

# Trends In Unlicensed Spread Spectrum Devices

Presentation at FCC Commission Meeting

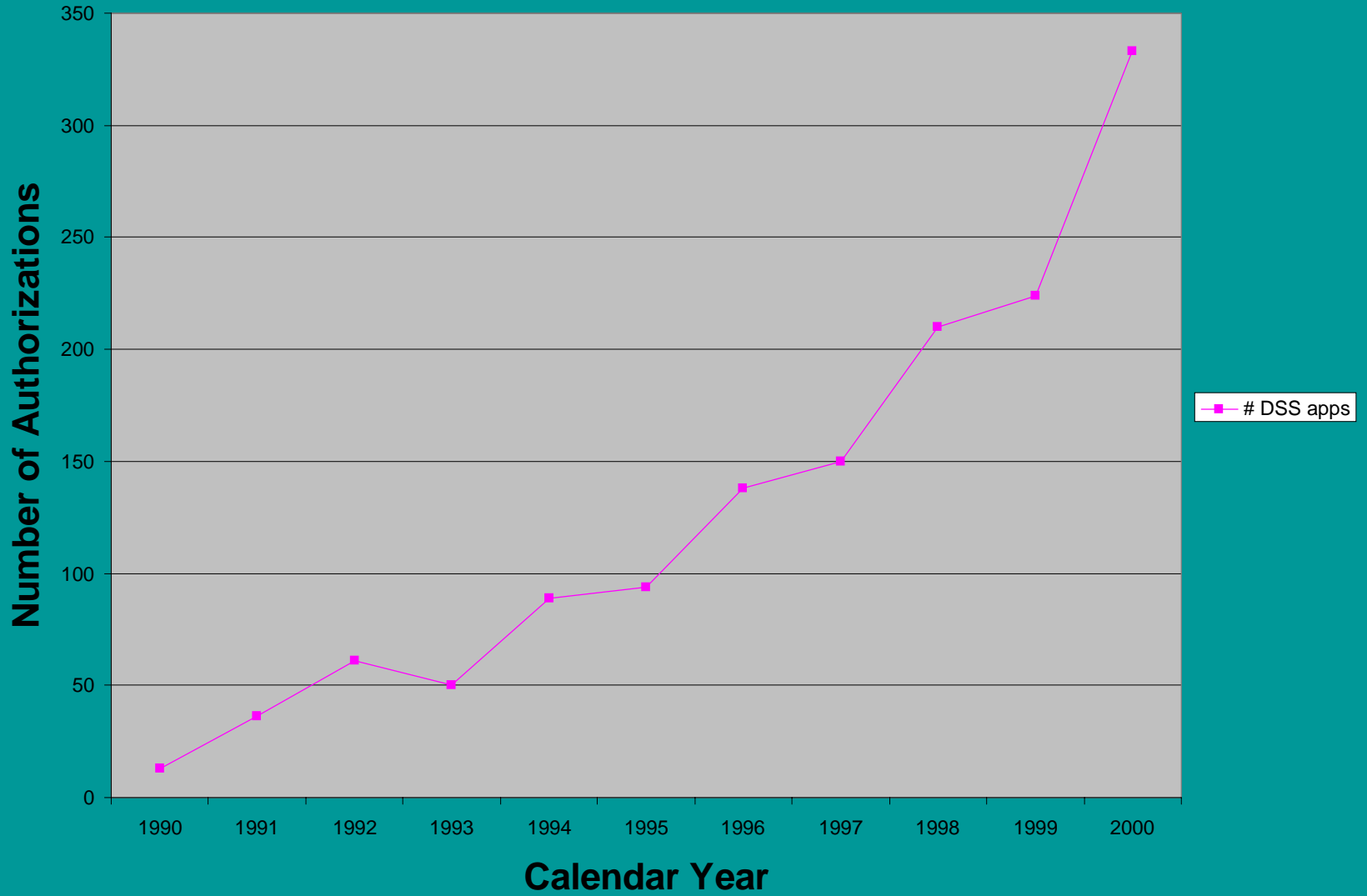
May 10, 2001

Office of Engineering and Technology  
Federal Communications Commission

# Birth of An Industry

- Spread spectrum technology was originally developed for military applications
- FCC first established provisions for Part 15 unlicensed spread spectrum devices in 1985
- Little activity in first few years
- Then it started to grow!

