Standardization Status of IMT-2000 & Systems Beyond
– ITU-R Geneva CPM and APG Tokyo Meeting –

Technical studies have been made on the future development of IMT-2000 and systems beyond IMT-2000, mainly by SG8 and WP8F of the ITU-R. In response to their study results, ITU-R held a CPM in November 2002 to create a Report to be submitted to WRC-03. In addition, a WRC preparatory meeting was held in February 2003 in the Asia Pacific region, at the auspices of APT.

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1. Introduction

The World Radiocommunication Conference (WRC) is an international conference that considers revisions to Radio Regulations (RR), which complements the Constitution and the Convention of the International Telecommunication Union. The Conference has met once every two to three years. The results of studies on the requirements of the future development of the Third-Generation (3G) mobile communication system (International Mobile Telecommunications-2000, IMT-2000) and systems beyond IMT-2000 (including the Fourth-Generation (4G) mobile communication systems) are scheduled to be reported at WRC-03 as Agenda Item 1.22, in accordance with Resolution 228 of WRC-2000, held in Istanbul. At WRC-03, the decision on whether or not to consider frequency-related matters at WRC-07 will also be made, taking into consideration progress in technical studies made by the International Telecommunication Union-Radiocommunication sector (ITU-R). Over the past three years, ITU-R Working Party 8F (WP8F) has conducted technical studies on the future development of IMT-2000 and systems beyond IMT-2000 in response to the resolu-tion of WRC-2000, and compiled a draft vision recommen-dation based on the results [1]. Furthermore, WP8F has created a draft text for the Report of a WRC Conference Preparatory Meeting (CPM) in line with the agreed-upon ITU visions.

The draft Report was reviewed at the Geneva Conference of CPM02-2, and approved as the final CPM Report to be forwarded to WRC-03.

In preparation for WRC-03, regional conference preparatory meetings are being held individually in such regions as Asia-Pacific, Europe, Inter-America, Arab, Africa, and Russia. In the Asia-Pacific region, Asia-Pacific Telecommunity (APT) has held five WRC preparatory group meetings (APT conference Preparatory Group meet-ings, or APGs) over a period of two and a half years. At the APG2003-5, convened in Tokyo, the final common pro-posals to WRC-03 were drafted.

In this article, the preparations status toward WRC-03 will be described with emphasis on the major discussion results of CPM-02-2 Geneva meeting and those of APG2003-5 Tokyo meeting.

2. CPM Meetings and APG Meetings – Chronological Overview

Figure 1 shows the position of CPMs and that of APG meetings. CPMs are held twice between two consecutive WRCs. CPM02-1, which was the initial CPM, was convened in Istanbul in June 2000, immediately following WRC-2000. At CPM02-1, technical studies required for the agenda for the next WRC were assigned to ITU-R Study Groups (SGs), WPs, and Task Groups (TGs). WRC-03 Agenda Item 1.22, which pertains to the future development of IMT-2000 and systems beyond IMT-2000, was assigned to WP8F, which is under ITU-R Study Group 8 (SG8). Also at this meeting, a decision was made on the chapter structure of the CPM Report to be developed, and a Rapporteur (a person responsible for coordination) for each chapter was appointed. Agenda Item 1.22 became a part of Chapter 7 of the CPM Report. Ms. V. Rawat of Canada became the Chapter Rapporteur for Chapter 7. Subsequent studies on the future development of IMT-2000 and systems beyond IMT-

2000 were conducted by ITU-R WP8F, and the results were submitted to the Chapter Rapporteur in May 2002 as a draft text of CPM Report. Based on the draft texts compiled by Rapporteurs of individual chapters, a draft CPM Report was developed and submitted to CPM02-2, which was the second meeting. At CPM02-2, held in November 2002 in Geneva, further proposals that were submitted by various countries were added to the draft CPM Report thus developed, and the finalized CPM Report was produced. Major results of CPM02-2 will be discussed in Chapter 3 of this article.

