How well works a K&L 1990 MHz lowpass filter in the 13cm band ?

Matthias, DD1US, August 20th 2020

Hello,

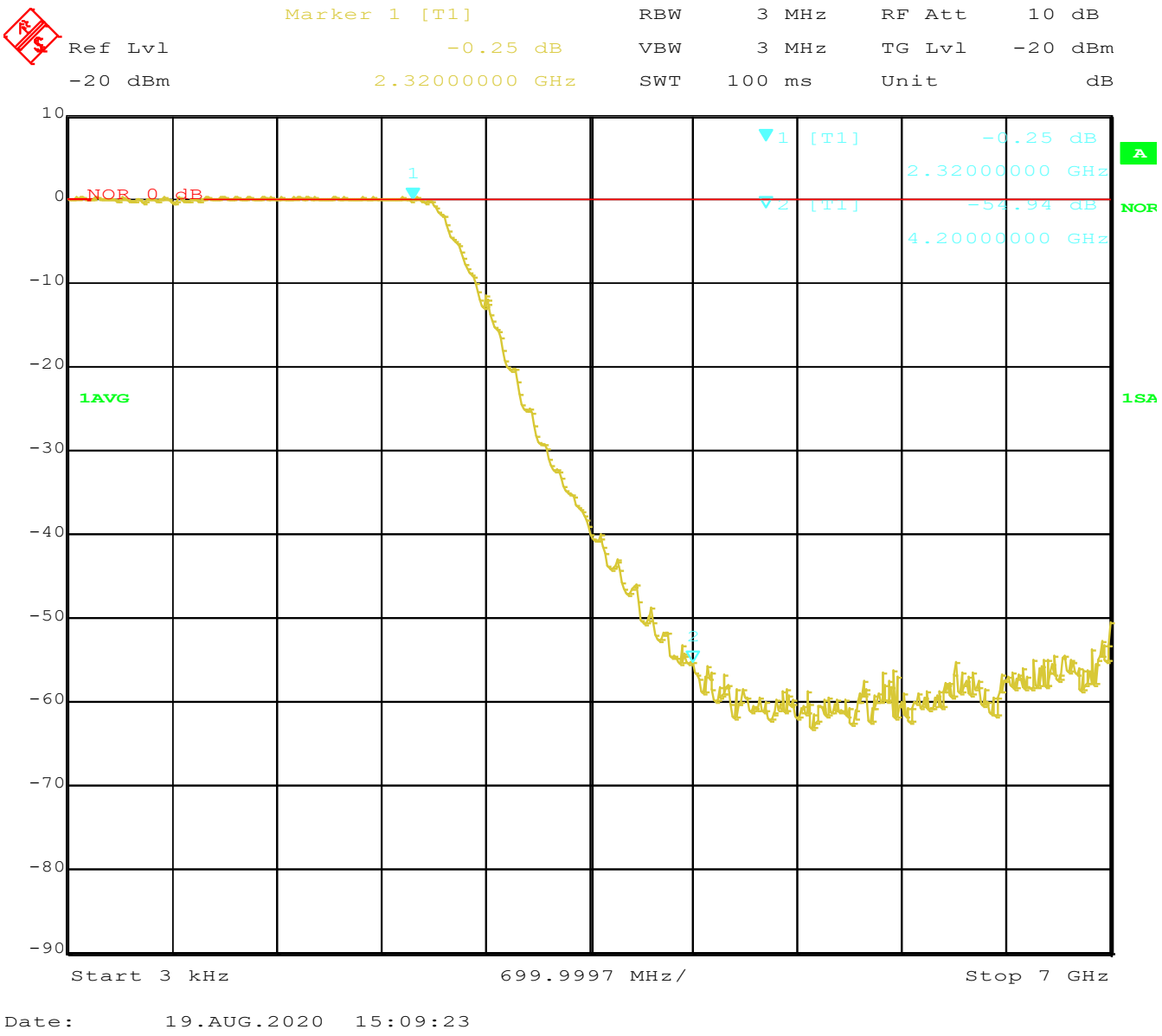
Some time ago I bought a filter from K&L Microwave Inc. and finally found the time to characterize it.
The type is K&L 4L121-1990/X12750-NP/N.

Here is how it looks like:

According to the nomenclature of K&L that means:

