Cross-Border Frequency Coordination: A Harmonized Calculation Method for Africa (HCM4A)

East Africa Assessment Report

HIPSSA

Harmonization of ICT Policies in Sub-Saharan Africa

Establishment of Harmonized Policies for the ICT Market in the ACP Countries

Cross-Border Frequency Coordination: A Harmonized Calculation Method for Africa (HCM4A)

East Africa Assessment Report

HIPSSA

Harmonization of ICT Policies in Sub-Saharan Africa

Disclaimer

This document has been produced with the financial assistance of the European Union. The views expressed herein may not necessarily reflect the official opinion of the European Union.

The designations employed and the presentation of material, including maps, do not imply the expression of any opinion whatsoever on the part of ITU concerning the legal status of any country, territory, city or area, or concerning the delimitations of its frontiers or boundaries. The mention of specific companies or of certain products does not imply that they are endorsed or recommended by ITU in preference to others of a similar nature that are not mentioned.

Please consider the environment before printing this report.

© ITU 2013

Foreword

Information and communication technologies (ICTs) are shaping the process of globalisation. Recognising their potential to accelerate Africa's economic integration and thereby its greater prosperity and social transformation, Ministers responsible for Communication and Information Technologies meeting under the auspices of the African Union (AU) adopted in May 2008 a reference framework for the harmonization of telecommunications/ICT policies and regulations, an initiative that had become especially necessary with the increasingly widespread adoption of policies to liberalise this sector.

Coordination across the region is essential if the policies, legislation, and practices resulting from each country's liberalization are not to be so various as to constitute an impediment to the development of competitive regional markets.

Our project to 'Support for Harmonization of the ICT Policies in Sub-Sahara Africa' (HIPSSA) has sought to address this potential impediment by bringing together and accompanying all Sub-Saharan countries in the Group of African, Caribbean and Pacific States (ACP) as they formulate and adopt harmonized ICT policies, legislation, and regulatory frameworks. Executed by the International Telecommunication Union (ITU), co-chaired by the AU, the project has been undertaken in close cooperation with the Regional Economic Communities (RECs) and regional associations of regulators which are members of the HIPSSA Steering Committee. A global steering committee composed of the representatives of the ACP Secretariat and the Development and Cooperation – EurepeAid (DEVCO, European Commission) oversees the overall implementation of the project.

This project is taking place within the framework of the ACP Information and Telecommunication Technologies (@CP-ICT) programme and is funded under the 9th European Development Fund (EDF), which is the main instrument for providing European aid for development cooperation in the ACP States, and co-financed by the ITU. The @CP-ICT aims to support ACP governments and institutions in the harmonization of their ICT policies in the sector by providing high-quality, globally-benchmarked but locally-relevant policy advice, training and related capacity building.

All projects that bring together multiple stakeholders face the dual challenge of creating a sense of shared ownership and ensuring optimum outcomes for all parties. HIPSSA has given special consideration to this issue from the very beginning of the project in December 2008. Having agreed upon shared priorities, stakeholder working groups were set up to address them. The specific needs of the regions were then identified and likewise potentially successful regional practices, which were then benchmarked against practices and standards established elsewhere.

These detailed assessments, which reflect sub-regional and country-specific particularities, served as the basis for the model policies and legislative texts that offer the prospect of a legislative landscape for which the whole region can be proud. The project is certain to become an example to follow for the stakeholders who seek to harness the catalytic force of ICTs to accelerate economic integration and social and economic development.

I take this opportunity to thank the European Commission and ACP Secretariat for their financial contribution. I also thank the Economic Community of West African States (ECOWAS), West African Economic and Monetary Union (UEMOA), Economic Community of Central African States (ECCAS), Economic and Monetary Community of Central Africa (CEMAC), East African Community (EAC), Common Market for Eastern and Southern Africa (COMESA), Common Market for Eastern and Southern Africa (COMESA), Southern African Development Community (SADC), Intergovernmental Authority on Development (IGAD), Communication Regulators' Association of Southern Africa (CRASA), Telecommunication Regulators' Association of Central Africa (ARTAC), United Nations Economic Commission for Africa (UNECA), and West Africa Telecommunications Regulators' Association (WATRA), for their contribution to this work. Without political will on the part of beneficiary countries, not much would have been achieved. For that, I express my profound thanks to all the ACP governments for their political will which has made this project a resounding success.

Brahima Sanou
BDT, Director

Acknowledgements

Executive Summary

This report is the result of a survey entitled ''Cross-border frequency coordination: Harmonization Calculation Method (HCM) for Africa'' that targeted 13 countries in the Eastern African region. The methodology used to conduct the survey was through questionnaires, which were distributed to all targeted countries. Each country nominated a focal point to fill the questionnaire and follow up questions were asked by telephone and emails. Out of the targeted 13 countries, only 9 were able to complete and return their questionnaires. Ethiopia, Comoros, Somalia and Madagascar did not submit their complete questionnaires. Kenya, Tanzania, Uganda, Rwanda, Sudan, Djibouti, Eritrea, Mauritius and Seychelles completed and returned their questionnaires. The report is divided into seven parts: Objective of the study, Regional Organizations and Regulatory Associations dealing with ICT matters, County Profile, Brief status of telecommunication/broadcasting, National Spectrum Management Framework, Observations and Conclusion.

The report assesses the current situation on cross border frequency management in the mentioned countries. The report also looks at the internal capacity in relation to tools used for frequency management i.e. National Table of Frequency Allocation, Spectrum Management Software and Fixed and Mobile frequency monitoring equipment. These are tools that help to manage and reduce levels of cross border interferences. The results of the survey indicate that, there are three regional organizations namely SADC, COMESA and EAC within the area covered by the study. In these organizations, the regulators have formed associations, which among their objectives are to collaborate on issues pertaining to cross border frequency management. These associations provide good platform to establish coordination framework, agreements and develop harmonized calculations methods. Only Communication Regulators' Association of Southern Africa (CRASA) and East Africa Regulators Association (EACO) have cross border coordination frameworks. CRASA has coordination framework for GSM, while EACO has coordination framework for GSM and digital television broadcasting. The two frameworks do not provide for preferential frequencies, shared frequencies and the register to record the results. The framework is much dwelt on administrative procedure for resolving cross border interferences. Kenya, Uganda, Rwanda, Sudan and Mauritius have National Frequency Table of Allocation (NFTA), which conforms to the ITU Table of Frequency. These countries have published their National Frequency Table of Allocation (NFTA) on their websites. Such actions reduce the possibilities of cross border frequency interferences while portraying transparency in allocation of the spectrum. Djibouti has no National Frequency Table of Allocation, which has been customized to the domestic needs. It uses the ITU Table of Frequency to plan for the spectrum. Eritrea has a National Table of Frequency Allocations (NTFA) but it needs to be updated. Tanzania has National Frequency Table of Allocation (NFTA), which conforms to ITU Table of Frequency Allocations and has been customized to the domestic needs. However the NFTA has not been published on their website

The report examines the different telecommunication legislations of the countries that mandate the regulator to manage Spectrum. Kenya, Uganda, Rwanda, Tanzania, Mauritius and Seychelles all have converged regulators (Telecommunication and Broadcasting), which provide effective management of the frequency spectrum. Sudan has an overlap of responsibilities for managing the radio frequency spectrum, and the regulatory bodies are not converged. Djibouti Telecom plays both role of the regulator and operator and manages the spectrum for both telecommunication and broadcasting. Eritrea has not liberalized telecommunication market and broadcasting.

The report looks at some of the observations and recommendations and finally discusses conclusion drawn out of the survey.

Table of contents

Table of contents

Table of contents

Table of contents

Table of contents

Table of contents

Table of contents

List of figures

List of figures

List of tables

GLOSSARY

Glossary

COM	COMOROS
DJI	DIJOUBTI
ERI	ERITRIEA
ETH	ETHIOPIA
KEN	KENYA
MDG	MADAGASCAR
MAU	MAURITIUS
RRW	RUWANDA
SEY	SEYCHELLES
SOM	SOMALIA
SDN	SUDAN
TZA	TANZANIA
UGA	UGANDA

INTRODUCTION

HIPSSA is a joint project of the International Telecommunication Union (ITU) and European Commission partnership. The program was officially launched in December 2008. Its objectives are:

- To develop and promote ICT market policies and guidelines for individual countries in Sub-Saharan Africa,

- To support the regional organizations and the sub-regional economic groupings to develop and

- To promote the use of harmonized ICT market policies and regulations in the area concerned and building human as well as institutional capacity in the field of ICT through a range of targeted training, education and knowledge sharing measures.

The project for "Harmonisation of ICT Policies in Sub-Sahara Africa" (HIPSSA) is building on the experience gained with a pilot project funded by European Commission (EC) and ITU that led to the adoption of Additional Acts for telecommunications to the ECOWAS Treaty. This project will result in the creation of harmonized regional and national policy, legal and regulatory frameworks conducive to significant investments in the ICT infrastructures and services.[1]

HIPSSA is aligned onto the African Union's (AU) Action Plan based of the Framework on Harmonization of ICT Policies, Legislations and regulation and the AU Commission co-chairs the HIPSSA Steering Committee with ITU.[2]

During the initial phase, the project will support respective countries in their on-going efforts to create harmonized regional telecommunication/ICT markets with possibility for a pan-African market as well as assist member countries without ICT policies to develop them. Countries with ICT policies will be supported in reviewing and updating while striving to harmonize them as regional/pan-African ICT policies.

The project will address the regulatory challenges facing the beneficiary countries with the goal of creating an environment conducive to massive investments in ICT infrastructure and ICT-enabled applications, which the countries will adopt for day to day use in their economic and social activities. This is the overriding objective for the African countries, which is in line with the goals of the WTDC (Doha, 2006) and the WSIS.

This report is the result of a survey carried out in the different countries within Eastern Africa that includes Kenya, Uganda, Tanzania, Rwanda, Eretria, Djibouti, Sudan, Seychelles and Mauritius. The report discusses the various regional bodies that the mentioned countries are affiliated to, countries telecommunication profile, National Spectrum Management Framework, the enabling legislative Act, National Table of Frequency Allocations and the Cross border frequency coordination for each the countries mentioned afore.

---

[1] www.itu.int/ITU-D/projects/ITU_EC_ACP/hipssa/tor/G-3/HIPSSA_G-3.5%5BINT%5D.pdf
[2.] 14th African Union Summit : www.africa-union.org/root/au/Conferences/2010/January/summit/informationsheet/5%20INFORMATION%20SHEET%205%20-%20HARMONIZATION%20OF%20ICT%20POLICIES%20IN%20SUB-SAHARA%20AFRICA.pdf

Main Findings

In the East Africa region, there are two regulatory associations established to collaborate on issues pertaining to ICT development. These associations are EACO, which incorporate East Africa Community Member States, and ARICEA, which incorporate COMESA countries. Among the objectives of these regulatory associations, are to collaborate on issues pertaining cross border frequency coordination

Most of the surveyed countries have established Communication Regulatory Authorities, which oversee Management of the Radio communication frequency spectrum. Only three countries have left their national operator the role of both regulation and policy making. This leads to overlapping of responsibilities on managing the sector.

EACO has established the committee dealing with spectrum management issues. This includes cross border frequency coordination and issues pertaining to agenda items for the World Radiocommunication Conference. The committee has representation of all EACO member state and meets not less than three times a year. ARICEA has no dedicated committee to address issues pertaining to frequency management.

All EACO Member states have adopted converged licensing framework. The regulatory Authority grants separate license or permit for the use of spectrum. The legislation mandates the Authority to retrieve the spectrum in case it is not used for one year. Such legislation cuts across for all EACO Member States.

Among the nine surveyed countries in East African (EA) region, there are no serious cross border frequency interferences, which lead to disruptions of the communication services among the neighbours' countries. However the most reported radio communications services, which brings cross border interference are broadcasting services (FM radio and analogue television), Fixed services (HF two ways communication radio) and Mobile Services (GSM and CDMA)

Most of the EA countries use the ITU tools for interference resolutions, coordination and registration. The most preferred tool for spectrum management is SMS4DC

Two cross border coordination frameworks have been developed by EACO Member states. The frameworks are for Digital television broadcasting and GSM. The two frameworks do not provide for preferential frequencies, shared frequencies and the register to record the results. The framework is much dwelt on administrative procedure for resolving cross border interferences.

Regional Report

Part 1: Regional Report

Regional Report

The countries of Eastern Africa (defined here as comprising Djibouti, Ethiopia, Eritrea, Kenya, Rwanda, Uganda, Sudan, Somalia, and Tanzania) have a number of features in common. First, most countries were colonies. While Rwanda was colonized by the Germans and then by the Belgians, Kenya, Uganda and Tanzania were British colonial territories (Tanganyika was taken from Germany at the end of the First World War). Ethiopia was colonized by Italy but only for a short while. Eritrea was part of Ethiopia up to 1993. Djibouti was French; Somalia was Italian (though a part of it was colonized by Britain).

Eastern Africa is not a homogenous region in physical, ecological, cultural, or historical terms. But while there are prominent differences there are also many similarities. We bring out two major similarities here:

All of the countries in this region are dependent on their natural resources for national and for household survival. The region has little mineral or manufacturing wealth, and the countries depend on agriculture with wildlife and coastal tourism playing a significant role (in those countries that are stable).

The second common thread, and linked to the first, is that this is a region of poverty. Some of the poorest countries of the world are here: Ethiopia, Somalia, Rwanda and Tanzania (see Table 1).

Within the Eastern Africa area there are three distinct groups of countries:

East Africa: the countries of Kenya, Tanzania, and Uganda, with a common lingua franca (Swahili), shared colonial history, and consequently similar institutions, policies, and laws.

The two smaller countries: Rwanda and Burundi have exceptionally high population densities exerting great pressure on land. The two have similar ethnic composition; share a common heritage of Belgian colonialism, and a recent history of civil war and genocide.

