THE NATIONAL ASSOCIATION OF BROADCASTERS WRITTEN SUBMISSION ON THE INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA'S INQUIRY INTO THE LONG-TERM SPECTRUM OUTLOOK

SUBMITTED: 4 March 2022

INTRODUCTION

1. On or about 24 December 2021, the Independent Communications Authority of South Africa (**ICASA** or the **Authority**) published its inquiry into the long-term spectrum outlook (the **Inquiry**) calling for written submissions by 4 March 2022.

2. The National Association of Broadcasters (**NAB**) is a leading representative of South Africa's broadcasting industry, representing the interests of all three tiers of broadcasters (public, community and commercial). Our members include the SABC, all the licensed commercial television broadcasters; e.tv, Multichoice, M-Net, and StarSat-ODM, independent commercial radio broadcasters such as Kaya FM, YFM, Smile FM, Rise FM, YOU FM, Hot 102.7FM, and radio services of media groups Primedia, Kagiso Media, MRC Management Services, AME, MSG Afrika and a number of community radio broadcasters and community television broadcaster, Faith Terrestrial. The NAB membership also extends to signal distributors as well as a range of industry associates.

3. As the voice of South Africa's broadcasting industry, the NAB's aim is to foster and promote the development of a sustainable and robust broadcasting system that upholds the principles of South Africa's constitutional democracy. It also seeks to enable and maintain an environment in which broadcasters are able to thrive – by serving audiences and contributing to diversity in the country. For our members, the long-term spectrum outlook is central to their ability to serve the public and to ensure that regulatory, technical and economic factors, including relevant regional and international best practices, are being upheld.

4. The NAB will confine its comments to those aspects of ICASA's Inquiry which relate to the broadcasting industry. The NAB participates in this process with the aim of providing constructive input for ICASA and looks forward to engaging further with ICASA on these issues.

GENERAL COMMENTS

5. At the outset the NAB notes that the broadcasting sector is poised to continue to grow in the next 10 to 20 years, and as such, the sector will need more, and not less, spectrum. Online content services will also grow and the existing licensing regime will have to change to plan for future applications. It has been noted that processes such as Digital Terrestrial Television (**DTT**) and Digital Audio, can take over a decade to implement. For instance, the NAB established the current DAB+ trial process in February 2012 and there are no terrestrial digital radio broadcasting technologies commercially on air. The Authority is also no doubt aware that complex technical matters require adequate time for meaningful public consultation.

6. It may be helpful to provide the Authority with a brief outline of the existing International Telecommunication Union (**ITU**) processes. The ITU hosts World Radiocommunication Conferences (**WRC**) every three to four years at which the Radio Regulations are reviewed, and

if necessary, revised. The Radio Regulations are based on an international treaty governing the use of the radio-frequency spectrum and the geostationary-satellite and non-geostationary-satellite orbit. The previous WRC occurred in 2019 (**WRC-19**) at which the agenda for the next WRC (WRC-23) was discussed and finalised. The various issues for consideration are divided between working parties or task groups. Each working party or task group is required to consider certain agenda items. Of particular relevance is Task Group 6/1, which is currently considering WRC-23 Agenda Item 1.5 relating to broadcasting services.

7. Prior to the WRC, a proposal can be made at the Conference Preparatory Meeting (**CPM**) following which a final CPM report is prepared, which is discussed at the next WRC. Recognised regional groups such as African Telecommunications Union (**ATU**) as well as individual member states can submit proposals for consideration. Members states can put in a common proposal, in terms of which the member states jointly sign-off on a proposal for submission. Such common proposals add more weight as opposed to proposals by individual member states. It is also important to note that at the WRC delegates are representing South Africa as a whole and are not representatives of each delegates individual organisation.

8. If a proposal on an agenda item is put forward in the CPM report at the WRC, the WRC can determine whether such proposal warrants a change (in whole or part) to the spectrum being considered or, in the event of a lack of agreement on the proposal, postponing deliberations on the proposal to the following WRC. It must be noted that all adopted proposals at the WRC form part of a draft treaty, which is then ratified by each member states government. In terms of South Africa, Cabinet must sign-off on any proposal by South Africa, common proposal by a group of nations or a regional body such as ATU. In addition, once the draft treaty is presented to Cabinet following the WRC, Cabinet will have to ratify such treaty and bring the provisions of such treaty into effect.

9. The NAB makes this submission in light of the fact that WRC-23 will be taking place next year and as such, any considerations relating to a long-term spectrum outlook should be made in the context of an impending draft treaty.

