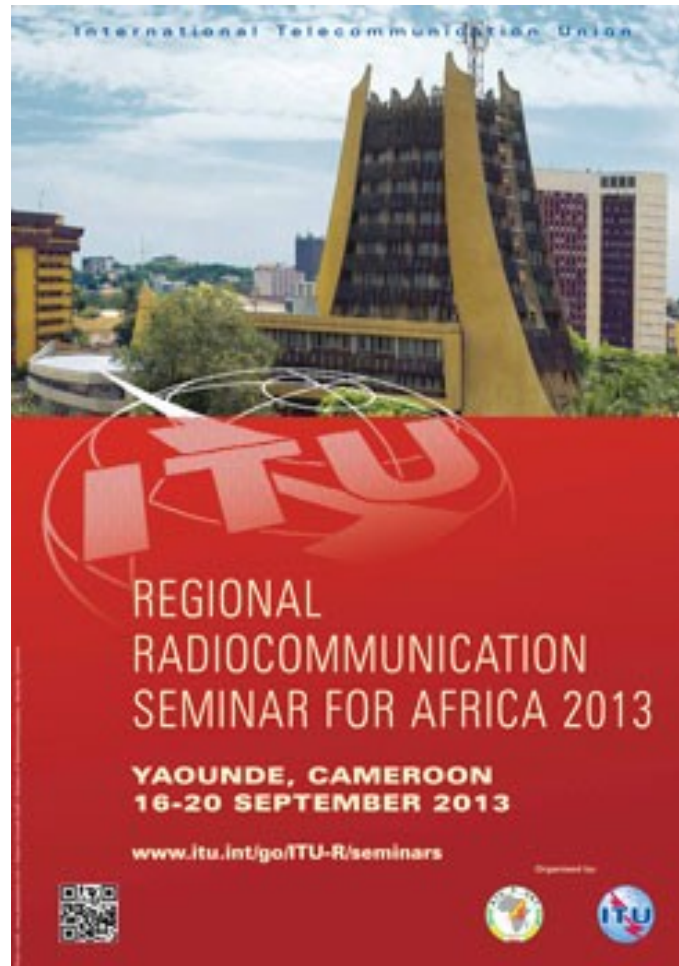


ITU-REGIONAL RADIOCOMMUNICATION SEMINAR for Africa 2013 Yaoundé 16 -20 September 2013



- 1. SPECTRUM MANAGEMENT**
- 2. RADIO REGULATIONS**



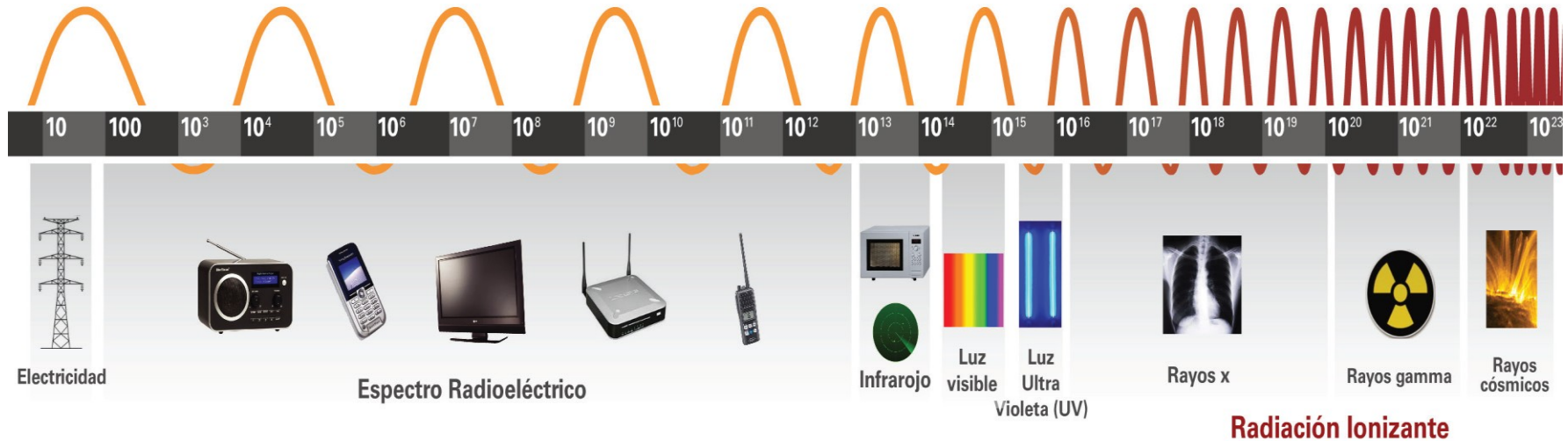
Spectrum Management

Radioelectric Spectrum:

