



This PDF is provided by the International Telecommunication Union (ITU) Library & Archives Service from an officially produced electronic file.

Ce PDF a été élaboré par le Service de la bibliothèque et des archives de l'Union internationale des télécommunications (UIT) à partir d'une publication officielle sous forme électronique.

Este documento PDF lo facilita el Servicio de Biblioteca y Archivos de la Unión Internacional de Telecomunicaciones (UIT) a partir de un archivo electrónico producido oficialmente.

یجر ی نور کتاب فملنم ننخوما ی هو تاظوفحموال، تمکتبال قسم ، (ITU) تصالاتلا لیلوالد ادحتالا نم تممقد PDF قسنبة تخسنال هذه
بامیرس دادة عا

本PDF版本由国际电信联盟（ITU）图书馆和档案服务室提供。来源为正式出版的电子文件。

Настоящий файл в формате PDF предоставлен библиотечно-архивной службой Международного союза электросвязи (МСЭ) на основе официально созданного электронного файла.

INTERNATIONAL TELECOMMUNICATION UNION

**Book of
Resolutions
and
Opinions**

Radiocommunication Assembly

Geneva, 16-20 October 1995

THE RADIOCOMMUNICATION SECTOR OF THE ITU

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

Contact address for inquiries about radiocommunication matters:

ITU

Radiocommunication Bureau

Place des Nations

CH-1211 Geneva 20

Switzerland

| | |
|-----------|---------------------------------|
| Telephone | +41 22 730 5800 |
| Fax | +41 22 730 5785 |
| Internet | brmail@itu.ch |
| X.400 | S=brmail; P=itu; A=400net; C=ch |

Contact address for orders of ITU publications:

ITU

Sales and Marketing Service

Place des Nations

CH-1211 Geneva 20

Switzerland

| | |
|-----------|--------------------------------|
| Telephone | +41 22 730 6141 English |
| Telephone | +41 22 730 6142 French |
| Telephone | +41 22 730 6143 Spanish |
| Fax | +41 22 730 5194 |
| Telex | 421 000 uit ch |
| Telegram | ITU GENEVE |
| Internet | sales@itu.ch |
| X.400 | S=sales; P=itu; A=400net; C=ch |

ITU-R RESOLUTIONS

| | Title | Page |
|-----------------|--|------|
| Res. ITU-R 1-1 | Working methods for the Radiocommunication Assembly and the Radiocommunication Study Groups..... | 1 |
| Res. ITU-R 2-1 | Conference Preparatory Meeting..... | 13 |
| Res. ITU-R 3-1 | Radiocommunication Advisory Group..... | 15 |
| Res. ITU-R 4-1 | Structure of Radiocommunication Study Groups | 16 |
| Res. ITU-R 5-1 | Work programme of Radiocommunication Study Groups for 1996-1997 | 20 |
| Res. ITU-R 6 | Liaison and collaboration with the ITU Telecommunication Standardization Sector | 46 |
| Res. ITU-R 7 | Telecommunication development including liaison and collaboration with the ITU Development Sector | 51 |
| Res. ITU-R 8 | Radiowave propagation studies and measurement campaigns in developing countries | 54 |
| Res. ITU-R 9 | Liaison and collaboration with other international and regional organizations | 56 |
| Res. ITU-R 10 | Electronic spectrum management information exchange | 57 |
| Res. ITU-R 11-1 | Development of automated spectrum management systems..... | 59 |
| Res. ITU-R 12 | Handbooks and special publications for development of radiocommunication services..... | 60 |
| Res. ITU-R 15-1 | Chairmanship and Vice-chairmanship of Radiocommunication Study Groups..... | 61 |
| Res. ITU-R 17 | Integration of Future Public Land Mobile Telecommunication Systems (FPLMTS) into existing networks..... | 62 |
| Res. ITU-R 19 | Dissemination of ITU-R texts | 63 |
| Res. ITU-R 20 | Access to and exchange of computer programs..... | 64 |
| Res. ITU-R 21 | Computer programs for radio-frequency management | 66 |
| Res. ITU-R 22 | Improvement of national radio spectrum management practices and techniques | 68 |
| Res. ITU-R 23 | Extension of the international monitoring system to a worldwide scale..... | 69 |
| Res. ITU-R 25-1 | Computer programs and associated reference numerical data for radiowave propagation assessment..... | 70 |
| Res. ITU-R 27 | HF field-strength measurement campaign | 71 |
| Res. ITU-R 28 | Standard-frequency and time-signal emissions..... | 72 |
| Res. ITU-R 29 | Characteristics of equipment and principles governing the allocation of frequency channels between 25 and 3000 MHz in the land mobile service..... | 73 |

II

| | Title | Page |
|---------------|--|------|
| Res. ITU-R 30 | Determination of the noise level for sound broadcasting in the Tropical Zone | 74 |
| Res. ITU-R 31 | Presentation of antenna diagrams | 75 |
| Res. ITU-R 33 | Presentation of texts on terminology | 76 |
| Res. ITU-R 34 | Guidelines for the selection of terms and preparation of definitions | 77 |
| Res. ITU-R 35 | The organization of vocabulary work..... | 81 |
| Res. ITU-R 36 | The coordination of vocabulary and related subjects | 83 |
| Res. ITU-R 37 | Radiowave propagation studies for system design and service planning | 85 |
| Res. ITU-R 38 | Study of regulatory/procedural matters | 86 |

ITU-R OPINIONS

| | Title | Page |
|----------------|---|------|
| Op. ITU-R 2-2 | Cooperation with the International Special Committee on Radio Interference | 88 |
| Op. ITU-R 14-7 | Preferred radio-frequency channel arrangements for radio-relay links for international connections..... | 89 |
| Op. ITU-R 15-3 | Broadcasting in the 26 MHz band..... | 90 |
| Op. ITU-R 16-3 | Organizations qualified to set standards on sound and television recording | 91 |
| Op. ITU-R 22-5 | Routine ionospheric sounding | 92 |
| Op. ITU-R 23-5 | Observations needed to provide basic indices for ionospheric propagation..... | 93 |
| Op. ITU-R 26-2 | Studies and experiments concerned with time-signal emissions..... | 94 |
| Op. ITU-R 27 | Standard-frequency and time-signal emissions in additional frequency bands..... | 95 |
| Op. ITU-R 38 | Exchange of monochrome and colour television programmes via satellites | 96 |
| Op. ITU-R 40 | Subjective assessment of the quality of television pictures. | 97 |
| Op. ITU-R 42-2 | Methods of measurement of technical characteristics of equipment for the land mobile service between 25 and 3000 MHz | 98 |
| Op. ITU-R 49-1 | Method of measurement of man-made noise in the various mobile services..... | 99 |
| Op. ITU-R 50-1 | Coordination of the work of the ITU-R and the International Electrotechnical Commission (IEC) on measurements for the adjustment and maintenance of radio-relay systems | 100 |
| Op. ITU-R 51 | Study of digital techniques by CCIR study groups and the CMTT | 101 |
| Op. ITU-R 56-1 | Location of interface between CCIR Study Group 4 and CCITT responsibilities for digital network Recommendations | 102 |
| Op. ITU-R 68-2 | Data bank of HF sky-wave signal intensity measurements..... | 103 |
| Op. ITU-R 69 | Field-strength measurements for frequencies below about 1.7 MHz..... | 104 |
| Op. ITU-R 71-2 | Documentation of time transmissions..... | 105 |
| Op. ITU-R 72 | Time dissemination using meteorological satellites | 106 |
| Op. ITU-R 73 | Interference due to man-made noise in the various mobile services..... | 107 |
| Op. ITU-R 74-1 | Systems for signal interface connection between sound-broadcasting receivers and associated equipment..... | 108 |
| Op. ITU-R 75-1 | Systems for signal interface connection between television receivers and associated equipment..... | 109 |
| Op. ITU-R 83-1 | Data broadcasting services | 110 |

IV

| | Title | Page |
|----------------|---|------|
| Op. ITU-R 85-1 | Measurements of the characteristics of atmospheric radio noise..... | 111 |
| Op. ITU-R 90 | Equipment interconnection in professional programme production installations | 112 |
| Op. ITU-R 91 | World Atlas of Ground Conductivities..... | 113 |
| Op. ITU-R 92 | Harmonization of activities for future mobile communications | 114 |
| Op. ITU-R 93 | Use of communications satellites for a service of two-way time and frequency transfer | 115 |
| Op. ITU-R 94 | Time and frequency transfer using digital telecommunication networks..... | 116 |

RESOLUTION ITU-R 1-1

**WORKING METHODS FOR THE RADIOCOMMUNICATION ASSEMBLY
AND THE RADIOCOMMUNICATION STUDY GROUPS**

(1993-1995)

The ITU Radiocommunication Assembly,

considering

- a) that the duties and functions of the Radiocommunication Assembly are stated in Articles 13 of the Constitution and 8 of the Convention (Geneva, 1992);
- b) that the duties, functions and organization of the Radiocommunication Study Groups are briefly described in Articles 11 and 20 of the Convention (Geneva, 1992),

resolves

1. that the working methods of the Radiocommunication Assembly and the Radiocommunication Study Groups shall be as follows:

PART I**Working methods****1. The Radiocommunication Assembly**

1.1 The Radiocommunication Assembly, in undertaking the duties assigned to it in Article 13 of the Constitution and Article 8 of the Convention (Geneva, 1992), shall conduct the work of each Assembly by setting up special committees, as may be required, to address organization, work programme, budget control, and editorial matters.

1.2 There shall also be established a Steering Committee, presided over by the Chairman of the Assembly, and composed of the Vice-Chairmen of the Assembly and the Chairmen and Vice-Chairmen of the Committees.

1.3 Heads of Delegations shall:

- consider the proposals regarding the organization of the work and the establishment of relevant Committees;
- draw up the proposals concerning the designation of Chairmen and Vice-Chairmen of the Committees, Study Groups and Conference Preparatory Meeting.

1.4 All special committees referred to in § 1.1 shall cease to exist with the closing of the Radiocommunication Assembly except the Editorial Committee. The Editorial Committee shall be responsible for the form of any texts prepared during the meeting and of any amendments made by the Radiocommunication Assembly to texts. This Committee shall also be responsible between Radiocommunication Assemblies for coordinating the work of the Editorial Groups set up by the Study Groups concerning texts prepared for approval before or at the next Radiocommunication Assembly. For this purpose, the Chairman and Vice-Chairmen of the Editorial Committee shall remain in office until the next Radiocommunication Assembly.

1.5 The Radiocommunication Assembly may also establish, by Resolution, committees to address specific matters. Committees so established may function beyond the closing of that Radiocommunication Assembly if the terms of reference contained in the establishing Resolution so permit.

1.6 The Radiocommunication Assembly shall consider the reports of the Director, Radiocommunication Bureau and the Radiocommunication Study Group Chairmen; it shall, in particular, consider and approve, approve with modifications, or refer back draft Recommendations submitted by the Study Groups, as well as Resolutions and

Opinions; it shall take note of the Recommendations approved since the last Radiocommunication Assembly, in accordance with the provisions of § 10 of this Resolution.

1.7 The Radiocommunication Assembly shall:

- approve the programme of work arising from the review of existing Questions and new Questions, determining the priority, urgency and time-scale for the completion of their study, taking into account the financial implications;
- decide, in the light of the approved programme of work, on the need to maintain, terminate or establish Study Groups, and allocate to each of them the Questions to be studied;
- give special attention to problems of particular interest to developing countries by grouping Questions of interest to the developing countries as far as possible, in order to facilitate their participation in the study of those Questions;
- delete any Question for which the results of studies have not been contributed during six years unless a member reports that it is undertaking studies on that Question and will contribute the results of those studies prior to the next Assembly or a revision of the Question is submitted.

1.8 The Radiocommunication Assembly shall establish, and determine suitable terms of reference and working procedures for the Radiocommunication Advisory Group to review priorities, strategies and progress of work, and to give guidance on the work of the Radiocommunication Sector, including Radiocommunication Study Groups and cooperation with other entities (see Resolution ITU-R 3).

1.9 The Radiocommunication Assembly shall report to the associated World Radiocommunication Conference on the progress in matters that may be included in agenda of future Radiocommunication Conferences as well as on the progress of ITU-R studies in response to requests made by previous Radiocommunication Conferences.

1.10 An Assembly may express its opinion relating to the duration or agenda of a future Assembly or, when appropriate, to the application of the provisions of Article 26 of the Convention relating to the cancellation of an Assembly.

2. Radiocommunication Study Groups

2.1 Each Study Group shall perform an executive role, including the planning, scheduling, supervision, delegation and approval of the work and other related matters.

2.2 The work of each Study Group, within the scope defined in Resolution ITU-R 4, shall be organized by the Study Group itself on the basis of proposals by its Chairman.

2.3 Each Study Group shall maintain a plan for its work that considers a period of at least four years ahead, taking due account of the related schedule of World Radiocommunication Conferences and associated Radiocommunication Assemblies. The plan should be reviewed at each meeting of the Study Group.

2.4 The Study Groups will normally set up Working Parties to study the Questions assigned to the Study Group. Each Working Party will study one or several Questions and will prepare draft Recommendations and other texts for consideration by the Study Group.

2.5 The Study Group may establish one or more Task Groups to which it may assign the studies of those urgent Questions and the preparation of those urgent Recommendations that cannot reasonably be carried out by a Working Party; appropriate liaison between the work of a Task Group and the Working Parties may be required.

2.6 Establishment of a Task Group shall be an action taken by a Study Group during its meeting and shall be the subject of a Decision. For each Task Group, the Study Group shall prepare a text listing:

- statement of the specific matters to be studied within the Question assigned and the subject of the draft Recommendation to be prepared;
- the reporting date;
- the name and address of the Chairman and any Vice-Chairmen.

In addition, for the case of an urgent Question (see § 3.4) arising between Study Group meetings, such that it cannot reasonably be considered at a scheduled Study Group meeting, the Chairman, in consultation with the Vice-Chairmen and the Director, Radiocommunication Bureau, (hereinafter, the Director) may take action to establish a Task Group, in a Decision.

2.7 When necessary, Joint Working Parties (JWP) or Joint Task Groups (JTG) may be established for the study of Questions requiring the participation of experts from more than one Study Group.

2.8 When Working Parties or Task Groups are assigned preparatory studies on matters to be considered by World or Regional Radiocommunication Conferences, the final reports of the Working Parties or Task Groups may be submitted directly to the Conference Preparatory Meeting (CPM), via the Chairman of the relevant Study Group.

2.9 Study Groups, Working Parties and Task Groups shall conduct their work as far as possible by correspondence, using modern means of communication.

2.10 The Director will maintain a list of administrations and other organizations participating in each Study Group, Working Party or Task Group.

2.11 In some cases, when urgent or specific issues arise that require analysis, it might be suitable to appoint a Rapporteur, who, being an expert, can carry out preliminary studies or conduct a survey among administrations and other participants in the work of the Radiocommunication Study Groups mainly by correspondence. It might also be useful to appoint a Rapporteur to prepare draft Recommendation(s) or other ITU-R texts. In this case, the Rapporteur should submit the draft as a contribution to the relevant Working Party or Task Group in due time before the meeting to allow for comments. A Rapporteur must have clearly defined Terms of Reference and may be appointed by a Working Party, a Task Group or by the Study Group. In some special cases, the establishment of a joint group of Rapporteurs from more than one Study Group might be envisaged.

2.12 Each Study Group shall set up a small Editorial Group to ensure that the technical vocabulary used is correct. In addition, it shall also ensure that the texts to be approved have the same meaning in the different working languages of the ITU and are easily comprehensible to all users. Participation in the Editorial Group should be arranged beforehand and participants should plan to extend their work beyond the close of the Study Group meeting for such periods as may be required and agreed.

2.13 The Chairman of the Study Group may establish a steering group to assist in the organization of the work.

2.14 In addition, should a Chairman, after the Radiocommunication Assembly has adjourned, consider that additional meetings of his Study Group are required, for which no provision was made by the Radiocommunication Assembly, should sufficient funds be available in the Study Group's budget, he may propose that his Study Group meet. Before such additional meetings are held, the Chairman shall consult with the Director to ensure that the provisions of § 2.16 and 2.17 below are appropriately considered especially as they apply to available resources.

2.15 Study Groups shall consider at their meetings, the draft Recommendations, progress reports and other texts prepared by Task Groups and Working Parties. To facilitate participation, a draft agenda shall be published, at latest, six weeks in advance of each meeting, indicating, to the extent possible, specific days for consideration of different topics.

2.16 For meetings held outside Geneva, the provisions of Resolution No. 4 of the Plenipotentiary Conference (Nice, 1989) and Annex 1 to the ITU Financial Regulations apply; invitations to hold meetings of the Study Groups or their Task Groups and Working Parties away from Geneva should be accompanied by a statement indicating the host's acceptance of **resolves** 2 of Resolution No. 4 (Nice, 1989).

2.17 To ensure the efficient use of the resources of the Radiocommunication Sector and of the participants in its work and to reduce the amount of travel involved, the Director, in consultation with the Chairmen, shall establish and publish a programme of meetings in a timely manner. This programme should take into account relevant factors, including:

- the common participation in certain Study Groups, Working Parties or Task Groups;
- the desirability of contiguous meetings on related topics;

- the capacity of the ITU resources;
- the requirements for documents to be used in meetings;
- the need for coordination with the other activities of the ITU and other organizations;
- any directive issued by the Radiocommunication Assembly concerning the Study Group meetings.

2.18 A Study Group meeting may be held immediately after Working Party and Task Group meetings. The agenda of such a Study Group meeting should contain the following points:

- a specific description of the topics to be addressed by the Working Party and Task Group meetings just before the Study Group meeting and, if possible, an indication of likely draft Recommendations which may be drafted;
- if some Working Parties and Task Groups have met earlier and have prepared draft Recommendations, for which the approval process in accordance with § 10 of Resolution ITU-R 1 is to be applied, a list of such draft Recommendations and the specific intent of the proposal in summarized form (see § 10.3.1).

2.19 The agenda for Working Party and Task Group meetings, which are immediately followed by a Study Group meeting, should indicate as specifically as possible the topics to be addressed, and should indicate where it is anticipated that draft Recommendations are to be considered.

2.20 With prior notice of a requirement and to the extent necessary and possible within available resources, the use of the working languages should be allowed during Task Group and Working Party meetings.

2.21 Each Study Group may adopt draft Recommendations. The draft Recommendations shall be approved either by the Radiocommunication Assembly or by correspondence, according to the provisions of § 10. Recommendations adopted in either manner shall have equal status.

2.22 Each Study Group may also adopt:

- draft Resolutions,
- draft Opinions,
- draft Questions (see also § 3),

for approval by the Radiocommunication Assembly.

2.23 Each Study Group may approve:

- Decisions,
- Reports,
- Handbooks.

The Study Group may establish other procedures for the approval of Handbooks, e.g. by the Working Party concerned.

3. Questions to be studied by the Radiocommunication Study Groups

3.1 In accordance with No. 129 of the Convention (Geneva, 1992) new or revised Questions referred to the Radiocommunication Assembly by the Plenipotentiary Conference, any other conference, the Council or the Radio Regulations Board will be assigned for study in accordance with § 3.4.

3.2 Other new or revised Questions may be approved by:

- Radiocommunication Assemblies;
- by correspondence in the interval between Radiocommunication Assemblies, when submitted to the Director by an administration or after adoption by a Study Group, Working Party or Task Group (see § 3.3).

3.3 The Director shall collect all Questions submitted for approval by correspondence under § 3.2 and circulate them to the Members in groups of related topics at appropriate intervals. Such Questions shall be approved, and have the same status as Questions approved at a Radiocommunication Assembly if:

- a simple majority of all the Member respondents are in agreement;
- and at least 10 replies are received within four months after circulation;

and shall be assigned for study in accordance with § 3.4.

3.4 Concerning Questions submitted or approved in accordance with § 3.1 and § 3.2, the Director shall, as soon as possible, consult with the Study Group Chairmen and Vice-Chairmen and shall determine the appropriate Study Group to which the Question shall be assigned, and the urgency for the studies. Each Question adopted at the Radiocommunication Assembly or by correspondence shall be assigned to only one Study Group.

3.5 When a Question has been assigned according to § 3.4, the Study Group Chairman, in consultation with the Vice-Chairmen and the Director, shall assign the Question to an existing Working Party or Task Group or, dependent upon the urgency, shall propose the establishment of a new Task Group, together with the name of its Chairman, or shall decide to refer the Question to the next Study Group meeting.

3.6 A circular-letter shall be sent by the Director to all participants in the Radiocommunication Study Groups, announcing the new or revised Question and the method of study proposed by the Study Group Chairman.

4. Preparations for World (and Regional) Radiocommunication Conferences

4.1 World Radiocommunication Conferences (WRCs) are foreseen to occur every two years. Exceptionally, Regional Radiocommunication Conferences (RRCs) may also be scheduled. The procedures outlined in Resolution ITU-R 2 apply to the preparation for WRCs. As appropriate, they may be adapted by a Radiocommunication Assembly to apply to the case of an RRC.

4.2 Preparations for WRCs will be carried out by the Conference Preparatory Meeting (CPM) (see Resolution ITU-R 2).

5. Coordination among Study Groups, Sectors and with other International Organizations

5.1 Meetings of Study Group Chairmen

Shortly after the close of each Radiocommunication Assembly and once in the interval between Radiocommunication Assemblies, the Director shall call a meeting of the Chairmen and Vice-Chairmen. The purpose of the meeting shall be to ensure the most effective coordination of the work of the Radiocommunication Study Groups. The Director shall serve as Chairman of this meeting. The meeting shall also consider the status of work in the Radiocommunication Study Groups regarding agendas for the next two WRCs and make recommendations regarding the WRC work programmes to the first meeting of the CPM.

In addition, the Director may, after consultation with the Chairmen and Vice-Chairmen of the Radiocommunication Study Groups, call meetings of Chairmen and Vice-Chairmen at other times to discuss subjects which require urgent consideration.

5.2 Liaison Rapporteurs

Coordination between Radiocommunication Study Groups may be ensured by the appointment of Radiocommunication Study Group Liaison Rapporteurs to participate in the work of the other Study Groups or with Study Groups of the other two Sectors.

5.3 Intersector Coordination Group

In specific instances, complementary work on certain topics may be conducted by Study Groups in both the Radiocommunication Sector and the Telecommunication Standardization Sector. In such circumstances, it may be agreed between the two Sectors to establish an Intersector Coordination Group (ICG). For details on this process see Resolution ITU-R 6.

5.4 *Other international organizations*

When cooperation and coordination with other international organizations is necessary, the interface shall be provided by the Director. Liaison on specific technical matters, following consultation with the Director, may be carried out by Working Parties or Task Groups, or by a representative appointed by a Study Group.

PART II

Documentation

6. Radiocommunication Assembly and Radiocommunication Study Group texts

6.1 *Definitions*

The Radiocommunication Assembly and Radiocommunication Study Group texts are defined as follows:

6.1.1 *Question*

A statement of a technical, operational or procedural problem, generally seeking a Recommendation (see Resolution ITU-R 5).

6.1.2 *Recommendation*

An answer to a Question which, within the scope of existing knowledge and studies, gives specifications, data or guidance; the preferred way of undertaking a specified task; or a preferred procedure for a specified application and which is considered to be sufficient to serve as a basis for international cooperation.

6.1.3 *Resolution*

A text giving instructions on the organization, methods or programmes of Radiocommunication Assembly or Radiocommunication Study Group work.

6.1.4 *Opinion*

A text containing a proposal or a request destined for another organization (such as Sectors of the ITU, international organizations, etc.) and not necessarily relating to a technical subject.

6.1.5 *Decision*

A text giving instructions on the organization of the work of a Study Group.

6.1.6 *Report*

A technical, operational or procedural statement, prepared by a Study Group on a given subject related to a current Question or by a CPM.

6.1.7 *Handbook*

A text which provides a statement of the current knowledge, the present position of studies, or of good operating or technical practice, in certain aspects of radiocommunications, which should be addressed to a radio engineer, system planner or operating official who plans, designs or uses radio services or systems, paying particular attention to the requirements of developing countries. It should be self-contained, require no familiarity with other ITU radiocommunication texts or procedures, but should not duplicate the scope and content of publications readily available outside the ITU.

6.2 *Presentation*

6.2.1 The text should be as brief as possible and should relate directly to the Question being studied.

6.2.2 Each text should include a reference to related texts and, where appropriate, to pertinent items of the Radio Regulations.

6.2.3 Radiocommunication Assembly texts shall be presented showing their number, their title and an indication of the year of their approval, and where appropriate, of any revisions.

6.3 *Numbering*

Radiocommunication Assembly texts shall be numbered as follows:

6.3.1 Recommendations approved prior to 1 March 1993 shall retain their previous number but be called Recommendations ITU-R and given a prefix before the number indicating the Series.

The indication of Series will be according to a list prepared by the Director. When revised, a Recommendation ITU-R shall retain its number with the addition of a hyphen and digit indicating the number of successive revisions.

Examples: Recommendation ITU-R SM.182
 Recommendation ITU-R SM.182-1
 Recommendation ITU-R SM.182-2.

6.3.2 New Recommendations approved after 1 March 1993 will be numbered in a new series starting from 1001 and be treated as above.

Examples: Recommendation ITU-R SF.1001
 Recommendation ITU-R SF.1001-1
 Recommendation ITU-R SF.1001-2.

6.3.3 Reports shall be numbered in the same way as Recommendations, but starting at 2001.

6.3.4 Questions shall be numbered in a separate series for each Study Group. Maintained Questions shall retain their existing number which will be prefixed by "ITU-R", e.g. Question ITU-R 23-1/4 (before 1 March 1993).

Questions approved after 1 March 1993 will be numbered in a new series for each Study Group starting from 201 which will have the prefix "ITU-R", e.g. Question ITU-R 201/8.

6.3.5 Opinions, Resolutions and Decisions shall be numbered in a separate series. When revised, they shall retain their number, with the addition of a hyphen and a digit indicating the number of successive revisions as in the case of a Recommendation.

6.4 *Publications*

6.4.1 Publication of approved texts shall be according to the following scheme:

- all Recommendations in force shall be published every four years; in the intervening period, new and modified Recommendations shall be published in fascicles in an economical form;
- all Resolutions and Opinions shall be published following each Radiocommunication Assembly.

6.4.2 Each Volume/fascicle for a given Series of Recommendations should include:

- a plan of the Books of the last Radiocommunication Assembly;
- a plan of the Volumes/fascicles;
- the distribution of texts between volumes/fascicles;
- a table of contents;
- an index of the Recommendations in numerical order;
- a list of other texts of the Study Group, including Questions, Resolutions, Opinions and Reports in force, indicating their title and the fascicle in which they are published;
- an introductory preface prepared by the Study Group Chairman when appropriate;
- the scope of the relevant Study Group, as well as the names of its Chairman and Vice-Chairmen;
- the texts of the Recommendations compiled by theme.

6.4.3 New Reports, Reports with significant amendments and those fulfilling a specific need shall be produced as soon as possible after approval by the Study Group.

Existing Reports need not be republished. Nevertheless, it would be desirable that they be grouped together and produced in a single volume for each Study Group once every 4 years.

Reports shall be produced in the most economical form, taking advantage of modern text preparation methods.

6.4.4 Handbooks should in general be published in bound form and updated and/or complemented by the issue of supplements. If necessary, they can include diskettes containing software or data for programs described in the text.

They should also include:

- a foreword or introduction;
- table of contents;
- general index of technical terms;
- list of abbreviations.

6.4.5 Publication of the texts of the Radiocommunication Assembly should involve the use of both printed and electronic formats.

The texts of approved Questions, Recommendations, Resolutions, Opinions and Decisions should be included in the ITU databases and be available for access by outside terminals.

Handbooks, Reports and specialized graphical texts would normally be published in printed format.