ERRORS IN THE INQUIRY DOCUMENT

10. The NAB notes that there are a number of errors in the spectrum/frequencies listed in the document. In this respect we note the following:

10.1 Item 4.3.2 Broadcasting states that "*Digital audio broadcasting is <u>currently</u> used in the <u>235-267 MHz</u> band and channel 13F is currently being used in the DAB+ trials. There is support for this band being permanently allocated for DAB+ use. In contrast 1452-1492MHz is no longer used for this purpose and can be reallocated. 3600-4200MHz is also used and suffering interference. There are trade-offs in the use of this band compared with for IMT services which need to be carefully considered.*" (Emphasis added)

10.2 The text indicating that the current band is 235 to 267 MHz is factually incorrect. There are no current transmissions of DAB+ (either trial or commercial) in this band. The portion of spectrum allocated in Band III for DAB+ broadcasting in South Africa is as follows:

Channel	*Frequency*	
11a	*216.926*	*MHz*
11b	*218.640*	*MHz*
11c	*220.352*	*MHz*
11d	*222.064*	*MHz*
12a	*223.936*	*MHz*
12b	*225.648*	*MHz*
12c	*227.360*	*MHz*
12d	*229.072*	*MHz*

10.3 As can be seen from the above list, the spectrum 235 to 267MHz has not been used for DAB+ broadcasting except for Channel 13F 239.200 MHz, which is an exception that falls within the accepted full band III for DAB+ broadcasting. This was due to Band III being allocated to analogue TV and channel 13F is the only frequency in Band III that could be used almost nationally to trial DAB+ as it could be “squeezed in” between existing analogue TV channels. It should be noted that all commercially available DAB+ receivers tune the full band from channel 5A to 13F.

10.4 There is support for this frequency (Channel 13F 239.200MHz) to be allocated permanently for DAB+ broadcasting as a possible national mux.

10.5 In South Africa, the bottom end of Band III (Channels 5 to 9 174MHz to 214MHz), which forms part of the full DAB Band III (see below) is allocated to DTT. It is highly unlikely that all of it would be used for this purpose as the current rolled out DTT network is all in the UHF band (470MHz to 694MHz).

10.6 In addition, Item 4.3.2 Broadcasting states that “*In contrast 1452-1492MHz is no longer used for this purpose and can be reallocated*.” This statement is factually correct as DAB+ receivers no longer use the L Band and only a few early generation 1 DAB receivers were ever able to tune to the L Band. This band can be reallocated.

COMMENTS ON SPECIFIC SECTIONS IN THE INQUIRY

11. **Item 3.1 Impact of Broadband**

Question 2: Are there services, in addition to broadband, that ought to be considered as important for economic growth? If so, please explain what these services might be and what the trade-offs are between using spectrum for broadband and alternative services. Please provide any evidence from other countries that may be relevant.

11.1 Comment: Television and radio broadcasting are important for economic growth. The United States of America's National Association of Broadcasters (**US NAB**), television and radio broadcasting generates $1,74 trillion per annum and 2.47 million jobs both directly and indirectly for the American economy.

11.2 In addition, the US NAB found that America's local broadcast television and radio stations are vital for keeping citizens in communities informed of local news, provide information and entertainment as well as lifeline emergency information. Broadcasting also enables small businesses reach local consumers through advertising.[1]

11.3 The position is similar in South Africa with broadcasting creating many jobs, both directly in terms of job in broadcasting and indirectly through other opportunities such as advertising, as well as providing much needed news, information and entertainment for national, regional and local audiences. As such, broadcasting is extremely important for economic growth in South Africa.

12. ***Item 4.2.1 Mobile***

***Question 12: Provide your support or reasons for objections on the bands being considered internationally for 5G commercial mobile allocations*.**

12.1 *Comment:* The NAB recommends that the Authority should note that incumbent services of some bands recommended for International Mobile Telecommunications (**IMT**) may need to be migrated to other bands. Some of these services are complicated and costly to migrate. For example, satellite services are services with long contract periods, as satellite operators need to recoup the investment in launching satellites into space. These service providers do not necessarily have the ability to simply swap or change frequencies. In allocating spectrum to IMT, the Authority must note the complexities and costs of migrating services. As some bands are still under consideration for decisions at World Radiocommunication Conference 2023

[1] https://www.nab.org/documents/newsroom/pressRelease.asp?id=5147

(**WRC-23**), the process should be allowed to continue without pre-empting any decisions that will be made at the conference.

Question 18: What are your views on reallocating the following bands for IMT over the next years?

