Meta

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**Independent Communications Authority of South Africa**
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Re: **Notice of Intention to Amend Annexure B of the Radio Frequency Spectrum Amendment Regulations 2021 to Allow Licence Exempt Use of the Lower 6 GHz Band**

Meta is pleased to submit the following comments in response to the Independent Communications Authority of South Africa (ICASA) notice of intention to amend Annexure B of the Radio Frequency Spectrum Amendment Regulations 2021 to allow licence exempt use of the lower 6 GHz Band.

Meta welcomes and applauds ICASA's efforts to stimulate innovation and investment in wireless technologies by allowing license-free use of the lower 6 GHz (5925-6425 MHz) band, which is a step toward enabling greater use of this spectrum for South Africans' benefit.

Meta further recommends that ICASA, for the reasons mentioned below, consider adopting a "No Change" position for the upper 6 GHz band (6425-7125 MHz range) at the World Radiocommunication Conference 2023 (WRC-23) and, in the near future, consider allowing licence exempt use of the upper 6 GHz Band.

**General Comments**

License-exempt spectrum is a crucial enabler of 5G and next-generation broadband. As mobile and Wi-Fi technologies evolve and continue to be integrated to meet wireless and mobile communications needs, demand for license-exempt spectrum will continue to grow. 5G networks will be critical for mobile connectivity, and Wi-Fi will be essential for connecting to broadband at home and work (within premises) due to the quality of service and associated lower costs. In addition to complementing 5G through offload and indoor connectivity, Wi-Fi will be critical to new mobile use cases, including wearable devices and peripherals.

Despite the increasing reliance on license-exempt technology such as Wi-Fi and the enormous growth in traffic demands being placed on the technology globally, the spectrum allocated to Wi-Fi use remains as it was 12-15 years ago. Today, newer Wi-Fi technology uses much wider channelization to meet consumers' and businesses' more intensive broadband needs. For example, the latest generation of Wi-Fi

technology, Wi-Fi 6, can utilize radio channels as broad as 80 or 160 megahertz. A future generation of Wi-Fi technology already in the final stage of development will use channels of 320 megahertz[1].

Global momentum is building behind making the entire 6 GHz band license-exempt as regulators see the benefit of allowing license-exempt devices to immediately access the band at low power levels and on a non-interference basis rather than deal with the delay and cost of relocating incumbents. The United States Federal Communications Commission (FCC) determined in April 2020 to make the full 1200 MHz of the 6 GHz band license exempt for indoor use[2] and is currently taking the necessary steps to make it available for VLP portable use. In Korea, the Ministry of Science and ICT has made the full 6 GHz band (5925-7125 MHz) license-exempt for LPI devices and the lower half for portable VLP devices[3]. The list includes countries like Brazil, Canada, Saudi Arabia and many others. And Ofcom, in the United Kingdom, has approved both LPI use and VLP portable use of the lower 6 GHz band (5925-6425 MHz) as an initial matter while reviewing the use of 6425-7125 MHz. Important to note is that Ofcom has recently published its position on the 6 GHz band in preparation for the World Radiocommunication Conference 2023 (WRC-23), adopting a "No Change" position for the upper 6 GHz band[4].

The World Radiocommunication Conference 2023 (WRC-23) Agenda Item 1.2, specifically the question whether to identify the 6425-7025MHz in Region 1 and the 7025-7125MHz globally for International Mobile Telecommunications (IMT), can have a negative impact on policies on electronic communications and climate change. An IMT identification at the conference would seriously restrict:

- the development of advanced connectivity in South Africa;
- the opportunity for business and community actors (hospitals, schools, townhall, libraries) to embrace a digital transition;
- the realization of the Department of Communication and Digital Technologies vision to drive digital inclusion and economic growth by supporting initiatives that will strengthen the country's efforts in the implementation of the Digital Economy Master Plan; the Presidential Commission on the Fourth Industrial Revolution report; SA Connect and the revised ICT development strategy for small, medium and micro enterprises;
- South Africa's innovation potential for the next wave of internet devices, including wearables and Virtual Reality/Augmented Reality
- the development and availability of the licence-exempt device ecosystem in South Africa and prevent South Africans from benefiting from global economies of scale for Wi-Fi and many other

