

Submission to the Australian Communications and Media Authority

Beyond 2020— A spectrum management strategy to address the growth in mobile broadband capacity

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Contents

1	Executive Summary	1
2	General observations	2
	2.1. Introduction	2
	2.2. Additional spectrum is required after 2019	2
	2.3. A greater sense of urgency is required	2
	2.4. The focus of Strategy 1 must be broadened	3
	2.5. Future spectrum options need to be proactively explored	3
	2.6. Solutions must be found for incumbents	3
	2.7. The quantity of available spectrum is over estimated	4
3	Comments on specific sections of the discussion paper	5
	3.1. Mobile Broadband – Context	5
	3.2. Addressing mobile broadband capacity growth	5
	3.3. Proposed mobile broadband strategies and work program	5

1 Executive Summary

Telstra welcomes the ACMA revisiting its spectrum management strategies to ensure that mobile operators will be able to provide sufficient capacity to meet the ongoing growth in demand from customers for mobile broadband services.

Telstra's customers are seeking faster speeds, more coverage and smarter devices as they become increasingly dependent on applications delivered via mobile broadband for their business and personal activities. Mobile broadband is also playing an increasingly essential role in enabling technology and innovation for the future productivity and competitiveness of the Australian economy. Telstra is continually improving its mobile broadband network to deliver these outcomes.¹

Telstra agrees with most of the ACMA's findings in the paper and the overall direction of the strategy, including the shift away from a focus on explicit quantitative targets of spectrum towards a contingency planning model; the five guiding strategies; and the four step process for identifying and allocating further mobile broadband spectrum. However, there are several aspects of the proposed approach which Telstra believes require further consideration and refinement.

- Telstra considers that sufficient spectrum is likely to be available for mobile broadband in the period leading up to the 2019 ITU World Radio Conference (WRC), noting the pending re-farming of some existing mobile bands and the opportunity to allocate new bands identified at the 2015 WRC. However, additional spectrum will be required after the 2019 WRC.
- The discussion paper considerably over estimates the aggregate amount of spectrum that is actually available in practice for the deployment of mobile broadband. In a number of bands the identified spectrum is of limited utility for competitive mobile broadband services due to factors such as the limited bandwidths available; fragmented holdings; band plan inefficiencies; and lack of a supporting global technology ecosystem.
- The proposed approach in the discussion paper will not be effective unless it is also accompanied by sense of priority and urgency. Australia cannot afford to take a 'wait and see' approach to mobile broadband spectrum if it seeks to remain a leading regional (and global) economy, offering a competitive environment for investment and services.
- The focus (in Strategy 1) on the efficient use of existing mobile broadband spectrum holdings should be broadened and applied more generally to all users of the radio spectrum resource. All spectrum users have a role to play in ensuring spectrum is used efficiently and moved to higher value uses (such as mobile broadband) over time.
- It is critical that a more proactive approach to fostering new regional and international spectrum options for mobile broadband is adopted by the ACMA in the future. If such options are not created then the Australian mobile industry will have fewer spectrum choices in the future and will be less responsive to the demands of its customers.
- Solutions must be found for encouraging incumbent licensees to make way for new uses such as mobile broadband. The proposals in the spectrum review to move towards a more unified and liberalised spectrum licensing regime, including a greater use of market forces, should assist in this regard. In situations where the government continues to reallocate spectrum, incumbents should either be (a) offered compensation for the costs incurred, or (b) given incumbency rights for a period of time during which they have the option of negotiating a commercial arrangement with the new owner (to either exit early or extend the tenure).

¹ "Telstra will increase its total capital expenditure to 15% of sales for the next two years, providing more than another half a billion dollars for its mobile network. In total, over the three years to June 2017, Telstra expects to invest more than \$5bn into its mobile network" - Andrew Penn, Telstra CEO, presentation to the Telstra Annual General Meeting, 13 October 2015, http://www.telstra.com.au/uberprod/groups/webcontent/@corporate/@about/documents/document/uberstaging_297418.pdf

2 General observations

2.1. Introduction

Telstra concurs with many of the ACMA's findings in the paper and the overall direction of the strategy. However, there are several aspects of the proposed approach which Telstra believes require further consideration before the paper is finalised.

