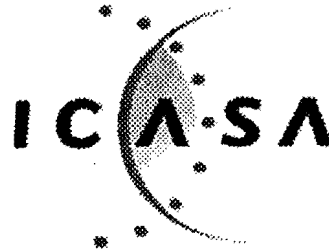

GENERAL NOTICE

NOTICE 1538 OF 2009



INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA (ICASA)

NOTICE OF PUBLICATION OF FINAL TERRESTRIAL BROADCASTING FREQUENCY PLAN, 2008

The Independent Communications Authority of South Africa ("The Authority") hereby gives notice in accordance with section 34 of the Act. After due consideration of comments and representations received pursuant to the two published draft terrestrial broadcasting frequency plans, the Authority has now determined the Final Terrestrial Broadcasting Frequency Plan 2008 and hereby publishes the plan accordingly.

Copies of the plan are available from ICASA offices at Pinmill Farm, 164 Katherine Street, Block D, Sandton and on ICASA website <http://www.icasa.org.za>

Enquiries May be directed to the attention of:

Mr. Monde Mbanga
Manager: Broadcasting Spectrum
Tel: +27 11 - 566 3165
Fax +27 11 - 566 3166
E-mail mmbanga@icasa.org.za

Block A,
Pin Mill Farm,
164 Katherine Street,

or

Private Bag X10002,
Sandton
2146;

ACKNOWLEDGMENT

The Authority would like to acknowledge the contribution of all individuals and organizations who participated in the production of the drafts and the Final Terrestrial Broadcasting Frequency Plan 2008.

ICASA

Councilor Robert Nkuna (Chairperson)

Councilor Brenda Ntombela (Co-Chairperson)

Mr Dumisa Ngwenya (GM: Engineering and Technology)

Mr Philemon Molefe (SM: Frequency Spectrum)

Mr Monde Mbanga (Manager: Broadcasting Spectrum)

Ms Tshifularo Sigwavhulimu (RF Specialist)

Mr Johannes Kgampe (RF Specialist)

Mr Thato Mahapa (Manager: Licensing and Compliance)

Ms Refilwe Ramatlo (Manager: Policy Development and Research)

Ms Fiona Naidoo (Legal Advisor)

Ms Nozipho Mvulane (Economic Analyst)

Mr Obakeng Tihabi (Manager: Consumer Affairs)

Mr Richard Makgotlho (RF Specialist)

Mr Melikhaya Mdudo (RF Specialist)

Ms Jacobeth Makhubele (Researcher)

Ms Nomcebo Mathe (Administration Officer)

SUBMISSIONS

The Authority would like to thank the following organizations and individuals who made submissions and representations:

1. Association of Christian Broadcasters (ACB)
2. All Media
3. Cell-C (Pty) Ltd
4. Ericsson
5. eTV
6. FLO Forum
7. ISPA (Internet Service Providers' Association)
8. MNET
9. MTN
10. Nation Association of Broadcasters (NAB)
11. Neotel (Pty) Ltd
12. On Digital Media
13. Orbicom
14. Qualcomm
15. Radio Pulpit
16. Radio Veritas
17. SABC
18. Sentech (Pty) Ltd
19. Square Kilometre Array (SKA)
20. Smile (Pty) Ltd
21. SUPER5 MEDIA
22. Telkom (Pty) Ltd
23. Telkom Media (Pty) Ltd
24. Vodacom (Pty) Ltd
25. Walk on Walter Television (WOWTV)

INTRODUCTION AND BACKGROUND

The Authority is publishing final draft terrestrial broadcasting frequency plan 2008 in terms of in terms of sections 30 (1) and 34 of the ECA, as an annexure to the National Radio Frequency Plan. This document should thus be read together with the National Radio Frequency Plan. The document is published for the purposes of adding further detail to the allotment of broadcasting frequencies, with a specific emphasis on frequencies that will be assigned for digital migration purposes.

After due consideration of comments and representations received pursuant to the two published draft broadcasting frequency plan 2008, the Authority has made a determination on the allotment and assignment of frequencies for the dual illumination period. This determination will, in particular, assist the electronic communications network services (ECNS) in the rollout of an electronic communications network for digital terrestrial television across the country. In the interest of providing the necessary clarity in respect of the Authority's perspective of the whole broadcasting sector, the document also highlight the allotment of frequencies for the purposes of sound broadcasting services.

The Authority published the first final Terrestrial Broadcast frequency plan in October 1999. Two revisions have since been published in July 2002 and December 2005 respectively. To incorporate frequencies for digital terrestrial television a draft plan based on GE06 was published in 2008 as part of public consultative exercise for public comments. In response to the draft, public comments were received and a workshop was held with industry on 11 - 12 March 2009.

The second draft terrestrial broadcasting frequency plan 2008 was published on 6 July 2009 for the public to make further comments before a final determination is made and subsequently public hearing were held on 16 to 18 September where representations were made on all pertinent issues.

The main objective of the second consultative process was to elicit final comments from stakeholders to finalize the terrestrial broadcasting frequency plan for dual illumination period.

The following section clearly depicts the views, determinations and the final position taken by the Authority on all pertinent areas.

Multiplex 3

Views were expressed on the creation of Multiplex 3 and the need to list the frequencies as part of the plan. However multiplex three will be exclusively built on existing Mnet and CSN frequencies. The Authority is of view that Multiplex 3 will only emulate existing Mnet and CSN coverage and the network will not affect the DTT frequencies. Frequencies that will be relinquished through the hard switch over exercise will be used to optimise DTT frequency networks and for analogue switch off and new DTT services re-planning exercise.

Square Kilometre Array (SKA)

Further comments were received on the need to consider all frequencies in the Northern Cape according to the requirements of the Astronomy Geographic Advantage Act (Act no. 21 of 2007).

The Authority concurs with such sentiments and an insertion has been included in the documents which state that "all existing and future assignments/allotments in the frequency bands depicted in Table 1(all terrestrial broadcasting Bands) for the Northern Cape Province will be subjected to the restrictions prescribed by the Astronomy Geographic Advantage Act (Act No. 21 of 2007)". In the plan all high power theoretical sites have been excluded to ensure compliance to the AGA requirements.

The Authority endeavours to initiate a separate process for further engagement of affected broadcasting industry to device alternative broadcasting transmission facilities/means for the SKA demarcated area.

Re-categorization of MW frequencies and Proposed FM Frequencies,

Discontent was expressed by some sound broadcasting services on Authority's continued refusal to assign spare commercial MW for community sound broadcasting purposes. The suggestion was to re-categorize the channels as "open use". The Authority has taken initiatives to deal with the issue around MW frequencies. This includes the recent ITA gazette for additional commercial sound broadcasting in the Primary Markets.

The Authority is of the view that the current licensing process should be allowed to run its course before AM frequencies can be made available for community broadcasting.

The Authority concurs with the sentiments and a separate process for re-categorization of AM frequencies outside the Primary Markets for community broadcasting purposes process will be undertaken to ensure that these new MW requirements are thoroughly addressed. It is envisaged that, such a process will be concluded by the end of June 2010.

New pre-coordinated frequencies were proposed for community sound broadcasting services for inclusion in the list of FM frequencies annexure. The Authority has reanalysed, co-ordinated as per proposed list, however only 15 of the proposed frequencies were suitable for inclusion in the plan and are included as part of FM frequencies on annexure A.

DTT planning approach

Views were raised that the broadcasting frequency plan should be based on digital migration regulations and the plan and the regulations must support each other. Further it was argued by some stakeholders that mobile broadcasting should not be a priority, but could be considered when the allocation of multiplexes to the DTT services has been concluded.

The Authority concurs with the view that the broadcasting frequency plan and digital migration regulations must be supportive of each other. The Authority endeavours to ensure that such is always the case. As a case in point, the draft Digital Terrestrial Television Regulations are based on the two Multiplexes as recommended in the GE 06.

Mobile broadcasting was identified as the country's strategic intent prior to RRC-06 and it was included in the GE-06. The introduction of mobile broadcasting is also one of the deliverables that the country has promised to FIFA ahead of the World Cup. Therefore, the plan caters for mobile broadcasting.

