Qualcomm

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24 - 30 GHz use in New Zealand
Radio Spectrum Management Policy and Planning
Ministry of Business, Innovation and Employment
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Qualcomm Incorporated (Qualcomm) welcomes the opportunity to provide input to Radio Spectrum Management (RSM) on the *24-30 GHz use in New Zealand* discussion document (the discussion document).

Qualcomm is the world's leading wireless technology innovator and the driving force behind the development, launch, and expansion of 5G. When we connected the phone to the internet, the mobile revolution was born. Today, our foundational technologies enable the mobile ecosystem and are found in every 3G, 4G, and 5G smartphone. We bring the benefits of mobile to new industries, including automotive, the internet of things, and computing, and are leading the way to a world where everything and everyone can communicate and interact seamlessly.

Qualcomm Incorporated includes our licensing business, Qualcomm Technology Licensing (QTL), and the vast majority of our patent portfolio. Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of our engineering, research and development functions, and substantially all of our products and services businesses, including our Qualcomm CDMA Technologies (QCT) semiconductor business.

One of our major areas of focus is the development of 5G technologies, including those that leverage low-band, mid-band, and high-band spectrum. In 2019 5G became a reality and 2020 and 2021 have seen worldwide deployments of 5G technology and increased reliance on wireless connectivity in the face of the COVID-19 pandemic.

Qualcomm supports RSM's efforts to develop an appropriate spectrum plan for the use of spectrum between 24 GHz and 30 GHz in New Zealand. Given the importance of the 26 GHz and 28 GHz bands to the deployment of 5G services across New Zealand, it is timely that RSM develops a comprehensive approach to maximizing the benefits of these key spectrum bands. The 26 GHz and 28 GHz bands are not fungible with mid-band spectrum which has different properties and supports additional use-cases, so Qualcomm also encourages RSM to also to examine the release for 5G of additional mid-band spectrum in the 3.3 – 4.2 GHz and 4.4 – 5.0 GHz ranges. Spectrum aggregation, including dual connectivity using mmWave and sub-6 GHz frequencies, is critical to delivering multi-Gigabit speeds and

the massive capacity required for a new generation of consumer and enterprise applications. Combining different types of radio spectrum will enable mobile 5G devices to wirelessly achieve wired broadband-class speeds, even in challenging conditions such as crowded venues and transit hubs, in addition to powering robust 5G fixed wireless access services in homes and small businesses. In this regard, in April this year Qualcomm announced the completion of 5G data calls that successfully combine millimeter wave (mmWave) with FDD or TDD sub-6 GHz spectrum by utilizing 5G Standalone (SA) mode Dual Connectivity. Using the 4th-generation Qualcomm® Snapdragon™ X65 5G Modem-RF System and Qualcomm® QTM545 mmWave Antenna Module inside a smartphone form-factor device, Qualcomm Technologies' engineers aggregated 5G sub-6 GHz FDD with 28GHz mmWave spectrum, demonstrating Snapdragon X65's ability to aggregate low-/mid- and high-bands across key global combinations.[1]

In this submission, Qualcomm provides information and views intended to assist RSM with its efforts, with a particular emphasis on approaches that maximize the potential to deliver 5G services via mmWave bands to New Zealand's users, including consumers and businesses.

We note that, as reflected in our responses to relevant questions, activities have been carried out within the ITU to address several of the issues raised in the discussion document. We encourage RSM to give significant weight to the agreements and recommendations developed within the ITU's processes and to avoid imposing conditions more strict than those forged through international discussion and compromise. However, we also remind RSM that New Zealand has the prerogative to impose less stringent approaches if shown to be required.

The remainder of this submission addresses the specific questions posed in the discussion document.

1.1 Responses to consultation questions

Q1. What are the most likely use cases in New Zealand for mmWave based 5G services?

Notable 5G mmWave use cases

5G mmWave is a truly transformative technology that delivers the next-level performance and user experience beyond what is possible with traditional cellular networks. 5G mmWave networks will deliver fiber-like data speeds and massive capacity for end users. The 26 GHz (and 28 GHz) bands will predominantly be used to deploy eMBB services, helping to meet ongoing demand.