Parallel to above-mentioned preparatory work toward WRC-03 within ITU-R, preparatory meetings are being held in various regions in order to produce regional common proposals for WRC-03. In the Asia-Pacific region, APT has convened APG meetings to consolidate views within the region and develop final APT common proposals. **Table 1** shows how APT has worked on the preparation work toward WRC-03. The initial preparatory meeting of APT for WRC-03 (APG2003-1) was held in September 2000 in Bangkok, Thailand. At the meeting, WRC-2000 results were reviewed, and APT organization was
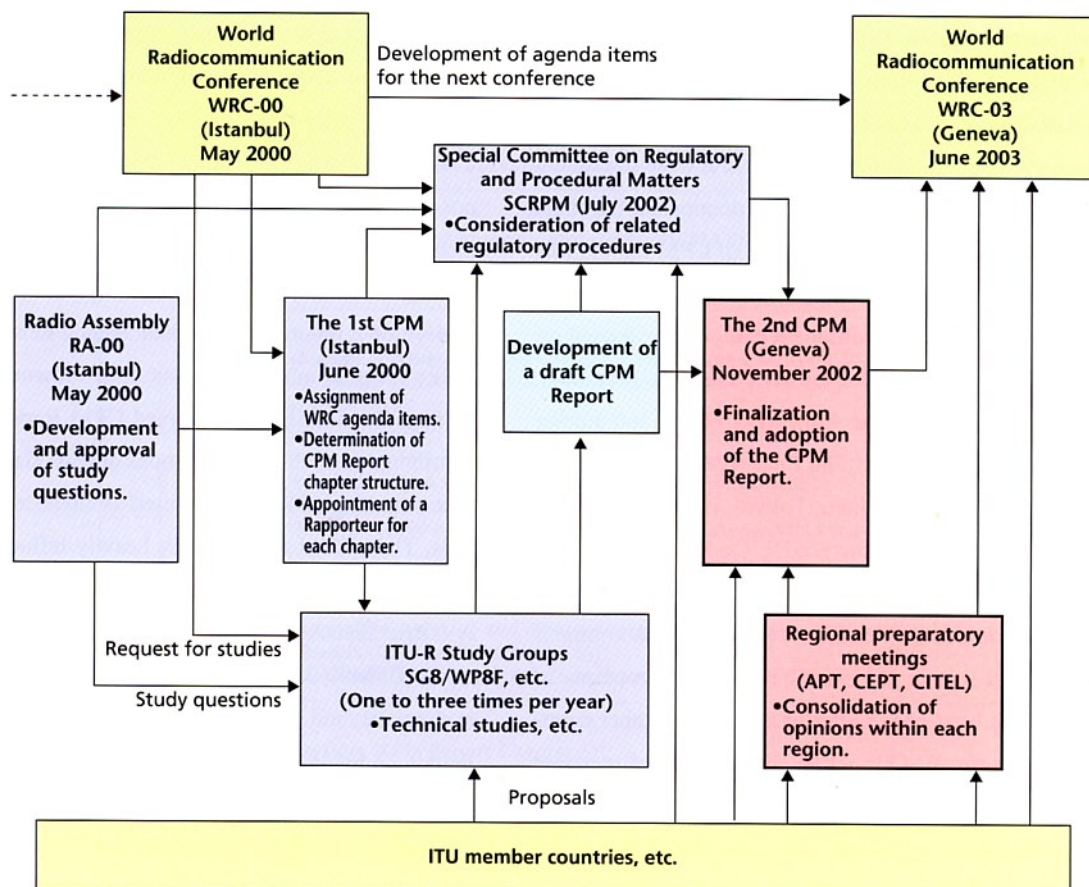

