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IEEE Recommended Practice for Local and Metropolitan Area Networks—Part 19: Coexistence Methods for IEEE 802.11 and IEEE 802.15.4 Based Systems Operating in the Sub-1 GHz Frequency Bands

IEEE Computer Society

Developed by the
LAN/MAN Standards Committee

IEEE Std 802.19.3™-2021

IEEE

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IEEE SA Standards Board

Abstract: Millions of IEEE Std 802.15.4g™ based devices are currently operating in sub-1 GHz frequency bands to provide the low to moderate data rate capabilities. IEEE Std 802.11ah™ may operate in the same sub-1 GHz frequency bands and provides higher data rate capabilities. This recommended practice enables IEEE Std 802.15.4g and IEEE Std 802.11ah to effectively operate in license exempt sub-1 GHz frequency bands, by providing best practices and coexistence methods.

Keywords: coexistence, CSMA/CA, energy detection, FSK, IEEE 802.11ah™, IEEE 802.15.4g™, interference, OFDM, receiver sensitivity, sub-1 GHz frequency bands, Wi-Fi HaLow™, Wi-SUN®

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Introduction

This introduction is not part of IEEE Std 802.19.3-2021, IEEE Recommended Practice for Local and Metropolitan Area Networks—Part 19: Coexistence Methods for IEEE 802.11 and IEEE 802.15.4 Based Systems Operating in the Sub-1 GHz Frequency Bands.

Many millions of devices based on IEEE Std 802.15.4™ are currently operating in sub-1 GHz frequency bands, and the field is expanding rapidly. Critical applications, such as grid modernization (smart grid) and Internet of Things (IoT), are using the low to moderate data rate capabilities of IEEE Std 802.15.4. IEEE Std 802.11ah™ may operate in the same sub-1 GHz frequency bands and provides higher data rate capabilities than IEEE Std 802.15.4. For example, Japan formed the 802.11ah Promotion Council (AHPC) to promote the widespread use of IEEE Std 802.11ah technology in areas such as home, office, industry, infrastructure, and mobility. In consideration of the current usage, as well as anticipation of as yet unforeseen usage models enabled by the standards within the scope of this recommended practice, and to fully realize the opportunity for successful deployment of products sharing the spectrum, strategies and tactics to achieve good coexistence performance are critical.

This recommended practice enables IEEE Std 802.15.4 and IEEE Std 802.11ah to effectively operate in license exempt sub-1 GHz frequency bands by providing best practices and coexistence methods. This recommended practice uses existing features of the referenced standards and provides guidance to implementers and users of IEEE 802® wireless standards.

Contents

IEEE Recommended Practice for Local and Metropolitan Area Networks—Part 19: Coexistence Methods for IEEE 802.11 and IEEE 802.15.4 Based Systems Operating in the Sub-1 GHz Frequency Bands

1. Overview

1.1 Scope

This recommended practice provides guidance on the implementation, configuration, and commissioning of systems sharing spectrum between IEEE Std 802.11ah™-2016 and IEEE Std 802.15.4™ smart utility networking (SUN) frequency shift keying (FSK) physical layer (PHY) operating in sub-1 GHz frequency bands.

1.2 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall* equals *is required to*).[1,2]

The word *should* indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (*should* equals *is recommended that*).

The word *may* is used to indicate a course of action permissible within the limits of the standard (*may* equals *is permitted to*).

The word *can* is used for statements of possibility and capability, whether material, physical, or causal (*can* equals *is able to*).

[1] The use of the word *must* is deprecated and cannot be used when stating mandatory requirements; *must* is used only to describe unavoidable situations.

[2] The use of *will* is deprecated and cannot be used when stating mandatory requirements; *will* is only used in statements of fact.