Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	Proposed IEEE Contribution to ITU-R on "Detailed specifications of the radio interfaces for mobile broadband wireless access (BWA) systems under 6 GHz"
Date Submitted	**2005-01-23**
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Re:	Proposed IEEE Contribution to ITU-R WP 8A
Abstract	IEEE 802.16 has collaborated with ITU-R to have the IEEE 802.16-2004 standard recognized in an ITU-R Recommendation in the F-series (Fixed Service). This contribution proposes a similar approach for the inclusion of the IEEE 802.16e amendment in another ITU-R Recommendation in the M-series (Mobile Service).
Purpose	Review and approve the proposed contribution for submission to IEEE 802 and IEEE-SA for consideration as an IEEE contribution to ITU-R.
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Proposed IEEE Contribution to ITU-R on
"Detailed specifications of the radio interfaces for
mobile broadband wireless access (BWA) systems under 6 GHz"

José Costa
NORTEL

Introduction

IEEE 802.16 has collaborated with ITU-R (Working Party 9B) to have the IEEE 802.16-2004 standard recognized in an ITU-R Recommendation in the F-series (Fixed Service). This activity is progressing well in collaboration with ETSI (see IEEE L802.16-04/30 and IEEE L802.16-04/31).

This contribution proposes a similar approach for the inclusion of the IEEE 802.16e amendment for mobility in another ITU-R Recommendation in the M-series (Mobile Service).

Discussion

Annex A contains a proposed draft IEEE contribution to ITU-R Working Party 8A (WP 8A) for the development of a Recommendation on "Detailed specifications of the radio interfaces for mobile broadband wireless access (BWA) systems under 6 GHz".

Proposed Schedule

The following .schedule is proposed for the development of the proposed IEEE contribution to ITU-R WP 8A:

Dates	Meeting/Event	Location	Expected outcome
24-27 January 2004	IEEE 802.16 (#35)	Sanya, China	Review and approval of draft contribution for further processing with IEEE
13-17 March 2005	IEEE 802.16 (#36)	Atlanta, USA	Update the draft contribution if required
18 March 2005	IEEE 802 Executive Committee	Atlanta, USA	IEEE 802 approval
21-25 March 2005	IEEE-SA	by correspondence	IEEE-SA processing of the draft contribution and submission to ITU-R
11-15 April 2005	ITU-R WP 8A	Geneva, CH	Consideration of the IEEE contribution and have it attached to chairman's report for the September meeting. Possible liaison statement from ITU-R WP 8A to IEEE 802.16 to provide feedback.
2-5 May 2005 and/or 18-21 July 2005	IEEE 802.16 (#37, #38) and IEEE 802	Sorrento, I, San Francisco, USA	Further consideration of the status of the proposed draft ITU-R Recommendation, and preparation of follow up contribution to WP 8A if required.
22-28 September 2005	ITU-R WP 8A	Geneva, CH	Approval of the draft Recommendation for submission to ITU-R SG 8
21-22 November 2005	ITU-R SG 8	Geneva, CH	Agree to the adoption of the draft Recommendation.

Proposal

It is proposed that IEEE 802.16 reviews and further develops the proposed contribution in Annex A for submission to IEEE 802 and IEEE-SA for consideration as an IEEE contribution to ITU-R.

INTERNATIONAL TELECOMMUNICATION UNION

**RADIOCOMMUNICATION
STUDY GROUPS**

IEEE C802.16-05/001

**ANNEX A to
IEEE C802.16-05/001**

**Document 8A/???-E
20 January 2005
English only**

Subject: Question ITU-R 212/8

[Proposed Draft] IEEE

PROPOSED WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW RECOMMENDATION ITU-R M.[8A/BWA]

1   Introduction

IEEE and ETSI have successfully worked with ITU-R WP 9B towards the development of a draft Recommendation in the F-series on radio interface standards for broadband wireless access systems in the fixed service operating below 66 GHz
IEEE 802.16 is now working on an extension to the standard to support mobile systems at frequencies below 6 GHz. Therefore, the purpose of this contribution is to propose to initiate the development of a similar Recommendation in the M-series for interoperability standards for systems operating in the mobile service below 6 GHz.

2   Discussion

This Recommendation identifies radio interface specifications for BWA systems in the mobile service, addressing profiles for the recommended interoperability parameters. It provides references to the standards for interoperability between BWA systems and it is not intended to deal with the identification of suitable frequency bands for BWA systems, nor any regulatory issues.

3   Proposal

IEEE proposes that WP 8A adopts the working document in Attachment 1 as a starting point for the development of a draft Recommendation

[Editor's Note: The following material is simply a first pass to edit Annex 6 to Doc. 9B/83 (IEEE L802.16-04/31) (Preliminary Draft New Recommendation ITU-R F.[9B/BWA], "Radio interface standards for broadband wireless access systems in the fixed service operating below 66 GHz"), to refer to frequencies below 6 GHz and mobility. Further work is needed to describe properly IEEE 802.16e. This needs to be completed before submitting the IEEE contribution to ITU-R].

Attachment 1

WORKING DOCUMENT TOWARDS PRELIMINARY DRAFT NEW
RECOMMENDATION ITU-R M.[8A/BWA]

**Radio interface standards for broadband wireless access systems
in the mobile service operating below 6 GHz**

(Question ITU-R 212/8)

1   Introduction

This Recommendation recommends standards for broadband wireless access (BWA)[1] systems in the mobile
service for international use. These standards are significantly harmonized specifications developed by
standardization bodies with broad international participation. The standards support a wide range of applications in
urban, suburban and rural areas for both generic Internet-type data and real-time data, including applications such
as voice and videoconferencing.

