Auckland Transport
An Auckland Council Organisation

Auckland Transport's Response to "Preparing for 5G in New Zealand"

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Executivy Summary

Auckland Transport would like to thank the Ministry for providing the opportunity to comment on the Discussion Document “Preparing for 5G in New Zealand”

Auckland Transport is responsible for all of the region’s transport services (excluding state highways), from roads and footpaths, to cycling, parking and public transport.

Transport plays a critical role in the development and liveability of any modern city. As an organisation, Auckland Transport views its role as contributing to an effective, efficient and safe transport system that puts people first, works to shape our city through providing high quality facilities and urban spaces, and provides choices for a growing, vibrant Auckland.

Since 2010, Auckland Transport has made significant progress with major improvements in the public transport system, strong patronage growth, commencement of the City Rail Link and investment in active modes – in particular cycling facilities.

Yet, despite this progress, the challenges facing transport for Auckland are increasing, in particular rapid population growth and legacy infrastructure issues which compound a funding shortfall.

The Auckland Plan is the roadmap to deliver on the region’s vision. It is a thirty-year plan that is underpinned by a set of outcomes and transformational shifts to achieve this vision which help ensure we focus on the right things.

The Auckland Plan sets strategic direction and transformational shifts to align actions, targets and outcomes that are required to achieve the vision. Auckland Transport plays a critical part in delivering on these actions and targets.

Critical to delivering these, is the need to collect and process data from a varying number of sources, in particular bus, train and ferry location information, loading data all in real-time to enable a dynamic transportation system that can work seamlessly and efficiently with the travelling public, private transportation companies and individual commuters.

Contents

General Comments

1 INTRODUCTION

1.1 What will 5G be used for?

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

Auckland Transport sees the deployment of 5G as an enabler to delivery of services in real time to consumers of the transport network. The development of smart technologies, demand for data driven decisions, CCTV analytics, ITS, predictive traffic management and on demand services are all envisaged to be enabled by 5G.

Autonomous and smart vehicles are likely to require substantial additional infrastructure investment. There will be a need for integration of these vehicles into public transport networks to manage spot demand as well as peak and off-peak flows. This integration, driven through AI, requires the management of real time and discreet geographic specific data, its collection, analysis and action from multiple sources.

This integration must provide wide ranging predictive analysis to ensure transportation resources are sufficient. To achieve this, a network with sufficient bandwidth and speed to collate the appropriate data is required. 5G is one technology that can help to achieve this.

Auckland Transport also recognises that Device to Device communications and altered data traffic paths allows information distribution to bypass elements of a centralised network design. The potential opportunities in terms of improved quality of service, traffic prioritisation that permits routing of traffic to mitigate areas of network congestion by direct communication via V2X. Again, 5G provides a technology to deliver on this.

2 REGULATORY CONSIDERATIONS FOR 5G IN NEW ZEALAND

2.1 Network competition

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

Auckland Transport believes that competition at the infrastructure level will generate innovation as well as encourage operational excellence. These vitally important fundamentals could be lessened if 5G was purely at the retail level.

However, since the physical infrastructure could be a shared capital investment from interested parties then the spectrum allocation could nominally be considered as the infrastructure due to the capability of 5G to utilise spectrum slicing to provide services.

This is particularly true if spectrum allocation is made under a tiered shared use framework with national and regional variations.

2.2 Other regulatory issues

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

Auckland Transport believes Net Neutrality and Traffic Management as regulatory issues should be considered as a mechanism for providing differentiated service for emergency and other essential services.

Use of shared infrastructure for locations where it is not cost effective to run multiple network infrastructure providers thru the use of network slicing etc for separation while maintaining a competitive marketplace.

Auckland Transport has significant infrastructure deployments across the Auckland Region and with the required increase of Cellular site density, particularly at higher frequencies, infrastructure within the road corridors such as light poles and bus shelters become ideal candidates for deployment of small cell sites and associated resource consenting requirements.

Context aware networks can hold more information about a user within the network to deliver a better experience. This is likely to become the norm and although this provides a speed of service presently not possible, this also brings many security and privacy challenges that will need to be addressed within the regulatory frameworks.

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

Auckland Transport sees Traffic Management and resource consenting as the most significant aspects for 5G.

Traffic Management has the ability to provide 1st and 2nd class services for general population and potentially threaten net neutrality doctrines to the detriment of open competition and innovation.

Resource consenting requirements would likely place undue burden on Territorial Local Authorities given the potential volume of additional sites.

3 POSSIBLE FREQUENCY BANDS FOR 5G

3.1 3.5 GHz band

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

Auckland Transport believes this is a top priority for allocation. Specifically to enable mobile CCTV deployments to assist in traffic management for events such as APEC and Americas cup.

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

Auckland Transport has no comment on this Question

3.2 26 GHz band

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

Auckland Transport has no comment on this Question

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

Auckland Transport has no comment on this Question

3.3 Other extremely high frequency bands

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?

Auckland Transport has no comment on this Question

Q10. When do you think equipment is likely to become available in the bands identified in Q8?

Auckland Transport has no comment on this Question

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

Auckland Transport has no comment on this Question

3.4 Possible ultra high frequency bands

3.4.1 1400 MHz band

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

Auckland Transport believes that IoT based solutions would be a better use of the 1400 MHz band.

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

Auckland Transport has no specific comment on this Question.

