Strategies for Wireless Access Services

Spectrum Access Options

Consultation Outcomes

Spectrum Planning Discussion paper SPP 08/08

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Contents

1. Introduction

The term 'wireless access services' (WAS) encompasses the variety of ways that telecommunications carriers, internet service providers (ISPs) or other service providers deliver a radio connection from an end-user to a core network, usually a public network, such as a public switched telephone network, the internet, or a local/wide area network. WAS covers a range of other terms such as fixed wireless access (FWA), broadband wireless access (BWA), wireless local loop (WLL), multipoint distribution system (MDS) and radio and wireless local area network (RLAN and WLAN). Mobile telephony systems can also be considered as WAS.

Over the past few years there has been increasing pressure both nationally and globally to make more spectrum available for WAS. Evidence for this includes:

- an increasing demand for broadband, and an increasing trend of using wireless technologies to provide broadband services;
- the requirement for greater bandwidth to cater for new services/applications and an expectation that these services will be available 'anywhere, anytime';
- global identification, harmonisation and allocation of spectrum;
- pro-active polices by government providing funding for and stimulating new WAS projects; and
- the identification of WAS as a key economic enabler.

In embarking on the WAS consultation process, ACMA's strategy was to ensure that sufficient spectrum could be made available to meet current and future demand, using technology-flexible arrangements that stimulate competition and allow industry (through market forces or other appropriate mechanisms) to determine best use of the spectrum while recognising the varying needs across Australia. To achieve this, a number of factors need to be considered when identifying spectrum for WAS, including:

- the amount of spectrum that is required to meet both current demand and the estimated future demand;
- international trends and harmonisation to ensure economies of scale and facilitate global roaming;
- where the spectrum is needed and when it should be released (for example, more spectrum will be needed in highly populated areas);

- the most suitable frequency bands, which can be affected by factors such as global harmonisation and economies of scale, standardisation, incumbent services and the potential for sharing or relocation, and whether the spectrum can be made available in a reasonable time frame;

- how to best make the spectrum available—ensuring a technology-flexible framework and determining the most appropriate licensing and allocation mechanism(s); and

- balancing the needs of new and existing users—developing sharing criteria or alternative spectrum arrangements for incumbent services if required.

WAS Review Process

In February 2006, ACMA released the discussion paper *Strategies for Wireless Access Services*[1]. The discussion paper sought stakeholder input on the previously mentioned factors and identified several candidate frequency bands for WAS. The release of the paper was coordinated with ACMA's first spectrum seminar held on the 11-12 December 2006—the topic of which was spectrum for wireless access. The seminar was well received and ACMA gained valuable input from radiocommunications stakeholders.

Submissions to the discussion paper closed on 3rd April 2007. Forty-seven submissions[2] were received to the discussion paper which, when studied in the context of regulatory and policy settings, helped form the basis for the WAS spectrum strategy.

Following on from the paper released in February 2006, ACMA released the discussion paper *Strategies for Wireless Access Services: Spectrum Access Options*[3] in December 2006. This paper provided an overview of demand for WAS and gave a summary of responses to the February paper. It also sought comments on frequency bands ACMA identified as potentially suitable candidates for WAS and some high-level options for band segmentation and licensing. At the close of the public comments period, a total of 166 submissions were received. ACMA also held a conference in Sydney in December 2006 that provided stakeholders with a further opportunity to discuss issues in the paper.

The responses to the discussion paper provided ACMA with a large amount of information to consider. Since comments on the *Strategies for Wireless Access Services: Spectrum Access Options* paper closed on 30th March 2007, ACMA has analysed this information in light of continuing Australian and international and developments in relation to WAS.

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[1] The February 2006 discussion paper can be viewed on ACMA's website at
http://www.acma.gov.au/acmainterwr/_assets/main/lib100639/was_discussion.pdf.
[2] Submissions can be viewed on ACMA's website at
http://www.acma.gov.au/ACMAINTER:STANDARD::pc=PC_100536
[3] Strategies for Wireless Access Services: Spectrum Access Options, Spectrum Planning Discussion paper SPP 10/06, December 2006, http://www.acma.gov.au/webwr/_assets/main/lib100639/was_discussion.pdf

Purpose

The purpose of this document is to provide stakeholders with:

- a summary of responses to the February 2006 discussion paper *Strategies for Wireless Access Services: Spectrum Access Options*;

- the outcomes of the WAS consultation process; and

- information on the additional work that ACMA will undertake to implement its WAS strategy.

2. Summary of key proposals and responses

In December 2006 ACMA released a discussion paper entitled *Strategies for Wireless Access Services: Spectrum Access Options* for public comment. The purpose of the paper, which followed on from the *Strategies for Wireless Access Services* discussion paper released in February 2006, was to:

- give a brief overview of demand for WAS and the estimated future spectrum required to support it;
- provide a summary of the responses received to the discussion paper released in February;
- identify bands that ACMA believes are currently the most suitable candidates for WAS in the short, medium and long term; and
- discuss and seek detailed comments on the identified bands, including some high-level options for band segmentation and licensing.

