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**COMMUNICATIONS ALLIANCE  
SATELLITE SERVICES WORKING GROUP (SSWG)**

SUBMISSION

to the

Australian Communications and Media  
Authority's (ACMA)

Improved spectrum access and pricing for  
satellite services

3 February 2020

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## EXECUTIVE SUMMARY

The Communications Alliance Satellite Services Working Group (SSWG) welcomes the opportunity to provide comments to the ACMA *Improved spectrum access and pricing for satellite services* Consultation Paper.

The SSWG acknowledges the advances proposed by the ACMA in the documents accompanying this ACMA consultation. The outcomes from these proposed changes to Australian regulatory framework will represent a welcome step forward in accommodating new and diverse satellite services, holding promise for businesses and consumers wherever they reside and operate, and will enhance Australia's move into an increasingly broadband and ubiquitous satellite-based era. The SSWG appreciates the measured and ongoing attention being given by the regulator to the critical resource of radiocommunications spectrum.

In providing these comments to the ACMA, it is noted that this submission does not necessarily represent the views of Telstra, which is lodging its own submission.

In summary the SSWG:

- supports the ACMA's approach with the changes to CSO Class Licence with the one exception - that of the choice of the 28.3 GHz boundary. The SSWG has concerns with the rationale being presented for the choice of 28.3 GHz boundary, based on proposed co-channel and adjacent channel sharing studies, including the inclusion of the proposed 200 MHz guard band.
- supports the ACMA proposal to include the 10.7 to 11.7 GHz band in the CSO Class Licence and supports proposed reduction of taxes in this band, suggesting these taxes should be the minimum amount allowed for in the Determination.
- notes the proposal to expand procedures in the section Protection for the Mid-West Radio Quiet Zone in Appendix E of the space/space receive Business Operating Procedure (BOP) to all space and space receive licence applications in the frequency range of the RQZ band plan.
- applauds the proposal to include the 18.2 to 18.8 GHz and 19.3 to 19.7 GHz bands into the CSO Class Licence on a no-protection basis.
- urges the ACMA to consider expanding the CSO Class Licence to include the 27.5 to 28.1 GHz spectrum for the operation of ubiquitous FSS earth stations, including ESIMS.
- encourages the ACMA to proceed to update the Business Operating Procedure (BOP) for submission and processing of applications for space and space receive apparatus licences.
- supports the proposed amendments to the *Radiocommunications (Transmitter Licence Tax) Determination 2015*, complementing the proposed changes to the CSO Class Licence.
- supports the proposal to increase apparatus licence taxes by the CPI of 1.6 % in the *Amending the apparatus licence tax determinations* Consultation Paper (IFC 41/2019) that was released in parallel with this consultation.

The SSWG has taken the opportunity in this response to take into account the parallel work being carried out under the ACMA *26/28 GHz Technical Liaison Group* (TLG). The best outcomes will be reliant on coordination between this consultation and the TLG work and the

SSWG encourages the ACMA to work towards achieving the necessary coordination to affect this desired outcome.

The SSWG is also providing comments on Aeronautical and Maritime ESIMs in this response, noting that the *Implementing outcomes of the 11 GHz and 28 GHz reviews Consultation Paper* clarifies that ubiquitous FSS refers to fixed earth stations at unknown locations (typically end user terminals) and earth stations in motion (ESIM).

### **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>.

## 1. Introduction

The ACMA has requested comments on the *Implementing outcomes of the 11 GHz and 28 GHz reviews Consultation Paper* (Part 1) including as follows:

- the draft *Radiocommunications (Communications with Space Object Class Licence Variation 2020 (No.1)* instrument
- the proposed amendments to the *Radiocommunications (Transmitter Licence Tax) Determination 2015*; and
- the proposed amendments to the ACMA's *Business Operating Procedure - Submission and processing of applications for space and space receive apparatus licences*

The SSWG has considered these issues and provides its comment in this submission.

