

From LPWA to NR RedCap - what's driving industrial IoT adoption?



Sylvia Lu, CEng, MBA

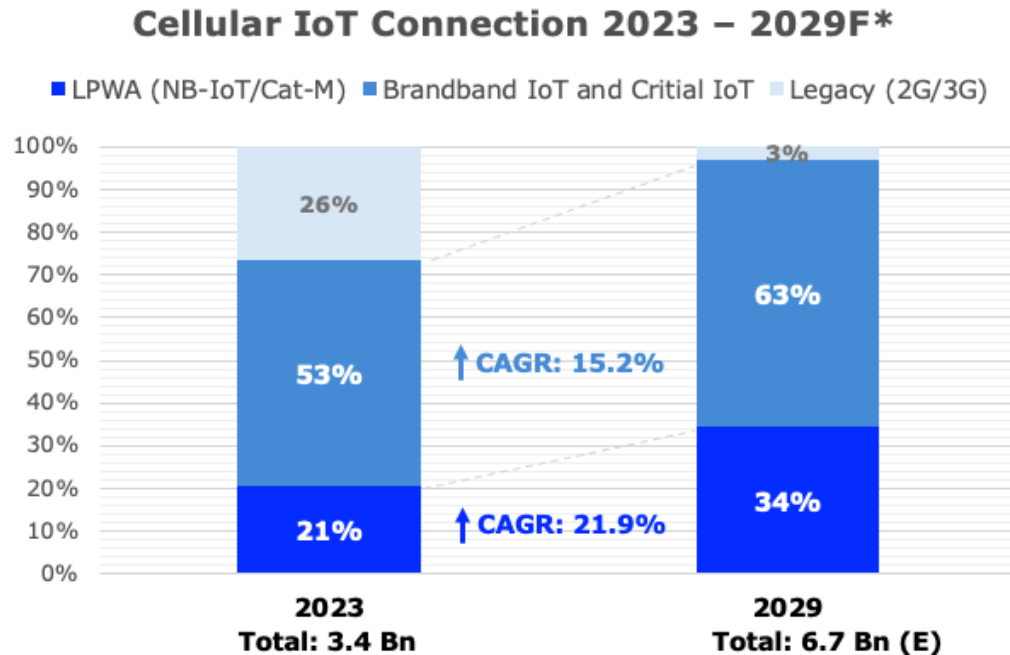
Managing Director, YOOVIP
(Ex u-blox, 5G-ACIA)

3 June 2025

Agenda

1. Cellular IoT Opportunity
2. Industrial connectivity challenges & market gaps
3. The technology evolution from LPWA to RedCap
4. Market Reality Check: adoption & economics
5. Unlocking new value for small cell vendors

The Cellular IoT Opportunity



6.7 Bn Cellular IoT Connections by 2029

- **Massive scale:** cellular IoT connections are set up nearly double, reaching 6.7Bn by 2029
- **Broadband IoT (CAGR 15.2%)** will be further strengthened by the introduction of 5G RedCap devices.
- **Market readiness: commercial** RedCap services are already live with **x4** service providers
- **For Small Cell:** the expansion in Broadband IoT creates a substantial demand for capable, often localised network infrastructure – **an opportunity for small cell vendors**

The Challenge: bridging industrial connectivity gaps



Deterministic on-site control for Industry 4.0

need reliable, low-latency, jitter-free, private networks inside their perimeter so robots, PLCs and motion control systems can exchange data in real time without missing a cycle.



Wide-area mission-critical links for remote and harsh environments

need carrier-grade coverage that stays online across hard-to-reach territory, supporting remote monitoring, worker safety and autonomous machinery.



Real-time visibility and orchestration of moving assets

Ports and logistics hubs must track containers and cranes in real-time, ensuring smooth flow of goods, rapid incident response to keep £-billion supply chains moving.

