

# Antennas part 1

Brought to you by CRHRC Tech-Net Committee and  
presented by:

Chris Faas – W5CUY

# Welcome!



- Overview of types of antennas and applications
- Only the 1<sup>st</sup> part. What topics would you like to hear more about?



# An antenna is an antenna.....?

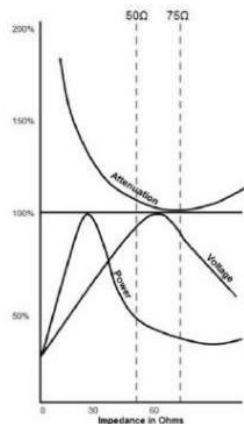
- Different antennas are designed for different purposes.
- What antenna is best depends on your plans on use.....  
repeater QSO, SSB, Meteor scatter, satellites, HF DX,  
Local HF coms...etc
- What considerations for space and height do you have?

# Why 50Ω; the original compromise.

## What Do You Want To Carry?

When you look at this chart, developed a century ago, you can see where and how choices had to be made by the telephone engineers of the time.

One of the major concerns was the ability to carry a signal without Voltage breakdown.



As can be seen from the bottom half of this chart, the best capacity for carrying Voltage efficiently is right around 60 Ohms.

This is near, according to the upper half, the point of least signal attenuation, which is around 75 Ohms.

So, why are the coax cables in broadcast usually 50 Ohms?

## The Choice

As seen, the power handling capacity of coax cables is the highest at around 30 Ohms.

But the best impedance for Voltage transmission is about 77 Ohms. With no perfect impedance to match both parameters, a middle ground was both needed and desired.

For example, with broadcast transmitters running thousands (even megawatts) of power, it was deemed prudent to find a compromise of where the power and Voltage were as equally good as possible. Since power handling falls off rapidly above 30 or 40 Ohms, to balance Voltage, Power, and signal Attenuation, engineers of the day settled on 50 Ohms.

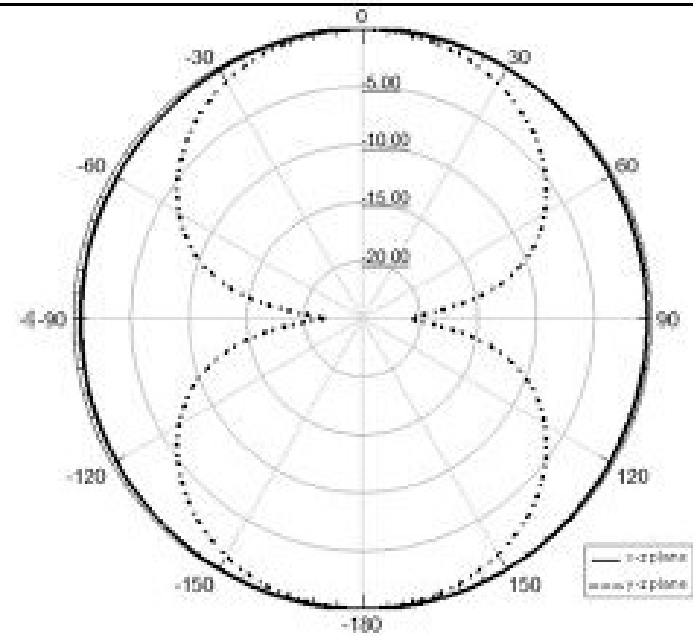
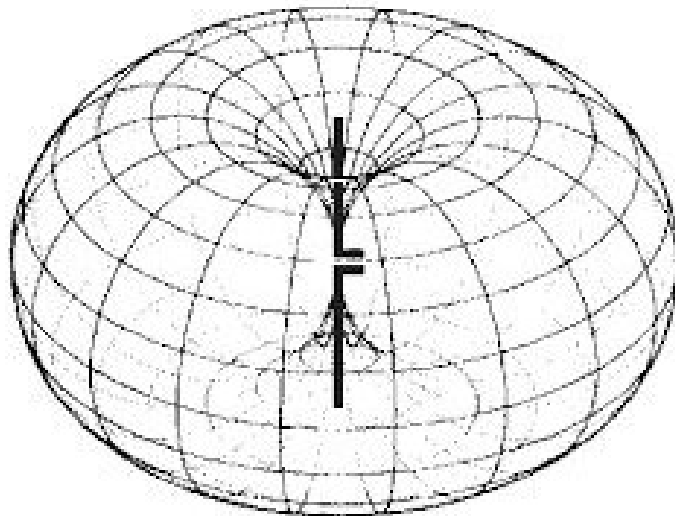
Voltage Capacity 60Ω

