

Welcome to the world of

***remoteMagicMike***  
***Filters***

# remoteMagicMikeFilter – DC/DC Filter

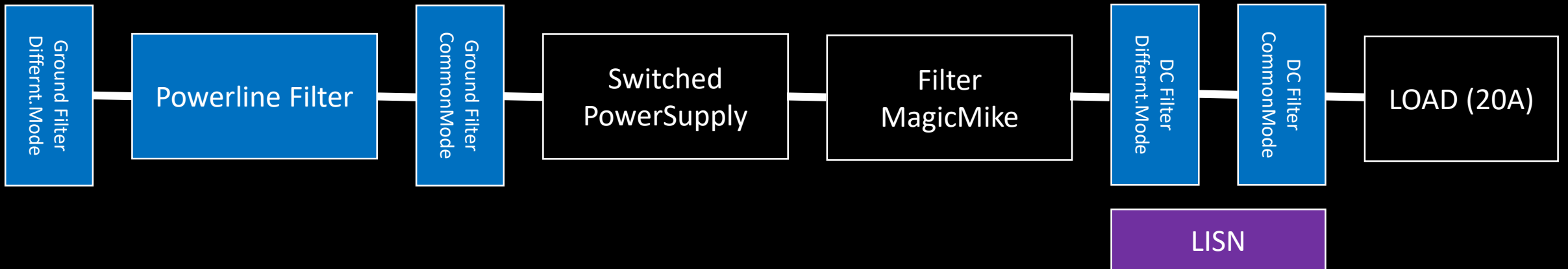
The days of transformer power supplies are gone... Switched power supplies are everywhere... Also in your shack... Let the fun begin!

Since we sold a bunch of switched power supplies and dealing with remoteRaspberry, we urgently needed to find a solution to make all of those supplies quiet.

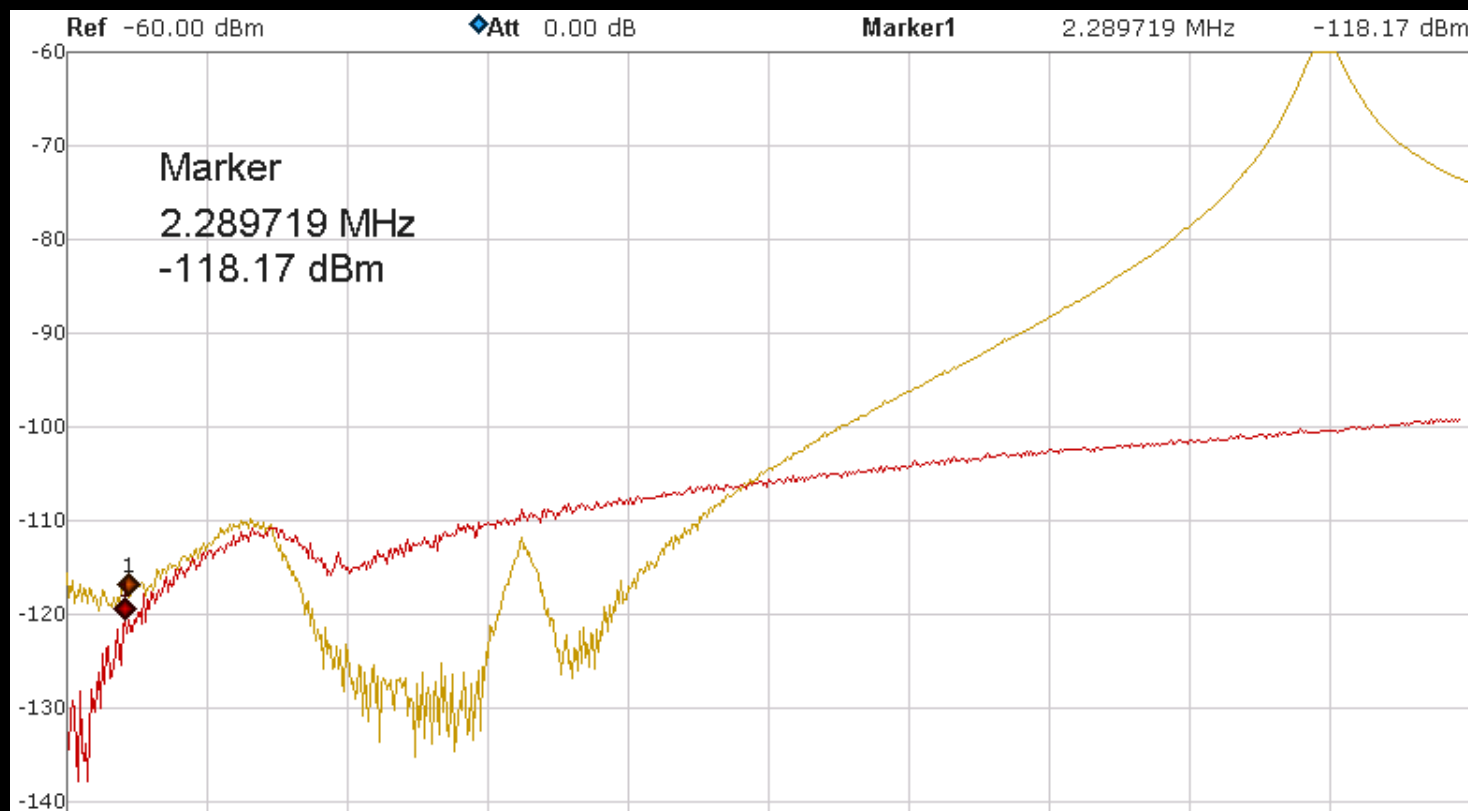
What we learned so far selling some modified power supplies @ OL7M: If your antennas are far from your shack – and/or everything is grounded well, there is no problem. Even if you measure directly under load...

But if not? Time to act: Ground your shack well and avoid EMI! Or you are doomed!

The recommended Filter-Path (**blue** was not added during the field test measurements):



# remoteMagicMikeFilter – Building own filters...



Building DC-Filters is no Rocket-Science, you might think. There are many good layouts out there in the internet. Even if you have the layout or some pcbs and you want to reproduce the filter, it is vry important to have excatly the same coils, the same cores, the same caps and all other parts.

If something is different – you are doomed.

The difference on **orange** to **red** is just 3 C's: smd, low esr, high quality (costs almost 3€/piece). Different Manufacturers, but same value...

See the difference! 😊

# remoteMagicMikeFilter – DC/DC Filter

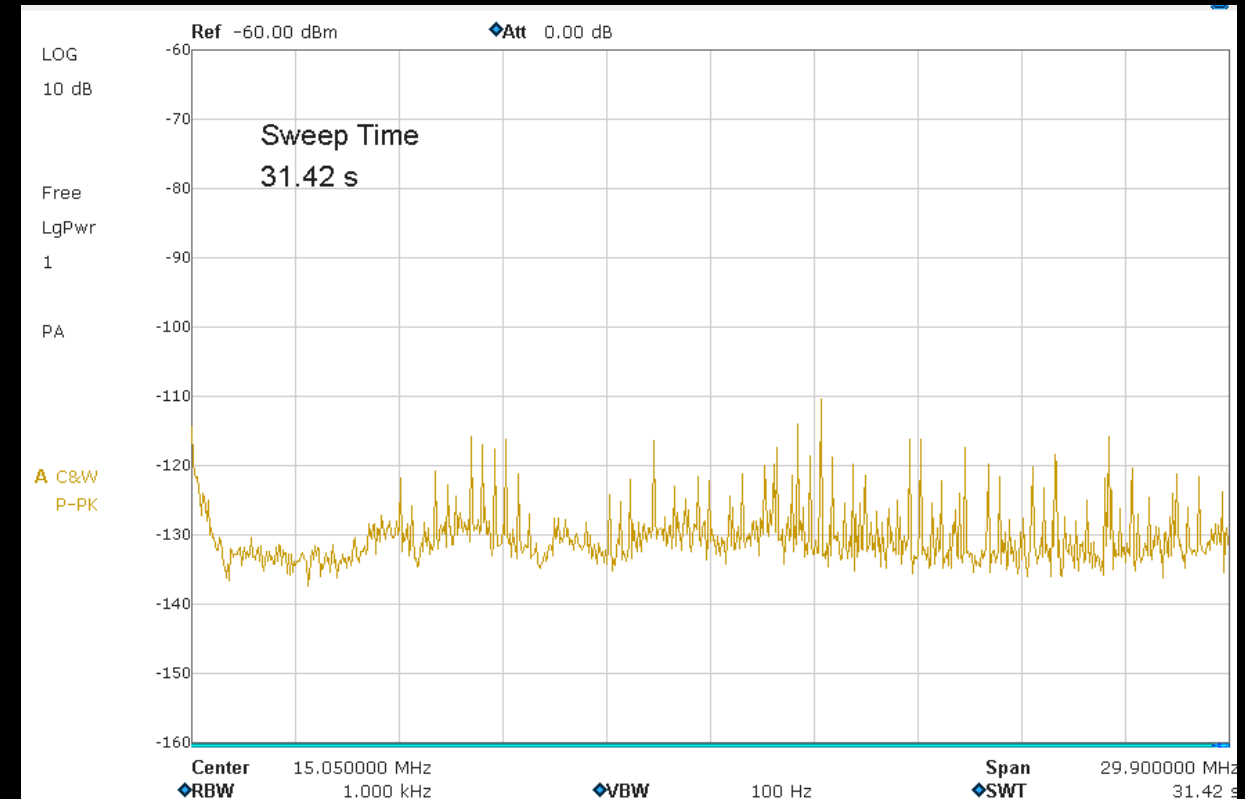
The candidates are well known, good protected and well made switching power supply: HB600AB. Name others like MeanWell or even the QJ PS30 and derived PSU (the ones with the „offset“ poti – which btw. Really works!)

