International Telecommunication Union

QUESTION 21/2

Calculation of frequency fees

RESOLUTION 9
(Rev. Istanbul, 2002)
Participation of countries, particularly developing countries, in frequency spectrum management

ITU-D STUDY GROUP 2 3rd STUDY PERIOD (2002-2006)

Report on Resolution 9 (Rev. Istanbul, 2002) and Question 21/2

International Telecommunication Union

THE STUDY GROUPS OF ITU-D

The ITU-D Study Groups were set up in accordance with Resolutions 2 of the World Telecommunication Development Conference (WTDC) held in Buenos Aires, Argentina, in 1994. For the period 2002-2006, Study Group 1 is entrusted with the study of seven Questions in the field of telecommunication development strategies and policies. Study Group 2 is entrusted with the study of eleven Questions in the field of development and management of telecommunication services and networks. For this period, in order to respond as quickly as possible to the concerns of developing countries, instead of being approved during the WTDC, the output of each Question is published as and when it is ready.

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ACKNOWLEDGEMENTS

The following contributors are thanked for their continuous support in preparing this report:

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  Mr Norbert Schroeder (United States)
  Mr Zoltan Zsuffa (Hungary)

- For Part II:

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Mr Howard Del Monte (United Kingdom)	Legal and regulatory aspects
Mr Lopez Vanegas (Nicaragua)	Updating the database
The late Mr Simplice Zanga Yene (Cameroon)	Assignments (generic)
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- For specific needs in spectrum management needs for developing countries:

  The late Mr Simplice Zanga Yene (Cameroon)
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  Mr Terry Jeacock (United Kingdom, representing ITU-D)
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REPORT ON RESOLUTION 9 (REV. ISTANBUL, 2002) AND QUESTION 21/2

PREFACE

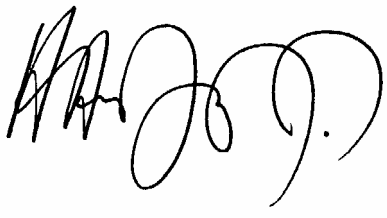
The active participation of countries, particularly developing countries, in frequency spectrum management is one of the important concerns of every administration throughout the world. The extraordinary growth rate of mobile telecommunications is just one indicator that the use of radiocommunications is essential to the social and economic welfare of any nation. Additionally, the calculation of fees for the use of the spectrum is another issue for which some administrations are seeking guidance from ITU, because there is no universal solution that can balance the need to promote telecommunications, determine an economic value for the spectrum and take into account national circumstances and policies. This report, the result of the fruitful collaboration between ITU-R Study Group 1 and ITU-D Study Group 2, is intended to assist the administrations and telecommunication operators to reach acceptable solutions for a wide variety of radiocommunication questions.

At the completion of this stage of the work, I would like to commend Mr Terry Jeacock (UK) and Mr Simplice Zanga Yene (Cameroon), the two Co-Chairmen of the Joint ITU-R/ITU-D Group on Resolution 9 (Rev. Istanbul, 2002), dealing with "Participation of countries, particularly developing countries, in frequency spectrum management", and on Question 21/2 ("Calculation of frequency fees"), for the valuable results achieved.

Unfortunately, it is with deep regret that I have to inform you that Mr Simplice Zanga Yene passed away, suddenly, earlier in 2005. Special recognition must be given for his valuable contribution to identify the specific needs of developing countries in spectrum management that he prepared as an attachment to the proposal for revision of Resolution 9 (Rev. Istanbul, 2002). In addition, it was expected that he would take over both co-chairmanships of the Joint Group until the World Telecommunication Development Conference to be held in 2006 in Doha, Qatar.

Mr Terry Jeacock has now retired from his Administration and has therefore resigned as Co-Chairman of the Joint Group as he is no longer involved in ITU work. On behalf of all those involved in the Resolution 9 activities, I would like to express my sincere thanks and appreciation to him and to wish him every success for the future.

Finally, it is my sincere wish and expectation that this report will become a useful tool for both those working with respect to spectrum management and radio monitoring as well as for those facing the problems of the calculation of spectrum fees.



Hamadoun I. Touré
Director, BDT

REPORT ON RESOLUTION 9 (REV. ISTANBUL, 2002) AND QUESTION 21/2

PARTS I AND II

1 Introduction

Resolution 9, first adopted in 1998 by the World Telecommunication Development Conference (WTDC-98) and revised in 2002 by WTDC-02, requires the Directors of ITU-D and ITU-R to develop a report, in several stages, 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.

A Joint Group between the Telecommunications Development Sector and the Radiocommunication Sector was established in 1999 to develop the reports required by Resolution 9. A Report on the first stage was completed in 2000. This current document contains the Report on the second stage.

In addition to the work programme to develop the second stage of the report on national spectrum management, WTDC-02 requested that the Joint Group should include in its scope the provision of assistance to the BDT in Programmes 2 and 4 of the Istanbul Action Plan, with respect to "Spectrum management and radio monitoring" and the preparation of a report in answer to Question 21/2 "Calculation of frequency fees".

1.1 ITU-D and ITU-R Joint Group for Resolution 9 (2002-2003)

The Joint Group is co-chaired by Mr Simplice Zanga-Yene (Cameroon) representing ITU-R Study Group 1 and Mr Terry Jeacock (United Kingdom) representing ITU-D. The group held six meetings: 1) July 2002; 2) September 2002 (during the ITU-D Study Group 2 meeting); 3) December 2002; 4) April 2003; 5) October 2003; 6) April 2004.

The first meeting agreed the basic structure of the Report and methodology. A three-part Questionnaire was developed, Part I: National use of the spectrum 960-3 000 MHz; Part II: National spectrum management; Part III: Question 21/2. At the second meeting a presentation was given to the members of Study Group 2 to explain the purpose of the Questionnaires and advise how they should be completed. At the third meeting, the initial responses were reviewed and the method for analyzing the results agreed. Rapporteurs were appointed to manage the development of the various parts of the Report. At the fourth meeting, the progress on the analysis was reviewed and final time-scales agreed for completion of the Report. The fifth meeting agreed to finalize all parts of the Report for 2004 and decided to invite the Members to provide their comments on the usability of the "Spectrum Fees" database (created by the BDT Secretariat) and to consider any possible refinement. The fifth meeting also decided to complete the Report with case studies to demonstrate practical examples of using the database, and with the requirements of developing countries for assistance in spectrum management activities.

The sixth meeting continued studying the requirements for assistance from developing countries, proposed a revision of the Resolution 9 for consideration by WTDC-06 and finalized the Report to be submitted to ITU-D Study Group 2 meeting in September 2004.

1.2 Work Programme

After the presentation at the September Study Group 2 meeting in 2002, the three-part Questionnaire was circulated to members of the Radiocommunication Sector and Telecommunication Development Sector via joint Administrative Circular CA/12 (ITU-D) and CA/120 (ITU-R), dated 11 September 2002. A deadline for receipt of responses was set for 1 November 2002. At the December meeting of the Joint Group, it was noted that 56 responses had been received. BDT produced, for each delegate, a CD-ROM containing an electronic version of these responses. It was also noted that during the period available for administrations to complete the Questionnaire, several important ITU meetings were in progress (including PP-02 and ITU-R CPM) and administrations may have found difficulty in finding the necessary resources to undertake this task. Further, it was recognized that some parts of the Questionnaire were complex and administrations might have needed assistance. Therefore, the meeting decided to extend the deadline for the replies to 14 February 2003. The BDT Secretariat therefore sent another Circular letter to extend the deadline to 14 February 2003. As BDT was receiving responses after this date, it was agreed to take into account all responses received by 28 February. Responses received after this date were placed on the web for information only.

The responses have been analysed according to the three-part Report structure and methodology agreed at the third meeting (see Section 1.4 below).

With respect to providing assistance on Programmes 2 (Technologies and Telecommunication Network Development) and 4 (Economics and Finance, including Cost and Tariffs) of the Istanbul Action Plan, the Joint Group was able to provide advice on the needs of developing countries in the preparation of Recommendation SM.1604: "Guidelines for an UPGRADED Spectrum Management System for developing countries". The sixth meeting of the Group decided to first identify the needs for assistance on the basis of a sample of three African countries. On the basis of needs identified, a small group, including BDT and BR, will be able to review the specification of requirements and make an estimate of the cost and, thereafter, advise on the advantages and disadvantages of the options for upgrading the WinBASMSs software.

1.3 Structure of the Report

1.3.1 Part I – National use of spectrum 960-3 000 MHz

Part I of the Questionnaire deals with national spectrum use. Member States were requested to provide information on their national use of the spectrum in the frequency range 960-3 000 MHz. This range was identified by developing countries as being of particular interest to them.

For convenience in responding to these questions, an extract of Article 5 of the Radio Regulations (Allocation Table for the frequency bands from 960 MHz to 3 000 MHz) was provided in both paper and electronic forms of the Questionnaire. Administrations were encouraged to submit the requested information in electronic form to facilitate analysis by the Joint Group. An example extract from a national table was given to show the typical information requested. The information on national spectrum use will be made available for several key purposes: firstly, it demonstrates that a large number of administrations have recognized the benefits of making this information available publicly to inform users about the frequency availability for their particular communication requirement and to guide manufacturers in the design and construction of equipment. Secondly, it is intended to facilitate the coordination requirements of use of the spectrum, either nationally or with neighbouring countries, or with other countries at an international level. Thirdly, by giving examples to show the variety of formats and depth of information provided, it encourages and guides administrations currently in the decision-making process of how to publish their Tables.

It will not be possible to include all the national frequency tables in the final Report because the quantity of the information is too large. Also, although administrations follow the international table at service allocation level, there are considerable differences on a national, regional and worldwide basis in the detailed arrangements for specific applications, channel and band-plans, etc. It could be misleading to summarize or attempt to show commonality. Further, the information collected through the Questionnaire can be considered as only a "snapshot" of the situation at that particular point in time. It is necessary to revise national tables from time to time to accommodate new applications and requirements and changes resulting from World Radiocommunication Conferences.

The Joint Group therefore considered how best to present this information in a useful format. The "raw" information as supplied in the responses to the Questionnaire is available on the ITU-D website and on CD-ROM. Also, many administrations include their Tables on their websites. Therefore, the Report includes a list of website addresses of those administrations that gave this information. In addition, the Joint Group is considering the possibility of developing a PC-based computer tool that will facilitate comparison of use between different regions or administrations.

Finally, Part I also provides a list of points of contact for each administration. The Questionnaire invited administrations to identify the person responsible for responding and able to answer queries on the information. This list may provide a useful reference for informal contact and cooperation between administrations.

1.3.2 Part II – National spectrum management practices

Part II of the Questionnaire dealt with general questions on national spectrum management. The Joint Group made a thorough review of the questionnaire used for the first stage of the (1998) Report. The results and replies from the first stage were taken into account to revise some of the questions to improve clarity and add new questions to obtain information to assist the related studies in ITU-R Study Group 1.

In order to provide clarity and ensure helpful comparisons are made in the statistical analysis, the questions were grouped into topics and the responses were grouped according to the regional and development categories of the responding administration.

The following topics were used for question grouping:

- Legal and Regulatory
- Spectrum management and engineering
- Monitoring, enforcement, interference
- Database management and computer assistance
- Economic aspects (to be considered in association with Q.21/2)
- Use of the ITU-R Handbooks and Reports
- Identification of problems experienced in national spectrum management.

The regional and development categories were obtained from lists supplied by the UN and the BDT.

An example of the format for presenting the statistical analysis is given in the table below. This example deals with a question on national requirements for compliance with equipment standards.

Region	Number of responses received	Yes, technical characteristics specified				Total "Yes" per cent for region
		Developed	Developing	Least developed	Total " Yes" responses	
Africa	19	–	5	14	19	100%
Americas	15	1	13	–	14	93%
Arab States	8	–	8	–	8	100%
Asia-Pacific	9	–	7	2	9	100%
Europe and CIS	29	9	18	–	27	93%
TOTALS	**80**	**10**	**51**	**16**	**77**	**96%***

* Percentage of total response

1.3.3 Part III: Calculation of frequency fees

The elaboration of a national frequency fee calculation model is a very complex matter and is the source of major difficulties for numerous developing countries and particularly LDCs for which the need is extremely urgent. Question 21/2 requested the establishment, in electronic format, of a document structure bringing together the calculation formulas and frequency fee amounts applied by different countries for different radiocommunication uses in the various frequency bands. The Question also requests a report on the various frequency fee calculation formulas currently applied in different countries.

Comprehensive information from administrations for this part of the report was obtained through Part III of the Questionnaire included in Circular letters CA/12 and CA/120. In order to store the results in electronic format, as requested by Q.21/2, the BDT secretariat has arranged for a suitable database to be designed and implemented and for the data from Part III to be entered into the database during 2003.

1.4 Proposals for future work

Resolution 9 was conceived as an ongoing task, to be undertaken in stages. The two stages completed so far have followed the same procedure, that is, the circulation of a multipart questionnaire dealing with (I) National spectrum use and (II) National spectrum management practices. Part I of the first stage dealt with national spectrum use in the range 30-960 MHz, the second in the frequency range 960-3 000 MHz. One proposal for future work could therefore consider analysing national frequency use in a third frequency range, for example 3 000 MHz to 30 GHz. Also, the analysis of the responses of the first and second Questionnaires for Part II, national spectrum management practices, has given an opportunity for comparisons of progress on a national and regional basis, especially for developing countries. Further, this analysis has enabled the identification of where developing countries would benefit from assistance in their spectrum management. The first stage of the Report required the full study period (1998-2002) to complete, while the Report of the second stage will be available after 2003 and included the additional work for

Q.21/2. In consideration of the future work plan for the remainder of the current study period (until 2006), the Joint Group proposes not to re-issue a third questionnaire until the next study period. Considerable resources are required by administrations to respond to these detailed questionnaires and the results that would be obtained from a questionnaire issued too soon after the second stage report would not be helpful. There is a wealth of information contained in the responses to the first and second Questionnaires that could be extracted by further analysis and presented in the form of supplementary reports.

The following work plan is therefore proposed for the remainder of the study period:

- Re-examine the responses to Stage 1 and Stage 2, with a view to preparing supplementary reports, e.g. on the requirements of developing countries for assistance in spectrum management activities, typical spectrum use in the ranges covered and changes foreseen, etc.
- Continuation of development on web-based access to national frequency allocation tables.
- Review the Resolution 9 website and consider how it could be improved to better distribute to developing countries information to assist them with national spectrum management.
- Review the use of the "Spectrum fees" database and the need for keeping it up to date.
- Prepare a revision of Resolution 9 for consideration by WTDC-06 with a view to continue to the third stage.
- Consider further cooperative projects between ITU-D study groups and ITU-R Study Group 1.

PART I

2 Analysis of the Submissions to Part I of the Questionnaires

2.1 Overview

In Part I of both questionnaires (ITU-D CA/08 and ITU-R CA/71 for Phase 1; and ITU-D CA/12 and ITU-R CA/120 for Phase 2) information was sought on the national strategies being followed by Member States for the allocation and use of the radio-frequency spectrum. To facilitate the preparation of responses, respective portions of the International Table of Frequency Allocations that appears in Article 5 of the International Telecommunication Union Radio Regulations were included in these questionnaires (27.5 to 960 MHz for Phase 1 and 960 MHz to 3 000 MHz for Phase 2). Member States were requested, in preparing their responses to these questionnaires, to identify the radiocommunication services allocated spectrum in the respective frequency bands and to provide information regarding the application of these radiocommunication services for satisfying spectrum requirements in given bands. These questionnaires also requested the Member States to designate individuals who would serve as focal points for addressing matters related to these questionnaires.

Annex 1-A presents an index of the submissions received in response to the questionnaires and a listing of the individuals who have been designated to serve as focal points. This index indicates that 117 Member States, one regional telecommunication organization (CEPT) and one national telecommunication operator (Korea Telecom) have submitted responses to these two questionnaires, that sixty-three submissions contain national allocation tables for the bands 27.5-960 MHz, that eighty-four submissions contain national allocation tables for the bands 960-3 000 MHz, and that thirty-six submissions contain national allocation tables for the entire spectrum from 27.5 to 3 000 MHz.

As is stated in the National Spectrum Management Handbook[1] "a national table of frequency allocations provides a foundation for an effective spectrum management process". Consequently, the objective of the working group was to promote the establishment of national allocation tables, where they do not yet exist. The approach pursued by the working group toward achieving this objective was to first obtain a broad range of existing national allocation tables and then make them readily available as examples that could be used by an administration in the development of both its own national table of frequency allocations table and an effective national strategy for radio-frequency spectrum management.

The responses submitted to these two questionnaires contain a wealth of highly useful information. All of this information is posted on the ITU-D Sector web page and is readily available to spectrum managers worldwide. The web page addresses for accessing this information are provided in the annexes.

2.2 Some examples of national allocation tables

In reviewing the national allocation tables submitted by the various administrations, some notable differences are evident in their scope, content, and format. While some administrations focused on national allocations, other administrations also presented their spectrum allocations in context with the provisions of the Radio Regulations and with strategies for spectrum use throughout their geographic region. While some administrations focused on current spectrum allocations, other administrations also presented strategies for planned changes in spectrum allocations and planned applications.

---

[1] A revision of the ITU-R National Spectrum Management Handbook will be completed in 2005.

The submission from Albania, given in Annex 1-B Table 1, is an example of how national spectrum allocations and uses can be presented in context with the strategies for spectrum use throughout an administration's geographic region.

The submission from the United Kingdom, given in Annex 1-B Table 2, is an example of how strategies for planned changes in spectrum use to satisfy anticipated requirements can be presented along with existing allocations and current spectrum uses.

The submission from the United States, given in Annex 1-B Table 3 is an example of how various applications of given allocated radiocommunication services are currently used, or planned for future use, to satisfy specified spectrum requirements.

The submission from the Czech Republic, given in Annex 1-B Table 4 is an example of how specified responsibilities can also be identified as an element of the national table of frequency allocations.

2.3 Further sources of information on national strategies for spectrum management

In addition to the information available from the administrations submission as is noted in the annexes, additional information can be obtained from a number of WebPages maintained by administrations. Some of these sources are the following:

A) Canada: http://strategis.ic.gc.ca/SSG/sf01608e.html

B) CEPT: http://www.ero.dk/documentation/docs/doc98/official/pdf/REPO25.PDF

C) Finland: http://www.ficora.fi/englanti/radio/Taulukko3.htm

D) United Kingdom: http://www.ofcom.org.uk/static/archive/ra/rahome.htm

E) United States: http://www.ntia.doc.gov
http:/www.fcc.gov

F) Venezuela:
http://www.conatel.gov.ve/ns/downloads/macro_legal/CUNABAF%20Extraordinaria.zip

PART II

3 Analysis of the submissions to Part II of the questionnaire

3.1 General structure of Part II of the questionnaire

For Part II of the questionnaire the questions were grouped into key aspects of national spectrum management and are dealt with in the following Sections:

3.2 Legal and regulatory aspects in questions 1, 2, 4 and 5

3.3 Updating the database in questions 3 and 10

3.4 Assignments (generic) in questions 7, 8, 9 and 11

3.5 Spectrum management in questions 6, 15 and 16

3.6 Spectrum monitoring in question 12, 13 and 14

3.7 Handbooks and reports in question 17

3.8 Problems in question 18

Each of these Sections are structured to give:

- a statement of the questions asked;
- a brief explanatory review to place the particular aspect in context;
- identification of any obvious misunderstanding of the questions;
- a tabular presentation of the analysis of the responses grouped into region and country category (developed, developing or least developed);
- preliminary summary per question.

For each of the categories, a tabular "country-by-country" presentation is given in the Annex 2 part of the Report.

3.2 Legal and regulatory aspects: questions 1, 2, 4 and 5

3.2.1 Question 1: Legal and regulatory texts

Background

National spectrum management consists of the structures, capabilities, procedures, and regulations whereby each administration controls the use of the radio spectrum within its geographical boundaries. By international agreement, each national government has flexibility and autonomy in the regulation of its radio use. Each administration must develop its laws, and organization to carry out the duties of spectrum management. The spectrum management system will grow in direct relationship to the level of radio use within a country and the laws may be changed to enable development of the spectrum.

Q.1: What legal or regulatory texts govern your national spectrum management processes?

The responders referred to national telecommunications acts and radio regulations. Only one administration did not provide details of a relevant text, although answering other Part II questions. The complete list of texts is given in **Annex 2-A**.

Q.1 subsidiary: Are any actions planned to change these legal texts or regulations? (YES/NO)

A total of 58 Administrations replied that they were planning changes and some added explanations about the changes. Several expected changes as part of the establishment of a new regulatory authority. Detailed comments are listed in **Annex 2-A**.

Region	Responses received	Yes, changes are planned				Changes planned as a percentage of region response
		Developed	Developing	Least developed	Total changes planned in region	
Africa	19	–	2	10	12	63%
Americas	15	1	11	–	12	80%
Arab States	8	–	5	–	5	63%
Asia-Pacific	9	–	5	1	6	67%
Europe and CIS	29	8	15	–	23	79%
TOTALS	**80**	**9**	**38**	**11**	**58**	**73%***

* Percentage of total response

3.2.2 Question 2: Regulations and procedures

Background

Effective management of the spectrum resource depends on a number of fundamental processes. These fundamentals encompass the goals and objectives of the spectrum management system, the major directives that establish the responsibility of the national spectrum management authority and regulate spectrum use, the national spectrum management structure and related processes, and the specific functional responsibilities that must be carried out by the spectrum management authority. Although no two administrations will manage the spectrum in exactly the same manner, these fundamental elements are essential to all approaches. Without them, the implementation of radio services will be delayed or not available. With these elements in place, an administration can begin to carry out more detailed spectrum management functions and daily activities, and maximize the benefits derived from use of the radio spectrum resource.

Q.2: Have you publicly available regulations and procedures for national spectrum management (e.g. radio services, licence requirements, etc.)? (YES/NO)

84% of the responders do make their regulations and procedures available. The following table breaks down the responses into region and development status. The full response is given in **Annex 2-B**.

Region		Yes, R&Ps are publicly available				Total "Yes" per cent for region
	Responses received	Developed	Developing	Least developed	Total "Yes" response	
Africa	19	–	3	10	13	68%
Americas	15	1	12	–	13	87%
Arab States	8	–	6	–	6	75%
Asia-Pacific	9	–	7	2	9	100%
Europe and CIS	29	10	16	–	26	90%
TOTALS	**80**	**11**	**44**	**12**	**67**	**84%**

3.2.3 Question 4: Equipment – technical requirements and standards

Background

Article 3 of the Radio Regulations concerns the requirements for the technical characteristics of stations with the objective to avoid interference. Appendices 2 and 3 respectively of the Radio Regulations give maximum values for frequency tolerance and spurious emissions. Administrations have the responsibility to ensure that equipment authorized for use in their territory conforms to these Regulations. This is achieved through the use of "equipment standards" (documents which specify the minimum performance standards required for radio transmitters and receivers and other equipment) and the associated procedures to ensure conformity with these standards.

Q.4: Do you specify that the technical characteristics of radiocommunications equipment must comply with certain requirements (often referred to as "equipment standards"), for example to avoid interference to other services and users? (YES/NO)

A total of 96% of the responders do specify compliance. The table below breaks down the response for each region. Refer to Annex 2-C for the full listing.

Region	Number of responses received	Yes, technical characteristics specified				Total "Yes" per cent for region
		Developed	Developing	Least developed	Total "Yes" response	
Africa	19	–	5	14	19	100%
Americas	15	1	13	–	14	93%
Arab States	8	–	8	–	8	100%
Asia-Pacific	9	–	7	2	9	100%
Europe and CIS	29	9	18	–	27	93%
TOTALS	**80**	**10**	**51**	**16**	**77**	**96%***

* Percentage of total response

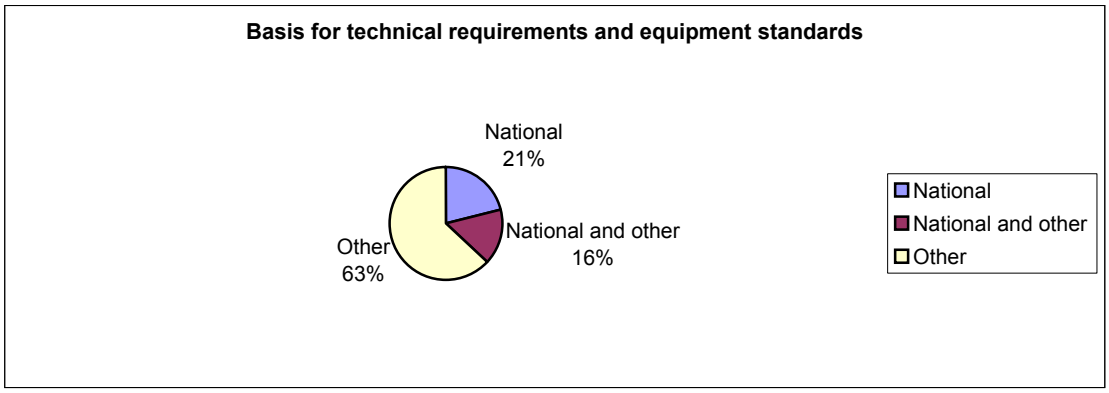
Q.4a): Do you develop these technical requirements or equipment standards on a national basis or use those developed by other administrations or international/regional standards organizations? (National/Other)

In addition to answering "national" or "other" some responders answered both. Generally the basis was less "national" than "other"; in two regions there is a greater choice of a national basis. The table below breaks down the results into region and development status. The full list of replies is given in **Annex 2-C**.

The range of answers received were:

National
Other
National and Other

Region	Basis of technical requirements and equipment standards?				
	Answer	By development status			Regional total
		Developed	Developing	Least developed	
Africa	National:	–	1	3	4
	Other:	–	4	10	14
	Nat. and other:	–	–	1	1
Americas	National:	1	2	–	3
	Other:	–	11	–	11
	Nat. and other:	–	1	–	1
Arab States	National:	–	4	–	4
	Other:	–	3	–	3
	Nat. and other:	–	1	–	1
Asia-Pacific	National:	–	3	2	5
	Other:	–	3	–	3
	Nat. and other:	–	1	–	1
Europe and CIS	National:	–	4	–	4
	Other:	9	9	–	18
	Nat. and other:	2	5	–	7
TOTALS					**80**



Q.4b): Do you have a procedure to ensure that radiocommunications equipment complies with the technical requirements, for example: Type Approval/Manufacturer's Declaration of Compliance/ Other?

Responders replied with one or more of the options in the questions and some gave other examples, e.g. RTTE[2]. To simplify the presentation of the results they are divided into several tables according to the type of answer, i.e. type approval, manufacturer's declaration or other.

The tables show the regional and development breakdown. The "% of total response" figure is based on the 80 replies received. The "% of development category" shows the percentage for each development status category, i.e. based on the 12, 52, and 16 responses received as tabulated in section 1, i.e. 50% of responses from developed countries refer to type approval Finally there is a summary table showing all answers with a regional breakdown. The full response is listed in **Annex 2-C**.

Region	Responses received	Procedure: 1. Type approval			
		By development status			Regional total
		Developed	Developing	Least developed	
Africa	19	–	5	4	9
Americas	15	1	10	–	11
Arab States	8	–	6	–	6
Asia-Pacific	9	–	6	1	7
Europe and CIS	29	5	11	–	16
TOTALS	**80**	**6**	**38**	**5**	**49**
% of total response	100	8	48	6	61
% of development category		50	73	31	

[2] The Radio and Telecommunications Terminal Equipment Directive of the countries of the European Union. This Directive provides procedures to replace the need for national type approval (the new procedures include the use of manufacturer's declaration of compliance).

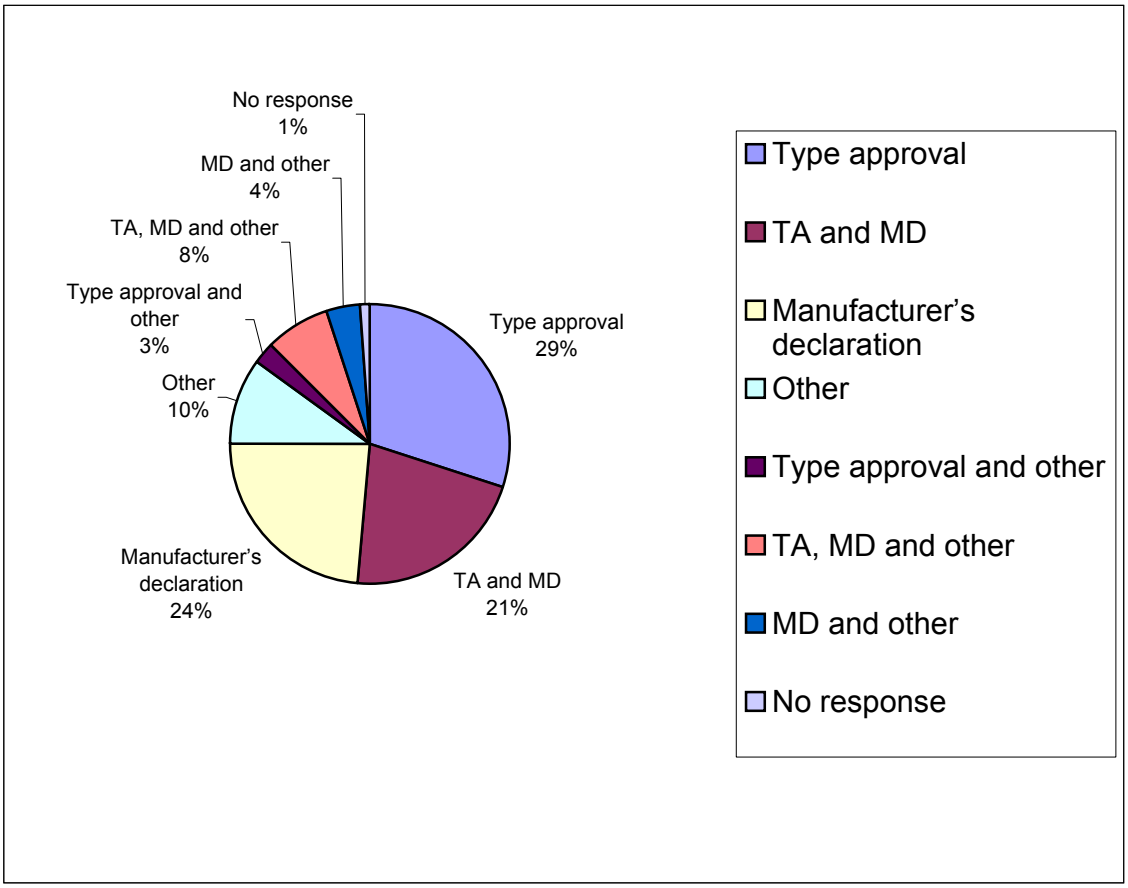
		Procedure: 2. Manufacturer's declaration			
Africa	19	–	3	8	11
Americas	15	–	5	–	5
Arab States	8	–	4	–	4
Asia-Pacific	9	–	1	2	3
Europe and CIS	29	10	12		22
TOTALS	**80**	**10**	**25**	**10**	**47**
% of total response	100	13	31	13	59
% of development category		83	48.08	63	

		Procedure: 3. Other			
Africa	19	–	1	4	5
Americas	15	–	1	–	1
Arab States	8	–	2	–	2
Asia-Pacific	9	–	1	–	1
Europe and CIS	29	2	7	–	9
TOTALS	**80**	**2**	**12**	**4**	**21**
% of total response	100	3	15	5	26
% of development category		17	23.08	25	

Q.4c): (Summary of types of compliance procedures): Do you have a procedure to ensure that radiocommunications equipment complies with the technical requirements, for example: Type Approval/Manufacturer's Declaration of Compliance/Other?

The following table combines and summarizes the results of the previous three tables. Type approval (TA) and manufacturer's declaration (MD) are the main procedures used.

Region	Responses received	Only type approval	TA and MD	Only manufacturer's declaration	Only Other	Type approval and other	TA, MD and other	MD and other	No Response	TOTAL
Africa	19	5	4	6	3	–	–	1	–	19
Americas	15	8	2	3	–	1	–	–	1	15
Arab States	8	3	2	1	1	–	1	–	–	8
Asia-Pacific	9	5	1	2	–	1	–	–	–	9
Europe and CIS	29	3	8	7	4	–	5	2	–	29
TOTAL	**80**	**24**	**17**	**19**	**8**	**2**	**6**	**3**	**1**	**80**
% of total response	100%	30.00%	21.25%	23.75%	10.00%	2.50%	7.50%	3.75%	1.25%	100%



The total for each type of answer is determined by adding all the segments that include that answer. For example the percentage of responders who use type approval is 29 + 21 + 3 + 8 = 61% and the percentage who use procedures **other** than type approval and manufacturer's declaration is 10 + 3 + 8 + 4 = 25%. Individual percentages are rounded to the nearest integer.

3.2.4 Question 5: Spectrum Redeployment

Background

Spectrum redeployment uses a collection of various tools to assist the spectrum manager in releasing valuable frequencies from existing users for new or more efficient use to provide greater economic benefit from the radio spectrum.

Q.5a): Has there been any spectrum redeployment in your country or has a need for spectrum redeployment been identified? (YES/NO)

A total of 50 responders have used or have a need for spectrum redeployment. In regional terms this ranged from 38% in Arab States to 86% in Europe & CIS. The full response is shown in **Annex 2-D**.

Region	Responses received	Yes, spectrum redeployment is used or needed				
		By development status			Regional total	
		Developed	Developing	Least developed	Total "Yes" response	Total "Yes" percentage for region
Africa	19	–	4	5	9	47%
Americas	15	1	8	–	9	60%
Arab States	8	–	3	–	3	38%
Asia-Pacific	9	–	5	1	6	67%
Europe and CIS	29	10	15	–	25	86%
TOTALS	**80**	**11**	**35**	**6**	**52**	

Q.5b): If so, do you have a method for achieving this redeployment in respective frequency bands and for given radiocommunication services? (YES/NO)

The regional percentages in the table below relate to whether there is a redeployment method used by the responders who answered YES in Question 5a above. This figure ranged from 67% to 89%. The full response is listed in **Annex 2-D**.

Region	Total "Yes" response from Q.5a) above	Yes, a method exists				
		By development status			Regional total	
		Developed	Developing	Least developed	Total "Yes" response	Total "Yes" percentage for region
Africa	9	–	3	3	6	67%
Americas	9	1	7	–	8	89%
Arab States	3	–	2	–	2	67%
Asia-Pacific	6	–	4	1	5	83%
Europe and CIS	25	8	10	–	18	72%
TOTALS	**52**	**9**	**26**	**4**	**39**	

Q.5c): Please define the established method and describe the nature of the consultation, if any, with users regarding the potential costs resulting from the planned redeployment.

Q.5c): Please define the established method and describe the nature of the consultation, if any, with users regarding the potential costs resulting from the planned redeployment.

The long-term approach involves forward planning with a long period of time before the frequencies are required. This allows advance notification of assignments and allows users to release frequencies at a routine system change, e.g. end of equipment life or expiration of licence. Geographical (space diversity) is another option. Six administrations, mainly from the European region, use at least one of the passive methods.

However, when the need for redeployment is more urgent a pro-active approach is required and the short-term options used range from incentives to licence revocation. Incentives can be used to persuade existing users to volunteer to release assignments. Spectrum pricing has also been identified as a method that can simplify the spectrum redeployment process.

Consultation with public and other affected users is often included in the preliminary procedures.

Redeployment can incur expenditure to the existing user for new equipment and infrastructure and many responders referred to the basis for compensation. Compensation payments can be derived from state funds or, more commonly, from the new user of the released frequencies. The state and the new user could also jointly fund compensation. The actual compensation amount can also be negotiated and can take account of expenditure that would have been expected even without redeployment, for example, end of life equipment replacement costs.

Apart from the use of passive methods there was no clear regional pattern of methods of redeployment or compensation.

Annex 2-D lists all the comments.

3.3 Updating the database: Questions 3 and 10

3.3.1 Question 3: National Frequency Allocation Table

Background

A national table of frequency allocations is a basic tool for an effective spectrum management process. It provides a general plan for spectrum use and the basic structure to ensure efficient use of the spectrum and the prevention of RF interference between services. Through use of the table, manufacturers will have a guide to where in the spectrum to design and build equipment and users will know where to operate. As described in the National Spectrum Management Handbook, the International Table of Frequency Allocations, Article 5 of the Radio Regulations forms the basis for national tables and in some countries this may be used as the national table. However, other countries have included additional information on national use varying in detail from showing which service operates when the Radio Regulations offer a choice, to spectrum available for government and non-government use, and, for specific sub-bands, channel arrangements and equipment specifications in use. Example extracts of national allocation tables are given in Part I of this Report.

Q.3: Do you have a national radio-frequency spectrum allocation table?

Statistical results

The country-by-country analysis of the responses to Question 3 is given in **Annex 2-E**.

A summary analysis by region and development category is given below and based on 73 responses.

Region	Developed countries	Developing countries	Least developed countries	Total	% of response
Africa	–	Y = 4 N = 2	Y = 8 N = 3	Y = 12 N = 5	Y = 71% N = 29%
Americas	Y = 1	Y = 11 N = 2	–	Y = 12 N = 2	Y = 86% N = 14%
Asia-Pacific	–	Y = 4 N = 1	Y = 2 N = 0	Y = 6 N = 1	Y = 86% N = 14%
Europe and CIS	Y = 9	Y = 17 N = 1	–	Y = 26 N = 1	Y = 96% N = 4%
Arab States	–	Y = 6 N = 2	–	Y = 6 N = 2	Y = 75% N = 25%
TOTAL	**Y = 10**	**Y = 42 N = 8**	**Y = 10 N = 3**	**Y = 62 N = 11**	**Y = 85% N = 15%**
% of response	Y = 100%	Y = 84% N = 16%	Y = 77% N = 23%		

It is worthwhile to note that 85% of the responses indicate that there is a national allocation table. In case of the developed countries, there is a 100% score.

3.3.2 Question 10: Policy and planning functions

Background

The primary purpose of policy making and planning in national spectrum management is to ensure that the radio spectrum is allocated to meet, both in the short and longer term, the often-competing requirements from different users and services. This must take account of international obligations and technical constraints as well as the national social, economic and political realities. Establishment of a national allocation table provides a basis for current and near-future needs; however, spectrum requirements and uses will change considerably over time especially due to economic growth and advances in technology. A national strategy for future use of the spectrum is developed from the national table, incorporating time-scales for foreseen changes, showing plans for phasing out old systems and introducing replacement technology. This enables these changes to be accommodated more easily, for different options to be considered and an opportunity for consultation with key players representing the radiocommunication industry, operators and users.

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

Statistical Results

The country by country analysis to Question 10 is given in **Annex 2-E**. A summary analysis by region and development category is given below and based on 73 responses.

Region	Developed countries	Developing countries	Least developed countries	Total	% of response
Africa	–	Y = 4 N = 2	Y = 9 N = 2	Y = 13 N = 4	Y = 76% N = 24%
Americas	Y = 1	Y = 13	–	Y = 14	Y = 100%
Asia-Pacific	–	Y = 5	Y = 2	Y = 7	Y = 100%
Europe and CIS	Y = 9	Y = 15 N = 4	–	Y = 24 N = 4	Y = 86% N = 14%
Arab States	–	Y = 6 N = 1	–	Y = 6 N = 1	Y = 86% N = 14%
TOTAL	**Y = 10**	**Y = 43** **N = 7**	**Y = 11** **N = 2**	**Y = 64** **N = 9**	**Y = 88%** **N = 12%**
% of response	Y = 100%	Y = 86% N = 14%	Y = 85% N = 15%		

88% of the Administrations have a policy and planning department concerning the future use of the frequencies. The value can be linked with the 85% of administrations which have an allocation table because an allocation table allows the planning of future use of frequencies.

3.4 Assignments (generic): Questions 7, 8, 9 and 11

Background

A national process of assigning frequencies should be implemented to ensure that new frequency use does not cause unacceptable interference to existing users on a national and, sometimes, international basis.

The assignment process includes the analysis of requirements for proposed radio services together with any relevant studies, and the assignment of frequencies in accordance with the national frequency allocation plan. This plan should also include references to related actions necessary to co-ordinate the national radiocommunication systems with those of other countries in order to provide mutual protection from potential interference.

After successful completion of the frequency assignment process, a licence is issued that requires the collection of relevant licence fees and other possible charges. It provides the basis both for technical and administrative planning. Administratively, this procedure will account for the majority of the work and staffing in many frequency management organizations. Therefore, careful planning is required to develop an operational version of this procedure when establishing a (new) frequency management organization.. This procedure should also be the subject of regular review with adjustments made based on practical experience.

To apply for frequency assignment, a user typically will prepare and submit an application form (which may be different for each radio service or groups of services). The application for a frequency assignment will usually be included as a part of the more general Radio Licence Application, although this need not always be the case. In those cases where only a permit or authorization is required (as may be the case when a government agency is requesting a frequency assignment) the information required for a frequency assignment will be much the same as for a licence application but without much of the administrative and business related information.

Question 7a): Does your administration have a system (manual or computerized) to keep and maintain records of national frequency assignments and spectrum use (usually known as a Data Base Management System (DBMS))?

