Plot 7-190. PAR Plot (NR Band n77 PC2 - 60MHz π/2 BPSK - Full RB)

Plot 7-191. PAR Plot (NR Band n77 PC2 - 60MHz CP-OFDM QPSK - Full RB)

Plot 7-192. PAR Plot (NR Band n77 PC2 - 60MHz CP-OFDM 256-QAM - Full RB)

Plot 7-193. PAR Plot (NR Band n77 PC2 - 50MHz π/2 BPSK - Full RB)

Plot 7-194. PAR Plot (NR Band n77 PC2 - 50MHz CP-OFDM QPSK - Full RB)

Plot 7-195. PAR Plot (NR Band n77 PC2 - 50MHz CP-OFDM 256-QAM - Full RB)

Plot 7-196. PAR Plot (NR Band n77 PC2 - 40MHz π/2 BPSK - Full RB)

Plot 7-197. PAR Plot (NR Band n77 PC2 - 40MHz CP-OFDM QPSK - Full RB)

Plot 7-198. PAR Plot (NR Band n77 PC2 - 40MHz CP-OFDM 256-QAM - Full RB)

Plot 7-199. PAR Plot (NR Band n77 PC2 - 30MHz π/2 BPSK - Full RB)

Plot 7-200. PAR Plot (NR Band n77 PC2 - 30MHz CP-OFDM QPSK - Full RB)

Plot 7-201. PAR Plot (NR Band n77 PC2 - 30MHz CP-OFDM 256-QAM - Full RB)

Plot 7-202. PAR Plot (NR Band n77 PC2 - 20MHz π/2 BPSK - Full RB)

Plot 7-203. PAR Plot (NR Band n77 PC2 - 20MHz CP-OFDM QPSK - Full RB)

Plot 7-204. PAR Plot (NR Band n77 PC2 - 20MHz CP-OFDM 256-QAM - Full RB)

7.7 Radiated Power (EIRP)

Test Overview

Equivalent Isotropic Radiated Power (EIRP) 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. Measurements on signals operating above 1GHz 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

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. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Setup

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

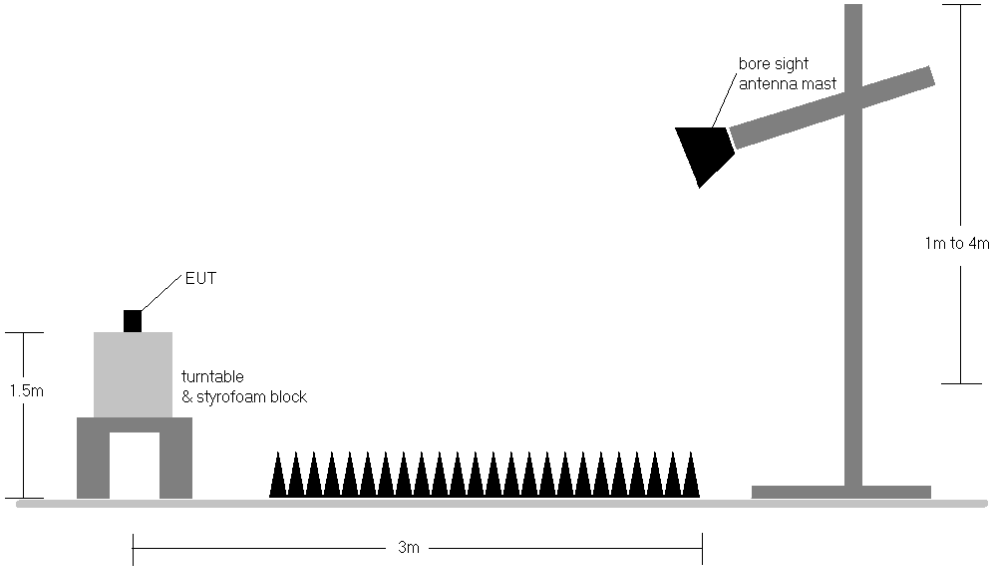


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

1) 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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
100 MHz	π/2 BPSK	3750.00	H	X	126	146	9.39	1 / 136	14.14	23.53	0.225	30.00	-6.47
		3840.00	H	X	102	147	9.46	1 / 68	15.25	**24.71**	0.296	30.00	-5.29
		3930.00	H	X	111	148	8.89	1 / 136	15.23	24.12	0.258	30.00	-5.88
	QPSK	3840.00	H	X	102	147	9.46	1 / 68	15.19	24.65	0.292	30.00	-5.35
	16-QAM	3840.00	H	X	102	147	9.46	1 / 68	14.06	23.52	0.225	30.00	-6.48
	64-QAM	3840.00	H	X	102	147	9.46	1 / 68	12.78	22.24	0.167	30.00	-7.76
	256-QAM	3840.00	H	X	102	147	9.46	1 / 68	11.07	20.53	0.113	30.00	-9.47
90 MHz	π/2 BPSK	3745.02	H	X	126	146	9.34	1 / 61	14.18	23.52	0.225	30.00	-6.48
		3840.00	H	X	102	147	9.46	1 / 61	15.38	**24.84**	0.305	30.00	-5.16
		3934.98	H	X	111	148	8.84	1 / 122	15.89	24.73	0.297	30.00	-5.27
	QPSK	3840.00	H	X	102	147	9.46	1 / 61	15.31	24.77	0.300	30.00	-5.23
	16-QAM	3840.00	H	X	102	147	9.46	1 / 61	14.09	23.55	0.226	30.00	-6.45
	64-QAM	3840.00	H	X	102	147	9.46	1 / 61	12.81	22.27	0.169	30.00	-7.73
	256-QAM	3840.00	H	X	102	147	9.46	1 / 61	11.66	21.11	0.129	30.00	-8.89
80 MHz	π/2 BPSK	3740.01	H	X	126	146	9.29	1 / 54	13.76	23.05	0.202	30.00	-6.95
		3840.00	H	X	102	147	9.46	1 / 162	15.77	**25.23**	0.334	30.00	-4.77
		3939.99	H	X	111	148	8.80	1 / 162	15.44	24.23	0.265	30.00	-5.77
	QPSK	3840.00	H	X	102	147	9.46	1 / 162	15.54	25.00	0.316	30.00	-5.00
	16-QAM	3840.00	H	X	102	147	9.46	1 / 162	14.49	23.95	0.248	30.00	-6.05
	64-QAM	3939.99	H	X	111	148	8.80	1 / 162	13.29	22.09	0.162	30.00	-7.91
	256-QAM	3740.01	H	X	126	146	9.29	1 / 54	10.90	20.19	0.105	30.00	-9.81
70 MHz	QPSK	3735.00	H	X	126	146	9.24	1 / 141	14.04	23.28	0.213	30.00	-6.72
		3840.00	H	X	102	147	9.46	1 / 141	15.74	**25.20**	0.331	30.00	-4.80
		3945.00	H	X	111	148	8.75	1 / 141	15.90	24.65	0.292	30.00	-5.35
	16-QAM	3840.00	H	X	102	147	9.46	1 / 141	13.85	23.31	0.214	30.00	-6.69
	64-QAM	3945.00	H	X	111	148	8.75	1 / 141	12.82	21.57	0.144	30.00	-8.43
	256-QAM	3840.00	H	X	102	147	9.46	1 / 141	11.65	21.10	0.129	30.00	-8.90
60 MHz	π/2 BPSK	3730.02	H	X	126	146	9.19	1 / 81	14.22	23.42	0.220	30.00	-6.58
		3840.00	H	X	102	147	9.46	1 / 40	14.95	24.41	0.276	30.00	-5.59
		3949.98	H	X	111	148	8.70	1 / 121	15.38	24.08	0.256	30.00	-5.92
	QPSK	3840.00	H	X	102	147	9.46	1 / 40	15.32	**24.78**	0.301	30.00	-5.22
	16-QAM	3840.00	H	X	102	147	9.46	1 / 40	13.76	23.22	0.210	30.00	-6.78
	64-QAM	3949.98	H	X	111	148	8.70	1 / 121	13.20	21.90	0.155	30.00	-8.10
	256-QAM	3840.00	H	X	102	147	9.46	1 / 40	10.31	19.76	0.095	30.00	-10.24
50 MHz	π/2 BPSK	3725.01	H	X	126	146	9.14	1 / 33	14.48	23.62	0.230	30.00	-6.38
		3840.00	H	X	102	147	9.46	1 / 33	15.17	**24.63**	0.290	30.00	-5.37
		3954.99	H	X	111	148	8.71	1 / 33	15.76	24.48	0.280	30.00	-5.52
	QPSK	3840.00	H	X	102	147	9.46	1 / 33	15.08	24.54	0.284	30.00	-5.46
	16-QAM	3840.00	H	X	102	147	9.46	1 / 33	13.63	23.09	0.204	30.00	-6.91
	64-QAM	3840.00	H	X	102	147	9.46	1 / 33	11.65	21.11	0.129	30.00	-8.89
	256-QAM	3840.00	H	X	102	147	9.46	1 / 33	10.53	19.99	0.100	30.00	-10.01
40 MHz	π/2 BPSK	3720.00	H	X	126	146	9.09	1 / 79	14.55	23.65	0.232	30.00	-6.35
		3840.00	H	X	102	147	9.46	1 / 79	15.72	**25.18**	0.330	30.00	-4.82
		3960.00	H	X	111	148	8.72	1 / 79	15.61	24.33	0.271	30.00	-5.67
	QPSK	3840.00	H	X	102	147	9.46	1 / 79	15.33	24.79	0.301	30.00	-5.21
	16-QAM	3840.00	H	X	102	147	9.46	1 / 79	13.57	23.02	0.201	30.00	-6.98
	64-QAM	3960.00	H	X	111	148	8.72	1 / 79	13.16	21.88	0.154	30.00	-8.12
	256-QAM	3840.00	H	X	102	147	9.46	1 / 79	10.81	20.27	0.106	30.00	-9.73
30 MHz	π/2 BPSK	3715.02	H	X	126	146	9.04	1 / 39	14.05	23.10	0.204	30.00	-6.90
		3840.00	H	X	102	147	9.46	1 / 19	15.27	24.73	0.297	30.00	-5.27
		3964.98	H	X	111	148	8.73	1 / 58	16.24	**24.98**	0.315	30.00	-5.02
	QPSK	3964.98	H	X	111	148	8.73	1 / 58	16.17	24.91	0.310	30.00	-5.09
	16-QAM	3840.00	H	X	102	147	9.46	1 / 19	13.83	23.28	0.213	30.00	-6.72
	64-QAM	3964.98	H	X	111	148	8.73	1 / 58	12.72	21.46	0.140	30.00	-8.54
	256-QAM	3964.98	H	X	111	148	8.73	1 / 58	11.45	20.19	0.104	30.00	-9.81
20 MHz	π/2 BPSK	3710.01	H	X	126	146	8.99	1 / 25	14.20	23.19	0.209	30.00	-6.81
		3840.00	H	X	102	147	9.46	1 / 13	15.83	25.29	0.338	30.00	-4.71
		3969.99	H	X	111	148	8.74	1 / 13	15.68	24.43	0.277	30.00	-5.57
	QPSK	3840.00	H	X	102	147	9.46	1 / 13	15.86	**25.32**	0.340	30.00	-4.68
	16-QAM	3840.00	H	X	102	147	9.46	1 / 13	14.43	23.88	0.245	30.00	-6.12
	64-QAM	3969.99	H	X	111	148	8.74	1 / 13	13.76	22.51	0.178	30.00	-7.49
	256-QAM	3710.01	H	X	126	146	8.99	1 / 25	11.67	20.67	0.117	30.00	-9.33
100 MHz	QPSK (CP-OFDM)	3840.0	H	X	102	147	9.46	1 / 68	13.77	23.23	0.210	30.00	-6.77
	QPSK (Closed)	3840.0	H	X	101	40	9.46	1 / 68	10.08	19.54	0.090	30.00	-10.46
	QPSK (Opposite Pol.)	3840.0	V	X	383	212	9.66	1 / 68	11.66	21.32	0.135	30.00	-8.68
	QPSK (WCP)	3840.0	H	X	113	135	9.46	1 / 68	11.48	20.94	0.124	30.00	-9.06

Table 7-10. EIRP Data (NR Band n77 PC2 – C-Band – SRS-1)