Portion of Electromagnetic Waves, used for Communications

From 3 KHz to 3.000 GHz

Artificial burden, based on technologic development



Spectrum Management

Spectrum as a Resource

Natural Resource: phenomena of nature

Non replicable: cannot be reproduced (as agriculture)

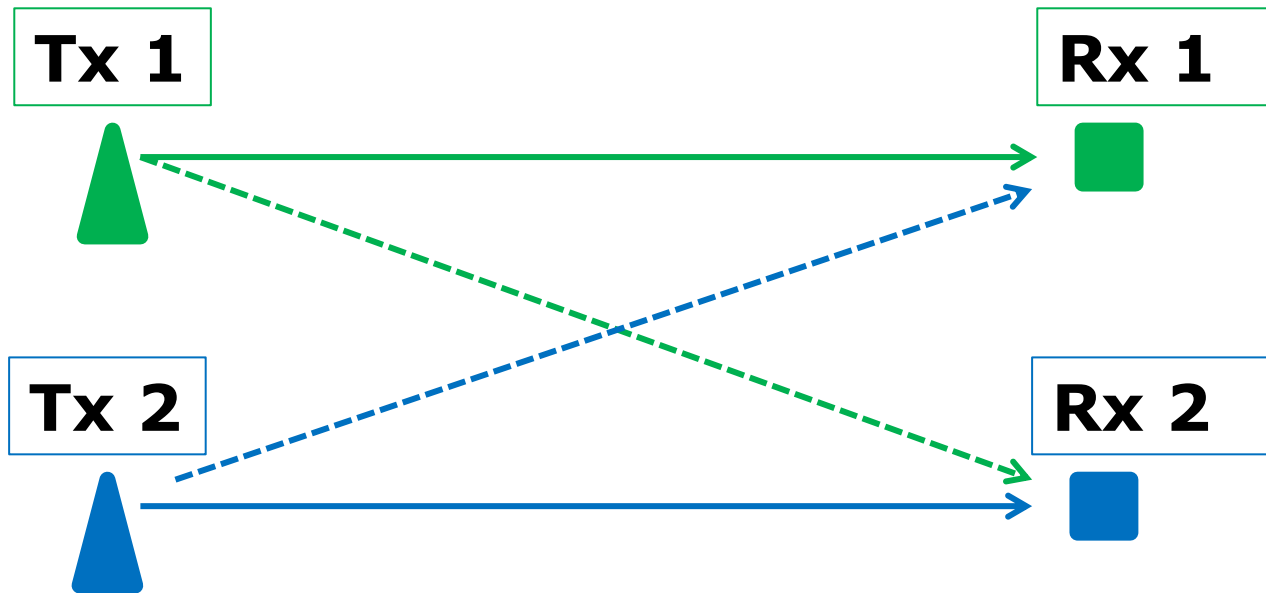
Scarce: quantity of information (Mbps) that can handle (MHz) is limited, i.e. “shared” by stations using same frequency

Then, Spectrum Management aims to guarantee an efficient and rational use of Spectrum

Main goal: prevent and control Interferences



Spectrum Management



Interference: any signal received from other transmitter different than the intended one

It disturbs the capacity of any radiocommunication link to send information

Interferences (RR)

1.166 interference: *The effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy.*

1.167 permissible interference: *Observed or predicted interference which complies with quantitative interference and sharing criteria contained in these Regulations or in ITU-R Recommendations or in special agreements as provided for in these Regulations.*



Interferences (RR)

1.168 accepted interference: *Interference at a higher level than that defined as permissible interference and which has been agreed upon between two or more administrations without prejudice to other administrations.*

1.169 harmful interference: *Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with Radio Regulations (CS).*



Spectrum Management

Planning:

Defining the use of different bands (Allocations)

Licensing

Authorizing of emissions, and technical conditions
(Assignments)

Enforcement

Verifying the use of spectrum in conformity with licensing



1. SPECTRUM MANAGEMENT

2. RADIO REGULATIONS



RADIO REGULATIONS

As spectrum cannot be limited to a given territory, international coordination is necessary

RR is an International Treaty, elaborated and revised by administrations, during WRC; has a binding nature for signatories states.

