

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>PAR and 5 Criteria for 802.16 Mobile Wireless MAN</b>	
Date Submitted	<b>2002-09-26</b>	
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Re:	Mobile Wireless MAN Call for contributions	
Abstract		
Purpose	For 802.16 MBSG Approval	
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Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.	
Patent Policy and Procedures	<p>The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures (Version 1.0) &lt;<a href="http://ieee802.org/16/ipr/patents/policy.html">http://ieee802.org/16/ipr/patents/policy.html</a>&gt;, including the statement "IEEE standards may include the known use of patent(s), including patent applications, if there is technical justification in the opinion of the standards-developing committee and provided the IEEE receives assurance from the patent holder that it will license applicants under reasonable terms and conditions for the purpose of implementing the standard."</p> <p>Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair &lt;<a href="mailto:r.b.marks@ieee.org">mailto:r.b.marks@ieee.org</a> &gt; as early as possible, in written or electronic form, of any patents (granted or under application) that may cover technology that is under consideration by or has been approved by IEEE 802.16. The Chair will disclose this notification via the IEEE 802.16 web site &lt;<a href="http://ieee802.org/16/ipr/patents/notices">http://ieee802.org/16/ipr/patents/notices</a>&gt;.</p>	

# IEEE-SA Standards Board Project Authorization Request (PAR) Form

Note: For use with help hyperlinks offline, download guide.html and par2000.html into the same directory. After completing this form, please e-mail it to the NesCom Secretary.

Instructions for Downloading the PAR Form

## 1. Sponsor Date of Request

[ ]

## 2. Assigned Project

Number

[P802.16d ]

## 3. PAR Approval

Date

Copyright release must be submitted with appropriate signatures by FAX (1-732-562-1571)

[...] PAR Signature Page on File {IEEE Staff to check box}

## 4. Project Title, Recorder and Working Group/Sponsor for this Project

Document type and title: {Place an X in only one option below}

[X] Standard for {document stressing the verb "shall"}

[...] Recommended Practice for {document stressing the verb "should"}

[...] Guide for {document in which good practices are suggested}

Title: [**Amendment to IEEE Standard for Local and Metropolitan Area Networks–Part 16a:**

**Mobility Extension for Fixed Broadband Wireless Access Systems–Physical Layer Specifications and Medium Access Control modifications for Licensed and License-Exempt Bands ~~below within the 2-11GHz Frequency Range~~**]

Name of Working Group (WG): [**802.16 Working Group on Broadband Wireless Access**]

Name of Official Reporter (usually the WG Chair) who must be an SA member as well as an IEEE/Affiliate Member: [**Roger B. Marks**]

IEEE-Standards Staff has verified that the Official Reporter (or Working Group Chair) is an IEEE and an IEEE-SA member: [...] (Staff to check box)

### Contact Information:

Telephone [[+1 303 497 3037] FAX: [[+1 303 497 7828]

E-mail: [r.b.marks@ieee.org]

Name of Working Group Chair (if different than Reporter): []

IEEE-Standards Staff has verified that the Working Group Chair is an IEEE and an IEEE-SA member: [...] (Staff to check box)

### Contact Information:

Telephone ] FAX: ]

E-mail: []

Name of Sponsoring Society and Committee:

[Computer Society, LAN/MAN Standards

Committee;

Microwave Theory and Techniques Society]

Name of Committee Sponsor Chair: [Paul Nikolich, Chair, LAN/MAN Standards Committ

IEEE-Standards Staff has verified that the Sponsor is an IEEE and an

IEEE-SA member: [ ] (Staff to check box)

### Contact Information:

Telephone [978 749 9999 x246] FAX: [978 749 8888]

E-mail: [p.nikolich@ieee.org].2001-11-17 IEEE 802.16-01/60r2

## 5. Type of Project

a. Is this an update to an existing PAR? [Yes/NO]

If YES, indicate PAR Number/Approval Date

If YES, is this project in ballot now? [yes/no]

[Indicate changes/rationale for revised PAR in Item #16. This should be no more than 5 lines.]

b. Choose one from the following:

[...] New Standard

[...] Revision of existing Standard {number and year} []

[X] Amendment (Supplement) to an existing standard {number and year}

[802.16-2001]

[...] Corrigenda to an existing standard {number and year} [...]

