Caribbean Telecommunications Union

HARMONIZED CARIBBEAN SPECTRUM PLANNING & MANAGEMENT PROJECT

Caribbean Spectrum Management Strategic Plan

2016 - 2018

Funded By:

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Caribbean Spectrum Management Task Force

Final Draft

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Together, all have helped to produce this plan through which it is hoped to assure the successful harmonisation and sustainable advancement of spectrum management expertise and practices region-wide.

LIST OF ACRONYMS

CARICOM	Caribbean Community
CBU	Caribbean Broadcasting Union
CITEL	Inter-American Telecommunications Commission
CTO	Commonwealth Telecommunications Organisation
CTU	Caribbean Telecommunications Union
DSA	Dynamic Spectrum Access
DSO	Digital Switchover
DTT	Digital Terrestrial Television
EC	Executive Council (of the CTU)
EWG	Expert Working Group
FAT	Frequency Allocation Table (NFAT – national FAT; RFAT – regional FAT)
GC	General Conference (of Ministers of the CTU)
HCSPM	Harmonised Caribbean Spectrum Planning and Management (Project)
HSM	Harmonised Spectrum Management
ICT(s)	Information and Communications Technology(ies)
IDB	Inter-American Development Bank
IMT	International Mobile Telecommunications
IoT	Internet of Things
ITU	International Telecommunication Union
PEU	Project Execution Unit
PPDR	Public Protection and Disaster Relief
SM	Spectrum Management
SMA	Spectrum Management Authority
SMSC	Spectrum Management Steering Committee
SMTF	Spectrum Management Task Force
STB	Set-top Box
TVWS	Television (TV) White Space(s)
UHF	Ultra High Frequency

Version Management

Version	Date	Edited By	Summary of Changes
Draft 1-9	5th February 2016	CTU	Baseline, with inputs from Spectrum Management Task Force Expert Working Groups
Draft 1-12	26th February 2016	CTU	Revisions based on feedback from Task Force Working Groups, CTU's internal review and input from the Secretary General, CTU. Changes include reformatting, restructuring, content rewording and refinement.
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EXECUTIVE SUMMARY

This strategic plan was developed under the auspices of the Harmonised Caribbean Spectrum Planning and Management (HCSPM) Project. It articulates a vision and mission for Caribbean spectrum management and consolidates regionally harmonised positions and strategies for the following thematic aspects of spectrum management which are critical to Caribbean Development:

- Spectrum pricing
- Frequency allocation tables
- Minimising cross border interference
- Digital broadcasting switchover and the regulation of "white spaces".

The HCSPM Project was developed and managed by the Secretariat of the Caribbean Telecommunications Union (CTU) with technical cooperation support from the Inter-American Development Bank (IDB) and Compete Caribbean (a regional development agency with which the IDB is affiliated). Altogether this support made it possible to sponsor the participation of fourteen Caribbean countries[1] in the Project while also allowing participation of non-sponsored CTU and other Caribbean countries in the work of the project.

The overall goal of the Project is to deepen the harmonisation of spectrum planning and management policies and practices across the Caribbean Region, including in areas such as white spaces and frequency reutilisation. The expected outcome is that beneficiary countries will have the necessary information and tools to deepen the harmonisation of spectrum planning and management policies and practices across the Caribbean Region. Consequent regulatory and procedural changes would ultimately result in cost reductions for mobile broadband services, thereby promoting the population's adoption and usage of broadband and the Region's advancement in the digital economy.

This strategic plan is a major output of the Project and is informed by significant research undertaken by expert consultants as well as deliberations of the members of the regional Spectrum Management Task Force (SMTF) and Spectrum Management Steering Committee (SMSC) over the 26-month period from December 2013 to February 2016. Consultancies were conducted in each of the critical thematic areas identified above in each of the fourteen sponsored countries. The recommendations from the reports of these consultancies were assessed and refined by the SMTF and SMSC and provided the foundation for this plan.

Given the vital role of wireless communications (enabled by spectrum use) in broadband development and as a key enabler of CARICOM's vision for a Single ICT Space in the region, a strategic vision, mission and priority areas for Caribbean spectrum management were articulated to provide an overall context for ongoing and future work and to underpin the provisions of the strategic plan.

[1] Antigua & Barbuda, Barbados, Belize, Dominica, Dominican Republic, Grenada, Guyana, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Suriname, The Bahamas, Trinidad & Tobago.

Vision:

A globally influential, Caribbean spectrum management regime.

Mission:

To build a regionally cohesive, technically efficient and sustainable spectrum management regime that proactively meets the region's requirements for broadband and socio-economic development and supports the establishment of a Single ICT Space in the Caribbean.

In support of the vision, the following six priorities were identified to inform interventions and actions in spectrum management in the region:

- Harmonisation
- Standardisation
- Technical Efficiency
- Capacity Building
- Regional Cohesion
- Global Influence

Guided by these imperatives, this plan identifies specific policy prescriptions, relevant strategies, key initiatives, time frames and governance frameworks for enhancing technical efficiency and harmonised approaches to the subject areas of spectrum management.

The policy prescriptions and relevant strategies are tabulated below.

Policy Theme	Policy Statements	Strategies
Spectrum Pricing	1. At a minimum, the full cost of spectrum management activities by SMAs should be recovered from all authorised spectrum users. 2. Spectrum Usage Charges should be collected from spectrum users reflecting the "highest value use" of the spectrum to the public. 3. National developmental policies should be considered in the determination of the "highest value use" of the spectrum to the public. 4. Spectrum Pricing must be guided by best practices which includes fairness, objectivity, transparency and being simple to administer.	• Establish a reform champion. • Undertake relevant legislative reform. • Engage stakeholders. • Develop appropriate national spectrum valuation regimes.

Policy Theme	Policy Statements	Strategies
Frequency Allocation Tables (FATs)	1. FATs should be fully consistent/compliant with ITU Radio Regulations Standards & Recommendations. 2. National FATs should be harmonised with the Regional FAT. 3. FATs should be reviewed and maintained as required by applying updates and upgrades to ensure data consistencies. 4. The Regional FAT should be maintained to facilitate ongoing harmonisation of national spectrum plans and support the existence of a single ICT Space.	• Ensure that services/licences are in the appropriate bands. • Make regional FAT available/accessible on-line to each Administration. • Assign responsibility and schedules for national and regional FAT maintenance and operations. • Harmonise with the objectives of the regional Single ICT Space.
Cross Border Interference	1. The authorised agencies shall establish points of contact at regulatory and diplomatic levels to address frequency coordination. 2. The authorised agencies shall update the ITU's frequency databases on a regular basis, which will encompass all frequency assignments. 3. The authorised agencies shall establish frequency coordination zones and preferential frequency band plans. 4. The authorised agencies shall establish bilateral and multilateral agreements at diplomatic and regulatory levels to address frequency management.	• Establish contact focal points at functional and diplomatic levels. • Register nationally assigned frequencies submitting to ITU MIFR if required. • Establish and follow frequency coordination processes between neighbouring countries. • Establish binding bilateral/multi-lateral frequency coordination agreements between relevant countries.
Digital Switchover & Whitespace Management	1. Caribbean countries should have a harmonized approach to determining the most suitable DTT and STB standard for their local needs. 2. A distribution model which encourages a common carrier infrastructure should be adopted. 3. Countries should create an enabling environment through which TVWS technologies can facilitate national and regional needs.	• Countries determine the most suitable DTT and STB standard for their local needs. • Develop the appropriate commercial and regulatory environment nationally to facilitate implementation of a common carrier distribution model • Harmonise spectrum allotted for TVWS technologies.

Key initiatives, activities and recommended time frames associated with each of these strategies are specified in an action plan contained herein.

Oversight of the implementation and operations of this plan will be achieved by means of a governance framework which leverages the capacity of the reconstituted SMTF and SMSC along with the resources of the CTU Secretariat, the statutory bodies of the CTU and chiefly in-kind contributions from national stakeholders. It is envisaged that full and effective management of this plan can be achieved within existing institutional capacity and no new institutions or organisations are proposed for this purpose.

Options for the ongoing financing of the work of regional spectrum harmonisation are also outlined but a more detailed treatment of the operational activities associated with this effort is addressed and contained under separate cover in the Sustainability Plan for Caribbean Spectrum Management 2016 – 2019.

1.0 BACKGROUND AND INTRODUCTION

Over the period 2006 to 2010, the CTU undertook its pioneering Caribbean Spectrum Management Policy Reform Project to modernize and enhance the policies and practices of spectrum management in the region in light of technological advances and a burgeoning demand for wireless communications. This project, which was funded by the CTU, the International Telecommunication Union (ITU), and European and Canadian and donor funds, was the first comprehensive regional initiative to address harmonised approaches to spectrum management. Through the work of the Spectrum Management Steering Committee (SMSC) and the multi-stakeholder Spectrum Management Task Force (SMTF), the governing bodies convened under this project, the following were achieved:

- Production of the Caribbean Spectrum Management Policy Framework which articulated policy objectives and prescriptions for the creation, maintenance and governance of a standardised spectrum regime in the Caribbean (This document is available on the CTU web site at <current link>
- Capacity building via multiple face-to-face and online training programmes and workshops in the areas of spectrum management and spectrum pricing;
- A report with recommendations from field audits of spectrum management practices and operations in seven (7) CTU member countries;
- Initiation of work on an indicative table of Caribbean radio frequency spectrum allocations; and
- Identification of priorities and a planned programme for future work.

The policy objectives identified in the policy framework included:

- Reform of existing policies and procedures in licensing, allocation, assignment and pricing of spectrum to reflect the evolution of wireless technologies
- Fair, efficient, transparent and non-discriminatory processes for accessing spectrum
- Harmonization of policies across the region
- Establishment of a permanent regional spectrum management advisory body, such as the Spectrum Management Task Force
- Ensuring that spectrum is available for important public purposes (e.g. law enforcement, public safety, emergency) and recognition of the social, public safety, security, privacy protection and public nuisance issues relating to its use
- Ensuring that spectrum is made available for new technologies and services, and flexibility is preserved to adapt to new market needs.