12.2 *Comment:* The 617 to 698 MHz band should be removed from the Inquiry**.** The Authority is aware that the 470 to 694 MHz band is allocated to broadcasting in South Africa and is key to the implementation of the 7-MUX plan. The band is also under consideration for WRC-23, under Agenda Item 1.5.

12.3 The 3600 to 3800 MHz band is also under consideration for WRC-23, under Agenda Item 1.3, and the inclusion of this band in the outlook may be pre-emptive. As such, this band should be removed from the inquiry.

12.4 Where WRC-23 methods are concerned, there is a possibility of a no-change decision following the WRC-23 and therefore it is proposed that the Authority allows the WRC-23 process to run its course before making plans around those bands, in order to avoid pre-empting the outcome of WRC-23.

13. ***Item 4.3.2 Broadcasting***

Question 30: What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Broadcasting services in South Africa?

13.1 *Comment:* Broadcasting continues to play a key role in the broader communications landscape, due to it being able to provide audio visual content without the need to pay for mobile or fixed data. Broadcasting reaches thousands of households in South Africa that may not be able to afford the cost of data, enabling access to news, information, education, sport and general entertainment content. The band 470 to 694 MHz plays a key role for broadcasters, specifically in the multi-channel environment that households have been and are becoming accustomed to. This band is sufficient to cater for the 7-MUX plan that South Africa has developed, which will ensure that households across the country are able to access multi-channel television, which will grow the broadcasting sector even further.

13.2 In addition, the NAB will like to refer the Authority to the ITU REPORT ITU-R BT.2302-1. In preparation for WRC-23 Agenda Item 1.5, Working Party 6A circulated a questionnaire to member states in Region 1 to update "*spectrum use and needs of the broadcasting services in the band 470 – 960 MHz in Region 1 and the Islamic Republic of Iran*".[2] The report included a

[2] ITU REPORT ITU-R BT.2302-1*

number of trends identified to influence future demands for the broadcast spectrum. The following services/applications have been listed in this document, including, *inter alia*:

13.2.1 High Definition (HD) and Ultra High Definition (UHD);

13.2.2 Interactive Broadcast Broadband (IBB);

13.2.3 IBB services encompass the following:

13.2.3.1 Service Portal (to access all available services);
13.2.3.2 Enhanced Electronic programme Guide (EPG);
13.2.3.3 Catch-Up and Video-On-Demand;
13.2.3.4 Start-Over service (example Start-over TV for catching up on the start of a program already broadcasting);
13.2.3.5 Rating/Voting - Get feedback from viewers;
13.2.3.6 Games;
13.2.3.7 Social Networks;
13.2.3.8 E-Commerce;
13.2.3.9 News, weather, sports;
13.2.3.10 Regional and Local TV;
13.2.3.11 E-Government;
13.2.3.12 E-Learning;
13.2.3.13 E-Payment;
13.2.3.14 E-Health;
13.2.3.15 Games;
13.2.3.16 Music; and
13.2.3.17 Radio.

13.2.4 Time-shifted services;

13.2.5 Local, regional and community services;

13.2.6 Pay-TV programme services; and

13.2.7 5G Broadcast.

13.3 The broadcasting industry, post DD1 and DD2, has consistently advocated for keeping the remaining spectrum allocation for terrestrial broadcasting, audio and audio-visual. The current allocation is sufficient to ensure the future of terrestrial broadcasting.

Question 31: How much spectrum should be maintained for terrestrial broadcasting in the band 470MHz to 694MHz in the next 10 to 20 years?

13.4 *Comment:* In order to remain consistent with South Africa's submission to the ITU revision of the Report ITU-R BT.2302, it is submitted that 470 to 694 MHz should be maintained (and remain unchanged) for broadcasting as it caters for the 7-MUX plan. The licensing of all 7 multiplexes is expected to bring about a rich multi-channel environment, thereby growing the broadcasting sector further.

14. ***Item 4.3.6 Programme Making and Special Events (PMSE):***

Question 35: What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for PMSE services in South Africa?

14.1 *Comment:* While some uses of PMSE's, such as linking from a special event to a studio of broadcasters, are carried over IMT (where available), the need for additional spectrum will grow as the country develops. Wireless microphones are used extensively in live concerts, films, theatre, religious, cultural and educational activities throughout the country, and it is highly unlikely that IMT will be used for linking wireless microphones in these instances. The transmission range is limited but it is submitted that enough spectrum needs to be reserved for this purpose. Many wireless microphone systems that are approved by ICASA for use by religious, cultural and educational institutions work in the bands due to be auctioned by ICASA to IMT shortly. As a result of this these bands will become unusable due to interference.

