

First antenna test

Report

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Antenna

We order TA-1 Turnstile antenna by WiMo. It was shipped without connectors (only cable). After consultation with dr Siwicki we installed N-connector (for outdoor use) and prepared low-loss adapter cable to SMA (compatible with our SDR).

- Type: VHF
- Length: 130 cm
- Weight: 2 kg
- Polarization: circular, clockwise
- Range: 137-152 MHz
- Feed: $50\ \Omega$
- SWR: <2
- Gain: 0dB (high elv) <4 dB (low elv)

Antenna was mounted on the Tomek's terrace on the top floor. From the north side it was obscured by wall and roof.

First connection

In test time the best pass parameters has NOAA 18 satellite. We adjust the SDR to frequency 137.9125 MHz and start observations. We noticed that noise level was -82dB. But downlink signal has very bad quality. It was at level -78 dB. It has very narrow width, without any side bands.

We cannot extract any imagery from this signal.

Compare to old antenna

So far we used a simply turnstile antenna attached to SDR. It is low quality and small length. But we received correctly a few imageries from NOAA satellites using this. We replaced it with new antenna during NOAA 18 pass.

The parameters of the signal changed. The noise level increased to -75 dB. The downlink signal increased to -60 dB. At specified frequency we had noticeable, wide beam. We noticed also a lot of side bands. Probably it is possible to extract imagery from recorded data, but we change the antenna in record time and our current algorithm wasn't prepare to handle it. Based on previous experienced the output picture will be strongly noised but on part recorded above antenna the details would be noticeable.

Conclusions

We have a problem with our antenna. We cannot receive useful signal on selected frequency.

We must to find cause or defect. We need to check cable (if it has good impedance and quality) and antenna. We plan first test antenna in open space in GUT area. Next we want to measure parameters of antenna in the laboratory.

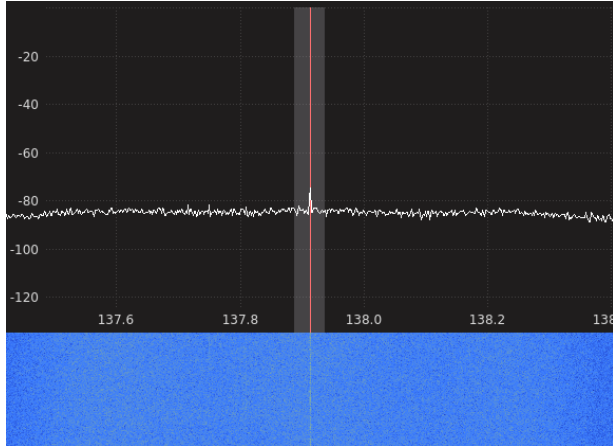


Figure 1: New antenna - very low quality signal. Only on main frequency exists little peak, but its level is greater by 4dB then noise. This peak is visible even when satellite doesn't pass. None side band occurs.

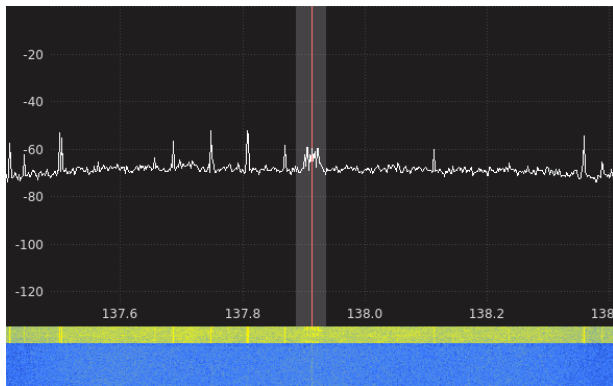


Figure 2: Old antenna - medium quality signal. We noticed data beam. We had 15 dB difference between useful signal and noise. Some side bands.

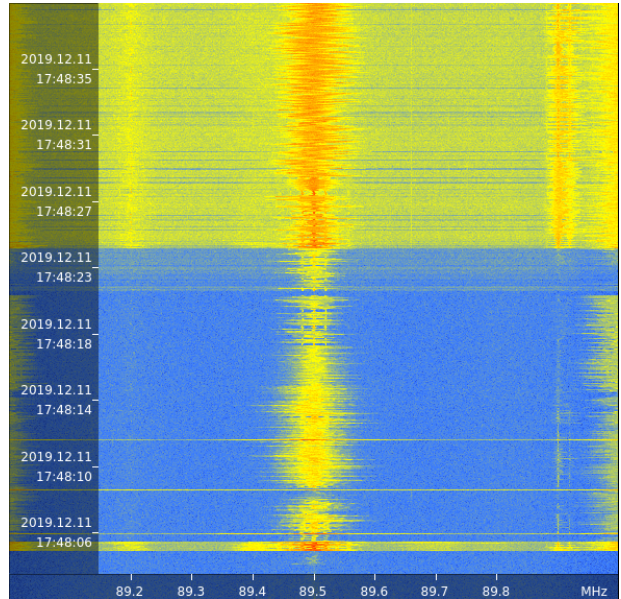


Figure 3: Waterfall of signal. At the bottom is signal on new antenna. The noise level is low (blue), but the signal is faint (center yellow). At the top is signal on old antenna. The noise level is high (yellow on sides). The useful signal is relative clear (center orange). At 17:48:30 the center line becomes zigzag. It is moment when satellite has passed the roof.