

## **Chapter 3<sup>rd</sup> [Networking Concepts]**

**Micro Waves:-**Electromagnetic waves having frequencies between 1 and 300 GHz are called micro waves. Micro waves are unidirectional. When an antenna transmits microwaves, they can be narrowly focused. This means that the sending and receiving antennas need to be aligned. The unidirectional property has an obvious advantage. A pair of antennas can be aligned without interfering with another pair of aligned antennas.

### **Characteristics of microwaves propagation:**

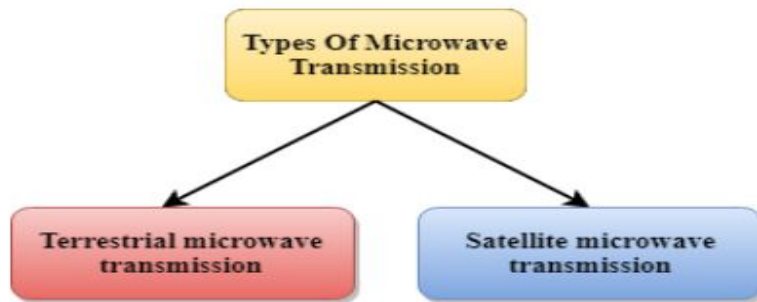
- Microwave propagation is line-of-sight. Since the towers with the mounted antennas need to be in direct sight of each other, towers that are far apart need to be very tall.
- Very high-frequency microwaves cannot penetrate walls. This characteristic can be a disadvantage if receivers are inside the buildings.
- The microwave band is relatively wide, almost 299 GHz. Therefore, wider sub-bands can be assigned and a high data rate is possible.
- Use of certain portions of the band requires permission from authorities.

### **Advantages Of Microwave:**

- Microwave transmission is cheaper than using cables.
- It is free from land acquisition as it does not require any land for the installation of cables.
- Microwave transmission provides an easy communication in terrains as the installation of cable in terrain is quite a difficult task.
- Communication over oceans can be achieved by using microwave transmission.

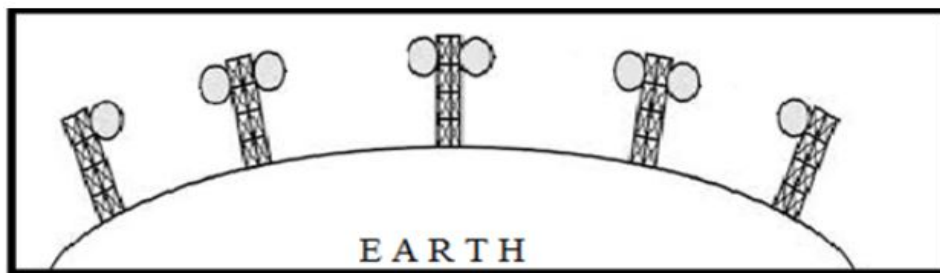
### **Microwaves are of two types:**

- Terrestrial microwave
- Satellite microwave communication.



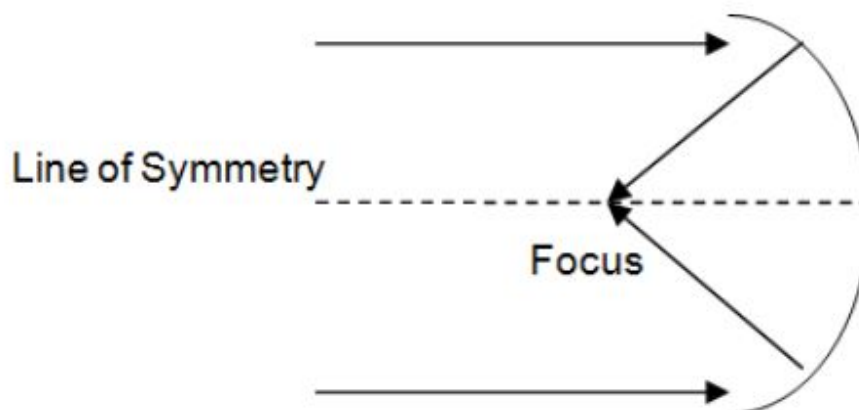
## Terrestrial Microwave

For increasing the distance served by terrestrial microwave, repeaters can be installed with each antenna. The signal received by an antenna can be converted into transmittable form and relayed to next antenna as shown in below figure. It is an example of telephone systems all over the world. There are two types of antennas used for terrestrial microwave communication :



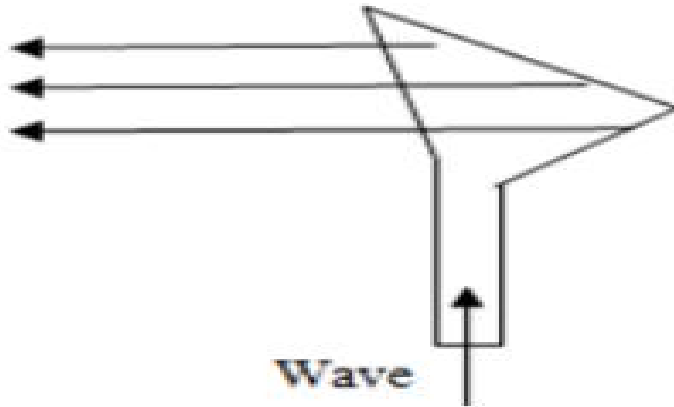
## Parabolic Dish Antenna

In this every line parallel to the line of symmetry reflects off the curve at angles in a way that they intersect at a common point called focus. This antenna is based on geometry of parabola.



## **Horn Antenna**

It is a like gigantic scoop. The outgoing transmissions are broadcast up a stem and deflected outward in a series of narrow parallel beams by curved head.



## **Assignment:-**

- 1-Explain Microwave Propagation.
- 2-What are the types of Microwaves transmission?