The Horn of Africa: The arid and largely pastoralist economies of Eritrea, Djibouti, Somalia, and to some extent Ethiopian lowlands. Ethiopia is much larger; it has a huge population and the central highlands add a great deal of diversity of ecosystems. This sub-region is still dominated by a complex set of conflicts.[3]

Table 1 – Summary of National Statistics

State	Area (1,000 km²)	Pop. (mil.)	Pop. Density per km²	GNP per capita ($)	Life Expect. (years)	Forests 1,000 km²	Deforestation %change (1990–95)	% PA*
Burundi	28	7	255	140	42	3	0.4	3.2
Djibouti	23	0.6	27	--	50	--	--	0.4
Eritrea	118	4	38	200	51	3	0.0	0.0*
Ethiopia	1,104	61	61	100	43	136	0.5	2.1*
Kenya	580	29	51	350	51	13	0.3	6.0
Rwanda	26	8	329	230	41	3	0.2	12.4
Somalia	638	9	14	--	48	--	--	0.3
Tanzania	945	32	36	220	47	341	--	13.8
Uganda	241	21	105	310	42	64	--	7.9

Source: The World Bank (2000); World Resources Institute (2000).

---

[3]   Regional Overview of Transboundary Natural Resource Management in Eastern Africa :
       www.worldwildlife.org/bsp/publications/africa/121/121/titlepage.HTML

Table 2 – Eastern African Economic Blocks

Pillars regional blocs (REC	Area (km²)	Population	GDP (PPP) ($US)		Member states
			In millions	Per capita	
EAC	1,817,945	124,858,568	104,239	1,065	5
COMESA	12,873,957	406,102,471	735,599	1,811	20
IGAD	5, 233,604	187,969,775	225,049	1,197	7

Source: CIA World Factbook 2005, IMF WEO Database

1   Regional initiatives towards harmonized cross border frequency coordination

ARICEA has done an effective job of leveraging other initiatives and previous work by others. A case in point is a recent (February 2006) report, "Guidelines on Satellite and Other Wireless Services Regulation" (Adam, 2006).

Through ARICEA, COMESA has been very proactive in member state capacity building. It has initiated programs to harmonize ICT policies and attract foreign investment to the region, and drafted model ICT policies, licensing rules, and frameworks. It has also established an agenda to stimulate regulatory harmonization.

ARICEA is working on identifying clusters of members at the same level of development of policy and regulation matters and continues to develop and update guidelines for member states where necessary.[4]

One of the main concerns for ARICEA is to facilitate proactive solution to issues such as Bandwidth and allocation, interconnection, co-ordinate the developments of standards and networks. ARICEA has a close relationship with the Communication Regulatory Association of Southern Africa (CRASA). Some CRASA members are also ARICEA members or participate actively in the activities of ARICEA. Given this overlap in membership and the fact that the Southern African Development Community (SADC) and COMESA harmonize their programmes, ARICEA and CRASA have started a process of cooperation. For instance, they have agreed to undertake a number of activities jointly i.e., management of the effect of spill over signals from neighbouring countries (frequency coordination across-borders). CRASA recognizes that harmonization of radio frequency spectrum use does facilitate frequency coordination across-borders and has the added benefit of allowing regional roaming of certain customer devices (e.g. GSM).

The other regional association of regulators in the region is the East Africa Communication Organization (EACO) has formulated draft guidelines on the use of radio systems within border areas, with the aim of resolving signal spill-over's and interferences along borders of the five East African countries. Members of the EACO are encouraged to carry out bilateral/multilateral coordination for all applicable frequencies. The existing EACO frequency coordination procedures guidelines were reviewed by members with a view to establishing their adequacy for digital broadcasting.

---

[4]   ARICEA : www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR03/Informal_meeting/ARICEA-ElementsofAction%20Plan.pdf

Regional Report

2   Regional cross border frequency coordination agreements

Bilateral or Multilateral agreements are agreements made between two or more countries on how to manage cross border frequency interference. The agreements cover both administrative and technical aspects. Communication Commission of Kenya (CCK) has a coordination framework with EACO members for GSM and digital television broadcasting only. The coordination framework does not cover other radio communications services. For the GSM and digital television the framework has covered both technical and administrative coordination procedures. However the agreement does not provide for frequency register to store coordination data.

Tanzania does not have a framework that covers all range of radio communication services. Tanzania has only three agreements, two being with EAC Member States on GSM and digital television broadcasting while the third one being with CRASA on GSM. None of the agreements attached to this report provide for frequency register to store coordination results, preferential frequencies and sharing of frequencies for cross border frequency coordination.

Uganda Communication Commission (UCC) does not have a framework that covers all range of radio communication services. Uganda has only two agreements with EACO, one being on GSM and another on digital television broadcasting. The agreements were made with EAC administrations. The GSM agreement was made when Burundi and Rwanda were not yet members of EAC. All agreements are attached to this report. The agreements do not provide for frequency register to store coordination results, preferential frequencies and sharing of frequencies for cross border frequency coordination.

Rwanda does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination. However, cross border frequency coordination agreement for Digital Television with Rwanda neighbouring countries will be done under the framework of EACO.

Sudan does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination. However, any agreement on cross border frequency coordination agreement will follow ITU frequency coordination framework.

Djibouti does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) cross border frequency coordination agreements. The country also does not have a procedure to handle interference experiences coming from across the border.

Eritrea does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination nor any agreement with its neighbours but would consider having one in the future.

Mauritius does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination. Information & Communication Technologies Authority (ICTA) conducts frequency coordination across their borders about 2-3 times annually on Earth station/VSAT with its neighbour Reunion Island.

Seychelles does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination.

3 Regional survey comparative analysis

The regional survey was carried out by first preparing a set of questions to assist solicit the necessary information that will be required to implement the regional agreement.

The questionnaire tried to clarify the entities in charge of frequency coordination in each country, particularly frequency coordination across borders for the different radio communication services.

Due to the importance that frequency harmonization plays for cross border coordination, information was requested pertinent to the national and regional frequency allocation band plan as well as alignment with the ITU frequency allocations for ITU Radio Region 1.

Of clear importance to the project was the need to know about cross border frequency coordination framework and agreements in existence, relevant procedures in place as well as capabilities to handle interference/co-ordinations.

Similarly it was necessary to know about relevant interference problems and cross border frequency coordination experiences to which the countries were exposed.

The basic approach followed was to consult with the relevant authorities of every country mainly through emails, making use of telephonic contact for minor clarifications or to expedite the response process.

For a more detailed information on the outcome of the regional survey please consult Part II where each country is addressed separately

3.1 Analysis of Tools and Databases used in the region

CCK uses TerraNotices and e-Notices for coordination or registration. CCK has also recently acquired spectrum management software from LS Telcom, and it plans to use this tool from now on for frequency coordination. The other tool in use by CCK is SRTM-3. This software is used for elevation and/or morphological data, geographical projection, interference calculation and coordination. CCK uses Maps with a resolution of 1:50.

Tanzania Communication Regulatory Authority (TCRA) have not used any ITU tools, database for coordination or interference resolution so far, but they have recently acquired an ITU Spectrum Management System for Developing Countries (SMS4DC) software tool to use for database record keeping and frequency coordination/interference resolution management. Uganda Communications Commission uses the following ITU tools and databases for coordination and registration; BRIFIC, MIFR, TerRaQ, TerNotice. The propagation models that are used by the software are registered as follows; Longley Rice, ITU-R.P 370-7, CRC, ITU-R P.526-6, Okumura-Hata, Detvag-90/FOI, ITU-R P. 676-2, ITU-R P.452-9, ITU-R P.619-1. These models are chosen depending on the frequency range, terrain dependence of the analysis, antenna height above ground of the transmitter and the calculation speed. The type of geographical projection is **long.lat – WGS 1984.** UCC has fixed and mobile frequency monitoring stations.

Rwanda Utilities Regulatory Agency uses ITU TerRaSys tools, for coordination or registration. However Rwanda does not use maps for digital terrain data for interference calculations. Rwanda is expecting to receive the Spectrum Management Software and Fixed and Mobile Frequency Monitoring stations. The procurement has been finalized and importation of the equipment is underway.

National Telecommunication Corporation of Sudan uses all available ITU tools and databases for coordination and registration. The tools are Terra Notices and e-Notices for coordination or registration

Djibouti uses Microsoft Access tool for coordination or registration. The country uses maps with a resolution of 1010 X 1215 pixels for determining the relevant terrestrial profiles.

Regional Report

Eritrea uses FMS tools to manage coordination and resolve issues of interference.

ICTA uses SPACECAP (and SAM family), GIBC, ITU eNotices Ge-84 (FM) RRC-06 planning interface, GE-06 Digital broadcasting notice for coordination or registration. ICTA also uses SMS4DC v4 ITU tool that they purchased. The Propagation models used by ICTA are as per ITU-R recommendation. The other tools and data used by ICTA are as follows;

- Digital Elevation Model (DEM): used for elevation and/or morphological data,
- Lambert and UTM with WGS84 datum: used as geographical projection system.

Seychelles does not have or use any tool or database.

4   Observations

4.1   Converged Regulator

Kenya, Uganda, Rwanda, Tanzania, Mauritius and Seychelles all have a converged regulator (Telecommunication and Broadcasting) which provide effective management of the frequency spectrum. Sudan has an overlap of responsibilities for managing the radio frequency spectrum, shared between National Telecommunications Corporation, Sudan Broadcasting Corporation and Ministry of Defence. The regulatory bodies are not converged.

Djibouti Telecom plays both role of the *regulator* and *operator* and manages the spectrum for both telecommunication and broadcasting.

Eritrea has not liberalized its telecommunication and broadcasting market. The Standard and Regulation Division within the Communication Department of the Ministry of Transport and Communication is responsible for frequency coordination. It is the Government itself, which carries out coordination activities and management of the spectrum. Legislation is not very clear as it provides for regulating telecommunication and broadcasting, but at the same time excludes regulating radio programs.

4.2   National Table of Frequency Allocation

Table 3 – Countries and National Table of Frequency Allocation

Name of the country	Possess NTFA	Customized NTFA	Published NFTA in Wesites
KENYA	YES	YES	YES www.cck.go.ke
TANZANIA	YES	YES	NO
UGANDA	YES	YES	YES www.ucc.co.ug
SUDAN	YES	YES	YES in ARABIC www.ntc.gov.sd
SEYCHELLES	YES	YES	NO
MAURITIUS	YES	YES	YES www.icta.mu
Eritrea	YES	NO	NO
DJIBOUT	NO	NO	NO
RWD	YES	YES	YES www.rura.go.rw

Publication of NFTA provides information to the service providers, radio communication users and manufacturers worldwide. It also reduces the possibilities of cross border frequency interferences while portraying transparency in assigning the spectrum.

Djibouti has no National Frequency Table of Allocation, which has been customized to the domestic needs. It is using the ITU table of frequency to plan for the spectrum. The ITU Radio Regulations is used as the tool for the national band plan. Eritrea has a National Table of Frequency Allocations (NTFA) but it needs to be updated some Band and sub-Band which are subject of WRC change of regional allocation. The ITU Radio Regulations is used as the tool for the national band plan.

Figure 1 – Countries and National Table of Frequency Allocation

NFTA= National Table of Frequency Allocation,
NPAR= Not Published but available on request,
FARW= Published National Table of Frequency Allocation in Regulator website
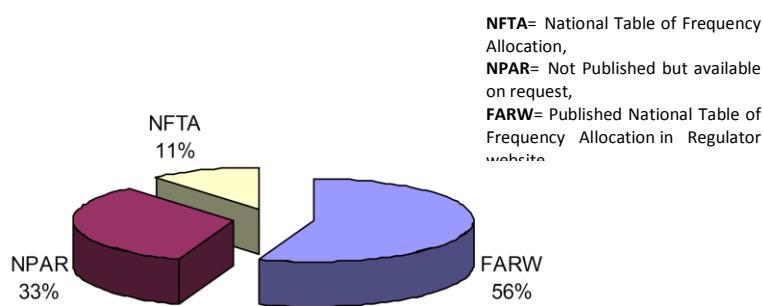
Tanzania has planned the NFTA based on ITU table of frequency. The NFTA has been customized according to the domestic needs but not published in the regulator website

All the countries above that have not published their NTFA can avail their NTFA on request

4.3   Cross Border Radio Frequency Coordination Frame work

Kenya, Tanzania, Rwanda and Uganda have cross border frequency coordination framework for the GSM and Television digital broadcasting, which is applicable among the EAC Member states. Tanzania Mauritius and Seychelles uses CRASA agreement for resolving GSM interferences across the border through the adopted framework. However all the adopted frameworks do not provide for preferential frequencies, shared frequencies and the register to record the results. The framework focuses mainly on administrative procedure for resolving cross border interferences. Sudan, Djibouti, and Eritrea have not adopted any frequency coordination framework for managing cross border interferences. Sudan relies on ITU framework to resolve any interference complaints with the neighbouring countries.

Table 4 – Entities responsible for frequency coordination

Countries	Responsibility for international frequency coordination	Responsibility for national spectrum management	Responsibility for broadcasting spectrum	Responsibility for defense/security spectrum
Kenya (KE)	CCK	CCK	CCK	CCK
Tanzania (TZ)	TCRA	TCRA	TCRA	TCRA
Uganda	UCC	UCC	UCC	UCC
Rwanda	RURA	RURA	RURA	RURA
Sudan	NTC	NTC	NTC	The Ministry of Defence
Djibouti	Djibouti Telecom	Djibouti Telecom	Djibouti Telecom	Djibouti Telecom
Eritrea	Minister of Communications	Minister of Communications	Minister of Communications	Minister of Communications

Regional Report

Countries	Responsibility for international frequency coordination	Responsibility for national spectrum management	Responsibility for broadcasting spectrum	Responsibility for defense/security spectrum
Mauritius	The Ministry of Information Technology and Telecommunications.	The Ministry of Information Technology and Telecommunications.	The Ministry of Information Technology and Telecommunications	The Ministry of Information Technology and Telecommunications
Seychelles	Ministry of Information Technology & Communication	Ministry of Information Technology and Communication	Ministry of Information Technology and Communication	Ministry of Information Technology and Communication

Figure 2 – Entities responsible for frequency coordination

Entities responsible for frequency coordination
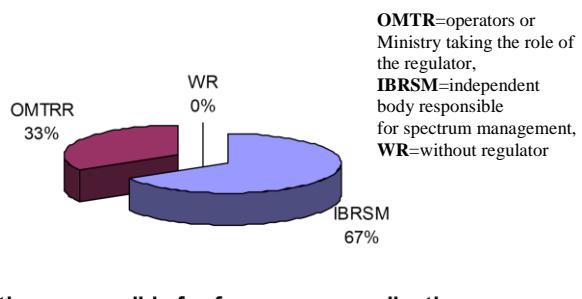
4.4 Harmonization of frequency planning in the region

EACO has been putting effort to harmonize frequency planning for different radio communication services. According to focal point of Tanzania, the services to be harmonized in frequency planning are HF two-way radio communications. This intends to facilitate communication for vehicles travelling across the border of EAC member states. SADC have harmonized allocation of spectrum for the short-range devices, Public safety and disaster relief and radio frequency channelling arrangement.

