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**AUSTRALIAN COMMUNICATIONS AND MEDIA
AUTHORITY**

FIVE-YEAR SPECTRUM OUTLOOK 2018–22

**THE ACMA'S SPECTRUM MANAGEMENT WORK
PROGRAM**

COMMUNICATIONS ALLIANCE

SATELLITE SERVICES WORKING GROUP

SUBMISSION

15 JUNE 2018

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INTRODUCTION

The Communications Alliance Satellite Services Working Group (SSWG) welcomes the opportunity to provide this submission on the Australian Communications and Media Authority's *Five-year spectrum outlook 2018–22: The ACMA's spectrum management work program—consultation draft* (the FYSO).

This submission complements the *Ensuring the Future of Australian Satellite Services* paper developed by the SSWG and published in May 2018.

Executive Summary

The Communications Alliance SSWG is pleased with the ACMA's progress as captured in the FYSO and compliments the ACMA for taking into account industry feedback on past FYSOs. The balanced approach to the ACMA's band replanning work is an important step in engaging productively all sectors of the industry in the management of radiocommunications spectrum.

In reviewing the FYSO, the SSWG wishes to draw out a number of areas where we believe more detailed treatment is still warranted, including greater use of in-band co-existence between class licensing and apparatus/spectrum licensing, catering for evolving dynamic spectrum techniques and disparities in licence period allocations.

There are also other matters to resolve in relation to the decision making processes, including justifications behind Highest Value Use and public interest, scope for innovative technologies and services, valuation and pricing of spectrum and future methodologies in public auction process.

One fundamental theme in the 5G era is the complementarity of satellite and terrestrial technology. The SSWG sees the ACMA in having an important role in this to ensure coexistence if the goals of 5G and IoT are to be satisfactorily achieved.

Further technology and international exposure will be highlighted by the Australian Space Agency program of activities and interests as the Agency mobilises. This is and will be of great economic importance to Australia and the ACMA should fully familiarise itself with the Agency's intentions and need for a supporting regulatory environment.

This submission details a range of observations on the proposed ACMA spectrum work program and work plan. The SSWG notes that the work being undertaken by the ITU Task Group 5/1 (TG 5/1), including the spectrum sharing studies, provides an essential component and the SSWG is happy to share its expertise to assist in the development of future technical frameworks for Australia.

Of particular interest, the SSWG predicts there will be emerging pressure on higher band spectrum to support High Density Fixed Satellite Service (HDFSS) User Equipment as systems migrate away from lower bands. In most cases fixed satellite systems (FSS) can successfully share with emerging IMT technologies but it should be noted that there are scenarios where fixed satellite systems cannot readily share with IMT without an agreement to accept a degree of constraint. To ensure the viability of these systems and FSS overall, the SSWG calls on the ACMA to consider the allocation of HDFSS bands at 48.2 to 50.2 and 40 to 42 GHz in order to align Australia with international trends.

About Communications Alliance

Communications Alliance is the primary telecommunications industry body in Australia. Its membership is drawn from a wide cross-section of the communications industry, including carriers, carriage and internet service providers, content providers, equipment vendors, IT companies, consultants and business groups.

Its vision is to provide a unified voice for the telecommunications industry and to lead it into the next generation of converging networks, technologies and services. The prime mission of Communications Alliance is to promote the growth of the Australian communications industry and the protection of consumer interests by fostering the highest standards of business ethics and behaviour through industry self-governance. For more details about Communications Alliance, see <http://www.commsalliance.com.au>.

Preamble

The exposure drafts for the proposed new *Radiocommunications Act* (the *Act*) contain interesting and exciting changes which, if properly implemented should, in some instances, allow successful sharing between the Fixed Satellite Service and emerging IMT systems (5G).

