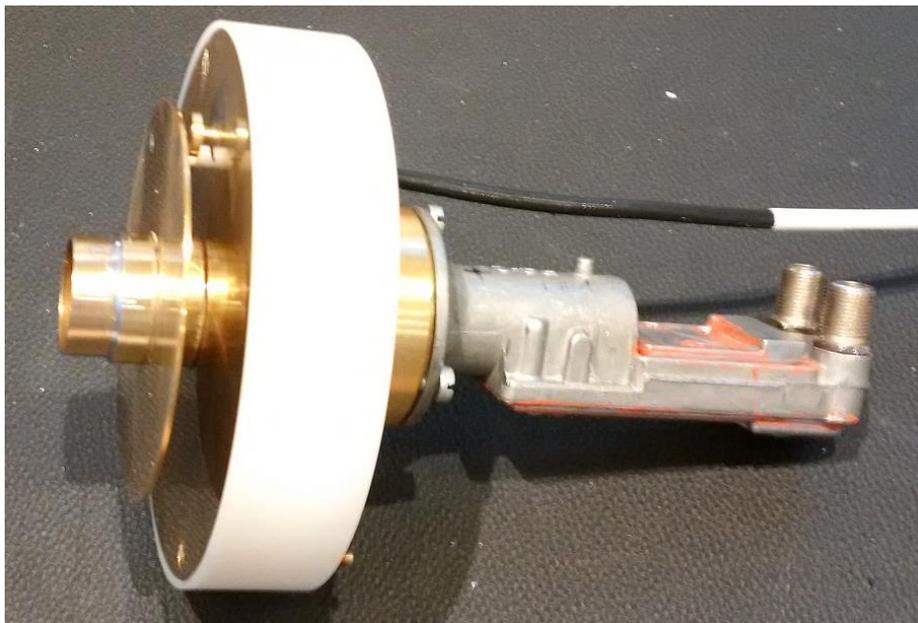


## Comparison of Dualband Feeds POTY and from DJ7GP for QO-100

Matthias, DD1US, August 9<sup>th</sup>2019, Rev 1.0

Since the beginning of the activation of QO-100 I have been using a dual-band feed which I built according to the description from Peter-Jürgen Gödecke DJ7GP. It works quite fine but I knew from measurements after I built it almost 3 years ago that the polarization is rather linear than circular. Beginning of 2019 the POTY (Patch of the year developed by Mike Willis G0MJW, Remco den Besten PA3FYM and Paul Marsh M0EYT) was published and I decided to give it a try. The concept is very similar except that the front patch is square with cutoff corners compared to the circular front patch and a tuning screw at the feed according to DJ7GP.

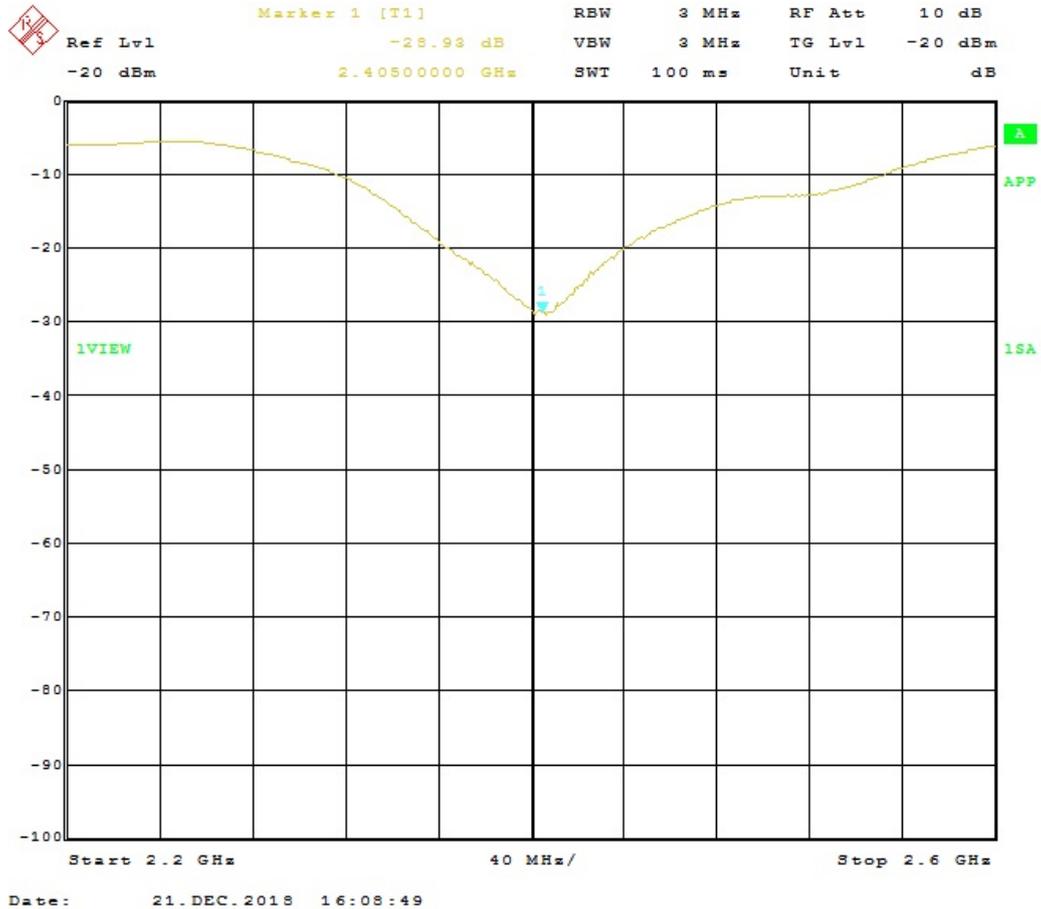
The design according to DJ7GP was modified in order to attach a modified Octagon LNB directly to the back of the 10 GHz waveguide. You can find a detailed description on my website. Here are some pictures:



