

# Designing Mission Critical Communications Solutions for First Responders



## Introduction

The [First Responders Network](#) — the nationwide public safety communications platform dedicated to America’s first responders, was created to provide emergency responders with a high-speed, broadband mobile network dedicated to public safety. Developed by the First Responder Network Authority, this network improves communications among first responders. All 50 states and six territories have agreed to participate in the initiative.

This initiative also creates an incredible business opportunity for companies with the expertise to develop robust, interoperable devices for use on this network. First responders are looking for devices that can straddle current communication protocols and can access Band 14.

We are just now getting an understanding of the opportunities this new network has created for organizations that develop devices to meet the needs of first responders. However, we do know one thing for sure — reliable communication capabilities are and will continue to be essential, especially during these challenging times with the novel COVID-19 outbreak.

Organizations that are searching for an IoT module provider for their first responder devices need to ensure that the vendor they choose can deliver connectivity and reliability. Moreover, the IoT module provider must have a track record of success that they can independently verify.

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## What Is the First Responder Network?

Prompted by the tragedy of 9/11, the FCC followed the 911 Commission's recommendation to create a national public safety network in March 2010. In February 2012, First Responder Network Authority was authorized to develop and oversee the dedicated nationwide network for first responders.

The First Responder Network is a dedicated broadband communication network for U.S. first responders. This network prioritizes communication among first responders in a tiered strategy, ensuring that those responding to an emergency will have uninterrupted communications.

In March 2017, the contract was awarded for building out a first responder network leveraging 20 MHz of government spectrum in the 700 MHz band, known in the telecom industry as Band 14. By December 2017, all U.S. states and territories had opted in to using the service.



This first responder network, which leverages the entire spread of deployed bands in addition to Band 14, is planned to reach more than 99 percent of the U.S. population when completed. The First Responder Network will also be an integral part of the [5G](#) rollout with a planned 500 total markets available by the end of 2018. In-building solutions and other coverage enhancements will ensure constant communications to serve first responders.

Identified by their special subscription, the system puts first responders first in line. For instance, there will often be a traffic jam on the commercial LTE networks in the event of an emergency. However, functionality in the First Responder Network ensures that first responders will always have priority for mission-critical communications through their priority features.

Communications for first responders on all deployed cellular bands will have priority for emergencies from all agencies who need to respond. Communication traffic can be further prioritized by bumping non-responder traffic as bandwidth in the commercial LTE network gets dynamically assigned to first responders. For example, in the case of a fire, fire departments and other responders would have priority, with other network traffic being bumped to a lower speed or service tier.

This dedicated LTE network will help overcome the inefficiencies of communication between the 10,000 separate, incompatible and often proprietary radio networks currently used by first responders as they try to talk to each other and coordinate. With this initiative, there's one dedicated nationwide network for all first responders to use.

## How First Responder Network Provides a Significant Market Opportunity

For organizations that develop communication devices, the First Responder Network presents an attractive and exciting market opportunity. First responders at the national, state and local level will all need devices and equipment that can access these special services.

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Instead of a private radio network for municipalities, a dual-carrier solution is possible. Regardless of where in the country first responders are located, they are going to have coverage, making it essential for first providers to have devices with the ability to access Band 14 and commercial LTE bands for priority and preemption.

The roadmap for the First Responder Network includes mission-critical push-to-talk, voice, data, text, video, broadcast technology and Z-axis location-based services. At the core of these communication solutions will be modules and data cards robust and reliable enough to meet these needs.



## 4 Core Elements of Choosing an IoT Partner for First Responder Devices

Original equipment manufacturers (OEMs) that are preparing to take advantage of the First Responder Network capabilities need to think carefully about the solutions they choose when [developing their devices and applications](#). Here are the four core elements that OEMs must consider when choosing an IoT partner for first responder communication solutions:

### 1. Reliability

For consumers, it can be disruptive when a call drops or an internet connection is lost. The stakes are quite a bit higher for first responders. On the network side, first responder services require 99.99 percent broadband service availability. Any service outage should be restored rapidly. Also, the device itself needs to perform optimally. First responders need all their equipment to be reliable, which means the external product needs to be ruggedized, and what's inside needs to be robust as well.

Look for rugged cellular modules and cards that can operate across a variety of stop/start environments. All Telit cellular modules, including the Band 14 products, boast industrial-grade environmental operating temperature ranges of -40 to +85 °C and are manufactured for high shock and vibration environments.

When developing first responder solutions, OEMs need to choose modules that are built to not only withstand a variety of environments but also provide reliable speed for mission-critical communications. Reliable speed matters not only for voice but also for video and images, which can be an essential part of first responder communications. For example, imagine the police need to obtain a photo of a suspect engaged in a hostage situation. If the image takes too long to arrive, the criminal may be able to slip away before the police can apprehend him.

