IEEE P802.11  
Wireless LANs

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| A PAR Proposal for Wake-up Radio (WUR) | | | | |
| Date: 2016-06-30 | | | | |
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Abstract

This submission includes a PAR proposal for the IEEE 802.11 Wake-up Radio (WUR) Study Group.

# PAR

**P802.11**

**Submitter Email:**   
**Type of Project:** Amendment to IEEE Standard 802.11  
**PAR Request Date:** TBD  
**PAR Approval Date:   
PAR Expiration Date:   
Status:** Unapproved PAR, PAR for an amendment to an existing IEEE Standard

**1.1 Project Number:** P802.11tbd  
**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 Wake-up Radio (WUR)

**3.1 Working Group:** Wireless LAN Working Group (C/LM/WG802.11)   
**Contact Information for Working Group Chair**

**Name:** Adrian Stephen  
**Email Address:**    
**Phone:**

**Contact Information for Working Group Vice-Chair Name:** Jon Rosdahl  
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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:**2019-xxxx  
**4.3 Projected Completion Date for Submittal to RevCom:**2019-xxxx

**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 the physical (PHY) layer and medium access control (MAC) layer specifications for a wake-up signal. The reception of the wake-up signal enables a low power (< tbd mW) secondary (auxiliary) receiver (referred to as Wake-up Receiver) in a station to trigger a transition of a primary IEEE 802.11 module in the same station from the sleep mode to wake-up mode.

The definition of the wake-up signal is applicable for IEEE 802.11 devices operating in the 2.4 GHz and 5 GHz bands. The wake-up signal may be transmitted in the same band or in a different band other than that the primary IEEE 802.11 module is using.

The new amendment enables 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: 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:**

Low power devices manifest themselves in a number of applications and usage cases. Those usage cases include healthcare, smart home, industrial sensors, wearables, etc. Devices used in these applications are usually powered by battery. Prolonging the battery lifetime becomes an imperative requirement. The IEEE 802.11 wireless technologies are often considered as one of the candidates for inter-connecting technologies. To be competitive, the IEEE 802.11 WG needs to develop power efficient mechanisms to be used with battery-operated devices. This project addresses this need. This project is also expected to benefit traditional devices with Wi-Fi interfaces such as smart phones.

**5.6 Stakeholders for the Standard:**Manufacturers and users of semiconductors, healthcare providers, enterprise networking devices, consumer electronic devices and wearables, smart home networking equipment, producers of industrial sensors, 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):**

**5.2.b**

* While this project focuses on the specification of the PHY and the MAC layers of the wake-up signal, it is expected that minor changes to the IEEE 802.11 MAC layer may be needed, e.g. the introduction of a new capability element, etc.
* The new amendment improves energy efficiency for data reception without a significant increase in latency.
* The new amendment ensures that methods are defined to alleviate the impacts of false wake-up attacks.
* The power consumption of a Wake-up Receiver is expected to be low enough to operate for a semi-permanent time period (> TBD months/years) in the battery-operated devices.
* The supported range of the wake-up signal will be no less than the supported range of the primary IEEE 802.11 signal of 20MHz bandwidth.

**References:**