Finding and Fixing RFI *to* Your Station

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Do You actually have RFI

- Keep track of your band noise so you can notice an increase
- Turn your power off to make sure that you are not the source. This includes battery operated devices.
- If you are the source, isolate it one breaker at a time
- Determine the type of RFI

Common Types of RFI

- Power Line RFI
  - Generally Broadband
  - Audio pulses on a scope will stand still if line triggering is used
- Switch-mode Power Supply RFI
  - Unstable Carriers 50 – 70 kHz apart across the whole band
- Grow light Ballast RFI
  - Broadband (40m). Timer
- High Speed Internet
  - Specific Wide Spectrum

Why Identify Type?

- Listen to Specific Signature
- May be several Noise Sources
- Make sure you are tuned to correct source

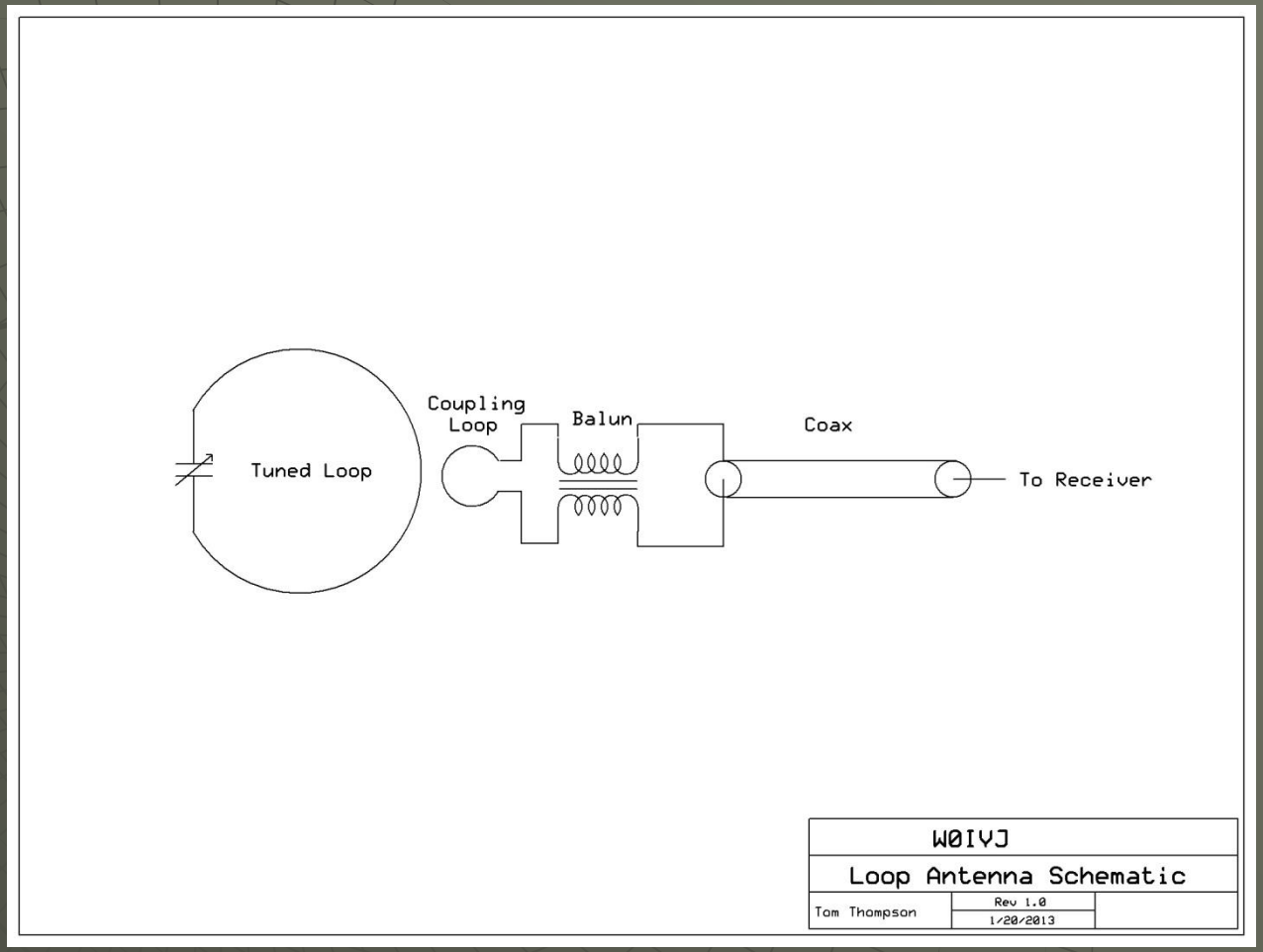
RFI Tracking Tools

- Portable Receiver with S-Meter and no AGC
- Switchable Attenuator
- Directional Antenna
- RF Ammeter