The feed is housed in a plastic encasing in the dish with the front covered with a PTFE ring holding a PTFE foil:



The return loss is approximately 29dB and thus very good:



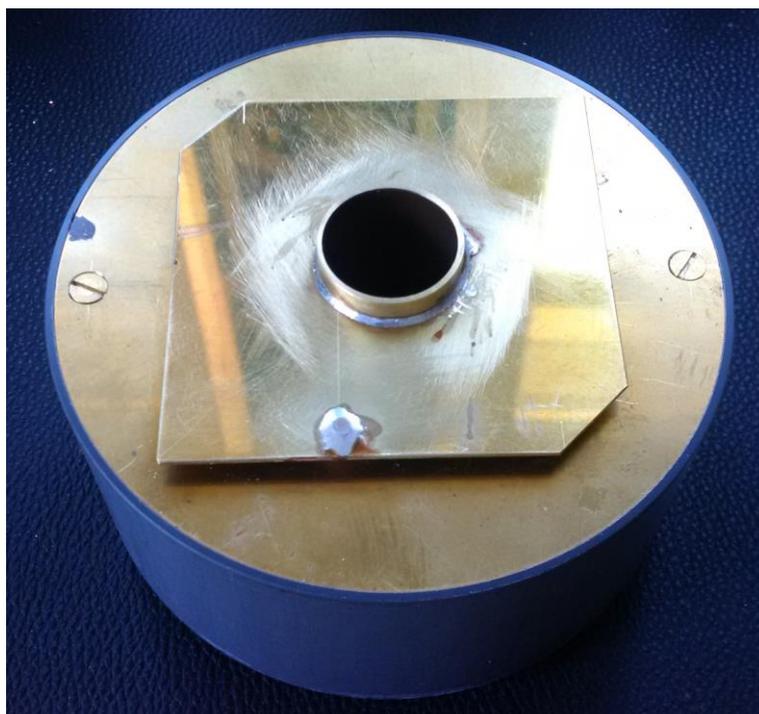
When I tested this patch antenna using a short link to a linear polarized logarithmic periodic antenna, I noticed that the received signal was varying strongly when turning the linear polarized antenna around its central axis. This shows that the antenna is not properly circular but rather linear polarized. I assume that the feed sold by BaMaTech does have the same behavior as it follows the design of DJ7GP.

