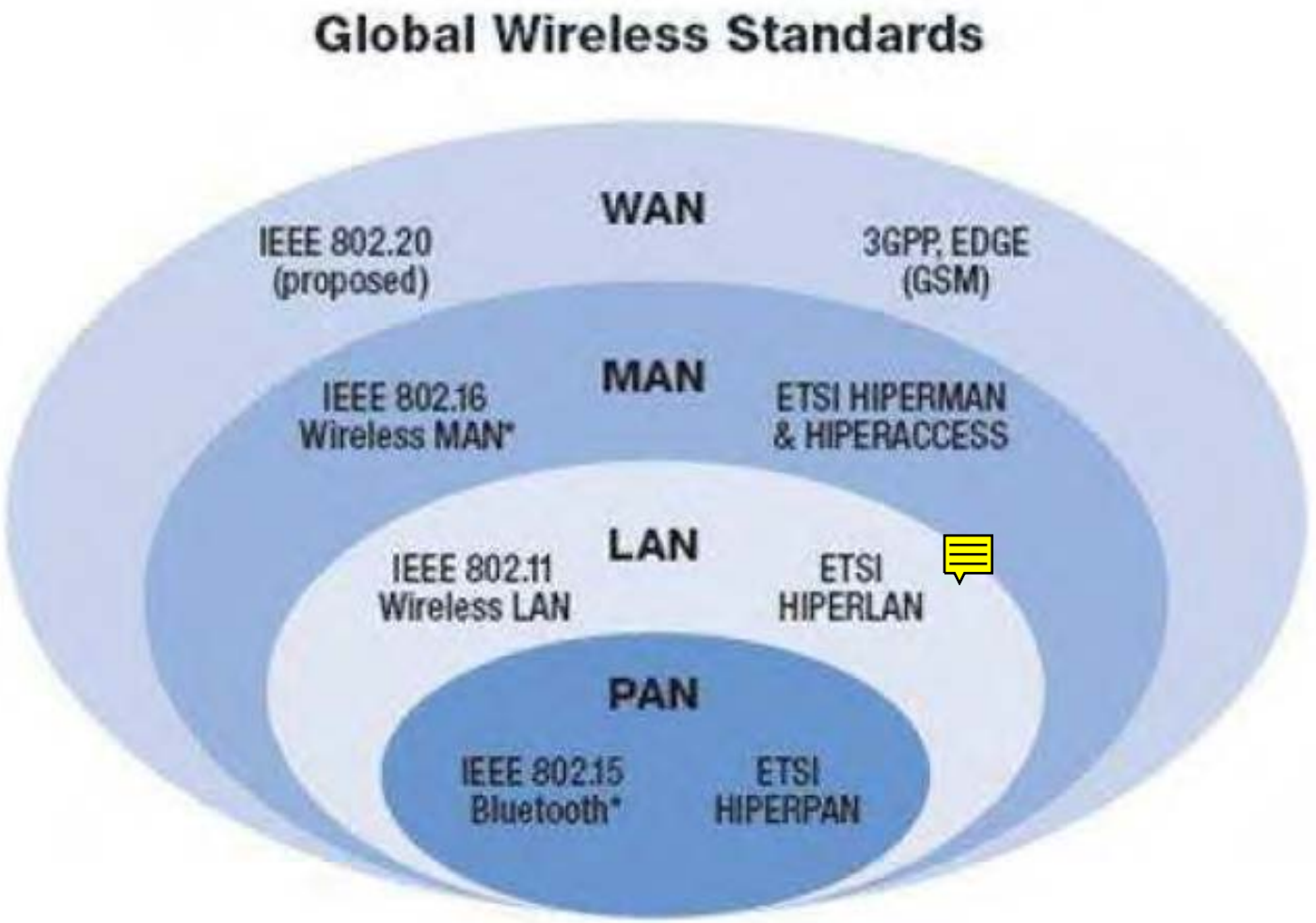
Outline

- A preliminary overview
- Propagation characteristics
- ISO-OSI Model
- Physical layer: modulation
- MAC layer:
  - Fixed resource assignment
  - Random access
    - Ethernet (CSMA/CD)
    - WiFi (CSMA/CA)
- **Personal Area Networks**
  - Bluetooth
  - Zigbee
- Cellular network dimensioning
- Cellular networks
  - From GSM (2G) to UMTS (3G)
  - LTE (4G)

Where are PANs?



What is a PAN?

A PAN is a computer network used to communicate among devices, e.g., mobile phones, personal digital assistants (PDAs). The devices are placed close to the body of a specific person and their range is about few meters.

- Wired: connected to PCs or other devices via USB or FireWire.

- Wireless: connected to PCs or other devices via IrDA, Bluetooth, UWB, Z-Wave, and ZigBee.

Wireless PANs

- Short range (within, typically, 10 meters).
- Low computational complexity and energy consumption (battery-powered).
- Pugging-in: ideally, when any two wireless PAN-equipped devices come into close proximity, they can communicate.
- The main carrier frequency is 2.4 GHz.
- IEEE 802.15.x standard (Bluetooth, 802.15.1, and ZigBee, 802.15.4).