

Shielded chamber for noise figure measurements

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Hi,

During some special measurements we are dealing with very small signal levels and thus the likelihood that unwanted external radio signals influence the measurement setup is quite high. This is especially the case during noise figure measurements. External signals can be anything, from strong broadcast radio stations to cellphone signals from a close by base station or from handsets in the vicinity. Also, strong low frequency signals such as the mains supply can create interference with the measured signals.

Thus, I decided to build a shielded chamber in which the device under test (DUT) can be placed and which shields it from the environment.

As the space in my lab is limited, I had to make compromised with respect to the size of the shielded chamber.

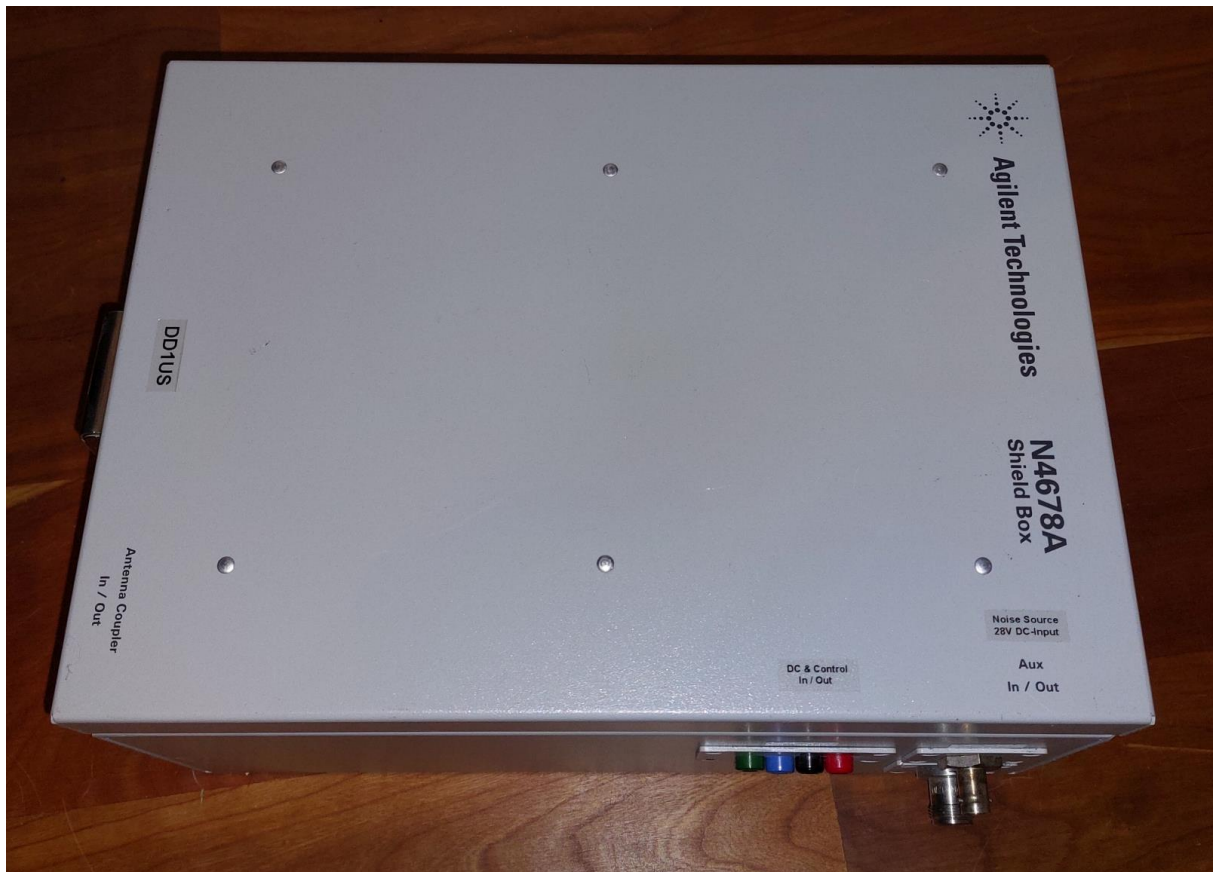
Instead of starting from scratch I bought a surplus Agilent N4678A RF shield box which had been used for cellphone handset measurements. I found a used box in a good shape where especially the absorber mats inside were still in a reasonably good condition. This mat is used to absorb emissions from any DUT inside the box. It certainly also helps to avoid oscillations in the measurement setup when using very high gain conditions.

