IEEE P802.11
Wireless LANs

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| 802.11 SENS SG Proposed PAR |
| Date: 2020-03-02 |
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Abstract

This submission includes the IEEE 802.11 WLAN Sensing (SENS) Study Group proposed PAR.

**P802.11**

**Submitter Email:**

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

**PAR Request Date:**

**PAR Approval Date:**

**PAR Expiration Date:**

**Status:** Unapproved PAR, PAR for an amendment to an existing IEEE Standard

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

**1.2 Type of Document:** Standard

**1.3 Life Cycle:** Full Use

**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 Wireless Local Area Network (WLAN) Sensing

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

**Contact Information for Working Group Chair**

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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

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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:** September 2023

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

**Note: Usual minimum time between initial sponsor ballot and submission to Revcom is 6 months.:** September 2024

**5.1 Approximate number of people expected to be actively involved in the development of this project:** 60

**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 the IEEE 802.11 medium access control layer (MAC), to the physical layer (PHY) of Directional Multi Gigabit (DMG), and to the PHY under development of Next Generation 60 GHz (NG60) that enhance Wireless Local Area Network (WLAN) sensing (SENS) operation in license-exempt frequency bands between 1 GHz and 7.125 GHz and above 45 GHz. This amendment defines:

* at least one mode that enables stations (STAs) to perform one or more of the following: to exchange WLAN sensing capabilities, to request and setup transmissions that allow for WLAN sensing measurements to be performed, to indicate that a transmission can be used for WLAN sensing, and to exchange WLAN sensing feedback and information;
* WLAN sensing operation that relies on transmissions that are requested, unsolicited, or both; and
* an interface for applications above the MAC to request and obtain WLAN sensing information.

This amendment also defines modifications to the PHY service interface of High Throughput (HT) and of Very High Throughput (VHT), and of PHYs under development (specifically, of High Efficiency WLAN (HEW) and of Extremely High Throughput (EHT)).

This amendment provides backward compatibility and coexistence with legacy IEEE 802.11 devices operating in the same band.

**5.3 Is the completion of this standard dependent upon the completion of another standard:** Yes

**If yes please explain:** The IEEE P802.11ax HEW, IEEE P802.11ay NG60, IEEE P802.11az NGP and IEEE P802.11be EHT task groups are amending the IEEE Std. 802.11. It is anticipated that the IEEE P802.11ax HEW, IEEE P802.11ay NG60, IEEE P802.11az NGP, IEEE P802.11be EHT, and IEEE P802.11bf SENS will coordinate their drafts in accordance with their expected completion dates to harmonize the amendment changes to the base standard. The IEEE P802.11md revision project is expected to be the baseline for the amendment changes to IEEE Std 802.11.

**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:**

WLAN sensing is the use of 802.11 technology to enable applications such as presence and proximity detection, gesture recognition, wellness monitoring, localization, and smart home, among others, in scenarios such as residential, enterprise, indoor, and outdoor. WLAN sensing is performed by processing transmissions of one or more STAs and detecting variations that can indicate an event of interest. Target subjects of WLAN sensing can be people, animals, or objects, among others, and are assumed to not make transmissions that can be used by WLAN sensing. The reliability and efficiency of WLAN sensing applications can be enhanced, compared to what can be achieved with the use of IEEE 802.11-2016, by defining standard support to WLAN sensing-specific operations, including the coordination of transmissions used to obtain WLAN sensing measurements. An amendment to IEEE 802.11-2016 that addresses unique characteristics of WLAN sensing is necessary to better support WLAN sensing, spur further innovation, and provide a technology development roadmap to the industry.

\* The efficiency of WLAN sensing can be characterized, at least in part, by the wireless medium use and power consumption to support a given application.

\* An amendment to IEEE 802.11-2016 with the scope defined in 5.2.b and that enhances WLAN sensing will provide a standardized sensing technology that provides backward compatibility and coexistence with IEEE 802.11 devices.

**5.6 Stakeholders for the Standard:** Manufacturers and users of semiconductors, personal computers, enterprise networking devices, consumer electronic devices, home networking equipment, mobile devices, wireless sensing equipment (including for behavior recognition, vehicular, smart home, and security applications), and test and measurement equipment providers.

**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

**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

**8.1 Additional Explanatory Notes:**

5.2.b:

\* This amendment will be evaluated in a set of typical deployment scenarios (residential, enterprise, indoor, and outdoor, for example) applicable to the main expected applications (such as presence and proximity detection, gesture recognition, wellness monitoring, localization, and smart home, among others).

\* The operating frequency bands to be considered in this amendment are defined in Annex E of IEEE 802.11-2016, IEEE P802.11ax/D6.0, IEEE P802.11ay/D5.0, and IEEE P802.11-REVmd/D3.0.

5.3

* IEEE Std 802.11-2016, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
* IEEE P802.11-REVmd/D3.1, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
* IEEE P802.11ax/D6.0, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment 1: Enhancements for High Efficiency WLAN
* IEEE P802.11ay/D5.0, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment 2: Enhanced throughput for operation in license-exempt bands above 45 GHz
* IEEE P802.11az/D2.0, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment 3: Enhancements for positioning