Among other things, specific recommendations were made for:

- Consistent conformance with the spectrum allocation requirements of ITU Region 2, in which the Caribbean region is located, and development of an indicative Frequency Allocation table, consistent with the ITU Region 2, for use in the Caribbean;
- Bi-lateral and multi-lateral initiatives to minimise frequency conflicts with neighbouring Caribbean states which for reasons of political structure do not at present conform to ITU Region 2 requirements;
- Common approaches to compliance and enforcement;
- Regional standards and procedures e.g. in certification of radio amateurs and GMDSS operators, in type approvals and mutual recognition agreements; and

- Adoption of common frequencies for disaster management and emergency communications as well as the adoption of relevant international protocols on emergency communications e.g. the Tampere Convention etc.

Short term objectives were also set for harmonising approaches to digital broadcasting and spectrum pricing.

The CTU has since continued working to advance its objectives for harmonising and enhancing regional expertise in spectrum management in the region, in particular through collaborations with the ITU, the Commonwealth Telecommunications Organisation (CTO), the Caribbean Broadcasting Union (CBU), the Inter-American Telecommunications Commission (CITEL) and others.

In 2013, the CTU obtained technical cooperation support for its **Harmonized Caribbean Spectrum Planning and Management Project (HCSPM Project)** from the Inter-American Development Bank (IDB) to accelerate many aspects of ongoing work in this field**.** This support was supplemented in 2014 by a similar technical cooperation with Compete Caribbean (a regional development agency with which the IDB is affiliated) which together made it possible to sponsor the participation of fourteen of the CTU's member countries while also including non-sponsored CTU and other Caribbean countries in the work of the project. Following is a list of the fourteen sponsored countries:

- Barbados
- Belize
- Dominican Republic
- Guyana
- Jamaica
- Suriname
- The Bahamas
- Trinidad and Tobago
- Antigua & Barbuda
- Dominica
- Grenada
- Saint Kitts & Nevis
- Saint Lucia
- Saint Vincent & the Grenadine

ECTEL

The overall goal of the HCSPM Project is to deepen the harmonization of spectrum planning and management policies and practices across the Caribbean Region, including in areas such as white spaces and frequency reutilisation. This goal and the associated project activities are consistent with and advance fulfillment of many of the policies and recommendations of the Caribbean Spectrum Management Policy Framework.

The key project activities include:

a. Reconstitution of the Caribbean Spectrum Management Steering Committee and Task Force, including the development of a mechanism to provide sustainability of these governing bodies;
b. Development of a regionally harmonised spectrum management plan to address minimisation of cross border interference and common approaches to digital broadcasting switchover, white spaces regulation and spectrum pricing; and
c. Development of a National Frequency Allocation Table (NFAT) for each country and a Frequency Allocation Table (RFAT) for the Caribbean. The RFAT will facilitate the adoption of common frequencies and international protocols for disaster management and emergency telecommunications.

The expected outcome is that beneficiary countries will have the necessary information and tools to deepen the harmonisation of spectrum planning and management policies and practices across the Caribbean Region. Consequent regulatory and procedural changes will ultimately result in cost reductions for mobile broadband services, thereby promoting the population's adoption and usage of broadband and the Region's advancement in the digital economy. The full scope of activities of the HCSPM Project is given in Appendix 1.

This document collates the agreed outputs from the work of the project related to activities b and c above only.

2.0 SCOPE AND METHODOLOGY

This strategic plan was developed under the auspices of the HCSPM Project and is informed by significant research undertaken by expert consultants and deliberations of the members of the SMTF and SMSC over the 26-month period December 2013 to February 2016. In order to consolidate regionally harmonised positions and strategies for specific aspects of spectrum management, consultancies were conducted in the following thematic areas in each of the fourteen sponsored countries:

- Development of common spectrum pricing principles
- Review of national frequency allocation tables and development of a regionally harmonised frequency allocation table
- Minimisation of cross border interference
- Common approaches to digital broadcasting switchover and the regulation of "white spaces".

The recommendations from the reports of these consultancies were assessed and refined by the SMTF and SMSC and provided the foundation for this plan.

It is important to note that while this plan promotes fulfillment of many recommendations of the Caribbean Spectrum Management Policy Framework, others (e.g. re certification and conformance) are outside of its scope.

3.0 CURRENT STATUS OF CARIBBEAN SPECTRUM MANAGEMENT

As a result of the work undertaken in the earlier Spectrum Management Policy Reform Project, which built the capacity and expertise of practitioners, made recommendations for enhancing Spectrum Management practices and published the Caribbean Spectrum Management Policy Framework in 2007, the quality of regulatory operations in the Caribbean has been enhanced. Management systems have been improved and automated systems for spectrum planning, licensing and compliance operations have been introduced in at least four Caribbean jurisdictions. Progress was also made towards greater harmonisation of spectrum management in the region by correcting any spectrum allocations that had been made in violation of the ITU Radio Regulations thus facilitating work towards completion of a regional table of frequency allocations. Limitations of resources however still remain as a challenge to realising the region's potential in spectrum management.

An overview of the current situation is tabulated below:

Status of Caribbean Spectrum Management	
Strengths	• Commitment from Caribbean spectrum management practitioners • Existence of SM Policy Framework to guide planning and operations • Institutional framework of SM Task Force and Steering Committee • Caribbean's numerical significance (e.g. 40% of CITEL state membership) • Ability to access donor resources
Weaknesses	• Enduring resource limitations • Limited participation in regional and international fora • Insufficient commitment to a regional focus at a political level • Lack of clear technical frameworks for harmonised action • Inconsistent Caribbean-wide implementation of policies
Opportunities	• Acceleration of movement towards a seamless Caribbean • Potential for successful influence at the global level via concerted action • Economies of scale (benefits & resources) from harmonised planning and action • Access to donor resources
Threats	• Lack of appreciation of the importance and value of spectrum, leading to inadequate commitment of resources and financing by Caribbean Governments to harmonised spectrum management • Inadequate political support for adhering to harmonised policies • Failure to adequately represent Caribbean interests and influence international decision-making • Sub-optimal costs and availability of wireless services regionally

This document and the ongoing work of the SMTF and SMSC will help to mitigate the weaknesses related to lack of clear technical frameworks and commitment to a regional focus, enabling opportunities (and attendant benefits) for concerted action to be seized.

4.0 VISION AND MISSION FOR CARIBBEAN SPECTRUM MANAGEMENT

Wireless communications (enabled by spectrum use) has a vital role to play in broadband development in the Caribbean and globally. It will also be a key enabler for the realisation of CARICOM's vision for a Single ICT Space in the region. SMTF and SMSC members therefore considered and articulated a strategic vision, mission and priority areas for Caribbean spectrum management to provide an overall context for ongoing and future work and to underpin the provisions of this strategic plan.

The ultimate vision is for the Caribbean to have and exercise an influential role, effectively promoting and protecting Caribbean interests, in spectrum management decision-making in the Americas region (where Caribbean countries count for about 40% of CITEL state members) and globally in the ITU fora. This would be achieved by enhancing and leveraging technical knowledge and expertise of Caribbean spectrum management practitioners for satisfying local/regional requirements, along with consistent participation and coordinated action by Caribbean States at the functional and political levels in international fora.

The Statements of vision and mission are given below.

4.1 VISION AND MISSION STATEMENTS

Vision:

A globally influential, Caribbean spectrum management regime.

Mission:

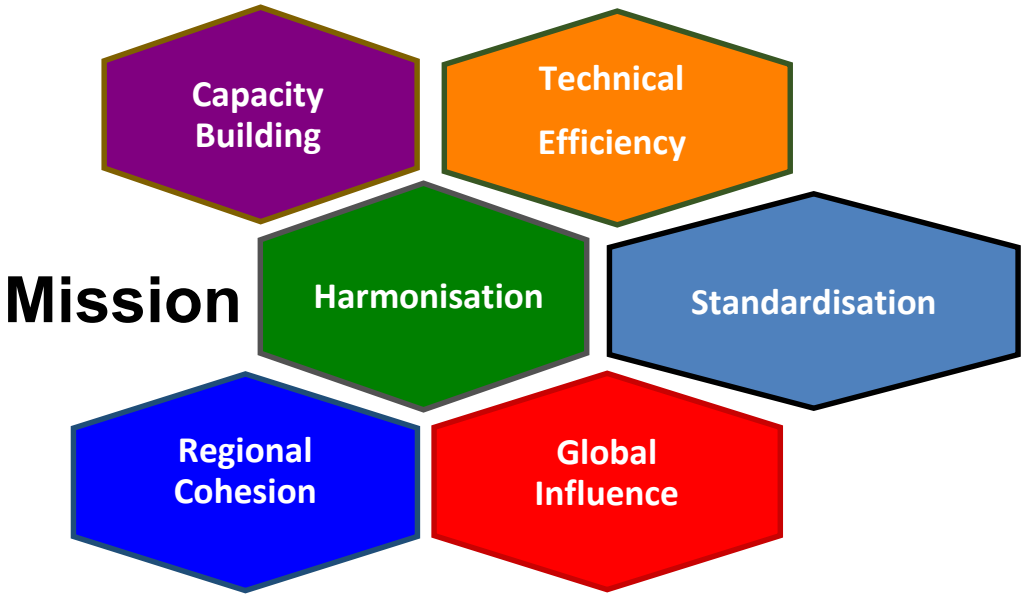
To build a regionally cohesive, technically efficient and sustainable spectrum management regime that proactively meets the region's requirements for broadband and socio-economic development and supports the establishment of a Single ICT Space in the Caribbean.

