Roadmap for Digital Broadcasting Migration Implementation

25 November 2011
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<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>ARICEA</td>
<td>Association of Regulators for Information and Communications in Eastern and Southern Africa</td>
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<tr>
<td>BTH</td>
<td>Broadcasting to Handheld</td>
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<td>COMESA</td>
<td>Common Market for Eastern and Southern Africa</td>
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<td>DAB</td>
<td>Digital Audio Broadcasting</td>
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<td>DTH</td>
<td>Direct To Home</td>
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<td>DTT</td>
<td>Digital Terrestrial Television</td>
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<td>DVB</td>
<td>Digital Video Broadcasting</td>
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<td>DVB-H</td>
<td>Digital Video Broadcasting Handheld</td>
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<td>DVB-S</td>
<td>Digital Video Broadcasting Satellite</td>
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<td>DVB-T</td>
<td>Digital Video Broadcasting Terrestrial</td>
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<td>EACO</td>
<td>East African Communications Organization</td>
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<tr>
<td>EPG</td>
<td>Electronic Programme Guide</td>
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<td>HDTV</td>
<td>High Definition Television</td>
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<tr>
<td>iDTV</td>
<td>Integrated Digital Television</td>
</tr>
<tr>
<td>ITU</td>
<td>International Telecommunication Union</td>
</tr>
<tr>
<td>MPEG2</td>
<td>Motion Pictures Expert Group Video Compression Standard 2</td>
</tr>
<tr>
<td>MPEG4</td>
<td>Motion Pictures Expert Group Video Compression Standard 4</td>
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<tr>
<td>SADC</td>
<td>Southern African Development Community</td>
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<tr>
<td>SIMULCAST</td>
<td>Simultaneous Broadcasting</td>
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<tr>
<td>SMS</td>
<td>Subscriber Management System</td>
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<tr>
<td>STB</td>
<td>Set Top Boxes</td>
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<tr>
<td>T-DAB</td>
<td>Terrestrial Digital Audio Broadcasting</td>
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<tr>
<td>T-DMB</td>
<td>Terrestrial Digital Multimedia Broadcasting</td>
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<td>WATRA</td>
<td>West African Telecommunications Regulators Assembly</td>
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1. Introduction

This document outlines a regional roadmap for digital transition for the members of the Association of Regulation of Information and Communication of Eastern and Southern Africa (ARICEA). Digital broadcasting uses frequency more efficiently and produces better quality video and audio than analogue broadcasting. The transition from analog to digital terrestrial broadcasting has been agreed at the international levels with switchover date set to June 2015.

The transition from Analog to digital broadcasting brings a number of benefits including to COMESA countries including:

- Increased choice and quality for viewers (as there will be more channels and the opportunity to provide a better image, including wide-screen aspect ratio, high definition and sound quality);
- Lower transaction costs or the ability to transmit more channels or services for the same cost. Broadcasters will no longer have to incur the costs of transmitting signals in both formats (simulcasting), releasing sources for investment in programming and other services for consumers;
- Better efficiency in spectrum use (as more data can be transmitted within the same bandwidth). Spectrum will be released to allow the development of more television and other services for consumers.
- Promotion of universal access to information. Digital terrestrial television signals are expected to reach the population who live in areas that cannot currently receive them because of spectrum limitation;
- The ability to transmit associated data allowing for enhanced television or fully interactive applications when associated with a return-path facility.

However, these benefits are not without costs. Digital migration requires a considerable amount of planning because it demands that consumers switch to digital TV or purchase Set Top Boxes (STBs) that convert digital signal to analog signal; broadcasters upgrade transmission and studio equipment and governments create incentives that stimulate the uptake of digital broadcasting.

Broadcast signals have no boundaries; therefore there is a need for cross-border coordination and frequency harmonization at the regional levels. Regional cooperation in frequency spectrum, harmonization of standards and synchronization of roadmaps is important in order to benefit from the economy of scale. The need for regional coordination is derives from:

- The transnational nature of spectrum management,
- The economy of scale that can be achieved through coordination of switchover dates and harmonization of standards that in turn have implications to the prices of the Set Top Boxes,
- The importance of knowledge exchange and information sharing,
- Capacity building needs can be aggregated and implemented at the regional levels.
Regional cooperation is essential for collection, sharing and distribution of information between Members States including regular reports on national roadmaps and strategies and for arranging public workshops at which representatives from member States can discuss and provide guidance on best practices.

