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IEEE Standard for a Convergent Digital Home Network for Heterogeneous Technologies

Amendment 1: Support of New MAC/PHYs and Enhancements

IEEE Communications Society

Sponsored by the
Power Line Communications Committee

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IEEE Std 1905.1a™-2014
(Amendment to
IEEE Std 1905.1™-2013)

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IEEE-SA Standards Board

Abstract: An abstraction layer for multiple home networking technologies that provides a common interface to widely deployed home networking technologies is defined in this standard: IEEE 1901™ over power lines, IEEE 802.11™ for wireless, Ethernet over twisted pair cable, and MoCA 1.1 over coax. Additional network technologies are supported by an extensible mechanism using an IEEE OUI and an XML-formatted document. Connectivity selection for transmission of packets arriving from any interface or application is supported by the 1905 abstraction layer. Modification to the underlying home networking technologies is not required by the 1905 abstraction layer, and hence it does not change the behavior or implementation of existing home networking technologies. The 1905 abstraction layer is between layers 2 and 3 and abstracts the individual details of each interface, aggregates available bandwidth, and facilitates seamless integration. The 1905 abstraction layer also facilitates end-to-end quality of service (QoS) while simplifying the introduction of new devices to the network, establishing secure connections, extending network coverage, and facilitating advanced network management features including discovery, path selection, autoconfiguration, and QoS negotiation.

Keywords: abstraction layer, access point (AP) autoconfiguration, data models, extensibility, fragmentation and reassembly, Generic Phy, IEEE 802.1™ bridge discovery, IEEE Std 802.11™, IEEE Std 1901™, IEEE Std 1905.1™, L2, MoCA®, pairwise master key, power management, push button, registration, security, topology discovery protocol, Wi-Fi®, XML

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Introduction

This introduction is not part of IEEE Std 1905.1a-2014, IEEE Standard for a Convergent Digital Home Network for Heterogeneous Technologies—Amendment 1: Support of New MAC/PHYs and Enhancements.

Among the home networking technologies, wireless networks offer mobility, and wired technologies offer extensive bandwidth or outlet ubiquity for data communications. Wired and wireless technologies complement each other to provide full home coverage.

To address the wide variety of applications, regions, environments, and topologies, multiple connectivity technologies are needed. Each of these different technologies has a unique interface to higher layer entities, thus, leading to software and hardware design complexities in multi-connectivity devices. This complexity must be reduced, and new features/functions must be enabled that can take advantage of the multiple paths available between devices.

IEEE Std 1905.1a addresses these requirements by defining an abstraction layer for multiple home networking technologies that provides a common interface to widely deployed home networking technologies: IEEE Std 1901™-2010 over power lines, IEEE Std 802.11™-2012 for wireless, Ethernet over twisted pair cable, and MoCA® 1.1 over coax.[a,b] Other network technologies are supported by an extensible mechanism using an IEEE OUI and an XML-formatted document.

The adjective "1905" is used in some terminology in this document and does not refer to, nor imply, any unique standard.

[a] Information on references can be found in Clause 2.
[b] MoCA is a registered trademark in the U.S. Patent & Trademark Office, owned by the Multimedia over Coax Alliance.

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