Figure 1 CPM and APG meetings

Table 1 APT preparatory meetings for WRC-2003

Meeting	Period	Venue	Number of participants	Main objectives
APG2003-1	Sept. 4–7, 2000	Bangkok, Thailand	125	Review of the results of WRC-2000, and establishment of a meeting structure for WRC-03.
APG2003-2	Jun. 4–7, 2001	Bangkok, Thailand	230	Development of APT preliminary views/proposals.
APG2003-3	Jun. 10–15, 2002	Bangkok, Thailand	236	Modification to preliminary APT views. Preparatory work for SCRPM.
APG2003-4	Aug. 26–31, 2002	Busan, Korea	259	Modification to preliminary APT views. Preparatory work for CPM02-2. Development of approval procedures for APT common proposals.
APG2003-5	Feb. 19–25, 2003	Tokyo, Japan	371	Development of Preliminary APT Common Proposals (PACPs). Establishment of coordination structure for WRC-03.

constructed in preparation for WRC-03. At the APG2003-2 meeting, held the following year, preliminary views of APT regarding individual WRC-03 agenda items and preliminary common proposals were developed. More serious work toward building an APT common proposal to be submitted at WRC-03 commenced at the APG2003-3 meeting, held in Bangkok. At this meeting, discussions were held also on the Special Committee on Regulatory and Procedural Matters (SCRPM), which met in July 2002. SCRPM is a committee which studies regulatory and procedural matters relating to the WRC-03 agenda. The results of the SCRPM discussions were also reviewed at CPM02-2. At APG2003-4, held in Busan, modifications to the APT preliminary views and action on CPM02-2 were discussed. Regarding Agenda Item 1.22, APT's opinion on the draft texts for Chapters 7.2 and 7.3 of the draft CPM Report was consolidated, and submitted to CPM02-2 as the common proposal of APT [2]. In addition, debate was conducted on new approval procedures for the APT common proposals, which had been carried over from APG2003-2, and a basic consensus was reached [3]. The final APG meeting before WRC-03 was held in Shinjuku, Tokyo. At the APG2003-5 Tokyo meeting, Preliminary APT Common Proposals (PACPs) were developed. Furthermore, APT's views were consolidated as needed. PACPs are approved as common proposals, and sent to ITU as APT common proposals to WRC when at least one quarter of the APT member countries endorse the PACPs while the number of member countries who do not endorse them does not exceed one half the number of countries that endorse the PACPs. The results of the discussions held at the APG2003-5 Tokyo meeting will be explained in Chapter 4 of this article.

3. CPM02-2 Geneva Meeting

CPM02-2 was held in Geneva, Switzerland from November 18th through November 29th, 2002. Approximately 860 delegates from 88 countries participated in the latest meeting. 64 people (including eight from NTT DoCoMo) participated from Japan.

This CPM meeting was the last opportunity for member countries to exchange opinions and seek a possible consensus prior to WRC. The aim of the meeting was, however, not to reach a final consensus but rather to clarify the points of disputes on individual agenda items and just to make preparations for the upcoming WRC. Consequently, the approved CPM report presents several possible solutions to each of the agenda items, accompanied by a description of the advantages and disadvantages of each proposed solution. In other words, CPMs are held to develop a report on individual agenda items, which provides national administrations with information to help them make decisions. Approved CPM Reports are to be distributed to such administrations at least six months prior to the opening of WRC to be used as advance review materials. Thus, CPM Reports may heavily influence the decisions of administrations although the Reports do not directly restrict discussions at WRC.

At CPM02-2, the future development of IMT-2000 and systems beyond IMT-2000 were discussed under Agenda Item 1.22 for WRC-03. Agenda Item 1.22 for WRC-03 is "to consider progress of ITU-R studies concerning future development of IMT-2000 and systems beyond IMT-2000" [4]. At WRC-03, progress of studies conducted by ITU-R over the past three years will be considered under this

agenda item. In addition, decision will be made on whether or not a new agenda item should be included in the WRC-07 agenda for spectrum identification for the future development of IMT-2000 and systems beyond IMT-2000.