This roadmap provides a guide on regional coordination in these areas and how best to migrate from analogue to Digital Terrestrial Television. It discusses key policy, regulatory and operational issues that allow the Common Market for Eastern and Southern Africa (COMESA) countries meet the international digital migration deadline of 17 June 2015. The recommendations draw on the Southern African Development Community (SADC) digital migration roadmap, the Eastern African Community digital transition roadmap and the recommendations of the West African Telecommunications Regulators Assembly (WATRA).

2. Goals and Objectives of the Roadmap

The main goals of the digital migration are to enhance choice, interactivity and quality of broadcasting for the benefits of citizens and to reap the social and economic benefits of spectrum efficiency (digital dividend). The specific objectives of the migration are to:

- Develop harmonised policies and regulations regarding digital broadcasting migration,
- Identify technical standards for digital broadcasting for the region,
- Develop regional and national frequency band plans for the provision of the digital broadcasting services in the COMESA Member States,
- Develop licensing framework for awarding the digital dividend,
- Implement an agreed schedule for digital migration covering Digital Switch On, Dual Illumination and Analogue Switch off,
- Ensure equal participation of all stakeholders including consumer participation to the migration process,
- Ensure effective and adequate human capacity development in digital broadcasting.

3. Roles of Stakeholders

Digital migration involves a wide range of stakeholders including government, regulators, service providers, equipment manufacturers and consumers that play diverse roles.

Role of Government

- Governments have a leading role in developing policies and roadmaps for accelerated digital migration and ensuring that consumers have the necessary support in order to benefit from digital broadcasting. Government needs to:
○ Put appropriate institutional, policy, legislative and regulatory framework to enable smooth execution of migration process within the set time,
○ Provide fiscal incentives to enable consumers procure Set-Top Boxes and digital TV receivers at affordable prices, preferably through tax waivers and subsidies,
○ Provide appropriate incentives and support for signal distributors and broadcasters to put in place necessary digital infrastructure and systems, and
○ Support the development of local content.

Role of Regulators

Regulators in the ARICEA countries will have a key role in setting the desired licensing frameworks, ensuring level playing field in broadcast services, signal distribution, spectrum allocation and cross-border regulation and in maintaining the requisite standards. Regulators need to:

○ Allocate digital broadcasting spectrum based on the provisions of ITU region 1 and other regional plans,
○ Coordinate spectrum management with neighboring countries to avoid interference so as to ensure a smooth transition process,
○ Institute appropriate measures for ensuring safe disposal of disused analogue equipment to minimize adverse impact on the environment,
○ Adopt digital broadcasting standards based on international recommendations and define the minimum standards/specifications for the Set-Top Boxes in line with international standards, and
○ Promote consumer education and awareness.

Role of Broadcasters and Signal Distributors

Broadcasters have a critical role in rolling out of digital broadcasting networks and services. Broadcasters need to:

○ Enhance content development taking the digital environment into the account,
○ Invest in studio and production equipment to facilitate the production of digital content,
○ Build the capacity of human resources to adopt the new digital broadcasting skills, and
○ Provide better technology for storage, processing and sharing of digital content.

Signal distributors play a major role in signal distribution, infrastructure development and operation. They need to:

○ Ensure carriage of signals from the studio to the distribution and transmission sites,
○ Broadcast the signal to the designated areas, and
○ Provision of quality services to broadcasters on an equitable, reasonable, non-preferential and non-discriminatory basis.
Role of Equipment Manufacturers

- Equipment manufacturers and vendors have a key role to assurance of the key adherence to the required and approved standards of equipment and hindrance to dumping of e-waste of analogue broadcasting equipments.
- The equipment manufacturers and other private sector can also play a critical role in financing research and development and supporting the migration process.

Role of Consumers and Consumer Associations

Consumers are critical in the uptake of digital terrestrial television by purchasing Set-Top Boxes or integrated digital TV receivers in order to receive digital terrestrial transmission,

The consumer associations’ commitment and involvement is critical for the provision of universally accessible digital broadcasting services and the inclusion of people with disabilities and special needs in the accessing the new broadcasting services. They have also roles in guarding against consumer exploitation through unfair market practices.

