



**Submission by
Free TV Australia Limited**

Australian Communications and Media
Authority

Development of Australian views on
potential IMT candidate bands under WRC-
15 Agenda item 1.1

Discussion Paper 2: 520-694MHz

27 November 2013



TABLE OF CONTENTS

1	EXECUTIVE SUMMARY	2
2	INTRODUCTION.....	3
3	GUIDING PRINCIPLES	4
4	SPECTRUM: THE BEST DELIVERY MECHANISM	4
5	BROADCASTING SPECTRUM DEMAND	5
6	FUTURE SPECTRUM PLANNING REQUIREMENTS FOR DTTB.....	5
7	AUSTRALIAN UHF BAND SEGMENTATION.....	6
8	520 – 698 MHZ – PRIMARILY FOR BROADCASTING PURPOSES	11
9	PROPOSED AUSTRALIAN VIEW.....	12



1 EXECUTIVE SUMMARY

- Free TV Australia (Free TV) represents all of Australia's commercial free-to-air television broadcasters. At no cost to the public, our members provide nine channels of content across a broad range of genres, as well as rich online and mobile offerings. The value of commercial free-to-air television to the Australian public remains high. On any given day, free-to-air television is watched by around 14 million Australians.
- The technical standards underlying the free-to-air television broadcasting platform are a key element in the success of these services, which reach over 99% of Australian households.
- Technical evolution and development cannot occur without access to spectrum. Free TV strongly supports transparency and certainty in ACMA's spectrum planning and decision-making activities. The next five to ten years will see significant change in the areas of spectrum demand and management. It is critical that spectrum requirements for FTA broadcasting are incorporated into these processes.
- Any lack of access to spectrum for future innovation in digital television will seriously inhibit the ability of free-to-air television broadcasters to grow, evolve and innovate. This in turn limits their ability to continue providing innovative services to the public at no charge, and compete with other media platforms in a challenging converged media market. It is therefore essential that spectrum be available to broadcasters in the future for testing of, and migration to, new technologies.
- Free TV supports the ACMA's proposed view and associated approach to the 520-694MHz band. However, Free TV is concerned that the premise for identification of this band to any other service is based upon a series of assumptions which the ACMA has not fully investigated.
- Free TV opposes any re-allocation of the UHF band in the frequency range 520-694MHz, given that:
 - to date few administrations in Region 3 (Asia Pacific) have indicated any need to do so, and
 - the basis upon which regional assignments have been made in Region 3 has been on the basis of the impact to a neighbouring country through bi-lateral and multi-lateral negotiations and treaties.
- Free TV is concerned that the current process does not include mention of an important factor in previous ITU-R study periods toward determining Australian positions – current Australian usage of a frequency band. The current and future usage of the band 520-698MHz is for the usage and protection of DTTB in Australia below 698MHz.
- Free TV is concerned that the lack of a proposal through the Australian preparatory process for WRC-15 for the development of at least an AUS footnote does not reflect the Australian commitment to the future for television broadcasting services below 694 MHz. We therefore request that the ACMA develop an AUS footnote in preparation for the next review of the Australian Radiofrequency Spectrum Plan to reflect this position.
- Free TV Australia also recommends that the ACMA consider the establishment of a regional footnote to include references to the regulatory requirements for the continuing allocation of the band 520-698MHz in Region 3 and to the protection of the Broadcasting Service on a co Primary basis.



- Free TV proposes the following amendments to the text for the Australian View on the band 520-694MHz under WRC-15 Agenda Item 1.1 [amendments in italics]:

Australia will not seek identification of the band 470-698MHz for use by IMT under WRC-15 Agenda item 1.1, and will exclude itself from a global or regional identification of the band for use by IMT.

Australia will:

- **not seek to include the band 470-698MHz on the list of potential candidate bands identified in JTG 4-5-6-7 under WRC-15 Agenda item 1.1**
- **not seek to include its name to a list of administrations identifying the band for use by IMT**
- **not oppose other administrations adding a new mobile allocation for the band and/or identifying the band for use by IMT in that administration or in Regions 1 or 2**
- **not oppose a new mobile allocation in the band or identification of the band for use by IMT that is on either a global or regional basis**
- **exclude Australia from a new identification of the band 470-698MHz for use by IMT that is on either a global or regional basis.**

2 INTRODUCTION

Free TV Australia represents all of Australia's commercial free-to-air television broadcasters. Commercial free-to-air television remains the most popular source of entertainment and information for Australians.

