# Cross border RF interference Management

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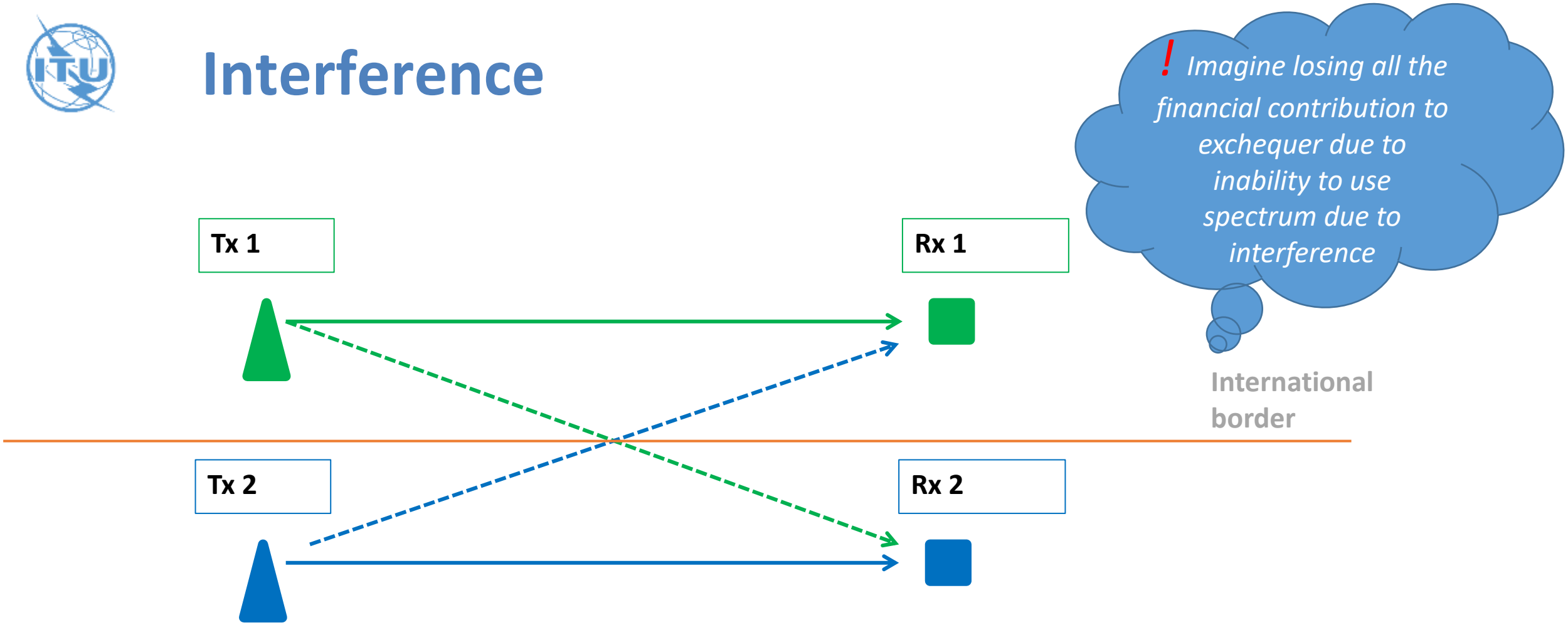
# What to expect in these slides

- ✓ Interference?
- ✓ Approaches to address cross border RF interference issues
- ✓ Advantages and Dis-advantages of Coordination
- ✓ Situation in Asia-Pacific
- ✓ Going Forward and suggestions to address the issue
- ✓ Conclusion

