From Sunset to Strategy:

Making the Right Connectivity Choices for the Next Decade

Why the landscape has shifted — and how to choose the safest connectivity path for the next decade.

telenor IoT

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Executive Summary

The Fog Has Cleared

For the past five years, the IoT industry has been sounding the alarm on the "2G/3G Sunset." The narrative was urgent: migrate now to Mobile IoT (LTE-M/NB-IoT) or risk total disconnection. For many enterprises, the urgency was real as there were connected products in the field, relying on 2G/3G network connectivity about to be shut down.

Looking back, both early and cautious adopters have contributed to the industry's understanding of what works best. Early movers validated LPWA use cases and helped uncover real-world challenges; organisations migrating today benefit from this collective learning. This guide is designed to support both groups with clear, up-to-date guidance for the decade ahead.

Many enterprises rushed to adapt. Others hesitated, concerned by reports of patchy coverage and immature ecosystems. **Whether you migrated early or waited, the landscape has evolved — and this guide reflects the current 2026 realities.**

The 2026 connectivity landscape is significantly different from the projections of 2021. The "winner" for global, mobile IoT fleets has shifted, and the "sunset" has proven to be less of a cliff and more of a complex, multi-year evolution. However, this 'soft landing' is not guaranteed. In specific markets, the cliff is immediate, and for the global fleet, a lack of planning will eventually turn a manageable transition into a hard stop.

This guide leverages Telenor IoT's latest 2026 market data to provide a decisive, risk-free path forward.

The 2026 Verdict:

- **The "Safe Harbor" is 4G:** For large international fleets, LTE Cat-1 / Cat-1 bis has emerged as the safest default choice because it is immediately compatible with virtually all existing 4G networks worldwide - maximizing global roaming from day one and bypassing the current ecosystem fragmentation of LTE-M and NB-IoT.

- **The Sunset is a Swamp, Not a Cliff:** Network shutdowns are fragmented and phased, creating specific firmware risks that earlier migration efforts often overlooked.

- **5G RedCap is a Future Story:** While promising, 5G RedCap is defined for 5G Standalone (SA) networks and requires SA for full commercial and roaming-grade deployment, which is still in early rollout.

What the Industry Learned Between 2021–2026

To the cautious operators who held onto 2G/3G: Your caution was understandable — and the market evidence collected over the past four years now provides a clearer basis for selecting the right migration path. While the industry hyped "Mobile IoT" (LTE-M and NB-IoT) as the immediate successor, the reality of the last four years has been messy. During this time, the industry has surfaced several practical lessons. Organisations that migrated early encountered them first; organisations migrating now can benefit from what the industry has learned.

What Early Adopters Experienced (2021–2024): Real Failures

Teams that migrated prematurely often faced significant operational disruptions:

- **Roaming Gaps:** While Telenor IoT offers global access, the local availability of NB-IoT roaming has been inconsistent. Some major operators (e.g., AT&T, NTT DoCoMo) have limited or never enabled NB-IoT roaming, leaving single-mode devices dark in key markets.
- **Truck Rolls:** Early devices with immature firmware often required manual or remote resets to re-establish connections during network changes, leading to costly physical interventions.
- **Module Regret:** Companies deployed LPWA-only modules, only to realize they needed dual-mode hardware and complex SIM profile management to achieve the global reach they could have had instantly with standard 4G.

The Maturity of 4G

Fears that 4G would soon follow 2G into retirement were unfounded.

- **The Reality:** Based on current operator roadmaps, 4G is expected to remain the backbone of global IoT well into the 2030s in most major markets. By waiting, you can now deploy 4G technology that offers a secure 10-year lifecycle without the growing pains of new tech.

Why the Old Guidance No Longer Applies

At Telenor IoT, we believe in transparency. As the market evolves, so must our recommendations.

Note:
The guidance in this document replaces and supersedes Telenor IoT's 2021 and 2024 Sunset Guides.

