INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NOTICE 161 OF 2018

ELECTRONIC COMMUNICATIONS ACT, 2005 (ACT NO. 36 OF 2005)

DISCUSSION DOCUMENT ON DIGITAL SOUND BROADCASTING

1. The Independent Communications Authority of South Africa ("the Authority") hereby gives notice of its intention to conduct an inquiry in terms of section 4B of the Independent Communications Authority of South Africa Act no. 13 of 2000 (ICASA Act).

2. The purpose of this inquiry is:

   2.1 To examine the prospects of implementation of Digital Sound Broadcasting ("DSB") services in South Africa; and

   2.2 To examine the manner in which the implementation of DSB services can improve spectrum efficiency and management.

3. Interested parties are hereby invited to make written representations on the attached Discussion Document on DSB ("Discussion Document") by no later than 16h00 within forty-five (45) working days of the publication of this Notice in the Government Gazette.

4. Written representations may be submitted to the Authority by post or email or facsimile or by hand delivery and must be addressed to:

Attention: Mr. Ndumiso Dana,

Block A, Pinmill Farm, 164 Katherine Street, Sandton,

2146, or by email at: ndana@icasa.org.za

or facsimile transmission at: 0115663818.

5. A copy of the Discussion Document will be made available at the Authority's Head Office library situated at: Block D, Pinmill Farm, 164 Katherine Street, Sandton and on its website at www.icasa.org.za.

6. Interested parties wishing to participate in oral presentations/hearings must indicate their willingness to do so in their submission.

7. Interested parties may request that specific information of their written representation be treated as confidential as envisaged in section 4D of the ICASA Act. In adhering to the provisions of section 4D (1) (b) and (4) of the ICASA Act[1], Interested parties must not just simply indicate that the information, for example is financial, commercial or technical, but must provide a detailed explanation(s) how such information is likely to cause harm to their commercial or financial interest or prejudice a third party if it were to be in the public domain. A confidential and non-confidential version of the written representation must be submitted with the request for confidentiality.

[1] Act No. 13 of 2000

8. Enquiries should be directed to Mr. Ndumiso Dana between 10h00 and 16h00, Monday to Friday via the email address provided above or by telephone at (011) 566 3817.

RUBBEN MOHLALOGA

CHAIRPERSON

DATE: 15/03/2018

Independent Communications Authority of South Africa

Pinmill Farm, 164 Katherine Street, Sandton
Private Bag X1002, Sandton, 2146

DISCUSSION DOCUMENT ON DIGITAL SOUND BROADCASTING

MARCH 2018

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Abbreviations

ACMA	Australian Communications and Media Authority
AfriSWoG	African Spectrum Working Group
AM	Amplitude Modulation
ATU	African Telecommunications Union
BBC	British Broadcasting Corporation
BRC	Broadcast Research Council of South Africa
CD	Compact Disc
CRASA	Communications Regulators Association of Southern Africa
DAB	Digital Audio Broadcasting
DAB+	Digital Audio Broadcasting Plus
DMB	Digital Multimedia Broadcasting
DB	Decibel
DoC	Department of Communications
DRM	Digital Radio Mondiale
DRM+	Digital Radio Mondiale Plus
DRM30	Digital Radio Mondiale Thirty
DSB	Digital Sound Broadcasting
DTT	Digital Terrestrial Television
DVB-S	Digital Video Broadcasting – Satellite
DVB-T	Digital Video Broadcasting — Terrestrial
ECA	Electronic Communications Act
EMC	Electromagnetic Compatibility
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission
FM	Frequency Modulation
GCIS	Government Communication and Information System
GE06	Geneva 2006 ITU Final Acts of the Regional Radiocommunication Conference for planning of the digital terrestrial broadcasting
GE84	Geneva 1984 ITU Final Acts of the Regional Radiocommunication Conference for planning of the digital terrestrial broadcasting
HD	High Definition

IBOC	In-Band On Channel
ICASA	Independent Communications Authority of South Africa
ICASA Act	Independent Communications Authority of South Africa Act no. 13 of 2000, as amended
ICT	Information and Communication Technology
ISDB-S	Integrated Services Digital Broadcasting - Single-carrier
ISDB-T	Integrated Services Digital Broadcasting – Terrestrial
ISDB-TSB	Integrated Services Digital Broadcasting for Terrestrial Sound Broadcasting
ITU	International Telecommunication Union
kHz	kilohertz
kW	Kilowatt
MDDA	Media Development and Diversity Agency
MER	Modulation Error Ratio
MHz	Megahertz
MW	Medium Wave
OFCOM	Office of Communications
OFDM	Orthogonal Frequency Division Multiplexing
QAM	Quadrature Amplitude Modulation
RAMS	Radio Audience Measurements Survey
RAVIS	Real-time AudioVisual Information System
RRC-06	Regional Radiocommunication Conference 2006
SABC	South African Broadcasting Corporation
SABS	South African Bureau of Standards
SADC	Southern African Development Community
SANS	South African National Standards
SFN	Single Frequency Network
SKA	Square Kilometre Array
TBFP	Terrestrial Broadcasting Frequency Plan
UK	United Kingdom
USA	United States of America
VHF	Very High Frequency

WECODEC Westbury Community Development Centre

1. Introduction and Purpose

1.1 Section 4 (3) (c) of the ICASA Act states that the Authority must control, plan, administer and manage the use and licensing of the radio frequency spectrum in accordance with bilateral agreements or international treaties entered into by the Republic.

1.2 South Africa is a member of regional, continental and international organisations and is bound by the Regional Radiocommunication Conference 2006 agreement (RRC-06) which, on 16 June 2006, resolved to switch from analogue to digital broadcasting services by 17 June 2015. This agreement prompted the Broadcasting Digital Migration Policy ("Policy"), which sets out South Africa's parameters in migrating the country's television broadcasting format from an analogue to a digital platform.

1.3 The current digital migration process from analogue to digital broadcasting services for television will allow the freed-up spectrum to be utilised for DSB amongst other uses.[1]. The policy has not made provision for sound broadcasting services and has thus left the FM and MW bands to cater for the sound broadcasting services[2]. The GE06 plan, to which South Africa is a signatory, has made provisions for 2x1.5 MHz of national terrestrial digital sound broadcasting for the whole country (South Africa) within VHF Band III (174-230 MHz)[3]. The Authority has accordingly allocated DSB frequencies in the TBFP 2013 as indicated in Annexure B.

1.4 The purpose of this Discussion Document is to solicit views from the public and to conduct an inquiry with respect to the following:

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[1] ITU 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)

[2] The digital migration policy includes allocation for DTT

[3] ITU 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)

(a) The prospects of implementation of DSB services in South Africa; and

(b) How the implementation of DSB services can improve radio frequency spectrum efficiency and management.

2. Discussion

2.1 DSB is audio broadcasting technology intended to deliver superior quality sound using digital communications technology. It is a new, digital signal delivery system capable of delivering sound and data in all its forms.

2.2 DSB differs from the traditional analogue broadcasting as follows:

(a) Digital signals are more robust than analogue and can be transmitted successfully at lower transmitter powers;

(b) Digital systems, using coded multi-carrier modulation, offer much-improved reception on mobile car radios and portable receivers;

(c) Advanced digital compression techniques enable low bit-rates to be used successfully, while still producing the sound of near CD quality. This makes digital systems more spectrum-efficient;

(d) The digital bit-stream can be used for transmitting both audio and data;

(e) Digital radio is much easier to use/tune than an analogue radio (AM/FM). The data capability of digital radio can be used directly or, with some modification, for other related broadcasting activities such as Internet radio[4].

[4] World Broadcasting Union, June 2017 Digital Radio Guide, p.10

2.3 The digital migration process, albeit its focus being on television services, will be able to make radio frequency spectrum available, which is currently occupied by analogue services for other broadband and broadcasting services. There is currently a scarcity of FM frequencies which has led to the Authority publishing a moratorium on the licensing of class community sound broadcasting services on the 87.5 - 108 MHz broadcasting Band[5]. This development, amongst others, highlights the need for an alternative sound broadcasting system.

2.4 New, more spectrum-efficient digital technologies should be considered to accommodate more broadcasters in frequency bands such as the 240 MHz frequency band that has been allocated to digital sound broadcasting[6].

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

2.5 In an effort to examine the potential feasibility and impact of DSB services in South Africa, the Discussion Document will consider the following aspects:

(a) The Digital Migration Policy and the legislative framework for DSB in the South African environment;

(b) DSB trials conducted in South Africa in terms of licences granted by ICASA on different DSB technologies;

[5] Please see Government Gazette 39226 of 22 September 2015

[6] ITU 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)

(c) International agreements that impact DSB with organisations to which South Africa is a signatory, i.e. ITU, ATU and CRASA; as well as DSB Systems on a global level including existing standardisation and frequency bands for DSB;

(d) International Benchmarking of DSB in regions where DSB is already operational; and

(e) A market analysis which incorporates statistics on the radio audience profile, radio advertisement spend and radio listenership.

3. South African Environment

3.1 The Policy

3.1.1 As mentioned above, South Africa is a signatory to various international treaties and agreements, such as the Regional Radiocommunication Conference 2006 agreement (RRC-06) which, on 16 June 2006, resolved to switch from analogue to digital broadcasting services by 17 June 2015. This agreement prompted the formulation of the Broadcasting Digital Migration Policy ("Policy"), which sets out South Africa's parameters in migrating the country's television broadcasting format from an analogue to a digital platform.

