19.30 inches

19.30 inches

0.407 in

1/2 Wavelength Dipole Antenna Calculator

Speed of Light = 299,792,458 m/s = 300 = s

Frequency = Operating Frequency in MHz = fo

Velocity Factor (see text*) = constant for 50 ohms cable = 0.95

Results is in meter…..

Meter -> Inch = 1 meter = 39.3701 inches

Formula:

λ = s / fo

Vertical Monopole Element = (λ*0.5)*vf

Actual wavelength approximate rounding off to = 81.3990 or 81.4 inches

Substitute from the formula for 145.000 MHz

λ = s / fo (meters)

$$\lambda = \frac{299,792,458}{145,000,000} = 2.0675 \text{ meters}$$

Converting to inches by multiplying wavelength results to 39.3701

λ = 2.0675 x 39.3701 = 81.3990 inches

Hence:

λ = 81.4 inches = L

vf = 0.95

Solving for one-half wavelength:

Radiating Element = (λ*0.5)*vf = E

$$= (81.4 \ x \ 0.25) \ x \ 0.95 = 38.6645 \text{ inches}$$

Divided by 2 elements for upper and lower elements

$$= \frac{38.6645}{2} = 19.3 \text{ inches}$$

Gap between Radiating Element = **λ / 200 = 0.407 inch** = G

L = 81.4"

E = 19.3"

G = 0.407"

Note: important
Adjust To the lowest Standing Wave Ratio (SWR)

- Add 5% to radiating element -> $19.3 \ + \ (19.3 x 0.05) = 20.265$ inches
- Check SWR, using SWR/Power Meter, tune to Operating Frequency (e.g. 145.00MHz)
- Connect cable. Antenna -> SWR/Power Meter -> Radio
- Set to SWR / Power to test
- Hence: if SWR = 1-1.2, Power = Radio Power Output Set, if you set your radio power to 5 watts it should be 5 watts meter reading in the SWR/Power meter.
- If the measurements of the cut elements are correct for the Operating Frequency, fixed and finalized antenna, else if the results reading is/are not meet the ideal reading, cut both elements.

Cutting:

- Operating Frequency = 145.000 MHz
- If the SWR is high and Power is low
- Adjust radio frequency to either higher or lower frequency to read to the lowest SWR, take note the Frequency with the lowest SWR
- Now, example the frequency with the lowest SWR is 146.000 MHz
- New formula New Frequency divided by old Frequency multiple by original radiating element results.

$$= (146 / 145) \text{ x } 20.265$$

$$= \textbf{20.125 inches}$$

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