Role of Regional Organizations

COMESA has a key role in convening the ministers responsible for broadcasting, mobilization of resources for capacity building and in support of the harmonization of policies, frequency allocation and standards.

ARICEA has a major role in creating the platform for regional coordination and knowledge sharing, policy harmonization, capacity building and the implementation of the roadmap for digital migration.

4. Action Plans

4.1. Institutional Arrangement

The migration from analog to digital is a long term process that requires the involvement of key stakeholders. The following institutional arrangements are proposed for smooth transition for analog to Digital Terrestrial Television at national and regional levels:

- A national steering committee drawn from relevant ministries and agencies represented by Ministers and Directors,
- National multi-stakeholders forums aimed at increasing awareness of the importance of digital broadcasting,
- A national Digital Terrestrial Television migration project office with adequate resources to facilitate smooth transition,
• Annual regional multi-stakeholders forum aimed at increasing information exchange and sharing of experience on the implementation of digital migration.
• Technical working groups that are established under the auspices of ARICEA to address spectrum management (digital dividend), licensing and specification for STBs, among others.

4.2. Creation of an Enabling Environment

Policy makers have a major role in developing a national strategy and plan for transition from analog to digital broadcasting with clear timetables and regulatory provision for licensing, spectrum planning and the effective use of digital dividend. The following actions should be taken by policy makers to facilitate smooth transition from analog to digital terrestrial broadcasting in COMESA Member States:

• A policy based approach for digital migration with a shorter dual illumination period and firm national shut off-date should be adopted. The Analog Switch Off (ASO) date for COMESA is set to June 2014. Countries that have agreed to the SADC and EAC frameworks should observe the dates that were established by their respective regions.

• To maximize the utilization of broadcast infrastructure and improve on the quality of content creation, it is recommended that a new broadcast model, which separates the functions of the Broadcaster (Content Provider), and the Broadcasting Signal Distributor be adopted,

• The number of signal distributors should be minimized. Countries should license more than one signal distributor in order to facilitate competition.

• In order to maximise the existing broadcast infrastructure, it is recommended that the existing and massive broadcast transmission infrastructure owned by Governments of respective countries should form the backbone for the new broadcasting signal distributor, which must be able to absorb the transmitting infrastructure of other existing broadcasting stations. Such stations will have to negotiate commercial terms for transfer of ownership of their infrastructure to the new Broadcasting Signal Distributor. The broadcasting regulator should be given the responsibility in guiding the process of valuation of this equipment.

• Policy makers should ensure that signal distribution should be provided by independent network operators. In the case where the broadcaster carries out both content and multiplexing, all broadcast stations should be unbundled so as to separate the broadcaster’s function from the signal distribution function,

4.3. Digital Migration Policy and Strategy

Digital Migration Policy

COMESA Member States should have policy document that addresses the key public interest issues of digital migration. The policy document should outline decisions with regards to
transition process and timetable, licensing, spectrum management and government incentives for enhancing affordability of digital receivers and Set Top Boxes, among others.

**Digital Migration Strategy**

The digital migration strategy that draws on the policy document should discuss the rationale for digital migration, standards, policy and regulatory interventions, the transition plan and other challenges and opportunities concerning the industry and consumers.

The policy and strategy papers should be developed by all COMESA Member States by April 2012. These documents should be available to stakeholders including content providers, signal distributors, consumers, equipment manufacturers and others. (An outline of digital migration strategy is attached as an annex.)

**4.4. Licensing and Competition**

The following actions should be undertaken by COMESA Member States with regards to licensing and competition:

- Broadcasting license should be given within the context of convergence licensing framework, wherever possible,

- Infrastructure sharing should be a key element of the licensing regime;

- COMESA Member States should consider two major licenses in the broadcasting sector – content service and network services (multiplexing).

- The number of signal distributors should be limited. It is preferred that countries license two signal distributors. In the case where two or more signal distributors are licensed, there should be interoperability between signal carriers.

- For countries with single distributor, tariff regulation is recommended, to ensure application of cost-based tariffs while for multiple distributors, competition rules should apply together with sector regulation on facilities sharing, co-location and access to sites.

- Countries that opt for a single signal distributor should encourage public and private partnership, where the signal distributor is established as an independent entity (corporate agency) to service both public and private broadcasters.

- There should be Service Level Agreements (SLA) between the signal distributor and content provider that will be submitted to the regulator, applicable for all parties.

