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Ques. Explain wireless local loop (WLL)

Ans. Wireless local loop is a telecommunication system that provides telephone and internet services using wireless technology. It serves as an alternative to traditional wired connections, offering a flexible, cost effective solution particularly in areas where laying cables is difficult or expensive.

1. Components of WLL

Base Station (BS) → Acts as a central hub, communicating with customer equipment wirelessly

Customer Premises Equipment (CPE) → devices like antennas and modems at the users location allowing communication with base station.

Switching center → manages call routing, billing and network switching

control system → ensure smooth communication and manages spectrum use

Transmission process

- the base station transmits voice and data signals to CPEs within its range.
- It enables two way communication with the switching center connecting calls or data to external networks.
- WLL uses licensed frequency bands to avoid interference.

Types of WLL

1. fixed → provide service to a fixed location.
2. mobile → offers mobility while staying connected.
3. broadband → provides high speed wireless internet.

Advantages →

1. cost effective and fast installation → no need for cables, making it cheaper and quicker to deploy.
2. flexibility in remote areas → ideal for areas with difficult terrain.
3. scalability → can easily expand by adding base station.

Limitations →

signal interferences → prone to interference from physical obstacles.

Limited range → users need to be within the base station coverage.

Capacity constraints → bandwidth limited the number of users.

Conclusion →

WLL provides a practical and cost effective solution for delivering communication services, especially in areas where traditional-wired infrastructure is difficult or costly to install.