

# **ARIB's Activities on IMT-2000 and IMT-Advanced**

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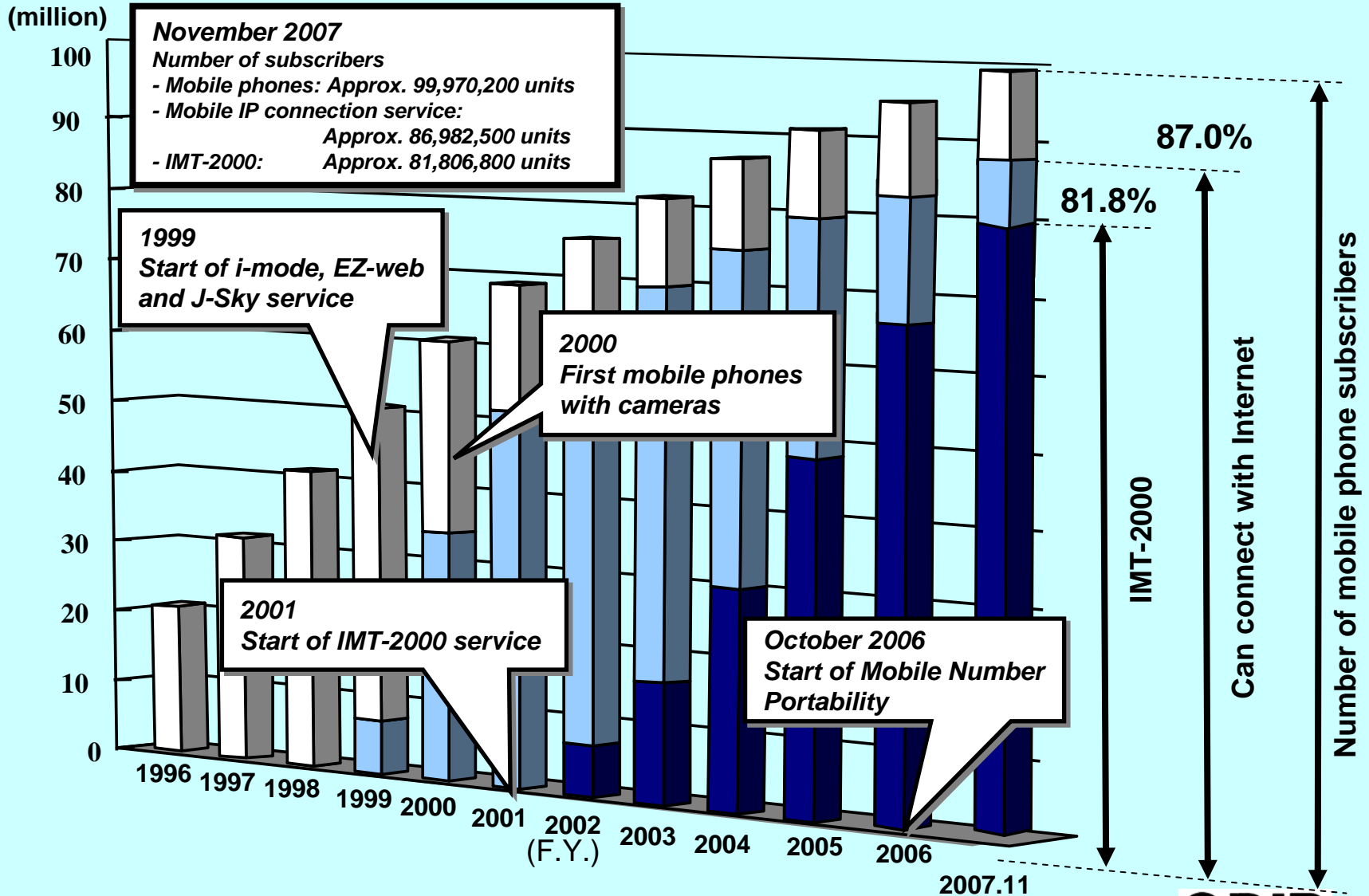
**ARIB**

# Outline of the Presentation

- ◆ ARIB's Activities on IMT-2000 and IMT-Advanced
- ◆ Recent Activities on IMT-Advanced in CJK-B3G WG and GSC meetings
- ◆ Collaboration works with WINNER Spectrum Team
- ◆ Concluding Remarks