165 submissions were received in response to this discussion paper. Respondents included small and large WAS operators, equipment manufacturers and suppliers, WAS interest groups and forums, as well as incumbent service providers from the broadcast industry and fixed satellite services (FSS) industry. A full list of respondents is provided in Appendix B.

This section summarises the key proposals from the discussion paper and the responses received from industry. It does not detail all responses, but highlights the main issues identified in the responses. ACMA's comments on the responses are provided in section 3 of this paper. Copies of the non-confidential responses to the second discussion paper are available from the ACMA website at
http://www.acma.gov.au/WEB/STANDARD/pc=PC_310171 .

Key Proposals

The December 2006 *Strategies for Wireless Access Services: Spectrum Access Options* discussion paper raised several important issues relating to the future of WAS in Australia. The following points summarise the key proposals ACMA presented in the paper:

- Responses to the first discussion paper were summarised and proposals for candidate bands for WAS were briefly outlined. The bands identified included: 1785-1805 MHz, 2500-2690 MHz, 3575-3710 MHz and the 520-820 MHz;

- The 1785-1805 MHz band was proposed for release in the short term to alleviate short-term demand in regional and remote areas;

- The release of the 2500-2690 ('the 2.5 GHz band') MHz band for WAS Australia-wide in the medium term was proposed. Of the bands identified, it was stated that WAS use of this band could have a significant effect on Australia's economic development due to the global identification of the band for IMT technologies. This would not only facilitate global roaming, but also support economies of scale and lower equipment costs. In Australia, the band is currently used for electronic new gathering (ENG) applications by free-to-air broadcasters;

- The 2025-2110 MHz and 2200-2300 MHz band were identified as potential host bands for the relocation of ENG services;

- Several segmentation options in the 2500-2690 MHz band were proposed. Options 1 and 2 allocated the whole band for WAS and Options 3 to 6 provided an allocation in the middle of an FDD allocation for ENG services;

- The release of the 3575-3710 MHz band ('the 3.6 GHz band') for WAS in the medium term was proposed. The band has been allocated by several countries for WAS and is part of the band that the WiMAX Forum has defined as the 3.5 GHz band (3.4-3.8 GHz). In Australia the band is used mainly for fixed point-to-point services and the C-band FSS;

- Options for spectrum allocation and management of incumbent FSS earth stations and fixed point-to-point services in the 3575-3710 MHz band were discussed;

- The 520-820 MHz band was identified as a potential candidate band for use by WAS and other related wireless applications in the long term. Parts of this band may become available following analog television switch-off and any subsequent restructuring of spectrum in the band; and

- Preferred licensing options for both the 2500-2690 MHz and 3575-3710 MHz bands and their inherent advantages and disadvantages were discussed. The concept of a Private Park licence and a possible structure of this arrangement were also outlined.

Responses

As discussed previously, the December 2006 discussion paper identified a number of bands that could be made available in the short, medium or long term, as suitable candidate bands for WAS either in regional areas or Australia-wide.

Comments received in response to the December 2006 discussion paper have been categorised into sections covering each of the candidate bands proposed as well as a section dealing with licensing issues.

The 520-820 MHz Band

The December 2006 discussion paper identified the 520-820 MHz band as a suitable candidate for WAS Australia-wide to potentially be made available in the long term (i.e. four to ten years). The band is currently used for free-to-air television broadcasting and low power devices such as wireless microphones. Part of this band may become available following analog switch-off and any subsequent restructuring in the band.

Of the 165 submissions received to the discussion paper, 140 respondents, including 130 users and retailers of wireless microphones, commented on this band.

Suitability of Candidate Band

As in the February 2006 discussion paper, many respondents commented on the attractiveness of the band for WAS, particularly in regional and remote areas due to its propagation characteristics and indicated the lighter use of the band by broadcasters in these areas could present opportunities for use. However, numerous respondents expressed concern on the following basis:

- the introduction of WAS may cause interference to wireless microphones which use the band;

- consideration of the 520-820 MHz band for WAS is premature given that digital dividend work and digital television rollout has yet to be completed;

- there is insufficient information about the amount of spectrum that will be required for digital television to adequately replace existing analog services; and

- there is currently a lack of international standardisation in the band for WAS.

Most respondents were of the opinion that ACMA should continue to monitor international developments for WAS in this band and/or that work on TV digital switchover needs to be progressed further before any decisions can be made.

The 2500-2690 MHz band

The December 2006 discussion paper identified the 2500-2690 MHz band as a suitable candidate for WAS Australia-wide to be made available in the medium term (i.e. two to four years). Internationally, the band was identified at WRC-2000 as an expansion band for IMT

technologies. In Australia, the band is primarily used for ENG applications by free-to-air broadcasters.

Twenty-five submissions commented on this band. These ranged from incumbent band users to current and prospective WAS providers, suppliers and manufacturers.

Issues for comment have been categorised into three sections addressed below—*Suitability of Candidate Band*, *Band Segmentation* and *Incumbent Management*.

