



INTERNATIONAL TELECOMMUNICATION UNION

**RADIOCOMMUNICATION
STUDY GROUPS****Document 1-6-8-9/39-E
4 December 2001
English only**

Received: 16 November 2001

Chairman, Joint Task Group 1-6-8-9**REPORT OF THE SECOND MEETING
(GENEVA, 1-7 NOVEMBER 2001)****1 Introduction**

The second meeting of Joint Task Group 1-6-8-9 dealing with terrestrial wireless interactive multimedia systems under WRC-03 agenda item 1.21 was held during 1-7 November 2001 at ITU headquarters in Geneva (Switzerland) with 57 participants from 20 countries, 2 sector members, 1 International Organization and the BR (ITU).

After its first meeting in October 2000, the JTG received 27 input documents including those from administrations, sector members and the contributing Working Parties for that agenda item.

Since many documents were submitted on very late days immediately before the meeting, it was pointed out at the first Plenary that such late submission might hinder enough consideration of these documents by the participants prior to the meeting.

Some of the input contributions submitted by administrations or sector members contain new and interesting subjects relating to more than one terrestrial services, however, views were expressed that they should have been well considered within the relevant Working Parties before being sent to the JTG, although the terms of reference of the JTG does not exclude such contributions.

Basic discussion was focused on developing draft CPM text for Chapter 7.1 based on the following five input documents, i.e. Documents 1-6-8-9/18 (WP 6E/WP 6M), 1-6-8-9/19 (WP 9B), 1-6-8-9/20 (WP 8F), 1-6-8-9/22 (WP 8A) and 1-6-8-9/34(JRG 8A-9B), also taking into account, where appropriate, the information contained in other input documents from administrations and sector members.

For this purpose the JTG has established a Drafting Group which is responsible for entire text of Chapter 7.1 of the draft CPM Report. At the first Plenary, the JTG nominated Mr. D. Barrett (UK) as Drafting Group Chairman. Detailed discussion in the DG is given in the later section.

2 Discussion at the first Plenary

The Liaison statements from the contributing Working Parties responding to the questions from the JTG were introduced by each Liaison Rapporteur. It was confirmed that these documents should be used for elements of the CPM text that the JTG would develop.

The following liaison documents were noted;

- Doc. 1-6-8-9/13 (WP 1B), 14 (ITU-T SG 16), 16 (WP 4A), 17 (WP 6E), 21 (WP 6M), 28 (WP 8A), 33 (WP 8A).

The Documents 1-6-8-9/31 and 32 both from Republic of Korea were withdrawn.

After active discussion, the following documents were agreed to be sent to the contributing Working Parties for their consideration.

- Doc. 1-6-8-9/24 (Ericsson): A technical study on the sharing between a digital mobile system and digital broadcasting system.
- Doc. 1-6-8-9/25 (Ericsson): A study on the convergence of fixed wireless access, mobile cellular and broadcasting networks from a multimedia perspective.
- Doc. 1-6-8-9/35 (Ericsson/Siemens): Services and systems for the mobile communication of tomorrow.

It was considered to be premature to incorporate the issues proposed in these documents immediately in the output of this JTG meeting without agreement of the relevant Working Parties. It was also understood that the information of these documents might be reflected in the output if the drafting group so agreed.

There was a short discussion on scope/description of terrestrial wireless interactive multimedia applications based on Doc.1-6-8-9/23 (Sweden, France, Germany and Netherlands). The proposed description obtained some supports, however there was another view that Doc.1-6-8-9/22 (WP 8A) provides better one. It was agreed that the JTG needs a certain scope or description on this concept in response to the question 1 (what is your understanding of terrestrial wireless interactive multimedia systems?). It was decided that the matter should be further considered at the drafting group.

Doc. 1-6-8-9/26 (Sweden) was introduced. The document contains a draft CPM text proposing possible changes to Art S5 of the Radio Regulations that may overcome the immediate problems with convergence between radiocommunication services without changing or amending the existing service definitions in Article S1. Several administrations expressed concern that the over-simplified proposals in this document did not address the consequent implications for other services and the impact on country footnotes, and it was concluded that it would be unacceptable to include this proposal in the draft CPM text.

Concerning the CPM text structure, a following proposal given in Doc.JTG1-6-8-9/30(Chairman) was basically agreed, and in order to carry out this work a Drafting Group chaired by Mr. Barrett (UK) was established.

Proposed CPM text structure for Chapter 7.1

- 1 WRC agenda item 1.21
- 2 Summary of technical and operational studies
 - 2.1 Terms related to the studies
 - 2.2 Summary of technical studies
 - 2.3 Summary of operational studies
- 3 Analysis of the results of studies
 - 3.1 Scope of terrestrial wireless interactive multimedia systems (based on question 1)
 - 3.2 General characteristics (technical and operational), various applications and technologies (based on the answers to questions 2 and 3)
 - 3.3 Current situation of spectrum use and sharing scenarios based on questions 4 and 5
 - 3.4 Trends in the next 5-10 years based on question 7
- 4 Methods to satisfy the agenda item for consideration by the WRC
- 5 Regulatory and procedural considerations (based on question 6)

3 Work in the Drafting Group (DG 1-6-8-9/1)

The DG having responsibility for whole CPM text for Chapter 7.1 subdivided the work into two Sub Drafting Groups.

The one Group (DG 1-6-8-9/1A) chaired by Mr. A. Frederich (Sweden) dealt with terminology issues (sub-Section 2.1) and description of terrestrial wireless interactive multimedia systems (element for sub-Section 3.1). There are many terms used in the CPM text, which need common understanding between the JTG and other contributing Working Parties. In sub-Section 2.1, these terms were listed with the reference ITU-R Recommendations. The definitions provided by these Recommendations were summarized in a separate output (Doc. 1-6-8-9/TEMP/8). The Sub-DG 1-6-8-9/1A identified several terms without a clear definition, for which further information has been requested to the relevant WPs through a liaison statement.

A preliminary working-description for terrestrial wireless interactive multimedia (TWIM) system was developed by DG 1-6-8-9/1A, and incorporated in sub-Section 3.1 of the CPM text (Doc. 1-6-8-9/TEMP/6).

DG 1-6-8-9/1A was also in charge of development of preliminary text for Sections 4 (Methods to satisfy the agenda item) and 5 (Regulatory and procedural considerations).

For the text for Section 4, it was agreed to identify several items concerning TWIM systems for further study. This section will be reconsidered taking into account the new inputs to the next meeting.

The text for the Section 5 has been developed based on the answers to question 6. According to views stated in many reply liaison statements there is no evidence at this time that there are any regulatory impediments to the development of TWIM systems. It was also recognized that recent systems are starting to appear to be capable of operating within more than one of the three terrestrial Services. Related preliminary considerations have been summarized in the output document (Doc. 1-6-8-9/TEMP/11).

The other group (DG 1-6-8-9/1B) chaired by Mr. L. Wieweg (Ericsson) tackled technical characteristics and applications (sub-Section 3.2). DG 1-6-8-9/1B provided the text for 3.2 based on the answers to questions 2 and 3 given in the reply liaison statements. Typical technical parameters were summarized for several example systems operating in the three terrestrial services.

DG 1-6-8-9/1B also developed a draft text for Section 3.4 dealing with trends in the next five to ten years. However, it was agreed to retain this draft as a separate Report and to invite further comments from the contributing Working Parties expecting that the content would reflect more balanced views (Doc. 1-6-8-9/TEMP/5).

DG 1-6-8-9/1B was further responsible for development of preliminary text for Section 3.3 (Current situation of spectrum use and sharing scenarios). Concerning the current spectrum situations, texts have been provided extracting the essence of the reply liaisons, and results of the sharing studies on the fixed/mobile Service and other Services have been summarized in a Table (Doc. 1-6-8-9/TEMP/7).

4 Discussion at the last Plenary

All the outputs from DG 1-6-8-9/1 were considered.

In relation to regulatory considerations the following paragraph was extracted from Doc. 1-6-8-9/TEMP/11 to be kept in the Chairman's Report (this document), since the text needs further consideration from the regulatory viewpoint before provided in the draft CPM Report.

“There are no provisions in the Radio Regulations that prevent transmissions intended for direct reception by the general public in frequency bands allocated to the Fixed and Mobile Services, albeit that such transmission would not fall under any broadcasting regulation.”

There were no other major changes in the preliminary draft CPM text proposed by the Drafting Group. It was agreed that the temporary documents addressing the preliminary CPM text (Docs. 1-6-8-9/TEMP/6, 7, 11 and 12) should be arranged into one document before sent to other Working Groups.

Two draft liaison statements prepared by the Drafting Group were approved. The one is to contain the combined preliminary draft CPM text for Chapter 7.1, Report on future trends (Doc. 1-6-8-9/TEMP/5) and terminology related to the study (Doc. 1-6-8-9/TEMP/8). This liaison has identified issues specifically requiring responses from relevant Working Parties, including suitable definitions for certain terms, typical technical parameters for the example systems and further information on the Report on future trends. In particular for the terminology issues, it has been encouraged that the work be facilitated through correspondence work utilizing an e-mail reflector (rcg-multimedia@itu.int) and that Mr. A. Frederich (Sweden) would become contact person on this subject. The Plenary decided to send this liaison statement (Doc. 1-6-8-9/TEMP/10) to all the contributing and interested groups including the relevant Study Group in ITU-T.

Also, another liaison statement (Doc. 1-6-8-9/TEMP/9) was approved to send the three input documents (Docs. 1-6-8-9/24, 25 and 35) to relevant contributing groups, asking their view mainly on whether these documents may have some elements affecting to the preliminary draft CPM text provided by the JTG contained in a separate liaison.

5 Liaison Rapporteurs

The following Liaison Rapporteurs to other Study Groups were confirmed to continue their job.

Study Group 1: Mr. D. Barrett (UK)

Study Group 6: Mr. B. Aldous (UK)

Study Group 8: Mr. J. Costa (Canada)

Study Group 9: Mr. D. Sward (Canada)

6 Next meeting schedule

Taking into account the heavy workload at this meeting, the JTG agreed to provisionally arrange the next meeting between 16th and 24th May 2002 (seven working days) to finalize the draft CPM text for WRC-03 agenda item 1.21.