# **ARIB's Activities on IMT-2000 and IMT-Advanced**

# Mobile phone subscribers in Japan

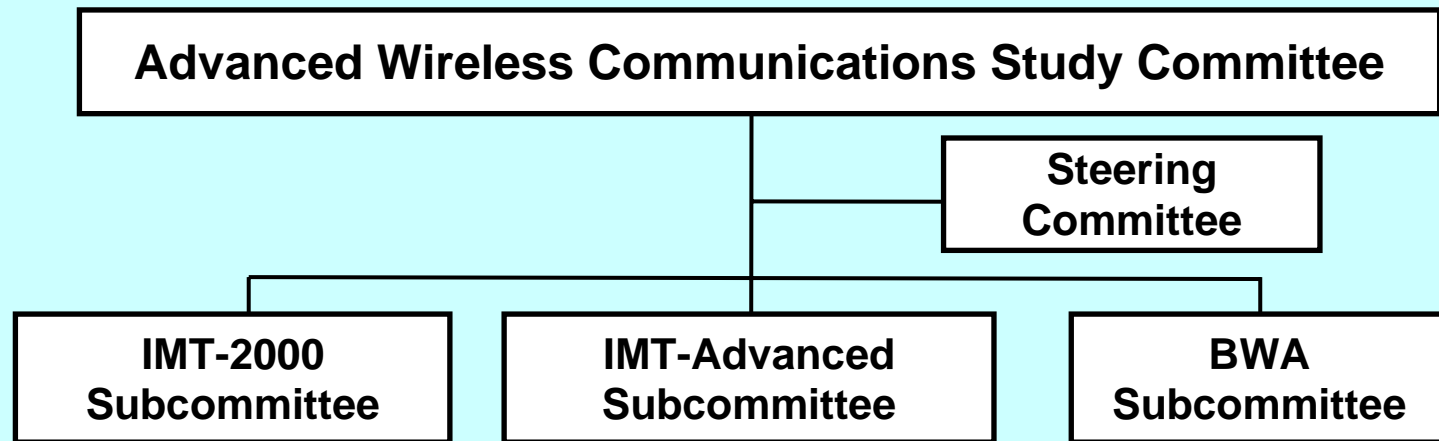


# Advanced Wireless Communications Study Committee

## ◆ Scope

- To perform the technical studies on advanced wireless communication systems in cooperation with other related international/domestic organizations
- To contribute to their international standardization activities

## ◆ Organization



*Committee was established in April 2006, through extending the scope of former IMT-2000 Study Committee*

# IMT-2000 Subcommittee

- ◆ **Operation of 3GPPs as one of an Organizational Partner**
- ◆ **Consideration and handling of ARIB contribution to 3GPPs on national regulatory requirements aspects**
- ◆ **Subcommittee members' activities support and information exchange in 3GPPs**
- ◆ **Downstream activities of the specification which is developed by 3GPPs for ARIB Standard**

