Response to the Second Information Memorandum on the Licensing Process for International Mobile Telecommunications in Respect of the Provision of Mobile Broadband Wireless Access Services for Urban and Rural Areas Using the Complementary Bands, IMT700, IMT800, IMT2600 And IMT3500, for Public Consultation

A submission to the Independent Communications Authority of South Africa submitted by: (alphabetic)

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- Association of Progressive Communications
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- Soweto Wireless User Group
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Introduction

We are extremely appreciative to see that the Authority has introduced wording in the 2nd Information Memorandum on the need for the radio frequency spectrum:

> *"to be shared with ECNS licensees in areas that spectrum is not utilised to stimulate competition, promote SMMEs and cooperatives, and ensure that the radio frequency spectrum is used efficiently in accordance with section 2 (f), (p) and (e) of the ECA, respectively."*

We are also pleased to see the direct inclusion of wording in the Second Information Memorandum to provide for the sharing of spectrum licensed to primary spectrum holders in cases where the licensed spectrum is not fully utilised, as per Section 11.6.2 below:

11.6.2 In cases where the spectrum is not fully utilised by the licensee within 5 years of issuance of the Radio Frequency Spectrum Licences, the Authority will initiate the process for the Licensee:

> *11.6.2.1 to share unused spectrum in all areas to ECNS licensees who may, inter alia, combine licensed spectrum in any innovative combinations in order to address local and rural connectivity in some municipalities including by entrepreneurial SMMEs;*

> *11.6.2.2 to surrender the radio frequency spectrum licence or portion of the unused assigned spectrum in accordance with Radio Frequency Spectrum Regulations, 2015;*

However, as currently framed, the wording is extremely unlikely to lead to the desired outcomes as expressed in section 2 (f), (p), and (e) of the Electronic Communications Act (ECA). We outline the reasons why below and propose a way forward.

Problematic Timeframe

The most significant problem with the spectrum sharing proposed above is the 5 year delay before spectrum sharing is even to be considered. On 22 November 2021, Minister of Communications, Khumbudzo Ntshavheni, announced that the government was reviewing plans to provide connectivity to all South African homes by 2024[1]. In particular, the Minister said that *"the challenge will be what South Africa should commit to given the development disparities that are not only a result of class differences but the geolocation of the person – the urban/rural divide"*. Addressing affordable access to spectrum in rural areas is key to addressing the urban/rural divide in communications. Yet the consideration of spectrum sharing will not be addressed until three years AFTER the government's expressed goal of connecting all South African homes.

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[1] Christopher Tredger, *SA looks to connect all citizens by 2024*, ITWEB 23 Nov 2021. https://itweb.africa/content/G98YdMLYZ2xqX2PD

We understand that the motivation for proposing a 5 year delay prior to implementing spectrum sharing is likely to be connected to the coverage obligations set out in Section 11.2 which oblige licensees to meet coverage obligations within 5 years of receiving their license. We can appreciate that licensees may object to spectrum being shared in regions where they have intent to roll out wireless services in order to meet their license obligations.

This creates a high-risk situation for the Authority in that they must wait five years before any gaps or failures to provide affordable access can even begin to be addressed. This makes it extremely difficult to set realisable targets for universal access and service, keeping in mind several missed targets since the initial publishing of SA Connect.

Challenges with Coverage Obligations

Coverage obligations have been used since the 1990s in operator and spectrum licensing frameworks in an attempt to ensure the equitable provision of telecommunications services. While little has been documented regarding operator compliance with coverage obligations, it is an open secret that many operators fail to meet their obligations, preferring to either engage in lengthy debate as to whether they have met their obligations or to simply pay a fine rather than undertake investment in less profitable regions in order to meet their obligations.

This is not to say that coverage obligations are a bad idea but rather that complementary mechanisms are needed to mitigate risk for the Authority and to establish a more responsive spectrum management framework that can adapt to changing requirements in rural and underserved regions.

