Assessing National Spectrum Management Practices

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Introduction

- It is a government responsibility to develop spectrum management policies that conform to the international treaty obligations of the Radio Regulations while meeting national spectrum needs
- Within the national legal framework for telecommunications a spectrum management organisation has the delegated authority to prepare spectrum plans that meet government policies
- One of the most important tools for effective spectrum management is the National Table of Frequency Allocation (NTFA). This shows how the spectrum can be used in the country

Guidelines

- **Creation of National Table of Frequency Allocation**
- **A Standard Approach for Assessing the Spectrum Management Needs Of Developing Countries**

Spectrum Management Master Plans

Spectrum Management Assessment

1 (1) Key elements of national spectrum management for review and assessment

1 Country background
2 Legal Framework for Spectrum Management
3 Organisational Structure of Spectrum Management
4 Current Spectrum Allocation & Usage as well as Future Trends
5 Spectrum & Apparatus Assignment/Licensing Processes/Mechanisms
6 Financing of Spectrum Management and Spectrum Pricing Mechanisms
7 Spectrum Quality Control, Interference Management & Enforcement
8 Spectrum Management Data Bases and Computer Assisted Assignment
9 Application of spectrum engineering in spectrum management and assignment
10 Radio Equipment Standardization, Type Approval & Related Certification
11 Participation in International Spectrum Planning and Co-ordination activities
12 Participation of Stakeholders in the Spectrum Management Process
13 Research Collaboration with Institutions of Higher Learning and Industry
14 Public Information; Websites; licensing

1(2) Terminologies

The radio frequency spectrum:

- a limited and valuable ***(re-usable)*** resource
- used for all forms of wireless communication
- its use must be managed or coordinated to prevent interference between signals
- growth in telecom services and radio technologies creates increasing demand

Strategic spectrum planning

- pressure on the regulatory system to manage rapidly rising/shifting demand
- becoming increasingly complicated
- must take account of: technical developments, market forces, social trends, international developments (radio waves cross national frontiers)

1(3) Terminologies

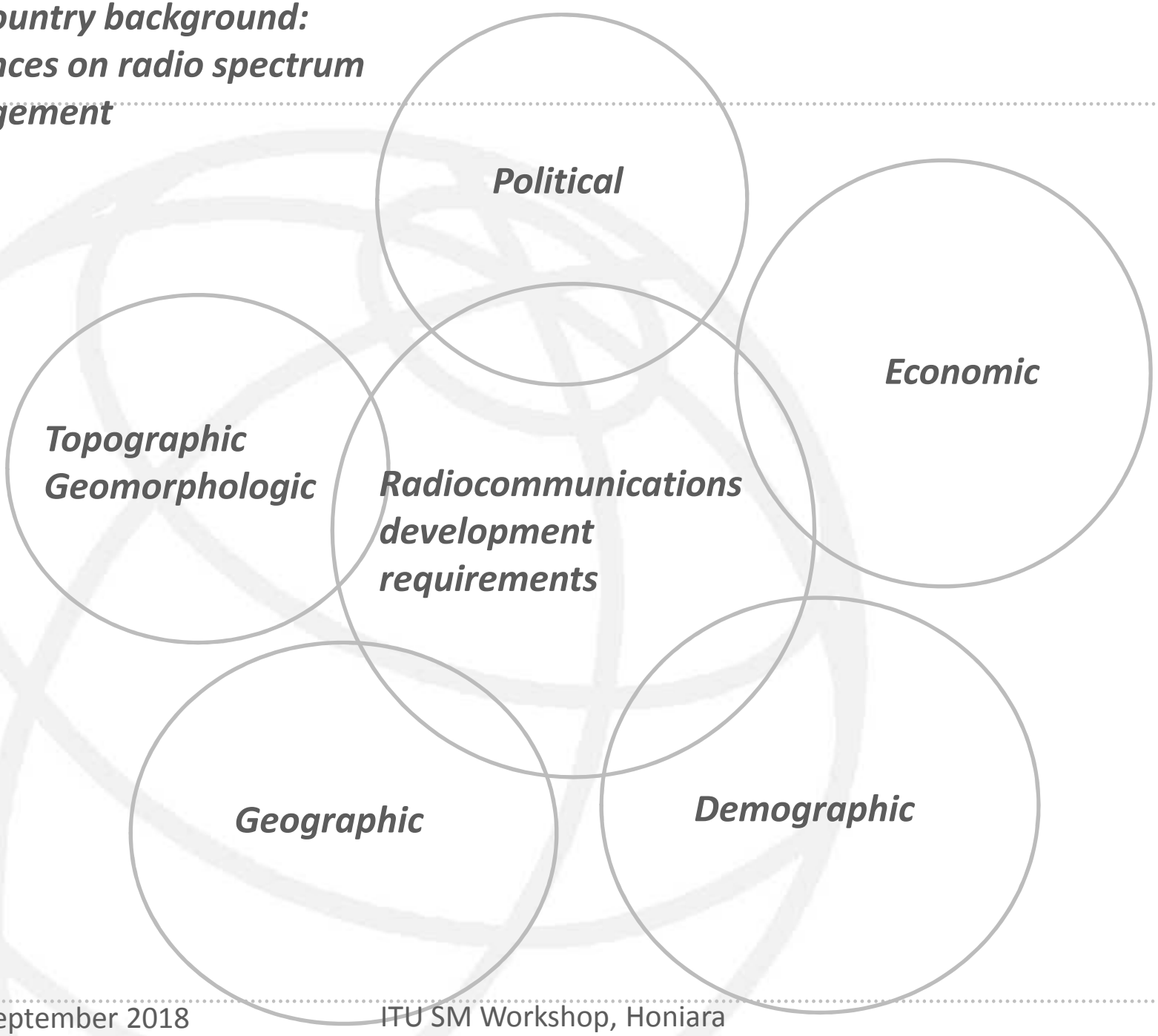
Spectrum management framework

- international framework set out in the ITU's Radio Regulations
- considerable flexibility for the establishment of national policies within this framework

Guidelines for assessment of National Spectrum Management practices

- no single standard model for spectrum management but a set of general requirements can be identified (follow the framework of the ITU Radio Regulations)
- intended to provide a standard approach for assessing national spectrum management development needs.

2(1) Country background: Influences on radio spectrum management



2(2) Country background: Influences on radio spectrum management

Political

Indication of organizational and legal structure; policies for liberalization and market approach. Regional administrative centres may require spectrum management on a regional basis. Different ethnic regions are likely to have regional broadcasting requirements.

Economic

Information on the role of radiocommunications in supporting major sources of Gross Domestic Product (GDP).

Demographic

Distribution of population, main cities and towns indicate areas of (future) high spectrum demand. Large, sparsely populated, rural areas indicate requirement for radio links to support infrastructure development and/or backhauling.

2(3) Country background: Influences on radio spectrum management

Geographic

Country size: radio coverage requirements; coastal areas: maritime requirements; number of neighbouring countries: cross-border frequency co-ordination requirements.

Topographic/Geomorphologic

Mountainous regions, flat plains, deserts, large inland water areas, large forests or jungle areas etc: different influences on radio use and planning requirements.

Assessment objectives

Pre-mission assessment and report on the key factors listed above. Information from publicly available sources (including ITU development reports). To be discussed and agreed with the administration while on-mission.

3 Legal Framework for Spectrum Management

Primary Legislation

- Establish the legal right of the State to manage radio spectrum
- Identify and define "The Administration"
- Legal right to charge for spectrum use and management
- National Table of Frequency Allocations

Secondary legislation:

- Regulatory codes of procedure
- Statutory instruments etc.

Assessment Objectives *(to check whether the legal framework establishes):*

- ✓Legal certainty (e.g. spectrum availability) to spectrum stakeholders and investors
- ✓Efficient and equitable spectrum management procedures
- ✓Fair and transparent procedures (for licensing, fees, dispute resolution)
- ✓Consultative procedures (stakeholders, operators, users, industry)
- ✓Monitoring for control of spectrum quality (compliance, interference, efficient use)
- ✓Equipment standards and certification, putting on the market, import
- ✓International negotiations – frequency co-ordination, ITU representation
- ✓Support/fund spectrum efficiency research
- ✓Pro-active spectrum efficiency improvement by facilitating (e.g.) re-farming

4(1) Organisational Structure of Spectrum Management

The *Telecommunications* or *Radiocommunications Act* should identify and establish the ***Administration***, the legal entity with overall responsibility for national spectrum management and interface with the ITU. The Administration could be a government Ministry or one of its departments, a state institution (still not independent but not quite a ministry) or an independent regulator.
The Administration (or the Act) may also ***delegate*** some spectrum management responsibilities in nationally allocated bands for specific purposes to other government agencies, telecommunications operators (e.g. of public fixed and mobile services) or similar large organisations that make extensive use radio in their operations.
Delegation arrangements are frequently used because there are considerable benefits for the Administration (e.g. reduction of administration and technical resources) and for the delegated organisation (e.g. faster decisions to meet operational requirements, direct involvement by specialist practioners). A typical example is to have separate organisations for civil and military radio use. However, these arrangements should ensure the Administration retains overall responsibility for national spectrum management and representing the country at ITU level.