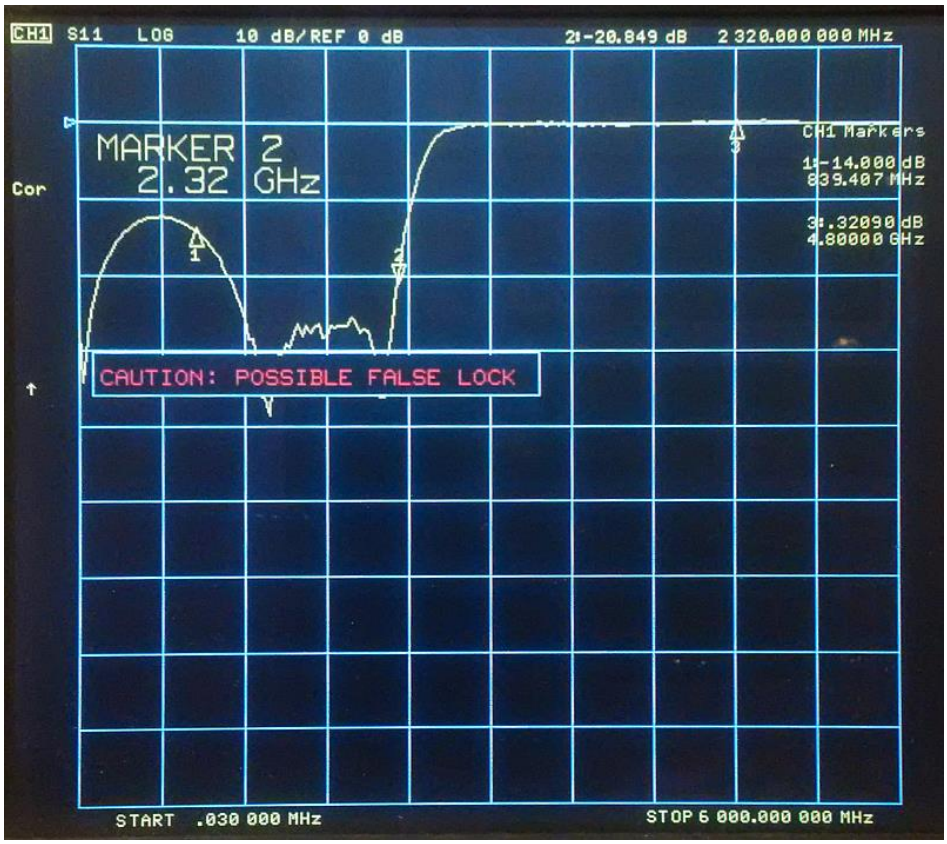
4 sections, low pass filter, 1dB cutoff frequency 1990 MHz, upper frequency stopband limit 12750 MHz, N female and N male connectors.

First, I measured the filter using a spectrum analyzer with tracking generator which covers the frequency range up to 7 GHz. The setup is limited to measure a maximum insertion loss of 60dB.

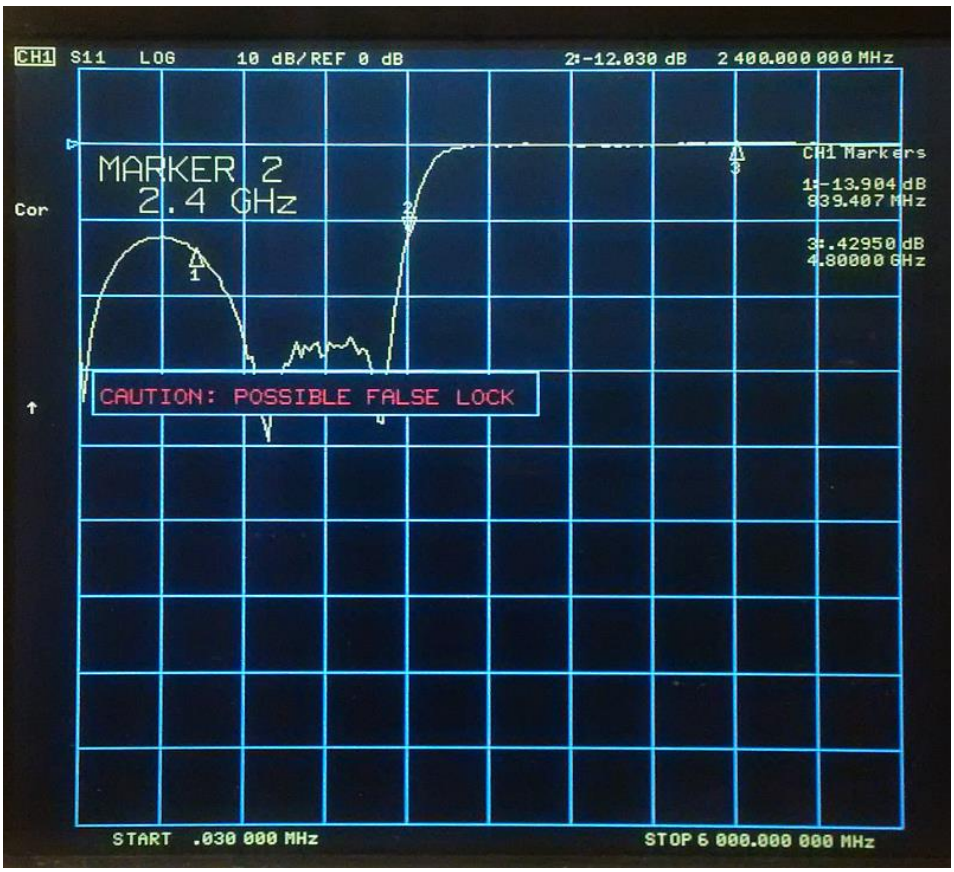


The measured insertion loss at 2320MHz is 0.25dB. At 4200MHz the stopband rejection is 55dB.

