

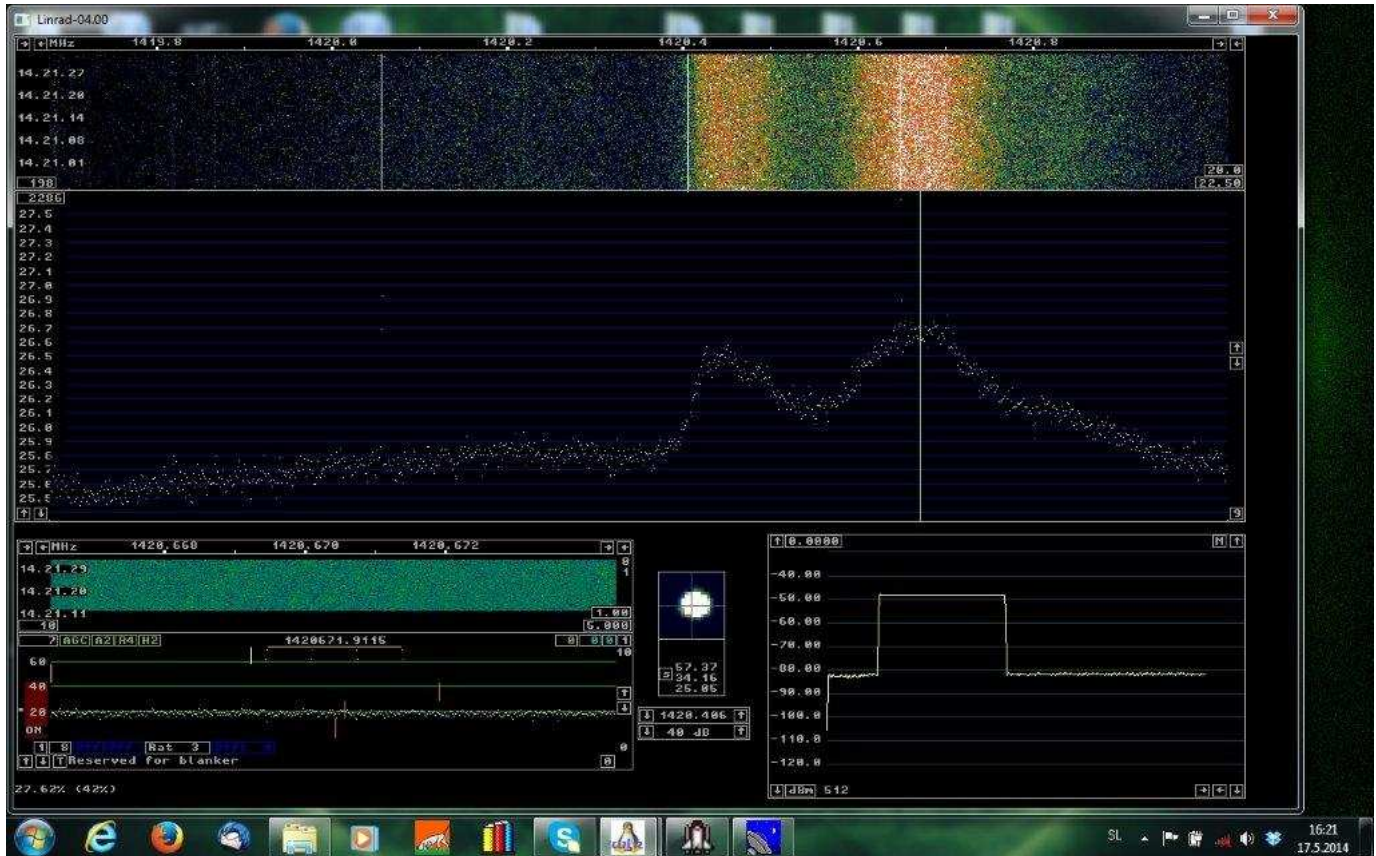
## Observing 21cm Hydrogen line

Over the winter 2013/14 I helped Matija – S53MM to build [3.6m parabolic mesh dish](#) for 23cm & UP EME. Looking at [11NDP](#) pictures of Hydrogen lines in Milky Way I decided to try to see them too. Afterwards I find nice pictures also on [FIEHN](#) home page. Until now I only used his SW for tracking the Moon and did not noticed his radio astronomy projects before.

