

# Antennas

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9:32 PM

## Antenna questions:

- All antenna lengths are \* 0.95, except quads (\* 1.02)
- Yagi: boom function
- Yagi: reflector (length, 1.05 of driven)
- Yagi: director (length, 0.95 of driven)
- Yagi: driven (length)
- Horizontal polarization
- Vertical polarization
- Isotropic antenna radiation pattern & definition
- VHF mobile typical polarization & antenna type
- Two element delta loops and quads
  - They focus energy on vert & horiz plane; therefore a two element quad = a three element yagi
- Front-to-back ratios
- Antenna length vs resonant frequency
- Wavelength vs frequency
  - 2, 25 MHz
- "Traps:" a coil & a capacitor in parallel
- Speed of RF in km/h & vs speed of light
- Wire antenna insulators are to shorten the antenna electrical length.
- Series inductance = loading coil, & makes the antenna appear electrically longer.
- HF dipole reflector effect & director effect
  - Note: HF dipoles are horizontal
- Antenna bandwidth
- Dipole radiation characteristics
- Larger diameter elements increases bandwidth
- Dipole has 2.1 dB gain over isotropic
- Parasitic beam def'n (=yagi)
- The 'i' in dBi
- Antenna gain, defn'
- How long 1/4 wavelength vertical at 21.125 MHz
  - $300/21.125 * .25 * .95$
  - Also 150 / freq. For 1/2 wave
  - Also 71.5 / freq for 1/4 wave
- 5/8 wave VHF have low takeoff angle (therefore more gain)
- 50 ohm coax is best for 1/4 wave vertical
- Verticals are omnidirectional
- Loading coils tune out capacitive reactance. See expl. For # B-006-10-10
- Sloping radials on a ground plane antenna increases to 50 ohms
- Stacked yagis have double the gain, therefore +3dB
- 2/10 wavelength is optimal yagi spacing (3 el)
- Yagi wide element spacing = high gain, easier tuning, wide bandwidth
- Trap antenna for multiband operation
  - Radiates harmonics

- Doublet antenna = dipole
- Dipole  $j = 73$  ohm; folded = 300 ohm
- Folded dipole bandwidth > than dipole
- Random wire antenna
  - RF in shack
- Cubicle quad antenna, (B=006-13-03)
  - Each loop = 1 wavelength
  - Length of sides =  $300/f * .25 * 1.02$
  - Vertical vs horizontal polarization
  - More horiz & vert gain
- Delta loop
  - Loops = 1 wavelength
  - Triangles, not squares