INTERNATIONAL TELECOMMUNICATION UNION

**TELECOMMUNICATION DEVELOPMENT BUREAU**

**ITU-D STUDY GROUPS**

**Document 1/REP/013(Rev.1)-E**
**Document 2/REP/016(Rev.1)-E**
**8 October 1999**
**Original: English**

SECOND MEETING OF STUDY GROUP 1: GENEVA, 30 AUGUST - 3 SEPTEMBER 1999
SECOND MEETING OF STUDY GROUP 2: GENEVA, 6 - 10 SEPTEMBER 1999

Questions :     All

**STUDY GROUPS 1 AND 2**

SOURCE:     CHAIRMAN OF THE JOINT GROUP ON WTDC-98 RESOLUTION 9

TITLE:     REPORT OF THE INFORMAL MEETING DEALING WITH WTDC-98 RESOLUTION 9 AND OTHER MATTERS REQUIRING LIAISON WITH ITU-R

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**1.     WTDC-98 Resolution 9**

The following documents were considered:

- 1/046-2/065 Report of the preparatory meeting (Geneva, 3-4 March 1999) and recommended approach to handle WTDC-98 Resolution 9 (Participation of countries, particularly developing countries, in frequency spectrum management);

- 1/096-2/118 Liaison statement from ITU-R Study Group 1 to ITU-D Study Groups 1 and 2 concerning action to be taken relating to WTDC-98 Resolution 9;

- 1/096-2/118 (Add.1) A draft Questionnaire on spectrum management, prepared by ITU-R Study Group 1, to obtain information from all ITU Member States and all the Sector Members of the Radiocommunication and Telecommunication Development Sectors to respond to Resolution 9;

Further informal proposals for revisions to Document 1/096-2/118, proposed by the ITU-R Study Group 1 Editorial Group and by members of ITU-D Study Groups 1 and 2, were considered.

The Questionnaire was revised and a final version produced, taking into account the comments and proposals received.

A draft circular letter to be sent with the Questionnaire was prepared. This will be sent jointly by the Directors of the Radiocommunication and Telecommunication Development Sectors.

_____

Contact point:     Mr. Terry Jeacock, Radiocommunications Agency, London, United Kingdom
            Tel.: + 44 171 2110004 / Fax: +44 171 2110028
            e-mail: terence.jeacock@itu.int / jeacockt@ra.gtnet.gov.uk

A liaison statement[1] to ITU-R Study Group 1 was agreed, appreciating highly the work done, endorsing the decisions taken by ITU-R Study Group 1 and confirming continued cooperation in the further joint action required for Resolution 9.

## 2.      Liaison with ITU-R Study Group 1 concerning Question 12/1

The following documents were considered:

- 1/052-2/069 Report of the joint consultative group on economic aspects of spectrum management (March 99)

- 1/092-2/115 Liaison statement from ITU-R Study Group 1 containing a revision of BR Report SM.2012 - Economic espects of spectrum mangement.

Noting the remarks made during Plenary sessions of both ITU-D Study Groups 1 and 2,  a liaison note[1] was drafted thanking ITU-R Study Group 1 for its rapid response to the request made at the Rapporteurs Group for Question 12/1 to update the report with additional experiences from countries in the economic aspects of spectrum management. ITU-R Study Group 1 is encouraged to continue its work on this subject, especially to seek further detailed case studies.

## 3.      Liaison statement from ITU-R Study Group 1 (Working Party 1B)

The following document was considered:

- 1/098-2/119 Guidance on the regulatory framework for national spectrum management.

The meeting noted that ITU-D Study Group 1 had agreed that the Rapporteurs of the relevant Questions in ITU-D Study Group 1 should be invited to identify aspects of their work which could benefit from mutual cooperation with ITU-R Study Group 1. Mr Jeacock, as Co-Chairman of the Joint Group on Resolution 9, had been asked to collect and forward any responses to ITU-R Study Group 1. It was also noted that the topics indicated for study in the liaison statement would be of interest to all administrations. A liaison statement[1] would be prepared to inform ITU-R Study Group 1 of the action taken.

