Degrees and Length Calculations

c is the speed of light in megafeet / sec = 983.57 $c := 983.57$
Vf is the velocity factor
f is the frequency in MHz
deg is the line length in degrees
λ is the wavelength in feet
L is the length in feet

The wavelength times the frequency = speed of propagation of signal

$$\lambda \cdot f = c \cdot Vf$$

Solving for λ:

$$\lambda = \frac{c \cdot Vf}{f} \qquad \text{(Eq. 1)}$$

The number of degrees in length L is:

$$deg = \frac{L}{\lambda} \cdot 360$$

Solving for L:

$$L = \frac{deg \cdot \lambda}{360} \qquad \text{(Eq. 2)}$$

Substitute Eq. 1 into Eq. 2, we get:

$$L = \frac{deg \cdot c}{360} \cdot \frac{Vf}{f} \qquad \text{L is in feet}$$

Setting L in inches = Li

$$Li = \frac{deg \cdot c \cdot 12}{360} \cdot \frac{Vf}{f} \qquad \text{Li is in inches}$$

The above may be simplified:

$$\frac{c \cdot 12}{360} = 32.786$$

$$Li = 32.786 \cdot deg \cdot \frac{Vf}{f} \qquad \text{Where Li is the length in inches}$$

Example

$Vf := 0.67$ $f := 146$ $deg := 28.5$

$Li := deg \cdot 32.785 \cdot \frac{Vf}{f}$ $Li = 4.288$ in inches

Setting deg = 360 gives the actual wavelength in inches at freq. f