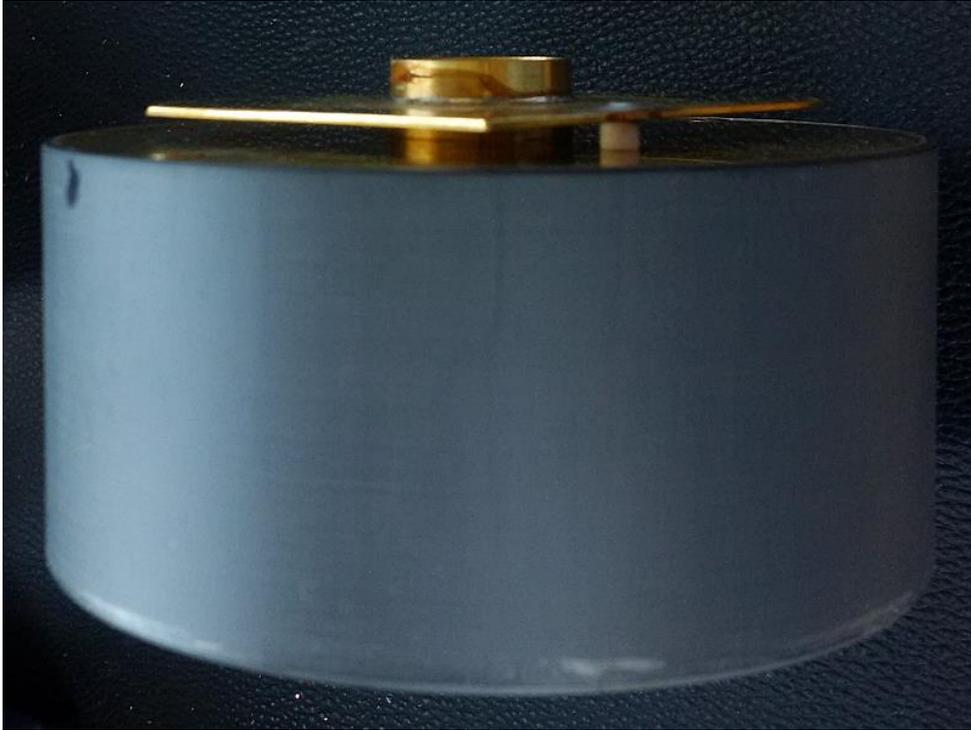
Even with the non-perfect polarization this feed works quite well. I have made more than 500 QSOs using this feed with 300mW and a 1.8m prime focus dish with an f/D of 0.4.

As I plan to become QRV in DATV soon I did not want to lose precious uplink power with the non-ideal polarization. Thus, I decided to build the POTY feed and compare it with the existing feed. The encasing is almost identical with the previous feed and thus the feeds can be swapped very quickly for a fair comparison.