While the Authority intends licensing of mobile television services, that would be handled as a separate exercise from the planning process. In the interest of transparency, the Authority has already signalled its intention to issue an Invitation to Apply for this purpose. Mobile television will be licensed on technology neutral basis, where potential investors will retain their right to choose their own technology/standard amongst the existing options such as DMB and DVB-H.

As indicated above, the introduction of mobile broadcasting will not affect the future licensing of additional DTT services. Based on the GE06 Plan, the Authority is of the view that digital migration will free additional frequencies in the 470-790 MHz. Although the Authority is committed to further consultation on the distribution on the digital dividend, there is no doubt that a significant part of this band will be allocated back to television for the purposes of providing High Definition Television (HDTV) as well as cater for the introduction of competition in both the pay and free -to- air markets (FTA).

Digital Dividends and 790 to 862 MHz band

There was a strong lobby to have the band 790 to 862 MHz to be made available for IMT immediately, just as there was an equally strong lobby against immediately releasing the band for IMT. Those who wanted the band to be made available immediately argued that South Africa is party to decisions of WRC-07 final regulations, enabling countries to make the band available before June 2015.

The other lobby argued that there are existing analogue services which need protection in this band. Furthermore, there is a risk of non-usable frequencies during dual illumination.

There was a lot of anxiety around the distribution of the digital dividend between broadcasting and electronic communications services. Some stakeholders argued that it is premature to start considering digital dividends at the moment, before the end of the dual illumination period.

The Authority takes the view that to minimise risks and to protect consumers, 790 to 862 MHz should be released for IMT after November 2011 or when and where analogue services have been switched off. The Authority will endeavour to limit new assignments made in this band. The freeing of this band will also allow the creation of a unified 800MHz for the purposes of providing electronic communications services such as broadband. This is in line with emerging international practice.

On digital dividends, based on international benchmark, the Authority anticipates frequency spectrum in the region of 300MHz to be released after dual illumination. Consideration for utilization of this spectrum will include additional broadcasting services, high definition TV, return paths for interactive TV, and others. The process around this will be informed by national objectives and policy intent. The Authority will continue engagements on market studies to ascertain needs and advise on policy issues.

Other issues

The Authority will endeavor to remain technology neutral as far as it is practically possible. However, where necessary, the Authority will engage industry on the adoption of certain standards in line with the objectives of the ECA.

- A number of errors and omissions have been highlighted in the submissions. The Authority has taken every effort to make appropriate amendments to the current draft.
- Issues around the Joint Spectrum Advisory Committee were raised. Terms of reference as the structure of the JSAC will be finalized as part of the finalization of digital terrestrial television regulations.
- The Authority also took note of the views expressed by stakeholders on the need to include, as part of the broadcasting plan, all available community radio frequencies.
- The workshop suggested that a technical committee be formed to look at all technical issues at hand and prepare a consolidated recommendation before the finalization of the plan. On further deliberations the Authority felt that the exercise would not add any substantial value, given that all views have been gathered from submissions and further canvassed during the workshop.
- The Authority also wishes to state that, subsequent to the workshop, it has received numerous uninvited correspondences from interested parties clarifying their various positions. None of these correspondences have had any substantial influence on positions expounded above.

Conclusion

Although, two widely diverging sentiments were raised in the submissions of both published drafts; during the workshop; and the public hearings. One predominant view was that the plan should be based on GE-06 which would allow speedy implementation. However, there was also a strong view that GE-06 plan was not optimal hence the slight deviation by the second ICASA draft to have a coverage that is comprehensive for dual illumination. The advocates of the second view proposed an allotment based plan, which would result in larger SFNs and contiguous blocks of channels.

The advantage in this approach is that it would make the broadcasting spectrum more organised and becomes easier to identify spectrum for digital dividends. The Authority accepts the view that an allotment based approach would be ideal. However, this exposes the plan to a huge risk of too many frequencies requiring international coordination. It also brings to question the country's commitment to international treaties and cooperation with our neighbouring countries. To determine the basis for delineation of service areas would require a lot time and effort. The GE-06 based plan attempts to minimise consumer disruptions by minimising changes on analogue services. This is the view that most of the representations alluded to during the public hearings. The Authority received a number of independent analysis from various broadcasters, which indicated no constraints with the implementation of the draft plan, their report only emphasised the suitability of the published plan for dual illumination.

In view of the above, it stands to reason that the final Terrestrial Broadcasting Plan should not deviate considerably from GE-06. The time, cost and effort far outweigh the benefits. There are indications that the identified limitations of the GE-06 based plan can be addressed satisfactory. It is worth noting that a number of countries avoid huge deviations from GE-06 for similar reasons.

The Authority has considered the following factors in making its overall assessment:

- Compliance with GE-06 Plan
- The extent of co-ordination required
- Existing analogue frequency changes
- Number of interference cases

The Authority has taken into account all workable modifications suggestions for enhancement of the published drafts which were based on GE-06 and has incorporated them in the Final Terrestrial Broadcasting Frequency plan 2008.



PARIS MASHILE
CHAIRPERSON
INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA



**Independent Communications Authority of South
Africa**

**Final Terrestrial
Frequency Plan 2008**

TABLE OF CONTENTS

TABLE OF CONTENTS	1
LIST OF TABLES	3
ANNEXURES	4
ACRONYMS	5
1 INTRODUCTION AND BACKGROUND	7
2 GUIDING PRINCIPLES	8
3 TOWARDS DIGITAL MIGRATION PLAN	12
3.1 PREPARATORY STAGE	12
3.2 ISSUES COVERED IN THE PLAN	12
3.3 DIGITAL TERRESTRIAL TELEVISION AND MOBILE TV	14
3.4 SELF- HELP STATIONS	16
3.5 PROVINCIAL (REGIONAL) BROADCASTING	16
3.6 DIGITAL DIVIDEND	16
3.7 DIGITAL AUDIO BROADCASTING	16
3.8 DIGITAL TELEVISION BROADCASTING	17
3.9 IMT (INTERNATIONAL MOBILE TELECOMMUNICATIONS)	17
4 BROADCAST FREQUENCY ASSIGNMENT PROCESS	19
4.1 FREQUENCY ASSIGNMENT TABLE STRUCTURE	19
4.2 COMPLIANCE WITH INTERNATIONALLY ACCEPTED METHODS	19
4.3 INTERFERENCE AS A LIMITING FACTOR TO FREQUENCY ASSIGNMENT	20
4.4 FACTORS RESTRICTING THE FREQUENCY PLAN	23
4.5 COVERAGE AREA AND SERVICE CONTOUR LEVELS	24
4.6 BROADCASTING FREQUENCY BANDS AND TECHNICAL PARAMETERS	25
4.7 CHANNEL NUMBERING	30
4.8 FREQUENCY TOLERANCES	34
4.9 MINIMUM USABLE FIELD STRENGTH	34
4.10 SPURIOUS EMISSION POWER LEVELS	35
4.11 STATISTICAL INFORMATION	36

4.12	ASSIGNMENTS FOR SOUND BROADCASTING SERVICES	37
4.13	TELEVISION BROADCASTING SERVICES.....	38
4.14	TERRESTRIAL SELF- HELP STATIONS ASSIGNMENTS	38
	TECHNICAL STANDARDS AND TRANSMISSION CHARACTERISTICS APPLICABLE TO DTT	39
4.15	39
4.16	GENERIC DEFINITION OF TERMS USED IN THE TABLE OF ASSIGNMENTS.....	39
5	REFERENCES	44

List of Tables

Table 1: Broadcasting Frequency Bands.....	25
Table 2: HF broadcasting frequency bands.....	26
Table 3: Channel numbering in VHF FM band (band II).....	30
Table 4: Channel numbering in band III (174 – 238MHz & 246 – 254MHz).....	31
Table 5: Channel Numbering in Band IV/V (470 – 854MHz).....	33
Table 6: Frequency Tolerances for Sound Broadcasting	34
Table 7: Service Contour Values used a Basis in Determination of Coverage Area	34
Table 8: Spurious Emission Limits for Sound Broadcasting.....	36
Table 9: Spurious Emission Power Levels for Television Broadcasting	36
Table 10: Statistical information of analogue audio broadcasting frequency assignments	36
Table 11: Statistical information of analogue television broadcasting frequency assignments.....	37

