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SATELLITE SERVICES WORKING GROUP (SSWG)

SUBMISSION

to the

Australian Communications and Media Authority's (ACMA) spectrum management work program

Consultation draft

Five-year spectrum outlook 2020–24

24 June 2020

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EXECUTIVE SUMMARY

The Communications Alliance Satellite Services Working Group (SSWG) welcomes the opportunity to provide this submission to the Australian Communications and Media Authority's (ACMA) *Spectrum management work program – Consultation draft: Five-year spectrum outlook 2020–24 (the FYSO Consultation Draft)*.

The SSWG is once again pleased to make a submission to the FYSO consultation process, allowing the industry to regularly engage and contribute to the ACMA's work program. This submission provides a band-by-band review of the satellite-related spectrum, offers specific comments on the *FYSO Consultation Draft* and feedback on the SSWG's priorities to the ACMA's published timing and priorities.

The FYSO has become an integral component of the ACMA's work program, providing the necessary visibility of the ACMA's current and planned spectrum-related activities. Unfortunately, the FYSO has grown in volume and content since its beginnings, to a point where its utility is being diminished through repetition and complexity. Further thoughts have been provided in the Introduction.

In light of the effects of the current pandemic, the SSWG suggests that there is an opportunity for a 'regulatory re-set' – a chance to simplify the regulatory framework and make it more progressive and less burdensome for all stakeholders.

In the band-by-band analysis, the SSWG:

- recommends that the ACMA accelerate its development of a licensing framework for the extended L-band and consider moving the Extended MSS L-band from 'Initial investigation' into the 'Preliminary replanning' stage.
- suggests that the 1.5 GHz band be deprioritised, due to the technical challenges that exist, the ongoing international processes related to this band, and the relatively low demand for these frequencies.
- welcomes the ACMA plans to proceed with an options paper for potential uses of the 2 GHz band.
- strongly recommends that the 3700 to 4200 MHz band be kept at the 'Preliminary replanning' stage, as it is premature to make available more C-band spectrum above 3700 MHz to terrestrial 5G, given the detrimental impact on FSS operations.
- supports the need for sharing and compatibility studies for the X-band, to protect the continued use of this band for Australia's gateways.
- welcomes the 13 GHZ item in the *FYSO Consultation Draft* and believes it should be advanced to the 'Initial Investigation' stage, rather than the 'Monitoring' stage.
- looks forward to supporting the ACMA in the successful and inclusive operations and outcomes of the TLG process for the Ka-band.
- notes that the Q/V bands represent the new frontiers for next generation High Throughput Satellites and Very High Throughput Satellites. Many satellite operators have concrete plans for the use of Q/V band and the SSWG has a strong interest in the planning of these bands.
- suggests that the ACMA may wish to consider a Spectrum Tune-Up dedicated to a general consolidated assessment of the mid-band spectrum needs within Australia.

- endorses arrangements supporting both terrestrial 5G and satellite broadband services in the 40 GHz and 47 GHz bands.
- draws the ACMA's attention to the forthcoming SSWG Spectrum Pricing Review submission which proposes a number of spectrum pricing innovations: providing comparisons with similar Administrations, a 'discount' based on the ability of systems to share the same band and an alternative way of considering stand-alone terminals and those which are co-located.
- acknowledges that dynamic spectrum sharing could offer some benefits to the satellite industry, but that there is a concern it will rarely be the beneficiary of a dynamic shared spectrum regime, whereby the satellite industry obtains access to new spectrum in a sustainable way. The development of a formal, ongoing DSA regime should not be prioritised at this time and Australia should adopt a wait-and-see approach.

The submission does not necessarily represent the views of Telstra, as a member of the SSWG, specifically in relation to the comments under Section 3.4 on C-band. It is understood that Telstra is lodging its own submission on the *FYSO Consultation Draft*.

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 FYSO process and accompanying Work Program has, over the years, grown to be a valuable resource to stakeholders; providing transparency and an overview of the intersecting planning and implementation intentions of the ACMA. The SSWG has made many comments over the development period of the FYSO and the SSWG is pleased to observe that many of its comments have been taken into account.

The FYSO is now a voluminous document, and there is quite some repetition, which we believe could be streamlined. In addition, the four-stage planning presentation is in danger of driving the whole process and at the same time creating an expectation of a 'one-year-per stage' schedule. This may be convenient for ACMA's management processes and resource allocation, but it could act to stifle the timely introduction of new services. The concept of a 'Five Year Spectrum Outlook' should have embedded within it, different life cycles of technology innovation, some of which might well be shorter than one year.

