Interference Test with SATRE Modems

1. Test setup

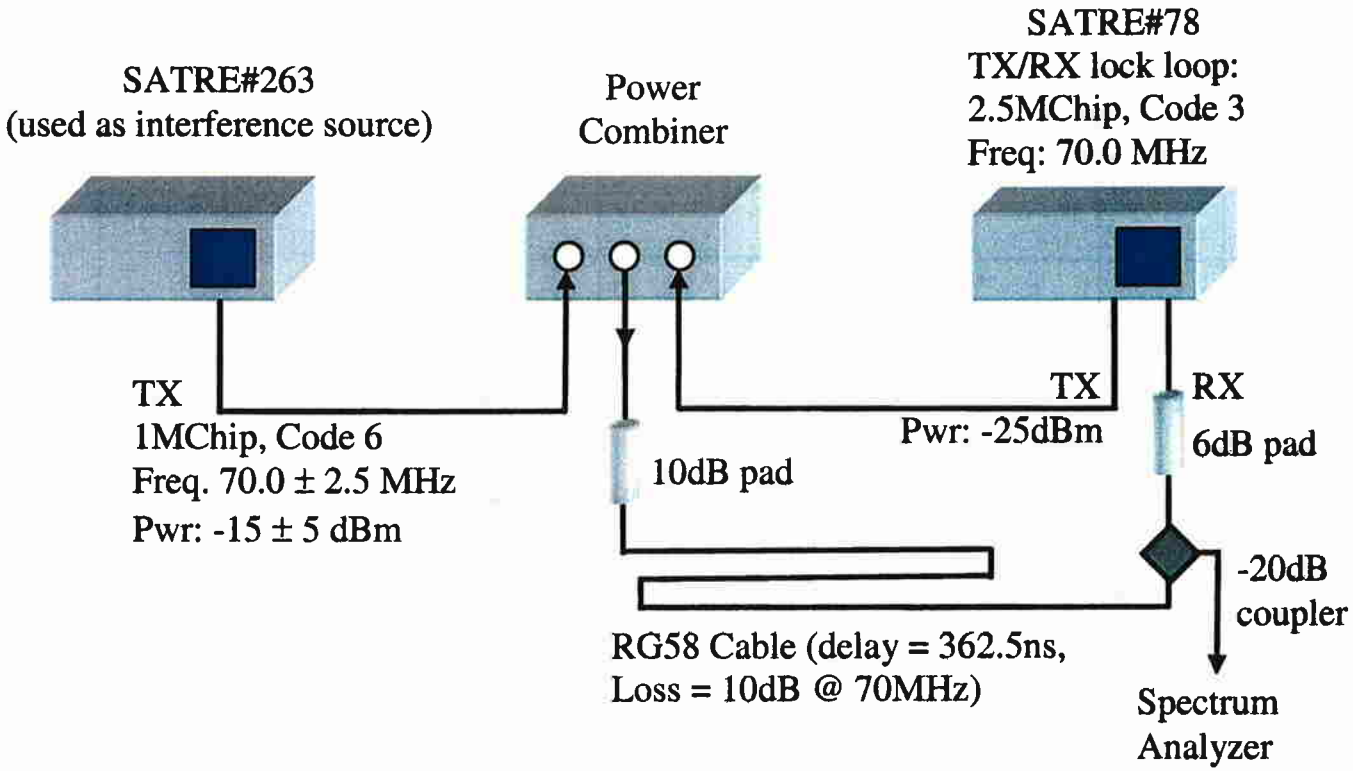


Figure 1. Block diagram of the test setup

Note: The -15dBm TX power from SATRE#263 was chosen such that the power ratio between the interference and the signal resembles the power ratio between the adjacent signal and the RX signal from Europe (see Figures 2 and 3).

