International Affairs

Radio waves do not respect national borders and many uses of the radio frequency spectrum have an impact outside the territory of the country in which the operation occurs. International harmonization of spectrum utilization is important for many applications because of roaming users e.g., maritime, aeronautical, mobile telephony, etc. International harmonization can also reduce equipment costs through economies of scale and can reduce the possibility of harmful interference. There are two types of international activities, namely project activities and transactional activities.

Reference Documents

- India: International Regulatory Aspects of Radio Spectrum Management

5.7.1 INTRODUCTION TO INTERNATIONAL AFFAIRS

Radio waves do not respect national borders and many uses of the radio frequency spectrum have an impact outside the territory of the country in which the operation occurs. Sometimes this is deliberate as, for example, in short wave broadcasting or international satellite communications or sometimes it is simply unavoidable. International harmonization of spectrum utilization is also important for many applications because users of communications services are not stationary (roaming) e.g., maritime, aeronautical, mobile telephony, etc. International harmonization can also reduce equipment costs through economies of scale and can reduce the possibility of harmful interference.

The governance of spectrum use on a global basis is a core responsibility of the International Telecommunication Union (ITU) and, in particular, its Radiocommunication Sector (ITU-R). The ITU is a specialized agency of the United Nations with its headquarters located in Geneva, Switzerland. It is important to recognize that the ITU is not a global regulatory authority in the way that a national regulator is within its own jurisdiction since the rules for international regulation and cooperation are written by those governed by them, i.e., by the Member States of the ITU. These rules are administered by the ITU-R's Radiocommunication Bureau (BR) in Geneva and conformity with the rules is based on goodwill rather than on the kind of regulatory sanctions found at the national level. The mission of the ITU-R sector is, *inter alia*, to ensure rational, equitable, efficient and economical use of the radio frequency spectrum by all radiocommunication services, including those using satellite orbits and to carry out studies and adopt recommendations on radiocommunication matters.

The ITU's Telecommunication Development Sector (ITU-D) has well-established programmes of activities. These programmes are designed to facilitate telecommunication connectivity and access to information and communication services (ICTs), foster ICT policy as well as technology development, assist in regulatory and network readiness, expand human capacity through training programmes, formulate financing and cybersecurity strategies. Some of these programmes are also designed to address topics of interest to spectrum regulators.

In addition to activities carried out within the ITU framework, there are often, of course, bilateral and multi-lateral agreements by which the use of spectrum is harmonized across national borders. There are two general categories of international activities, namely project activities and transactional activities.

Practice Notes

- Canada: Policy Statements - Planning, Consultation (National and International)

Reference Documents

- ITU: Radio Regulations, 2004

5.7.2 PROJECT ACTIVITIES

International project activities are those which have a defined beginning and ending date. Like all types of project activities, tasks and sub-tasks can be defined and milestones established. Appropriate resources must be committed over the lifetime of the project.

The ITU World Radio Conference and related Regional Conferences and Study Groups are described **in the first of the four following sections**. Projects undertaken by international bodies such as the World Trade Organization and the International Civil Aviation Organization are described **in Section 7.2.2**. Project activities related to other global or regional inter-governmental organizations are highlighted **in Section 7.2.3**. Bilateral and memoranda of agreement between countries are described **in the last section**.

5.7.2.1 ITU RELATED PROJECT ACTIVITIES

Project activities of the ITU consist of, primarily, World Radio Conferences, Study Groups and Development Conferences. The general purpose and scope of each of these activities is described here in this section. A more detailed description of WRC **2003** and **2007** along with the agenda for **WRC 2011** can be found in the next section, **Recent World Radio Conferences**.

ITU radiocommunication conferences are held every two to three years. One of the main jobs done at the radio conferences is the review, and, if necessary, revisions to the Radio Regulations (See **Section 2.3.4 Radio Regulations**), the international treaty governing the use of the radio-frequency spectrum and the geostationary-satellite and non-geostationary-satellite orbits.

