M.A. Space and Telecommunications Law
NALSAR University of Law,
Hyderabad, India.

ONLINE LECTURE PROGRAM
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M.A. Space and Telecommunications Law
NALSAR University of Law,
Hyderabad, India.

Lecture Topic:

International Radio Communication Regulations and Telecommunication Laws

(International Telecommunications laws)

Presentation By
Dr K S Mohanavelu

PART I
INTERNATIONAL TELECOMMUNICATIONS REGULATIONS

PART II
ITU RADIO REGULATIONS (ITU RR)

Acknowledgements

I take this opportunity to thank Prof. V. Balakista Reddy Registrar NALSAR University of Law Hyderabad for giving me an opportunity to present lectures for Post graduate Students of M.A. Space and Telecommunications Law.

I am grateful to Mrs. Bangaru Laxmi Jasti Research Associate, Centre for Aerospace and Defence Laws (CADL), NALSAR University of Law, Hyderabad, for many valuable suggestions for planning the topics for the online lecture program.

Since long time I have been working with Dr P Subba Rao CMD Ananth Technologies Limited Hyderabad in the areas of Communications Satellites, I take this opportunity to thank Dr Subba Rao.

I also want to clarify that short falls in this paper, if any are entirely due to me.

K S MOHANAVELU

Part I
International Telecommunications Regulations

Overview

Within the framework of ITU,

International Telecommunication Regulations deal with International Telecommunications Services.

These Regulations has the force of international treaty,

International Telecommunication Regulations:

- Adopted by ITU Telecommunication Standardization Sector (ITU-T).
- Establish general principles
- Develop Technical Standards in the form of ITU-T Recommendations
- Important for bringing together people all over the world through Telecommunications
- Facilitating global interconnection and interoperability of telecommunication facilities
- Promoting harmonious development and operating technical facilities

Overview (Contd.)

Objectives and Organization of the work of ITU-T Sector

Purpose and scope of the Telecommunication Regulations

Interoperability of Technical Facilities of International Telecommunications at different levels through

- Bilateral Commercial Service Agreements,
- Interconnection Agreements,
- International Route
- Terminal Equipment Compatibility,
- Service Compatibility,
- Network Compatibility, etc.

References:

Present: Final Acts of World Conference on International Telecommunications (2012)
https://www.itu.int/en/wcit-12/Documents/final-acts-wcit-12.pdf

Future: NEXT WCIT Final Acts to be issued after June 2022
NEXT WCIT Conference will b e held in Kigali, Rwanda, from 6 to 16 June 2022.
https://www.itu.int/en/ITU-D/Conferences/WTDC/WTDC21/Pages/default.aspx#:~:text=WTDC%20will%20be%20held%20in,6%20to%2016%20June%202022.

What is the great achievement of International Telecommunication Regulations?

Bringing people all over the world together through Telecommunications

Any person in any country can communicate with any other person in any other country (i.e. any of the 195 Countries or so).

International Telecommunication Regulations

- International Telecommunication Regulations is intimately connected with International Telecommunications**.**
- The International Telecommunication Regulations closely relate to International Telecommunications Union (ITU).
- ITU develops the **technical standards** that ensure networks and technologies seamlessly interconnect people all over the world.
- Every time we make a phone call via the mobile, access the Internet or send an email, we are **benefitting from the work of ITU.**
- ITU is **committed to connecting** the entire world's people – wherever people live and whatever their means. ITU protects and supports everyone's right to communicate through its work.
- ITU Member States affirm their commitment to implement these Regulations in a manner that respects and upholds their human rights obligations. These Regulations recognize the **right of access** of ITU Member States to international telecommunication services.
- International Telecommunication Regulations, which has the **force of international treaty**, is important for bringing together people all over the world through Telecommunications.

Why compliance with International Telecommunication Regulations is a must?

By complying with International Telecommunication Regulations (i.e. Essentially by adopting ITU-T Standards), the country establishes its **right for access to International Telecommunication Network**.

Any country which has no access to International Telecommunication Network will be cut off from the rest of the world.

International Telecommunication Regulations has the force of International Treaty.

International Telecommunication Union (ITU)

- **Founded in 1865 to facilitate international connectivity** in communications networks, ITU allocates global radio spectrum and satellite orbits, develop the technical standards that ensure networks and technologies seamlessly interconnect, and strive to improve access to Information and Communication Technologies (ICTs) to underserved communities worldwide.

- In this part of the discussions, we will see how ITU International Telecommunication Regulations bring people all over the world together through Telecommunications.

Regulations and Standardization

ITU–T Sector

International Telecommunications Regulations closely relate to the Standardization Work Done in the ITU-T Sector.

Why do we need International Standards (ITU-T Recommendations)?

- Worldwide standards eliminate the technical barriers and **enable manufacturers to compete** in the global marketplace.
- Worldwide standards help **deployment of Information and Communication Technologies (ICT)** for national economy development.
- Worldwide standards help to achieve **economies of scale** and **lower development and hardware costs.**
- Worldwide Global standards **eliminate incompatibility problems** between competing systems.
- Without standards defined by ITU, the **advanced wireless, broadband and multimedia technologies** simply would not exist.
- With **over 300 bodies** working in some capacity on ICT standards, ITU is able to provide focus, clarity and leadership.
- World's ICT industry work together with world governments and develop and update the equipment and transmission specifications which form **ITU-T Recommendations.**

Why do we need International Standards (ITU-T Recommendations)?

ITU-T Forum like/Meetings/Conferences/Study Groups bring together the Telecom Equipment Manufacturers and Telecom Service Providers both in Government and Private Sectors all over the world to agree upon adoption of worldwide standards and thereby achieve inter operability and interconnections of various national telecom networks and other benefits like economy of scale, etc.

ITU-T Sector Objectives

- ***Objective T.1***

  Develop non-discriminatory **international standards (ITU-T Recommendations)**, in a timely manner, and foster interoperability and improved performance of equipment, networks, services and applications.
- ***Objective T.2***

  Promote the active participation of the membership, in particular developing countries, in the definition and adoption of non-discriminatory international standards (ITU-T recommendations) with a view to bridging the standardization gap.
- ***Objective T.3***

  Ensure effective allocation and management of international telecommunication **numbering,** naming, addressing and identification resources in accordance with ITU-T recommendations and procedures.
- ***Objective T.4***

  Foster the acquisition and **sharing of knowledge** and know-how on the standardization activities of ITU-T.
- ***Objective T.5***

  Extend and facilitate **cooperation** with international, regional and national standardization bodies.

https://www.itu.int/en/annual-report-2017/itu-t/Pages/default.aspx

ITU-T Sector Related Regulations

- Establishment and operation of International Telecommunication Networks
- International Standards in the form of ITU-T recommendations
- International Network – Telecom Infrastructure
- International Telecommunication Services
- Interconnection Agreements – Internetworking
- Safety of life and Priority of Telecommunications
- Security and robustness of networks – Cyber security
- Charging and accounting
- Suspension of Services, etc.

How the work in ITU-T Sector is organized?

