

GSMA

# Digital Switchover in Sub-Saharan Africa

Bringing Low-Band  
Connectivity Within  
Reach

October 2022



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# Executive summary

Digital switchover (DSO) allows countries to use less broadcast spectrum due to the greater efficiency of digital terrestrial television (DTT). By improving spectral efficiency in this way, countries can reallocate spectrum for mobile broadband. At the same time, consumers can enjoy a

broader array of content offerings and clearer image quality through DTT.

The DSO process creates a digital dividend, shared by these two services, and this work has important implications for individuals, economies, and societies.

## Case studies of DSO in Sub-Saharan Africa

This report provides background, recommendations, and insights from the DSO process in Sub-Saharan Africa. Key lessons and recommendations are provided by the DSO experiences of five Sub-Saharan African countries, Botswana, Cameroon, Kenya, Senegal, and Tanzania, the uptake of mobile services in relevant

frequency bands, and the greater benefits these countries derive from this spectrum. While each country had a unique experience, there are common threads and challenges, as many faced the same trials experienced by other middle-income countries with their analogue to digital television transitions.

**While each country had a unique experience, there are common threads and challenges, as many faced the same trials.**



COMMON THREADS	CHALLENGES
<ul style="list-style-type: none"> <li>• Issues related to consumer outreach</li> <li>• Legal and regulatory framework overhauls to accommodate digital broadcasting</li> <li>• Stakeholder engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Consumer awareness of the transition</li> <li>• The need for regulatory changes</li> <li>• Funding difficulties</li> <li>• Legal challenges</li> </ul>

For each country, the report explores the obstacles encountered with the digital transition, the elements that led to a successful outcome, and the actual or projected use of the first and second digital dividends

(790-862 MHz and 694-790 MHz, respectively). These lessons, as summarised in Table 1, are valuable for the Sub-Saharan African countries still completing their DSO process.

**Highlights:**

- In **Botswana**, challenges included difficulties associated with choosing a less common DTT broadcasting standard and difficulties persuading consumers to transition to DTT.
- **Cameroon** experienced challenges associated with the absence of a clear timeline to see the switchover through to completion. Its experience further highlights, however, the value of using diverse funding sources to ensure adequate resources are available for the transition.
- While **Kenya** experienced some challenges associated with consumer awareness and set-top box (STB) pricing, as well as unexpected roadblocks in the form of legal challenges from the broadcasting industry, its experience nevertheless provides a strong example of ensuring stakeholder inclusion.
- **Senegal** encountered some challenges associated with the establishment of its new licensing framework for DTT, but its overall experience underscores the value of ensuring broad consumer access to new STBs.
- While **Tanzania's** new licensing framework for DTT required some tweaks to ensure that it was fit for purpose, it had a comparatively smooth migration experience that benefited from strong consumer engagement.

TABLE 1

## SUMMARY OF KEY FINDINGS

Country	Key challenges	Lessons learned	Funding sources used	Licencing approach	Migration status	Digital dividend status
<b>Botswana</b>	Choice of a less common STB standard; lack of consumer interest in switchover	Importance of STB availability and attractive content offerings	Government with some foreign public	Both unbundled and hybrid licences offered	ASO ongoing, with projected completion in Autumn 2022	DD1 partially auctioned in 2021
<b>Cameroon</b>	Absence of clear timeline for completion	Role of government engagement; benefit of diverse funding sources	Mix of government and foreign private	Partially unbundled, with distinct role for government broadcaster	No clear timeline for ASO established	DD1 and DD2 assigned in 2015 and 2019
<b>Kenya</b>	Value of strong consumer awareness campaigns; legal challenges from broadcasting industry	Benefits of strong efforts to drive down STB cost; Value of stakeholder inclusion	Mix of government and foreign private	Unbundled, with private licenced signal distributors	ASO completed in 2015	DD1 assigned in 2016 DD2 assigned in 2017
<b>Senegal</b>	Ongoing broadcaster funding by government	Benefits of wide availability of STBs; importance of private investment	Government with some local private	Unbundled, with government signal distributor	ASO ongoing, with completion anticipated in 2022	DD1 assigned between 2016 and 2021 DD2 planned for 5G
<b>Tanzania</b>	Minor adjustments to regulatory framework needed	Value of broad stakeholder engagement	Mix of government and private	Unbundled, with private licenced signal distributors	ASO completed in 2015	DD1 assigned in 2012 DD2 auctioned in 2018

Source: TMG.

**Based on the information available in the countries of interest, it is evident that the 470-694 MHz band provides more spectrum than necessary for existing and future broadcasting applications and could also be allocated to mobile services**

## Spectrum needs in the UHF band

An additional review of the current and planned use of the ultra-high frequency (UHF) spectrum ranges (470-960 MHz) and the uptake of mobile and broadcasting services in other eight countries was undertaken, including Côte d'Ivoire, the Democratic Republic of Congo (DRC), Ghana, Madagascar, Nigeria, Rwanda, South Africa, and Uganda. This information demonstrates that additional spectrum can be made available for mobile services without hindering existing or future digital television broadcasting services.

Based on the information available in the countries of interest, it is evident that the 470-694 MHz band provides more spectrum than necessary for existing and future broadcasting applications and could also be allocated to mobile services. Further, as more users adopt mobile services, and as 4G and 5G services develop in the region, additional spectral resources will be required.

First, continued efforts should be made so that the first and second digital dividends, or the 700 MHz and 800 MHz bands, are available to mobile services throughout Sub-Saharan Africa.

Further, the frequency ranges below 694 MHz, such as the 600 MHz band, are an optimal candidate to be identified for International Mobile Telecommunications (IMT) to provide highly valuable spectrum with little to no impact on the broadcasting sector.

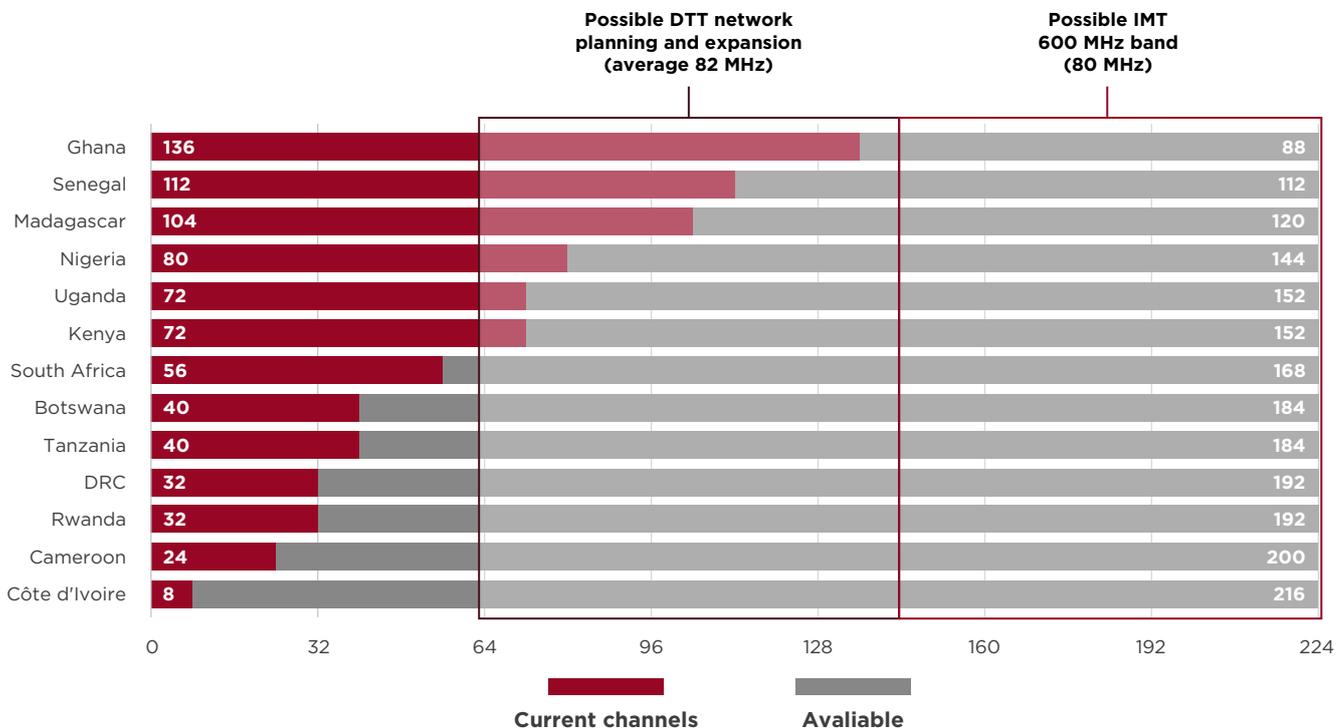
## Opportunity at the World Radiocommunication Conference

At the upcoming International Telecommunication Union (ITU) 2023 World Radiocommunications Conference (WRC-23), Sub-Saharan African countries, as part of Region 1, will have the opportunity to review the current use of the UHF band, and in particular the 470-694 MHz frequency range. Based on the information available in the countries studied, as well as the supplemental analysis provided in the Annex<sup>1</sup>, strong evidence exists that the 470-694 MHz band provides adequate spectrum for existing and future broadcasting applications.

In the representative countries analysed, excess spectrum is currently available to support the number of TV program offerings. As a result, at WRC-23 countries should consider reallocating part of this available spectrum for mobile use, where it can bring additional benefits to the countries in the Sub-Saharan Africa.

FIGURE 1

SPECTRUM UTILISATION AND AVAILABILITY FOR IMT USE IN THE FREQUENCY BAND 470-694 MHz



Source: TMG.

See the report annex for more details: <https://www.gsma.com/spectrum/wp-content/uploads/2022/10/Digital-Switchover-Sub-Saharan-Africa-Annex.pdf>

1 [www.gsma.com/spectrum/wp-content/uploads/2022/10/digital-switchover-sub-saharan-africa-annex.pdf](https://www.gsma.com/spectrum/wp-content/uploads/2022/10/digital-switchover-sub-saharan-africa-annex.pdf)

# 1. Introduction and background

The migration to digital terrestrial television (DTT) broadcasting provides a significant opportunity for the Sub-Saharan Africa region in improving access to connectivity. This transition offers greater spectral efficiency, making the spectrum known as the digital dividends available for other critical uses, such as mobile services, as well as enabling better television quality sound and image. Despite these demonstrated benefits, the transition is a complex process – presenting technical, operational, and financial challenges. Most notably, the transition involves a broad array of stakeholders, including governments, broadcasters, mobile operators, and everyday consumers, necessitating strong coordination and communication.

This section provides background on common characteristics of the digital switchover (DSO) process based on previous studies. This report then analyses the DSO experience of five Sub-Saharan African countries – Botswana, Cameroon, Kenya, Senegal, and Tanzania – that provide a geographically and experientially diverse range of perspectives.

For each country, the report explores the challenges encountered with the digital transition, the elements that led to a successful outcome, and the actual or projected use of the digital dividends. These case studies highlight valuable lessons that can provide guidance to regulators and policymakers from countries where the migration process is still ongoing.

This report further leverages data from eight additional Sub-Saharan African countries – Côte d'Ivoire, the Democratic Republic of Congo (DRC), Ghana, Madagascar, Nigeria, Rwanda, South Africa, and Uganda – to better understand the current and planned use of the ultra-high frequency (UHF) bands, the key relevant band involved in the migration process. This data highlights the wide availability of spectrum for both mobile services and digital broadcasting in this frequency band post-switchover, demonstrating the ability for both services to have adequate spectrum and to provide users with access to advanced mobile services and to high-quality digital broadcasting.



## 1.1 Digital television migration benefits



Digital migration offers a broad array of benefits for consumers and societies. From a broadcasting perspective, DTT offers improved audio-visual quality and enables a greater diversity of content offerings due to greater efficiency. While a single analogue TV channel can occupy up to 8 MHz of bandwidth, the same quantity of spectrum can support up to 20 digital television programs, resulting in 32 MHz of spectrum delivering the same amount of content using DTT as 392 MHz when using analogue television.<sup>2</sup> Considering the spectral efficiency of DTT, the digital migration frees up a significant quantity of spectrum for use by mobile services in the 470-862 MHz frequency range. In most African countries, this equates to 168 MHz of total bandwidth from both the first and second digital dividends (790-862 MHz and 694-790 MHz, respectively).<sup>3</sup>

Spectrum in the UHF bands offers significant cost advantages due to its physical capabilities of covering greater distances. These advantages, in turn, allow mobile operators to expand coverage for rural communities as well as to offer lower costs for consumers, facilitating greater mobile penetration.<sup>4</sup>

As spectrum is a scarce resource, its allocation frequently entails trade-offs for competing uses. DSO, however, offers a rare win-win scenario. It enables expanded access to mobile services through greater coverage and lower costs, while also providing better quality television services for consumers. The greater efficiency of digital television broadcasting compared to outdated analogue broadcasting allows countries to have two distinct uses in the UHF band – mobile services and television broadcasting – whereas before only television broadcasting could be supported.