4(2) Organisational Structure of Spectrum Management

Assessment objectives

❖Provide a clear description of the organisational structure of spectrum management, in particular to determine whether there is more than one organisation responsible for spectrum management.

❖The Administration should be identified and a description should be provided of the functional structure of the Administration together with staff numbers and responsibilities.

❖The legal relationship with other main spectrum users (government ministries, agencies or operators) should be described; especially if they have delegated powers for spectrum management.

❖The effectiveness of the co-ordination arrangements between Administration and other main spectrum users should be examined (described later).

5 Current Spectrum Allocation & Usage as well as Future Trends

An examination of national spectrum allocations and use can provide a measure of the effectiveness of spectrum management planning policies and day-to-day frequency assignment procedures.

Assessment objectives

- Obtain and examine the ***National Frequency Allocation Table;***
- Determine the amount of spectrum allocated to government and non-government services;
- Is there a rationale for this division;
- Determine the sub-division of spectrum for various non-government applications;
- Obtain from licensing records/statistics a measure of the actual use (i.e. number of assignments) for each user category;
- Identify systems, services or bands that have congestion or other spectrum availability difficulties.

The international licensing requirement

- Article 18 of the Radio Regulations requires that: “No transmitting station may be established or operated by a private person or by any enterprise without a licence issued in an appropriate form and in conformity with the provisions of these Regulations by or on behalf of the government of the country to which the station in question is subject…”.
- ITU Constitution Article 45 requires each Member State to ensure that stations established and operated by its operating agencies do not cause harmful interference to stations of other Member States or of recognized operating agencies operating in accordance with the Radio Regulations.
- The administration must therefore have some form of licensing process to meet this requirement.

National licensing arrangements – the flexibility

Individual licensing

Usually required for "international" stations (e.g. aeronautical and maritime mobile) and for those transmitters which required individual frequency planning (e.g. interference analysis) including international co-ordination.

A general licensing regime

May be used for personal transmitters operating under the control of public mobile telephone networks designed to meet international standards. Various short range devices, including computer terminals in wireless local area networks, can operate under a general "licence exempt" basis, provided that the equipment conforms to an accepted standard on agreed frequencies.

6(3) Spectrum & Apparatus Assignment/Licensing Processes/Mechanisms

Assessment objectives

To describe the licensing system in operation, including what types of system require a licence and whether there is a licence exemption arrangement or general licence for certain systems e.g. SRD, WiFi etc.

The following procedures are especially important:

- ❖Is the application procedure easy to understand and published?
- ❖Are all application registered (to track progress through the system)
- ❖Are there qualified staff for technical analysis?
- ❖Is decision-making fast and efficient
- ❖What options are there for payment of licensing fees and charges
- ❖How is the licence issued (in person, by post, electronically etc.)
- ❖Licence renewal (period of validity)
- ❖Is there any computerisation of the licensing process (any planned)

7(1) Financing of Spectrum Management and Spectrum Pricing Mechanisms

Financing Spectrum Management

Spectrum users benefit from the planning, management and monitoring of the spectrum carried out by the State or by other organizations delegated by the State. It is therefore reasonable and lawful for the State or spectrum management organizations to require users to pay *administrative fees* (known also as *frequency management fees* or *service fees)*, as well as *administrative charges* to cover all costs arising out of spectrum planning, management and monitoring activities *(cost recovery).*

Market Approaches to Spectrum Management

Market approaches go beyond simple cost recovery (described above) and become spectrum tools in themselves by placing a value on the spectrum. These tools (including opportunity costs and auctions) can:

- be designed to promote spectrum efficiency;
- assist when spectrum demand exceeds supply;
- determine the most cost beneficial spectrum use;
- encourage innovation and adoption of newer/more efficient technologies.

7(2) Financing of Spectrum Management and Spectrum Pricing Mechanisms

Assessment objectives

- Is there a well defined financial strategy for meeting the total costs of managing the spectrum?
- Does the spectrum management authority publish its annual operational budget?
- Are budgets well-balanced, costs fairly distributed between licence groups, with those requiring the most spectrum management resources paying higher fees?
- Is there a simplified fee structure and collection mechanism with a simplified licensing scheme?
- Are licensees are able to easily choose a licence "product" that meets their needs and see how much it will cost, both for any initial fee and the annual renewal fees?
- Are auctions run in accordance with established good practice?

8 Spectrum Quality Control, Interference Management & Enforcement

In order to guarantee that spectrum use conforms to existing regulations and the authorizations granted, there should be some form of spectrum monitoring capability.

The main purposes of spectrum monitoring are:

- To measure spectrum occupancy (to evaluate effectiveness of spectrum planning and identify geographical areas and bands having congestion)
- To verify administrative (licensing) database records
- To check technical compliance
- For interference resolution
- To trace unlicensed/illegal use

Assessment objectives *(to determine)*

- The type of monitoring facilities available and the extent to which they are used (e.g. regular monitoring programmes to target particular issues)
- The experience of the staff and how monitoring is integrated into general spectrum management activities
- If the national regulations contain enforcement measures (e.g. financial penalties) intended to deter interference from unauthorized use, non-compliance with the allocation, assignment or authorization etc.

9 Spectrum Management Data Bases and Computer Assisted Assignment

Record keeping of administrative and technical data is an essential requirement of spectrum management. The data may be stored on a paper-based system but computerized systems are more efficient. Whichever format is chosen, the key elements are: accuracy; sufficiency; security and control; data entry validation; ability to search and analyse; ability to interface with other systems (especially national monitoring)

Assessment objectives

- The assessment should identify all databases used in the country; in particular the database used by the administration/regulator but also those used by delegated agencies and operators;
- The design of the database(s) should be noted (e.g. MS Access), data fields used (e.g. conform to ITU recommendations), ease of transfer;
- Examine the procedures used to validate application data (in particular the accuracy of transmitter location);
- Networking capability;
- Security and backup arrangements .

10(1) Application of spectrum engineering in spectrum management and assignment

Spectrum engineering is one of the key elements of spectrum management. It is the application of engineering practice and principles to ensure that spectrum plans are designed to make effective and efficient use of the spectrum and maximise the number of different radio systems that are able to operate as intended in any given frequency band.

Spectrum engineering analyses used as technical input to spectrum planning in two ways:

- to plan the spectrum to enable systems with defined technical and operational characteristics to operate as intended; or
- to determine the technical and operational characteristics necessary to enable systems to work in a specified frequency plan.

Spectrum engineering must also take into account design and equipment costs to ensure the economical viability of engineering solutions to spectrum management problems.

10(2) Application of spectrum engineering in spectrum management and assignment

Assessment objectives

- To what extent is spectrum engineering used
  - EMC and interference analysis for new frequency assignments
  - National allocation system planning

- What services (e.g. fixed, mobile, broadcasting) benefit from application of spectrum engineering

- What spectrum engineering tools and models are used. In particular, are ITU tools and models used for international frequency co-ordination and allocation plans

- Is propagation modelling used and is high resolution terrain data available

- Are computer tools available for spectrum engineering

11(1) Radio Equipment Standardization, Type Approval & Related Certification

Equipment requirements of the Radio Regulations

- Article **3** of the Radio Regulations concerns the requirements associated with 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 and other technical standards.

- Administrations have the responsibility to ensure that equipment authorised for use in their territory conforms to these Regulations.

11(2) Radio Equipment Standardization, Type Approval & Related Certification

Equipment standards

Documents which specify the minimum performance requirements for radio transmitters and receivers (or other equipment) and the associated procedures to ensure conformity with these requirements are commonly referred to as "equipment standards". Standards can be developed by national, regional or international organisations such as ITU.

Compliance testing , placing on the market, import restrictions

- Obsolete procedures

- Nationally developed standards
- *Every* country required a sample of each equipment to be submitted to its own government-run laboratory for "type-approval" to the relevant national standard before market.

- New procedures

✓A combination of: manufacturers' declaration of compliance, compliance testing by commercial test-houses, market surveillance,

✓Global standards , mutual recognition agreements (MRAs) of standards and approvals between countries or groups of countries.

11(3) Radio Equipment Standardization, Type Approval & Related Certification

Assessment objectives

To examine and describe the radio equipment standardization certification and import procedures and determine whether these:

✓***Are efficient:*** quickly enable users to implement their new radio systems by ensuring suitable and approved equipment may be obtained from a variety of legal sources (manufacturers/dealers) at reasonable cost;

✓***Are open and flexible:*** where possible, authorizing compatible standards from a wide range of regional standards bodies and accepting equipment certification from internationally recognised test-houses;

✓***Are transparent:*** publishing the equipment specifications required for each frequency band and service so that users know what to purchase;

✓***Are "import-friendly":*** publishing the import requirements that have been notified and agreed with the customs authorities to ensure properly certificated equipment may be imported easily.

12(1) Participation in International Spectrum Planning and Co-ordination activities

The international dimension of national spectrum management

National radiocommunications exist within an international (global, regional or bi-lateral) framework of regulation, legal commitments , operational and commercial realities (e.g.):

- Radio wave propagation traverses political boundaries,
- Navigation equipment is standardized to allow safe movement throughout the world,
- Satellite system transmissions facilitate worldwide communications,
- Maritime, aeronautical, broadcasting, satellite services are subject to international plans,
- Personal mobile-phones and wi-fi operate on globally common frequencies,
- Communications system manufacturers produce common equipment for many markets,
- Market-commonality results in simpler and less expensive production processes.

