Cross border frequency co-ordination

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Purpose of frequency Co-ordination

- Avoiding radio interference

- Each country obliged to take account of other stations before putting own into operation

- Cross-border frequency co-ordination agreements exist for a long time since RR do not meet all practical requirements

- Bilateral preferential frequency agreements for frontier zones: who can operate what and with which interference ranges

Co-ordination agreements

- Aim: Optimise spectrum usage by accurate interference field strength calculations

- Modification of general parameters, improvement and supplementation of technical provisions, individual restrictions

- Establishment of models for computer-aided interference range calculations

- Harmonised parameters: Objectively predictable and transparent decision

Cross border frequency coordination with a harmonized calculation method (HCM)

- The harmonization set a **standard** that all the countries involved accept on a mutually beneficial approach by consensus;

- **Prevent** and easily **solve** radio **interference** across borders;

- Provide a solid basis for **bilateral and multilateral agreements**;

- Enable creation of **bilateral preferential frequency** agreements at border zones (who can operate what and with which interference ranges);

- Oblige each country to **take account of other stations before putting own into operation**.

- www.hcm-agreement.eu

Frequency Co-ordination (+)

- Aim: Optimise spectrum usage
- Administrations obliged to co-ordinate frequencies before assigning them
- Administrations obliged to ensure harmonised application of technical provisions
- Quick assignment of preferential frequencies
- Transparent decisions through agreed assessment procedures
- Quick assessment of interference through data exchange

Frequency Co-ordination (-)

- Increase in administrative work and costs (complex procedures, longer turnaround times, topographical database)

- Detailed input data required from operators (geographical data, antenna parameters)

- Limits also to preferential frequencies, limits may vary from case to case

- If utilization of other countries' preferential frequencies not allowed, it causes restrictions in frequency assignment

The Procedure (HCM)

- Co-ordination request and all technical characteristics of radio network/equipment sent to all administrations affected to enable accurate assessment of interference

- Administrations affected assess possibility of interference to own stations; no possibility of interference: obliged to agree to request

- If assessments produce different results, administrations can agree to operation on a trial basis; field strength calculations replaced with agreed field strength measurements

- Administrations exchange lists of co-ordinated assignments with technical characteristics, administrative reference data, conditions

The Procedure (HCM) cont.

- Verification that conditions for preferential frequency use exist and are met (agreement to another country's use of own preferential frequencies can be refused)

- Assessment of border cases: conditional agreement given (NIB/SGNB) with respect to already co-ordinated stations

    - no interference permitted (NIB)

    - no protection against interference (SGNB)

    - no interference permitted and no protection

Administrative Frequency Classification

- Frequencies requiring co-ordination

- Preferential frequencies

- Frequencies for planned radio networks

- Frequencies used on the basis of geographical network plans (same parameters required)

Preferential Frequency Agreements (+)

- Flexible planning of preferential bands, re-planning is possible: very important in particular to public mobile radio networks

- Long-term security for preferential frequencies, even if networks not planned or set up until later

- Accommodation of totally different transmission techniques (narrowband and broadband) on country's own preferential frequencies; important if, for example, civil and military services use same band (e.g. civil network in D, military services in F)

- Shorter turnaround times (time means money)

- Smaller countries have same amount of spectrum as larger neighbouring countries

Preferential Frequency Agreements (-)

- Spectrum allocation: 2 countries = 50%, 3 countries = 33.3%, 4 countries = 25%

- Other countries' preferential frequencies cannot normally be used in the defined frontier zones

- All frequency planning for both non-public and public mobile radio must be in line with each country's preferential frequency areas in the frontier zones

- Preferential frequencies are luxury goods and in great demand

- Assignment of non-preferential frequencies is seen as discriminatory because of the required (e.g. operational) restrictions

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Radio Interference Prediction

Planning and co-ordinating a station

- Special protection required?

- Co-ordination required?