Region	Developed countries	Developing countries	Least developed countries	Total	% of response	% of response by region
Africa	–	Y = 6	Y = 14 N = 1	Y = 20 N = 1	Y = 25 N = 2	Y = 95% N = 5%
Americas	Y = 1	Y = 13	–	Y = 14	Y = 18	Y = 100%
Asia-Pacific	–	Y = 8	Y = 2	Y = 10	Y = 13	Y = 100%
Europe and CIS	Y = 10	Y = 16	–	Y = 26	Y = 33	Y = 100%
Arab States	–	Y = 7	–	Y = 7	Y = 9	Y = 100%
TOTAL	**Y = 11%**	**Y = 50%**	**Y = 16% N = 1%**	**Y = 77% N = 1%**		

Virtually all the Member States (99%) have a system for keeping and maintaining records of frequency assignments. One LDC does not have such a system. This demonstrates its importance for managing frequency assignments.

Question 7b): Is there a single national DBMS or separate DBMS(s) for different users (for example a DBMS for assignments to government users and separate DBMS for assignments to non-government users)?

Region	Developed countries	Developing countries	Least developed countries	Total	% of response
Africa	Si = 0 Se = 0	Si = 4 Se = 2	Si = 12 Se = 2	Si = 16 Se = 4	Si = 20.78% Se = 5.19%
Americas	Si = 1 Se = 0	Si = 12 Se = 1	Si = 0 Se = 0	Si = 13 Se = 1	Si = 16.88% Se = 1.30%
Asia-Pacific	Si = 0 Se = 0	Si = 6 Se = 2	Si = 2 Se = 0	Si = 8 Se = 2	Si = 10.39% Se = 2.60%
Europe and CIS	Si = 4 Se = 6	Si = 7 Se = 9	Si = 0 Se = 0	Si = 11 Se = 15	Si = 14.29% Se = 19.48%
Arab States	Si = 0 Se = 0	Si = 7 Se = 0	Si = 0 Se = 0	Si = 7 Se = 0	Si = 9.09% Se = 0.00%
TOTAL	**Si = 5 Se = 6**	**Si = 36 Se = 14**	**Si = 14 Se = 2**	**Si = 55 Se = 22**	
% of response	Si = 6% Se = 8%	Si = 47% Se = 18%	Si = 18% Se = 3%	Si = 71% Se = 29%	

Si: single; Se: separate

Most Member States (71%) use a single database for all assignments. This preference is particularly pronounced in Africa, where deregulation is recent. The opposite tendency is observed in Europe (by 58% approximately).

Question 7c): What is the approximate size (at 2002) of your DBMS (number of frequency assignments)?

Region	No response	< 1 000	1 000 < X < 10 000	> 10 000	Total
Africa	3	9	7	2	21
Americas	2	2	4	6	14
Asia-Pacific	2	1	2	5	10
Arab States	2	1	2	2	7
Europe and CIS	2	1	6	18	27
TOTAL	**11**	**14**	**21**	**33**	**79**
% of response	14%	18%	27%	42%	

A very considerable proportion of the returns (14%) gave no response. This may be due to difficulties understanding the question. For subsequent stages it should be re-worded. Several Member States still have less than one thousand frequency assignments, by contrast with the 72% of European countries having more than ten thousand.

Question 7d): What is the approximate size (at 2002) of your DBMS (number of licences)?

Region	No response	< 1 000	1 000 < X < 10 000	> 10 000	Total
Africa	5	11	3	2	21
Americas	3	3	4	4	14
Asia-Pacific	3	0	3	4	10
Arab States	2	1	2	2	7
Europe and CIS	1	6	4	16	27
TOTAL	**14**	**21**	**16**	**28**	**79**
% of response	18%	27%	20%	35%	

Sixty-five administrations responded to this question. A very considerable proportion of the returns (18%) gave no response. Most of the latter are Least Developed Countries in Africa or in the Asia and Pacific region. The difficulty may be due to insufficiently clear wording in the question, allowing for some confusion between the number of networks per band and the number of licences. In the event, 27% of administrations have issued less than one thousand licences.

Question 7e): Are these frequency assignment records made available to public?

Seventy-seven Member States responded to this question. It emerged that 82% of administrations do not make their records available to the public. Presumably, privacy and security are the reasons. Nonetheless, some administrations are in the process of opening up. This may be a result of improved capabilities in protecting assigned frequencies and information contained.

Region	Developed countries	Developing countries	Least developed countries	Total	% of response
Africa	Y = 0 N = 0	Y = 0 N = 6	Y = 3 N = 11	Y = 3 N = 17	Y = 4% N = 22%
Americas	Y = 1 N = 0	Y = 4 N = 9	Y = 0 N = 0	Y = 5 N = 9	Y = 6% N = 12%
Asia-Pacific	Y = 0 N = 0	Y = 0 N = 8	Y = 1 N = 1	Y = 1 N = 9	Y = 1% N = 12%
Europe and CIS	Y = 2 N = 8	Y = 3 N = 13	Y = 0 N = 0	Y = 5 N = 21	Y = 6% N = 27%
Arab States	Y = 0 N = 0	Y = 0 N = 7	Y = 0 N = 0	Y = 0 N = 7	Y = 0.00% N = 9%
TOTAL	**Y = 3 N = 8**	**Y = 7 N = 43**	**Y = 4 N = 12**	**Y = 14 N = 63**	
% of response	Y = 4% N = 10%	Y = 9% N = 56%	Y = 5% N = 16%	Y = 18% N = 82%	

Question 7f): Is the DBMS computerized?

Seventy-seven response were received to this question. The trend is towards computerization (81%). 35% of responding African states had no computerized DBMS.

Region	Developed countries	Developing countries	Least developed countries	Total	% of response
Africa	Y = 0 N = 0	Y = 4 N = 2	Y = 9 N = 5	Y = 13 N = 7	Y = 17% N = 9%
Americas	Y = 1 N = 0	Y = 12 N = 1	Y = 0 N = 0	Y = 13 N = 1	Y = 17% N = 1%
Asia-Pacific	Y = 0 N = 0	Y = 7 N = 1	Y = 1 N = 1	Y = 8 N = 2	Y = 10% N = 3%
Europe and CIS	Y = 9 N = 1	Y = 12 N = 4	Y = 0 N = 0	Y = 21 N = 5	Y = 27% N = 6%
Arab States	Y = 0 N = 0	Y = 7 N = 0	Y = 0 N = 0	Y = 7 N = 0	Y = 9% N = 0%
TOTAL	**Y = 10 N = 1**	**Y = 42 N = 8**	**Y = 10 N = 6**	**Y = 62 N = 15**	
% of response	Y = 13% N = 1%	Y = 55% N = 10%	Y = 13% N = 8%	Y = 81% N = 19%	

Question 7g): What computerized DBMS do you use?

Region	No response	Manual	Auto	Total
Africa	8	1	12	21
Americas	3	0	11	14
Asia-Pacific	2	0	8	10
Europe and CIS	6	0	21	27
Arab States	2	0	5	7
TOTAL	**21**	**1**	**57**	**79**
% of response	27%	1%	72%	

Details on the responses received are annexed to this document. Only one administration uses a manual database. However, it must be pointed out that a total of 21 Member States skipped this question in their responses to the questionnaire, whether because of the way the question was worded or because this information was considered too confidential. Several administrations use proprietary software running under Oracle or Unix. Others operate with lists drawn up in Excel or Access. WinBASMS in its current form is not being used on an exclusive basis by any administration. It would be useful to know the degree of advancement of the DMBS products used (BASMS, ASMS and so on).

Question 8: Coordination of frequency assignments with other countries

Background

Coordination of frequency assignments is essential for efficient sharing between radio stations within a given zone, or between different administrations or services. The procedures for coordination are clearly laid out in the relevant parts of the Radio Regulations. The Radiocommunication Bureau plays a crucial role, the ultimate purpose of which is to protect national radio systems against interference.

Question 8.1: Do you coordinate assignments to terrestrial stations?

Region	Developed countries	Developing countries	Least developed countries	Total	% of response
Africa	0 N = 0	Y = 5 N = 0	Y = 10 N = 4	Y = 15 N = 4	Y = 19% N = 5%
Americas	1 N = 0	Y = 7 N = 6	Y = 0 N = 0	Y = 8 N = 6	Y = 10% N = 8%
Asia-Pacific	0 N = 0	Y = 6 N = 2	Y = 1 N = 1	Y = 7 N = 3	Y = 9% N = 4%
Europe and CIS	11 N = 0	1 Y = 4 N = 2	Y = 0 N = 0	2 Y = 5 N = 2	Y = 32% N = 3%
Arab States	0 N = 0	Y = 7 N = 0	Y = 0 N = 0	Y = 7 N = 0	Y = 9% N = 0%
TOTAL	**12** **N = 0**	**Y = 39** **N = 10**	**Y = 11** **N = 5**	**Y = 62** **N = 15**	
% of response	Y = 16% N = 0%	Y = 51% N = 13%	Y = 14% N = 6%	Y = 81% N = 19%	

For this question there were 77 valid responses. The tendency is increasingly to practice coordination for frequency assignments to terrestrial stations. However, 21% of African administrations and 30% of administrations in the Asia-Pacific region do not yet do so.

Question 8.2: Do you coordinate assignments to space stations?

For this question there were 78 valid responses. The tendency is increasingly to practice coordination for frequency assignments to space stations, frequently with the involvement of the Radiocommunication Bureau. In the African and American regions one half of all states do not practice coordination.

Region	Developed countries	Developing countries	Least developed countries	Total	% of response
Africa	Y = 0 N = 0	Y = 3 N = 3	Y = 7 N = 7	Y = 10 N = 10	Y = 13% N = 13%
Americas	Y = 1 N = 0	Y = 6 N = 7	Y = 0 N = 0	Y = 7 N = 7	Y = 9% N = 9%
Asia-Pacific	Y = 0 N = 0	Y = 7 N = 1	Y = 1 N = 1	Y = 8 N = 2	Y = 10% N = 3%
Europe and CIS	Y = 11 N = 0	Y = 14 N = 2	Y = 0 N = 0	Y = 25 N = 2	Y = 32% N = 3%
Arab States	Y = 0 N = 0	Y = 7 N = 0	Y = 0 N = 0	Y = 7 N = 0	Y = 9% N = 0%
TOTAL	**Y = 12 N = 0**	**Y = 37 N = 13**	**Y = 8 N = 8**	**Y = 57 N = 21**	
% of response	Y = 15% N = 0%	Y = 47% N = 17%	Y = 10% N = 10%	Y = 73% N = 27%	

Question 9: Do you notify to the ITU those frequency assignments that are required to be notified by the Radio Regulations?

Region	Developed countries	Developing countries	Least developed countries	Total	% of response
Africa	Y = 0 N = 0	Y = 4 N = 2	Y = 10 N = 5	Y = 14 N = 7	Y = 18% N = 9%
Americas	Y = 1 N = 0	Y = 6 N = 6	Y = 0 N = 0	Y = 7 N = 6	Y = 9% N = 8%
Asia-Pacific	Y = 0 N = 0	Y = 8 N = 0	Y = 2 N = 0	Y = 10 N = 0	Y = 13% N = 0%
Europe and CIS	Y = 10 N = 1	Y = 15 N = 1	Y = 0 N = 0	Y = 25 N = 2	Y = 32% N = 3%
Arab States	Y = 0 N = 0	Y = 7 N = 0	Y = 0 N = 0	Y = 7 N = 0	Y = 9% N = 0%
TOTAL	**Y = 11 N = 1**	**Y = 40 N = 9**	**Y = 12 N = 5**	**Y = 63 N = 15**	
% of response	Y = 14% N = 1%	Y = 51% N = 12%	Y = 15% N = 6%	Y = 81% N = 19%	

Virtually all Member States (81%) notify their frequency assignments in accordance with the Radio Regulations. A point of interest that remains unexplored is the extent to which bilateral or multilateral agreements with neighbouring countries are used in the process of notifying and coordinating frequency assignments.

Question 11: Do you perform technical analyses of frequency assignment requests?

Region	Developed countries	Developing countries	Least developed countries	Total	% of response
Africa	Y = 0 N = 0	Y = 6 N = 0	Y = 13 N = 2	Y = 19 N = 2	Y = 24% N = 3%
Americas	Y = 1 N = 0	Y = 12 N = 1	Y = 0 N = 0	Y = 13 N = 1	Y = 17% N = 1%
Asia-Pacific	Y = 0 N = 0	Y = 8 N = 0	Y = 2 N = 0	Y = 10 N = 0	Y = 13% N = 0%
Europe and CIS	Y = 10 N = 1	Y = 14 N = 2	Y = 0 N = 0	Y = 24 N = 3	Y = 31% N = 4%
Arab States	Y = 0 N = 0	Y = 5 N = 1	Y = 0 N = 0	Y = 5 N = 1	Y = 6% N = 1%
TOTAL	**Y = 11 N = 1**	**Y = 45 N = 4**	**Y = 15 N = 2**	**Y = 71 N = 7**	
% of response	Y = 14% N = 1%	Y = 58% N = 5%	Y = 19% N = 3%	Y = 91% N = 9%	

A total of 78 responses from Member States were received to this question. Technical analyses for frequency assignment requests are conducted in 91% of the responding countries. It should be noted that analysis is essential to determine electromagnetic compatibility in frequency utilization and ensure that the new assignment does not cause harmful interference against existing services. Technical analysis considers such aspects as frequency, time and geographical separation between stations, and operates with technical parameters that include protection criteria, radiated power, propagation modes and bandwidth.

3.5 Spectrum management: Questions 6, 15 and 16

Q.6: Spectrum management costs

Radio spectrum management bears a cost for the administration. This cost is made of staff wages and by the amount of investment made, for computers and for monitoring equipment. To know this cost can be very useful for the administrations. It can help to fix the amount of spectrum usage fees.

The extensive text of responses from administrations is given in **Annex 2-F**.

Q.6a): What is the cost of providing national spectrum management functions in your country (if there is more than one organization or agency responsible for spectrum management please give the total costs if this information is available)? (Swiss Francs)

More than half of administrations did not fill this line. The spectrum management process can be very complex and it then becomes difficult to ensure the costs, in particular general overhead costs, are apportioned fairly between the licences for different types of radio use. The costs and charges of many administrations are open to public scrutiny (for example by a national audit office) and the mechanisms for raising revenue to pay for spectrum management must be seen to ensure that fees charged to one type of licence use is not (accidentally) subsidising the costs of another type of use. The situation is complicated further if more than one organisation has responsibility for spectrum management or if the organisation has responsibility for additional (e.g. non-radio) functions.

A future Questionnaire should take care to specify what has to be taken into account to evaluate the cost of spectrum management. Do we consider only the central organization or service in charge of planning and monitoring, or do we take into account the budget used for frequency management of all the organizations managing spectrum for themselves (administrations) or for third parties (operators)?

Region	Developed			Developing			Least developed			Rate*
Swiss francs (Hundreds)	**Min.**	**Max.**	**Number of responses**	**Min.**	**Max.**	**Number of responses**	**Min.**	**Max.**	**Number of responses**	
Africa	–	–	–	nd.	nd.	0	0.450	250	5	26%
Americas	–	55 000	1	55.2	3 017	5	–	–	–	40%
Asia-Pacific	–	–	–	250	2 500	3	–	–	0	37%
Arab States	–	–	–	200	330	2	–	–	–	22%
Europe and CIS	14 500	116 000	5	98	36 800	10	–	–	–	52%
Responses	**14 500**	**116 000**	**6**	**55.2**	**36 800**	**20**	**0.450**	**250**	**5**	**39%**

* this rate corresponds to the number of responses per region on this question 6a) in comparison with the responses in Part II per region.

Some form of cost and resource management information system must be put in place to enable the full costs to be determined with accuracy.

The responses are split between two extremes, 116 million SF and 450 SF.

Q.6b): What is the source of the funding required to accomplish these spectrum management functions?

Administrations may obtain their funds for spectrum management, usually from spectrum usage fees. These fees can be given directly to the organization in charge of spectrum management or paid to the Treasury, the spectrum management organizations being then funded by subventions from the general Budget.

Responses to the Questionnaire can be grouped in three main groups depending on how the spectrum management function is funded:

– by a subvention from the general State Budget;

– by the budget of the organization in charge of this function, regulatory authority or an agency of a ministry (either the financing comes from the general Budget, or from the fees directly affected to this organization) or in some cases, by the budget of the incumbent telecommunication operator (when the telecommunication sector reform is not fully achieved);

– and in a limited number of Least Developed Countries, by donations from World Bank or UNDP.

Responses indicating a mixture of two of these groups are under column title "mixed".

Region	Developed (10)			Developing (45)			Least developed countries (14)			A
	General budget	Organization budget (fees)	Mixed	General budget	Organization budget (fees)	Mixed	General budget	Organization budget (fees)	Mixed	
Africa	–	–	–	–	4	1	2	7	3	17
Americas	1	–	–	6	6	–	–	–	–	13
Asia-Pacific	–	–	–	3	3	–	2	–	–	8
Arab States	–	–	–	2	2	1	–	–	–	5
Europe and CIS	2	5	2	5	10	1	–	–	–	25
TOTAL	**3**	**5**	**2**	**16**	**25**	**3**	**4**	**7**	**3**	**68**

More than half the administrations which answered to the Questionnaire use fees to directly fund spectrum management (were included responses showing a financing by the telecommunication which receives frequency usage fees). In developing countries, it is the main source of financing.

Region	General budget	Fees or budget of the organization responsible for spectrum management	Mixed	Number of responses
Africa	2	11	4	17
Americas	7	6	–	13
Asia-Pacific	5	3	–	8
Arab States	2	2	1	5
Europe and CIS	7	15	3	25
TOTAL	**23**	**37**	**8**	**68**
% of responses	34%	54%	12%	100%

Q.15: Use of computers for national spectrum management

Seventy-eight exploitable responses (on one response, the corresponding page was missing) were received. This shows that the Questionnaire was perhaps a little too complex. More useful information would have been obtained if the responses had included an explanatory note, especially in the case of the Least Developed Countries.

An administration answered too late and its response could not be taken into account in this Questionnaire.

Of the 78 responses received, 30 asked for the updating of WinBASMS.

For Q.15m) to q), there are too few responses to draw any conclusions.

The full responses by administrations are listed in **Annex 2-G**.

Q.15a): Do you use computers for national spectrum management?

Q.15b): Type of computers

Q.15c): How many workstations and/or personal computers (PCs)?

Q.15d): Operating system(s)

Q.15e): Does your spectrum management system operate within a Local Area Network (LAN)?

Q.15a), c) and e)

Administrations using PCs or workstations and use of Local Area Network (LAN)

Region	Developed (12)		Developing (50)		Least developed (15)		Total (77)	
	PC and/or stations	LAN	PC and/or stations	LAN	PC and/or stations	LAN	PC and/or stations	LAN
Africa	–	–	5	1	12	3	17	4
Americas	1	1	12	11	–	–	13	12
Asia-Pacific	–	–	6	6	2	0	8	6
Arab States	–	–	5	5	–	–	5	5
Europe and CIS	11	10	17	15	–	–	28	25
TOTAL	**12**	**11**	**45**	**38**	**14**	**3**	**71**	**52**
% of responses	100%	92%	90%	76%	93%	20%	92%	68%

(Between brackets, the number of administrations having answered to this question)

This question was perhaps not enough specific. In many responses, workstations and availability of PCs were mixed, resulting in figures ranging from 0.5 to 3 000 PC available.

Moreover, some responses, listed only those PCs used for spectrum management (frequency allocations and files maintenance), while other responses included the entire PC equipment of the organization.

It should be noted that PC availability does not always mean that spectrum management is computerized. Six administrations (1 in Africa, 2 in Americas, 1in Arab States and 2 in Europe and CIS) do not have at their disposal PC for spectrum management.

Q.15f): Do you have access to the internet?

Q.15g): Does your administration provide a website on the internet to disseminate spectrum management information? If yes, please provide the address (URL) of the website:

Administrations having access to the internet and/or having a website:

Region	Developed (11)		Developing (50)		Least developed (15)		Total (76)	
	Internet access	WWW site	Internet access	WWW site	Internet access	WWW site	Internet access	WWW site
Africa	–	–	5	2	11	8	16	10
Americas	1	1	13	9	–	–	14	10
Asia-Pacific	–	–	7	7	2	0	6	2
Arab States	–	–	6	2	–	–	9	7
Europe and CIS	10	8	17	11	–	–	27	19
TOTAL	**11**	**9**	**48**	**31**	**13**	**8**	**72**	**48**
% of responses	100%	82%	96%	62%	87%	53%	95%	63%

(Between brackets, the number of administrations having answered to this question)

Internet access is widely available. Construction of websites and their use for spectrum management are in progress, especially in developing countries.

Questions on Windows Basic Spectrum Management System (WinBASMS)

Q.15h): Are you aware that a Windows Basic Spectrum Management System is available from the ITU at no cost?

Q.15i): Has your administration used WinBASMS?

Q.15j): Has your administration had problems using WinBASMS?

Q.15k): Please list all problems that were encountered using WinBASMS.

Q.15l): Would you recommend using WinBASMS if the problems identified in (d) have been corrected?

Region	Developed (10)		Developing (52)		Least developed (15)		Total WinBASMS (77)	
	known/ used	difficulties/ recom-mended	known/ used	difficulties/ recom-mended	known/ used	difficulties/ recom-mended	known/ used	difficulties/ recom-mended
Africa	–	–	4/2	2/4	12/5	10/11	16/7	12/15
Americas	1/0	–/1	7/1	1/3	–	–	8/1	1/4
Asia-Pacific	–	–	5/1	1/1	1/1	0/1	6/2	1/2
Arab States	–	–	5/2	2/1	–	–	5/2	2/1
Europe and CIS	7/1	1/1	13/1	3/2	–	–	20/2	4/3
TOTAL	**8/1**	**1/1**	**34/7**	**7/11**	**13/6**	**10/11**	**55/14**	**18/25**
% of responses	80/10	10/10	65/13	13/61	87/40	67/73	71/18	23/32

Fifty-five administrations are aware of BASMS, i.e. 71% of responses, but 14, i.e. 18% use it, and 18, i.e. nearly one quarter indicate difficulties, either because they use it, or having given up the use of it because of these difficulties.

Almost one third of administrations of which some do not use it at present, would consider using WinBASMS if it was updated.

Q.15m): Do you need an enhanced spectrum management system if you answered no in (e)?

Administrations having answered they need an enhanced system	Developed (10)	Developing (52)	Least developed (15)	Total	In % of responses of regions to Q.15
Africa	–	4	6	9	**50%**
Americas	–	3		4	**27%**
Asia-Pacific	–	2	1	4	**57%**
Arab States	–	4	–	3	**33%**
Europe and CIS	2	2	–	4	**14%**
TOTAL	**2**	**15**	**7**	**24**	**31%**
% of responses	20%	29%	47%		

Almost one third of administrations declared their need for an enhanced system, mostly in Africa and in Arab States. Nearly one half of the Least Developed Countries that responded to the questionnaire, declared their need for such a system.

Questions on Advanced Automated Spectrum Management Systems (AASMS)

Q.15n): Does your administration use an Automated Spectrum Management Systems (AASMS) ?

Q.15o): Has your administration had problems using your AASMS?

Q.15p): Please list all problems that were encountered using your AASMS

Q.15q): How would you propose to change the AASMS to correct or overcome these problems (please describe)?

Region	Developed (10)		Developing (52)		Least developed (15)		Total AASMS (77)	
	used	difficulties	used	difficulties	used	difficulties	used	difficulties
Africa	–	–	0	1	2	1	2	2
Americas	1	1	4	2	–	–	5	3
Asia-Pacific	–	–	1	1	–	0	1	1
Arab States	–	–	3	0	0	0	3	0
Europe and CIS	3	0	0	0	–	–	3	0
TOTAL	**4**	**1**	**8**	**4**	**2**	**1**	**14**	**6**
% of responses	40%	10%	15%	8%	13%	6%	18%	8%

Q.16: Organization of spectrum management

There was a variety of responses from administrations on how they organized their national spectrum management. This variety of responses proved very difficult to analyze statistically.

One third of the 72 administrations that responded to all or some parts of Q.16 sent an organization chart for their administration. Responses were grouped as followed:

Organizational structure of spectrum management and recent or planned changes to this structure.

Q.16a): Please describe your country's spectrum management structure and enclose a copy of the organization chart. The following aspects are of particular interest:

Q.16d): Have there been recent changes in this organizational structure or are changes planned (for example to take account of any changes in your government's policy for telecommunications)?

One third of responses stated there had been recent or that changes were planned changes in the near future.

Responsibility of spectrum management, at the Ministry level or not, and responsibility given to a unique organization or shared between several organizations.

Q.16b): Is the spectrum management organization a separate ministry, department or agency reporting directly to the government or is it part of a larger government department (for example, a department responsible for all telecommunications)?

Q.16c): Is the responsibility for spectrum management contained within a single organization or is it shared between separate organizations (for example, some administrations have separate organizations for regulatory matters and policy matters, other administrations have separate organizations for government users and non-government users)?

The full text of responses is listed in **Annex 2-H**.

	Developed (10)			Developing (44)			Least developed (13)			Total (67)
Level of responsibility for spectrum management	**Ministry**	**Agency**	**Operator**	**Ministry**	**Agency**	**Operator**	**Ministry**	**Agency**	**Operator**	
Africa	–	–	–	2	1	1	9	2	1	16
Americas	1	–	–	8	1	1		–	–	11
Asia-Pacific	–	–	–	5	1		1	–	–	7
Arab States	–	–	–	3	1	2	–	–	–	6
Europe and CIS	6	3	–	12	6	0	–	–	–	27
TOTAL	**7**	**3**	**–**	**30**	**10**	**4**	**10**	**2**	**1**	**67**
% of responses	70	30	–	68	23	9	77	15	8	100

Total Ministry	47	% of total responses	70%
Total Agency	15	% of total responses	22%
Total Operator	5	% of total responses	7%

In 80% of responses, the responsibility for spectrum management is given to a unique organization.

Unique organization or several organizations	Developed (10)		Developing (38)		Least developed (14)		Total (67 responses to Q.16)	
Organization	**Unique**	**Several**	**Unique**	**Several**	**Unique**	**Several**	**Unique**	**Several**
Africa	–	–	3	1	13	–	16	1
Americas	1	–	8	2	–	–	9	2
Asia-Pacific	–	–	6	1	1	–	7	1
Arab States	–	–	4	1	–	–	4	1
Europe and CIS	7	2	12	–	–	–	19	2
TOTAL	**8**	**2**	**33**	**5**	**14**	**–**	**55**	**7**
% of responses	80%	20%	87%	13%	100%	–	82%	10%

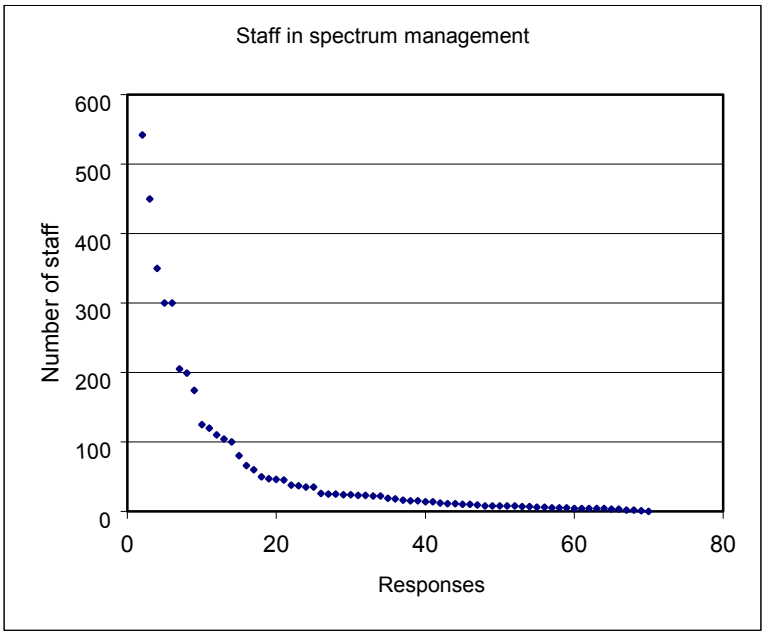
Human resources

Q.16e): Number of specialist staff in national spectrum management?

Q.16f): Number of support staff in national spectrum management?

The number of specialist or support staff varies considerably according to the responses from the administrations. However, the responses did not always make a distinction between specialist staff and support staff.

The full text of responses is given in **Annex 2-I**.



Region	Developed			Developing			Least developed			Total		
Staff	**≥ 100**	**99-10**	**< 10**	**≥ 100**	**99-10**	**< 10**	**≥ 100**	**99-10**	**< 10**	**≥ 100**	**99-10**	**< 10**
Africa	–	–	–	0	2	1	0	2	12		4	13
Americas	1	–	–	1	5	7	–	–	–	2	5	7
Asia-Pacific	–	–	–	2	3	0	–	–	2	2	3	2
Arab States	–	–	–	0	5	2	–	–	–	0	5	2
Europe and CIS	5	2	3	4	12	2	–	–	–	9	14	5
TOTAL	**6**	**2**	**3**	**7**	**27**	**12**	**0**	**2**	**14**	**13**	**31**	**29**
	11			**46**			**16**			**73**		
in %										18%	42%	40%

3.6 Spectrum monitoring: Questions 12, 13 and 14

Question 12 concerns technical monitoring facilities set up by administrations (fixed, mobile and transportable stations) for different parts of the radio spectrum.

It must be borne in mind that the purpose of technical monitoring with specialized stations is to assist administrations throughout the radio spectrum management process, including frequency assignment and planning. Thus, monitoring stations provide compliance information with respect to the technical requirements in the transmission licences, within the overall framework of radio spectrum management. Thus technical monitoring programmes are used to obtain precise data on currently valid assignments. Technical monitoring is an essential part of the spectrum management process, and the monitoring stations are an indispensable resource for effective technical monitoring of the spectrum at the national level.

Question 12: Do you perform radio monitoring of terrestrial radio services?

Sixty-five administrations responded to this portion of the questionnaire's Part II (see **Annex 2-J**). A synopsis is provided in the following.

Region	Developed Countries	Developing Countries	Least Developed Countries	Total	% of answers
Africa	–	6	11	17	26%
Americas	1	9	–	10	15%
Asia-Pacific	–	5	1	6	9%
Europe and CIS	8	16	–	24	38%
Arab States	–	8	–	8	12%
TOTALS	**9**	**44**	**12**	**65**	**100%**

At the time of the previous questionnaire for Resolution 9, in 2001, responses were received from 71 administrations. The 9% drop results from different factors:

- 32 of the administrations which had responded in 2001 did not give a reply this time around.
- 29 new administrations which had not responded in 2001 did so in 2003 (mainly from Africa and Arab States).

If the responses received are tabulated on the basis of the ITU's membership of 189 States, the results by region are as follows:

Region	Questionnaire		Change 2003-2001
	2003	2001	
Africa	35%	30%	+5%
Americas	28%	34%	–6%
Asia-Pacific	16%	37%	–11%
Europe and CIS	43%	49%	–6%
Arab States	42%	21%	+21%

Among the 65 responses submitted by ITU Member States, several merely indicate that the State in question either does not possess any radio spectrum monitoring system or that transmission monitoring stations were at the acquisition or installation stage. They break down as follows:

Region	No monitoring	Monitoring planned	Extension monitoring
Africa	4 Least Developed Countries	–	3
Americas	2 Developing countries	–	–
Asia-Pacific	1 Least Developed Country	–	–
Europe and CIS	–	–	1
Arab States	1 Developing Country	2	–

As a result, the statistics presented in the following are based on the responses received from **55 Member States** that actually possess and operate radio monitoring stations, which break down as follows:

Region	Developed countries	Developing countries	Least developed countries	Total	% of answers
Africa	–	5	8	13	24%
Americas	1	7	–	8	15%
Asia-Pacific	–	5	–	5	9%
Europe and CIS	8	16	–	24	43%
Arab States	–	5	–	5	9%
TOTALS	**9**	**38**	**8**	**55**	**100%**

3.6.1 Fixed monitoring stations

a) How many fixed monitoring stations do you have?

b) Please provide a brief list of the facilities available at your fixed monitoring stations (for example: receivers, spectrum analysers, direction finding equipment)

c) What is the upper frequency limit of your fixed monitoring stations? ----- MHz

d) What is the upper frequency limit of your fixed direction finding stations? ---- MHz

The results for fixed monitoring stations are broken down in **Annex 2-K**:

- Chart 1: Fixed measurement stations
- Chart 2: Fixed direction finding stations

The results may be summarized as follows:

Region	Measurement stations (MS)		Direction finding Stations		Ratio MS/DF
	Quantity	% of total	Quantity	% of total	
Africa	11	2%	4	1%	2.75
Americas	100	14%	101	15%	≈ 1
Asia-Pacific	237	33%	237	35%	1
Europe and CIS	352	49%	326	48%	1.08
Arab States	12	2%	13	1%	0.92
TOTALS	**712**	**100%**	**681**	**100%**	**1.05**

Closer examination shows that, on the basis of the responses sent in by administrations, **520 fixed stations** for radio spectrum monitoring are accounted for by **only six administrations**:

Region	Fixed stations	% of total	Administrations
Americas	85	84%	1 developed country
Asia-Pacific	206	87%	3 developed +1 developing countries
Europe and CIS	229	65%	1 developing country

This means that six Member States are responsible for 520 monitoring stations, or 73% of all declared fixed monitoring stations.

3.6.1.1 HF monitoring stations

In the 2003 questionnaire, for frequency bands between 960 MHz and 3 GHz including VHF and UHF, only two administrations in the Europe and CIS region reported fixed DF stations, for a total of two stations.

3.6.1.2 VHF/UHF monitoring stations

Taking charts 1 and 2 from **Annex 2-K**, the responses may be meaningfully broken down into three categories on the basis of frequency bands.

	Fixed stations/Region					
Frequency bands	Africa	Americas	Asia & Pacific	Europe &CIS	Arab States	Total
1 GHz-2 GHz	6 (1%)	102 (15%)	228 (33%)	346 (50%)	5 (1%)	687 (100%)
2 GHz-3 GHz	4 (1%)	98 (17%)	207 (36%)	266 (45%)	5 (1%)	580 (100%)
20 MHz-1 GHz	11 (2%)	106 (15%)	237 (33%)	346 (48%)	12 (2%)	712 (100%)

In summary, it may be noted that the Europe and CIS region accounts for some 50% of all declared fixed stations throughout the spectrum.

3.6.1.3 Stations SHF

The results of the analysis of the number of fixed SHF (> 3 GHz) stations declared under the 2003 questionnaire may be compared with those declared under the 2001 questionnaire.

Region	2003 Questionnaire	2001 Questionnaire
Africa	–	–
Americas	–	2 developed + 15-1 developing countries
Asia-Pacific	–	10-1 developing countries
Europe and CIS	3 (developed countries) + 137 3 (developing countries)	8-1 (developed countries)
Arab States	–	–
TOTALS	• **137 stations** • **19% of 712 declared stations** • **6 countries** • **9% of 65 countries**	• **33 stations** • **6% of 568 declared stations** • **5 countries** • **8% of 71 countries**

The above table shows:

- a major increase of **315%** in the number of fixed SHF stations, from 33 to 137; and
- only the Europe & CIS region has declared fixed SHF stations, with a single administration possessing measurement and DF stations (a total of 14).

3.6.2 Mobile monitoring stations

e) How many mobile monitoring stations do you have?

f) Please provide a brief list of the facilities available in your mobile monitoring stations (for example: receivers, spectrum analysers, direction finding equipment)

g) What is the upper frequency limit of your mobile monitoring stations? --- MHz

h) What is the upper frequency limit of your mobile direction finding stations? --- MHz

The main function of mobile monitoring stations is to carry out all monitoring of emission characteristics that cannot be undertaken (easily) by fixed centres, either on account of the magnitude of the measurement in question, or of difficulties resulting from spectrum congestion or to locate the exact position of a transmission. This is particularly true for all monitoring carried out on frequencies above 30 MHz, where the low transmitter power, higher antenna directivity and, in particular, propagation characteristics make effective measurements from fixed positions impossible.

A detailed analysis of the number of mobile stations declared by the 60 administrations is given in **Annex 2-K**:

- Chart 3 (mobile measurement stations)
- Chart 4 (mobile radio direction-finding stations)

The results of the analysis are as follows:

Region	Mobile measurement stations (MS)		Mobile direction-finding stations		Ratio Mobile MS /Mobile DF
	Qty	% of total	Qty	% of total	
Africa	5	2%	7	2%	0.71
America	16	5%	15	5%	1.07
Asia-Pacific	86	28%	85	28%	1.01
Europe and CIS	194	63%	185	62%	1.05
Arab States	8	2%	8	3%	1
TOTALS	**309**	**100%**	**300**	**100%**	**1.03**

It may be noted that virtually all (97%) mobile stations have both measurement and DF capabilities.

In addition, the results show that four administrations (or 6%) have declared 192 stations between them, i.e. 62% of all declared mobile stations.

Region	Stations	% total	Administrations
Asia-Pacific	71	83	2 developing countries
Europe and CIS	121	62	2 developing countries 2 developed countries

3.6.2.1 HF stations

For the 2003 questionnaire, Part I, frequency bands between 960 MHz and 3 GHz, only three administrations declared mobile HF stations with exclusive DF functionality, for a total of 59 stations.

3.6.2.2 VHF/UHF stations

For VHF/UHF (20 MHz-3 GHz) mobile stations, three groups of stations may be distinguished, depending on the frequency bands.

Frequency band	Mobile Measurement Stations per Region					
	Africa	Americas	Asia & Pacific	Europe & CIS	Arab States	Total
20 MHz-1 GHz	5 (1%)	16 (5%)	86 (28%)	194 (63%)	8 (3%)	309 (100%)
1 GHz-2 GHz	3 (2%)	16 (8%)	13 (6%)	165 (82%)	4 (1%)	201 (100%)
2 GHz-3 GHz	1 (1%)	16 (8%)	8 (4%)	162 (85%)	4 (2%)	191 (100%)

In conclusion, it should be noted that the Europe and CIS region represents some 70% of all mobile stations declared, in all frequency bands.

3.6.2.3 SHF stations

The results of the analysis of the number of mobile SHF (> 3 GHz) stations declared under the 2003 questionnaire may be compared with those declared under the 2001 questionnaire.

Region	2003 Questionnaire	2001 Questionnaire
Africa	–	–
Americas	8 stations (up to 4 GHz)	9 stations (up to 40 GHz)
Asia-Pacific	–	–
Arab States	1 station (up to 18 GHz)	–
Europe and CIS	84 stations (up to 50 GHz)	55 stations (up to 105 GHz)
TOTALS	• **93 stations** • **30% of 309 mobile stations**	• **64 stations** • **11% of 600 mobile stations**

The data gathered leads to the following observations:

- Growth in the number of mobile SHF stations from 64 to 93, i.e. +145%.
- SHF mobile stations increased by 173%.
- Only two administrations (Europe and CIS) have mobile stations for measurement and DF: three in the range 20 MHz to 50 GHz and seven in the range 20 MHz to 20 GHz.

3.6.3 Transportable monitoring stations

i) How many transportable monitoring stations do you have?

j) Please provide a brief list of the facilities available in your transportable monitoring stations (for example: receivers, spectrum analysers, direction finding equipment)

k) What is the upper frequency limit of your transportable monitoring stations?

l) What is the upper frequency limit of your transportable direction finding stations?

This question concerns specifically transportable monitoring station systems, and was not present in the report on the 2001 questionnaire.

The results of the responses to the 2003 questionnaire that were received from the various administrations are presented in **Annex 2-K**.

Transportable monitoring stations are increasingly employed by administrations responsible for frequencies. They are used primarily for inspecting radio stations (licence compliance) and tracking down unauthorized or illegal transmitters. The results from the data received are presented in the table below.

Region	Transportable Measurement Stations (MS)		Transportable Direction-Finding Stations (DF)		Ratio Transportable MS/DF
	Quantity	% of Total	Quantity	% of Total	
Africa	8	2%	1	–	8
Americas	5	1%	6	1%	0.83
Asia-Pacific	306	79%	311	80%	0.98
Europe and CIS	67	17%	73	19%	0.92
Arab States	2	1%	–	–	–
TOTAL	**388**	**100%**	**391**	**100%**	**0.99**

Closer study shows that only **two administrations declared 345 transportable monitoring stations**.

Region	Transportable stations	% of total	Administrations
Asia-Pacific	300	0.98%	1 developing country
Europe and CIS	45	0.67%	1 developed country

These two administrations account for 89% of the overall market in transportable stations.

General observations

The responses which administrations provided to the 2003 questionnaire show an increase in the utilization of fixed monitoring stations by comparison with mobile monitoring stations:

$$\frac{\text{Fixed stations}}{\text{Mobile stations}} = \frac{712}{309} = 2.30$$

N.B.: The ratio in 2001 was as follows:

$$\frac{\text{Fixed stations}}{\text{Mobile stations}} = 0.94$$

It should be noted that the results from the 2001 questionnaire showed a total of 600 mobile stations, so that the ratio of mobile stations is:

$$\text{Ratio of mobile stations } \frac{2003}{2001} = 0.52\%$$

This difference may be due to the fact that 32 of the administrations which participated in the 2001 questionnaire did not do so by 1 January 2003.

For the SHF band, the results give the following ratio:

$$\frac{\text{Fixed stations}}{\text{Mobile stations}} = \frac{137}{93} = 1.47$$

N.B.: The ratio in 2001 was 2.24.

