / 24	13.80	**23.17**	0.207	30.00	-6.83
		1745.0	H	X	169.0	203.0	9.14	1 / 12	13.83	22.97	0.198	30.00	-7.03
		1777.5	H	X	118.0	170.0	9.19	1 / 12	13.28	22.47	0.177	30.00	-7.53
	16-QAM	1712.5	H	X	126.0	196.0	9.37	1 / 24	12.78	**22.15**	0.164	30.00	-7.85
	64-QAM	1712.5	H	X	126.0	196.0	9.37	1 / 24	11.58	**20.95**	0.124	30.00	-9.05
	256-QAM	1712.5	H	X	126.0	196.0	9.37	1 / 24	9.91	19.28	0.085	30.00	-10.72
	QPSK (CP-OFDM)	1720.0	H	X	150.0	266.0	9.31	1 / 99	11.30	**20.61**	0.115	30.00	-9.39
	QPSK (Opposite Pol.)	1720.0	V	Y	286.0	85.0	9.31	1 / 99	12.46	21.77	0.150	30.00	-8.23
	QPSK (WCP)	1720.0	H		247.0	66.0	9.31	1 / 99	12.13	21.44	0.139	30.00	-8.56

Table 7-10. EIRP Data (NR Band n66 – ANT A)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
40 MHz	π/2 BPSK	1730.0	H	X	126.0	196.0	9.31	1 / 161	7.21	16.52	0.045	30.00	-13.48
		1745.0	H	X	169.0	203.0	9.14	1 / 108	7.44	**16.58**	0.045	30.00	-13.42
		1760.0	H	X	118.0	170.0	9.17	1 / 161	7.33	16.50	0.045	30.00	-13.50
	QPSK	1730.0	H	X	126.0	196.0	9.31	1 / 161	7.34	16.65	0.046	30.00	-13.35
		1745.0	H	X	169.0	203.0	9.14	1 / 108	7.62	**16.76**	0.047	30.00	-13.24
		1760.0	H	X	118.0	170.0	9.17	1 / 161	7.44	16.61	0.046	30.00	-13.39
	16-QAM	1745.0	H	X	118.0	170.0	9.17	1 / 108	6.56	**15.72**	0.037	30.00	-14.28
	64-QAM	1745.0	H	X	118.0	170.0	9.17	1 / 108	4.83	**14.00**	0.025	30.00	-16.00
	256-QAM	1745.0	H	X	118.0	170.0	9.17	1 / 108	2.91	**12.08**	0.016	30.00	-17.92
30 MHz	π/2 BPSK	1725.0	H	X	126.0	196.0	9.31	1 / 1	7.64	16.95	0.050	30.00	-13.05
		1745.0	H	X	169.0	203.0	9.14	1 / 80	8.80	17.94	0.062	30.00	-12.06
		1765.0	H	X	118.0	170.0	9.17	1 / 1	9.29	**18.46**	0.070	30.00	-11.54
	QPSK	1725.0	H	X	126.0	196.0	9.31	1 / 1	6.74	16.05	0.040	30.00	-13.95
		1745.0	H	X	169.0	203.0	9.14	1 / 80	7.92	**17.06**	0.051	30.00	-12.94
		1765.0	H	X	118.0	170.0	9.17	1 / 1	7.73	16.89	0.049	30.00	-13.11
	16-QAM	1765.0	H	X	118.0	170.0	9.17	1 / 1	6.77	**15.94**	0.039	30.00	-14.06
	64-QAM	1765.0	H	X	118.0	170.0	9.17	1 / 1	5.69	**14.86**	0.031	30.00	-15.14
	256-QAM	1765.0	H	X	118.0	170.0	9.17	1 / 1	3.97	**13.14**	0.021	30.00	-16.86
20 MHz	π/2 BPSK	1720.0	H	X	198.0	150.0	9.31	1 / 0	7.77	17.08	0.051	30.00	-12.92
		1745.0	H	X	185.0	153.0	9.14	1 / 50	8.78	17.92	0.062	30.00	-12.08
		1770.0	H	X	128.0	154.0	9.17	1 / 50	9.42	**18.59**	0.072	30.00	-11.41
	QPSK	1720.0	H	X	198.0	150.0	9.31	1 / 0	6.77	16.08	0.041	30.00	-13.92
		1745.0	H	X	185.0	153.0	9.14	1 / 50	7.94	17.08	0.051	30.00	-12.92
		1770.0	H	X	128.0	154.0	9.17	1 / 50	7.83	**17.08**	0.051	30.00	-12.92
	16-QAM	1720.0	H	X	198.0	150.0	9.31	1 / 0	5.84	15.15	0.033	30.00	-14.85
		1745.0	H	X	185.0	153.0	9.14	1 / 50	6.90	16.04	0.040	30.00	-13.96
		1770.0	H	X	128.0	154.0	9.17	1 / 50	6.88	**16.05**	0.040	30.00	-13.95
	64-QAM	1720.0	H	X	198.0	150.0	9.31	1 / 0	4.59	13.90	0.025	30.00	-16.10
		1745.0	H	X	185.0	153.0	9.14	1 / 50	5.51	14.65	0.029	30.00	-15.35
		1770.0	H	X	128.0	154.0	9.17	1 / 50	5.77	**14.94**	0.031	30.00	-15.06
	256-QAM	1720.0	H	X	198.0	150.0	9.31	1 / 0	3.23	12.54	0.018	30.00	-17.46
		1745.0	H	X	185.0	153.0	9.14	1 / 50	4.01	13.15	0.021	30.00	-16.85
		1770.0	H	X	128.0	154.0	9.17	1 / 50	4.07	**13.24**	0.021	30.00	-16.76
15 MHz	π/2 BPSK	1717.5	H	X	198.0	150.0	9.33	1 / 1	7.66	16.99	0.050	30.00	-13.01
		1745.0	H	X	185.0	153.0	9.14	1 / 37	8.83	17.97	0.063	30.00	-12.03
		1772.5	H	X	128.0	154.0	9.18	1 / 37	9.32	**18.50**	0.071	30.00	-11.50
	QPSK	1717.5	H	X	198.0	150.0	9.33	1 / 1	6.69	16.02	0.040	30.00	-13.98
		1745.0	H	X	185.0	153.0	9.14	1 / 37	7.34	16.48	0.044	30.00	-13.52
		1772.5	H	X	128.0	154.0	9.18	1 / 37	7.55	**16.72**	0.047	30.00	-13.28
	16-QAM	1772.5	H	X	128.0	154.0	9.18	1 / 37	6.84	**16.02**	0.040	30.00	-13.98
	64-QAM	1772.5	H	X	128.0	154.0	9.18	1 / 37	5.72	**14.90**	0.031	30.00	-15.10
	256-QAM	1772.5	H	X	128.0	154.0	9.18	1 / 37	4.06	**13.23**	0.021	30.00	-16.77
10 MHz	π/2 BPSK	1715.0	H	X	198.0	150.0	9.35	1 / 1	7.70	17.05	0.051	30.00	-12.95
		1745.0	H	X	185.0	153.0	9.14	1 / 25	8.80	17.94	0.062	30.00	-12.06
		1775.0	H	X	128.0	154.0	9.18	1 / 25	9.37	**18.56**	0.072	30.00	-11.44
	QPSK	1715.0	H	X	198.0	150.0	9.35	1 / 1	6.76	16.11	0.041	30.00	-13.89
		1745.0	H	X	185.0	153.0	9.14	1 / 25	7.89	**17.03**	0.050	30.00	-12.97
		1775.0	H	X	128.0	154.0	9.18	1 / 25	7.78	16.97	0.050	30.00	-13.03
	16-QAM	1775.0	H	X	128.0	154.0	9.18	1 / 25	6.70	**15.88**	0.039	30.00	-14.12
	64-QAM	1775.0	H	X	128.0	154.0	9.18	1 / 25	5.53	**14.71**	0.030	30.00	-15.29
	256-QAM	1775.0	H	X	128.0	154.0	9.18	1 / 25	4.04	**13.22**	0.021	30.00	-16.78
5 MHz	π/2 BPSK	1712.5	H	X	198.0	150.0	9.37	1 / 1	7.57	16.93	0.049	30.00	-13.07
		1745.0	H	X	185.0	153.0	9.14	1 / 12	8.81	17.95	0.062	30.00	-12.05
		1777.5	H	X	128.0	154.0	9.19	1 / 12	9.25	**18.44**	0.070	30.00	-11.56
	QPSK	1712.5	H	X	198.0	150.0	9.37	1 / 1	6.78	16.15	0.041	30.00	-13.85
		1745.0	H	X	185.0	153.0	9.14	1 / 12	7.92	**17.06**	0.051	30.00	-12.94
		1777.5	H	X	128.0	154.0	9.19	1 / 12	7.48	16.67	0.046	30.00	-13.33
	16-QAM	1777.5	H	X	128.0	154.0	9.19	1 / 12	6.64	**15.83**	0.038	30.00	-14.17
	64-QAM	1777.5	H	X	128.0	154.0	9.19	1 / 12	5.97	**15.17**	0.033	30.00	-14.83
	256-QAM	1777.5	H	X	128.0	154.0	9.19	1 / 12	4.15	**13.35**	0.022	30.00	-16.65

Table 7-11.EIRP Data (NR Band n66 - ANT E)

7.8 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

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.

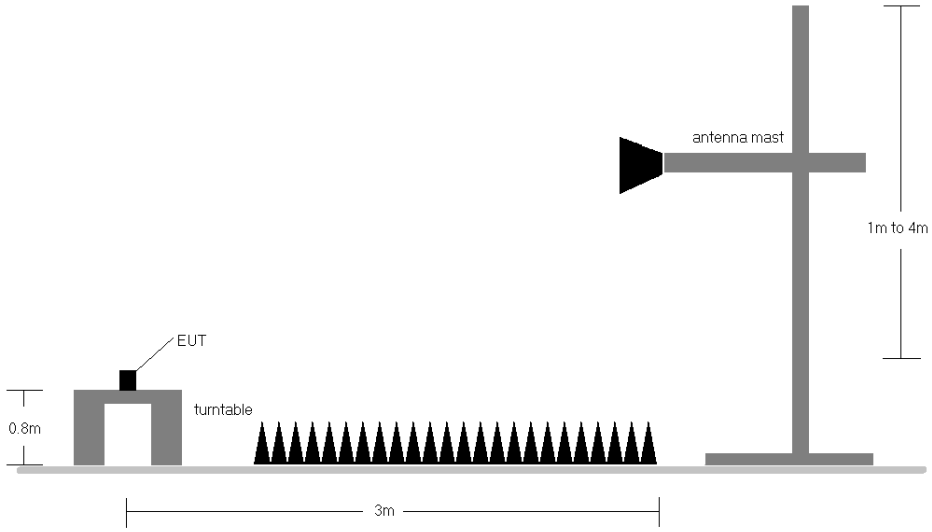


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
   b) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   d) EIRP (dBm) = E(dBµV/m) + 20logD – 104.8; where D is the measurement distance in meters.

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

3) This unit was tested with its standard battery.

4) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

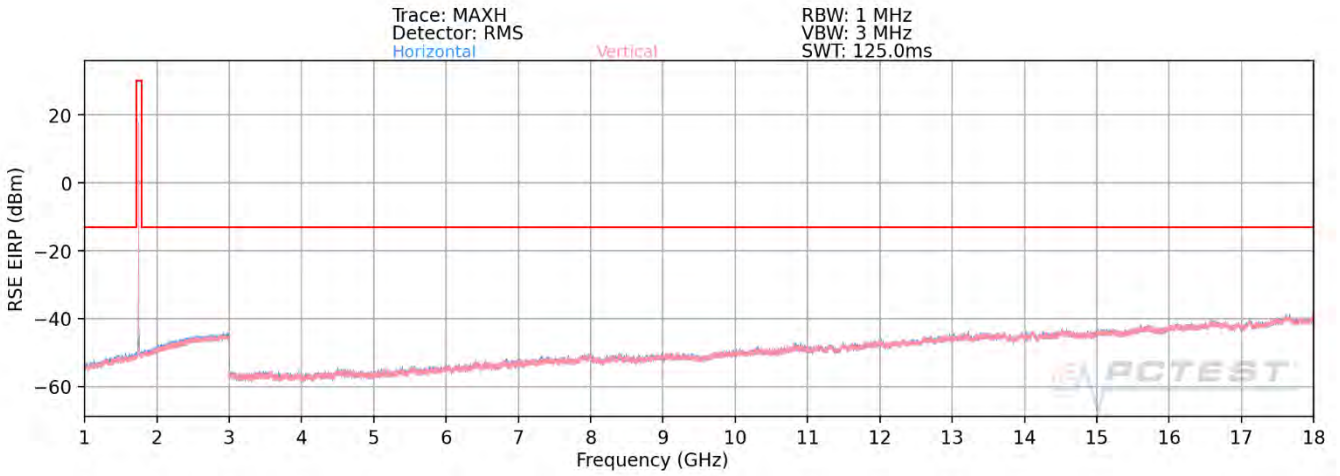
6) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

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

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

9) Spurious emissions shown in this section are measured while operating in EN-DC mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor). Spurious emissions from the NR carrier device, is subject to the rules under which the NR carrier operates. Spurious emission caused by the LTE carrier must meet the requirements of the rules under which the LTE carrier operates.