A four-year life cycle of international studies can also be incompatible with efficient and timely national deployment, and this has led to many countries taking up an industry leadership role ahead of international consensus. That leadership may then also flag the way forward for international studies to follow. In the meantime, significant market advantage can be achieved.

The FYSO provides an important, formal feedback loop between the industry and the ACMA. Its evolution from a five-year spectrum planning document to a complete work plan for the ACMA's spectrum activities, including an annual work plan and a forward allocation program, has made this document a focal point for the spectrum community's engagement with the ACMA. However, with the ACMA's attempt to fit in a complete picture of the planning framework into the one document comes the downside of having a consultation document that is complex and not very user-friendly. We observe, there are numerous topics that are repeated in various sections, which means the users have to sift through various sections of the document to ensure relevant information is not missed - not to mention the fact that, with repetition, inadvertent discrepancies can creep in.

Considering the consultation is for a five-year period, a more concise document that only calls out new topics or changes to the ACMA's priorities on a yearly basis may be of greater benefit to the community. We recognise the challenge of pulling together the *FYSO Consultation Draft,* which - unlike other consultation documents - needs to include both the breadth and depth of various topics of information related to whole range of stakeholders. The SSWG, for its part, is willing to work with the ACMA to review the structure of the document, to improve the utility of the paper for all users.

2. Issues for comment – summary

The *FYSO Consultation Draft* provides the following five issues for comment. The responses below highlight the main issues identified by the SSWG and provide references to further supporting information in the remainder of this submission.

1. What are the expected impacts of the COVID-19 pandemic on the short- and medium-term capacity of your industry?

The SSWG draws to the ACMA's attention the efforts by industry reduce the impact of the pandemic on customers. At the same time, the disruptive effects of the pandemic have made it harder for satellite operators to cope with the everyday regulatory burden under which they operate.

2. **Do you have any feedback on the ACMA's approach to its spectrum work program in the current environment? Do you have alternative proposals or priorities?**

   The SSWG suggests that there is an opportunity for a 'regulatory re-set' – a chance to simplify the regulatory framework and make it more progressive and less burdensome for all stakeholders. Refer to Section 4.10 Industry impact from the COVID-19 pandemic.

   The full recovery of industry health may stretch throughout the whole five-year FYSO. If it does, then the ACMA needs to consider the role that it can play and this may warrant a separate consultation and adjustment of priorities and operational matters.

3. **Are there other technology developments or sources of spectrum demand that the ACMA should be aware of in considering spectrum management over the next five years?**

   These matters are quite well observed in the *FYSO Consultation Draft*. Implementation on a national basis may be challenging and the ACMA may need to rely on industry cooperative planning and regulatory solutions in order to avoid resource priorities within the ACMA standing in the way of economic and social advances within Australia

4. **Do you have any other feedback on the ACMA's plans for monitoring, initial investigation, preliminary replanning or replanning of bands?**

   The stages in the planning approach tend to be cumbersome. Fast track progress could be considered in order to match regulation with optimum market introduction. Specific comments are provided under the various band discussions in the following sections. Further thoughts on the relationship between the ACMA work program and the FYSO are provided in the Introduction.

5. **Do you have any comments about the ACMA's approach to forward allocations?**

   The SSWG notes that the tabular summary in *FYSO Consultation Draft* is a useful mechanism that assists industry investment planning and timing. These tables have also been reproduced in Appendix A to provide SSWG feedback to the ACMA's timing and priorities.

3. Band by band review

The following comments are provided on specific bands. Whilst the bands addressed in the *FYSO Consultation Draft* are relevant to consider, the timing of planning stages of particular bands and synchronisation between studies can be refined. Also, probably because of the resource demands on the ACMA, it appears that some proposals have not benefitted from adequate research. There are also concerns that ACMA proposals may cause intrusive structural changes in the marketplace rather than the regulator adopting a hands-off or light touch form of regulation which supports the needs of industry and the market.

3.1 Extended MSS L-band (1518-1525 MHz and 1668-1675 MHz)

As the ACMA points out, WRC-03 and WRC-07 allocated this additional spectrum to the mobile satellite service to complement existing L-band allocations used by numerous satellite operators. The ACMA noted in the *Five-year spectrum outlook 2019-23* that coexistence with potential broadband use below 1518 MHz is likely to be a substantial consideration, and that, therefore, a simultaneous review of the extended MSS L-band and the 1.5 GHz bands was considered to be appropriate. However, recent developments suggest that this approach may no longer be the most appropriate, as the introduction of MSS in the extended L-band grows near, while work in international fora necessary to allow the introduction of harmonised IMT operations below 1518 MHz is progressing more slowly than expected (as discussed further below in Section 3.2 below on 1.5 GHz (1427 to 1518 MHz).

