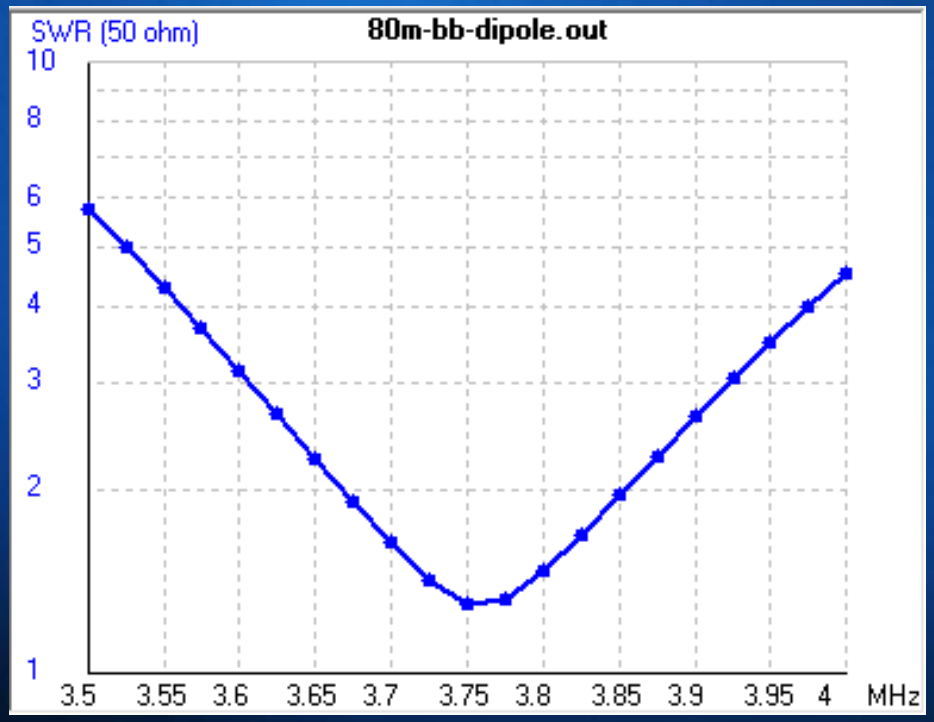
How To Broadband an 80m Dipole

Rogue Valley Amateur Radio Club

Tom McDermott, N5EG
May 3, 2018

The Problem

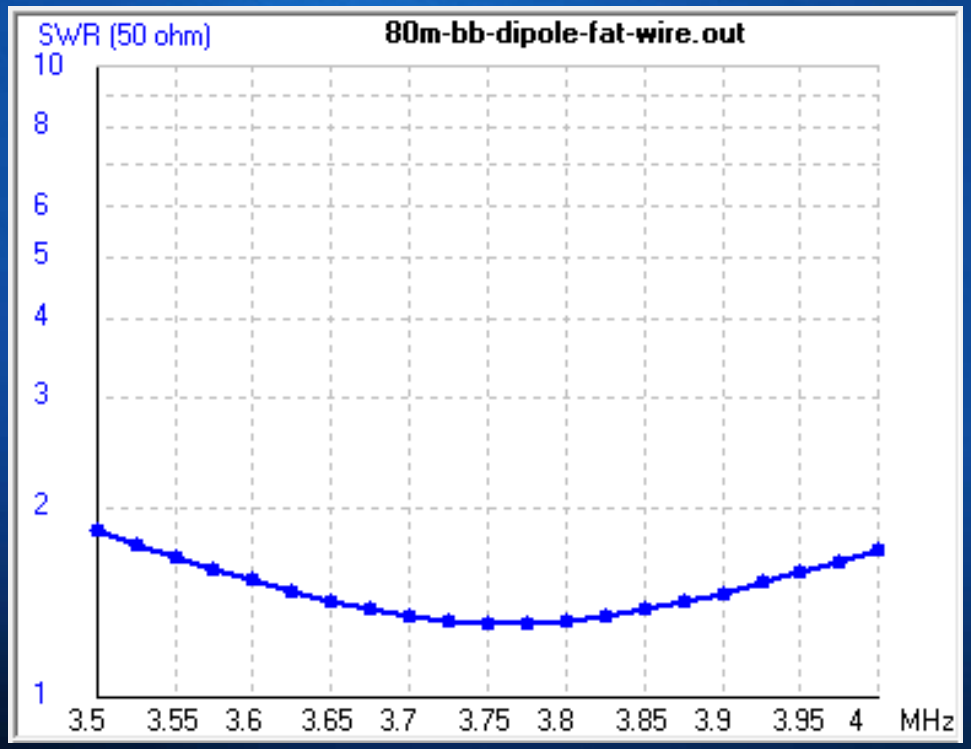
- An 80 meter wire dipole has high SWR at the edges of the band.