Suitability of Candidate Band

Support for introducing WAS to this band generally came from WAS operators, suppliers, manufacturers and interest groups/forums. The main reasons for their support were:

- the global identification of the band for IMT;

- the potential increase in global roaming ability;

- the economies of scale and reduced equipment costs that could be achieved from global harmonisation;

- that not aligning with international standards could result in a potential cost to the Australian economy in the order of hundreds of millions of dollars;

- that since most ENG activity occurs inside densely populated areas, many regional operators suggested that at a bare minimum, WAS and ENG could share the band outside these areas; and

- that the incumbent users have been 'on notice' regarding future use of the band by IMT since WRC-2000.

Opposition to introducing WAS into this band generally came from the broadcasting industry. In summary, the major issues raised by these respondents were that:

- sharing of the band between ENG and WAS will be difficult, particularly in metropolitan areas;

- there has been inadequate study into ENG sharing with incumbents in the proposed relocation bands;

- ACMA needs to weigh the public benefit of introducing WAS versus incumbent relocation;

- fragmented relocation of ENG could inhibit the broadcasters' ability to gather content;

- spectrum efficiencies resulting from new Standard Definition (SD) digital ENG technologies will be offset by spectrum requirements of future High Definition (HDTV) technologies;

- WAS would not be able to share with satellite services in the 2500-2690 MHz band;

- further work needs to be carried out on investigating existing but unused spectrum allocations, other bands which have or have not been identified for IMT, as well as the potential for current 2G spectrum allocations to be converted for use by 3G services; and

- there is insufficient evidence of demand for WAS in these bands at this point in time.

A few current WAS operators and manufacturers suggested it was premature to open the band to WAS in the medium term. Issues raised included that:

- there is currently a lack of equipment available for this band;

- current demand for the spectrum is not high enough; and

- there are incumbent sharing/relocation issues that have not been adequately addressed.

Band Segmentation

Respondents had varying views on their preferred band segmentation option. In general, only WAS operators, manufacturers and suppliers supported one (or more) of the options proposed by ACMA. The main points made by respondents are summarised below.

- The broadcast industry respondents stated that none of the band segmentation options presented were acceptable, as they do not adequately provide for the needs of broadcasting activities. Instead they claimed that incumbent services should be able to continue operating under their current arrangements.

- A few respondents acknowledged a preference for option 1 outlined in the paper. These respondents considered this option the most flexible arrangement, allowing for both FDD and TDD technologies. One respondent suggested that a national synchronisation scheme should be implemented to minimise adjacent channel/area interference issues in TDD systems.

- Options 2 and 5 were the most popular band segmentation choices with respondents for the following reasons:
    - they allow for the co-existence of FDD and TDD technologies;
    - they make use of an FDD duplex separation of 120 MHz;
    - they are in line with 3GPP specifications, ITU-R Recommendation M.1036, and plans of other administrations and international organisations such as the CEPT; and
    - they would allow for incumbent ENG access to the band (essentially turning option 2 into option 5) on a transitional arrangement, though eventually the entire band would be required for WAS.

- One operator expressed a preference for Option 3 as it provides for 20 MHz of spectrum per operator. This would allow for higher throughput and permit the use of either FDD or TDD technologies. It would also cater for ENG services for a period of time.

- There was also a preference for option 4 in rural areas, with an acknowledgement that this spectrum may be required to coexist with different arrangements in regional and urban centres.

- Although one respondent expressed an interest in option 6, it was generally stated that most international organisations, as well as operators and manufacturers, were

focusing on solutions with 5, 10 and 20 MHz bandwidths and FDD splits of 120 MHz. Most respondents therefore did not support this option.

A majority of respondents suggested that a minimum of 10-20 MHz of paired spectrum per operator would be required in the future to offer competitive broadband speeds. One respondent suggested that a minimum 15-20 MHz of unpaired spectrum would be required per operator, while others suggested 30 MHz would be necessary in the short to medium term and as much as 60 MHz would be required in the long term.

Incumbent Management

There were varying opinions on how to manage incumbent services in the 2500-2690 MHz band, with many respondents expressing opposing views. The main points raised in the submissions are provided below.

- The broadcast industry respondents stated their preference to leave incumbent services in the band under current arrangements.

- Broadcast industry respondents and some WAS proponents suggested that there is not yet enough demand for WAS to warrant relocation of ENG services.

- Various respondents believed that full consultation with the broadcasting industry should be carried out with the appropriate studies, before any alternative arrangements for ENG are determined.

- Many WAS proponents stated that ENG could use the 2.5 GHz mid-band with band segmentation options 3-6 (or some other portion of the band) under a transitional arrangement.

- One proponent suggested ENG could operate in the guard bands put in place between FDD and TDD technologies.

- Some WAS proponents stated the entire band should be given to WAS immediately.