The ACMA has also released a *Sharing between fixed point-to-point links and uncoordinated earth station receivers in 17.7 – 19.7 GHz* Technical Information Paper, offering its preliminary views on planning issues and technical feasibility for licensing procedures. The SSWG supports the ACMA's approach in publishing this paper as a useful means of providing feedback to industry.

## 2. Communication with Space Object Class Licence Variations

The Consultation Paper proposes amendments to the authorised frequencies listed in subparagraphs 6(a)(iv) and (v), 6(b)(vii), and 6(b)(viii) to (x) of the *Radiocommunications (Communication with Space Object) Class Licence 2015*:

'6(a) for transmission:

.

(v) 28.5 to 29.1 GHz

(vi) 29.5 to 30 GHz

6(b) for reception:

.

(vii) 11.7 to 12.75 GHz

(viii) 17.7 to 18.2 GHz

(ix) 18.8 to 19.3 GHz

(x) 19.7 to 20.2 GHz'

The new bands being proposed for inclusion in the CSO Class Licence are:

For transmission (uplink):

28.3 to 28.5 GHz

29.1 to 29.5 GHz

(to become an amalgamated band from 28.3 GHz to 30 GHz)

For reception (downlink):

10.7 to 11.7 GHz

18.2 to 18.8 GHz

19.3 to 19.7 GHz

The SSWG notes that the ACMA will be implementing the proposed changes in two tranches:

- (1) this Consultation Paper and the associated draft variation to the CSO Class Licence, with the extension of class licensing arrangements for Fixed Satellite Services (FSS) to a lower bound of 28.3 GHz; and subsequently
- (2) co-channel and adjacent channel sharing with Fixed Wireless Access (FWA) services, class licensing arrangements for FSS between 27.5 GHz and 28.3 GHz.

As discussed in the following sections of the submission, the SSWG supports the ACMA's approach with the changes to CSO Class Licence with the one exception - that of the choice of the 28.3 GHz boundary.

The SSWG has concerns with the rationale being presented for the choice of 28.3 GHz based on proposed co-channel and adjacent channel sharing studies. If FSS transmission meets the applicable PFD mask, then FWA services are protected, and hence, if these services are protected, then the need for a guard band is questioned. This submission provides further detail in later sections.

The SSWG recognises that the best outcomes of the work being carried out under the current ACMA *26/28 GHz Technical Liaison Group* (TLG) and the outcomes of this public consultation will be reliant on coordination between the two areas of work. The SSWG encourages the ACMA to work towards achieving the necessary coordination to affect this desired outcome.

### **3. 11 GHz band changes**

The SSWG supports the ACMA proposal to include the 10.7 to 11.7 GHz band in the CSO Class Licence. The extension of class licensing in the Ku-band further paves the way for ubiquitous services and it is felt that these will not cause unnecessary constraints on existing services.

The SSWG also supports proposed reduction of taxes in this band and suggests they should be the minimum amount allowed for in the Determination.

### **4. Mid-West Radio Quiet Zone**

The SSWG notes the proposal to expand procedures in the section Protection for the Mid-West Radio Quiet Zone in Appendix E of the space/space receive Business Operating Procedure (BOP) to all space and space receive licence applications in the frequency range of the RQZ band plan (70 MHz to 25.5 GHz). The SSWG believes the best process for coordination would be directly with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) as they have the most knowledge of the systems within that zone. The SSWG notes the Radio Quiet Zone (RQZ) parts of the Band Plan will not include the 27.5 to 29.5 GHz Band (the 28 GHz band) or the 29.5 to 30 GHz band.

### **5. 18 GHz Bands**

The ACMA has proposed to include the 18.2 to 18.8 GHz and 19.3 to 19.7 GHz bands into the CSO Class Licence on a no protection basis and subsequently to amend the associated Space Transmit licence.