I was pretty sure, that I can see this lines with [USB DVB-T dongle \(RTL 2832 & R820T tuner going up to 1.7 GHz\)](#) using S53MM EME preamplifier (0.3dB NF and 30dB Gain) and his Septum feed optimized for 23cm EME circular polarization.

I decided to use SM5BSZ Linrad SW. I made SM5BSZ pulse generator to calibrate DVB-T dongle. I achieved +/- 0.1 dB flat frequency response. Dongles have +/- 0.5 dB response without calibration (or more).

On the Saturday 17. May 2014 we decided to do short observations and than (more important) calibrate his AZ/EL rotor afterwards. This is what I get on my monitor:



I didn't have enough time to optimize my observations. I am sure that I have some room to improve.

Antenna was pointed some where around Cassiopeia A source. Two arms of our galaxy with different Doppler shifts are detected.

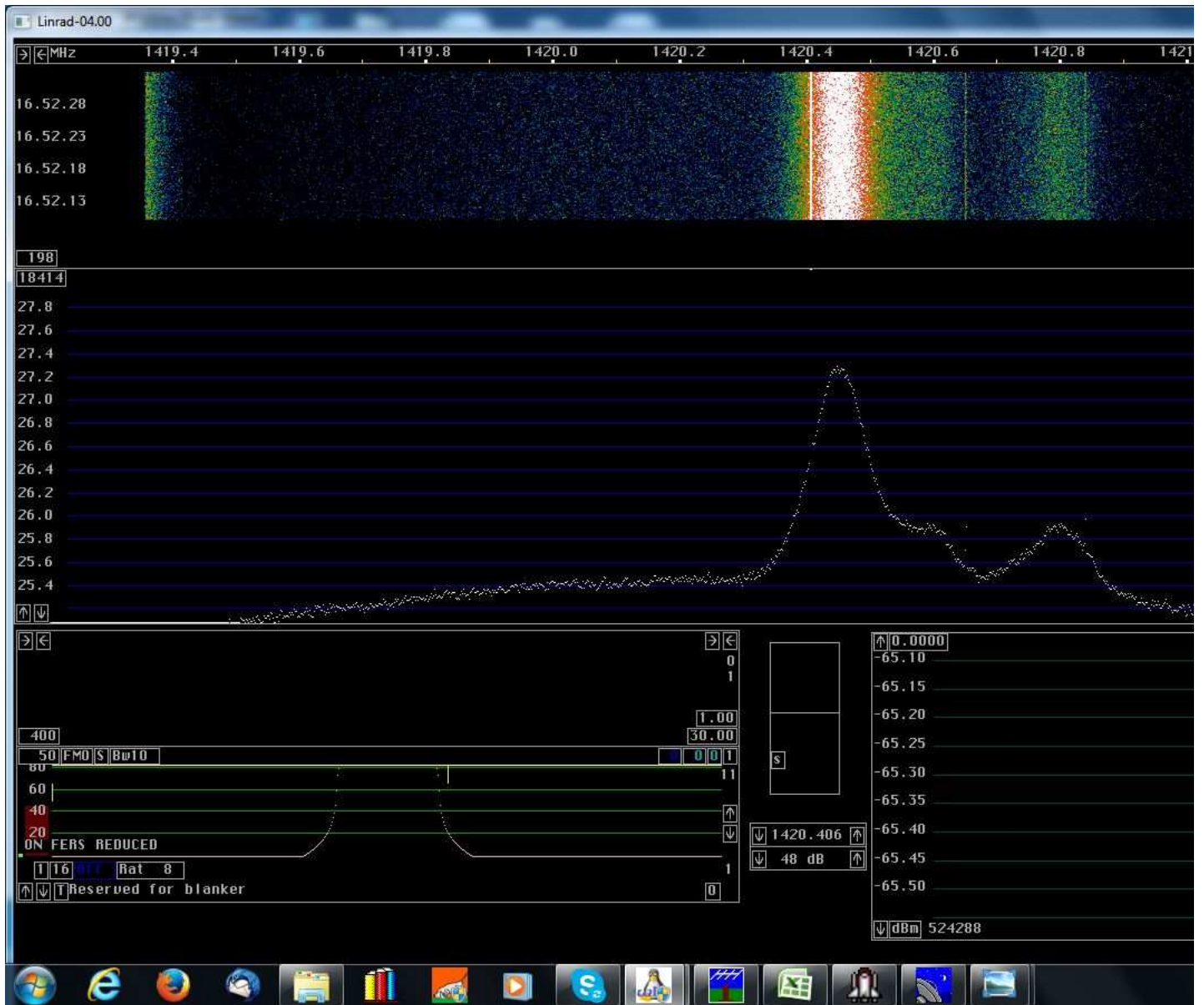
Trying to find other similar attempts on internet, I found also [S57UUU](#) and [S57RA](#) pages with quite serious radio astronomy.

