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The Independent Communications Authority of South Africa (the Authority)
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Attention: Mr. Davis Kgosimolao Moshweunyane via email to DMoshweunyane@icasa.org.za.

Monday, February 03, 2020

RE: QUALCOMM COMMENTS IN RESPECT OF THE PROVISIONING OF MOBILE BROADBAND WIRELESS OPEN ACCESS SERVICES FOR URBAN AND RURAL AREAS USING COMPLIMENTARY BANDS IMT700, IMT800, IMT2300, IMT2600 AND IMT3500

Please find herewith attached Qualcomm's comments in respect of the *Provisioning of Mobile Broadband Wireless Open Access Services for Urban and Rural Areas Using the Complimentary Bands, IMT700, IMT800, IMT2300, IMT2600 and IMT3500 (*the Information Memorandum*)*.

Please feel free to contact me should you have any questions.

Kind regards,



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QUALCOMM COMMENTS IN RESPECT OF THE PROVISIONING OF MOBILE BROADBAND WIRELESS OPEN ACCESS SERVICES FOR URBAN AND RURAL AREAS USING COMPLIMENTARY BANDS IMT700, IMT800, IMT2300, IMT2600 AND IMT3500

1.1 Introduction

Qualcomm Inc. (Qualcomm) welcomes the opportunity to provide input to Independent Communications Authority of South Africa's (ICASA's) *Notice on the Licensing Process for International Mobile Telecommunications ("IMT") Spectrum, Inviting Comments in respect of the Provisioning of Mobile Broadband Wireless Open Access Services for Urban and Rural Areas Using the Complimentary Bands, IMT700, IMT800, IMT2300, IMT2600 and IMT3500* (the Information Memorandum).

Qualcomm is a world leader in 3G, 4G, 5G, Wi-Fi, and next-generation wireless. For more than 30 years, Qualcomm's ideas and inventions have driven the evolution of digital communications, linking people everywhere more closely to information, entertainment, and each other. Qualcomm Technologies, Inc., a wholly owned subsidiary of Qualcomm Incorporated, is the world's largest fabless semiconductor producer and the largest provider of wireless chipset and software technology, which powers many wireless devices commercially available today. Our technologies are powering the convergence of mobile communications and consumer electronics making wireless devices and services more personal, affordable and accessible to people everywhere. We are redefining the experience of wireless mobility by applying our unmatched legacy of wireless innovation to enable new generations of increasingly powerful cell phones, smartphones, computers and consumer electronics, and Internet of Things (IoT) devices.
Today, we license nearly our entire patent portfolio to more than 300 manufacturers worldwide – from new market entrants to large multinational companies. Qualcomm's business model has created a pro-competitive, pro-innovation value chain of global scale whose ultimate beneficiaries are consumers.

When considering 5G, Qualcomm urges continued identification of unutilized and underutilized frequencies in low, mid, and high bands in order that spectrum is put to its highest-value use. Qualcomm's vision is for 5G to enable new services and devices, connect new industries, and empower new user experiences. We are developing a unified 5G system addressing both licensed and unlicensed spectrum and frequency bands both below 6 GHz and higher millimetre wave (mmWave) bands.

5G will be driven by heterogeneous services with vastly different requirements – from very low energy sensors, wearables and new form factors, to new mission-critical applications with high reliability and low latency (e.g., smart city and critical infrastructure, medical and emergency response, sensing and remote control), to very high data rate backhaul and access transmissions across wide bandwidths for ultra-high capacity broadband. 5G will be a new platform with the scalability and adaptability to cost efficiently support new wireless applications, services, and deployment models for 2019-2030 and beyond.

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The mobile industry continues to prepare for an increase in mobile data traffic growth due to: greater numbers of more capable LTE smartphones; larger file downloads and streaming driven by an increasing demand for video content; increasing number of connected devices including those related to the Internet of Things (IoT); and the deployment of 5G networks. While increasing the efficiency of existing assets, employing more resources in the form of small cells and spectrum, and adopting radically different ways of acquiring, deploying, operating, and managing these resources are all important, additional spectrum will continue to be essential to supporting increasing numbers of connected devices, mobile broadband (MBB) growth, and the advent of 5G services.

Qualcomm applauds ICASA for embarking on a process to make a significant amount of spectrum across multiple key IMT bands available simultaneously. Such an approach will enable significant expansion in the capacity and availability of IMT services in South Africa and will maximize the overall public benefit derived from IMT networks and services, helping to bring high quality connectivity and expand coverage.

The remainder of this submission presents information on Qualcomm's views on the issues raised in the Information Memorandum.