LTE Band 66/4



Plot 7-437. Radiated Spurious Plot (LTE Band 66/4)

Bandwidth (MHz):	20
Frequency (MHz):	1720.0
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]
3440.0	V	-	-	-68.59	5.20	43.61	-51.65	-13.00	-38.65
5160.0	V	-	-	-72.98	7.89	41.91	-53.35	-13.00	-40.35
6880.0	V	-	-	-73.01	10.68	44.67	-50.59	-13.00	-37.59

Table 7-12. Radiated Spurious Data (LTE Band 66/4 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1745.0
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]
3490.0	V	-	-	-68.47	5.35	43.88	-51.38	-13.00	-38.38
5235.0	V	-	-	-73.11	7.37	41.26	-53.99	-13.00	-40.99
6980.0	V	-	-	-73.33	10.84	44.51	-50.75	-13.00	-37.75

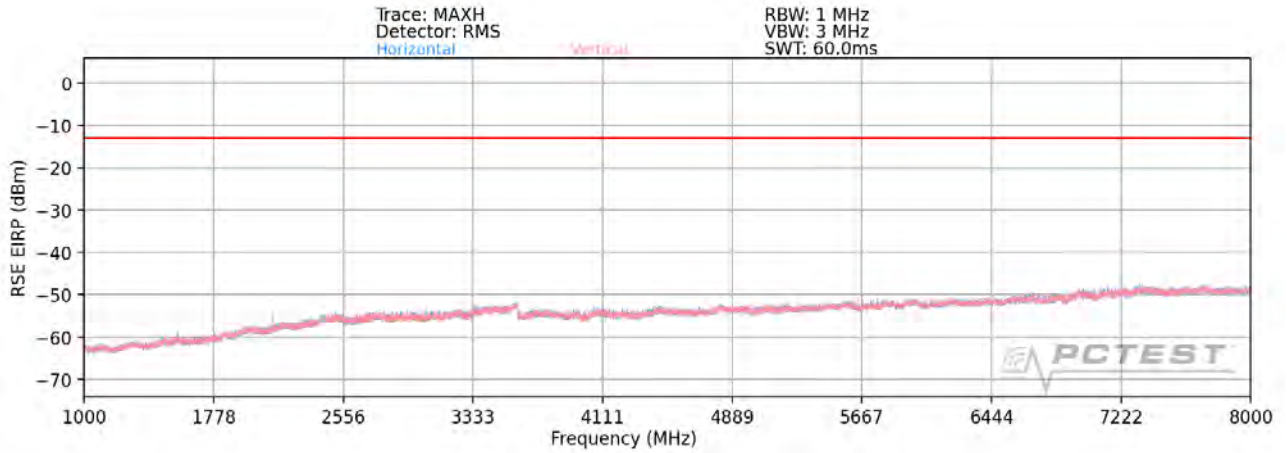
Table 7-13. Radiated Spurious Data (LTE Band 66/4 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1770.0
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]
3540.00	V	-	-	-68.89	5.30	43.41	-51.85	-13.00	-38.85
5310.00	V	-	-	-72.87	7.62	41.75	-53.51	-13.00	-40.51
7080.00	V	-	-	-72.80	10.94	45.14	-50.12	-13.00	-37.12

Table 7-14. Radiated Spurious Data (LTE Band 66/4 – High Channel)

LTE Band 12



Plot 7-438. Radiated Spurious Plot (LTE Band 12)

Bandwidth (MHz):	10
Frequency (MHz):	704.0
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]
1408.0	V	-	-	-69.43	-2.47	35.10	-60.16	-13.00	-47.16
2112.0	V	308	337	-60.97	0.89	46.92	-48.33	-13.00	-35.33
2816.0	V	-	-	-68.79	3.71	41.92	-53.34	-13.00	-40.34
3520.0	V	-	-	-68.54	4.45	42.91	-52.34	-13.00	-39.34

Table 7-15. Radiated Spurious Data (LTE Band 12 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	707.5
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]
1415.0	V	-	-	-69.69	-2.42	34.89	-60.37	-13.00	-47.37
2122.5	V	303	351	-60.87	0.98	47.11	-48.14	-13.00	-35.14
2830.0	V	-	-	-68.90	3.51	41.61	-53.65	-13.00	-40.65
3537.5	V	-	-	-68.35	4.53	43.18	-52.08	-13.00	-39.08

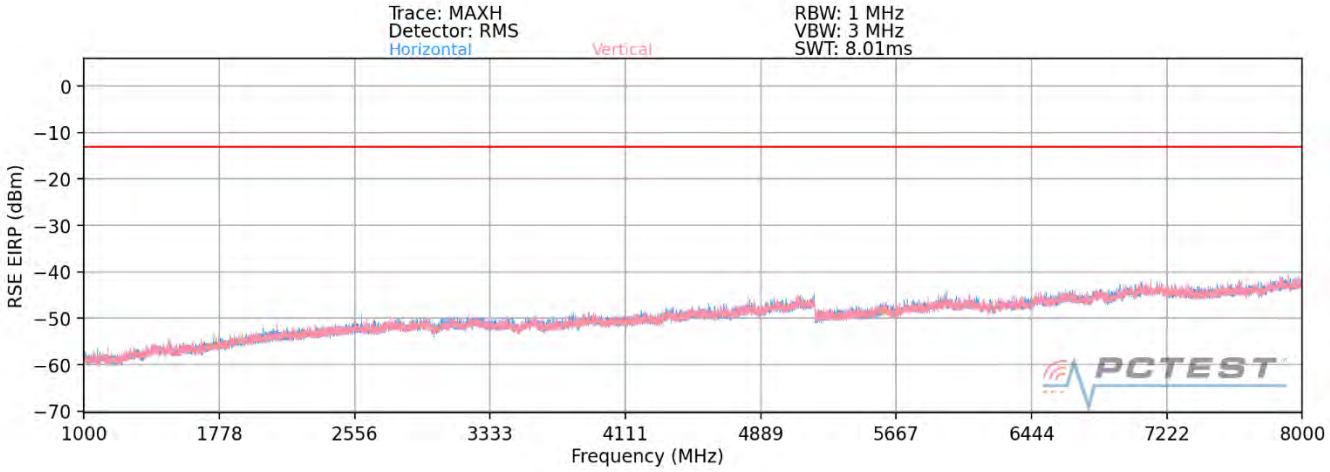
Table 7-16. Radiated Spurious Data (LTE Band 12 – Mid Channel)

Bandwidth (MHz):	10
Frequency (MHz):	711.0
RB / Offset:	1 / 25

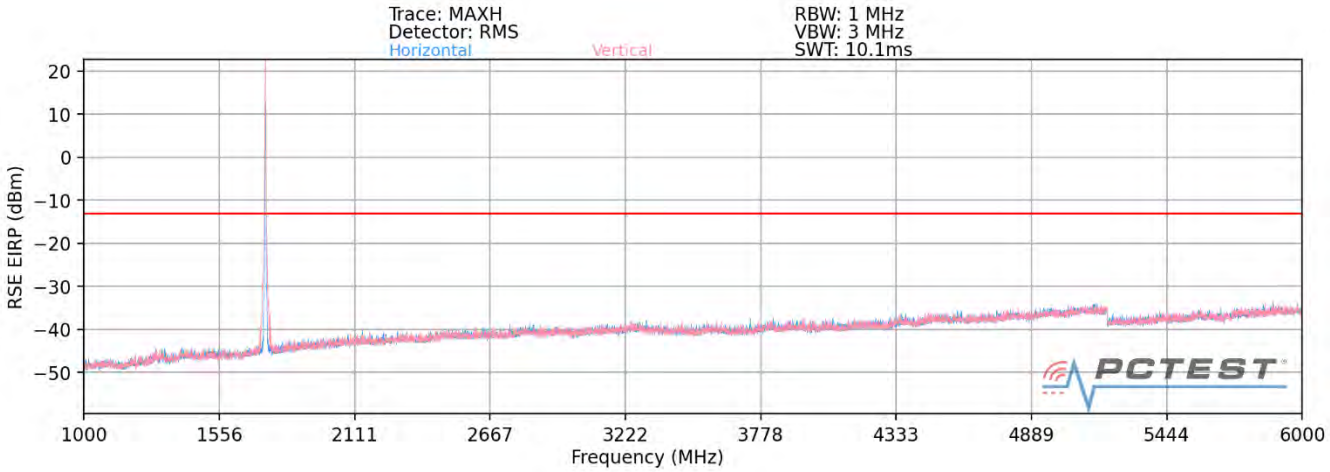
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1422.0	V	-	-	-69.71	-2.48	34.81	-60.45	-13.00	-47.45
2133.0	V	308	339	-58.07	1.09	50.02	-45.23	-13.00	-32.23
2844.0	V	-	-	-69.27	3.46	41.19	-54.07	-13.00	-41.07
3555.0	V	-	-	-68.19	4.75	43.56	-51.70	-13.00	-38.70

Table 7-17. Radiated Spurious Data (LTE Band 12 – High Channel)

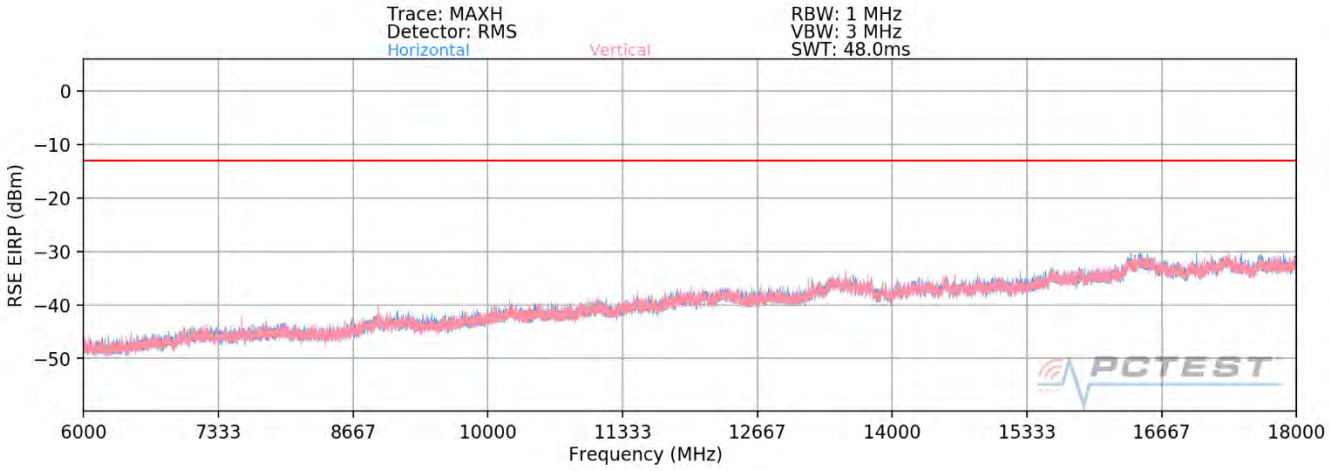
NR Band n12



Plot 7-439. Radiated Spurious Plot (NR Band n12)



Plot 7-440. Radiated Spurious Plot (NR Band n12+B66 – 1-6GHz)



Plot 7-441. Radiated Spurious Plot (NR Band n12 + B66 – 6-18 GHz)

Bandwidth (MHz):	10
Frequency (MHz):	704.0
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]
1408.0	V	115	273	-67.91	-2.47	36.62	-58.64	-13.00	-45.64
2112.0	V	-	-	-75.30	0.89	32.59	-62.66	-13.00	-49.66
2816.0	V	-	-	-74.21	3.71	36.50	-58.76	-13.00	-45.76

Table 7-18. Radiated Spurious Data (NR Band n12 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	707.5
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]
1415.0	V	115	277	-71.28	-2.42	33.30	-61.96	-13.00	-48.96
2122.5	V	-	-	-75.23	0.98	32.75	-62.50	-13.00	-49.50
2830.0	V	-	-	-74.20	3.51	36.31	-58.95	-13.00	-45.95

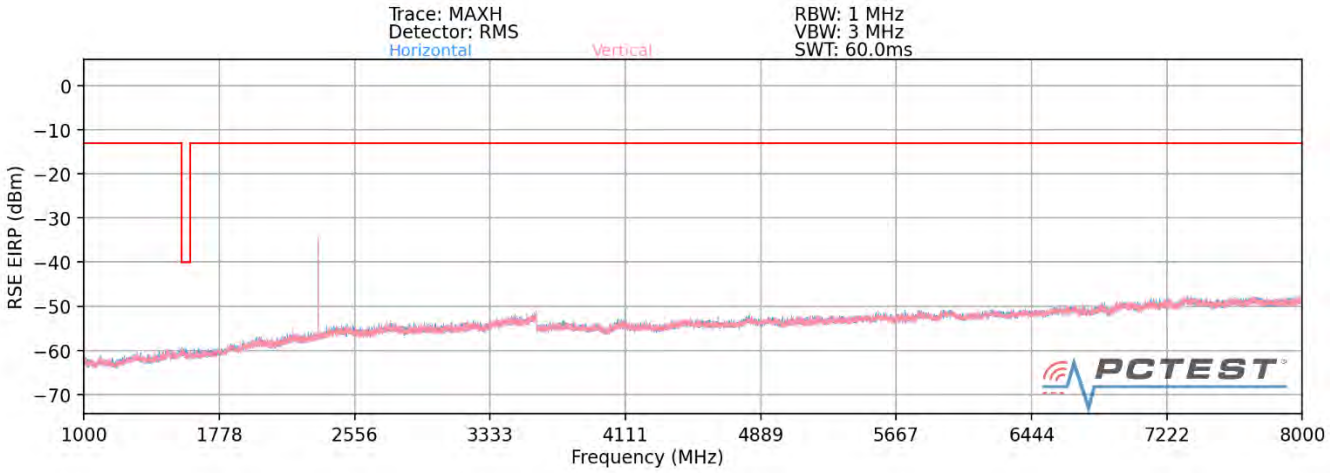
Table 7-19. Radiated Spurious Data (NR Band n12 – Mid Channel)