# Interference




**Interference**:
Any signal received from Transmitter different than the intended one

**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.*

# International concept of Interference

- **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.*

- **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).*

# Approaches to address cross border RF interference issues

# Managing cross Border Interferences

## Global Frameworks

- International Organizations

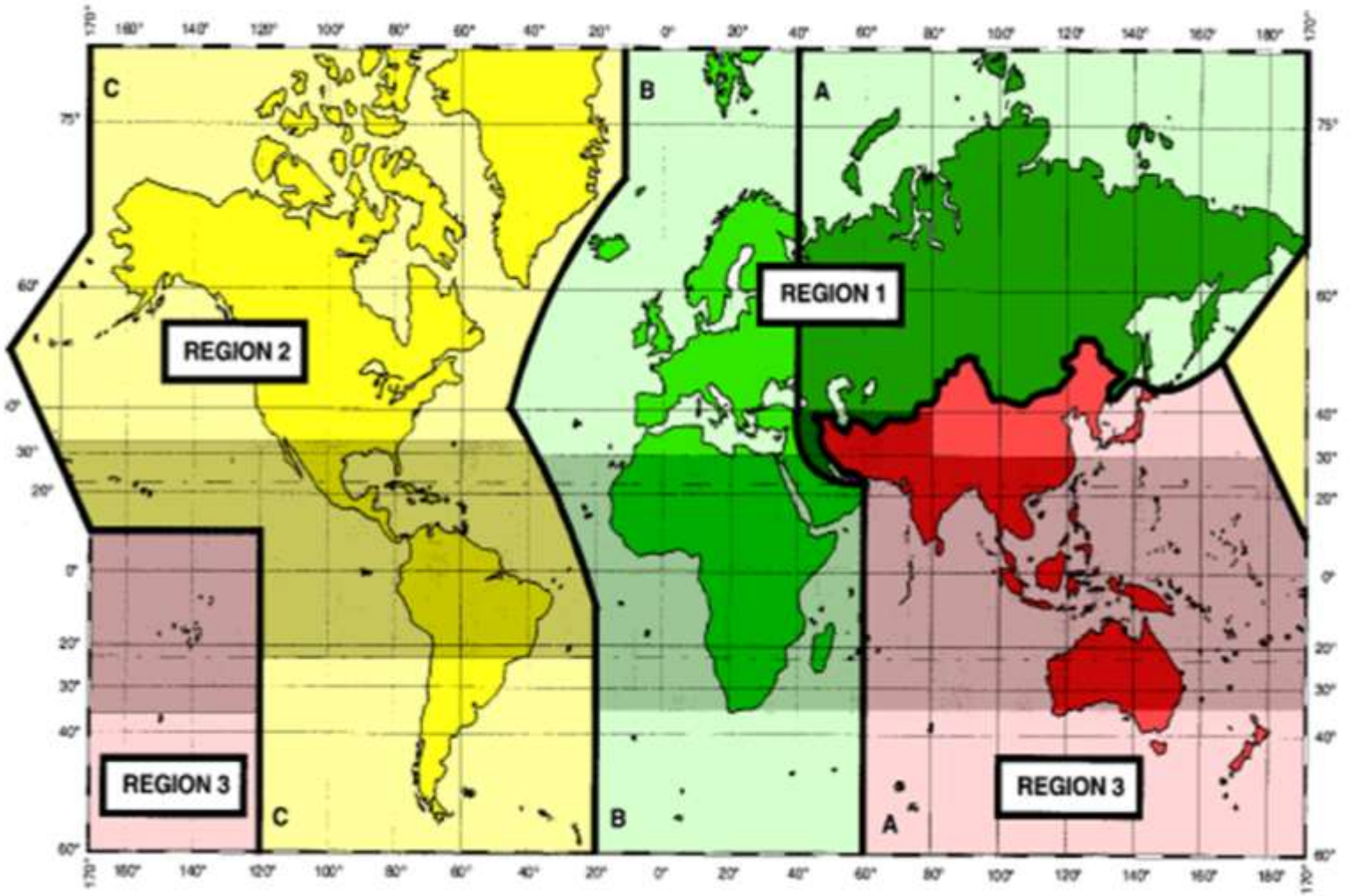
## Regional Frameworks

- Regional Organizations

## Bilateral/MultiLateral/subregional Frameworks

- Agreements between countries

# Frequency Coordination at Global Level




*The shaded part represents the Tropical Zones as defined in Nos. 5.16 to 5.20 and 5.21*

- **Example**
  - ITU Radio Regulations
    - *Article 5 Allocation Table*
    - *Annexures for plans*
- **Pros:**
  - Easier to implement with global backing of Admins
  - More acceptance once agreed
  - Economies of scale
- ***Cons***
  - Difficult to agree to a global solution
  - Flexible and not tailor made for any region/country situation

# Frequency Coordination at Regional Level

**Regional co-ordination on spectrum Management**

- Exchange information and experiences to foster the harmonization of spectrum management rules
- Facilitating efficient and flexible use of the spectrum
- Coordinating the Use of Technical Standards across Regions
- Managing interference by establishment of a common framework
- Prepare common positions to be presented to regional, then global instances

