24-30 GHz use in New Zealand

27 May 2021

CHORUS

Introduction

1. Chorus welcomes the opportunity to respond to Radio Spectrum Management's (RSM) paper '24-30GHz use in New Zealand: Discussion document' April 2021 (discussion document). This response is not confidential.

2. Our key comments in response to the discussion document are:

   2.1 Fixed Wireless Access (FWA) is a suitable solution in areas where no fixed fibre broadband is available. But in other areas it is a sub-optimal solution with worse performance and it is not in New Zealand's interest to allocate scarce spectrum resource to duplicate existing, and better performing, UFB infrastructure.

   2.2 RSM should make sufficient provision for private network use of mmWave based 5G services. Private networks are developing globally and are a potential source of significant growth and innovation in New Zealand.

   2.3 There is also value in making spectrum in these bands available for ESIM and other satellite services that can support consumers in remote rural areas who are not able to access quality broadband.

   2.4 We support a 'first come, first served' localised radio licensing approach, which should ensure that spectrum is made available to a variety of valuable uses.

Response to Commission questions

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

3. The discussion document suggests that, of the use cases available for these spectrum bands, 5G mobile broadband, FWA and satellite broadband "are likely to be the most beneficial to New Zealand".[1] We agree in relation to satellite broadband but are concerned that the discussion document overstates the potential benefits from FWA – industry verticals and private networks are more likely to deliver long-term benefits than FWA.

4. In relation to 5G, there is an important difference between the most likely use cases and most valuable use cases for mmWave 5G services. While the cost of mobile technology is coming down as 5G matures, the cost of the infrastructure supporting 5G remains expensive (e.g. cost of running fibre to base station and inside building are a labour-intensive exercise).

5. We agree 5G technology could bring significant benefit to New Zealand consumers and the economy, but it should be leveraged innovatively to deliver the greatest benefit. This means making spectrum available for specific purposes, such as private industrial networks. Earmarking spectrum would allow non-mobile organisations such as system integrators, universities and manufacturers to build innovative, industry-specific solutions that may not be achievable if mobile operators are awarded all of the

[1] Discussion document, page 5.

spectrum within these bands. Therefore we would caution against an approach of fully licensing spectrum to the highest bidder as the short-term revenue gain would be offset by longer-term inefficiencies.

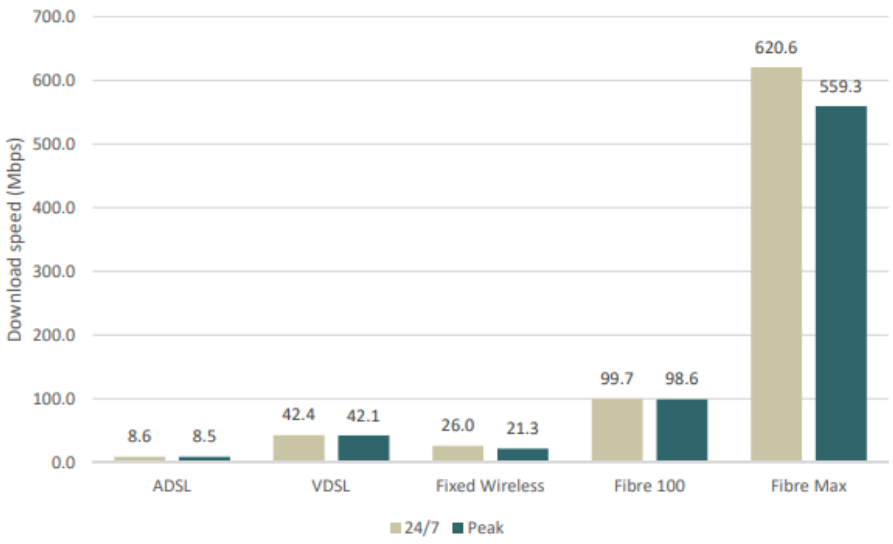
6. Enhanced mobile broadband would have a good use case for general population on the move. However, considering the build costs for additional infrastructure, we do not see a strong business case to support wide deployment of mmWave for EMB in NZ. This observation is based on the level of deployment to date in NZ and we question if consumers will be willing to pay more.