**“A single analogue TV channel can occupy up to 8 MHz of bandwidth, the same quantity of spectrum can support up to 20 digital television programs, resulting in 32 MHz of spectrum delivering the same amount of content using DTT as 392 MHz when using analogue television.”**

2 African Union, Guidelines on the Harmonized Use of the Digital Dividend in Africa: Policy, Technical and Regulatory Procedures, p. 12 (December 26, 2016), available [here](#).  
3 African Union, Guidelines on the Harmonized Use of the Digital Dividend in Africa: Policy, Technical and Regulatory Procedures, p. 13 (December 26, 2016), available [here](#).  
4 GSMA, Securing the digital dividend across the entire ASEAN, p. 7 (August 2018), available [here](#).

## 1.2 Digital television migration challenges

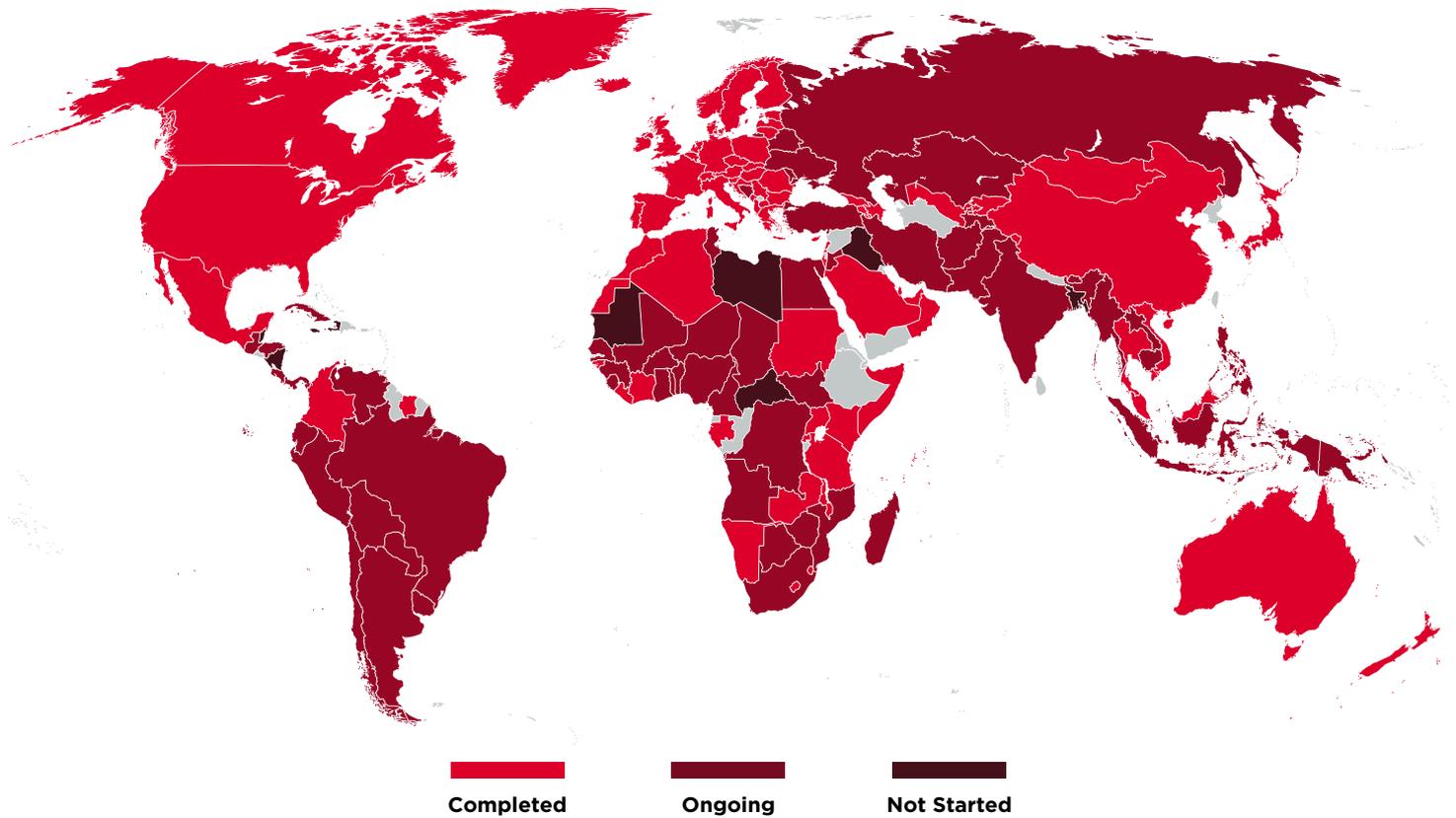


In general, most Sub-Saharan African countries have found meeting the internationally set analogue switch-off (ASO) deadline of 2015 challenging. Several countries are still completing their migrations as of 2022. These delays are commonly due to various challenges. Some apply more broadly to these

countries' efforts to enable the digital transformation, such as funding, technical expertise, and regulatory challenges, and some are more specific to the digital migration process itself, such as legal challenges from broadcasters, consumer outreach, and provision of new TV receivers, such as set-top boxes (STB).

FIGURE 2

GLOBAL STATUS OF DSO



Source: TMG based on ITU data.<sup>5</sup>

<sup>5</sup> ITU, Status of the Transition to Digital Terrestrial Television (visited on August 26, 2022), available [here](#).



FIGURE 3

DSO CHALLENGES



Source: TMG

1.2.1 Addressing funding needs to support DSO process

 The DSO process requires significant funding to enable planning, infrastructure deployment, and in some cases STB subsidisation. In the Sub-Saharan African region, insufficient funding is a notable barrier as countries transition from analogue to digital television broadcasting. Various funding options exist such as:

- national budgets
- universal service funds
- external financing from institutions, such as the World Bank
- public-private partnerships (PPPs)
- proceeds from the auction of the newly available spectrum bands<sup>6</sup>

The countries highlighted in this report took varied approaches to resolving the funding challenge, including through third-country support (in the case of Botswana and Cameroon) and enabling greater private investment (as in Kenya and Tanzania). Private sector funding can play an important role as relying too heavily on government funding can result in shortfalls, as Kenya learned during its migration process and Senegal is currently experiencing with its government-owned digital broadcaster.

1.2.2 Implementing DSO related reforms to update legal and regulatory frameworks

 Since digital broadcasting is a fundamentally different technology than traditional analogue broadcasting, many countries have concluded that relevant regulatory and policy frameworks must be updated. All countries analysed chose to take a version of the unbundled regulatory approach, where the new licensing frameworks separated out content production from the deployment and operation of broadcasting infrastructure.

For broadcasters, this approach allows specialisation in areas of expertise, as opposed to the vertically integrated approach used for analogue broadcasting, whereby broadcasters were responsible for a range of responsibilities in the audio-visual value chain. This approach also facilitates the entry of new content providers into the market.

While regulatory changes do not always pose a direct challenge, they can delay the process. Some countries, such as Tanzania, discovered that adjustments were required to ensure the frameworks were fit for purpose. Other countries, like Botswana and Cameroon, struggled to fully implement or utilise new regulatory frameworks that were designed to offer unbundled licenses.

6 African Union, Guidelines on the Harmonized Use of the Digital Dividend in Africa: Policy, Technical and Regulatory Procedures, p. 9 (December 26, 2016), available [here](#).

### 1.2.3 Addressing technical capabilities needs

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The digital migration poses numerous technical challenges. Countries may require capacity building and training to deploy necessary infrastructure, including antennas, and ensure that broadcasters are able successfully complete the transition. Furthermore, technical expertise is needed to ensure that newly available spectrum is optimised. Time may help mitigate these technical issues, as new equipment becomes the global norm. Training resources may also be available from regional and multilateral organisations, as well as from partner countries, as seen in the case of Botswana. Some countries have also benefited from partnerships with foreign equipment providers in ensuring knowledge would be transferred locally.

### 1.2.4 Dedicating sufficient resources to consumer outreach

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The migration from analogue to digital television requires consumers to replace some existing equipment, such as STBs, and in some cases also antennas. As such, consumer outreach is a critical component of a successful migration. Misinformation, including that the migration entails eliminating free-to-air television, or that televisions themselves must be replaced, can generate controversy. Running a prominent consumer awareness campaign highlighting benefits to consumers, such as greater access to diverse content and improved broadcasting quality, can address these challenges, as seen in Tanzania. Efforts to reduce the cost to the consumer by providing access to low-cost STBs, as in Senegal, can also forestall backlash on cost-grounds.

### 1.2.5 Delays caused by legal challenges

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While not a factor in every country's migration experience, lawsuits from different stakeholders can delay the transition, as well as create confusion and uncertainty for all stakeholders involved. To prevent such challenges, it is critical that key stakeholders, including the government, broadcasters, consumer rights groups, and mobile operators are represented and involved in all stages of the transition, from planning to implementation to the final ASO. As one lawsuit from a consumer group in Kenya demonstrates, sometimes legal challenges can be mollified by simply granting the litigant a seat at the table during the planning process. However, Kenya also demonstrates that even when stakeholders like broadcasters are involved in the process, lawsuits can result if those stakeholders perceive that their concerns are being ignored.

## 2. Status of DSO in Sub-Saharan Africa



This section provides a brief overview of the international context of DSO and presents five case studies from Sub-Saharan Africa. These representative case studies explore the background and present situation of the digital migration in Botswana, Cameroon, Kenya, Senegal, and Tanzania. As these sections show, each country had distinct experiences transitioning from analogue to digital television broadcasting, with varied challenges, delays, and successes.

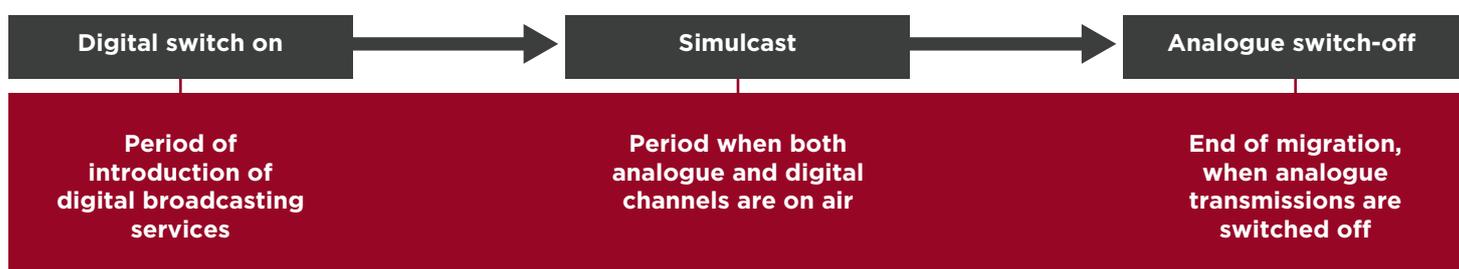
## 2.1 International and regional context

At the 2006 ITU Regional Radiocommunication Conference (RRC-06), the ITU Region 1 countries, including African countries, assented to the Geneva 2006 (GE06) Agreement, which established a deadline of 17 June 2015 to complete the ASO.<sup>7</sup> The agreement covered the frequency bands 174-230 MHz and 470-862 MHz. Despite the difficulties many countries

encountered with the 2015 and 2020 deadlines, they have not been officially extended.<sup>8</sup> In most countries, in both Africa and around the world, the digital migration has occurred in clear stages, allowing sufficient time for the roll-out of infrastructure and the distribution of new STBs to consumers, as highlighted in Figure 4.

FIGURE 4

### ANALOGUE TO DIGITAL TELEVISION MIGRATION PROCESS



Source: TMG.

In the Sub-Saharan African region, this simulcast period has varied widely. For example, due to Botswana's delayed start to the migration, its total migration time is currently scheduled to last only three years.<sup>9</sup> By comparison, Senegal switched on

digital broadcasting in 2015, and as of 2022 is still broadcasting analogue signals, with an anticipated final ASO by the end of 2022 (see Figure 5), while Cameroon is similarly still broadcasting analogue signals with no clear timeline for completion.<sup>10</sup>

7 Final Acts of the Regional Radiocommunication Conference for planning of the digital terrestrial broadcasting service in parts of Regions 1 and 3, in the frequency bands 174-230 MHz and 470-862 MHz (RRC-06) Geneva, 15 May - 16 June 2006, available [here](#).