Organisation of ITU-T Sector Work

World Conference on International Telecommunications (WCIT)

World Conferences on international telecommunications are planned to be convened every eight years or so to revise the International Telecommunication Regulations (ITRs).

World Telecommunication Standardization Assembly

the overall direction and structure for ITU-T. It meets every four years and defines the general policy for the Sector, establishes the study groups, approves their expected work programme for the next four-year period, and appoints their chairmen and vice-chairmen.

Telecommunication Standardization Advisory Group

The Telecommunication Standardization Advisory Group (TSAG) provides ITU-T with flexibility between WTSAs by reviewing priorities, programmes, operations, financial matters and strategies for the Sector. It also follows up on the accomplishments of the work programme, restructures and establishes ITU-T study groups, provides guidelines to the study groups, advises the Director of the Telecommunication Standardization Bureau (TSB), and produces organization and working procedures in the shape of A series Recommendations.

Study Groups – ITU-T Recommendations

The work of the Study Groups is at the heart of ITU-T

Workshops and Seminars

ITU-T organizes a number of workshops and seminars to progress existing work areas and explore new ones. The events cover a wide array of topics in the ICT field and speakers and attendees include engineering, strategy and policy experts from a range of industry sectors. Organized events are free of charge and open to the public.

Technology Watch

Technology Watch identifies and surveys emerging technologies, as well as their likely impact on future standardization work for both developed and developing countries, with a view to identifying work items able to lead to new ITU-T Recommendations.

https://www.itu.int/en/ITU-T/about/Pages/framework.aspx

ITU WORLD CONFERENCE ON INTERNATIONAL TELECOMMUNICATIONS

- Final Acts of World Conference on International Telecommunications form the source for International Telecommunication Regulations.
- World Conferences on international telecommunications are planned to be convened every eight years or so to revise the International Telecommunication Regulations (ITRs).
- For understanding and academic purpose the information is presented in a simplified way in this presentation.
- Viewers are requested to refer to the original texts given in the final acts.
- So the General Reference Document is:
  FINAL ACTS OF THE WORLD CONFERENCE ON INTERNATIONAL TELECOMMUNICATIONS (Dubai, 2012) The International Telecommunication Union (ITU)

Present Reference: https://www.itu.int/en/wcit-12/Documents/final-acts-wcit-12.pdf

NEXT WCIT will be held in Kigali, Rwanda, from 6 to 16 June 2022.
https://www.itu.int/en/ITU-D/Conferences/WTDC/WTDC21/Pages/default.aspx#:~:text=WTDC%20will%20be%20held%20in,6%20to%2016%20June%202022.

ITU-T Study Groups

- The Study Groups of ITU's Telecommunication Standardization Sector (ITU-T) assemble experts from around the world to develop international standards known as ITU-T Recommendations which act as defining elements in the global infrastructure of information and communication technologies (ICTs).
- **ITU-T Recommendations on Standards are critical to the interoperability of ICTs** and whether we exchange voice, video or data messages, standards enable global communications by ensuring that countries' ICT networks and devices are speaking the same language.
- https://www.itu.int/net/ITU-T/info/answers.aspx?Fp=faqs.aspx&Qn=2&ewm=False
- .

Thematic Priorities in ITU-T Sector

https://www.itu.int/md/D18-TDAG27.RDTP-C-0053/en
https://www.itu.int/en/ITU-D/Conferences/WTDC/WTDC21/Pages/Preparatory-Process.aspx

Thematic Priorities

- **Connectivity**
- **Digital Transformation**
- **Enabling Environment**
- **Resource Mobilization and International Cooperation**
- **Building confidence, trust and security in the use of ICTs**

EXAMPLE

Connectivity

- Deployment of Future Networks;
- Connecting remote and rural areas;
- Resilient and Safe Digital Infrastructure (including EMF-related issues, availability, and reliability);
- [Cybersecurity;]
- [Data protection and Privacy;]
- Connectivity in the Era of Pandemics and Other Disasters; and
- Emergency Telecommunications

Purpose and scope of the Telecommunication Regulations

Purpose and scope of the Telecommunication Regulations

- The Telecommunication Regulations establish **general principles for establishment and operation of international telecommunication services** offered to the public. These Regulations do not address the content-related aspects of telecommunications.

- Telecommunication Regulations are established with a view to **facilitating global interconnection and interoperability of telecommunication facilities** and to promoting the **harmonious development** and efficient operation of technical facilities and its availability international telecommunication services to the public.

- Within the framework of these Regulations, the provision and operation of international telecommunication services in each relation is pursuant to **mutual agreement between authorized operating agencies.**

- In implementing the principles of these Regulations, **authorized operating agencies** should comply with, to the greatest extent practicable, the relevant ITU-T Recommendations.

- These Regulations recognize the **right of any Member State**, subject to national law and should it decide to do so, to require that authorized operating agencies which operate in its territory and provide an international telecommunication service to the public be authorized by that Member State.

Facilitation of
International Telecommunications Services

Telecommunication Regulations facilitate International Telecommunication Services by ensuring interoperability at different levels through

- Bilateral Commercial Service Agreements,
- Interconnection Agreements,
- Terminal Equipment Compatibility,
- Service Compatibility,
- Network Compatibility, etc.

International Telecommunication Network

Governments must ensure that their **authorized operating agencies** cooperate in the establishment, operation and maintenance of the international network to provide a satisfactory quality of service.

- Governments through its operating agencies must to ensure the **provision of sufficient telecommunication facilities** to meet the demand for international telecommunication services.
- Authorized operating agencies must determine **international routes** to be used by mutual agreement.
- Subject to national law, any user, by having **access to the international network,** has the right to send traffic.
- A satisfactory **quality of service** should be maintained to the greatest extent practicable, corresponding to the relevant ITU-T Recommendations.
- Governments through its operating agencies must to ensure that international telecommunication **numbering resources** specified in ITU-T Recommendations are used only by the assignees and only for the purposes for which they were assigned; and that unassigned resources are not used.
- Governments through its operating agencies must ensure that international **calling line identification (CLI)** information is provided taking into account the relevant ITU-T Recommendations.
- Governments through its operating agencies must create an enabling environment for the implementation of regional telecommunication traffic exchange points, with a view to improving quality, increasing the connectivity and resilience of networks, fostering competition and **reducing the costs of international telecommunication interconnections**.

ITU-T Guidelines for International Telecommunication Services

- Governments must promote the development of international telecommunication services and shall foster their **availability to the public**.
- Governments must ensure that their authorized operating agencies cooperate within the framework of these Regulations to provide, by agreement, **a wide range of international telecommunication services** which should conform, to the greatest extent practicable, to the relevant ITU-T Recommendations.
- Subject to national law, Governments must ensure that authorized operating agencies provide and maintain, to the greatest extent practicable, a satisfactory **quality of service** corresponding to the relevant ITU-T Recommendations with respect to
- (Terminal equipment and inter network compatibility) Access to the international network by users using **terminals** which are permitted to be connected to the network and which do not cause harm to technical facilities and personnel;
- International telecommunication facilities and services available to users for their dedicated use;
- at least a form of **Telecommunication Service which is reasonably accessible to the public,** including those who may not be subscribers to a specific telecommunication service; and a capability for Interworking between different services, as appropriate, to facilitate international telecommunication services.
- Governments must promote measures to ensure that authorized operating agencies provide free-of-charge, transparent, up-to-date and accurate information to end users on international telecommunication services.

