Submission by
Free TV Australia Limited

Australian Communications and Media Authority

Review of the 2.5GHz band and long-term arrangements for ENG

1 April 2010

TABLE OF CONTENTS

1 Executive Summary

- Free TV welcomes the ACMA's recognition that broadcasters' use of the 2.5GHz band delivers social benefits to all Australians and its commitment to ensuring that "adequate spectrum [is] made available to enable provision of service delivery that is equivalent to that currently provided".
- Access to adequate spectrum for ENG is vital to broadcasters continuing to serve the Australian public with free access to high-quality news and current affairs, coverage of sport and major events and Australian and local content. This content is highly valued by viewers and delivers a range of public interest outcomes.
- Free TV has been working with the ACMA for many years to find a spectrum solution for ENG which offers broadcast licensees long-term certainty and equivalent functionality.
- The spectrum options outlined in the Discussion Paper have the potential to accommodate ENG. However, the long-term suitability of the proposed alternative bands is subject to further investigations and planning to confirm their utility for ENG.
- Free TV welcomes the invitation to participate in Technical Working Groups formed by the ACMA to further canvass the spectrum options.
- No final decision on replanning and reallocation of the 2.5 GHz band should be taken until the suitability of the alternative bands has been confirmed, and spectrum planning and licensing matters are satisfactorily resolved. Free TV would expect further detailed consultation on these matters.
- Licence fees for broadcasters would need to take into account the public benefit delivered by broadcasters' ENG activities. There is a high non-commercial value on ENG content.
- Any re-location of broadcasters would impose heavy re-location costs which should be covered. It will be critical that continuity of ENG operation is preserved during any migration period. In the case of Perth this will require additional spectrum arrangements until at least 2015 (pending relocation of the Earth space station).
- Broadcasters would also need to be given adequate time to design and source additional equipment to operate in the alternative bands.

2 Introduction

Free TV represents all of Australia's commercial free-to-air television broadcasters. Free TV welcomes the opportunity to respond to the Discussion Paper released by the Australian Communications & Media Authority (**ACMA**) in January 2010 "Review of the 2.5GHz band and long-term arrangements for ENG" (**Discussion Paper**).

Networks Seven, Nine and Ten (**the broadcasters**) are represented by Free TV and, together with the Australian Broadcasting Corporation (**ABC**), are currently licensed to use the 2.5GHz band for Television Outside Broadcasting (**TOB**) on an Australia-wide basis. Broadcasters' current TOB Network licenses (which include allocations in the 2.5GHz, 7GHz and 13GHz bands) expire in 2013.

TOB comprises a number of activities including electronic news gathering, television outside broadcasts and electronic field production. We note that for the purpose of this Discussion Paper references to ENG refer to all of these activities described in Attachment 1 of the Paper.

The Discussion Paper seeks comments on future planning, licensing and pricing arrangements for the 2.5GHz band. The Media Release announcing the Paper[1] stated that the Review had two important objectives, which are reiterated in the Discussion Paper:

- "to identify how the 2.5GHz band should be planned and allocated so that it accords with its highest value use"; and
- "to identify suitable long-term spectrum arrangements to support the essential ENG services."

This review follows the two earlier reviews by the ACMA regarding Spectrum Access Options for Wireless Access Services (WAS) [2] which arose out of a decision of the World Radio Conference in 2000 to identify the 2.5GHz band as an IMT expansion band.

The ACMA has now expressed the view that "harmonisation of the band for WAS is increasing across advanced economies, with indications that the value of the band is rising"[3] and that "the current arrangements for this band may not support its future efficient allocation and use". [4]

Free TV welcomes the ACMA's efforts to identify long-term spectrum options for ENG. Broadcasters have been seeking long-term certainty of adequate ENG spectrum for a decade and will continue to work with the ACMA and in international forums to achieve this outcome. Free TV has consistently reinforced the need to find suitable alternative spectrum for ENG before any decision is taken to re-plan or re-allocate the 2.5GHz band.

The spectrum options outlined in the Discussion Paper together offer the potential to support ENG operation, however much more work is required to ensure that broadcasters are able to deliver equivalent service to that currently provided. Free TV welcomes the opportunity to participate in Technical Working Groups to be formed by the ACMA to further canvass these options.