Bandwidth (MHz):	10
Frequency (MHz):	711.0
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]
1422.0	V	112	276	-71.34	-2.48	33.18	-62.08	-13.00	-49.08
2133.0	V	-	-	-75.21	1.09	32.88	-62.37	-13.00	-49.37
2844.0	V	-	-	-74.17	3.46	36.29	-58.97	-13.00	-45.97

Table 7-20. Radiated Spurious Data (NR Band n12 – High Channel)

LTE Band 13



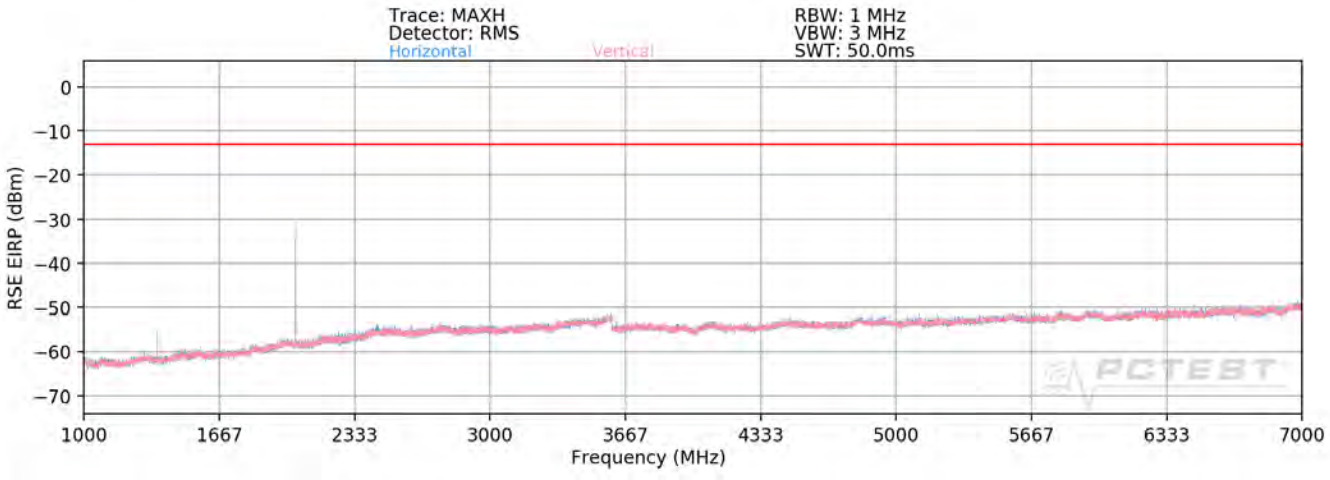
Plot 7-442. Radiated Spurious Plot (LTE Band 13)

Sample #:	0693M
Bandwidth (MHz):	10
Frequency (MHz):	782.0
RB / Offset:	1 / 25
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
1564.0	H	207	175	-76.05	-0.89	30.06	-65.19	-40.00	-25.19
2346.0	H	131	148	-49.65	2.25	59.60	-35.66	-13.00	-22.66
3128.0	H	-	-	-78.20	4.00	32.80	-62.46	-13.00	-49.46
3910.0	H	-	-	-78.51	5.14	33.63	-61.63	-13.00	-48.63
4692.0	H	-	-	-78.77	6.50	34.73	-60.53	-13.00	-47.53

Table 7-21. Radiated Spurious Data (LTE Band 13)

LTE Band 71



Plot 7-443. Radiated Spurious Plot (LTE Band 71)

Bandwidth (MHz):	20
Frequency (MHz):	673.0
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]
1346.0	H	102	357	-71.27	-2.44	33.29	-61.97	-13.00	-48.97
2019.0	H	133	350	-47.48	1.13	60.65	-34.61	-13.00	-21.61
2692.0	H	-	-	-77.63	3.34	32.71	-62.55	-13.00	-49.55
3365.0	H	-	-	-78.34	5.12	33.78	-61.47	-13.00	-48.47
4038.0	H	-	-	-79.60	5.97	33.37	-61.88	-13.00	-48.88

Table 7-22. Radiated Spurious Data (LTE Band 71 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	680.5
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]
1361.0	H	223	1	-70.22	-2.64	34.14	-61.12	-13.00	-48.12
2041.5	H	150	324	-47.06	1.05	60.99	-34.27	-13.00	-21.27
2722.0	H	-	-	-77.88	3.68	32.80	-62.46	-13.00	-49.46
3402.5	H	-	-	-78.07	4.81	33.74	-61.51	-13.00	-48.51
4083.0	H	-	-	-79.43	6.50	34.07	-61.19	-13.00	-48.19

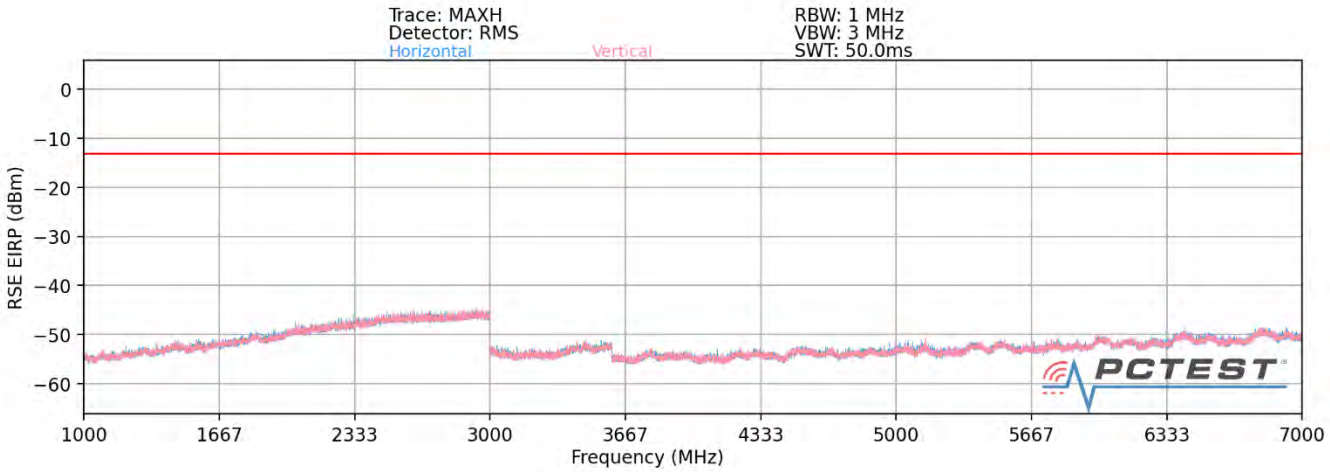
Table 7-23. Radiated Spurious Data (LTE Band 71 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	688.0
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]
1376.0	H	100	1	-67.73	-2.78	36.49	-58.77	-13.00	-45.77
2064.0	H	115	336	-48.78	0.77	58.99	-36.26	-13.00	-23.26
2752.0	H	-	-	-77.53	4.07	33.54	-61.72	-13.00	-48.72
3440.0	H	-	-	-77.29	4.49	34.20	-61.06	-13.00	-48.06
4128.0	H	-	-	-78.46	6.23	34.77	-60.49	-13.00	-47.49

Table 7-24. Radiated Spurious Data (LTE Band 71 – High Channel)

NR Band n71



Plot 7-444. Radiated Spurious Plot (NR Band n71)

Bandwidth (MHz):	20
Frequency (MHz):	673.0
RB / Offset:	1 / 50
Mode:	SA

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]
1346.0	H	101	351	-57.91	6.14	55.23	-40.03	-13.00	-27.03
2019.0	H	109	351	-47.74	8.71	67.97	-27.28	-13.00	-14.28
2692.0	H	-	-	-68.42	12.21	50.79	-44.47	-13.00	-31.47
3365.0	H	-	-	-69.26	13.44	51.18	-44.07	-13.00	-31.07

Table 7-25. Radiated Spurious Data (NR Band n71 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	680.5
RB / Offset:	1 / 50
Mode:	SA

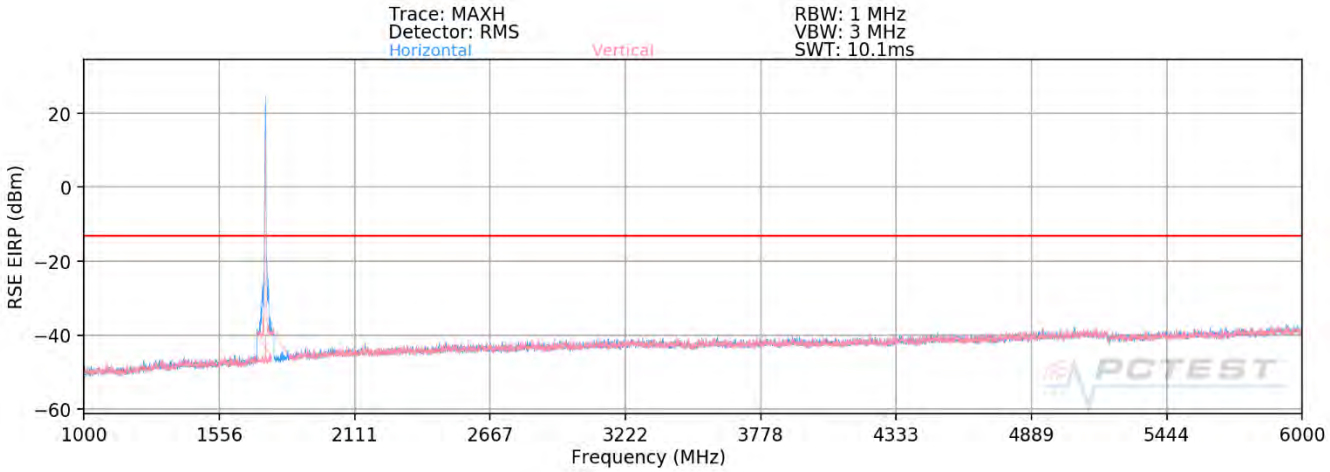
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1361.0	H	376	2	-69.30	-2.64	35.06	-60.20	-13.00	-47.20
2041.5	H	152	357	-46.95	1.05	61.10	-34.16	-13.00	-21.16
2722.0	H	-	-	-69.45	3.68	41.23	-54.03	-13.00	-41.03
3402.5	H	-	-	-74.92	4.81	36.89	-58.36	-13.00	-45.36

Table 7-26. Radiated Spurious Data (NR Band n71 – Mid Channel)

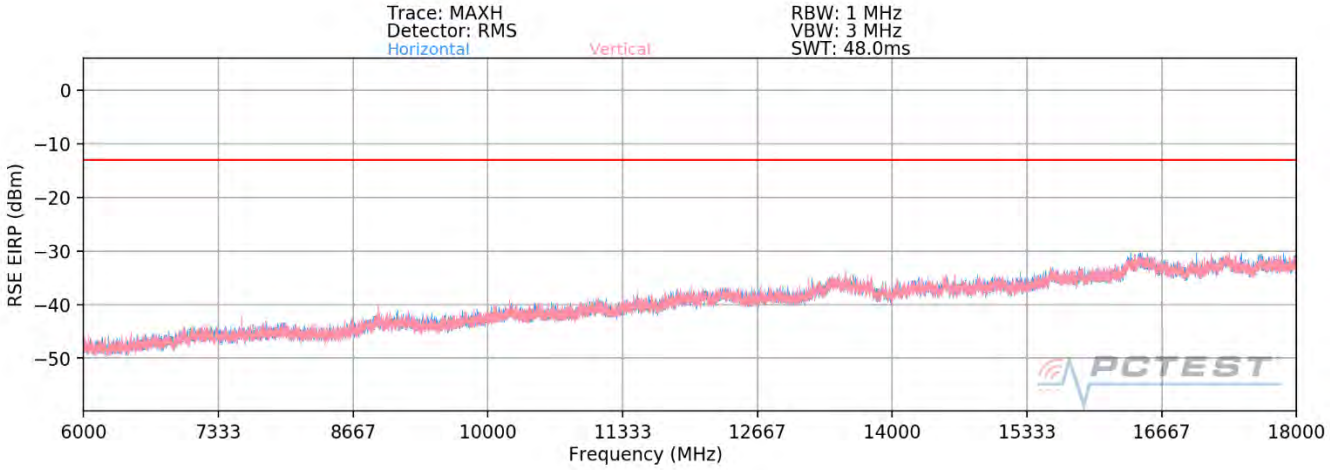
Bandwidth (MHz):	20
Frequency (MHz):	680.5
RB / Offset:	1 / 50
Mode:	SA

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]
1361.0	H	376	2	-69.30	-2.64	35.06	-60.20	-13.00	-47.20
2041.5	H	152	357	-46.95	1.05	61.10	-34.16	-13.00	-21.16
2722.0	H	-	-	-69.45	3.68	41.23	-54.03	-13.00	-41.03
3402.5	H	-	-	-74.92	4.81	36.89	-58.36	-13.00	-45.36

Table 7-27. Radiated Spurious Data (NR Band n71 – High Channel)



