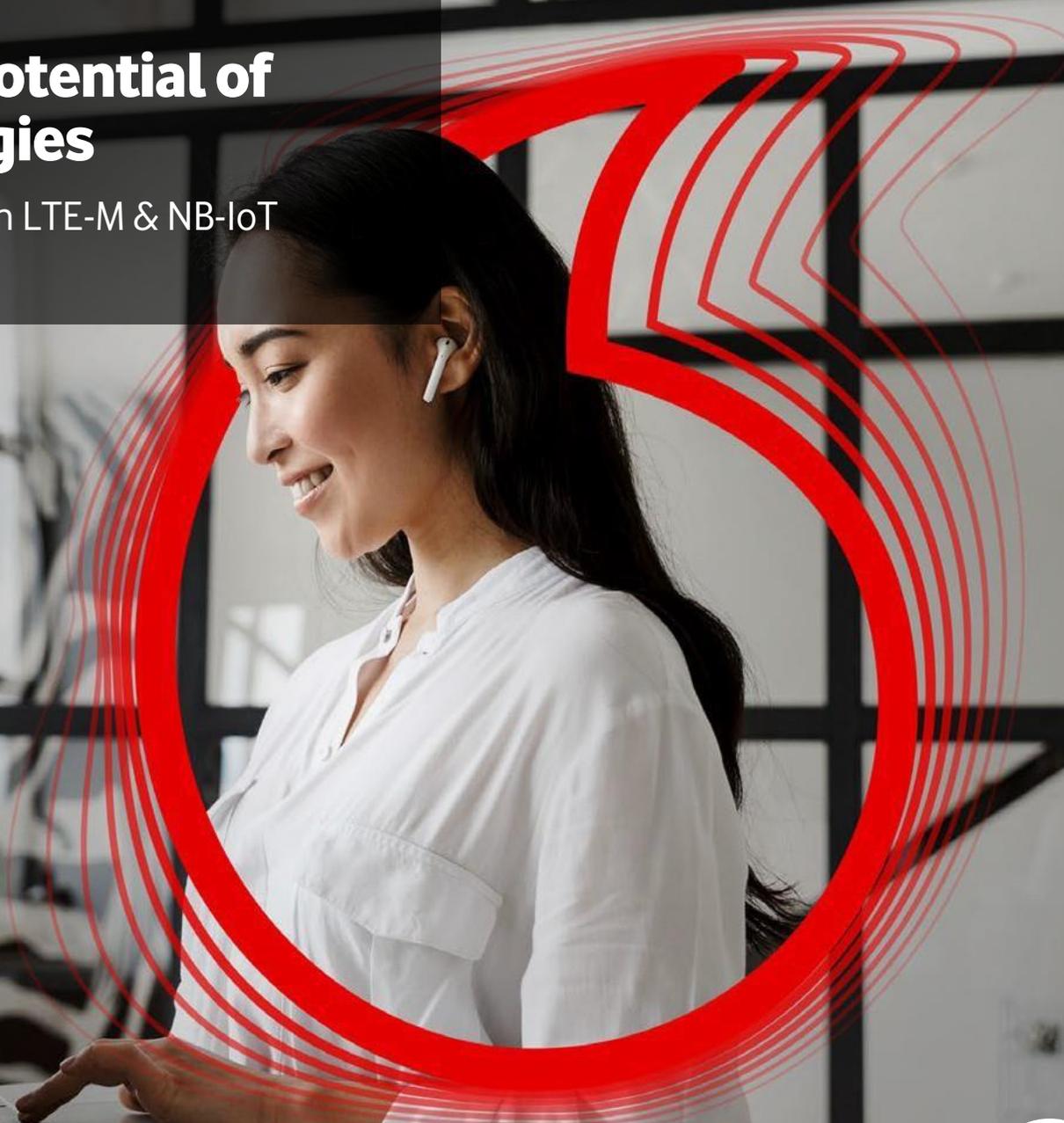


Unlocking the potential of LPWA technologies

Seamless connectivity with LTE-M & NB-IoT



Together we can
vodafone
business

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Introduction

In today's rapidly evolving digital landscape, the potential of LPWA (Low-Power Wide-Area) technologies is immense. These technologies enable the connectivity of a wide range of devices, leveraging low power consumption and extensive coverage capabilities. For deeper coverage, whether underground or in remote regions far from any cellular site, LPWA technologies outperform traditional cellular networks. Additionally, LPWA technologies offer a longer battery life, reducing the number of maintenance inspections required for IoT devices and resulting in operational savings. Moreover, LPWA modules are generally more cost-effective, often cost effective in comparison with cellular modules.

Vodafone is at the forefront of developing LPWA roaming, with inter-carrier roaming agreements that provide a larger footprint for customers to utilise and experience the benefits of LPWA