ITU-T Guidelines for International Telecommunication Services (contd.)

- Governments must promote measures to ensure that telecommunication services in international roaming of satisfactory quality are provided to visiting users.

- Governments promote cooperation among authorized operating agencies in order to avoid and mitigate inadvertent roaming charges in border zones.

- Governments promote competition in the provision of international roaming services and are encouraged to develop policies that foster competitive roaming prices for the benefit of end users.

Safety and Security Aspects

Safety of life and priority of telecommunications

- Safety-of-life telecommunications, such as distress telecommunications, shall be entitled to transmission as of right and, where technically practicable, have absolute priority over all other telecommunications, in accordance with the relevant articles of the Constitution and the Convention and taking due account of the relevant ITU-T Recommendations.
- Governments should encourage authorized operating agencies to inform all users, including roaming users, in good time and free of charge, of the number to be used for calls to the emergency services.

Security and robustness of networks

- Governments shall individually and collectively endeavour to ensure the security and robustness of international telecommunication networks in order to achieve effective use thereof and avoidance of technical harm thereto, as well as the harmonious development of international telecommunication services offered to the public.

Charging and Accounting
International Telecommunication Arrangements

- Subject to applicable national law, the terms and conditions for international telecommunication service arrangements may be established through commercial agreements or through accounting-rate principles established pursuant to national regulation.

- Member States shall endeavour to encourage investments in international telecommunication networks and promote competitive wholesale pricing for traffic carried on such telecommunication networks.

- Accounting-rate principles

  Based on ITU-T Recommendations, ITU-T Cost Studies, etc.

  Accounting Rate Principles are not applicable for arrangements established through commercial agreements.

- Taxation is Applicable for International Telecommunication Services

- **Notes:** Only preliminary information is given. This subject requires in-depth study.

Charging and Accounting
EXAMPLE ITU-T D SERIES RECOMMENDATIONS

https://www.itu.int/en/ITU-T/publications/Pages/structure.aspx

- D.1-D.9 Private leased telecommunication facilities
- D.10-D.39 Tariff principles applying to data communication services over dedicated public data networks
- D.185-D.189 Charging and accounting for international satellite services
- D.270-D.279 Charging and accounting principles for next generation networks (NGN)
- D.280-D.284 Charging and accounting principles for universal personal telecommunication
- D.90-D.99 Charging and accounting in the mobile services
- D.100-D.159 Charging and accounting in the international telephone service
- D.50-D.59 Principles applicable to GII-Internet

Extract from Recommendation

..... administrations take appropriate measures nationally to ensure that parties (including operating agencies authorized by Member States) involved in the provision of international Internet connections negotiate and agree to bilateral commercial arrangements, or other arrangements as agreed between administrations, enabling direct international Internet connections that take into account the possible need for compensation between them for the value of elements such as traffic flow, number of routes, geographical coverage and cost of international transmission, and the possible application of network externalities, amongst others;

https://www.google.com/search?q=ITU+T+D.50-D.59+Principles+applicable+to+GII-Internet+RECOMMENDATIONS&oq=ITU+T+D.50-D.59%09Principles+applicable+to+GII-Internet+RECOMMENDATIONS&aqs=chrome..69i57.13268j1j7&sourceid=chrome&ie=UTF-8

What about National Telecommunication Services and Regulations?

In India, Government of India ensures development and application of National Telecommunication Regulations through DOT, WPC, SACFA, NFAP, TEC, MI&B, etc. This includes Roles of Service Providers in private sector.

- TRAI is the Telecom Regulatory Authority of India (TRAI).
- DOT is Licensing Authority for Telecommunication Services.
- TEC deals with equipment specifications and quality requirements.
- MI&B is the Licensing Authority for Broadcast Services (DTH, FM Radio, TV Channels, Uplink, Downlink, Cable TV, etc.)
- WPC, SACFA and NFAP deal with Radio Frequency Spectrum matters.
- Regarding TRAI, Please see the web reference https://www.trai.gov.in/about-us/history
- Web sites of DOT, WPC, MI&B, etc. provide information on National Regulations.
- **Seth Dua & Associates** provide information in the article “In brief: telecoms regulation in India” Please see the web reference:
- https://www.lexology.com/library/detail.aspx?g=45ac7f16-f40c-42ea-b3df-dfe6e357e2c0#

Telecom Regulatory Authority of India

TRAI (https://www.trai.gov.in/about-us/history)

- The **Telecom Regulatory Authority of India** (TRAI) was, thus, established with effect from 20th February **1997** by an Act of Parliament, called the Telecom Regulatory Authority of India Act, 1997, to regulate telecom services, including fixation/revision of tariffs for telecom services which were earlier vested in the Central Government.
- TRAI's mission is to **create and nurture conditions for growth of telecommunications** in the country in a manner and at a pace which will enable India to play a leading role in emerging global information society.
- One of the main objectives of TRAI is to provide **a fair and transparent policy environment** which promotes a level playing field and facilitates fair competition.
- In pursuance of above objective TRAI has issued from time to time a large number of **regulations, orders and directives** to deal with issues coming before it and provided the required direction to the evolution of Indian telecom market from a Government owned monopoly to a multi operator multi service open competitive market.
- The directions, orders and regulations issued cover a wide range of subjects including **tariff, interconnection and quality of service** as well as governance of the Authority.
- The TRAI Act was amended by an ordinance, effective from 24 January 2000, establishing a Telecommunications **Dispute Settlement and Appellate Tribunal (TDSAT)** to take over the adjudicatory and disputes functions from TRAI. TDSAT was set up to adjudicate any dispute between a licensor and a licensee, between two or more service providers, between a service provider and a group of consumers, and to hear and dispose of appeals against any direction, decision or order of TRAI.

Telecommunications Regulation Handbook

This document may be another source of information

Tenth Anniversary Edition

The World Bank, InfoDev, and The International Telecommunication Union

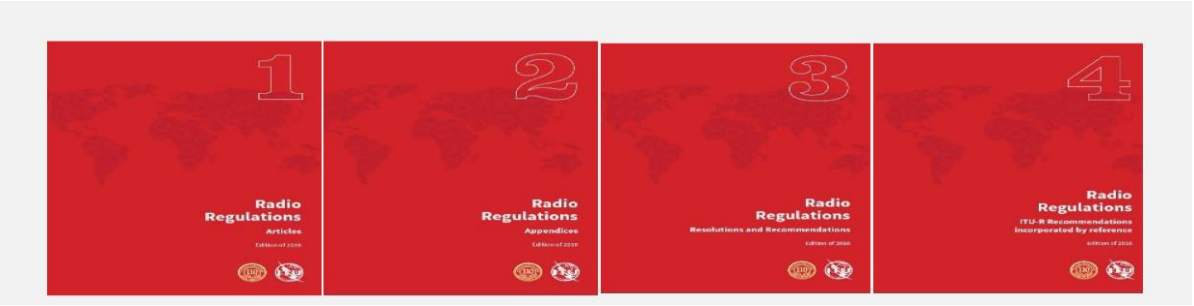
This volume is a product of the staff of the International Bank for Reconstruction and Development / The World Bank, InfoDev, and The International Telecommunication Union.