- Calculation of interfering field strength at 10 m on border

- Calculation of cross-border interference range according to prediction method, band, etc.

- Consideration of station's technical characteristics

- Consideration of frequency offset and bandwidth of stations affected

- Use of specific propagation curves

HCM4A implementation by
ITU-EC HIPSSA project

Project for Harmonization of ICT Policies in ACP

- **ITU and European Commission** launched a global project to provide "*Support for the establishment of harmonized policies for the ICT market in the ACP states*" end 2008

- Component of "ACP-Information and Communication Technologies" programme (ACP-ICT) within the framework of the 9th European Development Fund

- 3 regional sub-projects addressing specific needs of each region
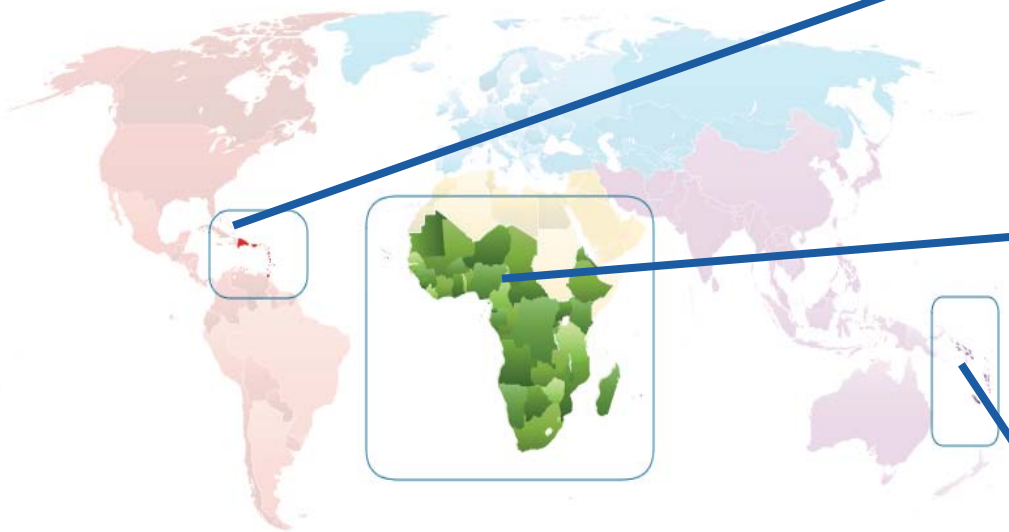
HIPCAR
Enhancing competitiveness in the Caribbean through the harmonization of ICT Policies, Legislation and Regulatory Procedures

HIPSSA
Support for Harmonization of the ICT Policies in Sub-Saharan Africa

ICB4PIS
Capacity Building and ICT Policy, Regulatory and Legislative Frameworks Support for Pacific Island States

Geographical modular implementation of priorities

- Reflect sub-regional heterogeneity in terms of ICT market development and status of harmonization initiatives in four AU geographical regions

Global

- Comparison of regional **harmonization** initiatives
- Monitoring and evaluation / Regulatory benchmarking
- **Cross-border frequency coordination: harmonized calculation method for Africa (HCM4A)**
- Input to African Union's Open Access guidelines

Regional

West Africa	Central Africa	East Africa	Southern Africa
▪ CERT training workshop ▪ WATRA guidelines on submarine cables	▪ ECCAS Model Laws ▪ ECCAS and CEMAC Cybersecurity Acts ▪ ARTAC Cost Model	▪ CERT training workshop for EAC ▪ Cost Modeling for COMESA ▪ IGAD Spectrum	▪ SADC Policy Framework Review ▪ CRASA Universal Service Guideline

National

▪ Transposition of ECOWAS & UEOMA Community Acts	▪ Transposition of ECCAS Model Laws & CEMAC Directives	▪ Implementation in IGAD & IOC Member States	▪ Implementation of updated SADC framework

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Advantages of a harmonized calculation method (HCM4A)

- **Based on HCM Agreement used in Europe**

- **Optimize** spectrum usage;

- **Prevent** harmful interferences;

- Confer an adequate **protection for stations**;

- Define **technical** provisions and **administrative** procedures;

- **Quick assignment** of preferential frequencies;

- **Transparent decisions** through agreed assessment procedures;

- Quick assessment of interference through **data exchange**.