4.2 GUIDING PRIORITIES FOR THE STRATEGIC PLAN

In order to ensure the most effective execution of this strategic plan, the following priorities will guide the work to be undertaken:

- Build the technical and administrative expertise of spectrum managers
- Foster technical efficiency in the use of spectrum and verify it is used as authorised
- Encourage practical standardisation to the extent possible
- Promote harmonisation in policy and practice
- Nurture collaborative relationships to establish regional cohesion
- Promote unity and regional positions to influence the global Agenda

Figure 1: Guiding Priorities



5.0 POLICY FOUNDATION OF THE STRATEGIC PLAN

This section consolidates the policy considerations, statements and rationales derived for spectrum pricing, frequency allocation tables, cross border interference and digital switchover and white spaces. The analysis and recommendations were decided upon by the SMTF as informed by research, reports and recommendations provided by expert consultants over the period from October 2014 to September 2015.

Further details and explanations of the policy recommendations are provided in Appendix II.

5.1 CORE POLICY STATEMENTS AND RATIONALE

Policy Theme	Policy Statements	Rationale
Spectrum Pricing	1. At a minimum, the full cost of spectrum management activities by Spectrum Management Authorities (SMAs) should be recovered from all authorised spectrum users.	• To ensure that SMAs are adequately equipped to effectively manage the national spectrum resource and therefore should be able to sufficiently recover its costs. • Conforming to this global best practice will ensure that resources required for effective spectrum management are paid for by the beneficiaries of the service thus also providing a cost incentive for tempering spectrum demand or hoarding.
	2. Spectrum Usage Charges should be collected from spectrum users reflecting the "highest value use" of the spectrum to the public.	• Spectrum is a finite public resource and should be exploited in a manner that maximises the public benefit and its socioeconomic value.
	3. National developmental policies should be considered in the determination of the "highest value use" of the spectrum to the public.	• National development plans are critical indicators of the value that can be assigned to spectrum and hence the price that can be charged to ensure the requirements for national development are met. • In addition to economic factors, decisions on spectrum assignments, charges and prices must also consider the relative value of non-commercial demands and uses for spectrum e.g. for public safety purposes.

Policy Theme	Policy Statements	Rationale
	4. Spectrum Pricing must be guided by best practices which includes fairness, objectivity, transparency and being simple to administer.	• In order to ensure the most efficient use of the spectrum, the best practices that are relevant to the region's aspirations should be adopted along with any other practice developed in the region that complies with global requirements. Such approaches will engender user confidence in the work of the SMA and promote the success of the charging regime.
Frequency Allocation Tables (FATs)	1. FATs should be fully consistent/compliant with ITU Radio Regulations Standards & Recommendations.	• To ensure that the region is integrated into the global framework so that maximum benefits can be derived from global consistency.
	2. National FATs should be harmonised with the Regional FAT.	• Harmonised FATs foster economies of scale and assist in minimising cross border interference.
	3. FATs need to be reviewed and maintained as required by applying updates and upgrades to ensure data consistencies.	• To ensure global consistency and to support the Single ICT Space.
	4. The Regional FAT should be maintained to facilitate ongoing harmonisation of national spectrum plans and support the existence of a single ICT Space.	• To ensure global consistency, foster economies of scale and to assist in minimising cross border interference.
Cross Border Interference	1. The authorised agencies shall establish points of contact at regulatory and diplomatic levels to address frequency coordination.	• To ensure that information is communicated to the relevant individuals in order to facilitate prompt action, initiate escalation proceedings and trigger protocol interference management arrangements in resolving instances of unexpected harmful interference.
	2. The authorised agencies shall update the ITU's frequency databases on a regular basis, which will encompass all frequency assignments.	• To ensure currency of frequency assignments and allocations and that the region's status is accurately reflected at the international level.
	3. The authorised agencies shall establish frequency coordination zones and preferential frequency band plans.	• To facilitate spectrum pre-planning and coordination arrangements.

Policy Theme	Policy Statements	Rationale
	4. The authorised agencies shall establish bilateral and multilateral agreements at diplomatic and regulatory levels to address frequency management.	• To formalise the processes for preventing / minimising frequency interference issues and for resolving them expeditiously.
Digital Switchover & Whitespace Management	1. Caribbean countries should have a harmonized approach to determining the most suitable DTT and STB standard for their local needs.	• The determination of a standard has implications for availability and cost of equipment for the region. Ideally a single standard will result in economies of scale and ultimately savings to consumers. • To provide for the more harmonised and efficient use of spectrum. • Opportunity for harmonised reuse of digital dividend (reclaimed spectrum).
	2. A distribution model which encourages a common carrier infrastructure should be adopted.	• To avoid duplication of resources, optimise spectrum usage and reduce expenditure on infrastructure development.
	3. Countries should create an enabling environment through which TVWS technologies can facilitate national and regional needs.	• Opportunity to leverage the use of TVWS technology for deployment of valuable services, including emergency communications, broadband rural access, remote monitoring, healthcare systems, intelligent transportation systems, and smart grid and energy management systems.

6.0 STRATEGIC PLAN FRAMEWORK

Following are specific strategies formulated to fulfil the various policies enumerated above for each of the four thematic areas.

6.1 SPECTRUM PRICING

STRATEGY: 1

A critical success factor for any policy implementation is to have a Champion to ensure the successful completion and adoption. A suitable Champion acts as a driver for policy implementation and the achievement of initiatives therein. An appropriate governance model will also be necessary to guide the successful policy implementation.

Appoint a Reform Champion

A person or entity responsible to ensure the successful realization of the policies.

KEY INITIATIVES

Develop a governance model to champion the implementation of initiatives.

Identify person or entity to drive the spectrum pricing reform, for a regional perspective.

Develop a coordination framework to monitor and evaluate successful completion of initiatives.

OUTCOMES AND BENEFITS

Governance structure for policy implementation.

Identification of Champion to drive policy implementation.

Proper monitoring and evaluation to confirm successful implementation.

STRATEGY:2

Spectrum pricing and associated spectrum fee regimes are normally enshrined in relevant legislation and associated regulations. Therefore, any change in policies related to spectrum pricing would usually result in the need to review the existing legislative and corresponding regulatory framework. Legislative reform, although it may be lengthy, is a defined process in Government and will be a pre-requisite to the implementation of new spectrum management policies.

Undertake Legislative Reform

Review and amend relevant legislation and regulations to effect policies.

KEY INITIATIVES

Conduct Legislative Review, in view of policy statements.

Develop enabling legislation and attendant regulations to effect policy statements.

Develop Cost Recovery Mechanism.

OUTCOMES AND BENEFITS

Revised enabling legislation and attendant regulations based on new spectrum pricing policies.

Legal and regulatory framework that promotes initiatives related to the implementation of spectrum pricing policies.

Greater independence in the operation of the SMA.

A more robust legislative and regulatory framework to manage the national spectrum resource more efficiently and effectively.

STRATEGY:3

Stakeholders in the Telecommunications and Broadcasting Industry are key participants in the realization of spectrum pricing policies, as they are the spectrum users. Any change in policy will require consultation with relevant stakeholders in order to educate and confirm suitability.

Conduct Stakeholder Engagement

Collaboration with relevant stakeholders towards successful implementation of initiatives.

KEY INITIATIVES

Identify Stakeholder Groups.

Develop Framework for Awareness, Engagement and Collaboration with Stakeholder groups.

OUTCOMES AND BENEFITS

Stakeholder involvement, via consultation, in the spectrum pricing reform process.

Effective and transparent regulatory process. Transparency requires that the basis on which fees are calculated should be made clear in a published document resulting from consultation with stakeholders and that all fees should be set based on a published schedule.

STRATEGY: 4

Spectrum should be allocated to the highest value use or uses to ensure maximum benefits to society are realized. Mechanisms should be put in place to enable and encourage spectrum to move to its highest value use. Spectrum valuation is an approach to the determination of the appropriate value for spectrum used for different purposes.

Develop Spectrum Evaluation Procedures

Development of appropriate spectrum pricing regimes for the national spectrum resources.

KEY INITIATIVES

Classify National Spectrum resources.

Develop Valuation Methodologies

Develop Fee Regime.

OUTCOMES AND BENEFITS

A fee regime that appropriately reflect the value of spectrum.

A fee regime that balances simplicity against the requirement to encourage efficiency of spectrum use.

Increase in the use of spectrum.

6.2 FREQUENCY ALLOCATION TABLES

STRATEGY: 1

To be able to create a frequency allocation plan that can be synchronized with the region, the local plan must be revised to allow this to happen. The following must be considered and carried out to be able to accomplish the strategy.

Ensure that services/licences are in appropriate bands

Identify any anomalies by comparison of current allocation with the current ITU RR's

Develop a strategy to correct the anomalies

Create a new NFAT compliant with the ITU allocations in conjunction with Licensees

Set a deadline to realize the activation of a new FAT

KEY INITIATIVES

Establish a team to identify and prioritize areas for change in existing FAT (PPDR, IMT)

Consult key stakeholders on changes

Take cognisance of the objections/comments/concerns

Implement Plan (taking into consideration stakeholders' concerns/comments and the ITU Radio Regulations)

OUTCOMES AND BENEFITS

Updated NFATs for each country in the Caribbean Region

Synchronized RFAT for the Caribbean Region

Ease of allocation of spectrum for Service Providers across the Caribbean Region

Ease of maintenance of the Harmonized NFATs and the RFAT across the Caribbean Region.

STRATEGY: 2

Harmonization also requires availability/accessibility to all parties concerned in order to be able to maintain the synchronization.

Make the RFAT available/accessible on-line to all administrations

This can be accomplished if the following key points are developed:

Establish the RFAT and respective countries' NFAT electronic database;

Make RFAT electronically accessible by each country;

Train and deploy personnel in the operation and maintenance of FATs;

Harmonise NFAT with RFAT on a continuous basis.

