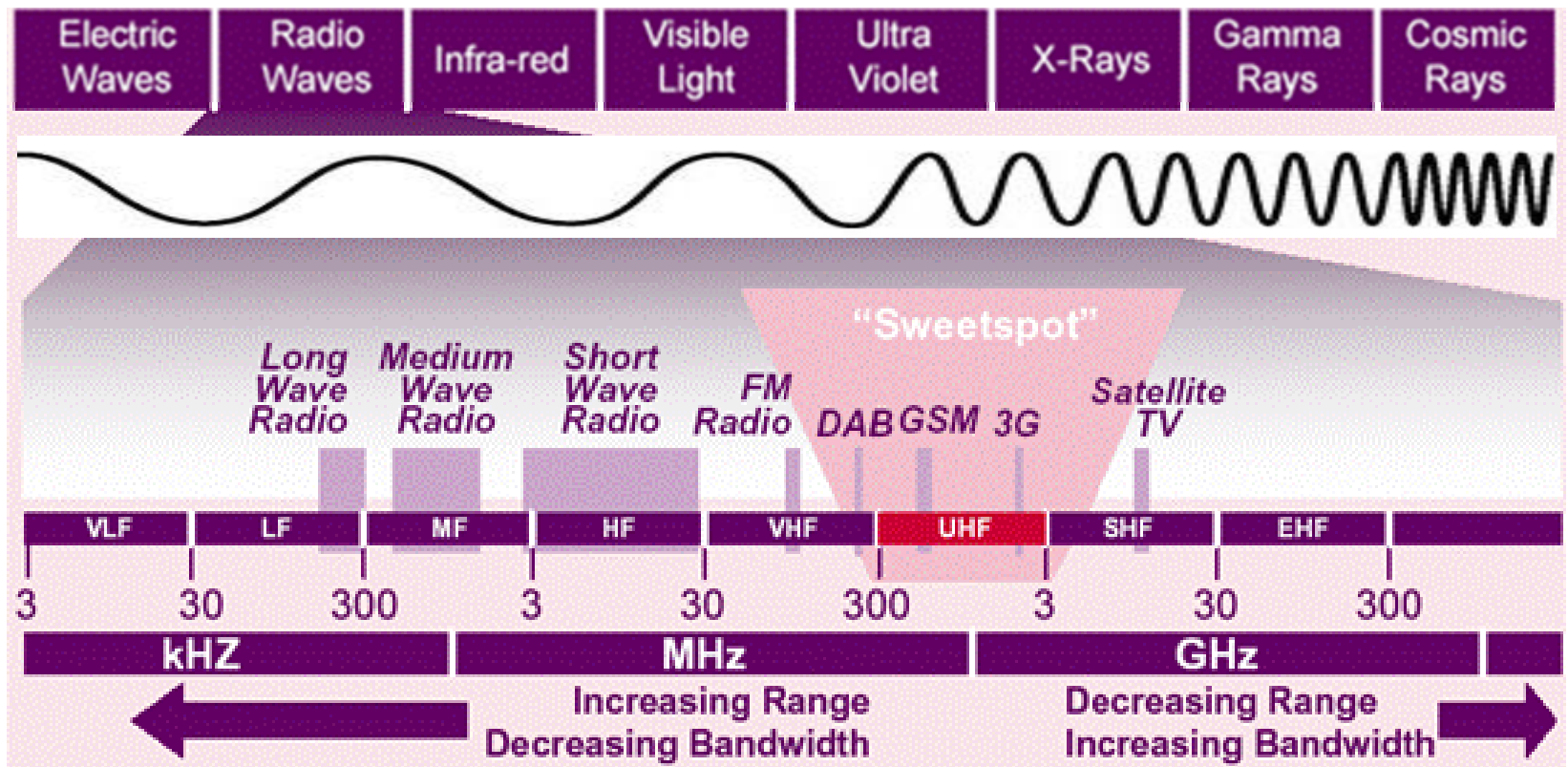


Wireless Networks



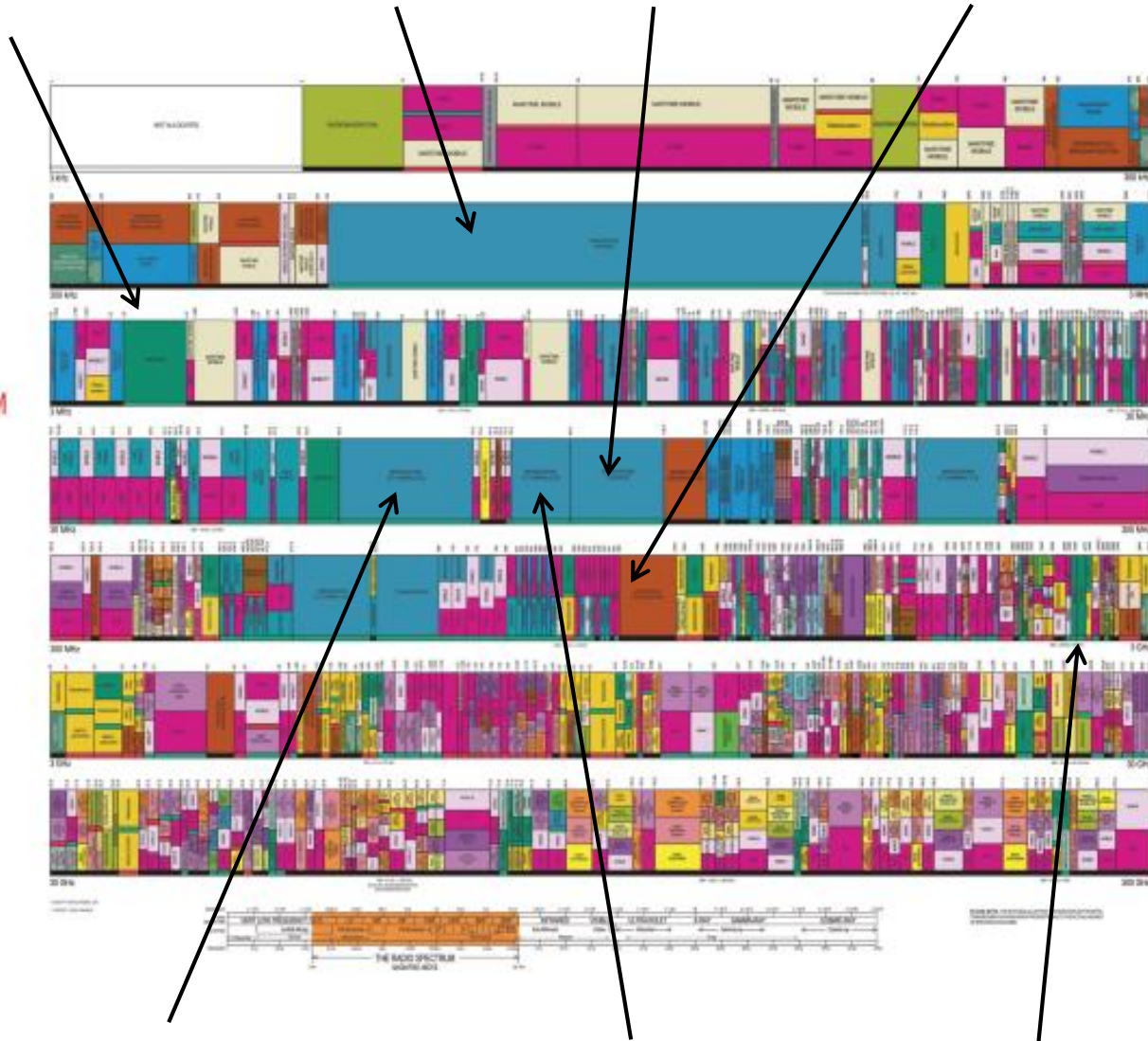
Wireless uses radio waves



In the USA, radio waves are regulated by the Federal Communications Commission (FCC).



