

Discussion Feedback for MBIE – Radio Spectrum Management Preparing for 5G in New Zealand

Issue version: 1.0

Version dated: 30 April 2018

INTRODUCTION

We thank the Ministry of Business & Innovation - Radio Spectrum Management in allowing for this public discussion to take place in determining how the 5G spectrum can be best released and utilised for public communication needs in New Zealand.

In responding to this discussion paper, it was important to recognise that the 5G capabilities is not just a radio spectrum, but an architecture that can be supported across multiple access types that include cellular, satellite, trusted and/or untrusted access networks.

When considering the ideal 5G spectrum bands for New Zealand, consideration needs to be given on how these bands will be supported by terminal devices in our international region and what their intended purpose of use will be (i.e. broadband, narrowband, real-time, interactive services, etc.).

It is believed that due to the small New Zealand consumer base and the cost of investment and return (by traditional operators), we may not see a full 5G feature set and capabilities being supported without significant justification.

We attempted to address the questions asked in this discussion paper from a broad industry prospective, whilst attempting to address how this industry may evolve and how competition can be best supported in delivering 5G services fairly across all industry segments.

RESPONSE TO QUESTIONS

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

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

It is recognised that 5G capabilities will be able to support a variety of service types based on their desired Quality of Service profiles. These services can be supported over a shared, dedicated or separate infrastructure(s) depending upon the commercial models of ownership.

The Quality of Service profiles and service types that can be supported over 5G may include the following:

1. **Low bandwidth (narrowband) and high-volume services** – such as Machine to Machine (M2M) interactions.
2. **Low delay (latency) and high reliability services** – such as vehicle navigation.
3. **Real-time Broadcast services** – such as real-time video streaming.
4. **Real-time interactive services** – such as interactive gaming and virtual reality services.
5. **On-demand and variable volume services** – this includes historic (best-effort) internet services and on-demand movies.
6. **Delay sensitive & highly reliable services** – this can include communication and management services for utilities, railways, emergency services, etc.

It is believed that the next wave of services that consumers will adopt will include real-time broadcast services over mobile portable devices. This can only be effectively supported if Multimedia Broadcast and Multicast Services (MBMS) are adopted within the mobile core and access infrastructure – that will offer better cost benefits in offering and consuming these services.

Standards are currently being developed that will allow 5G services to be offered over satellite access technologies. It is important that we keep track of these developments, as this will offer greater land mass coverage for services to parts of New Zealand where cellular coverage is not supported. This may also allow virtual cellular service providers to compete in offering consumer services - without the need for large infrastructure investments. However. This may require a heavier dependency on satellite earth stations.

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

The 5G architecture is designed as a multi technology capability that does not fit into a “One Size Fits All” analogy that has previously been offered by many cellular operators & service providers.

It is believed that competition is necessary at the Retail level by having a clear separation of the 5G Access network and retail service providers – in a similar way to that offered for fibre broadband services via the governments Rural Broadband Initiative (RBI) & Ultrafast Broadband (UFB) investment programs. This model will allow Retail Service Providers to offer competitive and innovative services to consumers.

Competition at the retail level, also comes with its own risks of anti-competitive practices by lobbyists, large and influential operators. We would suggest that the Commerce Commission ensures that fair and balanced market controls are maintained to avoid monopolies from forming that either push out competition or have a large control of the end-to-end service offerings.

It is recommended that the 5G capabilities are separated between the 5G access providers and retail service providers (in the same way UFB was done) and that no single 5G access provider can dominate this industry.

This may be possible by allowing multiple 5G access providers to operate in identified cities and/or national regions, and they collaborate with each other in supporting seamless service availability for retail service providers and consumers across the whole country.

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

It is important to recognise what role each of the different 5G spectrum bands will play in the overall communication capabilities, how these bands will be best offered for consumers and the impact that this will have on other industry sectors (such as the fixed/fibre access, digital mobile radio and cellular radio services).

Lower frequencies offer longer range in radio coverage, but lower bandwidth capabilities. It is therefore recommended that the 600MHz spectrum be best utilised to provide broader cellular coverage to support urban and rural areas in ensuring this frequency is best utilised in providing the best “Land Mass Coverage” as opposed to “Population Coverage”, in best serving consumers in all areas where they are expected to live, work and travel.

