



## UNIT - 5

### WAVE PROPAGATION

#### GROUND WAVE PROPAGATION

The power radiated from a transmitter is spread over relatively large area and hence power available at the receiving antenna is only a small fraction of the radiated power.

Depending on frequency of operation, distance between transmitting and receiving antennas, the modes of propagation are classified as:-

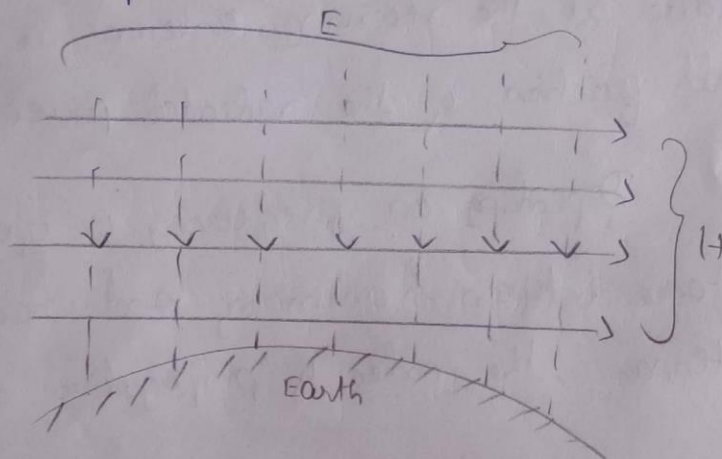
- \* Ground or surface wave propagation
- \* Sky wave or Ionospheric wave propagation
- \* Space wave propagation (Tropospheric propagation)

Ground wave Propagation (or) Surface wave propagation:-



The ground wave or surface wave is a wave that is guided along the surface of the earth and also around the curvature of the earth.

The ground waves are vertically polarized (produced by vertical antennas).



Simple electromagnetic wave

Any horizontal components of electric field vectors in contact with earth is short circuited by the earth.

This wave propagation along the surface induces charges which travel with

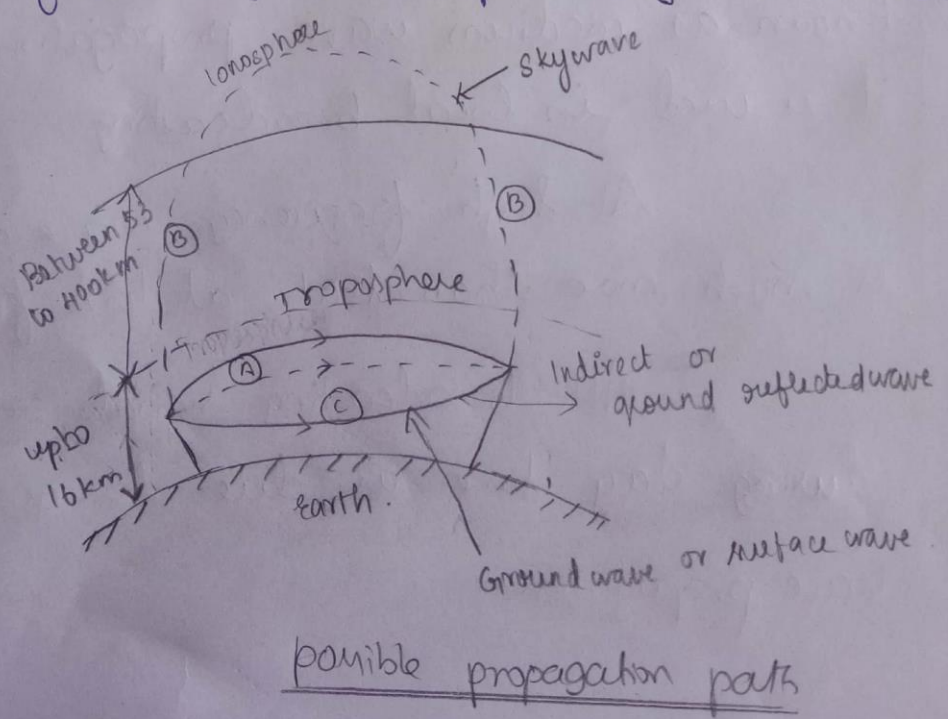


(2)

the wave prop and hence constitute current. while carrying the current, the earth behaves like a leaky capacitor.

The behaviour of earth as a conductor is described in terms of conductivity and dielectric constant  $k$ .

In surface wave the losses in energy is the result of absorption due to frequency, surface irregularities, permittivity and conductivity.





TX - Transmitting antenna

Rx - Receiving antenna

path A - ground wave propagation

path B - sky or ionospheric propagation

path C - space wave propagation.

This mode of propagation is suitable for Low and medium frequency (LF) upto 2 MHz only.

Ground wave propagation is also known as medium wave propagation, and it is used in local broadcasting.

At high frequency, wave attenuation is much more than that at low frequencies.

All broadcasting signals received during day time is due to ground wave propagation.



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Besides ground attenuation, another in surface wave is attenuated.

(ie) due to diffraction  
tilt in the wave front

As wave progress, the wave front starts gradually tilting.

It causes short circuit of Electric field

Components

Hence electric field strength goes on reducing.

At some distance from transmitter antenna, the surface wave dies because of losses.

