



Discussion Feedback for Radio Spectrum Management on 3.3 GHz Regional & Non-National use in New Zealand

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INTRODUCTION

We want to thank Radio Spectrum Management (RSM) for presenting their discussion document on the use of the 3.3 GHz spectrum for Regional and Non-National use in New Zealand, and we are pleased to be able to respond to this paper in providing our views and options on this spectrum range and how it can better serve future communication solutions for New Zealand.

OVERVIEW

We support the Radio Spectrum Management position in promoting greater opportunity in supporting WISPs and Private Network operators in offering regional connectivity services in the 3.30 to 3.40 GHz spectrum.

We recognise the current temporary rights that have been granted to the incumbent MNOs in the 3.5 GHz band will expire on 31 October 2022, and new rights will begin in November 2022. We do not believe incumbent MNOs who have excessive frequency allocation should be allocated any additional or new spectrum other than the existing temporary allocation in the 3.5 GHz band (from 3.41 GHz to 3.8 GHz), this is due to the lack of re-farming of their existing spectrum allocations in support of new emerging technologies.

We do not believe the incumbent MNOs will leverage these higher frequencies for future cellular technologies due to the reduced radio coverage, high investment needed, and higher operational cost involved (relative to legacy 4G networks).

In the Commerce Commissions Preliminary Findings on Mobile Market Study that was published in May 2019¹, it had stated:

PF8: However, the design of the upcoming 3.5 GHz spectrum allocation process should not foreclose the possibility for new parties (including parties who may complement or compete with the existing MNOs) to obtain spectrum.

We do not agree with the Commerce Commission view that the 3.5 GHz spectrum is adequate for new competition to emerge and in this discussion submission we are greatly in favour of supporting greater competition in New Zealand (as explained further).

We are also concerned about the way valuable spectrum frequencies are being openly offered to MNOs without any real procedure in how they are considered, utilised for innovation, or fairly offered to emerging new competitors.

We recommend that the RSM outcomes should also ensure that no single entity (directly or indirectly) is allowed to own excessive amounts of radio spectrum that is disproportionate to their intended use (both on a local, regional and national basis) or has an excessive control on vital radio assets that block competition. This is to discourage the forming of monopolies that may restrict or control market price and competition.

In a recent tender (RFP released: 9 April 2021) by Crown Infrastructure Partners (CIP) for the Rural Capacity Upgrade (RCU) Programme it had stated:

“Mobile Network Operators (MNOs) can also apply for Government Funding to purchase 600MHz antennae and radio” and

“all new mobile Towers must be built under the shared RAN model and must include antennas covering all existing 4G bands as well as the 600MHz band”.

To offer the 600 MHz spectrum for 4G/LTE use should be considered as an inappropriate investment on a legacy technology that no longer has a viable lifespan (beyond another 10 years). Giving away this valuable spectrum raises questions on the value of the spectrum.

Similar failures in innovation have been seen in the Next Generation Critical Communication services that have ignored the importance of valuable spectrum, 3GPP Mission Critical Services (3GPP MCX)

¹ https://comcom.govt.nz/__data/assets/pdf_file/0020/146711/Mobile-market-study-Preliminary-findings-16-May-2019.PDF

standards and technologies that could have offered essential and secure infrastructure for New Zealand's Public Safety services.

New Zealand's wireless communications industry lags in innovation and it has a strangled hold on consumer education, choice, and access, that has allowed it to be complacent. This situation has pushed the industry back by 5 years and has directly constrained consumer understanding of the industry. If this situation remains unchanged, this will cost the industry hundreds of millions of dollars to rectify this situation - due to naive throw-away decisions and judgements that are being made today.

Our recommendation in this discussion response is to support new competition and innovation from new MNO operator models (outside of the incumbent MNOs) who can offer wholesale services to multiple access service providers. This approach will offer a better position to support rapid innovation and wider consumer choice. This approach goes beyond the MVNO model and opens the market to a wider number of operators.

To support new MNOs requires them to effectively offer nationwide wireless services to support emerging technologies (through advancements in 3GPP, IoT, Artificial Intelligence (AI), Cloud technologies, Edge Computing, etc.). This can only be achieved if a new MNO is allowed to operate current 5G services using the following spectrum frequencies:

- 600 MHz with 5G (n71) band and
- 3.5 GHz with 5G (n78 a subset of n77) band

Unfortunately, the n71 band is not supported in the New Zealand region as of yet and therefore should be accelerated by RSM on how it can be made available for IMT with the ITU Radio Regulation (IRR).