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]
100 MHz	π/2 BPSK	3500.01	H	X	115	45	9.28	1 / 204	11.22	20.50	0.112	30.00	-9.50
	QPSK	3500.01	H	X	115	45	9.28	1 / 204	11.58	**20.86**	0.122	30.00	-9.14
	16-QAM	3500.01	H	X	115	45	9.28	1 / 204	9.92	19.20	0.083	30.00	-10.80
	64-QAM	3500.01	H	X	115	45	9.28	1 / 204	8.36	17.64	0.058	30.00	-12.36
	256-QAM	3500.01	H	X	115	45	9.28	1 / 204	6.27	15.55	0.036	30.00	-14.45
90 MHz	π/2 BPSK	3495.00	H	X	115	45	9.27	1 / 122	11.06	20.33	0.108	30.00	-9.67
		3500.01	H	X	115	45	9.28	1 / 122	11.39	**20.66**	0.117	30.00	-9.34
		3504.99	H	X	115	45	9.24	1 / 122	11.38	20.63	0.116	30.00	-9.37
	QPSK	3500.01	H	X	115	45	9.28	1 / 122	11.24	20.52	0.113	30.00	-9.48
	16-QAM	3495.00	H	X	115	45	9.27	1 / 122	9.83	19.10	0.081	30.00	-10.90
	64-QAM	3500.01	H	X	115	45	9.28	1 / 122	8.44	17.72	0.059	30.00	-12.28
	256-QAM	3495.00	H	X	115	45	9.27	1 / 122	6.31	15.57	0.036	30.00	-14.43
80 MHz	π/2 BPSK	3490.02	H	X	115	45	9.26	1 / 54	10.95	20.21	0.105	30.00	-9.79
		3500.01	H	X	115	45	9.28	1 / 54	10.79	20.07	0.102	30.00	-9.93
		3510.00	H	X	115	45	9.21	1 / 54	10.97	20.18	0.104	30.00	-9.82
	QPSK	3500.01	H	X	115	45	9.28	1 / 54	11.51	**20.79**	0.120	30.00	-9.21
	16-QAM	3510.00	H	X	115	45	9.21	1 / 54	10.00	19.21	0.083	30.00	-10.79
	64-QAM	3510.00	H	X	115	45	9.21	1 / 54	7.80	17.01	0.050	30.00	-12.99
	256-QAM	3510.00	H	X	115	45	9.21	1 / 54	6.42	15.63	0.037	30.00	-14.37
70 MHz	QPSK	3485.01	H	X	115	45	9.25	1 / 141	11.76	21.01	0.126	30.00	-8.99
		3500.01	H	X	115	45	9.28	1 / 141	11.71	20.98	0.125	30.00	-9.02
		3514.98	H	X	115	45	9.18	1 / 141	11.85	**21.03**	0.127	30.00	-8.97
	16-QAM	3514.98	H	X	115	45	9.18	1 / 141	10.02	19.20	0.083	30.00	-10.80
	64-QAM	3514.98	H	X	115	45	9.18	1 / 141	8.11	17.29	0.054	30.00	-12.71
	256-QAM	3500.01	H	X	115	45	9.28	1 / 141	4.72	13.99	0.025	30.00	-16.01
60 MHz	π/2 BPSK	3480.00	H	X	115	45	9.24	1 / 40	11.06	20.30	0.107	30.00	-9.70
		3500.01	H	X	115	45	9.28	1 / 40	10.96	20.23	0.106	30.00	-9.77
		3519.99	H	X	115	45	9.15	1 / 121	11.13	20.27	0.106	30.00	-9.73
	QPSK	3480.00	H	X	115	45	9.24	1 / 40	11.38	**20.63**	0.116	30.00	-9.37
	16-QAM	3519.99	H	X	115	45	9.15	1 / 121	10.67	19.81	0.096	30.00	-10.19
	64-QAM	3519.99	H	X	115	45	9.15	1 / 121	8.89	18.04	0.064	30.00	-11.96
	256-QAM	3480.00	H	X	115	45	9.24	1 / 40	6.13	15.37	0.034	30.00	-14.63
50 MHz	π/2 BPSK	3475.02	H	X	115	45	9.24	1 / 66	11.36	20.60	0.115	30.00	-9.40
		3500.01	H	X	115	45	9.28	1 / 66	11.52	**20.80**	0.120	30.00	-9.20
		3525.00	H	X	115	45	9.11	1 / 66	11.56	20.67	0.117	30.00	-9.33
	QPSK	3500.01	H	X	115	45	9.28	1 / 66	11.10	20.38	0.109	30.00	-9.62
	16-QAM	3500.01	H	X	115	45	9.28	1 / 66	9.66	18.93	0.078	30.00	-11.07
	64-QAM	3500.01	H	X	115	45	9.28	1 / 66	8.38	17.66	0.058	30.00	-12.34
	256-QAM	3500.01	H	X	115	45	9.28	1 / 66	6.64	15.92	0.039	30.00	-14.08
40 MHz	π/2 BPSK	3470.01	H	X	115	45	9.23	1 / 53	11.54	20.77	0.119	30.00	-9.23
		3500.01	H	X	115	45	9.28	1 / 53	11.32	20.59	0.115	30.00	-9.41
		3529.98	H	X	115	45	9.08	1 / 53	11.29	20.37	0.109	30.00	-9.63
	QPSK	3470.01	H	X	115	45	9.23	1 / 53	11.67	**20.90**	0.123	30.00	-9.10
	16-QAM	3470.01	H	X	115	45	9.23	1 / 53	10.11	19.34	0.086	30.00	-10.66
	64-QAM	3470.01	H	X	115	45	9.23	1 / 53	6.54	15.77	0.038	30.00	-14.23
	256-QAM	3470.01	H	X	115	45	9.23	1 / 53	6.61	15.84	0.038	30.00	-14.16
30 MHz	π/2 BPSK	3465.00	H	X	115	45	9.22	1 / 39	11.22	20.45	0.111	30.00	-9.55
		3500.01	H	X	115	45	9.28	1 / 39	11.08	20.36	0.109	30.00	-9.64
		3534.99	H	X	115	45	9.05	1 / 58	11.59	**20.64**	0.116	30.00	-9.36
	QPSK	3465.00	H	X	115	45	9.22	1 / 39	11.30	20.52	0.113	30.00	-9.48
	16-QAM	3500.01	H	X	115	45	9.28	1 / 39	10.21	19.49	0.089	30.00	-10.51
	64-QAM	3534.99	H	X	115	45	9.05	1 / 58	8.02	17.07	0.051	30.00	-12.93
	256-QAM	3465.00	H	X	115	45	9.22	1 / 39	7.43	16.65	0.046	30.00	-13.35
20 MHz	π/2 BPSK	3460.02	H	X	115	45	9.21	1 / 37	11.57	20.78	0.120	30.00	-9.22
		3500.01	H	X	115	45	9.28	1 / 37	11.46	20.73	0.118	30.00	-9.27
		3540.00	H	X	115	45	9.02	1 / 37	11.63	20.65	0.116	30.00	-9.35
	QPSK	3460.02	H	X	115	45	9.21	1 / 37	11.76	**20.98**	0.125	30.00	-9.02
	16-QAM	3460.02	H	X	115	45	9.21	1 / 37	10.49	19.71	0.093	30.00	-10.29
	64-QAM	3540.00	H	X	115	45	9.02	1 / 37	7.87	16.88	0.049	30.00	-13.12
	256-QAM	3460.02	H	X	115	45	9.21	1 / 37	7.60	16.82	0.048	30.00	-13.18
100 MHz	QPSK (CP-OFDM)	3500.01	H	X	115	45	9.28	1 / 204	9.41	18.69	0.074	30.00	-11.31
	QPSK (Closed)	3500.01	H	Z	147	326	9.28	1 / 204	6.73	16.01	0.040	30.00	-13.99
	QPSK (Opposite Pol.)	3500.01	V	Y	118	277	9.28	1 / 204	11.16	20.44	0.111	30.00	-9.56
	QPSK (WCP)	3500.01	H	X	122	38	9.28	1 / 204	9.29	18.57	0.072	30.00	-11.43

Table 7-11. EIRP Data (NR Band n77 PC2 – DoD-Band – SRS-1)

7.8 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 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

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

Test Setup

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

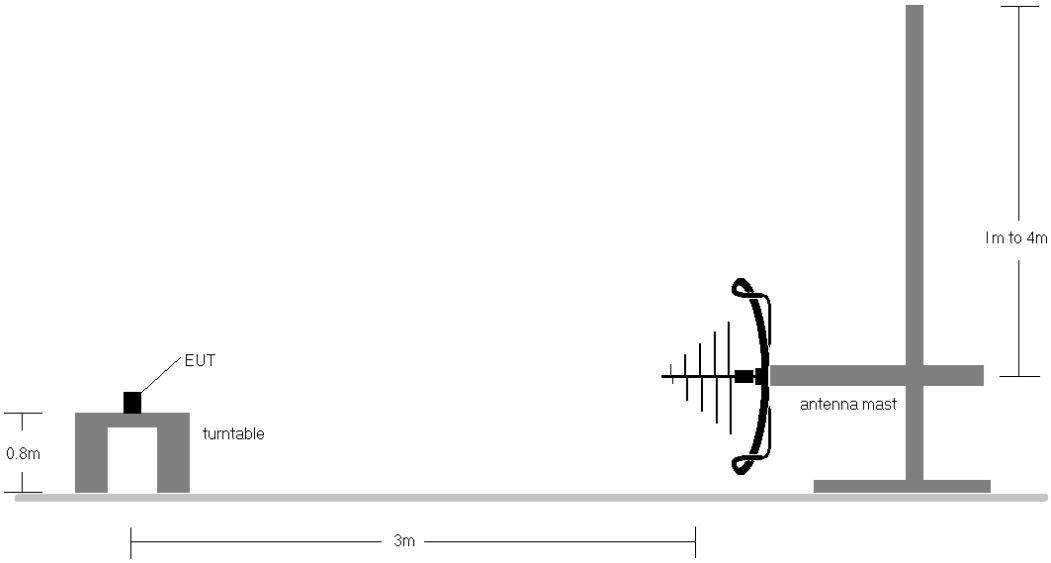


Figure 7-7. Test Instrument & Measurement Setup < 1GHz

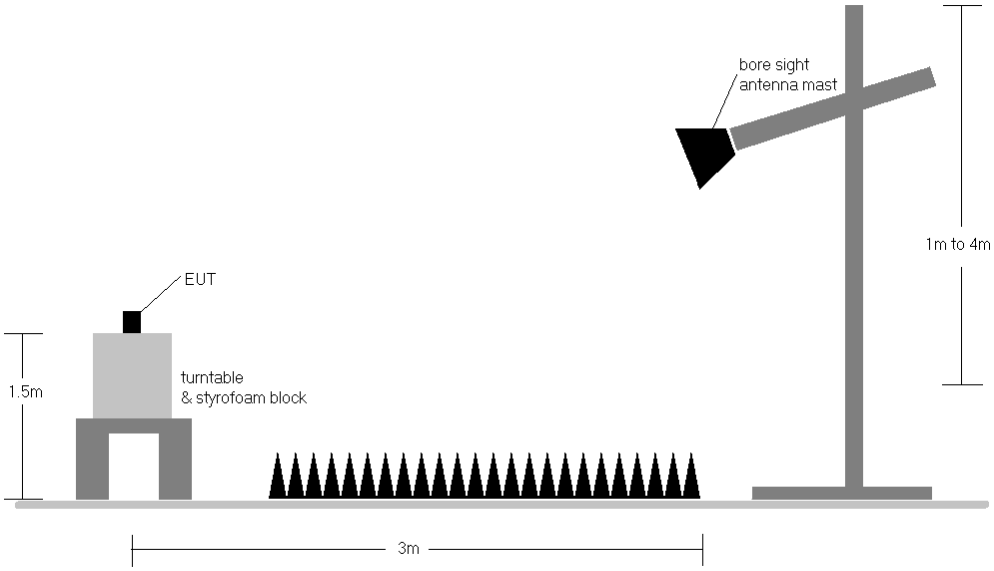


Figure 7-8. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in 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.

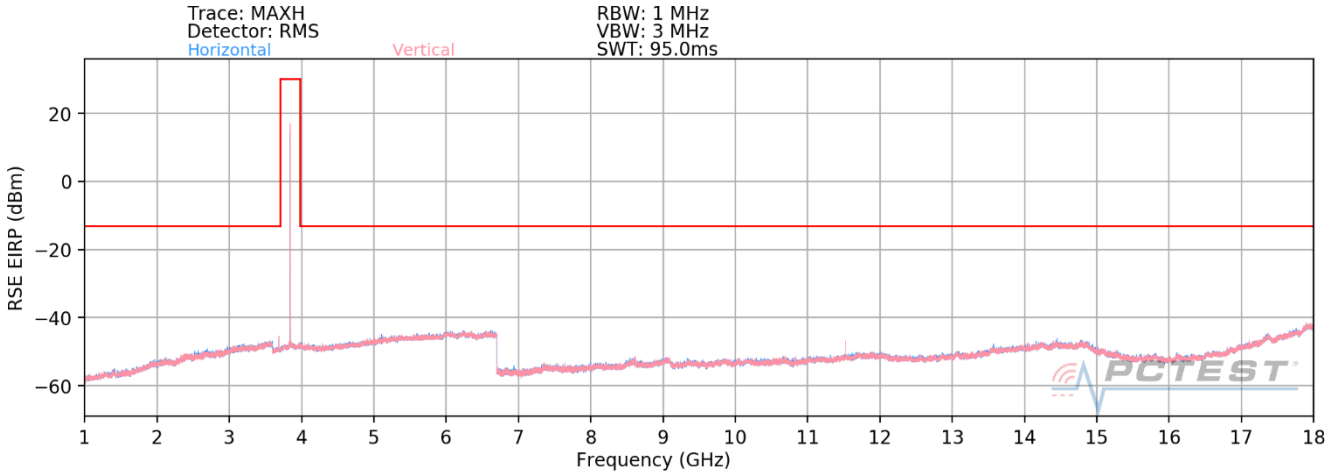
8) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results were determined to occur with the DFT-s-OFDM transmission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

