

5G Spectrum Road Map Discussion: Telco2 Response

Q1. What are the likely uses for 5G in New Zealand initially and in the longer term?

- 5G will initially be used for fixed mobile substitution - as a way for mobile network operators to compete on an infrastructure level with fibre-delivered services.
- In the longer term 5G will play an important role in mobility and IoT.

Q2. Do you consider competition should be encouraged at the infrastructure level or purely at the retail level for 5G? Why?

- I believe the majority of 5g band spectrum in urban and peri-urban areas should be reserved for wholesale-only infrastructure providers.

Q3. What regulatory issues need to be considered from a 5G perspective in New Zealand?

- Clarification and/or revision of the NESTF must be undertaken. The current standard is so unclear that some local authorities request extensive RF emissions testing be done any time a radio transmitter (including a Wi-Fi hotspot) is attached to a utility pole.
- The Standard Terms Determination on Mobile Co-Location should be re-visited, as some major access providers are unable to conform to its processes.
- A determination on process for utility pole access for telecommunications should be made to ensure the owners of utility poles allow for the best use of their unique and often irreplaceable real estate.

Q4. What aspects of these regulatory issues are most significant for 5G?

- Clarification of the NESTF and a process for utility pole access are most significant for 5G projects utilising Ka band spectrum.

Q5. Do you agree that the 3.5 GHz band is the top priority for allocation for 5G?

- No. 3.5 GHz is an additive band for mobile network operators which will be used in much the same way 2.3 and 2.5 GHz bands are used. No changes in policy should reduce the utility of 3.5 GHz band to existing rural and remote providers while 2.3 and 2.5 GHz bands still have a large amount of unutilised (or squatted) spectrum.

Q6. Do you have any comments on reallocating 3587 to 3690 MHz for 5G?

- The satellite industry is in a major state of flux due to micro-satellites, software defined radio, and lowered launch costs. Astranis is a good example of innovation in the field. The cost of using the extended C band for data services is likely to drop in cost by more than an order of magnitude, making it a viable technology for use in New Zealand - but only if spectrum is reserved for the application.

Q7. Do you agree that the 26 GHz band is a high priority for allocation to 5G in New Zealand?

- 5G is the most appropriate terrestrial use for the 26 GHz band.

Q8. Would this band be of interest to your organization for trials for 5G services in New Zealand?

- With access to the 26 GHz band I would likely assist my customers in trialling 5G technologies

Q9. Do you agree that the 31.8 to 33.4 GHz, 40.5 to 42.5 GHz and 42.5 to 43.5 GHz bands are a low priority for allocation to 5G in New Zealand?

- I agree that 31.8 to 33.4 GHz, 40.5 to 42.5 GHz and 42.5 to 43.5 GHz are low priority allocations for 5G in New Zealand.

Q10. When do you think equipment is likely to become available in the bands identified in Q9?

- Microwave linking equipment allowing exceptionally high data rates is already available in Q band, 40.5-43.5 GHz, however licenses cannot be issued as the band is currently a 5G candidate. I would like to see 40.5-43.5 removed from New Zealand's 5G candidates so that it can be used for linking.

Q11. Do you have any comment on the possible allocation of 27.5 to 29.5 GHz to IMT?

- 5G is the most appropriate terrestrial use for the 27.5-29.5 GHz band.

Q12. Is there demand for alternative uses other than IMT of the 1400 MHz band? If so, what uses?

- Mobile Satellite and IMT are the only two likely uses for L-band

Q13. When is the demand likely to require consideration of reallocation of the 1400 MHz band for IMT, if at all?

- Existing L-band linking users should be prepared to migrate to L-band linking compatible with an IMT channel plan from 2019.

Q14. Is there a need for more sub 1 GHz spectrum for IMT/5G?

- There is a need for more sub 1 GHz spectrum for IMT.

Q15. If so, how should we deal with radio microphones in the 600 MHz band?

- Sub 1 GHz spectrum could be reserved for rural and remote use, avoiding conflicts with the majority radio microphone users.

Q16. When is the demand likely to require reallocation of the 600 MHz band to IMT, if at all?

- Plans should be made to reallocate the 600 MHz band to IMT from 2019.

Q17. Which allocation methodology should be used for allocating spectrum bands identified for use with 5G? Why?

- The majority of all Ka band 5g spectrum in urban and per-urban areas should be reserved for administrative allocation to a single wholesale-only national infrastructure provider. Some national rights blocks should be made available for auction should one or more operators prefer to compete at an infrastructure level. Some blocks should be made available for administrative allocation on a regional basis.
- A portion of 3.5 GHz spectrum should be retained for administrative allocation on a regional basis. A portion of 3.5 GHz spectrum should be reserved for administrative allocation to a wholesale-only national infrastructure provider. Some blocks should be made available for auction should one or more operators prefer to compete at an infrastructure level.
- The majority of all sub 1 GHz 5g spectrum on a national basis should be reserved for administrative allocation to a wholesale-only national infrastructure provider. Some national blocks should be made available for auction should one or more operators prefer to compete at an infrastructure level.

Q18. Should different allocation mechanisms be used for rights for regional providers and national providers? Why?

- Providers wishing to acquire a national spectrum block for private use should compete via auction for that block. By winning, they have the long-term right to exclude others from using the spectrum, which they may choose to use only in areas where population density will support its commercial use.
- Regional providers should be administratively allocated spectrum with criteria favouring providers with existing networks and revenue to support a build.

Q19. Should deployment of 5G technology be specified for some or all bands? If not, why not?

- Technology or air interface should only be specified where not doing so would limit the utility of neighbouring spectrum blocks. In areas of low population density, regional providers should be able to use cost and power efficient technologies whatever their air interface as long as that use does not impact on users wishing to implement 5G.

