The logarithmic periodic antenna Hyperlog 7025

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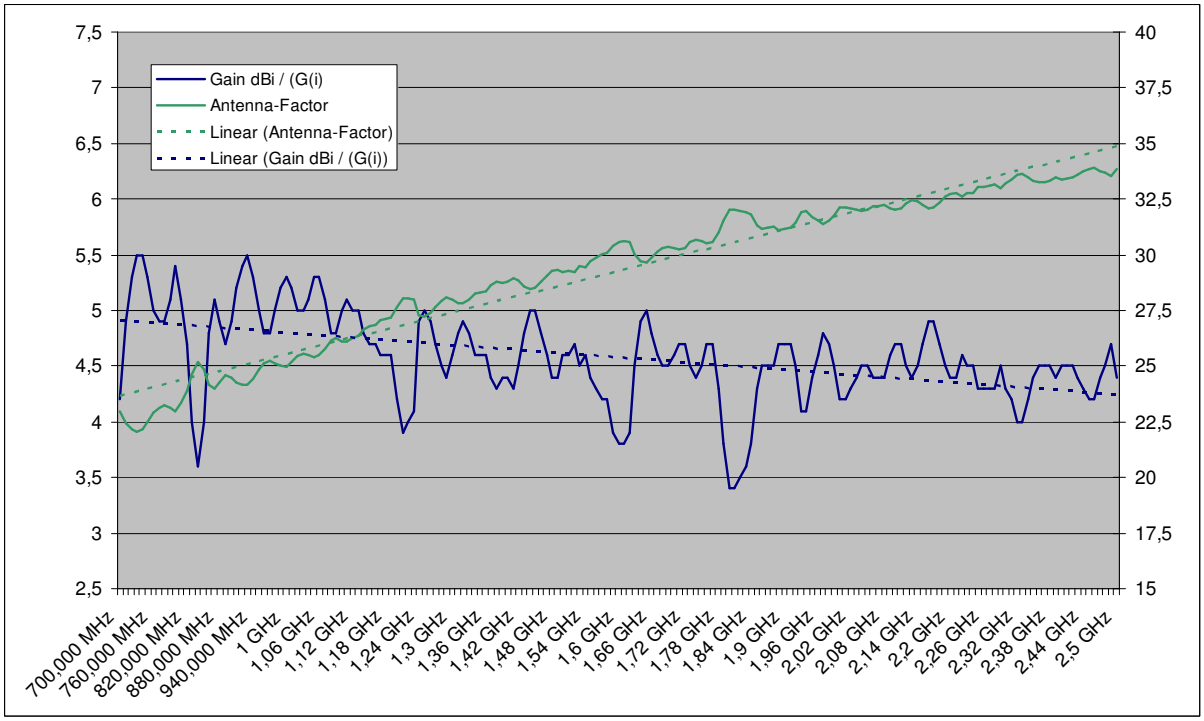
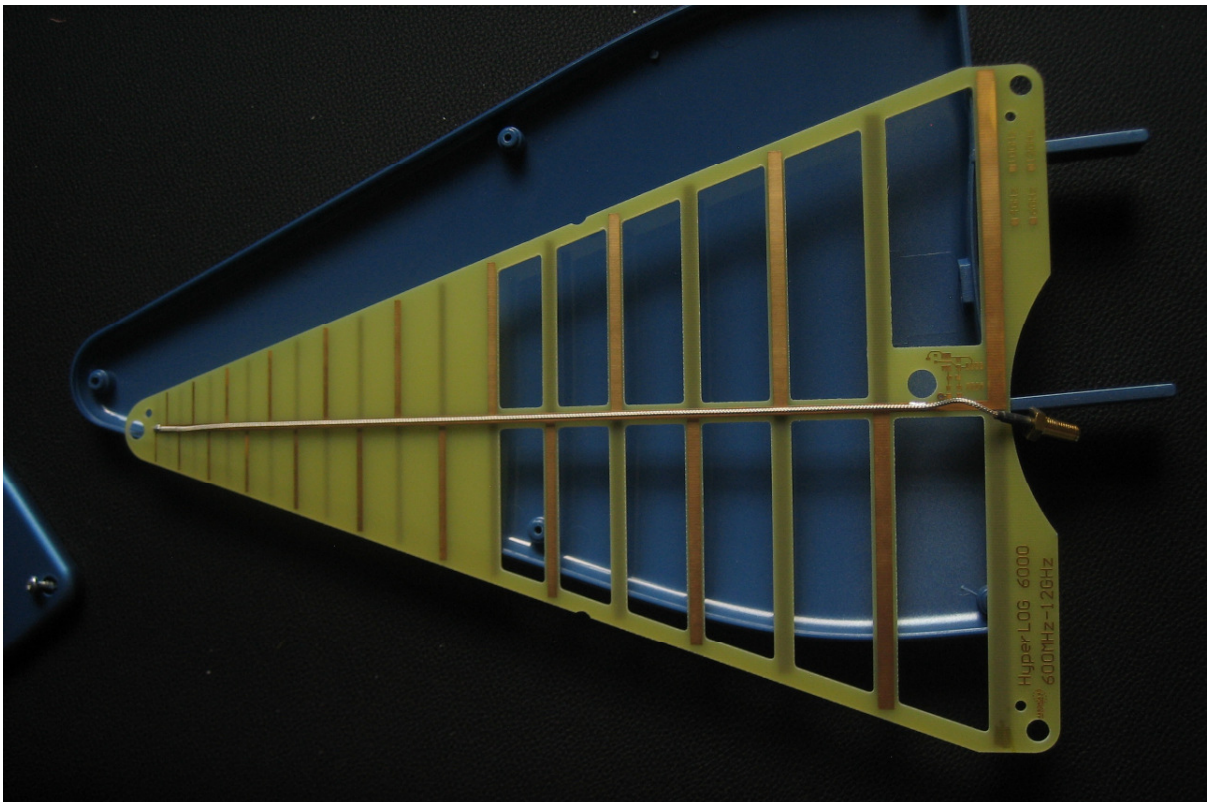
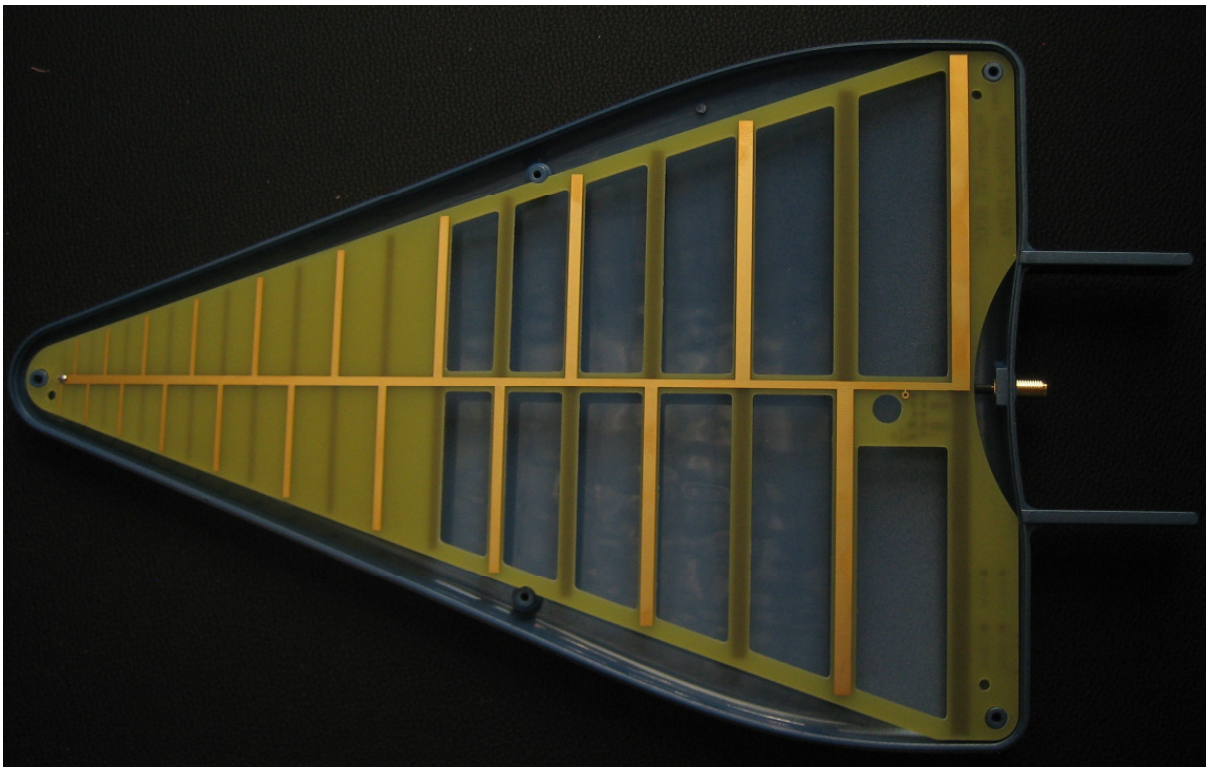
I have been interested in broadband antennas for a long time. Recently I updated my little portable setup which I use on my balcony together with the AOR AR-8600 receiver. I found a new Hyperlog 7025 antenna from Aaronia™ on Ebay for 74 Euros (including shipping and handling) and decided to give this antenna a try as it seemed to provide a good compromise between cost and performance. There is a transparent version and a blue version of the antenna available. I have the blue version. The antenna is well made and includes a ¼ inch thread on the bottom to attach a handle or a tripod.