12(2) Participation in International Spectrum Planning and Co-ordination activities

The need to participate in international fora and influence outcomes

The national spectrum manager's ability to participate in international fora (and influence outcomes) becomes significant because all the international (global, regional or bilateral) spectrum management decisions will have an eventual impact on national legislation, regulations and spectrum use.

Assessment objectives

- ❖Is there a requirement for cross-border co-ordination, if so is this given some priority;
- ❖Does the administration carry out it's obligations of notification and co-ordination in accordance with ITU procedures;
- ❖Are there bi-lateral or multilateral co-ordination arrangements (and meetings);
- ❖Does the administration organise co-ordination or is there informal border co-ordination between operators;
- ❖Does the administration participate in international or regional preparations for World or Regional Radio Conferences;
- ❖Are there national preparations for WRC

13(1) Participation of Stakeholders in the Spectrum Management Process

Spectrum stakeholders:

Spectrum stakeholders are the government and non-government spectrum users that depend on radiocommunications to function efficiently. Consultation with these stakeholders is essential in virtually every aspect of spectrum management, including the development of national legislation and regulations, spectrum policies, technical standards, etc.

The type and extent of consultation

➢depends on government policy and how the institutional authority for spectrum management has been organised;

- detailed and regular consultation
- less regular but major changes

13(2) Participation of Stakeholders in the Spectrum Management Process

For detailed and regular consultation:

✓establish working groups or committees with membership drawn from relevant government departments and other agencies,;

✓include: major non-government spectrum stakeholders (e.g. service providers, telecom industry, broadcasting organisations);

✓allow associations or bodies representing groups of users to contribute (not practical to consult with each individual spectrum user).

For less regular but major changes

✓Advance publication of proposals with invitation to comment

✓Publish responses

✓Publish decisions and reasons

13(3) Participation of Stakeholders in the Spectrum Management Process

Assessment objectives

- Examine and describe the procedures in place for consultation with spectrum stakeholders;
- In particular determine which stakeholders are invited to participate and
- Is there transparency and fairness;
- Is there a “national strategic spectrum planning committee” of major stakeholders
- Are there working groups of stakeholders to advise the administration on specific spectrum management issues

14 Research Collaboration with Institutions of Higher Learning and Industry

Research Collaboration – objectives and benefits

- research projects to improve spectrum management and efficient utilisation
- for administration with limited staff and resources, provides external source of academic knowledge and facilities
- academic institutions and students may be provided with the challenge of real spectrum management issues
- method of interesting and attracting a future generation of engineers and related professions into careers in spectrum management
- collaboration with telecom industry (including secondments) ensures the administration develops a practical understanding and industry understands the benefits of good regulation.

Assessment objectives

- Determine the extent to which the administration collaborates with colleges, universities, industry
- Provide examples of collaboration activities and benefits achieved

15(1) Public Information; Websites; licensing

The need for easily accessible, up-to-date and comprehensive spectrum information

All those involved in radiocommunications and telecommunications (users, potential users, operators, equipment suppliers etc.) need to be able to access, quickly and easily, timely an information about (e.g.):

- how spectrum is used (NTFA)
- what spectrum is available for particular purposes (NTFA),
- equipment specifications and standards (for each band/purpose),
- licensing processes and types,
- regulations and fees,
- proposed changes to regulations and spectrum use,
- opportunities and procedures to participate in the consultative process.

Information distribution through the internet and the administration's web-site is replacing the traditional official government gazette or journal.

15(2) Public Information; Websites; licensing

On-line licensing procedures

Ideally, the following licensing facilities should be available on-line:

- applications (in particular for “simple” licences)
- renewals
- electronic payments

Assessment objectives

An overall description of the administration’s public information facilities should be given, noting:

- Does the administration have a web-site
- Is it well maintained and up-to-date
- Does it contain key items (e.g.):
  - ✓Is the Radiocommunications legislation publicly available
  - ✓Is the National Table of Frequency Allocations (NTFA) available
  - ✓Is there a schedule of services and applications and available frequencies
  - ✓Is there a schedule of fees and charges
  - ✓etc.

16(1) The full ITU Guideline

More detailed information available

This presentation provides a brief review and introduction to the full ITU Guideline: "A Standard Approach for Assessing the Spectrum Management Needs Of Developing Countries". The Guiodeline contains detailed look-up tables for assessing spectrum management needs. In addition, it contains references and links to other relevant information from the ITU and other organizations.

Opportunities for improvement

As the Guideline is also intended as a template for preparing an assessment report (e.g. as part of an ITU mission), there is an example ***"Opportunities for Improvement"*** section for each key element of spectrum management. In a report, these can easily be prepared by comparing the actual situation in an administration with the look-up assessment tables and highlighting any activities that are not being done or are inadequate. Proposals on how to introduce these activities into national spectrum management may be given, preferably with a "route-map" and "milestones" relevant to the circumstances of that administration.

16(2) The full ITU Guideline: Sample Assessment Table

Current Spectrum Allocation & Usage as well as Future Trends

Aspects of spectrum use	Points to check and report
National Table of Frequency Allocations and if exists, associated Table of Frequency Use	Has an NTFA and Table of Frequency Use been developed? Are they separate or combined? What is the level of detail? How well has it been implemented?
Rational division of spectrum between major uses	How is spectrum divided between government and non-government use and how is spectrum provided for major uses such as aeronautical, maritime, public telecommunications, broadcasting?
Orderly use of frequency bands	Are channelling arrangements in use? Are "spectrum management parameters" of equipment specified (by applicable standards or other methods of specifying minimum performance requirements)?
Availability of statistical information on existing spectrum (actual) use.	Statistics should be available from assignment records. Information can be obtained from stakeholder interviews. Are there spectrum congestion problems (services, bands, areas)?
Strategic policies for future spectrum use	What plans are in place to deal with congestion or the introduction of new technology?
Availability and regular update of Spectrum Management Masterplan.	Is Spectrum Management Masterplan available and when was it last updated
Defence use	Approx amount of spectrum
Broadcasting	Approx amount of spectrum
Public mobile systems (cellular radio)	Approx amount of spectrum
Point-to-point links (microwave networks)	Approx amount of spectrum
HF radio	Approx amount of spectrum

National Table of Frequency Allocations (NTFA) preparation

Contents

1 (1) Introduction

The Radio Spectrum	**➢A major national asset** **➢Competing demands** **➢International obligations** **➢Harmonization**
National Spectrum Policies	➢Conform to ITU Radio Regulations ➢Meet national objectives
NTFA	➢Outcome of national spectrum plan ➢High level approval (government) ➢Several levels of detail

1 (2) Introduction

- **With changes in regulatory and technical approaches to spectrum management**

i.e. Administrative control >>>>> Market freedom

- **Do we still need an NTFA? >>>>> YES!!**
- **Regulators, Industry, Operators, General Users etc. need a publicly available, clear plan of the current and proposed national use of the spectrum**

2 (1) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

RR General Scope

- Legal instrument for international coordination of spectrum use
- Provisions binding on ITU Member States
- Frequency sharing between services
- Use of satellite orbits
- Recognition of spectrum use and protection from harmful interference
- Revised by World Radio Conferences (WRC-15)

2 (2) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

- **RR are compiled in 4 Volumes (and a Set of Maps), as follows:**
  - ***VOLUME 1: Articles (59)***
  - ***VOLUME 2: Appendices (22)***
  - ***VOLUME 3: Resolutions (151) and Recommendations (24)***
  - ***VOLUME 4: ITU-R Recommendations incorporated by reference (39)***
  - ***MAPS: Set of Maps for App. 27 (Aeronautical mobile (R))***

- **Rules of Procedure (RoPs):** explain or clarify the way in which the provisions of the RR are to be applied. RoPs are adopted by the Radio Regulations Board (RRB)

2 (3) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

- **Key Definitions (Services and Stations)**
- ***1.3 Telecommunication:*** Any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems
- ***1.5 Radio waves (or hertzian waves):*** Electromagnetic waves of frequencies arbitrarily lower than 3000 GHz, propagated in space without artificial guide
- ***1.19 Radiocommunication service:*** A service involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes
- ***1.61 Station:*** One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service

2 (4) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

- **RR classifies services that use radio communications, according to several parameters, namely:**
  - *Link type: Terrestrial (earth to earth) or satellite (earth-satellite, satellite-earth, satellite-satellite)*
  - *Type of coverage: land, maritime, aeronautical*
  - *Station type: fixed, mobile*
  - *Type of use: communications, broadcasting, navigation and associated, meteorological, scientific, earth observation, time standard, astronomy, security, special.*
- **It also defines the different types of radio stations, classified as:**
  - *Terrestrial space*
  - *Land, sea, air*
  - *Fixed, mobile*
  - *Broadcasting, amateur radio, radio-astronomy, etc*
- **41 types of services and 53 types of stations (more stations than services, as some stations simultaneously involve several services)**

2 (5) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

Key Definitions (Frequency Management)

- ***1.16 allocation (of a frequency band):*** Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned
- ***1.17 allotment* (of a radio frequency or radio frequency channel):** Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radiocommunication service in one or more identified countries or geographical areas and under specified conditions.
- ***1.18 assignment* (of a radio frequency or radio frequency channel):** Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions.