3.6.4 Space monitoring stations

m) Do you perform space monitoring?

n) Please provide a brief list of the facilities available at your space monitoring stations.

o) What tasks does your space monitoring station perform for GSO satellite monitoring?

p) What tasks does your space monitoring station perform for non-GSO satellite monitoring?

As with section 6.2 above, this is a new question not present in the 2001 questionnaire.

A total of **three** administrations responded to this question: China, Croatia and France. The responses are summarized below:

Space Monitoring

<table>
<tr><th colspan="3">China</th></tr>
<tr><td>Facilities</td><td colspan="2">Automatic measurement and analysis of signals (broadband receiver, vectorial signal analyser and C/Ku band antenna), location of interference sources (SATID) by means of fixed stations monitoring space emissions.</td></tr>
<tr><td>Tasks for GSO</td><td colspan="2">–</td></tr>
<tr><td>Tasks for non-GSO</td><td colspan="2">–</td></tr>
<tr><th colspan="3">Croatia</th></tr>
<tr><td>Facilities</td><td colspan="2">Monitoring of technical parameters and content</td></tr>
<tr><td>Tasks for GSO</td><td colspan="2">–</td></tr>
<tr><td>Tasks for non-GSO</td><td colspan="2">–</td></tr>
<tr><th colspan="3">France</th></tr>
<tr><td rowspan="6">Facilities</td><td colspan="2">The agency does not have its own resources for monitoring space transmissions. Since 2001 it has worked by agreement with the German Leeheim station, with which a cooperation MOU has just been signed for several years, covering the monitoring of satellites within the CEPT jurisdiction.
The Leeheim station consists primarily of three receiving antennas covering the range 130 MHz-12.75 GHz and a control room housing the measuring and computing systems.</td></tr>
<tr><td>Main activites conducted at Leeheim</td><td>% of workload</td></tr>
<tr><td>Assistance with satellite network</td><td>20%</td></tr>
<tr><td>Dealing with interference</td><td>20%</td></tr>
<tr><td>Monitoring</td><td>60%</td></tr>
<tr><td colspan="2">The centre conducts observations of existing satellite systems. It also deals with requests for compatibility testing prior to satellite launches.</td></tr>
<tr><td>Tasks for GSO</td><td colspan="2">The Leeheim station conducts the following basic operations for the agency
• scanning an orbit or frequency band
• creating identity files for satellites
• monitoring satellite position</td></tr>
<tr><td>Tasks for non-GSO</td><td colspan="2">For non-GSO satellites the agency’s work involves mainly:
• measuring pfd
• calculating trajectories
• signal demodulation</td></tr>
</table>

Radio monitoring requires hardware (e.g. earth stations) associated with a very high cost and advanced component technology, completely different from that used for HF, VHF or UHF.

Further to the response provided by France, various CEPT countries are working towards a Memorandum of Understanding (MOU) with the German Administration for joint use of the Leeheim station.

q) Participation of administrations in the International Monitoring Programme of ITU

Fifty-nine administrations responded to this question (see **Annex 5.2**). From the responses, only 50 provided useful information, which is summarized below:

Region	RESPONSES (International Monitoring Programme)				
	Total	Positive		Negative	
		Quantity	% of total	Quantity	% of total
Africa	11	1	9%	10	91%
Americas	7	3	43%	4	57%
Asia-Pacific	6	1	17%	5	83%
Europe and CIS	21	8	38%	13	62%
Arab States	5	–	–	5	100%
TOTAL	**50**	**13**	**22%**	**37**	**78%**

By way of a conclusion, it may be observed that only **28%** of responding administrations stated that they participate in the International Monitoring Programme, representing **29%** of all ITU Member States.

The results for the various administrations analysed by development region and category are given below.

Region	Developed	Developing	Least developed	Total	% of responses
Africa	–	Y = 0 N = 4	Y = 1 N = 6	Y = 1 N = 10	Y = 9% N = 91%
Americas	Y = 1	Y = 2 N = 4	–	Y = 3 N = 4	Y = 43% N = 57%
Asia-Pacific	–	Y = 1 N = 3	N = 2	Y = 1 N = 5	Y = 17% N = 83%
Europe and CIS	Y = 4 N = 2	Y = 4 N = 11	–	Y = 7 N = 13	Y = 38% N = 62%
Arab States	–	N = 5	–	N = 100	N = 100%
TOTAL	**Y = 5 N = 2**	**Y = 7 N = 27**	**Y = 1 N = 8**		
% of responses	Y = 77% N = 23%	Y = 21% N = 79%	Y = 13% N = 87%		

r) Cooperation between spectrum management and monitoring

Please indicate the amount of work (in percentages) performed by the monitoring service for:

s) frequency management department

t) enforcement department

u) licence department

The results of the analysis of the responses sent in by the different administrations (a total of 40 usable answers were received) are given in **Annex 2-L**.

Region	Countries	Average score, by department		
		Frequency management	Enforcement	Licence
Africa	8	28.62%	40.75%	30.63%
Americas	6	33.33%	39.17%	27.50%
Aisa-Pacific	4	37.50%	37.50%	25.00%
Europe and CIS	19	36.95%	35.58%	27.47%
Arab States	3	33.33%	21.67%	45%
TOTAL	**40**	**34%**	**35%**	**31%**

These results lead to the conclusion that, overall, the monitoring service provides support on a roughly equal basis of one third each to the frequency management, enforcement and licence department.

Inspection of radio stations

Q.13: Do you perform Inspections on Radio Stations?

The purpose of inspecting radio stations is to verify that radio stations, whether new or existing, comply fully with the technical requirements stipulated in their licences, in particular, that any new station does not cause unacceptable interference to existing stations in operations.

Result statistics

Annex 2-M gives the results country by country, for 71 administrations.

A synopsis of the results by region and by category of economic development is given in the table below.

Region	Developed	Developing	Least developed	Total	% of responses
Africa	–	Y = 6	Y = 6 N = 4	Y = 12 N = 4	Y = 75% N = 25%
Americas	N = 1	Y = 11 N = 2	–	Y = 11 N = 3	Y = 79% N = 21%
Asia-Pacific	–	Y = 5	Y = 2	Y = 7	Y = 100%
Europe and CIS	Y = 9	Y = 20	–	Y = 29	Y = 100%
Arab States	–	Y = 5	–	Y = 5	Y = 100%
TOTAL	**Y = 9 N = 1**	**Y = 47 N = 2**	**Y = 8 N = 4**	**Y = 64 N = 7**	**Y = 90% N = 10%**
% of responses	14%	69%	17%		

The results in the above table show that 90% of administrations conduct inspections of radio station sites.

Question 13 was expanded into subsidiary questions a) to e) to discover the exact administrative, legal and technical resources which administrations have at their disposal to ensure radio station inspections are carried out in the best possible manner.

a) What inspection techniques are used by your administration to determine that users of the spectrum are complying with national or international requirements?

From the 64 administrations which responded positively to the question on radio station inspection, we received 71 responses to point a), of which 60 could be used, due to certain administrations (8) which did not reply to point a) and three others which replied in the negative were all LDCs.

From an examination of the responses listed in **Annex 2-L** for item a), the following conclusions may be drawn. All the administrations that conduct radio station inspections do so in accordance with national legislation and regulations, using the technical means at their disposal to verify that station facilities are in full compliance with the technical requirements stipulated in their transmission licences.

b) What are the administrative procedures that determine your inspection policy (for example the number of inspections, type of notification provided prior to inspection, rules and regulations)?

From the responses sent in by 77 administrations, **only 49 could be used (71%)** for this item, for the following reasons:

- 18 administrations did not reply:

Region	Developed	Developing	Least developed
Africa	–	2	7
Americas	–	1	–
Asia-Pacific	–	1	1
Europe and CIS[3]	1	3	–
Arab States	–	2	–
TOTAL	**1**	**9**	**8**

- 5 administrations replied in the negative: 1 developed country and one developing from Americas, 1 Least Developed Country and one developing country from Africa, 1 developing country from Europe

From the analysis of the responses given in **Annex 2-M**, the following conclusion may be reached.

The vast majority of administrations bases its inspection policy for radio stations on the laws and regulations that are applicable on the national territory, using technical monitoring of stations with the means at their disposal with respect to licensing.

c) What measurement equipment does your administration use to perform technical measurements at an inspection?

To carry out technical measures relating to radio station inspections, administrations require suitable technical equipment. Positive replies were received from 54 administrations, while:

- fourteen administrations did not reply

Region	Developed	Developing	Least developed
Africa			5
Americas		2	1
Asia-Pacific			
Europe and CIS	1	3	–
Arab States	–	2	–
TOTAL	**1**	**7**	**6**

- two administrations (one developed from Americas and one least developed from Africa) stated that a) did not apply to them
- one least developed administration from Africa stated that it lacked the technical equipment

[3] CIS: Commonwealth of Independent States

It may be noted that the positive responses show that a great variety of measuring equipment is in use by administrations, but the most popular are spectrum analyzers, frequency meters and wattmeters, in addition to portable receivers or DF units, occasionally. Naturally, administrations also use mobile monitoring stations.

d) What technical parameters does your administration measure when inspecting a radio system?

The responses sent in by administrations included 58 which could be used, compared to:

- twelve administrations which did not reply, and

Region	Developed	Developing	Least developed
Africa	–	–	4
Americas	–	1	–
Asia-Pacific	–	–	–
Europe and CIS	1	3	–
Arab States	–	2	–
TOTAL	**1**	**6**	**5**

- one administration (a developing country from the Americas) which replied in the negative.

The positive responses are given in **Annex 2-M**. They show a great variety in the technical parameters that are measured when inspecting radio systems, but in general they fall under the inspection parameters recommended by ITU-R. The vast majority of administrations state that the parameters verified as a priority are **frequency, power and bandwidth (80%)**.

e) What station records does your administration review when inspecting a radio station?

Out of the 71 administrations which replied to the general question about radio station inspection, only 50 valid replies were received for question e), because

- seventeen administrations did not reply

Region	Developed	Developing	Least developed
Africa	–	2	4
Americas	–	2	–
Asia-Pacific	–	1	1
Europe and CIS	2	3	–
Arab States	–	2	–
TOTAL	**2**	**10**	**5**

- four administrations replied in the negative:
  - 1 developed from Europe (deregulation)
  - 1 least developed from Africa (lack of resources)
  - 2 developing from Americas

Without exception, the 50 administrations which provided a positive response stated that they use the technical and administrative information contained in the licences or frequency assignment databases and compare them to technical parameters measured in the field.

Q.14.1: Do you perform technical analyses of radio frequency interference complaints?

The response to this question makes it possible to assess how administrations handle interference complaints: administratively only or technically as well.

Result statistics

Annex 14 gives the responses received from a total of 69 administrations.

A synopsis of the results by region and by economic status is given below.

Region	Developed	Developing	Least developed	Total	% of responses
Africa	–	Y = 6	Y = 7 N = 1	Y = 13 N = 1	Y = 93% N = 7%
Americas	Y = 1	Y = 11 N = 1	–	Y = 13 N = 1	Y = 33% N = 7%
Asia-Pacific	–	Y = 5	Y = 2	Y = 7	Y = 100%
Europe and CIS	Y = 9	Y = 17 N = 1	–	Y = 26 N = 1	Y = 96% N = 4%
Arab States	–	Y = 7	–	Y = 7	Y = 100%
TOTAL	**Y = 10**	**Y = 47 N = 2**	**Y = 9 N = 1**	**Y = 66 N = 3**	**Y = 96% N = 4%**
% of responses	14%	72%	14%		

96% of administrations carry out technical studies in response to interference complaints.

Another question was raised under item 14 of the questionnaire:

Q.14.2: Do you have an established consultation process, involving Government and non-government organization, for resolving these complaints?

The reply statistics are given in **Annex 14** by administration (total of 68). A synopsis of the results by region and by economic status is given below.

Region	Developed	Developing	Least developed	Total	% of responses
Africa	–	Y = 4 N = 2	Y = 1 N = 7	Y = 5 N = 9	Y = 36% N = 64%
Americas	Y = 1	Y = 6 N = 6	–	Y = 7 N = 6	Y = 54% N = 46%
Asia-Pacific	–	Y = 3 N = 2	Y = 1 N = 1	Y = 4 N = 3	Y = 57% N = 43%
Europe and CIS	Y = 6 N = 3	Y = 11 N = 7	–	Y = 17 N = 10	Y = 63% N = 37%
Arab States	–	Y = 4 N = 3	–	Y = 4 N = 3	Y = 57% N = 43%
TOTAL	**Y = 7 N = 3**	**Y = 28 N = 20**	**Y = 2 N = 8**	**Y = 37 N = 31**	**Y = 54% N = 46%**
% of responses	14%	72%	14%		

It is observed that only 54% of administrations responded in the affirmative.

3.7 Handbooks and reports

Question 17 is worded as follows: Do you use the ITU-R Handbooks and Reports on:

a) National Spectrum Management, version 1995?

b) Spectrum Monitoring, version 2002?

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

d) Report SM.2012-1, Economic Aspects of Spectrum Management, version 2000?

ITU-R handbooks and reports are published to help frequency managers in the performance of their duties. The objective of this question is to determine to what extent, and at what level, these documents are used by administrations.

Eighty countries replied, i.e. some 42% of ITU Member States. Not all of those replies addressed the question adequately, unfortunately. Useful results (those that are sufficiently detailed and unambiguous) are available on:

- Question a): 64 replies
- Question b): 59 replies
- Question c): 60 replies
- Question d): 60 replies

A breakdown of responses by country, with distribution, is given in **Annex 2-N, section 1 and 2**.

ANALYSIS OF RESPONSES

Analysis of the responses allows the following conclusions to be drawn:

i) With respect to question a), 78% of the responding countries stated that they used the National Spectrum Management handbook (1995 version). This indicates a good level of utilization. This is the most widely used of all the handbooks.

ii) The Spectrum Monitoring handbook (2002 version) is little used. Almost 56% of responding countries are not using it at the moment. It should be pointed out that the French-language version of the document has not yet been published by ITU. Only five francophone countries were among those that stated they were using this handbook. In the future, it should be verified that a document is available in the appropriate versions, to avoid obtaining distorted results in response to such a question.

iii) Utilization of the handbook "Computer-aided Techniques for Spectrum Management" (1999 version) remains weak, at some 42%. This is the handbook which is used least widely.

iv) Report SM.2012-1 ("Economic Aspects of Spectrum Management") (2000 version) meets a current need, but also a need that was expressed by developing countries in general. Against this background, its level of utilization, at merely 52%, is disappointing.

A number of countries stated that they had taken steps to acquire handbooks which they did not have in their possession.

3.8 Problems

Question 18: Identification of problems experienced in national spectrum management.

Please use the following table to describe problems experienced by your administration in national spectrum management. This information will be used by the ITU, in particular ITU-R Study Group 1, to identify future areas of work, within the normal study programme, so that effort may be focused on the development of recommendations and reports for subjects where assistance is most needed.

This question is a summary of the problems as identified by the responses for all questions.

A detailed overview of all responses to this question is in **Annex 2-O**.

In analysing the responses to this question it can be noted that there is a variety of topics indicated.

The responses can be divided in a number of categories:

- Sometimes remarks are given to improve some situations;
- In other cases one can find real questions for explanation or requests for information on experiences by other administrations;
- In many cases it is indicated that a certain activity cannot or hardly not performed because of:
  - the lack of experienced staff;
  - even the lack of staff;
  - lack of sufficient equipment (both hard- and software).

It is for this latter part of responses that many times the assistance of the ITU is asked for.

In the case of legislation one can find responses varying from not having a telecom law, the modification of the telecom law due to the development of new technology to the difficulties in the development of secondary legislation in telecommunications.

In case of planning functions many of the responses indicated that, due to the lack of sufficient hard- and software for a computerized frequency management system, this is a difficult problem for administrations.

Regarding AASMS (Advanced Automated Spectrum Management System) and WinBASMS one can find requests to improve WinBASMS and questions for more explanation for the first system.

To perform monitoring it is in many cases indicated that a substantial improvement of the facilities are needed. In many cases, the lack of monitoring equipment is hampering the overall process of good spectrum management.

Administrations also remarked that they were having difficulties in solving national interference problems and how to overcome interferences from stations in neighbouring countries.

There were recommendations to organize regional seminars on the various topics.

Last but not least there were requests for training courses for specialists on various spectrum management topics.

ANNEX 1-A

Index of submitters and designated focal points

(last revised July 9, 2003)

NOTE 1 – The individuals listed are designated focal points only for information relevant to the two WTDC Resolution 9 questionnaires that have been issued (ITU-D CA/08 and ITU-R CA/71 for Phase 1; ITU-D CA-12 and ITU-R CA-120 for Phase 2); requests for other information should be directed to the official ITU contact for Member States that is listed in the ITU Global Directory.

NOTE 2 – All of the information submitted in response the questionnaires can be found for Phase 1 (27.5-960 MHz) at:

http://www.itu.int/ITU-D/study_groups/SGP_1998-2002/JGRES09/Res9_Index.html

and for Phase 2 (960-3 000 MHz) at:

http://www.itu.int/ITU-D/study_groups/SGP_2002-2006/JGRES09/Res9_Index.html

SUBMITTING ADMINISTRATION or ORGANIZATION ITU Code/Region	PHASE 1 RESPONSES INCLUDE Parts I/II	PHASE 2 RESPONSES INCLUDE Parts I/II/III	FOCAL POINTS DESIGNATED BY THE SUBMITTERS	Formats used: Word--*.doc Spreadsheet--*.xls Scanned--*.pdf Power Point--*.ppt Image--*.gif Publisher--*.pub Compressed--*.zip	Language of submission Phone # Fax # Email address Link to Webpage
Albania ALB/1	–	I/II/III	Loreta Andoni Radiocommunication Specialist Ministry of Transport and Telecommunication Scanderbeg Square, Tirana, Albania	*.doc	Submission in English Ph: +355 682 220903 Fx: +355 423 3772 loandoni@hotmail.com
Algeria ALG/1	I/II	–	Houria Khenchelaoui Sous-Directeur de la Reglementation des Services Radio Ministere des P et T L1, Bol Krim Belkacem, Alger, Algeria	*.pdf	Submission in French Ph: 271 1220 Fx: 272 4957

Angola AGL/1	–	I/II/III	Domingos Pedro António Directeur Général Adjoint INACOM – Institut Angolais des Communications Av de Portugal, 92 –7° andar, Luanda, Angola	*.doc	Submission in French Ph: 002 44 2 338352 Fx: 002 44 2 339356 incom.dg@netangola.com
Antigua-and-Barbuda ATG/2	–	I/II/III	Eustace Phillip Telecommunications Officer Ministry of Public Works and Communications St. John's Street, St. John's, Antigua and Barbuda	*.doc	Submission in English Ph: 268 562 1868 Fx: 268 562 1872 phillipe@candw.ag
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Armenia ARM/1	I/II		Phase 1 Arthur Andreassyan Administrative Director Armenia/Republican Center of Telecommunications SCJSC Ministry of Posts and Telecommunications 2, Mkhitar Heratsi Str. Yerevan 375025 Republic of Armenia	*.doc	Submission in English Ph: 3742 52 79 22 Fx: 3742 52 60 32

		I/II/III	Phase 2 Ashot Verdyan Director Republican Centre of Telecommunications – closed stock company 29, Tbilisian Highway Yerevan, 3750941 Republic of Armenia	*.doc	Submission in English Ph: 374 1 28 87 17 Fx: 374 1 28 86 83 ether@web.am
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Bahamas BAH/2	–	I/II/III	John Halkitis Senior Telecommunications Engineer Public Utilities Commission Fourth Terrace, East, Collins Avenue P.O. Box N-4860 Nassau, Bahamas	*.doc	Submission in English Ph: 1 242 322 4437 Fx: 1 242 323 7288 ahalkitis@PUCBahamas.gov.bs Note: Bahamas uses the ITU Region 2 and the United States Spectrum Allocation Tables
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Belarus BLR/1	II	–	Anatoly Budai First Deputy Minister Ministry of Posts and Telecommunications 10 Skoryna Ave. 220050 Minsk, Republic of Belarus	*.pdf	Submission in English Ph: 375 172 272 526 Fx: 375 172 260 848 SRFC@mpt.gov.by
Belgium BEL/1	II	–	Michael Vanroogenbroek Ingenieur – Conseiller IBPT Ave. de l'Astronomie 14 Bte 21 B-1210 Bruxelles, Belgique	*.pdf	Submission is in French Ph: +32 2 226 8800 Fx: +32 2 226 8882 michael.vandroogenbroek@ibpt.be
Belize BLZ/2	I/II	–	Clifford M. Slusher Director Office of Telecommunication P.O. Box 310 Belize City, Belize	*.pdf	Submission in English Ph: 501 2 24938 Fx: 501 2 24939
Bhutan BTN/3	–	I/II/III			

Bolivia BOL/2	I/II	–	Jose Alfredo Arce Jofre Director General de Comunicaciones Direccion General de Comunicaciones Avenida Mariscal Santa Cruz, Esquina Oruro, Edificio Palacio de Comunicaciones, Piso 4 Bolivia	*.doc	Submission in Spanish Ph: 591 2 378129 Fx: 591 2 371360 mtccom@caoba.entelnet.bo
Bosnia and Herzegovina BIH/1	–	I/II	Ms. Krivosic Amina Expert in Spectrum Division of CRA Communication Regulatory Agency 10, Vilsonovo setaliste 71000 Sarajevo Bosnia and Herzegovina	*.doc	Submission in English Ph: 387 33 250600 Fx: 387 33 713 080 akrivosic@cra.ba
Botswana BOT/1	–	I/II/III	Tshoganetso Kepaletswe Chief Engineer, Radio Services Botswana Telecommunication Authority Plot 206 & 207 Independence Avenue Private Bag 00495 Gaborone, Botswana		Submission in English Ph: 267 395 7755 Fx: 267 395 7976 kepaletswe@bta.org.bw
Brazil B/2	I/II	–	Haroldo Motta Engineer Agencia Nacional de Telecomunicações – ANATEL SAS – Quadra 6 Bloco H, 6^0 Andar Brazilia – DF, Brazil 70 313-900	*.zip *.doc	Submission partly in Spanish (Part 1) and partly in English (Focal point and Part 2) Ph: 55 61 312 2373 Fx: 55 61 312 2328 haroldo@anatel.gov.br

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Burundi BDI/1	I/II	I/II/III	Phase 1 Constaque Hakizimana Chef de Service Technique A.R.C.T Bujumbino Avenue Bururi No. 5 BP 6702 Burundi	*.pdf-Phase 1 *.doc-Phase 2	Submission in French and provides some specific assignments Ph: 257 210276 Fx: 257 210269

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Canada CAN/2	I/II	I/II/III	Phase 1 Thomas Racine Director, Automated Spectrum Management Systems Industry Canada 300 Slater Street, Rm B1240 Ottawa, Ontario Canada K1A0C8	*.doc	Submission in English Ph: +1 613 990 4767 Fx: +1 613 990 7287 racine.thomas@ic.gc.ca

			Phase 2 Barry Isherwood International Regulations Officer Industry Canada 300 Slater Street, Rm 1538B Ottawa, Ontario Canada K1A0C8	*.doc	Further information can be found at http://strategis.ic.gc.ca/SSG/sf01608e.html Submission in English Ph: +1 (513) 998 3778 Fx: +1 (613) 952 9871 isherwood.barry@ic.gc.ca
Central Africa, Republic of CAF/1	–	I/II/III	Josue Yongoro Chargé de Mission Ministère des postes et télécommunications Rue Gallieni, Bangui République Centrafricaine	*.doc	Submission in French Ph: +236 615 622 Fx: +236 612 313 yongoro@intnet.cf
CEPT/ERC	I	I	Phase 1 and Phase 2 Reiner Liebler Chairman ECC WG FM Regulatory Authority for Telecommunications and Posts P.O. Box 80 01 D – 55003 Mainz Germany	*.pdf *.doc	The submission is an extract of ERC Report 25 that can be found in its entirety at http://www.ero.dk/documentation/docs/doc98/official/pdf/REP025.PDF Ph: +49 6131 18 3110 Fx: +49 6131 18 5604 reiner.liebler@regtp.de
Chad TCD/1	II	–	Guirdonan Mogalbaye Office national des postes et télécommunications	*.pdf	Submission in French

Chile CHL/2	–	I/II/III	Pezoa Lizama Claudio Jefe Departmento Ingeniería y Adminstración del Espectro Radioeléctrico Subsecretaria de Telecomunicaciones Amunategui 139 Santiago, Chile	*.doc	Submission in Spanish Ph: 56 2 421 3665 Fx: 56 2 421 3549 cpezoa@subtle.cl
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Croatia HRV/1	I/II	I/II/III	Phase 1 DOMINIK FILIPOVIĆ Director Croatian Institute of Telecommunications Prisavlje 14, HR-10000 Zagreb Croatia Phase 2 Ante Dodig Director Croatian Institute for Telecommunications Jurisiceva 13 HR-10000 Zagreb Croatia	*.doc *.doc	Submission in English Ph: + 385 1 616 91 10 Fx: + 385 1 619 66 62 dominik.filipovic@telekom.hr Submission in English Ph: 381 148 96000 Fx: 385 149 20227 info@telekom.hr

Cuba CUB/2	–	I/II	Jesús Antonio Gonzalez Vidal Ingeniero Especialista Superior Ministerio de la Informatica y las Comunicaciones MIC Plaza de la Revolucion Ave. Rancho Boyeros y 19 de Mayo La Habana, Cuba	*.doc	Submission in Spanish Ph: +537 668 039 Fx: +537 335 193 jesus@mic.cu
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Mauritania MTN/1	–	I/II/III	Mohamed Vadel Ould Taabou Responsable chargé du contrôle et de la gestion du spectre des fréquences 14 Ilot z, Nouakchott, Mauritanie	*.doc	Submission in French Ph: +222 529 1270 529 4038 Fx: +222 529 1279 tabouv@yahoo.fr
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Ukraine UKR/1	–	I/II/		*.doc	
United Arab Emirates UAE/1	I/II	I/II/III	Phase 1 Sultan Ali Hassan Al Marzouki A/Director, Department of Telecommunication Ministry of Communication P.O. Box 900 Abu Dhabi, United Arab Emirates	*.pdf	Submission in English Ph: 00 97 12 662 909 Fx: 00 97 12 668 180

			Phase 2 Mohamed Mohamed Abd Allah A/D Telecommunication Department Ministry of Communications P.O. Box 900 Abu Dhabl, United Arab Emirates	*.doc	Submission in English Ph: 00 97 1269 111 22 Fx: 00 97 1266 681 80 engrhassan@moc.uae.gov.ae
United Kingdom G/1	I/II	I/II/III	Phase 1 Terry Jeacock Office of Communications (Ofcom) Riverside House 2A Southwark Bridge Road London SE1 9SX United Kingdom Phase 2 Howard Del Monte Contact T. G. Jeacock using the details given above	*.zip *.doc *.gif *.doc	Submission in English Ph: +44 (0)207 7834294 terence.jeacock@ties.itu.int Submission in English

United States USA/2	I/II	I/II	Phase 1 and Phase 2 William Luther (non-Federal Government issues) Chief, Radiocommunication Policy Federal Communications Commission Washington, DC USA Norbert Schroeder (Federal Government issues) Chief, Strategic Spectrum Planning and Policy Reform Division National Telecommunications and Information Administration Department of Commerce Washington, DC, 20230 USA	*.doc	Submission in English Ph: 202 418 0729 Fx: 202 418 7270 wluther@fcc.gov Ph: +202 482 6207 Fx: +202 501 6198 nschroeder@ntia.doc.gov
Uzbekistan UZB/1	–	I/II/III	Mayram Khalmuratova Deputy Chairman State Committee for Radio Frequencies of the Republic of Uzbekistan 700000 Tashkent Alexsey Tolstoy Street 1 Uzbekistan	*.doc	Submission in English Ph: 998 71 137 45 16 Fx: 998 71 133 16 95 scr@uzpak.uz

Venezuela VEN/2	–	I/II/III	Rita C. Hermosa M Ingeniero CONATEL Ave. Veracruz c/c Cali, Edificio CONATEL Las Mercedes Caracas, Venezuela	*.doc	Réponse présentée en espagnol Tél.: +58 212 9090 527 Fax: +58 212 9935 389 rhermoso@conotel.gov.ve http://www.conatel.gov.ve/ns/downloads/marco_legal/CUNABAF%20Extraordinaria.zip
Viet Nam VTN/2	I/II	I/II/III	Phase 1 Luu Van Luong Director General Radio Frequency Department (DGPT) 18 Nguyen Du Street Hanoi, Vietnam Phase 2 Quan Hoan Doan Deputy Director General Radio Frequency Department 18 Nguyen Du Street Hanoi, Viet Nam	*.pdf	Submission in English Ph: 84 4 822 6732 Fx: 84 4 822 6930 Submission in English Ph: 84 44 43 4704 Fx: 84 48 22 6910

ANNEX 1-B

Table 1 – Extract from the submission of Albania

Frequency Band	RR Region 1 Allocation and Relevant Footnotes	European Common Allocation	Major Utilization	Notes	Albanian Allocation	Utilization, Users in Albania
942-960 MHz	FIXED MOBILE except aeronautical mobile BROADCASTING S5.322 S5.323	MOBILE S5.323	GSM Existing cellular networks	EU13 ERC Decision ERC/DEC/(94)01, FB paired with 897-915 MHz	MOBILE S5.323	GSM CIVIL/TRE
960-1 215 MHz	AERONAUTICAL RADIONAVIGATION S5.328	AERONAUTICAL RADIONAVIGATION S5.328	Flight, Safety, Navigation and Information Distribution Systems (for example, DME, TACAN, SSR, MIDS)		AERONAUTICAL RADIONAVIGATION S5.328	Flight, Safety, Navigation and Information Distribution Systems (for example, DME, TACAN, SSR, MIDS) CIVIL/TRE **A37: Fixed service should be terminated prior to 2003.**

Frequency Band	RR Region 1 Allocation and Relevant Footnotes	European Common Allocation	Major Utilization	Notes	Albanian Allocation	Utilization, Users in Albania
1 215-1 240 MHz	EARTH EXPLORATION SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space to Earth) S5.329 SPACE RESEARCH (active) S5.330 S5.331 5.332	RADIOLOCATION RADIONAVIGATION-SATELLITE (space to Earth) S5.329 EARTH EXPLORATION SATELLITE (active) SPACE RESEARCH (active) RADIONAVIGATION S5.331 S5.332	Radar and Navigation Systems and Active Sensors; GNSS		RADIOLOCATION RADIONAVIGATION-SATELLITE (space to Earth) S5.329 EARTH EXPLORATION SATELLITE (active) SPACE RESEARCH (active) RADIONAVIGATION S5.331 S5.332	Radar and Navigation Systems and Active Sensors; GNSS CIVIL/TRE **A38: The operation of governmental users should be terminated prior to 2004.** **A39: Fixed services should be terminated prior to 2003.**

ANNEX 1-C

Table 2 – Extract from the submission of the United Kingdom

International Region 1 Allocation	European Common Allocation Table Report 25	UK Allocations	Current Use	Strategy
1 240-1 260 MHz EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (s→E) (s→s) SPACE RESEARCH (active) RADIONAVIGATION-SATELLITE (s→E) (s→s) S5.329, S5.329A Amateur S5.330, S5.331, S5.332, S5.334, S5.335	1 240-1 260 MHz RADIOLOCATION RADIONAVIGATION-SATELLITE (s→E) EARTH EXPLORATION SATELLITE (active) SPACE RESEARCH (active) RADIONAVIGATION Amateur S5.329, S5.331, S5.332	1 240-1 260 MHz EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE S5.329 SPACE RESEARCH (active) Amateur S5.332	AMATEUR Amateur secondary at powers of up to 26 dBW PEP (into the antenna) for many modes including packet, TV, Morse, etc. Amateur services are permitted on a non-interference basis. AERONAUTICAL/MoD 1 215-1 365 MHz – Naval and air defence radars. 1 164-1 300 MHz – RNSS allocation identified at WRC-2000. Civil and military radar, video radar data and security devices. WRC-97 accepted wind profiler radars on site protection basis. Spaceborne radiolocation for Earth exploration.	The Agency is currently looking into the possibility of permitting the use of spread spectrum techniques in the amateur service. Protection of existing services and aircraft systems from interference effects. Possible use by the European Galileo initiative. Monitor ICAO and European developments. Introduction of wind profiler radars to be monitored.

ANNEX 1-D

Table 3 – Extract from the submission of the US Federal Government

Band MHz	Government Allocation(s)	Government Allocations by Footnote	Government Usage	Planned Usage
1 215-1 240	RADIOLOCATION RADIONAVIGATION-SATELLITE(space-to-Earth) EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) S5.332 G56	None	**Surveillance Radars.** This band is jointly used by the FAA and DOD for radiolocation performing long-range air surveillance and safety-of-flight enroute air traffic control under Joint Surveillance System agreements. The military services make use of the band for high-power long-range surveillance radars on land and ships in support of national defense missions. The DOD and FAA recently deployed a modernized Air-Route Surveillance Radar Model 4 (ARSR-4) in this band for air-defense, drug interdiction and air-traffic control. **GPS.** The frequency 1 227.6 MHz 12 MHz is designated for the Global Positioning System (GPS) as part of the radionavigation satellite service. This is a 24B satellite constellation system with large numbers of U.S. and international users. **Drug Interdiction.** In this application, radar equipment is mounted on tethered balloons along the southern border of the U.S. to detect low-flying aircraft entering U.S. airspace.	Use expected to increase. Awaiting IRAC approval of AH 206 recommended implementation of WRC-2000 allocation changes: 1) to add ITU footnotes (S5.330 and S5.331); and 2) to add RADIONAVIGATION-SATELLITE (space-to-space).

Band MHz	Government Allocation(s)	Government Allocations by Footnote	Government Usage	Planned Usage
			NASA. Space research and Earth exploration-satellite activities for active microwave sensor measurements of geological surfaces and ocean wave structure are performed by NASA.	
1 240-1 260	RADIOLOCATION EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) S5.332 S5.334 S5.335 G56	AERONAUTICAL RADIONAVIGATION S5.334	Surveillance Radars. This band is jointly used by the FAA and DOD for radiolocation performing long-range air surveillance and safety-of-flight enroute air traffic control under Joint Surveillance System agreements. The military services make use of the band for high-power long-range surveillance radars on land and ships in support of national defense missions. The DOD and FAA recently deployed a modernized Air-Route Surveillance Radar Model 4 (ARSR-4) in this band for air-defense, drug interdiction and air-traffic control. NASA Research. Space research and Earth exploration-satellite studies of geological surfaces and ocean wave structures are done by NASA using active microwave sensor systems.	Use expected to increase. Awaiting IRAC approval of AH 206 recommended implementation of WRC-2000 allocation changes: 1) to add ITU footnotes (S5.330 and S5.331); and 2) to add RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space).

ANNEX 1-E

Table 4 – Extract from the submission of the Czech Republic

(CZE)

960-1 215 MHz

Frequency band	According to RR	National allocation	Responsible entity	Remarks
960-1 145	AERONAUTICAL RADIONAVIGATION 5.328	AERONAUTICAL RADIONAVIGATION 5.328 [2] [6]	[2] TA [6] MD	Navigation system TACAN. DME equipment linked with the portion 108-118 MHz (ILS-LLZ and VOR) and 328.6-335.4 MHz (ILS-GP).
1 145-1 215	5.328A	AERONAUTICAL RADIONAVIGATION 5.328 [2] [6] Fixed [7] CZ12 5.328A	[2] TA [6] MD [7] pol	Navigation system TACAN. DME equipment, linked with the portion 108-118 MHz (ILS-LLZ and VOR) and 328.6-335.4 MHz (ILS-GP).