3.2 Legislative/Regulatory framework

3.2.1 There are various regulations/ regulatory instruments that have an impact on the adoption of digital sound broadcasting technology. These regulations include the following:

(a) Terrestrial Broadcasting Frequency Plan, published in Government Gazette No. 36321 of 2 April 2013, read together with the amended Terrestrial Broadcasting Plan published in Government

Gazette No. 38005 of 16 September 2014.

(b) Radio Frequency Spectrum Regulations published in Government Gazette No.38754 of 30 April 2015, as amended by Government Gazette No. 40436 of 22 November 2016.

3.2.2 DAB is likely to be introduced in Band III after completion of digital migration for television. Ideally, digital audio broadcasting should augment and not replace AM and FM. Channel 11 and 12 (216 – 230 MHz) have been included as allotments in the TBFP, and this is replicated in Annexure A.

3.2.3 Type Approval Framework governing the possession, use, supply, sale, offer for sale or leasing/hiring of any type of electronic communications facility, including radio apparatus, used or to be used in connection with the provision of electronic communications which has been approved by the Authority. The DSB equipment, whether it is used to provide or receive the digital sound broadcasting services, falls within the scope of Type Approval Framework.

3.2.4 The official list of regulated standards for technical equipment and electronic communications equipment regulations, Government Gazette No. 39182 of 2015, that forms part of the Type Approval Framework, prescribes national standards for the performance and operation of equipment and electronic communications facilities, including radio equipment.

3.2.5 Tables 1 and 2 below list prescribed National Standards relevant to DSB equipment:

Table 1: Product Family EMC Standards

Classification of Equipment	**Applicable Standard**	**Effective Date**
DRM sound broadcasting Transmitters, T-DAB Sound broadcasting transmitters	SANS 301 489-11	2015-12-31

Table 2: Non-telecommunication EMC standards

Classification of Equipment	**Emissions Standard**	**Immunity standard**
Sound and television broadcast receivers and associated equipment, terrestrial and/or satellite	SANS 213 (*CISPR 13*) *	SANS 2200 (*CISPR 20*)

** This standard does not apply to sound and television collective distribution systems. For such systems,* ***SANS 60728-2*** *must apply.*

3.2.6 In addition to the National Standards prescribed by the Authority, the SABS has published technical standards that are relevant to DSB equipment:

(a) SANS 62104:2003 (IEC 62104) – Characteristics of DAB receivers;

(b) SANS 62105:1999 (IEC 62105) – Digital audio broadcast system – Specification of the receiver data interface (RDI); and

(c) SANS 300 401:2005 (ETSI EN 300 401) – Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers.

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?

3.3 **Digital Sound Broadcasting Trials**

3.3.1 Guided by the regulations mentioned above and the SABS standards, ICASA has granted several trial licences to be conducted in South Africa on different DSB technologies.

3.3.2 The **First Trial Licence** was granted to the SABC on 27 November 2013 by the Authority to trial the DAB+ technology. One of the main objectives of the DAB+ trial was to determine if the DAB+ technology could be used as an alternative, or a supplementary radio broadcast technology, which could be used in a frequency radio broadcast network.

3.3.3 The SABC trial is divided into three (3) phases, namely network verification tests, Audio Quality tests and Simulated Commercial tests. The public broadcaster is using two transmitters, one in Johannesburg and another in Pretoria. Both transmitters use a single frequency of 239.2 MHz in a SFN configuration, covering the majority of the Gauteng Province.

3.3.4 Phase 1 tested technical details by performing field verification tests and measurements around Gauteng emanating from DAB+ transmissions. The DAB+ trial for Phase 1 results were as follows:

(a) The end-to-end technical functionality was achieved;

(b) Portable or mobile coverage was evaluated with the use of domestic receivers as well as a professional measurement receiver which proved to be satisfactory;

(c) The measurement results of both the Johannesburg and Pretoria transmitter stations correlated well with the theoretical coverage predictions resulting in an over-predication of the DAB+ coverage by an average value of 2 dB;

(d) The DAB+ coverage area was found to be less than the FM Grade C coverage area. On FM, the Grade C service represents the absolute minimum field strength required for FM reception. DAB+ either provided a good quality or no signal at all;

(e) Measurements conducted on the different planned power levels contributed to the successful analysis of the DAB+ signal performance on the various power levels. Analysis of the results indicated the benefit of deploying high power DAB+ transmitters instead of low power DAB+ transmitters;

(f) When considering all building penetration measurement results, on both transmitter stations, except for a few isolated cases, the increase in the DAB+ transmitter power proved that the building penetration capability of the signal could be improved by increasing the transmitter station's power levels;

(g) Signals received from the two SFN network transmitters were well synchronised, resulting in the successful identification and the selection of the best signal by the receivers. Transmissions from the two transmitter stations also complemented one another, resulting in no interference, nor any reception failures which could be detected in any of the measured overlap coverage areas; and

(h) The overall summary of findings indicated that the DAB+ trial achieved a large portion of the total scope of the trial. The DAB+ technology proved to be easy to implement, and that it is power and spectrum efficient[7].

3.3.5 Phase two (2) and Phase three (3) is still in the testing Scenario and Scenario Implementation. The Authority granted the DAB+ trial licence extension to the SABC for another six (6) months from 13 November 2017 until 10 May 2018[8].

3.3.6 The Authority granted the **Second Trial Licence** to Radio Pulpit on April 2014 to trial DRM30 technology. The main objectives of the trial were to confirm potential benefits of the DRM30 technology as a radio broadcast platform and to evaluate the two, different, low-profile AM antenna systems. One transmitter was set up in Kameeldrift in Pretoria, on 1440 kHz using a 10kW DRM30 transmitter.

3.3.7 The DRM30 trial results were as follows:

(a) DRM30 measurements were conducted successfully on 1440 kHz using a 10 kW DRM30 transmitter;

(b) Two low-profile antennas were used in the trial, and both were capable of providing good signal coverage. Performance differences between the antennas highlighted the importance of the AM antenna as part of the DRM station design;

(c) Field strength measurement indicated that the propagated ground-wave does not radiate equally in all horizontal directions due to ground

[7] DAB+ JOHANNESBURG (T97) MEASUREMENT REPORT, DOCUMENT NO.: SEN_RFN_REP_MEASM_DAB+_T97, DATE: 2015/08/29

[8] SADIBA, 2017, SA DAB+ Traal Broadcast Licence. Available from: http://www.sadiba.org/index.php?lang=en

conductivity, the nature of the topographical terrain, human-made noise, etc;

(d) The DRM30 coverage performance is not only a factor in received signal strength but is also a factor in the signal to noise ratio in the reception area;

(e) Modulation configuration selection had a direct impact on the signal coverage area and data throughput. The 16 QAM modulation configuration setting provided a more robust signal resulting in a more substantial signal coverage area compared with the 64 QAM modulated signal, which provided a higher data rate and a smaller signal coverage area;

(f) The DRM30 signal performed better than the analogue AM signal with regards to coverage area for the same transmitter power;

(g) DRM30 demonstrated a substantial reduction in energy consumption compared with the analogue AM broadcast regarding covering the same area;

(h) DRM30 demonstrated improved spectrum usage in that, in the study, DRM30 can transmit two good audio services on the same AM frequency and bandwidth; and

(i) Added to the audio service text messages, a Journal line service was also transmitted which was seen on the receiver end. This demonstrated the value add offered by DRM30 to the normal audio program being broadcast[9].

[9] Radio Pulpit, 13 June 2016, Joint Radio Pulpit/Broadcom/Sentech DRM30 Trial Final Report

3.3.8 The Authority granted the **Third Trial Licence** to WECODEC on 02 February 2017 to trial the DRM+ technology. The main objectives of the trial was to test the co-existence of analogue FM signals together with DRM+ signals in the same FM band (87.5 – 108 MHz), and to test DRM+ in the VHF Band I (47 – 68 MHz) for the community living in the SKA area in the Northern Cape Province. The DRM+ trial results were as follows:

(a) The DRM signal was clearly at <-70dB on both sides;

(b) The DRM+ transmission caused no interference as it was audible to both adjacent FM channels;

(c) There was weak audio noticed on 101.0 MHz at Westdene Dam at a 2.3 km distance from the transmitter;

(d) There was no harmful interference to the adjacent FM channels which were evolving from WECODEC's DRM+ transmission; and

(e) The DRM+ trial phase 1 results found that there was a correlation between FM audio and the DRM MER with a non- relevant count of abnormalities.

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

4. International Agreement applicable to DSB

4.1 As a member of the ITU, South Africa subscribes to a number of international agreements which include agreements to create harmonised frequency plans for digital sound broadcasting systems. The current

international agreement relevant to DSB is the GE06 agreement[10], which governs the use of frequencies by the broadcasting service and other primary terrestrial services in the frequency Bands 174-230 MHz and 470-862 MHz frequency assignment and frequency allotment plans for the Digital Broadcasting service (television and sound).

4.2 The International Telecommunication Union

4.2.1 The Final Acts[11]of RRC-06 contain the Regional Agreement GE06, adopted by RRC-06, which governs the use of frequencies by the broadcasting service and other primary terrestrial services in the frequency Bands 174 - 230 MHz and 470 - 862 MHz in parts of Regions 1 and 3[12].

4.3 ITU Regions

4.3.1 ITU Radio Regulations divided the global radio spectrum into three (3) regions (Region 1, Region 2 and Region 3) with their own set of frequency allocations[13]. These ITU regions are shown in Figure 1 below.

