Australian Mobile Telecommunications Association

AMTA Submission on the ACMA's Consultation Paper:

Towards 2020 – Future spectrum requirements for mobile broadband - May 2011

25 July 2011

Introduction

The Australian Mobile Telecommunications Association (**AMTA**) is the peak industry body representing Australia's mobile telecommunications industry. Its mission is to promote an environmentally, socially and economically responsible, successful and sustainable mobile telecommunications industry in Australia, with members including the mobile Carriage Service Providers (**CSPs**), handset manufacturers, network equipment suppliers, retail outlets and other suppliers to the industry. For more details about AMTA, see http://www.amta.org.au.

AMTA supports the Australian Communication and Media Authority (**ACMA**) in its efforts to plan for the future spectrum requirements of mobile broadband and welcomes this opportunity to comment on the ACMA's consultation paper, *Towards 2020 – future spectrum requirements for mobile broadband* (**Paper**).

AMTA has also provided a submission to the ACMA's consultation paper, *900 MHz band – exploring new opportunities,* and our comments here are intended to be complementary to our comments on that paper.

The mobile telecommunications industry

The mobile telecommunications industry makes a substantial contribution to the Australian economy. An Access Economics report commissioned by AMTA found that the industry contributed $17.4 billion to the Australian economy in 2008-09.[1]

AMTA concurs with the ACMA that mobile broadband is an enabling force in Australia's developing digital economy.

Given the continuing growth in the mobile sector, AMTA is planning to undertake further research to analyse and quantify the current contribution made by the sector to Australia's economy.

We are in an environment where the expectations of end-users are rising, which is in turn increasing pressure on mobile network operators to ensure they have the capacity to meet an ever increasing demand for faster speed and bandwidth-hungry mobile data applications and services.

AMTA believes that in order to reap the benefits of mobility in a digital economy we must get spectrum strategy right. Getting the strategy right should start with a common view on forecast demand and the methodology for deriving these forecasts.

AMTA maintains that there is a need for closer consultation and partnership between industry, government and the regulator to identify mobile broadband spectrum requirements and develop a spectrum policy roadmap that includes long-term arrangements to meet those requirements.

[1] Access Economics Report, *Economic Contribution of Mobile Telecommunications in Australia,* June 2010.

AMTA considers the ACMA's Paper to be a useful first step towards a strategic roadmap document to inform both Government and industry on the supply and demand for spectrum resources to 2020 and beyond.

Further analysis of demand forecasts required

AMTA's members commend the ACMA for undertaking a review of current and forecast demand for mobile broadband and acknowledging the need to determine how this demand will be met.

However, AMTA suggests that the current analysis requires a more comprehensive and transparent analysis of baseline demand to support forecasts of future spectrum needs for the mobile sector.

For example, there is no visibility of the modelling and other analyses that support the ACMA's conclusion that 300MHz of extra spectrum will be required for mobile broadband by 2020. Some preliminary work undertaken by AMTA members suggests the quantum of spectrum needed from 2014 could be well in excess of the 300MHz proposed by the ACMA.

In addition, AMTA has concerns that the ACMA has:

- overestimated the level of spectrum that is currently available for mobile broadband;
- not taken full account of the metropolitan versus regional variation in spectrum availability;
- overestimated the improvements and efficiencies that can be achieved with technological advances;
- overestimated the extent to which the radius of cells can be reasonably reduced; and
- underestimated the growth in demand for mobile broadband.

AMTA would like to assist the ACMA in its analysis and intends to undertake its own research on baseline and forecast demand for mobile broadband.

It is AMTA's intention to complete this analysis as soon as possible so that the outcomes can be used by the ACMA to inform the next stage of its process of developing Australia's approach to meeting future spectrum requirements for mobile broadband.

Need for greater certainty and transparency

AMTA also suggests the ACMA not undertake its analysis in isolation from other parts of government and engage the Department of Broadband, Communications and the Digital Economy and other central agencies to develop a coordinated and comprehensive strategy on how Australia will meet future demand for mobile broadband services.

Such an approach will provide certainty and transparency for both government and industry.

For example, a recent study identified $62 billion worth of cumulative productivity benefits from LTE between 2013 and 2020. [2] To realise such benefits, industry requires certainty of spectrum availability to allow investment decisions to be made.

For industry it will provide certainty and transparency on spectrum availability so that technology choices and investment decisions for our future mobile networks and devices can be made in a timely and efficient way.

