IoT Network Certified:

Fueling Innovation Through Cellular IoT

CTIA
Certification™

## Cellular IoT Fuels Innovation

Today, IoT—the Internet of Things—is widely used to describe the rapidly expanding market of network-connected devices that are enhancing consumers' lives, increasing business efficiencies, and making our communities safer.

By 2030, it is estimated that there will be 25.4 billion IoT devices, many of which will connect via cellular networks. The wireless networks connecting our smartphones will also connect utilities, lifesaving healthcare devices, manufacturing robotics, agricultural sensors, asset trackers, and more—leading to cost savings, greater efficiency, higher reliability, and enhanced safety for consumers and enterprises alike. The benefits of IoT technology can also lead to lower carbon emissions, helping to address climate change.

Device manufacturers and network providers—large and small—can access major new opportunities by developing and delivering cellular IoT-enabled devices, supporting our IoT-connected future. Certifying these devices through industry-recognized programs focused on globally-recognized standards ensures device readiness, network compatibility, product reliability, network operator acceptance, and consumer trust.
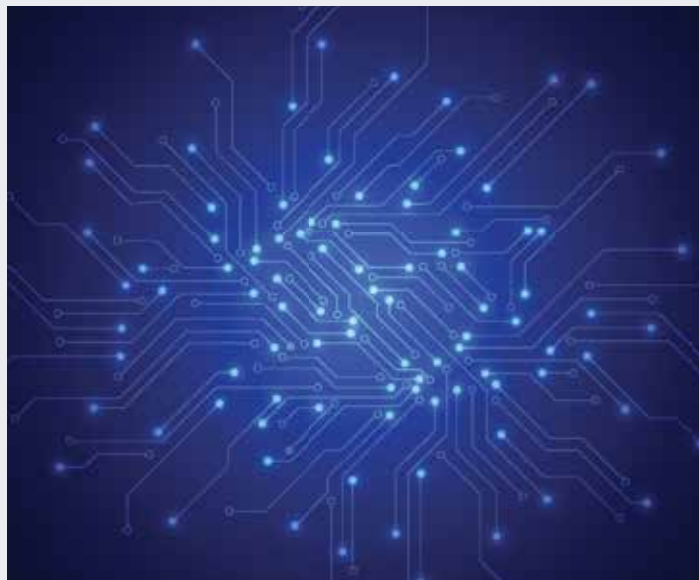
25.4
Billion IoT Devices
by 2030

Certifying IoT Products to Work on Cellular Networks Improves Security & Reliability

To realize IoT's massive benefits, cellular-enabled IoT devices must be able to reliably connect to wireless networks. Standards bodies such as 3GPP have developed standards for decades to ensure safety, security, reliability, and interoperability among our wireless devices.

The wireless industry created the IoT Network Certified™ program to certify that IoT devices that connect to wireless networks are also meeting these standards. Subject matter experts from across the industry developed the program's testing and certification processes, which are relied upon by both network operators and companies to verify an IoT device's readiness to connect to global cellular networks.

How It Works:
Multiple testing laboratories worldwide are authorized to conduct IoT Network Certified testing. Devices that undergo the certification process are tested for compliance with 4G and 5G network standards maintained by internationally recognized standards organizations. Once all requirements are met, a mark is granted by CTIA Certification™, certifying that the device meets industry standards.

Building on CTIA Certification's Decades of Experience:
CTIA Certification has been the certification authority for the cellular industry since 1991, certifying phones, laptops, tablets, modules, smartphone batteries, phone repair technicians, and more for over 30 years—and IoT devices for more than a decade. Most recently, CTIA Certification crafted the IoT Network Certified program to meet the specific needs of the IoT community. It simplifies and streamlines the process of certifying an IoT device, providing an efficient and affordable pathway for manufacturers.

