A Study on Systems Beyond IMT-2000 in Korea

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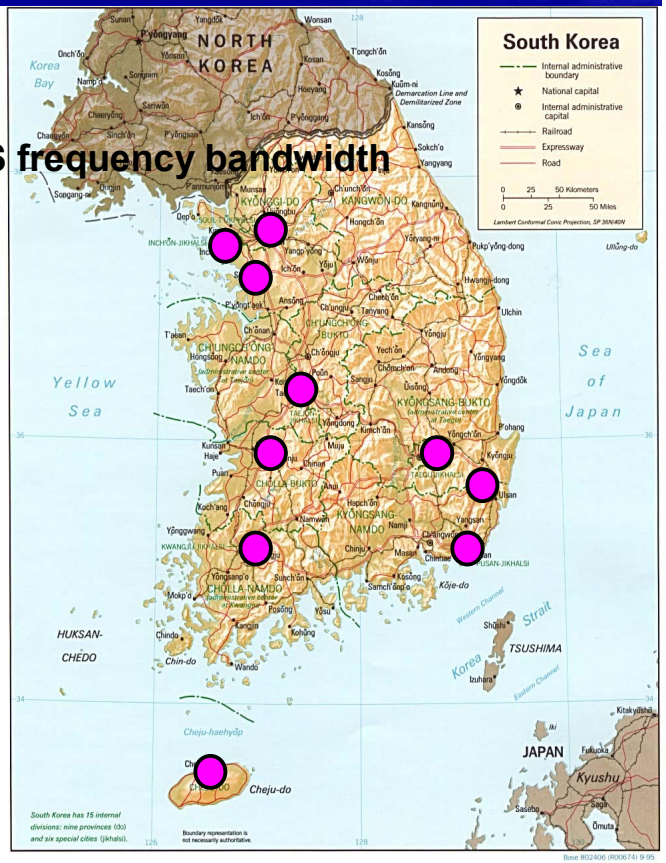
Contents