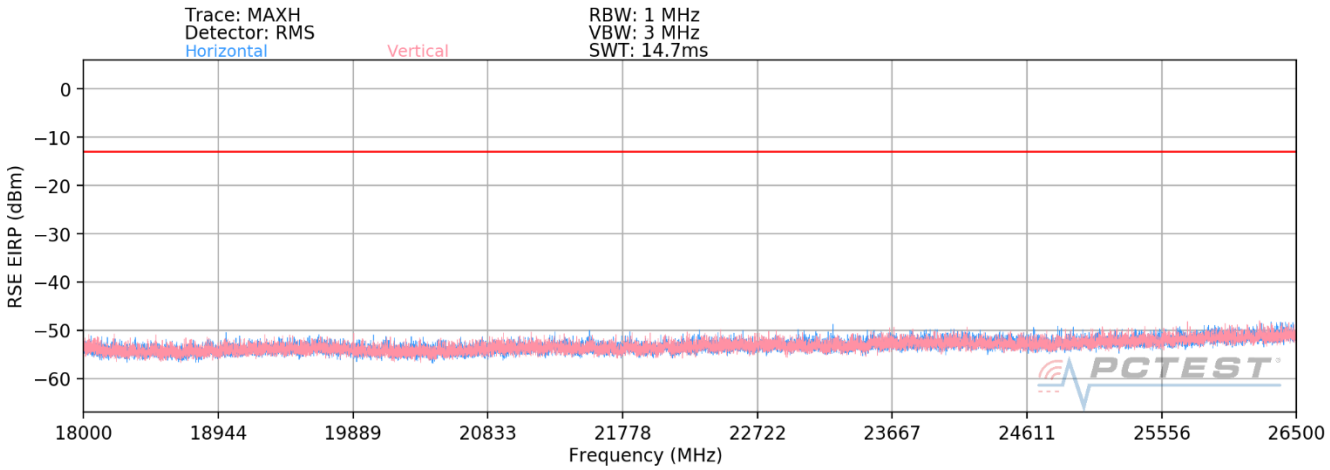
10) No significant emissions were found above 18 GHz.

11) For operation in DoD Band (3450-3550MHz), the maximum channel bandwidth (100 MHz) occupies the entirety of the band. Therefore, radiated spurious emission data for DoD Band operation is provided for only this single maximum-bandwidth channel. However, multiple RB configurations and offsets were investigated within this channel, and the worst case results are displayed.

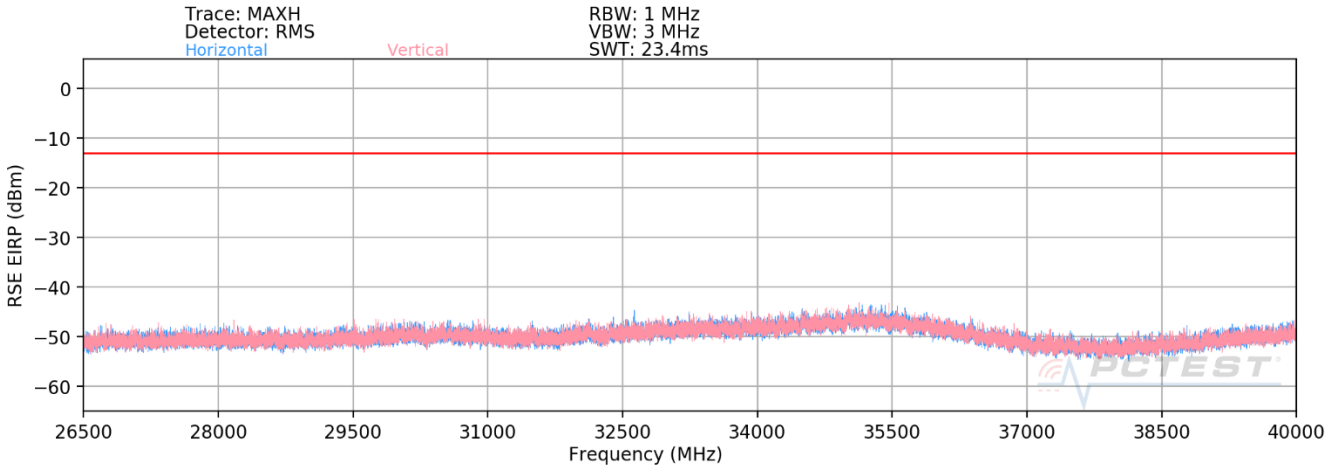
NR Band n77 (PC2) – C-Band – SRS-1



Plot 7-205. Radiated Spurious Plot - 1-18 GHz (NR Band n77 PC2)



Plot 7-206. Radiated Spurious Plot - 18-26.5 GHz (NR Band n77 PC2)



Plot 7-207. Radiated Spurious Plot - 26.5-40 GHz (NR Band n77 PC2)

Bandwidth (MHz):	100
Frequency (MHz):	3750.0
RB / Offset:	1/136

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]
7500.0	H	164	320	-75.34	9.76	41.42	-53.84	-13.00	-40.84
11250.0	H	323	314	-70.04	12.51	49.47	-45.79	-13.00	-32.79
15000.0	H	-	-	-81.39	15.66	41.27	-53.98	-13.00	-40.98

Table 7-12. Radiated Spurious Data (NR Band n77 PC2– Low Channel)

Bandwidth (MHz):	100
Frequency (MHz):	3840.0
RB / Offset:	1/136

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]
7680.0	H	145	327	-78.67	9.12	37.45	-57.81	-13.00	-44.81
11520.0	H	184	294	-70.75	13.77	50.02	-45.24	-13.00	-32.24
15360.0	H	-	-	-81.63	13.91	39.28	-55.98	-13.00	-42.98

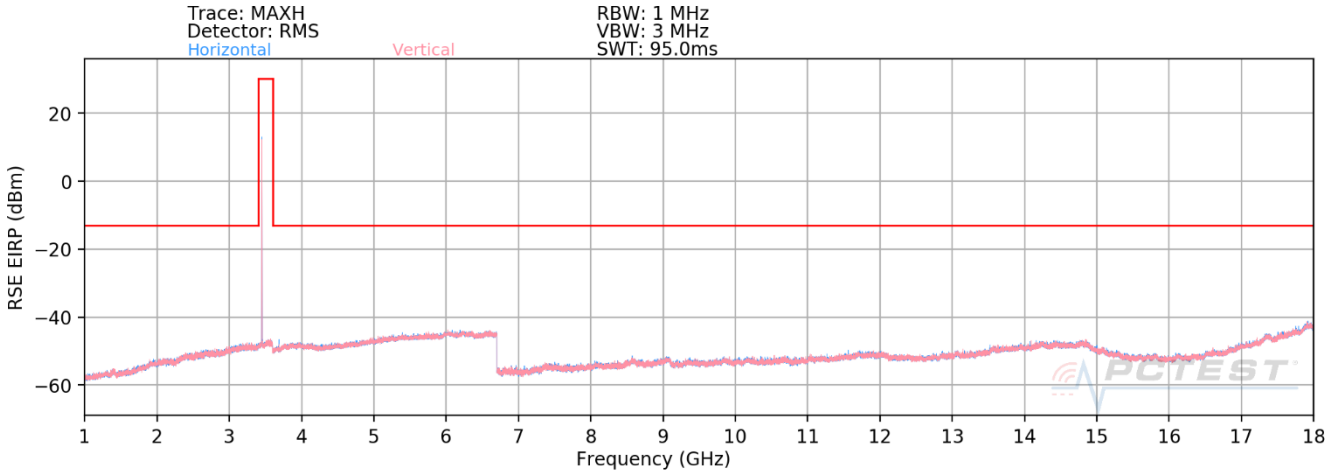
Table 7-13. Radiated Spurious Data (NR Band n77 PC2 – Mid Channel)

Bandwidth (MHz):	100
Frequency (MHz):	3930.0
RB / Offset:	1/136

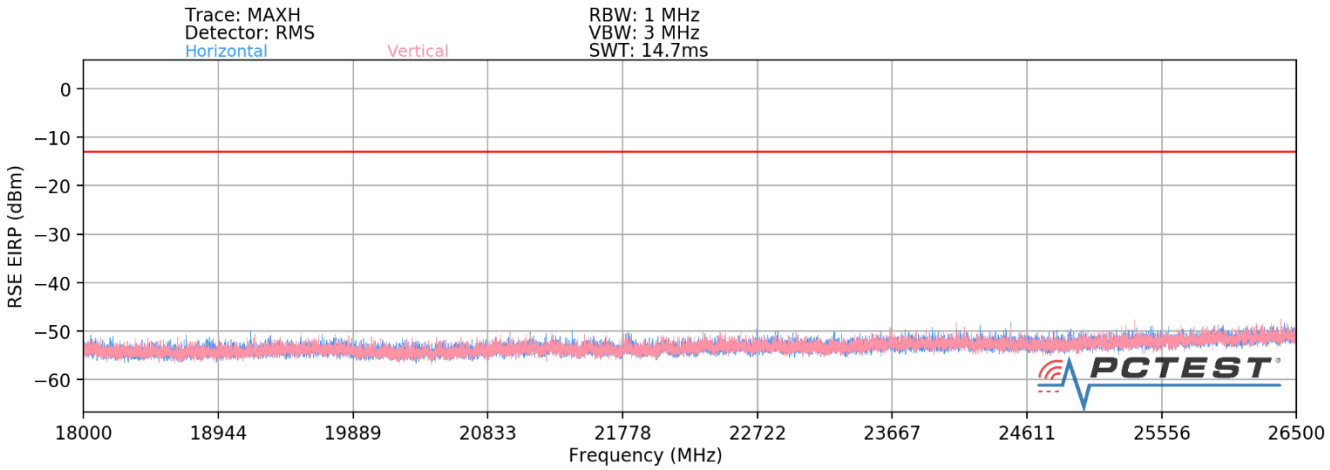
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7860.0	H	147	324	-76.24	9.93	40.69	-54.56	-13.00	-41.56
11790.0	H	117	299	-69.59	14.12	51.53	-43.73	-13.00	-30.73
15720.0	H	-	-	-81.81	14.30	39.49	-55.76	-13.00	-42.76

Table 7-14. Radiated Spurious Data (NR Band n77 PC2 – High Channel)

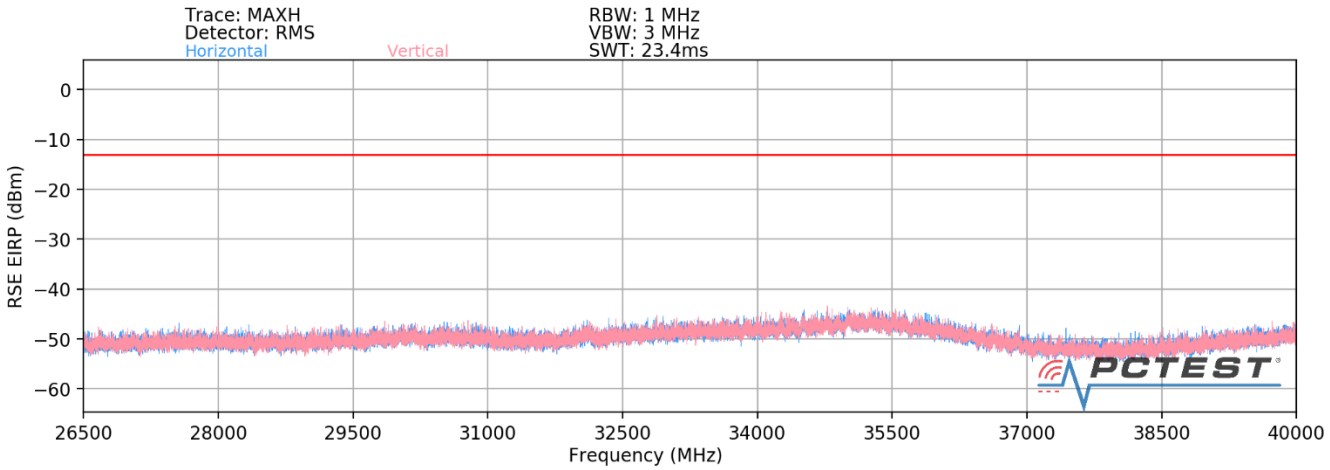
NR Band n77 (PC2) – DoD-Band – SRS-1



Plot 7-208. Radiated Spurious Plot - 1-18 GHz (NR Band n77 PC2)



Plot 7-209. Radiated Spurious Plot - 18-26.5 GHz (NR Band n77 PC2)