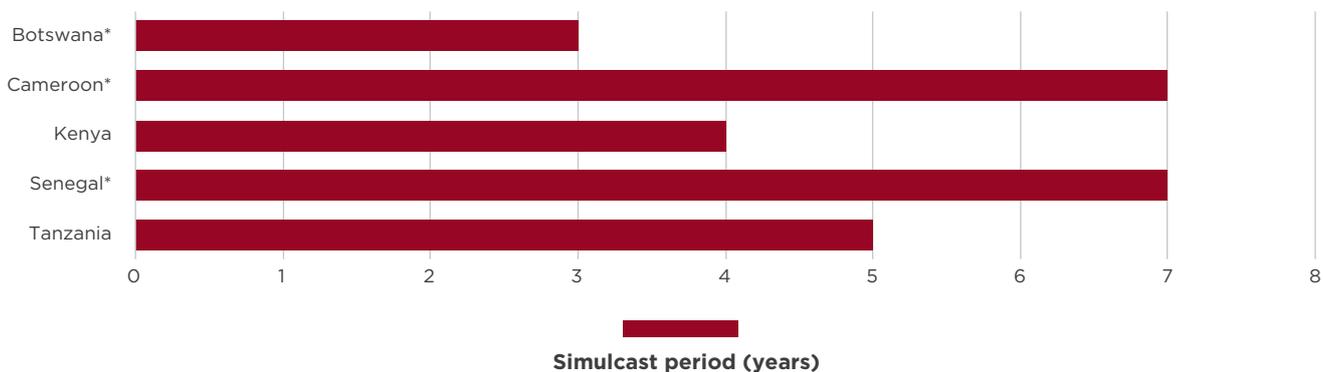
8 ITU Radiocommunication Sector (ITU-R), FAQ on the Digital Dividend and the Digital Switchover, p. 6 (May 20, 2020), available [here](#).

9 Interview with representative of Botswana Communications Regulatory Authority on August 2, 2022.

10 Interview with representative of Senegal Regulatory Authority for Telecommunications and Post on June 30, 2022; Written response to questions received from representative of ART on July 21, 2022.

**FIGURE 5**

COMPARISON OF SIMULCAST PERIODS IN TARGET COUNTRIES IN YEARS UNTIL 2022



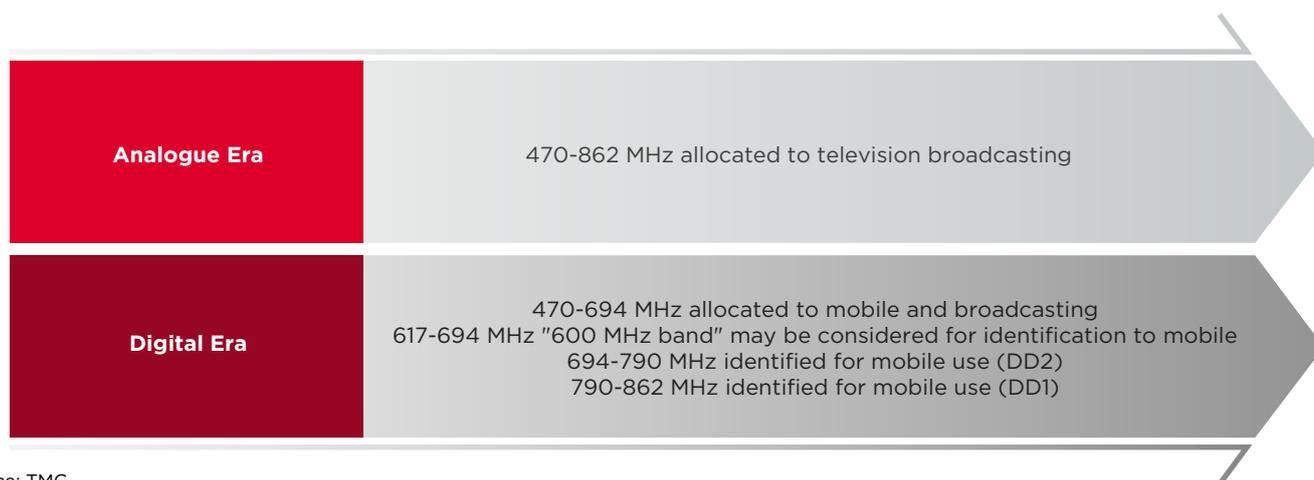
Source: TMG.

A key outcome of the migration from analogue to digital television broadcasting is the enabling of the digital dividends, meaning the availability of spectrum resulting from the improved efficiency of digital broadcasting. For ITU Region 1, the first digital dividend (DD1) was made available through the WRC-07 in the 790-862 MHz range (800 MHz band), which

reallocated this spectrum for mobile services. The second digital dividend (DD2) was made available for ITU Region 1 at WRC-12 and WRC-15, in the 694-790 MHz range (700 MHz band).<sup>11</sup> Despite the associated benefits, both digital dividends have yet to be made available to mobile network operators in several countries, especially in Sub-Saharan Africa.

**FIGURE 6**

REALLOCATION OF SPECTRUM TIED TO THE ANALOGUE TO DIGITAL TELEVISION MIGRATION



Source: TMG.

11 ITU, Digital dividend: Insights for spectrum decisions, p. 3 (2018), available [here](#).

## 2.2 Botswana

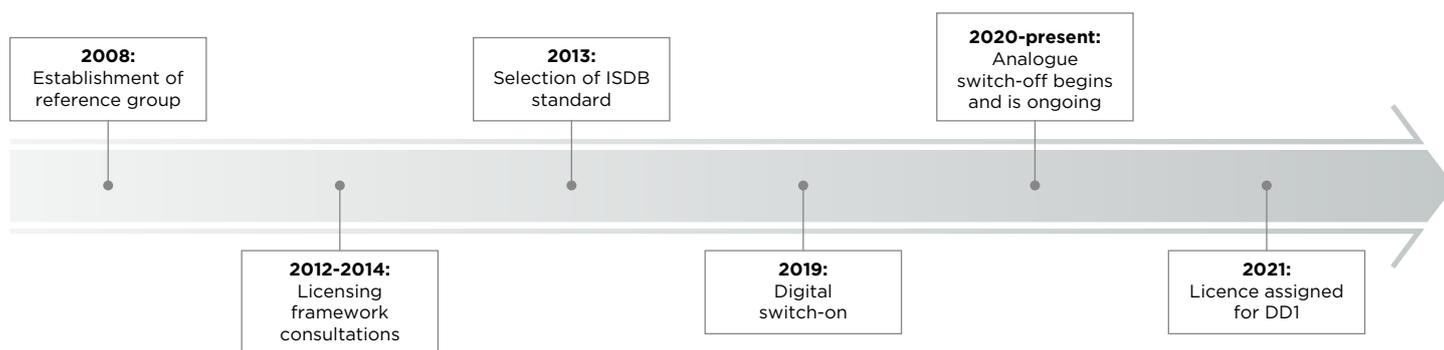


Botswana has not yet fully turned off analogue television signals and thus did not meet the GE06 deadline. It has, however, made important progress towards the ultimate goal of making the digital dividends available to mobile services. Botswana's experience highlights valuable lessons, including the value of leveraging international partnerships, but its

migration process has been delayed relative not only to the GE06 deadline but also compared to other Sub-Saharan African countries. In August 2021, Botswana launched a tender for DD1, among other frequency bands, and assigned new licences to two mobile operators, but it has yet to assign licenses for DD2.<sup>12</sup>

FIGURE 7

### TIMELINE OF BOTSWANA'S DIGITAL MIGRATION



Source: TMG.

TABLE 2

### OVERVIEW OF BOTSWANA'S DIGITAL MIGRATION

Key challenges	Lessons learned	Migration status	Digital dividend status
Choice of a less common STB standard; lack of consumer interest in switchover	Importance of STB availability and attractive content offerings	ASO scheduled for completion in October 2022	DD1 partially administratively assigned
STB pricing	Licencing approach	Consumer awareness	Funding sources used
Local government and foreign government support	Both unbundled and hybrid licences offered	Planned, but level of implementation unclear	Government with some foreign public

Source: TMG.

<sup>12</sup> Botswana Communications Regulatory Authority (BOCRA), Invitation to Apply for International Mobile Telecommunications Spectrum (IMT) Licences for the Provision of Mobile Broadband Wireless Access Services (August 6, 2021), available [here](#); Interview with representative of the Botswana Communications Regulatory Authority on August 2, 2022.

## 2.2.1 Key background



The planning for Botswana's migration began in early 2008, with the establishment of a Reference Group, while in April 2009, the Ministry of Communications, Science and Technology launched the digital migration task force, which was headed by the Chairperson of the National Broadcasting Board (NBB).<sup>13</sup> This task force's mandate included advising the Minister on standards and other key issues, as well as ensuring the migration's progress.<sup>14</sup> The task force sketched out a plan for the migration process, addressing standards, licensing, budget, the distribution of STBs, and timeline.<sup>15</sup>

In 2012, the NBB issued a consultation on a potential licensing framework. However, the project was put on hold as the country passed the Communications Regulatory Authority Act, which created a converged regulator, the Botswana Communications Regulatory Authority (BOCRA). This new entity superseded the NBB and the prior telecommunications regulator.<sup>16</sup> BOCRA released a subsequent consultation document on licensing in late 2014.<sup>17</sup>

Unlike the fully unbundled approach taken by other countries, BOCRA proposed a hybrid broadcasting licence category that replicated the vertical integration

seen during the analogue era, in addition to the unbundled options of content aggregator and multiplex operator/signal distributor.<sup>18</sup> While the unbundled licence categories were created following the consultation, as of 2022 only the state-run broadcaster Botswana Television (BTV) is licenced to offer DTT, and it holds the hybrid licence that replicates the analogue licencing model.

Notably, Botswana was the first African country to utilise the Japanese-made Integrated Service Digital Broadcasting (ISDB) standard, as opposed to the more widely used in the region Digital Video Broadcasting-Terrestrial (DVB-T2) standard. The only other African country to do so since is Angola.<sup>19</sup> Some stakeholders expressed concerns about Botswana's decision not to use the more common standard for the region, noting that it could lead to greater costs and make the migration more challenging for the country.<sup>20</sup> However, government officials concluded that the ISDB standard was superior in terms of cost, quality, and efficiency.<sup>21</sup> To support its choice to use the ISDB standard, Botswana received assistance from the Japanese government throughout its migration process. The Japan International Cooperation Agency (JICA), an official government body, assisted Botswana with technical expertise, the development of the Public Relations plan, and donations of STBs.<sup>22</sup>

### Botswana's Licensing Approach

**Botswana implemented a hybrid licensing framework category that offered both a hybrid, vertically integrated licence and unbundled content aggregator and signal distributor licences. To date, BOCRA has only issued one licence — a hybrid licence — to the state-run broadcaster.**

- 13 Botswana Communications Regulatory Authority (BOCRA), Projects (2016), available [here](#); Sunday Standard, Botswana takes steps towards digital migration (May 3, 2009), available [here](#); Thandie Puthologo and Ruth M. Abankwah, An Analysis of the Broadcasting Migration Process from Analogue to Digital Format (January 2015), available [here](#).
- 14 Ministry of State President Department of Broadcasting Services and Japan International Cooperation Agency, the Project for Implementation of the Digital Migration Project in Republic of Botswana Project Completion Report, p. 161 (August 2016), available [here](#).
- 15 Thandie Puthologo and Ruth M. Abankwah, An Analysis of the Broadcasting Migration Process from Analogue to Digital Format (January 2015), available [here](#).
- 16 ITU, The creation of the Botswana Communications Regulatory Authority (BOCRA) (November 2014), available [here](#).
- 17 Botswana Communications Regulatory Authority, Consultation paper on licensing framework for Digital Terrestrial Television (December 2014), available [here](#); Botswana Communications Regulatory Authority, Invitation for submission on Digital Terrestrial Television Licensing Framework (December 2014), available [here](#).
- 18 Botswana Communications Regulatory Authority, Consultation paper on licensing framework for Digital Terrestrial Television, p. 17 (December 2014), available [here](#).
- 19 MISA Zimbabwe, State of Broadcasting and Digital Migration in the Region, p. 15 (December 29, 2021), available [here](#).
- 20 Southern African Digital Broadcasting Association (SADIBA), Statement on ISDB-T announcement – Botswana (March 18, 2013), available [here](#).
- 21 Seamogano Mosanako and William O. Lesitaokana, Digital Terrestrial Television Broadcasting (DTT) in Botswana: Prospects and Challenges, p. 249. (2021).
- 22 Embassy of Japan in Botswana, Handing over STBs to Botswana through Japan's grant assistance completed (August 19, 2021), available [here](#); Ministry of State President Department of Broadcasting Services and Japan International Cooperation Agency, the Project for Implementation of the Digital Migration Project in Republic of Botswana Project Completion Report (August 2016), available [here](#).