4.5 Highly recommended radio communication services for cross border coordination

Kenya has identified the frequency ranges that need to be given priority for cross border coordination-900 MHz (GSM), 87.5-108 MHz (FM) and C-Band (satellite). Uganda has cited FM radio as the most services experiencing cross border interference. Rwanda has identified the following frequency ranges and given priority for coordination -900 MHz (GSM), 87.5-108 MHz (FM) and Analogue Television in the frequency range of UHF (470 – 862MHz) and VHF (174 – 230 MHz). Sudan has identified the following frequency ranges and given priority for coordination: 450 – 470 MHz.

4.6   Tools for managing the spectrum

Kenya, Rwanda and Uganda have necessary tools for managing the spectrum, namely, NFTA, Spectrum Management Software, Fixed and Mobile frequency monitoring Stations. Tanzania meanwhile has acquired necessary tool for managing the spectrum. The acquired tool is an ITU Spectrum Management System for Developing Countries (SMS4DC) software tool to use for database record keeping and frequency coordination/interference resolution management. Tanzania also has Mobile and fixed frequency monitoring stations. Sudan has not procured any tool for managing spectrum.

Table 5 – Summary of Tools for Frequency Monitoring and Co-ordination:

Country	Co-ordination Tools	Frequency Monitoring
Djibouti	Microsoft Access	None
Eritrea	FMS	None
Kenya	terra Notes& e-Notice, SRTM-3	TARDIRAN(Mobile & Fixed)
Mauritius	SPACECAP	None
Rwanda	terraQ, terra Notes &e-Notice	TIC (Mobile & Fixed)
Seychelles	None	None
Sudan	None	None
Tanzania	SMS4-DC	Rohde & Schwarz(Mobile & Fixed)
Uganda	terra Notes& e-Notice	TIC (Mobile & Fixed)

Djibouti uses Microsoft Access tool for coordination and/or registration. Eritrea has developed a professional frequency management tool purchased from outside software firm in addition to ITU/BDT supplied FMS4DC. Mauritius has acquired ITU Spectrum Management System for Developing Countries (SMS4DC) software tool to use for database record keeping and frequency coordination/interference resolution management. The Tools and data used by ICTA are Digital Elevation Model (DEM). This is used for elevation and/or morphological data. The type of geographical projection used by these tools is Lambert and UTM with WGS84 datum. Seychelles does not have any tool for spectrum management i.e. Spectrum Management Software, Fixed & Mobile frequency Monitoring station.

5   Regional conclusions and recommendations

5.1   Collaboration on Radio Spectrum Issues

All surveyed nine (9) countries belong to one or more regulatory associations namely ARICEA, CRASA and EACO. Among the objectives of these Associations are to collaborate on issues pertaining to cross border frequency management. These associations are useful for developing coordination framework, agreements and Harmonized calculations methods.

Considering strengths and opportunities that Kenya, Tanzania, Uganda, Mauritius, and Rwanda are having which are, the converged regulator, regional membership of EACO and CRASA, appropriate legislation for ICT sector and ownership of necessary tools for spectrum management, it is recommended that, this project takes advantages of the mentioned strengths and opportunities to support these countries to

Regional Report

develop Harmonized calculation methods which will take into account the existing spectrum management software of EACO and CRASA Member states.

5.2   Agreements and Coordination frameworks

There are only two adopted coordination frameworks for EACO and CRASA, which target two radio communications services, namely GSM and digital television broadcasting. The two frameworks are not comprehensive, as they do not provide for preferential frequencies, shared frequencies and the register to record the results. The framework is basically on administrative procedure for resolving cross border interferences.

Considering the Regulator's established committees, which include frequency coordination committees for both EACO and CRASA, it is recommended that this project uses these forums to initiate discussion with these organizations on how to establish the coordination framework and agreements which will take into account and address issues of preferential frequencies, shared frequencies, frequency register and data exchange format. The framework shall cover Fixed Services, Broadcasting frequency ranges for TV, FM radio and GSM/CDMA frequency ranges.

5.3   Sudan ICT Regulatory Regime

It is recommended that, for a more efficient management of radio frequency spectrum, this project advises the Government of Sudan to adopt a converged regulatory institution so that no overlapping of responsibilities may be experienced. Further, the National Telecommunication Corporation of Sudan, be advised to translate and publish the National Table of Frequency Allocation (NFTA) in its website to English and French (to enable many people to access and understand the plan).

5.4   Djibouti ICT Regulatory Regime

It is recommended that Djibouti establishes independent regulator who is not an operator based on the Telecommunication Act of 1998. The Act caters for the formation of a regulatory body. Further legislation should be implemented for the creation of an independent sector regulator. Djibouti may also be advised to procure small-scale frequency monitoring equipment for managing the spectrum. This will improve and reduce cross border interferences.

5.5   Highly recommended radio communication services for cross border frequency coordination

The survey indicates that, the highly recommended radio communication services for cross border frequency coordination are Fixed Services, Broadcasting for TV, FM radio and GSM/CDMA frequency ranges. The project may start to support both developing agreements on these mentioned services and Harmonized Calculation Method.

5.6   Tools for radio frequency management

Legislation, National Frequency Table of Allocation, Spectrum Management Software (SMS) and Frequency monitoring equipment are key tools to manage and reduce level of cross-border radio frequency interferences. Tanzania, Uganda, Mauritius and Kenya have these tools. Rwanda is finalizing procurement for the SMS and Radio Frequency Monitoring equipment. Sudan, Eritrea, Seychelles and Djibouti lack frequency-monitoring equipment. **The most radio communication services which brings cross border interference** FM Radio and Television broadcasting have been mentioned as the most occurring cross border interference by all the countries in the survey.

Regional Report

5.7   Radio Communication License

Tanzania, Kenya and Rwanda issue radio communication licenses for using the radio spectrum. Uganda issues authorization only to use the frequency resource. The system for issuing authorization for frequency use is used by European Union Countries. Tanzania, Kenya, Rwanda and Uganda legislations provide power to the regulator to retrieve back the frequency spectrum if the operator does not use the frequency within one-year duration.

5.8   Regional Organization Secretariats

The regional associations of the regulators play a big role on issues of cross border frequency management. Some of the regulator associations have secretariats, which are full time employed to follow up implementation of the agreed issues by the members. ARICEA has the secretariat while EACO is in the process of getting a secretariat.

5.9   Convergence

One of the Agenda items in some of the regulatory associations is to ensure that the existing legislation is aligned to accommodate convergence of technologies equally as the convergence of broadcasting and telecommunication regulators. All EACO members examined in this report have converged regulators, except Rwanda that is working on the convergence environment, which Rwanda Cabinet approved recently and also suggested content to be regulated by RURA. The legislation of EACO members addresses issues of convergence of technologies including the licensing framework. Most of ARICEA member states do not have legislations and institutional frameworks which adhere to convergence of technologies.

6   Contacts:

Johannes Magesa
Tanzania Communications Regulatory Authorities
Box 474, Dar eslaam, Tanzania

jmagesa@tcra.go.tz

Geofrey Sengodo
Uganda Communication Commission

Email address: Geks_76@gmail.com
Mobile: +256772461461

Zerai Teklehaimanot Mogos
Director, Standard and Regulation Division
Communication Departement
Ministry of Transaport and Communication
Eritrea

Tel : +2911189215
Email : zerai.zerai@ties.itu.int

Regional Report

Géraud-Constant AHOKPOSSI and
Aurelie ADAM SOULE
National Telecommunication Corporation (NTC)
Paulo Pierre
Director of Communication
The Communications Division of the Department of Information Communications Technology (Vice-President's Office)
Seychelles

communications@ict.gov.sc

Stanley K Kibe
Communication Commission of Kenya
Nairobim Kenya

+254 722 5100 13
kibe@cck.go.ke

7   Annex

1.0   Comparative analysis in excel

2.0   Digital television coordination framework- EACO

3.0   Report of the task force on GSM spill over – EACO

National Reports

Part 2: National Reports

Djibouti Report

Djibouti

Djibouti Report

1 Introduction

1.1 Country profile

The Republic of Djibouti is a country with a surface area of 23,200 km², located in the North Eastern Africa at the Horn of Africa. To the south it is bordered by the Atlantic Ocean. To the north it is bordered by Eritrea, to the west and south by Ethiopia and Somalia to the southeast.

Djibouti macro-economic statistics[5] are as follows:

- – Population: 864,200 inhabitants;
- – GDP per capita: $1,382;
- – Real growth rate in 2009: + 5%;
- – Inflation rate in 2009: + 1.7%.

Figure 3 – Map of Djibouti and its neighbours

1.2 Regional organizations

The "Office National des Télécommunications (Onatel)" is a state-owned corporation in charge of the provision of telecommunications services in Burundi. Onatel is accountable to the « Ministère des Transports, Postes et Télécommunications ».

---

[5]   Source WAEMU, April 2010

Djibouti is member of Common Market for Eastern and Southern Africa (COMESA) a free trade area with nineteen member states stretching from Libya to Zimbabwe. COMESA was formed in December 1994, replacing a Preferential Trade Area, which had existed since 1981. Nine of the member states formed a free trade area in 2000 (Djibouti, Egypt, Kenya, Madagascar, Malawi, Mauritius, Sudan, Zambia and Zimbabwe), with Rwanda and Burundi joining the FTA in 2004 and the Comoros and Libya in 2006.

Djibouti is a member of Intergovernmental Authority on Development (IGAD) is an intergovernmental organization in eastern Africa, which deals with the issues of food security and environmental protection, conflict prevention, management and resolution and humanitarian affairs. Djibouti is also a member of the *Community of Sahel-Saharan States (CEN-SAD), a regional group of eight French-speaking countries. Its mission is to promote "economic and social development of its states members through the harmonization of their legislations, the unification of their markets and the implementation of common policies".*

1.3   Brief telecommunication / broadcasting profile

Djibouti Telecom is a primary telecommunications company of Djibouti, providing landline, mobile and Internet service. The company is quartered in Djibouti City. Rural areas connected via wireless local loop radio systems; mobile cellular coverage is primarily limited to the area in and around Djibouti city. Agence Djiboutienne de Regulation des Telecommunications (ADRT) under the jurisdiction of the Ministry of Communication and Culture, which is currently in charge of postal services and telecommunications.

Djibouti Telecom is the body responsible for managing the spectrum of frequencies, including frequency coordination in the country. Djibouti maintains restrictions on the licensing and operation of broadcast media. State-owned Radio diffusion-Television de Djibouti (RTD) operates the sole terrestrial TV station as well as the only 2 domestic radio networks. There are currently no private TV or radio stations in Djibouti.

2   National Spectrum Management Framework

2.1   Legislative basis

Legislative acts governing telecommunications sector in Djibouti are the Loi n°80/AN/04/5ème L amending in 2004 the Loi n°13/AN/98/4ème L of 1998.

Telecommunication Legislation passed in March 1998 to separate postal activities from telecommunications and further to create a private company, Djibouti Telecom, established in 1999. The Act also caters for the formation of a regulatory body to take over from the dismantled post and telecommunications authority.

2.2   National Table of Frequency Allocations

According to the response to the questionnaire, Djibouti has no national table of frequency allocation however the country uses ITU system of spectrum management.

3 Cross border frequency coordination

3.1 Responsibility for cross border frequency coordination

Djibouti Telecom is the body responsible for frequency coordination. This responsibility is extended to all services (Fixe, Mobile, Broadcasting, Satellite, Maritime, etc.) and for any use (Civil as well as military). As per consequence, there is no challenge on spectrum management.

Regarding cross border frequency coordination agreement Djibouti has an administrative procedure that involves following a finding of cross-border issue then reporting the OFFICIAL USE and initiating the process with the Office of the ITU.

3.2 Bilateral / Multilateral agreement

According to the response to the questionnaire, Djibouti does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) cross border frequency coordination agreements. The country also does not have a procedure to handle interference experiences coming from across the border,

Table 6 – Bands and services shared with neighbours

Bands	Services	Neighbouring countries	Periodicity
87.5 – 108 MHz	Broadcasting	Yemen	1
87.5 – 108 MHz	Broadcasting	Ethiopia	1

3.3 Interference experience

According to the response to the questionnaire, Djibouti also does not have a procedure or experience in successfully handling interference experiences coming from across the border.

3.4 Data Exchange Format

According to the response to the questionnaire, Djibouti does not have different data formats for the exchange of relevant information; however the country uses Electronic and paper as data exchange formats and CD / DVD, Internet (email) and paper as data exchange methods of preference.

3.5 Tools and database used

Djibouti uses Microsoft Access tool for coordination or registration. The country uses maps with a resolution of 1010 X 1215 pixels for determining the relevant terrestrial profiles

4 Observation

Djibouti Telecom is the body responsible for frequency coordination. It plays both roles of the regulator and operator. However it manages the spectrum for both telecommunication and broadcasting. This also provides for the effective management of spectrum since there are no multiple bodies managing the spectrum. Telecommunication Legislation passed in March 1998 direct formation of the regulatory body, which has not been put into effect until now.

Djibouti Report

Djibouti has no customized National Frequency Table of Allocation. It is using the ITU table of frequency to plan for the spectrum. The ITU Radio Regulations is used as the tool for the national band plan.