# Organization of IMT-2000 Subcommittee

**IMT-2000 Subcommittee**

**3GPPs Evolution/Scope handling AdHoc**

**3GPPs Working Procedure AdHoc**

**Finance AdHoc (recess)**

**3GPP Meeting Invitation Group**

**3GPP-SA  
Support WG**

**3GPP-RAN  
Support WG**

**3GPP-CT  
Support WG**

**3GPP2  
Support WG**

**TSG-SA WGs  
Support AdHocs**

**TSG-RAN WGs  
Support AdHocs**

# Activities of IMT-2000 Subcommittee

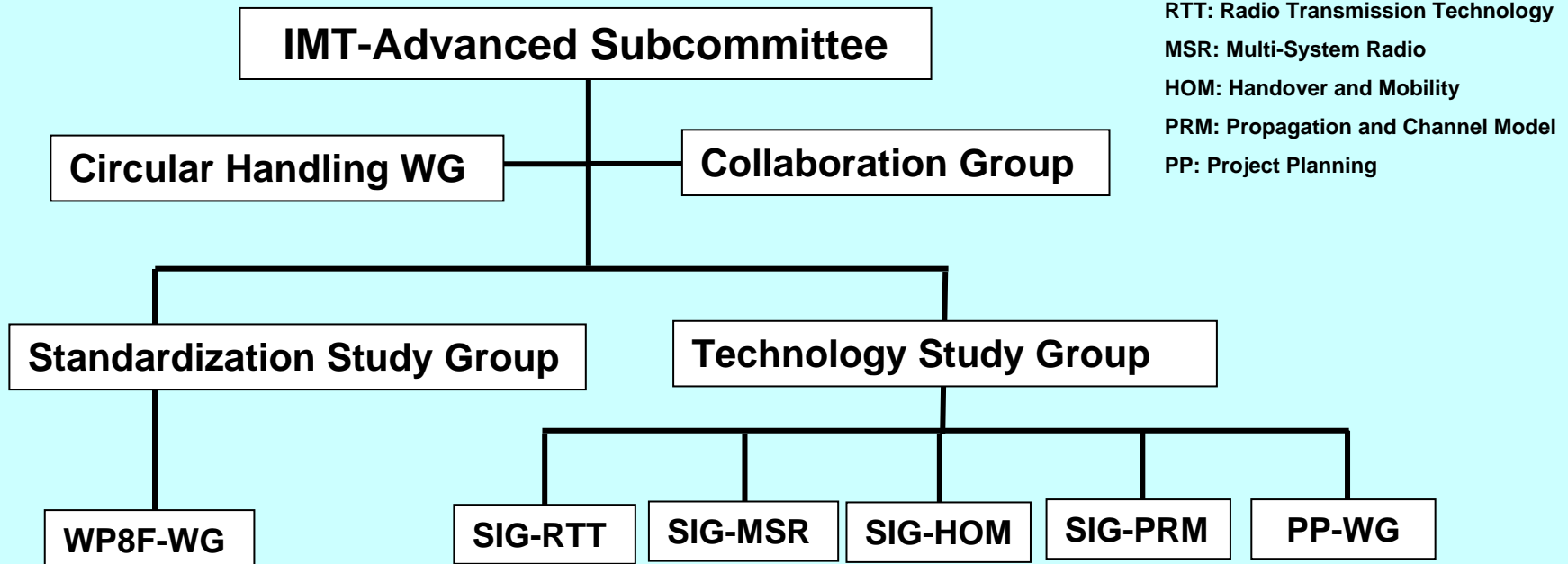
- ◆ Established TSG-RAN TDD Support AH in June 2006 to contribute on TDD national regulatory requirement
- ◆ Established TSG-CT Terminal Connector AH in May 2007 to revise ARIB TR on Terminal Connector( As indicated 3GPP TR-27.901, terminal connector is out of scope of 3GPP and could be standardized by national/regional SDO)
- ◆ ARIB STD-T63/TR-T12 has changed its name “IMT-2000 DS-CDMA System” to “IMT-2000 DS-CDMA and TDD-CDMA System” because of inclusion of TD-CDMA
- ◆ 3GPPs Evolution/Scope AH with Circular Handling WG in IMT-Advanced Subcommittee started discussion on possible extension of 3GPPs’ scopes

# IMT-Advanced Subcommittee

## ◆ Scope

- To conduct technical studies on IMT-Advanced
- To promote its standardization through contributions to ITU and other activities

## ◆ Organization



# Activities of IMT-Advanced Subcommittee (1/3)

## ◆ Standardization Study Group

- Preparation for ITU-R WP8F meeting

## ◆ Technology Study Group

- Succeed activities of System Sub-committee of 4th Generation Mobile Communications Committee, mITF
- Current main activities are studies, surveys and evaluation on element technologies

## ◆ Collaboration Group

- Conduct communication & collaboration with external related bodies
- Current main activities are CJK-B3G collaboration under the framework of cooperation among 4 SDOs

# Activities of IMT-Advanced Subcommittee (2/3)

## ◆ Circular Handling WG

- Studies how IMT-Advanced Subcommittee proceeds for the anticipated issuance of invitation circular
- With 3GPPs Evolution/Scope AH in IMT-2000 Subcommittee, WG started discussion on possible extension of 3GPPs' scopes

## ◆ PP (Project Planning)-WG

- Develop plan to communicate/collaborate with academia
- Communication/collaboration with academia

# Activities of IMT-Advanced Subcommittee (3/3)

## ◆ Special Interest Group (SIG)

### 1) SIG-RTT (Radio Transmission Technologies)

High-speed large-capacity transmission, Space division multiple access, Advanced adaptive array, Multi-hop Relay

### 2) SIG-MSR (Multi-System Radio)

End-to-end re-configurability, Multi-band RF, Multi-system antenna, Cognitive radio

