INTERNATIONAL TELECOMMUNICATION UNION

RADIOCOMMUNICATION STUDY GROUPS

Document 8A/109-E
Document 9B/57-E
31 August 2004
English only

Received: 30 August 2004

Source: Document 9B/49 (Annex 9)

IEEE

PROPOSED AMENDMENTS TO WORKING DOCUMENT TOWARDS PRELIMINARY DRAFT NEW RECOMMENDATION ITU-R F.[9B/BWA]

Recommended standards for broadband wireless access

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 and regulatory experts in IEEE 802 and was approved for submission by the IEEE 802.18 Radio Regulatory Technical Advisory Group and the IEEE 802 Executive Committee, in accordance with the IEEE 802 Policies and Procedures, and represents the view of IEEE 802.

IEEE thanks ITU-R and in particular WP 9B for the ongoing cooperation in the development of a preliminary draft new Recommendation on recommended standards for fixed broadband wireless access (BWA). This contribution on fixed BWA is submitted for consideration by WP 9B and for information of WP 8A, which are the parent groups of JRG 8A-9B where the cooperation was initiated. In the future we expect to have another proposal on mobile BWA.

Attachment 1 proposes amendments to the working document in Annex 9 of the Chairman's report (Document 9B/49). The intent of the proposed amendments is to align the text with the original purpose of the ITU-R Recommendation, which is simply to point to the IEEE 802.16 and ETSI BRAN standards containing the detailed technical specifications (refer to Attachment 4 in Document 9B/22). It is our understanding that the Recommendation is not intended to deal with specific frequency bands or regulatory issues.

We also note that you asked for technical and operational requirements. For background information, the functional requirements that were considered in the development of the IEEE 802.16 standard are available at this link: http://www.ieee802.org/16/tg3/docs/802163-00_02r4.pdf.

It is noted that ETSI BRAN has also submitted text on technical and operational requirements for standards targeting fixed BWA in frequencies below 11 GHz (Document 9B/56). It is proposed that this text be developed into a separate recommendation on requirements for fixed BWA systems.

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Attachment 1

WORKING DOCUMENT TOWARDS PRELIMINARY DRAFT
NEW RECOMMENDATION ITU-R F.[9B/BWA]

**Radio interface specifications for fixed broadband
wireless access (BWA) systems**
~~Technical and operational requirements and characteristics of
fixed wireless systems providing broadband wireless access~~

(Question ITU-R [BWA/9])

1   Introduction

This Recommendation recommends ~~the technical and operational requirements and characteristics of~~ standards for fixed broadband wireless access (BWA) systems for international use.

2   Scope

~~[TBD]~~This Recommendation identifies radio interface specifications for fixed BWA systems. These specifications are significantly harmonized standards developed by standardization bodies with broad international participation. This Recommendation provides references to these standards.

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.

Recommendation ITU-R F.1401: Considerations for the identification of possible frequency bands for fixed wireless access and related sharing studies.

Recommendation ITU-R F.1499: Radio transmission systems for fixed broadband wireless access based on cable modem standard.

4   Considerations

Considering that:

~~Standards for fixed BWA radio interfaces have been developed in standardization bodies with broad participation. The results of this work are significantly harmonized.~~ Recommendation ITU-R F.1499 specifies radio transmission systems for fixed broadband wireless access based on cable modem standard.

A number of proprietary solutions have also been developed for fixed BWA, some of which are described in the Handbook on Fixed Wireless Access (Volume 1 of the Land Mobile (including Wireless Access) Handbook).

5   Recommendations

The Radiocommunication Assembly recommends the radio interface standards in Annex 1 for BWA systems in the fixed service operating below 66 GHz.~~For deployment of BWA, the [standards] shown in Annex 1 should be considered~~.

