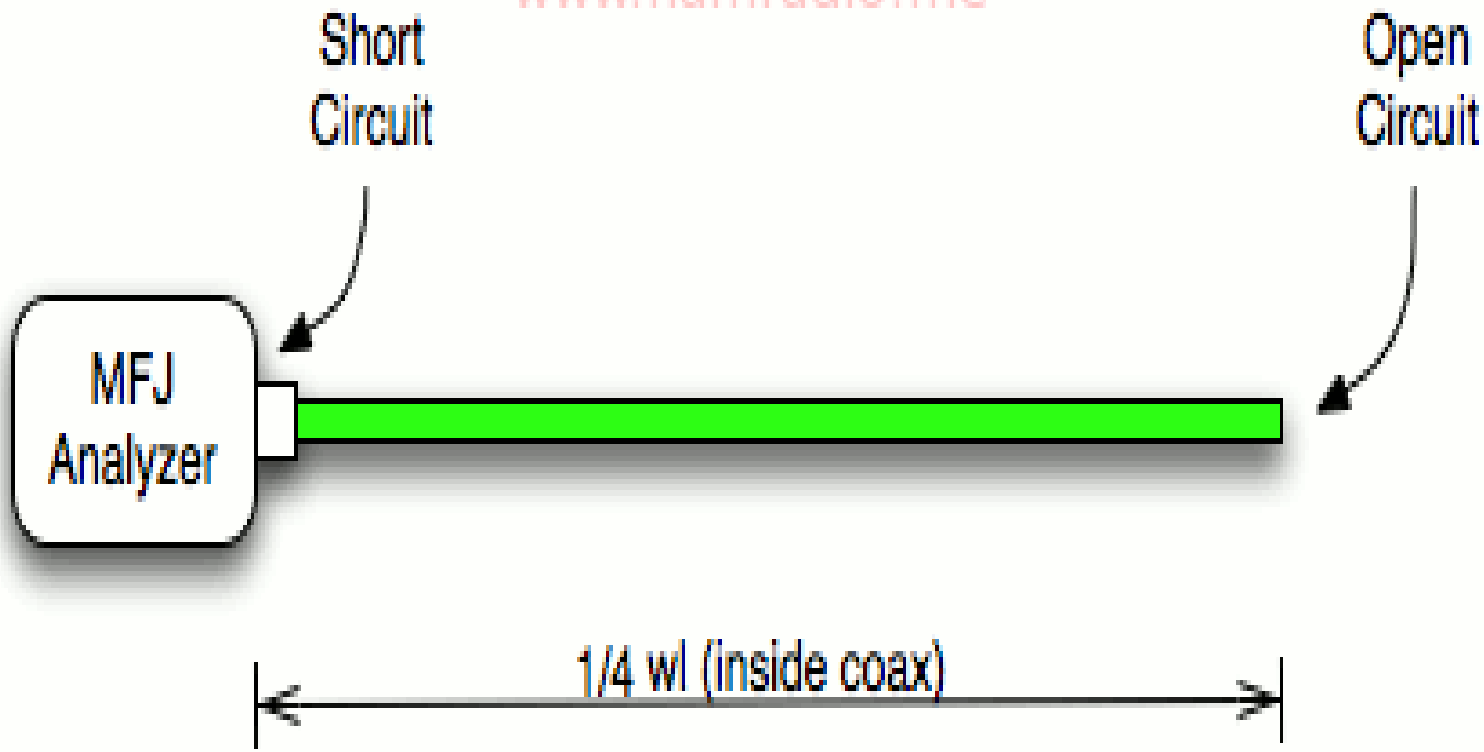
Inter-station Interference Reduction Coaxial Stubs

