Line-of-Sight Transmission.

Line-of-Sight (LoS) propagation is a characteristic of electromagnetic radiation in which two stations can only transmit and receive data signals when they're in direct view of each other with no obstacles in between. Satellite and microwave transmission are two common examples of LoS communication. All radio waves with a frequency greater than 2 MHz have an LoS characteristic.

This type of propagation would be fine if the earth were flat. However, it is round, meaning that high-frequency waves being propagated from a transmitter in a straight line would eventually become tangential to the earth's curved surface, causing them to shoot into space. As a result, a station positioned beyond the distance at which the signal just touches the earth's surface (i.e., becomes tangential) would not be able to receive this transmission.

LoS propagation will only work if a receiver is positioned within the circular region surrounding the transmitter, whose radius needs to be equal to the signal's tangential distance. The higher up the transmitter is, the further out the LoS propagation distance will be. This is why TV transmission antennas are positioned so high up on a TV tower. In most cases, these towers are put on a hill to give signals a larger coverage area.

To overcome the limitations of LoS propagation brought about by the earth's curvature, as well as geographical obstacles that may get in the way of transmission, additional technologies and a combination of different effects are usually incorporated. For instance, mobile phone signal transmission adopts a slight variation of LoS by integrating local repeaters to boost the signal, multipath reflection, rapid handoff, and diffraction.

The most common application of Line-of-Sight propagation in its most basic form is in Radar technology. The device transmits a radio pulse towards an object and waits for the echo to return. The distance of the object is obtained by calculating the time it took for the echo to return and the radio wave's speed. This value is then divided by two to get how far out the object is.