### 2. Focus on Quality

Everyone knows the expression “you get what you pay for.” When working with a limited budget, it's easy to understand the allure of low-cost modules — but at what cost?

What happens when your COVID-19 field medics cannot upload timely patient vitals to the attending ER because the [cellular broadband](#) connection is being carried by a module that does not support parallel data carriers aggregated across two different radio bands offered by the supporting mobile network?

As a long-standing supplier to the automotive and other quality-gated supply chains, Telit is equipped to handle quality audits across all its departments upon request. We do urge you to make that request when selecting a vendor for your mission-critical communication devices. [\[Start your quality review here.\]](#) We are happy to help you parameterize your quality evaluation criteria for the most critical component in your cellular first responder product: the cellular module.

### 3. Future-Proof Your Products

With 5G in full rollout, OEMs need to design first responder solutions with [current and future capabilities](#) in mind. New generation data cards, like Telit's [FN980m](#), will need to go with the NGFF M.2 form factor because of speed and latency performance in 5G. Band 14 is available in the new Telit 5G data card that can operate in LTE mode as a Cat 20 connection supporting up to 2.4 Gbps download speeds (7 CA).

### 4. Research and Track Record

When it comes to developing first responder devices, lives may depend on OEMs making the right choice for modules. Experienced engineers with decades of experience know how to create modules that work. Equipment manufacturers need to choose a module provider with a track record and proven ability to create robust, long-life products that you can verify with all mobile networks across America.

Moreover, organizations should look for a technology partner dedicated to building “what’s next.” At some point, 5G will be superseded by an even faster network. Even though 5G is set to penetrate markets this year, telecom companies are already researching “6G.” Module developers need to constantly look forward to these needs while continuing to innovate to meet the needs of currently available networks. A provider that is consistently testing its modules with telecom providers ensures that your product will always be able to connect.

With more than 400 engineers across 4 continents and 12 customer supporting application engineering hubs distributed around the globe, Telit is focused on continual improvements. We exist to connect things — even critically important things. That’s all we do. We are in the lab and the field, constantly testing and upgrading our ability to connect any device, anywhere.

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## Telit: Because It's What's Inside That Counts

For OEMs looking to design fully Band-14 capable solutions (modems, etc.), selecting the right data card or cellular module is the difference between successfully penetrating a new market or watching the competition take market share away.

There are two types of cellular communication modules with which integrators can design their devices: data cards (e.g., mini-PCIe and NGFF M.2 PC industry form factor standards) and direct-solderable form factors utilizing a land-grid array (LGA) that allows modules to be mounted onto public safety devices by automated manufacturing systems.

Telit's mPCIe [LM960A18](#) is the first data card capable of speeds more than 1 Gbps over LTE. It's also the first product in industry in the mPCIe form factor to support Cat 18. The rugged LM960A18 delivers significant flexibility and a competitive edge for OEMs looking to deploy next-generation products delivering carrier broadband-like user experience quickly.



The LM960A18 is a sibling product of the Cat 11 LM940, and the two products are fully interchangeable. This versatility provides OEMs the opportunity to create new products based on designs already using the LM940 or create product families in different grades of performance-based either on the LM960A18 for high end or the LM940 for mid-market.

The Telit Band 14-equipped [LE910C4-NF LTE Cat 4](#) and [LE910C1-NF LTE Cat 1](#) are LGA modules designed with public safety and first responder network needs in mind. As they are direct solderable, they require less space and form a more physically robust bond with the public safety device that they equip, delivering more shock and vibration resistance. The Cat 4 module delivers 150 Mbps and the Cat 1, 10 Mbps for download speeds.

As the LTE standard evolves and matures, router and gateway OEMs can leverage this technology not only for high download bandwidth and near instant network response times but also for solid upload speeds and reliability as applications like high definition video streaming, digital signage, all-cellular commercial and enterprise internet, and software-defined wide-area network (SD-WAN) access become more sophisticated.

## We Connect the World's Data

Telit offers the world's most comprehensive portfolio of high-performance IoT modules, connectivity services, and software. Our innovative spirit, decades of experience, deep industry insights and unmatched IoT technology expertise is the foundation of everything we do.

We help customers and partners who require best-in-class performance with our uncompromising engineering practices and design methodologies that exceed stringent environmental requirements and industry standards. Our IoT experts have pioneered a successful end-to-end system approach that assures all pieces work together seamlessly when connecting "things to apps" — from device management to connectivity and data management and everything in between.

Rugged. Reliable. Ready to Save Lives.

Industrial-grade cellular modules and data cards designed for public safety

Get a FREE Band-14 Project Review 

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