ITU-R World and Regional Radiocommunication Conferences establish treaty level regulations, agreements and plans for the global use of the radio frequency spectrum. Revisions to treaties are made on the basis of an agenda determined by the **ITU Council**, which takes into account recommendations made by previous world radiocommunication conferences.

The general scope of the agenda of world radiocommunication conferences is established four to six years in advance, with the final agenda set by the ITU Council two years before the conference, with the concurrence of a majority of Member States.

Under the terms of the ITU Constitution, a WRC can:

- revise the Radio Regulations and any associated frequency assignment and allotment plans;
- address any radiocommunication matter of worldwide character;
- instruct the Radio Regulations Board and the Radiocommunication Bureau, and review their activities;
- determine the questions to be studied by the Radiocommunication Assembly and related Study Groups in preparation for future Radiocommunication Conferences.

On the basis of contributions from administrations, the Special Committee, the Radiocommunication Study Groups, and other sources (see Article 19 of the Convention (Geneva, 1992)) concerning the regulatory, technical, operational and procedural matters to be considered by World and Regional Radiocommunication Conferences, the Conference Preparatory Meeting (CPM) shall prepare a consolidated report to be used in support of the work of such conferences.

ITU-R Study Groups, in addition to advancing radiocommunication science, prepare the technical, regulatory and operational basis for the treaty level Radiocommunication Conferences. The work of the Study Groups is overseen by the Radiocommunication Assembly which normally takes place in association with a World Radiocommunication Conference. While other ITU-R Study Groups deal with specific radio services, ITU-R Study Group 1 focuses specifically on Spectrum Management and Study Group 3 addresses radiowave propagation. As part of its work, Study Group 1 has produced handbooks on national spectrum management, on spectrum monitoring and on computer-aided techniques for spectrum management.

Project activities include preparing for and participating in these ITU conferences, assemblies and meetings. It is important for all spectrum regulators to keep abreast of the activities undertaken within the ITU's Radiocommunication Sector (ITU-R) since many of these activities have a direct impact on the national regulation of the radio frequency spectrum. For more information on the broad scope of the ITU-R's activities, see (**www.itu.int/ITU-R/**).

In addition to ITU-R activities, the **ITU's Development Sector (ITU-D)** is committed, among other things, to assisting spectrum regulators in carrying out their responsibilities. This occurs through workshops and other training opportunities, publications, virtual conferences, the **Global Symposium for Regulators**, regional meetings of regulators, sharing of legislation and country experiences, etc. For more information, see **www.itu.int/ITU-D/treg/** .

ITU-D Study Group 2 on the development and management of telecommunication services and networks also addresses several topics related to spectrum management including the development of a software based **Spectrum Management System for Developing Countries (SMS4DC)**, information on the calculation of spectrum fees, etc.

The ITU Development Conference adopted Resolution 9 (Rev. Doha, 2006) on the participation of countries, particularly

developing countries, in spectrum management. Cooperative work has been performed pursuant to this Resolution by experts participating in a joint group between ITU-R and ITU-D. The text of this resolution is available at: **www.itu.int/ITU-D/conferences/wtdc/2006/pdf/dohaactionplan.pdf**

To follow all ITU activities related to spectrum management is very resource intensive and priorities must be established so that the most critical activities are closely monitored. A cost effective way of involvement in ITU work is to participate in the ITU related activities of regional and sub-regional telecom organizations. These organizations can be an efficient and effective way by which countries can influence global decisions. A brief description of these organizations is given below along with their web sites where more information may be found.

A compilation of the legislation of different countries may be found at: **www.itu.int/ITU-D/treg/profiles/LegislationSelect.asp?lang=en**

A database related to the establishment of spectrum fees is available at: **www.itu.int/ITU-D/study_groups/SGP_2002-2006/SF-Database/index.asp**

A set of Best Practice Guidelines for Spectrum Management to Promote Broadband Access adopted at the Global Symposium for Regulators 2005 is available at: **www.itu.int/ITU-D/treg/bestpractices.html**