Over the past 50 years, Australia's broadcasting policy framework and technical standards have delivered the best free-to-air television services in the world. Currently all of these services are provided using the DVB-T transmission standard and MPEG-2 video compression standard.

Free TV strongly supports transparency and certainty in the ACMA's spectrum planning and decision-making activities. The next five to ten years are going to see significant change in the areas of spectrum demand and management.

Free TV welcomes the opportunity to comment on *Discussion Paper 2: Development of Australian views on potential IMT candidate bands under WRC-15 Agenda item 1.1*. Free TV's primary focus is on the band 520-694MHz.

Australia's commercial free-to-air broadcasters have first-hand experience of the increasing demand for spectrum applied to broadcasting applications, and the resulting pressures on government, regulators and incumbent users.

Free TV recognises the role played by the ACMA in administering Australia's participation on behalf of the government in radiocommunications regulation within the International Telecommunications Union (ITU) and the treaty decisions made at World Radiocommunication Conferences (WRC).

Ongoing accountability and transparency regarding the ACMA's assessment of spectrum demand issues has the potential to improve stakeholder relations and industry confidence. This is particularly important as we move into a period of significant change in the areas of spectrum demand and management.

The ACMA initiated in 2012 a consultation titled *Beyond switchover – the future technical evolution of digital terrestrial television in Australia*. The major assumption in launching this consultation is presumably the future of the Australian terrestrial television platform.



In developing a path to the next generation of platform and service standards, it is important to ensure that:

- any new standards are fully developed,
- there is spectrum available for testing and trialling of new technologies;
- there is spectrum available for a smooth transition, and
- consumers are not put to unnecessary expense.

For these reasons, any transition to new technologies in the broadcasting environment requires consideration of both technical and policy issues.

Planning for the evolution of these new DTTB services must recognise the importance of free-to-air terrestrial television services in Australia. Although there are a growing number of platforms for the delivery of audio-visual content, free-to-air television is the only service that does not require a paid subscription of some form. Most other subscription services (whether on Pay TV or the internet) in fact rely on the incorporation of the free-to-air services as a foundation tier in their service packages to attract clients.

The service is free for all Australians, providing valuable public goods such as access to news and current affairs, as well as an investment in the production and distribution of a diverse range of quality Australian content.

Free-to-air television broadcasters rely on the broadcasting service bands (BSB) spectrum to deliver highly valued and popular free to air television content to all Australians. The maintenance, improvement and future accessibility of these services should be central to the ACMA's consideration of these issues. The demand for spectrum from other services (particularly mobile broadband) will continue to be a challenge.

The evolution to new free to air terrestrial television platform technologies will continue to rely on the availability of spectrum.

3 Guiding principles

Free TV believes that there are some principles that should shape the ACMA's consideration in determining the future use of the band 520-694MHz for technical evolution of the digital free-to-air platform. These are:

1. recognition of the continued role of the digital free-to-air platform as the pre-eminent delivery mode for one-to-many,
2. the need to make spectrum available for testing and simulcast to maximise the opportunities for broadcasters to deliver improvements to viewers, including premium quality services such as 3DTV and UltraHD,
3. a collaborative approach which enables broadcasters to incorporate any migration path into long term business planning, and
4. sufficient lead time for establishment of transmission and receiver standards.

These over-arching principles should form the basis of any migration and evolutionary planning for DTTB.

4 Spectrum: the best delivery mechanism

It is worth re-iterating the importance of spectrum as the most effective one-to-many delivery mechanism for television in Australia and its effectiveness in reaching mass populations, including in times of crisis.



A combination of UHF and VHF spectrum has successfully delivered spectrally efficient wide area television broadcasting services in Australia. This means that large populations receive terrestrial television services from relatively few transmitter sites.

TV channel planning has continued to focus on equalisation of services across Australia. Television service coverage has been achieved with spectrum allocations smaller than that allocated to comparable services. For instance, the current spectrum allocation post restack for DTTB services in Australia will be 210MHz for a geographic area significantly larger than Europe, whereas across Europe the allocated spectrum for DTTB is currently 320MHz.