Plot 7-445. Radiated Spurious Plot (NR Band n71 + B66 – 1-6 GHz)



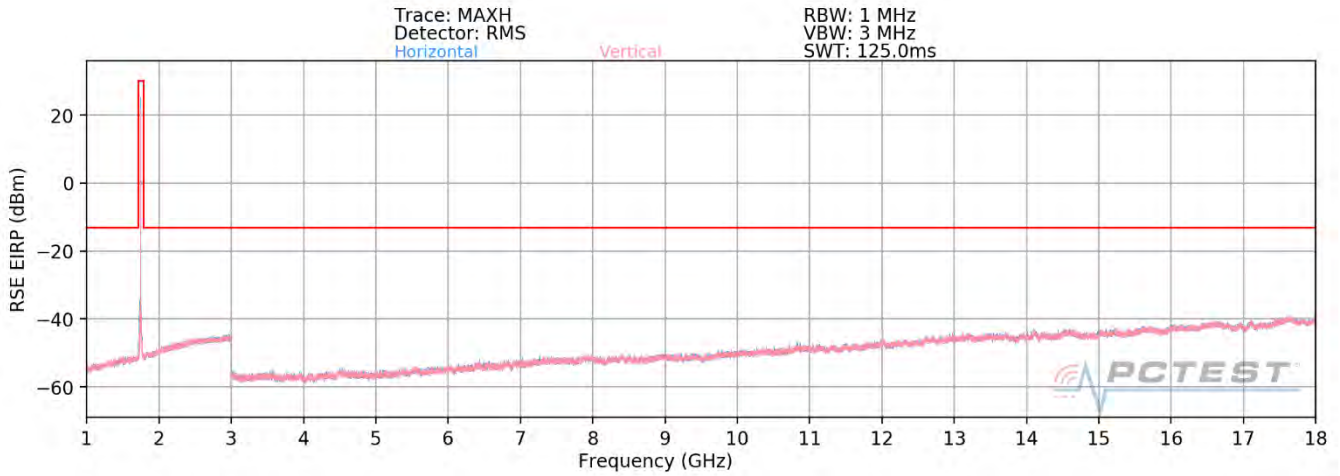
Plot 7-446. Radiated Spurious Plot (NR Band n71 + B66 – 6-18 GHz)

Bandwidth (MHz):	20
Frequency (MHz):	688.0
RB / Offset:	1 / 50
Mode:	EN-DC
Anchor Band:	LTE Band 66

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1376.0	H	155	6	-63.24	5.79	49.55	-45.70	-13.00	-32.70
2064.0	H	203	354	-67.28	8.64	48.36	-46.90	-13.00	-33.90
2752.0	H	-	-	-69.69	12.65	49.96	-45.30	-13.00	-32.30
3440.0	H	-	-	-67.91	14.80	53.89	-41.36	-13.00	-28.36

Table 7-28. Radiated Spurious Data (NR Band n71 + B66)

NR Band n66 ANT A



Plot 7-447. Radiated Spurious Plot (NR Band n66)

Bandwidth (MHz):	20
Frequency (MHz):	1720.0
RB / Offset:	1 / 50
Mode:	SA

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]
3440.0	V	-	-	-57.01	5.50	55.49	-39.77	-13.00	-26.77
5160.0	V	-	-	-62.99	7.62	51.63	-43.63	-13.00	-30.63

Table 7-29. Radiated Spurious Data (NR Band n66 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1745.0
RB / Offset:	1 / 50
Mode:	SA

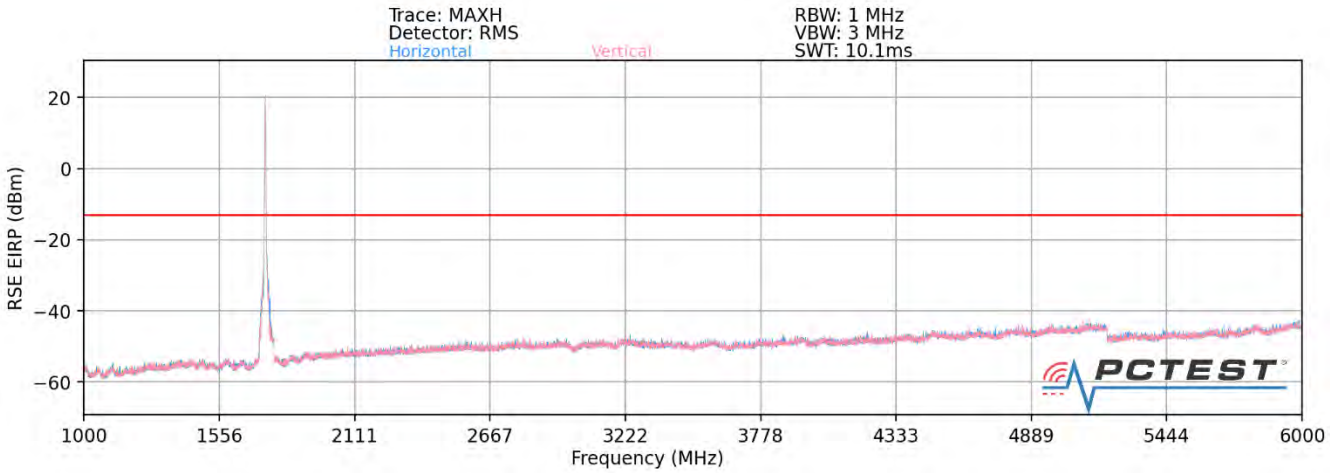
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3490.0	V	-	-	-56.72	5.35	55.63	-39.63	-13.00	-26.63
5235.0	V	-	-	-63.73	7.37	50.64	-44.61	-13.00	-31.61

Table 7-30. Radiated Spurious Data (NR Band n66 – Mid Channel)

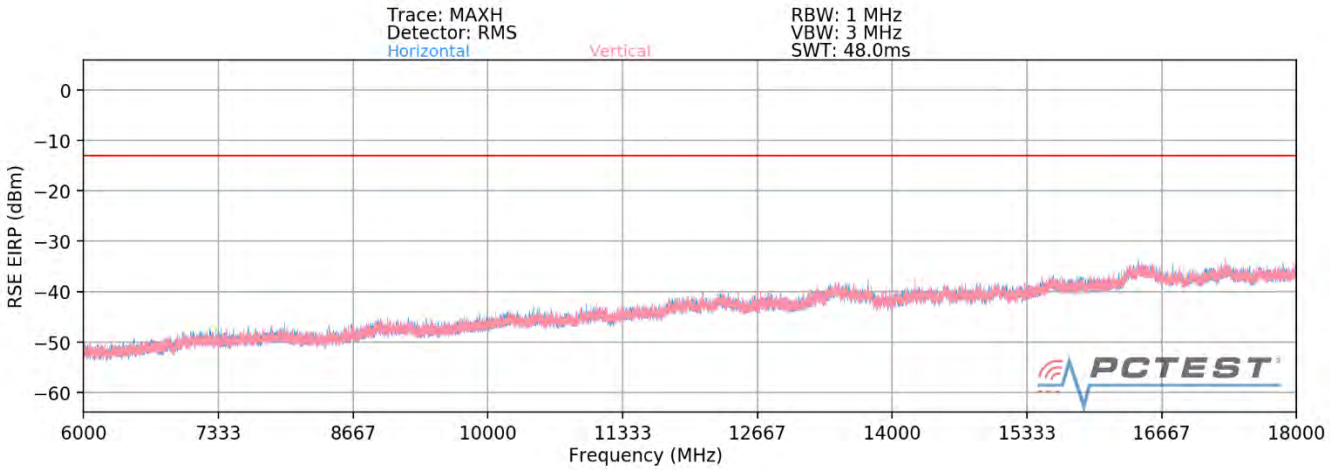
Bandwidth (MHz):	20
Frequency (MHz):	1900.0
RB / Offset:	1 / 50
Mode:	SA

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]
3800.0	V	-	-	-56.82	6.49	56.67	-38.59	-13.00	-25.59
5700.0	V	-	-	-64.00	8.26	51.26	-44.00	-13.00	-31.00

Table 7-31. Radiated Spurious Data (NR Band n66 – High Channel)



Plot 7-448. Radiated Spurious Plot (NR Band n66 + B13)

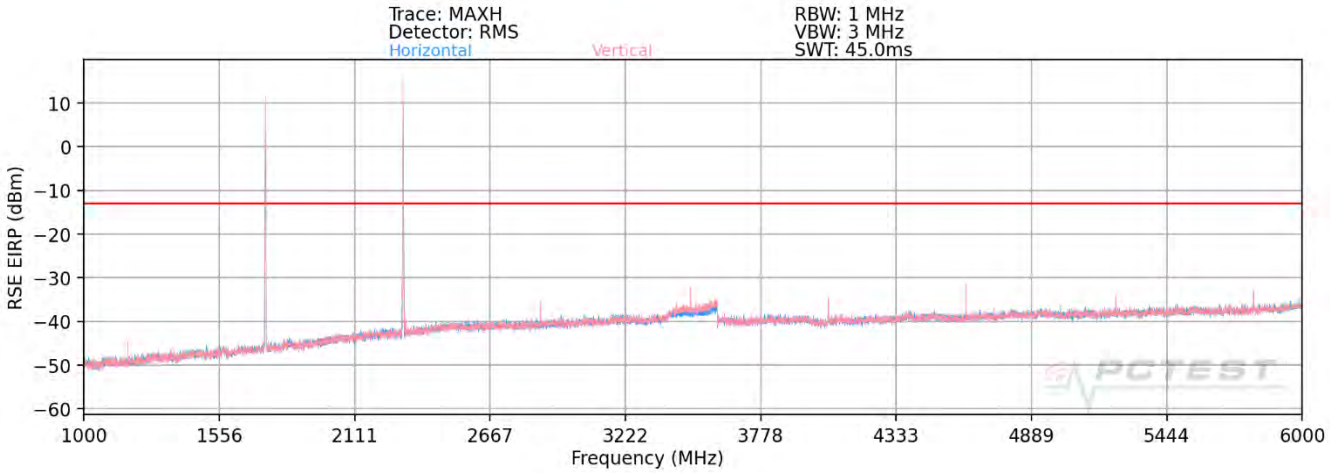


Plot 7-449. Radiated Spurious Plot (NR Band n66 + B13)

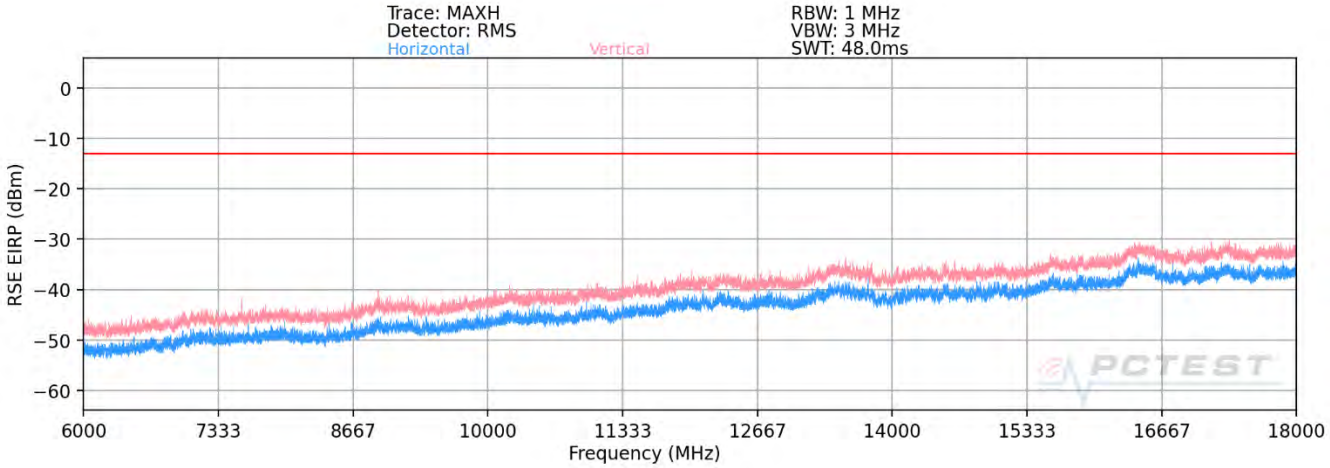
Bandwidth (MHz):	20
Frequency (MHz):	1745.0
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B2

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]
1205.0	H	-	-	-70.58	5.36	41.78	-53.48	-13.00	-40.48
1340.0	H	-	-	-70.99	5.98	41.99	-53.27	-13.00	-40.27
1475.0	H	-	-	-72.38	6.95	41.57	-53.69	-13.00	-40.69

Table 7-32. Radiated Spurious Data (NR Band n66 + B13)



Plot 7-450. Radiated Spurious Plot (NR Band n66 + B30)