8 AWG wire shown.

Approaches to the Problem

- Use wire cage to increase the effective diameter of the wire.



- 36 inch diameter many wires cage.
- Mechanical monstrosity.

Double Bazooka

- Mechanically complex. Higher Wind loading. Failure prone in the wind. Solar deterioration of coax.
- Not much more broadband than a wire dipole.

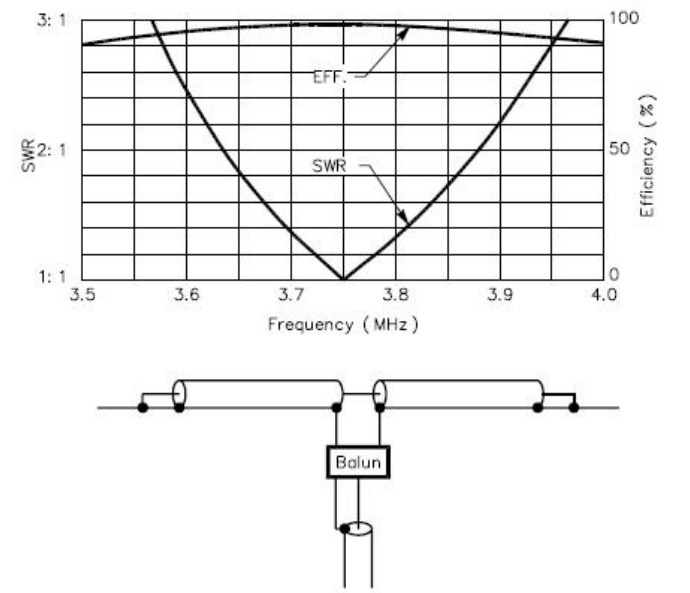


Fig 11—The double bazooka, sometimes called a coaxial dipole. The antenna is self-resonant at 3.75 MHz. The resonator stubs are 43.23-foot lengths of RG-58A coax.

Open Sleeve Dipole

- Large, bulky, requires 9:1 balun.
- Complex mechanically.
- Much wider bandwidth than Double Bazooka.

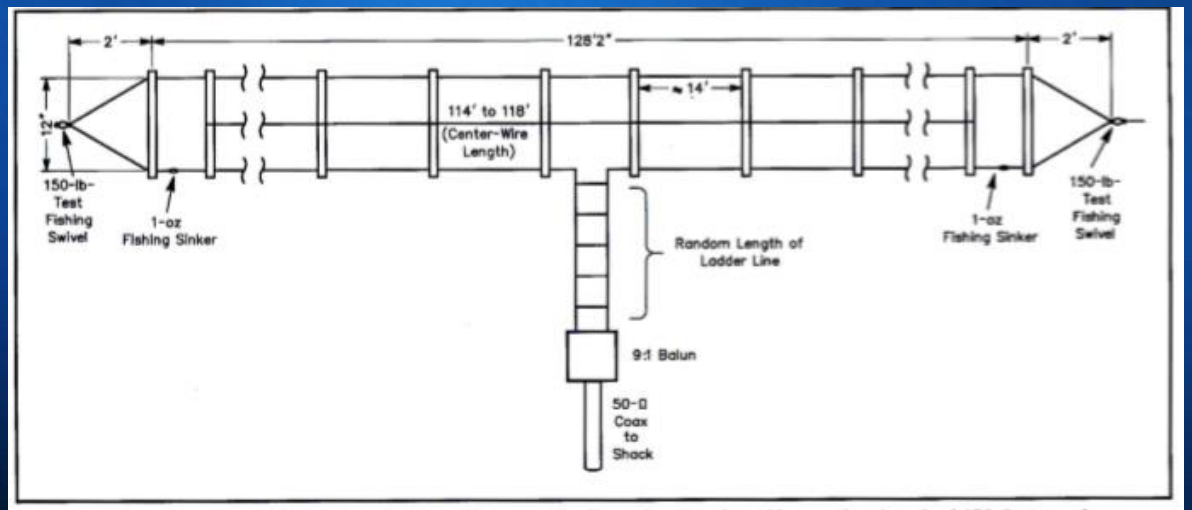


Figure 3—The open-sleeve folded dipole: simple and inexpensive. The antenna is fed with a random length of 450-Ω open-wire transmission line through a 9:1 balun.

