

ITU Radiocommunication Assembly (RA-07) Report

We report the main results and the summary of deliberations of the ITU Radiocommunication Assembly that was held in Geneva, Switzerland from October 15 to 19, 2007.

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1. Introduction

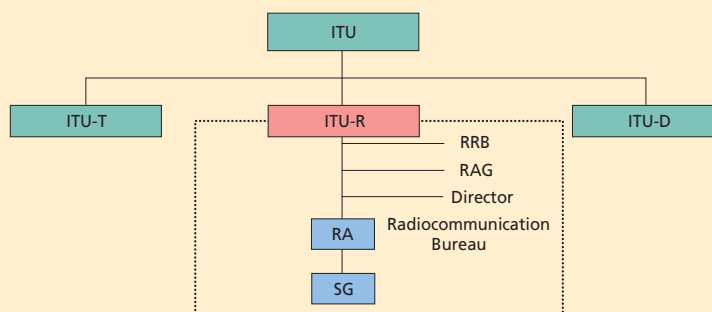
The International Telecommunication Union (ITU) is the leading United Nations agency for telecommunication technologies. The role of the ITU Radiocommunication sector (ITU-R) includes revising the Radio Regulations (RR), which is an international law, studying issues in radio communication technology and operations,

drafting Recommendations and registering radio frequency assignments.

The Radiocommunication Assembly (RA) is a general meeting of ITU-R (**Figure 1**) that is usually held every three or four years to review the structure of the ITU-R Study Groups (SGs), approve the appointments of the SG Chairman and Vice Chairmen, approve Resolutions and Recommendations, approve Questions to be studied for the

next study period, and review the working methods. In particular, the technological development and convergence in radio communication in recent years has made efficient research difficult to achieve under the existing SGs structure. Therefore, SG restructuring was discussed as a major topic at the Radiocommunication Assembly 2007 (RA-07).

RA-07 was attended by more than



ITU-D: ITU Telecommunication Development Sector
 ITU-T: ITU Telecommunication Standardization Sector
 RAG: Radio Advisory Group
 RRB: Radio Regulations Board

Figure 1 Structure of ITU-R

500 delegates (30 from Japan) from about 100 administrations and regional organizations. NTT DoCoMo sent Akira Hashimoto, Managing Director of the Wireless Technology Standardization Department and the three authors as the delegation of Japan.

2. SG Structure for the Next Study Period (2008-2011)

Studies in ITU-R are conducted for Questions decided at RA within SGs that are established on the basis of study topics.

At RA-07, a restructuring of SGs was discussed because new technological developments had made SGs activities inefficient under the existing structure. In particular, systems that belong to both the mobile and fixed

services, such as Broadband Wireless Access (BWA) systems^{*1}, have begun to appear, so there was discussion of restructuring the SGs in which the key issue was merging SG8 and SG9 into one SG. The result was an agreement on a structure that has a total of six SGs, revising the previous SGs structure by changing the scope of SG6 (terrestrial and satellite broadcasting services), SG4 (fixed satellite service), SG8 (mobile service and others) and SG9 (fixed service), and recombining them into SG5 for dealing with terrestrial services and SG4 for dealing with satellite services (Figure 2) [1].

Together with the SGs restructuring, the Chairman and Vice Chairmen of each SG for the next study period were appointed, and Akira Hashimoto

was selected as the Chairman of SG5. Under this revised SG structure, studies on International Mobile Telecommunications (IMT) which involves the Third and Fourth- Generation mobile communication systems^{*2}, will now be conducted by SG5. SG5 will also conduct studies on the mobile service, the fixed service, communication for disaster relief and amateur radio, giving SG5 a very broad responsibility in terms of work and fields of study.