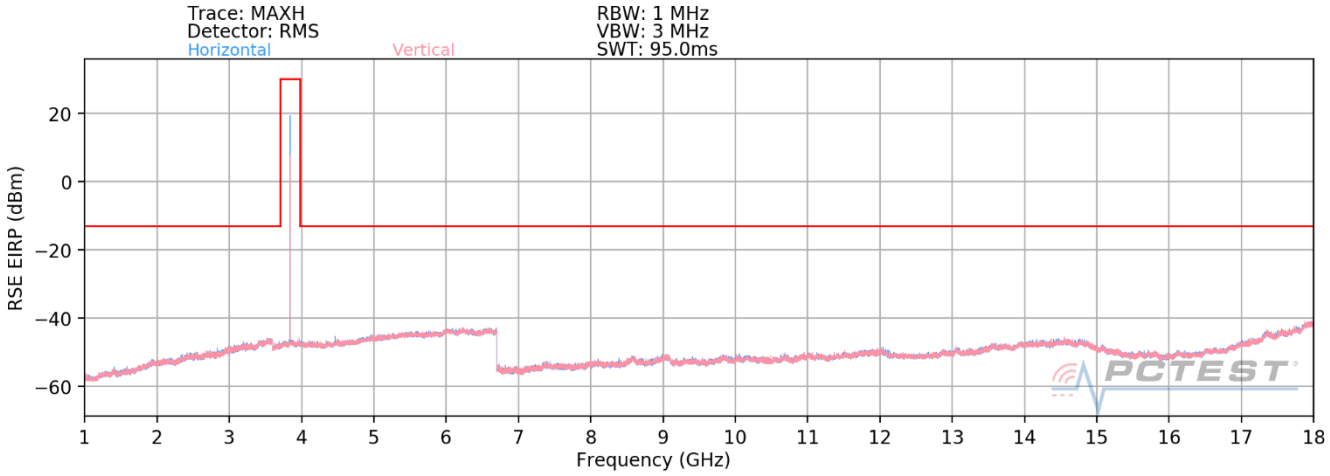
Plot 7-210. Radiated Spurious Plot - 26.5-40 GHz (NR Band n77 PC2)

Bandwidth (MHz):	100
Frequency (MHz):	3500.0
RB / Offset:	1/136

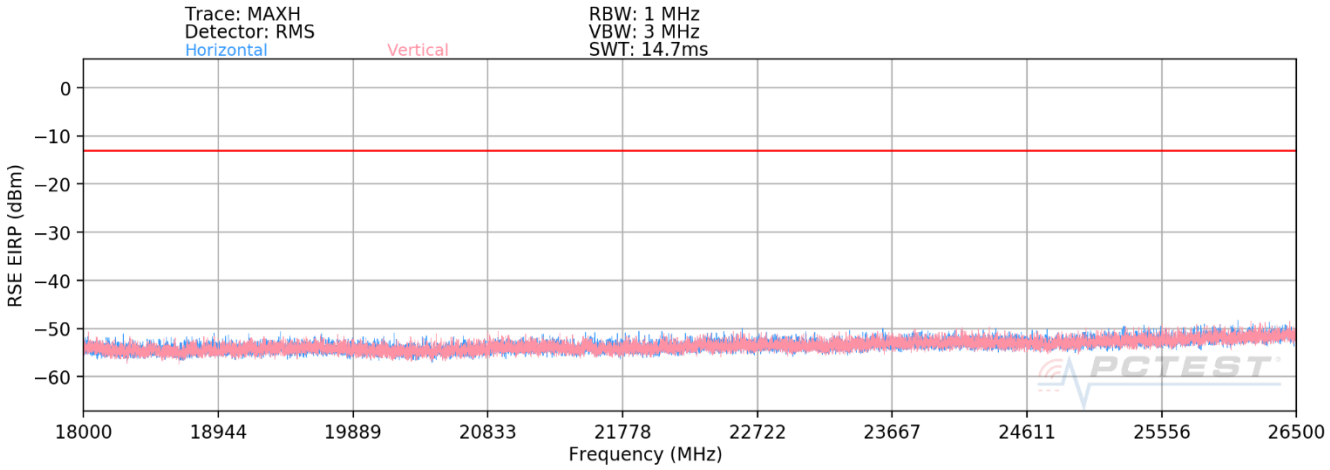
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7000.0	H	167	30	-76.70	8.09	38.39	-56.86	-13.00	-43.86
10500.0	H	230	27	-67.68	11.90	51.22	-44.04	-13.00	-31.04
14000.0	H	-	-	-81.43	16.25	41.82	-53.44	-13.00	-40.44
17500.0	H	-	-	-81.40	17.88	43.48	-51.78	-13.00	-38.78

Table 7-15. Radiated Spurious Data (NR Band n77 PC2 – Mid Channel)

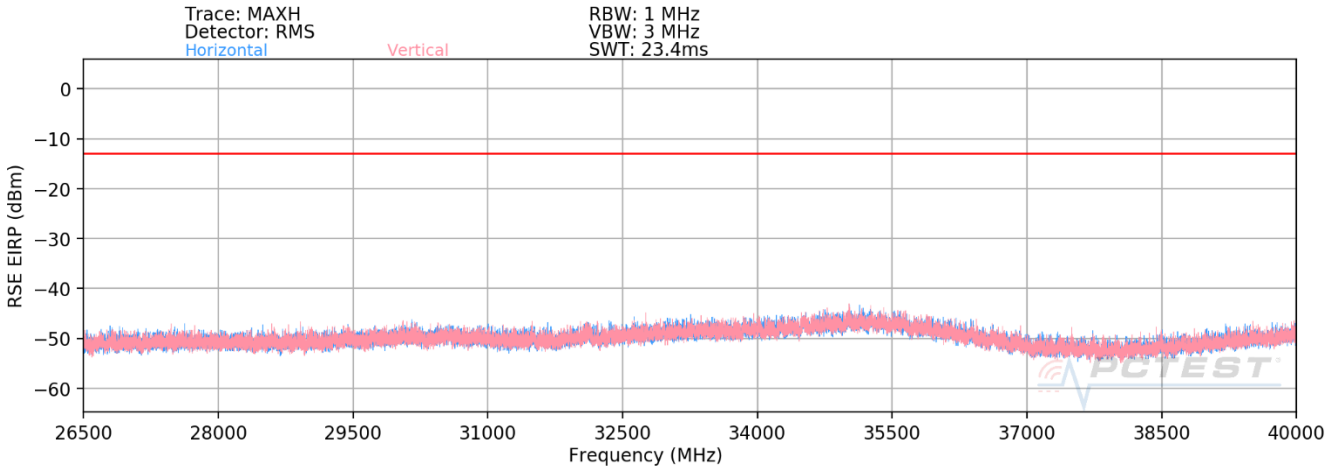
NR Band n77 (PC2) – C-Band – SRS-2



Plot 7-211. Radiated Spurious Plot - 1-18 GHz (NR Band n77 PC2)



Plot 7-212. Radiated Spurious Plot - 18-26.5 GHz (NR Band n77 PC2)



Plot 7-213. Radiated Spurious Plot - 26.5-40 GHz (NR Band n77 PC2)

Bandwidth (MHz):	100
Frequency (MHz):	3750.0
RB / Offset:	1 / 136

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]
7500.0	H	278	18	-79.54	9.76	37.22	-58.04	-13.00	-45.04
11250.0	H	-	-	-81.84	12.51	37.67	-57.59	-13.00	-44.59
15000.0	H	-	-	-82.35	15.66	40.31	-54.94	-13.00	-41.94

Table 7-16. Radiated Spurious Data (NR Band n77 PC2– Low Channel)

Bandwidth (MHz):	100
Frequency (MHz):	3840.0
RB / Offset:	1 / 136

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]
7680.0	H	112	139	-75.99	9.12	40.13	-55.13	-13.00	-42.13
11520.0	H	-	-	-82.09	13.77	38.68	-56.58	-13.00	-43.58
15360.0	H	-	-	-82.70	13.91	38.21	-57.05	-13.00	-44.05

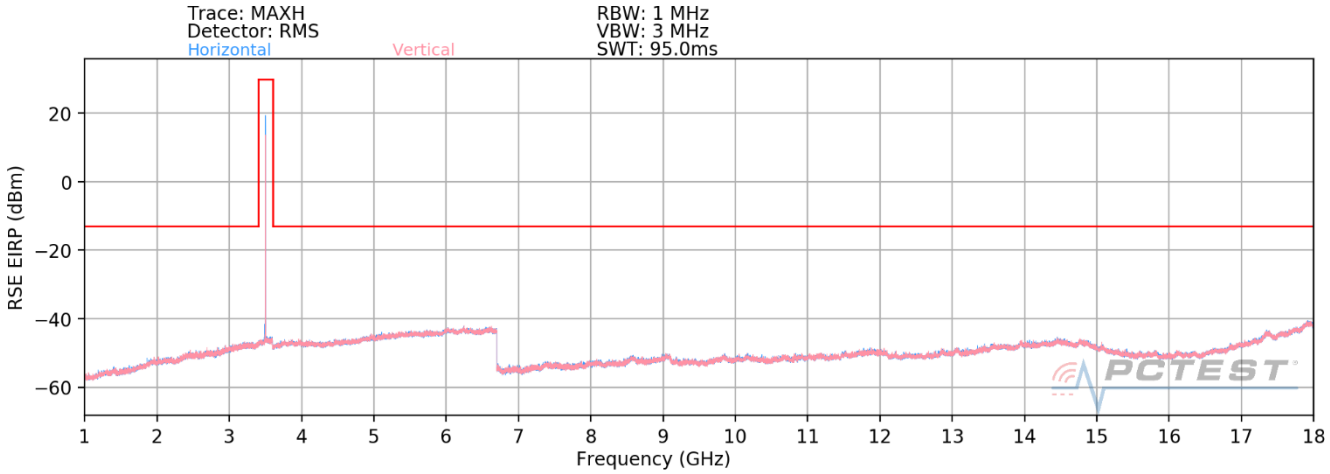
Table 7-17. Radiated Spurious Data (NR Band n77 PC2 – Mid Channel)

Bandwidth (MHz):	100
Frequency (MHz):	3930.0
RB / Offset:	1 / 136

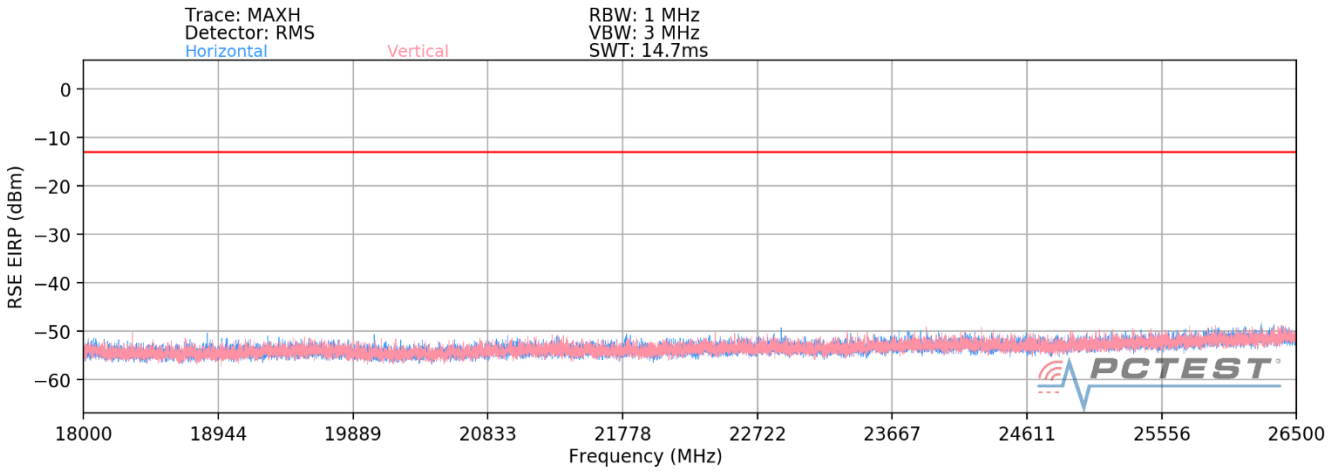
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7860.0	H	360	30	-78.74	9.93	38.19	-57.06	-13.00	-44.06
11790.0	H	-	-	-82.28	14.12	38.84	-56.42	-13.00	-43.42
15720.0	H	-	-	-82.93	14.30	38.37	-56.88	-13.00	-43.88

Table 7-18. Radiated Spurious Data (NR Band n77 PC2 – High Channel)

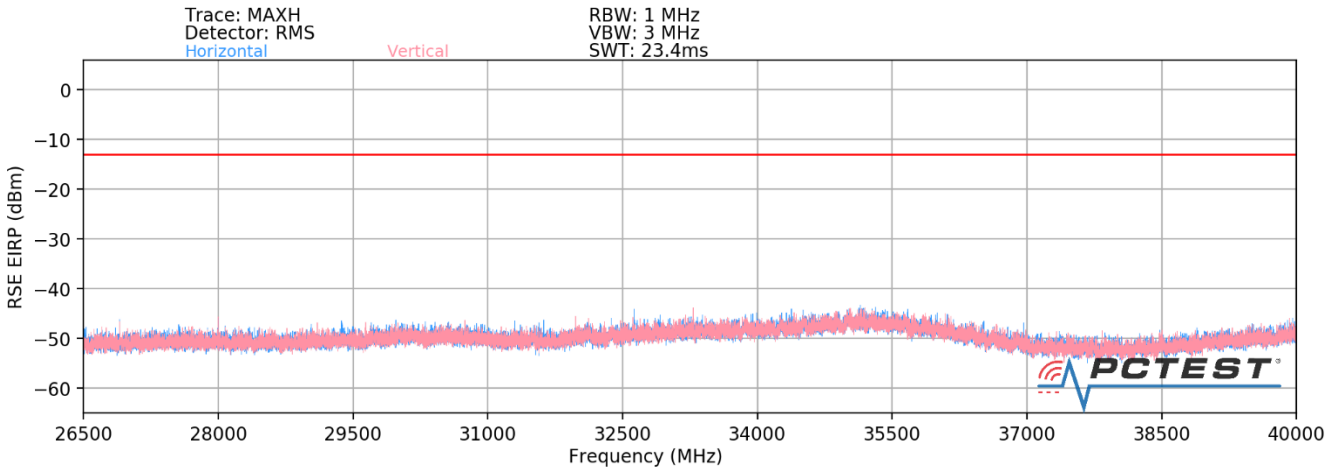
NR Band n77 (PC2) – DoD-Band – SRS-2



Plot 7-214. Radiated Spurious Plot - 1-18 GHz (NR Band n77 PC2)



