



Millimeter Wave vs. Mid-Band in Public Safety Applications

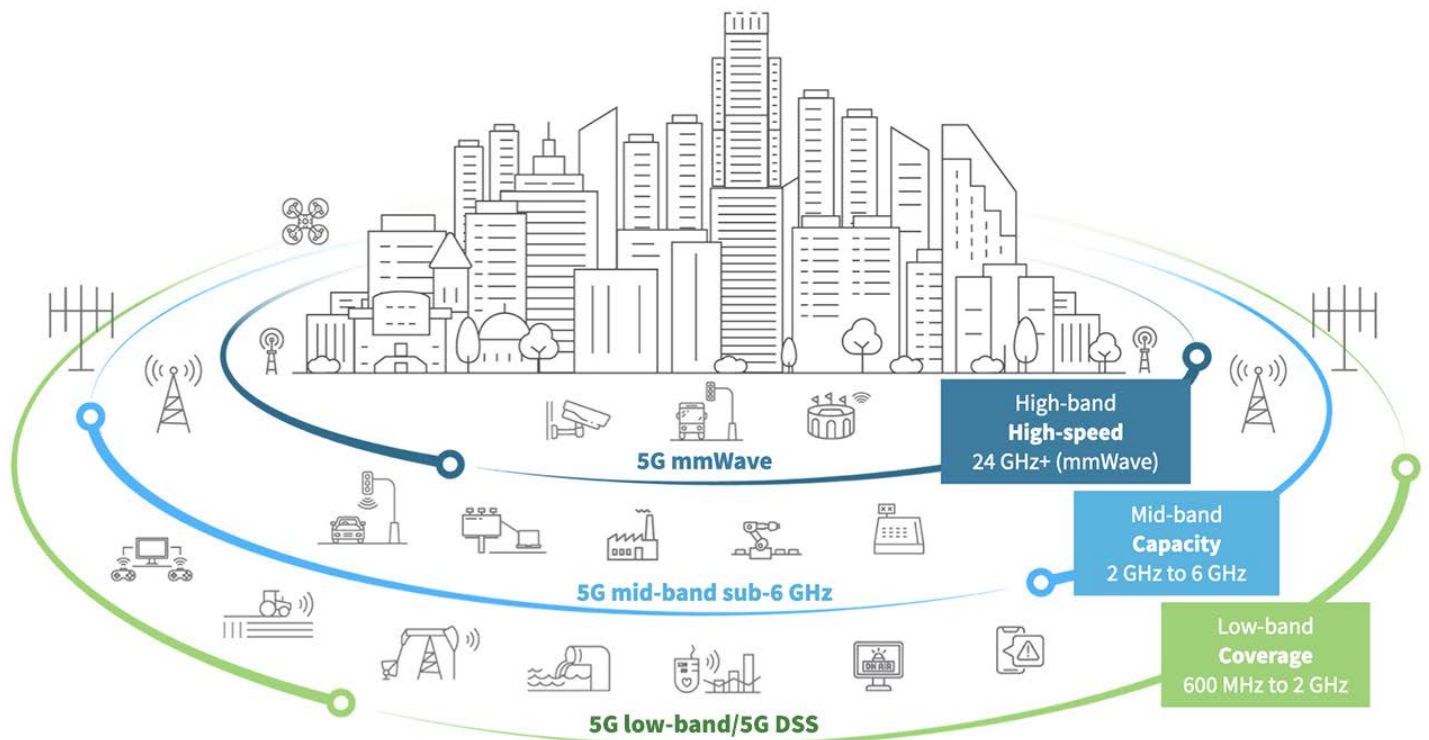
Public safety agencies need the most reliable, robust, and resilient communications technologies possible for rapid response in the communities they serve.

Today, thanks to 5G networks, first responders can stream video, share body camera footage and keep in constant communication with their teams and dispatchers. 5G is becoming the backbone of public safety networks.

In this white paper, we explain the differences between 5G frequency bands, including their benefits and applications. We also show how to put in place a secure, resilient solution that fits your budget.

Understanding 5G Frequencies and the Benefits of Each

5G, the fifth generation of cellular technology defined by the 3rd Generation Partnership Project (3GPP), uses specific frequencies to deliver faster data rates across a coverage area. Three frequency bands (high-band, mid-band and low-band) make up the 5G spectrum. Each band has benefits and challenges for public safety applications, and each mobile carrier incorporates 5G differently. In the U.S., mid-band is the frequency of choice.



