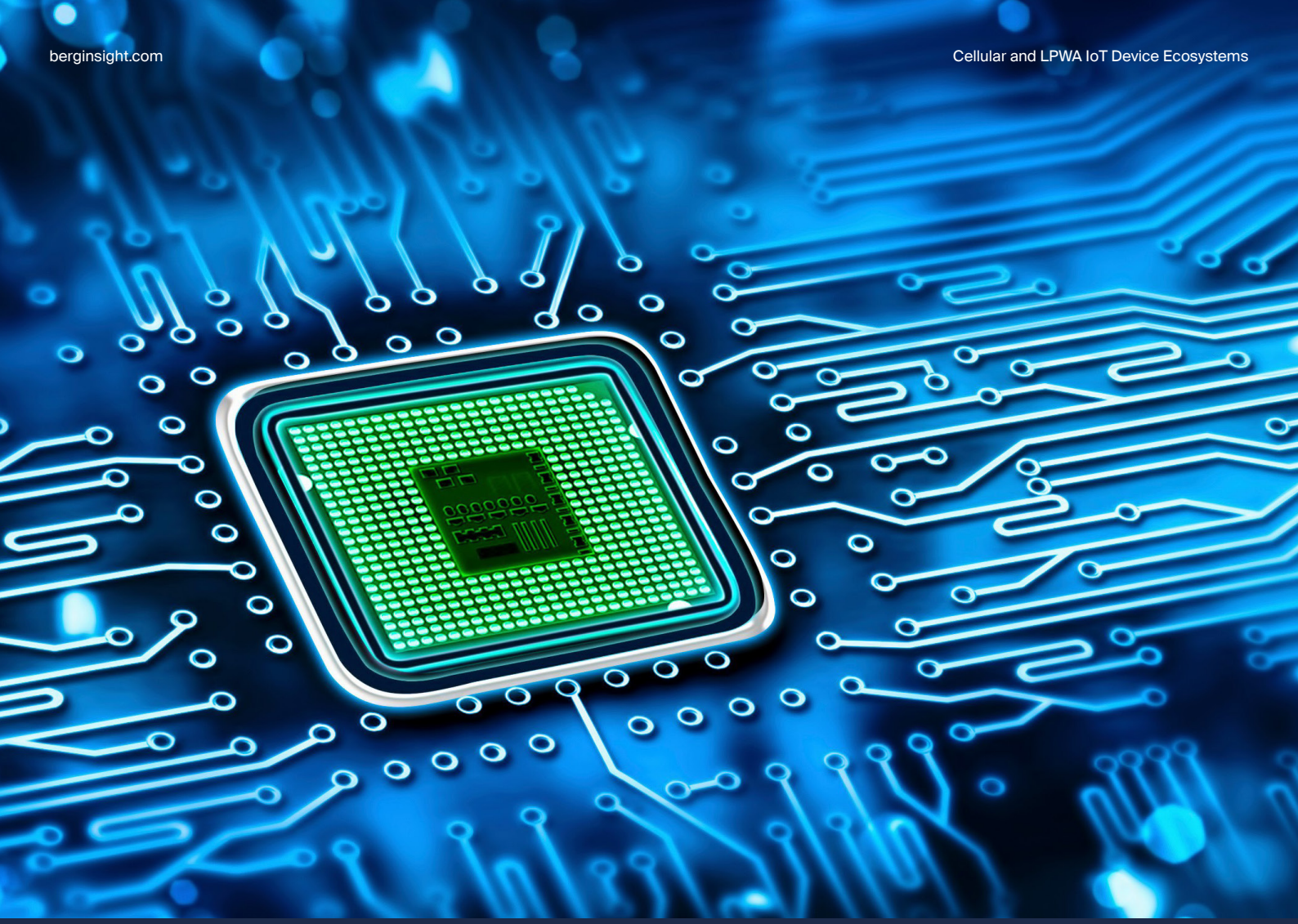


Cellular and LPWA IoT Device Ecosystems

8th Edition

Cellular and LPWA IoT Device Ecosystems gives a comprehensive overview of the main wide area networking technologies for the Internet of Things – 2G/3G/4G/5G cellular, LoRa, Sigfox as well as a group of emerging LPWA technologies including 802.15.4-based protocols, Wirepas Mesh, DECT-2020 NR and Mioty. This strategic research report from Berg Insight provides you with 120 pages of unique business intelligence including 5-year industry forecasts and expert commentary on which to base your business decisions.