5 Broadcasting Spectrum Demand

The overriding spectrum issue facing government and the free-to-air television industry in the next five years is to ensure that all viewers are able to continually receive digital free-to-view television into the future.

Television broadcasters are under considerable pressure from perceived demand for spectrum by others in Australia.

Decisions to change the existing use of BSB spectrum in response to perceived increase in demand from other services should not impact or reduce protection of the existing and future television broadcasting services that occupy the UHF spectrum.

For industry to have confidence in the ACMA spectrum decision-making process, decisions must be justified in an open and transparent manner throughout this process. A failure to commit to transparency in practice will lead to a lack of trust between industry and the ACMA.

In this regard, there will need to be sufficient consideration of the spectrum needs likely to arise as television services develop and adopt new technologies. The ACMA must recognise the impact of future broadcasting spectrum demand pressures in the BSB spectrum, such as second generation digital television, migration to alternative coding technologies and ultra-high definition television services.

Broadcasters reported these as important issues when interviewed by the consultants engaged by the ACMA in the preparation of the Five Year Spectrum Outlook and the 2009 review of the Australian Radiofrequency Spectrum Plan. Such matters must also be considered by Analysis Mason in their forecasts to 2025 for the ACMA.

6 Future spectrum planning requirements for DTTB

The success of the transition to DTTB in Australia has been largely due to the availability of spectrum for simulcast during the analogue-to-digital migration.

The successful transition was enabled within the short time frame because there was adequate adjacent spectrum to enable a simulcast of the broadcaster's transmissions during the gradual replacement of household TV receivers.

Critically, the history of the introduction of DTTB demonstrates that successful and efficient migration to a new radiocommunications technology requires available spectrum for the introduction of the new technology. This has also been the case for both digital radio and mobile telephone technologies.

Since the decision to mandate a Digital Dividend of 126 MHz in Australia, spectrum for a migration to a new DTTB platform is not easily identified. The substantial reduction in spectrum as a result of the Digital Dividend limits the capacity for a transition to future broadcast technologies. This is a point that has been made repeatedly by Free TV in recent years.



The issue was raised by Free TV during the Green paper consultation stage of the Digital Dividend process, and in other submissions focused on the spectrum demands of technology migration (specifically in relation to DVB-T2 and MPEG-4).¹

The lack of access to spectrum for future innovation in digital television will seriously inhibit the ability of free-to-air television broadcasters to grow, evolve and innovate. This in turn limits their ability to compete with other media platforms in a challenging converged media market.

More efficient transmission or compression techniques for delivering additional services such as 3DTV and/or UHDTV to free-to-air viewers simply cannot be explored without access to spectrum.

Competing platforms such as pay TV and mobile broadband do not face these constraints. Viewers should not be forced to pay for these exciting new services on alternative platforms.

Similarly, a transition to DVB-T2 cannot occur without a reasonable period of simulcast, because of the impact on households with legacy MPEG-2/DVB-T receivers. Without it, many viewers face a loss of, or unacceptable interruption to, free-to-air television services.

7 Australian UHF band segmentation

The ACMA has recognised “An essential and challenging element of spectrum management is recognising and meeting the needs of existing spectrum users while at the same time supporting the dynamic growth and changing uses of spectrum within what is a finite resource”.

Free TV has noted that the reasons for the division of the UHF band V between broadcasting and mobile at 694 MHz are:

- the announcement that the UHF digital dividend would consist of a single spectrum block of 126 MHz between 694 MHz and 820 MHz (the digital dividend band); and
- the changing use of the band with anticipated removal of the UHF digital dividend from the broadcasting services bands once the restack is complete.

