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FACULTY OF EGINEERING AND TECHNOLOGY

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LECTURE -5

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OUTLINE

- What is Multiple Access of Wireless communication?
- Frequency division multiple-access (FDMA)
- Time division multiple-access (TDMA)
- Code division multiple-access (CDMA)
- Space division multiple access (SDMA)
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WHAT IS MULTIPLE ACCESS OF WIRELESS COMMUNICATION?

What is Multiple Access of Wireless communication

Multiple access schemes are used to allow large number of users to share definite amount of radio spectrum in a most efficient way.

Multiple Access Techniques

In wireless communication systems, it is essential where the subscriber needs the information which is sent by the communication systems simultaneously from the mobile station to the base station while receiving information from the base station to the mobile station. The main objective of Multiple Access Techniques is to share the bandwidth among the users efficiently.

A cellular system consists of any given area which divides into cells where a mobile unit in each cell communicates with a base station. The main objective in the cellular system design is to increase the capacity of the channel, i.e., to handle so many calls in a given bandwidth with a good quality of service.

WHAT IS MULTIPLE ACCESS OF WIRELESS COMMUNICATION?

What is Multiple Access of Wireless communication

There are several different ways to allow access to the channel. These include mainly the following −

1. Frequency division multiple-access (FDMA)
2. Time division multiple-access (TDMA)
3. Code division multiple-access (CDMA)
4. Space division multiple access (SDMA)

WHAT IS MULTIPLE ACCESS OF WIRELESS COMMUNICATION?

Frequency Division Multiple Access (FDMA)

✓FDMA is the basic technology for advanced mobile phone services. The features of FDMA are as follows.

✓FDMA allots each user a different sub-band of frequency to access the network.

✓If FDMA is not in use, then the channel remains idle instead of allotting to the other users.

✓FDMA is implemented in Narrowband systems and it is less complex than TDMA.

✓Tight filtering is done in order to reduce the adjacent channel interference.

✓The base station BS and mobile station MS, transmit and receive simultaneously and continuously in FDMA.

WHAT IS MULTIPLE ACCESS OF WIRELESS COMMUNICATION?

Time Division Multiple Access (TDMA)

✓TDMA is used where frequent transmission is not required. The features of TDMA include the following.

✓TDMA shares a single carrier frequency with several users where each user makes use of non-overlapping time slots.

✓Data transmission in TDMA is not continuous process, but occurs in bursts. Hence hands-off process is simpler.

✓As TDMA uses different time slots for transmission and reception duplexers are not required.

✓TDMA has an advantage to allocate different numbers of time slots per frame to different users.

✓Depending upon their priority bandwidth is to be supplied on demand to different users by concatenating or reassigning time slot.

WHAT IS MULTIPLE ACCESS OF WIRELESS COMMUNICATION?

Code Division Multiple Access (CDMA)

✓Code division multiple access technique is an example of multiple access where the information is sent through single channel used by several transmitters simultaneously. Its features are as follows.

✓In CDMA the full available spectrum is used by every user instead of allotting separate frequency to the users.

✓DMA is much suggested for voice and data communications.

✓While the same channel in CMDA could be occupied by multiple codes , the users who has the same code can communicate with each other.

✓CDMA offers more air-space capacity than TDMA.

✓The CMDA helps in handling hands-off between base stations perfectly well.

WHAT IS MULTIPLE ACCESS OF WIRELESS COMMUNICATION?

Space Division Multiple Access (SDMA)

✓Space division multiple access or spatial division multiple access is a technique which is based on MIMO (multiple-input multiple-output) architecture and is mostly used in wireless and satellite communication. It has the following features.

✓Communication by all users can be occurred at the same time using the same channel.

✓SDMA gets free from interference.

✓More number of satellite receivers could communicate with a single satellite having the same frequency..

✓With the help of directional spot-beam antennas the base station in SDMA, can track a user mobility.

✓The radiated energy for each user in space is controlled by SDMA.

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