**In Confidence**

Office of the Minister for the Digital Economy and Communications

Chair, Cabinet Economic Development Committee

# Allocation of 3.5 GHz spectrum to support rollout of 5G mobile and advancement of rural connectivity

## Proposal

1 This paper seeks agreement to:

a) deliver rural connectivity improvements, and accelerate rollout of fifth generation cellular mobile technology (5G) to provincial centres, s9(2)(f)(iv) and s9(2)(j) and

b) expand the range of frequencies covered under the 3.5 GHz radio spectrum band previously agreed by Cabinet so to better enable deployment of 5G.

## Relation to Government priorities

2 The proposals in this paper further the Government priority of "*securing our economic recovery*". In addition, the proposals:

a) support our 2020 manifesto commitment to improve rural connectivity.

b) advance Cabinet's 2018 decision [DEV-18-MIN-0311 refers] to allocate long-term rights to the 3.5 GHz band of radio spectrum to support 5G rollout, and

c) support the implementation of the Digital Strategy for Aotearoa [GOV-21-MIN-0033 refers].

## Executive Summary

3 Cellular mobile services transmit and receive radio waves at frequencies in the radio spectrum.

4 Some radio spectrum frequency ranges are allocated for commercial use in tradeable legal instruments called "management rights". By convention, Cabinet's approval is sought for any significant allocations.

5 5G is the next generation of cellular mobile technology. It is expected to deliver faster and more reliable cellular mobile services supporting innovation and productivity.

6 New long-term rights to radio spectrum must be allocated for 5G to be effectively rolled out in New Zealand. Cabinet decided in 2018 to auction the long-term rights to

s9(2)(f)(iv) and s9(2)(j)

part of the 3.5 GHz band of radio spectrum, coming available from November 2022, to support implementation of 5G. This band is being used for 5G in many countries, which means suitable equipment is readily available in New Zealand.

7 The 2018 Cabinet decisions also included providing, if practicable, spectrum for Wireless Internet Service Providers (WISPs) who deliver valuable rural services. The increasing 5G needs of private networks at industrial and transportation sites also need to be provided for.

**Need for further investment in rural connectivity**

8 Good connectivity in rural areas is important for improving productivity, social connection, health and safety, education and attracting and retaining workers.

9 Successive Governments have invested more than $600 million to improve rural connectivity over the last decade. This investment, alongside that of the private sector, has lifted the standard of New Zealand's telecommunications infrastructure. New Zealand rates high in global connectivity rankings and, once the existing programmes are completed in 2023, 99.8% of the population will have access to broadband.

10 However, further investment is needed to address rural capacity issues caused by rapid data use growth and to extend coverage to more rural areas.

11 *s9(2)(j)*

12 *s9(2)(f)(iv)*

**Allocating the 3.5 GHz band**

13 Cabinet agreed in 2018 to allocate most of the 3.5 GHz band of the radio spectrum for the use of 5G; specifically, 390 MHz of the 3.41 GHz to 3.8 GHz range [DEV-18-MIN-0311 refers]. This allocation was subject to the outcome of the process for considering Treaty issues through engagement with the Māori Spectrum Working Group.

14 In December 2021, Cabinet agreed to key elements for an enduring Crown-Māori agreement on spectrum, including that 20% of commercial allocations (100 MHz in this case) will be provided to a Māori Spectrum Entity [GOV-21-MIN-0060 refers]. The final agreement was reached in the form of a memorandum of understanding between the Crown and the Māori Spectrum Working Group, which representatives from both parties signed in February 2022. My officials are now working to implement this agreement through legislation. With this historic agreement between Crown and Māori finalised, Government can now complete the 3.5 GHz spectrum allocation.

15 I propose to increase the amount of spectrum available for 5G by adding the 3.3 – 3.41 GHz range. Table 1 summarises the decisions made by Cabinet in 2018 and 2021, along with my current proposal to also include the 3.3 – 3.41 GHz range, bringing the total spectrum available to 500 MHz for allocation to four user groups.