- **Example**
  - APT Plans
- **Pros:**
  - Relatively easier to implement due to acceptance of regional Admins
  - Economies of scale
- ***Cons***
  - Less difficult to agree than a global solution
    - *Challenge to agree if region is diverse*
  - Still Flexible and not tailor made for any geographical situation

# Regional Organizations

| Name | Official website |
|---|---|
| APT - Télécommunauté Asie-Pacifique - Asia-Pacific Telecommunity - Telecomunidad Asia-Pacífico, BANGKOK, Thailand | www.apt.int |
| ASMG- Arab Spectrum Management Group | http://asmg.ae |
| ATU - Union africaine des télécommunications - African Telecommunications Union - Unión Africana de Telecomunicaciones, NAIROBI, Kenya | www.atu-uat.org |
| CANTO - Association des entreprises nationales de télécommunications des Caraïbes - Caribbean Association of National Telecommunication Organizations - Asociación de Organizaciones Nacionales de Telecomunicaciones del Caribe, PORT OF SPAIN, Trinidad and Tobago | www.canto.org |
| CEPT - Conférence européenne des Administrations des postes et des télécommunications - European Conference of Postal and Telecommunications Administrations - Conferencia Europea de Administraciones de Correos y Telecomunicaciones, VALLETTA, Malta | www.cept.org |
| CITEL - Commission interaméricaine de télécommunications - Inter-American Telecommunication Commission - Comisión Interamericana de Telecomunicaciones, WASHINGTON, D.C., United States | www.citel.oas.org |
| COMTELCA - Commission technique régionale des télécommunications - Telecommunications Regional Technical Commission - Comisión Técnica Regional de Telecomunicaciones, TEGUCIGALPA, M.D.C., Honduras | www.comtelca.org |
| COPTAC - Conférence des Postes et Télécommunications de l'Afrique centrale - Conference of Posts and Telecommunications of Central Africa - Conferencia de Correos y Telecomunicaciones de África Central, YAOUNDE, Cameroon | n/a |
| CTU - Union des télécommunications des Caraïbes - Caribbean Telecommunications Union - Unión de Telecomunicaciones del Caribe, PORT-OF-SPAIN, Trinidad and Tobago | http://www.ctu.int/ |
| ETSI - Institut européen des normes de télécommunication - European Telecommunications Standards Institute - Instituto Europeo de Normas de Telecomunicaciones, SOPHIA ANTIPOLIS CEDEX, France | www.etsi.org |
| LAS - Ligue des Etats Arabes - League of Arab States - Liga de los Estados Árabes, CAIRO, Egypt | www.arableagueonline.org |
| RCC - Communauté régionale des communications - Regional Commonwealth in the Field of Communications - Comunidad Regional de Comunicaciones, MOSCOW, Russian Federation | www.rcc.org.ru |