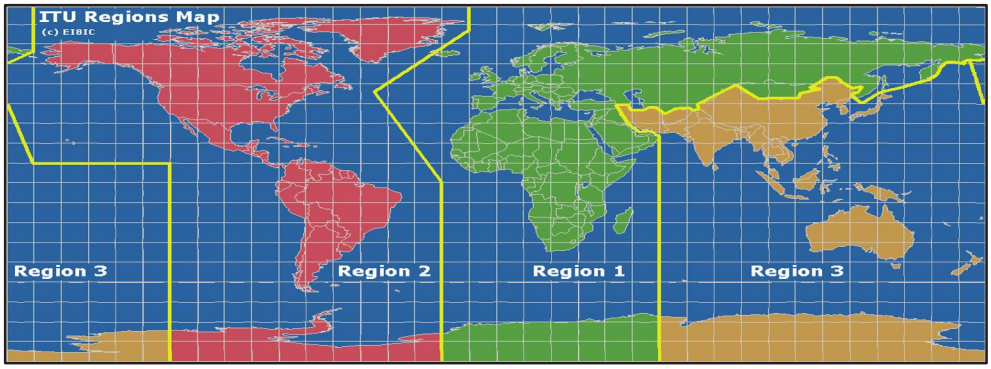

Figure 1: ITU regions

[10] ITU 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)

[11] *Ibid.*

[12] *Ibid.*

[13] ITU seminars presentation. Available from : https://www.itu.int/en/ITU-R/seminars/rrs/RRS-13-Africa/Documents/Tutorial/ITU-R_Basics.pdf

Region 1 comprises of Europe, Africa, the former Soviet Union, Mongolia, and the Middle East west of the Persian Gulf, including Iraq.

Region 2 covers the Americas including Greenland and some of the eastern Pacific Islands.

Region 3 contains most of non-FSU Asia east of and including Iran, and most of Oceania[14].

4.4 **SADC/ CRASA**

4.4.1 The Communications Regulators Association of Southern Africa has done extensive research with regards to certain DSB technologies, i.e. DAB+, DRM and IBOC. The findings from the report articulated that:

(a) DAB technology will allow for the more efficient use of spectrum and is already provided for in terms of the provision of ITU GE06;

(b) DRM technology will allow for more efficient use of spectrum and is already provided for in terms of the provisions of GE84. Both the DAB and the DRM technology have been widely adopted and implemented in ITU Region 1 enabling SADC to benefit from economies of scale, best practices in respect of implementation, customer awareness and financial implications; and

(c) IBOC is a DSB standard developed in ITU Region 2 utilising the low-power digital sideband signals and can be used in parallel with the analogue AM signal. IBOC can also be used interchangeably when AM is not in use.

[14]ITU regions. Available from: https://en.wikipedia.org/wiki/ITU_Region

4.4.2 The report articulated that CRASA will undertake a stocktaking exercise of all frequency assignments in the 148.5 - 200 kHz, 535.1-1605 kHz, 5.95 - 26.1 MHz, 87.5-108 MHz and 174 - 230 MHz spectrum Bands to assess the current utilisation of the aforementioned spectrum Bands to establish a technical basis for the assessment of the technical implications to implement digital sound broadcasting[15].

4.5 Types of Digital Sound Broadcasting Systems

4.5.1 DAB system[16] has been developed for satellite and terrestrial broadcasting applications to allow for a common, low-cost receiver to be used. It provides vehicular, portable and fixed reception with low-gain, omni-directional receiver antennas located at 1.5 metres above ground. DAB allows for the complementary use of satellite and terrestrial broadcast transmitters resulting in better spectrum efficiency and higher service availability in all receiving situations.

4.5.2 DAB[17]offers improved performance in multipath and shadowing environments, which are typical of urban reception conditions' use of on-channel terrestrial repeaters to serve as gap-fillers. It is capable of offering various levels of sound quality up to high-quality sound comparable to that obtained from consumer, digital, recorded media. It also offers various data services and different levels of conditional access and the capability of dynamically re-arranging the various services contained in the multiplex[18].

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15 Framework on establishment of Digital Sound Broadcasting in SADC

16 ITU-R Recommendations, ITU-R BO.1130-4 (04/2001) Systems for digital satellite broadcasting to vehicular, portable and fixed receivers in the bands allocated to BSS (sound) in the frequency range 1 400-2 700 MHz

17 ITU-R Recommendations, ITU-R BO.1130-4 (04/2001) Systems for digital satellite broadcasting to vehicular, portable and fixed receivers in the bands allocated to BSS (sound) in the frequency range 1 400-2 700 MHz

18 Ibid

4.5.3 DAB+ system[19] is an upgraded DAB system which was released in February 2007. DAB and DAB+ programmes can be integrated by broadcasters inside the same transmission and make a progressive transition to DAB+. DAB+ is approximately twice as efficient as DAB due to the adoption of the AAC+ audio codec. DAB+ can provide high-quality audio with bit rates as low as 64 Kbit/s. Reception quality is also more robust on DAB+ than on DAB due to the addition of Reed-Solomon error-correction coding.

4.5.4 The DRM system[20]has been developed for terrestrial broadcasting applications in all the frequency Bands allocated worldwide for analogue sound broadcasting. It respects the ITU-defined spectrum masks, allowing a smooth transition from analogue to digital broadcasting. In the Bands above 30 MHz, it defines DRM+ to offer audio quality comparable to that obtained from consumer digital recorded media. It offers various data services, including images and electronic programme guides, and the capability of dynamically rearranging the various services contained in the multiplex without loss of audio.

4.5.5 DRM+ also known as Mode E system was of official broadcasting standard with the publication of the technical specification by the European Telecommunications Standards Institute on 31 August 2009. This is effectively a new release of the whole DRM spec with the additional mode permitting operation above 30 MHz up to 174 MHz[21]. It provides bit-rates between 37.2 and 186.3 Kbit/s depending on the robustness level, using 4-QAM or 16-QAM modulations and 100 kHz bandwidth. DRM+ can coexist with DAB in Band III, but the present FM Band can also be utilised.

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19 Electronic Communication Committee, May 2015, ECC Report 230 Harmonisation Possibilities for Assistive Listening Devices in the Band 174-216 MHz

20 Report ITU-R BT.2295-1(07/2015) Digital terrestrial broadcasting systems.

21 DRM info. Available from: https://alchetron.com/Digital-Radio-Mondiale

4.5.6 DRM30 system is for use in the frequency Bands below 30 MHz DRM+ is the extension of this system for use in the frequency Bands between 30 and 174 MHz, allowing operation in Bands I and II (the FM Band)[22]. DRM30 uses the existing AM broadcast frequency bands and fits in with the existing broadcast Band plans, based on signals of 9 kHz or 10 kHz bandwidth; it has modes requiring only 4.5 kHz or 5 kHz bandwidth (AM), and modes that can take advantage of wider bandwidths – 18 kHz or 20 kHz[23].

The types DSB systems characteristics are indicated in **Annexure C**.

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.

4.6 Standardisation of DSB systems

4.6.1 ITU and ETSI have developed technical standards for digital sound broadcasting systems to harmonise terrestrial, radio broadcasting systems. A comparison of different radio systems is shown in Table 3[24]. The document focuses on the radio systems which are in the table below.

[22] Report ITU-R BS.2208 (10/2010) Possible use of VHF Band I for digital sound broadcasting services.

[23] DRM Technical info. Available from http://www.drm.org/technical-info/

[24] Possibilities for Future Terrestrial Delivery of Audio Broadcasting Services, 2012 ECC 177, Pg. 19-20

Table 3 : Comparison of different radio systems

System	Multiplex Bandwidth	Suitable Band(s)[25]	Channel Raster (ITU)	Standardization
DAB	1.5 MHz	VHF (30-300 MHz) III Band, L-Band Band III ranges from 174 to 240MHz, L Band ranges from 1452-1490MHz.	1.75 MHz	ETSI EN 300 401 [17] ITU-R Rec.BS.1114 [25] ITU-R Rec.BS.1660 [24]
DRM	N/A (2)	LF (30-300 kHz), MF (300-3000 kHz), HF (3-30 MHz)	9 kHz 5 kHz).	ITU-R BS.560 [23]
DAB+	1.5 MHz	VHF III, L-Band Band III ranges from 174 to 240MHz LBand ranges from 1452-1490MHz.	1.75 MHz	ETSI EN 300 401 [17] ITU-R Rec.BS.1114[25] ITU-R Rec.BS.1660 [24] ESTI TS 102 428 [20]

[25] Terrestrial Broadcasting Frequency Plan, published in Government Gazette No. 36321 of 2 April 2013

DRM+	96 kHz	VHF I, VHF II, VHF III, Band I range from 47 to 68 MHz Band II ranges from 87.5 to 108.0MHz Band III ranges from 174 to 240MHz	100 kHz 1.75 kHz	ETSI ES 201 980 [17] ITU-R Rec.BS.1114 [25] ITU-R Rec.BS.1660 [24]
DRM30	4.5 -20 kHz (3)	LF, MF, HF LF (30-300 kHz), MF (300-3000 kHz), HF (3-30 MHz)	9 kHz, 5 kHz	ETSI ES 201 980 [17] ITU-R Rec.BS.1514 [25]

4.7 **Broadcasting Frequency Bands**

4.7.1 The following sound broadcasting frequency bands are included in the South African broadcasting frequency plan[26]:

[26] Terrestrial Broadcasting Frequency Plan of 2013

Table 4: Sound Broadcasting Frequency Bands

Broadcasting bands	Range	ITU
AM-MF (MW) audio broadcasting	535.5 - 1606.5 kHz	GE75 Africa, Europe and Asia
VHF/FM audio broadcasting	87.5 -108 MHz	GE84 Africa and Europe
DSB allocations	174 - 230 MHz	GE06 Africa, Europe and parts of Middle East

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.

