Uniqueness and the MBWA PAR

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The MBWA PAR

- What is it ?
- Relationship to IEEE 802 Projects
- Relationship to 3G Projects
- Possible Ways Forward

The MBWA PAR Scope

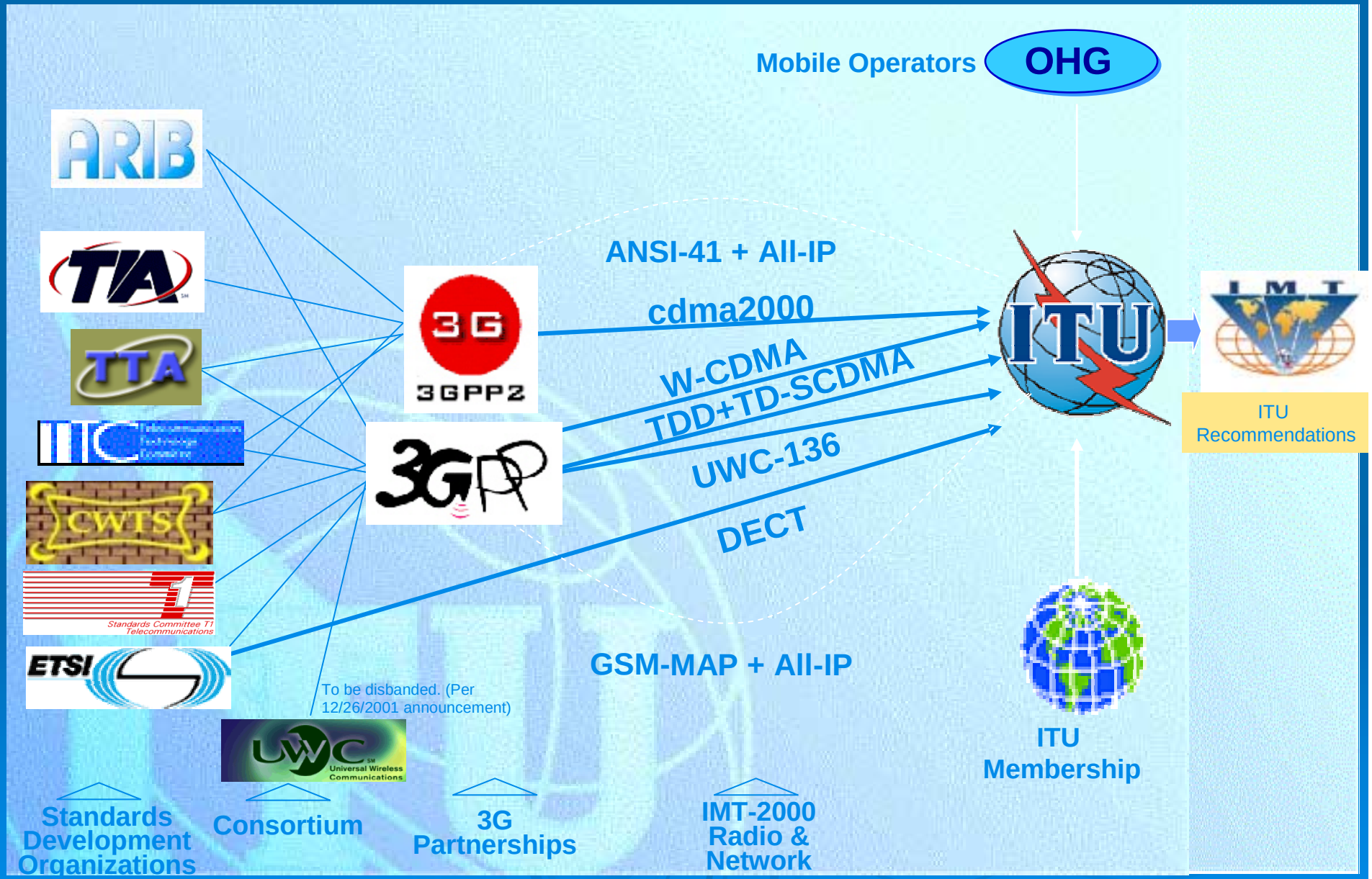
Develop a specification for the PHY and MAC layers of an air interface for interoperable packet-data mobile broadband wireless access systems that:

- operates in licensed frequency bands below 3.5 GHz,
- supports peak data rates per user in excess of 1 Mbps,
- supports vehicular mobility classes up to 250 Km/h,
- covers cell sizes commensurate with ubiquitous metropolitan-area networks, and
- targets spectral efficiencies, sustained user data rates and numbers of active users significantly higher than achieved by existing mobile systems.