### 3) SIG-HOM (Handover and Mobility)

Network layer mobility control, Upper Layer Mobility Seamless networking, Micro Mobility, Interworking

### 4) SIG-PRM (Propagation and Channel Model)

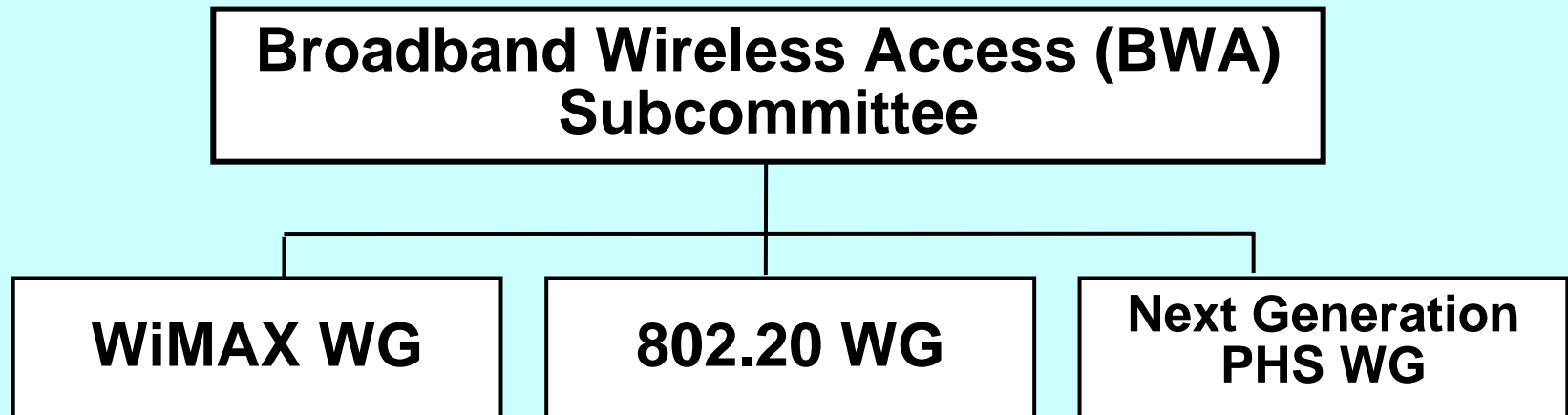
Study propagation model and channel model

# BWA Subcommittee

## ◆ Scope

- To study technologies on broadband wireless access (BWA) systems
- To standardize their technical specifications as ARIB Standards

## ◆ Organization



# Activities of BWA Subcommittee

## (1) WiMAX WG

- Aim for establishing ARIB technical standards for the WiMAX System
- Liaison with WiMAX Forum® is established
- Letter on reproduction of WiMAX Forum Documents is signed
- ARIB technical standard for the WiMAX System (ARIB STD-T94 Ver.1.0) to be established on 12<sup>th</sup> December 2007

## (2) 802.20WG

- Aim for establishing ARIB technical standards for the IEEE802.20 related System
- Liaison with IEEE802.20 is established
- Preparing to draft ARIB technical standards for the IEEE802.20 related System with reference to IEEE802.20 document

## (3) Next Generation PHS WG

- Aim for establishing ARIB technical standards for the Next Generation PHS System
- Liaison with PHS MoU Group is established
- Letter on reproduction of PHS MoU Group Documents is signed
- ARIB technical standard for the Next Generation PHS System (ARIB STD-T95 Ver.1.0) to be established on 12<sup>th</sup> December 2007

# Recent Activities on IMT-Advanced in CJK-B3G WG and GSC meetings

# CJK Standards Meeting

## ◆ Background

- Economic, technological, and social factors are highly pertinent among the three countries
- Play an important role in development of IT technologies & markets

## ◆ History

- MOU was signed by four SDOs (CCSA, ARIB, TTC and TTA) from three countries (China, Japan and Korea) in 7<sup>th</sup> November 2002
- Scope and objectives of collaboration have been defined

