T-MOBILE FOR GOVERNMENT

T-MOBILE AND PUBLIC SAFETY

PARTNERS FOR A 5G FUTURE

POLICE 1 FIRE RESCUE 1 EMS 1

The speed and reach of the T-Mobile network make it a clear choice for the critical needs of public safety.

In 2023, the most essential piece of equipment in a first responder's arsenal may not be the handcuffs on an officer's belt or a thermal imager in the hands of a firefighter–it may be their mobile device.

The advance of technology has brought capabilities that were once unimaginable to all our palms and pockets, and few professionals stand to benefit more than emergency service providers. For those in law enforcement, fire service, and EMS, their mobile devices have become a familiar, convenient hub that can combine the functions of voice communications, text, video, data, documentation, and more, all in a streamlined package. With the growth of 5G–the fifth-generation technology standard for broadband cellular networks–the capabilities of those phones and countless other devices are sure to expand further, and quickly.

The public will expect first responders to keep up. That means leveraging the fastest, most powerful networks they can, both for the 5G future and all they're doing today. And that choice isn't as hard as some might think.

In terms of speed and coverage, T-Mobile offers a 5G wireless network that is now demonstrably faster and more reliable than its competitors. And through its Connecting Heroes program, aimed at bringing connectivity to America's first responders, it's already helped hundreds of public safety agencies across the U.S. improve efficiency, bolster situational awareness, and deliver unprecedented levels of protection and care to their communities.

Read on to discover what 5G can enable, how T-Mobile stands apart, and why it's not only a viable choice, but the strongest option available for those charged with keeping Americans safe.

WHY 5G MATTERS TO PUBLIC SAFETY

It can make their jobs easier and safer in ways earlier generations could hardly have imagined.

Like many of his peers a few years ago, Craig Martinez wasn't yet intrigued by 5G.

"I had no idea what 5G meant–meaning, how it could help me better serve my community," said Martinez, who was then the chief of a busy suburban police department in Utah. "As chief, I felt like, '4G's working, isn't it? I mean, I can call people.' To me, 5G wasn't going to change anything, and I didn't need to understand what it was capable of."

Fast-forward four years, and today Martinez is an enthusiastic believer in the improvements 5G can bring to public safety and the world around it. As the senior manager for the public safety team at T-Mobile, he can tell you why–even if you're a veteran cop, firefighter, or medic who's not easily impressed.

"Think about it this way," Martinez explained. "A decade ago, if I wanted to put a camera up on the tree outside my home, I'd have had to dig a trench, run power, run fiber, run all these different things to operate that camera in a way that gave me not only a feed, but that data stored somewhere.

"Today, with 5G, I can put a camera in the tree right now, pop a T-Mobile SIM card in it, and boom, I'm up and running. The latency is so low, based on the speed and bandwidth we have, that what I see happening on that video is pretty much what's happening in real time. There's just not a lot of lag. And really, that's just the tip of the iceberg."

For emergency services leaders who don't fully appreciate the world coming to their grasps, that example showcases the biggest elements 5G brings: It allows lots of data–substantially more than 4G–to be moved extremely quickly and reliably. The potential benefits span a universe that includes the safety of both responders and citizens; the automation, streamlining and facilitation of countless processes essential and new; the collection, movement, and storage of vast amounts of information and data; high-powered, super-realistic training; and more.

Faster connectivity, lower latency

For police, 5G will power advances such as audio- and video-equipped robots that operate with unprecedented precision; more powerful drones for search and surveillance; live body- and dash-cam streaming and storage; camera observation with more clarity and automated analysis; and broad use of interoperable, highly reliable push-to-talk communication solutions.

Firefighters can benefit from thermal imaging with noise filtering integrated into connected helmet visors that stream video and location information back to command; smart sensors that detect and act to stop hazardous leaks and other threats; AI-powered early detection of wildfires using 5G cameras; and real-time monitoring of their physiology and vital signs during the stress of responses.

