

# DISCUSSION DOCUMENT ON DIGITAL SOUND BROADCASTING

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## 1. Introduction

SENTECH thanks the Independent Communications Authority of South Africa (“Authority”) for the opportunity to make a submission on the *Discussion Document on Digital Sound Broadcasting* (“Discussion document”) Government Gazette No. 41534, as published on 29 March 2018. SENTECH further indicates its willingness to participate in any hearings that the Authority may hold on the matters raised in the Discussion Document.

SENTECH is of the view that the radio frequency band 174 – 240 MHz requires urgent attention with respect to the regulatory licensing framework in compliance with section 4(7)(b) of the ECA. The radio frequency plan regulation have already been gazetted; the broadcasting industry has already indicated its readiness; and the receiver devices (desktop and car) are already available, with the latter being standard in certain brand of cars. The digitalisation of the AM and FM bands will likely be market driven.

## 2. Role of the Authority: Digital Sound Broadcasting

SENTECH acknowledges the roles of the Minister, in terms of section 3 of the ECA, and that of the Authority, in terms of section 3A (a) of the ICASA Act, with regards to policy making and policy consideration. The point of consideration for SENTECH is with regards to the powers of the Authority as enacted in the ECA and ICASA Act in relation to the introduction of DSB services in the absence of a policy or policy direction. SENTECH is of the view that the Authority is empowered to introduce DSB services through the prescription of regulations within the current regulatory framework. This view holds even with the absence of a policy or policy direction. The National Radio Frequency Plan 2018 (NRFP-18) in compliance with the ECA is required to “provide for flexibility and the rapid and efficient introduction of new-technologies”<sup>1</sup> and “aim at providing opportunities for the introduction of the widest range of services and the maximum number of users thereof as is practically feasible”<sup>2</sup>. The introduction of DSB services will not negatively impact on the allocations made in terms of the NRFP-18 nor will they introduce nonconformity with the frequency plan and coordination requirements as stated in the revised Terrestrial Broadcasting Frequency Plan 2013 (TBRFP-13). Therefore, the Authority will be within its mandate to introduce DSB services through regulations.

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<sup>1</sup> Section 34(6)(e) of the ECA

<sup>2</sup> Section 34(6)(f) of the ECA

## 2.1. Services licences

SENTECH is of the view that the ECA currently empowers the Authority to issue an ITA with regards to the licencing of an individual broadcasting services licence, even with the absence of a policy or policy direction. Section 9 of the ECA provides licensing guidelines to the Authority for the licensing an individual broadcasting services licence/s. Section 16 and 17 of the ECA relates to the guidelines for the licencing of class broadcasting services licence, even with the absence of a policy or policy direction. SENTECH's interpretation of section 3 of the ECA implies discretionary and not mandatory action on the Ministers part.

## 2.2. Spectrum redeployment

SENTECH would like to argue that the introduction of DSB services within existing terrestrial audio services (i.e. FM, AM and SW) is in line with spectrum management principle: spectrum redeployment. ITU-R SM.1603-2 defines this principle as following:

*Spectrum redeployment (spectrum refarming) is a combination of administrative, financial and technical measures aimed at removing users or equipment of the existing frequency assignments either completely or partially from a particular frequency band. The frequency band may then be allocated to the same or different service(s). These measures may be implemented in short, medium or long time-scales.<sup>3</sup>*

As stated previously, the introduction of DSB services is within the current allocation in the NRFP-18. Spectrum refarming for DSB does not only seek to enhance spectrum efficiencies (more service per radio frequency spectrum), but empower the following;

- I. Extension of coverage for existing services (e.g. language and type);
- II. Ensure terrestrial audio services are still competitive and relevant in the digital economy & society;
- III. Address the spectrum shortage in metropolitan areas; and
- IV. Introduce new services (i.e. plurality and format);

It is important to note that some DSB technologies enable the broadcast of analogue and digital services simultaneously, without the need of migrating listeners from inception. Spectrum refarming for DSB will also introduce spectrum sharing in compliance with section 30(2) (b). Spectrum refarming for DSB will require the Authority and industry to have a strategy addressing the following:

- I. Linking requirements for new services;

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<sup>3</sup> [https://www.itu.int/dms\\_pubrec/itu-r/rec/sm/R-REC-SM.1603-2-201408-!!!PDF-E.pdf](https://www.itu.int/dms_pubrec/itu-r/rec/sm/R-REC-SM.1603-2-201408-!!!PDF-E.pdf)

- II. Licensing of DSB for existing services (i.e. obligations, duplication of services, etc.);
- III. The role and accommodation of OTT services;
- IV. The impact of deploying different technologies within each band;
- V. Whether the Authority intends on introducing switch-off date for analogue services;
- VI. Whether DSB has the consequence of impacting the current licencing regime (IECNS (multiplex operators), content providers);
- VII. Licensing criteria (analogue vs digital, public tender process for IECNS (multiplex operators));
- VIII. The extent of DSB impact on existing standards and terms regulations (e.g. content, validity, etc.);
- IX. Exemption to FTA services from paying spectrum fees;
- X. The introduction of subscription audio services and the need for must-carry principles;
- XI. Should current licensees be protection when introducing new entrants; and
- XII. The impact of introducing DSB services (SW, AM and VHF FM) on content regulations;

## **2.3. Spectrum licences**

SENTECH is of the view that sections (2) (a)-(b), (d)-(e), 30(2) (b) - (d) of the ECA not only empowers but also encourages the Authority to positively consider the introduction of DSB services. Section 30(3) of the ECA requires the Authority to introduce DSB services without the introduction of unwanted interference on existing services. As previously acknowledged by the Authority during the public discussions on the Draft Radio Frequency

Spectrum Assignment Plans, sections 2 (d) and 4, read with sections 30, 31(4), and 33 of the ECA and read with the TBRFP-13 regulations enable the Authority to introduce regulations for terrestrial DSB services. Section 4(1)(a) and (2) empowers the Authority to make regulation on technology issues similarly to the public discussions previously held by ICASA on the *Draft Radio Frequency Spectrum Assignment Plan* for IMT services.

## **3. Importance of Digital Sound Broadcasting**

The importance of digital sound broadcasting (DSB) for listeners, broadcasters, ECNS licensees and the Government can be summarised as following:

- I. Listeners are exposed to greater choice in terms of language, variety and format; better reception quality; programming for niche markets and new features such as OTT services;
- II. Broadcasters are empowered to provide innovative services in view of increased competition from other platforms; improved ability to target audience; and improved cost-efficiencies with regards to signal distribution;
- III. ECNS licensees are empowered to diversify services and revenue whilst making use of existing infrastructure as a consequence of the huge range of receiver products and developments in interactivity;
- IV. Innovations such as a “pop-up” / on-demand radio is primed for Government imperatives;
- V. DSB will assist in the annihilation of historic borders based on language and culture, radio services based on all languages can be available nationally.

## 4. Licensing Framework

Based on the lessons learned consequence of the digital terrestrial television (DTT) migration process, SENTECH advocates that the licensing framework for a multichannel environment based on spectrum sharing principles requires a review of the licensing process. SENTECH proposes the review of the following principles:

- I. Multiplex assignment of dissimilar operating models for services; and
- II. Spectrum assignment to terrestrial broadcasters;

The challenges faced by ECNS licensees offering national terrestrial signal distribution services on the same multiplex to a FTA commercial broadcaster and subscription broadcaster has proved challenging. The difference in the operational model of each broadcaster makes spectrum sharing implementation less than ideal. Some of the challenges SENTECH faced were with regards to both broadcasters require dissimilar number of sites and coverage areas. In the configuration of either SFN and/or MFN the challenge created for ECNS licensees is that of underutilised multiplex capacity and subsequently challenges of cost recovery. Similar challenges are faced when a national content provider shares a multiplex with a local content provider.