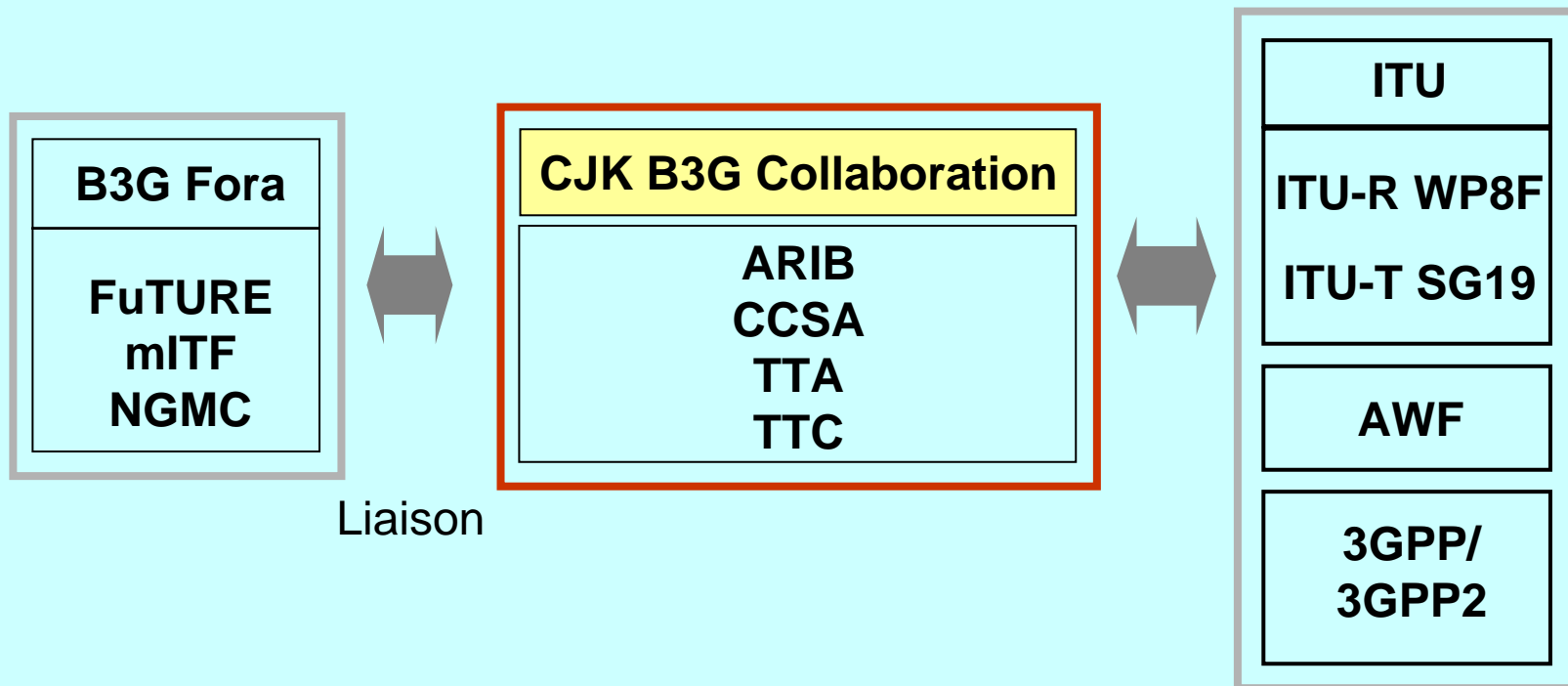
## ◆ Objectives

- To exchange views and information on the status of IT industries
- To monitor the developments of standards issues in IT fields within three countries
- To encourage mutual support and assistance
- To contribute to the regional and global standards bodies to contribute to the regional and global standards bodies