MBWA and Today's IEEE 802 Wireless WGs

	802.11	802.15	802.16	802.MBWA
Spectrum	Unlicensed	Unlicensed	Licensed Unlicensed	Licensed
Freq. Bands	2 Ghz	Various depending on application	10-66 GHz 2-11 GHz	Below 3.5 GHz
Range (Typical Cell-Size)	Local Area	Personal Space	Metropolitan Area Access	Metropolitan Area Access
Mobility Support	Portability Local Roaming	Personal Space Connector Avoidance	Fixed	Vehicular Speed Mobility Inter-Metro Roaming
Station Power	Battery	Battery	Mains	Battery
LOS/NLOS	NLOS	NLOS	LOS (10-66 GHz) NLOS (2 -11 GHz)	NLOS
Group Charter	PHY and MAC for LAN	PHY and MAC for PAN	PHY and MAC for Fixed Pt.-Mpt. Wireless Access	PHY and MAC for Vehicular Speed Mobile Access Networks

IMT-2000 Global Collaboration



ITU-R WP 8/F

3GPP specifications

Approved

Updated

SDO standards

Transposed

Submitted by SDOs to ITU-R

ETSI

ARIB

etc

Rec M.1457

- High level description of air interfaces
- Refers out to the SDOs' standards (ETSI, T1, etc.)

3GPP Partnership Agreement

Preamble

Standards organizations and other related bodies have agreed to co-operate for the production of a complete set of globally applicable Technical Specifications for a 3rd Generation Mobile System based on the evolved GSM core networks and the radio access technologies supported by 3GPP partners (i.e., UTRA both FDD and TDD modes).

The Project is entitled the "Third Generation Partnership Project" and may be known by the acronym "3GPP".

3GPP has been established for the preparation and maintenance of the above mentioned Technical Specifications, and is not a legal entity.

3GPP Partnership Agreement

Definition of the Third Generation Partnership Project

3GPP will provide globally applicable Technical Specifications for a 3rd Generation Mobile System based on the evolved GSM core network, and the Universal Terrestrial Radio Access (UTRA), to be transposed by relevant standardization bodies (Organizational Partners) into appropriate deliverables (e.g., standards).

3GPP Partnership Agreement

Scope and objectives (1)

The Technical Specifications will be developed in view of global roaming and circulation of terminals.

The 3rd Generation Mobile System and its capabilities will be developed in a phased approach. Initially, 3GPP will elaborate, approve and maintain the necessary set of Technical Specifications for the first phase of a 3rd Generation Mobile System including:

- **UTRAN (including UTRA; W-CDMA in Frequency Division Duplex (FDD) mode and TD-CDMA in Time Division Duplex (TDD) mode)**
- **3GPP Core Network (Third Generation networking capabilities evolved from GSM . These capabilities include mobility management and global roaming.)**
- **Terminals for access to the above (including specifications for a UIM)**
- **System and service aspects**

3GPP2 Partnership Agreement

About 3GPP2

What is 3GPP2?
3GPP2 Collaboration

The concept of a "Partnership Project" was pioneered by the European Telecommunications Standards Institute (ETSI) early in 1998 with the proposal to create a Third Generation Partnership Project (3GPP) focusing on Global System for Mobile (GSM) technology. Although discussions did take place between ETSI and the ANSI-41 community with a view to consolidating collaboration efforts for all ITU "family members," in the end it was deemed appropriate that a parallel Partnership Project be established - "3GPP2," which, like its sister project 3GPP, embodies the benefits of a collaborative effort (timely delivery of output, speedy working methods), while at the same time benefiting from recognition as a specifications-developing body, providing easier access of the outputs into the ITU after transposition of the specifications in a Standards Development Organization (SDO) into a standard and submittal via the national process, as applicable, into the ITU.