7. Importantly, mmWave operates over very short ranges and is prone to interference. This means its use case should be focused on localised private networks. From overseas experience, it seems clear that mmWave is not the most efficient option for mobile coverage due to range limitations.

8. We agree with the discussion document that FWA can provide an alternative solution in places where fixed infrastructure is not present. However, the allocation of scarce spectrum to FWA is not efficient in a New Zealand context given the aim of spectrum is simply to duplicate existing (and better performing) UFB infrastructure. Therefore we disagree with the statement in the discussion document that "Even in places with fibre available, FWA can provide additional flexibility for broadband connections".[2]

9. Also, we dispute the claim that "FWA can achieve a similar performance to broadband on fibre".[3] The Commerce Commission's most recent telecommunications monitoring report[4] has found that average FWA download speeds are much slower than fibre and are even slower than VDSL (see chart):

Figure 12: Average broadband download speed by technology



Source: Measuring Broadband New Zealand Spring Report, December 2020

[2] Discussion document, page 9.
[3] Discussion document, page 9.
[4] https://comcom.govt.nz/__data/assets/pdf_file/0030/247377/2020-Annual-Telecommunications-Monitoring-Report-Revised-version-16-March-2021.pdf

10. The Commission also found that:[5]

> "average download speeds for fixed wireless decreased by around 25% [during lockdown], reflecting the susceptibility of performance of these services to loads on the mobile networks over which they are provided."

11. Industry verticals and private networks are developing globally. We believe this is an important use case for mmWave, that will produce significant economic benefit for the whole of NZ in the long run. According to Mckinsey, private 5G networks could generate $400 billion - $650 billion of global GDP by 2030. We believe the New Zealand government should reserve spectrum for this purpose so it can be allocated as the market develops.

12. As RSM knows, spectrum is a scarce resource. We are concerned that if it is used to duplicate existing fibre infrastructure (with benefits mostly accruing to mobile network operators) that New Zealand risks missing out on valuable innovative mobile use cases that 5G and mmWave will enable. These use cases will likely generate far more value for New Zealand than duplicating existing infrastructure.

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

13. As the largest telecommunication infrastructure provider in NZ, Chorus understands the challenge of providing telecommunication services to the last 3% of population. There have been numerous attempts to improve broadband availability to that segment of users (RBI, RBI2), but we believe there are still at least 15,000 households who are unable to access good quality broadband, which would be a significant disadvantage for those households. While supply for these customers will need to be assessed on a case-by-case basis, we believe LEO satellite broadband is likely to be an appropriate technical solution for this segment.

14. In the short term, there is only one LEO constellation covering NZ – Starlink. Starlink is already in the beta testing phase and we believe many New Zealanders are amongst their 10,000 beta users[6]. We understand Starlink's network operates in the frequency bands covered by this consultation.[7] Considering the lifetime of LEO satellites, we believe a sufficient amount of spectrum should be allocated to LEO to serve the most remote proportion of New Zealand's population, taking account of expected usage growth by end users.

15. In the long term, we believe there will be increased competition in the LEO satellite market. We suggest that provision is made in spectrum allocation such that LEO players can enter and compete in the rural broadband market.

[5] Annual Telecommunications Monitoring Report 2020, page 21.
[6] https://www.businessinsider.com.au/elon-musk-spacex-starlink-beta-satellite-internet-users-worldwide-2021-2?r=US&IR=T
[7] We understand Starlink's network operates in the following frequency bands: 10.7–12.7 GHz, 14–14.5 GHz, 17.8–18.55 GHz, 18.8–19.3 GHz, 27.5–29.1 GHz and 29.5–30 GHz.

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

16. Chorus agrees that ESIM is an important use case and should be provided with an appropriate allocation.

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

17. As IMT is the most used technology for this band, Chorus agrees that the 24.25-27.5 GHz band should primarily be allocated for IMT use. However, this band should be allocated in a way that maximises the economic benefit for the country by creating sufficient provision for industry / vertical use, instead of a simple nationwide allocation of management rights.