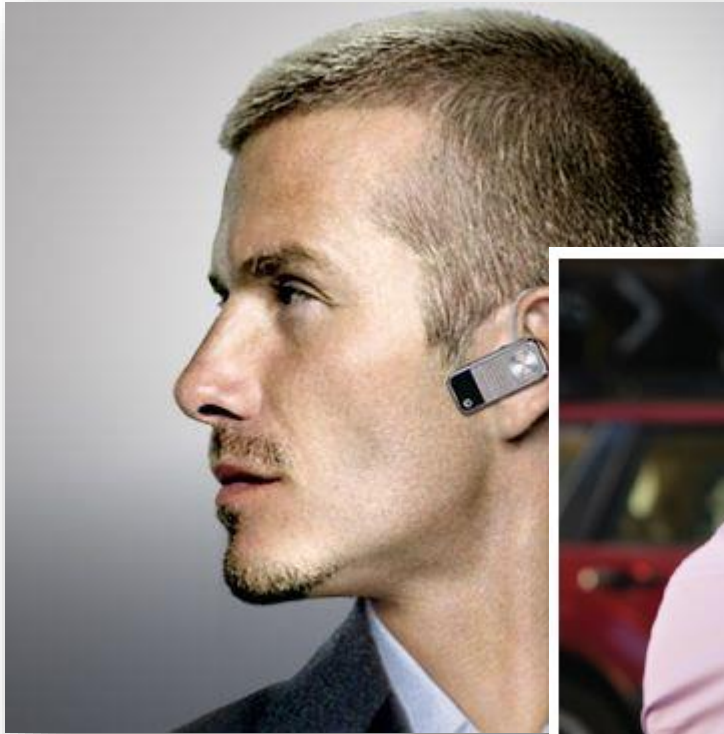
WiFi



Types of wireless networks

- Bluetooth (PAN)
- WiFi (wireless LAN)
- WiMax (WAN)
- Satellite network service
- Mobile wireless Internet access

Bluetooth®



Bluetooth

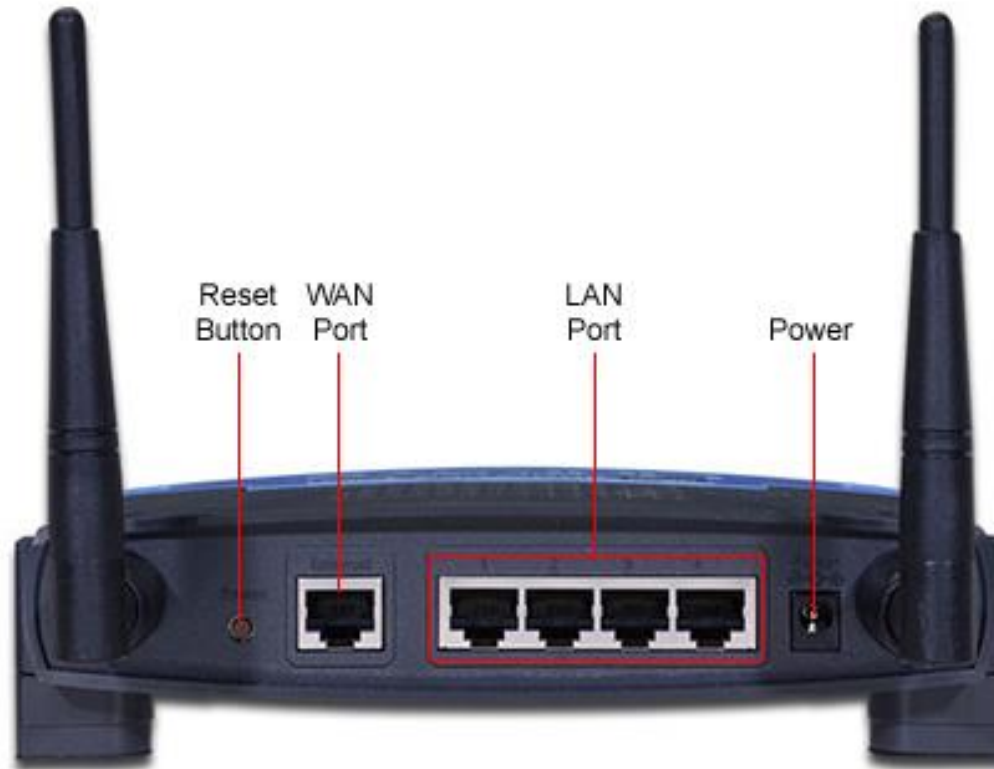
- IEEE 802.15
- Unlicensed space
- Mobile phones, gaming, PCs, watches, sports and fitness, healthcare, security & proximity, automotive, home electronics, automation, Industrial, etc.