KEY INITIATIVES

The strategy's success will best be accomplished if the following initiatives are developed and put into practice:

Establish a team to identify and prioritise areas for change between the NFAT and RFAT

Liaise with Regional Coordinator/Administrator to identify areas of harmonization

Update the NFAT as required

OUTCOMES AND BENEFITS

On establishment of the above key initiatives it's expected that the resulting outcomes and benefits will be derived as follows:

The application process for spectrum assignments across the Caribbean Region becomes easier;

Service Providers will be able to plan their networks utilizing spectrum assignments across the Caribbean Region;

The ease of establishing faster rollout of communications networks across the Caribbean Region;

The relative ease of replication of spectrum for incoming service providers across the Caribbean Region.

STRATEGY: 3

To ensure assignment of ownership for ongoing maintainance and upkeep once synchronization is achieved.

Assign Resources for FAT Maintenance and Operations

A person or entity responsible for consistent maintenance of the FAT at the national and regional levels, must be assigned.

KEY INITIATIVES

Arrange for appropriate training for potential staff and identify suitable staff to maintain the FAT

Identify the appropriate reporting mechanism that includes dates of revision

Establish reporting mechanism and frequency

OUTCOMES AND BENEFITS

Trained resources across the Caribbean Region in Harmonized Spectrum Management

Standardized mechanisms and performance measure to support HSM in Caribbean Region

Updated NFATs and RFAT across the Caribbean Region

STRATEGY: 4

To strengthen the case for harmonisation by associating it with the Single ICT Space.

Ensure alignment with the objectives of the Single ICT Space

The establishment of the Single ICT Space calls for a harmonised ecosystem of legislation, regulations, standards, networks and practices across the region. Harmonisation of spectrum management principles and practices will ultimately contribute to its successful implementation.

KEY INITIATIVES

Establish a team to work with the coordinator of the single ICT space initiative.

Jointly identify the possible impacts of the FAT operations/existence on the Single ICT Initiative.

The FAT team will take all the necessary actions to achieve the agreed/required outcomes.

OUTCOMES AND BENEFITS

Harmonization in NFATs and an RFAT which supports a single ICT space for the Caribbean Region.

HSM across the Caribbean Region to support Regional ICT and Regional Service Provision.

Strengthening of the HSM functions across the Caribbean Region to support a single ICT space.

6.3 CROSS BORDER INTERFERENCE

STRATEGY: 1

To establish a framework, via peer to peer contacts, between neighbouring countries to proactively address spectrum management and coordination issues

Establishing Focal Contact Points

Focal points of contact are essential in ensuring that information is communicated in a timely manner to the relevant individuals in order to facilitate prompt action, initiate escalation proceedings and trigger protocol interference management arrangements in preventing/resolving instances of unexpected harmful interference.

KEY INITIATIVES

Identify focal points of contact at diplomatic and regulatory levels, and technical working groups.

Identify communications protocols i.e. how information is going to be exchanged.

Identify and prioritize issues for resolution.

OUTCOMES AND BENEFITS

Better coordination and collaboration between neighbouring countries to proactively address spectrum management and interference issues.

Minimisation of harmful interference disputes.

STRATEGY: 2

To establish a fully populated national frequency assignment database, register the frequencies assigned with the ITU and share frequency assignment register data between/among signatory countries for effective spectrum planning.

Establish Frequency Registration

KEY INITIATIVES

Periodically update the national frequency database with frequency assignments.

The ITU Master Frequency Register shall be updated periodically with frequency assignments.

Share Frequency assignment register with signatory countries.

Frequency assignment register shall be transparent and accessible by signatory countries.

Capacity building with respect to cross border frequency coordination and assignment of frequencies in border areas.

OUTCOMES AND BENEFITS

Better coordination and collaboration between neighbouring countries to proactively address spectrum management and interference issues.

Minimisation of harmful interference disputes.

Harmonisation of frequency assignment within the agreed coordination zone.

Capacity building in cross border frequency assignment and coordination.

STRATEGY: 3

To establish procedures, processes and documentation for efficient frequency coordination between neighbouring countries

Implement Frequency Coordination Procedures

KEY INITIATIVES

Neighbouring countries shall coordinate frequencies through a notification process before assignment of frequencies.

Perform periodic monitoring schedules to test for irregularities.

Neighbouring countries shall implement a reporting mechanism for allocated frequencies and irregularities.

Develop notification forms for coordination of frequency assignment and reporting of irregularities.

Develop procedures for preliminary coordination and announcing/solving interference.

OUTCOMES AND BENEFITS

Harmonised coordination process for the collaboration of frequency assignment.

Avoid and remedy harmful interference.

STRATEGY: 4

To establish a legally binding agreement or memorandum of understanding that encompasses all agreed outputs concerning frequency coordination.

Institute Coordination Agreement

Effective bilateral or multilateral agreements on frequency use in border areas that will aid in long-term strategic planning to promote efficient spectrum utilisation and help avoid harmful interference.

KEY INITIATIVES

Neighbouring administrations establish coordination agreements which should include:

The exchange of appropriate/relevant frequency assignment data from a national database;

A means of resolving instances of unexpected harmful interference;

Procedural mechanisms such as the establishment of a Coordination zone;

Identify station technical parameters to be exchanged e.g. antenna height, cell size, cell cluster configuration, frequency plan, etc.

Draft guidelines for cross-border interference.

Adopt rules for harmonised spectrum planning and frequency allocations;

Identify different approaches for cross border coordination and arbitration;

Establish coordination zone delimitation lines of each country;

Develop agreed calculation methods, terrain database format and establish field strength limit values as could be easily verified within the coordination zone.

OUTCOMES AND BENEFITS

Draft guidelines for managing and resolving cross-border interference.

Coordination agreements specifying administrative and technical procedures

6.4 DIGITAL SWITCH OVER & WHITE SPACE MANAGEMENT

STRATEGY: 1

To enable countries to determine the most suitable DTT standard taking account of their local context, with consideration of innovation in support of regional needs.

Adopt Appropriate Technical Standards

In order to achieve the policy statement regarding the adoption of technical standards each jurisdiction must address the related challenges identified in the DSO investigations by the consultants. Additionally the countries are presented with unique opportunities to adapt current technologies in innovative ways to meet diverse local needs. In addition to a harmonized approach to standard selection, there are opportunities for harmonization of solutions adopted to allow for flexibility across countries. In particular, platforms such as software-defined radio allow for flexibility, economies of scale and futureproofing of solutions. In the current economic climate there is also tremendous opportunity for innovation. It is for this reason that the strategy takes account of regional contexts and encourages the development of the regional electronic product manufacturing industry. Thus the following strategy and initiatives address the challenges outlined in this respect.

KEY INITIATIVES

Develop and promote an evaluation tool to encourage a harmonised approach to assessment of standards and potential migration strategies.

Develop a framework (i.e. legislative & regulatory instruments) to promote regional activity focussing on the manufacture and support of consumer electronic equipment (telecoms & ICT) to meet regional needs through innovation.

OUTCOMES AND BENEFITS

Each jurisdiction will have access to a best practice resource which will provide assistance during the process of deciding upon DTT or STB standards and migration strategies.

Each jurisdiction will have access to instruments which can be adapted to their local requirements.

There will be an increased push towards the emergence of a regional electronic product development industry, with associated economic and social benefits.

STRATEGY: 2

To enable countries to develop an appropriate commercial and regulatory environment to facilitate the implementation of the common distribution model

Create an Enabling Environment

Coming out of the report the enabling environment for the digital switchover was a prime concern. Various facets were discussed in addition to the choice of technical standards. In particular the enabling environment should address issues relating to negative perceptions regarding different business models, as well as the appropriate regulatory and commercial framework required to encourage the switchover and support current stakeholders in the process of leveraging potential business models within this space. Addressing these would further incorporate a switch-over roadmap. Throughout the process, multi-stakeholder engagement and confidence, and awareness are essential to the success of this strategy. It is also noted that aspects of other initiatives in other thematic areas (e.g., the role of a champion for each process, or coordination of activities including NFATs and RFATs) are essential for the success of these initiatives. The resulting strategy and key initiatives outlined in the following address the noted concerns, additionally drawing on initiatives outlined in other areas:

KEY INITIATIVES

For multi-broadcaster markets, establish a multi-stakeholder entity (i.e. at the national level) composed of various broadcasters to ensure diverse broadcaster interests are met.

Develop the relevant frameworks (i.e. legislative & regulatory instruments) for a harmonised approach (i.e. regionally) to spectrum allocation and assignment to common carriers as well to govern the signal distributors.

Develop a protection framework to address harmonised price regulation, as well as dispute and arbitration mechanisms for content and carriage service providers.

Investigate technical challenges and economic model and disseminate through an awareness campaign.

OUTCOMES AND BENEFITS

Each jurisdiction will have flexibility in the implementation model adopted, based upon the broadcast market structure and size.

Traditional and emerging broadcasters/content developers/content distributors will have increased confidence in operating in the new environment (if a different environment is adopted for the switchover).

Stakeholders will have increased confidence in the adopted commercial and regulatory framework, particularly those in multi-broadcaster environments due to safeguards provided through the enabling framework.

Associated benefits of economies of scale and fairness are achievable through the adoption of the common distribution model.

STRATEGY: 3

To enable countries to make the necessary provisions for a harmonised approach to allocate a portion of spectrum for TVWS technologies

Establish a TV-White Space Enabling Environment

In order to be proactive in dealing with spectrum issues, it is essential that regulators and policy makers be aware of developments in the space. This is also true for TVWS, as it is the focal point for many investigations and trials globally. The region has not utilized much of the spectrum, and opportunities exist for many innovations to address various needs. Therefore the strategy presented focuses upon stakeholder awareness, at the local and regional levels. Additionally, an appropriate regulatory framework with accompanying infrastructure must be developed and implemented to allow for experimentation in the space regionally. This would allow for identifying innovative solutions while allowing for tremendous regulatory flexibility in managing the prime spectral real-estate offered by the whitespace. The initiatives therefore focus upon stakeholder engagement and awareness, as well as the deployment of the currently adopted geo-database infrastructural approach for investigating TVWS opportunities. The geo-database would allow for increased regulatory awareness and control of whitespace management, as a model for future spectrum management of various bands.

