Transmission of waves takes place in the electromagnetic (EM) spectrum. The carrier frequency of the data is expressed in cycles per second called hertz(Hz). Low frequency signals can travel for long distances through many obstacles but cannot carry a high bandwidth of date while high frequency signals can travel for shorter distances through few obstacles and carry a narrow bandwidth. Also the noise effect on the signal is inversely proportional to the power of the radio transmitter. The three broad categories of wireless media are:

Radio - 10 Khz to 1 Ghz. It is broken into many bands including AM, FM, and VHF bands. The Federal communications Commission (FCC) regulates the assignment of these frequencies. Frequencies for unregulated use are:

* + 902-928 MHz - Cordless phones, remote controls.
  + 2.4 Ghz
  + 5.72-5.85 Ghz

Microwave

* + Terrestrial - Used to link networks over long distances but the two microwave towers must have a line of sight between them. The frequency is usually 4-6GHz or 21-23GHz. Speed is often 1-10Mbps. The signal is normally encrypted for privacy. Two nodes may exist.
  + Satellite - A satellite orbits at 22,300 miles above the earth which is an altitude that will cause it to stay in a fixed position relative to the rotation of the earth. This is called a geosynchronous orbit. A station on the ground will send and receive signals from the satellite. The signal can have propagation delays between 0.5 to 5 seconds due to the distances involved. The transmission frequency is normally 11-14GHz with a transmission speed in the range of 1-10Mbps.

Infrared - Infrared is just below the visible range of light between 100 GHz and 1000 THz. A light emitting diode (LED) or laser is used to transmit the signal. The signal cannot travel through objects. Light may interfere with the signal.

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| **Media** | **Speed** | **Approx Cost/station** |
| 900 Mhz Spread spectrum | 2-6Mbps | $5000 |
| 6 Ghz Spread Spectrum | 2-6Mbps | $1000 |
| 23Ghz Microwave | 6Mbps at 50 kilometers | $15000 |
| Intra building Infrared | 10Mbps | $400 |
| Medium distance inter building Infrared | 10Mbps at 500 meters | $5000 |
| Long distance inter building Infrared | 155Mbps at 500 meters, Less than 20Mbps at 1200 meters. | $8000 |