7 Conclusion

The November 2001 meeting of JTG1-6-8-9 was able to successfully complete its work producing preliminary draft CPM text for Chapter 7.1, two working documents/Reports and two liaison statements.

It was confirmed that the interim work would be continued by correspondence through the JTG e-mail reflector address¹:

rcg-multimedia@itu.int

The JTG Chairman wishes to express his sincere thanks to all the participants in particular to three Vice-Chairmen, Messrs. T. Jeacock (UK), B. Aldous (UK) and J. Costa (Canada), for their important advice including initial preparation for the meeting. Also, special thanks should be mentioned to Drafting Group Chairman, Mr. D. Barrett (UK), Sub-Drafting Group Chairmen, Messrs. A. Frederich (Sweden) and L. Wieweg (Ericsson) for their excellent leadership and efficient works. Furthermore, appreciation should be made to Mr. Lorenzo Casado, Counsellor, and BR Secretariat staffs, for their important aid to the participants and to myself.

Akira Hashimoto (Japan)
Chairman, Joint Task Group 1-6-8-9

¹ Those wishing to subscribe to the e-mail reflector should send an e-mail to the following address: "mailserv@itu.int" with the following single line in the text (no text in the subject): "subscribe rcg-multimedia".

	Page
Attachment 1: Structure of the work (Doc. ADM/503).....	7
Attachment 2: Preliminary draft CPM text for Chapter 7.1 (Documents 1-6-8-9/TEMP/6, 7, 12 and 11).....	8
Attachment 3: Report on the possible trends in TWIM over the next 5-10 years (Document 1-6-8-9/TEMP/5).....	16
Attachment 4: Terminology and description of contents (Document 1-6-8-9/TEMP/8) .	19
Attachment 5: Liaison statements to other groups (Documents 1-6-8-9/TEMP/9 and 10).....	25
Attachment 6: List of the input documents.....	29
Attachment 7: List of the TEMP documents	33
Attachment 8: List of the participants.....	35

ATTACHMENT 1

Joint Task Group 1-6-8-9 (Multimedia applications)

STRUCTURE OF THE WORK, NOVEMBER 2001 MEETING

- 1** Drafting Group 1-6-8-9/1 – CPM-02 Text for Section 7.1
Chairman: Mr. David Barret (UK)
 - 1.1** Sub-DG 1-6-8-9/1A – Terminology
Chairman: Mr. Anders Frederich (Sweden)
 - 1.2** Sub-DG 1-6-8-9/1B – Technical characteristics
Chairman: Mr. Lasse Wieweg (LM Ericsson, Sweden)

ATTACHMENT 2

Source: Doc. 1-6-8-9/TEMP/6, 7, 12 and 11

PRELIMINARY DRAFT CPM TEXT FOR CHAPTER 7.1

1 WRC-03 Agenda item 1.21

"to consider progress of the ITU-R studies concerning the technical and regulatory requirements of terrestrial wireless interactive multimedia applications, in accordance with Resolution **737 (WRC-2000)**, with a view to facilitating global harmonization".

2 Summary of technical and operational studies

2.1 Terms related to the studies

Most of the terms used in relation to WRC-03 Agenda item 1.21 are defined in one or more ITU Recommendations. Due to the fact that the definitions have been developed in different groups and at different times there may be variations in the definition. It is considered important to get a common understanding of the terms used in this chapter of the CPM Report and a list of references providing definitions has been developed to achieve this goal (see below).

The terms and definitions in the references list should be read in addition to those in the Radio Regulations. In some cases the same term may be defined differently in an ITU-R Recommendation from that in the Radio Regulations (or even the Constitution). In these cases the definition in the Radio Regulations shall prevail.

Term	Reference
Bidirectional	Recommendation ITU-R V.662
Broadband	ITU-T Recommendation I.113
Broadband wireless access (BWA)	Recommendation ITU-R F.1399-1
Broadcasting	Recommendation ITU-R V.662
Core network (CN)	ITU-T Recommendation Y.101
Downlink channel	Recommendation ITU-R F.1399-1
Downstream	Recommendation ITU-R F.1399-1
End-user	Recommendation ITU-R F.1399-1
Fixed wireless access (FWA)	Recommendation ITU-R F.1399-1
Fixed wireless systems	Document 9/BL/15 (Draft revision of Recommendation ITU-R F.592-2)
High density applications in the fixed service (HDFS)	Document 9/BL/15 (Draft revision of Recommendation ITU-R F.592-2)
Interactive service	Recommendation ITU-R M.1224

Term	Reference
Mobile wireless access (MWA)	Recommendation ITU-R F.1399-1
Multimedia service ¹	Recommendation ITU-R M.1224 ITU-T Recommendation I.113
Multimedia wireless system (MWS)	Recommendation ITU-R F.1399-1
Narrow-band wireless access	Recommendation ITU-R F.1399-1
Network	Recommendation ITU-R M.1308
Nomadic wireless access (NWA)	Recommendation ITU-R F.1399-1
Service	Recommendation ITU-R M.1308
Station	Recommendation ITU-R F.1399-1
System	Recommendation ITU-R M.1308
Unidirectional	Recommendation ITU-R V.662
Universal personal telecommunications (UPT) service	ITU-T Recommendation I.114
Uplink channel	Recommendation ITU-R F.1399-1
Upstream	Recommendation ITU-R F.1399-1
User	Recommendation ITU-R F.1399-1
Wideband wireless access	Recommendation ITU-R F.1399-1
Wireless access ²	Recommendation ITU-R V.573-4 Recommendation ITU-R F.1399-1

2.2 Summary of technical studies

TBD. Further contributions from relevant contributing working parties are requested.

2.3 Summary of operational studies

TBD. Further contributions from relevant contributing working parties are requested.

3 Analysis of the results of studies

3.1 Scope of terrestrial wireless interactive multimedia systems

The terrestrial wireless interactive multimedia (TWIM) concept that is emerging in the marketplace should not be confused with any existing or planned system; it is, rather, more of a vision of future wireless applications. It may be regarded as a multi-network, multi-access and multi-service arrangement containing convergence in access, core network, management, content, information exchange and database functions and capabilities. These functions and capabilities will likely include integral seamless broadcasting, mobile and fixed wireless access, location and

¹ These Recommendations provide complementary information.

² See above.

navigation functions, on demand, supporting person-to-person, person-to-many persons, many persons-to-person, person-to-machine and machine-to-machine communications. It is end-user concentric in that it is the end-user that is the recipient of the multimedia applications.

This concept encompasses systems that allow the delivery of multimedia content with which the user may interact, as well as systems capable of conveying multimedia information and providing interactive functions between the user and the host or between users.

The term "interactive" implies a two-way, but not necessarily symmetrical, communication system in either a simplex or duplex form. More specifically, the term "interactive" implies not only two-way physical transport of information but also the functionality of conveying end-users' reaction or response to the network in order to provide a certain service application. Depending on the application, interactivity can be real-time such as voice communications or non-real-time such as e-mail.

Multimedia applications delivered by broadcasting services are expected to deliver larger amounts of multimedia data in the downlink direction compared to the amount of data carried from the user in the uplink direction, thus making such broadcast based multimedia applications different from those provided through other telecommunications services.

In consideration of the above the following is a preliminary working-description for the scope of terrestrial wireless interactive multimedia (TWIM) systems:

Systems that operate in one or more of the mobile, fixed and broadcasting services and are capable of supporting bi-directional exchange of information of more than one type (e.g. video, image, data, voice, sound, graphics) between users or between users and hosts.

NOTE – The bi-directional exchange of information may be provided with different degrees of interactivity and mobility.

3.2 General characteristics (technical and operational), various applications and technologies

3.2.1 Technical and operational characteristics

To be suitable for supporting terrestrial wireless interactive multimedia, a system needs to be capable of supporting simultaneously many different communication services offered to users and capable of delivering specific information to individual users.

A key requirement is the availability of downstream and upstream communication between the provider(s) of the multimedia content and the user. The systems used for the forward and return channels could be the same, or different, might operate within the same or different services, as defined in the Radio Regulations.

The total wireless access network traffic may be symmetrical or asymmetrical depending on the range of communication services offered to users.

The downstream and upstream bandwidth requirements will depend on the nature of the multimedia content, the user interface devices, the desired quality, etc. The support of some services (for instance, broadcast quality HDTV) may require the capability for broadband access.

Other technical characteristics that are important for some types of terrestrial wireless interactive multimedia applications include:

- support of various levels of quality of service (QoS);
- seamless services across various systems and networks;

- roaming service and interoperability between existing systems and future systems as they become available;
- the ability of the system to efficiently use the available bandwidth of the forward and return channels.

3.2.2 Applications and technologies

Examples of applications that may be supported by terrestrial wireless interactive multimedia:

- | | |
|---|--|
| • alternate scenario dramas | • e-mail |
| • broadcasting service on demand | • remote education |
| • car navigation and passenger infotainment | • shopping and EFTPOS |
| • database access | • telemedicine |
| • electronic newspapers | • travel information |
| • emergency and alert functions | • video and music on demand |
| • file transfers and photo albums | • video content contribution |
| • form filling and submission | • video games including multi-players |
| • game show and talk show participation | • virtual private networks services |
| • Internet and intranet access | • voting |
| • multi-camera angle sport viewing and replay | • voice and video calls and conferencing |
| | • web-casting and web-cams |

Table 1 provides technical characteristics of example systems, which could be considered relevant to enable terrestrial wireless interactive multimedia applications.

