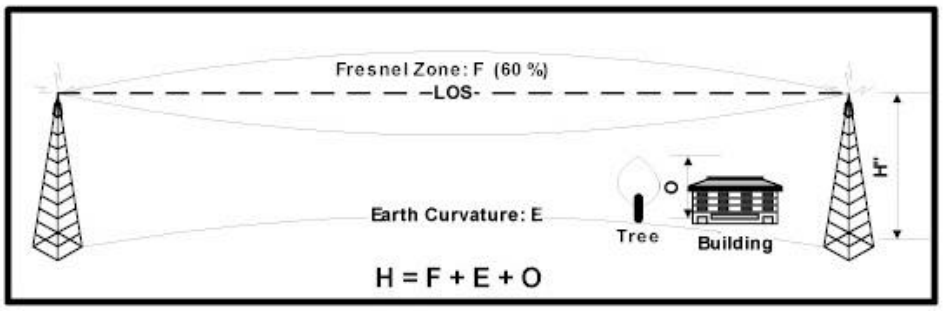
HyperLink Technologies, INC.

Technical Bulletin

Antenna Heights

The height of an antenna depends of many factors:



Add these values to find the Antenna Height.

- *Distance between the sites*: *Earth curvature*, the longer the link, the higher the antenna needs to be. (This relation is not proportional) See Table.
- *The Fresnel Zone*: This is a electromagnetical phenomenon, where light or radio signals get diffracted or bent from solid objects near their path. See Table showing the 60% of Fresnel Zone Values (Accepted clearing on path). Add this to the Earth curvature height.
- *Objects in the path*: At a frequency of 2.4 GHz, you need a clear line of sight (LOS). Tree tops will reflect or ground the signal. The theory is that the height of the tallest object in the path of the signal should be added to the Fresnel Zone and Earth Curvature clearance heights. In your case, you should have to check the height of the trees, hills, buildings or any object on the link path and add this to the measurement for the total of the tower height.
- The above three conditions make up the Radio Line of Sight. See Table

Wireless Link Distance (Miles)	Value Fresnel Zone F (60% at 2.4 GHz.) Approx. Value	Value E (Earth Curvature) Approx. Value	Antenna Height H Antenna Height No Obstruction
1	10	3	13
3	23	4	27
5	30	5	35
8	40	8	48
10	44	13	57
15	55	28	83
20	65	50	115
25	72	78	150

As mentioned before, this is theoretical data and there are many cases of customers with working links, with LOS (line of sight) just a few feet over the top of obstacles on their path. We just want to emphasize the need for clear line of sight. Trees should not be in the way. We recommend that the height of the tower should be the minimum of the Earth Curvature *plus* Fresnel Zone clearance height, making sure that this height is at least 10 feet above the top of any obstructing object…before you start testing the link.

We hope that this information helps in your installation. If you need further assistance, please contact us by e-mail at support@hyperlinktech.com or call us at (561) 995-2256.