3. Approval of Resolutions and Recommendations

Following the decision on the SG structure described in Chapter 2, the Resolutions and Recommendations regarding the Third and Fourth- Generation mobile communication systems

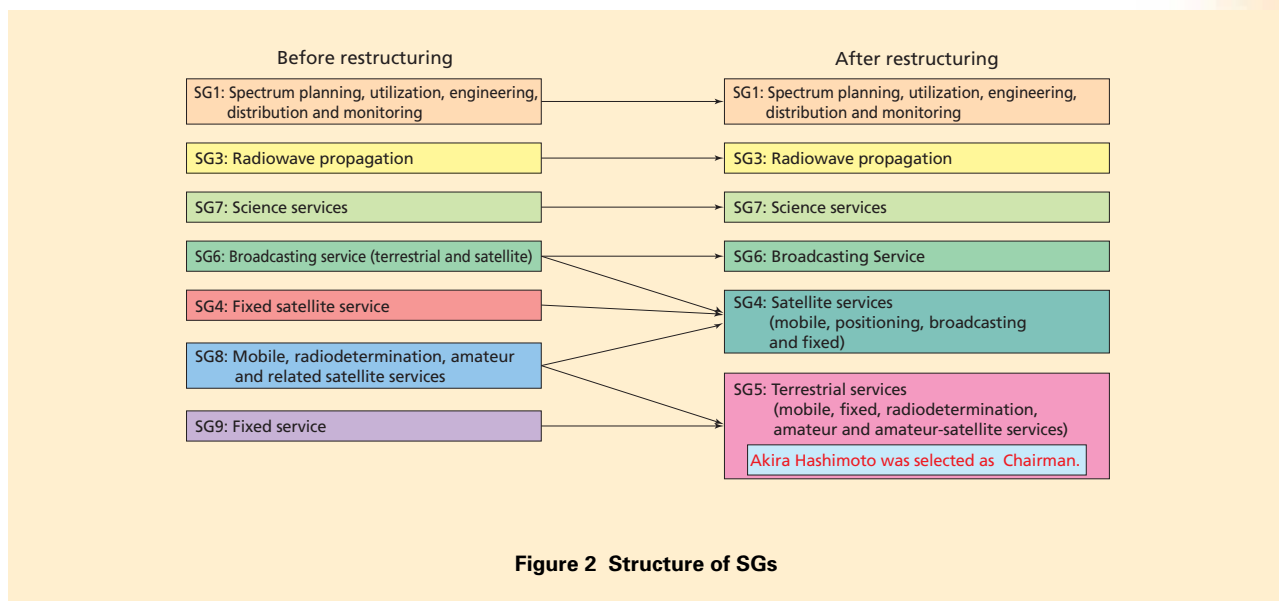


Figure 2 Structure of SGs

*1 **BWA system:** Defined as a wireless broadband system that has certain mobility and recognized as an intermediate system between Wireless LAN and cellular phone systems, or a system that covers both.

*2 **Fourth-Generation mobile communication system:** Systems beyond the Third-Generation mobile communication system (IMT-2000), which are referred to as IMT-Advanced in ITU-R. The target transmitting rates are 100 Mbit/s for high mobility envi-

ronments and 1 Gbit/s for static or low mobility environments.

were discussed and approved.

3.1 New Resolution on the Naming for IMT

The new Resolution (Resolution ITU-R 56[2]), which resolves that the term “IMT-2000” encompasses IMT-2000, Enhanced IMT-2000 and future development of IMT-2000, the term “IMT-Advanced” is applied to systems beyond IMT-2000 (i.e., the Fourth-Generation mobile communication system), and the root name “IMT” encompasses both IMT-2000 and IMT-Advanced, was approved. The target peak data rates and mobility speeds of those systems are illustrated in Recommendation ITU-R M.1645[3]

as “Van diagram” and which is shown in **Figure 3**.

3.2 New Resolution on the Principles for the Development Process of IMT-Advanced

The proposed new Resolution regarding the principles for the development process of IMT-Advanced (Resolution ITU-R 57[4]) was also approved. Provisions in that Resolution include development of the Recommendations for radio interface specifications for IMT-Advanced, taking into account the results of studies external to ITU-R, studying radio interface specifications based on submissions from Member States, and

processes for developing Recommendations. Hereafter SG5 is expected to accelerate IMT-Advanced radio interface standardization taking this Resolution into consideration while cooperating with relevant standardization organizations external to ITU. The tentative schedule for standardization work is listed below.

