ETSI BRAN Technical Committee

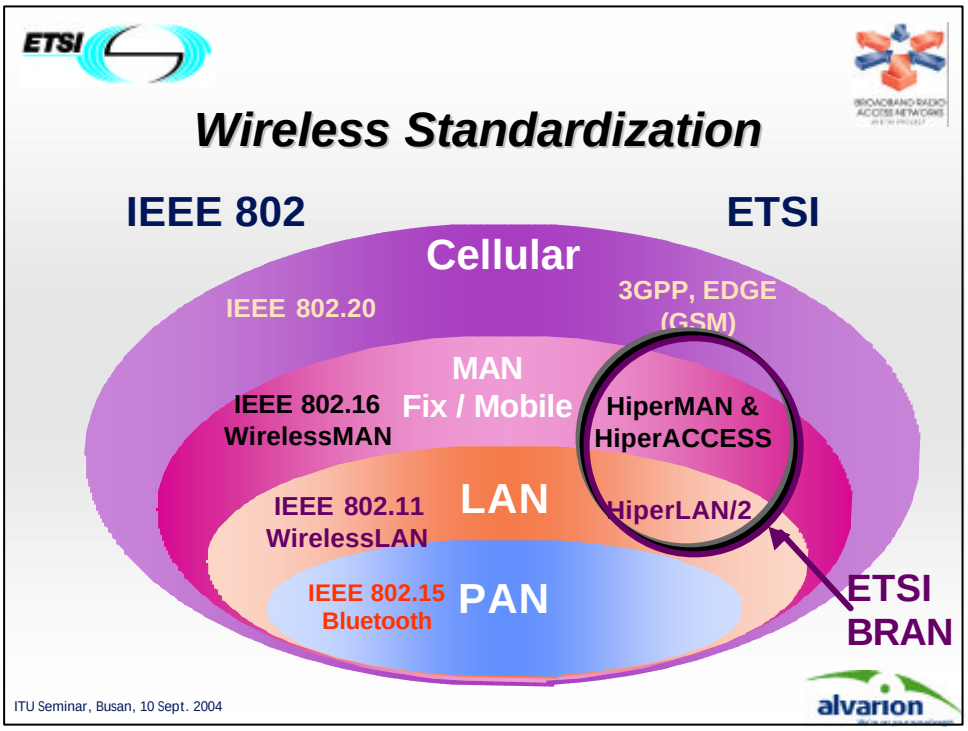
Mariana Goldhamer

ETSI BRAN Vice-Chair / HiperMAN Acting Chair

Alvarion

ETSI
European Telecommunications Standards Institute

- **699 member companies**
  - **from 55 countries in 5 continents**
- **10,800 technical standards and deliverables – free of charge**
  - **produced between 1988 - 2002**
- **60 co-operation agreements**
- **Location: Sophia Antipolis, Nice, France (French Riviera)**
- **www.etsi.org**


