
T-MOBILE
FOR BUSINESS
5G Educational
Brochure

Contents

The pitch

America's largest 5G network

To be ready to compete in today's evolving business environment, businesses need an incredible nationwide 5G network. The improved connectivity, reliability, and speeds the 5G era will provide could help business leaders challenge the status quo, gain new competitive advantages, and embrace new efficiencies that impact the bottom line.

With 5G in all 50 states and nearly 6,000 cities and towns, businesses can rely on our coverage to work for them. Plus, now that Sprint is part of T-Mobile, we have the largest and most reliable 5G coverage. By combining our networks, we have a network with more towers, more engineers, and more bandwidth than ever before to keep businesses and their employees connected. Over the next six years, our goal is to increase capacity over 14x what we have today to create the highest capacity network in U.S. history.

Note: 5G coverage is not available in some areas and a 5G capable device is required for access. Also, while 5G access won't require a certain plan or feature, some uses/ services might. There are different types of 5G and not all use cases are currently available or will be available in all areas.

The future of 5G

We're taking steps to build a 5G network that will deliver unprecedented reach and reliability, and the highest capacity in history. We plan to provide:

- Massive capacity: Over the next six years our capacity will increase 14x over what we have today.
- 15x faster: Our network will be 8x faster than current LTE in just a few years, and 15x faster in the next six years.
- 99% with 5G: We already have the largest 5G network, and within the next 6 years we'll provide 5G to 99% of Americans. This means T-Mobile's 5G is slated to cover more businesses and employees than anyone else in the country.

Our network

T-Mobile's network is comprised of low-band, mid-band, and high-band millimeter wave (mmWave) spectrum bands. What does that mean for our customers?

Low-band spectrum is the most cost-effective way to provide coverage. Deploying 5G on 600 MHz has enabled us to expand coverage and keep the cost low for customers.

Low-band **Speed:** Average **Coverage:** Hundreds of square miles	• Low-band consists of spectrum under 1 GHz, which includes our 600 MHz spectrum. • Our powerful 600 MHz spectrum is the foundation of our 5G network. No signal goes farther or is more reliable. • Low-band spectrum can cover hundreds of square miles from the tower, so we have a wide footprint. The signal also penetrates walls and deep inside buildings, so it's better indoors. • This spectrum is good for suburban and rural areas, as well as wide open spaces.
Mid-band **Speed:** Fast **Coverage:** A broad area	• Mid-band consists of spectrum between 1 GHz and 6 GHz. • Mid-band acquired from Sprint being utilized for 5G is 2.5GHz. • Mid-band has the benefit of being fast while also covering a much larger area than mmWave. This spectrum is good for indoor coverage, similar to low-band. The breadth of coverage is vast and still delivers fast speeds. • This spectrum is best for urban and suburban areas where higher capacity and faster speeds are required.
High-band (mmWave) **Speed:** Fastest **Coverage:** A couple city blocks	• mmWave consists of spectrum above 24 GHz. It is also referred to as high-band. • mmWave is incredibly fast, but the spectrum can only travel a few city blocks from the tower and can be disrupted by objects like trees, walls, and even glass windows. • We currently have 5G mmWave available in New York City, Los Angeles, Las Vegas, Dallas, Cleveland, Miami, and Atlanta. • This spectrum is best for situations where high capacity, low latency, and speed are needed, like in densely populated outdoor areas or indoor settings such as stadiums, where a single cell spot can cover many people.

What is 5G?

5G is the next generation of wireless network technology that will eventually fuel innovation and transform the way we live, work, and play.

The fifth generation (5G) of network technology has the potential to positively impact everything from entertainment and gaming to education and public safety. Over time, 5G is expected to deliver faster download speeds, real-time responses, and enhanced connectivity, giving businesses the potential to experience new, innovative technologies.

The 3rd Generation Partner Program (3GPP), which develops global standards for the telecommunications industry, has identified Enhanced Mobile Broadband (eMBB), Critical IoT, and Massive IoT as three categories of use cases that 5G could help address as more advanced networks and compatible devices become available.