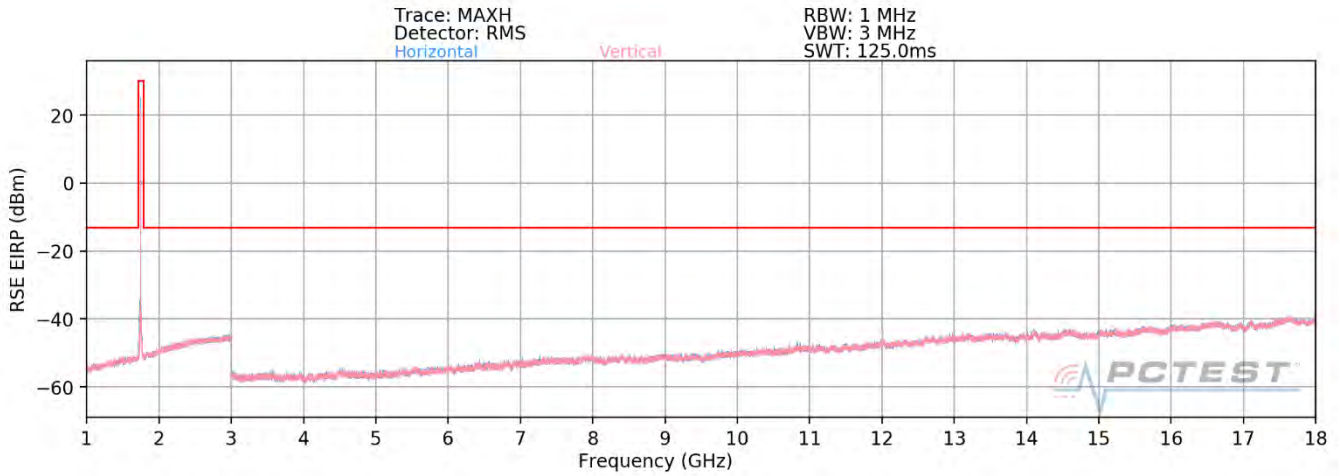
Plot 7-451. Radiated Spurious Plot (NR Band n66 + B30)

Bandwidth (MHz):	20
Frequency (MHz):	1745.0
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	30

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1180.0	H	-	-	-69.20	5.00	42.80	-52.46	-13.00	-39.46
2875.0	H	-	-	-71.42	12.90	48.48	-46.78	-13.00	-33.78
3440.0	H	-	-	-69.36	14.13	51.77	-43.49	-13.00	-30.49

Table 7-33. Radiated Spurious Data (NR Band n66 + B30)

NR Band n66 ANT E



Plot 7-452. Radiated Spurious Plot (NR Band n66)

Bandwidth (MHz):	40
Frequency (MHz):	1730.0
RB / Offset:	1 / 108
Mode:	SA

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]
3460.0	V	-	-	-75.91	5.73	36.82	-58.44	-13.00	-45.44
5190.0	V	109	51	-74.12	7.26	40.14	-55.12	-13.00	-42.12
6920.0	V	-	-	-80.53	11.12	37.59	-57.66	-13.00	-44.66

Table 7-34. Radiated Spurious Data (NR Band n66 – Low Channel)

Bandwidth (MHz):	40
Frequency (MHz):	1745.0
RB / Offset:	1 / 108
Mode:	SA

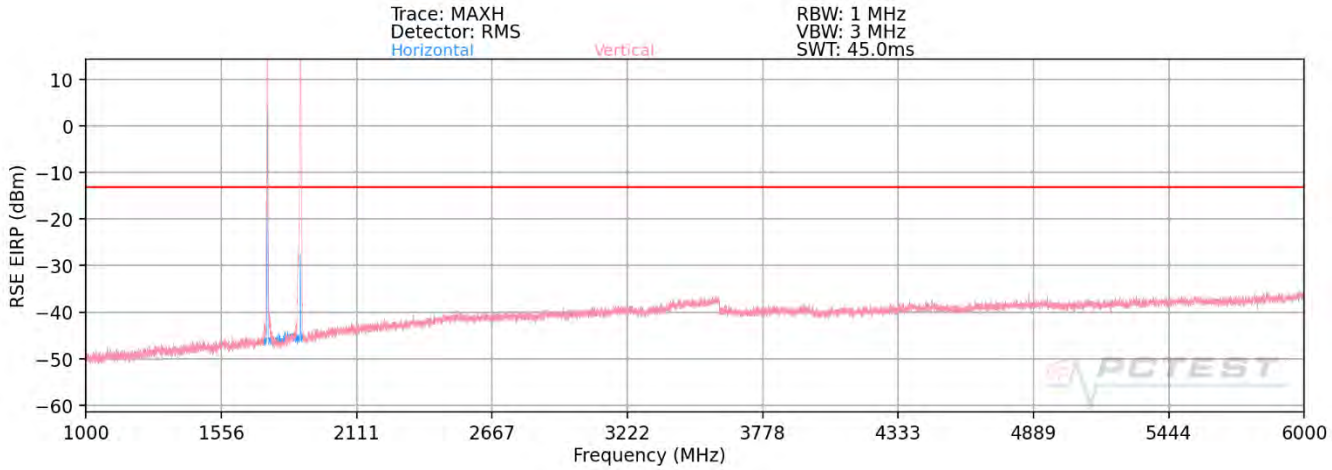
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3490.0	V	-	-	-78.03	5.34	34.31	-60.95	-13.00	-47.95
5235.0	V	100	351	-73.61	7.14	40.53	-54.73	-13.00	-41.73
6980.0	V	-	-	-80.27	10.72	37.45	-57.81	-13.00	-44.81

Table 7-35. Radiated Spurious Data (NR Band n66 – Mid Channel)

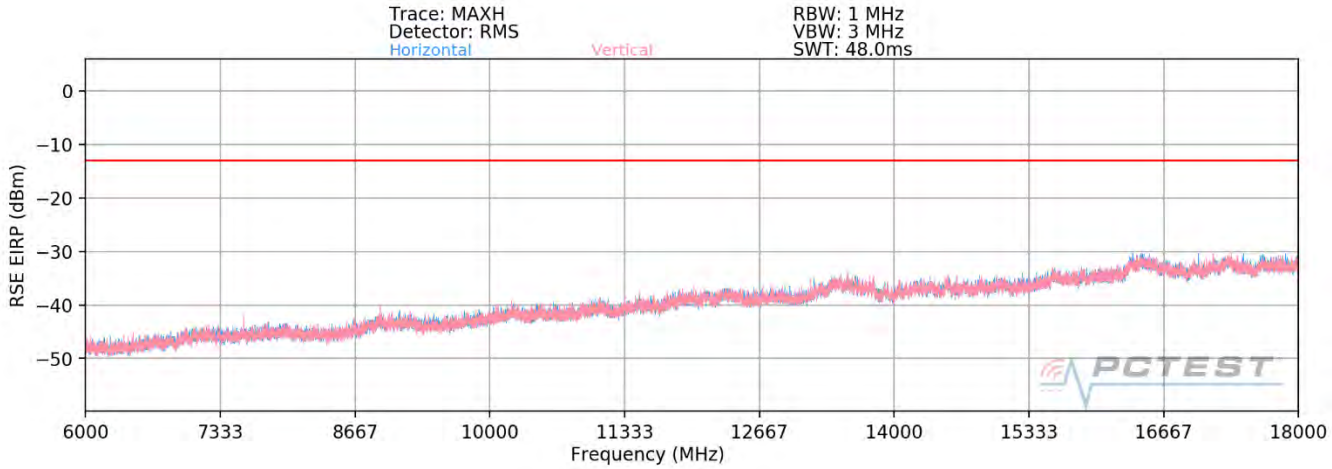
Bandwidth (MHz):	40
Frequency (MHz):	1760.0
RB / Offset:	1 / 108
Mode:	SA

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]
3520.0	V	-	-	-78.08	6.35	35.27	-59.99	-13.00	-46.99
5280.0	V	112	178	-66.39	8.00	48.61	-46.64	-13.00	-33.64
7040.0	V	-	-	-80.42	12.49	39.07	-56.19	-13.00	-43.19

Table 7-36. Radiated Spurious Data (NR Band n66 – High Channel)



Plot 7-453. Radiated Spurious Plot (NR Band n66 + B2)



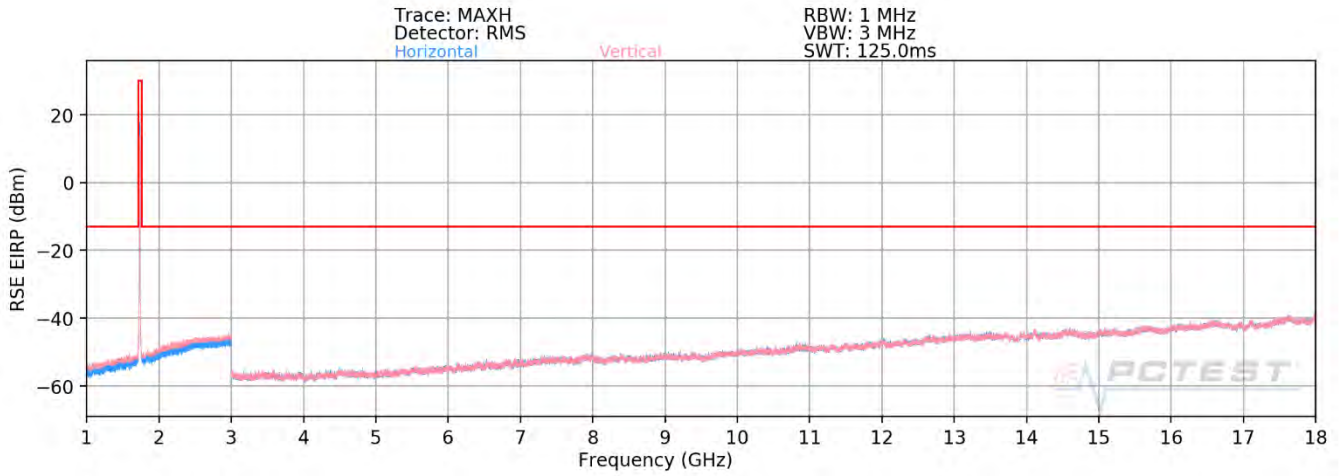
Plot 7-454. Radiated Spurious Plot (NR Band n66 + B2)

Bandwidth (MHz):	20
Frequency (MHz):	1745.0
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B2

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]
1205.0	H	-	-	-70.58	5.36	41.78	-53.48	-13.00	-40.48
1340.0	H	-	-	-70.99	5.98	41.99	-53.27	-13.00	-40.27
1475.0	H	-	-	-72.38	6.95	41.57	-53.69	-13.00	-40.69

Table 7-37. Radiated Spurious Data (NR Band n66 + B2)

WCDMA AWS



Plot 7-455. Radiated Spurious Plot (WCDMA AWS)

Mode:	WCDMA RMC
Channel:	1312
Frequency (MHz):	1712.4
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3424.8	V	-	-	-78.00	5.66	34.66	-60.59	-13.00	-47.59
5137.2	V	-	-	-80.21	7.85	34.64	-60.62	-13.00	-47.62
6849.6	V	-	-	-81.04	11.44	37.40	-57.86	-13.00	-44.86

Table 7-38. Radiated Spurious Data (WCDMA AWS – Low Channel)

Mode:	WCDMA RMC
Channel:	1413
Frequency (MHz):	1732.6
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3465.2	V	-	-	-78.14	5.73	34.59	-60.67	-13.00	-47.67
5197.8	V	-	-	-80.46	7.17	33.71	-61.55	-13.00	-48.55
6930.4	V	-	-	-79.96	11.45	38.49	-56.77	-13.00	-43.77

Table 7-39. Radiated Spurious Data (WCDMA AWS – Mid Channel)

Mode:	WCDMA RMC
Channel:	1513
Frequency (MHz):	1752.6
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3505.2	V	-	-	-77.99	5.33	34.34	-60.92	-13.00	-47.92
5257.8	V	-	-	-82.16	7.40	32.24	-63.02	-13.00	-50.02
7010.4	V	-	-	-71.69	11.03	46.34	-48.91	-13.00	-35.91

Table 7-40. Radiated Spurious Data (WCDMA AWS – High Channel)

7.9 Uplink Carrier Aggregation Radiated Measurements

§2.1053

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. No. of sweep points ≥ 2 x span / RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. The trace was allowed to stabilize

Test Setup

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

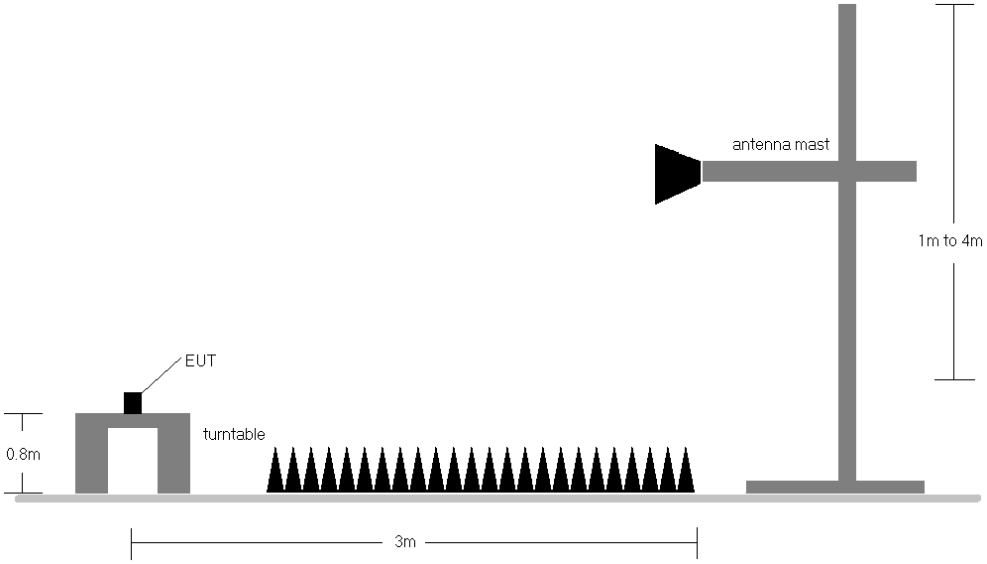


Figure 7-9. Test Instrument & Measurement Setup

Test Notes

1) 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.

