

Transmission Media

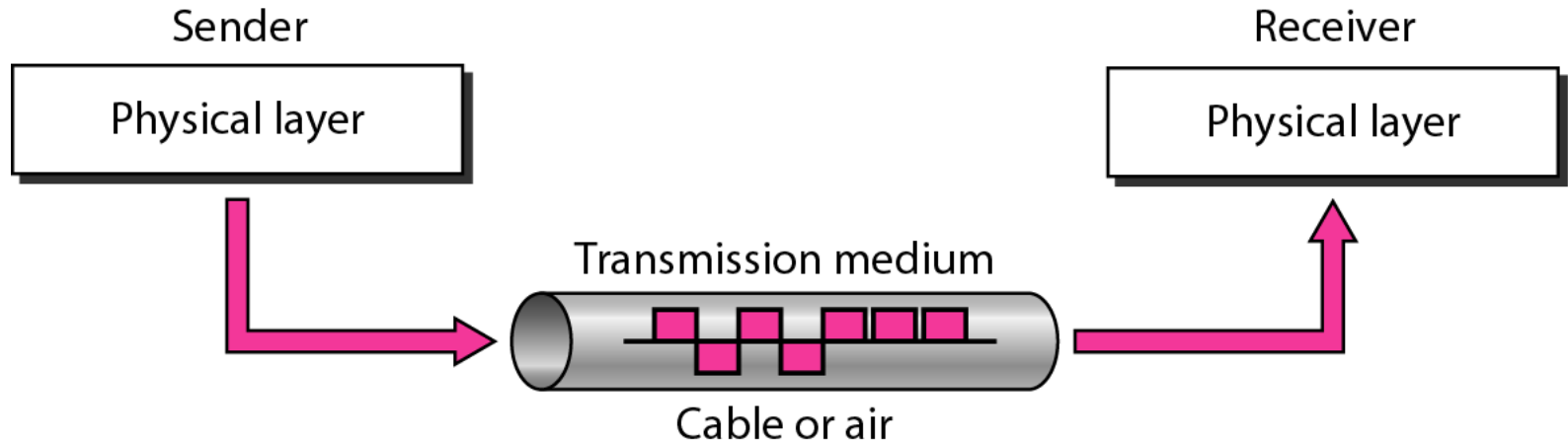


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What is a Transmission Media ?