The ITU Task Group 5/1 (TG 5/1) is currently studying sharing between the FSS and IMT in the '26 GHz band' (24.25 to 27.5 GHz). Unfortunately, to date there has been no agreement on FSS sharing criteria, but if the IMT systems are deployed in accordance with the parameters submitted to TG 5/1 by Working Party 5D then there will be sufficient margin to ensure FSS receivers are protected.

Under the new *Act*, Authorisations would enable FSS transmitters to operate under existing licence conditions in the 27 to 27.5 GHz band noting that flexibility would also need to be retained to facilitate the further development of the FSS.

The SSWG therefore encourages the ACMA to delay the allocation of the 24.25 to 27.5 GHz band until after the new *Act* is made in accordance with the option of the FYSO (ref Page 58) consultation and/or a domestic process along the lines of the *Technical Liaison Group* is instituted so that all stakeholders would have an opportunity to provide input into the develop a technical framework that facilitates shared use of the band for multiple services. The SSWG notes that Telstra does not support delaying the allocation until after the new *Act*.

The SSWG notes the option of '*Regulatory Undertakings* under the new *Act* but holds the view that these should generally not be used as they introduce rigid inflexibilities that 'seal' a band for up to 20 years. Such a regulatory mechanism would lock the FSS authorisation beyond the lifetime of a generation of satellites and in doing so could deprive the market of certain services and innovations without any real benefit to the terrestrial licence holder.

General comments

The current FYSO may be seen as a mid-stream adjustment in order to align the timing of the FYSO with the financial year and annual reporting needs of the incoming legislation. Nevertheless, the current version carries some important messages, challenges and adjustments resulting from feedback from the previous FYSO and further internal considerations and revelations.

In the current FYSO, statements such as:

- '... a holistic treatment of all major band (re)planning activities to support the establishment of new spectrum uses. *This replaces the previous focus on replanning activities driven by the ACMA's mobile broadband strategy*' (ref Page 1);
- 'As broadband is not the only driver of potential changes in the optimal use or uses of bands' (ref Page 15); and
- 'Some submissions were critical of the emphasis given to planning for mobile broadband uses and the inclusion of a separate mobile broadband work plan within the FYSO. *The ACMA recognises the value of employing a more neutral approach for future discussion of its band replanning work*' (ref Page 16)

represent a welcome turnaround in presentation by the ACMA and a reaffirmation of the ACMA being a fair and neutral administrator of spectrum.

Some fundamental factors however, remain in the background awaiting further more detailed treatment. These include:

- greater use of in-band co-existence between class licensing and apparatus/spectrum licensing (AL/SL) so as to optimise spectrum efficiency.
- provision and caveats in future licensing to allow for dynamic spectrum techniques as they evolve.
- disparities in licence periods between AL and SL and the risks of long licensing periods (15 years) that cannot be corrected where spectrum may not be fully implemented.

Other matters which are still not adequately resolved in the basis for spectrum decisions include:

- Highest Value Use and public interest. The justifying basis for decision making and ACMA opinions. It is noteworthy that the existing spectrum management principles refer to highest value uses, but that the single service model has been favoured in every case to date.
- how to provide scope in the licensing process for innovation e.g. new (or yet to be properly understood) developments in satellite communications (e.g. Earth Stations in Motion devices in the Ku-band).
- the basis for valuation and pricing of spectrum e.g. in Ku- and Ka-band. Some interim conclusions in Ka-band are still pending, whilst a pricing disparity exists with Ku-band which needs to be updated and in line with current and future technology innovations.
- the pattern of terrestrial MBB automatically heading for the public auction process may not be so simple in future, with the secondary trading market (and potential for private auctions) opening up new alternative possibilities.

FYSO improvements and stakeholder engagement (Q1)

The role of the *Radcomms* event held by the ACMA could be particularly helpful, especially to Part 1 of the FYSO, which deals with future developments in planning. Previously, *Radcomms* has been timed to coincide with the FYSO release and partially gave an opportunity to understand the FYSO better. However, a more significant benefit might derive from leaving *Radcomms* in October this year, by using the event to consider inputs appropriate to Part 1 of the next FYSO. The topics selected could be canvassed with industry and users to ensure their value.