Bands for reallocation to mobile broadband

AMTA is concerned that the analysis of candidate bands is not comprehensive, and that it should consider all spectrum in the range from 400 MHz to 4.2 GHz (and higher).

[2] 2.5GHz in Australia: The future deployment of mobile broadband services, commissioned by AMTA and developed by Network Strategies 700MHz]

Questions from the paper

AMTA has responded to selected questions from the Paper below.

1. ***Are there any other issues not addressed in this paper that the ACMA should consider in the context of its analysis of future spectrum requirements for mobile broadband services out to 2020?***

   AMTA considers that the following issues should be considered by the ACMA in the context of its analysis of future spectrum arrangements for mobile broadband out to 2020:

   Harmonisation

   The AMCA should give further consideration to international developments so as to ensure that Australia's spectrum strategy is harmonised wherever possible.

   ITU Demand Analysis

   The ACMA should look more closely at the ITU-R report (referenced in the Paper) in assessing and forecasting future demand for mobile broadband services, noting that parameters in this report can be customised and adjusted to reflect the situation in individual countries like Australia.[3]

   Additional Bands

   The ACMA should consider all spectrum in the range from 400 MHz to 4.2 GHz and higher, and not limit its review to the bands considered in the Paper.

   Demand Segmentation

   AMTA is also concerned that the Paper treats wireless access services as a subset of mobile broadband services. In AMTA's view wireless access services (such as fixed and nomadic services) should not be considered interchangeable with mobile services.

2. ***How should the ACMA encourage a band to move to its highest value use?***

   AMTA considers that market forces should be the primary mechanism used by the ACMA to ensure that spectrum moves to its highest value.

   Once a higher value use is identified, the ACMA should have a range of tools at its disposal to encourage a band to move to its highest value use.

[3] ITU-R M.2078 Estimated spectrum bandwidth requirements for the future development of IMT-2000 and IMT-Advanced, 2007

These tools should include the ACMA playing an active role in providing information to the market about current and proposed use and demand. In the case of Apparatus Licences the ACMA should also have the ability to provide incentives, compensation or compulsorily require the change of use of a band, after giving appropriate consideration to the situation of incumbent users.

Current information to the market is already provided by the ACMA's 'Five Year Spectrum Outlook, 2011-2015' and AMTA supports this material being supplemented by the development of a '*Mobile Broadband Spectrum Policy Roadmap'*.

A roadmap would include details of what bands will be reallocated for future mobile broadband use, transition arrangements and expected timeline for reallocation.

In terms of providing incentives or compulsorily requiring a band to move to its highest value use the ACMA could suggest Government:

- adopt a policy approach that supports a clear role for Government in meeting transitional costs involved with reallocation decisions, including compensation payments to compel existing users to relinquish spectrum;

- use auction proceeds to meet transitional costs and compensation payments;

These proposed reforms should be considered in the context of the current process of moving the 700MHz and 2.5GHz bands to their higher value use and the impact any delay would have on Australia's economic productivity, consumer choice and government revenue (including rebates on spectrum licence fees).

3. What allocation mechanisms should the ACMA take into account when considering the highest value use of the spectrum?

The ACMA today uses a range of allocation mechanisms, all of which have a role to play depending upon the level of demand for a particular band and the extent to which that demand is contested.

It is AMTA's view that the ACMA should carry out a cost benefit analysis (similar to the total welfare analysis that has previously been undertaken by the ACMA) when considering the highest value use of spectrum.

Factors such as the public interest, international harmonisation, the transition costs of reallocating the proposed band and the economic benefit of the services which are likely to be provided as a result of the proposed reallocation should be taken into account as part of this analysis.

AMTA notes that the USA's spectrum strategy includes plans to use incentive auctions to potentially free up spectrum currently used for television broadcasting for mobile broadband. Such a strategy could be worthy of consideration in an Australian context.

4. ***What public interest arguments are there for reviewing the existing arrangements for a band, or alternatively, not reviewing the existing arrangements for a band?***

It is widely accepted both in Australia and internationally that we are facing a spectrum "crunch". Julius Genachowski, Chairman of the FCC, has said:

> "*...the clock is ticking on our mobile future. The FCC is an expert agency staffed with first-rate employees who have been working on spectrum allocation for decades – and let me tell you what the career engineers are telling me. Demand for spectrum is rapidly outstripping supply. The networks we have today won't be able to handle consumer and business needs.*
>
> *And it's not like daylight savings – you can't just turn back the clock. We can't solve this problem in an instant. It will take time to reallocate spectrum.*
>
> *That's why we simply can't afford to wait.*
>
> *To avoid this crisis, the National Broadband Plan recommended reallocating 500 megahertz of spectrum for broadband, nearly double the amount that is currently available."*[4]

In light of the looming spectrum shortage, AMTA strongly believes it is in the public interest to review the existing arrangements where it appears that the band is not being used efficiently or there may be alternative, higher value, uses for the band.