New feed tuned for 1420 MHz:



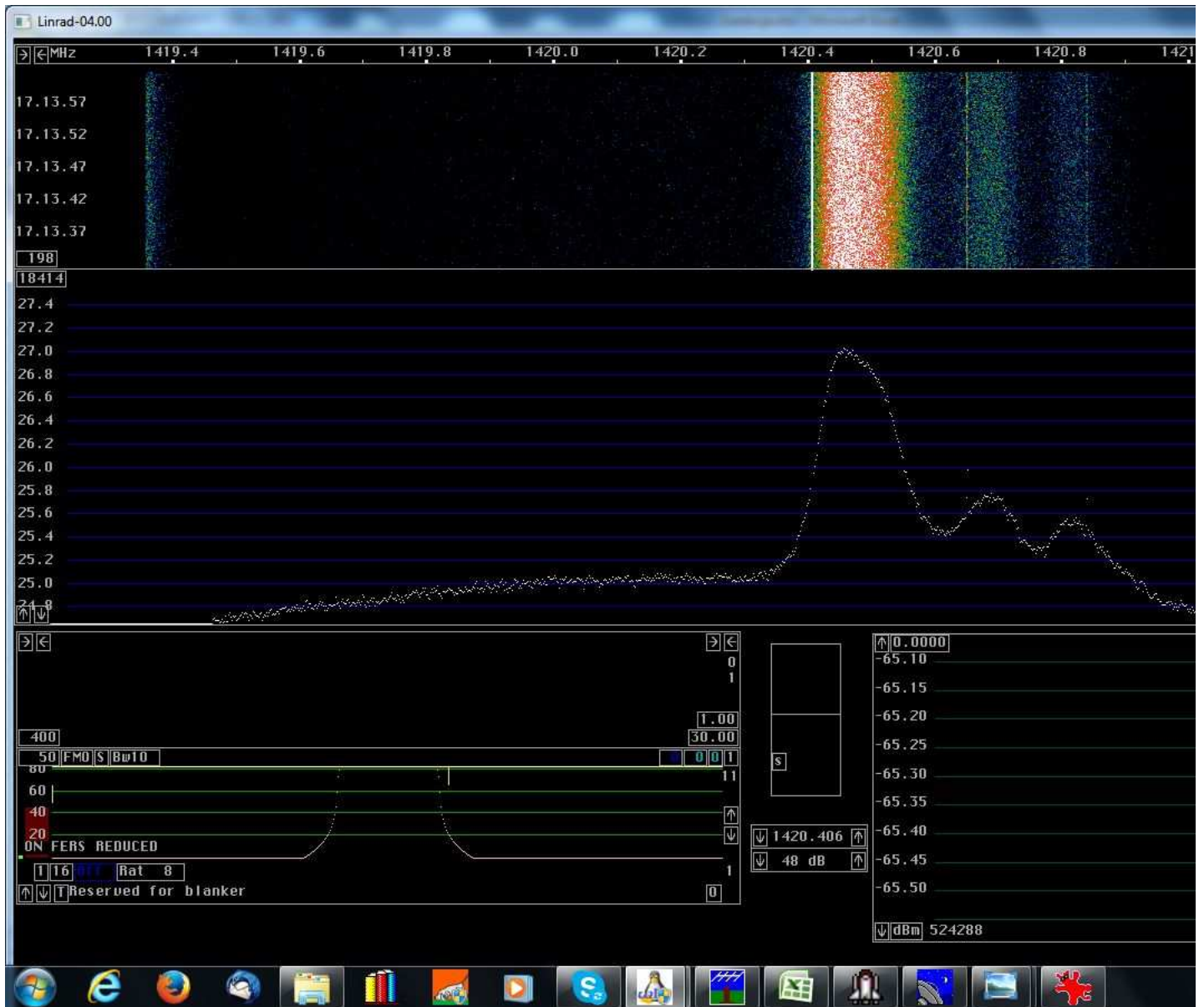
Results are better for 0.3dB compared to septum feed tuned to 1300 MHz

