



Future use of the 3.6 GHz band – Options Paper

**Submission to The Australian Communications &
Media Authority**

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Executive summary

Vodafone strongly supports the ACMA's proposals to progress the 3.6 GHz band to the re-farming stage. It has been clear since WRC15 that the 3.6 GHz band (along with the 3.4 and 3.5 GHz bands) will be pivotal to the development of competition and innovation in mobile services in Australia. The fundamental and increasing importance of mobile services not only to Australian consumers, but also to efficiency, productivity, and innovation in key sectors of the economy means that there will be huge benefits (or opportunity costs) depending on whether Australia is able to be on the leading edge of 5G mobile deployment.

The exponential growth in mobile data usage, serious limitations on further site deployment, and the fact that the ACMA is only proposing to move to re-farming stage in Q4 2017 all mean that there is an urgent need to accelerate the process, and ultimately access to sufficient quantities of internationally-aligned 5G spectrum. Mobile operators and vendors have conducted significant 5G trials to prove the exponential increases in capacity and throughput and the far lower latency of 5G, and all signs indicate that 5G will be required to be launched within the next 2-3 years. Our initial modelling suggests that the industry requires at least 300 MHz of sub-6GHz spectrum to support early stage 5G mobile services. This has important implications for the speed of the ACMA's process, and for significant elements of the ACMA's proposals such as the transition window for existing users.

Unfortunately, the relatively small proposed allocation (125 MHz) means Australia will already be falling short in its competitive 5G needs by the time the first sites are switched on. We have indicated to the ACMA and publicly that our modelling and trials, supported by significant international vendors and the wealth of experience of our two shareholders, all indicate a need for far more significant quantities of spectrum for 5G than has been the case for previous generations of mobile technology.

To that end, the ACMA's proposed decision to postpone its consideration of other parts of the 3400-3700 MHz range, particularly NBN Co's (NBN) 75 MHz set aside of metropolitan 3.5 GHz spectrum, until after the 3.6 GHz auction appears unwarranted. In fact the evidence presented by the ACMA strongly suggests that this spectrum should be included as part of the same preliminary re-planning stage – the benefits can be determined in the same manner as the ACMA used for its *Future use of the 3.6GHz band – Highest value use assessment – Quantitative Assessment* (June 2017). There is also no evidence to suggest that relocation costs of existing users are significant given the spectrum was only set aside to facilitate fixed wireless deployment on outer metropolitan areas to serve 80,000 customers, and there is no indication that a substantial customer base has been utilising this spectrum. The ACMA ought to reconsider this matter.

In the event the ACMA maintains its scope for re-planning to only the 125 MHz in the 3.6 GHz band then it is imperative that the ACMA introduce standard administrative tools to ensure that spectrum is able to transition to its highest value use in a timely manner. The use of opportunity cost pricing has been used in other bands (e.g. the 400 MHz band) and should be applied to this spectrum. Other apparatus licences in



the 3400-3600 MHz (including spectrum set aside for NBN) must be subject to a “ratchet” on their spectrum access charges to reflect the market prices for this spectrum obtained at auction (i.e., the opportunity cost price).

Given the late stage at which the ACMA’s process is moving into gear, and the timing considerations outlined above, Vodafone strongly opposes the ACMA’s unprecedented proposal for a seven-year transition window. The ACMA’s proposed long transition might serve some private interests but is not in the public interest and as outlined below introduces a strong likelihood of gaming and serious distortions. It is clear from the ACMA’s highest value use assessment that the benefits of transitioning to mobile outweigh the costs. As such, any delay in realising these benefits is detrimental to mobile users and to the Australian economy. The revenue raised from the allocation of the 3.6 GHz spectrum is likely to be sufficient to offset even the most fulsome cost estimates associated with transitioning the existing users.