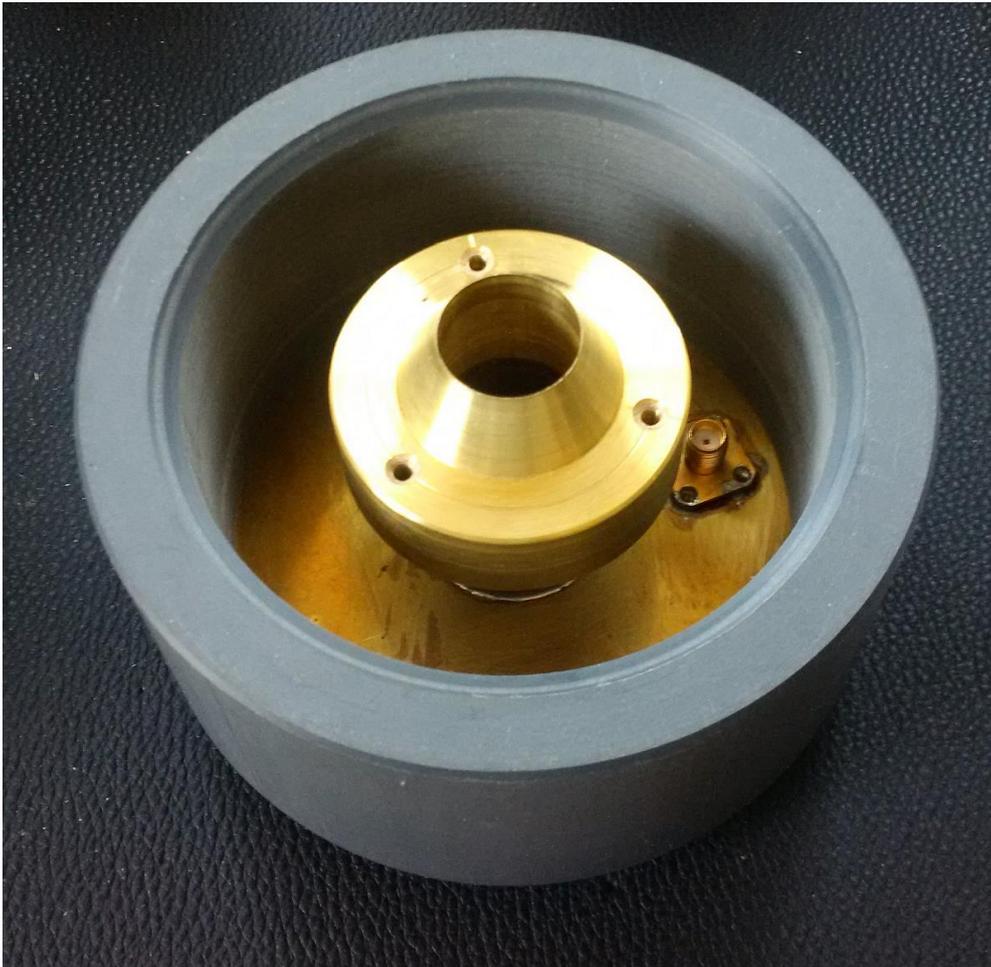


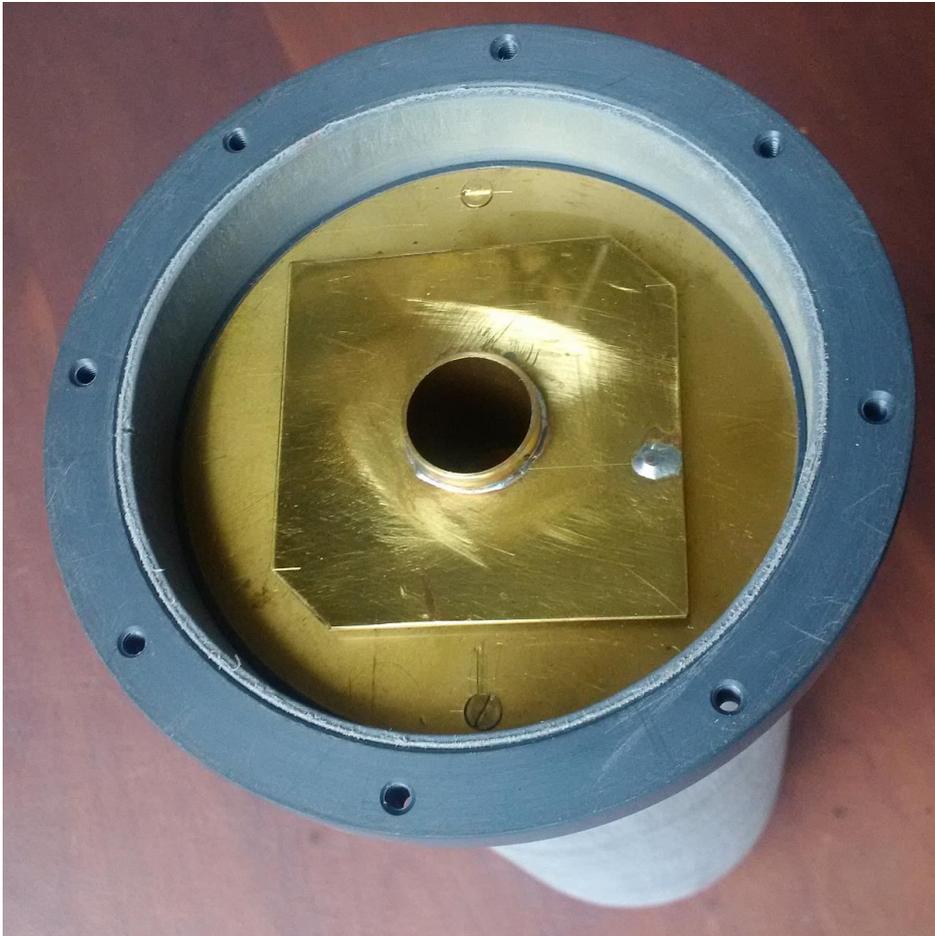
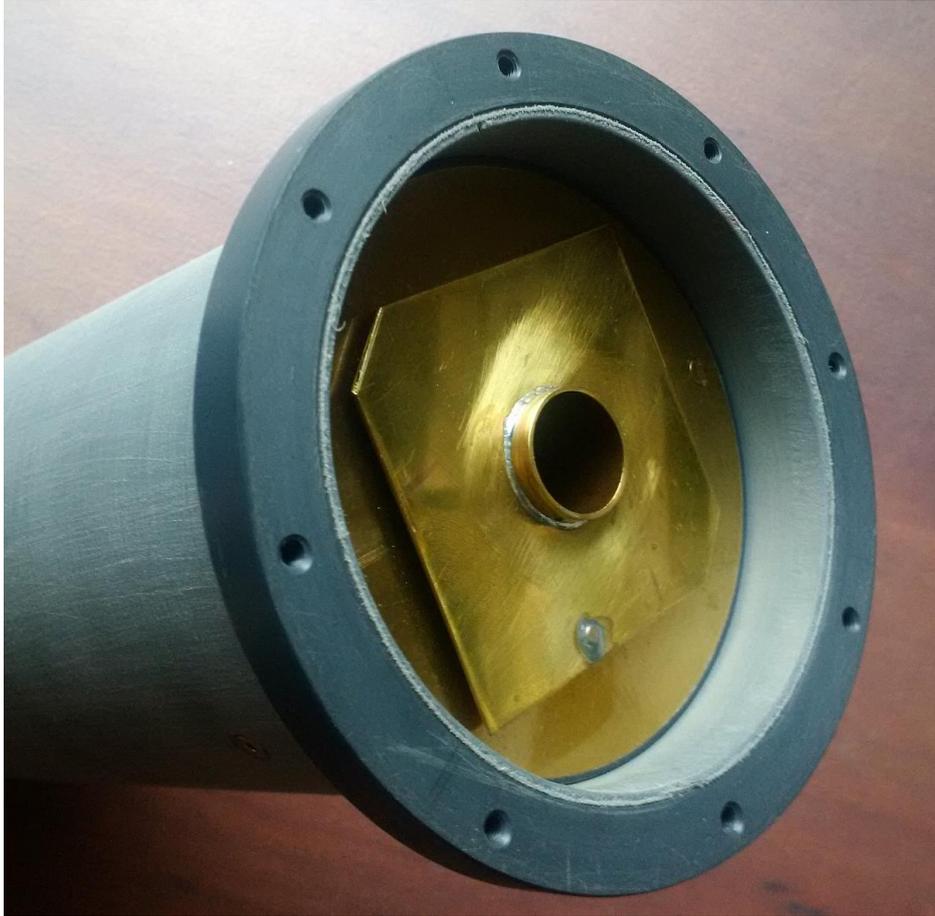
In order to fit my POTY feed in the same plastic tube as the previous feed I had to reduce the diameter of the reflector slightly. All parts of the feed are made from brass and are soldered. Here are some pictures:

