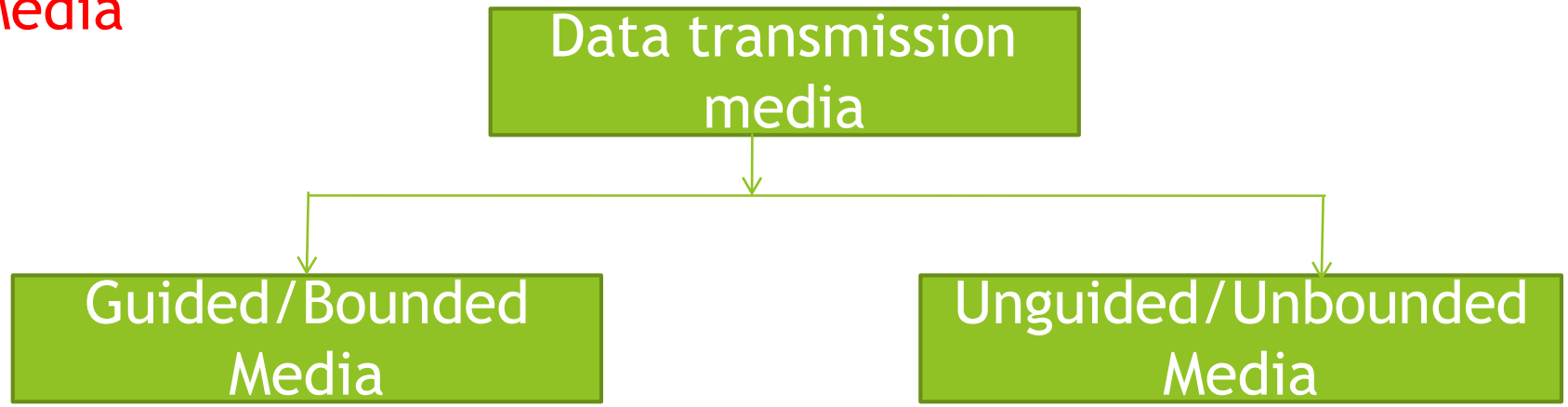
Data transmission media

Transmission media are means through which data travel form source to destination

The Transmission media can be grouped into guided media and Unguided Media



Twisted Pair cable

-Unshielded Twisted Pair(UTP)

- Shielded Twisted Pair (STP)

Coaxial Cable

Fiber optic Cable

Infrared Transmission

Radio Transmission

Microwave Transmission

Satellite Transmission

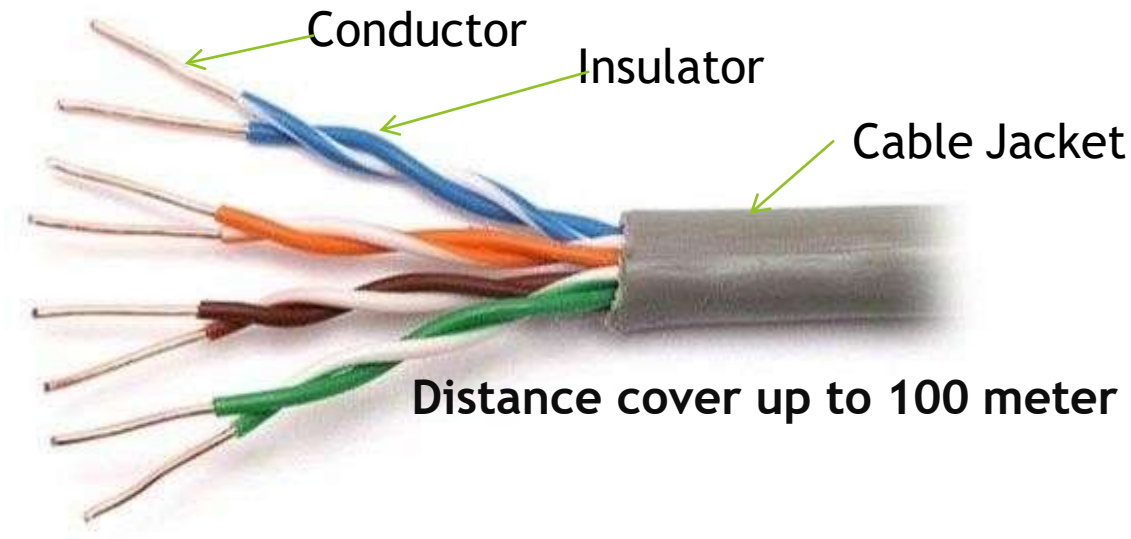
Guided /Bounded Media

In guided media, communication device are connected with each other using some physical media like wire.

