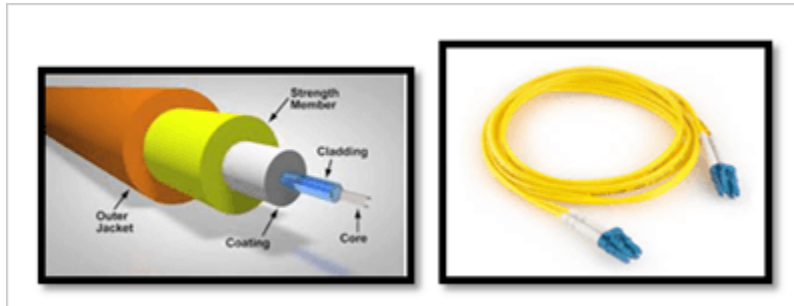


COMPUTER SCIENCE



A fiber optic cable is made up of a core surrounded by a transparent cladding material with a lesser index of reflection. It uses the properties of light for signals to travel between them. Thus Light is kept in the core by using the method of total internal reflection which causes the fiber to act as a waveguide.

In multi-mode fiber, there are multiple propagation paths and the fibers used to have wider core diameters. This type of fiber is mostly used in intra-building solutions.

Whereas in single mode fibers there is a single propagation path and the core diameter used is comparatively smaller. This type of fiber is used in Wide area networks.

An optic fiber is a flexible and transparent fiber which consists of silica glass or plastic. Optic fibers transmit signals in the form of light between the two ends of the fiber hence they permit transmission over longer distances and at a higher bandwidth than the coaxial and twisted pair cables or electrical cables.

Fibers are used instead of metal wires in this, therefore, the signal will travel with very less loss of signals from the sender to receiver and also immune to electromagnetic interference. Thus its efficiency and reliability are very high and also it is very light in weight.

Due to the above properties of Fiber optic cables, these are mostly preferable over electric wires for long distance communications. The only disadvantage of OFC is its high-installation cost and its maintenance is also very difficult.

Wireless Communication Media

So far we have studied the wired communication modes in which we have used conductors or guided media for communication to carry signals from the source to destination and we have used glass or copper wire as a physical media for the communication purposes.

The media which transports the electromagnetic signals without using any physical medium is called a wireless communication media or unguided transmission media. The signals are broadcast through the air and are available to anyone who is having the capability to receive it.

The frequency used for wireless communication is from 3KHz to 900THz.

We can categorize wireless communication into 3 ways as mentioned below:

#1) Radio waves:

The signals which have transmitting frequency ranging from 3KHz to 1 GHz are called radio waves.

These are omnidirectional as when an antenna transmits the signals, it will send it in all the directions, which means that sending & receiving antenna's need not be aligned with each other. If one sends the radio wave signals, then any antenna having the receiving properties can receive it.

Its disadvantage is that, as the signals are transmitted through radio waves, it can be intercepted by anyone, hence it is not suitable for sending classified important data, but can be used for the purpose where there are only one sender and many receivers.

Example: It is used in AM, FM radio, television & paging.

#2) Microwaves:

The signals which have transmitting frequency ranging from 1GHz to 300GHz are called microwaves.

These are unidirectional waves, which means that when the signal is transmitted between the sender and receiver antenna then both need to be aligned. Microwaves have fewer interference issues than the Radio wave communication as both the sender and receiver antenna are aligned at each other at both the ends.

Microwave propagation is the line-of-sight mode of communication and the towers with mounted antennas need to be in the direct line of sight, therefore, the tower height needs to be very high for proper communication. Two types of antennas are used for microwave communication i.e **Parabolic dish and Horn**.

Microwaves are useful in one to one communication systems due to its unidirectional properties. Thus, it is very widely used in satellite and wireless LAN communication.

It can also be used for long-distance telecommunication as microwaves can carry 1000's of voice data at the same interval of time.

There are two types of microwave communication:

1. Terrestrial microwave
2. Satellite microwave

The only disadvantage of the microwave is that it is very costly.

#3) Infrared waves:

The signals which have transmitting frequency ranging from 300GHz to 400THz are called Infrared waves.

It can be used for short distance communication as infrared with high frequencies can't penetrate the rooms and thus prevents the interference between one device to another.

Example: Use of infrared remote control by the neighbors.