

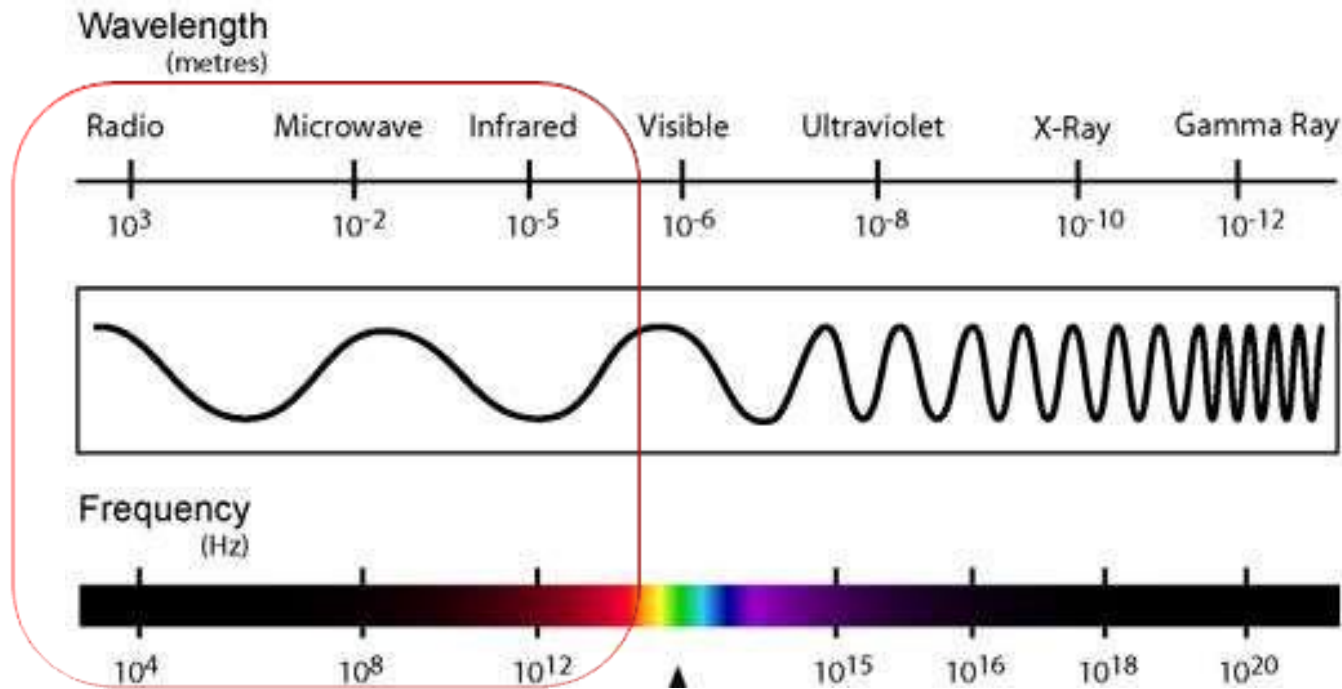
Radio Waves

The use and importance of radio waves and signals beyond radio broadcasting.

Contents

1. Overview
2. Television
3. Infrared
4. Satellite Navigation
5. Wi-Fi
6. Mobile Network
7. Radar





The Electro Magnetic Spectrum

- For this presentation, I will be focusing on the frequencies on the left side of the spectrum.
- Radio waves are form of electro-magnetic radiation that is invisible to the human eye.
- The wavelength can change from a millimeter to hundreds of thousands of kilometers.
- When the waves are transmitted they bounce off the ionosphere and find their way to a receiver.

Television

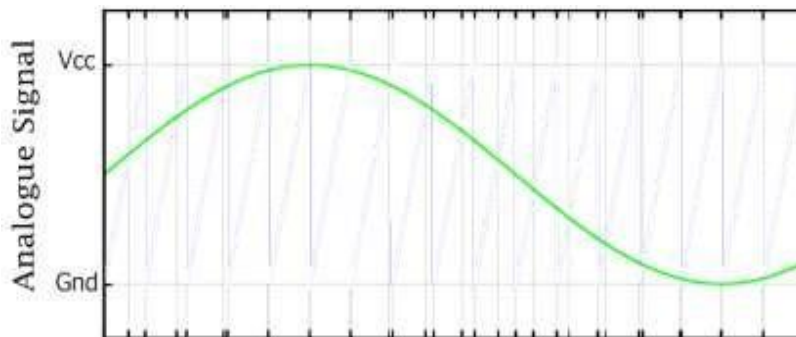
- A television requires about 6Hz to receive Audio and Visual components of the signal.
- The signal is sent in three parts, 55 to 88 MHz, 174 to 216MHz and 470 to 890MHz.
- The video signal is amplitude-modulated and the audio signal is frequency-modulated separately.
- The TV tuner then combines these two signals into what you see and hear on the screen.



Analogue and Digital Television

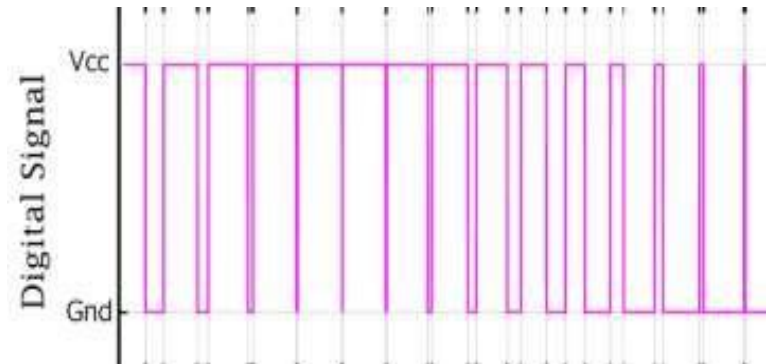
Analogue

- Waves are transmitted organically, meaning all information is received.
- Analogue televisions can only display information broadcast in image.
- With a varying signal, analogue televisions can get fuzzy or static.
- Analogue signal is no longer broadcast



Digital

- Waves are transmitted organically, meaning all information is received.
- Analogue televisions can only display information broadcast in image.
- With a varying signal, analogue televisions can get fuzzy or static



Infrared

- Infrared waves can send small packs of data via invisible waves.
- Infrared signals require a line of sight between the receiver and broadcaster in order to function properly.
- This form of radio wave communication is cheap to produce, but unreliable.
- As a result it's use is mainly in television-remote communication and other transmissions of small data packets.



