Project	**IEEE 802 Executive Committee Study Group on Mobile Broadband Wireless Access** <http://grouper.ieee.org/groups/802/mbwa>	
Title	**Mobile Broadband Wireless Access PAR as Approved by MBWA ECSG**	
Date Submitted	**2002-09-11**	
Source(s)	MBWA ECSG Contact: Mark Klerer	Voice: 908-997-2069 Fax: 908-997-2050 Email: m.klerer@flarion.com
Re:		
Abstract	The attached PAR contains the text of the PAR as approved on 2002-09-10 by the MBWA ECSG. Prior to submission it will be editorial revised in consultation NesCom staff to assure that the formatting is correct. In particular, the approved means for referencing multiple liaison organizations and international standards organizations in sections 15 and 16 of the PAR will be resolved.	
Purpose	To be submitted to the LMSC Executive Committee for approval. This PAR will also be forwarded to NesCom by 2002-11-01 as Conditinal Submission for scheduling for the December IEEE-SA Board meeting.	

IEEE-SA Standards Board
Project Authorization Request (PAR) Form (2002)

For a review of the Standards Development Process (designed to assist the Working Group, Working Group Chair, Sponsor Chair, and Society Liaison), please click here. ☐

1. Assigned Project Number (Please contact the NesCom Administrator if this is a new PAR):
P802.xy

2. Sponsor Date of Request: 2002-11-15

3. Type of Document (Please check one)
☒ Standard for {document stressing the verb "shall"}
☐ Recommended Practice for {document stressing the verb "should"}
☐ Guide for {document in which good practices are suggested, stressing the verb "may"}

4. Title of Document: Draft Local and Metropolitan Area Networks - Standard Air Interface for Mobile Broadband Wireless Access Systems Supporting Vehicular Mobility - Physical and Media Access Control Layer Specification

5. Life Cycle
☒ Full Use (5-year life cycle)
☐ Trial Use (2-year life cycle)

6. Type of Project:
☒ New standard
☐ Revision of existing standard (indicate Number and year existing standard was published in box to the right) (####-YYYY)
☐ Amendment to an existing standard (indicate Number and year existing standard was published in box to the right) (####-YYYY)
☐ Corrigendum to an existing standard (indicate Number and year existing standard was published in box to the right) (####-YYYY)
☐ Revised PAR (indicate PAR Number and Approval Date here: P - (YYYY-MM-DD)
Is this project in ballot now? No
State reason for revising the PAR in Item #18.

7. Contact information of Working Group Chair who must be an SA member as well as an IEEE and/or Affiliate Member

Name of Working Group(WG) : IEEE 802.xy Working Group on Mobile Broadband Wireless Access

Name of Working Group Chair:
First Name: Last Name:
Telephone:
FAX:
EMAIL:

8. Contact Information of Official Reporter, Project Editor or Document Custodian if different from the Working Group Chair. The Official Report must be an SA member as well as an IEEE and/or Affiliate Member

Name of Official Reporter (if different than Working Group Chair):
First Name: Last Name:
Telephone:
FAX:
EMAIL:

9. Contact information of Sponsoring Society or Standards Coordinating Committee

Sponsoring Society and Committee: Computer Society, LAN/MAN Standards Committee
Sponsor Committee Chair:
First Name: Paul Last Name: Nikolich
Telephone: 978-749-9999 x246
FAX: 978-749-8888
EMAIL: p.nikolich@ieee.org

10. Sponsor Balloting Information (Please choose one of the following)
Choose one from the following:
☒ Individual Balloting
☐ Entity Balloting
☐ Mixed Balloting (combination of Individual and Entity Balloting)

Expected Date of Submission for Initial Sponsor Ballot: 2004-05-26

Please review the PAR form three months prior to submitting your draft for ballot to ensure that the title, scope and purpose on the PAR form match the title, scope and purpose on the draft. If they do not match, you will need to submit a revised PAR.

