WIRELESS LOGIC **IOT GUIDES**

wireless logic

DEPLOYING A CELLULAR IOT SOLUTION FOR THE FIRST TIME OR BUILDING A 2G/3G MIGRATION PLAN?

Quick Guide to Cellular Bearer Services for IoT

Includes a deep-dive on low power technologies (NB-IoT, LTE-M and LTE Cat-1 BIS)

April 2024 UPDATED

wirelesslogic.com

Comparing Cellular Bearer Services

	LoRa	NB-IoT *(LTE Cat-NB1/2)*
Global Standards Based	✗	✓
Major MNO Support	✗	✓
Typical Connection Speed *(Up/Down)*	Up to 0.05Mbps	0.07Mbps/0.03 Mbps
Number of Antennas	1	1
Deployment Scenarios	Stationary *(excellent for indoor and underground)*	Stationary *(excellent for indoor and underground)*
International Availability & Roaming	n/a	Limited
Data transfer frequency	Intermittent	Intermittent
Response Time *(Latency)*	Medium	Slow (~1 sec)
Mobility	✗	*Handover between cells not supported*
Cellular Module Cost	£	£ *or ££ if 2G also supported*
Total Cost of Ownership	Deployment Specific *(might have to deploy and manage gateways)*	Deployment Specific *(low for local, medium for international)*
Power Source	Battery, Solar	Battery, Solar
Battery Life *(not rechargeable)*	5-10 years battery life	5-10 years battery life
Power Saving Mode (PSM)	✓	✓ *although not always available when roaming*
Extended Sleep Cycle (eDRX)	✗	✓ *although not always available when roaming*
SMS	✗	Not Standard
Two-way Voice	✗	✗
eSIM (eUICC) Compatible	n/a	Not Standard

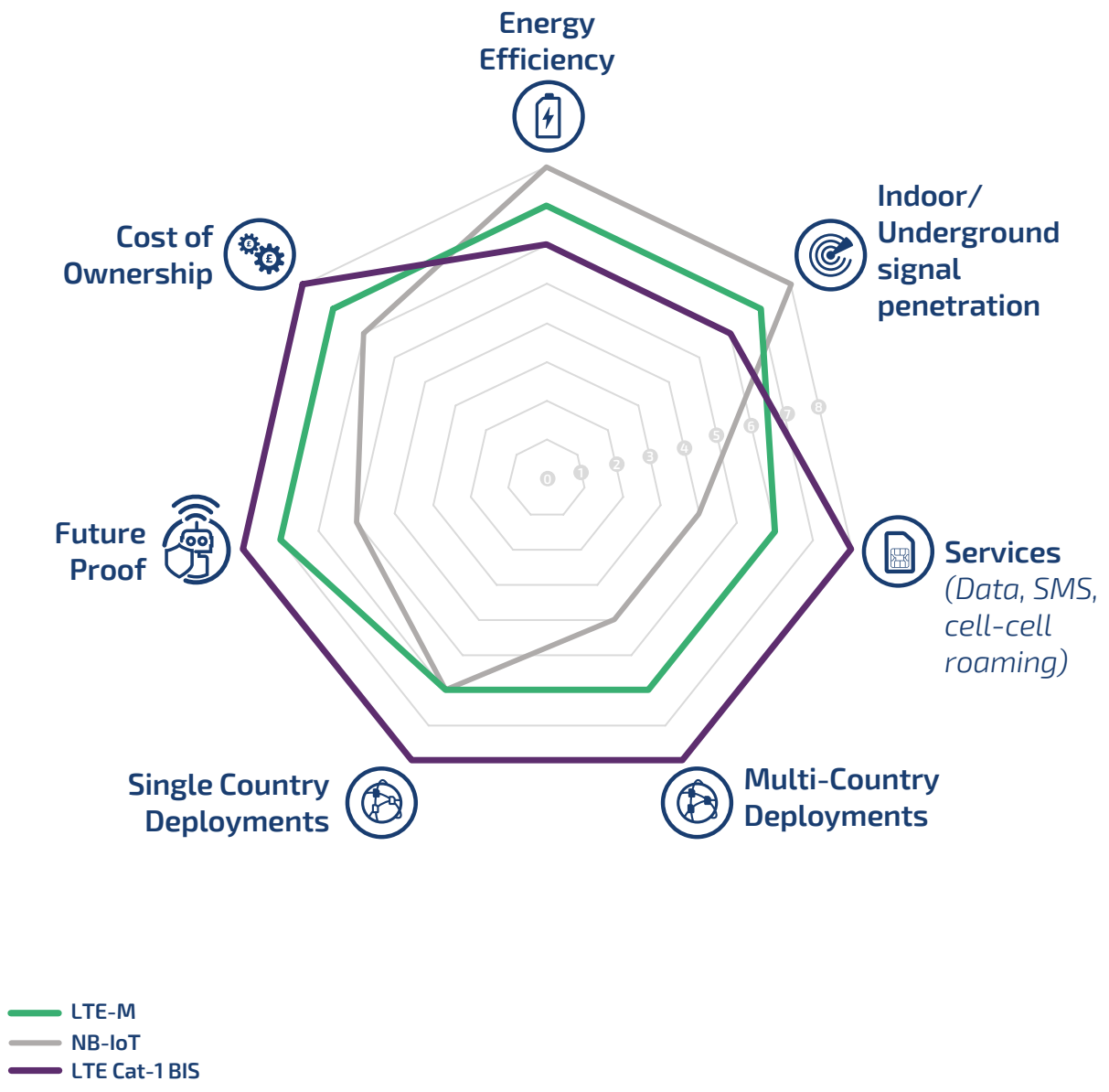
LTE-M (LTE Cat-M)	4G (LTE Cat-1 BIS)	4G (LTE Cat-1)	High Performance 4G (LTE Cat-4/6)	5G (LTE Cat-16)
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
Up to 1 Mbps	10Mbps/5Mbps	10Mbps/5Mbps	100Mbps/50Mbps	Up to 1Gbps/120Mbps
1	1	2	2	2
Mobile/Stationary *(good for indoor and underground)*	*Mobile/Stationary*	*Mobile/Stationary*	*Mobile/Stationary*	*Mobile/Stationary*
Limited	✓	✓	✓	✓
Frequent	Frequent	Frequent	Always On	Always On
Medium (~100ms)	Fast (40ms)	Fast (40ms)	Fast (40ms)	Ultra Fast (~1ms)
✓	✓	✓	✓	✓
£ *or ££ if 2G also supported*	£ *or ££ if 2G also supported*	££	£££	££££
Deployment Specific *(low for local, medium for international)*	Low	Low-Medium	Medium	Medium
Battery, Solar	Battery, Rechargeable Battery or Mains	Battery, Rechargeable Battery or Mains	Rechargeable Battery or Mains	Rechargeable Battery or Mains
5-10 years battery life	5-10 years battery life	up to 3 years	1 year	<1 year
✓ *although not always available when roaming*	✓ *although not always available when roaming*	✗	✗	✗
✓ *although not always available when roaming*	✓ *although not always available when roaming*	✗	✗	✗
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓ *although not in sleep mode*	✓	✓	✓	✓

