

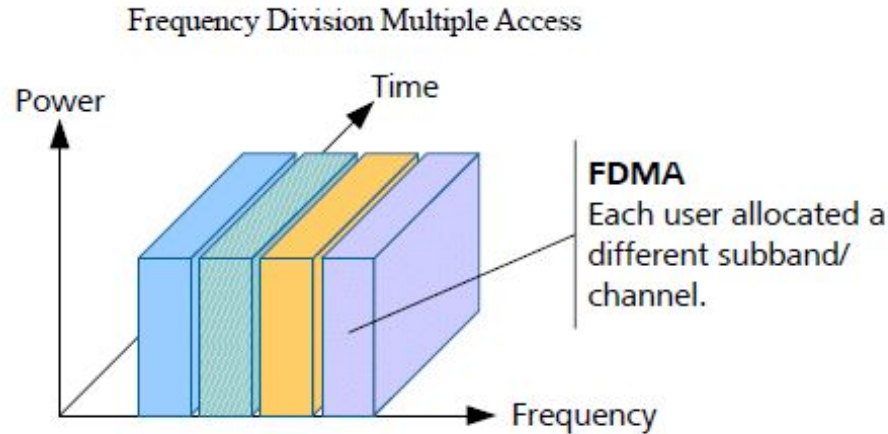
Frequency Division Multiple Access

Mobile Satellite and Communication

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FDMA

- FDMA works on the principle of dividing the total bandwidth of the communication channel into a number of discrete segments, and allocating each segment exclusively to a user.



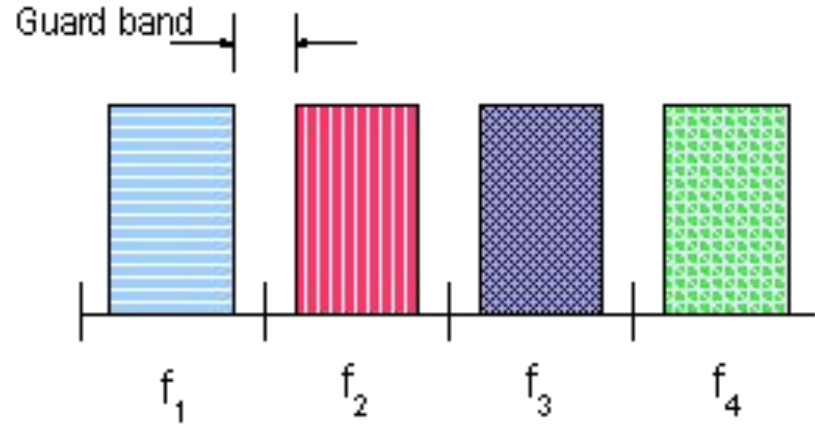
Features

- FDMA is the most basic way of creating channels, by assigning users to non overlapping frequency bands
- It was used in first and 2G cellular systems.
- System is used for low/medium traffic.
- Synchronization in FDMA is simple.
- Implemented at MAC(media access control) layer.
- Once a band is allocated to a user, it then belongs to the user exclusively for the continuous flow of information during the call.

Guard bands

To avoid leakage and interference due to imperfect filtering, frequency-domain guard-bands are required.

It is a narrow frequency range used to separate two wider frequency ranges to ensure that both can transmit simultaneously without interfering with each other.



Advantages of FDMA

- The advantage of the FDMA system is its **simplicity**, since once the channel capacity is divided amongst users each can operate independently of each other.
- Since each user has exclusive use of its allocated bandwidth there is **no contention** and therefore delays caused by collisions.
- Lowers the inter symbol interference (Equalization isn't required).
- Fairly efficient with a little base population and when traffic is constant.
- FDMA is therefore best for use in systems where all users have a stream of data to send, and it is unsuitable for users with 'bursty' traffic.

Disadvantages of FDMA

- There is wastage of bandwidth, firstly caused by the guard bands and secondly due to the fact that users can only use their own allocated frequency bands.
- Another disadvantage of fixed assignment systems, such as FDMA, is that the number of users cannot easily be changed. This would require the overall channel frequency band to be divided amongst the new users.
- FDMA is also not suitable for use in systems which require broadcast of data to many users.

THANKYOU