ITU acts a depositary of RR

Last version: RR-12 (as revised during WRC-12)

Download for general public, free of charge:

<http://www.itu.int/pub/R-REG-RR-2012>



RADIO REGULATIONS

RR classifies services that use radio communications, according to several parameters, namely:

1. Link type: Terrestrial (earth to earth) or satellite (earth-satellite, satellite-earth, satellite-satellite)
2. Type of coverage: land, maritime, aeronautical
3. Station type: fixed, mobile
4. Type of use: communications, broadcasting, navigation and associated, meteorological, scientific, earth observation, time standard, astronomy, security, special.



RADIO REGULATIONS

It also defines the different types of radio stations, classified as:

1. Terrestrial, space
2. Land, sea, air
3. Fixed, mobile
4. Broadcasting, amateur radio, radio-astronomy, etc.

There are 41 types of services and 53 types of stations



RADIO REGULATIONS

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.*



RADIO REGULATIONS

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.

Allocation is granted to Radiocommunications Services

Assignment is granted to Radiocommunications Stations

RR does NOT deal with Assignments, because it is an sovereign and autonomous right of administrations

However, Station Assignment shall be consistent with the Allocation of the band such Station intends to operate:

e.g.: TV Station, in bands allocated to Broadcasting Services



RADIO REGULATIONS

RR is technically neutral, hence, it

- Does allocate frequency bands to radiocommunication services
- Does not allocate to specific applications
- Does not allocate to particular technologies

e.g.: allocation for:

- “mobile”(terrestrial) (*service*)
- not for:
 - cellular networks (*application*)
 - neither GSM, LTE, Wimax, etc. (*technology*)



RADIO REGULATIONS

Type of Allocations:

PRIMARY (with capital letters) Secondary (with lower case)

5.28 Stations of a secondary service:

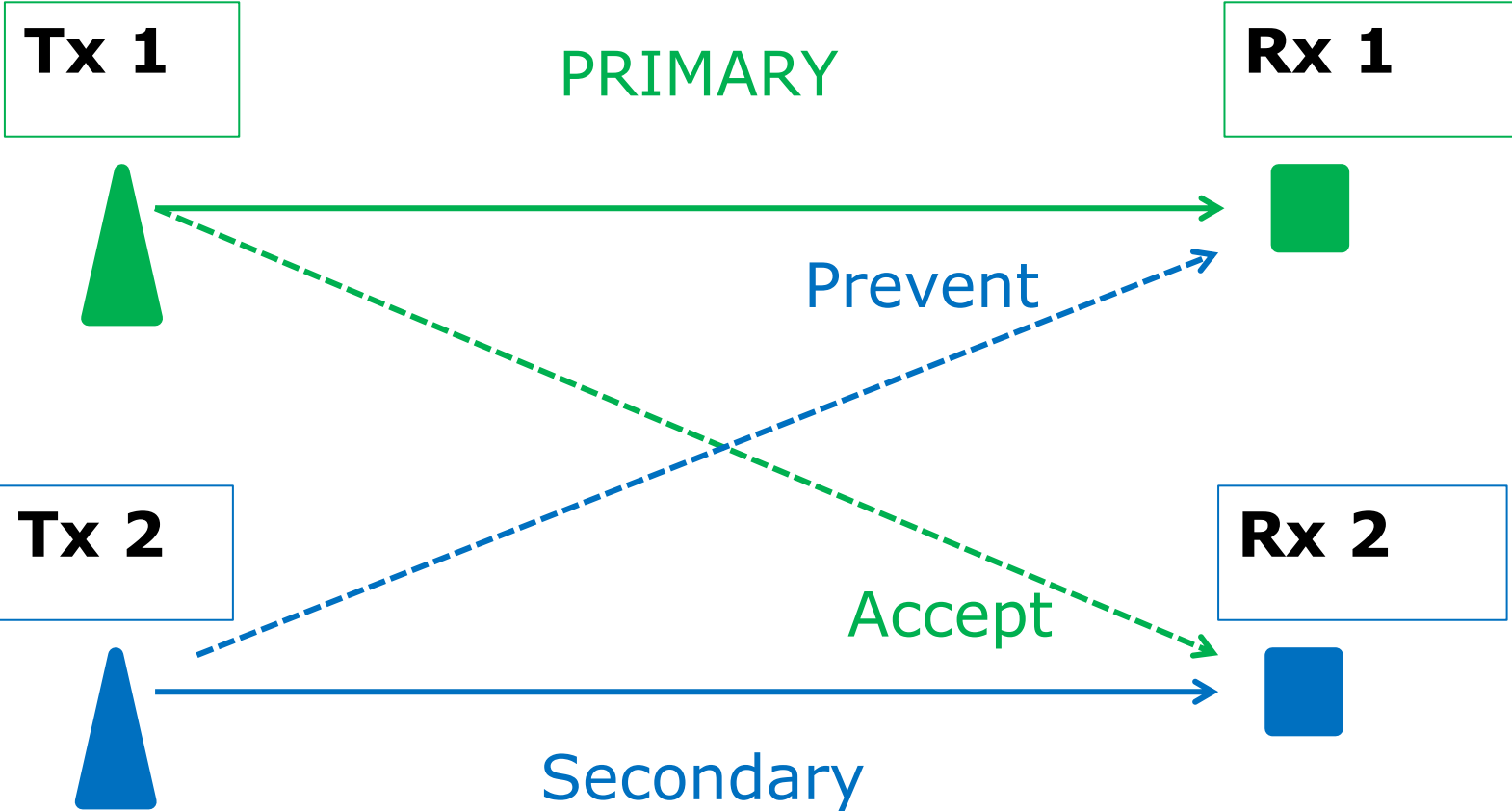
5.29 a) shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;