ANNEX 2-A

Question 1: Regulatory texts

Administration	Region	Development Status	Q.1 Reg Texts	Q.1 Changes	Q.1 Change Comment
Botswana	Africa	Developping	Telecommunication Act, 1996 [No.15 of 1996]	No	–
Burundi	Africa	Least Developed	Ministerial directive n° 520/730/540/231 of 9 April 1999 sets forth the conditions for conducting operations in the telecommunications sector. An act of the legislature n° 1/011 of 04/09/1997 makes formal provisions regarding telecommunication	Yes	–
Burkina Faso	Africa	Least Developed	Law n° 0051/98/AN of 04/12/1998 and the associated decision n° 001/MC/MEF of 28/09/2000 Burkina Faso	Yes	–
Cameroon	Africa	Developping	Law n° 67/LF/of 12 June 1967 regulating private radio and establishing an associated system of rates – Law n° 98/014 of 14 July 1998 governing telecommunications in Cameroon – Associated decision n° 00080/MINEFI/MINPT of 20 February 2002 concerning rights, rates, contributions and fees received by the "Agence de Régulation des Télécommunications"	No	–
Central African Republic	Africa	Least Developed	Decision N° 011/Mtacpt.Cab.Sg.Dgsocatel	Yes	–
Comoros	Africa	Least Developed	There are as yet no legal or regulatory provisions governing spectrum management in our country. Regulatory texts (a presidential decree and ministerial decisions) have been elaborated since July 2002 but have not yet adopted by the political decision makers.	No	–
Côte d'Ivoire	Africa	Developping	Law n° 95-526 of 07-07-1995; directive n° 97-173 of 18 March 97 and decree n° 97-391	Yes	–
Eritrea	Africa	Least Developed	Proclamation no.102/08 on National Telecom policy	Yes	–
Ethiopia	Africa	Least Developed	Telecommunication Services, Council of Ministers, Regulation No. 47/1999	No	–
Lesotho	Africa	Least Developed	Lesotho Telecommunications Authority Act of 2000.	No	–
Madagascar	Africa	Least Developed	Law 96-034 and the associated decree 99-228.	Yes	
Mali	Africa	Least Developed	Directive No. 99-043/P-RM of 30/9/99.	Yes	–
Mauritania	Africa	Least Developed	Law N° 99-019 of 11/07/1999 concerning telecommunications, and the associated decisions on its application (decision N° R134/MIPT of 28/02/2001 and R138/MIPT of 04/03/2001)	Yes	–

Administration	Region	Development Status	Q.1 Reg Texts	Q.1 Changes	Q.1 Change Comment
Mauritius	Africa	Developing	Information and Communication Technologies Authority	No	
Niger	Africa	Least Developed	Decision N° 99-045 , decree N°2000-370/PRN/MC, decision N° 0006/MC/DRP	Yes	–
Rwanda	Africa	Least Developed	Regulatory agency	Yes	–
Senegal	Africa	Least Developed	Telecommunication code, decree on frequency management	Yes	–
Swaziland	Africa	Developing	ITU Radio Regulations; Swaziland National Radio Regulations and SADC Regional Frequency Allocation Plan.	Yes	Update of the National Radio Regulations when the Regulatory Authority comes to force. Update of the SADC Regional Plan from 3-100GHZ Band.
Uganda	Africa	Least Developed	Uganda Communications Act -1997 and UCC Radiocommunication Regulations. On many occasions, we make reference to ITU Radio Regulations.	No	Not in the next five years.
Antigua and Barbuda	Americas	Developing	Government of Antigua, Telecommunications Act 1951, Cap 423	Yes	–
Bahamas	Americas	Developing	The Telecommunications Act, 1999 and the Telecom Sector Policy, July 2001 revised October 2002.	Yes	To produce New Regulations.
Canada	Americas	Developed	Legislation, Regulations and Treaties http://strategis.ic.gc.ca/SSG/sf01360e.html	Yes	–
Chile	Americas	Developing	The General Plan on Use of the Radio Spectrum, approved by Ministry of Transport and Telecommunications Decree No. 15 of 1983 and its modifications.	Yes	–
Columbia	Americas	Developing	Decree 1900/90 y Decree 555/98	Yes	–
Costa Rica	Americas	Developing	Act 1758 15	Yes	–
Cuba	Americas	Developing	Decrees, ministerial resolutions, instructions	Yes	–
El Salvador	Americas	Developing	Telecommunications Act and its implementing Regulations	Yes	–
Guatemala	Americas	Developing	General Telecommunications Act Regulations on the Operation of Satellite Systems Regulations on the Provision of International Telephony	No	–
Mexico	Americas	Developing	Federal Act on Telecommunications – Mexican National Table of Frequency Allocations	Yes	
Nicaragua	Americas	Developing	1. Regulations on Use of the Radio Spectrum and Communication Systems 2. National Table of Frequency Allocations	No	–
Panama	Americas	Developing	JD-107 of 30/9/97	Yes	–

Administration	Region	Development Status	Q.1 Reg Texts	Q.1 Changes	Q.1 Change Comment
Peru	Americas	Developing	Consolidated and Amended Text of the Telecommunications Act, its General Regulations, Standards for Use of the Radio Spectrum for Public Telecommunication Services, National Frequency Allocation Plan	Yes	–
Suriname	Americas	Developing	The Telegraph and Telephone Act, 1945	Yes	–
Venezuela	Americas	Developing	Organizational Act on Telecommunications (LOTEL) and regulations and resolutions in force	No	–
Bahrain	Arab States	Developing	None	Yes	–
Egypt	Arab States	Developing	Law 66 at 1979 governs our national spectrum management processes	Yes	–
Jordan	Arab States	Developing	The Telecommunications Law No. 13 and its amendments	No	To be answered by Telecommunication Regulatory Commission (TRC)
Lebanon	Arab States	Developing	New Law of Telecommunications N 431 dated 22/7/2002.	Yes	–
Morocco	Arab States	Developing	Law 24-96, concerning the post and telecommunication Decision 310-98 fixes fees for frequency assignments Decisions ANRT/DG/N°27, N°11/02, N°25, N°28, N°03/02 by the director of the "Agence Nationale de Réglementation des Télécommunications"	Yes	Some provisions will be modified.
Qatar	Arab States	Developing	Law No. 13 (of 1987 and Law No. 21 (of 1998) of the state of Qatar.	No	–
Syria	Arab States	Developing	Law No. 451 dated 1957.	Yes	–
United Arab Emirates	Arab States	Developing	Federal Law 1973	No	–
Bhutan	Asia & Pacific	Least Developed	National Radio Regulations 1999	No	–
China	Asia & Pacific	Developing	Radio Regulations Of The People's Republic Of China	No	–
Iran	Asia & Pacific	Developing	Rules and regulations approved by Islamic republic of Iran's Majlis	Yes	–
Papua New Guinea	Asia & Pacific	Developing	The Radio Spectrum Act 1996 and Radio Spectrum Regulation 1997.	Yes	–
Philippines	Asia & Pacific	Developing	Legislative Acts (Republic Act 7325, Act 3846) Memorandum Circular issued by this Commission (National Telecommunication Commission (M.C.: 8-5-95, M.C.: 3-3-96, etc.)	Yes	As deemed necessary
Samoa	Asia & Pacific	Least Developed	New Radio Regulation 2000, Posts and Telecommunications Act 1999.	Yes	–

Administration	Region	Development Status	Q.1 Reg Texts	Q.1 Changes	Q.1 Change Comment
Sri Lanka	Asia & Pacific	Developing	Sri Lanka Telecommunications Act No. 25 of 1991 as amended Act No. 27 of 1996 and Gazette Notifications (629/16 of 28.09.1990, 929/10 of 25.06.1996.1104/4 of 01.11.1999, 986/18 of 31.07.1997, 1084/14 of 16.06 and ITU regulatory publications.	Yes	–
Thailand	Asia & Pacific	Developing	The Act, Ministerial Relations and PTD announcements.	Yes	Yes, when the new independent organization, name NTC, is established, the Master Plan and new regulations for spectrum management should be published.
Vietnam	Asia & Pacific	Developing	Post and Telecommunications Act	No	
Albania	Europe & CIS	Developing	Law No 8618, dated 14.6.2000, "On Telecommunication in the Republic of Albania" and National Frequency Allocation Plan.	No	–
Armenia	Europe & CIS	Developing	Article 13, Law of Armenian Republic "On Telecommunications"(17 February 2002; N614 (20 November 1999) Decree of Armenian Government "On Regulation of use of radio electronic equipment and high-frequency facilities, distribution of radio frequencies in Armenian Republic"; National Table of Frequency Allocations	Yes	–
Bosnia & Herzegovina	Europe & CIS	Developing	Communication Law Of Bosnia And Herzegovina	Yes	–
Croatia	Europe & CIS	Developing	The Telecommunication Law, The RF Spectrum Assignment Rule	Yes	–
Cyprus	Europe & CIS	Developing	The Radiocommunications Law of 2002 (Law 146(I) of 2002)	Yes	The above new Law has been in force since July 2002. New regulations are expected to be voted by the Parliament by the end of this year.
Czech Republic	Europe & CIS	Developing	Act No. 151/2000 Coll. on Telecommunications and on Amendments to Other Acts – Number of Governmental Decrees – Set of General Licences Detailed list of all regulatory texts is published of web pages http://www.ctu.cz – Act No. 151/2000 Coll. on Telecommunications and on Amendments to Other Acts – Number of Governmental Decrees – Set of General Licences Detailed list of all regulatory texts is published of web pages http://www.ctu.cz	Yes	–
Estonia	Europe & CIS	Developing	Telecommunication Act	Yes	–
Finland	Europe & CIS	Developed	Radio Act (1015/2001), Act on Communications Administration (625/2001 and 493/2002).	No	–

Administration	Region	Development Status	Q.1 Reg Texts	Q.1 Changes	Q.1 Change Comment
France	Europe & CIS	Developed	The management of the radio spectrum as concerns the allocation of frequency bands is governed by: – the post and telecommunication code (which includes laws and decrees governing telecommunications, in particular the "loi de réglementation des télécommunications" (LRT) L. n°96-659 of 26 July 1996, creating the French national frequency agency ("Agence nationale des fréquences" or ANFR) and decree D. n°96-1178 of 27 December 1996 establishing the objectives and functioning of ANFR – Law n° 86-1067 of 30 September 1986 concerning freedom of communication; – the national frequency distribution table, adopted by a decision of the prime minister (article 21 of Law n° 86-1067 of 30 September 1986)	No	These documents are undergoing change, and it is anticipated that the LRT will be revised in five years, taking into account the fact that internal law must be brought into line with the EU telecom package by July 2003 at the latest.
Greece	Europe & CIS	Developed	TELECOMMUNICATION LAW 2867/00, LAW 2801/00 National Telecommunications and Post Commission (EETT) DECISIONS 210/2, 210/3, 254/72	Yes	to conform with the new EU framework
Hungary	Europe & CIS	Developing	Act on Communications (2001) Government Decree on the organization of the Authority dealing with non-civil frequency management and on the rules of non-civil frequency management (2001) Government Decree on the organization of the Communications Authority of Hungary (2001)	Yes	
Ireland	Europe & CIS	Developed	Wireless Telegraphy Acts 1926 - 1988, Telecommunications (Misc. Provisions) Act 1996, ITU Radio Regulations 2001, CEPT Decisions and Recommendations, EU Directives and Decisions.	Yes	–
Latvia	Europe & CIS	Developing	General legal instruments on utilization of radio frequencies in Latvia: – Law on Telecommunications adopted 1 November 2001; – Law on the Constitution of the International Telecommunication Union, Convention of the International Telecommunication Union and Optional Protocol on the Compulsory Settlement of Disputes Relating to the Constitution of the International Telecommunication Union, to the Convention of the International Telecommunication Union and to the Administrative Regulations and Other Legal Instruments adopted 21 March 2001; – Law on Radio and Television adopted 24 August 1995; – Latvian Administrative Offence Code (Articles 146-147 and 235); – Cabinet of Ministers Regulations No. 348 dated 7 October 1997 Regulations On The Licensing Of Several Types Of Commercial Activities; – Cabinet of Ministers Regulations No. 171 dated 30 April 2002 Radio Equipment Conformity Assessment Regulations entering into force .1 January 2003; – Cabinet of Ministers Regulations No. 188 dated 30 May 2000 Equipment Electromagnetic Compatibility Regulations; – Cabinet of Ministers Regulations No. 187 dated 30 May 2000 Equipment Electrical Safety Regulations; – Cabinet of Ministers Regulations No. 283 dated 22 August 2000 Telecommunication Terminal Equipment Conformity Assessment Regulations; – Cabinet of Ministers Regulations No. 395 dated 2 December 1997 Special Regulations On The Construction Of Telecommunication Networks And Equipment; – Other legal instruments, e.g. Standards Law, Law on Public Services Regulators, etc	Yes	–

Administration	Region	Development Status	Q.1 Reg Texts	Q.1 Changes	Q.1 Change Comment
Liechtenstein	Europe & CIS	Developed	Legal Act of 20 June 1996 on Telecommunications (TelG), Liechtenstein Legal Gazette 1996 No. 132 (http://www.ak.li/rechtsgrundlagen/gesetze.asp) Ordinance of 13 August 2002 on frequency management and usage (FVNV), Liechtenstein Legal Gazette 2002 No. 105 (http://www.ak.li/rechtsgrundlagen/verordnungen.asp)	Yes	–
Lithuania	Europe & CIS	Developing	Law on Telecommunications, 9 June, 1998 No. VIII-774 (in effect till 31.12.2002)	Yes	Law on Amending of the Low of the Republic of Lithuania on Telecommunications, 5 July, 2002 No. IX-1053 (with effect from 01.01.2003)
Malta	Europe & CIS	Developing	Wireless Telegraphy Ordinance (Chapter 49)	Yes	
Moldova	Europe & CIS	Developing	Telecommunication Law	No	–
Monaco	Europe & CIS	Developed	Law 928 of 8 December 1972 concerning non-public radio stations	Yes	–
Netherlands	Europe & CIS	Developed	On a national level: Telecommunication Act and the Frequency Decree. On an international level: the ITU Regulations, CEPT/ECC Decisions and EU directives.	Yes	–
Poland	Europe & CIS	Developing	Telecommunications Law 2000	Yes	–
Portugal	Europe & CIS	Developing	Telecommunications Law, Decree Laws and ANACOM Statutes. Can be found in ANACOM´s site in the address (http://www.anacom.pt/template16.jsp?categoryId=4654).	Yes	–
Slovenia	Europe & CIS	Developing	Telecommunications Law (Ztel-1) (Off.gaz. RS, 30/2001).	Yes	–
Spain	Europe & CIS	Developed	Act 11/1998 “General Telecommunications Act” and subsequent developments thereof	Yes	
Switzerland	Europe & CIS	Developed	Federal law of 30 April 1997 on telecommunication (LTC) Decision of the “Conseil fédéral” of 6 October 1997 on frequency management and radio concessions (OGC).	No	–
Tajikistan	Europe & CIS	Developing	Law “On Telecommunications” dated 22 May 2002, Radio Regulations.	No	–
Turkey	Europe & CIS	Developing	Wireless Law numbered 2813 and Implementing Regulations numbered 18183.	Yes	
Ukraine	Europe & CIS	Developed	The laws of Ukraine “On communications”, “On a radio frequency resource ”, Resolution No 112 of 7 February 2001 of the Cabinet of Ministers of Ukraine “On the order of issuing of the licences on use of the radio frequency resource”, “Rule on the allocation of radio frequencies”.	Yes	–
United Kingdom	Europe & CIS	Developed	Wireless Telegraphy Act, last modified 1998	Yes	A new draft Communications Bill is currently being considered.
Uzbekistan	Europe & CIS	Developin On a national level: Telecommunication Act and the Frequency Decree. On an international level: the ITU Regulations, CEPT/ECC Decisions and EU directives.g	Radiofrequency Spectrum Law and National Radio Regulations.	Yes	–

ANNEX 2-B

Question 2: Are regulations and procedures publicly available?

Administration	Region	Development Status	Q.2 Public Availability
Albania	Europe & CIS	Developing	Yes
Antigua and Barbuda	Americas	Developing	No
Armenia	Europe & CIS	Developing	Yes
Bahamas	Americas	Developing	Yes
Bahrain	Arab States	Developing	Yes
Bhutan	Asia & Pacific	Least Developed	Yes
Bosnia & Herzegovina	Europe & CIS	Developing	Yes
Botswana	Africa	Developing	Yes
Burundi	Africa	Least Developed	Yes
Burkina Faso	Africa	Least Developed	No
Cameroon	Africa	Developing	No
Canada	Americas	Developed	Yes
Central African Republic	Africa	Least Developed	Yes
Chile	Americas	Developing	Yes
China	Asia & Pacific	Developing	Yes
Columbia	Americas	Developing	Yes
Comoros	Africa	Least Developed	Yes
Costa Rica	Americas	Developing	Yes
Côte D'Ivoire	Africa	Developing	Yes
Croatia	Europe & CIS	Developing	Yes
Cuba	Americas	Developing	Yes
Cyprus	Europe & CIS	Developing	No
Czech Republic	Europe & CIS	Developing	Yes
Egypt	Arab States	Developing	Yes
El Salvador	Americas	Developing	Yes
Eritrea	Africa	Least Developed	Yes
Estonia	Europe & CIS	Developing	Yes
Ethiopia	Africa	Least Developed	No
Finland	Europe & CIS	Developed	Yes
France	Europe & CIS	Developed	Yes
Greece	Europe & CIS	Developed	Yes
Guatemala	Americas	Developing	Yes
Hungary	Europe & CIS	Developing	Yes
Iran	Asia & Pacific	Developing	Yes
Ireland	Europe & CIS	Developed	Yes
Jordan	Arab States	Developing	Yes
Latvia	Europe & CIS	Developing	Yes
Lebanon	Arab States	Developing	Yes
Lesotho	Africa	Least Developed	Yes
Liechtenstein	Europe & CIS	Developed	No

Administration	Region	Development Status	Q.2 Public Availability
Lithuania	Europe & CIS	Developing	Yes
Madagascar	Africa	Least Developed	Yes
Mali	Africa	east Developed	No
Malta	Europe & CIS	Developing	No
Mauritania	Africa	Least Developed	Yes
Mauritius	Africa	Developing	Yes
Mexico	Americas	Developing	Yes
Moldova	Europe & CIS	Developing	Yes
Monaco	Europe & CIS	Developed	Yes
Morocoo	Arab States	Developing	Yes
Netherlands	Europe & CIS	Developed	Yes
Nicaragua	Americas	Developing	Yes
Niger	Africa	Least Developed	No
Panama	Americas	Developing	Yes
Papua New Guinea	Asia & Pacific	Developing	Yes
Peru	Americas	Developing	Yes
Philippines	Asia & Pacific	Developing	Yes
Poland	Europe & CIS	Developing	Yes
Portugal	Europe & CIS	Developing	Yes
Qatar	Arab States	Developing	No
Rwanda	Africa	Least Developed	Yes
Samoa	Asia & Pacific	Least Developed	Yes
Senegal	Africa	Least Developed	Yes
Slovenia	Europe & CIS	Developing	Yes
Spain	Europe & CIS	Developed	Yes
Sri Lanka	Asia & Pacific	Developing	Yes
Suriname	Americas	Developing	No
Swaziland	Africa	Developing	No
Switzerland	Europe & CIS	Developed	Yes
Syria	Arab States	Developing	Yes
Tajikistan	Europe & CIS	Developing	Yes
Thailand	Asia & Pacific	Developing	Yes
Turkey	Europe & CIS	Developing	Yes
Uganda	Africa	Least Developed	Yes
Ukraine	Europe & CIS	Developed	Yes
United Arab Emirates	Arab States	Developing	No
United Kingdom	Europe & CIS	Developed	Yes
Uzbekistan	Europe & CIS	Developing	Yes
Venezuela	Americas	Developing	Yes
Viet Nam	Asia & Pacific	Developing	Yes

ANNEX 2-C

Question 4: Compliance Procedures

Administration	Region	Development Status	Q.4 Specify Compliance	Q.4a) Development	Q.4a) Develop Source	Q.4b) Procedure	Q.4b) Procedure Source
Albania	Europe & CIS	Developing	Yes	Other	–	Manufacturer's Declaration	–
Antigua and Barbuda	Americas	Developing	Yes	Other	–	Manufacturer's Declaration	–
Armenia	Europe & CIS	Developing	Yes	National & Other	–	Other	National declaration of compliance
Bahamas	Americas	Developing	Yes	Other	–	Type Approval & Declaration	–
Bahrain	Arab States	Developing	Yes	Other	–	Type Approval	–
Bhutan	Asia & Pacific	Least Developed	Yes	National	–	Manufacturer's Declaration	–
Bosnia & Herzegovina	Europe & CIS	Developing	Yes	Other	–	Other	Preparing regulations
Botswana	Africa	Developing	Yes	Other	–	Type Approval	–
Burundi	Africa	Least Developed	Yes	Other	–	Manufacturer's Declaration	–
Burkina Faso	Africa	Least Developed	Yes	Other	–	Type Approval	
Cameroon	Africa	Developing	Yes	Other	(However, national standards are under development)	Type Approval	–
Canada	Americas	Developed	Yes	National	–	Type Approval	–
Central African Republic	Africa	Least Developed	Yes	Other	–	Manufacturer's Declaration	–
Chile	Americas	Developing	Yes	Other	–	Type Approval	and Other
China	Asia & Pacific	Developing	Yes	National	–	Type Approval	–
Columbia	Americas	Developing	Yes	Other	–	Manufacturer's Declaration	–
Comoros	Africa	Least Developed	Yes	Other	–	Manufacturer's Declaration	–
Costa Rica	Americas	Developing	Yes	Other	–	Type Approval	–
Côte d'Ivoire	Africa	Developing	Yes	National	–	Type Approval & Declaration	–

Administration	Region	Development Status	Q.4 Specify Compliance	Q.4a) Development	Q.4a) Develop Source	Q.4b) Procedure	Q.4b) Procedure Source
Croatia	Europe & CIS	Developing	Yes	National & Other	–	Type Approval & Declaration	–
Cuba	Americas	Developing	Yes	National	–	Type Approval	–
Cyprus	Europe & CIS	Developing	Yes	Other	–	Type Approval & Declaration	–
Czech Republic	Europe & CIS	Developing	Yes	National & Other	ETSI	Type Approval & Declaration	and Other
Egypt	Arab States	Developing	Yes	National	–	Type Approval	Calibration and standardization institute
El Salvador	Americas	Developing	Yes	Other	–	Type Approval	–
Eritrea	Africa	Least Developed	Yes	Other	–	Manufacturer's Declaration	–
Estonia	Europe & CIS	Developing	Yes	National	Etsi	Manufacturer's Declaration	–
Ethiopia	Africa	Least Developed	Yes	National	–	Other	–
Finland	Europe & CIS	Developed	No	Other		Type Approval & Declaration	Also market surveillance. Note TA for only aeronautical and maritime equipment. Technical characteristics for radio equipment are defined in terms of essential requirements in the R&TTE directive. These are interpreted by Harmonized Standards drafted by standardization organizations recognized by the European Commission and on a mandate given by the European Commission. However these standards are not compulsory and a manufacturer can also use other technical basis for complying with the essential requirements but in that process a notified body, which has a consultative role, has to be used. Harmonized Standards do not contain all technical conditions needed to be defined for the use of the radio frequencies and such details, called Radio Interface Specifications, must be incorporated in the National Frequency Allocation Tables or defined separately. The borderline between Harmonized Standards and Radio Interface Specifications is not fixed but there is the principle that matters already coved in the relevant Harmonized Standards must not be redefined as part of the Radio Interface Specification. Compliance is based on Manufacturer's Declaration of Conformity as an a priori legal instrument but there is also Market Surveillance performed by the Competent Authority. For conformity assessment the R&TTE directive is the general framework with Manufacturer's Declaration of Conformity only, but for marine radio equipment (for compulsory use in ships) and for aeronautical radio equipment there is a separate EU legal framework based on type approval.

Administration	Region	Development Status	Q.4 Specify Compliance	Q.4a) Development	Q.4a) Develop Source	Q.4b) Procedure	Q.4b) Procedure Source
France	Europe & CIS	Developed	Yes	National & Other	The technical regulations needed for the minimum necessary level of compliance (health and safety, EM compatibility, efficient spectrum utilization, etc.) are laid down in decisions of the minister responsible for telecommunications following consultation with the telecommunication regulatory authority. Standards for the equipment used include, in particular, ETSI standards.	Manufacturer's Declaration	Radio equipment is subject to an assessment for compliance with essential requirements (art. L.34-9).
Greece	Europe & CIS	Developed	Yes	Other	–	Manufacturer's Declaration	–
Guatemala	Americas	Developing	No	Other	–	–	–
Hungary	Europe & CIS	Developing	Yes	National & Other	Mostly based on international (European) standards	Other	R&TTE
Iran	Asia & Pacific	Developing	Yes	National	–	Type Approval	–
Ireland	Europe & CIS	Developed	Yes	Other	–	Type Approval & Declaration	–
Jordan	Arab States	Developing	Yes	Other	International standard equipment used.	Other	–
Latvia	Europe & CIS	Developing	Yes	National & Other	–	Type Approval & Declaration	–
Lebanon	Arab States	Developing	Yes	Other	–	Manufacturer's Declaration	–
Lesotho	Africa	Least Developed	Yes	Other	–	Other	–
Liechtenstein	Europe & CIS	Developed	Yes	Other	–	Type Approval & Declaration	–
Lithuania	Europe & CIS	Developing	Yes	National	We establish these on a basis of those developed by international standards organizations.	Type Approval & Declaration	TA is an option.
Madagascar	Africa	Least Developed	Yes	National	–	Type Approval & Declaration	–
Mali	Africa	Least Developed	Yes	Other	–	Manufacturer's Declaration	and other
Malta	Europe & CIS	Developing	Yes	Other	–	Type Approval & Declaration	–

Administration	Region	Development Status	Q.4 Specify Compliance	Q.4a) Development	Q.4a) Develop Source	Q.4b) Procedure	Q.4b) Procedure Source
Mauritania	Africa	Least Developed	Yes	Other	–	Type Approval	–
Mauritius	Africa	Developing	Yes	Other	–	Type Approval & Declaration	–
Mexico	Americas	Developing	Yes	National	–	Type Approval	–
Moldova	Europe & CIS	Developing	Yes	Other	–	Type Approval	–
Monaco	Europe & CIS	Developed	Yes	Other	–	Type Approval	–
Morocco	Arab States	Developing	Yes	National	Nationals regulations are elaborated on the basis of, in particular, norms adopted by regional or international standardization bodies and taking into account national requirements.	Type Approval	A study is under way on the current process for certifying equipment. This could lead to a revision of the system currently in use.
Netherlands	Europe & CIS	Developed	Yes	Other	–	Manufacturer's Declaration	–
Nicaragua	Americas	Developing	Yes	Other	–	Type Approval	–
Niger	Africa	Least Developed	Yes	Other	–	Manufacturer's Declaration	–
Panama	Americas	Developing	Yes	Other	–	Manufacturer's Declaration	
Papua New Guinea	Asia & Pacific	Developing	Yes	National & Other	–	Type Approval	and National Radio Standards and Specifications.
Peru	Americas	Developing	Yes	Other	–	Type Approval	–
Philippines	Asia & Pacific	Developing	Yes	Other	–	Type Approval	–
Poland	Europe & CIS	Developing	Yes	Other	–	Type Approval & Declaration	or Certificate of Conformity of the Equipment.
Portugal	Europe & CIS	Developing	Yes	Other	–	Manufacturer's Declaration	–
Qatar	Arab States	Developing	Yes	National & Other	–	Type Approval & Declaration	–
Rwanda	Africa	Least Developed	Yes	National	–	Type Approval	–
Samoa	Asia & Pacific	Least Developed	Yes	National	–	Type Approval & Declaration	–
Senegal	Africa	Least Developed	Yes	National & Other	–	Manufacturer's Declaration	–
Slovenia	Europe & CIS	Developing	Yes	Other	CEPT, ETSI	Type Approval	–
Spain	Europe & CIS	Developed	No	Other	–	Manufacturer's Declaration	–
Sri Lanka	Asia & Pacific	Developing	Yes	Other	–	Manufacturer's Declaration	–

Administration	Region	Development Status	Q.4) Specify Compliance	Q.4a) Development	Q.4a) Develop Source	Q.4b) Procedure	Q.4b) Procedure Source
Suriname	Americas	Developing	Yes	Other	–	Type Approval & Declaration	–
Swaziland	Africa	Developing	Yes	Other	–	Type Approval & Declaration	We accept equipment Type Approved in South Africa and sometimes equipment that is (CE) compliant depending on the service to be used for.
Switzerland	Europe & CIS	Developed	Yes	Other	–	Manufacturer's Declaration	National or CE marking on equipment. Equipment Class Identifier. Notification to Administration of the fact that equipment is put on the market.
Syria	Arab States	Developing	Yes	National	–	Type Approval & Declaration	–
Tajikistan	Europe & CIS	Developing	Yes	Other	–	Other	–
Thailand	Asia & Pacific	Developing	Yes	Other	–	Type Approval	–
Turkey	Europe & CIS	Developing	Yes	National	–	Type Approval & Declaration	and R&TTE
Uganda	Africa	Least Developed	Yes	Other	–	Other	–
Ukraine	Europe & CIS	Developed	Yes	National & Other	–	Type Approval & Declaration	–
United Arab Emirates	Arab States	Developing	Yes	National	–	Type Approval & Declaration	and Other
United Kingdom	Europe & CIS	Developed	Yes	Other	–	Manufacturer's Declaration	R&TTE
Uzbekistan	Europe & CIS	Developing	Yes	National	–	Type Approval & Declaration	and Other
Venezuela	Americas	Developing	Yes	National & Other	–	Type Approval	–
Viet Nam	Asia & Pacific	Developing	Yes	National	–	Type Approval	–

ANNEX 2-D

Question 5: Spectrum redeployment

Administration	Region	Development Status	Q.5a) Spectrum Redeployment	Q.5b) Redeployment Method	Q.5c) Define Method	Q.5c) Describe Consultation
Albania	Europe & CIS	Developing	No	No	–	–
Antigua and Barbuda	Americas	Developing	No	Yes	–	–
Armenia	Europe & CIS	Developing	Yes	Yes	Limitation of use frequency band for allocation it for new planned systems; temporary licence for operation; bringing in use a new telecommunications system with the functioning systems; closing solitary systems and inappropriate to the standards radio electronic equipment	–
Bahamas	Americas	Developing	No	No	–	–
Bahrain	Arab States	Developing	No	No	–	–
Bhutan	Asia & Pacific	Least Developed	No	No	–	–
Bosnia & Herzegovina	Europe & CIS	Developing	No	No	–	–
Botswana	Africa	Developing	Yes	Yes	Currently we have waited for the equipment to reach their end of life, not licensing any new system. We are considering in future introducing some incentives for migration like lowering licence fees.	
Burundi	Africa	Least Developed	Yes	No	–	–
Burkina Faso	Africa	Least Developed	No	No	–	–
Cameroon	Africa	Developing	No	No	–	–
Canada	Americas	Developed	Yes	Yes	Public consultation	Extensive public consultation with stake-holders and industry/government strategic partnering to establish the implementation phases and incentives for the Redeployment Plan from 100-500 MHz.

Administration	Region	Development Status	Q.5a) Spectrum Redeployment	Q.5b) Redeployment Method	Q.5c) Define Method	Q.5c) Describe Consultation
Central African Republic	Africa	Least Developed	No	No	–	–
Chile	Americas	Developing	Yes	Yes	In a number of specific cases we have implemented the spectrum "redistribution" process referred to in this questionnaire	–
China	Asia & Pacific	Developing	Yes	Yes	According to relative international rules	–
Columbia	Americas	Developing	Yes	Yes	We have implemented processes to free up spectrum that is required for the introduction of mobile telephony services (e.g. PCS). The Ministry of Communications determines suitable frequencies for migration; the operators bear the costs associated with the changes.	–
Comoros	Africa	Least Developed	No	No	Redeployment is likely to become a necessity one day, but nothing has been done in this connection to date.	–
Costa Rica	Americas	Developing	Yes	Yes	The Table of Frequency Allocations establishes that, as from 2000, all radiocommunication operators shall use a bandwidth of 12.5 kHz rather than 25 kHz	–
Côte d'Ivoire	Africa	Developing	Yes	Yes	Sessions are used to poll users' positions. Upon conclusion of this consultation, the agency makes a redeployment proposal which all of the users concerned adopt at a workshop.	Sessions are used to poll users' positions. Upon conclusion of this consultation, the agency makes a redeployment proposal which all of the users concerned adopt at a workshop.
Croatia	Europe & CIS	Developing	Yes	Yes	Two-step procedure is usually applied. In first phase new licences for this spectrum are not issued, and in second step transition to new frequency band upon consultation with interested parties is done.	–
Cuba	Americas	Developing	Yes	No	–	–
Cyprus	Europe & CIS	Developing	Yes	No	All redeployment is made through the work at CEPT.	–
Czech Republic	Europe & CIS	Developing	Yes	Yes	Used methods ranging from persuasion up to change of frequency plans and/or expiration of licences or authorizations, which are not renewed in such cases.	–
Egypt	Arab States	Developing	Yes	Yes	Compensation method.	–
El Salvador	Americas	Developing	No	No	No application	–
Eritrea	Africa	Least Developed	No	No	Not yet.	–
Estonia	Europe & CIS	Developing	Yes	No	We don't have the common method for achieving the re-deployment. From legislative point of view the regulator can change technical conditions of licence but the period between the notification of the holder of a technical authorization of the decision to amend the conditions of the technical authorization and the entry into force of the amendments shall be not less than two years.	–

Administration	Region	Development Status	Q.5a) Spectrum Redeployment	Q.5b) Redeployment Method	Q.5c) Define Method	Q.5c) Describe Consultation
Ethiopia	Africa	Least Developed	No	No	–	–
Finland	Europe & CIS	Developed	Yes	Yes	The Finnish Radio Act gives FICORA the right to amend, in justified cases, all the licence conditions including the operating frequencies cases. If there is a need to give access for a new radio system operating according to an internationally/European wide adopted frequency usage plan, the relevant regulation by FICORA (On the Use of Radio Frequencies, Regulation 4, http://www.ficora.fi/englanti/document/FICORA04A2002M.pdf) will be revised, as appropriate. In this case moving costs are not compensated. In other cases new spectrum holders should, in general, compensate the moving costs.	–
France	Europe & CIS	Developed	Yes	Yes	The term spectrum redeployment is used in the context of long-term planning, while spectrum rearrangement ("réaménagement du spectre") designates the result of medium or short-term constraints. Spectrum rearrangement is one of the missions of the "Agence nationale des fréquences". The procedure was set up in 1997. The agency evaluates the cost of the operations, establishes a schedule for implementation, oversees work and manages funding intended for spectrum rearrangement (art. R.52-2-1 9°). As a rule, new entrants must contribute to cover the costs associated with redeployment (installing the previous user in other frequency bands or enabling alternatives to radio). The agency makes a partial contribution to rearrangement expenses from its spectrum rearrangement fund, which acts as an incentive to encourage such operations. Its spending is normally reimbursed by the new entrants once the vacated frequencies have been allocated.	To this end, the agency works through a standing committee which it chairs, in close concertation with administrations and designating authorities, telecommunication operators, and industry and trade union professionals, to prepare and oversee spectrum rearrangement operations.
Greece	Europe & CIS	Developed	Yes	Yes	Public consultation	Public consultation.
Guatemala	Americas	Developing	No	No	–	–
Hungary	Europe & CIS	Developing	Yes	Yes	The Government decides on the communications policy, which includes the introduction of new radiocommunication systems. Such decisions are taken after appropriate consultations with the interested parties. The actual spectrum redeployment process is based on the National Table of Frequency Allocations adopted by the Government after consultations with the interested users and keeping the European harmonization efforts in sight. Such redeployments may be financed from the state budget.	Appropriate consultations with the interested parties.
Iran	Asia & Pacific	Developing	Yes	Yes	In case of assigning a part of frequency band to a new service or expanding of frequency band for a service, we can act according to our legal authorities, provided that it isn't previously assigned to another service or user. If it assigned to another service or user, the issue must be solved through mutual negotiation otherwise the new operator shall compensate the loss caused by redeployment.	–

Administration	Region	Development Status	Q.5a) Spectrum Redeployment	Q.5b) Redeployment Method	Q.5c) Define Method	Q.5c) Describe Consultation
Ireland	Europe & CIS	Developed	Yes	No	–	–
Jordan	Arab States	Developing	No	No	To be answered by TRC.	–
Latvia	Europe & CIS	Developing	Yes	No	Not Yet – the procedure was described in the previous Law on Telecommunications.	–
Lebanon	Arab States	Developing	No	No	–	–
Lesotho	Africa	Least Developed	Yes	Yes	The redeployed bands have not been used yet.	–
Liechtenstein	Europe & CIS	Developed	Yes	Yes	Spectrum Monitoring, degree of usage, density of assignments.	No consultation regarding potential costs.
Lithuania	Europe & CIS	Developing	Yes	Yes	The following process describe spectrum redeployment in Republic of Lithuania: In accordance with the Law on Telecommunications one of the functions of the Communications Regulatory Authority shall be are to prepare and submit to the Government for its approval the National Radio Frequency Allocation Table, develop and implement the strategy for the use of radio frequencies in Lithuania; to prepare, together with the Radio and Television Commission, and submit to the Government for its approval the strategy and the strategic plan of allocation of radio frequencies for broadcasting and transmitting radio and television programmes. This plan shall also include the development of telecommunications networks intended for broadcasting of radio and television programmes.	–
Madagascar	Africa	Least Developed	Yes	Yes	Division on territorial basis.	–
Mali	Africa	Least Developed	Yes	No	–	–
Malta	Europe & CIS	Developing	No	No	–	–
Mauritania	Africa	Least Developed	No	No	Frequency redeployment has not yet commenced, given the limited number of spectrum users at present.	
Mauritius	Africa	Developing	Yes	Yes	Migration to other frequency band.	–
Mexico	Americas	Developing	Yes	No	–	–
Moldova	Europe & CIS	Developing	Yes	No	–	–
Monaco	Europe & CIS	Developed	Yes	No	–	–
Morocco	Arab States	Developing	Yes	Yes	The method is in the process of being finalized and adopted. More information may become available once this has been done.	–

Administration	Region	Development Status	Q.5a) Spectrum Redeployment	Q.5b) Redeployment Method	Q.5c) Define Method	Q.5c) Describe Consultation
Netherlands	Europe & CIS	Developed	Yes	Yes	There is no single method. The method for redeployment depends on the original method of assignment; users are informed well before the date of change. In recent history mostly voluntary withdrawal took place.	–
Nicaragua	Americas	Developing	No	No	–	–
Niger	Africa	Least Developed	No	No	–	–
Panama	Americas	Developing	Yes	Yes	–	Public consultation.
Papua New Guinea	Asia & Pacific	Developing	Yes	No	Telikom PNG have decided to avoid usage of bands around 2 GHz.	–
Peru	Americas	Developing	Yes	Yes	Políticas sectoriales.	–
Philippines	Asia & Pacific	Developing	Yes	Yes	Please refer to the attached copy of M.C. 3-3-96; Previous assignments not in conformity with the approved and current National Frequency Allocation Table shall be recalled. Those affected shall be re-located based on availability of frequency/ies. Special efforts shall be extended by the Commission to assist those affected. 603. TRANSFER OF AFFECTED AUTHORIZED RADIO FREQUENCY USER a. The commission shall allocate available radio frequencies for assignment to those affected by the reallocation as a result of the review of the radio spectrum pursuant to Rule 601. b. The cost of the transfer to new radio frequencies of affected authorized users shall be borne by the new assignees to the radio frequency channel/band where the radio frequencies of the previously authorized users fall within. c. When the transfer to a new set of radio frequencies would require additional radio links, the cost of these links shall also be taken into consideration. d. The manner and the cost of the transfer shall be negotiated in good faith between the affected authorized users and the assignees within 90 days from receipt of notice of relocation. e. The Commission shall extend all the necessary assistance to all affected authorized users and shall mandate settlement if the parties fail to come to an agreement within 90 days from receipt of notice of relocation or when warranted under the circumstances. f. Other means/mode of transmission comparable in quality to the existing facility shall be taken into consideration in the negotiation for the transfer. g. Transfer of radio frequency assignment shall only take effect upon activation of service by relocated party using its newly assigned or relocated frequency as agreed or mandated.	–

Administration	Region	Development Status	Q.5a) Spectrum Redeployment	Q.5b) Redeployment Method	Q.5c) Define Method	Q.5c) Describe Consultation
Poland	Europe & CIS	Developing	Yes	Yes	–	–
Portugal	Europe & CIS	Developing	Yes	No	The solutions are applied on a case-by-case basis.	–
Qatar	Arab States	Developing	No	No	–	–
Rwanda	Africa	Least Developed	Yes	Yes	Contact the regulatory agency.	–
Samoa	Asia & Pacific	Least Developed	Yes	Yes	–	–
Senegal	Africa	Least Developed	No	No	–	–
Slovenia	Europe & CIS	Developing	Yes	Yes	Art. 47 of Telecommunication Law; Revokation,	–
Spain	Europe & CIS	Developed	No	No	–	–
Sri Lanka	Asia & Pacific	Developing	Yes	Yes	Planned to recover the redeployments cost from the interested parties.	–
Suriname	Americas	Developing	No	No	–	–
Swaziland	Africa	Developing	Yes	No	This is really a problem except when the re-deployment is not immediate and is envisaged not to incur any costs which might need compensation. Such problems were experienced during the introduction of mobile cell phones as there was a public outcry for the cell phone service which in the region was earmarked at 890 MHz-960 MHz where there were sound broadcasting links We are faced with the same problem with the upcoming of new technologies where there are already existing services.	
Switzerland	Europe & CIS	Developed	Yes	Yes	(1) Waiting for radio licences to expire and (2) revocation of the radio licence (with or without financial compensation of the incumbent licensee).	
Syria	Arab States	Developing	No	No	–	–
Tajikistan	Europe & CIS	Developing	Yes	Yes	Conversion and counting the potential costs resulting from the planned redeployment.	Conduct consultation with users working in the band.
Thailand	Asia & Pacific	Developing	No	No	None	–
Turkey	Europe & CIS	Developing	Yes	Yes	When redeployment is needed, another frequency band is assigned to the user with sufficient time for redeployment. There is no payment due to redeployment.	–

Administration	Region	Development Status	Q.5a) Spectrum Redeployment	Q.5b) Redeployment Method	Q.5c) Define Method	Q.5c) Describe Consultation
Uganda	Africa	Least Developed	No	No	Not applicable.	–
Ukraine	Europe & CIS	Developed	Yes	Yes	–	–
United Arab Emirates	Arab States	Developing	Yes	No	–	–
United Kingdom	Europe & CIS	Developed	Yes	Yes	Spectrum pricing is one method that was introduced partly with the intention of simplifying the spectrum redeployment process. Another method is licence revocation.	Consultation involves user groups and other government organizations depending on the spectrum and services concerned.
Uzbekistan	Europe & CIS	Developing	Yes	Yes	Method of compensation of cost for usage other bands. Potential cost is approximately from 2 900 to 9 900 Swiss Francs.	–
Venezuela	Americas	Developing	Yes	Yes	Study + inspections, enquiry + auction (beneficiary covers expenses)	–
Viet Nam	Asia & Pacific	Developing	No	No	–	–

ANNEX 2-E

Responses concerning Questions 3 et 10

Country	Responses concerning Q.3 and Q.10	
	Q.3	Q.10
Albania	–	Yes
Angola	Yes	Yes
Antigua and Barbuda	No	Yes
Armenia	Yes	Yes
Bahamas	No	Yes
Bahrain	No	Yes
Bhutan	Yes	Yes
Bosnia	Yes	Yes
Botswana	Yes	Yes
Burkina Faso	Yes	Yes (in future)
Burundi	Yes	No
Cameroon	No	Yes
Canada	Yes	Yes
Central African Rep.	Yes	No
Chile	Yes	Yes
China	Yes	Yes
Colombia	Yes	Yes
Comoros	Yes (No use)	Yes in future Agency
Costa Rica	Yes	Yes
Côte d'Ivoire	Yes	Yes
Croatia	Yes	Yes
Cuba	Yes	Yes
Cyprus	No	No
Czech Rep.	Yes	Yes
Egypt	Yes	Yes
El Salvador	Yes	Yes
Eritrea	Yes	Yes
Estonia	Yes	No
Ethiopia	Yes	No
Finland	Yes	Yes
France	Yes	Yes
Gabon	NR	NR

Country	Responses concerning Q.3 and Q.10	
	Q.3	**Q.10**
Greece	Yes	Yes
Guatemala	Yes	Yes
Iran	Yes	Yes
Ireland	Yes	Yes
Jordan	Yes	–
Latvia	Yes	Yes
Lebanon	Yes	Yes
Lesotho	Yes	Yes
Liechtenstein	Yes	Yes
Lithuania	Yes	Yes
Madagascar	No	Yes
Mali	–	–
Malta	Yes	Yes
Mauritania	Yes	Yes
Moldova	Yes	Yes
Monaco	Yes	No
Morocco	Yes	Yes
Netherlands	Yes	Yes
Nicaragua	Yes	Yes
Niger	No	Yes
Panama	Yes	Yes
Papua New Guinea	Yes	No
Peru	Yes	Yes
Philippines	NR	NR
Poland	Yes	Yes
Portugal	Yes	Yes
Qatar	Yes	Yes
Romania	NR	NR
Rwanda	Yes	Yes
Samoa	Yes	Yes
Saudi Arabia	NR	NR
Senegal	Yes	Yes
Slovenia	Yes	Yes
Spain	Yes	Yes
Sri Lanka	Yes	Yes
Suriname	Yes	Yes
Swaziland	No	No

Country	Responses concerning Q.3 and Q.10	
	Q.3	Q.10
Switzerland	Yes	Yes
Syria	Yes	Yes
Tajikistan	Yes	Yes
Thailand	Yes	Yes
Turkey	Yes	Yes
Uganda	No	Yes
Ukraine	Yes	Yes
United Arab Emirates	No	No
United Kingdom	Yes	Yes
Uzbekistan	Yes	Yes
Venezuela	Yes	Yes

NR = No Response

ANNEX 2-F

Responses concerning Question 6

Administration	Region	Status	Q.6a) Spectrum managements costs	Q.6b) What is the source of the funding required to accomplish these spectrum management functions?
Albania	Europe & CIS	DVG	98, 000 SF	The fees of licences granted by TRE and NRTC.
Antigua and Barbuda	Americas	DVG	Unknown	Local government
Armenia	Europe & CIS	DVG	–	Organization's revenue by spectrum regulation
Bahamas	Americas	DVG	US $609.000	From licence fees
Bahrain	Arab States	DVG	–	–
Bhutan	Asia & Pacific	LDC	–	Royal Government of Bhutan (RGOB funding) Equipments were donated by UNOP and UNDP
Bosnia & Herzegovina	Europe & CIS	DVG	Not available	The funding of the Agency shall come from the following sources: a) Recurrent technical licence fees for the regulation and supervision of the telecommunications operators and broadcasters; and b) Grants or donations received by the Agency insofar as they are in conformity with general principles of law. When grants or donations are given for specific tasks or projects in the public interest, they shall be accounted for separately to the approved budget and not be included therein.
Botswana	Africa	DVG	Unavailable	Radio licence fees.
Burkina Faso	Africa	LDC	–	ARTEL budget and spectrum user fees
Burundi	Africa	LDC	–	Fees for spectrum utilization

Administration	Region	Status	Q.6a) Spectrum managements costs	Q.6b) What is the source of the funding required to accomplish these spectrum management functions?
Cameroon	Africa	DVG	Total cost unavailable	Fees for spectrum utilization; otherwise, general budget
Canada	Americas	DVD	55 M SF	The funding is obtained through parliamentary allotment.
Central African Republic	Africa	LDC	–	Funding from SOCATEL (fees)
Chile	Americas	DVG	–	Fiscal budget assigned to the Subsecretariat for Telecommunications
China	Asia & Pacific	DVG	about 2 million per year SF	Mainly from frequency fees
Columbia	Americas	DVG	CHF 632 000/year (planning and assignment) CHF 2 385 000/year (control)	National budget, approved with support from the Communications Fund which receives resources by way of compensation, administered by telecommunication service licensees and radio spectrum users
Comoros	Africa	LDC	Salary of official assigned to handle spectrum management (450 FS)	These functions are funded by SNPT, which hosts the body responsible for spectrum management within one of its services.
Costa Rica	Americas	DVG	Not available	Frequency levies established by the Ministry of Government and Police, the maximum amount being USD 400 per year in the case of television
Côte d'Ivoire	Africa	DVG	–	–
Croatia	Europe & CIS	DVG	N/A	Frequency Fee
Cuba	Americas	DVG	CHF 1.8 million	The income received from radiocommunication service licences, permits, authorizations and concessions
Cyprus	Europe & CIS	DVG	2 000 000 SF	Government budget
Czech Republic	Europe & CIS	DVG	Costs are set down case by case, namely if there is intention to award licence to winner of the competitive or comparative selection procedure.	State budget
Egypt	Arab States	DVG	330.000 (Swiss Francs)	The source of funding is self-dependent
El Salvador	Americas	DVG	CHF 1.200.000.00	Own funds (autonomous entity)
Eritrea	Africa	LDC	Xxxx	Government budget allocations
Estonia	Europe & CIS	DVG	It is responsible for one agency	State budget

Administration	Region	Status	Q.6a) Spectrum managements costs	Q.6b) What is the source of the funding required to accomplish these spectrum management functions?
Ethiopia	Africa	LDC	approx.100.000 SF	Annual budget from the Government of Ethiopia (GoE).
Finland	Europe & CIS	DVD	about 14.5 Million CHF (year 2002) (Incl. spectrum management, licensing, radio monitoring, investigation and solving of radio interferences, market surveillance, proficiency examinations, type approvals (aeronautical and maritime radio equipment only), radio equipment standardization.	All the costs of the Radio Administration are covered by the spectrum and licence fees collected from the users and the radio frequencies.
France	Europe & CIS	DVD	The cost of the functions of national spectrum management, i.e. for the allocation of frequency bands (planning and international affairs, registration of assignments and sites, monitoring) is equal to the budget of the national frequency agency (some CHF 47.5 million or EUR 32.5 millions in 2002, of which some 15% was for capital spending, including in particular the spectrum monitoring system).	The agency and the independent administrative authorities are funded by public grants from the economics and finance ministry and other concerned ministries.
Greece	Europe & CIS	DVD	To be determined	Spectrum fees and licence fee.
Guatemala	Americas	DVG	Not calculated	It used to be the case that a percentage was taken of the income received from spectrum auctions, whereas now everything is handled by the central Government
Hungary	Europe & CIS	DVG	36.8 million SF	Frequency reservation and usage fees for civil frequency management State budget for non-civil frequency management
Iran	Asia & Pacific	DVG	–	The budget of spectrum management is approved by government budget
Ireland	Europe & CIS	DVD	Not available	Licence fees in some cases and a levy (based on revenue) on spectrum users in other cases.
Jordan	Arab States	DVG	To be answered by TRC	To be answered by TRC
Latvia	Europe & CIS	DVG	–	The fees and charges for the insurance of electromagnetic compatibility, paid by frequency users
Lebanon	Arab States	DVG	200 000 SF	The MPT Public Budget
Lesotho	Africa	LDC	224 265.62 (Swiss Francs)	Annual spectrum fees, Government, Donor Community
Liechtenstein	Europe & CIS	DVD	not available	Fees for frequency usage and administrative efforts
Lithuania	Europe & CIS	DVG	The total is 7.41 million CHF per year	The fund for the communications management and control under the special program approved by the Government of the Republic of Lithuania Resolution No 1591 of 22 Dec. 2001 Concerning State Budget Allocations Under the Approved Programs.