[1] ACMA Media Release 7/2010 – 12 January 2010.
[2] ACMA – Strategies for Wireless Access Services, Spectrum Planning Discussion Paper SPP 1/06 , February 2006 and – ACMA - Strategies for Wireless Access Services – Spectrum Access Options, Spectrum Planning Discussion Paper SPP 10/06 , December 2006
[3] Discussion Paper, page 1.
[4] Ibid.

This submission comments on the following topics which form the basis for a spectrum solution for ENG.

Section 3: Spectrum options – technical issues for resolution
Section 4: Limitations on ENG operations
Section 5 Tenure and on-going certainty
Section 6: Costs of relocation and licence fees
Section 7: Timing of any relocation

3 Spectrum options

The ACMA's "preferred outcome" for allocation of spectrum to ENG consists of the following combination of options.

- ENG access Australia-wide to 2570-2620MHz (the 2.5GHz mid-band gap), with additional access in regional areas, subject to sharing and co-ordination issues;
- Shared use of the bands 2025-2110MHz and 2200-2300MHz;
- Exclusive use of the band 2010-2025MHz, at least in capital city areas; and
- ENG access to 1980-2010 MHz and 2170-2200MHz, with the caveat that mobile satellite services may be introduced into these bands in the future, in which case they would no longer be suitable for ENG operation.

This Section outlines the technical issues that would need to be addressed at the outset, to ensure that the spectrum options are able to support equivalent ENG service delivery.

Free TV assumes that renewal of broadcasters' TOBN apparatus licences in the 7GHz and 13GHz bands will be unaffected by the current Review. Allocations in those bands are not suitable for electronic news gathering.

3.1 Clearance of fixed links

It is essential that broadcasters have access to adequate interference-free spectrum for unplanned news gathering.

Based on a study undertaken by the ACMA and reflected in the Discussion Paper, fixed links will need to be cleared from the options bands within at least:

- 300km of capital city ENG collection stations in major metropolitan centres i.e. Brisbane, Sydney, Melbourne, Canberra, Adelaide, Hobart, Perth and Darwin; and
- a 150 km corridor along the coastline in regional areas from Cairns to Spencer Gulf.

A suitable fixed link clearance area would be defined by the blue and green shaded areas in Figure 5 of the Discussion Paper, with the addition of a 300km boundary around Darwin (as indicated by the red square). The clearance required is illustrated in Figure 1.