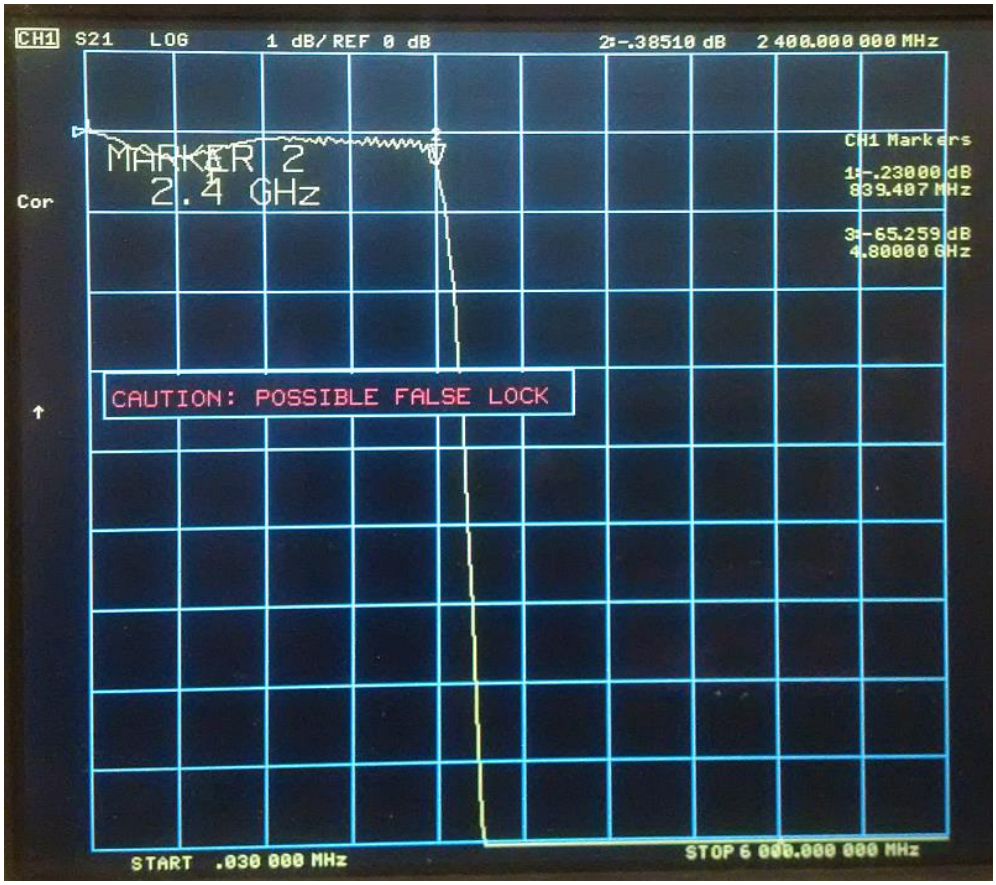
Next, I measured the S-parameters of the filter with a VNA in the range up to 6GHz. Please ignore the warning message in the screenshots 😉