HCM Agreement

HCM Agreement

http/englisch/verwaltung/index berliner vereninbarung.htm

Software tool for HCM4A

- Optimise spectrum usage by **accurate interference field strength calculations**;

- Establish **general parameters**, improvement and supplementation of technical provisions, individual restrictions;

- Establish **models** for computer-aided **interference range calculations**

- **Harmonise parameters**: objectively predictable towards transparent decisions

Implementation of HCM4A in four phases

1. **Assessment phase**

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

2. **Multilateral agreement proposal**

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

3. **Validation workshop**

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

4. **Development of HCM4A software**

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

HCM4A involves all for 4 sub regions

- This project includes performing a **survey** and a **comparative analysis** of existing administrative and technical procedures related to bilateral and multilateral cross-border frequency coordination agreements in 4 geographical sub-regions as defined by the AU

  - **Central Africa** [Burundi, Central African Republic, Chad, Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon, Sao Tome and Principe];

  - **East Africa** [Comores, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, Sudan, Tanzania, Uganda];

  - **Southern Africa** [Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe];

  - **West Africa** [Benin, Burkina-Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Sierra-Leone, Senegal, Togo].

Tasks in Phase 1 of HCM4A for the sub-regions

- Request

  - *Contact* details of the person, dealing with spectrum management matters, and who will be the HCM4A Focal Point (FP) in the relevant country for this project.

- Tasks from the HCM4A Focal Point

  - Fill in a questionnaire;

  - Provide info on any bilateral/multilateral agreement;

  - Provide current frequency register database format;

  - Provide protection requirements for the different radio-communication services;

  - Provide clarifications on the subject whenever the need arises.

Cross-border frequency coordination in Africa
Assessment Phase - Key questions (1/3)

- Does your country have a <u>framework</u> (administrative procedures and technical provisions) for cross-border frequency coordination? If so, please provide us an electronic copy.

- Does your country have one or more cross border frequency coordination <u>agreements</u>? If so, how many? Please provide us a sample electronic copy of each one.

- Please <u>indicate in a tabular form</u> the bands, the services, the neighboring country/countries involved and the periodicity how often your country experience interference problems or conduct frequency coordination across borders.

Cross-border frequency coordination in Africa
Assessment Phase - Key questions (2/3)

- Can you provide in a tabular form those bands, services, neighboring countries involved and priorities, that you consider requires frequency coordination across the different borders with neighboring countries?

- Does your country have a frequency register for storing the co-ordination results? If yes, please provide us an example on an electronic copy where all the fields considered are indicated.

- Indicate what type of ITU tools including databases you use and in which cases you use them for coordination or registration

Cross-border frequency coordination in Africa
Assessment Phase - Key questions (3/3)

- Indicate with certain detail any other tool used for coordination or interference resolution, whether self developed or purchased.

- Indicate in a tabular form the propagation models and/or methods used per bands and services.

- In cases where you use digital terrain data for interference calculations indicate:
    - o the use of elevation and/or morphological data,
    - o the type of geographical projection system do you use,
    - o the level of the resolutions of the terrain data that you use close to the different borders
    - o the point or line whereof the calculation is made

HCM4A implementation studies

- During the first phase of the project, ITU experts contacted various administrations in subSaharan Africa and compiled information related to cross border frequency coordination through a questionnaire.

- Based on the results of the first phase of the project, the ITU team prepared a draft HCM for Africa Agreement with relevant Annexes (HCM4A). The draft Agreement for Africa is an adapted version of the existing HCM for Europe. The Agreement deals with co-ordination of frequencies between 29.7 MHz and 43.5 GHz for the purposes of preventing mutual harmful interference to the Fixed and Land Mobile Services and optimising the use of the frequency spectrum on the basis of mutual agreements.