The *Work Program at a Glance* is a useful summary of activities and proposed timing. The sub-division into establishing new planning frameworks and optimising established frameworks is useful and dispels some earlier concerns about the potential for an inordinately terrestrial MBB-specific focus. Although some inconsistencies in ACMA's approach appear to remain, other important activities are accounted for.

With regard to specific timings, the Q4 timing of 10.7 to 11.7 GHz class licensing considerations may be more urgent than the ACMA proposes, given commercial interest and immediacy. Furthermore, there is, in principle, no technical or regulatory reason why consideration of the 10.7 to 11.7 GHz band for inclusion in the class licence should not occur alongside consideration of the 18.2 to 18.8 GHz, 19.3 to 19.7, 27.0 to 28.5, and 29.1 to 29.5 GHz bands – if anything, these bands present less of a challenge than the Ku-Band which the ACMA have proposed for class licence inclusion.

It is appreciated that earth station receivers should not lead to undue constraints on the future deployment of incumbent services. The general review of licensing procedures for space-based communications systems is a welcome part of the program, along with the other satellite topics programmed.

The SSWG also agrees with the sensible decision by the ACMA to decouple consideration of the 3.6 GHz and 26 GHz bands. It would, in our view, be premature and risky to proceed further with the 26 GHz band ahead of proper consideration and international studies.

In summary, the SSWG is pleased with the ACMA's progress captured in this FYSO and compliments the ACMA in acting upon industry feedback.

Part 1: Other technology developments and sources of spectrum demand (Q2)

A recognition of new developments in satellite technology and services is already acknowledged within the FYSO - in particular the advent of small satellites and satellite constellations. These have many consequences and further considerations. These may warrant a special 'Spectrum Tune Up' in the near future. For its part, Communications Alliance may see fit to feature important developments in its *Comms Essentials* series. The SSWG encourages the ACMA to recognise and accommodate satellite innovations in its programs and supports an adequate resourcing of these activities.

Dynamic Spectrum Access (DSA) is mentioned on several occasions in the FYSO, whilst there is evidence of immediacy of demand, it is not prevalent as yet. However, the SSWG suggests that the ACMA needs to make preliminary provision in its licensing approaches to make allowance for these techniques to be invoked when they become available - in other words contingency planning.

One fundamental theme in the 5G era should be complementarity of satellite and terrestrial technology. The ACMA could assist by recognising and promoting this aspect more, in order to avoid developing silos between the two industries. The two need to

co-exist and reinforce each other if the goals of 5G and IoT roll-outs are to be satisfactorily achieved. Service linkages should span technologies and the greatest efforts should be extended to spectrum sharing and appropriate mitigation to allow this to happen. This would be relevant to the 'holistic' view which the ACMA has raised in the FYSO. Each of the three aims of 5G - enhanced broadband (eBB), latency and criticality - will not be achieved at the same time moving into the future, and each can be contributed to by a mix of technology depending on the circumstances. IoT is probably the best example of the need for a holistic view. The ACMA could also be well informed on what the role of satellite in 5G can entail by reviewing the recently published ECC report on the role of satellite in 5G¹.

More sophisticated spectrum sharing strategies are worth striving for – single service outcomes for the use of a particular band are too easy to achieve, but this is considered to be inefficient. The US and the UK (plus Europe) have achieved approaches which are exemplary and are recommended to the ACMA. The ACMA gives some acknowledgement to this in the statement (ref Page 9):

'Ofcom has further investigated 3800–4200 MHz as a candidate for more intense spectrum sharing between users. In the US, the FCC has commenced a Notice of Inquiry into the 'flexible use in the mid-band', which includes the 3.7–4.2 GHz range. A common feature of all of these investigations is considering the possibility of more spectrum for wireless broadband in the context of existing spectrum users, particularly the fixed satellite service.'