- eMBB can be leveraged by businesses today for higher capacity and faster speeds. Examples include fixed wireless access, video surveillance, enhanced experiences in brick-and-mortar retail locations, vehicular infotainment, and more.
- Critical IoT will enable ultra-reliable low-latency communications in the future. Examples of this will include smart grids, traffic management, remote and autonomous drones and robotics, telemedicine, mobile bio-connectivity, interconnected transport, autonomous vehicles, and more.
- Massive IoT will enable massive machine-type communications. This is already in use today on 4G networks but will become more advanced on 5G networks. Examples of this include inventory optimization, smart home and health monitoring, and wearable communications.

5G vs 4G

5G is a transformative technology, with more advanced capabilities than 4G offer. Today, we are just beginning to experience these capabilities. In the future, 5G will be even more reliable, secure, efficient, and fast. It could eventually provide near-zero lag and enable IoT devices that will never need to be charged. It will also help employers ensure all employees and customers have access to tools they need for maximum performance and reliability. Together with Sprint's network, only T-Mobile has enough of the spectrum that's currently available to bring 5G to its full potential.

The benefits of 5G

The features and benefits of 5G will evolve over time, with transformative changes coming over the next several years as standards for eMBB, Critical IoT, and Massive IoT use cases are developed by 3GPP.

5G today

Most reliable 5G coverage: We have amazing 4G LTE coverage, and with the addition of 5G, business customers get an even better experience. Our nationwide 5G network's foundation is our powerful 600MHz signal, and there is no 5G signal that goes farther or is more reliable. Plus, there is no better signal for indoor and outdoor coverage. In fact, the signal travels far and deep to go through walls and reach into buildings, unlike mmWave which can be blocked by leaves, raindrops, and even your hand.

Increasing capacity: Now that Sprint is part of T-Mobile, we're combining our networks and resources to give customers access to the largest 5G network out there, with more coverage and bandwidth to keep businesses and employees connected. We've already started rolling out faster speeds and higher capacity nationwide, with the launch of 2.5 GHz in select cities, including Philadelphia, and New York City.

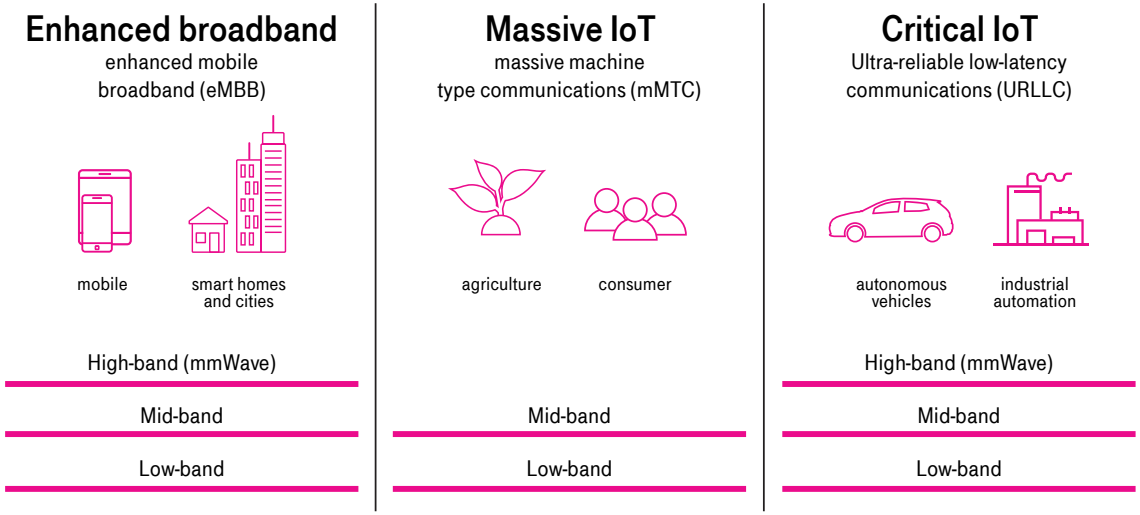
Current coverage: T-Mobile's 5G covers thousands and thousands of cities and towns across the U.S., and all of Puerto Rico.