KEY INITIATIVES

Develop the relevant frameworks for a harmonised approach (i.e. regionally) to spectrum allocation and assignment within the TVWS bands.

Create a regional database as well as supporting processes to support flexible management of services which leverage TVWS (and other) bands.

Develop an awareness campaign to promote regional innovation, research and development around the use of TVWS, DSA and other emerging technologies to meet regional needs (e.g. broadband rural, PPDR).

OUTCOMES AND BENEFITS

There would be harmonization of allocations and assignments, particularly for services of importance in the region (e.g., PPDR, rural broadband).

Each jurisdiction will have access to a best practice resource which will provide assistance for those countries which wish to experiment with or deploy a TVWS database in the future.

There would be increased regulatory flexibility to dynamically manage spectrum resources and policymakers will also have increased flexibility through the adoption of dynamic spectrum access principles, such as that offered through whitespace technologies.

Associated benefits of increased flexibility through the use of geolocation database functionality in the TVWS or other bands in which these technologies are deployed would create associated end-user benefits through increased flexibility.

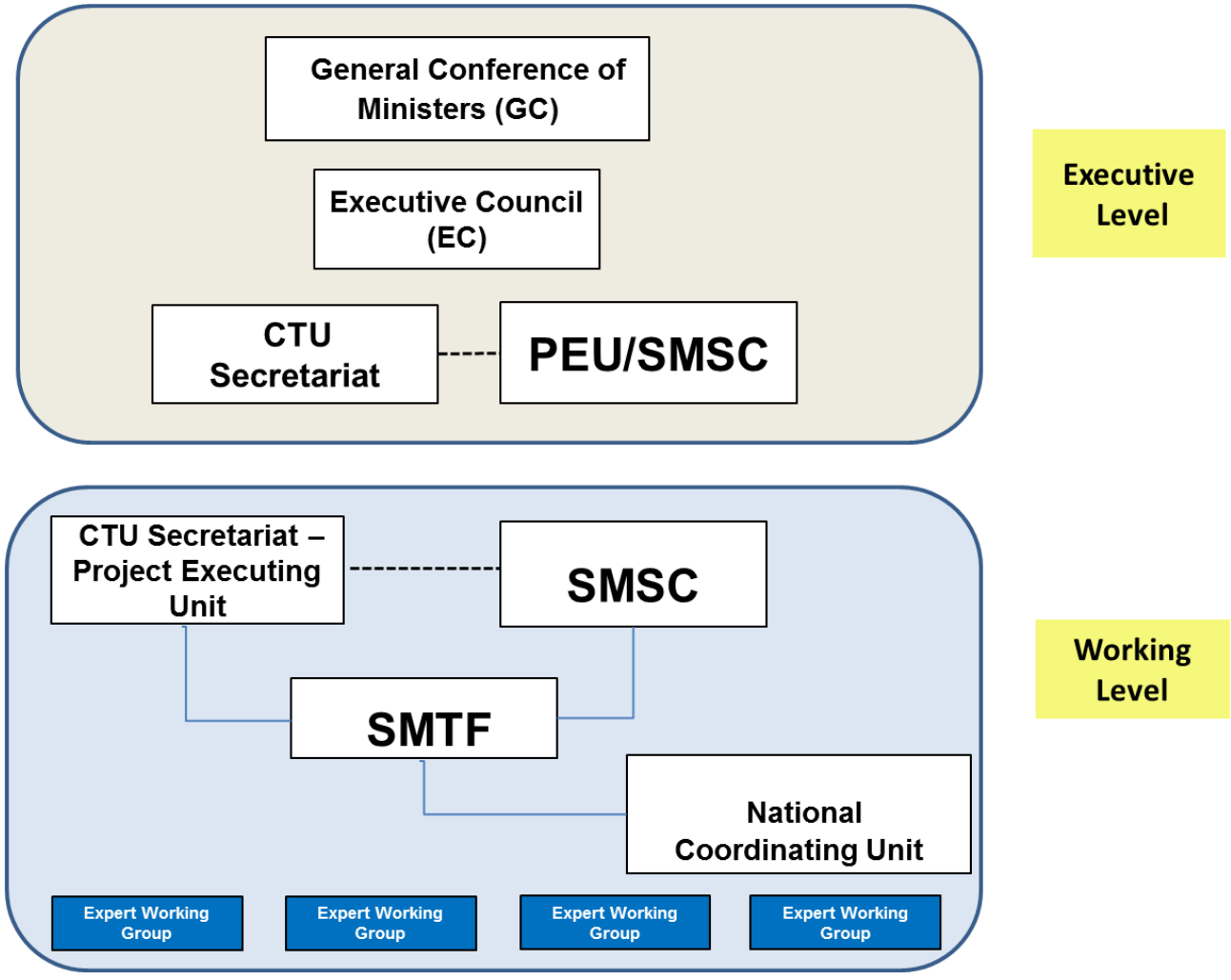
There would be increased innovation in the use of sub-3GHz spectrum regionally.

There would be an increased push towards the emergence of a regional electronic product development industry, with associated economic and social benefits.

7.0 GOVERNANCE FRAMEWORK

The Governance Structure and processes outlined in this section are designed to facilitate the effective implementation of the Spectrum Management Strategic Plan; focus on coordinating and driving the successful planning and execution of key initiatives, programmes and projects identified in the Plan; and provide a framework for approving, decision making and escalation, as well as identify key functional units within the various beneficiary jurisdictions with the responsibility to drive the regional and national level coordination, planning and implementation of the specific initiatives.

However, it is envisaged that governance of implementation of the plan can be successfully achieved within the ambit of existing institutional frameworks of the CTU and the spectrum harmonisation project structure, as illustrated and explained further below.



Stakeholder	Roles & Responsibilities
CTU Conference of Ministers (GC)	• provide strategic direction towards realizing the Vision • highest approving and decision-making body that oversees and drives the implementation of the Plan • drive the development and adoption of major projects within the region • oversee the progress of implementation
CTU Executive Council (EC)	• ensure that beneficiary governments' efforts are aligned and coordinated~~,~~ • ensure policies are adhered to and adequate resources are in place, in order to support the successful implementation of all major initiatives • report to the Conference of Ministers on the implementation • resolve operational project issues, review findings and recommendations from the CTU Secretariat provided on an ongoing basis • review performance of various initiatives through the tracking of Key Performance Indicators (KPI's)
CTU Secretariat (CTU SEC)	• support and coordinate the work of the various entities under the Governance Structure • coordinate the work of the executing agencies, to include a policy and research function, monitoring and evaluation, and administration • coordinate and integrate efforts across the various programmes of the Plan, and ensure alignment with other regional harmonisation efforts in realising the Single ICT Space • identify and address gaps and areas of overlap between the various programmes of the Plan and other regional initiatives • provide progress reports to the EC on the status of implementation • resolve issues escalated from project working level or escalate to EC as required

Stakeholder	Roles & Responsibilities
Spectrum Management Steering Committee (SMSC)	• provide direction and guidance for the execution of the programme • decide on actions required on issues that have been escalated by the Task Force or PEU
CTU Secretariat - Project Executing Unit – Facilitator (CTU-PEU)	• perform administrative and logistic functions to coordinate implementation of programmes under the Strategic Plan • coordinate work of the National Coordination Units • manage implementation project plans • work closely with the SMTF and SMSC in the execution of the Strategic Plan • monitor and review programme progress
Spectrum Management Task Force Members (SMTF)	• act as focal points/liaisons in the various jurisdictions in interfacing with the national stakeholders • work with CTU in regional coordination of technical issues and implementation activities • work with EWGs – provide guidance as needed
National Coordinators (ideally the SMTF or SMSC member)	• drive the national level coordination, planning and implementation of the specific initiatives • work closely with the PEU of the CTU Secretariat in: • planning and the execution of the project, and managing the performance and quality of assigned tasks • developing and designing of the project deliverables • tracking project statuses, risk management, and escalate project issues that cannot be resolved at the national level • facilitating meetings and discussions with stakeholder groups • managing project resources for maximum efficiency and effectiveness • securing endorsement of project recommendations and approval of project deliverables from Steering Committee
Expert Working Groups (Ad Hoc)	• Provide expert advice and technical support in the implementation of projects

8.0 FINANCING FRAMEWORK

Several options were identified for securing financing for the various initiatives identified under the Strategic Plan. These are described in more details below.

OPERATIONALISE CERTAIN ASPECTS OF THE PLAN

Some of the initiatives identified in the Strategic Plan, particularly those related to processes and procedures can be implemented as part of the ongoing operational work of the spectrum management authority in the individual jurisdictions. These areas may include the establishment of the national FATs, formulation and adoption of recommended frameworks and protocols to manage cross border interference and white space management and regulations.

REGULATORS

It is suggested that regulators, as part of their annual fiscal planning, consider the inclusion of the resources required to undertake certain aspects of the work laid out in the Strategic Plan. It is recognised that the respective national governments could significantly aid this initiative by adopting policies that serve to institutionalise this recommendation.

INDUSTRY ASSOCIATIONS

Industry stakeholders may be disposed to make direct contributions to various strategic initiatives perceived to be in their best interest. For example, pan-Caribbean operators may see possible economy of scale benefits in harmonising their mobile spectrum assignments across multiple countries and, through their industry associations, could be willing to subsidise research, consultations or logistical expenses associated with developing and implementing appropriate policies, legislation or regulations.