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[1] "Wi-Fi 6 Certified, Capacity, efficiency, and performance for advanced connectivity," Wi-Fi Alliance, https://www.wi-fi.org/discover-wi-fi/wi-fi-certified-6. There are a number of technological improvements contained in Wi-Fi 6 that make this generation of technology the most spectrally efficient version of Wi-Fi in history, including multi-user MIMO, beamforming and "target wake time" to improve network efficiency and device battery life. When deployed in 6 GHz, Wi-Fi 6 will be calledWi-Fi 6E.

[2] FCC Report & Order 20-51, https://ecfsapi.fcc.gov/file/0424167164769/FCC-20-51A1_Rcd.pdf

[3] Ministry of Science and ICT, supplies 6 GHz band as a broadband unlicensed frequency, October 16, 2020, https://www.msit.go.kr/web/msipContents/contentsView.do?cateId=_policycom2&artId=3140715

[4] "Update of the 6 GHz band", Ofcom, https://www.ofcom.org.uk/spectrum/spectrum-management/6-ghz?utm_medium=email&utm_campaign=Ofcom%20sets%20out%20position%20on%20the%20future%20of%20mobile%20markets%20and%20spectrum&utm_content=Ofcom%20sets%20out%20position%20on%20the%20future%20of%20mobile%20markets%20and%20spectrum%20CID_712c68e0a852a02a2deb38376032a4e4&utm_source=updates&utm_term=update%20on%20its%20current%20position%20on%20access%20to%20the%20upper%206%20GHz%20band%20for%20mobile%20services. "The risks of missing out on innovation opportunities would be higher, on balance, if WRC-23 were to agree an "IMT identification". Wi-Fi has developed using global bands and the Wi-Fi industry's international focus for innovation and expansion is now on 6 GHz and the large bandwidth available in the band. **There is no other band with similar prospects for Wi-Fi. Mobile innovation in contrast is progressing across many bands**". (emphasis added)

licence-exempt products resulting from the substantial international effort to develop the entire 6 GHz band (5925 to 7125 MHz) as the primary band for expansion and innovation in Wi-Fi

**Fixed/Wi-Fi connectivity delivers the vast majority of internet connectivity in South Africa and is the enabler for advanced connectivity**

Connectivity in South Africa is often analyzed by comparing the subscribers for one or another network. Such analysis is flawed - while mobile connections are typically individual, or even linked to a single user, fixed connectivity is typically shared. A community, for example an enterprise or a school, typically shares one fixed line between hundreds of users. As such, the number of mobile broadband subscribers cannot be compared with the number of fixed broadband subscribers, as they represent completely different usage models. A better comparison of the respective roles of fixed and mobile connectivity in South Africa is obtained by comparing the volume of data delivered by each network.

Fixed/Wi-Fi connectivity delivers 76% of the national traffic and is therefore the main connectivity means for South Africans (See Figure 1).

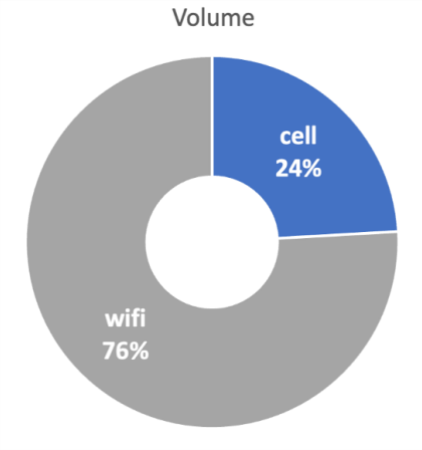


*Figure 1: Volume of data delivered by respectively Wi-Fi and Cellular networks in South Africa [based on analysis of open source data]*

Fixed/Wi-Fi and mobile connectivity fully complement each other. Fixed/Wi-Fi connectivity consistently provides higher Quality of Service (QoS) (See Figure 2).

