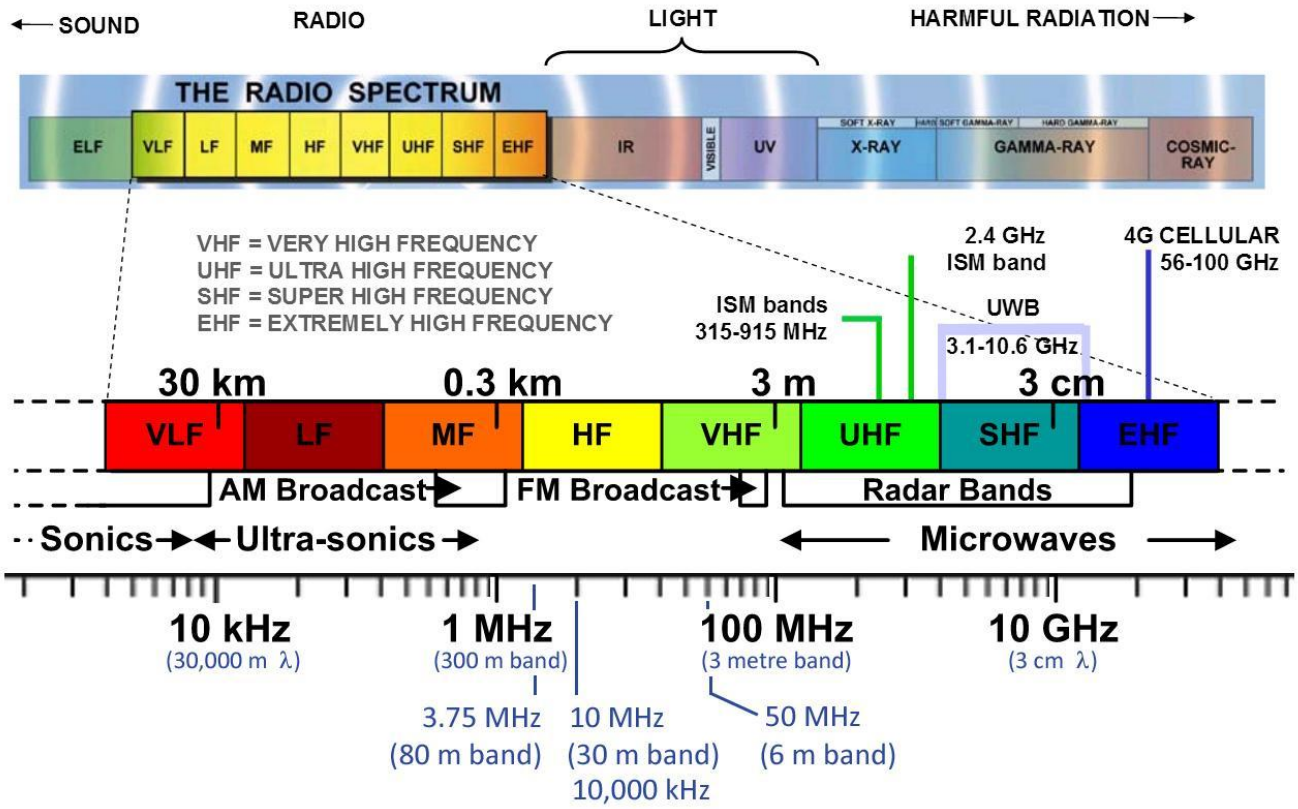
Radio

A radio wave is an electromagnetic transmission composed of electric and magnetic fields vibrating together. These two fields are aligned perpendicularly and travel as a wave. The energy in the wave moves back and forth between the electric and the magnetic fields. The frequency at which a radio wave cycles per second is measured in units of 'hertz'. Radio signals can either be omnidirectional and propagate outward in a spherical shape, or they can be unidirectional and radiate outward as a focused beam. Whereas light is characterised by wavelength, radio waves are usually described by the inverse of wavelength: frequency.



HF waves (single sideband supressed carrier short wave) can refract off the earth's ionosphere (a layer of charged particles in the atmosphere) and be redirect to a targeted location. HF radio frequencies are between 3 and 30 MHz. HF is popular with amateurs (e.g. 60 metre band) and is used over long distance, depending upon ionosphere reflectivity, impact angle and wavelength. Frequency modulated VHF signals are not refracted by the ionosphere and carry a higher amount of information, which is why the signal is clearer. A disadvantage is that VHF signals travel in a straight line; transmitting antennas must be elevated, with the receiver(s) in line of sight, otherwise, signals will eventually travel into space due to the earth's curvature.

VHF propagation characteristics are ideal for short-distance terrestrial communication. VHF radio waves are on the 30 to 300 megahertz range. Since VHF is not usually refracted by the ionosphere, VHF signals don't interfere with distant transmissions. Radio wave propagation can be affected by a number of environmental factors: geographical obstacles like mountains and bodies of water. VHF is less affected by atmospheric noise (e.g. lightning) and interference from electrical equipment than lower HF frequencies, but VHF signals are more affected by atmospheric disturbances such as fog or clouds than HF (short wave) signals. Whilst it is more easily blocked by land features than HF, VHF is less affected by buildings and other less substantial objects than UHF frequencies.

UHF is the most commonly used frequency bands for transmission of television signals. Modern mobile phones also transmit and receive within the UHF spectrum. UHF is widely used by public service agencies for two-way radio communication, usually using narrowband frequency modulation.