FSS systems have been operating in Australia for many years and, as pointed out, studies indicate that the risk of interference is small. With the inclusion of clutter and other factors, any interference, should it occur, is expected to be manageable. Thus the SSWG believes this is the right decision and represents an implementation of modern probabilistic methods to spectrum planning that will most certainly improve spectrum utility and thus economic activity.

The SSWG applauds the inclusion of these bands in the CSO Class Licence.

## 6. 28 GHz Band

Spectrum is scarce, with bands that were not even considered for radiocommunications and other applications two decades ago, now the subject of intense planned use by satellite operators within the ITU processes and domestically. The 28 GHz band is one such band.

WRC-19 considered the results of four years of studies into the introduction of ESIM in the 18/28 GHz bands and concluded that satellite operations are possible with the implementation of certain operational parameters on ESIM for cross-border situations, notably a power flux-density (PFD) mask for Aeronautical ESIM in bands where terrestrial services are allocated and operational. We note that Australia supported the less restrictive ECC Mask at WRC-19 which was shown through numerous studies to adequately protect terrestrial services.

With the requirements for FSS broadband increasing, comes the need to find new ways to accommodate as many users as possible, while balancing certainty with flexibility.

Although Interference to Noise ratios (I/N) are a recognised international methodology to ensure the compatibility of new services with existing services, the results of such interference assessment could be further improved with:

- the use of realistic Carrier-to-Noise-and-Interference ratio,  $C/(I + N)$ , rather than I/N for domestic planning
- the use of the duty cycle or transient nature of the services
- the realistic use of antenna discrimination
- the realistic use of clutter and various fade mechanisms
- the realistic use of availability

The introduction of ESIM in Australia is a vital part of the plans of the national carrier (QANTAS) and other domestic and international aviation carriers and promises a significant increase in productivity for passengers who travel for business or pleasure within and outside Australia, as well as crew, and digitalisation of aircraft themselves. Cruise vessels in Australian ports and waters have enjoyed hi-speed internet via ESIMS for many years and consider it essential for passengers and crew now accustomed to continuous connectivity to access social media or business applications, as if they were on land.

This paper will now address the concepts specific to the proposed changes to the *Communicating with Space Objects Class Licence* but which are also very relevant to the TLG process.

## 7. 28 GHz Fixed Wireless Access

The ACMA has proposed planning the 28 GHz FWA in major cities using a small cell model. Depending on the model used, the intra-system interference will rely on a suite of mechanisms which may include path loss (the traditional cellular planning model), code orthogonality (for CDMA) and timing (for TDD).

Each of these tools is effective, either individually or together, but each, individually or combined, has its limitation. The result of these limitations is intra-system interference. Thus, protecting such systems with an I/N ratio is not necessary, as they must plan for a dynamic interference environment cause by other deployed FWA. This means a path margin that caters for interference up to their availability requirements.

The addition of a small additional margin to cater for other systems is therefore a very small burden for operators and should form the basis of a new RALI. It should also be considered in the context of the CSO Class Licence.

## **8. CSO Class Licence – Frequency range**

The draft interim CSO Class Licence proposes to begin only at 28.3 GHz, even though ACMA's 28 GHz decision is to allow ubiquitous FSS earth stations (including ESIMs) in 28.1 to 29.5 GHz throughout Australia, essentially creating a 200 MHz guard band while the ACMA considers the appropriate out-of-band protections required for new FWA in 27.5 to 28.1 GHz. In the view of the SSWG, no such guard band is required.

The U.S. FCC considered essentially the same issue thoroughly in 2018 and concluded that no special rules or guard band was required for the protection 5G base stations or devices from ESIM emissions in adjacent bands.<sup>1</sup> The FCC relied instead on pre-existing out of band (OOB) emission standards generally applicable to FSS transmitting earth stations. Certainly, frequency coordination between the Fixed Service and Fixed Satellite Service in a co-frequency context have not required prophylactic guard bands of such magnitude.