3.4.2 600 MHz band

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

Auckland Transport has no comment on this Question.

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

Auckland Transport has no comment on this Question.

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

Auckland Transport has no comment on this Question.

4 SPECTRUM ALLOCATION

4.1 Allocation methodology

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

Auckland Transport supports Licenses for a shared use framework.

In the US, the FCC have announced new arrangements in the 3.5GHz band, which will see implementation of a three-tier shared-use framework involving Incumbents, Priority Access and General Authorised Access. These arrangements will enable access to 150 MHz slots suitable for wireless broadband services, while still protecting the incumbent military radar systems from interference.

This model could be replicated in New Zealand with local government authorities sitting within the priority access tier. The allocations of this priority access could be further broken down into national and regional allocations.

Shared use also enables regional providers to offer up underutilised bandwidth as a spot resource into the national general authorised access pool. In this way a spot market for bandwidth could be developed. This has a positive effect on carriers as they do not need to bid for all bandwidth everywhere and so have a reduced capital cost. They also have an operating cost that more closely matches the demand for the network as they can use spot pricing and bandwidth allocation only when required and balance service resilience and service quality with price on a variable basis.

It also has benefit for the local government authorities as it ensures access to bandwidth required to deliver the necessary services but are able to wholesale the underutilised portion for income which reduces their overall cost to serve.

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

Auckland Transport supports the notion that Regional providers should have first right of refusal with regards to allocation of priority access. Assuming regional providers are limited to local government authorities then the ability of these organisations to secure network resource for core services at a sustainable cost is paramount if there is to be a roll out of smart city infrastructure with the accompanying societal benefits.

4.2 Implementation requirements

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

Auckland Transport sees device availability as an enabler for band use. Auckland Transport installs mobile equipment on Bus, Train and ferries to collect information and provide electronic ticketing. Given the volume of equipment timelines involved, early indication of band allocation provides certainty for vehicle fitout.

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

Auckland Transport has no comment on this Question

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

If a tiered structure is put in place then national holders should be charged an additional payment if the network is not implemented to a satisfactory level n a given timeline. This payment should increase if non-implementation is continued until such time that the spectrum is forfeited into a general pool for reallocation.

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

Auckland Transport believes that implementation should have different requirements for regional and national providers.

Regional implementation should not need to meet potentially more stringent requirements that national providers must follow due to a narrower focus of local bodies. Non-implementation by regional providers should not be penalised in the form of additional payments however allocated spectrum should be made available for open use by the national providers, at an agreed rate, until such time that the regional provider completes their implementation.

4.3 Acquisition limits

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

Auckland Transport supports limits on acquisitions. A single organisation should not be able to hold more than 1/3 of available spectrum within a specific tier on either a national or regional basis, should a shared use tiering system exist. Such a limit would nominally continue the informal fairness doctrines presently in place but allow expansion to take into account non-Telecommunication organisations securing spectrum for essential services.

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

Auckland Transport supports limits on acquisitions for regional providers. Again, single Organisation should not be able to hold more than 1/3 of available spectrum within a specific tier on a regional basis, should a shared use tiering system exist. Introducing a limit should allow for the delivery of local body services within a priority construct without impacting overall market competition. The impact is further reduced if a of a spot market for spectrum consumption during peak periods is developed.

A regional provider should only be able to provide services within one region. This restriction facilitates the local body centric approach without extension into a national provider framework.

4.4 Duration of allocated rights

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

The term should be determined by the availability of design and implementation of future networks as determined by 3GPP in tandem with the lifecycle of IoT end devices. Nominally this could be up to 10 years.

This strategy should balance the requirement of national providers needing to gain a return on their capital investment without stifling continued innovation while optimising the return on investment by the end customers in their own IoT end device infrastructure.

5 MANAGEMENT RIGHTS FOR 5G

5.1 Band planning

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

Auckland Transport has no comment on this Question

5.2 Bandwidth

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

Auckland Transport has no comment on this Question

5.3 Out of band emissions

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

Auckland Transport has no comment on this Question

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?

Auckland Transport has no comment on this Question

5.4 Interference between TDD networks

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

Auckland Transport has no comment on this Question

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

Auckland Transport has no comment on this Question

6 ACCESS TO SPECTRUM FOR REGIONAL PROVIDERS

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

Regional users are likely to benefit from an allocation in the 3.5 GHz band. This is an important band for tying together Intelligent Transport Systems and Automated Vehicles and as such priority should be allocated regionally to the local body in charge of transport services so they can work with the national partner of choice to deliver a cost effective outcome to ratepayers.

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

The results in the US from the Citizens Band Radio Service (CBRS) Alliance trials would be a key in determining how this could be managed.

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

Auckland Transport has no specific comment on alternative bands, other than terrain and signal propagation should be considered in some regional areas as the basis for alternatives.

7 TIMING

7.1 3.5 GHz band

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?

Early access for Auckland Transport to access the 3.5 GHz band would assist in provisioning mobile CCTV and additional ITS services, specifically for the 2021 APEC meeting.

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

Auckland Transport has no comment on this Question

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

Auckland Transport has no comment on this Question

7.2 26 GHz band

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?

Auckland Transport has no comment on this Question

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

Auckland Transport has no comment on this Question

7.3 Other bands

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

Auckland Transport has no comment on this Question

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

Auckland Transport has no comment on this Question