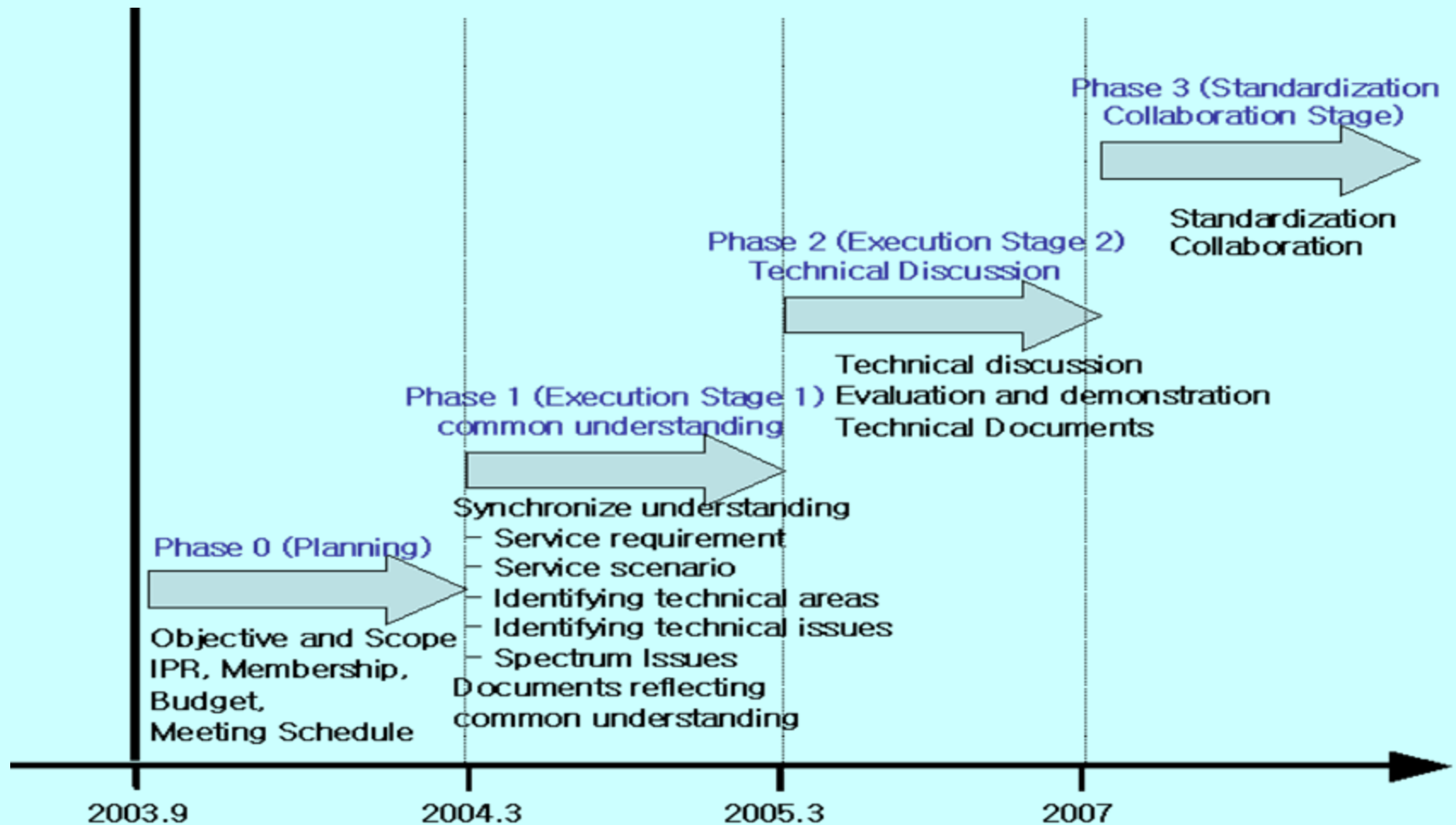
# CJK B3G Collaboration

## ◆ Objectives of CJK B3G Collaboration

- To mutually exchange views and information on 4G among the three countries
- To exchange research outcomes, and market/ policy issues of standardization
- To encourage mutual support and to cope with international standards issues



# CJK B3G Collaboration Framework (1/2)



# CJK B3G Collaboration Framework (2/2)

## ◆ Phase 2 (Technical Discussion Stage)

### Mission

- Drive **standards collaboration** among 3 country (China, Japan, Korea)

### Scope

- Collaboration in WP8F activity (service, market analysis, matters related spectrum, radio aspects)
- Joint research about system requirements & enabling technologies

### Deliverables

- Joint contributions to ITU-R WP8F, APT
- White papers about system requirements & enabling technologies of B3G

### Schedule

- Phase 2, Step 1 (2005.9 – 2006.6): solicit White Paper from SDO
- Phase 2, Step 2 ( 2006.7 – 2007.6): white paper consolidation

\*\*Decided at CJK 9<sup>th</sup> meeting (2005 9<sup>th</sup> of September, China)