Visit T-Mobile.com/coverage/4g-lte-5g-networks to view our current 5G map.

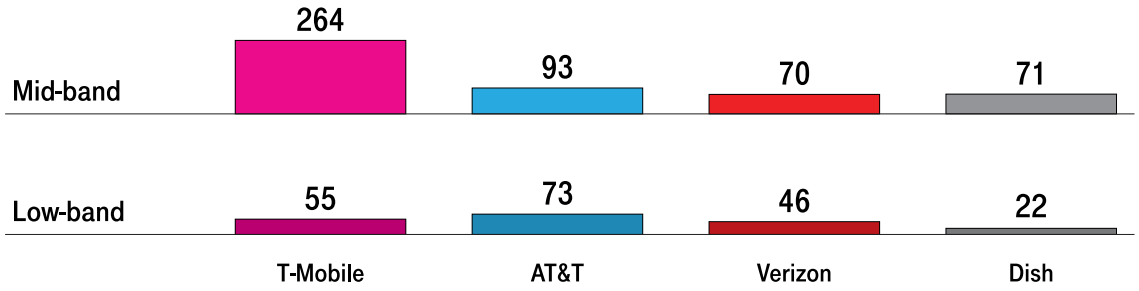
Clear spectrum: T-Mobile's 5G has launched on brand new spectrum. This allows T-Mobile to bring on new 5G customers without the same impacts some carriers may see from repurposing LTE capacity.

Primary 5G use case categories

Spectrum needed to execute



T-Mobile controls licenses for an average of 319 MHz of low- and mid-band spectrum nationwide, which is nearly 2x more than AT&T and nearly 3x more than Verizon. Other carriers will need to acquire more mid-band spectrum at auction later this year and then clear it to broaden their 5G coverage.



Why 5G will matter in the future

5G will be the most transformative tech of our lifetime

- For businesses, 5G will unleash a whole new mobile Internet experience.
  - With near real-time responses, 5G will unleash new manufacturing automation, predictive maintenance, better data analytics, new energy efficiencies, and massive IoT connectivity. This translates into improved mobile video conferences, new AR/VR applications, new robotics, new network configurations (SD-WAN/in-building), better location tracking, and a move towards edge computing.
  - 5G will also unlock significantly improved battery life, which will benefit IoT-based applications.
  - 5G will also unlock significantly improved battery life, which will benefit IoT- based applications. Sensors can be connected to 5G networks and used for decades in cities, farms, factories, and machinery to enable smart infrastructures.
- Just like 4G, 5G will create massive economic growth and unleash innovations that are only limited by our imaginations.
  - 4G LTE enabled the creation of new companies and industries we couldn't have even imagined before, like Uber, SnapChat, Venmo, etc.
  - 5G will have a major impact on industries like transportation, healthcare, and emergency services who can optimize and benefit from mobile-first approaches

Improved speed: Similar to LTE, 5G will continue to get faster over time. Since the average speed will be much higher, the overall speed experience will be improved. Our network will be 8x faster than current LTE in just a few years, and 15x faster in the next six years.

Improved density: Far greater than 4G, 5G's bandwidth will provide the wide-scale, ubiquitous coverage necessary for devices (from phones to cars) to interface with one another and their surroundings.

Reduced latency: 5G opens the ability for the network to process data with short, almost non-existent lag time, which could eliminate barriers for use cases that require near-instantaneous feedback like self-driving cars or virtual reality. (Imagine how an even seconds-long delay could affect the safety of your ride.)

Innovation: 5G allows for wide-ranging versatility, rather than one or two features, making the technology truly revolutionary and capable of not only improving a dizzying array of operations but enabling entirely new ones. In the future, a 5G network will power interconnected cities, autonomous cars, and automated manufacturing, which are just a few examples of applications that 4G can't fully support today.

Why T-Mobile: points of differentiation

T-Mobile is uniquely positioned to help businesses seize the 5G opportunity

With 5G in all 50 states and nearly 6,000 cities and towns, businesses can rely on our coverage to work for them.