However this could be misconstrued in the absence of qualification that the intention is to investigate genuine sharing which is not to the detriment of FSS usage.

Class licensing has an important expansionary role in Ku-band, Ka-band, and other bands where ubiquitous service developments are emerging, e.g. in aeronautical and in land/maritime MSS communications - such as in-motion terminals for connected cars and trains. Considerations roll on into spectrum pricing in situations where Equivalent-Power Flux Density (EPFD) levels should not interfere with terrestrial point-to-point services. The spectrum pricing should not then depend on a spectrum denial factor but the intended service area and clientele. This should trigger a re-think of the ageing basis of charging for ubiquitous satellite services and the SSWG looks forward to contributing to the future ACMA reviews in this area.

Further technology and international exposure will be highlighted by the Australian Space Agency program of activities and interests as the Agency mobilises. This is an exciting development for the Australian space and satellite industry, one which is of great economic importance to Australia and the ACMA should fully familiarise itself with the Agency's intentions and need for a supporting regulatory environment. Hopefully the ACMA can share its views and intentions within industry and the Agency.

The SSWG predicts there will be emerging pressure on higher band spectrum (e.g. the V-Band) to support High Density Fixed Satellite Service (HDFSS) User Equipment as systems migrate away from lower bands (i.e. the C-Band).

In most cases fixed satellite systems (FSS) can successfully share with emerging IMT technologies (5G), even in many cases in the same geographic areas, provided satisfactory licensing and/or authorisation processes are completed and technical parameters correctly reflect the parameters used in sharing studies (i.e. by the ITU-R TG-5/1).

¹ ECC Report 280 *Satellite Solutions for 5G* - Approved 18 May 2018
<https://www.ecodocdb.dk/document/2989>

It should be noted that there are scenarios where fixed satellite systems cannot readily share with IMT without an agreement to accept a degree of constraint. This is the case, for example, where FSS User Terminals are ubiquitous and may operate in any place at any time. To ensure the viability of these systems and FSS overall, the SSWG suggests that the ACMA consider 2 x 2 GHz High Density FSS (HDFSS) bands at 48.2 to 50.2 and 40 to 42 GHz in order to align Australia with international trends, including the recent FCC considerations made in respect of these two sub-bands. This would potentially allow satellite operators to service customers in all geographic areas while optimising IMT access to other bands via sharing mechanisms as discussed above.

Part 2 : Proposed 2018–19 work program (Q3,4)

The SSWG welcomes this part of the FYSO and the fact that the planning is flexible and available to negotiation where practical and reasonable.

A planning basis calling on maximising the overall public benefit is considered to be quite intangible and subjective. Therefore the basis on which such decisions are made by the ACMA need to be carefully articulated to be convincing. Economic outcomes alone cannot be a total surrogate use in decision making. An example comes with the tracking of aircraft such as the ill-fated MH 370 flight, which was carried out from the Perth Earth Station of Inmarsat.

A broader basis for planning rather than a pre-disposed view measured against terrestrial MBB is a valued and encouraging statement. Feedback from the last FYSO appears to have been heeded with interest.

The SSWG agrees in general with the categories and steps outlined in Table 9. Dynamic Spectrum Access is mentioned a few times but needs to be moved forward in terms of how to deal with it.

The SSWG also agrees with the general approach adopted with the 26 GHz band, but would strongly caution against adopting the arrangements of other regulators whose sharing environments are fundamentally different to Australia's, e.g. CEPT arrangements will not address sharing with FSS since, in Europe, there is no frequency overlap between FSS and the 26 GHz band. Other bands under AI 1.13 of the WRC-19 Agenda should remain at the monitoring stage.

With regard to the timing of the 2 GHz band (deferred to 2019-20) this may be able to be dealt with earlier, if required, as studies in ITU-R (ref RES 212 and WRC AI 9.1.1) are due to conclude in the near future - thus a hiatus may otherwise occur.