TABLE 1
Some typical technical characteristics of example systems

System		Transmitted data rate	Typical frequency range	Information data rate (TBD) ³
Cellular/MWA	Pre IMT-2000 systems ⁴	14.4 kbit/s	0.8-2 GHz	
	IMT-2000	2 Mbit/s (pico cells) 384 kbit/s (micro cells) 144 kbit/s (macro cells)	0.8-2.7 GHz	
	Systems beyond IMT-2000	(under study)		
TICS ⁵				
RLAN/wireless home networks		Up to 54 Mbit/s	0.9-6 GHz	
Personal area networks		(under study)	(under study)	
FWA/BWA ⁶		56 kbit/s up to 312 Mbit/s	1 to 66 GHz ⁷	
LMCS/LMDS/MMDS/MVDS/ MCS/MWS ⁸		up to 156 Mbit/s	2 to 6 GHz, above 20 GHz ⁹	
Broadcasting	Sound (digital)	up to 1.8 Mbit/s (static) 448 kbit/s (mobile)	TBD ¹⁰	
	Television (digital) SDTV/EDTV/HDTV	up to 32 Mbit/s (static) 500 kbit/s (mobile)	TBD ¹¹	

3 Additional information requested from all WPs.

4 It is recognized that some pre-IMT-2000 systems can provide some Internet browsing and an interactive channel for broadcasting systems.

5 Additional information requested from WP 8A.

6 BWA: Wireless access in which the connection(s) capabilities are higher than the primary rate.

7 Systems operating at a lower frequency range have typically lower data rate.

8 It is noted that there are also other abbreviations used for these systems.

9 Systems operating at a lower frequency range have typically lower data rate.

10 Additional information requested from WPs 6E/6M.

11 Additional information requested from WPs 6E/6M.

3.3 Current situation of spectrum use and sharing scenarios

3.3.1 Current use and future trends for spectrum

Since it is anticipated that there will be many different types of terrestrial wireless interactive multimedia systems, they will inevitably operate in many different frequency bands, typically, but not exclusively, across the range up to 66 GHz, with higher mobility systems tending to favour the lower frequency bands.

The frequency bands which are currently allocated to broadcasting are already fully utilized for broadcasting but, in time, will be more efficiently used through the conversion from analogue to digital, which will also permit the introduction of interactive multimedia services to the end user.

Since broadcasting is a one-to-many service which may have the capability for some personalized addressable applications, the downlink data from interactive multimedia and datacasting applications may be combined with conventional broadcasting applications and therefore use the same channel. If the uplink and downlink channels share the same frequency band, this could provide some economies of scale due to re-use of some existing user equipment, such as the antenna. In principle, multimedia applications provided by broadcasting operators may use a variety of spectrum bands in particular for the uplink channel in the fixed and mobile services.

It is believed that the current broadcast bands can provide most of the requirements for the downlink path for broadcast services with interactive multimedia capabilities when they are intended for the general public. However, with the expected evolution of these multimedia services, consideration will be needed to make sure that sufficient spectrum becomes available to accommodate anticipated future demand.

For the mobile service, the spectrum used by mobile applications and technologies is heavily used, and studies are underway to both increase the spectrum efficiency of those systems, and the identification of additional spectrum that could be used.

For the fixed service, the ITU-R is currently considering certain bands in the 5-20 GHz range with a view to accommodating FWA applications in bands where there is little growth of traditional point-to-point systems. Moreover, work is being undertaken to identify spectrum in bands above 70 GHz for short-range, broadband FWA applications.

A challenge in the future may be to find sufficient suitable spectrum, under 1 GHz, to support broadband fixed wireless systems in rural and remote areas. New access to spectrum in this range would help service providers to reach non-line-of-sight subscribers in areas of difficult terrain.

The demand for spectrum for broadband NWA is increasing and this matter is now being studied by the ITU-R. WRC-03 Agenda item 1.5 addresses a possible new allocation to the mobile (and fixed) service in certain bands in the 5 GHz range. According to ongoing studies in the ITU-R, it is currently believed that frequency spectrum of the order of at least several hundred MHz is possibly required to meet future demands for broadband NWA around year 2010.

3.3.2 Band sharing scenarios with other users

In general, terrestrial wireless interactive multimedia systems may require access to large portions of radio spectrum, with minimal technical and operational constraints with regard to sharing with other radio services. Given the ubiquitous nature of these systems, it may not be practical to require coordination on a site specific basis with stations in other radiocommunication services. However, it is possible to establish sharing conditions on the basis of technical and operational limits.

The sharing scenarios will depend on the technologies used in different bands, wideband vs narrowband, high power vs low power etc.; the nature of the terminals and the type of modulation in the radio link may significantly affect the sharing scenario. However, it is not believed that the sharing scenarios for terrestrial wireless interactive multimedia systems will be significantly different to those for a high-density public land mobile telecommunications system or a high density fixed wireless access system.

Terrestrial wireless interactive multimedia applications will have different spectrum usage characteristics, dependent on whether they are delivered on an area coverage basis or a point-to-point basis.

A number of studies have been made on frequency sharing between the fixed/mobile service and other radiocommunication services, and the results are summarized in Table 2. The sharing scenarios developed in the Recommendations listed in Table 2 may be applicable to other frequency bands in the future to support new terrestrial wireless interactive multimedia systems.

TABLE 2

Summary of sharing study results between the fixed/mobile service (including FWA and NWA systems) with other services

Other service, which is sharing the band with the FS or MS	Frequency band	Recommendation
FSS	3.4-3.8 GHz	SF.1486
	5.15-5.25 GHz	M.1454
	37.5-42.5 GHz	Draft revision of SF.1484 (Doc. 4/76-9/97) DNR SF.[Doc. 4/75-9/96]
MS	800-900 MHz	F.1402
	1.8-1.9 GHz	F.1402, F.1518
BSS	1.4-1.5 GHz	F.1338
RL	3.4-3.7 GHz	F.1489
ISS	24-27 GHz	F.1249, F.1509
RN	31.8-33.4 GHz	DNR F.[Doc. 9/86]
EESS (active) / SR (active)	5.25-5.35 GHz	PDNR F.[Doc. 8A-9B/TEMP/48] PDNR M.[Doc. 8A-9B/TEMP/56]
	5.47-5.57 GHz	Doc. 8A-9B/TEMP/61

3.4 Trends in the next five to ten years

Further work is required on this section of the report and the current source text in the shape of a report is contained in Attachment 2. Specific questions with respect to the report's contents are addressed in the liaison statement.

4 Methods to satisfy the agenda item for consideration by the WRC

Editor's note: JTG 1-6-8-9 intends to study this item further at its next meeting to give greater focus to specific studies required.

In order to complete the work associated with this agenda item it will be necessary to conduct further studies with the results to be completed and reported to the WRC-05/06. Resolutions 737 (WRC-2000) may be revised by WRC-03 to reflect the Recommendations following further studies.

Further exploration of issues related to the TWIM concept.

Study possible frequency bands for TWIM applications, taking into account the scope of TWIM systems as described in this report (including sharing between different radiocommunication services).

Study the benefits of global and regional harmonization of spectrum for TWIM applications and the possible need for recognition of TWIM within the Radio Regulations.

Co-operate with ITU-T on the project Mediacom 2004 to create a framework for the harmonized and coordinated development of interactive multimedia communication standardization for use across all ITU Study Groups.

Review the existing radiocommunication service definitions including how they are used to determine the use of frequency bands and the consequences they may have on international frequency coordination procedures.

5 Regulatory and procedural considerations

The distinctions between the Fixed, Mobile and Broadcasting Services have been clear and unambiguous, and the traditional national regulatory processes and the organization of the ITU-R were designed to reflect those distinctions. It is believed that the definitions of the three radiocommunication services are still valid and applicable; however it should be understood that systems are starting to appear that are capable of operating within two or even all of the three radiocommunication services.

There is no evidence at this time that there are any regulatory impediments to the development of TWIM systems. It will be necessary to review the traditional boundaries between existing radiocommunication services to determine if there are any impediments. If any appear in the future they could be minimised by ensuring that sufficient flexibility is employed in the interpretation of the regulations.

The further development of convergence raises the fundamental question of whether current service definitions will continue to make sense by the end of the decade when voice has turned into data and television may be delivered on-demand via a broadband interactive Internet. This may require studies on whether modifications to ITU radiocommunication service definitions are necessary and how they may impact the future use of frequency bands. It may also be necessary to review the impact any such modifications may have on the existing international frequency coordination procedures.

Harmonization of spectrum is an important factor in the success of TWIM systems and there are potential equipment cost advantages through economics of scale. Studies are required to assess the benefits of global and regional harmonization of spectrum for these systems and the need for any recognition within the Radio Regulations.

Most bands that are allocated to the fixed service are also allocated to the mobile service (and vice versa), and may be candidate bands for terrestrial wireless interactive multimedia applications. Studies may be required to evaluate the possibility of adding the mobile service to bands allocated to the fixed service (and vice versa) with the view to increasing the flexibility, in light of studies on service definitions.

ATTACHMENT 3

Source: Doc. 1-6-8-9/TEMP/5

REPORT ON THE POSSIBLE TRENDS IN TERRESTRIAL WIRELESS INTERACTIVE MULTIMEDIA OVER THE NEXT FIVE TO TEN YEARS

Market Trends

The recent Internet phenomenon, where users can readily access on-demand multimedia content and communications, pushes upward the information bit-rate requirements for terrestrial wireless interactive multimedia systems.

Ownership structures are changing fast, with horizontal mergers and alliances among content developers and providers and vertical mergers along the value chain between content companies, aggregators or publishers and delivery companies.

There are systems for mobile and fixed service operators to deploy, that can offer both mobile and fixed wireless access applications. This situation results in economies of scale by which the same system is used to support both mobile and fixed applications with usage/traffic patterns complementing each other and thus increasing the utilization of the system and the resources.

Mobile multi-service networks will develop further, forming a truly global mass-market phenomenon, and will become a dominant model for all further mainstream development of communications. This transformation will come as a result of a number of possible communication marketing trends:

- the phenomenal growth of mobile telephony and its expansion from voice services to the multi-service networks that will bring the Internet into the pocket of the user and create a new world of personalized, info-centric, always-on and always-with-you services;
- the extraordinary growth of Internet services and applications;
- demand for greater data rates for residential and business IP applications;
- the large volumes of new mobile telephones and devices shipped every year (more than 500 million units in the year 2001) and wireless enabled communicating PCs, cars and appliances, bringing ever more powerful communicating devices into the hands and homes of the users;
- the compelling case for e-business;
- new technologies and standards enabling affordable fixed and mobile broadband access and multi-service networking;
- network convergence, moving from vertically integrated single service networks to open, horizontally layered, multi-service networks;
- intensified competition and specialization driven by deregulation and globalization;
- the availability and quality of the Internet and mobile services to developing and developed countries at an increasing penetration rate;
- strong demand for high speed Internet services in semi-rural, rural and remote areas;
- emergence of multiple wireless access service providers offering various grades of service to meet specific requirements of client groups.