# Bilateral

**Bilateral /Multi-Lateral / sub-regional Arrangement**

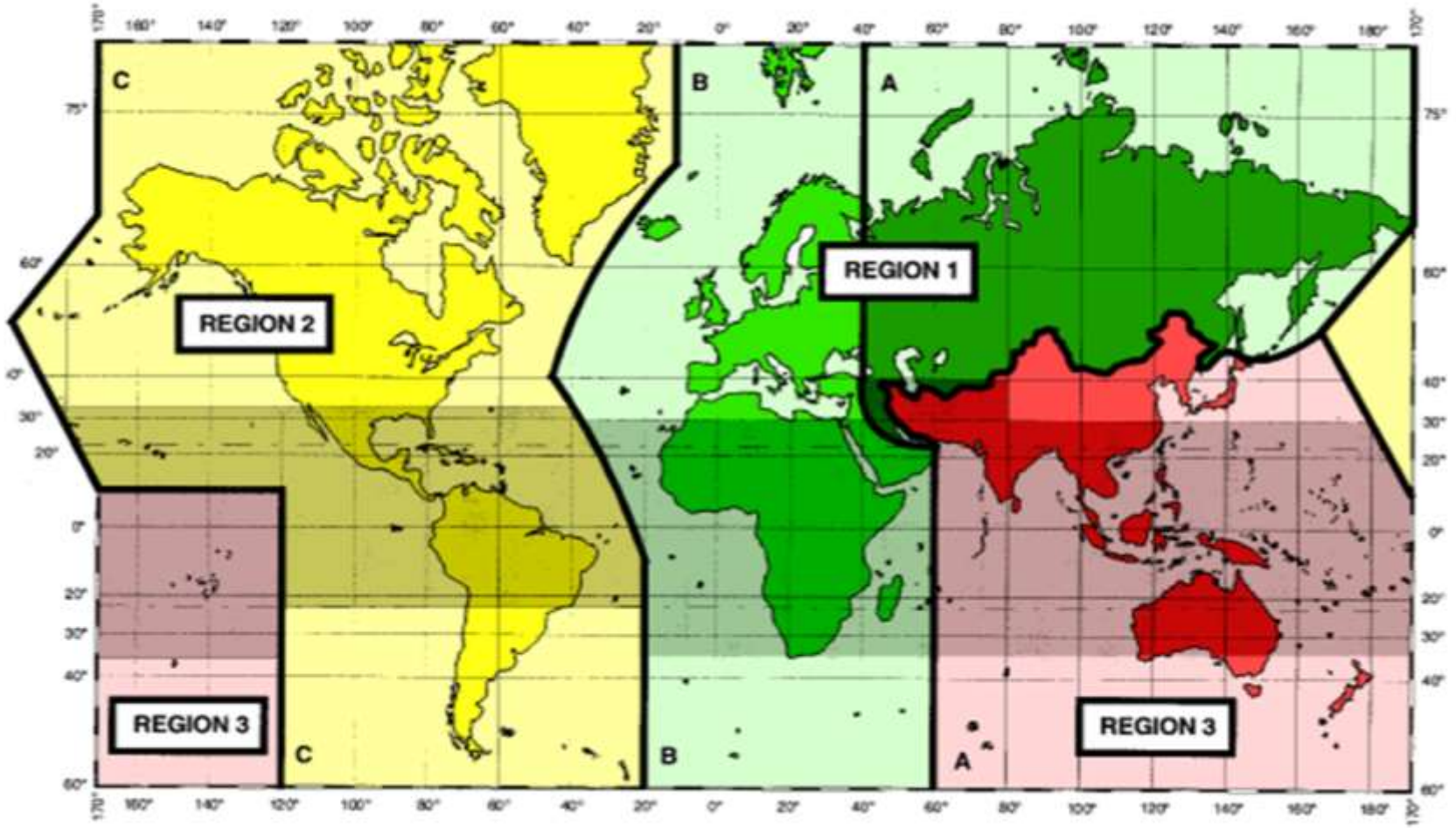
Cross-border co-ordination by harmonizing the use of frequency spectrum.

develop means of resolving instances of unexpected harmful interference

- **Example**
  - Trilateral meeting between IND-MLA-SNG
  - Agreements of Thailand with Neighbors
- **Pros:**
  - Relatively easier to agree
  - Very specific solution to a particular problem
- **Cons**
  - Difficult to implement
    - *To common from neutral administrations to implement*
  - Difficult to plan nationally with multiple arrangements with several neighbors