Benefits of IoT Certification:
By designing new IoT devices around a wireless module that has already been certified, a manufacturer can more easily certify its new device using a process that takes advantage of the rigorous testing and certification already done on the module. Hundreds of options are available, such as high-bandwidth modules for integration into security cameras and routers, and low-power modules for use in meters, trackers, and sensors.

CTIA Certification's 30+ Year Track Record

100
Authorized Test Labs Worldwide

100,000
Device Certifications

15,000
Phone Repair Technicians

3,000
Retail Repair Locations

Why Cellular Networks Are Key for Connecting the Internet of Things

Today's 4G and 5G network-enabled IoT devices deliver powerful features unmatched by any other wireless technology. They provide a blend of greater coverage, capacity, responsiveness, mobility, reliability, and security—and network evolution has enabled increased precision for network management, allowing networks to focus more heavily on particular factors needed for specific use cases. IoT use cases improve the lives of consumers and the operations of enterprises.

The Evolution of IoT. Early iterations of IoT focused on low-complexity devices, such as asset trackers and smart meters, and on high-performance applications, such as control of robotics and industrial equipment. These are traditionally covered by 4G LTE Narrowband (NB-IoT) technology, which provides increased coverage and longer IoT battery life, along with LTE-M or LTE-MTC for mobility or machine-type communications.

Over time, a need to address mid-tier devices—such as wearables, health monitors, vehicle trackers, voice assistants, industrial sensors, augmented reality (AR) glasses, and much more—became apparent. The industry solution to address these needs is 5G RedCap (for "reduced capability"), which will expand IoT options using cellular technology and can coexist with 4G for the foreseeable future. 5G RedCap networks will provide a blend of diversified requirements for IoT devices that range from industrial wireless sensors and wearables, to video surveillance and more.

The IoT Network Certified program certifies that devices can connect to these networks, adhering to the latest standards.

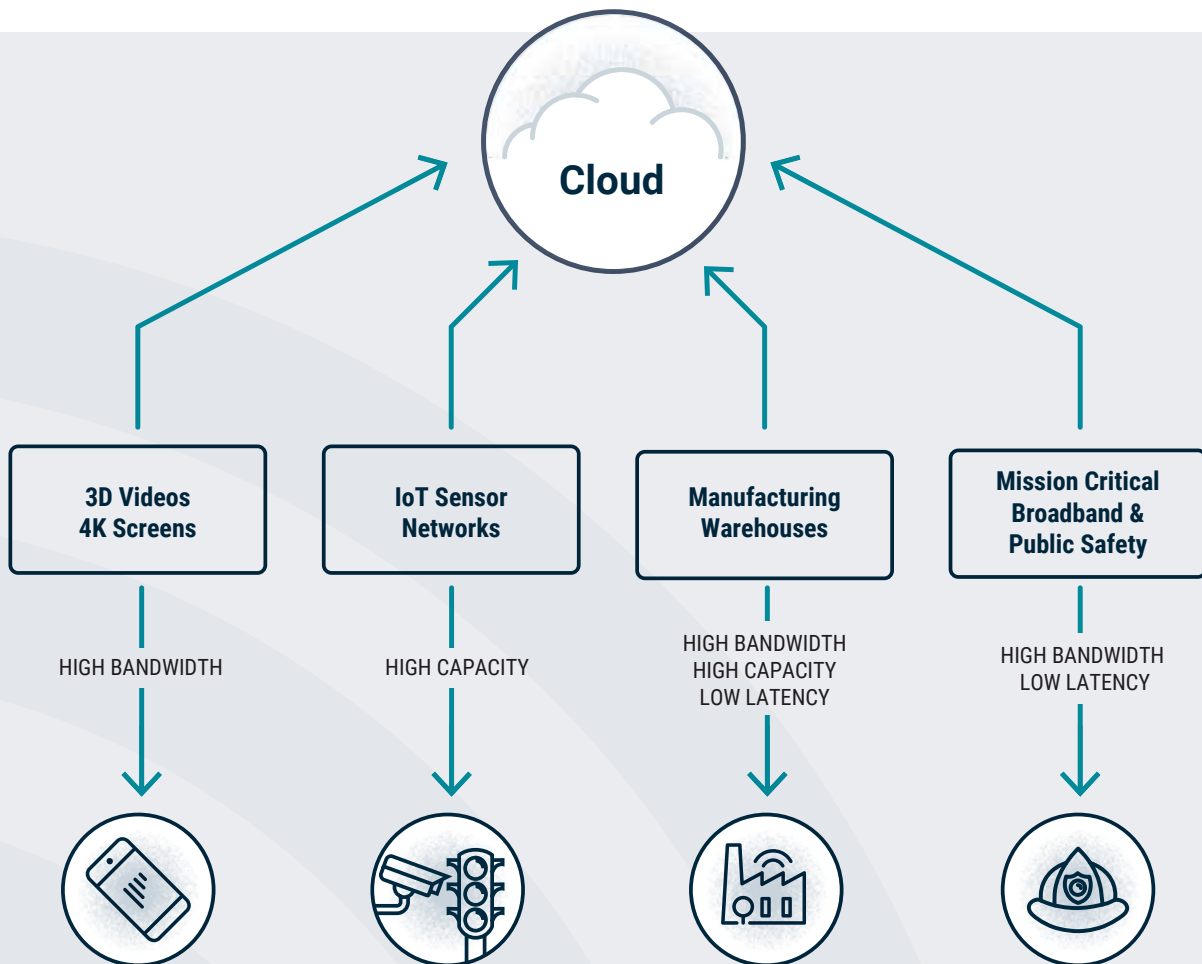## IoT-Enabled Devices Run Efficiently on 4G and 5G Networks