Copper wires and optical fibers are the most commonly used guided media.

Some example of bounded for communication are Twisted pair cable Co-axial cable or fiber optic cable.

Twisted Pair Cable



A twisted pair cable is a collection of four pair insulated wires wrapped together , they are preferably used for local area network.

Twisted pair consist of a pair of copper wires.

The pair of wires is covered by plastic insulation and it is twisted together

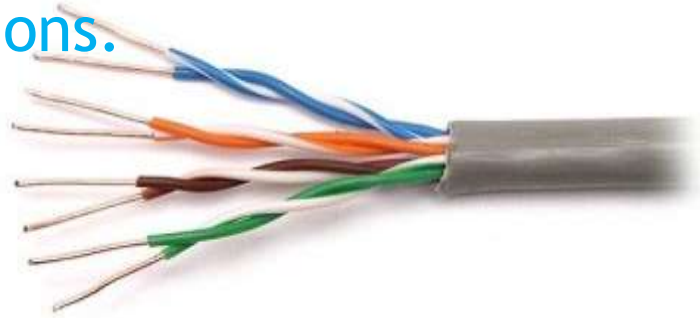
Twisting of wire protest them from interference by external electromagnetic waves

Shielded Twisted Pair(STP)

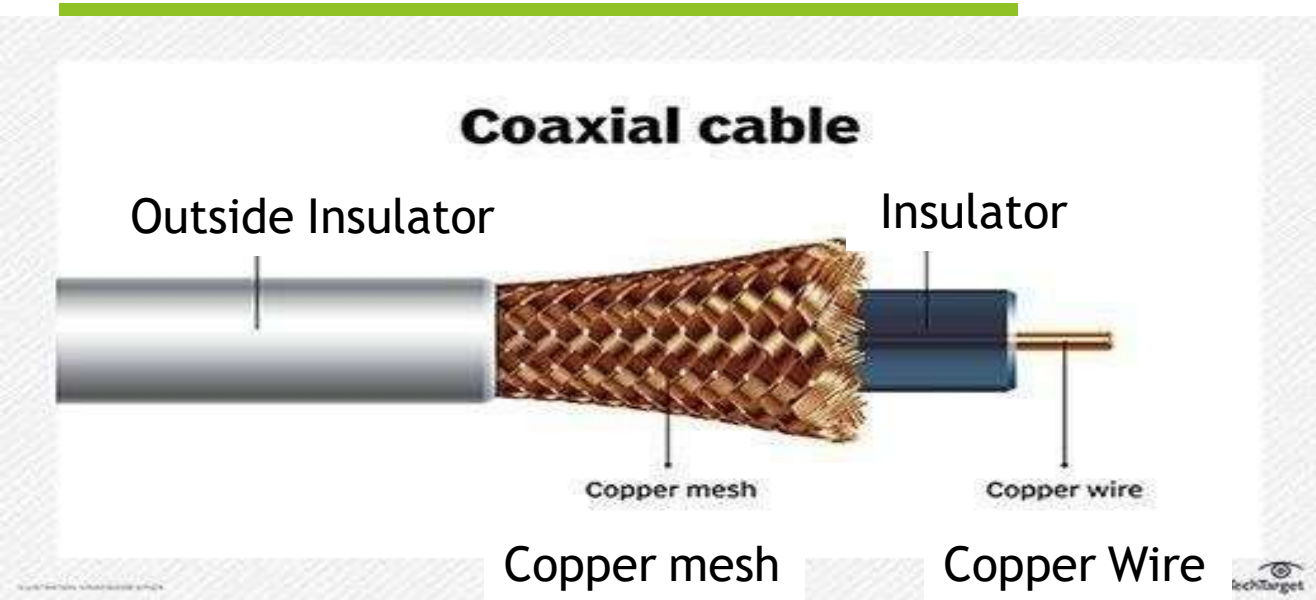
This type of cable consists of a special jacket to block external interference. It is used in fast-data-rate Ethernet and in voice and data channels of telephone lines.

Unshielded Twisted Pair (UTP)

This type of cable has the ability to block interference and does not depend on a physical shield for this purpose. It is used for telephonic applications.