# Situation in Asia-Pacific

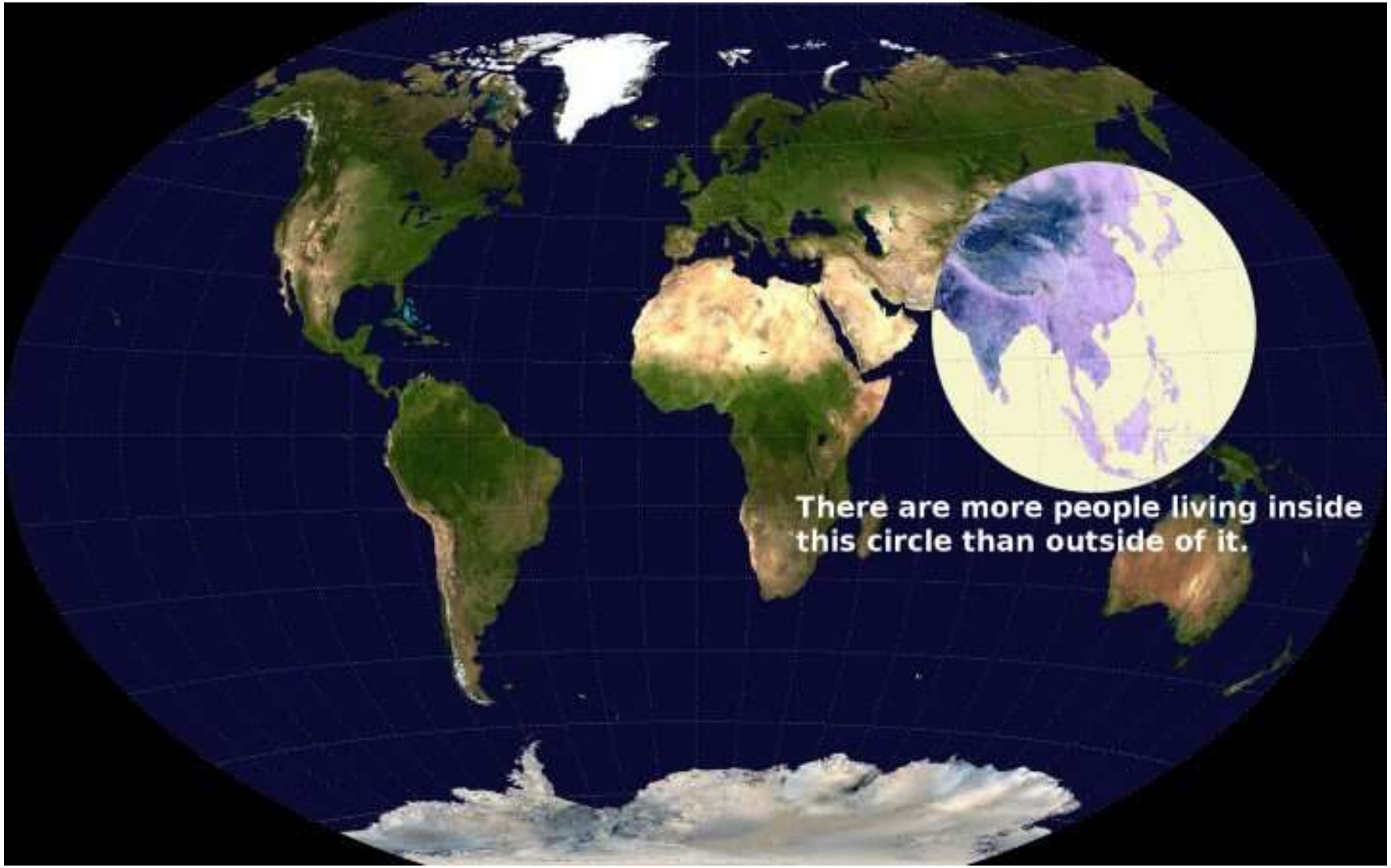
# Welcome To ASP: Predominantly Region 3




**Note the diversity in**

- **Geography**
  - *Archipelagos*
  - *Island sates*
  - *Landlocked*
  - *Himalayas*
- **Level of Development in ICTs**
  - *IDI index rankings range from 1 to 164*

# Understanding the need of Framework on cross border RF Management




**Source**: http://brilliantmaps.com/population-circle/

# Cross Border RF Interference Mitigation

- **Some Facts**
  - *Significant population concentration on the border areas of countries in e.g. Cambodia - Lao P.D.R – Thailand - Vietnam etc.*

  - *Interference Issues always exist has primarily due to nonexistence of any formal agreement on the management of this issue at regional and/or sub-regional level.*

- **Some Examples of Sub-regional approaches in ASEAN to address the issue**

  - ***Indonesia-Malaysia-Singapore*** *under the trilateral forum between the three countries;*
  - ***Singapore-Malaysia-Brunei*** *using Frequency Assignment and Coordination, Singapore, Malaysia and Brunei Darussalam (FACSMAB) platform.*
  - *Bilateral agreements of Lao P.D.R with Vietnam and Thailand separately.*
  - *Activities of* ***SAARC*** *in South-Asia*

# Recognition of Cross Border RF Interference issue

- **ASEAN**

  **ASEAN ICT MASTERPLAN 2020**

  **6.1.3 (*Harmonize Telecommunication Regulations)***

  *"Recognizing the potential for cross-border spectrum conflict in light of new technologies such as unlicensed and dynamic spectrum allocation, this aims to develop a guideline, based on best practices, for managing such developments regionally) "*