Telstra supports the ACMA abandoning its focus on explicit quantitative targets of spectrum to be made available for mobile broadband, and shifting towards a contingency planning model focused on the outcome of mobile broadband capacity growth that will enable the right spectrum to be made available, at the right time, for mobile broadband. Telstra agrees that this new approach should allow the ACMA to be more flexible and responsive to the rapidly changing environment. However, the effectiveness of this approach will depend on how it is implemented.

Telstra supports the five strategies and four stages that the ACMA has proposed to guide the future identification and allocation of additional spectrum suitable for mobile broadband. However, a stronger proactive stance and greater sense of urgency needs to be applied to these proposed measures, noting both the rapid ongoing growth in mobile broadband demand and the long lead times involved in identifying and re-farming new spectrum. The efficiency objectives in Strategy 1 also need to be explicitly applied to all spectrum users (not only to mobile broadband users) to encourage spectrum to be freed up and moved to higher value uses (such as mobile broadband) over time.

2.2. Additional spectrum is required after 2019

The discussion paper concludes that sufficient spectrum is available for mobile broadband in the short-to-medium term. However, the paper does not explain what is meant by short-to-medium term.

Telstra considers that sufficient spectrum is likely to be available for the period leading up to the 2019 ITU World Radio Conference (WRC). This view is based on the assumption that during this period several existing mobile bands (i.e., 900 MHz, 2.1 GHz, 3400-3575 MHz) will be re-farmed and additional new bands (such as 1427-1518 MHz and 3575 3700 MHz) will be made available for the deployment of new infrastructure. The spectrum in these bands will support operators with the further building and densification of mobile network infrastructure in a cost effective manner and without unduly escalating community concerns about the deployment of additional infrastructure

However, Telstra believes the situation will change after the 2019 WRC, when additional spectrum will eventually be required to address the ongoing growth in 4G mobile broadband traffic (largely driven by video content), new traffic growth from the Internet of Things, and the deployment of 5G technologies (initial trials are envisaged around the time of the 2019 WRC with commercial deployment starting shortly thereafter).

2.3. A greater sense of urgency is required

Telstra is concerned that the proposed approach in the discussion paper will not be effective unless it also given a sense of priority and urgency. Given the long lead times to identify and harmonise spectrum within the ITU framework, and noting the need to give incumbents adequate time to migrate to alternative delivery options before spectrum is re-farmed, it is critical that potential spectrum options are identified and explored as early as possible. Australia cannot afford to take a 'wait and see' approach to mobile broadband spectrum if it seeks to remain a leading regional (and global) economy offering a competitive environment for new investment and services.

Telstra accepts the need for a spectrum identification and allocation process similar to the four step process proposed in Strategy 2 but is concerned that the timeline to work through the four steps will not be responsive enough. The process does not have to be serial and some steps could be processed in

parallel. Telstra is also concerned that bands in the Stage 0 monitoring category will simply languish and never reach Stage 1. Telstra questions why spectrum bands that are to be considered at the 2015 WRC are regarded as being in Stage 0 when they really need to have been progressed through the Stage 1 investigation to inform the Australian position at the conference. For example, it is expected that the Australian delegation at the 2015 WRC will be required to make decisions on a future agenda item for identifying bands above 6 GHz, but Table 3 on page 49 of the discussion paper indicates that these bands are still in the Stage 0 monitoring phase.

2.4. The focus of Strategy 1 must be broadened

Telstra considers that the focus in Strategy 1 on the efficient use of existing mobile broadband spectrum holdings should be broadened and applied more generally to all users of the radio spectrum resource. This broader focus is essential for freeing up new spectrum for mobile broadband and other higher value uses of spectrum. All spectrum users should be continuously encouraged to use their assigned resources in the most efficient way possible. This can be achieved through the increased use of market forces and pricing signals, spectrum planning reviews, and fostering co-operative spectrum sharing arrangements.

2.5. Future spectrum options need to be proactively explored

Strategy 5 of the discussion paper (page 48) indicates that the ACMA will seek to influence international and regional forums to promote mobile broadband spectrum options that are viable for possible implementation in Australia. Telstra supports this approach and notes that Australia's role in developing and promoting the Asia-Pacific 700 MHz band plan is a great example of how it can influence international outcomes.