- The Draft HCM4A Agreement has a number of Annexes relating to Land Mobile and Fixed Service respectively.

The Agreement

- The Draft Agreement comprises of a Preamble and the following Articles :

    Art 1   Definitions
    Art 2   General
    Art 3   Technical Provisions
    Art 4   Procedures
    Art 5   Report of harmful interference
    Art 6   Revision of the Agreement
    Art 7   Accession to the Agreement
    Art 8   Withdrawal from the Agreement
    Art 9   Status of coordinations prior to the Agreement
    Art 10 Languages of the Agreement
    Art 11 Entry into force of the Agreement

The Annexes relating to the Land Mobile Service

Annex 1: Maximum permissible interference field strengths and maximum cross-border ranges of harmful interference for frequencies requiring co-ordination in the Land Mobile Service

Annex 2A: Data exchange in the Land Mobile Service

Annex 3A: Determination of the correction factor for the permissible interference field strength at different nominal frequencies in the Land Mobile Service

Annex 4 Propagation curves in the Land Mobile Service

Annex 5 Determination of the interference field strength in the Land Mobile Service

Annex 6 Coding instructions for antenna diagrams in the Land Mobile Service

Annex 7 Provisions on measurement procedures in the Fixed Service and the Land Mobile Service

Annex 8A Method for combining the horizontal and vertical antenna patterns for the Land Mobile Service

The Annexes relating to the Fixed Service

Annex 2B Data exchange in the Fixed Service

Annex 3B Determination of the Masks Discrimination and the Net Filter Discrimination in the Fixed Service

Annex 7 Provisions on measurement procedures in the Fixed Service and the Land Mobile Service

Annex 8B Method for combining the horizontal and vertical antenna patterns for the Fixed Service

Annex 9 Threshold Degradation in the Fixed Service

Annex 10 Determination of the basic transmission loss in the Fixed Service

Annex 11 Trigger for co-ordination in the Fixed Service

Workshop on HCM4A, Nairobi, October 2012

➢ There is a lack of specialised institutional framework to address the issue of frequency coordination

➢ There is no Regional Table of Frequency Allocations

➢ There is no common procedure for frequency coordination between Administrations

➢ There is a need to create at the national and regional level, permanent working groups to deal with frequency coordination at the borders

➢ There is a need for more concrete action on the part of subregional organisations, to support frequency coordination amongst the future beneficiaries of the HCM4A Project

➢ The final report of the HCM4A project should be presented to the concerned regional bodies

➢ The views of the regional economic bodies, the regional association of regulators and the regional association of consumers on the project should be obtained since some of these were not represented at this meeting even though they had been invited.

Timelines for the Clean Agreement

- The meeting agreed on the following work schedule
  - ➢ By **30th November 2012**, the clean document will be sent to the ITU for alignment of the English and French versions, noting that the French version is normally adopted by the ITU as the original language;
  - ➢ By **15th December 2012** all Focal points will be sent the revised draft Agreement for final editorial review
  - ➢ By **11th January 2013** the editorial observations by various Administrations should have been sent to the ITU
  - ➢ By **31st January 2013** ITU will send the final clean document to all the Administrations for signature
  - ➢ By **31st March 2013** the signed documents should have reached ITU Office in Addis Ababa.

Team of ITU experts for HCM4A

- Under the management of the HIPSSA Project Team (Project manager and Project Coordinator)
- In close collaboration with the ITU regional Office for Africa and the ITU Division at HQ dealing with the matter (TND)
- Team of 6 experts
  - ➢ 4 Regional Experts (West, Central, East and Southern Africa)
  - ➢ 1 International HCM Expert
  - ➢ 1 Senior Coordinator

Contacts

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http://www.itu.int/ITU-D/projects/ITU_EC_ACP/index.html

Thank you!

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