5.30 b) cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date;

5.31 c) can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date



RADIO REGULATIONS



RADIO REGULATIONS

Many times National regulations “replicates” RR content, adopting them into their legal framework.

Nonetheless, RR is applied on the international context; for national issues, each country should apply its national framework

National Spectrum Planning includes National Table of Frequency Allocations (NFTA), and maybe also channeling Plans. They could adopt applications and/or technologies

NFTA shall be consistent with the national concerns as expressed on the International Table of Frequency Allocations (ITFA) of RR (Article 5), in particular his Region, and national footnotes



STATIONS REGISTRATION

Stations protection cannot be “in abstract”

Stations shall be duly registered, with all their technical parameters, and other issues:

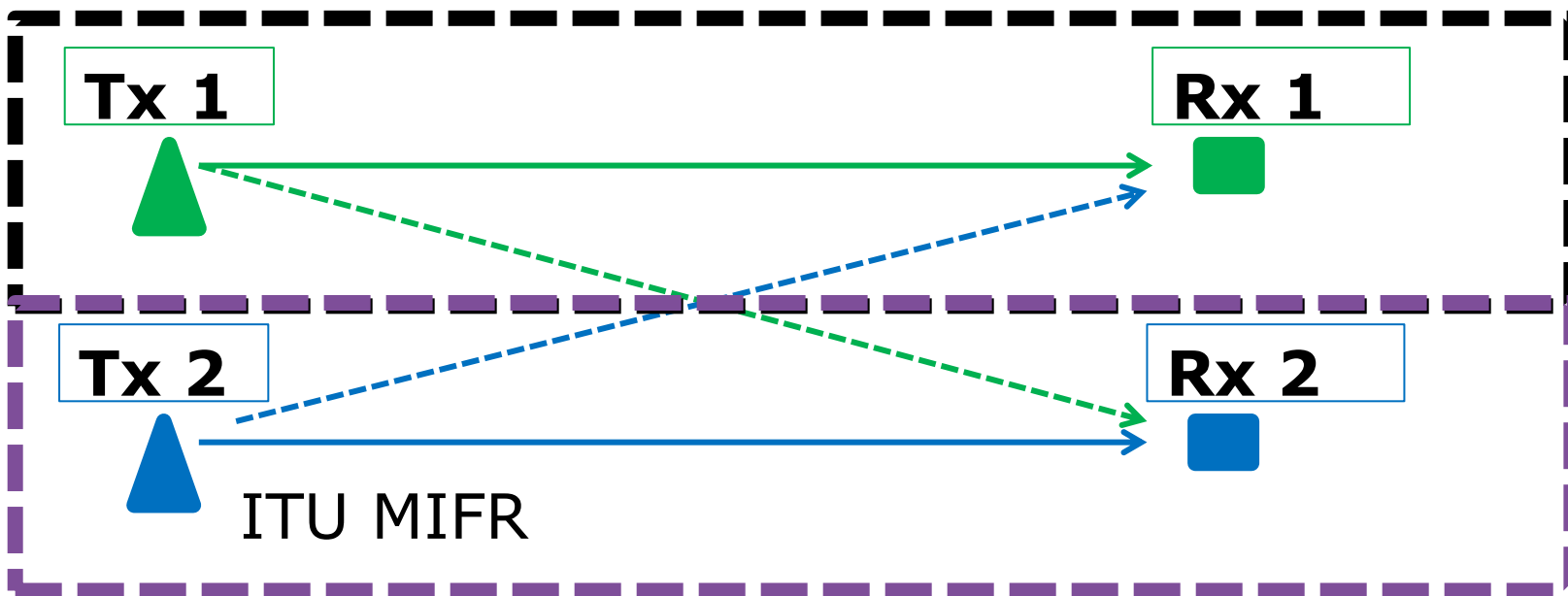
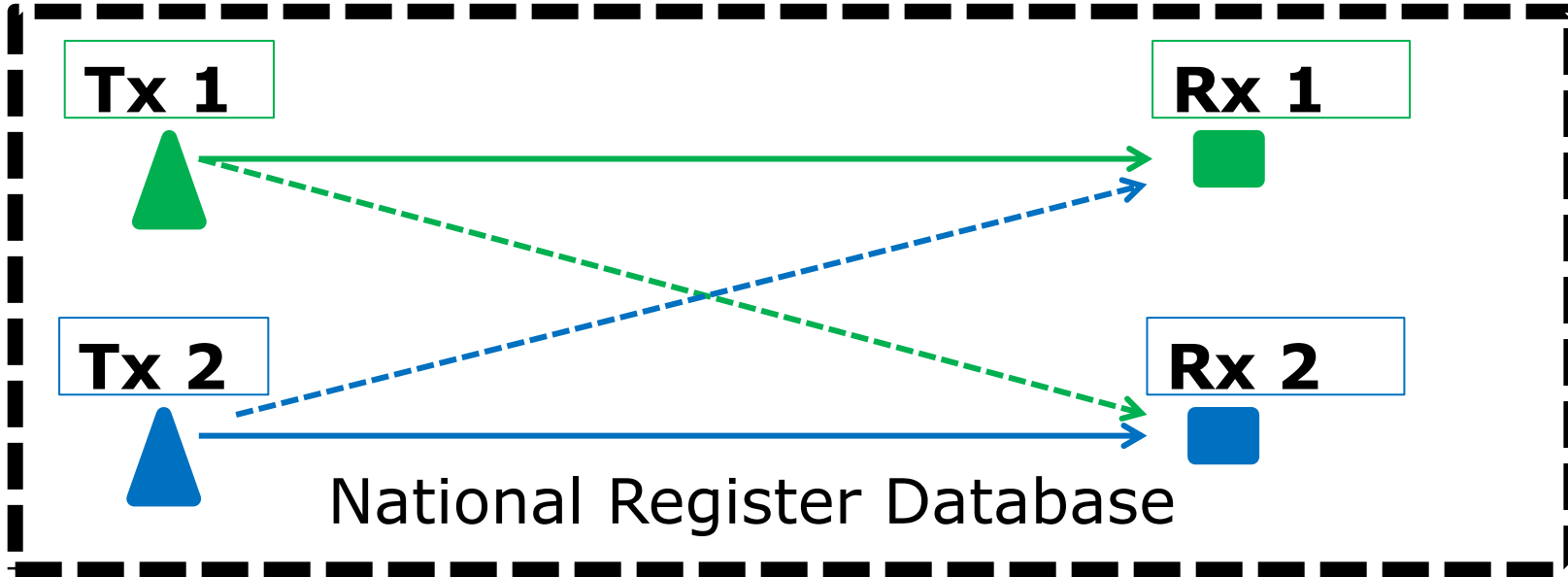
- National: National Table
- International: ITU MIFR