However, the ACMA's current practice does not always seem to be consistent with the proposed approach. For example, at least some of the 2700-2900 MHz band is viable for possible mobile broadband deployment in Australia but the ACMA has chosen to adopt a 'wait and see' approach to this band at the 2015 WRC rather than actively exploring the opportunity.

Telstra believes a more proactive approach to fostering regional and international spectrum options for mobile broadband needs to be adopted in the future. Options which are agreed internationally can then be taken up in Australia as domestic demand emerges and after any impacts on incumbents are considered. If such options are not created, the Australian mobile industry will have fewer spectrum choices in the future and will be less responsive to the demands of its customers.

Telstra notes that the third recommendation in the Government's spectrum review report² proposes that government entities be incentivised to lease and/or sell their spectrum holdings to other parties. This reform will be of little practical value unless Australia is also willing to promote alternative uses for the relevant spectrum bands at the ITU and in other international forums. Alternative uses need to be harmonised internationally if these bands are to be of value to other users in Australia. Again, this points to the need for Australia to be proactive in identifying and promoting alternative spectrum options for mobile broadband (and other services) within the ITU framework.

2.6. Solutions must be found for incumbents

Freeing up spectrum for mobile broadband requires existing incumbents to make way for the new uses. Understandably, incumbents are reluctant to do so when it requires them to write off existing infrastructure investment and incur the cost of migrating to alternative options. The challenge of moving incumbents will only increase as more bands which are already heavily utilised are considered for mobile broadband use.

² Available at <https://www.communications.gov.au/publications/spectrum-review-report>

The current government review of the spectrum management framework provides a timely opportunity to address this problem. The proposals in the review to move towards a more unified and liberalised spectrum licensing regime, including a greater use of market forces, should assist in creating commercial incentives for incumbents to change their use of spectrum. In situations where the government continues to reallocate spectrum, Telstra believes it is only reasonable that incumbents should either be (a) offered compensation for the costs incurred, or (b) given incumbency rights for a period of time during which they have the option of negotiating a commercial arrangement with the new owner (to either exit early or extend their tenure).

2.7. The quantity of available spectrum is over estimated

Telstra considers that the discussion paper over estimates, by a considerable margin, the aggregate amount of spectrum that is actually available in practice for the deployment of mobile broadband services in Australia - as outlined on page 9, Figure 9 on page 22, and in Appendix A of the discussion paper. The reason is that much of the identified spectrum is of limited utility for competitive mobile broadband services due to factors such as the limited bandwidths available, fragmented holdings, band plan inefficiencies, or a lack of a supporting global technology ecosystem. The following table sets out Telstra's concerns about the bands where the paper appears to be over estimating the quantum of useful spectrum available.

Band	Comment
800 MHz band	The 800 MHz assignments (5/10 MHz FDD) in Australia are currently used for the delivery of 3G voice, messaging and broadband services. These 3G services are becoming superseded by 4G services, but it will not be possible to decommission them for some time. In the meantime, this band can only make a limited contribution to the delivery of competitive mobile broadband services.
900 MHz band	The current 900 MHz assignments (8.3 MHz FDD) in Australia are inefficient for mobile broadband, and the only possible channel bandwidth (5 MHz) is no longer a competitive mobile broadband proposition in the market. The band needs to be re-farmed so it can make a more useful contribution towards the delivery of mobile broadband services.
1900 MHz band	The 1900 MHz band is still used for fixed services, including electronic news gathering, in regional areas. This factor, along with the lack of a global mobile broadband technology ecosystem, means that this band is currently not useful for the delivery of mobile broadband services.
2.1 GHz band	The assignments in the 2.1 GHz band are heavily fragmented, and unsuitable for the deployment of competitive mobile broadband services. Instead, the band continues to be used for delivery of 3G services that are becoming superseded by 4G services. The band needs to be defragmented (including offering unassigned lots to interested parties) so that it can make a more useful contribution towards the delivery of mobile broadband services.
3.5 GHz band	The 3.5 GHz band is heavily fragmented and not planned for the efficient delivery of competitive mobile broadband services – especially in metro and regional areas. The band needs to be replanned and defragmented before it can make a more useful contribution towards the delivery of mobile broadband services.
3.6 GHz band	The 3.6 GHz band is yet to be identified by the ITU for mobile broadband and it lacks a global mobile broadband technology ecosystem. This band has been released under site-specific (apparatus) licensing arrangements in regional/remote areas but remains unavailable in metro areas due to an ACMA licensing embargo. These factors have meant that the band has not been attractive for the deployment of mobile broadband services.