Question 6

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

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

5. International Benchmark

5.1 The reasons for choosing the countries for international benchmarking was based on certain motives as outlined below:

(a) The sizes of the market: The countries with large markets were preferred over those with smaller markets;
(b) Whether the identified countries have sector-specific Regulators. In this case, it was relevant if the country had a broadcasting and Manufacturing Regulators; and
(c) Having already introduced digital sound broadcasting and whether relevant information could be gathered to allow the Authority to learn how this technology had been introduced, implemented and is regulated.

5.2 Australia

5.2.1 Background

5.2.2.1 The ACMA is mandated, through the Broadcasting Services Act of 1992 as amended, to monitor the broadcasting industry, datacasting and the Internet industry[27]. It is the regulator for both broadcasting and telecommunication within the communications portfolio[28]. The ACMA is tasked with ensuring media and communication works, through various legislation, regulations, standards and codes of practice in the country[29].

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[27] Bills Digest no. 37, 2006-07-Communications Legislation Amendment (Enforcement Powers) Bill 2006 (The powers and functions of the Australian Communications and Media Authority)

[28] Australian government https://www.australia.gov.au/directories/australia/portfolio/communications

[29] Australian Communications and Media Authority, 05 September 2016. Available from http://165.191.2.88/theACMA/About/The-ACMA-story/Communicating/introduction-to-the-acma

5.2.2.2 In July 2015, the Australian Department of Communications released a report recommending the establishment of a Digital Radio Planning Committee for Regional Australia to focus on the rollout of digital radio to regional areas. The report further recommended giving priority to the licensing of permanent, digital, radio services where trials have been underway since 2010 prior to a nationwide rollout[30].

5.2.2 **Legislative Framework**

5.2.2.1 The Broadcasting Services Act of 1992 as amended, classifies main categories of licences which are mainly national, commercial, community, subscription and international broadcasting services. The National Broadcaster is licensed in accordance with Section 6 of the Australian Broadcasting Corporation Act of 1983. Broadcasting services that have been awarded licences will also be afforded spectrum in accordance with the Radio Communications Act of 1992.

5.2.2.2 In accordance with the Broadcasting Services Act of 1992, the three main sound broadcasting service licences have different licensing conditions and durations. Section 54 of the Broadcasting Services Act provides for a limitation of the control of commercial radio licences in the same area to not more than two, and a limitation of numbers of directorships for radio[31]. The Broadcasting Services Act provides for the duration of the licences, a renewal schedule for the different broadcasting, and applicable annual fees payment.

30 http://www.minister.communications.gov.au/malcolm_turnbull/news/release_of_digital_radio_report#.WiufGOQUkeE

31 https://www.legislation.gov.au/Details/C2017C00201

5.2.3 **Licensing Framework**

5.2.3.1 The licensing framework for digital radio in Australia operates under a digital radio multiplex transmitter (DRMT) licence category system[32]. The ACMA made foundation category 1 DRMTs for the major metropolitans for community radio with special conditions[33].

5.2.3.2 The current regulatory framework in the five state metropolitan capitals allocates each incumbent broadcaster with permanent DAB+ services an entitlement to a minimum of 128kbit/s (1/9 multiplex) and a maximum of 256kbit/s (1/5 multiplex)[34]. Given the likelihood of shared multiplexes in regional Australia, these allocations may change in the first phase of the regional rollout to accommodate a single, shared multiplex.

5.2.3.3 Currently, regulations on coverage are that broadcasters cover their licence area and do not spill over into adjacent markets. There is a quota for Australian music on analogue but not on DAB+, as well as video services on the radio. Other key points of the digital radio legislation in Australia are that there is no cost for the spectrum for incumbent, commercial broadcasters and no new entrants are allowed for six years from the switch-off date. The Government has reserved spectrum for DAB+ digital radio regionally after the analogue television switch-off by 2013[35].

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[32] https://www.acma.gov.au/Industry/Broadcast/Spectrum-for-broadcasting/Spectrum-digital-radio/digital-radio-licensing

[33] Digital radio, reviews to be conducted under section 215B of the Broadcasting Services Act 1992 and section 313B of the Radiocommunications Act 1992, p 13

[34] https://www.worlddab.org/country-information/australia/history/regulation-and-spectrum

[35] Ibid

5.2.3.4 The ACMA has also determined further program standards and licence conditions dealing with certain issues. For example, commercial radio broadcasters are subject to standards requiring the disclosure of commercial agreements with the potential to affect the content of current affairs programmes. Most aspects of the content of the programmes are governed by codes of practice developed by industry groups representing the various broadcasting sectors. Most complaints about the content of programmes on radio and television, including ABC and SBS services, must first be made to the broadcaster concerned. Information about the broadcasting complaints process is available under the ACMA broadcasting complaints section[36].

5.2.4 **The Market Catalyst**

5.2.4.1 According to the world DAB forum, a study published shows that radio continues to be the key driver of audio consumption in Australia at 85% penetration of the population. Since the launch of DAB+ digital radio in metropolitan Australia in late 2009, DAB+ digital radio listening continues to outperform expectations, with 3.2 million people or nearly 25% of the population in the metropolitan areas now listening to radio each week using a DAB+ digital radio in the five metropolitan capitals. The ACMA is now planning the rollout of digital radio in regional areas where the industry indicates it is economically feasible to do so, starting with the permanent licensing of the Canberra and Darwin trial services[37].

5.2.4.2 The ACMA started licensing in the metropolitans to check the viability of the radio stations. The metropolitans' populations can afford the new radio sets due to their LSM, and thereby the radio stations can compete with analogue

[36] https://www.acma.gov.au/theACMA/ACMAi/Complaints/Broadcast-complaints/faqs-broadcasting-rules-and-complaints-acma-1

[37] https://www.worlddab.org/country-information/australia?page=

operators for listenership and ad spend. The government was also in the forefront of working with the automobile industry to provide for DAB receivers in the new models of cars because of the high number of listeners using radios.

5.2.4.3 The number of new cars on the road fitted with DAB+ broadcast digital radios has tripled, helping to lift digital radio uptake to 27% of the population in the metropolitan capital cities. The total number of DAB+ digital radios in Australia has now reached 2.9 million, including 758,000 in-car units, as well as portable digital radios and home receivers sold through retailers[38].

5.2.4.4 To raise awareness with regional audiences, there was a development of a regional campaign entitled "We want digital radio", which has been aired on regional stations and encouraged listeners to send a message to their local member of Parliament to support digital radio being rolled out to their areas[39]. In Australia, a leading cell phone company introduced the world's first smartphone with an in-built DAB+ broadcast digital radio[40].

5.3 **United Kingdom**

5.3.1 **Background**

5.3.1.1 OFCOM is the regulator for the communications sector in the UK, which is mandated to regulate television, radio and video-on-demand sectors, fixed-line telecoms (phones), mobiles and postal services, plus the

[38] https://www.worlddab.org/country-information/australia.

[39] http://www.digitalradioplus.com.au/CMSPages/GetFile.aspx?guid=8db0422d-4e5b-4c0d-a45e-9b88b498cd40

[40] http://www.digitalradioplus.com.au/latest-news/2016/lg-stylus-dab-world-s-first-smartphone-with-built

airwaves over which wireless devices operate[41].The government's Radio Policy decisions were articulated through the Digital Radio Action Plan (DRAP)[42].

5.3.1.2 Using the Digital Group, the policy objectives aimed at driving, among other things, the publication of the first digital radio action plan, a review of the progress in the digital market against what was conducted through OFCOM set criteria, the assessment of the impact of the options and timing of a digital radio switchover, the identification of the impact of the digital switchover on the government's current contingency measures in order to make necessary changes, the defining of the target for DAB coverage at the time of switchover, the assessment of the costs for the DAB coverage, the conducting of a market review for digital radio switchover, the monitoring of the regulatory framework and the identification of any changes to the multiplex licensing regime which are aligned with the digital radio switchover[43].

5.3.2 **Legislative framework**

5.3.2.1 The Broadcasting Act of 1996 makes provision for the licensing and regulation of independent radio broadcasting, and the Communication Act of 2003 empowered OFCOM to take over functions of the Broadcasting Standards Commission, the Independent Television Commission, the Office for Telecommunications, the Radio Authority and the Radiocommunications Agency[44].

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41 https://www.ofcom.org.uk/about-ofcom/what-is-ofcom

42 Department for Culture, Media and Sport, Digital Radio Action Plan, Version 10, 9 January 2014.

43 Department for Culture, Media and Sport, Digital Radio Action Plan, Version 10, 9 January 2014.

44 http://www.politics.co.uk/reference/ofcom.

5.3.3 **Licensing framework**

5.3.3.1 Radio multiplex services are licensed by OFCOM under Part 2 of the Broadcasting Act of 1996 (as amended by the Communications Act of 2003)[45]. Section 47 and 51 of the Broadcasting Act of 1996, detail specific criteria to be applied in the awarding of national and local radio multiplex licences.

