

# The Rise of LPWA



## Introduction

The options for industrial connectivity are broad and growing, including analog, Ethernet, cellular, satellite, Bluetooth, Wi-Fi and the up-and-coming Low Power Wide Area (LPWA) technologies, which seek to address key limitations of the others in order to better enable the growing Internet of Things, specifically: range, cost and battery life.

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We're now at the stage where cellular operators are voluntarily shutting down the earliest 2G networks and driving M2M/IoT customers to not only upgrade their physical devices, but also purchase bandwidth beyond what is needed for M2M and IIoT applications – 75% of which use less than one megabyte per month of data. The global carrier community is looking to variants of LTE and even forward years to 5G to address this disconnect. Unfortunately, from a practical perspective, these alternatives (LTE Categories 1 and M and Narrow Band IoT [5G]) are still on the horizon in terms of immediate adoptability. This timing disconnect has created a window of opportunity for unlicensed LPWA networking solutions like LoRaWAN™. LoRa® technology-based solutions can run for years on batteries and operate in locations other technologies simply don't reach. Plus, because it operates on unlicensed spectrum, they deliver device connectivity at a fraction of the cost of cellular or even analog wireless solutions.

## What are your Options?

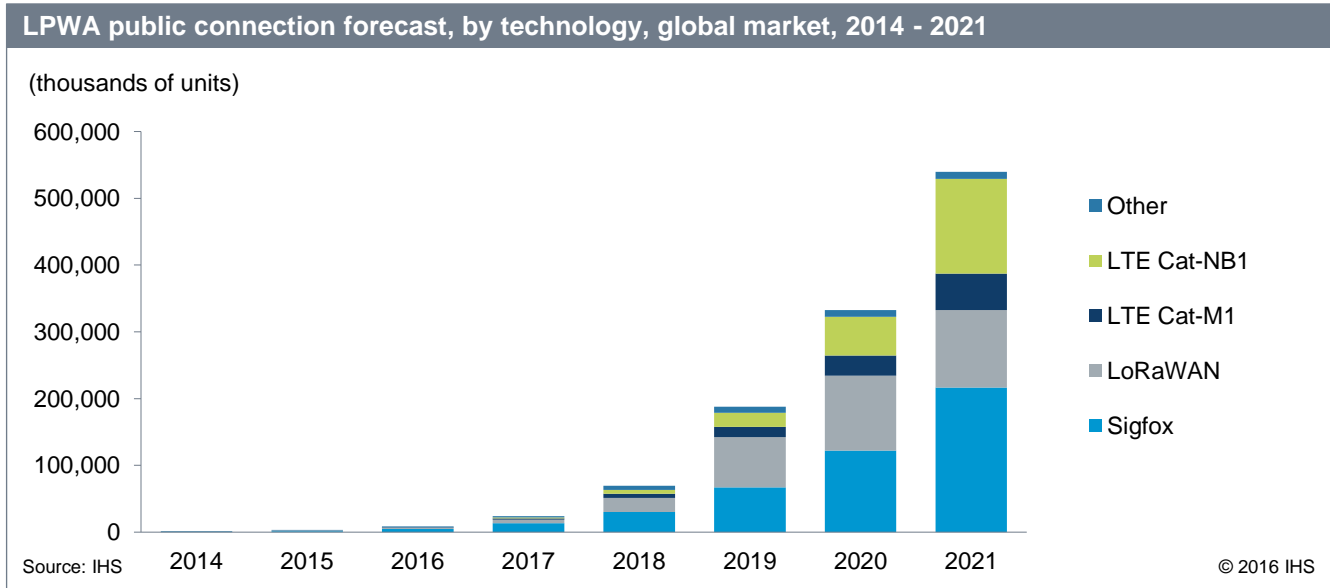
Among LPWA options available today, the leader has yet to emerge. Multiple options are making names for themselves. They include LoRaWAN, Sigfox and RPMA (Ingenu, formerly OnRamp Wireless). Each offers long range and long battery life, but they have important differences which impact their suitability to particular purposes. There are new offerings coming out from the cellular carriers including LTE Categories 1 and M, and narrow-band IoT (5G).