NATIONAL GOVERNMENT ADMINISTRATIONS

Governments are perhaps one of the major stakeholders in the management and use of spectrum. Governments also generate a significant amount of revenues from the collection of spectrum usage licensing fees. A recommendation was put forward for Governments to make provisions for a small portion of these revenues to be utilized to facilitate the more efficient and effective management and use of this asset.

OPERATORS

A recommendation was also put forward for operators, as part of their ongoing spectrum usage fees, to be required to provide funding to assist in the administration and management of the spectrum resource. The mechanism for the establishment and collection of these fees would need to be determined and developed by the regulator.

GRANT FUNDING

The Harmonized Caribbean Spectrum Planning and Management Project (HCSPM Project) was funded through technical cooperation agreements with the IDB and Compete Caribbean (a regional development agency). It is anticipated that funding for the implementation phase of recommendations arising from this project can be afforded through similar arrangements with these or other like agencies.

9.0 ACTION PLAN

Strategic Theme	Strategy	Key Initiative	Outputs/Deliverables	Key Performance Indicator	Implementation Timeframe											
					YEAR 1				YEAR 2				YEAR 3			
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Spectrum Pricing	1 **Assignment of a Reform Champion: A person or entity responsible to ensure the successful realization of the policies**	i. Develop A Governance Model to Champion the Implementation of Initiatives.	Governance structure for policy implementation	Appropriate Governance model developed.												
		ii. Identify person or entity to drive the spectrum pricing reform, from a regional and national perspective.	Identification of Champion to drive policy implementation	Champion(s) identified												
		iii. Develop a coordination framework to monitor and evaluate successful completion of initiatives.	Proper monitoring and evaluation to confirm successful implementation	Monitoring and Evaluation Process implemented												
	2. **Enact Legislative Reform: Necessary amendments to relevant legislation and regulations to effect policies**	i. Conduct Legislative Review, in view of policy statements.	Report of Legislative Gap and Relevant Recommendations to Realize Policies.	Report submitted and approved.												
		ii. Develop enabling legislation and attendant regulations to effect policy statements.	New or revise Spectrum Pricing legislation and attendant regulations for implementation.	New or revised legislation enacted, along with attendant regulations.												
		iii. Develop Cost Recovery Mechanism.	New or revised cost recovery legislation.	New or revised legislation enacted												
	3. Promote Stakeholder Engagement: Collaboration with relevant stakeholders towards successful implementati	i. Identify Stakeholder Groups.	List of Relevant Stakeholders	All relevant stakeholders identified.												
		ii. Develop Framework for Awareness, Engagement and Collaboration campaign for Stakeholder groups	Stakeholder involvement in the spectrum pricing reform process	Active stakeholder participation in reform process.												

	on of initiatives.																
	4. Implement Spectrum Valuation Mechanisms: Development of appropriate spectrum pricing regimes for the national spectrum resources.	i. Classify National Spectrum resources.	Classification Table for Usable Spectrum	Appropriate Table developed													
		ii. Develop Valuation Methodologies.	Appropriate method(s) for the Assessment of Usable Spectrum	Appropriate Method(s) developed													
		iii. Develop Fee Regime.	A Fee Regime that balances simplicity and efficient use of spectrum	Increase in revenues and spectrum use.													

Strategic Theme	**Strategy**	**Key Initiative**	**Outputs/Deliverables**	**Key Performance Indicator**	**Implementation Timeframe**											
					YEAR 1				**YEAR 2**				**YEAR 3**			
					Q1	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Frequency Allocation Tables	**Ensure that services/licenses are in the appropriate bands**	**i.** Establish a team to identify and prioritize areas for change in existing FAT (PPDR, IMT)	Updated NFATs for each country in the Caribbean Region Synchronized RFAT for the Caribbean Region Easy allocation of spectrum for Service Providers Easy maintenance of the Harmonized NFATs and the RFAT	Completed Report from consultants outlining prioritized areas to be changed.												
		ii. Consult key stakeholders on changes		Receipt of stake holder comments.												
		iii. Take cognizance of the objections/comments/concerns		Public Consultation												
		iv. Implement Plan (taking into consideration stakeholders' concerns/comments and the ITU RR's		Implementation of Plan.												

Strategic Theme	**Strategy**	**Key Initiative**	**Outputs/Deliverables**	**Key Performance Indicator**	**Implementation Timeframe**											
					YEAR 1				**YEAR 2**				**YEAR 3**			
					Q1	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Frequency Allocation Tables	**RFAT available/accessible online to administrations**	**i.** Establish a team to identify and prioritize areas for change between the NFAT and RFAT	Easier application process across the Caribbean. Service Providers better able to plan networks across region. Faster rollout of communications networks. Ease of replication of spectrum for new service providers	Identified team to conduct review. Report outlining changes.					■							
		ii. Liaise with Regional Coordinator/Administrator to identify areas of harmonization		Report from Regional SMAs on harmonization concerns.						■						
		iii. Update the NFAT as required		Completion of update.							■					
Frequency Allocation Tables	**Assign responsibility for FAT maintenance and operations**	i. Arrange appropriate training for potential staff	Trained resources across the region in Harmonised Spectrum Management Standardized mechanisms and performance measure to support HSM. Updated NFAT and RFAT.	Completed list of training courses.		■										
		ii. Identify suitable staff to maintain FAT.		Completed list of staff.	■											
		iii. Identify reporting mechanism which includes date of revision.		Completed reporting mechanism.		■										
	Find out objectives of Single ICT Space.	i. FAT team to take necessary actions to achieve agreed/required outcomes	Harmonisation in NFATs and RFAT supports single ICT space in the region. HSM across the region supports regional ICT & Service Provision.	Report on harmonisation of NFATs & RFAT with Single ICT Space.									■			

			Strengthening of HSM functions to support Single ICT space.														

Strategic Theme	Strategy	Key Initiative	Outputs/Deliverables	Key Performance Indicator	Implementation Timeframe											
					YEAR 1				YEAR 2				YEAR 3			
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Cross Border Interference	**Focal Contact Point**	i. Identify focal points of contact at diplomatic and regulatory levels, and technical working groups.	Better coordination and collaboration between neighboring countries to proactively address spectrum management and interference issues	Appointed focal point person and alternate (Diplomatic & Regulatory)												
		ii. Identify communications protocols i.e. how information is going to be exchanged.		Correspondence exchange												
		iii. Identify and prioritize issues for resolution.		Schedule Meetings												
			Minimization of harmful interference disputes.	Adoption of protocol /procedure to resolve interference dispute.												
	Frequency Registration	I. The national frequency database shall be updated periodically with frequency assignments	Obtain a list of all authorised frequency(ies) and technical parameters 0f the station	Establish register of authorised frequency and station parameters.												
		II. The ITU Master Frequency database shall be updated periodically with frequency assignments.														
		III. Share Frequency assignment register with signatory country.		Establish an agreed procedure for Sharing and accessing information frequency assignment in the coordination zone												

		IV. Frequency assignment register shall be transparent and accessible by signatory countries.	Harmonisation of frequency assignment within the agreed coordination zone.														
		Capacity building with respect to cross border frequency assignment and coordination	Capacity building in cross border frequency assignment and coordination	Workshop													
Strategic Theme	**Strategy**	**Key Initiative**	**Outputs/Deliverables**	**Key Performance Indicator**	**Implementation Timeframe**												
					YEAR 1				**YEAR 2**				**YEAR 3**				
					Q1	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	
	Frequency coordination	I. Neighboring countries shall coordinate frequencies through a notification process before assignment of frequencies.	Harmonised coordination process for the collaboration of frequency assignment.	Adoption of notification form for exchange of frequency assignment and allocation between countries													
				Adoption of complain form for filing interference complaint between countries.													
		II. Perform periodic monitoring schedules to test for irregularities.		Adoption of a reporting structure to be exchange between countries													
		III. Neighboring countries shall implement a reporting mechanism for allocated frequencies and irregularities.	Avoid and remedy harmful interference	Set periodic monitoring schedules and generate report													
		IV. Develop notification forms for coordination of frequency assignment and reporting of irregularities															
Strategic Theme	**Strategy**	**Key Initiative**	**Outputs/Deliverables**	**Key Performance Indicator**	**Implementation Timeframe**												
					YEAR 1				**YEAR 2**				**YEAR 3**				
					Q1	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	
	Coordination Agreement	i. Neighbouring administrations establish coordination agreements which should include:	Bilateral or multilateral agreements on frequency use in border areas that will aid a long-term strategic planning to promote efficient spectrum	Consult stakeholders													

		ii. the exchange of relevant frequency assignment data from a national frequency assignment database;	utilisation and help avoid harmful interference.														
		iii. a means of resolving instances of unexpected harmful interference;															
		iv. procedural mechanisms such as the establishment of a Coordination zone															
		v. Identify station technical parameters to be exchanged e.g. antenna height, cell size, cell cluster configuration, frequency plan, etc.		Demarcate coordination zone													
		vi. Draft guidelines for cross-border interference.		Setting technical parameters within the coordination zone.													
		vii. Adopt rules for a harmonised spectrum planning and frequency allocation		Draft and adoption of Bilateral or multilateral agreements.													
		viii. Identify different approaches for cross border coordination and arbitration.		Signing Bilateral or multilateral agreements.													
		ix. Establish coordination zone delimitation of each country,															
		x. Establish field strength limit values as they could easy check within the coordination zone.															
Strategic Theme	**Strategy**	**Key Initiative**	**Outputs/Deliverables**	**Key Performance Indicator**	**Implementation Timeframe**												
					YEAR 1				**YEAR 2**				**YEAR 3**				
					Q1	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	