Some of the reasons cited for a seven year transition window create serious and troublesome competition and regulatory precedents. For instance, the ACMA suggests an extended re-allocation period of seven years “would allow incumbent point-to-multipoint operators a minimum of around eight years to recoup investment on installed infrastructure”. This reasoning not appear to have any clear relationship to any legislative criteria of the *Radiocommunications Act 1992* and, in our view, is likely to be contrary several criteria in the object (letters refer to part 3 of the Act):

- (a) maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum;
- (d) encourage the use of efficient radiocommunication technologies so that a wide range of services of an adequate quality can be provided;
- (e) provide an efficient, equitable and transparent system of charging for the use of spectrum, taking account of the value of both commercial and non-commercial use of spectrum;
- (g) provide a regulatory environment that maximises opportunities for the Australian communications industry in domestic and international markets.

Moreover, the rationale of licensees’ investments being used to avoid reallocation creates a dangerous regulatory precedent. It means licensees have an incentive to make investments in long-life assets even if this is not otherwise rational or efficient and then argue for extended transition of apparatus licences. This incentive leads to regulatory processes that become highly susceptible to gaming. For instance, incumbents could make non-efficient investments in long-life assets to profiteer from licensees which need to move into the band through offers to rescind their licences earlier than the extended window.

One of the most serious risks however arises from the horizontal integration of incumbent holders of this spectrum. This gives rise to an opportunity and likelihood of even more pernicious forms of gaming. For instance, the ACMA is well aware that in many cases the incumbent licence holder (e.g., of an earth station apparatus licence) is the same company which is also a prospective bidder for the spectrum licence (e.g., who proposes to use it to deploy 5G mobile services). In this circumstance, the incumbent licensee will have unfair advantages which will distort the auction beyond recognition:



- (i) at auction, the incumbent holders of this spectrum will have a major unfair advantage in valuing the spectrum. The incumbent holder, and only the incumbent holder, will have perfect internal knowledge of the real timing and cost of its fastest possible migration path out of satellite services, which is very likely to be substantially faster than the seven-year time frame proposed by the ACMA – particularly in some of the highest value areas such as Sydney and Perth. This deficiency is of sufficient magnitude that we believe it will fundamentally undermine the integrity of a future auction process; and
- (ii) post-auction, in adjusting to its transition path timetable in a manner that most benefits it when competing in the downstream mobile services, by either delaying transition so that competitors cannot make site investments in conjunction with their 5G rollout for the region, or by accelerating its transition to take advantage of its own technology rollout.

Given that the proposed transition timeframe is so unusually long in the context of the proposed licence term, these unfair advantages that would accrue to the integrated firms which are both incumbents and seeking access for mobile services are so large that the auction would become inherently anti-competitive.

Vodafone supports the use of market mechanisms. Yet, market mechanism must give primacy to the most well-defined property right and the highest value use of the spectrum. That is, the spectrum licences should be sold with the minimum two year transition period for existing apparatus licences. If existing users wish to continue using spectrum beyond the two year transition period they could approach successful bidders for the 3.6 GHz spectrum licences and pursue commercial arrangements. Alternatively, if the Government wanted to go further in terms of accommodating the interests of existing users, then government should be willing to use some of the proceeds from allocation process (e.g., an auction) to compensate users to migrate to alternative arrangements. Both these options are far fairer, more transparent and more efficient than the ACMA's proposed approach.

Vodafone broadly supports option 3c (that spectrum licences are made available in metropolitan and regional areas) though we consider several additions are warranted to the areas that will be sold via spectrum licences. In particular, we see merit in Darwin, Geraldton and the Pilbara being included as part of "Area 3 plus" definition. (We do not consider the ACMA's approach to the definitions of Areas 1, 2 and 3 ought to provide any basis for how lots are designed at a potential future auction).



1. Introduction

Vodafone Hutchison Australia Pty Limited (**VHA**) welcomes the opportunity to respond to the Australian Communications & Media Authority (**ACMA**) Paper on the 'Future Use of the 3.6 GHz band' (the "**Options Paper**").

In chapter 2 of the Options Paper, the ACMA has outlined the 4 key outcomes of the October 2016 discussion paper that have led to the development of this Options paper. VHA is aligned to 3 of those outcomes.