Co-axial Cable



Copper mesh

Copper Wire

Distance cover up to 500 m

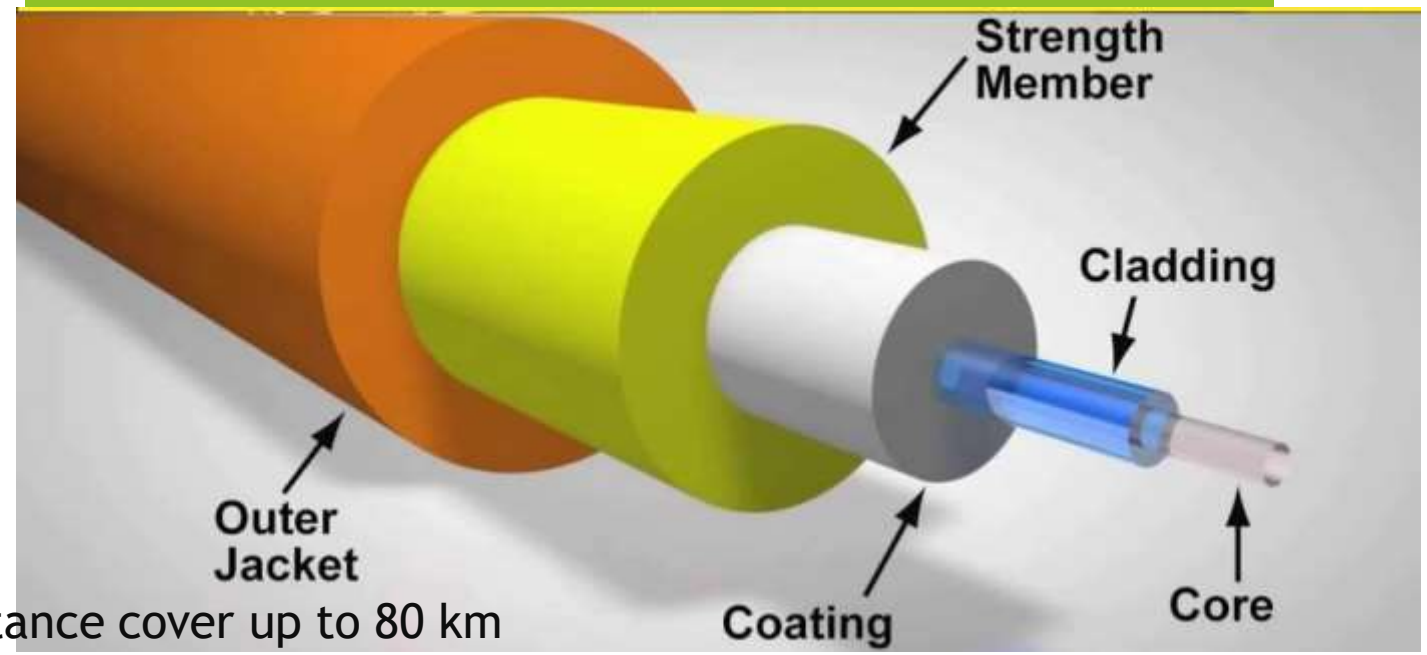
Coaxial cable consists of a solid wire surrounded and insulator further surrounded by wire mesh further covered with plastic insulator

The insulated copper wire is covered by copper mesh

The mesh protect the data signals from interference by external electromagnetic waves.

Co-axial cable are used by the cable tv networks

Optical fiber cable



Distance cover up to 80 km

Optical fiber cable is make of glass or glass like material . It can transmit information in the form of light waves.

Optical fiber are being used for transmission over large distance most effectively then the copper wire connection

An optical fiber cable consists of

Core – optical fiber conductor(glass) that transmits light.

Cladding – it is covering of core used to reflect the light back to the core

Plastic coating – it is the plastic coating to protect cable from damage

Unguided / Unbounded Transmission

An unguided transmission transmits the electromagnetic waves without using any physical medium. Therefore it is also known as wireless transmission.

In unguided media, air is the media through which the electromagnetic energy can flow easily.

Signals are normally broadcast through free space and thus are available to anyone who has a device capable of receiving them.

The lack of physical restrictions provide large bandwidth as well as wide area capability. Typically use very high frequency.

Infrared Waves

- Infrared is direct line of sight transmission within a short distance (5 meters),it is suitable for short distance communication .