2) This unit was tested with its standard battery.

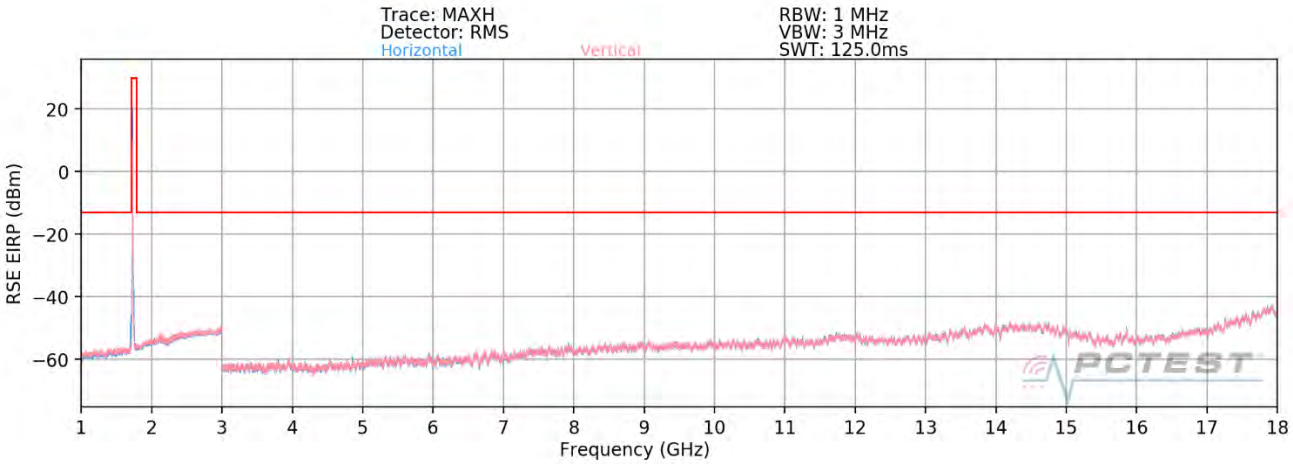
3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.

4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

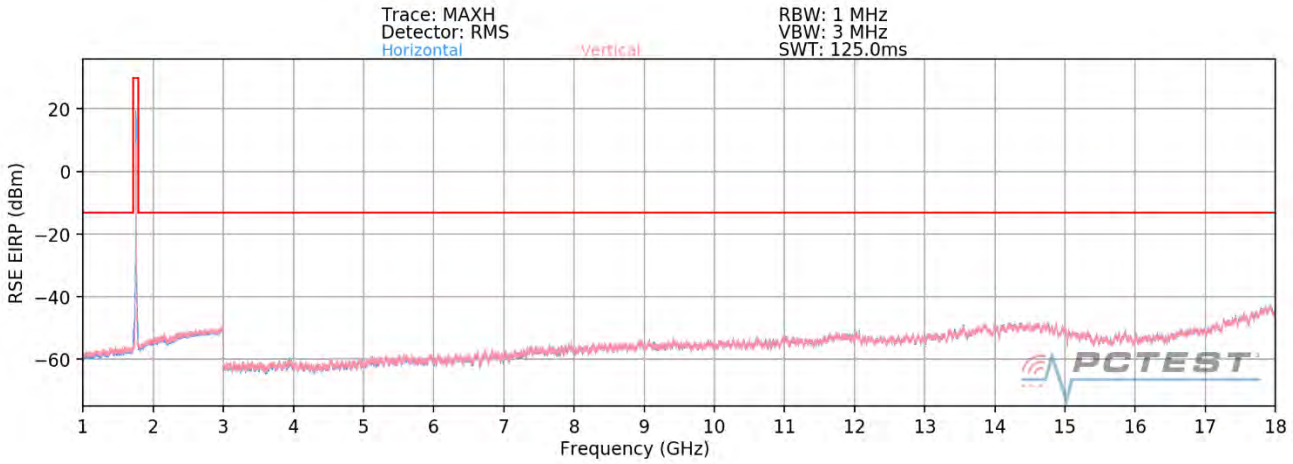
5) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

6) No significant emissions were found as a result of two uplink carriers operating contiguously.

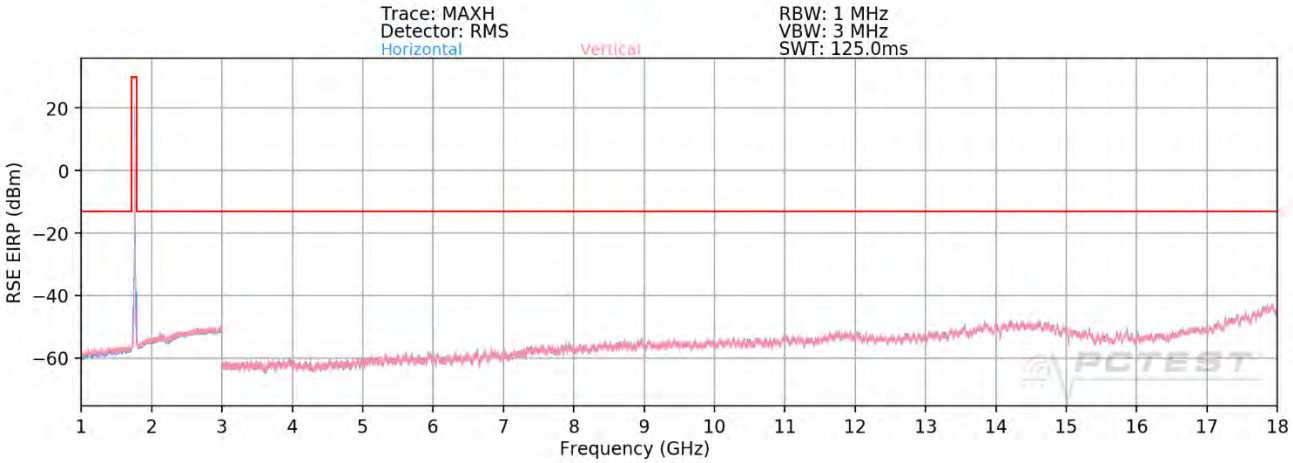
ULCA Band 66



Plot 7-456. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Low Channel – PCC/SCC: 1RB)



Plot 7-457. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Mid Channel – PCC/SCC: 1RB)



Plot 7-458. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 High Channel – PCC/SCC: 1RB)

PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	1720.0
PCC RB / Offset:	1 / 99
SCC Bandwidth (MHz):	20
SCC Frequency (MHz):	1739.8
SCC RB / Offset:	1 / 0
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3460.0	V	-	-	-68.66	5.50	43.84	-51.42	-13.00	-38.42
5190.0	V	-	-	-75.47	7.62	39.15	-56.11	-13.00	-43.11
6920.0	V	-	-	-74.36	11.27	43.91	-51.35	-13.00	-38.35

Plot 7-41. Radiated Spurious Data (ULCA B66 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	1745.0
PCC RB / Offset:	1 / 99
SCC Bandwidth (MHz):	20
SCC Frequency (MHz):	1764.8
SCC RB / Offset:	1 / 0
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3510.0	V	-	-	-68.75	5.09	43.34	-51.92	-13.00	-38.92
5265.0	V	-	-	-75.29	7.45	39.16	-56.10	-13.00	-43.10
7020.0	V	-	-	-74.71	10.93	43.22	-52.04	-13.00	-39.04

Plot 7-42. Radiated Spurious Data (ULCA B66 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)

PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	1770.0
PCC RB / Offset:	1 / 0
SCC Bandwidth (MHz):	20
SCC Frequency (MHz):	1750.2
SCC RB / Offset:	1 / 99
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3560.0	V	-	-	-67.88	5.56	44.68	-50.57	-13.00	-37.57
5340.0	V	-	-	-74.98	7.89	39.91	-55.35	-13.00	-42.35
7120.0	V	-	-	-75.55	11.27	42.72	-52.54	-13.00	-39.54

Plot 7-43. Radiated Spurious Data (ULCA B66 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)

7.10 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

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

Test Notes

None

Band 12 Frequency Stability Measurements

Operating Frequency (Hz):	707,500,000
Ref. Voltage (VDC):	4.18
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.18	- 30	707,499,755	2	0.0000003
		- 20	707,499,564	-189	-0.0000267
		- 10	707,500,302	549	0.0000776
		0	707,499,811	58	0.0000082
		+ 10	707,499,966	213	0.0000301
		+ 20 (Ref)	707,499,753	0	0.0000000
		+ 30	707,500,145	392	0.0000554
		+ 40	707,499,736	-17	-0.0000024
		+ 50	707,499,794	41	0.0000058
Battery Endpoint	2.98	+ 20	707,499,999	246	0.0000348

Table 7-44. Frequency Stability Data (Band 12)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

Band 12 Frequency Stability Measurements

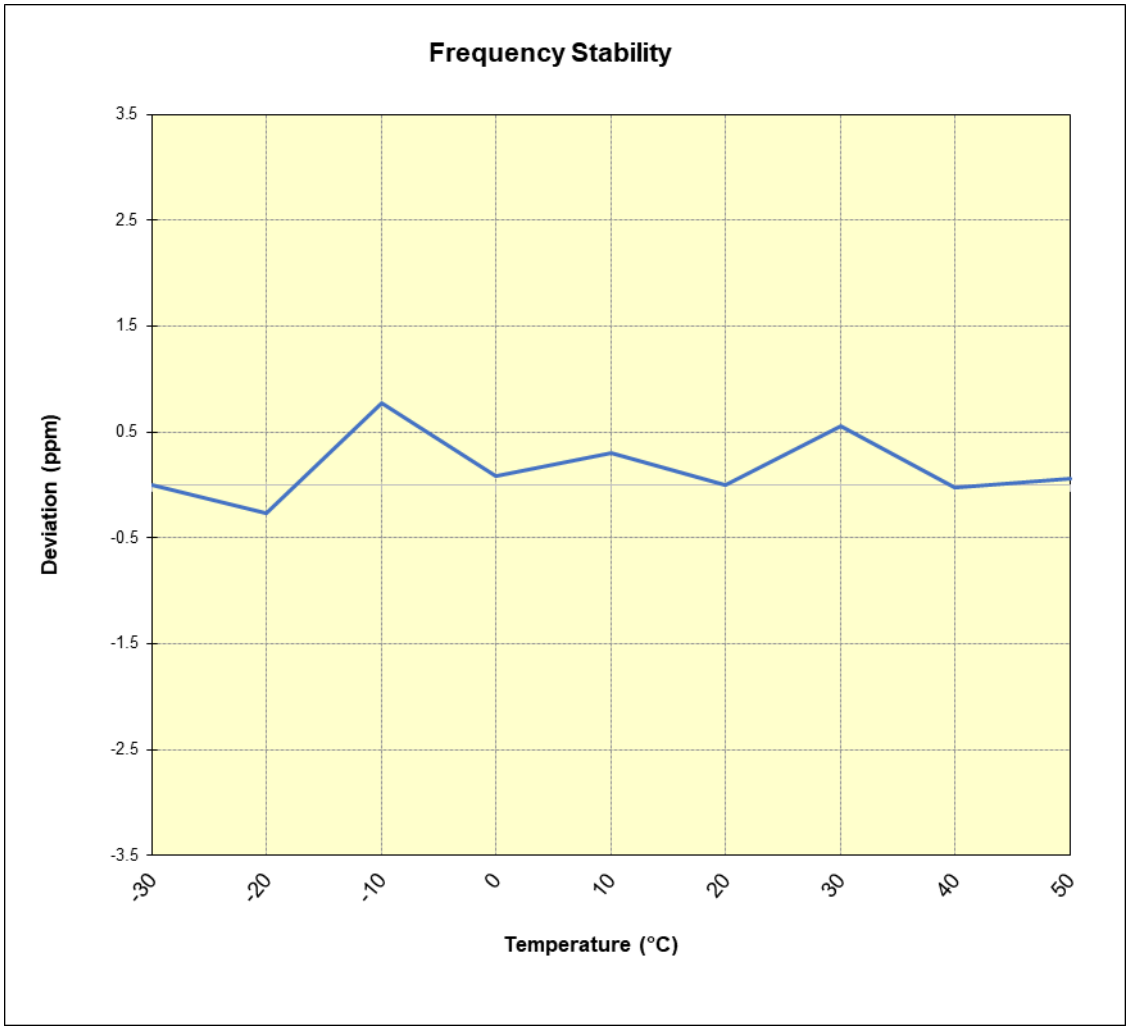


Figure 7-10. Frequency Stability Graph (Band 12)

NR Band n12 Frequency Stability Measurements

Operating Frequency (Hz):	707,500,000
Ref. Voltage (VDC):	4.18
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.18	- 30	707,500,130	244	0.0000345
		- 20	707,500,140	254	0.0000359
		- 10	707,499,768	-118	-0.0000167
		0	707,499,796	-90	-0.0000127
		+ 10	707,500,236	350	0.0000495
		+ 20 (Ref)	707,499,886	0	0.0000000
		+ 30	707,500,233	347	0.0000490
		+ 40	707,500,053	167	0.0000236
		+ 50	707,500,097	211	0.0000298
Battery Endpoint	2.98	+ 20	707,500,446	560	0.0000792

Table 7-45. Frequency Stability Data (NR Band n12)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

