LPWA Solutions for Industrial IoT

Introducing a broad array of LPWA devices spanning both licensed and unlicensed spectrum
Why Choose MultiTech?

With more than 45 years in the communications industry, MultiTech is committed to supporting the growth and development of the Internet of Things in order to create new customer experiences and unparalleled economic value, while improving quality of life for countless people throughout the world. By providing products and services to connect “things” to the Internet, MultiTech delivers deeper understanding to businesses, governments, organizations and individuals, which will in turn transform the way we live and work.

That experience has proven that machine communications has more stringent requirements than consumer applications. Long life cycles, extremely low cost connectivity requirements, and ability to connect to devices in difficult to reach places are paramount to enabling IoT use cases that can change the world. For example, when it comes to connecting utility meters, power companies expect equipment to operate reliably, anywhere, for as long as 15 years, often times in harsh environmental conditions, and more often than not on battery power. Underground sensors or meters have historically been impossible to connect, as traditional technologies such as cellular, Wi-Fi and wired solutions, didn’t have the link budget to penetrate metal, reach underground or cost-effectively span miles of distances. Overcoming these core communication challenges of long lifetime, low cost, and long distance is crucial to enable growth of the IoT on the scale necessary to provide these life changing solutions. This is where LPWA comes in.

Low Power Wireless Area (LPWA) network technologies were specifically designed to solve these difficult IoT challenges. LPWA covers a range of communications options from unlicensed wireless to licensed cellular options, feature very low power consumption for long lifetime, can span incredible distances to connect devices previously thought impossible to reach, and do so in a cost-effective way that provides the ROI necessary to deploy and manage a myriad of IoT use cases. Suddenly, the art of the possible in the world of connected IoT devices is limitless – all thanks to LPWA technology.

Whether you prefer to work with established cellular carriers for the utmost reliability and availability or you prefer the flexibility and cost profile of an unlicensed approach, MultiTech has you covered with a range of LPWA devices to connect to both cellular networks and LoRaWAN™.
Unlicensed LPWA

Unlicensed LPWA offers the opportunity to free industrial applications from the consumer-driven cycles of the public cellular networks by providing the stability of public or private networks designed and built specifically for machines. These networks extend battery life and range and provide “good enough” connectivity for the large majority of connected device use cases. Among unlicensed LPWA technologies available today, multiple options are making names for themselves due to the anticipation of long lifetime and efficiency for machines. Options include LoRaWAN, Sigfox and RPMA (marketed by Ingenu, formerly OnRamp Wireless). Ultimately, we believe these technologies are very complimentary as each is suited to a subset of applications. Sigfox, for example, is ideal for simple sensor harvesting where its inherent limitations are acceptable due to the limited size and daily transmissions of the data being transferred and the need for optimal power efficiency. Ingenu offers a broader bit rate and tighter control, but the business model options and technical requirements (e.g., edge antenna diversity) generally requires an up-front CAPEX investment most suitable to very high-value assets where the additional complexity of integration can be effectively absorbed at the margin. LoRaWAN resides comfortable in the middle, providing higher bandwidth and a faster data rate than Sigfox at a slightly shorter range and smaller link budget than Ingenu, but with a lower up front cost and business model flexibility with both CAPEX and OPEX options. And while Sigfox and Ingenu are both on the path to building ubiquitous nationwide networks, LoRa offers the ability, for those who prefer it, to deploy a private network to cover a campus, farm, refinery, etc. as well as the option to work with public network service providers. For these reasons and others, industry analysts agree that LoRaWAN is likely to emerge as the undisputed leader among these technologies.