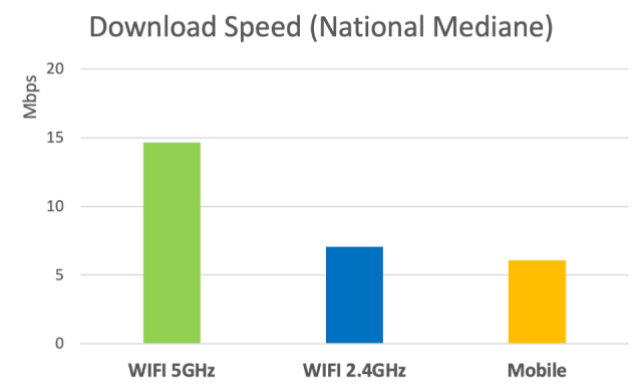


*Figure 2: Quality of Service on respectively Wi-Fi and Cellular networks in South Africa [based on analysis of open source data]*

Higher QoS combined with better flexibility - in particular to share one access line between a large number of users - explains why users favor fixed/Wi-Fi in geographic areas where fixed connectivity is widely available. These include the most important economic centers, as illustrated in Figure 3. Today, in South Africa, Fixed/Wi-Fi connectivity provides high QoS/high volume/high economic impact connectivity to denser areas, while mobile connectivity is very important to deliver lower QoS, lower volume connectivity throughout the country. As the deployment of fiber progresses, it is expected that the role of fixed/Wi-Fi connectivity increases even further.

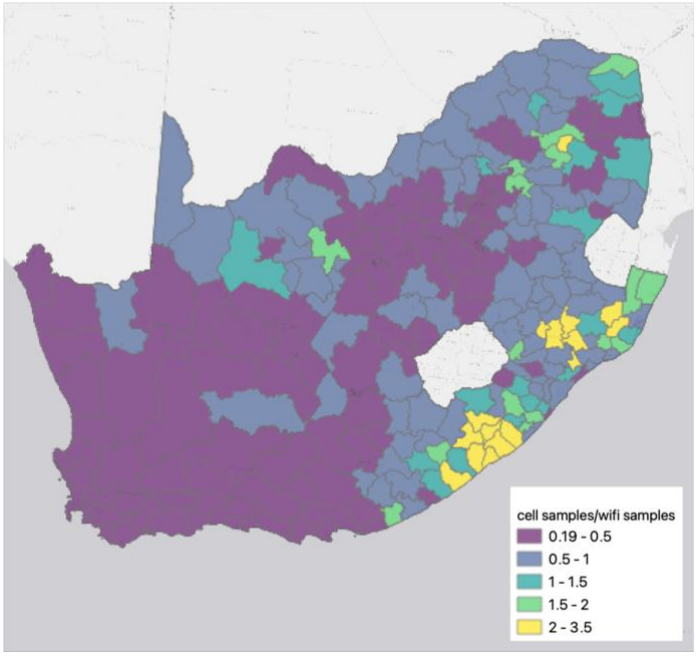


*Figure 3: Mapping of zones where Fixed/Wi-Fi connectivity is dominant (purple and blue) and zones where mobile connectivity is dominant (green and yellow). [based on analysis of open source data]*

The 6425-7125 MHz band supports large bandwidth and small distances, i.e. is best suited as a capacity band for dense urban areas. In South Africa, fiber networks are becoming increasingly available in such dense urban areas and fixed/Wi-Fi connectivity is already the dominant connectivity technology present. Opening the band to Wi-Fi would support the further improvement of QoS and capacity, while justifying more rapid deployment of fiber.

Mobile networks in sparsely populated areas are mostly deployed on the 1800 and 2100 MHz bands, whereas coverage from higher bands such as the 2500 MHz band is mostly limited to urban areas. The 6425-7125 MHz band would not be helpful to improve either coverage or QoS of mobile networks in sparsely populated areas. **5G in the upper 6 GHz band, if deployed, would mostly be used for additional capacity in densely populated areas, not extending 5G coverage.** 5G in the 6425-7125 MHz cannot be used for Fixed Wireless Access (FWA) and is unlikely to enable Ultra Reliable Low Latency Connectivity (URLLC).