# Activities on IMT-Advanced in GSC-12 held in Kobe/Japan in July 2007

## ◆ Issues Discussed:

- Presentation of the Status of ITU-R IMT Studies (gsc12\_open\_18)
- Presentation of TTA Standardization Status on B3G and WiBro (M-WiMAX) (gsc12\_open\_29)
- Presentation from ETSI on Continuing Co-operation on IMT Standardization - on the way to IMT Advanced - System Architecture Evolution (SAE) and Long-Term Evolution (LTE) (gsc12\_open\_41)
- Presentation of Evolution of TD-SCDMA Standard from CCSA (gsc12\_open\_49)
- Presentation of ARIB Activities on IMT-2000 and IMT-Advanced (gsc12\_open\_17)
- The existing joint resolution on IMT Standardization was discussed and a drafting group was assigned to the revision (GSC-11/01)

## ◆ Main Outcome:

- Activities on enhancement of IMT-2000 and Systems Beyond IMT-200 were active in ITU and in each PSO
  - Standardization activities on systems beyond IMT-2000 were updated in ITU-R WP8F
- ◆ Resolution on “Continuing Cooperation on IMT Standardization” was revised on the basis of discussions in the drafting group (gsc12\_closing\_13r1)
- ◆ Maintained as High Interest Subject for GSC-13; ARIB remains Prime PSO
- ◆ All documents in GSC-12 are available in [http://www.gsc.etsi.org/GSC\\_12.htm](http://www.gsc.etsi.org/GSC_12.htm)

# ARIB's Proposal to update Resolution GSC-11/01

Considering recent activities in ITU-R WP8F on IMT-Advanced, Resolution GSC-11/01 (Continuing Cooperation on IMT Standardization) should be updated as follows:

- ***To encourage exchanging information and views on candidate radio interface technologies for IMT-Advanced in GSC meeting***
- ***To create a GRSC Task Force on this topic in order to facilitate above activities***

# RESOLUTION GSC-12/01: (Opening) Continuing Cooperation on IMT Standardization (Revised)

The 12th Global Standards Collaboration meeting ([Kobe, 2007](#))

## **Recognizing:**

- a) that ITU-R Working Party 8F and ITU-T SG19 are studying “Systems Beyond IMT 2000.” ITU-R produced spectrum, market and services-related recommendation(s) and report(s) in preparation for the World Radiocommunication Conference 2007 (WRC-07), and will invite candidate radio interface technologies for IMT-Advanced and subsequently produce recommendations;
- b) that core network(s) are increasingly becoming access technology agnostic;
- c) that it is expected that ITU-R will agree on the name of “IMT-Advanced” for “Systems Beyond IMT-2000,” in advance of WRC-07 (Resolution 228 (Rev. WRC-03));
- d) that IMT and other rapidly emerging wireless broadband access technologies will make high-speed wireless access services available where this was not previously possible, thereby enabling access to advanced telecommunication, computing and entertainment services and capabilities, not only for urban but also for rural and other low density environments;
- e) that work on evolution of the radio technologies may converge to use similar techniques; and
- f) that there are related international, regional and national research activities in this area.

## **Resolves:**

- 1) to encourage 3GPP, 3GPP2, Participating Standards Organizations (PSOs) and others ([e.g. IEEE](#)) to continue to work on enhancing the IMT standards as an essential part of future telecommunication, computing and entertainment standards;
- 2) to encourage the harmonization of candidate proposals for the radio transmission technologies for IMT and related networking standards;
- 3) to invite 3GPP, 3GPP2, PSOs and others to take care of the evolution of the current systems and the long-term evolution for such systems taking into account copyrights, working procedures, IPR aspects etc. and report to the next meeting for review; and
- 4) to exchange information and views on candidate radio interface technologies for IMT-Advanced among PSOs allowing for efficient, effective and timely development of the IMT-Advanced standard;
- 5) to create a Task Force under the GRSC to be available to exchange information and views mentioned in 4), if needed; and
- 6) to review this Resolution at future GSC meetings as required.