Measured by a SIGLENT SAA-3021X in a range of 100kHz/1MHz-30MHz

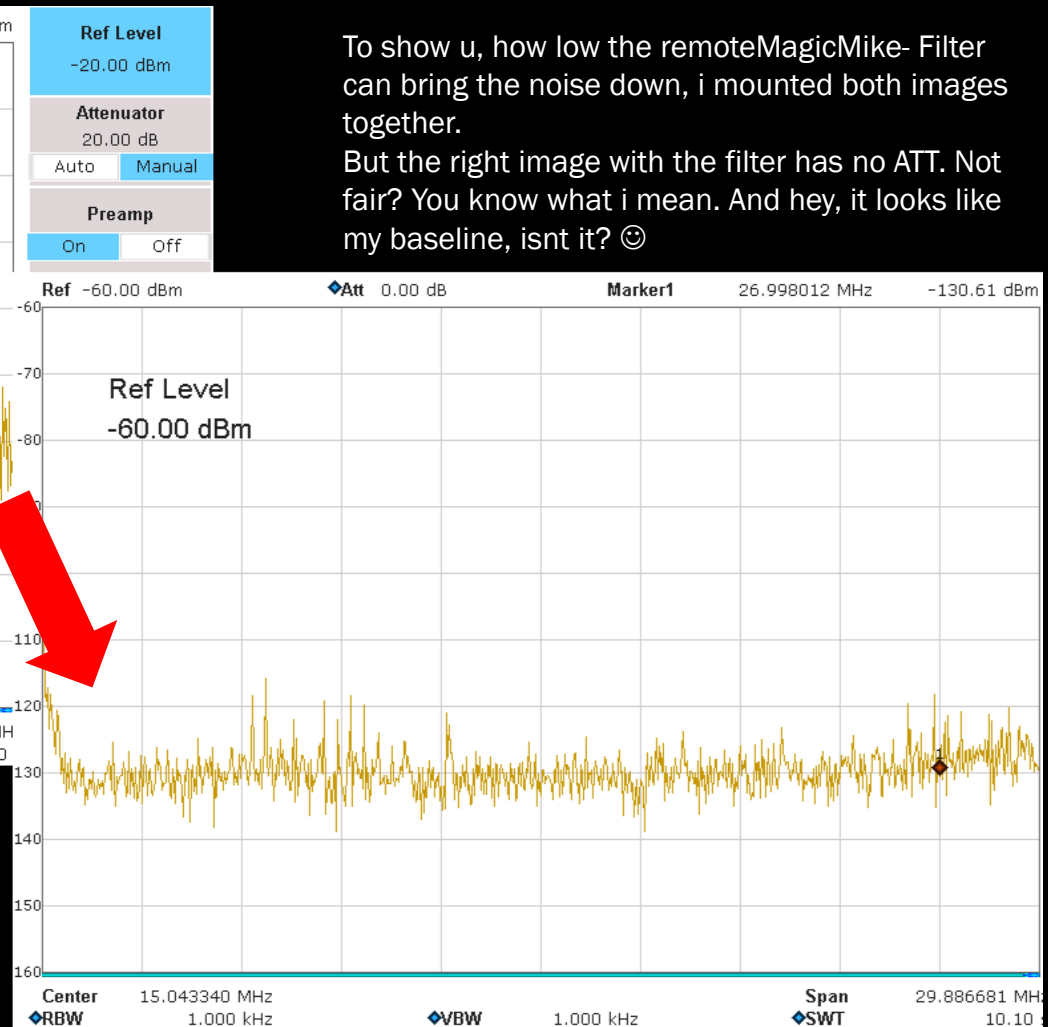
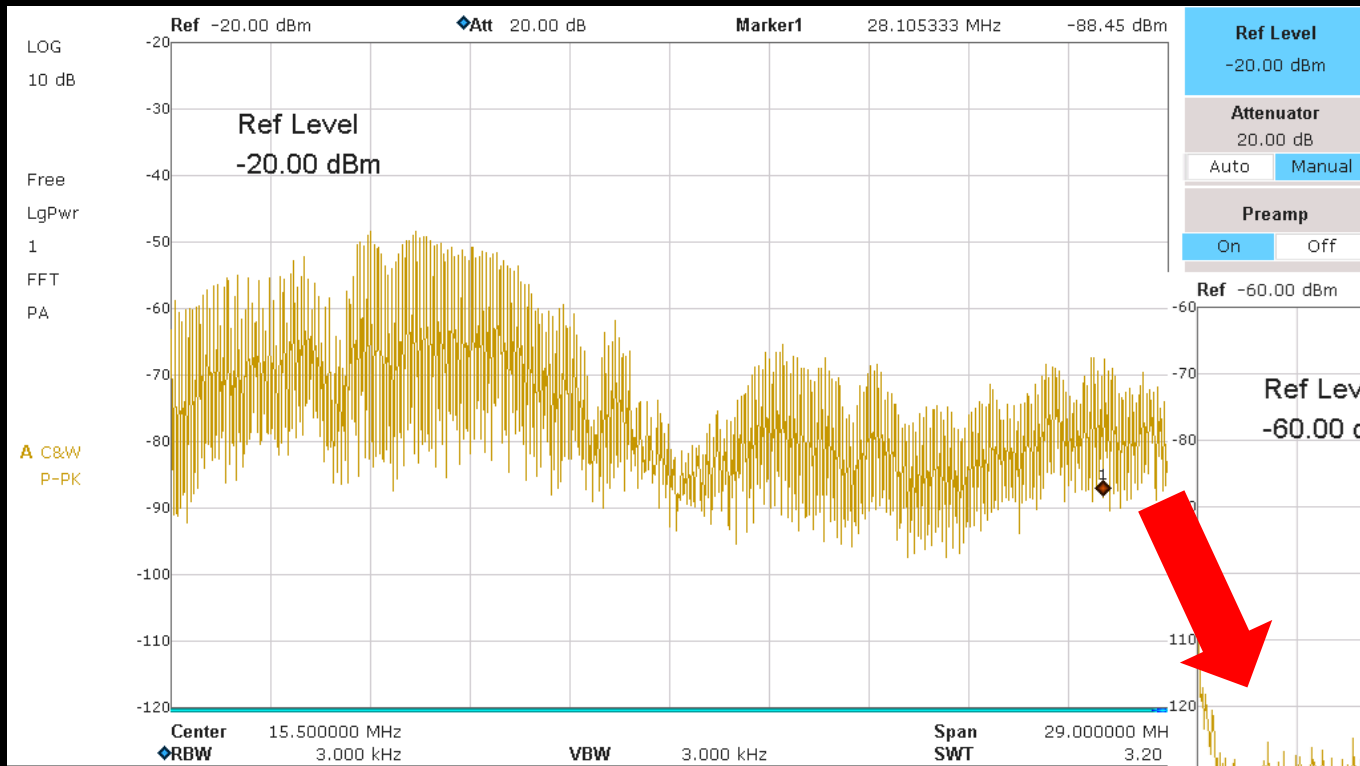
My baseline measurement – ok, its not so clean. But hey, its -120 and below. And this is my basement... Lowest detectable signal is about -138dbm.

All PSUs are with a load of 20A using 4 H7 Car-Bulbs ☺  
Signal measured direct at PSU (no Filter) or after the filter, but parallel to the load.

Lets start with some MeanWell 12V..