Additional communication and input from other organizations or other IEEE Standards Sponsors should be encouraged through participation in the working group or the balloting pool.

11. Projected Completion Date for Submittal to RevCom: 10/2004

If this is a REVISED PAR and the completion date is being extended past the original four-year life of the PAR, please answer the following questions.

If this is not a revised PAR, please go to question #12

Statement of why the extension is required:

When did you begin writing the first draft?:

How many people are actively working on the project?:

How many times a year does the working group meet in person?:

How frequently is a draft version circulated to the working group via electronic means?:

How much of the Draft is stable (Format: NN%)?: %

How many significant working revisions has the Draft been through?:

Briefly describe what the development group has already accomplished, and what remains to be done:

12. Scope of Proposed Project
[Projected output including technical boundaries. REVISED STANDARDS - Projected output including the scope of the original standard, amendments and additions. Please be brief (less than 5 lines).]:

This standard specifies the physical and medium access control layers of the air interface for interoperable mobile broadband wireless access systems with peak data rates per user in excess of 1 Mbps. This standard targets spectral efficiencies, sustained user data rates and numbers of active users, which are all significantly higher than those achieved by existing mobile communications systems. This standard supports a cellular system with cell sizes appropriate to ubiquitous metropolitan-area networks and supports various vehicular mobility classes (as defined in ITU-R M.1034-1) up to 250 Km/h. It applies to systems operating in licensed bands below 3.5 GHz allocated to mobile services. The standard shall allow for use of FDD and/or TDD. The air-interface is optimized for carrying IP-based wireless data traffic.

13. Purpose of Proposed Project:
[Intended users and user benefits. REVISION STANDARDS - Purpose of the original standard and reason for the standard's revision. Please be brief (less than 5 lines).]:
To enable worldwide deployment of cost effective, spectrum efficient, ubiquitous, always-on and interoperable multi-vendor mobile broadband wireless access networks. To provide an efficient packet based air interface optimized for IP. The standard will address end user markets that include access to Internet, intranet, and enterprise applications by mobile users as well as access to infotainment services.

14. Intellectual Property {Answer each of the questions below}

Sponsor has reviewed the IEEE patent policy with the working group?
Yes

Sponsor is aware of copyrights relevant to this project?
Yes

Sponsor is aware of trademarks relevant to this project?
Yes

Sponsor is aware of possible registration of objects or numbers due to this project?
Yes

15. Are there other standards or projects with a similar scope?
Yes, with explanation below
Explanation: The 3G partnership projects are developing mobile data air-interface specifications. The approach taken in these specifications is an extension/derivation from existing voice and circuit-switched architectures that impose performance and cost penalties on data transport. This project adopts an approach of defining an air-interface optimized for IP data that will result in a cost effective mobile broadband wireless data solution.

Related but non-duplicative work is ongoing in ITU-R Working Party 8F, in the ITU-T SSG on "IMT-2000 and Systems Beyond", in the 3GPP RAN Technical Specification Group and in the 3GPP2 TSG-C.

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In addition T1P1.4 has a project on WWINA which addresses standards related to the radio and network aspects of systems optimized for internet data applications in low mobility (handoff) environments.

Asok Chatterjee
Chairman, T1P1
Ericsson, Inc.
6160 Stoneridge Mall Road, Suite 400
Pleasanton, CA 94588

If Yes, please answer the following:
Sponsor Organization:
Project Number:
Project Date:
Project Title:

16. International Sponsor Organization
Is there potential for this standard (in part or in whole) to be submitted to an international organization for review/adoption?
Yes{Yes/No/?? if you don't know at this time}

If Yes, please answer the following questions:

International Committee Name and Number: Potential inclusion by international and nationally recognized Standards Development Organizations (e.g., the ITU, TIA, ETSI,ARIB, TTC, TTA, CWTS, and T1 Standards Committee)

	Phone	Fax	e-mail
ARIB			
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International Organization Contact Information:
Contact First Name: See Above
Contact Last Name:
Contact Telephone Number:
Contact FAX Number:
Contact E-mail address:

17. Will this project focus on health, safety or environmental issues?
No{Yes/No/?? if you don't know at this time}
If Yes: Explanation? [ ]

18. Additional Explanatory Notes: {Item Number and Explanation}

Item 12. Additional information on the scope of this project is provided in the attached informative document “Initial Views on the Desired Characteristics of Mobile Broadband Wireless Access Air Interface”.

