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W5WS

BEGINNING AND STEALTH ANTENNAS FOR HF

Purpose and Scope

- Get new hams on the air with a reasonable signal at minimal cost.
Target: <\$100.00
- Strike a balance between stealth and performance while minimizing visual impact and electrical interference.

First Rule of Antennas

Any antenna is better than no antenna!

Don't worry if it's not optimum, just get an antenna up in the air and improve it as you mature and learn in your amateur radio journey.

Discussion

- ⦿ Commercial vs. Homebrew
- ⦿ Homebrew Wire Antennas
- ⦿ A word about Magnetic Loops
- ⦿ Site survey
- ⦿ Where to put the antenna?
- ⦿ Construction – Focus on cheap and simple
- ⦿ Tuning
 - Antenna analyzer
 - NanoVNA

Site Survey



Where Can We Put an Antenna?



Wire Antennas

- Dipole – Best performing wire antenna, it will be our standard
- OCF Dipole – A dipole fed off center with ladder line and used with a Balun for multi-band use.
- Fan Dipole – Multiple dipoles with a common feed point
- EFHW – End Fed Half Wave, dipole fed at end. Can be multi-band. Stealthiest.

More Wire Antennas

- Trapped Dipole – Multi-band dipole using traps to be resonant on two or more frequencies
- G5RV and variants – Multi-band doublet fed with ladder line. Will tune most bands. 104 ft or 52 ft.
- Vertical – can be very stealthy, requires radials or counterpoise.

Discussion

- Limit the size of the antenna: 40m – 10m, about 67 ft for any version of the dipole except multiband antennas using loading coils/traps.
- Traps add expense and complexity, but reduce overall length with a small penalty in performance.

- ⦿ Depending on how the antenna is mounted and considering how the coax will be run, decide if it makes more sense in your situation to feed the antenna from the end, about 25% from the end or in the middle.
- ⦿ A vertical wire is very stealthy and if the feed point is elevated only requires a couple of radials. Making it multiband requires traps or multiple vertical wires with a common feed point. Don't forget the balun.

A Word About Baluns

- Current Balun – Usually 1:1. Also called an rf isolator, current choke, or Guanella, there should be one at the feed point of every antenna. It can be a simple coil of coax (ugly balun), ferrite beads on the outside of the coax or a piece of coax wrapped inside a toroid. This is to keep RF off of your feedline and out of the shack.

More About Baluns

- Voltage Balun – A transformer to match impedance between you antenna and your radio. For example EFHW antennas use a 9:1 or 49:1 balun. An OCF dipole may use a 4:1. My low band vertical uses a custom 32:50 to match the coax to the vertical's nominal impedance. Normally (but not always) they do not block common mode current so you still need a 1:1 current balun also.

What Do I Need?

- Wire – Any size, thicker is better, no CCA
- Center Connector and Insulators – Make out of Dollar Store cutting board or PVC
- Coax connection – SO239 connector
- Rope – Paracord, or other UV stable rope
- Wire Cutters
- Soldering Iron
- Zip Ties
- Balun

My Recommendations

- EFHW – Very popular right now, easy to build, set-up, and use. Multi-band with a 49:1 balun. Very reasonably priced kit available from ARRL (less than \$85.00 with shipping).
- Many websites and Youtube videos for building and setting up EFHW antennas and for the ARRL kit.

Final comments

- If you're more interested in one of the other antennas we've talked about or you have questions about commercial antenna, feel free to ask. We can also do a Part II and go into more depth.

Questions?

Links

- ◎ [ARRL EFHW antenna kit \(\\$69.95\)](#)
- ◎ [Assembly instructions for kit](#)
- ◎ [Antenna kit build on Youtube](#)
- ◎ [Using nanoVNA to tune antennas](#)