What is LPWA?
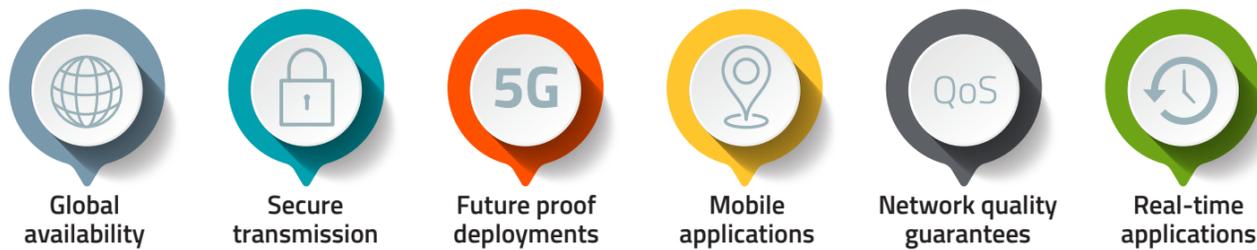
Low-Power Wide-Area (LPWA) networks deliver a new class of wireless technology specifically designed for low data IoT applications.
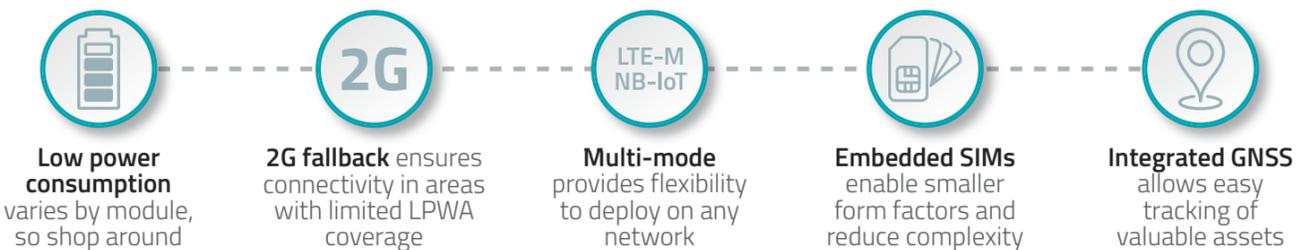
LPWA / LPWAN

STANDARDS-BASED
- LTE-M
- NB-IoT
- EC-GSM-IoT

Also known as:
- eMTC
- Cat-M

PROPRIETARY
- LoRA
- Sigfox
- Ingenu

What You Need To Know Before You Start Development

Standards-Based Advantages

- **Global availability**
- **Secure transmission**
- **5G** — **Future proof deployments**
- **Mobile applications**
- **QoS** — **Network quality guarantees**
- **Real-time applications**

Module Spec Considerations

- **Low power consumption** varies by module, so shop around
- **2G** — **2G fallback** ensures connectivity in areas with limited LPWA coverage
- **LTE-M NB-IoT** — **Multi-mode** provides flexibility to deploy on any network
- **Embedded SIMs** enable smaller form factors and reduce complexity
- **Integrated GNSS** allows easy tracking of valuable assets

Four C's of LPWA

Four C's of LPWA*

COST
> 50% reduction -
Think Wi-Fi or Bluetooth

CAPACITY
1 million users per square kilometer

CURRENT
>75x lower power -
10+ years battery life

COVERAGE
>20dB coverage -
5-10x improvement

*Comparisons to broadband LTE
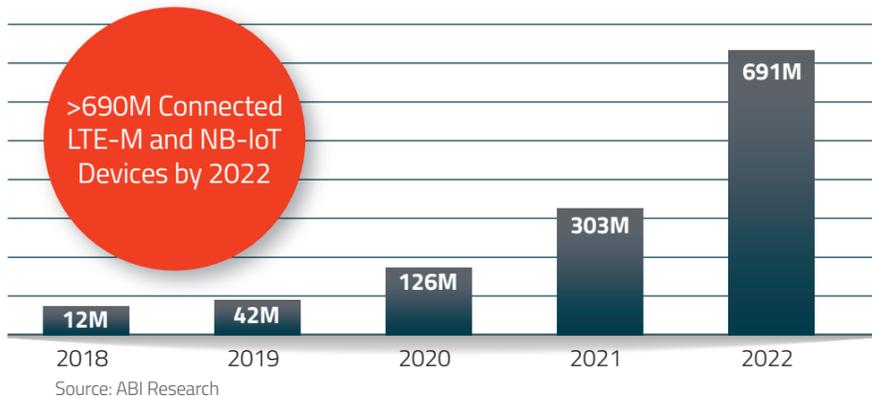
Technologies Driving Change

COST DRIVERS: Half duplex, lower bandwidth, lower speed, single antenna all drive down the module complexity.