Figure 2 shows the structure of the latest CPM. Deliberation of Agenda Item 1.22 was conducted by Working Group 7 (WG7). WG7 discussed the content of Chapter 7 of the CPM Report based on the results of ITU-R studies. Japan was responsible for Agenda Item 1.22 as the representative of APT. APT's proposal requested a consideration on spectrum requirements and associated matters of systems beyond IMT-2000 at WRC-07. Furthermore, APT has sought to have eliminated from draft CPM Report a description of inter-relationship between Agenda Item 1.22, which APT is promoting, and Agenda Item 1.21 (studies on Terrestrial Wireless Interactive Multimedia applications), which is a separate WRC-03 agenda item. APT's position is that the two agenda items are fundamentally different and that they should be discussed separately in light of the results of technical studies by ITU-R. APT urged the

draft CPM Report to be amended so as to reflect the results of technical studies that accord with the draft Vision Recommendation [1] that was made by ITU-R WP8F. Furthermore, APT proposed draft revisions, maintaining that the above-described assertions should be reflected in the amendment to Resolution 228.

The European Conference of Postal and Telecommunications Administrations (CEPT) proposal is similar to APT's in that it suggests that the results of technical studies that accord with the draft Vision Recommendation that was agreed upon by ITU-R WP8F be reflected on the CPM Report. Europe also favored the draft revision to Resolution 228. Europe, however, seems to be more interested in spectrum consideration for the future development of IMT-2000 than in consideration on systems beyond IMT-2000.

Adding to these regional common proposals, Germany asserted that it is necessary to pay close attention to trends in the mobile communications market in frequency consideration. France made a proposal that emphasized the compatibility and
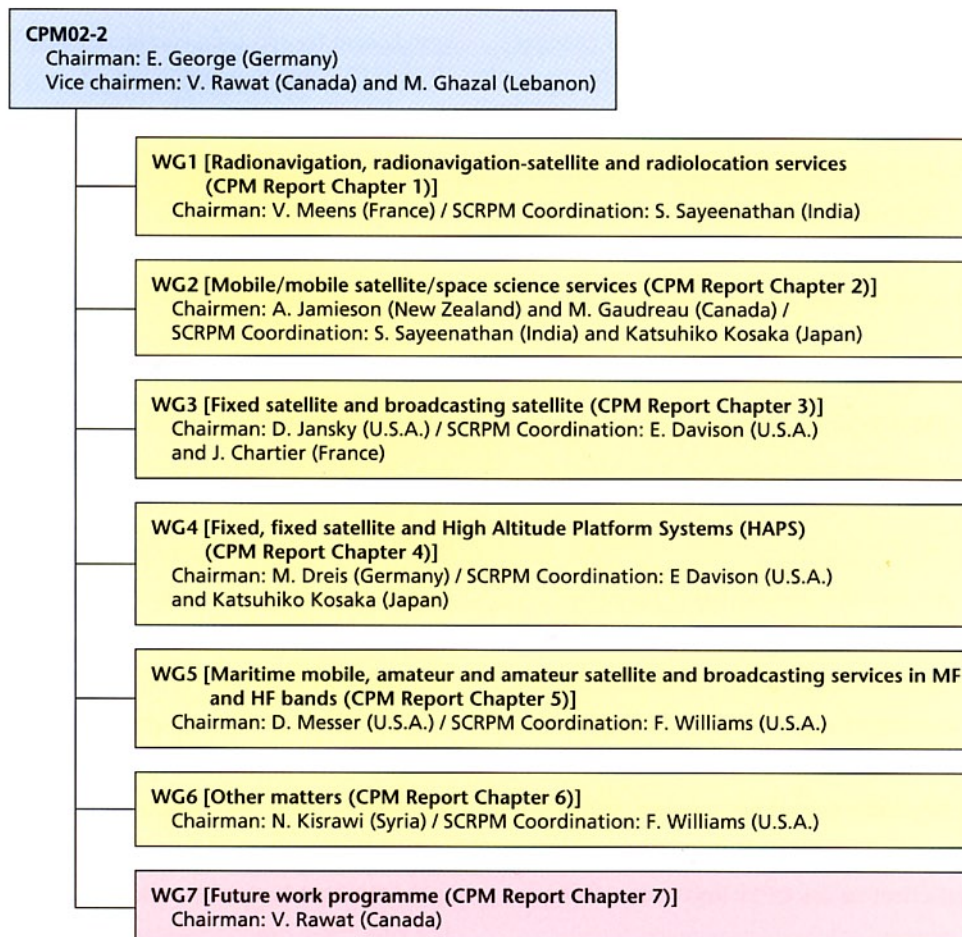
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CPM02-2
   Chairman: E. George (Germany)
   Vice chairmen: V. Rawat (Canada) and M. Ghazal (Lebanon)