The satellite industry has moved on to a more urgent need for spectrum in extended L-band. Inmarsat expects to launch its next L-band satellite, Inmarsat 6F1, in 2021. This satellite will operate across the entirety of the MSS L-band, including the 1518 to 1525 MHz and 1668 to 1675 MHz portions of the band. Service to Australia should become available on Inmarsat 6F1 during 2022. This means that preparations for technical conditions and an associated licensing framework need to be in place by then.

The technical requirements for MSS operation in this frequency band are well-understood, at this point. The spectrum was allocated to the MSS in WRC-03 and WRC-07, and MSS operations have been conducted in these frequencies in Region 1 since 2013. Based upon these circumstances, and to ensure that Australian users are able to benefit from the introduction of new MSS operations in the Extended L-band, the SSWG recommends that the ACMA accelerate its development of a licensing framework for the extended L-band and consider moving the Extended MSS L-band from 'Initial investigation' into the 'Preliminary replanning' stage.

3.2 1.5 GHz (1427–1518 MHz)

The international processes of developing a harmonised framework for deployment of IMT below 1518 MHz are going slower than expected, due to a number of factors including lack of demand for this spectrum by the IMT community, lack of global harmonisation within the relevant technical standards, challenging incumbency issues, and delays in identifying how new IMT operations will protect MSS operations above 1518 MHz. These delays have only been exacerbated by the COVID-19 pandemic, which has slowed progress on this work at key international bodies such as the ITU and AWG. As the ACMA noted in the Addendum to FYSO 2019-23, parties submitted comments in response to the 2019-23 Outlook suggesting that this band be deprioritised in planning, or deployed in a staggered way that focuses first on the 1452 to 1492 MHz band, followed by other portions of the band later, subject to demand. These suggestions remain sound.

The ACMA correctly notes in the current draft Five-year spectrum outlook that RA-19 adopted Recommendation ITU-R M.1036-6, which included IMT frequency arrangements for the 1.5 GHz band. That Recommendation recognised that additional technical measures are needed in order for IMT to protect MSS and it instructed administrations to refer to the work being done in ITU for guidance. Additionally, WRC-23 revised Resolution 223 to call on ITU-R to conduct compatibility studies that include guidance on the implementation of the IMT frequency arrangements in this band, and to include the results of these studies in one or more ITU-R Recommendations and Reports, as appropriate. While the work to conduct these studies is underway jointly within ITU-R Working Parties 4C and 5D, a Report is not expected to be finished until next year at the earliest, and the Recommendation may follow sometime later than that. Accordingly, it may be premature to authorize IMT in the 1492 to 1518 MHz portion of the band (as some European admins have concluded). However, if it is going to do so, the ACMA should only proceed after a thorough examination of the technical measures needed to protect MSS in the band.

While the ITU compatibility studies are not yet completed, the results so far have shown serious potential for harmful interference to MSS operations above 1518 MHz. At the heart of the slow progress at ITU is the disagreement between IMT and MSS proponents over the need for interference protection at the band edge of 1518 MHz. Leaving aside the commercially driven positions, there are also safety-of-life considerations for vessels, for which the IMO has great concern. In addition to IMT interference into the 1518 to 1525 MHz band, there is real danger of blocking effects into MSS terminals above 1525 MHz – including terminals used for the GMDSS and other maritime and aviation safety-of-life applications. The ACMA should take this into account in considering technical conditions for the introduction of IMT below 1518 MHz. While future MSS terminals will have increased resilience to this interference, replacement or upgrade of on-board earth stations cannot be implemented in many

thousands of vessels for quite some time (upwards of seven years as estimated by the IMO in a recent statement made to the ECC and ITU-R Working parties) and at considerable cost.

Similar concerns exist regarding aviation MSS terminals, leading ICAO to encourage the ITU-R to identify technical measures on IMT base-station and mobile station transmissions around airports to ensure the protection of existing aeronautical earth stations operating in the 1518 to 1559 MHz frequency range. Even with more resilient MSS terminals, however, some protection measures will still be necessary to ensure that high-powered IMT base stations do not interfere with critical MSS operations. When the ACMA does begin evaluating technical conditions for IMT deployment below 1518 MHz, a two-stage mitigation framework should, therefore, be taken into account.