Portable Receiver

HF Directional Antenna

HF Antenna Schematic
4:1 Loop Diameter Ratio



Loop Antenna Characteristics

- Bi-Directional
- Vertically Polarized Null Looking Through the Loop
- Null is very sharp
- Most HF RFI (other than Power line noise) is vertically polarized.

Power Line Antenna

- 3-Element Yagi for 2m or 70 cm (Uni-Directional)
- Acoustical Parabolic Dish (Uni-Directional)

Learn How to Use Your Tools

- I had a 40m RFI problem that was across the whole band
- I coupled a 40m oscillator into my house wiring on the GREEN wire using a 600 VDC series capacitor with a shunt inductor on the oscillator side

Learn How to Use Your Tools

- I went outside and determined the polarity and direction ability of the loop antenna
- I was able to easily triangulate my house
- I learned how to use the attenuator as I approached the source

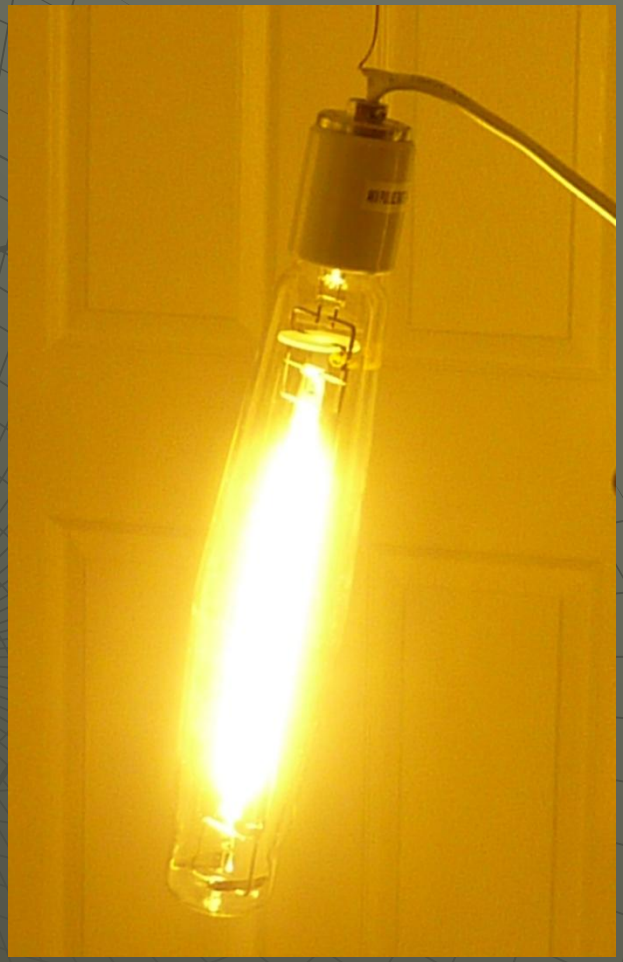
Clamp-On RF Ammeter

Clamp-On RF Ammeter

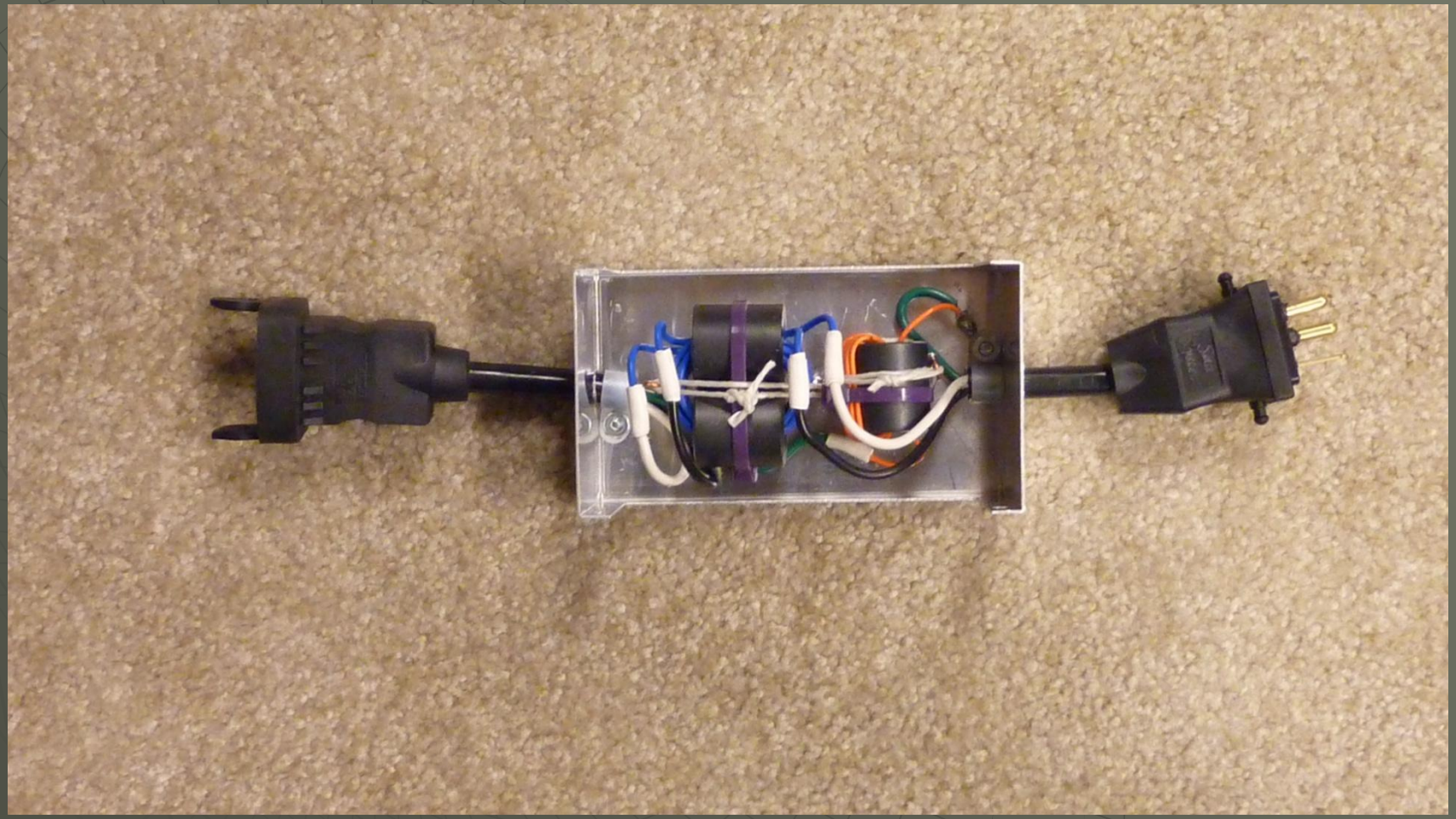
- Use the Clamp-On Ammeter to locate a particular RFI source by clamping the leads from the source
- The meter can be calibrated by clamping onto a known RF current source
- The Ferrite in the Ammeter is shielded so that it will only respond to the RF current passing through it