There is much evidence that the Australian public is increasingly using mobile devices to access the internet. In a recent report by the ACMA it was found that during December 2010, 3.1 million persons accessed the internet via their mobile phone handset, compared to 1.9 million during December 2009.[5]

The review of Australia's current spectrum band plans and development of a comprehensive strategy and policy response to the much evidenced increasing demand for mobile broadband and the looming spectrum crunch is clearly in the public interest.

[4] Julius Genachowski "The Clock is Ticking" remarks on broadband, Washington DC March 16, 2011
[5] The internet service market and Australians in the online environment, ACMA Report, 5 July 2011

AMTA supports the use of the following public interest test criteria when assessing whether existing arrangements for a band should be reviewed:

- productivity – greater economic activity per unit of input
- consumer benefits – increased product choices, volume and affordability;
- investment – stimulate economic activity and enable high service standards;
- technological innovations – encourages creativity and investment, as well as contributing toward productivity and competition; and
- competition – more competitive markets.

5. What factors should the ACMA take into account when attempting to balance both "certainty" and "flexibility" in its spectrum management arrangements?

While it is imperative that the ACMA and the industry plan for the longer term, there are also short-term considerations that must be addressed in parallel with planning the longer term strategy.

In the short to medium term, Australia, along with the rest of the world is facing a looming spectrum crunch.

> "*Multiple expert sources expect that by 2014, demand for mobile broadband and the spectrum to fuel it, will be 35 times the levels it was in 2009. Cisco has projected a nearly 60X increase between 2009 and 2015. This compares to spectrum coming on line for mobile broadband that represents less than a 3X increase in capacity. The looming spectrum shortage is real...* "[6]

The most significant factors the ACMA should take into account when attempting to balance both 'certainty' and 'flexibility' in its spectrum management arrangements are:

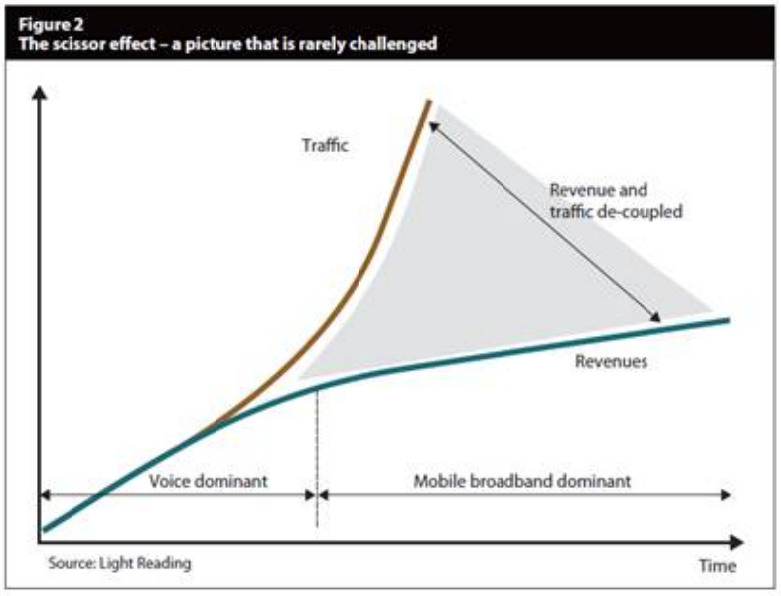
- the length of investment cycles;
- timeframes for return on investment; and
- the social and commercial significance of the particular frequency band, judged against public interest criteria (as discussed in response to 4).

Investment in telecommunications networks requires significant capital outlay and the return on such investment is only realised in the longer term. Decisions to invest when returns are long-term are not taken lightly and there is an extended business cycle to consider.

Further, even as demand is increasing, revenue rates for mobile telecommunications are falling. Mobile devices and services are no longer luxury items, but have become basic commodities. However, the underlying infrastructure of a mobile network still requires significant investment and long-term planning. This leaves mobile network

[6] Julius Genachowski, "The Clock is Ticking" remarks on broadband Wash DC March 16, 2011

operators faced with difficult choices to make and when uncertainty is added to the equation, there may be significant repercussions for Australian consumers.