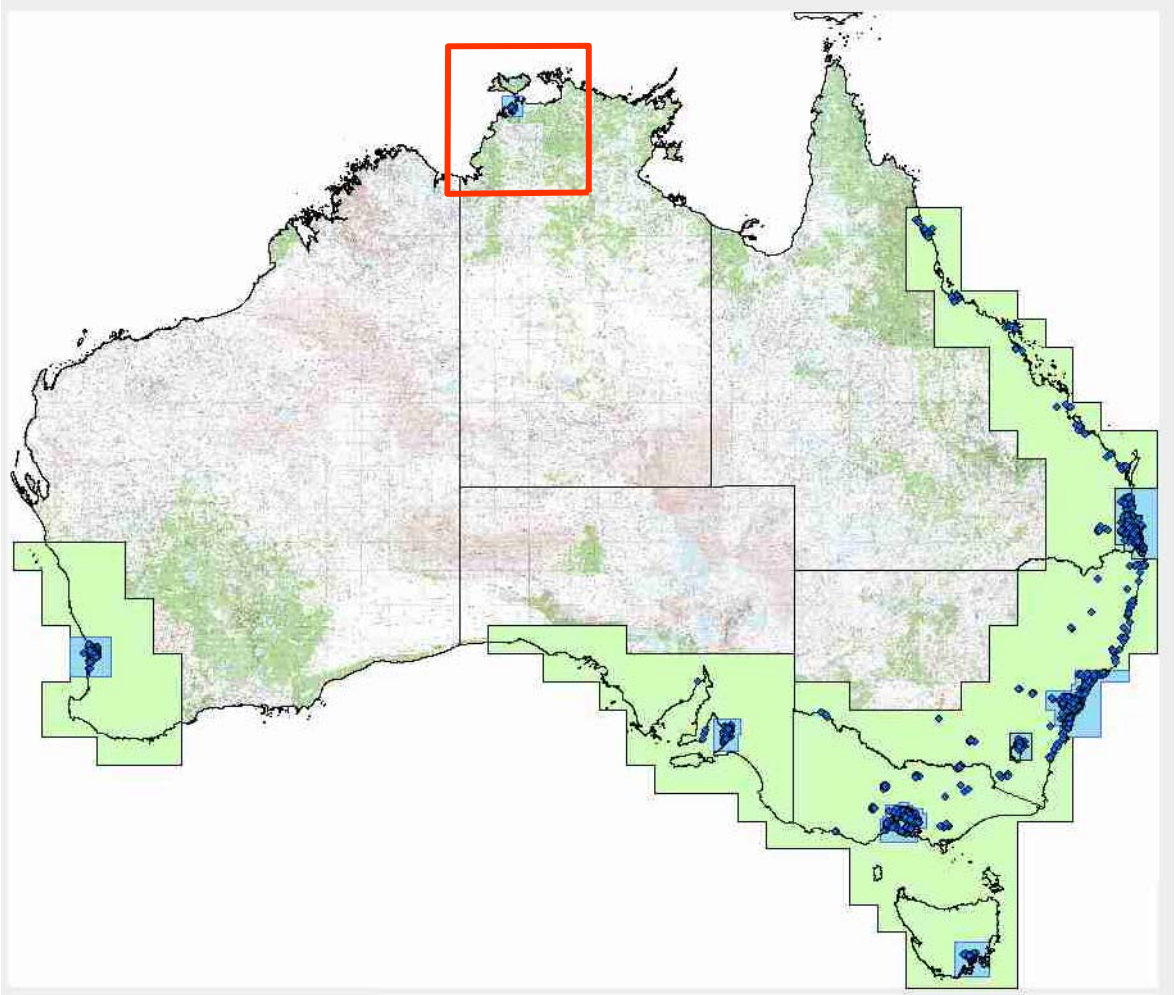

Figure 1 - Proposed Fixed Link Clearance Areas

Arrangements for operation in association with fixed links in remote areas will need to be developed. To enable speedy access for news gathering in remote areas, ENG operators require the right to transmit without co-ordination with other users in at least one of the proposed options bands. In such a case, ENG operators cannot guarantee they will not interfere with an existing user, but are prepared to move to another frequency if they find they are receiving interference on the assumption that only fixed links are operating so the levels of interference in a particular area are not dynamic. This will require changes to the licences of existing fixed link licensees to either have a condition that they may suffer interference and/or be re-categorised as a secondary user. Free TV suggests this method of working in the bands between 1980MHz and 2110MHz.

3.2 Guard bands and boundary conditions

Broadcasters require a high degree of certainty regarding protection from interference into their services. The adequacy of the protection arrangements for alternative ENG spectrum will be a key determinant of their suitability.

Free TV supports the ACMA's view that there is an urgent need for investigation of ENG and WAS adjacent band compatibility. Amongst other things, the investigation will need to address the likely need for:

- guard bands between ENG and adjacent services;
- additional filtering of ENG receivers; and
- additional suppression for out-of-band emissions from WAS transmitters;

to ensure that services are adequately protected from interference. Interference-free spectrum is vital to the continued operation of highly-valued services such as coverage of natural disasters, breaking news events and key sporting events.

The Discussion Paper suggests that a 5MHz guard band will be likely at the upper edge of the 2.5GHz mid band gap. The paper further suggests that in order to mitigate against interference between ENG and adjacent systems, a more stringent mask of -45dBm/MHz is proposed. Free TV submits that guard bands of at least 5MHz will be required (this should be the starting point for study). 'Second adjacent channel' performance should also be studied, that is, the spectrum between 5 and 10 MHz from the band edge.

The same adjacency issue exists at the 2110MHz boundary. However, in this case there are existing spectrum licensees, so it is not possible to impose a more stringent mask. This brings into question the usability of the top 5 or 10MHz of this band for ENG.

Guard bands are also likely to be required at least at the 2570 MHz frequency boundary. A preliminary analysis by Free TV indicates that without such a guard band separation distances of up to 50 km may be required to protect base station receivers from helicopter borne ENG transmitters under the reasonable assumption of line-of-sight interference paths.

Free TV also notes that similar issues will arise regarding usability of spectrum for ENG operations at the 2010 and 2200MHz frequency boundaries, when mobile satellite services (**MSS**) are introduced in the 1980-2010 MHz and 2170-2200MHz bands. This is potentially likely to occur within a short timeframe.

Free TV acknowledges that in practice, band edge interference will depend on the actual unfiltered performance of the equipment, and the extent to which additional filtering can be achieved within the proposed 5 MHz guard band.