# remoteMagicMikeFilter – DC/DC Filter vs. MeanWell 12V

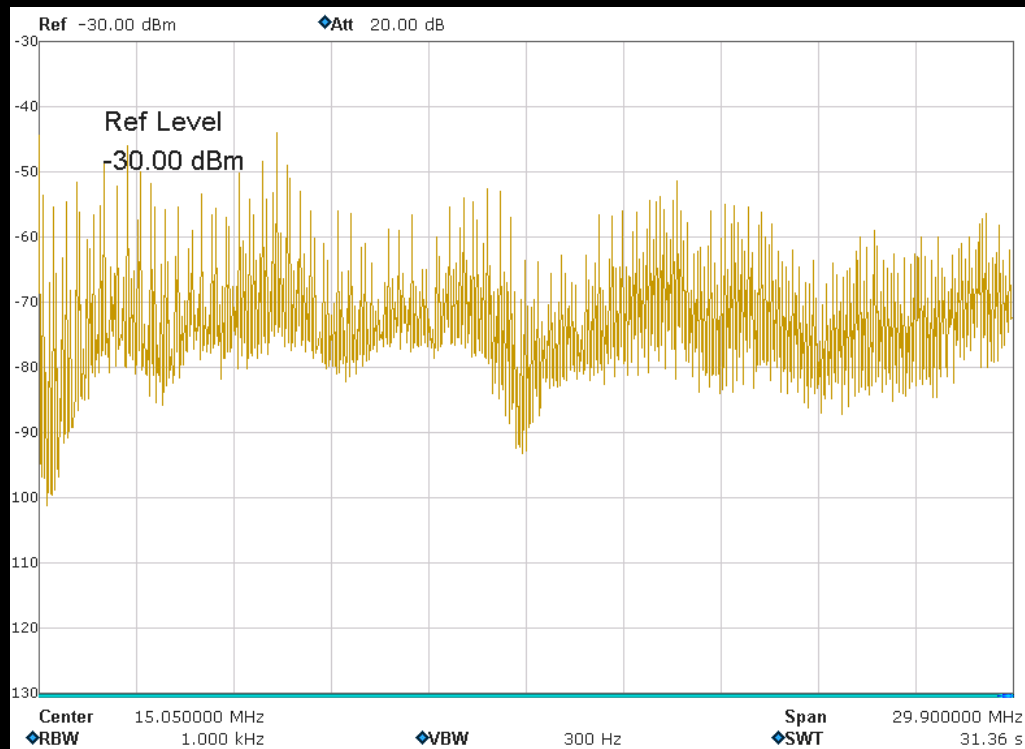


To show u, how low the remoteMagicMike- Filter can bring the noise down, i mounted both images together.

But the right image with the filter has no ATT. Not fair? You know what i mean. And hey, it looks like my baseline, isnt it? 😊

Maybe somebody told you „MeanWell“ is working nice.  
Yes, in deed, its not that bad – and if antennas are far and shack is grounded well...  
Looking into the spectrum above, its even worse than shown...  
I needed to add an ATT of 20db and shift the reference level until my Spec says „ok“. This is a loaded MeanWell without a filter, directly measured.

# remoteMagicMikeFilter – DC/DC Filter vs. HP600AB@20A



Ref Level  
-30.00 dBm

Attenuator  
20.00 dB

Auto Manual

Preamp  
On Off

Units  
dBm

Scale/Div  
10.00 dB

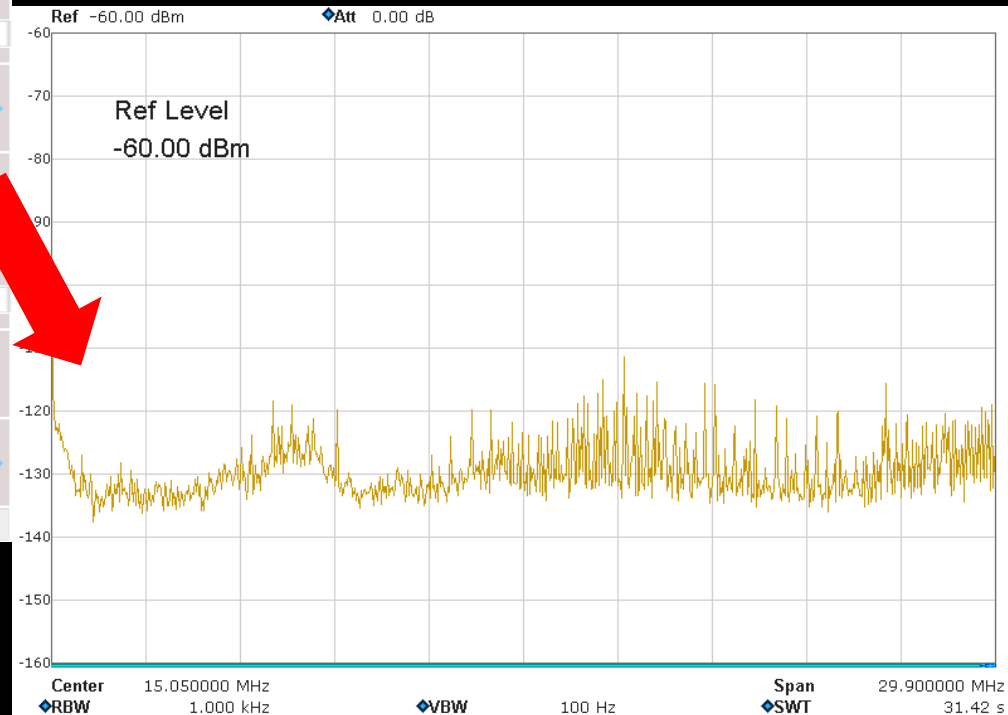
Scale Type  
Log Lin

Ref Offset  
0.00 dB

Corrections  
Local

HP600AB - I needed to add an ATT of 20db and shift the reference level to -30dm...