Wireless Standardization
IEEE 802
ETSI
Cellular
IEEE 802.20
3GPP, EDGE
(GSM)
MAN
IEEE 802.16
WirelessMAN
Fix / Mobile
HiperMAN &
HiperACCESS
LAN
IEEE 802.11
WirelessLAN
HiperLAN/2
IEEE 802.15
Bluetooth
PAN
ETSI
BRAN
ITU Seminar, Busan, 10 Sept. 2004
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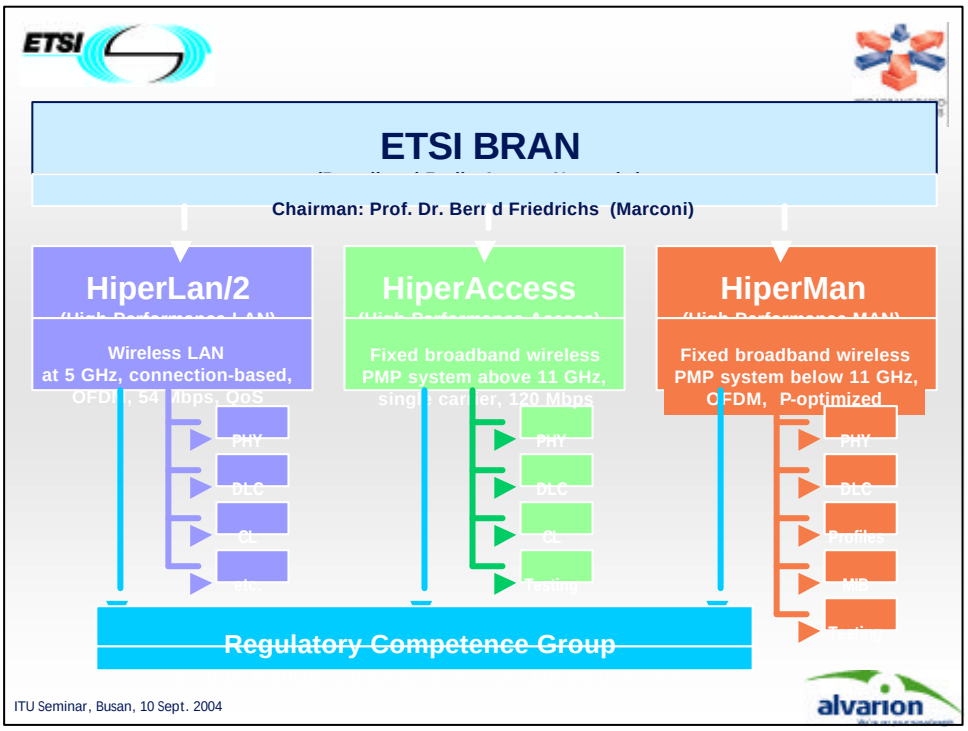
ETSI BRAN
Chairman: Prof. Dr. Bern d Friedrichs (Marconi)
HiperLan/2
Wireless LAN
at 5 GHz, connection-based,
OFDM, 54 Mbps, QoS
HiperAccess
Fixed broadband wireless
PMP system above 11 GHz,
sing carrier, 120 Mbps
HiperMan
Fixed broadband wireless
PMP system below 11 GHz,
OFDM, P-optimized
PHY
DLC
CL
Profiles
Regulatory Competence Group
ITU Seminar, Busan, 10 Sept. 2004
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HiperLAN/2

- For corporate, public and home environments
- Wireless access to the Internet and future multimedia
- 20 technical documents published
  - PHY: ETSI TS 101 475: 20MHz channel, OFDM PHY (harmonized with IEEE 802.11)
  - DLC: ETSI TS 101 761: QoS, enabling real time video services at speeds of up to 54 Mb/s
  - Ethernet and ATM convergence layers
- Maintenance active
- Harmonization with MMAC (Mobile Multimedia Access Comm.) - Japan
- HiperLAN/2 Global Forum
  - http://www.hiperlan2.com
- More details at:
  - http://portal.etsi.org/bran/kta/Hiperlan/hiperlan2.asp

HiperACCESS Overview

- Main applications
  - UMTS backhauling
  - SOHO, SME
  - ATM and Ethernet
- ETSI BRAN developed protocol stack and radio specifications
- Strong points
  - Suitable for immediate deployment in GSM and UMTS networks
  - Technical quality
    - » Precision of specification
    - » Well controlled optional features
    - » Test specifications with ETSI strength (MBS2)
- Weak points (same as for IEEE above 10 GHz)
  - Image in this domain appears to be less strong than for below 11 GHz
  - Industry & market momentum

HiperACCESS - Basic Features

- **Focus on frequency bands**
  - 40.5 - 43.5 GHz, 31.8 - 33.4 GHz, 27.5 - 29.5 GHz, 24.5 - 26.5 GHz, etc.
- **Channel size = 28 MHz, Baudrate = 22.4 MBaud**
  - Paired bands (FDD mode, fixed asymmetric rates)
  - Unpaired bands (TDD mode, adaptive asymmetric rates)
- **Important parameters =>**