16 s9(2)(f)(iv) and s9(2)(j)

17 s9(2)(f)(iv) and s9(2)(j)

s9(2)(f)(iv) and s9(2)(j)

s9(2)(g)(i)

s9(2)(f)(iv) and s9(2)(j)

s9(2)(g)(i)

s9(2)(f)(iv) and s9(2)(j)

s9(2)(f)(iv) and s9(2)(j)

**Table 1. Summary of the 3.5 GHz band, existing and proposed Cabinet decisions, and groups and entities being considered for spectrum allocation**

| | | |
|---|---|---|
| | The **3.5 gigahertz (GHz) band** is a spectrum range we have defined from 3.3 GHz to 3.8 GHz below. It is informally referred to by its midpoint. The band can be broken into smaller spectrum blocks of various size, typically referred to in megahertz (MHz) units. | |
| ***Cabinet decisions to date*** | | *3.41 – 3.8 GHz (390 MHz)* |
| | | In 2018, Cabinet agreed in principle, subject to resolution of treaty issues, to auction long term rights from November 2022 to this 400 MHz block of spectrum to MNOs and possibly regional operators /WISPs.<br>Short-term allocations to MNOs were made in 2020.<br>In 2021 Cabinet agreed that 20% of commercial allocations be provided to Māori. |

s9(2)(f)(iv)

26

## Background

### Wireless telecommunications and the benefits of enabling 5G

24 Cellular mobile technology delivers voice and data services on mobile phones as well as some home and business broadband services.

25 Cellular mobile services transmit and receive radio waves at frequencies. Some radio spectrum frequency blocks are allocated for commercial use in tradeable legal instruments called "management rights". By convention, Cabinet's approval is sought for any significant commercial allocations.

26 5G improves the speed and reliability of mobile communications. It is expected 5G-enabled services will be of important economic value, used for very high-volume data needs. Some examples of 5G application include connections between multiple devices (the 'internet of things') and autonomous vehicles.

27 More spectrum is required for 5G. The 3.5 GHz frequency range (or 'band') has been identified as important for 5G in New Zealand.[3]

### The need for further investment in wireless connectivity in rural areas

28 Good connectivity in rural and remote areas is important for social and economic wellbeing.[4]

29 Over the last eleven years successive New Zealand Governments have invested over $2.5 billion in improving telecommunications connectivity in New Zealand. Of that amount, $1.83 billion has been toward fibre optic services, almost entirely in towns, with around $600 million going into fixed wireless broadband services in rural areas. As a result of the significant government and private sector investment, New Zealand has a strong connectivity offering[5].

30 Despite this significant past investment, further investment is needed to address pressures caused by rapid growth in data usage, particularly in rural areas. As part of the 2020 Election Manifesto the Government committed to addressing rural capacity constraints, and further extending rural wireless and mobile coverage.

31 *s9(2)(f)(iv)*

[3] Internationally and in New Zealand several bands, including 600 MHz, 3.5 GHz and 26 GHZ, can be used for 5G purposes. Lower spectrum bands provide better coverage, while higher bands provide better capacity

[4] The 2021 KPMG Agribusiness Agenda report ranked fast, accessible rural broadband as the third highest priority behind biosecurity and quality trade agreements, while the 2021 'Quality of Life' survey reported good connectivity as the highest priority amongst rural women.

[5] New Zealand was ranked 12th in the world under the 2020 Huawei Global Connectivity Index and ranked in the top five OECD countries for the provision of fibre. Following the completion of the Rural Connectivity Group build programme, Vodafone GSMA narrow-band internet of things (NB-IOT) coverage of approximately 70 per cent of New Zealand's land area could bring significant productivity gains to the agriculture sector.

**Cabinet has already made some decisions to allocate the 3.5 GHz spectrum**

32 Long-term rights to the 3.5 GHz spectrum can commence in November 2022. Cabinet agreed in late 2018 to allocate by auction long-term rights, for a 20-year period to some of the 3.5 GHz band, being 3.41 GHz to 3.80 GHz, mainly to national 5G networks. Provision of spectrum for Wireless Internet Service Providers (WISPs) was also agreed if sufficient spectrum was available and interference could be managed. This allocation was subject to the outcome of the process for considering Treaty issues through engagement with the Māori Spectrum Working Group.