In the SSWG's view, restricting the interim CSO Class Licence to 28.3 GHz and above will result in inefficient use of spectrum that has designated FSS primary use, and unnecessarily delay and constrict the capacity available for the introduction of new FSS applications (including ESIM applications) in the band.

## **9. Ubiquitous Earth Stations and ESIMs**

The SSWG urges the ACMA to consider expanding the CSO Class Licence to include the 27.5 to 28.1 GHz frequencies for the operation of ubiquitous FSS earth stations, including ESIMs, provided the applicable criteria established by WRC-19 (Agenda Item 1.5) are met in the areas in which FWA is primary.

In areas where FWA is secondary to the FSS in the 27.5 to 28.1 GHz band (and in the 28.1 to 29.5 GHz band), there should be no difficulty in authorising ubiquitous FSS earth stations of all types (fixed and ESIMs) under the CSO Class Licence without criteria for the protection of co-primary terrestrial services.

In areas where FWA is primary in the 27.5-28.1 GHz band, the CSO Class Licence should authorise fixed VSAT, and additionally ESIMs that comply with applicable WRC-19 (AI1.5) criteria for the protection of co-primary terrestrial services. Conditions that would need to be applied to fixed VSAT, if any, would be best managed administratively, through a RALI or similar.

For Aeronautical ESIM (A-ESIMs) operating near FWA primary areas, an emission mask has been established to protect co-primary terrestrial systems (WRC-19 AI 1.5) at international borders. This mask has been shown through exhaustive study to protect terrestrial systems from A-ESIM when there is an allocation, they are operational and within line of sight. This supports the following:

- no altitude limits on ESIM in any part of the spectrum where they can meet the mask.

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<sup>1</sup> *Amendment of Parts 2 and 25 of the Commission's Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed Satellite Service*, FCC 18-138, Report and Order and Further Notice of Rulemaking, at ¶¶ 60-62 (Sep. 27, 2018).



- no limitation on A-ESIM over the cities where FWA will be deployed, provided the mask is met.
- a zone around airports where ESIM will operate on the ground. FWA operators can be advised of the environment and adjust antenna pointing and link margin accordingly or move to other bands (e.g., 26 GHz or low/mid bands).

For maritime ESIMS (M-ESIM) operating near the FWA primary areas, the WRC-19 also established a 70 km coordination distance when there is a terrestrial allocation and terrestrial services are operational. It should be noted that the 70 km distance is not an 'exclusion zone', and that administrations are free to agree to closer operations based on a showing that co-frequency terrestrial services would not be harmed. The limit does not apply at all when terrestrial services are not present.

In addition to these immediate extensions of the interim CSO Licence, the SSWG urges the ACMA to start work immediately on enabling ESIM operations around major airports and maritime ports, as envisaged in the 28 GHz decision.

## **10. Amendments to the Radiocommunications (Transmitter Licence Tax) Determination 2015**

As pointed out by the ACMA, these proposed amendments complement the proposed changes to the CSO Class Licence. They cover the bands 10.7 to 11.7 GHz, 18.2 to 18.8 GHz and 19.3 to 19.7 GHz. The amendments recognise that the environment for uncoordinated earth station receivers should not expect protection, and as such the minimum annual tax for spectrum access should apply. The SSWG agrees with this conclusion.

The SSWG observes that the *Amending the apparatus licence tax determinations* Consultation Paper (IFC 41/2019) has been released for comment in parallel with this Consultation paper. Insofar as this affects SSWG interests, the SSWG has no concern over the proposal to increase apparatus licence taxes by the CPI of 1.6 % and sees this as a prudent adjustment. With respect to fixed services and extension of the frequency range for taxes relating to PMTS Class B licences, the SSWG has no comment.