Practice Notes

- **AFRICAN TELECOMMUNICATIONS UNION**
- **ASIA-PACIFIC TELECOMMUNITY**
- **CARIBBEAN TELECOMMUNICATIONS UNION**
- **CEPT EUROPEAN CONFERENCE OF POSTAL AND TELECOMMUNICATIONS ADMINISTRATIONS**
- **CITEL INTER-AMERICAN TELECOMMUNICATION COMMISSION**
- **COOPERATION COUNCIL FOR THE ARAB STATES OF THE GULF**
- **REGIONAL COMMONWEALTH IN THE FIELD OF COMMUNICATIONS**

Reference Documents

- **Resolution 9 - (Rev. Doha, 2006) Participation of Countries, particularly developing countries, in spectrum management, 2006**

5.7.2.2 RECENT ITU WORLD RADIO (WRC) AND REGIONAL RADIO CONFERENCES (RRC)

Important decisions were taken on global allocation at 5 GHz. for mobile wireless access systems, thereby paving the way for the use of wireless devices that do not require individual licences, those of which can be used to create broadband networks in homes, offices and schools. These networks are also used in public facilities in so-called “hot spots”, such as airports, cafés, hotels, hospitals, train stations and conference sites, which offer broadband access to the Internet. The use of these frequency bands is subject to provisions that provide interference mitigation mechanisms and power emission limits in order to avoid interference into other radiocommunication services operating in the same spectrum range.

The 2003 conference also adopted a new Resolution which enables the deployment of new technologies for wideband and broadband public protection and disaster relief applications. WRC-2003 opened the door for the commercial introduction of a new mobile information service: two-way real-time broadband connectivity to aircraft passengers and crew. There were many other decisions dealing with other services such as; aeronautical services, future development of 3G mobile applications, earth stations on board vessels, the protection of radio astronomy, amateur radio regulations, the sound broadcasting satellite service, the radionavigation-satellite service, sharing criteria for VSAT applications and land, ship and airborne radars, etc.

ITU Regional Radiocommunication Conference – 2004: Inter Alia resolutions were adopted by the first session of the Regional Radiocommunication Conference held in Geneva for planning of the digital terrestrial broadcasting service in parts of Regions 1 and 3, in the frequency bands 174-230 MHz and 470-862 MHz (RRC-04).

ITU Regional Radiocommunication Conference – 2006: At RRC-06, a treaty agreement was signed at the conclusion of ITU´s Regional Radiocommunication Conference (RRC-06) in Geneva, heralding the development of ´all-digital´ terrestrial broadcast services for sound and television

ITU World Radiocommunication Conference – 2007: The three main issues addressed at WRC-07 were: determining

standards for advanced mobile services; identifying and agreeing on new spectrum allocations IMT-Advanced Wireless Broadband Services; and discussing ways to improve the framework and approach to spectrum management . An important goal of the conference was to earmark the use of spectrum on a worldwide basis facilitating its development by tapping into the higher frequencies beyond 1GHz, leading to an increase in the data capacity of new systems.

IMT Standardization

The ITU initiated the standardization of systems beyond IMT-2000 – known as IMT-Advanced or 4G - as early as 2000. Collectively, the IMT-2000 standards became the basis for what the industry and regulators came to refer to as "third-generation" or "3G" mobile systems, distinguishing them from the existing generations of analogue (1G) and digital (2G) mobile systems. IMT-2000 envisions transmission speeds ranging from 2 megabits per second (Mbit/s) on a stationary or nomadic basis, up to 348 kilobits per second (kbit/s) at vehicular speeds.

The actual standards as presented in the same GSR Discussion Paper referenced are:

- IMT-Direct-Sequence (IMT-DS) - Also known as Wideband-Code Division Mulitple Access (W-CDMA) or UMTS Terrestrial Radio Access – Frequency Division Duplexing (UTRA-FDD), used in the Universal Mobile Telecommunications System (UMTS) 3G standard.
- IMT-Multi-Carrier (IMT-MC) - Also known as Code Division Multiple Access 2000 (CDMA2000), the successor to second-generation (2G) CDMA.
- IMT-Time-Division (IMT-TD) - This comprises: TD-CDMA (Time Division - Code Division Multiple Access) and TD-SCDMA (Time Division - Synchronous Code Division Multiple Access).
- IMT-Single Carrier (IMT-SC) - Also known as Enhanced Date rate for GSM Evolution or "EDGE" .
- IMT-Frequency Time (IMT-FT) also known as Digital Enhanced Cordless Telecommunications or "DECT".

