Cellular and LPWA
IoT Device Ecosystems

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 and 802.15.4 WAN.

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

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

- **Cellular** IoT module market data for 2019.

- **Early** adoption trends for emerging LPWA technologies.

- **Cellular** and non-3GPP LPWA IoT device market forecasts until 2024.

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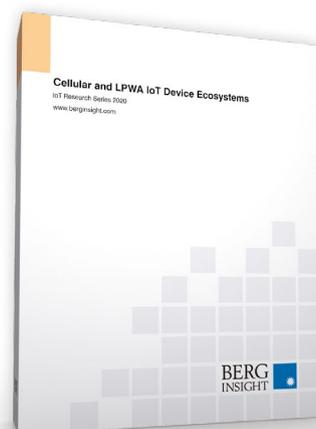
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Cellular IoT module shipments reached 265 million units in 2019

The Internet of Things is weaving a new worldwide web of interconnected objects. At the end of 2019, approximately 1.9 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 four most prominent technology ecosystems for wide area IoT networking – the 3GPP ecosystem of cellular technologies, the LPWA technologies LoRa and Sigfox and the 802.15.4 ecosystem.

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 1.6 billion at the end of the year – corresponding to around 17.0 percent of all mobile subscribers. Yearly shipments of cellular IoT modules increased by 22.3 percent in 2019 to reach 265.4 million units.
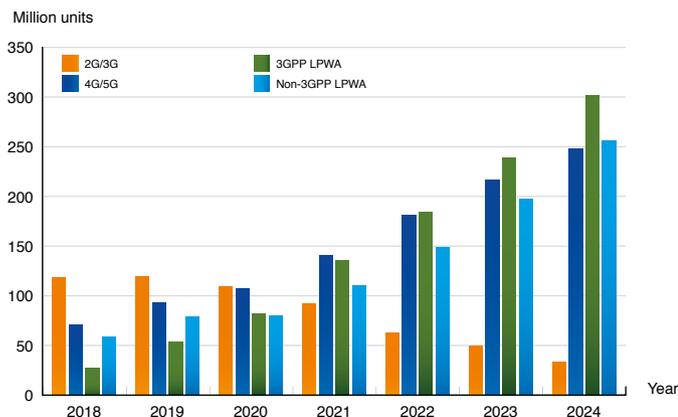
The cellular IoT technology landscape is in a phase of rapid transformation. Developments in China accelerate a global shift to 4G LTE technologies from 2G, which still accounts for close to 40 percent of annual module shipments. The move from 2G to 4G LTE began in North America with 3G as an intermediate technology. The region has seen a rapid uptake of LTE Cat-1 since 2017 and LTE-M starting in 2018 at the same time as GPRS and CDMA are fading away. In Europe, NB-IoT module shipments commenced in 2019 and are set to accelerate in 2020. The region will also see an accelerated uptake of LTE-M starting in 2021. China is moving from GPRS to NB-IoT in the mass-market segment with shipments amounting to about 40 million modules in 2019. At the same time, there is a boom in demand for LTE Cat-1 modules as the Chinese operators are opting for LTE Cat-1 rather than LTE-M. While 5G coverage is improving rapidly across developed markets, 5G IoT modules will not be available in significant volumes until the second half of 2020. The first 5G-enabled products will be routers and gateways. The first vehicles equipped with 5G modules are planned for release in 2021. Early product launches will likely focus on technology branding rather than performance, which will be similar to 4G LTE.

LoRa is gaining momentum as a global connectivity platform for IoT devices. According to Semtech, the global installed base of LoRa devices was approximately 135 million at the beginning of 2020. ▶

▶ The first 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 area and local area IoT deployments as a platform for networking smart sensors and tracking devices in cities, industrial plants, commercial buildings and homes. Semtech has stated that it generated in the range of US$ 74 million in revenues from LoRa chips in its financial year ending in January 2020 and expects to reach US$ 90–120 million in fiscal 2021. Berg Insight estimates that yearly shipments of LoRa devices were 47.0 million units in 2019. Until 2024, yearly shipments are forecasted to grow at a compound annual growth rate (CAGR) of 27.2 percent to reach 156.9 million units. While China accounted for about 60 percent of total shipments in 2019, LoRa device shipments in Europe and North America are expected to scale into significant volumes in the coming years as early adopters move from pilots to large-scale deployments.

Sigfox has very ambitious plans for establishing the technology bearing the company's name as the leading global platform for ultra-narrow band IoT networks. In order to meet its strategic goals, Sigfox must be able to break into entirely new mass-volume device segments and prove its capability to create value by adding connectivity to things that never communicated before. At the end of 2019, Sigfox reported 15.4 million connected devices. In a positive scenario where early trials ramp up to large-scale commercial deployments, Berg Insight forecasts that shipments of Sigfox devices will grow at a compound annual growth rate (CAGR) of 41.1 percent from 9.4 million units in 2019 to 52.6 million units by 2024.

802.15.4 WAN is an established connectivity platform for private wide area wireless mesh networks used for applications such as smart metering. Faced with increasing competition from emerging LPWA standards, 802.15.4 WAN is however only expected to grow at moderate rate in the coming years. Berg Insight forecasts that shipments of 802.15.4 WAN devices will grow at a compound annual growth rate (CAGR) of 15.5 percent from 22.7 million units in 2019 to 46.6 million units by 2024. Smart metering is expected to account for the bulk of the demand. Wi-SUN is the leading industry standard for smart electricity metering networks in North America, with adoption also spreading to Asia-Pacific and Europe.

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 new standards LTE-M and NB-IoT so significant for the cellular IoT ecosystem?
- When will 5G appear in the cellular IoT market?
- Which IoT applications will drive the adoption of 5G?
- What is the current installed base of LoRa and Sigfox?
- What are the prospects for emerging LPWA technology standards?

Million units

Annual shipments of cellular/LPWA IoT devices (World 2018-2024)

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About the Authors

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