- In view of the need for investment, the licensing framework should include incentives such as the duration of licenses, waiver of taxes. The duration of broadcast license is usually five years.
while for signal distribution is often 15 years considering the high capital cost for the infrastructure.

- The roll out targets should set for the signal distributor; and there should be equal access to the signal carrier by content service providers to ensure competition.

- New channels as part of the digitization process should be introduced appropriately to strike a balance between the efficient utilization of radio frequency spectrum and needs of consumers;

- Where necessary COMESA Member States may limit competition during the dual illumination period (moratorium on new licenses); countries may not charge for digital frequencies during the dual illumination period.

- COMESA Member States should introduce the necessary spectrum pricing models taking the social and economic opportunities of the spectrum into the account. Spectrum allocations and fees should ensure effective spectrum use.

- Frequency license should be made to signal distributor.

- The freed spectrum needs to be returned to the nation as the digital dividend.

- Public broadcasting needs to continue in digital broadcasting scenario as a base for informed and socially relevant content. Government may also like to continue to finance public broadcaster; and wherever appropriate public broadcasters may be licensed to provide signal distribution. However, this should not create an obstacle to competition. If public broadcaster is licensed to provide signal distribution, its content and multiplexing functions should be unbundled. A public and private partnership model that creates a new independent entity should be explored.

4.5. Spectrum Planning and Allocation

- The transition from analogue to digital broadcasting will result in changes in spectrum usage allowing excess freeing capacity that creates a spectrum dividend to the Government. In order to achieve this, it is recommended that governments should revisit the assignments in the ITU GE-06 Plan and optimize the assignments using a range of frequency planning tools and the latest propagation techniques.

- The assignment of the frequency in COMESA countries should be within the framework of the ITU GE-06 Plan for region 1. The national frequency plan should be updated based on regional and international agreements.

- Any modification of bands III, IV and V of GE06 plan should be coordinated with neighboring countries and with subsequent filing with the ITU.
• Spectrum should be coordinated to eliminate harmful interference between COMESA Countries.

• There is a need for cooperation between neighboring countries with regard to licensing of transmitters located at geographical borders.

• Member countries should consider further optimization of the broadcasting frequency after the digital switch-over;

• Consistent with the GE06 member, countries should facilitate the sharing of the band 174 – 230 MHz for DTT and T-DAB; DTT should be assigned to band (174 – 214) while T-DAB should utilize band (214-230MHZ);

  ▪ Additional bands 230–238 / 246–254 MHz can be used for DTT services as per GE06 Plan (Table A3.1 – 11).

• The transition from analogue to digital broadcasting will result in the ceding of the 790-862 MHz currently being utilized by the existing analogue broadcasters. ARECA members need to harmonize band plan for the 790 – 862 MHz and create a unified 800MHZ band for electronic communications services.

• Initial emphasis to be placed on migrating the bands 214–230 MHz and 790–862 MHz.

• Members States need to re-plan the broadcast spectrum within 470 to 790 MHz range.

• Where possible COMESA Member States should avoid making any new DTT assignments in the band 790–862 MHz unless it is for the purposes of facilitating a smooth migration process.

• Band 790 -862 MHz should be continued to be allocated for mobile services including IMT and should be used when available.

4.6. Technical standards

• In order to ensure compatibility, it is important to define the appropriate standards for digital broadcasting in the COMESA region. The approach adopted is to:

  o Identify existing digital broadcasting standards available worldwide;
  o Analyze them from a technical perspective, their compatibility with GE06 plan and with reference to individual countries and make recommendations on the choice of standards and the way forward.

Transmission Standards

• Harmonization of transmission standards is essential to achieve interoperability between systems and attain economy of scale. Lack of commonly agreed standards would be as barrier to achievement of universal access to digital television service and to the achievement of the
economies of scale in manufacturing and distribution of the equipment in the region. The following actions are therefore necessary with regards to adoption of regional standards:

- DVB-T2 should be adopted as the common standard for DTT in the COMESA region;
- MPEG 4 is recommended for compression;
- DVB-S2 standard should be considered for satellite broadcasting;
- DVB-H for mobile TV standard;
- IBOC system for use as the FM digital sound broadcast format, and
- DRM for Medium and Shortwave radio broadcast.