## 4.      Benefits of computer assisted spectrum management

The following document from Agra Spectrocan (Canada) was considered:

- 2/098 Radio station licensing, administrative and economic benefits of computer assisted spectrum management.

The meeting agreed with the emphasis the document gave toward promoting the greater awareness of developing countries of the benefits arising from introducing computer assisted spectrum management. However, it was thought that the detailed aspects of the document dealing with computer assisted radio station licensing and the consequential economic benefits should be forwarded to ITU-R Study Group 1 for consideration within its existing work programme on these matters. The document should therefore be attached to the liaison note[1] to ITU-R Study Group 1.

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[1]  A single liaison statement to ITU-R Study Group 1 has been drafted to cover all subjects. See Document 1/102-2/134.

## 5 Review of ITU-R Resolutions relevant to the Telecommunications Development Sector

The following documents were considered:

- Resolution ITU-R 7: Telecommunication development including liaison and collaboration with the ITU Development Sector

- Resolution ITU-R 11-2: Development of Basic Automated Spectrum Management System

These Resolutions were reviewed briefly, recognising their importance to the Development Sector but noting that some updating was necessary. It was agreed that Mr. Kisrawi and Mr. Jeacock (both Vice Chairmen of ITU-R Study Group 1) should collaborate in proposing amendments to the Chairman of ITU-R Study Group 1 for him to forward to the Radio Assembly 2000.

## 6 Region representatives in the Joint Group on WTDC-98 Resolution 9

- Africa: Mr. Idrissa SAMAKE (Mali)
  Mr. Kouakou YAO (Côte d'Ivoire)
  Mr. Gomes ZITA (Mozambique)

- Americas: Mr. Norbert SCHROEDER (United States)

- Arab States: Mr. Nabil KISRAWI (Syria)

- Asia: Mr. P.K. GARG (India)

- Europe: Mr. Terry JEACOCK (United Kingdom)
  Mr. Pierre FONTAINE (France)

- CIS countries: Mr. Vadim NOZDRIN (Russia)

**ANNEX**

**Reference: Document 1/096-2/118 (Add.1)-E**

- DRAFT ADMINISTRATIVE CIRCULAR –

for distributing national spectrum management questionnaire

To:     All ITU Member States and all the Sector Members of the Radiocommunication and
        Telecommunication Development Sectors

Subject: Distribution of Questionnaire on National Radio Frequency Spectrum Management to Seek
        Information Needed for Responding to Resolution 9 of the World Telecommunication
        Development Conference (WTDC-98, Valleta)


At the request of both Mr. Nabil Kisrawi, Chairperson of ITU-D Study Group 2, and Mr. Robert Mayher, Chairperson of ITU-R Study Group 1, we are forwarding to you by means of the attached Action Memorandum 1) for your action, a two-part questionnaire on national radio frequency spectrum management (see Attachments 1 and 2); and 2) for your information, a summary report on the information contained in responses to similar questionnaires previously distributed on this same subject (see Attachment 3).

The subject questionnaire has been designed to gather current information, from both administrations and industry, regarding 1) national activities in radio frequency spectrum management and 2) the products available from industry for using the spectrum. The information requested is urgently needed to enable the preparation of a joint Radiocommunication and Telecommunication Development Sector report that is intended to assist administrations in their consideration of alternative strategies for national radio frequency spectrum use.

Administrations are invited to complete Parts I and II of the questionnaire, while Sector members are invited to complete only Part I, if relevant. We would be grateful if you could complete responses to this questionnaire and return them by December 31,1999, to [_____].