To address the challenges proposed, SENTECH advocates for the Authority to consider the UK Broadcasting Act of 1996 (as amended)<sup>4</sup> in particular sections 46, 47 and 54. Taking into consideration the Broadcasting Act and Electronic Communications Act, SENTECH argues that the principles highlighted in the UK Broadcasting Act of 1996 (as amended) can be

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<sup>4</sup> <http://www.legislation.gov.uk/ukpga/1996/55/contents>

implemented without contradicting the three (3) South African Acts: Broadcasting Act, EC Act and ICASA Act provisioned principles.

In a multichannel and/or spectrum sharing environment SENTECH recommends radio frequency spectrum for terrestrial broadcasting services be assigned to an ECNS licensee/s. Interpreting sections 2 (Object of Broadcasting Act); (d), (e), (i), (k), (o), (p), (q) and (r), SENTECH is of the view that assigning radio frequency spectrum to licensees will enhance the spirit of the Broadcasting Act of 1999.

## 5. SENTECH's Responses to the Questions

### 5.1. Question 1

**Question 1:** *Is there a need for the introduction of DSB technologies in South Africa? Motivate your answer?*

In section 2.1 – 2.4 the Authority succinctly provides motivation for the introduction of DSB in South Africa. SENTECH is therefore in agreement with the Authority that DSB will enable sound broadcasting to transform with the digital age of instant gratification by offering more choices (services and modes of reception) to listeners; increase revenue opportunities for broadcasters, content providers and ENCS licensees; alleviate the Metropolitan FM spectrum congestion; enable more services for underserved areas due to more affordable cost of implementation; empower the introduction of new broadcasters and content providers; and enable broadcasters and content providers to offer differentiated content, leveraging additional functionality not currently available on terrestrial analogue sound broadcasting.

Pereira & Romero (2017) in their article *A review of the meanings and implications of the Industry 4.0 concept* argue that the digital transformation potentiated by the Industry 4.0 (4IR: fourth industrial revolution) will mainly affect the following six areas: “(1) Industry, (2) Products and services, (3) Business models and market, (4) Economy, (5) Work environment and (6) Skills development”<sup>5</sup>. Just like the previous three industrial revolutions,

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<sup>5</sup> Pereira, A.C. and Romero, F. (2017). A review of the meanings and the implications of the Industry 4.0. concept. *Procedia Manufacturing*, 13, 1206 – 1214. <https://doi.org/10.1016/j.promfg.2017.09.032>

the 4IR is driven by smart manufacturing and 4IR is enabled by IoT, robotics, artificial intelligence, connectivity, automation, cloud computing, big data, etc.

It is also important to note that the definition of digital transformation is influenced by the context of the environment affected, such as; a) government departments; b) state owned companies; c) private sector; d) higher education; and e) country's technology status. Digital transformation is an "industry-agnostic" strategic journey involving the holistic metamorphosis and integration of the institution's structures, procedures, operational models, proficiencies, etc. The sole purpose and intention of digital transformation is to prioritise and optimise overall efficiencies, and leverage on prospects created as a consequence of the pervasive technology adoption and usage, innovation, diversity, rivalry, changes in societal expectations and regulatory framework. Digital transformation relates to the ability of institutions to speedily adapt and succeed in the attainment of core competencies in a rapidly changing environment, despite the challenges<sup>6</sup>.

Therefore an enabling regulatory environment for the implementation of DSB empowers the industry to maintain a strong identity; capture new listeners; innovate by enabling seamless listening of analogue, digital and IP based audio services through hybrid radio. Digital transformation of the industry enable provision of a blend of services (linear, semi-linear and fully personalised) with Internet access augmenting audio customer experience. Listeners are empowered to interact with devices in more innovative ways, for example the ability to have a personalised relationship with the broadcaster and the ability to book content for later listening or listening to content on a different device. In short, the introduction of DSB in an enabling regulatory framework is fundamental to the survival and growth of radio as a free to air (FTA) service in the digital economy and society.