Where the ACMA intends to investigate apparatus-licensed fixed wireless broadband outside of metropolitan areas, the SSWG is alarmed that no mention was made of the interests of existing satellite users of the 27.5 to 29.5 GHz band, or their plans for use of this band in the future, and recommends that IMT should not be considered for the 27.5 to 29.5 GHz band. This position is strongly supported by CEPT, who appear to have made the decision to segment IMT spectrum usage and FSS spectrum usage, with a boundary at 27.5 GHz, noting that Region 1 has no FSS allocation within 27.0 to 27.5 GHz. The SSWG notes that the 27.0 to 27.5 GHz is allocated to the FSS in Region 3, is used intensively in Australia by the satellite industry, and is an important band for the consideration of future satellite systems, including for VSAT use. Consequently, if Australia were to adopt a similar approach to that expected to be announced by CEPT, the upper boundary would be 27.0 GHz.

Under *Preliminary Replanning*, progress with 1.5 GHz should be contingent on satisfactory sharing between IMT and MSS at the 1518 MHz band edge. This should be finalised at WP5D/WP4C meetings by mid-2018 and further discussed at AWG-24 in September 2018.

With regard to 26 GHz, the SSWG agrees with the ACMA proposal to accelerate study of parts of this band with no FSS overlap in order to gain an accurate working basis for decision.

Under 3.6 GHz, unfortunately there is no mention of Earth Station re-location which formed an important outcome of the re-allocation decision.

Under *Optimising established planning frameworks*, the ACMA is making good progress with domestic planning priorities in the satellite area, and the SSWG is generally satisfied with the timing and priorities. The recognition by the ACMA to improve its engagement with a range of new entrant organisations is also acknowledged and supported. The SSWG suggests that this may be a topic for a *Spectrum Tune-up*.

The SSWG commends the proposal of a general review of space licensing and looks forward to responding to the Consultation Paper in Q2 2018-19. The further work on support for ESIMs is particularly supported as a timely initiative given the commercial acceleration of these services. Some SSWG members are especially interested to know more about the ACMA's framework planning and review of regulatory arrangements for earth stations in motion (ESIM) in Ku-band. It is also worth noting that ESIM in Ku-band involves a number of verticals where the role of satellite provides a unique attribute for connectivity for in-motion devices such as connected cars of the future as well as aeronautical and maritime usages. Recently the ECC has published a number of ECC Decisions to allow free circulation and harmonisation in the Ku-band 14.0 to 14.5 GHz for ESIM type applications.²

The ACMA is encouraged to start developing more flexible regulatory and licensing arrangements for NGSO and GSO satellite services operating in the Ku-band (much like what was done in Ka-band). If the ACMA intends to review existing arrangements to identify what (if any) changes are required to existing regulatory and licensing arrangements to support ESIM in Ku-band for both GSO and NGSO satellite networks, then the recently approved ECC Decisions are a good starting point for evaluation

Finally, spectrum embargoes are somewhat anachronistic in a fast-developing world. An embargo is a general technique which freezes progress indefinitely whilst giving the regulator time to reflect on options. This can stand in the way of innovation and and/or entrench incumbent interest at the expense or broader commercial progress.

While much of the work on defining the technical parameters for sharing between FSS and IMT has been undertaken by TG 5/1, this will still need to be converted to technical frameworks for future licences and authorisations. The SSWG has significant experience to offer in determining parameters for successful sharing and offers this expertise to the ACMA to assist, along with the Carriers, in the development of a set of workable technical frameworks.

The intended new *Act* proposes some exciting new opportunities for band sharing between existing (in this case FSS) and new services such as IMT (5G). Careful use of these new provisions, while avoiding cumbersome 'regulatory interventions', would enable systems to co-exist while also avoiding the situation, as experienced in the last 26/27 GHz allocations, where some services were held to ransom by the then 'owners' of the spectrum. Indeed, a system where multiple users can coexist must by definition deliver a higher value use of any band than that derived from a single user.