14.2 Certain NAB members have extensive broadcast ancillary equipment, such as wireless microphones and in-ear monitors, in the 450 to 470MHz band, and hold licenses to that effect. Any changes to this band will be very costly for the members as new equipment will need to be purchased to accommodate any changes.

15. ***Item 4.3.7 Emergency Services (Including PPDR)***

Questions 36 to 38 regarding spectrum allocation for emergency services

15.1 *Comment*: This section highlights the need for Emergency Services via IMT, but both the existing Digital Radio standards offer emergency warning systems (**EWS**) and can provide larger coverage to the population from single sites. The NAB notes that there is no discussion on these systems in the Inquiry document. While IMT can provide similar services and there are many commercial reasons why this might not work as well as that consideration be given to narrow band communications. Although the spectrum can be made available, no service is reliable enough as there are many base stations throughout South Africa that have no standby power system available in the event of a power failure. This would render these services

useless in times of natural disasters as power lines are often one of the first services to be disrupted. In addition, the problem of battery theft and security of base sites needs to be resolved before emergency services via IMT or narrow band communications could be considered effective.

16. ***Item 4.3.8 Satellite Systems***

Question 39: What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Satellite services in South Africa?

16.1 *Comment:* Satellite systems provide widespread coverage, ensuring that signals reach where terrestrial systems are unable to reach. The Authority itself recognises the value that satellite systems have on a number of industries. Growth in data usage is not only limited to terrestrial IMT systems, but also impacts other systems as well. Similar to mobile systems, satellite systems also have a requirement for more spectrum allocations to be able to meet future demands.

16.2 In addition, it must be noted that the satellite ecosystem has drastically changed over the last few years, mainly due to technological developments that have radically reduced the cost of launching satellites lead by the likes of Space X, Amazon and OneWeb. It is reasonable to surmise that companies like Amazon are likely looking for vertical integration of their services and product offering, and are looking to reduce dependency on mobile network operators' infrastructure for connectivity. The modern space exploration which is currently being led by billionaires, in contrast to the previous space exploration, that was lead by superpower nations. This space exploration is expected to create a satellite broadband market which is anticipated to increase to US$400 billion by the year 2040.[3] The business model seems to be based on increasing profit margins by connecting the unconnected, unserved and under-served at a cost similar to, or cheaper than terrestrial telecommunications services, thereby increasing demand for existing services and creating new customers.

16.3 Due to satellite launches for low earth orbits (**LEO**), there is a need for the creation of mega-constellations and coupled with the desire to provide satellite broadband at speeds similar to fibre has increased the demand for spectrum in the Ku-band, Ka-band and V-band.

16.4 The question of whether there are enough spectrum allocations for satellite services in South Africa infers that issues of allocation in the National Radio Frequency Plan (**NRFP**) are uniform. The Authority is aware that the ITU has in place procedures and provisions in the Radio Regulations for the registration, co-ordination and operation of satellite networks in order to

[3] https://www2.deloitte.com/us/en/insights/industry/technology/technology-media-and-telecom-predictions/2020/satellite-broadband-internet.html

ensure the efficient use of satellite orbital slots and to avoid harmful interference between satellite networks utilizing the orbital slots.[4] Effectively, the Authority's responsibilities in terms of aspects of spectrum management are mainly limited to satellite receivers.

16.5 It is conceded that the operations of the satellite receivers are governed by the NRFP. The challenge is primarily the lack of adequate protection for satellite receivers mainly in the C-band and Ku-band.

Question 40: Which applications and allocations will require the most frequency spectrum demand in the following frequency bands?

16.6 *Comment:* **C-Band is key for mission critical satellite-based applications** that require high levels of uptime, even in times of challenging atmospheric conditions. Migration of satellite services from the C-Band will have a severe impact on these applications.

16.7 The nature of spectrum demand for satellites is a function of the availability of orbital slots and the type of orbit at which the satellite will operate. The creation of the mega-constellations for nanosatellites in the low earth orbit is a result of the need for low latency and small coverage from the satellites in comparison to GEO satellites. It takes three GEO satellites to cover the entire earth, whilst it takes up to 80 LEO satellites for similar coverage. A lot of the nanosatellites are targeted to operate in the Ka-band and Ku-band.

16.8 Broadcasters rely heavily on **Ku-Band** for direct to home (**DTH**) services. This band plays a key role in ensuring availability of pay and free-to-air services to audiences across the country. The growth of DTH in South Africa has shown demand for satellite services in the Ku-Band, which will require more spectrum to ensure broadcasters meet the demands of multi-channel environments.

Question 41: What and how will technology developments and/or usage trends aid in relieving traffic pressures and addressing spectrum demand for satellite services? When are these technologies expected to become available?