Queries or requests for further information regarding this questionnaire will be answered by the Co-Chairpersons of the Joint Group for Resolution 9, Mr. Jeacock or Mr. Garg. Their respective addresses presented in the Appendix. This Administrative Circular, including the questionnaire, is available on the ITU-R and ITU-D web sites in electronic form; and to facilitate the timely analysis of the collected information, all respondees are kindly invited to submit the requested information, to the extent possible, in electronic form.


|                    |                    |
|--------------------|--------------------|
| Robert W. Jones    | Hamadoun I. Touré  |
| Director           | Director           |
| Radiocommunication Bureau | Telecommunication Development Bureau |

**APPENDIX**


ACTION MEMORANDUM


To:           All ITU Member States and all the Sector Members of the Radiocommunication and
              Telecommunication Development Sectors

From:         Mr. Nabil Kisrawi, Chairperson of ITU-D StudyGroup 2
              Mr. Robert Mayher, Chairperson of ITU-R Study Group 1

Focal point:  Mr. Terry Jeacock, Chairperson of the Joint Group on WTDC-98 Resolution 9


Subject: Questionnaire on National Radio Frequency Spectrum Management in Response to Resolution 9
of the World Telecommunication Development Conference (WTDC-98, Valleta)


Resolution 9 adopted by the World Telecommunication Development Conference (WTDC-98) requires
the Directors of ITU-D and ITU-R to develop a report on current and foreseen national uses of the radio
frequency spectrum. This resolution also requires the Directors of the Telecommunication Development and
Radiocommunication Sectors to consider and implement effective means to encourage and facilitate the
active participation of both developing and Least Developed Countries in the preparation of this report.

In response to this resolution, ITU-R Study Group 1 has approved the proposal from ITU-D to establish a
joint ITU-R/ITU-D group, to be named the "Joint Group on Resolution 9", and has defined a proposed
program of work that leads toward the production of the required report. This proposed work program
was submitted for review and adopted by ITU-D Study Groups 1 and 2 during their meetings in Geneva in
September 1999.

As envisioned in the proposed work program for the Joint Group on Resolution 9, the scope of the
proposed work includes 1) collecting selected information from all Member States and all Sector Members
in the Radiocommunication and Telecommunication Development Sectors, through the use of a two-part
questionnaire (see the Attachments to this Appendix) distributed jointly by the Radiocommunication and
Telecommunication Sectors; 2) using the spectrum management expertise in the Joint Group on Resolution
9 to analyze the collected information; and 3) producing a report that will be reviewed by ITU-R Study
Group 1 and ITU-D Study Groups 1 and 2. To ensure the timely completion of this work, Member States
and Sector Members are urged to complete the attached questionnaire as soon as possible.

The first review of the responses to this questionnaire is tentatively scheduled to be performed at a meeting
of the Joint Group on Resolution 9 in Geneva on1 and 2 March 2000.

Attachment 1 (Specific Questions on National Spectrum Management Relating to Resolution 9) presents
the portion of the questionnaire that is intended to be completed by both Member States and Sector
Members. Member States are requested 1) to respond to the questions on national spectrum allocations
(plus providing the technical parameters of systems in use in given frequency bands); and 2) to describe in
detail specific problems in national spectrum management currently faced by the responding Member State.
Sector Members are requested to provide the technical parameters of systems currently available for given
frequency bands. For convenience in responding to these questions, an extract of Article S5 of the Radio

Regulations (Allocation Table for the frequency bands from 29.7 to 960 MHz) is included in Attachment 1; however, this extract is available in electronic form from the ITU-R web site, and consequently, all respondees are urged to submit the requested information in electronic form.

Attachment 2 (General Questions on National Spectrum Management) presents the portion of the questionnaire that is intended to be completed by Member States only. This attachment is a revision of a general questionnaire that has been distributed previously by the ITU-R (CA/401 dated 20 January 1993). The responses to the questions in Attachment 2 will be used both in the preparation of the report required in Resolution 9, and also in planning the future work program of ITU-R Study Group 1.

Attachment 3 is a summary report that lists the countries who responded to ITU-R Study Group 1's previous general questionnaire on national spectrum management, and presents some results of analyses performed on the responses.

Both Member States and Sector Members are invited to forward (before December 31,1999) their responses to this two-part questionnaire to [_____].