ACRONYMS

AGA	Astronomy Geographic Advantage Act (Act No. 21 of 2007)
AM	Amplitude Modulation
Cat	Category
CML	Commercial National Service
COFDM	Coded Orthogonal Frequency Division Multiplexing
CSP	Content Service Provider
CTY	Community District Service
DAB	Digital Audio Broadcasting
dB	Decibels
DOC	Department of Communication, Republic of South Africa
DTT	Digital Terrestrial Television
DVB-H	Digital Video Broadcasting-Handheld
DVB-T	Digital Video Broadcasting-Terrestrial
ECA	Electronic Communications Act, 2005 (Act No. 36 of 2005)
ECNS	Electronic Communication Network Services
EMRP	Effective Monopole Radiated Power
EPG	Electronic Program Guide
ERP	Effective Radiated Power
FM	Frequency Modulation
FTA	Free To Air
GE06	Analogue and digital frequency plan as per RRC-06
HDTV	High Definition Television
HF	High Frequency
IBA	Independent Broadcasting Authority
ICASA	Independent Communications Authority of South Africa
IMT	International Mobile Telecommunication
IRD	Integrated Receiver Decoders
ITA	Invitation To Apply
ITU	International Telecommunication Union
kHz	Kilohertz
Kw	Kilowatts

LI	Licensed
LIC	Licensed
MDTT	Mobile Digital Terrestrial Television
MHz	Megahertz
MPEG	Moving Picture Expert Group-Advanced coding and tx of video
MUX	Multiplex Operator
MW	Medium Wave
OP	Operational
OPE	Operational
PAL	Phase Alternating Line
PNS	Public National Service
Pol	Polarization
PSB	Public Service Broadcaster
RRC-06	Regional Radiocommunication Conference 2006
SABC	South African Broadcasting Corporation
SAFTA	South Africa Frequency Table Allocations
SFN	Single Frequency Network configuration
SKA	Square Kilometer Array
SPA	Spare
STB	Set-Top-Box
T-DAB	Terrestrial Digital Audio Broadcasting
TV	Television
UHF	Ultra high Frequency
VCR	video cassette recording
VHF	Very High Frequency

1 INTRODUCTION AND BACKGROUND

The Authority is publishing final terrestrial broadcasting frequency plan 2008 in terms of in terms of sections 30 (1) and 34 of the ECA, as an annexure to the National Radio Frequency plan. This document should thus be read together with the National Radio Frequency plan. The document is published for the purposes of adding further detail to the allotment of broadcasting frequencies, with a specific emphasis on frequencies that will be assigned for digital migration purposes.

After due consideration of comments and representations received pursuant to the two published draft terrestrial broadcasting frequency plan 2008, the Authority has made a determination on the allotment and assignment of frequencies for the dual illumination period as depicted on the annexure G and H. This determination will, in particular, assist the electronic communications network services (ECNS) in the rollout of an electronic communications network for digital terrestrial television across the country. In the interest of providing the necessary clarity in respect of the Authority's perspective of the whole broadcasting sector, the document also highlights the allotment of frequencies for the purposes of sound broadcasting services.

The Authority published the first Final Terrestrial Broadcast Frequency Plan in October 1999. Two revisions have since been published in July 2002 (Gazette no 23695, notice 1341 of 2002) and December 2005 (Gazette no. 28299, notice no. 1513 of 2005) respectively. The 2009 Final Terrestrial Broadcasting Frequency Plan was to facilitate comprehensive deliberations on digital planning parameters and to incorporate frequencies for digital terrestrial television and mobile digital terrestrial television for dual illumination period.

2 GUIDING PRINCIPLES

The Authority's approach to this document was informed by a number of principles as outlined below:

Categorization of Services

The categorisation was informed by the following:

- Expressions of interest for commercial, community and digital broadcasting services;
- The Triple Inquiry Report, including language obligations¹;
- The current licensed broadcasting services;
- The SABC radio language service expansion;
- Coverage and ERP requirements of broadcasters;
- Additional regional public broadcasting services licenses.
- Restrictions prescribed by the Astronomy Geographic Advantage Act (Act No. 21 of 2007).

The Authority may consider re-categorisation where a request is made. In analysing the request, the Authority will consider optimum usage of the broadcast frequency spectrum and changes (technology or otherwise) in the broadcasting industry.

Contribution to the Diversity Requirements of the Act

Section 2(s) (i) of the ECA promotes a diversity of services. The Terrestrial Broadcasting Frequency Plan is aimed at contributing to diversity by amongst other things ensuring audiences have access to different categories of broadcasting services on different technological platforms.

¹ See page 8 of the Triple Inquiry Report 1995.

Protection of national and regional Identity, Character and Culture

The Terrestrial Broadcasting Frequency plan attempts to give every citizen access to at least one broadcast frequency assignment for a service in his or her language of choice. In areas of greatest demands, such as Johannesburg, a greater number of frequency assignments are grouped together to address this need. The Authority has noted that the roll out of digital terrestrial and satellite broadcasting would go a long way to help alleviate the shortage of frequency assignments in some geographic areas.

Balance between protection of existing broadcasting services and the need for digital migration

The Terrestrial Broadcast Frequency Plan does not deprive any existing licensed broadcaster of any frequency assignment. Future assignments though might necessitate some frequency changes to existing broadcasting services. These changes will as far as possible be limited to stations that have a low ERP and a small coverage area². The GE-06 plan has made provisions for 2x1.5 MHz of a national T-DAB network for the whole country from 214-230MHz.

It was agreed with the SADC countries, that in areas where there is more demand, each country could add more channels after consultation with the affected neighbouring countries. T-DAB allotment can only be available once the current analogue services have migrated to digital.

Protection of the integrity and viability of the public broadcaster

Section 2(t) of the ECA advocates the protection of the integrity and viability of public broadcasting services. The plan protects all operational PBS services and reserves frequency assignments to cater for public broadcasting.

² Frequency changes will be made in accordance with Section 31(4) of the EC Act

Television frequency assignments with a low ERP (less than 1 kilowatt) were not considered for co-ordination and are therefore not protected.

Efficient Use of the National Frequency Spectrum

Section 2(e) of the Act provides for the efficient use of the radio frequency spectrum. The terrestrial broadcasting Frequency plan is developed in line with global spectrum management principles as prescribed by the ITU recommendations.

Fair Competition between Broadcasting Services

Section 2(f) of the ECA mandates the Authority to promote competition within the ICT sector. In order to fulfil this mandate, the plan allows, in most cases, for frequency assignments with similar coverage area (CML, PBS, PNS) in the same licence areas. This will allow for effective competition between different private broadcasters due to the equal potential listener- and viewer-ship from a transmitter site. The responses for the expressions of interest for radio (community and commercial) were taken into account in developing the Plan. The Community frequency assignments vary in ERP from area to area, and sometimes in the same area, depending upon the coverage requirements for each Community.

Promotion of stability in the broadcasting Industry

The Authority has attempted to make frequency assignments available according to demand, need and population distribution.

Promotion of research into broadcasting policy and technology

The Authority has actively supported the promotion of research into broadcasting policy and technology and has licensed test broadcasts for both T-DAB Eureka 147 as well as DVB-T. Tests have been conducted by Sentech in Johannesburg and Pretoria for T-DAB on 239.2 MHz and 1466.656 MHz. Test for DTT has been carried out on channel 58 in Johannesburg. Orbicom

and MNET have also conducted DTT tests in Johannesburg, Kyalami and Helderkruijn on channel 62. The Authority has also issued DVB-H test licenses to MNET, Vodacom and Sentech. The feedback received from the tests assist the Authority in acquiring insight on pertinent issue of the technology.

3 DIGITAL MIGRATION PLAN

3.1 Preparatory Stage

The Authority has in 2007 issued DVB-H test licenses to MNET, Vodacom and Sentech. The feedback received from the tests assisted the Authority in acquiring knowledge and insight from industry of the potential that such a broadcasting service could have in the development of digital broadcasting in the country.