Galactical coordinates  $L=70$   $De=0$  with a new feed. Diagram made on 15.08.2014.

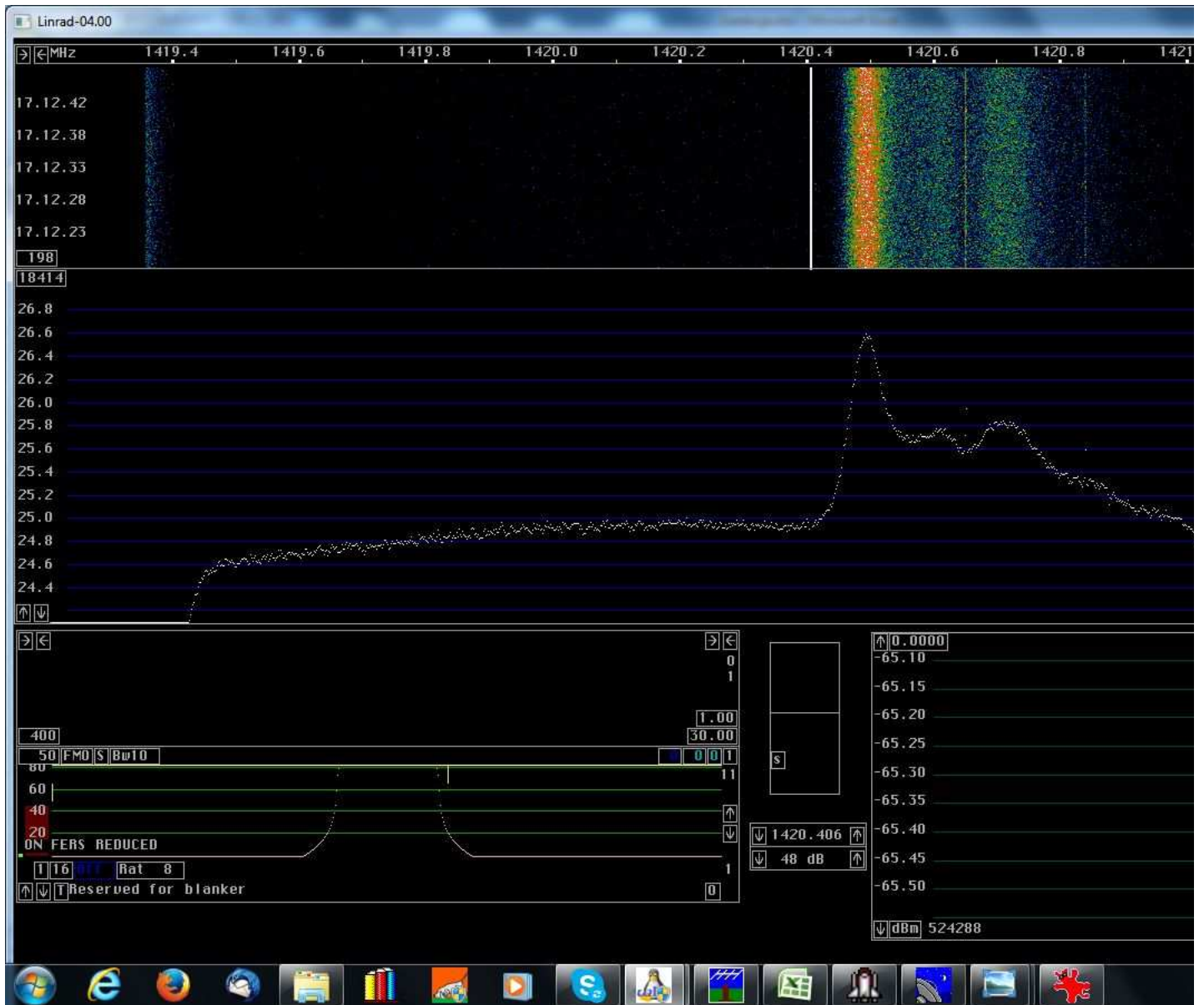