These trends are driven by the large investments in current and future business opportunities enabled by the rapid convergence.

If implementations of wireless systems follow the above trends, the need to distinguish these systems under different service categories may not be practical.

It is believed that new developments in technology, and convergence of applications, will increasingly challenge the regulatory distinctions between the services, as defined in the Radio Regulations.

Technology Trends

There is a clear trend that some systems can be used to support both mobile and fixed applications.

A challenge in the future may be to find sufficient suitable spectrum to support broadband fixed and mobile wireless systems. With regard to rural and remote areas new access to spectrum below 1 GHz would help operators reach non-line-of-sight subscribers in areas of difficult terrain.

One trend that is anticipated over the coming years is the integration of low power broadband RLANs with wide area cellular mobile systems to support hot-spot coverage. This results in more efficient use of the spectrum and the delivery of high-speed wireless access services. A further trend that supports the convergence of systems is the increasing use of packet-based transport and in particular the use of Internet protocols (IP), for most end-user and enterprise-based applications. In addition, it is foreseen that the core network will increasingly become IP-centric, supporting a wide variety of different user speed/mobility/coverage scenarios and also support such requirements as security, authentication and billing. This will facilitate the convergence of systems which we now consider as being distinct (e.g. MWA, FWA, NWA, RLAN, IMT-2000, broadcasting, narrowcasting, etc.). In the future this will form part of a web of systems and networks supporting a large variety of wireless interactive multimedia services. Therefore, rather than considering any one particular type of system as a terrestrial wireless interactive multimedia system, it will be used to describe a collection of systems.

Advances in technology, including the development of software radio, could facilitate:

- automatic switching of the operating mode, public network access, office network access, home link access;
- adaptive modulation, level of multi-states;
- adaptive array antenna;
- variable bit rate;
- different class of service;
- dynamic RF channel assignment;
- multiband operation.

The notion of multicasting and broadcasting applications have come to the fore utilizing asymmetric communication services, which are defined as a set of possible enhancements to broadcasting, mobile and fixed systems. These will address the required improvements needed, in particular for delivering a set of services simultaneously to small as well as to large user groups. Several options are suggested to facilitate and to enhance broadcasting, mobile and fixed communication systems and applications for these additional types of asymmetric services:

- additional downlink integrated access networks may include some multicasting and broadcasting functionality by providing additional downlink access bearers via the mobile and fixed radio access networks;

- as a supplementary component of mobile and fixed communication systems for broadcast- and multicast-like services, an additional downlink radio access network for connection through a core network may be integrated;
- adding additional uplink access bearers for multicast- and broadcast-like services provides additional radio access networks, including multicasting and broadcasting services using extended interactivity;
- with partly integrated radio access networks, the broadcast, fixed and mobile services are partly converged providing multimedia access wherein two-way, additional-downlink, downlink-only and additional-uplink access bearers are provided by the partly integrated radio access networks for broadcast, mobile and fixed services to all types of devices;
- finally, total integration of broadcast, mobile and fixed radio access into one radio access network provides a totally integrated multimedia radio access network which offers two-way asymmetric access bearers for broadcast, mobile and fixed services to all types of devices.

The suggested utilization of broadcasting services is well suited to large user groups, and particularly for satisfying the needs of the traditional broadcasting service. However, considering the situation where user groups are smaller and more widely dispersed or, where multicast communications require end-to-end interactivity, enhancements to mobile communication systems or fixed wireless access systems would provide a more efficient and integrated solution and facilitate the integration of several functions and modes in single end-user terminals.

ATTACHMENT 4

Source: Doc. 1-6-8-9/TEMP/8

TERMINOLOGY AND DESCRIPTION OF CONTENTS

Most of the terms used in relation to WRC-03 Agenda item 1.21 are defined in one or more ITU Recommendations. Due to the fact that the definitions have been developed in different groups and at different times there may be variations in the definition. It is considered important to get a common understanding of the terms used in this chapter of the CPM Report and a list of definitions has been developed to achieve this goal.

The terms and definitions in the list should be read in addition to those in the Radio Regulations. In some cases the same term may be defined differently in an ITU-R Recommendation from that in the Radio Regulations (or even the Constitution or Convention). In these cases the definition in the Radio Regulations shall prevail.

This list will be updated at the next meeting of JTG 1-6-8-9 taking into account the input to the meeting.

Term	Definition	Reference	Note
Bidirectional	<p>Pertaining to a link where the transfer of users' information is possible simultaneously in both directions between two points.</p> <p>NOTE 1 – The transmission channel capacity and signalling rate are not necessarily the same in both directions.</p> <p>NOTE 2 – This term should not be used to describe the directions of call set-ups.</p>	Recommendation ITU-R V.662	
Broadband	<p>Broadband [wideband]</p> <p>Qualifying a service or system requiring transmission channels capable of supporting rates greater than the primary rate.</p>	ITU-T Recommendation I.113	According to the conventions applied in vocabulary Recommendations, any term in common usage, but whose use is deprecated, is shown in square brackets.
Broadband wireless access (BWA)	<p><i>Wireless access</i> in which the connection(s) capabilities are higher than the primary rate.</p>	Recommendation ITU-R F.1399-1	
Broadcasting	<p>A form of unidirectional telecommunication intended for a large number of users having appropriate receiving facilities, and carried out by means of radio or by cable networks.</p> <p>NOTE – In English, it should be assumed that "broadcasting by radio waves" is intended where the word "broadcasting" is used without qualification, unless the context indicates the contrary.</p> <p><i>Examples:</i> Sound broadcasting or television broadcasting, teletext, the distribution of time signals and navigational warnings, the distribution of news from press agencies.</p>	Recommendation ITU-R V.662	
Core network (CN)	<p>A portion of the delivery system composed of networks, systems equipment and infrastructures, connecting the service providers to the access network.</p>	ITU-T Recommendation Y.101	See wireless access
Downlink channel	<p>A unidirectional transmission channel from central station to terminal station. Also referred to as downstream.</p>	Recommendation ITU-R F.1399-1	Also defined in I.224
Downstream	<p>The direction from base station to subscriber station(s).</p>	Recommendation ITU-R F.1399-1	

Term	Definition	Reference	Note
End-user	A human being, organization, or telecommunications system that accesses the network in order to communicate via the services provided by the network. (See ITU-T Recommendation J.112.)	Recommendation ITU-R F.1399-1	
Fixed wireless access (FWA)	<i>Wireless access</i> application in which the location of the <i>end-user termination</i> and the network access point to be connected to the end-user are fixed.	Recommendation ITU-R F.1399-1	<i>Doc. 9/BL/15 (Draft Revision of Rec. ITU-R F.592-2) the definition is too limited.</i>
Fixed Wireless Systems	Telecommunication systems operating in the fixed service including, for example, radio-relay systems, HF systems and systems using high altitude platform stations (HAPS) and which support a range of applications such as access and core transport. NOTE – The Radio Regulations indicate that the fixed service uses electromagnetic waves arbitrarily limited up to 3 000 GHz; however it is anticipated that the term "fixed wireless system" could also include the use of optical signals without artificial guide.	Doc. 9/BL/15 (Draft Revision of Rec. ITU-R F.592-2)	
High density applications in the fixed service (HDFS)	A significant level of deployment of point-to-point (P-P) and/or multipoint (MP) systems within a given area. NOTE 1 – These systems are generally intended to support broadband applications. NOTE 2 – Multipoint (MP) systems cover either point-to-multipoint (P-MP) or multipoint-to-multipoint (MP-MP) systems.	Doc. 9/BL/15 (Draft Revision of Rec. ITU-R F.592-2)	
Interactive service	A service which provides the means for the bidirectional exchange of information between users or between users and hosts. NOTE 1 – Interactive services are subdivided into three classes of services: conversational services, messaging services and retrieval services.	Recommendation ITU-R M.1224	ITU-T J 1 supp 4 also contains a definition. This definition is not as wide as the one in Rec. ITU-R M.1224.
Mobile wireless Access (MWA)	<i>Wireless access</i> application in which the location of the <i>end-user termination</i> is mobile.	Recommendation ITU-R F.1399-1	

Term	Definition	Reference	Note
Multimedia service	<p>A service in which the interchanged information consists of more than one type (e.g. video, data, voice, graphics). Multimedia services have multivalued attributes which distinguish them from traditional telecommunication services such as voice or data. A multimedia service may involve multiple parties, multiple connections, the addition/deletion of resources and users within a single communication session.</p> <p>NOTE 1 – In IMT-2000 specifications or reports, multimedia is used in the sense of multiple information types supported within what the user sees as a single call.</p> <p>A service in which the interchanged information consists of more than one type, such as text, graphics, sound, image and video.</p>	<p>Recommendation ITU-R M.1224</p> <p>ITU-T Recommendation I.113</p>	<p>Note 1 is not to be taken into account.</p> <p>The interchanged information is understood to include program information.</p> <p>ITU-T J 1 supp 4 J-series supplement 2</p>
Multimedia wireless system (MWS)	<p>A <i>wireless system</i> which supports information exchange of more than one type, such as text, graphics, voice, sound, image, data and video.</p>	Recommendation ITU-R F.1399-1	The definition in Document 35 is too restrictive.
Narrow-band wireless access	<p><i>Wireless access</i> in which the maximum usable end-user bit rate is up to and including 64 kbit/s.</p> <p>NOTE 1 – The access is typically digital but could encompass equivalent analogue access.</p>	Recommendation ITU-R F.1399-1	
Network	<p>A set of nodes and links that provides connections between two or more defined points to facilitate telecommunication between them (ITU-T Recommendations I.112, Q.9).</p>	Recommendation ITU-R M.1308	
Nomadic wireless access (NWA)	<p><i>Wireless access</i> application in which the location of the <i>end-user termination</i> may be in different places but it must be stationary while in use.</p>	Recommendation ITU-R F.1399-1	
Radiocommunication service	<p>A service as defined in this Section involving the transmission, <i>emission</i> and/or reception of <i>radio waves</i> for specific <i>telecommunication</i> purposes.</p>	Radio Regulations S1.19	
Service	<p>A set of functions offered to a user by an organization (ITU-T Recommendations E.800, M.60).</p>	Recommendation ITU-R M.1308	