The Department of Communications in preparing the country for the Regional Radiocommunications Conference (RRC-06) that was held in May/June 2006 established a National Preparatory Task Team, with the view of developing a digital plan for South Africa. The National Preparatory Task Team subsequently agreed on a plan that was submitted to the International Telecommunications Union (ITU). These processes culminated in the draft terrestrial broadcasting frequency plan 2008 which was gazetted in October 2008 and subsequently the publication of the final terrestrial broadcasting frequency plan 2008 for dual illumination.

3.2 Issues Covered in the Plan

The Plan seeks to address the introduction of new players in the market from the inception of digital transmission. This plan attempts to meet the digital migration broadcasting frequency requirements as submitted by industry.

The plan permits new players, albeit limited and as services begin to switch off analogue transmissions a further freeing of spectrum will permit more role players to enter into the market.

The Plan also addresses the Digital Audio Broadcasting (DAB) services needs by the industry. The occupancy of the Very High Frequency Band (VHF) by television services further limits the introduction of Digital Audio Broadcasting in the short term.

Due to the limited number of VHF channels available and the intensive occupancy of VHF band, use of these frequencies for DAB and DTT can only occur once existing analogue television services have migrated to a digital platform. The VHF band has only seven frequency assignments, and all these frequencies are extensively used for television transmission in analogue format. It is therefore essential that in order for Digital Audio Broadcasting to be deployed in this band some services will have to be migrated .

The Plan proposes that should there be a need for introduction of DAB before some television assignments have migrated; the L-Band should be used in the short term. The bands that DAB can operate are the VHF band, the L-Band and through satellite. Therefore in as far as terrestrial transmission is concerned the only option is to deploy DAB in the L-Band in the short term until such time that the television services have migrated.

The ideal requirements for DTT spectrum were compiled by the National Preparatory Task Team which included of all broadcasters and signal distributors in consultation with the industry through an exercise carried out by the Department of Communications (DOC) in preparation for RRC-06.

The planning principles supported by South Africa are those that provide balance between the protection of existing services and the introduction of a spectrum efficient digital broadcasting. The introduction and migration strategy for digital broadcasting hinges on the availability of spectrum.

The Authority decided to prioritize the allocation of frequencies for digital broadcasting, taking into account both legislative obligations and practical limitations. This includes availability of spare usable frequencies to be used for digital broadcasting. It might not always be possible to have analogue coverage and digital coverage at the same time in some areas.

The Authority is also proposing that due to the nature of digital broadcasting, there might be a need to establish more gapfiller sites to ensure that the analogue network is emulated, and would therefore propose that in the interest

of ensuring that the network reception is sufficient, there would be an authorization process to assist in making sure that network rollout happens quickly, and timely.

The Authority also encourages the early migration of services that could, especially if such a migration would result in the freeing of spectrum. This is to ensure that spectrum is freed early to the benefit of the efficient use of spectrum and for the post dual illumination re-planning exercise. On the basis of the technical analysis and limited spectrum resource the authority produced a plan for digital migration as articulated below.

3.3 Digital Terrestrial Television and Mobile TV

The Frequency Plan incorporates the two national Digital Terrestrial Television (DTT) frequency networks using the Digital Video Broadcasting – Terrestrial (DVB-T) standard that were submitted to the ITU for incorporation in the GE-06 plan. In addition to the above two metropolitan DTT frequency networks using the Digital Video Broadcasting – Handheld (DVB-H) standard were submitted to the ITU for incorporation in the GE-06 plan.

The Introduction of mobile television services using DVB-H were further endorsed in the policy directions issued by the Minister of Communications in terms of section 3(1) and (2) of the ECA in Government Notice 876, Government Gazette Vol. 507, No. 30308, on 17 September 2007..

After considering both the GE 06 Plan and the Ministerial Policy directives, the Authority proposes that mobile television services be licensed on technology neutral basis. While DVB-H is preferred, as reflected in the ministerial policy directives, other technologies and standards should be encouraged. The Two multiplexes (MDTT1 and MDTT2) for mobile television services have been indicated in the table of assignments as a way forward to secure a smooth analogue-digital migration.

In line with the above-mentioned considerations, two UHF channels were planned for mobile DTT use in Gauteng and surrounding areas, Durban and surrounding areas, Cape Town and surrounding areas. These channels will be below 700 MHz to allow for mobile television applications. Additional channels have been added to extend the mobile DTT coverage to other metropolitan areas. Further channels for digital mobile broadcasting services will be available after analogue switch-off. In planning for digital services, coverage equivalent to that currently provided by analogue services must be ensured. This could necessitate additional low power gap fillers.

The Authority is also mindful that for the mobile DTT networks to operate and sufficiently cover the whole metropolitan areas, there would be a need to migrate some services in the identified channels. The Authority is however cognizant that the services that would have to move are in the low power sites and therefore would not significantly hamper the launch of a commercial MDTT network, while services are moved from the occupied channels.

It is the Authority's view that the licensing of mobile television networks could go ahead while at the same time, time frames are established on the migration of the services from the identified channels of mobile television networks in the metropolises. This would ensure that mobile television frequency network licensing does not have to be hampered by the migration of the services from the identified channels.

For the mobile DTT networks, to operate and sufficiently cover the whole metropolitan areas and surrounding areas, there will be a need to migrate some services from identified channels. The services that will have to move are predominantly in the low power sites and therefore will not significantly hamper the launch of a commercial mobile network. Channels 33 and 35 will be used for mobile television services in Gauteng and surrounding areas. Channels 25 and 33 will be used for mobile television services in Durban and surrounding areas. In Cape Town and surrounding areas channels 28 and 32 will be used

for mobile television services. It is therefore the Authority's intention to license these frequencies as per GE-06, while at the same time migrating services from the identified frequencies, in order to facilitate the launching of mobile DTT.

3.4 Other Pertinent Issues

Self- Help Stations

The Authority does not reserve frequencies for self-help stations due to the very low power used and the uncertainty of the requirement. Assignments are made as and when required. Therefore, the assignments listed in Annexure B and E are all operational. Self-Help frequencies should be proposed by the applicant.

Provincial (Regional) Broadcasting

It is the Authority's view that the two national DTT frequency networks that are used in GE-06 plan fully accommodate the regional public services of the SABC.

Digital Dividend

The migration process will release much of the spectrum currently occupied by analog services. After dual illumination more spectrum will be available for additional digital broadcasting, Digital audio services and telecommunications. Broadcasters and other interested stakeholders will be engaged further in a separate process to ensure a fair criterion is used in the distribution of spectrum after dual illumination.

Digital Audio Broadcasting

Digital dividends in terms of digital audio broadcasting are not attractive. On the other hand the cost, including social cost, of converting existing AM and FM might be high. DAB will be introduced in Band III after digital migration for

television. Authority recommends that DAB be introduced when the market is ready. Ideally, digital audio broadcasting should augment and not replace AM and FM.

Therefore, there is no switch-off date for AM and FM. Rather there should be a commitment to grant fair access to spectrum where the right conditions prevail. The Authority has recommended to the ITU that Channel 9 and 10 (214-230MHz) be identified for DAB.

Digital Television broadcasting

The anticipated spectrum to be released by analog services from current SABC, eTV and Mnet services which will translate to bandwidth for new services or enhancement of existing services. Frequency 470 MHz to 790 MHz Band will be redistributed for future broadcasting services (additional regional multiplexes, HDTV requirements and for other ICT services).

IMT (International Mobile Telecommunications)

The band 790 MHz to 862 MHz has been identified for IMT implementation. After dual illumination this spectrum will be freed for IMT. The Authority will undertake a separate process to determine the criteria to be used to access the spectrum.

Square Kilometre Array (SKA)

All existing and future assignments/allotments in the broadcasting frequency bands depicted in Table 1 for the Northern Cape Province will be subjected to the restrictions prescribed by the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007). In the plan all high power theoretical sites have been excluded to ensure compliance to the AGA Act requirements.