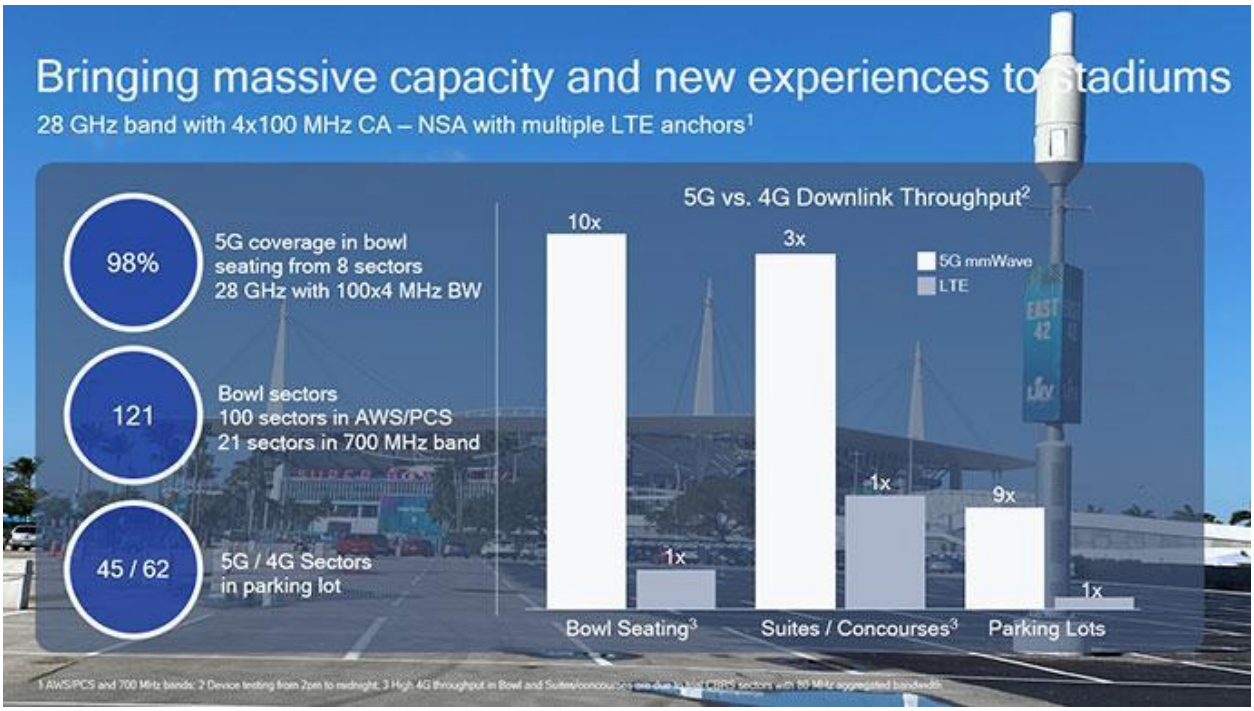
5G mmWave will meet consumer and business needs all day long; during the morning at home, on train/subway commutes, at university and colleges, in the office, enterprises and factories, in shopping malls and along the high street, all the way back to the home in the evening.

The universe of 5G mmWave use cases continues to expand. Beyond mobile services, Qualcomm expects to see continued growth in the use of the technology to support indoor enterprises, indoor and outdoor venues (e.g., conventions, concerts, stadiums), transportation hubs, fixed wireless access (urban, suburban, and rural), and industrial Internet of Things (IoT).

[1] https://www.qualcomm.com/news/releases/2021/04/13/qualcomm-announces-successful-data-calls-using-5g-mmwave-and-sub-6-ghz

5G mmWave brings a once-in-a-generation opportunity to transform venue experiences, and for many years we have been working with venue owners and event organizers to deploy cutting-edge wireless networks. Last year, Qualcomm announced a collaboration with Live Nation to bring broader 5G deployments to their venues. On the sporting front, 40+ of the largest stadiums in North America already have commercial mmWave networks (with many more in planning), and in China, plans are in place to deploy 5G mmWave at the 2022 Winter Games in Beijing.[2] At a 2020 sporting event in the United States, we found that 5G mmWave can deliver average downlink throughput that is 10x higher than LTE in a bowl seating area, fulfilling the insatiable demand of subscribers who are downloading, streaming, and sharing high-definition videos as well as content from inside the stadium.

[2] Verizon, Fastest 5G Network in the World just got bigger and better, October 13, 2020, https://www.globenewswire.com/news-release/2020/10/13/2107851/0/en/Fastest-5G-Network-in-the-World-just-got-bigger-and-better.html.



