

MIOTY, the New LPWAN Standard, Provides Quality and Scalability for Worldwide Sub-1 GHz Communication



Wireless technologies are the backbone of our rapidly evolving, connected world. These technologies push different boundaries around communication speed, range and integration. Developers and manufacturers are looking for standardized solutions that offer a simplified approach to Internet of Things (IoT) design.

While communication speed has been a priority for decades, there's been a stronger focus lately toward long range and low power connected devices. The networks long-range, low-power devices use are often referred to as low-power wide-area networks (LPWANs). Examples of applications that benefit from LPWANs are environmental sensors like temperature and air quality and battery-powered flow meter sensors for [water](#), [heat](#) and [gas](#).

These sensors typically communicate very infrequently – with minutes to hours between each engagement. For such applications, the technology is optimized for long-range radio-frequency (RF) communication at the expense of high data throughput.

Today, LPWAN solutions have a lack of scalability and are less robust due to interference issues and coexistence problems with other radio networks. Many existing solutions are not able to offer very high data delivery consistency over time. Battery life is also limited due to inefficient transmission methods.

TI is one of the founding members of the recently formed MIOTY Alliance, which serves as the governing body of the MIOTY LPWAN solution. The MIOTY standard offers a complete long-range and low-power solution for worldwide Sub-1 GHz communication

MIOTY can help IoT developers overcome design challenges such as:

- Difficulty meeting long-range requirements.

- Achieving long battery lifetime.
- Performance degradation in high-node-count networks.

MIOTY has many inherent advantages, including:

- A combination of coding and narrowband operation enables long range RF communication.
- Reduced packet overhead and efficient coding result in current saving.
- More robust communication and larger networks are possible due to the telegram splitting.

The MIOTY solution offers a star network for low-power end/leaf nodes, as well as a gateway solution for cloud connectivity. As of today, MIOTY offers a private network, but the expectation is that third parties will also offer a network solution as a service.

The MIOTY standard operates in license-free bands around the world. There are no costs involved in using the radio spectrum, unlike narrowband IoT (NB-IOT) solutions.

Standard versus proprietary solution

The answer may seem obvious, but existing LPWAN solutions on the market today are suffering from a lack of standardization; some are driven by startup companies with an unproven track record. It isn't easy to make alterations to an RF protocol or system if you need to reverse the compatibility of an existing product, so it's important to choose the right solution now and for the future.

The basic MIOTY technology (physical layer [PHY]/Media Access Control) is based on a public technical standard by the European Telecommunications Standards Institute (ETSI) ([TS 103 357](#)) and can be downloaded by anyone at no cost. MIOTY has already been tested with three independent silicon providers, including Texas Instruments, using the CC1310 microcontroller (MCU).

Key benefits of MIOTY technology

MIOTY technology is a good fit for long-range, low-power and robust networks. It can scale to large networks and reach 5 km in urban areas.

Existing LPWAN solutions give the impression that there are multiple silicon providers available, but a more careful look reveals that some solutions use RF transceivers from only one or two companies – representing vendor lock-in. MIOTY is transparent with respect to important details like modulation formats (PHY). MIOTY solutions have already been tested with multiple vendors, which helps create real competition in the marketplace.

TI offers a complete family of products for MIOTY. The [CC1310](#) wireless MCU, part of the [SimpleLink™ platform](#), is an ultra-low-power system-on-chip that includes an RF transceiver and an Arm® Cortex®-M3 MCU plus peripherals. This device can fit a complete MIOTY stack as well as a small sensor application in a 4-mm-by-4-mm quad flat no-lead package. Larger memory and higher processing power alternatives are CC1312R and the CC1352R. CC1352R can in addition to handling sub 1 GHz MIOTY, also handle a Bluetooth Low Energy connection to a smartphone.

MIOTY is truly the LPWAN solution for the future. It offers scalable, robust network performance, which is a core requirement for industrial IoT. In addition, the MIOTY standard provides low power due to effective system architecture. When combined with the low power SimpleLink RF SoC, this architecture makes long battery life possible. As the IoT landscape continues to grow and evolve, the MIOTY standard and the SimpleLink platform create a viable connectivity option for worldwide Sub-1 GHz communication.

Visit www.mioty-alliance.com to learn more about MIOTY technology. Get started evaluating MIOTY with our evaluation kit: www.ti.com/mioty



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