
P802.15.4ae

Type of Project: Amendment to IEEE Standard 802.15.4-2020

Project Request Type: Initiation / Amendment

PAR Request Date:

PAR Approval Date:

PAR Expiration Date:

PAR Status: Draft

Root Project: 802.15.4-2020

1.1 Project Number: P802.15.4ae

1.2 Type of Document: Standard

1.3 Life Cycle: Full Use

2.1 Project Title: IEEE Standard for Low-Rate Wireless Networks Amendment: Ascon cryptographic algorithms

3.1 Working Group: Wireless Specialty Networks (WSN) Working Group(C/LAN/MAN/802.15 WG)

3.1.1 Contact Information for Working Group Chair:

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3.2 Society and Committee: IEEE Computer Society/LAN/MAN Standards Committee(C/LAN/MAN)

3.2.1 Contact Information for Standards Committee Chair:

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4.1 Type of Ballot: Individual

4.2 Expected Date of submission of draft to the IEEE SA for Initial Standards Committee Ballot:

Nov 2025

4.3 Projected Completion Date for Submittal to RevCom: Dec 2026

5.1 Approximate number of people expected to be actively involved in the development of this project: 10

5.2.a Scope of the complete standard: This standard defines the physical layer (PHY) and medium access control (MAC) sublayer specifications for low-data-rate wireless connectivity with fixed, portable, and moving devices with no battery or very limited battery consumption requirements. In addition, the standard provides modes that allow for precision ranging. PHYs are defined for devices operating in a variety of geographic regions.

5.2.b Scope of the project: This amendment adds the Ascon-128 and Ascon-128a cryptographic algorithms to the IEEE Std 802.15.4.

5.3 Is the completion of this standard contingent upon the completion of another standard? No

5.4 Purpose: The standard provides for ultra low complexity, ultra low cost, ultra low power consumption, and low data rate wireless connectivity among inexpensive devices, especially targeting the communications requirements of what is now commonly referred to as the Internet of Things. In addition, some of the alternate PHYs provide precision ranging capability that is accurate to one meter. Multiple PHYs are defined to support a variety of frequency bands.

5.5 Need for the Project: IEEE Std 802.15.4 is widely used in IoT applications. Use of the Ascon-128 and Ascon-128a lightweight cryptographic algorithms enables 802.15.4 devices to support even more demanding IoT applications.

5.6 Stakeholders for the Standard: The stakeholders include manufacturers and users of telecom, medical, environmental, energy, and consumer electronics equipment and manufacturers and users of

equipment involving the use of wireless sensor and control networks.

6.1 Intellectual Property

6.1.1 Is the Standards Committee aware of any copyright permissions needed for this project?

No

6.1.2 Is the Standards Committee aware of possible registration activity related to this project?

No

7.1 Are there other standards or projects with a similar scope? No

7.2 Is it the intent to develop this document jointly with another organization? No

8.1 Additional Explanatory Notes: 5.2.b Ascon-128 and Ascon-128a: Ascon is a family of lightweight authenticated ciphers that has been selected by US National Institute of Standards and Technology (NIST) for future standardization of the lightweight cryptography. Ascon provides the same Authenticated Encryption with Associated Data (AEAD) functionality as Advanced Encryption Standard (AES), allowing an Ascon algorithm to be a drop-in.

5.5 Ascon provides functions like hashing and extracting key material, which are not provided by AES. These functions are not currently used by IEEE Std 802.15.4, but key management protocols defined in IEEE Std 802.15.9 need such functions and providing one algorithm that supports encryption, authentication, hashing, and key material extraction allows more lightweight implementations in the future.

IEEE Std 802.15.9: IEEE Standard for Transport of Key Management Protocol (KMP) Datagrams