

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

to the

Australian Communications and Media  
Authority (ACMA)

Apparatus licences in the 26 GHz and 28 GHz  
bands – Licensing, technical framework and  
pricing arrangements

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## EXECUTIVE SUMMARY

The Communications Alliance Satellite Services Working Group (SSWG) welcomes the opportunity to comment on the ACMA's *Apparatus licences in the 26 GHz and 28 GHz bands – Licensing, technical framework and pricing arrangements* Consultation paper.

The central feature of the consultation revolves around Area-Wide Licences (AWLs). The SSWG generally supports the ACMA's proposals for licensing AWLs in the 28 GHz band (27.5 - 29.5 GHz), subject to various matters raised in this submission, including the following:

- the SSWG believes that 28 GHz band should not be allocated until May 2021 or later.
- special consideration is required for gateway access before and after that date. Access is also required to a contiguous 2 GHz bandwidth.
- FWA should remain secondary to Fixed Satellite Services (FSS) at all times outside the defined band (the 27.5 - 28.1 GHz band ) and areas.
- a single, simple  $-83$  dBW/m<sup>2</sup>/MHz PFD boundary limit should be equally applicable to all systems.
- introduction of an appropriate time percentage consideration for the PFD limit applicable to NGSO constellations is needed.
- the SSWG does not support the proposed increase in the TRP limit for FWA in the 27.5 - 29.5 GHz band from 25 dBm/200 MHz to 30 dBm/200 MHz with the addition of an EIRP mask.
- fixed UE antennas in 27.5 - 29.5 GHz should not be exempted from GSO arc avoidance requirements when pointing up to 11 degrees above the horizon.

This submission also draws attention to licence duration and the need to align with the developing head of legislation. Other remarks are directed to subordinate legislation, including the Licence Condition Determination and the *RALI [new]*.

The SSWG strongly supports the proposals for Area-Wide Licensing (AWL) pricing of spectrum which bring together an equitable structure of pricing, and the SSWG further encourages the extension of that framework to include the 29.5 – 30 GHz band. Similarly, the SSWG also advocates a general parity adjustment of the current space related apparatus fees.

Communications Alliance acknowledges that some of its members, including Telstra and Optus, do not agree with some aspects of this submission, and that these members will be making their positions clear in separate submissions.

## 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 : Australian spectrum allocations in the 27.0-29.5 GHz and the satellite industry**

The 27.0 - 29.5 GHz frequency range is a vital resource for the future of the satellite industry in Australia. The 27.5 - 30 GHz band is especially important to satellite operators for broadband service provision, earth stations in motion (ESIM) and other high-throughput satellite applications. In recognition of this, the ACMA has decided on a spectrum plan for the 27.5 - 29.5 GHz band in the *28 GHz Decision* whereby:

- both fixed and ubiquitous FSS (including ESIMs) will have unconstrained access to: (1) the 28.1 - 29.5 GHz band in all parts of Australia; and (2) the 27.5 - 28.1 GHz band outside of Australia's large population centres; and
- inside Australia's large population centres in the 27.5 - 28.1 GHz band, FSS earth stations will operate on a co-primary basis with terrestrial fixed Wireless Broadband (WBB) services. We understand that the extent to which ubiquitous FSS earth stations are allowed in this band in large population centres will be the subject of a separate consultation.

As a result, the purpose and effect of the technical and licensing conditions for the 27.5-29.5 GHz band should be to enable continued primary FSS use of the band, while accommodating new Fixed Wireless Access (FWA) services in a portion of the band (27.5 - 28.1 GHz) in large population centres. In this respect, the goal in the 27.5 - 29.5 GHz band should not be confused with the ACMA's goal to make the 24.25 - 27.5 GHz band suitable for 5G.

Thus, even as new FWA services are enabled, technical conditions should ensure that FSS space station receivers, both Geostationary Satellite Orbit (GSO) and Non-Geostationary Satellite Orbit (NGSO), are protected and licensing rules should afford opportunities for deployment of FSS earth stations in large population centres, consistent with their co-primary status. We address these issues in greater depth in our comments below.

## **2. General Observations on Area-wide Licensing**

In this Consultation Paper, the ACMA proposes to introduce Area-wide Apparatus Licences (AWL) as a means of accommodating both FSS 'gateway' earth stations and FWA services in the 27.5 - 29.5 GHz band. The AWL is a new licence type initially introduced to license wireless broadband (WBB) stations. The principle of the AWL is to provide FWA licensees with the opportunity to exclusively reserve 'building blocks' to flexibly establish their networks – licensees can reserve a number of geographical units (the smallest is 500 x 500 m in size) for a specific frequency in the 27.5 - 29.5 GHz band, within which their operations would need to meet a certain Power Flux-Density (PFD) level at the boundaries.