Below please find the frequency response of my antenna based on the data which I got from the supplier Aaronia™. By the way they are very friendly and responsive. As you can see there is no indication, that the antenna might stop operating immediately below and above the specified frequency range of 700 MHz to 2.5 GHz. The gain of the antenna versus an isotropical radiator is specified to be typ. 4dBi. As shown in the graph below it actually drops from about 5dBi at the lower frequency end to about 4.5dBi at the higher end.

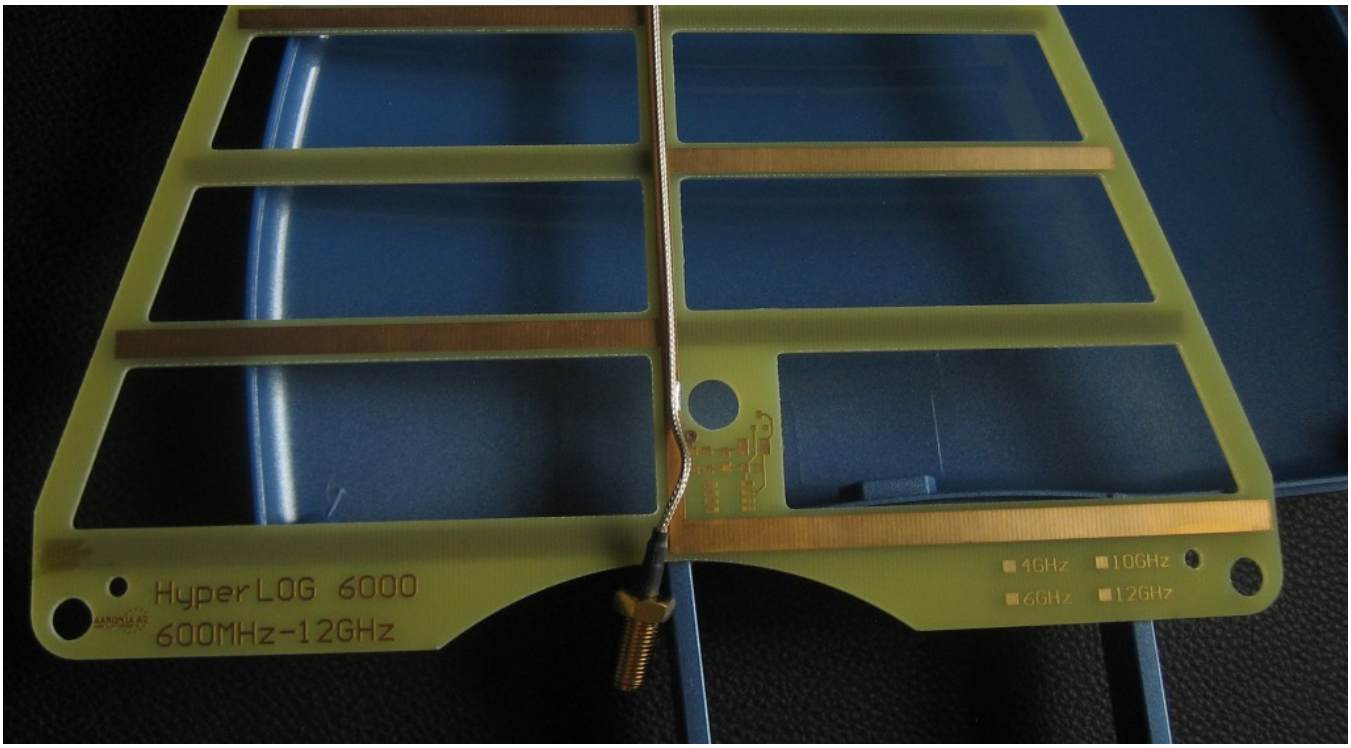


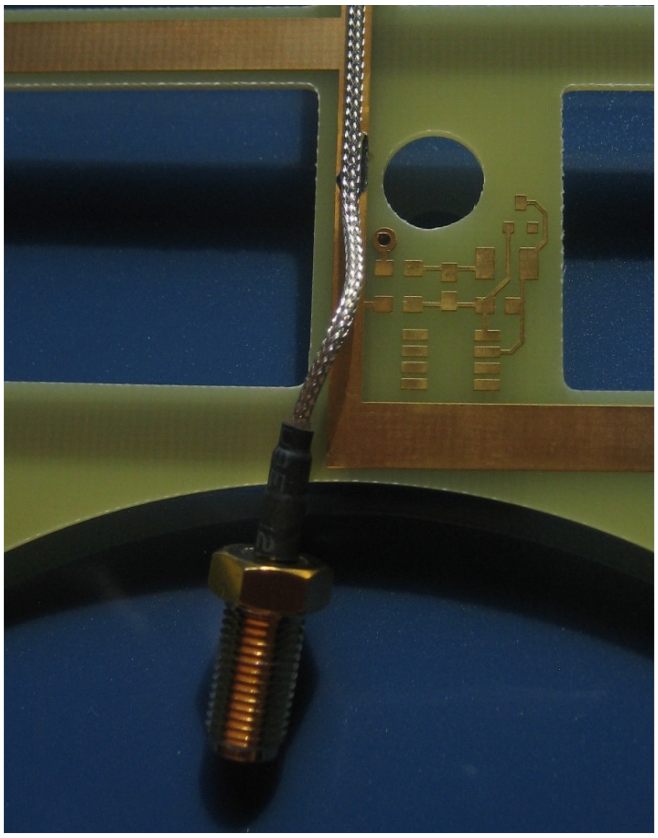
I could not resist opening the antenna and see what's inside. As expected it is a logarithmic periodic dipole antenna printed on a FR4 PCB with the traces gold plated. The antenna consists of 20 dipoles, thus 40 elements. The longest dipole (the rear end of the antenna) has a total length of 190mm, the shortest dipole has a total length of 20mm. The PCB is partly milled out between the dipoles. Calculating the corresponding resonance frequencies of the dipoles indicate, that the milled out part should have an effect on those dipoles which are active in the frequency range between 700 MHz and 2.5 GHz.