For EMS, smart devices will monitor patients automatically and securely collect, save, and share more of their data more easily; video capability will fuel increased telehealth and expert consultations; and priorities like triage, patient tracking, and post-care quality assurance will be expedited and better-informed.

All the public safety disciplines will enjoy benefits like connected vehicles that can communicate not only with traffic and crossing signals but directly with other motorists, and virtual- and augmented-reality training that prepares them more realistically for the challenges they'll face on the job.

"If I'm a patrol officer and have a car stopped, and I could get information on that driver back in three seconds with 5G and eight seconds with 4G, that five-second gap might mean an opportunity for that person to try something and get a jump on me," Martinez said. "Or say I'm the chief in an EOC watching body-worn camera footage of my SWAT team going into a house. Because of the latency and speed of historic 3G and 4G networks, what I'm seeing might have really happened four seconds ago. But if I have a good 5G network, where the latency is low and what I'm seeing is what's happening in near real time, that can save lives.

"What 5G does for the street cop, firefighter, and EMT/paramedic is give them faster connectivity and more secured data in a timely manner."

All carriers are not created equal

While such amazing capabilities will be widely available, the degree to which your police, fire, or EMS organization will realistically be able to take full advantage of 5G and its benefits may depend on who provides your service.

All carriers are not created equal. Especially in the emergency fields, users must consider factors like coverage, bandwidth, and cost when choosing who will provide their 5G.

"With how big and robust the network is, to me it's a no-brainer to have an agency on T-Mobile for both voice and data," said Martinez. "And the other part is that T-Mobile is so responsive. They have dedicated teams to take care of people in times of need."

HOW FAST IS IT?

THE METRICS OF 5G

It optimizes performance by leveraging low-, middle-, and high-frequency bands

Here are the key things to know about 5G:

It's powerful

How powerful? In theory it allows upload speeds as fast as 20 Gbps. Most users won't hit such dizzying theoretical maximum rates, but T-Mobile provides industry-best average rates–roughly five times faster than 4G speeds on average.

T-Mobile's upload speeds–from device to network, cloud, or other device–average 7–32 Mbps. 4G LTE upload speeds typically run no faster than 15 Mbps.

T-Mobile's download speeds, as measured by the second-quarter results from the Ookla Speedtest Global Index, average 220 Mbps with 5G. With 4G LTE, such speeds typically top out at 20 Mbps.

5G latency–the delay between command and execution–is also an improvement over 4G. Currently T-Mobile's median 5G multiserver latency rate of 53 milliseconds is best among major carriers.

It's reliable

This high bandwidth, or maximum rate of data transfer, means networks can accommodate more users before becoming congested and slowing down. In extreme instances when that does happen, T-Mobile provides priority access to agencies in the federal Wireless Priority Service (WPS) based on criteria set forth by the DHS Cybersecurity and Infrastructure Security Agency. And T-Mobile takes the additional step of proactively enrolling eligible first responder agencies in WPS, which also provides priority for calls made across carrier networks and to landlines.

The best of all bands

The key to 5G is optimizing all bands of the frequency spectrum: low, middle, and high. The latest 5G devices can jump quickly among them.

The bands have different characteristics: The highest frequencies are faster, but have less range. They are well suited for carrying large amounts of data in populated areas, but need cell sites nearby and may not penetrate structures. The lowest frequencies have more

range and are less susceptible to obstacles, making them good for rural coverage. However, the lower frequencies move data more slowly. Mid-band effectively splits the differences and balances the interests of speed, capacity, coverage, and penetration.

The T-Mobile network provides first responders with an optimal balance of coverage and speed. Its low band now extends 5G service to rural agencies that previously couldn't access broadband, while its middle band represents a "sweet spot" that maximizes performance. T-Mobile now offers America's largest and fastest 5G network.

The latest data

In July 2023, T-Mobile posted the top 5G performance marks in Ookla's Speedtest Global Index Market Analysis United States Q2 2023 report. Speedtest is a prominent web service that analyzes internet access performance metrics.

