

5.3

Transmission media

A transmission medium is anything that can carry information from source to destination

Guided media

Those that provide a conduit from one device to another.

1) Twisted pair cable - accept electric current. One wire is used to carry signal whereas other is used as reference. If two wire parallel noise may affect the signal as change may happen at different points but twisting balances it out.

a) Unshielded twisted pair

b) Shielded twisted pair cable - shielding prevents crosstalk or penetration of noise

Performance

Attenuation increases with frequencies above 100 kHz.

Applications

Used by telephone lines to provide voice and data channels. Loop that connects subscribers to telephone office is VTP. DSL lines use VTP for high data rate connections.

Coaxial

It has a central core conductor or solid enclosed in insulating sheath which is encased in outer conductor which serves as second conductor to complete circuit

Performance

Attenuation is much higher but also has higher bandwidth.

Application

Used in places requiring high bandwidth like analog phone network which could carry over 10,000 voice signals.

Cable TV used ~~for~~ coaxial later shifted to fiber optic

Fiber Optic

Made of glass or plastic, works on total internal reflection contains core and cladding.

Modes:-

- a) Multimode, step index
- b) ~~or~~ Multimode, graded index
- c) Single mode

Performance

Attenuation is flatter. we need fewer repeaters.

Application

Used in backbone networks. wherever high bandwidth is needed fiber optic used

classmate
Date _____
Page _____

Unguided media ^{without} transport EM waves, using physical conductor

Propagation type

- i) Ground - Travel close to ground. Low frequency signals emanate in all direction. distance depends on power in signal
- ii) Sky propagation - higher frequency radio waves radiate upward to ionosphere which are reflected back used in greater distance
- iii) Line of sight - high frequency signal are transmitted in straight line. Antennas face each other

Radio waves

Radio - $3\text{ kHz} - 1\text{ GHz}$

Microwave - $1\text{ GHz} - 300\text{ GHz}$

Radio are omnidirectional.

Susceptible to interference as another emitter may send same frequency and cause disturbance.

Radio waves in sky mode travel long

Low and medium frequency can penetrate walls. signal travels through walls but can't isolate it.

Microwave

$1 - 300\text{ GHz}$

Unidirectional

Line of sight

High data rate possible

Can't penetrate walls.

Used in satellite and WLAN

Infrared

300 GHz - 400 THz

Used for short range

Can't penetrate walls

Used in TV remote control

It is affected by sun rays