Any queries or requests for further information regarding this questionnaire should be directed to the Co-Chairmen of the Joint Group, Mr. Jeacock or Mr. Garg at the addresses listed below:

Mr. P. K. GARG

Ministry of Communications
Joint Wireless Advisor to the Government of India
Wireless Planning and Coordination Wing
317 Dak Bhavan
Parliament Street
New Delhi 110001
India
Tel.: + 91 11 37 55440
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**Attachment 1**

# QUESTIONNAIRE - PART I

## (To be completed by both Administrations and Sector members, if relevant)

## Specific Questions on National Radio Frequency Spectrum Management

**1.      Information on national radio frequency spectrum allocations: 29.7 - 960 MHz**

a)      If you have published a National Table of Radio Frequency Spectrum Allocations, please submit a copy (either in electronic, or printed form, or both ) of that table along with your responses to the attached questionnaire.

b)      If you do not have a national frequency allocations table available, the attached modified extract from Article S.5 of the Radio Regulations may be used to indicate general information on how this range of frequencies is used by your administration within your national borders.

In using the attached modified extract of the International Frequency Allocations table presented in S.5, you as a respondee from an administration or industry are requested to enter the following information. In the column designated "National Allocations", respondees from administrations are requested to enter the name of the radiocommunications service (using the ITU terminology given in Article S1 of the Radio Regulations, such as FIXED, MOBILE, space research, radio astronomy...) that is allocated use of a given frequency band. In the column designated "Remarks", 1) respondees from administrations are requested to enter further technical specifications, if any, that have been established nationally for a given band such as channel spacing, limitations on radiated signal power...; and 2) respondees from industry are requested to enter the operating parameters such as channel spacing, radiated signal power capabilities,..., of products available for operation in a given frequency band.

**2.      Problems experienced in national spectrum management.**

Describe succinctly the problems that your administration is currently experiencing in national spectrum management (for example subject areas in national spectrum management, see part 2 of this questionnaire - Attachment 2).

**3       Identification of a point of contact regarding correspondence on this questionnaire (Parts I and II)**

Please identify a point of contact in your administration who could provide a response to further correspondence regarding this questionnaire.

Sample pages from the full extract to be included in questionnaire

**ALLOCATION OF RADIOCOMMUNICATION SERVICES IN THE 29.7-960 MHz BAND**

**- an excerpt from the Radio Regulations Article S5 -**

**29.7-47 MHz**

| Allocation to Services | | | National Allocation | Remarks |
|---|---|---|---|---|
| **Region 1** | **Region 2** | **Region** | | |
| **47-68**<br>BROADCASTING<br><br><br><br>S5.162A  S5.163<br>S5.164  S5.165<br>S5.169  S5.171 | **47-50**<br>FIXED<br>MOBILE | **47-50**<br>FIXED<br>MOBILE<br>BROADCASTING | | |
| | **50-54**<br>　　AMATEUR<br>　　　S5.166  S5.167  S5.168  S5.170 | | | |
| | **54-68**<br>BROADCASTING<br>Fixed<br>Mobile<br><br>S5.172 | **54-68**<br>FIXED<br>MOBILE<br>BROADCASTING | | |
| **68-74.8**<br>FIXED<br>MOBILE except<br>aeronautical<br>mobile<br><br><br>S5.149 S5.174 S5.175<br>S5.177<br>S5.179 | **68-72**<br>BROADCASTING<br>Fixed<br>Mobile<br>S5.173 | **68-74.8**<br>FIXED<br>MOBILE<br><br><br><br>S5.149  S5.176<br>S5.179 | | |
| | **72-73**<br>FIXED<br>MOBILE | | | |
| | **73-74.6**<br>RADIO<br>ASTRONOMY<br>S5.178 | | | |
| | **74.6-74.8**<br>FIXED<br>MOBILE | | | |

**Attachment 2**

# QUESTIONNAIRE - PART II
**(To be completed by Administrations only)**

## General Questions on National Spectrum Management

Country_____

The following general questions on national spectrum management are based in part on the functional requirements of spectrum management described in the handbook on "National Spectrum Management." If you need additional space to answer the questions please continue on a separate sheet of paper.

1. Do you have a national law governing spectrum management?  YES__ NO__

 - Last date this law was changed or modified?  _____

 - Are any actions planned to change this law?  YES__ NO__

 Have any problems been identified? and if so, do you need any assistance from the ITU in solving them?