33 In December 2021, Cabinet agreed to key elements for an enduring Crown-Māori agreement on spectrum, including that 20% of commercial allocations (100 MHz in this case) will be provided to a Māori Spectrum Entity [GOV-21-MIN-0060 refers]. The final agreement was reached in the form of a memorandum of understanding between the Crown and the Māori Spectrum Working Group, which representatives from both parties signed in February 2022. My officials are now working to implement this agreement through legislation. With this historic agreement between Crown and Māori finalised, Government can now complete the 3.5 GHz spectrum allocation.

34 The Minister of Finance, the Minister of Research, Science and Innovation, the Minister for Māori/Crown Relations: Te Arawhiti, Minister for Māori Development, and the Minister of Broadcasting, Communications and Digital Media, acting jointly, were authorised to make decisions on the detailed design of the allocations in the 3.5 GHz band, without further referral to Cabinet.

**Interim allocations to allow 5G roll out to start**

35 In addition, Cabinet agreed [DEV-19-MIN-0329] in December 2019 to provide some temporary early access for MNOs, Māori, and Dense Air to 5G radio spectrum until the end of October 2022.

36 All three New Zealand MNOs are now rolling out 5G cellular mobile services in a range of urban areas using interim allocations.

*Allocation to Interim Māori Spectrum Commission*

37 In December 2021, Cabinet agreed an allocation of 20% of national commercial spectrum to a Māori Spectrum Entity (currently represented by an Interim Māori Spectrum Commission (IMSC) [GOV-21-MIN-0060 refers]. Given the available 500 MHz proposed below, this allocation works out at 100 MHz.

**Additional spectrum for regional broadband, private networks, and Māori**

38 Since Cabinet's 2019 decisions, the Ministry of Business, Innovation and Employment (MBIE) has become aware of increasing demands for 3.5 GHz band spectrum. These demands include:

a) providing world class 5G services through our MNOs;

b) accommodating Māori interests in spectrum;

c) improving broadband services to rural and remote areas via regional broadband services (for example WISPs), and

d) an emerging use of 5G for industry automation through private networks industrial sites and campuses.

39 After consultation with affected parties, officials advise it is possible for regional broadband and private networks to use the 3.3 GHz to 3.41 GHz frequency range. I have asked MBIE to provide me with advice on the best allocation method.

40 Providing regional licences to spectrum in the 3.3 GHz to 3.41 GHz range to regional broadband and private networks would mean that the spectrum Cabinet has already agreed to make available could all be allocated as national management rights for use by the MNOs and Māori.

41 Under Cabinet-agreed parameters, Māori would receive an allocation of 100 MHz. *s9(2)(f)(iv)*

42 Existing, agreed and proposed new allocations of spectrum discussed in paragraphs 33 to 41 are summarised in Table 1.

**Table 1. Summary of the 3.5 GHz band and existing and proposed Cabinet decisions and groups and entities being considered for spectrum allocation**

| | The **3.5 gigahertz (GHz) band** is a spectrum range we have defined from 3.3 GHz to 3.8 GHz below. It is informally referred to by its midpoint. The band can be broken into smaller spectrum blocks of various size, typically referred to in megahertz (MHz) units. | |
|---|---|---|
| ***Cabinet decisions to date*** | | *3.41 – 3.8 GHz (390 MHz)* |
| | | In 2018, Cabinet agreed in principle, subject to resolution of treaty issues, to auction long term rights from November 2022 to this 400 MHz block of spectrum to MNOs and possibly regional operators /WISPs.<br>Short-term allocations to MNOs made in 2020.<br>In 2021 Cabinet agreed that 20% of commercial allocations be provided to Māori. |

*s9(2)(f)(iv)*

45

**Important policy objectives can be leveraged through the spectrum allocation**

43 The primary purpose of the 3.5 GHz spectrum allocation is to allow the MNOs to further invest in 5G coverage. This commercially driven investment is expected to quickly achieve 5G coverage for most of the population, who live in larger centres.