Galactical coordinates L=80, De=0

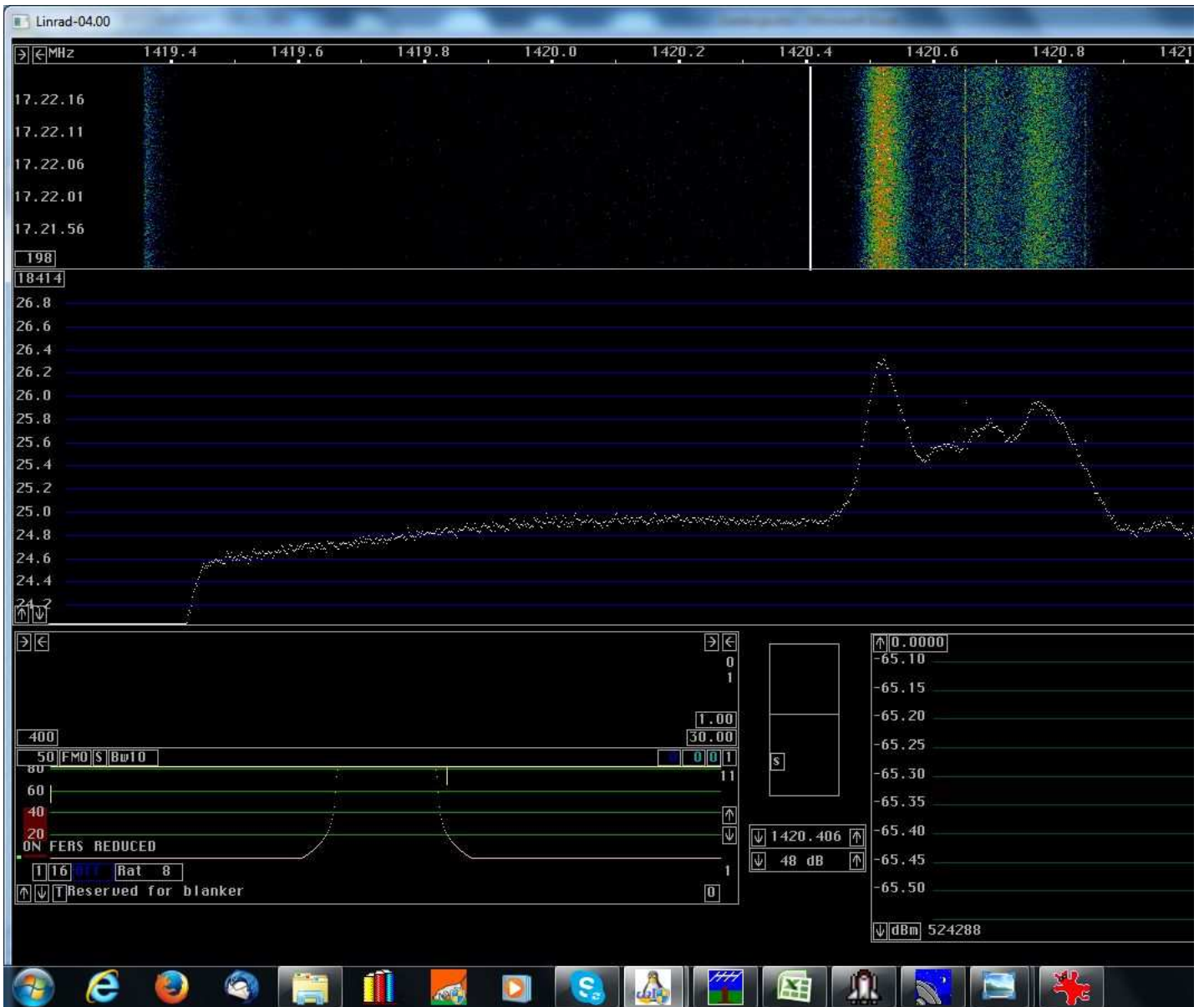




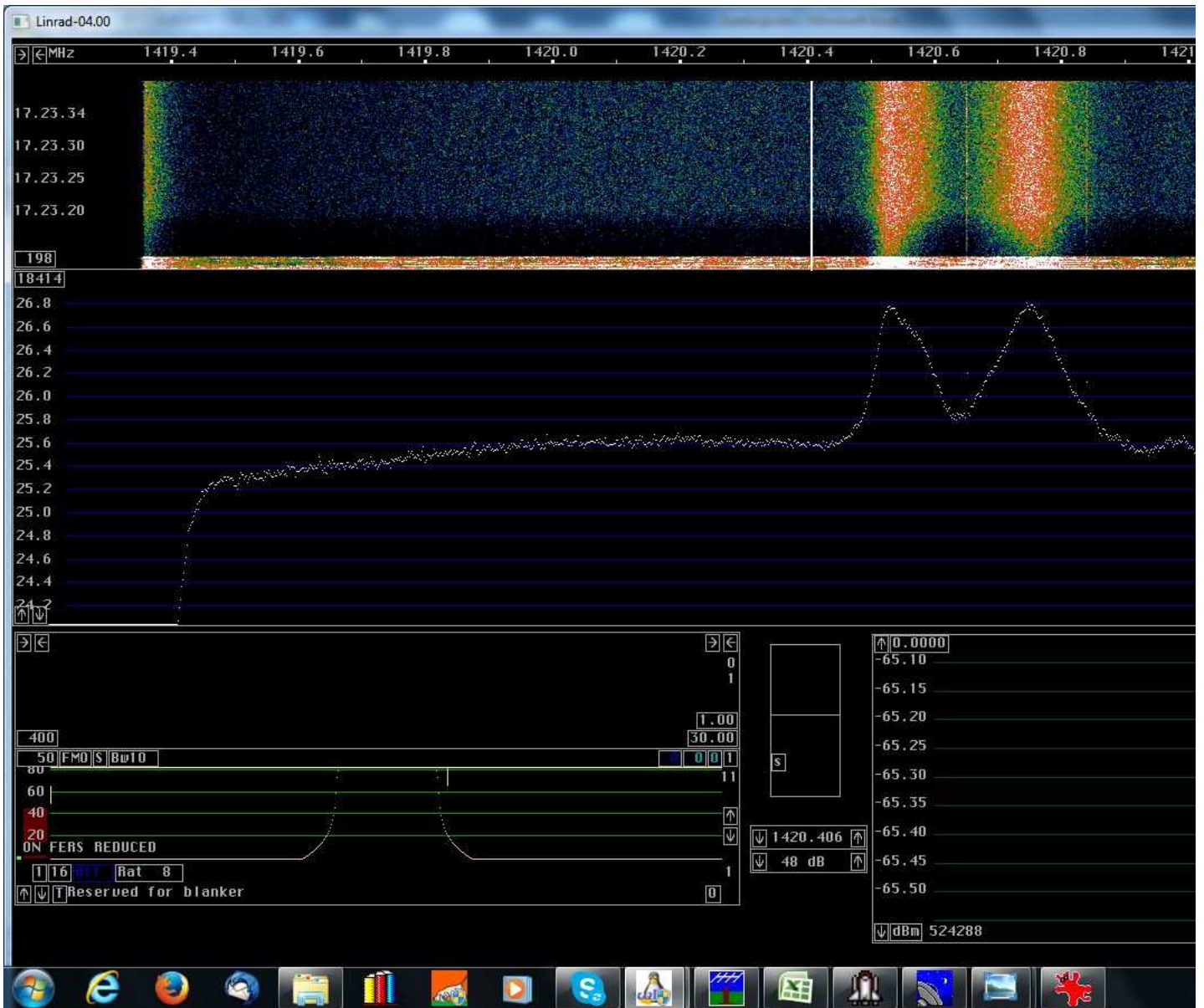