The 3575-3710 MHz band

The December 2006 discussion paper identified the 3575-3710 MHz band as a suitable candidate for WAS that could be made available in the medium term (i.e. one to three years). Internationally, several countries including the USA, Canada, the UK, Sweden, Norway, Denmark, Portugal, Switzerland and Japan have allocated or are considering allocating spectrum in and around this band for WAS. The band is part of the spectrum that the WiMAX Forum has defined as the 3.5 GHz band (3.4-3.8 GHz).

In Australia, the band is mainly used for fixed point-to-point services (mostly Telstra) and C-band FSS. There are also Department of Defence (Defence) maritime radiolocation services and secondary amateur services operating in the 3400-3600 MHz band.

Twenty-eight submissions commented on this band. These ranged from providers and users of services in the 3575-3710 MHz band, to current and prospective WAS providers, suppliers and manufacturers of WAS equipment.

Responses to the issues for comment have been categorised into three sections addressed below—*Suitability of Candidate Band, Band Segmentation* and *Incumbent Management*.

Suitability of Candidate Band

Respondents who were opposed to the introduction of WAS into the band made the following comments.

- There are concerns with setting the band edge for WAS at 3710 MHz, since this represents a 10 MHz overlap with the 'standard' C-Band.

- Some FSS operators appeared to be focused on the protection of existing and future licensed Earth Stations in the band, while others stated that the large amount of unlicensed users should also be considered.

- There are as many as 200,000 unlicensed receivers in the extended and standard C-bands, operated by individuals of the ethnic community, hotels, educational institutions and government agencies, as well as radio and TV stations.

- There is a high cost associated with the physical relocation of FSS sites.

- There are concerns about co-channel and adjacent channel interference as well as receiver overload issues, which could also affect standard C-band services.

- There is a lack of equivalent alternative spectrum for the FSS.

- Coordination with existing FSS sites would significantly restrict WAS, with exclusion zones of up to 200 km required at some locations.

- Future FSS deployments would be constrained.

- There is difficulty in coordinating with mobile devices and it may be hard to restrict these devices geographically so they are not operated too close to earth stations.

- The financial implications of any WAS allocation on FSS operators could reduce the economic viability of this service in the band.

- Some regions and offshore territories of Australia rely on satellite communications as fibre and wireless terrestrial technologies are not an option.

- There is potential for the FSS to share with other services including ENG.

- If the band was made available to WAS, there would need to be adequate protection for current FSS earth stations in the entire C-band, as well as guarantees protecting new sites into the future.

- There is not yet enough demand for WAS in the band.

- Defence expressed some concern about the introduction of WAS in this band, commenting that it operates a maritime radiolocation service in the 3400-3600 MHz band. They are currently conducting sharing studies between these services and WAS.

Proponents for the opening of the band for WAS made the following comments.

- The band has been identified for WAS internationally by numerous administrations (including in Europe and the US) and organisations including the WiMAX forum.

- Making this band available to WAS would allow Australia to tap into global economies of scale and globally standardised equipment. Specifically, respondents

expressed the view that this would lead to more successful deployments of WAS in regional areas.

- Equipment is already available for this band.

- Opening the band to WAS would facilitate global roaming and negate interoperability problems with globally roaming equipment.

- A few respondents commented that there is not yet enough demand for WAS in the band, but suggested an allocation may be required by 2010-2013.

Band Segmentation

Numerous respondents offered their views on how much of the band should be considered for WAS and when it would be required. The main points are summarised below.

- In general, proponents for opening the band for WAS stated that the entire 3575-3710 MHz band should be made available.

- Many respondents questioned the setting of the band edge for WAS at 3710 MHz, since this represents a 10 MHz overlap with the standard C-Band.

- There were suggestions of a phased opening of the band to avoid co-channel interference into existing licensed earth stations.

- One respondent suggested that this band could be combined with spectrum in the 3.4-3.5 GHz band to create an asymmetric FDD spectrum structure.

- Many respondents suggested that TDD technologies (in particular WiMAX) would be the most likely WAS technology deployed in the band, and therefore band segmentation should represent this.

Incumbent Management

Incumbent FSS operators generally opposed the introduction of WAS into the band due to potential interference issues. However, there appeared to be a general level of acceptance that if WAS were to be introduced, current licensed earth stations should be protected so they are not exposed to harmful interference or unduly financially impacted. To this end, most FSS respondents felt that grandfathering[4] would be an adequate form of protection, some of the caveats suggested include:

- earth stations should be protected for as long as they are operational;

- special consideration should be given to tropical (high rainfall rate) areas;

- there needs to be allowances for new earth stations and additional frequencies at existing sites; and

- appropriate coordination procedures would need to be developed to protect the FSS from harmful interference.

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[4] 'Grandfathering' is a term used to describe the situation where existing earth stations are allowed to continue operating under current arrangements while new earth stations or new frequency assignments to existing earth stations are not permitted.

Some incumbent FSS operators felt that grandfathering of current licences was not sufficient for the following reasons:

- it does not address unlicensed users;

- geographical relocation of sites, if supported by grandfathering, may be impractical and/or uneconomical; and

- there is no suitable alternative spectrum for the satellite service to migrate into when considering new services or if grandfathering is only for a limited period of time.