As the scopes of the Partnership Projects change over time, more collaboration can occur and more SDOs may join either project. In addition, the SDOs in the projects also meet with staff at the ITU-T and ITU-R to further cooperation with the ITU.

3GPP2 Partnership Agreement

Preamble

Standards organizations and other related bodies have agreed to co-operate for the production of a complete set of globally applicable Technical Specifications for a 3rd Generation Mobile System based on the evolving ANSI-41 core network and the radio access technologies supported by 3GPP2 partners.

The Project is entitled the "Third Generation Partnership Project 2" may be known by the acronym "3GPP2."

3GPP2 has been established for the preparation and maintenance of the specifications, and is not a legal entity and is non-profit making.

3GPP2 Partnership Agreement

Scope and objectives (1)

The Technical Specifications will be developed in view of global roaming and circulation of terminals.

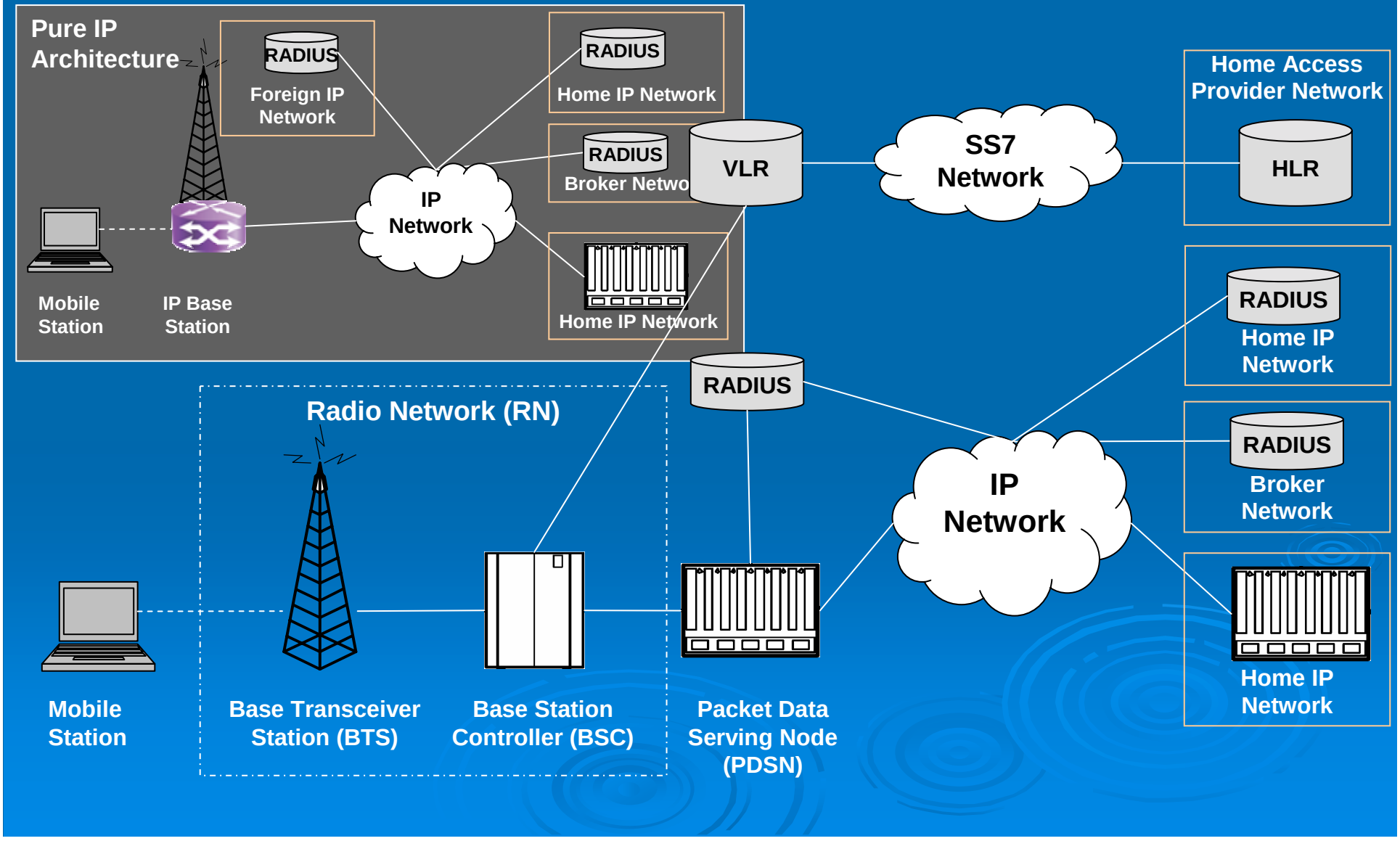
The 3rd Generation Mobile System and its capabilities will be developed in a phased approach. 3GPP2 will prepare, approve and maintain the necessary set of Technical Specifications and Technical Reports for a 3rd Generation Mobile System including:

- cdma2000 and its enhancements
- A 3G Core Network evolved from ANSI-41 (Third Generation networking capabilities that include mobility management and global roaming.)
- A 3G Network based on Internet Protocol that includes support for network and mobile station interoperability with the 3G Network evolved from ANSI-41.
- Interface of 3GPP Radio Access technology to 3G Core Network evolved from ANSI-41
- Interface of 3GPP2 Radio Access Technology to a 3G Core Network evolved from GSM-MAP
- Wireless Packet Data Networking
- A-Interface
- Services and Systems Aspects

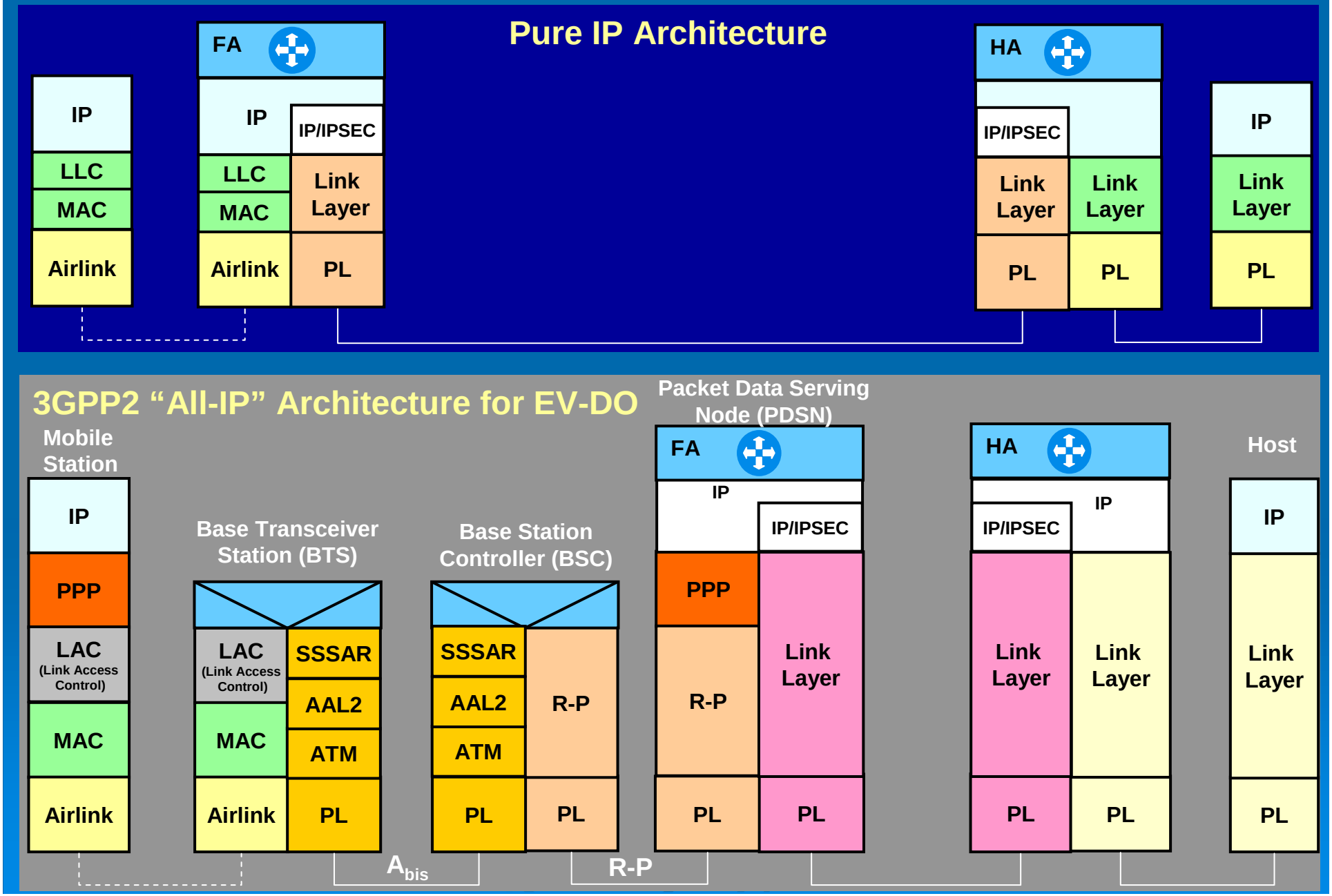
3G Differentiators: Overall Architecture

