

802.15.4

MARKETS

ZIGBEE

ISA100

WHART

WI-SUN

THREAD

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Executive Summary

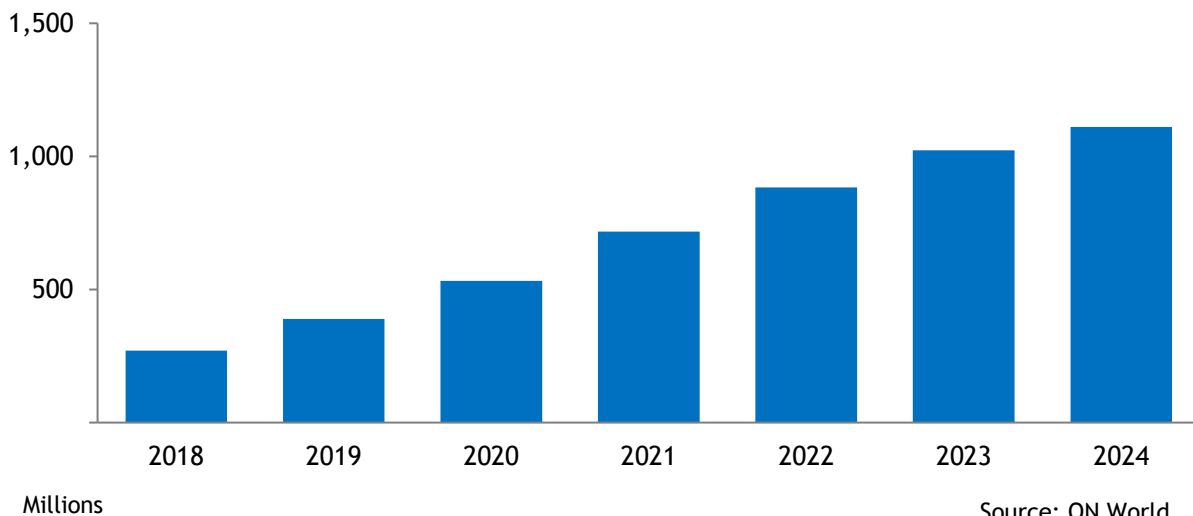
Fifteen years of advances for power management, wireless mesh networking, application profiles and multi-protocol chipset integration are driving the 802.15.4 ecosystem to new heights. Within the next year, there will be a billion devices worldwide using 802.15.4 network protocols such as Zigbee, Thread or Wi-SUN.

IoT device manufacturers have fewer risks today due to chipset costs approaching \$1 in high volumes and the emergence of multi-protocol chips that combine 802.15.4 wireless mesh networking and BLE. These new chips will soon be ubiquitous by leveraging BLE’s smart phone app integration with 802.15.4’s reliable mesh, security and advanced smart home profiles. With dozens of 802.15.4 chipset suppliers today, there are several combo chips available from leading 802.15.4 chipset suppliers including Silicon Labs, Qorvo, NXP and Texas Instruments as well as innovators and newer entrants such as Qualcomm, Nordic Semiconductor and Redpine Signals.

With 802.15.4/BLE chipsets developers are seeing significant demand, lower product development costs, faster time to market and the ability to create new product categories. For example, Signify’s recently launched 802.15.4/BLE smart light bulbs give mass market customers a hub-less smart lighting option that can be upgraded to a whole-home wireless mesh network later. Voice assistants are one of the biggest drivers of smart home solutions and market leaders such as Amazon, a Zigbee promoting member, and Google, the Thread Group founding member, are likely to use combo chips in their smart speakers.

By 2024, global annual shipments of 802.15.4 mesh chipsets will reach 1 billion. Zigbee will make up the largest portion but protocols using IPv6/6LoWPAN such as Thread and Wi-SUN will increase faster. Multi-protocol chipsets will make up 1 in 4 by this time.