- 2008-2010: Proposal of candidate radio interference technology and evaluation of the proposal
- The end of 2010: Completion of standardization work in the Working Group
- About 2011: Drafting of the Recommendation

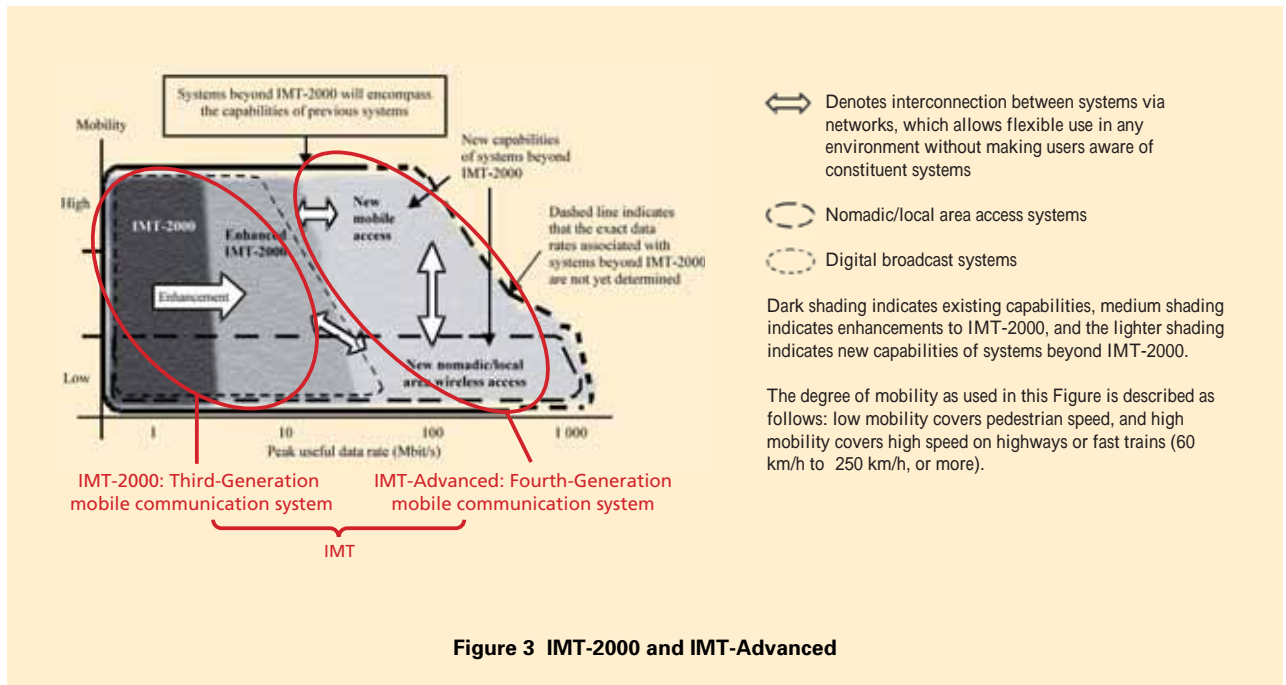


Figure 3 IMT-2000 and IMT-Advanced

3.3 Revision of Recommendation Concerning IMT-2000 Detailed Radio Interface Specifications (Recommendation ITU-R M.1457)

In Recommendation ITU-R M.1457[5], the five specifications shown in **Table 1** (1) to (5) are recommended for the IMT-2000 radio interface.

The proposed revision of that Recommendation submitted to RA-07 included the revision of the existing five specifications for the IMT-2000 radio interface and the addition of IMT-2000 Orthogonal Frequency Division Multiple Access Time Division Duplex Wireless Metropolitan Area Network (IMT-2000 OFDMA TDD WMAN), which is generally known as Mobile Worldwide interoperability for Microwave Access (WiMAX), as a new IMT-2000 radio interface. Prior to RA-07, the proposed revision had been discussed in SG8 (in the previous structure) and Working Party 8F (WP8F), which is subordinate to SG8. However, China and others opposed the addition of Mobile WiMAX to this Recommendation as not satisfying the minimum requirements of the IMT-2000 radio interface. No agreement was reached in the SG8 and WP8F and the conclusion was to carry the issue forward to RA-07. At RA-07, there was also controversy