LoRaWAN™

LoRaWAN is a low-power, wide-area network (LPWAN) protocol intended for wireless, remotely located, often battery-operated, things in local, regional, national or global networks. LoRaWAN provides secure bi-directional communication, mobility and localization services, and seamless interoperability among smart things. Better yet, thanks to its low power consumption, a cost of pennies on the dollar compared to alternative technologies, and the ability for enterprises to deploy their own private networks for added security, LoRaWAN has the opportunity to facilitate the long-predicted huge IoT growth well before alternative technologies are broadly available.
MultiConnect® Products for LoRa® Technology

Leveraging the power of LoRa® technology, MultiTech has created a portfolio of gateways and embedded end nodes that enable your IoT applications in a myriad of outdoor and indoor use cases. These products were designed to ensure the quickest route to market based on your needs, programming capabilities, preferred use of resources and business focus, in order to deliver a fast return on investment and low total cost of ownership.

GATEWAYS:

**MultiConnect® Conduit™**

MultiConnect Conduit gateway, ideal for indoor industrial use, is the industry’s most configurable, manageable, and scalable communications gateway for industrial IoT applications. Network engineers can remotely configure and optimize their Conduit performance through DeviceHQ®, the world’s first IoT Application Store and Device Management platform.

The Conduit features two accessory card slots that enable users to plug in MultiConnect mCard™ accessory cards supporting their preferred wired or wireless interfaces to connect a wide range of assets to the gateway. Available options include a LoRaWAN™ mCard capable of supporting thousands of MultiConnect mDot™ or xDot™ long range RF modules connected to remote sensors or actuators.

**MultiConnect® Conduit™ IP67 Base Station**

MultiConnect Conduit IP67 Base Station is a ruggedized IoT gateway solution specifically designed for outdoor public or private LoRa network deployments. This highly scalable and IP67-certified solution is capable of resisting the harshest environmental factors including moisture, dust, wind, rain, snow and heat, supporting LoRaWAN applications in virtually any environment. Leveraging the MultiConnect Conduit, this solution can support thousands of LoRaWAN certified end nodes, including the MultiConnect mDot and xDot. It provides durable, low-power, wide area connectivity supporting IoT applications for both LoRa service providers and individual enterprises wanting to expand their LoRa network coverage. It can be deployed on an existing telecommunications tower, individual stand or wall mount.
MultiConnect® Conduit™ AP

MultiConnect Conduit AP Access Point for LoRa Technology is a cost-optimized gateway capable of connecting thousands of IoT assets to the cloud utilizing the LoRaWAN protocol. Based on the award-winning MultiConnect Conduit design, the Access Point is ideal for extending LoRa network coverage in difficult-to-reach areas such as subterranean spaces, and for increased in-building penetration where coverage is weak or not cost-effective. The Access Point enables LoRa use cases previously considered too expensive or too difficult to manage, like connecting assets where a full-sized gateway is too costly, e.g. in a retail supermarket, restaurant or hotel chain environment.

The Access Point is capable of forwarding control and user data packets between LoRa end nodes and a Network Server located either in the cloud, in an enterprise data center or on a public operator’s core network. The powerful mLinux™ development environment provides customers with the flexibility to program applications at the network edge and to send all or select data to the location of their choice.

ENDPOINTS:

MultiConnect® mDot™ & xDot™

MultiConnect mDot and xDot are secure, CE/FCC/RCM- certified, Arm® Mbed™ programmable, low-power RF modules, providing long-range, low bit rate IoT data connectivity to sensors and actuators.

The mDot and xDot are LoRaWAN compliant, providing bi-directional data communication up to 10 miles line-of-sight and 2-3 miles in buildings, using the global sub-GHz ISM radio bands in North America, Europe, and the APAC regions.

The mDot was the first Arm Mbed platform listed on mbed.org that was deployment ready. The mDot supports applications written and compiled in the mbed online environment using developer-friendly libraries. Decision making and control can be done at the edge, reducing the need to optimize RF performance and implement complex IoT middleware.

mDots and xDots bring intelligence, reduced complexity and a lower overall bill of material to the edge of the network while supporting a variety of interfaces to connect just about any battery-powered “thing”.
Licensed/Cellular

Though later to market than LoRaWAN™, the cellular carriers entry into the LPWA space are LTE Cat M and NB-IoT. These technologies have subtle differences that are targeted for specific use cases (e.g., voice and mobility for Cat M; and large range and power consumption for NB-IoT) to help customers decide which variant is right for their needs. Around the globe are currently enabling LTE Cat M networks and already preparing to roll out NB-IoT. And we’re right there with them, first to market with a variety of embedded and device products designed to leverage these purpose-built technologies. Use cases that require very high reliability or real-time/low latency connections, these new technologies enable customers to leverage the large and well established ecosystem, near ubiquitous infrastructure and dedicated spectrum to limit interference.