Respondents that supported allocating the band to WAS had differing opinions on the way incumbent FSS services could be managed. Some of the suggestions included:

- no new assignments should be allowed and existing services should be protected for a specified period of time;

- the FSS should be protected while phasing out their use of the band over a period of time;

- WAS and the FSS could co-exist provided that Earth Stations (after some period of time) are either relocated to less densely populated areas or greater planning/site engineering at both WAS and FSS sites is employed to reduce exclusion/interference zone areas;

- adequate study into the protection of and coordination with the FSS must be conducted; and

- C-Band earth station 'farm' sites could be created, one for each of the west and east coasts of Australia.

Respondents' views were split on how to handle incumbent point-to-point links. Some of the suggestions included:

- no new assignments should be allowed and point-to-point links should remain as a primary service for a specified amount of time before becoming secondary in the band;

- existing links should remain a primary service and be protected for their lifetime;

- since most links are located in rural environments there would be opportunity for the services to co-exist; and

- point-to-point links should be given secondary status in the band.

Alternative bands for WAS

Respondents commented on a number of other potential bands for WAS, the main suggestions are summarised below:

- existing, but unused spectrum allocations should be investigated;

- re-farming of existing WAS spectrum allocations should be considered;

- there needs to be investigation into other bands which either have or have not been identified for IMT, including bands above 6 GHz, which may be suitable for nomadic applications;

- the 45-70 MHz is already identified for Fixed and Mobile applications in Regions 2 and 3, and could be considered for WAS;

- the 2700-2900 MHz band could be considered for rural/remote area WAS usage on a coordinated basis with aeronautical radar systems; and

- the standard C-band, 3700-4200 MHz could be considered in the long term.

The band that attracted the most comments was the standard C-band. FSS operators that commented on this band were strongly opposed to any allocation in this region of spectrum while some WAS proponents felt it should be made available in the long term. Many of the arguments made by respondents are similar to those for the extended C-band and are not repeated here. The main additional points raised were that:

- this band could be suitable for metropolitan areas for fixed and mobile WAS after 2013;

- the characteristics of the standard C-band's intercontinental interconnectivity and ability to operate in high rainfall regions make it the only means of communication for some geographies; and

- without standard C-band access Australia would be cut off from direct communications with many jurisdictions, including some Australian territories, Pacific Islands and other destinations.

Licensing Issues

The December 2006 discussion paper requested comment on possible licensing options for the 2500-2690 MHz and 3575-3710 MHz bands. Comments on general licensing issues associated with Private Park arrangements such as maximum EIRP levels and device registration were also requested, along with comments on the implementation of the aggregation of spectrum lots from auctions. Finally, ACMA requested that respondents comment on any other relevant issues. Since many of these 'other issues' involved comments on other bands or licensing issues, responses to this question have been integrated into summaries provided here and in previous sections.

Twenty-eight submissions commented on licensing options for the 2500-2690 MHz and 3575-3710 MHz bands, while a total of twenty submissions commented on general licensing issues. Responses were generally from current and prospective WAS service providers, as well as suppliers and manufacturers of WAS equipment; however a number of incumbent operators also commented.

Issues for comment have been categorised into three sections addressed below—*Licensing Options*, *Private Park Issues* and *Aggregation of Spectrum Lots*.

Licensing Options

Regional WAS operators were generally in favour of a private park arrangement. However, some respondents suggested that spectrum licensing would be appropriate in areas of high population density in order to provide a better quality of service and avoid some of the

sharing issues associated with Private Parks. The main reasons given in support of private park arrangements were:

- it would likely be a more affordable option than spectrum licences;

- it would maximise spectrum access for regional and remote areas and ensure the lowest end price for users;

- it would result in better utilisation of the spectrum in regional areas; and

- it would promote competition in regional areas.

Some of the respondents, including large WAS operators, suppliers and manufacturers, expressed concerns about Private Park arrangements for the following reasons:

- it would be difficult to guarantee quality of service with multiple operators sharing the same spectrum, especially in areas of very high usage; and

- it relies on the concept of 'perfect cooperation' which could result in numerous problems and lengthy litigation, more so in areas of high population density where demand for spectrum is greater.

In general, respondents in favour of spectrum licensing fell under the categories of manufacturers, suppliers and national/large WAS operators. There were many reasons for the support of spectrum licensing from these respondents including:

- it facilitates national roaming;

- it is considered an efficient way to handle interference between different licensees;

- it allows more flexibility for the licensee to design, coordinate and rollout their own networks;

- it allows the market to determine the best use of the spectrum;

- it is argued that exclusive use of the spectrum is the best way to ensure quality of service; and

- it was suggested that a mixture of both national and disaggregated local area licences would promote competition in localised areas and facilitate rollout for national operators.

Some respondents also suggested the use of different licence types for different areas, for example spectrum licensing in cities and private park/spectrum licensing in regional areas.