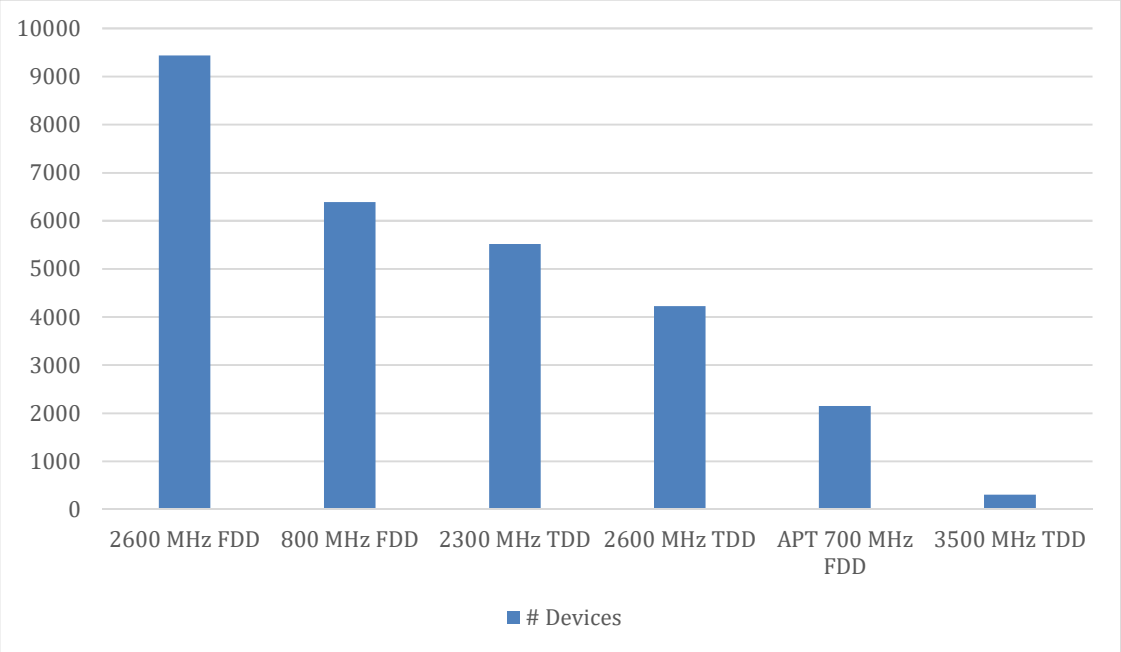
1.2 Proposed spectrum for the award

With the ever-increasing complexity in wireless communications technologies, spectrum harmonization becomes even more important. Some of today's LTE devices support more than 40 different frequency bands. As such, when defining the most adequate channelization option for each of the proposed bands, it is important to take into consideration their global use, and the development of the device ecosystem. Devices with a greater ecosystem support the quicker deployment of such network, with lower cost due to the economies of scale. Figure 1 shows how many devices support the bands under consideration by ICASA, based on the information from the Global mobile Suppliers Association (GSA).[1]

[1] GSA, "Status of the LTE Ecosystem," December 2019, https://gsacom.com/download.php?id=7473.

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Figure 1. Number of devices with support of each frequency band



1.2.1 700 MHz, 800 MHz, and 2600 MHz

The spectrum options presented in the Information Memorandum (Options 1-5) indicate that ICASA has given significant thought to the various combinations of spectrum in the 700 MHz, 800 MHz, and 2600 MHz bands and how it could be put to use by incumbents, new industry awards, and the wholesale open access network (WOAN). Given the key role played by all three spectrum bands in the delivery of IMT services, it is appropriate that ICASA implement a band plan that has a good chance of ensuring maximization of spectrum use.

Qualcomm supports band plans that ensure that interested stakeholders can obtain spectrum in each of these key bands, leveraging the coverage benefits of the 700 MHz and 800 MHz bands and the higher capacity of the 2600 MHz band, along with the infrastructure and device ecosystems for each of these bands. As indicated by ICASA, there are different advantages and disadvantages of each of the combinations proposed in the different options. Among the options presented in the Information Memorandum, Option 5 seems to meet this goal in the most practical manner, providing spectrum across the bands to both the WOAN and additional spectrum awards to industry.

1.2.2 2300 MHz and 3500 MHz

Qualcomm believes that it is appropriate to license the 2300 MHz and 3500 MHz bands at the earliest possible date in order to make them available for the provision of IMT services. ICASA's proposed

band plans, which maximize the availability of 10 MHz blocks, is appropriate for the provision of IMT services in both bands and is in line with international band plans. Specifically, in the case of the 3500 MHz, it is recommended to take this opportunity to do a reorganization of the current incumbent use, in order to have block sizes which are multiples of 10 MHz, which will provide a more efficient use of this spectrum whether for 4G or 5G technologies.

The 2300 GHz band is standardized for LTE technology as band 40 on 3GPP, having the greatest ecosystem of devices available for TDD, as shown in Figure 1. There are several networks with commercial LTE in operation using band 40, being the most common band in use for LTE TDD, in countries such as Australia, Canada, China, Ivory Coast, Gambia, Ghana, Hong Kong, India, Indonesia, Lithuania, Malaysia, Nigeria, Oman, Peru, Russia, Saudi Arabia, Sri Lanka, Tanzania, Uzbekistan and Vanuatu. It should be noted that the 2300 MHz band was also standardized on 3GPP for the 5G NR technology as Band n40. Thus, operators will have the flexibility to already count on the extensive LTE TDD ecosystem for this range, and to be able to migrate to more advanced technologies in the future, such as the 5G NR. Thus, the use of this frequency band for mobile services in South Africa will contribute to the continued access to more mobile connectivity by the national population, contributing to greater digital inclusion.