5G mmWave not only brings next-level mobile experiences. It can also deliver high-capacity fixed wireless broadband access to urban, suburban, and rural homes as well as enterprises, including extended-range solutions. The commercial momentum is strong. To date, ~40% of operators with commercial 5G networks (i.e., 37 out of 94) are offering fixed wireless access (FWA) services and 80+ FWA products are in design or development from 30+ OEMs using our 5G modem-RF solutions. In a joint announcement with U.S. Cellular and Ericsson, we showcased extended-range 5G mmWave FWA in a commercial network, achieving a 7 km range while sustaining average downlink speeds ~1 Gbps and average uplink speeds of ~55 Mbps.[3] This proves that 5G mmWave can be utilized to deliver fast, reliable, and cost-efficient connectivity to rural and often underserved areas — taking a significant stride to bridge the digital divide. More recently, on 8 June 2021, Nokia, Qualcomm Technologies, Inc. and UScellular announced a world record extended range over mmWave of more than 10km utilizing its 5G extended-range mmWave solution on a commercial network. This milestone paves the way to bring extended range 5G service with massive capacity and low latency to even more environments, including rural areas.

One key technology area in 3GPP Release 16 is the expansion of 5G to address high-performance industrial IoT (IIoT) applications — delivering enhanced ultra-reliable and low-latency wireless connectivity.[4] Building on the collaborations with industrial ecosystem leaders to usher in the factory of the future, we have expanded our efforts to utilizing mmWave spectrum for a wide range of high-bandwidth IIoT use cases. We have shown that 5G mmWave can bring great indoor coverage, even in a

[3] Qualcomm, U.S. Cellular, Qualcomm and Ericsson Achieve Extended-Range 5G Data Call Over mmWave, September 17, 2020, https://www.qualcomm.com/news/releases/2020/09/17/us-cellular-qualcomm-and-ericsson-achieve-extended-range-5g-data-call-over.

[4] Qualcomm, Propelling 5G forward: A closer look at 3GPP Release 16, July 7, 2020, https://www.qualcomm.com/news/onq/2020/07/07/propelling-5g-forward-closer-look-3gpp-release-16; Qualcomm, What key technology inventions will drive the 5G expansion?, July 3, 2020, https://www.qualcomm.com/news/onq/2020/07/03/what-key-technology-inventions-will-drive-5g-expansion.

noisy, industrial settings, as well as provide the high system capacity needed to satisfy bandwidth-demanding use cases, such as high-definition video streaming and extended reality (i.e., virtual reality (VR) and augmented reality (AR)). Collaborating with an industrial customer and leading mobile operator for our initial deployment, we achieved over 1.5 Gbps and 120 Mbps in downlink and uplink throughput, respectively, which met all initial use case requirements.

Qualcomm also notes the increasing interest in private or local wireless networks enabled by 5G mmWave, which enable or optimize critical business processes in locations not covered by public networks or where dedicated capacity and radio configuration is required, or where there are challenging radiofrequency conditions. Private, purpose-built networks enable businesses and other organizations to optimize and tailor networks for specific applications (e.g., network dimensioning, quality-of-service, latency, security, etc.). Private 5G networks support deployments of wireless broadband within, for example, industrial complexes including factories, enterprises, ports, mines, petrochemical installations, agricultural environments enable the expansion or introduction of IIoT networks.

26 GHz and 28 GHz ecosystem

5G mmWave use cases are enabled by an expanding device ecosystem. According to the Global mobile Suppliers Association (GSA), the number of announced 5G devices grew by 7.5% between March and April 2021 to reach 756. This is 28.6% higher than the number of announced devices at the end of January this year; a similar increase has occurred in the number of 5G devices understood to be commercially available. This has risen by 28.2% over the last quarter, now standing at 468 commercial 5G devices, which represents 61.9% of all announced 5G devices.

By end-April 2021, GSA had identified the following 5G device data points:

- 22 announced form factors;
- 124 vendors who had announced available or forthcoming 5G devices;
- 756 announced devices, including 468 that are understood to be commercially available:
    - 387 phones (up 36 from March), at least 330 of which are now commercially available (up 32 in a month);
    - 135 FWA CPE devices (indoor and outdoor), of which 54 are now commercially available.
    - 92 modules;
    - 38 industrial/enterprise routers/gateways/modems;
    - 37 hotspots;
    - 15 laptops;
    - 15 tablets;
    - 7 in-vehicle routers/modems/hotspots; and
    - 30 other devices (including drones, head-mounted displays, robots, TVs, USB terminals/dongles/modems, cameras, femtocells/small cells, repeaters, vehicle OBUs, a snap-on dongle/adapter, a switch, a vending machine, and an encoder).