Power Handling 30Ω

Lowest Attenuation 75Ω

**Compromise average: 50Ω**

The dBi thing..... its how antennas are measured

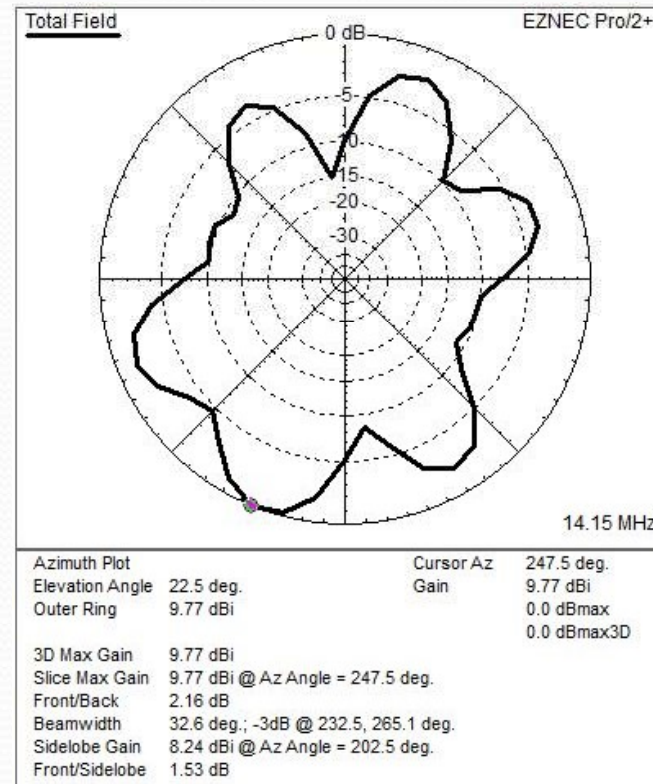
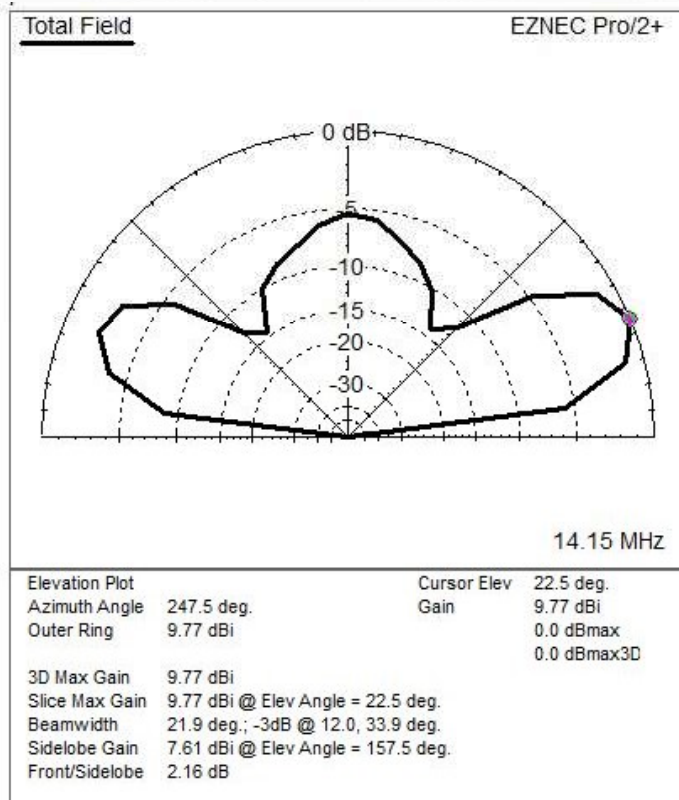