2 (6) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

Key Definitions (Frequency Management)

Other concepts related to Spectrum Management :

- Although not explicitly defined, in the RR when dealing with band allocations (Art. 5), the use in footnotes of expressions: "*identified*" and "*designated*" express the interest/intention of some administrations on a future use of that band for a specific application; that in benefit of a mid and long term harmonization of the use of that band.
- such designations/identifications in the international Table do *not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations*. However, they are a key element of worldwide or regional spectrum harmonization.

2 (7) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

Key Definitions (Categories of Services and allocations)

- **When the same band is shared between several services, categories are established, as:**

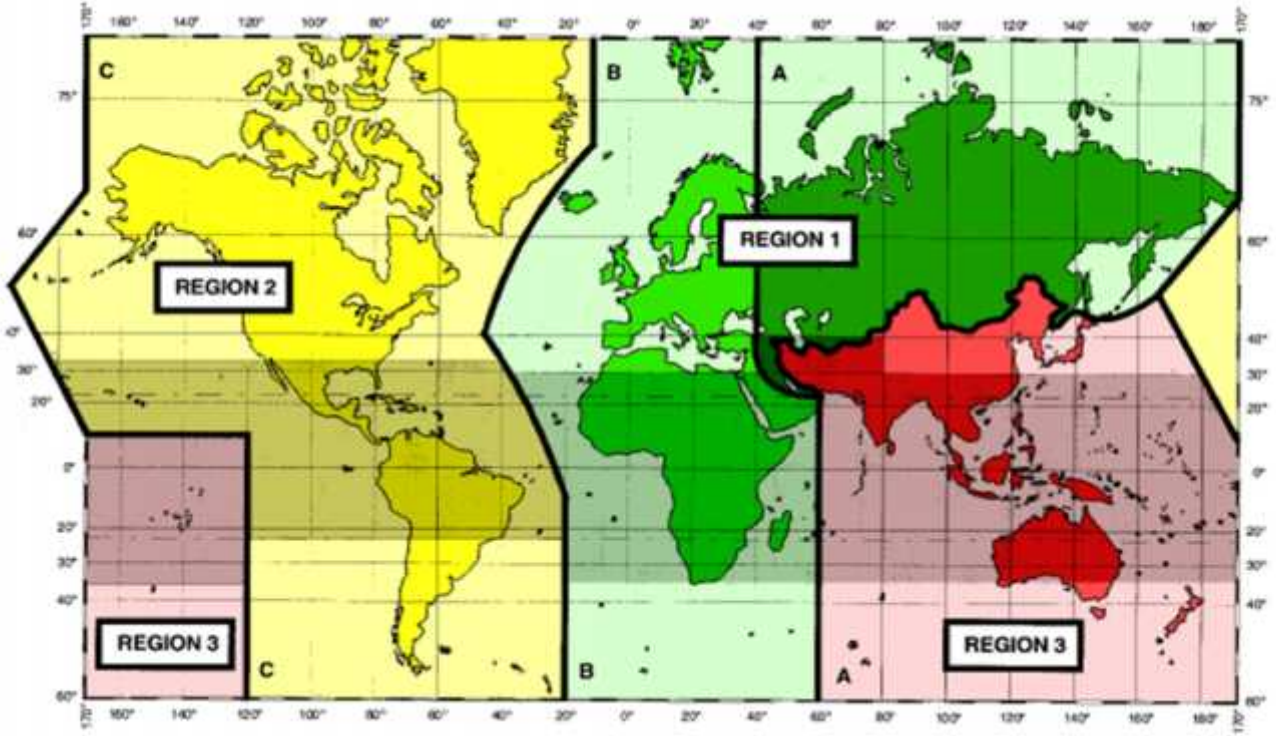
- **PRIMARY (with capital letters):** *Primary Basis* means that in accordance with the nature of a right granted to the assignee of a particular spectrum (band or spot frequency), the assignee is the only entity to use the identified spectrum and is entitled to protection from:
  - ***harmful interference caused by any other spectrum user who may be authorized to use same spectrum on secondary basis; and***
  - ***claims of harmful interference by any such spectrum user***
- **Secondary (with lower case):** *Secondary basis* means the nature of a right granted to the assignee of a particular spectrum (band or spot frequency), is subject to the condition that the entity does not cause any harmful interference to, or claim protection from any harmful interference caused by, other licensees who have been granted the right to use same frequency bands on primary or co primary basis.

- Primary services protection considers both present and future stations

2 (8) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

Key Definitions (RR Regions)

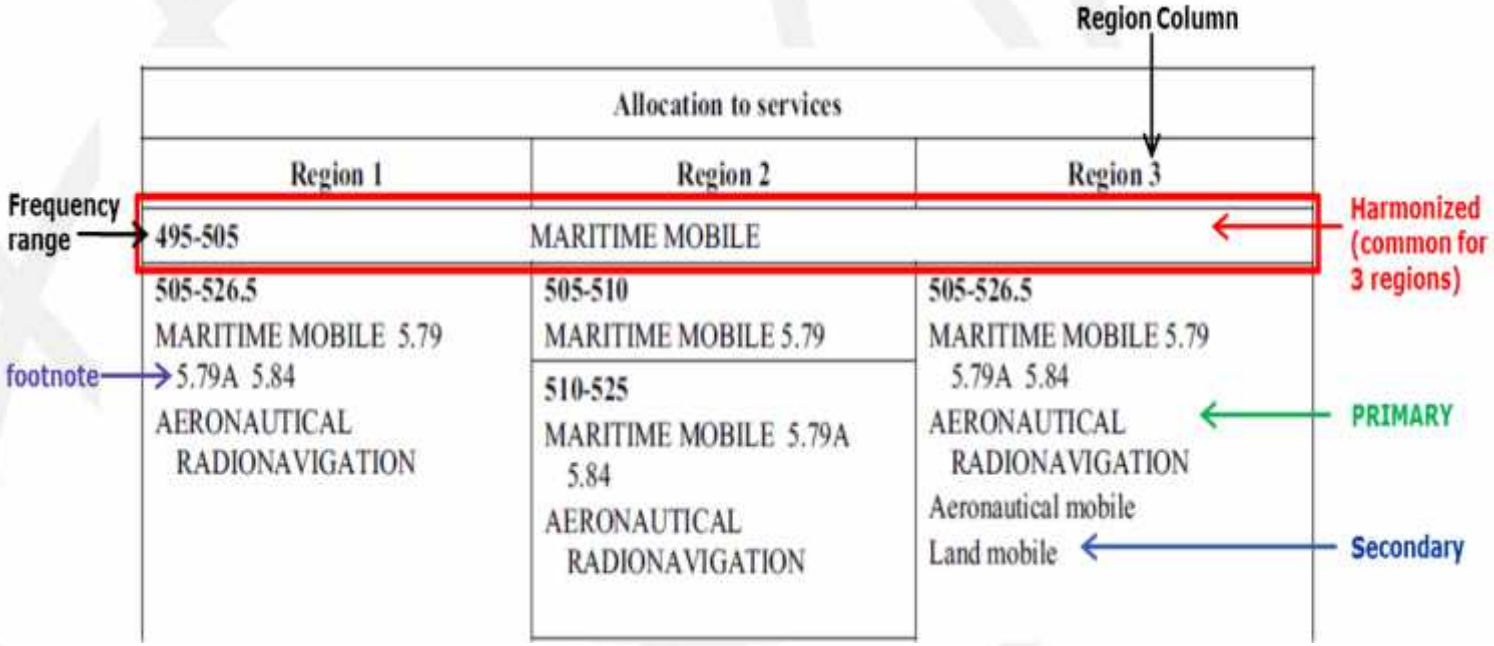
- Frequency bands are allocated to different services either worldwide (worldwide allocation) or regionally (regional allocation). The world is divided into three ITU Regions (Regions 1, 2, 3), as shown below.



2 (9) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

Key Definitions (Table of Frequency Allocations)

- an excerpt of Table allocations in the RR, illustrating the different features of the Table (Frequency range, Worldwide & Regional allocations, Services (PRIMARY & Secondary), Footnotes.



2 (10) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

RR and NTFA

The RR is an international Treaty, applicable to all ITU Member States, therefore the NTFA must be consistent with the RR. However, it also has to respond to national interests and needs in relation to spectrum usage. Some relevant considerations in this regard are as follows:

- ***Inclusion of Footnotes of the RR:*** NTFA might contain a different allocation than those in the RR Allocations table (Art. 5) basically: a) additional allocation (adding more services); b) different (alternative) allocations (allocating to other different services instead); c) change categories to allocated services (different categories).

As these differences were accepted by the competent WRCs and included in the RR, they enjoy international recognition (with the limitations contained in the respective footnote).