NR Band n12 Frequency Stability Measurements

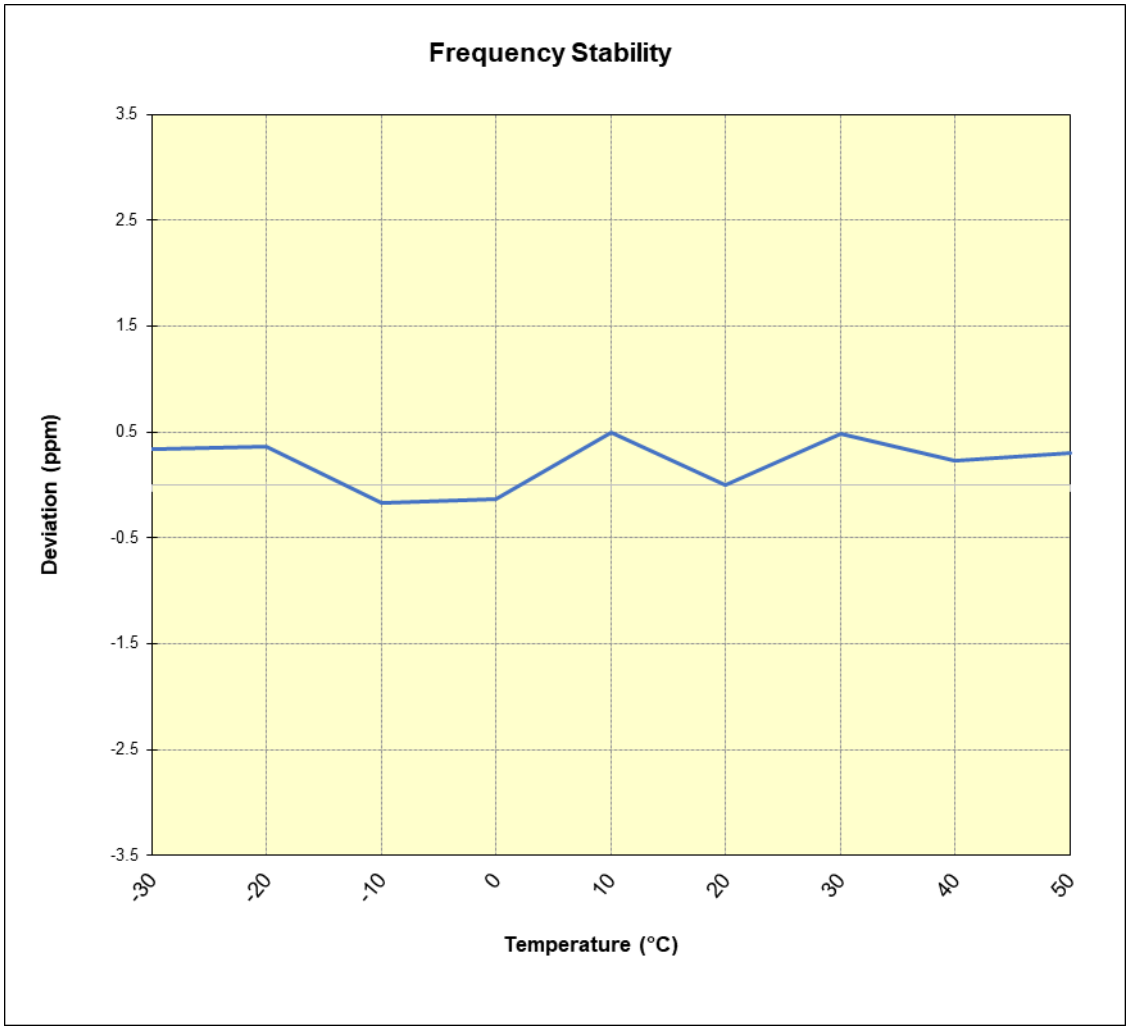


Figure 7-11. Frequency Stability Graph (NR Band n12)

Band 13 Frequency Stability Measurements

Operating Frequency (Hz):	782,000,000
Ref. Voltage (VDC):	4.18
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.18	- 30	782,000,157	-175	-0.0000224
		- 20	782,000,274	-58	-0.0000074
		- 10	781,999,963	-369	-0.0000472
		0	781,999,972	-360	-0.0000460
		+ 10	782,000,449	117	0.0000150
		+ 20 (Ref)	782,000,332	0	0.0000000
		+ 30	782,000,013	-319	-0.0000408
		+ 40	781,999,996	-336	-0.0000430
		+ 50	782,000,054	-278	-0.0000355
Battery Endpoint	2.98	+ 20	782,000,070	-262	-0.0000335

Table 7-46. Frequency Stability Data (Band 13)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

Band 13 Frequency Stability Measurements

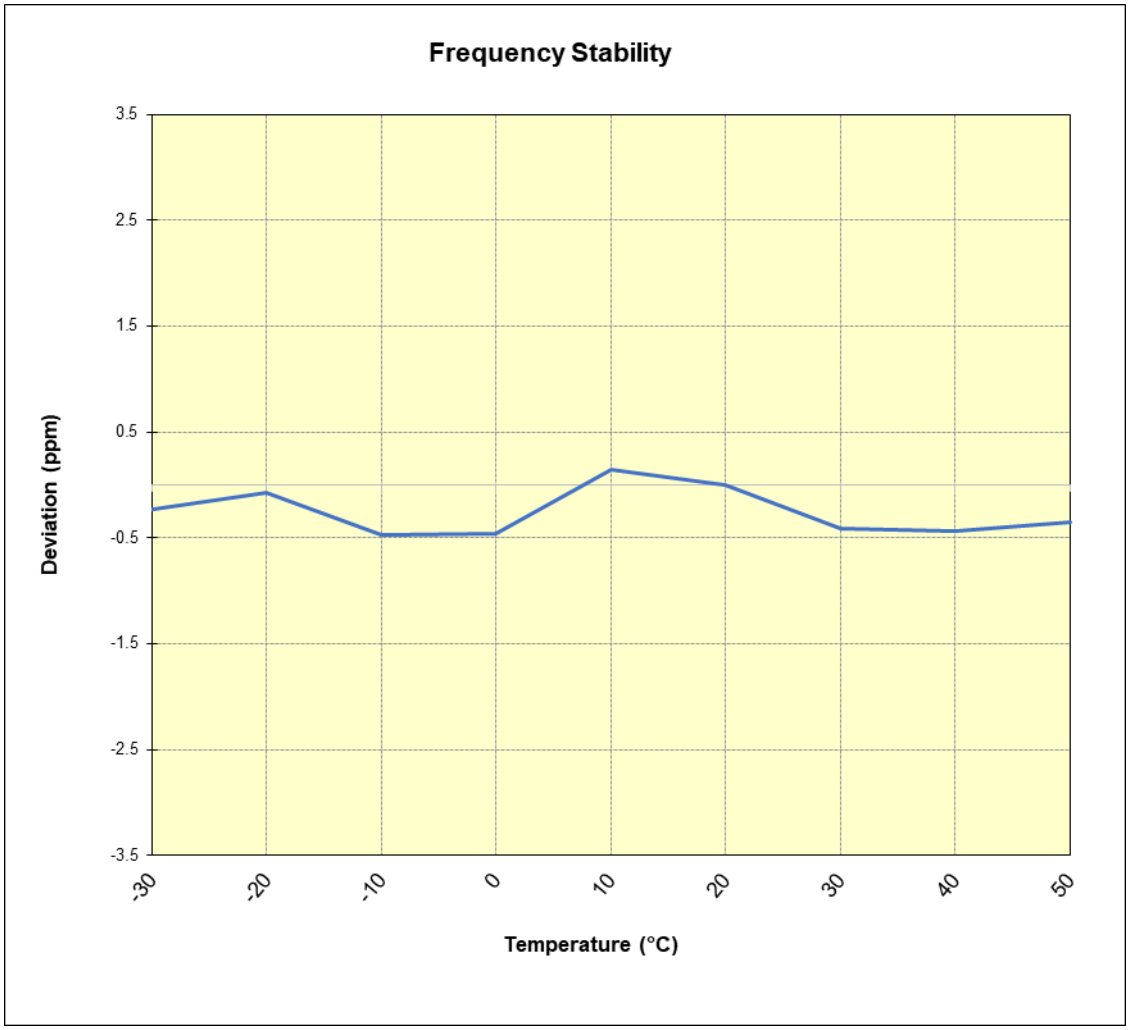


Figure 7-12. Frequency Stability Graph (Band 13)

Band 71 Frequency Stability Measurements

Operating Frequency (Hz):	680,500,000
Ref. Voltage (VDC):	4.18
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.18	- 30	680,499,614	-369	-0.0000542
		- 20	680,500,235	252	0.0000370
		- 10	680,500,094	111	0.0000163
		0	680,499,917	-66	-0.0000097
		+ 10	680,500,035	52	0.0000076
		+ 20 (Ref)	680,499,983	0	0.0000000
		+ 30	680,500,145	162	0.0000238
		+ 40	680,500,206	223	0.0000328
		+ 50	680,500,019	36	0.0000053
Battery Endpoint	2.98	+ 20	680,500,151	168	0.0000247

Table 7-47. Frequency Stability Data (Band 71)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

Band 71 Frequency Stability Measurements

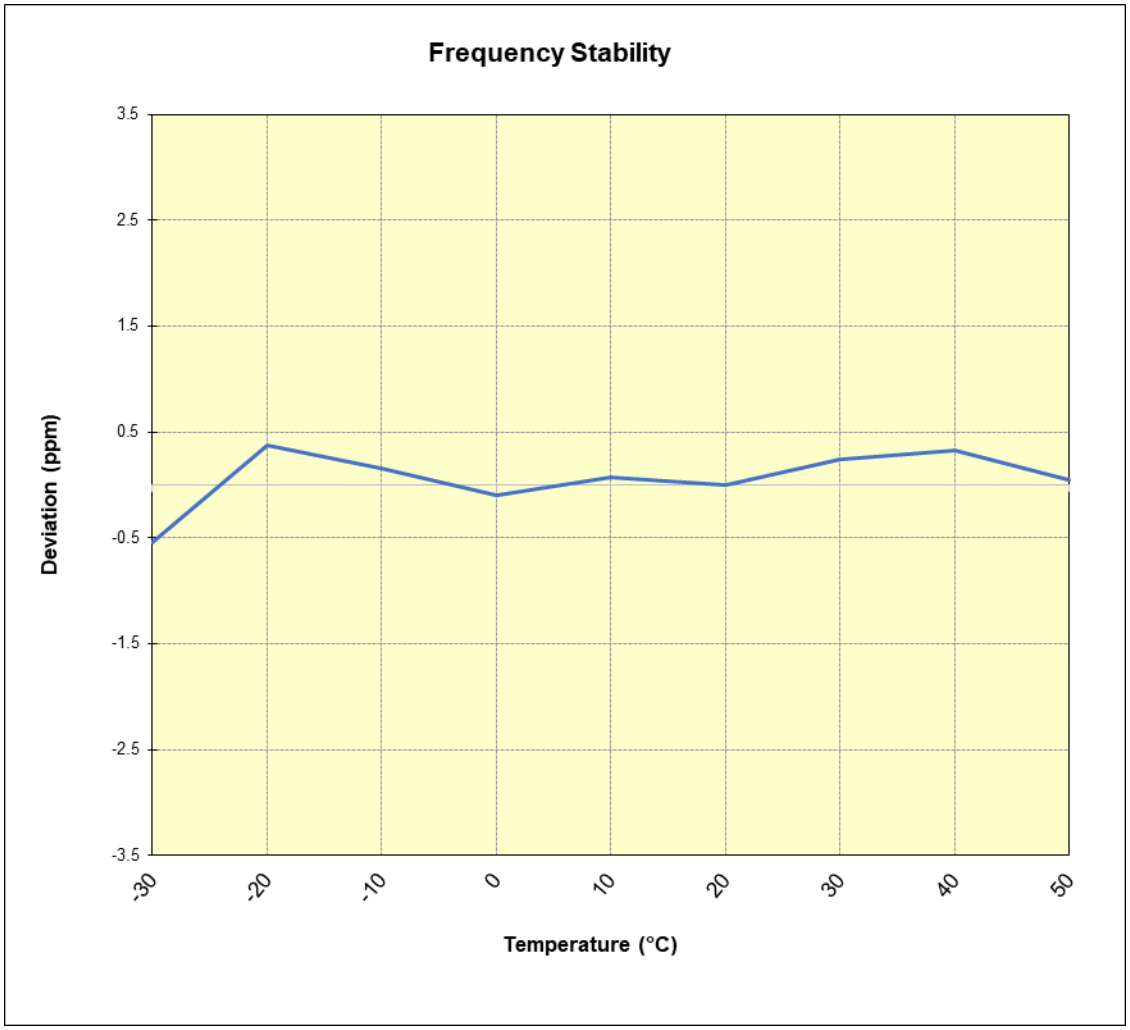


Figure 7-13. Frequency Stability Graph (Band 71)

NR Band n71 Frequency Stability Measurements

Operating Frequency (Hz):	680,500,000
Ref. Voltage (VDC):	4.18
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.18	- 30	680,500,173	151	0.0000222
		- 20	680,500,310	288	0.0000423
		- 10	680,499,965	-57	-0.0000084
		0	680,499,695	-327	-0.0000481
		+ 10	680,500,007	-15	-0.0000022
		+ 20 (Ref)	680,500,022	0	0.0000000
		+ 30	680,499,581	-441	-0.0000648
		+ 40	680,500,373	351	0.0000516
		+ 50	680,499,838	-184	-0.0000270
Battery Endpoint	2.98	+ 20	680,500,121	99	0.0000145