Pattern of an isotropic radiator

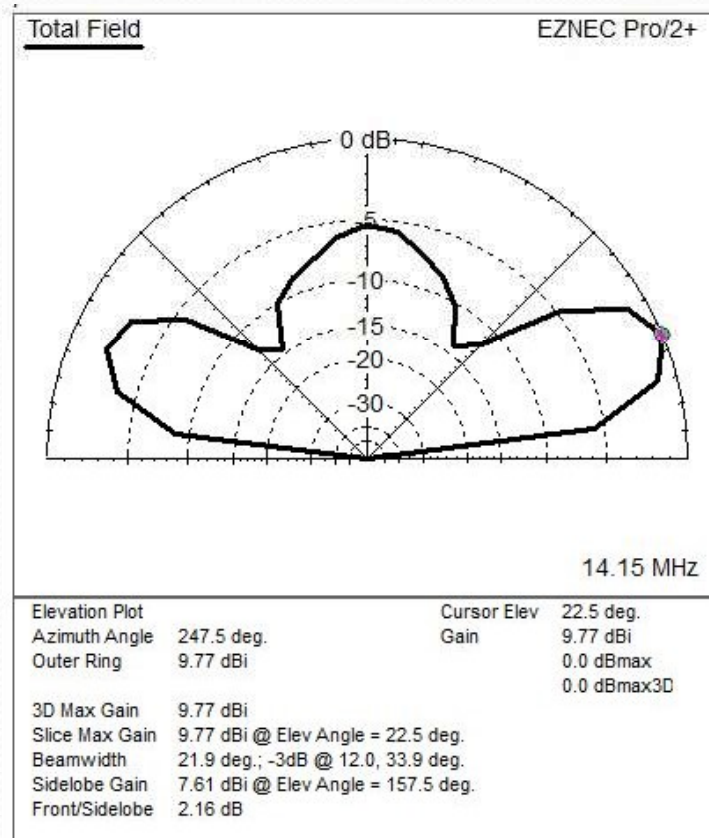
# Where can I get gain?