Bye bye noise. Clean baseline from 100kHz up to 30mhz ☺



Ref Level  
-60.00 dBm

Attenuator  
0.00 dB

Auto Manual

Preamp  
On Off

Units  
dBm

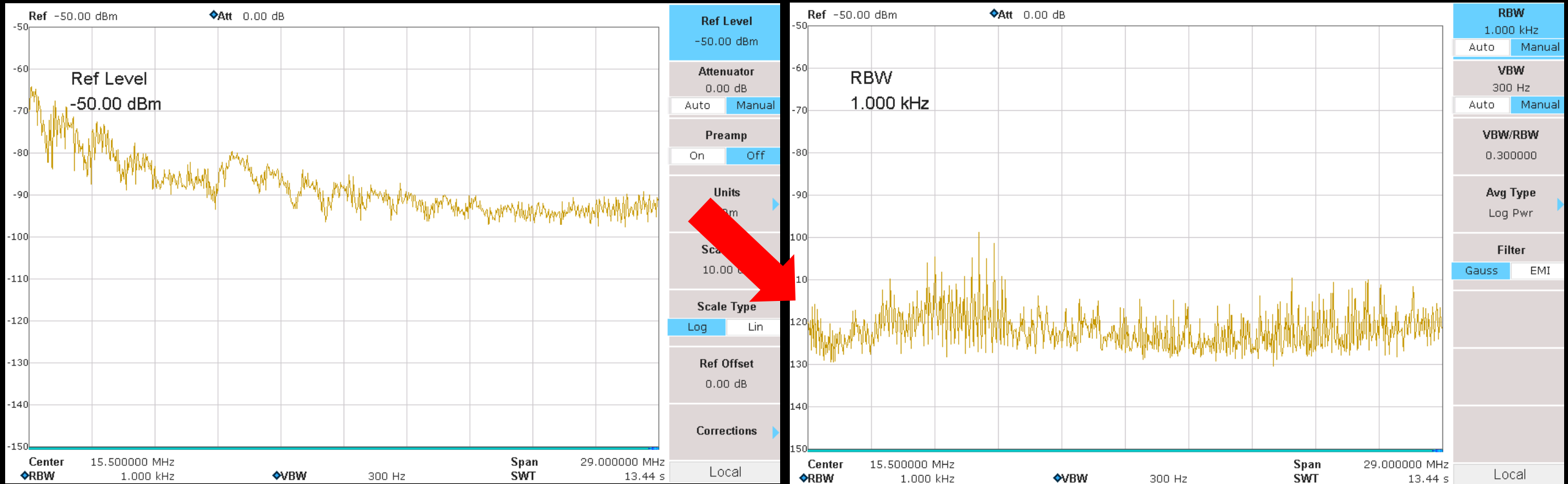
Scale/Div  
10.00 dB

Scale Type  
Log Lin

Ref Offset  
0.00 dB

Corrections  
Local

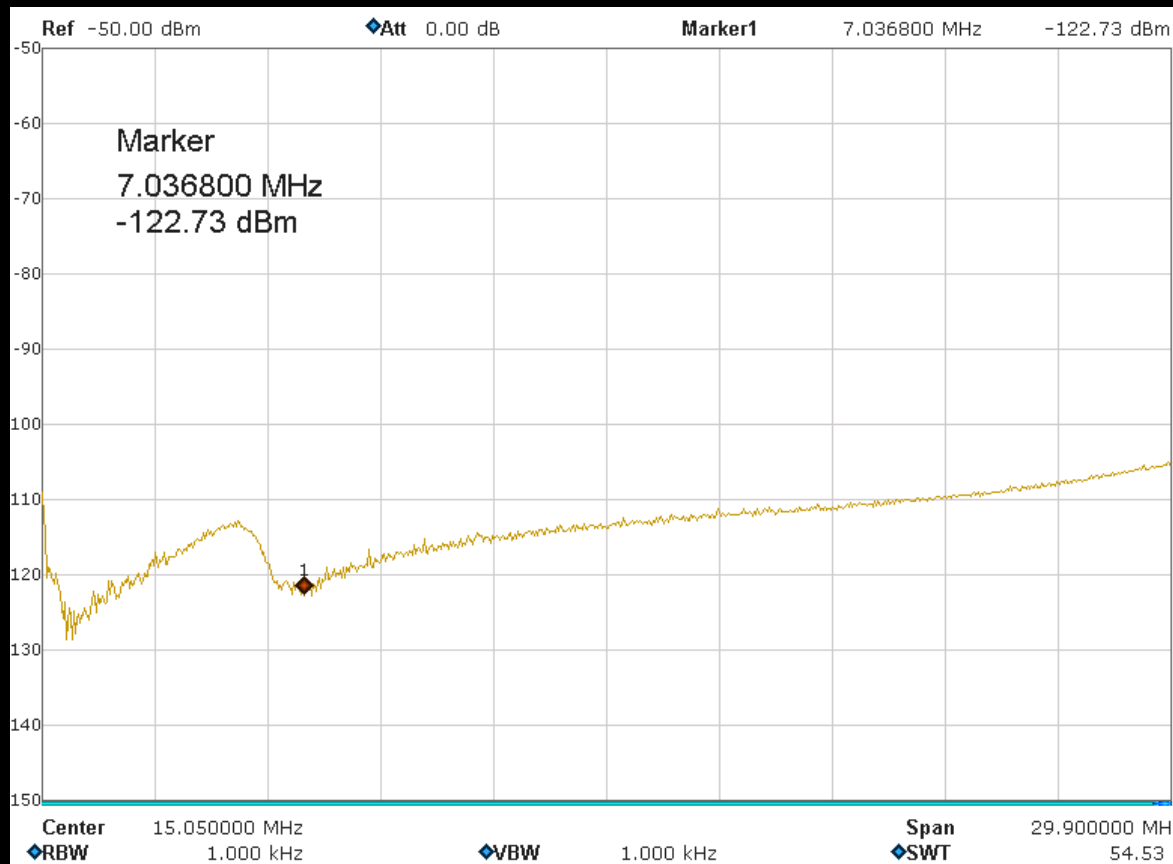
# remoteMagicMikeFilter – DC/DC Filter vs. HSTNS-PL14 HP 30A under load



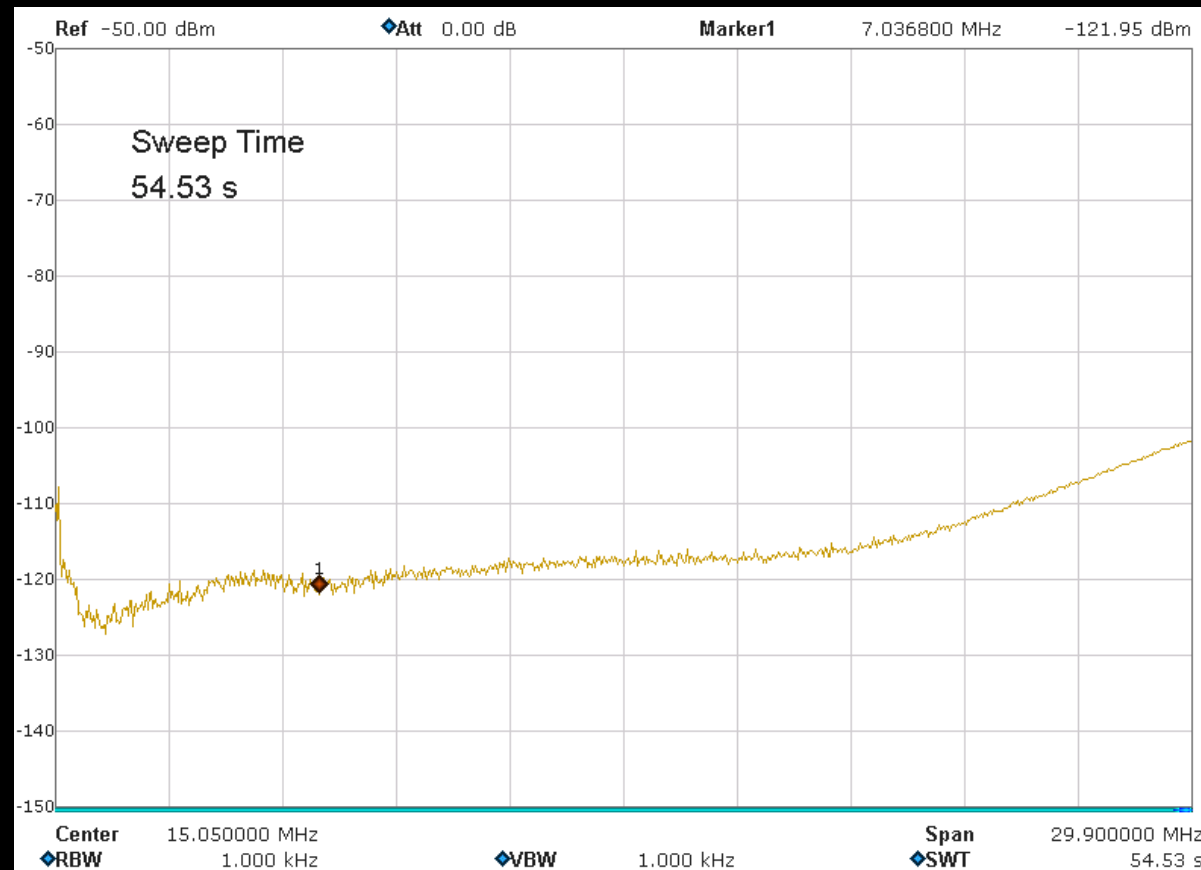
Repeated and verified the measurement from Tobi DH1TW using the same PSU and the same LISN as he did (TNX Tobi for the idea and [hamparts.shop](https://hamparts.shop) for the LISN). He added 2 filtere on cores (see [here](#)), i added the remoteMagicMikeFilter. Left image is PSU under load using LISN with -10db ATT, right image is using the Filter. Measuring again –psu not conntected to 240V, same image. So this is verified against baseline/noise level (mmeasurement cables act as antennas... :/).

Hints: No Filter on the primary side of the psu (vy recommended!). Noiselevel is more accurate on the first slide (Page3) and this here is just a disconnected PSU. But i wanted to have a setup compareable (ADC overload, smaller BTW => longer SWT - and i was lazy, a single run takes just 14s)

