Wireless Local Loop

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Introduction

• Wireless local loop (WLL) is a system that connects subscriber to a public switched telephone network (PSTN) using radio signal.

• Other terms for this type of access include **Broadband Wireless Access (BWA)**, **Radio In The Loop (RITL)**, **Fixed-Radio Access (FRA)** and **Fixed Wireless Access (FWA)**.
A General WLL Setup
Connection Setup

Wireless Access Network Unit (WANU)
- Interface between underlying telephone network and wireless link
- Consists of
  - Base Station Transceivers (BTS)
  - Radio Controller (RPCU)
  - Access Manager (AM)
  - Home Location Register (HLR)

Wireless Access Subscriber Unit (WASU)
- Located at the subscriber
- Translates wireless link into a traditional telephone connection
WLL technology can be implemented across 4 categories of wireless technology. They are:

• Analog cellular (AMPS, NMT, TACS, NAMPS)

• Digital cellular (CDMA, TDMA etc.)

• Personal Communication Services (PCS)/ Personal Communication network (PCN) of Japan.

• Cordless Telephones 2nd generation (CT-2)/ Digital European Cordless Telecommunication (DECT)

In India the WLL services are implemented through CDMA and corDECT
corDECT  WLL

• corDECT is an advanced, wireless access system developed by Midas communication technologies and Indian Institute of Technology, Madras.

• corDECT is a TDMA (WLL) based on DECT standard specification from the European Telecommunication Standards Institute (ETSI).

• **Frequency standards:**
  - RF band (1880-1900 MHz)
  - 10 frequencies operation in 20 MHz band
  - Channel spacing -1.728 MHz
  - Data burst rate-1.152 Mbps
corDECT

- It is a Micro Cellular Wireless Access system.
- It provides both voice and internet access
- Provides internet access at 35 kbps or 70 kbps
- It can cover up to 200-300 meters inside building. In clear line of sight conditions, if available, it can cover up to 5Km from base station.
CDMA (WLL)

- Frequency band of operation for WLL systems using CDMA: 824 MHz – 845 MHz
- CDMA systems are based on Macro Cellular technology.
- As these systems operate in 900 MHz band, the propagation losses are less as compared to DECT.
- It can provide connectivity to the subscribers located at around 25 kms from the base station in LOS conditions without using repeaters.
- The capacity of BSC of CDMA is 20,000 subscribers and capacity of Base Station is 1,000.
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<th>WLL</th>
<th>Mobile Wireless</th>
<th>Wireline</th>
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<tbody>
<tr>
<td>Good LOS component</td>
<td>Mainly diffuse components</td>
<td>No diffuse components</td>
<td></td>
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<tr>
<td>Rician fading</td>
<td>Rayleigh fading</td>
<td>No fading</td>
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<tr>
<td>Narrowbeam directed</td>
<td>Omnidirectional antennas</td>
<td>Expensive wires</td>
<td></td>
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<tr>
<td>antennas</td>
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<tr>
<td>High Channel reuse</td>
<td>Less Channel reuse</td>
<td>Reuse Limited by wiring</td>
<td></td>
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<tr>
<td>Simple design,</td>
<td>Expensive DSPs,</td>
<td>Expensive to build and</td>
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<tr>
<td>constant channel</td>
<td>constant channel</td>
<td>maintain</td>
<td></td>
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<tr>
<td>Low in-premises</td>
<td>High mobility allowed,</td>
<td>Low in-premises</td>
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<tr>
<td>mobility only, easy</td>
<td>easy access</td>
<td>wiring of distant areas</td>
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<tr>
<td>access</td>
<td></td>
<td>cumbersome</td>
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<tr>
<td>Weather conditions</td>
<td>Not very reliable</td>
<td>Very reliable</td>
<td></td>
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<td>effects</td>
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WLL provides...

• Same level of quality as conventional telephone network.
• Short construction period
• No Interference with other wireless systems
• Supports larger traffic volume
• Subscriber costs equivalent or better than copper.
• No handoffs necessary:
  – Decreases hardware costs and system complexity
  – Increases quality of service through accurate traffic predictions
THANK YOU