Make smart design choices - *which low power technology is right for my* application?

Energy Efficiency	All technologies have PSM and eDRX. NB-IoT has lowest throughput which in itself limits power consumption but LTE-M and LTE Cat-1 BIS are only marginally less energy efficient.
Signal Penetration	NB-IoT was designed to operate better indoors and underground on stationary devices. LTE-M and LTE Cat-1 BIS will also work in many of those scenarios although they are designed with mobility in mind and required for non-stationary devices.
Services	The higher performance LTE-M and LTE Cat-1 BIS will support superior fleet management capabilities, enhanced customer experiences and device software /feature evolution.
Single Country Deployments	All work well for single country deployments but LTE Cat-1 BIS devices will have access to multiple 4G networks in all key markets. In contrast many other countries only offer a single NB-IoT and/or LTE-M network.
Multi-Country Deployments	LTE Cat-1 BIS offers strongest international coverage and roaming support. NB-IoT and LTE-M global coverage is patchy with a limited number of networks. LTE-M roaming works but with some PSM/eDRX limitations. NB-IoT roaming is still poorly developed and has many more challenges.
Cost of Ownership	There is parity on hardware costs (module cost, single antenna etc) and data costs. NB-IoT and LTE-M often have cost overheads in the form of roaming limits, fees and multiple SIM SKUs which increase the total cost of ownership.
Future Proof	There have been some examples of NB-IoT networks being switched off due to lack of adoption. Unlike the other technologies, NB-IoT is not compatible with eSIM remote SIM provisioning so you are locked to your original SIM provider. LTE Cat-1 BIS is compatible with 5G networks.

Comparing the low power technologies

NB-IoT, LTE-M v LTE Cat-1 BIS



VoLTE or VoIP?

