



SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



19EC601 – Wireless Communication

Unit -1 4G Cellular Networks



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4G

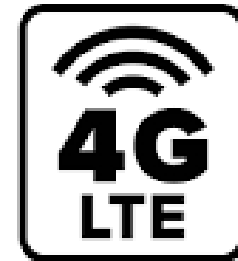


- Abbreviation of Fourth Generation wireless technology.
- It will provide a comprehensive IP solution where voice, data, multimedia can be given to user on “anytime, anywhere” basis.



Why 4G Required

- Due to substantial growth in overall number of subscribers.
- Due to massive demand of new services like data, audio, image or video.

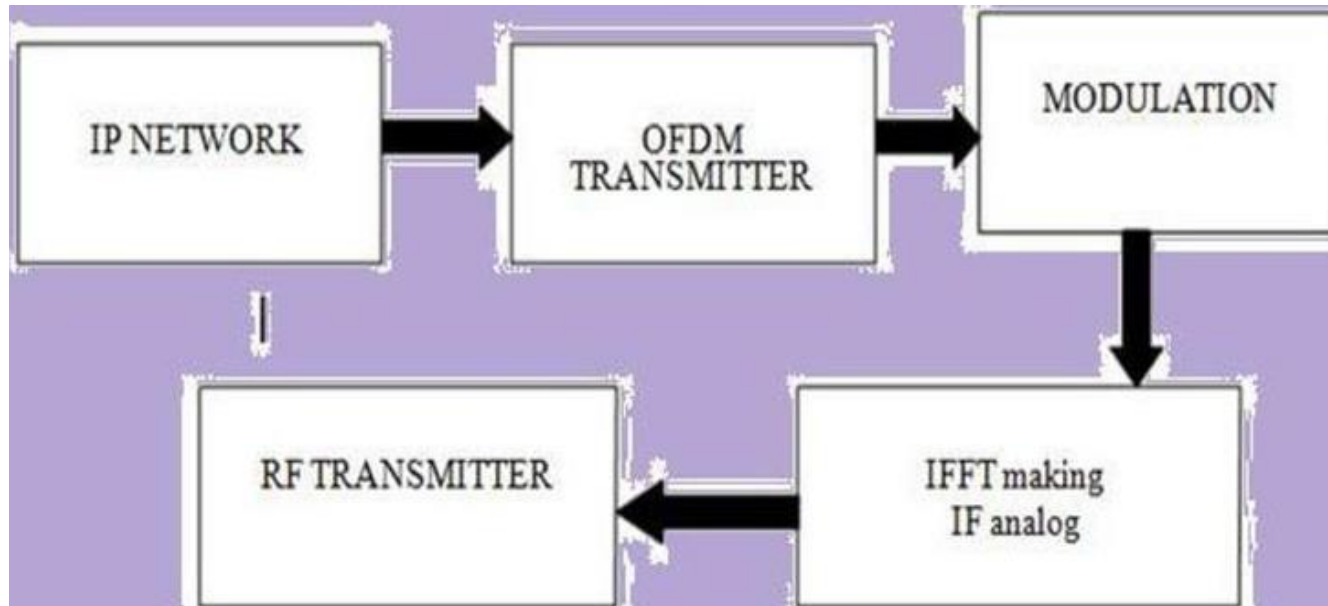




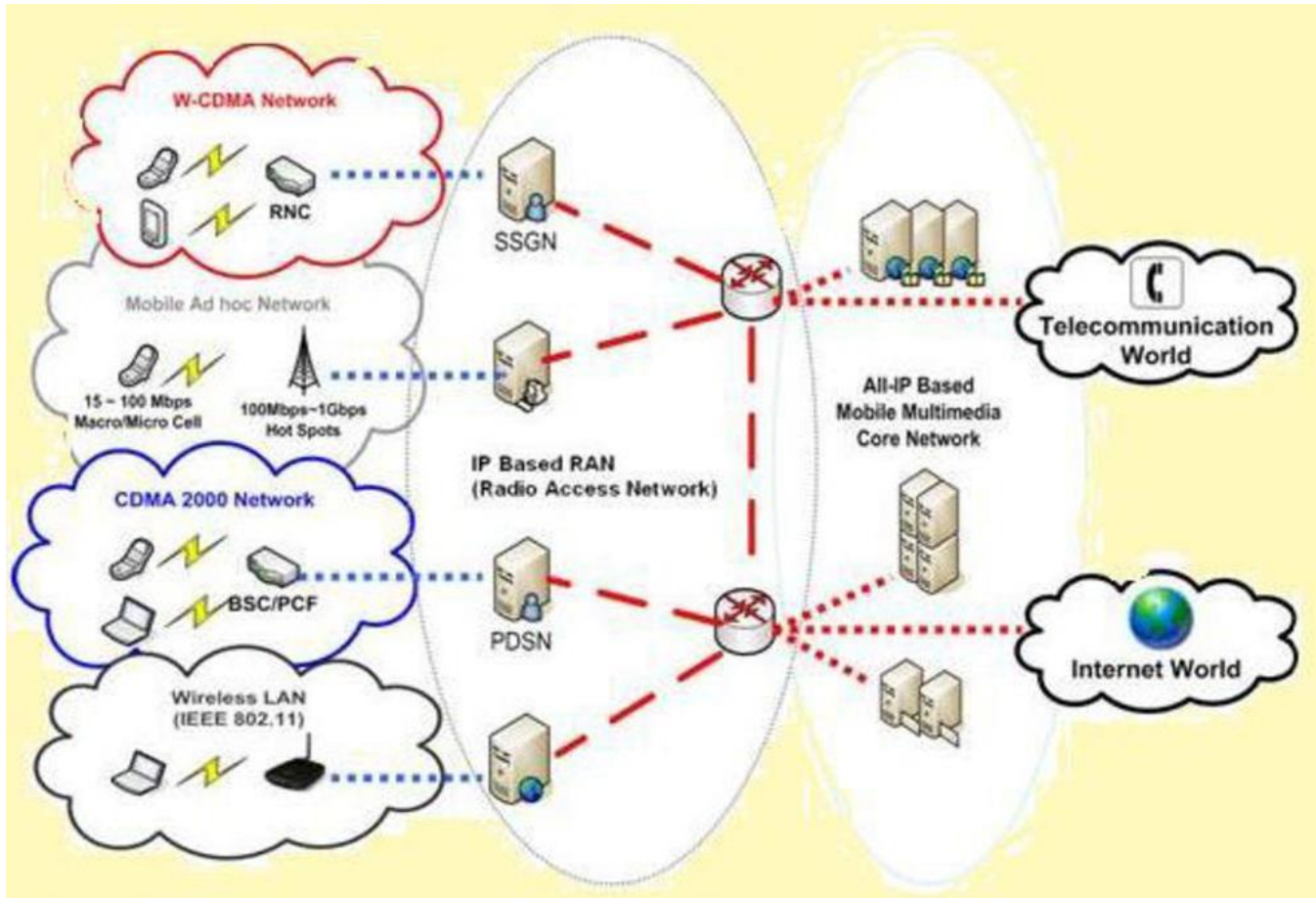
Features of 4G Technology

- ❖ Wider bandwidths and higher bit rates.
- ❖ Entirely packet-switched network.
- ❖ Global mobility and service portability.
- ❖ Support for previous wireless technologies.
- ❖ High internet speed. Tight network security.

Transmission System



4G Network





Technology used in 4G

- OFDM
- UWB
- Smart antennas
- IPv6



OFDM



(orthogonal frequency division multiplexing)

- OFDM works by splitting the radio signal into multiple smaller sub- signals that are then transmitted simultaneously at different frequencies to the receiver.
- By inserting a cyclic prefix between adjacent OFDM signal inter signal interference is virtually eliminated if the max.
- channel delay spread is less than the time interval of cyclic prefix. In OFDM the subcarrier pulse used for transmission is rectangular.



UWB(ultra wide band)

- An advanced technology that can be used in 4G technology.
- It is typically detected as noise. It can use any part of the frequency spectrum, which means that it can use frequencies that are currently in use by other radio frequency devices.
- It uses a frequency of 3.1 to 10.6 Hz.