- We've been the leader in network innovation in the mobile industry for years and have the "firsts" to prove it:
  - First in the world to light up 5G and LTE in 600 MHz
  - Completion of the world's largest virtualized Evolved Packet Core (EPC), the framework for converging voice and data on 4G LTE networks
  - First 5G on 600 MHZ call
  - First to launch caller verified technology
  - First to deploy speed-boosting, advanced LTE technologies like 4x4 MIMO and 256 QAM
  - First to deploy a nationwide narrowband IoT network
- Our 5G isn't just in parts of urban cities. It reaches small towns and rural areas to keep companies of all sizes connected, from agricultural farms to Fortune 100 businesses.
- We're customer obsessed. We're dedicated to keeping costs fair, eliminating hassle, and providing amazing care from a dedicated Team of Experts. For the third year in a row, we're honored to be awarded #1 in Business Customer Satisfaction with Very Small, Small/Medium, and Large Enterprise Wireless Service by J. D. Power. Ranked based on feedback from the people who matter most: our customers.
- We're committed to using our 5G network for good through programs like Connecting Heroes and Project 10Million.
- T-Mobile is investing billions in its network for the future, in order to meet our 5G goals:
  - Massive capacity: Over the next six years our capacity will increase 14x over what we have today.
  - 15x faster: Our network will be 8x faster than current LTE in just a few years, and 15x faster in the next six years.
  - 99% with 5G: We already have the largest 5G network, and within the next 6 years we'll provide 5G to 99% of Americans.

Competitive landscape

Now that Sprint has joined the T-Mobile family, we have the largest and most reliable 5G coverage—and we've got the stats to back it up. By combining our networks, we have a network with more towers, more engineers, and more bandwidth than ever before. With clear spectrum and the right mix of low-band, mid-band, and high-band millimeter wave (mmWave) spectrum bands, we're set up for long term success against Verizon and AT&T.

	T-Mobile	Verizon	AT&T
Population percentage	65% of Americans	3% of Americans	54% of Americans
Population covered	225 million	Approximately 4 million	179 million
Cities	Nearly 6,000 cities and towns	Parts of 35 cities	355 markets (includes small counties)
Square miles	More than 1 million SQMI	Covers 37 SQMI	More than 138K SQMI
Low- and mid-band holdings ranking	#1	#3 (T-Mobile has 3x more)	#2 (T-Mobile has 2x more)
High-band (mmWave) holdings ranking	#2	#1	#3
Speed ranking	#3	#1	#2
Three bands deployed	Yes	No	No
Two bands deployed	Yes	No	Yes
Wide open spectrum on all bands	Yes	No	Yes
Building of the layer cake	Bottom up	Top down	Bottom up
Primary spectrum being utilized to support 5G	600 MHz (covers hundreds of square miles from a single tower)	mmWave (covers less than 1 square mile)	800 MHz (covers hundreds of square miles from a single tower)
Indoor & outdoor coverage	Works indoors and outdoors	Only works outdoors; signal easily blocked	Works indoors and outdoors
DSS & re-farming needs	None; built on dedicated spectrum	No clear spectrum; must take from LTE through re-farming or DSS	No clear spectrum; must take from LTE through re-farming or DSS
Rate plans & costs	Included at no extra cost	$10/month per line for customers on top tier plans only; customers on lower tier plans are charged more. Waiving fees for a limited time on select plans.	Only available on the highest priced plans
5G network expansion	Adding nationwide 5G coverage with additional 600 MHz and 2.5 MHz spectrum, which will continue to improve 5G coverage and speed.	Nationwide 5G announcement planned for fall of 2020. Potential for a fastest 5G claim.	Expanded 5G coverage expected in the fall of 2020 in time for NPI. Will slow down speeds as it will not be mmWave coverage. Could launch a national 5G map at this time.
Partnerships	5G innovation lab launch with continued partnership announcements	Continue to announce 5G innovation and partnerships for 5G innovation credibility	Partnership with Stadia extended to mobile. Could be positioning their edge computing (business offering) ability with this partnership. Leaning into FirstNet progress with the first federally approved ad. Potential to expand messaging to "5G on America's most trusted network by first responders."

