

Plorization

In

Anteena

What is polarization in antenna

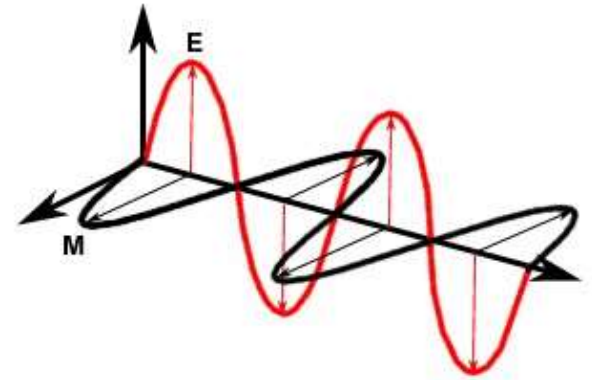
- An **antenna** is a transducer that converts radio frequency electric current to electromagnetic waves that are then radiated into space. The electric field or "E" plane determines the **polarization** or orientation of the radio wave. In general, most **antennas** radiate either linear or circular **polarization**.

Polarization categories:

- Vertical and horizontal are the simplest forms of antenna polarization and they both fall into a category known as linear polarization.
- However it is also possible to use circular polarization.
- Another form of polarization is known as elliptical polarization. It occurs when there is a mix of linear and circular polarization

Vertical Polarization

- ❖ An antenna is said to be vertically polarized (linear) when its electric field is perpendicular to the Earth's surface.
- ✓ An example of a vertical antenna is a broadcast tower for AM radio or the "whip" antenna on an automobile.

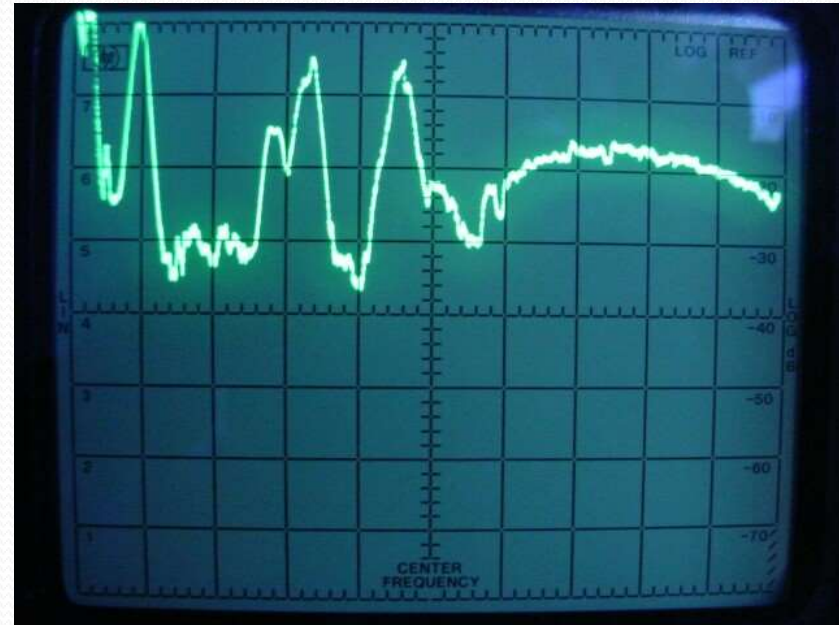


Application of Vertical polarization

Vertical polarization is most often used when it is desired to radiate a radio signal in all directions such as widely distributed mobile units.

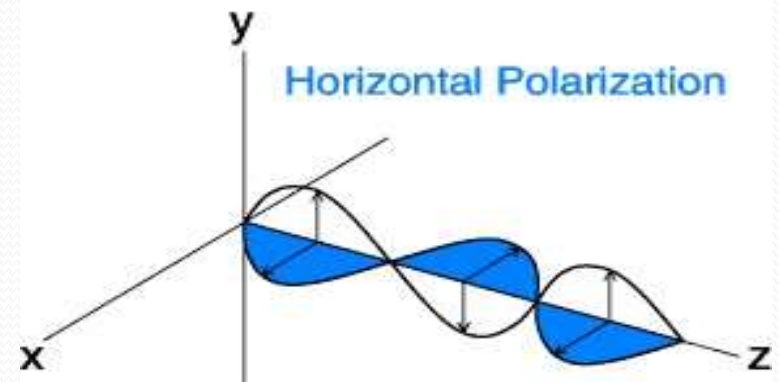
Vertical polarization also works well in the suburbs or out in the country, especially where hills are present.