Djibouti does not have any agreement on cross border spectrum coordination and the FM broadcasting frequency range has been cited as the most services which cause cross border interference with neighbours.

Djibouti is a member country of COMESA. However ARICEA, which is the association of the regulators of COMESA countries, has not taken any initiative of addressing the spectrum issues in the region.

Djibouti uses Microsoft Access tool for coordination or registration. The country uses maps with a resolution of 1010 X 1215 pixels for determining the relevant terrestrial profiles.

5   Conclusion and Recommendations

5.1   It is recommended that any agreement model and the Harmonized Calculations Method, for Djibouti should take into account needs and requirements of COMESA counties. This is because Djibouti belongs to COMESA and is a member of regulator association for COMESA countries.

5.2   It is recommended that this project initiate discussion with ARICEA with a view of guiding them on establishment of the coordination framework which will address issues of preferential frequencies, shared frequencies, frequency register and data exchange format. The framework shall cover Fixed Services, Broadcasting frequency ranges for TV, FM radio and GSM/CDMA frequency ranges.

5.3   It is recommended that Djibouti establishes an independent regulator who is not an operator based on the telecommunication act of 1998. Djibouti may also be advised to procure small-scale frequency monitoring equipment for managing the spectrum. This will improve and reduce cross border interferences.

6   Contact

No Contact details provided

7   Annex

Djibouti response on Cross-border frequency coordination: Harmonization Calculation Method (HCM) for Africa survey

Djibouti Country Profile 2010 :

http://www.bk-conseil.com/espaceinformation/documentation/ict/djibouti_Country_Profile.pdf

Eritrea Report

Eritrea

Eritrea Report

1 Introduction

1.1 Country profile

The Republic of Eritrea is a country in Eastern Africa, bordering the Red Sea, between Djibouti and Sudan. Eritrea's economic growth is estimated at 15.5% (EIU, 2009). Inflation is estimated at 2.5% (EIU, 2009). Contributions from the diaspora help to keep the economy afloat but these are thought to be diminishing. Efforts are underway to develop the tourist industry around Massawa. The current GDP real growth rate in 2010 stood at 4%. Eritrea population in 2009 stood at 5.6 million (CIA, 2009 est.).

Figure 4 – Map of Eritrea with its neighbours
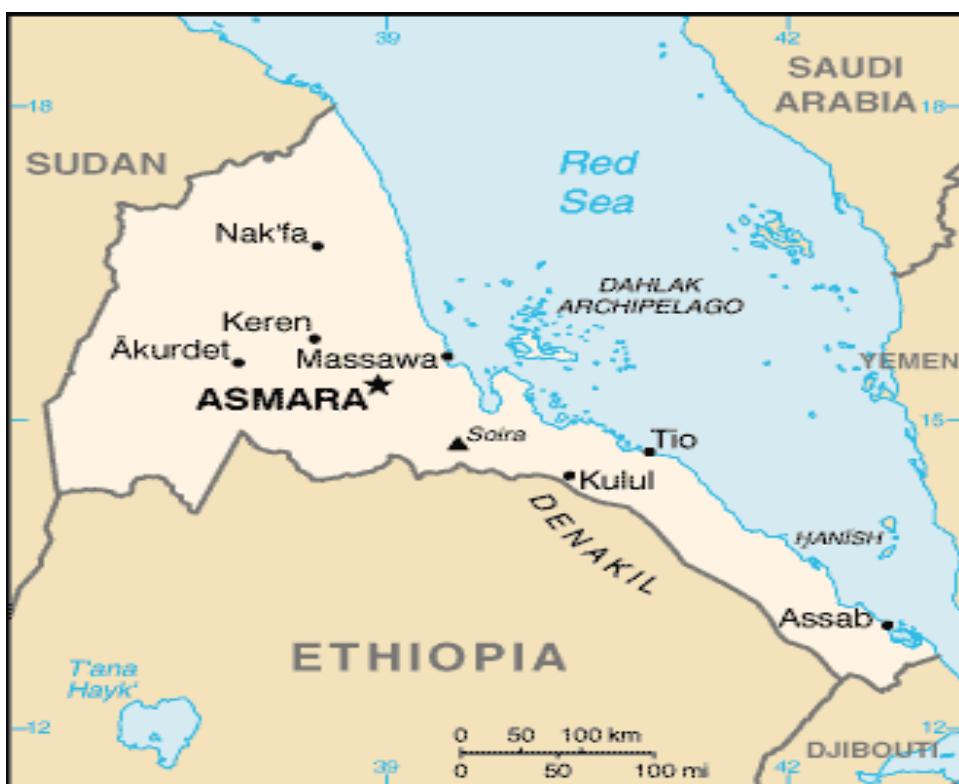
Eritrea is member of the Inter-Governmental Authority on Development (IGAD), Organisation of six eastern African countries focused on drought control and *development* initiatives. Eritrea is also a member of Common Market for Eastern and Southern Africa (COMESA)

1.2 Brief Information and Communication Technology profile

The telecommunication and broadcasting sector in Eritrea is controlled by the government and there is adequate regulation.

Eritrea is characterized with limited telecommunication infrastructures and fixed telephone lines are mostly available in Asmara. The government is seeking international tenders to improve the general telephone system in Eritrea (2002). The regulator is the Standard and Regulation Division within the communication department of the Ministry of Transport and Communication

Eritrea Report

The government controls broadcast media with private ownership prohibited. There exist one state-owned TV station (ERITV) and four relay television stations that cover 80% of the population. There are three radio stations out of which two have national coverage while the third covers the whole nation. The combined fixed-line and mobile-cellular subscribership is only about 4.5 per 100 persons (2011). That is the tele-density is 4.5%. [6]

2 National Spectrum Management Framework

2.1 Legislative basis

Legislative acts governing telecommunications sector in Eritrea are as follows:

In March 1998, the Eritrean Government issued a "Communications Proclamation7" which regulates communications (telecommunications, broadcasting and postal services) in the State of Eritrea. The Proclamation applies also to sea-going vessels and aircrafts registered in the country and to works, plants and devices of any kind in connection with offshore activities, but excludes programme activities related to radio broadcasting and television transmission.

2.2 National Table of Frequency Allocations

Eritrea has a National Table of Frequency Allocations (NTFA) but it needs to be updated with some bands and sub-bands, which are subject of WRC-07 change of regional allocation. Eritrea's NTFA is not much different compared with that of ITU or ITU-R Table (as specified under art. 5 of the IRR) in the bands and sub-bands. However there are exceptions, which can be tolerated: e.g. in the newly allocated bands for TV and sound including HFBC. The table is annexed.

3 Cross border frequency coordination

3.1 Responsibility for cross border frequency coordination

The Standard and Regulation Division within the communication department of the Ministry of Transport and Communication is responsible for frequency coordination. This responsibility is extended to all services (Fixe, Mobile, Broadcasting, Satellite, Maritime, etc.) and for any use (Civil as well as military). Eritrea has not developed a Regional band Plan with its neighbours or with the sub-region. This is according to the response given by the focal point. The band plan may be considered in the future.

3.2 Bilateral / Multilateral agreement

According to the response to the questionnaire, Eritrea does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination nor any agreement with its neighbours but would consider having one in the future.

---

[6] www.bk-conseil.com/espaceinformation/documentation/ict/Eritrea_Country_Profile.pdf
[7] www.uneca.org/AISI/nici/country_profiles/Eritrea/eripap1.htm

Eritrea Report

3.3 Interference Experience

According to the response to the questionnaire, Eritrea has not yet encountered any mutual interference with its neighbours but they have experienced some coordination problems internally which they have successfully handled. This was with the national broadcasting especially with regards to HFBC (chiefly on seasonal broadcast schedule). These problems are usually solved as and when the problem arises.

3.4 Data Exchange Format

According to the response to the questionnaire, Eritrea has some data exchange format understandable only to its frequency management staff, which can be used in case of need with some domestic service. A copy of the electronic file will be submitted on later stage to the regional expert. Eritrea prefers emails and DVD for data exchange format.

3.5 Tools and database used.

According to the response to the questionnaire, Eritrea uses FMS tools to manage internal radio frequency interferences.

4 Observation

4.1 Eritrea has not liberalized telecommunication market and broadcasting. The Standard and Regulation Division within the communication department of the Ministry of Transport and Communication is responsible for frequency coordination. It is government itself, which carries coordination activities and management of the spectrum. Legislation provides for regulating telecommunication and broadcasting but not for regulating radio programs.

4.2 Eritrea has a National Table of Frequency Allocations (NTFA) but it needs to be updated some Band and sub-Band which are subject of WRC-07 change of regional allocation. The ITU Radio Regulations is used as the tool for the national band plan.

4.3 Eritrea doesn't have any agreement on cross border spectrum coordination and has not yet encountered any mutual interference with its neighbours.

4.4 Eritrea is a member country of COMESA. However ARICEA, which is the association of the regulators of COMESA countries, has not taken any initiative of addressing the spectrum issues in the region

4.5 Eritrea have developed a professional frequency management tool purchased from outside software firm in additional to ITU/BDT supplied FMS4DC, Eritrea is ready to tackle the problem of storing the co-ordination using the safe national frequency register, if at any time the problem rises.

5 Conclusion and Recommendations

5.1 The Government of Eritrea may want to delegate the radio spectrum management to a specialized body, which shall take care on all issues pertaining to spectrum management.

5.2 There is a need to study the software developed by Eritrea with a view to establishing if it is providing accurate results and solution especially when developing Harmonizing Calculation Method with neighbouring countries.

Eritrea Report

5.3   Considering that Eritrea is a member of COMESA, it is recommended that, this project takes advantages of its membership to come up with the agreements on managing cross border interference and develop Harmonized calculation methods which will take into account the existing spectrum management software of the COMESA Member states.

5.4   It is recommended that this project initiate discussion with COMESA with a view of guiding them on establishment of the coordination framework which will take into account and address issues of preferential frequencies, shared frequencies, frequency register and data exchange format. The framework shall cover Fixed Services, Broadcasting frequency ranges for TV, FM radio and GSM/CDMA frequency ranges

There is no independent organ, which manages the spectrum in Eritrea. The Government is the one, which play the role of policy making and managing the Spectrum. This may be among the shortfall towards developing harmonized calculation method for managing the Spectrum.

6   Contacts

Zerai Teklehaimanot
Director of standards and regulations division

Tel: +291 1189215/291 7 115470
Email: Zerai@ties.itu.int ;

7   Annex

7.1   Response to the questionnaire

Annex 1: Final response from Eritrea

7.2   Cross border frequency coordination agreement

Annex 2: None

7.3   National Table of Frequency Allocations

Annex 3: Eretria's National Table of Frequency Allocations.

Kenya Report

Kenya

Kenya Report

1 Introduction

1.1 Country profile

Kenya land mass is approximately 582,650 square kilometres. Kenya is located in East Africa and borders Ethiopia in the North, Sudan in the North West, Somalia in the East, Tanzania in the south and Uganda in the west. The population of Kenya is 41,070,934 at the last census done in August 2009.

Kenya's economy continued to grow at a rate of over 4.0%. GDP real growth rate was at 4% in 2010 (2010 est.), 2.6% (2009 est.) and 1.7% (2008 est.).

Figure 5 – Map of Kenya with its neighbours

1.2 Regional organizations

Kenya is a member of the East Africa Community (EAC), a regional group of five countries, Republics of Burundi, Kenya, Rwanda, Uganda and the United Republic of Tanzania with its headquarters in Arusha, Tanzania. The Treaty for Establishment of the East African Community was signed on 30th November 1999 and entered into force on 7th July 2000 following its ratification by the Original 3 Partner States –

Kenya Report

Kenya, Uganda and Tanzania. The Republic of Rwanda and the Republic of Burundi acceded to the EAC Treaty on 18th June 2007 and became full Members of the Community with effect from 1st July 2007.[8]

Kenya is also a member of COMESA (Common Market of East and Southern Africa). Kenya benefits from membership in the Association of Regulators of Information and Communication for Eastern and Southern Africa (ARICEA) and from the COMESA ICT Policy that was developed to serve as a policy model for the harmonious development and application of ICTs across member states.

The East Africa Community has an association of regulator authorities called East Africa Regulatory, Postal and Telecommunications Organization (EARPTO). Later on due to convergence of technology, and the need to have converged regulator, in December 2010, the EARPTO congress, which at the first time was attended by Republic of Burundi and Rwanda, decided to incorporate Broadcasting sector in this organization. The new constitution was developed whereby the organization named East Africa Communication Organization (EACO) was burned.

The main objectives of the EACO include:

- Harmonize and promote the development of postal and telecommunications services and regulatory matters and devise ways and means to achieve fast, reliable, secure, economic and efficient services within the Community

- Ensure the provision of tariff structure and settlement of accounts

- Promote the development and application of Information Communications Technologies (ICT)

- Serve as a consultative organization for settlement of postal and telecommunications matters which are regional in nature, promote the development of technical facilities and their most efficient utilization with a view to improving the efficiency for telecommunications and postal services, increasing their usefulness and making them generally available to the public

- Harmonize policies and legislation in the communications sector (i.e. managing competition and licensing requirements in the region)

1.3   Brief Information and Communication Technology profile

The postal and telecommunications sub-sectors accounted for 2.5% of the total GDP in 2006 compared to 2.4 % in 2005. The sub sector recorded a growth of 18.1% in 2006.

The Mobile telephony dominated the telecommunications market by posting a rise of 36.5% in the subscriber base from 5.3 million in 2005 to 9.3 million by December 2006. In 2010 the subscriber base of mobile telephony stood at 20 million.[9]

The Kenya Communication Act 1998 also provided the establishment of the regulator Communication Commission of Kenya (CCK), its board and management, The Appeals Tribunal as the independent arbitrator and the National Communications Secretariat under the Ministry of Information and Communication as the policy advisory arm within the Ministry. It is responsible for spelling out Government policy on ICT matters.