1. VHA supports the ACMA's decision to progress both the 1.5 GHz and 3.6 GHz bands from the *initial investigation* to the *preliminary replanning* stage of the ACMA's process for considering additional spectrum for MBB services in Australia.
2. We also support the ACMA's decision to prioritise the consideration of the 3.6 GHz band over 1.5 GHz band as that would speed up the allocation of additional spectrum for MBB services.
3. We are in favour of the replanning options based on the use of TDD technologies in the band as we have previously advocated the allocation on an unpaired spectrum basis, which is notionally the framework for 5G and will be used either for TDD or Full Division Duplex operation (both of which will be used as unpaired spectrum). Further, as TDD has already been implemented in the 3400 – 3575 MHz spectrum band in regional and remote areas, implementing TDD in the 3600 – 3800 MHz range would bring greater synergies.

With respect to the fourth outcome, Vodafone welcomes the ACMA's recognition that the 3.5 GHz band is strongly linked to the 3.6 GHz band. We are disappointed the ACMA chose to defer the consideration of possible changes (including reconfiguration) of planning and licensing arrangements in the 3.5 GHz band till outcome of the process for 3.6 GHz is known. Optimising the broader 3400–3700 MHz band should be the priority for initial 5G services in Australia, since there is insufficient spectrum in Australia in the 3 to 6 GHz range to form a foundation for 5G on a standalone basis. The rapidly growing MBB traffic characteristics in Australia call for maximising spectrum release through an expansive allocation of available spectrum.

The 3.6 GHz band should be progressed from the preliminary replanning stage (stage-2) to the re-farming stage (stage-3) in the ACMA's process for considering additional spectrum for MBB services. Further in this submission, we present our views on ACMA's preferred replanning option. Further, once the ACMA has made a decision on the preferred replanning option, it will need to quickly move to the third stage (re-farming) in Q4 2017 as per the indicative timeframe given at Table 1 of the Options Paper.



2. Answers to questions:

Question 1 Should the 3.6 GHz band be progressed from the *preliminary re-planning* stage to the *re-farming* stage in the ACMA's process for considering additional spectrum for MBB services? Why/Why not?

VHA supports progressing 3.6 GHz band spectrum from *preliminary re-planning* stage to *re-farming* stage. The 3.6GHz band is essential to the deployment of competitive 5G mobile services in Australia.

VHA considers that the ACMA's own reasoning and evidence in fact supports the notion that the ACMA should progress additional spectrum bands to preliminary re-planning and re-farming stages (ie the spectrum currently set aside for NBN).

Question 2 Do the areas identified in this analysis cover the likely areas of high demand for access to the 3.6 GHz band? Would smaller or larger areas be more appropriate? Why?

We note the ACMA's view that *implementing spectrum licensing arrangements in metro and regional areas, while retaining site-based apparatus licensing arrangements in remote areas, strikes a balance between capturing all likely areas of high demand while minimising the areas of low to medium demand re-allocated for spectrum licensing. To that end, the re-allocation of metro and regional areas for the issue of spectrum licences maximises the increase in economic benefit while minimising overall costs.*

However it is VHA's view that re-farming 3.6 GHz band only for Area 3 (as currently defined in the Options Paper) is not sufficient.

The ACMA has rightly observed at page 19 of the Options Paper that *although interest will initially be in deploying wide-area MBB services in major cities, it is expected that expansion into regional areas will occur over time (as it has in numerous other bands). This will be facilitated by advanced technologies such as massive multiple input, multiple output (mMIMO) and beamforming, which are expected to improve coverage and capacity of cells deployed in the 3.6 GHz band. This will make it more attractive and cost-effective for operators to deploy wide-area services in the 3.6 GHz band in regional and remote areas.* In view of the above as well, Area 3 (as currently defined) appears inadequate and needs to be expanded to subsume other areas of high population density / commercial activity.

We specifically note that Area 1, 2 and 3 (at Page 39, Figure 6 in the Options Paper) do not include the metropolitan area of Darwin, Geraldton and the mining region of Pilbara, which is incongruous with the object of capturing all likely areas of high demand.



Question 3 If any part of the 3.6 GHz band is re-allocated for the issue of spectrum licences is seven years a suitable re-allocation period? If not, what period of time would be appropriate?

VHA does not support setting aside some bandwidth (such as 25 MHz) for site-based / area-wide apparatus licensing or protecting particular geographic areas and frequencies for some incumbent licensees as proposed under Option 4(a) and 4(b).