7. Preparatory documentation

7.1 *Radiocommunication Assemblies*

Preparatory documentation shall include:

- draft texts, prepared by Study Groups, for approval;
- a report from the Chairman of each Study Group and CPM, reviewing the activities of the Group since the preceding Radiocommunication Assembly, including from each Study Group Chairman a list of Questions for which no input documentation has been received for the period mentioned in § 1.7. Should a Chairman believe that a certain Question should continue an explanation must be given;
- a report by the Director which should include proposals for the future work programme;
- a list of Recommendations adopted since the previous Radiocommunication Assembly;
- contributions submitted from administrations and other participants addressed to the Radiocommunication Assembly.

7.2 *Radiocommunication Study Groups*

Preparatory documentation shall include:

- any directives issued by the Radiocommunication Assembly with respect to the Study Group, including this Resolution;
- draft Recommendations and other texts prepared by Task Groups or Working Parties;
- proposals for approval of draft Recommendations between Radiocommunication Assemblies (see § 10);
- progress reports from each Task Group, Working Party and Rapporteur;

- the contributions to be considered at the meeting, which may include documentation prepared by the Bureau on the basis of current literature, with a view to updating existing texts;
- the Chairman's report, summarizing the conclusions of any work carried out by correspondence and preparing the work to be accomplished at the meeting;
- the conclusions of the preceding meeting, in so far as they have not been included in the official texts referred to above;
- an outline agenda indicating: draft Recommendations to be considered, Questions to be considered, reports from Task Groups and Working Parties to be received, and Reports to be approved (see § 2).

8. Contributions to Radiocommunication Study Group studies

8.1 The Director, following consultation with the Study Group Chairmen, shall issue guidelines concerning the length and form of preparation for contributions, and dealing with numbering, figures, formulae, etc.

8.2 The Director shall also issue guidelines encouraging contributions provided on diskette or electronically.

8.3 The Director may return a document which does not comply with the guidelines, for it to be brought into line.

8.4 Each contribution should clearly indicate the Question, the Task Group, Working Party or, when of a general nature, the Study Group.

8.5 Contributions should be sent to the Chairman and Vice-Chairmen of the Study Group concerned, the Chairman of the Task Group or Working Party and any relevant Rapporteur and at the same time, in five copies, to the Director for numbering, translation, reproduction and distribution.

8.6 Contributions submitted by participants at least four months before the opening of the meeting at which they will be considered shall be distributed by the Director not later than one month before the opening of the meeting at which they are to be examined.

8.7 Contributions for consideration by correspondence submitted well before the date of the meeting should be distributed promptly by the Director.

8.8 Reports from the Chairmen of Study Groups, Working Parties and Task Groups may be submitted up to two months before the opening date of the meeting and shall be distributed by the Director.

8.9 Exceptionally, participants may submit in one or more of the working languages, contributions which they consider essential, and which cannot be submitted by the above-mentioned time-limit up to seven days before the opening date of the meeting at which they are to be examined. Recognizing that the Director cannot make a firm commitment regarding translation, those which can be published in at least the original working language(s) provided by administrations and distributed by the Radiocommunication Bureau before the meeting will be placed on the agenda of the first session of the meeting, but will be considered only if the meeting concerned so decides.

8.10 Participants are encouraged to submit contributions through electronic means following the procedures outlined in the BR Guidelines.

8.11 Contributions which are not available to participants at the opening of the meeting shall not be considered.

8.12 The Director shall maintain records and copies of all contributions received, in numbered series.

8.13 Contributions and other documents shall be distributed to those who have indicated a wish to participate in the Study Group, Working Party, JWP, Task Group or JTG concerned (see § 9.1).

8.14 When articles are referred to in documents submitted to the Radiocommunication Bureau, such references or bibliography should be to published works which are readily available through library services.

9. Circulation of information

9.1 The Director shall issue, at regular intervals, information which will include:

- an invitation to participate in the work of the ITU-R Study Groups for the next study period;
- a request form to be completed for the receipt of the documentation;
- a schedule of meetings for at least the next 12 months with updates, as appropriate;
- all Radiocommunication Study Group meeting invitations;
- CPM preparatory documents and final reports;
- preparatory documents for the Radiocommunication Assembly.

The following information will be provided based on responses to requests for documentation as outlined above:

- Radiocommunication Study Group circulars which will include invitations to all Working Party and Task Group meetings with a form for individual participation and draft agenda;
- Radiocommunication Study Group, Working Party and Task Group documents;
- other information which will assist Members/members.

9.2 Information on Radiocommunication Study Group activities will also be available in electronic form, as appropriate.

PART III

10. Approval of Recommendations

10.1 General provisions

10.1.1 Due to rapid and continuing changes in telecommunication technologies and consequent changes in radiocommunication services and their operational and technical functions, it is desirable to employ procedures for expeditious approval of radiocommunication Recommendations. To this end, approval of new or revised Recommendations may be sought:

- at a Radiocommunication Assembly;
- by consultation of the Members as soon as the relevant Radiocommunication Study Group has adopted the text. Procedures for such approval and consultation are given in the following sections.

10.1.2 As soon as draft new or revised Recommendations have been developed to a mature state, Radiocommunication Study Groups may decide to seek approval by one of the procedures described below. Although not explicitly mentioned below, these procedures may also be used for the deletion of existing Recommendations.

10.2 Prerequisites

10.2.1 Approval may only be sought for a draft new Recommendation within the Radiocommunication Study Group's mandate as defined by the Questions allocated to it in accordance with Nos. 129 and 149 of the Convention (Geneva, 1992). Alternatively, or additionally, approval may be sought for amendment of an existing Recommendation within the Radiocommunication Study Group's mandate, unless the text of that Recommendation specifically excludes application of this procedure.

10.2.2 Where a draft Recommendation (or revision) falls, exceptionally, within the mandate of more than one Radiocommunication Study Group, the Chairman of the Radiocommunication Study Group proposing the approval should consult and take into account the views of any other Radiocommunication Study Group Chairmen concerned before proceeding with the application of this approval procedure.

10.2.3 In the interests of stability, revision of a Recommendation should not normally be put for this procedure again within two years, unless the proposed revision complements rather than changes the agreement reached in the previous version.

10.2.4 Any Members considering themselves to be adversely affected by a Recommendation approved in the course of a study period may refer their case to the Director of the Radiocommunication Bureau (BR), who shall submit it to the relevant Radiocommunication Study Group for prompt attention.

10.2.5 The Director of the BR shall inform the next Assembly of all cases notified in conformity with § 10.2.4 above.

10.3 *First procedure: decision at a Radiocommunication Study Group meeting*

10.3.1 Upon request of the Radiocommunication Study Group Chairman, the Director shall explicitly indicate the intention to seek approval of new or revised Recommendations under this procedure when announcing the convening of the relevant Radiocommunication Study Group meeting. The announcement shall include the specific intent of the proposal in summarized form. Reference shall be provided to the document where the text of the draft of the new or revised Recommendation may be found.

This information shall be distributed to all Members/members.

The invitation to the meeting as well as the advice on the intended use of this approval procedure should be sent by the Director so that it shall be received, so far as practicable, at least three months before the meeting.

10.3.2 After debate at the Radiocommunication Study Group's meeting the decision of the delegations to apply this approval procedure must be unopposed (however, see § 10.3.3).

10.3.3 This decision must be reached during the meeting on the basis of a text available to all participants at the meeting. Exceptionally, but only during the meeting, delegations may request more time to consider their positions. Unless advised of formal opposition from any of these delegations within a period of one month after the last day of the meeting, the Director shall proceed in accordance with § 10.5.1.

10.3.4 A delegation may advise at the meeting that it is abstaining from the decision to apply the procedure. This delegation's presence shall then be ignored for the purposes of § 10.3.2 above. Such an abstention may subsequently be revoked, but only during the course of the meeting.

10.3.5 Based on the specific intent of the proposal in summarized form as referred in § 10.3.1, the Radiocommunication Study Group should approve a document stating the summaries of the proposed new Recommendations and the summaries of modifications for the proposed revised Recommendations. This document should be included in the request for consultation dispatched by the Director in accordance with § 10.5.

10.4 *Second procedure: decision by Radiocommunication Study Group consultation*

10.4.1 The following consultation process is necessary only for those draft Recommendations to which the procedure of § 10.5 is proposed to be applied, but which have not been announced according to § 10.3.1.

10.4.2 Immediately following the Radiocommunication Study Group meeting, the Director should circulate these draft Recommendations to all administrations and other organizations participating in the work of the Radiocommunication Study Group for full Radiocommunication Study Group consultation.

10.4.3 The Radiocommunication Study Group consultation period shall extend for at least two months following the circulation of the draft Recommendations and shall end after the texts of the draft Recommendations have been available in the working languages for at least four weeks.

10.4.4 If within this Radiocommunication Study Group consultation period no objections are received from Members, the approval procedure of § 10.5 should be initiated.

10.4.5 However, if objections to the continuation of the approval procedure are received within this period, the Director and the Radiocommunication Study Group Chairman shall consult the Member making the objection with a view to resolving the problem.

10.4.6 If there is an unresolved objection, the approval procedure of § 10.5 shall be abandoned and the text should either be submitted to the next Radiocommunication Assembly or, if appropriate, referred back to the Working Party or Task Group for further study.

10.5 *Approval procedure*

10.5.1 Within one month of a Radiocommunication Study Group's final decision to seek approval, according to § 10.3, or immediately following the Radiocommunication Study Group consultation of § 10.4, the Director shall request Members to indicate within three months whether they approve or do not approve the proposal. This request shall be accompanied by the complete final text, in the working languages, of the proposed new or revised Recommendation.

10.5.2 The Director shall also advise other organizations participating in the work of the relevant Radiocommunication Study Group under the provisions of Article 19 of the Convention (Geneva, 1992), that Members are being asked to respond to a consultation on a proposed new or revised Recommendation, but only Members are entitled to respond. This advice should be accompanied by the complete final texts, for information only.

10.5.3 If 70% or more of the replies from Members indicate approval, the proposal shall be accepted. If the proposal is not accepted, it shall be referred back to the Radiocommunication Study Group. Subject to further consideration in the Radiocommunication Study Group, the proposal may be submitted again for approval, either using procedures set out in this Part (including the prerequisites in § 10.2 above) or through the Radiocommunication Assembly.

10.5.4 Those Members who indicate that they do not accept approval are encouraged to advise their reasons and to indicate possible changes in order to facilitate further consideration by the Radiocommunication Study Group.

10.6 *Notification*

10.6.1 The Director shall promptly notify, by circular letter, the results of the approval procedure of § 10.5. The Director shall arrange that this information is also included in the next available ITU Notification.

10.6.2 Should minor, purely editorial amendments or correction of evident oversights or inconsistencies in the text as presented for approval be necessary, the Director may correct these with the approval of the Chairman of the relevant Radiocommunication Study Group.

10.6.3 Any comments received along with responses to the consultation shall be collected by the Director and submitted to the Radiocommunication Study Group for consideration.

10.6.4 The ITU shall publish the approved new or revised Recommendations in the working languages as soon as practicable, indicating as necessary, a date of entry into effect.

RESOLUTION ITU-R 2-1

CONFERENCE PREPARATORY MEETING

(1993-1995)

The ITU Radiocommunication Assembly,

considering

a) that the duties and functions of the Radiocommunication Assembly, in preparing for World Radiocommunication Conferences (WRCs) are stated in Articles 13 of the Constitution and 11 of the Convention (Geneva, 1992);

b) that special arrangements are necessary for such preparations,

resolves

1. that a Conference Preparatory Meeting (CPM) shall be set up on the basis of the following principles:
 - that the CPM should be permanent;
 - that it should address topics on the agenda of the immediately forthcoming conference and make provisional preparations for the subsequent conference;
 - that invitations to participate should be sent to all Members/members of the Radiocommunication Sector;
 - that documents should be distributed to all Members of the ITU and to members wishing to participate in the CPM;
 - that the terms of reference of the CPM should include the updating and rationalization of material from Radiocommunication Study Groups and the Special Committee, together with consideration of new material submitted to it;
2. that the scope of the CPM shall be:
 - on the basis of contributions from administrations, the Special Committee, the Radiocommunication Study Groups (see also Provision No. 156 of the ITU Convention (Geneva 1992)), and other sources (see Article 19 of the ITU Convention (Geneva 1992)) concerning the regulatory, technical, operational and procedural matters to be considered by world and regional radiocommunication conferences, the CPM shall prepare a consolidated report to be used in support of the work of such conferences. In the preparation of these reports, differences in approach as contained in the source material shall be reconciled to the extent possible;
3. that the working methods shall be as presented in Annex 1.

ANNEX 1

Working methods for the Conference Preparatory Meeting

1. Regulatory studies of technical and operational matters will be undertaken by the appropriate Study Groups.
2. The CPM will normally hold two meetings during the interval between WRCs.
 - 2.1 The first meeting will be for the purpose of coordinating the work programmes of the relevant Study Groups based on the agenda for the next two WRCs, and for taking into account any directives which may have come from the previous WRC. This meeting will be of short duration and will normally occur within three months after the conclusion of the previous WRC.
 - 2.2 The second meeting will be for the purpose of preparing the report for the next WRC. This meeting shall also review progress on preparatory studies for agenda items to be considered at the WRC following the next scheduled WRC. The meeting will be of adequate duration to accomplish the necessary work (two to three weeks) and will normally occur six months before the next WRC.

3. The work of the CPM will be directed by a Chairman and two Vice-Chairmen. The Chairman will be responsible for preparing the report to the next WRC. The first Vice-Chairman will be responsible for coordinating the preliminary work of the Study Groups for the WRC following the next WRC. When the next WRC has completed its work, the first Vice-Chairman mentioned above will assume the title and responsibilities of the Chairman. A new Vice-Chairman, appointed by the just-completed Radiocommunication Assembly associated with the just-completed WRC, will begin the coordination process for the WRC to follow the next scheduled WRC.
 4. In relation to working arrangements, the CPM shall be considered as an ITU meeting in accordance with No. 172 of the Constitution (Geneva, 1992).
 5. In preparing for the CPM, maximum use should be made of electronic means for the distribution of contributions to participants.
 6. The other working arrangements shall be in accordance with the relevant provisions of Resolution ITU-R 1.
-

RESOLUTION ITU-R 3-1

RADIOCOMMUNICATION ADVISORY GROUP

(1993-1995)

The ITU Radiocommunication Assembly,

considering

- a) Resolution 17 of the Plenipotentiary Conference (Kyoto, 1994) concerning the Advisory Groups for the Radiocommunication and Telecommunication Standardization Sectors;
- b) the need for continuing measures to review priorities and strategies in the radiocommunication activities and to advise the Director of the Radiocommunication Bureau;
- c) the desirability of broad-based participation of administrations, entities and representatives of Study Groups to assure the responsiveness of radiocommunication activities to the needs of the membership,

resolves

1. that, in compliance with Resolution 17 of the Plenipotentiary Conference (Kyoto, 1994), the Radiocommunication Advisory Group (RAG) to advise the Director of the Radiocommunication Bureau be maintained with the following principal duties:

- to review priorities and progress in the implementation of work programmes relating to the Radiocommunication Assembly, Radiocommunication Study Groups, CPM and the related functions of the Bureau;
- to provide guidelines and advice for the work and structure of the Radiocommunication Study Groups;
- to recommend measures to improve cooperation and coordination within the Radiocommunication Sector without impacting on the Radio Regulations Board (RRB);
- to recommend measures that may be taken, *inter alia*, to foster cooperation and coordination with other relevant international and regional organizations and standardization bodies, with the Telecommunication Development Sector, with the Telecommunication Standardization Sector, and with the Strategic Planning Unit in the General Secretariat;
- to make recommendations for the establishment of intersector coordination groups as appropriate, and monitor their activities;
- to meet jointly with the Telecommunications Standardization Advisory Group, *inter alia*, to continue the review of new and existing work and its distribution between both Sectors;
- to provide advice on strategic planning for the Radiocommunication Sector;

2. that the Radiocommunication Advisory Group shall be open to representatives of administrations, entities and organizations authorized to participate in the Radiocommunication Sector in accordance with the provisions of Article 19 of the Convention (Geneva, 1992), and representatives of Study Groups;

3. that the Radiocommunication Advisory Group shall adopt suitable working procedures for its work without imposing any restrictions on working languages, and prepare reports for the Director of the Radiocommunication Bureau,

instructs the Director of the Radiocommunication Bureau

- 1. to provide the necessary support for the Radiocommunication Advisory Group, and
 - 2. to report each year to the members of the Sector and to the Council on the results of the work carried out by the Radiocommunication Advisory Group.
-

RESOLUTION ITU-R 4-1

STRUCTURE OF RADIOCOMMUNICATION STUDY GROUPS

(1993-1995)

The ITU Radiocommunication Assembly,

considering

- a) provision No. 133 and Article 11 of the ITU Convention (Geneva, 1992);
- b) that the work of the Radiocommunication Study Groups is involved with developing the technical, operational and procedural bases for efficient use of the radio spectrum and the geostationary-satellite orbit;
- c) that cooperation between the Radiocommunication Sector and international and regional organizations with regard to the development of standards for radiocommunication systems and operations would provide considerable benefits,

resolves

- 1. that eight Radiocommunication Study Groups shall be set up as shown in Annex 1;
- 2. that the principles applicable to the work of Radiocommunication Study Group 1 are described in Annex 2;
- 3. that, in liaison with the Telecommunication Standardization Sector, the Telecommunication Development Sector, the ITU General Secretariat and with other interested organizations, the Radiocommunication Bureau organizes the work of a Coordination Committee for Vocabulary, the scope of which is given in Annex 3.

ANNEX 1

The Radiocommunication Study Groups**STUDY GROUP 1**

(SPECTRUM MANAGEMENT)

(Spectrum planning, utilization, engineering, sharing and monitoring)

Scope:

- 1. Development of principles and techniques for effective spectrum management, sharing criteria and methods, techniques for spectrum monitoring and long-term strategies for spectrum utilization as well as, in association with the appropriate bodies of the ITU, facilitation of the collection and dissemination of information concerning computer programs prepared for the implementation of relevant Recommendations (See Annex 2).
- 2. Development of Recommendations or of a Report to the Conference Preparatory Meeting in answer to those urgent Questions concerning inter-service sharing and compatibility requiring special attention. This course of action shall be followed if the matter cannot be dealt with more expeditiously through the mechanism of joint working parties, joint task groups or ad hoc rapporteur groups, as assigned by the Radiocommunication Assembly, or if the Question arises during the interval between Radiocommunication Assemblies, by the Director after consultation with interested Study Group Chairmen and Administrations (See Annex 2).

| | | |
|-----------------------|---------------|----------------------------|
| <i>Chairman:</i> | R. MAYHER | (United States of America) |
| <i>Vice-Chairmen:</i> | R. N. AGARWAL | (India) |
| | T. JEACOCK | (United Kingdom) |
| | N. KISRAWI | (Syrian Arab Republic) |
| | A. PAVLIOUK | (Russian Federation) |

STUDY GROUP 3
(RADIOWAVE PROPAGATION)

Scope:

Propagation of radio waves in ionized and non-ionized media and the characteristics of radio noise, for the purpose of improving radiocommunication systems.

| | | |
|-----------------------|---------------|---|
| <i>Chairman:</i> | L. W. BARCLAY | (International Union of Radio Science (URSI)) |
| <i>Vice-Chairmen:</i> | D. G. COLE | (Australia) |
| | F. FEDI | (Italy) |

STUDY GROUP 4
(FIXED-SATELLITE SERVICE)

Scope:

Systems and networks for the fixed-satellite service and inter-satellite links in the fixed-satellite service, including associated tracking, telemetry and telecommand functions.

| | | |
|-----------------------|-----------------|---------------|
| <i>Chairman:</i> | E. HAUCK | (Switzerland) |
| <i>Vice-Chairmen:</i> | J. M. P. FORTES | (Brazil) |
| | Y. ITO | (Japan) |

STUDY GROUP 7
(SCIENCE SERVICES)

Scope:

1. Systems for space operation, space research, earth exploration and meteorology, including the related use of links in the inter-satellite service.
2. Radio astronomy and radar astronomy.
3. Dissemination, reception and coordination of standard-frequency and time-signal services, including the application of satellite techniques, on a worldwide basis.

| | | |
|-----------------------|------------------|----------------------------|
| <i>Chairman:</i> | H. G. KIMBALL | (United States of America) |
| <i>Vice-Chairmen:</i> | G. DE JONG | (Netherlands) |
| | J. SAINT-ETIENNE | (France) |
| | J. B. WHITEOAK | (Australia) |

STUDY GROUP 8
(MOBILE, RADIODETERMINATION, AMATEUR
AND RELATED SATELLITE SERVICES)

Scope:

Systems and networks for the mobile, radiodetermination and amateur services, including related satellite services.

| | | |
|-----------------------|-----------------|---------------------------------|
| <i>Chairman:</i> | E. GEORGE | (Germany (Federal Republic of)) |
| <i>Vice-Chairmen:</i> | A. A. AL-DARRAB | (Saudi Arabia (Kingdom of)) |
| | Y. HIRATA | (Japan) |
| | O. VILLANYI | (Hungary (Republic of)) |

STUDY GROUP 9

(FIXED SERVICE)

Scope:

Systems and networks of the fixed service operating via terrestrial stations.

| | | |
|-----------------------|--------------|----------------------------|
| <i>Chairman:</i> | M. MUROTANI | (Japan) |
| <i>Vice-Chairmen:</i> | R. D. COLES | (Canada) |
| | G. F. HURT | (United States of America) |
| | V. M. MINKIN | (Russian Federation) |

STUDY GROUP 10

(BROADCASTING SERVICE – SOUND)

Scope:

International exchange of programmes and systems of the broadcasting and broadcasting-satellite services, including audio frequency and recording equipment, as well as the overall performance of the means of delivering signals to the general public, where they are used for sound, data and ancillary services accompanying sound.

| | | |
|-----------------------|-------------|---------------------------------|
| <i>Chairman:</i> | A. MAGENTA | (Italy) |
| <i>Vice-Chairmen:</i> | H. M. JOSHI | (India) |
| | H. KUSSMANN | (Germany (Federal Republic of)) |
| | L. OLSON | (United States of America) |

STUDY GROUP 11

(BROADCASTING SERVICE – TELEVISION)

Scope:

International exchange of programmes and systems of the broadcasting and broadcasting-satellite services, including video frequency and recording equipment, as well as the overall performance of the means of delivering signals to the general public, when they are used for television, data and associated ancillary services.

| | | |
|-----------------------|---------------|----------------------|
| <i>Chairman:</i> | M. KRIVOCHEEV | (Russian Federation) |
| <i>Vice-Chairmen:</i> | T. NISHIZAWA | (Japan) |
| | R. ZEITOUN | (Canada) |

ANNEX 2

**Principles applicable to the work of Radiocommunication
Study Group 1**

1. To provide a worldwide forum for managers of the radio-frequency spectrum to exchange information and to discuss common interests in relation to the relevant issues of radio-frequency spectrum management.
2. To develop ITU-R texts (Resolution ITU-R 1, § 6) on long-term strategies for frequency spectrum utilization.

3. To develop ITU-R texts (Resolution ITU-R 1, § 6) concerning:
 - principles and techniques for the effective use and management of the radio-frequency spectrum including the technical basis for frequency assignment and coordination, computer-aided analysis, electromagnetic compatibility (EMC), analysis equipment parameters which affect the efficient use of the radio spectrum, and methods of measurement;
 - in cooperation with the Study Groups concerned, appropriate spectrum sharing criteria and methods to enable the efficient use of the spectrum;
 - techniques for spectrum monitoring and related issues.
4. To provide assistance in matters within its competence to developing countries in cooperation with the Telecommunication Development Sector.
5. Recognizing the continuing work within the Study Groups, including Study Group 1, to facilitate the collection and dissemination of information concerning computer programs identified by the Study Groups for implementation of relevant Recommendations which use automated processes for their proper application, in cooperation with the appropriate bodies of the ITU.
6. Study a limited number of specific urgent Questions concerning inter-service sharing and compatibility referred to it by the Radiocommunication Assembly or, if the Question arises during the interval between the Assemblies, by the decision of a meeting of the Study Group Chairmen and Vice-Chairmen or by the Director after consultation with interested Study Group Chairmen and Administrations. The Radiocommunication Assembly or the Director, as the case may be, shall establish a time schedule for the completion of this work.

Upon referral of such an urgent Question, the Chairman shall, in consultation with the Director, establish a Task Group to consider the Question, inviting all interested Administrations and agencies to participate.

The Task Group, upon successful completion of their work, shall prepare draft new or modified Recommendation(s).

The Study Group Chairman shall, if the level of urgency requires it, convene a meeting of the Study Group to consider such draft Recommendations. The Study Group may decide to apply the procedures for the approval of Recommendations according to § 10 of Resolution ITU-R 1.

ANNEX 3

CCV

(COORDINATION COMMITTEE FOR VOCABULARY)

Scope:

Coordination within the Radiocommunication Study Groups, and liaison with the Telecommunication Standardization Study Groups, the Telecommunication Development Study Groups, the ITU General Secretariat and other interested organizations (mainly the IEC) concerning:

- vocabulary, including abbreviations and initials;
- related subjects (quantities and units, graphical and letter symbols).

Chairman: J. SCHWOB (France)

Vice-Chairmen: P. GARCÍA-BARQUERO (Spain)
A. N. HEIGHTMAN (United Kingdom)

RESOLUTION ITU-R 5-1

**WORK PROGRAMME OF RADIOCOMMUNICATION
STUDY GROUPS FOR 1996-1997**

(1993-1995)

The ITU Radiocommunication Assembly,

considering

- a) that according to Article 8 of the ITU Convention (Geneva, 1992), the Radiocommunication Assembly shall, bearing in mind the need to reduce the demands on the resources of the Union, approve the programme of work arising from the review of existing Questions and new Questions and determine the priority, urgency, estimated financial implications and time-scale for the completion of their study, allocate the work to Study Groups and report to the associated World Radiocommunication Conference on the progress of matters that may be included in the agenda of future radiocommunication conferences;
- b) the Strategic Plan for the Union given in Resolution 1 of the Plenipotentiary Conference (Kyoto, 1994);
- c) those parts of § 1, 2 and 3 of Resolution ITU-R 1 concerning the Questions to be studied by the Radiocommunication Study Groups,

resolves

1. that the categories used to identify the priority and urgency of Questions to be studied should be:
 - C: Conference oriented Questions associated with work related to specific preparations for, and decisions of, world and regional radiocommunication conferences (see NOTE 1):
 - C1: Very urgent and priority studies, required for the World Radiocommunication Conference to be held within the next two-year period;
 - C2: urgent studies, expected to be required for other radiocommunication conferences;
 - S: Questions which are intended to respond to:
 - matters referred to the Radiocommunication Assembly by the Plenipotentiary Conference, any other conference, the Council, the Radio Regulations Board (see NOTE 1);
 - advances in radiocommunication technology or spectrum management;
 - changes in radio usage or operation:
- S1: urgent studies which are intended to be completed within two years;
- S2: important studies, necessary for the development of radiocommunications;
- S3: required studies, expected to facilitate the development of radiocommunications;
2. that the work programme for the next study period shall be the Questions listed in Annex 1 with Categories C and S. These Questions shall be referred to the appropriate Radiocommunication Study Group. The texts of the Questions listed in Annex 1 are to be found in Document 1 of the series of documents for the next study period of the appropriate Study Group,

further resolves

3. that Conference oriented Questions for study by the Radiocommunication Study Groups shall:
 - address topics seeking a Recommendation or a report to a conference;
 - address a single specific issue;
 - include a specified target date for the output;

4. that each Question shall:
- indicate in a concise form the reason for the study;
 - specify the scope of the study as precisely as possible;
 - indicate the form in which the response should be prepared (e.g. as a Recommendation or other text, etc.) and, when possible, an outline of the contents of the expected response;
 - specify the date when a complete or partial response is needed or the time period for the study, together with the milestones for the progress of the study;
 - be modified to take account of partial answers;
 - identify relevant ITU Study Groups working in closely related areas, to which the text of the Question should be sent for information;
5. that Radiocommunication Study Groups shall consider all their Questions and make proposals to each Assembly:
- so as to bring them into conformity with *further resolves* 3 and 4 above;
 - for the categorization of Questions in accordance with *resolves* 1 above;
 - for the deletion of Questions, where the study has been completed, where no contributions are expected within the next study period, or, in conformance with Resolution ITU-R 1 § 1.7, where no contributions have been made; such Questions shall be identified as category D;
6. that each Radiocommunication Study Group shall report to each Radiocommunication Assembly the progress that has been made in respect of each Question allocated to it with categories C1, C2 or S1;
7. that, as a part of the work programme, a Study Group may also undertake studies, within the scope of its mandate, for the revision of an existing Recommendation or on a topic for which a new Question is required. Where such study is expected to continue beyond the date of the next Radiocommunication Assembly, an appropriate Question should be drafted for approval by the Assembly.