The AWL concept is an attractive one as it would seem to involve significantly more equitable licensing fees for FSS earth stations licensed under the proposed AWL regime. The SSWG supports the ACMA's fairer pricing structure that is more directly linked to the 'spectrum footprint' of each service, as defined by the same PFD boundary condition. The proposed AWL fee that is based on a \$0.0003/MHz/pop fee in a small Hierarchical Cell Identification Scheme (HCIS) block is a welcome recognition that the current earth apparatus licence fees in this band are currently too high and are thus in need of urgent reform across all bands.

The AWL concept also shows promise as a means of managing interference and enabling co-existence among FWA operators. It provides each AWL holder with flexibility within their licensed area while providing protection for adjacent AWL holders. As between co-primary

FSS and FWA, the proposed PFD boundary condition provides a workable means of defining an AWL licence area around a transmitting FSS earth station.

The SSWG seeks clarification, however, about how AWLs would work with respect to FSS earth stations. In particular, the SSWG wishes to clarify the following:

- a) the ACMA's intention appears to be to allow 'FSS-only' AWLs that would not preclude other 'FSS-only' AWLs from operating nearby.<sup>1</sup> However, nothing would seem to preclude an FSS earth station operator from seeking an AWL without an 'FSS-only' designation and thereby precluding other FSS earth stations from operating nearby, even when co-location would otherwise be possible and even desirable under ordinary intra-FSS coordination principles. Is this an intended result of the ACMA's proposed arrangements? If not, the ACMA may want to consider how to prevent such potential behaviour.
- b) the ACMA should clarify that the grant of an AWL over a given area should allow multiple FSS earth stations to be located within the area, provided that the PFD condition continues to be met at the boundary of the AWL.
- c) the ACMA should clarify the applicable licensing fees in the case of multiple overlapping AWLs in a given AWL HCIS licence area. In principle, no more than a single AWL licence fee ought to be collected in the aggregate in a given HCIS area, no matter how many licences are overlapping in that area. In the case of multiple overlapping AWLs in a given HCIS licence area, this would mean dividing the applicable fee for that area by the number of overlapping licences. This maintains the equitable pricing structure.

The SSWG also recognises the proposals by the ACMA for the voluntary option of conversion of a fixed Earth licence to an AWL. It is the SSWG's preliminary understanding that the option of the Fixed Earth apparatus licence will continue and is in any case applicable to the downlink band. The ACMA should clarify that that pre-existing earth licences will enjoy priority during a licensing round and continue to enjoy priority over later FWA services operating under later-issued AWLs in bands/areas where FSS and FWA are co-primary, even if the earth licences are converted to AWLs and/or amended at a later date.

In addition, in bands where FSS and FWA are co-primary, until formally converted into an AWL, the ACMA should attach an FWA denial area around the pre-existing earth licences in such bands/areas defined by the HCIS blocks within the applicable PFD boundary condition, and apply the equivalent fee based on area times population density. In areas/bands where FSS is the sole primary service, application of *RALI [new]* would require the FSS to only license the small HCIS area in which the earth station is located, so the same approach can be applied to pre-existing FSS earth stations that are in such areas/bands. The SSWG would urge the ACMA to apply the same fee to pre-existing apparatus-licensed FSS earth stations as for AWL-licensed FSS earth stations to ensure that equivalent fees are applied to equivalent services in the given band. The SSWG urges the ACMA to consider this aspect as soon as possible as part of its spectrum pricing review.

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<sup>1</sup> Consultation Paper, at Appendix B, p.13 ('This arrangement will: ... Allow earth stations, which are operated by different licensees, to operate on the same frequency in the same area (assuming appropriate international satellite coordination arrangements are in place.').

### 3. Responses to Specific Questions

#### 1. The ACMA is proposing to use a two-stage administrative allocation for apparatus licences in certain segments of the 26 GHz band and in all of the 28 GHz band. Do stakeholders agree with this approach? If not, please explain why.