[illegible]

This trend illustrated in the above graph means that industry, more than ever, requires certainty that investment in infrastructure will be worthwhile.

For these reasons, in the short term industry requires early certainty about the arrangements in the upcoming spectrum auctions for the assignment of spectrum in these bands as well as the renewal of existing spectrum licences.

The baseline demand for mobile broadband spectrum in Australia.

6. Are the ACMA's assumptions on establishing a baseline for demand correct?

AMTA wants to better understand the ACMA's assumptions used to establish a baseline for mobile broadband spectrum demand.

AMTA is concerned that the ACMA has:

- overestimated currently available spectrum;
- underestimated future demand. In particular, AMTA is concerned with the ACMA's assertion that future demand for spectrum will plateau at some stage (rather, AMTA considers it more likely that spectral efficiencies will plateau), and AMTA is not aware of any other analyses that come to the same conclusion as the ACMA's regarding demand levels;
- not taken into consideration the variations between spectrum availability in metropolitan and regional areas;
- overestimated the potential improvements that can be achieved from increasing spectral efficiency with LTE. AMTA suggests that the rate of potential improvement in average efficiencies (over a cell coverage area) will be significantly less than the ACMA forecasts (perhaps reaching 3.5 bits/sec/Hz in 2020); and
- overestimated the potential to decrease cell size and increase the number of cells. The ACMA's prediction that the industry can halve cell sizes and quadruple the number of cells is unrealistic considering typical community reactions to new cell towers, physical constraints of the environment and the expected levels of investment in infrastructure.

AMTA also questions the ACMA's assumption that demand for mobile broadband was met in 2007 and considers that this assumption needs to be investigated further if we are to establish a reliable baseline.

In conclusion, AMTA suggests that the ACMA's forecast is significantly underestimating the future demand for spectrum. AMTA would like to see a more transparent analysis undertaken by the ACMA, working in close consultation with industry. A shared understanding of the base level of spectrum demand is critical to the industry and the ACMA progressing with the next phase of spectrum planning work.

7. ***Are there other strategies to establish spectrum demand that the ACMA has not thought of, or applied?***

   AMTA strongly believes that industry and government must form a partnership to deliver a spectrum policy roadmap that will detail how demand for mobile broadband in Australia is expected to be met. The work of this partnership must be transparent and focused on a realistic assessment of current spectrum uses and future demand as well as the need to provide certainty for industry's investment planning processes.

   Commercial decision-making processes must be aligned with government processes and when government processes are not transparent or are delayed this will inevitably lead to commercial outcomes where investment in infrastructure is slowed to the extent that customer expectations are not met.

   There is a significant risk that Australian mobile networks will be faced with congestion issues and degradation of service levels that will have productivity impacts if fundamental spectrum policy decisions are not made in a timely fashion.

Strategies to address increased demand

8. ***What are some of the emerging technologies that providers may consider deploying in their respective network architecture in the next 5 to 10 year period?***

   It is expected that Australian network operators will deploy LTE and LTE Advanced systems over the next decade and that this will be a significant step forward in terms of achieving more efficient use of spectrum and meeting customer expectations for mobile broadband services. It is critical that enough spectrum be made available to allow for the roll-out of competitive LTE and LTE Advanced services.

   AMTA also considers that the need for new spectrum in bands that cannot support symmetrical FDD configurations may make future TDD allocations more attractive for mobile broadband deployment in Australia. The opportunity to use Advanced LTE for asymmetric FDD (downlink) capability in some bands could also be a useful option.

   Other emerging technologies are less likely to gain widespread deployment by 2020. For example, cognitive radio is still in the early stages of development and is unlikely to be adopted on a wide scale by 2020.

   Demand off load technologies, such as Femtocells have been deployed by some mobile network operators however the impact these emerging technologies will have on meeting future demand is expected to be small.

AMTA also notes that '*broadcast usage off loa*ding' via the use of connected TV sets over the NBN has not been analysed for its potential to increase the supply of spectrum for mobile use.. A strategic long term analysis, such as the 2020 paper, would greatly benefit from reviewing all significant and realistic spectrum supply and demand scenarios.

9. ***Should particular new or emerging technologies be considered a higher priority than others? Why is this the case?***

   LTE and LTE-Advanced are internationally accepted technologies which in AMTA's opinion are likely to be the most commercially viable of the emerging technologies and provide the greatest benefit over the period leading up to 2020.