NOTE 1 – If necessary, following a world or regional radiocommunication conference, the Director of the Radiocommunication Bureau, in consultation with the Chairmen of the Study Groups concerned, may assign appropriate categories to Questions which are related to the decisions of the conference or to the agendas of future world or regional radiocommunication conferences.

ANNEX 1

Questions assigned by the Radiocommunication Assembly to Study Group 1

Spectrum management

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 1-2/1 | Designation of emissions | C2 |
| 22-2/1 | Frequency measurements at monitoring stations | S2 |
| 24-2/1 | Field-strength measurements at monitoring stations | S2 |
| 26-3/1 | Bandwidth measurements at monitoring stations | S2 |
| 27-2/1 | Monitoring of spacecraft radio emissions | S2 |
| 28-3/1 | Direction finding at monitoring stations | S2 |
| 29-4/1 | Automatic monitoring of the radio-frequency spectrum | S2 |
| 32-4/1 | Application of monitoring to assist radiocommunications development | S2 |
| 34-3/1 | Identification of radio stations by manual or automatic means | S2 |
| 44-1/1 | System models for the evaluation of compatibility in spectrum use | S3 |
| 45-3/1 | Techniques and technical criteria for frequency sharing | S2 |
| 47/1 | Definition of efficiency and utility of spectrum use | S2 |
| 52-3/1 | Determination of radiation levels related to safety aspects | S3 |
| 54-1/1 | Frequency tolerance of transmitters | C2 |
| 55-3/1 | Spurious emissions | C1 |
| 60-1/1 | Spectra and bandwidths of emissions | S2 |
| 64-1/1 | Spectrum usage and sharing criteria above about 20 GHz | S3 |
| 65/1 | Improved methods of exchanging computer programs and data for spectrum management purposes | S1 |
| 66/1 | Methods and algorithms for frequency planning | S3 |
| 67/1 | Method of measuring the maximum frequency deviation of FM broadcast emissions at monitoring stations | S2 |
| 71/1 | Bandwidth expansion techniques and spectrum sharing | S2 |
| 72/1 | Optimum network planning and frequency assignment techniques | S3 |

Spectrum management (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 80-1/1 | Definition of interference and units and methods of measurement | S2 |
| 81/1 | Electromagnetic compatibility requirements concerning radiocommunication services, in particular safety services | S3 |
| 201/1 | Spectrum management aspects of short-range communication systems | S2 |
| 202/1 | Characterization and measurement of various interference sources to digital communication service (according to their interference effect) | S2 |
| 203/1 | New spectrally efficient techniques and systems | S2 |
| 204/1 | Block allocations for adaptive systems in the HF band | S2 |
| 205/1 | Long-term strategies for spectrum utilization | S2 |
| 206/1 | Strategies for economic approaches to national spectrum management and their financing | S1 |
| 207/1 | Assessment, for spectrum planning and strategy development purposes, of the benefits arising from the use of the radio spectrum | S1 |
| 208/1 | Alternative methods of national spectrum management | S1 |
| 209/1 | Parameters of radio equipment required for spectrum management and the efficient use of the radio spectrum | S1 |

Questions assigned by the Radiocommunication Assembly to Study Group 3

Radiowave propagation

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 201-1/3 | Radiometeorological data required for the planning of terrestrial and space communication systems and space research applications | S2 |
| 202/3 | Methods for predicting propagation over the surface of the Earth | S2 |
| 203-1/3 | Propagation data and prediction methods for terrestrial broadcasting and terrestrial mobile services at frequencies above 30 MHz | S2 |
| 204-1/3 | Propagation data and prediction methods required for terrestrial line-of-sight systems | S2 |
| 205-1/3 | Propagation data and prediction methods required for trans-horizon systems | S2 |
| 206-1/3 | Propagation data and prediction methods for fixed- and broadcasting-satellite services | S1 |
| 207-1/3 | Propagation data and prediction methods for satellite mobile and radiodetermination services above about 0.1 GHz | S1 |
| 208-1/3 | Propagation factors in frequency sharing issues affecting fixed-satellite services and terrestrial services | S2 |
| 209/3 | Variability and risk parameters in system performance analysis | S2 |
| 210/3 | Propagation prediction procedure for the land mobile and terrestrial broadcasting services in the frequency range 30 MHz to 3 GHz | S1 |
| 211/3 | Propagation data and propagation models for the design of short-range wireless personal communication systems and wireless local area networks (WLANs) in the frequency range 300 MHz to 100 GHz | S1 |
| 212/3 | Ionospheric properties | S3 |
| 213/3 | The short-term forecasting of operational parameters for ionospheric and trans-ionospheric radiocommunications | S3 |
| 214/3 | Radio noise | S2 |
| 215-1/3 | Sky-wave field strength and circuit performance at frequencies below about 1.7 MHz | S2 |
| 217-1/3 | Radio system reliability, variations of ionospheric propagation characteristics and fading at frequencies between about 1.6 and 30 MHz | S2 |
| 218-1/3 | Ionospheric influences on space systems at frequencies above about 1.6 MHz | S2 |

Radiowave propagation (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 220/3 | Ionospheric effects and operational considerations associated with artificial modification of the ionosphere and the radio-wave channel | S3 |
| 221/3 | VHF and UHF propagation by way of sporadic E and other ionization | S3 |
| 222/3 | Measurements and data banks | S2 |
| 223/3 | Prediction of sky-wave propagation conditions, signal intensity and circuit performance at frequencies between about 1.6 and 30 MHz | S2 |
| 224/3 | The prediction of system performance and reliability for digital modulation techniques at HF | S2 |
| 225/3 | The prediction of propagation factors affecting systems using digital modulation techniques at LF and MF | S1 |

Questions assigned by the Radiocommunication Assembly to Study Group 4

Fixed-satellite service

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 7-3/4 | Baseband transmission variability, delay and echoes in systems in the fixed-satellite service | S2 |
| 32-3/4 | Methods for determining the interference potential of earth stations in the fixed-satellite service in the frequency bands shared with radio-relay systems | S1 |
| 39/4 | Technical criteria to be used in the Board's examinations of the probability of harmful interference required by provisions Nos. 1354, 1506 and 1509 of the Radio Regulations | S1 |
| 42-1/4 | Characteristics of antennas at earth stations in the fixed-satellite service | S1 |
| 44-1/4 | Use of transportable transmitting earth stations in the fixed-satellite service including use for feeder links to broadcasting satellites | S2 |
| 46-2/4 | Preferred multiple-access characteristics in the fixed-satellite service | S2 |
| 55-2/4 | Feeder links in the fixed-satellite service used for the connections to and from geostationary satellites in various mobile-satellite services | S1 |
| 56-1/4 | Frequency sharing between the inter-satellite service when used for links of the fixed-satellite service and terrestrial radiocommunication services | S2 |
| 57-1/4 | Preferred technical characteristics and selection of sites for earth stations in the fixed-satellite service to facilitate sharing with terrestrial services | S2 |
| 59/4 | Preferred technical characteristics of space stations in the fixed-satellite service to facilitate sharing with terrestrial services | S2 |
| 60-1/4 | Sharing criteria for protecting systems in the fixed-satellite service against interference from line-of-sight radio-relay transmitters operating in shared frequency bands | S2 |
| 61/4 | Criteria for frequency sharing between the fixed service and the fixed-satellite service in bidirectionally allocated frequency bands | S2 |
| 62/4 | Frequency sharing of the fixed-satellite service and the inter-satellite service with the fixed service under provisions of RR Article 14 | S2 |
| 63-1/4 | Frequency sharing of the fixed-satellite service with terrestrial radio services other than the fixed service under the provisions of Article 14 of the Radio Regulations | S2 |

Fixed-satellite service (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 67-1/4 | Frequency sharing between the fixed-satellite service and the Earth exploration-satellite (passive) and space research (passive) services near 19 GHz | C1 |
| 68-1/4 | Frequency sharing of the fixed-satellite service and the inter-satellite service with other space radio services under provisions of Article 14 of the Radio Regulations | S2 |
| 70-1/4 | Protection of the geostationary-satellite orbit against unacceptable interference from transmitting earth stations in the fixed-satellite service at frequencies above 15 GHz | S2 |
| 73-1/4 | Availability and interruptions to traffic on digital paths or circuits in the fixed-satellite service | S2 |
| 75-3/4 | Performance objectives of international digital transmission links in the fixed-satellite service | S1 |
| 76-1/4 | Voice and data signal processing for international digital transmission links in the fixed-satellite service | S2 |
| 77-1/4 | Video signal processing for international digital transmission links in the fixed-satellite service | S2 |
| 78-1/4 | Use of satellite communication systems in the B-ISDN | S2 |
| 81/4 | Frequency sharing among networks in the fixed-satellite service, the mobile-satellite service and those of multiservice satellites in the geostationary satellite orbit | S2 |
| 201-1/4 | Digital satellite systems in the FSS in synchronous transport networks based on the SDH | S1 |
| 202-1/4 | Interference criteria in the fixed-satellite service for the optimum inhomogeneous use of the available capacity of the geostationary orbit | S1 |
| 203-1/4 | The impact of using small antennas on the efficient use of the geostationary-satellite orbit | S1 |
| 204/4 | Interference of undetermined origin on Earth-to-satellite links | S2 |
| 205-1/4 | Frequency sharing between non-geostationary satellite feeder links in the fixed-satellite service used by the mobile-satellite service | S1 |
| 206-2/4 | Sharing between non-geostationary satellite feeder links in the fixed-satellite service used by the mobile-satellite service and other space services, and networks of the fixed-satellite service using geostationary satellites | S1 |
| 208/4 | Use of statistical and stochastic methods in evaluation of interference between satellite networks in the fixed-satellite service | S2 |

Fixed-satellite service (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 209/4 | The use of frequency bands allocated to the fixed-satellite service for both the up and down links of geostationary-satellite systems | S2 |
| 214/4 | Technical implications of steerable and reconfigurable satellite beams | S1 |
| 216/4 | Interruptions to traffic due to site diversity arrangements and/or equipment protection arrangements on digital paths or circuits in the fixed-satellite service | S2 |
| 218-1/4 | Compatibility between on-board processing satellites in the FSS and terrestrial networks | S2 |
| 219/4 | Protection of non-geostationary satellite feeder links in the fixed-satellite service used by the mobile-satellite service from radio-relay systems in the shared frequency bands | C2 |
| 220/4 | Interference criteria for systems in the fixed-satellite service using spread spectrum multiple access | S2 |
| 221/4 | Selection of radio stars visible in the southern hemisphere for use in determining <i>G/T</i> values for antennas in the fixed-satellite service | S2 |
| 222/4 | Protection ratio masks for TV/FM carriers | S1 |
| 223/4 | Interference criteria for short-term interference events into the fixed-satellite service networks | S1 |
| 224/4 | Technical coordination and optimization methods for systems in the fixed-satellite service to be used under Appendix 30B of the Radio Regulations | S1 |
| 226-1/4 | Use of portable and transportable transmitting earth stations for digital transmission of digital high-definition television for news gathering and outside broadcasts via satellite | S1 |
| 227/4 | Use of digital transmission techniques for satellite news gathering (sound) | S2 |
| 229/4 | SNG User's guide | S1 |
| 230/4 | Studies on efficient use of FSS orbit/spectrum resources resulting from Resolution 18 (Kyoto-94) | C1 |
| 231/4 | Sharing between networks of the fixed-satellite service using non-geostationary satellites and other networks of the fixed-satellite service | C2 |
| 232/4 | Use of regenerative processing in FSS allocations | S2 |
| 233/4 | Dedicated user digital satellite communications systems and their associated architectures | S2 |
| 234/4 | Phase jitter and wander requirements for satellite earth station modems | S1 |

Fixed-satellite service (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 235/4 | Use of operational facilities to meet power flux-density limitation under Article 28 of the Radio Regulations | S1 |
| 236/4 | Interference criteria and calculation methods for the fixed-satellite service | S1 |
| 237/4 | Sharing criteria for systems in the fixed-satellite service involving a large number of non-geostationary satellites with radio-relay systems in the 17.7 to 19.7 GHz and 27.5 to 29.5 GHz bands | S1 |
| 238/4 | Sharing criteria for inter-satellite links between non-geostationary satellites in connection with feeder links for the mobile-satellite service using the same frequency bands with radio-relay systems | S2 |
| 239/4 | Sharing criteria between systems utilizing inter-satellite links | S1 |

Questions assigned by the Radiocommunication Assembly to Study Group 7

Science services

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 101-1/7 | Performance and reliability of frequency standards and their use in time-scales | S3 |
| 102-1/7 | Methods for improving terrestrial standard-frequency and time-signal dissemination | S2 |
| 103-1/7 | Techniques for time transfer | S2 |
| 104-1/7 | Stability of standard-frequency and time-signal emissions as received | S3 |
| 110-1/7 | Time codes | S2 |
| 111/7 | Signal delays in antennas and other circuits for high-precision time transfer | S2 |
| 112-1/7 | World-wide dissemination of time signals to an accuracy of 1 μ s or better for industrial purposes | S3 |
| 117/7 | Radio links between earth stations and spacecraft by means of data relay satellites | S2 |
| 118/7 | Data relay satellite systems and factors which affect frequency sharing with other services | S2 |
| 127/7 | Radiation patterns and side lobe characteristics of large antennas used for space earth stations and radioastronomy | S3 |
| 129-1/7 | Unwanted emissions radiated from and received by stations of the science services | C2 |
| 139-2/7 | Data transmission systems for Earth exploration satellites systems | S2 |
| 141-2/7 | Data transmission for meteorological satellite systems | S2 |
| 142-2/7 | Earth exploration satellite and meteorological satellite data collection and position location systems | S2 |
| 143-1/7 | Radiocommunications for satellite systems for geodesy and geodynamics | S2 |
| 144/7 | Radiocommunication systems for the meteorological-aids service | S2 |
| 145-1/7 | Technical factors involved in the protection of radioastronomical observations | S2 |
| 146-1/7 | Criteria for evaluation of interference to radioastronomy | S2 |
| 147/7 | Radioastronomy in the vicinity of the L ₂ Sun-Earth Lagrangian point | S2 |
| 148/7 | Radar astronomy | S2 |
| 149-1/7 | Frequency utilization on the far side of the Moon | S2 |
| 150/7 | Radiocommunication requirements for systems to search for extraterrestrial intelligence | S2 |

Science services (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 152-1/7 | Standard frequencies and time signals from satellites | S3 |
| 154/7 | Possible relocation of frequency assignments to certain space missions from 2 GHz bands to bands above 20 GHz | C2 |
| 201/7 | Two-way time transfer through communication satellites | S1 |
| 202/7 | Frequency sharing and protection between space VLBI and other space research systems | S2 |
| 203/7 | Characteristics and telecommunications requirements for space VLBI | S2 |
| 204-1/7 | Sharing of the band 1 675-1 710 MHz between the mobile-satellite service and the meteorological-satellite and meteorological aids service | C1 |
| 205/7 | Radio observations of pulsars | S2 |
| 206/7 | Frequency comparisons of remotely located standards at the 10^{-15} level of uncertainty | S2 |
| 207/7 | Time and frequency transfer using digital telecommunication networks | S1 |
| 209/7 | Bandwidth requirements for deep-space research | S2 |
| 210/7 | Protection criteria for deep-space research | S2 |
| 211/7 | Frequency sharing between the space research service and other services in the 37-38 GHz and 40-40.5 GHz bands | S2 |
| 212/7 | Frequency sharing between the space research service and other services in the bands near 400 MHz | C1 |
| 213/7 | Compatibility of active spaceborne sensors and systems in the radionavigation and radiolocation services | C1 |
| 214/7 | Frequency sharing between Earth exploration-satellite systems and systems in the fixed-satellite and meteorological-satellite services in the band 8 025-8 400 MHz | C1 |
| 215/7 | Frequency sharing between Earth exploration-satellite systems (passive), space research systems (passive) and systems in the fixed, mobile and fixed-satellite services in the band 18.6-18.8 GHz | C1 |
| 216/7 | Frequency sharing between Earth exploration-satellite systems (passive), space research systems (passive) and systems in the fixed, mobile, fixed-satellite, mobile-satellite, inter-satellite and radiolocation services in the band 50.2-65 GHz | C1 |
| 217/7 | Frequency sharing in the band 401-403 MHz between satellite data collection and position location systems for Earth exploration and meteorology and systems in the fixed, mobile, space operation and meteorological aids services | C1 |

Questions assigned by the Radiocommunication Assembly to Study Group 8

Mobile, radiodetermination, amateur and related satellite services

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 1-2/8 | Signal-to-interference protection ratios and minimum field strengths required in the mobile services | S3 |
| 5-5/8 | The introduction of direct-printing telegraph equipment in the maritime mobile service | S2 |
| 7-4/8 | Characteristics of equipment and frequency planning for the land mobile service between 25 and 3 000 MHz | S2 |
| 9-6/8 | Digital selective-calling system for future operational requirements of the maritime mobile service | S2 |
| 12-4/8 | Radio-paging systems | S2 |
| 28-2/8 | Frequency requirements for shipborne transponders | S2 |
| 35-1/8 | Efficient use of the radio spectrum by radar stations in the radiodetermination service | S2 |
| 36-1/8 | Leaky feeder systems in the land mobile service | S2 |
| 37-3/8 | Systems with improved spectrum efficiency for the land mobile service | S1 |
| 39-4/8 | Future Public Land Mobile Telecommunication Systems | S1 |
| 40-4/8 | Digital transmission in the land mobile service | S1 |
| 45-4/8 | Technical and operating considerations for a global land and maritime distress and safety system | S3 |
| 48-3/8 | Techniques and frequency usage in the amateur service and amateur-satellite service | S3 |
| 51-3/8 | Automatic determination of location and guidance in the land mobile service | S1 |
| 52-1/8 | Integration of public mobile radiocommunication services in the VHF/UHF frequency bands | S3 |
| 53-3/8 | Use of frequencies by the maritime mobile service in the band 435-526.5 kHz | S3 |
| 55-3/8 | Development and future implementation of data exchange systems and ship movement telemetry and telecommand systems | S3 |
| 62-2/8 | Interference to the aeronautical mobile and aeronautical radionavigation services | S2 |
| 67-1/8 | Multi-transmitter radio systems using quasi-synchronous (simulcast) transmission in the land mobile service | S2 |

Mobile, radiodetermination, amateur and related satellite services (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 72-1/8 | Minimum channel separation and optimum systems of modulation, co-channel and adjacent-channel coordination criteria for simultaneous use of different modulation techniques in systems of the land mobile services between 25 and 3 000 MHz | S3 |
| 74-3/8 | Public mobile telephone service with aircraft | S2 |
| 76-3/8 | Data communication in the maritime mobile service | S3 |
| 77-2/8 | Adaptation of mobile radiocommunication technology to the needs of developing countries | S1 |
| 82-3/8 | System concepts of the mobile-satellite services | S2 |
| 83-3/8 | Efficient use of the radio spectrum and frequency sharing within the mobile-satellite service (MSS) | C2 |
| 84-3/8 | Use of non-geostationary-satellite orbits in mobile-satellite services | C2 |
| 85-1/8 | Availability of circuits in mobile-satellite services | S2 |
| 87-3/8 | Transmission characteristics for a mobile-satellite communication system | S2 |
| 88-1/8 | Propagation and mobile earth station antenna characteristics for mobile-satellite services | S3 |
| 89-2/8 | Compatibility for interworking between the mobile-satellite systems and terrestrial networks including ISDN | S2 |
| 90/8 | Technical and operating characteristics of systems providing radio-communication using satellite techniques for distress and safety operations | S2 |
| 91-1/8 | Technical and operating characteristics of the radiodetermination-satellite service | S2 |
| 92/8 | Study on general questions relating to the Global Maritime Distress and Safety System (GMDSS) | S3 |
| 93-2/8 | Automation of MF, HF and VHF maritime mobile communications | S2 |
| 94/8 | Necessary bandwidth required for radio altimeters operating in the band 4 200-4 400 MHz | S3 |
| 95/8 | Sharing between the aeronautical radionavigation service and the mobile service in the band 5 000-5 250 MHz | S2 |
| 96/8 | Improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service | S2 |
| 97/8 | System for automatically identifying VHF and UHF radio stations transmitting in the maritime mobile service | S3 |

Mobile, radiodetermination, amateur and related satellite services (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 98/8 | Transmission of digital data for the updating of electronic chart display systems (ECDIS) | S2 |
| 99/8 | Interference due to intermodulation products in the land mobile services between 25 and 3 000 MHz | S3 |
| 101-2/8 | Digitally encoded speech in the land mobile service | S1 |
| 102-2/8 | Suitable frequency bands for the operation of wind profiler radars | C1 |
| 103/8 | Criteria for sharing between the mobile service and the space research, space operation and Earth exploration-satellite service space stations in the 2 025-2 110 MHz and 2 200-2 290 MHz bands | C1 |
| 104/8 | Technical and operational considerations for multiservice satellites operating in the frequency bands from about 20 to about 30 GHz | C1 |
| 105/8 | Criteria for sharing between the fixed service, and the mobile, radiodetermination, amateur and related satellite services within the range 1-3 GHz | S1 |
| 106/8 | Criteria for sharing between the broadcasting-satellite service (sound) and complementary terrestrial broadcasting and the mobile, radiolocation and amateur services within the range 1-3 GHz | C2 |
| 107-1/8 | Cellular land mobile telecommunication systems | S2 |
| 108/8 | Multi-purpose open system interconnection standards for data communications in the maritime mobile service | S3 |
| 109/8 | GMDSS requirements for mobile-satellite systems operating in the bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz | S2 |
| 110/8 | Interference to the aeronautical mobile-satellite (R) service | S2 |
| 111/8 | Coordination of frequency assignments in bands allocated to the aeronautical mobile-satellite (R) service | S2 |
| 112/8 | Performance objectives for digital mobile-satellite services | S3 |
| 113/8 | Technical and operational characteristics of land mobile systems using multi-channel access techniques without a central controller | S2 |
| 114/8 | Technical and operational characteristics of cordless telephones and cordless telecommunication systems | S2 |
| 201/8 | Frequency sharing between mobile-satellite services and other services | C2 |
| 202/8 | Spurious emissions of radar systems operating in the 3 GHz and 5 GHz bands | S2 |
| 203/8 | Use of the maritime radionavigation band 285-325 kHz (283.5-315 kHz in Region 1) | S1 |

Mobile, radiodetermination, amateur and related satellite services (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 204/8 | Compatibility of active spaceborne sensors and systems in the radionavigation and radiolocation services | C1 |
| 205/8 | Intelligent road transport systems | S2 |
| 206/8 | Technical and operational requirements for multi-mode mobile radio stations | S1 |
| 207/8 | Procedures for determining the interference coupling mechanisms and mitigation options for systems operating in bands adjacent to and in harmonic relationship with radar stations in the radiodetermination service | S1 |
| 208/8 | Evolution of land mobile systems towards FPLMTS | S1 |
| 209/8 | Contributions of the mobile and amateur services and associated satellite services to the improvement of disaster communications | S1 |
| 210/8 | Technical characteristics for mobile earth stations operating with global non-geostationary satellite systems in the mobile-satellite service (MSS) in the band 1-3 GHz | S1 |
| 211/8 | Interference criteria and calculation methods for the mobile-satellite service (MSS) | S1 |
| 212/8 | Radio local area networks for mobile applications | S2 |

Questions assigned by the Radiocommunication Assembly to Study Group 9

Fixed service

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 102-2/9 | Availability of digital radio-relay systems | S1 |
| 103-1/9 | Digital trans-horizon radio-relay systems | S2 |
| 107-1/9 | Characteristics of radio-relay systems operating in frequency bands above about 17 GHz | S2 |
| 108-1/9 | Radio-frequency channel arrangements for radio-relay systems operating in frequency bands above about 17 GHz | S1 |
| 109-1/9 | Methods for frequency sharing between radio-relay systems and systems in the fixed-satellite service | S1 |
| 110/9 | Antenna radiation diagrams of radio-relay stations for use in sharing studies | S2 |
| 111-2/9 | Sharing criteria between the broadcasting-satellite service (sound and television) and the fixed service | C1 |
| 113-1/9 | Frequency sharing between radio-relay systems and systems of the Earth exploration-satellite service and the space research service | C1 |
| 114-1/9 | Maximum e.i.r.p. and e.i.r.p. spectral density for line-of-sight radio-relay transmitters operating in frequency bands shared with the fixed-satellite service | S2 |
| 115/9 | Criteria for frequency sharing between the fixed service and the fixed-satellite service in bidirectionally allocated frequency bands | S2 |
| 116-1/9 | Sharing criteria for protecting the fixed service from systems in the fixed-satellite service in shared frequency bands | S2 |
| 117-1/9 | Criteria for frequency sharing between the fixed service and FSS networks using satellites in slightly inclined geostationary orbits | S2 |
| 118-1/9 | Sharing criteria between the mobile-satellite services and the fixed service in the band 1 to 3 GHz | C1 |
| 119/9 | Limitation of unwanted emissions from radio-relay systems | S3 |
| 120-1/9 | Frequency tolerances of radio-relay systems | S3 |
| 122-1/9 | Effects of propagation on the design and operation of radio-relay systems | S2 |
| 125-2/9 | Point-to-multipoint radio systems | S2 |
| 127-1/9 | Maximum allowable performance and availability degradations of radio-relay systems due to various sources of interference | S2 |

Fixed service (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 129-1/9 | Evaluation of interference among line-of-sight radio-relay systems | S3 |
| 131/9 | Criteria for frequency sharing between the fixed and broadcasting services | S3 |
| 133/9 | Sharing criteria between the fixed and mobile services in the frequency bands between about 0.5 and 3 GHz | S1 |
| 134-3/9 | Hypothetical reference digital paths and performance objectives for digital radio-relay systems | S1 |
| 135-1/9 | Characteristics of digital radio-relay systems operating in frequency bands below about 17 GHz | S3 |
| 136-1/9 | Radio-frequency channel arrangements for digital radio-relay systems operating in frequency bands below about 17 GHz | S1 |
| 139-2/9 | Measurement of digital radio-relay systems | S2 |
| 140-1/9 | Application of cellular type mobile radiocommunication systems for use as fixed systems | S2 |
| 141/9 | Technical criteria to be used in the Board's examinations of the probability of harmful interference required by provisions Nos. 1354, 1506 and 1509 of the Radio Regulations | S1 |
| 142-1/9 | Radio local area networks (RLANs) | S2 |
| 145/9 | Characteristics required for single-sideband and independent-sideband systems used for high-speed data transmission over HF radio circuits | S2 |
| 146/9 | Improvements in the performance and efficiency of HF radiotelephone circuits | S2 |
| 147-1/9 | Automatically controlled radio systems and networks in the HF fixed service | S2 |
| 149-1/9 | Remotely controlled HF receiving and transmitting stations | S2 |
| 158/9 | Packet data transmission protocols for systems operating below about 30 MHz | S2 |
| 159/9 | Effects of unwanted emissions from radar systems in the radiodetermination service on systems in the fixed service | S2 |
| 160-1/9 | Radio-relay systems in a synchronous digital network | S2 |
| 161-2/9 | Performance limits for bringing into service and maintenance of digital radio-relay systems | S2 |
| 163/9 | Criteria for frequency sharing between the fixed service and the inter-satellite service operating in bands above about 20 GHz | S1 |
| 164/9 | Digitized speech transmissions for systems operating below about 30 MHz | S2 |