44 s9(2)(g)(i) My proposal is that the Government utilises the allocation of 3.5 GHz at the point of sale to leverage wider policy objectives including:

a) advancing Government's priority of "*securing our economic recovery*";

b) improving services to rural areas in a manner that complements the Government's 2020 Election Manifesto commitments;

c) accelerating improvements to network performance and coverage, particularly in rural areas, as part of ongoing work under my *Future of Connectivity* programme (see Appendix 2), and

d) supporting the implementation of the *Digital Strategy for Aotearoa* [GOV-21-MIN-0033 refers].

**The value of the 3.5 GHz spectrum is estimated at around** s9(2)(j)

45 Officials estimate a total, one-off value of s9(2)(j) for 20-year rights for the 3.5 GHz spectrum on offer to MNOs. s9(2)(j)

*Leverage for delivery of policy goals is optimal at point-of-sale of spectrum*

46 If sold for s9(2)(j) the revenue from these spectrum rights would accrue to the Crown account at a rate of s9(2)(j) per year over the twenty-year rights period. s9(2)(f)(iv) and s9(2)(j)

47 My proposed implementation requirements are targeted at the following two areas to align with current Government economic recovery and rural connectivity priorities:

a) **Improved rural connectivity**: s9(2)(f)(iv) and s9(2)(j)

- Increased capacity of rural fixed and mobile wireless networks, s9(2)(f)(iv) and s9(2)(j)

- Increased mobile wireless coverage in rural areas, s9(2)(f)(iv)

b) s9(2)(f)(iv)

**Granting spectrum with the same requirements on all MNOs should promote competition**

48 Purchase of spectrum rights is subject to the provisions of the Commerce Act 1986. This prohibits the acquisition of assets if the acquisition would be likely to have the effect of substantially lessening competition in a market.

49 s9(2)(f)(iv) I consider this would promote rather than lessen competition.

s9(2)(f)(iv)

50 Although it has been common practice to auction spectrum management rights, the Radiocommunications Act 1989 provides an unconstrained choice of allocation method.

51 s9(2)(f)(iv) s9(2)(j) s9(2)(f)(iv)

[6] s9(2)(j)

s9(2)(f)(iv)

**How to provide for additional entrants is a key choice and the key risk**

54 Providing opportunity for further competition from a new entrant is an important consideration. s9(2)(b)(ii) .

55 s9(2)(g)(i)

56 s9(2)(f)(iv)

57 s9(2)(f)(iv)

**Negotiation and monitoring risk with allocation method**

58 The s9(2)(j) estimated value of the 300 MHz spectrum is based on a range of approximate international benchmarks. The ability to define and enforce a level of 5G service quality is also technically challenging. To mitigate these service definition and equivalent value negotiation risks, I am proposing to use the expertise of Crown Infrastructure Partners to work with officials.

## Next steps with industry

59 s9(2)(f)(iv)

[7] s9(2)(b)(ii)

s9(2)(f)(iv) s9(2)(b)(ii)

60 s9(2)(j)

61 I recommend that, acting as the Minister for the Digital Economy and Communications, I be authorised to make decisions on details of the allocation without further referral to Cabinet.

62 Final decisions are needed by end of March 2022 to allow MNOs to plan for further 5G deployment from November 2022.

## Financial Implications

63 s9(2)(f)(iv)

64 s9(2)(f)(iv) The appropriate tax, and accounting details to support these arrangements will be determined by MBIE, in consultation with the Treasury and IRD.

## Legislative Implications

65 The decisions sought in this paper have no legislative implications.

### Regulatory Impact Statement

66 A Regulatory Impact Statement is not required as there are no legislative or regulatory implications arising from this paper.

### Climate Implications of Policy Assessment

67 There are no significant climate change implications arising from this paper.

## Population Implications

68 The proposed s9(2)(f)(iv) and s9(2)(j) will benefit smaller rural towns.

69 Providing long-term rights to enable MNO deployment of 5G services across the main metropolitan areas of New Zealand is the primary purpose of this spectrum allocation. s9(2)(f)(iv)

## Human Rights

70 There are no human rights implications arising from this paper.

## Consultation

71 Consultation has been undertaken with: The Treasury, Crown Infrastructure Partners (CIP), and the Commerce Commission. DPMC has been informed.