   Other technologies that are likely to be of use in the short to medium term include greater sectorisation of existing sites and offloading traffic to Wi-Fi access points.

   Demand off load technologies, such as Femtocells, are emerging technologies that need to be factored into future demand forecasts. However the impact of these emerging technologies on meeting future demand is likely to be small.

   AMTA's view is that emerging technologies are unlikely to significantly reduce the need for new spectrum allocations for mobile broadband, particularly given that many of these technologies will require additional spectrum in order to be deployed and some emerging applications, such as video, require substantially higher bandwidth per end user.

   However, AMTA considers that deployment of many of the emerging technologies referred to in the Paper will still be useful in helping to address the gap between spectrum supply and demand in the medium to longer term.

10. ***The ACMA notes that some providers have indicated that there may be some constraints on using new technologies, such as femtocells, in current network architecture. What are the current constraints and what arrangements could the ACMA consider introducing that would facilitate their use?***

    Demand off load technologies, such as Femtocells are an emerging technology that needs to be factored into future demand forecasts. However the impact of these emerging technologies on meeting future demand is likely to be small.

11. ***What types of network or system architecture could be implemented by 2015 and beyond?***

    AMTA considers LTE technology will be well established in Australia by 2015, with LTE-Advanced technology likely to be adopted in the period from 2015 to 2020.

    AMTA also expects to see an increase in network heterogeneity by 2015 as a result of increased Wi-Fi offloading and small cell technologies (linked with macrocell architecture) in high density areas.

12. What frequency ranges of operation would these networks or systems require operating in?

AMTA considers that this is a question best answered individually by the mobile network operators as it depends on their own commercial considerations.

Candidate bands for mobile broadband

The following questions are applicable to each of the frequency bands identified in chapter 5 of the Paper.

As a general comment, AMTA strongly believes that it is in Australia's best interests to ensure international harmonisation is achieved wherever possible. This means that we need to carefully consider international developments and directions before acting to change our current band plans.

AMTA also believes it would be more useful if the ACMA's analysis included all bands from 400 MHz upwards. This would allow for a more comprehensive analysis rather than the one undertaken for this Paper that currently displays significant gaps.

13. What interest is there in the identified band for access to provide mobile broadband services? Alternatively, if there is no interest, please indicate why.

Band	Comment
850 MHz band	AMTA refers the ACMA to its submission regarding the ACMA's consultation paper on the 900 MHz band. AMTA believes that the future use of this band is dependent in part on the outcomes of 3GPP work including: • 3GPP transition plan for iDEN LTE services in 806-824/851-869 MHz segments. • 3GPP proposal for expansion of Band 5 to cover 814-849/859-894 MHz segments • ITU Resolution 646 which identifies spectrum within 806-824/851-869 MHz segments for advanced PPDR in the Asia-Pacific region. • APT work on considering options for advanced PPDR in 806-824/851-869 MHz segments.

1.5 GHz band	In light of the international support for using this band for mobile broadband (as noted below), this band should be considered for use in relation to mobile broadband services
Mobile satellite services bands	Refer to individual AMTA member submissions
Meteorological satellite service band	A TDD or asymmetric FDD allocation in this band could be used to provide mobile broadband services in the 1675-1710 MHz segment, provided there is international support for this use
2010–2025 MHz band	This band has potential for mobile broadband use, provided that technological developments (i.e.TDD or asymmetric FDD technology) are able to facilitate that use. However, the relatively small 15 MHz of bandwidth may mean that its allocation to mobile broadband is not commercially viable.
3.3 GHz band	If this band gains international support for use in relation to mobile broadband services, then it may be suitable for a reallocation to this service. In particular, this band could be used for low-coverage, high-capacity solutions.
3.4 GHz band	The 3.4 GHz band has been recognised by the 3GPP as Band 42 and is proposed for TDD services. If TDD downlink-only architecture is introduced, this band would be feasible for TDD deployment for mobile broadband services. However, due to the importance of this band providing international telecommunications satellite connectivity for voice and broadband in Asia Pacific countries, this band may not secure widespread support for mobile broadband services in ITU Region 3. While it may offer significant bandwidth (eg, up to 10 x 20 MHz LTE TDD channels), further studies are required to identify the utility of this band and the 3.8 GHz band for mobile broadband systems.
3.8 GHz band	Refer to individual AMTA member submissions

14. What impact would the introduction of mobile broadband services have on the operation of existing services in the identified band in areas of high, medium and low density?