3 Comments on specific sections of the discussion paper

3.1. Mobile Broadband – Context

As explained in section 2.7, the paper overestimates the quantity of spectrum currently available for mobile broadband. Figure 9 and Table 1 need to be revised accordingly.

3.2. Addressing mobile broadband capacity growth

Network infrastructure and topology (page 32)

The discussion paper overlooks the increasing level of community concern associated with the deployment of new mobile base station sites and infrastructure. Network operators in Australia (and those in many other countries) are finding that obtaining the necessary approvals for construction of additional base-stations, to increase coverage and capacity, is becoming increasingly difficult and costly.

For this reason, and contrary to the assumption on page 33 of the discussion paper, network densification is not always a viable option to address the growth in demand for mobile broadband capacity. This factor needs to be taken into account as part of any ACMA assessment into the need for additional mobile broadband spectrum resources.

3.3. Proposed mobile broadband strategies and work program

Strategy 1

The discussion paper seems to overlook network implications associated with the use of small-cell and Wi-Fi off-load options:

To be effective, small-cells must utilise a spectrum band distinct and separate from the macro-layer, to avoid creating regions where the small-cells cause coverage disruption (interference) and directly degrade macro capacity. A separate band for small-cells has not yet been made available in Australia, so only a limited deployment of small-cells has occurred. The 3.5 GHz and 3.6 GHz bands are expected to be useful for this purpose in the future, subject to the former being replanned for mobile use, and the latter being identified by the ITU for mobile broadband and released accordingly in Australian metro and regional areas.

Telstra is in a good position to assess the extent of Wi-Fi off-load given that it has rolled out 3,500 public Wi-Fi hotspots. To date, Wi-Fi has not driven any noticeable off-load impact on Telstra's macro-cell network. Telstra considers that this is mainly due to Wi-Fi coverage and performance limitations delivering a customer experience which is not as good as that from mobile broadband, even at pedestrian mobility levels. Instead, the public Wi-Fi service appears to be generating new broadband demand, due to customers extending their home Wi-Fi usage expectations to external venues such as cafes, train stations, tram stops, parks and public buildings. No noticeable change in traffic levels has been observed on Telstra's macro cells.

Proposed work program

Telstra recommends that the following changes be made to the work program:

- As well as the potential for spectrum in the 3575-3700 MHz range to be allocated as spectrum licences for mobile broadband (subject to the outcome of the 2015 WRC) there is opportunity for some or all of the remaining apparatus licensed spectrum in the 3400-3575 MHz band to be allocated as spectrum licences. Telstra also notes that the ACMA has identified the release of PTS apparatus licences for NBN Co as a re-farming stage (Stage 3) item in the work programme. Rather than treating each of these items separately, Telstra recommends they be incorporated into a new

work item which considers the allocation of spectrum for mobile broadband (and other potential uses) across the entire 3400-3700 MHz frequency range, subject to there being no lessening of the rights associated with the spectrum licences that are due to be reissued and restacked in December 2015. This approach is more likely to result in an optimal allocation of spectrum across this broader frequency range. Telstra believes this new item should be identified as being in the preliminary planning stage (Stage 2) and that the ACMA should seek to progress the work shortly after the outcome of the 2015 WRC is known (i.e., in 2016).

- Telstra believes there has been sufficient international and domestic interest for the 2700-2900 MHz band to be moved from the monitoring stage (Stage 0) to the initial investigation stage (Stage 1).
 - Telstra believes the bands above 6 GHz should also be moved from the monitoring stage (Stage 0) to the initial investigation stage (Stage 1), on the basis that the Australian delegation to the 2015 WRC needs to make informed decisions about the bands above 6 GHz that will be considered as part of a future agenda item for the 2019 WRC.
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