



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**

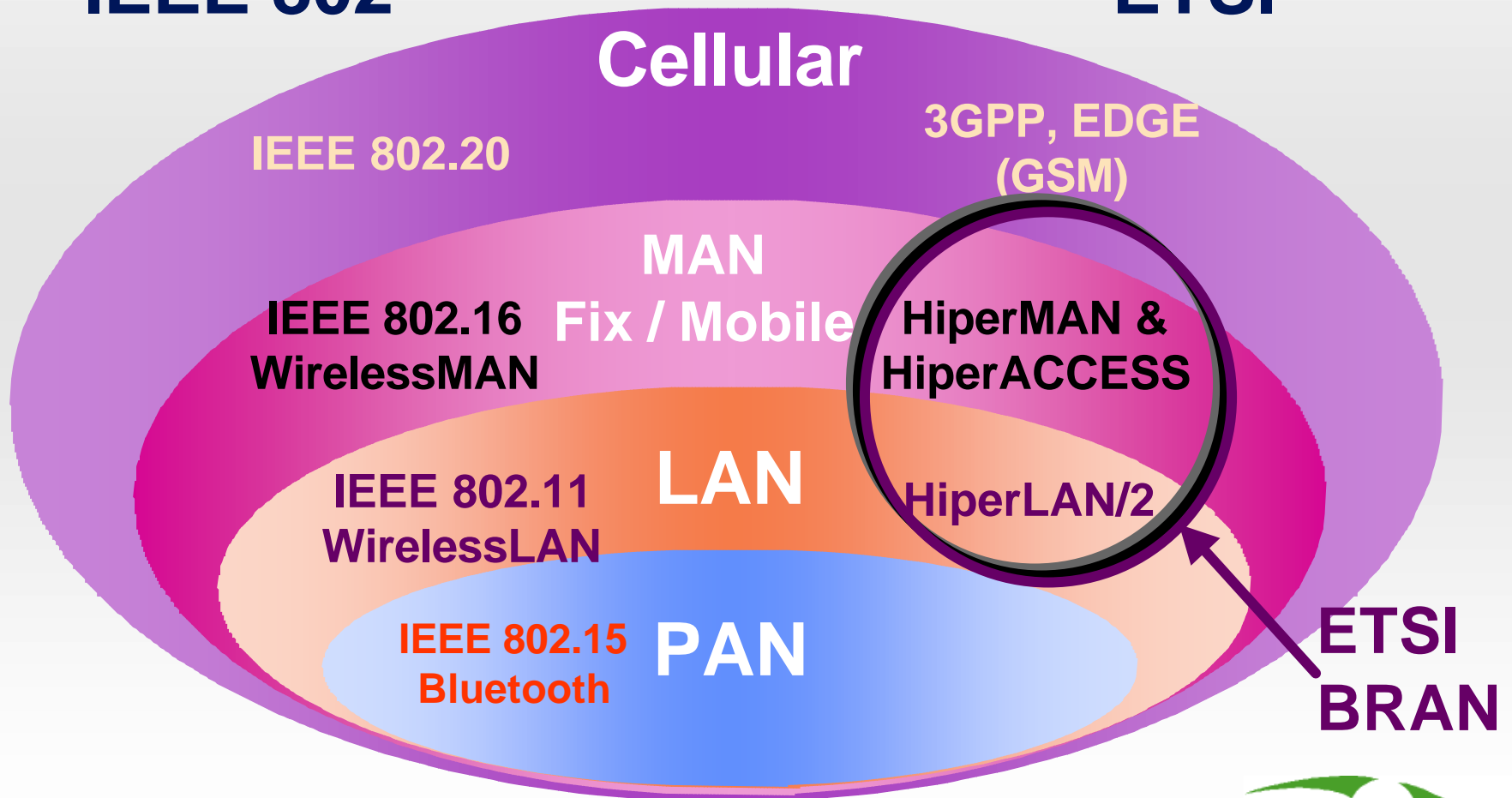




Wireless Standardization

IEEE 802

ETSI





ETSI BRAN

(Broadband Radio Access Networks)
Chairman: Prof. Dr. Bernd Friedrichs (Marconi)

HiperLan/2

(High Performance LAN)

Wireless LAN
at 5 GHz, connection-based,
OFDM, 54 Mbps, QoS

- PHY
- DLC
- CL
- etc.