Interference situations need to be objectively analyzed, and measured

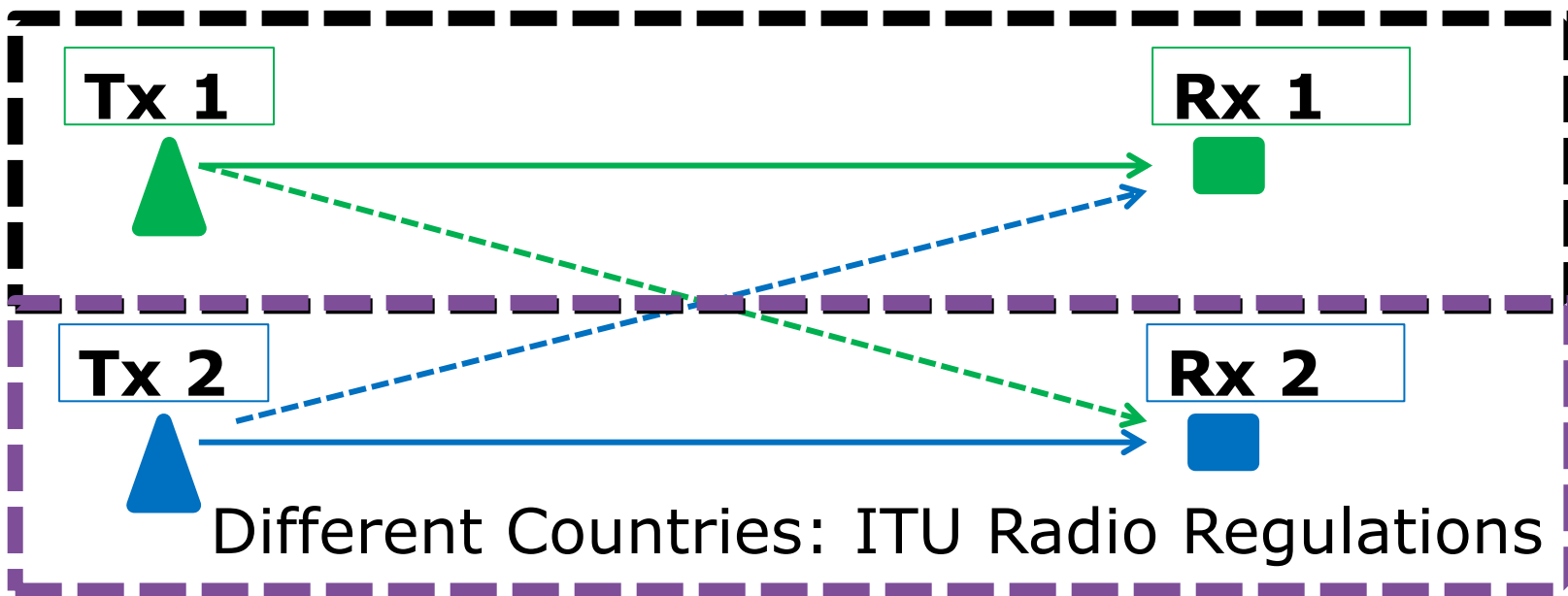
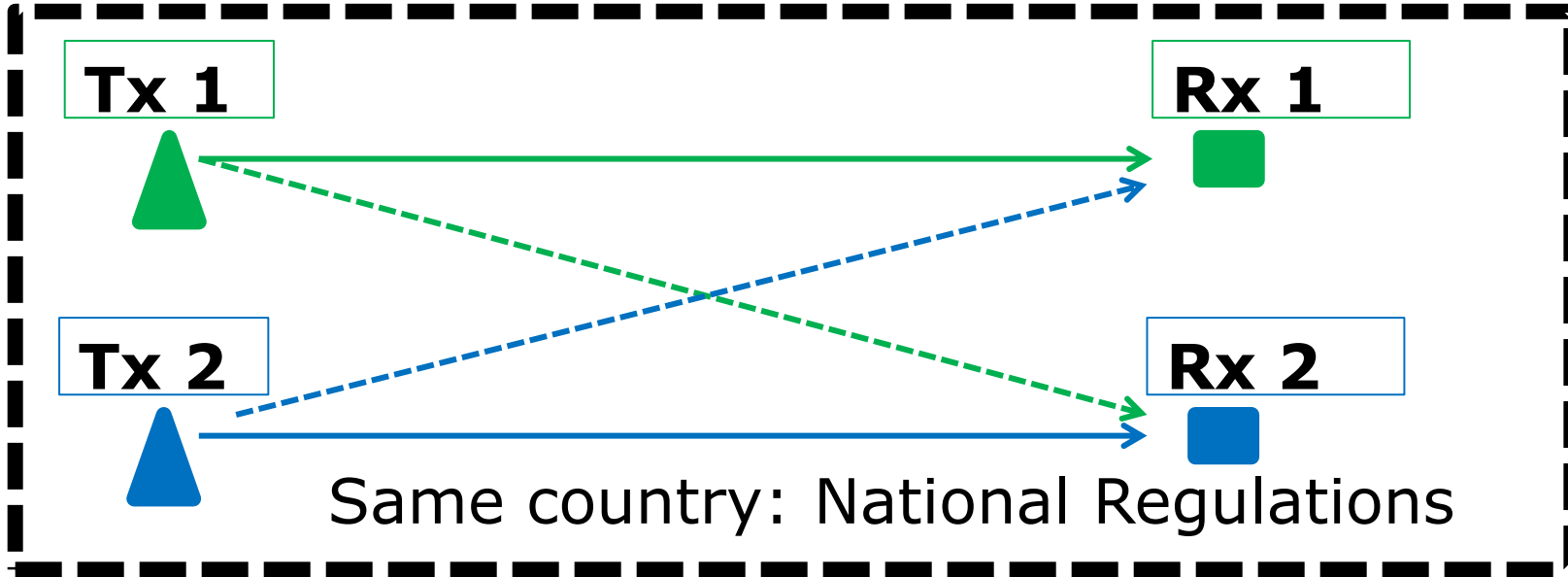
- National: Application of Spectrum National Rules
- International: Application of RR and RoP