- It uses less power, since it transmits pulse instead of continuous signal. Special antennas are needed to tune and aim the signal.



IPv6

- IPv6 means Internet Protocol Version 6.
- The Internet Protocol (IP) is the method or protocol which data is sent from one computer to another on the internet.
- Each computer (known as a host) on the Internet has at least one IP that uniquely identifies it from all other computers on the Internet.
- It includes 128 bits, which is 4 times more than 32bits IP address in IPv4.
- Understanding of IPv6 in 4G- - 32 bits IP address looks like this 216.37.129.9 all 4 sets are defined in different functions and usages erst set of the IP address (216.37.129.9) can be defined to be the home address" purpose.



QOS(quality of service)

- In wireless networks, Quality of Service (QOS) refers to the measure of the performance for a system reflecting its transmission quality and service availability.
- 4G is expected to have at least a reliability of 99.99%). In 4G QOS may be divided in following ways- A Transaction-level QOS describes both the time it takes to complete a transaction and the packet loss rate.
- Circuit-level QOS includes call blocking for new as well as existing calls.
- User Level QoS depends on user mobility and application type.



Software defined radio(SDR)



- A software defined radio is one that can be configured to any radio or frequency standard through the use of software.
- The phone should automatically switch from operating on a CDMA frequency to a TDMA frequency whenever it is required.
- Roaming can be an issue with different standards, but with a software defined radio, users can just download the interface upon entering new territory, or the software could just download automatically.



Application

- In traffic control.
- Multimedia - video services
- Telemedicine.
- Crisis Management Virtual Navigation



Thank
you