Further, this is compounded by the challenge of adequately defining underserved regions in a manner that keeps pace with the evolution of existing network infrastructure and changes in the needs of citizens. The current Underserviced Area Definitions, published in 2012, may no longer adequately reflect the current needs of South Africans, especially 15 years later at the end 2027 when coverage obligation compliance is due.

What Does Rural Coverage Look Like

In order to understand how spectrum sharing could be accomplished without interfering with the requirements of primary spectrum licensees, it is worth looking at how investment in rural areas often plays out. We know that rural markets are characterised by lower income levels and more sparsely populated areas making them less profitable for operators (also acknowledged as the 'true access gap' which will always require some form of intervention).[2] In fact, some rural areas may not sustain more than one large commercial operator. Here too, it will remain to be seen if such operators will be able to provide service at a cost affordable enough to drive demand. When considering where to invest in rural areas, operators will naturally take into consideration where their competitors have already invested

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[2] See page 4 of the Rural Broadband Policy Framework which captures the unique connectivity challenges of Rural areas.
https://1e8q3q16vyc81g8l3h3md6q5f5e-wpengine.netdna-ssl.com/wp-content/uploads/2020/09/UPDATED-Rural-Broadband-Policy-Framework-Report-09-2020-web-ready.pdf

in network infrastructure. Thus, even if operators fulfill their coverage obligations, they will do their best to avoid significant overlap with their competitors.

Given the desire of the Authority to introduce more competitors into the market through this licensing process, it is extremely likely that in any given rural area, there is always going to be spectrum from at least one operator that is lying unused. The prospect of multiple operators vying to serve unprofitable rural areas is not a realistic scenario.

Under these circumstances there will always be unused spectrum by one or more operators in rural areas that they have no intention of deploying because of one or more existing competitors in that region[3].

Danger of Further Delays Beyond the 5 Year Period

We would also like to point out that, even after the 5 year period has expired, there is a risk, indeed a likelihood, of additional delays before spectrum sharing is implemented. The 10 plus years that it has taken to bring this spectrum auction to fruition has been rife with litigation from various operators. We believe that spectrum sharing will be no exception to this. Operators will be disinclined to share spectrum, over which they have had an exclusive license, seeing it as a dangerous precedent to the market control that expensive, exclusive spectrum licenses have afforded them. For example, Zenzeleni Networks has approached all major operators in South Africa, over a number of years, with a request to share spectrum. None of these requests were successful, even though there is evidence that their assigned spectrum was unused in certain rural geographies.

This is likely to have the impact of stretching spectrum sharing rules so far into the future as to make them largely ineffective.

Proposed Way Forward

There is a means of implementing spectrum sharing with no delay in a manner that complements the coverage obligations of the primary licensees. We propose that the Authority implement spectrum sharing provisions similar to that of the United Kingdom's authority[4] or that proposed by the Canadian spectrum regulator[5] as outlined in more detail in the original submission by the APC (See Annexure 1). However, in order to harmonise these spectrum sharing rules with the coverage obligations outlined in the information memorandum, we propose that the geographic regions covered by any deployments under a proposed secondary-use shared spectrum arrangement **count towards the coverage obligations of the primary license holder**.

This *quid pro quo* can serve to reduce the pressure on primary license holders and allow innovation both in business models and access technologies to thrive in underserved areas. As pointed out in the previous section, historically, operators have not been able to fulfil

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[3] See section 5.4.2 Spectrum Sharing for Rural Mobile Operators on pg. 40 in Innovations in Spectrum Management, Internet Society, 2019
https://www.internetsociety.org/resources/doc/2019/innovations-in-spectrum-management/
[4] https://www.ofcom.org.uk/__data/assets/pdf_file/0037/157888/local-access-licence-guidance.pdf
[5] https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11717.html

obligations. The proposed way forward will create a conducive environment for rural based ICT enterprises to provide affordable and reliable data services in remote and rural geographies. It is crucial that there is a more definitive framework - at this milestone juncture, to ensure that the most economically and socially marginalised in South Africa are brought into the digital ecosystem, without any further delay.

