

# LONG-TERM EVOLUTION(LTE)



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# Introduction

- Mobile communication system

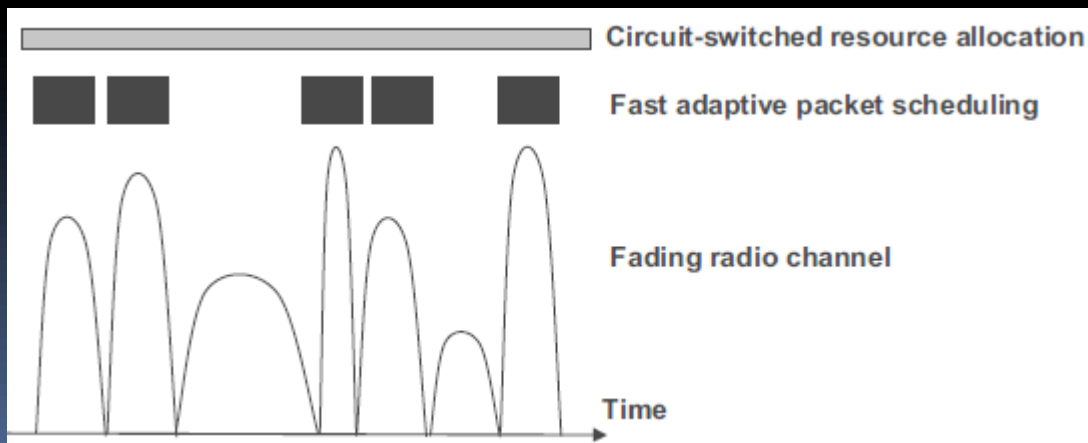
Generation	Characteristic
1G	Analog mobile radio system Plain old telephony
2G	First digital mobile system All narrowband targeted at “low bandwidth”
2.5G	Provide data service with packet data
3G	First mobile system handling broadband data Wireless communication
4G	Mobile WiMAX standard & first release LTE standard are candidates for 4G

- Design parameters

- Data rate, QoS and spectrum efficiency, delay, core network

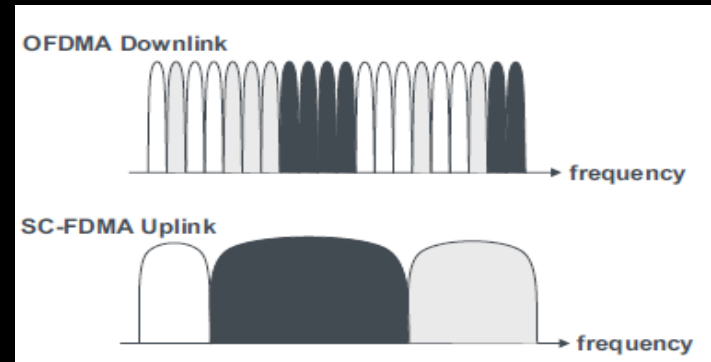
# System Structure

- Uplink : SC-FDMA
- Downlink : OFDM
- Fundamental technologies in LTE design
  - Multicarrier-for frequency efficiency
  - Multiple-antenna-for spectral efficiency
  - Application of packet-switching to the radio interface

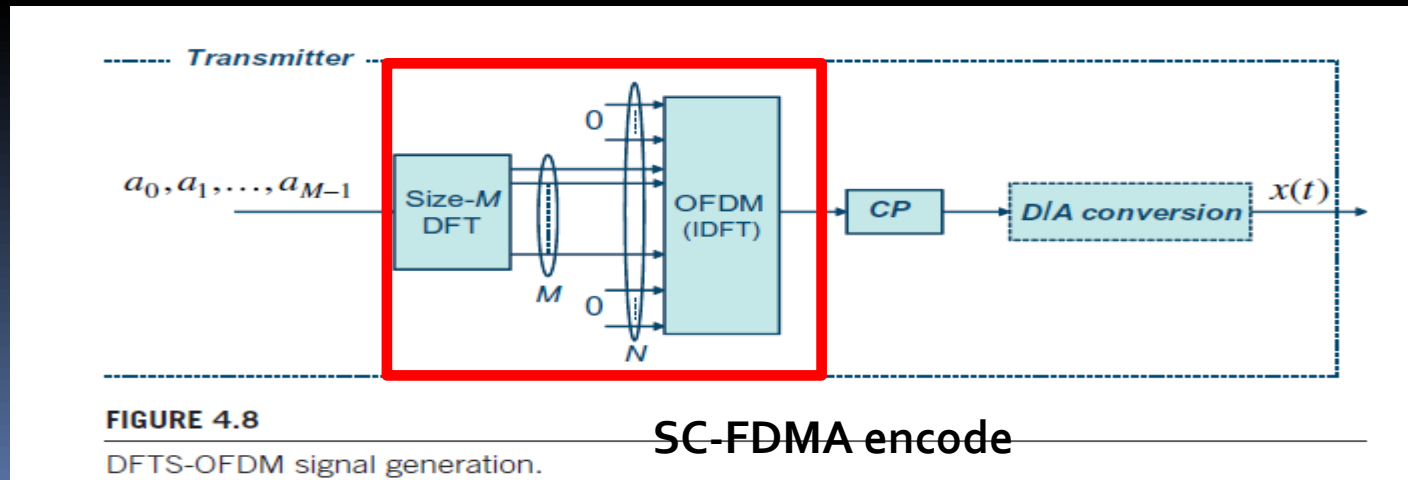


Short transmission interval + new dimension of time and space → new technique between MAC and Physical layer

# SC-FDMA VS OFDM



- Single Carrier VS multicarrier
- Wideband VS narrowband
- SC-FDMA is often viewed as DFT-based precoding + normal OFDM
- Cyclic Prefix(CP) added to eliminate ISI



# Characteristic of OFDM & SC-FDMA

- OFDM
  - Orthogonality of each subcarriers
    - less complexity for the receiver
    - attractive for high-rate mobile data transmission
  - High frequency efficient
- SC-FDMA
  - Low Peak-to Average Power Ratio(PARR) of transmitted signal
  - Ability to handle frequency diversity