2 (11) The ITU Radio Regulations Article 5: Definition of Terms and Table of Frequency Allocations

RR and NTFA

- ***Choice of allocations*:** In most frequency bands, the RR leaves the flexibility to each country to exercise a choice between several allocations. Often, this choice has to be exercised because the corresponding services would be incompatible over the same territory (e.g. broadcasting and mobile IMT). Alternatively, the NFTA may split the band into sub-bands, each allocated to one or more of those services already allocated in the RR.
- ***Worldwide and regional harmonization**:* In order to benefit from economies of scale, interoperability and facilitate equipment compliance, worldwide and regional harmonization needs to be followed, wherever possible. In this regard, the NTFA should also include details on which particular standard or detailed "Band Plan" (or channel Plan) is applicable in the country for a given allocation, consistent with this harmonization. This information may be included in Annexes to the NTFA
- ***Technology neutrality*:** In order to keep flexibility in adopting new and more efficient technologies, it is preferable to avoid mandating specific technologies for the use of a specific allocation.

3 (1) International and National spectrum management frameworks

- **Spectrum management: levels of authority**

International (worldwide level)

- The international framework for the use of the radio frequency spectrum is set out in a treaty – *the Radio Regulations* - ratified by the Member States of the International Telecommunication Union (ITU), a specialized UN agency.

International (regional level) (*Note: not ITU region*)

- Regional Telecommunication Organizations have been established (usually) by administrations to develop harmonization measures intended to facilitate free movement of telecommunication equipment and services within the region and to offer industry and operators the economies of scale through a larger market with common requirements.

3 (2) International and National spectrum management frameworks

Spectrum management levels of authority

- **National (allocation level)** by an *administration* established by a national legislative framework. Recognised by the ITU as responsible for ITU obligations (CS, CV & AR). These obligations include management of the radio spectrum. The administration may be a Government ministry, or an independent regulator operating under a legislative mandate or policy guidelines. The administration establishes: a National Table of Frequency Allocations which sets out what radio services can use which frequency bands and under what conditions; national consultative procedures to prepare national requirements and positions for WRCs and harmonization by regional organizations.
- **National (assignment level)** Assigning a particular frequency (or groups of frequencies) to users (stations) is the detailed level of national spectrum management. The methods used may be administrative, market-based or some spectrum may be reserved for licence-exempt systems. Technical conditions for frequency use may vary widely, from reserving particular frequencies for specific uses with detailed technical requirements (for example: channel plans, equipment standards and assignment criteria), to allowing considerable flexibility in spectrum use for particular bands or services with light technical requirements (e.g. a simple spectrum mask).

4 (1) The Essential Requirements for effective National Spectrum Management

Legal Basis for Spectrum Management

- The legal basis for the regulation of the spectrum is set out in ***Primary* legislation** with associated detailed regulations. Legislation should set out such things as definitions, powers of the Minister or head of the spectrum regulatory authority, the powers of others involved in spectrum regulation, offences and penalties and the organizational structure and framework for regulation of the spectrum.
- ***Secondary* legislation** can be used to allow the regulatory authority to issue or revise regulations without changing primary legislation.
- The primary telecommunications legislation should require and authorise the administration to establish a National Table of Frequency Allocations. However, some countries do not include the NTFA itself in the primary legislation.

4 (2) The Essential Requirements for effective National Spectrum Management

Institutional Organisation of Spectrum Management

- The choice of national authority for spectrum management will depend on overall government policy on national regulatory arrangements. For example, the authority might be a government ministry or an independent regulator; the ministry might be responsible for policy decisions and the regulator for executive matters; often, there are separate authorities for government and non-government radio use.
- Whichever organisational option is used, there should be a single organisation with the overall authority to represent the country as the *administration* at the ITU.
- A *senior level* spectrum policy & strategy committee should be established to consider and agree major national spectrum allocation strategy and policy issues with the aim of ensuring spectrum use supports overall national objectives and achieves a rational balance between government and non-government use.
- Government spectrum users, major telecommunication operators, telecom manufacturing industry, broadcasters, spectrum user groups etc should be represented, at least in working groups of the policy and strategy committee.

4 (3) The Essential Requirements for effective National Spectrum Management

Consultation with major spectrum stakeholders

- Consultation with stakeholders is essential in virtually every aspect of spectrum management, including the development of national legislation and regulations, spectrum policies, technical standards, etc.
- effective consultations can take place by also allowing associations or bodies representing groups of users to contribute.
- it is important that the spectrum regulator's proposals be made public.
- meetings are held between the spectrum regulator and relevant stakeholders. The Internet has increasingly become a standard tool to maximise the effectiveness of consultations.
- minimal guidelines should be set, such as allowing for a given period of time, with a deadline by which comments must be submitted.
- transparency and fairness are paramount.

4 (4) The Essential Requirements for effective National Spectrum Management

National Spectrum Control and Enforcement

- National laws and regulations are useless unless the administration has the legal power and practical means to monitor whether actual spectrum use is in accordance with those laws and regulations and to take effective action against violations.
- national spectrum monitoring capability to obtain information on spectrum use and gather evidence of illegal activity to support subsequent legal action against offenders.
- unlicensed transmissions or operation that does not conform to the conditions of a licence.
- obligation to ensure all emissions from the country conform to the Radio Regulations and do not cause harmful interference to the services of other countries

5 (1) National Spectrum Planning and the National Table of Frequency Allocations (NTFA)

Principles and objectives

- The NTFA is the published outcome of national spectrum planning.
- National spectrum planning should be one of the duties of the spectrum policy and strategy committee, including setting up regular reviews, in particular as part of the preparations for ITU radio conferences.
- Direct relationship between effective planning of the spectrum resource through the continuous review of NTFAs and the economic impact of national spectrum use through an effective and efficient spectrum allocation, consistent with international spectrum harmonization.
- Ensure technical compatibility but also *provide the legal/regulatory basis for maximizing economic output from the utilization of the spectrum resource in the particular context of the corresponding country.*

5 (2) National Spectrum Planning and the National Table of Frequency Allocations (NTFA)

National choices

- Using the international Table of Frequency Allocations as the source document, work through each frequency band to decide which service allocations are required nationally and, in the case where there is more than one organisation responsible for frequency assignments (for example government and non-government use), decide how frequency bands (or parts of frequency bands) should be shared between the organisations concerned.
- Flexibility is possible with national allocations while maintaining conformity with the Radio Regulations. For example, only those international footnotes relevant to the country need to be applied as national footnotes. Also, in cases where, in the RR, a frequency band is allocated to several services, an administration may select which of those services may operate in its territory (choosing one or several) or may decide to split the band into sub-bands, each allocated to one or more services allocated in the RR.

6 (1) National Spectrum Planning and the National Table of Frequency Allocations (NTFA)

National Table of Frequency Allocations – structure

- NTFA is a method for presenting the national spectrum plan in an easily understandable (tabular) format.
- NTFA is derived from the international table of frequency allocations (Art. 5 of RR), the same tabular structure is used as it may easily be adapted to show national allocations, simply by inserting additional columns.

The following generic example of a simple NTFA demonstrates the basic structure >>

6 (2) National Spectrum Planning and the National Table of Frequency Allocations (NTFA)

Generic example of a simple NTFA

kHz

Allocation to Services			National Allocation	
Region 1	**Region 2**	**Region 3**	**Frequency and Service**	**Use**
4 063-4 438 MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 *5.128*			4063-4438 Maritime Mobile 5.79A 5.109 5.110 5.130 5.131 5.132	G
4 438-4 488 FIXED MOBILE except aeronautical mobile (R) Radiolocation 5.132A	4 438-4 488 FIXED MOBILE except aeronautical mobile (R) RADIOLOCATION 5.132A	4 438-4 488 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	4 438-4 450 FIXED 4 450-4 460 MOBILE except aeronautical Mobile	G NG
			4 460 4 488 Mobile except aeronautical Mobile RADIOLOCATION 5.132A	S (Mobile NG) (Radiolocation G)

G=Government; NG=Non-Government; S=Shared

7 National Frequency Use Information

- **Considerably more detailed planning is required at the national assignment level and this can be provided by a National Table of Frequency Use as a separate companion to, or as part of, the NTFA. For example:**
  - Detailed information about the assignment of frequencies or blocks of frequencies to different types of system (channelling plans)
  - Technical conditions for frequency access (e.g. power, bandwidth)
  - Licensing conditions for frequency access (individual licence, licence exempt etc)
  - Future re-allocations (repurposing) as a result of long term planning: *Assignment freezing; Reallocation roadmap*

8 (1) Practical steps to develop a country's first NTFA

- Countries that are in the preliminary stages of introducing spectrum management may have to start with no spectrum plan. In this case, an outline NTFA can provide a helpful map to enable a logical approach to deciding how to allocate spectrum to services to meet national requirements.

- An example procedure is described in the next slides:

8 (2) Practical steps to develop a country's first NTFA

- Using the international allocation table, construct a draft NTFA by selecting the allocation "column" for the Region concerned as the base
- Identify and add all footnotes relevant for the Region and country concerned
- Identify and "reserve" in the draft NTFA the frequency bands used by all major "international" services, systems or applications which are already in use or are likely to be used in the country
- Identify and "reserve" in the draft NTFA all allocations which would be difficult to use without causing interference to (or receiving interference from) services in other countries operating in accordance with the Radio Regulations, even though such services might not be used in the country concerned
- Collect information on existing national frequency use.