Plot 7-215. Radiated Spurious Plot - 18-26.5 GHz (NR Band n77 PC2)



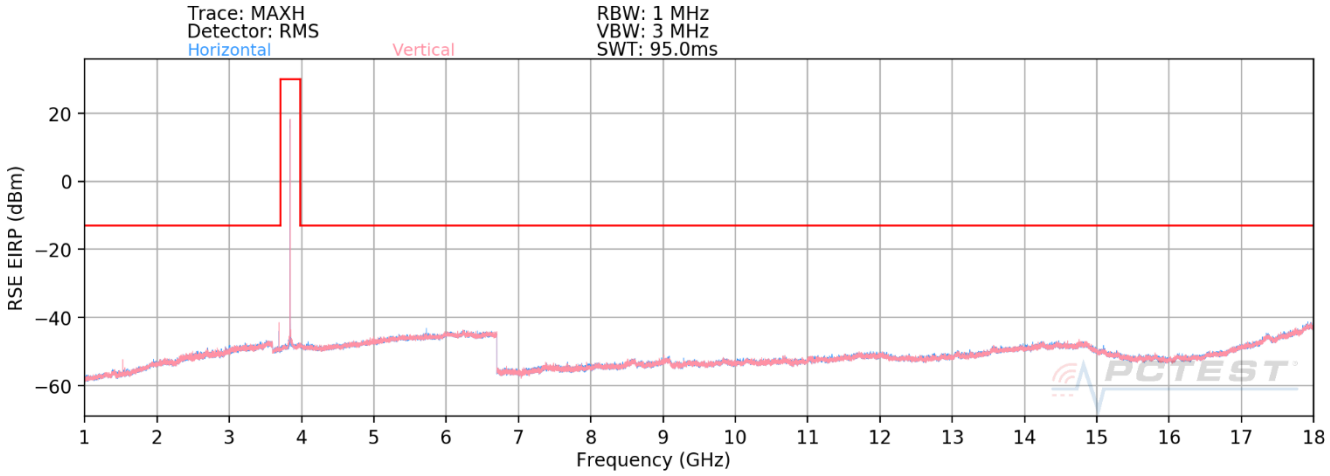
Plot 7-216. Radiated Spurious Plot - 26.5-40 GHz (NR Band n77 PC2)

Bandwidth (MHz):	100
Frequency (MHz):	3500.0
RB / Offset:	1 / 136

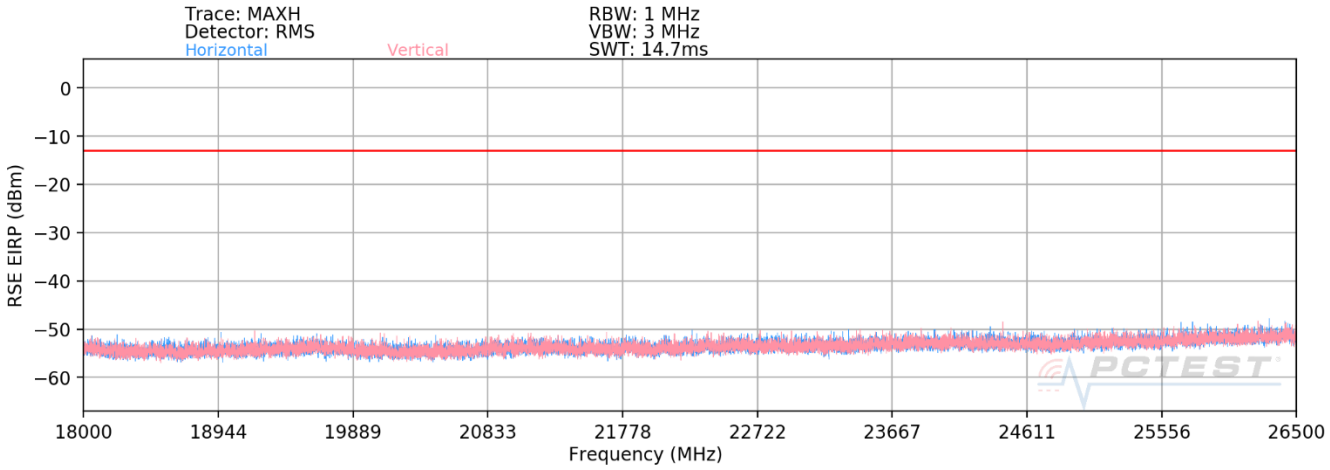
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7000.0	H	119	167	-77.92	7.98	37.06	-58.20	-13.00	-45.20
10500.0	H	-	-	-82.16	11.94	36.78	-58.47	-13.00	-45.47
14000.0	H	-	-	-81.83	16.39	41.56	-53.70	-13.00	-40.70

Table 7-19. Radiated Spurious Data (NR Band n77 PC2 – Mid Channel)

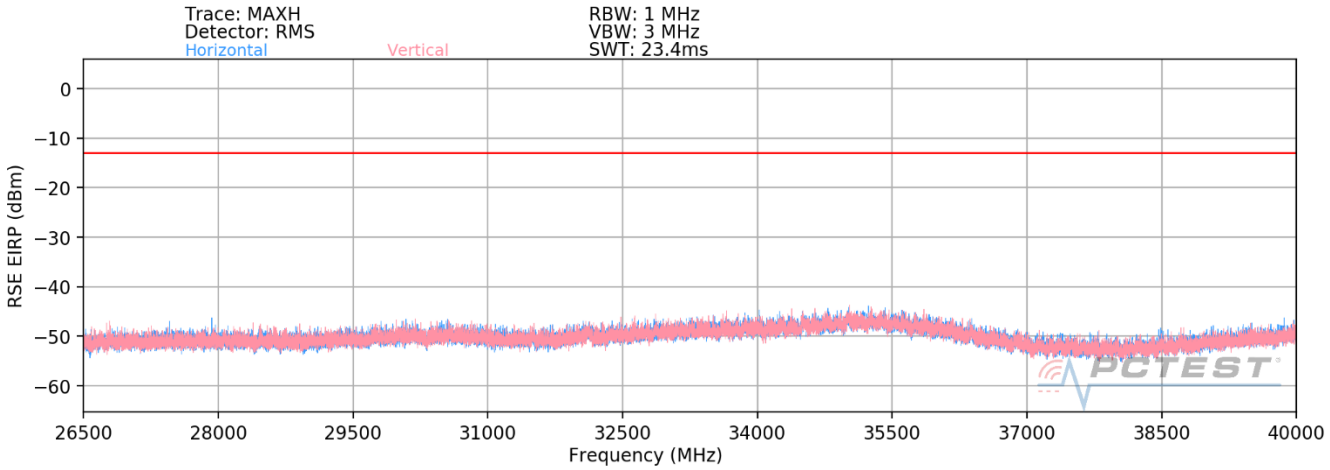
NR Band n77 (PC2) – C-Band – SRS-3



Plot 7-217. Radiated Spurious Plot - 1-18 GHz (NR Band n77 PC2)



Plot 7-218. Radiated Spurious Plot - 18-26.5 GHz (NR Band n77 PC2)



Plot 7-219. Radiated Spurious Plot - 26.5-40 GHz (NR Band n77 PC2)

Bandwidth (MHz):	100
Frequency (MHz):	3750.0
RB / Offset:	1 / 136

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]
7500.0	V	377	144	-69.55	9.76	47.21	-48.05	-13.00	-35.05
11250.0	V	228	186	-79.87	12.51	39.64	-55.62	-13.00	-42.62
15000.0	V	-	-	-81.55	15.66	41.11	-54.14	-13.00	-41.14

Table 7-20. Radiated Spurious Data (NR Band n77 PC2– Low Channel)

Bandwidth (MHz):	100
Frequency (MHz):	3840.0
RB / Offset:	1 / 136

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]
7680.0	V	392	149	-72.36	9.12	43.76	-51.50	-13.00	-38.50
11520.0	V	303	199	-75.87	13.77	44.90	-50.36	-13.00	-37.36
15360.0	V	-	-	-81.63	13.91	39.28	-55.98	-13.00	-42.98

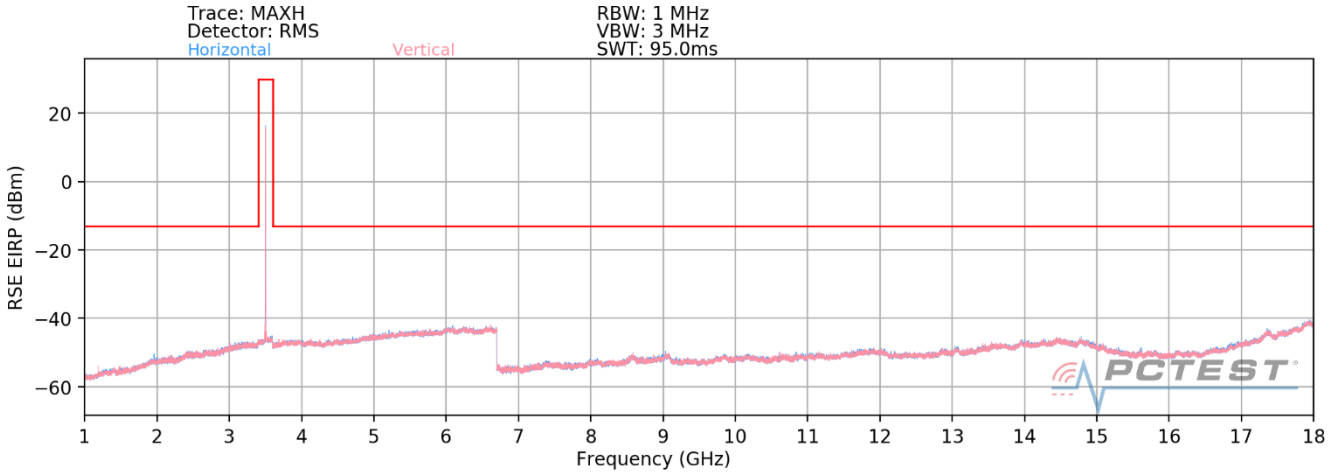
Table 7-21. Radiated Spurious Data (NR Band n77 PC2 – Mid Channel)

Bandwidth (MHz):	100
Frequency (MHz):	3930.0
RB / Offset:	1 / 136

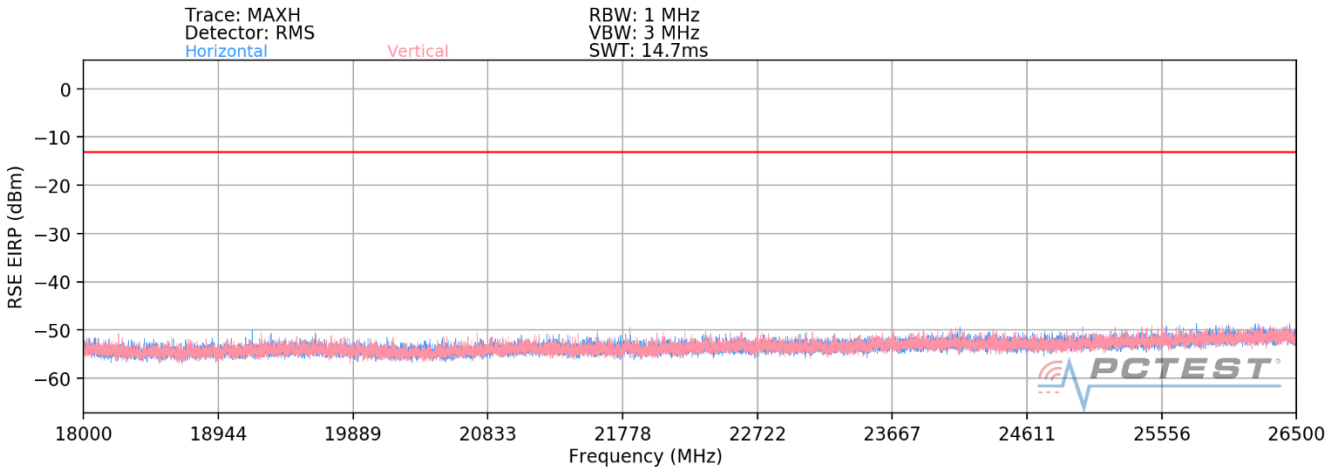
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7860.0	V	396	195	-72.71	9.93	44.22	-51.03	-13.00	-38.03
11790.0	V	294	171	-80.85	14.12	40.27	-54.99	-13.00	-41.99
15720.0	V	-	-	-81.97	14.30	39.33	-55.92	-13.00	-42.92