The PAR Copyright Release and Signature Page must be submitted either by FAX to 732-562-1571 or as an e-mail attachment in .pdf format to the NesCom
Administrator before this PAR will be sent on for NesCom and Standards Board approval.

IEEE-SA Standards Board
Working Guide for the Project Authorization Request (PAR) Form

This guide has been prepared to assist in the submittal of the PAR for consideration by the New Standards Committee (NesCom) and approval by the IEEE-SA Standards Board as an IEEE Standards Project. Submitters should also refer to the latest edition of the IEEE-SA Standards Board Operations Manual.

A PAR must be received by the IEEE-SA Standards Department at least 40 calendar days before the next IEEE-SA Standards Board meeting. Submittal deadlines for the year 2002 are available. Please note that the PAR may be approved via our continuous processing program. For more information on this program, please go to our website at http://standards.ieee.org/faqs/contproc.html.

1. Assigned Project Number

New Standards Projects: Leave blank.
Standards Revision/Update: Enter PAR number from existing standard.

Note: New project numbers are assigned by the IEEE Standards Department. Please confer with IEEE staff if a specific project number is desired.

2. Sponsor Date of Request

Enter the date when the PAR is submitted to the IEEE-SA.

3. Type of Document

For the submitter's reference, standards are documents with mandatory requirements and are generally characterized by the use of the verb "shall."

Recommended practices are documents in which procedures and positions preferred by IEEE are presented and are generally characterized by the use of the verb "should."

Guides are documents in which alternative approaches to good practice are suggested, but no clear-cut recommendations are made. They are generally categorized by the use of the verb "may."

4. Title of Document

Enter the title of the document.

The project title should include the type of document. For example:

1. Standard Test Method for...
2. Recommended Practice for...
3. Guide for...

The title should not contain the acronym "IEEE". This is added to the title when published.

All acronyms should be spelled out.

5. Life Cycle

A standard can be designated trial-use or full-use.

A standard can be designated for trial use when a draft satisfies the standards-developing group (i.e., subcommittee or working group), but needs input from a very broad constituency. This is a preferred alternative to the widespread distribution of unapproved drafts. Such a draft requires a letter ballot of the sponsor and approval by the IEEE-SA Standards Board as a trial-use standard. Trial-use standards are effective for not more than two years from the date of publication. In the absence of comments received in the trial period, the document is subject to adoption as a full-use standard upon receipt of written recommendation from the sponsor and approval by the IEEE-SA Standards Board.

6. Type of Project

Indicate whether this work will result in a new standard, a revision of an existing standard (indicate standard number and year), an amendment (formerly supplement) to an existing standard (indicate standard number and year), or a corrigendum (indicate standard number and year). Amendments are additions to existing standards and may contain substantive corrections and/or errata to the standard. Corrigenda are substantive corrections and/or errata to a standard.

If this is an update to an existing PAR, indicate the original PAR number, approval date and ballot status.

If this is a PAR revision, provide a short explanation of the changes to the original PAR. Rationale MUST be submitted with the PAR revision request under Item #18.

7. Contact Information of Working Group Chair

Indicate the Name, Telephone Number, FAX Number and E-mail address of the Working Group (WG) Chair. The Working Group Chair must be an SA member as well as an IEEE and/or Affiliate Member. IEEE/IEEE-SA membership number is required.