A number of respondents expressed a preference for apparatus licensing. These were typically FSS operators and regional/rural WAS operators. The main reasons provided included that:

- it reflects how current earth station, point-to-point links and numerous other services are coordinated, and would ensure a case by case interference analysis for proposed WAS sites; and

- it would allow exclusive access to the spectrum in regional/remote locations. Larger centres could still be licensed under a spectrum licensing regime.

However, it was identified by some respondents that apparatus licensing arrangements would likely suit rural/regional operators more than metropolitan and national operators.

Numerous respondents supported a 'use it or lose it' provision on licences to avoid non-use of spectrum, spectrum hoarding or other anti-competitive behaviour. Respondents also suggested that there should be limits on the amount of spectrum one operator can own in a competitive environment[5].

Private Park Issues

Mainly regional operators commented on a recommended maximum equivalent isotropic radiated power (EIRP) for class licensed or private park arrangements. The main comments made were that:

- a maximum EIRP needs to be set to minimise the potential for harmful interference;

- EIRP and other parameters should be aligned with international standards/recommendations;

- there should be varying limits depending on the Private Park tier, for example, higher limits could be set in regional and remote areas, where there is less competition to maximise coverage area;

- limits in class licensed bands are often exceeded and are difficult to police; and

- numerous WAS manufacturers, suppliers and large operators opposed EIRP limits, stating their preference for spectrum licensing over Private Park due to reasons stated under the *Licensing Options* section.

A broad range of respondents encompassing national and regional WAS operators to FSS operators, strongly supported device registration under a Private Park arrangement. The main reasons for supporting registration were that:

- it would facilitate site planning and coordination with incumbent services and other WAS operators;

- it would assist in dispute resolution by allowing site identification;

- it would create conditions for operators to offer the best Quality of Service; and

- it would maximise spectrum efficiency;

A suggestion was made that device registration should be handled by a third party (other than ACMA), who would also handle interference issues.

The main reasons provided by respondents who opposed device registration were that:

- it is difficult to manage registration since operators would have little control over the location and even type of user equipment (assuming user equipment is registered);

- it would rule out mobile applications; however, there was a counter argument raised that by limiting the number of users in self regulated spectrum, coexistence would be possible with an open plan framework;

- a national synchronisation plan would make device registration irrelevant; and

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[5] A competitive environment is considered to be an area where the demand for spectrum is expected to exceed the availability.

- coordination should be self regulated by licensees.

Although there was significant support for Private Park arrangements, there was general agreement that more work on addressing the framework for the concept is required. In particular, if Private Parks are to be implemented, respondents suggested that the following additional issues will need to be resolved:

- definition of clear geographical boundaries;

- an appropriate means to determine the number of licensees per private park; and

- a procedure for coordination between operators to ensure fair and equitable use of the spectrum and avoid "spectrum hogs" and "squatters".

Aggregation of Spectrum Lots

Respondents were unanimous in their agreement that aggregation should be implemented by ACMA as it facilitates efficient use of the spectrum. There were no preferences expressed for how aggregation should be implemented (e.g. low, high or other), but the following suggestions where made:

- licensees owning spectrum in adjacent licence areas should be allocated spectrum at the same frequency (i.e. allow aggregation of frequency lots across a boundary);

- aggregation should preserve spectrum pairing; and

- aggregation should group like services at different ends/portions of the band.

3. Consultation outcomes

1785-1805 MHz Band

The 1785-1805 MHz band discussion paper was released in December 2006 at the same time as the WAS discussion paper. Eight submissions were received on the proposal to release the band. The submissions were mainly from incumbent users concerned with interference to their services. Although some concern was expressed, incumbents were generally accepting of the arrangements proposed for the band. However, there was a lack of significant support from potential users and, as such, no further work has been undertaken on the release of this band. The band could still be made available in a short time frame if indications of demand increase. However, it is not considered necessary at this time.

2500-2690 MHz Band

ACMA recognises the importance of the ENG services that currently use the 2.5 GHz band, and that ongoing access to spectrum is critical for the collection and delivery of content. ACMA also realises that the continued uncertainty surrounding spectrum arrangements for ENG needs to be resolved and suitable long-term arrangements developed.

ACMA has formed the view that the current planning, licensing and pricing arrangements for the band are unlikely to support its efficient allocation and use into the future, particularly in light of the identification of the band internationally for use by WAS and indications of the rising vale of the band. Additionally, responses to the discussion papers indicated significant interest in the 2.5 GHz band for uses other than ENG. Incumbent ENG users raised a number of significant issues that will need to be addressed before the final adoption of any approach to changing arrangements in the band.