It would be naive to ignore future 5G architecture (and developments that are occurring with emerging 3GPP 5G Advance and 6G roadmap). One of the key benefits that 5G introduces is its capability to support a heterogeneous network architecture that allows a variety of access networks to be connected irrespective of whether it is a 3GPP cellular (4G/5G) Radio Access Network or another Access Network. This opens the potential to allow Trusted Access Networks and Untrusted Access Networks to connect onto the 5G core in a controlled manner.

RESPONSE TO QUESTIONS

This section includes our responses to the various questions that have been asked in response to this discussion paper.

Q1. Do you agree that the 10 MHz between 3.40 – 3.41 GHz should be included with the 3.41 - 3.80 GHz band (the 3.5 GHz band) that will be made available for national use?

We disagree that the 10 MHz spectrum should be included in the 3.5GHz band.

We are in agreement that the 3.30 to 3.40 GHz should be assigned to other operators such as WISPs to support the growth of their networks and alternative competition to incumbent MNOs, but we disagree that they should only be allowed to use these frequencies in restricted regions.

It is our opinion that this should also be available for new MNOs to offer wider nationwide coverage where applicable to their business.

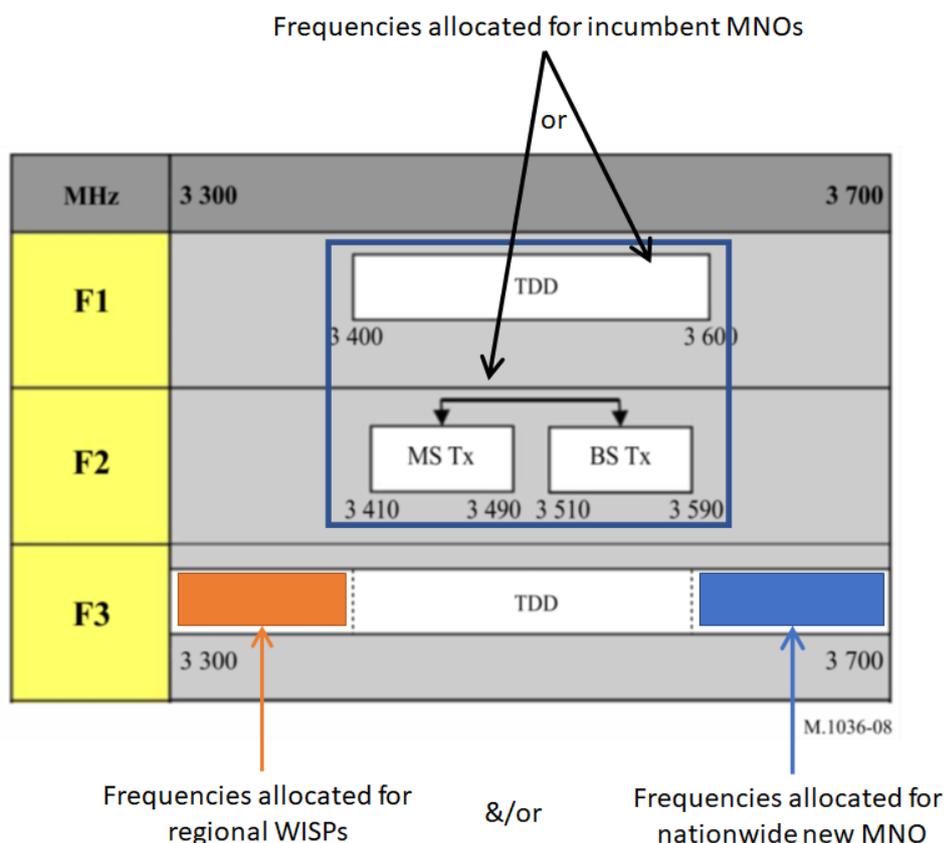
To support nationwide coverage of the 3.30 to 3.40 spectrum, it is necessary to have at least a 20 MHz guard band with the incumbent MNO allocation in the 3.5 GHz band (in frequency arrangement F1 or F2). This is particularly important with adjacent frequency operations.