The T-Mobile network was fastest in at least 45 of 50 states, plus the District of Columbia, and at least 87 of the 100 biggest U.S. cities by population, including 19 of the 20 largest. Its median download speeds were more than twice as fast as its competitors.

How We Got Here

1G

1980s

The initial wireless cellular technology of the 1980s supported voice calls only. Its maximum speed was 2.4 Kbps.

2G

1990s

Cell phones moved from analog to digital in the 1990s and added basic text and multimedia messaging.

3G

2000s

The 2000s brought faster data speeds that powered functions like video calling and mobile internet access.

4G

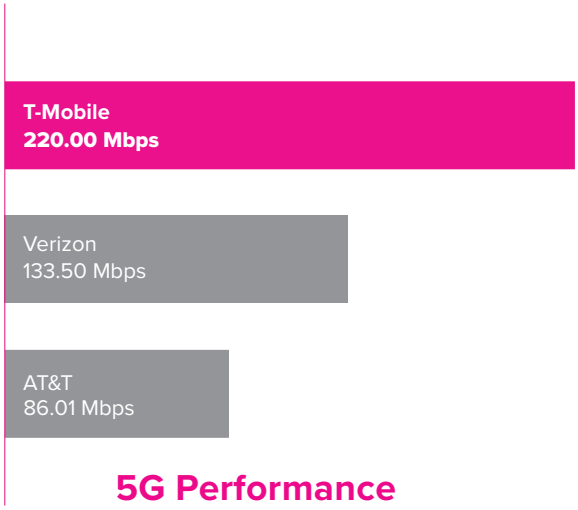
2010s

A decade later, 4G supported video conferencing, gaming and other increasingly intensive uses. Its maximum speed were faster, up to 1 Gbps.

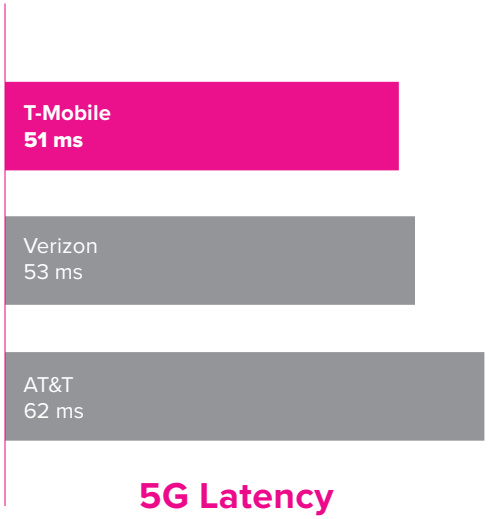
5G - The Best of All Bands

	Frequency	*Characteristic*
High-frequency	6 GHz and above	Ultrafast data, limited range
Mid-frequency	1-6 GHz	Fast but targeted
Low-frequency	Below 1 GHz	Slower but wider range

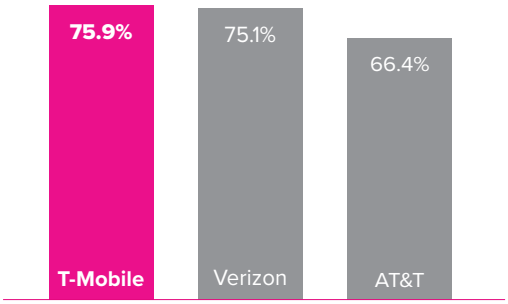
T-Mobile 5G now covers 325 million people across 1.9 million square miles – more area than AT&T and Verizon combined.