Fixed service (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 201/9 | Protection of radio-relay systems from non-geostationary satellite feeder links in the fixed-satellite service used by the mobile-satellite service in the shared frequency bands | S1 |
| 202/9 | Reference radiation patterns of omnidirectional and sectoral antennas in point-to-multipoint systems for use in sharing studies | S1 |
| 203/9 | Influence of propagation conditions on the bringing-into-service procedure for digital radio-relay systems | S2 |
| 204/9 | Radio-frequency signals transport through optical fibres | S2 |
| 205/9 | Technical and operational implications of using discrete blocks of spectrum by adaptive HF systems | S2 |
| 206/9 | Sharing criteria for radio-relay systems with systems in the fixed-satellite service involving a large number of non-geostationary satellites in the 17.7 to 19.7 GHz and 27.5 to 29.5 GHz bands | C1 |
| 207/9 | Sharing criteria for radio-relay systems using the same frequency bands with intersatellite links between non-geostationary satellites in connection with feeder links for the mobile-satellite service | S2 |

Questions assigned by the Radiocommunication Assembly to Study Group 10

Broadcasting service – Sound

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 44-2/10 | LF, MF and HF sound broadcasting | S3 |
| 49-2/10 | Receivers for sound broadcasting below 30 MHz | S3 |
| 55-1/10 | Protection ratios in LF, MF and HF broadcasting | C2 |
| 56/10 | Minimum usable field strength in LF, MF and HF broadcasting | C2 |
| 57/10 | Sky-wave reception in LF, MF and HF broadcasting | C2 |
| 58-1/10 | Coverage in LF, MF and HF broadcasting | C2 |
| 60-1/10 | Transmission of supplementary information in amplitude modulation sound broadcasting | S2 |
| 61-1/10 | Single-sideband (SSB) system for broadcasting (HF) | C2 |
| 62-1/10 | Synchronized transmitters in HF sound broadcasting | C2 |
| 64/10 | System design for HF broadcasting | S1 |
| 65-1/10 | Short-distance broadcasting in band 7 (HF) in the Tropical Zone | S2 |
| 67-1/10 | Interference from other services to sound broadcasting in the Tropical Zone | S2 |
| 68/10 | Modulation level control in frequency-modulation sound broadcasting | S1 |
| 69/10 | Polarization of emissions in FM sound broadcasting | S2 |
| 70/10 | Transmission of several programmes with a single transmitter in FM sound broadcasting | S2 |
| 71/10 | Transmission of supplementary information with a single transmitter in frequency-modulation sound broadcasting | S1 |
| 73-1/10 | Sound broadcasting in band 8 (VHF) in the Tropical Zone | S2 |
| 75/10 | Immunity of FM broadcast receivers against interference | S2 |
| 76-3/10 | Transmitting and receiving antenna at VHF and UHF | S1 |
| 78-1/10 | Standards for the transmission of several sound signals in one television channel in terrestrial or satellite broadcasting including high-definition and enhanced definition television systems | S1 |

Broadcasting service – Sound (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 83/10 | Determination of the electro-acoustical properties of studio monitor headphones | S3 |
| 84-1/10 | Sound systems for the hearing impaired | S2 |
| 85-2/10 | Subjective assessment of sound quality in broadcasting using digital techniques | S2 |
| 91-1/10 | Digital recording of sound programmes on magnetic tape for international exchange | S3 |
| 92-1/10 | Optical recording of sound-broadcasting programmes for international exchange | S3 |
| 93-1/10 | Characteristics of systems in the broadcasting-satellite service (sound) for individual reception by means of portable and vehicular receivers | C2 |
| 96-1/10 | Determination of the effects of atmospheric noise on the grade of reception in the Tropical Zone | S2 |
| 102/10 | Transmission of data information as an alternative to the main programme in frequency-modulation sound broadcasting | S2 |
| 105-1/10 | Multi-lingual services in multi-channel sound systems | S2 |
| 106-1/10 | Subjective assessment of sound quality | S2 |
| 107/10 | Characteristics of terrestrial digital sound-broadcasting systems for reception by vehicular, portable and fixed receivers | S1 |
| 201-1/10 | Transmitting and receiving antennas at LF and MF | C2 |
| 202/10 | Receivers for terrestrial FM sound broadcasting | S2 |
| 203/10 | Antenna characteristics | S3 |
| 204/10 | Frequency sharing issues related to the introduction of the broadcasting-satellite service (sound) in the frequency range 1-3 GHz | C2 |
| 205-1/10 | Evaluating fields from broadcasting transmitting systems operating at frequencies below 30 MHz for assessing exposure to non-ionizing radiation | S2 |
| 207/10 | Standards for digital audio techniques | S2 |
| 208-1/10 | Low bit-rate audio coding standards | S1 |
| 209/10 | Parameters and tolerance limits for the international exchange of sound programmes | S3 |
| 210/10 | Objective perceptual quality assessment methods | S1 |
| 211/10 | System parameters for multichannel sound systems | S3 |
| 212/10 | Planning procedures for HF broadcasting | C2 |

Broadcasting service – Sound (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 213/10 | Synchronized transmitters in LF and MF sound broadcasting | S2 |
| 214/10 | Unified identification label for international exchange of sound recordings | S2 |
| 215/10 | Recording of sound programmes for international exchange | S3 |
| 216/10 | Archival of sound programmes in broadcasting | S1 |
| 217/10 | Digital broadcasting in AM bands | S2 |
| 218/10 | Broadcasting of film programmes with multichannel sound | S2 |

Questions assigned by the Radiocommunication Assembly to Study Group 11

Broadcasting service – Television

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 1-3/11 | Colour television standards | S3 |
| 4-5/11 | Protection ratios in television | S3 |
| 27-3/11 | Standards for the high-definition television studio and for international programme exchange | S3 |
| 35-3/11 | Synchronization necessary for the satisfactory reception of sound and picture signals | S1 |
| 36-2/11 | Polarization of emissions in the terrestrial broadcasting service (television) | S3 |
| 42-2/11 | Enhanced television | S3 |
| 43-1/11 | Technical bases required for planning the broadcasting service (television) in bands 8, 9 and 10 | S3 |
| 45-1/11 | Processability margins required for contribution programme material in television production | S3 |
| 47-1/11 | Standards for digital high definition television | S1 |
| 49-1/11 | Characteristics of television signals radiated in bands above 2 GHz from terrestrial broadcasting transmitters | S2 |
| 53-1/11 | Systems which allow a direct displayed indication of picture quality | S3 |
| 55-1/11 | Conditions for a satisfactory television service in the presence of reflected signals | S3 |
| 58/11 | Quality targets of overall television systems and allocation of tolerances | S2 |
| 64-2/11 | Objective quality parameters and associated measurement and monitoring methods for digital television signals | S3 |
| 65-1/11 | Interfaces for digital video signals | S1 |
| 66-1/11 | Principal characteristics of television receiving installations | S3 |
| 71-1/11 | Objective measurement in an overall HDTV environment | S3 |
| 72-1/11 | Multiplexing of data services in a broadcasting channel | S3 |
| 73/11 | International exchange of captioning material for television programmes | S3 |
| 74-1/11 | Data broadcasting services provided in a broadcasting channel | S3 |
| 75/11 | Methods of reducing interference to the broadcasting service (television) from other services operating in the same or adjacent bands | S3 |
| 76/11 | Radiation from cable distribution networks | S3 |

Broadcasting service – Television (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 77-1/11 | Conditional-access broadcasting systems | S1 |
| 79/11 | Terrestrial emission of enhanced television | S3 |
| 85-1/11 | Improved use of the bands allocated to the broadcasting-satellite service (sound and television) in the frequency range 11.7-12.7 GHz | C1 |
| 86-1/11 | Frequency sharing for the feeder links to a broadcasting satellite (sound and television) | C1 |
| 89-1/11 | Sharing studies between high-definition television (HDTV) in the broadcasting-satellite service and other services | C1 |
| 92-1/11 | Digital techniques in the broadcasting-satellite service (sound and television) | S1 |
| 93-1/11 | Transmitting and receiving antennas for the broadcasting-satellite service (sound and television) and for the associated feeder links | C1 |
| 94-1/11 | Radiation of unwanted emissions from space stations in the broadcasting-satellite service (sound and television) | S1 |
| 95-1/11 | Analogue emission techniques in the broadcasting-satellite service (sound and television) | S3 |
| 99-1/11 | Telemetry, tracking and command signals and test signals for maintenance testing of broadcasting-satellite radio-frequency characteristics | S2 |
| 100-1/11 | Satellite broadcasting of high-definition television (HDTV) | C2 |
| 101-1/11 | Integrated services digital broadcasting (ISDB) in the broadcasting-satellite service (sound and television) | S2 |
| 103-1/11 | Small format recording of television programmes on magnetic tape for international exchange | S2 |
| 104-1/11 | Recording of television programmes on optical disks for international exchange | S3 |
| 108-1/11 | Digital recording of high definition television programmes for international exchange | S3 |
| 109-1/11 | Recording of high definition television programmes on cinematographic film for international exchange | S3 |
| 111-1/11 | Addition to television programmes recorded on magnetic tape of data for controlling automatic equipment | S3 |
| 115-1/11 | Interconnection specifications for audiovisual equipment related to broadcasting | S3 |
| 119-1/11 | The harmonization of standards between broadcast and non-broadcast applications of television | S1 |
| 121-1/11 | Digital terrestrial television broadcasting | S1 |

| | | |
|--------|---|----|
| 201/11 | HDTV still image recording (“HDTV photography”) | S3 |
|--------|---|----|

Broadcasting service – Television (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|---|----------|
| 202/11 | Synchronization of digital video and audio bit streams in production | S1 |
| 203/11 | Coding for the broadcasting of digitally-encoded TV signals in terrestrial narrow-band channels | S1 |
| 204/11 | Data broadcasting systems and services in an HDTV environment | S3 |
| 205/11 | Parameters for integrated services digital broadcasting (ISDB) | S2 |
| 206/11 | Standards for the digital encoding of colour television signals | S3 |
| 207-1/11 | Generic bit-rate reduction coding of digital TV signals (SDTV, EDTV and HDTV) for contribution, for primary and secondary distribution, for emission and for related applications | S1 |
| 210-1/11 | Planning parameters for television broadcasting using digital terrestrial narrow-band channels | S1 |
| 211-2/11 | Subjective assessments of the quality of television pictures including alphanumeric and graphic pictures | S3 |
| 213/11 | Target digital HDTV standard for use in the development of future systems for the studio and for international programme exchange | S1 |
| 214/11 | User requirements for interconnection of digital HDTV studio equipment operating at full or reduced bit rate | S1 |
| 217/11 | Digital multi-programme television emissions within a satellite transponder | C1 |
| 218/11 | Technical characteristics of feeder links to broadcasting satellites operating in the 12, 17 and 21 GHz bands | C1 |
| 220/11 | Characteristics of systems in the broadcasting-satellite service (sound and television) for reception by transportable and fixed receivers | S2 |
| 221/11 | Characteristics of receiving systems in the broadcasting-satellite service (sound and television) | S2 |
| 222/11 | Satellite orbits and space station technology for the broadcasting-satellite service (sound and television) | S2 |
| 223/11 | Protection ratios for interference studies and system planning in the broadcasting-satellite service (sound and television) | C1 |
| 224/11 | Simultaneous transmissions of TV programmes on BSS and FSS services from a multiservice space station | S1 |
| 225/11 | Overall coordination of the technical characteristics and associated test methods for the separate parts of the television signal chain | S2 |

Broadcasting service – Television (*continued*)

| Question ITU-R No. | Title | Category |
|-----------------------|--|----------|
| 226/11 | Extremely high-resolution imagery | S3 |
| 229/11 | Recording of television programmes in the case where several programmes might be broadcast in the same digital multiplex | S2 |
| 230/11 | Acquisition and recovery times in digital television encoding | S2 |
| 231/11 | Digital HDTV studio interfaces | S1 |
| 232/11 | Interactive television broadcasting systems | S1 |
| 233/11 | Unified identification label for international exchange of television recordings and films for television | S3 |
| 234/11 | Subjective assessment of stereoscopic television pictures | S3 |
| 235/11 | Digital coding and compression of stereoscopic television pictures | S3 |
| 236/11 | User requirements for electronic news gathering (ENG) | S1 |
| 237/11 | Data structure and requirements for multimedia-hypermedia broadcasting services | S3 |
| 238/11 | Television recording format for long-term programme archives | S3 |
| 239/11 | Recording of television programmes for international exchange | S3 |
| 240/11 | Use of cinematographic film in television | S3 |
| 241/11 | Interactive satellite broadcasting systems (television, sound and data) | S1 |
| 242/11 | Use of television disc recording in broadcasters' operations | S3 |

RESOLUTION ITU-R 6*

LIAISON AND COLLABORATION WITH THE ITU
TELECOMMUNICATION STANDARDIZATION SECTOR

(1993)

The ITU Radiocommunication Assembly,

considering

a) that the Additional Plenipotentiary Conference (APP-92) held in Geneva, December 1992, decided with respect to the assignment of responsibilities to the newly-created Radiocommunication Sector and the Telecommunication Standardization Sector:

- that the Radiocommunication Sector Study Groups are charged to focus on the following in the study of Questions assigned to them:
 - "a) use of the radio-frequency spectrum in terrestrial and space radiocommunications (and of the geostationary-satellite orbit);
 - b) characteristics and performance of radio systems;
 - c) operation of radio stations;
 - d) radiocommunication aspects of distress and safety matters;" (Article 11 of the ITU Convention, Nos. 151 to 154);
- that the Telecommunication Standardization Sector Study Groups are charged to:
 - "... study technical, operating and tariff questions and prepare recommendations on them with a view to standardizing telecommunications on a worldwide basis, including recommendations on interconnection of radio systems in public telecommunication networks and on the performance required for these interconnections;" (Article 14 of the Convention, No. 193);

b) that the two Sectors were given the responsibility of jointly agreeing on the assignment of studies and to keep the division of studies constantly under review (Nos. 158 and 195 of the Convention);

c) that the Directors of the Standardization and Radiocommunication Bureaux were instructed "to work together to develop proposals for an initial allocation of work between the Sectors, ensuring that:

- there is minimum disruption to the continuing work of the Sectors;
- the grouping of work ensures that there is maximum opportunity for efficient participation by experts from all countries;
- there is minimum overlap between respective Study Groups of the Sectors;

and to report to the first World Telecommunications Standardization Conference and the first Radiocommunication Assembly on the proposed initial allocation" (APP-92, Resolution 2);

d) that the respective Conference and Assembly shall confirm the detailed allocation of work and that joint meetings of the Advisory Groups of the Radiocommunication and Standardization Sectors shall review the distribution of new and existing work between the Sectors, subject to confirmation by the Members. The objective is to:

- minimize the duplication of activities of the Sectors;
- group the standardization activities in order to foster cooperation and coordination of the work of the Telecommunication Standardization Sector with regional standardization bodies (APP-92, Resolution 2),

* Essentially the same Resolution No. 18 was approved by the first World Telecommunication Standardization Conference (Helsinki, 1993).

noting

- e) that the CCIR Ad Hoc Group on Strategic Review and Planning (Resolution 106) and the CCITT Ad Hoc Group on CCITT working methods and structure (Resolution 18) have carried out an initial review of their respective work programmes and have identified matters of interest for each Sector;
- f) that a joint meeting of these Groups endorsed the conclusions of the Groups as indicated in § e) above and made recommendations on the allocation of work to the Telecommunication Standardization Sector and the Radiocommunication Sector, subject to confirmation by the Members;
- g) that a joint meeting of the Telecommunication Standardization Advisory Group and the CCIR Resolution 106 Ad Hoc Group submitted a report before October 1993 to the Directors of the two Bureaux,

resolves

- 1. that the Telecommunication Standardization and the Radiocommunication Advisory Groups, meeting jointly as necessary shall continue the review of new and existing work and its distribution between the two Sectors, for approval by Members in accordance with the procedures laid down for the approval of new or revised Questions;
- 2. that the principles for the allocation of work to the Radiocommunication Sector and Telecommunication Standardization Sector (see Annex 1) shall be used to give further guidance in the allocation of work to the Sectors, taking account of the objectives for continuing review as outlined in § d);
- 3. that, if considerable responsibilities in both Sectors in a particular subject are identified, either:
 - a) the procedure as given in Annex 2 should be applied, or
 - b) a joint meeting may be arranged by the Directors, or
 - c) the matter should be studied by relevant Study Groups of both Sectors with appropriate coordination (see Annex 3),

requests

that a joint meeting of the Advisory Groups submit a report by the end of April 1994 to the Directors of the two Bureaux to assist them in the preparation of a joint report to the Plenipotentiary Conference (Kyoto, 1994).

ANNEX 1

**Principles for the initial allocation of work to the Radiocommunication
and Telecommunication Standardization Sectors**

1. General

Principle 1

The approach to work in a Sector needs to be task-oriented, with an appropriate Study Group (or designated group) responsible for coordination. Further assignment of detailed tasks within a given work item or subject area would then occur, with special arrangements for handling work which crosses Sector boundaries.

Work planning may start with a service or system concept, and would include development of overall network or service architectures and identification of interfaces through to more detailed specification and linking of tasks.

Activity related to ongoing review of existing Recommendations needs to be accommodated as a general area of work.

2. Roles of the Sectors

Within a task-oriented approach, experts of both Sectors should be able to work as part of a well-managed team.

Principle 2

Standardization Sector work includes interworking arrangements required for either radio-based equipment within a public telecommunication network or radio systems requiring interconnection for the carriage of public correspondence.

Note 1 - Public correspondence: any telecommunication which offices and stations must, by reason of their being at the disposal of the public, accept for transmission.

In addition, the Recommendations developed by the Telecommunication Standardization Sector need to provide for the capabilities required to support the particular characteristics of radio systems. Similarly, the work of the Radiocommunication Sector should complement the work of the Standardization Sector, especially where it relates to the use of radio-based technology in telecommunication networks. The two Sectors will therefore both need to consider interface questions.

The term "public correspondence" should not be interpreted too restrictively in principle 2 (and elsewhere). The word "includes" is intended to imply that the carriage of related classes of traffic (e.g. government, service) or user applications are not excluded.

Principle 3

Radiocommunication Sector work related to network standards includes studies addressing the characteristics, performance, operation and spectrum aspects of radio-based equipment or radio systems as necessary to support the interconnection and interworking arrangements identified by the Telecommunication Standardization Sector.

The characteristics of radio-based equipment refer to those characteristics dealing with the equipment and the physical environment in which the equipment must work. Examples include performance, modulation, coding, error correction, maintenance and other aspects that may affect the interface signals and protocols that are able to be supported.

Principle 4

Before specific tasks are allocated, services, network architectures, and interfaces should be identified as clearly as possible.

For example, the Telecommunication Standardization Sector and the Radiocommunication Sector would jointly identify interfaces to be supported by the system under study. The Radiocommunication Sector will also need to identify the scope and capabilities of radio systems needed to meet the interface requirements and achieve optimum spectrum/orbit utilization.

Principle 5

Work unique to the Radiocommunication Sector covers matters related to spectrum and orbit utilization and efficiency and, *inter alia*, all aspects of services not used for public correspondence, for example radiodetermination, independent mobile radio services, broadcasting, safety and distress operation, remote sensing, amateur radio, and radioastronomy.

Principle 6

The studies in one Sector must complement those of the other Sector where a task crosses Sector boundaries noting that in some cases, joint studies may be required as the most practical option. To guide actual work allocations, the coordinating Sector (as user) could produce statements on "desirable/required characteristics". The potential provider Sector (or Study Group) could on its own initiative, or in response, develop statements of technology capability in the form of "achievable/typical characteristics".

Mutual dependency will require continued cooperation where both Sectors have an interest in the work. In establishing tasks toward standards for a service based on technology of both Sectors, the coordinating Sector must make best use of established sources of skill and knowledge. Joint ad hoc Groups could be established as needed to ensure the best possible progress and information exchange, where necessary.

3. Transition to new arrangements

It is important that suitable transition arrangements be put in place and be virtually complete within a reasonable period, e.g. by the 1994 Kyoto Plenipotentiary Conference. A key element of such arrangements is the maintenance of a satisfactory pace, quality of output and avoidance of delays in progressing current work.

In order to keep the work reasonably integrated, the work derived from CCIR Questions (or parts of Questions), should be allocated to the Telecommunication Standardization Sector in blocks to the extent practicable. Radiocommunication experts will wish to be able to concentrate in particular areas rather than to be distributed over many Study Groups and Working Parties.

Principle 7

Existing standardization work may continue in both Sectors while suitable arrangements are developed and put in place to maintain the current pace and quality of output.

The finalization of transfer required as part of the establishment of the Sectors should be monitored and reviewed by the proposed Advisory Groups (at a Sector level and in collaboration) for the purpose of ensuring a timely and progressive transfer.

Some study Questions include components which fall into both Sectors. In line with the project approach and efficient management practice, such Questions should be rewritten/revised so that the tasks for each Sector can be clearly identified, or joint arrangements established, if necessary.

Principle 8

In allocating existing study Questions to Sectors, those Questions which would require shared responsibility or study should be revised if necessary so that work required of each Sector is clearly identified in separate Questions.

The Telecommunication Standardization Sector would provide the lead role on the standardizing of telecommunications on a worldwide basis, including Recommendations on interconnection of radio systems in public telecommunication networks and on the performance required for these interconnections.

The Radiocommunication Sector would provide the lead on all other radiocommunication matters.

Questions which relate to complementary work in another Study Group or Sector should always refer to that related or complementary work.

Principle 9

Study Groups should continue as efficient and effective sources of special skills in the task-oriented environment.

Task orientation should not lead to numerous, independent project groups which potentially duplicate or diverge from established work. Where it is appropriate to establish a special group (e.g. to address interface or interworking issues), it should draw skills from the relevant Study Groups, appropriately limiting the scope of the project group. In this way, compatibility and consistency across multiple applications is maintained. Recommendations from such special groups, in any case, have to be approved by the appropriate Study Group prior to submission to the ITU Members for approval.

ANNEX 2

Procedural method of cooperation

With respect to *resolves* 3a), the following procedure should be applied:

- a) the joint meeting, as indicated in *resolves* 1 nominates the Sector which will be leading in the work and will finally approve the deliverable;
- b) the leading Sector will request the other Sector to indicate those requirements which it considers essential for integration in the deliverable;
- c) the leading Sector will base its work on these essential requirements and integrate them in its draft deliverable;
- d) during the process of development of the required deliverable the leading Sector shall consult with the other Sector in case it meets difficulties with these essential requirements. In case of agreement on revised essential requirements the revised requirements shall be the basis for further work;
- e) when the deliverable concerned comes to maturity, the leading Sector shall seek once more the views of the other Sector.

ANNEX 3

Coordination of the radiocommunication and standardization activities through Intersector Coordination Groups

With respect to *resolves* 3c) the following procedure shall be applied:

- a) the joint meeting of the advisory groups as indicated in *resolves* 1, may, in exceptional cases, establish an Intersector Coordination Group (ICG) to coordinate the work of both Sectors and to assist the advisory groups in coordinating the related activity of their respective Study Groups;
 - b) the joint meeting shall, at the same time, nominate the Sector which will be leading in the work;
 - c) the mandate of each ICG shall be clearly defined by the joint meeting, based on the particular circumstances and issues at the time the group is established; the joint meeting shall also establish a target date for termination of the ICG;
 - d) the ICG shall designate a Chairman and a Vice-Chairman, one representing each Sector;
 - e) the ICG shall be open to members of both Sectors in accordance with Nos. 86 to 88 and 110 to 112 of the Constitution;
 - f) the ICG shall not develop Recommendations;
 - g) the ICG shall prepare reports on its coordinating activities to be presented to each Sector's Advisory Group; these reports shall be submitted by the Directors to the two Sectors;
 - h) an ICG may also be established by the World Telecommunication Standardization Conference or by the Radiocommunication Assembly following a recommendation by the advisory group of the other Sector;
 - j) the cost of an ICG shall be supported by the two Sectors on an equal basis and each Director shall include in the budget of his Sector, budgetary provisions for such meetings.
-

RESOLUTION ITU-R 7

**TELECOMMUNICATION DEVELOPMENT INCLUDING LIAISON AND
COLLABORATION WITH THE ITU DEVELOPMENT SECTOR**

(1993)

The ITU Radiocommunication Assembly,

considering

- a) that one of the purposes of the Union is to "foster international cooperation in the delivery of technical assistance to the developing countries and the creation, development and improvement of telecommunication equipment and networks in developing countries by every means at its disposal, ..." (No. 14 of the Constitution of the International Telecommunication Union (Geneva, 1992));
- b) that a further purpose of the Union is also to "undertake studies, make regulations, adopt resolutions, formulate Recommendations and Opinions and collect and publish information concerning telecommunication matters" (No. 18 of the Constitution, (Geneva, 1992));
- c) that the Constitution and the Convention (Geneva, 1992) consolidated the activities of the ITU relating to radiocommunications in the Radiocommunication Sector and the activities relating to the technical cooperation with, and assistance to, developing countries in the Telecommunication Development Sector;
- d) that Nos. 159 and 160 of the ITU Convention (Geneva, 1992) require that the Radiocommunication Study Groups "... pay due attention to the study of Questions and to the formulation of Recommendations directly connected with the establishment, development and improvement of telecommunications in developing countries at both the regional and international levels." and that, for the purpose of facilitating the review of activities in the Radiocommunication Sector, "... measures should be taken to foster cooperation and coordination with ... the Telecommunication Development Sector";
- e) that Resolution 7 of the Additional Plenipotentiary Conference (APP-92) (Geneva, 1992) instructs the Director of the Telecommunication Development Bureau (BDT) to search, with the assistance of the Directors of the Bureaux of the other two Sectors, for appropriate mechanisms to facilitate the involvement of developing countries in the activities of these Sectors;
- f) that in accordance with No. 134 of the Convention (Geneva, 1992), the Radiocommunication Assembly shall "group Questions of interest to developing countries, as far as possible, in order to facilitate their participation in the study of those Questions",

noting

- a) the very limited material and financial resources available to the developing countries, preventing them from participating regularly in the work of the Radiocommunication Study Groups;
- b) the adverse effects which the absence of the developing countries from Study Group activities has on the universal nature of Study Group decisions and, possibly, on their effective application;
- c) that the procedure for adopting Recommendations by correspondence necessitates adequate exchange of information to obtain the broadest possible support;
- d) that, since the Radiocommunication Study Group work now involves Radiocommunication Conference preparation including procedures and other matters related to the Radio Regulations, all countries, irrespective of their level of development, need to be fully informed of developments in the studies,

further considering

- a) the important function of the Group of Engineers in the BDT in the provision of efficient consultancy to developing countries and the need to benefit in this respect of the expertise existing in the Secretariat of the Radiocommunication Bureau;

b) that the complementary activities of engineers in the two Sectors, when appropriately coordinated, would benefit greatly the developing countries,

recognizing

1. that the developing countries themselves should, to the extent possible:

1.1 participate in an active manner in the work of the Radiocommunication Study Groups, and provide any relevant technical information they possess concerning the conditions in their respective countries;

1.2 exchange technical information on Study Group matters among themselves in areas of common interest;

1.3 take advantage of the participation of countries of the same region in the meetings of the Study Groups;

1.4 when they face difficulties which may be of interest to other administrations during the course of operating radio services, they should be encouraged to submit contributions to the Radiocommunication Bureau describing these difficulties. The Director of the Bureau will communicate these contributions to the appropriate Study Group(s),

resolves

1. that the Radiocommunication Advisory Group and the Director of the Bureau shall cooperate actively with the BDT in identifying and implementing means facilitating developing countries to participate in the Study Group's activities;

2. that, in order to facilitate this participation, Questions which are of interest to developing countries shall be grouped as far as possible in a limited number of Study Groups as stipulated in No. 134 of the Convention;

3. that the participation of developing countries may be facilitated through extensive use of modern communication means and the BDT should be urged to consider possibilities for providing developing countries with such means;

4. that, pursuant to No. 224 of the Convention, Chairmen and Vice-Chairmen of ITU-R Study Groups and the Director of the Radiocommunication Bureau shall assist the BDT in organizing worldwide and/or regional information meetings that will provide developing countries with the required information on ITU-R Recommendations;

5. that, pursuant to No. 166 of the Convention, the Director of the Radiocommunication Bureau shall provide assistance to the developing countries in their preparations for radiocommunication conferences;

6. that, as the GAS activities have been transferred to the BDT pursuant to Resolution 7 (APP-92), Radiocommunication Study Group Chairmen and Vice-Chairmen and the Director of the Radiocommunication Bureau shall provide the BDT with the necessary assistance in the development and updating of handbooks;

7. that, in accordance with No. 129 of the Convention, the Director of the Radiocommunication Bureau and Chairmen and Vice-Chairmen of Radiocommunication Study Groups shall contribute to and participate in the work of Study Groups that may be set up by the ITU-D, when considering relevant studies to which they may give valuable inputs;

8. that the Director of the Radiocommunication Bureau shall cooperate with Directors of the other two Bureaux relating to the activities in the development of, and updating of, handbooks with the view to avoiding duplication of effort;

9. that, in the process of cooperating actively with the BDT, all radiocommunication activities of the Union in the field of telecommunication development should be closely coordinated in the interest of achieving efficiency, effectiveness and avoiding duplication of effort,

instructs the Chairmen of the Study Groups, the Chairman of the Radiocommunication Advisory Group and the Director of the Radiocommunication Bureau

to take all appropriate actions for the implementation of this Resolution, among others, by motivating participants in the Radiocommunication Sector to provide assistance to the BDT,

urges administrations and members of the Radiocommunication Sector

to actively participate in the implementation of this Resolution, among others, by providing experts to assist developing countries, by contributing to the information meetings and seminars, by providing the necessary expertise in matters under consideration by the Study Groups to be set up by the ITU-D including support to the activities of the GAS Groups and by hosting trainees from developing countries.