- **SAARC**

  **Recognized Areas of Cooperation**

**Information And Poverty Alleviation**

II. Telecommunications and ICT

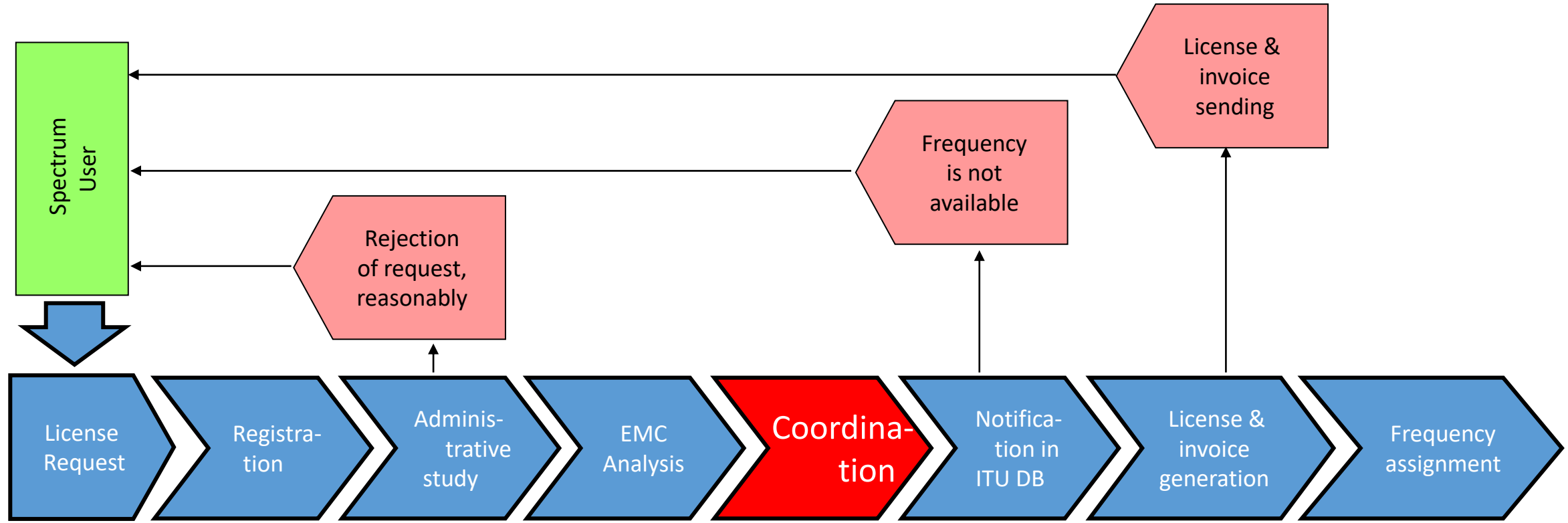
*Cross border interference on Radio Signals*

# Going Forward and suggestions to address the issue

# Principle of Cross border coordination

- **Traditional way**
  - Case to case basis: Resolve when issue arises
    - *Takes long time as network has already been rolled out*
  - Longstanding multiple arrangements designed around lower frequencies (HF or Max VHF)
    - *Difficult to plan nationally with multiple arrangements with several neighbors*
- **Better Way**
  - Assign spectrum only when coordination is achieved with neighboring countries
  - One common coordination framework
    - *Easier to implement*

# General Procedure for Licensing




| | | | | |
|---|---|---|---|---|
| *Official request* | *Folder Creation* | *Processing, administrative and technical analysis* | *Coordination study & submission to ITU** | *Fee calculation and licensing, collection of some fees* |

* *ITU notification is not required for each cases, and that a bi/multilateral agreement is stronger than the RR (see Article 6 of the RR)*

# Example - National Spectrum Licensing workflow

- **Request for Licensing received by office**
  - *Ensure all the technical parameters are there in application (establish a minimum required info. criteria)*
  - *Detailed backend technical evaluation*

Need for Coordination Established

# How to coordinate?

**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**

# A cross border Agreement - Components

1. Definitions
2. General
3. Technical provisions
4. Procedures
5. Report of harmful interference
6. Revision of this Agreement
7. Accession to this Agreement
8. Withdrawal from this Agreement
9. Status of co-ordinations prior to this Agreement
10. Languages of the Agreement
11. Entry into force of Agreement
12. Annexes for technical and administrative details

Rec. ITU-R SM.1049-1

*(A METHOD OF SPECTRUM MANAGEMENT TO BE USED FOR AIDING FREQUENCY ASSIGNMENT FOR TERRESTRIAL SERVICES IN BORDER AREAS )*

**ITU, with support from its partners, is assisting countries in ASP to prepare frameworks that countries can use to further develop a multi country cross-border interference management solution**

# Conclusion

- Issues of Cross Border Interference are going to grow in future
- A regional framework required to prevent rather than cure cross border interference issues
- Regional or sub-regional solutions more effective in implementation and addressing very specific problems
- ITU remains ready to support in development of harmonized solutions to growing problem.

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