Table 1 IMT-2000 radio interfaces

	Naming in Recommendation ITU-R M.1457	Common name	Comments
(1)	IMT-2000 CDMA Direct Spread	W-CDMA	Introduced by NTT DoCoMo Inc., Softbank Mobile Corp. and EMOBILE Ltd.
(2)	IMT-2000 CDMA Multi-Carrier	cdma2000	Introduced by KDDI Corp.
(3)	IMT-2000 CDMA TDD	TD-CDMA TD-SCDMA	
(4)	IMT-2000 TDMA Single-Carrier	EDGE	
(5)	IMT-2000 FDMA/TDMA	DECT	
(6)	IMT-2000 OFDMA TDD WMAN	Mobile WiMAX	Added in RA-07

cdma2000: Code Division Multiple Access 2000
 DECT: Digital Enhanced Cordless Telecommunications
 EDGE: Enhanced Data GSM Environment
 FDMA: Frequency Division Multiple Access
 TDMA: Time Division Multiple Access
 TD-CDMA: Time Division-CDMA
 TD-SCDMA: Time Division-Synchronous CDMA

between the countries that supported the addition of Mobile WiMAX and those that opposed it, but finally the proposed revision was approved with a footnote stating that “The Chinese Administration objects to the adoption of the draft revision of Recommendation ITU-R M.1457 by this Assembly” in order to reflect the continuing concern expressed by China.

4. Approval of Questions

The Questions proposed by each SG at RA-07 (including continued Questions and revised Questions) were discussed, and more than 300 were approved. Of those SG5 is responsible for 62 Questions, including those related to IMT-2000 and IMT-Advanced, and those related to software defined radios^{*3} and cognitive radio systems^{*4}.

5. Conclusion

We reported the main results and the summary of deliberations of RA-07, which was held in Geneva, Switzerland.

NTT DoCoMo has been a driving force in R&D of the Fourth-Generation mobile communication system (IMT-Advanced), and has already succeeded in a field experiment for packet transmission in the downlink of up to 5 Gbit/s in an outdoor environment[6]. We will also continue to promote discussion of standardization of the IMT-Advanced radio interface in ITU-R to further strengthen momentum for practical application of the Fourth-Generation mobile communication system.

*3 **Software defined radio:** Radio communication in which the RF operating parameters including, frequency range, modulation type, or output power can be set or altered by software, and/ or the technique by which this is achieved.

*4 **Cognitive radio system:** Radio communication in which the optimum frequency and communication systems are selected according to the radio wave environment. There is no fixed definition, however, and the definition of “cognitive radio systems” is included in a

Question of ITU-R.

REFERENCES

- [1] Resolution ITU-R 4-5: "Structure of Radiocommunication Study Groups"
- [2] Resolution ITU-R 56: "Naming for International Mobile Telecommunications"
- [3] ITU-R: "Framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000," Recommendation ITU-R M.1645, 2003.
- [4] Resolution ITU-R 57: "Principles for the process of development of IMT-Advanced"
- [5] ITU-R: "Detailed Specifications of the Radio Interfaces of International Mobile Telecommunications-2000 (IMT-2000)," Recommendation ITU-R M.1457, 2007.
- [6] H. Taoka et. al: "Field Experiments on 5-Gbit/s Ultra-high-speed Packet Transmission Using MIMO Multiplexing in

Broadband Packet Radio Access,"
NTT DoCoMo Technical Journal, Vol. 9,

No. 2, pp. 25-31, Sep. 2007.

Election to Chairman of ITU-R SG5

Interest was high in all participating countries concerning the position of ITU-R SG5 Chairman, and several countries including Japan sent candidates for the position. Finally, Akira Hashimoto, Managing Director of the NTT DoCoMo Wireless Technology Standardization Department and recommended by Japan, was selected. Until now, the Chairman of this SG (formerly SG8), which is responsible for the mobile service, has been selected from Europe. Japan's technology level in radio communications and long-term contribution to ITU-R has been highly praised around world and has resulted in the selection of an SG5 Chairman from Japan.



Akira Hashimoto