Administration	Region	Status	Q.6a) Spectrum managements costs	Q.6b) What is the source of the funding required to accomplish these spectrum management functions?
Madagascar	Africa	LDC	SFR 181 585.94 per year	Rights and fees collected from spectrum users
Mali	Africa	LDC	–	–
Malta	Europe & CIS	DVG	140.088 (capital) (Swiss Francs)	70.000 (recurrent) (Swiss Francs)
Mauritania	Africa	LDC	Not available	The acquisition of management resources was funded by the state and certain development partners. Ongoing spectrum management will be funded essentially by the regulatory authority.
Mauritius	Africa	DVG	spectrum fees: MUR 10.000/100 kHz (approx. 500 FS for 100 kHz)	Licence fees for spectrum usage.
Mexico	Americas	DVG	We do not have this information	Government
Moldova	Europe & CIS	DVG	–	Fees for frequency usage
Monaco	Europe & CIS	DVD	Not identified	State budget
Morocco	Arab States	DVG	–	Spectrum user fees
Netherlands	Europe & CIS	DVD	44 million SF	Mostly fees, little contribution from state budget for performing certain legal, non frequency management tasks.
Nicaragua	Americas	DVG	–	Operators
Niger	Africa	LDC	Figure not available	Spectrum user fees
Panama	Americas	DVG	42.000 $	Own funds and UNDP funds (World Bank)
Papua New Guinea	Asia & Pacific	DVG	2.5 million SF	Operational Licence fees & Radio Spectrum Fees
Peru	Americas	DVG	Not available	Ministry's own resources, generated by the charges levied on telecommunication service operators
Philippines	Asia & Pacific	DVG	–	Agency Annual Budget Appropriations.
Poland	Europe & CIS	DVG	23 million SF	State budget

Administration	Region	Status	Q.6a) Spectrum managements costs	Q.6b) What is the source of the funding required to accomplish these spectrum management functions?
Portugal	Europe & CIS	DVG	The value of the ANACOM's costs with management spectrum is not available. It is only available the value of personnel costs, who accounted 4.304.059 Swiss Franc in 2001. This value represented 19.6% of total ANACOM's personnel costs	Financed by fees/charges paid by all licensed operators
Qatar	Arab States	DVG	–	Licence fees as well as grant
Rwanda	Africa	LDC	Depends on frequency; for more information contact the agency	Operator and state-funded
Samoa	Asia & Pacific	LDC	–	The Ministry of Posts and Telecommunication is seeking overseas assistance for funding to accomplish the Spectrum Management Division. (e.g. World Bank)
Senegal	Africa	DVG	Information not available	Spectrum user fee income
Slovenia	Europe & CIS	DVG	6.000.000 SF	Frequency fee, numbering fee, licence fee, notifications
Spain	Europe & CIS	DVD	–	–
Sri Lanka	Asia & Pacific	DVG	250.000 SF	Telecommunications Regulatory Commission of Sri Lanka
Suriname	Americas	DVG	–	–
Swaziland	Africa	DVG	–	Swaziland Posts and Telecoms Corporation so far, is responsible for all the funding required to accomplish the spectrum management functions.
Switzerland	Europe & CIS	DVD	approx. 18'000'000 SF	Cost-covering administrative fees + General budget of the State
Syria	Arab States	DVG	Not available	The functions is funded by the revenues of the licensing
Tajikistan	Europe & CIS	DVG	301 431.801 SF per annum	From frequency fees and any additional charges
Thailand	Asia & Pacific	DVG	N/A	Government
Turkey	Europe & CIS	DVG	–	Frequency usage fee, licensing fee, contribution fee from 0.3% of endorsement of companies (licensed services only)
Uganda	Africa	LDC	There is currently no specific cost for providing spectrum management functions. The frequency fees are paid for frequency usage and these fees cover other Uganda Communications Commission (UCC) functions.	Spectrum Licence Fees
Ukraine	Europe & CIS	DVD	–	–

Administration	Region	Status	Q.6a) Spectrum managements costs	Q.6b) What is the source of the funding required to accomplish these spectrum management functions?
United Arab Emirates	Arab States	DVG	–	MOC
United Kingdom	Europe & CIS	DVD	116m SF	Spectrum usage fees
Uzbekistan	Europe & CIS	DVG	793 000 SF	Radiofrequency spectrum fees
Venezuela	Americas	DVG	–	State budget + taxes + fees + additional contributions
Viet Nam	Asia & Pacific	DVG	–	–

ANNEX 2-G – SECTION 1

Use of computers for national spectrum management

Preliminary remarks

– which criterion to be used for the purpose of analysis? The development status, the situation in a regional group? The GNP? Besides the diversity of responses given in descriptive texts, statistics can help to give an overall view;

– spectrum management does not mean exactly the same according to the administrations. It can be understood in a more or less broad meaning, moreover as organizations responsible for spectrum management can vary according the administrations;

– the large rate of no replies to some questions (up to 60% for question 6 on spectrum management costs) make the use of statistics more perilous.

General rate of response to Part II (reply to at least one part of the Questionnaire)

Region	Number of administrations in the region (a)	Number of responses (b)	Developed	Developing	Least developed	Rate of response by region (a)/(b)	In % of total responses to Part II
Africa	45	19	–	5	14	41%	24%
Americas	34	15	1	14	–	44%	19%
Arab States	19	8	–	8	–	42%	10%
Asia-Pacific	38	9	–	7	2	24%	11%
Europe and CIS	53	27	11	18	–	51%	34%
Total	**189**	**80**	**12**	**52**	**16**		**100%**
As % of all responses Part II		100%	15%	67%	20%		

Rate of response for questions 6, 15 and 16 by region

Region	Response to Q.6a)	Response to Q.6b)	Response to Q.15	Response to Q.16a) to d)	Response to Q.16e) to f)	Response to Part II
Africa	5	17	18	17	15	19
Americas	6	13	15	11	14	15
Arab States	3	8	7	6	7	8
Asia-Pacific	2	15	9	8	7	9
Europe and CIS	15	25	29	27	28	27
Total	**31**	**68**	**78**	**69**	**71**	**80**
In % of total of responses to Part II	39%	85%	98%	86%	89%	100%

Rate of response for questions 6, 15 and 16 by development status

Region	Response to Q.6a)	Response to Q.6b)	Response to Q.15	Response to Q.16	Response to Part II
Developed	6	10	12	11	12
Developing	20	45	51	46	52
Least developed	5	14	15	15	16
Total	31	68	78	72	80
Developed	50%	83%	100%	92%	
Developing	38%	87%	98%	88%	
Least developed	31%	88%	94%	94%	
In % of total responses Part II	39%	85%	98%	86%	100%

ANNEX 2-G – SECTION 2

Administrative Management

COUNTRY	DMBS	No. of assignments	No. of licences	Personnel		IT				
				Expert	Techn.	XS	PC	System	LAN	Internet
Albania*	Manual	1 500	331	14	8	–	3 DELL	W 2000	–	X
Antigua and Barbuda*	Manual	800	500	2	–	–	–	–	–	X
Armenia	Personnel	1 342	673	54	50	1	20 IBM	W98/2000/XP	X	X
Bahamas*	Access	1 700	2 957	3	1	–	2	W/2000/XP	X	X
Bahrain*	L and S	3 932	–	8	16	–	11 IBM	W/NT/98	X	X
Bhutan*	Manual	–	–	–	2	1	1	W/98	–	X
Bosnia*	ATDI	1 100	900	8+4	2	15	15 IBM	W/2000	X	X
Burkina Faso	–	1 103	1 337	2	3	–	2 COMPAQ	–	–	X
Burundi	Access	689	–	2	2	–	2 DELL	Access	X	X
Cameroon	Excel WinBASMS	3 974	183	–	–	–	4	W 58/XP	–	X
Canada	Oracle	587 000	869 000		300	50	600	W 2000/NT	X	X
China	Oracle	8 203	4 438	25	100	500	3 000	W/2000/NT XP	X	X
Colombia	ASMS 710 (TCI)	13 000	78	25	10	–	14 HP	W/NR	W	–
Comoros*	Excel (3)	250	6	1	–	–	1 DELL	World	–	X
Costa Rica*	Auto	8 400	12 000	11	2	No	No	No	–	X
Côte d'Ivoire	Manual	120	50	17	6	15	15	W	X	X
Croatia	MS Access	20 000	20 000	20	30	–	20	W	X	X

COUNTRY	DMBS	No. of assignments	No. of licences	Personnel		IT				
				Expert	Techn.	XS	PC	System	LAN	Internet
Cuba*	MS Access	422	52 705	–	–	10	7	W 2000	X	X
Cyprus	Manual (AO)	2 500	2 000	7	8	5	8	W/NT/98	X	X
Czech Rep.	L and S	50 000	20 000	30	8	32	6	W/NT	X	X
Egypt	ELLIPSE	25 000	3 800	2	9	1	5	Sun	X	X
El Salvador*	SQL	5 000	200	2	6	3	3	W/2000	X	X
Eritrea	Local	1 000	300	3	–	2	–	W/95/98	–	X
Estonia	LOIS	1 168	2 260	20	27	–	47	W/NT/98/2000	X	X
Ethiopia	Excel	3 000	–	2	5	–	2	W/XP	–	X
Finland	UNIX	100 000	71 000	30	16	–	90	W/200/XA/NT	X	X
France	Auto	150 000	35 000	95	110	10	40	Oracle	X	X
Gabon	Pas de	Response								
Georgia										
Greece	SQL	> 12 500	10	12	6	–	10	W/2000	X	X
Guatemala*	Auto	4 824	4 824	4	–	–	37 HP	W/98/NT/XP	X	X
Iran	Access	–	–	–	–	25	–	W/NT	X	X
Ireland*	Infocentre	19 000	14 000	3	1	5	100	W/XP/NT	X	X
Jordan*	–	–	–	–	–	–	–	–	–	–
Latvia	L and S	10 500	12 800	60	6	–	40 IBM	W/2000	X	X
Lebanon*	ELLIPSE	500	400	5	5	–	10 HP	NT	X	X
Lesotho	Excel	298	24	14	11	–	1	–	–	–
Liechtenstein	–	–	–	1	1	–	1	–	–	–
Lithuania	Access	57 000	31 000	25	12	100	100	W/95/98 2000/XP	X	X
Madagascar	D Base IV	–	–	8	4	–	1	MS/DOS	–	–
Mali	Yes	500	155	6	–	2	2	Windows	–	X

COUNTRY	DMBS	No. of assignments	No. of licences	Personnel		IT				
				Expert	Techn.	XS	PC	System	LAN	Internet
Malta	Manual	–	15 000	4	4	–	–	–	–	X
Mauritania*	TCI	960	240	3	5	–	16 DELL	W 2000	X	X
Moldava	FoxPro Access	14 000	1 858	6	4	–	10	W/98/NT	X	X
Monaco	Excel	800	600	2	–	–	3	W/NT	X	X
Morocco*	Spectrocan (bidding stage)	–	–	14	5	–	PC	–	–	X
Netherlands	Oracle	5 200	10 000	150	150	–	300	W	X	X
Nicaragua	SpectraPlus	10 000	–	2	–	12	–	–	X	X
Niger*	No	315	121	–	–	1	1	W98	–	X
Norway										
Panama*	Access	–	–	9	2	–	10	W/NT	X	X
Papua New Guinea	Oracle	10 000	30 000	30	30	7	10	Oracle	X	X
Peru										
Philippines	–	100 000	–	10	100	–	–	–	–	–
Poland*	Informix	> 100 000	> 20 000	130	70	–	120	W	X	X
Portugal	Oracle	15 512	10 524	39	41	1	121	W/2000	X	X
Qatar*	Excel	7 000	2 000	11	5	–	DELL	W/98	X	X
Romania	Pas Part II									
Rwanda*	No	–	–	3	2	–	–	–	–	–
Samoa	Freqman	849	1 843	2	1	1	–	W/98	–	X
Senegal*	Access	3 316	3 362	5	3	–	5	W/XP	–	X
Slovenia*	Local	1 500	8	16	7	–	50	W/2000/98	X	X
Spain	Auto	80 000	40 000	–	–	> 500	> 500	W/2000	X	X
Sri Lanka*	Oracle	7 500	1 800	10	25	14	–	–	W/NT	X

COUNTRY	DMBS	No. of assignments	No. of licences	Personnel		IT				
				Expert	Techn.	XS	PC	System	LAN	Internet
Suriname	Access	250	400	1	3	–	1	W/NT	–	X
Swaziland*	Excel	1 200	400	3	3	1	1 DELL	W/98/ 2000	-	X
Switzerland	Oracle	Milliers	Milliers	90	10	–	X	MS/DOS	X	X
Syria*	Auto	–	13 000	15	30	–	–	–	X	X
Tajikistan*	Manual	12 000	24 000	5	17	1	4	W/98/ 2000	-	X
Tanzania*	Manual	500	155	6	–	2	2	W	-	X
Thailand	Oracle	19 742	85 058	6	30	2	144	W	X	X
Turkey	Oracle	140 000	34 000	20	5	–	–	Oracle	X	–
Uganda	Excel	12 000	4 000	6	2	6	–	W/NT	X	X
Ukraine*	Local	100 000	2 800	300	150	–	150	W/2000	X	X
United Arab Emirates	Access	23 000	15 000	2	3	10	–	W/NT	X	X
United Kingdom	Oracle (4)	200 000	212 000	245	297	–	–	–	X	X
Uzbekistan*	Windows	71 800	26 860	136	38	–	35	W/95/98/XP	X	X
Venezuela	ASMS	30 000	2 300	80	40	80	80	W	X	X

* These countries responded for the first time in 2003, having not participated in 2001.

ANNEX 2-H

Responses concerning responsibilities of spectrum management (Question 16 b) and c))

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Albania	Europe & CIS	DVG	The organizational structure in Albania involved in frequency management process consist on: General Directorate of Posts and Telecommunications (GDPT) is a legal, public, buxhetory person, and works for fulfilment of the objectives of policy on telecommunications. GDPT depends on the Minister of Transport and Telecommunications. GDPT coordinate work for drafting the National Frequencies Allocation Table, as well as for its harmonization with international policies for radio frequencies spectrum development; Telecommunications Regulatory Entity (TRE) is a public legal entity operating in conformity with its regulation approved by the Board of TRE and independent in making its decisions. TRE should supervise the all frequency spectrum, in order to ensure effective, interference-free use of frequencies. TRE manages radio-frequency spectrum for civil purposes and makes regulations for civil spectrum activities. Regulations and activities falling within radio communications must be in conformity with rules and standards of international organizations, conventions and treaties where Republic of Albania is a party. d) No	Organs of Radio Frequency Management: – TRE manages frequency bands designated for civil purposes and public or private use, except broadcasting bands. – National of Radio Television Council manage broadcasting bands – Ministry of Defence, Ministry of Public Order and National Information Service manage frequency bands aimed for national defence use.	
Antigua and Barbuda	Americas	DVG	Telecommunications Officer, Assistant Telecommunications officer and Secretary d) No	Department responsible for all telecommunications	Single organization
Armenia	Europe & CIS	DVG	d) Changes are planned in this organizational structure	Ministry of transport and communications	The responsibility for spectrum management is contained within a single organization
Bahamas	Americas	DVG	(org.) See Org Chart attached to email d) At present evaluating bids to have section revamped.	Separate.	Single.
Bahrain	Arab States	DVG	d) Changes planned	It is a Ministry	A Single organization

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Bhutan	Asia & Pacific	LDC	It is done by a Department called Telecom Authority under Ministry of Communications d) None	A separate Department under the Ministry of Communications	It is totally done by one Department
Bosnia & Herzegovina	Europe & CIS	DVG	We have three division in CRA, and CRA is independent regulatory body: Telecom, Broadcast and Spectrum. Total staff is 80. Spectrum is 15.		CRA is a regulatory body and policy maker is Council of Minister of BiH.
Botswana	Africa	DVG	Under Botswana Telecommunications Authority organization structure spectrum management falls under the Director of Engineering Service. The Chief Engineer, Radio Services heads the sub-section responsible for spectrum planning, monitoring, radio licensing and enforcement. The organization structure can be found at the following website: "http://www.bta.org.bw" d) BTA was established in 1997. Before 1997 The PSTN operator Botswana Telecommunications Corporation was responsible for spectrum management	Spectrum management is the responsibility of the Telecommunication Authority under the Telecommunication Act, 1996.	The Telecommunication Authority, BTA, has the sole mandate of spectrum management under the Telecommunication Act, 1996.
Burkina Faso	Africa	LDC	(org.) See organization chart below d) The spectrum management organization was transferred from ONATEL (incumbent operator) to ARTEL (ministerial department) in 2000.	The spectrum management organization is a ministerial department.	Spectrum management is the responsibility of a single organization
Burundi	Africa	LDC	Executive – Head of service – Technicians d) Changes are anticipated	An agency attached to a ministry	Single organization
Cameroon	Africa	DVG	(org.)	Spectrum management in Cameroon is the responsibility of several organizations, for different sectors. However, they all manage frequencies under the coordination of the ministry of posts and telecommunications. As far as the telecommunications sector is concerned, ART is an administrative public establishment.	No
Canada	Americas	DVD	(org.) See attached chart d) No	The spectrum management organization is under a government department called Industry Canada, which reports directly to the Minister. Industry Canada is a large department which includes the Spectrum, Information Technologies & Telecommunications Sector and the Operations Sector.	The responsibility for spectrum management is contained within a single organization.
Central African Republic	Africa	LDC	A radiocommunication section with three employees d) The regulatory authority will soon be set up.	PTT ministry	Single organization

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Chile	Americas	DVG	(org.) Spectrum management is the reponsibility of the Subsecretariat for Telecommunications, which comes under the Ministry of Transport and Telecommunications. In accordance with the General Telecommunications Act, the Chilean Navy administers assignments to maritime (mobile and fixed) services, and the General Civil Aeronautics Directorate (DGAC), which comes under the Chilean Air Force, is responsible for administering the aeronautical services bands. d) No	See 16 a)	Ver 16 a).
China	Asia & Pacific	DVG	Terrestrial service division, Space service division, Supervision and inspection division, Frequency planning division. d) No, there have not.	It is part of a larger government department.	The responsibility for spectrum management is shared between separate organizations.
Columbia	Americas	DVG	Org: – Office for Sectoral Planning, General Services Directorate, General Technical Directorate. – The responsible body is the Ministry of Communications. d) Yes, it is intended to adopt a general telecommunications act that includes a spectrum management policy.	The responsible body is the Ministry of Communications	The responsible body is the Ministry of Communications
Comoros	Africa	LDC	(org.) see annexed organization chart d) It is planned to create an independent spectrum management agency. A date for the creation of the agency has not yet been proposed.	The organization responsible for spectrum management is an office of the telecommunication design and planning directorate of the national post and telecommunication company (see annexed organization chart).	Spectrum management is the sole responsibility of the national post and telecommunication company.
Costa Rica	Americas	DVG	–	Ministry of Government and Police	The National Radio Control Bureau is the body responsible for spectrum management at the national level. It is, however, assisted in this task by ICE in the case of spectrum that is allocated to ICE for radiocommunication purposes.
Côte d'Ivoire	Africa	DVG	Spectrum management is performed by the Radiocommunication directorate of ATCI, broken down into three sub-directorates (spectrum management, spectrum monitoring and licensing), seven services and a monitoring centre.	Agency, organization attached to ministry	Single organization
Croatia	Europe & CIS	DVG	d) Yes	Spectrum management is preformed by Administration which is separate institution reporting to Ministry.	All in one institution

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Cuba	Americas	DVG	–	–	–
Cyprus	Europe & CIS	DVG	(org.) Figure 1 – Organizational Chart d) Cyprus telecommunications policy is in a changing mode, from a monopoly to a full liberalized market. A new NRA was established, that is responsible for telecommunications – the radio communications are still in the powers of the Ministry. A fixed monitoring station will be established and the two administrations will hire more personnel.	It is a Directorate of Telecommunications which is part of the Ministry of Communications and Works	Single organization-The Directorate of Telecommunications
Czech Republic	Europe & CIS	DVG	Main activities are concentrated in the Czech Telecommunication Office (CTO). Ministry of Transport and Communications sets down general strategy of telecommunications, approves drafts of NTFA developed by the CTO. The CTO cooperates with other subjects (Council for Broadcasting and Ministry of Defence) in regulation of specific services. d) This organizational structure has been established two years ago, no significant changes are expected in the near future.	Spectrum management is part of the Czech Telecommunication Office, the independent body of the State Administration, which is responsible for regulatory matters of all telecommunications (taking into account above mentioned detailed specification of the structure).	The separate organizations share the responsibility for spectrum management for government users and broadcasters.
Egypt	Arab States	DVG	d) Changes are planned to take places.	It is a department of Telecommunication Regulatory authority.	Within a single organization.
El Salvador	Americas	DVG	SIGET d) No changes foreseen	Spectrum management comes under the heading of telecommunications management, which is the responsibility of the General Superintendency for Electricity and Telecommunications (SIGET). SIGET is directly responsible to the Government.	Single organization
Eritrea	Africa	LDC	Chart to be supplied by mail if necessary , because it is not practical to draw and send the chart by email attachments d) No Change planned	The last one	Within a single org.
Estonia	Europe & CIS	DVG	(org.) There are three departments responsible for frequency management: Technical planning department Licensing Department Supervision Department d) Since 2002 changed our structure was changed and Postal Affairs Department was created.	Estonian National Communication Board is agency under area of responsibility of Minister of Economic Affairs and Communications.	Estonian National Communication Board is a regulator of Telecommunication market (included frequency management) with following exceptions: the coordination of aeronautical frequencies is under responsibility of Estonian Air Navigation Services the use of exclusive military frequencies are under responsibility of Minister of Defence
Ethiopia	Africa	LDC	–	–	–

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Finland	Europe & CIS	DVD	(org.) A copy of the organization chart is enclosed at the end of this document. d) Yes	Department of an independent regulatory authority.	Single organization.
France	Europe & CIS	DVD	(org.) The responsibilities of the national frequency agency extend over the entire radio spectrum, both civil and military. See the organization block diagram and the organization chart of the agency. d) This system was set up on 1 January 1997. No changes are planned in the immediate future.	The national frequency agency is an administrative public establishment (a specialized administrative body) of the ministry that is responsible for telecommunication (in the current government this is the deputy minister for industry).	The entire domain of spectrum management and public and non-public spectrum utilization is handled by the national frequency agency, which establishes the national table for frequency distribution between the nine different administrations and authorities in question. This table is approved by the prime minister. Overall responsibility for telecommunication policy and regulatory matters lies with the minister responsible for telecommunications. Frequencies are distributed to network or telecommunication service licence-holders by a decision of the telecommunication regulatory authority. Allocation of frequencies for radio and television is by decision of the “conseil supérieur de l'audiovisuel”.
Greece	Europe & CIS	DVD	d) Existing framework since 01/01/2001. Changes are going to be made during 2003 to meet the requirements of the new EU Framework.	Spectrum management in Greece is a responsibility of the National Telecommunications and Post Commission (EETT), the National Regulatory Authority, with the exception of the military, broadcasting and aeronautical bands. EETT is also responsible for the maintenance of the National Frequency Register. Ministry of Transport and Communications is responsible for the telecommunications policy guidelines and the Frequency Allocation Table along with the Ministry of Defence.	As above
Guatemala	Americas	DVG	d) No	Forms part of the Ministry of Communications, Infrastructure and Housing	Single organization
Hungary	Europe & CIS	DVG	(org.) Organizations: – Department in Ministry of Informatics and Communications, – Department in Ministry of Defence, – Directorate in civil Communications Authority of Hungary, – Governmental Frequency Management Agency. d) Ministry of Informatics and Communications was set up in 2002. No changes are planned in the organizational structure in the near future.	The frequency management structure in Hungary has two branches and two levels (see Annex 1). The first branch is responsible for civil, non-government spectrum management. The second one is responsible for the management of frequency issues in state administrations such as police, armed forces, fire authorities. The first higher level (Ministries) is responsible for frequency management policy and legal regulations and the second lower level (Authorities) is responsible for the planning and authorization of spectrum use.	–

Administration	Region	Status	Q.16 a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Iran	Asia & Pacific	DVG	d) Yes, our organization have been changed recently	The spectrum management organization is part of the Ministry of PTT	The responsibility of spectrum management is single(Ministry of PTT)
Ireland	Europe & CIS	DVD	(org.) d) New legislation expected to be enacted shortly will create a Commission for Communications Regulation which will absorb the current Regulator.	Spectrum management is carried out by the regulator responding to policy received from government.	Responsibility for Spectrum management is carried out by a single organization, the regulator, responding to policy received from government.
Jordan	Arab States	DVG	To be answered by TRC	To be answered by TRC	To be answered by TRC
Latvia	Europe & CIS	DVG	(org.) d) the potential changes depend on changes in legislation	Latvia Telecommunication State Inspection (LTSI) operates under the supervision of Ministry of Transport.	The responsibility for spectrum management is shared between Ministry of Transport (regulatory and policy matters), Public Utilities Commission (regulatory matters), National Broadcasting Council of Latvia (regulatory matters), LTSI (technical matters)
Lebanon	Arab States	DVG	(org.) d) Yes, especially after issuing a new telecom law	According to the new law, the spectrum management organization must be separate ministry organization	One organization (the spectrum management organization)
Lesotho	Africa	LDC	The structure of Telecommunications Regulatory Authority as a whole gives a good picture. According to the structure, spectrum management and monitoring falls under the technical division; the licensing and enforcement; licensing and enforcement under telecommunications services; pricing is in the strategic planning division. d) LTA was established in 2000. Before 2000, a parastatal telecommunications network operator performed spectrum management function.	It is part of telecommunications authority reporting to parliament through Communications ministry.	It is contained within the Lesotho Telecommunications Authority (LTA) alone.
Liechtenstein	Europe & CIS	DVD	The Liechtenstein regulatory body, the Office for Communications (OfC) consists of the Director, a Vice-Director who is a technical expert, a Frequency Manager a part-time employee for technical administration and a Secretary. Strategic spectrum management matters are dealt with within the OfC while most operational matters are out-sourced. d) No	The spectrum management function is integrated in the OfC which is a autonomous organization reporting to the government, the ministry for traffic and communications.	The OfC has got all spectrum management responsibilities.

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Lithuania	Europe & CIS	DVG	(org.) The organization chart of the Communications Regulatory Authority is given above c). d) The CRA was officially registered on 1 May 2001. The Council of the CRA comprised of 5 members was appointed by a presidential decree on 30 May 2001. According to the Law on Amending of the Low of the Republic of Lithuania on Telecommunications that is in effect from 01.01.2003 the State organizational structure in respect to matters of spectrum management will remain as above mentioned.	In accordance with Law on Telecommunications there are two prescribed Regulatory Bodies of Telecommunications Activities in Republic of Lithuania: the Government or an authority Designated by It. The first of its functions is to develop and implement state policy in the telecommunications sector; the Communications Regulatory Authority (CRA) which shall be an independent institution of the Government regulating communications activities and implementing provisions of in point 1 mentioned Law, acting in accordance with that Law, other laws of the Republic of Lithuania, and its own regulations. It has prescribed appropriate tasks, functions and rights	(note: see Q.16B)
Madagascar	Africa	LDC	(org.) see annex 1	A single organization	–
Mali	Africa	LDC	Set up members of the telecoms regulatory committee d) Setting up in progress	A separate organization attached to the government	Single organization
Malta	Europe & CIS	DVG	(org.) Following Independence in 1964, the organization responsible for spectrum management and monitoring has been the Wireless Telegraphy Department (WTD). Until 1999 the Director of the WTD reported to the Office of the Prime Minister, but following a Ministerial re-organization, the Department is now responsible, through the Director, to the Permanent Secretary of the Ministry for Transport and Communications. The WTD consists of some 58 staff, including 4 student apprentices, of whom approximately 28% are engineers/technicians, with the remainder being general clerical staff. d) No	The Frequency Management Section falls within the WTD, which forms part of the Ministry for Transport and Communications.	In Malta, the Ministry for Transport and Communications sets the policy. The regulator of all radiocommunication matters, including frequency management and monitoring, is the Wireless Telegraphy Department.
Mauritania	Africa	LDC	–	Spectrum management and monitoring is the responsibility of the regulatory body ARE, which reports directly to the prime minister and has the necessary independence to meet its regulatory objectives.	ARE only
Mauritius	Africa	DVG	Information and Communications Authority is responsible for spectrum management d) yes	It is a parastatal body responsible for regulating the telecommunications sector.	Single organization
Mexico	Americas	DVG	(org.) Organizational diagram attached d) Yes, changes are foreseen	The Directorate-General for Spectrum Planning and Management comes under the Federal Telecommunications Commission, which is the regulatory body responsible to the Ministry of Communications and Transport.	The Federal Telecommunications Commission is responsible for spectrum management, and the Ministry of Telecommunication Policy

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Moldova	Europe & CIS	DVG	(org.) d) No	The Ministry of Transport & Communications is responsible for policy matters. Agency for Regulations in Communications is responsible for regulatory matters in the non-governmental (civil) sector. The radiofrequency management organization in the civil sector is the State Communication Inspection reporting directly to the Ministry of Transport & Communications	The government users are separate from non-government users
Monaco	Europe & CIS	DVD	Three workers in the "Direction du Contrôle des Concessions et des Télécommunications" d) No	The "Direction du Contrôle des Concessions et des Télécommunications" is part of the "Département Ministériel des Travaux Publics et Affaires Sociales"	Spectrum management is conducted by a single organization.
Morocco	Arab States	DVG	(org.) The organization chart for the directorate charged with spectrum management at the ANRT is attached to the questionnaire. It should be noted that the interconnection division and the terminal equipment certification service, although listed in that organization chart, do not have any spectrum management responsibilities.	It is an independent telecommunication regulatory authority set up in connection with the office of the prime minister.	–
Netherlands	Europe & CIS	DVD	see website: http://www.agentschaptelecom.nl/pdf/jaarverslag_eng/rijksdienst_eng.pdf d) Not really, only that the Directorate General of Telecommunications and Postal Services and the RA Netherlands have moved to the Ministry of Economic Affairs.	See Q.4 of part III of the questionnaire and the end of this part II. Organization of spectrum management – Answers to questions 16 a, b, c, and d. The Directorate General for Telecommunication and Postal services (DGTP) and the Radiocommunications Agency are responsible for the national frequency management. Policy issues are the competence of DGTP; product development, putting into effect of decisions, advising on policy issues, inspections and monitoring and of course licensing are the competences of the Radiocommunications Agency Netherlands. Both organizations are within the Ministry of Economic Affairs. DGTP and the Radiocommunications Agency have been moved from the Ministry of Transport to the Ministry of Economic Affairs (22 July 2002). The main reason for this movement is to integrate and strengthen the national ICT policy.	See Q.4 of part III of the questionnaire and the end of this part II. *RA Netherlands operates within the policy framework of the Directorate-General for Telecommunications and Post (DGTP). The Directorate General for Telecommunications and Post (DGTP) formulates the government policy in the field of telecommunications (and postal services). RA Netherlands implements that part of the policy which is related to the structuring of the radio spectrum.* *The distinction between policy and its implementation will lead to productive efficiency: a more effective, flexible and efficient operational performance of the RA Netherlands.*
Nicaragua	Americas	DVG	d) No	Yes	No
Niger	Africa	LDC	Currently attached to the PTT regulatory directorate ("Direction de la Réglementation des postes et Télécommunications"). A radiocommunication department is responsible for spectrum management.	Yes, the directorate responsible for spectrum management is currently attached to the minister responsible for telecommunication.	Single organization
Panama	Americas	DVG	–	–	–

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Papua New Guinea	Asia & Pacific	DVG	Spectrum and Broadcasting Planning Department produces frequency plans and assigns frequencies, proposes spectrum usage and pricing policies. The Enforcement Department performs licensing, inspections and monitoring and type approvals. d) Changes are being planned to accommodate in governments policy.	The Spectrum and Broadcasting Planning Department is part of Papua New Guinea Technical Telecommunication Authority and currently it is the only national statutory organization established by the government to regulate radiocommunication policies etc for both private, business and government radio spectrum users in the country.	There is no other organization responsible for spectrum matters.
Peru	Americas	DVG	d) There have recently been changes in the organizational structure of the Ministry, as communicated to ITU in letter (M) No. 319-2002-MTC/03 of 27 December 2002	Forms part of the Ministry of Transport and Communications	Responsibility for spectrum management lies with the Ministry of Transport and Communications
Philippines	Asia & Pacific	DVG	org ? d) There might be some changes due to developments brought about by ICT.	The National Telecommunications Commission is an attached Agency to the Dept. of Transportation and Communications	It is contained within a single organization
Poland	Europe & CIS	DVG	The URTiP (Office of Telecommunications and Post Regulation) is responsible for the planning and authorization of use over the whole of the civil spectrum with the exception of formal assignments analogue broadcast frequencies. It cooperates on a day-to-day basis with staff from the Ministry of Defence regarding military bands but has no detailed plans of usage within these bands. The URTiP has the status of a statutory body, responsible to the Council of Ministers. The URTiP consists of some 600 staff. Of these 600 staff, some 88 are employed on frequency management at headquarters in Warsaw, with approximately 5 to 8 engineers, in each of the 16 branches. The URTiP has responsibility for the following functions – issuing licences and frequency permits covering the provision of telecommunications services and the use of radio equipment management and monitoring of the frequency spectrum including: Public mobile services, Private mobile services, Aeronautical and marine services, Amateur Radio, Low power devices, Broadcasting services (cooperation with National Broadcasting Council) Public fixed services, Private fixed services, Public satellite services, Private satellite services; Certification of equipment (e.g. terminal equipment); Ensuring compliance with universal service obligations; Management of emergency and disaster recovery plans; Approving wholesale and, in conjunction with the Anti-Monopoly Office, retail tariffs for telecommunications;	Authority reporting directly to the government.	Responsibility for spectrum management is shared between separate organizations.