Reference Model for Access with Mobile IP

3GPP2 P.S0001-A



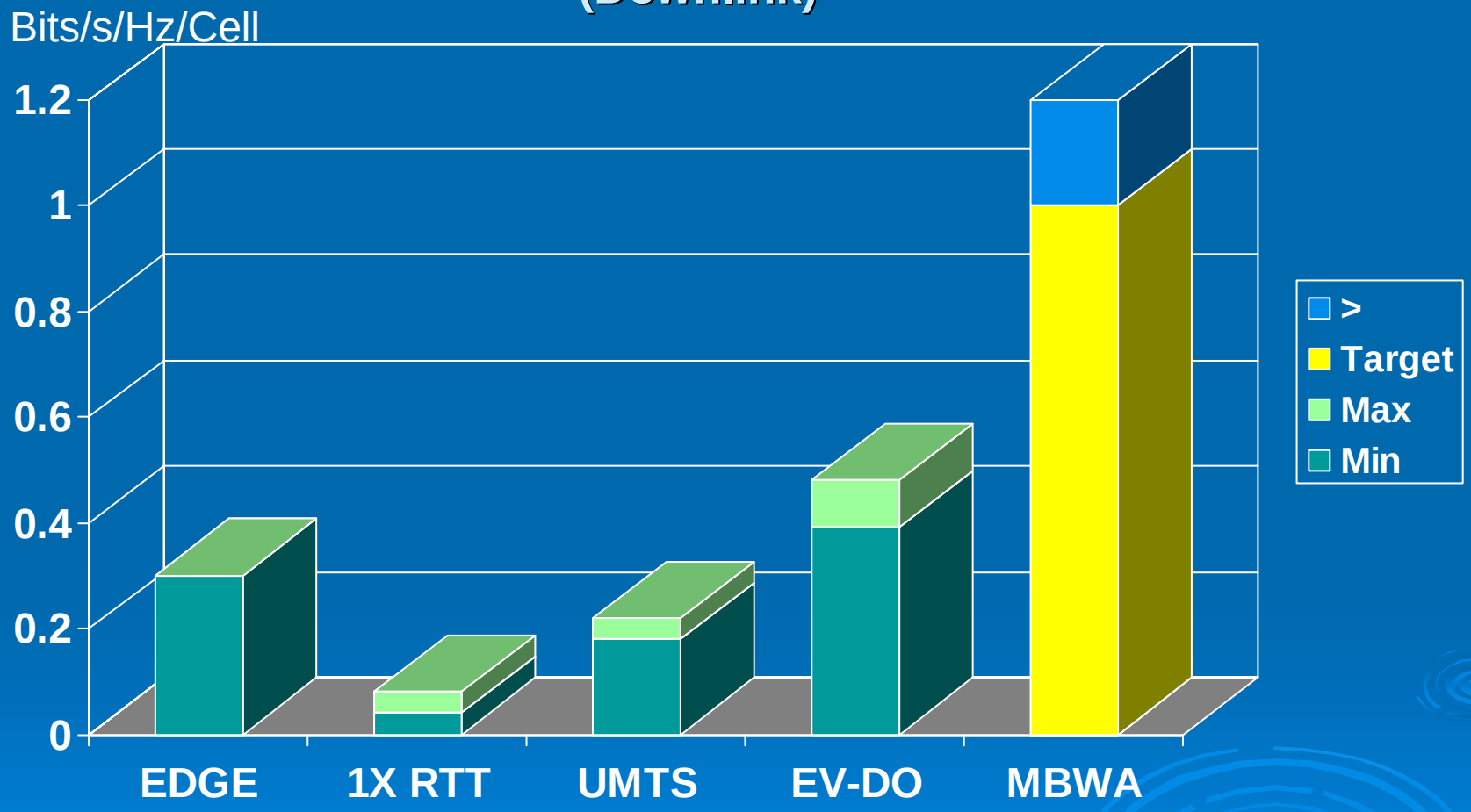
Pure IP versus “All-IP”