Source: Carrier Network Factbook: 1Q 2020

5G-enabled devices

We offer several 5G-enabled devices from multiple manufacturers at various price points so that all business customers can access our 5G network. And in 2020, we expect at least 15 new devices to launch that can utilize our 5G network, as well.

Note: Older devices will not get a 5G signal. Some use cases, like 5G IoT, will not be achievable until 5G-enabled IoT devices have been introduced into the market. Compatible 5G devices may access low-, mid-, or high-band spectrum, or a combination of the three.

As of June 2020, we offer several 5G-endabled devices:

Samsung:
- Galaxy S20 Ultra
- Galaxy S20+
- Galaxy S20
- Galaxy A71 5G
- Note 10+ 5G

LG:
- V60 ThinQ 5G Dual Screen
- V60 ThinQ 5G

One Plus:
- 7TPRO 5G McLaren (Exclusive to T-Mobile)
- 8 5G

T-Mobile for Business: our ways in

Network reliability

There isn't a signal that goes further or is more reliable than T-Mobile's 5G on 600 MHz. Broad coverage will open new opportunities for connectivity in rural and suburban fringe areas, and improve connectivity for last mile offices, employees, and customers who struggle with reliability today. With better in-building penetration than high-band and nationwide reach, our network will provide the foundation for the advanced mobility that will drive innovation.

Workforce mobility

5G will create hyper-connected businesses, connecting everything. T-Mobile's nationwide 5G will offer a truly mobile experience, eventually allowing the workforce to do businesses from virtually anywhere at any time. Businesses will be able to start experiencing a seamless conferencing experience along with access to VR/AR tools as they emerge, which will change the way we all do business.

Innovation

T-Mobile will be the ultimate solutions partner for businesses. Not only will T-Mobile be able to innovate with new and improved products, services, and devices, but we will enable businesses to turn big ideas into reality.

5G resources

New podcasts from T-Mobile for Business

How could 5G impact your business?

Hosts Oz Woloshyn (Sleepwalkers) and Kara Preiss (Sleepwalkers) look closely at how 5G could revolutionize the way we work, socialize, and interact with the world around us. Tune in and listen here: ThisTimeTomorrowPodcast.com

How are today's leaders envisioning a 5G future?

Host Jonathan Strickland (TechStuff) explores how technology is changing industries overnight. In this series, Jonathan sits with the most dynamic CIO's and CTO's of our time to discuss how the latest advancements in technology, including 5G, will propel their vision for the future. Tune in and listen here: TheRestlessOnesPodcast.com

Other resources

T-Mobile for Business enterprise pitch deck: 5G

This enterprise pitch deck includes a wealth of information to help you learn more about 5G. Bigtincan.com

T-Mobile for Business Trends & Insights hub

T-Mobile for Business Trends & Insights hub is a one-stop destination for 5G thought leadership featured on Forbes, CNBC, and Bloomberg, as well as present day solutions, customer stories, and more.
T-Mobile.com/business/trends-and-insights

Enterprise selling persona

CIO

The biggest challenges for enterprise CIOs are security, cost optimization, and anticipating major shifts in business needs.

The increase in mobility and workforce distribution for enterprise requires the CIO to plan for:

Technology requirements

- Infrastructure strategy planning for next five years (wired and wireless)
- Security planning and policy development for mobility devices and workforce
- Physical office network decisions (e.g. can they rely on 5G for in-building coverage?)
- Anticipating the next several disruptive technologies and how they affect user behavior
- IoT and Machine to Machine (M2M): how can they effectively be deployed and where

Business requirements

- Change management at the organizational level
- Anticipating how economic changes may affect the business and the workforce and how that ties into the infrastructure strategy
- Understanding how the individual business units can benefit from 5G-enabled IoT and M2M

Value propositions

Increased mobility & reliability: T-Mobile's 5G network will eventually enable enterprise businesses to support the ever-changing needs of an increasingly mobile workforce. Coverage and reliability, as well as advancements in VR and AR, will allow for businesses to operate from virtually anywhere at any time.