---

[8]   www.eac.int/about_eac.htm
[9]   Macro-economic Outlook: CCK annual report 2007/2008

Kenya Report

Telkom Kenya the sole landline provider provides main lines for users, the main line users as in 2009 stood at 664,100. The main cell phone operators in Kenya are Safaricom, Airtel, Telkom Kenya under the Orange brand and Yu. Mobile cellular subscribers stood at 19.365 million in 2009. The mobile-cellular telephone usage is has a tele-density reaching 50 per 100 persons in 2009.

There are about a half-dozen privately-owned TV stations and a state-owned television broadcaster that operates 2 channels; satellite and cable TV subscription services are available; state-owned radio broadcaster operates 2 national radio channels and provides regional and local radio services in multiple languages; a large number of private radio broadcasters, including provincial stations broadcasting in local languages; transmissions of several international broadcasters are available (2007)

2 National Spectrum Management Framework

2.1 Legislative basis

Legislative acts and policy governing telecommunications sector in Kenya are as follows:

- The Kenya Communication Act 1998 and
- The Kenya Communication regulation 2001
- National Information Communication Technology Policy, 2006

All the above mentioned legislation and policy plays important role to the growth of the ICT industry and social and economic developments

2.2 National Table of Frequency Allocations

The Regulator for telecommunication and broadcasting in Kenya has developed the National Table of Frequency Allocation (NFTA). The NFTA has been developed in line with the ITU table of frequency and customized to the domestic requirements. The NFTA has been developed and adhere to the following requirements:

- Adhered to definitions and principles of frequency allocation recommended in the ITU regulations article 5.
- Adhered to Recommendations and foot notes provided for ITU Region 1
- Customized to domestic requirements and take into account usage of radio frequencies and future demand of government agencies, commercial entities and non-governmental organizations.

The National Table of Frequency Allocation complies with the international treaty provisions on a global basis for services related to Public, Safety and security such as police, fire, ambulance, defence and conservation.

Publication of the NFTA in the web sites, and other media is of importance to ensure that the Public and investors are well informed on the radio communication services provided in the different radio frequency range. It also provides information to manufacturer and service providers on the radio communication equipment to be imported or manufactured in the different countries, and avoid unnecessary cross border interferences which may arise due to ignorance of the users and operators. Kenya administration has published its NFTA in the CCK website: www.cck.go.ke

Kenya Report

3 Cross border frequency coordination

3.1 Responsibility for cross border frequency coordination

Communication Commission of Kenya (CCK) is the responsible for radio frequency coordination. This responsibility is extended to all services (Fixe, Mobile, Broadcasting, Satellite, Maritime, etc.) and for any use (Civil as well as military). As a consequence, there is no challenge on spectrum management.

3.2 Bilateral / Multilateral agreement

Bilateral and Multilateral agreements, are agreements made between two or more countries on how to manage cross border frequency interference. The agreements cover both administrative and technical aspects. According to the response to the questionnaire, Kenya has a coordination framework for GSM and digital television broadcasting only. The coordination framework does not cover other radio communications services. For the GSM and digital television the framework has covered both technical and administrative coordination procedures. However the agreement does not provide for frequency register to store coordination data.

3.3 Interference experience

Kenya does not face frequent radio communication interference across the border. However, the GSM spill over signal across the border of Tanzania and Uganda compelled the convening of a meeting to seek for permanent solution, whereby cross border coordination framework for GSM services were developed by Tanzania, Uganda and Kenya. According to the response to the questionnaire, forced roaming of mobile subscribers along the international borders on Uganda and Tanzania sides in 2004 resulted to a coordination meeting for regulators and mobile operators in the region with resolved to reduce the round-trip delay for BTSs located near the border. FM frequency interference along the borders resulted to antenna pattern attenuations

CCK expresses the needs of cross border frequency coordination with Tanzania and Uganda. There have been successful resolutions of interferences as mentioned above, and efforts have been put in place to help resolve interferences as illustrated in the table below;

Table 7 – Band and services Kenya share with its Neighbours

Band	Services	Country	Periodicity	Coordination
900 MHz	GSM Mobile	Uganda & Tanzania	rarely	Once a year
87.5-108 MHz	FM Radio	Uganda & Tanzania	rarely	Once a year
470-862 MHz	Digital TV	Uganda & Tanzania	rarely	Once a year

Table 8 – Frequency Range with priority on coordination

	Band	Services	Country	Priority
1.	900 MHz	GSM Mobile	Uganda & Tanzania	High
2.	87.5-108 MHz	FM Radio	Uganda & Tanzania	High
3.	470-862 MHz	Digital TV	Uganda & Tanzania	High
4.	C-Band	Satellite/Fixed	Uganda & Tanzania	Low

Kenya Report

3.4 Data Exchange Format

According to the response to the questionnaire, Kenya does not have different data formats for the exchange of relevant information.

3.5 Tools and database used

Kenya uses TerraNotices and e-Notices as for use in coordination or registration. CCK has also recently acquired spectrum management software from LS Telcom, and will proceed from now on with the process of frequency coordination using this tool.

The other tool in possession by CCK is SRTM-3. This software is used for elevation and/or morphological data, geographical projection, interference calculation and coordination. CCK uses Maps with a resolution of 1:50.

4 Observation

4.1 Kenya does have a converged regulator (Telecommunication and Broadcasting) which provide effective management of the frequency spectrum

4.2 Kenya has published its National Frequency Table of Allocation (NFTA) in the website of Communication Commission Of Kenya. Such action provides information to the service providers, radio communication users and frequency interferences while portraying transparency in assigning the spectrum

4.3 Kenya has a frequency coordination framework for the GSM and Television digital broadcasting. However the adopted framework does not provide for preferential frequencies, shared frequencies and the register to record the results.

4.4 The frequency ranges that have been identified and given priority for coordination are 900 MHz (GSM), 87.5-108 MHz (FM) and C-Band (satellite)

4.5 Kenya has necessary tools for managing the spectrum, namely, NFTA, Spectrum Management Software, Fixed and Mobile frequency monitoring Stations

5 Conclusion and Recommendations

Kenya has built internal capacity to manage the spectrum including cross border interferences. These are the appropriate legislation to manage the spectrum, customized and published National Table of Frequency Allocation, Radio spectrum monitoring equipment. However Kenya has no agreement on cross border frequency coordination, which caters for all radio communication services. The above-mentioned recommendations should be considered to develop harmonized calculation method for Kenya

6 Contact

Stanley K Kibe
Communication Commission of Kenya
Nairobi Kenya

+254 722 5100 13
kibe@cck.go.ke

Kenya Report

7 Annex

7.1 Response to the questionnaire

Annex 1: Final response from Eritrea

7.2 Cross border frequency coordination agreement

Annex 2: None

7.3 National Table of Frequency Allocations

Annex 3: KEN National Table of Frequency Allocations.

Mauritius Report

Mauritius

Mauritius Report

1   Introduction

1.1   Country profile

The Republic of Mauritius is an island nation with a surface area of 2,040 sq.km. It is located off the southeast coast of the African continent in the southwest Indian Ocean, about 900 km east of Madagascar. In addition to the island of Mauritius, the Republic includes the islands of Cargados Carajos, Rodrigues and the Agalega Islands. Mauritius Island is part of the Mascarene Islands.[10]

Mauritius macro-economic statistics are as follows:

- Population: 1,288,000 (2008 estimate)

- Real growth rate in 3.6% (2010 estimate)

Figure 6 – Map of Mauritius and its neighbours

1.2   Regional organizations

Mauritius is a member of Commonwealth and Southern Africa Development Community (SADC) and has a founding member of the Common Market for Eastern and Southern Africa (COMESA)*.* Mauritius is a member of the *Association* of *Regulators* in Central, East and Southern Africa (ARICEA)[11]

---

[10]   Source : Wikipedia
[11]   Padayatchy, V (2010) 'Consumer Protection Rights in the ICT Sector – the Mauritian Case', Cybernaptics, Mauritius & LINK Centre Johannesburg, July 2010

Mauritius Report

1.3 Brief Information and Communication Technology profile

Mauritius has been the first with many telecommunication innovations in Africa: It launched the first cellular system on the continent in 1989, the first commercial Third Generation (3G) mobile service in November 2004, and the world's first nationwide high-speed wireless broadband network based on the WiMAX standard in 2005.

Mauritius is actively pursuing a policy to make telecommunications the fifth pillar of its economy after sugar, textiles, tourism and financial services, and to become a regional telecom hub with Singapore as a role model.

Information & Communication Technologies Authority (ICTA) a department under the Ministry of Information Technology and Telecommunications[12] is responsible for telecoms regulation.

2 National Spectrum Management Framework

2.1 Legislative basis

Legislative act governing telecommunications sector in Mauritius is: Telecommunication Act of 1998

2.2 National Table of Frequency Allocations

Mauritius has developed the NFTA as the tool for managing the radio spectrum. The criteria used to develop the NFTA is as follow:

- The NFTA has been developed in line with the ITU table of frequency and customized to the domestic requirements

- The NFTA has been developed based on the CRASA framework on Harmonization of allocation of Frequencies for Public Protection and Disaster Relief

- The NFTA has been developed based on the CRASA framework on Harmonization of allocation of frequencies for short-range devices

- The NFTA has been developed based on the harmonized Radio Frequency Channelling Arrangements

The Administration of Mauritius has published the NFTA in ICTA website www.icta.mu. This gives credibility to the regulator as investors, manufacturers, services providers and frequency users will not have difficulties in complying with the specifications and importation of the radio communication equipment's. ICTA is harmonising its Frequency Allocation Table as per South African Development Community Frequency Allocation Table (FAP v2010).

3 Observations

3.1 Responsibility for cross border frequency coordination

According to the response to the questionnaire, Mauritius follows the relevant provisions of the Radio regulations and regional plans for frequency coordination especially for fixed satellite Service and Broadcasting Service.

---

[12] www.ncb.intnet.mu/mitt.htm

Mauritius Report

Given that Mauritius is an island, it does not have immediate borders with other countries. The closest island is Reunion Island.

3.2   Bilateral / Multilateral agreement

According to the response to the questionnaire, Mauritius does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination.

Information & Communication Technologies Authority (ICTA) conducts frequency coordination across their borders about 2-3 times annually on Earth station/VSAT with it neighbour Reunion Island.

3.3   Interference experience

According to the response to the questionnaire, ICTA has successfully handled coordination or interference cases by enabling coordination of Earth Station/VSAT, which is conducted as per ITU Radio Regulations. This process has been successful and efficient until now.

3.4   Data Exchange Format

According to the response to the questionnaire, ICTA uses Electronic format mainly for FM broadcasting band with Reunion Island. ICTA also uses Internet /Email using general document formats or ITU .mdb files as data exchange methods.

3.5   Tools and database used

According to the response to the questionnaire, ICTA uses SPACECAP (and SAM family), GIBC, ITU eNotices Ge-84 (FM) RRC-06 planning interface, GE-06 Digital broadcasting notice for coordination or registration ICTA also uses SMS4DC v4 ITU tool that they Purchased.

The Propagation models used by ICTA are as per ITU-R recommendation. The other tools and data used by ICTA are as follows:

- Digital Elevation Model (DEM)- Used for elevation and/or morphological data,

- Lambert and UTM with WGS84 datum- used of the type of geographical projection system do you use,

4   Observation

4.1   Mauritius has a converged regulator (Telecommunication and Broadcasting), which provides for the effective management of the frequency Spectrum.

4.2   Mauritius has published its National Frequency Table of Allocation (NFTA) in the website of Information & Communications Technologies Authorities website. www.icta.mu. Such an action provides good information for frequency users and reduces probabilities of interferences across the borders. This is because radio communication equipment importers get the right information

4.3   Mauritius being a member of SADC, its frequency planning has been harmonized with CRASA frequency channelling arrangement. SADC have harmonized allocation of spectrum for the short-range devices, Public safety and disaster relief and radio frequency channelling arrangement.

Mauritius Report

4.4 Mauritius is hardly experiencing cross border frequency interference, as it does not have immediate borders with other countries. The closest island is Reunion Island. The most experienced radio interference is the VSAT communication, which has been resolved through ITU coordination framework.

4.5 Mauritius has necessary tool for managing the spectrum. The acquired tool is an ITU Spectrum Management System for Developing Countries (SMS4DC) software tool to use for database record keeping and frequency coordination/interference resolution management.

4.4 The Propagation models used by ICTA are as per ITU-R recommendations.

Tools and data used by ICTA are Digital Elevation Model (DEM). This is used for elevation and/or morphological data. Type of geographical projection tools used is Lambert and UTM with WGS84 datum

5   Conclusion and Recommendations

5.1 Considering the strengths that Mauritius is having which are, the converged regulator, regional membership of CRASA, appropriate legislation for ICT sector and ownership of necessary tools for spectrum management, it is recommended that, this project takes advantages of the mentioned strength to supports Mauritius and other CRASA Member states to develop Harmonized calculation methods which will take into account the existing spectrum management software specifications of ICTA (SMS4DC) and of CRASA Member states.

5.2 It is recommended that this project initiates discussion with CRASA with a view of guiding them on establishment of the coordination framework which will take into account and address issues of preferential frequencies, shared frequencies, frequency register and data exchange format.

5.3 Mauritius has built internal capacity to manage its radio spectrum. Mauritius has customized and published Table of Frequency Allocation. Mauritius has converged regulator, which makes effective management of spectrum for both internal and cross border. However no agreement of cross border coordination has been established which cater for all radio communication services. There is only one agreement within CRASA member, which does not cater for sharing and preferential frequencies. Mauritius has harmonized frequency channelization with SADC countries specifically in short ranges and disaster relief.

6   Contacts

Dr. Krishna OOLUN
Information & Communications Technology Authority
Port Louis, Mauritius

+ 230 211 53333
oolunn@imail.icta.mu

Mauritius Report

7 Annex

7.1 Response to the questionnaire

Annex 1: Final response from Eritrea

7.2 Cross border frequency coordination agreement

Annex 2: None

7.3 National Table of Frequency Allocations

Annex 3: MAU National Table of Frequency Allocations.