8. Contact Information for Official Reporter, Project Editor or Document Custodian

Indicate the Name, Telephone Number, FAX Number and E-mail address of the Official Reporter, Project Editor or Document Custodian if different from the Working Group Chair. The Official Reporter must be an SA member as well as an IEEE and/or Affiliate Member. IEEE/IEEE-SA membership number is required.

9. Contact Information of Sponsoring Society or Standards Coordinating Committee

Enter the name of the sponsoring society and the name of the sponsoring committee (i.e., Power Engineering/Switchgear, not PE/SWG) responsible for the development and coordination of the project and for the maintenance of the document after approval by the Standards Board. The name entered here should not be confused with the name of the group writing the standard. If the project is sponsored by two or more committees, enter all committee names and indicate that the work is a jointly sponsored project. When a Standards Coordinating Committee (SCC) is developing the document, enter the SCC number and name as the sponsor (i.e., Standards Coordinating Committee 4 - Thermal Rating).

10. Sponsor Balloting Information:

Is the balloting group for this project expected to be composed of individuals, of entities (persons representing corporations/government bodies/academic institutions, or SDO's), or a combination of both? See Section 5.4.1 in the IEEE-SA Standards Board Operations Manual for further explanation.

For the expected date of submission for initial balloting entry, enter the date the draft standard is planned to be submitted to the IEEE for balloting. Make the entry in numerical month-year format.

Additional communication and input from other organizations or other IEEE Standards Sponsors should be encouraged through participation in the working group or the balloting pool.

11. Projected Completion Date for Submittal to RevCom

Enter the date the draft standard is planned to be submitted to RevCom for processing. Make the entry in numerical month-year format (not to exceed four years from the date of PAR submission). Cutoff dates for submitting draft standards to RevCom are generally in February, May, August and October. Check the appropriate calendars for the specific date as the draft matures. Use a best estimate for the PAR.

12. Scope of Proposed Project

The submittal should clearly and concisely define the scope of the document. The scope generally describes "what" will be done, i.e. the technical boundaries of the project. For example:

"Scope: This project will develop a standard protocol for the control of printers. This protocol will be independent of the underlying datastream or page description language used to create the printed page. This protocol will be usable by all classes of printers. This project is limited to management

and control of printers and will not include management or control of printing systems or subsystems."

The Scope of a revision to a standard or a revision to the Scope of an existing PAR shall represent the new Scope. If the Scope is different from the original Scope, provide an indication of the differences in Item #18.

13. Purpose of Proposed Project

The submittal should clearly and concisely define the purpose of the document. The purpose generally describes "why" a project will be done. For example:

"Purpose: There is currently no defined, independent standard for controlling printers. Each vendor builds some control into the underlying page description language or datastream. Without an independent, openly defined protocol, applications and operating systems cannot automatically determine the type of printer being addressed. This protocol will provide a minimum implementation subset which will allow automatic identification and configuration of printers and vendor extensibility to provide for growth and product differentiation."

The purpose of the document should be consistent with the description of the document in Item 3, the title in Item 4, and the scope in Item 12. If the title of the document is "Guide for...," it is inconsistent if the purpose states "This document will describe standard criteria..."

The scope, purpose and/or title indicated on the PAR should agree in principle with the scope, purpose and/or title stated in the document at the time of submittal to the IEEE-SA Standards Board.

If this is a PAR to revise the standard, explain here why changes are being made to the standard. This may be due to a change in industry, the introduction of new technology, etc.

The Purpose of a revision to a standard or a revision to the Purpose of an existing PAR shall represent the new Purpose. If the Purpose is different from the original Purpose, provide an indication of the differences in Item #18.

14. Intellectual Property

If an IEEE standards-developing committee chooses to include patented technology in its standard, early disclosure of these patents is valuable. Early disclosure notifies the standards developers and the IEEE of the patent in the most timely manner and gives participants the greatest opportunity to evaluate the benefits the patented technology may offer a draft standard. However, the standards developers should not take any action that could be interpreted as requiring any participant in the development process to undertake a patent search of its own portfolio or of any other. The objective is to obtain early disclosure concerning the existence of patents, where known.