While WiMAX and IMT-2000 developed along different paths, they were evolving toward functional equivalency. Both provide broadband Internet access (roughly equivalent to a DSL line), as well as voice connectivity. WRC – 2007 ultimately adopted a resolution adding the WiMAX air interface specification as the 6th IMT-2000 technology. They also modified the general naming conventions for IMT technologies so that:

- 3G technologies will continue to be known as "IMT-2000";
- 4G technologies will be known as "IMT-Advanced", and;
- Collectively, all of the 3G and 4G technologies will be known as simply "IMT".

Digital Dividend Bands

Prior to WRC-07, the frequency band 790-862 MHz was allocated to Regions 1 and 3 of the broadcasting service and the fixed service on a primary basis. In Region 2 the mobile service was allocated on a primary basis and, additionally, in nineteen countries of Region 1, to the aeronautical radionavigation service (ARNS) on a primary basis (RR No. 5.312).

A decision of the WRC-07 was to allocate the 790-862 MHz sub-band in Region 1 (covering the European Broadcasting Area and Africa) to the Mobile Service for IMT technologies such as 3G, 4G, WiMAX on a primary basis, except for aeronautical mobile, and on shared basis with the broadcasting service until 17 June 2015. However, the amount of spectrum vacated by television broadcasting services, and making way for DTT according to the Final Acts of WRC-07, varies by region. Box 7.2.1 shows the size of the Digital Dividend resulting from Digital Switchover by ITU Region.

Insert Box

Spectrum Management Guidelines

The ways to further improve the framework and approach to spectrum management was an important topic discussed at length at WRC-07, and it led to agreement on Resolution 951 which established guidelines for evaluating and developing concepts related to four options identified in the resolution for enhancing the framework and for preparing solutions to be discussed at WRC.12. The four options include: keeping current practices, revising current service definitions, creating new service definitions, and introducing composite definitions.

ITU World Radiocommunication Conference – 2012 . The agenda for WRC-12 can be viewed at **www.itu.int/ITU-R/index.asp?category=study-groups&rlink=rcpm-wrc-11-studies&lang=en**.

There are over 35 agenda items with several examples listed below:

- 1.14 to consider requirements for new applications in the radiolocation service and review allocations or

regulatory provisions for implementation of the radiolocation service in the range 30-300 MHz, in accordance with Resolution[COM6/14] (WRC-07);

- 1.19 to consider regulatory measures and their relevance, in order to enable the introduction of software-defined radio and cognitive radio systems, based on the results of ITU-R studies, in accordance with Resolution [COM6/18] (WRC-07);
- 1.20 to consider the results of ITU-R studies and spectrum identification for gateway links for high altitude platform stations (HAPS) in the range of 5 850-7 075 MHz in order to support operations in the fixed and mobile services, in accordance with Resolution 734 (Rev.WRC-07).
- Resolution 749 (WRC-07) and Agenda item 1.17 of WRC-12 tasks the ITU-R Sector "to conduct sharing studies for Regions 1 and 3 in the band 790-862 MHz between the mobile service and other services in order to ensure adequate *protection* of services allocated to the band and to take appropriate action." See Box 7.2.2 below.