The Authority endeavours to initiate a separate process for further engagement of affected broadcasting licensees to device alternative broadcasting transmission facilities/means for the SKA demarcated area; all affected frequencies are depicted in annexure J. Annexure H has a list of frequencies changes to be effected during the implementation of the DTT frequency plan.

4 BROADCASTING FREQUENCY ASSIGNMENTS AND TECHNICAL PARAMETERS

4.1 Frequency Assignment Table Structure

The frequency assignments listed fall into one of three levels of assignment status:

- OP or OPE - Frequencies assigned and in use
- SP or SPA - Spare frequency assignments in the vicinity of an existing transmitting station site or frequency assignments available for use in the vicinity of a theoretically determined lattice node point
- LI or LIC - Frequencies licensed and awaiting finalisation of technical parameters or the installation of transmitting equipment

The information provided in annexure A to H is structured to give the transmitting station name, its geographic co-ordinates, the frequency and the channel, the maximum effective radiated power and the polarisation mode. In cases where the frequency is already in use, the name of the licensed broadcasting service is also given, together with the date it came on air. In each case, it is indicated into which of the three above-mentioned assignment-status levels the frequency assignment falls.

4.2 Standards and Requirements of the ITU

As a requirement in terms of section 30 (2)(a) of the ECA the Authority must, in controlling, planning, administering, managing and licensing the use of the radio frequency spectrum, comply with the applicable standards and requirements of the ITU and its Radio Regulations.

The broadcasting frequency bands are pre-planned and internationally co-ordinated through the ITU to avoid mutually harmful interference between neighbouring countries. These bands are the Medium Wave (MW or MF), and VHF/FM bands for sound broadcasting and the VHF and UHF bands for television broadcasting. To allow for technological advances and to accommodate changing priorities of

countries, the international plans are reviewed every 20 to 30 years. Provision is also made for modifications to the plans. Procedures are laid down by which frequency assignments can be modified or added to the existing plans. Affected countries have to be consulted and the ITU has to be notified of all such modifications or additions.

South Africa, as a signatory to the ITU Convention, and more particularly having acceded to the Regional Agreements concerning VHF-FM Sound broadcasting and VHF/UHF television broadcasting, is obliged to adhere to the planning principles agreed to in the planning conferences organised by the ITU to plan the broadcasting frequency bands.

The existing frequency plans for FM and TV have been developed on the basis of providing essentially a full range of public broadcasting services to the majority of the population. The South African frequency plans currently in use are based on internationally accepted practices similar to those adopted in Europe, Australia and Asia. The current levels of spectrum usage in South Africa are also consistent with international practice.

Frequencies are normally assigned to transmitting stations according to a uniform lattice in case of the VHF/FM and UHF television frequency bands. Frequencies are reused at a distance where there will be no harmful interference between transmitting stations operating on the same frequency or on adjacent frequencies. Techniques are used to increase frequency usage density, such as orthogonal polarisation and frequency off-set.

4.3 Interference as a Limiting Factor to Frequency Assignment

Issues that are important in frequency planning include definition of the area to be served by each broadcasting station, whether these areas may be or need to be served through the use of multiple frequencies or whether it is to be served by a single transmitter, and decisions about how much interference between services is tolerable, and the grade of service to be provided to the listeners or viewers within

the area to be served. In the final instance, a frequency plan can consist of a number of combinations and permutations of frequencies and power levels for the same area, all of which may be technically acceptable. Also, it would be possible to have a smaller number of high power transmitters, or a larger number of low power transmitters, or any combination between these extremes, in any particular geographic area, dependent on the particular needs, and considering the topography in the area.

While it would be possible to avoid interference between broadcasters or transmitters by never using a frequency more than once nor using frequencies close to each other, this is unrealistic because very few services could be established in this scenario. Frequency re-use is therefore a standard feature of all frequency plans and is the essence of the efficient use of the frequency spectrum.

The plan attempts to manage the problem of interference and accommodate the maximum number of frequency assignments within a given area for a given amount of spectrum. The plan also takes account of the practical limits of coverage of stations imposed by factors such as the physics of radio wave propagation, limits of radiated power from the stations, and performance characteristics (selectivity and sensitivity) of typical receivers.

The engineering considerations of interference prediction and coverage assessment usually follow recommendations of the ITU. These recommendations draw on the pooled knowledge of experts world-wide, which is expressed in terms of guidelines, standards and parameters that have been established as providing proven practical and realistic results. The Authority therefore has to establish a policy of defining licence areas to be served, and to plan accordingly. Interference or signal strength complaints about reception from listeners or viewers outside of the licence area of the station are normally not considered.

This is generally known as interference limited approach in assigning frequencies and determining the coverage area of a particular broadcasting station, as opposed to a noise limited approach (where the signal level is allowed to drop to below the

ambient noise level). The latter is considered to be inefficient in the use of the frequency spectrum.

Due to current spectrum utilisation in some areas, particularly in the VHF/FM band, it has in certain cases been possible to receive broadcast transmissions in areas beyond the intended target area of transmitting stations, as broadcasts have been mostly noise limited.

As more frequency assignments are made and new broadcasters come on the air, services will no longer be noise limited but will become interference limited. This means that although the prime target area of the transmitting station will continue to receive satisfactory coverage, people in areas outside the target area who in the past were able to receive transmissions, will no longer be able to do so due to increased spectrum usage and the consequent increase in interference levels. This issue becomes more relevant in the context of digital broadcasting; the signal degradation where one is able to view a picture that is not clear is no longer applicable. The viewer outside the recommended signal level would not be able to receive.

Some broadcasting signal distributors are making use of re-broadcasting techniques (RBR) to provide programme feeds to transmitting stations. In this process a signal is received from an adjacent transmitting station and re-transmitted to the intended target area. The Authority did not use any criteria to protect such links from any interference in the compilation of this plan. When necessary, more use will have to be made of either telecommunications links or satellite facilities to provide programme feeds to transmitting stations where interference on RBR has become a problem.

In drawing up the Frequency Plan, priority was given to maximising the number of broadcasting frequencies available for assignment to broadcast services. Consequently, no protection against harmful interference can be given to radio frequency output signals on home equipment such as video cassette recorders (VCR's), satellite receivers, integrated receiver decoders (IRD's) etc. operating in the broadcasting services frequency bands.

In countries with a tradition of public broadcasting, systematic planning methods have been applied on the basis that public services should be widely accessible to all of the population. This planned approach is the one adopted by the ITU generally and in particular for planning of broadcasting services in Africa.

This is the approach that has been used for broadcasting frequency planning in South Africa, and which the Authority intends to continue applying (in compliance with ITU methods).

The Frequency Plan is to be treated as a living document and as a vehicle to assist the Authority to facilitate the development of a broadcasting system which is responsive to the changing technical and social environment, and which will enable the Authority to achieve the primary objects of section 2 of the ECA. The Authority will at all times keep the latest frequency plan on its website (www.icasa.org.za) for easy access by the public.

4.4 Factors Restricting the Frequency Plan

A number of factors place restrictions on the Frequency Plan, being:

- frequencies occupied by existing broadcasters;
- the need to co-ordinate broadcasting frequencies with South Africa's neighbours; and
- demographic and topographic conditions.

International agreements and ITU Radio Regulations require that all medium and high power frequency assignments are co-ordinated with neighbouring territories so as not to cause trans-border interference. This requires that any addition of a new frequency or relocation of a frequency of a medium or high power broadcasting station situated within approximately 400 km from the border of any of South Africa's neighbours (Namibia, Botswana, Zimbabwe, Swaziland, Mozambique or Lesotho) would require extensive bilateral negotiations.

4.5 Coverage Area and Service Contour Levels

ITU provides the following definitions:

Coverage Area³:

The coverage area is defined by the ITU as "the area within which the wanted field strength is equal to or exceeds the usable field strength defined for specified reception conditions and for an envisaged percentage of covered receiving locations".

ECA provides the following definition:

Licence Area⁴:

The licence area is defined in the ECA as "the geographical area specified in a licence".

If a licence area is not specified in a broadcasting service licence, then the technical parameters specified in the licence conditions will be used in order to determine the licence area..