Digital switchover and TVWS Management	**Harmonized approach to technical standard selection**	i. Develop and promote harmonized evaluation tool	Best practice guide available to assist countries in DSO strategy planning	Of countries adopting the guide													
			Awareness campaign (regionally)	Of countries selecting DTT and STB standards													
			Increased stakeholder awareness of DSO (nationally)	Quality and amount of consultation interactions													
				Stakeholder awareness of DSO at national level													
			National DSO migration plans	Countries having developed and published migration plans.													
		ii. Develop legislative and regulatory framework for electronic product manufacture	Recommendations for legislative and regulatory reform for countries	Country satisfaction with recommendations													
			Promotion of recommendations (nationally)	Stakeholder satisfaction with recommendations at the national level													
			Promotion of recommendations (nationally)	Stakeholder satisfaction with recommendations at the national level													

Strategic Theme	**Strategy**	**Key Initiative**	**Outputs/Deliverables**	**Key Performance Indicator**	**Implementation Timeframe**											
					YEAR 1				**YEAR 2**				**YEAR 3**			
					Q1	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Digital switchover and TVWS Management	**Environment for common distribution model in multi-broadcaster markets**	i. Establish multi-stakeholder entity composed of various broadcasters	Stakeholder groups formed	Of countries with groups formed.												
			Stakeholder groups meeting	Of countries with group meetings underway												
		ii. Develop legislative and regulatory framework for harmonized approach to govern in common carrier infrastructure	Recommendations for legislative and regulatory reform for countries	Country satisfaction with recommendations												
			Promotion of recommendations (regionally)	Countries adopting recommendations												
			Promotion of recommendations (nationally)	Stakeholder satisfaction with recommendations at the national level												

		iii. Development of protection framework addressing price regulation and dispute resolution and arbitration mechanisms	Recommendations for protection framework developed for countries	Country satisfaction with recommendations													
			Promotion of recommendations (regionally)	Countries adopting recommendations													
			Promotion of recommendations (nationally)	Stakeholder satisfaction with recommendations at the national level													
		iv. Investigate technical challenges and economic model and disseminate through an awareness campaign	Report on investigation	Country satisfaction with report													
			Awareness campaign (regionally)	Stakeholder satisfaction with recommendations at regional level													
			Awareness campaign (nationally)	Stakeholder satisfaction with recommendations at the national level													

Strategic Theme	Strategy	Key Initiative	Outputs/Deliverables	Key Performance Indicator	Implementation Timeframe											
					YEAR 1				YEAR 2				YEAR 3			
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Digital switchover and TVWS Management	**Harmonized approach to planning and management of TVWS**	Develop framework for harmonized approach to regional spectrum allocation and assignment in TVWS	Recommendations for protection framework developed for countries	Country satisfaction with recommendations												
		Create national geo-databases	National databases created	of countries with deployed databases												
			Awareness campaign (regionally)	Stakeholder satisfaction with recommendations at regional level												
			Awareness campaign (nationally)	Stakeholder satisfaction with recommendations at the national level												
		Encourage TVWS innovation through awareness campaign	Pilot studies for different TVWS uses	# of studies proposed / RFPs												

			Awareness campaign (regionally)	# of (funded and unfunded) investigations underway													
			Awareness campaign (nationally)	# of (funded and unfunded) investigations underway													

APPENDIX I PROJECT DESCRIPTION

HARMONISED CARIBBEAN SPECTRUM PLANNING AND MANAGEMENT

PROJECT DESCRIPTION

The objective of the Project is to deepen the harmonization of spectrum planning and management policies and practices across the Caribbean Region, including in areas such as white spaces and frequency reutilization. The project has six (6) main **outputs /activities:**

Activity 1 – Reconstitution of governing bodies
This involves the Reconstitution of the Caribbean Spectrum Management Steering Committee and Task Force comprised of representatives from governments (policy and law makers), telecommunications regulatory bodies and from the private sector (including telecommunications providers, business associations and banks).

Activity 2 – Design of mechanisms to provide sustainability to the governing bodies
Develop a study on possible funding mechanisms aiming at the sustainability of the Caribbean Spectrum Management Steering Committee and Task Force.

Activity 3 – Frequency band analysis
Assessment and evaluation of current national frequency band plans. This activity will also include the analysis of the National Frequency Allocation Table (NFAT) for each country, through the carrying out of surveys and the collection of frequency usage information.

Activity 4 – Development of a harmonized regional spectrum management plan
Development of a regional plan with regionally harmonized recommendations. This activity comprises the development of: (i) a framework to minimize cross border interference between beneficiary countries; (ii) a harmonized technical and policy approaches for the digital switchover; (iii) a proposal for white spaces management and regulation; and (iv) an assessment of common pricing principles and methods for determining pricing values.

Activity 5 – Frequency band proposal
Development of the National Frequency Allocation Table (NFAT) for each country, through the carrying out of surveys and the collection and collation of frequency usage information and development of a Regional Frequency Allocation Table (RFAT) for the Caribbean.

Activity 6 – Program Management
All activities related to the management of the project. This includes the Programme Manager, Administrative support, CTU Project Execution Unit, External Audit and Final Project Evaluation.

PERFORMANCE MEASURES AND KEY INDICATORS

Results Statement	Indicator	Y1 Target	Y1 Actual
Intermediate Outcome			
Improved and regionally harmonized regulatory and Procedural frameworks	Indicator 1: Number of countries which have accepted the recommendations of the agreed spectrum management plan	14	-
	Indicator 2: number of physical and/or virtual meetings of a functioning and sustainable Spectrum Management Steering Committee and Task Force	5	5
Immediate Outcome			
Prioritized national-level actions to streamline, harmonize, and/or improve regulations and procedures in telecommunications, especially related to broadband.	Indicator 1: Number of countries endorsing the strategic and implementation plan for spectrum management and committing to Follow-up actions. (Strategic Plan to be developed in October 2015)	14	-
	Indicator 2: No. of countries endorsing a harmonized regional frequency allocation table and committing to implementing compliant national FATs (Final Report and Recommendations on FATs to be finalized in August 2015)	14	-
Output 1. Reconstitution of Spectrum Management Steering Committee and Task Force	Number of bodies reconstituted	2	**2**
Output 2. Study on possible funding mechanisms	Number of studies developed	1	0
Output 3 A National Frequency Allocation Table (NFAT) for each country and a	Number of tables developed	14	8 (partially populated)

Results Statement	Indicator	Y1 Target	Y1 Actual
Regional Frequency Allocation Table (RFAT) for the Caribbean.			
Output 4. Strategic Regional Spectrum Management Plan, prepared to ensure regional regulatory harmonization taking into account specific national circumstances and requirements.	Number of the following frameworks developed: (i) mitigation of interference problems; (ii) harmonized technical and policy approaches for the digital switchover; (iii) harmonized regional frequency allocation table; (iv) spectrum pricing policy; and (v) proposal for white spaces management and regulation. (vi) Number of Agreements in place	6	6 (- draft frameworks and recommendations developed - 1 draft agreement developed between OECS and French territories)
Activity 1 Establish: (i) regional Management Steering Committee; and (ii) Spectrum Management Task Force	Number of meetings held	2	**2**
Activity 2 Study on possible funding mechanisms	See output 2	1	0 (A draft sustainability action plan was developed)
Activity 3 Frequency Band Analysis	Number of frequency plans analyzed (one per country)	14	14
Activity 4 Development of a Strategic Regional Spectrum Management Plan	(i) Number of consultations with stakeholders and the Spectrum Management Steering Committee and Task Force. (ii) Report Review & Capacity building workshops See Output 4 above.	4 4	4 (Feb, April, July & Dec 2014 meetings) 4 (March, June , July)
Activity 5 Frequency Band Proposal	See Output 3 above.	-	-

APPENDIX II POLICY FOUNDATION OF THE STRATEGIC PLAN

This Appendix consolidates the policy considerations and statements derived for each of the four thematic areas of relevance to this plan viz. spectrum pricing, frequency allocation tables, cross border interference and digital switchover & white spaces. The analysis and recommendations were decided upon by the SMTF as advised by research, reports and recommendations provided by expert consultants over the period from October 2014 to September 2015.

Core Policy Objectives and Corresponding Policy Statements

Spectrum Pricing

Radio spectrum can be an extremely valuable and often scarce natural resource with a multitude of uses and major contributions to economic and social development, while helping to ensure national and civil security. It is not an exaggeration to say that modern economies depend on fully developed and robust wireless communications capabilities.

Spectrum values are determined (obtained or estimated) through a market exchange mechanism or administrative mechanisms. Similarly, spectrum prices can be set through an administrative process such as establishing a fee schedule where those willing to pay accept prices or alternatively, prices can be established by way of a market mechanism such as an auction. The value and price for spectrum during a given time period can be influenced by a number of factors including: geography, competition amongst potential users, advances in technology, the present value of cash flows derived from a particular service over time, and the general economic climate.

Spectrum values are therefore reflective of the benefits to be gained by society from its best use whereas spectrum prices are representative of spectrum value obtained through some form of market exchange or set by authorities.

The practice of charging a price for the right to use radio spectrum is based on the premise that radio spectrum has value and there are also costs associated with its management. Resulting spectrum prices are very important to government and regulators by potentially raising significant revenues that reflect an economic rent from private use of a public resource and by recovering the costs of managing spectrum.

In the development of suitable Policy statements in the area of Spectrum Pricing, reference was drawn from the recommendations arising out of the Consultant's Report in this area. Additionally, discussions amongst the Spectrum Management Task Force (SMTF) aided in the development of the following policy statements:

Policy Statement 1 – Cost Recovery plus

In order to ensure that a Spectrum Management Authority (SMA) is adequately equipped to effectively manage the national spectrum resource, it should be able to sufficiently recover its costs. All the SMA's activities are as a result of, directly or indirectly, the manner in which spectrum is used. Some key SMA activities include mitigation of harmful interference, spectrum planning and keeping abreast (training) of emerging wireless technologies. Naturally, these costs should be recovered from all the spectrum users, as the SMA operates as the custodian of the national spectrum resource. All Spectrum users include both non-government and government users.