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

18. Those rural areas of New Zealand where fixed broadband is not a practical option will require satellite based broadband services. Unless there are other alternatives, Chorus suggests that RSM makes provision for space services within this band.

Q8. How do you see our proposal of the 28 GHz band allocation?

19. We agree with the proposal to allocate the band for satellite use; and that allocating spectrum in the 28 GHz band for mobile broadband would deliver marginal gains at best.

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?

20. We prefer allocation option 1 (where 27.5-28.35 GHz is allocated on a shared basis between IMT private networks, FWA, FSS and ESIMs). The arrangement proposed in this option would likely result in least interference in the long term, although for reasons described in this submission we see limited value in allocating spectrum to FWA purposes.

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?

21. The proposed sharing mechanism within allocation option 1 appears sensible. RSM will need to make provision for new FSS ground stations and IMT over time.

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?

22. As noted, our preference is for option 1. If option 2 (to allocate a portion of the 28 GHz band to IMT and ESIM respectively) is progressed, a portion should also be allocated to private networks given the potential economic benefits they can deliver.

23. As discussed above, we see limited value in allocating scarce spectrum resource to FWA.

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

24. Yes. We agree that RSM may need to review licence conditions that support NGSO operation as well.

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

25. Of the licensing options available, we believe option 3 (Radio Licenses being allocated on a 'first come, first served' basis) is the best option. This will provide for spectrum use by 'industry verticals' and private networks, which would encourage growth and innovation in New Zealand. Private networks are critical to enabling digitisation and automation, which will be important drivers of New Zealand's economic growth in the long term so there is real value in licensing spectrum for these uses.

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

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?

26. As noted, we believe option 3 (Radio Licenses being allocated on a 'first come, first served' basis) is the best option over time. However, if RSM considers that there would be benefits from creating GUL spectrum (option 4) in the short term then we would urge that radio licenses (option 3) are protected from transmitters operating under GUL. Setting appropriate limits on GUL would be important to protect other users.

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?

27. We agree, if that approach will ensure the most choice and flexibility for potential developers of private networks.

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

28. Yes. The use of alternative standards would limit the options for usable equipment – it is better to align to global standards. However, there should be provision to cater for LEO satellite equipment (where there is not currently widely accepted global standard) assuming that the equipment doesn't cause excessive interference.

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?

29. We agree with RSM that technology is evolving at pace, which is why we consider traditional MR arrangements will tie up the spectrum for too long, potentially locking more innovative uses out of the market. We recommended that RSM use a radio license approach instead or introduce a relatively short break point (5 year) if an MR approach is taken.

Q18. Do you agree RSM should mandate equivalent ETSI harmonised standards for radio licenses in Radio Standards Notices and review these standards regularly?

30. Yes. Using ETSI standards will ensure the most universal and readily available equipment can be deployed.

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.

31. We have concerns about the use of the 1 September 2027 transition date. Resolution 750 is based on the assumption that mass-market deployments will not occur during the initial step. However, the European Electronic Communications Committee has implemented the outcomes of WRC-19 but decided to bring the transition date forward, from 1 September 2027 to 1 January 2024 on the grounds that mass market deployments in Europe might happen significantly earlier than 2027.

32. Depending on the timing of allocation of this band, we believe that, rather than having a fixed date, NZ should introduce the more stringent unwanted emission limits one year after the allocation. The wireless industry is evolving rapidly and 'mass market deployments' could occur any time after the spectrum is allocated so determining a fixed date (of 2027) now is ineffective.

33. If 'mass market deployments' do not occur there would be little impact from having a tighter unwanted emission limit and if 'mass market deployments' do occur then the services will be well protected.

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?

34. Fixed Satellite Service will continue to play a role in deep rural areas and RSM should continue to make provision for these operations, in alignment with internationally accepted ITU standards.

35. In relation to sharing of spectrum between FSS and IMT FWA in the 28 GHz band, we note FSS Earth Stations are likely to be deployed in rural areas, while IMT would either be in urban / sub-urban / private facilities. We consider that either establishing certain geographic areas where FSS has priority over FWA, or leveraging Approved Radio Engineers to ensure sufficient separation and calculate a coordination zone should be sufficient.