The SSWG's primary interest in the 26 GHz band is to ensure that existing and future FSS Gateways can continue to access the band. FSS Gateways, in many cases, must be positioned in a particular general area to both 'see' the spot beam of a satellite as well as to connect to available and nearby optical fibre cable infrastructure. This is fundamental to operations, and limited choice of where these systems are constructed means in some cases apparatus licensed co-primary services may need to make adjustments and secondary services such as FWA may receive interference. Failure to allow ongoing installation of Gateways may affect both existing and future systems and may cause an overall loss of throughput which reduces spectrum efficiency and services to Australians.

The SSWG continues to urge that the 26 and 28 GHz processes be separated, and this paper reinforces that belief. The 28 GHz process has additional and different issues that need to be fully considered, for example:

- a) the ACMA, in our view, should:
  - clarify the licensing framework in the parts of the band where FSS is the sole primary service (28.1 - 29.5 GHz everywhere and 27.5 - 28.1 GHz in defined populated areas);
  - confirm that Class Licensing will be available for ubiquitous FSS earth stations in the band with priority over secondary FWA services; and
  - review the corresponding space related apparatus fees, to bring them more in line with the AWL ones.
- b) Gateway Earth Stations will need access to convenient and reliable fibre networks in order to support maximum throughput and therefore will need access to contiguous spectrum inside large population centres, including in the 27.5 GHz and 28.1 GHz.
- c) no 'paired' licensing is as yet proposed in the 18 GHz band where gateways do require protection. Whether or not the AWL model makes sense for the FSS in the 18 GHz band, the regulatory fee structure in the 18 GHz band should also be re-examined in light of much more equitable (and much lower) fee structure in the 28 GHz band.
- d) an October/November AWL allocation window is not feasible for some satellite operators.

To further explore item a), the SSWG notes that the *28 GHz Decision* intended the 28.1 - 29.5 GHz band to be available for unconstrained FSS operations, including both gateways and ubiquitously deployed FSS terminals (whether fixed or in motion) via the Communicating with Space Objects Class Licence. We therefore assume that, earth station operators in 28.1 - 29.5 GHz will be able to freely choose to operate either under an AWL (or modified earth licence, as proposed above) or under the Class Licence (to be updated under a separate consultation). Importantly, the ACMA should confirm that earth stations operating under such Class Licence need not protect secondary FWA services in the same band.

On the subject of class licensing for ESIMs, the SSWG notes that the *28 GHz Decision* decided that 'the ACMA has also identified restricting the deployment of FWA

services (or make them secondary) in and around airports and major maritime ports as another technique to manage interference' in the 27.5 - 28.1 GHz band where FSS and FWA are co-primary. Despite the urgings of the satellite industry, this concept has not yet received any attention by the ACMA. The SSWG therefore requests that the ACMA return to this finding during the Class Licensing consultation.

Further exploring item b), there are existing and evolving satellite systems that are currently in the design stage. Some of these require access to the contiguous 27.5 – 30 GHz band in areas where the 27.5 – 28.1 GHz band is slated for co-primary FWA. These systems have a small number of gateways but a limited flexibility in the selection of location. Loss of a gateway terminal would result in loss of throughput to the entire network and thus all Australians. This is not an efficient use of spectrum given the low interference potential between FSS Gateways and FWA. A mechanism is needed to ensure FSS Gateways have continued access to the contiguous band in all areas through the use of available sharing techniques<sup>2</sup>. At the very least, this factor should be taken into account by the ACMA when evaluating competing FSS and FWA applications for 27.5 - 28.1 GHz spectrum in populated areas. This will ensure that Australian consumers can capture the full benefits of Ka-band satellite networks that are serving (or seeking to serve) Australia.

Further exploring item c), the 28 GHz uplink band is typically paired with the 18 GHz downlink band. Affordable protection for FSS Earth Station receivers using a similar pricing mechanism as for AWLs in 28 GHz would be well received by industry. If anything, the proposed pricing structure in the 28 GHz band demonstrates just how over-priced the existing apparatus licence fee structure is in the 17.3 - 31.3 GHz band and thus in need of reform.

In item d), the SSWG points out that an October/November allocation window may not be feasible for some operators. FSS gateways are complex and new and emerging systems require in depth planning that takes time. The SSWG therefore requests that the ACMA provide time between the promulgation of its new rules and the opening of the first window for AWL applications, so as to avoid unnecessary first mover advantages.

**2. Do stakeholders have any concerns with the licence duration and renewal policy for AWLs in the 26 GHz and 28 GHz bands?**

As stated in Attachment A to the consultation package, the ACMA may issue an AWL for a period of five years. However, the *Radiocommunications Bill*, being introduced into Federal Parliament, intends that this could increase to 20 years. The life of a GSO satellite is in the order of 20 years and in many cases satellite operators also may replace the spacecraft in orbit. This means that certainty of spectrum tenure is vital. The SSWG proposes delaying allocation of AWLs until the 20-year option is available or, as a fallback, giving some guarantee that this option will be available for upgrade as soon as the Act is enabled.