As per Section 153B of the Radiocommunications Act 1992, the incumbent licencees have been well aware for many years that the spectrum re-allocation period under a spectrum re-allocation declaration must run for *at least 2 years*. In light of the same, a blanket 7 years re-allocation period for all incumbent users alike, is inordinately long and will deny a subset of the market access to 5G services for at least 5 additional years.

Given that in many cases the incumbent is the same firm which will be seeking to deploy 5G mobile services, a 7 year transition gives those firms vast unfair advantages and incentives for gaming as those firms and only those firms will have perfect internal knowledge of the real timing and cost of redeployment of existing services. Since that information will not be available to other firms, this would give a massive unfair advantage and introduce major distortions into the auction process and subsequent deployment.

It is our view that a 2 year re-allocation (transition) period for Apparatus Licenses (point-to-point and point-to-multipoint) coupled with the flexibility to negotiate with any spectrum licensees in the area to continue operating their services after the end of the re-allocation period, is adequate.

We support a 2 year re-allocation period for FSS Earth Stations as well. At the end of the re-allocation period, the Earth Stations should either relocate to a different frequency or geographic location (viz. earth station protection zone as discussed in more detail hereinafter). Given the low frequency agility of earth-receive (space-to-earth) stations as pointed out by ACMA, geographic relocation is a feasible option and relatively cheap compared to the highest value use of the spectrum.

Question 4 Should different re-allocation periods be considered for different areas? For example, should a longer period be considered for services outside Area 1?

For the reasons set out above, Vodafone does not support extended re-allocation periods in general nor does it support different re-allocation periods for different Areas. Vodafone notes there are many high demand locations outside of Area 1 and these regions should not be disadvantaged in the deployment of 5G services due to extended re-allocation periods. The ACMA's analysis provides sufficient evidence supporting Vodafone's position. For instance, as indicated in Table 2 (page 30 of the Options Paper), there are 15 Earth Stations in Area 1 (that are sited in and around the major metropolitan areas of Perth and Sydney) and 2 Earth Stations in Area 3 (located at Uralla, NSW) which are expectedly regions of high



demand for broadband and therefore deferring the end of the re-allocation periods in these areas of high demand would affect the valuation of the spectrum.

Licence type	Number of incumbent licences			
	Area 1	Area 2	Area 3	Australia-wide
Point-to-multipoint	0	122	293	413
Point-to-point	2	14	47	47
Earth station	15	15	17	19
Amateur repeater	2	2	2	2
Total	19	153	359	481

Options Paper Table 2 - Number of incumbent licences in different areas across the 3.6 GHz band (RRL extract, 1 May 2017)

Other incumbent services (viz. point to point links and point to multipoint links) do not require a longer re-allocation period than 2 years owing to the availability of alternate modes of delivery (such as NBN's Sky Muster service) and ACMA's proposal to allocate 5.6 GHz band spectrum for these services. The 2 year period strikes the right balance in terms of protecting rights of incumbent users by enabling them to recoup investments and at the same time not adversely impacting the valuation of this band by potential bidders desirous of acquiring this spectrum for wide area MBB services. If some incumbent services want to continue operating they could pursue commercial agreements with the new acquirers of spectrum licences.

VHA cautions against adopting different re-allocation periods for different areas as that would seriously jeopardise the object of re-farming 3.6 GHz for highest value use by preventing 5G investment and has the effect of hampering regional economic development in some parts of the country. In summary, VHA strongly supports simultaneous availability of 3.6 GHz spectrum throughout all areas and uniform re-allocation periods within the areas.

Question 5 Are these guidelines appropriate? Why?

Question 6 Are there any other issues that affect the usability of an area-wide licence that should be taken into account when defining the licence area?

Question 7 If point-to-point licences are affected by re-planning activities in the 3.6 GHz band, are the options identified for point-to-point licences suitable? Are there any alternative options that should be considered?

VHA does not have any material comments on the questions 5 to 7.

Question 8 Is the 5.6 GHz band a viable option for wireless broadband systems?

