# 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
**[15 November 2002  ]**
## 2. Assigned Project
**Number**
**[P802.16e]**
## 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 fo**r{document stressing the verb "shall"}
 [..] **Recommended Practice fo**r{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 16: Mobility Extension for Fixed Broadband Wireless Access Systems–Physical Layer and Medium Access Control modifications for Licensed Bands below 6GHz 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 Committee
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].

## 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}

**[802.16-200**1]

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

# 6. Life Cycle

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

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

# 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: [April 2004]**

# 8. Fill in Projected Completion Date for Submittal to RevCom [9.2004]

# 9. Scope of Proposed Project:

To amend the 802.16 standard with the needed capabilities to support combined fixed and mobile operation within a single system.  The mobile operation will support vehicular speeds up to 250km/hour. The extension will address PHY and MAC changes to support mobile subscriber operation and roaming between 802.16 base-stations or their sectors. This amendment will allow high spectral efficiency (3-4 bit/s/Hz), macrocell sizes and NLOS operation in licensed bands below 6GHz.


# 10. Purpose of Proposed Project:

To increase the market for Broadband Wireless Access solutions by taking advantage of the inherent mobility of wireless media. This standard will fill the gap between very high data rate WLANs and very high mobility cellular systems and will support 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 supported.

 T1P1.4 is currently developing air interface standards for medium data rate, low speed mobility.  The individual user data rates specified 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. This amendment is specifically directed towards longer-range wireless point to multipoint MAN systems that provide access to core public networks.  ITU-R Working Party 8F in conjunction with 3GPP and 3GPP2 are developing air interfaces for IMT-2000 both mobile and fixed applications. The work targets CDMA and W-CDMA, with relatively low spectral efficiency and data rate per user, as compared with 802.16 solutions.



 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. The spectral efficiency is >1 bit/sec/Hz/cell with a peak aggregate DL data rate >4 Mbps in a 1.25 MHz bandwidth.

## 13. International Harmonization

Is this standard planned for adoption by another international organization?
[**Yes**] {Yes/No/?? if you don't know at this time}

If Yes: Which International Organization [ITU-R]
International Contact Information:
Name: Address:
Phone:
FAX: Email:

## 14. Is this project intended to focus on health, safety or environmental issues?
[NO] {Yes/No/?? if you don't know at this time}
If Yes: Explanation [...]

## 15. Proposed Coordination/Recommended Method of Coordination
**Mandatory Coordination**
SCC 10 (IEEE Dictionary) by **DR** {Circulation of **DR**afts}
IEEE Staff Editorial Review by by **DR**
SCC 14 (Quantities, Units and Letter symbols) by **DR**
**Coordination requested by Sponsor:**
[ITU] by [DR] {circulation of **DR**aft**s/LI**aison memb/**C**ommon memb}
[ETSI BRAN] by [DR,LI] {circulation of **DR**aft**s/LI**aison memb/**C**ommon memb}
[.....................] by [...] {circulation of **DR**aft**s/LI**aison memb/**C**ommon memb}
[.....................] by [...] {circulation of **DR**aft**s/LI**aison memb/**C**ommon memb}
**Coordination Requested by Others:**
[...] {added by staff}
## 16. Additional Explanation Notes: {Item Number and Explanation}

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

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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 the 802.16 standard,
while stationary, walking or mobile. For example, in a 6 MHz channel, the maximum data
rate per user can be beyond 20Mb/s.
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**This standard will converge 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 Laptops, PDAs, etc, we believe that the producers of those devices will add the enhanced 802.16 PHY/MAC interface to mobile BWA terminals.

c) Balanced costs (LAN versus attached stations)

The production costs for portable PDA and Laptop radio interfaces should be similar to devices with cellular air 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, fixed and vehicular mobile MAN operation. It targets macrocells, as compared with 802.11 or 802.15 wireless standards and utilizes licensed frequency bands

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

By modifying the existing 802.16 air interface, a unique solution will be developed. The mobile extension to the 802.16 standard will inherently provide a single BWA solution for both fixed and mobile applications.

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

It is anticipated that the document will be easily selectable by the user.

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 that provide some, if not all, of the capabilities envisioned for this standard and being deployed in many cities worldwide.

b) Proven technology, reasonable testing

The radio technology proposed has been in existence for decades in both commercial and military environments.  Similar proprietary systems currently exist.

c) Confidence in reliability

Commercial deployment of point-to-point and point-to-multipoint systems at these 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.

Utilizing  modern radio-modem technologies, defined by 802.16a or ETSI BRAN HIPERMAN, 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, such as PDAs and Laptops, do not need installation. The base station site is a more complex issue, but since one base station supports many users, the costs involved are low on a per-user basis.