There has been considerable operator interest, as well as deployment of mobile broadband services, in the 3500 MHz band, in countries around the world, including in Africa, the Asia-Pacific region, North America, and Europe. 3GPP has developed band plans conducive to deployment of TDD LTE in the 3400-3600 MHz bands (band 42), and we note the increasing momentum for the delivery of IMT services in the band. The GSA noted in January 2020 that 23 countries across Europe, Asia, and the Middle East have auctioned or allocated spectrum in the 3500 MHz band since 2015, with the intention of making it available for 5G services.[2] We also note the continuing development of a global ecosystem for 3500 MHz equipment. According to the GSA, the ecosystem continues to grow, with 306 devices now available for use in band 42.[3] The 3500 MHz band can benefit from commonality of equipment, which is critical due to the number of bands that can be supported in mobile handsets. Global standards have already been developed and equipment already exists to support operation throughout the 3400-3800 MHz range. This band offers a large amount of contiguous spectrum giving the opportunity to deploy channels with wide bandwidth, ideal for 4G and 5G networks.

In addition, at the International Telecommunication Union (ITU) there has been considerable discussion of the 3400-3700 MHz band with respect to IMT, with the 3400-3600 MHz band identified for IMT in Regions 1 and 2, as well as in 12 countries in Region 3 (entirely or in part). The strong international interest and support for use of the band for mobile broadband services make clear that the band is very likely to play an important role in the development of MBB and 5G services.

[2] GSA, "C-Band Spectrum auctions/allocation trends," January 2020, https://gsacom.com/download.php?id=7488.
[3] GSA, Status of the LTE Ecosystem.

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Noting the view in the Information Memorandum that ICASA may consider the award of spectrum in the 2300 MHz band and 3500 MHz band on either a regional or national basis, Qualcomm encourages ICASA to make at least some portion of the spectrum available on a nationwide basis. In doing so, ICASA would make such bands attractive to stakeholders who seek to deploy or supplement nationwide networks for the provision of IMT services and have business plans to do so. Making spectrum available solely on a regional basis would complicate the process for a nationwide operator to obtain spectrum, potentially making investment in a South African network less attractive.

The ITU Recommendation for the IMT Vision demonstrates the characteristics of what an IMT-2020 (or 5G) network should provide. It indicates that mobile broadband systems enhanced with 5G should achieve a data transmission capacity of 10 Gbps, in this case a hotspot with limited coverage, and thus better provided by bands above 24 GHz. In the case of broad coverage networks, in urban and suburban areas, for which bands below 6 GHz are best suited, 5G is expected to offer a user experience at speeds of 100 Mbps.[4] Thus, in relation to the 3500 MHz band, given the importance of this band for the 5G ecosystem, Qualcomm's suggest the allocation of 80-100 MHz blocks per operator. As such, Qualcomm welcomes the initiative form ICASA to expand the available band in this range, taking into account that the same ecosystem applies to the entire 3300-3800 MHz band. We therefore suggest that ICASA uses this current consultation to initiate plans for licensing the entire 3300-3800 band, based on an appropriate roadmap.

1.3 Obligations

Qualcomm has no comment on the proposed obligations for the Industry or for the WOAN.

1.4 Award process

Qualcomm supports the use of the three-stage award process as outlined in the Information Memorandum. In general, an auction mechanism with reasonable reserve prices is the most efficient approach to ensuring that spectrum is put to its highest-value use. The inclusion of a qualification stage that ensures that interested parties hold the requisite Individual Electronic Communications Networks Services license and are otherwise in compliance with applicable South African law is appropriate in order to ensure that any potential licensee is adequately qualified to provide services in South Africa. Further, the use of a simultaneous multi-round auction with generic lots is a reasonable choice in order to allow bidders to focus on the number of lots for which they would like to bid. Qualcomm would suggest that the final tender documents provide additional detail regarding the mechanism by which the specific lots are assigned to the Preferred Bidders at the conclusion of the auction.

1.5 Conclusion

Qualcomm welcomes the opportunity to convey our views to ICASA regarding the licensing of IMT spectrum in South Africa. Qualcomm strongly supports efforts to make additional spectrum available for the provision of IMT-based wireless broadband technologies and to enable the delivery of high-

[4] Recommendation ITU-R M.2083-0, "IMT Vision - Framework and overall objectives of the future development of IMT for 2020 and beyond," September 2015, pp. 14, https://www.itu.int/rec/R-REC-M.2083-0-201509-I/en.

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quality broadband services to all South Africans. It is encouraging to see ICASA continue to work on making more spectrum available for Gigabit LTE and 5G. We encourage the process of awarding the spectrum discussed in the Information Memorandum to proceed as soon as possible as we look forward to seeing not only the continued deployment of LTE, but also further commercial launches of 5G worldwide. We are working with urgency to make that a reality.

Should you have any questions or comments on this submission, please do not hesitate to contact me at +27 82 616 3604 or emigwall@qualcomm.com.