3G Differentiators: Spectral Efficiency

Sustained Spectral Efficiency Comparisons

(Downlink)



Sources: UMTS -> Qualcomm: The Economics of Wireless Mobile Data (Citing Nokia data)
EV-DO & 1XRTT -> CDMA Development Group:*CDMA2000 Market Facts; October 10, 2002*
EDGE -> 3G Americas: EDGE Compact and EDGE Classic Packet Data Performance
MBWA -> Design objectives

New capabilities for systems beyond IMT-2000

- It is anticipated that there will be a requirement for a new radio access technology or technologies at some point in the future to satisfy the anticipated demands for higher bandwidth services.
- Systems beyond IMT-2000 will:
  - Support a wide range of symmetrical, asymmetrical, and unidirectional services
  - Provide management of different quality of service levels to realize the underlying objective of efficient transport of packet-based services.
- In parallel, there will be an increased penetration of nomadic and mobile wireless access multimedia services.
- The technologies, applications and services associated with systems beyond IMT-2000 could well be radically different from the present, challenging the perceptions of what may be considered viable by today's standards and going beyond what can be achieved by the future enhancement of IMT-2000 working with other radio systems.

Ref: ITU-R Draft New Recommendation (DNR): Vision, framework and overall objectives of future development of IMT-2000 and systems beyond IMT-2000

Future network of systems beyond IMT-2000 including a variety of potential interworking access systems