8 (3) Practical steps to develop a country's first NTFA

- **Examples of major "international" services, systems or applications:**
  - International services for maritime and aeronautical
  - Public mobile communications systems
  - Broadcasting (especially if there is an ITU Regional Allotment Plan)
  - Fixed services – use ITU-R recommended frequency arrangements
  - Non-public mobile systems. Unfortunately there are no ITU recommended channel arrangements, so it will be necessary to consider examples from other countries in the Region concerned and adopt the most common and comprehensive plans
  - Fixed and mobile satellite bands, (especially if there is an Allotment Plan)
  - Public protection and disaster relief radiocommunication systems (see Recommendation ITU-R M.2015)
  - Radionavigation and Radiolocation

8 (4) Practical steps to develop a country's first NTFA

- **Examples of allocations or frequencies which would be difficult to use without causing interference to (or receiving interference from) services or systems in other countries operating in accordance with the Radio Regulations, even though such services might not be used in the country concerned:**
  - Primary Amateur Radio allocations
  - Radio astronomy (especially frequency bands where all emissions are prohibited)
  - Frequencies used for Industrial Scientific and Medical applications
  - Frequencies used for Short Range Devices. See ITU-R Recommendation SM.1896: Frequency ranges for global or regional harmonization of short-range devices (SRDs)

8 (5) Practical steps to develop a country's first NTFA

Identification of existing national use

- Potential sources of information on existing national use: existing licensing and assignment records; request users to provide information from their own records.
- If some form of monitoring capability is available, especially mobile monitoring, it may be used to verify existing records of spectrum use. Where records are poor or non-existent, monitoring can be used to determine actual frequency use, including finding transmitter locations and control points by direction finding.
- When existing national use is added to the draft NTFA, it is most likely that some will not conform to the Radio Regulations or will be using frequencies within frequency bands identified for the "international" services and applications identified in the previous slides. A transition plan should be prepared for the migration of non-conforming use to the new plan.

8 (6) Practical steps to develop a country's first NTFA

- Once the draft NTFA has been "populated" with the allocations and frequencies identified, the spectrum policy and strategy group can decide on a rational distribution of the spectrum between government and non-government uses.
- The spectrum for government use may be further sub-divided for particular departments: Defence; Transport (Maritime, Aeronautical) etc.
- The spectrum for non-government use may be considered for channelling arrangements, technical use conditions and licensing regimes

9 Publishing the NTFA and National Frequency Use Tables

- **With increasing global telecommunications and liberalization of telecommunications markets, it has become a necessity to publish the NTFA as an aid to investment and market planning.**
- **An on-line NTFA can provide:**
  - *a public electronic record which is readily available and with timely updating;*
  - *a tool for identifying and flagging future modifications to the NTFA, for newly-planned bands and/or services;*
  - *clear information about the actual use versus allocation of any particular band (in cases of public safety, defence and other restricted government use, these can be simply labelled as "government use" for example);*
  - *a source of online information that can be used to generate important statistics/analytics on spectrum use.*

10 Regional co-operation in presenting National Frequency Allocation Tables

- **There is considerable regional co-operation and harmonization in spectrum management. This has resulted in regional telecommunications organizations providing "one-stop-shop" frequency allocation and use information systems.**

Examples:

- The Inter-American Telecommunication Commission (CITEL) provides a Spectrum Allocation Database and a Mobile Services Database
- Southern African Development Community (SADC) countries have a Frequency Allocation Plan (SADC FAP)
- The Asia-Pacific Telecommunity (APT) has a Frequency Information System (AFIS)
- European Conference of Postal and Telecommunications Administrations (CEPT) has the ECO Frequency Information System (EFIS)

Generic contents list for NTFA document

FAT		RR REFERENCE
Chapter 1	Meaning of abbreviations	
	Terms and definition	
	General terms	RR 1.2 – 1.15
	Frequency management	RR 1.16-1.18
	Radiocommunication services	RR 1.19-1.60
	Radio stations and systems	RR 1.61- 1.115
	Operational terms	RR 1.116-1.136
	Characteristics of emissions and radio equipment	RR 1.137-1.165
	Frequency sharing	RR 1.166-1.176
	Technical terms relating to space	RR 1.177-1.191
Chapter 2	Frequency bands	RR 2.1-2.2
Chapter 3	Technical characteristics of stations	RR 3.1-3.14
Chapter 4	Assignment and use of frequencies	
	General rules for assignment and use of frequencies	RR 4.1-4.9
Chapter 5	Frequency allocations	RR 5.1-
	Regions and areas	RR 5.2-5.9
	Categories of services and allocations	RR 5.23-5.44
	Footnotes of RR	RR 5.53-5.565
	Plan of Frequency Bands Allocations in the [*Country*] (National Frequency Table)	National footnotes and general information
	National Frequency Table	

Example 1: Moldova

- **A simple table showing direct alignment with ITU and simple categorisation of usage (P=shared)**

Region 1	National allocation		
Frequency band services footnotes	Frequency band - services	Footnotes	Usage
143.65 - 144 MHz AERONAUTICAL MOBILE (OR) 5.210, 5.211, 5.212, 5.214	143.65 - 144 MHz AERONAUTICAL MOBILE (OR)	RN018, RN035	G
144 - 146 MHz AMATEUR AMATEUR SATELLITE 5.216	144 - 146 MHz AMATEUR AMATEUR SATELLITE	RN018, RN035	NG
146 - 148 MHz FIXED MOBILE except aeronautical mobile (R)	146 - 148 MHz FIXED MOBILE except aeronautical mobile (R)	RN018, RN018A, RN018B, RN035	G
148 - 149.9 MHz FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth to space) 5.209 5.218, 5.219, 5.221	148 - 149.9 MHz FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth to space)	5.209, 5.218, 5.219, 5.221 RN018, RN018A, RN035	G
149.9 – 150.05 MHz RADIONAVIGATION-SATELLITE 5.224B MOBILE-SATELLITE (Earth-to-space) 5.209, 5.224A 5.220, 5.222, 5.223	149.9 - 150.05 MHz RADIONAVIGATION-SATELLITE MOBILE-SATELLITE (Earth-to-space)	5.209, 5.220, 5.222, 5.223, 5.224A, 5.224B RN018, RN018A, RN035	P
150.05 - 153 MHz FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	150.05 - 153 MHz FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY	5.149 RN018, RN018A, RN019, RN035	P
153 - 154 MHz FIXED MOBILE except aeronautical mobile (R) Meteorological Aids	153 - 154 MHz FIXED MOBILE except aeronautical mobile (R) Meteorological Aids	RN018, RN018A, RN019, RN035	P
154 - 156.4875 MHz	154 - 156.4875 MHz	5.226	P

Example 2: Bahrain

- **Somewhat more comprehensive providing more details of utilisation and some additional information**

Frequency Allocation	ITU RR allocations for Region 1	National Allocations for Kingdom of Bahrain	Major utilization in Kingdom of Bahrain	Additional Information
1 710-2 026 MHz	1 710-1 930 FIXED MOBILE 5.384A 5.388A 5.388B 5.149 5.341 5.385 5.386 5.387 5.388	1 710-1 930 FIXED MOBILE 5.384A 5.388A 5.388B 5.149 5.341 5.385 5.388	Public fixed and mobile GSM1800 IMT candidate band (1710 1885 MHz) Op1 1735 1760 / 1830 1855 MHz, Op2 1730-1735 / 1875-1880 MHz GSM Guard band 1780 - 1785 MHz DECT 1880-1900 MHz IMT2000	1710-1785 MHz paired with 1805-1880 MHz 3rd mobile licence incl GSM1800 – 2x15 MHz IMT2000 TDD 1900 1920 MHz FDD 1920-1930 / 2110-2120 MHz
	1 930-1 970 FIXED MOBILE 5.388A 5.388	1 930-1 970 FIXED MOBILE 5.388A 5.388	Public fixed and mobile IMT2000 (FDD) 3 operators each with 2x15 MHz FDD & 5 MHz TDD	IMT2000 FDD 1930 – 1970 / 2120 – 2160 MHz
	1 970 1 980 FIXED MOBILE 5.388A 5.388	1 970 1 980 FIXED MOBILE 5.388A 5.388	IMT2000 (FDD)	IMT2000 FDD 1970 – 1980 / 2160 – 2170 MHz
	1 980-2 010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.388A 5.388B 5.389F	1 980-2 010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.388A 5.388B 5.389F	IMT2000 space segment	
	2 010 2 025 FIXED MOBILE 5.388A 5.388B 5.388	2 010 2 025 FIXED MOBILE 5.388A 5.388B 5.388	IMT2000 (TDD)	
2 025 2 200 MHz	2 025 2 110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space to space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth to space) (space to space) 5.392	2 025 2 110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space to space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth to space) (space to-space) 5.392	Government mobile	

Example 3: USA

- A slightly different arrangement split between Federal (Government) and non-Federal. Helpful identification of any FCC rules that apply to the band