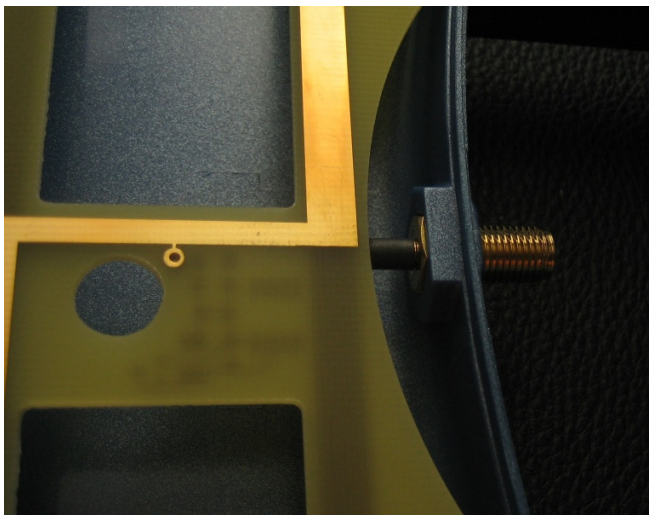




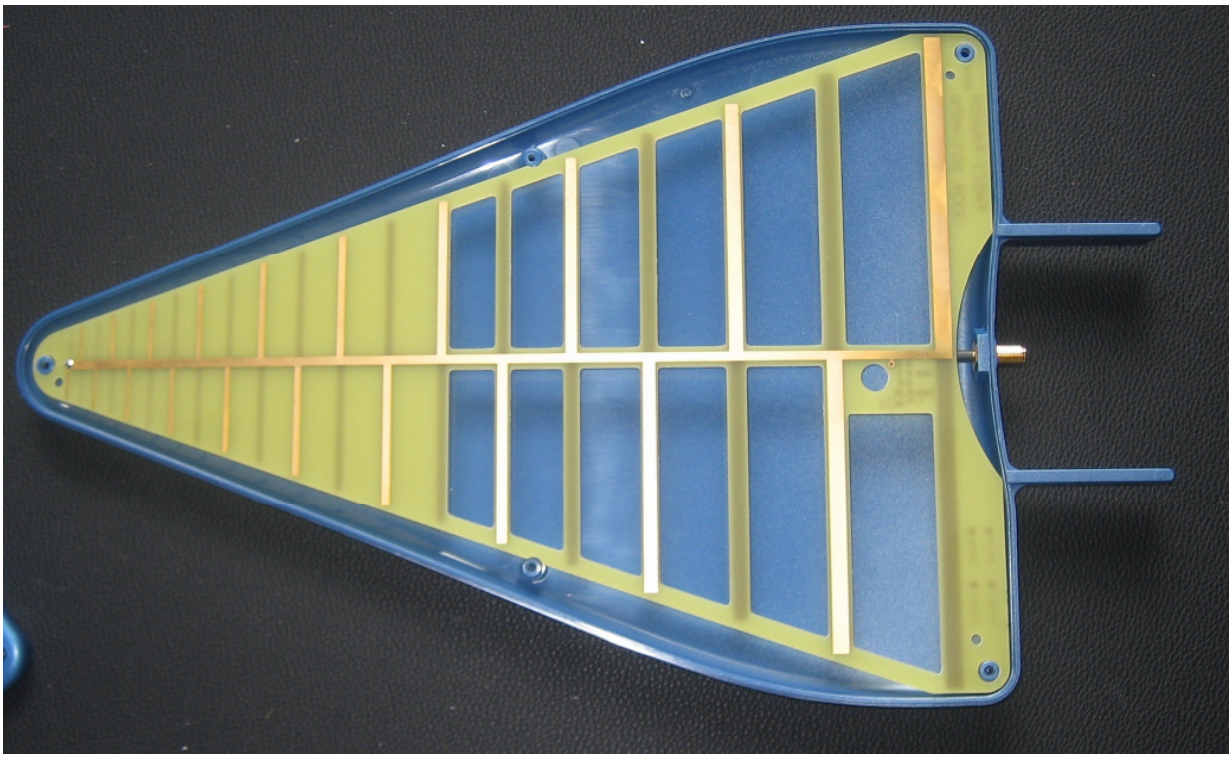
Here are some detailed views of the back end of the antenna including the SMA antenna connector. The connector is held in the plastic encasing very nicely. As you can see on the PCB, the antenna is marked as HyperLOG 6000 with a frequency range of 600MHz – 12 GHz. On the right there are 4 pads marked with 4 GHz, 6 GHz, 10 GHz and 12 GHz which might indicate, that there are multiple versions of the antenna generated from the same PCB. You can also see the place on the PCB where optional memory chips can be assembled. This would allow to read out the calibration data electronically.

