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**AUSTRALIAN COMMUNICATIONS AND MEDIA  
AUTHORITY**

**FUTURE USE OF THE 3.6 GHZ BAND OPTIONS PAPER**

COMMUNICATIONS ALLIANCE

SATELLITE SERVICES WORKING GROUP SUBMISSION

AUGUST 2017

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## INTRODUCTION

The Communications Alliance Satellite Services Working Group (SSWG) welcomes the opportunity to provide this submission in response to the *Future use of the 3.6 GHz band Options Paper* by the Australian Communications and Media Authority (the Options Paper).

### Executive Summary

The SSWG acknowledges the value of the analysis that has been carried out by the ACMA on the relative importance of Mobile Broadband (MBB) compared with other services or uses of the 3.6 GHz spectrum. It illustrates well that MBB needs to be accommodated because of its economic importance to Australia.

The SSWG has not identified any reasons why the process of spectrum licensing should not proceed immediately, if satisfactory sharing scenarios were achieved. The preferred options as presented in the *Options Paper* are, in order, a qualified Option 1 or 4b, then a 3c/4b combination.

There are a number of aspects of the *Options Paper* that the SSWG wishes to highlight when the ACMA is to consider the next steps for this band.

The regulation of the 3.6 GHz band needs to be considered as a part of a long-term approach, taking into consideration stakeholders' interests and being mindful to avoid adverse influences on future investment decisions. An important component of this is to take into account and align with other jurisdictions to foster a healthy and dynamic market to cater for the provision of future services to the Australian public.

The SSWG has previously raised the issue of the ACMA's reliance on the concept of the Highest Value Use (HVVU), which, from the perspective of the SSWG, has some shortcomings. It is a useful tool but the SSWG wishes to point out that further consideration of spectrum sharing studies is required (recognising the progressive stance taken at the ACMA Workshop that was held on 7 August) and the need to fully address the public benefit. It is noted that the proposed program of re-allocation and a progressive geographic-based obsolescence of ground-segment infrastructure poses risks to the continuity of associated satellite services.

It is important to take into account that the convergence between services leads to alternatives such as point-to-multipoint Wi-Fi hotspots with satellite backbone networks; or Wi-Fi offering offloading and extension to MBB networks in areas where this appropriate; or the broadcasting nature of satellites covering many IoT applications of the future in a more economic way.

The SSWG suggests that the proposed period of relocation of Fixed Satellite Service (FSS) facilities is not reasonably justified by analysis. It is not reasonable to prescribe fixed and arbitrary time periods, because each infrastructure situation is different and there may be co-located services in different bands that would benefit from a co-ordinated simultaneous relocation. One beneficial feature of relocation to a less dense region is a reduction in spectrum costs for apparatus licences. Account needs to be taken, however, of the significant intangible negative consequences, such as disruption costs to customers, staff relocation and/or the availability of new, local, qualified staff.

There also appears to be no consideration of compensation for the significant costs that commercial operators would incur through the need to relocate ground segment infrastructure. Conversely, compensation is under consideration in the package of legislative materials for Commonwealth spectrum holders – Departments, Defence forces etc, - that might surrender spectrum as a result of the proposed changes. A more equitable solution needs to be agreed.

Rather than the punitive proposition advanced and preferred in the Options Paper, a practical and equitable sharing / coexistence strategy for the 3.6 GHz band within existing areas needs to be debated and agreed. Taking into account all considerations, a sharing strategy – which we know to be an achievable outcome, is a more appropriate and lower risk strategy.

Finally, attention is drawn to the fact that there is substantial activity in sharing studies internationally. For example, the ITU-R is investing immense study efforts in sharing scenarios and new mitigation techniques to enable countries to successfully manage co-existence. Advanced technologies and techniques are under further study to assist this e.g. Multiple-Input and Multiple-Output (MIMO) radio links, Software-Defined Networking (SDN), Cognitive Radio Service (CRS), shielding and propagation evaluation.

