

Elements of Satellite Communication

The basic element of satellite communication are earth station terrestrial system and users the basic structure of a satellite communication are shown in the following figure

This consists of many earth stations on the ground and there are linked with a satellite in space. The users is connected to the earth station through a terrestrial station and this network may be a telephonic switch or a well established link to a earth station. Basic Elements shown in the figure are

- Earth Station
- Satellite
- Terrestrial System
- User

1) The user generates a base band signal that is proceeds through a terrestrial network and transmitted to a satellite at the earth station.

2) The satellite consists of a large number of repeaters in the space that perform the reception of modulated RF carrier in its uplink frequency spectrum from all the earth station in the present networks, amplifier these carriers and retransmits them back to the Earth Station in the down link frequency spectrum.

3) In order to avoid the interference downlinks frequency spectrum should be different from uplink frequency spectrum.

4) The signal at the receiving earth stations in processed to get back base band signal, it sent to the user through a terrestrial network.

Advantages of 6/4 GHz

1. In this band there is no absorption by the rain.
2. It has fewest propagation problems. Attenuation is low below 10 GHz at an elevation angle of 5 degree or more than this.
3. There is no change of polarization when the waves pass through the ionosphere.
4. RF Components for these bands were being used for terrestrial relay links also and hence they are easily available.

Disadvantages of 6/4 GHz

1. Bandwidth is limited to 500 MHz which can be extended upto 1000 MHz at the most by the use of orthogonal polarization scheme.
2. This band acquire interference from the other band at more rate.
3. Power can not be concentrated in a very small area on the Earth. Higher frequencies can produce narrower beams.

4. Direct reception in home Television is not easily possible because of the need of big sized parabolic dishes. Higher bands are required for the same.

Satellite Frequency Allocation and Band Spectrum

Allocating frequencies to the satellite services is a complicated process which requires internal coordination and proper planing. This is carried out under the auspices of the internal Telecommunication union. To facilitates frequency planning the whole world is divided into three regions, which are as follows:

- Region 1: Europe, Africa
- Region 2: North and South America and Greenland.
- Region 3: Asia, Australia and South West pacific.

Within these regions, frequency bands are allocated to various satellite services, although a given services may be allocated different frequency band in different region. Some of the Services provided by satellite are as follows:

1. Fixed subsystem services.
2. Navigation subsystem services.
3. Mobile subsystem services
4. Meteorological subsystem services