To this end, Free TV submits that the ACMA should investigate adjacent channel performance of all devices involved. This will assist broadcasters and frequency planners in determining what re-design will be required across the various frequency bands to address out-of-band filtering in system designs. We would suggest that once these technical investigations have been carried out by the ACMA that the results should be shared with industry and form the basis of a joint consultative process to reach agreement on the best way forward.

Similarly, the Discussion Paper notes that the guard band requirements will have an impact on licensees in the 2.3GHz band and that the technical framework for that band could be revised. As with broadcasters we would expect licensees in the 2.3GHz band to be directly consulted on any impact on them of any changes to technical licensing parameters in that band.

In addition, further study of the approach being proposed by the ACMA would confirm the Ofcom approach of IMT/ENG boundary conditions and utility of the spectrum for DENG and mobile services.

Where ever possible, systems should be designed to address filtering to suppress out-of-band emissions so as to minimise the guard band required for interference protection. It is noted that the 3GPP specifications for mobile and base station equipment apply asymmetric filtering; better to their paired bands than to non-mobile system bands, in order to maximise their own system performance and effectively reducing the viability of adjacent bands. Guard bands should be shared between services to maximise the usable bandwidth for both services.

3.3 Co-ordination arrangements

The proposed alternative ENG spectrum is currently home to space services and Defence activities. Hence, viable co-ordination arrangements must be established, if broadcasters are to continue to operate unplanned terrestrial ENG services with equivalent functionality.

This spectrum will only be suitable for ENG if coordination requirements are established which give ENG operations primacy in the band. The requirement must be on space services and Defence to approach broadcasters, notifying them of planned operations in the band.

For unplanned terrestrial ENG to operate with equivalent operating conditions, sharing with space services in the 2025-2110MHz band, and space services and Defence in the 2200-2300MHz band will only be viable if co-ordination arrangements are established that requires space services and Defence to notify ENG of planned operations.

Broadcasters cannot predict the timing or location of breaking news and as such, arrangements which require broadcasters to approach other spectrum users to seek access, will simply not be viable and will render the 2025-2110 MHz and 2200-2300 MHz bands unsuitable for ENG.

Broadcasters will require as much notice as possible of space services and Defence operations in these bands and their bandwidth and frequency requirements. We expect these matters to be further discussed and agreed with broadcasters at Technical Working Group meetings.

3.4 Mobile satellite services

Broadcasters are concerned that the 1980-2010 MHz and 2170-2200MHz bands are not long term viable options for ENG use, because of the potentially short timeframe within which mobile satellite services (**MSS**) are likely to be introduced. As noted in the Discussion Paper, the introduction of MSS in these bands would render this spectrum no longer suitable for ENG operation.

Short term use of these bands by ENG will need further study to justify the costs associated with:

- filtering to protect ENG from satellite interference,
- the need for co-ordination with satellite operators; and
- adjustments to ENG equipment to operate in changed channel plans after the introduction of MSS.

The ACMA may wish to consider whether these bands are suitable for other operators who will no longer be able to be accommodated in the 2025-2110MHz and 2200-2300MHz bands.

The ACMA currently makes spectrum available in these bands on request by overseas media and a range of third party operators. This ‘overflow’ spectrum is

used for events such as visits of heads of state attracting international news coverage (the planned visit by the US President, for example); wide area sporting events such as the Australian Open Tennis, Sydney to Hobart Yacht race, Melbourne Cup, AFL Grand Final, F1 Grand Prix, Indy V8 Gold Coast.

3.5 Band planning

Further consultation will be required on band plans and channel arrangements for ENG in the options bands before any re-location of ENG.

If the ACMA does ultimately proceed to re-plan the 2.5GHz band for conversion and re-allocation as described in Options 3 and 4 of Chapter 3 of the Discussion Paper, it should consider channel arrangements that would facilitate continued ENG use of spectrum between the 2570MHz and 2620MHz frequency boundaries in the event that some channels remain available in metropolitan and regional areas after a price based allocation process, particularly for ENG helicopter operations in regional areas. This would maximise efficient use of the spectrum and allow continued use of existing ENG equipment, which is optimised/calibrated for use in this spectrum.

4 Limitations on ENG operations

Even if all of the technical issues outlined above in Section 3 of this submission are satisfactorily addressed, broadcasters will face a number of challenges to maintain equivalent service delivery.