### **The submission**

The SSWG has provided general comments on the Options Paper and also addressed the specific questions posed in the Paper.

Optus advises that, while it is in agreement with some elements of the positions advanced by the SSWG in this submission, it is not in a position to endorse the submission in its entirety. Optus is making an individual submission in response to this options papers.

Telstra advises that on the whole, it supports the positions proposed by the SSWG. There are, however, some aspects of the SSWG submission that it does not support. Aspects that Telstra does not support have been identified at the appropriate locations in this submission.

### **About Communications Alliance**

Communications Alliance is the primary telecommunications industry body in Australia. Its membership is drawn from a wide cross-section of the communications industry, including carriers, carriage and internet service providers, content providers, equipment vendors, IT companies, consultants and business groups.

Its vision is to provide a unified voice for the telecommunications industry and to lead it into the next generation of converging networks, technologies and services. The prime mission of Communications Alliance is to promote the growth of the Australian communications industry and the protection of consumer interests by fostering the highest standards of business ethics and behaviour through industry self-governance. For more details about Communications Alliance, see <http://www.commsalliance.com.au>.

## BACKGROUND

### Observations at the outset

Prior to responding to the questions in the *Options Paper* which follow on from the considerations of geographic regulation of services, the SSWG offers the following view of what it considers to be required in the developing regulatory and market environment in Australia.

The SSWG suggests that what is needed is a licensing scheme which is responsive and inclusive of the future needs of all Australian stakeholders in a shared spectrum environment. Some of these elements deserve further consideration in order to create a realistic package for all stakeholders.

Whilst the *Options Paper* acknowledges the developing new legislation, it appears to not pick up on the intentions of the new legislation. This means that the outcomes of this review may not be attuned to the incoming environment. In that environment, the SSWG believes that:

- licensing needs to transition easily into unified licensing,
- spectrum should not be artificially inflated,
- the scheme should fit into less prescriptive legislation; and
- stakeholders should have a greater degree of influence and self-determination.

These future influences need to be considered for expediency.

### Outline of the ACMA approach

The ACMA uses a combination of estimating Highest Value Use (HVV) of spectrum, together with a re-allocation strategy, and existing imbalanced licensing conditions to draw together the proposals for the way forward. The way forward is itself a long-term proposal and therefore warrants longer term thinking. Whilst proposals may be couched in immediate effects (e.g. in Area 1), growth and encroachment into other areas (Areas 2 and 3) cannot be discounted and therefore solutions must be enduring with time and technology/market advances and how they evolve.

The three elements of the proposed way forward are to a degree necessary to consider but they may be neither sufficient nor fully adequate. They could well lead to an isolated approach compared with the rest of the comparable world. Some of the measures proposed present what appears to be an assertive position of the regulator exerting great influence over investment decisions, and the licensing arrangements may be artificially distorting of the true value of spectrum to intending users.

Thus the SSWG seeks to offer comments towards a regulatory basis which is basically fit for purpose and has enduring qualities.

### Highest Value Use and a re-allocation strategy

The ACMA presents some very compelling economic analysis of the HVV of spectrum. This is considered by certain sectors of the industry to be now quite a dated concept, which has been around for a decade or so. In its present simple application, it leads to a single service outcome (or use), being Mobile Broadband (MBB), whereas the ACMA often quotes the potential for the plural 'uses'. The latter would have been a much more attractive piece of analysis which would offer up the synergies of multiple interdependent services being in the frame and for which the interactive sum of the parts would no doubt be higher than the sum of the individual components. In addition, the analysis does not appear to fully address public benefit.

Despite this, the ACMA analysis is of great value as an indicator of the relative importance of MBB<sup>1</sup> compared with other services or uses of the spectrum. It illustrates well that MBB needs to be accommodated because of its economic importance and something dramatic needs to be done to harness MBB in an accelerated way in order to capitalise on the benefits.