Table 7-48. Frequency Stability Data (NR Band n71)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

NR Band n71 Frequency Stability Measurements

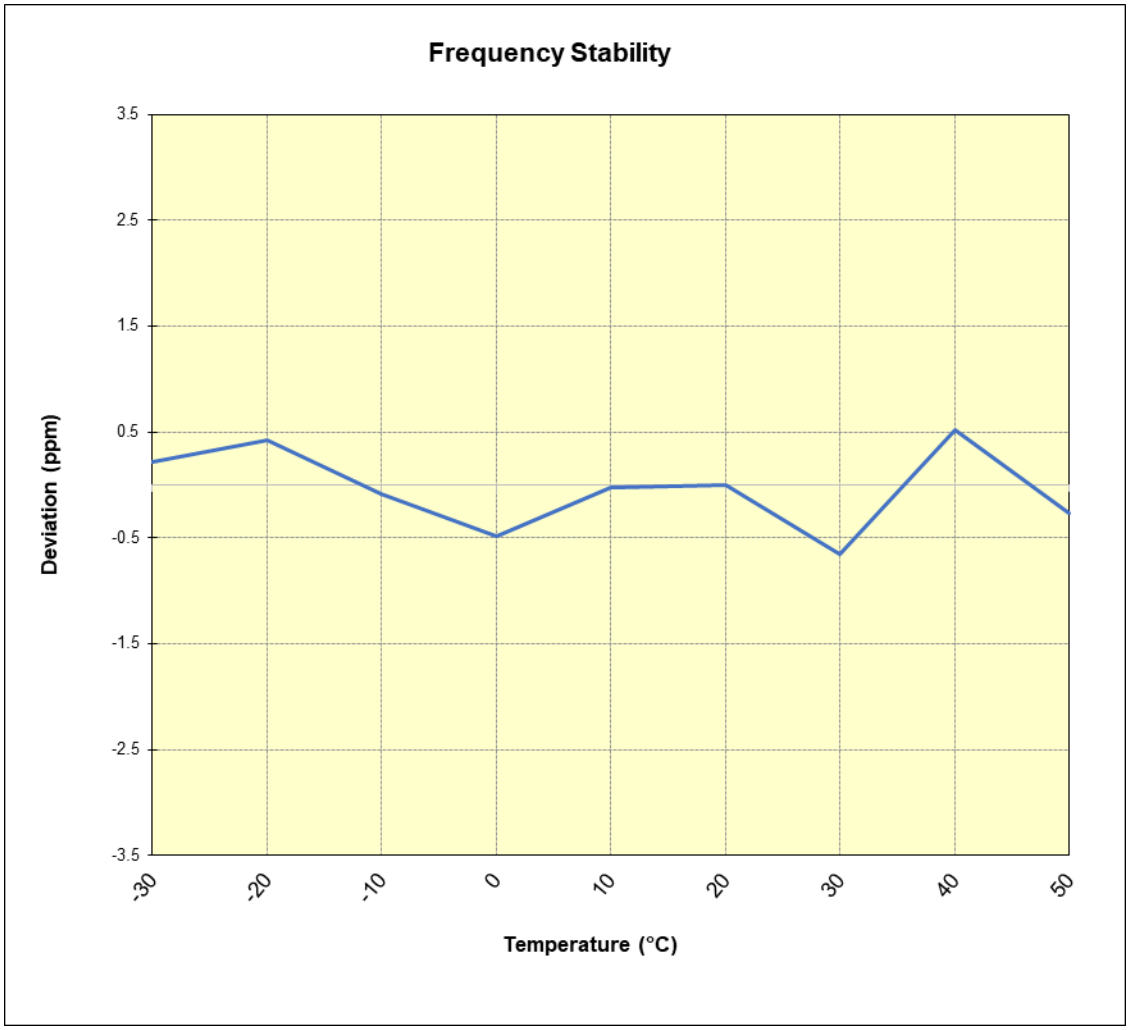


Figure 7-14. Frequency Stability Graph (NR Band n71)

Band 66/4 Frequency Stability Measurements

Operating Frequency (Hz):	1,745,000,000
Ref. Voltage (VDC):	4.18
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.18	- 30	1,744,999,703	-320	-0.0000183
		- 20	1,744,999,832	-191	-0.0000109
		- 10	1,744,999,933	-90	-0.0000052
		0	1,745,000,312	289	0.0000166
		+ 10	1,744,999,738	-285	-0.0000163
		+ 20 (Ref)	1,745,000,023	0	0.0000000
		+ 30	1,745,000,201	178	0.0000102
		+ 40	1,744,999,556	-467	-0.0000268
		+ 50	1,745,000,091	68	0.0000039
Battery Endpoint	2.98	+ 20	1,744,999,904	-119	-0.0000068

Table 7-49. Frequency Stability Data (Band 66/4)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

Band 66/4 Frequency Stability Measurements

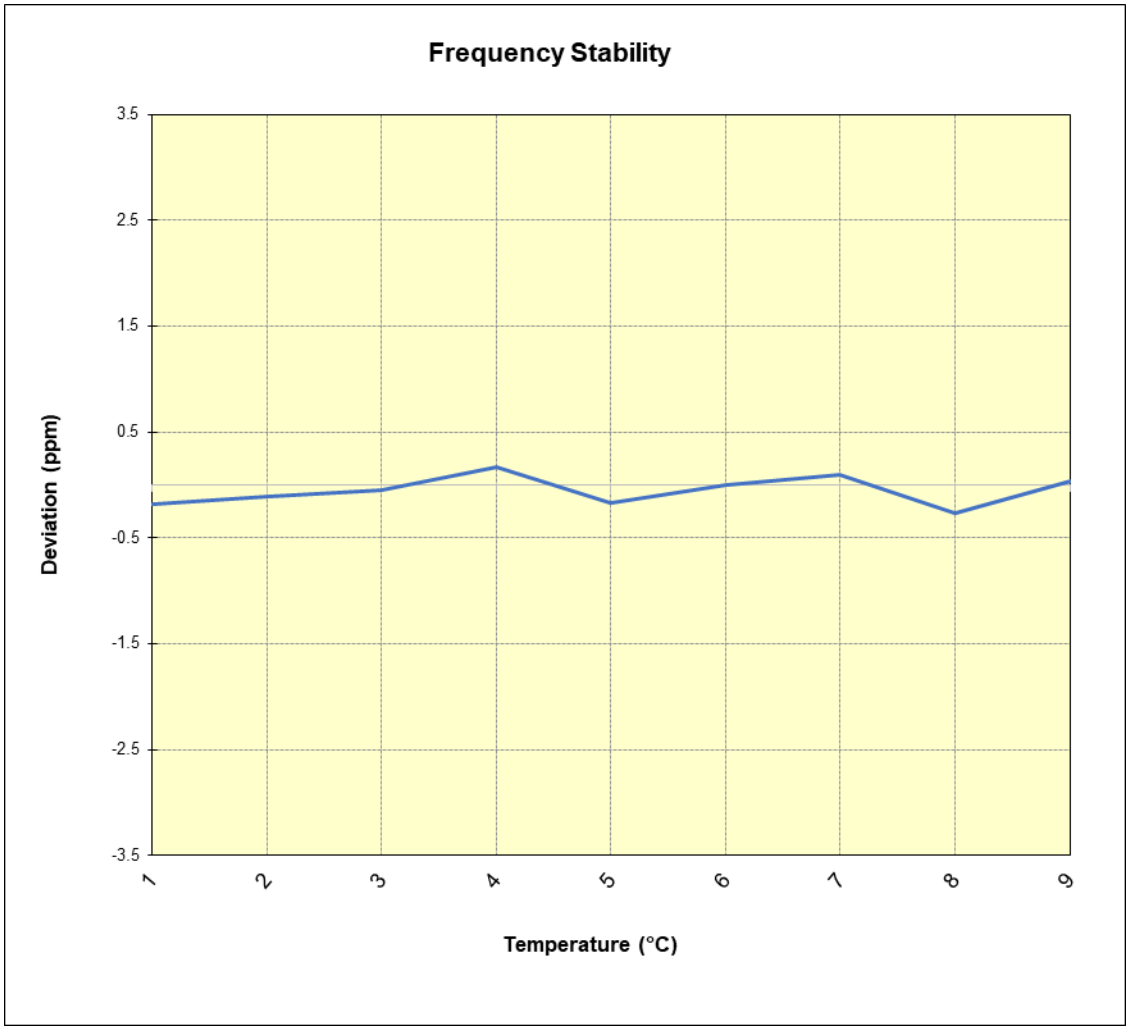


Figure 7-15. Frequency Stability Graph (Band 66/4)

NR Band n66 Frequency Stability Measurements

Operating Frequency (Hz):	1,745,000,000
Ref. Voltage (VDC):	4.18
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.18	- 30	1,745,000,251	240	0.0000138
		- 20	1,744,999,848	-163	-0.0000093
		- 10	1,744,999,901	-110	-0.0000063
		0	1,744,999,981	-30	-0.0000017
		+ 10	1,744,999,998	-13	-0.0000007
		+ 20 (Ref)	1,745,000,011	0	0.0000000
		+ 30	1,745,000,007	-4	-0.0000002
		+ 40	1,744,999,965	-46	-0.0000026
		+ 50	1,744,999,799	-212	-0.0000121
Battery Endpoint	2.98	+ 20	1,744,999,978	-33	-0.0000019

Table 7-50. Frequency Stability Data (NR Band n66)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

NR Band n66 Frequency Stability Measurements

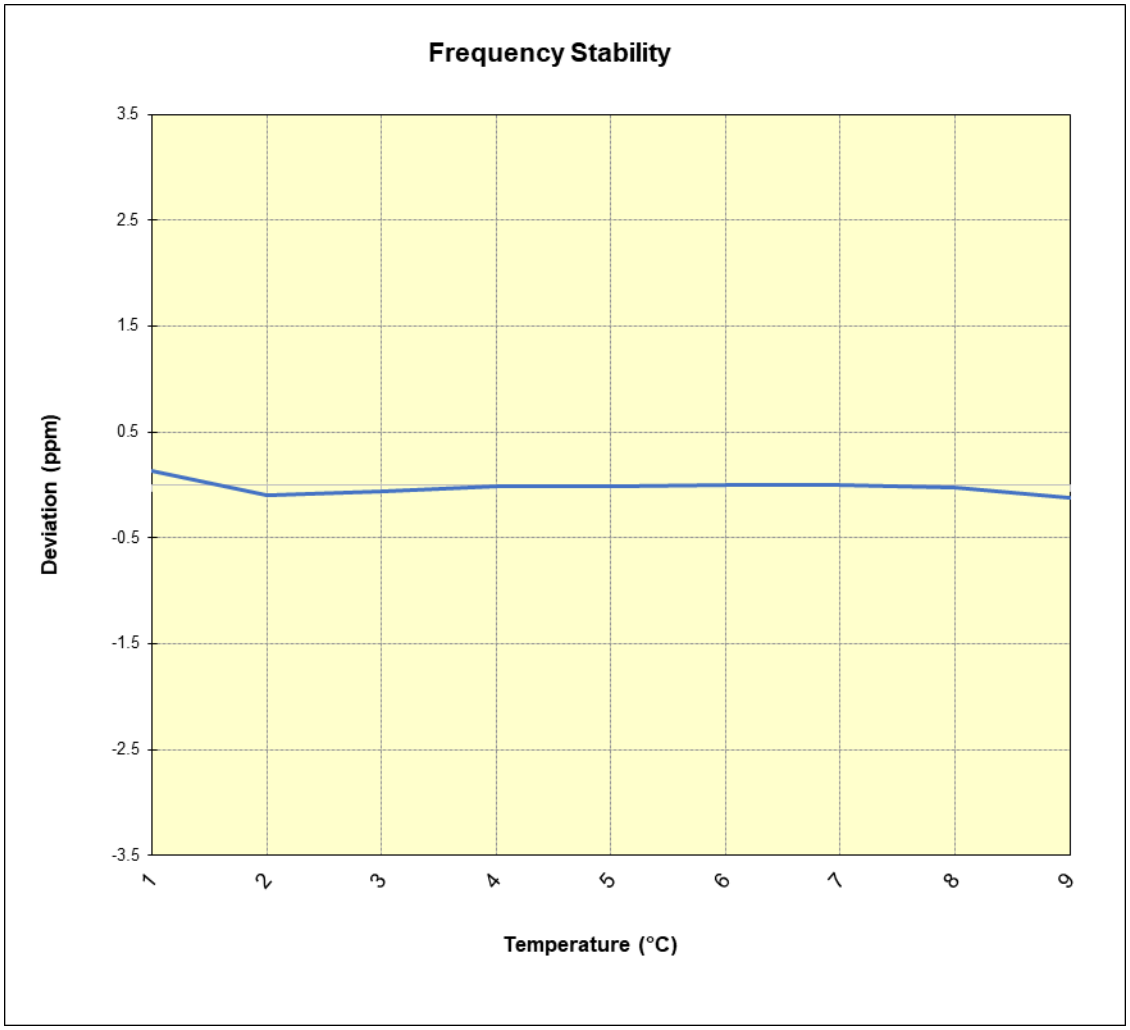


Figure 7-16. Frequency Stability Graph (NR Band n66)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG998U** complies with all the requirements of Part 27 of the FCC rules.