Feature	LoRaWAN Now	Sigfox Now	LTE Cat-1 Now	LTE Cat-M1 2017 (Rel13)	LTE Cat-M2 NB-IoT 2018 Rel13+
Modulation	SS with Chirp	UNB / GFSK - BPSK	OFDMA	OFDMA	OFDMA
Rx bandwidth	500 - 125 KHz	100 Hz	20 MHz	1.4 MHz	200 KHz
Data Rate	290 - 50K bps	100 bps 12 / 8 bytes Max	10 Mbps	380 Kbps	40 Kbps
Max. # Msgs/day	Unlimited	UL: 140 msgs/day DL BC: 4 msgs/day	Unlimited Single Ant (200KB)	Unlimited	Unlimited

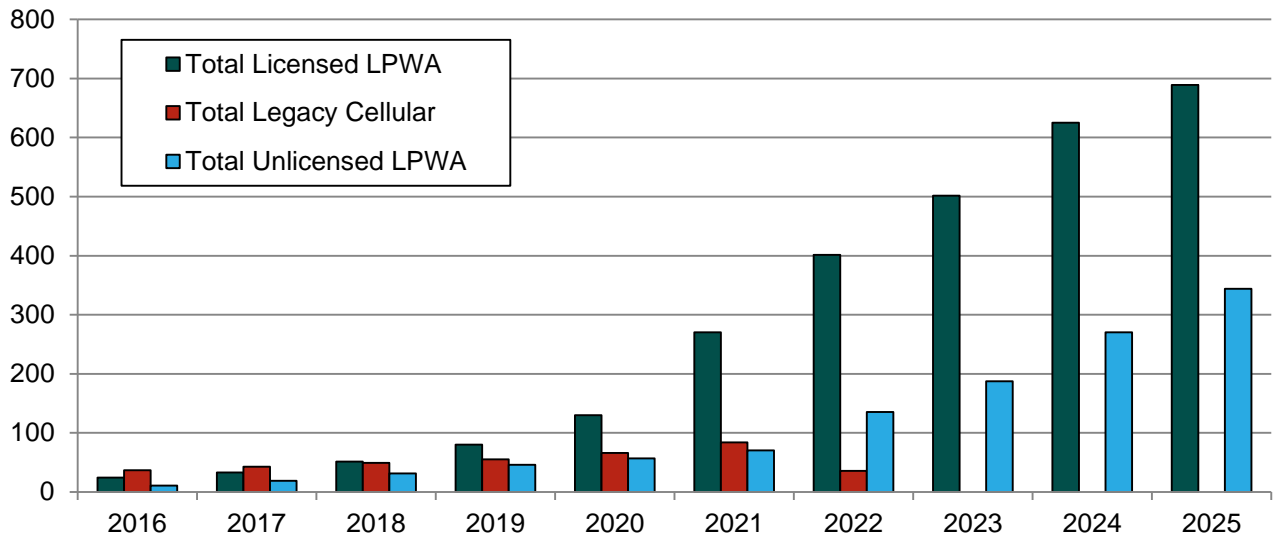
Max Output Power	20 dBm	20 dBm	23 - 46 dBm	23 dBm	20 dBm
Link Budget	154 dB	151 dB	130 dB+	146 dB	150 dB
Communication channel	Half Duplex	Quasi Half Duplex	Full Duplex	Half Duplex	Half Duplex
Power Efficiency	Very High	Very High	Low	Medium	High
Complexity	Very Low	Very Low	High	Medium	Low
Coexistence	Yes	No	Yes	Yes	Yes
Security	Yes	No	Yes	Yes	Yes
Mobility/localization	Yes	Limited/No	Yes	Yes	Limited/No

## A Bigger Pie

To the casual observer, it may appear that the race is on to become the connection technology of choice, but we believe there is no clear winner takes all – as each available technology provides unique suitability for particular applications. It seems analysts agree, predicting solid growth across all available and emerging LPWA technologies.



Total chipset shipments by technology type (Millions)



Source: ABI Research

Applications which leverage multiple connectivity technologies can provide profound value with an improved return-on-investment, as they can be more flexible than strictly mobile or fixed applications. That's why MultiTech offers many embedded devices and modems, gateways and routers that address connectivity across many technologies including analog, Ethernet, cellular, PAN and multiple "flavors" of LPWA.

MultiTech is committed to supporting the growth and development of the Internet of Things 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 transform the way we live and work.

## Contact Us Today!

Call **1-800-833-3557** to speak with your local Arrow M2M business development manager, or email us at [m2m@arrow.com](mailto:m2m@arrow.com) for more information.



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