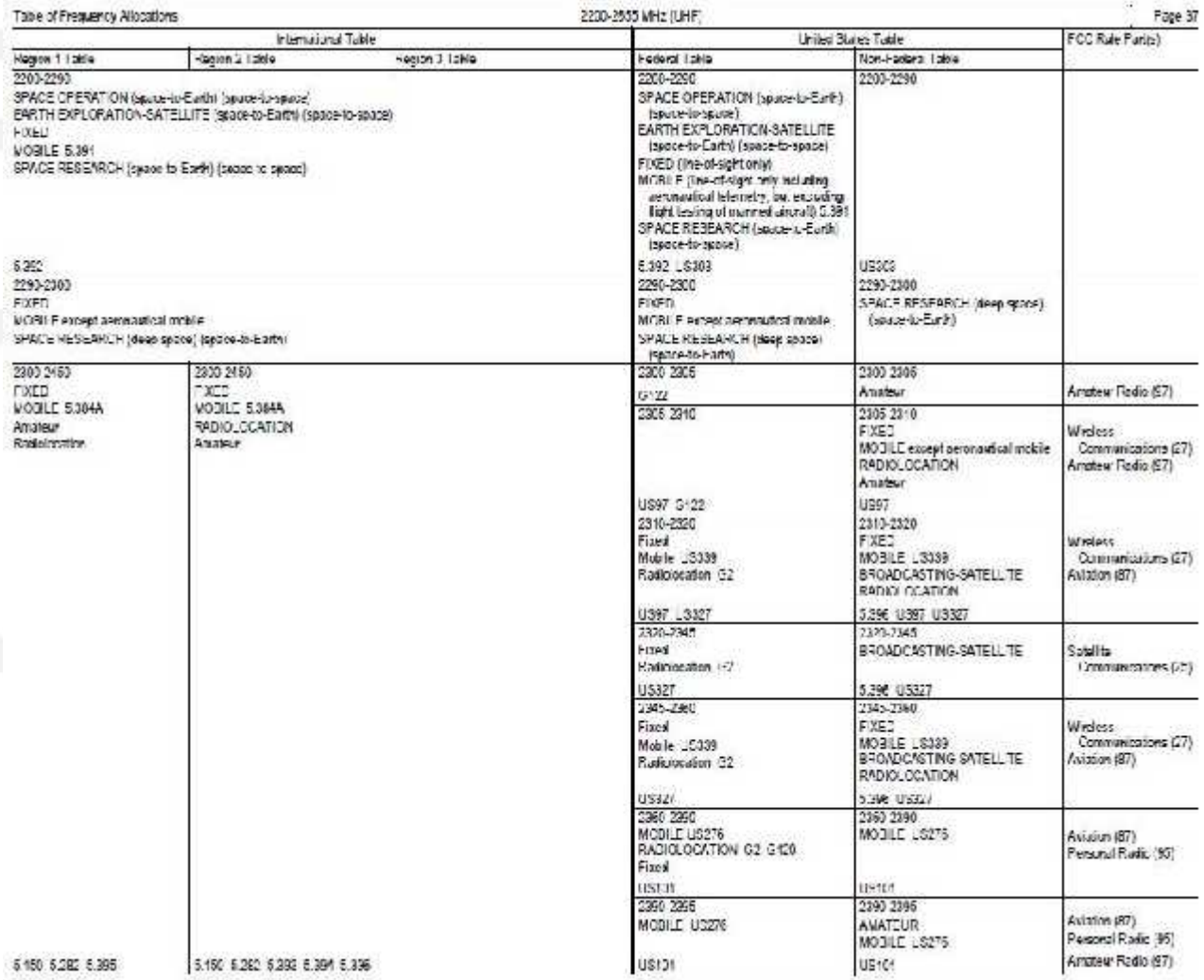
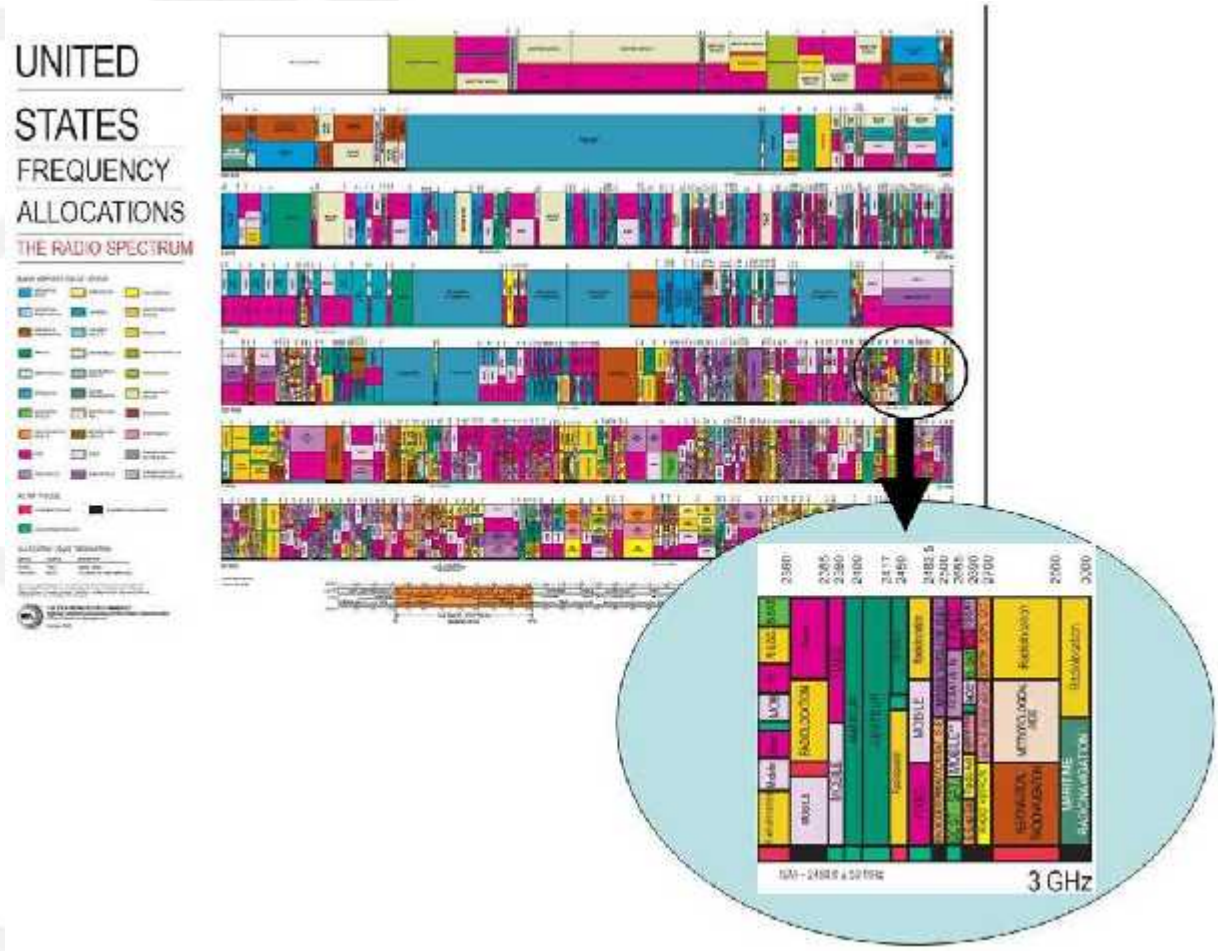


Table of Frequency Allocations — 2200-2655 MHz (UHF) — Page 37

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space)			2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only) MOBILE (line-of-sight only including aeronautical telemetry, but excluding flight testing of manned aircraft) 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space)	2200-2290	
5.392			5.392 US303	US303	
2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)			2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	2290-2300 SPACE RESEARCH (deep space) (space-to-Earth)	
2300-2450 FIXED MOBILE 5.384A Amateur Radiolocation	2300-2450 FIXED MOBILE 5.384A RADIOLOCATION Amateur		2300-2305 G122	2300-2305 Amateur	Amateur Radio (97)
			2305-2310 FIXED MOBILE except aeronautical mobile RADIOLOCATION Amateur	2305-2310 FIXED MOBILE except aeronautical mobile RADIOLOCATION Amateur	Wireless Communications (27) Amateur Radio (97)
			US97 G122	US97	
			2310-2320 Fixed Mobile US339 Radiolocation G2 US97 US327	2310-2320 FIXED MOBILE US339 BROADCASTING-SATELLITE RADIOLOCATION 5.396 US97 US327	Wireless Communications (27) Aviation (87)
			2320-2345 Fixed Radiolocation G2 US327	2320-2345 BROADCASTING-SATELLITE 5.396 US327	Satellite Communications (25)
			2345-2360 Fixed Mobile US339 Radiolocation G2 US327	2345-2360 FIXED MOBILE US339 BROADCASTING-SATELLITE RADIOLOCATION 5.396 US327	Wireless Communications (27) Aviation (87)
			2360-2390 MOBILE US276 RADIOLOCATION G2 G120 Fixed US101	2360-2390 MOBILE US275 US101	Aviation (87) Personal Radio (95)
			2390-2395 MOBILE US276	2390-2395 AMATEUR MOBILE US275	Aviation (87) Personal Radio (95)
5.150 5.282 5.395	5.150 5.282 5.393 5.394 5.396		US101	US101	Amateur Radio (97)

