Managed Spectrum Park Review and Regional/Non-National Allocation

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Executive Summary

Thank you for the opportunity to provide feedback on RSM's Managed Spectrum Park (**MSP**) Review and Regional/Non-National Allocation discussion paper (**the discussion paper**).

2.6GHz Managed Spectrum Park

The discussion paper highlights a number of concerns with the operation of the 2.6GHz MSP, and whether the anticipated outcomes have been achieved. The current arrangements have not led to the anticipated co-operative approach to using the park, and the allocation process has led to "winner take all" outcomes.

However, in considering the operation of the park, the Ministry should also consider the impact on adjacent management rights holders, and technology and market trends. It is increasingly difficult to sustainably differentiate between a regional or niche provider and national operator, both are potentially using the same technologies and targeting the same end users.

In terms of the 2.6GHz MSP, it is also increasingly more difficult to manage interference between TDD systems deployed in the park and adjacent FDD systems. The 2.6GHz FDD band is being used more intensively in provisional towns and rural fringe areas and, accordingly, it is more difficult to sustain geographic separation to mitigate potential interference.

It could also be difficult to manage interference between MSP providers especially if they are un-synchronised and have different frame structures.

We recommend that the Ministry consider migrating MSP users to other more suitable bands such as the 3.3GHz-3.4GHZ band, or potentially the 3.8GHz-4.2GHz band.

Other Regional/Non-National Allocations

The Ministry has also requested high-level input on the way in which regional/non-national rights are managed, including preferred allocation methods and implementation requirements (if any).

We agree that the discussion paper asks the right questions – how to allocate spectrum and how to preserve anticipated outcomes in a dynamic market? These are significant issues that cut to the purpose of regional allocations with implications for all rights holders.

However, answering these questions relies on key issues being resolved such as the purpose of regional allocations in the future market, and how the regions are defined. We believe these questions should be considered through a separate and further consultation.

Introduction

1. Thank you for the opportunity to provide feedback on RSM's Managed Spectrum Park (**MSP**) Review and Regional/Non-National Allocation discussion paper (**the discussion paper**).

2. In the discussion paper you note that although the 2.6GHz band MSP is working well for many companies that have gained rights, it has a reputation as an 'untidy' licencing regime where it can be difficult to do business. The administrative load for RSM is also much greater than was originally envisaged.

3. Further, RSM anticipates allocations of spectrum to be used by regional/non-national networks, including Wireless Internet Service Providers (**WISPs**) networks. For example, RSM has recently considered allocation of C band spectrum to regional providers.

4. Accordingly, RSM is:

    a. Considering whether there is a need to amend the way in which spectrum is allocated in the 2.6GHz MSP, and whether to amend requirements for technical license parameters to provide for better use of spectrum.

    b. Seeking high-level input on the way in which regional/non-national rights are managed, including preferred allocation methods and implementation requirements (if any).

Proposed approach

5. We support the Ministry considering how managed park and regional rights spectrum should be allocated and used.

6. The Ministry notes that the MSP was established to encourage flexibility and innovation by providing a compromise between dedicated spectrum, which is costly, and general user licenses, which do not allow companies control of the quality of service. There were no specific requirements or restrictions on the technology used by Licensees and, rather than relying on in-depth technical rules to manage use, the MSP is based in part on an assumption of collaboration as the primary mechanism to allow multiple users within the 'park'.

7. The discussion paper observes that the approach has had mixed success for MSP users. We believe that the current approach is also at odds with the changed technology and market context from when 2.6GHz managed park was established:

    a. Compatible 3GPP standards and equipment are increasingly used by both regional and national providers. For example, regional providers are using 4G standard technologies that were once the preserve of national providers, and 5G NR technologies are designed to work seamlessly across corporate, regional, and national networks.

    b. There is significant - and more intensive - spectrum use by TDD systems. While TDD technologies are less susceptible to interference where standardised equipment (i.e., 3GPP compliant) and timing/synchronisation is used, there is incompatibility between FDD and TDD systems. This means, for example,

        i. That increased co-ordination is necessary across shared and assigned bands, and

        ii.   Geographic separation as a means to manage interference is less effective as other mitigation tools- for example, national operators increasingly use higher frequencies to provide services to provincial towns and rural customers. Our calculations show that an FDD base station can result in blocking of the MSP receiver in the centre band gap and to avoid this > 100 dB of isolation/coupling loss is needed (i.e., a distance of 18.5 km using free space propagation).

    c.   <u>Technology and market boundaries are blurring.</u> The boundaries between markets served by regional providers and those by national providers is blurring, and this means it is more difficult for the Crown to differentiate price and technical obligations across operators. For example, a national operator cannot be expected to incur significant costs to acquire spectrum when its competitors pay minimal prices.