Version	Max. speed	Max. distance
Original	3 Mbps	30 feet
3.0	25 Mbps	100 feet
4.0	25 Mbps	200 feet
5	50 Mbps	800 feet

Wireless Router Network Diagram



Wireless router



WiFi

- IEEE 802.11
- Unlicensed radio frequencies
- Distance from 150 to 300 feet
- **Up to 144 Mbps**
- Variations
 - 802.11 a
 - 802.11 b
 - 802.11 g
 - 802.11 n
 - etc.

The future of WiFi

- 802.11 ac
 - **Up to 1 Gbps**
- 802.11 ad
 - **Up to 7 Gbps**
 - Also known as **WiGig**

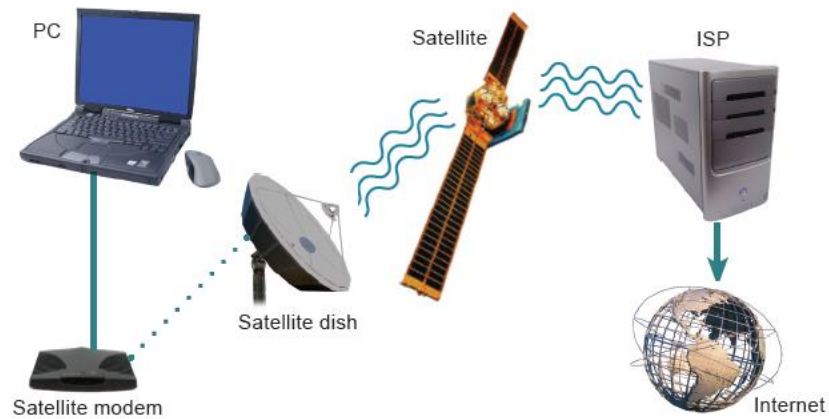




WiMax information

- IEEE 802.16
- Uses microwaves (300 MHz to 300 GHz)
- 30 to 35 miles
- 70 Mbps maximum (subject to weather, distance)

Satellite network service



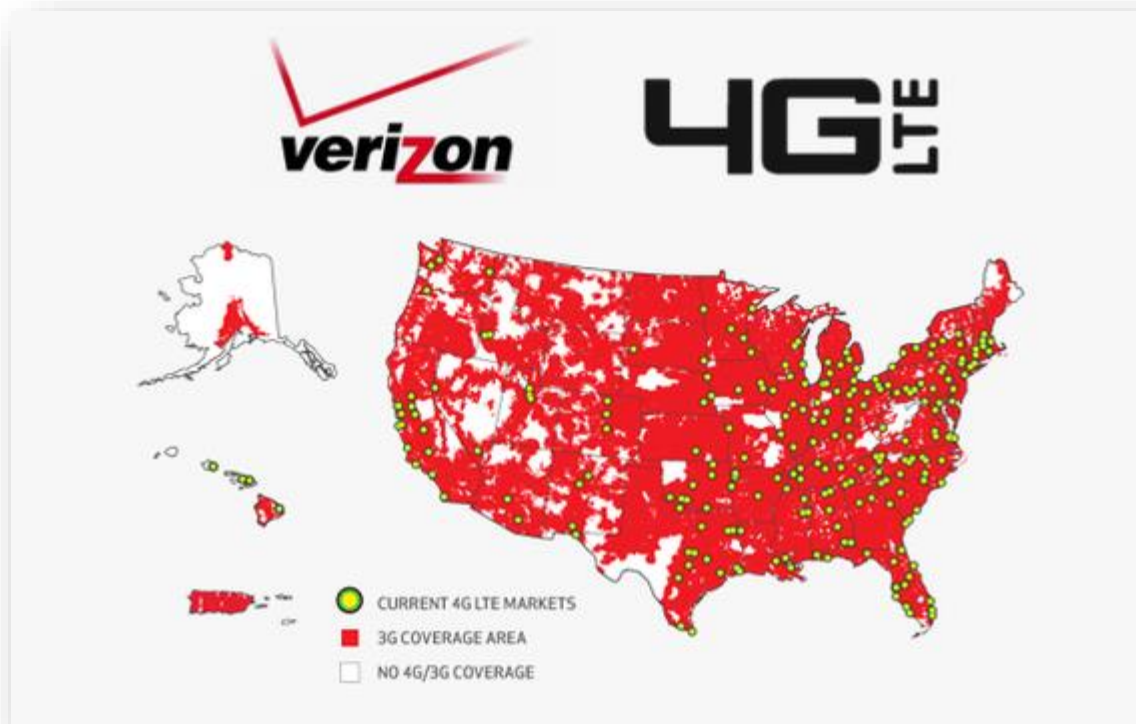
Mobile wireless Internet access

Cellular service

Generation	Uses	Speed
First generation (1G)	Voice	
Second generation (2G)	Voice and data	14.4 Kbps
Third generation (3G)	Voice and data	2 to 5 Mbps