L=90, De=0



L=100, De=0



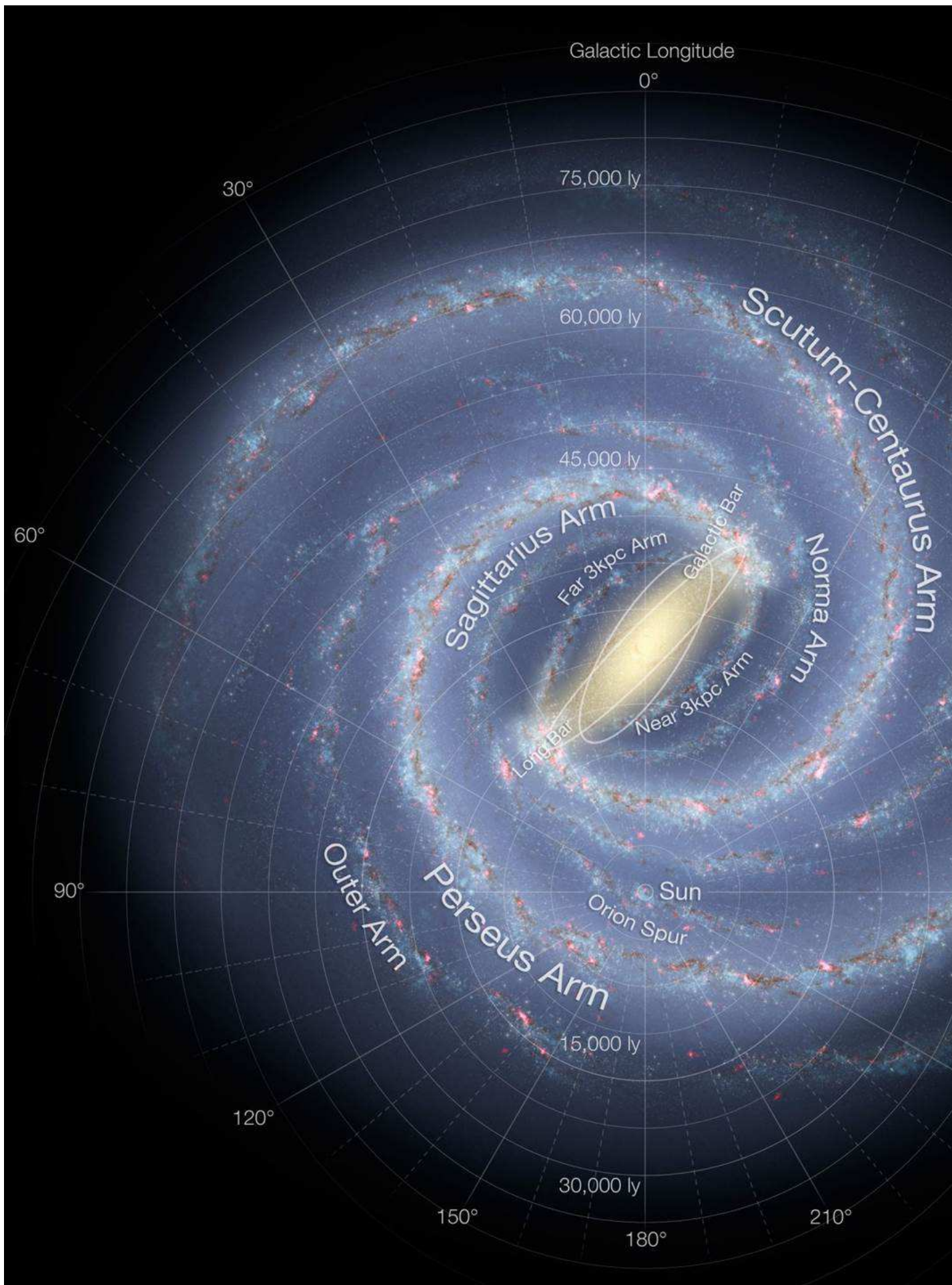
L=110, De=0



I also find out that noise is at least 2dB higher if tree is an obstacle in the way.

Here is picture of Milky Way with coordinates for comparison of my results.



