

Test Report

Adjacent channel selectivity and Blocking of Amateur Radio Equipment

1. Required tests:

On the ISS, the International Space Station, there is some Amateur Radio Equipment installed. In the near future there should be some Amateur Satellites launched from ISS and flying nearby it. Because of this Radio interference issues should be considered.

2. Tests made:

Some commercial available Amateur Radios tuned to 145,800 and 435,000 MHz were connected to two test generators, one tuned to the receiving frequency with Levels of 0 dB μ V which is approximately the Level produced by a 5 W erp ground station at 2000km range,
10 dB μ V which is approximately the Level produced by a 50 W erp ground station at 2000km range and
20 dB μ V which is approximately the Level produced by a 20 W erp ground station at 400km range.

The second generator was tuned to frequencies separated from the RX-Frequency by 25 kHz, 100 kHz and 600 kHz (2m) / 1 MHz (70cm).

Both generators were FM modulated with 3 kHz deviation. The generator tuned to the RX-Frequency was modulated with a 1 kHz tone, the interferer was modulated with a 400 Hz tone.

The Levels noted are the Ratios between the two signal generators. That means the at a RX Level of 10 dB μ V and a noted ratio of 60 dB the Signal of the interferer was 70dB μ V.

There are for all Frequencies and RX Levels three values noted. The first is with open squelch. At the noted value a reduction of the demodulated S/N is clearly noticeable, but the signals would still be readable. This value is a bit subjective to the operators ears. If the Ratio would be increased by about 10 dB above the noted value the Signal would no longer be readable.

The other two values are that when a squelch closing would be caused by the Interferer. The squelch was first set so it was just closed and not opened without signal but the radio has the highest sensitivity. Then the squelch was fully closed, this is the third value noted.

Radio 1: Kenwood TH-D7 E

	Ratio Interferer/Signal dB								
RX-Level:	0 dB μ V			10 dB μ V			20 dB μ V		
Squelch:	Open	Just closed	Fully closed	Open	Just closed	Fully closed	Open	Just closed	Fully closed
RX:145,800 Interferer:145,825	50	51	49	50	51	49	50	49	47
RX:145,800 Interferer:145,900	60	75	73	60	74	71	55	73	70
RX:145,800 Interferer:145,200	70	89	75	70	89	75	70	87	78
RX:435,000 Interferer:435,025	50	52	50	50	52	50	50	60	59
RX: 435,000 Interferer:435,100	65	80	76	65	80	75	65	80	75
RX: 435,000 Interferer:436,000	70	86	76	70	85	76	65	86	76

Radio 2: Yaesu FT-817 (There was no difference between FM and FM-N)

	Ratio Interferer/Signal dB								
RX-Level:	0 dB μ V			10 dB μ V			20 dB μ V		
Squelch:	Open	Just closed	Fully closed	Open	Just closed	Fully closed	Open	Just closed	Fully closed
RX:145,800 Interferer:145,825	55	50	47	55	46	42	52	41	38
RX:145,800 Interferer:145,900	65	90	78	65	84	76	65	80	73
RX:145,800 Interferer:145,200	80	> 90	87	80	> 90	84	80	> 90	83
RX:435,000 Interferer:435,025	55	50	47	55	46	42	50	42	37
RX: 435,000 Interferer:435,100	65	85	76	65	83	74	65	79	72
RX: 435,000 Interferer:436,000	75	> 90	82	70	> 90	82	70	> 90	79

Radio 3: Alinco DJ-580E

RX-Level:	Ratio Interferer/Signal dB								
	0 dB μ V			10 dB μ V			20 dB μ V		
Squelch:	Open	Just closed	Fully closed	Open	Just closed	Fully closed	Open	Just closed	Fully closed
RX:145,800 Interferer:145,825	53	56	52	52	55	50	50	53	49
RX:145,800 Interferer:145,900	65	> 90	77	65	> 90	74	60	> 90	72
RX:145,800 Interferer:145,200	75	> 90	85	70	> 90	85	70	> 90	85
RX:435,000 Interferer:435,025	45	61	53	45	60	53	45	57	51
RX: 435,000 Interferer:435,100	55	77	69	55	75	66	55	75	64
RX: 435,000 Interferer:436,000	65	84	75	65	84	73	60	83	73

Radio 4: Standard C-710

	Ratio Interferer/Signal dB								
RX-Level:	0 dB μ V			10 dB μ V			20 dB μ V		
Squelch:	Open	Just closed	Fully closed	Open	Just closed	Fully closed	Open	Just closed	Fully closed
RX:145,800 Interferer:145,825	55	40	34	55	40	34	50	37	32
RX:145,800 Interferer:145,900	65	70	66	65	67	64	60	66	62
RX:145,800 Interferer:145,200	80	87	81	75	> 90	78	75	> 90	90
RX:435,000 Interferer:435,025	50	42	36	50	41	36	45	39	35
RX: 435,000 Interferer:435,100	60	69	63	60	66	62	55	63	59
RX: 435,000 Interferer:436,000	70	86	76	70	82	76	70	78	73

Radio 5: Motorola MX2000 (only limited tests, because it has no 50 Ohm antenna connector and fixed squelch)

	Ratio Interferer/Signal dB	
RX-Level:	0 dB μ V	
Squelch:	Open	closed
RX:145,800 Interferer:145,825	70	84
RX:145,800 Interferer:145,900	80	> 85
RX:145,800 Interferer:145,200	> 85	> 85