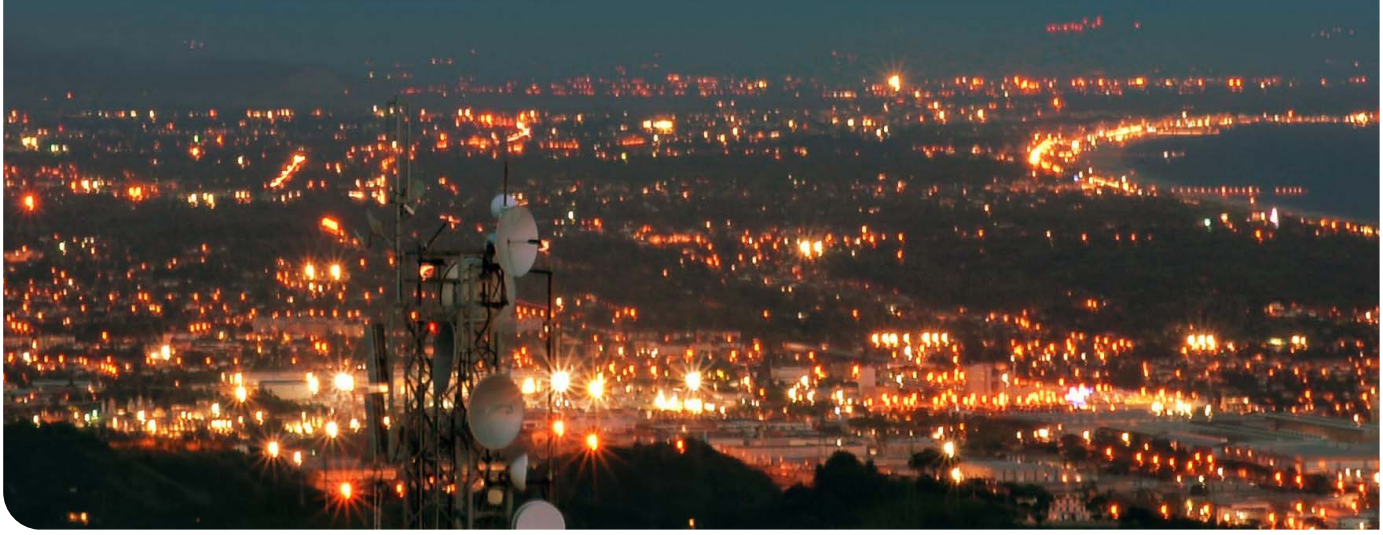
Voice remains critical for security or safety critical IoT applications including lone worker solutions, elevators, telehealth, secure door entry and alarm systems.

In a post-2G/3G world, voice communication will be supported by either Voice over IP (VoIP) or Voice over LTE (VoLTE).

A VoIP connection is based on an IP data connection so is an excellent universal solution although it requires investment in software services on both the device and on your server.

On the other hand, VoLTE is a powerful 4G alternative to the current 2G/3G voice service, delivering superior voice clarity, faster data speeds, and extended battery life for IoT devices. VoLTE is increasingly well supported in 4G LTE networks and roaming agreements are growing steadily.

With the technology still in transition, it is important that you discuss your deployment footprint and hardware selection plans with us since VoLTE is only supported on certain mobile operator networks and on certain cellular modules and bearers. For example NB-IoT does not support voice.



Adopt Leading edge technology to address next generation IoT deployment challenges

Whether you are a first-time IoT developer or planning a 2G/3 migration, there are new connectivity solutions to help you maximise the return on your investments.

Future Proofing

Remote SIM Provisioning (RSP) and eSIM, iSIM technologies help optimise manufacturing and operational overheads. In addition, over-the-air (OTA) management of SIMs provides a means to future proof IoT deployments against commercial, regulatory and operational change.

Find out more...

Quality and Reliability

Conexa, is our mobile core network built specifically for IoT. Only certified IoT devices can connect to the network which results in greater quality and reliability. The greater visibility and control of our own infrastructure means troubleshooting is also easier and faster.

Find out more...

IoT Security

IoT cyber attacks including malware, ransomware and denial-of-service attacks are on the rise. These attacks can target your devices and infrastructure or leverage them to attack others and lead to operational issues and loss of revenue or reputation. Our IoT Security Framework promotes a continuous or 360 degree assessment and improvement of security through the adoption of best practices in technology, people and processes.

Find out more...

Why Wireless Logic?

IoT Expertise

Knowledge and expertise from our IoT experts to help you select the right solution and keep total cost of ownership low.

MNO Partnerships

Network choice and access to MNO expertise and test labs for your applications

Secure

Multi-layer security that builds on the high security standards built into cellular services. ISO27001 certified.

Rapid Deployment

Fast and expert deployment, solution design, customer service and tech support.

Contact us today...

Talk to one of our IoT solution experts or get a quote

Call
0330 056 3300

Email
hello@wirelesslogic.com

Web
wirelesslogic.com

UK_ID_C010524_V1_U010524