



Figure 7.9 Major pieces of the electromagnetic spectrum with frequency in Hz shown on a log scale.

7.14 Signal Propagation

Chapter 6 explains that the amount of information an electromagnetic wave can represent depends on the wave's frequency. The frequency of an electromagnetic wave also determines how the wave *propagates*. Figure 7.10 describes the three broad types of propagation.

Classification	Range	Type Of Propagation
Low Frequency	< 2 MHz	Wave follows earth's curvature, but can be blocked by unlevel terrain
Medium Frequency	2 to 30 MHz	Wave can reflect from layers of the atmosphere, especially the ionosphere
High Frequency	> 30 MHz	Wave travels in a direct line, and will be blocked by obstructions

Figure 7.10 Electromagnetic wave propagation at various frequencies.

According to the figure, the lowest frequencies of electromagnetic radiation follow the earth's surface, which means that if the terrain is relatively flat, it will be possible to place a receiver beyond the horizon from a transmitter. With medium frequencies, a transmitter and receiver can be farther apart because the signal can bounce off the ionosphere to travel between them. Finally, the highest frequencies of radio transmission behave like light — the signal propagates in a straight line from the transmitter to the receiver, and the path must be free from obstructions. The point is:

The frequencies used for wireless networking technologies cannot be chosen arbitrarily because governments control the use of spectrum and each frequency has characteristics such as wave propagation, power requirements, and susceptibility to noise.