Grow Light Ballast

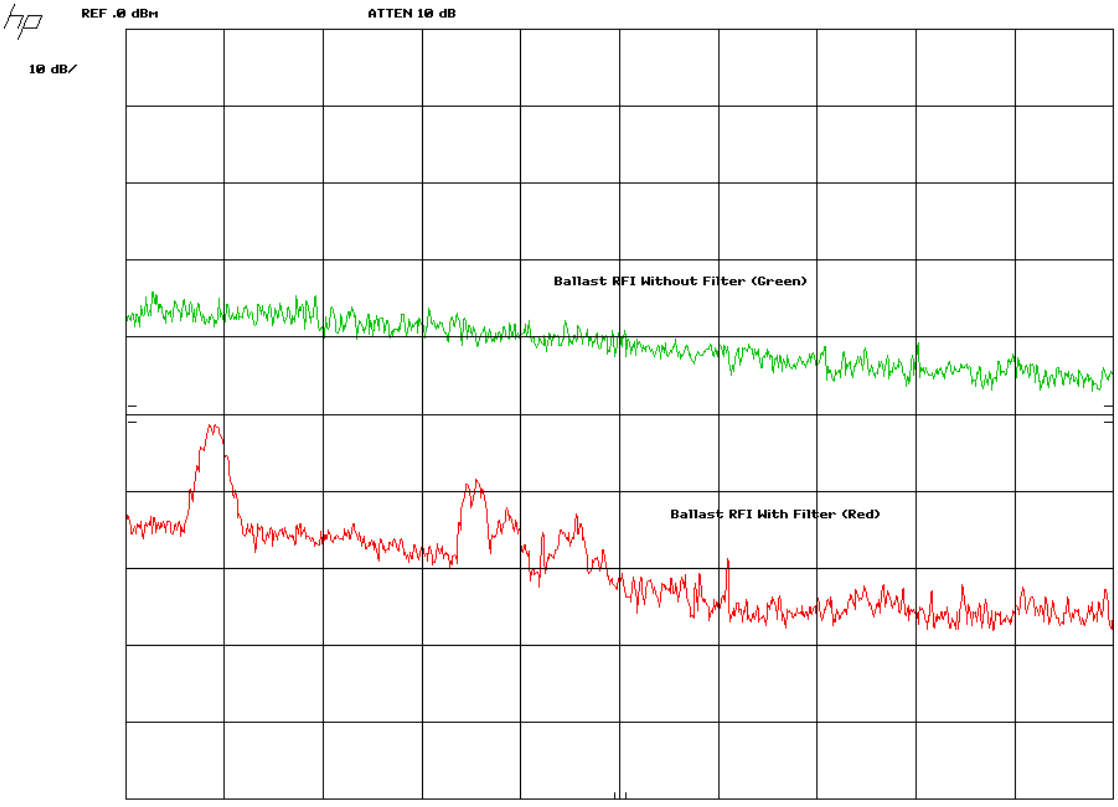
Grow Light



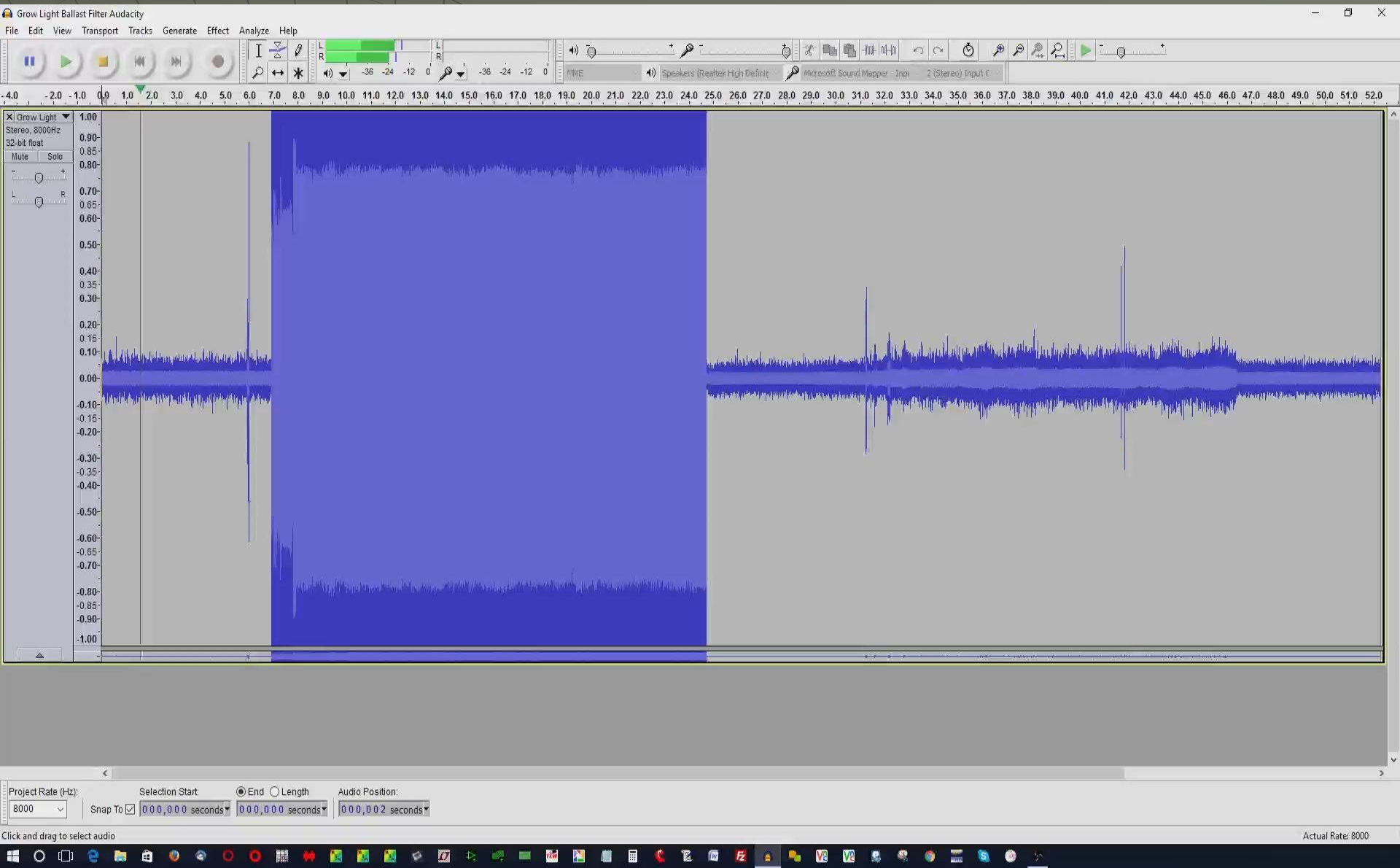
Ballast Filter



Ballast Filter Results

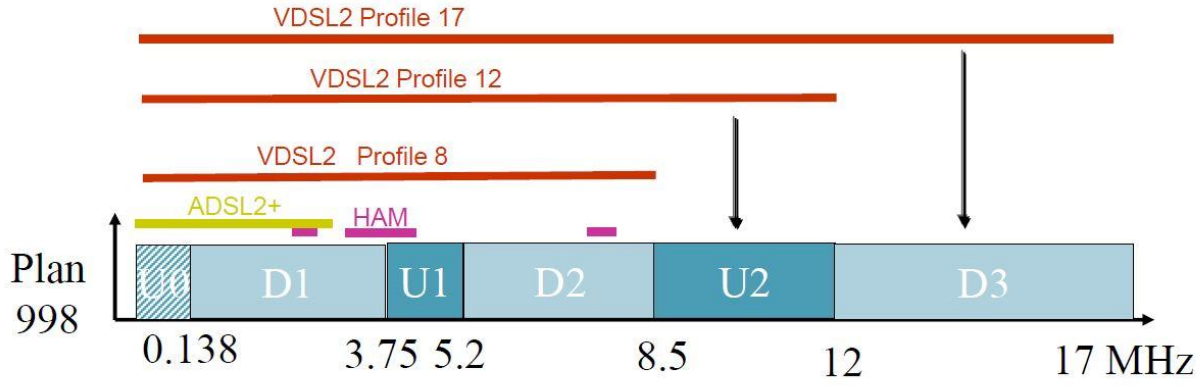


Ballast Filter Test



CenturyLink Modem Leakage

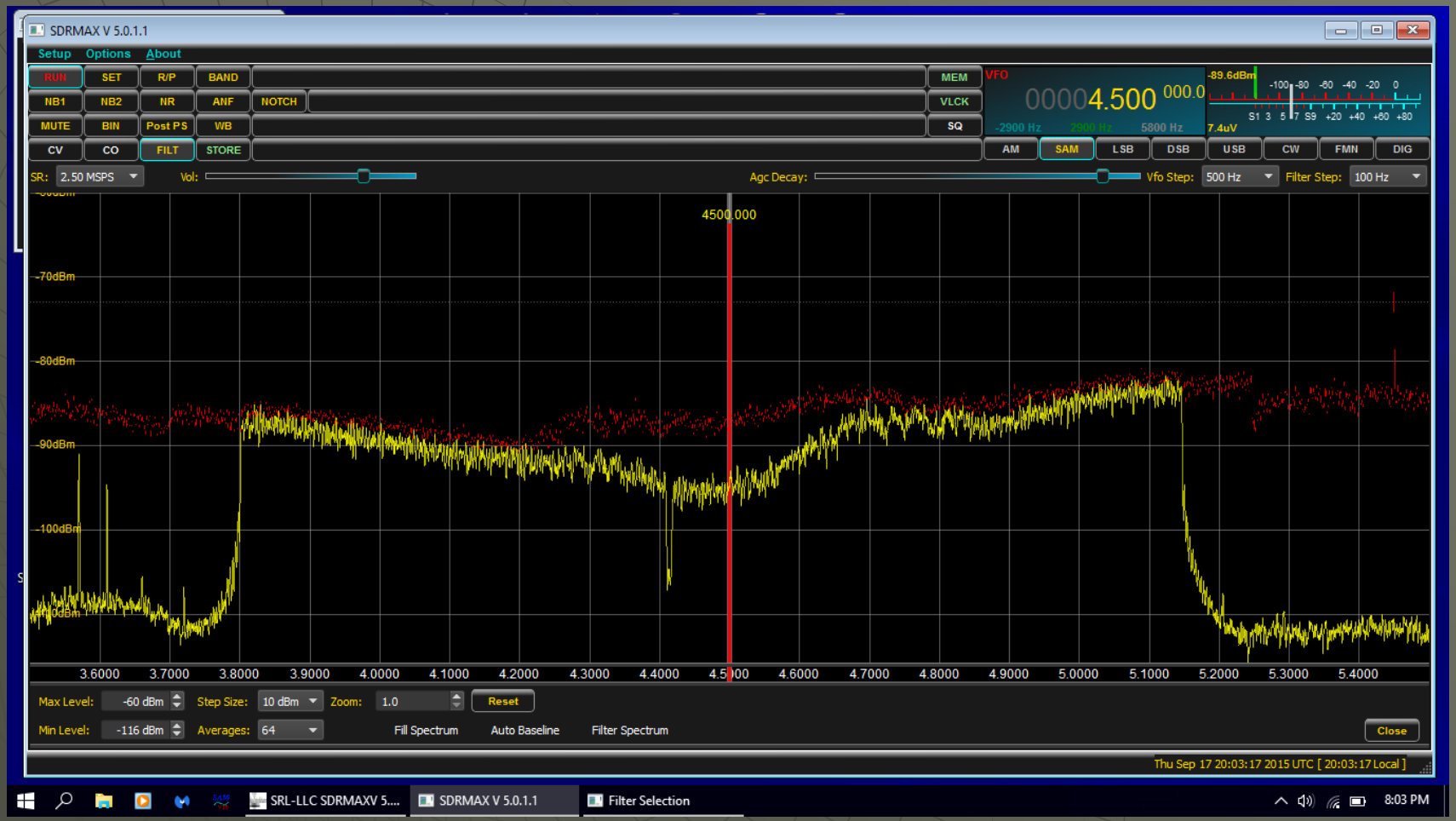
VDSL2 Profiles & Band Plan 998



- D3 usable out to 610 m (1968 ft)
- U2 usable out to 900 m (2953 ft)
- D2 usable out to 1200 m (3937 ft)
- U1 usable out to 1300 m (4265 ft)
- HAM Bands: 1.81-2 Mhz, 3.5-4 MHz, 7-7.3 MHz

Loop lengths must be reduced in order to take advantage of high frequency VDSL2 bands

CenturyLink Modem Leakage



SDRPlay

Active Antenna

Once you have located the Source

- Approach neighbor with a helpful attitude
- Explain that their transmissions are not to their benefit
- Contact ARRL for a letter if all else fails
- Diplomacy Diplomacy Diplomacy

More Information

- http://tomthompson.com/radio/ReceivingLoop/loop.html
- http://tomthompson.com/radio/GrowLight/GrowLightBallastFilter.html
- http://rsgb.org/main/technical/emc/emc-publications-and-leaflets/
- www.arrl.org/radio-frequency-interference-rfi