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
			Resolving disputes (e.g. inter-connection disputes); Management and assignment of numbers within the nation numbering plan; Fining operations for non-compliance with the law; d) Yes, there have been some changes.		
Portugal	Europe & CIS	DVG	(org.) See Appendix 5. d) No	The spectrum management organization is part of "ICP-ANACOM – the Portuguese telecommunications Regulatory Authority. According to point c), n° 1, of article 6° of ICP-ANACOM's Statute, approved by Decree-Law nr. 309/2001, of December the 7th, one of ICP-ANACOM's attributions consists of ensuring the management of radio spectrum namely involving its planning, granting of spectrum resources and its supervision as well as ensuring the coordination between civil, military and semi-military communications. ICP-ANACOM is a public legal entity that has administrative and financial autonomy as well as own patrimony performing its role under the tutelage of Ministry of Economy. ICP-ANACOM is autonomous in its decision making, and needs no "ex ante" or "ex post" approval by the Government."	The ICP-ANACOM is responsible for the overall management of the spectrum; concerning aeronautical and maritime services there is a coordination procedure with the aeronautical authority and the maritime authority, respectively; there are also some bands whose management is delegated in the military authority.
Qatar	Arab States	DVG	(org.) Enclosed d) No	It is a division of Qatar telecom (QSC), empowered by law as sole authority for telecommunication development and providing telecommunication service in the state of Qatar.	Single organization
Rwanda	Africa	LDC	d) No change	Ministry (regulatory authority)	Single
Samoa	Asia & Pacific	LDC	d) No	No	No
Senegal	Africa	DVG	d) Yes	Agency subject to the Presidency	Single organization
Slovenia	Europe & CIS	DVG	(org.) Att.3 d) No	Agency reporting directly to the government	Single organization
Spain	Europe & CIS	DVD	–	–	–
Sri Lanka	Asia & Pacific	DVG	(org.) See Annexure I – A & B d) Yes	A part of a larger government organization	Within a single organization
Suriname	Americas	DVG	Is a division of the legal Department of Telecommunicatiebedrijf Suriname (Telesur), a state-owned telecommunication Company, with one (1) Head and 3 other personnel d) Yes, spectrum management will be transferred to a regulatory authority.	Is part of a state-owned telecommunication Company, Telesur.	Single organization

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Swaziland	Africa	DVG	The structure is as follows:- Managing Director(SPTC); General Manager, Telecomms; Senior Manager, Regulatory, Policy and International Affairs; Manager, Frequency Management; Technician, Frequency Management and Monitoring. d) There has been recent changes and more changes are still expected to be made in preparation for the formation of a complete Regulatory unit. The office of Regulatory, Policy and International Affairs has been formed to that effect	The spectrum management organization is part of a larger government department, the Swaziland Posts and Telecomms Corporation.	The responsibility for the spectrum management is contained within a single organization, the Swaziland Posts and Telecomms Corporation with the Regulatory matters and Policy matters shared with the Ministry of Tourism, Environment and Communication while still working towards the formation of an independent Regulatory Authority.
Switzerland	Europe & CIS	DVD	(org.) The order in the Frequency Management Division (FM) does not reflect any order of importance. d) No	The Frequency Management Division (FM) is part of the Federal Office for Communications (OFCOM). OFCOM in turn is subordinated to a Ministry the Swiss Federal Department for the Environment, Transport, Energy and Communication (DETEC). The Office prepares the decisions of the Swiss government (the Federal Council) and the Swiss Federal Communications Commission (ComCom). FM is the skills center for regulatory tasks of national authority in the fields of radiocommunications, electromagnetic compatibility (EMC) and environmental electromagnetic compatibility (EECM). The division is subdivided in 4 sections: (1°) Radio Technology (GF), (2°) Frequency Planning (FP), (3°) Frequency Assignment (FZ), and (4°) Radiomonitoring (RM)	In Switzerland, in the civil bands frequency allocation and assignment tasks are shared by two organizations: the Federal Communications Commission (ComCom) and the Federal Office for Communications (OFCOM) - with the exception of assignments in the Aeronautical Service. OFCOM prepares the commercial transactions of the Federal ComCom, makes the necessary applications and implements its decisions. In the radiocommunications sector where ComCom delegated its competencies to OFCOM, the latter grants inter alia those radio licences which do not involve any telecommunications services, e.g. company radio and amateur radio licences. In addition, OFCOM licences all providers of fixed network services (without a tender procedure). ComCom, for its part, awards the basic provision licence and licences for the provision of mobile telephone and other radio services where the licence is awarded on the basis of an invitation to tender. It also approves frequency plans.
Syria	Arab States	DVG	d) No	It is part of a larger government department (Syrian Telecommunication Establishment)	It is shared between separate organizations
Tajikistan	Europe & CIS	DVG	d) According to the new accepted law “On Telecommunications” dated 22 May 2002, our organization on spectrum management are planed to be agency at the government of the Republic of Tajikistan by December 2003.	Our spectrum management organization is a State Inspectorate of Communication at the Ministry of Communications of the Republic of Tajikistan.	The responsibility for spectrum management is contained within a single organization
Thailand	Asia & Pacific	DVG	(org.) see in Attachment d) Thailand has the plan to establish the independent organization (NTC.)	PTD is the part of a larger government department.	Single Organization

Administration	Region	Status	Q.16a) Spectrum management organizational structure Q.16d) Have there been recent changes or are changes planned?	Q.6b) Which organization is responsible for spectrum management?	Q.6c) Is the responsibility for spectrum management contained in a single organization or shared between separate organizations?
Turkey	Europe & CIS	DVG	(org.) d) The organizational structure had been changed in 2001. Before 2001 there wasn't Telecommunication Regulation Authority.	Spectrum Management department is responsible department of Telecommunications Regulatory Authority which is independent authority. Telecommunication Authority was founded as a public judicial entity with a private budget having administrative and financial autonomy on January 27, 2000 in accordance with Article 5 of Law No. 4502 amended by Wireless Law No. 2813 in order to execute the actions envisaged in Wireless Law No. 2813, Law No. 406 on Telegraph and Telephone and other laws, and became effective as from August 15, 2000. The Authority works under the auspices of Ministry of Transportation.	The responsibility for spectrum management contained within only our authority.
Uganda	Africa	LDC	a) Refer to 16(c) d) None	It is part of the Uganda Communications Commission Structure. Uganda Communication is a regulatory agency in Uganda. Spectrum Management is part of the technical department of UCC. The section dealing with spectrum Management is six professional technical persons.	The responsibility for spectrum management is contained within UCC, which deals with regulatory, and policy matters on communications in the country.
Ukraine	Europe & CIS	DVD	–	–	–
United Arab Emirates	Arab States	DVG	–	–	–
United Kingdom	Europe & CIS	DVD	(org.) Organization Chart d) Next year the Agency will become part of a new national telecommunications regulator that amalgamates five existing telecommunication organizations	Currently an agency within a government department	Single
Uzbekistan	Europe & CIS	DVG	d) Organizational structure of State Committee for Radiofrequencies has been changed: Working group of SCRF has been renamed to Direction, staff has been increased and departments created.		Spectrum management organization in our country is a separate organization, named State Committee for Radiofrequencies of the Republic of Uzbekistan (SCRF RU), which complied Communications and Information Agency of Uzbekistan.
Venezuela	Americas	DVG	–	An autonomous entity attached to a Ministry	Single organization (CONATEL)
Viet Nam	Asia & Pacific	DVG	–	–	Single organization

ANNEX 2-I

Responses concerning human resources (Question 16 e) and f))

Administration	Region	Status	Q.16e) Number of specialist staff	Q.16f) Number of support staff
Albania	Europe & CIS	DVG	app. 14 spec.	app. 8 spec.
Antigua and Barbuda	Americas	DVG	none	none
Armenia	Europe & CIS	DVG	54	50
Bahamas	Americas	DVG	3	1
Bahrain	Arab States	DVG	8	16
Bhutan	Asia & Pacific	LDC	None	2
Bosnia & Herzegovina	Europe & CIS	DVG	Experts: 8 planning 4 monitoring	2
Botswana	Africa	DVG	8	4
Burkina Faso	Africa	LDC	2	3
Burundi	Africa	LDC	2	2
Cameroon	Africa	DVG	–	–
Canada	Americas	DVD	300 (approx)	50 (approx)
Central African Republic	Africa	LDC	1	3
Chile	Americas	DVG	3	6
China	Asia & Pacific	DVG	25	about 100
Columbia	Americas	DVG	25	10
Comoros	Africa	LDC	1	None
Costa Rica	Americas	DVG	8 CNR, ICE 3	2 CNR
Côte d'Ivoire	Africa	DVG	–	–
Croatia	Europe & CIS	DVG	20	30
Cuba	Americas	DVG	–	–
Cyprus	Europe & CIS	DVG	7	8
Czech Republic	Europe & CIS	DVG	30	8
Egypt	Arab States	DVG	2	9
El Salvador	Americas	DVG	2	6
Eritrea	Africa	LDC	3	none
Estonia	Europe & CIS	DVG	20	27
Ethiopia	Africa	LDC	2	5
Finland	Europe & CIS	DVD	30	16

Administration	Region	Status	Q.16e) Number of specialist staff	Q.16f) Number of support staff
France	Europe & CIS	DVD	95	110
Greece	Europe & CIS	DVD	9 EETT 3 Ministry	6
Guatemala	Americas	DVG	4	–
Hungary	Europe & CIS	DVG	135	64
Iran	Asia & Pacific	DVG	–	–
Ireland	Europe & CIS	DVD	3	1
Jordan	Arab States	DVG	To be answered by TRC	To be answered by TRC
Latvia	Europe & CIS	DVG	about 60 specialists	about 6 specialists
Lebanon	Arab States	DVG	5	5
Lesotho	Africa	LDC	14	11
Liechtenstein	Europe & CIS	DVD	1+ outsourcing partner	1+ outsourcing partner
Lithuania	Europe & CIS	DVG	25	12
Madagascar	Africa	LDC	8	4
Mali	Africa	LDC	6	–
Malta	Europe & CIS	DVG	4 (part-time)	4 (part-time)
Mauritania	Africa	LDC	3	5
Mauritius	Africa	DVG	–	–
Mexico	Americas	DVG	7	–
Moldova	Europe & CIS	DVG	6 (only at the State Communication Inspection)	4 (only at the State Communication Inspection)
Monaco	Europe & CIS	DVD	2	0
Morocco	Arab States	DVG	14	5
Netherlands	Europe & CIS	DVD	150	150
Nicaragua	Americas	DVG	15	–
Niger	Africa	LDC	2	–
Panama	Americas	DVG	9	2
Papua New Guinea	Asia & Pacific	DVG	About 30	About 30
Peru	Americas	DVG	12	12
Philippines	Asia & Pacific	DVG	About 10	About 100 or more
Poland	Europe & CIS	DVG	130	70
Portugal	Europe & CIS	DVG	39	41
Qatar	Arab States	DVG	11	5
Rwanda	Africa	LDC	3	2
Samoa	Asia & Pacific	LDC	2	1
Senegal	Africa	DVG	5	3
Slovenia	Europe & CIS	DVG	16	7

Administration	Region	Status	Q.16e) Number of specialist staff	Q.16f) Number of support staff
Spain	Europe & CIS	DVD	–	–
Sri Lanka	Asia & Pacific	DVG	10	25
Suriname	Americas	DVG	1	3
Swaziland	Africa	DVG	3	3
Switzerland	Europe & CIS	DVD	90	10
Syria	Arab States	DVG	15	30
Tajikistan	Europe & CIS	DVG	5	17
Thailand	Asia & Pacific	DVG	6	20
Turkey	Europe & CIS	DVG	20	5
Uganda	Africa	LDC	6	2
Ukraine	Europe & CIS	DVD	About 300	about 150
United Arab Emirates	Arab States	DVG	2	3
United Kingdom	Europe & CIS	DVD	245	297
Uzbekistan	Europe & CIS	DVG	136	38
Venezuela	Americas	DVG	80	40
Viet Nam	Asia & Pacific	DVG	–	–

ANNEX 2-J

List of fixed, mobile and transportable radio monitoring stations by Member State

Legend

RX	Receiver	**TX**	Transmitter
SpA	Spectrum Analyser	**Meas**	Measuring
DF	Direction Finder	**R&S**	Rohde & Schwarz
Ant	Antenna	**HP**	Hewlett Packard
DB	Data Base	**Mon**	Monitor
SW	Software	**BC**	Broadcast
NA	Not Applicable	**NR**	No Reply
–	No Answer to Question		

Monitoring Stations												
Country	Fixed				Mobile				Transportable			
	Number of stations	Facilities	Mon F_{max} MHz	DF F_{max} MHz	Number of stations	Facilities	Mon F_{min} MHz	DF F_{max} MHz	Number of stations	Facilities	Mon F_{min} MHz	DF F_{max} MHz
ALBANIA	1	Broadcast only	3000	30	1	RX[5],SpA,DF BC only	–	–	1	RX,SpA,DF BC only	–	–
BAHAMAS	0				0				0			
ANTIGUA AND BARBUDA	0				0				0			
BAHRAIN	4	RX,SpA,DF	1000	1000	1	RX,DF	18000	1300	3	RX,DF	1000	1000
BHUTAN	1	An Argus System, three fixed antenna, Spectrum analyser	3000	3000	1	One miniport spectrum analyser with rotor antenna set	3000	3000	1	Miniport receiver; one ESVN 20	3000	3000
BOSNIA AND HERZEGOVINA	0				1	RX,SpA,DF R&S Argus software	2750	2750	0			
BOTSWANA	0	In acquisition			0				1	RX, DF	3000	3000
BURKINA FASO	1	RX (V/UHF)	1000	–	0				1	RX (V/UHF)	1000	–
BURUNDI	0				0				3	RX,Watt-Mtr SpA (future)	–	–
CAMEROON	2	RX 3-30 RX136-470	470	–	0	In course of acquisition			0			
CANADA[2]	2 Centers + 85 Remote	RXs, SPAs, Mod Analyz, Tone Dec., DF, rf switch, Audio matrix	3000	1300	7	RXs, SPAs, modulation analysers, tone decoder, direction finder	3000	1300	Variable	RXs, SPAs, modulation analysers, tone decoder, direction finder	3000	1300

5 Récepteur

CHINA	2006	**HF: RX** R/S-ESMB **SPA** Agilent-8563 **DF** R/S-DDF01M **Ant** R/S-ADD011 **VHF/UHF: RX** R/S-ESMB **SpA** Agilent-8563 **DF** R/S-DDF05M **Ant** R/S-ADD051	1000	12750	56	**RX:** R/S-ESVN40 ICOM 8500 **DF**	1	30	> 300	**RX** R/S-EB200 **SpA** Agilent-8563E	30	3000
COLOMBIA	6	RX,DF, Vector Signal An, Universal Telegraph Decoder	3000	2700	7	RX,DF,SpA, Vector Signal An, Universal Telegraph Decoder	4000	2700	0			
COMORES	1	**RX** AR-3000A	2000	–	1	**RX** AR-3000A	2000	–	1	**RX** AR-3000A	2000	–
COSTA RICA	1	Appropriate	3000	0.009	1	Appropriate	3000	9	0			
COTE D'IVOIRE	1	RX,SpA,DF	1000	0.001	2	RX,SpA,DF	1000	0.001	2	RX,SpA,DF	1000	30
CROATIA	9	RX,SpA,DF	20000	20000	7	RX,SpA,DF	20000	20000	4	RX,SpA,DF	1000	1000
CUBA	4	RX, SpA, Frq Synth, Automatic monitor System	2000	–	0				0			
CYPRUS	0				1	RX,SpA,DF, SW & DB,PC GPS	3000	1000	0			
CZECH REPUBLIC	2	**RX:** ESVN40, R3261C, **SPA:** Advantest U3641, **Argus IT**	2050	–	5	ESVN40, ESMB, FSEB 30, R3261A, R3371A, **Argus IT**	2700	**2x** 1000 **1x** 1300	1	ICOM 8500, VisualRadio	2000	–
EGYPT	4	RX, SpA, DF	3000	3000	2	RX, SpA, DF	3000	3000	2	RX, SpA	3000	–
EL SALVADOR	3	RX,SpA,DF, automatic monitor of radio parameters, Ant distribut.	1000	1000	0				2	RX,SpA,DF, Antenna distribution system	26500	1000
ERITREA	1	RX,SpA,DF	2700	2700	1	RX,SpA,DF	2700	2700	0			
ESTONIA	5	**RX** R&S ESVN20 9kHz – 275 MHz ESVN40 10MHz – 1000MHz **SpA** R&S FSP 9kHZ – 30GHz HP 9kHz – 23GHz Advatest 9kHz – 26,5GHz) **Mong RX** R&S EB200 10kHz – 3GHz ESMB 20MHz – 3GHz) **DF** R&S DDF190 HF,U/VHF	20000	20000	8	**RX** R&S ESVN20 9kHz – 2750MHz ESVN40 10MHz – 1000MHz **SpA** R&S FSP 9kHZ – 30GHz HP 9kHz – 23GHz Advatest 9kHz – 26,5GHz), **Mon RX** R&S EB200 10kHz – 3GHz ESMB 20MHz – 3GHz) **DF** R&S DDF190	20000	1000	1	**RX** R&S ESVN20 9kHz – 2750MHz ESVN40 10MHz – 1000MHz (AM, FM, SSB) **SpA** (R&S FSP 9kHZ – 30GHz HP 9kHz – 23GHz Advatest 9kHz 26,5GHz)	1000	–

		Telegon 20MHz – GHz), **GSM coverage** measurement equipment, **GSM interference** analyzers system, **DAB** analyzing system.				HF,U/VHF Telegon 20MHz – 2GHz)						
ETHIOPIA	0				0				0			
FINLAND	4	**RX:** H/V/UHF **DF:** HF/VHF	50000	3000	3	**RX** V/UHF **DF** VHF	1300	1300	3	**RX** V/UHF (Hand held Directional Antennas)	3000	3000
FRANCE	2 16 37	6 centers, 52 remote, 7 control	20-1350 20-3000 9KHz	20-1350 20-3000	27	Note (1)	20-1000 30-40000	20-1000	1	Note (1)	3000	3000
GABON		NR				NR				NR		
GREECE	2	RX,SpA,DF, Spectrum Monitoring Software	3000	3000	1	RX,SpA,DF	3000	3000	1	2 SpA	40000	–
GUATEMALA		Uses the transportable				Uses the transportable			3	Directional antennas used both in spectrum analysers and in electric field strength receivers. Also used are global positioning systems and amplifying "pistol" antennas for determining the precise direction and azimuth of the signal detected.	26500	3000
IRAN	7	RX,SpA,DF, full range TX[6]	300	1000	7	RX,SpA,DF	1000	1000	2	RX,SpA,DF	1000	1000

6 Emetteur

IRELAND	1	Antennas covering from 30 kHz to 1.3 GHz both omni directional and directional. Receivers covering 30 kHz to 3 GHz. Spectrum analysers covering 0 Hz to 40 GHz.	40000	1300	1	Antennas covering from 68 MHz to 1.0 GHz omni directional. Receivers covering 30 kHz to 3 GHz. Spectrum analyzers covering 0 Hz to 40 GHz.	3000	3000	2	Antennas covering from 20 kHz to 3.0 GHz directional. Receivers covering 30 kHz to 3 GHz.	3000	3000
JORDAN	0				0				0			
LATVIA	1 4	<u>**One central station**:</u> **RX** MINILOCK 6910 (Schlumberger), ESVN40 **DF** ESMC (R&S DDF190 **SpA** R& S FSP **Antenna set** R& S AU900A4 **Software** R&S ARGUS software <u>**Four regional stations**:</u> **RX** R&S ESMB ICOM, AoR **DF** R&S DDF190 **Antenna set** AU900A5 **Software** ARGUS software (under implement.)	3000	1300, 3000	1 1 1	**Mobile monitoring station with direction finding facility: RX** R&S ESVN40 Miniport Receiver EB200 **DF** R&S DDF190 **SpA** R&S HP8563E up to 26.5 GHz with set of horn antennas; **Antenna** pneumatic mast and set of antennas **Software** ARGUS, **Mobile station for GSM measr. and field strength measr. in digital broadcast. RX** R&S ESVB, mast and set of antennas **coverage** measurement system R&S TS9955 **Software** ARGUS **Mobile station adapted for KTV measurement SpA** TEKTRONIX 2715, **RX** R&S ESMB, mast, anten.	3000 26500 2600 1000	2700	0			
LEBANON	1 2	RX, SpA, radio-finder radio-finder	2700	20	1 2	SPA, radio-finder *Same but planned*	2700	20	0			
LESOTHO	1	RX	1000		0				1	RX Portable		

LITHUANIA	5	**RX:** EB200, ESVN40, ESMB; **SpA:** HP8591EM, HE4407B; **DF:** DDF190	1300	1300	1	**RX:** ESMB **SpA:** HP 8591EM, HP E4407B	3000	–	1	**RX:** EB200, ESMB; **SpA:** HP 8591EM, HP E4407B	18000	
MADAGASCAR	1	RX, SpA	3000	–	0				1	RX, SpA	3000	–
MALTA	1	Radio-monitoring RX Radio-monitoring Software	3000	1000	1 1 1	DF Radio-monitoring RX SpA Radio-monitoring RX Radio-monitoring Software	3000	1000	0			
MAURITANIA	2	**RX:** HF, V/UHF **SpA:** 9K-26GHz **RFI** Transceiver equipment **Oscilloscope DF:** 8067 TCI spectrum analyzer with three DELL workstations	3000	3000	2	**RX:** R&S ESMB EB200 **DF:** DF4400 **SpA:** E4407B 9K-26.5 GHz **Antennes:** HF,V/UHF, GSM	26000	1300	1	**RX:** 10K-3GHz **SpA:** 9K-3GHz	3000	
MOLDOVA		NR				NR				NR		
MONACO	1	RX	2000						1	RX, SpA, DF	2000	–
MOROCCO	1	RX (measuring), SpA, DF, Antenna System	1000	1000	2	RX (measuring), SpA, DF, Antenna System, Portable RX, GPS Other equipm for spectrum control are in course of acquisition	1000	1000	0			
NIGER	0				0				0			
PANAMA	6	–	4000	1350	1	–	4000	1300	–	–	4000	1350
PERU		No response										
POLAND	18	RX(mon measure), SpA, DF, ANT(meas), PC	3000	1300	36	RX(mon measure), SpA, DF, Ant(meas), PC	26000	1300		Delicated According to task	26000	–
PORTUGAL	114	**Manned** **Remote unmanned** **RX**(com, meas) **SpA DF**	2750	2750	24	DF Mobile Monitoring units	50000	1000	0			

		Antenna systems, **Dec**oders, audio **Record**ers, **TV receiver**, **FM/RDS** analyser, **modulation** analyser.				**RX**(meas) **SpA DF Ant**enna, **Power metr**, **Counter, TV receiver**, **RadioCom** Monitor.						
QATAR	1	**AFMS** Project under Implement. RX, SpA, DF EMI/EMC RX	3000	3000	2	**AFMS** Project under Implement. RX, SpA, DF EMI/EMC RX	3000	3000	0			
ROUMANIA		NR				NR				NR		
RWANDA	0				0				0			
SAMOA	0				0				0			
SENEGAL	1	RX, SpA, DF	1750	1750	2	SpA, DF	1750	1750	0			
SLOVANIA	1	RX, SpA	2G75 26000	–		RX, SpA, DF (analog/dig).	3000	3000	0			
SPAIN	55	102 RX 1 SpA 1 DF	40000	3000	25	1 RX 1 SpA 1 DF	26000	3000	45	RX, SpA	26000	3000
SRI LANKA	9	RX, SpA, DF Mon & DF SW.	3000	3000	7	RX, SpA, DF Mon & DF SW. GPS Rec.	3000	3000	0			
SURINAME	1	RX, SpA	500	–	0				0			
SWAZILAND	0				1	RX, SpA, DF Sound Recorder			0			
SWITZERLAND	55	–	26500	1300	–	–	26500	1300	–	–	26500	1300
SYRIA	0				0				0			
TAJIKISTAN	1	**RX** AR-5000, AR-3000, STV-402, STV-302-1. **SpA** SDU-5000	2600	2600	0				0			
TANZANIA	0				0				0			
THAILAND	14	RX, SpA, DF	1800	1000	15	RX, SpA, DF	1800	1000	6	RX, SpA, DF	26500	1000
TURKEY	17 8	Current Under Implement RX, SpA, DF Ant (omni, Log)	2500	2500	17 12	Current Under Implement RX, DF Ant (omni, Log)	2500	2500	13 8	Current Under Implement RX, SpA, DF Ant (omni, Log)	2500	2500
UGANDA	0				1	Planned AUG 2003 Spectrum Management System	3000	3000	1	FM_RX, SpA, SW	108.0	
UKRAINE	66	RX,DF	2600	1000	33	RX, SpA, DF	2600	1000	5	RX, DF	1000	1000

UNITED ARAB EMIRATES	2	**RX** 9KHZ - 1GHz **SpA** 10 KHz to 3.5GHz, **DF** 20-100MHz	1000	1000	2	**RX, DF** 20 MHz-500MHz **RX, DF** 20-1000MHz	1000	1-500 2-1000	1	RX 20-1000MHz	1000	–
UNITED KINGDOM	20 1	**Fixed** **Remote** **DF** 9K-30M **RX** 9K-3G **SpA**	3000	3000	3	**DF RX** 9K-50G **SpA**	50000	50000	3	**DF, RX, SpA**	1200	1200
UZBEKISTAN	15	**DF** EBD190, **RX** EB200	18000	3000	15	**DF** EBD190, **RX** ESMB	3000	3000	0			

Note 1)		
Facilities	Monitoring of technical parameters and content	
Tasks for GSO	–	
Tasks for non-GSO	–	
France		
Facilities	The agency does not have its own resources for monitoring space transmissions. Since 2001 it has worked by agreement with the German Leeheim station, with which a cooperation MOU has just been signed for several years, covering the monitoring of satellites within the CEPT jurisdiction. The Leeheim station consists primarily of three receiving antennas covering the range 130 MHz – 12.75 GHz and a control room housing the measuring and computing systems.	
	Main activities conducted at Leeheim	**% of workload**
	Assistance with satellite network	20%
	Dealing with interference	20%
	Monitoring	60%
	The centre conducts observations of existing satellite systems. It also deals with requests for compatibility testing prior to satellite launches.	
Tasks for GSO	**The Leeheim station conducts the following basic operations for the agency:** • scanning an orbit or frequency band • creating identity files for satellites • monitoring satellite position	
Tasks for non-GSO	**For non-GSO satellites the agency's work involves mainly:** • measuring pfd • calculating trajectories • signal demodulation	

ANNEX 2-K

Radio monitoring stations

- Chart 1: Fixed measurement stations
- Chart 2: Fixed direction-finding stations
- Chart 3: Mobile measurement stations
- Chart 4: Mobile radio direction-finding stations
- Chart 5: Transportable measurement stations
- Chart 6: Transportable radio direction-finding stations

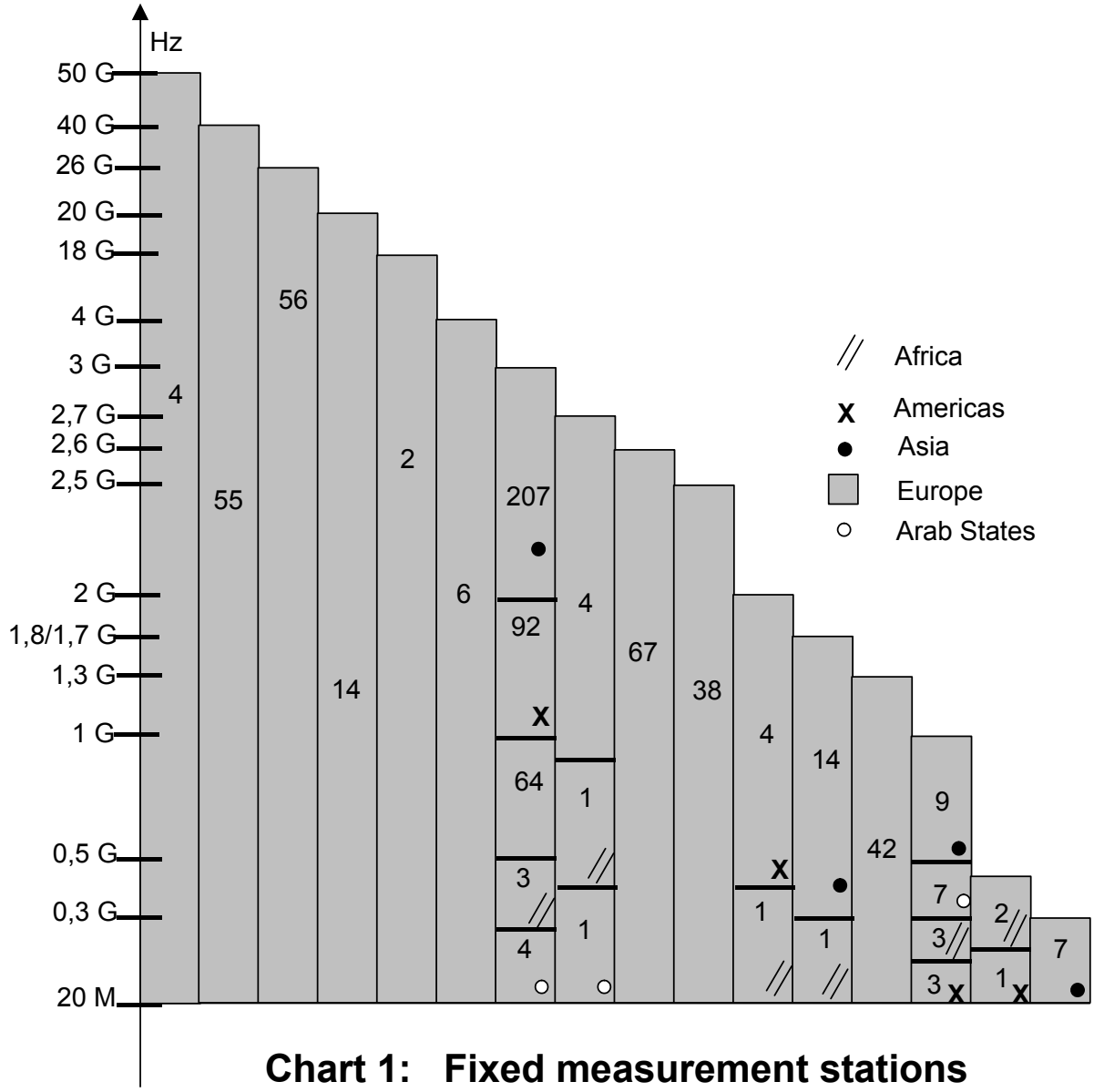

Chart 1: Fixed measurement stations

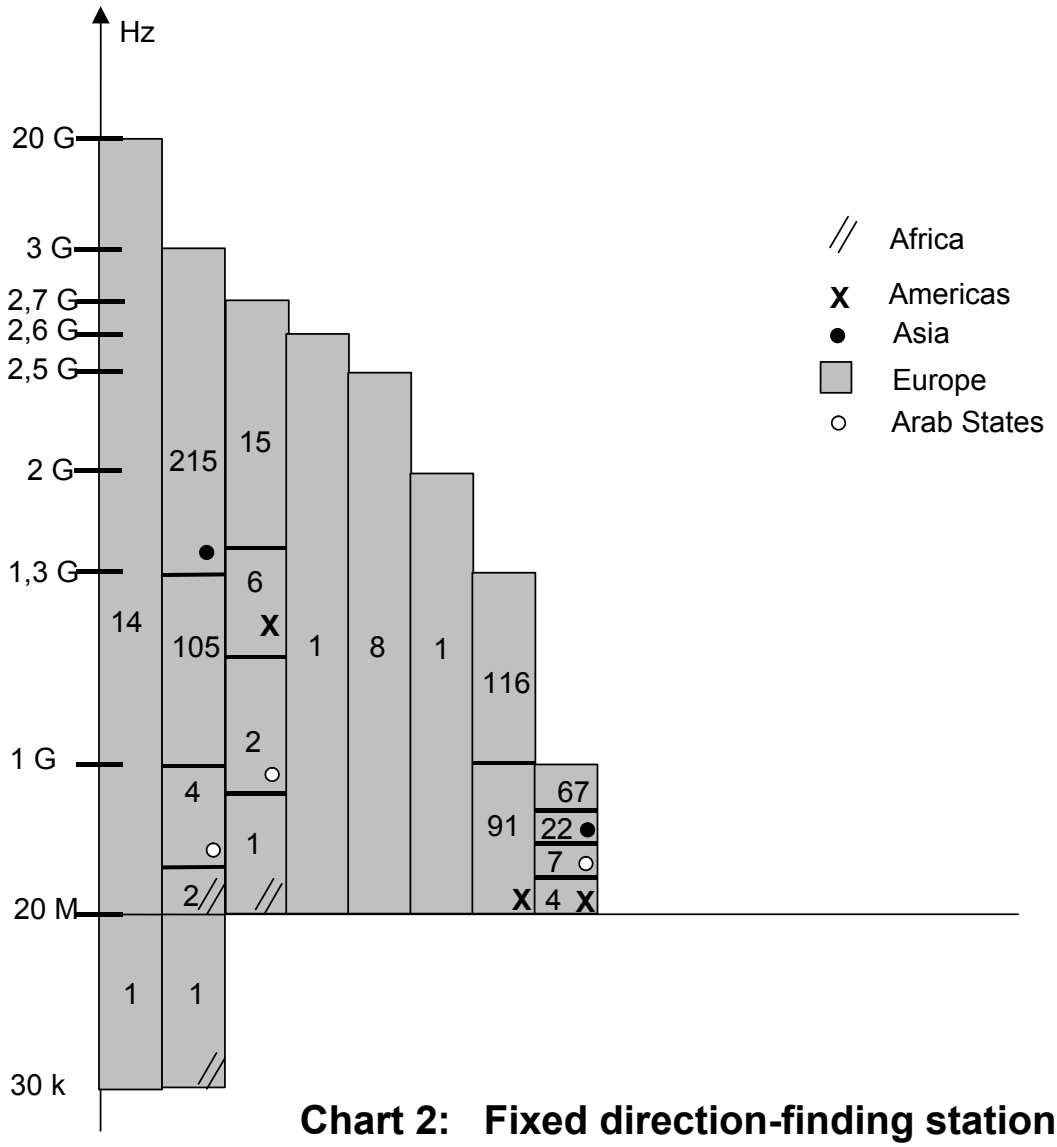

Chart 2: Fixed direction-finding stations

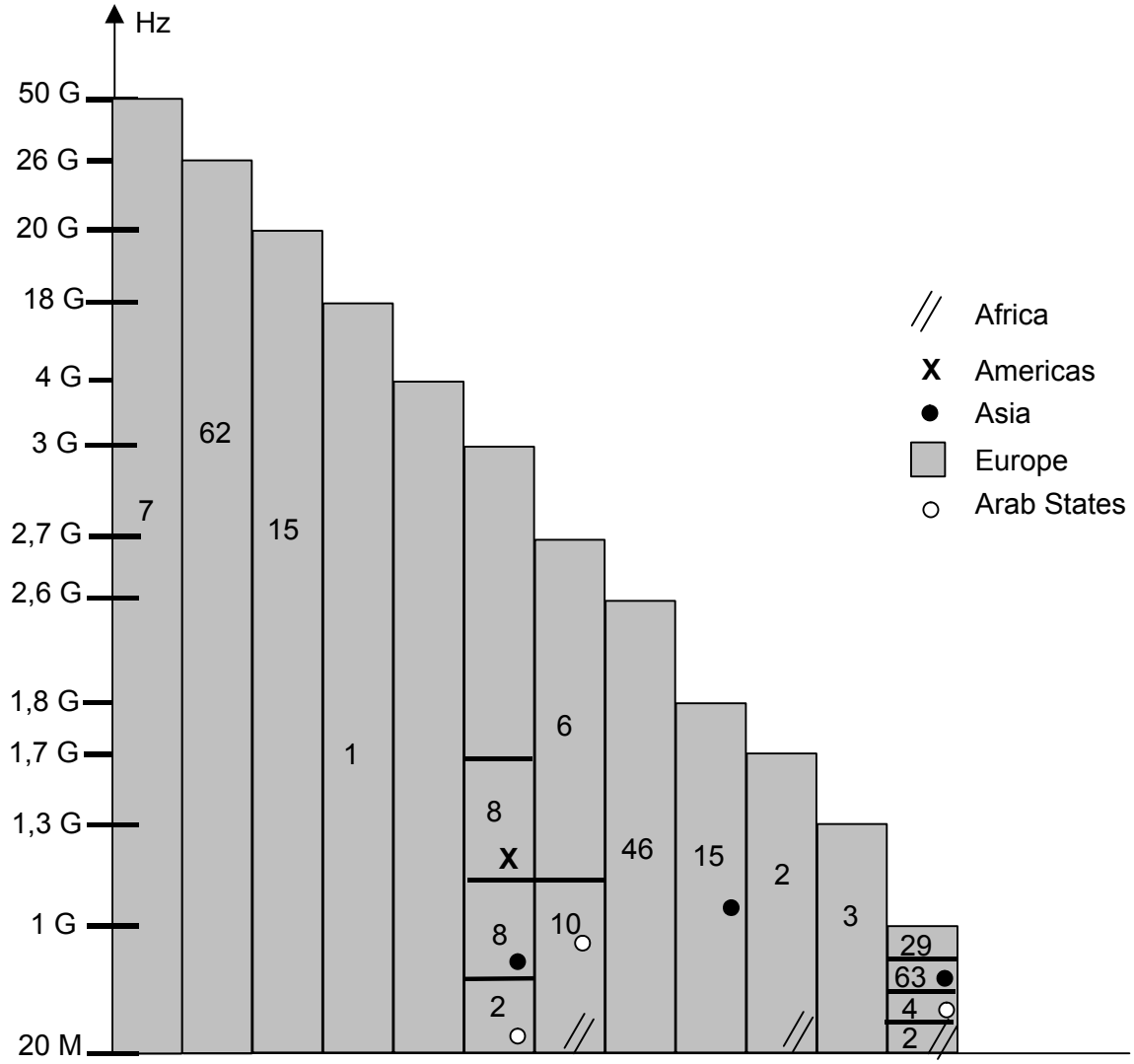

Chart 3: Mobile measurement stations

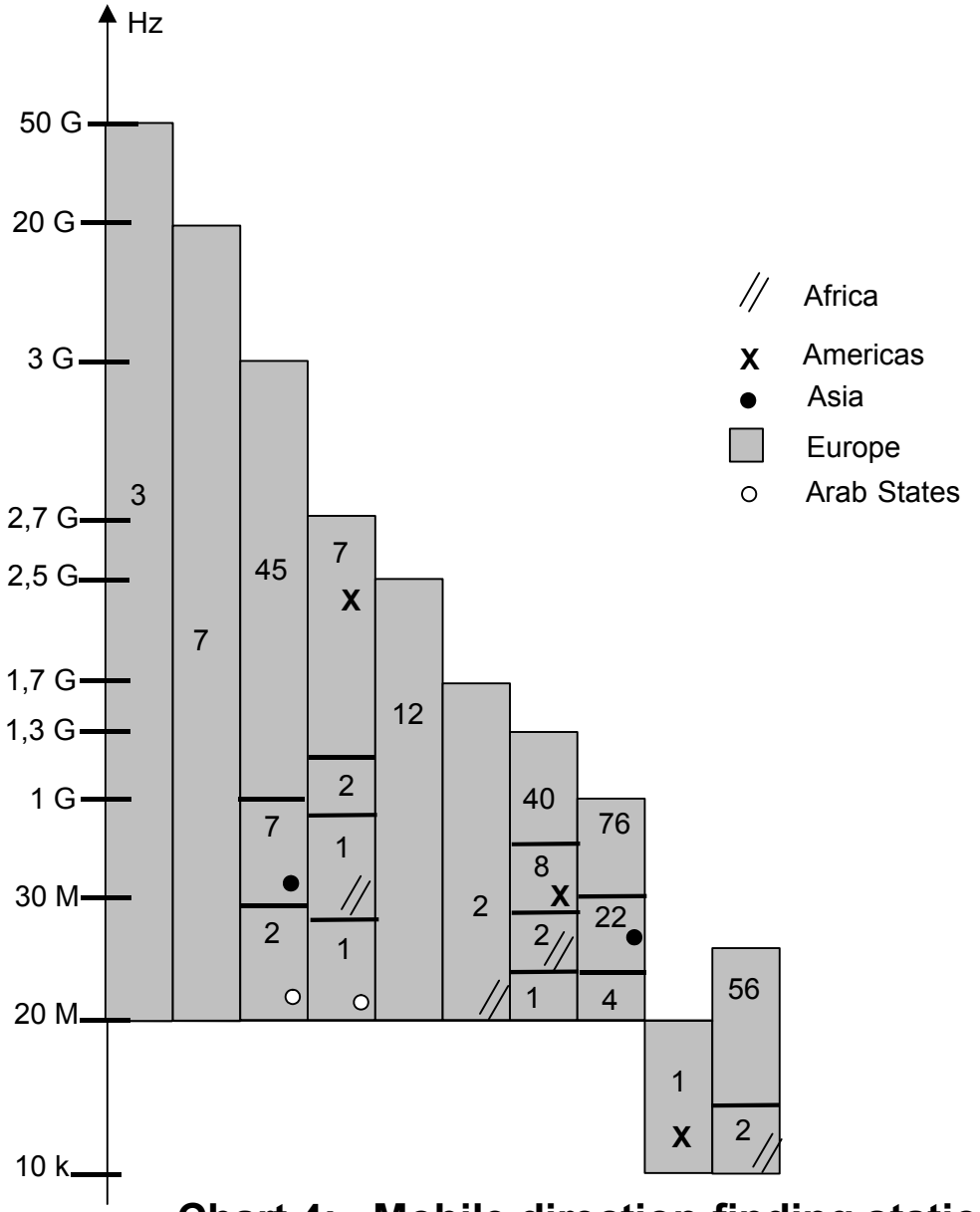

Chart 4: Mobile direction-finding stations

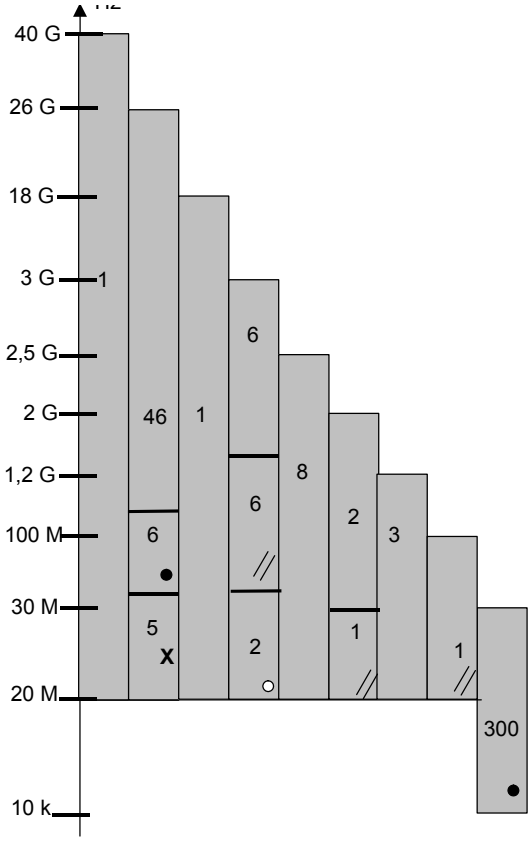

Chart 5: Transportable measurement stations

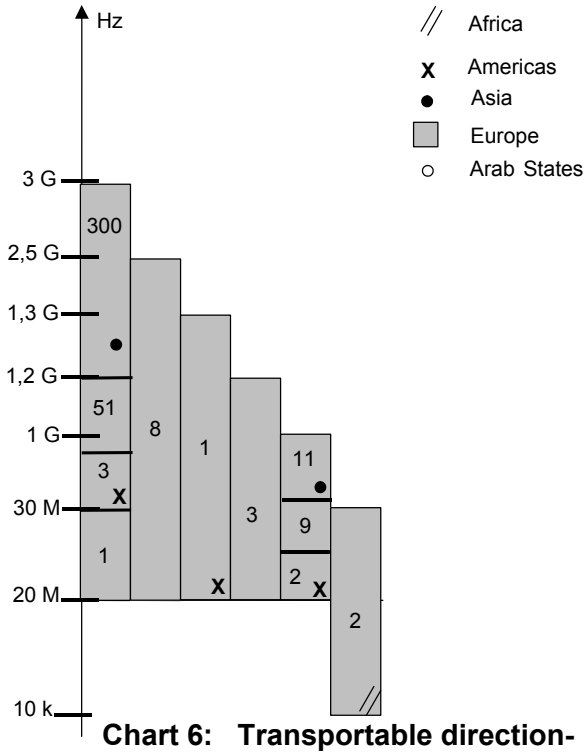

Chart 6: Transportable direction-finding stations

ANNEX 2-L

Responses concerning cooperation between spectrum management and monitoring (Question 12 r), s), t) and u))

- Participation of administrations in the International Monitoring Programme of ITU
- Amount of work (in percentages) performed by the monitoring service for administrative management departments

	Country	ITU Mon Prog	Co-op between Spectrum Management and Monitoring Dep.				Country	ITU Mon Prog	Co-op between Spectrum Management and Monitoring Dep.		
			% Frequency Management	% Enforcement	% Licence				% Frequency Management	% Enforcement	% Licence
1	ALBANIA	–	–	–	–	19	CYPRUS	NO	30	30	40
2	BAHAMAS	NA	NA	NA	NA t	20	CZECH REPUBLIC	YES	35	65	–
3	ANTIGUA AND BARBUDA	NO	0	0	0	21	EGYPT	NO	30	15	55
4	BAHRAIN	NO	50	10	40	22	EL SALVADOR	NO	30	60	10
5	BHUTAN	NO	60	–	80	23	ERITREA	NO	10	70	20
6	BOSNIA AND HERZEGOVINA	NO	10	5	85	24	ESTONIA	NO	10	45	45
7	BOTSWANA	NO	35	20	45	25	ETHIOPIA	NA	NA	NA	NA
8	BURKINA FASO	YES	50	30	20	26	FINLAND	YES	30	30	40
9	BURUNDI	–	–	–	–	26	FRANCE	YES	20	70	10
10	CAMEROON	NO	30	–	–	28	GABON	NR	NR	NR	NR
11	CANADA	YES	40	20	40	29	GREECE	Temp	30	60	10
12	CHINA	YES	30	30	30	30	GUATEMALA	NO	40	20	40
13	COLOMBIA	YES	5	90	5	31	IRAN	NO	–	–	–
14	COMORES	NO	(1)	(1)	(1)	32	IRELAND	NO	56	20	24
15	COSTA RICA	NO	55	–	20	33	JORDAN	NA	NA	NA	NA

	Country	ITU Mon Prog	Co-op between Spetrum Management and Monitoring Dep.				Country	ITU Mon Prog	Co-op between Spetrum Management and Monitoring Dep.		
			% Frequency Management	% Enforcement	% Licence				% Frequency Management	% Enforcement	% Licence
16	COTE D'IVOIRE	NO	34	36	30	34	LATVIA	YES FM22	70	5	25
17	CROATIA	YES	35	50	15	35	LEBANON	NO	20	40	40
18	CUBA	YES	30	20	50	36	LESOTHO	NO	50	30	20
37	LITHUANIA	YES	34	33	33	54	SLOVANIA	NO	60	20	20
38	MADAGASCAR	NO	30	60	10	55	SPAIN	NO	40	20	40
39	MALTA	NO	55	20	25	56	SRI LANKA	NO	30	50	20
40	MAURITANIA	NO	–	–	–	57	SURINAME	NR	43	22	43
41	MOLDOVA	NR	NR	NR	NR	58	SWAZILAND	NO	80	0	20
42	MONACO	NO	20	10	70	59	SWITZERLAND	NO	70	20	10
43	MOROCCO	NR	40	10	50	60	SYRIA	NO	NA	NA	NA
44	NIGER	NR	NR	NR	NR	61	TAJIKISTAN	NO	72	18	10
45	PANAMA	NO	50	30	40	62	TANZANIA	NO	NR	NR	NR
46	PERU	NR	NR	NR	NR	63	THAILAND	YES	30	70	0
47	POLAND	NO	15	70	15	64	TURKEY	NO	NA	NA	NA
48	PORTUGAL	NO	5	85	10	65	UGANDA	NO	20	80	80
49	QATAR	NO	–	–	–	66	UKRAINE	YES	25	30	45
50	ROMANIA	NR	NR	NR	NR	67	UNITED ARAB EMIRATES	NR	NR	NR	NR
51	RWANDA	NA	NR	NR	NR	68	UNITED KINGDOM	YES	30	20	0
52	SAMOA	NO	68	NR	NR	69	UZBEKISTAN	NO	20	70	10
53	SENEGAL	NO	NR	NR	NR						

NR = No Reponse

(1) r) Cooperation between spectrum management and monitoring: ***Response***: One and the same person handles everything: spectrum management, monitoring, licensing, invoicing, correspondence with ITU-R (questionnaires), the ministry that is the beneficiary of spectrum management revenues, and other correspondents, regulatory questions, etc.