CAPACITY DRIVERS: Signaling optimization, narrowband transmission, HARQ, frequency hopping, adaptive modulation, and higher order modulation all increase the network capacity.

CURRENT DRIVERS: Power savings mode (PSM), small data optimization, and flexible sleep (eDRX) all reduce the power consumption of devices.

COVERAGE DRIVERS: Repetition; hybrid automatic repeat request (HARQ), downlink power spectral density (PSD) boosting, frequency hopping, and selective scheduling all extend signal coverage.
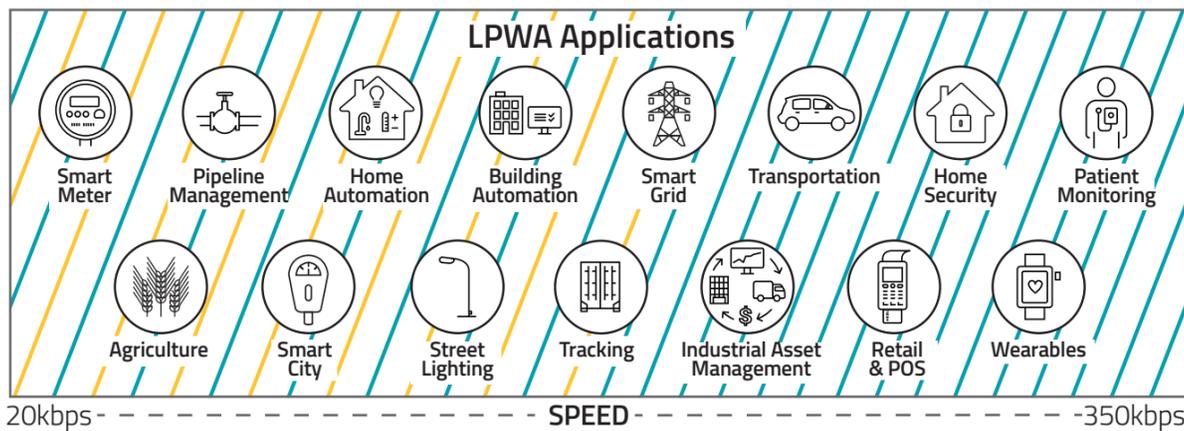
Forecast of LTE-M and NB-IoT Connections Globally (Millions)

>690M Connected LTE-M and NB-IoT Devices by 2022

- 2018: 12M
- 2019: 42M
- 2020: 126M
- 2021: 303M
- 2022: 691M

Source: ABI Research

Two Leading LPWA Technologies

NB-IoT — 5G ready
- Focused on very low data rates
- Ideal for simpler static sensor applications

LTE-M / eMTC / Cat-M — 5G ready
- Highest bandwidth of any LPWA technology
- Ideal for fixed and mobile applications

Batch Communication --------- LATENCY --------- Real-Time Communication

LPWA Applications

- Smart Meter
- Pipeline Management
- Home Automation
- Building Automation
- Smart Grid
- Transportation
- Home Security
- Patient Monitoring
- Agriculture
- Smart City
- Street Lighting
- Tracking
- Industrial Asset Management
- Retail & POS
- Wearables

20kbps --------- SPEED --------- 350kbps

	NB-IoT	LTE-M
	REL 13	REL 13
Power Consumption	75X or 10 Years	
Network Coverage	20dB or 164 dB MCL	
Deployment	In-band, Guard-band, Stand alone	In-band
Worldwide SKU	Yes	
Bandwidth	180kHz	1.08MHz
Data Rate (DL/UL)	27/65kbps	300/375kbps
Resource Allocation	pre-allocated	dynamic
Mobility	no	yes
Real Time	no	yes
Voice	no	yes
Network Requirements	mostly software upgrade	software upgrade

For more information, **visit sierrawireless.com/LPWA**