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IEEE Standard for Medium Frequency (less than 12 MHz) Power Line Communications for Smart Grid Applications

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IEEE Std 1901.1™-2018

IEEE Standard for Medium Frequency (less than 12 MHz) Power Line Communications for Smart Grid Applications

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Power Line Communication Standards Committee
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IEEE Communications Society

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Abstract: Physical (PHY) and media access control (MAC) layers of the medium frequency band (less than 12 MHz) broadband power line communication technology for smart grid applications (SGPLC) based on orthogonal frequency division multiplexing (OFDM) are specified in this standard. The necessary security requirements that assure communication privacy and allow use for mission critical and security sensitive services and applications are addressed in this standard. The coexistence with other technologies based on IEEE Std 1901™-2010 also are addressed. The approach that is geared towards achieving an extended communication range with medium speeds in comparison with the existing power line communication technologies operating in similar frequency bands is defined in this standard.

Keywords: BPL, broadband power line, coexistence, FFT, IEEE 1901™, IEEE 1901.1™, IEEE 1901.2™, MAC, medium frequency, OFDM, orthogonal frequency division multiplexing, PHY, PLC, power line communication, security, smart grid

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Introduction

This introduction is not part of IEEE Std 1901.1-2018, IEEE Standard for Medium Frequency (less than 12 MHz) Power Line Communications for Smart Grid Applications.

This standard specifies physical (PHY) and media access control (MAC) layers of the medium frequency band (less than 12 MHz) broadband power line communication technology for smart grid applications (SGPLC) based on orthogonal frequency division multiplexing (OFDM). The standard addresses the necessary security requirements that assure communication privacy and allow use for mission critical and security sensitive services and applications. It also addresses the coexistence with other technologies based on IEEE Std 1901™. This standard also defines the approach that is geared towards achieving an extended communication range with medium speeds in comparison with the existing power line communication technologies operating in similar frequency bands.

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1. Scope

This standard specifies physical (PHY) and media access control (MAC) layers of the medium frequency band (less than 12 MHz) broadband power line communication technology for smart grid applications (SGPLC) based on orthogonal frequency division multiplexing (OFDM) (e.g., FTT and/or wavelet OFDM). This standard coexists with IEEE Std 1901™-2010, IEEE Std 1901.2™-2013 [B1], and IEEE Std 1901.2a™-2015 [B2].[1,2] The standard addresses the necessary security requirements that assure communication privacy and allow use for mission critical and security sensitive services and applications. This standard also defines the approach that is geared towards achieving an extended communication range in comparison with the existing power line communication technologies operating in similar frequency bands.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

FIPS 197, Advanced Encryption Standard (AES), 2001.[3]

IEEE Std 802™-2001, IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture.[4,5]

IEEE Std 1901™-2010, IEEE Standard for Broadband over Power Line Networks: Medium Access Control and Physical Layer Specifications.

[1]Information on references can be found in Clause 2.
[2]The numbers in brackets correspond to those of the bibliography in Annex F.
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