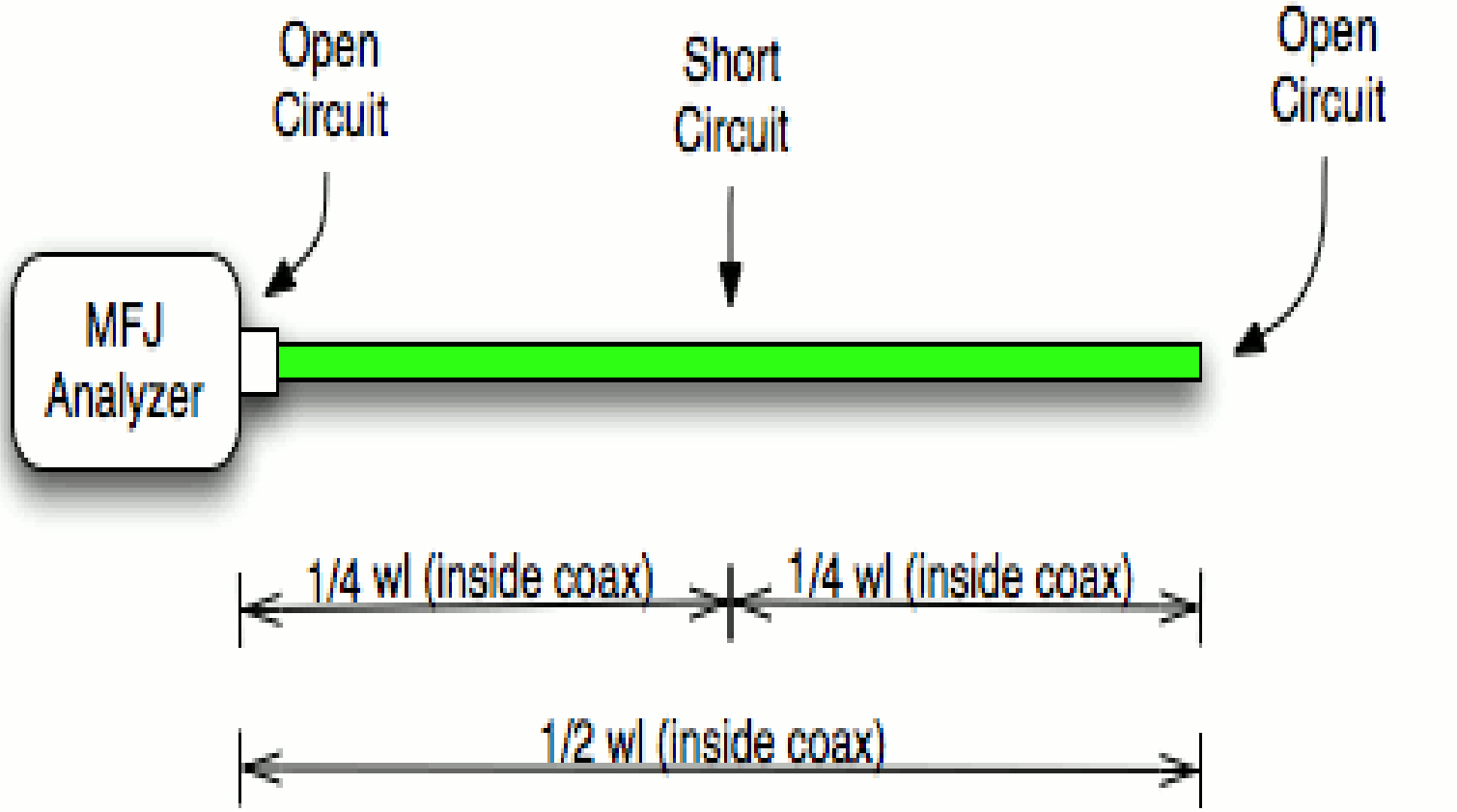
What is a Coax Stub
Coax Stub Demonstration
How to Make Them

LCARA Meeting Nov 6, 2016
Lee N8LJ

Characteristics of ¼ Wave Stub



Characteristic of ½ Wavelength Stub



Common Harmonic Cancelling Coax Stubs

- 1/4 wave stubs characteristics
  - Open end
    - ¼ wave 80 meter stub passes 40…..cancels 80
    - ¼ wave 40 meter stub passes 20 …..cancels 40
    - ¼ wave 20 meter stub passes 10…..cancels 20
  - Shorted end
    - ¼ wave 80 meter stub passes 80…..cancels 40
    - ¼ wave 40 meter stub passes 40…..cancels 20
    - ¼ wave 20 meter stub passes 20…..cancels 10

Common Harmonic Cancelling Coax Stubs

- ½ wave stubs characteristics
  - Open end
    - ½ wave 80 meter stub passes 80…cancels 160
    - ½ wave 40 meter stub passes 40…..cancels 80
    - ½ wave 20 meter stub passes 20..cancels 40
    - ½ wave 10 meter stub passes 10…..cancels 20
  - Shorted end
    - ½ wave 15 meter stub passes 40…..cancels 15

Custom Cut for the Frequency of Interest

- 492/ Frequency Mhz = ½ wave RF in free space
- 468/ Frequency Mhz = ½ wave dipole in wire
- 234/ Frequency Mhz = ¼ wave antenna
- Difference is the velocity factor (Vf) antenna of wire about 0.95
- Different Coax has unique Vf
    - Foam dielectric runs about 0.85
    - Poly dielectric runs about 0.66

How To Cut ¼ Wavelength Stubs Using RG-8 with Vf 0.66

- 80 m...246 x 0.66 divide by 3.55 Mhz= 46.8 ft
- 40 m…246 x 0.66 divide by 7.05 Mhz= 23.4 ft
- 20 m…246 x 0.66 divide by 14.05 Mhz= 11.8 ft
- 15 m…246 x 0.66 divide by 21.05 Mhz= 7.9 ft
- 10 m…246 x 0.66 divide by 28.05 Mhz= 5.9 ft