Band	Comment
850 MHz band	An allocation to mobile broadband is likely to impact existing land mobile and fixed services. An adequate lead time for transitioning these services would be required.
1.5 GHz band	The introduction of mobile broadband services could have a significant impact on existing fixed services including digital radio concentrator systems that are used to deliver Universal Service obligation PSTN access services in regional and remote areas. Alternative options for these services, and a transition plan, would need to be developed, or sharing arrangements would need to be implemented, before this band could be allocated to mobile broadband.
Mobile satellite services bands	Refer to individual AMTA member submissions
Meteorological satellite service band	As discussed under question 16 below, it seems likely that mobile broadband services and meteorological satellite (**MetSat**) services could coexist in this band. However, further investigation is required to understand the likely impact of such a sharing arrangement on existing MetSat services.
2010–2025 MHz band	If this band was used to support urban areas only, it is unlikely to pose any significant impact to existing legacy fixed links. AMTA notes that this band has been earmarked by the ACMA to facilitate the migration of ENG services out of the 2.5 GHz band so it is important that any reallocation to mobile broadband does not disrupt that migration.
3.3 GHz band	AMTA is unable to comment on the impact the introduction of mobile broadband services could have on the existing Defence radiolocation systems in this band.
3.4 GHz band	While there is some European support for the allocation of the 3.4–3.8 GHz range for mobile broadband services, the short propagation range of this frequency range suggests that in Australia it may only be of interest for mobile services in dense urban areas. The band is currently used to provide fixed point-to-multipoint wireless broadband access services (in urban areas) and point-to-point high-capacity fixed links (generally in remote areas). Given the possibility of geographic separation from fixed links, it seems likely that fixed wireless broadband services are the primary services which would be affected by the introduction of mobile broadband services.

3.8 GHz band	Refer to individual AMTA member submissions

15. Is there interest in replanning the identified band to better align spectrum allocations with international standards to support mobile broadband, or more generally?

Band	Comment
850 MHz band	AMTA supports replanning of this band to be aligned with international standards and with the spectrum management principles, and encourages the ACMA to monitor international developments in this band.
1.5 GHz band	AMTA is interested in the replanning of this band to better align it with international standards, and notes that this band falls within the existing 3GPP Bands 11 and 21 (and is therefore covered by relevant standards which the ACMA could use in band planning). Japan currently uses this band to support mobile broadband, and the European Parliament has also expressed support for use of this band to provide mobile broadband.
Mobile satellite services bands	Refer to individual AMTA member submissions
Meteorological satellite service band	3GGP is not currently considering this band for use for mobile broadband services. However, it is possible this band may gain international support for use in relation to mobile broadband following the approval of a new Agenda Item focused on providing additional spectrum for IMT systems to be considered at WRC-12.
2010–2025 MHz band	At this stage, AMTA is not aware of any firm international support for use of this band for mobile broadband services. However, it notes that the UK has considered this band for potential allocation to mobile broadband services.
3.3 GHz band	AMTA supports replanning this band. While AMTA understands that the 3.3 GHz band has not been identified by 3GPP as a candidate band for mobile broadband at this stage, this band may emerge as a candidate following agreement at WRC-12 for a new Agenda Item focusing on identification of new bands for IMT systems. Subject to Defence making the band available, AMTA believes any replanning would be straightforward.
3.4 GHz band	AMTA is not aware of any interest in replanning this band.
3.8 GHz band	AMTA is not aware of any interest in replanning this band.

16. Could sharing arrangements be developed to support the coexistence of mobile broadband services with incumbent services?

Band	Comment
850 MHz band	Give the need for nationwide mobile broadband coverage and the dynamic nature of these services, AMTA suggests that sharing arrangements with incumbent services are unlikely to be practical.
1.5 GHz band	Sharing arrangements could be developed to enable ongoing usages by fixed point-to-point and point-to-multipoint services in rural and remote areas (possibly with licences for mobile broadband being limited to major metro and regional areas).
Mobile satellite services bands	Refer to individual AMTA member submissions
Meteorological satellite service band	Given MetSat earth stations are fixed and are usually located in quiet areas, it may be possible to implement sharing arrangements in this band. However, further investigation is required to test this possibility.
2010–2025 MHz band	Sharing arrangements in this band could be viable to facilitate mobile broadband in urban areas and the continued operation of fixed links in rural and regional areas.
3.3 GHz band	AMTA cannot comment on the impact of a mobile broadband allocation on incumbent Defence radiolocation systems.
3.4 GHz band	Mobile broadband services could co-exist with fixed links given the likely geographic separation between the services. AMTA does not consider that co-existence with fixed wireless broadband services would be feasible. A mobile broadband deployment could therefore only be considered after existing spectrum licences expire in 2015.
3.8 GHz band	Refer to individual AMTA member submissions

17. What quantum of spectrum could be made available for mobile broadband services in the band? How much contiguous spectrum would be required (FDD, TDD or both)?

