**WIRELESS COMMUNICATION**

* **HISTORY OF WIRELSS COMMUNICATION:**

The idea of wireless communication ages long back with the understanding the concepts of electrical and magnetic properties during the early days by different cultures (like Chinese, Greek, Roman etc.) and the experiments and inventions carried out in the 17th and the 18th century by different individuals.

* **SOME IMPORTANT DATES:**

|  |  |
| --- | --- |
| 1864 | James Clerk Maxwell provided us with the concept of electromagnetic waves. |
| 1887 | Heinrich Hertz sent and received wireless waves, using a spark transmitter and a resonator receiver. |
| 1895 | Guglielmo Marconi sent morse radio signals over more than a mile. |
| 1901 | Marconi received the morse message "s" (...) sent across the Atlantic. |
| 1904 | J.A. Fleming patented the diode. |
| 1906 | * Lee DeForest patented the triode amplifier. * First speech wireless transmission, by Fessenden. |
| 1907 | * Commercial Trans-Atlantic Wireless Service, using huge ground stations: 30 x 100m antenna masts. * Beginning of the end for cable-based telegraphy. |
| WW I | Rapid development of communications intelligence, intercept technology, cryptography. |
| 1915 | Wireless voice transmission New York to San Francisco. |
| 1920 | Marconi discovers short wave radio, with wavelengths between 10 and 100 meters. |
| 1920 | First commercial [radio broadcast](http://www.wirelesscommunication.nl/reference/chaptr01/brdcsyst/abroadc.htm) in Pittsburgh. |
| 1921 | Police car [dispatch radios](http://www.wirelesscommunication.nl/reference/chaptr04/multi/fdma.htm) in Detroit. |
| 1930 | BBC began television experiments. |
| 1935 | First telephone call around the world. |
| WW II | Rapid development of radio technology. |
| 1968 | Carterphone decision. |
| 1974 | [FCC](http://www.wirelesscommunication.nl/reference/chaptr07/fcc.htm) (Federal Communications Commission) allocates 40 MHz for cellular telephony. |
| 1982 | European [GSM](http://www.wirelesscommunication.nl/reference/chaptr01/telephon/gsm/gsm.htm)(Global System for Mobile Communications) and Inmarsat established. |
| 1984 | * Breakup of AT&T. * Initial deployment of [AMPS](http://www.wirelesscommunication.nl/reference/chaptr01/telephon/amps.htm) (Advanced Mobile Phone System) cellular system. * RBOC (Regional Bell Operating Company) market in operations |
| 1986 | FCC allocates 5MHz extended band. |
| 1988 | TDMA (Time-division multiple access) voted as digital cellular standard in North America. |
| 1992 | GSM (Group Special Mobile) operable Germany D2 system. |
| 1993 | CDMA (Code Division Multiple Access) |
| 1994 | PDCC (Personal Digital Cellular Operable) in Tokyo, Japan |
| 1995 | CDMA operable in Hong Kong. |
| 1996 | Six Broad Band PCS (Personal Communication Services) licensed bands (120 MHz) almost reader 20 billion US dollar |
| 1997 | Broadband CDMA constructed and of the 3rd generation mobile. |
| 1999 | Powerful WLAN systems were evolved, such as Bluetooth. This uses 2.4 MHz spectrum. |

* **GENERATIONS OF WIRELESS COMMUNICATION:**
* **1G:**

This the first generation of wireless communication / mobile telecommunication and was launched in Japan by NTT (Nippon Telegraph and Telephone) in the year 1979. The main technological development that set aside the first-generation mobile phones from the other generations was the use of multiple cell sites and the ability to transfer calls from one site to another as the user travelled between cells during a conversation. It uses analog signals. It allows voice call in one country.

The disadvantages of first generation mobile phones are:

* Voice quality is poor.
* Low battery life.
* Size of the phones were not compact.
* Lack of security.
* Storage capacity was limited.
* Handoff reliability was poor.
* **2G:**

These were the second generation of mobile phones launched in Finland in the year 1991. These cellular devices were based on GSM standards. These devices were capable of message transfer (SMS – Short Message Service), transfer of multimedia like photos but not videos. The later versions of this generation are:

* *2.5G* - Based on GPRS (General Packet Radio Service) standards.
* *2.75G* – Based on EDGE (Enhanced data rates for GSM Evolution) standards.

The main feature of the devices of these generation was that they were of better quality as compared to the devices of the previous generation. Also, they provided better capacity then the 1G devices.

The disadvantages of 2G devices were:

* They were unable to handle complex data like videos because of which one cannot transfer videos.
* 2G devices required strong digital signals.
* **3G:**

The devices of these generations were introduced in the year 2000. The transmission rate was increased up to 2Mbits/s, that allowed user to send as well as receive large email files. The main feature that set aside the 3G devices from the 2G was the use of packet switching instead of circuit switching for data transmission.

Advantages of 3G devices:

* Mode of communication was fast.
* High speed web.
* Improved security.
* Video Conferencing
* Supports 3D gaming.
* Phone calls, TV streaming, Mobile TV, etc.

Disadvantages of 3G devices:

* Cost of 3G devices were than the devices of the previous generations.
* Required higher bandwidth.
* Size of the devices were not compact.
* **4G:**

These devices are the fourth generation of mobile communication that came in existence in the year 2010. These devices are based on LTE (Long Term Evolution) standards and offer features like

video calling, real time language translation and video voice mail.

It can provide speed from 100Mbps up to 1Gbps.

Advantages of 4G devices:

* Provides better quality of services.
* Improved security.

Disadvantages of this network are:

* Battery consumption is more.
* Implementation is difficult.
* Requirement required are expensive.

**Note:-**

The basic term used to describe 4G technology is **MAGIC**. Where:

1. M - Mobile multimedia
2. A - Anytime anywhere
3. A - Anytime anywhere
4. A - Anytime anywhere
5. G - Global mobility support
6. I - Integrated wireless solution
7. C - Customized personal service

* **5G:**
* It is referred as the fifth-generation technology standard for broadband cellular networks. Unlike other networks, machine to machine communication is possible. This network has the capability to perform Internet of Things(IOT) for smart home and smart city, connected cars etc. This generation of devices are based on lower cost, low battery consumption and lower latency than 4G equipment. The speed offered by this network is around 1Gbits/s as a result of which rate of data transfer is much faster as compared to previous versions.