- Salient Topics covered are:
- **A LEVEL PLAYING FIELD: REGULATING FOR EFFECTIVE COMPETITION**
- **GROWING THE MARKET: LICENSING AND AUTHORIZING SERVICES**
- **GOING MOBILE: MANAGING THE SPECTRUM**
- **FROM CAPACITY TO CONNECTIVITY: NETWORK ACCESS AND INTERCONNECTION**
- **FROM AVAILABILITY TO USE: UNIVERSAL ACCESS AND SERVICE**
- **A DIGITAL FUTURE: REGULATORY CHALLENGES IN A BRAVE NEW WORLD**
- **WORLD TRADE ORGANIZATION REFERENCE PAPER ON BASIC TELECOMMUNICATIONS:**
  1. **Competitive safeguards**
  2. **Interconnection**
  3. **Universal service**
  4. **Public availability of licensing criteria**
  5. **Independent regulators**
  6. **Allocation and use of scarce resources**

THIS COMPLETES PART I DISCUSSIONS ON ITU-T TELECOMMUNICATION REGULATIONS

NOW LET US DISCUSS PART II ITU RADIO REGULATIONS (ITU RR)

ITU RR VOLUMES - RED COLOUR BOOKS



Overview

- Organization of ITU-R Sector of ITU
- World Radio Conference
  - ITU Radio Regulations (ITU RR)
- ITU-R Study Groups
  - ITU-R Recommendations
- International Regulatory Framework for use of Orbit-Spectrum Resources
  - Managing the international use of the Radio Frequency Spectrum and Geostationary Satellite Orbit and Other Orbits
- Overview of ITU Coordination and Notification Procedures for Space Services – (Extracts from ITU-R Seminar Document)

ITU Radiocommunication Sector (ITU-R)

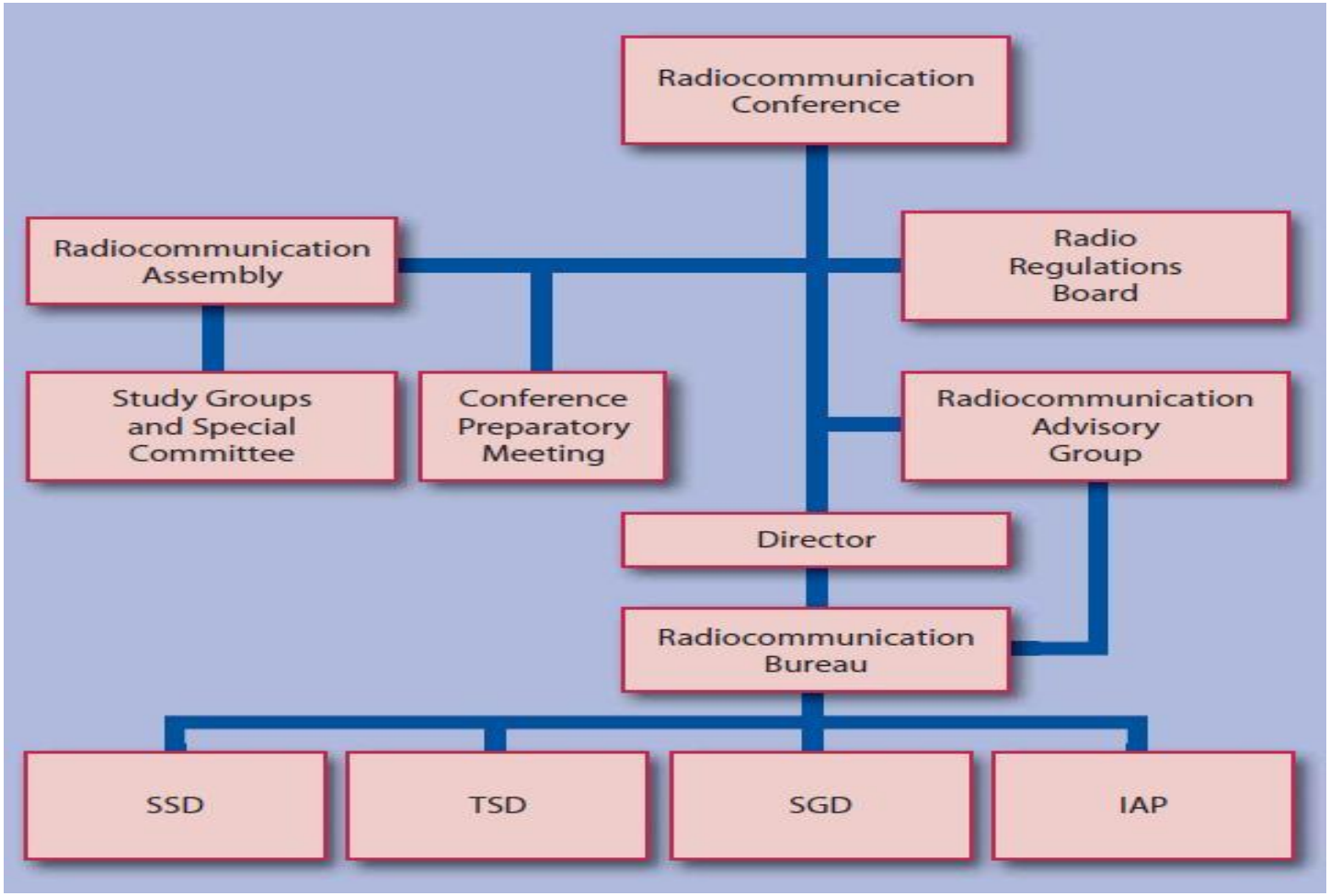
The ITU Radiocommunication Sector (ITU-R)
is responsible for developing regulatory framework for

international management of the use of the
radio-frequency spectrum and satellite orbits
- limited natural resources

which are increasingly in demand from a large and growing number of services such as fixed, mobile, broadcasting, amateur, space research, emergency telecommunications, meteorology, global positioning systems, environmental monitoring and communication services - that ensure safety of life on land, at sea and in the skies.

ITU Radiocommunication Sector (ITU-R)

ITU Radiocommunication Sector (ITU-R)



ITU-R Sector Mission

ITU-R Sector mission is

to ensure the 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 approve Recommendations on radiocommunication matters.

In implementing this mission, ITU-R aims at

creating the conditions for harmonized development and efficient operation of existing and new radiocommunication systems, taking due account of all parties concerned.

ITU-R Sector

The primary objective of ITU-R sector is to ensure interference free operations of radiocommunication systems.