Transmission Impairments

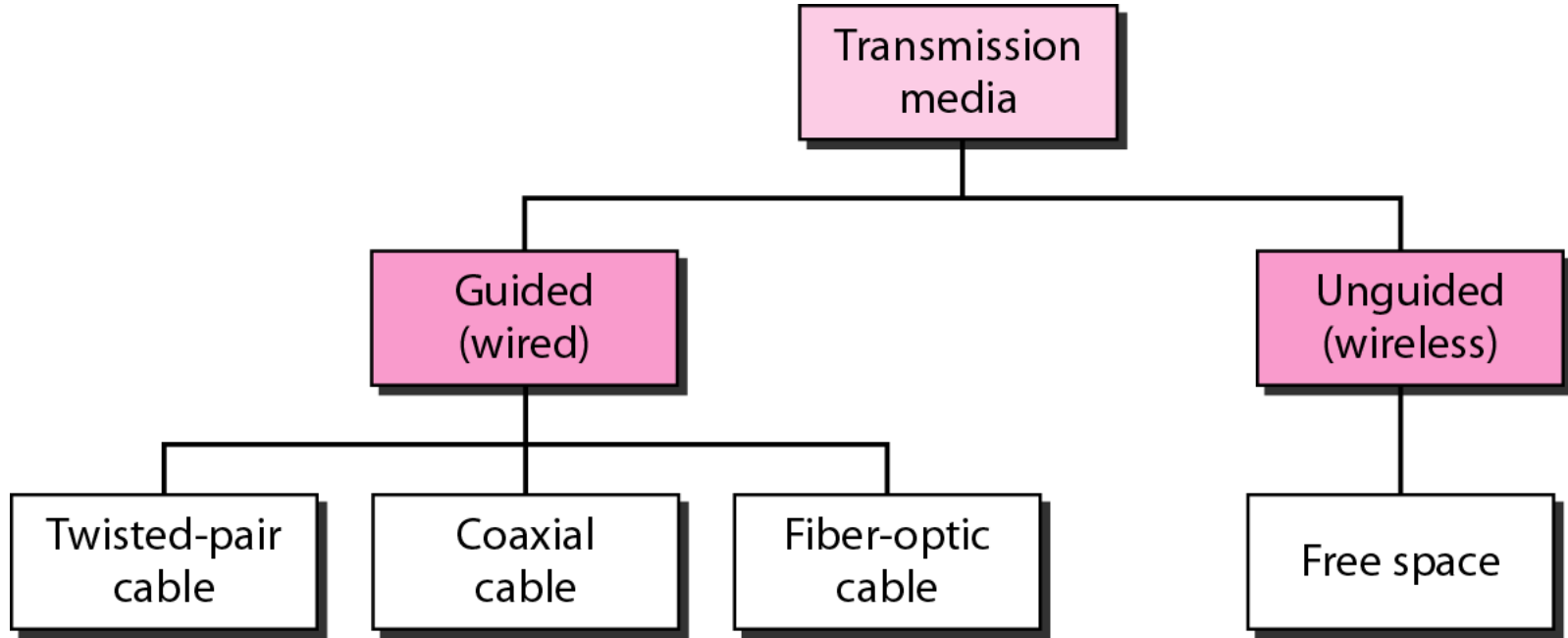


- ✓ The Imperfection in transmission media causes signal impairment
- ✓ What is sent is not what is received due to impairment
- ✓ Three causes of impairment are
 - ✓ Attenuation
 - ✓ Distortion
 - ✓ Noise

Transmission Impairments

- ✓ Attenuation means a loss of energy
- ✓ Distortion means that the signal changes its form or shape
- ✓ Noise is another cause of impairment
- ✓ Several types of noise
 - ✓ Example: thermal noise, induced noise, crosstalk

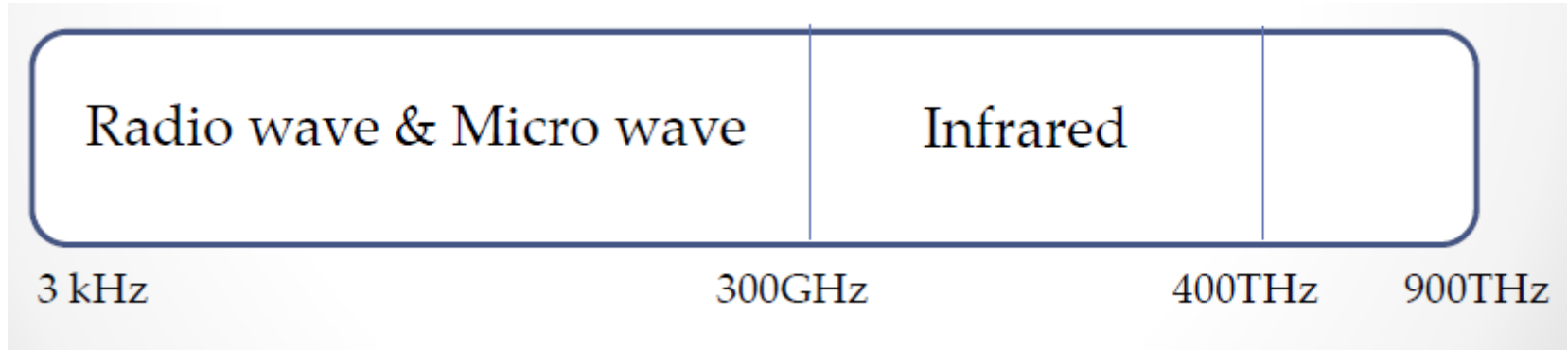
Classification of Transmission Media



Unguided Transmission Media - Wireless Transmission

- ✓ Unguided media transport electromagnetic waves without using a physical conductor
- ✓ This kind of transmission is known as Wireless Transmission
- ✓ Signals broadcast through free space and available to capable receiver

Electro Magnetic Spectrum for Wireless Transmission

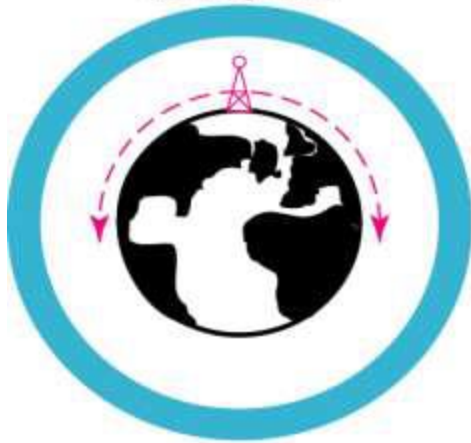


Propagation methods

- ✓ Unguided signals travels from the source to destination in several ways
- ✓ This process is known as propagation
- ✓ **They are three types:**
 - ✓ Ground propagation
 - ✓ Sky propagation
 - ✓ Line-of-Sight Propagation

Propagation methods

Ionosphere



Ground propagation
(below 2 MHz)