# Gain



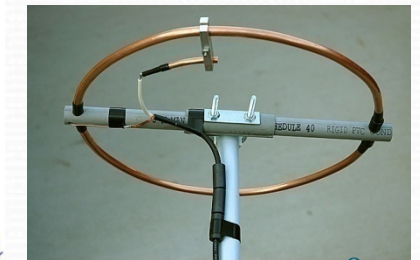
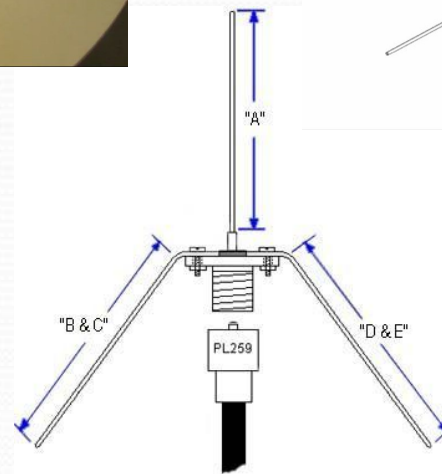
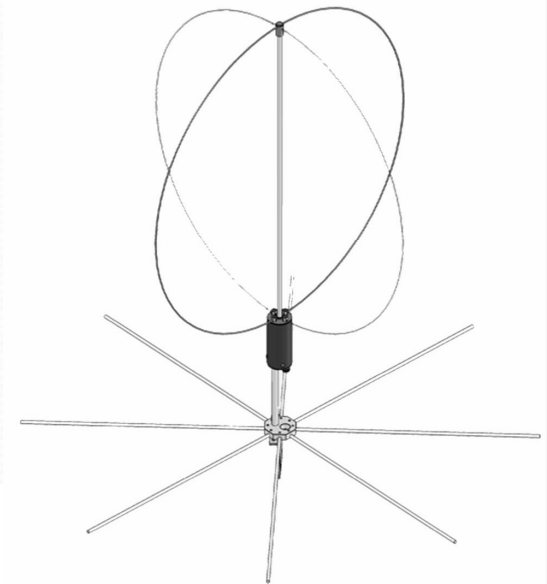
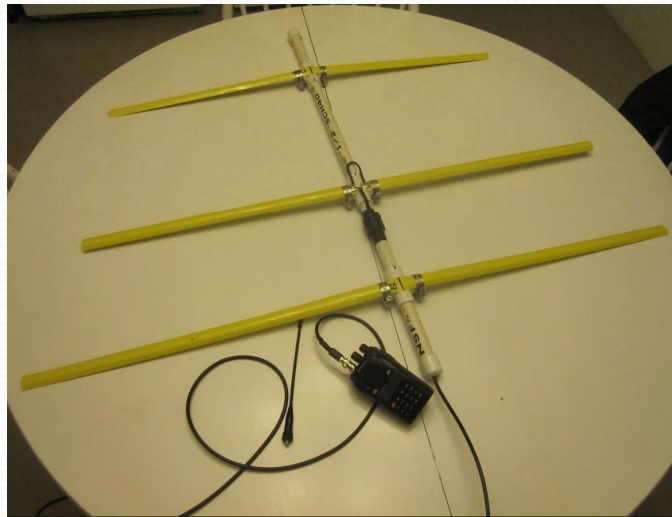