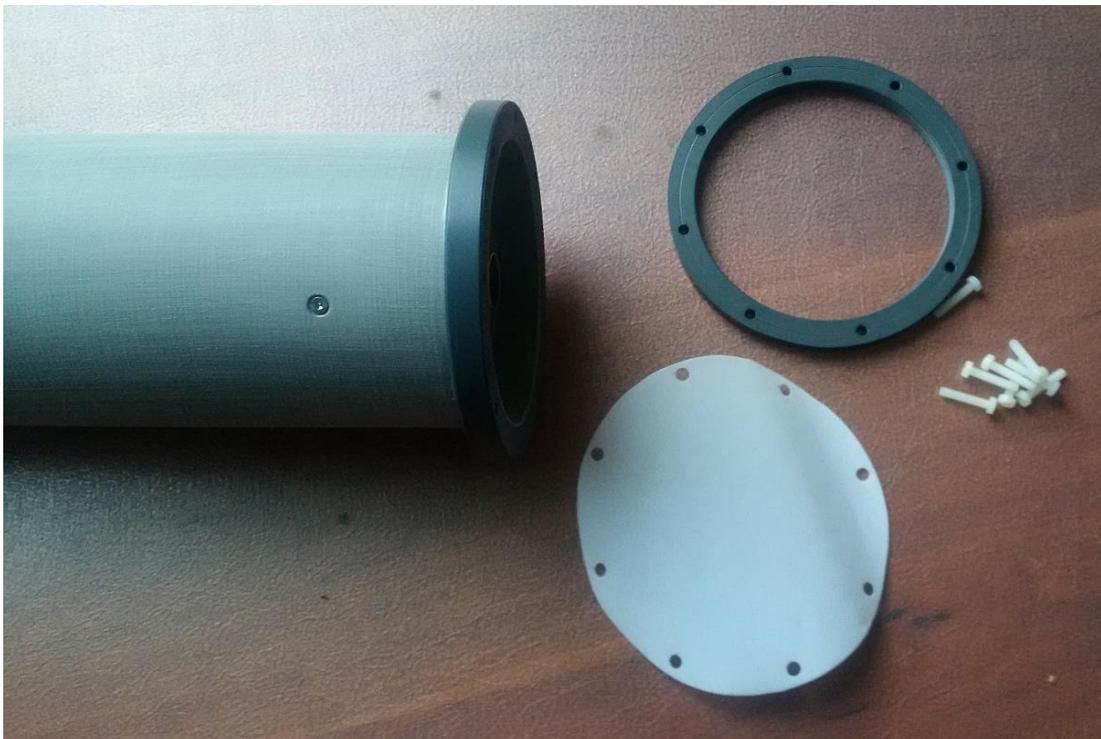




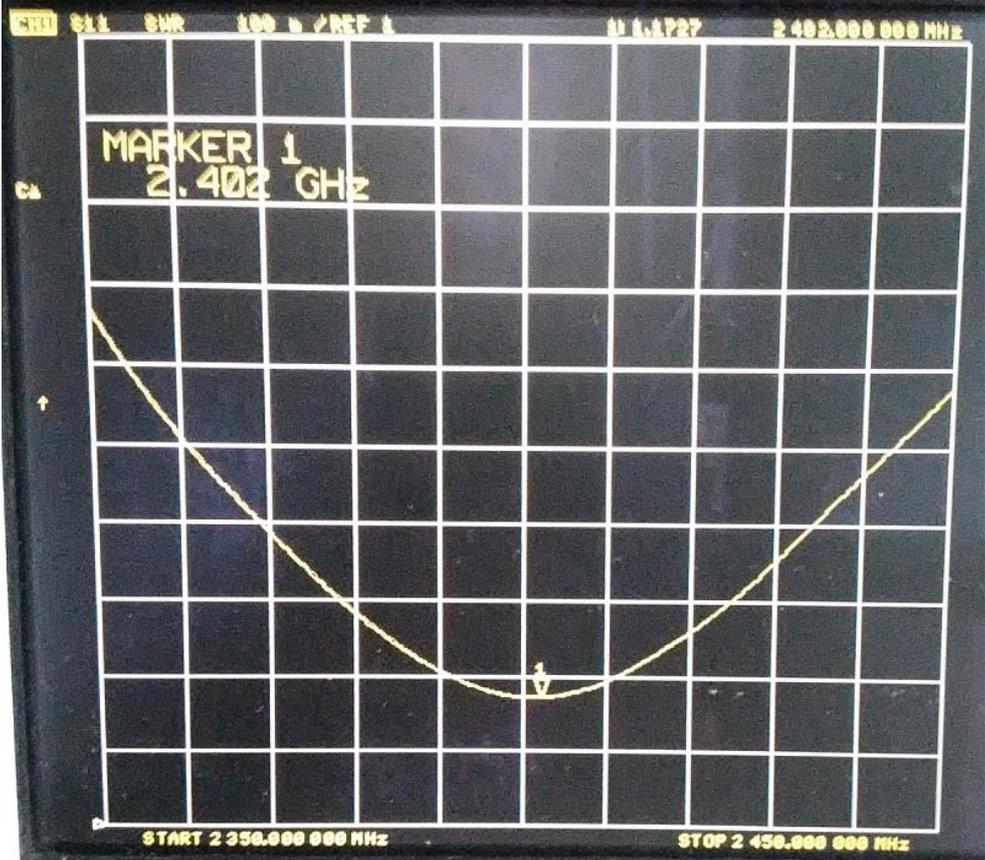
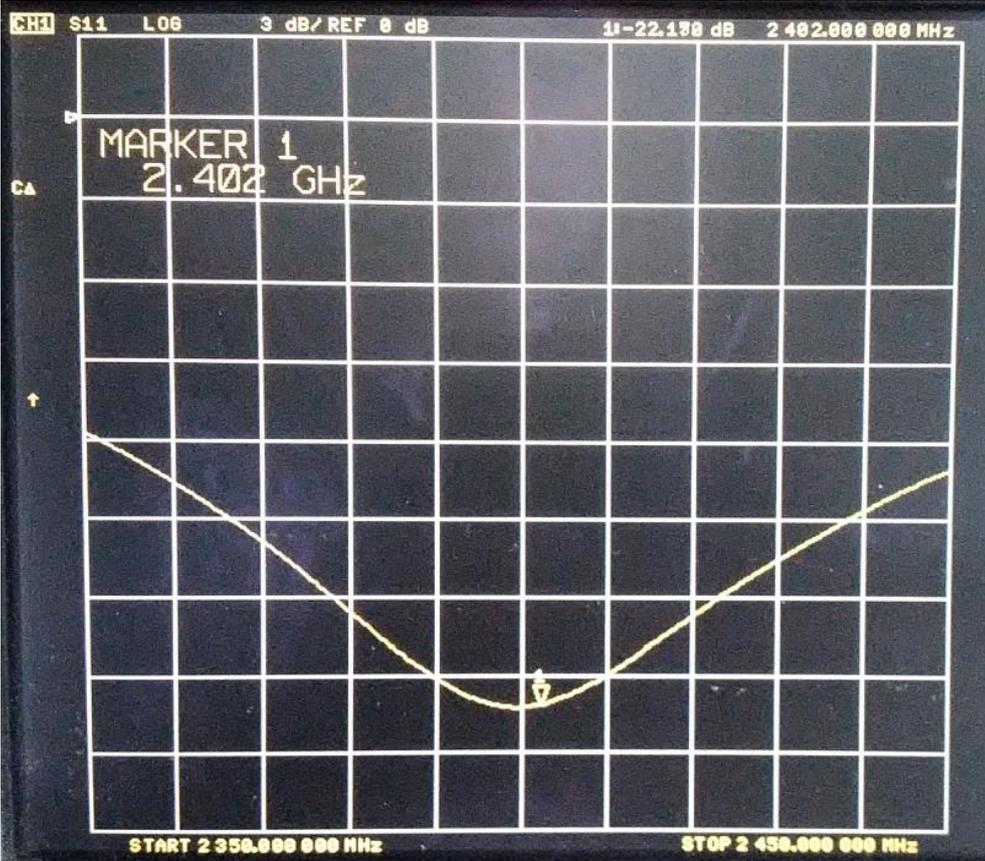
The patch antenna is screwed into a plastic ring which is later fixed inside the tubular encasing. Thus I can remove the patch antenna easily form the encasing by removing the 2 brass screws.