ANNEX 2-M

Responses concerning inspection of radio stations (Question 13)

Legend:

App. = Measuring equipment

T = Techniques

Mes = Measurements

Monit = Monitoring stations

A = Antennas

F = Frequency

P = Power

L = Bandwidth

G = Gain

M = Modulation

I = Field intensity

D = Frequency deviation

NA = Not applicable

NR = No response

a) What inspection techniques are used by your administration to determine that users of the spectrum are complying with national or international requirements?

b) What are the administrative procedures that determine your inspection policy (for example the number of inspections, type of notification provided prior to inspection, rules and regulations)?

c) What measurement equipment does your administration use to perform technical measurements at an inspection?

d) What technical parameters does your administration measure when inspecting a radio system?

e) What station records does your administration review when inspecting a radio station?

Country	Station Inspection	a)	b)	c)	d)	e)
ALBANIA	Yes	Inspection	Law	NA	NA	NA
ANGOLA	Yes	NR	NR	App	P,L	NR
ANTIGUA AND BARBUDA	No	No	No	No	No	No
ARMENIA	Yes	App.	Law	App	App	NR
BAHAMAS	Yes	Visual	Inspection	App	F,P,A	Licences
BAHRAIN	Yes	App	App	App	App	Technical parameters
BHUTAN	Yes	NA	Annual	App	F,P,D	Technical monitoring
BOSNIA AND HERZEGOVINA	Yes	NR	NR	NR	NR	NR
BOTSWANA	Yes	Licences	Inspection	App	App	Licences
BURKINA FASO	Yes	Inspection	Decentrali-zation	App	F,P,L,A	Licences
BURUNDI	Yes	Licences	NR	App	F,P	Database
CAMEROON	Yes	T parameters	Inspection	App	E,P,PAR,A	Licences
Canada	No	T parameters	No	App	Parameters Licences	Licences
CENTRAL AFRICAIN REP.	Yes	T parameters	NR	No app	NO	Licences
CHILE	Yes	Reception	Type of service	App	P,F, coverage area	Licences
CHINA	Yes	Daily monit	NR	Monit	P,L	Licences
COLOMBIA	Yes	Inspection	Annual inspection	App	F,M,D,T,P,L	Licences
COMOROS	No	App	Annual inspection	App	App	Licences
COSTA RICA	Yes	Inspection	Inspection	App	L,F,---	Privates
CÔTE D'IVOIRE	Yes	Inspection	NR	App	T,F,M,--	Database
CROATIA	Yes	Inspection	NR	Monit	P,F,A,---	Licence
CUBA	Yes	T technical parameters	Authoriza-tion (Cause for Tx)	App	F,D	Licence
CYPRUS	Yes	UIT	Interference complaints	Monit	P,F,.----	Licences
CZECH REP.	Yes	Mes/ Laws	Inspection	App + Monit	F,P,L,D + Parameters	Licences

Country	Station Inspection	a)	b)	c)	d)	e)
EGYPT	Yes	Inspection Database	Laws	App	F,L, place, A interference	Licence
EL SALVADOR	Yes	Monit	Inspection	App	F,P,L, Zone	No
ERITREA	Yes	Licence	Inspection	App	Tx.out of band	Licence
ESTONIA	Yes	Law	Inspection	App	P,L,F	NR
ETHIOPIA	No	NR	NR	NR	NR	NR
FINLAND	Yes	Inspection	Law	App	P,F,D,A	Licence Database
FRANCE	Yes	Inspection	Inspection	Monit Mobile	PAR,F, Spectrum	Licence
GREECE	Yes	UIT	Complaints interference	App	P,A, Masques	Licence
GUATEMALA	No	No	Complaints	NR	I,L,M	NR
IRAN	Yes	Monit	Technical parameters	App	F,L,TX. Place	NR
IRELAND	Yes	Parameters	Licences	App	F,L,Tx.	Licence
LATVIA	Yes	Inspection	Law	Monit	F,P,L,D,A Place	Licence
LEBANON	Yes	Monit	App.	App.	F,D,P,L, -------	UIT/ Licence
LESOTHO	No	NR	NR	NR	NR	NR
LIECHTENSTEIN	Yes	Inspection	Inspection	App.	Tx,P	Licence
LITHUANIA	Yes	Inspection	Law	App.	P,F,L,D	F,D
MADAGASCAR	Yes	Licence	Inspection	App.	P,F,M	Licence
MALI	NR	No	No	No	No	No
MALTA	Yes	Inspection	Licence	App.	F,L,P,	Licence
MAURITANIA	Yes	Inspection + Monit	Inspection	App.	I,F,M, Level	Database
MOLDOVA	Yes	Mesures	Law	App.	F,M,A,L,P Tx	Licence
MONACO	Yes	Inspection	Systematic visit	App.	F,D,P	Licence
MOROCCO	Yes	Inspection	Decentrali-zation	App.	P,L,P,A	Licence
NETHERLANDS	No (exception)	NR	NR	NR	NR	NR
NICARAGUA	Yes	NR	NR	NR	NR	NR

Country	Station Inspection	a)	b)	c)	d)	e)
NIGER	No	NR	NR	NR	NR	NR
PANAMA	Yes	Inspection	Programme	App	F,L,I,N	Licence
PAPUA NEW GUINEA	Yes	Inspection	Law	App	F,P,L,Tx	Tests
PERU	Yes	Mes	Inspection	App	P,F	Database
POLAND	Yes	Mes/ Licences	No	App	P,F,Tx	Licence
PORTUGAL	Yes	Licences	Law	App	Tx parameters	Licences
QATAR	Yes	Inspection	Inspection	App	P,F	Licence
ROMANIA	NR	NR	NR	NR	NR	NR
RWANDA	NR	NR	NR	NR	NR	NR
SAMOA	Yes	NR	NR	NR	NR	NR
SENEGAL	Yes	Inspection	Inspection	App	P,F,L	Database
SLOVENIA	Yes	Checks	Interference	App	I,M,F,D,P	F,P,M
SPAIN	Yes	Licence	NR	App	P,Tx, Spectrum	Licence
SRI LANKA	Yes	Monit (L,P)	Inspection	App	F,L,P	Place, Equipment
SURINAME	Yes	T parameters	Law	App	F,L	Place
SWAZILAND	Yes	Licence	No	NR	NR	NR
SWITZERLAND	Yes	Monit	Illegal	App	Best Pratices	Database
SYRIA	NR	NR	NR	NR	NR	NR
TAJIKISTAN	Yes	Mes/ Licences	Laws	App	Technical parameters	Licences
THAILAND	Yes	Case by case	Reports	App	I,F,G,M	Licences
TURKEY	Yes	Mes	Inspection	App	P,I,F,L,D	Licences
UGANDA	Yes	NR	Regulatory	App.	PAR,L,P	Licences
UKRAINE	Yes	T parameters	NR	App	P,F,I	Licences
UNITED ARAB EMIRATES	NR	NR	NR	NR	NR	NR
UNITED KINGDOM	Yes	Technical parameters	Work program	App	F,P,M Emission	No
UZBEKISTAN	Yes	Checks	Inspection	App	F,P,T, ------	Licence
VENEZUELA	Yes	T parameters	Laws	App	F,P,L,I	Licences

ANNEX 2-N

Responses concerning handbooks and reports (Question 17)
SECTION 1
Response by country

List of countries	A National Spectrum Management 1995 version	B Spectrum Monitoring 2002 version	C Computer-aided Techniques for Spectrum Management 1999 version	D Report SM.2012-1, Economic Aspects of Spectrum Management 2000 version
Albania	N	N	N	N
Bahamas	Y	N	N	N
Antigua and Barbuda	Y	N	N	N
Armenia	Y	N	N	N
Bahrain	Y	Y	Y	Y
Bhutan	Y	N	Y	N
Bosnia and Herzegovina	Y	–	Y	Y
Botswana	Y	Y	N	Y
Burkina Faso	Y	N	N	Y
Burundi	Y	N	Y	Y
Cameroon	Y	N	Y	Y
Canada	Y	Y	Y	Y
Central African Rep.	Y	Y	Y	Y
Chile	N	N	N	N
China	–	–	–	–
Colombia	Y	N	Y	N
Comoros	N	N	N	N
Costa Rica	–	–	–	–
Côte d'Ivoire	Y	N	N	Y
Croatia	Y	Y	N	Y
Cuba	–	–	–	–
Cyprus	N	N	N	N
Czech Rep.	Y	Y	N	N
Egypt	N	Y	Y	Y
El Salvador	Y	Y	N	N

List of countries	A National Spectrum Management 1995 version	B Spectrum Monitoring 2002 version	C Computer-aided Techniques for Spectrum Management 1999 version	D Report SM.2012-1, Economic Aspects of Spectrum Management 2000 version
Eritrea	N	N	N	N
Estonia	Y	Y	N	N
Ethiopia	–	–	–	–
Finland	N	Y	N	Y
France	Y	Y	N	Y
Gabon	–	–	–	–
Greece	Y	N	Y	N
Guatemala	Y	N	N	N
Iran	Y	Y	Y	Y
Ireland	Y	N	Y	Y
Jordan	–	–	–	–
Latvia	Y	Y	Y	Y
Lebanon	Y	–	N	Y
Lesotho	Y	N	N	Y
Liechtenstein	–	–	–	–
Lithuania	N	N	N	N
Madagascar	N	N	N	N
Mali	Y	–	–	Y
Malta	Y	N	Y	N
Mauritania	–	–	–	–
Moldova	Y	Y	–	–
Monaco	–	–	–	–
Morocco	Y	N	N	Y
Netherlands	Y	Y	Y	Y
Nicaragua	Y	Y	Y	Y
Niger	Y	N	N	N
Panama	Y	N	N	–
Papua New Guinea	–	–	–	–
Philippines	Y	–	Y	–
Poland	Y	N	Y	N
Portugal	Y	Y	Y	Y
Qatar	Y	Y	Y	Y
Romania	–	–	–	–

List of countries	A National Spectrum Management 1995 version	B Spectrum Monitoring 2002 version	C Computer-aided Techniques for Spectrum Management 1999 version	D Report SM.2012-1, Economic Aspects of Spectrum Management 2000 version
Rwanda	Y	Y	Y	N
Samoa	N	N	N	N
Saudi Arabia	–	–	–	–
Senegal	Y	Y	Y	Y
Slovenia	N	N	N	N
Spain	–	–	–	–
Sri Lanka	Y	Y	N	Y
Suriname	Y	Y	Y	N
Swaziland	N	N	N	N
Switzerland	Y	Y	Y	Y
Syria	Y	N	N	N
Tajikistan	Y	–	–	–
Thailand	N	N	N	N
Turkey	Y	Y	–	Y
Uganda	Y	Y	N	Y
Ukraine	Y	N	N	N
United Arab Emirates	N	N	N	N
United Kingdom	–	–	–	–
Uzbekistan	Y	Y	Y	Y
Venezuela	Y	N	N	Y

ANNEX 2-N – SECTION 2

Breakdown of answers

	A National Spectrum, Management 1995 version		B Spectrum Monitoring 2002 version		C Computer-aided Techniques for Spectrum Management 1999 version		D Report SM.2012-1, Economic Aspects of Spectrum Management 2000 version	
OVERALL TOTAL OF RESPONSES	64		59		60		60	
ANSWER	Y	N	Y	N	Y	N	Y	Y
TOTAL, EACH ANSWER	50	14	26	33	25	35	31	29
PERCENTAGE, EACH ANSWER	78.125	21.875	44.06	55.93	41.66	58.33	51.66	48.33

ANNEX 2-O

Responses concerning the identification of problems experienced in national spectrum management (Question 18)

Question 1	Legal and regulatory texts
Antigua and Barbuda	Assistance with the drafting of legislation
Columbia	Notification of terrestrial services
Comores	Texts governing spectrum management have not been signed
Latvia	the necessity for adjustment of legislation, the development of secondary legislation in telecommunications
Monaco	Reform of legal framework
Papua New Guinea	The legal expertise required for the development of legislation pertinent to spectrum management and telecommunications in general is inadequate. The ITU could develop a template legislation that could be used as the basis for the development of corresponding national legislations
Peru	Any modification of the legislation should be in keeping with the technological environment

Question 2	Regulations and procedures
Antigua and Barbuda	Assistance with the drafting of such legal texts or regulations
Central Africa	ITU assistance required in the area of tariffs
Papua New Guinea	The legislation is publicly available i.e. anybody can purchase a copy however it is not posted on a website. Regulations and procedures for spectrum management that are developed by the regulator can also be made available to the public. The problem here is that such procedures are usually not fully developed in a form that may readily be distributed. Like in Q.1 above the ITU could develop model templates for such procedures/rules and regulations for countries to adjust and adopt.

Question 3	National radio-frequency spectrum allocation table
Antigua and Barbuda	Assistance with the provision of such a table after a database is established
Central Africa	Training on frequency management software
Papua New Guinea	The ITU Table of Frequency Allocations could be made available on the Internet or as a soft copy that administrations can use to add their specific allocations and notes. This would save time in retyping and correcting errors, ensure all tables are standardized and free from typing errors.
Uganda	Experienced delay in formulation of a national table of frequency allocations.

Question 4	Equipment – technical requirements and standards
Antigua and Barbuda	Assistance with such technical characteristics specifications
Papua New Guinea	Because of insufficient expertise developing countries usually adopt technical specifications from developed countries. Locating a specification can also be a problem. It would be useful if the ITU maintains a register of specifications that can be used as the first point of reference.
Peru	Efforts need to be made in the interests of having our own technical standards
Uganda	Assistance to develop capacity on equipment standards.

Question 5	Spectrum redeployment
Antigua and Barbuda	Assistance with development of suitable method
Armenia	Materials concerning other Administration's experiences
Botswana	Spectrum migration strategy required to align the users with the National frequency Allocation Plan
Papua New Guinea	A model of cost benefit analysis is required. How is the total cost to be established and what are the options available to meet this cost?

Question 6	Spectrum management costs
Antigua and Barbuda	Assistance with setting up the requirements of such a function with equipment and staff together with cost estimate
Armenia	Materials concerning other Administration's experiences
Malta	Increased funding would be welcome to augment the number of staff available for frequency management and for participation in International fora.
Papua New Guinea	What is the minimum structure required for complete spectrum management? What is the optimum ratio between core and support staff? What is the reasonable cost of spectrum management in relation to the size of the telecommunications market?
Uganda	Spectrum Management functions not adequately funded.

Question 7	Data Base Management System
Albania	Problems caused by lack of computerized system to keep and maintain records national frequency assignments.
Antigua and Barbuda	Assistance with the establishment of such a database
Malta	Lack of a computerized frequency management system.
Samoa	The FREQMAN Data Base for Spectrum Management Allocation not supported few of technical components for isolation the intermodulation interference. Our Ministry is looking forward to replace the old system to WINBASM software has more advance in managing the Frequency Spectrum
Uganda	Lack of automated spectrum management system.

Question 8	Coordination of frequency assignments with other countries
Antigua and Barbuda	Assistance with the establishment of such a system
Armenia	Coordination of frequency assignments to BT stations with other countries, because Armenian Administration isn't member of ST-61
Malta	We experience difficulty in carrying out terrestrial/space frequency coordination requests
Papua New Guinea	There is a need to develop a template for a frequency coordination agreements in border areas.
Uganda	

Question 9	Notification of frequency assignments to ITU
Antigua and Barbuda	This function will be better performed when a suitable database is in place
France	Difficulties have been encountered in the process of notifying assignments to the IFIC, mainly involving updates of some BR products (TeRraSys, BR IFIC, PC Capture, Preface to the International Frequency List, TO2, for terrestrial digital television).
Malta	Lack of human resources
Papua New Guinea	It would be useful if notification could be possible over the Internet.
Peru	There needs to be updated coordination in order to notify frequencies
Venezuela	The register has not been updated but work on this is under way

Question 10	Policy and planning functions
Antigua and Barbuda	Assistance is required in setting up such a policy
Sri Lanka	Bandwidth requirements for the allocation of spectrum for the individual operators in the GSM1800 Band and 3G Bands

Question 11	Technical analyses of frequency assignment
Albania	Lack of skills in the technical analyses process of frequency assignments.
Antigua and Barbuda	Assistance is required in setting up such a policy
Armenia	New methods of the technical analysis of radio frequency and parameters of radio transmitting equipment
Uganda	Limited equipment to effect measurements

Question 12	Radio monitoring of terrestrial radio services
Albania	Lack of equipment and skills on frequency monitoring process
Antigua and Barbuda	No equipment available. Require assistance
Armenia	New methods of the technical analysis of radio frequency and parameters of radio transmitting equipment
Botswana	Shortage of fixed monitoring equipment and direction finding equipment
Lesotho	Shortage of fixed monitoring equipment and direction finding equipment
Malta	We need improvement in our direction finding facilities. We also need an upgrade of monitoring equipment and further training in radiomonitoring techniques.
Mauritius	Up to now we don't have any monitoring stations, but we like to get guidelines from the ITU in setting up of our monitoring stations
Uganda	Lack of radio monitoring facilities at the moment
Uzbekistan	Administration of the Republic of Uzbekistan would like to participate in the International Monitoring Program of ITU.

Question 13	Inspection of radio stations
Antigua and Barbuda	No equipment available. Require assistance
Lesotho	Shortage of measuring equipment e.g. power meters, frequency counters, spectrum analysers, field strength meters, GPS, etc.
Papua New Guinea	What is the reasonable proportion of cost for inspections? Should this cost be covered across the board by the licence fees or should it be paid by the licensee in full?
Uganda	Few technical staff to carry out radio station inspections

Question 14	Technical analyses of radio frequency interference
Antigua and Barbuda	No equipment available. Require assistance
Armenia	New methods of the technical analyses of radio frequency interference complaints.
Uganda	Experience some difficulties in solving some cases of interference especially those relating to broadcasting services

Question 15	Use of computers for national spectrum
Antigua and Barbuda	Require suitable software
Armenia	Latest version WinBASMS for Windows 2000, Windows XP
Botswana	No fully automated spectrum management system
Burkina Faso	Difficulties working with certain ITU software products such as WinBASMS
Estonia	The WinBasms should be modified as soon as possible. See our comments in “k” section.
Malta	Lack of a computerized frequency management system.
Papua New Guinea	Awareness of WinBASMS needs to be propagated. How many and which countries are using it? Experience could be shared among administrations. ITU needs to hold seminars for training. Advice and support on how to convert form other systems to WinBASMS is required
Samoa	Need 2 computers loaded with Microsoft 2000, MS Office 2000 and WINBASM software to support our spectrum work and provides training.
Sri Lanka	Preparation of new spectrum fee structure for cellular and fixed services
Uganda	Few problems but these will be overcome after acquisition of ASMS and radio monitoring facilities
Uzbekistan	Administration of the Republic of Uzbekistan would like to get more information about Advanced Automated Spectrum Management System (AASMS) for studying and using this program.

Question 16	Organization of spectrum management
Antigua and Barbuda	Department requires expansion to include equipment and personnel
Botswana	Shortage of skilled trained personnel
Lesotho	Shortage of trained personnel
Malta	Lack of human resources in Frequency Management Section
Uganda	Require additional staff

Question 17	Use of ITU-R Handbooks and Reports
Albania	Lack of ITU literatures on managing and monitoring of frequency spectrum
Antigua and Barbuda	Department Requires additional ITU-R Handbooks
Armenia	Latest publication of the Recommendations ITU-R (Russian version)
Papua New Guinea	Greater awareness is needed about these tools.

Remarks of a more general nature

Country	Remarks
Burkina Faso	• Difficulties with acquisition of monitoring equipment (fixed and mobile) suitable for new radio technologies • Difficulties setting up an appropriate radio fee structure to take into account some new radio technologies • Difficulties with re-planning the VHF/UHF bands for national utilization. • Difficulties with access to two/three-week training courses for spectrum management executives. • Difficulties handling certain types of international frequency coordination requests • Difficulties elaborating texts for the procedure to be used in responding to interference complaints
Cameroon	• Spectrum engineering • Site management and controlled-transmission areas • Acquisition of an interactive spectrum management and monitoring system • Radio fee recovery • Dealing with unauthorized transmissions • Elaboration of a calculation model for spectrum utilization fees • Measurement of propagation • Coordination with other countries in the framework of modification of the plans of Appendices 30 and 30 A
Columbia	• Notification of terrestrial services • Notification of space services • Coordination • Appendix 7

Country	Remarks
	• Appendix 8 • Appendix 30 • Appendix 30A • Services in shared bands
Comores	• Texts governing spectrum management have not been signed • Lack of appropriate spectrum management training • Need for WinBASMS user training • Administrative inertia and obstacles • Outdated computer • Computer shared by several managers • Limited computer access • Limited Internet access • Information provided by ITU is insufficient • Computer memory approaching saturation • Requirement for Internet computer exclusively for spectrum management purposes • Impossible to do research in certain databases (BRIFIC) • Lack of suitable software being used for spectrum management • Lack of monitoring and measuring equipment • Lack of working documents and references (ITU handbooks) • Lack of contacts • Impossibility of dealing with every issue
Costa Rica	• The need for software to create a computerized database • The need for programs to manage the National Radio Control budget • Guidance on the purchase of fixed monitoring stations • Guidance on the purchase of mobile monitoring stations • Guidance on the purchase of portable monitoring stations • Programs for station monitoring • Guidance of the purchase of appropriate equipment • Guidance on the purchase of the computer and engineering system • Support and financing for the purchase of equipment needed to perform proper spectrum management and monitoring
Eritrea	• We are just waiting for a concrete and practical reply out put for the above request under this question ------- Development of spectrum fee models where Morocco and Eritrea were the prime movers of the request for such models in Istanbul at the WTDC-02. We hope we will get a useful out put soon possibly within a year.

Country	Remarks
Estonia	• Principles of coordination of maritime stations (procedure, criteria, method of calculation) • Inter-relationship between coordination and notification process (for all services except broadcasting)
Mauritania	• Lack of reliable information from spectrum users • Skill in using recently acquired measuring and spectrum analysis equipment • Lack of technical resources for monitoring radio equipment compliance with ITU standards • Staff training • Participation in sub-regional seminars for sharing experience
Mauritius	• We also want to know if there is a specific band available for the migration of frequency bands for certain services
Niger	• Lack of IT resources Need for training on computerized spectrum management • No-automatic management system • Lack of fixed and mobile monitoring stations • Lack of transportable monitoring stations • Absence of a national policy on frequency management • We wish to request the assistance of ITU in setting up a national frequency management policy and an independent frequency management body. • We wish to request the assistance of ITU for hosting a monitoring station and setting up a calibration laboratory for radio equipment • Training is necessary • Free availability of WinBASMS offers advantages, as a training resource if nothing else.
Qatar	• Anomalous propagation effect (possibly due to duct formation over the sea) causes severe seasonal cross-border interference problems from and to the neighbouring countries, primarily in VHF/UHF bands. The phenomenon is required to be studied in depth for a lasting solution. ITU-R may like to look into the matter. Radar interference to the radiocommunication services by naval ships sailing in Arabian gulf is a major problem for the telecommunication systems of this region. The matter requires to be studied for remedial actions

Country	Remarks
Senegal	• HR shortage • Training • Equipment • Users' non-compliance with regulations • Inflexible procedures • Tariff guide • Ignorance of the regulations among the general public
Tajikistan	• The methods of frequency fee calculation are obsolete & do not consider the technical characteristics of modern radio equipment. Could you send us the last methods & recommendations on frequency fee calculation? • The single methods of adding frequency fee for all the users do not provide the users separation, using the frequency in commercial & non commercial activities. Could you send us the recommendations on adding frequency fee to different users. • The lack of automatic system of spectrum management & electronic map complicates the work of spectrum management & analysis of electromagnetic compatibility of the users. Could you send us the single software on calculation of EMC for broadcasting service, frequency spectrum management & electronic map of Central Asia? • The lack of means for raising the level of skill, working in the field of frequency spectrum management reduces the productivity of labour in the field of frequency spectrum management. • The lack of means does not allow in proper time to get the documents provided by ITU. • The lack of skilled technical translators complicates the translation of technical documentations sent by ITU. • The lack of modern fast-acting computers does not allow to solve required tasks. • It is necessary to organize different training courses for the specialists on various kinds of services, as well as the work with software, which is important for the calculating electromagnetic compatibility, database management & frequency spectrum.
United Arab Emirates	• Interference calculation • Fees calculation

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REPORT ON RESOLUTION 9 (REV. ISTANBUL, 2002) AND QUESTION 21/2 – PART III

1 Introduction

ITU-D Question 21/2 (see Annex 1), adopted by the World Telecommunication Development Conference (Istanbul, March 2002), aims to respond to one of the most pressing concerns of the majority of developing countries, particularly LDCs, which are experiencing difficulties in establishing a national frequency fee calculation model.

The Question was entrusted to the Joint Group on Resolution 9 (ITU-D Study Group 2 and ITU-R Study Group 1) in order to benefit from the experience it had acquired during the period 1998-2002 in mobilizing ITU-D and ITU-R expertise. It will lead *inter alia* to the establishment of a document structure bringing together the calculation formulas and frequency fee amounts applied by the countries for radiocommunication usages in the various frequency bands.

A questionnaire (**Administrative Circular CA/12**) was thus sent to administrations in order to collect the necessary data, which were analysed in depth. The responses submitted by the administrations were processed in several stages, in the course of which they were classified by region and by type and quality of response. They were then subjected to more in-depth analysis (where the content of the responses permitted it), which was used to draft this report and set up a database that the countries can query via the ITU website.

Generally speaking, Report ITU-R SM.2012-1, while it does not go into detail about the situation in each country, does describe several possible methods of administrative spectrum pricing and mentions the variables likely to be used to calculate frequency fees, in addition to the Spectrum Management Handbook.

These two documents also consider the systems of assignment by public tender and of transferable rights to use the spectrum, in both of which frequency prices are set by the market.

Question 21/2 thus carries on from Report ITU-R SM.2012-1 and the Spectrum Management Handbook, and the results of the work done under this Question will provide information on the real conditions in which frequency fees are implemented in all the countries that participated, along with the values used.

2 Questionnaire responses

Fewer countries than expected sent in a response to Part III of the questionnaire, relating to the calculation of fees for frequency use.

The modest number of survey participants is shown in the following table, which also gives an indication of the incompleteness of some of the responses received. The results and graphs in the following have been elaborated on the basis of those responses which were received, which are available on the ITU-D website and on a CD-ROM distributed by BDT.

Countries that did not respond to Part III (CD)	Countries that did not respond to Part III (website)
BHUTAN(1)	ANGOLA
BOSNIA AND HERZEGOVINA	BHUTAN(1)
CANADA(1)	BOSNIA AND HERZEGOVINA
CEPT	CANADA(1)
CHILE(1)	CEPT
CHINA(1)	COSTA RICA
COMOROS(1)	CUBA
COSTA RICA(1)	CYPRUS
CUBA(2)	ETHIOPIA(1)
ETHIOPIA(1)	GABON
GABON	IRAN
IRAN	IRELAND
IRELAND	JORDAN
JORDAN(1)	LATVIA
LATVIA	LITHUANIA(1)
LITHUANIA(1)	NETHERLANDS
MEXICO	NICARAGUA
NICARAGUA	PANAMA(1)
PANAMA(1)	PERU(1)
PERU(1)	POLAND
POLAND	QATAR(1)
QATAR(1)	ROMANIA
ROMANIA	RWANDA(1)
RWANDA(1)	SAMOA
SAMOA	SAUDI ARABIA
SAUDI ARABIA	SURINAME(1)
SURINAME	UZBEKISTAN(1)
SWAZILAND(1)	VENEZUELA(1)
UZBEKISTAN(1)	
VENEZUELA(1)	
VIET NAM(1)	

(1) = Countries that responded to the questions in Part III, but not to the charts.

(2) = Countries that responded to the charts in Part III, but not to the questions.

The variables and scales/formulas received are contained in the specially set up database; a large number of responses would help by enriching the database, increasing its usefulness to all administrations.

Since the database is intended to be renewed periodically, administrations are encouraged to respond to the questionnaire or add to their previous response.

The analysis and statistics in the present report refer to geographical regions, defined as follows:

– Africa: region 1

– Americas: region 2

– Asia and Pacific: region 3

– Europe and Asia minor: region 4

– Arab States: region 5.

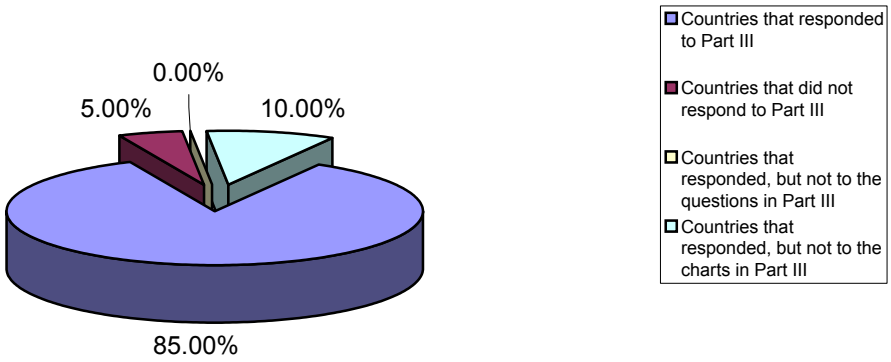
Number and type of response, by region: the graphs below give a breakdown of the responses received, broken down as follows:

- number of countries that provided a full response to all of Part III of the questionnaire;
- number of countries that did not respond to Part III of the questionnaire;
- number of countries that responded to Part III of the questionnaire but not to questions Q.1-Q.9;
- number of countries that responded to Part III of the questionnaire but not to charts A-E.

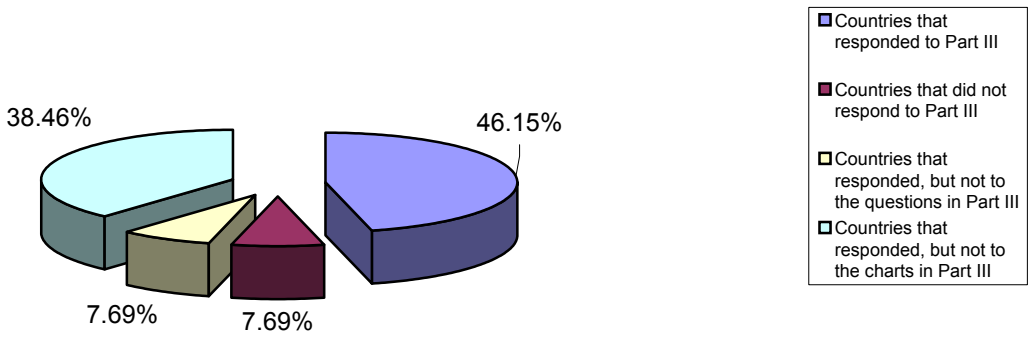
Region	Number of countries that responded to the whole questionnaire	Number of countries that responded to Part III	Number of countries that did not respond to Part III	Number of countries that did not respond to the questions in Part III	Number of countries that did not respond to the charts in Part III
1	20	17	1	0	2
2	13	6	1	1	5
3	6	5	0	0	1
4	25	20	1	0	4
5	8	6	0	0	2
Total	**72**	**54**	**3**	**1**	**14**

NUMBER OF RESPONSES, BY REGION

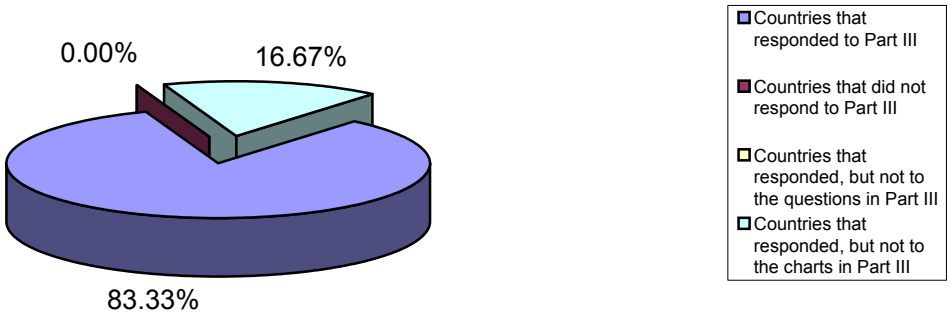
Region 1



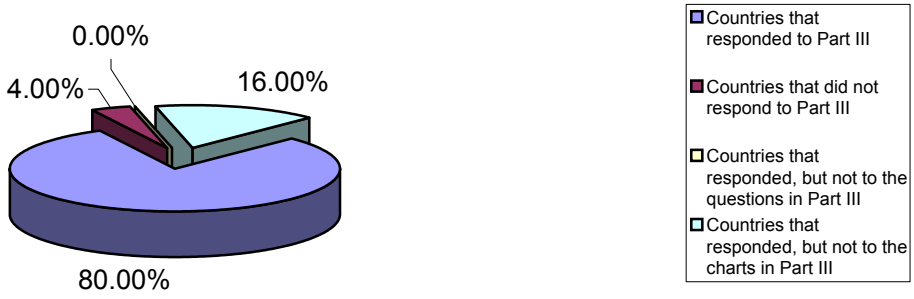
Region 2

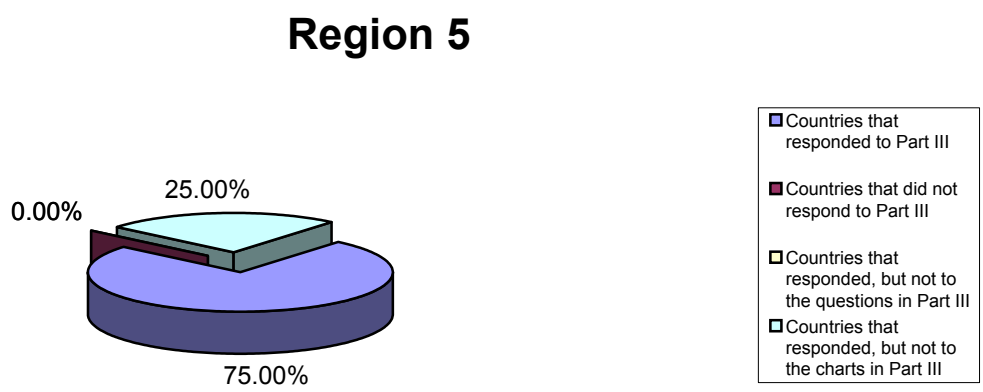


Region 3



Region 4





3 Analysis of responses

The responses received from administrations have been integrated in their entirety into the database created for the purpose (see § 6), by country and region. Their size precludes full reproduction in this report.

Some administrations provided full and detailed answers to all parts of the questionnaire, while others left out some or all of the questions and the five charts relating to variables used to calculate fees. In some cases there were discrepancies between the answers given to the questions and the charts, in others there were evident mistakes, which were left out of the analysis. Administrations are free to correct any erroneous data they find in their database entries.

3.1 General questions (Q.1 to Q.5)

3.1.1 Question Q.1: *Are there any legal texts on the establishment of frequency fees?*

The responses are summarized in the following table:

Existing texts	Yes	No	No answer provided	Number of responses	Texts in progress
Africa	13	5	0	18	2
Americas	10	2	0	12	–
Asia-Pacific	6	0	0	6	–
Europe and Asia minor	22	2	1	25	1
Arab States	6	1	1	8	–
Column total	**57**	**10**	**2**	**69**	**3**

A large majority of countries has legal texts governing the establishment of fees. Among the ten countries which do not, three indicated that work was being pursued to develop such texts.

3.1.2 Question Q.2: *What procedure (regulatory, legislative, etc.) is used to review and update your system for setting frequency fees? Are reviews conducted at pre-established regular intervals? Does recourse to market mechanisms (auctions, calls for tenders) to screen applicants for spectrum access require that parliament enact legislation, that the government make a decision, or any other measure?*

The responses relating to the existence of a legislative or regulatory procedure are summarized in the following table:

	Yes	No	No answer provided	Number of responses	Texts in progress
Africa	15	2	1	18	1
Americas	9	1	2	12	–
Asia-Pacific	6	0	0	6	–
Europe and Asia Minor	23	0	2	25	–
Arab States	5	0	3	8	–
Column total	**58**	**3**	**8**	**69**	**1**

A large number of countries (58 out of 69) has legislative or regulatory procedure for reviewing and updating the fee system.

