

# P802.16n

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**Submitter Email:** [r.b.marks@ieee.org](mailto:r.b.marks@ieee.org)

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

**PAR Request Date:** 17-Oct-2011

**PAR Approval Date:** 07-Dec-2011

**PAR Expiration Date:** 31-Dec-2014

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

**Root PAR:** P802.16n **Approved on:** 17-Jun-2010

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**1.1 Project Number:** P802.16n

**1.2 Type of Document:** Standard

**1.3 Life Cycle:** Full Use

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**2.1 Title:** IEEE Standard for Local and metropolitan area networks Part 16: Air Interface for Broadband Wireless Access Systems Amendment: Higher Reliability Networks

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**3.1 Working Group:** Broadband Wireless Access Working Group (C/LM/WG802.16)

**Contact Information for Working Group Chair**

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

None

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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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**Contact Information for Standards Representative**

None

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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:** 07/2012

**4.3 Projected Completion Date for Submittal to RevCom:** 08/2013

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**5.1 Approximate number of people expected to be actively involved in the development of this project:** 20

**5.2 Scope:** This amendment specifies protocol enhancements to the medium access control layer (MAC) for enabling increased robustness and alternate radio path establishment in degraded network conditions. Limited orthogonal frequency-division multiple access physical layer (OFDMA PHY) extensions are included for enabling operation with radio path redundancy and direct communication between subscriber stations. Also mobile base stations and mobile relay stations are supported.

**Changes in scope:** This amendment specifies protocol enhancements to the ~~IEEE 802.16~~ medium access control layer (MAC) for enabling increased robustness and alternate radio path establishment in degraded network conditions. Limited orthogonal frequency-division multiple access physical layer (OFDMA PHY) extensions are included for enabling operation with radio path redundancy and direct communication between subscriber stations. Also mobile base stations and mobile relay stations are supported.

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

**If yes please explain:** Yes. This will amend IEEE Std 802.16, following completion of the current revision.

**5.4 Purpose:** This amendment addresses higher reliability requirements that are not supported by IEEE Std. 802.16.

**Changes in purpose:** This amendment addresses higher reliability requirements that are not supported by IEEE Std. 802.16 ~~presently~~.

**5.5 Need for the Project:** Work undertaken within Land Mobile Radio, Aeronautic, Maritime and Government bodies, such as the TETRA Association, Eurocae, International Maritime Organization, and the US Department of Homeland Security and Federal Aviation Administration, regarding the deployment of IEEE 802.16 technology in Public Safety, Avionics, Airport Surface Communication, Maritime Safety, and Surveillance applications, has raised specific issues which may be addressed within IEEE 802.16.

Recently introduced legislation in U.S. and other countries encourages and funds a wide range of activities in communications technologies supporting Smart Grid applications such as monitoring and control of generation, transmission, distribution and consumption of energy resources. This project is expected to support communication with higher reliability that may be used in some Smart Grid applications.

High data rates and long range are required for some of these applications. 802.16 technology is uniquely suitable for these purposes, due to its inherent longer range and high data rate capability compared to other wireless technologies. The benefit of this particular project is to facilitate applications for those new markets. In particular, the new mechanisms will be advantageous for IEEE 802.16 when targeted to those applications.

**5.6 Stakeholders for the Standard:** Semiconductor manufacturers, network equipment manufacturers, mobile and wireless device manufacturers, network operators, utility companies, government agencies (e.g. US Department of Homeland Security, Department of Energy and the Federal Aviation Administration), non-government agencies with equivalent interest and the public safety and energy industries.

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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 (Item Number and Explanation):** (3.3) MTT/SCC is a Joint Sponsor

In Section 5.2 the following definitions and notes apply:

Degraded Network: The failure of one or more 802.16 network infrastructure nodes or network connectivity.

Robustness: The capability of the network to withstand and automatically recover from degradation to provide the required availability to support mission critical applications (essential to the core function of society and the economy). e.g. the ability to recover from a single point of failure.

Mobile Base Station: A base station which is capable of maintaining service while moving.

Radio Path Redundancy: The ability to provide alternative paths between base stations, relay stations, and subscriber stations.

Operation in licensed, unlicensed and lightly licensed spectrum bands below 6 GHz with means and mechanisms to coexist with other radio access technologies (RATs) is supported. Support for enabling application specific specialized security suites is also provided.

### **CHANGES IN THIS MODIFIED PAR:**

The completion dates are extended by about six months. Otherwise, the only material change is to restrict the PAR scope to exclude amendments to the WirelessMAN-Advanced air interface introduced in IEEE 802.16m. This was achieved by the following:

(1) 5.3 was changed to mention the contingency on the current revision of IEEE Std 802.16, which excludes the WirelessMAN-Advanced air interface.

(2) 2.1 was changed to refer to the title of the base standard following revision