As acknowledged by the Discussion Paper, ENG operations will suffer some loss of utility, as the operation of ENG in the alternative bands will be subject to coordination and usage restrictions. *"Therefore, not all of the proposed spectrum options will be available in all areas, in all bands, or at all times. This spectrum congestion creates an increased requirement for sharing and coordination, a complexity that is not present in current ENG arrangements. It may add to the overall cost of operating an ENG system, and may reduce flexibility compared to current arrangements."* [5]

The ACMA and broadcasters will need to address these issues to ensure that the spectrum options are able to support equivalent service delivery. The following is a list of the likely impacts on ENG service delivery that will have to be considered:

- Limited access to ENG spectrum in Perth and surrounding areas. The Discussion Paper indicates that the requirements of the New Norcia Earth Station north of Perth will preclude any unplanned ENG operations in the 2025-2110 and 2200-2300MHz bands until at least 2015, pending relocation of the station.
- Limited access to ENG spectrum in Canberra, which is subject to co-ordination with the Tidbinbilla Earth station in the 2025-2110 and 2200-2300MHz bands
- Access to less spectrum generally when space research services and Defence licensees are conducting operations. These operations can cover wide geographical areas in numerous locations around Australia.
- Access to less spectrum generally based on interference from adjacent bands.
- Risk of interference when spectrum use is not or can not be appropriately coordinated.

[5] Discussion Paper, page 29.

- Technical restrictions on airborne operations in all alternate bands.
- Less spectrum options for airborne operations due to inability to accommodate duplicate equipment, such as antennas on helicopters. This may reduce flexibility of spectrum use where bandwidth is limited, such as in the 2.5GHz mid-band gap.
- Restrictions on broadcasters' ability to transmit quality HD content where spectrum access is limited by coordination requirements. A full 20MHz channel is required for transmission of quality HD content and often one connection to the studio may involve two "hops" from camera back to the link vehicle, then another link to the central receiving point, requiring instantaneous use of 40MHz. HD is now the industry-standard for the majority of key sporting events. Broadcasters are also subject to minimum HD programming requirements.
- Less spectrum to accommodate terrestrial 'overflow' required for coverage of large-scale news, emergency or other major events, such as the Formula 1 Grand Prix. The ACMA will no longer be able to accommodate these requests in the 2025-2110MHz and 2200-2300MHz bands.
- Less flexibility in spectrum use, as broadcasters will require up to 3 sets of equipment to operate across multiple bands, and will be less able to share channels to accommodate coverage of large events.

5 Spectrum tenure

If a decision is taken to re-allocate ENG, broadcasters must be assured of long-term tenure in the options bands to justify the huge investment in equipment and additional ongoing operational expenses that will be necessary to operate across several bands.

5.1 2.5GHz band

Free TV agrees that the 'preferred policy outcome' of converting the 2.5GHz mid-band gap to spectrum licenses suitable for continued ENG operation will provide broadcasters with certainty of exclusive access to that part of the band for at least 15 years. The utility of the band for ENG will depend on whether appropriate interference protection arrangements can be established and an appropriate 'conversion fee' agreed.

Free TV also supports the ACMA's proposal to reserve some 2.5GHz spectrum in regional and remote areas for apparatus licensing for ENG and/or WAS.

Free TV submits that should spectrum auctions occur in the 2.5GHz band, but lots remain unsold at the conclusion of the auction process, the band should be re-organised to place unused lots adjacent to the mid-band gap. This would provide two benefits:

- the wider mid-band gap would enable greater use of the gap for ENG operations; and
- minimise the need for additional guard bands to other spectrum allotments.

5.2 2025-2110MHz and 2200-2300MHz bands

Free TV notes the ACMA's view that apparatus licences may be the most appropriate licensing arrangement for the 2025-2110MHz and 2200-2300MHz bands, due to the range of services operating in the bands, and the need to balance interference protection with utilization of spectrum.

As these bands account in total for 185MHz of the 250MHz of bandwidth forming the spectrum options for ENG, it is vital that they offer broadcasters security of tenure and certainty of ongoing access (that is, no additional applications that may cause interference with ENG). Free TV is concerned that proposed apparatus licences would not deliver the security of tenure necessary to gain broadcasters' support for the disruption to their services and ongoing costs and would like to discuss these issues further with the ACMA and Government.