16.9 Comment: The most significant technological innovations regarding satellite trends include small satellites, e.g. NanoSats, that have become the driving force behind the next generation of satellite capabilities.[5] As indicated previously, the enormous decline in the manufacturing cost of small satellites is enabling the mass production of satellites. The low manufacturing costs are supported by the decreasing cost of launching satellites due to technological developments that have enabled the reusability or "recycling" of the most expensive components of the launch vehicles.

[4] https://www.imda.gov.sg/-/media/Imda/Files/Regulation-Licensing-and-Consultations/Frameworks-and-Policies/Spectrum-Management-and-Coordination/Spectrum-Rights-Auctions-Assigment/GuideSatelliteOrbitalSlotLic.pdf
[5] https://www.startus-insights.com/innovators-guide/satellite-trends-innovation/

16.10 Nanosatellite technology has been identified as the most cost-effective alternative to mobile communications in the provisioning of affordable communication services to the unconnected, unserved and underserved. Small satellites are expected to revolutionise the telecommunications sector due to their low cost of manufacturing, lightweight and high capabilities.[6] Another interesting development, related to WRC-23 agenda Item 1.4, is the potential use of high altitude platform stations as IMT base stations (**HIBS**) to provide broadband connectivity. Though the recent advances in battery and solar-panel technologies including spectrum allocation are central to the success of HIBS, nanosatellites will play an important role in the value chain by providing low latency backhaul channels.

16.11 As noted in Forbes in December 2021 (the **Forbes Article**), there is an increasing interest and investment from governments and the private regarding lunar landings as a "*good testbed for many technologies that will eventually help…make our way to Mars*". [7] Innovations linked to these projects benefit the entire satellite ecosystem. It was further noted in this article that:

> *"Something of a holy grail for space travel at the moment, reusable launch systems for orbital vehicles are set to dramatically lower the cost of leaving Earth's atmosphere, opening the doors to many exciting space initiatives which, while theoretically possible, are currently too expensive to be practical. It will also make routine space missions, such as launching satellites and resupplying the International Space Station, far more economical. SpaceX's SN20 will attempt to launch the first successful orbital flight using a reusable rocket in early 2022, pending approval from the US FAA. SN20 is the most powerful rocket ever built, and is the craft that SpaceX hope will eventually take humans to Mars."*

16.12 Another important trend is the satellite Internet of Things (**IoT**) that enables unparalleled connectivity across industries, including empowering 5G capabilities. Ground stations have also benefited from technological developments, e.g. requiring smaller dishes. Satellite technology development includes digitized payloads and propulsion systems, with Artificial Intelligence (AI) as an enabler for satellites to perform more complex functions autonomously. It was further noted in the Forbes Article that:

> *"Satellite launches make up the majority of commercial space activity, and that won't change as we go into 2022. The big drivers of increased activity in this field are the ever-falling cost of putting satellites into orbit and the growing number of use cases for the data they can provide. GPS and satellite imagery is an essential tool for many*

[6] https://cordis.europa.eu/article/id/415777-nanosatellites-set-to-provide-internet-coverage-to-developing-world
[7] https://www.forbes.com/sites/bernardmarr/2021/12/10/the-five-biggest-space-technology-trends-for-2022/?sh=478297471bf4

aspects of day-to-day life, and new uses – for example, tackling pandemics – are emerging all the time.

Satellites are becoming smaller and lighter, meaning that even start-ups can now take advantage of the technological capabilities. In fact, reports in recent years have found that the cost to a business of launching a satellite is becoming comparable to launching an app. China's Galaxy Space has developed and launched 1,000 small satellites into space for its customers in industries including aviation, marine, and vehicle manufacturing. Meanwhile, another Chinese company, ADA Space, is planning a network of 192 satellites that will use artificial intelligence (AI) technology to provide live streaming satellite imagery of the Earth[8]*."*

CONCLUSION

17. As can be seen from the above, the NAB is of the view that further detailed engagements with the various players and stakeholder in the sector need to be considered prior to the conceptualisation of Scenario Plans for the Long-Term Spectrum Outlook for South Africa. In addition, the Authority should be mindful of the outcome of WRC-23, which may require ICASA to consider additional aspects and will prevent ICASA from pre-empting the outcome of WRC-23.

18. The NAB thanks ICASA for the opportunity to provide this written submission and requests an opportunity to make oral representations, should hearings be held.

[8] https://www.forbes.com/sites/bernardmarr/2021/12/10/the-five-biggest-space-technology-trends-for-2022/?sh=478297471bf4