Increased efficiency & optimization: T-Mobile's 5G network can provide the tools to help enterprise businesses optimize and develop more efficient processes to capture, send, and act on endpoint data. With the future development of 5G-enabled IoT and M2M technologies, work-streams in many departments become faster, more accurate, and more cost-effective.

Innovation: T-Mobile's uniquely built 5G network offers the foundation to create new workflows to meet the specific needs of enterprise businesses. T-Mobile is the premier partner that can offer a scalable network that is primed for future innovation.

Potential future use cases by vertical

Aviation

As the airlines recover from economic losses resulting from COVID-19, business decision makers will be more focused than ever on gaining new efficiencies, maximizing cost savings, and adopting innovations in technology that help them compete while on the ground.

- Airlines and airports can rely on 5G instead of the sometimes unreliable and expensive Wi-Fi they use today.
- Airlines can monitor and help predict delays in tarmac-delivered vendor activities, including fuel and food services.
- A single passenger airplane carries an average of 1 TB of data during the flight day and is only on the ground for an average of four hours. Today, that data is often impossible to relay to ground servers in that time. With 5G-enabled IoT and M2M endpoint capture, individual sim-carrying components could relay their data from the endpoints, reducing threats and delays in reporting and reactions to older data about flight systems.
- Electronic flight bags, an innovation made mainstream by industry innovator United Airlines, will become more and more capable of using and sharing weather, air traffic, and flight pattern information within and beyond the cockpit while taxiing or on the apron.

Outcomes: customer

- Baggage handling and delivery is more efficient and accurate.
- Passenger comfort is improved through data-driven decisions.
- Passenger safety is improved through IoT and M2M monitoring of mechanical systems and proactive maintenance.

Retail

- Manufacturing of consumer goods is streamlined through systems endpoint monitoring, digital modelling, and ability to digitize samples, prototypes, and bring goods to market more quickly with less cost.
- Retailers are able to coordinate global vendor deliveries to arrive at brick and mortar stores within the same timeframe and ensure that product announcements and launches are timely and inventory is available.
- Changes in product pricing can be transferred immediately into digital signage and POS systems.
- Digital signage becomes intuitive and can be tailored to the individual in the store through endpoint data or M2M data exchange, as well as GPS and buying behavior algorithms.
- Retailers are able to hybridize the e-commerce and in-person experience by offering “pick it up” services for online purchases and using 5G-enabled IoT and M2M data to inform AI, and offering custom-built specials for the individual consumer once onsite, increasing their purchases dramatically.

Manufacturing (all physical product industries)

- With 5G, businesses with remote manufacturing operations could use lower bandwidth spectrum for IoT and M2M solutions by capturing, sending, and acting upon endpoint data.
- This provides an understanding of the root cause of breakage, manufacturing equipment downtime, process inefficiencies, and delivery failures or delays, and how these affect the bottom line for the business itself.
- Global companies can share data digitally with increased security and reduce time for samples, prototypes, and design revisions to get to market.
- With this data, teams can develop strategies to address and even prevent these challenges, improving quality of product, time frames, and reliability of deliveries, while improving customer satisfaction and sales and resulting in lowered cost of goods.

Outcomes: customer

- Consumer products from apparel to groceries are brought to market faster at a higher quality and are consistently delivered on time.

Healthcare

- Patient data becomes more mobile, enabling healthcare providers to give higher-quality, more accurate patient care.
- 5G-enabled IoMT patient implants and monitors capture and report lifesaving data quickly, allowing doctors and first responders to lessen the time to act and reducing errors in patient self-descriptions of life-threatening emergencies.
- Healthcare providers can offer telemedicine and extend their reach to mobility impaired patients across geographies.
- Coordinated care becomes more effective, with mobile care providers being able to share endpoint data in real time with other patient care staff.

Financial services and insurance

- 5G and 5G-enabled IoT and M2M data allow insurance claims to be handled more quickly and effectively. Incident details can be captured, reported, and reacted to quickly, even across geographies. Investigations are more accurate, and evidence becomes more substantive by capturing endpoint data about critical systems or activity.