Becoming overly focussed on one technology or service has the drawback of attempting to 'pick a winner', which is not a recommended path for regulators. There is substitutability (or lack thereof) and diversity of services to accommodate and technology advances plus convergence which all makes predictability the monkey of certainty and stability. Convergence between services leads to alternatives such as point-to-multipoint Wi-Fi hotspots with satellite backbone networks; or Wi-Fi offering offloading and extension to MBB networks in areas where this appropriate; or the broadcasting nature of satellites covering many IoT applications of the future in a more economic way.

The increasing global demand for data has implications for spectrum requirements of both mobile and fixed wireless networks. Increased wireless broadband use will also impact fixed line networks. The use of Wi-Fi offloading (where mobile phone users access fixed networks), for example, can optimise user experience. Deloitte Australia's recent research finds that Wi-Fi remains the Australian mobile consumer's preferred way of connecting their smartphone and tablet to the internet (59% and 89% respectively). Further, people are increasingly using multiple screens, including mobile devices, simultaneously in the home. 83% of Australians report using their smartphone while watching TV<sup>2</sup>.

The proposed program of re-allocation and a progressive obsolescence by area of other services is also a risky business fraught with manipulating services and areas since guessing of market futures. A safer approach evident in equivalent regulatory regimes is that of better developed spectrum sharing scenarios. The ACMA appears to have focused on the path of geographic redistribution of services. Some notable sharing scenario work has been set out in the US and Europe (ECC Report 254<sup>3</sup>) – these considerations could be appraised by the ACMA.

During the Spectrum Tune-up<sup>4</sup> as a part of this consultation, the ACMA undertook to organise a workshop to further evaluate sharing scenarios. This is a welcome addition to the considerations in the *Options Paper*.

### **More on the re-allocation strategy**

A test of the re-allocation strategy as presented in Options 3a to 3d is take an assumption that MBB will progressively spread through successive Areas 1, 2 and 3 of Australia (perhaps even the whole of the mainland as contemplated in Option 3d).

This outcome suggests to eventually have only one service remaining in Australia. This may lead to some services and facilities having to relocate to external territories.

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<sup>1</sup> It is noted that the ACMA in respect of the Options Paper uses the term 'mobile broadband' (MBB) to refer to a variety of different technologies including terms such as 3G, 4G and 5G, including fixed broadband systems (Introduction, Page 9). The use of the term MBB in this submission includes fixed broadband systems as appropriate.

<sup>2</sup> <http://landing.deloitte.com.au/rs/761-IBL-328/images/deloitte-au-tmt-mobile-consumer-survey-2015-291015.pdf>

<sup>3</sup> ECC Report 254 *Operational guidelines for spectrum sharing to support the implementation of the current ECC framework in the 3600-3800 MHz range*, Approved 18 November 2016

<sup>4</sup> ACMA Spectrum tune-up: *Future use of the 3.6 GHz band*, 12 July 2017, <http://www.acma.gov.au/theACMA/About/Events/Spectrum-tune-ups/spectrum-tune-up-future-use-of-the-3-6-ghz-band>

A proposed period of relocation of Fixed Satellite Service (FSS) facilities is not analytically well justified. It is not possible to prescribe such a period of time because each situation is different and there may be co-located services in different bands which would be better relocating together.

One feature of relocation to a less dense region is a reduction in spectrum costs for apparatus licences. If the cost of relocation is known, then dividing this by annual spectrum savings gives a first pass relocation period which would be cost neutral. Other things to take into account include annual increases in infrastructure costs to maintain the same level of customer service.

However, there are very significant intangibles such as disruption costs to customers, staff relocation and/or new local qualified staff availability. All these factors would lead to a fundamental re-appraisal of doing business in Australia or in an alternative country which offered longer term settled stability.