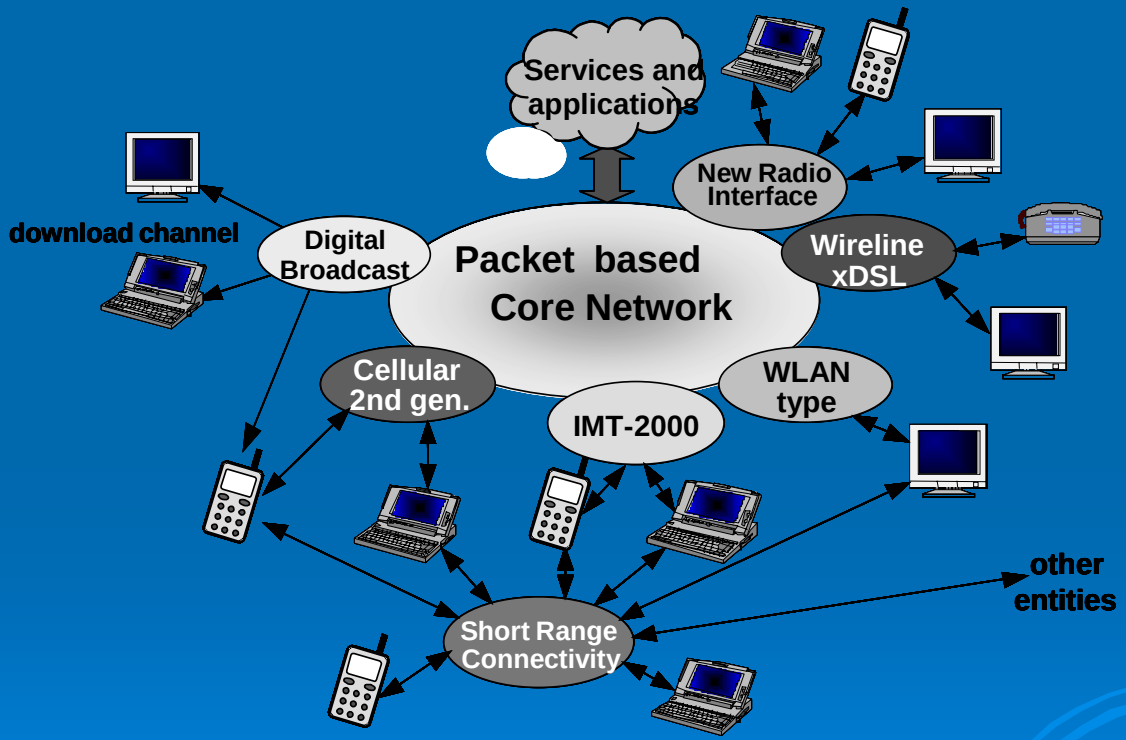
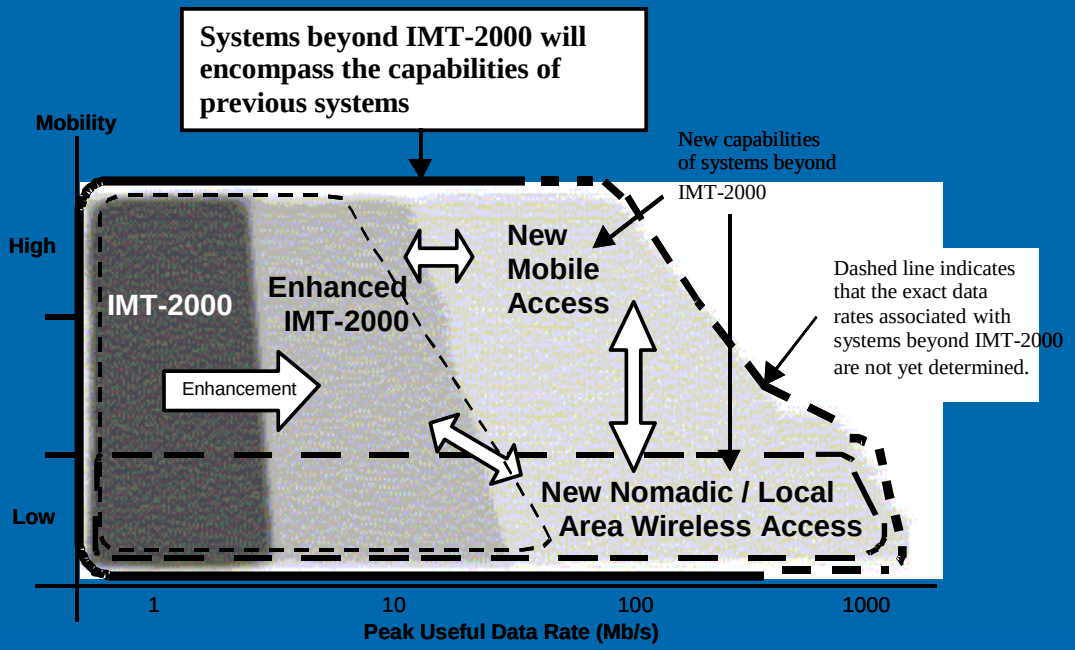


Illustration of capabilities of IMT-2000 and systems beyond IMT-2000



Dark shading indicates existing capabilities, medium shading indicates enhancements to IMT-2000, and the lighter shading indicates new capabilities of systems beyond IMT-2000.

The degree of mobility as used in this figure is described as follows: Low mobility covers pedestrian speed, and high mobility covers high speed on highways or fast trains (60 km/h to ~250 km/h, or more).

Two options to go Forward

- Combine: Raise maximum frequency of ECSG PAR to 6 GHz and then form New WG with expertise in all aspects of mobility
- Differentiate:

Two Unique Projects ?

	802.16ev	802.MBWA
Spectrum	Licensed Unlicensed	Licensed
Freq. Bands	2-11 GHz	Below 3.5 GHz
Range (Typical Cell-Size)	Metropolitan Area Access	Metropolitan Area Access
Mobility Support	Mobility consistent with complete backward compatibility	Vehicular Speed Mobility Inter-Metro Roaming
Station Power	Battery	Battery
LOS/NLOS	NLOS	NLOS
Group Charter	802.16 PHY and MAC with complete backward compatible enhancements to facilitate mobility and roaming	PHY and MAC for Vehicular Speed Mobile Access Networks