- ½ wavelength stub formula
  - 492 x 0.66 divided by Frequency Mhz

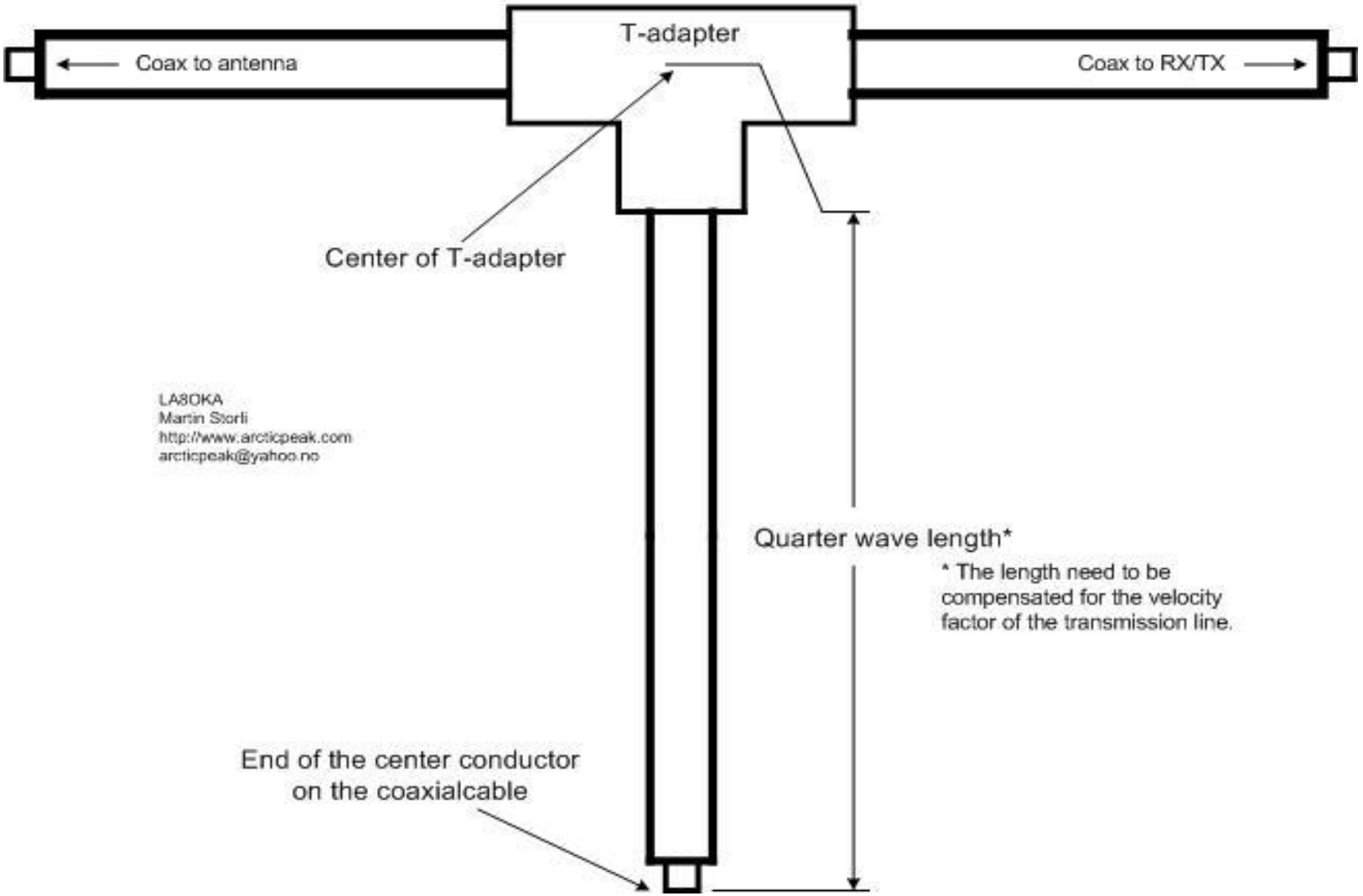
Application of a ¼ Wave Shorted Stub

Pass Freq	Null Freq	Approx Length
160m	80m	91 ft
80m	40m	47 ft
40m	20m	24 ft
20m	10m	12 ft

Application of a ¼ Wave Open Stub

Pass Freq	Null Freq	Approx Length
80m	160m	91 ft
40m	80m	47 ft
20m	40m	24 ft
10m	20m	12 ft

Quarter-wave stub



Other Applications

- Six Meters Ops who interfere with the FM broadcast band
- Combination of open and shorted stubs can be used together for custom interference frequencies
- Stubs can be used as coaxial resonators at UHF and microwave frequencies
- Recommended Reading
  - Managing Interstation Interference with Stubs and Filters
  - By George Cutsogeorge W2VJN