Everything you need to know about 5G.

Here is where you find 5G technology explained—how 5G works, why 5G is important and how it's changing the way the world connects and communicates. At Qualcomm, we invented the foundational breakthroughs that make 5G possible.

Q: What is 5G?

A: 5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices.

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.

OnQ Blog: 5G in 101 Seconds > More 5G Resources >

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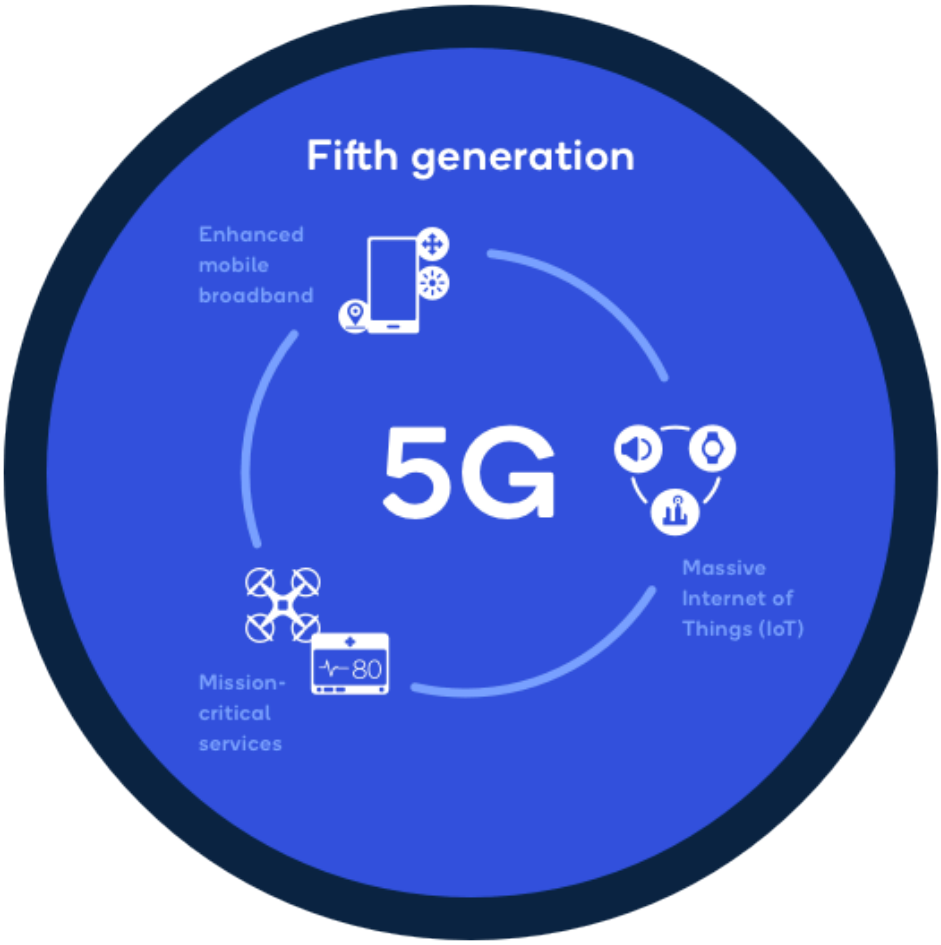
Q: What underlying technologies make up 5G?



Q: What are the differences between the previous

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What is 5G? How's 5G Different? 5G Economic Impact? Where's 5G being used? How fast

generations of mobile networks and 5G?

A: The previous generations of mobile networks are 1G, 2G, 3G, and 4G.

First generation - 1G
1980s: 1G delivered analog voice.

Second generation - 2G
Early 1990s: 2G introduced digital voice (e.g. CDMA- Code Division Multiple Access).

Third generation - 3G
Early 2000s: 3G brought mobile data (e.g. CDMA2000).

Fourth generation - 4G LTE
2010s: 4G LTE ushered in the era of mobile broadband.