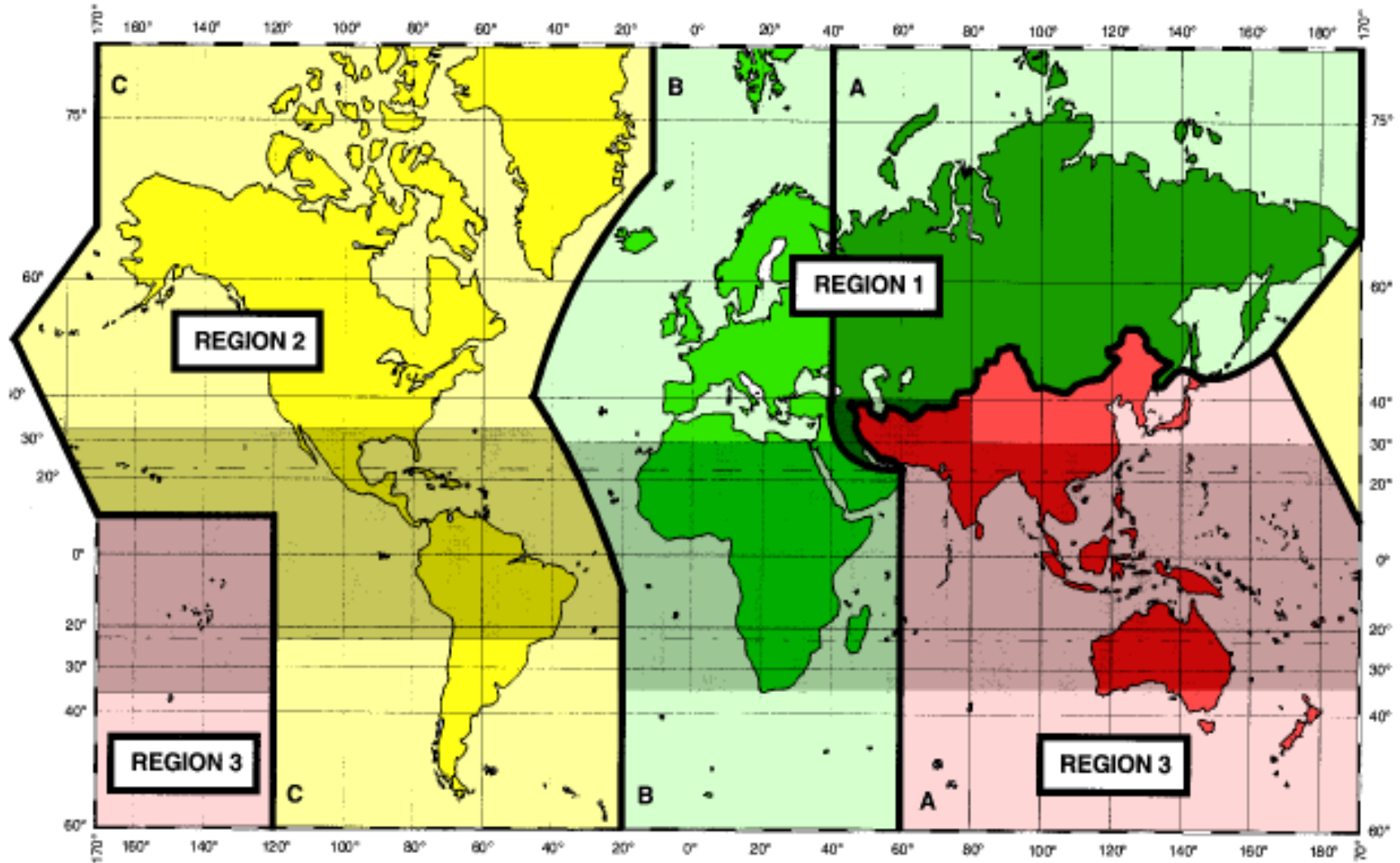
STATIONS REGISTERS



SPECTRUM RULES



RR REGIONS



RADIO REGULATIONS

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



RADIO REGULATIONS VOL 1

CHAPTER I – Terminology and technical characteristics

ARTICLE 1 Terms and definitions

ARTICLE 2 Nomenclature

ARTICLE 3 Technical characteristics of stations

CHAPTER II – Frequencies

ARTICLE 4 Assignment and use of frequencies

ARTICLE 5 Frequency allocations

ARTICLE 6 Special agreements



RADIO REGULATIONS VOL 1

CHAPTER III – Coordination, notification and recording of frequency assignments and Plan modifications