This is ensured through implementation of the Radio Regulations and Regional Agreements, and

the efficient and timely update of these instruments through the processes (WRCs and RRCs).

Radio Regulations is not a static document. RRs are reviewed and revised every four years at WRCs.

WRCs are held every four years or so.

ITUWRC
SHARM EL-SHEIKH2019
28 October - 22 November
Sharm El-Sheikh, Egypt

World Radio Conference (WRC) in 2019
Participation: More than 3000 delegates from Governments, various Organisations and Private Sector Companies from all over the world

ITU-R Radiocommunication Sector addresses:

- **ITU-R Recommendations -** Worldwide standards for various radiocommunication services

  For example ITU-R addresses Global Solutions to meet the requirements of explosive growth of wireless communications especially the need for additional radio spectrum allocations and harmonized standards (Example: 2G, 2.5G, 3G, 4G/LTE, 5G standards for mobile communications).
- **ITU Radio Regulations (ITU RR)** – Development and Application of ITU RR as the international regulatory framework for use of the Radio-Frequency Spectrum and Satellite Orbits.

ITU-R Recommendations

Furthermore, standardization establishes 'Recommendations' intended to assure the necessary performance and quality in operating radiocommunication systems.

It also seeks ways and means to conserve spectrum and ensure flexibility for future expansion and new technological developments.

ITU Radio Regulations

- Everywhere, at every moment, people need to communicate and to understand each other. Encouraging communication between nations through the harmonious development of the tools made available to them is ultimate goal of ITU.
- In this respect, the ITU Radio Regulations facilitate equitable access to and rational use of the natural resources of the radio-frequency spectrum and geostationary (GSO) and non geostationary satellite orbits (NGSO).

  They also ensure the availability of the frequencies provided for distress and safety purposes and assist in the prevention and resolution of cases of harmful interference between the radio services of different administrations.

  Further, the regulations facilitate the efficient and effective operation of all radiocommunication services and, where necessary, regulate new applications of radiocommunication technology.

This Presentation discusses ITU RR considerations for the following aspects:

Frequency Allocation, Allotment and Assignment

- ITU Table of Frequency Allocations - ITU Regions
- Frequency: Allocation-Allotment –Assignment
- Technical Requirements for Frequency Sharing by different Services

Managing the international use of Geostationary Satellite Orbit and Other Orbits

- Plan and Coordination Approaches for Space Services
- Procedures for Coordination of the proposed new Satellite Network
- Procedures for Notification and Recording of Frequency Assignments in MIFR
- Regulatory Procedures for Coordination and Recording of Frequency Assignments (includes Orbit Characteristics)
- International Recognition and Protection
- Interference Free Operations

Frequency
Allocation-Allotment -Assignment

Terms and Definitions

- ITU Radio Regulations includes terms and definitions. Here it is considered useful to highlight the significance of the following three specific terms relating to frequency management with examples:
- **Allocation**
- **Allotment**
- **Assignment**

- **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.

Table of Frequency Allocations

- As said earlier, the natural resource Radio Frequency Spectrum belongs to humanity.

  In order to facilitate administrations to use the spectrum for meeting their own requirements and at the same time in order to ensure harmonized usage of spectrum, ITU Radio Regulations include Table of Frequency Allocations.

  Usually Frequency bands are allocated for more than one service for example Fixed Satellite Service (FSS) and Fixed Service (FS) and ITU Radio Regulations define the sharing criteria for achieving compatibility among different services for operations in the same band.
- The Tables of Frequency Allocations are discussed and developed at the ITU Conferences and Meetings taking into account the requirements of various countries, technical considerations like propagation, technology developments, standardization of equipment and criteria for sharing the spectrum by different services.

Example for ITU Frequency Allocation: Extract from ITU table of Frequency Allocations

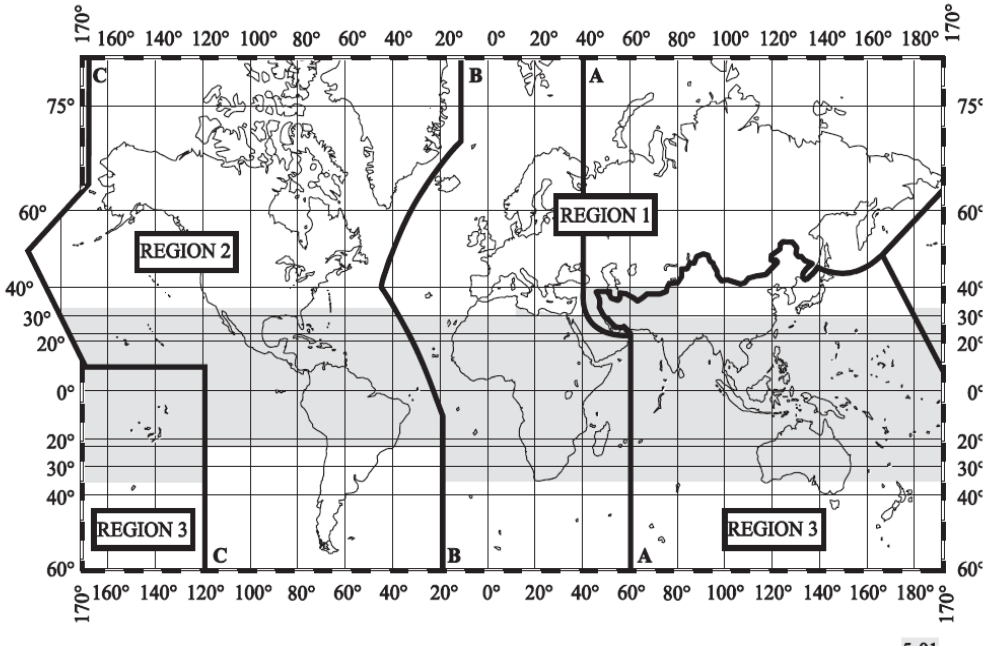
Frequency Allocations are shown for three ITU Regions

Allocation to services		
Region 1	**Region 2**	**Region 3**
2 700-2 900	AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423 5.424	
2 900-3 100	RADIOLOCATION 5.424A RADIONAVIGATION 5.426 5.425 5.427	
3 100-3 300	RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149 5.428	
3 300-3 400 RADIOLOCATION	**3 300-3 400** RADIOLOCATION Amateur Fixed Mobile	**3 300-3 400** RADIOLOCATION Amateur
5.149 5.429 5.429A 5.429B 5.430	5.149 5.429C 5.429D	5.149 5.429 5.429E 5.429F
3 400-3 600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.430A Radiolocation	**3 400-3 500** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431A 5.431B Amateur Radiolocation 5.433 5.282	**3 400-3 500** FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432 5.432B Radiolocation 5.433 5.282 5.432A

ITU Regions

World divided into three ITU Regions for frequency allocation purpose

- The frequency allocations are made on the basis of ITU Regions in order to take into account differences in the requirements. ITU Regions are shown in the diagram.