Wireless-enabled devices with small "form factors"—that is, their size and shape—can utilize these 4G and 5G networks efficiently with their optimizations for IoT, enabling them to draw less power, and extending precious battery life. With advancements in energy-saving technology, batteries on these devices can last well over ten years. This is especially important for smart meters or devices deployed in remote or hard-to-reach locations.

These devices can remain in service for decades without compromising performance. The foundation for these products and applications is the networks in which multiple wireless service providers have invested tens of billions of dollars. This unprecedented investment has enabled countless applications for consumers and enterprises alike.

Next-Generation Wireless Networks Enhance IoT Security

With millions of connected IoT devices, network security is critical—and cellular wireless networks have safety measures built in. End-to-end encryption, which uses complex algorithms to authenticate both ends of a connection, protects data that flows through these networks, making wireless the most secure network technology.

In addition, 5G networks are designed in a way that allows providers to deliver more enhanced, targeted forms of security. For example, network segmentation and slice isolation allow network operators to customize security and prevent cyberattacks from spreading from one part of the 5G network to another. Other wireless IoT features include improved user privacy protection, enhanced security while roaming, strict controls for physical and IT access, and customized security updates.
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Cloud

3D Videos 4K Screens	IoT Sensor Networks	Manufacturing Warehouses	Mission Critical Broadband & Public Safety
HIGH BANDWIDTH	HIGH CAPACITY	HIGH BANDWIDTH HIGH CAPACITY LOW LATENCY	HIGH BANDWIDTH LOW LATENCY

Wireless IoT in Action: Manufacturing

Wireless-enabled IoT enhances manufacturing efficiency, reduces costs, enables flexibility, and improves safety and security in several ways. It enables manufacturers to:

- **Better Predict Maintenance Needs**. Sensors measure and track equipment performance, and robotics can automate repairs.

- **Increase Efficiency**. Machines can work collaboratively, increasing productivity and eliminating friction, while also allowing for process changes and customization.