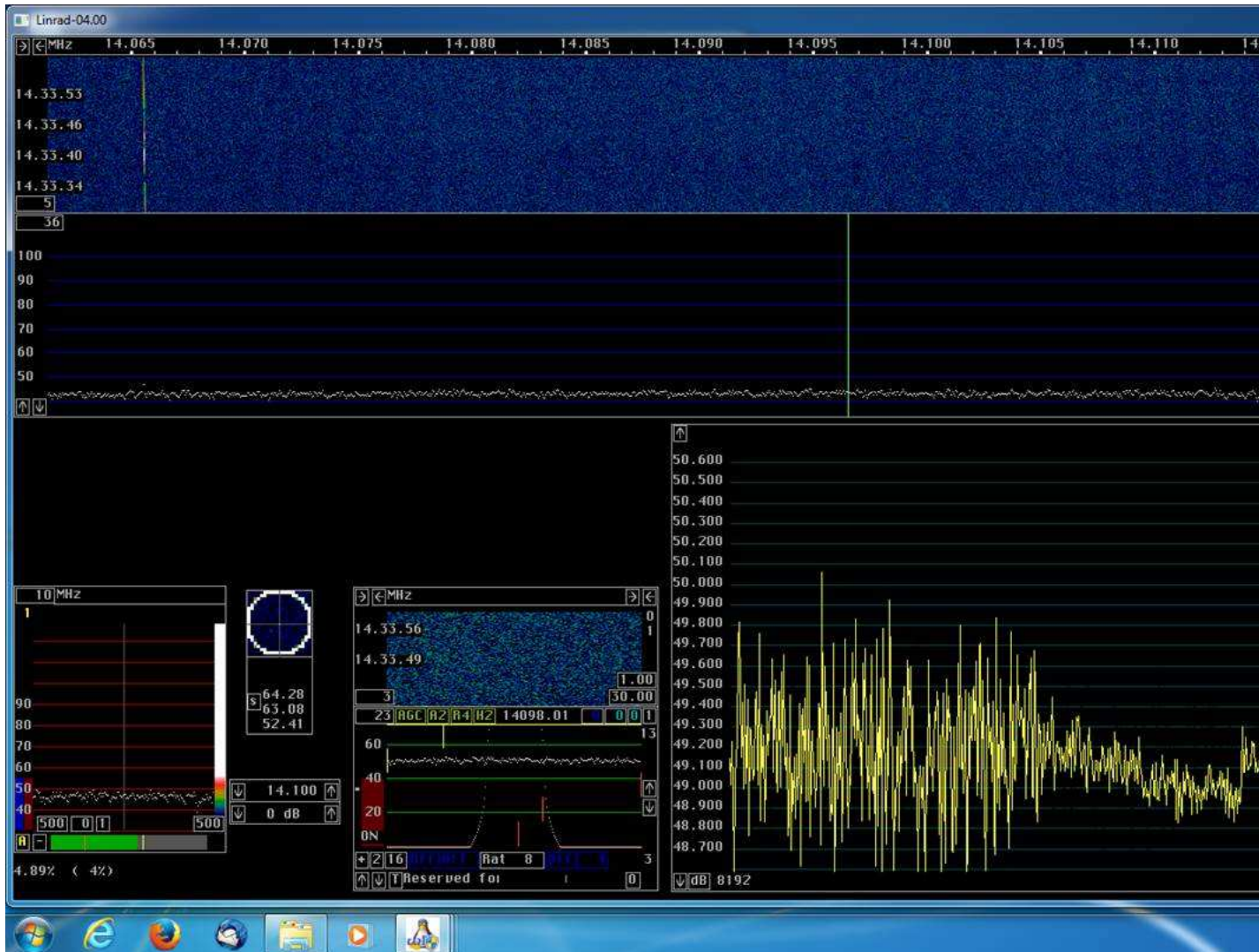


[Short video](#) when moving antenna.



### Moon Noise – 28. 03. 2015

Here is Moon noise (around 0.25dB over cold sky) on 2.3 GHz. I used DB6NT transverter with preamplifier (2.3 GHz to 144 MHz, than Javornik transverter from 144 MHz to 14 MHz and Afedri SDR with Linrad). Antenna is 3.6m mesh parabolic dish. 2.3 GHz picture is a bit messy. Noise can be seen in the last bulge before diagram goes sky high because of ground noise. Then we changed feed to 3.4 GHz for DUBUS 3.4 GHz EME contest.



With similar equipment we than also saw Moon noise on 3.4 GHz. We take a litle more time to do that and picture below is nice now. We measured about 0.3 dB of Moon noise on 3.4 GHz.