Radio Transmission

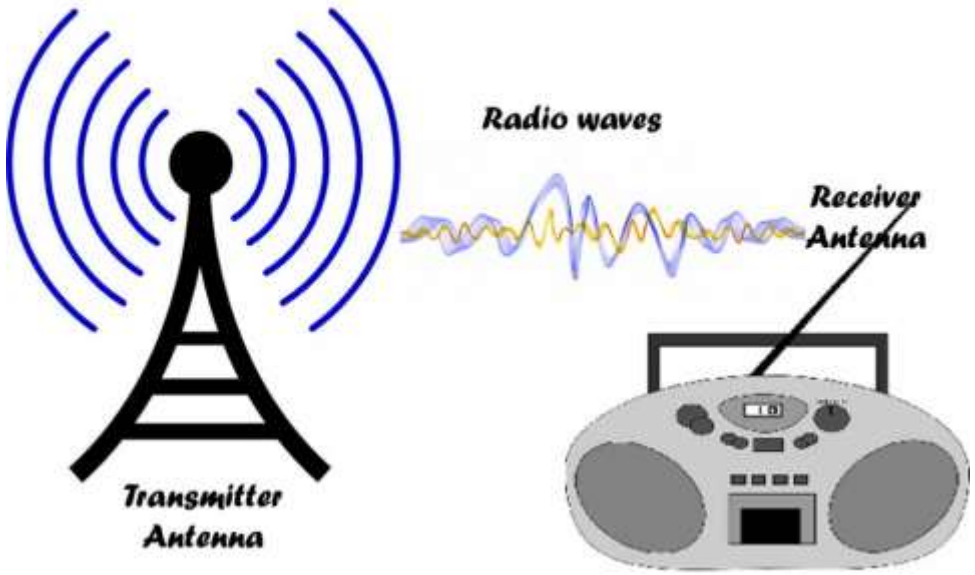
Radio waves are the electromagnetic waves that are transmitted in all the directions of free space.

Radio waves are omnidirectional, i.e., the signals are propagated in all the directions.

Radio waves can penetrate buildings easily. So, they are widely used for communication both indoors and outdoors.

A Radio wave is useful for multicasting when there is one sender and many receivers.

An FM radio, television, cordless phones are examples of a radio wave.



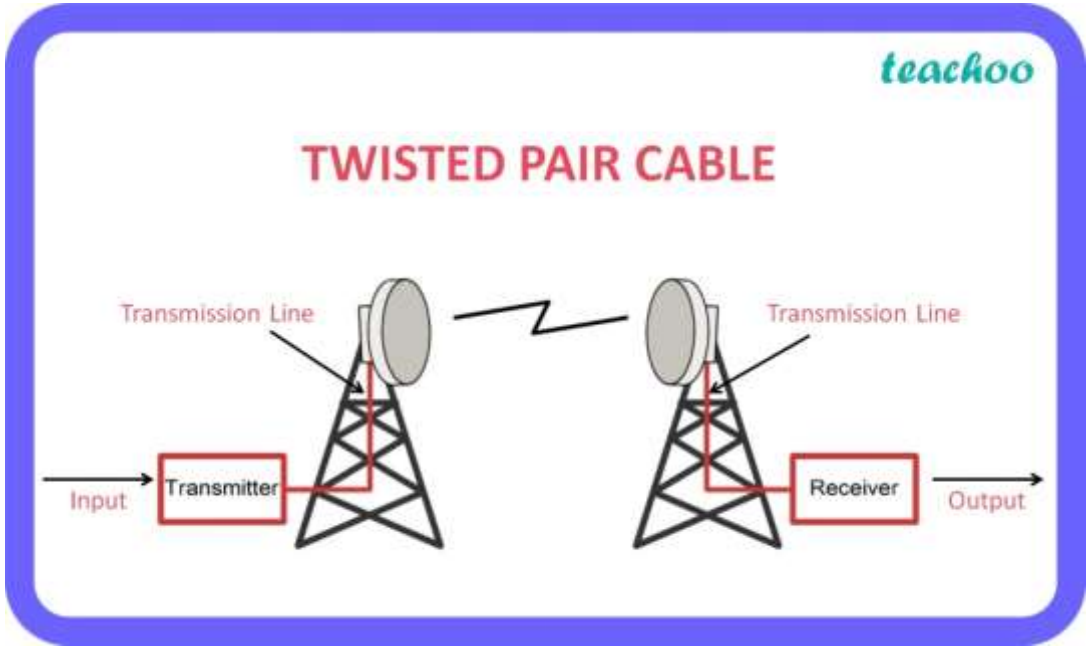
Microwave Transmission

Microwave is direct line of slight transmission in which parabolic antennas are placed in from of each other

Microwave transmission can be amide in a single direction, instead of broadcasting in all direction (like in radio waves).

Microwaves can carry more information then radio waves but cannot penetrate metals.

Microwaves are used where there is a clear path between transmitter and receiver.



Satellite Transmission

In Satellite communication, artificial satellite is placed in geostationary orbit at around 36,000 kms above the surface of earth

The satellite consists or transporter that can Receive RF signals and transmit back to the ground a different angle.

The main components of a satellite consist of the communications system, which includes the antennas and transponders that receive and retransmit signals

the power system, which includes the solar panels that provide power