

Sentrius™ Series

RM1xx Modules with LoRa® and BLE
RG1xx LoRa-Enabled Gateway
RS1xx LoRa + BLE Temperature and Humidity Sensor



What is LoRa®?



The **Enterprise Internet of Things (EIoT)** is a massive network of connected devices and sensors that is taking shape as new technologies bring connectivity to unprecedented applications. By 2020, ABI research predicts **40.9 billion wireless devices** will be connected, like smart meters, street lights, security sensors, industrial controls, and more. However, an infrastructure must be in place to enable the EIoT to thrive in remote areas. While current networks (like cellular) were made for very different applications with other requirements and priorities, **Low Power Wide Area Networking (LPWAN)** solutions are emerging to specifically address these EIoT applications.

Low Power Wide Area Networking (LPWAN) is not a specific technology, but rather a category of technologies. It provides wireless connectivity to extremely power conscious devices in networks that can blanket everything from large facilities to entire cities. This means using sensors and gateways to **enable data acquisition, provide useful controls, and generate logistical insights and actionable data**. Devices that were once impractical to connect are being designed into real world systems that were mere dreams just years ago. But these devices all need a robust, reliable wireless infrastructure built on specific technologies to manage and interconnect them.

Many protocols and technologies exist in this space, trying to solve this challenge in unique ways with different strengths and weaknesses. The most promising and flexible is **LoRa**, developed by [the LoRa Alliance](#) and powered by [LoRa chipsets from Semtech](#). [The LoRa Alliance](#) is a non-profit collection of companies that aims to standardize LPWAN worldwide via LoRa technology. Version 1.0 of the LoRaWAN™ specification was released in June 2015, providing a technology with a **remarkable balance when it comes to cost of deployment, flexibility, and performance**. Its core strengths make it an ideal LPWAN offering for EIoT that eliminates many costs and challenges associated with provisioning such a network.

Best Balance of LPWAN Characteristics and Features

Generally, LPWAN technologies (and therefore the choice of an EIoT solution) can be thought of in terms of three primary characteristics: **power consumption, range, and cost**. LPWAN is meant to provide connectivity over long ranges utilizing minimal power, but figures vary among competing solutions. LoRaWAN provides an attractive balance between the highest and lowest of LPWAN data rates, providing a theoretical **~21.9 kbps** that more than exceeds the requirements of the vast majority of LPWAN applications with overhead to spare (for example, this is nearly 40 times the maximum data rate of SIGFOX). Likewise, **when compared to LTE-M cellular solutions, LoRaWAN provides the same or greater range and is much less expensive**. In a large and competitive field of LPWAN options, LoRa provides the surest path to success.

	SIGFOX	LoRa	LTE-M (Cellular)
Data Rate	< 0.1 kbps ¹	~21.9 kbps	< 150 kbps ¹
Cost of Module	~\$5 - \$20	~\$5 - \$20	\$12 - \$65
Range	< 13 km ¹	Up to 15 km	< 15 km ¹
Ongoing Costs	Paid Subscription Model	Paid Subscription OR Free / Independent	Paid Subscription Model

1. Nokia Networks. "LTE-M – Optimizing LTE for the Internet of Things." Retrieved 11 Feb 2016.

Reduce or Eliminate Dependence on a Network Carrier

Where other competing solutions require you connect through existing gateways maintained by carriers for a fee, LoRaWAN uniquely allows you to connect to either **an open (public) network or to your own closed (private) network**. No other current LPWAN solution offers this self-contained, full-ownership option. Owning the complete infrastructure means not relying on a provider to continue supporting your LPWAN offering, mitigating risk when entering the EIoT space. This model has the triple advantage of **eliminating reliance on a third party provider, eliminating monthly subscription costs, and total end-to-end data control**, providing the smartest path forward into LPWAN networks at a time of competing solutions and providers.

Meets and Exceeds EIoT Requirements



LoRa's features and specifications make it an ideal EIoT solution, balancing throughput and range to optimize both while using minimal power. **LoRaWAN Class A** nodes like the Sentrius™ Series RM1xx or RS1xx sensor achieve either a **maximum range (Up to 15 km, around 10 miles)**, a **maximum data rate (~21.9 kbps)** or a balance of each as is required by the application. Class A LoRaWAN nodes are very power conscious, only enabling their **extremely efficient 10 mA RF receivers** briefly after transmitting, ideal for battery-operated remote devices. All LoRa-enabled nodes and gateways are interoperable and [can be certified with the LoRa Alliance](#), ensuring your device can migrate to any desired network hassle-free.

Enterprise Security for Sensitive Applications

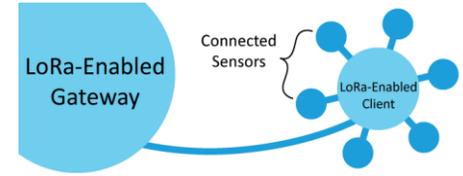
In addition to **AES-128 security**, LoRaWAN employs a scheme of **device, application, and network security keys** to authenticate end nodes and secure their traffic. This three-level approach ensures that only trusted devices can interface with your device and its application. The end result is public and private networks with heightened intelligence and the ability to screen and authorize just the nodes you want to participate on your network. LoRaWAN offers the kind of robust security that EIoT networks demand as the emergent wave of connected devices approaches.

