

## P802.15.4p

---

**Submitter Email:** [bheile@ieee.org](mailto:bheile@ieee.org)

**Type of Project:** Modify Existing Approved PAR

**PAR Request Date:** 04-Mar-2013

**PAR Approval Date:**

**PAR Expiration Date:**

**Status:** Unapproved PAR, Modification to a Previously Approved PAR for an Amendment

**Root PAR:** P802.15.4p **Approved on:** 29-Mar-2012

---

**1.1 Project Number:** P802.15.4p

**1.2 Type of Document:** Standard

**1.3 Life Cycle:** Full Use

---

**2.1 Title:** Standard for Local and metropolitan area networks--Part 15.4: Low-Rate Wireless Personal Area Networks (LR-WPANs) Amendment: Physical Layer for Rail Communications and Control

**Changes in title:** ~~IEEE~~ Standard for Local and metropolitan area networks--Part 15.4: Low-Rate Wireless Personal Area Networks (LR-WPANs) Amendment: ~~Positive Train Control for (PTC) Rail System Communications Physical and Layer Control~~

---

**3.1 Working Group:** Wireless Personal Area Network (WPAN) Working Group (C/LM/WG802.15)

**Contact Information for Working Group Chair**

**Name:** Robert Heile

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

**Phone:** 781-929-4832

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

**Name:** Richard Alfvín

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

**Phone:** 585-781-0952

---

**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:** 857.205.0050

**Contact Information for Standards Representative**

**Name:** James Gilb

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

**Phone:** 858-229-4822

---

**4.1 Type of Ballot:** Individual

**4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot:** 11/2013

**4.3 Projected Completion Date for Submittal to RevCom:** 05/2014

---

**5.1 Approximate number of people expected to be actively involved in the development of this project:** 150

**5.2.a. Scope of the complete standard:** This standard defines the physical layer (PHY) and medium access control (MAC) sublayer specifications for low-data-rate wireless connectivity with fixed, portable, and moving devices with no battery or very limited battery consumption requirements typically operating in the personal operating space (POS) of 10 m.

Physical layers (PHYs) are defined for

-- Devices operating in the license-free 868-868.6 MHz, 902-928 MHz, and 2400-2483.5 MHz bands

-- Devices with precision ranging, extended range, and enhanced robustness and mobility

-- Devices operating according the Chinese regulations, Radio Management of P. R. of China doc. #6326360786867187500 or current document, for one or more of the 314-316 MHz, 430-434 MHz, and 779-787 MHz frequency bands

-- Devices operating in the 950-956 MHz allocation in Japan and coexisting with passive tag systems in the band

**5.2.b. Scope of the project:** This amendment specifies a physical layer (PHY) for IEEE STD 802.15.4, and any media access control (MAC) changes needed to support this PHY, for use in equipment intended to address industry needs and to meet United States (US) Positive Train Control regulatory requirements and similar regulatory requirements in other parts of the world. The PHY enables operation in licensed or license-free radio frequency bands below 6 GHz; meets performance requirements at speeds up to 600 km/h; supports radio ranges on the order of 70 km; allows operation in contiguous or non-contiguous channel bandwidths as narrow as 5 kHz and potentially as high as 20 to 30 MHz, consistent with any applicable regulations; supports data rates up to 1 Mbps with flexible and robust quality of service; provides modulation methods and

spectral characteristics consistent with local regulatory requirements; and accommodates rapidly changing network membership.

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

**5.4 Purpose:** This document will not include a purpose clause.

**5.5 Need for the Project:** PTC is becoming a vital part of global rail transportation systems. In the US, the PTC performance requirement is specified in Section 20157.(i).(3) of US Public Law 110-432, also known as the US Rail Safety Improvement Act of 2008 (<http://www.gpo.gov/fdsys/pkg/PLAW-110publ432/pdf/PLAW-110publ432.pdf>). It is anticipated that requirements similar to those in the US public law may be adopted in other geographic regions in the future.

There are over 250,000 km of track in North America alone, approximately 24,000 locomotives, and the potential for tens of thousands of wayside devices and other infrastructure. There is much potential in large-scale information exchange, and device command and control applications. These needs are effectively served by the development of mobility-capable IEEE STD 802.15.4 networks. In addition, the work done by the IEEE Vehicular Technology Society's Rail Transportation Standards Committee to establish the IEEE 1474 family of standards for Communication Based Train Control may benefit from development of a wireless protocol for communications links.

**5.6 Stakeholders for the Standard:** The stakeholders include:

- Communication device manufacturers and users
- Passenger rail entities
- Freight rail entities
- State, regional, municipal and private rail transit entities
- Device, component, and systems suppliers
- US regulatory and government agencies
- Spectrum licensees and spectrum management entities

---

## 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 Scope: This amendment also provides mechanisms that enable coexistence with other 802 systems in the same band.

5.2 Scope: North American Class One railroads and many rail transit entities have acquired spectrum in the 216 - 222 MHz band for such uses.