In March 2016, the Ministry of State President's Department of Broadcasting Services (DBS) released a Public Relations Plan for the Digital Migration.<sup>23</sup>

This plan was broken down into different core tasks, including providing information via various media, advertising, a public relations campaign, demonstrations of receivers, and technical assistance to individuals. The government ultimately implemented some public relations efforts, including television and radio advertising, starting in 2016 and accelerating in 2019, as the digital switch-on approached.<sup>24</sup>

Following a tender, in 2021 BOCRA assigned two licences to mobile operators using the newly available DD1 spectrum and is holding some remaining 800 MHz spectrum in reserve. BOCRA has not yet made the DD2 spectrum available. As of August 2022, the government intends to complete the ASO by October 2022.<sup>25</sup>

## 2.2.2 Notable challenges faced and key recommendations from Botswana's experience



As noted above, Botswana's migration and attribution of the digital dividends faced delays, even compared to other countries that missed the GEO6 deadline. These delays can be attributed to the difficulties Botswana has had getting viewers to migrate to DTT, which in turn stem from limited content offerings and challenges associated with implementing ISDB – a different technical standard from most countries in the African region.

### 2.2.2.1 STB availability and cost

As in many countries, transitioning consumers to new STBs proved challenging in Botswana. Notably, it was not just the STB cost that caused issues, but also STB availability, due to Botswana's choice to use the less common ISDB standard. Especially considering the size of Botswana's population (2.4 million), it was unable to benefit from the economies of scale generated by other African countries that chose the more common DVB-T2 standard.<sup>26</sup>

23 Ministry of State President Department of Broadcasting Services and Japan International Cooperation Agency, the Project for Implementation of the Digital Migration Project in Republic of Botswana Project Completion Report, p. 307 (August 2016), available [here](#).

24 Interview with representative of the Botswana Communications Regulatory Authority on August 2, 2022.

25 Interview with representative of the Botswana Communications Regulatory Authority on August 2, 2022.

26 World Bank, Total population – Botswana (2021), available [here](#).

While cost remains a challenge, Botswana has leveraged its partnership with Japan to distribute STBs. In 2020, the Japanese government contributed JPY 150 million (USD 1.1 million), which was ultimately used to purchase and distribute 15,000 STBs.<sup>27</sup> The Botswanan government has further supplied 10,000 STBs free of charge for low-income consumers.<sup>28</sup> However, these quantities are relatively small considering the 386,000 households estimated to have television sets as of 2019, and the 300,000 households the government determined needed to have access to DTT before the ASO could be completed.<sup>29</sup>

### 2.2.2.2 Limited interest from consumers in DTT

Beyond the actual availability of STBs, many citizens have not been inclined to transition to digital television, thereby delaying Botswana from meeting its targets in terms of households migrated. In 2019,

BOCRA noted that a key challenge was the fact that the STBs provided by state broadcaster BTV did not offer more channels of content than they were already receiving.<sup>30</sup> BOCRA further noted that the remaining analogue viewers were primarily among the poor and the elderly, with middle- and high-income groups more likely to use satellite offerings as opposed to switching to DTT. The regulator concluded that more efforts were needed to ensure that BTV could offer enough content to attract viewers to DTT.<sup>31</sup> For television viewers generally, key benefits of the transition include a greater diversity of channel offerings and improved picture quality. However, due to a lack of locally produced content and the limited number of channels available, viewers in Botswana had little motivation to switch. Due to the potential benefits of greater connectivity associated with the digital dividends, however, it is important that Botswana not delay their attribution as a result of these challenges.

FIGURE 8

## KEY TAKEAWAYS FROM BOTSWANA'S TRANSITION



### STB AVAILABILITY

Less common STB standard and small market size



### LIMITED CONSUMER INTEREST

Absence of attractive content offerings to motivate consumers

Source: TMG.

## 2.2.3 Spectrum environment in Botswana after DSO



According to Botswana's 2018 National Table of Frequency Allocation, the 470-694 MHz frequency range is allocated exclusively to broadcasting, the 694-790 MHz range to mobile and broadcasting, and the 790-862 MHz range to fixed, mobile, and broadcasting. This range is also identified for International Mobile Telecommunications (IMT).

27 Embassy of Japan in Botswana, Handing over STBs to Botswana through Japan's grant assistance completed (August 19, 2021), available [here](#).

28 National Broadcasting Conference: The Future of Broadcasting in the Era of Emerging Technologies, p. 14, available [here](#).

29 Statistics Botswana, Household Access To Information & Communication Technology p. 9 (May 2020), available [here](#).

30 Botswana Communications Regulatory Authority, National Broadcasting Conference: The Future of Broadcasting in the Era of Emerging Technologies, available [here](#).

31 Botswana Communications Regulatory Authority, National Broadcasting Conference: The Future of Broadcasting in the Era of Emerging Technologies, available [here](#).

TABLE 3

SUMMARY OF THE CURRENT USE OF THE FREQUENCY BAND 470-694 MHz IN BOTSWANA

NTFA allocation	Current use	Number of TV programs	TV penetration (households)	Mobile penetration (unique subs)	UHF bands assigned to IMT
Broadcasting	DTT	5	62%	67.8%	800 MHz

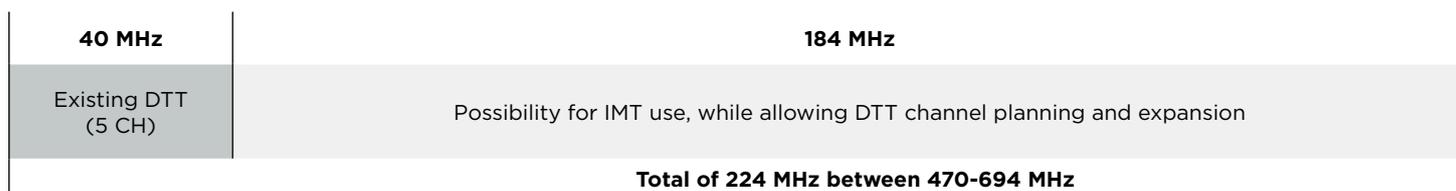
Sources: BOCRA, GSMA Intelligence, Datisis.

As highlighted in Table 3, Botswana has a mobile penetration rate of about 68 percent and a TV penetration rate of 62 percent.<sup>32</sup> Relative to peer countries, Botswana has experienced delays in fully assigning both digital dividends, resulting in an imbalance where an excess amount of spectrum is currently used by television broadcasting, instead of providing value for mobile services. This imbalance is particularly stark when considering the scarcity of broadcasting channels offered. While the television

offerings are expected to increase once the ASO is completed, television programs in Botswana are carried on five channels.<sup>33</sup> Based on the spectrum utilisation aspects explained in the Annex, Figure 9 shows that Botswana has sufficient spectrum to expand the allocation to mobile services below 694 MHz and has the opportunity to catch up with peer countries by making the DD2, or the 700 MHz band, as well as additional spectrum in the 600 MHz range available for mobile services.

FIGURE 9

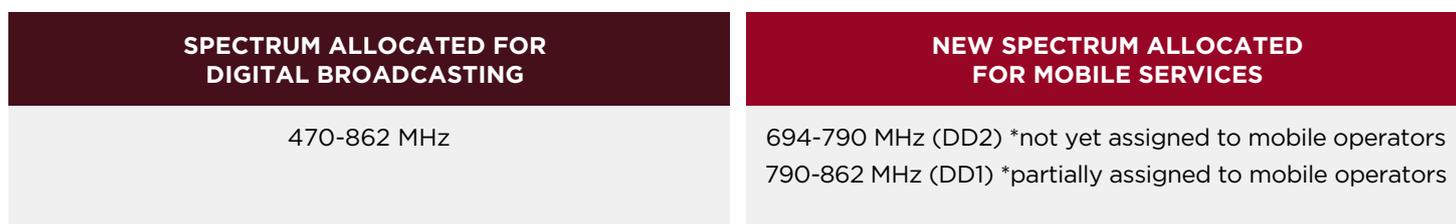
SPECTRUM UTILISATION IN THE FREQUENCY BAND 470-694 MHz IN BOTSWANA



Source: TMG.

FIGURE 10

BOTSWANA'S SPECTRUM ENVIRONMENT AFTER DSO



Source: BOCRA.

32 TV household penetration rates for 2021 from Datisis, Botswana Television Market Report, available [here](#). Mobile unique subscribers' penetration rates from GSMA Intelligence data.

33 Written response to questions received from representative of BOCRA on August 31, 2022.



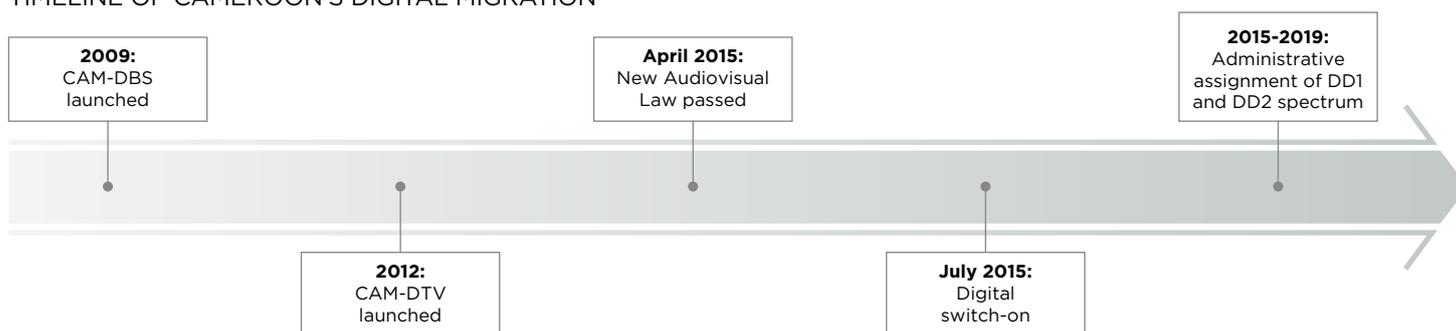
## 2.3 Cameroon

Cameroon has made important progress towards completing its migration, including by assigning some of the digital dividend spectrum to mobile operators. However, it appears that, as of 2022, there is no clear plan to complete the ASO. While important steps have

been taken, such as a new Audio-Visual Law to enable digital broadcasting, and digital signals have been switched on, there does not appear to be a clearly defined timeline to complete the ASO.

FIGURE 11

### TIMELINE OF CAMEROON'S DIGITAL MIGRATION



Source: TMG.

TABLE 4

### OVERVIEW OF CAMEROON'S DIGITAL MIGRATION

Key challenges	Lessons learned	Migration status	Digital dividend status
Absence of clear timeline for completion	Role of government engagement; need for diverse funding sources	No clear timeline for ASO established	DD1 and DD2 administratively assigned in 2015 and 2019
STB pricing	Licencing approach	Consumer awareness	Funding sources used
No direct action taken	Partially unbundled, with distinct role for government broadcaster	Not extensive	Mix of government and foreign private

Source: TMG.

### 2.3.1 Key background



Cameroon's migration began in 2009 with the establishment of an initial National Supervisory Committee for the Migration from Analog to Digital Broadcasting (CAM-DBS), which was later succeeded by the Cameroon Digital Television Project (CAM-DTV) in mid-2012.<sup>34</sup> CAM-DTV was charged with proposing specific legal and regulatory changes related to the transition, managing public awareness, monitoring the transition from a technical and financial perspective, and representing the government in any contracts or arrangements with private partners.<sup>35</sup> In November 2012, Cameroon selected the DVB-T2 standard, which was promulgated by a decree that also prohibited the sale of analogue receivers starting in July 2013.<sup>36</sup> Beyond this importation ban, which proved difficult to enforce, the government did not take any other action to reduce the cost or improve the availability of STBs.<sup>37</sup>

In 2015, the government chose StarTimes as a financing partner for a significant rehabilitation of the state broadcaster, CRTV, to prepare for DTT. The partnership budgeted USD 220 million to upgrade CRTV's broadcasting equipment and was supported by financing from the Export-Import Bank of China (Exim Bank).<sup>38</sup> Alongside this partnership, in April 2015, Cameroon promulgated a new Audio-visual Law

to serve as the legal basis for the transition to digital broadcasting.<sup>39</sup> This law faced controversy, as the final version of the law did not incorporate inputs from CAM-DTV and included a provision that exempted public broadcasters from a new obligation that separated broadcasting from content production.<sup>40</sup> This is in contrast to the approach of countries such as Tanzania, Kenya, and Senegal, which do not allow the signal distributors to have this type of dual role. While the government had originally planned to establish a separate neutral entity as the signal distributor, these plans did not materialize.<sup>41</sup> Digital broadcasting signals were switched on in parts of the cities of Douala et Yaoundé in July 2015, just a few weeks after the GEO6 Agreement deadline for the ASO.<sup>42</sup>

Despite the steps taken to advance the digital migration, it currently appears to have slowed down. The migration has faced challenges due to financial constraints and difficulties negotiating with StarTimes. As of July 2022, Cameroon remains in the simulcast phase and does not have a defined ASO deadline in place.<sup>43</sup> However, Cameroon has succeeded in reassigning parts of both DD1 and DD2 to major operators, including MTN, and Orange in 2015 and CAMTEL in 2019. Each operator received 30 MHz of spectrum, with the remaining spectrum placed in reserve for future use.<sup>44</sup>

## Cameroon's new law

**The country has implemented a new Audio-Visual Law to support the development of digital television.**

34 Mezom Melouta, Cameroon Analog to Digital Switchover (September 16, 2013), available [here](#).

35 Order No. 122 Reorganizing the National Supervisory Committee for the Migration from Analog to Digital Broadcasting (August 30, 2012), available [here](#).