# remoteMagicMikeFilter – DC/DC FilterSweep Graph 30A Versions



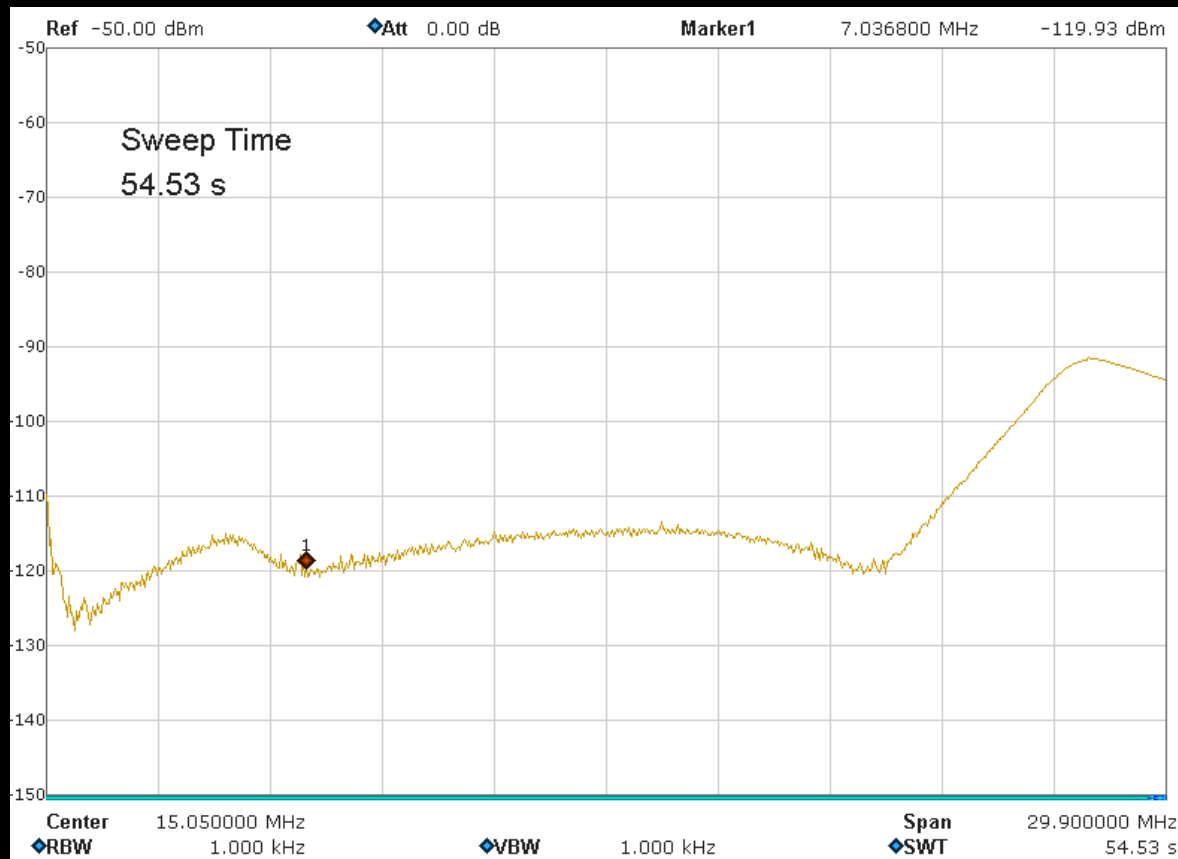
Common Mode Filter



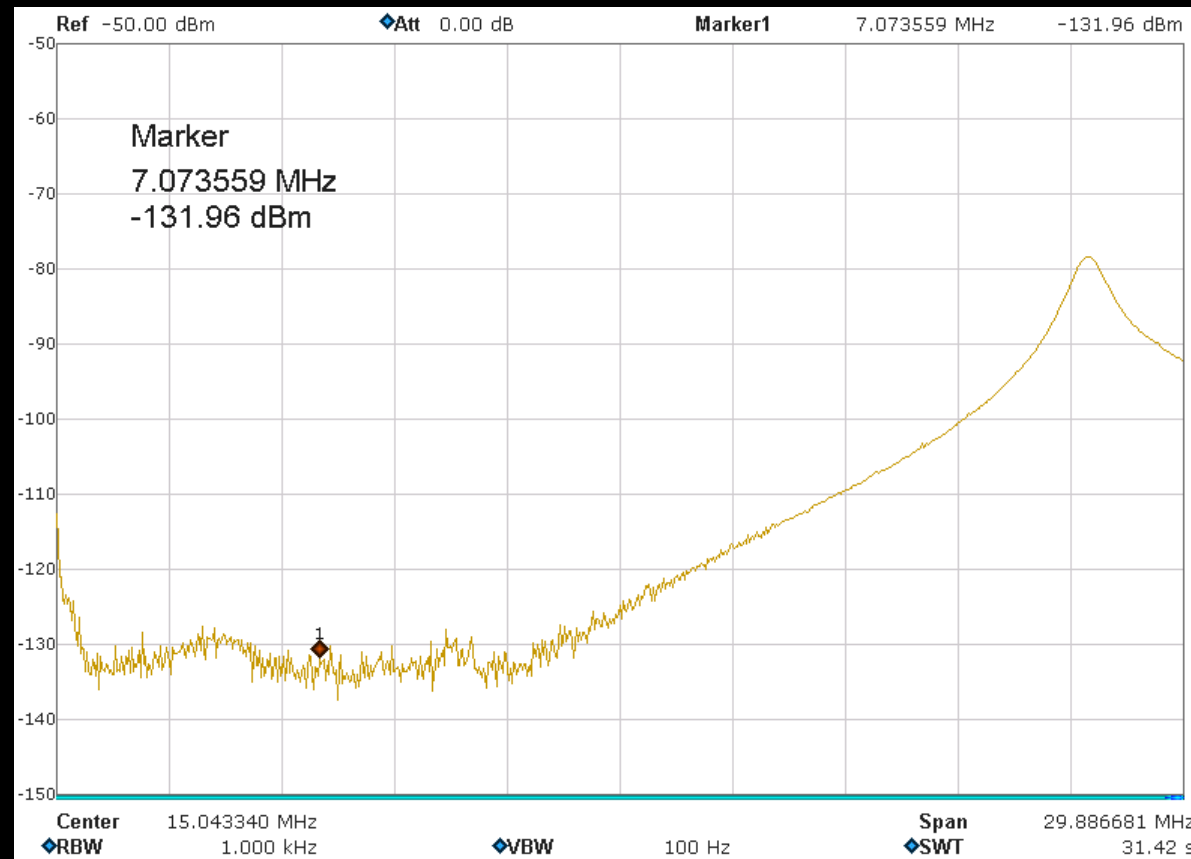
Differential/Common Mode Filter (mixed)