   WG1 [Radionavigation, radionavigation-satellite and radiolocation services
        (CPM Report Chapter 1)]
        Chairman: V. Meens (France) / SCRPM Coordination: S. Sayeenathan (India)

   WG2 [Mobile/mobile satellite/space science services (CPM Report Chapter 2)]
        Chairmen: A. Jamieson (New Zealand) and M. Gaudreau (Canada) /
        SCRPM Coordination: S. Sayeenathan (India) and Katsuhiko Kosaka (Japan)

   WG3 [Fixed satellite and broadcasting satellite (CPM Report Chapter 3)]
        Chairman: D. Jansky (U.S.A.) / SCRPM Coordination: E. Davison (U.S.A.)
        and J. Chartier (France)

   WG4 [Fixed, fixed satellite and High Altitude Platform Systems (HAPS)
        (CPM Report Chapter 4)]
        Chairman: M. Dreis (Germany) / SCRPM Coordination: E Davison (U.S.A.)
        and Katsuhiko Kosaka (Japan)

   WG5 [Maritime mobile, amateur and amateur satellite and broadcasting services in MF
        and HF bands (CPM Report Chapter 5)]
        Chairman: D. Messer (U.S.A.) / SCRPM Coordination: F. Williams (U.S.A.)

   WG6 [Other matters (CPM Report Chapter 6)]
        Chairman: N. Kisrawi (Syria) / SCRPM Coordination: F. Williams (U.S.A.)

   WG7 [Future work programme (CPM Report Chapter 7)]
        Chairman: V. Rawat (Canada)
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Figure 2 CPM02-2 structure

continuity between IMT-2000 to be launched soon in Europe and future systems to be considered under Agenda Item 1.22. In this connection, France maintained the need for more appropriate naming of such terms as "future development of IMT-2000" and "systems beyond IMT-2000," which are currently used by ITU-R. On the other hand, Iran asserted that no frequency bands below 862 MHz should be considered, taking into account the current usage of existing services in its country.

At this meeting, discussions centered on the proposals of APT and those of CEPT. As a result, the description concerning the Agenda Item 1.22 was worded to give full support to the development of a new agenda item to review frequency-related matters at WRC-07. No major objections were raised to the proposals that address the inclusion of an additional new text in the CPM Report, relating to the results of technical studies by ITU-R. Consequently, an amendment was made to be consistent with the draft Vision Recommendation of ITU-R. Furthermore, an agreement was reached on deleting the part that describes the inter-relationship with agenda item 1.21. These changes were consistent with the views of Japan wishing actively to promote Agenda Item 1.22.

As the discussions headed in the direction of positive consideration of frequency matters at WRC-07, the U.S. asserted that as a general comment, studies on frequency sharing with existing services in the potential frequency bands should be duly conducted when considering new frequency bands for the future development of IMT-2000 and systems beyond IMT-2000. Following the discussions, an agreement was reached on the wording of the modification to Resolution 228, incorporating the opinions of APT, CEPT and the U.S.

Regarding the naming issues that were raised by France, all countries agreed on the importance of more appropriate naming. However, some held a view that the discussion on naming changes at CPMs would not be appropriate. As a result, an agreement was reached on having ITU-R WP8F study the proper naming, following WRC-03. An agreement was also reached on adding a statement to that effect in the CPM Report as a footnote [5].