### **Outcome on reflection**

To *re-locate, re-tune or cease business* raises the concern that it presents an aggressive and off-putting signal to intending investors other than those involved in the chosen HVU of spectrum.

The approach also forecloses on new future service developments which are intended in services / industries other than terrestrial MBB.

There appears to be no consideration of compensation for relocation, though this is under consideration for Commonwealth spectrum holders in the current package of legislation considerations. There is, however, scope for 'commercial negotiation' with spectrum licensees for early movement but not a subsidy from the auction proceeds which by all accounts would dwarf the needs of incumbents to relocate.

**A sharing / coexistence strategy within existing areas is suggested to be a more appropriate, orthodox and lower risk strategy.**

### **Other jurisdictions**

Other jurisdictions where HVU and a re-allocation strategy has been favoured or is under consideration are yet to finalise. The UK (Ofcom) has similar ideas to the ACMA and is pursuing a more aggressive timeframe. In contrast, Europe (ECC) has concluded that a sharing approach amongst users of spectrum is the appropriate outcome, without the forced excising of incumbents. Apparently, the UK did not take part in these considerations, despite the fact that they contained Case Study of the UK. The US Federal Communications Commission (FCC) in 2015 established a Citizen's Broadband Radio Service in the 3550 to 3700 MHz band. Because of technical complexities related to FCC sharing rules for the band, few, if any, services have been established. More recently some MBB operators have requested the FCC re-open the rules to permit wider use of the band. A conclusion that can be drawn from the US experience is that finding the HVU solution for the 3.6 GHz band can be fraught with difficulty.

In related work in the USA, the FCC has now issued a Notice of Inquiry (dated 3 August 2017) into 'Expanding Flexible Use in mid-band spectrum between 3.7 and 24 GHz'<sup>5</sup>. The FCC has

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<sup>5</sup> FCC FACT SHEET *Exploring Flexible Use in Mid-Band Spectrum Between 3.7 GHz and 24 GHz*

sharing scenarios in mind and in the 3.7 to 4.2 GHz band it will examine current uses, options for more intensive use, options for mobile broadband use, and changes to terrestrial service rules to promote flexible use.

In Hong Kong, the Communications Authority has also announced (27 July 2017) a consultation on proposed re-allocation of the 3.4 to 3.7 GHz band from the Fixed Satellite Service to the Mobile Service<sup>6</sup>. The proposal is to re-allocate 3.4 to 3.6 GHz for mobile service apart from the FSS. 100 MHz of spectrum (3.6 to 3.7 GHz) will be designated as a guard band to minimise interference to the FSS in the range 3.7 to 4.2 GHz. This is consistent with the intentions of 'the Mainland' for commercial deployment of 5G services with use of the frequency band in 2020.

The ITU-R is investing immense study efforts in sharing scenarios and new mitigation techniques to enable countries to successfully manage co-existence. Advanced technologies and techniques are under further study to assist this e.g. Multiple-Input and Multiple-Output (MIMO) radio links, Software-Defined Networking (SDN), Cognitive Radio Service (CRS), shielding and propagation evaluation.

The ITU-R Tables of Frequency Allocations also clearly define Primary and Secondary services and expectations in associated Footnotes. These assist users in their expectations and reflect world opinion. Conversely the ACMA appears to be set to eliminate Primary status and its meaning for the FSS, with MBB set to assume a virtual *super-Primary* status. This is very unorthodox, and revokes the past value of investment decisions made by FSS operators on the basis of this status.

Within Australia, MBB operators have a pressing need to get on with the job of delivering service. As mentioned, MBB is well recognised in its vital role in Australia. Any procrastination and lengthy re-allocation periods will be counterproductive. An appropriate sharing arrangement would obviate the need to even consider a re-allocation strategy, and MBB operators would be encouraged to implement their plans for the spectrum licences immediately.

It should be noted that in achieving 5G and IoT, terrestrial MBB will be complemented by other services (FSS/Wi-Fi offload, hotspots, broadcasting from satellites).

