

Radio frequency band their rays

Band	Frequency range	wave length range
Extremely low frequency (ELF)	Less than 3KHz	Larger than 100 Km.
Very low frequency (VLF)	3-30 KHz	10-100 Km.
Low frequency (LF)	30 - 300 KHz	1-10 Km.
Medium frequency (MF)	300KHz - 3 MHz	100m - 1Km.
High frequency (HF)	3 MHz - 30 MHz	10m to 100m
Very high frequency (VHF)	30 - 300 MHz	1m - 10m.
Ultra high frequency (UHF)	300 MHz - 3 GHz	10cm - 1m.
Super high frequency (SHF)	3 GHz - 30 GHz	1cm - 10cm.
Extremely high frequency (EHF)	30 GHz to 300 GHz	1mm - 1cm.

2020 MARCH

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9th Week - 055-303

08 Service

Bandwidth

Application

1) Standard
AM broadcast

540 - 1600 KHz

Radio broadcast
over AM channel.

2) FM broadcast

88 - 108 MHz

Radio broadcast
over FM channel.

3) VHF

54 - 73 MHz

76 - 88 MHz

Television broadcast.

4) UHF

174 MHz - 216 MHz

420 - 890 MHz

Wireless microphone

5) cellular mobile
communication

396 - 901 MHz

840 - 935 MHz

Mobile to base station
base station to mobile.6) Satellite
communication

5.925 - 6.425 GHz

Uplink base station
to satellite.

3.7 - 4.2 GHz

Downlink satellite
to base station.

2020 FEBRUARY

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Communication Channel :-

(Basic Idea)

→ The transmission of information across a communication network is accomplished by means of a communication channel.

→ Based on mode of transmission communication channels are divided into two categories.

Communication Channels

↓
Guided Propagation

- Twisted pair cable
- Co-axial cable
- Optical fibers

↓
Unguided or free Propagation

- Broadcast channel
- mobile radio channel
- Satellite channel

10 MARCH

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Twisted pair cable:

→ The telephone channel is built using twisted pairs for signal transmission. A twisted pair cable consists of two solid copper conductors each of which is encased in a PVC sheath.

→ The characteristic impedance is 90Ω to 110Ω.

→ It can allow a signal having 0-200 KHz Bandwidth without any attenuation. Twisted pair cable supports only the transmission of electrical signals.

→ It can reduce crosstalk and also prevents from external form of signal interference.

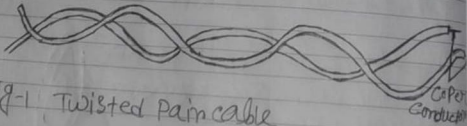


Fig-1 Twisted pair cable

01 Sunday

2020 FEBRUARY

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Co-axial cable:-

→ A co-axial cable consists of an inner conductor and an outer conductor separated by a dielectric insulating material. The inner conductor is made of a copper wire and outer conductor is made of copper coated steel.

→ Typically a co-axial cable has a characteristic impedance of 50Ω to 75Ω .

→ Compared to a twisted pair cable, a co-axial cable offers a greater degree of immunity to electromagnetic interference (EMI) and higher bandwidth upto 600 MHz .

→ The major disadvantage of co-axial cable is that it is bulky.

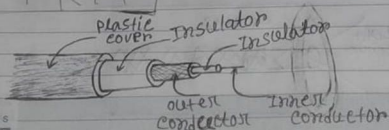
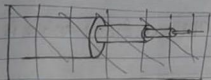


Fig-2 Co-axial Cable

Optical fiber :-

- An optical fiber is a dielectric wave guide that transports signals in the form of light from one place to another place.
- Optical fiber works on the principle of total internal reflection to guide the light through the cable.
- It consists of a central core within which the propagating wave is confined and core is surrounded by a cladding layer, which is itself surrounded by a thin protective jacket.
- The core and cladding are both made of pure silica glass and the jacket is made of plastic.
- Optical fiber offers bandwidth in the range of 10's of GHz.
- The major disadvantage of optical fiber cable is its cost.

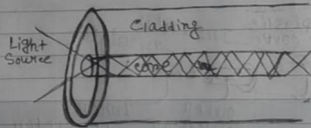


Fig - Optical fiber

March

Unguided or free space Propagation:

→ Transport Electromagnetic waves without using a physical conductor.

→ The Propagation of EM wave may be Surface Propagation, Tropospheric Propagation, Ionospheric Propagation and Space Propagation.

→ It is used for long distance transmission.

→ Initial Setup is much costly.

→ Unguided Propagation is used in wireless broadcast channels for the Propagation of Radio and Television Signals.

→ It is also used in mobile communication.

→ For providing broad-area coverage in both continental and inter continental Satellite channel is used.

→ The most popular frequency band for Satellite communication is 6 GHz for uplink and 4 GHz for the downlink.

2020 APRIL

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