Technical Model

For clarity, shared spectrum licensees would not operate as traditional MNOs but as wireless ISPs offering data services. While it might be desirable for small shared spectrum operators to have full interoperability and roaming with larger MNOs, the technical and financial challenges of establishing themselves as a full-fledged mobile operator are likely to make this impractical, at least in the near future. Accordingly, shared spectrum would be used to enable 4G or 5G services but data communications would be gatewayed via the internet backbone in a manner similar to existing wireless ISPs. This could be via fixed wireless services or mobile access network which would effectively operate as a private LTE network.

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Annexure 1: Original Submission by APC

Introduction

The importance of access to affordable broadband is now a commonplace insight since the outbreak of COVID-19. However, the pandemic has revealed something even more important for policy-makers and communication regulators; it has made clear that **inclusion** must be a top priority if the Internet is not to become an amplifier of inequality.

Communication technology is a natural amplifier of human activity. Those with affordable access to communication move forward while those without are quite literally invisible to the connected. Broadband networks are delivering ever greater utility, from education to commerce to social safety nets with the unfortunate side effect that the social and economic gap between those with affordable access and those without increases by default. The inescapable conclusion from this is that inclusiveness, making sure everyone has affordable access to broadband, must be a pre-eminent priority of policymakers.

The purpose of this submission is to encourage ICASA to adopt "use-it-or-share-it" provisions for IMT spectrum licenses issued through the ITA. The impact of these provisions will be to increase digital inclusion by unlocking innovation in service delivery in underserved regions by WISPs and community networks in South Africa.

This submission has been prepared by the Association for Progressive Communications[6].

Equitable Access to Spectrum

While the scarcity of spectrum as a natural resource is a fundamental principle of spectrum management, it is a principle that is more applicable to urban areas than rural areas, where large amounts of spectrum often remain unused. As spectrum licenses for mobile services are typically national in scope, the business models of national mobile operators are naturally oriented towards investment in infrastructure in more densely populated urban areas where the customer base is larger and income levels are higher. The result is that spectrum in many rural areas lies unused, even though assigned to an operator[7]. A recent case in point is Cell C has beginning to switch off their networks in some provinces, leaving a large amount of spectrum assigned but unused[8]. Incentives in the form of subsidies to national network operators for rural roll-out have achieved some success but are typically not a priority for corporate shareholders. For exclusively-licensed spectrum, a property-rights based approach that guarantees exclusivity to the license holder is the international norm for the IMT frequency bands. This model has enabled highly successful investment in national mobile telephony (and now mobile broadband) networks all over the world. However, as

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[6] See Annexure 1 for an overview of the Association for Progressive Communications

[7] Innovations in Spectrum Management: Enabling community networks and small operators to connect the unconnected. Authors: Stephen Song, Carlos Rey-Moreno, Michael Jensen. Published by Internet Society. 2019. Available at https://www.internetsociety.org/resources/doc/2019/innovations-in-spectrum-management/

[8] Cell C decommissions physical network in three provinces https://www.commsupdate.com/articles/2021/07/01/cell-c-decommissions-physical-network-in-three-provinces CommsUpdate 1 July 2021

demand for spectrum has exceeded its administrative availability, the cost of access to IMT spectrum has risen dramatically. While this may be a boon to governments who see the telecom sector as a critically-needed influx to the treasury, the rise in the cost of spectrum has had the unintended consequence of establishing an insurmountable barrier to smaller operators who are the likely source of innovation needed to bridge the digital divide.