DEVICE PRODUCTS:

MultiConnect® Cell 100 Series

MultiConnect Cell 100 Series cellular modems are fully certified and carrier approved, so you can deploy faster and get your devices communicating. Now with LTE Cat M1 and NB-IoT functionality, the MultiConnect Cell 100 Series delivers secure data for remote operations, and integrate easily to extend the life of legacy equipment. Several chassis options are available to meet a variety of application needs and environmental demands.

EMBEDDED PRODUCTS:

SocketModem® Cell

The SocketModem Cell cellular modem is a complete, ready-to-integrate communications device that offers LTE Cat M1, 4G-LTE, 3G or 2G, GSM or CDMA data performance. These quick-to-market communications devices allow developers to add wireless communication to products with a minimum of development time and expense. The SocketModem Cell cellular modems are based on industry-standard open interfaces and use MultiTech’s Universal Socket design enabling easy technology transitions and drop and replace simplicity.
EMBEDDED PRODUCTS:

MultiConnect® Dragonfly™ Nano

The MultiConnect® Dragonfly™ Nano cellular SoM’s are fully certified and MNO approved, ready-to-integrate LTE Cat M1 modules that offer developers the functionality of a programmable computing platform with the convenience of an onboard cellular radio all in one very compact design. Dragonfly Nano is programmable using Arm Mbed™ allowing for rapid prototyping, development and deployment. With its integrated Cortex®-M4 processor, developers can host their application and have access to a full suite of interfaces for connecting sensors or other remote assets. The Dragonfly Nano uses the same 40-pin board to board connector and pin out found in the standard sized Dragonfly family providing a full range of connectivity and carrier options.

These LTE Cat M1 devices are 3GPP Release 13 compliant meaning they are optimized for ultra-low power IoT applications while offering improved range and in building penetration. Example use cases include battery operated sensors, asset trackers, solar powered parking meters and many more IoT applications that require low power and/or low data rate connectivity.

MultiTech DeviceHQ®

Available on select MultiTech Products

MultiTech DeviceHQ® is a cloud-based tool set for managing the latest generation of MultiTech devices. It incorporates all the functionality of MultiTech Device Manager, on which so many M2M and IoT applications already rely for remote monitoring, upgrades and configuration of entire device populations – whether one or 1 million. DeviceHQ takes remote device management and maintenance to a new level, by providing an application marketplace, allowing users to browse applications or build their own then easily deploy them to and customize them for remote devices from anywhere.
# Wireless Technologies for Every Application

Multiple Wireless Technologies, often Complimentary

## Long Range - Low Power

**Unlicensed ISM Bands**
- SigFox
- LoRa
- Ingenu & Wi-SUN

**Cellular Licensed Bands**
- NB-IoT
- LTE-Cat M
- LTE-Cat 1
- LTE-Cat 3 - 11

Bit Rate
- 100bps
- 10Kbps
- 100Kbps
- 1Mbps
- 100Mbps

## Mission Critical Data

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<th>Unlicensed ISM Bands</th>
<th>Bluetooth &amp; Wi-Fi</th>
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## Product Reference Guide

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### Included feature * Planned

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### Deployment

- Cellular
- E2E Only

### Cellular Technology

- 4G LTE Cat 4
- 4G LTE Cat S
- 4G LTE Cat 1
- LTE Cat-M
- NB-IoT
- 700MHz
- 2G GPRS
- 2G GPRS EDGE

### Wireless

- Wi-Fi
- Bluetooth
- LoRa

### Bit Rate

- 100bps
- 10Kbps
- 100Kbps
- 1Mbps
- 100Mbps

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