VHA will defer to the incumbents to respond to this case-by-case for existing services in total. As a generalisation, 5.6GHz will exhibit similar coverage characteristics and whilst we acknowledge a nominal



reduction in range, the emergence of beam-forming equipped subscriber antennas can be used to compensate for the losses and yield a comparable or better result.

- Question 9** Under what circumstances should apparatus-and class-licensed arrangements be considered for the 5.6 GHz band?
- Question 10** If apparatus licensing arrangements are developed for wireless broadband systems in the 5.6 GHz band, are the notional arrangements proposed in Appendix 3 suitable?
- Question 11** If point-to-multipoint licences are affected by re-planning activities in the 3.6 GHz band, are the alternative options identified suitable? Are there any alternative options that should be considered?

VHA does not have any material comments on the questions 9 to 11.

- Question 12** The ACMA seeks comment on the suitability of the current west coast earth station protection zone located near Mingenew, WA, for long-term satellite service use. Are the current regulatory arrangements effective?
- Question 13** In the event FSS earth stations are affected by replanning activities in the 3.6 GHz band, the ACMA seeks comment on:
- Any issues surrounding the development and establishment of an east coast earth station protection zone; particularly on what factors would be necessary to make it an attractive option for earth station operations.
 - Whether there are any views on potential candidate locations to consider.
 - Whether there should there be more than one earth station protection zone on the east and west coasts of Australia.
 - If the identification of a central Australia earth station zone should be considered.

It is VHA's view that the existing earth stations facilities that are located in metropolitan / regional areas of high population / high demand for broadband services need to be relocated. Establishment of a suitable earth station protection zone which lies in an area of low population density / low demand is crucial to the proper valuation of 3.6 GHz spectrum licenses. We expect the ACMA to engage with the industry in a separate consultation to determine a suitable location for ESPZ in Australia.

- Question 14** Are the approaches for amateurs, radiolocation services, class licensed devices and TVRO systems suitable?
- Question 15** Are there any other options for incumbent services, not identified in this paper, which should be considered?



VHA does not have any material comments on the questions 14 and 15.

Question 16 Should any of the sharing arrangements discussed in this section be considered for implementation in the 3.6 GHz band? Why or why not?

Question 17 Are there any other sharing arrangements that should be considered?

The ACMA has discussed several sharing arrangements in this section (pages 34 to 38). Our views on the same are as follows –

- We do not think that it would be feasible to allow incumbent users to continue operating on a primary basis and expect spectrum licenses in the 3.6GHz to operate on a secondary basis (*such that they do not cause unacceptable interference to primary users*). Such an approach would neither result in spectrum moving to its highest value use nor allow for a correct valuation of this band.
- We also do not consider the “use-it-or-share-it” approach (which allows incumbent users to continue operating on a secondary basis indefinitely till a primary user deploys services in the same / neighbouring area) to be a practicable solution as that would create logistical problems for new spectrum licenses due to the need for all parties affected (including the licensee) to constantly communicate their presence and intentions. A well-defined re-allocation period for incumbent users is a pre-requisite for a proper valuation of the spectrum licenses in the 3.6GHz band (*which is not pivoted on date of commissioning of service by the spectrum licensee as such decisions are made by operators based on a myriad factors*).
- We concur with the ACMA that the *best-efforts interference management* approach (*where all users of the spectrum are required to take reasonable measures to manage interference and none has primacy over the operations of the other*) is not suitable for carrier grade services and would discourage proper valuation of the 3.6GHz band spectrum envisioned for area-wide broadband deployments.
- The multi-tiered approach (*where primary, secondary, tertiary and potentially more levels are defined for different services types or specified licences AND which supports the opportunistic use of spectrum by services operating in lower tiers on a ‘no interference and no protection’ basis*) would also weaken the incentives for bidders to acquire the 3.6GHz band as it would be laden with many pre-existing users / rights and consequently significant potential interference problems in future.
- The geographical separation between services might not be feasible for services that are area / location-specific as well as result in fragmentation of license area / excision of portions / creation of dead zones, all of which would adversely impact the valuation of spectrum.
- It is our view that adopting the sharing arrangements developed in the United States for the 3550–3700 MHz band and the Licensed Shared Access (LSA) arrangements developed in Europe would devalue the 3.6GHz band for bidders desirous of deploying wide area broadband networks as these are inclined towards incumbent users by placing considerable weightage on supporting the ongoing use of the band by incumbent services.



