Re-planning options for frequency bands within 1710-2300 MHz: Two Degrees Submission on RSM Discussion document

Executive summary

- The 1710 to 2300MHz band is heavily used to deliver cellular services, serving millions of consumers on a national basis.
- 2degrees supports efficient use of the band, including allowing for new uses of the 1800MHz duplex gap, the lower and upper portions of the paired 2200 MHz band, and use of the '2100MHz band expansion' frequencies. However, introduction of other services needs to be carefully considered and done with care to ensure that such new services do not create interference issues for the existing consumers of services due to incompatibility issues.
- MBIE will be aware that incompatibility issues have arisen in the past in the 2GHz band, leading to significant uncertainty and disruption (including court action). We are able to learn from these experiences and avoid a repetition.
- 2degrees supports the allocation of the band 1785-1805MHz for radio microphones provided there is a maximum transmit power of 20mW and 50mW for body worn radio microphones, that out of band and spurious emission limits based on maximum transmit power and limits defined in ETSI standard EN 300 422-1 are adhered to, and that at least a 200kHz guard band at the top and bottom end of the band is put in place. Because the impact of radio microphone interference is likely to vary depending on location in the band, it is important to ensure no harmful interference to a mobile operator immediately adjacent to the duplex gap.
- 2degrees supports the allocation of the 2100MHz band expansion to future mobile broadband use over the longer term. These frequencies are identified for IMT, and have the potential to provide very significant benefits for New Zealand in the delivery of mobile broadband. New Zealand should be in a position to migrate these bands to IMT use in line with international developments.
- However, we acknowledge it is early days in relation to this band. There is currently no equipment or handsets for mobile services, and this is unlikely to emerge in the short term. Given this uncertainty, it may be that the MBIE continues to monitor international developments in this band in the short term, whilst allowing for trials that do not interfere with existing use in adjacent rights. Any trial should not be on a long-term basis and should not hinder the future allocation of this band to IMT use.
- 2degrees agrees that an engineering assessment needs to take place to ensure compatibility with incumbent licences in relation to use of the 2100MHz band expansion frequencies. As the operator immediately adjacent to the proposed expansion band 2degrees would like an opportunity to consider and feedback on this assessment.

- 2degrees supports the MBIE proposal to postpone a decision on the unpaired 2000MHz band until there is clarity on the type of international harmonised usage for this band.

Radio microphones in the 1800 MHz Duplex Gap

Question 1: Do you agree with the RSM proposal to use the 1800MHz duplex gap (1785-1805MHz) for radio microphones? If not, what is a better use of this block of spectrum?

The 1800MHz duplex mid band gap is used by radio microphones in a number of countries. 2degrees supports the allocation of the band 1785-1805MHz for radio microphones, provided sufficient safeguards are put in place to protect adjacent management rights from harmful interference.

The ETSI standard EN 300 422-1 specifies out of band and spurious emissions based on maximum transmit power. Other countries have imposed maximum transmit power limits on radio microphones: 20mW and 50mW for body worn radio microphones[1] to protect 1800MHz cellular services. MBIE should similarly require compliance with 20mW and 50mW power limits and associated out of band and spurious emission limits defined in ETSI standard EN 300 422-1.

Given the importance of the 1800MHz band to the delivery of mobile services (including a significant proportion of total traffic across operators), MBIE needs to ensure the cellular services operating in the 1800MHz band are not impacted by radio microphones. 2degrees' mobile receive band is likely to be close to radio microphones and exposed to interference if radio microphones are introduced without appropriate restrictions. Given 2degrees' lack of 2300MHz or 2600MHz spectrum, it is even more important to ensure it has full use of all of its spectrum in the 2GHz bands and that issues arising from use within adjacent bands (including the duplex gap) do not impact performance/capability.

The Radiocommunications Act (the Act) is not likely to provide adequate protection because it lacks provisions to deal with cumulative interference in the event interference arises.

Question 2: What size guard band would be appropriate for achieving compatibility between radio microphone use and mobile networks operating below 1785 MHz and above 1805 MHz?

A guard band of 200kHz has been used in countries that use the band 1785-1805MHz for radio microphones. MBIE should adopt a similar guard band of at least 200kHz at both upper and lower ends of the 1800MHz duplex gap.

[1] Association of Professional Wireless Production Technologies, "Frequencies for wireless microphones," Revision 30 April 2020.

Postponing a decision on the Unpaired 2000 MHz band

Question 3: Do you agree with RSM's proposal to postpone a decision on the Unpaired 2000 MHz band (2010-2025 MHz) until there is clarity on international harmonised use for the band? If not, what is the best value use for this band?

2degrees supports RSM's proposal to delay any decision on the range 2010-2025MHz until there is greater clarity on the use of this band.

Fixed links in lower portion of Paired 2200 MHz Band

Question 4: Do you agree with RSM's proposal to use the lower portions of the Paired 2200 MHz band (2025-2081.5 MHz and 2200-2256.5 MHz) available for fixed links to enable clearing of the 'L' and 'LL' bands (1427-1524 MHz)?

2degrees supports the use of the bands 2025-2081.5 MHz and 2200-2256.5 MHz to clear the fixed links in the L and LL band. However, RSM needs to ensure that there is no incompatibility with systems operating below 2025MHz and 2200MHz end of the spectrum.

Question 5: Do you agree that the proposed channel plan for fixed links in Figure 1 would be adequate to transition those affected licences in 'L' and 'LL' fixed link bands? If not, why not?

2degrees does not have any comments on the overall band plan. However, urges RSM to ensure that the proposed band plan does not negatively impact on the potential cellular use of 2010-2025 and 2170-2200MHz bands in line with potential international developments.

A potential option is to restrict the use of the channels e.g. N1, N1#, N01-N12, N01#-N12#. RSM has previously placed such restrictions on other fixed link bands, and similar principles could be applied to protect future systems operating in 2010-2025 and 2170-2200MHz bands.

Options for the Paired 2100 MHz Band Expansion

Question 12: What is the best value use for the Paired 2100 MHz band expansion?

2degrees supports the allocation of the 2100MHz band expansion for IMT use over the longer term. These frequencies are identified for IMT applications, and have the potential to provide very significant benefits for New Zealand with mobile broadband use. The 2GHz bands have a good balance of coverage and bandwidth which are well-suited to delivering mobile broadband.

New Zealand should be in a position to allocate this band to IMT applications in line with international developments. However, it is early days in relation to this band, and there is no clarity on equipment or handset availability. Development of such

products is expected to be driven by global, not local, demand. Further, when such equipment emerges, it will require significant investment in new equipment and handsets (alongside spectrum). In the current environment, with the primary focus on the 3.5GHz band and mmWave bands for 5G (and other bands likely to get priority for equipment support ahead of the 2100MHz band expansion), equipment availability in this band is likely to be some years away.

Given this uncertainty, it may be that the Ministry continues to monitor international developments in this band in the short term, whilst allowing for trials that do not interfere with existing use in adjacent rights.

As identified in the discussion document, 2degrees uses the spectrum immediately adjacent to these frequencies[2]. This spectrum is for both 3G and 4G use. As noted above, with 2degrees' more limited 2GHz spectrum versus Spark and Vodafone, it is especially important it maintains full use of these bands – this includes no interference from any trial licences that are granted. Any trial use should be on a short-term basis only and should not hinder the future allocation of this band to IMT use.

As such, 2degrees agrees with MBIE that an engineering assessment needs to take place to ensure compatibility with incumbent licences. 2degrees would like an opportunity to consider and feedback on this assessment.

[2] Hautaki Management Right.