Focusing on 5G mmWave devices, the GSA notes that 112 announced 5G devices explicitly support one or more of the 5G spectrum bands above 24 GHz, including 70 that are understood to be commercially available.[5]

The GSA notes that, based on vendors' previous statements and recent rates of device release, the number of commercial 5G devices may surpass 500 by the end of Q2 2021. As the number of 5G mmWave devices in diverse form factors continues to grow (there are already more than 100 5G mmWave devices in a variety of form factors), the ecosystem will be able to support an increasing range of use cases.

[5] GSA, mmWave Bands: Global licensing and usage for 5G, May 2021.

On May 19 Qualcomm Technologies, Inc., announced new, upgraded features and capabilities to the Qualcomm® Snapdragon™ X65 5G Modem-RF System. As the world's first 10 Gigabit 5G and the first 3GPP release 16 modem-RF system, the software-upgradeable architecture allows future-proofing of solutions powered by the Snapdragon X65 which supports and enables acceleration of 5G expansion, while enhancing coverage, power efficiency and performance for users.

Indeed Qualcomm has announced the Qualcomm® Snapdragon™ X65 and X62 5G M.2 Reference Designs for accelerating 5G adoption across industry segments, including PCs, Always-Connected PCs (ACPCs), laptops, Customer Premises Equipment (CPEs), XR, gaming and other mobile broadband (MBB) devices. These reference designs for a plug-and-play M.2 form factor allow OEMs to reduce time to launch for high-performance 5G-enabled products.

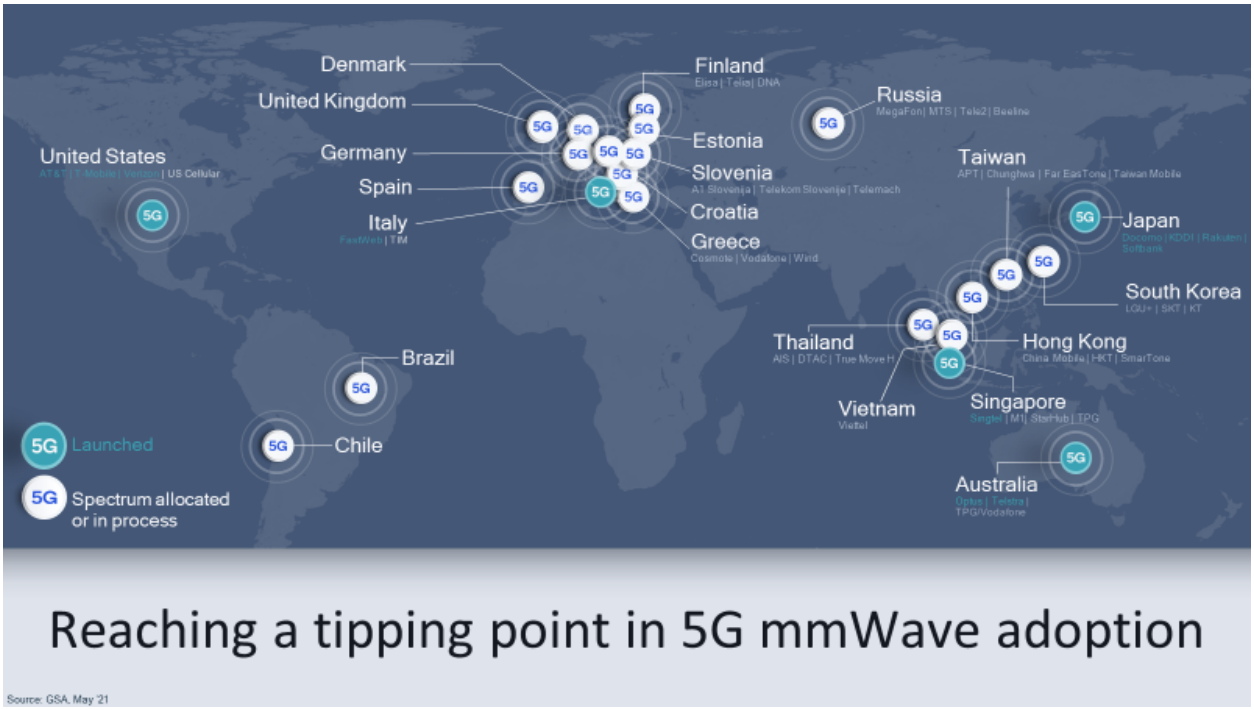
From the regulatory perspective and focusing on 5G mmWave, the GSA noted in May 2021 that