36 Cameroon Online, Cameroon Adopts DVB-T2 (January 4, 2013), available [here](#).

37 Written response to questions received from representative of ART on July 21, 2022.

38 Chinafrique, "From analog to digital," (February 2016), available [here](#); written response to questions received from representative of ART on July 21, 2022.

39 Law No. 2015/007 of April 20, 2015 governing audiovisual activities in Cameroon, available [here](#).

40 Agence Ecofin, "Cameroon is heading straight for a wall" according to the Prime Minister's advisor (April 7, 2015), available [here](#).

41 Written response to questions received from representative of ART on July 21, 2022.

42 Agence Ecofin, Digital Television debuts with 1000 households (July 15, 2015), available [here](#).

43 Written response to questions received from representative of ART on July 21, 2022.

44 Written response to questions received from representative of ART on July 21, 2022.

## 2.3.2 Notable challenges faced and key recommendations from Cameroon's experience



Cameroon's experience further highlights the value of diverse funding sources, including partnerships with foreign countries and foreign private investment. However, Cameroon may benefit from establishing a clear timeline to complete the ASO. While many countries have faced delays in implementing set deadlines, clear plans remain an important factor to ensure that the digital migration is seen through completion, with the final ASO.

### 2.3.2.1 Diverse funding sources

In order to advance its digital migration, Cameroon has relied both on its own government funding and outside funding sources, including through the private company StarTimes and the Chinese government-

associated Exim Bank.<sup>45</sup> In particular, Cameroon relied on this funding to improve state broadcaster CRTV's technical capacity and equipment.<sup>46</sup> While Cameroon has faced some difficulties, its experience highlights the value of seeking out diverse sources of funding, including through foreign private investment, to address funding shortfalls frequently faced by developing countries.

### 2.3.2.2 Clear timelines

While key elements of Cameroon's migration have been implemented, including the attribution of spectrum to mobile operators, specific timelines remain a critical element to ensure that countries follow through on all steps of the migration through the final ASO. As will be seen in the experiences of countries such as Senegal and Tanzania, high-level government engagement with the transition can play an important role in ensuring its completion.

FIGURE 12

## KEY TAKEAWAYS FROM CAMEROON'S TRANSITION



### DIVERSE FUNDING SOURCES

Use of both government and foreign private investment to fund the transition and overcome shortfalls



### CLEAR TIMELINES

Absence of a clear timeline to complete the transition has led to its stalling out

Source: TMG.

45 Written response to questions received from representative of ART on July 21, 2022.

46 Chinafrique, From analog to digital (February 2016), available [here](#); written response to questions received from representative of ART on July 21, 2022.



### 2.3.3 Spectrum environment in Cameroon after DSO



According to Cameroon’s National Table of Frequency Allocation, which was last updated in 2018, the 470-790 MHz range is allocated to broadcasting on a primary basis, and to fixed and land mobile services on a secondary basis.<sup>47</sup> The 790-862 MHz band is assigned to mobile services, and is allocated to fixed, mobile, and broadcasting services on a primary basis.<sup>48</sup>

TABLE 5

SUMMARY OF THE CURRENT USE OF THE FREQUENCY BAND 470-694 MHz IN CAMEROON

NTFA allocation	Current use	Number of TV programs	TV penetration (households)	Mobile penetration (unique subs)	UHF bands assigned to IMT
<b>Broadcasting</b>	DTT	12	57%	52.4%	800 MHz 700 MHz

Sources: ART, GSMA Intelligence.

47 Agency for the Regulation of Telecommunications, Cameroon National Frequency Allocation Table (2018), available [here](#).

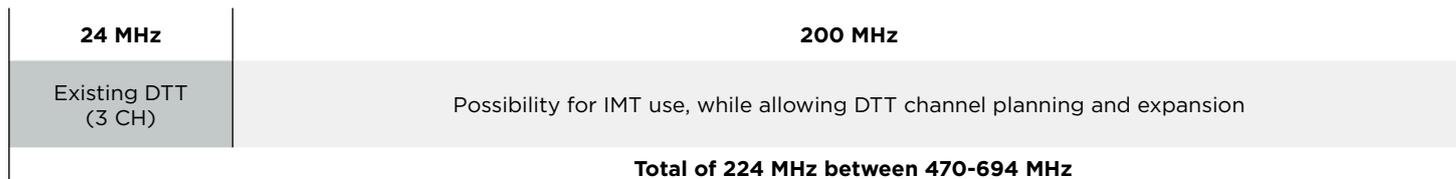
48 Written response to questions received from representative of ART on August 1, 2022.

As highlighted in Table 5, Cameroon has a mobile penetration rate of about 52 percent and a TV penetration rate of 57 percent.<sup>49</sup> There are 12 television programs currently, while the government had planned to reach up to 30. Those programs are provided

using up to three channels.<sup>50</sup> Based on the spectrum utilisation aspects explained in the Annex, Figure 13 shows that Cameroon has sufficient spectrum to expand the allocation to mobile services below 694 MHz.

FIGURE 13

SPECTRUM UTILISATION IN THE FREQUENCY BAND 470-694 MHz IN CAMEROON



Source: TMG.

FIGURE 14

CAMEROON'S SPECTRUM ENVIRONMENT AFTER DSO



Source: ART.

49 TV household penetration rates for 2021 from Dataxis, Cameroon Television Market Report, available [here](#). Mobile unique subscribers' penetration rates from GSMA Intelligence data.

50 Written response to questions received from representative of ART on August 1, 2022.



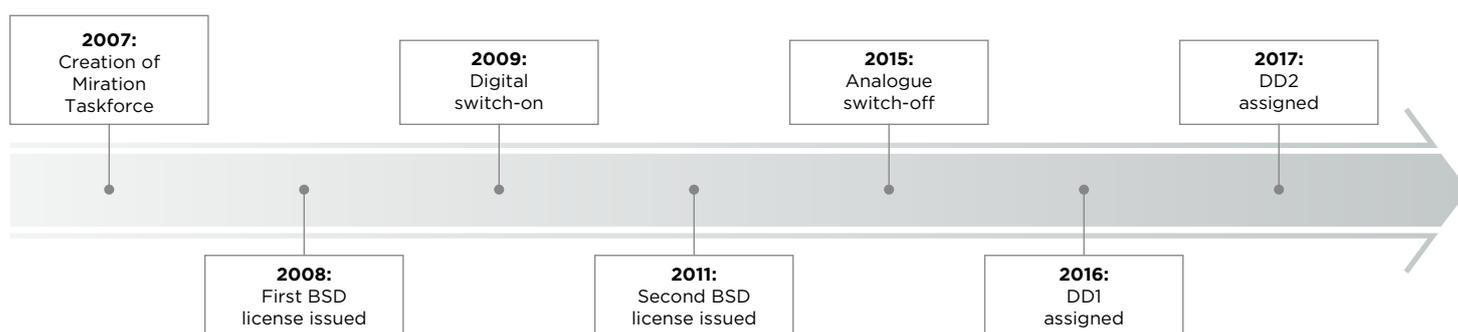
## 2.4 Kenya

Kenya successfully completed its digital transition by the GEO6 Agreement deadline. This was accomplished despite notable challenges not seen in many countries, including disruptive legal challenges from the broadcasting industry. Its experience primarily

highlights the need to maintain flexibility in the face of unexpected roadblocks. Following its successful migration, Kenya has succeeded in reassigning frequencies in the 800 MHz and 700 MHz bands to mobile operators.

FIGURE 15

TIMELINE OF KENYA'S DIGITAL MIGRATION



Source: TMG.

TABLE 6

OVERVIEW OF KENYA'S DIGITAL MIGRATION

Key challenges	Lessons learned	Migration status	Digital dividend status
Consumer awareness; legal challenges from broadcasting industry	Value of efforts to drive down STB cost; stakeholder inclusion	ASO completed in 2015	DD1 administratively assigned in 2016 DD2 administratively assigned in 2017
STB pricing	Licencing approach	Consumer awareness	Funding sources used
Waived VAT and import duty	Unbundled, with private licenced signal distributors	Strong consumer awareness campaign implemented	Mix of government and foreign private

Source: TMG.

## 2.4.1 Key background



Kenya launched its digital migration process relatively early, in 2006, and set ambitious timelines. Early planning steps included establishing a multi-stakeholder Digital Migration Task Force in 2007, which advised the Minister for Information, Communications, and Technology (MICT) and developed a migration roadmap report.<sup>51</sup> The Migration Task Force included the MICT, the National Communications Secretariat, the Communications Authority (CA) of Kenya,<sup>52</sup> the Kenya Broadcasting Corporation, the Media Owners Association, the Association of Practitioners in Advertising, and individual ICT consultants.<sup>53</sup>

The Digital Migration Task Force's report that laid the groundwork for an effective transition, including by defining clear deadlines, contemplating potential consumer issues at an early stage, and laying out the necessary transition steps. Based on the report's recommendations, the MICT established the Digital Transition Committee (DTC) to manage the process. The DTC was comprised of the Communications Authority (CA), the MICT, broadcasters, STB vendors, and consumer associations.

To complement the DTC's work, the CA developed a new broadcasting licensing framework that unbundled content from distribution and created two categories of licences – content licences and broadcast signal distributor (BSD) licences. The MICT granted the Kenyan Broadcasting Corporation (KBC) conditional authority as the first BSD licensee in February 2008. KBC was required to establish a subsidiary company (SIGNET), to provide the BSD services, a process that took five years. Due to these delays, the DTC recommended that the MICT licence additional private

BSD providers through a competitive procurement process, which the MICT ultimately did, awarding Pan Africa Networks Group (Kenya) Co. Ltd. (PANG) a licence in October 2011.<sup>54</sup>

The migration required significant government funding – an estimated KES 5.1 billion (USD 43 million) – to support infrastructure roll-out and consumer awareness campaigns.<sup>55</sup> While the government's original approach envisaged using SIGNET as the sole BSD licensee and fully funding SIGNET's digital transmissions during the simulcast period, the slow pace of infrastructure deployment due to inadequate funding resulted in a shift in strategy to launch the competitive tender.

The actual transition process began in 2009 with the digital switch-on, followed by a simulcast period until 2015, when the ASO occurred. As with many other countries, Kenya chose to employ a phased ASO approach. It began with Nairobi, followed by other major towns, and then finally more remote areas. While the ASO deadline was ultimately delayed compared to the government's original goal of 2012, it was completed by the GEO6 deadline.

Kenya succeeded in enabling access to both the first and the second digital dividends. The 800 MHz spectrum was originally licenced to operator Safaricom, but, following complaints from operators Airtel and Telkom Kenya that this attribution was unfair, the CA arranged for the return of this licence. The spectrum was ultimately split equally among the three operators in June 2016, subject to a licence fee of KES 2.5 billion (USD 25 million) paid by each operator.<sup>56</sup> Parts of the 700 MHz spectrum was further administratively assigned in 2017 to Jamii, with some remaining spectrum at present remaining in reserve.<sup>57</sup>

### Kenya's Commitment to Stakeholders

**The Digital Transition Committee comprised a wide range of stakeholders, including the Communications Authority, the Communications Ministry, broadcasters, STB vendors, and consumer associations. Despite the legal challenges from stakeholders Kenya ultimately faced, it should nevertheless be seen as a model for stakeholder inclusion.**

51 Report of the Taskforce on Migration of Terrestrial Television From Analogue to Digital Broadcasting In Kenya (July 2007), available [here](#).

52 At the time, the CA was known as the Communications Commission of Kenya (CCK). It became the CA in 2014.

53 GSMA, Digital Migration Process in Kenya, p. 13 (January 2017), available [here](#).

54 GSMA, Digital Migration Process in Kenya, p. 16 (January 2017), available [here](#).

55 GSMA, Digital Migration Process in Kenya, p. 25 (January 2017), available [here](#).

56 GSMA, Digital Migration Process in Kenya, p. 22 (January 2017), available [here](#).

57 Interview with representative from the National Communications Secretariat on July 22, 2022.

## 2.4.2 Notable challenges faced and key recommendations from Kenya's experience



Kenya faced both challenges common to many other Sub-Saharan African countries, as well as certain unique obstacles. As has been common in the region, the issues of consumer awareness presented difficulties. More exceptionally, Kenya's migration faced legal challenges from broadcasters that ultimately had a significant impact on its migration timeline. While not alone in facing such legal challenges, Kenya's experience is nevertheless distinct in their significance and impact.

