| | |
|---|---|
| Project | **IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>** |
| Title | **Proposed 5-criteria for MWBA** |
| Date Submitted | **2002-05-07** |
| Source(s) | Dr. Zion Hadad<br>Yigal Leiba<br>Itzik Kitroser<br>Yossi Segal<br>Moshe Levinson<br>Runcom Technologies LTD.<br>2 Ahcoma St. 75655, Rishon Lezion<br>Israel<br><br>Voice: 972-3-9528440<br>Fax: 972-3-9528805<br>yigall@runcom.co.il<br>yossis@runcom.co.il<br>itzikk@runcom.co.il<br>zionh@runcom.co.il<br>moshel@runcom.co.il |
| Re: | Call for contributions, document IEEE 802.16-02/13r1 |
| Abstract | The document contains proposed text for the 5-criteria document of the MBWA study group |
| Purpose | For discussion and adoption |
| Notice | This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. |
| 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 | The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures (Version 1.0) <http://ieee802.org/16/ipr/patents/policy.html>, 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.<br><br>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 <mailto:r.b.marks@ieee.org> 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 <http://ieee802.org/16/ipr/patents/notices>. |

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

## *1.1 1. Broad Market Potential*

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

### 1.1.1 a) Broad sets of applicability

Access networks in the centimeter-wave region are a rapidly emerging technology on a worldwide basis. Such networks have the potential to compete with copper-
and fiber-based systems in terms of capacity, and they offer the advantage of not requiring the installation of buried or pole-based infrastructure. This is particularly
advantageous in countries where the infrastructure is not widely deployed. The capabilty of the wireless medium to support mobility is a feature unmatched by the capabilities of wireline broadband access networks. The mobile capabilty has thus far proven vastly sucessful as can be seen from the abundance of narrow-band mobile devices.

### 1.1.2 b) Multiple vendors and numerous users

The interest of many vendors is attested by the participation of 45 companies in the tutorial and CFI session on mobile broadband wireless access.

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

Given that a base station in a point-to-multipoint network can serve many user stations, the cost of the equipment can easily be spread over many users. Typically it is expected to compete with the prices of cellular phones and similar equipment while providing superior performance in terms of capacity and available bandwidth.

## *1.2 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.

## *1.3 3. Distinct Identity*

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

### 1.3.1 a) Substantially different from other IEEE 802 standards.

IEEE 802 presently has no project that supports vehicular mobility (speeds up to 200 Km/H). The mobile BWA standard is intended to provide for public access networks operated by a third party, where the user typically makes use of a wide-area network through an access network when mobile. It differs also from a wireless LAN, which typically is operated by a single organization over smaller distances and has less-stringent requirements for system integrity and resistance to unauthorized usage.

The access network is optimized for distances comparable with the propagation of microwaves through the atmosphere. The extension of the air interface specification to support mobility for systems operating in licensed bands between 0.45 and 6 GHz is expected to extend the 802.16a air interface specification currently under development by adding the PHY and MAC extensions required to support mobile subscribers.

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

It is envisioned that the standard will provide protocols sufficiently flexible to provide efficiently for a variety of services, some of which may have stringently bounded delay requirements. Hence it will not be necessary to have a multiplicity of different and incompatible versions. An effort will be made to utilize the 802.16a MAC and PHY layers or applicable elements thereof.

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

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

## *1.4 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:

### 1.4.1 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.

### 1.4.2 b) Proven technology, reasonable testing

Mobile radio technology in centimeter-wave systems has been demonstrated in recent years in point-to-multipoint systems, as used in commercial and military environments. Many systems are now in commercial use.

### 1.4.3 c) Confidence in reliability

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

## *1.5 5. Economic feasibility*

### 1.5.1 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. And by the vast success of mobile naroow-band devices. 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 mobile wireless access industry as a whole.

### 1.5.2 b) Reasonable cost for performance.

Point-to-multipoint communication is efficient in handling data, which is characterized by high peak demands but bursty requirements overall. As demonstrated in many IEEE 802 standards over the years, such shared-media systems effectively serve users whose requirements vary over time, within the constraints of the total available rate. The cost of a single base station is amortized over a large number of users.

### 1.5.3 c) Consideration of installation costs.

Installation of any wireless customer-site system is relatively simple in that no offsite cabling need be installed. In contrast, with wireline networks the plant expense to connect the customer to the network is a very substantial part of the total cost and must be incurred for the first user in a coverage area. With wireless, the expenses can be incurred as customers come on-line. The siting of base stations is a more complex issue, but since one base station supports many users, the costs involved are very nominal on a per-user basis.