

Bluetooth Operation

The networking standards of Bluetooth will transmit data via low power radio frequency. Bluetooth communicates on a 2.45 GHz frequency. This very band of frequency has been set aside by international agreement for the use of industrial and medical devices.

Many devices that you already know and use take advantage of this frequency band. Garage door openers, baby monitors, and the next generation of mobile phones all use this frequency within the ISM band. Ensuring that Bluetooth and the other devices don't interfere with each other is a crucial part of the design process.

One of the ways Bluetooth will avoid interfering with other electronic devices is by sending out weak signals of around 1 mw. In comparison, even the most powerful of cell phones can transmit a signal of 3 watts.

The low power signals will limit the range of a Bluetooth device to around 32 feet, which cut the chances of interference between your computer and other electronic devices. Even though it has low power, Bluetooth doesn't require a line of sight between the communicating devices. The walls in your home won't stop the signal, making it great for rooms throughout the house.

Bluetooth can connect 8 devices at the same time. With each of those devices on the same radius, you may think they would interfere with each other, although it's very unlikely. Bluetooth utilizes a technique known as low frequency hopping, which makes it harder for more than one device to transmit on the same frequency at the same time.

With this technique, a device will use 79 individual, randomly chosen frequencies within

a designated range, which change from one another on a regular basis.

In the case of Bluetooth, the transmitters will change frequency 1,600 times or more every second, meaning that more devices can make full use of the radio spectrum. Since every transmitter of Bluetooth will use spread spectrum automatically, it's very unlikely that two transmitters will be on the same frequency at the exact same time.

When the Bluetooth devices come within close range of each other, an electronic conversation will occur to determine whether or not they have data to share or whether one needs to take total control. The user doesn't have any buttons to press or commands to give - as the conversation will occur automatically.

Once the conversation has occurred, the devices will form a network. Bluetooth devices will create a PAN (Personal Area Network) or piconet that may fill a room. Once the piconet has been established, the devices will randomly hop in frequencies.

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