networks. These agreements also help drive industry standards for LPWA networks. As we continue to invest in the global reach of LPWA networks, Vodafone's LPWA solutions offer secure, efficient, and scalable options to keep your assets connected globally.

There are differences between LTE-M and NB-IoT and the purpose of this document is to help you decide based on the use cases for which IoT Connectivity is needed. By understanding the unique advantages and applications of each technology, businesses can choose the most suitable LPWA solution to meet their needs.

If you are looking for long-range, low-power connectivity for your IoT devices, Vodafone's LPWA solutions are the ideal choice. With our commitment to innovation and industry leadership, we are dedicated to unlocking the full potential of LPWA technologies.

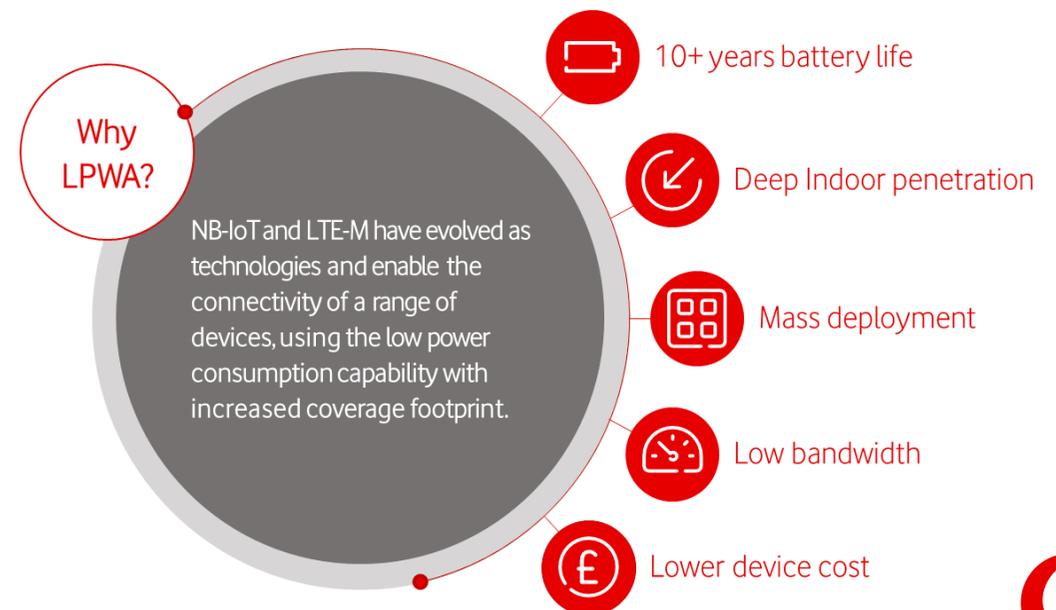


What is LPWA?



Low Power Wide Area (LPWA) is a type of wireless telecommunication wide area network designed for connecting devices with low bandwidth requirements whilst providing increased penetration with the added capability of using low power.