 _____

 _____

2. Have you published regulations and procedures for national spectrum management (e.g. radio services, license requirements etc.)?  YES__ NO__

 Have any problems been identified?  and if so, do you need any assistance from the ITU in solving them?

 _____

 _____

3. Do you have a national radio frequency spectrum allocation table?  YES__ NO__

 Have any problems been identified?  and if so, do you need any assistance from the ITU in solving them?

 _____

 _____

4.    Do you have technical specifications for national spectrum use?    YES__ NO__

Have any problems been identified?  and if so, do you need any assistance from the ITU in solving them?

_____

_____

5.    Do you have a need for any spectrum redeployment* ?    YES__ NO__

\* The term "redeployment" is used here to refer to a process of national scope in which an assessment is conducted 1) to determine if portions of spectrum can be identified that are in limited use; and 2) to determine if  such spectrum segments can be reallocated for use in delivering radiocommunication services that have expanding spectrum requirements.

- If so, do you have a strategy for achieving this redeployment in respective frequencybands and for given radiocommunication services?    YES__ NO__

- Please define the established strategy and describe the nature of the consultation, if any, with users regarding the potential costs resulting from the planned redeployment.

_____

_____

6.    What is the total cost of national spectrum management functions performed by your Government (expressed in Swiss francs)?    _____

- What is the source of  the funding required to accomplish these spectrum management functions?

_____

_____

7.    Do you have a method for establishing spectrum users' fees?    YES__ NO__

- If so, please give a brief description of the method used in establishing those fees.

_____

_____

8.    Do you maintain centralized databases for spectrum management?    YES__ NO__

- What is the approximate size of your database (expressed in number of records)?    _____

- Do you have a computerized data base management system (DBMS)?    YES__ NO__

- What DBMS system do you use?    _____

- Are these frequency assignment records available to public?    YES__ NO__

Have any problems been identified? and if so, do you need any assistance from the ITU in solving them?

_____

_____


9.      Do you notify frequency assignments to the ITU?                    YES__ NO__

Have any problems been identified?  and if so, do you need any assistance from the ITU in solving them?

_____

_____


10.     Do you have a policy and planning function for national spectrum management (i.e. a national strategy for future use of the spectrum)?                    YES__ NO__

Have any problems been identified?  and if so, do you need any assistance from the ITU in solving them?

_____

_____


11.     Do you perform technical analyses of frequency assignment requests?        YES__ NO__

Have any problems been identified?  and if so, do you need any assistance from the ITU in solving them?

_____

_____


12.     Do you perform radio monitoring?                                    YES__ NO__

- number of fixed monitoring stations                                    _____

        - facilities available at fixed monitoring stations
            -- monitoring up to _____ MHz
            -- direction finding up to _____MHz

- number of mobile monitoring stations                                    _____

        - facilities available at mobile monitoring stations
            -- monitoring up to _____ MHz
            -- direction finding up to _____MHz

Have any problems been identified?  and if so, do you need any assistance from the ITU in solving them?

_____

_____

13.   Do you perform technical analyses of radio frequency interference
      complaints?                                                    YES__ NO__

      - Do you have an established consultation process, involving Government and non-government
      organization, for resolving these complaints?                  YES__ NO__

      Have any problems been identified?  and if so, do you need any assistance from the ITU in solving
      them?

      _____

      _____


14.   What computers and operating systems are in use for national spectrum management?

      Type of computers                                              _____

      Operating system(s)                                            _____

      Have any problems been identified?  and if so, do you need any assistance from the ITU in solving
      them?

      _____

      _____


15.   Number of technical/professional staff in national spectrum management? _____


16.   Number of support staff in national spectrum management?       _____


17.   Describe your country's spectrum management structure (Please enclose a copy of organization
      chart).

18. Do you use the ITU-R Handbooks and Reports on:

    a)        National Spectrum Management, version 1995 ?

    b)        Spectrum Monitoring[1], version 1995?

    c)        Computer-aided Techniques for Spectrum Management, version 1999?

    d)        HF Broadcasting System Design, version 1999?

    e)        Report SM.2012,  Economic Aspects of Spectrum Management, version 1997[2]?

    f)        Windows Basic Automated Spectrum Management System (WinBASMS) Software Version 1997, Manual Version 1997

What additional information/handbooks do you need from the ITU?