- 180 operators in 45 countries/territories are investing in mmWave (e.g., tests/trials, acquisition of licenses, planning deployments or engaging in deployments);
- 132 operators in 22 countries/territories have been assigned mmWave spectrum (often on a regional basis) enabling operation of 5G networks;
- 28 operators in 16 countries/territories are known to be already deploying 5G networks using mmWave spectrum; and
- 19 countries/territories have announced formal (date-specified) plans for assigning frequencies above 24 GHz by end-2022.[6]

Less than two months ago, Australia concluded its first mmWave spectrum auction, awarding frequencies in the 25.1-27.5 GHz range in areas in and near major cities.[7] The 358 lots awarded were

[6] GSA, mmWave Bands: Global licensing and usage for 5G, May 2021.
[7] ACMA, 26 GHz band auction results, April 23, 2021, https://www.acma.gov.au/26-ghz-band-auction-results.

divided between major telecommunications providers and smaller stakeholders. The licenses are scheduled to come into force later this year and will be in effect for 15 years, until the end of 2036, and are expected to enable the widespread deployment of mmWave 5G in Australia's population centers.



Notably on March 18th, Japan's SoftBank Corp. launched its 5G millimeter (mmWave) service in Japan – using devices based on Qualcomm® Snapdragon™ 5G Mobile Platforms and Modem-RF Systems[8]. This launch is because 5G mmWave has been shown to be a cost-effective way for mobile operators to increase the network capacity needed to meet the increasing demand for data in dense urban, fixed wireless access and enterprise environments – with savings up to 35% in total cost of ownership compared to sole use of sub-6 GHz bands[9].

Q2. What are the likely use cases for Ka band satellite services in New Zealand in the short and long term?

No comment.

Q3. What are the spectrum requirements for ESIM use in New Zealand?

While Qualcomm has no comment on the spectrum requirements, we note that the regulatory measures associated with ESIMs should reflect ITU-R Resolution 169 (WRC-19). This includes, in particular, *resolves* 1.2 regarding the protection of terrestrial services in the 27.5-29.5 GHz range and the associated Annex 3.[10]

[8] https://www.qualcomm.com/news/releases/2021/03/18/softbank-corp-launches-multi-gigabit-5g-mmwave-japan-qualcomm-technologies

[9] "The economics of mmWave 5G," GSMA Intelligence, Jan. '21.

[10] ITU, Resolution 169 (WRC-19), https://www.itu.int/dms_pub/itu-r/oth/0C/0A/R0C0A00000F0056PDFE.pdf.

Q4. Do you think the existing fixed service licenses in 26 GHz can be migrated to the 23 GHz and/or 38 GHz fixed service bands?
Q5. If not, do you think the existing fixed services should be allowed in the 26 GHz?

Fixed services currently operating in the 26 GHz band should be migrated to the 23 GHz and/or 38 GHz bands in order to maximize the amount of unencumbered spectrum for 5G services. As noted in the discussion document, both of the proposed bands provide feasible options for the continued operation of fixed services currently providing cellular backhaul. Given the importance of such backhaul for the continued connectivity of rural areas, an appropriate migration plan should be identified and implemented.

Q6. Do you agree New Zealand should allocate 24.25 - 27.5 GHz primarily for IMT use?