Rwanda Report

RWANDA

1 Introduction

1.1 Country profile

The Republic of Rwanda is in Central Africa, east of Democratic Republic of the Congo. It borders Burundi, Democratic Republic of the Congo, Tanzania and Uganda. Rwanda population stands at 11,370,425 as per July 2010. Rwanda is a poor rural country with about 90% of the population engaged in (mainly subsistence) agriculture and some mineral and agro-processing. In 2008, minerals overtook coffee and tea as Rwanda's primary foreign exchange earner. The 1994 genocide decimated Rwanda's fragile economic base, severely impoverished the population, particularly women, and temporarily stalled the country's ability to attract private and external investment. However, Rwanda has made substantial progress in stabilizing and rehabilitating its economy to pre-1994 levels. GDP has rebounded and inflation has been curbed, nonetheless, a majority still live below the poverty line of 250 Rwandan francs per day (about US$0.43). Rwanda joined the East African Community and is aligning its budget, trade, and immigration policies with its regional partners. Rwandan GDP (real growth rate) has risen from 4.5% in 2009 to 6% in 2010.[13]

Figure 7 – Map of Rwanda and its neighbours

1.2 Regional organizations

Rwanda became a member of the East Africa Community (EAC) in 2007 together with Burundi. The inclusion of the two countries expanded the membership of EAC to five from the original three.

---

[13]   www.indexmundi.com/rwanda/

Rwanda Report

EAC has an association of regulator association called East Africa Communication Organization (EACO) formerly named East Africa Regulatory, Postal and Telecommunications Organization (EARPTO)

Rwanda is also a member of the Common Market for Eastern and Southern Africa (COMESA). It benefits from membership in the Association of Regulators of Information and Communication for Eastern and Southern Africa (ARICEA) and from the COMESA ICT policy that was developed to serve as a policy model for the harmonious development and application of ICTs across member states.

1.3 Brief Information and Communication Technology profile

After the 1994 war, the Rwandan government embarked on a policy that aimed to increase connectivity as a spur to development. This meant that the sole state-owned telecommunication company at the time, Rwandatel, would be treated differently by setting up an independent regulatory body known as the Rwanda Utilities Regulatory Agency (RURA), and altering the ICT market structure. Telecommunications reforms were aimed at increasing the competitiveness of the telecommunications industry and attracting foreign investment[14]. RURA was created in 2001 as a multi-sector regulator whose work included regulating telecommunication sector. In 2001 a Telecommunication Law was passed which defines the regulatory agenda to enforce by the agency. The main operators are RwandaTel, Tigo and MTN. The government owns and operates the only TV station. The government-owned and operated Radio Rwanda has a national reach apart from this there are 9 private radio stations.

2 National Spectrum Management Framework

2.1 Legislative basis

Legislative acts governing telecommunications sector in Rwanda are as follows:

- Law No 39/2001 establishing Rwanda Utilities Regulatory Agency as a Multi sector Regulatory Authority (telecom, energy, gas, transport, water and sanitation)
- Law No 44/2001 governing telecommunications

However, there is another separate body, which regulates Content only for broadcast and the press. The body is namely High Media Council

2.2 National Table of Frequency Allocations

Rwanda National table of frequency allocation can be accessed through this link www.rura.gov.rw/docs/Table_NFTA.pdf and it shows both the ITU region 1 allocation and the national allocation. The differences between the two tables are not many except on bands where services are not in use in the country or there is a considerable deployment of services in the band: e.g. Deployment of WIMAX in the 3.5 GHz.

The development of the NTFA has considered the following criteria's:

- In line with the ITU table of frequency and customized to the domestic requirements
- Adhered to definitions and principles of frequency allocation recommended in the ITU regulations article 5.
- Adhered to Recommendations and foot notes provided for ITU Region one

---

[14]   www.apc.org/en/system/files/CICEWARwanda_20090908.pdf

Rwanda Report

The National Table of Frequency Allocation complies with the international treaty provisions on a global basis for services related to Public, Safety and security such as police, fire, ambulance, defence and conservation.

Publication of the NFTA in the web sites, and other media is of importance to ensure that the Public and investors are well informed on the radio communication services provided in the different radio frequency range. It also provides information to manufacturer and service providers on the radio communication equipment to be imported or manufactured in the different countries, and avoid unnecessary cross border interferences which may arise due to ignorance of the users and operators. Rwanda administration has published its NFTA in the Rwanda Utilities Regulatory Agency www.rura.gov.rw/docs/Table_NFTA.pdf

3   Cross border frequency coordination

3.1   Responsibility for cross border frequency coordination

There is framework being prepared under East Africa Communications Organization (EACO) for Digital Television frequency coordination. According to the response on the questionnaire, Rwanda does not have any framework for other services such as Fixed or Mobile. Association of Regulators of Information and Communication for Eastern and Southern Africa (ARICEA) has not developed any framework to be used for cross border coordination among the COMESA countries.

3.2   Bilateral / Multilateral agreements

According to the response to the questionnaire, Rwanda does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination. However, cross border frequency coordination agreement for Digital Television with Rwanda neighbouring countries will be done under the framework of EACO.

3.3   Interference experience

Rwanda uses the procedures prescribed in the ITU Radio Regulation especially in its Art. 15. To handle issues of cross boarder interference.

Under the framework of East Africa Communications Organization (EACO), Rwanda has conducted coordination with EAC neighbouring countries on Digital Terrestrial Television Channels. It took two meetings to agree on the framework and conduct bilateral coordination.

Rwanda Frequency in aeronautical band has been interfered by Control Tower in Congo, and efforts to solve the interference have up to now not yielded a solution. The same applies with FM Broadcasting frequencies in districts bordering with Congo.

Table 9 – Bands and services shared with neighbours.

BAND	SERVICE	COUNTRIES
108 – 137 Mhz	Aeronautical Band	All neighbouring countries
88 – 108 MHz	FM Broadcasting	All neighbouring countries

Rwanda Report

Table 10 – Bands and services with the neighbouring country/countries

Service	Band	Neighbouring Country	Periodicity
GSM	900, 1800 MHz	Uganda, Tanzania, Burundi and DR Congo	Addressed during different EACO Meetings. Not yet done with DR Congo.
FM Broadcasting	88 – 108 MHz	Uganda, Tanzania, Burundi and DR Congo	Addressed during different EACO Meetings. Not yet done with DR Congo.
Analogue TV Broadcasting	VHF Band	Uganda, Tanzania, Burundi and DR Congo	Addressed during different EACO Meetings. Not yet done with DR Congo.
Digital TV Broadcasting	470 – 862 MHz	Uganda, Tanzania, Burundi and DR Congo	Addressed during different EACO Meetings. Not yet done with DR Congo.

3.4   Data Exchange Format

According to the response to the questionnaire, Rwanda does not have different data formats for the exchange of relevant information. However Rwanda prefers Internet method for data exchange format.

3.5   Tools and database used.

Rwanda uses ITU TerRaSys tools, for coordination or registration. However Rwanda does not use maps for digital terrain data for interference calculations. Rwanda is expecting to receive the Spectrum Management Software and Fixed and Mobile Frequency Monitoring stations. The procurement has been finalized and importation of the equipment is underway.

4   Observation

4.1   Rwanda Utilities Regulatory Agency (RURA) is in charge of regulating radio frequency spectrum resource for all radio communication services (Telecommunication and Broadcasting) which provide effective management of the frequency spectrum

4.2   Rwanda has published its National Frequency Table of Allocation (NFTA) in the website of Rwanda Utilities Regulatory Agency (RURA). Such action provides information to the service providers, radio communication users and manufacturers worldwide. It also reduce possibilities of cross border frequency interferences while portraying transparency in assigning the spectrum

4.3   Rwanda is member of two regional organizations namely EAC and COMESA. The regulator of telecommunication/ broadcasting in Rwanda is a member of EACO and ARICEA. These are the associations of the regulators in East African Countries and COMESA.

4.3   Rwanda has frequency coordination framework for Television digital broadcasting to be used by EAC Member states. Other services have no agreement made with its neighbours. The only adopted framework does not provide for preferential frequencies, shared frequencies and the register to record the results

4.4   The frequency ranges that have been identified and given priority for coordination are 900 MHz (GSM), 87.5-108 MHz (FM) and Analogue Television in the frequency range of UHF (470 – 862MHz) and VHF (174 – 230 MHz)

Rwanda Report

4.5   Rwanda has finalized procurement of the Spectrum Management Software with the Fixed and Mobile frequency Monitoring stations. Rwanda has NFTA for managing the frequency spectrum resource.

5   Conclusion and Recommendations

5.1   Considering that Rwanda is a member of EACO, that it has appropriate legislation for ICT sector and is expecting to acquire necessary tools for spectrum management and that RURA is in charge of radio frequency spectrum, it is recommended that, this project takes advantages of the mentioned strength to supports Rwanda and other EACO Member states to come up with the agreements on managing cross border interference and develop Harmonized calculation methods which will take into account the existing spectrum management software of the EACO Member states.

5.2   It is recommended that this project initiate discussion with EACO with a view of guiding them on establishment of the coordination framework which will take into account and address issues of preferential frequencies, shared frequencies, frequency register and data exchange format. The framework shall cover Fixed Services, Broadcasting frequency ranges for TV, FM radio and GSM/CDMA frequency ranges

5.3   Rwanda has no coordination framework, which caters for all radio communication services. It has only one framework, which is not sufficient and does not address issues of sharing frequencies, preferential frequencies and no register to record coordination results. However Rwanda has built internal capacity, which covers appropriate legislation for spectrum management, it has National Table of Frequency Allocation and it is published. Rwanda has procured the Radio spectrum Monitoring equipment, which is on the installation process.

6   Contact

Francis Ngabo
Rwanda Utilities Regulatory Agency
Box 7289, Kigali, Rwanda

Francis.ngabo@rura.gov.rw
+250 78877 24 88

7   Annex

7.1   Response to the questionnaire

Annex 1: Final response from Eritrea

7.2   Cross border frequency coordination agreement

Annex 2: None

7.3   National Table of Frequency Allocations

Annex 3: RRW National Table of Frequency Allocations.

Seychelles Report

Seychelles

1 Introduction

1.1 Country profile

Seychelles is a country with a surface area 455 sq.km of land scattered over 650,000 sq.km of ocean located in Southern Africa, island in the Indian Ocean, east of Madagascar.[15]

Seychelles macro-economic statistics are as follows:

- Population: 89,188 (July 2011 est.)

- Real growth rate in 4.011% (2010 estimate)

Figure 8 – Map of Seychelles and its Neighbours

1.2 Regional organizations

Seychelles is a member of Commonwealth, International Organisation of the Francophonie (OIF), Indian Ocean Rim-Association for Regional Co-operation (IOR-ARC), Indian Ocean Commission (IOC), and Southern Africa Development Community (SADC) and is observer with Common Market for Eastern and Southern Africa (COMESA). Seychelles is associated with the Regulators Association of Southern Africa namely Communication Regulator Authorities for Southern Africa (CRASA). Among the objectives CRASA are

- To co-ordinate regulatory matters and to exchange ideas, views and experiences on all aspects of regulation of the telecommunications sector throughout the Southern Africa region;

---

[15]   www.indexmundi.com/madagascar/

Seychelles Report

- To promote the establishment and operation of efficient, adequate, and cost-effective telecommunications networks and services in the Southern Africa region which meet the diverse needs of customers while being economically sustainable;

- To facilitate a uniform level of understanding of regulatory matters' and

- To maximise the utilisation of scarce resources in specialist areas of telecommunications.

1.3 Brief Information and Communication Technology profile

Telecommunications services in the Seychelles are entirely privatized. The telephone system is very effective with a combined fixed-line and mobile-cellular tele-density is 130 telephones per 100 persons.

Currently, two GSM operators share the market in the Seychelles:

- Cable and Wireless (Seychelles) Ltd

- Telecom Seychelles (Airtel)

The Communications Division of the Department of Information Communications Technology (Vice-President's Office) is the regulator for Broadcasting and Telecommunications. Among its mission is to develop legislations, regulations and policies pertaining to telecommunication and related services. The government operates the only terrestrial TV station, which provides local programming and airs broadcasts from international services; multi-channel cable and satellite TV are available via subscription; the government operates one AM and one FM radio station; transmissions of two (2) international broadcasters are accessible in Victoria (2007).

2 National Spectrum Management Framework

2.1 Legislative basis

Legislative acts governing telecommunications sector in Seychelles is the Broadcasting and Telecommunications Act (BTA) of 2006. The legislations give power to the regulator to manage the spectrum.

2.2 National Table of Frequency Allocations

The Seychelles National Frequency Band Plan (NFBP) is annexed. It is harmonized with the Southern African Development Community (SADC) Frequency Allocation Plan and includes the decisions made at the World Radiocommunication Conference 2003 (WRC-03) with respect to Article 5 of the Radio Regulations. Also note that the NFBP ranges from 20MHz to 3GHz and for frequencies not in that range the ITU Radio Regulations is used as the national band plan.

3 Cross border frequency coordination

3.1 Responsibility for cross border frequency coordination

Due to the geographical location of Seychelles from other countries and considering that there is limited possibility of potential interference, there is no framework for any cross-border frequency coordination. Cross-border frequency coordination is carried out only for coordination of earth stations as received from other administrations in the region. If any coordination needs to be carried out the ITU regulations and procedures are followed.

Seychelles Report

3.2 Bilateral / Multilateral agreement

According to the response to the questionnaire, Seychelles does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination.

3.3 Interference experience

According to the response to the questionnaire, in the event that any interference this is recorded and ITU regulations will be referred to and ITU will be consulted.

3.4 Data Exchange Format

According to the response to the questionnaire, Seychelles does not have different data formats for the exchange of relevant information nor do they have preferred data format.

3.5 Tools and database used

According to the response to the questionnaire, Seychelles does not have use any tool or database.

4 Observation

4.1 Seychelles does have a converged regulator (Telecommunication and Broadcasting), which provides effective management of the frequency spectrum.

4.2 Seychelles has a NFTA, which is harmonized with the Southern African Development Community (SADC) Frequency Allocation Plan and includes the decisions made at the World Radiocommunication Conference 2003 (WRC-   03) with respect to Article 5 of the Radio Regulations. Also the NFTA ranges from 20MHz to 3GHz and for frequencies not in that range the ITU Radio Regulations is used as the national band plan.