Narrowband IoT (NB-IoT) and **LTE Machine Type Communications (LTE-M)** are two such LPWA technologies that are standardized and are now part of the 5G specifications.



What opportunities LPWA enables?

LPWA networks allow a wide range of opportunities, the evolved spectrum has introduced some new capabilities which allow a range of requirements to be addressed.



Gas metering

Large homogenous market measured in millions
Battery life and propagation are critical
Large number of potential meter manufacturers



Water metering

Large homogenous market measured in millions
Battery life and propagation are critical
Large number of potential meter manufacturers



Liquid and pressurised fuels

Large homogenous market measured in millions
High Losses where asset are not monitored
Battery life is critical



Smart bins

Growing market with good business case
Battery life and network coverage are critical
Complements our high-end connected bins



Environmental monitoring

Latent market waiting for a low power solution
Battery life and network coverage are critical
Fragmented channel to market in low volumes



Smoke and fire alarms

Massive market measured in hundreds of millions
Battery life & ability to test device are critical
High volume B2C play



Parking monitoring

Market measured in hundreds of thousands
Battery life and low install cost are critical
Low data throughput



Alarms and event detectors

Market measured in hundreds of thousands
Battery life is ultra critical
Very low data throughput on check and trigger



How LPWA technologies compare?

A NB-IoT device can achieve a battery life of around 10+ years, while an LTE-M device will likely have a battery life of around 5-10 years.

The longer battery life offered by NB-IoT reduces the number of device maintenance inspections required, allowing for operational savings.

For deeper coverage, whether underground or in a remote region far from any cellular site, NB-IoT outperforms LTE-M by a range of approximately 10dB.

There are multiple LPWA technologies but only NB-IoT and LTE-M use licensed spectrum, tailored with the security provided by Mobile Network Operators (MNOs) which give users an added layer of service assurance.

	Unlicensed services	Licensed service
Leverages existing network	●	●
Extended battery life	●	●
Deep indoor coverage	●	●
SIM security for the IoT	●	●
Experienced network support	●	●
Standard-based (non-proprietary)	●	●
Bandwidth available	●	●
2-way communication	●	●
Low device cost	●	●



Licensed standards provide significantly better security



NB-IoT or LTE-M?

There are differences between NB-IoT and LTE-M. For example, maximum speed, deployment scenarios, latency, and battery life.

	NB-IoT	LTE-M
Maximum Speed ¹	Up to 0.07 Mbps	Up to 1 Mbps
Deployment Scenarios	Stationary (good for indoor & underground)	Mobile/Stationary (good for indoor)
International availability & roaming ²		
Data Transfer Frequency	Intermittent	Intermittent
Lower Response Time (Latency)	Slow (~1 sec)	Medium (~100ms)
Mobility	Handover between cells not supported	
Typical total cost of ownership	Ultra low	Low
Battery Life	More than 10 Years	5-10 Years
SMS		

1. Maximum speed depends on actual network conditions and will be typically lower

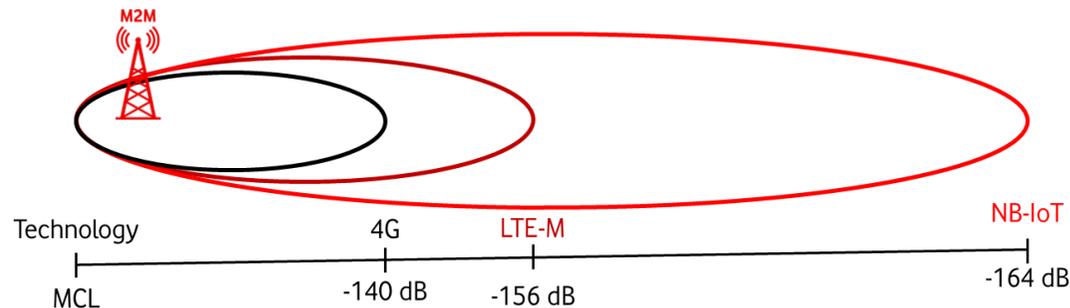
2. Depends on the specific deployment: type of devices, roaming countries, amount of data exchanged, etc.