Term	Definition	Reference	Note
Station	<p>The common name for all the radio equipment at one and the same place (see Fig. 1).</p> <p>NOTE 1 – The term "station" may refer to any <i>end-user</i> radio equipment or network radio equipment.</p>	Recommendation ITU-R F.1399-1	Station is defined in the Radio Regulations S1.61
System	A regularly interacting or interdependent group of items forming a unified whole technology.	Recommendation ITU-R M.1308	
Unidirectional	<p>Pertaining to a link where the transfer of users' information is possible in one preassigned direction only.</p> <p>NOTE – This term should not be used to describe the direction of call set-ups.</p>	Recommendation ITU-R V.662	
Universal personal telecommunications (UPT) service	<p>A service which provides personal mobility and UPT service profile management.</p> <p>NOTE 1 – This involves the network capability of uniquely identifying a UPT user by means of a UPT number.</p> <p>NOTE 2 – The general principles of universal personal telecommunication are given in Recommendation ITU-R F.850 "Principles of universal personal telecommunication".</p>	ITU-T Recommendation I.114	See also Recommendation ITU-R M.1224
Uplink channel	A unidirectional transmission channel from terminal station to central station. Also referred to as upstream channel.	Recommendation ITU-R F.1399-1	
Upstream	The direction from subscriber station(s) to base station.	Recommendation ITU-R F.1399-1	
User	<p>Any entity external to the network which utilizes connections through the network for communication.</p> <p>(See ITU-T Recommendation E.600.)</p>	Recommendation ITU-R F.1399-1	
Wideband wireless access	<p><i>Wireless access</i> in which the maximum usable end-user bit rate is greater than 64 kbit/s and up to, and including, the primary rate.</p> <p>NOTE 1 – The access is typically digital but could encompass equivalent analogue access.</p>	Recommendation ITU-R F.1399-1	

Term	Definition	Reference	Note
Wireless access	<p>wireless access (Rec. F.1399, MOD) Radio connection between a radio user and a core network.</p> <p>NOTE – Examples of wireless access: – fixed wireless access (FWA); – mobile wireless access (MWA); – nomadic wireless access (NWA).</p> <p>End-user radio connection(s) to core networks.</p> <p>NOTE 1 – Core networks include, for example, PSTN, ISDN, PLMN, PSDN, Internet, WAN/LAN, CATV, etc. (See § 4.4 for list of acronyms and abbreviations.)</p> <p>NOTE 2 – The <i>end-user</i> may be a single <i>user</i> or a <i>user</i> accessing the services on behalf of multiple <i>users</i>.</p>	<p>Recommendation ITU-R V.573-4</p> <p>Recommendation ITU-R F.1399-1</p>	

ATTACHMENT 5

Source: Document 1-6-8-9/TEMP/9

LIAISON STATEMENT TO WORKING PARTIES 1B, 6E, 6M, 8A, 8F, 9B AND JRG 8A-9B*

Terrestrial wireless interactive multimedia systems

Joint Task Group 1-6-8-9 (JTG 1-6-8-9) held its second meeting during 1-7 November 2001, and received a number of proposals for further work from Sector Members. JTG 1-6-8-9 decided that considering the work currently being performed within the contributing or interested Working Parties (or Joint Rapporteur Group), that it would be more appropriate for them to review these contributions and accordingly forwards the documents for comment.

In addition, JTG 1-6-8-9 requests that these attached documents be reviewed against the preliminary draft CPM text contained in Doc. 1B/39 (or 4A/347, 6E/159, 6M/89, 7E/73, 8A/111, 8A-9B/92, 8F/494 and 9B/128), and in particular:

- 1) Have the concepts and proposals within these documents been covered in the preliminary draft CPM text? or
- 2) What text elements on these documents would you like to be further considered by the JTG?
- 3) Do these attached documents raise any issues to which you would like to draw particular attention?

Attachments: Documents 1-6-8-9/24, 1-6-8-9/25 and 1-6-8-9/35 (these documents can be found at the respective addresses:

<http://web.itu.ch/itudoc/itu-r/sg1/docs/1-6-8-9/2000-03/contrib/024e.html>,
<http://web.itu.ch/itudoc/itu-r/sg1/docs/1-6-8-9/2000-03/contrib/025e.html> and
<http://web.itu.ch/itudoc/itu-r/sg1/docs/1-6-8-9/2000-03/contrib/035e.html>).

* This liaison statement is also brought to the attention of ITU-T Study Group 16 and ITU-R Working Parties 4A and 7E for information and possible comments.

Source: Document 1-6-8-9/TEMP/10

LIAISON STATEMENT TO WORKING PARTIES 1B, 6E, 6M, 8A, 8F, 9B AND JRG 8A-9B*

Terrestrial wireless interactive multimedia systems

Joint Task Group 1-6-8-9 (JTG 1-6-8-9) held its second meeting during 1-7 November 2001. JTG 1-6-8-9 received a number of input contributions including responses from contributing or interested working parties (or Joint Rapporteur Group). The responses from the working parties were analysed and this process has generated a number of questions that need to be resolved in order for JTG 1-6-8-9 to complete its work. JTG 1-6-8-9 also considers that it is important to correct any misinterpretation, or factual errors, arising from the analysis process and therefore wishes to provide this opportunity for the contributing working parties and administrations to review its work prior to its last meeting to be held 16-24 May 2002. JTG 1-6-8-9 will then take these comments into consideration when finalising the draft CPM text on WRC-03 agenda item 1.21.

In reviewing the attached documents, JTG 1-6-8-9 would like to draw specific attention to the following issues.

1 Preliminary draft CPM text

The preliminary draft CPM text has been developed from the analysis of responses and is forwarded for review and comment (see Attachment 1).

2 Terminology and description of concepts

The work of JTG 1-6-8-9 has required the identification of a set of common definitions, this has necessitated choosing a particular definition or description for the work. However, it is recognized that different groups may have generated definitions or descriptions for a specific purpose and the description/definition selected by the JTG 1-6-8-9 may not match their understanding of the systems covered by the scope of terrestrial wireless interactive multimedia (TWIM). Some groups may consider there are terms that are required for a common understanding of TWIM but are not defined or perhaps not included in JTG 1-6-8-9 Document 1-6-8-9/TEMP/8. In addition, there are a number of areas where JTG 1-6-8-9 needs to identify suitable ITU definitions these include:

- host-to-host communication;
- unicasting;
- narrowcasting; and
- multicasting.

* This liaison statement is also brought to the attention of ITU-T Study Group 16 and ITU-R Working Parties 4A and 7E for information and possible comments.

For JTG 1-6-8-9 to progress its work at its next meeting it is important to resolve any issues on descriptions and definitions before that meeting and to facilitate this work in the intersessional period an e-mail reflector has been set up (mailto: rcg1689-multimedia@itu.int). The contact person for this work is:

Mr. Anders Frederich
Tel.: +46 708 537879
E-mail: anders.frederich@pts.se

3 Typical technical characteristics of example systems

The following table has been extracted from the preliminary draft CPM text - see Attachment 1. In developing the preliminary draft CPM text JTG 1-6-8-9 would like to confirm the validity of all the data in the following table and requests further information on the following items(see notes (1) to (4) in the Table):

- (1) Typical transmitted data rates and information on personal area networks are required for all the systems listed - all Working Parties.
- (2) Information on the traffic information and control system (TICS) – WP 8A.
- (3) Typical frequency ranges for sound broadcasting – WPs 6E/6M.
- (4) Typical frequency ranges for television broadcasting – WPs 6E/6M.

System		Transmitted data rate	Typical frequency range	Information data rate (TBD) ¹
Cellular/MWA	Pre IMT-2000 systems	14.4 kbit/s	0.8-2 GHz	
	IMT-2000	2 Mbit/s (pico cells) 384 kbit/s (micro cells) 144 kbit/s (macro cells)	0.8-2.7 GHz	
	Systems beyond IMT-2000	(under study)		
TICS ²				
RLAN/Wireless home networks		up to 54 Mbit/s	0.9-6 GHz	
Personal area networks		(under study)	(under study)	
FWA/BWA		56 kbit/s up to 312 Mbit/s	1 to 66 GHz	
LMCS/LMDS/MMDS/MVDS/MCS/MWS		up to 156 Mbit/s	2 to 6 GHz, above 20 GHz	
Broadcasting	Sound (digital)	up to 1.8 Mbit/s (static) 448 kbit/s (mobile)	TBD ³	
	Television (digital) SDTV/EDTV/HDTV	up to 32 Mbit/s (static) 500 kbit/s (mobile)	TBD ⁴	

4 Report on future trends

Document 1-6-8-9/TEMP/5 (see Attachment 2) will form the source text for § 3.4 of the draft CPM text but currently the main input to this report has been on the fixed-mobile side. JTG 1-6-8-9 considers that it would be beneficial if this report were reviewed by the contributing working parties to ensure the information it contains is accurate, up to date and reflective of the overall views of the ITU.

5 Future studies

Many of the requirements listed in the preliminary draft CPM text (see Attachment 1) are based on the results of studies undertaken in the contributing working parties. This information includes estimates of spectrum requirements, sharing considerations, time-scales for access etc. as JTG 1-6-8-9's work has to take into consideration current and future spectrum and sharing requirements, the JTG requests that where any new information is available that updates previously supplied data the new updated figures are provided with, where possible, the reference to the particular Report, or Recommendation.