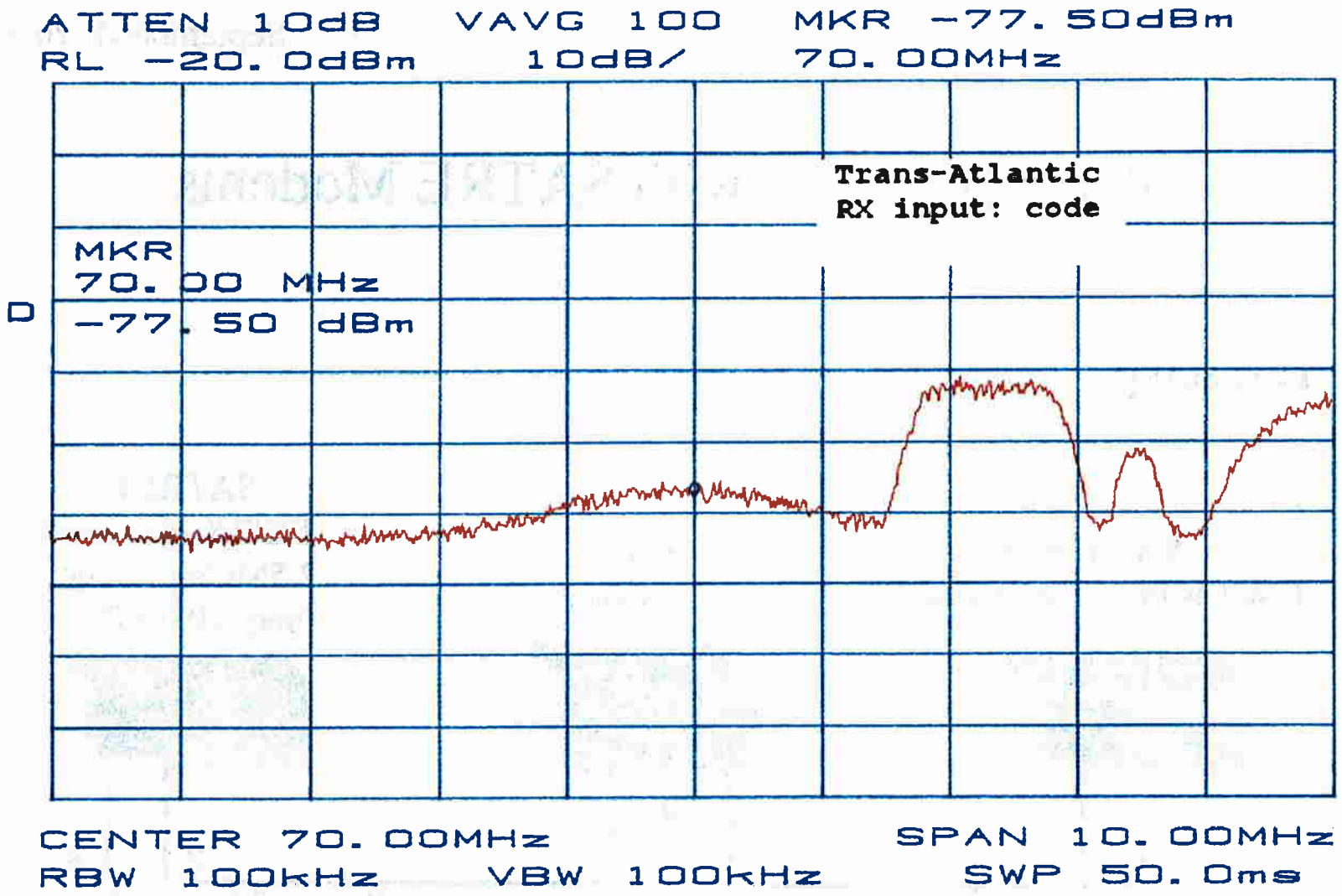


Figure 2. Trans-Atlantic RX input

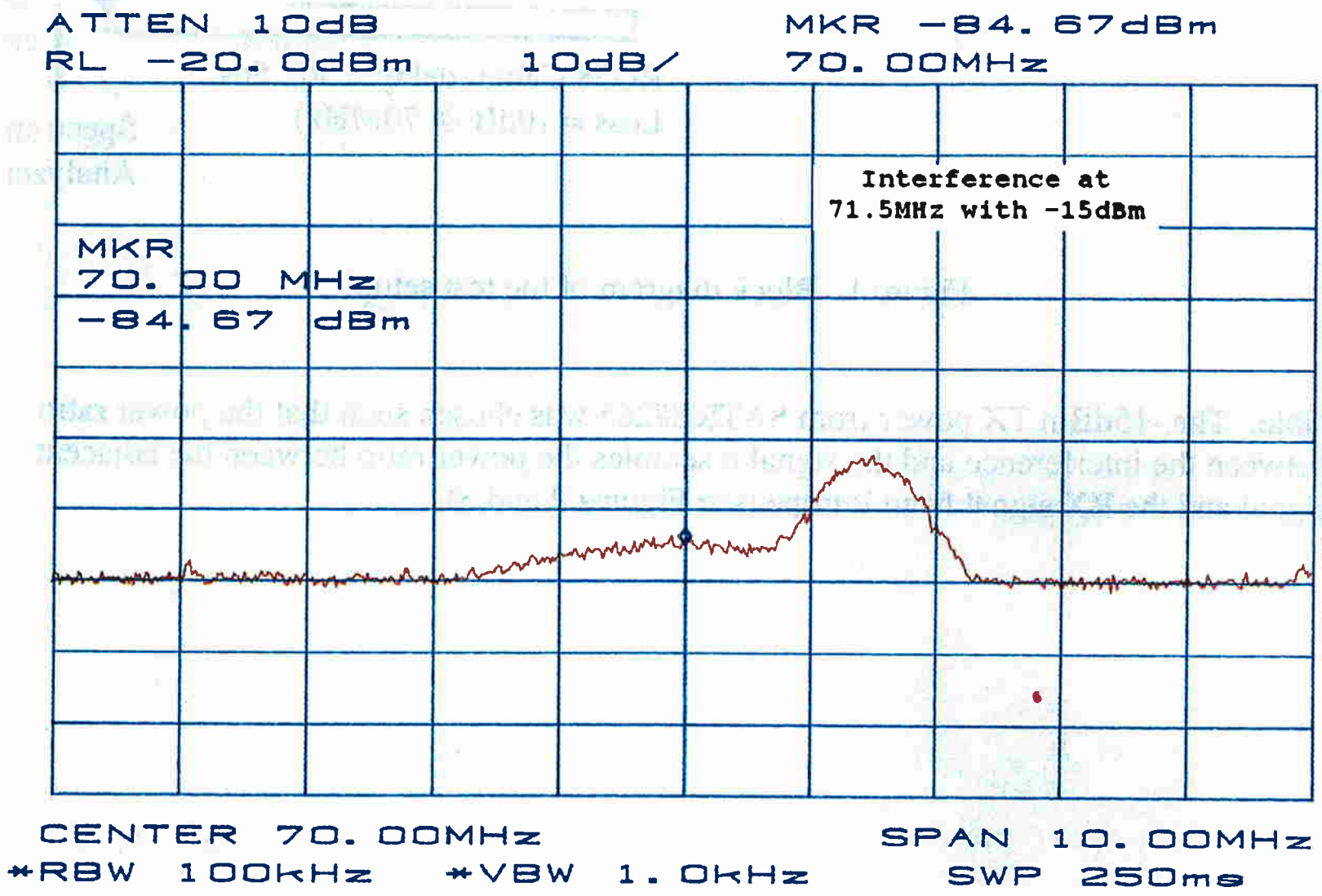


Figure 3. Interference at 71.5MHz with -15dBm

2. Test Results and Observations

Table 1. Interference Test Results

Interference center freq. (MHZ)	Interference signal Power (dBm)	RX Power (dBm)	RX C/No (dBHz)	TX-RX delay Change (ns)	TX-RX σ (ns)
72.5	-20	-52.96	64.6	-0.1	0.020
	-15	-52.94	60.9	-0.1	0.023
	-10	-52.94	55.9	-0.1	0.030
72.0	-20	-52.96	64.2	-0.1	0.086
	-15	-52.94	60.3	-0.1	0.160
	-10	-52.98	55.4	0.0	0.230
71.5	-20	-52.98	64.0	0.0	0.100
	-15	-52.96	59.9	0.0	0.100
	-10	-52.96	55.0	0.2	0.350
71.0	-20	-52.96	63.8	-0.3	0.080
	-15	-52.98	59.7	-0.5	0.300
	-10	-52.98	54.8	-1.3	0.400
70.5	-20	-52.98	63.7	-0.3	0.160
	-15	-52.98	59.5	-0.8	0.340
	-10	-52.94	54.6	-2.1	0.630
69.5	-20	-52.98	63.5	0.0	0.150
	-15	-52.98	59.3	0.1	0.210
	-10	-52.91	54.5	0.8	0.300
69.0	-20	-52.96	63.6	-0.1	0.120
	-15	-52.96	59.3	0.2	0.300
	-10	-52.94	54.5	1.0	0.480
68.5	-20	-52.96	63.7	-0.1	0.150
	-15	-52.98	59.5	-0.3	0.300
	-10	-52.98	54.7	-0.4	0.510
68.0	-20	-52.98	64.0	-0.1	0.090
	-15	-52.98	59.9	-0.2	0.170
	-10	-52.98	55.1	-0.3	0.260
67.5	-20	-52.98	64.5	-0.1	0.013
	-15	-52.98	60.6	-0.1	0.016
	-10	-52.98	55.7	-0.1	0.023

Note: The TX – RX and the TX – RX σ were the 2-minute average values.

Observations:

1. The RX power, as indicated by the SATRE, was not affected by the interference signal (for both frequency and power level changes).
2. The RX C/No is roughly inversely proportional to the interference power (interference power increased by 5dB, the RX C/No reduced by about 5dB). The interference frequency has very little effect on the RX C/No for a given interference power level.
3. The TX – RX delay change and the TX – RX σ are affected by both the interference frequency and interference power level, as shown by Figure 4. The effect is not symmetric about the 70MHz signal frequency.