_____

_____

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[1] The Spectrum Monitoring Handbook is currently being updated, therefore, you are urged to contact Mr Jan Verduijn (NL), the designated Rapporteur from ITU-R Study  Group 1, Working Party 1C if you have any comments that you wish included in a future version of this Handbook.

[2] The Report SM.2012 was updated in September 1999, this new version is expected to be available by _____.

**Attachment 3**

# SUMMARY REPORT OF PREVIOUS QUESTIONNAIRES
# ON THE NEEDS OF DEVELOPING COUNTRIES
# IN NATIONAL RADIO FREQUENCY SPECTRUM MANAGEMENT

1.      Background

The Chairman of Study Group 1 distributed a Questionnaire to developing countries with the purpose of obtaining information about spectrum management in the developing countries. The Questions that were listed in the questionnaire directly reflected the descriptions of the functional requirements of national spectrum management described in the Handbook on "National Spectrum Management". The following discusses the results obtained from that Questionnaire. The sixty-two countries who answered the Questionnaire are listed in Table 1.

2       Results of the Discussions concerning the Questionnaire

2.1      Communication law

Sixty seven percent of the countries indicated that they had an up to date communication law.  Some of the dates of the enactment of the laws indicate that at a minimum the laws should be reviewed.  Discussions with some of the countries indicate that the laws should be modified to include additions that encourage efficient use of the spectrum. This subject is being reviewed under Question 2/1 by Study Group 1 of the ITU-D and a report has been prepared.

2.2      Allocation Table

Sixty-five percent of the countries indicated that they had an up to date Allocation Table.  Allocation tables in many countries are being reviewed because of changes in technology and the reviews will probably result in a modified table in the future.  Study Group 1 discussions indicate that this subject should be further addressed to describe what are the basic principles to be followed in developing the allocation tables and the services the allocation tables should contain.  Software should be made available to allow simple construction and use of the allocation table in the processing of frequency assignment licenses (See ITU software catalog).

2.3      National Regulations and Procedures

Eighty-six percent of the countries indicated that they were using regulations and procedures to administer the national spectrum management activities.  Although the numbers do not indicate a major problem in this area, discussions with many of the countries indicate that the regulations and procedures are not complete.  Study Group 1 should address typical subject areas and principles that need to be addressed in producing national regulations and procedures.

## 2.4 Technical Specifications for Spectrum Use

Fifty-two percent of the countries indicated that they had available spectrum standards. In general it is recognized that developing countries do not have the staff or the expertise to develop radio standards. These countries mainly use the standards of other countries or regional groups. Study Group 1 has been developing a list of parameters that are required for Spectrum Management and the Efficient Use of the Radio Spectrum. This could be used as input guidance for the development of radio standards. Standards could be developed based on a limited set of recommended parameters and therefore could be developed in a simpler and less time consuming manner than is normally done.

## 2.5 Spectrum Management Data

Seventy-eight percent of the countries indicated that they were collecting data for spectrum management. The countries had frequency assignment records that varied from 200 to 500,000 records. The fact that a few countries were collecting little or no data was surprising. Spectrum Management operations require data to effectively manage the Spectrum. This data has been described in the Handbook on "Computer Aided Techniques for National Spectrum Management". What is needed for the future is additional guidance on how to use data effectively in Spectrum Management. This requires that new documents to be developed that explain how to effectively use various types of data and the specific data required for these data files. In addition, there appears to be limited data available in the TeraSys(IFL) because countries do not always notify this information to the ITU.

## 2.6 Policy and Planning

Seventy-three percent of the countries indicated that they were involved in planning and policy for national spectrum management. The comments received indicate that this is a very important activity and that this topic should be further addressed. A particular area that should be addressed is the interference criteria used for frequency assignments in both block assignments and frequency distance procedures. This should include BR procedures for assignments, if applicable, and a general procedure for each region of the world.

