

# P802.11bd

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**Submitter Email:** [dstanley1389@gmail.com](mailto:dstanley1389@gmail.com)

**Type of Project:** Amendment to IEEE Standard 802.11-2016

**PAR Request Date:** 27-Sep-2018

**PAR Approval Date:** 05-Dec-2018

**PAR Expiration Date:** 31-Dec-2022

**Status:** PAR for an Amendment to an existing IEEE Standard

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**1.1 Project Number:** P802.11bd

**1.2 Type of Document:** Standard

**1.3 Life Cycle:** Full Use

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**2.1 Title:** Standard for Information technology--Telecommunications and information exchange between systems Local and metropolitan area networks--Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications  
Amendment: Enhancements for Next Generation V2X

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**3.1 Working Group:** Wireless LAN Working Group (C/LM/WG802.11)

**Contact Information for Working Group Chair**

**Name:** Dorothy Stanley

**Email Address:** [dstanley1389@gmail.com](mailto:dstanley1389@gmail.com)

**Phone:** 630-363-1389

**Contact Information for Working Group Vice-Chair**

**Name:** Jon Rosdahl

**Email Address:** [jrosdahl@ieee.org](mailto:jrosdahl@ieee.org)

**Phone:** 801-492-4023

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

**Contact Information for Sponsor Chair**

**Name:** Paul Nikolich

**Email Address:** [p.nikolich@ieee.org](mailto:p.nikolich@ieee.org)

**Phone:** 8572050050

**Contact Information for Standards Representative**

**Name:** James Gilb

**Email Address:** [gilb@ieee.org](mailto:gilb@ieee.org)

**Phone:** 858-229-4822

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**4.1 Type of Ballot:** Individual

**4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot:** 09/2020

**4.3 Projected Completion Date for Submittal to RevCom**

**Note: Usual minimum time between initial sponsor ballot and submission to Revcom is 6 months.: 10/2021**

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**5.1 Approximate number of people expected to be actively involved in the development of this project:** 100

**5.2.a. Scope of the complete standard:** The scope of this standard is to define one medium access control (MAC) and several physical layer (PHY) specifications for wireless connectivity for fixed, portable, and moving stations (STAs) within a local area.

**5.2.b. Scope of the project:** This amendment defines modifications to both the IEEE 802.11 Medium Access Control layer (MAC) and Physical Layers (PHY) for vehicle to everything (V2X) communications for 5.9 GHz band as defined in clauses E.2.3 and E.2.4 of IEEE Std 802.11(TM)-2016; and, optionally, in the 60 GHz frequency band (57 GHz to 71 GHz) as defined in clause E.1 of IEEE Std 802.11(TM)-2016.

This amendment defines at least one mode that achieves at least 2 times higher throughput (measured at the MAC data service access point) than as in IEEE Std 802.11(TM)-2016 operating at maximum mandatory data rate as defined in the 5.9 GHz band (12 Mb/s in a 10 MHz channel), in high mobility channel environments at vehicle speeds up to 250 km/h (closing speeds up to 500 km/h); this amendment also defines at least one mode that achieves at least 3dB lower sensitivity level (longer range), than that of the lowest data rate defined in IEEE Std 802.11(TM)-2016 operating in 5.9 GHz band (3 Mb/s in a 10 MHz channel); and this amendment defines procedures for at least one form of positioning in conjunction with V2X communications.

This amendment shall provide interoperability, coexistence, backward compatibility, and fairness with deployed OCB (Outside the Context of

a BSS) devices.

**5.3 Is the completion of this standard dependent upon the completion of another standard:** No

**5.4 Purpose:** The purpose of this standard is to provide wireless connectivity for fixed, portable, and moving stations within a local area. This standard also offers regulatory bodies a means of standardizing access to one or more frequency bands for the purpose of local area communication.

**5.5 Need for the Project:** Current IEEE 802.11 wireless access in vehicular environments (WAVE) technology for V2X applications is based on IEEE Std 802.11(TM)-2016 operating in 5.9 GHz band, which was originally standardized as IEEE Std 802.11p(TM)-2010, and which, in turn, derived from the OFDM PHY as defined in clause 17 of IEEE Std 802.11(TM)-2016 (a.k.a. IEEE Std 802.11a(TM) -1999). WAVE technology has been available for almost a decade, and has been extensively tested and is a proven, mature technology.

During the past decade, IEEE 802.11 technology has improved, from IEEE Std 802.11a(TM)-2009, to IEEE Std 802.11n(TM)-2009, IEEE Std 802.11ac(TM)-2013 and the ongoing IEEE P802.11ax(TM) amendment, with supported throughput increasing from 54 Mbps to close to 10 Gbps, as well as higher reliability and improved range. To address future needs for V2X communication technology and provide 802.11-based future-proof technology for V2X applications, the definition of new V2X mechanisms based on new and existing, proven IEEE 802.11 WLAN PHY/MAC technologies, are needed.

**5.6 Stakeholders for the Standard:** Semiconductor manufacturers and users of semiconductors, vehicle vendors, vehicle component providers, consumer electronic and mobile devices vendors, and road side infrastructure manufacturers.

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### Intellectual Property

**6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?:** No

**6.1.b. Is the Sponsor aware of possible registration activity related to this project?:** No

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

### 7.2 Joint Development

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

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**8.1 Additional Explanatory Notes:** IEEE Std 802.11(TM)-2016 Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

IEEE Std 802.11a(TM)-1999 Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: High Speed Physical Layer in the 5 GHz band

IEEE Std 802.11n(TM)-2009 Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 5: Enhancements for Higher Throughput

IEEE Std 802.11p(TM)-2010 Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 6: Wireless Access in Vehicular Environments

IEEE Std 802.11ac(TM)-2013 Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 4: Enhancements for Very High Throughput for Operation in Bands below 6 GHz

IEEE P802.11ax Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment: Enhancements for High Efficiency WLAN