Figure 1: Global 802.15.4 Annual Chipset Shipments (2018-2024)





Smart Homes & Buildings

Smart homes and buildings make up two-thirds of the 802.15.4 market. Zigbee 3.0 has unified Zigbee PRO profiles to simplify development and ensure interoperability among Zigbee products. Through an alliance between the Zigbee Alliance and Thread Group, Zigbee profiles are available to Thread developers. In July, the Fairhair Alliance published its 1.0 specification for a unified, highly secure IP infrastructure for smart buildings that features 802.15.4/Thread for wireless IP mesh communications.

Utility Networks & Smart Cities

Zigbee Smart Energy is the most commonly deployed technology today for the Home Area Network (HAN) with 100 million smart meters capable of connecting with in-home/building devices. With end-to-end IP addressability, long network range, robust security and scalability, Wi-SUN is another rapidly growing 802.15.4 mesh technology for the HAN and Field Area Networks (FAN). Wi-SUN profiles use 802.15.4g/e, 802.5.4u and 802.15.4v as well as IPv6/6LoWPAN and CoAP. There are currently more than 50 million installed Wi-SUN devices for utility networks and smart city infrastructures with another 45+ million planned in the next few years.

Industrial Automation & Logistics

For process automation, 802.15.4 mesh protocols WirelessHART and ISA100 Wireless are the most widely used technologies for wireless sensor networks. Wi-SUN is also targeted at a variety of industrial IoT applications such as distribution automation, agriculture, aquaculture, structural health and environmental monitoring.

Ultra-wide-band solutions using 802.15.4a, 802.15.4f and 802.15.4z are also growing for precision asset tracking applications for factory automation, logistics, mining, healthcare and other IoT markets.

For this report (our 15th edition), we did an exhaustive investigation of the 802.15.4 ecosystem including 3,000 interviews and surveys with end users, component suppliers, manufacturers, service providers and distributors targeting 20+ IoT market segments. We provide 6-year unit market size forecasts by protocol, frequency, topology, product design (e.g., chipset/module), geography as well as 802.15.4 chipset/module revenues and average sale prices. The report also includes 802.15.4 chipset market shares, an in-depth value system analysis and 90+ company profiles.



Report Scope

In this report, we analyze and forecast seven application areas across ten target markets that are most suited to 802.15.4 and its competing wireless alternatives such as Bluetooth, WiFi, Z-Wave, EnOcean, LoRa, NB-IoT, Sigfox and others. We analyze the whole value chain from chipset to end user and assess the forecast impact from a moderate and aggressive viewpoint.

ON World has conducted research on low power wireless and wireless sensor network (WSN) markets and technologies since 2002. Every year, we interview and survey thousands of individuals representing IoT companies along the whole value chain— end users, service providers, vendors and suppliers-- in dozens of markets.

Methodology

Primary Research: For this report, ON World conducted phone interviews and/or surveyed over 3,000 individuals including:

End users/Distributors: Consumers, home service providers, professional installers, systems integrators, retailers and other distribution channels.

Vendors: Component suppliers, device manufacturers, IoT platforms and service providers.

Competitive Landscape: Analysis of 100+ companies including:

- **Product segmentation:** Chipsets, RF modules, Network stacks, Systems, Platforms.
- **Competitive Analysis:** Products/services/pricing/intellectual property, business models/distribution channels and financials/partners/industry alliances.

Market Dynamics:

- **Target Markets:** AMI/DER; Smart Home; Media Center; Health & Wellness; Smart Buildings; Industrial, Logistics and Agriculture; Smart Cities; Retail, Automotive and Others.
- **Applications:** Energy/Metering, Lighting Controls, Health/Fitness, Security/Safety, Condition Monitoring/Asset Management, Entertainment Controls and Others.
- **Market forces:** Energy trends, economics, regulations, competitive forces along the value chain as well as end user adoption trends.
- **Technology dynamics:** Analysis of the latest technology advances, competing alternatives, standards efforts and industry alliances.
- **Sales Data Collection:** Unit sales, pricing, future predictions as well as breakdowns by market, geography, application, technology and module/chipset.

Market Size Forecasts: Using a complete value chain approach that is based on device shipments to end users, our forecasts are based on extensive primary research, vendor feedback, market forces analysis and data modeling.



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