**The FSS industry is well placed to work in close harmony in delivering MBB by complementary measures, and can work with MBB operators for them to take immediate advantage of spectrum licensing and their implementation of services without delays caused by re-allocation**

## Spectrum licensing

The SSWG has not identified any reasons why the process of spectrum licensing should not proceed immediately, if satisfactory sharing scenarios were achieved (i.e. incumbency considerations of 7 or 15 years may not need to be invoked).

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Notice of Inquiry, GN Docket No. 17-183. <https://www.fcc.gov/document/fcc-opens-inquiry-new-opportunities-mid-band-spectrum>

<sup>6</sup> The Government of Hong Kong Special Administrative Region Press Release: *Proposed Change in the Allocation of the 3.4 – 3.7 GHz Band from Fixed Satellite Service to Mobile Service* Consultation Paper, 27 July 2017, <http://www.info.gov.hk/gia/general/201707/27/P2017072700392.htm>



Both MBB and FSS would rely on continuing Primary status and technical measures could be put in place to excise the protection around existing FSS facilities - enhanced and updated with more conventional data and mitigation techniques. Where this is not sufficient commercial agreements can also be achieved. The role of the regulator here would be to acknowledge such measures and agreements rather than outguessing the players or the market – that is, it would be assisting with the licensing formalities in the future. It should be noted that Telstra does not agree with continued Primary status for FSS, or co-primary status for FSS and MBB, however, it does agree with the ability for technical measures to minimise interference which could decrease the distance (proximity) between FSS and MBB services, and Telstra supports the role that commercial agreements could play in facilitating sharing where appropriate.

The Department of Communications and the Arts (DoCA) has a close interest in the unfolding future use of the spectrum. Flexibility and less prescription will be hallmarks of the future legislation, so the less prescriptive an outcome of the 3.6 GHz band the better.

It is also noted that other users with a keen interest in the 5.6 GHz band or the adjacent band are the Wi-Fi industry.

## Looking at the options

From the Options offered by the ACMA, the following hierarchy is satisfactory to the FSS operators. However, with some additional qualifications the first three can be considered as workable, as follows.

**Option 1 – No change** – to the current allocation or licensing arrangements in this band.

Clearly this would suit some FSS operators, but it is recognised that MBB, including fixed wireless, and spectrum licensing also needs to be accommodated – and as soon as possible.

Licensing of FSS earth stations under an apparatus licence could continue as *status quo* but with endeavours to better manage the technical sharing of spectrum by both FSS facilities and MBB operators. Spectrum would be shared, not re-assigned and the FSS location would remain protected within agreed technical parameters.

There should be no barriers to the immediate implementation of services in encumbered spectrum and no complications of a re-allocation period

**Option 4b – Define frequencies and areas around incumbent apparatus licences that will not be re-allocated for spectrum licensing**

This is similar to the observations above with Option 1, and would be greatly assisted by the negotiation in good faith of adequate sharing and mitigation approaches by both parties. It would not necessarily involve a redefinition of frequencies but might result in a tighter area of protection around the FSS.

**Options 3 – Progressive area re-allocation strategy**

These options are least favoured for FSS stations. They are disruptive when they do not necessarily need to be, and carried through to the extreme may ultimately cause extinction. They are also the highest risk for the regulator, with many unknowns in the future. They tie all assumptions to geography. Option 3c could be combined with 4b and this might be workable for the FSS.

## **Options 2 – Site-based and area-wide spectrum licensing**

Of more concern for the Wi-Fi industry.

**The preferred options, in order are: a further qualified  
Option 1 or 4b, then a 3c/4b combination**

### **A final word on licensing**

Spectrum licences should have a 15-year life time. This would perpetuate expectations from the past. However, progress payments and reporting milestones at each five years would temper speculation or harbouring of spectrum.