Satellite Navigation

- Satellite Navigation uses a GPS (Global Positioning System) to find the co-ordinates of your longitude and latitude using the reference of three separate Satellites.
- The navigation system then cross references these co-ordinates with a onboard saved map to demonstrate your location visually.
- It then uses a algorithm to find the best route to a destination you set.



Wi-Fi

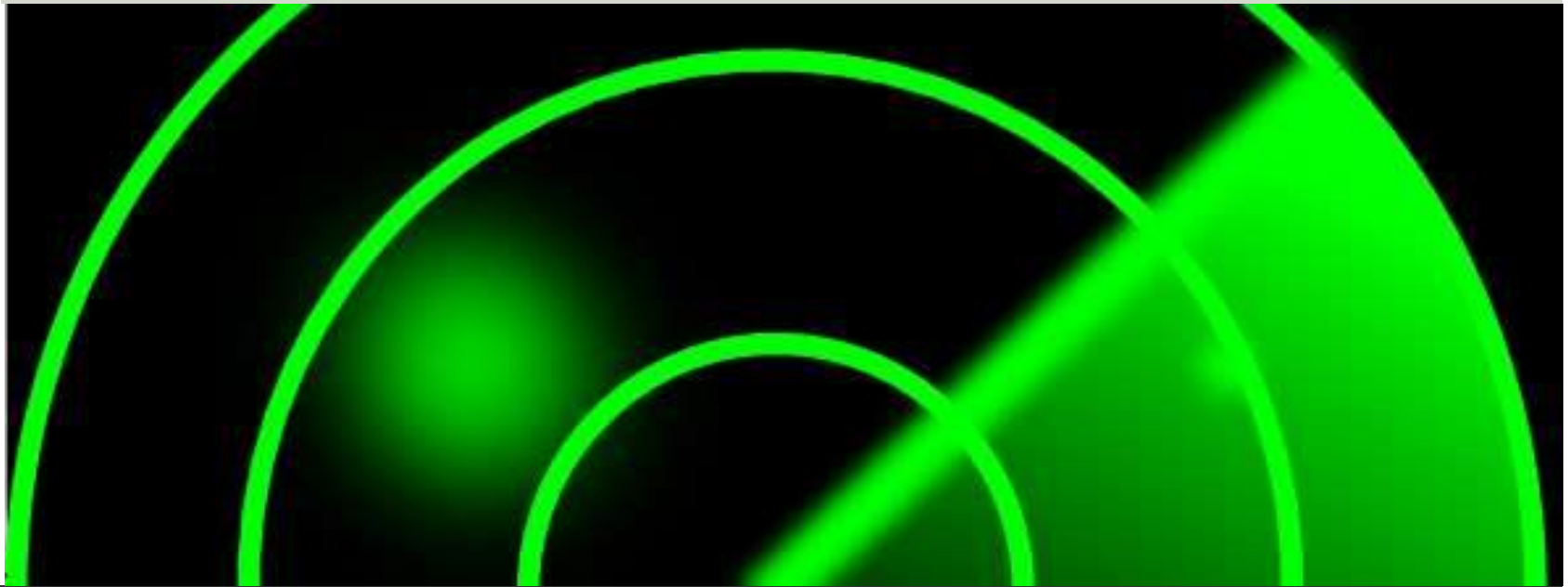
- Wireless networks use a system similar to Radio and Mobile networks.
- It requires a base station with an antenna that transmits data that is translated into a radio signal.
- The computer then receives this radio transmission and converts the radio wave back into data.
- It then requests more data back to the base station which uses a physical connection (Ethernet) to find the information on a remote server.



Mobile Networks

- Mobile networks use a microwave form of electromagnetic radiation.
- Your voice is transmitted as a sine wave to a transmitter.
- The signal is then sent to a mobile tower which then forwards the signal to another mobile.
- The same process is used to receive the voice back from the other end.





Radar

- Radars are used to identify objects, for use in boats etc.
- They are also used to identify the speed of an object.
- They can also be used to map out an area.

They accomplish this by sending out a radio wave, and waiting for the signal to be bounced back from the object. This is especially useful if it's impossible to visually identify the speed/distance of the object.

This method is also used with Bats, which send out a signal and sense for a return vibration to know if there is an object in it's flying path.

Conclusion

- There are many different forms of radio communication in use today. Many of these have proved vital in the progression and safety of the human race.
- Some of these forms of communication are not traditionally associated with radio waves, but that is where they hold the basis of their function.
- I feel many forms of radio communication will continue to be used in the future, with their use proving necessary in current and future technologies.

Bibliography

<http://www.kollewin.com/EX/09-15-03/electromagnetic-spectrum.jpg>

<http://n4n1.articlealley.com/digital-tv-vs-analog-tv--pros-and-cons-1691037.html>

<http://www.howstuffworks.com/radio.htm>

<http://computer.howstuffworks.com/wireless-network1.htm>