We support the sharing and replanning Option 3(c) proposed by ACMA as its preferred approach, subject to few alterations as suggested by us in response to Question 23. We do not think any other sharing arrangements should be considered.

Question 18 Are there any other replanning options that should be considered?

Question 19 Which replanning option should be implemented in the band? Why?

Question 20 In the event an area-wide licensing option is implemented, in which of the defined areas (that is, Area 1, 2, 3 and Australia-wide as defined in Appendix 6) should these arrangements be implemented? Are the current area definitions appropriate? If not, what area should be defined?

VHA supports the replanning principle on which ACMA's preferred option (Option 3c) is based. However, VHA recommends certain adaptations to the Option 3c

- The entire 125 MHz in the 3.6 GHz band should be refarmed via spectrum licensing and no portion should be set aside (as proposed under option 4(a) and 4(b))
- Area-wide spectrum licensing should be implemented in Area 3 plus certain other selective areas like Darwin, Geraldton, Pilbara etc. which should be targeted for high demand / population density / commercial activity
- Re-allocation period of 2 years should be allowed for incumbent users viz. point-to-point and point-to-multipoint apparatus licenses and earth station licenses
- The same re-allocation period should apply for the entire region subject to spectrum licensing
- Whilst spectrum sharing can be implemented on a contractual basis amongst licensees; however none should be mandated of the style of "use-it-or-share-it" approach or "best-efforts interference management" approach or "multi-tiered sharing" approach.

Question 21 If Option 4a is implemented, what frequencies and areas should be re-allocated for the issue of spectrum licences? How much spectrum should remain subject to site-based apparatus licensing arrangements? Should different amounts be considered in different areas?

We do not consider Option 4a to be suitable.

Setting aside a portion of the 3.6 GHz band spectrum for site-based apparatus licensing for incumbent users' (say 25 MHz to be used point to multipoint services) is not appropriate as whilst it might reduce incremental costs of relocating the earth station and point-to-multipoint licensees to a different band or delivery option (fibre); it would also result in a corresponding reduction in re-farming benefits by leaving lesser bandwidth available for new potential services like MBB. Setting aside a portion of the 3.6 GHz band spectrum from the pool available for area-based spectrum licensing is likely to result in a



significant devaluation of the 3.6GHz spectrum by prospective licensees. We have determined that due to the availability of 3.6GHz spectrum already being too low (125MHz max vs 300MHz minimum), the spectrum utility and hence value decrease exponentially with every step the volume available is further reduced.

Question 22 If Option 4b is implemented, what frequencies and areas (that is, incumbent apparatus licence services) should remain subject to site-based apparatus licensing arrangements?

We do not consider Option 4b to be suitable either.

Question 23 Comment is sought on the ACMA's preferred option (Option 3c) for the 3.6 GHz band.

Same as Response to Question 20 above.



VHA's views on the questions raised in the ACMA Paper on the 'Future Use of the 3.6 GHz band - the Highest Value Use Assessment - Quantitative Analysis (the "HVU Assessment Paper") are as set out below:

Question 1 Are there any general economic impacts that should be included but are not currently included in the method to determine highest value use?

Vodafone is not aware of any general economic impacts that should be included in the ACMA's HVU analysis.

Question 2 Are there any other spectrum valuations (for example, domestic or international auction prices or re-issue prices) that should be considered as a guide to the value of the 3.6 GHz band?

Question 3 Is the range of \$/MHz/pop values suitable for this analysis, or is there a case to narrow or broaden the range?

The ACMA has considered a reasonably broad range of potential valuations for the \$/MHz/pop value that could be placed on 3.6 GHz band spectrum. As per the HVU Assessment Paper, the \$/MHz/pop valuation estimates are based on similarities with past spectrum allocations and the 5G context of 3.6 GHz band spectrum. ACMA uses a lower limit of \$0.03/MHz/pop (*which is the re-issue price for the 3.4 GHz band spectrum implemented in 2012 for 15-year licenses re-issued in December 2015 as it represents the minimum willingness to pay for spectrum in an adjacent band, which occurred without the 5G context*) and an upper limit of \$0.625/MHz/pop (*which represents the re-issue prices for the 2GHz band spectrum as it is the highest expressed willingness to pay for spectrum above 1 GHz*). This is reasonable range.