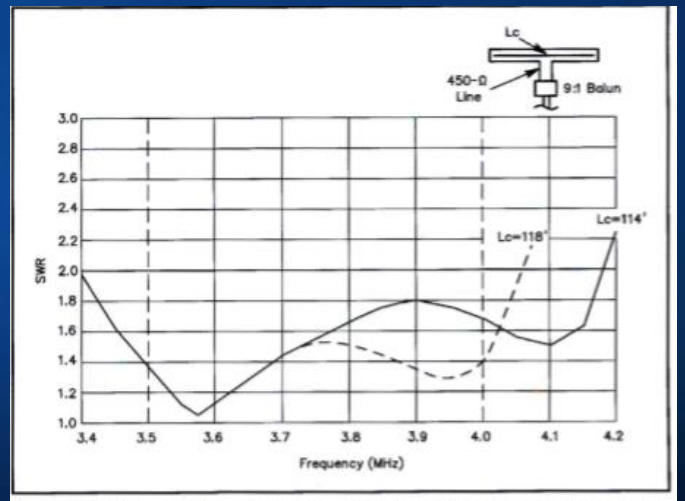
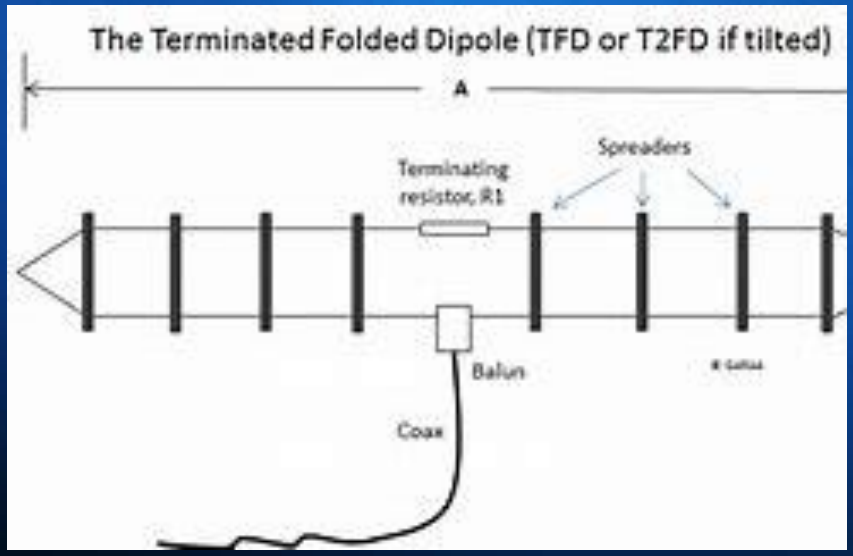
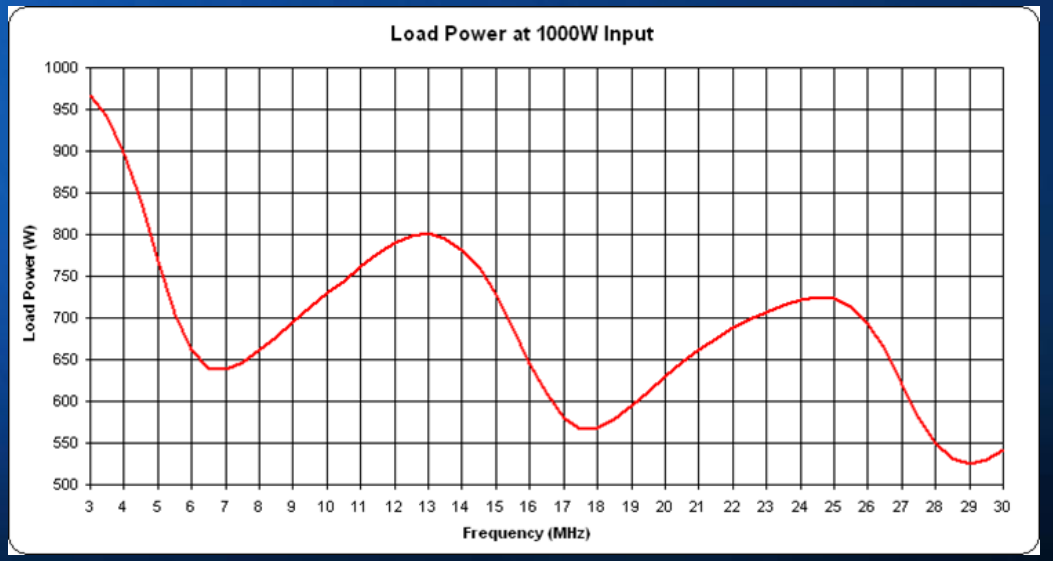


Figure 4—SWR curve of the open-sleeve dipole of Figure 3, showing curves for different lengths of the center wire (L_C).