Insert Box

- In view of the complexity and importance of WRC-12 Agenda item 1.17 issues, a dedicated Joint Task Group 5-6 (JTG 5-6) was established to study how mobile service can share the band 790-862 MHz band with:
    - the Broadcasting service (Issue A);
    - the Aeronautical radionavigation service (Issue B); and
    - the Fixed service (Issue C).
  - These issues were further sub-divided by cases according to either an ITU-R Region (for Issue B and Issue C, also See See RR provision No. 5.2.). or to whether or not the countries were Contracting Members of the GE06 Agreement (Issue A). Appropriate methods have been proposed for each issue and case.
  - The work of the Joint Task Group, in providing the text for the draft CPM Report addressing the results of sharing studies for fixed, mobile and broadcasting services in the band 790-862 MHz in Regions 1 and 3, was completed in May 2010 and indicates that there is a need to protect certain other primary terrestrial services from the newly allocated mobile service in Region 1. Of particular significance the need for coordination and interference avoidance between mobile services and aeronautical radionavigation services (ARNS) in those countries where ARNS has a primary allocation. See RR provision No. 5.312).
  - Coordination between GE06 Contracting and Non-Contracting member states requires careful consideration of the spectrum sharing studies. Sharing options are outlined in the Annexes attached to the report. However, a number of interference issues are not yet resolved, suggesting that further study of interference issues is necessary. In some cases, a consensus could not be reached around a single option. This implies that digital switchover will occur at different times over the period leading up to analogue shut-off.

Practice Notes

- **ITU Allocations for Broadband Wireless Access**

5.7.2.3 PROJECT ACTIVITIES RELATED TO OTHER GLOBAL INTER-GOVERNMENTAL ORGANIZATIONS

It is important for countries to be aware of, and participate, as appropriate, in activities that touch on spectrum matters in other international bodies in addition to activities within the framework of the International Telecommunication Union. These organizations include, for example, the World Trade Organization (WTO), the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO), the World Meteorological Organization (WMO), etc.

A reference is provided below to the West African Common Market (ECOWAS) approach which aims at developing common policies to achieve greater coordination and harmonization in the access, use and development of ICT technologies including wireless in support of development goals.

Practice Notes

- **Inter American Convention on an International Amateur Radio Permits**

Reference Documents

- West African Common Market Project - Harmonization of Policies Governing the ICT Market in the UEMOA - ECOWAS Space - Final Guidelines, ITU, September 2005

5.7.2.4 OTHER BILATERAL AND MULTILATERAL PROJECT ACTIVITIES

In addition to activities in the ITU and other global, intergovernmental organizations, often bilateral and multilateral agreements for the use of the spectrum must be developed. Such agreements might, for example, set out how two or more countries will coordinate their use of certain frequency bands. Establishing such agreements requires negotiations between the spectrum authorities in the respective countries and possibly the involvement of foreign affairs ministries depending on the legal status of the resulting agreement which can take the form of a simple exchange of letters, a memorandum of understanding, a treaty, etc. Some multilateral agreements can also be established through participation in the regional and sub-regional telecommunication organizations (e.g., CITEL's Inter American Convention on an International Amateur Radio Permit, the agreement within the framework of CEPT between the Administrations of Austria, Belgium, the Czech Republic, Germany, France, Hungary, the Netherlands, Croatia, Italy, Liechtenstein, Lithuania, Luxembourg, Poland, Romania, the Slovak Republic, Slovenia and Switzerland on the coordination of frequencies between 29.7 MHz and 39.5 GHz for the fixed and land mobile services).

CEPT's HCM Agreement which is the unofficial designation of the Agreement between the Administrations of Austria, Belgium, the Czech Republic, Germany, France, Hungary, the Netherlands, Croatia, Italy, Liechtenstein, Lithuania, Luxembourg, Poland, Romania, the Slovak Republic, Slovenia and Switzerland on the Coordination of frequencies between 29.7 MHz and 39.5 GHz for fixed service and land mobile service.

Reference Documents

- CITEL_Radio Amateur Permits Agreement

5.7.3 TRANSACTIONAL ACTIVITIES

Transactional international activities are those activities which are of an ongoing nature. Specific types of transactions are processed over an extended period of time. These types of activities lend themselves to process engineering and electronic data processing support.

Practice Notes

- ITU Publications

5.7.3.1 ITU RELATED TRANSACTIONAL ACTIVITIES

Under the **ITU Radio Regulations**, there are requirements for the regular submission of spectrum related information such as details concerning frequency assignments to the **ITU's Radiocommunication Bureau** for purposes of coordination with other countries and for registration in the Master International Frequency Register (MIFR). This information is published every two weeks in an ITU-R publication known as the **Radiocommunication Bureau's International Frequency Information Circular (BR IFIC)**. The BR IFIC contains details on the current and intended frequency usage by ITU Member States.