- Attachments:**
- 1** Preliminary draft CPM text for Chapter 7.1 (Source: Docs 1-6-8-9/TEMP/6, 7, 12 and 11) (see Attachment 2)
 - 2** Report on the possible trends in terrestrial wireless interactive multimedia over the next 5-10 years (Source: Doc. 1-6-8-9/TEMP/5) (see Attachment 3)
 - 3** Terminology and description of concepts (Source: Doc. 1-6-8-9/TEMP/8) (see Attachment 4)

ATTACHMENT 6

List of the input documents

Doc. No: 1-6-8-9/010
Title: LIAISON STATEMENT TO JTG 1-6-8-9 AND WPs 6E AND 6S - WORKING DOCUMENT FOR DIAGRAMMATIC INTER-RELATIONS OF RECOMMENDATIONS FOR INTERACTIVE BROADCASTING SERVICES AND THEIR SUMMARIES
Submitter: WP 6M
Language: E

Doc. No: 1-6-8-9/011
Title: LIAISON STATEMENT TO ITU-R WORKING PARTY 8A, JTG 1-6-8-9, JTG 4-7-8-9, AND THE CCV
Submitter: JRG 8A-9B
Language: E

Doc. No: 1-6-8-9/012
Title: REPORT OF THE FIRST MEEETING (GENEVA, 2-4 OCTOBER 2000)
Submitter: JTG 1-6-8-9
Language: E

Doc. No: 1-6-8-9/013
Title: LIAISON STATEMENT TO JOINT TASK GROUP 1-6-8-9 AND WORKING PARTIES 6M, 6E, 8A, 8F, 9B AND JRG 8A-9B - TECHNICAL CONVERGENCE WITH RESPECT TO TERRESTRIAL FIXED, MOBILE AND BROADCASTING INTERACTIVE MULTIMEDIA APPLICATIONS AND THE ASSOCIATED REGULATORY ENVIRONMENT
Submitter: WP 1B
Language: E

Doc. No: 1-6-8-9/014
Title: LIAISON STATEMENT ON SG 16 PROJECT "MEDIACOM 20004"
Submitter: ITU-T SG 16
Language: E

Doc. No: 1-6-8-9/015
Title: LIAISON STATEMENT TO WPs 6E, SG 8 AND ITS WPs 8A, 8D AND 8F, SG 9, JTG 1-6-8-9, AND ITU-T SGs 9, 11,13 AND 16 - 4th REVISION OF WORKING DOC. FOR DIAGRAMMATIC INTER-RELATIONS OF RECS. FOR INTERACTIVE BROADCASTING SERVICES AND THEIR SUMMARIES
Submitter: WP 6M
Language: E

Doc. No: 1-6-8-9/016
Title: REPLY TO LIAISON STATEMENT FROM JTG 1-6-8-9 - TERRESTRIAL WIRELESS INTERACTIVE MULTIMEDIA SYSTEMS
Submitter: WP 4A
Language: E

Doc. No: 1-6-8-9/017
Title: LIAISON STATEMENT TO WPs 7B, 7E, 8A, 8D, 8F AND JTG 1-6-8-9 IN RESPECT OF SHARING OF SPECTRUM FOR WRC-03 AGENDA ITEMS SEEKING SPECTRUM ALLOCATIONS WITHIN VHF/UHF TERRESTRIAL TELEVISION BANDS - CURRENT AND FUTURE SPECTRUM REQUIREMENTS FOR TERRESTRIAL TELEVISION BROADCASTING
Submitter: WP 6E
Language: E

Doc. No: 1-6-8-9/018
Title: LIAISON STATEMENT TO JTG 1-6-8-9 - TERRESTRIAL WIRELESS INTERACTIVE MULTIMEDIA SYSTEMS
Submitter: WPs 6E & 6M
Language: E

Doc. No: 1-6-8-9/019
Title: LIAISON STATEMENT TO JOINT TASK GROUP 1-6-8-9 AND WORKING PARTY 1B - TERRESTRIAL WIRELESS INTERACTIVE MULTIMEDIA SYSTEMS OPERATING UNDER THE FIXED SERVICE
Submitter: WP 9B
Language: E

Doc. No: 1-6-8-9/020
Title: LIAISON STATEMENT TO ITU-R JTG 1-6-8-9, WP 8A AND TO JRG 8A-9B
Submitter: WP 8F
Language: E

Doc. No: 1-6-8-9/021
Title: LIAISON STATEMENT TO WPs 6E AND 6S, SG 8 AND ITS WPs 8A, 8D AND 8F, SG 9, JTG 1-6-8-9 AND ITU-T SGs 9, 11, 13 AND 16 - WORKING DOCUMENT FOR DIAGRAMMATIC INTER-RELATIONS OF RECOMMENDATIONS FOR INTERACTIVE BROADCASTING SERVICES AND THEIR SUMMARIES
Submitter: WP 6M
Language: E

Doc. No: 1-6-8-9/022
Title: LIAISON STATEMENT TO ITU-R JRG 1-6-8-9
Submitter: WP 8A
Language: E

Doc. No: 1-6-8-9/023
Title: DESCRIPTION OF TERRESTRIAL WIRELESS INTERACTIVE MULTIMEDIA APPLICATIONS
Submitter: SWEDEN, FRANCE, GERMANY, NETHERLANDS
Language: E

Doc. No: 1-6-8-9/024
Title: A TECHNICAL STUDY ON THE SHARING BETWEEN A GENERIC DIGITAL MOBILE SYSTEM CONCEPT AND A GENERIC DIGITAL BROADCASTING SYSTEM CONCEPT OPERATING IN A GEOGRAPHICALLY DEFINED BROADCASTING SERVICE AREA AND IN THE SAME FREQUENCY RANGE
Submitter: ERICSSON
Language: E

Doc. No: 1-6-8-9/025
Title: PROPOSAL FOR THE WORK - A STUDY ON THE CONVERGENCE OF TERRESTRIAL FIXED WIRELESS ACCESS, MOBILE CELLULAR AND BROADCASTING NETWORKS FROM A MULTIMEDIA SERVICES PERSPECTIVE
Submitter: Ericsson
Language: E

Doc. No: 1-6-8-9/026
Title: POSSIBLE CHANGES TO ARTICLE S5
Submitter: Sweden
Language: E

Doc. No: 1-6-8-9/027
Title: PROPOSED DRAFT CPM TEXT FOR WRC-03 AGENDA ITEM 1.21
Submitter: Sweden
Language: E

Doc. No: 1-6-8-9/028
Title: LIAISON STATEMENT TO WP 6M AND JTG 1-6-8-9 - FOURTH REVISION OF WORKING DOCUMENT FOR DIAGRAMMATIC INTER-RELATIONS OF RECOMMENDATIONS FOR INTERACTIVE BROADCASTING SERVICES AND THEIR SUMMARIES
Submitter: WP 8A
Language: E

Doc. No: 1-6-8-9/029
Title: TECHNICAL AND OPERATIONAL CONVERGENCE BETWEEN TERRESTRIAL SYSTEMS IN THE FIXED, MOBILE AND BROADCASTING SERVICES
Submitter: Chairman, JTG 1-6-8-9
Language: E

Doc. No: 1-6-8-9/030
Title: A CONSIDERATION ON CPM TEXT STRUCTURE (CHAPTER 7.1) AND WORK PLAN DURING THE OCTOBER 2001 MEETING
Submitter: Chairman, JTG 1-6-8-9
Language: E

Doc. No: 1-6-8-9/031
Title: TECHNICAL AND OPERATING PARAMETERS AND SPECTRUM REQUIREMENTS FOR SHORT-RANGE RADIOCOMMUNICATION DEVICES IN KOREA
Submitter: Korea (Republic of)
Language: E

Doc. No: 1-6-8-9/032
Title: PROPOSED REVISION TO REPORT ITU-R SM.2012 ECONOMIC ASPECTS OF SPECTRUM MANAGEMENT
Submitter: Korea (Republic of)
Language: E

Doc. No: 1-6-8-9/033
Title: LIAISON STATEMENT TO WP 6M AND JTG 1-6-8-9 - MULTIMEDIA-BASED APPLICATIONS FOR TRAVELLER AND ROAD TRAFFIC INFORMATION FOR TRANSPORT INFORMATION AND CONTROL SYSTEMS (TICS)
Submitter: WP 8A
Language: E

Doc. No: 1-6-8-9/034
Title: LIAISON STATEMENT TO ITU-R JTG 1-6-8-9 - TERRESTRIAL WIRELESS INTERACTIVE MULTIMEDIA SYSTEMS
Submitter: JRG 8A-9B
Language: E

Doc. No: 1-6-8-9/035
Title: PROPOSAL FOR THE WORK - SERVICES AND SYSTEMS FOR THE MOBILE COMMUNICATION OF TOMORROW
Submitter: Ericsson, Siemens
Language: E

Doc. No: 1-6-8-9/036
Title: TERRESTRIAL WIRELESS INTERACTIVE SYSTEMS
Submitter: France Telecom
Language: E

ATTACHMENT 7

List of the Temporary documents

Doc. No: 1-6-8-9/TEMP/005

Title: REPORT ON THE POSSIBLE TRENDS IN TERRESTRIAL WIRELESS
INTERACTIVE MULTIMEDIA OVER THE NEXT 5-10 YEARS

Submitter: JTG 1-6-8-9

Language: E

Doc. No: 1-6-8-9/TEMP/006

Title: DRAFT CPM TEXT FOR CHAPTER 7.1

Submitter: JTG 1-6-8-9

Language: E

Doc. No: 1-6-8-9/TEMP/007

Title: SECTION 3.3 OF THE DRAFT CPM TEXT FOR CHAPTER 7.1

Submitter: JTG 1-6-8-9

Language: E

Doc. No: 1-6-8-9/TEMP/008

Title: TERMINOLOGY

Submitter: JTG 1-6-8-9

Language: E

Doc. No: 1-6-8-9/TEMP/009

Title: DRAFT LIAISON STATEMENT TO WORKING PARTIES 1B, 6M, 6E, 8A, 8F, 9B
AND JRG 8A-9B

Submitter: JTG 1-6-8-9

Language: E

Doc. No: 1-6-8-9/TEMP/010

Title: DRAFT LIAISON STATEMENT (2) TO WORKING PARTIES 1B, 6M, 6E, 8A, 8F,
9B AND JRG 8A-9B

Submitter: JTG 1-6-8-9

Language: E

Doc. No: 1-6-8-9/TEMP/011

Title: REGULATORY AND PROCEDURAL CONSIDERATIONS (BASED ON THE
ANSWERS TO QUESTION 6)

