

What is “Wireless”?



PCS/Cellular

Cordless Phone

Pager

GPS (Global Positioning System)

TRS (Trunked Radio System)

AM/FM Radio, Broadcast TV, Satellite

Wireless LAN/Bluetooth

WiMAX/Wibro

WLL (Wireless Local Loop)

LMDS (Local Multiple Distribution System)

Remote Control

How can we differentiate the wireless Service?

Wireless and Mobile
Chia V. Lee

Mobility Range

WLL (Home - Central Office)

Cellular phone

Satellite

Real time vs. Non-real time

Voice vs. Data, E-mail

Cellular vs. Pager

Direction

1-way: TV broadcast, GPS

2-way: Mobile phone traffic

How can we differentiate the wireless Service?

Wireless and Mobile
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Bandwidth/user

Low: Pager 12 kHz/ch

Medium: cellular 30 kHz/ch

High: TV Broadcast 6MHz/ch

Access to the Network

Assigned channel: cellular phone

Shared medium: WLAN

Broadcast

How can we differentiate the wireless Service?

Wireless and Mobile
Eric V. Lee

Installation Cost

WLL : \$800/customer

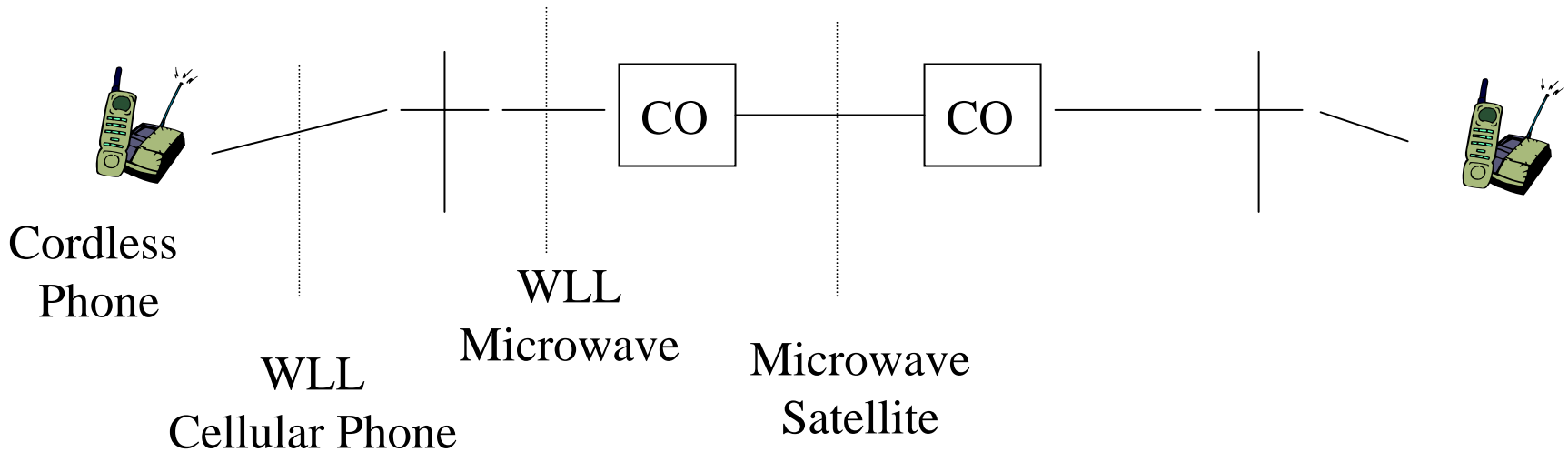
Wired Line: \$1200/customer

Frequency

Low < 1GHz < High

Basic Phone Service

Wireless and Mobile
Chae Y. Lee



Mobility

No other way to get the capability of communication

Low cost connection

Cheaper than wired link

The cost is less sensitive than the wired line

Low cost distribution

The marginal cost for each additional user is lower

What will be covered in this class ?

Wireless and Mobile
Chae Y. Lee

Radio environment

Noise, Interference, Distortion, Attenuation

Radio communication tech.

Diversity, Equalization, ECC (Error Correction Code)

How do you put information onto radio signals ?

Multiple conversation in a shared media

FDMA/TDMA/CDMA/OFDMA

Using spectrum efficiently

What will be covered in this class ?

Wireless and Mobile
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Radio System

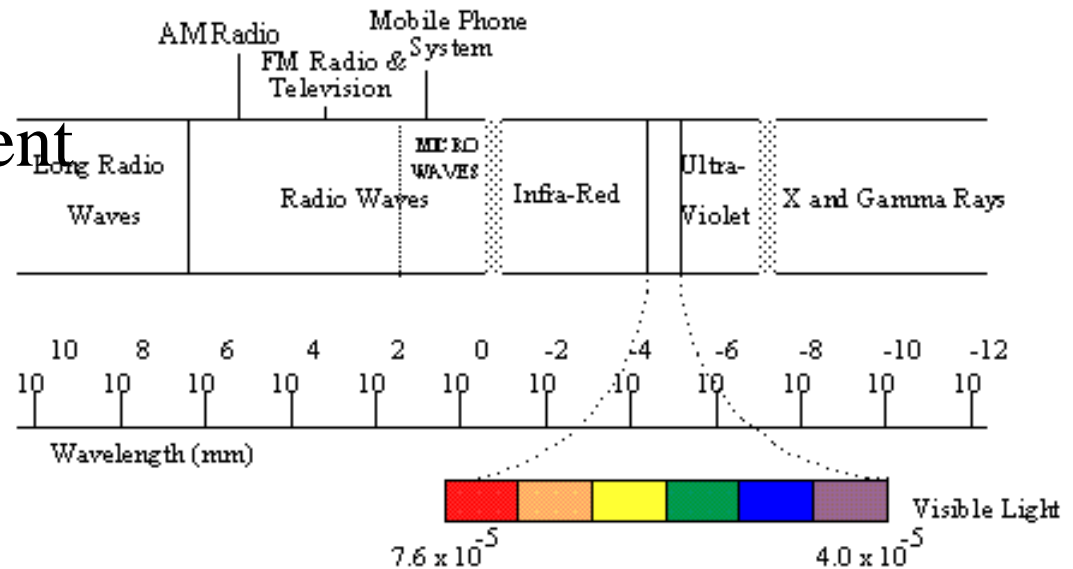
1st Generation Standard: Analog

2nd Generation Standard: Digital

3rd Generation Standard: WCDMA/CDMA 2000

B3G/4G:

Spectrum Management



The Electromagnetic Spectrum