Q20. What implementation requirements should be specified and how should these be expressed – time, extent, etc –.

- No implementation requirements should be specified for blocks sold at auction, provided significant blocks are also available for administrative allocation.
- Administrative allocation of spectrum should only be done for providers with existing networks, customer bases, and financial support to begin implementing a production network immediately. Administrative allocations that do not progress towards a pre-agreed build plan within eighteen months of allocation should be withdrawn.

Q21. What should be the consequence of non-implementation – lose spectrum, additional payment, other

- Non-implementation of administratively allocated blocks should result in the loss of spectrum.

Q22. Should the implementation requirements be different for regional and national providers? What should these be and why?

Implementation requirements should be a condition of administrative allocations, but not of auction blocks, provided the majority of spectrum in each band is administratively allocated.

Q23. Should acquisition limits be imposed on 5G bands? If so, what should these be and why?

- No retail provider should be allowed to acquire more than 70 MHz of sub 1 GHz spectrum
- No retail provider should be allowed to acquire more than 200 MHz of 1-4 GHz spectrum
- No retail provider should be allowed to acquire more than 400 MHz of Ka band spectrum
- Such a regime will ensure wholesale-only providers have adequate spectrum to offer robust urban & rural products without disadvantaging retail providers competing on cost.

Q24. Should acquisition limits be imposed for regional providers? If so, what should these be and why?

- Acquisition limits should be applied to all retail providers.

Q25. What term should be used for management rights suitable for 5G? Why?

- A minimum fifteen year term should be applied to 5G management rights to ensure the spectrum is available for two equipment/service lifecycles.

Q26. Should the 5G bands be replanned as TDD bands or some bands or parts of bands be retained as FDD? Why?

- 600 MHz band should be offered as FDD to match existing sub-GHz band plans.
- 3.5 GHz band should be replanned as TDD to most efficiently use the spectrum.
- Ka band should be replanned as TDD to most efficiently use the spectrum.

Q27. What bandwidth should be used as the basis for allocation? Why?

- 600 MHz band should be offered with a basis of 5 MHz bandwidth to match existing sub-GHz band plans.

- 3.5 GHz band should be offered with a basis of 10 MHz bandwidth to compromise between efficiency and fair distribution of spectrum.
- Ka band should be offered with a basis of 100 MHz bandwidth to compromise between efficiency and fair distribution of spectrum.

Q28. What out of band emission limits should apply to management rights when first created for allocation? Why?

Out of band emission limits to suit the 5G air interface should be applied to management rights to ensure the most efficient possible use of the spectrum.

Q29. Should out of band emission limits be different if the band is technology neutral? If so, what out of band emission limits should be applied?

Even in technology neutral bands, 5G compatible limits should be implemented to ensure the most efficient possible use of the spectrum.

Q30. How should interference between adjacent frequency 5G TDD networks be managed? Should this be the same for all frequency bands?

It should be up to providers with adjacent 5G TDD networks to manage their own interference.

Q31. How should interference between different technologies within the same band be managed, if bands are technology neutral?

Using 5G compatible (and most restrictive) out of band emission limits will eliminate the potential for interference between different technologies within the same band.

Q32. Should regional uses be provided for in the 3.5 GHz band plan? Why?

- Yes. 3.5 GHz is an additive band for national mobile network operators which will be used in much the same way 2.3 and 2.5 GHz bands are used. On the other hand, 3.5 GHz is currently important to regional operators as a radio access technology. No changes in policy should reduce the utility of 3.5 GHz band to existing rural and remote providers while 2.3 and 2.5 GHz bands still have a large amount of unutilised (or squatted) spectrum.

Q33. If allowed in the 3.5 GHz band, how could this be managed or facilitated?

Some 3.5 GHz band allocations should be divided between national urban allocations and regional rural ones, with sufficient peri-urban buffer areas to ensure no significant coordination or interference mitigation is required between providers.

Q34. Which alternative bands may be suitable for regional allocation? Why?

Alternative bands are only suitable for regional allocation where equipment is widely available and inexpensive. The 2370-2395 MHz band would be ideal for this purpose.

Q35. Is early access to the 3.5 GHz band required for roll out of 5G networks prior to the expiry of existing rights in 2022? If so, why?

- No. 3.5 GHz is an additive band for mobile network operators which will be used in much the same way 2.3 and 2.5 GHz bands are used.

Q36. How could early access to the 3.5 GHz band be achieved?

- Allocated (non-auction) blocks of 3.5 GHz band could be issued immediately.

Q37. Should the government be involved in early access arrangements for the 3.5 GHz band?

- Yes. Government should immediately claw back all spectrum which has not been used to build significant regional or national networks, with no compensation.

Q38. Is early access to the 26 GHz band required for roll out of 5G networks prior to the expiry of existing rights in 2022? If so, why?

- Yes. From a technical innovation standpoint, it's important that New Zealand businesses be able to use 5G networks as soon as a standard is issued.

Q39. How could early access to the 26 GHz band be achieved?

Government should immediately claw back all spectrum which has not been used to build significant regional or national networks, with no compensation. In the few cases spectrum has been used for microwave linking, government should offer to purchase existing links at their replacement value, providing a capacity matched link in an alternative band such as 23 GHz.

Q40. When is demand for the bands above 30 GHz likely to eventuate?

Demand for Q band spectrum is immediate, and its reservation for 5G technologies has already held back innovation in New Zealand

Q41. When is demand for the 600 and 1400 MHz band likely to eventuate, if at all?

Demand for 600 MHz spectrum is likely to eventuate immediately post WRC-19. MSS demand for 1400 MHz band is likely to eventuate within the next five years.