In case of national licences, OFCOM should pay attention to:

(a) the extent of the coverage area proposed to be achieved by the applicant;

(b) the applicant's ability to establish the proposed service and maintain it throughout the licensing period;

(c) the capacity of the digital sound programme services proposed, to be included in the service to appeal to a variety of tastes and interests; and

(d) any proposals by the applicant for promoting and assisting the take-up of receivers. The Broadcasting Act of 1996 has different provisions for awarding national and local radio multiplex licences to analogue licensees[46].

[45] Broadcasting (Radio Multiplex Services) Bill 2016-17.

[46] Office of Communications (Ofcom), The Future Licensing of DAB Digital Radio, 2006.

5.3.4 **The market catalyst**

5.3.4.1 OFCOM conducted a research study in 2017 on the progress of digital radio in the UK, and a report was compiled which is the eighth annual publication. The research focused on the availability, take-up, listening patterns, and attitudes towards digital radio. The data sources which were used in the report are from RAJAR data, OFCOM Technology Tracker research data, OFCOM licensing data, BBC data, Arqiva coverage data for national commercial DAB coverage, GfK retail equipment sales statistics, and the Society of Motor Vehicle Manufacturers and Traders (SMMT) data on a number of DAB radios in newly-registered cars[47].

5.3.4.2 The research revealed that DAB coverage and availability vary throughout the UK, three-quarters of both analogue and DAB listeners are aged over 35, compared with 57% of online listeners, digital share of listening across the UK is under 50%; it ranges from 31% in Northern Ireland to more than 60% in parts of England. The majority of listening in the home is through a digital platform, digital share of listening while on the road remains below 31%, digital radio sales were down compared with 2016 sales but fell at a lower rate than total radio sales, high-quality sound and a wider choice of stations are the features most commonly experienced with digital radio[48].

[47] The Communications Market: Digital Radio Report, Ofcom's eighth annual digital progress report, 30 November 2017.

[48] The Communications Market: Digital Radio Report, Ofcom's eighth annual digital progress report, 30 November 2017.

5.4 **United States of America**

5.4.1 **Background**

5.4.1.1 The Federal Communication Commission (FCC) is an independent USA government agency mandated through The Communication Act of 1934 overseen by Congress to regulate radio, television, wire, satellite, and cable communications in all 50 states, the District of Columbia and USA territories[49].

5.4.1.2 The National Radio System Committee (NRSC) is a committee sponsored by the National Association of Broadcasters (NAB) and the Consumer Technology Association (CTA) to study and make recommendations for radio broadcasting technical standards[50]. The NRSC approved the Digital Radio Broadcasting standards in April 2005[51] and In-Band On-Channel (IBOC) as the selected technology for AM and FM radio broadcasting.

5.4.1.3 IBiquity Digital Corporation develops IBOC digital radio system for the United States. It was formed through merging the U.S.A Digital Radio and the Lucent Digital Radio[52].

5.4.2 **Legislative framework**

5.4.2.1 The FCC has seven (7) divisions called bureaus each carrying out a particular business within the agency. The Media Bureau develops, recommends, oversees and administers the rules and policy relating to the

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[49] Justice Information sharing, 27 November 2013.avalable from: https://it.ojp.gov/PrivacyLiberty/authorities/statutes/1288

[50] National Radio Systems Committee. Available from: http://www.nrscstandards.org/.

[51] Legislative Council Secretariat IN06/05-06.

[52] Wikipedia, Ibiquity, 12 July 2016. Available from: https://en.wikipedia.org/wiki/IBiquity.

AM and FM radio broadcasting in the USA[53]. The FCC makes rules and policies whenever congress enacts a law affecting communication[54]. A Notice of Proposed Rule Making (NRPM) is a document that proposes new or changes to the current rules and gives the public a chance to contribute/give input on the proposed rules. The rules are then finalised, adopted and published in an Order of rulemaking. In addition, the FCC issued the Digital Audio Broadcasting First Report and Order to adopt and commence DAB using IBOC technology in 2004 and amended the order in the Second Report and Order in 2007[55].

5.4.3 **Licensing regime**

5.4.3.1 The FCC licenses individual broadcast stations and not networks such as (CBS, ABC or FOX). The licences for AM radio stations are licensed as commercial facilities and FM radio stations are either commercial and non-commercial educational[56]. The FCC does not have requirements for existing AM and FM stations to obtain a DAB broadcasting licence because IBOC is integrated into the existing AM and FM bands and no new allocations for frequencies are necessary. The FCC licensing conditions for DAB IBOC broadcasting are for a radio station to notify them before the commencement of broadcasting, AM IBOC broadcasters can only broadcast during the day to avoid interference, and IBOC operators can broadcast the same program material.

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[53] Legislative Council Secretariat IN06/05-06.

[54] https://www.fcc.gov/proceedings-actions

[55] Federal Communications Commission second report and order first order on reconsideration and second further notice of proposed rulemaking, 31 May 2007. Available from: http://www.cavellmertz.com/uploads/N_198_FCC-07-33A1.pdf

[56] Federal Communication Commission,3 October 2017, The FCC Regulation of Broadcast Radio and Television. Available from: https://www.fcc.gov/media/radio/public-and-broadcasting#FCC

5.4.4 **The market catalyst**

5.4.4.1 The USA has a population of 325 million[57]with a radio reach of 91% of the population compared to other media services such as television[58]. Each week, 271 million listeners tune in to the radio, amongst those are digital radio listeners[59].

5.4.4.2 Currently 8 million Americans have digital radios in their homes[60] and 2% of them are using digital radio in their primary vehicle[61]. Digital radio usage is lagging behind other media services with an estimated usage of 9%, online radio at 61% and traditional AM/FM radio at 91% according to the Pew Research Center[62].

5.4.4.3 In an initiative to increase the digital radio listenership, the radio industry and iBiquity worked with the automotive industry to keep digital radio tuners in car stereos and several automakers had reportedly committed to removing AM/FM radio from their dashboards by 2014 but it wasn't a success[63]. The FCC has not set a deadline to switch from analogue to digital

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[57] Worldometers, U.S Population, 2017. Available from : http://www.worldometers.info/world-population/us-population/

[58] Pwe Research Center,Audio and Podcasting Fact sheet, 2017. Available from. Available from http://www.journalism.org/fact-sheet/audio-and-podcasting/

[59] https://www.newsgeneration.com/broadcast-resources/radio-facts-and-figures/

[60] Satista, Number of people living in households that own an HD radio in the United states, 2017. Availble from :https://www.statista.com/statistics/369970/people-living-in-households-that-own-an-hd-radio-usa/

[61] Pwe Research Center,Audio and Podcasting Fact sheet, 2017. Available from :http://www.journalism.org/fact-sheet/audio-and-podcasting/

[61]Pwe Research Center,Audio

[62] we Research Center,Audio and Podcasting Fact sheet, 2017. Available from http://www.journalism.org/fact-sheet/audio-and-podcasting/

[63] Statista,U.S Radio Industry – Statistics and Facts. Available from : https://www.statista.com/topics/1330/radio/

due to the cost of the digital radio receivers and the low market penetration as compared to the traditional radio and other media services[64].

5.5 Singapore

5.5.1 Background

5.5.1.1 Info-communications Media Development Authority (IMDA) is a statutory body in the Singapore government mandated by the IMDA Act of 2016 to develop and regulate the media, information and communication sector. The IMDA was officially formed on 1 October 2016 merging the Media Development Authority (MDA) and Infocomm Development Authority (IDA). MDA was formed in 2003 merging the Film and Telecommunications Authority of Singapore and Singapore Broadcasting Authority. IDA was formed in 1999 merging the National Computer Board and the Telecommunication Authority of Singapore[65].

5.5.1.2 MediaCorp is a group of commercial media companies in Singapore with a business interest in television, radio broadcasting and interactive media. The Singapore Broadcasting Authority issued MediaCorp a licence to provide DAB services in 1999 with a multiplex simultaneously broadcasting six FM stations[66].

5.5.1.3 Rediffusion Singapore was the first cable-transmitted, commercial radio station operating on a monthly subscription rate, and it was founded in 1949 by Rediffusion London. In 2001, it was awarded a DAB broadcast service licence to broadcast two (2) analogue radio channels simultaneously on MediaCorp radio multiplex. In 2005, it was awarded a

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[64] Libraries Miami. Available from :https://scholarlyrepository.miami.edu/cgi/viewcontent.cgi?referer=https://www.google.co.za/&httpsredir=1&article=2416&context=oa_dissertations Pg4

[65] Singapore government https://www.imda.gov.sg/about/history.

[66] Legislative Council Secretariat IN06/05-06.

five-year DAB licence to broadcast the world's first DAB subscription service operated on its multiplex[67].

5.5.2 **Legislative framework**

5.5.2.1 Radio broadcasting is governed by the Broadcasting Act 15 of 1994 and Media Development Authority of Singapore Act of 2002 both incorporated into the (IMDA) Act amended on 01 October 2016. The Broadcasting Act regulates the operation of broadcasting services, apparatus/equipment and empowers the Authority to grant, modify, suspend, cancel broadcasting service licences and issue codes of practice on broadcasting standards. The Media Development Authority of Singapore Act empowers the Authority to license, regulate and develop a code of practice for content and media services[68].

5.5.3 **Licensing framework**

5.5.3.1 The Singapore broadcasting regulator has a two-tier system consisting of public and commercial broadcasting. The Media Development Authority of Singapore issues two separate licences to the multiplex operator and the broadcaster. The Multiplex licence is awarded for eight years and the broadcasting service licence is awarded for five years[69].