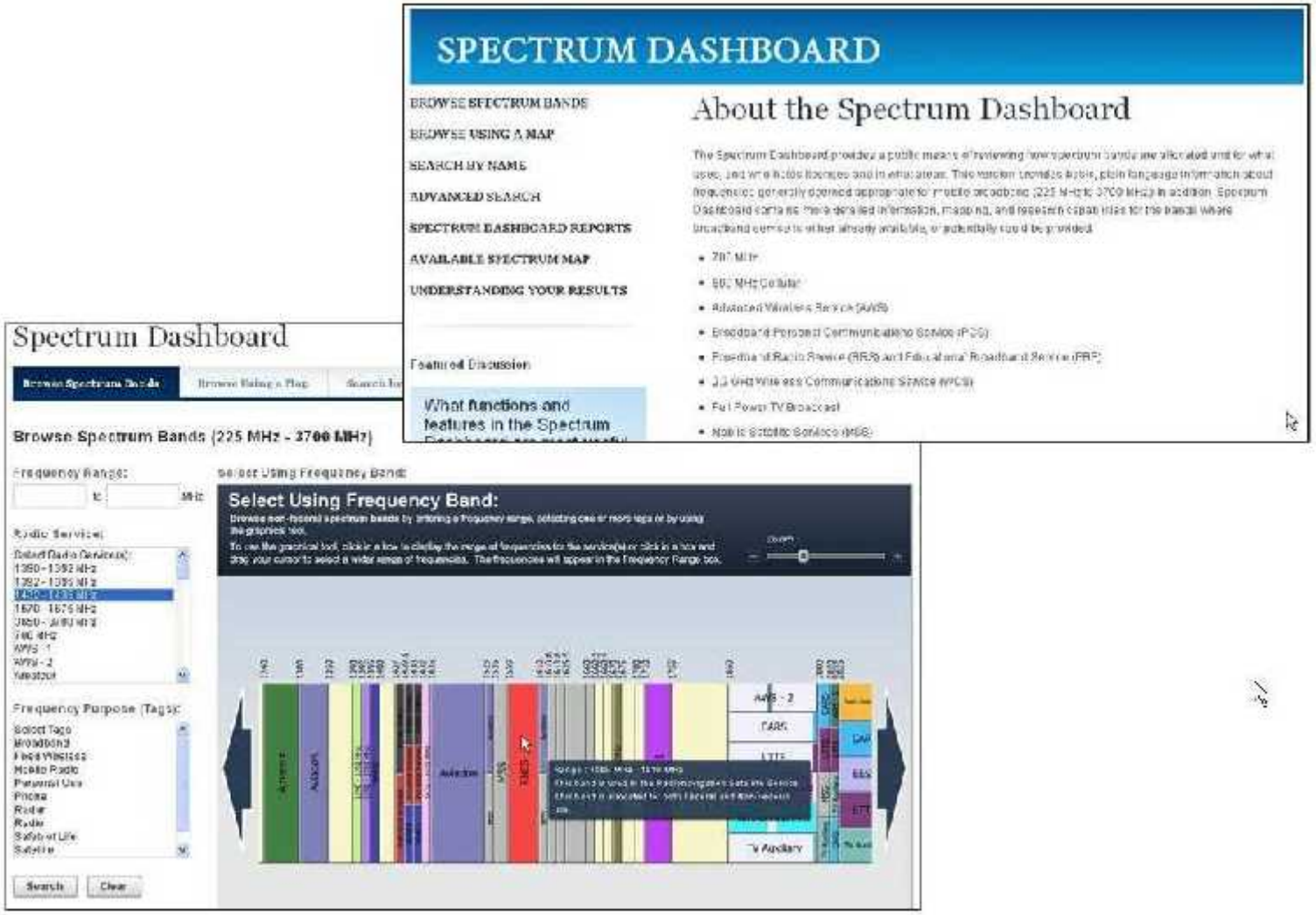
Example 4: Graphical Representation

Useful for public consumption and a quick overview of the use of the radio spectrum



Online system - US

The US spectrum dashboard is a recent initiative to make much more information publicly available and searchable



UK FAT

- Like other NRAs Ofcom publish a FAT. Here we look into a part of it in detail to understand some of the issues

UNITED KINGDOM

FREQUENCY ALLOCATION TABLE

2013

Issue No. 17

Including
The International Telecommunication Union Table of Frequency Allocations contained in the current Radio Regulations

Issued by the National Frequency Planning Group on behalf of the Committee on UK Spectrum Strategy

Summary

- The NTFA is a core element of the national use of radio spectrum and will be one of the most important documents for the NRA
- Most countries adopt a similar format, using the RRs as a template and then showing the national use alongside this
- It can be helpful to provide informative notes, cross-references and footnotes so that most of the activities of the NRA can be “hung from” the NTFA
- Developing the NTFA is a large undertaking and once produced it will need regular updates
- Most NRAs now make the NTFA available on-line both as a published document and sometimes as a searchable database

Spectrum Management Master Plan

SM Master Plan Project

- **Increasing need of efficient spectrum management**
  - Many countries adopted new approaches: unified licensing, market based spectrum allocation, technical neutrality, cognitive radio systems
  - Requires resources and skills to update national spectrum management frameworks
- **ITU-D Global Objective**
  - ***WTDC-14 Dubai Action Plan Objective 2:*** To foster an enabling environment for ICT development and foster the development of telecommunications/ICT networks, including enhancing awareness and capability of countries in the fields of spectrum planning and assignment, spectrum management and radio monitoring
- **MSIP Korea project** for ASP and Caribbean on developing SM Masterplan
- **ITU and MSIP formulated the scope** of activities and conducted a Spectrum Management profiling survey of the countries from ASP and Caribbean)

Report Framework (1)

Executive summary

1. Introduction

1.1 The context and scope for the study
1.2 Report contents

2. Global trends in Radio Spectrum Management

2.1 Administrative processes
2.2 Existing and new licensing policies (including DSA, LSA, white space)
2.3 Fees
2.4 Market mechanisms
2.5 Policy in respect of non-commercial use

3. Current Spectrum Management Framework

3.1 Legislative framework
3.2 Process (including internal coordination with stake-holders)
3.3 Licensing
3.4 Spectrum fee

Report Framework (2)

3.5 Monitoring, type approval and enforcement
3.6 Cross-border frequency coordination
3.7 Spectrum policy, management issues and strategy (if exists)

4. Current spectrum demand and issues - by sector/service

4.1 Data sources used in analysis
4.2 NTFA (National Table of Frequency Allocation)
4.3 Analysis of current spectrum use
4.4 Issues identified by Stakeholders in relation to frequency use
4.5 Conclusions, issues to deal with during the assistance

5. Future demands for spectrum

5.1 Spectrum Demand Trends by Sector/Service

6. Recommendations and Key issues

6.1 Allocation Policy
6.1.1 Improving information on spectrum allocations and policy
6.1.2 Making allocation decisions

Report Framework (3)

6.1.2.1 Role of ITU and other international and regional organizations
6.1.2.2 Role of local investors and spectrum users
6.1.2.3 Unique needs of the country
6.1.2.4 Cross-border frequency coordination agreements
6.1.3 Consultation arrangements
6.1.4 Balance between government and commercial allocations
6.2 Assignment , licensing, monitoring and enforcement
6.2.1 Policy principles
6.2.2 Licensing policy and fees
6.2.3 Planning and licensing processes
6.2.4 Monitoring, type approval and enforcement processes
6.3 Spectrum management strategy
6.4 Capacity building

Annexes
Abbreviations

Cross-border frequency coordination

European frequency coordination agreement (HCM) to Africa (HCM4A)

- Co-ordination request and all technical characteristics of radio network/equipment sent to all administrations affected to enable accurate assessment of interference
- Administrations affected assess possibility of interference to own stations; no possibility of interference: obliged to agree to request
- If assessments produce different results, administrations can agree to operation on a trial basis; field strength calculations replaced with agreed field strength measurements
- Administrations exchange lists of co-ordinated assignments with technical characteristics, administrative reference data, conditions

Implementation of HCM4A in four phases

1. Assessment phase

Review existing bilateral and multilateral cross-border frequency coordination agreements in Sub-Sahara Africa;

2. Multilateral agreement proposal

Technical working group review the results of the assessment and propose a multilateral agreement

3. Validation workshop

Adopt the draft agreement in line with the conclusion of the assessment

4. Development of HCM4A software

Develop and release software based on HCM4A agreement (if adopted) and propose training workshops on the software

Spectrum Management Assistance

Assistance on Spectrum Management

- Spectrum Management Master Plan (SM MP)
  - 3+3 ASP, 3 Caribbean
- Spectrum Management Software (SMS4DC)
  - v5.1 released, v5.2 is under preparation
- Cross-border frequency coordination
  - NBTC training, ASP project (MSIP), Americas
- Other activities
  - CTU SM Task Force, monitoring, direct country assistance
- Trainings, workshops
  - SMTP, SM workshops in EUR, ASP, AFR, AMS

Thank you!

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