**3. The ACMA is proposing that AWLs be available for issue for the operation of FSS earth stations in the 27–29.5 GHz range. Do stakeholders support this proposal? If not, please explain why.**

The SSWG generally supports the proposed AWL concept for earth stations, especially the more equitable pricing that comes with it, subject to clarification of various points related to how the AWL regime applies to FSS earth stations – see above. However,

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<sup>2</sup> For example, FWA systems may be able to avoid interference through the judicious use of antenna discrimination, link budget and clutter through appropriate planning.

whilst it does seem strange to the SSWG that the AWL concept – which was developed for FWA licensing – will apply to FSS earth stations even in the parts of the 27-29.5 GHz range where FSS is the sole primary service, the SSWG can accept this attempt to harmonise licensing given the benefits which should apparently ensue.

**4. The draft technical framework is optimised for both wireless broadband and FSS earth stations. Fixed earth stations in the range 29.5–30 GHz are still authorised under a fixed-earth apparatus licence. We are seeking views on a proposal to authorise FSS in the 29.5-30 GHz range with AWLs. Do stakeholders have any comments about this proposal?**

The SSWG assumes the ACMA is referring here to gateways in the 29.5 - 30 GHz band, as ubiquitous FSS terminals are authorised via the existing Class Licence.

As the SSWG notes above, the AWL concept is useful for managing co-existence between FSS and FWA services in the same band. However, in the 29.5 - 30 GHz band, there is no need for AWLs to manage co-existence since there is no terrestrial allocation in the band at all, and none is contemplated.

However, the SSWG would support the extension of the much more equitable AWL pricing structure into the 29.5 - 30 GHz band as a better reflection of the value of the spectrum, and the extent of the spectrum denial caused by FSS earth stations in the band. The ACMA could calculate the fee for FSS earth licences in this band by taking the same approach proposed in *RALI [new]* for earth stations in the areas/bands where FSS is the sole primary service (i.e. 28.1 - 29.5 GHz everywhere, and 27.5 - 28.1 GHz outside of defined areas). In such areas, it would seem that FSS earth stations need pay for only the small HCIS area in which the earth station is located.

**5. Do stakeholders have any specific comments about the draft AWL LCD or RALI [new] or updated RALI MS 38?**

Comprehensive comments on the draft *Radiocommunications Licence Conditions (Area-Wide Licence) Determination 2020* (the AWL LCD) and *RALI [new]* are included in Sections 4 and 6 below.

**6. Do stakeholders agree with the proposed apparatus licence tax? As explained in Appendix A, at this time in Australia there is limited information about the value of the spectrum on offer for administrative allocation. The ACMA is open to reviewing the apparatus licence tax for AWLs in light of developments in domestic markets that have occurred or will occur over time. What considerations should the ACMA take into account?**

As noted above, the SSWG supports the much more equitable apparatus licence tax proposed by the ACMA. In the SSWG's view, the new fees more accurately reflect the value of the spectrum and level of spectrum denial (within the spectrum 'footprint') caused by FSS earth stations. The proposed AWL fees also demonstrate that the existing FSS earth apparatus licence fees are too high and in urgent need of reform (including the space transmit and space receive fees).

In addition to this, the ACMA should consider additional discounts on its base AWL fees, especially if it allows overlapping AWLs to be issued over pre-existing FSS earth station AWLs, or if it were to allow an FWA AWL to overlap, where such co-existence is possible. The guiding principle should be for the ACMA to collect not more than the applicable AWL fee for a given HCIS licence area (in the aggregate), regardless of the number of overlapping licensees. On this basis, the applicable AWL fee should be divided equally among the overlapping licences issued over a given HCIS licence area.

#### 4. Observations on RALI [new]

Generally, the SSWG supports the current DRAFT of *RALI [new]*. We do, however, make the following observations:

- a) AWLs are described as providing service and technology flexible access to a frequency range and geographic area. The SSWG understands that there are differences in the application of AWLs to the FSS and FWA and broadly supports these with the following exceptions:

- (i) The SSWG does not support the ACMA's proposal to allow FWA base station Total Radiated Power (TRP) in the 27.5 - 29.5 GHz band to exceed 25 dBm and to be as high as 30 dBm, provided the base station complies with an Equivalent Isotropically Radiated Power (EIRP) mask. In the lead up to WRC-19, a TRP level of 25 dBm was provided by the IMT community and was the basis for the compatibility studies conducted as part of the WRC process. In addition, the use of an EIRP elevation mask to protect FSS space station receivers was proposed but this was rejected by the IMT community in the lead up to WRC-19 on account of uncertainties and perceived difficulties with determining compliance. There is no indication that such uncertainties and difficulties have now disappeared or been resolved.

