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# The comparison between 1g , 2g , 3g , 4g

**and 5g**

# 1G :

**Year :** 1979 **Frequency :** 30 KHz **Avg speed :** 2 kbps **Bandwidth :** 2 kbps **Range :** N/A

**Use cases** : Analogue cellular technologies that were used were: Advanced Mobile Phone System (AMPS) Nordic Mobile Telephone (NMT) Total Access Communications System (TACS) developed in the United Kingdom and also some other parts of the world , analog system ,dropped calls ,giant cell phones

**Capacity** : Based on an analog technology known as Advanced Mobile Phone System (AMPS), 1G networks offered a channel capacity of 30KHz and a speed of 2.4kbps

**Capabilities :** 1G is the first generation of wireless cellular technology. 1G supports voice only calls. 1G is analog technology, and the phones using it had poor battery life and voice quality, little security, and were prone to dropped calls. The maximum speed of 1G technology is 2.4 Kbps

**Advantages :** Improve voice clarity The network uses the analog signal

Reduce noise in the line

Secrecy and safety to data and voice calls Consume less battery power **Disadvantages :** Poor voice quality

Large phone size Poor battery life No security Limited capacity

Poor hand-off reliability Very slow speed

# 2G :

**Year :** 1991 **Bandwidth :** 364 kbps **Frequency :** 1.8 GHz **Avg speed :** 40 kbps **Range :** 50 mi

**Use cases :** Designed to accommodate the growing number of mobile phones, 2G introduced cellular services like SMS, multimedia messaging, and digitally encrypted voice conversations. It also made more efficient use of the radio

frequency (RF) spectrum, so more devices could share the same frequency bands

**Capacity :** 2G systems offer increased voice quality and capacity over 1G systems. 2G systems provided voice and a limited data capacity of 9.6 to 14.4 Kbps

**Capabilities :** Data speeds of up to 64 kbps Use of digital signals instead of analog

Enabled services such as SMS and MMS (Multimedia Message) Provided better quality voice calls

It used a bandwidth of 30 to 200 KHz

**Advantages** : they are more efficient on frequency spectrum than 1G

hey introduced data services for mobile in form of SMS text messaging

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**Disadvantages :** Unable to handle complex data such as Videos

Required strong digital signals

If digital signals would weak then no network coverage in that specific area

# 3G :

**Year :** 2001

**Frequency :** 1.6-2 GHz **Bandwidth :** 3 Mbps **Avg speed :** 300 Kbps **Range :** 35 miles

**Use cases** : Mobile networks. The 3G standard is most commonly used within mobile networks and their radio access technology platforms

Mobile phones/smartphones Mobile broadband routers Computer modems

Cellular backup Telematics

**Capacity :** The average speed of 3G connections is 3 megabits per second (Mbps), which was 30 times faster than 2G average speed of 100 kilobits per second (or 0.1 Mbps). Some 3G connections could achieve speeds of 7Mbps

**Capabilities** : Speed of up to 2 Mbps Increased bandwidth and data transfer rates Send/receive large email messages

Large capacities and broadband capabilities

**Advantages :** Faster data transfer rate

Availability of fixed

Multimedia services are available

.Anywhere access to the internet

.Cheap call rate in worldwide Security and reliability are more Always online devices

**Disadvantages :** Needs different handsets Insufficient bandwidth

Power consumption is high

Require closer base station and are expensive Spectrum license cost

High expenses of 3G phones

# 4G :

**Year :** 2009 **Frequency :** 2-8 GHz **Bandwidth :** 100 Mbps **Avg speed :** 25 Mbps **Range :** 10 miles

**Use cases :** A 4G system must provide capabilities defined by ITU in IMT Advanced. Potential and current applications include amended mobile web access, IP

telephony, gaming services, high-definition mobile TV, video conferencing, and 3D television

**Capacity :** Each generation of wireless cellular technology has introduced increased bandwidth speeds and network capacity. 4G users get speeds of up to 100 Mbps, while 3G only promised a peak speed of 14 Mbps

**Capabilities** : 4G users get speeds of up to 100 Mbps, while 3G only promised a peak speed of 14 Mbps. With 4G download speeds, wireless users can stream high- definition video and audio

**Advantages :** Better spectral efficiency High speed

High capacity High bandwidth

Tight network security Low cost per bit

**Disadvantages :** The battery uses is more Hard to implement

Need complected hardware High data prize for consumers Need different handsets Power consumption is high

# 5G :

**Year : 2019 Frequency :** 3-30 GHz **Bandwidth :** 10 GHz **Avg speed :** 150 Mbps **Range :** 1000 ft

**Use cases** : Broadly speaking, 5G is used across three main types of connected services, including enhanced mobile broadband, mission-critical communications, and the massive IoT. A defining capability of 5G is that it is designed for forward compatibility—the ability to flexibly support future services that are unknown today

**Capacity :** 5G has more capacity than 4G. 5G is designed to support a 100x increase in traffic capacity and network efficiency

**Capabilities :** 5G wireless technology is meant to deliver higher multi-Gbps peak data speeds, ultra low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. Higher performance and improved efficiency empower new user experiences and connects new industries

**Advantages :** It posses a very high speed High capacity

More efficient

Longer battery life High security

High data rates Low cost per bit

Availability at low cost Dynamic information access

**Disadvantages :** Development infrastructure need high cost

Security and privacy issue yet to be solved A 5G smartphone is costly

This technology is still under process and research on its viability is going on