4.3 Due to the geographical location of the country, Seychelles hardly experience interferences to and from its territory.

4.4 No coordination framework except the agreement made among the SADC countries on the GSM spill over signal interference exist.

4.5 Seychelles does not have any tool for spectrum management i.e. Spectrum Management Software, Fixed & Mobile frequency Monitoring station.

5 Conclusion and Recommendations

5.1 It is recommended that any agreement model and the Harmonized Calculations Method for Seychelles should take into account needs and requirements of SADC counties since Seychelles belongs to SADC and is a member of the Communication Regulators Authorizes of Southern Africa

5.2 It is recommended that Seychelles be advised to procure small-scale equipment for managing the spectrum.

5.3 Seychelles has built internal capacity for managing the spectrum. It has customized and published National Table of Frequency Allocation. It has a converged regulator, which makes management of spectrum to be more effective. However Seychelles has no agreement on cross border coordination with its neighbours. The CRASA membership

may be used as an opportunity to develop the coordination framework. The above-mentioned recommendations may be used to develop HCM.

6   Contact

For this study, Géraud-Constant AHOKPOSSI and Aurélie ADAM SOULE had been contacted.

The focal point is:

Paulo Pierre
Director of Communication

communications@ict.gov.sc

7   Annex

7.1   Response to the questionnaire

Annex 1: Final response from Eritrea

7.2   National Table of Frequency Allocations

Annex 2: SEY National Table of Frequency Allocations.

Sudan Report

Sudan

Sudan Report

1 Introduction

1.1 Country profile

The Republic of Sudan 2,505,813 sq.km is located in North-eastern Africa. It is bordered by Egypt to the north, the Red Sea to the northeast, Eritrea and Ethiopia to the east, Kenya and Uganda to the southeast, the Democratic Republic of the Congo and the Central African Republic to the southwest, Chad to the west and Libya to the northwest.[16]

Sudan's macro-economic statistics are as follows:

- Population: 43,939,598 (2009 estimate)
- Real growth rate of 5.2% (2010 estimate)

Figure 9 – Map of Sudan and its Neighbours

1.2 Regional organizations

Sudan is a member of IGAD, Community of Sahel-Saharan States (CEN-SAD) and Common Market for Eastern and Southern Africa (COMESA).

1.3 Brief Information and Communication Technology profile

Sudan has a large, relatively well-equipped telecommunications system by regional standards, including a national fibre optic backbone and international fibre connections. With penetration rates in all market segments still relatively low, it is regarded as one of Africa's most lucrative telecommunications markets,

---

[16] Source : Wikipedia

receiving hundreds of millions of dollars in foreign investment per year. It consists of microwave radio relay, cable, fibre optic, radiotelephone communications, tropospheric scatter, and a domestic satellite system with 14 earth stations.

The national telecommunication company is known as Sudatel (Sudan Telecom). Sudatel has been privatized for more than ten years, with major shares and management control now held by Etisalat of the UAE and Qatar Telecom. The telecom sector currently has an annual growth of 30% making it the fastest growing in the world. Other players in the market include Airtel, MTN, Canar and Sudani.

National Telecommunication Corporation (NTC) is the telecommunication regulator and Sudan Broadcasting Corporation assumes the role of a regulator for broadcasting.

In the north, the Sudanese Government directly controls TV and radio, requiring that both media reflect government policies, the TV has a permanent military censor. There is a presence of a private radio station is in operation.

In southern Sudan[17], TV is controlled by the regional government; several private FM stations are operational in southern Sudan; some foreign radio broadcasts are available (2007)[18]

2 National Spectrum Management Framework

2.1 Legislative basis

Legislative act governing telecommunications sector in Sudan is the Telecommunications Act of 2001.

The Telecommunications Act is currently under review to embrace new emerging services and technological development in the field of telecommunications and information technology. The Act does not accommodate legislations, which governs the convergence of technology.

2.2 National Table of Frequency Allocations

The Sudan National Frequency Band Plan (NFBP) is available at http://ntc.gov.sd/

Publication of the National Table Of Frequency Allocation (NFTA) gives credibility to the country, as it is useful for investors, manufacturers and users of the spectrum, while portraying transparency on frequency assignments. However the NFTA has been published in Arab language, which needs translation for some of the users.

3 Cross border frequency coordination

3.1 Responsibility for cross border frequency coordination

According to the response to the questionnaire, NTC is working under the ITU framework. The NTC is not a converged regulatory Authority, but it is regulating telecommunication and postal services only. NTC was formed in September 1996 with a view of providing effective regulatory framework to ensure competition and protection of consumer interests. The telecommunications Act of 2001 is currently under review to embrace new emerging services and technological development in the field of

---

[17] At the time of the study South Sudan had not yet reached full independence
[18] Sudan Telecommunication profile: www.indexmundi.com/sudan/telecommunications_profile.html

telecommunications and information technology. Cross border frequency management becomes challenging, as the NTC does not manage the entire radio frequency spectrum. The Ministry of Defence is partly managing military spectrum, which leads to the overlapping of the responsibilities on managing the frequency spectrum. There are two regulatory organs, one dealing with telecommunication and postal services and other dealing with broadcasting specifically on content matters.

3.2   Bilateral / Multilateral agreements

According to the response to the questionnaire, Sudan does not have a framework (administrative procedures, technical provisions, frequency register to store coordination results, etc.) for cross border frequency coordination. However, any agreement on cross border frequency coordination agreement will follow ITU frequency coordination framework.

3.3   Coordination procedure

There is no coordination procedure to handle interferences.

3.4   Interference experience

According to the response to the questionnaire, NTC uses the ITU framework taking into account article 15 of the RR as a procedure for mitigating cross border interference. The most experienced interference is in the frequency range 450 – 470 MHz. This is a public CDMA technology services. The interference experienced is at the cross border of Sudan and Saudia Arabia. It is always takes long to resolve any interference as there is no proper mechanism or framework to mitigate it.

3.5   Data Exchange Format

According to the response to the questionnaire, NTC uses Email as a preferred data format for coordination purposes.

3.6   Tools and database used

According to the response to the questionnaire, NTC uses all available ITU tools and databases for coordination and registration.

4   Observation

4.1   There is an overlap of responsibilities for managing the radio frequency   spectrum, between National Telecommunications Corporation, Sudan Broadcasting Corporation and Ministry of Defence. The regulatory bodies are not converged.

4.2   Sudan has published its National Frequency Table of Allocation (NFTA) in the website of National Telecommunication Corporation (www.ntc.gov.sd). Such action provides information to the service providers, radio communication users and manufacturers worldwide. It also reduces possibilities of cross border frequency interferences while portraying transparency in assigning the spectrum.

4.3   Sudan is a member of IGAD, Community of Sahel-Saharan States (CEN-SAD) and Common Market for Eastern and Southern Africa (COMESA). COMESA regulatory authorities have got the associations namely ARICEA dealing with regulatory matter. However, so far there is no policy or framework developed by these regulatory bodies to deal with issues pertaining spectrum.

Sudan Report

4.3   There is no adopted frequency coordination framework to be used for managing cross border interferences. Sudan is relying on ITU framework to resolve any interference complaints with the neighbour countries.

4.4   The frequency ranges that have been identified by NTC and given priority for coordination is 450 – 470 MHz.

4.5   No tool has been procured for managing spectrum in Sudan.

5   Conclusion and Recommendations

5.1   It is recommended that, for proper management of radio frequency spectrum, this project advises the Government of Sudan to adopt a converged regulatory institution so that no overlapping of responsibilities may be experienced.

5.2   It is recommended that, this project advise the NTC to translate the published National Table Of Frequency Allocation in English/French so that the wider spectrum of the Public can understand it

5.3   It is recommended that this project uses the strength of Sudan being a member to ARICEA to develop a cross border coordination framework which will take into account the existing specifications of the spectrum management software used by member states of COMESA

5.4   Sudan has overlapping responsibilities on managing the spectrum. The Ministry of Defence is also part of regulating spectrum. This will be among the challenges in developing the HCM.

6   Contact

National Telecommunications Corporation

Tel : +249 183 484489

itisalat@ntc.gov.sd

7   Annex

7.1   Response to the questionnaire

Annex 1: Final response from Sudan

7.2   Cross border frequency coordination agreement

Annex 2: None

7.3   National Table of Frequency Allocations

Annex 3: SDN National Table of Frequency Allocations.

Tanzania Report

Tanzania

1 Introduction

1.1 Country profile

The Republic of Tanzania is an Eastern Africa country, bordering the Indian Ocean, between Kenya and Mozambique. To the southeast it bordered by the Mozambique. To the north it is bordered by Kenya and Uganda, to the west by Zambia, DRC Congo, Burundi and Rwanda. Tanzania population as at July 2010 stood at 42,746,620 inhabitants.[19]

Tanzania is one of the world's poorest economies in terms of per capita income, however, Tanzania average 7% GDP growth per year between 2000 and 2008 on strong gold production and tourism. The economy depends heavily on agriculture, which accounts for more than one-fourth of GDP, provides 85% of exports, and employs about 60% of the work force. The current GDP - real growth rate 6.4% (2010 est.)

Figure 10 – Map of Tanzania and its Neighbours

1.2 Regional organizations

Tanzania is both a member of the Southern African Development Community (SADC) and the East Africa Community, which comprises five countries in the eastern part of Africa

Each of these two institutions has an association of regulatory authorities, which are respectively Communications Regulator Authorities for Southern Africa (CRASA) and East Africa Communications Organization (EACO) formerly known as EARPTO (East Africa Regulatory, Postal and Telecommunications Organization).

---

[19] Source : Indexmundi

Tanzania Report

The objectives of the EACO is to harmonise policy and regulatory frameworks in the region; promote the development of broadcasting, postal and telecommunications/ICT services and regulatory matters; and devise ways and means to achieve fast, reliable, secure, affordable and efficient communications services within the Community.

Cross border frequency coordination is among the objectives of the CRASA and the core functions of the regulators residing in these institutions namely CRASA and EACO. It is therefore relevant to engage the two Regulatory institutions (CRASA and EACO) for all matters pertaining to cross border coordination activities

1.3   Brief Information and Communication Technology profile

Tanzania launched a new telecommunications regulatory framework in 1994 with the support of the World Bank. The essence of the telecommunication policies was to ensure the accelerated development of an efficient telecommunications network that can provide an info-communications infrastructure and universal access to telecommunications services by all sectors of the national economy and segments of the population' (MOCT, 1997). Tanzania Communications Regulatory Authority is the regulator for telecommunication, Postal, Broadcasting and Electronic communications industries. Telecommunication operators in Tanzania include; TTCL, Vodacom Tanzania, Celtel Tanzania, Zantel and Tigo.

Tanzania fixed-line telephone network is inadequate with less than 1 connection per 100 persons; mobile-cellular service, aided by multiple providers, is increasing rapidly; trunk services are provided by open-wire, microwave radio relay, troposphere scatter, and fibre-optic cable. Tanzania has a state-owned TV station and multiple privately owned TV stations. The number of television stations until April, 2011 is 28.There is also a state-owned national radio station supplemented by more than 68 privately owned radio stations.

2   National Spectrum Management Framework

2.1   Legislative basis

Legislative acts and policy governing telecommunications and broadcasting in Tanzania are as follows:

- Tanzania Communications Act of 1993[20]
- Tanzania Broadcasting Services Act of 1993[21]
- Electronic, Postal and Communication (EPOCA) Act, 2010
- ICT policy (2003)

It has been noted that the Broadcasting policy of Tanzania is currently under review to accommodate new technology development in the sector. Some important points to note especially in EPOCA Act, 2010, is that, this legislation empowers the regulator to manage the spectrum resource country wide.

2.2   National Table of Frequency Allocations

Tanzania has developed the NFTA as the tool for managing the radio spectrum. The criterion used to develop the NFTA is as follow:

---

[20]   www.tcra.go.tz/policy/Tanzania Communications Act 18 1993.pdf
[21]   www.tcra.go.tz/policy/Tanzania broadcasting Act 6 of 1993.pdf

Tanzania Report

- The NFTA has been developed in line with the ITU table of frequency and customized to the domestic requirements

- The NFTA has been developed based on the CRASA framework on Harmonization of allocation of Frequencies for Public Protection and Disaster Relief

- The NFTA has been developed based on the CRASA framework on Harmonization of allocation of frequencies for short range devices

- The NFTA has been developed based on the harmonized Radio Frequency Channelling Arrangements.

The Administration of Tanzania has not published the NFTA in any media. This creates difficulties on accessing information especially when you are living outside the borders of Tanzania particularly for the stakeholders, being service providers, manufacturers and other users.

3   Cross border frequency coordination

3.1   Responsibility for cross border frequency coordination

TCRA is the responsible for frequency coordination. This responsibility is extended to all services (Fixe, Mobile, Broadcasting, Satellite, Maritime, etc.) and for any use (Civil as well as military). As per consequence, there is no challenge on spectrum management.

According to the response on the questionnaire, Tanzania has a harmonized framework on administrative procedures and technical provisions for cross-border frequency coordination. An electronic copy is as provided.

3.2   Bilateral / Multilateral agreement

According to the response to the questionnaire, Tanzania does not have a framework that covering all range of radio communication services. Tanzania has only three agreements, two being with EAC Member States on GSM and digital television broadcasting while the third one being with CRASA on GSM. None of the agreements herewith attached provide for frequency register to store coordination results, preferential frequencies and sharing of frequencies for cross border frequency coordination.

3.3   Interference experience

Tanzania has solemnly experienced interference coming from across the border. However, if cross border interference occurs use is made of the established EAC Harmonized Cross Border Frequency Coordination Administrative Procedure.