1G, 2G, 3G, and 4G all led to 5G, which is designed to provide more connectivity than was ever available before.

5G is a unified, more capable air interface. It has been designed with an extended capacity to enable next-generation user experiences, empower new deployment models and deliver new services.

With high speeds, superior reliability and negligible latency, 5G will expand the mobile ecosystem into new realms. 5G will impact every industry, making safer transportation, remote healthcare, precision agriculture, digitized logistics — and more — a reality.

Qualcomm's 5G Timeline >

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Q: How is 5G better than 4G?

• 5G has significantly lower latency than 4G
• 5G is a unified platform that is more capable than 4G
• 5G uses spectrum better than 4G

5G is a unified platform that is more capable than 4G.
While 4G LTE focused on delivering much faster mobile broadband services than 3G, 5G is designed to be a unified, more capable platform that not only elevates mobile broadband experiences, but also supports new services such as mission-critical communications and the massive IoT. 5G can also natively support all spectrum types (licensed, shared, unlicensed) and bands (low, mid, high), a wide range of deployment models (from traditional macro-cells to hotspots), and new ways to interconnect (such as device-to-device and multi-hop mesh).

5G uses spectrum better than 4G.
5G is also designed to get the most out of every bit of spectrum across a wide array of available spectrum regulatory paradigms and bands—from low bands below 1 GHz, to mid bands from 1 GHz to 6 GHz, to high bands known as millimeter wave (mmWave).

5G is faster than 4G.
5G can be significantly faster than 4G, delivering up to 20 Gigabits-per-second (Gbps) peak data rates and 100+ Megabits-per-second (Mbps) average data rates.

5G has more capacity than 4G.
5G is designed to support a 100x increase in traffic capacity and network efficiency.[1]

5G has lower latency than 4G.
5G has significantly lower latency to deliver more instantaneous, real-time access: a 10x decrease in end-to-end latency down to 1ms.[1]

Podcast: How 5G is different than 4G >

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Q: How and when will 5G affect the global economy?

A: 5G is driving global growth.

- $13.1 Trillion dollars of global economic output
- 22.8 Million new jobs created
- $265B global 5G CAPEX and R&D annually over the next 15 years

Through a landmark 5G Economy study, we found that 5G's full economic effect will likely be realized across the globe by 2035—supporting a wide range of industries and potentially enabling up to $13.1 trillion worth of goods and services.

This impact is much greater than previous network generations. The development requirements of the new 5G network are also expanding beyond the traditional mobile networking players to

defined in the future. Only time will tell what the full "5G effect" on the economy is going to be.

Read: Economic Impact Report >

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Q: How will 5G affect me? ⊕

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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.

Enhanced mobile broadband

In addition to making our smartphones better, 5G mobile technology can usher in new immersive experiences such as VR and AR with faster, more uniform data rates, lower latency, and lower cost-per-bit.

Mission-critical communications

5G can enable new services that can transform industries with ultra-reliable, available, low-latency links like remote control of critical infrastructure, vehicles, and medical procedures.

Massive IoT

5G is meant to seamlessly connect a massive number of embedded sensors in virtually everything through the ability to scale down in data rates, power, and mobility—providing extremely lean and low-cost connectivity solutions.

Download: 5G use cases >

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Q: How do consumers use 5G? ⊕

Q: How do businesses use 5G? ⊕

Q: How do cities use 5G? ⊕

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500% faster than 4G LTE

Q: How fast is 5G?

A: 5G is designed to deliver peak data rates up to 20 Gbps based on IMT-2020 requirements. Qualcomm Technologies' flagship 5G solutions, the Qualcomm® Snapdragon™ X65 is designed to achieve up to 10 Gbps in downlink peak data rates.

But 5G is about more than just how fast it is. In addition to higher peak data rates, 5G is designed to provide much more network capacity by expanding into new spectrum, such as mmWave.