5.5.3.2 The licence for operating DAB services is classified into three categories namely:

(a) DAB multiplexer licence - issued with a frequency assignment for the multiplex;

[67] National library Board Singapore http://eresources.nlb.gov.sg/infopedia/articles/SIP_1198_2008-10-24.html?s=Broadcasting--Singapore.

[68] Legislative Council Secretariat IN06/05-06.

[69] Legislative Council Secretariat IN06/05-06

(b) DAB broadcasting service licence - issued to the content service providers; and

(c) Class licence - allows any operator to provide data and multimedia services such as traffic and weather reports[70].

5.5.3.3 The licence conditions for the multiplex operator are to carry at least five audio services on each multiplex and ensure that there is 98% of nationwide coverage with 35% of each multiplex providing data services[71].

5.5.4 **The market catalyst**

5.5.4.1 Singapore has a population of 5.61 million[72]. According to the World DAB forum, in 2002 Singapore had 100% DAB coverage[73], then nine years later MediaCorp stopped DAB broadcasting in November 2011 and Rediffusion stopped broadcasting in April 2012 with only 3000 subscribers[74]. Radio listeners were not keen to buy DAB receivers since radio was simultaneously broadcast on DAB and FM. Singapore has a small population and there are few FM transmitters for radio stations, which is cost-effective[75].

5.5.4.2 DAB broadcasting has been on and off which is unreliable for listeners, and DAB penetration into the market was poor, which eventually led to Singapore ceasing DAB services[76]. Currently, Singapore's number one English FM radio station has 661, 000 listeners weekly[77], which is an

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[70] Legislative Council Secretariat IN06/05-06.

[71] Legislative Council Secretariat IN06/05-06.

[72] http://www.singstat.gov.sg/.

[73] EBU TECHNICAL REVIEW – October 2002 8 / 8 D. Josse.

[74] Legislative Council Secretariat IN06/05-06.

[75] Legislative Council Secretariat IN06/05-06.

[76] https://garfors.com/2011/11/singapores-dab-troubles-explained-html/.

[77] http://www.asiaradiotoday.com/news/singapores-kiss92-has-top-listenership-share-among-english-stations.

indication that the market is very small, and it is difficult for other broadcasting services to penetrate thus making DAB services unviable.

6. Market Analysis

6.1 Section 2 (f) (r) of the ECA states that the object of the Act is to promote the development of public, commercial and community broadcasting services which are responsive to the public's needs and which promote competition within the ICT sector. The Authority published a list of all class sound broadcasting services on 08 September 2017, and there is currently approximately two hundred and sixty three (263) licensed community, sound-broadcasting licensees[78], although not all of them are on-air and there are twenty-seven (27) Individual Sound Broadcasting Licensees. It is therefore vital that there is a proper assessment of the market before any broadcasting services are licensed.

6.2 The discussion below, related to market analysis, will be based on the current three-tier system for sound broadcasting, i.e., public sound broadcasting services, commercial sound broadcasting services and class sound broadcasting services. The figures that are used for the market analysis are from research companies, sales agencies and government departments.

6.3 The Authority published a Position Paper on the Review of Ownership and Control of broadcasting services for classification of the South African sound broadcasting services market into primary and secondary towns/markets for the consideration of the economic viability and the sustainability of commercial sound broadcasting services[79].

[78] Please see Government Gazette 4100 of 08 September 2017 Pg 25 -31

[79] ICASA, Position Paper on Ownership and Control published in Government Gazette No. 34828 of 8 December 2011

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.

6.4 Radio Audience Profile and Reach

6.4.1 The August 2017 RAMS figures released by the BRC are from a sample split of a 60% sampling in the metro and the remaining 40% split between urban and rural. The figures are based on thirty-nine (39) commercial public service radio stations, two hundred, and sixty-nine (269) community radio stations. According to the BRC RAM August 2017 release presentation, the weekly reach for radio based on their sample is 90%, which makes it the most widely accessible medium of all[80].

6.4.2 Furthermore, a provincial breakdown of the radio reach indicates that KwaZulu - Natal, Limpopo, Eastern Cape, Gauteng and Mpumalanga have an average of 90% percentage population reach[81]. A breakdown of the figures indicates that commercial and PBS radio stations based in Gauteng and Western Cape target a higher LSM and are mainly using English as their primary language, while community sound services broadcast using multiple languages based on whether they are geographically-based or of community-interest in nature. The target market predominantly is lower LSMs with programming catering for most of the population as opposed to a specific target audience focussed on by commercial sound broadcasting services[82]. The public service radio

[80] The Broadcast Research Council of South Africa, August 2017 ,BRC RAM August 2017 release. Available from :http://www.brcsa.org.za/brc-ram-august-release-presentation-august-2017/ Pg. 19

[81] http://www.brcsa.org.za/brc-ram-august-release-presentation-august-2017/ Pg20

[82] The Broadcast Research Council of South Africa, August 2017 ,BRC RAM August 2017 release. Available from: http://www.brcsa.org.za/brc-ram-august-release-presentation-august-2017/ Pg. 44 – 67

services of the SABC predominantly uses a primary language spoken in the base province apart from Lotus FM, which uses English[83].

6.4.3 Radio listening trends are evolving with the introduction of new devices used as radio receivers. The current figures indicate that radio is consumed on traditional radio receivers, followed by cell phones, in vehicles, television sets and personal computers[84]. It should be noted however that the percentages do differ in different provinces, for both commercial and community radio services.

6.4.4 With South Africa currently moving from analogue to digital terrestrial for television, more households will be subsidised with the provision of set-top boxes that will offer sound broadcasting services[85]. That would mean that the trend pertaining to the listening devices might change significantly considering that the current percentage is based on subscription television services, which still does not have a wide penetration in the market. Figure 2 below shows the BRC establishment survey October 2017 released for radio listening devices.

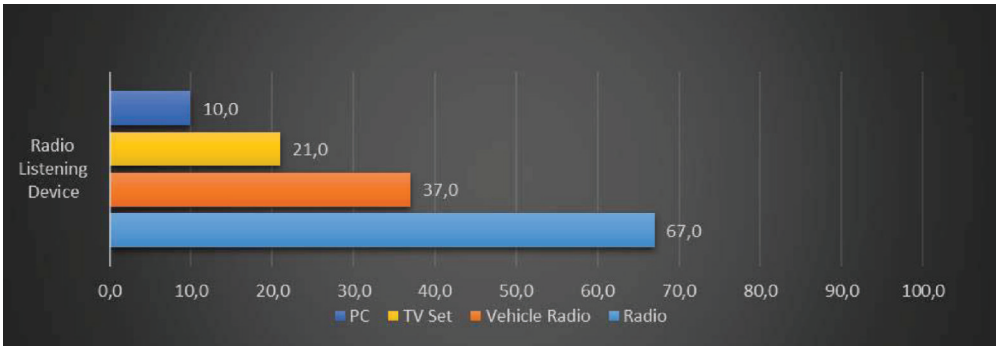

Figure 2: Radio Listening Devices[86]

83 http://www.sabc.co.za/sabc/radio/

84 http://themediaonline.co.za/2016/12/brc-rams-show-stable-trends-for-radio/

85 http://www.sabcgoesdigital.co.za/dtt/index.php?lang=en

86 The Broadcast Research Council of South Africa, August 2017 ,BRC RAM August 2017 realese. Available fromhttp://www.brcsa.org.za/category/demographic-and-media-consumption-trends/.

6.4.5 The top four (4) provinces, regarding audience reach, follow a similar pattern in their radio listenership trends, with Eastern Cape having the major share of listeners accessing sound broadcasting services on traditional radio devices, followed by cell phones and vehicle devices. Gauteng has the most listeners using traditional radio devices, followed by vehicle radio and cell phones.

6.4.6 KZN has most people listening to traditional radio devices, followed by cell phones and vehicle radios. Lastly, Western Cape follows the same trend with the majority listening to traditional radio devices followed by vehicle radios and cell phones respectively. The traditional radio device is still the most widely-used device at around eighty percent (80%) in all the metropolitan areas followed by vehicles and cell phones at an average of thirty percent (30%)[87].

6.5 Listenership Figures and Ad Spend

6.5.1 According to the advertising agency PricewaterhouseCoopers (PwC), radio advertising is projected to increase by 7.1% on a compound, annual rate from R3.2 billion in 2011 to R4.6 billion in 2016[88]. The Media Radio Annual report publishes advertisement spend with figures from Nielsen Research Company. The 2015[89] and 2016[90] published data reflects that the amount spent on advertising and/or sponsorship per radio station does not always correlate with the amount of listenership, as seen in the discussion below.