RESOLUTION ITU-R 8

**RADIOWAVE PROPAGATION STUDIES AND MEASUREMENT
CAMPAIGNS IN DEVELOPING COUNTRIES**

(1993)

The ITU Radiocommunication Assembly,

considering

- a) the importance of radiowave propagation measurement campaigns for acquiring data for the planning and coordination of various radiocommunication services, particularly at regional and subregional levels in developing countries;
- b) that various recommendations of World Administrative Radio Conferences have requested the Radiocommunication Study Groups to encourage and assist in initiating the study of radiowave propagation and radio noise in those areas where few or no measurements have been made;
- c) that Resolution No. 5 of the WARC-79 invites the Secretary-General to offer the assistance of the Union to developing countries in the tropical areas which endeavour to carry out national propagation studies and to arrange funds and resources for this purpose, and urges administrations to submit the results of these propagation measurements to the Study Groups,

recognizing

that there continue to be many regions of the world, particularly in the tropics, for which propagation data are not available,

noting with satisfaction

the contributions made by some Member countries, their scientific and industrial organizations and other entities, to the radio propagation measurements in Africa and Papua New Guinea,

resolves

1. that Radiocommunication Study Group 3 should identify within [its] work programme and in consultation with the concerned countries, radiowave propagation studies relating to tropical and subtropical regions of the world for which there is a lack of data. The programme of work of Radiocommunication Study Group 3 should clearly define study programmes in which engineers and scientists from the developing countries also contribute collecting data and developing analytical methods;
2. that scientists and engineers from developing countries should be encouraged to participate actively in these study programmes and carry out studies at first hand on topics identified by Radiocommunication Study Group 3:
 - by means of research in their home countries;
 - by participation in meetings held in connection with Radiocommunication Study Group or Working Party meetings, in the regions concerned whenever possible;
 - by means of working visits for appropriate study periods to radiowave propagation laboratories of administrations, recognized operating agencies, and other organizations participating in the work of the Radiocommunication Study Groups;
3. that the Radiocommunication Bureau, with appropriate support from Radiocommunication Study Group 3, should collaborate closely with the BDT in identifying suitable propagation measurement campaigns in the regions of interest and should offer all necessary technical guidance to the BDT in the establishment of any such measurements;

4. that the Director of the Radiocommunication Bureau, in close cooperation with the Director of the BDT and the administrations concerned, be requested to determine the objectives, scope, technical means and staff required for carrying out identified propagation measurement campaigns and to seek through the Secretary-General funding and other arrangements from appropriate sources to implement the above decisions with respect to propagation measurement activities;
 5. that Member countries, their recognized operating agencies, scientific or industrial organizations and other entities, be urged to make contributions (in cash and/or in kind) to support the radio propagation measurement campaigns in the developing countries;
 6. that the administrations interested in the measurement campaigns be requested to designate suitably qualified personnel to participate actively in these campaigns.
-

RESOLUTION ITU-R 9

**LIAISON AND COLLABORATION WITH OTHER INTERNATIONAL
AND REGIONAL ORGANIZATIONS**

(1993)

The ITU Radiocommunication Assembly,

bearing in mind

Article 50 of the ITU Constitution (Geneva, 1992), and

considering

- a) that a number of organizations dealing with radiocommunications (including broadcasting) exist;
- b) that such organizations have the potential for identifying, defining and proposing solutions of particular problems of interest to the Radiocommunication Study Groups;
- c) that one objective of the Radiocommunication Study Groups is to harmonize the work in radiocommunications with that of regional bodies and other international bodies;
- d) that such organizations may offer a means of improving the dissemination and effectiveness of ITU-R Recommendations,

resolves

1. that administrations should encourage organizations dealing with radiocommunications (including broadcasting) to take into account the global activities of the Radiocommunication Study Groups;
 2. that the Director of the Radiocommunication Bureau should request the collaboration of the Secretary-General and should take all the necessary steps, within the framework of the ITU's regional activities, to encourage increased involvement by these organizations in the Radiocommunication Study Group activities.
-

RESOLUTION ITU-R 10

ELECTRONIC SPECTRUM MANAGEMENT INFORMATION EXCHANGE

(1993)

The ITU Radiocommunication Assembly,

considering

- a) that many administrations have created national spectrum management units to coordinate, within their country and across national borders, technical and operational characteristics of radio stations under their authority, such as frequency assignments and orbital position assignments, in order to avoid harmful interference;
- b) that administrations and regional telecommunication organizations have developed or are developing automated analysis programs, database management systems (DBMS), and networks necessary for coordination and spectrum management purposes;
- c) that access to these automated analysis programs and DBMS is necessary for rational use of spectrum resources and is vital to governmental agencies and non-government entities such as government contractors, international organizations and consortia, service providers, equipment manufacturers and consultants;
- d) that the transfer of computer programs and spectrum management data would support and facilitate national spectrum management and coordination among administrations;
- e) that Recommendation ITU-R SM.668 recommends methods of exchanging computer programs and data for spectrum management;
- f) that spectrum management data can be transferred between computer systems of administrations and regional telecommunication organizations using, *inter alia*, the public telecommunication network and existing ITU telecommunications facilities, such as TIES and ITUDOC,

further considering

- g) the decreasing price of computers and proliferation of computer networks;
- h) that a common electronic information system for spectrum management could integrate existing resources into a computer network, could serve as a framework for exchange of spectrum management data in national, regional and interregional areas and could facilitate:
 - exchange of general information about spectrum management activities and technical and operational characteristics of radio stations and their environment for planning purposes;
 - the rational and economic use of the radio-frequency spectrum resource; and,
- j) that Radiocommunication Study Groups have already agreed on many elements, such as propagation models, conductivity maps, data structures, that could be used in such a system,

recognizes

that other efforts are underway by the ITU in development of methods for electronic document handling,

recommends

1. that administrations and regional telecommunication organizations expand the use of electronic data information exchanged nationally between spectrum management units and interested parties;
2. that administrations be encouraged to use existing networks for this electronic exchange of spectrum management information,

resolves

1. that, on a priority basis, a Task Group be established under Study Group 1 to exchange experiences and to develop guidance for an informal exchange of information through electronic means to share spectrum management information.
-

RESOLUTION ITU-R 11-1

DEVELOPMENT OF AUTOMATED SPECTRUM MANAGEMENT SYSTEMS

(1993-1995)

The ITU Radiocommunication Assembly,

considering

- a) that the development of a system to manage spectrum data would support and facilitate national spectrum management and monitoring, coordination among administrations and notification to the Radiocommunication Bureau (BR);
- b) that data elements used in national spectrum management have been reflected in the Preface to the International Frequency List (IFL) and Recommendation ITU-R SM.667;
- c) that administrations should maintain spectrum management data with an automated database management system;
- d) that many administrations have been successful in implementing automated database management systems (DBMS) in the development and maintenance of their national spectrum management data;
- e) that computer programs which accomplish engineering analysis are described in the ITU Catalogue of Software for Radio Spectrum Management;
- f) that basic automated spectrum management system (BASMS) software (in the English version) has been developed by the BDT in close cooperation with Radiocommunication Study Group 1 and the BR based on those guidelines contained in Recommendation ITU-R SM.1048;
- g) that BASMS is designed primarily to assist developing countries in spectrum management in order for them to abandon inefficient old-fashioned means of managing the spectrum,

resolves

- 1. that the BR should continue its endeavours to assist the BDT in implementing BASMS in different countries through the participation of Radiocommunication Study Group 1 experts in relevant accelerated training projects in order for the BDT to start training different language groups before the end of 1996;
 - 2. that Radiocommunication Study Group 1 and the BR should assist the BDT in providing BASMS software in the required official languages of the Union in order for the BDT to make this software available by the end of 1996;
 - 3. that Radiocommunication Study Group 1 in cooperation with the BR, the BDT and other study groups, if required, should initiate the necessary studies for developing design specifications for a future advanced automated spectrum management system, based on the design guidelines for BASMS.
-

RESOLUTION ITU-R 12

**HANDBOOKS AND SPECIAL PUBLICATIONS FOR DEVELOPMENT
OF RADIOCOMMUNICATION SERVICES**

(1993)

The ITU Radiocommunication Assembly,

considering

- a) that close cooperation shall be carried out among the Radiocommunication, Telecommunication Standardization and Telecommunication Development Sectors (No. 79 of the Constitution (Geneva, 1992));
- b) Resolution 3 (APP-92) which instructs the organization Advisory Groups within the Radiocommunication and Telecommunication Standardization Sectors which should recommend measures, *inter alia*, to foster cooperation and coordination with other standards bodies, with the Development Sector, within and between the two Sectors, and with the Strategic Planning Unit in the General Secretariat;
- c) that Radiocommunication handbooks and special publications constitute an authoritative source of technical material relating to radiocommunications that may be of direct benefit to developing countries,

bearing in mind

that there is a need to disseminate information contained within handbooks and special publications as widely as possible throughout the ITU membership in a form which is readily understandable and that can be applied practically, especially in the training of technicians and engineers for use in developing countries,

resolves

that in establishing priorities for the preparation and publishing of handbooks and special publications, special consideration should be given to the needs of developing countries,

invites

the Telecommunication Development Sector to indicate what special subjects would be most useful to developing countries so that planning for handbooks and special publications may be undertaken.

RESOLUTION ITU-R 15-1

**CHAIRMANSHIP AND VICE-CHAIRMANSHIP OF
RADIOCOMMUNICATION STUDY GROUPS**

(1993-1995)

The ITU Radiocommunication Assembly,

considering

- a) that No. 133 and No. 148 of the Convention (Geneva, 1992) provide for the establishment of Radiocommunication Study Groups;
- b) that No. 149 of the Convention (Geneva, 1992) and other related provisions indicate the nature of the work of the Radiocommunication Study Groups;
- c) that No. 242 of the Convention (Geneva, 1992) requires the Radiocommunication Assembly to appoint Chairmen and Vice-Chairmen of Radiocommunication Study Groups, taking account of competence and equitable geographical distribution;
- d) that a specific time limit on the term of office would permit the introduction of new ideas on a periodic basis, while at the same time give an opportunity for Radiocommunication Study Group Chairmen and Vice-Chairmen to be appointed from different Member countries;
- e) that the Additional Plenipotentiary Conference provided for re-election once only i.e. a maximum of 8 years for the posts of the Secretary-General, Deputy Secretary-General and the Directors of the Bureaux;
- f) that the setting of a maximum time in office for the Radiocommunication Study Group Chairmen and Vice-Chairmen conforms to the directions given to the Radiocommunication Assembly in No. 242 of the Convention (Geneva, 1992),

taking into account

- g) that a maximum time in office of eight years for Study Group Chairmen and Vice-Chairmen provides for a reasonable amount of stability while providing the opportunity for different individuals to serve in these capacities,

resolves

- 1. that candidates for the posts of Radiocommunication Study Group Chairmen and Vice-Chairmen should be identified, by administrations and/or by small “m” members of the ITU, as soon as possible once the structure of the Radiocommunication Study Groups is clear;
- 2. that candidates for the posts of Radiocommunication Study Group Chairmen and Vice-Chairmen should be identified, taking into account that for each Study Group there may be one Vice-Chairman and, if the workload of any Study Group requires, the Assembly may appoint additional Vice-Chairmen as it deems necessary, normally not more than two in total;
- 3. that nominations for the posts of Radiocommunication Study Group Chairmen and Vice-Chairmen should be accompanied by a biographical profile highlighting the qualifications of the individuals proposed. The Director will circulate the profiles to the Heads of Delegation present at the Assembly;
- 4. that the maximum term of office for both Chairmen and Vice-Chairmen should be limited to an eight-year period; the term of office, determined in this way, shall be deemed to commence in 1993 for existing Chairmen and 1995 for existing Vice-Chairmen;
- 5. that the period in office in one appointment (e.g. as a Vice-Chairman) does not count towards the period in office for another appointment (e.g. as a Chairman) and that steps should be taken to provide some continuity between Chairmen and Vice-Chairmen,

and invites

- 1. the Radiocommunication Advisory Group to further study procedures which provide for more transparency in the selection of Radiocommunication Study Group officials, according to Nos. 242 and 243 of the Convention (Geneva, 1992).
-

RESOLUTION ITU-R 17

INTEGRATION OF FUTURE PUBLIC LAND MOBILE TELECOMMUNICATION SYSTEMS (FPLMTS) INTO EXISTING NETWORKS

(1993)

The ITU Radiocommunication Assembly,

considering

- a) that, with the changing radiocommunication environment, a world harmonization process needs to be developed;
- b) that the introduction of new technologies and services is of great importance for the modernization and expansion of telecommunication networks;
- c) that Future Public Land Mobile Telecommunication Systems (FPLMTS) will be a key medium for the development of those networks;
- d) that FPLMTS concern terrestrial and space service alike;
- e) the studies under way on FPLMTS in connection with Questions ITU-R 39/8 and ITU-R 77/8,

resolves to request the Secretary-General

1. to study, in conjunction with the Directors of the Radiocommunication, Telecommunication Standardization and Telecommunication Development Bureaux, appropriate measures to enable the developing countries to make better plans for the smooth integration of these future systems into their existing public networks.
-

RESOLUTION ITU-R 19*

DISSEMINATION OF ITU-R TEXTS

(1978-1986-1990-1993)

The ITU Radiocommunication Assembly,

considering

- a) the decisive importance for radiocommunication of the information contained in the ITU-R texts;
- b) that a wider dissemination of the information contained in these texts would promote technical progress and create the possibility of a considerable increase in the number of contributions and Questions for study;
- c) that the ITU electronic Telecom Information Exchange Services (TIES) are being implemented,

decides

1. that the administrations should ensure the dissemination of ITU-R texts within their countries, by the means which they consider to be the most suitable and in the most appropriate fields;
2. that the Director of the Radiocommunication Bureau should take all the necessary steps, requesting the collaboration of the Secretary-General of the Union, to give emphasis to the importance attached to the wider dissemination and knowledge of ITU-R texts;
3. that participants in the work of the Radiocommunication Sector should give due consideration to the advantages that could be realized by the dissemination of information through electronic and other modern technological means.

* Revision of former CCIR Resolution 105.

RESOLUTION ITU-R 20*

ACCESS TO AND EXCHANGE OF COMPUTER PROGRAMS

(1990-1993)

The ITU Radiocommunication Assembly,

considering

- a) that, with the evolution of the radiocommunications environment, it has become necessary to develop a world-wide harmonization process so as to enable as many administrations and organizations as possible to apply the ITU-R Recommendations to meet their requirements for the development of their various radiocommunication services;
- b) that the number and complexity of ITU-R Recommendations and Reports is increasing, making it necessary at times to consult several Recommendations and Reports in order to deal with a given problem;
- c) that data could be retrieved much more easily through the use of modern telecommunication media and access to data bases;
- d) that, in some cases, administrations may need to use computer programs to obtain coherent results;
- e) that steps should be taken to ensure that programs and data bases to be used by different users are compatible with as many computer systems as possible;
- f) that the ITU-R Reports may be useful, in particular, for countries which do not possess sufficient material resources to conduct advanced technical studies,

having noted with satisfaction

the results already achieved in Study Groups 1 and 3 and the efforts deployed by the Director of the Radiocommunication Bureau and his Secretariat to obtain computer programs and to disseminate them among the telecommunication administrations and organizations,

decides

that the Director of the Radiocommunication Bureau, with the assistance of the ITU Information Services Department, shall, within the available resources, draw up the necessary specifications:

- for computer programs relevant to ITU-R Recommendations and Reports, so that they may be used by a large number of computer systems by way of standardized access;
- that each Radiocommunication Study Group shall endeavour to obtain from the telecommunication administrations and organizations, the computer programs relevant to the Recommendations and Reports for which they are responsible, using the specifications drawn up by the Director of the Radiocommunication Bureau;
- that the Director, with the assistance of the General Secretariat, shall make all ITU-R documents available in machine-readable form and shall participate actively in the direct computer access project under way within the ITU, with a view to providing access to the ITU-R data bases as soon as possible,

requests the Secretary-General

to give the Director of the Radiocommunication Bureau every assistance to ensure that this Resolution is applied as soon as possible,

requests the Director of the Telecommunication Development Bureau

to study the necessary measures to ensure that the developing countries have the requisite means to access and use the data bases,

* Revision of former CCIR Resolution 104.

requests the Director of the Radiocommunication Bureau

to explore with the Council, ways to obtain the financial resources to implement this Resolution in due course.

RESOLUTION ITU-R 21*

COMPUTER PROGRAMS FOR RADIO-FREQUENCY MANAGEMENT

(1986-1990)

The CCIR,

CONSIDERING

- a) that many administrations and organizations create, use and exchange various computer programs for radio-frequency management;
- b) that all administrations and organizations would benefit from the exchange of these programs, particularly if procedures are employed that enable them to be used with computers that are universally available to the maximum possible extent;
- c) that some computer programs have already been offered for such an exchange and are described in the CCIR List of Computer Programs for Radio Frequency Management and made available through the CCIR Secretariat,

NOTING

- a) that the WARC-79, in its Resolution No. 7 relating to the development of national radio-frequency management and No. 37 relating to the introduction and development of computer assistance in radio-frequency management within administrations and in its Recommendation No. 31 relating to a handbook for computer-aided techniques in radio-frequency management, indicated the importance of the radio-frequency management and computer-aided techniques;
- b) that Resolution No. 14 of the WARC-79 and Decision 56 of the CCIR relating to the transfer of technology, indicated needs for cooperation activities,

UNANIMOUSLY DECIDES

- 1. that administrations and other participants in CCIR work should be encouraged to submit their computer programs in accordance with Annex I;
- 2. that the Director, CCIR, should be requested to:
 - 2.1 invite administrations and organizations which have such computer programs to consider the possibility of making them available to other parties through the CCIR Secretariat in a format that is compatible with computers to the maximum possible extent;
 - 2.2 prepare and publish by means of Circular-letters and also in the ITU Telecommunication Journal information about computer programs which have been submitted;
 - 2.3 transfer, as requested, the programs that have been made available, in the form they were received and without review with minimum administrative cost;
 - 2.4 transfer these programs to Interim Working Party 1/2 for review and to examine for their portability, adequacy of documentation, and correctness, and to determine which of them may be recommended for general use;
 - 2.5 make arrangements for the CCIR Secretariat to provide advice to the administrations that have little or no computer personnel or expertise with problems that may arise with their installation and use of these programs on microcomputers.

* Former CCIR Resolution 88-1.

ANNEX 1

INFORMATION FOR THE SUBMISSION OF PROGRAMS

1. The program should be submitted on a data storage medium in current use by the CCIR. Floppy disks (MS-DOS formatted, 5 1/4", 360 kB or 1.2 MB; the 3 1/2", 760 kB or 1.44 MB) or 9-track tape (1600 bits per inch) may be used as the file size dictates.
 2. The program should not be copy protected.
 3. The documentation should preferably include:
 - description of the engineering method used in the program and applicable limitations;
 - the users' manual;
 - samples of typical input data and expected output data to demonstrate operation of the program;
 - the program documentation to permit maintenance of the code;
 - inventory of data elements used in the program;
 - information about the computer hardware and additional software packages used to run the program.
 4. Summary information about the program for publishing in Circular-letters and the ITU Telecommunication Journal should contain:
 - title of the program;
 - sub-title of the program if any;
 - submitter/source address;
 - description of the program, with indication of the documentation's language;
 - programming language, source code;
 - mode of operation;
 - hardware requirement (i.e. monitor, printer, memory, storage capacity, RAM);
 - input requirements, including data file(s);
 - auxiliary data file(s);
 - data output;
 - output medium;
 - date of last revision;
 - references.
-

RESOLUTION ITU-R 22*

**IMPROVEMENT OF NATIONAL RADIO SPECTRUM MANAGEMENT
PRACTICES AND TECHNIQUES**

(Questions 44/1, 45/1 and Decision 27-2)

(1990)

The CCIR,

CONSIDERING

- a)* that WARC-79 in Resolution No. 7 indicated that the administrations of many developing countries need to strengthen the national radio-frequency management organization in order to effectively carry out their responsibilities at both the international and national level;
- b)* that the IFRB and the CCIR have held two meetings in response to Resolution No. 7 of WARC-79 to organize meetings between representatives of developing and developed countries concerning the establishment and operation of national spectrum management organizations;
- c)* that these national frequency management meetings have recommended that administrations of developing countries take into account the guidelines indicated in the IFRB/CCIR Booklet on National Frequency Management, the IFRB Handbook on Radio Regulations, and other relevant ITU documents including the CCIR Handbook on Spectrum Management and Computer-Aided Techniques, and the CCIR Handbook for Monitoring Stations;
- d)* that the national frequency management meetings concluded that the terms of Resolution No. 7 had been fulfilled and recommended that the CCIR Study Group 1 continue the needed efforts on national frequency management particularly with regard to the use of computer-aided spectrum management,

UNANIMOUSLY DECIDES

- 1.** that Study Group 1, in accordance with the conclusions of the Second National Frequency Management Meeting should take note of the special requirements of national spectrum management organizations from developing countries and devote particular attention to these matters during the regular meetings of the Study Group and its Interim Working Parties;
- 2.** that such meetings shall be aimed at developing practices and techniques to improve spectrum management and include discussions concerning the establishment of computer-aided spectrum management systems;
- 3.** that personnel involved in spectrum management from developing and developed countries and representatives from the IFRB are particularly invited to participate in the spectrum management studies of Study Group 1.

* Former CCIR Resolution 110.

RESOLUTION ITU-R 23*

**EXTENSION OF THE INTERNATIONAL MONITORING SYSTEM
TO A WORLDWIDE SCALE**

(Question ITU-R 32/1)

(1963-1970-1993)

The ITU Radiocommunication Assembly,

considering

- a) that Recommendation No. 30 of the World Administrative Radio Conference, Geneva, 1979, stresses the urgent need for improvement in the international monitoring system and invites administrations to make every effort to develop monitoring facilities;
- b) that there are still wide areas of the world where the facilities available to the international monitoring system are inadequate or non-existent;
- c) that the General Secretariat maintains and publishes the List of International Monitoring Stations (List VIII) indicating their capabilities, telephone numbers, telegraphic addresses, telex numbers, and facsimile numbers;
- d) that it is of utmost importance to satisfy the needs of the Radiocommunication Bureau, laid down by the Radio Regulations (RR), that all countries having domestic monitoring facilities make them available for international monitoring to the maximum possible extent,

decides

- 1. that all administrations now participating in the international monitoring system should be urged to continue to do so to the maximum extent possible;
- 2. that administrations, which do not at present participate in the international monitoring system, should be urged to make monitoring facilities available to that system, in accordance with Article 20 of the RR;
- 3. that cooperation between monitoring stations of different administrations should be encouraged and improved with a view to exchanging monitoring information and to settling harmful interference caused by transmitting stations that are difficult to identify or cannot be identified;
- 4. that administrations, located in those areas of the world where monitoring facilities are inadequate, should be urged to promote the establishment of monitoring stations for their own use and make them available for international monitoring, in accordance with Article 20 of the RR;
- 5. that administrations with more advanced monitoring systems be urged to accept officials from other administrations to train them in the techniques of monitoring and direction finding. Initial contact for training may be made to the appropriate centralizing office.

Note 1 - The Administrations of Australia, France, Germany, the United States of America, Italy, Japan, Portugal and the United Kingdom have offered to receive officials from other administrations.

* Revision of former CCIR Resolution 15-1.

RESOLUTION ITU-R 25-1

**COMPUTER PROGRAMS AND ASSOCIATED REFERENCE NUMERICAL
DATA FOR RADIOWAVE PROPAGATION ASSESSMENT**

(1978-1982-1986-1990-1993-1995)

The ITU Radiocommunication Assembly,

considering

- a) that methods of prediction of the state of the propagation environment and of radiowave propagation characteristics are given or referred to in ITU-R Recommendations and Reports;
- b) that for effective use of such methods, computer programs and associated reference numerical data are needed;
- c) that it is uneconomic for individual organizations to develop their own computer programs for these predictions;
- d) that successive issues of the “Catalogue of Software for Radio Spectrum Management” are being published by the Radiocommunication Bureau,

resolves

1. that the Director of the Radiocommunication Bureau should be requested to invite organizations which at present have their own computer programs, numerical reference data, and related documentation for the prediction methods described in the ITU-R Recommendations and Reports prepared by Radiocommunication Study Group 3, to make these available to the Radiocommunication Bureau through Radiocommunication Study Group 3.
-

RESOLUTION ITU-R 27*

HF FIELD-STRENGTH MEASUREMENT CAMPAIGN

(1990-1991-1993)

The ITU Radiocommunication Assembly,

considering

- a) that the Second Session of the World Administrative Radio Conference for the Planning of HF Bands Allocated to the Broadcasting Service (Geneva 1987) (WARC HFBC-87), in its Recommendation No. 514 (HFBC-87) invites the Radiocommunication Bureau to undertake studies of the HF propagation prediction method adopted by the Conference and to recommend both improvements in the method and later, if necessary, an improved method to be used in the future for the HF bands allocated exclusively to the broadcasting service;
- b) that significant improvements in HF propagation prediction methods for general service requirements seem unlikely until a substantial data base of new measurements becomes available;
- c) that Recommendation ITU-R PL.845 proposes a field-strength measurement campaign and identifies a need for coordination, training etc;
- d) that Recommendation No. 514 (HFBC-87) also recommends administrations:
 - to conduct HF field-strength measurement programmes;
 - to contribute data, in a form suitable for study, to the Radiocommunication Bureau;
- e) that administrations should be urged to undertake such measurements in the longer term,

decides

- 1. that administrations should be urged to assist in the campaign by providing transmissions from worldwide locations and by installing and operating, as far as possible, worldwide receiving stations;
- 2. that the measurement campaign should extend, if possible, through a complete solar cycle but that transmissions on fewer than five frequencies from one location would still provide a valuable facility for measurements;
- 3. that the Director of the Radiocommunication Bureau should coordinate the overall activity and disseminate the information necessary for running the campaign;
- 4. further, that the Director of the Radiocommunication Bureau should arrange for the receipt of data on computer diskettes, for the validation and incorporation into a data bank of the measurements;
- 5. that administrations, the Director of the Radiocommunication Bureau and other organs of the ITU, in so far as resources allow, should ensure that guidance and training in the installation and operation of measurement stations is provided where required.