	Downlink (AP ® AT)	Uplink (AT ® AP)
Data rates (Mbit/s)	20...120 (typically 80)	20...80 (typically 50)
Transmit power	15 dBm	14 dBm
Range	up to 12 km (hard limit from ranging, effectively depending on availability and rain zone)	

  - Frame based
    - » 1 ms frames
    - » Optional adaptive TDD mode (unpaired bands), H-FDD terminals, ARQ
  - Fixed length PDUs
    - » Efficient support of ATM and IP, robust, high QoS, allows ARQ

HiperACCESS Technical Specs

- **6 Base Technical Specifications**
  - TS 101 999 PHY Layer
  - TS 102 000 DLC Layer
  - TS 102 115-1 Cell-based CL, common part
  - TS 102 115-2 Cell-based CL, UNI service-specific part
  - TS 102 117-1 Packet-based CL, common part
  - TS 102 117-2 Packet-based CL, ethernet service-specific part
- **16 Test Technical Specifications**
  - TS 102 123 Radio conformance test
  - TS 102 149 - 1/2/3 DLC PICS/TSS&TP/ATS
  - TS 102 147 - 1 - 1/2/3 CBCL common part PICS/TSS&TP/ATS
  - TS 102 147 - 2 - 1/2/3 CBCL UNI part PICS/TSS&TP/ATS
  - TS 102 148 - 1 - 1/2/3 PBCL common part PICS/TSS&TP/ATS
  - TS 102 148 - 2 - 1/2/3 PBCL ethernet part PICS/TSS&TP/ATS
- **3 Technical Recommendations (non-mandatory)**
  - TR 102 003 System overview
  - TR 102 271 Essential radio parameters (for TM4 generic HEN)
  - TR 102 327 API definition for UDP/IP-based testing

HiperMAN Overview

- **Main applications**
  - First release: Fixed Wireless Access below 11GHz
  - Residential (self installation), SOHO, SME (wireless DSL)
- **Features (100% selected by WiMAX Forum)**
  - Optimized for IP traffic, full QoS support
  - Both FDD and TDD, including half-duplex CPE
  - High spectral efficiency and data rates, up to 25Mb/s in a 7MHz channel
  - Adaptive modulation, from QPSK rate ½ to 64QAM rate ¾
  - Interoperability profiles for 1.75MHz, 3.5MHz and 7MHz
  - Up-link OFDMA
    - » High cell radius, up to 50km in P-MP mode with directive antennae;
  - Hooks for Advanced Antenna Systems
  - High security TEK encryption algorithms

HiperMAN – Technical Specs

- **Standards**
  - ETSI TS 102 177 v1.1.1 - Physical (PHY) Layer
  - ETSI TS 102 178 v1.1.1 - Data Link Control (DLC) Layer
  - ETSI TS 102 210 v1.1.1 - System Profiles
- **Functional Requirements**
  - ETSI TR 101 856 v1.1.1. - Functional Requirements for Fixed Wireless Access systems below 11 GHz: HIPERMAN
- **System Reference Documents**
  - ETSI TR 102 079 v1.1.1. - System Reference Document for HIPERMAN in the band 5,725 GHz to 5,875 GHz
- **More details at:**
- http://webapp.etsi.org/WorkProgram/Frame_WorkItemList.asp?qPROJECT_CODE=HIPERMAN:685

HiperMAN drafting activity

- MIBs for Network Management
  - To be published 2004
- Test Standards
  - PICS
    - » To be published 2004
  - TSS&TP
    - » To be published 2004
  - ATS
- Harmonization with IEEE 802.16-2004
  - To be published 2004
- To start:
  - Support for Nomadic systems