**Set Top Box Specifications**

- Given that DVB has been recommended as a standard on the transmission network side, it is advisable that Set Top Boxes comply with the DVB family of standards. The specification (e.g. free-to-air, conditional access, low-level entry, etc) needs to be determined as part of a broader policy discussion.

- COMESA member States should a task team to develop a regional technical specification for STBs and integrated digital TV based on experiences in SADC and other countries in Europe and Africa.

- Governments should provide appropriate incentives so as to attract potential manufacturers with a view to licensing a maximum of three (3) manufacturers of STB. Such incentives should include:
  - Tax holiday on manufacturing inputs,
  - Zero import duty on manufacturing equipment,
  - A government policy to protect the market through a moratorium on imports of similar equipment for a specified period of time,
  - Provision of sufficient infrastructure, including electricity, water etc.,
  - A maximum of three manufacturers should be allowed. It is recommended that the regulator should manage the process for the selection of the 3 manufacturers of the Set Top Boxes.

**4.7. Content Development and Regulation**

ARICEA members should consider the following with regards to content during the transition period.

- Digital content should be regulated with light touch approach,
- Channels are required to include electronic programming guide (EPG) in order to allow consumers to navigate through the available programmes,
- Governments should facilitate the establishment of local content development funds within national Universal Service Funds (USF) to enhance the development of local content,
• Capacity building in digital content production through training and apprentice programmes should be considered,

• Local content provisions should be spread across the multiplex and not focused on individual channels.

4.8. Consumer Awareness and Participation

The success of the transition programme will be determined largely by the extent to which the consumer is well informed on the key issues of the programme. It is therefore recommended that:

• Policy makers should pay particular attention to costs that are involved in the broadcasting value chain (production, transmission and reception) and ensure that costs will not be burdensome to consumers.

• Regulators in COMESA Member States should embark on continuous sensitization of the general public on the digital switchover as approved Government.

• All national and international events should be encouraged to buy into this awareness programme.

• Governments should establish multi-stakeholder forums in the mould of the Digital Kenya, Digital UK, Digital Dzonga (South Africa) to deal mainly with consumer issues such as child safety, health, environmental, quality of service, privacy, security of information and safety issues.

• Consumers should be well informed of the transition and broad availability of affordable receiving equipment.

• STBs must be affordable and easy to use.

• Government should consider putting aside resources for speeding up the digitization process. The resources can be used to:
  o Co-finance pilot trials or research projects;
  o Develop programmes and additional services with ‘digital added value’;
  o Raise public awareness on digital transmission;
  o Assist infrastructure operators and broadcasting companies to manage the simulcast phase.
  o Assist consumers who cannot afford the end-user equipment such as STBs and integrated digital televisions.

4.9. Climate Change Issues
• Digitization will inevitably result in generation of additional e-waste; which is a serious concern to climate change that should be addressed.
  
  o COMESA Member States should adopt the Switzerland model of e-waste disposal whereby all actors (manufacturers, wholesalers and retailers) are licensed,
  o A token amount (an advance recycling fee) should be charged at points of purchase of every electronic equipment, while disassembling centres are established in order to achieve an organized retrieval and safe disposal of e-waste arising from digitization;
  o All importers of transmit and receive broadcast equipment should be licensed by the Regulator as Broadcast Equipment Dealers.

4.10. Capacity Building

Capacity building is an important aspect during digital transition. Every stakeholder should be provided with the necessary skills and knowledge in order to benefit fully from the migration to digital broadcasting. National level capacity building initiative should focus on:

  o Increasing public awareness of the digital migration,
  o Enhancing the awareness of policy makers, broadcasters, media, content producers.

• COMESA need to establish a regional platform for ongoing capacity building in digital transition with focus on:

  o Creation of programes for capacity building with a focus on creating a critical mass of qualified and skilled professionals and experts in the governments, regulatory authorities, broadcasters, frequency planners, equipment resellers and public on the complex issues technical, regulatory and economic issues of digital migration,
  o Empowering people involved in the migration process through technology knowledge transfer in digital transmission technology, digital studio technologies, content development, spectrum planning, networking and applications, and
  o Creation of forums on policy and regulatory harmonization, new regulation and regional information sharing.