High-Band or Millimeter Wave (mmWave) 5G: High Speed but Short Range

In 2016, the Federal Communications Commission (FCC) opened large amounts of high-band spectrum for 5G.¹ High-band 5G frequencies range from 24 GHz to 100 GHz and

deliver very fast, multi-gigabit-per-second speeds. However, these high frequencies struggle to pass through buildings and walls, so they are useful only over short distances. As a result, mmWave works best in densely populated, confined areas such as sports stadiums



Limited applications mean hardware and carrier support are also limited and costly. If the industry resolves mmWave signal range and building penetration issues, this band could enable new applications. Imagine, for example, first responders using virtual and augmented reality for situational awareness to visualize the complete scenario.

Mid-Band 5G: Medium Range, Good Speed

5G mid-band operates between 2 GHz and 6 GHz. It provides longer range than mmWave, with good speeds in the gigabit-per-second range. In fact, this is the most used 5G band because it offers the most value for the investment. C-band, which spans roughly 3.7 GHz to 3.98 GHz, is one portion of mid-band. In 2022, major carriers began expanding their C-band coverage² across the U.S. Although implementation differs among carriers, many include C-band as part of their public safety network offerings.

Low-Band 5G: Long Range, Slower Speed

5G low-band operates below 2 GHz. It does not offer fast data transmission speeds, and 4G LTE traffic crowds the band. However, low-band is still commercially important because it supports legacy systems for basic data transmission.

Architecting a Public Safety 5G Solution

Over the past several years, 5G has not always lived up to the hype. The promise of mmWave is still exciting, even with its current limitations. Mid-band, however, is well established. In this section, we share key considerations for architecting a 5G solution that enhances first responder communications and makes life easier for your IT team.

Here Comes the C-band

T-Mobile has the largest mid-band coverage³ of any U.S. carrier, built mainly on its 2.5 GHz spectrum. By early 2024, its Ultra Capacity 5G network reached more than 300 million people. Verizon initially invested in mmWave, then expanded its C-band coverage significantly in 2022 and reached nearly 250 million people by late 2024. AT&T also built out C-band and mid-band coverage and reached more than 175 million people by late 2024⁴.

¹ [Understanding 5G Spectrum Frequency Bands](#)

² [How C-Band is Jumpstarting AT&T and Verizon's 5G Experience](#)

³ [5G Bands Cheat Sheet](#)

⁴ [AT&T quietly updates 5G coverage info amid mapping madness](#)

When Fixed Wireless Access Makes More Sense Than Fiber

Fixed Wireless Access (FWA) is a method of providing high-speed broadband access using radio frequencies instead of fiber cabling. FWA that runs on 5G is fast, secure and reliable enough to support public safety requirements. It is quickly gaining ground across North America as an alternative to fiber because of its lower cost and faster deployment. According to GSMA Intelligence, 5G now accounts for about 60 percent of mobile connections in the U.S. and Canada⁵. Although mid-band is getting significant interest, T-Mobile has said it could use mmWave to boost its fixed wireless service in some high-demand areas⁶.

Once you consider the time and cost of laying new fiber compared to adding FWA, the benefits of FWA become clear. According to Dgtl Infra, fiber construction costs \$60,000 to \$80,000 per mile⁷, and a new fiber network can take 6 to 10 months to become operational. With a mid-band cellular connection, you can have a network up and running in minutes at a fraction of the cost. This is especially true in rural areas, where FWA makes more economic sense.

Reliable Connections for Public Safety

Whether your public safety application requires mobile connectivity or stationary connectivity at locations such as fire stations and precincts, your solution needs a failover strategy for reliability. First responders perform mission-critical tasks, so they cannot rely on a single connection. Agencies in areas without fiber can work with partners such as Digi to deploy solutions that support multiple carriers. The **Digi TX65 5G cellular router family** supports this approach with Dual SIM Dual Standby, which keeps both SIMs active so failover goes only to a live carrier connection. The dual-modem model runs two carrier connections at the same time, so a failure on one path does not affect the other. The family also supports FirstNet, Citizens Broadband Radio Service (CBRS) and Verizon Frontline deployments, so agencies can deploy resilient connectivity across both public and private cellular networks.

Digi Solutions for Emergency Response Connectivity

Whether you need an end-to-end solution or networking equipment to get your mobile command center up and running quickly, **Digi Transportation Cellular Solutions** are

purpose-built for public safety vehicles and other mission-critical use cases. They are designed for secure, redundant communications on public safety cellular plans. You can also manage them from a precinct or command center with Digi Remote Manager, a cloud-based platform for monitoring and managing deployed devices.

