**Mobile Communication Technologies**

Since the introduction of first commercial mobile phone in 1983 by Motorola, mobile technology has come a long way. Be it technology, protocols, services offered or speed, the changes in mobile telephony have been recorded as generation of mobile communication. Here we will discuss the basic features of these generations that differentiate it from the previous generations.

## 1G Technology

1G refers to the first generation of wireless mobile communication where analog signals were used to transmit data. It was introduced in the US in early 1980s and designed exclusively for voice communication. Some characteristics of 1G communication are −

* Speeds up to 2.4 kbps
* Poor voice quality
* Large phones with limited battery life
* No data security

## 2G Technology

2G refers to the second generation of mobile telephony which used digital signals for the first time. It was launched in Finland in 1991 and used GSM technology. Some prominent characteristics of 2G communication are −

* Data speeds up to 64 kbps
* Text and multimedia messaging possible
* Better quality than 1G

When GPRS technology was introduced, it enabled web browsing, e-mail services and fast upload/download speeds. 2G with GPRS is also referred as 2.5G, a step short of next mobile generation.

## 3G Technology

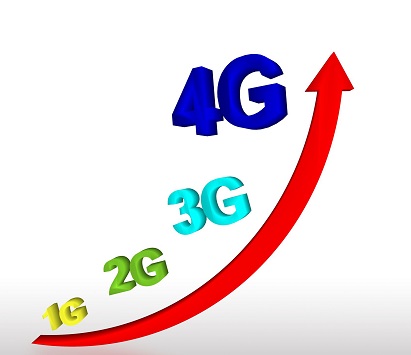
Third generation (3G) of mobile telephony began with the start of the new millennium and offered major advancement over previous generations. Some of the characteristics of this generation are −

* Data speeds of 144 kbps to 2 Mbps
* High speed web browsing
* Running web based applications like video conferencing, multimedia e-mails, etc.
* Fast and easy transfer of audio and video files
* 3D gaming

Every coin has two sides. Here are some downsides of 3G technology −

* Expensive mobile phones
* High infrastructure costs like licensing fees and mobile towers
* Trained personnel required for infrastructure set up

The intermediate generation, 3.5G grouped together dissimilar mobile telephony and data technologies and paved way for the next generation of mobile communication.



## 4G Technology

Keeping up the trend of a new mobile generation every decade, fourth generation (4G) of mobile communication was introduced in 2011. Its major characteristics are −

* Speeds of 100 Mbps to 1 Gbps
* Mobile web access
* High definition mobile TV
* Cloud computing
* IP telephony

**5G Technology**

5G is [next generation wireless network technology](https://www.cnn.com/2020/01/17/tech/5g-technical-explainer/index.html" \t "https://edition.cnn.com/interactive/2020/03/business/what-is-5g/_blank) that’s expected to change the way people live and work. It will be faster and able to handle more connected devices than the existing 4G LTE network, improvements that will enable a wave of new kinds of tech products. 5G networks began rolling out in the United States and around the world in 2018 and are still in their early days, but experts say the potential is huge.

Companies are racing to have the fastest or largest 5G networks. And [countries are competing](https://www.cnn.com/2019/11/01/tech/5g-china/index.html" \t "https://edition.cnn.com/interactive/2020/03/business/what-is-5g/_blank) to be the first to deploy fully functional, nationwide 5G. That’s because the benefits of the new technology are expected to fuel [transformative new technologies](https://www.cnn.com/2019/03/22/tech/5g-factory-manufacturing/index.html" \t "https://edition.cnn.com/interactive/2020/03/business/what-is-5g/_blank), not just for consumers but also for businesses, infrastructure and defense applications.

**Mobile Processors**

A smartphone's processor is unarguably one of the most important components. The performance of the processor directly impacts the phone's speed, gaming performance, user experience, and battery efficiency. A mobile phone with a fast processor will open all your favorite apps in a blink of an eye and your task will be done in no time.

**Wireless Technologies**

**Wi-Fi**

Wi-Fi is the means of getting a hold of the internet by identifying the available wireless equipment within the IEEE 802.11 requirement and counting several standards of wireless such as 802.11a, 802.11b and 802.11g. Wi-Fi is a tool specifically made for the electronics that use a little amount of electricity like mobiles. Personal Digital Assistants, notebooks/netbooks and a variety of accessories are intended to be compatible with Wi-Fi-. These days, we have mobiles that will have the capability of exchanging data from cellular networks to Wi-Fi networks during a phone conversation.

**WiMax**

WiMax is a protocol used in mobile-Internet. This Protocol helps telecommunication fields to enable the use of the Internet in a wireless and a mobile environment. Anyone can easily access the internet from anywhere. Internet access has different stages like dial-up Internet and broadband Internet. The latest stage of the all is the WiFi access or else the “wireless access”.

WiMax is known as the pioneer of the mobile environment internet access. “WiMax” has reduced the negative effects of the codeless Internet. The most common adverse effect of the wireless network is the violation of the speed of the connection. It is considered as a major problem for the decrease of the WiFi in the Internet community. WiMax gives you the guarantee of high speed which the other modes like broadband and cable Internet claim to offer. Anyone can use this facility as they only need to subscribe with a local “WiMax” provider to achieve this facility. Those providers will give the necessary equipment to enjoy the “WiMax” network environment.

|  |  |  |
| --- | --- | --- |
| **Features** | **WiMax** | **Wi-Fi** |
| Primary  Application | Broadband Wireless  Access | Wireless LAN |
| Frequency Band | Licensed/Unlicensed  2 G to 11 GHz | 2.4 GHz ISM |
| Channel  Bandwidth | Adjustable  1.25 M to 20 MHz | 25 MHz |
| Half/Full Duplex | Full | Half |
| Radio Technology | OFDM  (256-channels) | Direct Sequence  Spread Spectrum |
| Bandwidth  Efficiency | <=5 bps/Hz | <=0.44 bps/Hz |
| Modulation | BPSK, QPSK,  16-, 64-, 256-QAM | QPSK |
| FEC | Convolutional Code  Reed-Solomon | None |
| Encryption | Mandatory- 3DES  Optional- AES | Optional- RC4  (AES in 802.11i) |
| Mobility | Mobile WiMax  (802.16e) | In development |
| Mesh | Yes | Vendor  Proprietary |
| Access Protocol | Request/Grant | CSMA/CA |