## Part 15 Spread Spectrum Authorizations (1990 - 2000)



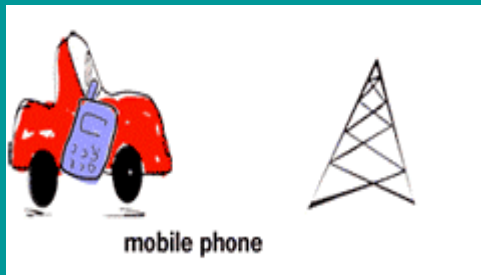
# Regulatory Principles

- Minimal rules to control interference
- Encourage innovation through flexibility
- Adjust the rules periodically in response to technology advances & other developments
- Broad rules provide a framework for the private sector to develop detailed standards

# Bluetooth

- Developed by industry standards group - - supported by more than 2000 companies
- Key features:
  - Frequency hopping spread spectrum
  - Operates in the 2.4 GHz band
  - Low power (1 mW), short-range (10 m)
  - Designed for peer-to peer operation
  - Can be Implemented on a low-cost “chip”
  - Bandwidth: 1 MHz; data rates of 720 Kb/s

# Bluetooth Applications



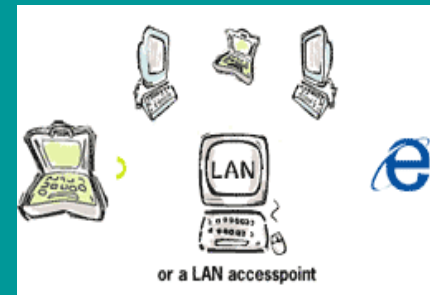
Three-in-one phone:  
cellular, cordless, walkie-talkie



Wireless Headsets



Interactive  
Conferencing



Internet Bridge &  
Wireless Personal  
Area Networking



Automatic Device  
Synchronizer

# IEEE 802.11b

- Developed by industry standards group - - widespread support & explosive growth
- Also known as “Wi-Fi”
- Key features:
  - Direct sequence spread spectrum
  - Operates in the 2.4 GHz band
  - Low power < 100 mW; range < 100 m
  - Designed for network operations
  - Bandwidth: 22 MHz; data rates up to 11 Mb/s

# IEEE 802.11b Applications



Wireless Access  
Points

Community Networks

Wireless Bridge to  
Ethernet Backbone

Access Points at  
Public Gathering Places



# Home RF

- Developed by HomeRF Working Group
- Required FCC rule changes
- Key features:
  - Frequency hopping spread spectrum
  - Operates in the 2.4 GHz band
  - Low power (125 mW), short-range (50 m)
  - Designed primarily for home applications
  - Bandwidth: 5 MHz; data rates up to 10 Mb/s

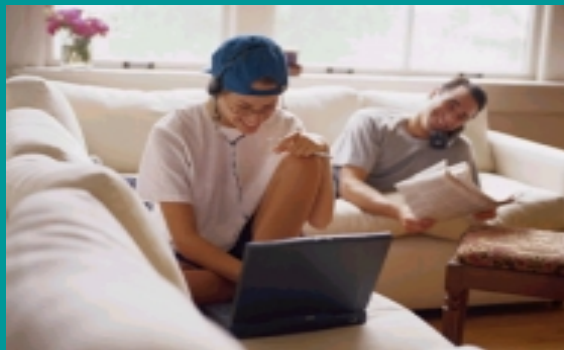
# Home RF Applications



**Internet Access And Printer Sharing Around the Home**



**Cordless Data and Voice**



**Listen to MP3 Music**



**Share Files Without Wires**

# Other Activities

- IEEE 802.11g: 2.4 GHz; up to 22 Mb/s
- IEEE 802.11a: 5.7 GHz; up to 54 Mb/s
- Introduction of new alternative digital technologies: OFDM
- Growing interest in 5.8 GHz Unlicensed-National Information Infrastructure Devices

# Conclusion

- Spread spectrum and other unlicensed technologies are evolving at a rapid pace
- Benefits businesses and consumers
- Rules require periodic review to eliminate impediments to new technology
- Notice of Proposed Rule Making we are presenting advances this objective