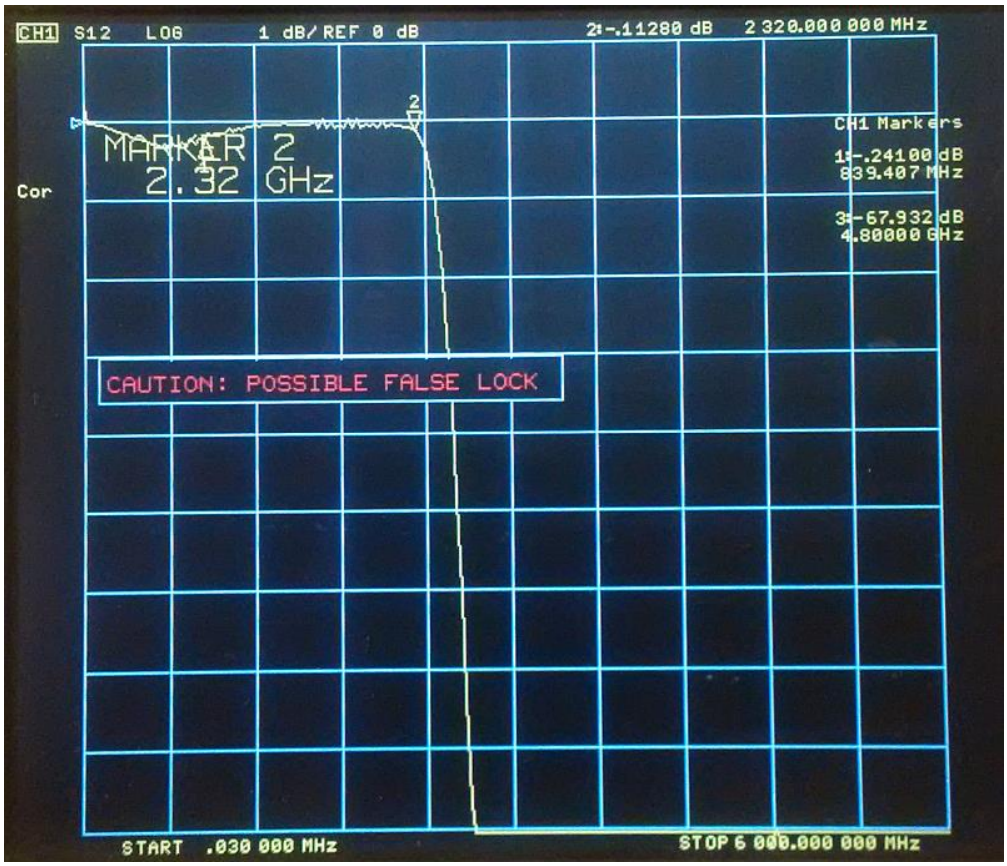
S11 log mag: -20dB @2320 MHz



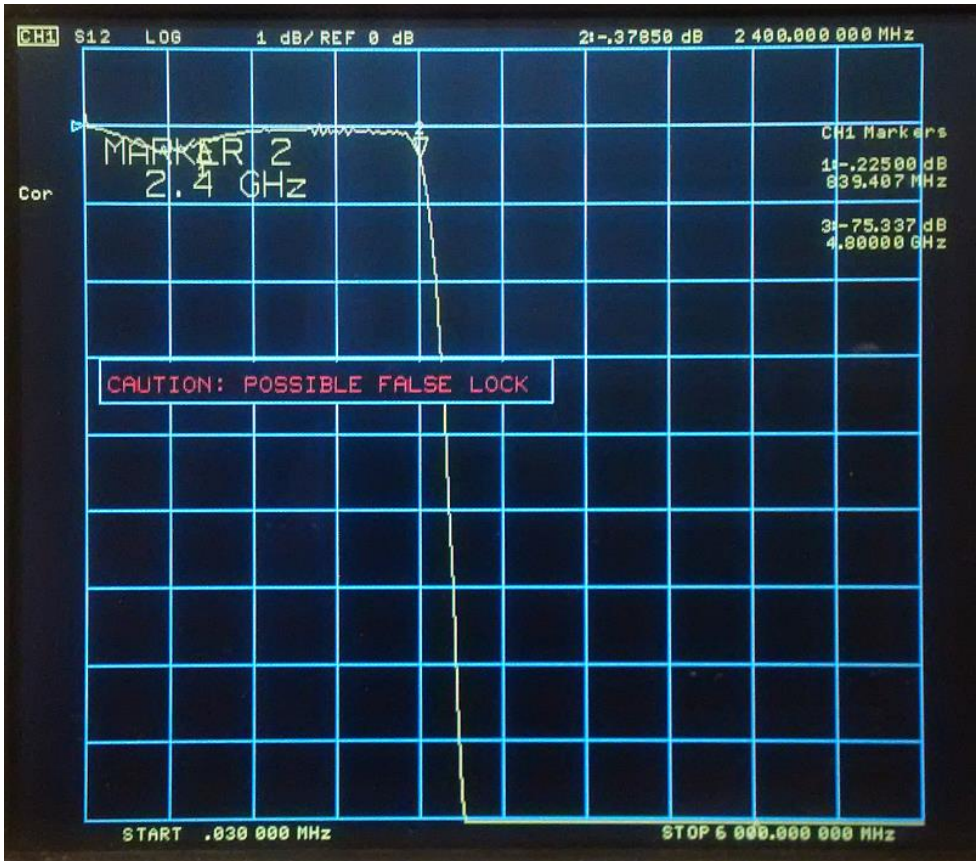
S11 log mag: -12dB @2400 MHz



S21 log mag: -0.39dB @2400MHz

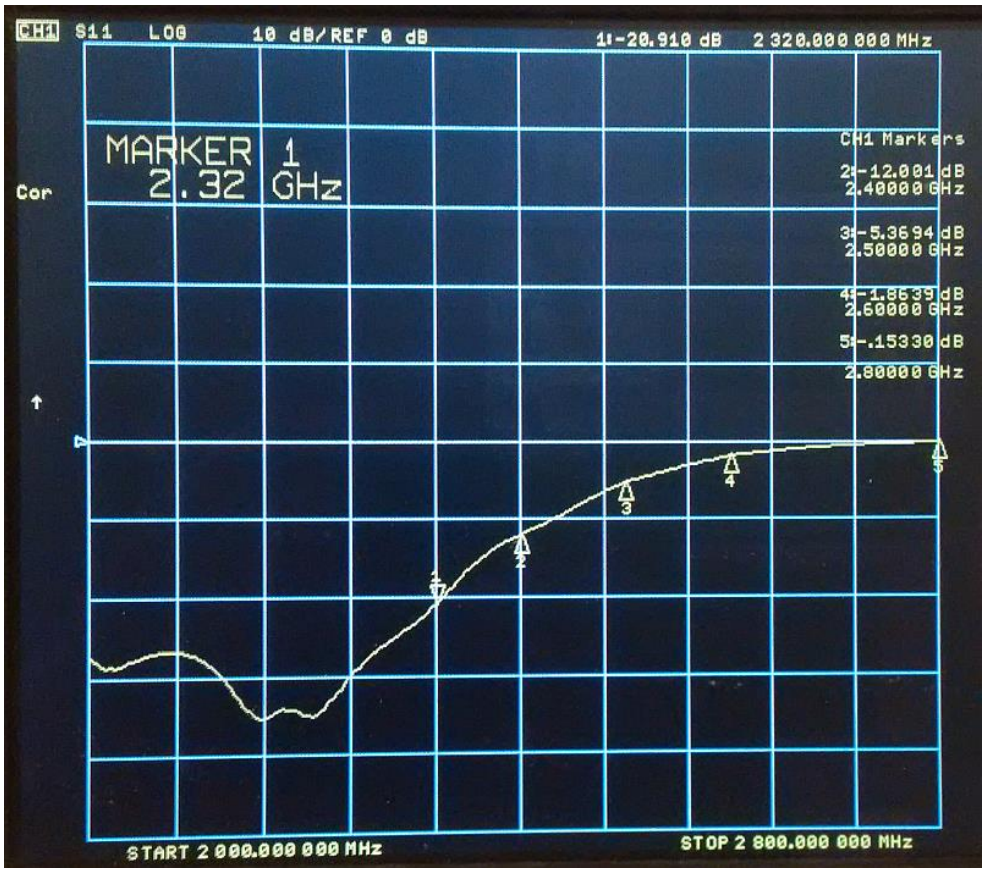


S12 log mag: -0.11dB @2320MHz