Cellular service (continued)

- Fourth generation/Long-Term Evolution (**4G LTE**)
 - Voice and data
 - **100 Mbps maximum** while in motion
 - **1 Gbps maximum** while stationary





MiFi from Novatel



Mobile wireless hot spot

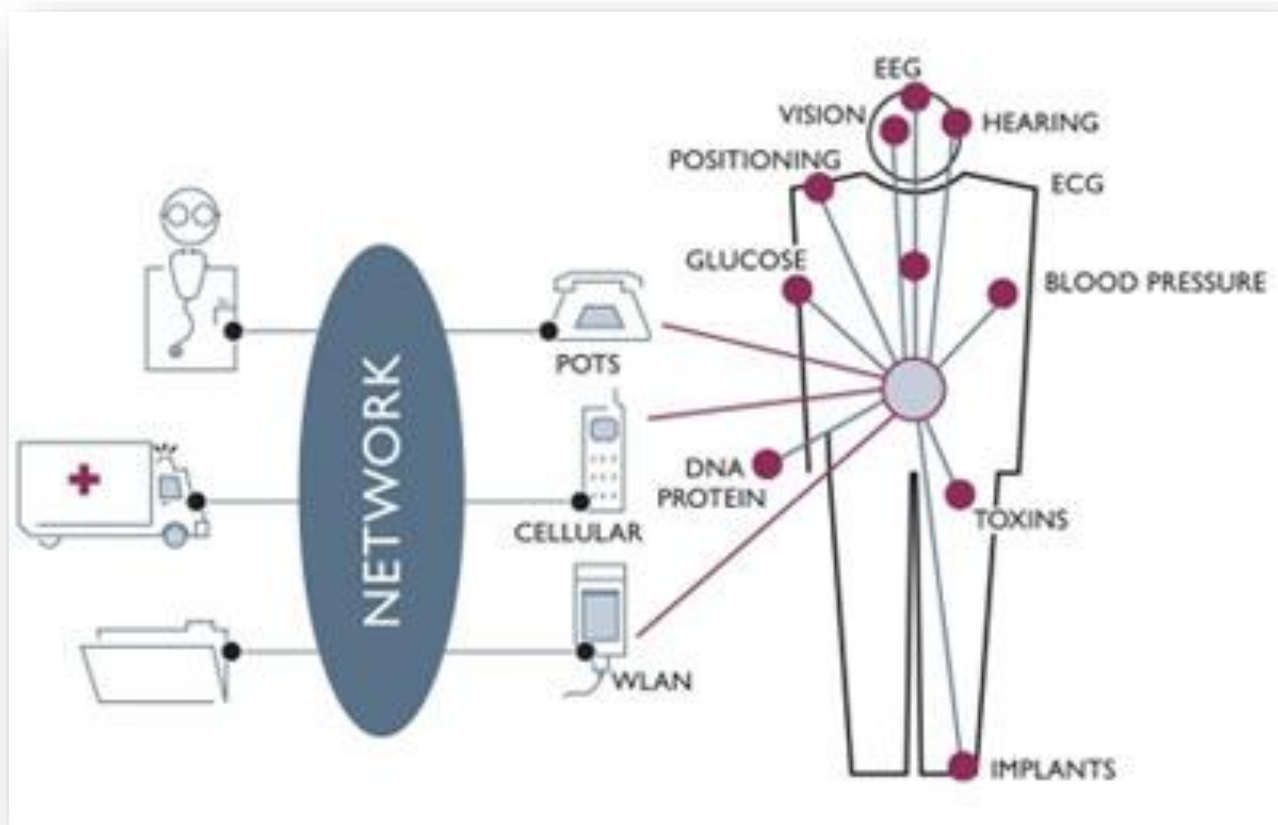
MiFi





Emerging wireless technology

Body Area Network (BAN)



Broadband Global Area Network (BGAN)



BGAN terminal



BGAN operated by **inmarsat**