ATU Recommendation 05 recommends opening the 5945-6425 MHz band to RLANs and provides a limited number of clean channels for Wi-Fi 6E. The lower 6 GHz band only provides few clean channels and would most likely limit the end users to 80 MHz channels, or even down to 40 MHz in the context of enterprise, as reported by Aruba, see Figure 4.

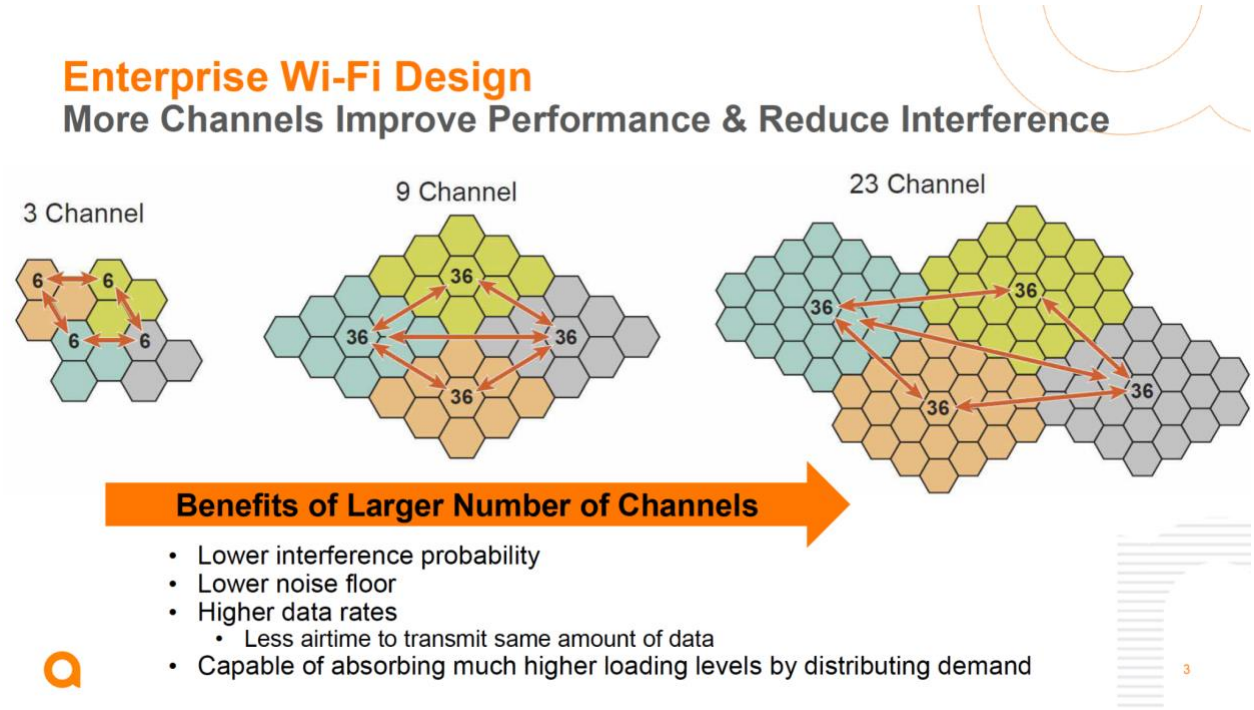


*Figure 4: HPE Aruba estimates that the lower 6GHz would limit Wi-Fi enterprise deployment to 20 and 40 MHz channel, delivering connectivity well below the EU gigabit objective*

The benefits of opening both the lower and the upper 6 GHz band to Wi-Fi would include:

- Ability to leverage 160 and 320MHz channels, unlocking the real benefits of Wi-Fi 7,
- Availability of predictable low latency communication, especially with the advent of Wi-Fi 7 on wide channels.

We urge South Africa to open the 6425-7215 MHz to Wi-Fi to improve the QoS and capacity of connectivity in urban areas, where users favor fixed/Wi-Fi connectivity over mobile networks. Prioritizing IMT in the band would slow down the deployment of fiber and endanger advanced connectivity in South Africa without delivering significant benefits to end users. In particular, the band would not significantly contribute to rural coverage and is therefore irrelevant in the areas where mobile networks matter most.