Current Status of IMT-2000 Service in Korea

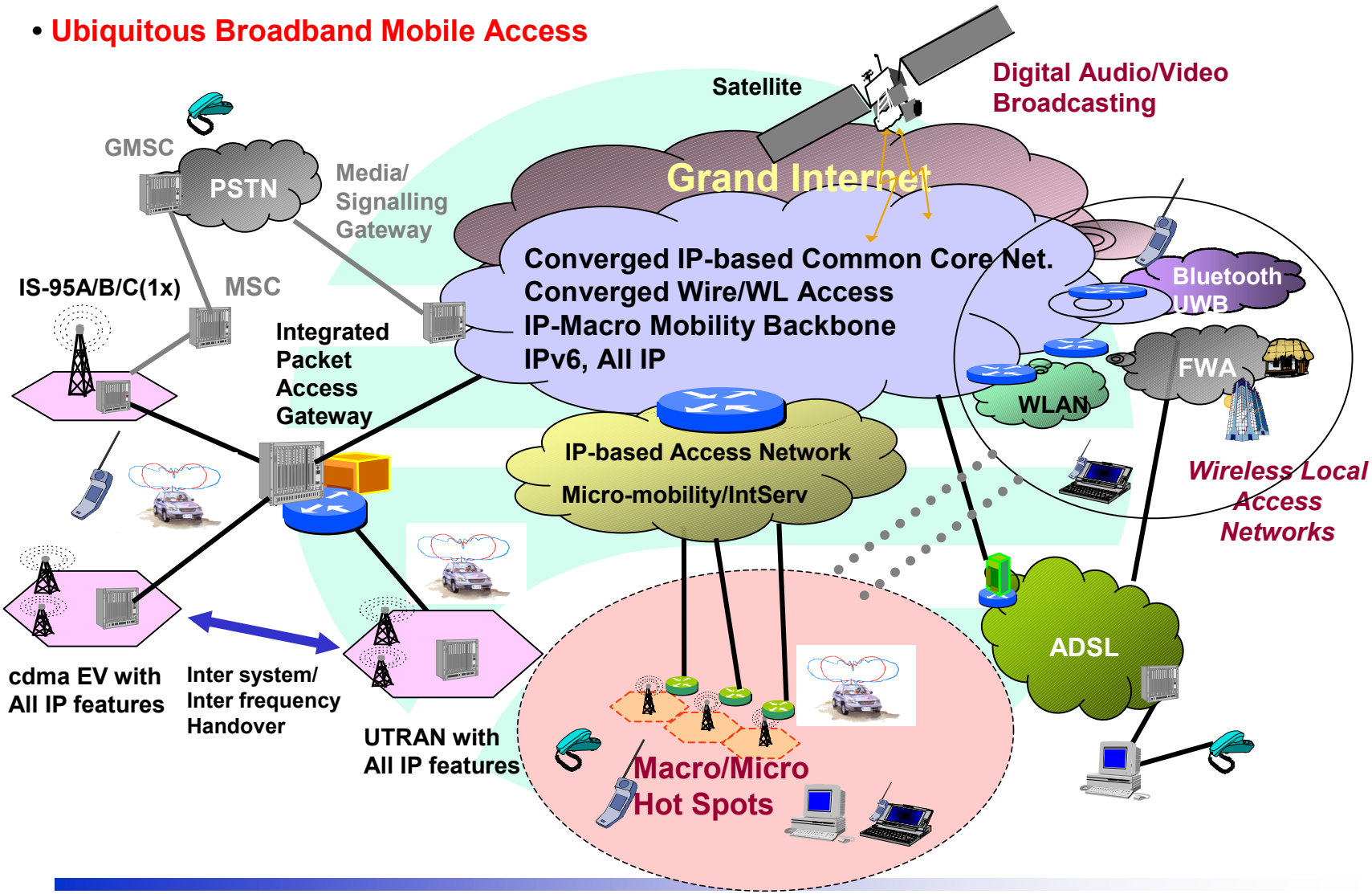
- **No. of Subscribers**
  - xDSL : over 10 million (population 45 million)
  - Mobile : over 30 million (population 45 million)
- **Commercial Service of cdma2000**
  - **cdma2000 1x**
    - 2000.10. Commercial launch on the cellular/PCS frequency bandwidth
    - 2001. 4. Nation-wide service
    - 2002. 4. 2.4 million subscribers
  - **cdma2000 1x EV-DO**
    - 2002. 4. 1.2 million subscribers
    - 2002. 6. 2002 FIFA World Cup service
- **Launching of W-CDMA**
  - 2001.10. Start bench mark test
  - 2002. 6. 2002 FIFA World Cup trial service
  - 2002.11. Start commercial launch
  - 2003. Nation-wide service

2002 FIFA World Cup Stadium



ETRI's Vision for Systems beyond IMT-2000 (I)

