

Chapter 4: Radio Frequency Components, Measurements, and Mathematics

The 4th chapter is broken up into 3 major categories, Radio Frequency components, Units of Power Comparison, and Radio frequency mathematics. The first RF component the book discusses is the transmitter, which is responsible for creating the RF signal from the data received from the computer. The transmitter then sends the signal to an antenna, which produces a radio wave containing the data across the physical space to be picked up by a receiver's antenna on the other end. Typically, the antenna can be used for receiving and transmitting. Once the wave is accepted by the antenna, it sends the collected bits to the receiver in order to decipher the signal into a format that the attached computer can understand. Due to the physical properties of radio waves and interference, the receiver will always have less strength than what was sent by the transmitter. An Intentional Radiator is defined as any device that generates radiation or AC. In a wireless connection, this includes every component of the wireless device that isn't the antenna, such as the transmitter, receiver, and any cables or circuits meant to send/receive data from the antenna. To combat signal loss, some devices enact ERIP, or Equivalent Isotropically Radiated Power. This technology allows an antenna to focus its signal for a more efficient transfer. While this method allows for less coverage, the sections it does cover retain signal strength much better than if it were transmitting in all directions. In the book, an analogy involving a flashlight is used to demonstrate this concept. When the bulb on the inside is transmitting at 1 watt, it will lose a large amount of its energy and ultimately will be less bright than if it had a lens. Add a lens to focus the energy produced by the bulb, and the light on the wall may show the equivalent brightness of an 8-watt bulb.