## 2.7 Frequency Assignment and Licensing

Ninety percent of the countries indicated that they did frequency assignment and licensing. These functions are basic functional requirements of spectrum management and it is not surprising that the countries responded this way. Discussions indicated that automated procedures are required especially for those countries with large number of frequency assignments. General discussion of this topic by Study Group 1 also indicates that the Study Group should adopt a Recommendation describing general procedures. It would be useful to describe multiple approaches to this problem including very basic or simple procedures for developing countries.

## 2.8 Monitoring and Enforcement

Sixty-seven percent of the countries indicated that they were doing monitoring. Thirty-nine percent indicated that they were doing enforcement but not monitoring. In general, some countries indicated that they were doing monitoring but not using enforcement procedures in cases in which harmful interference had been created. Enforcement laws are the responsibility of each country. Some countries indicated that Study Group 1 should do additional tasks on monitoring beyond what is included in the Handbook on Monitoring to help developing countries. The number of fixed monitoring stations varied from 1 to 22 while the number of mobile stations varied from 0 to 26.

## 2.9    Liaison and Consultation

Seventy-one percent of the countries indicated that they did some type of liaison and consultation with those interested in obtaining information about Spectrum Management activities.  Although only 29% said they were not giving information about Spectrum Management, the answers do not indicate that the process of given information was open to all that requested information.  A simple Handbook or Document on Spectrum Management should be prepared emphasizing an open process for liaison and consultation on matters concerning Spectrum Management.  In addition, information about tariff and fees for radio licenses was considered to be important to developing countries.  It was though that it would be valuable to hold "Information Meetings" on general aspects of Spectrum Management in various portions of the world.  This could be organized and sponsored by the BR and the BDT.

## 2.10    Spectrum Management Engineering

About fifty percent of the countries indicated that they were doing interference analysis, Spectrum usage, efficiency calculations, or frequency assignment calculations.  This is approximately one-half of the frequency assignment action indicated in 2.7 and indicates that no technical evaluation is done for one-half of the action.  Additional guidance is available in this area in the Handbook on "National Spectrum Management".  Additional assistance could be made available through a new mini Handbook and through Spectrum Management seminars.

## 2.11    Computerized Engineering

In response to the three Questions on this topic, approximately fifty percent said that they did automated engineering analysis (the same percent as indicated in the previous Questions), some type of Data Base Management System (DBMS) and used a computer system for administrative support.  The answer to the first two Questions is surprising.  The answer to this Question indicates that Engineering Analysis or Spectrum Engineering is being done with computer software or probably not at all.  This is surprising since many calculations can be done manually, although complex calculations can generally only be done with the aid of computer software.

2.12    Fifty-nine percent of the countries indicated they were using a DBMS in spectrum management.  In many cases this may be an inadequate DBMS system and needs improvement.  The answer to the second Question on Data Base Management Systems is expected since many developing countries have asked for assistance in setting up a DBMS and no general DBMS like WINBASMS is known to exist.  It ca be concluded that, in general, a system like WINBASMS for small developing countries is also needed for larger or medium size countries.  Overall, the information contained in the Questionnaire and Study Group discussions indicated that computerized engineering software is being used and further use should be encouraged through activities such as the Handbooks and seminars.  The WINBASMS and ASMS tasks should continue so that general DBMS software is more readily available for all radio services and countries.

## 2.13    Types of computers

The types of computers varied from 486's to various Pentium computers.

## 2.14     Operating Systems

The operating system varied from a few countries still using DOS, to countries mainly using WINDOWS and a few using WINDOWS 3.1 and NT and UNIX.

2.15    Number of Technical and Non-Technical Staff in Spectrum Management

The technical staff varied from 1 to 450 and the non-technical staff from none to 250.  There is no relationship between the number of technical staff and the non-technical staff employed by the countries.

3.         General

The responses to the questions generally improved by approximately 4% from the previous survey.  This is certainly encouraging although an examination of the responses indicates that additional improvement is needed in many areas.  In addition, many countries have indicated that much additional work is needed in the areas of regulations, frequency assignments, standards, data structures, interference and computer techniques.

_____