**Fixed/Wi-Fi connectivity is crucial for the digitization of public and private interest actors and stakeholders.**

The long-term use of the upper 6 GHz band will have a profound impact on South Africa's innovation potential. Schools, hospitals, SMEs and the public sector are key actors that would benefit from a digital transition. The fundamental digital transition enabler for schools, hospitals, libraries, town halls, conference centers, stadiums and other public or community premises is to provide connectivity within their premises to a large number of users, most often not restricted to specific users and even less to specific devices. RLANs empower community and public actors to provide local connectivity according to their own needs. This includes the ability to authorize access without having to manage SIM-cards (whether physical or virtual), maintaining control of infrastructure and QoS, enabling access to the widest range of devices (including laptops) and maximizing affordability and scalability.

Wi-Fi in the upper 6 GHz band is very supportive of the SA Connect plan, which aims to connect in excess of 42 000 government facilities countrywide to high-capacity and future-proof networks at more affordable rates. In order for government employees and citizens to fully benefit from these connectivity points of presence, it is critical to also have the ability to distribute the connectivity locally, within and in close proximity of aforementioned government facilities. Opening the 6425-7125 MHz to Wi-Fi is the best way to support the most socially impactful connectivity programmes such as SA Connect.

*The best way to support the digital transition and digital transformation of communities, public actors and SMEs is to support the connectivity means that corresponds to their needs, i.e. Wi-Fi.*

**Wi-Fi is the key enabling technology for the next wave of internet innovation.**

Wi-Fi will not only be used for RLANs, but will replace Bluetooth for Personal Area Networks, especially for advanced wearables such as Augmented Reality/Virtual Reality (AR/VR) headsets. Such headsets must transmit large data rates but operate on very limited activity factors to reduce their energy consumption. Wi-Fi 6E and 7 are particularly efficient for such use cases.

*Opening the upper 6 GHz band to RLAN will enable the next computing revolution with the rise of wearables and the Metaverse.*

The Metaverse refers to the idea that the internet, after being based on text, then pictures, then videos, is likely to evolve to more immersive content, for example through Augmented Reality/Virtual Reality headsets. Augmented Reality corresponds to a situation where limited information is overlayed over the physical world, for example the number of a building is displayed and highlighted. Virtual reality recreates the full 360 field of vision around a user and requires much more data. Both AR and VR must operate at brain speed, i.e. at a latency low enough for the user to feel that the digital environment is real.

Moving to more immersive content is not new. Cinemas for many years have developed more advanced surround sound or more immersive projection technologies for people to feel more engaged with the media.

Immersive internet is not just for entertainment. Professional users develop solutions that quite simply improve efficiency. An architect can give his customers a chance to visit a building before it is built and modify the design before finalizing the plan. Industrial design is faster and more intuitive through digital solutions than using mockups. Customers can test how a couch can fit in their living room or how a dress will look on them. Emergency doctors can train online, learning not only to master the technical skills, but also learning how to manage the human emotional component[5]. Teams will be able to meet online in a more personal way, reading the body language and feeling a sense of presence of their teammates. Children will not just learn about the ancient Kingdom of Mapugubwe, they will be able to walk through it. These are just a few examples made possible by moving to a more immersive internet.

Numerous industry participants in South Africa have taken moves towards adopting the Metaverse and creating immersive experiences for South Africans. For instance, the University of Johannesburg has begun to create immersive learning environments for its students. Mic Mann, a South African entrepreneur, is constructing Africarare, a metaverse-based digital slice of Africa. Africarare is a hotspot for 3D VR. It houses a virtual marketplace for African art and provides a venue for businesses and artists

[5] Meta has partnered with Children's Hospital Los Angeles (CHLA) to build a VR simulation that would efficiently and effectively train medical students and staff to respond in high-stakes, low-frequency pediatric emergencies. *See* https://www.oculus.com/blog/immersive-education-chla-and-oculus-expand-vr-medical-training-program-to-new-institutions/

to promote their wares, helping define the African experience of the Metaverse. SodaWorld which streams, a proudly South African curated music experience, is organizing live music events that are live broadcast via SodaWorld's immersive VR technology and VRChat capabilities, allowing attendees from across the globe to experience a twin VR version of these events. These experiences contribute to the creative economy in South Africa and provide artists with much-needed international opportunities, such as the African Immersive Experience offered at the Venice International Film Festival.