Equip Your Public Safety Communications with a Digi Connectivity Solution

Digi offers complete solutions for the full range of public safety applications, from first responder vehicles and mobile command units to dispatch centers and traffic management systems. These solutions help emergency teams respond rapidly and maintain communications during a large-scale public emergency. Digi cellular solutions come under one Digi 360 offering that includes the device, Digi Remote Manager, warranty and customer care.

Digi 360: Comprehensive cellular solutions with purpose-built devices, software and services that simplify IoT complexity and help customers optimize their IoT investments:

- **Device:** High-performance, purpose-built Digi devices with integrated software, designed for a wide range of enterprise, industrial and transportation use cases
- **Management:** Digi Remote Manager, a network orchestration platform with complete visibility and control, including configuration, remote monitoring, automation, security and over-the-air (OTA) software updates
- **Warranty:** Device warranty that covers the full length of the Digi 360 subscription, helping customers maximize their technology investment while limiting risk
- **Customer care:** 24 x 7 x 365 tier 1 support with a 4-hour service level agreement (SLA) for device and network troubleshooting, so customers can resolve issues quickly

Digi Remote Manager: A cloud-based remote management platform that provides centralized visibility, automation and 24/7 remote monitoring across the entire network. Its simple interface helps you manage, configure, deploy and troubleshoot Digi routers wherever they are in the field, with network-wide updates, data insights and control.

- **A “single pane of glass”:** Manage an entire network through a single screen
- **Zero-touch deployment:** Configure hundreds or even thousands of devices remotely

⁵ [The Mobile Economy North America 2026](#)

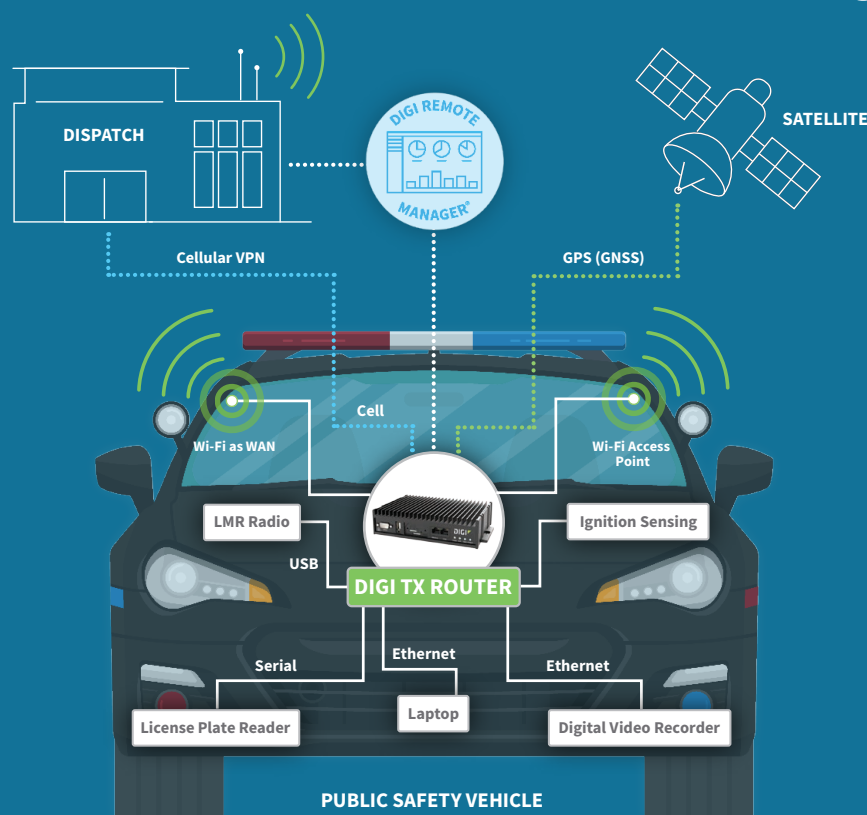
⁶ [T-Mobile Execs Open a Door to mmWave FWA](#)

⁷ [Fiber Optic Network Construction: Process and Build Costs](#)