Terminated Folded Dipole

- Simple, reliable, commercially available.
- SWR < 3:1 across a wide range of frequencies.
- Termination resistor dissipates a lot of power.
  - Very high loss at lower frequencies

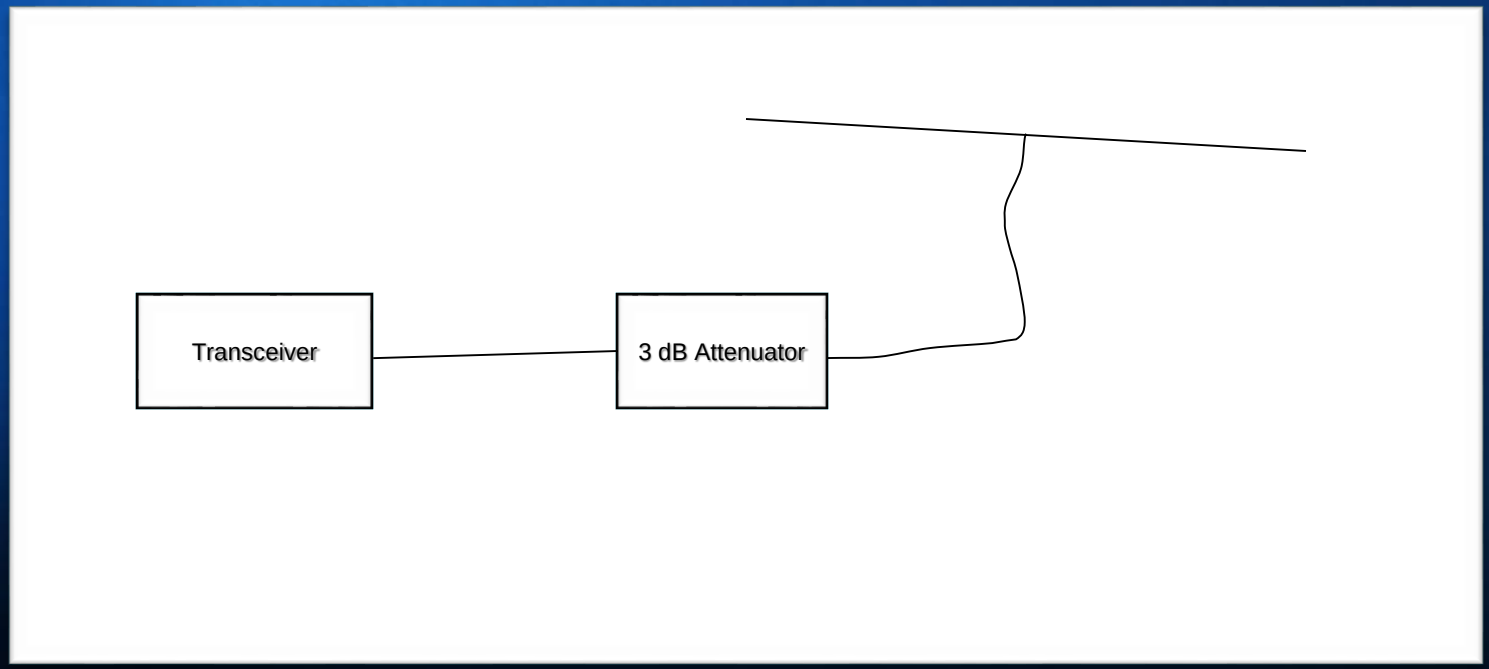




Ref: AC6LA 89.9 foot TFTD

3 dB Resistive Attenuator

- Simple, reliable, may need BIG resistors.
- Just turn half your power into heat.
- SWR < 3:1 across a wide range of frequencies.



Coax Broadband matching (AI1H).

- Simple wire dipole. Mechanically robust, low profile, low wind area.
- One wavelength 50-ohm line:
  - Shorter than 1λ at 3.5 MHz
  - Longer than 1λ at 4.0 MHz
- About 1 dB of excess feedline loss.