## 5.2. Question 2

**Question 2:** *Do you think the list of technical standards to which the DSB equipment must conform are exhaustive? Motivate your response and suggest other equipment technical standards?*

SENTECH advocates for the status quo in relation to the mandate of the SABS taking into consideration the former's relationship with the Authority. That is, the SABS principles and processes in place adequately addresses this matter.

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<sup>6</sup> <https://www.i-scoop.eu/digital-transformation/>

The ability to implement multiple standards for DSB will also be depended on the ability of the systems to coexist without introducing unwanted interference and the ability of the technologies to operate within the coordinated frequency plan.

### 5.3. Question 3

**Question 3:** *In the absence of a policy directive for providing standard for DSB, should the Authority provide licences for other DSB technologies? Please motivate your answer*

The purpose of the policy directive requirement with respect to DSB is different to the need of the same for DTT migration requirement. With the latter, a lot hinged on the policy directive as the State funded network infrastructure requirements and the subsidy of set-top-boxes (STBs) for certain households. With regard to the former, the digitalisation is most likely going to be funded by the industry and the Minister of Communications is probably not empowered to impose any particular standard. Therefore, SENTECH advances the view that existing licensees are empowered to introduce DSB.

SENTECH interprets section 3(1) (d) of the ECA to imply that the Minister has discretion to make policies on the general application of terrestrial DSB services and not with regards to issuing a policy advancing a particular technology. SENTECH also advances the opinion that by ratifying the Final Acts of RRC-06, South Africa has subsequently adopted DAB frequency plan in the VHF band III. SENTECH believes that the outcome of RRC-06 should be interpreted in the same context as the proceedings of the World Radiocommunication Conference because of the active involvement of the industry in supporting country positions. Therefore the ratification of the Final Acts of RRC-06 was done after the participation of the broadcasting industry.

SENTECH acknowledges that the EC Act is a technology neutral legislation and therefore empowers the Authority to “*provide licences for other DSB technologies*” in the radio frequency bands where currently terrestrial analogue audio services are deployed. This view is also supported by section 4(1) (a) and 5(1) of the ECA read together with 5(3) (e). But there is a requirement for an enabling regulatory framework. In this regulatory framework the Authority is advised to address the following:

- XIII. Linking requirements for new services;
- XIV. Licensing of DSB for existing services (i.e. obligations, duplication of services, etc.);
- XV. The role and accommodation of OTT services;
- XVI. The impact of deploying different technologies within each band;
- XVII. Whether the Authority intends on introducing switch-off date for analogue services;

- XVIII. Whether DSB has the consequence of impacting the current licencing regime (IECNS (multiplex operators), content providers);
- XIX. Licensing criteria (analogue vs digital, public tender process for IECNS (multiplex operators));
- XX. The extent of DSB impact on existing standards and terms regulations (e.g. content, validity, etc.);
- XXI. Exemption to FTA services from paying spectrum fees;
- XXII. The introduction of subscription audio services and the need for must-carry principles;
- XXIII. Should current licensees be protection when introducing new entrants;
- XXIV. Accessibility of services and devices for people with disabilities; and
- XXV. The impact of introducing DSB (SW, AM, VHF FM and VHF band III) on content regulations; <sup>7</sup>

## 5.4. Question 4

**Question 4:** *South Africa through its international agreements at ITU and SADC level agreed on DAB+ and DRM systems. Please indicate which other digital sound broadcasting technology (ies) if any should be considered for South Africa? Please motivate.*

As an IECNS licensee, SENTECH supports the technology neutrality principle of the ECA. SENTECH can reconcile its support for technology neutrality and the support of DAB+ & DRM/+ on the basis that the trials on the latter where at the request and support of existing broadcasters. As an ECNS licensee that provides technical expertise to valid licenced broadcasters, SENTECH is inclined to support technologies requested by its clients. SENTECH acknowledges the existence of technologies can coexist without negatively impacting on each other, the choice of technology.....