If the proposed standard uses copyrighted material, copyright releases must be obtained by the working group and included in the final package submitted to the IEEE-SA Standards Board.

Additionally, remember that during development of your approved project, the proper IEEE copyright notices must be maintained on all drafts.

If the proposed standard uses any trademarked terms, permission for use must be obtained from the owner. Refer to Section 6 of the IEEE-SA Standards Board Operations Manual for IEEE patent, copyright, and trademark policies.

If the proposed standard will require the unique identification of objects or numbers by the IEEE for use in industry, this should be indicated. An example of this type of registration is the unique manufacturer ID, known as Organizationally Unique Identifier (OUI).

15. Are there other Standards or Projects with a Similar Scope?

Identify any standard(s) or project(s) of similar scope(s), both within or outside of the IEEE, and explain the need for an additional standard in this area.

16. International Sponsor Organization

If the project is intended to be submitted to the appropriate international technical committee as the basis of or for inclusion in an international standard, or if this standard is intended to be adopted as the international standard, this should be noted here. It is important for all working group members to be aware of international activity within their area of technical expertise.

17. Will this Project focus on Health, Safety or Environmental Issues?

No intensive research required; only obvious or general health, safety, or environmental issues that would be affected by this work need to be cited.

18. Additional Explanatory Notes:

If you know of any further information that may assist NesCom in recommending approval for your project, please include this information here.

If this is a revised PAR or a PAR for the revision of a standard, a short explanation of the changes to the original PAR and rationale MUST be submitted under this item.

Copyright Form (separate page)

The copyright form, the last page in the electronic PAR form (and a separate page), must be submitted by FAX to the IEEE-SA office before the PAR will be approved. In order to comply with US copyright law, the IEEE and its legal counsel request that a copyright agreement be signed by the Official Reporter, who is usually the chair of the working group. This signed copyright agreement is an official part of the IEEE Standards Project Authorization Request (PAR). The PAR will not be submitted to the IEEE-SA Standards Board until the copyright agreement is signed by the proper person.

If you have any questions, please contact the NesCom Administrator.

Informative Attachment

Initial Views on the Desired Characteristics of Mobile Broadband Wireless Access Air Interface

1 Introduction

The MBWA Air-Interface (AI) will be optimized for high-speed IP-based data services operating on a distinct data-optimized RF channel. The AI will provide for compliant Mobile Terminal (MT) devices for mobile users, and will enable significantly improved performance relative to other systems targeted for wide-area mobile operation. The AI will be designed to provide improved performance attributes such as peak and sustained data rates and corresponding spectral efficiencies, system user capacity, air-interface and end-to-end latency, overall network complexity and Quality-of-Service management.

2 Desired Characteristics

2.1 Service Characteristics

- **Applications**: The AI should support interoperability between an IP Core Network and IP enabled mobile terminals to allow applications including, but not limited to, full screen, full graphic web browsing, e-mail, file upload and download without size limitations (e.g., FTP), video and audio streaming, IP Multicast, VPN connections, VoIP, instant messaging and on-line multi-player gaming.
- **Always on**: The AI should provide the user with "always-on" connectivity. The connectivity from the wireless MT device to the Base Station (BS) should be automatic and transparent to the user.
- **Inter-technology roaming and handoff**: The AI should support roaming and handoff with different wireless access systems, e.g. wireless LAN.
- **Open interfaces**: The AI should support open interfaces between any network entities in the AI that may be implemented by service providers and manufacturers as separate systems, sub-systems, or network entities. IETF protocols should be considered and adopted in these open interfaces wherever possible.
- **QoS support**

  The AI should support the means to enable end-to-end QoS within the scope of the AI and should support a Policy-based QoS architecture. The resolution of QoS in the AI should be consistent with the end-to-end QoS at the Core Network level.