The determination of a coverage area is governed by the following definitions of ITU:

- "The area within which the wanted field strength is equal to or exceeds the usable field strength defined for specified reception conditions and for an envisaged percentage of covered receiving locations."
- "Usable field strength is the minimum value of the field strength necessary to permit a desired reception quality, under specified receiving conditions, in the presence of natural or man-made noise and of interference, either in an existing or as determined by agreements or frequency plans."

³ See Final Acts GE 06

⁴ See EC Act 36 of 2005 (Definitions)

- "Minimum usable field strength is the minimum value of the field strength necessary to permit a desired reception quality, under specified receiving conditions, in the presence of natural and man-made noise, but in the absence of interference from other transmitters."

4.6 Broadcasting Frequency Bands and Technical Parameters

The following broadcasting frequency bands are included in the South African broadcasting frequency plan. All existing and future assignments/allotments in the frequency bands depicted in Table 1 for the Northern Cape Province will be subjected to the restrictions prescribed by the Astronomy Geographic Advantage Act (Act No. 21 of 2007).

Table 1: Broadcasting Frequency Bands

Broadcasting bands	Range	ITU plan
AM-MF (MW) audio broadcasting	535.5 – 1606.5 kHz	Geneva plan of 1975 for Africa, Europe and Asia
VHF/FM audio broadcasting	87.5 – 108 MHz	Geneva plan of 1984 for Africa and Europe
VHF television broadcasting	174 – 238 MHz 246 – 254 MHz	Geneva plan of 2006 in parts of Region 1 and 3
UHF television broadcasting	470 – 854 MHz	Geneva plan of 2006 in parts of Region 1 and 3

The HF broadcasting bands are coordinated by the ITU. The procedures are laid down in Article 12 of the Radio Regulations (RR12-1) and subsequent planning documents released by the Radio Communication Bureau. The procedure is based on the principle of equal rights of all countries to equitable access to these bands.

As transmissions in the tropical Bands are intended for national coverage, the transmitter output power is restricted to 50 kW. Table 2 indicates the various allocations to the HF frequency spectrum sound broadcasting services available to South Africa.

Table 2: HF broadcasting frequency bands

HF (kHz)	
3900 – 4000	13600 – 13800
5950 – 6200	15100 – 15600
7100 – 7300	17550 – 17900
9500 – 9900	21250 – 21850
11650 – 12050	25670 – 26100
HF Tropical Band (kHz)	
2300 – 2498	3200 – 3400
4750 – 4995	5005 – 5060
HF single side band (kHz)	
5900 – 7300	13570 – 13600
7300 – 7350	13800 – 13870
9400 – 9500	15600 – 15800
11600 – 11650	17480 – 17550
12050 – 12100	18900 – 19020

MF-AM Broadcasting Band

The MF AM broadcasting band lies between 530 and 1606,5 kHz, and is divided into 120 channels of 9 kHz bandwidth each. In South Africa, the first channel on 531 kHz is not used for MF broadcasting as the frequency band 526.5 – 535.5 kHz is

allocated to mobile telecommunications service. Three of the MF channels have been designated as low power channels where the power may not exceed 1 kW. Currently medium to high power MF-AM transmitting sites are located at Meyerton, Springs, Komga, Ga-Rankuwa and Klipheuwel. The local authority and environmental considerations often limit the establishment of high power MF stations due to the large infrastructure associated with such stations and its interference impact on electronic systems.

South Africa has 37 channels registered with the ITU; of these 11 are in use with powers between 10 kW and 100 kW. At the ITU Geneva '75 Conference for MF-AM planning, it was resolved in the Final Acts that the provisions and resolutions adopted for the benefit of member and non-member states shall not be applied to the Government of the Republic of South Africa. The Authority has already undertaken a process of including all the assignments in the Master Register of the ITU. The South African MF-AM plan includes low power frequencies assigned to Community Radio services. Low power for MW applies to 1 kW or lower powers.

VHF-FM Sound Broadcasting Band

In the VHF FM sound-broadcasting band between 87.5 MHz and 108 MHz there are 204 channels, each of 100 kHz bandwidth. These are grouped into 31 groups of 6 channels, plus additional 18 channels. The groups are distributed in a uniform lattice where each node point relates to a transmitting area. This means that at any one transmitting site in an area the ITU plan provides for 6 channels or frequencies to be available for assignment. In areas of greatest demand, 12 channels were assigned to one area by combining 2 lattice node points. In order to provide national FM coverage it was necessary to locate high power transmitting stations approximately 110 km apart.

Although such a transmitting station may only have coverage radius of 30 - 50 km, interference from such a station can occur over hundreds of kilometres. In order to avoid mutual interference between stations operating on the same frequency, it is necessary for the signal from the wanted station to be between 37 dB and 45 dB

higher (i.e. 5 000 and 30 000 times stronger) than the interfering signal. Hence a high power FM frequency assignment can only be reused at a distance of close to 500 km. On the other hand, low power (e.g. 1 watt) FM transmitters using the same frequency can be situated some 10 km apart (depending on the terrain and broadcasting antenna characteristics and site height) due to its limited area of coverage and interference impact.

Due to constraints in receiver design, an average domestic FM radio receiver cannot discriminate between frequencies less than three channels apart. This places a further limitation on the number of VHF/FM frequencies available for assignment in an area.

VHF TV Broadcasting Band

The VHF television broadcasting band is between 174 MHz and 238 MHz and between 246 and 254 MHz. It contains only 9 channels of 8 MHz bandwidth each. A uniform lattice with multiple channels (3) at each node cannot be formed and used to assign frequencies on a national basis. These channels have been assigned in groups of 3 only to metropolitan areas and, where possible, also to rural areas, using a method of "foremost priority".

In the past, there has been a prohibition of adding a NICAM (Near Instantaneously Compounded Audio Multiplex) carrier for digital stereo sound to TV channel 13 (246 – 254 MHz) due to its interference to the public trunked mobile radio communication services located at 254 MHz and higher. The problem is made more noticeable by the fact that channel 13 is used with a slightly offset vision carrier of 247.43 MHz rather than the standard 247.25 MHz. This was originally done to avoid interference from the residual vestigial colour sub-carrier to the international distress frequency on 243 MHz.

Modern television transmitters no longer produce any significant residual vestigial colour sub-carrier. A technical solution has been found to the interference problem to mobile trunking services. The solution is to move the vision frequency by 300

kHz down to 247.13 MHz and to apply the narrower PAL-B/G "roll-off" filtering instead of the wider PAL-I version. This solution has been tested and all concerned parties have accepted the results. The Authority's Council has approved the introduction of NICAM in channel 13 as described above.

UHF TV Broadcasting Band

The UHF television broadcasting band between 470 MHz and 854 MHz contains 48 channels, each of 8 MHz bandwidth, arranged into 12 groups of 4 channels. This means that 4 channels are available for assignment at any one transmitting site on a national basis. In areas of greatest demand 7 to 11 channels have been assigned by combining lattice node points or where both VHF and UHF channels have been assigned to a particular area.