4.11. Implementation Schedule

Efforts should be made in promoting regional coordination in transition process by synchronizing the digital switch-on and analog switch-off dates. The digital switch-on date for COMESA member States should be set to December 2012 and digital analog switch off date of June 2014 in order to allow time to meet the global analog switch-off date of 16 June 2015.
• ARICEA member states should also coordinate pilot trials in order to share experience and address interference issues.

• Member States need to adhere to the following time table.
<table>
<thead>
<tr>
<th>No</th>
<th>Activity</th>
<th>Starting Date</th>
<th>Ending Date</th>
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<tbody>
<tr>
<td>1.</td>
<td>Set up National DTT migration Committees</td>
<td>Mid 2009</td>
<td>April 2012</td>
<td>Member States</td>
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<tr>
<td>2.</td>
<td>Stakeholder consultation</td>
<td>Mid 2009</td>
<td>Ongoing until after switch-over</td>
<td>Member States</td>
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<td>3.</td>
<td>Development of technical specifications for STBs</td>
<td>January 2012</td>
<td>April 2012</td>
<td>ARICEA Technical team</td>
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<td>4.</td>
<td>Development of harmonized frequency plans</td>
<td>January 2012</td>
<td>June 2012</td>
<td>ARICEA Technical Team</td>
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<td>5.</td>
<td>Regional and National spectrum plans and interference review</td>
<td>June 2012</td>
<td>Every six months</td>
<td>ARICEA</td>
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<td>6.</td>
<td>Consumer awareness</td>
<td>Beginning 2009</td>
<td>Ongoing until after switch-over</td>
<td>Member States</td>
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<td>7.</td>
<td>Annual DTT Forum</td>
<td>Annually in November</td>
<td>June 2015</td>
<td>COMESA Secretariat</td>
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<td>8.</td>
<td>Adoption of DTT migration strategic plan template</td>
<td>November 2011</td>
<td>January 2012</td>
<td>COMESA Secretariat</td>
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<td>9.</td>
<td>Completion of national policies and strategies plan on DTT migration</td>
<td>December 2011</td>
<td>April 2012</td>
<td>Member States</td>
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<td>10.</td>
<td>Special Session for ICT Ministers</td>
<td>May 2012</td>
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<td>12.</td>
<td>Conduct DTT trials and DSO</td>
<td>June 2012</td>
<td>December 2012</td>
<td>Member States</td>
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<td>13.</td>
<td>Dual illumination period</td>
<td>Mid to End 2012</td>
<td>End of 2013</td>
<td>Member States</td>
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<td>14.</td>
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<td>2012</td>
<td>Ongoing until after switch-over</td>
<td>COMESA/ARICEA</td>
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<td>15.</td>
<td>Analog Switch off</td>
<td>June 2013</td>
<td>June 2014</td>
<td>Member States</td>
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5. Monitoring and Evaluation

The policy recommendations put forward in this roadmap should be incorporated in digital transition strategies and action plans of COMESA Member States in order to ensure effective implementation. Monitoring and evaluation will be a key aspect of the roadmap. The implementation of the roadmap will be overseen by:
• The COMESA Secretariat that will serve as a focal point for regional implementation,
• An annual forum on digital migration

The COMESA will provide bi-annual review of the progress of digital migration by collecting data from Member States. A review sheet shown in Table 2 will be used to assess progress of countries in fulfilling the action plan. A presentation of the progress will be made at annual forums in order to urge countries that have not taken the necessary steps to do so.
<table>
<thead>
<tr>
<th>Country</th>
<th>Set up National DTT Migration Committee</th>
<th>Stakeholder consultation</th>
<th>Development and adoption of technical standards for the STBs</th>
<th>Development and adoption of a harmonized frequency plan</th>
<th>Participation in regional and cross-border spectrum and interference review</th>
<th>Consumer awareness campaigns</th>
<th>Participation in the regional form to exchange experience</th>
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<td>Participation in a special session of Ministers</td>
<td>Participation in digital dividend review</td>
<td>Conducting DTT Trials and Digital Switch on</td>
<td>Launching Dual Illumination Period</td>
<td>Monitoring and Review</td>
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Annex. Outline of a digital Migration Policy

1. Executive Summary (summary of the rationale and key policy consideration)

2. Overview
   a. Overview of digital migration
   b. Legal basis of digital migration
   c. Progress to date (task force, government commitment, initial interaction with the industry and other relevant activities)