### 2.4.2.1 Consumer awareness and STB cost

Kenya took its consumer awareness efforts seriously, creating a "Digital Kenya" brand, establishing a dedicated website, and making use of social media. However, tensions with broadcasters bled into efforts to raise consumer awareness about the transition. While broadcasters were required to assist the DTC with the migration process by donating airtime for public awareness campaigns, some media owners ran negative campaigns against the migration.<sup>58</sup> The award of the second BSD licence to Chinese-owned PANG sparked concerns about potential Chinese influence in the transition.<sup>59</sup> Further confusion and misinformation spread because of the government's decision mid-transition to switch standards from the first DVB-T to the more updated DVB-T2 standard, after approximately 10,000 DVB-T STBs had already been sold to consumers. While this change future-proofed the overall transition at ultimately a much-lower cost, it generated consumer confusion and misinformation.<sup>60</sup>

To make STBs more accessible, Kenya implemented various measures that significantly decreased STB

costs. At the beginning of its transition, STBs, primarily imported from Europe and Asia, were prohibitively expensive for many consumers. As in Tanzania, the government identified that a key element of that cost was due to a 25 percent import duty, which it ultimately waived. The CA further waived vendor registration fees and reduced type approval fees to bring more STBs to the market at lower costs. Kenya's swift interventions decreased the price of STBs by as much as 80 percent.<sup>61</sup>

### 2.4.2.2 Legal challenges from broadcasters

Although several African countries implemented the unbundled licensing approach without issue, Kenya's BSD licensing framework generated several legal challenges that contributed significantly to its inability to meet its ambitious 2012 ASO deadline.

The core legal challenges came from broadcasters in two separate cases, one regarding the tender process used to award the BSD licence to PANG, and the other regarding incumbent broadcasters' inability to receive a BSD licence. This second case generated significant uncertainty for Kenya's digital migration and was ultimately decided by Kenya's Supreme Court.

After conflicting lower court rulings, the Supreme Court resolved this case in 2014 by reinstating a licence to PANG that had been suspended, but also requiring the government to reconsider the merits of the broadcaster's BSD licence applications.<sup>62</sup> As of February 2022, SIGNET and PANG remain the only BSD licensees.<sup>63</sup> Considering the attention Kenya paid towards stakeholder engagement throughout the transition, its experience can primarily highlight the need for countries to react flexibly to unexpected roadblocks.

58 GSMA, Digital Migration Process in Kenya, p. 21 (January 2017), available [here](#).

59 See, e.g. All Africa, Kenya: Chinese Dominance in Kenyan Digital Migration Raises Alarm (January 14, 2014), available [here](#).

60 GSMA, Digital Migration Process in Kenya, p. 9 (January 2017), available [here](#).

61 GSMA, Digital Migration Process in Kenya, p. 25 (January 2017), available [here](#).

62 Supreme Court of Kenya at Nairobi, Civil Application No. 9 of 2014 (April 11, 2014).

63 Communications Authority of Kenya, License Broadcasting Service Providers as at 16th February 2022, available [here](#).



### 2.4.3 Spectrum environment in Kenya after DSO



According to the Kenya's 2020 National Table of Frequency Allocation, the 470-694 MHz band is allocated to broadcasting on a primary basis, and to mobile services on a

secondary basis.<sup>64</sup> The allocation to mobile service is on a secondary basis intended to support applications ancillary to broadcasting and program making. The adjacent 694-960 MHz range is allocated to mobile and fixed services, with the 703-862 MHz band identified for IMT.

TABLE 7

SUMMARY OF THE CURRENT USE OF THE FREQUENCY BAND 470-694 MHz IN KENYA

NTFA allocation	Current use	Number of TV programs	TV penetration (households)	Mobile penetration (unique subs)	UHF bands assigned to IMT
<b>Broadcasting</b>	DTT	142	51%	52.3%	800 MHz 700 MHz

Sources: CA, GSMA Intelligence, Dataxis.

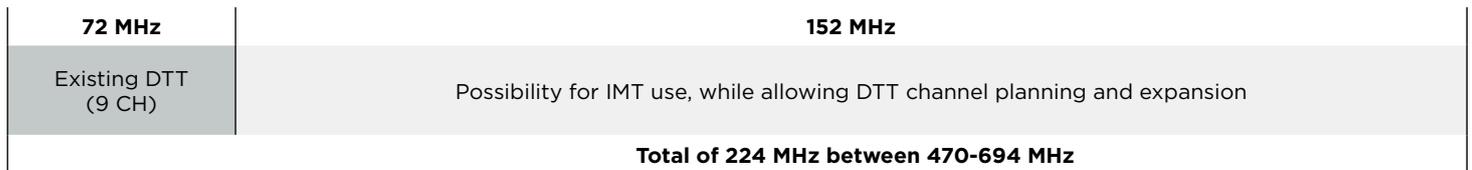
64 Communications Authority of Kenya, Table of Frequency Allocations, available [here](#).

As highlighted in Table 7, Kenya’s current TV penetration rate is 51 percent while its mobile penetration is just over 52 percent.<sup>65</sup> According to data published by the CA, there are 142 digital TV programs available nationally in Kenya carried by five digital distributors, with a maximum of nine television channels in each location.<sup>66</sup> There has been an uptick

in digital TV content programs offered, from 89 in 2017 to 142 in 2021.<sup>67</sup> Based on the spectrum utilisation aspects explained in the Annex, Figure 17 shows that Kenya, even with its considerable amount of television content offered, has sufficient spectrum to expand the allocation to mobile services below 694 MHz.

FIGURE 17

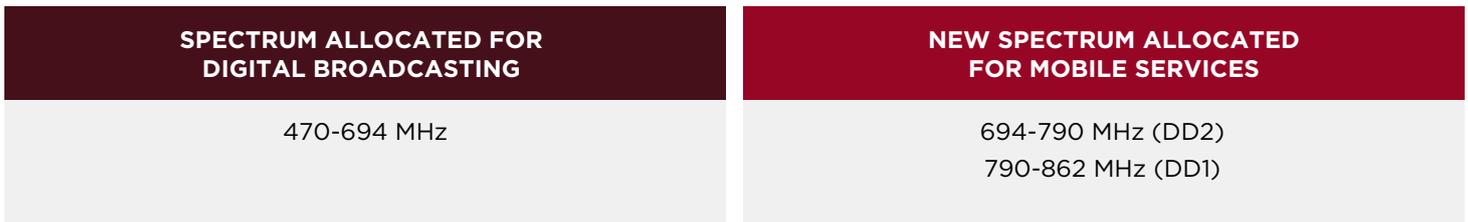
SPECTRUM UTILISATION IN THE FREQUENCY BAND 470-694 MHz IN KENYA



Source: TMG.

FIGURE 18

KENYA’S SPECTRUM ENVIRONMENT AFTER DSO



Source: CA.

65 TV household penetration rates for 2021 from Dataxis, Kenya Television Market Report, available [here](#). Mobile unique subscribers’ penetration rates from GSMA Intelligence data.

66 Communications Authority of Kenya, List of TV Frequencies Assigned to Signal Distributors, available [here](#).

67 Kenya National Bureau of Statistics, Economic Survey 2022, p. 329 (2022), available [here](#).



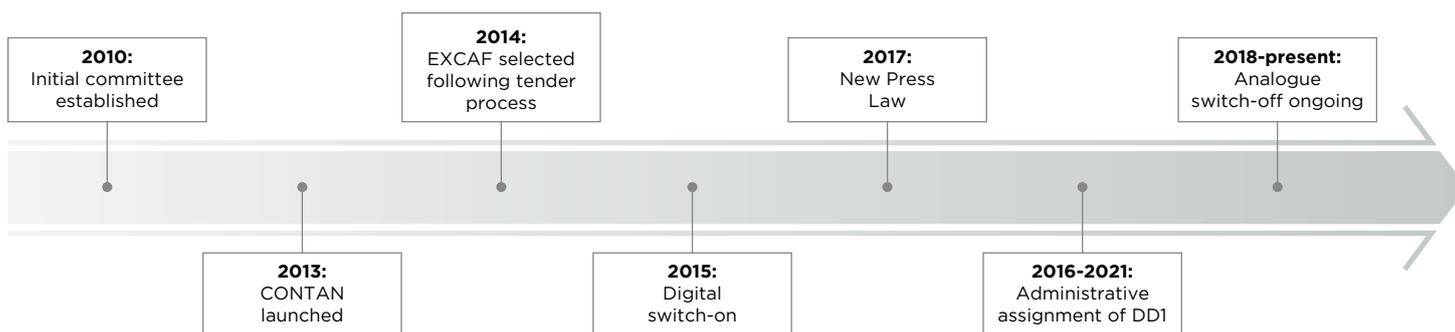
## 2.5 Senegal

Like Botswana and Cameroon, Senegal did not ultimately meet the GE06 deadline and has yet to fully complete its ASO. However, it has succeeded in reassigning newly available spectrum to its mobile operators, enabling its citizens to benefit

from expanded mobile services. It has further made significant strides in providing subsidised and free STBs to ensure expanded broad access by the population.

FIGURE 19

### TIMELINE OF SENEGAL'S DIGITAL MIGRATION



Source: TMG.

TABLE 8

### OVERVIEW OF SENEGAL'S DIGITAL MIGRATION

Key challenges	Lessons learned	Migration status	Digital dividend status
Ongoing broadcaster funding by government	Benefits of wide availability of STBs; importance of private investment	ASO ongoing, with completion anticipated in 2022	DD1 administratively assigned between 2016 and 2021 Plans for DD2 to be used for 5G services
STB pricing	Licencing approach	Consumer awareness	Funding sources used
Subsidised costs directly	Unbundled, with government signal distributor	Campaign implemented	Government with some local private

Source: TMG.

## 2.5.1 Key background



Senegal launched its migration process in August 2010. Through a decree, it established the National Committee for the Transition from Analogue to Digital Audio-Visual Services.<sup>68</sup> In 2013, under a new government, this Committee was replaced by the Steering Committee for the Transition from Analog to Digital (CONTAN), which became the leading planning body for the migration.<sup>69</sup> CONTAN's core missions included selecting broadcasting and infrastructure partners and providing recommendations as to the best use of the soon-to-be available spectrum.

In 2014, CONTAN chose local company EXCAF to build the necessary DTT infrastructure, on a build-operate-transfer model, whereby the infrastructure would ultimately be transferred to the government.<sup>70</sup> EXCAF was chosen from nearly 20 applicants based on its past experience in the market and proposed economic model.<sup>71</sup> The choice of a local company was fairly unique in the region, as many countries have relied on foreign companies for infrastructure deployment associated with the migration. After being selected, EXCAF chose the DVB-T2 standard. On June 17, 2015, digital signals were switched on in a ceremony attended by the President, on the date coinciding with the GEO6 deadline.<sup>72</sup>

An updated regulatory framework for digital broadcasting was established in 2017, with the legislature's approval of a new Press Code. The Press Code created an entity to serve as the only digital terrestrial broadcast operator, banning any other entities in the audio-visual or telecommunications value chain from holding shares in this operator.<sup>73</sup> Concurrently, a separate law named this entity Télédiffusion du Sénégal (TDS) and established its legal status.<sup>74</sup> The intention behind establishing TDS was to create a neutral player in the audio-visual value chain, offering the same services and conditions to all television channels.<sup>75</sup> With TDS as the only digital terrestrial broadcaster, Senegal followed the approach of unbundling the audio-visual value chain, allowing for competition in content creation. However, its approach limited competition on the signal distribution level, whereas other countries, such as Kenya and Tanzania, both chose to licence multiple entities for this role, including private companies.

The ASO has occurred in phases, starting in 2018, with a mix of switch-offs in highly populated areas with good availability of STBs and less populated areas that are less impacted by the switch-off. As of June 2022, about half of the regions in Senegal are fully digital, while the other half are still in simulcast mode, largely in areas that are still lacking the broad availability of STBs.<sup>76</sup>

### Senegal's Broadcaster Model

**Senegal's framework is unique among the countries examined in successfully establishing a sole, independent state-backed digital broadcaster, TDS. While TDS serves as an unbundled signal distributor, it does not have direct competition from the private sector as seen in Kenya and Tanzania.**

68 Order creating the Steering Committee for the Transition from Analog to Digital (August 26, 2010), available [here](#).