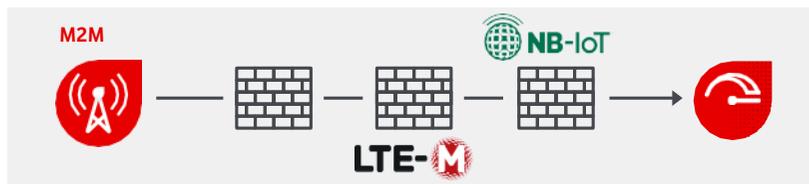
NB-IoT or LTE-M?

One of the main features concerning LPWA technologies is the enhanced coverage capability. This is improved for LTE-M and the improvement is great when compared to 4G. This is achieved by a few factors:

- Number of repetitions of transmissions
- New control channels (usage of Non Access Stratum)
- Size of UE bandwidth



Based on our previous testing, NB-IoT has the ability to penetrate two to three double brick walls, enabling connectivity in underground car parks and basements.



(Note +10dB approximately equates to one brick wall).



What is the LPWA device ecosystem?

Vodafone works with several OEMs, we have tested and GCF certified a number of their devices, some of which are listed below.



IoT Chipsets

Today there are a number of chipsets available for NB-IoT and LTE-M and in varying combination with other technologies. These chipsets range from entry level with basic functionality to more complex, which also include application processing capabilities.

From a radio perspective, the available options offer a combination of the following:

- NB-IoT
- LTE-M
- 2G GPRS
- GSM

IoT Modules

Manufacturers of IoT modules have adopted NB-IoT as well as LTE-M. This evolution of LPWA modules has facilitated a reduction in price which is now 2 to 3 times lower.

Vodafone is working with IoT module vendors to integrate and test their devices on our network. We have NB-IoT Open Labs available in Newbury (UK), Düsseldorf (DE), Milan (IT), Midrand (RSA), Redwood City (CA).

Through our Düsseldorf lab we offer IoT module certification services. For more information, please visit our website and download the IoT device test and support document which is located here:

[Vodafone Innovation Park | Vodafone](#)



Why are LPWA devices more cost effective?