Annex 1

Radio interface standards for fixed broadband wireless access (BWA) systems

~~Technical and operational requirements and characteristics of fixed wireless systems providing broadband wireless access~~

~~[Editor's Note: This text is very preliminary and was provided by liaison statements from IEEE and ETSI. Further submission has been requested to provide reference and links to specific versions of their standards as well as their requirements documents. This Annex will contain introductory text for the standards being developed for BWA (IEEE, ETSI, etc.), a link to the current version of the appropriate standards, and a link to the current version of the appropriate requirements documents. The standards bodies and administrations are requested to provide input on these sections by the September 2004 meeting of WP 9B.]~~

~~[~~Radio interface

Overview of the radio interface

Depending on the frequency band and implementation details, an access system built in accordance with this standardized radio interface ~~specification~~ can support a wide range of applications, from enterprise services to residential applications in urban, sub-urban and rural areas, as well as cellular backhauling. The specification could easily support both generic Internet-type data and real-time data, including two-way applications such as voice and videoconferencing.

The technology is known as a wireless metropolitan area network (WirelessMAN in IEEE 802.16, HiperACCESS and HiperMAN in ETSI BRAN). The word "metropolitan" refers not to the application but to the scale. The design is primarily oriented toward outdoor applications. The architecture is primarily point-to-multipoint, with a base station serving subscribers in a cell that can range up to tens of km. Terminals are fixed or, in frequencies below 11 GHz, nomadic, and therefore ideal for providing access to buildings, such as businesses, homes, Internet cafes, telephone shops (telecentres), etc. When the system provides broadband access to a site, such as a building, distribution of the content throughout the site would normally be by conventional means, such as IEEE 802.11 (wireless LAN, IEEE 802.3 (Ethernet), T1/E1, etc., depending on the required service. Enhancements to provide direct service to mobile terminals using the WirelessMAN air interface are in development. HiperMAN targets currently only fixed applications, but it is a desire to maintain harmonization between WirelessMAN-OFDM and HiperMAN.

The radio interface includes support for a variety of worldwide frequency allocations in either licensed or licence-exempt bands. At higher frequencies (above 10 GHz), supported data rates range over 100 Mbit/s per 25 MHz or 28 MHz channel, with many channels available under some administrations. At the lower frequencies (below 11 GHz), data rates range up to 70 Mbit/s per 20 MHz channel.

The radio interface includes a medium-access control layer (MAC) as well as a physical layer. The MAC specifies a mechanism for controlling access to the airwaves. It 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 IP and ATM, with full quality of service (QoS) support.

The MAC is specified in IEEE Std 802.16 and ETSI TS 102 178.

The MAC supports several physical layer specifications, depending on the frequency bands of interest and the operational requirements. In particular, the alternatives include:

a)   Below 11 GHz

   i)   WirelessMAN-OFDM and HiperMAN: this specification, defined in IEEE Standard 802.16 and in ETSI TS 102 177, is based on orthogonal frequency-division multiplexing (OFDM). The physical layer specifications in the IEEE and ETSI standards are intended to be aligned.

   ii)   WirelessMAN-OFDMA: this specification, defined in IEEE Standard 802.16, is based on orthogonal frequency-division multiple access (OFDMA).

   iii) WirelessMAN-SCa: this specification, defined in IEEE Standard 802.16, uses single-carrier transmission.

b)   Above 10 GHz

   i)   ~~HiperACCESS, defined by ETSI BRAN for frequencies above 11 GHz, uses single-carrier transmission.~~

   ~~ii)~~ WirelessMAN-SC: this specification, defined in IEEE Standard 802.16, uses single-carrier transmission.

   ~~iii) HiperACCESS and 802.16 are aligning the 10-66 GHz physical layer.~~

In addition, HiperACCESS, defined by ETSI BRAN for frequencies above 11 GHz, uses single-carrier transmission as well as a different MAC.

All the standardization groups will define profiles for the recommended inter-operability parameters. IEEE 802.16 profiles are included in the main standards document. HiperMAN profiles are defined in ETSI TS 102 210, while HiperACCESS profiles are contained in ETSI TS 101 999 and TS 102 000.

Detailed specification of the radio interface

The specifications contained in this section ~~are based on~~include the following ~~[standards]~~ for fixed BWA:

IEEE Standard 802.16[1] ~~http://standards.ieee.org/getieee802/802.16.html~~

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[1]   IEEE has approved the standard IEEE 802.16-2004 that consolidates and replaces the three listed here. However, as of 12 July 2004 this standard has not yet been published; when it is published the three references will be replaced by a single reference to IEEE 802.16-2004.