# Take-off angle



Takeoff angle is  $22^\circ$  above horizon

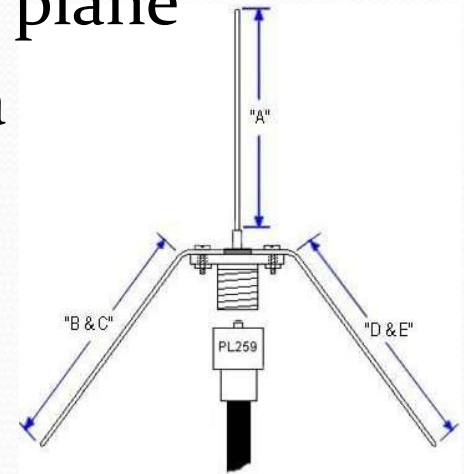


# VHF and UHF



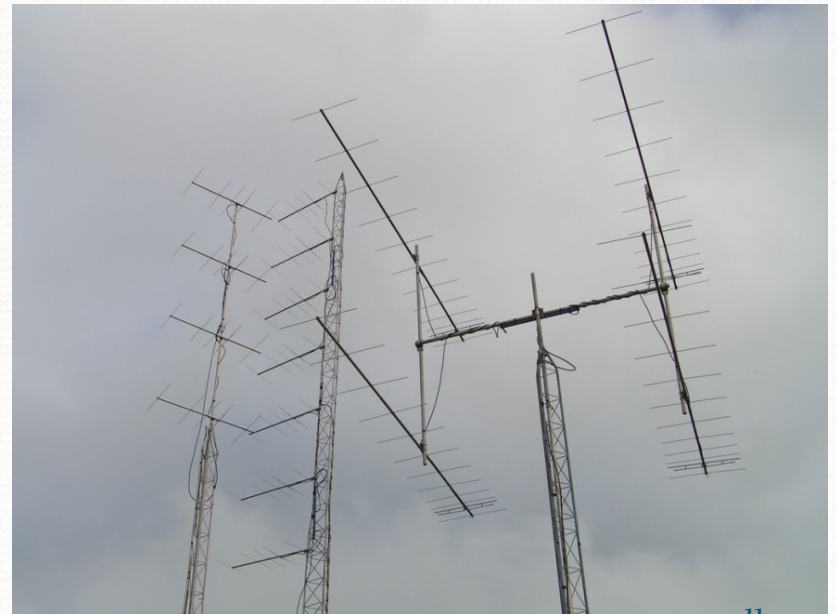
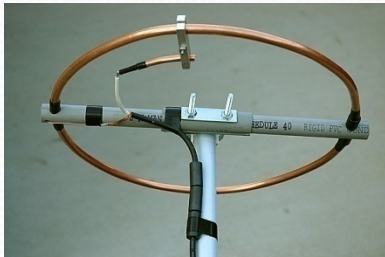
# Local repeater (FM):