## **11. Changes to licence assessment procedures**

The SSWG notes the updates flagged for the Business Operating Procedure (BOP) for submission and processing of applications for space and space receive apparatus licences as a result of three matters:

- arrangements for ESIM being expanded to include the 10.7 to 11.7 GHz without change.
- an advisory note being added for inclusion on all space licences issued in the 10.7 to 11.7 GHz, 18.2 to 18.8 GHz and 19.3 to 19.7 GHz bands to the effect that no protection from interference is able to be claimed from duly licensed current or future fixed point-to-point services in those bands.
- procedures in the *Protection for the Mid-West Radio Quiet Zone* section in Appendix E of the space/space receive BOP being expanded to apply to all space/space receive licence applications in the 70 MHz to 25.5 GHz range of frequencies.

The SSWG encourages the ACMA to proceed to update the BOP as proposed, taking due regard of the advisory nature of the process Notes in the two latter dot points which will be included in the BOP and space licences. The SSWG appreciates the intention of the ACMA to increase the visibility of existing requirements already in place for the Murchison Radio Astronomy Observatory (MRAO).

The SSWG also agrees with no changes to the BOP dealing with the use of Earth stations in motion in Ka-band, except to dispense with the 'interim' description of the process. The process has been shown to be of value without causing problems to our knowledge.

## **12. Technical Information Paper - Sharing between fixed point-to-point links and uncoordinated earth station receivers in 17.7 to 19.7 GHz**

Both consultation documents refer to arrangements in the 17.7 to 20.2 GHz frequency range and outline the case for facilitating the use of uncoordinated earth station receivers in the 18.2 to 18.8 GHz and 19.3 to 19.7 GHz bands.

The SSWG fully supports and is grateful for the ACMA planning decisions and the outcomes proposed by the ACMA, as summarised in Figures 1 and 2 in the *Consultation Paper*. Technical arrangements in 28 GHz are the subject of parallel work in the current ACMA 26/28 GHz *Technical Liaison Group* (TLG) process and the SSWG is of the firm opinion for use of a firm boundary at 28.1 GHz (with no concept of a guard band being involved). The argument proposed by the ACMA for a 200 MHz guard band seems to lack a credible foundation.

With regard to the 17.7 to 20.2 GHz frequency range, the SSWG agrees with the ACMA proposal to adopt the same approach as the 11 GHz band. That is, to support uncoordinated earth receive stations in the 18.2 to 18.8 GHz and 19.3 to 19.7 GHz bands on a non-protected basis, and to not create constraints to the fixed service. The SSWG also agrees with the implications for tax amendments in line with a lack of spectrum denial.

The *Technical Information Document*, a new category of document prepared by the ACMA, contains useful information on existing arrangements on Earth station receivers and licensing options. It also reviews proposed new spectrum planning arrangements in the 17.7 to 20.2 GHz frequency range and the technical feasibility for change. Although specific consultation or feedback has not been sought, the SSWG recognises that this document provides useful technical information and background education for operators or potential operators wishing to explore licensing possibilities. The SSWG encourages the ACMA to make these types of Technical Information Documents available in the future, as they greatly assist to create transparency and guidance to the ACMA's thought processes. A similar document might be envisaged to come out of the current 26/28 GHz TLG process.

The SSWG also suggests that the ACMA endeavours to have accurate and up to date technical information in its database of FS transmitters, the Register of Radiocommunications Licences (RLL). It is understood that currently 1500 assignments do not have antenna size information in the RLL. If the parameters of the FS transmitters and the frequency assignments are known, industry members would have the opportunity to better simulate the interference environment and more accurately plan operations over Australia.

## **13. Conclusions**

The SSWG applauds the initiatives presented in these consultation papers. Notwithstanding concerns raised with the 28 GHz ESIM implementation, the SSWG believes that this consultation demonstrates a welcome direction in improving spectrum sharing using probabilistic methods.

With the 28 GHz band, and especially the proposal of introducing a guard band, the SSWG would encourage the ACMA to revisit the various studies in this band, especially those that resulted in the ECC PFD mask, and to reconsider its recommendations.

## Communications Alliance Satellite Services Working Group membership

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