The 1.5 GHz band identified for IMT at WRC-15 has been categorised by the ACMA as in the 'preliminary replanning' phase. Given the technical challenges that exist, the ongoing international processes related to this band, and the relatively low demand for these frequencies (as compared to other mid-band frequency bands), the SSWG suggests that this band be deprioritised. Additionally, a simultaneous review of issues surrounding this band and the Extended MSS L-band at 1518 to 1525 MHz and 1668 to1675 MHz is no longer appropriate, as the MSS spectrum can be brought to use for the benefit of Australian users on a much shorter timeframe.

3.3 S-band (2 GHz) (1980 to 2010 MHz and 2170 to 2200 MHz)

This is at the 'preliminary replanning' stage within the *FYSO Consultation Draft*. The issue of compatibility and sharing considerations between terrestrial IMT and satellite IMT was discussed at length at WRC-19 and a revised Resolution 212 was adopted by the Conference. With the completion of WRC-19, national decisions now need to be made regarding usage of this spectrum in Australia.

The SSWG welcomes the ACMA plans to proceed with an options paper for potential uses of the 2 GHz band in Q2-3 2020. The SSWG looks forward to involvement and support of the use of the spectrum for mobile-satellite services (with or without Ancillary Terrestrial Component/Complementary Ground Component rules), and which would include satellite IoT.

The SSWG supports the aim of releasing a decision paper for future use of the 1980 to 2010 MHz and 2170 to 2200 MHz bands in Q4 2020.

The SSWG considers that the decision paper needs to address the restoration of this band in the *Communicating with Space Objects Class Licence* without which any MSS service will not be economically viable. While not a part of the 2 x 30 MHz MSS bands, the SSWG also suggests the ACMA follow and support additional spectrum for MSS being studied under WRC-23 Agenda Item 1.18.

3.4 C-Band (3700 to 4200 MHz)

The ACMA's attention to the 3700 to 4200 MHz band seems to be driven by an apparently insatiable desire from the terrestrial mobile industry for more mid-band spectrum (1 to 6 GHz), and the ACMA seems to be unduly influenced by the FCC decision to auction the 3700 to 3980 MHz spectrum and by various international studies and debate.

With regard to the FCC, the U.S had a unique spectrum allocation because the 3400 to 3700 MHz spectrum was encumbered by federal users, so the FCC had no choice but to look into the standard FSS C-band in the 3700 to 4200 MHz band to try to accommodate the mobile demands for spectrum. However, if anything is to be learned from the FCC proceeding it is the amount of spectrum to be made available to mobile. After prolonged debate, the FCC decided that 280 MHz of mid-band spectrum in C-band was sufficient for

three major Mobile Network Operators (MNOs), which should allow each MNO to potentially acquire 90 MHz, if the spectrum was to be split evenly among them. Nonetheless, there are arguments that 50 MHz may be sufficient. As is shown in Figure 1 below the Australian mobile market is mainly a three[1] player market across the operators.

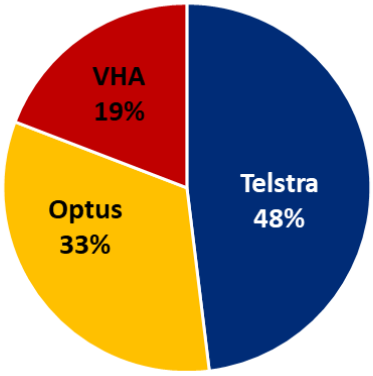

Figure 1

2019 Mobile Market Share[2]

Australia's mobile market is one of the most developed in the world, and Telstra and Optus have released commercial 5G services using the 3.5 GHz band. With that said, the 4G mobile market is very well developed with a 4G subscriber penetration of 76%. Even where there are still four players, the likely outcome is that each operator will secure 60 to 80 MHz, or perhaps 40 to 100 MHz, if operators pursue different approaches to launching 5G services.

In all these cases, the expectation is that every operator will secure at least 40 MHz of mid-band spectrum for 5G services. This is more than sufficient for every MNO in Australia in every region of the country to provide a high-quality 5G service, as demonstrated by recent research published by Ofcom, the communications regulator in the United Kingdom. In response to claims by some MNOs that they needed access to at least 80 MHz of contiguous spectrum, Ofcom researched the ability of mobile operators to launch 5G services with 40 MHz of spectrum. It found that:

> '… there was no evidence that 5G could not be delivered with smaller [e.g. 40 MHz blocks] or non-contiguous carriers in other frequency bands [i.e. spectrum other than C-band].'