- **Ubiquitous Broadband Mobile Access**

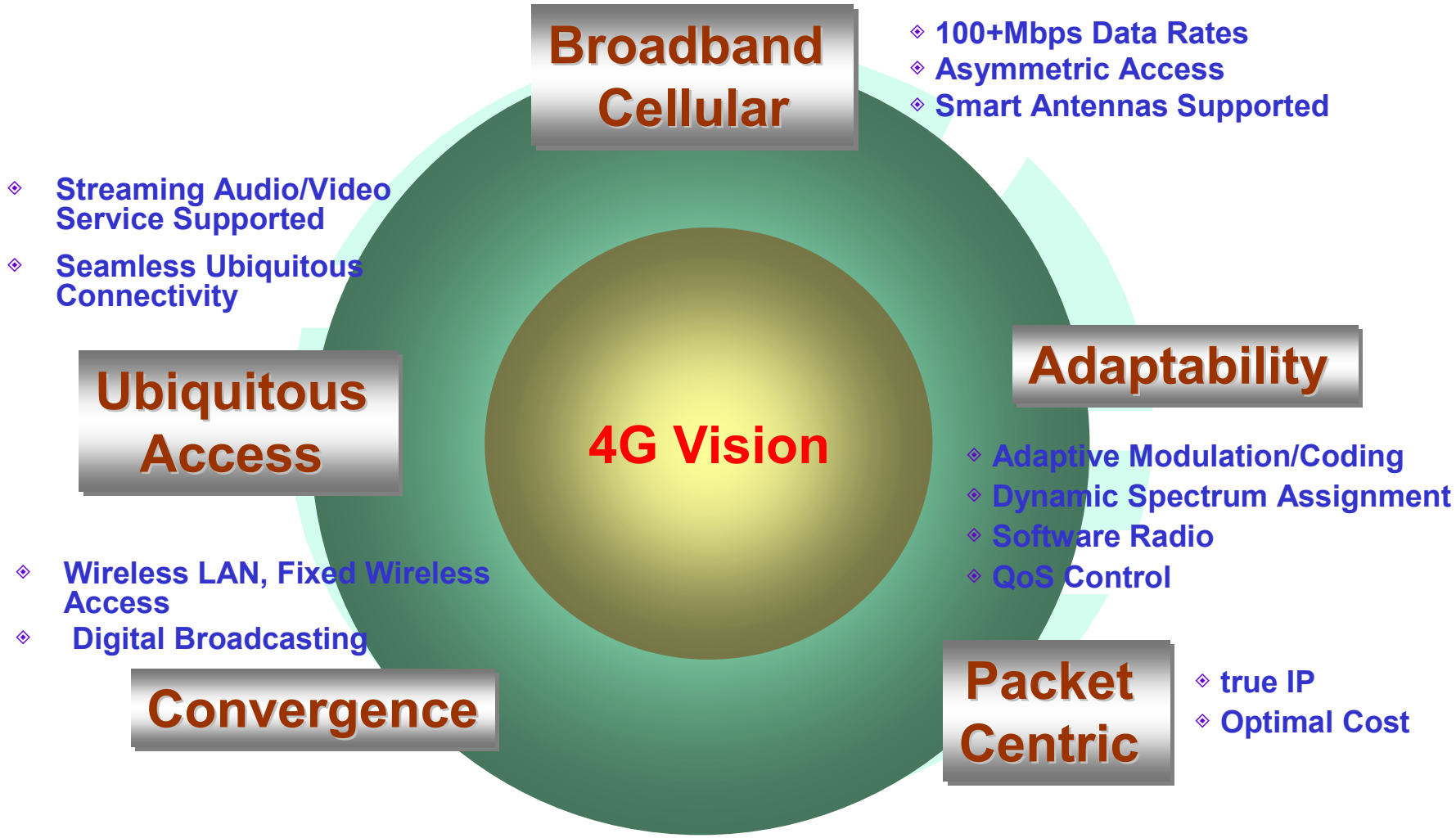


ETRI's Vision for Systems Beyond IMT-2000 (II)

- **Ubiquitous Broadband Mobile Access**
  - **Always Connected with Optimal Bandwidth & Cost**
  - **Any where, Any device, Any time, Any one, Any information**