Frequency allocations are of international nature

- The frequency allocations are of international nature i.e. any Administration (basically the Government of a sovereign nation representing in ITU) can make use of these allocations and implement satellite networks on a worldwide basis. This also implies any country can claim any orbital slot to provide service in any geographical area unless there are specific restrictions to the contrary indicated in the ITU Table of Frequency Allocations.
- However the country proposing such a system must obtain the agreement of the country concerned for including their territories in the Service Area of the proposed satellite network Fling / Assignment. Providing Service in a particular country is also subject to obtaining Landing Rights (i.e. Access to the Market). Landing Right is the prerogative of the country concerned.
- Still the country proposing the satellite network can coordinate and acquire the Orbit-Spectrum resources but put them into operations only in those territories for which the Landing Rights are given.
- The footnotes to ITU Table of Frequency Allocations are also important as they indicate procedural or technical conditions applicable for the allocations.

Frequency Allotment and BSS Plan

- **Allotment** (of a radio frequency or radio frequency band): Entry of a designated frequency channels in an agreed plan adopted by competent conference, for use by one or more administrations for terrestrial or space radiocommunication service in one or more identified countries or geographical areas and under stipulated conditions.

- As far as space services are concerned, Allotment refers to “A Priori” Allotment of Frequencies and Orbital Slots to All Countries. ITU World Radio Conferences adopted BSS and FSS Plans in certain frequency bands.

- **BSS PLAN**
- **ITU Broadcasting Satellite Service Plan (Region 3)**
- **11.7-12.2 GHz (downlink) and 17.3-18.1 GHz & 14.5-14.8 GHz (uplink)**

- **India has been allotted 55.8 E and 68 E Orbital Slots For National Coverage using multiple spot beams**

Frequency Allotment and FSS Plan

- **FSS PLAN**

ITU Fixed Satellite Service Plan

Ku Band: 10.7-10.95 GHz & 11.2-11.45 GHz (downlink); 12.75-13.25 GHz (uplink)

C Band: 4500-4800 MHz (downlink) and 6725-7025 MHz (uplink)

- **India has been allotted 74 E for National Coverage using single beam**

Assignment

- **Assignment** (of a radio frequency or radio frequency channel): Authorization given by an administration for radio station to use a radio frequency or radio frequency channel under specific conditions.
- The entire international regulatory framework flows out of the Frequency Assignment. The ultimate aim of the Administration is to ensure that their Frequency Assignments are recorded in the MIFR (Master International Frequency Register) and thereby achieve international recognition and protection against interference.
- Administrations authorize the frequency assignment on the basis of their requirements conforming to various ITU RR provisions including the ITU Table of Frequency Allocations and at the same time taking into consideration the Assignments of other administrations recorded in the MIFR and those already in the Coordination stage.
- Administrations proposing the new frequency assignment first must go through the Coordination process. ITU BR identifies the Coordination requirements. During the Coordination process, the administration obtains all the required Coordination Agreements and submits the Notification to ITU BR for recording the new Frequency Assignment in the MIFR and ITU BR examines the Notification and records the Assignment in the MIFR if the proposed Assignment meets the Coordination and all other regulatory requirements (i.e. favourable finding by ITU BR).

Technical Requirements for Frequency Sharing by different Services

- Usually the frequency bands are allocated for both space and terrestrial services. So these services need to be planned and operated in such a way that these services can coexist in the same frequency band without causing or receiving interference.

  It is therefore mandatory to comply with Technical Requirements specified in the ITU RR (Articles 5, 21, 22 and others) by both space and terrestrial services.

Managing satellite Orbits

Managing the international use of the Geostationary Satellite Orbit and Other Orbits

- Following the procedures given in the ITU RR including taking into account the existing and planned satellite systems and conducting international coordination, administrations submit their “Frequency Assignments” for recording in the Master International Frequency Register (MIFR).
- Frequency Assignments are basically the characteristics of the use of spectrum and associated satellite orbits (in case of space services). ITU Radiocommunication Bureau (ITU-BR) examines and records in MIFR only those Frequency assignments which comply with technical requirements and regulatory procedures stipulated in the ITU RR.
- In this regard for examination of compliance requirements, ITU BR also develops and applies Rules of Procedures (ROP) which complement ITU RR. While ITU RR is approved by WRCs, ROP goes through approval processes of Radio Regulation Board (RRB) and WRC.
- The frequency assignments and the associated satellite orbits conforming to ITU RR requirements with favourable finding by ITU BR are recorded in the MIFR. Only those frequency assignments recorded in the MIFR with favourable findings attain international rights and recognition as well as protection against harmful interference.

Plan and Coordination Approaches

- As far as space services are concerned, the frequency allocations are broadly referred to as non planned bands and Plan bands.
- Coordination approach is followed for access to **non planned bands** for satellite networks. Coordination approach is based on **first come first served basis**. The priority is fixed on the basis of dates of receipt of the complete Coordination Request information on the proposed satellite network filings by ITU BR. Accordingly ITU BR examines the filings and determines the Coordination Requirements for each satellite network filing by ITU BR.
- **FSS Plan and BSS Plans** have been adopted and **a priori allotments** are made in certain frequency bands. (Please see Slides 55 and 56).

  But generally the assignments / allotments made in the Plans can be put into use without going through the Coordination process. But in case of any modifications to the Plan assignments / allotments, Coordination will be necessary.
- In the present prevailing actual situations, first come first served is almost followed for **Plan bands** as well as **non planned bands**.

Regulatory Procedures for Coordination and Recording of Frequency Assignments (includes Orbit Characteristics)

- ITU-R manages the detailed coordination and recording procedures for space systems and earth stations.

  Its main role is to process and publish data and to carry out the examination of frequency assignment notices submitted by administrations for inclusion in the formal coordination procedures or recording in the Master International Frequency Register.
- ITU-R also develops and manages space-related assignment or allotment plans and provides mechanisms for the development of new satellite services by locating suitable orbital slots.

Regulatory Procedures for International Coordination and Notification

Procedures for Coordination of the proposed Satellite Network
Advance Publication of Information on Satellite Networks
Submission of Coordination Requests for Satellite Networks
(Basically the characteristics of the envisaged spectrum and satellite orbit use)
Determination of Coordination Requirements
Coordination with other administrations determined as per Coordination Requirements
Seeking Coordination Agreements from other administrations

Procedures for Notification and Recording of Frequency Assignments in MIFR
Submission of Due Diligence Information on the proposed satellite and launch Vehicle
Submission of Notification of Frequency Assignments
(Basically the characteristics *of the coordinated spectrum and satellite orbit use)*
Examination of Notices by ITU BR
Recording of Frequency Assignments in the MIFR if the ITU BR findings are favourable

Over View of Coordination and Notification Procedures (Non-Planned Space Services)

Certain Aspects Only

REF: ITU SEMINAR DOCUMENT SP-0017

https://www.itu.int/dms_pub/itu-r/md/15/wrs18/sp/R15-WRS18-SP-0017!!PDF-E.pdf

To Sum Up

We have discussed the following topics:

Part I
International Telecommunications Regulations

Part II
ITU Radio Regulations (ITU RR)

International and National Telecommunications are implemented
Taking into account the above mentioned Regulations.