69 Conseil National de Régulation de l'Audiovisuel, Creation of the Steering Committee for the Transition from Analog to Digital (CONTAN) (April 23, 2015), available [here](#); Decree No. 2013-1432 of November 12, 2013 establishing the National Steering Committee for the transition from analog to digital (November 12, 2013), available [here](#).

70 Balancing Act, Excaf wants to complete DTT process in Senegal by the end of 2019 and starts DTT transition in Gambia for 2020 finish date - CEO Sidy Diagne on the lessons learned (July 30, 2019), available [here](#); Conseil National de Régulation de l'Audiovisuel, Memorandum - dispute between the EXCAF TELECOM group and the company STARTIMES on the illegal exercise of activities of distribution of audiovisual communication services (September 7, 2018), available [here](#).

71 Interview with representative from Télédiffusion du Sénégal on June 23, 2022.

72 Conseil National de Régulation de l'Audiovisuel, Speech by the President of the Republic on the occasion of the transition from analogue television to digital television (June 18, 2015), available [here](#).

73 Law No. 2017-27 of July 13, 2017, on the Press Code, article 148, available [here](#).

74 Law No. 2017-28 of July 14, 2017, authorizing the creation of the independent company called Société de Télédiffusion du Sénégal (TDS-SA), available [here](#).

75 UNESCO, Creation of the independent company called "Société de Télédiffusion du Sénégal (TDS-SA)" (2020), available [here](#).

76 Interview with representative from Télédiffusion du Sénégal on June 23, 2022.

Senegal administratively assigned the DD1 to three operators – Sonatel, Free, and Expresso – between 2016 and 2021. According to the Regulatory Authority for Telecommunications and Post (ARTP), Senegal chose to assign the spectrum rather than hold an auction to ensure that all operators could benefit from the digital dividend, in addition to a history of poor responses to prior tenders.<sup>77</sup> The additional spectrum enabled the operators to expand their service offerings, primarily in rural areas, providing increased 4G coverage. DD2 is currently envisaged for use for 5G services but has not yet been assigned or auctioned to mobile operators.<sup>78</sup>

## 2.5.2 Notable challenges faced and key recommendations from Senegal’s experience



Similar to Kenya, Senegal has faced challenges with its transition tied to the new regulatory frameworks in place for digital broadcasting, including adjustment challenges for broadcasters. Importantly, Senegal made significant efforts to improve the accessibility of STBs through direct subsidisation and the distribution of free STBs to vulnerable populations. However, Senegal invested significant government funding in its transition and its state-owned broadcaster, TDS, now faces challenges in being financially self-sufficient. The involvement of greater private investment, as seen in Kenya and Tanzania, could assist with this challenge.

### 2.5.2.1 New roles for broadcasters and broadcasting funding

Having chosen to rely on government-owned broadcaster TDS, Senegal has faced challenges with sufficient funding. Notably, TDS’s funding continues to come primarily from the government, and the broadcaster has faced difficulties negotiating terms with channels and pay TV distributors, which are expected to pay for the use of TDS’s spectrum. As of 2020, the Senegalese government had invested CFA 39 billion (USD 62 million) in TDS.<sup>79</sup> While these difficulties have not resulted in legal challenges, as was seen in Kenya, they highlight the obstacles associated with new roles for actors in the audio-visual value chain. While content providers are no longer spending money developing and operating infrastructure as they did with analogue television, they are not yet accustomed to having to pay for access to airwaves.<sup>80</sup> Importantly, the challenge here relates not to insufficient spectrum for broadcasters, but rather to providers of television channels adjusting to their new roles under the digital broadcasting framework.<sup>81</sup>

### 2.5.2.2 Accessibility of STBs and inclusion

Senegal’s transition sought to ensure accessibility for all consumers. While most countries have taken steps to reduce STB costs, including by eliminating import duties and taxes as in Kenya and Tanzania, Senegal has gone further by directly subsidizing STBs. At the launch of the digital signal in 2015, STBs were subsidised to be one quarter of their market price, costing on average FCA 10,000 (USD 16) as compared to the market price of FCA 40,000 (USD 64).<sup>82</sup> To further increase availability for the most vulnerable consumers, in 2020, TDS distributed 120,000 STBs free of charge, funded via Senegal’s universal service fund, through its “TNT Tour Senegal” program.<sup>83</sup>

77 Interview with representative from the Regulatory Authority for Telecommunications and Post on June 30, 2022.

78 Interview with representative from the Regulatory Authority for Telecommunications and Post on June 30, 2022.

79 UNESCO, Creation of the independent company called “Société de Télédiffusion du Sénégal (TDS-SA)” (2020), available [here](#).

80 Interview with representative from Télédiffusion du Sénégal on June 23, 2022.

81 Interview with Regulatory Authority for Telecommunications and Post on June 30, 2022.

82 Conseil National de Régulation de l’Audiovisuel, Speech by the President of the Republic on the occasion of the transition from analogue television to digital television (June 18, 2015), available [here](#).

83 Télédiffusion du Sénégal, TDS-SA and the FDSUT offer 7000 decoders to vulnerable households in Saint-Louis to help finalize the digital transition (October 26, 2020), available [here](#).

FIGURE 20

KEY TAKEAWAYS FROM SENEGAL'S TRANSITION



Source: TMG.

2.5.3 Spectrum environment in Senegal after DSO



According to Senegal's National Table of Frequency Allocation, the 470-694 MHz range is allocated to broadcasting services, and utilised for DTT. The 694-790 MHz and 790-862 MHz bands are allocated to mobile services.<sup>84</sup>

TABLE 9

SUMMARY OF THE CURRENT USE OF THE FREQUENCY BAND 470-694 MHz IN SENEGAL

NTFA allocation	Current use	Number of TV programs	TV penetration (households)	Mobile penetration (unique subs)	UHF bands assigned to IMT
Broadcasting	DTT	80	63%	53.2%	800 MHz

Sources: ARTP, TDS, GSMA Intelligence, Dataxis.

As described in Table 9, Senegal's TV penetration rate is 63 percent, while its mobile penetration rate is about 53 percent.<sup>85</sup> According to TDS, currently about 80 television programs are offered throughout Senegal.<sup>86</sup> The region with the greatest television variety is Dakar, being covered by 14 different channels.<sup>87</sup> Based on the

spectrum utilisation aspects explained in the Annex, Figure 21 shows that Senegal, even considering its high number of television content offered, has sufficient spectrum to expand the allocation to mobile services below 694 MHz.

84 ARTP, National Frequency Allocation Table (2021), available [here](#).

85 TV household penetration rates for 2021 from Dataxis, Senegal Television Market Report, available [here](#). Mobile unique subscribers' penetration rates from GSMA Intelligence data.

86 Interview with representative from Télédiffusion du Sénégal on June 23, 2022.

87 ARTP, Tableau des télévisions autorisées au Sénégal (visited on August 31, 2022), available [here](#).



**FIGURE 21**

**SPECTRUM UTILISATION IN THE FREQUENCY BAND 470-694 MHz IN SENEGAL**

<b>112 MHz</b>	<b>112 MHz</b>
Existing DTT (14 CH)	Possibility for IMT use, while allowing DTT channel planning and expansion
<b>Total of 224 MHz between 470-694 MHz</b>	

Source: TMG.

**FIGURE 22**

**SENEGAL'S SPECTRUM ENVIRONMENT AFTER DSO**

<b>SPECTRUM ALLOCATED FOR DIGITAL BROADCASTING</b>	<b>NEW SPECTRUM ALLOCATED FOR MOBILE SERVICES</b>
470-694 MHz	694-790 MHz (DD2) 790-862 MHz (DD1)

Source: ARTP.



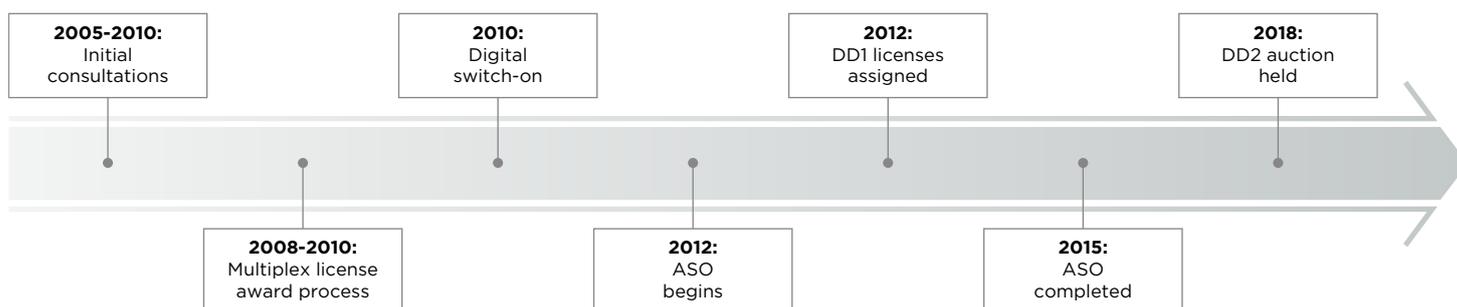
## Tanzania

Tanzania successfully completed its digital transition by the GEO6 Agreement deadline. Indeed, Tanzania was the first country in mainland Sub-Saharan Africa to begin switching off its analogue signal at the end of 2012.<sup>88</sup> Tanzania's transition benefitted from strong organisation, planning, and outreach, which led to

a smooth migration process. Tanzania further made the digital dividends in the 800 MHz and 700 MHz bands available to mobile operators in 2012 and 2018, respectively, allowing the country to benefit from the expansion of mobile services made possible by the switch to digital broadcasting.<sup>89</sup>

FIGURE 23

### TIMELINE OF TANZANIA'S DIGITAL MIGRATION



Source: TMG.

TABLE 10

### OVERVIEW OF TANZANIA'S DIGITAL MIGRATION

Key challenges	Lessons learned	Migration status	Digital dividend status
Adjustments to regulatory framework needed	Value of broad stakeholder engagement	ASO completed in 2015	DD1 administratively assigned in 2012 DD2 auctioned in 2018
STB pricing	Licencing approach	Consumer awareness	Funding sources used
Waived import duty and type approval fees	Unbundled, with private licensed signal distributors	Strong consumer awareness campaign implemented	Mix of government and private

Source: TMG.

88 Biztech Africa, Case study of digital TV switchover in Tanzania (July 29, 2013), available [here](#).

89 Interview with representatives of the Tanzania Communications Regulatory Authority on July 6, 2022.

### 2.3.1 Key background



Tanzania kicked off its migration process early, in 2005, with preliminary consultations with key stakeholders. This included a public consultation process held by the Tanzania Communications Regulatory Authority (TCRA) in August 2005, even prior to the formal adoption of the GEO6 Agreement.<sup>90</sup> This public consultation sought to gather inputs to provide recommendations for licencing and policy frameworks on digital broadcasting. This early consultation noted the extensive benefits of digital television broadcasting, as well as the anticipated challenges, including replacing analogue receivers, raising consumer awareness, the absence of an appropriate policy and regulatory framework for digital broadcasting, and the relatively nascent stage of the Tanzanian broadcasting markets.

This initial step was followed by a subsequent TCRA consultation in 2006, which presented a revised licensing framework. Tanzania's licensing strategy was to unbundle content generation and transmission, creating a new licence category of signal distributor/multiplex operator.<sup>91</sup> The consultation paper proposed the attribution of three multiplex licences – one public and two commercial – with the state broadcaster being divided into a signal distributor and a content

provider. This consultation also proposed a phased timeline, which noted specific actions taken and their objectives, as well as responsible entities.

The award process for multiplex licences began in April 2008, but the TCRA rejected the five expressions of interest it received.<sup>92</sup> A follow-up tender in July 2008 yielded seven applications, from which the TCRA awarded three licences in 2010 to Star Media Tanzania Limited, Basic Transmission Limited, and Agape Associates Limited.<sup>93</sup> Star Media is a joint venture between the Chinese company StarTimes and the Tanzanian broadcaster TBC, while the other two licensees are Tanzanian companies.<sup>94</sup>

Starting in 2011, the Tanzanian government conducted a broad consumer awareness campaign, which incorporated print and electronic media, roadshows, and outdoor advertising. The government further adopted a clearly identifiable logo associated with the transition, which was selected from a public competition that received over 70 submissions. The winner received a TZS 5 million (USD 2,146) prize.<sup>95</sup> The logo and campaign were launched with participation from the President in August 2011.<sup>96</sup> The government further took steps to make STBs more accessible to consumers, including by eliminating the applicable value-added tax (VAT) and import duties.<sup>97</sup>

#### Tanzania's Consumer Awareness Campaign

**Alerting consumers to the migration is a key step in the DSO process. Tanzania distinguished itself through the implementation of a diverse range of initiatives to raise consumer awareness, including a contest, a specialized logo, and a broad array of advertising.**

90 TCRA, Consultation Document on the Switchover from Analogue to Digital Broadcasting in Tanzania (August 8, 2005), available [here](#).