ACMA is also mindful of the Minister for Broadband, Communications and the Digital Economy's statements in relation to the 2.5 GHz band from his speech to the ACMA *Radcomms08* conference on 30 April 2008[6], which included the following:

> "*In planning for future services, the Government will ensure the adequate provision for a long-term home for EN*G,
>
> *This will take into account the needs of the broadcasters, the pros and cons of any transition strategy and developments internationally*

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[6]Senator the Hon Stephen Conroy, Address to ACMA's Radcomms08 conference, Melbourne, 30 April 2008, this address can be viewed at: http://www.minister.dbcde.gov.au/media/speeches/2008/008

> *Of course, in order to make an effective decision, clear information and co-operation from industry on their requirements and careful consideration of alternative spectrum options for supporting ENG services is also required.*"

Accordingly, ACMA has decided to review planning, licensing and pricing arrangements to determine how the band can be planned and allocated to permit maximisation of the overall benefit derived from the spectrum. The review will have the twin objective of delivering suitable long-term arrangements for ENG services, whether in the 2.5 GHz band, in other bands or in combinations of bands, so as to resolve the current uncertainty around spectrum arrangements for ENG.

3575-3710 MHz Band

ACMA recognises the importance of both the Fixed (Point to Point) and Fixed Satellite Services operating in the 3575 – 3710 MHz band and the complexity of introducing new licensing arrangements around existing licensed services in this band.

ACMA also recognises the importance of WAS in the provision of broadband, especially in areas where 'the last mile' is difficult to bridge using cable and where Fixed Wireless Access provides the optimal solution.

ACMA intends to review the extended C-band to create arrangements that facilitate its use for regional WAS and address incumbency issues. As the initially proposed band 3575-3710 MHz overlaps the standard C-band (3700-4200 MHz) by 10 MHz, ACMA will only consider the 3575-3700 MHz band for WAS in its review.

This review will also include consideration of Defence's current and future requirements in this band.

ACMA is aware from submissions to the discussion paper and other anecdotal evidence that unlicensed satellite receivers use this band. Under legislative and regulatory arrangements, unlicensed receivers are not afforded protection and as a consequence are subject to interference from any existing or future licensed services in the band.

520-820 MHz Band

The consideration of the 520-820 MHz band for use by WAS is a long term issue. The Government is considering planning options for the band following the switch-off of analog television services. The only decision that Government has made is that analog television services will be switched off by the end of 2013. Any decision on future use of the band is for the Minister for Broadband, Communications and the digital Economy. At this stage, ACMA will take no further action with regard to WAS in this band but will continue to monitor and review developments.

4. Additional work

2500 – 2690 MHz

During the review of the 2.5 GHz band, a number of possible approaches will be considered regarding the future management of the band. These approaches might include one or more of:

- reviewing apparatus licence fees to better reflect the changing value of the band;
- changing licensing arrangements in some or all parts of the band to facilitate future changes in use, including by way of spectrum trading; and
- conducting a price-based allocation to distribute some or all of the spectrum to its highest value use or uses.

Implementation of any new approach will have implications for electronic news gathering operators, so there needs to be certainty around future arrangements for electronic news gathering before final adoption of any approach or approaches.

ACMA proposes initially to consult with broadcasters to determine their future spectrum requirements for electronic news gathering and later, more broadly on any alternative options.

3575 – 3700 MHz

To facilitate the use of the 3575-3700 MHz band for regional WAS on an equal basis with existing licensed services, ACMA proposes to develop, in consultation with interested parties, licensing and coordination arrangements for WAS, point to point and fixed satellite services. These arrangements will ensure that new services entering the band can be coordinated with existing licensed services.

It is anticipated that proposed coordination and licensing conditions will be released in 2009.

Appendix A: Summary of issues for comment

Suitability of candidate bands

Recognising the suitability of the identified bands for WAS, and their importance for incumbent services:

1. Should the 2500–2690 MHz band be made available (in whole or part) for WAS applications? If it were, what would the implications (costs) be for ENG applications? (also refer to section 5 'Band Segmentation Options')
2. What are the implications if the 2500–2690 MHz band is not made available for WAS?
3. Should the 3575–3710 MHz band be made available (in whole or part) for WAS applications? If it were, what would the implications (costs) be for fixed point-to-point links and fixed-satellite services? (also refer to section 5 'Band Segmentation Options')
4. What are the implications if the 3575–3710 MHz band is not made available for WAS?

If the 2500–2690 MHz band were made available for WAS:

5. Which segmentation option would you prefer? Why? Respondents are welcome to suggest alternative segmentation options.

6. What option(s) would you prefer for the management of incumbent services? Why?

If the 3575–3710 MHz band were made available for WAS:

7. How much spectrum in the band should be made available? Why?

8. What option(s) would you prefer for the management of incumbent FSS earth stations? Why? In particular, should FSS earth stations be 'grandfathered'? If so, for how long? In general, what arrangements should be considered for the protection of earth stations?

9. What option(s) would you prefer for the management of incumbent fixed point-to-point services? Why?

Licensing options

10. Which licensing option(s) would you prefer for WAS in the 2500–2690 MHz band? Why?

11. What areas should the licences cover? (e.g. Australia-wide, capital cities, regional areas, state-wide)

12. If the 2500–2690 MHz band was allocated for WAS, and a block of spectrum in the band was preserved for ENG operation, how should the ENG spectrum be licensed? Why?

13. Which licensing option(s) would you prefer for WAS in the 3575–3710 MHz band? Why?

14. What areas should the licences cover? (e.g. Australia-wide, capital cities, regional areas, state-wide)

General licensing issues

15. If WAS were authorised under a class licence or a private park (in either of these bands), what should the maximum equivalent isotropically radiated power (EIRP) be? Why?

16. Is device registration necessary under a private park? If not, what other arrangements could be used to allow coordination?

17. Should aggregation of spectrum lots be allowed? If so, how should lots be aggregated (low, high or other)?

Other issues

18. What other issues should ACMA consider?

Appendix B: List of respondents

2.5GHz and 3.6GHz band responses:

Alcatel-Lucent

Austar

Australian Broadcasting Corporation (ABC)

AsiaSat

Australian Music Association

Avcomm

BHP Billiton

Broadcast Australia

Communications Alliance

Department of Defence

EM Solutions

Ericsson

Foxtel

Free TV Australia

Geoscience Australia

Halenet

Horizon Broadband Communications

Inmarsat

Intel

Intelsat

Internode-Agile Communications

Motorola Australia

Murray Regional Development Board

Nokia

Optus

Qualcomm

Reach

Special Broadcasting Service (SBS)

Shoalhaven Internet

Stratos Global

Telstra

Television Oceania

UMTS Forum

Unwired Australia

Vodafone

Wireless microphone usage responses:

A Audio Hire

Allison Music

Altronic Distributors

APAC Audio

Audio Telex

Austage

Audio Visual Dynamics

B Music

Barossa Music

Bayside Church

Billy Hyde Music - Adelaide

Billy Hyde Music - Blackburn

Billy Hyde Music - Camperdown

Billy Hyde Music - Flemington

Billy Hyde Music - Fortitude Valley

Billy Hyde Music - Perth

Billy Hyde Music - Sunshine Coast

Blackwood Music

Bout Time Music

Byrron Scullin

Clear Systems

Carlingford Music Centre

Computer Allied Services

Concept Music

Connect Integrated Systems

Cooma Music

Corporate Theatre

Custom Music

Cutting Edge Music

Cutting Edge

Deluxe Audio

Derringers

Dillmac Entertainment

DRM Audio Visual

Eastwood Audio

Electric Factory

Ellaways Music

Factory Sound

FFF Production Services

Frontier Music

Gallagher Audio and Lighting

Gold Coast Music

Gosford Music Centre

Green Brothers

Haworth Guitars

IBS AV

Jade Australia

Jands

JDS Sound and Lighting

John L'Estrange

Johnston Audio Services

Jands Production Services

Kevin Batchelor

Kosmic

Kurt Jacob and Co

KWMC

Leading Edge Electronics

Leading Edge Electronics and Music

Loud and Clear

LSS Productions (Confidential)

LSW

Macron Music

Mandurah Performing Arts Centre

Masson Music

McLean Audio Services

Monaco Sound

Murray Tregonning and Associates

Music Ednet

Music Spot

Musos Corner

National Theatre - 1st response

National Theatre - 2nd response

Nova Hire

Nova Tech Production Services

Optim Audio

Opus Music

O'shea Inservice Centre - Part 1, Part 2, Part 3

Outlook Communications

Oz-eGuitar Sales

Pacific Music

Patrick Hinchey Sound

Peninsula Music

Peter Wood

Phase Engineering

Picture Perfect Installations

Pipers Wollongong Music Centre

PK Music

Planet Music

Poptronics

Powa Audio

Powers AV

Production Works

R&B Music

Rajen Music

RCH (Altona City Theatre)

Revolver Audio

Riverlinks

Rom Enterprises

Rutledge Engineering

Scene Change

Scott Audio

Shure

Sinclair Communications

Smithys

Sound and Light Concepts

Sound Choice

Soundcorp

South Coast Music

Stagecraft

Swan Hill Council

Sydney Hifi

Sydney Theatre Company

System Sound

Tamworth Regional Council

Technical Audio Group

The Best Music Shop

The Drum Shop SA

The Resource Corporation (T Burn)

The Resource Corporation (T Hosking)

TLS Productions

Tom Sparkes Instrument Repairs

Tony Bones Entertainment

Traffic Light

Tropic Sun

Wakes Music Centre

Warragul Arts Centre

Warren Targett

Wombat Woodwinds and Brass

World of Music

World Wide Entertainment

Appendix C: Glossary

3GPP   3rd Generation Partnership Project

BWA   Broadband Wireless Access

CEPT   European Conference of Postal and Telecommunications Administration

Defence   Department of Defence

EIRP   Effective Isotropic Radiated Power

ENG   Electronic News Gathering

FDD   Frequency Division Duplex

FSS   Fixed Satellite Service

FWA   Fixed Wireless Access

HD   High Definition

IMT   International Mobile Telecommunications

ISP   Internet Service Provider

MDS   Multipoint Distribution System

RALI   Radiocommunications Assignment & Licensing Instruction

RLAN   Radiofrequency Local Area Network

SD   Standard Definition

TDD   Time Division Duplex

WAS   Wireless Access Services

WLL   Wireless Local Loop

WRC   World Radiocommunications Conference