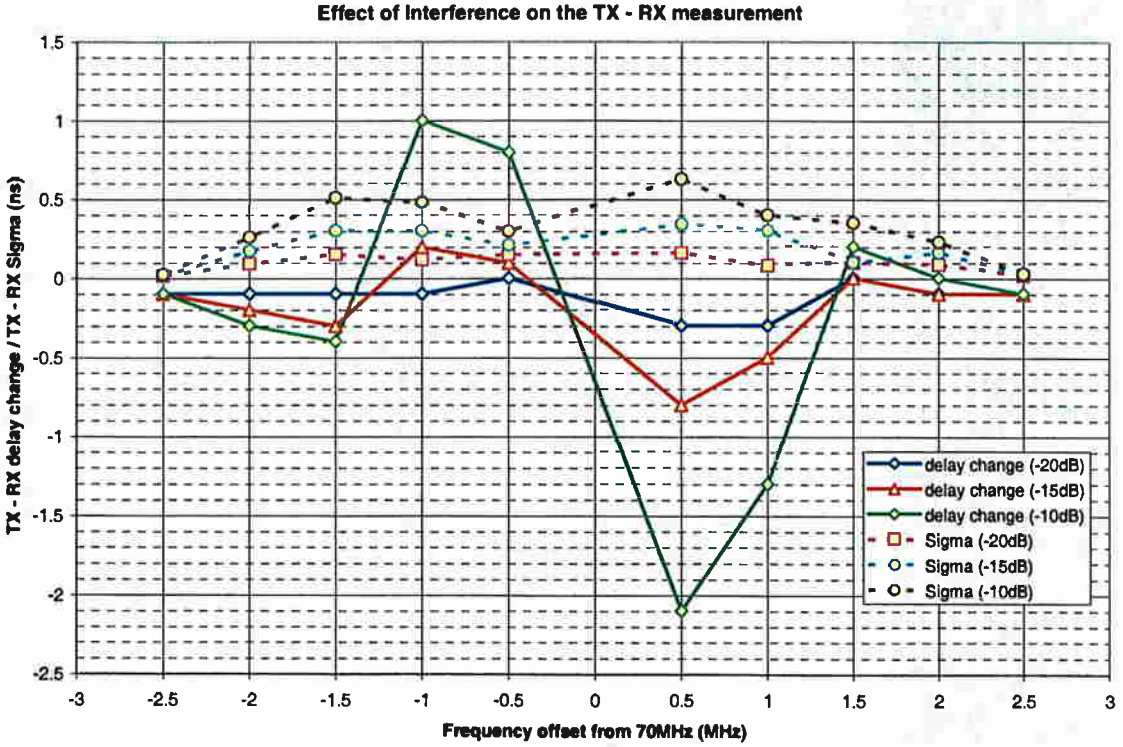
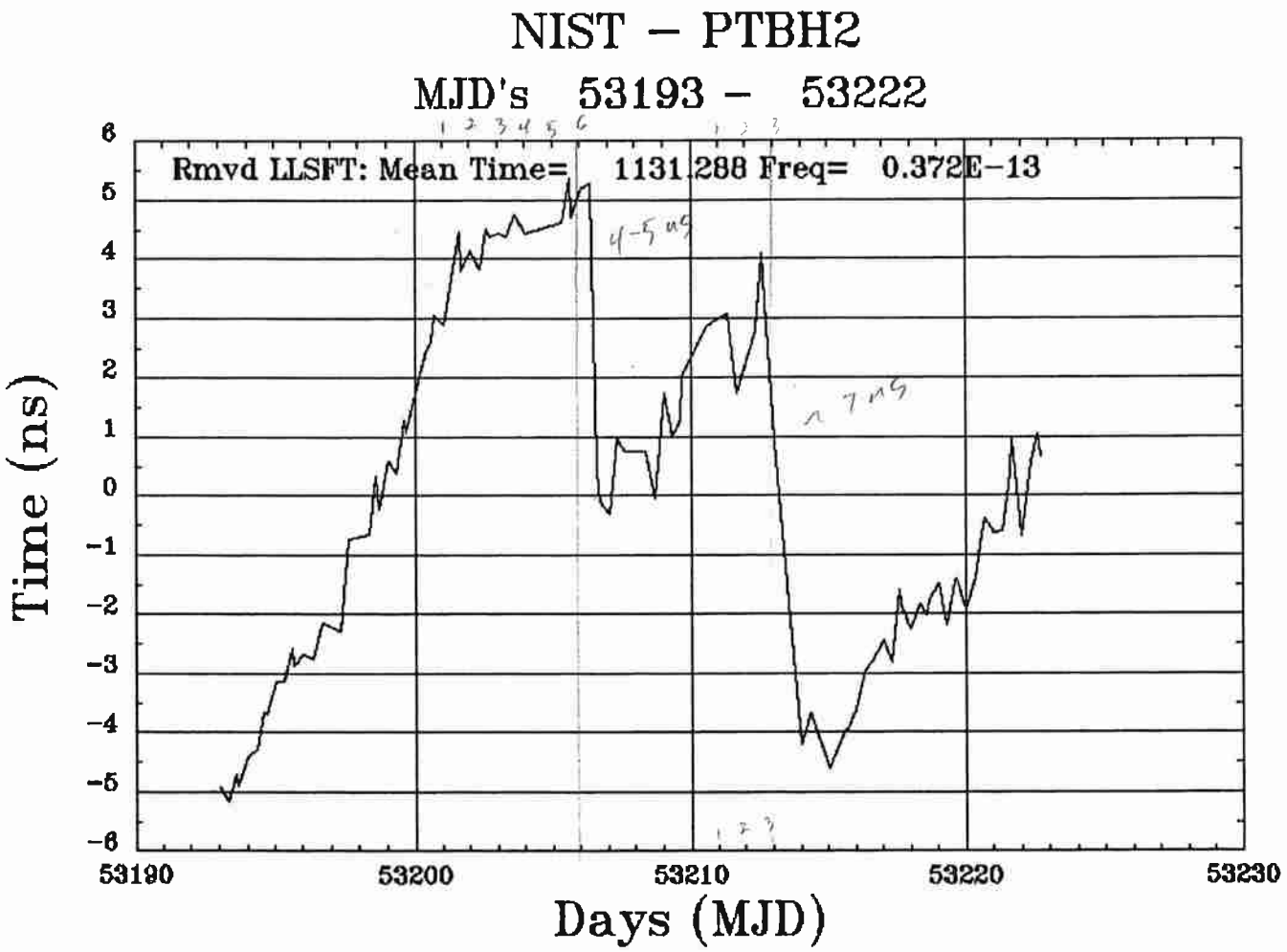


Figure 4. Effect of Interference on the TX – RX Measurement



July 20

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~~Clock 1 – Clock 2~~

MJD's 53182 – 53212