**IEEE P802.19**

**Wireless Coexistence**

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| Project | IEEE P802.19 Wireless Coexistence WG | |
| Title | Recommended Practice for Local and Metropolitan Area Networks - Part 19: Coexistence Methods for 802.11 and 802.15.4 based systems operating in the Sub-1 GHz Frequency Bands | |
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| Source | Jianlin Guo (MERL)  Yukimasa Nagai (MERL)  Philip Orlik (MERL)  Benjamin A. Rolfe (MERL/BCA)  Takenori Sumi (Mitsubishi Electric) | E-mail: [guo@merl.com](mailto:guo@merl.com)  [nagai@merl.com](mailto:nagai@merl.com)  [porlik@merl.com](mailto:porlik@merl.com)  [ben@blindcreek.com](mailto:ben@blindcreek.com)  [Sumi.Takenori@dc.MitsubishiElectric.co.jp](mailto:Sumi.Takenori@dc.MitsubishiElectric.co.jp) |
| Abstract | This document is the initial table of content for P802.19.3: Coexistence Methods for 802.11 and 802.15.4 based systems operating in the Sub-1 GHz Frequency Bands | |
| Purpose | To start discussion of the Recommended Practice | |
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1. **Overview**
   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. Need for the Project

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-2016 may operate in the same Sub-1 GHz frequency bands and provides higher data rate capabilities than IEEE Std 802.15.4. In consideration of the current usage, as well as anticipation of 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-2016 to most 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(R) wireless standards.

1. **Normative reference**
2. **Definitions, acronyms and abbreviations**
   1. Definitions
   2. Acronyms and abbreviations
3. **Overview of Sub-1 GHz band systems considered**

4.1 IEEE 802.11ah

4.2 IEEE 802.15.4g

4.3 LoRa

4.4 SigFox

1. **Use cases of the IEEE 802 Sub-1 GHz technologies**

5.1 Smart utility

5.2 Smart city

5.3 Field monitoring

5.4 From Wi-Fi Alliance

5.5 Wi-SUN Alliance

5.6 802.11ah Promotion Council

1. **Sub-1 GHz spectrum allocation (informative, could be annex)**

6.1 Japan

6.2 US

6.3 Europe

**7. Necessity of spectrum sharing**

7.1 Spectrum allocation constraint

7.2 Potential multiple co-located applications

7.3 Communication range

1. **802.11ah and 802.15.4g coexistence mechanisms and issues (informative)**

8.1 802.11ah coexistence mechanisms

8.2 802.15.4g coexistence mechanisms

8.3 Coexistence performance of 802.11ah and 802.15.4g

Simulation results

8.4 Need of coexistence management

8.5 Potential coexistence improvement

8.6 Simulation results

1. **Recommendation scenarios**
   1. Frequency coordination
   2. CSMA/CA recommendations
   3. CCA recommendations
   4. Transmission duration recommendation
   5. Duty cycle recommendation
   6. PHY parameter recommendation
   7. MAC parameter recommendation
   8. Network topology recommendation
   9. Application based recommendation
2. **Coexistence architectures**
   1. Distributed coexistence control
   2. Centralized coexistence control
3. **Conclusion**
4. **References**

**Annex A**

**Evaluation and simulation practice**

Simulation profiles

Propagation models

Model for stations below roof height

Model for stations above or below roof height

**Annex B**

**802.11ah CSMA/CA vs 802.15.4g CSMA/CA**

**Annex C**

**Self-Coexistence control by 802.11ah stations**

B.1 α-fairness based control

B.2 Q-Learning based control

B.3 Prediction based control

**Annex D**

**Self-Coexistence control by 802.15.4g nodes**

D.1 xxx

D.2 xxx