Apparatus Licences could have a five-year presumption of continuity. This then balances up the current structural disparity ready for uniform licensing. Similar time horizons would also affect perceived value of spectrum towards true value.

With milestones, whilst the auction windfalls to Government would be staggered, a benefit would accrue to spectrum licence awardees through better cash flow availability for other investment e.g. in networks to be built to use the spectrum.

## **The ACMA FSS earth station sharing study**

With regards to the FSS earth station sharing study in Appendix 4 in the *Options Paper*, the SSWG understands that the ACMA's preliminary look at this makes a number of assumptions and that the study should be regarded as indicative only. There are mitigation factors which have not been assessed such as antenna down tilt, reducing power, and reducing antenna height that can be employed to facilitate coexistence. The study also depends on single entry interference only. Also clutter information has not been taken into account.

Overall the modelling would benefit from further consideration of these details and the SSWG would welcome the more detailed and pragmatic assessment which the ACMA technical discussion being held on 7 August 2017 is intended to look at.

## Addressing the questions in the Options Paper

The following section reproduces the list of questions from the *Options Paper*, together with the SSWG responses.

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

The 3.6 GHz band should be progressed from the preliminary replanning stage to the re-farming stage if FSS protection issues are appropriately addressed.

- 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?**

No comment on the demand for terrestrial services. In some cases, breaking up areas may be appropriate to enable protection of other services.

- 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?**

From an SSWG perspective, long-term protection of the Perth facility would be appropriate and achievable, qualified by the points made in this submission.

New FSS earth stations could be placed in Area 3.

From a Telstra perspective, there is no need to implement long-term protection for existing FSS earth stations in Area 1 for the 3.6 GHz band. Further, new earth stations should not be placed in Area 3.

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

Most of Area 3 is not used by FSS Earth stations. Long-term periods should be considered for these locations. Telstra does not support this position.

- 5. Are these guidelines appropriate? Why?**

With respect to FSS Earth stations, the defined areas are not particularly helpful. It would be better to consider how long-term protection can be provided for Earth stations at specific locations. Telstra does not support long-term protection for existing earth station facilities in Area 1 for the 3.6 GHz band.

- 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?**

The SSWG does not agree with the approach of defining exclusion zones when assessing potential areas for replanning in the 3.6 GHz band but would suggest the allocation of licences be based on managing interference levels coordinated through a RALI.

- 7. If point-to-point licences are affected by replanning 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?**

No comment.

- 8. Is the 5.6 GHz band a viable option for wireless broadband systems?**

The 5.6 GHz band should be included in the class licenced LIPD 5 GHz Wi-Fi band in alignment with international arrangements. The current embargo on Wi-Fi channels in the 5.6 GHz band restricts the number of channels that can be used for Wi-Fi in Australia. This is well documented on page 79 of the *Options Paper*.

Wi-Fi is a very important component of internet connectivity in households and therefore an important contributor to productivity gains offered by the internet. This use of the 5.6 GHz band may not be compatible with its use for apparatus licenced wide area wireless broadband systems (Wireless Internet Service Providers (WISPs)).

**9. Under what circumstances should apparatus- and class-licensed arrangements be considered for the 5.6 GHz band?**

The 5.6 GHz band should be included in the class licenced LIPD 5 GHz Wi-Fi band in alignment with international arrangements such as in Europe or the US, as proposed in one of the options offered for future use of the band in Appendix 3.

Dynamic Frequency Selection/Transmission Power Control (DFS/TPC) arrangements should be required for the channels in the 5.6 GHz band so that they may coexist with metrological radars on a no interference basis.

Apparatus licenced radars in the band would continue operation on the basis of no interference from the LIPD class licenced use of the band. However, apparatus licenced wide area wireless broadband systems in 5.6 GHz may prevent the use of the band for Wi-Fi by blocking DFS/TPC controlled channels through the presence of the wireless broadband carriers.

**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?**

No comment.