Berg Insight™

Cellular IoT module shipments reached 423 million in 2023

The Internet of Things is continuously evolving and expanding into new domains. By the end of 2023, approximately 3.8 billion devices were connected to wide area networks based on cellular or LPWA technologies. The market is highly diverse and divided into multiple ecosystems. This report will focus on the most prominent technology ecosystems for wide area IoT networking – the 3GPP ecosystem of cellular technologies and the LPWA technologies LoRa and Sigfox – as well as a group of emerging LPWA technologies including 802.15.4-based protocols, Wirepas Mesh, DECT-2020 NR (NR+) and Mioty.

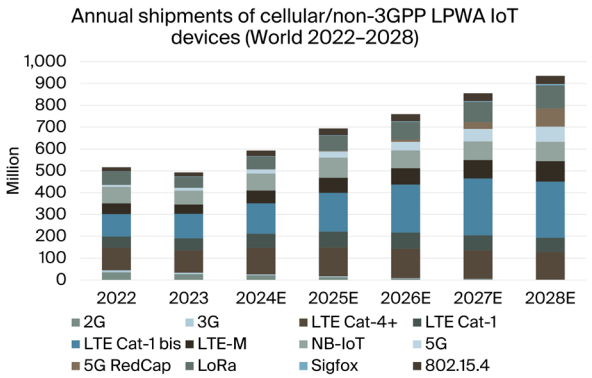
The 3GPP family of cellular technologies support the largest ecosystem in wide area IoT networking. Berg Insight estimates that the global number of cellular IoT subscribers amounted to 3.3 billion at the end of 2023 – corresponding to 28 percent of all mobile subscribers. Yearly shipments of cellular IoT modules amounted to 423 million units in 2023, down 3 percent year-on-year. Annual cellular IoT module revenues declined by 9 percent to US$ 5.9 billion. The five largest cellular module vendors – Quectel, Fibocom, Telit Cinterion, Semtech and u-blox – held a market share of 72 percent in terms of revenues. Qualcomm, UNISOC and ASR Microelectronics are the main cellular IoT chipset suppliers. Other important cellular IoT chipset providers include Eigencomm, MediaTek, Sony and Xinyi Information Technology.

IoT-optimised 4G LTE technologies dominate the cellular IoT technology landscape as LTE Cat-1/LTE Cat-1 bis, NB-IoT and LTE-M replace 2G and 3G technologies in the low to mid market segments. LTE Cat-4 and higher Cat LTE-A technologies remain the main alternative for high-speed IoT devices but will over time be replaced by 5G as network coverage and pricing improves. 5G IoT devices are today largely concentrated to FWA CPEs, IoT routers as well as cars from front-running automotive OEMs. 5G RedCap modules are starting to become generally available and will in time enable a broader set of 5G IoT use cases. Uptake of the technology is expected to be limited in the short-term due to the price gap to 4G LTE Cat-4/6 modules and 5G SA network coverage requirements. Cellular IoT module shipments are forecasted to grow at a compound annual growth rate (CAGR) of 13.2 percent to reach 786 million units by 2028.

LoRa is gaining momentum as a global connectivity platform for IoT devices. The installed base of LoRa end nodes reached 350 million at the beginning of 2024 with around 20 percent connected to public networks. Berg Insight believes the LoRa and LoRaWAN ecosystems will continue to be dominated by private networks. Major volume application segments are smart gas and water metering, where LoRa's low power consumption matches the requirements for long-life battery operation. LoRa is also gaining traction for metropolitan and local area IoT deployments for networking smart sensors and tracking devices in cities, industrial plants and commercial buildings. Smart home is expected to become a major application area in the coming years, driven by Amazon's Sidewalk network in the US. Berg Insight estimates that yearly shipments of LoRa devices amounted to 50 million units in 2023. Until 2028, yearly shipments are forecasted to grow at a CAGR of 16.2 percent to reach 106 million units.

The Singapore-based Sigfox operator UnaBiz took over as the new owner of Sigfox in 2022, setting a new direction for the Sigfox technology and operating model for the business. At the end of 2023, the installed base of Sigfox devices reached 12.5 million, up 10 percent from the previous year. Berg Insight believes that the critical test for Sigfox will be how the technology is received in the asset tracking segment. In addition, sensor solutions in different industries is one of the most promising application areas for the technology. Berg Insight forecasts that shipments of Sigfox devices will grow at a compound annual growth rate (CAGR) of 33.6 percent from 1.6 million units in 2023 to 6.6 million units by 2028.

Emerging LPWA device ecosystems such as IEEE 802.15.4, Wirepas Mesh, Mioty and NR+ have the potential to grow into significant IoT networking platforms in the coming years. So far, IEEE 802.15.4 has achieved the most widespread adoption. The technology is the most mature in the group and has gained support from several of the leading smart metering vendors. Wirepas Mesh counts an installed base in the millions and has been used in a number of large-scale projects. Mioty and NR+ represent two even more nascent technologies – the former is so far mainly deployed in pilot projects while the latter is expecting its first deployments of devices during 2024.