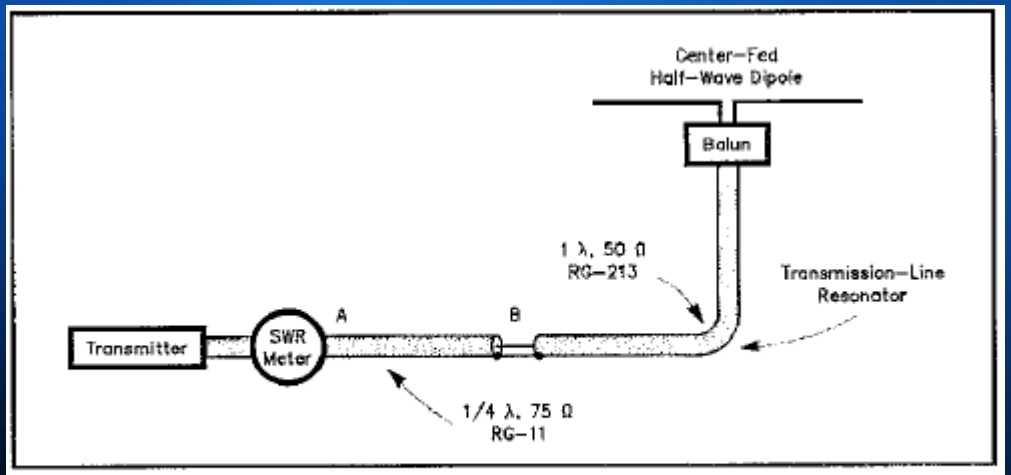


Fig 1—One form of the simple broadband antenna system. It resembles a conventional dipole except for the ¼-wavelength, 75-Ω segment. Points A and B are discussed in the text.

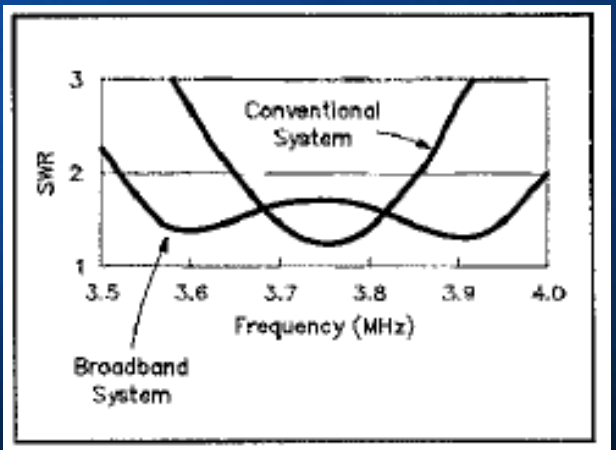


Fig 2—Measured SWR versus frequency for the broadband and conventional antenna systems.

Coax Broadband matching (AI1H).

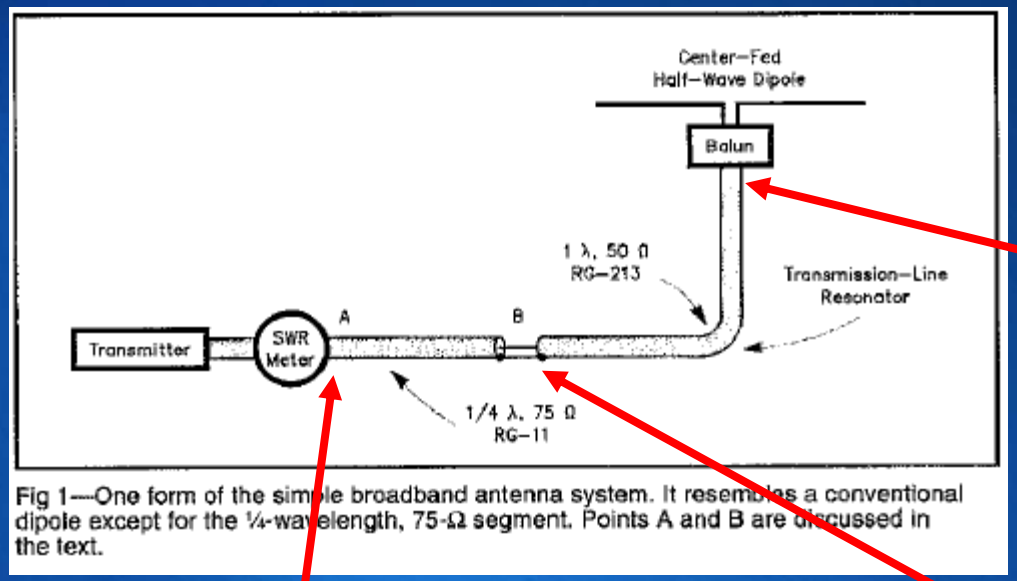


Fig 1—One form of the simple broadband antenna system. It resembles a conventional dipole except for the ¼-wavelength, 75-Ω segment. Points A and B are discussed in the text.