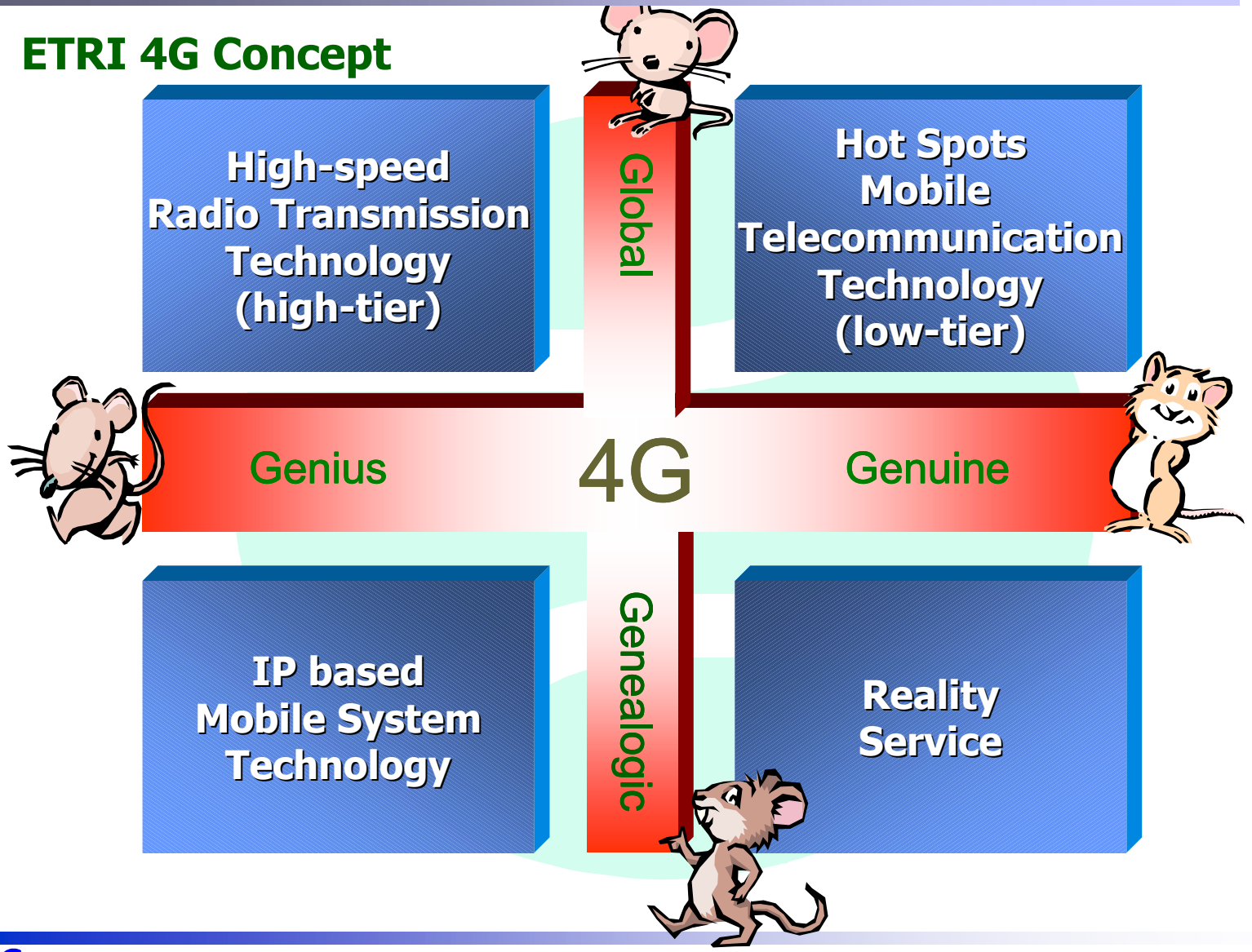
- **Driven by Technology, Standards, Regulatory, Investment, Services and Applications**

ETRI's Vision for Systems Beyond IMT-2000 (III)