- **Real-time alerts:** Receive updates on device health for proactive network management
- **Secure out-of-band access:** Access third-party routers, hubs and switches through a secure VPN and console
- **Digi Artificial Network Intelligence (DANI):** Ask a question in plain language and get an answer based on live network data in seconds, with this built-in AI platform available as a value-added service
- **Digi TX65 5G Cellular Router:** Rugged 5G vehicle router family delivering secure, high-performance connectivity and centralized management for fleet, transit and public safety applications, with dual SIMs plus an embedded eSIM for persistent connectivity
- **Digi EX60:** Digi EX60 is a 5G eMBB enterprise router for environmentally controlled mobile command units, fully integrated with [Digi Remote Manager](#) and value-added services including [DANI](#), [Digi Containers](#) and [Digi WAN Bonding](#). Dual SIM slots support carrier flexibility and wireless failover, including embedded [Digi eSIM](#) for zero-touch device setup.
- **Digi Professional Services:** Services that help you select, configure and deploy equipment for your carrier and purpose, plus application development, training and other support for rapid, successful deployments

Use Case: First Responder Vehicles

Software and Hardware That Work Together



Digi Remote Manager

Digi Remote Manager is the command center for your public safety network. It enables IT teams to monitor, manage and update devices in the field remotely. It also speeds deployment of cellular routers and delivers security and firmware updates.