Question 4 Would there be a change in the quality of services that could be provided by WISPs with the 5.6 GHz band compared with the incumbent 3.6 GHz band services?

As indicated by the ACMA in the Options Paper –

- site-based apparatus licensing arrangement can be established for point-to-multipoint systems alongside the current apparatus licensing of radars
- frequency assignment rules similar to those in the 3.6 GHz band would be established
- point-to-multipoint and radar would enjoy equal status in the band based on defined first-in-time coordination rules
- the upper 40 MHz of the 5.6 GHz band (5610–5650 MHz) would be made available for site-based point-to-multipoint apparatus licensing and the bottom 10 MHz (i.e. 5600 – 5610 MHz) being retained purely for radar services



- the top 40 MHz provides for two distinct 20 MHz channels (or a single 40 MHz channel) for point-to-multipoint, consistent with the defined Wi-Fi channelisation for the band
- a power of 4 W would be reasonable for point-to-multipoint deployments (considering the expected use of external antennas at a modest height for point-to-multipoint outstations) while managing adjacent channel compatibility with radar and existing class-licensed RLAN use
- whilst the 5.6 GHz band apparatus licensing arrangements would offer less spectrum than currently available for point-to-multipoint licensing in the 3.6 GHz band; however 5.6 GHz band would offer access to more geographic areas than current 3.6 GHz band arrangements—specifically, access to metropolitan areas
- Given compatibility of the proposed arrangements with the Wi-Fi channel raster, it is expected there will be equipment available in the band suitable for point-to-multipoint use in the 5.6 GHz band.
- Apparatus licensing arrangements in the 5.6 GHz band will provide coordinated interference protection for both radar and point-to-multipoint use of the band. This will enable licensed services to provide higher quality-of-service commitments than if class licensing were implemented in the band

Therefore, based on the ACMA's assessment, the relocation of WISPs from 3.6 GHz to 5.6 GHz would not have a material adverse effect on the quality of services that can be provided by WISPs.

Question 5 What alternative internet services could regional consumers access (excluding NBN Sky Muster services) if WISPs are unable to provide their fixed wireless broadband services?

Although the ACMA analysis considers NBN satellite services (NBN Sky Muster) as the primary substitute service for existing customers of WISPs; however it is not the only alternative. Potential spectrum licensees in the 3.6 GHz band can replicate the broadband services for WISPs in regional areas once this spectrum is refarmed for wide area fixed and mobile broadband services. Therefore if any WISP licensees are unable to continue providing services, it is not expected that consumers will lose all internet access. Moreover, where it is uneconomical to deploy fixed line broadband services in regional areas (owing to low population density), mobile broadband services could be a suitable alternative.

Question 6 How could the loss of point-to-multipoint licences in the 3.6 GHz band affect regular business operations for non-WISP licensees?

The geographical areas currently being served by WISP and non-WISP licensees should be included in the spectrum licensing area of 3.6 GHz in order to allow it to be served by wide area fixed and mobile broadband services. Accordingly, Area 3 as currently defined by the ACMA (refer Figure 6 at Page 39 of the Options Paper) would need to be modified. Similarly Option 3c and Option 3d would need to be blended to design a geographical area which is a mix of Area 3 and 4.



Once this area is subject to spectrum licensing, these would be serviced by potential holders of 3.6 GHz spectrum through fixed or mobile broadband services. As pointed out by the ACMA in the HVU Assessment Paper, majority of the non-WISPs are councils, state government departments and mining sector entities. These are not in the business of providing terrestrial communication services (the connectivity is auxiliary to their main business and an input into their operations). To the extent the non-WISPs use the 3.6 GHz to serve their connectivity needs, these can be serviced by new licensees acquiring rights to 3.6 GHz spectrum for fixed and mobile broadband services or by pursuing spectrum authorisation agreements from the new licensees. Therefore it is unlikely that their regular business operations will be affected by loss of access to 3.6 GHz band spectrum.