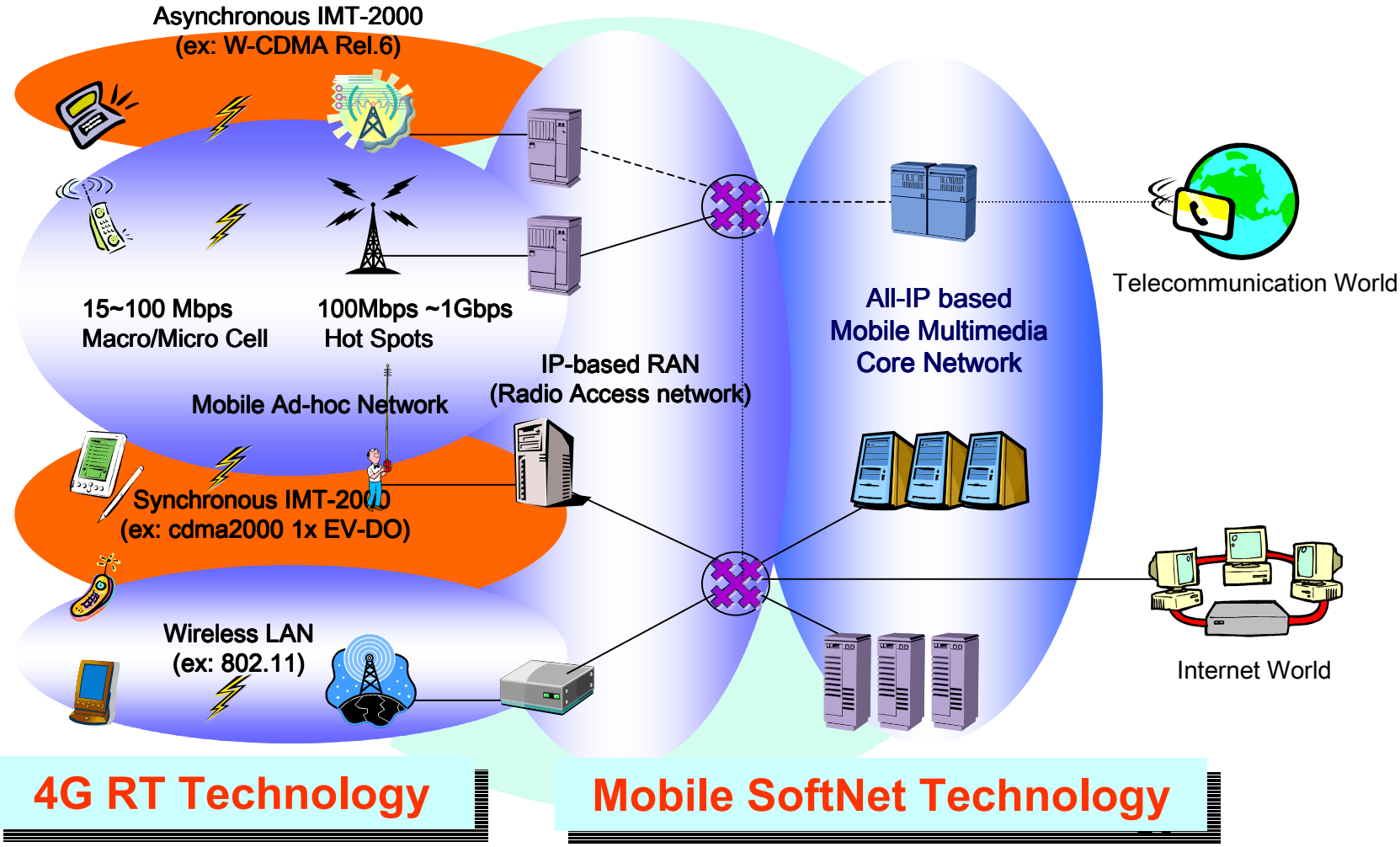
ETRI's R&D Project on Systems Beyond IMT-2000 (I)

- **ETRI 4G Concept**



ETRI's R&D Project on Systems Beyond IMT-2000 (II)

Overview



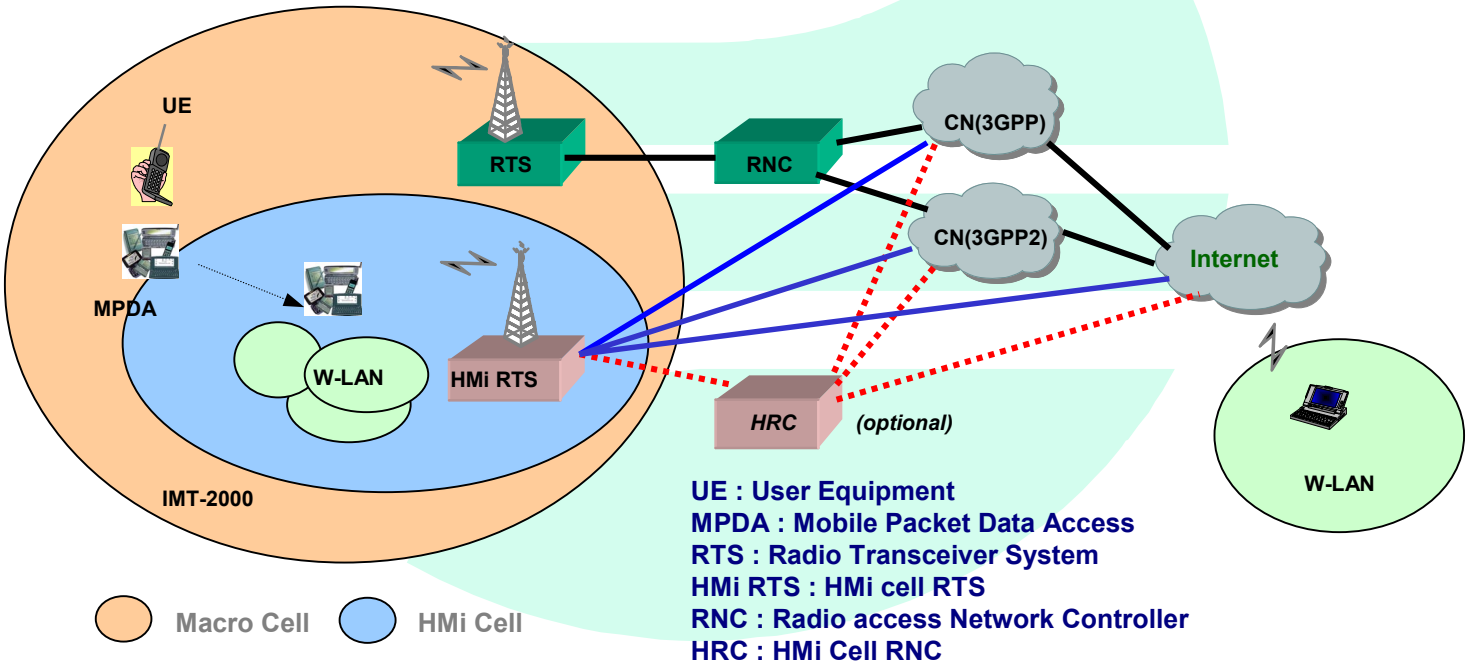
Low-tier 4G System (I)