## 5.5. Question 5

**Question 5:** *To use the spectrum efficiently, the digital sound broadcasting network can be planned on a Single Frequency Network. Do you think that it would be applicable for purposes of digital sound broadcasting? Please motivate.*

With lessons learned from the DTT migration process, requirements of terrestrial community audio broadcasters must be thought of differently to those of individual licensees. Although use of single frequency networks is more spectrum efficient with the added benefit of

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<sup>7</sup> [https://www.worlddab.org/public\\_document/file/521/EBU-MIS\\_Digital\\_Radio\\_Toolkit.pdf?1418724468](https://www.worlddab.org/public_document/file/521/EBU-MIS_Digital_Radio_Toolkit.pdf?1418724468)

network gain in digital systems, all content in an SFN must be identical from the different transmitter sites and be synchronized in time. In a multi-channel and radio frequency sharing conditions, large area SFNs limit the flexibility of individual broadcasters to determine their footprints. Provincial sized SFNs will force all broadcasters sharing a multiplex to have the same coverage footprint. Large SFNs do not empower the adoption of the three tiers (public, commercial and community) of sound broadcasters' license conditions and business models. It is therefore proposed that a combination of SFNs for the main metropolitan areas and MFNs for rural areas be adopted.

SENTECH therefore supports a regulatory framework catering for all categories of broadcasting. With regards to VHF band III, kindly refer to Annexure A.

## **5.6. Question 6**

*6.1 Should the Authority consider one or more mux operator(s) for DSB? Please motivate.*

In the spirit of creating a fair and just process, SENTECH proposes that a public tender process similar to what was envisioned in the Digital migration Regulations, particular sub-regulation 9, should be considered by the Authority. Additionally, in a multichannel and/or spectrum sharing environment SENTECH recommends radio frequency spectrum for terrestrial broadcasting services be assigned to ECNS licensees. ECNS licensees will also be empowered to seek innovative ways of revenue diversification and consequently reduce of dependency on traditional broadcasting.

The 4IR has enforced ICT regulatory reform as a consequence of the transformational nature of communications, the fast evolving technological environment and the increase in mass personalised production. The transformation has created a 4<sup>th</sup> generation regulator whose task has been expanded beyond addressing traditional issues with regards to technology convergence and competition issues (inter-licensees and/or versus unlicensed operators). But also to address socioeconomic issues of social growth, social inclusion, economic growth, social development, etc. Figure 1 below illustrates the scope of the 4<sup>th</sup> generation regulator as a consequence of socioeconomic policies. Therefore the public tender process is in line with the requirement of a 4<sup>th</sup> generation regulator.

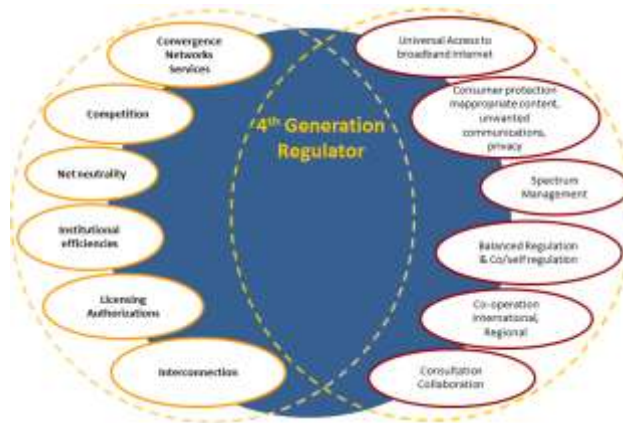


Figure 1: 4<sup>th</sup> Generation Regulator (source: ITU)

6.2 Would you propose a total switch – off of the traditional analogue AM and FM sound broadcasting? Please motivate.

For operational purposes, there will be a requirement for terrestrial analogue audio switch-off strategy. Since digital and analogue sound broadcasting can be operated successfully simultaneously, SENTECH proposes an annual measure of DSB take up. Through public participation process the Authority can determine the percentage take up required to commence analogue switch-off.