I removed most of the parts inside which were to hold the handset during measurements and also replaced the feedthrough connections. For passing DC and control signals into the box I built a filter box in a tin-plated encasing with passive LC filters. For RF connections I mounted N and BNC chassis mount adapters into the encasing.

Here are some pictures of the now finished shielded chamber:









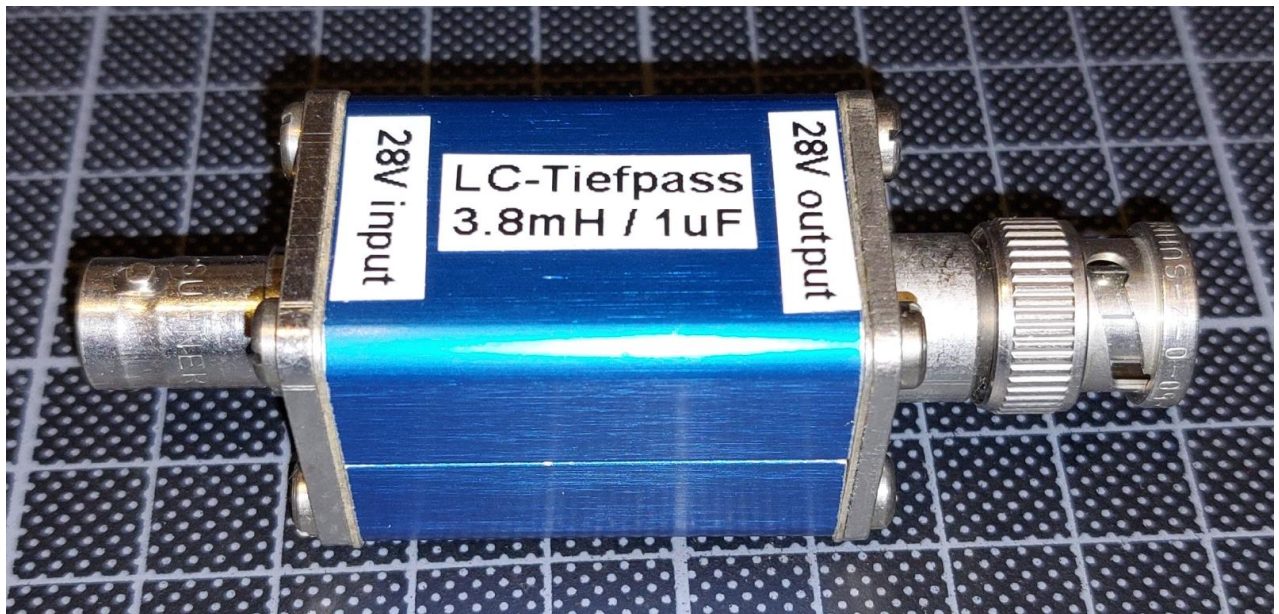
Especially for noise measurements I can add a low noise amplifier inside the box and therefore I can also use longer cables from the output of the DUT to the spectrum analyzer / test receiver.



If not all RF feedthrough connectors are needed during a measurement, I am screwing shielding caps on the unused RF jacks.



During noise measurements the noise source is placed inside the shielded box and its pulsed 28V DC supply voltage is supplied via a BNC feedthrough connector. Outside of the shielded box I use an additional LC-lowpass filter in another small shielded box in order to additionally filter the pulsed DC supply signal. I am using this filter also when measuring noise figures outside of the shielded chamber.



I always appreciate feedback or answer questions.

Please send it to my Email address below.

Kind regards

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