To support its finding that 40 MHz of C-band spectrum was sufficient to provide 5G services, Ofcom developed a theoretical cell site throughput model to estimate network performance based on various assumptions on the type of antenna used, bandwidth of C-band carrier, and signal strength received by the user. Figures 2 and 3 below show the results of Ofcom's analysis for both downlink and uplink signals, respectively. The results clearly demonstrate that terrestrial mobile operators will be able to deliver all the main services anticipated under 5G, including, but not limited to connected cars, virtual reality cloud broadband and live 4K streaming – with 40 MHz of spectrum.

[1] TPG provides retail fixed broadband services, and leases wholesale capacity from NBN. TPG also has a retail mobile service as an MVNO. TPG halted their mobile network rollout in January 2019.
[2] Telegeography Global Comms database for March 2019 (Accessed 16 July 2018). Subscribers include wholesale subscribers on MNO network.

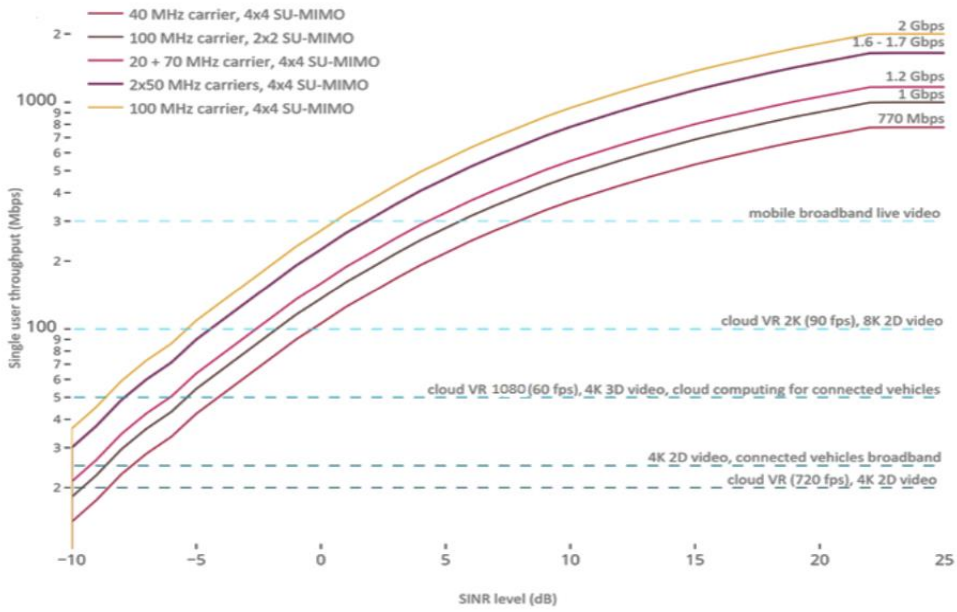

Figure 2

Downlink Single User Throughput (SUT) across different signal strengths in a cell compared with the minimum data rate requirements for some 5G services[3]

