Microwave Engineering Project
Beamwidth Worksheet

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

HPBW = a = k*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.

$freq := 3000, 3100 .. 6000$ $D := 0.5m$ $k := 70$

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

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

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

$\lambda := 9 .. 5$

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

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

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

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