The work done on ITU-T and ITU-R Sectors is highly specialized.

These topics also involve legal considerations.

Hence these topics should be of interest to members of legal profession.

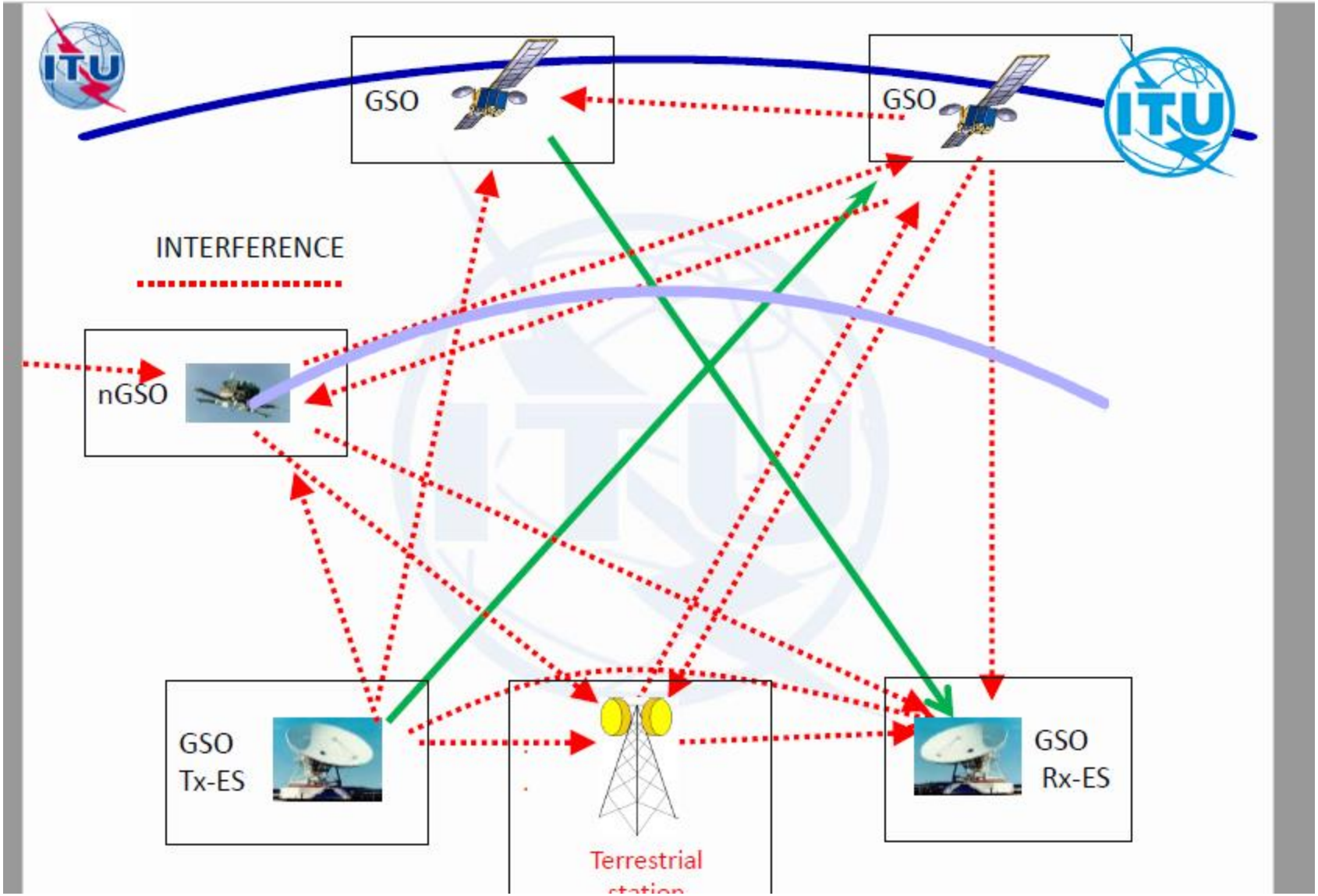
Thank You

Over View of
Coordination and Notification Procedures
(Non-Planned Space Services)

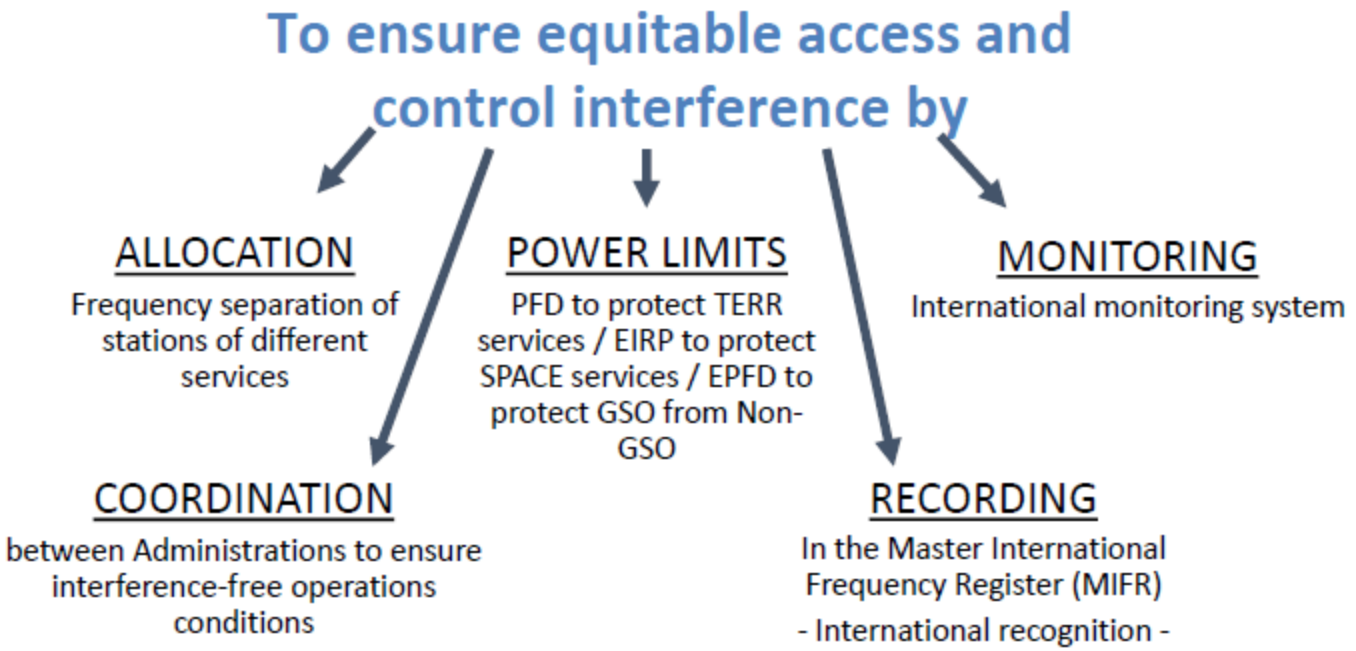
Certain Aspects Only

REF: ITU SEMINAR DOCUMENT SP-0017

https://www.itu.int/dms_pub/itu-r/md/15/wrs18/sp/R15-WRS18-SP-0017!!PDF-E.pdf


GSO
GSO
INTERFERENCE
nGSO
GSO
Tx-ES
Terrestrial
GSO
Rx-ES

Regulatory and technical solutions



Contents

Essence of coordination approach

Two stage procedure – A, N or C(A), N

Examination of Coordination Request

CR/C, CR/D and CR/E

earth station coordination

Recording in MIFR

Resolution 49 and Resolution 552

BR Actions at the end Regulatory Time Limit

One of the Main Purpose of RR is Interference-free operation

Mechanisms to achieve it

(Allocation, Limits, Licensing , Monitoring)

and

- Planned use
- Coordinated Use

→**First Come First Served (subject to some restrictions) and Obligatory Negotiations**

