Evaluation of Diapason Active Antenna against Chinese antenna

Apart a DIY antenna solution, there was only one commercial antenna available for FLARM 868 MHz receive stations.

This antenna from China is a collinear 9dBi gain antenna, and 160 cm long

Now a new antenna is available. This is an active antenna of low Noise Figure < 1.1 dB, high gain >22 dB and reduce bandwidth to FLARM frequency using SAW filter 10 MHz BW for high level GSM frequency rejection. It also includes an input stripline filter showing a DC short and thus assuring ESD and most lightning protection.
220 mm long Diapason Active Antenna
With the support of Benjamin HB9FWG and Paul HB9AXA, thanks to both, an active antenna has been installed on Letzi site close to a Chinese antenna, for a comparison of performances. The active antenna has been installed with a 16 m long RG58 coaxial cable, showing near 9dB losses.

Records of coverage of both antennas have been done, on the 11th and 12th of July, as well as plotted pattern of sensitivity.
As a comparison, here is for the same days the LSZF sensitivity pattern, with a Chinese antenna.

All these test show that the active antenna coverage and sensitivity are better than for chinese antenna.

This may be explained, as follow:

The noise figure of the Chinese antenna system is the SDR dongle NF + coax cable losses. So NF is 3.5 + Cable losses. As the cable losses for Letzi is closed to 5 dB, the receive system noise figure will be 8.5 dB. This NF as an impact on sensitivity, killing a part of the antenna gain, and increasing with cable length.

A solution to improve the Chinese antenna performance is to install the SDR dongle just behind the antenna, which give a 3.5 dB Noise Figure. Then we can either use an amplified USB cable to the RPi, or install the RPi and the SDR dongle in a waterproof housing close to the antenna, with the risk of lightning and ESD during storm period, as we can’t disconnect Dongle and RPi from antenna.

Another solution is to add a low noise LNA with a filter just behind the antenna. (which does impact the cost of the system considerably)

The active antenna has a constant Noise Figure of 1.1 dB if the cable losses stays below the LNA gain. Let us say 18 dB with some margin.

This means that if we use SAT TV cable Type RG6 (17 db /100m ), we may have up to 100 m of cable length without sensitivity loss.

Also the active antenna having lightning and ESD protection, with the strip line DC short on the LNA input, is quiet well protected during storm period.

The active antenna being an all in one solution is very easy to install. Only the mast clamp to secure, and cable connection. It also have
very small dimensions, thus it is possible to install it where the surrounding is rather antenna sensitive.