- **High-speed Mobile Internet System (HMi) as a candidate of low-tier 4G system**

- **Basic Requirements of HMi**
  - **Service**
    - **High speed Internet Access equivalent to xDSL**
    - **IP based Voice/Data Services**
    - **Streaming Video and Audio**
  - **High Speed Packet Transmission**
    - **Channel adaptive variable rate : 10 Mbps ~ x100bps**
  - **Interworking with 3G cellular system**
    - **Handover with 3G cellular**
    - **More enhanced mobility**
  - **Cost-Quality effective solution**
    - **QoS comparable to wired network with low cost**
  - **More robust against interference and tapping**
    - **Robust radio access against interference of adjacent frequency band**
    - **Data security and authentication support**

Low-tier 4G System (II)

- **Target of HMi**
  - Provide high speed packet access with asymmetric mode which covers high density area and metropolitan area.
  - Provide robustness against channel interferences, cellular-like cell coverage, medium mobility, improved QoS and security
  - Maximize re-use of existing cellular infrastructure for low cost of service



Low-tier 4G System (III)

- **HMi System Specification**
  - **Radio Access Scheme**
    - **Carrier Frequency : 2GHz Band (2.3 or 2.5GHz Band)**
    - **Bandwidth : 10/20MHz**
    - **Duplexing : TDD(Time Division Duplexing)**
    - **Multiple Access : OFDM-TDMA/CDMA**
  - **Packet Data Transmission**
    - **Data Rate : up to x100 Mbps with medium mobility**
    - **Adaptive Modulation Scheme**
  - **Radio Link Protocol**
    - **HMi cellular MAC**
    - **Mobile multimedia QoS control**
    - **Handover to cdma2000 1x and WCDMA**

High-tier 4G Radio Transmission Technology (I)