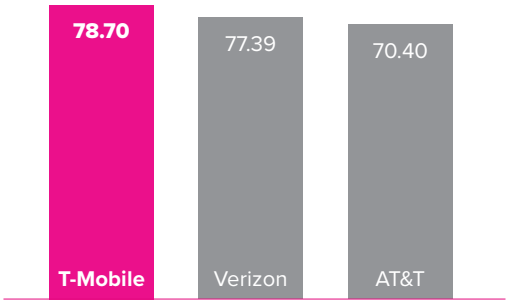
5G Performance



5G Latency



5G Consistency



5G Video Score

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How 5G can transform key public safety operations

Police and fire innovators are making good use of their data capabilities every day

How can 5G benefit daily operations for connected public safety departments? Here are two recent examples.

For police

Florida's Pinellas Park Police Department started making greater use of smartphones in their jobs during the COVID-19 pandemic. Sergeant John Shea outlined the many uses of PPPD's agency-issued iPhones in a recent webinar for the International Public Safety Association.

There are the expected phone, text, and email uses, with the addition of video apps for remote meetings and interviews. Officers also have standard business platforms and cloud storage options for sharing large documents, alarms/timers, and a voice-to-text function for transcribing notes.

A CAD app alerts officers to calls and lets them self-dispatch and see and add call notes. It also provides unit location mapping, mobile access to the national and state crime information centers for searches and plate scans, and location tracking. A handy function lets users scan information from IDs and driver's licenses without inputting it manually. Another app pairs with bodycams to facilitate the upload of audio, video, and images to cloud storage. It integrates location tracking and can livestream camera footage in dangerous situations.

A countywide situational awareness app integrates all active calls and location information for both police and fire. Special operations are supported by platforms that let entire crisis teams listen to negotiations, and others to operate drones and stream their footage. Still other apps manage the training and handling of canines, fleet operations, and individuals' shifts.

5G–obtained through the T-Mobile Connecting Heroes program–gives Pinellas Park officers all of these capabilities, nearly instantly and as close as their pockets. "As an agency, we're always looking for the next best thing to use on our phones," said Shea.

For firefighters

Wildfires in America are growing more frequent and severe. That's raising the value of early detection–it saves lives, time, and resources to identify and contain such fires before they spread. Pano's Rapid Detect platform uses 5G and artificial intelligence to power that in six western states.

The system uses ultrahigh-definition cameras mounted in high locations and supported by AI analysis to scan continuously for the initial indications of smoke and flames. Firefighters are automatically notified if anything is detected. In Big Sky, Montana, the system helped crews get a fast jump on the Shedhorn fire in 2021. "We only had one camera at the time, but we got an early detection," Deputy Fire Chief Dustin Tetrault said. "We were able to mobilize quickly and gauge what would be needed in resources and evacuations."

The Pano system can provide detection specialists with a single combined view that integrates all cameras, along with location data and input from field sensors, legacy cameras, and other sources. They can share this all in near real time with their entire team. It all requires moving large amounts of data, which is why Pano is partnering with T-Mobile to grow its coverage.

"If you can detect, pinpoint, and share actionable intelligence, you're able to respond more effectively by getting resources on scene sooner," said Pano COO Arvind Satyam. "This reduces the size of these incidents and improves safety for responding personnel."

RESPONDERS FIRST

Giving public safety the priority it needs

T-Mobile goes the extra mile by proactively enrolling agencies in the federal Wireless Priority Service

As priority enablement ambassador for T-Mobile, Stuart Campbell describes the company's approach to first responder prioritization this way:

"All the major wireless carriers can provide you a car. Only T-Mobile signs you up for the express lanes along with it."

For T-Mobile's emergency services customers, that extra touch is automatic enrollment in the federal government's Wireless Priority Service (WPS). While the capacity of 5G will make such congestion and disruption rare, getting users registered in advance and ready to use WPS will ensure they can reach anyone if it happens.

Set and forget

The WPS is available to qualified users in public safety and other vital fields. It's the wireless equivalent to the Government Emergency Telecommunications Service (GETS), which performs the same function for congestion on landlines. WPS connects calls across all major cell networks and the networks of some regional carriers. Users simply dial *272 to activate the service or use the free Priority Telecommunications Service (PTS) app, which provides an easy shortcut to dialing. Calls made via WPS have historically completed with a success rate of 93%, per DHS, but during Hurricane Matthew in 2016, more than 99% of WPS calls made it through.