Unlike in the 26 GHz band, where there are only a few FSS space stations deployed, there are more than one hundred satellites already deployed in many orbits and orbital locations using the 28 GHz band; several of which serve Australia (including the 20-satellite O3b constellation). Given the lack of agreement from the satellite stakeholders, the SSWG urges the ACMA to reconsider its proposal to increase the TRP limits in the 27.5 - 29.5 GHz band with the additional protection of an EIRP mask.

- (ii) As explained in detail below for the LCD, the SSWG does not support the proposal to allow small FWA user terminals (< 34.7 dBi gain) to point above the horizon. As noted by the ACMA, FWA user terminal antennas have a 50° beamwidth, meaning the 3 dB point is at 25° in the vertical. Given there will be a large number of user terminals per base station, the resulting aggregate interference could cause interference to satellite receivers in orbit.
- (iii) The defined boundary condition for AWL licences is prescribed as a PFD limit (see discussion below) at the edge of the licensed area, yet *RALI MS38* continues to apply an EIRP limit of -60 dBW/Hz to FSS Earth Stations. The SSWG questions whether a further EIRP limit is still necessary. As long as this PFD limit is met at the boundary, FWA services in the adjacent AWL will be protected.
- (iv) The SSWG notes that ubiquitous FSS Earth Stations will still be authorised by a Class Licence, subject to a separate consultation on the matter. The *RALI [new]* should draw a distinction between FSS earth stations that may be licensed under AWLs and ubiquitous FSS earth stations that may be authorized under the Class Licence.
- (v) The SSWG also notes that in the *28 GHz Decision* 'the ACMA has also identified restricting the deployment of FWA services (or make them secondary) in and around airports and major maritime ports as another technique to manage interference' in the 27.5 - 28.1 GHz band where FSS and FWA are co-primary. Despite the urgings of the satellite industry, this concept has not yet received any attention by the ACMA. The SSWG would therefore urge the ACMA to return to this finding during the Class Licensing consultation. The *RALI [new]* should note that such later consultation may result in ESIMs being allowed in the 27.5 - 28.1 GHz band in and around airports and major maritime ports.

- (vi) In the case of coexistence (Sections 2.2 and 3.3.1), the SSWG notes that a system using an 'active antenna' is permitted a PFD at the boundary of  $-83$  dBW/m<sup>2</sup>/MHz (measured at 5 m above ground) while that for FSS is 8 dB more stringent at  $-91$  dBW/m<sup>2</sup>/MHz. The higher PFD limit for an Active Antenna System (AAS) seems to be because of the variable beam forming capabilities of such systems. However, the analysis should rather be based on the level of interference that a victim receiver at the boundary of the AWL must be able to accept, rather than on the characteristics of the source transmitter. The ACMA is already asking the victim receiver to accept a PFD of up to  $-83$  dBW/m<sup>2</sup>/MHz at the boundary of the AWL repeatedly from a fixed AAS antenna. Why should it matter that the source is instead a non-AAS or FSS transmitter? In addition, the statistical distribution of receiver beam pointing will be similar to that of a transmitter which would offset interference by the same amount. Accordingly, the SSWG submits the AWL boundary levels should be a uniform  $-83$  dBW/m<sup>2</sup>/MHz for all types of transmitters.
- (vii) In Section 3.2.1, the antenna pattern in *ITU-R Recommendation S.1428* should be included as applicable to NGSO systems alongside the proposed reference to *ITU-R Recommendation S.1855*. The latter (S.1855) applies only to GSO systems, while the former (S.1428) is referenced in Section 2.2.1.2 of the updated RALI MS 38 as being applicable to NGSO systems.
- (viii) Regarding Section 3.3.1 of *RALI [new]*, the following modification to the text would also seem appropriate: '*Calculation of the pfd at the area boundary is only required when the distance from the proposed transmitter to the licence boundary is lower than the exceeds the minimum distances shown in Figure 1.*' For the reasons given above, however, the SSWG supports a uniform PFD of  $-83$  dBW/m<sup>2</sup>/MHz rather than the two different PFD levels in Figure 1.
- (ix) A distinction should be drawn between FSS earth station emissions for GSO and NGSO applications. NGSO gateway earth stations create, by definition, a dynamic interference environment where the worst possible situation, in terms of interference potential, occurs only instantaneously. For the NGSO case, the nominated PFD limit would correspond to emissions at low elevation angles which would occur at only at a very small percentage of time, meaning that for most of the time the emissions would be significantly below the limit.
- To take account of this, it would be reasonable to associate a time percentage for which the PFD limit must be met in the NGSO case, and therefore accommodate some exceedance for a short percentage of time. Setting the percentage of time for which the PFD limit must be met at, say, 95% would seem to be appropriate. This would be consistent with the 5% of the time that the ACMA is allowing mobile base station AAS transmitters to stray above the horizon.