We also further believe that to support new competition and allow new MNOs to emerge they will require at least another 100 MHz bandwidth in the 3.5 GHz band (resulting in a total of 200 MHz bandwidth).

It is our recommendation the 3.5 GHz band is divided into 3 frequency ranges, as follows:

- 3.30 to 3.40 GHz – reserved for regional WISPs and Private Network Operators
- 3.41 to 3.59 GHz – reserved for incumbent MNOs for 5G (or future 6G) services only
- 3.60 to 3.70 GHz – reserved for new nationwide MNOs for 5G (or future 6G) services only

The ITU Recommendation M.1036-6 (10/2019 - as identified in Section 8) are illustrated below, and we have identified how these frequencies ranges can be supported between incumbent MNOs, regional WISPs/Private Network operators and new nationwide MNO.



By assigning the two bands for new MNOs as indicated above this will give a degree of confidence that terminal devices will be available from global markets to support operation in these bands.

Q2. What is your view on using the 3.3 - 3.4 GHz band for regional broadband and/or private networks? Are there other use cases of this band that should be considered?

We agree that the 3.30 to 3.40 GHz band should be used for regional broadband and private networks.

We recommend this band only to be offered to a new MNO operator model to include national use who are able to support & demonstrate resale through a wholesale model or an MVNO model (without discrimination and on an equivalence basis) that is not related (influenced or part owned) by the incumbent MNOs (directly or indirectly).

We also encourage that the bandwidth should be extended to a total of 200 MHz and include 3.60 to 3.70 GHz under this proposed model.

This ownership model should be complemented with the existing fixed fibre wholesale model on a wider regional basis, so each region has a continuous coverage. To achieve this will also require the use of the 600 MHz frequency spectrum.

Q3. Do you agree with our assessment of current spectrum use and potential impacts?

We agree with the assessment and potential impacts that have been provided by RSM.

Q4. Do you agree with the assessment that regional and local use will not be able to co-exist in the same geographic area on the same frequency? If not, why?

We agree the same frequency should not co-exist for use in the same geographic areas and interleaving of local and regional use.

The allocation of the 3.3 to 3.4 GHz should be made on a priority basis as identified below for use by:

1. WISPs in providing long term communication services,
2. Private Networks for providing specialised services,
3. Nationwide services provided by a new MNO for general and specialised use.

The best utilisation of this spectrum would be served under Scenario 1 and 3, where competing Local and Regional services operate, but Scenario 3 would be best served where any of the spectrum bandwidth is not being fully utilised.

It is recommended that Scenario 1 and 2 be considered as a short-term plan, and in the long term offer any un-utilised spectrum bandwidth for apocoptate use for Local or Regional services – providing it with the allocated bandwidth is being effectively utilised (without blocking the available bandwidth for other users).

Q5. Do you agree that both regional and indoor use as well as local and indoor use could be manageable in the same geographic area on the same frequency? If not, why?

We agree with the view of RSM that to fully understand the impact of offering in local/regional/indoor does require a detailed analysis.

Q6. Do you agree that the most effective way to manage spectrum in this band is to have contiguous services with a common frame structure and timing (synchronisation)? If not, why not?

As indicated in response to Question 1. We recommend the 3.5GHz band be split into 3 parts to support Local/Regional and Nationwide services for a new MNO wholesale model and a set portion be made available for incumbent MNOs.

Although a contiguous service would be ideal, some incumbent MNOs have not demonstrated they have re-farmed their existing spectrum to repurpose existing bandwidth allocation for 4G or 5G services. For this reason, we would not support allocating the 3.5 GHz on a contiguous allocation.

We agree that synchronisation will be critical for 5G data services and should be supported.

Q7. What are your preferred options for a band plan for the 3.3 - 3.4 GHz band, are there other options we should consider, if so, please explain what these are?

Please refer to our response in Question 1 and Question 4.

Q8. How much spectrum is required for regional and uses and how much is needed for local Use

In our recommendation we have proposed the 3.5 GHz band be divided into three blocks that will give the following uses and bandwidth allocations:

- 3.30 to 3.40 GHz (100 MHz bandwidth)– for regional/local WISPs and Private Networks
- 3.41 to 3.59 GHz (~180 MHz bandwidth) – for incumbent MNOs services only
- 3.60 to 3.70 GHz (100 MHz bandwidth) – for new nationwide MNOs services

For the 3.3 to 3.4 GHz band, these can be offered based on actual demand and utilisation in blocks of 10, 15, 20, 30, 40, 50, 60, 70, 80, 90 or 100 MHz bandwidth. This band should be only available for WISPs, Private Networks and new Nationwide MNO operators based on priority (as indicated in Question 4).

