SigFox Vs. LoRa: A Comparison Between Technologies & Business Models

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SigFox and LoRa have been competitors in the LPWAN space for several years. And while the business models and technologies behind the companies are quite different, the end goals are very similar. The goal of the LoRa Alliance, LoRaWAN adopters, and SigFox is that mobile network operators adopt their technology for IoT

deployments over both city and nationwide low power, wide-area networks (LPWANs). But there are some prominent differences between how each technology plans to achieve this goal and which applications the technology is best suited for.

Technology

SigFox

SigFox is a narrowband (or ultra-narrowband) technology. It uses a standard radio transmission method called binary phase-shift keying (BPSK), and it takes very narrow chunks of spectrum and changes the phase of the carrier radio wave to encode the data. This allows the receiver to only listen in a tiny slice of spectrum which mitigates the effect of noise. It requires an inexpensive endpoint radio and a more sophisticated basestation to manage the network.

See also: **Sigfox Resource Page**

SigFox communication tends to be better if it's headed up from the endpoint to the basestation. It has bidirectional functionality, but its capacity going from the basestation back to the endpoint is constrained, and you'll have less link budget

going down than going up. This is because the receive sensitivity on the endpoint is not as good as the expensive basestation.

See also: **What Is SigFox?**

LORA & LORAWAN

For the purpose of this article, we'll compare LoRa (a chirped modulation format) and LoRaWAN (a MAC-layer protocol) to SigFox. **LoRa** is a spread-spectrum technology with a wider band (usually 125 kHz or more). Its frequency-modulated chirp utilizes coding gain for increased receiver sensitivity.

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LoRaWAN looks at a wider amount of spectrum than SigFox (and thus gets more interference). However, because it's looking for a very specific type of communication, the elevate noise due to a larger receiver bandwidth is mitigated by the coding gains. Practical link budgets are about the same for SigFox and LoRaWAN.

Unlike SigFox, both the endpoint and the basestation are relatively inexpensive with LoRa-enabled devices. This is primarily because you can use the same radio for a receiver on the basestation and at the endpoint. While the LoRaWAN basestation tends to be more expensive than the endpoint, it's inexpensive in comparison to a SigFox basestation.

See also: **What Is LoRa?** & **What Is LoRaWAN?**

Business Model

SIGFOX

The SigFox business model takes a top-down approach. The company owns all of its technology—from the backend data and cloud server to the endpoints software. But the differentiator is that SigFox is essentially an open market for the endpoints. SigFox gives away its endpoint technology to whatever silicon manufacturer or vendor wants it so long as certain business terms are agreed upon. Large manufacturers like STMicroelectronics, Atmel, and Texas Instruments make SigFox radios. SigFox thinks that allowing the application to be really inexpensive is the way to drive people to its market

SigFox endpoints use commodity MSK radios, and they are relatively inexpensive. You can get a chip for a few dollars and a module for less than $10 in high volumes, so SigFox partners aren't bringing in much money from the hardware itself. SigFox makes its money by getting network operators to pay royalties on reselling its technology stack to customers. In other words, SigFox gives away the hardware enablers but sells the software/network as a service. In some cases, the company actually deploys the network and acts as the network operator. This is the case in France and in the US; when you buy LPWAN service there, you're operating on a SigFox network.

SigFox's ultimate goal is to get large network operators from all over to world to deploy its networks. It has raised more than €100 million to do this and has great global reach. SigFox has been around since 2009 (longer than almost everyone else in the space), and it's likely the most aggressive marketer in IoT.

SigFox is of the opinion that it's easier to work with mobile network operators or deploy networks itself and charge a small recurring fee than to sell expensive hardware at the endpoint. However, there are some challenges associated with this business model. For one, if you want to deploy a SigFox network, you have to work directly with SigFox—there isn't another option. Additionally, only one SigFox network can be deployed in an area, because the company has exclusive arrangements with network operators when they work together.

LORA

The LoRa Alliance has a different strategy. They would say they're more open than SigFox, strictly because the specification that governs how the network is managed is relatively open. You can download the specifications and join the LoRa Alliance, and any hardware or gateway manufacturer can build a module or gateway that conforms with the LoRa specifications. The catch is that the only company that makes the radio for LoRa is Semtech. (They've announced licensing to other silicon manufacturers in the future, but Semtech is the only option right now.) So while the ecosystem itself is open, it does have a closed element.

One nice thing about LoRa's open standard is its potential to be very flexible; it's not going to be driven by a specific company. In practice, this does force development to be a little slower, because you're developing standards by committee.

The LoRa Alliance believes that openness creates adoption, so members stress that *anyone* can join the Alliance and build hardware to support it. The trick here is how companies who adopt LoRaWAN can add value. Just like SigFox, the LoRa Alliance wants network operators to deploy the LoRa network—but they also want private companies and startups to do so. To allow for this, they've developed some discussion around roaming network to network. The business and technology around this idea isn't fleshed out yet, so one of the next steps will be to figure out how to

allow for roaming from public network to public network and private network to private network.

Use Cases For LoRa & SigFox

LoRa is likely the better option if you need true bidirectionality because of the symmetric link. So if you need command-and-control functionality—for, say, electric grid monitoring—LoRa is your best option. (Full disclosure: Link Labs is a proud member of the LoRa Alliance, and we build on this technology. Check out how our systems integrate here.)