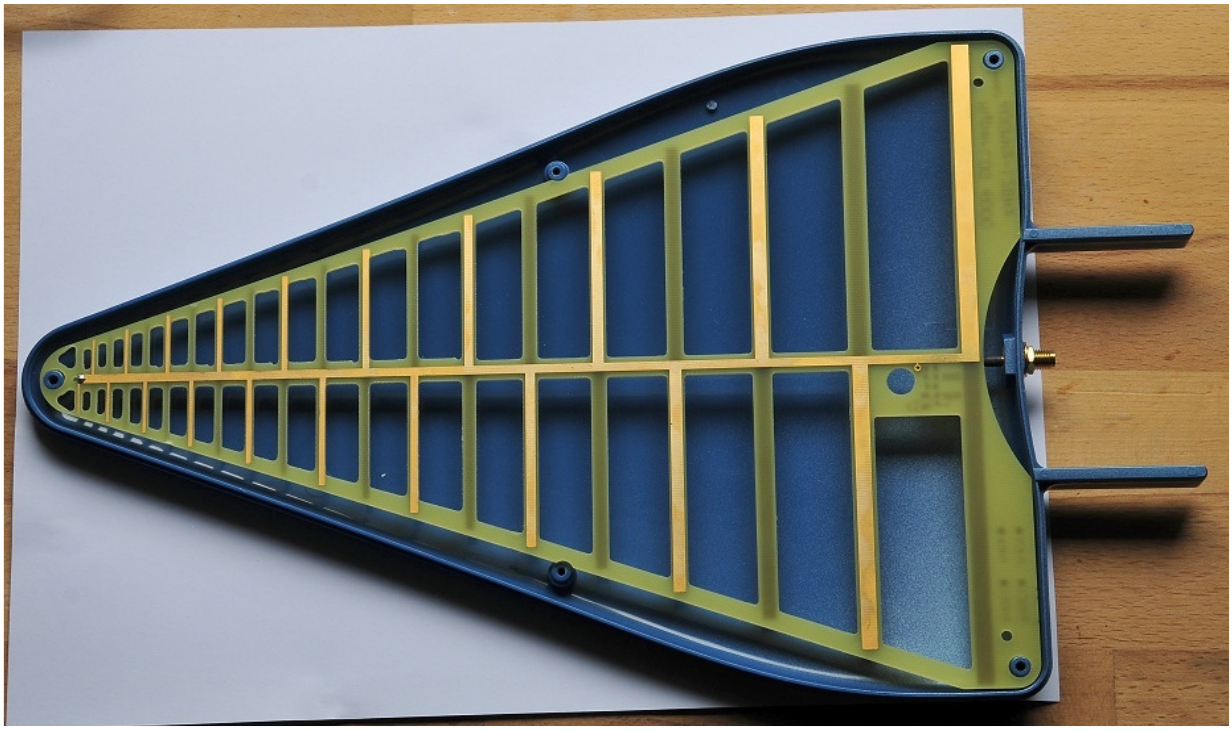


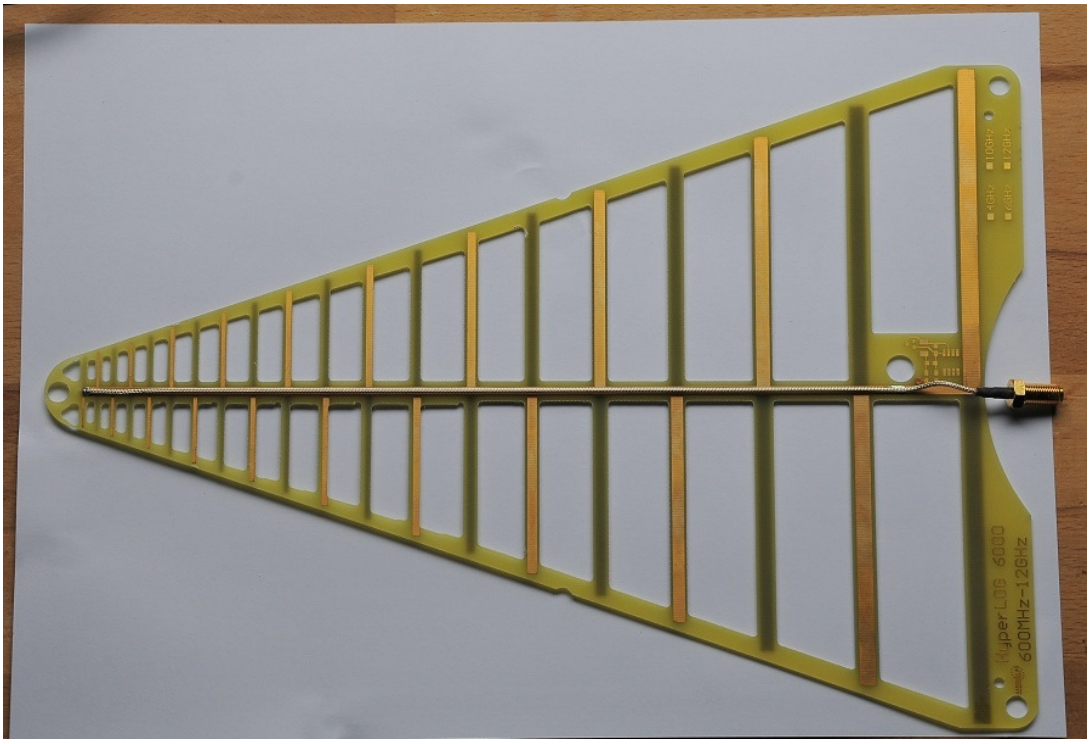




What could be the difference between the versions ? Maybe the part of the logper antenna which is milled out from the FR4 PCB is different at the versions ? This would make sense because FR4 material exhibits high losses at higher frequencies. I decided to try to extend the frequency range of my antenna by having the rest of the PCB milled out. A good friend of mine with excellent equipment and skills helped me out with this. Below is a direct comparison of the original antenna and after the modification.







Comparing the gain versus frequency curves published by Aaronia™ for the 7025 (700 MHz to 2.5 GHz) and for the 7040 (700 MHz to 4 GHz) versions of the Hyperlog show exactly identical figures up to 2.5 GHz. This may indicate that both antennas are actually identical in this frequency range and I might be on the right track !? Of course it would be most interesting if someone who owns the 7040 or 7060 versions of the Hyperlog could have a look inside …

Update: Meanwhile I got hold of an Aaronia™ 7040 antenna and when opening it had to notice, that inside is exactly the same antenna as in the 7025 antenna! The higher frequency parts of the antenna are also not milled out! The only difference is the sticker on the blue plastic encasing !

The next step will be some practical experiments. I am about to finish a suitable broadband LNA which will be attached right at the output of this antenna.

If you have comments or questions please send them to my Email address given below.

Best regards

Matthias Bopp

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