b) Questions for the ACMA on *RALI [new]*

- (i) Will simple apparatus licences still be available in the defined areas and in the 27.5 – 28.1 GHz band, or is there a lifetime limit envisaged? At the very least, it seems that the ACMA envisages that existing FSS earth licences in this band will be allowed to continue until voluntarily converted into AWLs.

To the extent that non-AWL licence types for FSS are still allowed in this band, the SSWG would urge that the ACMA apply the new AWL fee structure to such older licences to ensure that equivalent services are priced equivalently in this band. In areas/bands shared by FSS and FWA on a co-primary basis, this can be achieved by using the PFD boundary condition to determine the HCIS areas

that would be denied FWA services around the earth station, and then calculating the fee based on those HCIS areas. In areas/bands where FSS is the sole primary service, the ACMA can apply the approach proposed in *RALI [new]* or licensing only the small HCIS area in which the earth station is located.

- (ii) Where an FWA AWL is collocated with an FSS AWL and able to operate due to the low denial of an FSS Gateway, will the ACMA discount the FSS AWL price accordingly in the same way a discount should apply to coexisting FSS terminals? As noted above, discounts should be applied if overlapping AWLs are issued. In principle, only a single AWL fee should be collected for a given HCIS licence area. This means that the fee will need to be divided among overlapping licensees.
- (iii) In areas/bands where FSS and FWA are co-primary, will FSS earth station operators have a choice of seeking third party authorisation from an existing AWL holder, in addition to seeking an overlapping AWL?
- (iv) Will *RALI MS-38* and associated BOPS be updated to better reflect *RALI [new]*?

## 5. Observations on Allocation of Apparatus Licences in the 28 GHz band

The SSWG generally supports the ACMA's plans for allocation with the following caveats.

**Timing:** The SSWG believes that October/November 2020 may be too ambitious for the allocation of AWLs in the 27.5 – 29.5 GHz band for some operators and, for a number of reasons, including the unresolved issues mentioned in this paper. The SSWG requests that the ACMA provide more time between the promulgation of its rules and the first round of AWL licensing, to allow for proper planning by all parties, so as to avoid unnecessary first-mover advantages.

**Context:** The ACMA has correctly identified the need for both small and large gateways and service links to require access to the full band in all areas in the future. The SSWG suggests a different approach is required, particularly for gateways, so that they can be assured of access. The SSWG does not believe this will have a great impact on any installed FWA infrastructure, given the small spectrum area an FSS terminal occupies. It would seem that, given most user terminals will be assisted by clutter, some otherwise simple engineering remedies are available to overcome any issues. It also seems incongruous to prevent high-value systems from operating, based on protecting individual FWA elements.

**Available Spectrum:** The SSWG is comfortable with the spectrum available and band planning options, noting that FSS gateways require access to the contiguous 28 GHz band in all areas.

The SSWG also supports flexible licence conditions that will deliver flow-on benefits to consumers, especially as they can be applied to guarantee FSS Gateways access to the spectrum space they require.

**Licence Duration:** The SSWG notes that the current proposed maximum term is five years, but taking into account the 25 year+ life of an FSS system, the SSWG urges the ACMA to convert FSS licences to 20 years as soon as this becomes available by Law.

**Taxes and Charges:** While the taxes and charges outlined in the paper are a welcome improvement over the old fees and charges, the SSWG urges the ACMA to apply an additional discount in cases where overlapping AWLs are issued over a

given HCIS licence area. As explained elsewhere herein, the ACMA should divide the applicable AWL fee among the overlapping licensees to ensure that the ACMA does not collect more than the specified fee for any given area. The SSWG also urges the ACMA to make a fair estimate of the time taken to administratively issue an AWL so that all users have certainty in terms of cost.