# Collaboration Works with WINNER Spectrum Team

# Collaboration Works with WINNER Spectrum Team (1)

- ◆ mITF started its own activity on the spectrum calculation methodology in 2003,
- ◆ mITF established Ad-Hoc methodology under the supervision of Prof. Hideaki Takagi, Tukuba-Univ.
  - One of the Queuing Theory Experts of worldwide recognition, in Japan
- ◆ **“Historical” collaboration started in September, 2003 , Berlin**
- ◆ However, there were a number of disagreements between us **at its initial stage**
  - both technically and procedurally

# Collaboration Works with WINNER Spectrum Team (2)

- ◆ The collaboration went into good and friendly atmosphere, through many teleconferences and F2F meetings,
- ◆ Spectrum calculation methodologies;
  - **Packet based services:**  
M/G/1 preemptive priority queuing model  
by IST-WINNER Spectrum Team headed by **Prof. Walke, RWTH**
  - **Circuit Switched services:**  
Multi-dimensional Erlang-B model  
by mITF Methodology Group headed by **Prof. Takagi, Tsukuba Univ.**
  - Refinement of the methodology through positive interactions between WINNER and mITF experts,
- ◆ **Great accomplishment:**  
**Recommendation ITU-R M.1768 (Methodology)**, which was base for WRC-07 spectrum identification
- ◆ **Acknowledgement:**  
Many thanks to Dr. Werner Mohr for his kind and generous support for the collaboration between IST-WINNER and mITF.

# Collaboration Works with WINNER Spectrum Team (3)

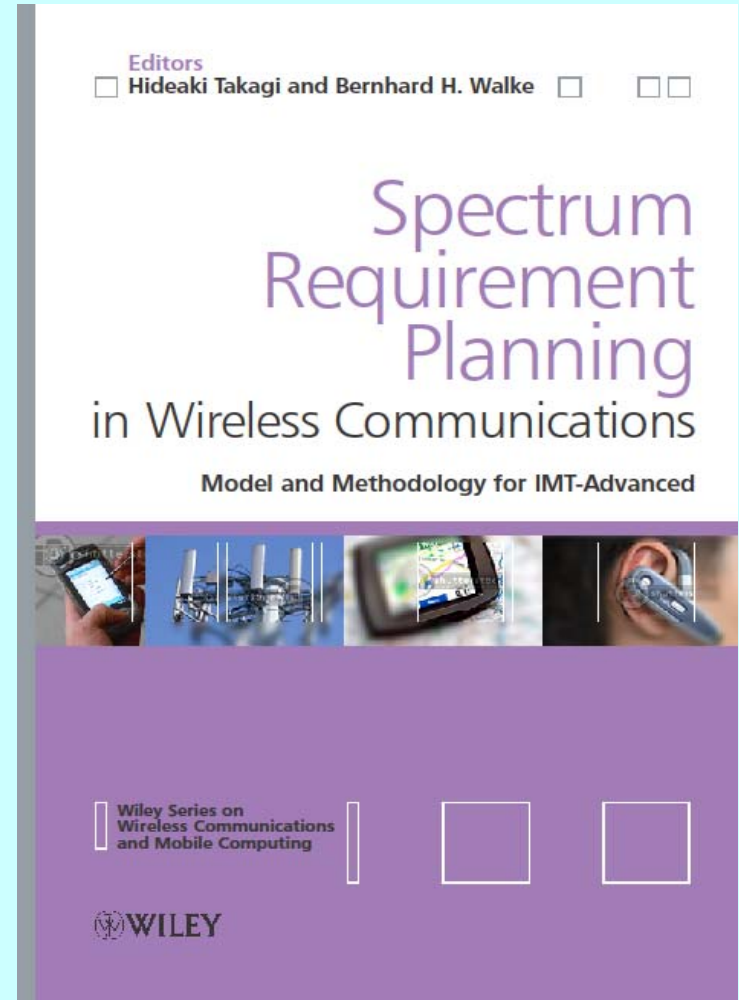
## ◆ Extra Achievements:

### ✓ Degrees through this work:

- Doctorial degrees awarded to Mitsuhiro Azuma (2007, Univ. Tsukuba) and Tim Irnich (2008, RWTH);
- Licentiate degree to Marja Matinmikko (2007)

### ✓ A book on the methodology, co-authored by IST-WINNER and mITF colleagues, to be published soon from WILEY...

*\* Design of the book cover may be subject to change by various factors*



# Concluding Remarks

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- ◆ **IMT-Advanced system, which create an ultra fast-speed mobile Internet environment and enables seamless communications services, holds the key to realize a world's leading mobile IT environment.**
- ◆ **To achieve this goal, it is strongly required to promote research and development activities capitalizing on technologies and knowledge accumulated in various areas.**
- ◆ **To facilitate the R&D and standardization of IMT-Advanced systems and services in a smooth and efficient manner, it is indispensable for the concerned parties to work closely with one another, so that they can share information, and promote R&D and standardization activities.**

**Thank you for your kind attention!**

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