IEEE 802.16: The Global Standard for Wireless Metropolitan Area Networks

http://WirelessMAN.org

Phillip Barber, presenter

President, Broadband Mobile Technologies
Vice-Chair, IEEE 802.16 Netman Study Group

Roger B. Marks, presentation author

National Institute of Standards and Technology (U.S.A.)
Chair, IEEE 802.16 Working Group

IEEE 802.16 Approach

Divide the problem
Take one step at a time

- **Development of standards**
  - **Do the detailed technical work**
  - **Develop and publish timely standards**
  - **Move on to the next project**
  - **Work with others to continually develop global consensus**

- **Deployment of product**
  - **Fixed (stationary) systems**
    - **Low cost to deploy**
  - **Don't try for full ubiquity up front**
  - **Provide upgrade path to nomadic, portable, mobile**

IEEE 802.16 History

- **Initial Development: 1998-1999**

- **Meet every two months:**
  - **Session #1: July 1999**
  - **...**
  - **Session #31/May 2004: Shenzhen, China**

- **Future Sessions**
  - **Session #32/Jul 2004: Portland, Oregon, USA**
  - **Session #33/Sep 2004: Seoul, Korea**
    - **Offers for Tokyo, Geneva, Montreal, …**
  - **Session #34/Nov 2004: San Antonio, Texas, USA**

IEEE Standard 802.16: Air Interface

Completed Elements

IEEE Std 802.16-2001
MAC
(QoS; TDD/FDD; adaptive)
10-66 GHz PHY

+

IEEE Std 802.16c-2002
Amendment:
Profiles/Maintenance

+

IEEE Std 802.16a-2003
Amendment:
2-11 GHz PHY (NLOS)
three alternatives

Active Projects

P802.16-REVd
Revision project: Fixed only
Complete: June 2004
to be published as
IEEE Std 802.16-2004

P802.16e
Mobile Amendment
Licensed bands; 2-6 GHz
Started: Dec 02
Completion: late 2004

New Content in 2004 Revision

- **Numerous enhancements**
- **Better support for nomadic service**
  - **Better link margin range**
  - **Subchannelized OFDM**
  - **Better support for Adaptive Antennas**
  - **MIMO**
  - **Security**
  - **etc.**
- **Operational profiles**
  - **Basis of compliance test**

Additional IEEE 802.16 Standards

Conformance

**IEEE Std 802.16/Conf01-2003
10-66 GHz PICS**

**IEEE Std 802.16/Conf02-2003
10-66 GHz TSS&TP**

**P802.16/Conf03-2004
10-66 GHz RCT**

**P802.16/Conf04
11 GHz PICS
New in March 2004**

Coexistence

IEEE Std 802.16.2-2001

IEEE Std 802.16.2-2004

New IEEE 802.16 Activities

- **"NetMan" Study Group:**
  - **Network Management**
  - **Proposed two new project plans (PARs):**
    - **Management Information Base (MIB)**
      - **Amendment for fixed operation**
    - **Management Plane Procedures and Services**
      - **Amendment for fixed/mobile operation**
- **License-Exempt Coexistence Ad Hoc**

The World Wants 802.16 WirelessMAN™ Standards

- **Over 1300 people have attended a meeting.**
- **Over 220 people at Shenzhen session.**
- **Have had attendees from Australia, Belgium, Brazil, Canada, China, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Korea, Netherlands, Norway, Pakistan, Russia, Singapore, Spain, Sweden, Taiwan, UK, USA**

IEEE 802.16 and ETSI

- **Over 50 liaison letters between IEEE 802.16 WG and European Telecom Standards Institute (ETSI) groups**

- **ETSI HIPERMAN**
  - **Below 11 GHz**
  - **Healthy cooperation**
  - **Harmonized with 802.16a OFDM**
  - **Developing conformance test specs**

IEEE 802.16 and Korea

- **5 liaison documents exchanged between IEEE 802.16 WG and TTA PG05/PG302**
- **Meeting between chairs: 15 May 2004**
- **TTA focusing on OFDMA**

IEEE 802.16 Interest within China

"IEEE 802.16a Broadband Wireless Access (BWA) Standard Development and Internet Application": conference sponsored by BUPT and MII on 24 August 2001 in Beijing "on the specific topic of whether to use 802.16a as the Chinese national standard for fixed broadband wireless access at 3.5 GHz"

IEEE 802.16 and China

- **Met with leaders of Standards Administration of China (Beijing, 18 May 2004)**
- **Met with leaders in Ministry of Information Industry and China Communications Standards Association (Shenzhen, 19 May 2004)**

- **Liaison Presentation from CCSA (Shenzhen, 20 May 2004)**

IEEE 802.16 and ITU

- ## ITU-T:
  - SG9: "Broadband Wireless Extensions" to cable television/data networks
  - SG15: network management coordination

- ## ITU-R:
  - Working with WP9B on Preliminary Draft New Recommendation

Strong Relationships with Global Industry Groups

- **WiMAX Forum**
  - Worldwide Interoperability for Microwave Access

- **WCA**
  - Wireless Communications Association International

IEEE 802.21 Working Group on Media Independent Handover

Developing framework for handover across heterogeneous networks

Participation in IEEE 802.16

- *Open process and open standards*
- Anyone can participate in meetings
- Anyone can participate outside of meetings
  - Subscribe to mailing lists and read list archives
  - Post to mailing lists
  - Examine documents
  - Contribute and comment on documents
  - Join the Sponsor Ballot Pool
    - Vote and comment on draft standards
    - Must join the IEEE Standards Association to vote
    - Producers and Users must both be in ballot group

Free IEEE 802 Standards

- **Since May 2001, IEEE 802 standards have been available for free download.**
- **See:**

http://WirelessMAN.org

beginning six months after publication

- **IEEE Std 802.16, 802.16a, 802.16c are free**
- **IEEE Std 802.16.2-2001 is free**
- **IEEE Std 802.16/Conformance 01 is free**

IEEE 802.16 Resources

IEEE 802.16 Working Group on Broadband Wireless Access

info, documents, tutorials, email lists, etc:

http://WirelessMAN.org