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[87] The Broadcast Research Council of South Africa, August 2017, BRC RAM August 2017 release. Available from http://www.brcsa.org.za/brc-ram-august-release-presentation-august-2017/ Pg. 43 – 69

[88] PWC,SouthAfrican entertainment and media outlook. Available from : 2012-2016https://www.pwc.co.za/en/assets/pdf/enm-20120-chapter5.pdf

[89] http://rodoyo.com/emags/radio/index.html#/1/

[90] http://www.wagthedog.co.za/emags/June16/#/1/

6.5.2 Commercial Radio

6.5.2.1 Figure 3 below shows the BRC RAM Radio Listening: Oct 16 – Marc 17/Jan 17 – Jun 17

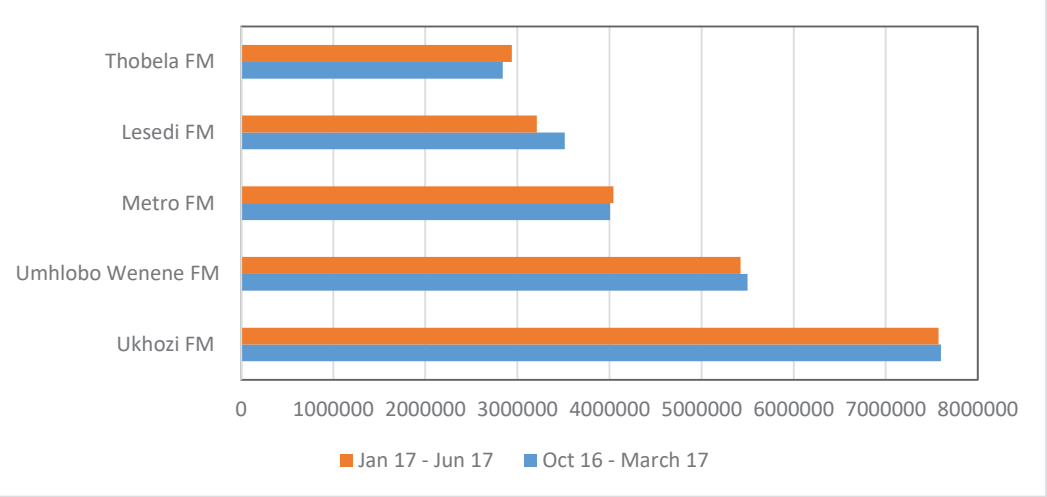

Figure 3: RAMS figures

6.5.2.2 The top five (5) radio stations with the highest listenership figures are all SABC radio stations with Metro FM being the only commercial sound service in the list[91]. There are, however, two other privately-owned commercial radio stations in the top ten (10) list, namely iGagasi FM in Durban and Jacaranda FM in Gauteng[92]. The high listenership figures for the SABC radio stations could be attributed to the provision of many languages, wide coverage and lack of competition in the respective areas in which they operate.

6.5.2.3 According to Nielsen research, the top five (5) radio stations reflected in the advertisement spend, are 94.7 Highveld, Metro FM, East Coast Radio, Talk Radio 702 and 94.5KFM. The core audience for the main five (5)

[91] http://www.brcsa.org.za/brc-ram-radio-listening-oct-16-mar-17-jan17-jun17/

[92] Ibid

radio stations is from LSM 6-10 with a target age from 25–49. All the radio stations in the top five regarding ad spend are in the primary markets, with three (3) being in Gauteng and the other two (2) in the Western Cape and Durban respectively. It is only Metro FM that is in the top five in terms of both listenership figures and ad spend[93].

6.5.3 Community Radio

6.5.3.1 According to the Media Radio Annual report for 2015 and 2016, the core audience for community radio is the lower LSM and mostly rural[94]. The current licensing framework for community broadcasting services limits the services to a district municipality[95] and the radio services which offer multiple languages in their programming services to cater for the different audiences.

6.5.3.2 The top five community radio stations in the country in relation to listenership figures are Unitra Community Radio, Vukani Community Radio, Jozi FM, Kasie FM and Radio Tygerberg in no particular order. Three (3) of the radio stations are in the primary markets while the remaining two (2) are in the secondary market albeit within bigger districts which would translate into a bigger audience reach[96].

[93] Wag the dog publishers, June 2016 . Available from: http://www.waqthedoq.co.za/emaqs/June16/#/16/

[94] Ibid

[95] Regulations regarding the Standard Terms and Conditions, 2010 published in GG no 33296 dated, 14 June 2010

[96] http://www.brcsa.org.za/brc-ram-radio-listening-oct-16-mar-17-jan17-jun17/

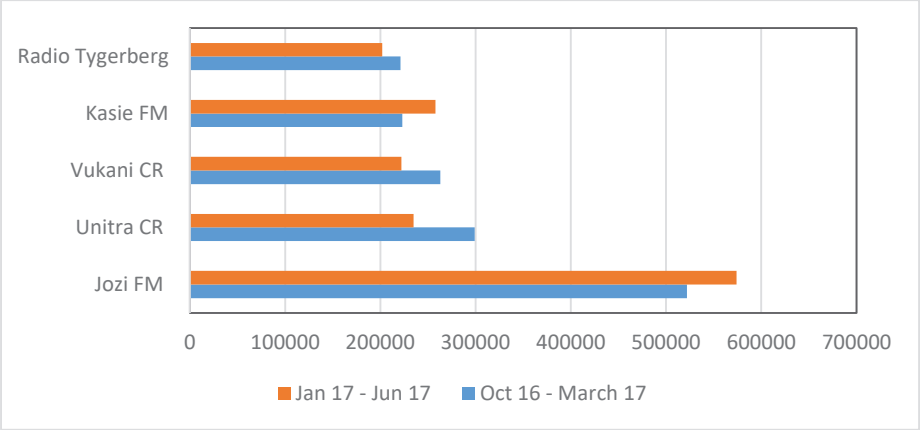

Figure 4: RAMS Figures

6.5.3.3 Information gathered from different publications reveal that community radio reaches 25% of the population but only receives 2% of the advertising spend[97]. However, the challenge with many publications relates to accessing data for reporting purposes pertaining to ad spend for the sector. This is due to many factors including the inaccessibility of information from the sector, the lack of transparency and accountability related to financial information amongst other reasons.

6.5.3.4 The advertising spend for community radio has been obtained from the Media Connection which is a major sales agent for more than three-quarters of the community sound broadcasting services in South Africa, either exclusively or in partnership with other agents, together with data from the GCIS that represents the government department. The 15/16 financial year saw the top five (5) community radio stations having 10.9% of the ad spend out of an average of 200 community radio stations represented by the Media Connection[98].

97 PWC,SouthAfrican entertainment and media outlook. Available from : https://www.pwc.co.za/en/assets/pdf/enm-20120-chapter5.pdf Pg. 114

98MDDA Annual Report 201/16 Pg. 60

6.5.3.5 The top five radio stations for the 2015/16 financial year are Tygerberg Radio 104 FM, Zibonele Radio, Jozi FM, Mix 93.8 FM and Thetha FM. These top five stations in the 2014/15 financial year used an average of 12.8% of the ad spend. Government through the GCIS has spent almost 13 million in the 14/15[99] financial year growing to 21 million in the 15/16[100] financial year and finally more than 22 million in the 2016/17 financial year[101].

6.5.3.6 Between the Media Connection and GCIS, an average of sixty (60) million Rands has been spent over the past three financial years alone for advertising and sponsorship programmes[102]. The trend from the figures provided is that all the radio stations in the top five for the ad spend are based in the metropolitans of the primary markets, i.e., Gauteng and Western Cape. Figure 5 below shows the MDDA Annual Report 2016/17

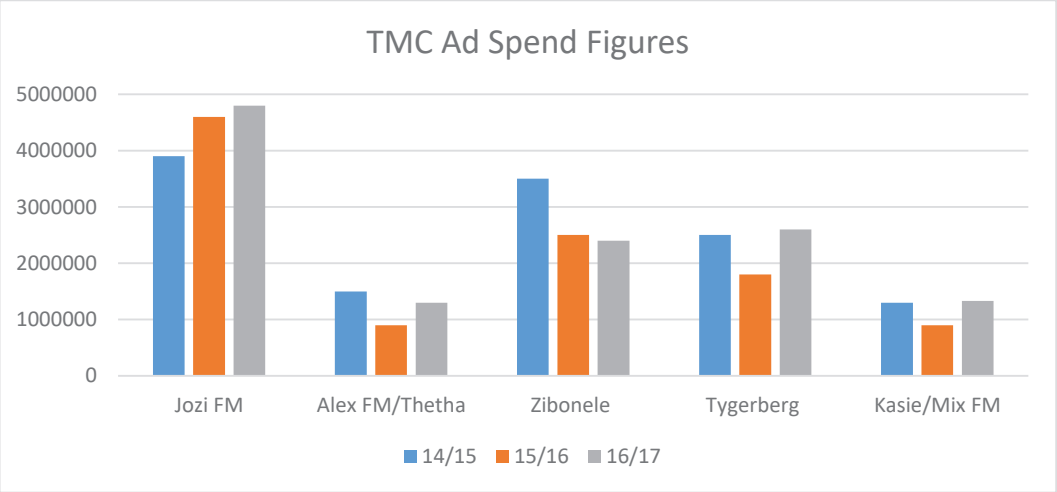

Figure 5: TMC Ad Spend per station

99 https://nationalgovernment.co.za/entity_annual/972/2016-media-development-and-diversity-agency-(mdda)-annual-report.pdfPg 59

100 MDDA Annual Report 2015/16 Pg 59

101 MDDA Annual Report 2016/17 Pg. 62 – 70

102 Ibid

6.5.3.7 The trend in community radio is that it differs slightly from the one in the commercial sound broadcasting services, in that the amount of ad spend is correlated to the numbers of listenership figures. There are only two radio stations in the top five (5) that fall in the top five (5) for RAMS figures but in the low tens in the ad spend which are all based in the Eastern Cape.

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.

ANNEXURE A: Additional Questions

For Consumers

1. What is your understanding and expectations of digital sound broadcasting?

2. What impact do you think DSB will have on your experience of radio?

3. What concerns do you have regarding the implementation of DSB?

4. Do you believe that the cost associated with acquiring DSB devices is worth it considering that you already utilize analogue radio?