## 5.7. Question 7

**Question 7:** Should the Authority adopt the strategy used in other international markets of licensing DSB services in the primary markets first and then a nationwide rollout? Please motivate.

SENTECH does not support the strategy seeking to introduce DSB initially for primary markets. The introduction of DSB must be in compliances with objects of the ECA, in particular section 2(g), (h), (k), (s) (i) and (t). DSB services should enable the leapfrogging on addressing national, regional and local inequalities that analogue services were hindered to address. The Authority also needs to address the issue of digital divide through the introduction of DSB services.

## 5.8. Question 8

**Question 8:** Can the current sound broadcasting market afford new DSB licensees in community, commercial and public service? In your answer, explain your reasons and/or choice for any of your submission.

SENTECH is not clear what the intention of question 8 is. There are too many variables to consider in answering such a broad based question.

### **5.9. Question 9**

SENTECH submits that the Authority erred by not including a specific question on how DSB (services and devices) will empower maximum participation of people with disabilities, taking into consideration the interactivity introduced within the DSB services.

## **6. Conclusion**

SENTECH thanks the Authority again for the opportunity to make a submission on the discussion document. SENTECH in its submission argues for the Authority to proceed with establishment of regulatory framework for the introduction of terrestrial DSB services.

# 1. Annexure A: DAB spectrum for South Africa

The outcome of the Regional Radiocommunication Conference 2006 (RRC06) planning conference, was a coordinated T-DAB allotment plan for Region 1. The status of the allocation is recognised in the South African National Frequency Plan of 2013, table of frequency allocations. In 2013 during the revision of the Terrestrial Broadcasting Frequency Regulations, ICASA included the RRC06 T-DAB allotment plan in the plan as Annex D as illustrated below;

NO	PROVINCE	FREQ (MHZ)	FREQUENCY BLOCK BANDWIDTH (MHZ)	CH	SFN
1	Eastern Cape	220,352	219.584 - 221.120	11C	DAB01
2	Eastern Cape	227.360	226.592 - 228.128	12C	DAB02
3	Free State	220,352	219.584 - 221.120	11C	DAB03
4	Free State	227.360	226.592 - 228.128	12C	DAB04
5	Gauteng	216,928	216.160 - 217.696	11A	DAB05
6	Gauteng	223,936	223.168 - 224.704	12A	DAB06
7	KZN	216,928	216.160 - 217.696	11A	DAB07
8	KZN	223,936	223.168 - 224.704	12A	DAB08
9	Limpopo	220,352	219.584 - 221.120	11C	DAB09
10	Limpopo	227.360	226.592 - 228.128	12C	DAB10
11	Mpumalanga	218.640	217.872 - 219.408	11B	DAB11
12	Mpumalanga	225,648	224.880 - 226.416	12B	DAB12
13	North West	218.640	217.872 - 219.408	11B	DAB13
14	North West	225,648	224.880 - 226.416	12B	DAB14
15	Northern Cape	222,064	221.296 - 222.832	11D	DAB15
16	Northern Cape	229,072	228.304 - 229.840	12D	DAB16
17	Western Cape	216,928	216.160 - 217.696	11A	DAB17
18	Western Cape	223,936	223.168 - 224.704	12A	DAB18

The usage of the radio frequency channels 11D/12D allotment in Northern Cape will require approval in compliance with the *Regulations on the Protection of the Karoo Central Astronomy Advantage Areas in Terms of the Astronomy Geographic Advantage* gazette No. 41321 as published on 15 December 2017. Post ASO, digital sound broadcasting will be sharing the VHF Band III with DTT services;

- I. DTT: 174 – 214 MHz; and

II. DAB: 214 – 230 MHz;

## 1.1. Challenges

It is important to note that the coordinated DAB frequency plan assumed provincial SFNs in the TBRFP-13. Taking into consideration challenges experienced on the DTT implementation, it is not advisable for class licensees to share a multiplex with individual licences. Co-sharing a multiplex will require a class licensee to expand their coverage from district municipality to provincial. The Authority is also cognizant that existing audio class services' coverage area cannot exceed a District Municipality as stated in sub-regulation 3(1) of the *Standard Terms and Conditions for Class Licences Regulations*.