Yes, Qualcomm strongly supports RSM's proposal to allocate the 24.25-27.5 GHz range (the 26 GHz band) primarily for IMT use. As noted in the response to Q1, in Region 3, Australia has recently concluded its auction of 26 GHz spectrum in metropolitan areas and has now opened a call for applications for use of the band in the remainder of the country.[11] Other countries in the region that have awarded spectrum between 24.25 GHz and 27.5 GHz include Australia, Hong Kong, Japan, Korea, Singapore, Thailand. In addition to the 26 GHz band, some of these countries have also awarded spectrum in the 28 GHz band (approximately 27.5-28.5 GHz), including via licensing approaches that differ from those employed for the 26 GHz band. For example, 400 MHz Hong Kong's 28 GHz spectrum is for use on a localized, shared basis and Australia's 28 GHz licenses are also intended for use in small geographic areas and are available on a first-come, first-served basis, as compared to the wide-area 26 GHz licenses awarded in both of those countries through an auction process and intended for public mobile services. It is also notable that the spectrum awarded in Japan and Korea spans the ranges often referred to as the 26 GHz and 28 GHz bands, including 27.0-29.5 GHz in Japan and 26.5-28.9 GHz in Korea.

The 26 GHz band has already been harmonized in the European Union, as indicated in the discussion document, and assigned or identified for assignment in countries including Australia, China, Denmark, Finland, Italy, Germany, Greece, Slovenia, and the United Kingdom. The band has been identified as a pioneer 5G band in Europe and is expected to see significant deployment across the continent. In the Americas, 26 GHz spectrum has been assigned in the United States (specifically, 24.25-24.45 GHz, 24.75-25.25 GHz, and 27.5-28.35) and, more recently, Chile (25.9-27.5 GHz), while countries including Brazil and Canada have developed plans to auction spectrum in the band.

Please also see our response to Q1 regarding 26 GHz use cases and the associated ecosystem.

Q7. How should RSM accommodate other use in this band such as space services?

The 26 GHz band should be allocated for the exclusive use of IMT services. Noting the global momentum behind 26 GHz IMT services indicated in the response to Q6 and the growing device ecosystem indicated in the response to Q1, RSM should maximize both the amount of 26 GHz spectrum available for use by IMT services and opportunities for global and regional harmonization.

[11] ACMA, Auction summary – 26 GHz band (2021), https://www.acma.gov.au/auction-summary-26-ghz-band-2021; ACMA, Area-wide apparatus licensing in the 26 and 28 GHz bands, https://www.acma.gov.au/area-wide-apparatus-licensing-26-and-28-ghz-bands.

Q8. How do you see our proposal of the 28 GHz band allocation?
Q9. Which option do you prefer for allocating 28 GHz band? Or is there any other option for managing the shared use of IMT, ESIMs and FSS in the 28 GHz band?
Q10. If you prefer option 1, do you agree with the proposed sharing mechanism (defining satellite coordination zones) between IMT use and FSS ground stations?
Q11. If you prefer option 2, how much spectrum do you think RSM should allocate to ESIM, IMT private network/FWA? And what's the preferred spectrum placement?
Q12. Are there any other issues of sharing use between satellite earth stations and ESIMs that you would like to bring to our attention?

In considering the appropriate use of the 28 GHz band, Qualcomm urges RSM to ensure that the allocation plan includes allowances for private/local IMT networks, FWA and/or indoor eMBB in a portion of the band. We note that to maximize the benefits of 5G mmWave services and enable the widest range of use cases, each operator in New Zealand should be able to access 800 MHz of spectrum in the 26 GHz and 28 GHz bands.

Q13. Do you agree that the current satellite allocation and licensing regime for 29.5 - 30 GHz should remain?

No comment.

Q14. What's your preferred licensing option in 26/28 GHz spectrum?

The joint consideration of the 26 GHz and 28 GHz bands provides RSM with an opportunity to take a holistic approach to the planning and authorization regime for the entire spectrum range. The 28 GHz band has been home to the first wave of 5G mmWave deployments, while the 26 GHz band is gaining momentum. Both bands benefit from continuously developing ecosystems.

Qualcomm encourages RSM to consider an approach that mixes exclusive spectrum rights for mobile network operators with regional rights and radio licenses for more targeted uses. In particular, we propose an authorization regime with the following characteristics:

- 26 GHz: exclusive, nationwide rights or licenses for use by public mobile network operators; and
- 28 GHz: radio or apparatus licenses for use in more geographically limited settings, such as for industry verticals and local or private networks, FWA by wireless Internet service providers, and indoor coverage by mobile network operators.

As noted in the response to Q12, 5G mmWave's benefits are maximized by the ability of mobile network operators to access at least 800 MHz of mmWave spectrum.

Q15. Do you see any need for general user licence spectrum for IMT? If so, what use case might there be?

