

Cellular Networks – 5G



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Previous Generations of Mobile Network

Before we leap into the future with the 5G technology, here's what the previous generations of the mobile network were like.

First Generation (1G): The first-ever implementation of the mobile network with the delivery of analog voice.

Second Generation (2G): The introduction of digital voice.

Third Generation (3G): The implementation and mass usage of mobile data.

Fourth Generation (4G): An enhancement to the era of mobile broadbands.

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- The first wireless technology, the analog cell phone, appeared in the US in the 1980's.
- The system, which we'll call 1G, worked a lot like your old AM/FM radio.
- Callers were each given their own small slice of the dial, and there was a limited number of users that could be on any given network at a time.
- Much like with radio stations, cell phone calls frequently picked up interference from other callers.
- Were likely to become staticy if you were too far away from the cell phone towers.

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- In the 90's, the introduction of 2G technologies brought about the first generation of the digital cellular calls.
- Digital calls means turning your voice into 0s and 1s and compressing it
- This meant more customers could use a single cellular network.
- 2G also allowed data transmission for the first time, making text and picture messaging possible.

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- 3G was mostly about speed.
- From 2G's top 200 kilobytes per second speeds, 3G shot up to a few megabits per second
- Making third generation (3G) **250 times** faster than its predecessor.
- Rocketing consumer demand for internet browsing and data downloading a faster more robust network was needed.
- This would only increase exponentially in wireless' future.

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- 4G scaled data velocity to up to hundreds of megabits, and even gigabit-per-second speeds.
- 4G technology promised service being able to deliver download speeds of 100 Mbit/s for high mobility devices (such as when you're in the car or on a train), and around 1Gbit/s for stationary or low-mobility devices.

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- The first 4G phones in the US appeared in 2010
- Followed closely by a host of 4G applications - from Uber to Whatsapp

So what is LTE

- Short for “Long Term Evolution”, LTE wasn't technically 4G at first.
- Early LTE didn't satisfy the technical requirements or speeds to be considered actual 4G. There were mainly for two reasons.
- **One**, the cell phones of the day didn't have enough antennae to pick up the signals
- **Two**, there was a notable lack of carrier aggregation - a way that operators add different radio channels together to create quicker speeds for users.

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When LTE technology was refined and advanced

- Speeds were increased to allowed the technology to be called a 4G technology.
- 5G up the ante significantly.
- 5G wireless is a completely separate technology
- It can move data faster, in a more responsive manner
- Will connect a whole lot more devices at the same time.

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- AT&T will shut down 3G networks in February 2022.
- Verizon will pull the plug on 3G on December 31, 2021
- T-Mobile will shut down Sprint 3G networks on March 31.
- T-Mobile's own 3G networks will be gone by July 1.

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What Devices will no longer function:

Medical Equipment (Life Alert)

Security Monitoring (Alarm Equipment)

Older Cellular Phone (3G)

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Where did the extra Bandwidth come from for 4G & 5G

Analog TV stations (Started switching to Digital TV 2000)

800 Mhz Cordless phones

Older Cellular Phone (3G)

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- 5G is 10 times faster than 4G, promising better wireless internet access. It's also expected to put the Internet revolution in high gear.
- 5G stands for fifth-generation cellular network technology.
- 5G can deliver speeds of around 50 megabits per second, up to more than 1 gigabit per second.
- A gigabit per second connection allows you to download a high-definition movie in less than a minute.
- Does this mean no more bad cell connections in crowded places? The increased bandwidth will help, but just as increasing the number of lanes on highways does not always reduce traffic jams, as [more people use the expanded highways](#),
- 5G is likely to carry a lot more traffic than 4G networks, so you still **might not** get a good connection sometimes.

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What Exactly is 5G?

- The 5th generation of mobile network or more commonly known as 5G the new global standard.
- Just like its predecessors 1G, 2G, 3G, and 4G; 5G offers a completely different spectrum of the network.
- Ensuring that it can connect to everyone and bring forth all the devices, and machines together.

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Flavors of 5G

5G can **use low-, mid- and high-band** frequencies, each with advantages and disadvantages.

Lower-frequency waves can travel **farther** but are **slower**.

Using higher frequency waves means information can travel **faster** but these waves can only go **limited distances**.

Higher-frequency 5G can achieve **gigabit-per-second speeds**, which promises to render ethernet and other wired connections obsolete in the future.

Currently, the higher frequency comes at a higher cost and thus is deployed **only** where it's most needed: in crowded urban settings, stadiums, convention centers, airports and concert halls.

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The 5G technology is primarily meant for delivering **multi-Gbps data speed** along with **ultra-low Latency, reliability,** and **massive network capabilities.**

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Which phones are 5G Capable

- **Apple**
 - iPhone 12
 - iPhone 13
- **Android**
 - Samsung Galaxy S21 Ultra
 - Google Pixel 5a
 - OnePlus 9 Pro
 - Samsung Galaxy S21 Plus
 - Samsung Galaxy A32 5G
 - Samsung Galaxy A52 5G

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Problems with 5G

The issues reside between the **Federal Communications Commission (FCC)** and the **Federal Aviation Administration (FAA)** over the rollout of AT&T and Verizon 5G C-band service.

The PAUSE button was pushed in **January 2022**, with the wireless carriers offering accommodations that appear to mollify the concerns of commercial air carriers at the U.S.'s largest airports.

The Issue:

The impact of wireless signals in the **3.7 to 3.98 GHz range** bumping up against radar/radio altimeters that live in the **4.2 to 4.4 GHz environment**.

Causing those altimeters to give potentially false readings to pilots and the various aircraft systems they support.

Endangering aviation safety, particularly during takeoff and landing in low visibility conditions.

The apparent solution on the horizon is to adopt a version of accommodations in place at France's largest airports and in Canada—powering down C-band base stations near runways and aiming wireless tower antennas downward at steeper angles.

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Fact check: 5G technology is not linked to coronavirus

The claim: 5G has been increasing and even causing the spread of coronavirus across the globe:

[Viral posts on social media](#) alleging that COVID-19 is either caused or exasperated by 5G technology have spread.

[Arsonists in several countries have burned down 5G cell towers](#), on a belief they help spread the new coronavirus.

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China vs. The United States In The Race For 5G | The Daily Show – Bing

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QUESTIONS

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