* Revision of former CCIR Resolution 111.

RESOLUTION ITU-R 28*

STANDARD-FREQUENCY AND TIME-SIGNAL EMISSIONS

(Question 1/7)

(1963-1966-1970-1974-1986)

The CCIR,

CONSIDERING

the provisions of Article 33 of the Radio Regulations,

UNANIMOUSLY DECIDES

1. that, whenever an assignment to a station operating standard-frequency emission is put into service, the administration concerned shall notify this assignment to the IFRB, in accordance with the provisions of Article 12 of the Radio Regulations; however, no notice should be submitted to the IFRB until experimental investigations and coordination have been completed, in accordance with Article 33, of the Radio Regulations;
2. that, in addition, each administration should send all pertinent information on standard-frequency stations (such as frequency stability, changes in the phase of time pulses, changes in transmission schedule) to the Chairman, Study Group 7, to the Director, CCIR, and, for official publication, to the Director, BIPM;
3. that Study Group 7 should cooperate with the International Astronomical Union (IAU), the International Union of Radio Science (URSI), the International Union of Geodesy and Geophysics (IUGG), the International Union of Pure and Applied Physics (IUPAP) and the Bureau international des poids et mesures (BIPM) and the International Committee of Weights and Measures (CIPM).

* Former CCIR Resolution 14-4.

RESOLUTION ITU-R 29*

**CHARACTERISTICS OF EQUIPMENT AND PRINCIPLES GOVERNING THE
ALLOCATION OF FREQUENCY CHANNELS BETWEEN 25 AND 3000 MHz
IN THE LAND MOBILE SERVICE**

(Question 7/8)

(1959-1963-1966-1970-1974-1978-1990)

The CCIR,

CONSIDERING

- a) that land mobile services of various kinds are developing rapidly;
- b) that, in border areas, difficulties may arise between the services of different administrations;
- c) that it would be advantageous if there were a sufficient measure of agreement, where necessary, between administrations on the characteristics of equipment and on the principles adopted in the planning for land mobile services,

UNANIMOUSLY DECIDES

1. that administrations should consult together as necessary to resolve any difficulties concerning their land mobile services and for the purpose of improving such services;
2. that those administrations which are interested in the provision of common land mobile services should consult together and should advise the CCIR of any technical and operational problems that require international study;
3. that administrations should continue to submit new data regarding the measuring methods used in their respective countries to the Chairman, Study Group 8 and to the Director, CCIR, for circulation. The attention of administrations is drawn to the methods of measurement currently being standardized by the International Electrotechnical Commission (IEC) (see Opinion 42);
4. that administrations should submit information on practices adopted for the allocation of channels between 25 and 3000 MHz for land mobile services to the Chairman, Study Group 8 and the Director, CCIR, for circulation;
5. that administrations should submit details of the blocks of frequencies between 25 and 3000 MHz allocated:
 - 5.1 for transmissions from base stations, and
 - 5.2 for reception at base stations;
6. that administrations which have reached agreement with adjacent countries on the operation of land mobile services in border areas, should submit to the CCIR technical and operational details of the agreement to assist other administrations with similar problems.

* Former CCIR Resolution 20-5.

RESOLUTION ITU-R 30*

**DETERMINATION OF THE NOISE LEVEL FOR SOUND
BROADCASTING IN THE TROPICAL ZONE**

(1978)

The CCIR,

CONSIDERING

that studies on the characteristics of atmospheric radio noise and collection of noise data come within the purview of Study Group 6,

UNANIMOUSLY DECIDES

1. that the results of studies contained in Report 303 (Geneva, 1974), which no longer appear in current CCIR texts, should be brought to the notice of Study Group 6;
2. that this information should be considered by Study Group 6 whenever revision of worldwide noise grade data, as given in Report 322, is attempted.

* Former CCIR Resolution 64.

RESOLUTION ITU-R 31*

PRESENTATION OF ANTENNA DIAGRAMS

(1982-1990)

The CCIR,

CONSIDERING

- a) that the WARC HFBC-87 in Resolution No. 516 invites the CCIR to update the CCIR Book of Antenna Diagrams and the IFRB to base its Technical Standards on this publication;
- b) that new types of antennas as used by administrations for HF broadcasting are needed to complement the publication CCIR, Antenna Diagrams, edition 1984;
- c) that a considerable amount of work in this respect was already carried out by Study Group 10 in preparation of the WARC HFBC-84 and WARC HFBC-87;
- d) that Study Group 10 under its Study Programmes 44H/10 and 45F/10 has the task to evaluate the radiation patterns of HF antennas, including consideration of their performance in terms of coverage and interference,

UNANIMOUSLY DECIDES

- 1. that the results of the studies carried out by Study Group 10 and the related antenna diagrams should be contained in a CCIR Recommendation separately published;
- 2. that this Recommendation while ensuring a certain continuity with the previous CCIR publications on antenna diagrams, should also contain both sufficient technical background and complementary information to guide in the selection of the antenna appropriate to the desired service together with other possible data relevant to its practical operation;
- 3. that a suitable set of antenna patterns covering as far as possible the range of the types of antennas used by administrations should appear in this Recommendation;
- 4. that suitable computer programs for calculating antenna radiation patterns should complement this Recommendation and be made available by the CCIR Secretariat who will also be responsible for the software maintenance;
- 5. that the participants in the work of the CCIR should be invited to cooperate to maintain and update this new Recommendation submitting relevant contributions to the CCIR.

* Former CCIR Resolution 76-1.

RESOLUTION ITU-R 33*

PRESENTATION OF TEXTS ON TERMINOLOGY

(1982-1990-1993)

The ITU Radiocommunication Assembly,

considering

- a) that it is essential that the terminology work done within the ITU should be widely disseminated, as regards both terms and definitions;
- b) that users generally have ITU publications at their disposal in one language only but are often required to read or write technical texts in one of the other working languages;
- c) that texts on vocabulary and glossaries, such as the collection of terms and definitions in the former CCITT Blue Book, are not as a rule directly available to users interested in a particular volume;
- d) that an alphabetical presentation of terms in a vocabulary results in a different order of terms for each language and that it is not very practical for users wanting to compare definitions in different languages;
- e) that the user of vocabulary texts often wants each term to be grouped with other terms on the same subject, these terms being presented in a logical order,

decides

1. that the texts on vocabulary and the parts of texts dealing specifically with definitions of terms, published by the Radiocommunication Sector, shall include the equivalents of all the terms defined in the other working languages of the ITU;
2. that the practical means of providing the equivalents of terms in addition to the full text of terms and definitions in one of the languages is left to the discretion of the BR (see examples given in Recommendations ITU-R V.573 and ITU-R V.662);
3. that in the texts on vocabulary and the parts of texts dealing specifically with definitions of terms, published by the Radiocommunication Sector, the terms are presented in a logical order by subjects which should be the same in all languages, and that the vocabulary should be completed if necessary by an alphabetical index giving the reference number of each term.

Note 1 - When an abbreviation (or initials) exists to represent a term, it should be given immediately after the term, in the different working languages.

* Revision of former CCIR Resolution 78-1.

RESOLUTION ITU-R 34*

GUIDELINES FOR THE SELECTION OF TERMS AND PREPARATION OF DEFINITIONS

(1986-1990-1993)

The ITU Radiocommunication Assembly,

considering

- a) that the individual Radiocommunication Study Groups have a responsibility for the selection of terms and preparation of definitions;
- b) that there is sometimes a wide diversity of approach in the implementation of these procedures;
- c) that there is a need for conformity in their implementation,

decides

that when selecting terms and preparing definitions, the Radiocommunication Study Groups should use the guidelines given in Annex 1.

ANNEX 1

Guidelines for the selection of terms and preparation of definitions**1. Introduction**

Given below are guidelines for:

- selection of terms;
- preparation of definitions.

2. Terms**2.1 What is meant by a term?**

A term is a word or a group of words used to express a definite concept.

2.2 Conciseness of terms

The term should be selected to be as concise as possible, without impairing the understanding of the text containing the term.

When a term is used in more than one field in a general vocabulary, the field of application should be added between brackets, for example:

- coverage area (of a space station);
- coverage area (of a terrestrial transmitting station).

* Revision of former CCIR Resolution 89-1.

2.3 *Ambiguous terms*

The occurrence of terms with more than one meaning is occasionally inevitable. When one term has several meanings, confusion can arise in the following cases:

- the meanings are very similar;
- the terms appearing in the same text with different meanings (for instance when they are in the same field).

In such cases different terms should be found to express the different meanings of such ambiguous terms.

2.4 *Complex terms*

A complex term should reflect the combination of concepts included in the definition. However, it need not include every constituent of the combination of concepts shown in the definition.

Care should be taken to avoid the unnecessary proliferation of terms and definitions where an already-defined qualifying term, used in conjunction with a simpler term, would suffice.

3. **Definitions**

3.1 *What is meant by definition?*

To define, is to state clearly, accurately and precisely what is a concept. This should preferably be done in one sentence, expressing exactly the meaning of the term used to designate the concept.

A definition should describe the concept fully for the engineering experts and contain sufficient data for the concept to be perfectly understood and its limits properly identified. The definition must be simple, clear and relatively brief. If necessary, additional information should be in the form of notes.

3.2 *Use of terms in definitions*

The following general principles may be adopted for the terms used in a definition:

- all the technical terms which appear in a definition must either be well known or defined elsewhere in the text,
- the term or terms representing a concept to be defined should not appear in the definition,
- the meaning of a term must not be expressed using another term which is itself defined by means of the first term.

3.3 *Accuracy of definitions*

The degree of accuracy of definitions may depend on their intended use. Attempts to achieve greater accuracy may lengthen the text unnecessarily. This may involve the use of more specific and hence less familiar technical terms, thereby making the definition harder rather than easier to understand.

3.4 *Changes to, or limitation of, generally accepted terms*

No attempt should be made to modify or limit the established usage of a term, unless the use of the existing terms causes confusion or ambiguity. In this case the use of the term may be deprecated.

When certain general terms are used in a restricted sense in the telecommunications fields, the definition should include an indication of this constraint.

3.5 *Formulation of definitions*

The wording of the definition should clearly indicate whether the term is a substantive noun, a verb or an adjective.

3.6 *Incomplete definitions*

Care should be taken not to omit the specific characteristics of a term in its definition. Such definitions are incomplete. The term and its definition should be interchangeable.

3.7 *Definitions with more than one term*

It sometimes occurs that more than one term may apply to the same concept. In such cases the alternative term should also be shown (separated by a semicolon).

3.8 *Definitions of limited application*

In general, the definitions which appear in ITU publications are of limited application, i.e. are valid only in the particular publication or field concerned.

The International Telecommunication Constitution (Geneva, 1992) stipulates that the terms used in the Constitution and defined in its Annex shall have the meanings assigned to them in that Annex. The same applies to the terms used in the Geneva Convention and defined in the Annex thereto, those used in the Radio Regulations (1990) and defined in Article 1 thereof, and those used in the International Telecommunication Regulations (1988) and defined in Article 2 thereof. It is also stated that these terms and definitions do not necessarily apply for other purposes. The same considerations hold good for the terms defined by the experts of a Radiocommunication Study Group for the specific requirements of their Study Group.

However, when the experts of a Radiocommunication Study Group develop, for an existing term, a specific new definition which differs from an existing definition in a text that has already been approved, they should ensure that the new definition does not contradict the one which already exists for the same term.

In the case of definitions which are applicable in other Radiocommunication Study Groups, the relevant experts are requested to prepare their definitions to allow them to be used in the widest possible field.

3.9 *Illustrations*

Illustrations can often be used to clarify or explain a definition. The type of illustration used will depend on each specific case; an example of a graphical depiction of terms used in the transmission loss concept can be seen in Recommendation ITU-R PN.341 (see also Recommendation ITU-R V.573, subsection A4).

3.10 *Further use of terms and definitions*

It should be borne in mind that it may be useful later to include a definition in a dictionary and, in this case, it would be valuable if the definition were fully comprehensible even when taken out of context. It could then be included in the dictionary without amendment.

4. *Presentation of terms and definitions*

4.1 For the presentation of terms and definitions, reference should be made to Resolution ITU-R 78 which states that the terms, definitions and where necessary the abbreviations, should be published in the different working languages and presented in a logical order by subject which is the same in each language.

4.2 *Index of terms*

Should there be a need for an index, complex terms may be shown under one or other of the key words.

4.3 *Printing of terms*

Initial letters of terms should be printed in upper-case or lower-case letters as they would appear within a sentence according to the usage in each language.

5. Further references

For further and more specific guidance on the drafting of terms and definitions, reference may be made to the following publications:

- ISO Recommendation 704 "Principles and methods for terminology" (1987).
 - "IEC Guide for work relative to terminology (TC 1), documentation (TC 3) and letter symbols (TC 25)" (1986).
-

RESOLUTION ITU-R 35*

THE ORGANIZATION OF VOCABULARY WORK

(1990-1993)

The ITU Radiocommunication Assembly,

considering

- a) that it is important for the work of the ITU and in particular of the Sectors and for liaison with other interested organizations that terms and their definitions be standardized as far as possible;
- b) the importance of avoiding misunderstanding within the Radiocommunication Sector and between the Radiocommunication Sector and the Telecommunication Standardization Sector and the IEC, respectively, in the use of terms and definitions;
- c) the need to establish lists of terms and definitions for information within the Radiocommunication Sector and for the information of the Telecommunication Standardization Sector and the IEC, and to update such lists rapidly and regularly,

decides

1. that the Radiocommunication Study Groups, within their terms of reference, should continue their work on technical and operational terms and their definitions which may be required for regulatory or administrative purposes and also on specialized terms which may be required by them in the course of their work, these terms and definitions being published rapidly and regularly by the ITU;
2. that each Radiocommunication Study Group should assume responsibility for terminology in its particular field of interest with the assistance of the Coordination Committee for Vocabulary (CCV) if necessary;
3. that each Radiocommunication Study Group shall appoint a permanent Rapporteur for Vocabulary to coordinate its efforts regarding terms and definitions and related subjects and to act as a contact person for the Study Group in this domain. The Rapporteur may be assisted by experts in different languages and different technical subjects;
4. that the responsibilities of the Rapporteur for Vocabulary should be as given in Annex 1;
5. that each Radiocommunication Study Group should consider terms included within its texts and should define them if necessary, or at least explain new concepts or clarify the text used to express existing concepts. Dependent upon the generality of usage terms and definitions should be published in:
 - a separate text of the Radiocommunication Study Group;
 - a specifically labelled section of each text;
 - within the text associated with the first usage of the term;
6. that where more than one Radiocommunication Study Group is defining the same concept, efforts should be made to select a single term and a single definition which is acceptable to all of the Radiocommunication Study Groups concerned;
7. that, when selecting terms and preparing definitions, the Radiocommunication Study Group, and those entities responsible to the Study Group, shall take into account the established use of terms and existing definitions in ITU Sectors as well as those found in the International Electrotechnical Vocabulary (IEV);
8. that the Secretariat should collect all new terms and definitions proposed by the Radiocommunication Study Group, and provide them to CCV which shall act as an interface with the Telecommunication Standardization Sector and the IEC;

* Revision of former CCIR Resolution 113.

9. that the CCV shall communicate with individual Rapporteurs for Vocabulary and, if necessary, promote meetings of experts where inconsistencies are found between terms and definitions in the Radiocommunication Sector, the Telecommunication Standardization Sector and the IEC. These mediation efforts should seek agreement to the extent that such agreement is feasible, with remaining inconsistencies duly noted;
10. that the CCV should review the texts previously drawn up by the former CMV; revised texts, and proposed new texts on general subjects, should be submitted to the Radiocommunication Assembly;
11. that Radiocommunication Study Groups, administrations and other participants in the work of the Radiocommunication Sector, may submit contributions concerning vocabulary and related subjects to the CCV;
12. that Rapporteurs for Vocabulary should take into account any available Telecommunication Standardization Sector lists of emerging terms and draft IEV chapters, to seek consistency of Radiocommunication Sector terms wherever practicable.

ANNEX 1

Responsibilities of Rapporteurs for Vocabulary

1. The Rapporteurs shall study vocabulary and related subjects referred to them by:
 - Working Parties or Task Groups of the same Radiocommunication Study Group;
 - the Radiocommunication Study Group as a whole;
 - the Chairman of the Radiocommunication Study Group;
 - the Rapporteur for Vocabulary of another Radiocommunication Study Group, or by
 - the CCV.
 2. The Radiocommunication Rapporteurs shall be responsible for coordination of vocabulary and related subjects within their own Radiocommunication Study Groups and with other Radiocommunication Groups in conjunction with the CCV; the objective being to achieve the agreement of the Study Groups concerned.
 3. The Rapporteurs shall be responsible for liaison between their Radiocommunication Study Group and the CCV with regard to the activities of the ITU-IEC Joint Coordination Group for Vocabulary and the ITU-IEC Joint Working Group on Graphical Symbols and Documentation.
-

RESOLUTION ITU-R 36*

THE COORDINATION OF VOCABULARY AND RELATED SUBJECTS

(1990-1993)

The ITU Radiocommunication Assembly,

considering

- a) that it is desirable to seek the most efficient method of organizing vocabulary work within the Radiocommunication Sector;
- b) that it is important for the work of the ITU, and in particular of the Sectors and for liaison with other interested organizations, that terms and their definitions, graphical symbols for documentation, letter symbols and other means of expression, units of measurement, etc., be standardized as far as possible;
- c) the difficulty of achieving agreement on definitions when more than one Radiocommunication Study Group is involved;
- d) that the Sectors are collaborating with the International Electrotechnical Commission (IEC) (Technical Committee No. 1) in order to provide an internationally agreed vocabulary of telecommunications and that for this purpose a Joint Coordination Group (JCG) has been established;
- e) that the Sectors are collaborating with the IEC (Technical Committee No. 3) in order to provide internationally agreed graphical symbols for diagrams and for use on equipment, approved rules for the preparation of documentation and for item designation and that for this purpose a Joint Working Group (JWG) has been established;
- f) that the Sectors are collaborating with the IEC (Technical Committee No. 25) in order to provide internationally agreed letter symbols and units;
- g) that the former CCIR has published certain terms with their definitions in the Plenary Assembly Publications and that there is a continuing need for the publication of terms and definitions appropriate to the work of particular Radiocommunication Study Groups;
- h) that unnecessary or duplicated work can be avoided by effective coordination of all work on vocabulary and related subjects carried out by the Radiocommunication Study Groups;
- j) that the long-term objective of the terminology work must be the preparation of a comprehensive vocabulary of telecommunications in the working languages of the ITU,

decides

- 1. that the coordination of work on vocabulary within the Radiocommunication Sector should be ensured by a Coordination Committee for Vocabulary (CCV) comprised of experts in the various working languages and members designated by interested administrations and other participants in the work of the Radiocommunication Sector, as well as the Rapporteurs for Vocabulary of the Radiocommunication Study Groups;
- 2. that the terms of reference of the CCV should be as given in Annex 1;
- 3. that the CCV should work mainly by correspondence according to Resolution ITU-R 1;
- 4. that the CCV should review and, where necessary, revise the texts drawn up by the former CMV;
- 5. that administrations and other participants in the work of the Radiocommunication Sector may submit, to the CCV and to the Radiocommunication Study Groups, contributions concerning vocabulary and related subjects;
- 6. that the Chairman of the CCV should be chosen by the Radiocommunication Assembly.

* Revision of former CCIR Resolution 114.

ANNEX 1

Terms of reference for the Coordination Committee for Vocabulary**1. Vocabulary**

1.1 To coordinate vocabulary work, including abbreviations and initials, within the Radiocommunication Sector and to seek agreement among all concerned Radiocommunication Study Groups to ensure acceptability of definitions.

1.2 To liaise with the Telecommunication Standardization Sector Terminology Coordination Committee to ensure, so far as is practicable, that definitions of technical terms of common interest are mutually acceptable.

1.3 To liaise with the Language Division of the ITU General Secretariat, and with other organizations dealing with vocabulary work in the telecommunications field, for example with the IEC and the International Organization for Standardization (ISO) by means of the ITU-IEC Joint Coordination Group for Vocabulary (JCG) and the IEC-ISO Joint Technical Committee for Information Technology (JTC 1).

2. Related subjects

2.1 To ensure coordination between the Radiocommunication Study Groups concerning graphical symbols to be used in documentation or on equipment, the objective being to achieve the agreement of all Study Groups, and to ensure liaison with the ITU-IEC Joint Working Group for Graphical Symbols and Documentation (JWG).

2.2 To ensure coordination between the Radiocommunication Study Groups concerning letter symbols and other means of expression, systematic classification, units of measurement, etc., the objective being to achieve the agreement of all Radiocommunication Study Groups, and to cooperate with the relevant IEC Technical Committee (Technical Committee No. 25) and with the ISO.

RESOLUTION ITU-R 37

**RADIOWAVE PROPAGATION STUDIES FOR SYSTEM DESIGN
AND SERVICE PLANNING**

(1995)

The ITU Radiocommunication Assembly,

considering

- a) that Radiocommunication Study Group 3 has the task of taking account of the characteristics and variability of radiowave propagation and of advising on prediction procedures suitable for use in service planning and performance evaluation;
- b) that since propagation characteristics depend on geographical location, climate, local environment and atmospheric variability, the development of propagation prediction procedures by Radiocommunication Study Group 3 relies, *inter alia*, on the availability of measurement data and the maintenance of calibrated databanks;
- c) that the acquisition of measurement data, and their subsequent use by Radiocommunication Study Group 3 in the development and improvement of prediction procedures, is a medium- to long-term process,

recognizing

- a) that the service Radiocommunication Study Groups often have short-term needs for information for new systems and networks;
- b) that, when designing such systems, relevant propagation data are sometimes submitted directly to the Radiocommunication Study Group concerned;
- c) that these data, whilst fulfilling a particular short-term need, may be of limited value in other circumstances and may require further analysis prior to their use in studies on propagation prediction method development for other applications,

resolves

- 1. that, whenever possible, Radiocommunication Study Group 3 should be consulted on the most appropriate propagation information for each purposes that arises, where a current Recommendation may not seem to be wholly applicable;
 - 2. that all input contributions to other Study Groups which contain propagation information should be referred to Radiocommunication Study Group 3, so that, in addition to the value of the contribution to the work of the other Study Group, the information may also be used in the future work of Radiocommunication Study Group 3;
 - 3. that the series of Questions now assigned to Radiocommunication Study Group 3 should be examined by all Study Groups to identify where additional study topics are required.
-

RESOLUTION ITU-R 38

STUDY OF REGULATORY/PROCEDURAL MATTERS

(1995)

The ITU Radiocommunication Assembly,

considering

- a) that the ITU Convention included among the functions of Radiocommunication Study Groups the study of technical, operational and procedural matters to be considered by World and Regional Radiocommunication Conferences (CV 156);
- b) that the Radiocommunication Assembly, 1993 (Resolution ITU-R 2) established a Working Party of the Conference Preparatory Meeting to deal with matters relating to regulatory/procedural issues as part of preparations for World Radiocommunication Conferences;
- c) that the maintenance of high quality Radio Regulations is of concern to the membership of the Radiocommunication Sector;
- d) that regulatory/procedural matters may need to be considered for a longer period than the two-year period normally between Radiocommunication Conferences and that consequently their study should not be approached in a fragmented manner,

resolves

- 1. to establish a special committee to address the review of regulatory/procedural matters, the results of which may be used by administrations in their preparation for the 1997 World Radiocommunication Conference;
- 2. that the committee shall incorporate and address the work formerly undertaken in the Working Party to the Conference Preparatory Meeting on regulatory/procedural matters;
- 3. that the results of these studies shall be contained in reports as contributions to the work of the Conference Preparatory Meeting in preparing its report to the 1997 World Radiocommunication Conference;
- 4. that the committee shall be open to all the membership of the ITU-R Sector;
- 5. that the committee shall adopt the working methods of the Study Groups wherever applicable, and shall be task oriented;
- 6. that the committee will have a Chairman and at least one Vice-Chairman appointed by this Radiocommunication Assembly,

instructs the Director

- 1. to investigate, with the advice of the Radiocommunication Advisory Group, options for the study of regulatory/procedural matters, including but not limited to the use of a Working Party to the Conference Preparatory Meeting or a full Radiocommunication Study Group;
- 2. to include in the investigation the precise definition of the tasks that are necessary; the relationship of the work to World Radiocommunication Conferences, the Conference Preparatory Meeting and Study Groups; possible working methods of any long term group, and the financial implications for the Sector;

Note by the Director: Following the approval of Resolution ITU-R 38, the Assembly appointed Mr. A. Berrada (Morocco) as Chairman and Mr. R. N. Agarwal (India) and Mr. V. Rubio Carretón (Spain) as Vice-Chairmen of this special committee (Minutes of the eleventh and last Plenary Meeting (Document RA95/PLEN/81)).

3. to report on these matters to the 1997 Radiocommunication Assembly;
 4. to invite the ITU-R membership to participate in both the work of the special committee, and the investigation of options for the study of regulatory/procedural matters in the period beyond 1997;
 5. to invite the Chairman and Vice-Chairman/Chairmen of the special committee to participate in meetings of Radiocommunication Study Group Chairmen and Vice-Chairmen to ensure co-ordination of work programmes, meetings, and resources.
-

OPINION ITU-R 2-2

**COOPERATION WITH THE INTERNATIONAL SPECIAL COMMITTEE
ON RADIO INTERFERENCE**

(Questions 4/1, 10/1, 35/1, 46/1, 57/1 and 81/1)

(1963-1978-1990)

The CCIR,

CONSIDERING

- (a) that cooperation between the International Special Committee on Radio Interference (CISPR), and the CCIR is desirable;
- (b) that cooperation between the CISPR and the CCIR has been of value;
- (c) that it is desirable to interchange information concerning the protection of radiocommunication services, in particular, safety services;
- (d) that to facilitate the exchange of such information it is desirable to reach agreement on the methods of measurement and radiation limits adopted,

IS UNANIMOUSLY OF THE OPINION

that the CISPR should be invited

1. to advise the CCIR of any proposals they have under consideration for the methods of measurements and radiation limits;
2. to take into account all the studies done by the CCIR relevant for the work of CISPR;
3. to continue cooperation with the CCIR on the following subjects:
 - 3.1 study of methods for the measurement of radio interference and, having due regard to the frequency bands used by safety services, of procedures (in some cases issued by the International Electrotechnical Commission), for limiting undesirable radiations produced by:
 - electrical apparatus and installations (Question 4/1, Study Programme 4A/1);
 - all types of receivers (Recommendation 239; Question 10/1; Publication 106 of the International Electrotechnical Commission);
 - 3.2 determination of the maximum interference level tolerable in complete systems (Question 4/1);
 - 3.3 identification of sources of interference with radio reception (Question 35/1);
 - 3.4 study of the usable sensitivity of receivers in the presence of quasi-impulsive interference (Question 57/1);
 - 3.5 study the relationships between various parameters of man-made noise, in particular between the quasi-peak voltage, the mean noise power, and the amplitude and time distributions of the received noise (Questions 46/1, 29/6 and Study Programmes 46A/1, 29C/6).

Note - The Director of the CCIR is invited to transmit this Opinion to the CISPR with Report 1104.