To expand 5G's reach beyond traditional public mobile networks, 3GPP Release 16 enables 5G NR-U, which allows 5G to operate in unlicensed spectrum. It defines two operation modes, anchored NR-U requiring an anchor in licensed or shared spectrum and standalone NR-U that utilizes only unlicensed spectrum, i.e., does not require any licensed spectrum. It Is the first time that 3GPP defines a cellular technology for "standalone" usage in unlicensed spectrum.

3GPP Releases 15 and 16 addresses LTE and 5G NR in unlicensed bands such as 5 GHz and 6 GHz and the radio frequency ranges 5150 – 5925 MHz and 5925 – 7125 MHz corresponding to 3GPP bands 46 and n96 respectively. For the 26 and 28 GHz bands there is no current work item to develop specifications for 5G NR-U in 3GPP, therefor Qualcomm is of the view that RSM need not allocate spectrum in these bands for access under a General User Radio Licence as this spectrum would be better suited to Management Rights, Regional Rights or Radio Licenses.

Q16. If there is a need for general use spectrum for IMT and ESIM, how much spectrum should we set aside for it? Should RSM mandate technical conditions on the general use licence?

As noted in the response to Q3, the technical conditions associated with ESIMs should reflect ITU-R Resolution 169 (WRC-19).

Q17. Do you agree RSM should adopt 3GPP NR FR2 based channel bandwidth to design a channel plan in the radio licence regime for IMT services?

Yes, RSM should adopt band plans and bandwidths based on the FR2 bands identified by 3GPP. As noted in the responses to Q12 and Q14, RSM should adopt a band plan and authorization approach that will enable prospective rights holders and licensees to gain access to at least 800 MHz of spectrum.

Q18. Do you agree RSM should refer 3GPP standards to set the regulatory requirements for spectrum allocated to IMT?

RSM should support industry-led standardization processes that have enabled the rapid development and evolution of mobile technologies, including the development of 5G. The global standardization efforts conducted through 3GPP, for example, have been very successful in enabling the commercialization of new technologies without governmental intervention. Qualcomm strongly encourages RSM to directly refer to 3GPP standards as far as possible in national policies and standards documents. By enabling New Zealand's stakeholders to stay in sync with global developments through the adoption of international industry standards, RSM would position users to participate in and benefit from the worldwide market for 5G devices and services.

Q19. Should we introduce a break point for MR technical conditions mid-way through the duration of the MR? Or is it sufficient to set AFELs based on current technology and standards only?

No comment.

Q20. Do you agree RSM should mandate equivalent ETSI harmonised standards for radio licences in Radio Standards Notices and review these standards regularly?

Yes, RSM should mandate ETSI-harmonized standards or their equivalents for radio licenses in Radio Standards Notices. ETSI standards are widely adopted and referenced, and their inclusion in Radio Standards Notices would further encourage compliance with international best practices. Further, as proposed, the standards included in Radio Standards Notices should be reviewed regularly to provide an opportunity to ensure that they reflect international best practices.

Q21. Which option do you prefer to set the unwanted emissions?
Q22. If we use a TRP option for setting AFEL and UEL, do you have any recommended solutions on TRP measurement in field?

TRP is preferable, as it is easier to associate with 3GPP and ITU requirements. However, the concept of TRP and its measurement are currently the subject of 3GPP and ITU studies. RSM should monitor these studies for implementation once mature.

Q23. Do you agree that RSM should set unwanted emissions limits (in UELs and AFELs) base on 3GPP category B requirements? If no, please explain the reasons and provide your suggestions?

Qualcomm urges RSM to retain maximum flexibility and to only implement more stringent values when demonstrably necessary to avoid spurious emissions and interference.

Q24. Do you agree that we should we implement (e.g. through UELs and AFELs) the ITU Radio Regulations, Resolution 750 limits, including the 1 September 2027 transition date and grandfathering clause for the protection of the EESS (Passive) Band? If not, please explain what limits and transition dates you consider to be more appropriate.

Yes, Qualcomm strongly encourages RSM to align regulatory options and related decisions for the 26 GHz band with World Radiocommunication Conference (WRC) outcomes as well as international best practices. By adopting decisions in line with global and regional harmonization efforts, RSM will maximize the alignment of New Zealand's use of key spectrum bands with other countries, enabling New Zealand users to benefit from global economies of scale and infrastructure and device ecosystem development.