Economics, historically determine where cell sites are situated in providing a justifiable Return on Investment (ROI). With newer and leaner ways of deploying virtual communication technologies, many of these barriers may be breaking down in justifying the deployment of new cell coverage sites in these areas (that were not previously economical).

Q4 – What aspects of these 5G regulations are most important for 5G?

Over the last two decades trends have moved from consumers using fixed access to wireless communication mediums. This has meant that consumers have a higher dependency on their cellular services with no other alternatives available to them.

Regulation should consider that service reliability and availability is being reasonably maintained from an end-to-end prospective by the cellular/5G access, transport and core service providers.

Where service failures occur, there should either be adequate cellular coverage available from neighbouring sites (to ensure that essential communication services are available for consumers) or where there adequate (overlapping) coverage is not available that the service restoration times are minimal - to allow consumers to feel a sense of wellbeing and support for their social/economic needs.

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

This band would be ideal in the initial launch for 5G services.

The 3.5 GHz would be ideal in offering wireless broadband services to both fixed and mobile broadband consumers. However, 5G services should also be offered for other service types (as identified in Q1 above) and different access mediums.

Before assigning the 3.5GHz band (and other bands) for use for 5G services, it is recommended that MBIE undertakes an impact assessment to understand what and how these band will be used in offering communication services to consumers and its impact on other competing communication technologies. If there is a likely impact on these other technologies, measures need to be put into place to ensure these competing industry sectors are protected from anti-competitive sales opportunities in offering broadband services and best value to consumers.

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

See comments in Q5 above.

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

We do not believe that this band should be considered for high priority for allocation to 5G due to the full maturity of the 5G spectrum allocations and the intended purpose of this spectrum by the 5G community.

The 5G standards that are being developed by 3GPP, also includes capability of 5G services being offered and supported by satellite coverage. It is important that this is taken into consideration when re-assigning this band for any other purpose.

Industry trends indicate that there will be a large deployment of communication satellites, these may offer 5G coverage services and this band would be ideal in supporting 5G satellite services.

The 26GHz band offers interesting opportunities in innovation in supporting high bandwidth services and with low latency, this allows new market segments to develop new and innovative services/applications. This segment still needs to evolve for its timing to be ideal.

This band would also be ideal for offering localised wireless broadband services that may cannibalise fibre access services.

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

At this stage we are not considering in using this band, however if the opportunity and funding allowed we would consider testing this band within the scope of the 5G capabilities.

This band would be ideal for trialling fixed broadband services, M2M and internet of things (IoT). These are best supported using technologies such as network slicing to ensure the correct quality of service can be supported across these differing communication service types under extreme weather conditions.

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

Any decisions on the use of 5G spectrum should meet international and regional standards and agreements to ensure that standard 5G compatible mobile terminals will be supported when 5G

services are available. The allocation of these spectrums should be with understanding of its support for 5G services at the appropriate time.

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

It is understood that many major vendors are already exploring the development of 5G terminal devices as early adopters of pre-final 5G standardisation.

The 5G New Radio standards (by 3GPP) and radio spectrum standards (by ITU and regional radio spectrum agencies) are expected to be finalised during 2018-to-2019. With this understanding it is expected that fully compliant 5G terminals will be available by the end of 2019.

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

Not at this stage, without performing detail assessment of industry trends.

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

No comments.

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

No comments.

Q14 – is there a need for more sub 1 GHz spectrum for IMT/5G?

No Comments.

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

No Comments.

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

It is recommended that this spectrum has allocation for public safety operations, transport services, utilities and other commercial use.

If the 600 MHz spectrum is likely to form part of the 5G assignment (IMT), then this should be assigned to new operators who are likely to promote competition and offering innovative communication solutions.

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

We would recommend that the 5G licences be allocated based on Administrative Allocation.

We would like the 5G spectrum to be made available to 5G Access Providers, who will provide wholesale 5G access services to all Retail Service Providers on an equal basis. This will allow fair availability of communication services across all Retail Service Providers.

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

We believe that regional and national providers should be treated with the same policy for their licence agreements. However, policy should ensure that dominant (national) operators are not dominating regions through anti-competitive measures or unfair practices of operation.

With this agreement we believe that 5G spectrum should also be licenced on a royalty's basis, that will allow part of the revenue earned (by the 5G Access providers) to be shared with government.

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

It would be best if no technology was specified for these bands, this will allow the bands to evolve over time.