# remoteMagicMikeFilter – DC/DC Filter Sweep Graph 10/6/3A Versions

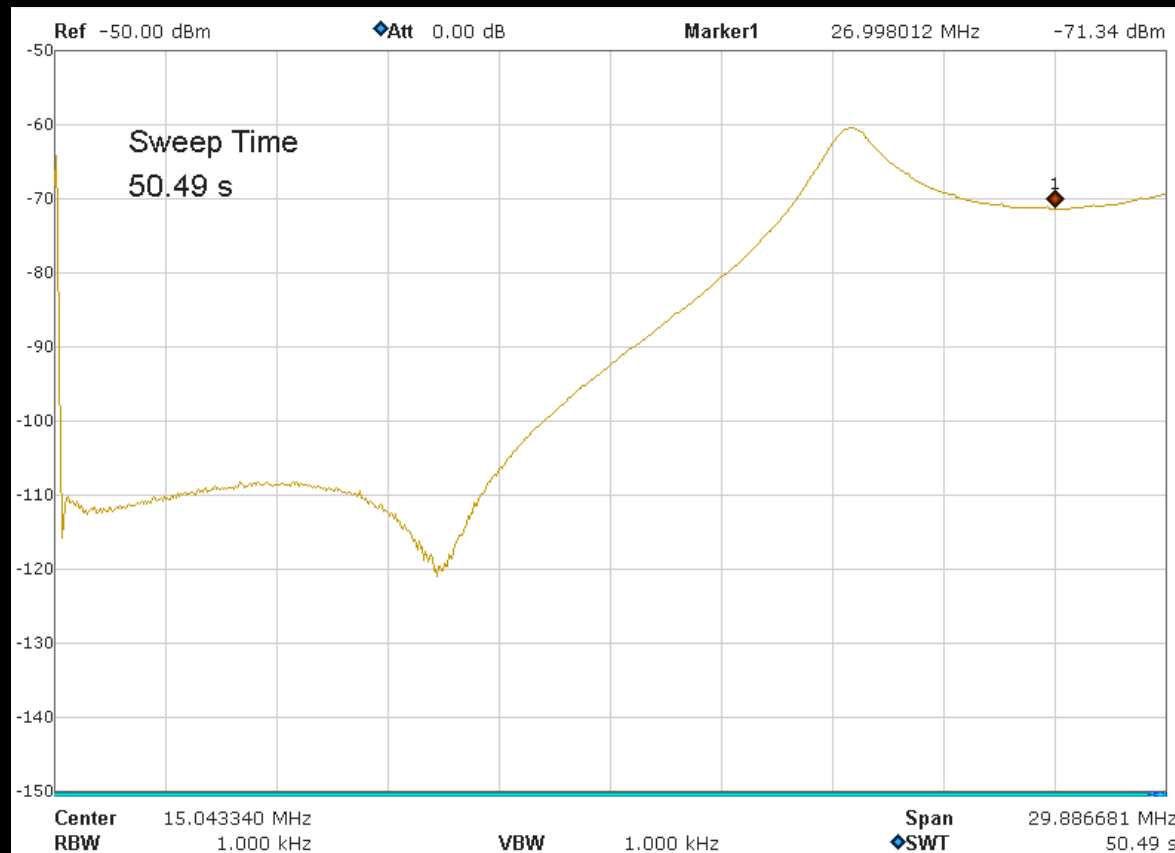


10/6A Common Mode Version

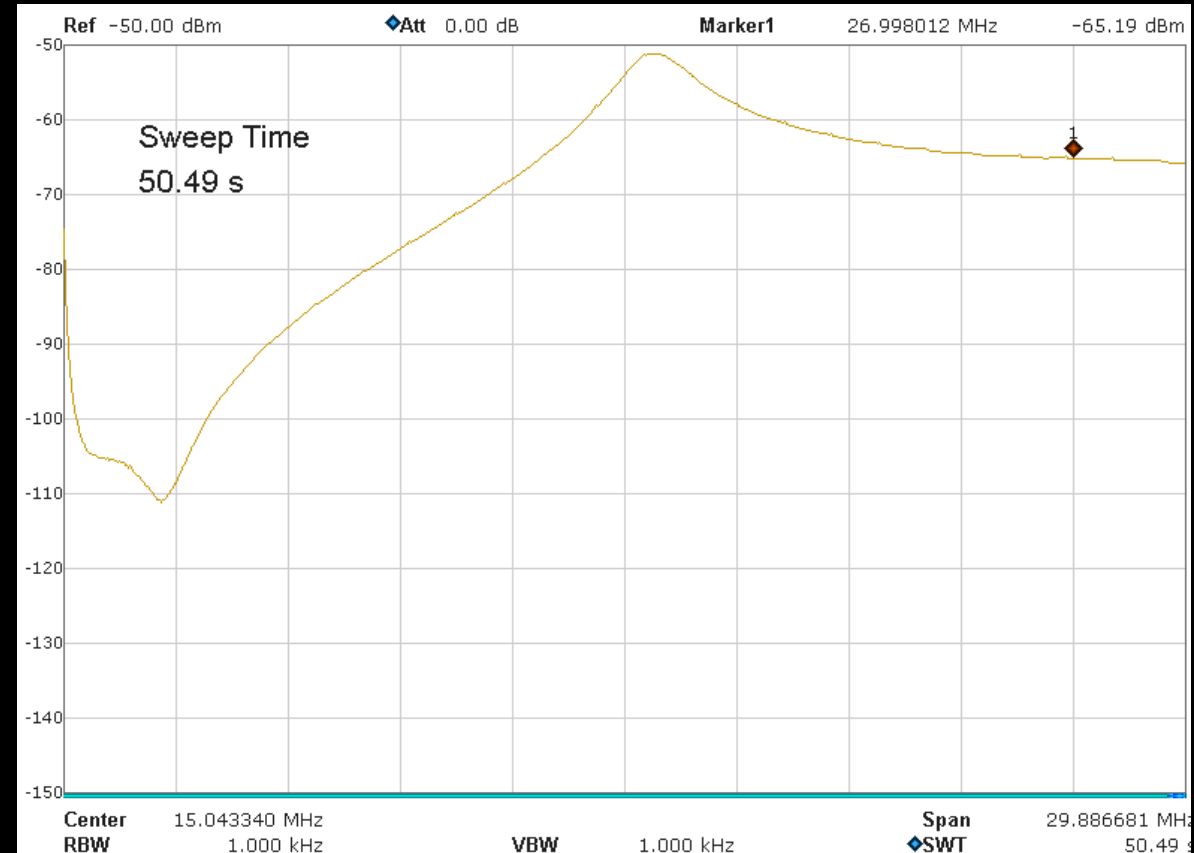


3A Common Mode Version

# remoteMagicMikeFilter – Different **240V** Power Line filters

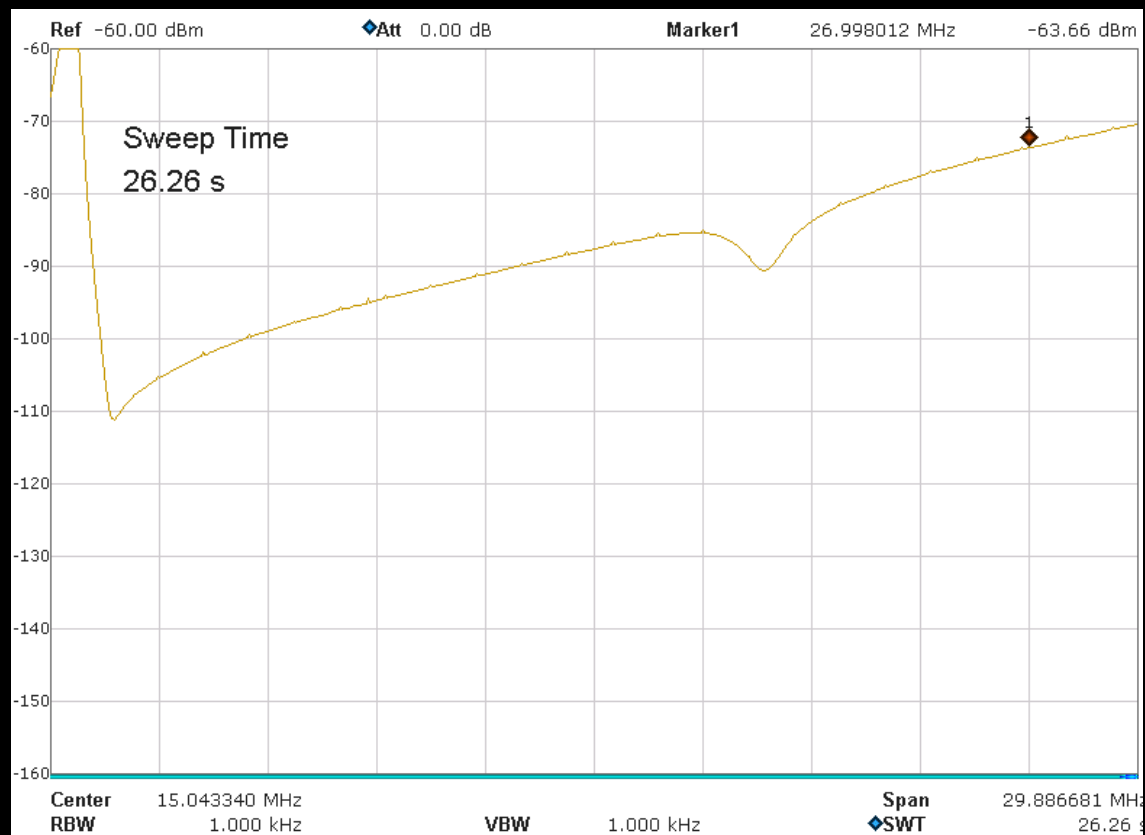