5G can also deliver much lower latency for a more immediate response and can provide an overall more uniform user experience so that the data rates stay consistently high—even when users are moving around. And the new 5G NR mobile network is backed up by a Gigabit LTE coverage foundation, which can provide ubiquitous Gigabit-class connectivity.

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Q: How does 5G work?

Q: Does 5G change my home internet service?

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Is 5G available now?

A: Yes, 5G is already here today, and global operators started launching new 5G networks in early 2019. Also, all major phone manufacturers are commercializing 5G phones. And soon, even more people may be able to access 5G.

5G has been deployed in 60+ countries and counting. We are seeing much faster rollout and adoption compared with 4G. Consumers are very excited about the high speeds and low latencies. But 5G goes beyond these benefits by also providing the capability for mission-critical services, enhanced mobile broadband and massive IoT. While it is hard to predict when everyone will have access to 5G, we are seeing great momentum of 5G launches in its first year and we expect more countries to launch their 5G networks in 2020 and beyond.

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Q: When will 5G be available to more people?

5G phones are already available at affordable prices. In fact, 5G is now offered across all tiers of the current portfolio of Qualcomm Snapdragon mobile platforms, from 8- to 4-series. This makes 5G accessible to more than 3.5 billion smartphone users globally.

How 5G will change your life >

Q: Do I need a new phone if I want 5G?

There are several new mobile phones available that are designed to support 5G, and multiple carriers across the world support the 5G wireless network. As the 5G rollout timeline progresses, more smartphones and carrier subscriptions will become available, as 5G technology and 5G compatible devices becoming more mainstream.

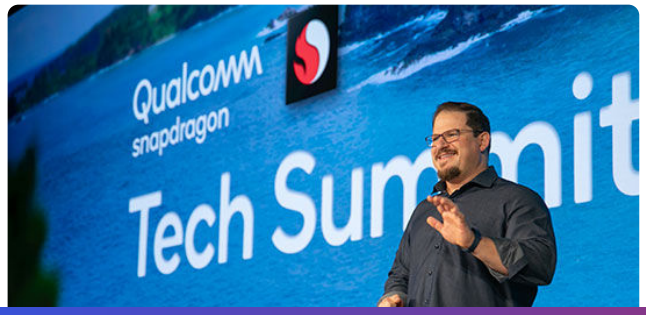
Q: Where can I learn more about 5G and how it works?

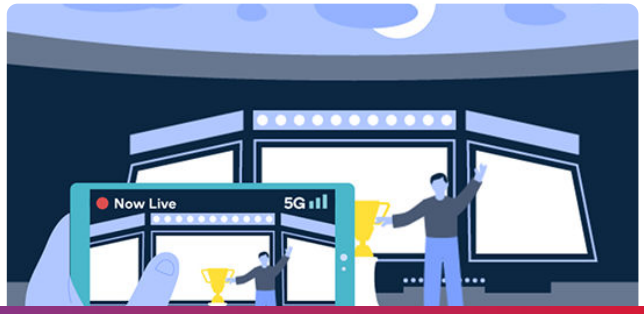
The Qualcomm® Wireless Academy (QWA) offers a wide array of 5G training courses for advanced wireless engineers, non-engineers new to 5G, and everyone in between. Courses are offered through a flexible eLearning format, so you can learn at your own pace and from anywhere in the world.

If you're new to 5G, we recommend the two-hour 5G Primer for non-engineers.

Visit Qualcomm Wireless Academy ↗

The latest 5G news from Qualcomm





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from 5G in 2020 and beyond [video]

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[1] Numbers are based on IMT-2020 requirements based on the ITU vision.
[2] Cisco Visual Network Index: Global Mobile Data Traffic Forecast Update, 2017 - 2022.
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Qualcomm is enabling a world where everyone and everything can be intelligently connected. We are efficiently scaling the technologies that launched the mobile revolution to the next generation of connected smart devices.

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