Economically, Virtual Reality is no longer a question mark. IDC indicated that the EMEA VR headset was 1B$ in 2021 and is expected to grow to 3B$ by 2025. IDC also reported that the number of VR headset sold in Q1 2022 was 2.42x larger than in Q1 2021, an annual growth rate of 241%. The application revenues on the Oculus app store have been multiplied by 3 since 2020. AV/VR is a booming market, the bulk of which is VR.

VR, due to its very nature, is an indoor use case, as the user cannot see its physical surroundings. VR can be used to play or work and can be best thought of as either an extension or a replacement of a laptop or a desktop. Just like laptop and desktop, there are very limited benefits to mobile connectivity for these devices. It is therefore no surprise that VR headsets do not support 5G but rely exclusively on Wi-Fi for connectivity.

AR, by contrast, will require mobility as the user interacts with the world. AR can be thought of as an extension or replacement of a smartphone. However, AR glasses face significant integration challenges as they must remain much smaller and much lighter than smartphones to remain comfortable and fashionable. Current smart glasses, while incredibly high tech, embark from a processing, battery and communication standpoint only a fraction of the power or weight of a smartphone. For example Ray-ban Stories weigh 49 grams while an Iphone 13/13 pro weighs 203/238g, i.e. 4x more. Advanced Wi-Fi is the best technology to enable the device to operate on a very low duty cycle and preserve its battery. Wi-Fi 6E and 7 devices can wake up, transmit large amounts of data very fast and switch off their modem, while maintaining a very low modem and antenna complexity.

Smart glasses and future AR glasses will achieve mobile connectivity by connecting over a Wi-Fi Personal Area Network to a processing and gateway device, for example a smartphone. In such a case, the PAN connectivity must operate at high data rate and low latency to avoid AR sickness and preserve the headset battery. The wide area connectivity on the other hand is simply an internet connectivity and depending on use cases may not require advanced QoS. Over time, Meta is working with partners in 3GPP to improve the 5G standards to accommodate devices which require much lower implementation complexity and energy consumption. Lower complexity would require severe limitation of the number of frequency bands supported by the device making it completely unrealistic that such device would ever operate on the upper 6 GHz band.

Wi-Fi is also critical for innovation in Personal Areas Networks (PANs), including innovative Augmented Reality/Virtual Reality (AR/VR) devices and other wearables such as connected watches.

## Conclusion

Meta encourages the Independent Communications Authority of South Africa (ICASA) to consider a "No Change" position at WRC-23 for the upper 6 GHz spectrum. A "No Change" outcome at WRC-23 allows ICASA to open the upper 6 GHz band (i.e. 6425-7215 MHz) to Wi-Fi, enabling improvements in QoS and connectivity capacity in urban areas, where enterprises and indoor users are likely to favour fixed/Wi-Fi connectivity over mobile networks. Moreover, adopting a "No Change" position for WRC-23 would not

prevent ICASA from authorising IMT use in the higher 6GHz band if that proves to be the best use for the band once the IMT ecosystem has fully grown (which is unlikely to happen before the end of this decade).

On the other hand, identifying IMT in the upper 6GHz band at WRC-23 would slow down the deployment of fibre and endanger advanced connectivity in South Africa without delivering substantial benefits to South Africans. In particular, the band would not contribute to improving rural coverage and, therefore, would not be relevant in the areas where mobile networks are most important. An "IMT identification" in the upper 6 GHz band would also significantly impede the development and availability of the licence-exempt device ecosystem in South Africa and prevent South Africans from benefiting from global economies of scale for Wi-Fi and many other licence-exempt products resulting from the substantial international effort to develop the entire 6 GHz band (5925 to 7125 MHz) as the primary band for expansion and innovation in Wi-Fi.

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Meta is grateful for the opportunity to provide these comments and welcomes the opportunity to provide additional comments in the future in response to further consultation on this issue or any other related issue.

Respectfully submitted by:

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