Submitter: JTG 1-6-8-9

Language: E

Doc. No: 1-6-8-9/TEMP/012

Title: METHODS TO SATISFY THE AGENDA ITEM FOR CONSIDERATION BY
THE WRC

Submitter: JTG 1-6-8-9

Language: E

ATTACHMENT 8

List of the participants

I. Administrations

- D Germany (Federal Republic of)**
- D Mr. THALER Hans-Jörg**
Siemens A.G.
ICN M SR B
Hofmannstrasse 51
81359 MUNICH
Germany
Tel.: +49 89 72241167
Fax: +49 89 72262366
E-mail: hans-joerg.thaler@icn.siemens.de
- D Mr. WEGNER Rainer**
Federal Ministry of Economics and
Technology
Scharnhorststrasse 36
10115 BERLIN
Germany
Tel.: +49 30 20147773
Fax: +49 30 20146065
E-mail: Rainer.Wegner@bmwi.bund.de
- B Brazil (Federative Republic of)**
- C Mr. FERREIRA-SILVA Luiz
Fernando**
Agência Nacional de Telecomunicações
- ANATEL
SAUS - Quadra 06
Bloco E - 6º Andar
Ed. Deputado Luis Eduardo Magalhaes
BRASILIA, D.F. 70070-940
Brazil
Tel.: +55 61 3122393
Fax: +55 61 3121969
E-mail: lffs@anatel.gov.br
- B Brazil (Federative Republic of)**
- D Mr. LATORRACA Luis Francisco S.**
Agência Nacional de Telecomunicações
- ANATEL
SAUS - Quadra 06
Bloco H - 4º Andar
Ala Sul
BRASILIA, D.F. 70070-940
Brazil
Tel.: +55 61 3122334
Fax: +55 61 3122272
E-mail: lfrancisco@anatel.gov.br
- CAN Canada**
- C Mr. MIMIS Vassilios**
Industry Canada
300 Slater Street
Room 1962C
OTTAWA, Ontario K1A 0C8
Canada
Tel.: +1 613 9982916
Fax: +1 613 9915487
E-mail: mimis.vassilios@ic.gc.ca
- D Mr. COSTA Jose M.**
Vice-Chairman, JTG 1-6-8-9
Nortel Networks (Canada)
P.O. Box C-3511
100 Constellation Crescent
NEPEAN, Ontario K1Y 4H7
Canada
Tel.: +1 613 7637574
Fax: +1 613 7651225
E-mail: costa@nortelnetworks.com
- CAN Canada**

D **Mr. HANNA Salim**
Industry Canada
300 Slater Street
Room 1982D (Jet-N)
OTTAWA, Ontario K1A 0C8
Canada
Tel.: +1 613 9907218
Fax: +1 613 9903158
E-mail: hanna.salim@ic.gc.ca

D **Mr. LAM Andrew**
Industry Canada
300 Slater Street
OTTAWA, Ontario K1A 0C8
Canada
Tel.: +1 613 9981694
Fax: +1 613 9520652
E-mail: lam.andrew@ic.gc.ca

D **Mr. TAYLOR William**
Industry Canada
Spectrum Engineering
300 Slater Street
Floor 19D (Jet-N)
OTTAWA, Ontario K1A 0C8
Canada
Tel.: +1 613 9904806
Fax: +1 613 9903158
E-mail: taylor.william@ic.gc.ca

CHN China (People's Republic of)

D **Mr. WONG Cheuk-Hung**
Office of the Telecommunications
Authority
29/F Wu Chung House
213 Queen's Road East
Wan Chai
HONG KONG
China
Tel.: +852 29616681
Fax: +852 29047141
E-mail: wchwong@ofta.gov.hk

KOR Korea (Republic of)

C **Mr. RYU Chung-Sang**
Ministry of Information and
Communication
Radio Research Laboratory
IT Venture Tower 17F
N° 1 Wonhoro-1-Ga
Yongsan-gu
Songpa-gu
SEOUL 140-848
Korea (Rep. of)
Tel.: +82 2 7106460
Fax: +82 2 7106449
E-mail: chsryu@rri.go.kr

D **Mr. KIM Il-Kwon**
Ministry of Information and
Communication
Radio Research Laboratory
Wonhyoro 3-1
Yongsan-gu
SEOUL 143-113
Korea (Rep. of)
Tel.: +82 2 7106590
Fax: +82 2 7106559
E-mail: kmik@yonsei.ac.kr

D **Mrs. LEE Keoung Hee**
Ministry of Information and
Communication
Radio Research Laboratory
Wonhyoro 3-1
Yongsan-gu
SEOUL 140-848
Korea (Rep. of)
Tel.: +82 2 7106561
Fax: +82 2 7106559
E-mail: khlee@rri.go.kr

D **Mr. OH Seong-Teak**
Ministry of Information and
Communication
Radio Research Laboratory
IT Venture Tower 17F
N° 1 Wonhoro-1-Ga
Yongsan-gu
SEOUL 140-848
Korea (Rep. of)
Tel.: +82 2 7106522
Fax: +82 2 7106509
E-mail : stoh@rri.go.kr

CUB Cuba

C Mr. FERNANDEZ MACBEATH Hugo
Ministerio de la Informática y las Comunicaciones
Plaza de la Revolución José Martí
CIUDAD HABANA 10600
Cuba
Tel.: +53 7 574068
Fax: +53 7 335193
E-mail: hugo@mic.cu

D Mr. WEINREICH David
Chairman, WP 4B
Globalstar L.P.
Washington Technical Office
10004 Lewisdale Road
IJAMSVILLE, MD 21754
United States
Tel.: +1 301 6074165
Fax: +1 301 6074178
E-mail: weinreich@lan2wan.com

USA United States of America

FIN Finland

C Mr. WILLIAMS Frank
Vice-Chairman, SC
Department of State
2201 C Street N.W.
Room 2529
WASHINGTON, D.C. 20520
United States
Tel.: +1 202 6470049
Fax: +1 202 6473491
Email: williamsfk@state.gov

C Mr. TOIVONEN Pasi
Finnish Communications Regulatory Authority (FICORA)
P.O. Box 313
00181 HELSINKI
Finland
Tel.: +358 9 6966853
Fax: +358 9 6966410
E-mail: pasi.toivonen@ficora.fi

D Mrs. HARRIS Vernita
NTIA - Department of Commerce
1401 Constitution Avenue N.W.
Suite 4076
WASHINGTON, D.C. 20230
United States
Tel.: +1 202 4824686
Fax: +1 202 5018189
Email: vharris@ntia.doc.gov

F France

C Mr. CONIL Pierre
Agence Nationale des Fréquences
78, avenue du Général de Gaulle
Boîte postale 400
94704 MAISONS-ALFORT Cedex
France
Tel.: +33 1 45187212
Fax: +33 1 45187313
E-mail: conil@anfr.fr

D Mr. IRELAND Walter E.
American Radio Relay League
3545 Chain Bridge Road
Suite 209
FAIRFAX, VA 22030
United States
Tel.: +1 703 9342078
Fax: +1 703 9342079
E-mail: wireland@mindspring.com

D Mr. CORDIER Pascal
FRANCE TELECOM
R&D
38-40, rue du Général Leclerc
92794 ISSY MOULINEAUX Cedex 9
France
Tel.: +33 1 45296992
Fax: +33 1 45296962
E-mail: pascal.cordier@rd.francetelecom.com

USA United States of America

F France

D Mr. COUTURIER Frédéric
Agence Nationale des Fréquences
78, avenue du Général de Gaulle
Boîte postale 400
94704 MAISONS-ALFORT Cedex
France
Tel.: +33 1 45187352
Fax: +33 1 45187309
E-mail: couturier@anfr.fr

D Miss DEPIT Ludivine
Alcatel S.A.
Alcatel Space Industries
26, avenue J.-F. Champollion
Boîte postale 1187
31037 TOULOUSE Cedex 1
France
Tel.: +33 5 34354155
Fax: +33 5 34356866
E-mail:
ludivine.depit@space.alcatel.fr

D Mrs. REBECCHI Véronique
FRANCE TELECOM
Orange France
41-45, boulevard Romain Rolland
75672 PARIS Cedex 14
France
Tel.: +33 1 55222356 / 55222365
Fax: +33 1 55222371
E-mail:
veronique.rebecchi@francetelecom.com

INS Indonesia (Republic of)

D Mr. NASUTION Datuk
Directorate General of Posts and
Telecommunications
Jalan Medan Merdeka Barat N° 17
Gedung Sapta Pesona, 7th Floor
10110 JAKARTA
Indonesia
Tel.: +62 21 3835961/ 3835972
Fax: +62 21 3867500
E-mail: Not Available

CA Mr. ARASTEH Kavouss
Ministry of Posts, Telegraph and
Telephone
Shariati Road
P.O. Box 15875-4415
15598 TEHRAN
Iran (Islamic Rep. of)
Tel.: +98 21 8403612
Fax: +98 21 867999
E-mail: kavouss.arasteh@ties.itu.int

D Mr. MEYERHOFF Henry
Ministry of Communications
Henri Mussard, 22
1208 GENEVE
Switzerland
Tel.: +41 22 7891163
Fax: +33 4 50433363
E-mail: henry.meyerhoff@ties.itu.int

J Japan

D Ms. FUKAHORI Michiko
Ministry of Public Management, Home
Affairs, Posts and Telecommunications
4-8, rue Sainte-Anne
75001 PARIS
France
Tel.: +33 1 42615045
Fax: +33 1 42615029/
+81 3 35044411
E-mail: ritepari@easynet.fr

D Mr. HASHIMOTO Akira
Vice-Chairman, SG 9
Chairman, WP 9B & JTG 1-6-8-9
NTT DoCoMo, Inc.
Sanno Park Tower 40F
2-11-1 Nagatacho
Chiyoda-ku
100-6150 TOKYO
Japan
Tel.: +81 3 51561150
Fax: +81 3 51560225
E-mail: hashimoto@nttdocomo.co.jp

IRN Iran (Islamic Republic of)