Target

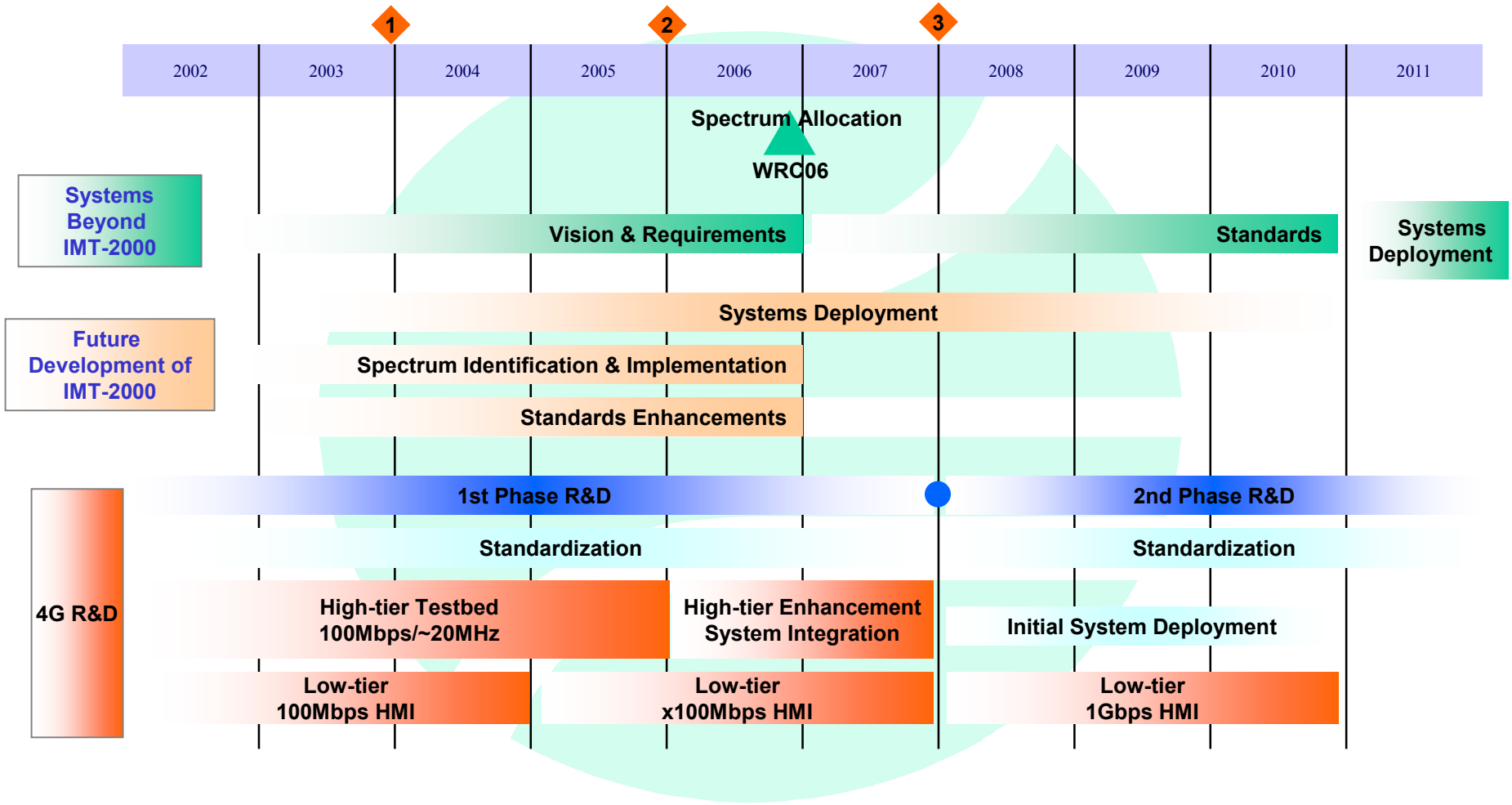
Issues	Target
Freq. Band	2 GHz
	3 ~ 5 GHz
Spectrum BW	5 / 10 / 20 MHz (DL) Asymmetric Band / Carrier
Multiplexing Multiple Access	FDD/FDMA : Macro/Micro Cell
Service Type	Packet Data
Cell Type	Macro/Micro & Hot Spots
Data Rate vs. Mobility	**100 Mbps** (Peak Aggregate Payload / Cell) **at** **>60 km/h**

High-tier 4G Radio Transmission Technology (II)

Candidate Technologies

Candidates	Features
Multiplexing Multiple Access	• **FDD/Distributed Freq-Hopping OFDMA (Macro/Micro)** - Granular Packet Transmission - Efficient Freq Diversity - Reduction of Complexity
HOM/AMC	• Reliable Packet Transmission under Varying Channel • QPSK / 16QAM / 64QAM / 256QAM • Turbo Code, LDPC
Multiple Antennas	• Robust Link Construction over Wireless Channel • MIMO • STC
H-ARQ	• Latency Minimization & QoS Control • Chase Combining / IR
Future-Oriented	• UWB • BLAST • Etc.

4G Milestones & Activities



Summary

- **4G Activities in Korea**
  - Korean 4G Vision Committee : Organized on March 2002
  - Beijing Mobile Communication Research Center : open on April 2002
- **4G R&D Directions**
  - Develop low-tier technologies to support high-speed, low-cost, hot-spot area wireless mobile internet services
  - Develop high-tier technologies to support high-speed, wide-area wireless mobile internet services
- **Standardization**
  - De-facto
  - ITU-R/3GPP/3GPP2