

Mobile Radio Systems Historical Milestones to 1995

ECE4823

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Early Milestones

- 1885: Heinrich Hertz—First radio transmission across a laboratory using coils and gaps
- 1897: Guglielmo Marconi—First radio transmission using a pole on a mast over 18 miles to a tugboat
- 1921 and 1923: One-way police radio in Detroit and London, respectively

Mid-century Milestones

- 1927: First international spectrum management conference (for carriers up to 1.5MHz)
- WW2: Mass production of mobile radio equipment
- 1946: First public mobile telephone service
- 1948: Inventions of the transistor and the cellular concept, both by Bell Labs
- 1965: First pocket-sized mobile phones

Late Century Milestones-First Generation

- 1976: 1327 non-cellular mobile telephone systems operating in US; Bell System had 637 of these, serving 40,000 customers. There was a large waiting list!
- 1977-1981: Cellular trials in the 800MHz band
- 1982: Standardization for digital cellular begun in Europe
- 1983: FCC allocates 666 channels within 40 MHz in 800MHz band for Advanced Mobile Phone System (AMPS), which uses analog modulation. Each city (market) could have only two service providers, System A and System B. Roaming not possible

Wireless LAN Milestones

- Late '80s: FCC allocated license-free spectrum; IEEE 802.11 wireless LAN (WLAN) working group established
- 1997: IEEE 802.11 standard for WLANs (*Wi-Fi*) adopted: 802.11b at 2.4 GHz and 802.11a at 5 GHz

Recent Milestones—Second Generation (Digital)

- 1990: Global System Mobile (GSM), Europe's mandated digital standard, is introduced in 800-900MHz band.
- 1991: U.S. Digital Cellular (USDC or IS-54) systems introduced in 800MHz band to gracefully convert AMPS users to digital
- 1993: Code Division Multiple Access (cdmaOne or IS-95) introduced for the 800MHz band
- 1995: DCS1900 (GSM) introduced in 1.9 GHz band (PCS) to compete with 800-900 MHz band



Recent Milestones

- 2.5 Generation—mobile wireless data
 - 1998: NTT DoCoMo introduced I-mode, a wireless data service and internet “microbrowser”
 - 199?: GPRS, the packet data extension to GSM, is introduced
- 3rd Generation:
 - 1998: IMT-2000 proposals for a world-wide 3rd generation standard are submitted



References

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- [Lee, '98] W.C.Y. Lee, *Mobile Communications Engineering*, McGraw-Hill, 1998