HiperAccess

(High Performance Access)

Fixed broadband wireless
PMP system above 11 GHz,
single carrier, 120 Mbps

- PHY
- DLC
- CL
- Testing

HiperMan

(High Performance MAN)

Fixed broadband wireless
PMP system below 11 GHz,
OFDM, IP-optimized

- PHY
- DLC
- Profiles
- MIB
- Testing

Regulatory Competence Group

Spectrum regulatory issues, Harmonized European Norms





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:**



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 $\frac{1}{2}$ to 64QAM rate $\frac{3}{4}$
 - 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 STF (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**

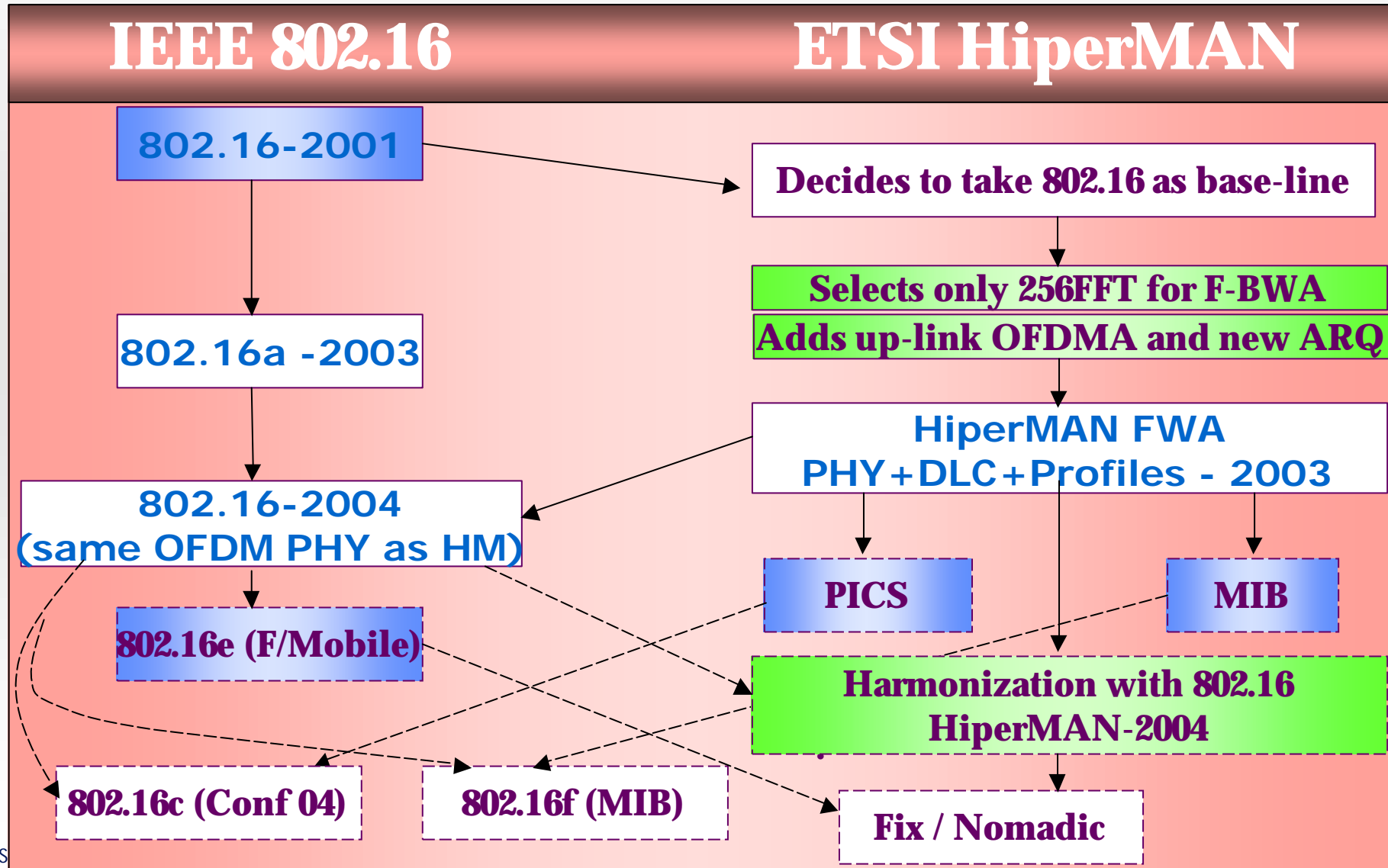


Testing Standards

- **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**

