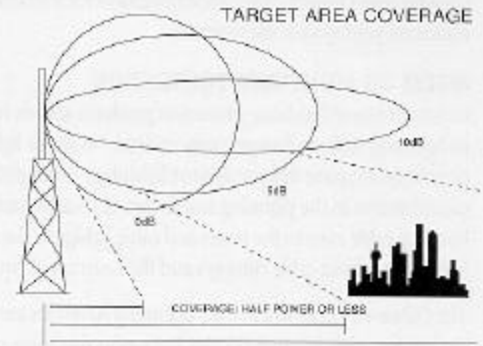


# Technical Data

| HAAT | Radio Horizon Miles | Lower Half Power DEG in Miles |      |      |      |     |     |     |     |     |     |     |      |      |
|------|---------------------|-------------------------------|------|------|------|-----|-----|-----|-----|-----|-----|-----|------|------|
|      |                     | 5.5°                          | 6°   | 7°   | 8°   | 14° | 16° | 18° | 33° | 36° | 40° | 58° | 65°  | 70°  |
| 150  | 17                  | 0.6                           | 0.5  | 0.5  | 0.4  | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.05 | 0.04 |
| 300  | 24.5                | 1.1                           | 1.1  | 0.9  | 0.8  | 0.5 | 0.4 | 0.4 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1  | 0.1  |
| 450  | 30                  | 1.8                           | 1.6  | 1.4  | 1.2  | 0.7 | 0.6 | 0.5 | 0.3 | 0.3 | 0.2 | 0.2 | 0.1  | 0.1  |
| 600  | 34.6                | 2.4                           | 2.2  | 1.9  | 1.6  | 0.9 | 0.8 | 0.7 | 0.4 | 0.4 | 0.3 | 0.2 | 0.2  | 0.2  |
| 750  | 38.7                | 3                             | 2.7  | 2.3  | 2    | 1.2 | 1   | 0.9 | 0.5 | 0.4 | 0.4 | 0.3 | 0.2  | 0.2  |
| 1000 | 44.7                | 3.9                           | 3.6  | 3.1  | 2.7  | 1.5 | 1.4 | 1.2 | 0.6 | 0.6 | 0.5 | 0.3 | 0.3  | 0.3  |
| 1500 | 54.8                | 6                             | 5.4  | 4.6  | 4.1  | 2.3 | 2   | 1.8 | 1   | 0.9 | 0.8 | 0.5 | 0.5  | 0.4  |
| 2000 | 63.3                | 7.9                           | 7.2  | 6.2  | 5.4  | 3.1 | 2.7 | 2.4 | 1.3 | 1.2 | 1   | 0.7 | 0.6  | 0.5  |
| 2500 | 70.7                | 9.9                           | 9    | 7.7  | 6.8  | 3.9 | 3.4 | 3   | 1.6 | 1.5 | 1.3 | 0.9 | 0.7  | 0.7  |
| 3000 | 77.5                | 11.8                          | 10.8 | 9.3  | 8.1  | 4.6 | 4   | 3.6 | 2   | 1.8 | 1.6 | 1   | 0.9  | 0.8  |
| 3500 | 83.7                | 13.8                          | 12.6 | 10.8 | 9.5  | 5.4 | 4.7 | 4.2 | 2.2 | 2   | 1.8 | 1.2 | 1    | 0.1  |
| 4000 | 89.4                | 15.8                          | 14.5 | 12.4 | 10.8 | 6.2 | 5.4 | 4.8 | 2.6 | 2.3 | 2.1 | 1.4 | 1.2  | 1.1  |

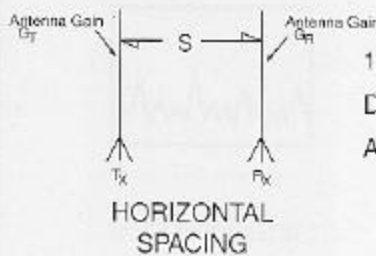


This chart is an approximation of coverage that can be expected by a given antenna. To use, simply look at the vertical beamwidth of the antenna and the height above average terrain. Look at the HAAT and go across to the vertical beamwidth. This will tell you the distance at which the lower half power point will hit the earth. The radio horizon remains constant with the given height. This is also the distance at which the main lobe is directed.

Horizon formula =  $\sqrt{2H}$  where H = Height

## Antenna Spatial Decoupling

$$\lambda \text{ (in.)} = \frac{11808}{\text{Freq. (MHz)}}$$



1. Horizontal spacing:

$$\text{Decoupling in dB} = 22 + 20 \text{ LOG} \left( \frac{S}{\lambda} \right) - (G_T + G_R)$$

Above relation valid for  $\left( \frac{S}{\lambda} \right) > 10$  and  $G_T$  &  $G_R < 10\text{dB}$

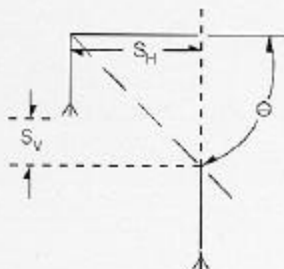
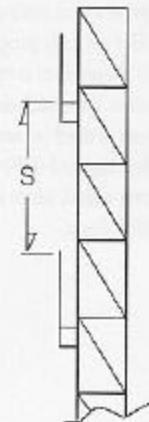
2. Vertical or Collinear spacing:

$$\text{Decoupling in dB} = 28 + 40 \text{ LOG} \left( \frac{S}{\lambda} \right)$$

Typically  $1\lambda \leq S$

and  $\text{dB}_{\text{MAX}} = 70\text{dB}$

"S" is spacing between ends of radiating portion of antennas.



3. Slant Decoupling:

$$S(\text{dB}) = (V-H) \times \frac{\theta}{90} + H$$

S is Slant Decoupling

V is Vertical Decoupling

H is Horizontal Decoupling

theta is Slant angle relative to horizontal plane