

5.4 MULTIPLE ACCESS TECHNIQUES

The transmission from the BS in the downlink can be heard by each and every mobile user in the cell, and is referred as *broadcasting*. Transmission from the mobile users in the uplink to the BS is many-to-one, and is referred to as multiple access.

Multiple access schemes to allow many users to share simultaneously a finite amount of radio spectrum resources.

Should not result in severe degradation in the performance of the system as compared to a single user scenario.

Approaches can be broadly grouped into two categories: narrowband and wideband.

Multiple Accessing Techniques : with possible conflict and conflict-free

- Random access
- Frequency division multiple access (FDMA)
- Time division multiple access (TDMA)
- Spread spectrum multiple access (SSMA) : an example is Code division multiple access (CDMA)
- Space division multiple access (SDMA)
- For voice or data communications, must assure two way communication (duplexing, it is possible to talk and listen simultaneously). Duplexing may be done using frequency or time domain techniques.
 - Forward (downlink) band provides traffic from the BS to the mobile
 - Reverse (uplink) band provides traffic from the mobile to the BS.
- Provides two distinct bands of frequencies for every user, one for downlink and one for uplink.
- A large interval between these frequency bands must be allowed so that interference is minimized.
- Frequency separation should be carefully decided. Frequency separation is constant
- In TDD communications, both directions of transmission use one contiguous frequency allocation, but two separate time slots to provide both a forward and reverse link.
- Because transmission from mobile to BS and from BS to mobile

alternates intime, this scheme is also known as “ping pong”.

- As a consequence of the use of the same frequency band, the communication quality in both directions is the same. This is different fromFDD.