- **Improve Processes from End-to-End**. Segmented workflows—like assembly or delivery—can operate seamlessly, and manufacturers can track and manage them step-by-step.
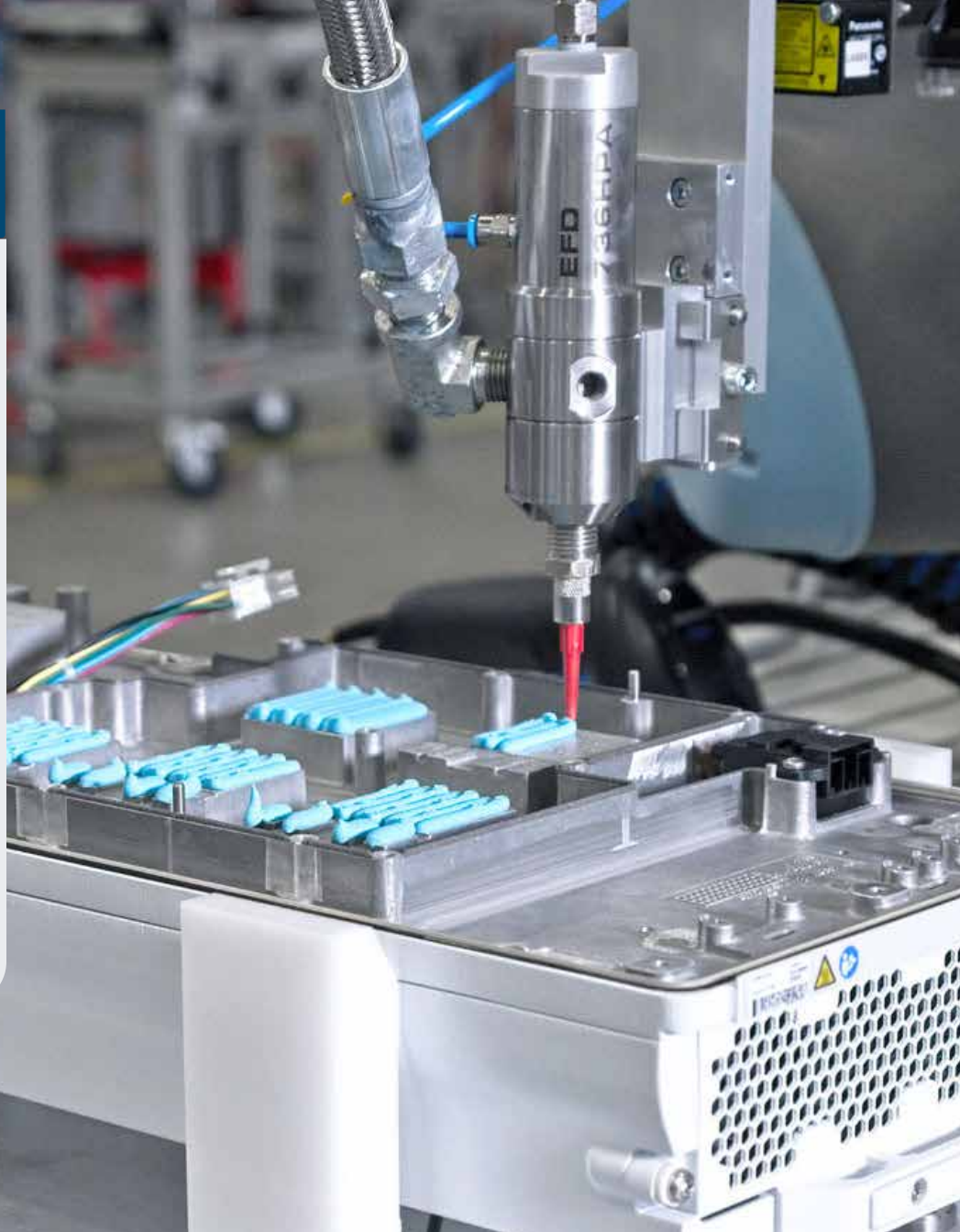
> "We know [5G] technology. We want to bring in the experts who know manufacturing or other industries to show them how they need 5G— to show them what 5G is capable of.