4.7 Channel Numbering

Table 3: Channel numbering in VHF FM band (band II)

	A	B	C	D	E	F
1	87.6	32 90.7	64 93.9	97 97.2	132 100.7	168 104.3
2	87.7	33 90.8	65 94.0	98 97.3	133 100.8	169 104.4
3	87.8	34 90.9	66 94.1	99 97.4	134 100.9	170 104.5
4	87.9	35 91.0	67 94.2	100 97.5	135 101.0	171 104.6
5	88.0	36 91.1	68 94.3	101 97.6	136 101.1	172 104.7
6	88.1	37 91.2	69 94.4	102 97.7	137 101.2	173 104.8
7	88.2	38 91.3	70 94.5	103 97.8	138 101.3	174 104.9
8	88.3	39 91.4	71 94.6	104 97.9	139 101.4	175 105.0
9	88.4	40 91.5	72 94.7	105 98.0	140 101.5	176 105.1
10	88.5	41 91.6	73 94.8	106 98.1	141 101.6	177 105.2
11	88.6	42 91.7	74 94.9	107 98.2	142 101.7	178 105.3
12	88.7	43 91.8	75 95.0	108 98.3	143 101.8	179 105.4
13	88.8	44 91.9	76 95.1	109 98.4	144 101.9	180 105.5
14	88.9	45 92.0	77 95.2	110 98.5	145 102.0	181 105.6
15	89.0	46 92.1	78 95.3	111 98.6	146 102.1	182 105.7
16	89.1	47 92.2	79 95.4	112 98.7	147 102.2	183 105.8
17	89.2	48 92.3	80 95.5	113 98.8	148 102.3	184 105.9
18	89.3	49 92.4	81 95.6	114 98.9	149 102.4	185 106.0
19	89.4	50 92.5	82 95.7	115 99.0	150 102.5	186 106.1
20	89.5	51 92.6	83 95.8	116 99.1	151 102.6	187 106.2
21	89.6	52 92.7	84 95.9	117 99.2	152 102.7	188 106.3
22	89.7	53 92.8	85 96.0	118 99.3	153 102.8	189 106.4
23	89.8	54 92.9	86 96.1	119 99.4	154 102.9	190 106.5
24	89.9	55 93.0	87 96.2	120 99.5	155 103.0	191 106.6
25	90.0	56 93.1	88 96.3	121 99.6	156 103.1	192 106.7
26	90.1	57 93.2	89 96.4	122 99.7	157 103.2	193 106.8
27	90.2	58 93.3	90 96.5	123 99.8	158 103.3	194 106.9
28	90.3	59 93.4	91 96.6	124 99.9	159 103.4	195 107.0
29	90.4	60 93.5	92 96.7	125 100.0	160 103.5	196 107.1
30	90.5	61 93.6	93 96.8	126 100.1	161 103.6	197 107.2
31	90.6	62 93.7	94 96.9	127 100.2	162 103.7	198 107.3
Additional channels:						
63	93.8	95 97.0	96 97.1	128 100.3	129 100.4	130 100.5
130	100.6	163 103.8	164 103.9	165 104.0	166 104.1	164 104.2
199	107.4	200 107.5	201 107.6	202 107.7	203 107.8	204 107.9

Table 4: Channel numbering in band III (174 – 238MHz and 246 – 254MHz)

Channel No.	Channel Limits (MHz)	Vision Carrier Frequency (MHz)
4	174 – 182	175.25
5	182 – 190	183.25
6	190 – 198	191.25
7	198 – 206	199.25
8	206 – 214	207.25
9	214 – 222	215.25
10	222 – 230	223.25
11	230 – 238	231.25
13	246 – 254	247.13 ⁵

⁵ Refer to Section 3.4.3 for explanation to the non-standard vision carrier frequency of channel 13.

Table 5 Channel Numbering in Band IV/V (470 – 854MHz)

Channel No.	Channel Limits (MHz)	Vision Carrier Frequency (MHz)
21	470 – 478	471.25
22	478 - 486	479.25
23	486 – 494	487.25
24	494 – 502	495.25
25	502 – 510	503.25
26	510 – 518	511.12
27	518 – 526	519.25
28	526 – 534	527.25
29	534 – 542	535.25
30	542 – 550	543.25
31	550 – 558	551.25
32	558 – 566	559.25
33	566 – 574	567.25
34	574 – 582	575.25
35	582 – 590	583.25
36	590 – 598	591.25
37	598 – 606	599.25
38	606 – 614	607.25
39	616 – 622	615.25
40	622 – 630	623.25
41	630 – 638	631.25
42	638 – 646	639.25
43	646 – 654	647.25

44	654 – 662	655.25
45	662 – 670	663.25
46	670 – 678	671.25
47	678 – 686	679.25
48	686 – 694	687.25
49	694 – 702	695.25
50	702 – 710	703.25
51	710 – 718	711.25
52	718 – 726	719.25
53	726 – 734	727.25
54	734 – 742	735.25
55	742 – 750	743.25
56	750 – 758	751.25
57	758 – 766	759.25
58	766 – 774	767.25
59	774 – 782	775.25
60	782 – 790	783.25
61	790 – 798	791.25
62	798 – 806	799.25
63	806 – 814	807.25
64	814 – 822	815.25
65	822 – 830	823.25
66	830 – 838	831.25
67	838 – 846	839.25
68	846 – 854	847.25

4.8 Frequency Tolerances

For both VHF and UHF TV bands, the tolerance shall be 500 Hz Table 6 show frequency tolerances for audio broadcasting.

Table 6: Frequency Tolerances for Sound Broadcasting

Frequency Band	Tolerance
535.5 kHz to 1606.5 kHz	±10 Hz
1606.5 kHz to 29.7 MHz	±10 Hz
87.5 MHz to 108 MHz	±2000 Hz

4.9 Minimum Usable Field Strength

The minimum usable field strength values to be used to calculate coverage, using the associated technical parameters, are referred to as the service contour values and are specified in Table 7.

Table 7: Service Contour Values used a Basis in Determination of Coverage Area

MF	74 dB μ V/m
FM Monophonic	60 dB μ V/m
FM Stereophonic	66 dB μ V/m
TV VHF(Band III)	55 dB μ V/m
TV UHF(Band IV)	65 dB μ V/m
TV UHF(Band V)	70 dB μ V/m

The coverage can be calculated for each frequency, using the associated technical parameters, determining the effect of interfering transmitters and using the service contour values as defined in section 5.6.

The coverage calculation is based on a data terrain model and a specific prediction model. The prediction model must be applicable to the frequency band of operation. All interference from other transmitting stations must be taken into consideration whenever this calculation is performed. This calculation produces the usable (interference limited) service area.

The usable coverage area, as described in this section, must be used as the basis for all demographic calculations such as percentage population coverage figures.

4.10 Spurious Emission Power Levels

This is an emission on a frequency or frequencies outside the necessary bandwidth and which may be reduced without affecting the corresponding transmission of information. Spurious emission includes harmonic emission, parasitic emissions, intermodulation products and frequency conversion products but exclude out of band emissions. The maximum permitted levels of spurious emissions, in terms of the mean power level of any spurious component supplied by a transmitter to the antenna transmission line shall be as set out in table below:

Table 8: Spurious Emission Limits for Sound Broadcasting

Frequency Band	Spurious Emission Level
535.5 kHz to 1606.5 kHz	40 dB/50 mW
87.5 MHz to 108 MHz	
Transmitter output power > 25 W	60 dB/1 mW
Transmitter output power < 25 W	40 dB/25 μ W

Table 9: Spurious Emission Power Levels for Television Broadcasting

Frequency band	Spurious Emission Level
174 – 254 MHz and 470 – 854 MHz	
<ul style="list-style-type: none"> • Tx o/p > 25 W • Tx o/p < 25 W 	<ul style="list-style-type: none"> • 60 dB/1 mW • 40 dB/25 μW

4.11 Statistical information

The frequency plan in this document contains all the foregoing and the amendments and additional assignments referred to elsewhere in this document.

Table 10: Statistical information of analogue audio broadcasting frequency assignments

SERVICE CATEGORY	MW	FM	SELF-HELP	TOTAL
Commercial	17	224	1	242
Community	20	340	0	360
Public	15	760	42	817
TOTAL	52	1324	43	1419

Table 11: Statistical information of analogue television broadcasting frequency assignments

SERVICE CATEGORY	VHF/UHF	SELF-HELP	Total
Commercial	230	268	498
Community	10	1	11
Public National	485	770	1255
DTT	460	0	460
Mobile DTT	73	0	73
TOTAL	1258	1039	2297

4.12 Assignments for Sound Broadcasting Services

This subsection covers the frequency assignments for the sound-broadcasting services as defined by the ITU, for the categories used in the RSA, viz. VHF/FM and MF/AM. The description of the categories, their frequency assignment tables and relevant definitions are given in the subsections to follow.

Sound VHF FM audio broadcasting

Frequency assignments for audio VHF FM broadcasting are given in Annexure A. It is based on the ITU Geneva Plan of 1984 (GE84).

Sound MF/AM audio broadcasting

Frequency assignments for audio MF/AM broadcasting are given in Annexure C. It is based on the ITU Geneva Plan of 1975 (GE75). Frequencies in South Africa are also assigned to theoretical stations, which are available for future use.

