Submission in response to ACMA Options Paper

Planning for wireless broadband use in urban areas in the 3400 – 3475 MHz band

Public Version

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EXECUTIVE SUMMARY

1. Optus welcomes the opportunity to provide feedback to the Australian Communication and Media Authority's (ACMA) Consultation Paper: *Replanning of the 3700-4200 MHz band Planning for wireless broadband use in urban areas in the 3400 – 3475 MHz band* (the Options Paper).

2. We note that the progressive release of spectrum in various segments in the band and attempts to maximise the utility and value of that spectrum are to be encouraged and supported. While there are many challenges to overcome in realising this outcome for the urban excision areas, the overall approach and sought-for outcomes are viewed positively by Optus.

3. The ACMA's proposed changes to the technical frameworks associated with the urban excision are acceptable to Optus, with some clarification required for the operational aspects of the grandfathering arrangements for NBN's devices.

4. Optus supports the rationale and arguments set out in the AMTA response to this options paper and refers the reader to that document for information on many of the principles applied when formulating both Optus' and AMTA's submission to this consultation.

5. Optus supports the use of Option 4 with Option 2 in the 3460 – 3470MHz band, or the use of Option 1. We have a slight preference for Option 4.

6. Optus acknowledges that there is a "no change" option that allows the ACMA and other potential licensees to wait for technology and interference management techniques to advance to a point where the aims of the ACMA are more easily achievable. Optus would not oppose this outcome.

7. Optus does not support the adoption of either Option 2 or Option 3 as, neither supports the deployment of macro base stations.

8. Optus does not support Option 3 on the grounds that it introduces to many frequency and geographic boundaries, reducing the utility of the spectrum and unnecessarily complicating interference and spectrum management for all licensees.

9. Option 3 as a subset of Option 4 in the 3460 – 3470MHz band is not supported.

10. Optus shares the concerns regarding the use of AWLs as other members of AMTA. These views are reflected in the AMTA response to the Options Paper.

KEY PRINCIPLES ADOPTED

11. Optus has formulated its approach in responding to this consultation alongside the other MNO members of AMTA and the views below largely reflect the agreed position between those AMTA members. Some emphases may differ, but the methods of arriving at the proposed outcomes are the same as those adopted by other AMTA members.

12. Mid-bad spectrum is scarce, and hence valuable, even with tight technical constraints limiting deployment. Due to its scarcity, it is vital the technical configuration is optimised to serve the greatest population with the greatest potential benefit, rather than optimised to serve bespoke, localised solutions.

13. In this sense, we agree with the ACMA's statement that, with respect to implementing Option 4 with Option 2 in the restricted cell portion between 3460-3470 MHz : "It supports a greater density of deployments and spectrum utility in the 3460–3475 MHz frequency range. It would also allow an operator to combine this spectrum with spectrum below 3460 MHz to deploy services with a larger contiguous bandwidth".

14. Mixing use cases (e.g., fixed wireless, mobiles, localised deployment) within a sub-band leads to under-utilisation of spectrum due to the requirement for greater interference protection. This is delivered via mechanisms like guard bands and (indirectly) dead zones, power limits, antenna pointing restrictions, synchronisation requirements, etc., all leading to reduced utility of the spectrum. Hence, homogeneity should be sought where possible, i.e. allocating all the 5G mobile networks together in the same spectrum space, all the localised deployments together, etc.

15. It could be considered a sub-optimal planning outcome to have bespoke, localised deployments in both the Urban Excise and in 3800-4000MHz bands currently open for technical framework development. Planning guidelines should be created to show where the ACMA believes different use cases should reside. Technical parameters can then be optimised based on these groupings.

16. While it is understood that the ACMA wishes to discuss strict technical matters only in the TLGs, without discussing how allocation will be carried out in detail, unfortunately the allocation process can affect how technical matters could or should be considered.

17. Given the relatively large amount of spectrum available above 3.8GHz and due to the complexities of operating in the urban excision areas and band, Optus recommends that allocations take place above 3.8GHz before they are considered in the urban excise space.

18. Optus shares the other AMTA members' concerns about the use of AWLs for LA WBB in high demand areas. These arguments have previously been presented to the ACMA via the 3400-4000 MHz TLG and are reproduced in the AMTA response to this paper under the section titled "AMTA concerns over AWLs for LA WBB".

19. Optus is of the opinion that, over time, technology will evolve to better compensate for interference. We also assume that NBN's FWA will be upgraded to 5G with AAS at some point in the next 5-10 years. As such, a technical arrangement that can accommodate future macro base station deployment is required (even if it is not technically possible today), without having to repeatedly revisit licence conditions, s.145 determinations, RALIs and RAGs.

20. We prefer spectrum licensing to AWL as the licensing mechanism for the Urban Excise, again, because of the scarcity of the spectrum and the likelihood of longer duration

licensing, bringing certainty to investment and enabling the spectrum to achieve highest value use.

21. Furthermore, if another restack exercise is required in the future to consolidate the spectrum holdings of users across 3400-3800 MHz, spectrum licences will facilitate secondary trading; AWLs would not.