As a result, nowadays most two-way Earth to Earth communications in the frequency range above 30 MHz use vertical polarization



Horizontal polarization

- Horizontally polarized (linear) antennas have their electric field parallel to the Earth's surface.
- ✓ Television transmissions can use horizontal polarization.



Application of Horizontal polarization

- Horizontal polarization is used to broadcast television in the USA. Some say that horizontal polarization was originally chosen because there was an advantage to not have TV reception interfered with by vertically polarized stations such as mobile radio.
- Also, man made radio noise is predominantly vertically polarized and the use of horizontal polarization would provide some discrimination against interference from noise.



circular polarization & elliptical polarization

- A circular polarized wave radiates energy in both the horizontal and vertical planes and all planes in between.
- The difference, if any, between the maximum and the minimum peaks as the antenna is rotated through all angles, is called the axial ratio or ellipticity and is usually specified in decibels (dB).

If the axial ratio is near 0 dB, the antenna is said to be circular polarized.

- If the axial ratio is greater than 1-2 dB, the polarization is often referred to as elliptical.

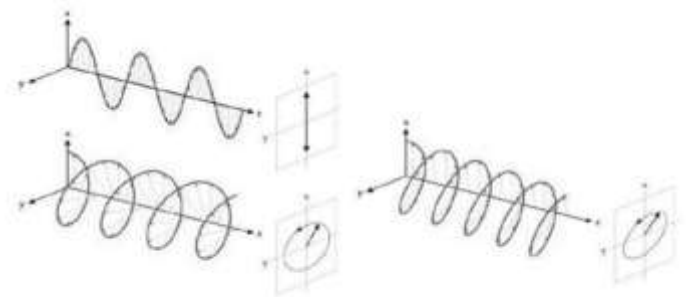
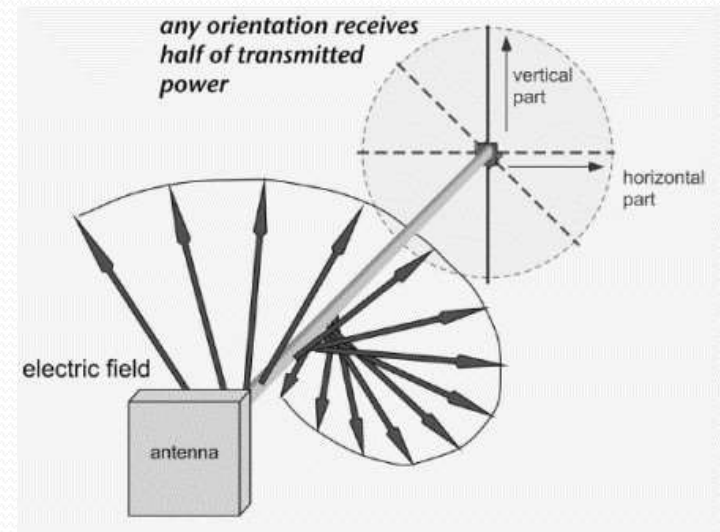


Figure 8 : Graphical illustration of linearly, circularly and elliptically polarized EM waves.

Applications of circular polarization

- Circular polarization is most often use on satellite communications. This is particularly desired since the polarization of a linear polarized radio wave may be rotated as the signal passes through any anomalies (such as Faraday rotation) in the ionosphere.
- Furthermore, due to the position of the Earth with respect to the satellite, geometric differences may vary especially if the satellite appears to move with respect to the fixed Earth bound station. Circular polarization will keep the signal constant regardless of these anomalies.



Summary:

- Polarization is an important parameter and consideration when discussing about antenna. It helps to have a good grasp of all the aspects of this subject. In this presentation we discussed about the classifications of polarization of antenna and applications of them.

THANK YOU