4.13 Television Broadcasting Services

Frequency assignments for VHF and UHF television broadcasting are given in Annexure D. It is based on the ITU Geneva Plan of 2006 (GE06). The plan incorporates two national Digital Terrestrial Television (DTT) frequency networks using DVB-T standard. It also incorporates two metropolitan DTT frequency networks planned for the use of DVB-H standard. Both standards were considered in the GE-06 plan. Annexure F shows national DTT networks. Annexure G shows metropolitan networks for both DVB-T and DVB-H.

Frequencies assigned to TV low power stations are invariably in the UHF band. Orthogonal polarisation, relative to that of high power stations, is used in order to increase frequency usage as a result of reduced interference levels with orthogonal polarisation. Orthogonal polarisation and frequency offset is also used between high power transmissions to decrease interference experienced and increase frequency use, in an analogue broadcasting environment.

4.14 Terrestrial Self-Help Stations Assignments

Self-help broadcasting relay transmitting stations are transmitting stations established, owned and operated by entities such as municipalities, farmers associations, business organisations and individuals. The purpose of a self-help station is to relay a programme service to an area where the programme service cannot easily be received through the regular transmissions, i.e. where the coverage is insufficient. Self-help broadcasting relay transmitting stations are extensions of the broadcaster's network and have been operating under the broadcaster's licence. The broadcasters involved are the SABC, e-tv and M-Net.

Self-help relay transmitting stations are used for both sound and television broadcasting. It is envisaged that the need for self-help stations will continue, with the purpose probably shifting from providing coverage to facilitating lower-cost communal reception. Frequency assignments for VHF FM self help stations are

given in Annexure B. Frequency assignments for VHF and UHF television broadcasting are given in Annexure E.

4.15 Technical Standards and Transmission Characteristics Applicable to DTT

The technical standards and transmission characteristics for digital broadcasting will be in accordance with the GE-06 plan, which South Africa is a signatory. The implementation of digital broadcasting and Transmission characteristics will be in accordance with the GE-06 plan (See annexure I).

4.16 Generic definition of terms used in the table of assignments

Station name

The station name is the internationally co-ordinated name of the transmitting station or area location. The name was decided upon using the following guidelines:

- In cases where the site is located in or near a city, major town or suburb, the respective name is used.
- In cases where it is not located near a city or town the name of a relevant hill, mountain or other well-known geographical feature is used.
- In some cases, a station name has been used but the station does not yet exist, neither is there any development at the site. The station name in those cases is a provisional name that is associated with a theoretical lattice node point.

Latitude and Longitude

This is the nominal co-ordinates of the station in degrees, minutes and seconds, south and east. In those cases where a site has not yet been developed i.e. where the frequency is assigned to a theoretical lattice point, the co-ordinates are those of the theoretical point.

Channel No. (Chan.)

Channel numbering is applicable to only Television frequency assignments. This is the number of the frequency channel, according to the ITU designation.

Frequency (Freq.)

For VHF/FM assignments, this is specified in megahertz (MHz). In the case of MF/AM, it is specified in kilohertz (kHz).

Vision frequency (Freq.)

Vision frequency is applicable to Television assignments in analogue format in the tables. It is the frequency of the vision carrier in megahertz (MHz): The sound-carrier frequency is not given. It is 6 MHz above the vision carrier in all cases in analogue broadcasting.

Offset

Offset is also applicable to only Television frequency assignments in analogue. It is the frequency offset from the nominal frequency given in the assignment plan to reduce co-channel interference. The offset may be positive (P), i.e. the frequency is greater than the nominal frequency or negative (N), and i.e. the frequency is less than the nominal frequency. The letters P or N are preceded by the offset in twelfths of the line frequency (e.g. 20P means that the frequency is $20/12 \times 15.625$ kHz above the nominal frequency).

In the majority of cases of self-help relay stations, because of the low ERP employed and the type of equipment used, there is a lesser strict frequency tolerance than in the main and the gapfiller stations. This precludes the use of offset in these assignments.

ERP

This is applicable to VHF/FM and Television frequency assignments. ERP is the maximum effective radiated power. In the case of an omni-directional antenna it is

the maximum effective radiated power in any direction. In the case of a directional antenna it is the effective radiated power in the direction of maximum gain. The ERP is specified in kilowatts (kW) and is sometimes rounded off to the nearest integer.

EMRP

This is the effective monopole radiated power applicable to MF/AM assignments. This is the power supplied to the antenna, multiplied by the antenna gain referred to that of a short vertical antenna in the horizontal plane.

Polarisation (Pol.)

This column indicates the dominant polarisation mode of the transmitting antenna, while transmission in the other mode is minimal, unless slant or circular polarisation is specified. The dominant polarisation is normally either horizontal (H) or vertical (V).

Programme Service (programme)

This is the name of the programme service carried by the transmission.

On-air Date

This is the date on which the transmitter went on the air. Where the date is omitted, the frequency is either available for future use at the station site or available for re-assignment to a site in the vicinity of the theoretical lattice point in the GE84 (See definition of "Status") or the broadcaster has not supplied the Authority with this information.

Status

The Status column indicates which frequency assignments are:

- Operational - In which case the status is indicated as OPE or OP;

- Spare - in which case the Status is indicated as SPA or SP. A frequency with SPA or SP status is either assigned to an already developed site, or a theoretical lattice node point;
- Licensed - in which case, the Status is indicated as LIC or LI. This frequency status means that it has been assigned to a broadcasting licensee by the Authority but that the technical parameters have not yet been finalised or the broadcasting service is not yet on air at this site. LIC or LI is an intermediate stage between SPA/SP and OPE/OP;
- Under Technical Investigation - In which case the Status is indicated as ICASA.

Stations with a status of OP, SP or LI are stations in the national database which have not yet been or are in the process of being internationally co-ordinated

Category (Cat)

In the respective columns of Category, the categorisation of the frequency assignment is given as follows:

- **PBS** - Public Broadcasting Service as per the definition in chapter one of the EC Act 36 of 2006.
- **CML** - Commercial Broadcasting as per the definition in chapter one of the EC Act 36 of 2005 and
- **CTY** - Community Broadcasting Service as per the definition in chapter 1 of the EC Act 36 of 2005.

A blank category field indicates that the frequency has not yet been assigned to any service.

Allotment

*"Allotment (of a radio frequency or frequency channel). Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radiocommunication service in one or more identified countries or geographical areas and under specified conditions"*⁶

Assignment

*"Assignment (of a radio frequency or radio frequency channel). Authorization given by an administration for a radio station to use a radio frequency channel under specified conditions"*⁷.

⁶ Radio Regulations, International Communications Union, RR1.17

⁷ Radio Regulations, International Communications Union, RR1.18

References**ITU [1975] (GE75)**

Final Acts of the Regional Administration LF/MF Broadcasting Conference (Regions 1 and 3), Geneva 1975 (ITU, Geneva, 1975)

ITU [1984] (GE84)

Final Acts of the Regional Administrative Radio Conference for the planning of VHF sound broadcasting. (Region 1 and part of Region 3), Geneva 1984 (ITU, Geneva, 1984)

ITU [2006](GE06)

Final Acts of the Regional Radio communications 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)

ITU [2004]

Radio Regulations, edition of 2004 (ITU, Geneva, 2004)

EC ACT

Electronic communications Act, No. 36 of 2005

TRIPLE INQUIRY REPORT

Independent Broadcasting Authority Triple Inquiry Report 1995

SATFA

South African Table of Frequency Allocations (20MHz – 70GHz)

ANNEXURES

- Annexure A: VHF/FM Frequency Assignments
- Annexure B: VHF/FM Self-Help Frequency Assignments
- Annexure C: MW Frequency Assignments
- Annexure D: Television Frequency Assignments
- Annexure E: Television Self-Help Frequency Assignments
- Annexure F: DTT Frequency Networks
- Annexure G: Mobile DTT Frequency Networks
- Annexure H: Frequency Changes
- Annexure I: Digital Technical Parameters
- Annexure J: Square Kilometre Array (SKA) affected frequencies