J Japan

D Mr. MUROTANI Masayoshi
NTT DoCoMo, Inc.
Sanno Park Tower
2-11-1 Nagatacho
Chiyoda-ku
100-6150 TOKYO
Japan
Tel.: +81 3 51561888
Fax: +81 3 51560225
E-mail: murotani@nttdocomo.co.jp

Vice-Chairman, SG 1
Chairman, WP 1C
Syrian Telecommunications
Establishment (S.T.E.)
S.T.E. Permanent Representative to the
ITU
9, champ d'Anier
1209 GENEVE
Switzerland
Tel.: +41 22 7988451/
+963 11 6122400
Fax: +41 22 7889251/
+963 11 6121400
E-mail: nabil.kisrawi@ties.itu.int

MEX México

D Mr. ADAME Lucio
Comisión Federal de
Telecomunicaciones
Bosque de Radiatas N° 44
4° Piso
Col. Bosques de las Lomas
05120 MEXICO, D.F.
Mexico
Tel.: +52 5 2614128/
+52 5 5606614
Fax: +52 5 2614055
E-mail: lucio.adame@ties.itu.int

**G United Kingdom of Great Britain and
Northern Ireland**

C Mr. JEACOCK Terence
Vice-Chairman, SG 1 & JTG 1-6-8-9
Chairman, WP 1A
Radiocommunications Agency
Wyndham House
189 Marsh Wall
LONDON, E14 9SX
United Kingdom
Tel.: +44 20 72110004
Fax: +44 20 72110021
E-mail: terence.jeacock@ties.itu.int

HOL Netherlands (Kingdom of the)

D Miss VAN DER LINDEN Jessie
Ministry of Transport, Public Works and
Water Management
Willem Witsenplein 6
P.O. Box 20903
2500 EX THE HAGUE
Netherlands
Tel.: +31 70 3517919
Fax: +31 70 3516505
E-mail:
jessie.vdlinden@dgtp.minvenw.nl

CA Mr. BARRETT David
Radiocommunications Agency
Wyndham House
189 Marsh Wall
LONDON, E14 9SX
United Kingdom
Tel.: +44 20 72110069
Fax: +44 20 72110021
E-mail: dave.barrett@ra.gsi.gov.uk

SYR Syrian Arab Republic

C Mr. KISRAWI Nabil

**G United Kingdom of Great Britain and
Northern Ireland**

D Mr. ALDOUS Brian
Chairman, WP 6M
Vice-Chairman, JTG 1-6-8-9
Department of Trade and Industry
151 Buckingham Palace Road
LONDON, SW1W 9SS
United Kingdom
Tel.: +44 20 72151737
Fax: +44 20 72151966
E-mail: brian.aldous@dti.gsi.gov.uk

D **Mr. BUSH Douglas**
Radiocommunications Agency
Wyndham House
189 Marsh Wall
LONDON, E14 9SX
United Kingdom
Tel.: +44 20 72110125
Fax: +44 20 72110047
E-mail: douglas.bush@ra.gsi.gov.uk

D **Mr. COOPER Robert**
Radiocommunications Agency
Wyndham House
189 Marsh Wall
LONDON, E14 9SX
United Kingdom
Tel.: +44 20 72110590
Fax: +44 20 72110117
E-mail: robert.cooper@ra.gsi.gov.uk

D **Mr. DEL MONTE Howard**
Radiocommunications Agency
14R/5B
Wyndham House
189 Marsh Wall
LONDON, E14 9SX
United Kingdom
Tel.: +44 20 72110090
Fax: +44 20 72110047
E-mail: howard.delmonte@ties.itu.int

D **Mr. DIXON Johnny**
British Telecommunications Public Ltd.
Co. (BT plc)
PP7B, RSB G10
BT Adastral Park
Martlesham Heath
IPSWICH, Suffolk IP5 3RE
United Kingdom
Tel.: +44 1473 645456
Fax: +44 1473 640962
E-mail: johnny.dixon@bt.com

G **United Kingdom of Great Britain and Northern Ireland**

D **Mr. GOWANS Andrew John**

Radiocommunications Agency
Wyndham House
189 Marsh Wall
LONDON, E14 9SX
United Kingdom
Tel.: +44 20 72110309
Fax: +44 20 72110163
E-mail: andy.gowans@ra.gsi.gov.uk

D **Mr. PIKE Simon**
Vodafone Plc.
The Courtyard
2-4 London Road
NEWBURY, Berkshire RG18 3BN
United Kingdom
Tel.: +44 1635 682829
Fax: +44 1635 676147
E-mail: simon.pike@vodafone.com

D **Mr. TALBOT Stephen Michael**
Radiocommunications Agency
Wyndham House
189 Marsh Wall
LONDON, E14 9SX
United Kingdom
Tel.: +44 20 72110679
Fax: +44 20 72110203
E-mail: stephen.talbot@ra.gsi.gov.uk

RUS **Russian Federation**

D **Mr. FEDOUNINE Vladimir**
Radio Research and Development
Institute (NIIR)
16 Kazakova Street
103064 MOSCOW
Russia
Tel.: +7 095 2610614
Fax: +7 095 2610090
E-mail: m.krivocheev@mail.tcnet.ru

S **Sweden**

C **Mr. FREDERICH Anders**
National Post and Telecom Agency

(PTS)
P.O. Box 5398
102 49 STOCKHOLM
Sweden
Tel.: +46 708 537879
Fax: +46 8 6785682
E-mail: anders.frederich@pts.se

D **Mr. NGUYEN DUY Tan**
Radio Frequency Department
18 Nguyen Du Street
HANOI 1000
Viet Nam
Tel.: +84 4 8229994
Fax: +84 4 8226910
E-mail: rfd.fpd@bdvn.vnmail.vnd.net

VTN Viet Nam (Socialist Republic of)

III. Recognized Operating Agencies

F France

FRANCE TELECOM

Mr. CORDIER Pascal
For address details, see Section I.
Mrs. REBECCHI Véronique
For address details, see Section I.

G United Kingdom of Great Britain and Northern Ireland

British Telecommunications Public Ltd. Co. (BT plc)

Mr. DIXON Johnny
For address details, see Section I.

J Japon - Japan - Japón

NTT DoCoMo, Inc.

Mr. HASHIMOTO Akira
For address details, see Section I.
Mr. MUROTANI Masayoshi
For address details, see Section I.

S Sweden

Telefonaktiebolaget LM Ericsson

Mr. KELLER Ralf
Ericsson Eurolab Deutschland GmbH
Ericsson Allee 1
52134 HERZOGENRATH
Germany
Tel.: +49 2407 575440
Fax: +49 2407 575400
E-mail: ralf.keller@ericsson.com

IV. Scientific or Industrial Organizations

- D** **Allemagne (République fédérale d') -
Germany (Federal Republic of)**
- Siemens A.G.
- Mr. THALER Hans-Jörg**
- For address details, see Section I.*
- Northern Ireland**
- Vodafone Plc.
- Mr. PIKE Simon**
- For address details, see Section I.*
- CAN** **Canada**
- Nortel Networks (Canada)
- Mr. COSTA Jose M.**
- For address details, see Section I.*
- USA** **United States of America**
- Globalstar L.P.
- Mr. WEINREICH David**
- For address details, see Section I.*
- S** **Sweden**
- Telefonaktiebolaget LM Ericsson
- Mr. WIEWEG Lasse**
- Telefonaktiebolaget LM Ericsson
- Telefonvägen 30
- 126 25 STOCKHOLM
- Sweden
- Tel.: +46 8 7196038
- Fax: +46 8 7193242
- E-mail: lasse.wieweg@lme.ericsson.se
- FIN** **Finland**
- Nokia Corporation
- Mr. OJANEN Pekka**
- Nokia Corporation
- Nokia Research Center
- Itamerenkatu 11-13
- P.O. Box 407
- 00045 NOKIA GROUP
- Finland
- Tel.: +358 7180 36545
- Fax: +358 7180 36856
- E-mail: pekka.ojanen@nokia.com
- G** **United Kingdom of Great Britain and**

VI.1 Regional and Other International Organizations

The North American Broadcasters Association (NABA)

Mr. GAUTHIER Francois

Canadian Broadcasting Corporation (CBC)

1400 René Lévesque Boulevard East

Room A10-8, 1

MONTREAL, Québec H2L 2M2

Canada

Tel.: +1 514 5973894

Fax: +1 514 5973838

E-mail: francois_o_gauthier@radio-canada.ca

XI. International Telecommunication Union

Radiocommunication Bureau

Mr. ROSSI Giuliano

Head, SGD Department

Radiocommunication Bureau

Place des Nations

Office V.427

1211 GENEVE 20

Switzerland

Tel.: +41 22 7305913

Fax: +41 22 7305806

E-mail: giuliano.rossi@itu.int

Mr. CASADO Lorenzo

Counsellor, SG 9

Radiocommunication Bureau

Place des Nations

Office V.423

1211 GENEVE 20

Switzerland

Tel.: +41 22 7305609

Fax: +41 22 7305806

E-mail: lorenzo.casado@itu.int

Mr. HENRI Yvon

Head, SSC Division

Radiocommunication Bureau

Place des Nations

Office V.121

1211 GENEVE 20

Switzerland

Tel.: +41 22 7305536

Fax: +41 22 7305785

E-mail: yvon.henri@itu.int

Mr. MESIAS Gerardo

Counsellor, SG 6

Radiocommunication Bureau

Place des Nations

Office V.438

1211 GENEVE 20

Switzerland

Tel.: +41 22 7305175

Fax: +41 22 7305806

E-mail: gerardo.mesias@itu.int

Mr. NALBANDIAN Albert

Counsellor, SG 1, 7 & CPM

Radiocommunication Bureau

Place des Nations

Office V.429

1211 GENEVE 20

Switzerland

Tel.: +41 22 7305815

Fax: +41 22 7305806

E-mail: albert.nalbandian@itu.int

Radiocommunication Bureau

Mr. VASSILIEV Alexandre

Radiocommunication Bureau

Place des Nations

Office V.304

1211 GENEVE 20

Switzerland

Tel.: +41 22 7305924

Fax: +41 22 7305785

E-mail: alexandre.vassiliev@itu.int