22. In the event that the 3800 – 4000MHz allocation does not take place before the urban excised areas allocation, Optus can support the ACMA's statement regarding Options 1, 2 (and therefore also Option 4) that "it is desirable to combine the release of spectrum with allocation processes for spectrum in the 3700–4200MHz band". If area-wide licensing is employed, either as the sole mechanism or in combination with spectrum licensing, the AWL release should occur shortly *after* the auction of metro area spectrum within the range 3700-4200 MHz (as was the case for the regional/remote 26 GHz band), or at a minimum, coincidentally with said auction. It must not precede the auction.

23. The technical definition for the Restricted Use (RU) band needs to be sufficiently flexible such that, if MNOs end up on both sides of the RU band, and can coordinate as they do today at frequency boundaries between 3475-3700 MHz, then operation in the RU band is carried out seamlessly as part of the usable Urban Excise spectrum. However, if another use case is in the Urban Excise immediately below the RU band, then then RU band acts as a guard band.

24. In this sense, we agree with the ACMA's definition of the RU band in both footnote 3 and under Desirable Outcome 3, which reads "In context of this paper, a restricted use band refers to a defined frequency range were either no operation is permitted, or operation is only permitted under certain conditions (e.g., agreement between operators)". This is further extended to clarify that synchronisation is a second condition under which operation could occur, in addition to agreement, i.e. "Operation within these restricted use bands could be permitted via negotiation with the adjacent band spectrum licensee or if operation can be synchronised with the adjacent band licensee".

RESPONSES TO ACMA QUESTIONS

Proposed amendments to the 3.4 GHz technical framework

s.145(4) Determination

Q1 – Comment is sought on the draft amendments to the s.145(4) Determination contained at Appendix B (separate attachment in key documents section of this consultation).

Should additional measures be included to also grandfather device registrations when minor modifications are made? If so, what minor modifications should be permitted? For example, changes that results in the same or lower horizontal radiated power for the purposes of device boundary calculations? Alternatively, changes that result in the same or smaller device boundary as originally calculated when registering a device?

25. Optus agrees that the general amendments to the s.145 Determination make sense to maximise utility of the band in the excised spectrum areas, namely;

    (a) Change the band definition to 3.4 – 3.7GHz

    (b) Non-AAS LOP = -98dBm, AAP LOP = -90dBm

    (c) Adopt 3" DEM

    (d) Radial increment distance changes to 100m

    (e) Number of increments along radial path to be calculated changes to 1080, resulting a radial path of 108km

26. The use of a grandfathering clause for the continued operation of NBN devices that would not ordinarily pass s.145 is a reasonable approach to take to ensure continuity of service for NBN fixed wireless users.

27. It is unclear from the information available how the specifics of grandfathering would operate in practice as and when NBN wishes to make changes to registrations on the devices that would not ordinarily pass s.145.

28. Optus urges caution in the definition of "minor modifications", however the suggestion of allowing only changes that result in the same or smaller device boundary from the *latest* registration that passed s.145 seems reasonable. Its aim should be to satisfy the needs of a licensee inside the urban excised and their requirement to know the characteristics of their radio environment without NBN degrading their interference conditions by making unconstrained changes to their devices and associated registrations.

29. An exemption for NBN devices from meeting the DBC at the urban excision boundary is a prerequisite for ongoing operation of NBN services in the areas near the urban excision boundaries.

Receiver spurious emission limits

Q2 – Comment is sought on the proposed changes to receiver spurious emission limits on 3.4 GHz spectrum licences detailed in Tables 4 and 5 for non-AAS and AAS receivers respectively.

30. The receiver spurious emissions limits proposed by the ACMA are supported by Optus.

RALI MS44

Q3 – Comment is sought on the draft amendments to RALI MS44 contained in Appendix C (found separately in key documents section of this consultation).

31. Optus supports the suggested changes to RALI MS44.

Options for use of spectrum in urban excise areas

Identification of options

Q4 – Comment is sought on the options developed for use of spectrum in urban excise areas.

32. The options developed by the ACMA attempt to plot a difficult path between protecting NBN's users and ensuring that the spectrum excised from NBN's licences retains some utility for potential licensees.

33. Optus contends that this aim, while admirable, may be difficult to realise within today's technological constraints and the nature of NBN's network design and operating model.

34. Of the options proposed, those that most closely adhere to existing spectrum licence conditions and technical frameworks would be most appealing.

35. Interference management between NBN and potential urban excise licensees as well as interference management between urban excise licensees are the most difficult issues to resolve.

36. Maintaining a degree of future proofing in the band, by not constraining licensees to a specific type of deployment, is a preferred approach.

37. Optus' response and general views on the options presented are informed by this, along with the principles developed with the AMTA membership.

38. Optus acknowledges that there is a "no change" option that allows the ACMA and other potential licensees to wait for technology and interference management techniques to advance to a point where the aims of the ACMA are more easily achievable. Optus would not oppose this outcome.

Possible interference management criteria

Q5 – Views are sought on the possible interference management approaches for both co-channel mechanisms (including ducting) and adjacent channel mechanisms (including adjacent band coexistence) contained at Appendix E.