While WPS is available to all first responders and part of all major carriers' priority arsenals, T-Mobile is currently the only carrier that proactively enrolls eligible agencies into the program. It manages the set-up for customers, registering their numbers and obtaining all needed permissions. This is done without charge for public safety users, both individuals and departments, and there is no fee to use WPS.

For account-level users T-Mobile also automatically adds additional lines and manages

renewals. “For the user it [WPS registration] is basically set and forget,” said Campbell. In effect, WPS will be there for the user if and when it is needed.

The key advantage of the WPS is that it prioritizes calls across networks.

“If a FirstNet user without WPS, for example, reaches congestion on another network, their call is going to be treated by the receiving network as any other call–there’s no recognition FirstNet is making that call,” Campbell explained. Those callers can still activate WPS if that happens, assuming they’ve established the needed qualifications and permissions and enrolled, but that’s the only way they can break through congestion beyond their networks.

“If we give you the tool [WPS] at the beginning,” Campbell added, “it’s available to you if you have trouble connecting.”

WPS is also available to other classes of essential workers such as disaster responders, military command and control personnel, public services/utility/critical infrastructure workers, and disaster recovery personnel, as well as executive personnel and policy makers. T-Mobile has helped extend it to more than 1,400 organizations and nearly 275,000 authorized devices.

The T-Mobile Emergency Response Team keeps systems working

Disasters may impact communications, but the ERT ensures the vital work of first responders can continue

When a major event happens that damages a community's communications capabilities, there are fewer priorities greater than getting them restored. Emergency responders may be hamstrung in their response without quick attention to their need to stay connected.

T-Mobile is ready to answer that need immediately with an array of resources highlighted by its Emergency Response Team (ERT). Available 24 hours a day, 365 days a year, the ERT consists of trained and experienced professionals who respond to affected areas to help mitigate communications disruptions, coordinate response resources, and connect stakeholders to facilitate cooperations. It has offered support throughout America's manmade and natural disasters and special security events for more than 20 years.

"I think it's really important for government, especially public safety agencies, to know and trust that T-Mobile has a planned approach to disaster recovery that understands and solves for their priorities," said Nicole Hudnet, a 25-year veteran of wireless communications who oversees the team for T-Mobile. That includes both prioritizing network restoration and providing the tools and personnel to manage the response.

Gaps and goals

When ERT members reach a scene, their first order of business is collaboration with colleagues from the T-Mobile network teams to determine both public safety and greater network needs and priorities. They'll join the briefings and calls and reach out to key players–emergency management and communications leads, interoperability coordinators, and county and city officials–to determine their gaps and goals. They'll gauge the lay of the land: where shelters and command posts are, where surges are happening or expected, and what support is needed where. That helps the network teams develop accurate overall views of the situation and balance public safety priorities with others.

Such deployments happened more than 50 times in 2020–an active year for disasters and other large-scale emergencies. That year the ERT was activated for hurricanes, tornadoes, and wildfires, among other events, assisting not only police, fire, and EMS, but also school districts, humanitarian organizations, and others.

Communities' communications infrastructure has several components that can be damaged through major storms or other causes. Power may be knocked out, cell sites can be harmed, and backhaul fiber can be cut, especially during debris-removal efforts after the fact, causing outages where there had previously been none.

Well-known solutions like COWs (cells on wheels, mobile cell sites that boost or create signals), COLTs (cells on light trucks) and SatCOLTs (COLTs with satellite capability) are available when more straightforward solutions aren't feasible. They can power essential users until definitive repairs happen. But simpler options may do the trick, too.

"From an infrastructure standpoint, there's a lot we can do to provide or extend network coverage into impacted areas with our existing towers," said Hudnet. "The last resort is bringing in that SatCOLT or COW to provide that bubble of coverage when the towers are completely damaged, the backhaul isn't available, or there's a remote deployment where there isn't a network."