With SigFox, you could use bidirectional command-and-control functionality, but to work appropriately, network density would need to be higher (due to the asymmetric link). Therefore, it is better for applications that send only small and infrequent bursts of data (like alarms and meters).

Other than these minor differences, SigFox and LoRa serve similar markets. It's worth noting that both technologies were originally designed for the European regulatory bands between 865 and 868 mHz, and they've both faced challenges in coming over to the regulatory markets in the U.S. Progress is being made, and both technologies are working toward optimization for FCC use.

Takeaway

If you're an application provider building a dog tracker and you want to go on a *public* network, both are good options for you—but only if the network is there. Be sure to find out if the network you're looking at is deployed in the market you're building in. If you're deploying a *private* network, LoRa is your only option. Let's talk.

We won't say which of the two technologies will build networks faster, or where they

will build them—but we will continue to track them and monitor their successes.

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Before Link Labs, Glenn worked at the Department of Energy bringing energy efficiency to main street businesses, and was also a co-founder of ECORE Ventures, a cleantech project development company. He graduated from the U.S. Naval Academy, where he eventually went back to teach Energy Policy as a military officer and civilian professor. Prior to his return to USNA, he was a submarine officer stationed in Virginia on a guided missile sub.

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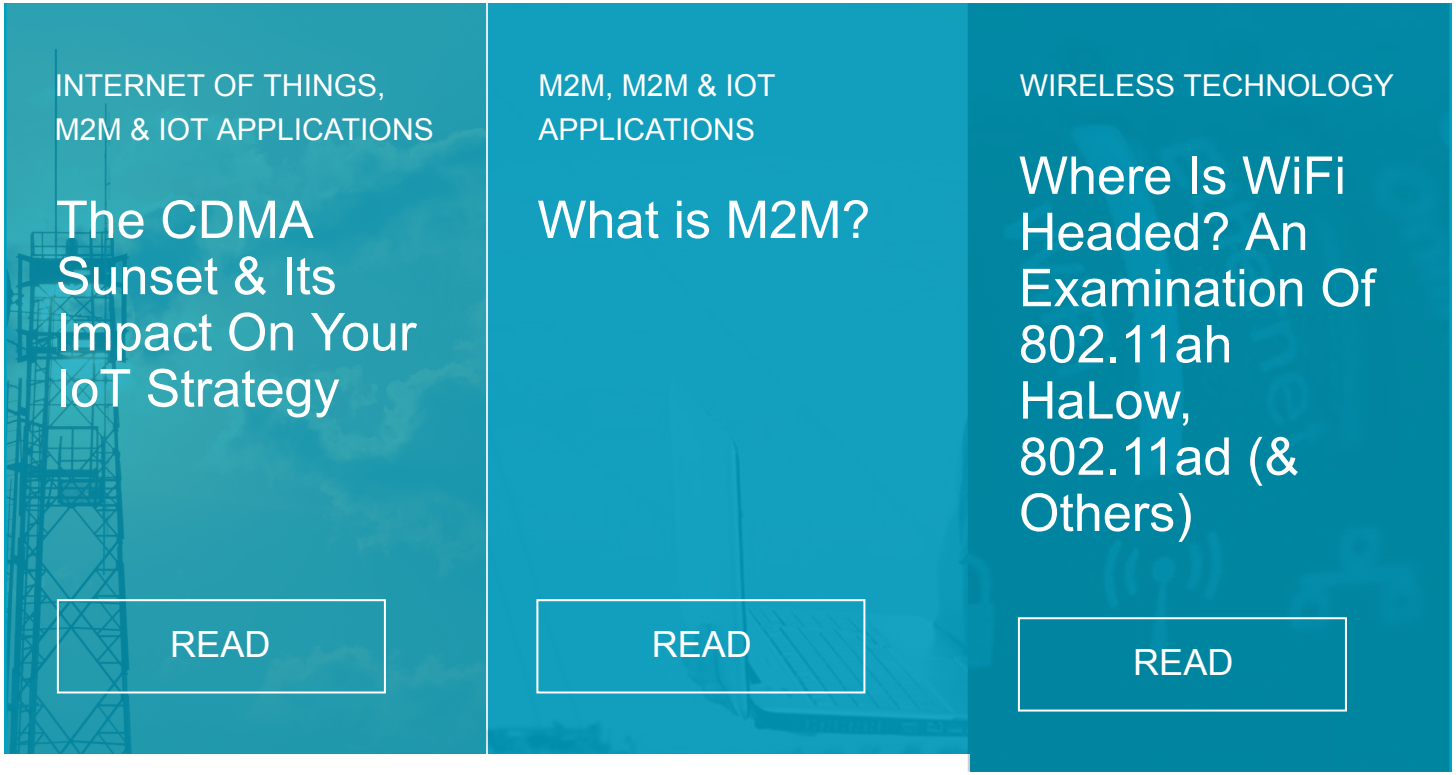

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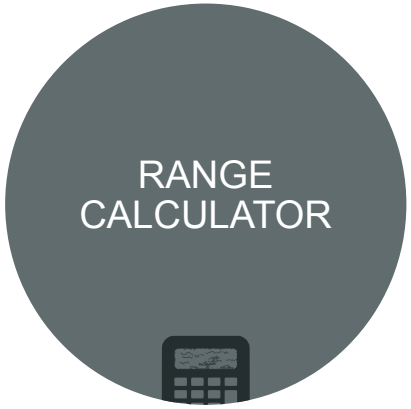

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