There may however, be a need to check that these bands are being realised in accordance to their intended purpose and used effectively across their intended coverage areas.

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

This section of the report has implied that 4G operators will deploy 5G also, which may not always be the case.

Greenfield 5G access providers or operators may not be able to deliver under aggressive timelines and therefore consideration needs to be given for these providers.

Under both circumstances time limits should be set for achieving 1) Land Mass Coverage & 2) Population Coverage.

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

Where conditions of a user's 5G license agreement are not being met, then agreement should be defined that will allow initial extension of time, termination of part/full agreement, further failure to

meet its obligations can result in withdrawal of part/full license agreement with the intent to re-assign part/full license to other operators that may be authorised or interested.

It may also be possible for operators to re-assign their licences to other access providers/operators with agreement with MBIE (provided they meet the terms of operation and competition). Where licenses are being partially/fully re-assigned to other operators/access providers, these may include financial costs settlements between the parties involved under fair terms.

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

We do not believe the conditions in principle should be different. However, where a dominating operator wishes to take over a re-assigned licence, then conditions should be in place to prevent a single operator becoming a dominant or monopoly in this industry sector or an operator that may influence consumer choice and competition.

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

It is preferred that the spectrum can be assigned to a 5G wholesale access provider, for specified cities/regions, who are able to equally provide 5G access services to all Retail Service Providers (for their customers) in a fair and equal manner.

We do not believe that any limits should be imposed other than ensuring that fair competition is present, and no single service provider or access provider is able to dominate or monopolise the market nationally or in its entirety of ownership.

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

We recommend that there is fair competition in the market and no single party can dominate or monopolise the market segment. In our opinion a market share greater than 40%, is considered as being dominating.

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

It is recommended that the spectrum be assigned over a 15-year period.

The wireless communication industry goes through a change in technology every decade. It is important that any company that is assigned the spectrum can recover its investment and take financial advantage over a reasonable period.

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

It is important to determine the best deployment of 5G services (as being TDD or FDD) as this will provide the best strategy in how the 5G spectrum will be supported for consumption and the technology that will support it.

FDD may not be ideal for asynchronous bandwidth services and TDD would offer better flexibility in supporting such services.

It is difficult to assess this decision and we would recommend that this decision be aligned with the regional band allocation recommendations and an assessment be done on how vendors/industry would prefer in deploying 5G services.

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

No comments

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

No comments.

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?

As 5G has multiple purposes of use, adjacent operators are likely to have issues in operating with adjacent bands. Bands may be technology neutral but may still have a need for high power outputs that may interfere with adjacent bands, in these cases it is recommended that a guard band be introduced to minimise signal interference.

An example of this could be where 5G maritime, 5G public safety and 5G railways all operate on adjacent spectrums with varying radio power output needs, it would be better to have a guard band present than require control in cross spectrum band management rights.

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

Cross band interference should be managed regardless of FDD or TDD.

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

It is difficult to respond to this questions without understanding of the likely use case scenarios for interference within the same band.

Also see response above in Q29.

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

The 3.5 GHz spectrum would be best served in offering 5G services as opposed to non-5G services.

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

If existing operators are willing to operate at other frequencies, then they should be offered compensation (in moving to these bands), so that they offer like-for-like service capabilities.

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

No comment.

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?

It would be best if the rollout of these spectrums can be assigned by 2020 with an understanding the 5G standards will have been agreed for the radio spectrum by this time and its use.

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

It is recommended that MBIE and Radio Spectrum Management undertake an assessment as to the use cases and business benefits for this and other proposed 5G spectrum availability and how they will be best supported in our global region by vendors, service providers and terminal manufacturers.

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

See comments above.

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?

This is not recommended at this stage without a full understanding on how this spectrum best serves 5G communication services and its relationship with other proposed 5G bands. We need to ensure that we are not over subscribing spectrum bandwidth without a proper justification on how these bands will be utilised.

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

See comments above.

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

No comments.

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

We would like to see 5G services being made available in these bands, with agreement with IMT for our global region. This agreement with IMT is essential to ensure that standard terminals are regionally available that will be supported on these bands. These bands also offer the coverage and bandwidth capabilities that are suitable for a large consumer base.

When these bands are available, they should be primarily considered for greenfield 5G access providers and service providers with an understanding that they will be used in supporting national communication services.