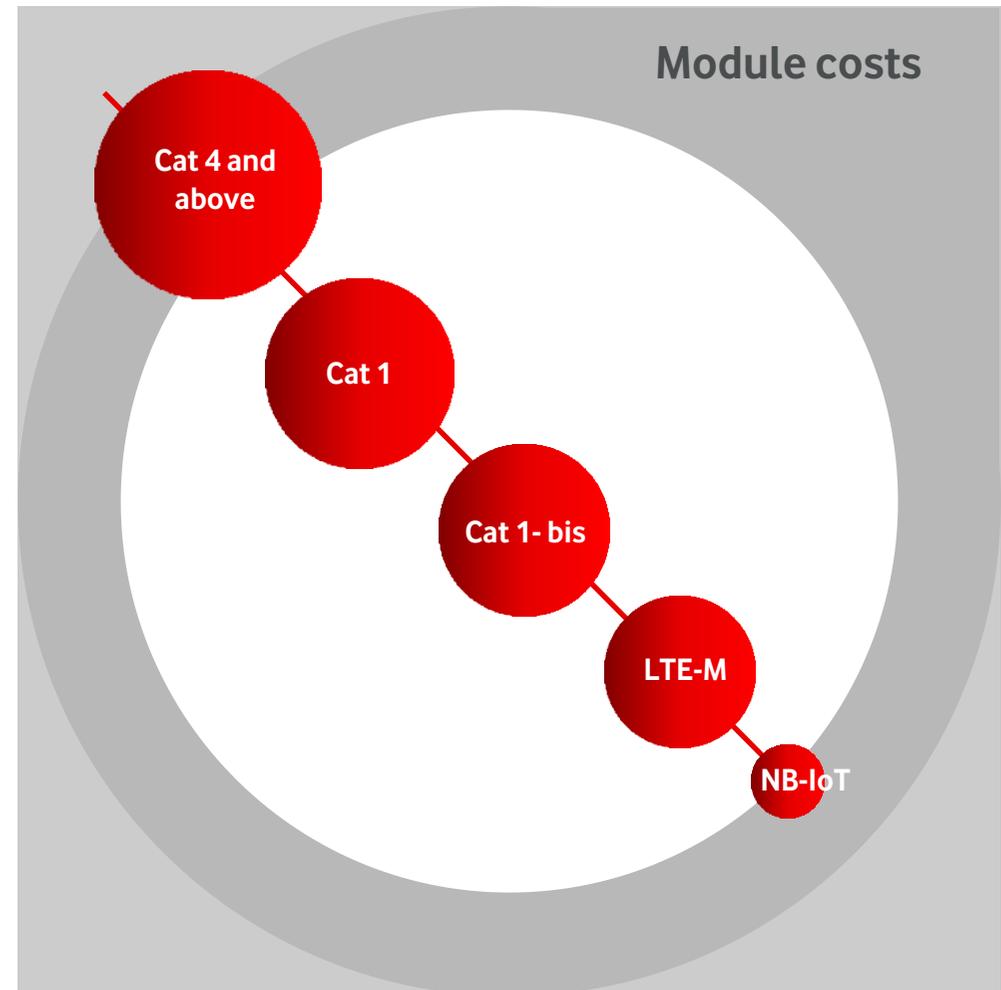
The device architecture for LPWA devices is similar but less complex than the architecture of cellular devices.

Module costs are directly reduced by:

- Half duplex operation
- Single antenna
- Reduced memory requirements
- Lack of IPR floor