The responses relating to the interval for fee reviews are summarized in the following table:

	Yes	No	No answer provided	Number of responses	Texts in progress
Africa	1	12	5	18	1
Americas	4	6	2	12	–
Asia-Pacific	0	6	0	6	–
Europe and Asia minor	6	15	4	25	–
Arab States	0	6	2	8	–
Column total	**11**	**45**	**13**	**69**	**1**

For the vast majority of the countries which submitted a response to this question, fees are not reviewed at regular intervals.

Responses concerning the need for a legislative or regulatory act to have recourse to the market are summarized in the following table:

	Yes	No answer provided	No act required, or no need foreseen	Number of responses
Africa	8	3	7	18
Americas	9	2	1	12
Asia-Pacific	5	1	0	6
Europe and Asia minor	17	3	5	25
Arab States	4	2	2	8
Column total	**43**	**11**	**15**	**69**

In the majority of cases having recourse to the market requires a legislative or regulatory act.

3.1.3 Question Q.3: *Are the same approaches and principles used to set frequency fees for all users?*

The responses concerning the similarity of methods used to determine fees for all users are summarized in the following table:

	Yes	No	No answer provided	Number of responses
Africa	8	9	1	18
Americas	5	5	2	12
Asia-Pacific	3	3	0	6
Europe and Asia minor	16	7	2	25
Arab States	4	3	1	8
Column total	**36**	**27**	**6**	**69**

The responses received do not show any clear preference, suggesting that the question may have been interpreted differently by the various administrations.

3.1.4 Question Q.4: *In addition to direct frequency fees, certain administrations require the payment of additional spectrum-related charges (for example, for spectrum access, spectrum replanning, management of equipment using the frequencies, etc.). Does your administration require such payments?*

The responses concerning the use of additional charges are summarized in the following table:

	Yes	No	No answer provided	Number of responses
Africa	4	12	2	18
Americas	3	7	2	12
Asia-Pacific	3	3	0	6
Europe and Asia minor	8	16	1	25
Arab States	1	5	2	8
Column total	**19**	**43**	**7**	**69**

A majority of the countries indicated that they did not use additional charges.

3.1.5 Question Q.5: *To which institution(s) are the frequency fees and any additional charges collected paid?*

The answers concerning the institution(s) to which fees are paid are summarized in the following table:

	State (or ministry) budget	National regulatory authority (or independent body responsible for spectrum management)	No answer provided	Number of countries submitting responses
Africa	4 (+ 1)	13	2	18
Americas	7 (+ 1)	2	4	12
Asia-Pacific	4	2	0	6
Europe and Asia minor	14 (+ 5)	15	1	25
Arab States	4	2	2	8
Column total	**33 (+7)***	**34**	**9**	**69**

* (+ 7) means that in total, fees are paid both to the regulatory authority and the State in 7 countries.

The responses show that the proportion of cases in which the State (or ministry) budget is the beneficiary is comparable with those in which it is an independent body, frequently the one in charge of spectrum management.

Financing spectrum management expenditure

The answers to Q.5 may be put in the context of those received in response to Q.6, Part II (spectrum management costs and how they are funded).

The responses show that spectrum management bodies are funded in one of three ways:

a) through spectrum use fees collected directly by the spectrum management body;

b) through public budget funding; or

c) by some combination of collected fees and public funding.

For countries in group a), the annual total of fees collected from spectrum users should thus correspond to the cost of spectrum management at the national level given in Q.6, Part II.

3.2 Exemption from payment of frequency fees

This section relates to the questions Q.6 and Q.7 in Part III of the questionnaire, which read:

Q.6: *Are any applications partially or completely exempted from the payment of frequency fees?*

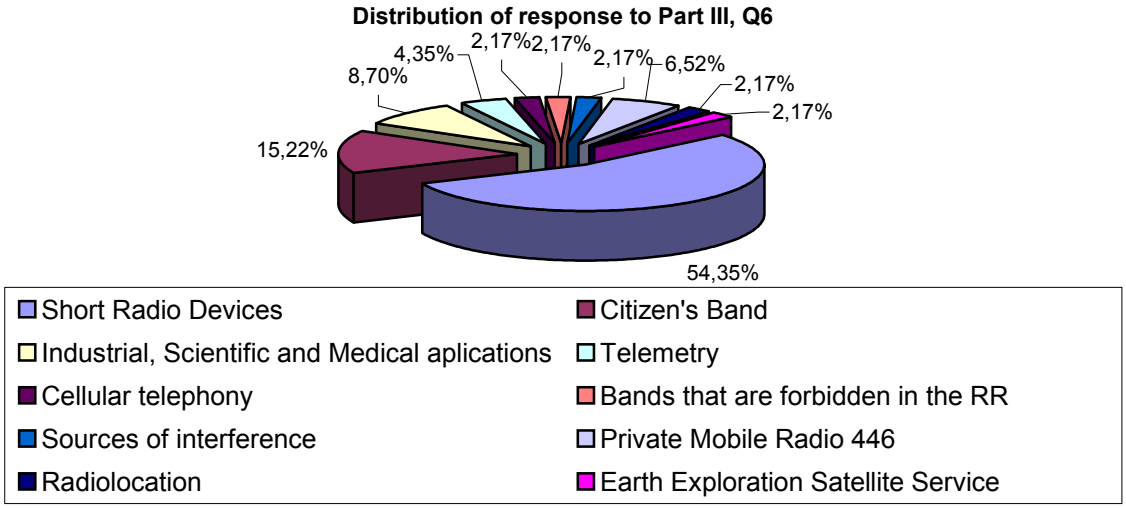
Q.7: *Are any users partially or wholly exempted from the payment of frequency fees?*

Examination of the responses received to these two questions concerning exemptions from frequency use fees granted by administrations shows that, for applications, generally fully or partly exempted, there are applications operating in certain predetermined frequency bands, generally not requiring an assignment procedure on the part of the administration.

The various applications that have an exemption or discount are illustrated below, with the percentage corresponding to the three regions.

Application	Region	No. of countries	Total
SRD	1	7	25
	2	3	
	3	3	
	4	9	
	5	3	
Citizen's Band (CB)	1	3	7
	2	0	
	3	1	
	4	3	
	5	0	
ISM	1	1	4
	2	0	
	3	1	
	4	2	
	5	0	
Telemetry	1	0	2
	2	1	
	3	1	
	4	0	
	5	0	

Application	Region	No. of countries	Total
Cellular telephony	1	0	1
	2	0	
	3	1	
	4	0	
	5	0	
Bands forbidden in Radio Regulations	1	0	1
	2	0	
	3	0	
	4	1	
	5	0	
Sources of interference	1	0	1
	2	0	
	3	0	
	4	1	
	5	0	
Simplified professional radio (PMR)-446	1	0	3
	2	0	
	3	0	
	4	3	
	5	0	
Radiolocation	1	0	1
	2	0	
	3	0	
	4	1	
	5	0	
EESS	1	0	1
	2	0	
	3	0	
	4	1	
	5	0	

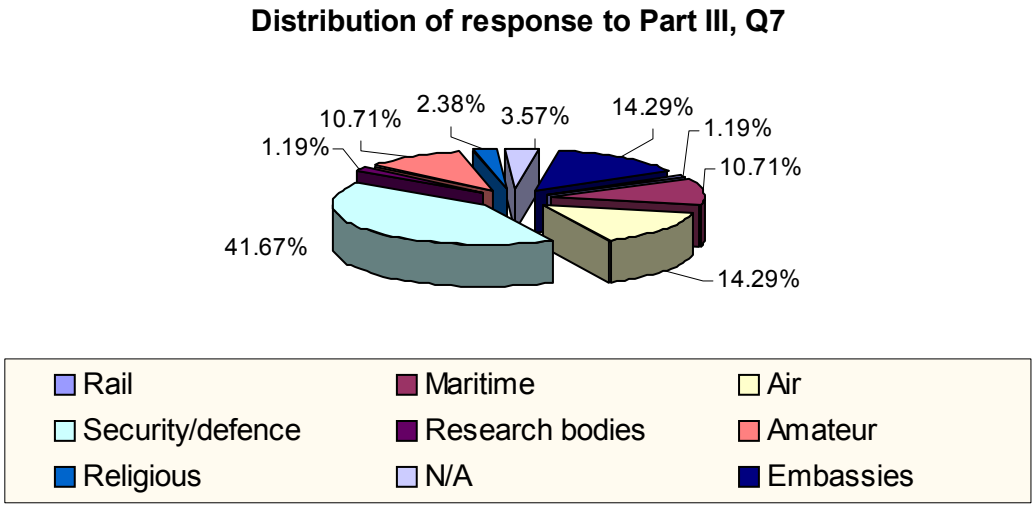


Furthermore, a number of administrations grant exemptions or discounts for frequency user fees collected from the public sector (ministries, departments, etc.), humanitarian organizations, safety departments and so on.

The organizations that benefit from an exemption or discount are shown below, with the percentage corresponding to the three regions.

Users	Region	No. of countries
Rail	1	1
	2	0
	3	0
	4	0
	5	0
Maritime	1	1
	2	2
	3	2
	4	3
	5	1

Users	Region	No. of countries
Air	1	3
	2	2
	3	3
	4	3
	5	1
Security/defence	1	9
	2	5
	3	5
	4	12
	5	4
Research bodies	1	1
	2	0
	3	0
	4	0
	5	0
Amateur	1	2
	2	1
	3	2
	4	3
	5	1
Religious	1	1
	2	1
	3	0
	4	0
	5	0
United Nations	1	1
	2	0
	3	2
	4	0
	5	0
Embassies	1	3
	2	1
	3	2
	4	5
	5	1



3.3 The application of frequency fees

3.3.1 Methods used by administrations

Charts A to E, with information provided by administrations, allow an analysis of the variables which administrations have decided should make up the fees.

In determining the amounts of fees, administrations use formulas, scales or some combination of both.

Section 5 below examines the results with respect to the use of variables by administrations.

3.3.2 Explanations, grounds and objectives

Few administrations gave an answer to this part of the questionnaire. Their answers are found in the database. They may be summarized briefly as follows.

Frequency use fees make it possible to:

– finance spectrum management;

– create incentives for more efficient spectrum utilization; and

– make the most of the spectrum, as a public good, in the public interest.

The table below lists some of the explanations and objectives given for the variables, as expressed in the responses.

Variable	Explanation and ground, desired objectives
Bandwidth	Occupation of common spectrum. Incentive for economic spectrum use.
Centre frequency, band position in spectrum	Propagation characteristics are not constant throughout spectrum. Incentive to make use of uncongested portions.
Exclusive/shared use	Occupation of common spectrum. Incentive for efficient spectrum use.
Allocated area, distance between transmitter and receiver	Geographic possibilities for others to reuse frequencies, based on area and distance. For commercial frequency use, the potential turnover is a function of the allocated area.
Number of transmitting stations	Occupation of public lands and spectrum.
Duration of authorization	Length of period during which the common spectrum is occupied.
Population covered	For commercial frequency use, the potential turnover is a function of the population that is covered.
Geographic location	Conditions of propagation (and therefore network cost), spectrum congestion and potential turnover are all related to the geographic location. Important for land-use planning in particular.
Operator turnover	The operator enjoys a position advantage by virtue of access to a common resource. Objective: redress any imbalance.

3.3.3 Recourse to market mechanisms

Administrations were invited to indicate any applications for which they employed market mechanisms (auction, call for tenders or comparative selection).

The tables below give the number of countries that did so for various applications.

Wireless local loop

	Africa	Americas	Asia-Pacific	Europe and Asia minor	Arab States	No. of responses
e	0	0	0	3	0	3
scp	0	0	0	0	1	1
sc	0	0	0	2	0	2
Column total	**0**	**0**	**0**	**5**	**1**	**6**

e: auction
scp: call for tenders
sc: comparative selection

2G mobile systems

	Africa	Americas	Asia-Pacific	Europe and Asia minor	Arab States	No. of responses
e	0	0	0	1	0	1
scp	0	0	0	3	1	4
sc	0	0	0	5	0	5
Column total	**0**	**0**	**0**	**9**	**1**	**10**

e: auctions
scp: call for tenders
sc: comparative selection

3G mobile systems

	Africa	Americas	Asia-Pacific	Europe and Asia minor	Arab States	No. of responses
e	0	0	0	3	0	3
scp	0	0	0	0	0	0
sc	0	0	0	3	0	3
Column total	**0**	**0**	**0**	**6**	**0**	**6**

e: auctions
scp: call for tenders
sc: comparative selection

Analogue terrestrial radio

	Africa	Americas	Asia-Pacific	Europe and Asia minor	Arab States	No. of responses
e	0	0	0	0	0	0
scp	0	0	0	0	0	0
sc	0	0	0	3	0	3
Column total	**0**	**0**	**0**	**3**	**0**	**3**

e: auctions
scp: call for tenders
sc: comparative selection

Digital terrestrial radio

	Africa	Americas	Asia-Pacific	Europe and Asia minor	Arab States	No. of responses
e	0	0	0	0	0	0
scp	0	0	0	0	0	0
sc	0	0	0	2	0	2
Column total	**0**	**0**	**0**	**2**	**0**	**2**

e: auctions
scp: call for tenders
sc: comparative selection

Digital terrestrial television broadcasting

	Africa	Americas	Asia-Pacific	Europe and Asia minor	Arab States	No. of responses
e	0	0	0	0	0	0
scp	0	0	0	0	0	0
sc	0	0	0	4	0	4
Column total	**0**	**0**	**0**	**4**	**0**	**4**

e: auctions
scp: call for tenders
sc: comparative selection

Furthermore, it may be observed that one of the Arab States has conducted:

- an sc to select independent trunk operators; and
- an scp to select VSAT network operators.

For the most part, market mechanisms are called upon only for applications involving access to the end-user or, in the case of broadcasting, access to the general public.

For broadcasting applications, only comparative selection is used.

For other applications, the two main mechanisms, calls for tenders (e and scp) and "beauty contest"-type comparative selection tenders (sc), are roughly equally popular.

4 Updating the report and database

4.1 Updating the report

Question Q.9: *How often would you consider it most appropriate to update the report and the database: every 2 years, 3 years, 4 years, ...?*

The responses received on the subject of updating the report are summarized below.

Update interval	2 years	3 years	4 years	Number of responses
Africa	6	4	2	12
Americas	2	3	3	8
Asia and Pacific	2	2	0	4
Europe and Asia minor	6	7	6	19
Arab States	0	3	1	4
Column total	**16**	**19**	**12**	**47**

One country proposed an update every five years.

It is proposed that the Study Groups in question state their preference for the report updating interval.

4.2 Updating the database

It is proposed that the Study Groups in question state their preference for the manner of updating the database.

5 Analysis of results

5.1 Variables used to determine fees

5.1.1 Variables and applications identified in questionnaire

The questionnaire considers 19 variables to characterize the elements used by administrations in establishing the fees charged for frequency usage.

The variables are given in the table below.

Categories	Variables
Spectrum-related variables	bandwidth
	number of channels
	centre frequency, or band position in the spectrum
	exclusive/shared use
Variables relating to geographic coverage	surface area allocated
	distance between transmitter and receiver

Categories	Variables
Variables relating to equipment and infrastructure	transmitter power
	antenna diameter
	bit rate or capacity
	transmitting beam angle
	number of transmitting stations
	number of receiving stations
	degressivity
Socio-economic variables	duration of authorization/licence
	population density
	total population covered
	geographic location
	operator's turnover
	gross domestic product

The questionnaire also identified 30 applications, grouped in five categories concerning the fixed, mobile, satellite and broadcasting service and one called "other applications".

For any given application, administrations were asked to respond with a "Yes" or "No" for each of the listed variables in charts A to E of the questionnaire, to indicate whether they used that variable in calculating the amount of the fee.

5.1.2 Processing of responses from administrations

All of the responses from administrations relating to the five charts, A to E, have been transcribed verbatim into the database. The quality of the **statistical** information extracted thus depends entirely on the manner in which administrations have filled in those charts.

The database has been designed to provide, for any of the 30 applications and for a given variable, information about which countries use the variable, and the number (and proportion) of countries in each of the five regions and worldwide which use it.

The annex contains, by way of example, the statistics for the variables used for fixed service applications worldwide.

5.1.3 Analysis of variables used

Variables are used more or less commonly depending on the application being considered.

5.1.3.1 Most commonly used variables

Apart from "duration of authorization/licence", the most common variables are:

– number of transmitting stations;

– bandwidth; and

– transmitter power.

The tables below give the worldwide percentage for utilization (number of countries which use the variable/total replies + no-answers) on the basis of the current database contents.

Fixed service

Radio-relay	Local radio loop	Links between fixed stations	Local radio networks
number of transmitting stations (65%)	bandwidth (56%)	number of transmitting stations (62%)	bandwidth (40%)

Mobile service

2G mobile systems	3G mobile systems	Radio-messaging	Private independent networks	Operated independent networks
bandwidth (57%)	bandwidth (28%)	bandwidth (37%)	number of transmitting stations (51%)	bandwidth (40%)

Satellite service

VSAT	Earth stations	Satellite video reporting	Mobile-satellite service
bandwidth (47%)	bandwidth (53%)	bandwidth (27%) number of transmitting stations (27%)	bandwidth (41%)

Terrestrial broadcasting service

Analogue sound broadcasting	Digital sound broadcasting	Analogue television broadcasting	Digital television broadcasting
transmitter power (36%)	number of transmitting stations (21%)	transmitter power (33%)	number of transmitting stations (20%)

Other applications

Radio amateur	Experimental networks	Low-range, low-power devices	Radionavigation
number of transmitting stations (24%)	number of transmitting stations (21%)	number of transmitting stations (14%)	number of transmitting stations (21%)

Remark: For some applications, the relatively low percentage of utilization indicated after the variable signifies that few countries apply fees for those applications.

5.1.3.2 Rating of most commonly used variables

Given the wide range of responses, such a rating is only possible application by application. By way of an example, the table below rates the variables (with the exception of "duration of authorization") for radio-relays and 2G mobile systems.

It will be observed that socio-economic variables are not in wide use.

Radio-relays

Variable	% use
number of transmitting stations	65%
bandwidth	60%
centre frequency or band position	47%
number of channels	44%
bit rate or capacity	25%
number of receiving stations	23%
transmitter power	23%
exclusive/shared use	22%
surface area allocated	18%
distance between transmitter and receiver	13%
degressivity	10%
geographic location	10%
transmitting beam angle	7%
antenna height	6%
gross domestic product	1%

2G mobile systems

Variable	% use
bandwidth	57%
number of transmitting stations	27%
centre frequency or band position	27%
surface area allocated	24%

Variable	% use
exclusive/shared use	19%
geographic location	12%
number of receiving stations	10%
bit rate or capacity	9%
population density	7%
total population covered	7%
operator's turnover	6%
degressivity	4%
gross domestic product	1%

5.2 Fee size

Few administrations indicated the size of their fees.

Some administrations gave detailed information on the calculation algorithms or scales, making it possible to determine the size of the fee for a given application. This information may be found in the database.

As indicated in § 3.1.5, in some countries the fee total is determined in such a way as to cover the costs of spectrum management.

5.3 Recourse to market mechanisms

As § 3.3.3 shows, to date few administrations have made use of market mechanisms. The total number in any one application never exceeds ten.

5.4 Advantages and disadvantages of each approach

Question Q.8: *What are the advantages and disadvantages of the approaches currently used by your administration to establish the amount of frequency fees and any additional charges?*

Twenty-four administrations responded to this question. Their answers, which may be viewed in the database, are summarized in the table below, broken down according to the spectrum pricing methodology (discussed in Chapter 2 of the report ITU-R SM.2012) and with an additional category of "other advantages and disadvantages".

None of the administrations cited opportunity cost as the basis for pricing.

In general, each administration listed a number of advantages and disadvantages. The columns headed "advantages" and "disadvantages" provide a synopsis of the responses of the administrations concerning their spectrum pricing system and their view of the problem. This explains why apparently contradictory remarks may be found in that table (their sources are different administrations).

The number of responses given for each of the advantages and disadvantages is indicated in parentheses.

Seven administrations also indicated that studies were planned or in progress to evaluate or revise their pricing system.

Spectrum pricing:	Advantages	Disadvantages
by means of auctions or calls for tenders	– spectrum prices determined by the market (1). – theoretically provides for optimum spectrum utilization (1).	– market may overestimate the actual value of spectrum (1). – spectrum overpricing may inhibit the development of services (1). – price charged is fixed and cannot be revised to take account of changing economic conditions (1).
by means of comparative selection ("beauty contests")	– fees can be revised to take account of changing economic conditions (1). – does not inhibit the development of services (1).	– risk of fees being priced too low by comparison with the market value of spectrum (1).
on the basis of the cost of spectrum management	– low administrative overhead (1). – contributes to developing spectrum management and monitoring (1).	– the real value of spectrum resource is not known or determined (2). – difficulties with detailed breakdown of fees (1). – does not address the objectives of scarcity management and spectrum reaccommodation (1). – small users may find themselves paying high fees (1).
on the basis of spectrum users' income	– fees are a function of user size (1).	– inhibits user growth (1).
on the basis of an incentive formula	– incentive for spectrum utilization (1). – encourages higher-frequency use (2). – encourages efficient spectrum utilization (5). – encourages use of new technologies (1). – encourages research and development in radio field (1). – promotes telecommunication development in rural areas (1). – attractive for foreign investment (1).	– numerous variables and formulas are used (1). – actual spectrum occupancy in the affected geographical area is not taken into account (1).

Spectrum pricing:	Advantages	Disadvantages
Other advantages and disadvantages which administrations associate with their pricing system	general advantages of fee system: – system makes it possible to reach the public authority's objectives in terms of socio-economic spectrum management (3). specific advantages of system: – fee calculation is simple to apply and readily understandable (9). – fee system is transparent (1). – fee system is stable (1). – differentiates between commercial and non-commercial activities (2). – all services are billed (2). suitable fees: – reasonable fees that are in line with market demand (1). – low fees (1).	incomplete system: – system doesn't cover all applications (2). – important parameters left out (2). – efficiency of spectrum utilization not taken into account (1). – digital equipment is not taken into account properly (1). – duration of use is not taken into account (1). system imperfections: – does not differentiate between commercial and non-commercial activities (1). – fee tables or system too rigid (2). – inconsistency of the system (1). – fees not under control (1). – emergency services billed (1). – inadequate substantiation to motivate user compliance (1). practical difficulties: – calculation method too complicated (2). – scales difficult to apply (2). – difficulties assessing the real number of mobile and portable stations (2). fees not suitable: – fees too low (1). – fees too high (1). – fees too high for non-commercial activities (1). – fees lower than management costs (1).

6 Database

The BDT secretariat has created a database for Question 21/2 in order to analyse the information provided by administrations in response to the questionnaire.

The database, which can be accessed from the website, contains all of the responses received by BDT to date.

The database was designed by BDT in consultation with the Joint Group on Resolution 9. It allows for viewing of the variables used in establishing frequency usage rights and the scales and formulas used. It is complemented by this report, which provides an analysis and the statistics for the responses received from administrations.

Section 7 below explains how to use the database.

The database may be freely accessed at the URL http://www.itu.int/ITU-D/study_groups/SGP_2002-2006/SF-Database/index.asp for purposes of consulting and displaying the information it contains.

However, modification and update rights for the data relating to any given country are restricted to the administration of that country. No administration can modify data belonging to any other administration.

To this end, BDT will provide a password for use by each administration, which can then be changed. Administrations will be asked to provide BDT with a contact to whom the password can be sent.

7 Using the database

The database allows the data relating to calculation of frequency usage fees to be viewed. The database contains the responses to the questionnaire on implementation of Resolution 9 of the World Telecommunication Development Conference (CA/12 and CA/120).

The homepage has four columns:

1) The first column is for viewing the responses to the general questions (Q.1 to Q.9) in Part III of the questionnaire by:

   - region;
   - country;
   - chart (radio service);
   - application; and
   - variable.

   A scroll button is used to make one or more choices, before clicking on “Display”.

2) The second column is for viewing the data relating to calculation of frequency usage fees by:

   - region;
   - country;
   - chart (radio service);
   - application; and
   - variable.

   A scroll button is used to make one or more choices, before clicking on “Display”.

3) The third column ("scales/formulas") is used for viewing the calculation formulas or scales that are applied, by:

- region;
- country;
- chart (radio service).

A scroll button is used to make one or more choices, before clicking on "Display".

4) The fourth column is for:

- obtaining the "cross-variable count", i.e. the number of countries using a particular variable (chosen from a drop-down list) for a given application (chosen in the same way); and
- displaying statistics and diagrams showing the rate of use of variables broken down by region, radio service and applications.

A scroll button is used to make one or more choices, before clicking on "Statistics on Chart/Region".

5) Modification and update of data by administration:

To do this, the user (who needs to have a password, as explained in § 6 of this report) clicks on the "Identification page" button at the bottom of the homepage.

This will take the user to a new page where the name of the country and the password must be entered. If a password has not yet been assigned for the administration, the user clicks on the appropriate link.

ANNEX 1

Definition of Question 21/2

Question 21/2: Calculation of frequency fees

1 Statement of the situation or problem

The draft new Question dealt with here responds to one of the most pressing concerns of numerous developing countries, particularly LDCs, which are experiencing difficulties in elaborating a national frequency fee calculation model.

Furthermore, several regulatory frameworks place the frequency resource within the State domain. As a result, its use, which may well not be equitably distributed, must be properly remunerated as part of the rational management of public property. Techniques for sharing, segmentation, access to new frequencies and reorganization of the spectrum no longer suffice to guarantee effective management. The frequency spectrum therefore has to be optimized. This effort should, however, take into account the nature of the service to be provided, the band in question and the end user (consumer activities, etc.).

The optimization effort must be adapted to the new trends in the area of spectrum usage and sharing and must reflect the socioeconomic features of each country. It is particularly urgent when it comes to evaluating bands which are in high demand or may come to be so in the light of emerging technologies, as is the case with IMT-2000 systems in the 2 GHz band.

It should be borne in mind that the economic aspects of spectrum management are addressed in the ITU-D handbook on the economic, administrative and regulatory aspects of national spectrum management, as well as in Report ITU-R SM.2012, which describes, *inter alia*, the three main approaches to financing national spectrum management and the corresponding main advantages and disadvantages (financing from the national budget, through the collection of fees or charges for use of the spectrum, and by public tender). The report also presents the economic approaches used to promote national spectrum management (assignment through comparative assessment procedures; random assignment; assignment by public tender; transferable, flexible rights to use the spectrum; incentive pricing and concessionary charges, etc.).

Thus, the elaboration of a national frequency fee calculation model is a very complex matter and is the source of major difficulties for numerous developing countries and particularly LDCs for which the need is extremely urgent. The proposed Question will help to meet those concerns.

2 Question or issue proposed for study

The proposed study relates to the methods for calculating the various charges, fees, etc. that are levied on spectrum users. The points to be considered within the framework of this new Question are as follows:

a) Establishment in electronic format of a document structure bringing together the calculation formulas and frequency fee amounts applied by different countries for different radiocommunication usages in the various frequency bands. This database will be made available to the ITU Member States and will require periodic updating.

b) Preparation of a report dealing with the following points:

- Analysis of the various methods, formulas and approaches currently applied by different countries for calculating frequency fees, accompanied by a comparative study clearly highlighting:
  - approaches and principles relating to the calculation of frequency charges;
  - the justifications and reasoning for each approach;
  - how each approach contributes to fostering spectrum management and the effectiveness thereof;
  - advantages and drawbacks of each approach (socioeconomic, technical and other considerations).
- Basic factors that may be taken into account when elaborating new formulas or reviewing existing ones.
- How to bring about consistency and complementarity between spectrum rearrangement processes and economic optimization of frequencies.

3 Expected outputs

An electronic document structure and links enabling users to have easy access to data on frequency fee calculation formulas for the users of the radio-frequency spectrum in different countries. BDT is requested to coordinate participation with those countries who do not have access to the Web, providing them a hard copy upon request.

A report on the various frequency fee calculation formulas currently applied in different countries.

4 Required timing of the expected output

An initial version of the output is requested by mid-2003.

A regular update should subsequently be carried out.

5 Proposers/sponsors

This Question was submitted to WTDC-02 and has been recognized as being very important for the developing countries and LDCs, and as being urgent.

6 Source of required inputs

- Inputs are expected from spectrum managers (administrations, regulators), relating to:
  - the structure of the information to be made available and the questionnaire(s) to be circulated to the Member States in order to gather the information to be entered into the database;
  - analysis of the replies and of the report.
- Inputs are also expected from spectrum users (operators, etc.) that are subject to the fees in question, for analysis of the replies and of the report.
- Member States' replies to the questionnaire(s).

7 Target audience for the output

a) Indicate the target audience for the output in the following table:

	Developed countries	Developing countries	LDCs
Telecom policy-makers	X	X	X
Telecom regulators	X	X	X
Service providers (operators)	X	X	–
Manufacturers	–	–	–

b) Target audience for the study – who specifically will use the output?

The output could be particularly useful to frequency spectrum managers when it comes to identifying the basic elements to be taken into account in elaborating a national frequency fee calculation model for the various users of the radio-frequency spectrum in the different frequency bands.

c) Proposed methods for implementing the output

The output will be made available to all Member States free of charge (documents on paper, on the Web and on CD-ROM). An ITU circular letter should be sent out informing the Member States of the results of this study and inviting them to use that output when elaborating their national model for optimizing the frequency spectrum.

8 Proposed method of handling this Question

Given that this Question, which is very important and urgent for the developing countries and particularly LDCs, touches also on the field of radiocommunications, and that ITU-R Study Group 1 has already accumulated expert experience on the matter, it is proposed that it be dealt with by the **joint working group** already set up for the implementation of Resolution 9 (ITU-D Study Group 2/ITU-R Study Group 1).

Meetings dealing specifically with this Question should be programmed by the joint working group during the period 2002-2003.

9 Coordination requirements for the study

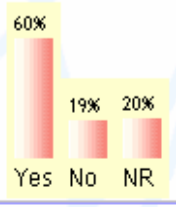
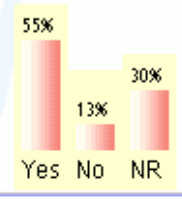
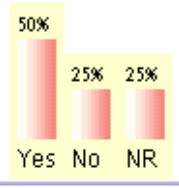
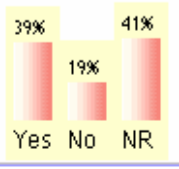
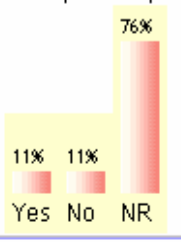
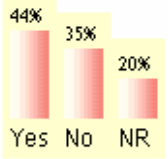
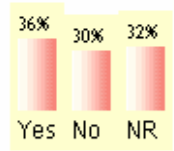
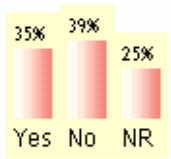
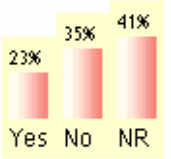
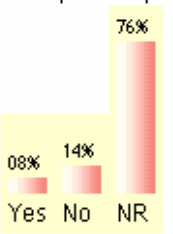
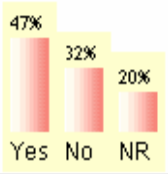
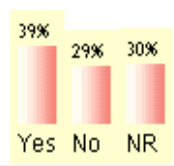
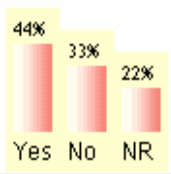
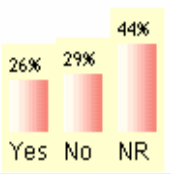
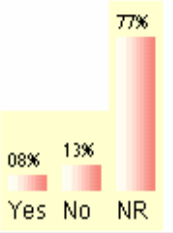
Coordination between ITU-D and ITU-R is required and should be carried out within the framework of the joint working group on Resolution 9.

In addition, coordination with ITU-D Study Group 1 is necessary (Question 12/1).

ANNEX 2

Spectrum Fees Database statistics for all countries

CHART A: FIXED SERVICE

VARIABLE / APPLICATION	Radio Relay	Local Radio Loop	Links between fixed stations	Local Radio Networks	Other Applications
Bandwith	Yes :41(60.29%) No : 13(19.12%) NR : 14(20.59%) 	Yes :38(55.88%) No : 9(13.24%) NR : 21(30.88%) 	Yes :34(50.00%) No : 17(25.00%) NR : 17(25.00%) 	Yes :27(39.71%) No : 13(19.12%) NR : 28(41.18%) 	Yes : 8(11.76%) No : 8(11.76%) NR : 52(76.47%) 
Number of channels	Yes :30(44.12%) No : 24(35.29%) NR : 14(20.59%) 	Yes :25(36.76%) No : 21(30.88%) NR : 22(32.35%) 	Yes :24(35.29%) No : 27(39.71%) NR : 17(25.00%) 	Yes :16(23.53%) No : 24(35.29%) NR : 28(41.18%) 	Yes : 6(8.82%) No : 10(14.71%) NR : 52(76.47%) 
Centre frequency, or band position in the spectrum	Yes :32(47.06%) No : 22(32.35%) NR : 14(20.59%) 	Yes :27(39.71%) No : 20(29.41%) NR : 21(30.88%) 	Yes :30(44.12%) No : 23(33.82%) NR : 15(22.06%) 	Yes :18(26.47%) No : 20(29.41%) NR : 30(44.12%) 	Yes : 6(8.82%) No : 9(13.24%) NR : 53(77.94%) 

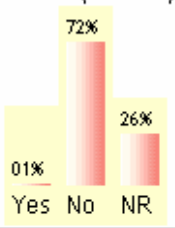
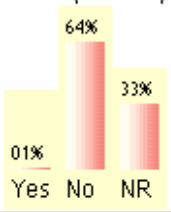
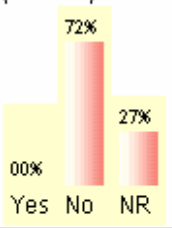
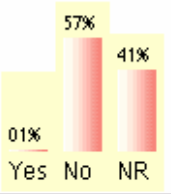
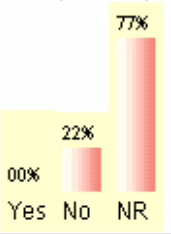
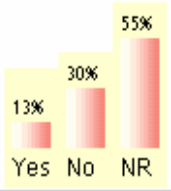
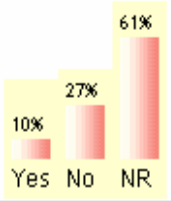
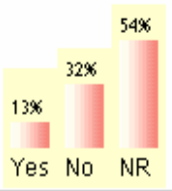
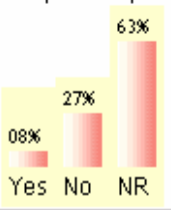
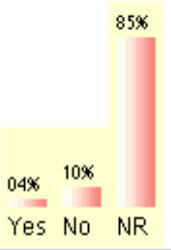
Exclusive / shared use	Yes :15(22.06%) No : 38(55.88%) NR : 15(22.06%) 	Yes :13(19.12%) No : 30(44.12%) NR : 25(36.76%) 	Yes :12(17.65%) No : 38(55.88%) NR : 18(26.47%) 	Yes :15(22.06%) No : 24(35.29%) NR : 29(42.65%) 	Yes : 3(4.41%) No : 12(17.65%) NR : 53(77.94%)
Surface area allocated	Yes :12(17.65%) No : 41(60.29%) NR : 15(22.06%) 	Yes :17(25.00%) No : 29(42.65%) NR : 22(32.35%) 	Yes : 9(13.24%) No : 41(60.29%) NR : 18(26.47%) 	-	Yes : 3(4.41%) No : 15(22.06%) NR : 50(73.53%)
Distance between transmitter and receiver	Yes : 9(13.24%) No : 45(66.18%) NR : 14(20.59%) 	-	Yes :14(20.59%) No : 37(54.41%) NR : 17(25.00%) 	-	Yes : 3(4.41%) No : 14(20.59%) NR : 51(75.00%)

Transmitter power	Yes :16(23.53%) No : 39(57.35%) NR : 13(19.12%) 	Yes :14(20.59%) No : 31(45.59%) NR : 23(33.82%) 	Yes :20(29.41%) No : 31(45.59%) NR : 17(25.00%) 	Yes :12(17.65%) No : 26(38.24%) NR : 30(44.12%) 	Yes : 4(5.88%) No : 10(14.71%) NR : 54(79.41%)
Antenna height / diameter	Yes : 4(5.88%) No : 50(73.53%) NR : 14(20.59%) 	Yes : 3(4.41%) No : 41(60.29%) NR : 24(35.29%) 	Yes : 5(7.35%) No : 45(66.18%) NR : 18(26.47%) 	-	Yes : 1(1.47%) No : 12(17.65%) NR : 55(80.88%)
Bit rate or capacity	Yes :17(25.00%) No : 36(52.94%) NR : 15(22.06%) 	Yes :13(19.12%) No : 32(47.06%) NR : 23(33.82%) 	Yes : 8(11.76%) No : 42(61.76%) NR : 18(26.47%) 	Yes :10(14.71%) No : 28(41.18%) NR : 30(44.12%) 	Yes : 2(2.94%) No : 11(16.18%) NR : 55(80.88%)

Transmitting beam angle	Yes : 5(7.35%) No : 47(69.12%) NR : 16(23.53%) 	-	-	-	Yes : 1(1.47%) No : 12(17.65%) NR : 55(80.88%)
Number of transmitting stations	Yes :44(64.71%) No : 12(17.65%) NR : 12(17.65%) 	Yes :30(44.12%) No : 15(22.06%) NR : 23(33.82%) 	Yes :42(61.76%) No : 10(14.71%) NR : 16(23.53%) 	Yes :25(36.76%) No : 14(20.59%) NR : 29(42.65%) 	Yes : 6(8.82%) No : 8(11.76%) NR : 54(79.41%)
Number of receiving stations	Yes :16(23.53%) No : 38(55.88%) NR : 14(20.59%) 	Yes :10(14.71%) No : 34(50.00%) NR : 24(35.29%) 	Yes :14(20.59%) No : 35(51.47%) NR : 19(27.94%) 	Yes :10(14.71%) No : 29(42.65%) NR : 29(42.65%) 	Yes : 3(4.41%) No : 11(16.18%) NR : 54(79.41%)

Degressivity	Yes : 7(10.29%) No : 43(63.24%) NR : 18(26.47%) 	Yes : 1(1.47%) No : 40(58.82%) NR : 27(39.71%) 	Yes : 7(10.29%) No : 40(58.82%) NR : 21(30.88%) 	Yes : 3(4.41%) No : 33(48.53%) NR : 32(47.06%) 	Yes : 1(1.47%) No : 12(17.65%) NR : 55(80.88%)
Duration of the authorization / licence	Yes :31(45.59%) No : 20(29.41%) NR : 17(25.00%) 	Yes :25(36.76%) No : 19(27.94%) NR : 24(35.29%) 	Yes :31(45.59%) No : 19(27.94%) NR : 18(26.47%) 	Yes :19(27.94%) No : 20(29.41%) NR : 29(42.65%) 	Yes : 5(7.35%) No : 10(14.71%) NR : 53(77.94%)
Population density	-	Yes : 6(8.82%) No : 39(57.35%) NR : 23(33.82%) 	Yes : 3(4.41%) No : 45(66.18%) NR : 20(29.41%) 	Yes : 4(5.88%) No : 33(48.53%) NR : 31(45.59%) 	Yes : 1(1.47%) No : 12(17.65%) NR : 55(80.88%)

Total population covered	-	Yes : 7(10.29%) No : 37(54.41%) NR : 24(35.29%) 	-	-	Yes : 1(1.47%) No : 13(19.12%) NR : 54(79.41%)
Geographic location	Yes : 7(10.29%) No : 45(66.18%) NR : 16(23.53%) 	Yes :11(16.18%) No : 33(48.53%) NR : 24(35.29%) 	Yes : 9(13.24%) No : 39(57.35%) NR : 20(29.41%) 	Yes : 9(13.24%) No : 29(42.65%) NR : 30(44.12%) 	Yes : 2(2.94%) No : 11(16.18%) NR : 55(80.88%)
Operator's turnover	-	Yes : 2(2.94%) No : 42(61.76%) NR : 24(35.29%) 	Yes : 2(2.94%) No : 46(67.65%) NR : 20(29.41%) 	-	Yes : 0 No : 14(20.59%) NR : 54(79.41%)

Gross domestic product	Yes : 1(1.47%) No : 49(72.06%) NR : 18(26.47%) 	Yes : 1(1.47%) No : 44(64.71%) NR : 23(33.82%) 	Yes : 0 No : 49(72.06%) NR : 19(27.94%) 	Yes : 1(1.47%) No : 39(57.35%) NR : 28(41.18%) 	Yes : 0 No : 15(22.06%) NR : 53(77.94%) 
Other Variables	Yes : 9(13.24%) No : 21(30.88%) NR : 38(55.88%) 	Yes : 7(10.29%) No : 19(27.94%) NR : 42(61.76%) 	Yes : 9(13.24%) No : 22(32.35%) NR : 37(54.41%) 	Yes : 6(8.82%) No : 19(27.94%) NR : 43(63.24%) 	Yes : 3(4.41%) No : 7(10.29%) NR : 58(85.29%) 

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