Elements of Coordination Approach

- Publish a planned use of satellite network
- Fulfil requirements mentioned in the RR
- Negotiate with concerned administrations and get agreements
- Record the coordinated assignments in the MIFR (Master International Frequency Register) to be taken into account by other administrations

Forms of Coordination

No.9.6:Before BiU or Notify in cases below shall effect coordination (No.9.27/AP 5 -Table 5-1)

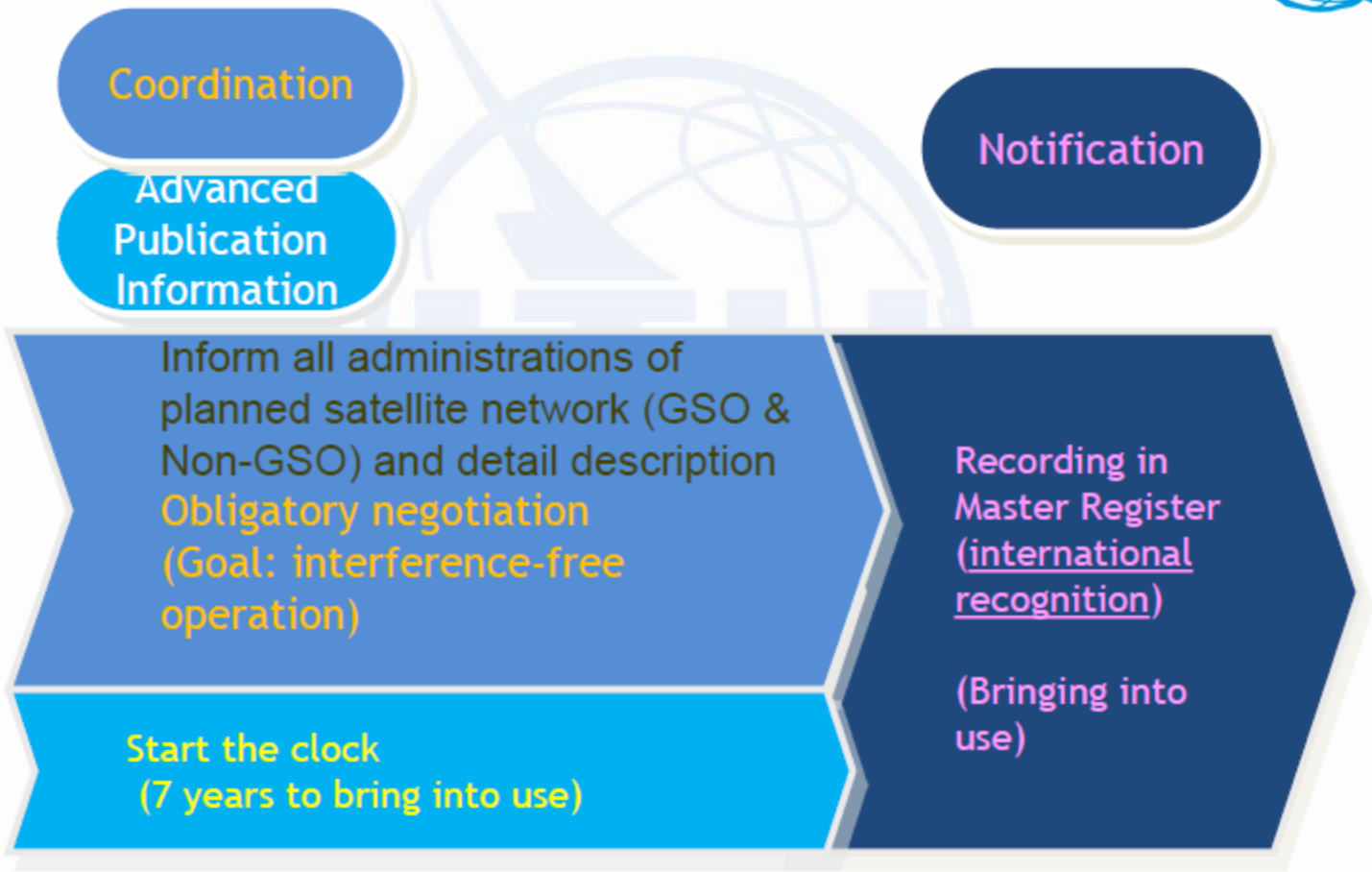
Cases	Provision
GSO to GSO	9.7, Art7 AP30/30A
Certain ES of GSO to NGSO	9.7A
NGSO to Certain ES of GSO	9.7B
BSS (GSO/NGSO) to Terrestrial Services	9.11, Res.539
NGSO to NGSO	9.11A/9.12
NGSO to GSO	9.11A/9.12A
GSO to NGSO	9.11A/9.13
NGSO/GSO to Terrestrial Services	9.11A/9.14
the requirement to seek the agreement of other administrations is included in a footnote to the Table of Allocation	9.21

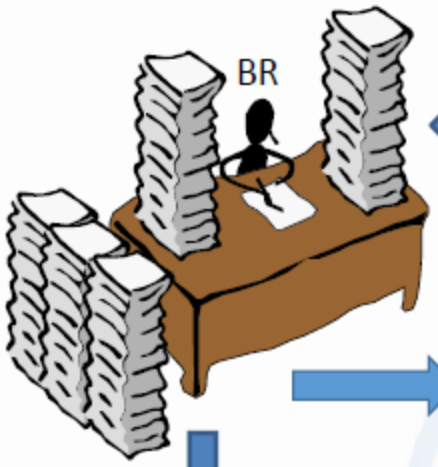
Elements of Coordination Approach

Elements	Relevant Provisions
Procedures	Articles 9 & 11
Submission format	Appendix 4
Technical & operational limits	Article 5, Articles 21&22 etc.
Criteria and methods to identify coordination requirements	Appendix 5 (Appendices 7 and 8)

Coordination Approach

Satellite networks Subject to Coordination Procedure





Request for coordination AP4 submission

API/C publication

CR/C publication
Technical & regulatory Exam
+
Coordination requirements

Set regulatory period

Findings (No.9.35)

Affected adm (No.9.36)

Set priority subject to Res.2 and No.9.53

Continue with the Presentation