39. Optus agrees with the adoption of the same unwanted emissions limits as for existing 3.4GHz licences.

40. The existing synchronisation fallback requirement as per clause 11 of licence schedule 4 in all 3.4GHz licences should be retained as per Option B.

41. Optus does not support the introduction of a secondary synchronisation fallback requirement in this or any other part of the 3.4 – 4.0GHz band.

42. Optus concurs with the exemption of transmitters from the DBC for cases where the existing NBN device boundary crosses the urban excise area boundary.

43. Optus agrees with implementing an approach that protects NBN's UEs outside the urban excision areas from new registrations within the urban excision areas. The best method for achieving this is, as yet, not clear (pfd, C/I and the values associated with the chosen method).

44. A reciprocal arrangement could be considered for the protection of UEs within the urban excise areas, although there is an argument for new NBN registrations being required to meet existing DBC as per s.145. This has the effect of maintaining the utility of the spectrum, as allocated, within the urban excised areas.

45. In protecting NBN's UEs from interference from registered devices within the urban excision areas, the ACMA could consider defining the areas within which any interference criteria are to be applied by selecting the premises or serviceable locations defined for NBN fixed wireless service and adding a small buffer (in the order of 100m) around those locations to provide licensees within the urban excised area a well-defined and manageable area over which any UE protections are needed.

46. Any polygons or areas associated with the areas to be protected should be a reasonable and realistic representation of the areas needing protection and provided and maintained by the NBN. First-in-time principles should apply to the protection criteria should the NBN protection areas change after devices are registered inside the urban excise areas.

47. This approach would avoid any overly onerous requirements on urban excise are licensees and ensure that protections are afforded to locations where NBN fixed wireless premises actually are, rather than arbitrarily protecting vacant land, forests or other uninhabited spaces.

48. As agreed in the TLG, Optus agrees with the concept that NBN UEs are not deemed to cause interference to urban excised are a licensees' registered devices. Interference management Option B seems to be the best way to achieve this.

49. A reciprocal arrangement for urban area licensees should be adopted whereby they are not deemed to cause interference to NBN registered devices outside the urban excise area. Again, the adoption of Option B is favoured.

50. Optus strongly supports the proposal that no changes are made to existing spectrum licensees operating generally above 3475MHz or above 3442.5MHz in Regional WA East

51. NBN's requirement and intent to deploy more advanced and efficient network technology (5G, AAS, etc.) in its fixed wireless network is encouraging. Optus agrees that the licence conditions should support such advancements in technology, particularly those that improve spectrum efficiency and interference outcomes. As such, Option B is supported, as any "no protection" clauses are generally not acceptable to spectrum licensees.

52. Optus supports the adoption of Option B; whereby restricted use bands are used. We also strongly support the ACMA's view that the synchronisation requirement should not be mandated between 5G users operating above 3475MHz (Regional WA East as an exception per above) and 4G licensees operating below 3475MHz. The adoption of a restricted use band reflects the position taken by Optus and AMTA in the ongoing 3400 – 4000MHz TLG.

Assessment of options

Q6 – Comment is sought on the desirable planning outcomes for use of spectrum in urban excise areas.

53. Optus does not support Option 3 or Option 2 for spectrum use in the urban excise areas.

54. Option 3 represents the worst of all worlds, resulting in multiple spectrum and geographic boundaries within the excised areas, complex interference and spectrum management issues and potentially highly inefficient use of the available spectrum. This option also denies any possibility of macro deployments in the future.

55. Optus contends that combining Option 3, in operation above 3460MHz, with Option 4 would also result in poor spectrum outcomes and does not support its introduction under those circumstances.

56. Option 2 differs from Option 3 only in that the geography cannot be further split from the existing boundaries. This option also denies future macro deployment.

57. Option 1 and Option 4 (with Option 2 in the restricted cell portion from 3460 – 3470MHz) – "Option 4(2)" – both have merits and Optus does not have a clear preference for either.

58. Option 1 and Options 4(2) both allow for macro and small cell deployments, protect spectrum licensees operating above 3475MHz (Regional WA East as an exception per above) and ensures that new entrants in the urban excised areas of the band would have to synchronise or agree with Optus if wishing to operate above 3460MHz.

ACMA preliminary preferred option

Q7 – Comment is sought on the ACMA's preliminary preferred option. Are other options preferred, and if so, why?

59. Optus agrees with the ACMA's selection of preferred option: Option 4. This is entirely conditional on the ACMA adopting Option 2 in the 3460 – 3470MHz band.

60. If, under Option 4, Option 2 is not adopted in the 3460 – 3470MHz range, Optus will default to Option 1 as the preferred choice.

61. Optus acknowledges that there is a "no change" option that allows the ACMA and other potential licensees to wait for technology and interference management techniques to advance to a point where the aims of the ACMA are more easily achievable. Optus would not oppose this outcome.

62. Optus considers Options 2 and 3 unworkable from an interference and boundary management perspective, nor do they support the deployment of macro base stations.