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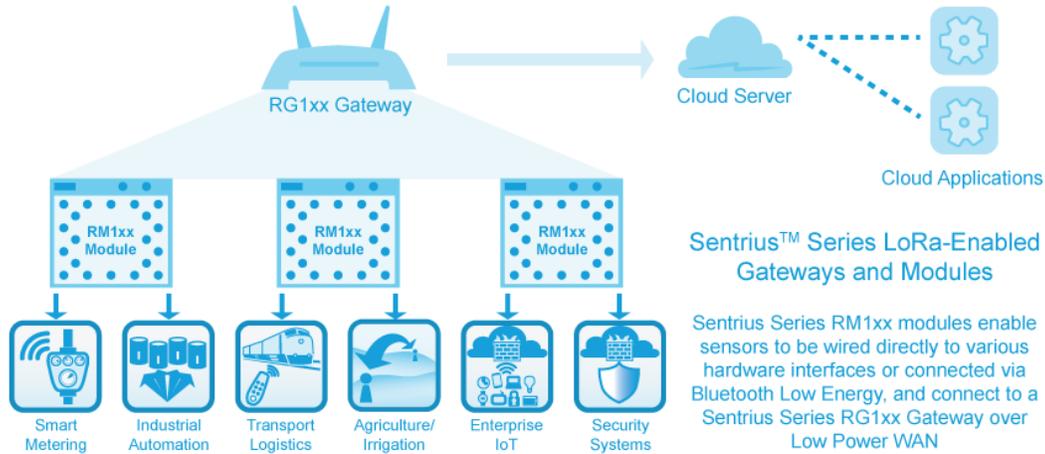
Interested in Laird's Sentrius Series?
Contact us at cs-sales@lairdtech.com

LoRa Structure

LoRa-enabled nodes are arranged in a star topology, with a gateway (a concentrator for all node activity) connected to many nodes (clients) in range. One such gateway is Laird's Sentrius™ Series RG1xx, which bridges node data over the internet for storage, access, and processing. Because LoRaWAN is bidirectional, data can also be pushed down to the client, triggering actions based on insights from the cloud or for administrative purposes.



Laird's Sentrius Series RM1xx series modules take the structure of LoRaWAN to the next level. The RM1xx is the first LoRa-enabled module that also contains Bluetooth® Smart (Bluetooth v4.0 or BLE). This creates a more powerful and flexible star of stars topology in which the RM1xx module acts as a bridge between the Personal Area Network of Bluetooth v4.0 and the Wide Area Network of LoRaWAN. This means BLE devices, which regularly have a range of a few meters, can communicate for miles with the RM1xx, enabling a massive array of new applications. And now with the introduction of **Laird's RS1xx self-contained LoRa+BLE sensor**, you can gather up-to-date temperature and humidity data directly to the RG1xx gateway with minimal setup and configuration.



LoRaWAN Is an Ideal Protocol for Countless EIoT Applications

Smart, Central Metering



The Sentrius Series RM1xx is ideal for smart metering. It may be connected to a residential utility meter and transmit usage data to a Sentrius Series RG1xx within 10 miles. Low-volume data means low data rates and batteries lasting years without replacement. Data may further be routed to cloud storage and applications for processing, billing, analytics, and insight.

Industrial Automation



Sensor data can provide deep insights needed to maintain efficiency and productivity, especially in manufacturing. Sensors can monitor and report output vs. targets, downtime vs. uptime, and other critical metrics from the floor across an entire facility with LoRaWAN. The Sentrius Series RG1xxx covers an entire facility and gathers intelligence with ease.

Remote Security Monitoring



The Sentrius™ Series RM1xx excels with home security devices like door, window, and motions sensors. An RM1xx-powered home security system can broadcast its status regularly to a monitoring station via the Sentrius Series RG1xx Gateway. As many as eight BLE peripherals can be connected to the system via a single RM1xx, creating a hub of smart BLE home sensors.

Municipal Assets Management



Cities and towns can take control over street lights, traffic signals and more with LoRa. Signal and sensor data can be collected over LoRaWAN to improve traffic. RS1xx sensors can catalog environmental data. Damaged devices can call for repairs. Tracking assets across large areas requires a full-scale network. LoRaWAN makes this network easy to build and maintain.

Laird's LoRa-enabled Sentrius™ Series RM1xx modules, RG1xx gateway and RS1xx sensor uniquely bring Bluetooth Smart (BLE) and LoRa together, enabling exciting new applications for the Enterprise Internet of Things. The Sentrius Series builds on the flexibility, security, stability, and efficiency of LoRa to provide the most innovative, powerful, easy to use LoRa-enabled module and gateway available. And with *smartBASIC*, Laird dramatically simplifies your application development to reduce your time to market. Visit lairdtech.com/products/rm1xx-lora-modules, lairdtech.com/products/rg1xx-lora-gateway, and lairdtech.com/products/rs1xx-lora-sensors to learn more.