Ionosphere



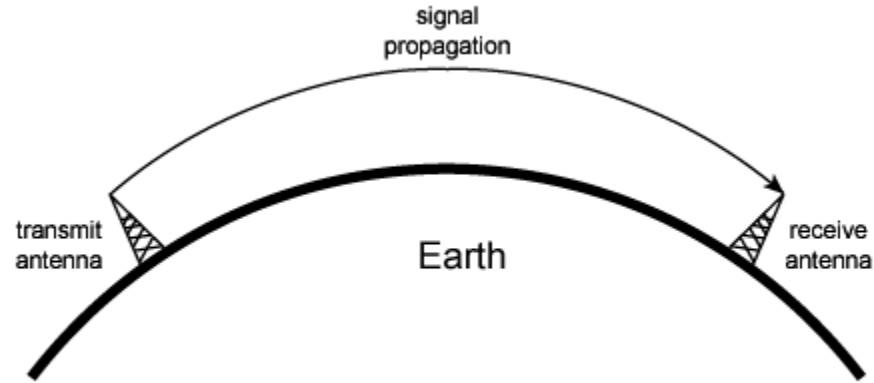
Sky propagation
(2 - 30 MHz)

Ionosphere



Line-of-sight propagation
(above 30 MHz)

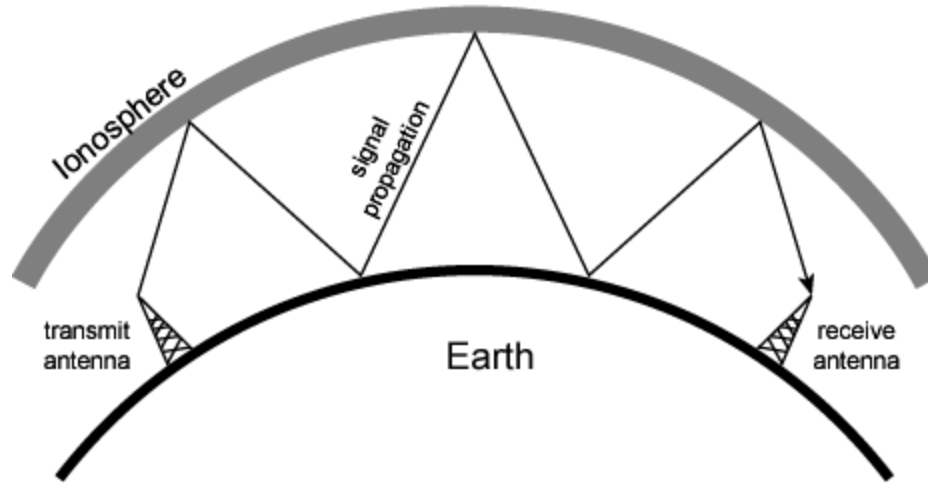
Propagation methods



(a) Ground-wave propagation (below 2 MHz)

- ✓ Radio waves travel through the lowest portion of the atmosphere
- ✓ Touching the earth

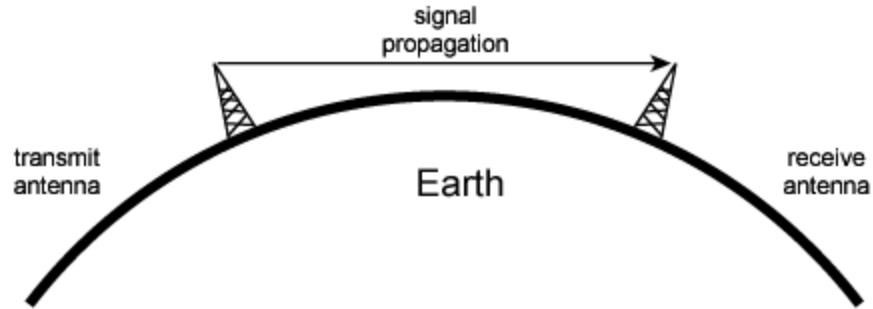
Propagation methods



(b) Sky-wave propagation (2 to 30 MHz)

- ✓ Radio waves radiate to the ionosphere
- ✓ Then they are reflected back to earth

Propagation methods



(c) Line-of-sight (LOS) propagation (above 30 MHz)

- ✓ In straight lines directly from antenna to antenna

Propagation methods – Frequency Ranges (Bands)

Band	Range	Propagation	Application
VLF	3–30 KHz	Ground	Long-range radio navigation
LF	30–300 KHz	Ground	Radio beacons and navigational locators
MF	300 KHz–3 MHz	Sky	AM radio
HF	3–30 MHz	Sky	Citizens band (CB), ship/aircraft communication
VHF	30–300 MHz	Sky and line-of-sight	VHF TV, FM radio
UHF	300 MHz–3 GHz	Line-of-sight	UHF TV, cellular phones, paging, satellite
SHF	3–30 GHz	Line-of-sight	Satellite communication
EHF	30–300 GHz	Line-of-sight	Long-range radio navigation

References

- ✓ Book: Data communication and Networking
Fourth edition
By : BEHROUZ A FOROUZAN
- ✓ various relevant websites

Thank You