Free TV contends this reasoning does not take into account:

- the division within the band in the 2012 edition of the Radio Regulations;
- the establishment of and recognition for a “guard band” between broadcasting and mobile within the development of regional band plans;
- recognition within national planning of the guard band between broadcasting and mobile.

a. 2012 edition of the Radio Regulations

The 2012 edition of the Radio Regulations indicates that within the sub division 460-890 MHz the band is divided in Region 3 in the following manner with no intentional division at 694 MHz:

¹ [Free TV Australia submission to ACMA's Five Year Spectrum Outlook and submission to spectrum reallocation in the 700 MHz digital dividend band](#)



460-890 MHz

Allocation to services		
Region 1	Region 2	Region 3
460-470	FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.288 5.289 5.290	
470-790 BROADCASTING	470-512 BROADCASTING Fixed Mobile 5.292 5.293	470-585 FIXED MOBILE BROADCASTING 5.291 5.298
	512-608 BROADCASTING 5.297	
	608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)	610-890 FIXED MOBILE 5.313A 5.317A BROADCASTING
	614-698 BROADCASTING Fixed Mobile 5.293 5.309 5.311A	
	698-806 MOBILE 5.313B 5.317A BROADCASTING Fixed	
	5.149 5.291A 5.294 5.296 5.300 5.304 5.306 5.311A 5.312 5.312A	
790-862 FIXED MOBILE except aeronautical mobile 5.316B 5.317A BROADCASTING 5.312 5.314 5.315 5.316 5.316A 5.319	5.293 5.309 5.311A	5.149 5.305 5.306 5.307 5.311A 5.320
862-890 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.319 5.323	806-890 FIXED MOBILE 5.317A BROADCASTING	
	5.317 5.318	

In addition international footnotes pertinent to this band in Region 3 also indicate a band division at 698 MHz not 694 MHz:

5.313A The band, or portions of the band 698-790 MHz, in Bangladesh, China, Korea (Rep. of), India, Japan, New Zealand, Pakistan, Papua New Guinea, Philippines and Singapore are identified for use by these administrations wishing to implement International Mobile

Telecommunications (IMT). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. In China, the use of IMT in this band will not start until 2015. (WRC-12)

5.317A Those parts of the band 698-960 MHz in Region 2 and the band 790-960 MHz in Regions 1 and 3 which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolutions **224 (Rev.WRC-12)** and **749 (Rev.WRC-12)**, as appropriate. This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-12)

b. Development of a regional harmonised Digital Dividend band plan

Australia took part in the activity within the APT Wireless Group toward the establishment of a APT Report on "UHF Band Usage and Considerations for Realizing the UHF Digital Dividend" ([APT/AWF/REP-11](#))

Within the work of the APT Wireless Group studies produced

- APT Report on "Harmonized Frequency Arrangements for the Band 698-806 MHz" ([APT/AWF/REP-14](#)), and
- APT Report on "Implementation Issues Associated with Use of the Band 698-806 MHz by Mobile Services" ([APT/AWG/REP-24](#)).

In which the following band plan configurations were agreed:

The overall structure of the harmonized FDD arrangement for the band 698-806 MHz is illustrated below in Figure 1:

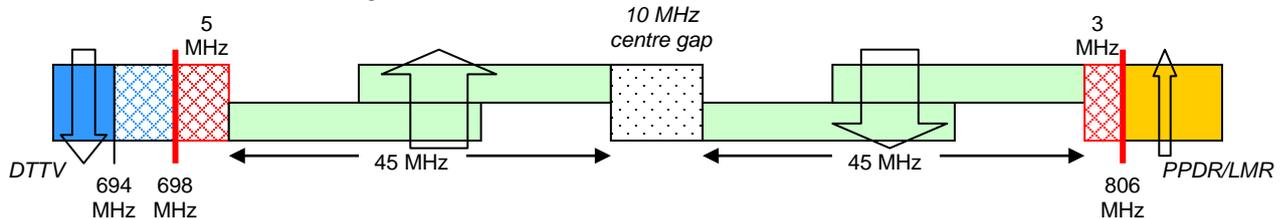


Figure 1: Harmonised FDD Arrangement of 698-806 MHz band

Further, the harmonized all-TDD arrangement for the band 698-806 MHz is illustrated in Figure 2:

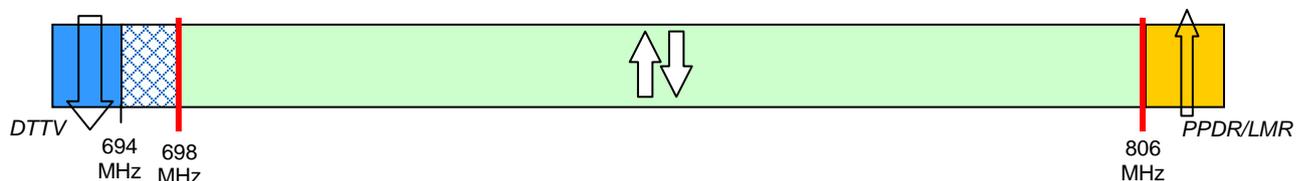


Figure 2: Harmonised all-TDD Arrangement of 698-806 MHz band

For this TDD arrangement, taking into account the external 4 MHz guard band (694-698 MHz), a minimum internal guard-band of 5 MHz at the lower edge (698 MHz) and 3 MHz at the upper edge (806 MHz) needs to be considered.

Within APT Report on "Harmonized Frequency Arrangements for the Band 698-806 MHz", it states:



*Recognizing the need to provide sufficient protection for the services in adjacent bands, the APT Wireless Forum has concluded that a combination of mitigation measures would be necessary, including sufficient guard-band allocations within the **698-806 MHz** band.*

Based on studies of the various interference mechanisms that may impact services in adjacent bands, it was agreed that spectrum should be allocated as follows:

- *a lower guard-band of 5 MHz should be allocated between **698-703 MHz**; and*
- *an upper guard-band of 3 MHz should be allocated between 803-806 MHz*

*It should be noted that some administrations in Region 3, which currently use a 7 MHz or 8 MHz TV broadcasting channel framework in the band 470-806 MHz giving a natural channel boundary at 694 MHz, may also implement an additional 4 MHz 'external' guard-band in the 694-**698 MHz** band segment.*

Within its participation the ACMA provided the following contributions:

- AWF-8/INF-08 (March 2010) *Preliminary engineering study of DVB-T - LTE compatibility in UHF band V* – where the topic under study was harmonised arrangements for the use of the spectrum in the range **698-806 MHz** in Region 3 after the transition from analogue to digital television services.
- AWG-10/INP-43 (March 2011) *Required LTE UE out-of-band emission limits to ensure coexistence of mobile services and adjacent broadcasting services below **698 MHz***
- AWG-11/INP-82 (September 2011) *Required long term evolution user equipment out-of-band emission limits to ensure coexistence of mobile services and adjacent broadcasting services below **698 MHz***

In addition the studies by other organisations took into consideration a band edge at 698MHz:

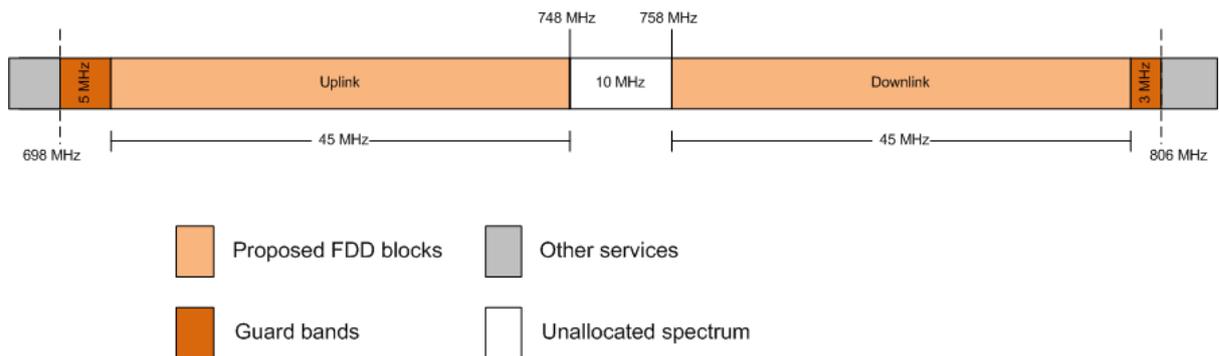
- AWG-10/INP-30 (Rev.1) (March 2011) *Preliminary results on the LTE'S interference to the DTV receiver* from Samsung Electronics
- AWG-11/INP-48 (September 2011) *Simulation result of studies on coexistence between LTE UE Tx in the APT 700MHz band and digital TV Rx* from Qualcomm Incorporated
- AWG-11/INP-92 (September 2011) *Probabilistic analysis on interference from LTE UE to the DTV receiver*

All recognised the band as 698-806 MHz in contributing studies to the development of the APT band plan.

c. National Digital Dividend band planning

The ACMA conducted a Technical Liaison Group on development of the technical framework for the re allocation of the 700 MHz band. Within this framework the ACMA recognised: *The AWG frequency division duplex (FDD) plan published in APT/AWF/REP-14² consists of a pair of 45 MHz blocks with a 10 MHz mid-band gap, and uses conventional duplex – with the mobile transmit in the lower block and the base transmit in the upper block.*

² <http://www.apr.int/AWF-RECREP>

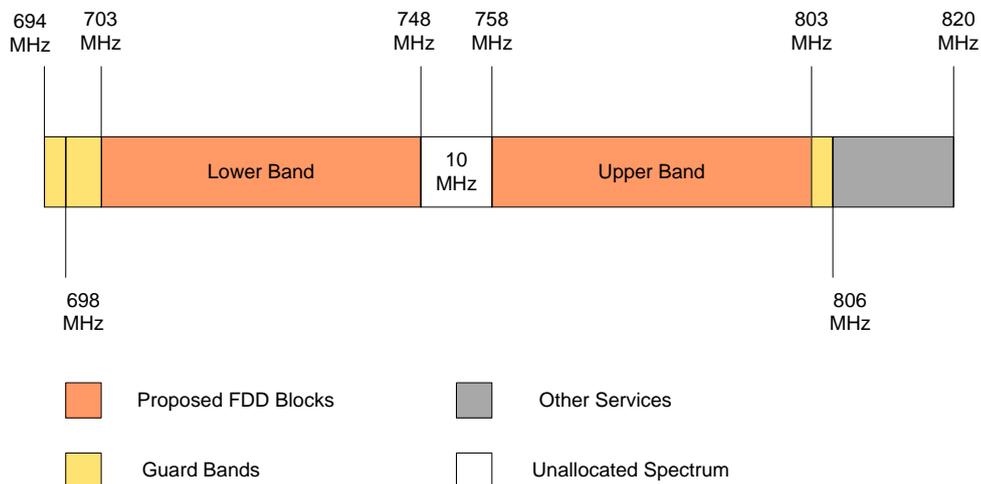


The AWG also developed a time division duplex (TDD) arrangement for the band (see APT/AWF/REP-14). These arrangements occupy 108 MHz of spectrum – from 698 to 806 MHz – which is wholly contained within the 126 MHz identified as the Australian digital dividend.

Following consideration of several established international band arrangements, including those from the USA and Europe, the ACMA intends for Australia to follow the plan developed by the AWG. Due to the difference in the exact frequency boundaries between Australia’s Digital Dividend and the AWG plan, the lower guard band (between proposed WAS and broadcast television services) in Australia will be 9 MHz wide, as opposed to 5 MHz in many other Asia-Pacific nations.

Furthermore the 9 MHz of band exists below 703 MHz providing a buffer to the topmost television broadcast channel. These arrangements are depicted in the diagram below.

Proposed 700Mhz Digital Dividend Arrangements



d. Australian Footnote – AUS 104

Free TV is concerned with the establishment of footnote AUS 104

AUS104 Under subsection 31(1) of the Radiocommunications Act 1992 parts of the radiofrequency spectrum, including the band 520–694 MHz, are designated as being primarily for broadcasting purposes and referred for planning in accordance with Part 3 of the Broadcasting Services Act 1992.



Free TV Comment

Free TV proposes that in the context of *Discussion Paper 1: 520-694MHz Development of Australian views on potential IMT candidate bands under WRC-15 Agenda item 1.1* the regional boundary of the band should be lifted to 698MHz, to account for the necessary “guard band” between 694-698MHz. For successful implementation of the APT, the 700MHz Band Plan must also be recognised.

Free TV would be very concerned with any ACMA proposal to place the entire 9 MHz “guard band” under mobile service.