The SSWG commends these changes to the ACMA and suggests allocation of mmWave bands be delayed until the new *Act* is in force, noting that Telstra does not support delaying the allocation.

² ECC Decision (17)04 *The harmonised use and exemption from individual licensing of fixed earth stations operating with NGSO FSS satellite systems in the frequency bands 10.7-12.75 GHz and 14.0-14.5 GHz* - Approved 30 June 2017 <https://www.ecodocdb.dk/implementation/987>

ACMA approach to forward allocations and scenarios (Q5)

The SSWG believes the distinguishing of planning activities or re-allocation and/or existing planning review is a good move. The three scenarios drawn up in the 2017-21 FYSO were clearly not to the satisfaction of the mobile community. However, the SSWG believes the ACMA has taken a sensible approach to mmWave bands in general, rather than submitting to pressure take these bands to market as fast as possible without due consideration. 26 GHz still requires substantial study and sharing considerations, to take into account other services than IMT. The SSWG agrees that to link up the 3.6 GHz and 26 GHz bands might slow up the whole process. There is also loose reference to mmWave bands when what is meant is the 26 GHz band.

The priorities given in Tables 15 to 17 can be supported if they reveal the correct amount of focus. The SSWG supports an Options Paper in the 2018-19 year. A target of Q1 may be at risk because of ongoing studies in ITU-R yet to be finalised. This is especially true for the Earth Exploration-Satellite Service (EESS). Whilst the potential to proceed in a piecemeal way with the 26 GHz band exists, it would be far preferable to take a holistic approach. Even IMT protagonists should be against a piecemeal solution. The penalty of one or two quarters would not be significant if the ACMA is *to do it once and to do it right*.

With 1.5 GHz, we are still awaiting outcomes of studies of the out-of-band (OOB) interference at the 1518 MHz band edge, before this work should proceed.

As mentioned above, the SSWG believes the 26 GHz band reallocation and development of the associated technical frameworks should not occur until the new Act is made, noting that Telstra does not support delaying the allocation.

Spectrum review implementation (Q6)

The SSWG appreciates the commitment of the ACMA to user involvement in the design of revised spectrum managements and looks forward to participating.

With regard to finalisation of interference management principle by Q4 2017-18, this is not evident to date. The SSWG hopes that the ACMA can meet its commitment of finalisation of the FYSO near the commencement in order to transition smoothly forward with expectations of the Work Program being available.

The SSWG notes and encourages the further review of how the ACMA administratively prices spectrum, in light of market value, international parity and new technology, an example being satellite constellations. The latter may be a major task in adapting an ageing pricing framework but should be worth the effort. The ACMA intentions here represent a good start.

Planned activities for licensing, pricing, compliance and international engagement (Q7)

The work on body scanners in airports is progressing satisfactorily.

Drone regulation is an important upcoming area. The ACMA should note the difference in definitions in this area. In ITU-R the abbreviation of UAV refers to Unmanned Aircraft Vehicles associated with the aviation industry, whilst in ITU-T UAV is the abbreviation for Unmanned Aerial Vehicles – more commonly referring to drones (or sometimes *civilian* UAV). There appears to be scope for confusion.

Pricing adjustments are favoured by the SSWG and are overdue in Ka-band (the full discount is awaiting to be passed on in high density areas) and Ku-band which deserves comparable pricing levels to Ka-band. The SSWG looks forward to this work progressing in the near future.

The SSWG notes that Priority Compliance Areas should have been finalised in Q4 2017-18.

International engagement is travelling quite well and industry's role is recognised in a satisfactory way, where industry has been given the opportunity to participate in the lead up to international meetings and to engage in international meetings at the discretion of the ACMA or DOCA, and within agreed Australian Delegation Briefs for the meetings. This utilisation of assets is most appropriate and welcomed.

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