**11. If point-to-multipoint licences are affected by replanning activities in the 3.6 GHz band, are the alternative options identified suitable? Are there any alternative options that should be considered?**

No comment.

**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?**

We believe the arrangements are effective.

**13. In the event FSS earth stations are affected by replanning activities in the 3.6 GHz band, the ACMA seeks comment on:**

1. 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.

SSWG supports the early designation of an east coast earth station protection zone. The SSWG thanks the ACMA for including population and other information in the consultation paper which might assist in determining a suitable location. The SSWG has not examined the data in detail but takes good note that the establishment of such a protection open would rule out indefinitely the use of the 3.5 GHz (and possibly other bands) from MBB type services in radius of around 75 km from the zone centre using the conditions at Mingenew as a basis.

Factors to be considered might include:

- i. Site area to be adequate for a number of teleports by different operators. Maybe several square kilometres in total area.
- ii. Connection to terrestrial broadband network preferably via diverse routes.

- iii. Reliable and adequate mains power electricity with possibility of diverse connections.
- iv. All weather road access for vehicles with substantial and possibly out of gauge loads.
- v. Visibility down to [5°] elevation for azimuths along the GSO arc (and maybe beyond the GSO arc to accommodate possible future NGSO networks in other frequency bands)
- vi. Checking the local rain microclimate to avoid 'storm fronts'. This is not critical at 3.6 GHz but comes into play when addition bands at much higher frequencies are access through the teleport.
- vii. No significant sources of RF interference in the vicinity.

2. Whether there are any views on potential candidate locations to consider.

Whilst there are two Earth station facilities near Dubbo (NSW), the SSWG considers that such a location would not be suitable for 3.6 GHz services owing to the significant rural centre and its need for MBB services. Moree, the site of the former OTC earth station, might be considered as it is not as large as Dubbo. Other possibilities are near Broken Hill, Bourke or Roma which are NBN gateway station locations.

3. Whether there should there be more than one earth station protection zone on the east and west coasts of Australia.

The SSWG can see advantages in having at least two distinct Earth station protection zones on East and West Coasts. In the case of the West Coast maybe in the Carnarvon area or an inland site possibly near Kalgoorlie.

4. If the identification of a central Australia earth station zone should be considered.

The view of the SSWG is that a central Australia earth station zone would have minimal impact on any of the existing or future fixed/ mobile broadband deployments.

The SSWG would propose an earth station protection zone in Northern Australia with a latitude North of about 15° South. Such a location might be able to access regional beams covering SE Asia for satellites which do not cover the whole of Australia.

**14. Are the approaches for amateurs, radiolocation services, class licensed devices and TVRO systems suitable?**

No comment.

**15. Are there any other options for incumbent services, not identified in this paper, which should be considered?**

Possibly the use of shielding, mitigation coupled with Option 4b and Option 1.

**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?**

Yes, portions of the FCC arrangements and the ECC approach should be used to allow incumbent services, i.e. FSS Earth stations, to continue to operate, noting that Telstra is not supportive of these options.

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

Discussions/workshop with MBB operators.

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

None outside the range of options (as enhanced in this submission) that have been presented.

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

Any option that allows the incumbent services to continue to operate unaffected is acceptable for, noting that this is possible without substantial impact on the deployment of IMT systems, since exclusion zones will be limited, will only affect portions of the 3.6 GHz band and can be further reduced through the use of shielding/mitigation. It is noted that Telstra does not support this position, due to the substantial impact on the deployment of IMT systems.

**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?**

Areas can be defined with reference to existing FSS Earth station locations to allow these stations to continue to operate.

**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?**

No comment.

**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?**

Option 4b should be used to grandfather existing FSS Earth station sites.

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

This option has a disastrous impact on FSS operations. However, this impact can be removed by combining Option 3c with Option 4b to protect existing FSS Earth station sites. This will have limited impact on IMT deployment in the band.





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