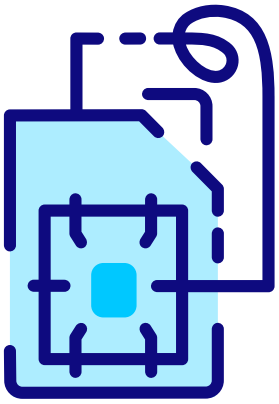
The Strategic Shift: A Side-by-Side Comparison

Feature	The Old Guidance (2021-2024)	The 2026 Reality
Primary Recommendation	**LTE-M** is the "preferred" standard for international IoT.	LTE Cat-1 / Cat-1 bis is the safest default choice for global IoT, while LTE-M remains relevant for power-constrained and battery-operated devices - subject to local coverage constraints.
Roaming Strategy	Rely on LTE-M/NB-IoT roaming agreements to expand.	LPWA roaming is still maturing. Cat-1 is preferred because it uses mature 4G roaming rails.
Device Strategy	Use Dual Mode (LTE-M + NB-IoT) to cover gaps.	Use Cat-1 / Cat-1 bis as the primary coverage anchor instead of 2G, with LTE-M added where power efficiency or stationary use cases justify it.
5G Outlook	Prepare for 5G RedCap as an imminent upgrade.	RedCap is still the long-term target but global availability has shifted from a near-term upgrade to a late-decade reality.

Rescue Plan: If You Already Deployed NB-IoT or LTE-M

To the teams currently struggling with patchy LPWA connectivity: **You are not alone**. The fragmentation you are experiencing is structural.

- **Immediate Mitigation:** If you have deployed multi-mode modules, ensure your firmware logic prioritizes LTE-M or 4G fallback where available, rather than getting stuck searching for an NB-IoT signal that may not allow roaming.
- **The "Next Batch" Fix:** For your next hardware iteration, consider moving to LTE Cat-1 bis. It leverages the mature, global 4G roaming infrastructure that already exists, instantly solving the "black hole" coverage issues of NB-IoT.
- **SIM Strategy:** Utilize eUICC (eSIM) as a long-term resilience mechanism - enabling operator profile changes when network conditions, commercial agreements, or regulatory requirements evolve, rather than as an emergency response to immediate loss of coverage. This provides strategic protection against future roaming or policy shifts over the device lifecycle.



The “Firmware Traps”
— How Fallback Actually Fails

The 2G/3G sunset is rarely a single “off switch” event. It is a phased retirement where operators re-farm spectrum over years. This creates specific scenarios where legacy firmware fails.

Scenario 1: The Death Loop

- **The Trap:** An operator refarms some frequencies first, but not all. A device sees a faint legacy signal and attempts to attach, but is rejected due to capacity management or insufficient signal strength for a stable connection.
- **The Failure:** Instead of falling back to a healthy 4G network, the device keeps retrying the “visible” but unreliable signal until the battery dies. This often requires a manual reset to fix.

Scenario 2: The SMS Sleeper

- **The Trap:** Many LPWA devices rely on SMS for “shoulder tap” wake-up commands. However, not all operators support the combination of NB-IoT and SMS.
- **The Failure:** As legacy 2G/3G signaling networks are retired, a device may technically have a data connection but become unreachable via SMS if the underlying signaling support is removed or incompatible. The device appears “alive” but cannot be triggered to report data.

The Fix:

- Audit your fleet’s firmware logic.
- Ensure “Network Rejection” triggers an immediate scan for alternative technologies (Cat-1).
- **Recommendation:** Move to LTE Cat-1, which supports standard Voice and SMS globally where enabled by the module and network, avoiding the signaling limitations of NB-IoT.

The Hardware Sweet Spot
(Cat-1 bis & eSIM)

Historically, the argument against Cat-1 was cost. That has changed with **LTE Cat-1 bis**. By using a single antenna combined with the massive economies of scale created by mature 4G chipsets and global production volumes, Cat-1 bis cuts device complexity and cost - narrowing the price gap with LPWA while delivering superior performance.

The "Single SKU" Manufacturing Win

For hardware directors, the combination of Cat-1 bis and eSIM (eUICC) offers a massive logistics advantage:

- **One Hardware SKU:** Because Cat-1 bis works on standard 4G bands globally, you can manufacture a single hardware variant for the entire world.
- **Late-Stage Provisioning:** Using eUICC, you can embed a global bootstrap profile at the factory and swap to a local operator profile over the air (OTA) once the device is deployed.
- **The Result:** No more region-specific hardware variants (e.g., "US Variant" vs. "EU Variant") sitting in inventory.
- **Strategic Advice:** Use eUICC not just for roaming, but as insurance against operator lock-in over the 10+ year lifecycle of your device.

