IEEE P802.11
Wireless LANs

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| 802.11 UHR SG Proposed PAR |
| Date: 2022-09-11 |
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Abstract

This submission includes the IEEE 802.11 Ultra High Reliability (UHR) Study Group PAR.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revised based on feedback from Brian, Jinsoo and Wookbong

# PAR

**P802.11**

**Submitter Email: ming.gan@huawei.com**
**Type of Project:** Amendment to IEEE Standard 802.11
**PAR Request Date:** TBD
**PAR Approval Date: May 2023
PAR Expiration Date: May 2027
Status:** Unapproved PAR, PAR for an amendment to an existing IEEE Standard

**1.1 Project Number:** P802.11??
**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 Ultra High Reliability WLAN

**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:
July 2026
4.3 Projected Completion Date for Submittal to RevCom:
Note: Usual minimum time between initial sponsor ballot and submission to Revcom is 6 months.:** **March 2027**

**5.1 Approximate number of people expected to be actively involved in the development of this project:** 200

**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 standardized modifications to both the 802.11 physical (PHY) and medium access control (MAC) layers that enable modes of operation capable of supporting a maximum aggregated throughput of at least 100 Gbps, and at least two times improvement in aggregated throughput at every signal to noise ratio (SNR) level (measured at the MAC data service access point) compared to 802.11be, with carrier frequency operation between 1 and 7.125 GHz and also 42.5 and 71 GHz.

This amendment defines at least one mode of operation capable of improved latency bound and jitter at the 99 to 99.9999th percentiles compared to 802.11be, satisfying real-time applications requirements for high reliability in the presence of overlapping BSSs and for seamless BSS transitions within an ESS.

This amendment a) shall enable backward compatibility and coexistence with legacy IEEE 802.11 devices operating in license-exempt bands between 1 and 7.250 GHz, and b) shall enable coexistence with legacy IEEE 802.11 devices operating in license-exempt bands between 42.5 and 71 GHz.

 **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:**

Wireless LAN (WLAN), based on IEEE 802.11 technology, has steadily seen a significant increase in the achievable data rates. It is now possible to find WLAN devices that support rates in the range of a few gigabits per second (Gbps).

WLAN usage continues to grow and find new applications demanding additional capacity. As an example, the speed of a wired interface, such as Ethernet, can reach 800 Gbps, and is advancing towards terabit (Tbps) territories.

Emerging metaverse applications provide a spectrum of digitally enhanced worlds, realities and business models poised to revolutionize life and enterprises in the next decade. Those new applications are characterized by fast symmetrical broadband with low delay and high reliability requirements [1].

The required data rates for such applications are higher than the currently available rates. The latency bound under 10 milliseconds and jitter under 2.5 milliseconds at the 99 to 99.9999th percentiles [2] are required to support the interactive nature of those applications. With the high throughput and stringent real-time delay requirements of these applications, users expect enhanced throughput, enhanced reliability, reduced worst case delay and jitter, and improved power efficiency in supporting their applications over WLAN.

In addition to further improvements of throughput and latency within a single basic service set (BSS), this amendment also focuses on improving the throughput, latency and reliability of multiple non-collocated BSSs in dense scenarios via a) in-band and optionally out-of-band (including via 802.3) AP MLD coordination for interference reduction, and b) the frequency reuse of channels with larger bandwidths than 40 MHz.

**5.6 Stakeholders for the Standard:**Manufacturers and users of semiconductors, personal computers, enterprise networking devices, consumer electronic devices, home networking equipment, mobile devices, and cellular operators.

**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 (Item Number and Explanation):**

Item 5.5:

**References:**

[1] <https://circleid.com/posts/20220312-network-requirements-for-the-metaverse>

[2] <https://mentor.ieee.org/802.11/dcn/18/11-18-2009-06-0rta-rta-report-draft.docx>