Repeater antennas vertically polarized so best antenna would be the same polarization and same plane  
 $1/4\lambda$ ,  $5/8\lambda$ , co-linear, j-pole, mobile antenna



# CW, SSB, DIGI (VHF and up)

- Typical polarization for these modes is horizontal.
- Loop, beam, quad
- Height is MIGHT!

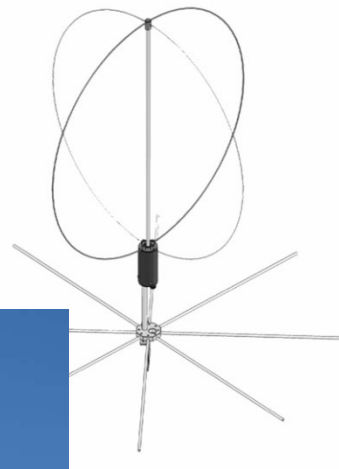


# Satellite, Meteor, EME

- Antennas range from simple handheld to dish arrays.
- 1000' dish at Arecibo was used for EME on 432 MHz

• [https://wsjt.sourceforge.io/Moonbounce\\_at\\_Arecibo.pdf](https://wsjt.sourceforge.io/Moonbounce_at_Arecibo.pdf)

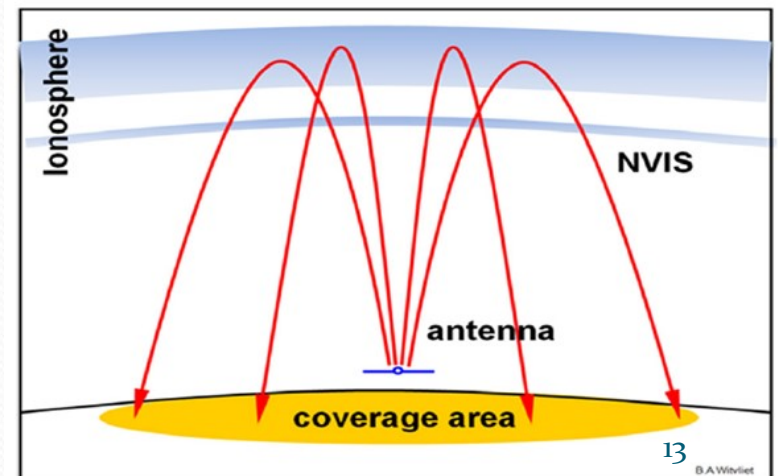
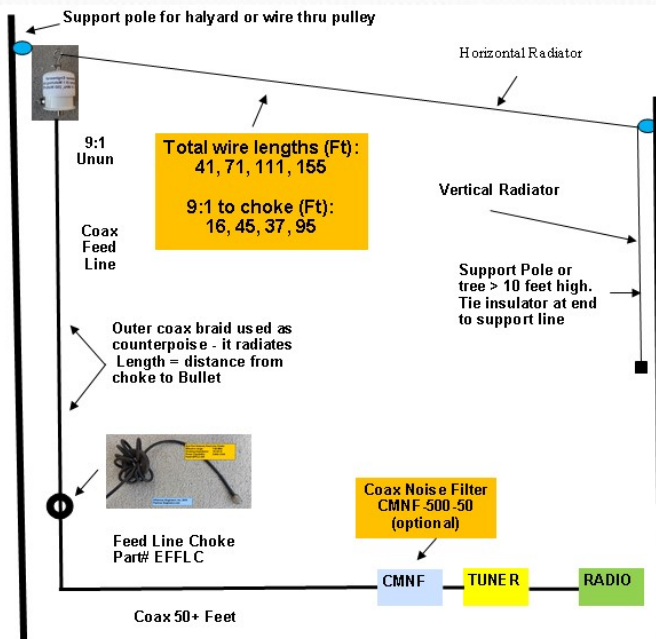
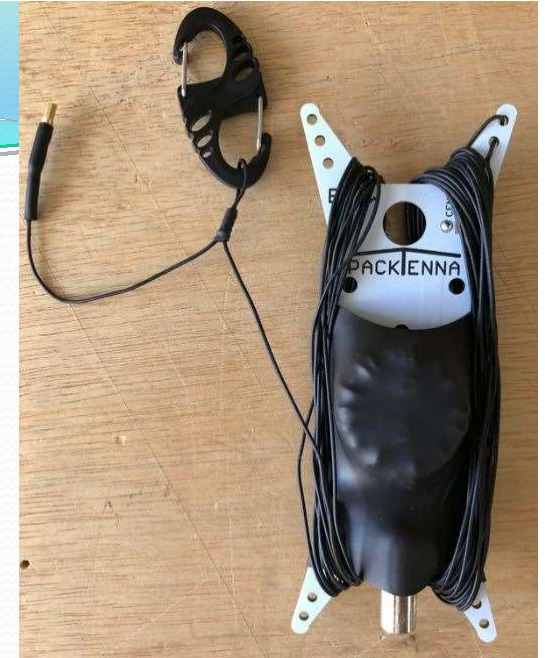
[https://laoby.darc.de/LA8YB\\_EME\\_MBA.htm](https://laoby.darc.de/LA8YB_EME_MBA.htm)