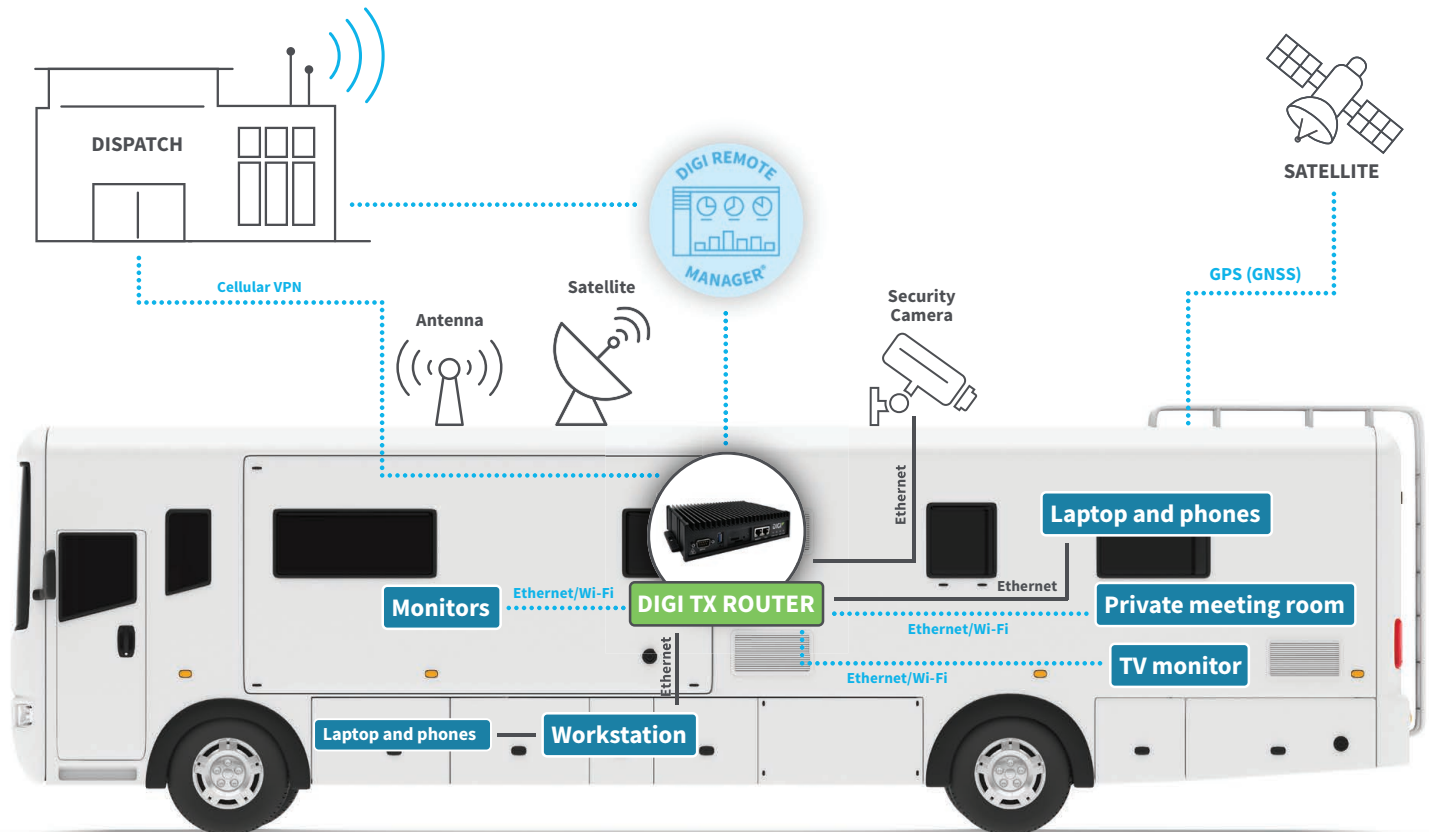
Digi Transportation Cellular Solutions

Purpose-built for the challenging conditions that public safety professionals face in the field, these routers have IP64-rated hardened enclosures, are rated for temperatures from -34°C to 74°C (-29°F to 165°F) and include serial, USB and dual SIMs for flexible integration. With Dual SIM Dual Standby (DSDS), both SIMs stay registered, so failover goes only to a live carrier connection.

Emergency vehicles require a range of connected devices, from dispatch center communications to in-vehicle radios, radars, video equipment and smart devices such as tablets, cell phones and laptops. The challenge is that multiple systems require data plans and IT support, which adds cost and complexity that strain the lean budgets of public safety teams.

Digi 360 offers an all-in-one solution to meet these needs, combining a purpose-built router, Digi Remote Manager, warranty and customer care in one offering. The hardware can withstand extreme conditions, and Digi Remote Manager helps IT teams monitor and manage the network from one place. This approach helps police and fire departments simplify deployments and lower network costs.

Use Case: Mobile Command Vehicles



MOBILE COMMAND CENTER

Communication is the primary purpose of mobile command vehicles. During emergency events, they become remote command centers. Whether responding to wildfires or conducting rescue operations after a hurricane, they can quickly create secure communication networks for first responders.

In areas hit by disaster, these vehicles may be the only viable communication link. They must carry everything needed to stay connected, including access to satellites, the Internet and phone systems. That means they host power, racks of servers and all the necessary networking equipment. They're climate-controlled lifelines for response teams, so the equipment must operate reliably wherever the vehicle travels.

Digi 360 provides high-speed, mission-critical connectivity and remote management in one offering for mobile command vehicles.

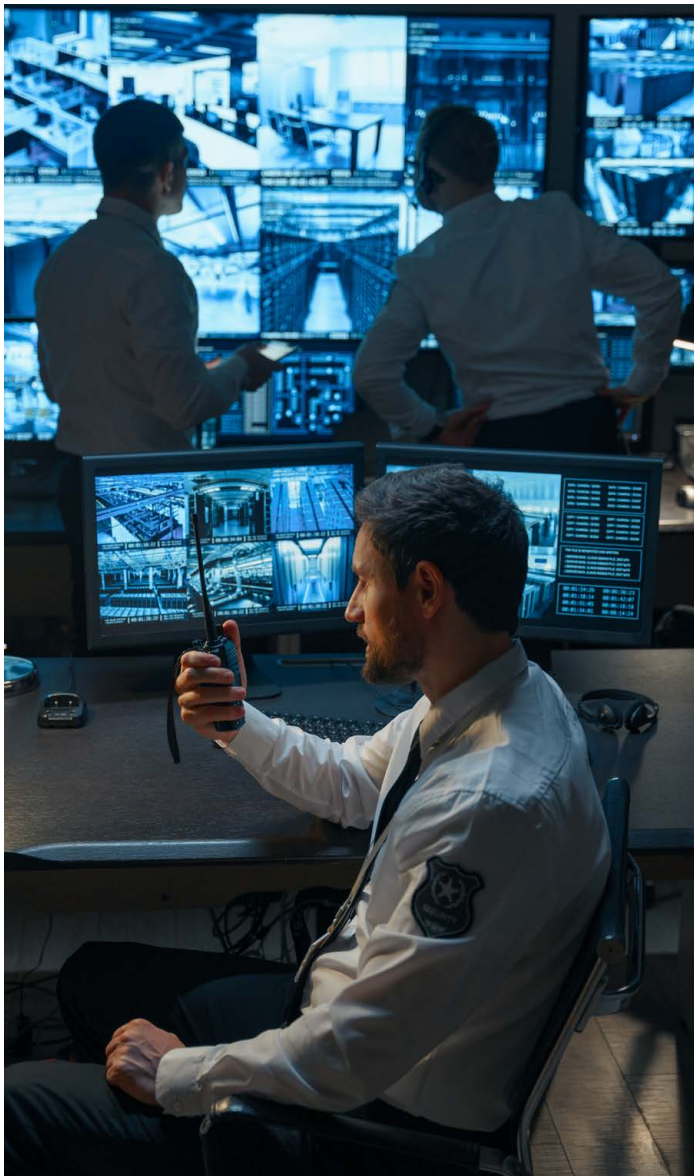
Use Case: Traffic Management and Public Safety