CPM Reports typically contain diverse opinions. As far as Agenda Item 1.22 was concerned, however, no objection was raised against creating a new agenda item to consider frequency-related matters at WRC-07.

4. APG Tokyo Meeting

APG2003-05 Tokyo meeting was the final preparatory meeting of APT prior to WRC-03. It was held in Shinjuku, Tokyo from February 19 to February 25, 2003. Approximately 370 people from 25 member countries attended the meeting. 130 people participated from Japan (including seven from NTT DoCoMo). **Figure 3** shows the structure of the Tokyo meeting. The new agenda item concerning the future development of IMT-2000 and systems beyond IMT-2000 was considered by Working Party 1 (WP1).

Figure 4 shows the structure of WP1. Discussions on the future development of IMT-2000 and systems beyond IMT-2000 have two facets. One is that of WRC-03 Agenda Item 1.22, whose objectives are to review the progress of studies made by ITU-R so far and establish associated agenda item for spectrum consideration at WRC-07, and to also deliberate on a revision to appended Resolution 228. The other is that of WRC-03 Agenda Item 7.2, whose objective is to consider new agenda items for WRC-07. At APG Tokyo meeting too, discussions were carried out by both Drafting Group (DG) 1-3, which was in charge of Agenda Item 1.22, and DG1-4, which was responsible for Agenda Item 7.2. The procedure of the discussions was as follows:

First, DG1-3, in charge of Agenda Item 1.22, deliberates on a revision to Resolution 228 (a resolution concerning studies on requirements for the future development of IMT-2000 and systems beyond IMT-2000). Based on the revised and agreed-upon content of Resolution 228, a text for new agenda items to be developed for WRC-07 is created and sent to DG1-4. DG1-4, which handles new agenda items for future WRCs, receives the new agenda item text concerning the future development of IMT-2000 and systems beyond IMT-2000, which is earlier created by DG1-3. It then deliberates on the agenda item together with new agenda items that are also earlier developed by other WPs and DGs. Based on the results of the deliberation, DG1-4 creates a draft new resolution concerning the new agenda
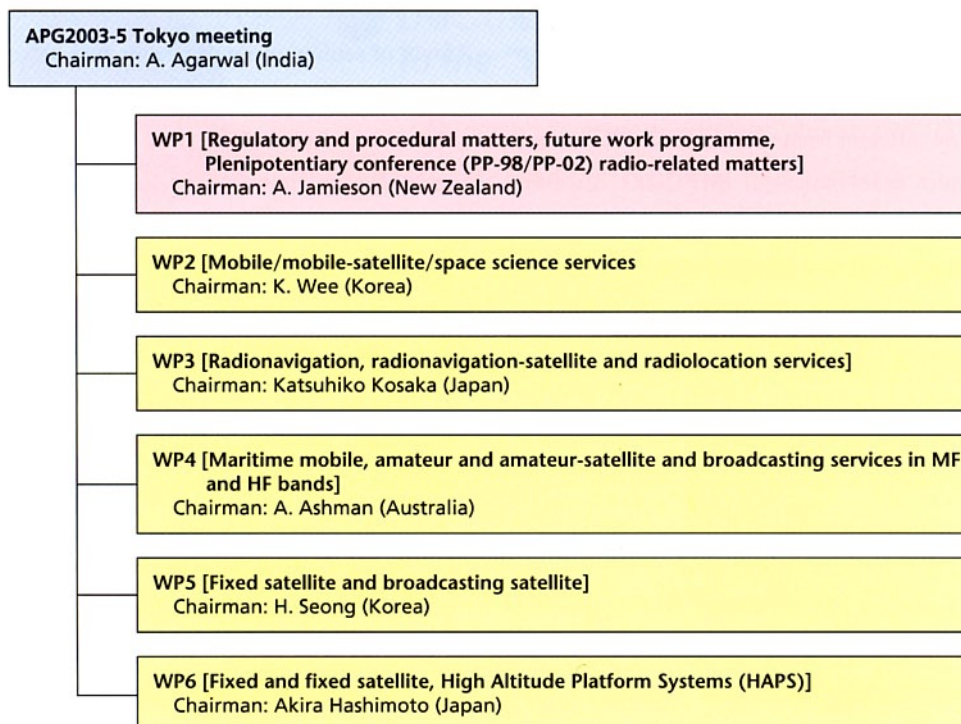
APG2003-5 Tokyo meeting
Chairman: A. Agarwal (India)