## 6. Life Cycle

[X] Full Use (5-year life cycle)

[...] Trial Use (2-year life cycle) h

## 7. Balloting Information

Choose one from the following:

[X] Individual Sponsor Balloting

[...] Entity Sponsor Balloting

[...] Mixed Balloting (combination of Individual and Entity Sponsor Balloting)

Expected Date of Submission for Initial Sponsor Ballot: [~~November~~ April 2004]

## 8. Fill in Projected Completion Date for Submittal to RevCom [12.2004]

## 9. Scope of Proposed Project:

To amend the 802.16 standard with the needed capabilities to support mobile ~~as well as nomadic~~ use, with a focus on, but not limiting, vehicular speeds up to 120km/hour. The extension will address PHY and MAC changes to support roaming between FWA base-stations or their sectors, as well as new multi-media and interactive applications. This amendment will keep the 802.16a uniqueness, allowing in the same time high spectral efficiency (3-4 bit/s/Hz), high cell sizes and NLOS operation below 11GHz, in a high variety of channel spacings and licensed or license-exempt frequency bands.

## 10. Purpose of Proposed Project:

To increase the FWA operators' revenues potential, permitting to take advantage of the inherent mobility of wireless solutions, in opposition with wired broadband applications, as xDSL and Cable modem. This standard will fill the gap between very high speed (WLANs) and very high mobility (UMTS) systems and will support IP fixed and mobile services, for both enterprise and consumer markets.

## 11. Intellectual Property {Answer each of the questions below}

Has the sponsor reviewed the IEEE patent policy with the group? Yes.

Are you aware of any copyrights relevant to this project? No.

Are you aware of any trademarks relevant to this project? No.

Are you aware of any registration of objects or numbers relevant to this project? No.

## 12. Are you aware of any other standards or projects with a similar scope?

[Yes]{Yes, with detailed explanation below / No}

The ETSI BRAN HIPERMAN Project is currently focusing on licensed frequencies between 2 and 11 GHz and license-exempt frequencies in the 5.725-5.875 GHz band. No mobility is supposed.

T1P1.4 is currently developing air interface standards for Fixed Wireless Access to the PSTN Network. The primary focus of the group is wireless access to POTS, ISDN and Fractional T1/E1 services delivered via the public circuit switched telephone network, although their charter does include packet data services. The individual user data rates currently contemplated by this group range from 8 Kb/s to 2 Mb/s.

IEEE 802.11, ETSI HIPERLAN/2 and 802.15 address primarily short range WLAN and WPAN applications, respectively. The amendment is specifically directed towards longer-range wireless point to multipoint MAN

systems that provide access to core public networks. These systems typically serve large numbers of dispersed subscribers.

□ ITU-R Working Party 8F is developing air interfaces for IMT-2000 both mobile and fixed applications. Nevertheless, the data rates and the time latency do not fit properly the IP applications. The work targets CDMA and W-CDMA, with relatively low spectral efficiency and maximum rate per user, as compared with 802.16a solutions.

□ DVB-RCT (EN 301 958) is an ETSI standard for video distribution and broadband wireless access.

□ IEEE 802 EC Study Group for Mobile Broadband Wireless Access has produced a PAR focused on ITU-R mobile bands, under 3.5GHz, targeting 250km/h vehicular speeds. No target for spectral efficiency is mentioned. The user data rates are not higher than the available UMTS solutions.

### **13. International Harmonization**

Is this standard planned for adoption by another international organization?

[Yes] {Yes/No/?? if you don't know at this time}

In long time, we intend to be part of an IEEE 802 harmonized solution for international standardization, targeting both mobile LAN and MAN solutions.

In order to have a full solution for an IP mobile system, it is necessary to address higher layers issues beyond the scope of the existing PAR. For example, 802.11f defines procedures for inter-AU communication, to support high-speed roaming, that might be useful for all wireless groups. We consider that the 802 wireless groups should work together for the definition and standardization of fast and performant IP roaming solutions, AAA and service interfaces. Only after that, a full IP mobile solution may be proposed to ITU-R for global standardization.

If Yes: Which International Organization [ITU]

International Contact Information:

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FAX: +1 613 763 1225

Email: costa@nortelnetworks.com

### **14. Is this project intended to focus on health, safety or environmental issues?**

[Yes] {Yes/No/?? if you don't know at this time}

If Yes: Explanation [...]

The radio equipment, compliant with the intended standard, will be suitable for the US government Homeland Security project.

### **15. Proposed Coordination/Recommended Method of Coordination**

#### **Mandatory Coordination**

SCC 10 (IEEE Dictionary) by DR {Circulation of DRafts}

IEEE Staff Editorial Review by DR

SCC 14 (Quantities, Units and Letter symbols) by DR

#### **Coordination requested by Sponsor:**

[ITU] by [DR] {circulation of DRafts/LIaison memb/Common memb}

[ETSI BRAN] by [DR,LI] {circulation of DRafts/LIaison memb/Common memb}

[.....] by [...] {circulation of DRafts/LIaison memb/Common memb}

[.....] by [...] {circulation of DRafts/LIaison memb/Common memb}

#### **Coordination Requested by Others:**

[...] {added by staff}

### **16. Additional Explanation Notes: {Item Number and Explanation}**

5a) This PAR updates P802.16a to encompass P802.16b and should be accompanied by the withdrawal of the latter. In the process of developing P802.16a and P802.16b drafts, the documents have been integrated technically and

editorially and are anticipated to draw largely overlapping ballot pools. Proceeding with separate projects is no longer beneficial.