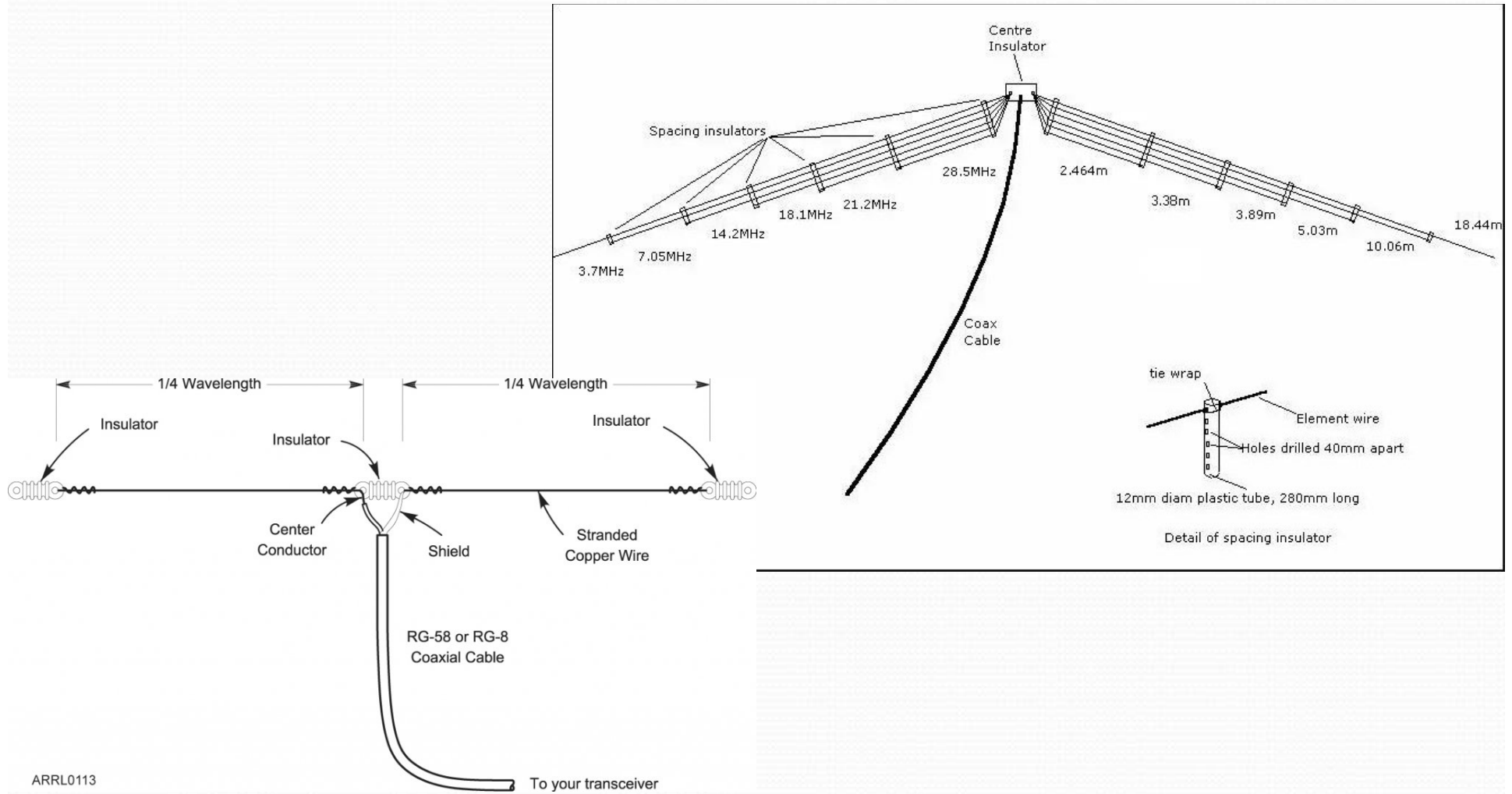
# HF - portable

Light, portable, easy to deploy, non intrusive antennas.

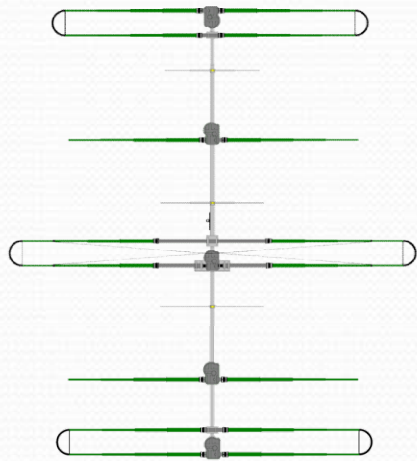
Not typically the best in performance but will work!