The BR IFIC is composed of two parts. The first part deals with space services. It contains information on the frequency assignments to space stations, earth stations and radioastronomy stations submitted by countries to the Radiocommunication Bureau for recording in the Master International Frequency Register, as well as those that are submitted under the relevant provisions of the Radio Regulations or which are subject to the Appendices 30 and 30A Plans for the Broadcasting Satellite Service and the Appendix 30B Plan for the Fixed Satellite Service Plan. The information published corresponds to the recorded assignments as well as the notifications still being processed.

The second part of the BR IFIC deals with terrestrial services. It contains a permanently updated edition of the International Frequency List with regard to terrestrial services, as well as permanently updated versions of the frequency allotment or assignment plans for terrestrial services that are drawn up under the auspices of the ITU. In addition, it contains information on the frequency assignments submitted by countries to the Radiocommunication Bureau for recording in the Master International Frequency Register and in the various regional or worldwide Plans/Agreements.

In order to protect a nation's sovereign rights, there is also a need to analyze on a regular basis the regulatory material published by the ITU in order to determine if there is a potential impact on the country's use of the spectrum and, if so, involvement in the relevant procedures set out in the Radio Regulations is required.

The BR International Frequency Information Circular is published on CD-ROM ROM (for space services) and on DVD (for

terrestrial services) every two weeks. One copy of the BR IFIC (consolidated package) is provided to the ITU Member States' Administrations responsible for radiocommunication matters.

There is also a need for submission of information for publication by the ITU in various service documents. Such documents include List IV – List of Coast Stations, List V – List of Ship Stations, List VI –List of Radio-determination and Special Service Stations, List VII A – List of Call Signs and Numerical Identities of Stations Used by the Maritime Mobile and Maritime Mobile-Satellite Services, List VIII – List of International Monitoring Stations and List VIII A – List of Stations in the Space Radiocommunication Services and in the Radio Astronomy Service (twice per year on DVD). Again, there is a need to review these publications on a regular and ongoing basis.

5.7.3.2 INTERNATIONAL BORDERLINE FREQUENCY COORDINATION

Coordination of frequency assignments and freedom from harmful interference form essential features of modern global radiocommunications networks. A lack of coordination is both economically and technically inefficient. For a discussion of economic and technical efficiency see **Section 1.3 - Objectives of Spectrum Management**.

Article 4 of the ITU **Radio Regulations** – Assignment and use or radio frequencies states the member states shall:

- Endeavour to limit the number of frequencies and spectrum used;
- Undertake to make assignments which are in accordance with the Table of Frequency Allocations;
- Make changes to assignments will be made to avoid harmful interference; and,
- Not seek protection for frequencies not in accordance with the Table of Frequency Allocations.

Member states are required to notify the ITU-R and update the Master International Frequency Register (MIFR) in order to facilitate coordination. The Radio Regulations describe the four steps involved in the notification process which are: notification, publication using the **International Frequency Information Circular (IFIC)**, examination and finally registration in the MIFR.

There are several examples where international frequency coordination has taken place on a regional basis using radio service specific coordination agreements. The HCM Agreement (Vilnius 2005) which superseded the previous "Berlin Agreement - 2003" amongst 17 European countries requires the participant countries to actively coordinate, register and resolve issues using harmonized calculation models for specified Fixed and Land Mobile Services.

Practice Notes

- **Australia: Australian Communications and Media Authority – Frequency Coordination for Satellites**

Reference Documents

- **The HCM Agreement (Vilnius 2005)**

5.7.3.3 OTHER TRANSACTIONAL ACTIVITIES

In addition to transactions involving the ITU, there are transactional activities that need to be carried out on a bilateral or multilateral basis. For example, pursuant to bilateral or multilateral agreements, there may be a need for submission of frequency assignment information for purposes of frequency coordination with adjacent or nearby countries. Often such activities are automated to the extent feasible.

Next: 5.8 Developing Spectrum Management Capacity ➔