Q25. Do you have any insights on equipment availability at, or close to, the edge of 24.25 GHz that can meet both pre-1 September 2027 and post-1 September 2027 unwanted emission limits? Is there any additional technical solution such as frequency separation or filtering required for some equipment types?

No comment.

Q26. Do you agree with RSM's position to not establish a framework for coordination zones for RAS?

No comment.

Q27. Do you see a need for RSM to allow EESS and SRS earth stations to operate in the band?

No comment.

Q28. Do you agree a semi-synchronised or unsynchronised network should be used in 5G high band deployment?

No comment.

Q29. If the network is unsynchronised, what is the best way to manage the interference between unsynchronised operators?

No comment.

Q30. If your preference is a semi-synchronised network, what is your suggestion on setting the synchronized parameter?

No comment.

Q31. Do you agree that think RSM should implement ITU Radio Regulations, Resolution 242, resolves 2.1 in the management rights and licences conditions? If not please explain why or propose an alternative?

Qualcomm agrees that RSM should implement Resolution 242, the product of international agreement, in the conditions for use of the 26 GHz band. Further, we would caution RSM to avoid imposing additional more restrictive or overly complex regulatory conditions on the implementation of IMT in 26 GHz. A regulatory framework that extends beyond the guidance in Resolution 242 creates a risk for New Zealand becoming unaligned with international harmonization developments, and therefore less attractive to businesses and investors seeking to exploit 5G technologies.

Q32. Do you see a need for RSM to allow continued FSS gateway access to 27.0 - 27.5 GHz on a case by case basis? If so, how should we coordinate FSS Earth stations and IMT?

As noted in the discussion document, work has been undertaken at the ITU to address issues related to interference between IMT and FSS systems in the 27.0-27.5 GHz range. Qualcomm encourages RSM to implement coordination requirements that are in line with international best practices as exemplified by Resolution 242 and the potential future recommendation regarding mitigation of FSS interference with IMT stations. We encourage RSM to monitor future ITU activity on this matter and to revise New Zealand's approach to coordination as needed to ensure harmonization with international best practices.

Q33. Do you have any comments regarding the spectrum sharing approach proposed by RSM between FSS and IMT FWA in the 28 GHz band?

Qualcomm appreciates RSM's thoughtful approach to enabling spectrum sharing between IMT and FSS in the 28 GHz band. We agree that all FSS earth stations and FWA base stations should be licensed for specific locations and that the FWA service areas should be recorded in the license.

With respect to the establishment of geographic areas in which FSS has priority over FWA and be licensed with primary status, Qualcomm proposes that this approach only apply to existing FSS operations. We also propose that in such areas, existing IMT FWA operations should retain priority over new FSS earth stations. Ultimately a revised spectrum-sharing regime should not negatively affect existing IMT operations.

Qualcomm agrees with the RSM's proposed approach to sharing in more densely populated urban and suburban areas. As noted in the discussion document, IMT FWA is likely to be more prevalent in urban and suburban areas. The RSM's proposed approach would allow for FSS operations in these settings as long as they do not cause interference to the FWA service.

Qualcomm does not believe there is a specific need to set an EIRP limit towards the horizontal plane for FSS earth station transmitters, as the provisions of Resolution 242 are sufficient to address this concern.

Q34. If RSM were to apply an EIRP limit on horizontal plane for FSS, what is the maximum EIRP value we should assume?

As noted in the response to Q33, Qualcomm does not believe there is a specific need to set an EIRP limit towards the horizontal plane for FSS earth station transmitters. The provisions of Resolution 242 are sufficient to address this concern.

Q35. Which option do you prefer for arranging the existing fixed service in the 26 GHz band?

No comment.

Q36. Do you think RSM should mandate the regulatory requirements as laid out in Resolution 169 (WRC-19) for ESIM use if a shared use between 27.5 – 28.35 GHz?
No comment.

1.2 Conclusion

Qualcomm fully supports the efforts of RSM and the Ministry of Business, Innovation, and Employment to understand the use cases and obtain input on licensing options and the technical parameters that will affect the planning of the 24-30 GHz range. We look forward to continued engagement with RSM on the various issues raised in the discussion document to assist in the development of plans that will deliver the full benefits of mmWave 5G across New Zealand.

Should you have any questions or comments on this submission, please do not hesitate to contact me at +852 6901 0087 (mobile) or aorange@qti.qualcomm.com.

Sincerely,

Alex Orange
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Qualcomm Inc.

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