Table 7-22. Radiated Spurious Data (NR Band n77 PC2 – High Channel)

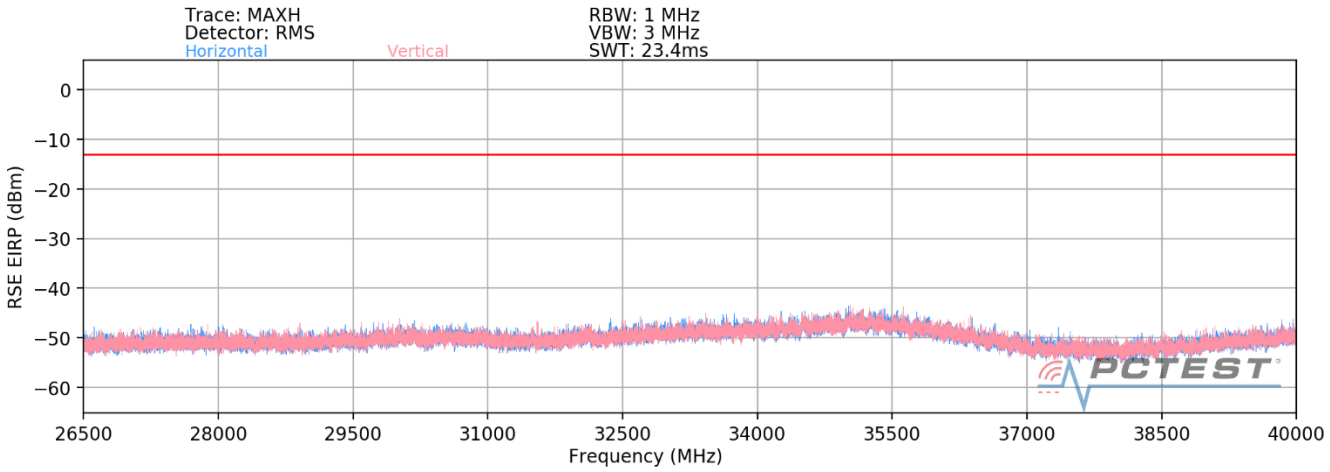
NR Band n77 (PC2) – DoD-Band – SRS-3



Plot 7-220. Radiated Spurious Plot - 1-18 GHz (NR Band n77 PC2)



Plot 7-221. Radiated Spurious Plot - 18-26.5 GHz (NR Band n77 PC2)



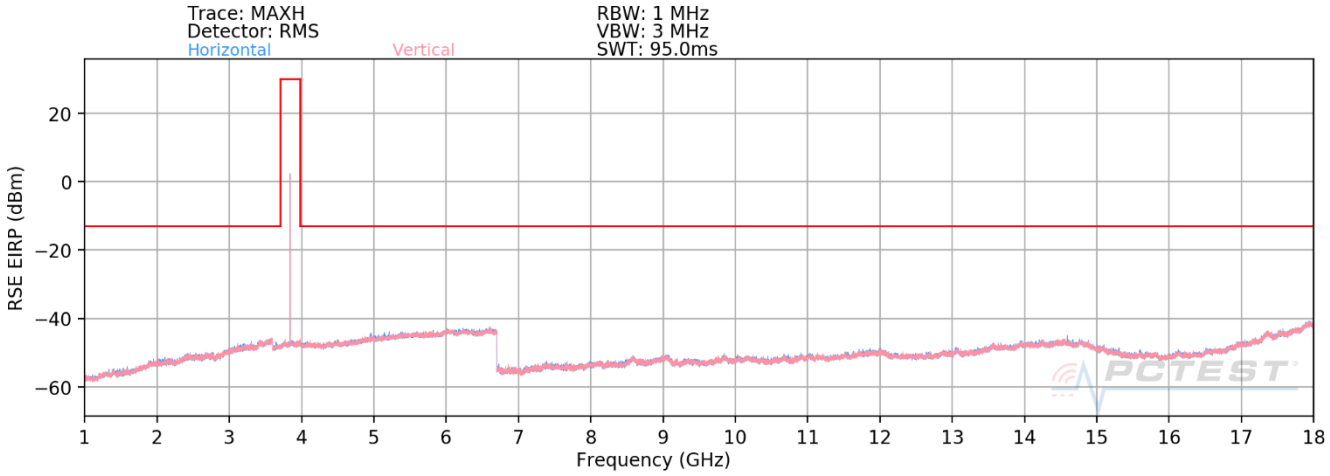
Plot 7-222. Radiated Spurious Plot - 26.5-40 GHz (NR Band n77 PC2)

Bandwidth (MHz):	100
Frequency (MHz):	3500.0
RB / Offset:	1 / 136

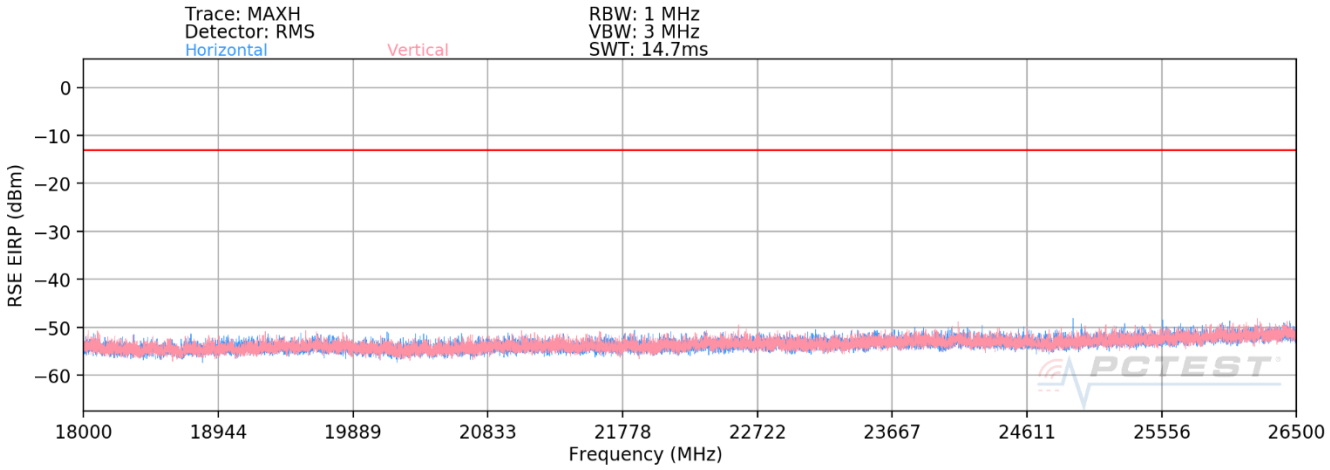
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7000.0	V	314	139	-79.70	7.98	35.28	-59.98	-13.00	-46.98
10500.0	V	-	-	-82.26	11.94	36.68	-58.57	-13.00	-45.57
14000.0	V	-	-	-81.12	16.39	42.27	-52.99	-13.00	-39.99

Table 7-23. Radiated Spurious Data (NR Band n77 PC2 – Mid Channel)

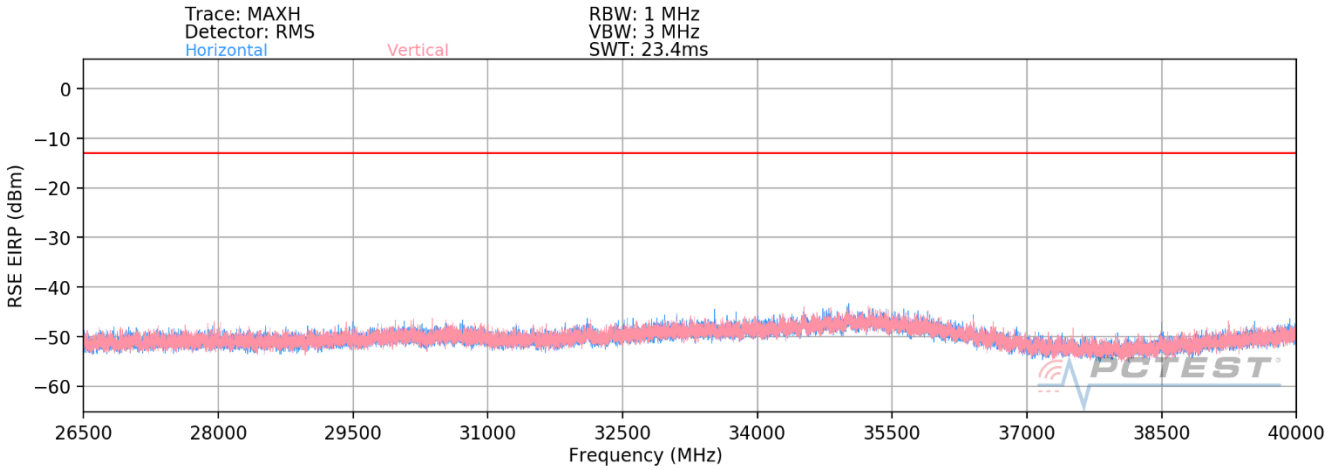
NR Band n77 (PC2) – C-Band – SRS-4



Plot 7-223. Radiated Spurious Plot - 1-18 GHz (NR Band n77 PC2)



Plot 7-224. Radiated Spurious Plot - 18-26.5 GHz (NR Band n77 PC2)



Plot 7-225. Radiated Spurious Plot - 26.5-40 GHz (NR Band n77 PC2)

Bandwidth (MHz):	100
Frequency (MHz):	3750.0
RB / Offset:	1 / 136

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]
7500.0	V	118	187	-77.19	9.76	39.57	-55.69	-13.00	-42.69
11250.0	V	333	330	-79.67	12.51	39.84	-55.42	-13.00	-42.42
15000.0	V	-	-	-81.14	15.66	41.52	-53.73	-13.00	-40.73

Table 7-24. Radiated Spurious Data (NR Band n77 PC2 – Low Channel)

Bandwidth (MHz):	100
Frequency (MHz):	3840.0
RB / Offset:	1 / 136

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]
7680.0	V	364	197	-77.17	9.12	38.95	-56.31	-13.00	-43.31
11520.0	V	-	-	-81.13	13.77	39.64	-55.62	-13.00	-42.62
15360.0	V	-	-	-81.10	13.91	39.81	-55.45	-13.00	-42.45

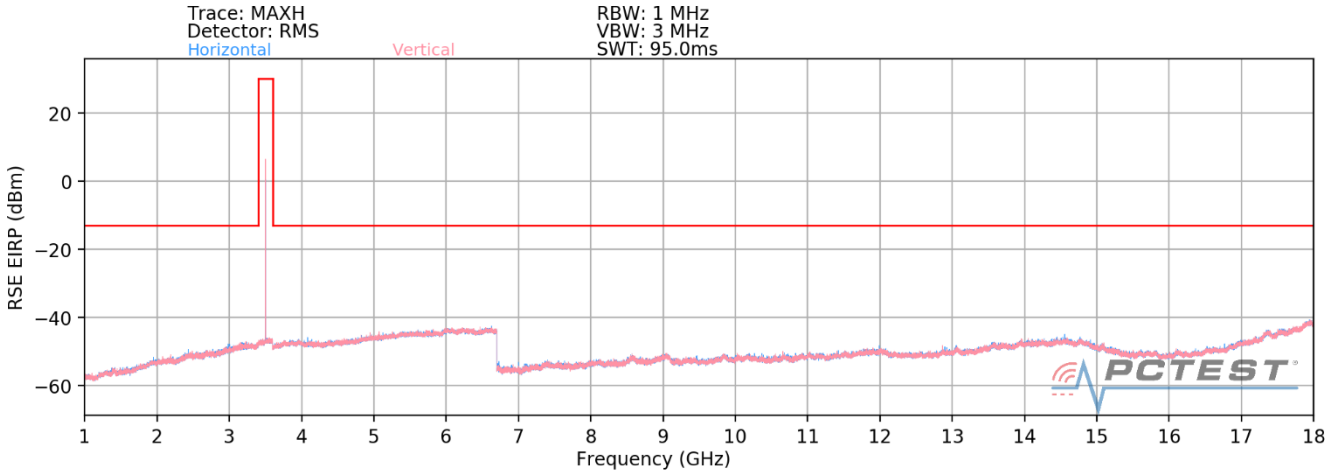
Table 7-25. Radiated Spurious Data (NR Band n77 PC2 – Mid Channel)