1. At a minimum, the full cost of spectrum management activities by SMA's should be recovered from all authorized spectrum users.

Conforming to this global best practice will ensure that resources required for effective spectrum management are paid for by the beneficiaries of the service thus also providing a cost incentive for tempering spectrum demand or hoarding.

Policy Statement 2 – Maximizing Public Benefit from the Value of Spectrum

Separate from the SMA's cost of operation, the cost associated with the value of the spectrum resource should also be considered. The value of spectrum is fluid, as it is influenced by available technologies, national economic considerations and demand. It should be noted that spectrum has a different worth to different users. Therefore, being a public resource, spectrum should be priced based on its value and the highest value for the spectrum resource should be explored.

2. Spectrum Usage Charges should be collected from spectrum users reflecting the "highest value use" of the spectrum to the public.

Economic factors should be taken into account in determining charges/prices to be applied for exclusive commercial use of spectrum

Policy Statement 3 – Satisfying National Developmental Needs

The National spectrum resource is a critical resource of the country. However, the most important resource for a country is its people (human resource) and the needs of its people must be considered in the use and pricing of spectrum. Notwithstanding the intent to seek the highest value use for the national spectrum resource, due consideration would be needed to ensure that national developmental policies/initiatives, which may require spectrum use, are met.

3. National developmental policies should be considered in the determination of the "highest value use" of the spectrum to the public.

In addition to economic factors, decisions on spectrum assignments, charges and prices must also consider the relative value of non-commercial demands and uses for spectrum e.g. for public safety purposes.

Policy Statement 4 – Best Practice Principles

The operations of an SMA should employ common, best practice principles in all aspects of the work undertaken (including pricing) to manage the national spectrum resource and, by extension, spectrum users. Such principles are fairness, objectivity, transparency and simple-to-administer processes. These should be adopted and demonstrated by SMAs that operate within central government in particular.

7. Spectrum Pricing should be guided by best practices which include fairness, objectivity, transparency and being simple to administer.

This will engender user confidence in the work of the SMA and promote success of the charging regime.

Frequency Allocation Tables

The frequency allocation tables (FATs) specify which radio-communication services may be allocated/operated in each band (or range) of frequencies. These allocations are administered globally and regionally by treaty via the ITU Radio Regulations and direct frequency allocations, allotments and assignments at the national level. The policy statements stem from the need to ensure that national FATs adhere to national spectrum policies yet follow international best practice and the ITU frequency allocation tables for ITU Region 2 (Americas, including the Caribbean). Policies must support roaming and mitigate interference, promote efficient usage and yet be flexible enough to accommodate new technologies and public protection and disaster relief. Harmonization in the Caribbean will reduce cross-border interference yet promote cost-efficiency on spectrum allocation.

Policy Statement 1 - Compliant

1. FAT's should be fully consistent/compliant with ITU Radio Regulations Standards & Recommendations

Policy Statement 2 - Harmonised

2. National FAT's should be harmonised with the Regional FAT

Policy Statement 3 – Maintained

3. National FAT's need to be reviewed and maintained as required by applying updates and upgrades to ensure data consistencies

Policy Statement 4 – Facilitate Single ICT Space

4. The Regional FAT should be maintained to facilitate ongoing harmonisation of national spectrum plans and support the existence of a single ICT Space.

Cross Border Interference

A country has a sovereign right to access its radio frequency spectrum. However, it is understood that for countries that are in geographical proximity, they are likely to be affected by harmful radio frequency interference from neighbouring territories given that radio waves propagate across borders.

In addition to complying with the ITU Radio Regulations, in order to effectively minimise the possibility and severity of cross border interference, there must be some mutually agreed coordination rules between Caribbean territories that are in close geographical proximity.

To do so, the following policies should be established by authorised agencies of each country/territory:

Policy Statement 1: Establishing Focal Points of Contact

1. The authorised agencies shall establish points of contact at regulatory and diplomatic levels to address frequency coordination.

Policy Statement 2: Registration of Frequency Assignments

2. The authorised agencies shall update the ITU's frequency databases e.g. Master International Frequency Register (MIFR), on a regular basis, which will encompass all frequency assignments.

Policy Statement 3: Establishing Coordination Zones

3. The authorised agencies shall establish frequency coordination zones and preferential frequency band plans.

Policy Statement 4: Establishing Bilateral and Multilateral Agreements

4. The authorised agencies shall establish bilateral and multilateral agreements at diplomatic and regulatory levels to address frequency management.

Digital Switchover & Whitespace Management

Globally many jurisdictions are in the process of switching over to digital television, particularly for reclaiming spectrum through more efficient use of the UHF band (470 – 790 MHz). In conjunction with this development, the reclaimed spectrum (digital dividend) is being evaluated in many countries for various uses, applications and services such as broadband rural access, emergency communications and others. While the issues of spectrum congestion and the growing demand for spectrum were key drivers for these developments globally due to high cable TV penetration in many countries, in the Caribbean spectral congestion in the UHF (TV) band was determined to be a minor (often non-existent) issue. However, as a result of the global work to-date vis-a-vis digital switchover and consequent developments in whitespace management technologies, is the ability to promote innovation in the use of whitespaces (i.e., unused portions of the UHF band) to create novel, dynamic and cost-effective applications (e.g., for rural broadband or national and regional emergency communications), which would be of value to Caribbean territories.

Given the importance of this emerging area and global thrusts into whitespace and dynamic spectrum access, the policies are focussed on developing a harmonised approach to digital switchover and whitespace management including addressing current challenges surrounding technical standards, appropriate business models and commercial and regulatory arrangements in the jurisdictions.

Policy Statement 1 – Technical Standards for Digital Terrestrial TV (DTT) and Set-top Boxes (STBs)

Across the region, some jurisdictions currently run different digital TV standards, and others are at various stages of the switchover process. While jurisdictions should be free to choose their DTT and STB standards, there should be a harmonised approach to the process of selection and implementation. This would allow for meeting the diverse needs taking account of local market conditions in each jurisdiction.

1. Caribbean countries should have a harmonised approach to determining the most suitable DTT and STB standard for their local needs.

Policy Statement 2 – – Digital Switchover Enabling Environment (Infrastructure, Business Models, Regulatory and Commercial Framework)

Various distribution models are possible across the region, given practical considerations related to market structure and size, as well as other local contexts. Appropriate regulatory interventions may also be necessary to safeguard the interests of multiple stakeholders, particularly the traditional broadcasters, emerging broadcasters and the public sector. Stakeholders however need to evaluate and adopt new business models to support their transition.

Based on research undertaken, a common carrier distribution model which separates the players into network (distribution) service providers and content providers (new model for broadcasters) could optimise spectrum usage and expenditure on infrastructure. In the interest of harmonisation, countries should consider the development of roadmaps for the transition, even if there is no pressing need to effect the change at present. Recent reports and work of the CTU's HCSPM Project as well as ITU handbooks on the switchover process may be used to guide development of appropriate roadmaps.

2. A distribution model which encourages a common carrier infrastructure should be adopted.

Policy Statement 3 – TV White Space (TVWS) Enabling Environment

Across the region, a considerable portion of the TV bands is available, whether or not countries switch over to DTT. This presents a unique opportunity for the region to determine how this available spectrum can be leveraged for regional needs. Many trials are currently going on across the world to provide valuable use cases for TVWS technology. These include emergency communications, broadband rural access, remote monitoring, the Internet of Things (IoT), healthcare systems, intelligent transportation systems, and smart grid and energy management systems. In order to support such activities, it is essential that an appropriate regulatory framework is in place. Additionally, as demonstrated through various recent global investigations, currently the dynamic spectrum access approach which underlies TVWS technology, requires the establishment of a geo-location database.

Through this database the regulator has knowledge and remote control over licensed and secondary users of TVWS at all times. This approach transcends the TV band as DSA is the basis for its usage, which allows for dynamic and flexible access to any bands of interest. The approach additionally allows for regulatory flexibility, since regulators and policy-makers can logistically make changes through control of the database. Given the tremendous opportunities for innovation, stakeholders should be made aware of the potential and should be encouraged to leverage TVWS technologies for addressing regional needs. This should further be guided by the framework of regional spectrum harmonization initiative. This forms the basis for the policy statement below:

3. Countries should create an enabling environment through which TVWS technologies can facilitate national and regional needs.

Policy Statements Summary Table

Policy Theme	Policy Statements
Spectrum Pricing	1. At a minimum, the full cost of spectrum management activities by SMA's should be recovered from all authorised spectrum users. 2. Spectrum Usage Charges should be collected from spectrum users reflecting the "highest value use" of the spectrum to the public. 3. National developmental policies should be considered in the determination of the "highest value use" of the spectrum to the public. 4. Spectrum Pricing must be guided by best practices which includes fairness, objectivity, transparency and being simple to administer
Frequency Allocation Tables	1. FATs Should be fully consistent/compliant with ITU Radio Regulations Standards & Recommendations 2. National FATs should be harmonized with Regional FAT 3. FATs need to be reviewed and maintained as required by applying updates and upgrades to ensure data consistencies 4. The Regional FAT should be maintained to facilitate ongoing harmonization of national spectrum plans and support the existence of a single ICT Space
Cross Border Interference	1. The authorised agencies shall establish points of contact at regulatory and diplomatic levels to address frequency coordination. 2. The authorised agencies shall update the ITU's frequency databases on a regular basis, which will encompass all frequency assignments. 3. The authorised agencies shall establish frequency coordination zones and preferential frequency band plans. 4. The authorised agencies shall establish bilateral and multilateral agreements at diplomatic and regulatory levels to address frequency management.
Digital Switchover & Whitespace Management	1. Caribbean countries should have a harmonized approach to determining the most suitable DTT and STB standard for their local needs. 2. A distribution model which encourages a common carrier infrastructure should be adopted. 3. Countries should create an enabling environment through which TVWS technologies can facilitate national and regional needs.

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