# Multi band vs monoband



# Beams and Quads



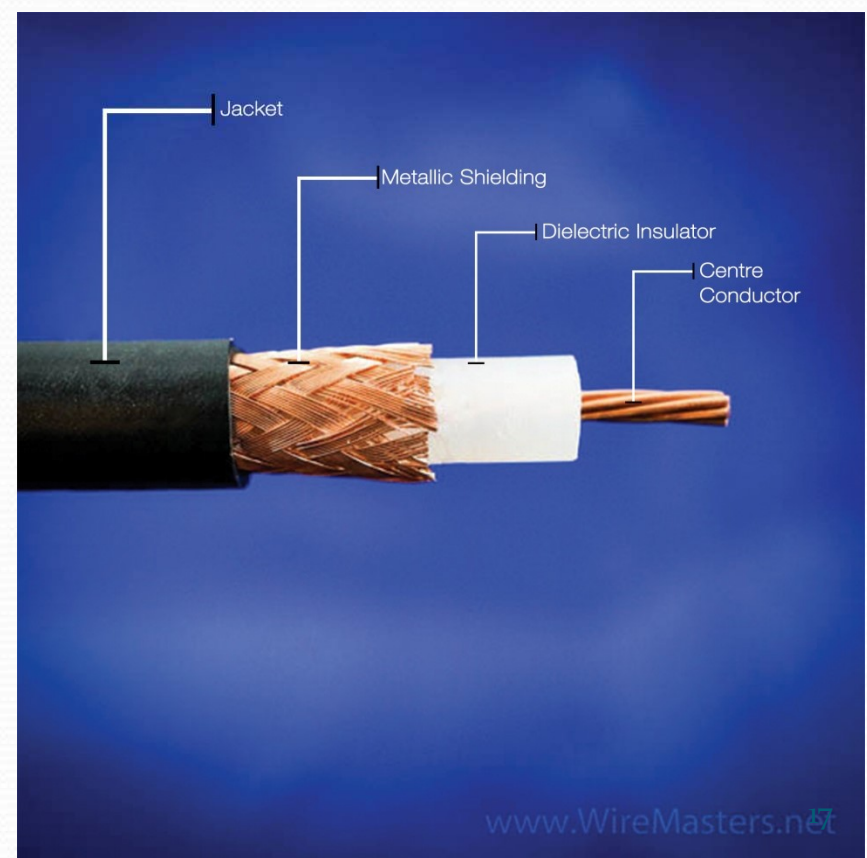
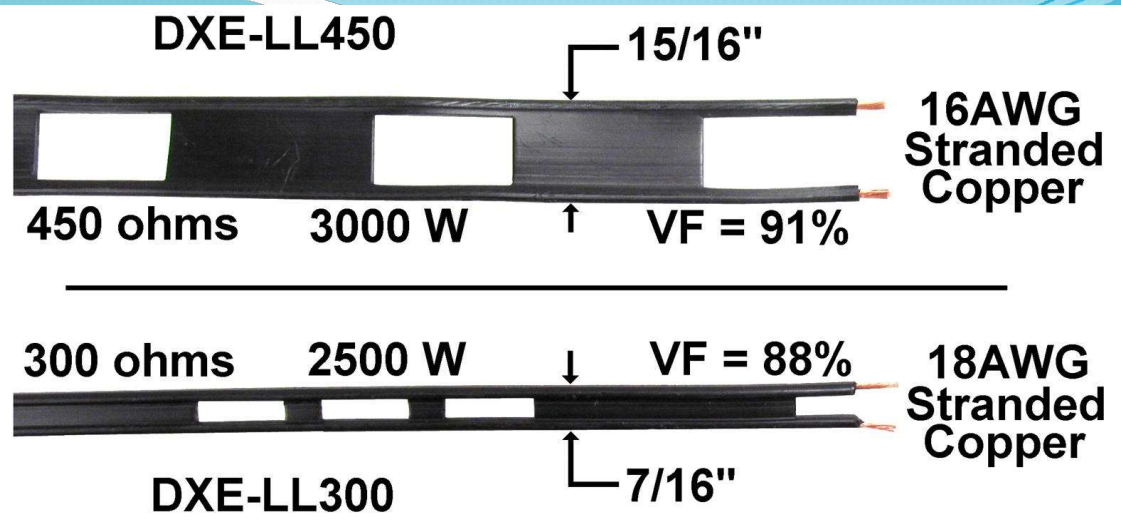
# Rx antenna





# Feed Line

<https://www.youtube.com/watch?v=YaTCXQSu9B4>



# Tuners

- Are they magic boxes??



NO!



# recap

- Best antenna is the one you have to make contacts with
- Don't get wrapped up tuning to make everything perfect, you will spend more time working than playing!
- Use your antenna
- Get on the air
- Make contacts
- Every antenna is a compromise

# Giveaway:

