



Air Navigation Services

GPO Box 367
Canberra City 2601

t (02) 6268 5443

f (02) 6268 5191

www.airservicesaustralia.com

ABN 59 698 720 886

The Manager
Spectrum Planning Section
Spectrum Infrastructure Branch
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

Dear Sir/Madam

Thank you for the opportunity to provide comments on the ACMA's discussion paper *Future use of the 1.5 GHz and 3.6 GHz bands* considering the use of the bands for mobile broadband (MBB) services. Airservices Australia (Airservices) appreciates that internationally both the 1.5 GHz and 3.6 GHz bands are being considered for MBB, and that the ACMA need to determine whether the 1.5 GHz and 3.6 GHz bands should progress to the *preliminary re-planning* stage of the ACMA's process for consideration of additional spectrum for MBB services. This paper only provides comments on the 1.5 GHz band. Airservices wants to ensure its fixed service infrastructure in the 1.5 GHz band, used to carry critical Air Traffic Control (ATC) traffic between sites, is not adversely impacted by replanning timelines.

Airservices represents the Australian civil aviation community in national and international forums on aviation radiofrequency spectrum issues. Under agreement with the ACMA, Airservices is responsible for the endorsement of all frequency assignments made in the civil aeronautical bands. Airservices also makes use of other parts of the radiofrequency spectrum to support its wide spread Airways systems, including fixed service infrastructure in the bands 900 MHz, 1.5 GHz and 1.8 GHz, used for remote monitoring and carriage of critical ATC traffic between sites. All these fixed service bands have been, or are currently being, reviewed by ACMA to accommodate MBB resulting in Airservices having to migrate the services to other bands at significant cost.

On 2 July 2012, Airservices responded to the ACMA Discussion Paper *Replanning the 1.5 GHz Mobile Band* advising that Airservices could support replanning of the 1.5 GHz band for MBB services provided sufficient time is given to allow existing fixed links operating in the band opportunity to migrate to another band. The response also requested that migration options for the incumbent services be specified by the ACMA going forward. Airservices also responded on 15 July 2011 to the ACMA Discussion Paper *Towards 2020 - Future Spectrum Requirements for Mobile Bands* advising that Airservices utilises the 1427-1535 MHz band to carry critical ATC traffic between sites. This response expressed concerns that the proposed planning options may result in Airservices having to vacate the 1.5 GHz band within the next few years.

There are currently 16 communications links deployed by Airservices in the 1.5 GHz band. These communications links comprise 8 paired assignments for low-capacity, two-frequency fixed point-to-point services operating in the bands 1428.5-1474.5 MHz paired with 1489-1535 MHz. Two of the eight paired assignments are scheduled to be replaced in 2017, with the remaining six paired assignments all being located in metropolitan and major population areas. Airservices has long-term plans to migrate all the 1.5 GHz links to the 7.5 GHz band, but at this time there is no funding or project proposal developed. This work is expected to commence in about 3-4 years. Replanning the 1.5 GHz mobile band for MBB services using the FDD arrangements specified by the 3GPP, SDL or UDL arrangements may require Airservices to migrate all the 1.5 GHz fixed links to another band before it is planned and scheduled for.

In summary, Airservices could support the 1.5 GHz band being progressed to the *preliminary re-planning* stage of the ACMA's process for consideration of additional spectrum for MBB services, provided sufficient time is given to allow existing fixed links operating in the band time to migrate to other bands. This is particularly important for those Airservices fixed services used for safety critical systems. The costs for migrating infrastructure is significant and will need to be included in incumbent's forward budget estimates. Airservices anticipates a four year timeframe is required to migrate the 1.5 GHz fixed services, especially as Airservices is also currently migrating 900 MHz and 1.8 GHz fixed service infrastructure.

Detailed comments to the ACMA questions raised in the Discussion Paper *Future use of the 1.5 GHz and 3.6 GHz bands* are provided in Annex A.

Please do not hesitate to contact me should you require any further information.

Yours sincerely,



Eddy D'Amico
Senior Engineering Specialist (RF Spectrum)
Air Navigation Services

2 December 2016

Annex A – Response to ACMA’s discussion paper *Future use of the 1.5 GHz and 3.6 GHz bands*

Qu. #	Question	Response
1.	Should the 1.5 GHz band and/or the 3.6 GHz band be progressed from the <i>initial investigation</i> stage to the <i>preliminary re-planning</i> stage in the ACMA’s process for consideration of additional spectrum for MBB services? Why/Why not?	Airservices supports progression of the 1.5 GHz band from the <i>initial investigation</i> stage to the <i>preliminary re-planning</i> stage <u>provided</u> sufficient timelines are afforded for migration of impacted fixed link channel pairs to alternative bands (i.e. the 7.5 GHz band). No specific comment on the 3.6 GHz band.
2.	Should either of the 1.5 GHz and 3.6 GHz bands be prioritised through the ACMA’s process for consideration of additional spectrum for MBB services? If so, which band? Why?	No specific comment to this question.
3.	Are there specific issues, other than those mentioned, that may affect the timeframe in which the 1.5 GHz or 3.6 GHz bands could be made available for MBB?	Airservices would not be in a position to migrate all of its fixed point-to-point services in the 1.5 GHz band for at least another 3-4 years. A transition arrangement developed taking account migration timings may be a way forward.
4.	If the 1.5 GHz and 3.6 GHz bands are re-farmed for MBB, would there be benefit in allocating the bands simultaneously?	No specific comment to this question.
5.	The ACMA seeks comment on expected future use of the 1.5 GHz band by the fixed, broadcasting and broadcasting-satellite services and by the Department of Defence in Australia.	Airservices currently operates eight paired assignments for low-capacity, two-frequency fixed point-to-point services in the bands 1428.5–1474.5 MHz paired with 1489–1535 MHz. These links carry critical Air Traffic Control (ATC) traffic between sites. There are no plans to install any more links in the 1.5 GHz band. Airservices has long-term plans (no project approval or budget) to migrate all the 1.5 GHz links to the 7.5 GHz band (even though this results in inefficient spectrum usage for these low capacity services). Two of the eight paired assignments (Licence Nos. 423066/1 and 423058/1) are planned to be replaced in 2017 as part of the Links Phase 2 project. At this time there is no funding or project proposal to replace the remaining six paired assignments (Licence Nos. 1431836/1, 1105642/1, 419685/1,

Qu. #	Question	Response
		419628/1, 1145728/1 and 1191425/1). This work is expected to commence in about 3-4 years.
6.	Comment is sought on the potential deletion or modification of footnote AUS3 from the Australian Radiofrequency Spectrum Plan (ARSP).	No specific comment to this question.
7.	If the 1.5 GHz band is re-farmed for MBB services, what frequency arrangement should be adopted? Should a frequency division duplex (FDD), supplemental downlink (SDL) or time division duplex (TDD) arrangement be adopted? Why/why not? What type of arrangement should be adopted (that is, 3GPP bands 11 and/or 21, 3GPP band 32, 3GPP band 45 or another arrangement)?	<p>Airservices fixed point-to-point services would be impacted if the ACMA decides to replan the 1.5 GHz mobile band for mobile broadband services using the FDD arrangement specified by the 3GPP, SDL or the TDD arrangement.</p> <p>Noting that we will have 6 full duplex links operating in the 1.5 GHz band by end 2017, all of the full duplex links would be impacted if the FDD option (3GPP bands 11 and 21 arrangement) was introduced Australia-wide or in metropolitan and major population areas only. 5 full duplex links would be impacted if 3GPP band 11 only was adopted, however only 1 full duplex link would be impacted if the 3GPP band 11 only was adopted.</p> <p>Airservices fixed point-to-point services would still be impacted, but to a lesser extent, if the ACMA decides to replan the 1.5 GHz mobile band for mobile broadband services using a SDL or TDD arrangements.</p> <p>Obviously these impacted links will need to migrate to other bands and therefore implementation timing becomes a key factor. With some links scheduled for upgrade in the next 3-4 years, and noting the importance to aviation safety of these links, an agreed schedule to migrate these links would need to be developed.</p>
8.	If the 1.5 GHz band is re-farmed for MBB services, what geographical areas should be re-farmed? To what extent are mobile network operators (MNOs) interested in the 1.5 GHz band outside of metropolitan areas?	It is suggested in the discussion paper that the 1.5 GHz mobile band could be replanned to facilitate MBB services in metropolitan and major population areas only. This would not greatly benefit Airservices as all of Airservices fixed point-to-point services in the 1.5 GHz band operate in metropolitan and major population areas.

Qu. #	Question	Response
9.	If the 1.5 GHz band is re-farmed for MBB services, should a geographically and/or spectrally staged process be considered, where more heavily utilised parts/areas are re-farmed later than those that are more lightly utilised?	See answer to Question 8 above. Airservices believes that spectrally staged re-farming of the band would provide more time for fixed services to relocate from the band.
10.	What are the alternative spectrum or delivery options for current users of the 1.5 GHz band if the band is re-farmed for MBB services and migration of incumbent services is required?	Airservices plans on migrating the 1.5 GHz fixed services to the 7.5 GHz band.
11.	Could services, in particular fixed services, provided in the 1.5 GHz band be migrated to new or existing mobile networks in areas where the band is re-farmed for MBB services?	Airservices does not believe it can effectively and efficiently use mobile networks to carry critical ATC traffic between sites.
12.	Should existing users (some or all) be allowed to continue operation within the band either temporarily or on an ongoing basis?	As the Airservices 1.5 GHz fixed services provide data for a safety service, it is vital that Airservices be allowed to continue operation within the band until the fixed services migrate to another band.
13.	What types of sharing arrangements could be put in place to facilitate coexistence between MBB services and existing users of the 1.5 GHz band in both the short and long term?	Airservices has 6 full duplex links operating in the 1.5 GHz band potentially impacted by the proposed replanning. Therefore, geographic and frequency separation are sharing arrangements that could be used to facilitate coexistence between MBB services and these links.
14.	Comment is sought on the ACMA's proposal to progress the 1.5 GHz band to the <i>preliminary re-planning</i> stage of its process for consideration of additional spectrum for MBB services, as detailed in the ACMA's mobile broadband strategy .	See answer to Question 1 above. Further, the ACMA should consider options for existing users of low capacity point-to-point fixed links impacted by this review. For example, it may not be spectrum efficient to simply migrate the links to other fixed service bands as many of these low capacity links have a bandwidth of only 500 kHz.
15.	To assist the ACMA in conducting a comprehensive assessment of the highest-value use for the 1.5 GHz	The following are responses to Questions 15e & 15f. No specific comments on the other questions.

Qu. #	Question	Response
	<p>band, responses to the following questions are requested:</p> <ol style="list-style-type: none"> a. Do you see demand for fixed broadband/MBB services in the 1.5 GHz band? b. What benefits do you envision from using the band for fixed broadband/MBB services? c. What are relevant data points (for example, market based allocation results) for considering the demand for 1.5 GHz band spectrum for use by MBB providers? d. Is demand the same or similar across regions (that is, across metropolitan, rural and remote areas), or are some regions more likely to be in demand for MBB providers? e. Do incumbent 1.5 GHz band licensees require ongoing access to the band, or are there plans to cease operation at some future point? f. Do other options exist for the delivery of point-to-point, point-to-multipoint, fixed receive, aeronautical and radiodetermination incumbent services? How practical are they? What are the costs involved? Will there be a diminution of the service delivered if MBB services are introduced in the band? 	<p><i>Qu15e.</i> – See answer to Question 5 above.</p> <p><i>Qu15f.</i> – Airservices plans on migrating all the 1.5 GHz fixed services to the 7.5 GHz band. This is expected to be a timely and costly exercise.</p> <p>Airservices estimates the average cost to migrate a full duplex link outside the 1.5 GHz band to be A\$292,000, excluding possible additional costs to upgrade towers due to the higher windloading of antennas operating at higher frequencies, compared to low windload (e.g. gridpak) antennas used at 1.5 GHz.</p> <p>Based on works carried out in the past, Airservices estimates the average implementation time for a full-duplex link to be 3 months after equipment selection has been completed.</p>
16.	The ACMA seeks comment on expected future use of the 3.6 GHz band by fixed, fixed-satellite, amateur and radiolocation services in Australia.	No specific comment to this question.
17.	If the 3.6 GHz band is re-farmed for MBB services: a. Do you agree that a time division duplex (TDD)	No specific comments to these questions.

Qu. #	Question	Response
	<p>arrangement should be adopted? Why/Why not?</p> <p>b. Should all or only part of the band be considered for re-farming?</p> <p>c. Should different amounts of spectrum be re-farmed in different areas?</p>	
18.	If the 3.6 GHz band is re-farmed for MBB services, what geographical areas should be considered?	No specific comment to this question.
19.	If the 3.6 GHz band is re-farmed for MBB services, should existing users (some or all) be allowed to continue operation within the band, either temporarily or on an ongoing basis? Should/could sharing arrangements be developed? Should sharing only be considered for some services or specific licences? If yes, what kind of arrangements would be suitable to support the ongoing operation of incumbent services or specific licences? If no, why?	No specific comment to this question.
20.	If the 3.6 GHz band is re-farmed for MBB services, and migration of incumbent services is required, are there alternative spectrum or delivery options?	No specific comment to this question.
21.	<p>In determining whether to re-farm the 3.6 GHz band for MBB, are there any adjacent band issues that should be considered? This includes:</p> <p>a. the effect such use may have on adjacent band services</p> <p>b. the effect adjacent band services may have on the utility of the 3.6 GHz band for MBB services.</p>	No specific comment to this question.
22.	If the 3.6 GHz band is re-farmed for MBB services,	No specific comment to this question.

Qu. #	Question	Response
	should the ACMA review arrangements in the broader 3400–3700 MHz band? Why/Why not?	
23.	Would such a review be facilitated through the alignment of geographical boundaries in the 3.6 GHz band with existing boundaries defined for spectrum and apparatus licensing in the 3400–3575 MHz band (that is, to facilitate trading)?	No specific comment to this question.
24.	Is there anything else that could be considered as part of the 3.6 GHz band process that may facilitate a future review of the broader 3400–3700 MHz frequency range?	No specific comment to this question.
25.	Comment is sought on the ACMA’s proposal to progress the 3.6 GHz band to the <i>preliminary re-planning</i> stage of its process for consideration of additional spectrum for MBB services, as detailed in the ACMA’s mobile broadband strategy .	No specific comment to this question.
26.	<p>To assist the ACMA in conducting a comprehensive assessment of the highest-value use for the 3.6 GHz band, responses to the following questions are requested:</p> <ul style="list-style-type: none"> a. Do you see increasing demand for fixed broadband/MBB services in the 3.6 GHz band? What benefits do you envision from using the band for fixed broadband/MBB services? b. Which regions of Australia will be in demand for fixed broadband/MBB services in the 3.6 GHz band? c. Is demand the same or similar across regions, 	No specific comments to these questions.

Qu. #	Question	Response
	<p>or are some regions/areas more likely to be in demand for MBB providers?</p> <p>d. Do incumbent 3.6 GHz band licensees require ongoing access to the band, or are there plans to cease operation at some future point?</p> <p>e. Do other options exist for the delivery of fixed, fixed-satellite and amateur incumbent service, how practical are they? What are the costs involved? Will there be a diminution of the service delivered if MBB services are introduced in the band?</p> <p>f. Should further consideration be given to the migration of incumbent 3.6 GHz band FSS earth stations to low density population areas?</p>	