OPINION ITU-R 14-7

**PREFERRED RADIO-FREQUENCY CHANNEL ARRANGEMENTS FOR
RADIO-RELAY LINKS FOR INTERNATIONAL CONNECTIONS**

(1959-1963-1970-1974-1978-1982-1986-1990-1993)

The ITU Radiocommunication Assembly,

considering

- a) that line-of-sight and near line-of-sight radio-relay links have already been established by many countries for international connections and that such networks are expanding;
- b) that some countries may be considering the use of trans-horizon links for international connections;
- c) that the ITU-R has recommended preferred radio-frequency channel arrangements for analogue and digital radio-relay links (see Recommendation ITU-R F.746);
- d) that, for radio-frequency interconnection of links in international networks, agreement is necessary on specific radio frequencies as well as on the arrangement of radio channels within a band;
- e) that specific radio frequencies can readily be defined in terms of the centre frequency of the radio-frequency interconnection arrangement;
- f) that, for technical reasons, only certain preferred values of the centre frequency are acceptable in a given frequency band;
- g) that there are various aspects of radio-wave propagation and equipment design that lead to the choice of particular frequency bands for certain capacities and types of radio-relay systems;
- h) that radio-relay links used for international connections must meet high standards of performance similar to those recommended by the ITU-T for line transmission systems;
- j) that it is essential to avoid interference to radio-relay links used for international connections, either from other radio-relay links or from other radio services (including unwanted emissions), operating in the same or other countries,

is of the opinion

that the attention of world and regional radiocommunication conferences should be drawn to:

1. the technical advantages of international agreement on preferred frequency bands, within which international line-of-sight and trans-horizon radio-relay links may be established, using the radio-frequency channel arrangements recommended by the ITU-R;
 2. the technical advantages of preferred values for the centre frequency of channels as defined by the basic pattern, or derived by means of subdivision, of the radio frequency channel arrangements for line-of-sight and trans-horizon systems being established by international agreement;
 3. the risk of interference between line-of-sight and trans-horizon links if these operate in the same frequency band and in the same geographical zone;
 4. the need to avoid interference to radio-relay links used for international connections, from other radio services or unwanted emissions caused by them.
-

BROADCASTING IN THE 26 MHz BAND

(1953-1966-1970-1974)

The CCIR,

CONSIDERING

- (a) that it is important that long-distance broadcasting should use all frequency bands available to it;
- (b) that when the smoothed relative sunspot number reaches 70, long-distance broadcast transmissions can be carried out efficiently during daylight hours, over many routes, at frequencies within the 26 MHz broadcasting band;
- (c) that these frequencies are seldom used;
- (d) that such transmissions on these frequencies, whenever they are possible, are particularly advantageous, because of the very low atmospheric-noise intensity and the low absorption,

IS UNANIMOUSLY OF THE OPINION

1. that administrations should bring to the notice of broadcasting organizations the advantages of the 26 MHz band for long-distance terrestrial broadcasting when ionospheric conditions are favourable;
 2. that receiver manufacturers be informed of these possibilities and encouraged to extend the tuning range of their products to permit reception in the 26 MHz band.
-

OPINION ITU-R 16-3*

**ORGANIZATIONS QUALIFIED TO SET STANDARDS ON SOUND
AND TELEVISION RECORDING**

(1956-1970-1978-1986)

The CCIR,

CONSIDERING

- (a) that standards for the international exchange of recorded programmes among broadcasting organizations are the concern of the CCIR;
- (b) that the world-wide definition of standards for the recording of sound and television on discs and on magnetic tape is among the institutional tasks of the IEC;
- (c) that the world-wide definition of standards for the recording of motion pictures and sound on cinematographic film is among the institutional tasks of the ISO;
- (d) that unnecessary duplication of work and a multiplicity of standards should be avoided,

IS UNANIMOUSLY OF THE OPINION

1. that the CCIR should determine the technical and operational criteria which may be necessary to facilitate the international exchange of recorded programmes;
2. that the CCIR should determine the acceptability of existing international standards such as those issued by the IEC and the ISO, and should collaborate with the IEC, ISO and other international organizations in formulating new standards when the existing ones are unsuitable for the international exchange of programmes;
3. that CCIR texts should make reference to existing standards that are judged to be acceptable; references should refer directly to the relevant information without involving successive cross-references; these texts may also include brief descriptive excerpts from these standards when this may help the reader to grasp quickly the full technical content of a specification;
4. that the Director, CCIR, should keep in close touch with the IEC and the ISO, with a view to avoiding unnecessary duplication of work;
5. that to inform the IEC and the ISO of CCIR studies and decisions, the Director, CCIR, should transmit all relevant documents to these organizations inviting them to take CCIR views into account.

* This Opinion also concerns Study Group 11.

OPINION ITU-R 22-5

ROUTINE IONOSPHERIC SOUNDING

(Study Programme KA/6)

(1966-1970-1974-1978-1986-1990)

The CCIR,

CONSIDERING

- (a) that the routine observations from the existing ground-based ionosonde network together with satellite and oblique sounding programmes provide the bases for continuing improvements in both long- and short-term ionospheric predictions;
- (b) that the increasing importance of space research and Earth-space communications will require continued collection of such information, derived as a matter of routine, together with possible increases and changes in the quantity and nature of the information;
- (c) that URSI Commission G has formed an Ionosonde Network Advisory Group (INAG) which is responsible for advising ionospheric sounding stations on scientific questions and for advising URSI on questions concerning the network as a whole,

IS UNANIMOUSLY OF THE OPINION that administrations should make every effort:

1. to continue the operation of the ionosonde network and the interchange, preferably in digital form, of basic data, for which there is much demand, through the World Data Centres;
2. to establish new ionosondes at, or transfer existing ionosondes to, places recommended by the CCIR in fulfilment of Study Programme KA/6 or to support the organizations responsible for new and relocated ionosondes;
3. to consult URSI (INAG) on all questions relating to the establishment or closure of stations in the ionosonde network and proposed changes in the programme of operation or analysis of the ionograms;
4. to support the work under Study Programme KA/6 concerning the use of ionospheric data from satellite programmes and to explore the use of such data as are now available at the World Data Centres, for ionospheric predictions.

Note - The Director, CCIR, is requested to transmit the text of this Opinion to the International Union for Radio Science (URSI), the International Union for Geodesy and Geophysics (IUGG), the Special Committee for Solar-Terrestrial Physics (SCOSTEP), the Scientific Committee for Antarctic Research (SCAR) and the Committee for Space Research (COSPAR) for comments.

OPINION ITU-R 23-5*

**OBSERVATIONS NEEDED TO PROVIDE BASIC
INDICES FOR IONOSPHERIC PROPAGATION**

(1966-1970-1974-1982-1986-1995)

The ITU Radiocommunication Assembly,

considering

- a) that the 12 month running mean sunspot number R_{12} is recommended as the index to be used for all ionospheric predictions for dates more than 12 months ahead of the date of the last observed value;
- b) that the 12 month running mean 2 800 MHz solar radio noise flux, Φ_{12} is recommended as the index to be used for predicting monthly median values of foE, foF1 and foF2, for dates, certainly up to 6 months, and perhaps up to 12 months ahead of the date of the last observed value,

is of the opinion

1. that the Sunspot Index Data Centre (SIDC) sponsored by the Observatoire Royal de Belgique and the Federation of Astronomical and Geophysical Data Analysis Services (FAGS) be encouraged to continue determination and distribution of the international relative sunspot numbers;
2. that the National Research Council (NRC), Ottawa (Canada) should be encouraged to continue the necessary solar radio-noise flux measurements.

* The Director, BR, is requested to bring this Opinion to the attention of SIDC, NRC, URSI and FAGS.

OPINION ITU-R 26-2

STUDIES AND EXPERIMENTS CONCERNED WITH TIME-SIGNAL EMISSIONS

(Question 1/7)

(1966-1970-1974)

The CCIR,

CONSIDERING

- (a) that the standard-frequency and time-signal emissions are used in many fields of pure and applied science;
- (b) that Study Group 7 frequently needs the advice of the scientific unions and organizations,

IS UNANIMOUSLY OF THE OPINION

1. that the General Conference of Weights and Measures (CGPM), the Bureau international des poids et mesures (BIPM), the International Union of Radio Science (URSI), the International Astronomical Union (IAU), the International Union of Geodesy and Geophysics (IUGG), and the International Union of Pure and Applied Physics (IUPAP) should be asked to cooperate with CCIR Study Group 7;
 2. that the Chairman, Study Group 7, should communicate with the Director, BIPM, and with the Chairmen of the appropriate Commissions of URSI, the IAU, the IUGG, the CGPM and the IUPAP, and that the Director, CCIR, should be informed.
-

OPINION ITU-R 27

**STANDARD-FREQUENCY AND TIME-SIGNAL EMISSIONS
IN ADDITIONAL FREQUENCY BANDS**

(Question 2/7)

(1966)

The CCIR,

CONSIDERING

- (a) that in certain areas, particularly in industrial centres, it is not always possible to obtain an adequate signal-to-noise ratio with the existing standard-frequency and time-signal service;
- (b) that a better service is needed in certain areas and this service may be given by use of frequencies in band 8 and higher,

IS UNANIMOUSLY OF THE OPINION

that each administration should, as far as possible, provide for the distribution of standard frequencies and time signals, on a local basis, two bands 100 kHz wide in bands 8 and 9 respectively, the centre frequencies of which should be whole multiples of 5 MHz.

**EXCHANGE OF MONOCHROME AND COLOUR TELEVISION
PROGRAMMES VIA SATELLITES**

(1970)

The CCIR,

CONSIDERING

- (a) the importance of facilitating the exchange of television programmes via satellites;
- (b) that, if this exchange is to be made between countries using the same standard or the same system, any conversion or any transcoding at intermediate points could lower the quality of the signal,

IS UNANIMOUSLY OF THE OPINION

that the attention of administrations and organizations responsible for the transmission of international television programmes should be drawn to the desirability of conserving, in the transmission over their networks, the original standard and system, to provide a better quality of service.

* This Opinion has been brought to the attention of Study Groups 4, 9 and the CMTT.

OPINION ITU-R 40

**SUBJECTIVE ASSESSMENT OF THE QUALITY
OF TELEVISION PICTURES**

(1970)

The CCIR,

CONSIDERING

- (a) that it has already done considerable work on the subjective assessment of the quality of television pictures (see Report 405);
- (b) that the International Electrotechnical Commission (IEC) is also making a similar study with special reference to receivers;
- (c) that it is important to develop analogous assessment procedures to obtain consistent results,

IS UNANIMOUSLY OF THE OPINION

that the Director, CCIR, should remain in close contact with the IEC to keep it informed of the wishes of the CCIR and to obtain the results of the work of the IEC with a view to arriving at one or more common methods of assessing picture quality and preventing duplication of work.

**METHODS OF MEASUREMENT OF TECHNICAL CHARACTERISTICS
OF EQUIPMENT FOR THE LAND MOBILE SERVICE
BETWEEN 25 AND 3000 MHz**

(1970-1974-1990)

The CCIR,

CONSIDERING

- (a) that it is desirable to interchange information of the requirements of administrations concerning the technical characteristics of equipment used in land mobile services between 25 and 3000 MHz;
- (b) that to facilitate the exchange of such information it is desirable to reach agreement on the methods to be adopted for the measurement of the technical characteristics;
- (c) that it is understood that the International Electrotechnical Commission (IEC) is studying methods of measurement,

IS UNANIMOUSLY OF THE OPINION

1. that the IEC should be invited to advise the CCIR of any proposals they have made (or have under consideration) for the methods of measurement of the technical characteristics of transmitters and receivers which could be applied to radio equipment used in land mobile services;
2. that the Director, CCIR, should be invited to transmit this Opinion to the IEC.

Note - Recommendation 478 indicates the technical characteristics considered of international importance.

OPINION ITU-R 49-1

**METHOD OF MEASUREMENT OF MAN-MADE NOISE
IN THE VARIOUS MOBILE SERVICES**

(1974-1978)

The CCIR,

CONSIDERING

- (a) that the CCIR has under study the signal-to-noise ratios and the minimum usable field strengths required for satisfactory reception of the different classes of emission in the various mobile services;
- (b) that the minimum usable field strengths required are influenced by levels of ambient man-made noise;
- (c) that information on ambient man-made noise levels is necessary to further the present studies;
- (d) that the levels of man-made noise will vary with the distance from the source of that noise;
- (e) that the units in which man-made noise is measured should be the same as the units used in the determination of the degradation of performance of mobile radio receiving equipment;
- (f) that the degradation of performance of mobile radio receiving equipment appears to be dependent not only on the amplitude of such noise but also on the pulse repetition rate;
- (g) that the IEC have under consideration methods of measurement of degradation of performance of mobile radio receiving equipment due to man-made noise; and
- (h) that a uniform method of measurement and presentation of results is desirable to permit comparison of measurements made independently,

IS UNANIMOUSLY OF THE OPINION

1. that the International Electrotechnical Commission (IEC) and the International Special Committee on Radio Interference (CISPR) should be invited to advise the CCIR of suitable methods of measuring the parameters of man-made noise;
2. that the methods proposed should include the definition of a reference antenna and a reference distance from noise sources;
3. that the IEC and the CISPR should advise the CCIR on the preferred units to be used in the measurement of noise parameters and degradation of performance by man-made noise.

Note 1 - The Director, CCIR, is invited to draw the attention of the IEC and the CISPR to this Opinion.

Note 2 - The Director, CCIR, is also invited to draw the attention of the Interim Working Party 6/2 to this Opinion.

**COORDINATION OF THE WORK OF THE ITU-R AND THE INTERNATIONAL
ELECTROTECHNICAL COMMISSION (IEC) ON MEASUREMENTS FOR
THE ADJUSTMENT AND MAINTENANCE OF RADIO-RELAY SYSTEMS**

(1974-1995)

The ITU Radiocommunication Assembly,

considering

- a) that it is essential to define and unify the measuring methods and the general characteristics of the measuring instruments to be used by administrations for the adjustment and maintenance of radio-relay systems;
- b) that the IEC has been working in this field;
- c) that any duplication of, or inconsistency between the work of the ITU-R and the IEC is to be avoided;
- d) that the coordination of the work of the ITU-R and the IEC has been satisfactorily maintained since the original version of Opinion ITU-R 50 was adopted in 1974,

is of the opinion

- 1. that the ITU-R should continue to collaborate with the IEC in defining the measurements for the adjustment and maintenance of radio-relay systems and in determining the characteristics of the appropriate measuring instruments;
 - 2. that the Director of the Radiocommunication Bureau (BR), should keep in close touch with the IEC to prevent unnecessary duplication of work;
 - 3. that the Director, BR, should provide the IEC with all relevant ITU-R documents and invite the IEC to take account of the views expressed by the ITU-R;
 - 4. that, if necessary, the Director, BR, should propose a joint meeting of the ITU-R and the IEC to settle any problems that cannot be settled by correspondence.
-

OPINION ITU-R 51*

**STUDY OF DIGITAL TECHNIQUES BY CCIR STUDY GROUPS
AND THE CMTT**

(1974)

The CCIR,

CONSIDERING

- (a) that the study of digital techniques will be an important part of the future work of CCIR Study Groups 4, 9, 10, 11 and the CMTT;
- (b) that CCITT Study Group XVIII has been assigned all questions relating to pulse-code modulation under study by CCITT;
- (c) that CCITT Study Group XVIII will establish performance requirements for transmission systems and, for this work, will need to know the likely digit rates for the various services to be carried by digital networks and performance capabilities of various transmission media, including terrestrial radio and satellite systems,

IS UNANIMOUSLY OF THE OPINION

1. that the work of CCIR Study Groups 4 and 9 on digital transmission systems should be closely coordinated with the work of CCITT Study Group XVIII. The Director, CCIR, should transmit the relevant documents of Study Groups 4 and 9 directly to CCITT Study Group XVIII;
2. that Study Groups 10 and 11 should study the methods of digital encoding and error protection appropriate to the broadcasting, recording and studio processing of sound programme and television signals respectively, and to study methods for the reduction of redundancy in these signals;
3. that the CMTT should study the methods of digital encoding, transcoding and error protection appropriate to the long distance transmission of sound programme and television signals. The CMTT should also provide the necessary coordination to ensure that the work of Study Groups 10, 11 and the CMTT is transmitted to CCITT Study Group XVIII in a unified manner through the Director, CCIR;
4. that the results of the work of CCITT Study Group XVIII should be transmitted to the CCIR Study Groups concerned through the Director, CCIR.

* The Director, CCIR, is requested to bring this Opinion to the attention of the IEC and the CCITT.

**LOCATION OF INTERFACE BETWEEN
CCIR STUDY GROUP 4 AND CCITT RESPONSIBILITIES
FOR DIGITAL NETWORK RECOMMENDATIONS**

(1978-1986)

The CCIR,

CONSIDERING

- (a) that the fixed-satellite service HRDP forms part of an overall HRX;
- (b) that the CCITT has responsibilities for developing Recommendations for both the overall HRX and some of the constituent HRDPs;
- (c) that CCIR Study Group 4 has responsibility for developing Recommendations relating to the satellite HRDP,

IS UNANIMOUSLY OF THE OPINION

that the interface point between the responsibilities of CCIR Study Group 4 and the CCITT should be the digital distribution frame at which the satellite HRDP interfaces with the terrestrial network (see Recommendation 521).

* This Opinion should be brought to the attention of the CCITT.

OPINION ITU-R 68-2

DATA BANK OF HF SKY-WAVE SIGNAL INTENSITY MEASUREMENTS

(1992-1990-1995)

The ITU Radiocommunication Assembly,

considering

- a) that observations of HF sky-wave signal intensity collected under standardized conditions are needed for a wide range of path and operating conditions in order to test the accuracy of methods of signal intensity estimation and to enable the development of new methods;
- b) that Recommendation ITU-R P.845, Annex 1 gives details of how observations may be carried out and reported in order to produce standardized data of the greatest value;
- c) that Recommendation ITU-R P.845, Annex 2 gives specifications for a field-strength measurement campaign intended for future improvements in prediction methods;
- d) that the existing data bank of measurements is inadequate for the purposes in hand,

is of the opinion

- 1. that administrations and organizations should make every effort to provide such existing measured data to the Director of the Radiocommunication Bureau (BR), for inclusion in the data bank;
 - 2. that administrations and organizations should collect and provide new data in accordance with the details given in Recommendation ITU-R P.845;
 - 3. that, although data in accordance with Recommendation ITU-R P.845 are preferable, administrations and organizations having other data are encouraged to provide them to the Director, BR. The nature and method of processing the data must be adequately explained.
-

**FIELD-STRENGTH MEASUREMENTS FOR FREQUENCIES
BELOW ABOUT 1.7 MHz**

(Study Programme 31D/6)

(1982)

The CCIR,

CONSIDERING

that there is a need for improved propagation data at frequencies below about 1.7 MHz,

IS UNANIMOUSLY OF THE OPINION

1. that administrations and organizations which can make field strength and phase measurements, or which can provide suitable transmissions, should be encouraged to participate in measurement campaigns, especially in those parts of the world where few measurements have been made;

2. that administrations and organizations should communicate their results to the Director of the CCIR. The standardized form described in Opinion 46 should be used where possible.

OPINION ITU-R 71-2*

DOCUMENTATION OF TIME TRANSMISSIONS

(1993)

The ITU Radiocommunication Assembly,

considering

- a) that transmitted time signals are kept within various accuracy limits by the introduction of steps or changes in the rate;
- b) that each Administration furnishes current information concerning adjustments to frequency and time signals in accordance with Article 33, No. 2771 of the Radio Regulations and Resolution ITU-R 28;
- c) that there have been different values of the steps and changes of the rates in the different countries before the introduction of coordinated universal time (UTC), and that the relevant details are not readily available;
- d) that these data could be necessary for future analysis,

is of the opinion

1. that all administrations operating a standard-frequency time-signal service should document the details of significant adjustments to frequencies and time-scales and specifically should publish the amount and date of time steps and rate changes in their emissions and also communicate the data to the Bureau international des poids et mesures (BIPM).

* This Opinion should be brought to the attention of the authorities responsible for standard-frequency and time-signal services listed in Recommendation ITU-R TF.768.

TIME DISSEMINATION USING METEOROLOGICAL SATELLITES

(Question 2/7)

(1982)

The CCIR,

CONSIDERING

- (a) that needs are growing in many application areas, such as geodesy, geophysics, international time coordination, and many other types of coordinated scientific observations for reference time signals that are available world-wide on a highly reliable basis;
- (b) that an accurate time code referenced to UTC has been successfully disseminated from two United States GOES meteorological satellites since 1975 and is finding increasing acceptance and use within the western hemisphere;
- (c) that the European Meteosat satellites and the Japanese GMS satellites are part of the same world-wide meteorological satellite system as the United States GOES satellites and have similar data formats, including appropriate code bits reserved for possible time code use;
- (d) that inexpensive receivers could be used in common with the GOES, Meteosat, and GMS satellites with little or no modification;
- (e) that time and frequency organizations in Europe and Japan have expressed interest in implementing time codes on the Meteosat and GMS satellites,

IS UNANIMOUSLY OF THE OPINION

1. that the addition of a time code compatible with the GOES satellites to Meteosat and GMS satellites would provide a valuable world-wide time and frequency dissemination service useful in many applications and requiring no significant modifications to the satellite signal formats, space hardware, or ground equipment;
2. that the World Meteorological Organization should be asked to distribute this Opinion to its national organizations in appropriate countries;
3. that the European Space Agency should be asked to distribute this Opinion to appropriate organizations within Europe that are interested in the METEOSAT program.

* The Director, CCIR, is requested to bring this Opinion to the attention of the International Union of Geodesy and Geophysics (IUGG) and CCIR Study Group 2.

OPINION ITU-R 73

**INTERFERENCE DUE TO MAN-MADE NOISE IN THE
VARIOUS MOBILE SERVICES**

(1982)

The CCIR,

CONSIDERING

- (a) that the CCIR has under study the signal-to-noise ratios and the minimum usable field strengths required for satisfactory reception of the different classes of emission in the various mobile services;
- (b) that the minimum usable field strengths required are influenced by levels of ambient man-made noise;
- (c) that information on ambient man-made noise levels is necessary to further the present studies;
- (d) that the International Electrotechnical Commission (IEC) has elaborated methods of measurement of degradation of performance of mobile radio receiving equipment due to man-made noise;
- (e) that the IEC has elaborated methods of measurement of man-made noise which are expressed in the same units as used in Considering (d);
- (f) that the International Special Committee on Radio Interference (CISPR) limits provides for measurements of ignition systems of motor vehicles in the frequency range 40-250 MHz,

IS UNANIMOUSLY OF THE OPINION

1. that the IEC and the CISPR should be invited to advise the CCIR as to the man-made radiation levels of motor vehicles complying with the CISPR limits when received by a base or mobile station antenna:
 - 1.1 mounted on a vehicle radiating the noise,
 - 1.2 mounted on a vehicle operated in traffic of from 100 to 10 000 vehicles per hour,
 - 1.3 mounted at a base station in an area of traffic density of 10, 100, 1000 vehicles per km²,
 - 1.4 mounted on an aircraft operating at altitudes of 1 km, 4 km and 10 km for traffic densities of 100 and 1000 vehicles per km² in an area below the aircraft;
 2. that the IEC and the CISPR should be invited to advise the CCIR as to the degree of degradation to both analogue and digital communication systems caused by these noise levels.
-

**SYSTEMS FOR SIGNAL INTERFACE CONNECTION BETWEEN SOUND-BROADCASTING
RECEIVERS AND ASSOCIATED EQUIPMENT**

(1982-1990)

The CCIR,

CONSIDERING

- (a) the importance of facilitating the enhancement and greater efficiency of broadcast systems;
- (b) that the introduction of such improvements has heretofore often been delayed by the need to wait until equipment in the hands of the public has become obsolete;
- (c) that such delays could be shortened if appropriate means were provided for the connection of associated equipment;
- (d) the CCIR studies decided in Study Programmes 46G/10 and 46H/10,

IS UNANIMOUSLY OF THE OPINION

that the IEC should be invited to study and set standards for signal interface connection between sound broadcasting receivers, audio recorders and players, decoders for sound broadcasting supplementary services, and other associated equipment intended for use by the public, taking into appropriate account the studies that will be carried out by the CCIR on this subject.

* The Director, CCIR, is requested to bring this Opinion to the attention of the CCITT and the IEC. This Opinion has also been brought to the attention of Study Group 11.

OPINION ITU-R 75-1

**SYSTEMS FOR SIGNAL INTERFACE CONNECTION BETWEEN
TELEVISION RECEIVERS AND ASSOCIATED EQUIPMENT**

(1982-1990)

The CCIR,

CONSIDERING

- (a) the importance of facilitating the enhancement and greater efficiency of broadcast systems;
- (b) that the introduction of such improvements has heretofore often been delayed by the need to wait until equipment in the hands of the public has become obsolete;
- (c) that such delays could be shortened if appropriate means were provided for the connection of associated equipment;
- (d) the CCIR studies decided in Study Programme 18U/11,

IS UNANIMOUSLY OF THE OPINION

that the IEC should be invited to study and set standards for signal interface connection between receiving equipment, recorders, teletext decoders and other associated equipment intended for use by the public for conventional television, enhanced television and high-definition television, taking into appropriate account the studies that will be covered by the CCIR on this subject.

Note - The Director, CCIR, is requested to bring this Opinion to the attention of the CCITT and IEC. This Opinion has also been brought to the attention of Study Group 10.

OPINION ITU-R 83-1

DATA BROADCASTING SERVICES

(1986-1990)

The CCIR,

CONSIDERING

- (a) that some data broadcasting services have already been introduced and information is given in Recommendation 653;
- (b) that studies within the CCIR on data broadcasting generally are in progress and information is given in Reports 802, 956, 1207 and 1208;
- (c) that several administrations are providing a wide range of data services via the public telecommunication networks;
- (d) that the use of these complementary delivery facilities can increase the appeal of some of these data services;
- (e) that it is desirable to optimize the compatibility of receiving terminals for the two methods of delivery,

IS UNANIMOUSLY OF THE OPINION

that the Director, CCIR, should draw the attention of the Director, CCITT, to the CCIR documentation on data broadcasting services and invite the CCITT to take into account in its studies of data services based on the public telecommunication networks, the desirability for compatibility of the terminal equipment with data broadcasting services. Similarly, the CCIR in its studies of data broadcasting services, should take into account relevant CCITT documentation.

OPINION ITU-R 85-1

MEASUREMENTS OF THE CHARACTERISTICS OF ATMOSPHERIC RADIO NOISE

(1986-1993)

The ITU Radiocommunication Assembly,

considering

- a) that the intensity of atmospheric radio noise sets a limit to the performance of radio circuits operating at frequencies below about 30 MHz;
- b) that information contained in the several versions of Report ITU-R PI.322, and subsequently Recommendation ITU-R PI.372, has been used for many years as an element in the planning of radio services;
- c) that new information on the characteristics of atmospheric radio noise differs considerably from that given in Recommendation ITU-R PI.372 for some parts of the world;
- d) that further studies are necessary as detailed in Question ITU-R 29/6,

is of the opinion

that administrations and recognized operating agencies should make every effort:

1. to make measurements of the intensity and other characteristics of atmospheric radio noise, bearing in mind the need to distinguish natural noise from that due to man-made sources;
 2. to analyse the results of measurements of atmospheric radio noise in terms of the parameters used in Recommendation ITU-R PI.372 so as to facilitate comparison;
 3. to evaluate the practical effects of applying the information of Recommendation ITU-R PI.372 to the planning of radio systems.
-

**EQUIPMENT INTERCONNECTION IN PROFESSIONAL
PROGRAMME PRODUCTION INSTALLATIONS**

(1990)

The CCIR,

CONSIDERING

(a) the importance of facilitating the easy interconnection of equipment in programme production installations for sound broadcasting and television; this covers:

- interconnections to carry programme signals from equipment to equipment,
- interconnections to coordinate operation of equipment, e.g. control and tally functions;

(b) that developing countries would particularly benefit from easy interconnectability of equipment in their installations;

(c) that the CCIR possesses the expertise required to define and recommend essential elements of specifications for equipment interconnection in professional broadcast installations, that optimally meet the system engineering requirements of broadcasters and programme producers (several such Recommendations have been successfully set by the CCIR in the past);

(d) that IEC Technical Committee 84 is engaged in work on audio and audiovisual equipment interconnection with special attention to audiovisual equipment for domestic use;

(e) the content of Opinion 16,

IS UNANIMOUSLY OF THE OPINION

that the IEC should be invited to take into appropriate consideration the results of relevant CCIR studies, and the relevant CCIR Recommendations, in its own work on equipment interconnection for domestic and professional audio and audiovisual equipment.