Future-Proofing vs. Future-Gambling (RedCap & NTN)

A major reason operators delay migration is the fear of buying "old" tech (4G) just as "new" tech (5G RedCap) arrives.

5G RedCap: The "Not Yet" Technology

5G RedCap promises a middle ground between speed and battery life. However, it is defined for 5G Standalone (SA) networks and requires SA for full commercial and roaming-grade operation. While limited 5G SA roaming trials exist between selected operators, there is not yet a globally usable, enterprise-grade roaming fabric for RedCap devices.

RedCap Readiness Scorecard: Is It Safe to Adopt?

Factor	Status in 2026	Verdict
Network Core	Most global 5G is "Non-Standalone" (NSA) and cannot support RedCap.	**FAIL** - Not ready at scale
Global Roaming	Inter-operator roaming agreements for 5G SA are rare.	**FAIL** - No scalable global IoT roaming yet
Timeline	Broad availability in major economies expected by 2030.	**WAIT** - Late-decade

Strategic Advice: For large international fleets, RedCap will realistically be a late-decade option. Use LTE Cat-1 today, which serves the same mid-range use cases but works globally now.

Satellite (NTN): The Complement, Not the Replacement

Non-Terrestrial Networks (NTN) are exciting for remote coverage but should be treated as a "complement" for fail-over in maritime or desert scenarios, rather than a primary connectivity layer.

The Verdict

Analysis paralysis ends here. Use this matrix to confirm your technology choice.

Feature	NB-IoT	LTE-M	LTE Cat-1 / Cat-1 bis	5G RedCap
Global Roaming	Poor (Fragmented)	Good (EU/US/ AUS)	**Excellent (Near-Universal 4G Coverage)**	Poor (No SA Roaming)
Mobility (Tracking)	Optimised for Stationary	Good	**Excellent**	Excellent
Indoor Penetration	**Best**	Very Good	Good	Good
Throughput	Low (~20kbps)	Medium (~200kbps)	**High (~10Mbps)**	High (~10Mbps+)
Battery Life	10+ Years	Very Good	Good	Very Good
Availability	Patchy	Regional	**Broad global coverage**	Limited (Pioneer Markets)

Executing this strategy requires more than choosing the right radio technology. It requires a connectivity partner that can manage roaming, eSIM profiles, regulatory compliance, and lifecycle changes at global scale — without fragmenting your operations.

Your Lowest-Risk Choice: LTE Cat-1 / Cat-1 bis

If you are deploying a solution that must work across borders, in varying signal conditions, and without complex operator-specific configurations, **LTE Cat-1 is the safest default choice.**

- **It works everywhere 4G works** (which is nearly everywhere).
- **It is cost-competitive** via Cat-1 bis.
- **It is future-proof** until the mid-2030s.

Telenor IoT's Global Roaming Promise:

Telenor IoT gives you access to 500+ networks in over 200 countries. Choosing LTE Cat-1 ensures your device is technically capable of utilizing the maximum number of these networks immediately, without being dependent on uneven LPWA roaming maturity across markets.

Stop waiting for the perfect "next-gen" network. For the next decade, the most reliable network is the one that is already built, proven, and running globally: 4G LTE.

Your Next Step

Don't navigate global connectivity and compliance alone.

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About Telenor IoT

Telenor IoT is Telenor Group's dedicated organization for managed IoT, built on the scale and reliability of one of the world's leading mobile operators. We help companies around the globe securely connect, manage and scale their products — from global enterprises and automotive leaders with millions of connected devices, to small and medium-sized businesses looking for simplicity and flexibility.

With more than 20 years of IoT experience, a global sales presence across the Nordics, EMEA, the Americas and APAC, and over 30 million connected devices in operation, Telenor IoT is recognized for consistently high customer satisfaction and is a trusted partner to enterprises such as Volvo Cars, Scania, Hitachi, Verisure and Great Wall Motors.

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