Comparing RedCap Key Features: Rel-17 to Rel-19

Features	Rel-17 RedCap	Rel-18 RedCap	Rel-19 eRedCap
Primary focus	Introduced RedCap UE	Further reduce UE complexity, power consumption	Introduce power class 2, enhance network management of RedCap UEs
Peak data rate	226Mbps/120Mbps (DL/UL)	10 Mbps (DL/UL)	-
UE max RF Bandwidth	20MHz (FR1), 100MHz (FR2)	5MHz baseband with 20MHz RF	-
UE Antennas	1-2 Rx branches	Same as Rel-17	-
DL MIMO Layers	1-2 layers, matching the number of Rx branches	Same as Rel-17	-
Power class	PC3 (23dBm)	PC3 (23dBm)	Introduce PC2 (26dBm) support
<u>eDRX</u> support	Up to approx. 3h (Idle) 10.24s (Inactive)	Enhanced <u>eDRX</u> in Inactive (from 10.24 to up to approx. 3h)	-
Duplex support	Half-duplex FDD (HD-FDD)	Same as Rel-17	-
Management features	Basic framework	Limited	Enhanced OAM: Multi-Initial BWP, access control, performance monitoring

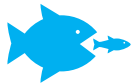
Market Forces reshaping Cellular IIoT

Forces

What's happening

So what?

Industry Consolidation



M&A wave

- Telit + Thales → Telit Cinterion
- Qualcomm buys Sequans' 4G/5G IP
- Semtech absorbs Sierra Wireless (2023)
- u-blox divests cellular line to Trisna & Trident IoT (2024)

- Fewer module suppliers (western), but deeper portfolios.
- Supply risk rises if one vendor stumbles.

Geopolitical Dynamics











Supply-chain pressure

- US/EU "chips acts" subsidise on-shore fabs
- Tariffs & tech-export controls fragment trade
- China ↔ West decoupling forces dual sourcing

- BOM and lead-times swing with policy.
- Companies should consider securing alternate silicon paths and factor localisation options into plans.

Early 5G RedCap use cases seen from connecting factory robots, power grid sensors, to enabling smart wearables and safer vehicles

Operators	Country	Pilots	Time	Sector	Use Cases
	South Korea	Hyundai Mother smart factory (private 5G)	Jan 2025	Automotive mtg	First end-to-end RedCap on private 5G. Wireless vehicle inspection system; 5G replaced Wi-Fi for real-time QA, enabling expansion to EV plants.
	China	Provincial RedCap smart grid	Nov 2023	Energy (Utility)	3220+ RedCap smart grid terminals in <u>Laiwu</u> city; planning 150k RedCap devices by mid-2024. Improves grid monitoring
	Australia	Optus AI camera (Speedshield) demo	2024	Industrial Safety	Integrated RedCap with AI vision forklift safety system. Achieved reliable low-power video streaming for real-time pedestrian detection.
	UK	UK/EE <u>Adastral Park</u> trial	Oct 2023	Telecom, IoT	Field trial on 5G SA network. <u>Nokia AirScale</u> + <u>MediaTek RedCap UE</u> . Demonstrated support for wearables & sensors
	Singapore	5G RedCap IoT trial	Dec 2023	Telecom, IoT	Trial across 5 sites on live 5G SA. Verified battery life improvements (~60%) and cost reduction for mid-tier IoT.
	UAE	RedCap verification	Jul 2024	IoT	First RedCap implementation in Middle East. Enabled Ericsson RedCap on live 5G SA (FDD & TDD). Created device certification framework; poised to scale network-wide.
	Germany	O2 Telefónica smart meter pilot	2024	Energy (Utility)	Live 5G+ RedCap tests for smart grids. 5 live RedCap in Germany; connecting meters, grid sensors with few-Mbps 5G. Opening trials to energy firms in 2024.
	US	Open RAN RedCap trial (<u>Boost Mobile Network/EcoStar</u>)	Jun 2024	IoT, Open RAN	Industry-first RedCap on Open RAN. Demonstrated RedCap on Boost Mobile Network's cloud-native 5G using <u>Mavenir vRAN</u> + <u>Qualcomm X35</u> . Validated RedCap for future IoT on modular networks.



You Vision, Our Priority



Sylvia Lu

Email : sylvia@yoovip.co.uk

Website : www.yoovip.co.uk

LinkedIn : <https://www.linkedin.com/in/sylvialu>