Band	Comment
850 MHz band	AMTA refers the ACMA to its submission regarding the ACMA's consultation paper on the 900 MHz band. AMTA believes that the future use of this band is dependent in part on the outcomes of 3GPP work including: • 3GPP transition plan for iDEN LTE services in 806-824/851-869 MHz segments. • 3GPP proposal for expansion of Band 5 to cover 814-849/859-894 MHz segments • ITU Resolution 646 which identifies spectrum within 806-824/851-869 MHz segments for advanced PPDR in the Asia-Pacific region. • APT work on considering options for advanced PPDR in 806-824/851-869 MHz segments.
1.5 GHz band	A minimum allocation of 2x35 MHz FDD segments could be made available for mobile broadband in this band. Until filter technologies improve, the 13 MHz mid-band gap envisaged by 3GPP is likely to be the minimum mid-band gap that could be implemented in this band.
Mobile satellite services bands	Refer to individual AMTA member submissions
Meteorological satellite service band	In light of the relatively small bandwidth available for mobile broadband use in this band (totalling 35 MHz) and the lack of a readily implemented mid-band gap, this band may only be feasible for TDD services or asymmetric FDD services.
2010–2025 MHz band	Given the small amount of spectrum available in this band, AMTA suggests that TDD services would be most viable in this band. This view is supported by the 3GPP identification of this band for TDD services.
3.3 GHz band	As at least 100 MHz of spectrum is available, both FDD and TDD services could potentially be used in this band. The large bandwidth would allow for a band plan similar to that used in the 2.6 GHz band (ie, FDD services with the mid-band gap used for TDD services). International developments are likely to dictate the most viable planning options.

3.4 GHz band	At present the band is recognised by the 3GPP for TDD services. Given the quantum of spectrum available long-term, there are possibilities for FDD and TDD services, including a planning option involving FDD services with TDD services allocated in the mid-band gap. International consensus would need to develop further before the most viable planning option could be determined.
3.8 GHz band	Refer to individual AMTA member submissions

18. Is there interest in FDD, TDD or both access methods operating in the band?

Band	Comment
850 MHz band	In light of international trends and the other services occupying or likely to occupy this band, AMTA considers it unlikely that it would be viable for TDD to operate in this band. However, as noted above, there is potential for FDD to operate in this band.
1.5 GHz band	As noted above, there is potential for FDD services to be provided using this band. It seems unlikely that it would be feasible to provide TDD services using the 13 MHz mid-band gap referred to above.
Mobile satellite services bands	Refer to individual AMTA member submissions
Meteorological satellite service band	For the reasons noted in question 17 above, this band may only be feasible for TDD or asymmetric FDD services.
2010–2025 MHz band	For the reasons noted in question 17 above, this band may only be feasible for TDD or asymmetric FDD services.
3.3 GHz band	As noted in question 17 above, this band may be feasible for both FDD and TDD services.
3.4 GHz band	As noted in question 17 above, this band may be feasible for both FDD and TDD services.
3.8 GHz band	Refer to individual AMTA member submissions

Specific questions raise in Chapter 5 include:

19. (MSS Bands) What interest is there in industry for ATC systems to be deployed in Australia?

AMTA suggests that the ACMA wait for the ATC interference issues in the United States (regarding adjacent band interference with Global Navigation Satellite Systems) to be resolved before it permits the deployment of ATC systems in Australia.

AMTA also queries whether the deployment of ATC systems would align with 3GPP specifications, as ATC is a US-based proposal.

20. (The 2010-2025 MHz band) What impact would the introduction of mobile broadband services in regional and remote areas have on the future operation of ENG services in the band?

In AMTA's view ENG and mobile broadband services will not be able to co-exist in Australia without a substantial geographic separation.

Introducing mobile broadband services into the 2010 – 2025 MHz band may also impact on legacy fixed links which use the 2010 – 2025 MHz spectrum. However, coordination with these services may enable a suitable sharing arrangement.

21. (Bands greater than 4.2 GHz) What bands above 4.2 GHz do stakeholders feel could be released for mobile broadband?