Bandwidth (MHz):	100
Frequency (MHz):	3930.0
RB / Offset:	1 / 136

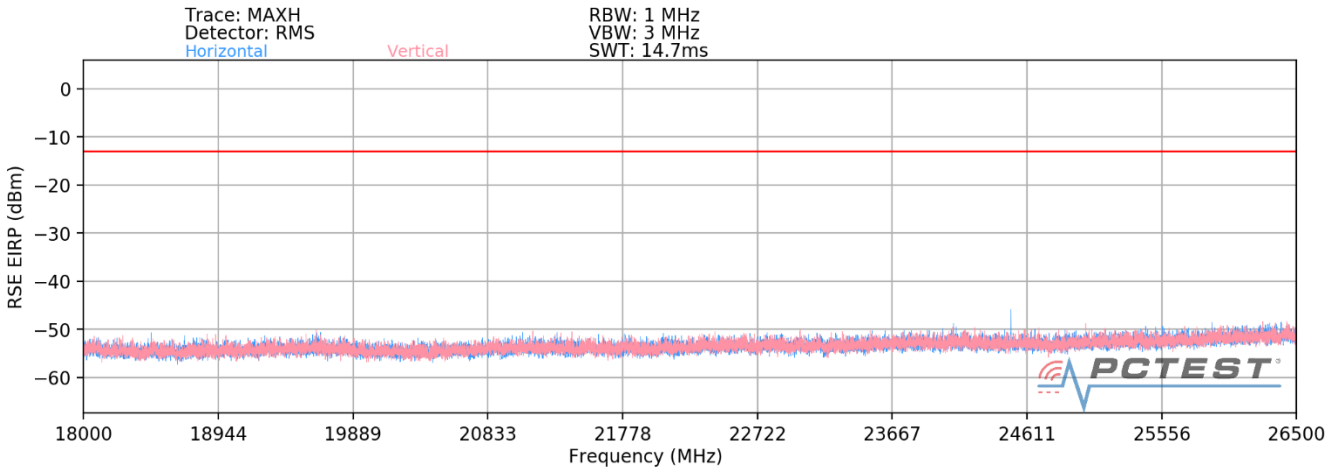
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7860.0	V	347	201	-76.05	9.93	40.88	-54.37	-13.00	-41.37
11790.0	V	-	-	-80.78	14.12	40.34	-54.92	-13.00	-41.92
15720.0	V	-	-	-81.28	14.30	40.02	-55.23	-13.00	-42.23

Table 7-26. Radiated Spurious Data (NR Band n77 PC2 – High Channel)

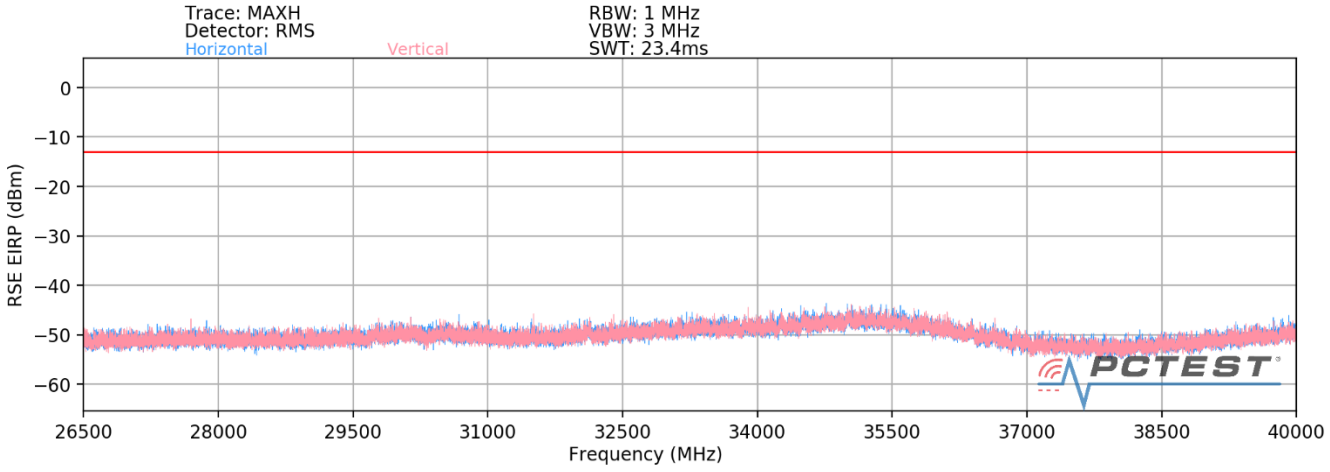
NR Band n77 (PC2) – DoD-Band – SRS-4



Plot 7-226. Radiated Spurious Plot - 1-18 GHz (NR Band n77 PC2)



Plot 7-227. Radiated Spurious Plot - 18-26.5 GHz (NR Band n77 PC2)



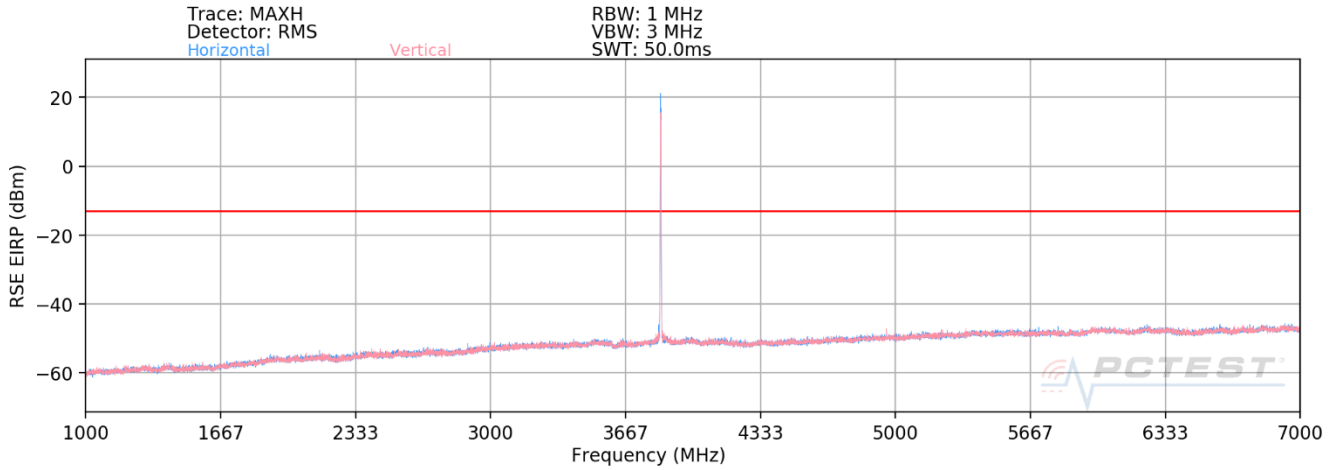
Plot 7-228. Radiated Spurious Plot - 26.5-40 GHz (NR Band n77 PC2)

Bandwidth (MHz):	100
Frequency (MHz):	3500.0
RB / Offset:	1 / 136

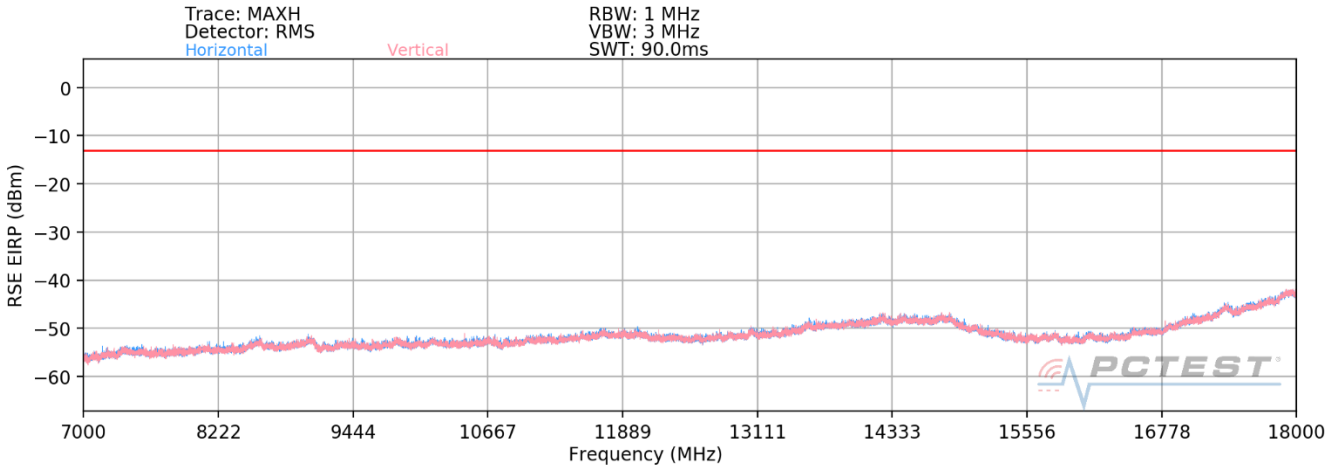
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7000.0	H	121	298	-75.80	7.98	39.18	-56.08	-13.00	-43.08
10500.0	H	115	354	-78.36	11.94	40.58	-54.67	-13.00	-41.67
14000.0	H	-	-	-81.03	16.39	42.36	-52.90	-13.00	-39.90
17500.0	H	-	-	-81.00	19.45	45.45	-49.81	-13.00	-36.81
21000.0	H	-	-	-66.33	5.00	45.68	-49.58	-13.00	-36.58
24500.0	H	150	342	-61.27	6.02	51.75	-53.05	-13.00	-40.05
28000.0	H	-	-	-66.20	7.97	48.77	-56.03	-13.00	-43.03

Table 7-27. Radiated Spurious Data (NR Band n77 PC2 – Mid Channel)

EN-DC – n77 (PC2 - SRS-1) + B14



Plot 7-229. Radiated Spurious Plot (NR Band n77 PC2 – EN-DC Anchor B14)



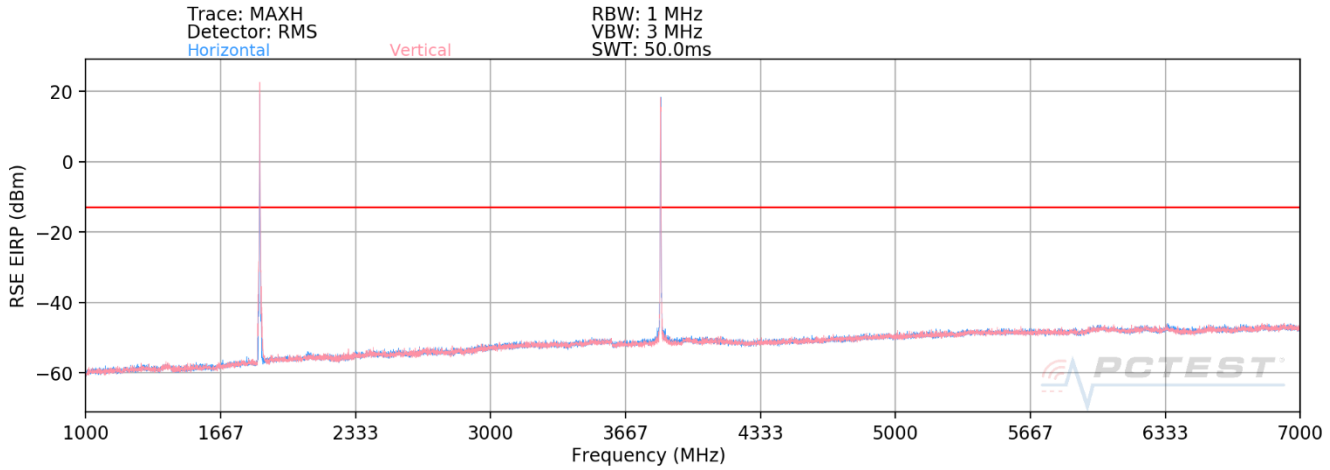
Plot 7-230. Radiated Spurious Plot (NR Band n77 PC2 – EN-DC Anchor B14)

Bandwidth (MHz):	100MHz/ 10MHz
Frequency (MHz):	3840MHz/ 793MHz
RB / Offset:	1/136 & 1/25
Mode:	EN-DC
Anchor Band:	LTE B14

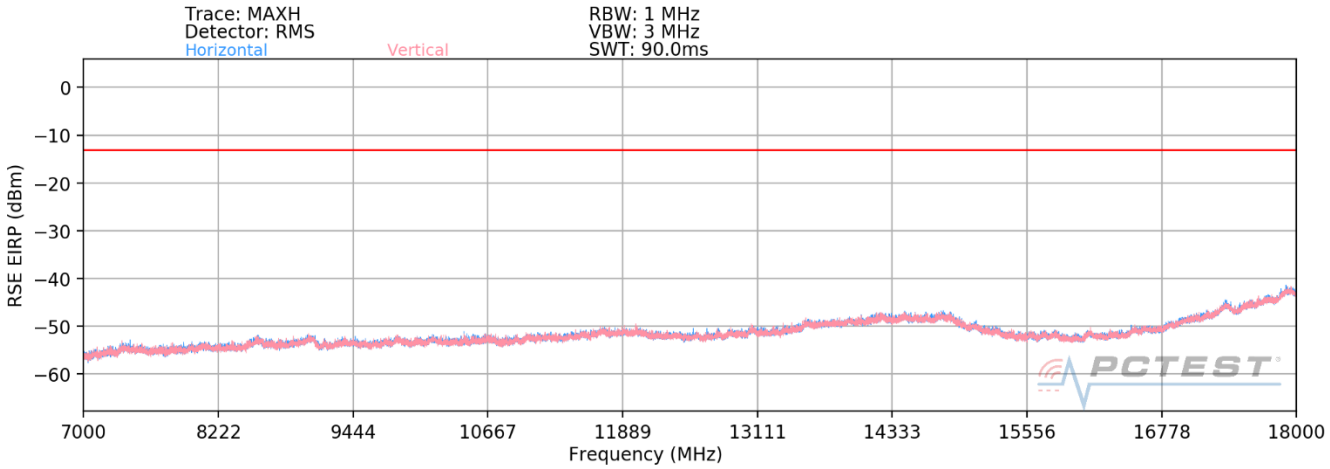
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
2254.0	H	-	-	-72.03	5.54	40.51	-54.75	-13.00	-41.75
4956.0	H	386	111	-76.11	13.44	44.33	-50.92	-13.00	-37.92
5301.0	H	-	-	-77.21	14.28	44.07	-51.18	-13.00	-38.18
6887.0	H	-	-	-78.25	16.68	45.43	-49.83	-13.00	-36.83