  The AI should support IPv4 and IPv6 enabled QoS resolutions.

The AI should support efficient radio resource management (allocation, maintenance, and release) to satisfy user QoS and policy requirements.

2.2 Air Interface Characteristics

- **Layered architecture**: The AI should support a layered architecture and separation of functionality between user, data and control planes.
- **MAC States**: The AI should support multiple MAC protocol states with fast and dynamic transitions among them. This allows the system to conserve air-link resource usage for users when they are not actively sending or receiving data by temporarily placing them in dormant states that require fewer system resources (e.g., control messages) to maintain. By making such transitions fast and dynamic, the system capacity is improved while maintaining the user experience (e.g., maintaining good end-to-end TCP/IP performance).
- **Resource allocation**: The AI should support fast resource assignment and release procedures on the uplink and downlink for maximum utilization, especially for bursty IP applications.
- **Handoff**: The AI should provide inter-sector and inter-cell handoff procedures at vehicular speeds that minimize packet loss and latency for robust and seamless (i.e., without service interruption) IP packet transmission.
- **Latency**: The AI should minimize the round-trip times (RTT) and the variation in RTT for acknowledgements, within a given QoS class, over the air interface. The RTT over the airlink for a MAC data frame should be less than or equal to 10 ms. This reduces the adverse impact on IP packet transmission. .
- **Spectrum:** The AI should be designed for deployment within existing and future licensed spectrum below 3.5 GHz. The MBWA system frequency plan should include both paired and unpaired channel plans with multiple bandwidths, e.g., 1.25 or 5 MHz, to allow co-deployment with existing cellular systems. Receiver sensitivity, blocking and selectivity specifications should be consistent with best commercial practice for mobile wide-area terminals.
- **Spectral Efficiency**: Spectral efficiency should be in excess of 1 b/s/Hz/cell in a loaded network. Additionally, the AI should support universal frequency reuse but also allow for system deployment with frequency reuse factors of less than 1 (e.g., using spatial diversity to reuse spectrum within a cell).
- **User Data Rate Management**: The AI should support automatic selection of optimized user data rates that are consistent with the RF environment constraints. The AI should provide for graceful reduction in user data rates, on the downlink and uplink, as a mechanism to maintain an appropriate frame error rate performance.
- **Authentication Functions**: The AI should provide messaging for mutual authentication of the MT and network, as well as supporting network authentication of the accessing user and measures to thwart MT cloning.

- **Data rates:** For a 1.25 MHz channel bandwidth[1], the AI should support peak aggregate data rate (user payload) per cell in excess of 4 Mbps in the downlink and in excess of 800 Kbps in the uplink. The AI should support peak per-user data rates in excess of 1 Mbps on the downlink and in excess of 300 kbps on the uplink. These data rate targets are established without consideration of channel conditions, traffic loading, and system architecture. The peak per user data rate targets are less than the aggregate per cell data rate to allow for design and operational choices.
- **Mobility**: The AI should support one or more of the vehicular mobility classes defined in ITU–R M.1034-1.

The numerical characteristics are summarized in the following table:

Characteristic	**Value**
Mobility	up to 250 km/hr
Spectral efficiency	> 1 b/s/Hz/cell
Peak user data rate (DL)	> 1 Mbps*
Peak user data rate (UL)	> 300 Kbps*
Peak aggregate data rate per cell (DL)	> 4 Mbps*
Peak aggregate data rate per cell (UL)	> 800 Kbps*
Airlink MAC frame RTT	<10 ms
Bandwidth	e.g., 1.25 MHz, 5 MHz
Spectrum	< 3.5 GHz

* Targets for 1.25 MHz channel bandwidth. See footnote 1.

[1] This represents 2 x 1.25 MHz (paired) channels for FDD and a 2.5 MHz (unpaired) channel for TDD. For other channel bandwidths, the data rates may change.