8. Facing these challenges, the current approach to managed parks is unlikely to be sustainable going forward and will need to change.

2.6GHz Managed Spectrum Park

9. The Ministry has requested comments on whether the co-operative approach applied to the current MSP remains feasible. The discussion paper notes several challenges with the current approach:

    a.   As bandwidth requirements have increased so that multiple co-located services are no longer feasible, and the allocation process has led to a "winner take all" outcome.

    b.   Some applicants have taken advantage of the lack of technical rules by lodging licences that are very sparse on technical detail, and

    c.   The nature of the MSP allocation process means that licensees often implement something that is different from their initial licence application.

10. Accordingly, the Ministry is considering changes to the allocation process, including alternative methods that better manage sharing between parties and exclusive allocations.

11. While the options being considered can mitigate implementation concerns, they also appear to be at odds with one or more purposes of managed parks and question the need for MSP arrangements. For example, establishing exclusive regional franchises seems inconsistent with a spectrum park which aims to support multiple access seekers (albeit we appreciate that this might be the unintended effect of current arrangements).

12. In addition to the impact on MSP users, we recommend that the Ministry also consider the implications for neighbouring rights holders. We have concerns relating to co-ordination and interference with users of neighbouring bands. These adjacent national MRs are now used extensively for broadband services.

13. The MSPs were introduced for the 2.6GHz band that - at the time - allowed for FDD and TDD co-existence. The band plan had essentially two parts, an FDD part and a TDD part essentially in the centre band gap. Anecdotally a 5 MHz guard band was considered between FDD and TDD. This arrangement only worked when the FDD and TDD base stations were in geographically separate areas as the guard band is inadequate to provide an I/N = - 6dB. To do so a large coupling loss is needed. Furthermore, to avoid receiver blocking an appropriate isolation is also required. The coupling loss in practice will be the max of the two. This was fine when the 2.6GHz band use was only in urban areas and MSPs operated in provincial rural areas.

14. Insofar as TDD to FDD interference is concerned to some extent isolation is provided by the FDD duplex filter but there are no duplex filters in TDD.

15. However, the use of FDD 2.6GHz band is increasing and is now not limited to urban areas. Provincial towns (the areas where MSPs work) are also becoming candidates for use of this band and co-ordination between FDD and MSP uses will consequently become increasingly difficult.

16. There is no easy answer for this co-ordination. FDD and TDD systems do not co-exist as this makes uplink (**UL**) sit beside the downlink. Co-existence, if it has to be done, must typically be based on achieving an I/N value of - say - 6dB. Given this scenario, allocation to an MSP in only a remote area where the co-existence criteria are realisable is an option to consider.

17. Therefore, we recommend that RSM consider migrating MSP users to a different band (except possibly remote deployments where geographic separation remains feasible), potentially the planned 3.3GHz to 3.4GHz band for regional providers or a portion of the 3.8GHz to 4.2GHZ band being considered for this purpose[1]. The centre band could continue to be used for low power indoor uses such as radio microphones.

18. Whatever approach the Ministry takes, it could also consider more oversight of deployments in shared bands by, for example, mandating 3GPP equipment should be used and synchronisation. This would facilitate co-ordination between MSP users and also with users of adjacent bands, and promote more efficient use of MSP band spectrum.

Question 1: Do you think that co-operation is feasible in the Managed Spectrum Park?

19. Given the technical limitations of the MSP band identified in the discussion paper and the commercial drivers of MSP users, it is difficult to see how co-operation is feasible within the current framework.

20. If the Ministry decides not to move the users to a more suitable band as we recommend, then RSMs current "hands-on" approach will likely need to continue. Mandating standard compliant equipment and synchronisation will reduce interference concerns and ensure better use of the spectrum. However, MSP users' commercial incentives to create exclusive rights through MSP processes remain, undermining the desired co-operation.

Question 2: When considering **[exclusive]** *MSP spectrum allocations, what allocation method(s) would be preferable to you?*

21. The discussion paper asks that, if exclusive allocations were anticipated, what allocation method would be preferred, i.e., whether that is an auction, tender, first in, lottery or administrative allocation.

22. We agree with the discussion paper that the allocation method should seek to promote the most efficient use of the spectrum. We believe the allocation methodology should also be provider neutral and not undermine competitive markets. For example, MSP users should face the same spectrum access costs than providers who access spectrum through alternative approaches such as MR auctions.

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[1] For example, Ofcom set out its proposed approach for using this band in *Enabling wireless innovation through local licensing: Shared access to spectrum supporting mobile technology* in July 2019 https://www.ofcom.org.uk/__data/assets/pdf_file/0033/157884/enabling-wireless-innovation-through-local-licensing.pdf

23. In which case, we agree the first in first served and lottery methodologies are unlikely to lead to an efficient allocation and are open to gaming. Further, a price-based approach should always be preferred where there are competing demands for spectrum.