– Erik Simonsson
Head of the USA 5G Smart Factory for Ericsson

How 5G-Powered IoT Devices Are Changing Industries

Every day, a new and exciting cellular-enabled IoT device is introduced to the world. Products that may have seemed more science fiction than reality just a decade ago are being applied today in homes, communities, businesses, farms, and factories—and transforming the way we live, work, play, and create.
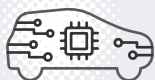
Autonomous Vehicles
Wireless driver support systems are using artificial intelligence to reshape fleet operations and reduce accidents

Industrial IoT/Manufacturing
5G's quick responsiveness and high-speed communication are enabling autonomous robots to perform complex tasks and react in real time—making factory floors safer.

Food Processing
Sensors coupled with cellular modems are helping food processors to address one of their industry's biggest challenges—food storage stability.

Entertainment and Gaming
5G-powered applications are providing new augmented reality experiences at live events such as sports and concerts.

Utilities
Remote monitoring of power grids is reducing outages and improving energy consumption management, enhancing residents' lives in major cities and rural areas.

Smart Cities
Cities are embracing major improvements from cellular IoT connectivity, including smart transportation, parking, safety, lighting, and other benefits.

Smart Agriculture
Farms need scalable technology to fuel innovation and lead to a prosperous future. 4G and 5G-connected devices are connecting sensors covering a wide swath of farmland to monitor water usage and crop growth. Advanced wireless networks are supporting these massive amounts of data through their broad coverage and high capacity.

Enterprise Connectivity
Businesses are using cellular modems to maintain connectivity and diminish the adverse impact of system outages.

Public Safety and Healthcare
Mobile personal emergency response devices are alerting public safety authorities about emergencies at the click of a button. In the future, wearable sensors and wireless devices will enable surgery patients to recover safely at home.

The future of IoT is in wireless.

The wireless industry's efforts to bring together a diverse set of stakeholders to establish technological best practices has led to smoother transitions between generations of wireless, and given manufacturers expectations of interoperability that they can rely on in markets around the world.

Now more than ever, the wireless industry is building innovative security and network management features into the nation's wireless networks. This ongoing innovation, along with cellular technology's expansive coverage, mobility, and reliability, make it the optimum platform for IoT devices—just as IoT devices are the optimum platform for stronger communities and more efficient enterprise operations.

Device certification through trusted, industry-backed programs like IoT Network Certified ensure our devices meet the standards and expectations enabled by all the capabilities our next-generation wireless networks have to offer.

About CTIA Certification

CTIA Certification™ is the global leader in certification for the mobile wireless industry. Since 1991, our trusted certification programs have set the standard for devices, test labs, technicians, and repair facilities, playing a crucial role in advancing the wireless industry.

IoT Network Certified™ is a custom certification program for cellular-enabled IoT devices. The program has been crafted to meet the specific needs of the IoT community. It simplifies and streamlines the process of certifying an IoT device according to industry standards for excellence, providing an efficient and affordable pathway for manufacturers.

Additional CTIA Device Certification Programs

CTIA Certification proudly operates 7 device certification programs covering everything from battery quality to cybersecurity for IoT devices. Our trusted programs, which keep pace with the curve-setting work done by our Working Groups, set the global industry standard for device durability, antenna performance, global network interoperability, and more.

- Battery Compliance Certification
- Battery Life Certification
- Device Hardware Reliability Certification
- IoT Cybersecurity Certification
- IoT Network Certified Program
- Over-the-Air Performance Testing
- PTCRB Certification

Visit **www.iotnetworkcertified.com** for more information on the IoT Network Certified program and **www.ctiacertification.org** for information on the entire portfolio of CTIA certification programs.

CTIA Certification™ is the global leader in certification for the wireless industry since 1991. Trusted certification programs set the standard for devices, technicians, test laboratories, and repair service facilities.