DoubleCoil T-Filter

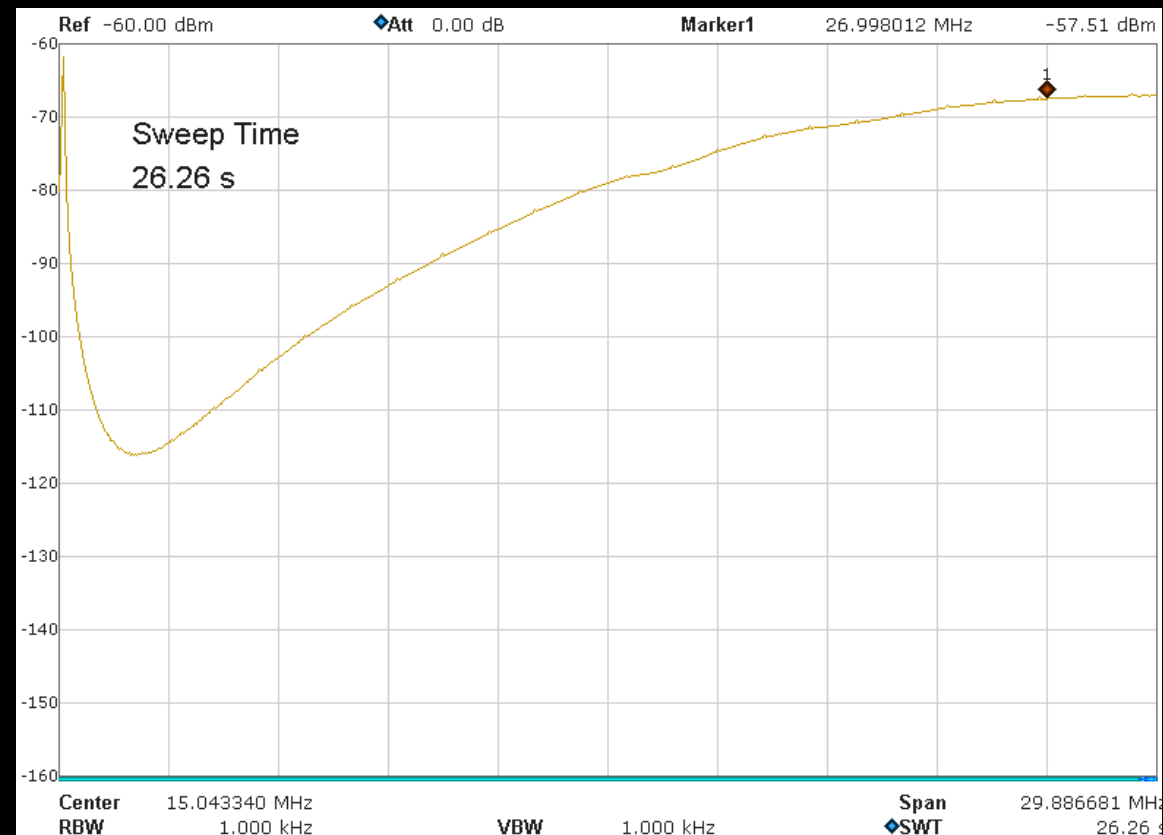


MultiCoil Common/Differential Mode

# remoteMagicMikeFilter – Different **240V** Power Line filters

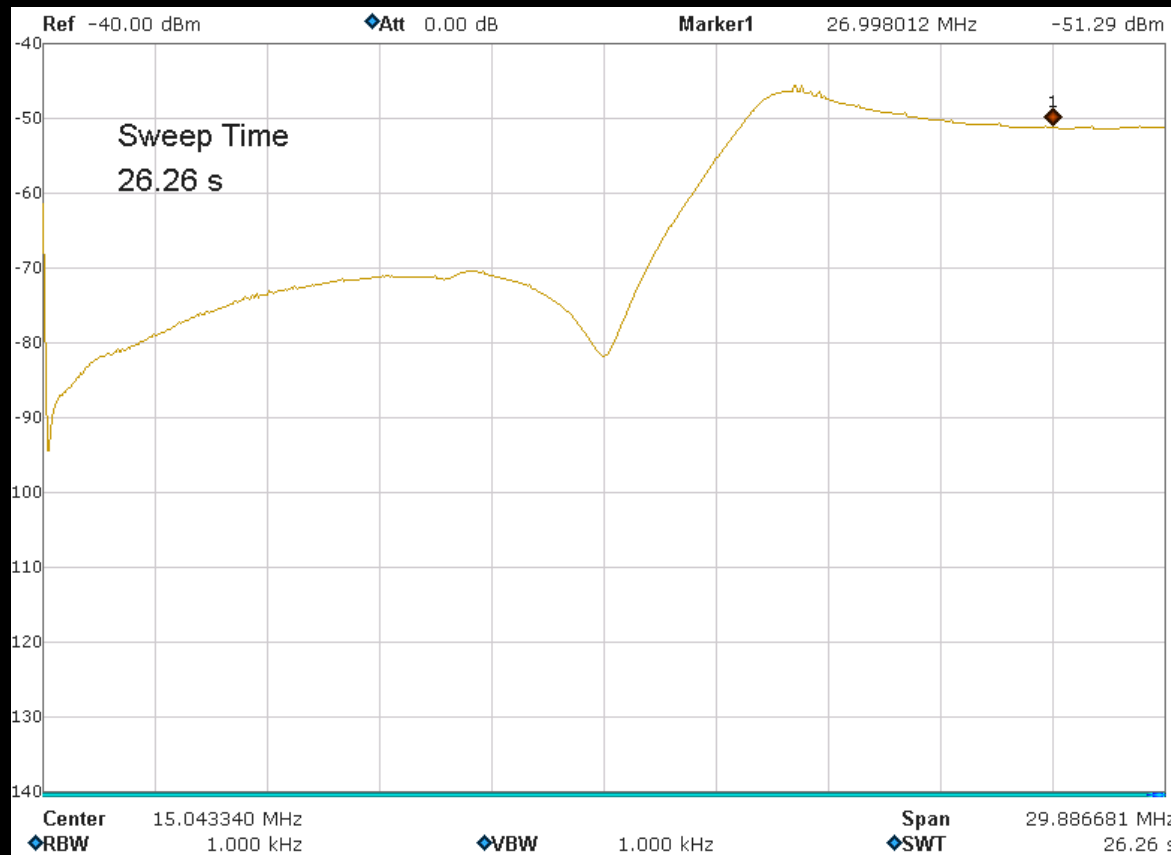


YUNSANDA CW4L2-20A-S

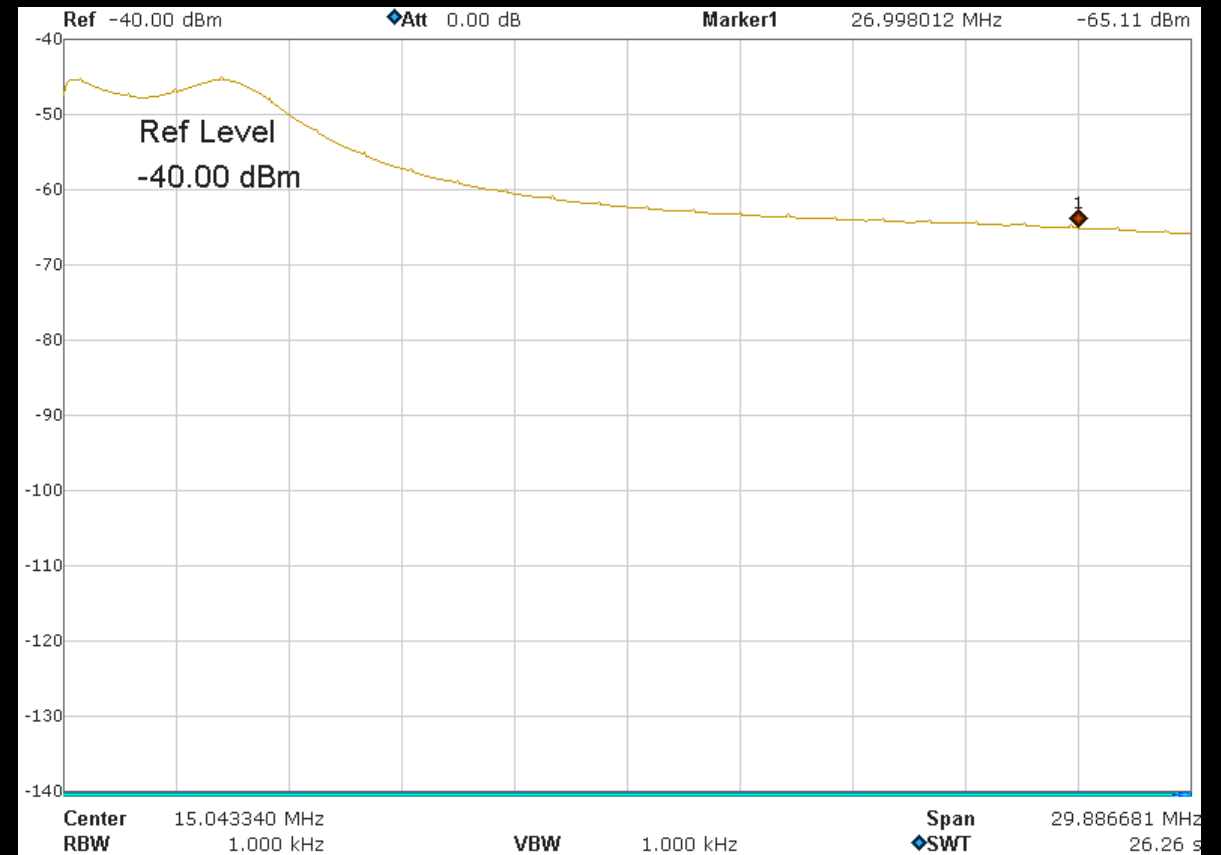


OKAYA SUP-EP30-ER-6 (30A)