24. In this case, we believe that, if RSM anticipates users having exclusive use of park spectrum, then this is better done through anticipated regional licences in the 3.3GHz to 3.4GHz band, and potentially 3.8GHz to 4.2GHz band, i.e., not at 2.6GHz.

25. The Ministry should not be looking to guarantee exclusive use or tenure in the current MSP 2.6GHz band. Given the nature of residual park use as proposed, an administrative allocation approach would likely continue to better deliver the residual objectives of the MSP and wider policy goals.

Question 3: What are your thoughts on the level of technical requirements/rules in relation to MSP licenses?

26. We agree the Ministry should tighten licence parameters, better specifying the location and coverage of the transmitters and technologies which could be used, i.e., specifying that equipment should be 3GPP standard compliant and synchronised.

Other Regional/Non-National Allocations

27. The Ministry notes it expects to allocate other spectrum bands for regional/non-national use in future and, in preparing for this, it is considering:

   a. The best way to manage the allocation process, implementation requirements, co-operation, and inter-regional interference for this regional/non-national spectrum (similarly to the MSP).

   b. The feasibility of competition at a regional/non-national level, and whether existing service providers should have priority over new entrants when it comes to allocation of new frequencies, and

   c. In order to protect regional providers such as WISPs, how to define what constitutes a regional versus national provider. For example, is there a threshold for the number of regions held by any one provider before that provider may be considered national?

28. The discussion paper asks a series of questions to explore these issues. We agree that these are significant issues, and the discussion paper questions are the sorts of questions that will need to be resolved to agree an approach.

29. However, at the same time as resolving for current MSP concerns, the wider implications should be considered. For example:

   a. The regional/non-national approach could apply to any number of providers beyond current MSP users, including WISPS in the C band, industry verticals or campus environments, and also future non-public networks in other bands, and

   b. As noted above, the distinction between regional and national provider technologies deployed, services offered, and customers served is blurring, and the Ministry should ensure that it does not distort these markets.

   National providers have made significant investments in current spectrum and networks - and expect to invest significantly more in the future – and this investment

would not have occurred if their competitors could access functionally equivalent spectrum at little or no cost.

30. Accordingly, it is equally as important that the Ministry, in protecting regional provides, also considers other potential spectrum users, and preserves the ability for national providers to continuing investing in networks and customer services.

31. These are significant questions that should be consulted on further. However, at this stage, key decisions that enable these questions to be resolved have yet to be made. For example, what the purpose of regional allocations is?   Whether meaningful differentiation between regional and national providers is possible? How large and how many regions will there be?

32. Accordingly, we believe these questions should be considered through a separate consultation.

Question 4: What are your thoughts on the best method(s) for future regional/non-national spectrum allocations?

33. As noted above, the allocation methodology should follow the purpose and technical requirements of the regional allocation. For example, the best method for a future regional allocation to WISPs for the purposes of serving remote customers would differ from that for providers aiming to provide broadband services to regional or main centres.

34. At this stage, it is unclear what the purposes of regional/non-national spectrum allocations will be and, therefore, how to allocate spectrum for those purposes.

35. In all cases, it is important that MBIE ensure technical compatibility with the licences for regional/non-national operators and the MNOs. In a TDD band allocated to MNOs, the regional/non-national allocations must be time synchronised with the MNOs and also have compatible frame structures. Additionally, hardware deployed should be 3GPP compliant. Spark is aware that 5G advanced may result in new features that could have an impact on, and/or result in enhancements to, the frame structures. Whilst the MNOs deploy 3GPP compliant equipment and will keep in step, these other operators may not. Compliance with 3GPP enhancements is desirable.

36. In any case, then, clearer synchronisation policies, and clearer dispute resolution processes, will need to be provided for.

Question 5: Should priority be given to incumbents over new entrants?

37. The license agreements set out the licence term and it is unclear why further commitments are required. Further, at this stage it remains unclear what the purpose of proposed regional allocations is and, accordingly, whether the incumbent or new entrant providers would be consistent with that purpose.

Question 6: Is the market big enough to support sub-regional competition?

38. We anticipate that over time there will be a range of national, regional and location specific users, across existing operators, industry verticals and non-public networks, i.e., for campus or business park operation.

Question 7: Should spectrum allocation rules be used to limit consolidation (mergers or take-overs) of regional players?

39. We anticipate that - if the Ministry decides to offer regional rights - a range of measures and protections will be necessary to ensure the anticipated outcomes are delivered and avoid spill-overs into other markets.

Question 8: What are your thoughts on how to protect regional rights for regional use?

40. See question 4.

[End]