Table 11 – Bands and services shared with neighbours

Frequency Band	Services Affected	Neighbouring Country/Countries	Periodicity
87.5-108 MHz	VH- FM Broadcasting, VHF Aeronautical services	Tanzania, Uganda	Twice, station in Kampala affecting station in Mwanza

Tanzania Report

Table 11 – Bands and services with the neighbouring country/countries

Frequency Band	Services Affected	Neighbouring Country/ Countries involved	Priorities on Frequency Coordination
HF broadcasting	HF broadcasting	Burundi, Congo DRC, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia.	Coordination on Long distance Cross-border communication frequency assignments in accordance with the ITU Radio Regulations
HF radio communication	HF radio communication	Burundi, Congo DRC, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia.	Coordination on Long distance Cross-border communication frequency assignments in accordance with the ITU Radio Regulations
87.5-108 MHz	VHF- FM broadcasting, VHF Aeronautical services	Burundi, Congo DRC, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia.	Coordination on VHF- FM broadcasting frequency assignments in accordance with GE-06 Plan
138-174 MHz	VHF radio communication	Burundi, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia.	Coordination on VHF radio communication frequency assignments within radial distance of 100 Km cross-border in accordance with the ITU Radio Regulations
174-230 MHz	VHF (television & sound) broadcasting	Burundi, Congo DRC, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia	Coordination on VHF (television & sound) broadcasting frequency assignments in accordance with GE-06 Plan
230-300 MHz	VHF radio communication	Burundi, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia	Coordination on VHF radio communication frequency assignments in accordance with GE-06 Plan
300-470 MHz	UHF radio communication	Burundi, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia	Coordination on UHF radio communication frequency assignments within radial distance of 100 Km cross-border in accordance with the ITU Radio Regulations
470-790 MHz 790-862 MHz	VHF Television Broadcasting	Burundi, Congo DRC, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia	Coordination on UHF Television Broadcasting frequency assignments in accordance with GE-06 Plan
790-960 MHz;	UHF Land Mobile/ Fixed Wireless Access/ Broadband Wireless Access Services	Burundi, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia	Coordination on UHF radio communication frequency assignments within radial distance of 100 Km cross-border in accordance with the ITU Radio Regulations
4, 5, 6, 7, 8, 10, 11, 13, 15, 18, 23 GHz Bands	Microwave links transmission frequencies	Burundi, Malawi, Mozambique, Kenya, Tanzania, Uganda, Zambia	Coordination on Microwave links transmission line-of-sight frequency assignments within radial distance of 100 Km cross-border in accordance with the ITU Radio Regulations

Tanzania Report

3.4　　Data Exchange Format

According to the response on the questionnaire, TCRA does not have different data formats for the exchange of relevant information. TCRA preferred methods for data exchange format are CD, Internet (mail, ftp) and paper

3.5　　Tools and database used

TCRA have not used any ITU tools, database for coordination or interference resolution so far, but they have recently acquired an ITU Spectrum Management System for Developing Countries (SMS4DC) software tool to use for database record keeping and frequency coordination/interference resolution management.

4　　Observation

4.1　Tanzania has a converged regulator (Telecommunication and Broadcasting), which provides for the effective management of the frequency spectrum

4.2　Tanzania has not published its National Frequency Table of Allocation (NFTA) on the website of Tanzania Communications Regulatory Authority (www.tcra.go.tz). Such an absence provides inconvenience to the service providers, radio communication users and manufacturers worldwide. It also contributes to the possibilities of increasing cross border frequency interferences.

4.3　There are a lot of efforts within the SADC to harmonize radio frequency planning. SADC has harmonized allocation of spectrum for the short-range devices, public safety and disaster relief and radio frequency channelling arrangement.

4.4　Tanzania has frequency coordination framework for the GSM and Television digital broadcasting which is applicable among the EAC Member states, while in CRASA, there is an agreement for resolving GSM interferences across the border through the adopted framework herewith attached. However the entire adopted framework does not provide for preferential frequencies, shared frequencies and the register to record the results. The framework is much dwelt on administrative procedure for resolving cross border interferences.

4.5　The frequency ranges that have been identified and given priority for coordination are 900 MHz (GSM), 87.5-108 MHz (FM), UHF and VHF radio communication services as provided in the table below, microwave links, in the band of 5,6,7,8,9,10,11,13,15,18, and 23GHz band

4.6　Tanzania has acquired necessary tool for managing the spectrum. The acquired tool is an ITU Spectrum Management System for Developing Countries (SMS4DC) software tool to use for database record keeping and frequency coordination/interference resolution management. Tanzania also has Mobile and fixed frequency monitoring stations.

5　　Conclusion and Recommendations

5.1　Considering the strengths that Tanzania has, that is, a converged regulator, regional membership of EACO and CRASA, appropriate legislation for ICT sector and ownership of necessary tools for spectrum management, it is recommended that, this project takes advantages of the mentioned strength to support Tanzania and other EACO Member states to develop Harmonized calculation methods which will take into

Tanzania Report

account the existing spectrum management software of TCRA (SMS4DC) and of EACO Member states.

5.2 It is recommended that this project initiates discussion with EACO and CRASA with a view of guiding them on establishment of the coordination framework which will address issues of preferential frequencies, shared frequencies, frequency register and data exchange format. The framework shall cover Fixed Services, Broadcasting frequency ranges for TV, FM radio and GSM/CDMA frequency ranges

5.3 Tanzania has built internal capacity to manage the spectrum and even cross border interferences. The said internal capacity is having appropriate legislation and converged regulator to manage the spectrum, owning radio spectrum monitoring equipment and customized National Table of Frequency Allocation. However Tanzania does not have an agreement for cross border frequency management, which cater for all radio frequency services. It has only for digital television and GSM which does not cover issues of sharing and preferential frequencies and register to record the coordination results

6 Contact

The focal point is:
Johannes Magesa
Tanzania Communications Regulatory Authorities
Box 474, Dar eslaam, Tanzania

7 Annex

7.1 Response to the questionnaire

Annex 1: Final response from Eritrea

7.2 National Table of Frequency Allocations

Annex 2: TZA National Table of Frequency Allocations.

Uganda Report

Uganda

Uganda Report

1 Introduction

1.1 Country profile

Uganda is a country with a surface area 236,040 sq.km. It is bordered on the east by Kenya, on the north by Sudan, on the west by the Democratic Republic of the Congo, on the southwest by Rwanda, and on the south by Tanzania.[22]

Uganda's macro-economic statistics are as follows:

- Population: 32,369,558 inhabitants (2009 estimate)
- Real growth rate in 5.8% (2010 estimate)

Figure 11 – Map of Uganda and its Neighbours

1.2 Brief Information and Communication Technology profile

Currently, Uganda's major mobile telephony providers are MTN Uganda, Orange Uganda Limited, Airtel (formerly Zain) Uganda Telecom Mobile and Warid Telecom. The boom in Uganda's mobile market is the result of continuous positive growth of the country's gross domestic product (GDP) and a clear policy of liberalization and competition.

---

[22]   Source : Wikipedia

Uganda Report

Uganda Communications Commission (UCC) is the country's regulator of the communications sector. A third-generation (3G) mobile broadband service was launched in major cities in March 2008 by Uganda Telecom Mobile, and Orange Uganda has launched a 3G mobile service in 2009. The fixed-line operators Uganda Telecom and MTN Uganda offer a range of data services, but mobile phones seem likely to predominate as the means for accessing the Internet. Uganda's broadcasting market has also liberalized, as there are many private licensed radio stations.

Uganda is a member of the Commonwealth, East African Community, Common Market for Eastern and Southern Africa (COMESA), Intergovernmental Authority on Development (IGAD). Uganda is affiliated to the East Africa Regulators Association (EACO)

The objectives of EACO are hereunder mentioned:

The objectives of the EACO shall be to harmonise policy and regulatory frameworks in the region; promote the development of broadcasting, postal and telecommunications/ICT services and regulatory matters; and devise ways and means to achieve fast, reliable, secure, affordable and efficient communications services within the Community, with particular focus on:

- Network development and regional inter-connectivity;
- Harmonization of tariff structures and settlement of accounts;
- Policy advise on issues relating to the communications sector;
- Regional projects, and programmes;
- The security of broadcasting, postal and telecommunication/ ICT networks;
- Research and technological development;
- Human resource development;
- Exchange of information;
    o Management of radio frequency resource;
    o Standards development and promotion of ethical practices;
    o Quality of services;
- Ensuring the provision of universal service in the region;
- Promoting the development and application of Information Communication Technologies (ICT);
- Serving as a consultative organization for settlement of matters, which are of regional nature, promote the development of technical facilities and their most efficient utilization;
- Harmonizing policies and legislation in the communications sector;
- Promoting the development of local content from the East African Region; and
- Any other objective as may be determined by the Congress from time to time

2   National Spectrum Management Framework

2.1   Legislative basis

Legislative acts governing telecommunications sector in UGANDA is:

- Broadcasting and Telecommunications Act (BTA) of 2006

Uganda Report

- Uganda communication Act chapter 106 of 2000

The legislations of 2000 provides for the restructuring of the communications industry in Uganda, by establishing the Uganda Communication Commission, providing for its functions and administrations, providing for the incorporation of Uganda telecommunication limited and Uganda Post Limited, to liberalize and introduce competition in the industry.

The Broadcasting sector of Uganda is regulated by the Uganda Broadcasting Council. The council is particularly dealing with content. However the government recently decided to merge the Uganda Broadcasting Council and Uganda Communications Commission.

2.2   National Table of Frequency Allocations

Uganda has developed the NFTA as the tool for managing the radio spectrum.

The criteria used to develop the NFTA is as follow,

- The NFTA has been developed in line with the ITU table of frequency and customized to the domestic requirements

- Adhered to definitions and principles of frequency allocation recommended in the ITU regulations article 5.

- Adhered to Recommendations and foot notes provided for ITU Region one The Administration of Uganda has not published the NFTA in Uganda Communications Commission website www.ucc.co.ug. This makes difficulties on accessing information especially when you are living outside the borders of Uganda particularly for the stakeholders, being service providers, manufacturers and other users

3   Cross border frequency coordination

3.1   Responsibility for cross border frequency coordination

UCC is responsible for frequency coordination. This responsibility is extended to all services (Fixe, Mobile, Broadcasting, Satellite, Maritime, etc.) and for any use (Civil as well as military). As a consequence, there is no challenge on spectrum management.

UCC as member of EACO has a harmonized framework on digital television broadcasting and GSM services for both administrative procedures and technical provisions for cross-border frequency coordination. An electronic copy is provided.

3.2   Bilateral / Multilateral agreement

According to the response to the questionnaire, Uganda does not have a framework that covers all range of radio communication services. Uganda has only two agreements, one being on GSM and another on digital television broadcasting. The agreements were made with EAC administrations. The GSM agreement was made when Burundi and Rwanda were not yet the members of EAC. All agreements are herewith attached. The agreements does not provide for frequency register to store coordination results, preferential frequencies and sharing of frequencies for cross border frequency coordination.

3.3　　Interference experience

According to the response to the questionnaire, UCC has not cited specific radio communication services with priorities, which are regularly experiencing cross border interference.

3.4　　Data Exchange Format

According to the response to the questionnaire, UCC prefers Internet as a Data exchange format.

3.5　　Tools and database used.

Uganda Communication Commission uses the following ITU tools and databases for coordination and registration;

- BRIFIC
- MIFR
- TerRaQ
- TerNotices

The propagation models that are used by the software are registered as follows;

- Longley Rice
- ITU-R.P 370-7
- CRC
- ITU-R P.526-6
- Okumura-Hata
- Detvag-90/FOI
- ITU-R P. 676-2
- ITU-R P.452-9
- ITU-R P.619-1

These models are chosen depending on the Frequency range, Terrain dependence of the analysis, antenna height above ground of the transmitter and the calculation speed.

The type of geographical projection is long.lat – WGS 1984.

UCC has fixed and mobile frequency monitoring stations

4　　Observation

4.1　Uganda Communications Commission is in charge of managing the entire frequency ranges and services in Uganda. This provides for effective utilization and management of the spectrum.

4.2　Uganda has not published its National Frequency Table of Allocation (NFTA) in the website of Uganda Communication Commission (www.ucc.co.ug). Such an action provides inconvenience to the service providers, radio communication users and manufacturers worldwide. It also contributes to the possibilities of increasing cross border frequency interferences

Uganda Report

4.3   Uganda has frequency coordination framework for the GSM and Television digital broadcasting, which is applicable among the EAC Member states. However the entire adopted framework does not provide for preferential frequencies, shared frequencies and the register to record the results. The framework is much dwelt on administrative procedure for resolving cross border interferences.

4.4   Uganda Administrations has not indicated any radio communication frequency range, which is most facing cross border interference. However after conducting telephone interview with the focal point, FM radio has been cited as the services experiencing the most cross border interference.

4.5   Uganda has acquired necessary tools for managing the spectrum. The acquired tools include spectrum management software and fixed and mobile radio frequency monitoring stations.

5   Conclusion and Recommendations

5.1   Considering the strengths that Uganda have, that is having one body in charge of spectrum management, regional membership of EACO and ARICEA, appropriate legislation for ICT sector and ownership of necessary tools for spectrum management, it is recommended that, this project takes advantages of the mentioned strength to support Uganda and other EACO Member states to develop Harmonized calculation methods which will take into account the specifications of the existing spectrum management software of UCC and of EACO Member states.

5.2   It is recommended that this project initiate discussion with EACO and ARICEA with a view of guiding them on establishment of the coordination framework which will take into account and address issues of preferential frequencies, shared frequencies, frequency register and data exchange format. The framework   shall cover Fixed Services, Broadcasting frequency ranges for TV, FM radio and GSM/CDMA frequency ranges.

5.3   Uganda does not have coordination framework, which take into account all radio communication services. Uganda has built internal capacity to manage the spectrum. These are the National Table of Frequency Allocation, Radio frequency Monitoring equipment and appropriate legislation. The above two mentioned recommendations might be used to develop the Harmonized Calculation Method to cater for EACO and ARICEA Members.

6   Contact

The focal point is:
Geofrey Sengodo
Uganda Communication Commission

Email address: Geks_76@gmail.com
Mobile: +256772461461

7   Annex

7.1   Response to the questionnaire

Annex 1: Final response from Uganda

Uganda Report

7.2   Cross border frequency coordination agreement

Annex 2: None

7.3   National Table of Frequency Allocations

Annex 3: UGA National Table of Frequency Allocations.