While bands above 4.2 GHz are not useful for traditional macrocell deployment (given their limited propagation characteristics), these bands could be used for very short range, high-capacity network augmentation (eg, microcells, femtocells and picocells) and for "offload" target technology (eg, 802.11ad Wi-Fi).

These uses would be at specific very high-demand density locations or for very short range uses. AMTA suggests that these bands should be investigated as part of the future solutions for mobile broadband. However, without any international consensus on planning arrangements above 4.2 GHz, there would be no utility in releasing segments in this range in the short term.

22. What international activities are stakeholders aware of that could result in the potential release of bands above 4.2 GHz for the purposes of mobile broadband?

AMTA is not aware of any international activities focusing on bands above 4.2 GHz that would support deployment of mobile broadband systems. However, pending consideration of the proposed new Agenda Item at WRC-12, bands above 4.2 GHz may attract interest for specific future IMT service categories or deployment scenarios.

23. What are the expected timeframes the ACMA could release bands above 4.2 GHz for the purposes of mobile broadband?

AMTA recommends that any release of spectrum for mobile broadband in these bands should wait until international developments in these spectrum bands emerge.

In particular, AMTA notes that results from ITU-R studies emerging from the proposed new WRC-12 Agenda Item are expected around late 2012. These studies may provide further guidance on planning above 4.2 GHz.

24. Could bands above 4.2 GHz provide the necessary spectrum to support femtocell infrastructure? If so, how much contiguous (or non-contiguous) spectrum would be required (please specify the bands identified)?

In the short to medium term AMTA does not support the allocation of any band above 4.2 GHz that is not already identified for mobile services for femtocell architecture. Support for femtocell bands needs to be built into end-user equipment, so international acceptance of any femtocell band proposal will be critical. Such allocations may be possible in the longer term once international planning outcomes are clearer.

In the long term, frequencies above 4.2 GHz could also be used for short range communications (including microcells, femtocells and picocells) generally. Wider bandwidths will be easier to identify within allocations at these high frequencies so this may be an ideal opportunity to exploit the capabilities of LTE-Advanced. While further work is required to identify the bandwidths LTE-Advanced will require, it may be that bandwidths of around 100 MHz per licensee would be optimal (so that a total allocation of 2x300 MHz with a mid-band gap would be ideal).

Such a plan would be ideal for small cell (e.g. picocell) deployment and may be shared across femtocells in 20 MHz or larger blocks.Summary

25. Where do stakeholders believe additional pressure will be placed on backhaul requirements in relation to specific frequency bands and geographic areas as a result of the increasing demand for mobile broadband?

The growing demand for faster mobile broadband means that mobile network operators will increasingly rely on fibre backhaul solutions where possible.

However, in some areas provision of fibre-based backhaul will remain challenging due to topographical features. In these cases radio backhaul to a hub site will continue to be required. This hub may be up to hundreds of kilometres from the mobile base station. In areas where fibre-based backhaul is not possible or economic, AMTA expects that there will be increased demand for spectrum to support wireless backhaul.

26. Do stakeholders believe the NBN will provide a role in reducing the requirement for microwave backhaul; in bands below 5 GHz?

The NBN will be part of the solution to counter the overall demand for backhaul to support the growth in mobile broadband services in bands below 5 MHz by enabling some carriers to reduce the requirement for microwave backhaul and should be factored into future demand.

However, at this stage the NBN's contribution cannot be quantified.

In addition, the NBN may make options for traffic unloading onto broadband connections (via Wi-Fi or femtocells) more appealing in the future, which would reduce pressure on mobile network backhaul links.

Conclusion

AMTA welcomes the opportunity to comment on the ACMA's analysis of future spectrum requirements for mobile broadband. AMTA considers the Paper to be a useful first step towards defining a mobile broadband spectrum policy roadmap for Australia.

AMTA concurs with the ACMA that mobile broadband is an enabling force in Australia's developing digital economy.

Given the increasing economic and social influence of the mobile sector particularly via mobile broadband, AMTA strongly supports a detailed and holistic consideration of the mobile industry's spectrum needs.

Against this background AMTA is planning further research to analyse and quantify the current contribution made by the mobile sector to Australia's economy and remains committed to working with the ACMA, DBCDE and the central agencies of Government on the corresponding Australian spectrum policy settings.

Please contact Lisa Brown, Policy Manager, AMTA, if you have any questions concerning this submission. Ph: 02 6239 6555.