5.3 2010-2025MHz band

The Discussion Paper proposes that spectrum licences should be issued in areas of higher spectrum demand (metropolitan and some regional areas) and apparatus licences should be issued in remaining areas. Spectrum licences in metropolitan areas in this band will provide broadcasters with long-term tenure but may not be consistent with a single channel plan for ENG across the total bandwidth comprising the 2010-2025 and 2025–2110 bands. Free TV would like to discuss this matter further with the ACMA.

Free TV assumes that renewal of existing TOBN apparatus licences in the 7GHz and 13GHz bands will be unaffected by this review.

6 Costs of relocation and licence fees

The combination of spectrum options put forward by the ACMA would result in ENG operations in at least 3 separate spectrum bands. This is in contrast to current arrangements, in which all electronic news gathering operations take place within a single band of contiguous spectrum.

The changed arrangements would have a material impact on broadcasters' ENG equipment requirements and their costs of co-ordination and operation.

To operate in at least 3 spectrum bands, broadcasters would need to make huge investments in additional equipment. In some instances, up to 3 sets of equipment could be required. Free TV has made some preliminary estimates of the likely capital expenses and is happy to discuss these with the ACMA.

In addition to capital investment, broadcasters would incur much higher operating costs on an ongoing basis. For example, housing of additional equipment (for example up to 3 antennas for each broadcaster on major collection sites like the MLC building in Sydney) would attract substantial ongoing operational expenses. There are numerous collection sites in each metropolitan area.

Due to weight restrictions, only one set of equipment may be carried on a helicopter. Other ENG facilities will need to be equipped with multiple units in order to maintain the flexibility of quickly reconfiguring to uplink to a helicopter then link to a central collection site.

The relocation costs of broadcasters should be covered as part of the relocation process and funded by the Government in recognition of the revenue potential of the cleared 2.5GHz spectrum. Licence fees for the new ENG spectrum allocations must take into account the importance of these services to viewers and the fact that re-planned spectrum arrangements will place additional and increased burdens on broadcasters while providing less utility than the current arrangements.

7 Timing

Free TV welcomes the ACMA's commitment to preserving continuity of operation for ENG. This is critical to broadcaster's business. Spectrum planning decisions involve enormous commercial and financial implications for industry. There are also serious implications for consumers. Long-term strategies are needed to provide market stability for investment decisions by industry and for ongoing business planning.

If a decision is taken to re-locate ENG it will be critical that continuity of ENG operations are preserved during the process of spectrum migration. The programming and services reliant on ENG spectrum are produced and delivered consistently throughout the year. As already noted, much ENG spectrum use takes place on an unplanned basis.

The decision by the ACMA to limit extensions of our current TOBN licences to February 2013 gives added urgency to the need to find a suitable long term solution for ENG services (and to clarify the status of TOBN licences in other bands).

The ACMA must therefore establish a clear project-management timeline for any transition, in close consultation with TOBN licensees.

The timeline will be dependent on suitable resolution of technical issues such as appropriate guard bands and boundary conditions; completion of planning for clearance of fixed links; band planning for ENG, and further consultation on licensing issues.

In the case of Perth it will also depend on spectrum access arrangements for ENG until at least 2015 (pending relocation of the Earth space station). This is at odds with the limitations with our existing TOBN licences.

Broadcasters would also need to be given adequate time to design and source additional equipment then install for operation in the options bands. This may take some time, depending on a range of factors including the progress of international harmonisation of spectrum for ENG that may bring economies of scale / pricing of ENG equipment in the options bands.

In order to meet the commitments of government as regards the continuity of ENG services, it is also critical that a solution for ENG needs to be finalised with the broadcasters well ahead of any decision to reallocate and auction the 2.5GHz band. Given the uncertainties around the utility of the proposed new bands for ENG, we would not wish to see the auction process for the 2.5GHz band occur before broadcasters had been successfully relocated to their new operating environments.

8 Conclusion

For more than a decade broadcasters have been working closely with the ACMA and international forums to find a spectrum solution for ENG which offers broadcast licensees long-term certainty and equivalent functionality.

Free TV will continue to work with the ACMA to canvass the spectrum options. A number of technical, licensing and spectrum planning issues will need to be addressed.

No decision on replanning and reallocation of the 2.5 GHz band should be taken until the suitability of the alternative bands has been confirmed and adequate spectrum can be made available to enable broadcasters to continue to deliver ENG services equivalent to that currently provided.