**Licence continuity and conversion:** The SSWG has some concerns regarding the steps to change an apparatus licence to an AWL. There would appear to be a period of 'unlicensed operation' involved, albeit short, and the SSWG suggests the ACMA make some form of guarantee of continuity that an AWL will be issued upon the surrender of an apparatus licence. In addition, the ACMA should clarify that existing FSS earth licensees that seek to convert to AWLs will continue to enjoy primary status relative to new FWA licensees, even if the FSS earth licensee were to seek to convert their licences to an AWL whether in the first round of new licensing or later.

## 6. Observations on the AWL Determination

The SSWG provides the following comments on the draft Determination:

- **Schedule 1, Clause 1, TRP Limits**

The SSWG does not support the proposed increase in base station TRPs from 25 dBm/200 MHz to 30 dBm/200 MHz, provided the base station complies with an EIRP mask. In the lead up to WRC-19, a TRP level of 25 dBm was provided by the IMT community and was the basis for the studies that showed compatibility with the FSS.

In addition, the use of an EIRP elevation mask to protect FSS space station receivers was proposed but was rejected by the IMT community in the lead up to WRC-19 on account of uncertainties and difficulties with determining compliance. There is no indication that such uncertainties and difficulties have now disappeared or been resolved.

Unlike in the 26 GHz band, where there are only a few FSS space stations deployed, there are more than one hundred satellites already deployed in orbit using the 28 GHz band; several of which serve Australia (including the 20-satellite O3b constellation). In addition, the EIRPs at various angles may cause interference to GSO FSS receivers and are highly likely to cause a degradation to NGSO systems. Given the lack of agreement from the satellite stakeholders, the SSWG would urge the ACMA to take a precautionary approach and to reconsider its proposal to increase the TRP limits in the 27.5 - 29.5 GHz band to 30 dBm/200 MHz.

- **Schedule 1, Clause 1, Bandwidth Adjustment for TRP Limits.**

Since the ACMA has defined the licence channel raster as 50 MHz, while defining the TRP limits in a 200 MHz bandwidth, the applicable TRP limit in 50 MHz should be proportionally reduced by 6 dB to match the 50 MHz channel raster. The ACMA should also make clear in other clauses that TRP limits are by reference to the standard 200 MHz bandwidth in Clause 1 rather than 'per occupied bandwidth' and that all TRP limits must then be adjusted proportionally to the occupied bandwidth.

In addition, if the ACMA decides to retain the EIRP mask (which the SSWG does not support), all EIRP levels in the mask will need to be adjusted in proportion to the occupied bandwidth.

- **Schedule 1 Clause 2. Operation only at fixed locations**

The 'fixed-only' restriction should only apply to the FWA services that are authorised in the 27.5-29.5 GHz band. The 28 GHz Decision clearly intended that ESIMS and other ubiquitous earth stations to be deployed in the 27.5 - 29.5 GHz band in all areas and all parts of the band that are not shared with FWA on a co-primary basis.

Even within areas shared with FWA, the ACMA should recall its finding in the 28 GHz Decision that: 'The ACMA has also identified restricting the deployment of FWA services (or make them secondary) in and around airports and major maritime ports as another technique to manage interference.' In such areas, it is unlikely that FWA services will be in high demand while satellite-delivered aeronautical and maritime services are significant growth markets for the FSS industry.

The SSWG would urge that this issue be thoroughly considered by the ACMA as part of its class licensing consultation. Until then, FWA AWLs should be on notice that Earth Stations In Motion (ESIM) operations in this band in and around airports and major maritime ports remain an open issue.

- **Schedule 1, Clause 3, Recording devices in the Register; Clause 13, Record keeping – high-powered outdoor user equipment stations.**

As presently drafted, Clause 3 exempts from registration FWA base stations that operate at or below a TRP of 23 dBm 'per occupied bandwidth.' In the SSWG's view, the ACMA should require the registration of at least all outdoor WBB base stations in the 27.5 - 29.5 GHz band (and in the 27.0 - 27.5 GHz band in gateway footprint areas) so that the areas and parameters of FWA operations are generally identified to aid in identifying possible sources of interference.

The registration of base stations is even more important when one considers that all UEs operating in the 27.5 - 29.5 GHz band (and in the 27.0 - 27.5 GHz band in gateway footprint areas) will be exempt from registration. Under Clause 3, all fixed UEs with a TRP of less than 35 dBm 'per occupied bandwidth' are exempt from registration. However, the maximum TRP for fixed UEs in these bands/areas is 25 dBm/200 MHz (or 30 dBm/200 MHz with an EIRP mask, which the SSWG does not support).