Regulatory Competence WG

- 5GHz Harmonized EN
  - To be used for European type approval in <5.725GHz
    - » ETSI EN301 893 v1.2.3 - 5 GHz high performance RLAN; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive
- 5.8GHz Harmonized EN (FWA)
  - To be used for European type approval in 5.725 – 5.875GHz
- Converged Fixed+Nomadic System Reference Document
  - To be used by ECC for more spectrum allocation

ETSI Testing

- **ETSI Experience**
  - GSM, DECT, 3G, Bluetooth
  - The working methods and approaches have given very good results in terms of interoperability for important technologies
  - 3G considers the test specifications "very good value for money".
- **Organization**
  - Work is progressed through STFs (Specialist Task Force)
    - » STF brings together experts, working together at ETSI premises for limited periods
    - » STF funded by ETSI or eEurope
    - » STF operates under the guidance of ETSI BRAN
    - » Support by ETSI PTCC (Protocol and Testing Competence Center)

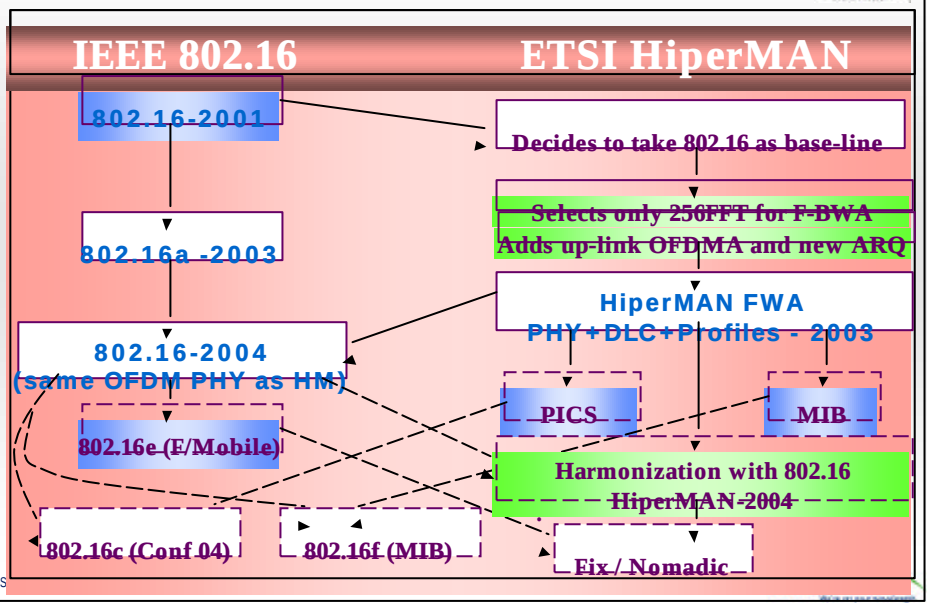
Testing Approach

- Interoperability testing = Two implementations trying to inter-operate
  - Can test only normal behaviour
- Golden unit testing = An implementation that is somehow representing a standard trying to inter-operate with an implementation under test
  - Can test exceptional behaviour only by chance
- Conformance testing = A test tool evaluates implementation under test
  - Can test both normal and exceptional behaviour
  - Can repeat the specific test any time and any number of times (following corrections for example)
- As shown on one IEEE802.16 example: The ratio of normal versus total behaviour could be 6/46
- **ETSI has achieved good results using a combination of conformance testing followed by some level of interoperability testing**

Testing Standards

- PICS - Protocol Implementation Conformance Statement
- TSS & TP - Test Suite Structure and Test Purposes
- ATS - Abstract Test Suite
  - Uses TTCN3 language
  - To be used in Testing Platforms
    - » Enterprise
    - » Industry forums
- **Protocol test specifications according to ITU-T X.291...296, ISO/IEC 9646**

HiperMAN-802.16 Cooperation



Conclusions

- Wireless industry needs global standards
- ETSI BRAN is looking for harmonization with parallel standard associations
- IEEE 802.16 – ETSI HiperMAN cooperation is a good example of:
  - What can be achieved
  - How standard organizations can contribute one to each-other