Given that

- The 2012 edition of the Radio Regulations indicate no divide in the table of frequency allocations at 694 MHz,
- the regional studies toward establishing a regionally harmonised Digital Dividend band plan have recognised a break in the band between mobile and broadcasting at 698 MHz,
- the APT band plan recognises a 5 MHz guard band below the uplink at 703 MHz and an additional 4 MHz ‘external’ guard-band in the 694-698 MHz band segment, and
- Australian national planning has recognised the band edge at 698 MHz,

Free TV strongly urges the ACMA to maintain the band edge being retained at 698 MHz and to alter footnote AUS104 to reflect this.

Free TV would not wish to see the importance of the guard band diminish over time and maintaining the band edge at 698 MHz indicates a balance in the constrained spectrum to both the broadcasting and mobile services above and below 698 MHz.

8 520 – 698 MHz – Primarily for Broadcasting purposes

While Free TV acknowledges the ACMA’s reluctance to maintain and establish specific Australian country footnotes, it is inevitable that protection of Australian national interests by virtue of geographical separation of primary national interest may seek to establish some national priorities in Australian footnotes.

Free TV is concerned that AUS 104 does not reflect the legislative requirements to determine protection of the broadcasting service in Channel 51 and below.

Free TV notes that the ACMA has contributed to the APT Preparatory Group for WRC-15 processes with the following contribution

APG15-2/INP-32 Proposed Identification for IMT in the Range 698-960

Within this contribution Australia states:

This contribution proposes revision of the current identification for IMT in the band 698-790 MHz in some countries in Region 3 to the entire Region. Furthermore, taking into account the existing identifications noted in Figure 1, and contingent upon the result of deliberations under WRC-15 Agenda item 1.2 with regard to IMT in 694-790 MHz in Region 1, this may facilitate a global identification for IMT from 698-960 MHz.

As stated above and previously to the ACMA, Free TV does not wish to see the importance of the guard band diminish over time. Maintaining the band edge at 698 MHz indicates a balance in the constrained spectrum to both the broadcasting and mobile service above and below 698 MHz.



Free TV requests that the ACMA develop in the context of WRC-15 Agenda Item 8 a regional footnote to include references to the regulatory requirements for the continuing allocation of the band 520-698MHz in Region 3 to the Broadcasting Service on a co Primary basis.

9 Proposed Australian View

Free TV notes the following proposals from the ACMA:

Australia will not seek identification of the band for use by IMT under WRC-15 Agenda item 1.1, and will exclude itself from a global or regional identification of the band for use by IMT.

As a corollary to the proposed Australian view, the ACMA proposes the following approach for the band 520–694 MHz considered in this discussion paper:

Australia will:

- > ***not seek to include the band on the list of potential candidate bands identified in JTG 4-5-6-7 under WRC-15 Agenda item 1.1***
- > ***not seek to include its name to a list of administrations identifying the band for use by IMT***
- > ***not oppose other administrations adding a new mobile allocation for the band and/or identifying the band for use by IMT in that administration or in Regions 1 or 2***
- > ***not oppose a new mobile allocation in the band or identification of the band for use by IMT that is on either a global or regional basis***
- > ***exclude Australia from a new identification of the band for use by IMT that is on either a global or regional basis.***

Free TV Australia strongly supports the above, however, on balance Free TV considers that Australia should also establish a regional footnote to include references to the regulatory requirements for the continuing allocation of the band 520-698MHz in Region 3 and protection to the Broadcasting Service on a co Primary basis.

Free TV proposes the following text for development of the Australian View on the band 520-694MHz under WRC-15 Agenda Item 1.1 [new text in italics]:

Australia will not seek identification of the band 470-698MHz for use by IMT under WRC-15 Agenda item 1.1, and will exclude itself from a global or regional identification of the band for use by IMT.

Australia will:

- ***not seek to include the band 470-698MHz on the list of potential candidate bands identified in JTG 4-5-6-7 under WRC-15 Agenda item 1.1***
- ***not seek to include its name to a list of administrations identifying the band for use by IMT***
- ***not oppose other administrations adding a new mobile allocation for the band and/or identifying the band for use by IMT in that administration or in Regions 1 or 2***
- ***not oppose a new mobile allocation in the band or identification of the band for use by IMT that is on either a global or regional basis***
- ***exclude Australia from a new identification of the band for use by IMT that is on either a global or regional basis.***