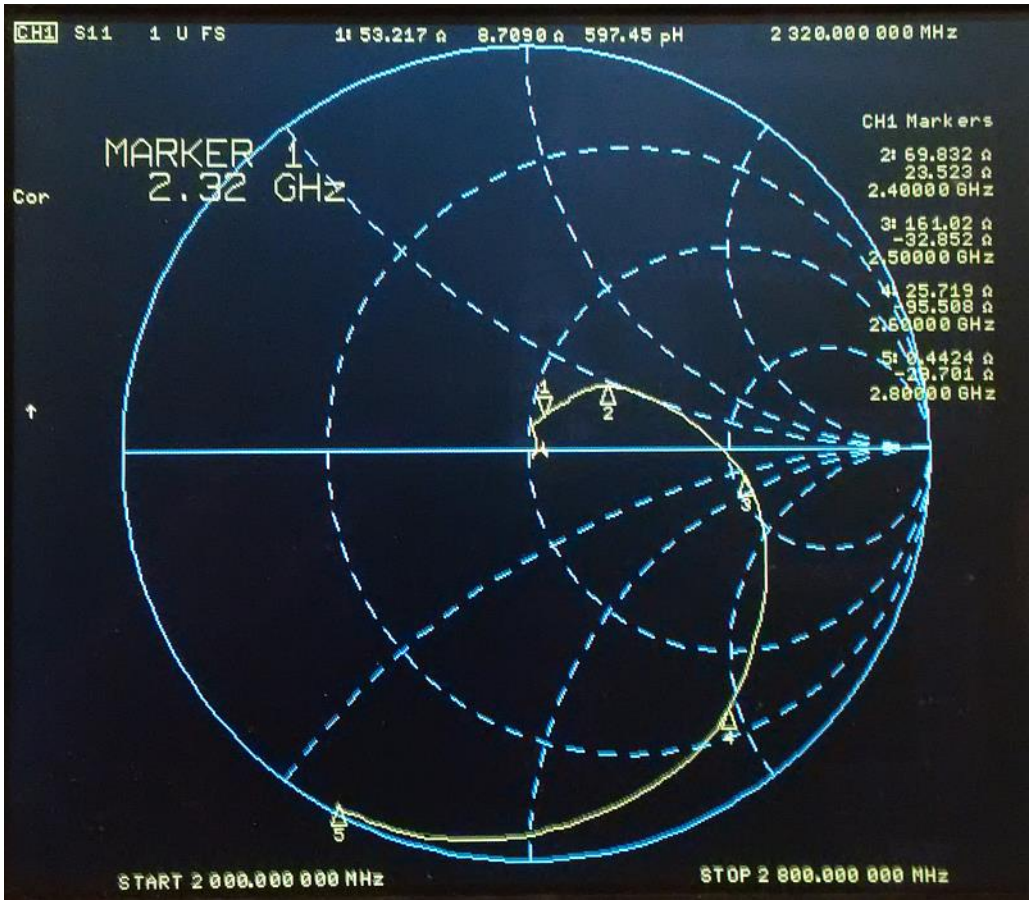


S12 log mag: -0.38dB @2400MHz

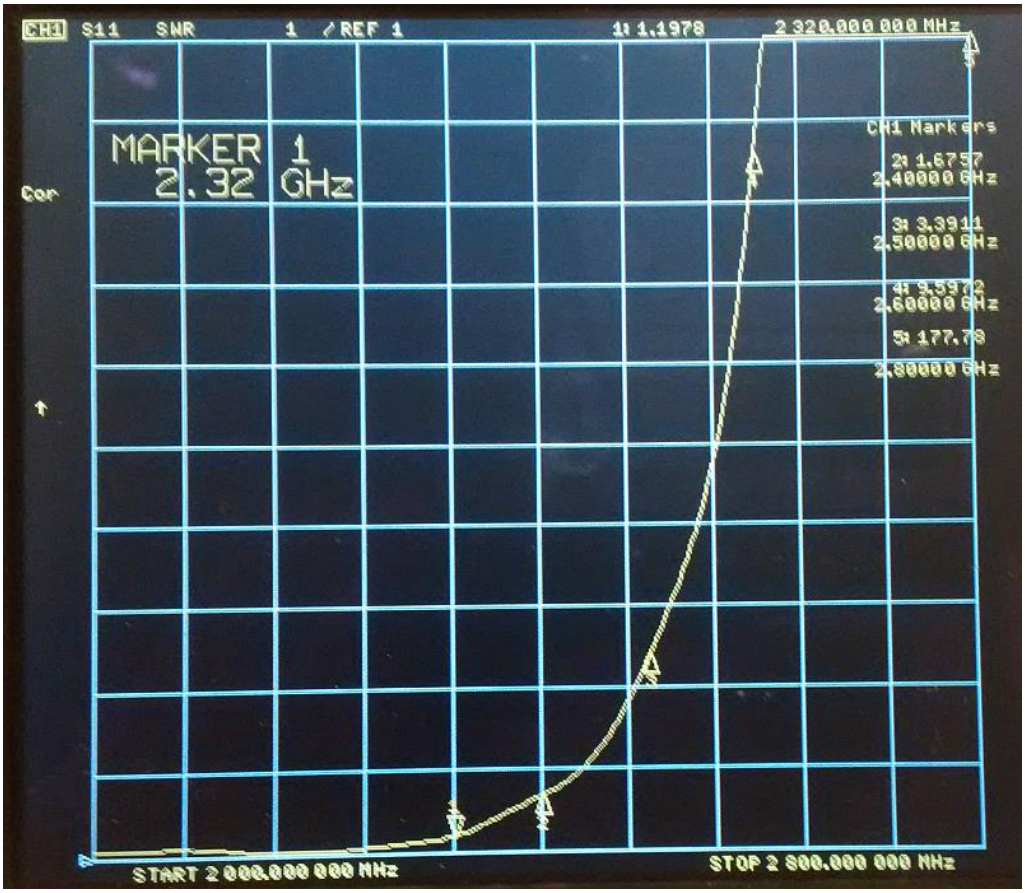
Finally, I measured the s-parameters in the frequency range from 2000 to 2800 MHz which is the transition frequency range from passband to stopband.