# remoteMagicMikeFilter – Different **240V** Power Line filters

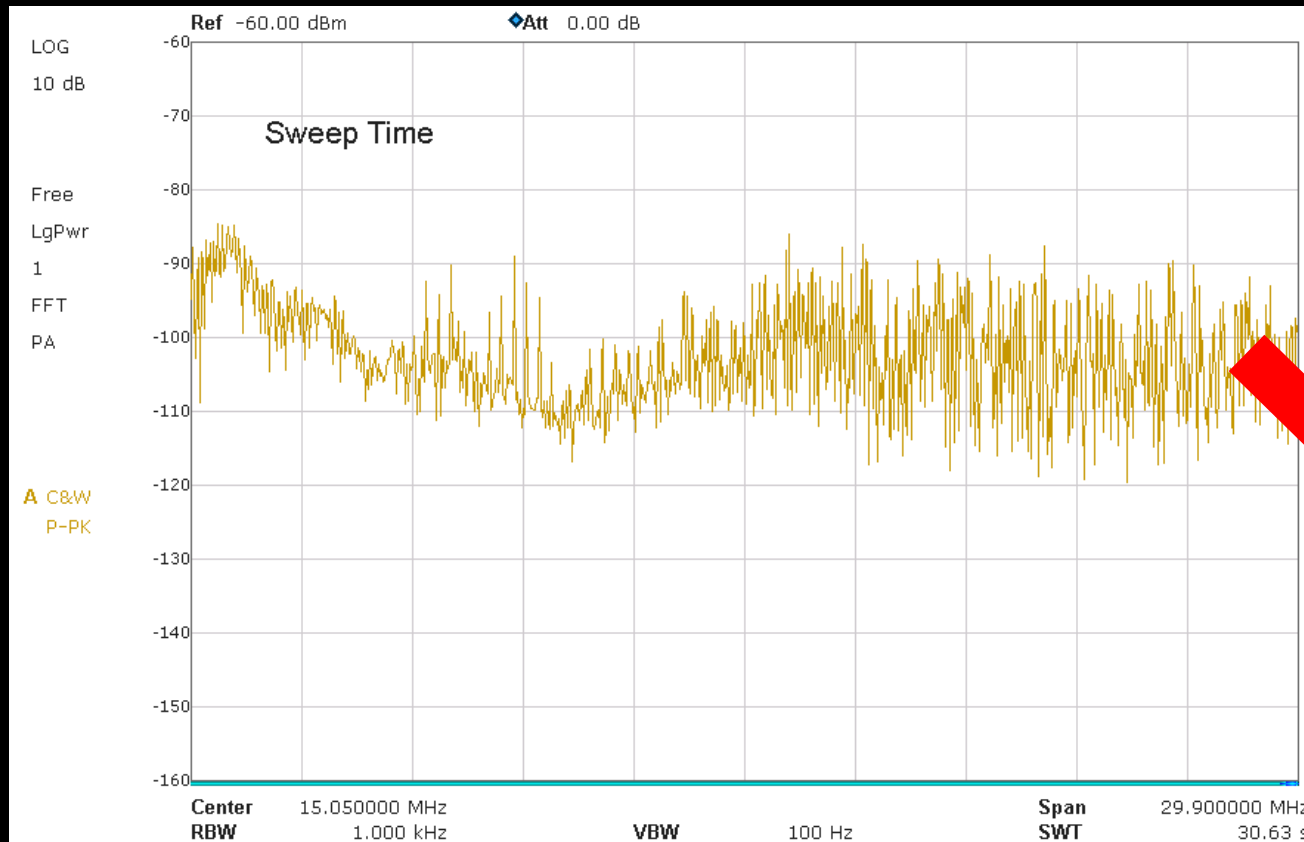


SF20A



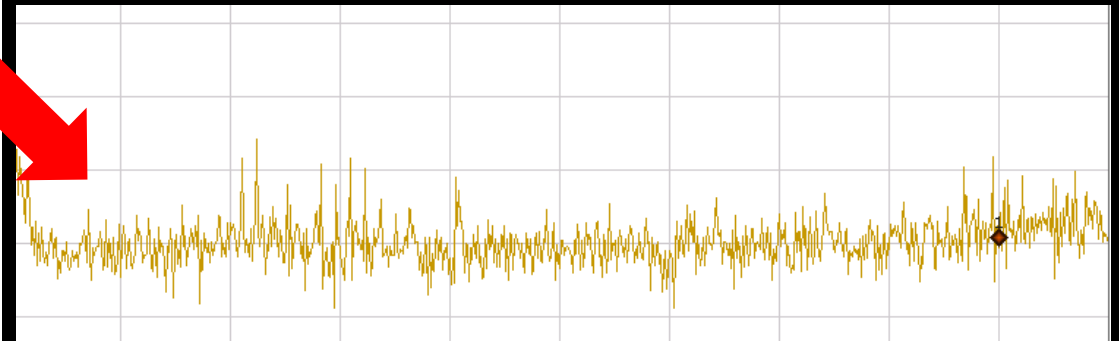
Delta 10EEG (Rubber connector EMI socket)

# remoteMagicMikeFilter – The QJE PS30 measured directly.



Not clean, but also not too bad. The QJE PS30 is somehow quiet. OK, it costs about 100€, but with the additional remoteMagicMike Filter, imagine how quiet it will be...

But hey, choosing a very cheap server power supply and the filter.. Whooooop 😊

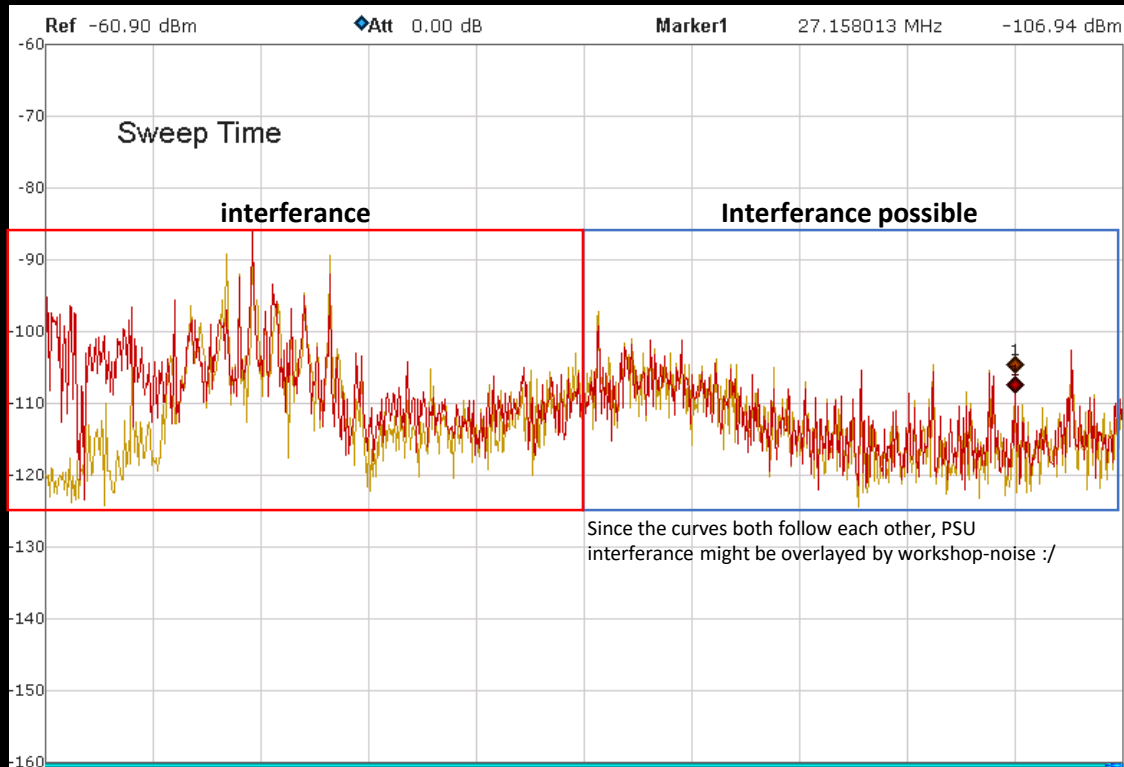


Filter first, no worries later 😊 Additionally – you will like the offset to move the birdies away from your listening frequency, for sure 😊

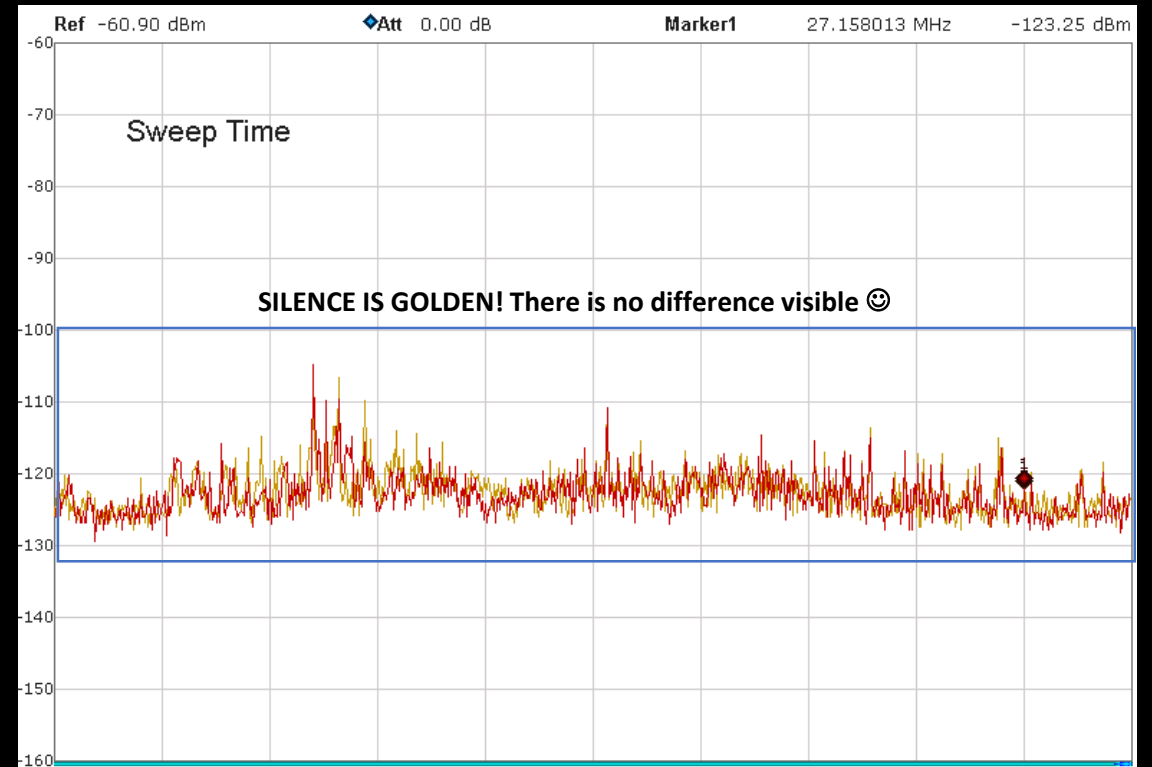
Be aware – there are several copies around. [Ask](#) for checked/mod version at [hamparts.shop](http://hamparts.shop) if interested (see next Page).

# remoteMagicMikeFilter – The Mod\_QJE PS30\* from QR0.CZ/hamparts.shop

## Mod\_QJE PS30



## Mod\_QJE PS30 + magicMikeFilter



The Mod\_QJE PS30 sold by hamparts.shop is one of the most silent PSU measured yet. Since it's not listed, [ask](#) for it if you want this nice PSU! My work-shop is not a noise-free environment and the wiring/components act as antennas. So its important to compare PSU\_ON (red) with PSU\_OFF (orange). In our case, the connecting cables without filter (left image) are 20cm long and act perfectly as antennas => higher noise – compared to filter setup with much shorter cables 😊 !

\*with LISN@-10db and loaded with 10A (Difference to measurement at P.12: 20A and direct connected).