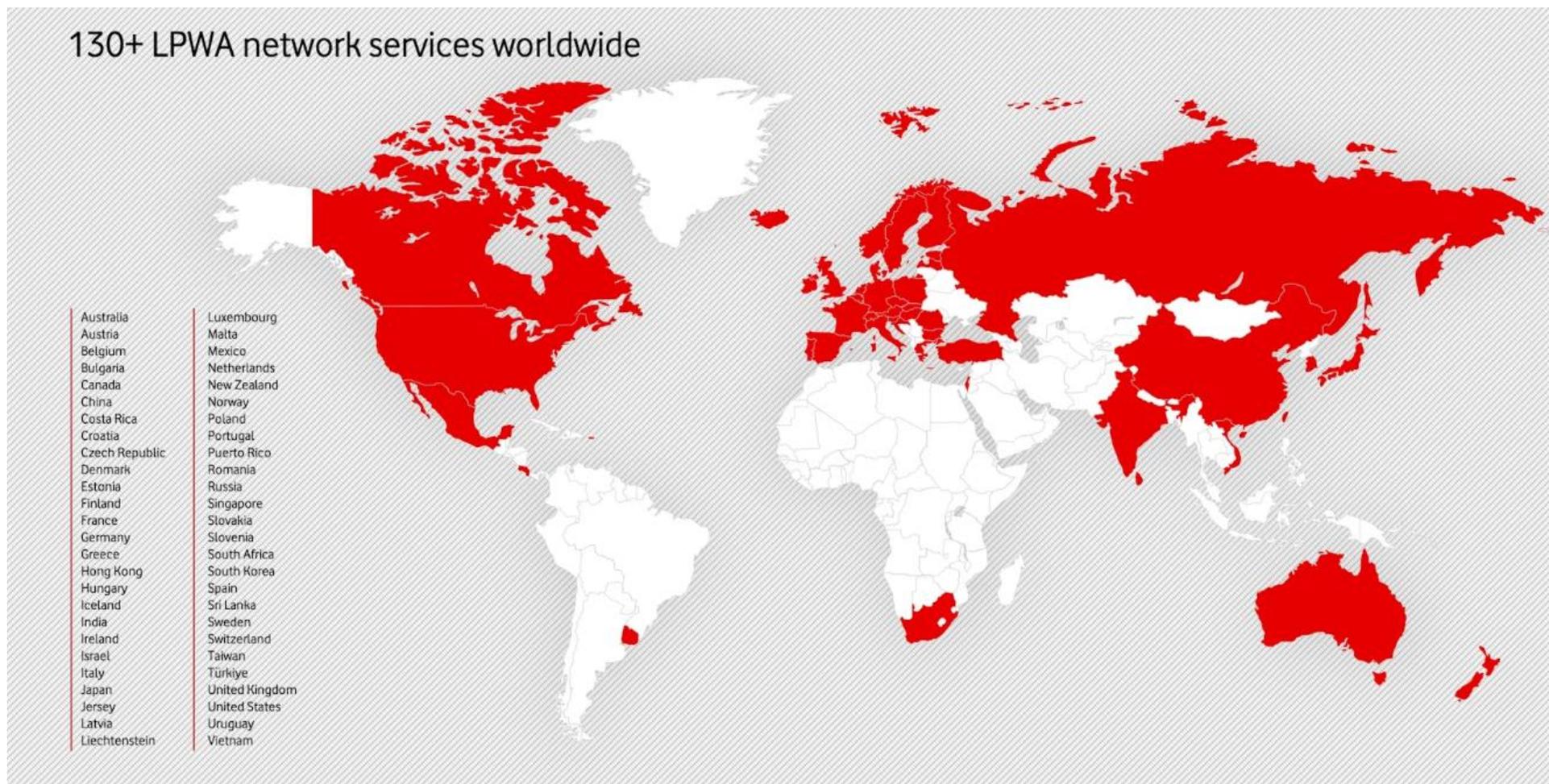


Having significantly reduced device complexity, functionality and capability, the cost has gradually decreased compared to traditional LTE.



Where is Vodafone LPWA deployed?

Vodafone has launched NB-IoT in a number of markets as well as LTE-M, through our local markets and partner markets. **Please visit <https://iot.vodafone.com/solutions/lpwa-technologies>** for the latest availability map.



Note: Map updated in July 2025



Enabling your business transformation

Predictability of costs and service

Our network and global SIM enable service level agreements that guarantee global performance and complete cost transparency



Industry-specific capability

Experienced and dedicated IoT team providing industry-specific insight and expertise



Peace of mind

Highly rated by a wide range of industry analysts



Unleash your full potential with our **leading IoT connectivity**, unrivalled expertise and support.



Proven

With an extensive list of global reference customers, Vodafone is behind some of the world's most successful IoT deployments



Single point of contact for IoT solutions

Harnessing the power of a growing partnership base to provide seamless end-to-end solutions



24x7x365 support

Best-in-class professional services providing expert support at local and global level

Trials and support

For customers who would like to trial Vodafone's Managed LPWA Connectivity service or our LPWA devices, please reach out to your local sales representative to get started. If you do not have the contact details for your nearest local sales representative, please contact us at [Vodafone IoT](#) for more information.



What's next?

Keep your IoT devices connected globally with Vodafone's Low-Power Wide-Area (LPWA) technologies.

Designed for large-scale deployments, our NB-IoT and LTE-M solutions provide secure, energy-efficient connectivity—even in remote or underground locations.

We also offer a range of pre-fabricated LPWA modems and gateways. If you are looking to ensure seamless monitoring of critical infrastructure, smart meters, and for cost-effective, always-on performance get in touch with us!



Get in touch

Our leading experts are on hand to provide advice based on your business requirements.

Contact us at [Vodafone IoT](#) and our IoT Specialists will guide you on your next steps.

<https://iot.vodafone.com/solutions/lpwa-technologies>

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