Further, it is a misconception that large service providers would not be able to meet the needs of regional customers owing to their homogenised national product offerings which do not cater to the needs of the latter and only WISPs / non-WISPs can tailor-make offerings customised to the needs to regional customers. Moreover any non-WISP (minority) who rely on the 3.6 GHz band spectrum for their primary business activity would have the same chances to continue operation of point to multipoint services, as a WISP, through allocation of spectrum in the 5.6 GHz band.

Question 7 Are the applicable costs for equipment replacement and re-tuning for point-to-multipoint licences suitable? If not, what cost ranges should be applied?

No comments

Question 8 Are there any additional costs (applicable under a Total Welfare Standard) that have not been considered in this analysis?

VHA is of the view that as such all relevant cost items have been considered in this analysis. However, VHA cannot comment on the precise dollar value of the cost items particularly the equipment replacement costs, retuning costs, user terminal upgrade costs, etc. associated with the relocation of the various incumbent users holding point-to-point and point-to-multipoint licenses.

However, the upper bound of relocation costs attributed to FSS earth station facilities appear to be overly generous since the 'per facility relocation costs' in the range of \$20-50m have been attributed to Optus, Telstra and Lockheed Martin whereas INMARSAT (who has a facility in Perth where Optus & Telstra also have their facilities) has indicated a relocation cost of \$25-30m. In light of a lower cost estimate provided by one FSS earth station operator, it is unclear why the ACMA has given weight to a higher upper bound cost estimate.



Question 9 If the 3.6 GHz band is re-farmed, what is the extent to which a longer re-allocation period would reduce incremental costs under a TWS?

VHA reiterates its position as stated in the response to Question 3 & 4 of the Options Paper. Briefly, we think that a blanket 7 years re-allocation period for all incumbent users alike, is inordinately long and introduces serious gaming and distortions. A spectrum re-allocation period of years – the minimum mandated by Section 153B of the Radiocommunications Act 1992 – is adequate for point to multipoint licenses and FSS Earth Station licenses. Although a longer re-allocation period may reduce the incremental costs for the incumbent users; however it significantly diminishes the welfare benefits from re-farming the 3.6GHz band for wide area spectrum licenses and the ACMA should not discount the value of these benefits, which by its own analysis, are likely to be of far greater value.

We note the revenue realised from the licensing of 3.6 GHz spectrum for wide area broadband service could be used for compensating the displaced incumbent uses, if required.

Question 10 Is the cost range for the relocation of all C-band licences from an FSS earth station facility suitable for this analysis?

ACMA has considered the cost of relocating all C-band licences for a single FSS earth station facility to be in the range of \$20 million to \$50 million. In this regard it is pertinent to note that –

- A single facility may have multiple services (or licences) operating across C-band i.e. not just the 3.6 GHz band portion. Whilst there is a possibility to either relocate only the 3.6 GHz band licences OR relocate all of the C-band (3.4–7.25 GHz) licences; however the incumbent licensees operating the FSS earth receive licences in the 3.6 GHz band have proposed that the most cost-effective option is to relocate all C-band licences to a new facility. Thus, in the ACMA's analysis, the entire costs of a C-band geographic relocation are attributed to the 3.6 GHz band. Therefore the ACMA has taken the worst-case scenario since it has attributed the entire relocation costs to the 3.6 GHz band instead of apportioning it on a proportional basis. Accordingly VHA is of the view that the cost range considered by the ACMA for the relocation of all C-band licenses from an FSS earth station facility is far higher than the actual incremental costs attributable only to the 3.6 GHz licenses.
- Secondly, INMARSAT (who holds 4 earth receive licenses = 116 FSS licences in 3.6 GHz band all of which are located at Landsdale Perth) has outlined costs of between \$25 million and \$30 million to relocate its Perth facilities (as noted by ACMA on page 38 of HVU Assessment Paper). In view of the same, the outer limit of \$50 million considered by ACMA is significantly higher than upper limit of INMARSAT's estimate.



Question 11 Are the applicable costs for equipment replacement and re-tuning for point-to-point licences suitable? If not, what cost ranges should be applied?

No comments