Q9. What equipment options and standards should we consider for the 3.30 – 3.30 GHz band? If we adopt multiple standards, how should we manage potential interference issues between the technologies while minimising inefficient use of spectrum?

If this band is offered to WISPs, then there should not be any technology constraints applied. This is to encourage service connectivity to their communities at a cost and technology solution that is affordable and adequate for their needs.

For Private Networks, we would apply a similar constraint to that applied for WISPs, but preference should be given to Private Network operators who are able to demonstrate the use of modern and innovate technologies, that provide optimal benefits to its uses and users.

For nationwide services, this bandwidth should only be offered to provide 4G/LTE, 5G or better technology solutions – where preference is given for use in modern and innovative communication solutions (such as 5G services). This should not be constrained to 3GPP standardised technologies and should consider other alternative technology solutions/standards, including satellite where applicable.

We do not believe utilising the 3.3 to 3.8 GHz band for 4G/LTE services would provide an optimal future-proof solution for New Zealand's mobility and wireless services. This band would be better served based on 3GPP release 18 and above technologies (5G, 5G Advance and 6G, etc.).

Considering DMRS as a viable technology would be a poor technology decision for this band. At this band it will only offer limited data throughput speeds (in kilobits per second) - this technology would be better served at the sub-1GHz spectrum range. With this being said, there are better IoT technologies that are emerging such as Wi-Fi HaLow that are better suited for IoT in the sub-1GHz range.

To overcome the issue of network synchronization, it would be wise to allow operators who operate at this band to share a common synchronisation source to allow for optimal investment and support a harmonized network function.

Q10. Do you agree that we should seek to permit all three use cases, indoor, local, and regional uses in the 3.3 GHz band? Do you agree with our mix of use? If not which cases, should we permit?

There is justification to allow all 3 use cases to be permitted in this band. To achieve this operators should ensure no adverse cross channel interference occurs when operating in a mixed mode

environment. This can be achieved through channel allocation, power control, use of self-healing technologies (to optimise the network performance), or other techniques.

We see the value of using mixed mode operating model, that may include indoor/outdoor mesh networks, combined with wider area networks such as Smart- X (City, Village, etc.) solutions.

Q11. What authorisation mechanisms should we use for indoor, local, and regional use cases non-national access in the 3.3 – 3.4 GHz band? Are there any other mechanisms that should be considered?

We agree that all three use cases should be allowed to operate in the 3.3 to 3.4 GHz band.

In addition to the various proposed options presented by RSM for this question, they should also consider the bandwidth allocation that is needed for both Local and Regional services.

As proposed in our recommendation, this should be extended to allow new MNO operator models to operate in offering nationwide services that include the 3.7 to 3.8 GHz band.

Q12. What are sort of rules should be applied to the authorisation mechanisms to ensure compatibility and fair access?

For Indoor use, we see the value of a General Authorisation mechanism to be in place. However, this would be preferred where a limited bandwidth or channel allocation could be supported effectively together with a controlled radio power output for these indoor devices. This will also support for Private Service providers to offer local communication services without the high licence costs that generally block competition and innovation to emerge.

For Local Use, we would favour a First in Time License, but there should be a justification on the actual bandwidth & channels required. This allocation should further justify for renewal, based on suitability of technology, actual utilisation, and demand in the selected local area. This will allow alternative competitors or technologies to emerge if the band is not fully utilised.

For Regional we favour that this license is allocated to new MNO operators (not incumbent MNOs) who are able to offer their services on a wholesale basis that is fair and non-discriminating to the service providers.

Q13. How should we prevent spectrum denial / hoarding/ speculating of licenses? Should we adopt one of the existing models that RSM already employs or what new model should we use in the 3.3 GHz band?

We believe that the incumbent MNOs should allow any new MNO operators to leverage connectivity onto their network (for national roaming purposes) to support wider nationwide services without discrimination or adversely high charges. To achieve this, it may require regulatory changes to ensure legacy MNOs are operating fairly and without discrimination.