The PAR Copyright Release and Signature Page must be submitted by FAX to 732-562-1571 before this PAR will

**be sent on for NesCom and Standards Board approval.**

## Rationale for a Broadband Wireless Access Standard: Meeting the Five Criteria

### 1. Broad Market Potential

A standard project authorized by IEEE 802 shall have a broad market potential. Specifically, it shall have the potential for:

#### a) Broad sets of applicability

The mobility enhancement will target the consumer and enterprise market, allowing fast access to mobile IP applications, multi-media messaging, mobile videoconference, etc. The possible services include: games, video clips, virtual sightseeing, emergency, location based services, financial services, Telematics, telemedicine, etc. The user will have access to these services at data rates similar to those provided by 802.16a standard, while staying, walking or traveling with vehicular speeds. For example, in a 6MHz channel, the maximum data rate per user can be beyond 20Mb/s.

These applications will add the revenue flux that will improve the business case of FWA applications and will permit to transform a niche market into a main telecommunication segment.

**This standard will create the real convergence between fixed and mobile services, by allowing connectivity for high-speed data rates in both stationary and mobile situations.**

#### b) Multiple vendors and numerous users

The products on the market already allow connectivity while using multiple standards (GSM, CDMA, 802.11a, 802.11b, 802.15, etc). Due to the mass-market applications for Lap-tops, PDAs, etc, we believe that the producers of those devices will add the PHY/MAC interface for mobile FWA terminals. A possible application will be the mobile backhauling for WLAN based Hot Spots.

In the 802.16 and 802 MBSGs, Nokia and Samsung have expressed interest for a high efficiency mobility standard, as an enhancement of 802.16.

#### c) Balanced costs (LAN versus attached stations)

The production costs for portable PDA and Laptop radio interfaces should be similar with devices having cellular interfaces.

### 2) Compatibility

IEEE 802 defines a family of standards. All Standards shall be in conformance with the IEEE 802.1 Architecture, Management and Interworking documents as follows: 802 Overview and Architecture, 802.1D, 802.1Q and parts of 802.1f. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with 802.

Each standard in the IEEE 802 family of standards shall include a definition of managed objects which are compatible with systems management standards.

The proposed standard will conform to the 802 Functional Requirements Document, with the possible exception of the Hamming distance.

### 3. Distinct Identity

Each 802 standard shall have a distinct identity. To achieve this, each authorized project shall be:

a) Substantially different from other IEEE 802 standards.

This standard will be the first IEEE 802 standard to support high data rate, high speed, MAN mobility. It targets high cell sizes, as compared with 802.11 or 802.15 wireless standards. It targets a high variety of radio bands, high spectral efficiency and much higher bit rates, as compared with the EC-SG PAR.

b) One unique solution per problem (not two solutions to a problem).

The mass-market success of the standard will be possible only if a single air interface will be defined to allow both fixed and mobile use.

c) Easy for the document reader to select the relevant specification.

In order to help the document reader, is proposed to provide the standard as an amendment to 802.16 basic standard, instead of supplying an amendment to 802.16 and 802.16a standards.

4) Technical feasibility

For a project to be authorized, it shall be able to show its technical feasibility. At a minimum, the proposed project shall show:

a) Demonstrated system feasibility

The feasibility of such systems has been demonstrated by proprietary systems covering some if not all of the capabilities intended for this standard and now going into operation in many cities worldwide.

b) Proven technology, reasonable testing

802.16a like systems are already working.

c) Confidence in reliability

Commercial deployment of point-to-point and point-to-multipoint systems at millimeter-wave frequencies by carriers is evidence of proven reliability.

5) Economic feasibility

a) Known cost factors, reliable data

The economic feasibility of the equipment has already been demonstrated at the level of proprietary systems now going into operation. The willingness of investors to spend large sums to acquire spectrum rights, plus the large additional investment required for hardware in public networks, attests to the economic viability of the wireless access industry as a whole.

b) Reasonable cost for performance.

Standardizing modern radio-modem technologies, defined by 802.16a or ETSI BRAN HIPERMAN, allowing power concentration, will minimize the subscriber radio cost. As demonstrated in many IEEE 802 standards over the years, the radio shared-media systems effectively serve users whose requirements vary dynamically, within the constraints of the total available rate. The cost of a single base station is amortized over a large number of users.

c) Consideration of installation costs.

The mobile hand-held devices, as PDAs and Laptops, do not need installation. The base stations site is a more complex issue, but since one base station supports many users, the costs involved are low on a per-user basis.