WP1 [Regulatory and procedural matters, future work programme,
Plenipotentiary conference (PP-98/PP-02) radio-related matters]
Chairman: A. Jamieson (New Zealand)

WP2 [Mobile/mobile-satellite/space science services
Chairman: K. Wee (Korea)

WP3 [Radionavigation, radionavigation-satellite and radiolocation services]
Chairman: Katsuhiko Kosaka (Japan)

WP4 [Maritime mobile, amateur and amateur-satellite and broadcasting services in MF
and HF bands]
Chairman: A. Ashman (Australia)

WP5 [Fixed satellite and broadcasting satellite]
Chairman: H. Seong (Korea)

WP6 [Fixed and fixed satellite, High Altitude Platform Systems (HAPS)]
Chairman: Akira Hashimoto (Japan)

Figure 3 APG2003-5 meeting structure

APG2003-5 Tokyo meeting
WP1 [Regulatory and procedural matters, future work programme,
Plenipotentiary conference (PP-98/PP-02) radio-related matters]
Chairman: A. Jamieson (New Zealand)

DG1-1 [Deletion of country names from footnotes (Agenda Item 1.1)]
Chairman: Wang Jian (China)

DG1-2 [Boundary between spurious and out-of-band emissions (Agenda Item 1.8.1),
spurious-passive service protection (Agenda Item 1.8.2)
Chairman: Sachio Fukuda (Japan)

DG1-3 [Terrestrial wireless interactive multimedia applications (Agenda Item 1.21),
systems beyond IMT-2000 (Agenda Item 1.22)
Chairman: Nguyen Hong-Son (Vietnam)

DG1-4 [New agenda items for future WRCs (Agenda Item 7.2, Resolution 801)]
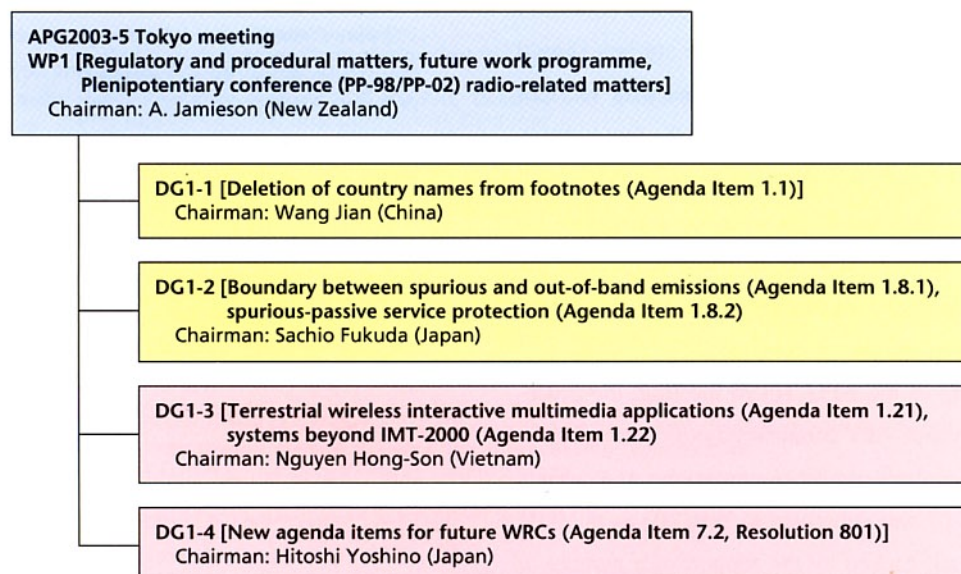Chairman: Hitoshi Yoshino (Japan)

Figure 4 WP1 structure of APG2003-5

items for WRC-07.

