

# Microwave Engineering Project

## Beamwidth Worksheet

4 Nov 2008 Version 1.0 W5NYV  
4 Nov 2008 Version 2.0 W5NYV, KB5MU

$$\text{HPBW} = a = k \cdot \lambda / D$$

where k is a factor that depends on the shape of the reflector and the method of illumination. For a typical parabolic antenna, k = 70. For a circular dish, k = 73. D is diameter, lambda is wavelength.

$$\text{freq} := 3000, 3100 \dots 6000$$

$$D := 0.5\text{m} \quad k := 70$$

$$\lambda(\text{freq}) := \frac{299792458 \frac{\text{m}}{\text{s}}}{\text{freq} \cdot \text{MHz}}$$

$$\lambda(3400) = 88.174 \times 10^{-3} \text{ m}$$

$$\lambda(5600) = 53.534 \times 10^{-3} \text{ m}$$

$$\lambda := 9 \dots 5$$

$$\text{HPBW}(\lambda) := \frac{(k \cdot \lambda)}{D}$$

$$\text{HPBW}(8.8\text{cm}) = 12.32 \times 10^0$$

$$\text{HPBW}(5.4\text{cm}) = 7.56 \times 10^0$$

Half-power beamwidth is  
12.3 degrees at 3.4GHz  
and 7.6 degrees at 5.6GHz.

