

LINE OF SIGHT MICROWAVE COMMUNICATION

2.1 Link Engineering:

A link in a communication system can be defined as connecting two points separated at a distance, where one point may act as transmitter and another point act as a receiver. Implementation of data link is an integral part of communication engineering design and performance of data links significantly effect the overall communication system performance.

Broadly data links are divided in four types:

- i. Wire line link
- ii. Radio wave link
- iii. Microwave link

Radio link systems operate in the MHz to GHz range (microwaves). A microwave system consists of a number of ground base stations. Transmitting and receiving antennas must be in direct line of sight of each other. Radio link systems were introduced as an alternative to coaxial cable on long haul routes. They are also used for links to islands and difficult rural situations.

Advantages of radio link systems include:

- high bandwidth
- low level of signal attenuation
- can be used over rough terrain which would be unsuitable for cabled media

Disadvantages of radio link systems include:

- expensive over short distances
- there can be no obstacles between the transmitting and receiving antennas
- can suffer from interference due to climatic conditions and other microwave sources

Digital Point-to-Point Microwave Link:

The term digital communications covers a broad area of communications techniques, including digital transmission and digital radio. Digital transmission is the transmittal of digital pulses between two points in a communications system. Digital radio is the transmittal of digitally modulated analog carriers between two points in a communications system. Digital transmission systems require physical facility between the transmitter and receiver, such as a metallic wire pair, a coaxial cable or a fiber optic cable. In digital radio systems, the transmission medium is free space or the earth's atmosphere. Figure 2.1 shows simplified block diagrams of digital transmission point-to-point microwave system. In a digital transmission system, the original source information may be in digital

or analog form. If it is in analog form, it must be converted to digital pulses prior to transmission and converted back to analog format the receive end. In a digital radio system, the modulating input signal and the demodulated output signal are digital pulses. The digital pulses could originate from a digital transmission system, from a digital source such as a mainframe computer or from the binary encoding of an analog signal.

Transmission Lines A transmission line is a device that transfers energy (information) from one point to another with minimum amount of loss. Information can take the form of voice, video and data signals.

In other words, the transmission line must be efficient. Efficiency is the real key to a transmission.

Transmission media can be classified as either:

Cabled

- twisted pair
- coaxial cable
- fiber optic cable

Non-cabled

- cellular radio systems
- radio link systems
- satellite system

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