The Challenge of Rural Access

Liberalisation and privatisation of the telecommunications market has led to massive investment in telecommunications infrastructure leading to the unprecedented spread of telecommunications networks around the world, not to mention the growth of the internet. But the growing value of "being connected" combined with slowing growth in poor and rural areas suggest that specific provisions need to be made to incentivise and lower the cost of access to the unserved and under-served. The GSMA have summed up the issue succinctly in their policy paper on Enabling Rural Access[9]:

> *"The lack of coverage in rural areas is the consequence of a basic economic challenge: deploying infrastructure in remote areas can be twice as expensive, while revenue opportunities are as much as ten times lower, a combination that deeply affects the business case for MNOs to deploy infrastructure."*

While the application of universal service funds in some countries have been able to mitigate this problem by subsidising the capital costs of rural deployments by MNOs, the operational costs in many cases still do not match the income levels in rural areas. Thus, even when coverage obligations are imposed on operators, it may yet not result in active service. It is hard not to conclude that there is now an urgent need to introduce alternative business models and regulation to ensure affordable service delivery in rural and remote areas.

It is worth noting that the cost of eNodeB LTE base station technology has plummeted in recent years, with a wide ecosystem of manufacturers now producing LTE and 5G equipment for a fraction of the cost of what radio equipment cost even ten years ago. If affordable LTE and 5G technologies are within the financial reach of smaller operators, then all that holds them back is access to spectrum. Given that spectrum which is in high demand in urban centres often remains unused in rural areas, there is an opportunity for ICASA to establish a win-win scenario with spectrum auctions that guarantee protections for successful bidders while unlocking spectrum in areas where primary license holders have little interest.

Enabling Digital Inclusion in the Spectrum Auction

We have already seen the economic value that can be unlocked when wireless technologies are made available through a combination of affordability and regulatory accessibility through license exempt regulation or WiFi. WiFi technologies are estimated to generate

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[9] Enabling Rural Coverage: Regulatory and policy recommendations to foster mobile broadband coverage in developing countries.
https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/02/Enabling_Rural_Coverage_English_February_2018.pdf GSMA 2018

US$31 billion in economic value in South Africa alone[10]. License exempt spectrum is the one avenue that small operators have to enter the wireless broadband market. Small operators have leapt to take advantage of improvements in WiFi technologies as both an access and a backhaul technology.

However, WiFi has distinct limitations, especially when trying to service more sparsely populated regions. The restricted power output of WiFi which enables its license exempt status also has the impact of significantly increasing the number of access points required to cover a given region. What a single LTE base station can cover might require dozens or even hundreds of WiFi access points in order to offer the same coverage.

If action is not taken to empower small operators with access to broadband spectrum beyond license exempt frequencies, the divide between large and small operators is likely to grow as is the digital divide between the relatively-wealthy, connected urban centres and poorer rural regions.

Shared Spectrum

There is an opportunity to bridge the chasm that exists between expensive exclusive spectrum licensing and the license exempt ecosystem in the auction by enshrining "use-it-or-share-it" provisions in the licenses that will be issued to winning bidders. Recognising that large amounts of licensed spectrum remain unused, especially in rural areas, regulators around the world have begun to implement shared spectrum regulation that continues to empower spectrum license holders while at the same time unlocking access to spectrum in areas where operators have no strategic interest. In the United States this has been implemented in the 3.5GHz band with the Citizens Band Radio Service (CBRS) which contains three tiers of access licensing ranging from license-exempt to exclusive use[11]. In the United Kingdom, the regulator (OFCOM) introduced a Local Access License[12] in 2019 which offers access to spectrum that has already been licensed to existing mobile network operators in locations where they are not using their spectrum. In the same year, the German regulator announced spectrum sharing in 3.7GHz and 3.8GHz[13]. Even now the Canadian regulator has launched a consultation on a shared spectrum strategy to support rural and remote deployment in Canada[14]. The proposed strategy in Canada builds on the model developed by OFCOM. Each of these countries chose to attach specific "use-it-or-share-it" provisions to IMT spectrum license even though their regulatory