2   Scope

This Recommendation identifies radio interface specifications for BWA systems in the mobile service, addressing
profiles for the recommended interoperability parameters. It provides references to the standards for
interoperability between BWA systems and it is not intended to deal with the identification of suitable frequency
bands for BWA systems, nor any regulatory issues.

3   Related ITU Recommendations

The existing Recommendations that are considered to be of importance in the development of this particular
Recommendation are as follows:

Recommendation ITU-R F.1399: Vocabulary of terms for wireless access.

[Preliminary Draft New] Recommendation ITU-R F.[9B/BWA]: Radio interface standards for broadband wireless
access systems in the fixed service operating below 66 GHz (Annex 6 to Doc. 9B/83)

Recommendation ITU-R M.1450: Characteristics of broadband radio local area networks

Recommendation ITU-R M.1457: Detailed specifications of the radio interfaces of International Mobile
Telecommunications-2000 (IMT-2000)

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[1]   "Wireless access" and "BWA" are defined in Recommendation ITU-R F.1399.

4   Considerations

Recommendation ITU-R M.1457 recommends the detailed specifications of the radio interfaces of International Mobile Telecommunications-2000 (IMT-2000), which include broadband capabilities.

[Preliminary Draft New] Recommendation ITU-R F.[9B/BWA] (Annex 6 to Doc. 9B/83) recommends radio interface standards for broadband wireless access systems in the fixed service operating below 66 GHz. Some of these standards have been extended to support mobility as described in Annex 1.

It is recognized that future versions of the standard referenced in Annex 1 will be taken into account through future revisions of this Recommendation following the procedures of Resolution ITU-R 1-4. Any subsequent versions of these specifications which have not been accepted and approved by the ITU-R are not part of this Recommendation.

5   Recommendations

The Radiocommunication Assembly recommends the radio interface standards in Annex 1 for BWA systems in the mobile service operating below 6 GHz.

Annex 1

Radio interface standards for broadband
wireless access (BWA) systems in the mobile service

1   Overview of the radio interface

Depending on the frequency band and implementation details, an access system built in accordance with this standardized interoperable radio interface can support a wide range of applications, from enterprise applications to residential applications in urban, suburban and rural areas. This radio interface can also be applied to other applications, such as for backhaul network applications. The specification could easily support both generic Internet-type data and real-time data, including applications such as voice and videoconferencing.

This type of system is referred to as a wireless metropolitan area network (WirelessMAN). The word "metropolitan" refers not to the application but to the scale. The design is primarily oriented toward outdoor applications. The architecture for this type of systems is primarily point-to-multipoint, with a base station serving subscribers in a cell that can range up to tens of km. Terminals can be mobile, nomadic or fixed.

The radio interface includes support for a variety of data rates. At frequencies below 6 GHz data rates range up to ?? Mbit/s per ?? MHz channel.

The radio interface includes a physical layer (PHY) as well as a medium-access control layer (MAC). The MAC is based on demand-assigned multiple access in which transmissions are scheduled according to priority and availability. This design is driven by the need to support carrier-class access to public networks, both Internet protocol (IP) and asynchronous transfer mode (ATM), with full quality of service (QoS) support.

The MAC supports several PHY specifications, depending on the frequency bands of interest and the operational requirements. In particular, the alternatives include, typically, below 6 GHz:

   i)   WirelessMAN-OFDM: this specification is based on orthogonal frequency-division multiplexing (OFDM).

   ii)   WirelessMAN-OFDMA: this specification is based on orthogonal frequency-division multiple access (OFDMA).

   iii) WirelessMAN-SCa: this specification uses single-carrier transmission.

The SDOs define profiles for the recommended interoperability parameters. IEEE 802.16 profiles are included in the main standards document.

2   Detailed specification of the radio interface

The specifications contained in this section include the following standards for BWA in the mobile service:

[Draft] IEEE Standard 802.16e-????

[Draft] IEEE Standard for local and metropolitan area networks Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems – Amendment for Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands.

Abstract: This Amendment updates and expands IEEE Standard 802.16 2004 to allow for mobile stations.

Scope: This document provides enhancements to IEEE Standard 802.16-2004 to support stations moving at vehicular speeds and thereby specifies a system for combined fixed and mobile broadband wireless access. Functions to support higher layer handover between base stations or sectors are specified. Operation is limited to licensed bands suitable for mobility below 6 GHz. The fixed IEEE Standard 802.16-2004 subscriber capabilities are not compromised.

IEEE Standard 802.16-2004: this standard specifies the air interface of fixed BWA systems supporting multimedia services. The medium access control layer (MAC) supports a primarily point-to-multipoint architecture, with an optional mesh topology. The MAC is structured to support multiple PHY specifications, each suited to a particular operational environment. For operational frequencies from 10-66 GHz, the PHY is based on single-carrier modulation. For frequencies below 11 GHz, where propagation without a direct line of sight must be accommodated, three alternatives are provided, using OFDM, OFDMA, and single-carrier modulation. This standard revises and consolidates IEEE Standards 802.16-2001, 802.16a-2003, and 802.16c-2002.

Standard: The IEEE Standard is available in electronic form at the following address: http://…