In addition, even though a fixed UE operating at a TRP of between 23 dBm and 35 dBm 'per occupied bandwidth' is not required to be registered, the ACMA should make clear that fixed UEs in the 27.5 - 29.5 GHz band (and 27.0 - 27.5 GHz band in gateway footprint areas) are still subject to an overall TRP limit of 25 dBm/200 MHz (or 30 dBm/200 MHz with the EIRP mask, which the SSWG does not support).

Finally, the SSWG would urge the ACMA to amend Clause 3 so that the TRP references are expressed relative to the standard 200 MHz bandwidth of the overall TRP limits in Clause 1. The TRP for the occupied bandwidth would have to be adjusted proportionally to the actual occupied bandwidth.

- **Schedule 1, Clause 4, Compliance with RALI [new]**

Comments on RALI [new] have been addressed separately.

- **Schedule 1, Clause 6, Co-sited radiocommunications devices**

Where the ACMA decides to permit an overlapping AWL and given the fixed nature of an FSS Earth Station the onus for coordination should rest with the FWA operator as

FWA are adaptive systems and numerous engineering solutions are available to the operators for the avoidance of interference to the FSS.

- **Schedule 1, Clause 9, Co-existence with Space Receive Stations**

The SSWG makes the following comments with respect to the conditions for the protection of space receive stations in 27.5 - 29.5 GHz:

- a. *Clause 9(7) and 9(8), Increased TRP with EIRP Mask in 27.5 - 29.5 GHz.* As explained above, the SSWG opposes the proposed increase in TRP limits from 25 dBm/200 MHz to 30 dBm/200 MHz with an EIRP mask. In addition, the EIRP mask at various angles is likely to cause interference to GSO and NGSO FSS space station receivers.
- b. *Clause 9(13) and 9(14), GSO Arc Avoidance.* The SSWG objects to the ACMA's proposal to allow fixed outdoor FWA UEs operating in the 27.5 - 29.5 GHz band (and the 27 - 27.5 GHz band in gateway footprint areas) to point up to 11° above the horizontal plane without complying with the GSO arc avoidance requirement. Larger fixed UEs pointing 11° above the horizon could affect the GSO arc up to 12.5° above the horizon (11° plus 1.5° half-beam width) at each end of the arc. Smaller fixed UEs pointing 11° above the horizon could affect the GSO arc up to 36° above the horizon (11° plus 25° half-beam width) at each end of the arc. In the aggregate, such UE deployments could lead to significant interference being experienced by many geostationary satellites. It is not enough to simply ensure that the NBN satellites will not be affected because of their higher elevation angles from Australia. Other GSO and NGSO satellites are serving Australia today in this band, and more may serve Australia in the future, from lower elevation angles.

In the SSWG's view, this exemption from the GSO arc avoidance requirement should be limited to larger UEs (> 34.7 dBi gain) pointing less than 3° above the horizon and eliminated altogether for the smaller UEs. This may mean that smaller UEs can only point upwards towards a base station located in a southerly direction, but such constraints can be factored into the network planning of FWA operators. In contrast, the GSO arc is a fixed and finite international resource that should not be allowed to be contaminated in this way.

### **Earth station limitations in highly populated areas**

The SSWG questions whether FSS earth stations should be limited to an EIRP limit of -60 dBW/Hz along the horizontal plane, whether in highly populated areas or not. From an inter-service sharing perspective, the ACMA has established a PFD at the boundary of the AWL (which the SSWG submits should be a uniform -83 dBW/m<sup>2</sup>/MHz). As long as that PFD is met, no additional restriction is needed in the horizontal plane for the protection of other services.

The fact that the proposed limit is intended to apply only in 'highly populated' areas suggests that the -60 dBW/Hz is intended to be a human exposure limit of some kind. However, this does not make sense since a human exposure limit is necessarily dependent on distance from the transmitter and would need to apply to all transmitters in the band, not just FSS earth station transmitters. Since human exposure would, in any event, be governed by other applicable ARPANSA standards<sup>3</sup>, there is

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<sup>3</sup> Australian Radiation Protection and Nuclear Safety Agency. <https://www.arpansa.gov.au/>

no need for an additional distance-insensitive  $-60$  dBW/Hz EIRP limit on FSS earth stations.

## Communications Alliance Satellite Services Working Group membership

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