The most effective and expedient way to restore communications doesn't always require bringing in outside resources. Following a tornado in Texas last year, first responders working in an impacted subdivision requested a SatCOLT. However, T-Mobile had a nearby cell tower still

operating, which enabled the ERT to coordinate with the network team to perform an antenna tilt that changed the tower's projection angle and boosted its signal into the impacted neighborhood. This rapidly solved their problem.

Planning and partnerships

Among the ERT's core missions is enabling secure and resilient communications, and more goes into resiliency than just quick repairs on the back end. A big part of it is partnerships, forged in advance and strengthened over time. When they're not responding to disasters, team members and T-Mobile leaders keep engaged with policy and planning efforts and ensuring things can keep running smoothly.

"Those public-private partnerships are absolutely key in making sure we have an effective response when things occur," said Hudnet. "We work with agencies at the federal, state, and local levels to be part of their critical infrastructure working groups and collaborate with them and those representing critical infrastructure–utilities, other communications carriers–so we have a plan for any disaster and have mitigated some of the roadblocks ahead of time."

What else does T-Mobile offer?

Here are three more important services for first responders

What else can T-Mobile offer first responders and public safety 5G users? Additional features of interest include the following:

Direct Connect is an integrated push-to-talk (PTT) solution that replicates key functions of responders' land mobile radios (LMRs) on their smartphones. With the push of a button, users can instantly communicate individually or within talk groups. Authorized users can reach groups of up to 500, and supervisors can track user locations and statuses. Direct Connect works on a wide range of devices and networks, including those beyond T-Mobile, and is interoperable with LMRs.

Connecting Heroes is a 10-year, $7.7 billion commitment by T-Mobile to provide low-cost connectivity to public and nonprofit first responders across America. Available to state and local law enforcement, fire departments, EMS organizations, and 911 call centers, the program includes access to the T-Mobile 5G network.

Go5G First Responder plans, an exclusive option for emergency service providers' personal service, offer 40% off T-Mobile's regular Go5G plan rates for family lines (40% off additional price for lines 2–6 with autopay discount using eligible payment method). These include 5G access.

A NEW SET OF ANSWERS FOR PUBLIC SAFETY

A focused effort to serve first responders has made T-Mobile a top choice

There was a time T-Mobile was known as a consumer service. In 2023, that perception is as dated as flip phones. Having dramatically upgraded its capacity and capabilities, and as we move into the world of 5G, T-Mobile stands out as an appealing solution for public safety.

> “In a lot of ways, we’ve passed our competitors. Since I’ve been here, we’ve had more net adds every quarter than the other carriers combined. And there’s a reason why people are choosing us. It’s not just because of the price. We’ve done amazing things with our network.

Stuart Campbell
T-Mobile priority enablement ambassador

> “I think the biggest thing is, if your current provider isn’t giving you the service you deserve as first responders, let us show you what we can do. Our network is strong and only getting stronger.

Craig Martinez
T-Mobile senior manager, public safety

About T-Mobile

T-Mobile for Government is committed to delivering critical connectivity to first responders when and where it matters most. Through its Connecting Heroes program, it provides state and local public safety agencies with FREE unlimited talk, text, and smartphone data—all on the nation's largest 5G network. Plus, WPS-enrolled agencies receive priority access and preemption at no additional cost, for unmatched access to T-Mobile's network. With decades of experience fielding rapid deployable networks and mobile devices, T-Mobile is always prepared to support the community though natural disasters or any other events.

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Capable device required for 5G. Coverage not available in some areas and may be impacted by emergencies; check your response area. WPS eligibility must be confirmed by USDHS. WPS functionality may not be available while roaming. Completion of calls not guaranteed. Fastest: Based on median, overall combined 5G speeds according to analysis by Ookla of Speedtest Intelligence data 5G download speeds for Q2 2023. Ookla trademarks used under license and reprinted with permission.