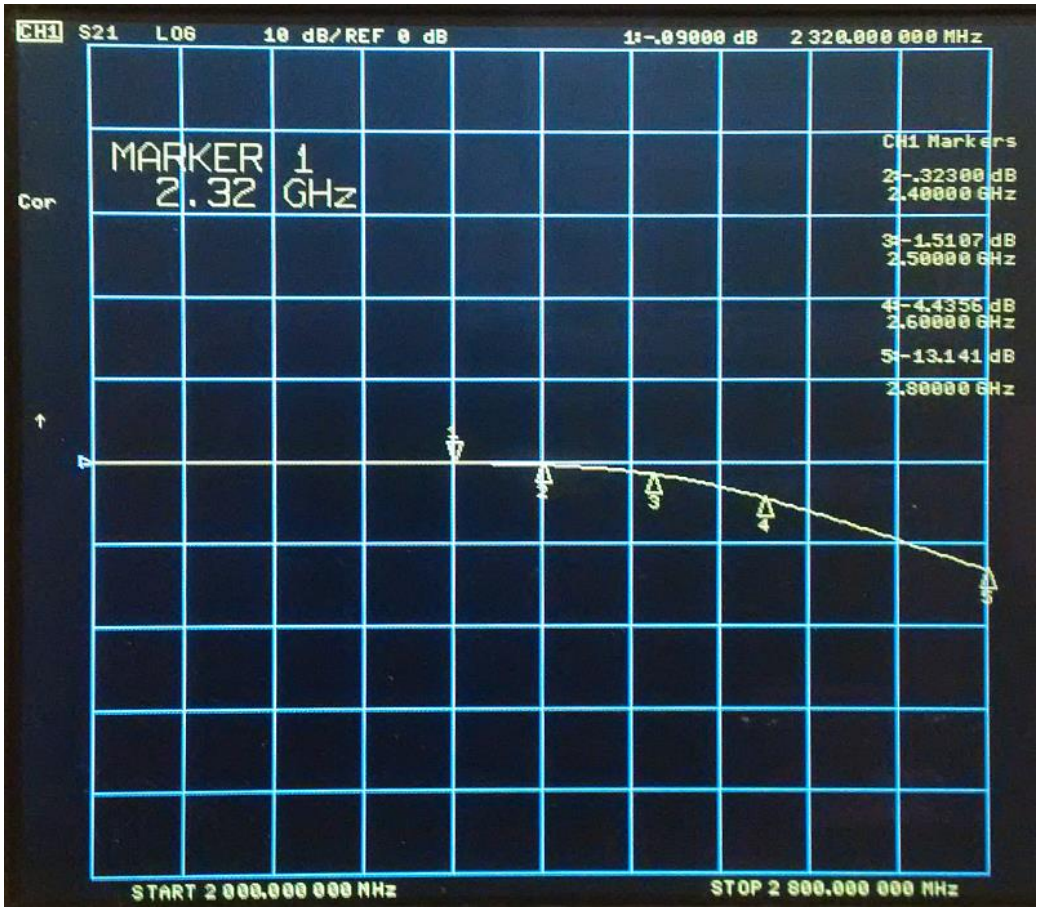
S11 log mag



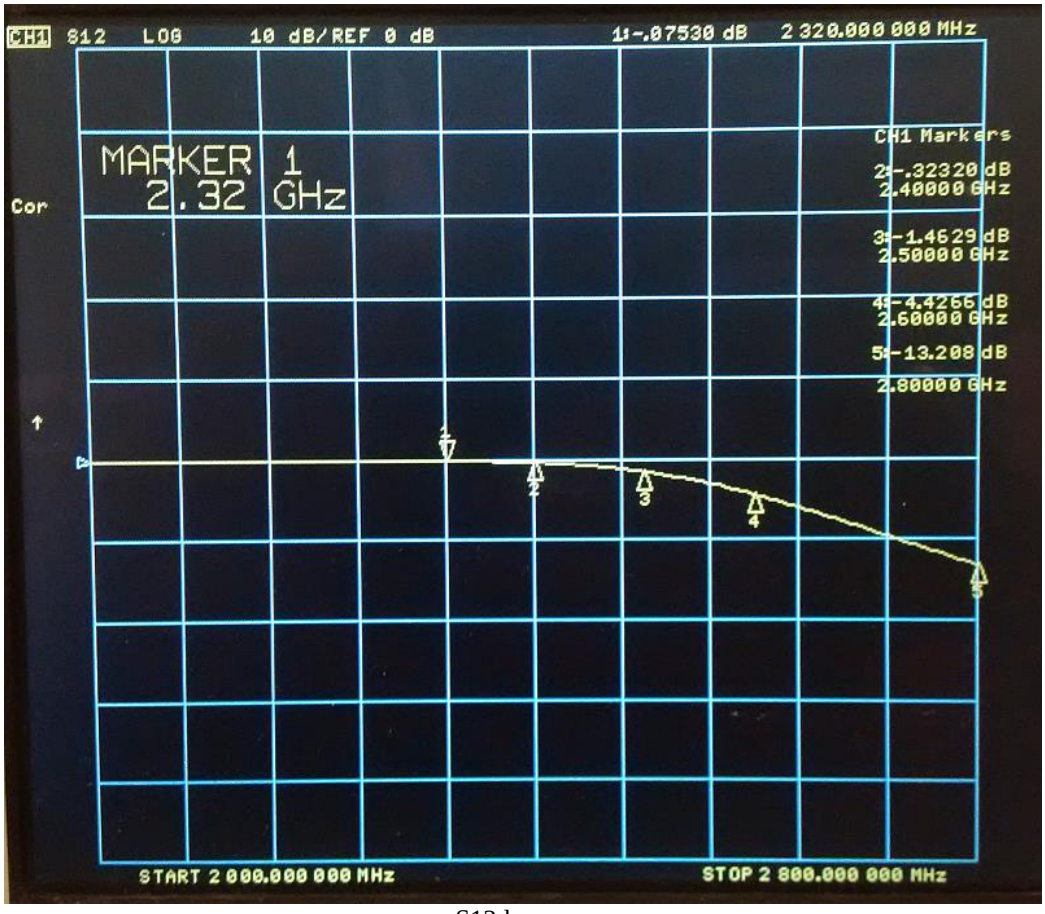
S11 Smith Chart



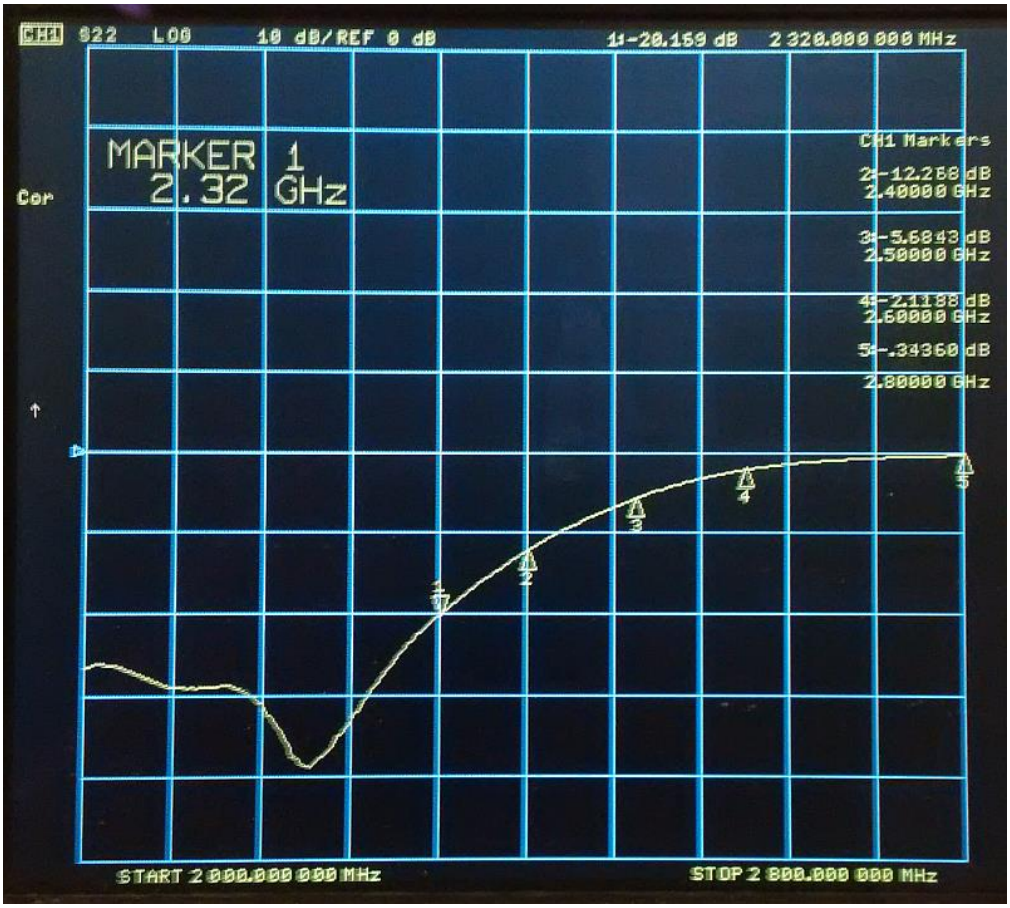
S11 SWR



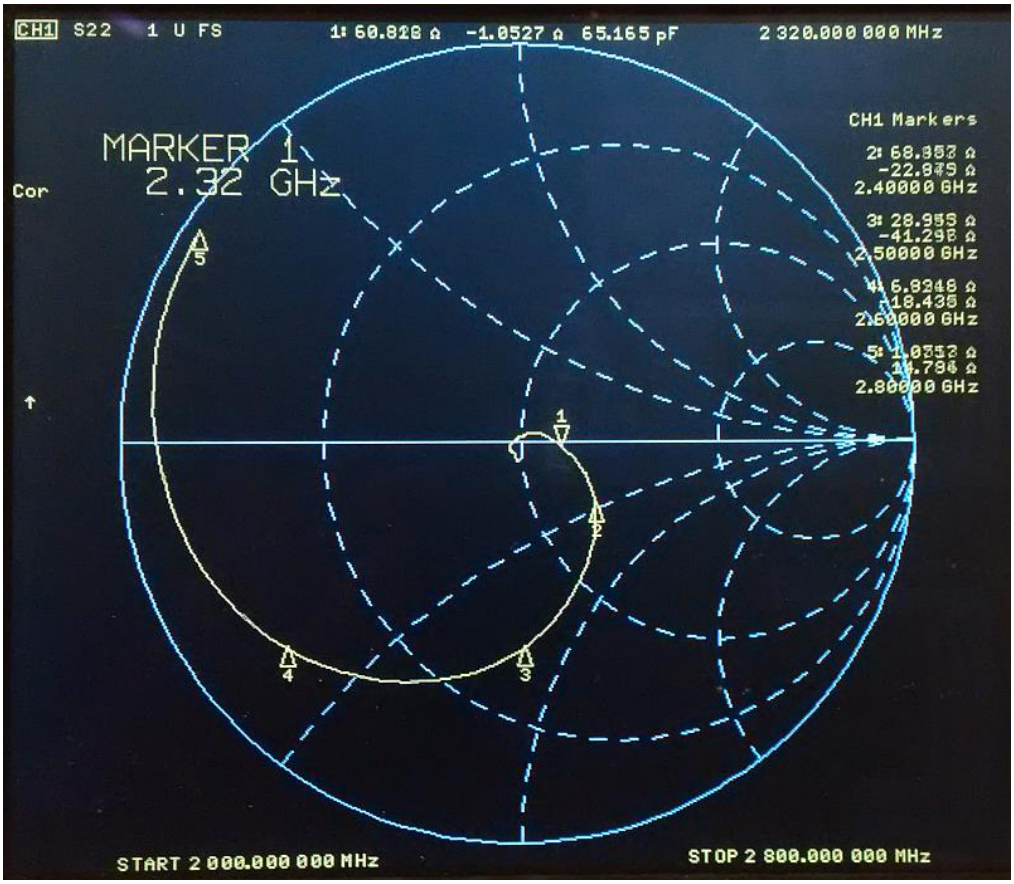
S21 log mag



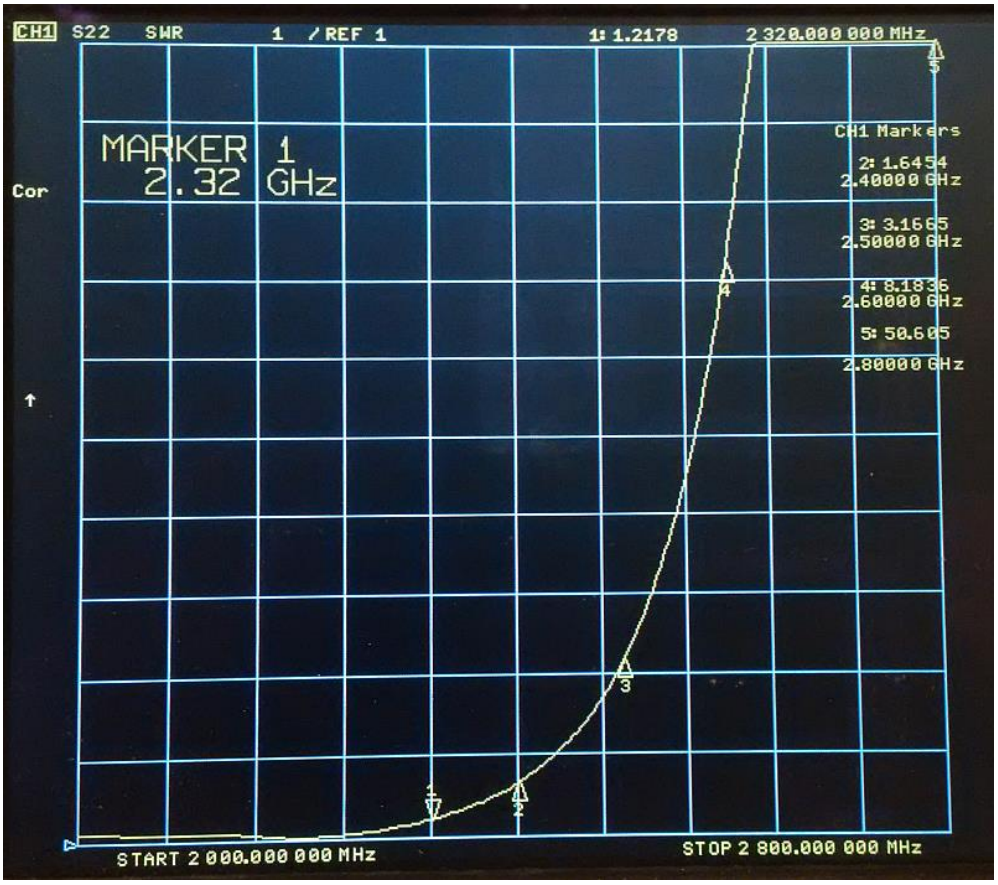
S12 log mag



S22 log mag



S22 Smith Chart



S22 SWR

In summary this low pass filter fits excellent as a low pass filter on 2320MHz. This is the 13cm EME band and with the low loss of about 0.1dB and a return loss of about 20dB this filter is well suited.

For smaller power levels it can also be used on 2400MHz but the insertion loss increases to 0.32dB and the return loss decreases to only 12dB (which is a SWR of about 1.7).

I always appreciate feedback. Many thanks in advance.

Best regards

Matthias DD1US

Email: DD1US@AMSAT.ORG
Homepage: http://www.dd1us.de