3. The Status of Broadcasting
   a. Overview the development in broadcasting sector
   b. Legislation in the broadcasting sector
   c. Table on main milestones in the broadcasting sector
   d. Policy, legal and regulatory frameworks in the broadcasting sector
   e. Industry statistics (satellite, terrestrial, and cable broadcasting), radio
   f. Summary of global trends

4. Rationale for migration
   a. Concept of digital broadcasting
   b. Benefits of digital migration
      i. Implications to consumers
      ii. Implications to service providers
   c. Challenges of digital migration
   d. Drivers for migration
   e. Costs of digital migration (public education, STB subsidies, transmission infrastructure costs)
   f. The economic and social implications of digital migration

5. Technical standards
   a. DTT standards
   b. Receivers and Set Top Box standards
   c. Other standards

6. Policy and regulatory considerations
   a. Overall policy concerning frequencies, market structure
   b. Assessing the potential of broadcasting market
   c. Licensing framework

7. Signal distribution
   a. Introduction to signal distribution
   b. Rationale for signal distributor (s)
   c. The Public broadcaster as signal distributor
   d. Impact of signal distribution on broadcaster, public and consumer
   e. Challenges and obligations
   f. Strategies
8. Content Development and Regulation
   a. Content regulation
   b. Production of content
   c. Copy right and other issues
   d. Promotion of diversity of digital content

9. Schedule and Time Table for Digital Transition
   a. Frequency allocation
   b. Platform selection
   c. Licensing of channels
   d. New entrants
   e. Consideration for different switch off approaches
      i. Nationwide switch off
      ii. Regional phased switch off
      iii. Partial switch off
   f. Basic steps for switchover
   g. Geographic aspects of switchover
   h. Time table for digital migration
   i. Digital receiver issues
   j. Signal distribution
   k. Spectrum fees, digital dividend

10. Governance and implementation
    a. Implementation agency
    b. Policy obligation and incentives
    c. Regional cooperation and cross-border coordination
    d. Monitoring and evaluation

11. Consumer issues
    a. Consumer protection
    b. Consumer education and awareness
    c. Improving affordability and quality of broadcast services
    d. Technological obsolescence
    e. Environmental factor

12. Conclusions and recommendations
    a. Standards
    b. Policy and regulatory issues
    c. Signal distribution
    d. Content
    e. Consumer issues
    f. Post Analog Switchover Issues
## Annex II. Major Items of STB Specifications

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<tr>
<th>Item</th>
<th>Description</th>
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<tr>
<td>System</td>
<td>DVB-T2 with MPEG-4 or any other GE06 compliant equivalence. SDTV and/or HDTV only.</td>
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<tr>
<td>Conditional Access (CA)</td>
<td>No CA.</td>
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<tr>
<td>Network</td>
<td>DVB-T2 or any other GE06 compliant equivalence.</td>
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<tr>
<td>Video</td>
<td>Profiles: MPEG-4 MP@L3. PAL I/B/G modulator.</td>
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<tr>
<td>Audio</td>
<td>Support mono and stereo.</td>
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<tr>
<td>Memory</td>
<td>Enough to provide services as described. Recommend minimum of 8 MB RAM and 16 MB flash.</td>
</tr>
<tr>
<td>Middleware</td>
<td>Embedded – No royalty.</td>
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<tr>
<td>Software</td>
<td>Now and Next banner with programme information/EPG. Provide for over the air secure downloads.</td>
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<tr>
<td>Front End</td>
<td>Each COMESA Member State to determine.</td>
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<tr>
<td>Power Supply</td>
<td>Internal 160-264 Volts AC and 47-63 Hz or External AC to DC Adaptor. Over and under voltage protection (emphasis to be placed). Over heating protection.</td>
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<tr>
<td>Connections</td>
<td>IEC 60169-2. RF In – Female &amp; RF Out – Male. Audio/Video RCA or HDMI. Serial/USB port for software download.</td>
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<tr>
<td>Remote Control</td>
<td>Standard remote control. Protocol to be determined by each SADC MS.</td>
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<tr>
<td>Exterior</td>
<td>Standby functionality (with sleep mode). Volume (V+ &amp; V-) &amp; Channel change (Ch+ &amp; Ch-). One tri-colour LED indication required. Channel scan.</td>
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1 Based on SADC STB Specification
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<td><strong>Qualification</strong></td>
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