In 2020, the [New York City Department of Transportation \(NYC DOT\)](#) completed a large-scale Intelligent Transportation System (ITS) deployment, led by AT&T. The project brought together multiple vendors and agencies on a tight timeline. The result is a citywide traffic system communications upgrade that includes Digi Remote Manager, the FirstNet Ready Digi TX54 dual cellular router at each intersection and customized Digi software and services.

Dedicated Digi experts assisted with system integration and deployment. On-site personnel worked daily with NYC DOT network engineers and contractors for nearly a year, and a Digi implementation engineer kept the project moving by coordinating planning, testing and troubleshooting.

This award-winning project⁸ incorporated an AT&T wireless network with a dual-carrier design to maximize network connectivity and uptime. In the case of an outage, it automatically switches to a secondary carrier to provide 99.99 percent communication reliability. This massive deployment took just 9 months and stayed under budget. And today, the system seamlessly routes traffic to support better traffic flow, and rapid emergency response. Additionally, the entire deployment can be managed from the traffic management center with Digi Remote Manager.



Make Your IT Team's Job Easier

Speed, cost and coverage matter when you choose 5G equipment, whether it uses mmWave or mid-band. But every 5G solution also needs ongoing management. Your IT team handles configuration, deployment, troubleshooting and security updates, and many public safety IT teams have little time for new projects. Involve your IT team early and agree on a management strategy before you deploy.

A remote management platform such as Digi Remote Manager is the foundation of that strategy and reduces the workload. Instead of programming every router by hand, IT teams can configure any number of devices at once, monitor them from one place and push security and firmware updates remotely. This saves time, energy and money and makes your IT team's job easier.

Work with Digi to Upgrade Your Emergency Communications

Communication is central to public safety operations. Tight budgets force tough decisions about technology, including IT, so every public safety 5G implementation, whether it uses mmWave or mid-band, needs a plan.

Digi helps public safety teams upgrade to 5G with less complexity. Digi 360 brings purpose-built devices, Digi Remote Manager, warranty and customer care together in one offering, so you can simplify deployment, lower network costs and manage every vehicle and site from one place. Talk to a Digi expert to build your upgrade plan.

⁸ [NYC Intelligent Transportation Project Wins ITS-NY Award, Advancing ITS](#)



Why Digi?

Digi is a complete IoT solutions provider. We support your project from start to finish, with mission-critical connectivity, remote management and services that get your application installed, tested and running securely and reliably.

Digi solutions are designed for reliability, performance, security, scalability and versatility, so customers can expect extended service life, adapt quickly to evolving system requirements and adopt new technologies as they emerge. Across [embedded systems](#), [cellular routers and extenders](#), and [infrastructure management](#), Digi supports connected applications for public safety, enterprise, transportation, energy, industrial and smart city use cases.

Digi solutions enable connectivity for standards-based and proprietary equipment, devices and sensors, and support reliable communications over wireless and wired networks. Digi Remote Manager, our integrated remote management platform, speeds deployment and strengthens security with mass configuration, firmware updates and system-wide monitoring through dashboards, alarms and performance metrics.

Company Background

- Digi has been connecting the Internet of Things, from devices and vehicles to equipment and assets, since 1985.
- Digi is publicly traded on NASDAQ under the symbol DGII.
- Headquartered in Hopkins, Minnesota, Digi has more than 800 employees and has connected millions of devices worldwide.

As an IoT solutions provider, Digi helps organizations across industries deploy, manage and support connected systems. For public safety teams, that means dependable communications from the first vehicle to the full network, with expert support after deployment. Connect with Confidence.

Next Steps

- Ready to talk to a Digi expert? [Contact us](#) →
- Want to hear more from Digi? [Sign up for our newsletter](#) →
- Shop now for Digi solutions: [How to buy](#) →

Contact a Digi expert and get started today

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