* The Director, CCIR, is requested to bring this Opinion to the attention of the IEC.

OPINION ITU-R 91

WORLD ATLAS OF GROUND CONDUCTIVITIES

(1993)

The ITU Radiocommunication Assembly,

considering

- a) the need for ground conductivity data when planning radiocommunication services, including those concerning navigation, in the VLF, LF and MF bands;
- b) that the World Atlas of Ground Conductivities (formerly published separately in Report ITU-R PN.717) is published as Recommendation ITU-R PN.832;
- c) the desirability for the World Atlas to contain ground conductivity data for all countries of the world,

is of the opinion

- 1. that Administrations should check and, if necessary, revise the information given in the World Atlas;
 - 2. that for those countries for which no conductivity data are contained in the World Atlas, the Administrations concerned should collect and provide data in accordance with the information given in Recommendation ITU-R PN.832.
-

HARMONIZATION OF ACTIVITIES FOR FUTURE MOBILE COMMUNICATIONS

(1993)

The ITU Radiocommunication Assembly,

considering

- a) that the Radiocommunication Sector has a program on Future Public Land Mobile Telecommunication Systems (FPLMTS) which would enable worldwide compatibility;
- b) that major programs for future mobile communications within each Region are at early stages;
- c) that resources of budget, manpower, and planning expertise are available to these programs which substantially exceed those readily available to the Radiocommunication Sector;
- d) that, without international coordination, these regional programs would tend to diverge;
- e) that international standards for future mobile communications (i.e. FPLMTS) will not be effective unless these regional programs are harmonized;
- f) that the production of ITU-R Recommendations on FPLMTS will be an important step in achieving this harmonization,

is of the opinion

1. that the ITU, as a matter of policy, should make every effort to persuade regional bodies, national authorities and other appropriate entities to support the Radiocommunication Sector in an explicit manner in its development of Recommendations on FPLMTS and strongly encourage regional organizations to work together towards a single worldwide standard.

* This Opinion should be brought to the attention of the Telecommunication Standardization Sector.

OPINION ITU-R 93*

**USE OF COMMUNICATIONS SATELLITES FOR A SERVICE OF TWO-WAY
TIME AND FREQUENCY TRANSFER**

(Question ITU-R 201/7)

(1995)

The ITU Radiocommunication Assembly,

considering

- a) that the two-way method of time and frequency (T/F) transfer using various geostationary communication satellites has been under investigation for a number of years;
- b) that a range of modems designed to support two-way T/F transfer is now available;
- c) that, recently, a large programme of T/F transfer has been actively pursued, both within Europe and between Europe and North America, by virtue of the free access provided for one year at 14/12 GHz and 14/11 GHz bands to INTELSAT 513 satellite positioned at 307 °E;
- d) that this programme has demonstrated that regular (i.e. three times per week) time transfer with instabilities at the level of 1 ns, or less, can be achieved;
- e) that these results have been obtained with PN sequences having a bandwidth of 3.5 MHz (at the -18 dB point), the signals being immersed in noise for the small (~2-3 m) antennas in use by the T/F transfer community;
- f) that coordination and extension of this existing programme is necessary if the two-way method is to be introduced on a regular basis as a constituent part of international timekeeping and, also, if it is to realize its full potential as a means of intercontinental frequency transfer;
- g) that there is a good prospect of reducing instabilities to the region of 100 ps, which would make possible frequency transfer in the vicinity of 10^{-15} for a one-day averaging time,

is of the opinion

1. that the appropriate measures should be taken by the international communication satellite operators with the aim of securing the channel capacity required for a programme of regular T/F transfer, preferably at minimum cost, based on the low transponder powers involved;
2. that, in consequence, the T/F community should adjust its operational procedures to take account of possible access to the transponders at times of low commercial activity and/or possible pre-emptive measures.

* This Opinion should be brought to the attention of Radiocommunication Study Groups 4 and 8.

**TIME AND FREQUENCY TRANSFER USING DIGITAL
TELECOMMUNICATION NETWORKS**

(Question ITU-R 207/7)

(1995)

The ITU Radiocommunication Assembly,

considering

- a) that ITU-T Recommendations G.707, G.708 and G.709 specify bit rates, frame structure, and formatting for a synchronous digital hierarchy (SDH);
- b) that optical fibre transmission lines and the SDH are capable of time and frequency dissemination at very high levels of accuracy and precision;
- c) that optical fibre transmission lines will reach industrial facilities, offices and other end users making it a widely available source of frequency and, if properly implemented, time information;
- d) that synchronization messages will be required for time transfer between network elements;
- e) that the delays between network elements need to be measured for precise time transfer between network elements;
- f) that the quality of timing information being transferred needs to be included;
- g) that maintaining precise time at network elements will assist in fault detection and correction in the network;
- h) that the normal SDH data transmission format includes overhead bits which can be used to transmit additional information for supporting network operations;
- j) that some of these overhead bits could be useful in conveying timing information, including the current date and time-of-year,

is of the opinion

1. that sufficient overhead bits be reserved in the appropriate levels of the SDH format for the purpose of supporting both one-way and two-way time exchanges at the 1 ns or highest practical accuracy level between network elements;
2. that the techniques for time and frequency transfer outlined in Annex 1 be considered in the development and specification of digital telecommunication networks.

ANNEX 1**Configurations and interfaces for time and frequency transfer using
telecommunication networks**

The following information provides some preliminary ideas from Radiocommunication Working Party 7A with regard to possible methods, network configurations, and interfaces that could facilitate the use of such networks for time and frequency transfer to a broad range of potential users.

* This Opinion should be brought to the attention of the Telecommunication Standardization Sector (ITU-T).

1. General

Telecommunication networks are suitable for transferring time and frequency, and are alternatives to conventional dissemination methods of time and frequency such as LORAN-C, GPS, GLONASS and time transfer methods using stationary satellites such as INTELSAT.

ITU-T Recommendations enable time and frequency transfer using telecommunication networks to establish standardized system configurations and interfaces. SDH bit rates are specified in ITU-T Recommendation G.707 and the Network Node Interface (NNI) is specified in ITU-T Recommendation G.708.

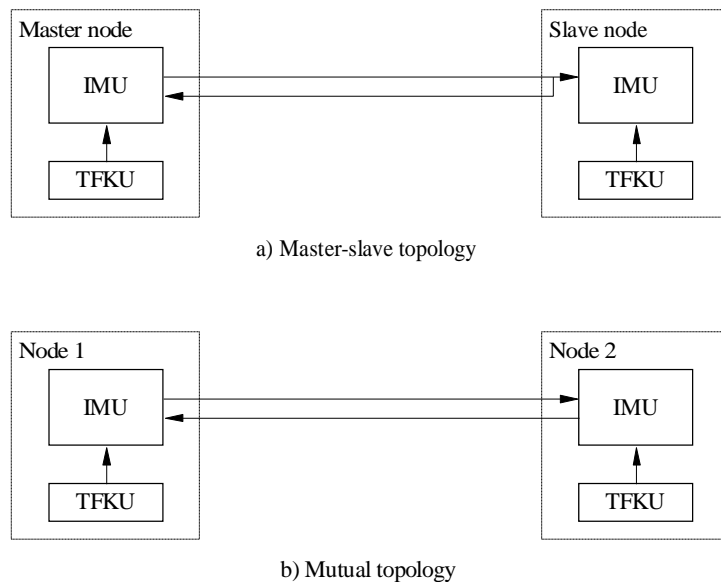
This Annex provides information, guidance and requirements concerning time and frequency transfer over digital telecommunication networks.

2. Transfer method

Time and frequency are transferred through a transfer medium between two nodes each of which includes a time and frequency keeping unit (TFKU). The location data of the TFKU is not required: however, it is required that delay and delay variation of the media can be explicitly evaluated. Therefore, time and frequency transfer in telecommunication networks uses a bidirectional path that consists of outgoing and incoming paths composed of the same medium. Difference in delay between outgoing and incoming paths results in time and frequency error.

There are two basic topologies in time and frequency transfer as shown in Fig. 1.

FIGURE 1
Basic topology in time and frequency transfer



TFKU: time and frequency keeping unit
IMU: interface and measurement unit

2.1 *Master-slave topology*

One always receives a time and frequency signal and so it is called the slave node. The other node is called the master node; however, the name of the master node is not related to whether the master node is the origin of the time and frequency signal or not. The master node measures the delay experienced on outgoing and incoming paths over a round-trip and manages the delay data. The time and frequency signal is compensated by the delay data and sent from the master node to the slave node, or the time and frequency signal is first sent to the slave node and then compensated at the slave node by the delay data transferred from the master node. The time and frequency signal is advanced by the delay data which is calculated by the following equation:

$$T_d = T_{rd} / 2 \quad (1)$$

where:

T_d : delay data

T_{rd} : round-trip delay.

2.2 *Mutual topology*

Both nodes send and receive the time and frequency signal. Delay is caused by outgoing and incoming paths and is measured at the two nodes by comparing the time and frequency signals generated at each node. Measurement results are exchanged. The time difference between the two nodes can be calculated from the results.

$$T_{12} = \frac{1}{2} (T_{d1} - T_{d2}) \quad (2)$$

where:

T_{12} : time difference between two TFKUs

T_{d1} : time difference measured at node 1 between the time and frequency signal sent from node 2 and the time and frequency signal generated at node 1

T_{d2} : time difference measured at node 2 between the time and frequency signal sent from node 1 and the time and frequency signal generated at node 2.

The mutual topology can be used between any two nodes regardless of their hierarchy. Each node measures the time difference between other nodes rather than compensating the time and frequency signal.

3. *System configuration*

The above topologies can be implemented in three ways as shown in Fig. 2. The path defined in the topology is constructed from network elements. The network element connects two locations that are geographically separated and provides both network and node interfaces including TFKU. The interface supports two signals: a time and frequency signal that includes a time marker, time information and delay data, and a data signal which includes time difference data and general data.

3.1 *One-way configuration*

Slave nodes receive the time and frequency signal generated at a reference node. The data signal may not be required. Specifications of time and frequency depend on that of the reference node.

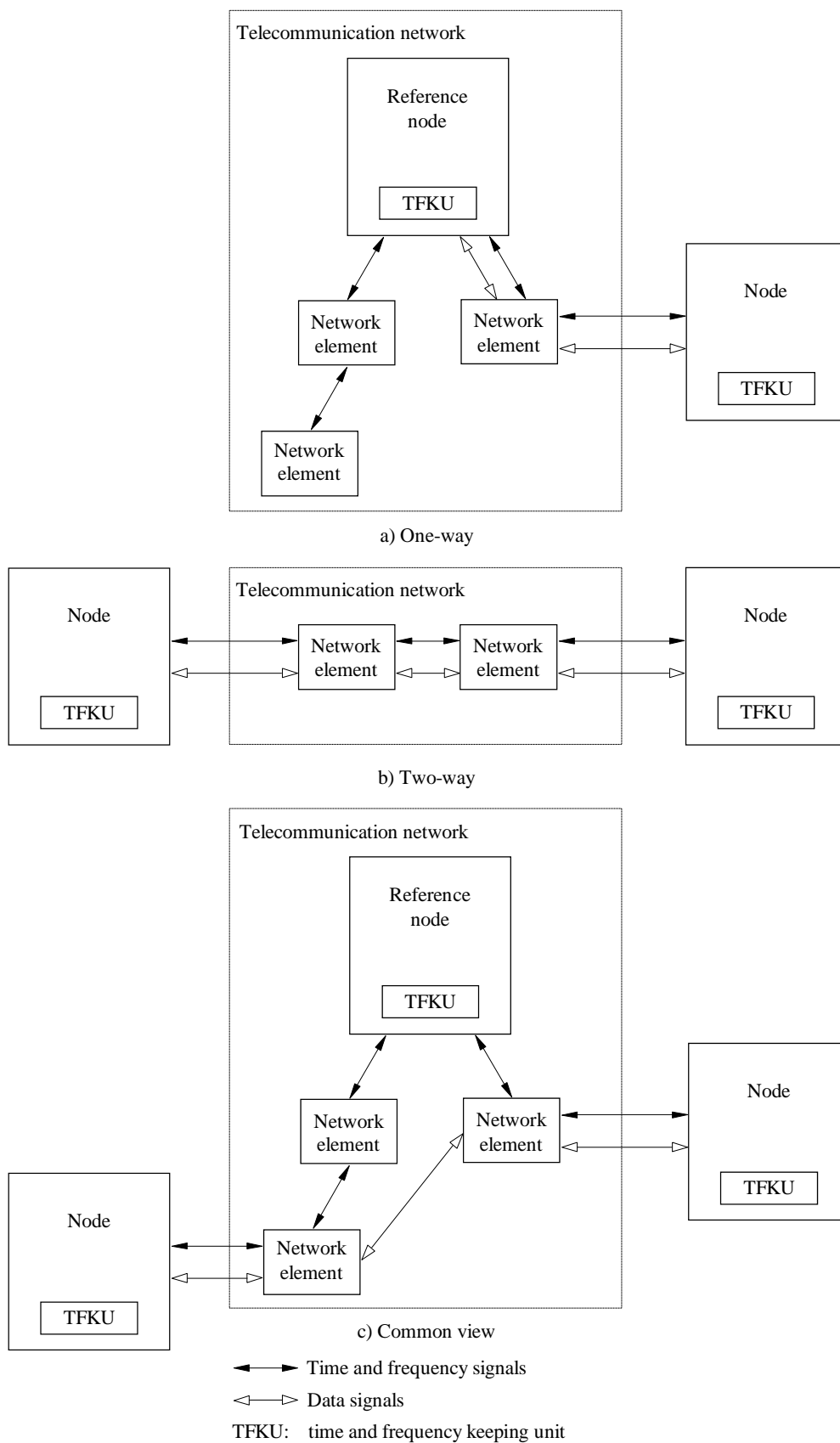
3.2 *Two-way configuration*

Nodes in the mutual topology can exchange time and frequency signals generated by their TFKUs. The network must provide nodes with access to the interface used by the reference node.

3.3 *Common-view configuration*

All nodes initially receive the same time and frequency signal generated at the reference node as slave nodes. Nodes then exchange data signals to calculate the time difference between them in the mutual topology. The time and frequency error of the reference node TFKU is suppressed within the nodes due to the simultaneous observation of the common source.

FIGURE 2
Basic category for time and frequency transfer

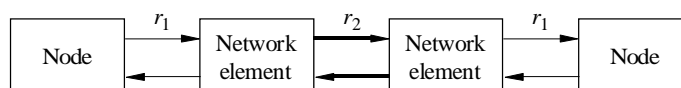


4. Physical specifications

4.1 Bit rates

This Recommendation should specify bit rates of paths between network elements and nodes (bit rate r_1 in Fig. 3) and of paths between network elements (bit rate r_2 in Fig. 3). Allowable bit rates of paths are listed in Table 1. The bit rates are recommended in ITU-T Recommendation G.707.

FIGURE 3
Transmission path configuration and
synchronous digital hierarchy level



Bit rates of r_1 and r_2 can be selected from Table 1. r_2 is higher than or equal to r_1 .

D03

TABLE 1
Synchronous digital hierarchy bit rates

| Synchronous digital hierarchy level | Hierarchical bit rate (kbit/s) |
|-------------------------------------|-----------------------------------|
| 1 (STM-1) | 155 520 |
| 4 (STM-4) | 622 080 |
| 16 (STM-16) | 2 488 320 |
| 64 (STM-64) ⁽¹⁾ | 9 953 280 |

4.2 Frame format

The frame format based on the synchronous digital hierarchy level (STM- N) is in accordance with ITU-T Recommendation G.708. STM- N frame format, shown in Fig. 4a), enables network elements and nodes to achieve excellent global communication. In addition, using the Section Overhead (SOH) offers another advantage. We can use the STM- N payload area for B-ISDN services at the same time when the time and frequency transfer application is executed as a background communication. MSOH, the lower 5 bytes of nine rows in SOH (see Fig. 4b)), is appropriate for time and frequency transfer because it can be transmitted as far as the opposite network element if the element supports MSOH reception and if MSOH is not terminated at devices such as repeaters located in the path between network elements.

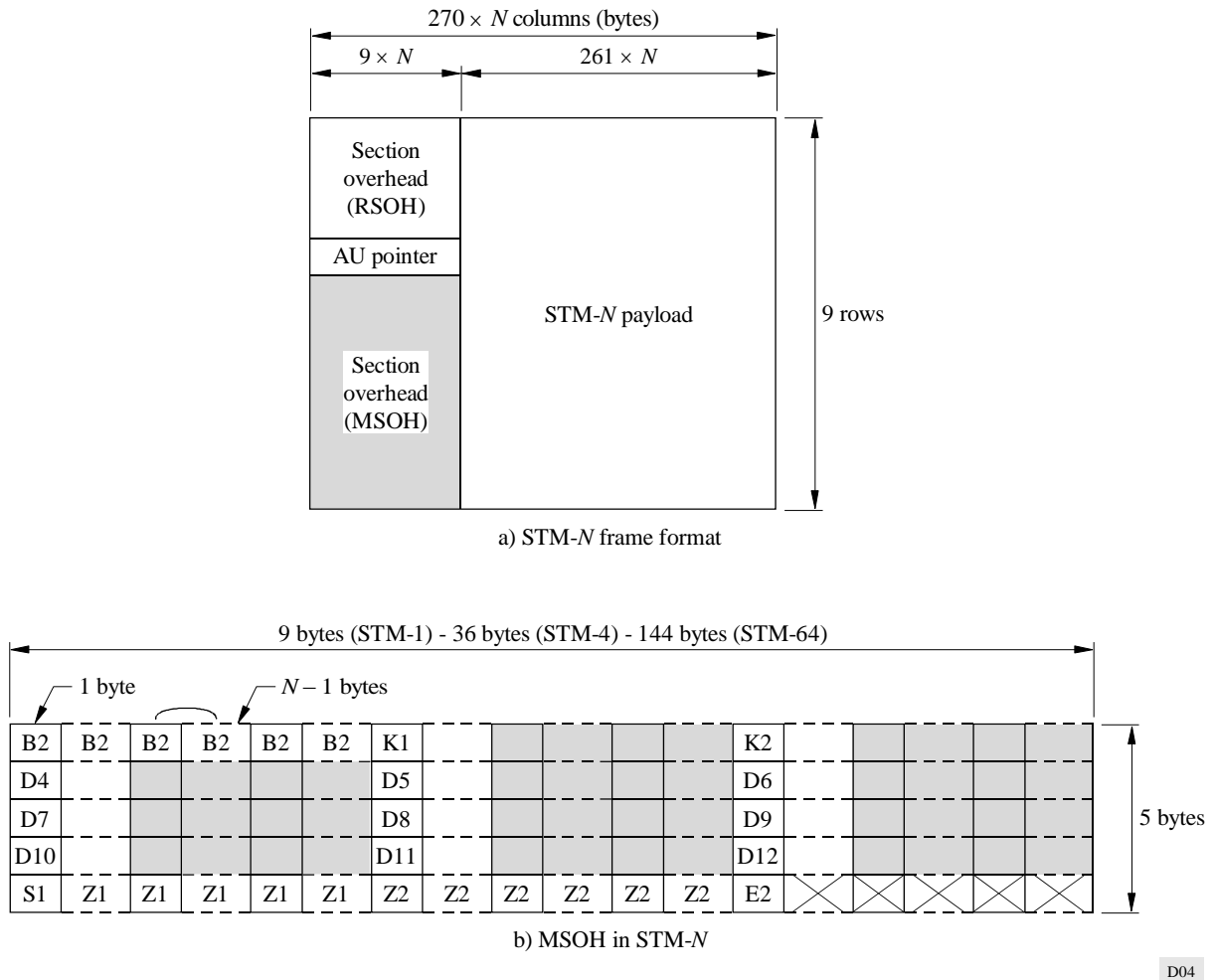
4.3 Bytes for time and frequency application

Which byte is suitable for transmitting time and frequency information is for further study. Promising bytes are shaded in Fig. 4b). These bytes are not defined for any purpose in ITU-T.

4.4 Multiframe format

A multiframe in the bytes specified in § 4.3 should be defined to transmit a second signal because the STM- N frame period is 8 kHz. Multiframe format is for further study.

FIGURE 4
STM- N frame format and MSOH byte mapping



5. Examples

Figure 5 shows examples of the time and frequency transfer configuration. The network elements directly connected to nodes are the multiplexers/demultiplexers based on ITU-T Recommendation G.709.

5.1 Common-view example

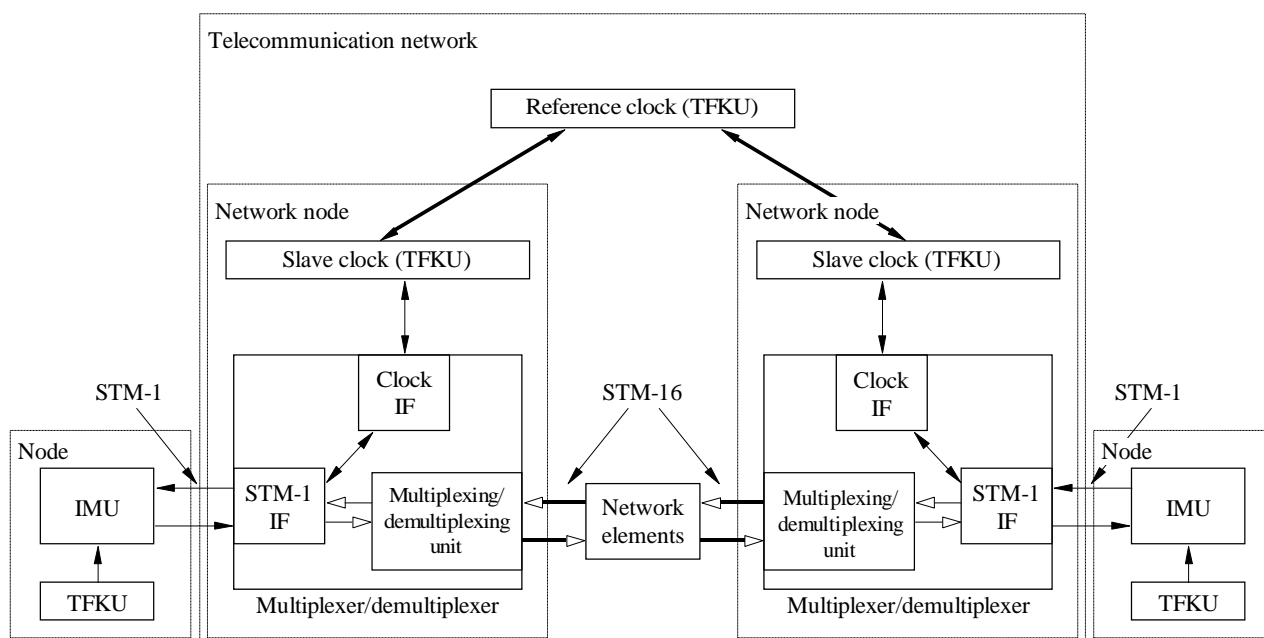
In the common-view example shown in Fig. 5a), the time and frequency signal is generated by TFKU, called the reference clock in ITU-T, and then distributed to multiplexers/demultiplexers through the TFKU, called the slave clock in ITU-T. The time and frequency signal is immediately transferred to the TFKU in connected nodes through clock IF and STM-1 IF from the slave clock. Each multiplexer/demultiplexer adds general STM-1 signals to STM-16 and drops them from STM-16, and also adds the time and frequency signal to STM-1.

5.2 Two-way example

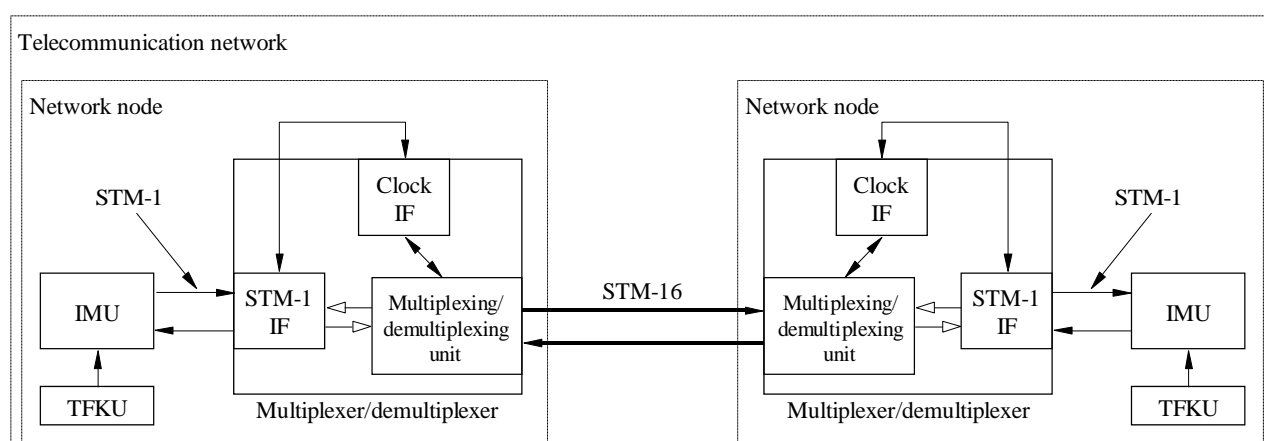
Figure 5b) shows the two-way example. Each multiplexer/demultiplexer adds the time and frequency signal to STM-1 and drops them from STM-16 leaving general STM-1 signals. Information imposed on the MSOH described in § 4.2 is terminated at the end of a section. This means that the MSOH information can be transmitted only between multiplexers/demultiplexers and between multiplexer/demultiplexer and the node. The MSOH information in STM-1

generally cannot be transported to the MSOH in STM-16, nor can the MSOH information in STM-16 to the MSOH in STM-1. In this example, the time and frequency signal generated by TFKU is extracted in STM-1 IF, transferred to the Mux/demux unit via Clock IF, and then imposed on the MSOH in STM-16. In the other network node, the time and frequency signal is extracted at the Mux/demux unit, and transferred to STM-1 IF via Clock IF, and then imposed on MSOH in STM-1 IF again. The time and frequency signal thus can be directly transferred to the other node by this configuration.

FIGURE 5
Examples of the time and frequency transfer configuration constructed
by line systems of STM-16 and by local systems of STM-1



a) Common-view example



b) Two-way example

↔ Time and frequency signal
 ⇌ Data signal
 ⇔ Time and frequency and data signals

TFKU: time and frequency keeping unit

IMU: interface and measurement unit

There is no network element such as multiplexers/demultiplexers between network nodes in this example. STM-16 can be transmitted via other multiplexers/demultiplexers if the original clock of STM-16 is not changed; however, time and frequency error due to transmission delay asymmetry might occur.

In this example, TFKU is located in the network node, as is the multiplexer/demultiplexer. However, a subscriber loop system can be used to connect TFKU to the multiplexer/demultiplexer if TFKU is located in a node different from the network node.

6. Performance specification guidelines

The specifications concerning time and frequency errors such as stability and accuracy require additional discussion. This section is for further study.

7. Important documents

Important ITU-T Recommendations related with this Opinion are as follows:

- “Synchronous Digital Hierarchy Bit Rates”, ITU-T G.707;
 - “Network node interface for the synchronous digital hierarchy”, ITU-T G.708;
 - “Synchronous multiplexing structure”, ITU-T G.709;
 - “Considerations on timing and synchronization issues”, ITU-T G.810;
 - “Timing requirements at the outputs of primary reference clocks suitable for plesiochronous operation of international digital links”, ITU-T G.811;
 - “Timing requirements at the outputs of slave clocks suitable for plesiochronous operation of international digital links”, ITU-T G.812;
 - “The control jitter and wander within digital networks which are based on the 2 048 kbit/s hierarchy”, ITU-T G.823;
 - “The control jitter and wander within digital networks which are based on the 1 544 kbit/s hierarchy”, ITU-T G.824;
 - “Timing characteristics of slave clocks suitable for operation of SDH equipment”, (draft Recommendation), ITU-T G.81s.
-