IEEE 802.16-2001, IEEE Standard for Local and Metropolitan Area Networks--Part 16 -- Air Interface for Fixed Broadband Wireless Access Systems.

Abstract: This standard specifies the air interface of fixed (stationary) point-to-multipoint broadband wireless access systems providing multiple services. The medium access control layer is capable of supporting multiple physical layer specifications optimized for the frequency bands of application. The standard includes a particular physical layer specification applicable to systems operating between 10 and 66 GHz.

http://standards.ieee.org/getieee802/download/802.16-2001.pdf.

IEEE 802.16a-2003 IEEE Standard for Local and Metropolitan Area Networks Part 16: Air Interface for Fixed Broadband Wireless Access Systems--Amendment 2: Medium Access Control Modifications and Additional Physical Layer Specifications for 2-11 GHz.

Abstract: This document amends IEEE Std 802.16-2001 by enhancing the medium access control layer and providing additional physical layer specifications in support of broadband wireless access at frequencies from 2 to 11 GHz. The resulting standard specifies the air interface of fixed (stationary) broadband wireless access systems providing multiple services. The medium access control layer is capable of supporting multiple physical layer specifications optimized for the frequency bands of application. The standard includes particular physical layer specifications applicable to systems operating between 2 and 66 GHz. It supports point-to-multipoint and optional mesh topologies.

http://standards.ieee.org/getieee802/download/802.16a-2003.pdf.

IEEE 802.16c-2002 IEEE Standard for Local and Metropolitan Area Networks--Part 16: Air Interface for Fixed Broadband Wireless Access Systems--Amendment 1: Detailed System Profiles for 10-66 GHz.

Abstract: This amendment updates and expands Clause 12 of IEEE Std 802.16-2001, which concerns system profiles that list sets of features and functions to be used in typical implementation cases. Errors and inconsistencies in IEEE Std 802.16-2001 are also corrected. The scope is limited to 10–66 GHz.

http://standards.ieee.org/getieee802/download/802.16c-2002.pdf.

————ETSI Standards: http://<TBD>

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

a)   Standards addressing Fixed BWA below 11 GHz:
   –   ETSI TS 102 177 v1.1.1; Broadband Radio Access Networks (BRAN); HiperMAN; Physical (PHY) Layer.
   –   ETSI TS 102 178 v1.1.1; Broadband Radio Access Networks (BRAN); HiperMAN; Data Link Control (DLC) Layer.
   –   ETSI TS 102 210 v1.1.1; Broadband Radio Access Networks (BRAN); HiperMAN; System Profiles.

b)   Standards addressing Fixed BWA above 10GHz:
   –   ETSI TS 101 999 v1.1.1; Broadband Radio Access Networks (BRAN); HiperAccess; Physical (PHY) Layer.
   –   ETSI TS 102 000 v1.3.1; Broadband Radio Access Networks (BRAN); HiperAccess, Data Link Control (DLC) Layer.
   –   ETSI TS 102 115 v1.1.1 Parts 1 and 2, Broadband Radio Access Networks (BRAN); HiperAccess; Cell-based Convergence Layer.

–   ETSI TS 102 117 v1.1.1 Parts 1 and 2, Broadband Radio Access Networks (BRAN); HiperAccess; Packet-based Convergence Layer.

All the ETSI standards are downloadable at: http://pda.etsi.org/pda/queryform.asp, by specifying in the Search box the standard number.

[Editor's Note: Should provide reference and link to specific version of standards, not just a global link. Any modification to the standard referred to here should be discussed by the ITU-R before the link is updated.]

7   References

[1]   ETSI TR 101 177 V1.1.1 (1998): "Broadband Radio Networks (BRAN); Requirements and architectures for broadband fixed radio access networks (HIPERACCESS)".

[2]   IEEE 802.16

[3]   IEEE 802.16.3-00/02r4: "Functional Requirements for the 802.16.3 Interoperability Standard"

[4]   ETSI TR 101 856 V1.1.1 (2001-03): "Broadband Radio Access Networks (BRAN)- Functional Requirements for Fixed Wireless Access systems below 11 GHz: HIPERMAN"]

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