5. What are your expectations from broadcasters and manufacturers?

6. Do you have any suggestions to provide to the Authority with respect to the implementation and regulation of DSB?

7. Please provide the Authority with any further information you deem necessary and asked herein.

8. Will you be willing to trade your traditional analogue radio receiver for a digital radio? Motivate your answer.

For Broadcasters

1. What is your understanding, expectations and concerns as broadcasters with respect to DSB?

2. How will DSB impact your sound broadcasting services business?

3. What are the projected financial implications associated with DSB, considering that Digital Terrestrial Television (DTT) is to be implemented prior to DSB?

4. What issues of concern should the Authority be wary of when implementing and planning for the regulation of DSB, with respect to competition, spectrum concerns, financial considerations etc.;

5. Do you believe DSB will encourage growth in your business or will it create unnecessary financial pressure on your business?

6. Have you conducted research on DSB and the implementation and regulation of same that you can share with the Authority?

7. Please provide the Authority with any further information you deem necessary and asked herein.

8. How would the introduction of digital sound broadcasting benefit the service providers?

For Manufacturers

1. What is your understanding of DSB and the impact it will have on your business model and financial projections in South Africa once implemented?

2. What financial, competition, manufacturing etc. challenge do you anticipate having with respect to DSB?

3. Do you plan on building and manufacturing equipment for DSB in South Africa in partnership with state or regulatorily assigned Broad-Based Black-Economic Empowerment and Historically Disadvantaged Groups?

4. What is your business plan, if any with respect to preparing yourselves for manufacturing and selling DBS equipment for South African consumers?

5. What pricing negotiations are you open to discussing with relevant bodies, including the Authority, to make the said DSB equipment affordable for consumers?

6. Will the introduction of DSB create more jobs for South Africans in your sector? If not why, if yes, how will this impact the statistics on job levels in the South African economy?

7. What projected impact do you believe that DSB will have on your business in terms of growing same and enhancing operations in South Africa?

8. Would you be prepared to partner with the Authority or the state in ensuring the success and uptake of DSB in South Africa?

9. Have you conducted any studies or research with respect to the manufacturing, distribution and marketing of DSB internationally? If so can you same with the Authority?

10. Please provide the Authority with any further information you deem necessary and asked herein.

11. How would it impact the car and radio manufacturers business if the Authority had to develop regulations making it mandatory for radio receivers they manufacture to have at least one digital interface?

ANNEXURE B : DAB FREQUENCY ALLOTMENTS

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

ANNEXURE C: Types of DSB Technologies

DSB Characteristics	DAB	ISDB-TSB (T)	IBOC	DRM	RAVIS
Advantages	1. DAB makes more radio stations available and suffers from less interference from other broadcasts. 2. Rooted out the problem of interference in AM and FM broadcast. 3. Data transmission alongside with audio broadcast providing text-based information such as	1.Excellent robustness of ISDB-T which might cover a service area with a small number of stations than DVB-T. 2. ISDB-T enables both fixed TV service and mobile TV service at the same time	1. Inherently simulcast both analogue and digital services, using the current frequency assignment (i.e. does not require additional spectrum). 2. Enables broadcasters	1. It can be broadcast via existing AM transmitters. 2. DRM signals are stronger and broadcast for much longer distances than DAB[106].	**For Listener:** **1.** High-quality sound broadcasting. 2. New multimedia services –video, text, additional data. 3. Easy tuning on the station by station name, program genre. **For Manufacturers:** 1. Mass replacement of old analogue receivers. 2. Upgrade of transmitters. 3. General growth of the market potential.

106 https://www.theguardian.com/media/organgrinder/2007/feb/12/drmdabthebbcandthefuture.

	instant reports on news, weather and traffic information etc. 4. More channels are available in the same frequency spectrum as compare with AM and FM transmissions[103].	within one channel and one transmitter. 3. All ISDB-T STBs are applicable for HD TV. 4. The number of ISDB-T Receivers is larger than that of DVB-T. 5. ISDB-T provides Emergency Warning System(EWS)[104]	to maximise the use of existing infrastructure; thereby minimising upgrade costs. 3. A receiver avoids abrupt reception[105].		**For broadcasters:** 1. Decrease in power consumption and expansion of coverage area[107].

103 https://www.quora.com/What-are-the-advantages-of-DAB-radio.
104 http://www.dibeg.org/news/2009/0903Pilippine_ISDB-T_seminar/Presentation_1.pdf.
105 slideplayer.com/slide/10243841/.
107 https://www.slideshare.net/vladshikhov/ravis-38207087.

DSB Characteristics	DAB+	DRM+	DRM30	DMB
Advantages	1. Transmit other types of information with the audio such as album covers, the name of the artist or the latest news headlines. 2. When the signal is weak, the listener still enjoys good sound quality. 3. DAB+'s compression technology offers up to 200 DAB+ radio broadcasters in a region[108].	1. The flexibility to offer a wide range of subsidiary data services, multiplexed programming or single frequency networks. 2. Capable of operating in a compatibility mode in which the huge existing base of FM receivers in the home and cars can continue to be used until the audience and broadcasters can	1. DRM30 signal performance is better than AM signal with regards to coverage area. 2. DRM30 demonstrated improved spectrum usage. 3. DRM30 demonstrated a a reduction in energy consumption compared to	**1.** DMB can be rolled out and used without much modification for mobile video applications, simply increasing the level of error correction to cope with the mobile environment[111].

[108] https://blog.teufelaudio.com/dab-makes-digital-radio-reality/.
[111] http://www.radio-electronics.com/info/broadcast/dab/dmb-digital-multimedia-broadcasting.php.

		complete the changeover on the basis of mutual convenience and needs. 3. DRM+ has the flexibility to satisfy any coverage need in Band II ranging from national and regional networks to community stations[109].	analogue AM broadcast[110].	

[109] Report ITU-R BS.2384-0 (07/2015) p.15.
[110] Joint Radio Pulpit/Broadcom/Sentech DRM 30 – Final report.

DSB Characteristics	DAB	ISDB-TSB (T)	IBOC	DRM	RAVIS
Disadvantages	1. Lower sound quality than FM. 2. Reception quality is often unreliable. 3. DAB receivers are less energy-efficient than FM receivers. 4. DAB transmission powers are higher than would be required by modern digital	-.	1. On AM, IBOC is incompatible with analogue stereo[113].	1. Lack of compatible receivers[114].	-.

[113] https://en.wikipedia.org/wiki/In-band_on-channel.
[114] http://www.nab.org/xert/scitech/pdfs/rd062810.pdf.

	broadcasting systems[112].				
Some of the Countries that are using these DSB systems	Australia, Belgium, Czech Republic, Denmark, France, Germany, Gibraltar, Hong Kong, Indonesia, Ireland, Italy, Malta, Netherlands, Norway, Poland, South Korea, Spain, Sweden, South Africa[115].	America: Brazil, Peru, Argentina, Chile, Venezuela, Ecuador, Paraguay, Costa Rica, Bolivia, Nicaragua, Uruguay, Belize, Honduras, and Guatemala. Asia: Japan, Philippines, Maldives and Sri Lanka.	Argentina, Bosnia, Brazil, Canada, Czech Republic, China, Colombia, El Salvador, Europe, France, Germany, Indonesia, Jamaica, Mexico, New Zealand, Philippines, Poland, Puerto	India, Europe, Southern Africa, Brazil, Russia and Asia[118].	Russia.

[112] https://www.parliament.uk/documents/documents/upload/stevegreen.pdf.
[115] https://en.wikipedia.org/wiki/Countries_using_DAB/DMB.
[118] http://www.digitag.org/wp-content/uploads/2015/06/ITVF2015-DRM-Global-Update-2015-05-29_v4.pdf.

		Africa: Botswana[116].	Rico, Switzerland, Thailand, Ukraine, Vietnam and United States[117].		
DSB Characteristics	**DAB+**	**DRM+**	**DRM30**	**DMB**	
Disadvantage		1. The self – fading phenomenon, fading may occur when the antenna of a vehicle travelling at high speed receives a reflected signal.			

116 https://en.wikipedia.org/wiki/ISDB.
117 https://en.wikipedia.org/wiki/In-band_on-channel

		2. The availability of low-cost DRM+ consumer receivers is still very limited119.			
Some of the Countries that are using these DSB systems	Australia, Czech Republic, Denmark, Germany, Hong Kong, Italy, Malta, Norway, Poland, Switzerland, United Kingdom and the Netherlands. Malta was the first	Brazil, Germany, France, India, Sri Lanka, the UK, Slovakia and Italy (incl. the Vatican)121.	Australia, South Korea, China, Malaysia, France, United Kingdom, Italy, Russia and India122.	South Korea, Malaysia, Norway, Germany and France123.	

119 https://itunews.itu.int/en/4153-contributed-by-pv-giudici-vice-chairman-of-the-radiocommunication-advisory-group-and-alfredo-magenta-member-of-the-radio-regulations-board.note.aspx.

121 https://en.wikipedia.org/wiki/Digital_radio.

122 Digital Radio – A global perspective, Richard Redmond.

123 https://en.wikipedia.org/wiki/Digital_multimedia_broadcasting.

	country to launch DAB+ in Europe. Several other countries are also expected to launch DAB+ broadcasts over the next few years, such as Austria, Hungary and Asian countries, such as Thailand, Vietnam and Indonesia[120].				

[120] https://en.wikipedia.org/wiki/Countries_using_DAB/DMB.