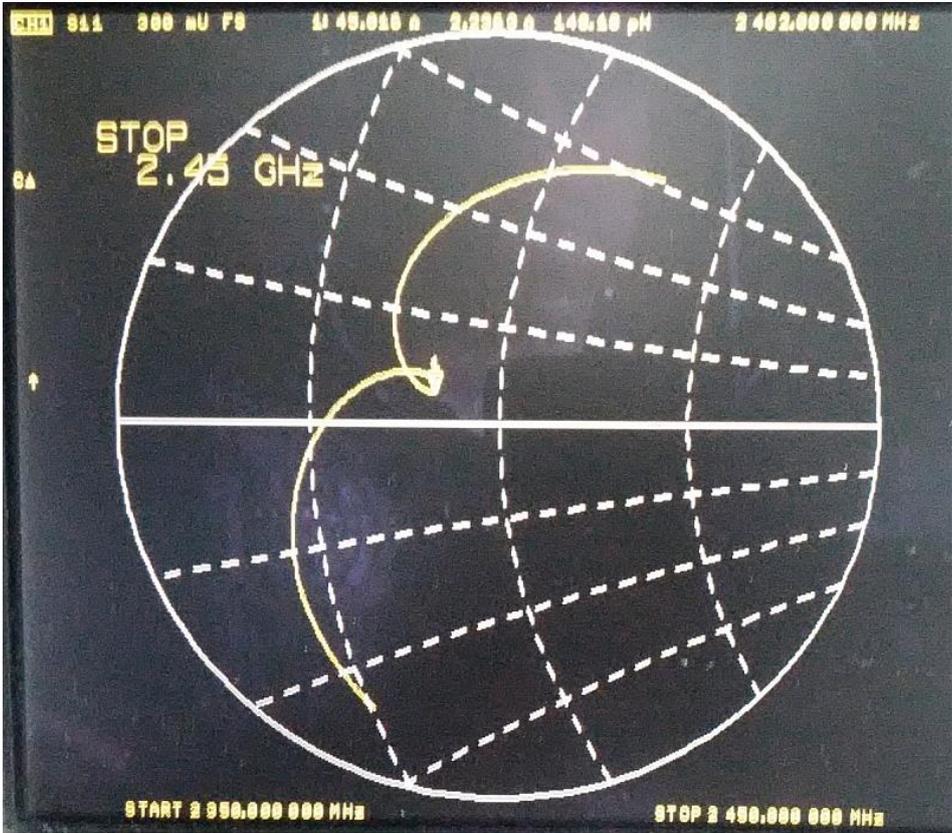
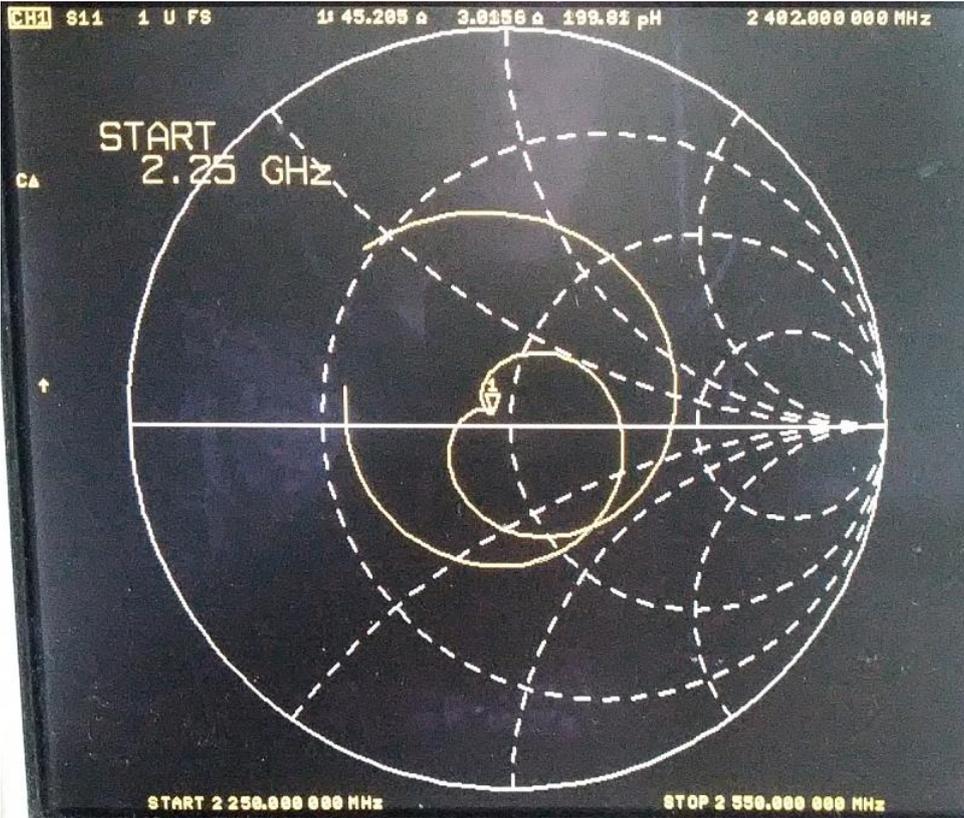


Here are measurements of the return loss of the 13cm patch antenna:



The return loss is 22dB and correspondingly the SWR is 1:1.17. These are excellent values.

The input impedance of the feed shows the expected shape in the Smith chart:



The resonance at 2402 MHz is due to the shape of the front patch with 2 corners cropped. Thus, there are 2 resonances slightly above and below 2402 MHz which are superimposed and which result in the desired circular polarization of this feed.

I tested both feeds on QO-100 and my signal on the narrowband transponder was about 2.5dB (2-3dB) better using the POTY compared to the feed according to DJ7GP. I assume this is based on a much better circular polarization compared of the POTY feed. The measurements on QO-100 were also confirmed by other stations.

Receive tests with different dielectrically lenses made from PTFE did not show any improvements of the SNR of the received signal at 10 GHz. I assume the open round waveguide illuminates my prime focus dish quite well.

If you have any questions or comments please send them to the Email address which you will find below.

Best regards

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