Table 7-28. Radiated Spurious Data (NR Band n77 PC2 – EN-DC Anchor B14)

EN-DC – n77 (PC2 - SRS-1) + B2



Plot 7-231. Radiated Spurious Plot (NR Band n77 PC2 – EN-DC Anchor B2)



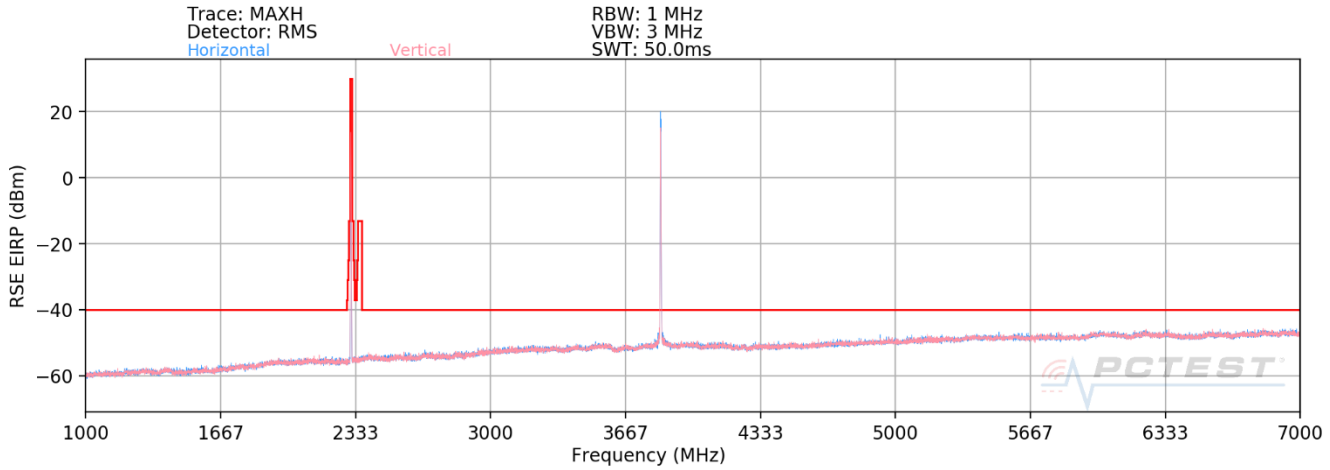
Plot 7-232. Radiated Spurious Plot (NR Band n77 PC2 – EN-DC Anchor B2)

Bandwidth (MHz):	100MHz/ 20MHz
Frequency (MHz):	3840MHz/ 1880MHz
RB / Offset:	1/136 & 1/50
Mode:	EN-DC
Anchor Band:	LTE B2

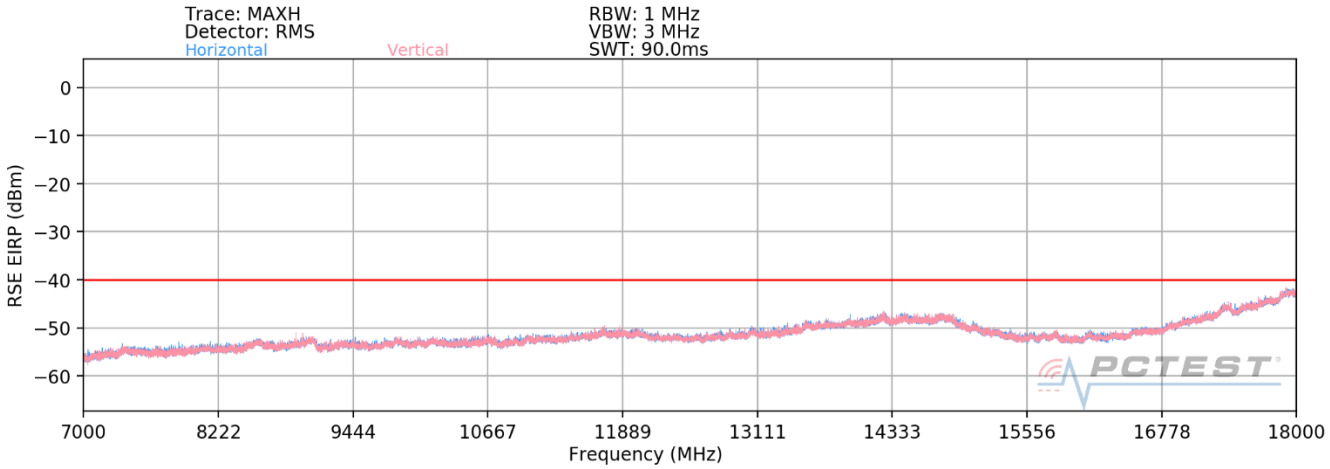
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
2040.0	V	-	-	-72.32	5.73	40.41	-54.85	-13.00	-41.85
4000.0	V	-	-	-76.41	11.83	42.42	-52.84	-13.00	-39.84
5800.0	V	-	-	-77.37	14.99	44.62	-50.63	-13.00	-37.63
5960.0	V	-	-	-76.48	15.54	46.06	-49.20	-13.00	-36.20

Table 7-29. Radiated Spurious Data (NR Band n77 PC2 – EN-DC Anchor B2)

EN-DC – n77 (PC2 - SRS-1) + B30



Plot 7-233. Radiated Spurious Plot (NR Band n77 PC2 – EN-DC Anchor B30)



Plot 7-234. Radiated Spurious Plot (NR Band n77 PC2 – EN-DC Anchor B30)

Bandwidth (MHz):	100MHz/ 10MHz
Frequency (MHz):	3840MHz/ 2310 MHz
RB / Offset:	1/136 & 1/25
Mode:	EN-DC
Anchor Band:	LTE B30

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]
2280.0	H	-	-	-71.90	5.89	40.99	-54.26	-40.00	-14.26
3810.0	H	-	-	-76.27	11.61	42.34	-52.92	-40.00	-12.92
5340.0	H	-	-	-77.36	14.64	44.28	-50.98	-40.00	-10.98
5370.0	H	-	-	-77.14	14.69	44.55	-50.71	-40.00	-10.71

Table 7-30. Radiated Spurious Data (NR Band n77 PC2 – EN-DC Anchor B30)

7.9 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.

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

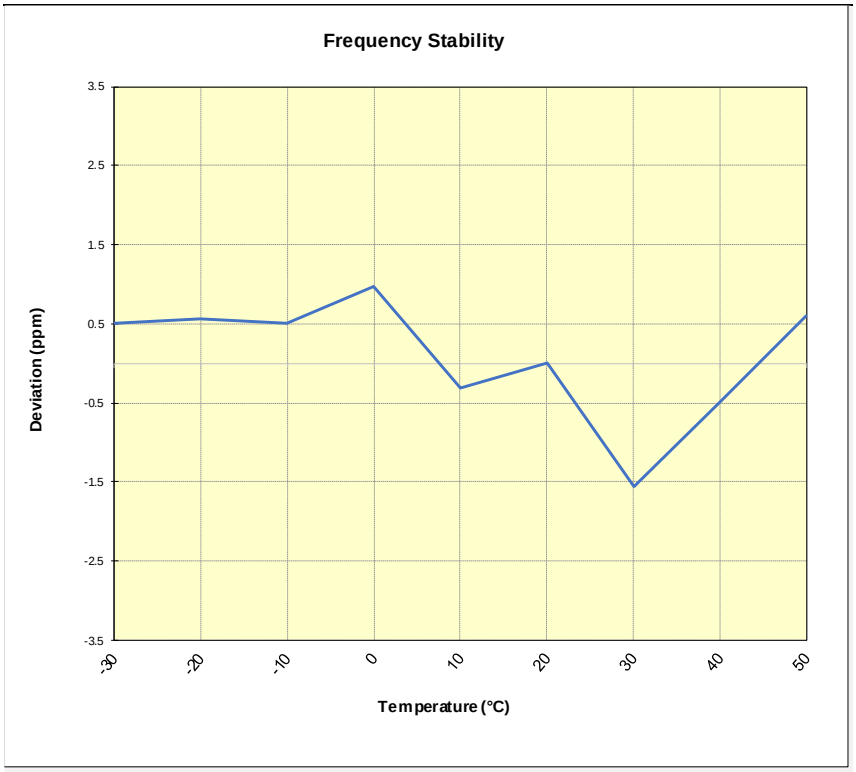
None

NR Band n77 (PC2) SRS-1 - C-Band

Operating Frequency (Hz):	3,840,000,000
Ref. Voltage (VDC):	4.43

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.43	- 30	3,840,096,059	1,912	0.0000498
		- 20	3,840,096,324	2,177	0.0000567
		- 10	3,840,096,110	1,963	0.0000511
		0	3,840,097,882	3,734	0.0000972
		+ 10	3,840,092,931	-1,217	-0.0000317
		+ 20 (Ref)	3,840,094,147	0	0.0000000
		+ 30	3,840,088,160	-5,987	-0.0001559
		+ 40	3,840,092,220	-1,927	-0.0000502
		+ 50	3,840,096,417	2,269	0.0000591
Battery Endpoint	3.36	+ 20	3,840,092,057	-2,090	-0.0000544

Table 7-31. NR Band n77 (PC2) C-Band - Frequency Stability Data



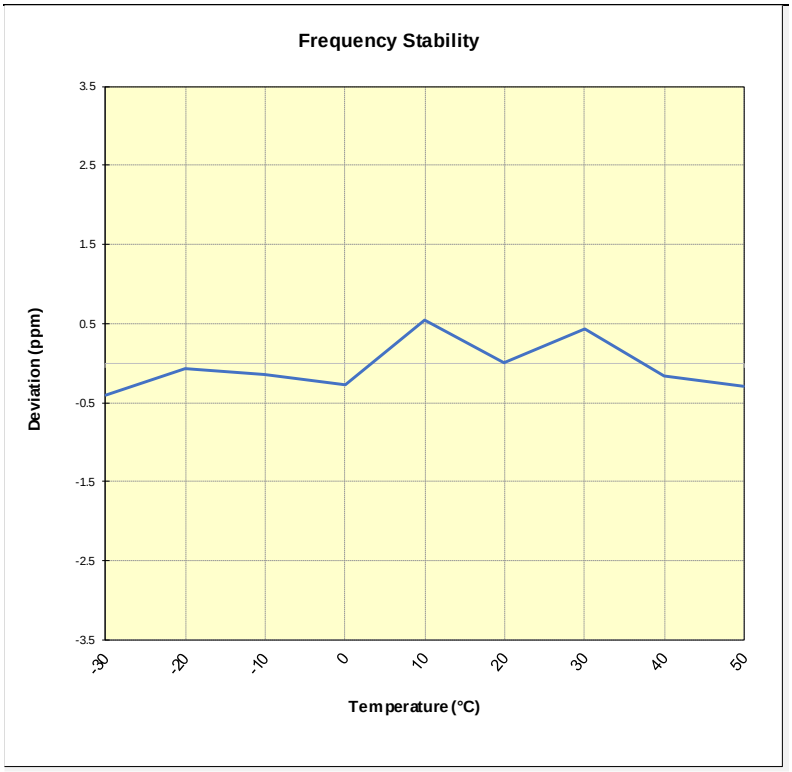
Plot 7-235. NR Band n77 (PC2) C-Band - Frequency Stability Chart

NR Band n77 (PC2) SRS-1 - DoD Band

Operating Frequency (Hz):	3,500,010,000
Ref. Voltage (VDC):	4.43

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.43	- 30	3,500,004,492	-1,421	-0.0000406
		- 20	3,500,005,677	-236	-0.0000068
		- 10	3,500,005,403	-511	-0.0000146
		0	3,500,004,945	-969	-0.0000277
		+ 10	3,500,007,824	1,911	0.0000546
		+ 20 (Ref)	3,500,005,913	0	0.0000000
		+ 30	3,500,007,412	1,498	0.0000428
		+ 40	3,500,005,333	-580	-0.0000166
		+ 50	3,500,004,865	-1,048	-0.0000299
Battery Endpoint	3.36	+ 20	3,500,004,971	-942	-0.0000269

Table 7-32. NR Band n77 (PC2) DoD-Band - Frequency Stability Data



Plot 7-236. NR Band n77 (PC2) DoD-Band - 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: A3LSMF711U1** complies with all the requirements of Part 27 of the FCC rules.