



Subject: Question ITU-R 212/8

Institute of Electrical and Electronics Engineers (IEEE)

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

1 Introduction

This contribution was developed by IEEE Project 802, the local and metropolitan area network standards committee ("IEEE 802"), an international standards development committee organized under the IEEE and the IEEE Standards Association ("IEEE-SA").

The content herein was prepared by a group of technical experts in IEEE 802 and was approved for submission by the IEEE 802.16 Working Group on Broadband Wireless Access and the IEEE 802 Executive Committee, in accordance with the IEEE 802 policies and procedures. It represents the view of IEEE 802.

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. Additionally, the IEEE 802.20 Working Group is developing mobile broadband wireless standards. 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.

It is envisioned that in the future the IEEE standard may also be submitted to WP 8F for consideration as a technology for IMT-2000 and/or systems beyond IMT-2000. Indeed, we understand that many of the IMT-

2000 technologies currently in Rec. ITU-R M.1457 originally started in WP 8A Recommendations (e.g., M.1033 and M.1073).

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

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)

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 supports a variety of channel widths and operating frequencies, providing a peak spectral efficiency of up to 4 bits/s/Hz.

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:

IEEE Draft P802.16e

[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://standards.ieee.org/getieee802/download/802.16-2004.pdf>>.