## 1.2. Proposed Solution

In its submission on the *Draft Update of the National Radio Frequency Plan (2016)*, SENTECH proposed to the Authority that the 174 – 240 MHz band be shared between terrestrial digital sound and television broadcasting. SENTECH is confident that the implementation of both services can be successfully co-ordinated. Chapter 3 to Annex 2 of the 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) provides guidelines on the mitigation of interference between DAB and DVB-T.

SENTECH also proposed that the broadcasting band be extended by 2 MHz from 238 to 240 MHz to enable the immediate implementation of digital sound broadcasting, in particular DAB+ standard. In the event that the Authority agrees with the proposal, SENTECH recommended the band 246 – 254 MHz be made available for PMR and/or PAMR in place of the band 238 – 242.95 MHz.

DAB+ trials were undertaken on the channel 13F (239.2 MHz). The receivers used during the trial have a tuning range extending to 240 MHz and the single frequency (239.2 MHz centre frequency with bandwidth of 1.536 MHz) will allow SFNs to be implemented in all metro areas immediately, with the total population coverage of greater than 50%. In order to ensure that terrestrial analogue television services are not affected, the allocation for PMR and/or PAMR should be effective post ASO.

The current DAB plan can be used to implement terrestrial commercial and public sound broadcasting services, i.e. Individual audio broadcasting licensees (regional and/or national). The band 230 – 238 MHz has been allocated to broadcasting services in terms of the National Frequency Plan 2013 Regulations and therefore is available for DAB assignments.

Therefore, the following channels can be used for DAB assignment to Individual (regional) and Class (district municipality) audio broadcasting licensees;

Channel	Lower Limit	Centre Frequency	Upper Limit	Availability
10D	215071	215072	215073	Mpumalanga and Western Cape
11D	221,296	222,064	222,832	KZN
12D	228,304	229,072	229,84	Gauteng
13A	230,016	230,784	231,552	Nationally
13B	231,728	232,496	233,264	Nationally
13C	233,44	234,208	234,976	Nationally
13D	235,008	235,776	236,544	Nationally
13E	236,72	237,488	238,256	Nationally
13F	238,432	239,2	239,968	Nationally

### 1.3. DAB: VHF Band III (Neighbouring Countries)

The tables below indicate the coordinated DAB channel allotment shared between Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland and Zimbabwe.

<b>10A</b>	209.936
<b>10B</b>	211.648
<b>10C</b>	213.36
<b>10D</b>	215.072

<b>11A</b>	216.928
<b>11B</b>	218.64
<b>11C</b>	220.352
<b>11D</b>	222.064

<b>12A</b>	223.936
<b>12B</b>	225.648
<b>12C</b>	227.36
<b>12D</b>	229.072

### 1.4. DAB Neighbouring Country's Allocation

The tables presented in this section illustrates the DAB radio frequency allotment allocation of neighbouring countries in reference to South Africa's provinces.

#### 1.4.1. Botswana

The table below indicates the channel allotment for regions of Botswana neighbouring South Africa and the Provinces neighbouring Botswana.

Botswana		
West	South East	Central





#### 1.4.4. Namibia

The table below indicates the channel allotment for regions of Namibia neighbouring South Africa and the Province neighbouring Namibia.

	Namibia			
	Karas		Hardap	
Northern Cape	11A	12A	11B	12B



#### 1.4.5. Swaziland

The table below indicates the channel allotment for the entire Swaziland and the Provinces neighbouring Swaziland.

	Swaziland
Kwa-Zulu Natal	12D
Mpumalanga	12D

## 1.4.6. Zimbabwe

The table below indicates the channel allotment for regions of Zimbabwe neighbouring South Africa and the Province neighbouring Zimbabwe.

	Zimbabwe			
	Matabeleland South		Masvingo	
Limpopo	11B	12B	11D	12D