ARTICLE 7 Application of the procedures

ARTICLE 8 Status of frequency assignments recorded in the Master International Frequency Register

ARTICLE 9 Procedure for effecting coordination with or obtaining agreement of other administrations

ARTICLE 10 (Number not used)

ARTICLE 11 Notification and recording of frequency assignments

ARTICLE 12 Seasonal planning of the HF bands allocated to the broadcasting service between 5 900 kHz and 26 100 kHz

ARTICLE 13 Instructions to the Bureau

ARTICLE 14 Procedure for the review of a finding or other decision of the Bureau



RADIO REGULATIONS VOL 1

CHAPTER IV – Interferences

ARTICLE 15 Interferences

ARTICLE 16 International monitoring

CHAPTER V – Administrative provisions

ARTICLE 17 Secrecy

ARTICLE 18 Licences

ARTICLE 19 Identification of stations

ARTICLE 20 Service publications and online information systems



RADIO REGULATIONS VOL 1

CHAPTER VI – Provisions for services and stations

ARTICLE 21 Terrestrial and space services sharing frequency bands above 1 GHz

ARTICLE 22 Space services

ARTICLE 23 Broadcasting services

ARTICLE 24 Fixed service

ARTICLE 25 Amateur services

ARTICLE 26 Standard frequency and time signal service

ARTICLE 27 Experimental stations

ARTICLE 28 Radiodetermination services

ARTICLE 29 Radio astronomy service

ARTICLE 29A Radio services related to Earth observation



RADIO REGULATIONS VOL 1

CHAPTER VII – Distress and safety communications

CHAPTER VIII – Aeronautical services

CHAPTER IX – Maritime services

CHAPTER X – Provisions for entry into force of the Radio Regulations

ARTICLE 59 Entry into force and provisional application of the Radio Regulations



RR Table of Allocations (Art. 5)

Example: excerpt from Art. 5:

Allocation to services		
Region 1	Region 2	Region 3
495-505	MARITIME MOBILE	
505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	505-510 MARITIME MOBILE 5.79 510-525 MARITIME MOBILE 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Land mobile

Global Harmonization: Ultimate goal (as possible; RR Rec 34)

Ex.: 495-505 KHz situation



RADIO REGULATIONS

NOT HARMONIZED ALLOCATION:

- **Different Services by Region:** not global scale for terminals; harder border coordination (Regions edges)
- **Different Primary Services:** countries might adopt different primary service, harder border coordination intra RR Region
- **Primary and Secondary Services:** some country might allocate as primary onto his territory; however, for international coordination it can be claimed protection
- **National Footnotes:** national particular exemptions, with all the above inconvenients



ITU-R Rules of Procedure

The Radio Regulations are supplemented by its Rules of Procedure, clarifying the application of particular rules or establishing the necessary practical procedures that may not be stipulated in current regulations. These rules stem from an extensive review and revision of the Rules of Procedure of the Board of the Radio Regulations, taking into account the decisions of the WRC.



ITU-R Rules of Procedure

RoP are to be used by administrations and the Radiocommunication Bureau in applying the Radio Regulations. The RoP are presented in three main parts:

- **Part A:** Rules relating to a provision of the Radio Regulations, or a limited number of them.
- **-Part B:** Rules relating to a process such as the technical examinations.
- **Part C:** Rules relating to internal working methods of the Board



Example RR & RoP bounds

In appliance of provision 1.23 (RR)

1.23 *space operation service: A radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry and space telecommand.*

These functions will normally be provided within the service in which the *space station* is operating.

it shall be followed the associated procedure (RoP)

1.23

1 Number **1.23** states that the functions of the space operation service (space tracking, space telemetry, space telecommand) will normally be provided within the service in which the space station is operating. The question thus arises as to the appropriateness of considering frequency assignment notices with classes of stations performing these functions, to be in conformity with the Table of Frequency Allocations when the Table does not contain an allocation to the space operation service.



Thank you...

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