91 TCRA, Second Public Consultation Document on Migration from Analogue to Digital Broadcasting in Tanzania (August 2006), available [here](#).

92 Daily News, Dar es Salaam exemplary in digital broadcasting (June 3, 2013), available [here](#).

93 TCRA, List of Licensed Operators (May 2020), available [here](#).

94 Biztech Africa, Case study of digital TV switchover in Tanzania (July 29, 2013), available [here](#).

95 Biztech Africa, Tanzania readies for digital migration campaign (September 16, 2011), available [here](#).

96 TCRA, Digital Migration – Lessons from Tanzania (June 17, 2015), available [here](#).

97 Interview with representatives of the Tanzania Communications Regulatory Authority on July 6, 2022.



Following the digital switch-on in 2010, the ASO began in Tanzania in late 2012, starting in Dar es Salaam. This switch-off stimulated significant demand in Dar es Salaam for STBs in the first weeks of 2013. Despite demands from stakeholders such as the Media Owners Association of Tanzania in 2013 to extend the simulcast period to ensure more consumers could purchase STBs, there were no notable litigation efforts and the switch-off continued.<sup>98</sup> The ASO was completed on April 30, 2015.<sup>99</sup>

To ensure that Tanzania would realise the benefits from the digital dividend, the TCRA moved quickly following the start of the ASO to make the 800 MHz band available to mobile operators. This spectrum was administratively assigned to operators in 2012.<sup>100</sup> While more time was needed to ensure that the 700 MHz was fully available before it could be provided to operators, in 2018 the TCRA held a public auction for this band. In its press release, the TCRA highlighted its intention that the spectrum promote mobile broadband capabilities, lower costs as a result of the fewer base stations needed and expand mobile services to rural areas.<sup>101</sup>

98 The East African, Tanzania media owners demand switch back to analogue as TV screens go blank (March 13, 2013), available [here](#).

99 The Vanguard, Nigeria's digital migration failure: Lessons from Tanzania (June 24, 2015), available [here](#).

100 Interview with representatives of the Tanzania Communications Regulatory Authority on July 6, 2022.

101 TCRA, Results of the 700 MHz Spectrum Auction (June 8, 2018), available [here](#).

## 2.6.2 Notable challenges faced and key recommendations from Tanzania's experience



Despite Tanzania's careful planning, extensive consultations, and success in completing the ASO by the GE06 deadline, it experienced a small learning curve associated with the new regulatory regime for digital television broadcasting. However, Tanzania's experience can be seen as an example of how to manage the migration process successfully. In particular, Tanzania was highly successful regarding the key element of stakeholder engagement and was rewarded by a relatively smooth transition.

### 2.6.2.1 Relationship between content service providers and multiplex operators

While the introduction of a new licensing framework for digital television broadcasting involved consultations with stakeholders, the framework still required intervention from the TCRA in order to make it fit for purpose. In the lead up to the ASO, concerns were raised that the multiplex operator licensees were charging prohibitively high fees to content service providers. In a consultation paper issued in 2012, the TCRA found a wide range of fees, from USD

3,700 per transmitter per channel to USD 17,600 per channel.<sup>102</sup> Based on its own cost estimates, the TCRA ultimately set a regulated maximum carriage fee of USD 3,800 per channel.<sup>103</sup> This experience highlights the importance of a flexible approach to regulatory reforms, to ensure that new licensing frameworks are fit for purpose.

### 2.6.2.2 Stakeholder engagement

Tanzania's successful migration experience can be distinguished through its highly effective efforts to reach a broad range of stakeholders. For example, the TCRA held a preliminary consultation prior to issuing a new regulatory framework for a subsequent consultation, to ensure that stakeholder feedback was included in the framework. This preliminary consultation also allowed the government to first highlight the benefits of the digital migration for all parties prior to announcing a new regulatory framework. Tanzania's consultations further offered generous response deadlines of multiple months to ensure sufficient time for input from stakeholders. Other strategies used to ensure stakeholder engagement included frequent stakeholder meetings. Key stakeholders, including broadcasters, felt engaged throughout the process.<sup>104</sup>

FIGURE 24

## KEY TAKEAWAYS FROM TANZANIA'S TRANSITION



### ADJUSTMENTS TO REGULATORY FRAMEWORK

Refinements needed to ensure new regulatory framework was fit for purpose



### STAKEHOLDER ENGAGEMENT

Extensive consultations and stakeholder meetings throughout the migration process

Source: TMG.

## 2.6.3 Spectrum environment in Tanzania after DSO



According to Tanzania's 2017 National Table of Frequency Allocation, the 470-694 MHz range is allocated to broadcasting services and utilised for DTT in accordance with the GE06 Agreement. The adjacent 694-790 MHz and 790-862 MHz bands are recognised as the DD2 and DD1 bands, being allocated to fixed and mobile services and identified for IMT.<sup>105</sup>

102 Public consultation document on establishment of cost-based transmission fee for digital terrestrial television (DTT) charged by multiplex operators to content service providers.

103 Tanzania Communications Regulatory Authority, Digital Migration – Lessons from Tanzania (June 17, 2015), available [here](#).

104 GSMA, Digital Migration Process in Kenya, GSMA, p. 35 (January 2017), available [here](#).

105 TCRA, National Table of Frequency Allocation, available [here](#).

# 3. Conclusions

## 3.1 Key lessons learned



The migration experiences of the countries analysed in this report offer a range of valuable lessons for countries still completing their digital switchovers. Each country encountered challenges relating to funding, availability and cost of STBs, regulatory frameworks, consumer outreach, and legal and technical obstacles. From these experiences, three lessons stand out:

- First, countries must embrace **flexibility**, whether regarding funding, adjustments to regulatory frameworks, or responses to unexpected roadblocks.
- Second, **outreach to both consumers and key stakeholders** plays a key role in ensuring the successful completion of the digital migration.
- Third, the most essential part of the transition is ensuring the speedy and successful **assignment of the digital dividends**. As the key benefit to be derived from the transition to DTT, putting the newly available spectrum to use for mobile services is a hallmark of a successful migration.

FIGURE 27

KEY LESSONS LEARNED FOR A SUCCESSFUL DSO



Source: TMG.

### 3.1.1 Need for flexibility



Even countries with carefully considered plans for the migration must nevertheless be prepared to pivot or adjust as these plans are enacted. The most successful migrations studied in this report, Kenya and Tanzania, embraced flexibility to ensure that the overall goal of seeing the migration through to its completion and attributing the digital dividends was achieved.

Kenya, despite notable challenges not experienced by other countries, is a model in this regard: when public funding was insufficient, it turned to private investment, and despite unexpected legal challenges, it nevertheless managed to complete its transition by the deadline.

Tanzania, similarly, was willing to adjust its new regulatory framework regarding the fees charged by multiplex operators to ensure that it was working well for all actors in the broadcasting value chain. In contrast, several challenges faced by countries were in part due to a lack of flexibility, as seen with Senegal continuing to rely on public funding for its broadcaster as opposed to embracing private investment to overcome shortfalls.

### 3.1.2 Consideration of consumers and stakeholders



Consumer and stakeholder outreach similarly stands out as an essential element to a successful migration. Countries like Kenya and Tanzania experienced success in large part due to their concerted efforts to reach both key stakeholders and everyday consumers throughout their migrations. Similarly, Senegal's laudable efforts to communicate with consumers and provide the most vulnerable with STBs ensured an equitable transition. In contrast, Cameroon struggled with clear communication regarding deadlines, while Botswana experienced difficulties in highlighting the benefits and importance of the transition for consumers.

### 3.1.3 Importance of the digital dividends



Most importantly, the migration experiences analysed in this report all highlight the importance of making the digital dividends available for mobile services. The spectrum made available through the migration can offer significant value to Sub-Saharan African countries to allow the expansion of mobile services and greater connectivity. In particular, as highlighted for example by the Senegalese and Tanzanian governments, this spectrum can assist with expanding access in rural and underdeveloped areas.

The assignment of DD1 and DD2 in countries such as Cameroon, Kenya, and Tanzania following or during their migrations, and of DD1 in Senegal and Botswana, combined with the continuing success and availability of a significant number of TV channels for consumers highlights the win-win nature of the digital dividends: DTT allows ample spectrum for digital broadcasting, while also making new spectrum available for use by mobile services.

While countries such as Senegal and Botswana have not yet made DD2 available, the expansion into 5G services provides another important opportunity for this spectrum to be used in the most efficient and valuable manner. It is critical that countries take action to put this spectrum to use for mobile services, to not fall further behind other Sub-Saharan African countries and to realise the economic and social benefits of the digital dividend.

TABLE 12

## SUMMARY OF KEY CHALLENGES, LESSONS LEARNED, AND MIGRATION STATUS IN TARGET COUNTRIES

 Botswana		 Cameroon	
<b>Key challenges</b>	<b>Lessons learned</b>	<b>Key challenges</b>	<b>Lessons learned</b>
Choice of a less common standard; lack of consumer interest in switchover	Importance of STB availability and attractive content offerings	Absence of clear timeline for completion	Role of government engagement; value of diverse funding sources
<b>Migration status</b>	<b>Digital dividend status</b>	<b>Migration status</b>	<b>Digital dividend status</b>
ASO ongoing, with projected completion in Autumn 2022	DD1 partially auctioned in 2021	No clear timeline for ASO established	DD1 and DD2 administratively assigned in 2015 and 2019
 Kenya		 Senegal	
<b>Key challenges</b>	<b>Lessons learned</b>	<b>Key challenges</b>	<b>Lessons learned</b>
Value of strong consumer awareness campaigns; legal challenges from broadcasting industry	Benefits of strong efforts to drive down STB cost; Value of stakeholder inclusion	Ongoing broadcaster funding by government	Benefits of wide availability of STBs; importance of private investment
<b>Migration status</b>	<b>Digital dividend status</b>	<b>Migration status</b>	<b>Digital dividend status</b>
ASO completed in 2015	DD1 administratively assigned in 2016 DD2 administratively assigned in 2017	ASO ongoing, with completion anticipated in 2022	DD1 administratively assigned between 2016 and 2021 Plans for DD2 to be used for 5G services
 Tanzania			
<b>Key challenges</b>	<b>Lessons learned</b>		
Minor adjustments to regulatory framework needed	Value of broad stakeholder engagement		
<b>Migration status</b>	<b>Digital dividend status</b>		
ASO completed in 2015	DD1 administratively assigned in 2012 DD2 auctioned in 2018		

Source: TMG.

TABLE 13

## SUMMARY OF TRENDS AMONG COUNTRIES ANALYSED



Botswana

STB pricing	Licencing approach
Local government and foreign government support	Both unbundled and hybrid licences offered
Consumer awareness	Funding sources used
Planned, but level of implementation unclear	Government with some foreign public



Cameroon

STB pricing	Licencing approach
No direct action taken	Partially unbundled, with distinct role for government broadcaster
Consumer awareness	Funding sources used
Not extensive	Mix of government and foreign private



Kenya

STB pricing	Licencing approach
Waived VAT and import duty	Unbundled, with private licenced signal distributors
Consumer awareness	Funding sources used
Strong consumer awareness campaign implemented	Mix of government and foreign private



Senegal

STB pricing	Licencing approach
Subsidised costs directly	Unbundled, with government signal distributor
Consumer awareness	Funding sources used
Campaign implemented	Government with some local private



Tanzania

STB pricing	Licencing approach
Waived import duty and type approval fees	Unbundled, with private licenced signal distributors
Consumer awareness	Funding sources used
Strong consumer awareness campaign implemented	Mix of government and private

Source: TMG.

## 3.2 Looking ahead: the ITU 2023 World Radiocommunication Conference

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At the upcoming WRC-23, Sub-Saharan African countries, as part of Region 1, will have the opportunity to review the current use of the UHF band, and in particular the 470-694 MHz frequency range. Based on the information available in the countries studied, and supplemental analysis provided in the Annex, strong evidence exists that the 470-694 MHz band can provide more spectrum than needed for existing and future broadcasting applications. In the representative countries analysed, excess spectrum is currently available to support the number of TV program offerings.

As a result, at WRC-23 countries should consider reallocating part of the unused spectrum of the 470-694 MHz band for mobile use, where it can bring additional benefits to Sub-Saharan African countries, in particular as 4G and 5G services expand and develop in the region. For example, the 600 MHz frequency band is an ideal candidate to be allocated to mobile services and identified for IMT to provide highly valuable spectrum with limited impact on the broadcasting sector.

For countries that have not yet assigned the DD1 and DD2 spectrum to mobile operators, this reallocation provides an opportunity to catch up with peer countries by assigning DD1, DD2, and new spectrum in the 600 MHz band at the same time.



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