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Glossary

Highlights from the report

360-degree overview of the main IoT wide area networking ecosystems.

Comparison of technologies and standards.

Updated profiles of the main suppliers of IoT chipsets and modules.

Cellular IoT module market data for 2023.

Adoption trends for LPWA technologies including NB-IoT, LTE-M, LoRa and Sigfox.

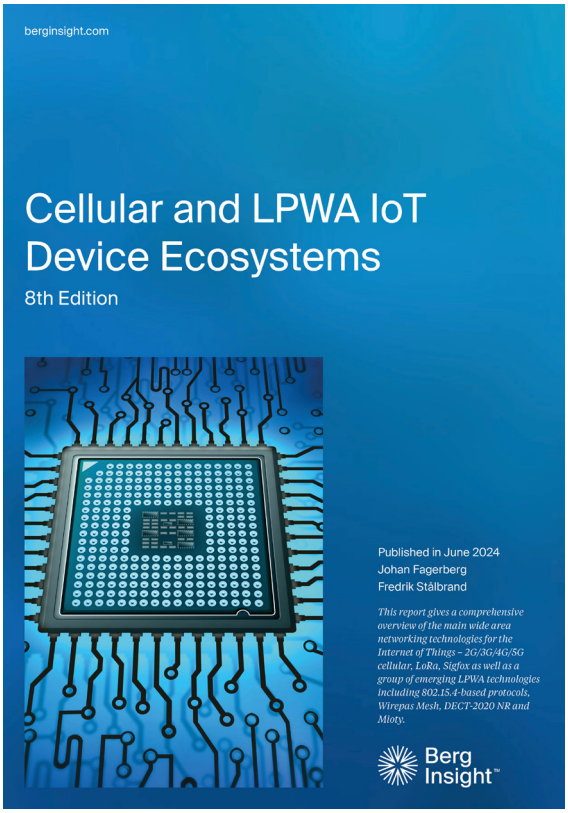
Cellular and non-3GPP LPWA IoT device market forecasts until 2028.

This report answers the following questions

- How will the IoT wide area networking technology market evolve over the next five years?
- Who are the new challengers in the cellular IoT module market?
- Which new mass-volume segments can be addressed by low-cost LPWA technologies?
- Why are the standards LTE-M and NB-IoT so significant for the cellular IoT ecosystem?
- Which IoT applications will drive the adoption of 5G?
- What is the timeline for the introduction of 5G NR Reduced Capability (RedCap) devices?
- What is the current installed base of LoRa and Sigfox devices?
- What are the prospects for emerging LPWA technology standards?

About Berg Insight's IoT market research

Our market reports offer comprehensive information and analysis on key IoT technologies and markets, addressing important concerns including total addressable market, market penetration, market shares, industry landscape, regulatory environment, market trends and forecasts. Our research portfolio today comprises more than 70 items, where each market report focuses on a specific vertical application area or cover horizontal themes. All market reports come with complementary data sets in Excel format that can be easily analysed and converted into tables and charts. We offer a range of different license options together with bundled packages and subscriptions to suit your specific needs.



HORIZONTAL THEMES

Cellular and LPWA IoT Device Ecosystems

The Internet of Things is weaving a new worldwide web of interconnected objects. By the end of 2023, about 3.8 billion devices were connected to wide area networks based on cellular or LPWA technologies. The market is highly diverse and divided into multiple ecosystems. Berg Insight forecasts that annual shipments of cellular and non-3GPP LPWA IoT modules will grow at a compound annual growth rate (CAGR) of 13.7 percent from 493 million units in 2023 to 936 million units in 2028. Get up to date with the latest trends from all main regions and vertical markets with this unique 120-page report.

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Who should read this report?

Cellular and LPWA IoT Device Ecosystems is the foremost source of information about all the major wide area networking technologies for the Internet of Things. Whether you are a chipset or module vendor, software vendor, utility, vehicle manufacturer, telecom operator, investor, consultant, or government agency, you will gain valuable insights from our in-depth research.

Johan Fagerberg & Fredrik Stålbrand

Johan Fagerberg is co-founder and an experienced analyst with a Master's degree in Electrical Engineering from Chalmers University of Technology. He has during the past 22 years published numerous articles and reports about various IoT topics.

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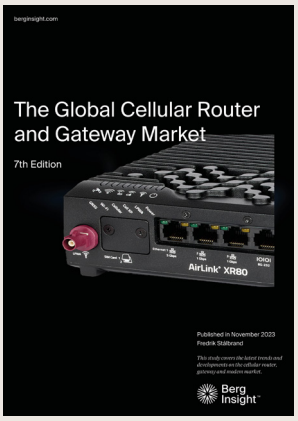

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