Japan and Korea proposed new agenda items regarding the consideration of spectrum identification and associated regulatory provisions for systems beyond IMT-2000 at WRC-07. The two countries also proposed a draft revision to Resolution 228 to be in conformity with their proposed new agenda items. These proposals took into consideration the results of CPM02-2, held in November 2002. China, Iran, Malaysia and Thailand expressed their support for the development of a new agenda item to consider the requirements of future development of IMT-2000 and systems beyond IMT-2000 at WRC-07. In addition to supporting the development of a new agenda item, India asserted that the Resolution should reflect the interest of developing countries, recognizing that a disparity still exists between the telecommunication infrastructures available in developing countries and those in developed countries. During the discus-

sion, a number of countries expressed their opinion that future studies should focus on spectrum requirements for systems beyond IMT-2000, whose spectrum requirements are expected to be different from those of IMT-2000, rather than for the future development of IMT-2000. Australia and New Zealand, in particular, firmly maintained that the consideration of spectrum identification in the new agenda item should exclude that of the existing IMT-2000 or future development of IMT-2000.

Following these discussions, a new agenda text for WRC-07 and a revision to Resolution 228 were developed. It was agreed that the new agenda text for WRC-07 would be "to consider spectrum identification for systems beyond IMT-2000 and regulatory provisions as necessary, taking into account Resolution 228 (Rev.WRC-03)" Regarding Resolution 228, the meeting pushed the draft revision adopted at CPM02-2 a step further, and developed a proposal that addresses "that WRC-07 should consider the results of ITU-R studies under way and consider spectrum identification for systems beyond IMT-2000 and regulatory provisions as necessary" and "that the studies should include sharing and compatibility studies with services already allocated in potential spectrum for the future development of IMT-2000 and systems beyond IMT-2000 [6][7]." Finally, Japan and Korea were appointed to be the APT leading countries at WRC-03 with respect to the WRC-03 Agenda Item 1.22 concerning the future development of IMT-2000 and systems beyond IMT-2000 [8].

Upon closing of the APG Tokyo meeting, the procedures for approval of APT common proposals were implemented. The new draft resolution concerning new agenda items for WRC-07 was submitted to WRC-03 as the APT common proposal, backed by the support of a number of member countries [9].

5. Conclusion

This article described the discussions held at preparatory meetings of ITU-R and those of Asia-Pacific Region for WRC-03, as well as the major outcome of such meetings.

There still exist subtle differences of views among regions and countries regarding the future development of IMT-2000 and systems beyond IMT-2000. Nevertheless,

opinions are in the process of being brought together in favor of setting up a new agenda item to consider frequency-related matters at WRC-07. Premature predictions should be avoided at this time as Inter-American countries, including the United States and Canada, typically refrain from clearly indicating their stances before WRC-03. Nonetheless, WRC-03 would provide the stage for final adjustments of the differing views among administrations to get the green light to consider frequency-related matters at WRC-07. What Arab, African and Russian Group countries might do in the coming months will also need to be monitored carefully. The results of the discussions at WRC-03 will greatly influence the content and schedule of ITU-R standardization activities until WRC-07. WRC-03 will meet in Geneva, Switzerland between June 9 and July 4 of 2003. Six DoCoMo members plan to participate in the meeting as representatives of Japan and APT.

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[3] APG Rapporteur of the Correspondence Group: "Report of the APG Correspondence Group on Procedure for the Development and Approval of an Asia-Pacific Telecommunicty (APT) Common Proposals for Submission to ITU World Radiocommunication Conferences," Document APG2003-4/49, Aug. 2002.

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[8] APG2003-5 DG1-4 of Working Party 1: "ChairmanÅfs Report (Agenda Item 7.2 and Resolution 801)," Document APG2003-5/165 (Rev.2), Feb. 2003.

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