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[10] Economic value of Wi-Fi® forecast in Africa, Middle East, and India
https://www.wi-fi.org/news-events/newsroom/economic-value-of-wi-fi-forecast-in-africa-middle-east-and-india Sept 2021
[11] FCC: Citizens Band Radio Service (CBRS)
https://www.fcc.gov/wireless/bureau-divisions/mobility-division/citizens-band-radio-service-cbrs
April 13, 2017
[12] OFCOM: Local Access Licence - Guidance document (2019)
https://www.ofcom.org.uk/__data/assets/pdf_file/0037/157888/local-access-licence-guidance.pdf
[13] German Telecom Regulator awards 5G private network licenses in the 3.7GHz to 3.8GHz band
https://techblog.comsoc.org/2020/09/25/german-telecom-regulator-awards-5g-private-network-licenses-in-the-3-7ghz-to-3-8ghz-band/ IEEE ComSoc Technology Blog 25 Sept 2020
[14] Consultation on New Access Licensing Framework, Changes to Subordinate Licensing and White Space to Support Rural and Remote Deployment
https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11717.html August 2021

frameworks already support C/IS". All of the above suggests that now is the time to invest in shared spectrum regulation that can unlock affordable access for all South Africans.

Right to Exclusivity vs Right to Protection from Interference

The key to opening up access opportunities lies in the framing of IMT spectrum licenses. Nation-wide spectrum licenses have historically provided a guarantee of exclusivity of spectrum access across an entire country. As such, any decision to share spectrum is then vested in the license holder who may not have significant incentive to share spectrum. Things began to change however in 2012 with the publication in the United States of a presidential report on Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth[15] which proposed that the right to exclusivity in spectrum licensing be transformed into a right to protection from interference. This subtle but profound change enables the regulator to implement spectrum sharing in a manner that preserves all the rights of the primary licensee but unlocks the potential of unused spectrum. An example of this kind of clause can be found in Section 4.2 of the OFCOM 800MHz and 2600MHz license [16] which states:

> *4.2 For the avoidance of doubt the Licences will not guarantee exclusive use of the spectrum awarded. In the future we may grant additional authorisations to allow the use of all, or part, of the spectrum, including the spectrum that is the subject of this Award Process. We would develop and consult on the conditions of use under any such additional authorisations in order to manage the risk of harmful interference.*

It can also be found in the renewal of the PCS license[17] in Mexico:

> *"8.6. Services for secondary use. The Institute reserves the right to grant other authorisations for the use, development and exploitation of the frequency bands that are the subject of this Radio Spectrum concession, or portions thereof, for secondary use. In such case, the use of the bands subject to this Radio Spectrum concession shall be protected against harmful interference. "*

Clauses such as this extend spectrum sharing beyond generic sharing frameworks as they have in the UK with the Local License framework and in Mexico where the regulator has set aside spectrum for underserved regions. Clauses such as the above enable a "use-it-or-share-it" approach to spectrum licensing. This contrasts with "use-it-or-lose-it" policies which have proven challenging to implement given the significant sunk costs of the licensees.

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[15] Report to the President on Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth. Executive Office of the President. President's Council of Advisors on Science and Technology. July 2012 https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf

[16] OFCOM: The award of 800 MHz and 2.6 GHz spectrum Information Memorandum. July 2012 https://www.ofcom.org.uk/__data/assets/pdf_file/0022/32872/im.pdf

[17] https://rpc.ift.org.mx/vrpc//pdfs/68531_190715125729_364.pdf Original text in Spanish.
"8.6. Servicios para uso secundarlo. El Instituto se reserva el derecho de otorgar otras autorizaciones para el uso, aprovechamiento y explotación de las bandas de frecuencias objeto de la presente concesión de Espectro Radioeléctrico, o porciones de las mismas, para uso secundarlo. En tal caso, el uso de las bandas materia de esta concesión de Espectro Radioeléctrico contarán con protección contra Interferencias perjudiciales."

Recommendations

We strongly encourage ICASA to develop "use-it-or-share-it" provisions for spectrum licenses issued in the context of the proposed ITA. We believe that license provisions that guarantee the license holder the right to protection from interference as opposed to absolute exclusivity are better suited to achieving the efficient use of spectrum as well as more affordable access to communications in underserved regions. These provisions can be a precursor to an enabling environment for greater digital inclusion in the country. We encourage ICASA to follow-up on these provisions with a national consultation on shared access to spectrum in underserved regions.