72 The Treasury is supportive of the objectives to improve rural connectivity and accelerate the rollout of 5G but considers that it will be important to ensure that any investment by the Crown does not fund activities that would have otherwise been delivered by the market on the same or similar timeframes. The Treasury's preference is for a sale of the spectrum (for example, by auction) with revenue returned to the Crown so that Ministers can participate in decisions about how it should be spent and can consider these proposals against other Government priorities.

73 The Commerce Commission have been advised that my recommended approach is neutral with respect to the competitive landscape. Existing levels of competition would remain for both 5G infrastructure and 5G services.

74 Officials expect that Crown Infrastructure Partners will have a key role in the implementation of these investments.

75 s9(2)(j)

76 The RCG, a joint venture between the three existing MNOs, was also consulted. s9(2)(f)(iv)

## Communications

77 Communications, limited to MNOs only, are proposed from my office to assure MNOs that the pressing need for long-term allocation of spectrum to support continued 5G investment is under active consideration.

## Proactive Release

78 I propose this paper, with any appropriate redactions, is publicly released at the time of the completed sale of 3.5 GHz spectrum with associated implementation requirements, expected in April 2022.

## Recommendations

The Minister for the Digital Economy and Communications recommends that the Committee:

**Background**

1 note that in December 2018, Cabinet [DEV-18-MIN-0311] agreed to allocate spectrum between 3.41 gigahertz and 3.80 gigahertz for national 5G networks as 20-year management rights and to regional broadband services (including regional Wireless Internet Service Providers, or WISPs);

2 note that improved connectivity is important to meeting the needs of rural communities experiencing poor network performance because of lack of capacity, and some areas still have no network coverage;

3 note that an ongoing allocation of 20 percent of national commercial spectrum allocations to a Māori Spectrum Entity, at no cost to Māori, has been agreed by Cabinet [GOV-21-MIN-0060 refers];

**Proposed expansion of spectrum range for allocation / sale**

4 agree to add the 3.3 GHz to 3.41 GHz range of spectrum, to the 3.41 GHz to 3.8 GHz range already agreed by Cabinet, making a total of 500 MHz available to accommodate the following four groups:

4.1 group one: 5G operators comprising the existing three MNOs requiring national management rights;

4.2 group two: Māori, requiring national management rights;

4.3 group three: Regional operators (for example, WISPs) requiring local rights only, and

4.4 group four: private networks requiring local rights only.

s9(2)(j)

5 note that the market value of 300 MHz of spectrum in the 3.5 GHz band is estimated at s9(2)(f)(iv) and s9(2)(j)

6 s9(2)(f)(iv) and s9(2)(j)

7 agree to s9(2)(f)( the Government's key priority for economic recovery and rural connectivity commitments, by imposing sale implementation requirements s9(2)(f)(iv) s9(2)(f)(iv) s9(2)(j) s9(2)(f)(iv)

8 agree the objectives for implementation requirements on MNOs comprise:

8.1 s9(2)(f)(iv) and s9(2)(j)

8.1.1 s9(2)(j) s9(2)(f)(iv)

8.1.2 s9(2)(j) s9(2)(f)(iv)

8.2 s9(2)(j)

9 note these 3.5 GHz spectrum allocation implementation requirements will advance wider Government objectives including: the *Digital Strategy for Aotearoa* [GOV-21-MIN-0033 refers], the 2020 Election Manifesto commitments to improve rural services, and rural network improvements as part of my *Future of Connectivity* programme;

s9(2)(f)(iv)

s9(2)(g)(i)

**Next steps**

13 note that in in December 2018 Cabinet [DEV-18-MIN-0311] agreed that the Minister of Finance, the Minister of Research, Science and Innovation, the Minister for Māori/Crown Relations: Te Arawhiti, Minister for Māori Development, and the Minister of Broadcasting, Communications and Digital Media, acting jointly, were authorised to make decisions on the detailed design of the allocations in the 3.5 GHz band, without further referral to Cabinet.

14 agree that final decisions for the 3.5 GHz spectrum allocation relating to the scope, level, and timing of MNO investment under an administrative allocation, rather than auction sale method of allocation, be delegated to me as the Minister for the Digital Economy and Communications.

Authorised for lodgement

Hon Dr David Clark

Minister for the Digital Economy and Communications

*s9(2)(f)(iv) and s9(2)(j)*