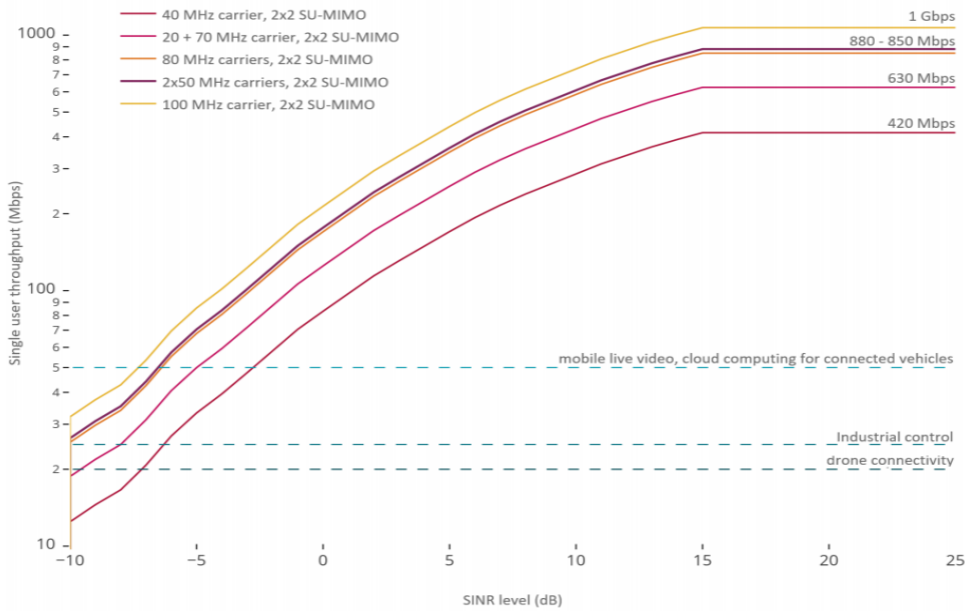

Figure 3

Uplink Single User Throughput (SUT) across different signal strengths in a cell compared with the minimum data rate requirements for some 5G Services[4]

[3] Source: Figure A7.26, Award of the 700 MHz and 3.6-3.8 GHz spectrum bands: Annexes (13 March 2020).
[4] Source: Figure A7.27, Award of the 700 MHz and 3.6-3.8 GHz spectrum bands: Annexes (13 March 2020).

Ofcom's conclusions that 40 MHz of spectrum is sufficient for initial 5G deployment are further substantiated by the 3.6 GHz band (3.575 to 3.7 GHz) that was auctioned for metropolitan and regional areas during November to December 2018. There were four winning bidders: Dense Air (25 x 5 MHz); Mobile JV (131 x 5 MHz); Optus (47 x 5 MHz) in non-metropolitan areas; and Telstra (143 x 5 MHz). The carrier Dense Air is seeking to provide carrier-neutral wholesale service of small cells to the other MNOs which retail their services. The aim of Dense Air is to assist with densification of IMT/5G networks through shared facilities. The mobile Joint Venture (TPG and Vodafone) was upheld in the High Court thus confirming the belief that a sufficiently competitive market could survive with effectively three MNOs.

Another candidate for mid-band spectrum would have been 2.5/2.6 GHz spectrum. By contrast, the ACMA has spectrum-licensed the 2500 to 2570 MHz and 2620 to 2690 MHz spectrum bands with an Australia-wide distribution and core conditions given in MS35. The auction was held in 2012/2013 and successful bidders were TPG (2 x 10 MHz), Telstra (2 x 40 MHz), and Optus (2 x 25 MHz). As a result of the review in 2010, ENG applications were relocated from the 2.7 to 2.9 GHz band to the 1980 to 2010 and 2170 to 2200 MHz bands, causing disruption to the broadcasting industry, and encumbering the mobile satellite service allocation.

The 3.425 to 3.575 band was auctioned in 2000 for a licence period of fifteen years. There were no MNO winning bids at the time. Now the ACMA is in the process of re-stacking incumbent services in the band by November 2020 with a view to the Minister making a decision on designating spectrum for spectrum-licensing.

The point of summarising these bands which have gone or are about to go 'under the hammer' is that spectrum licensing may already be quite sufficient for the needs of IMT/5G mid-band spectrum.

Furthermore, the conclusions of Ofcom's model are backed up by real-world observations of operators around the world, that have launched high-quality 5G services using less than 80 to 100 MHz of C-band spectrum. Information from Chile, France, Germany, UK, Hong Kong, Iceland. Italy, Singapore, South Korea, Switzerland and Taiwan, for example, points to the status of mid-band spectrum awards being completed or in progress in C-band (extended and/or standard) amongst three or four nationwide MNOs. Further statistics are provided in Table 1 below.

Table 1

Amount of C-band spectrum allocated to MNOs in international markets

Country	C band Allocated to MNO (MHz)	Number of Nationwide MNOs
Taiwan	270	5
Singapore	200	4
Italy	200	4
UK	390	4
France	310	4
South Korea	280	3

For the ACMA to now focus on potentially more spectrum in the 3700 to 4200 MHz band has considerable consequences which should be more carefully considered. Firstly, there may well be danger that an inappropriate imbalance of supply and demand is created. The

ACMA should ensure that there is no dumping of spectrum onto the market. Oversupply would result in inefficient use of spectrum and lower auction proceeds. By managing the spectrum appropriately, there is scope for a competitive auction, with MNOs competing to differentiate their offerings. If more spectrum is offered (i.e. above 3700 MHz), the likelihood is that MNO demand would be completely sated. This could result in an auction that ends after one round, with MNOs sharing out the spectrum at the lowest possible price. In such a scenario, if reserve prices are low, then the auction will generate very little revenues – notwithstanding the high value that terrestrial mobile operators place on having a critical mass of spectrum in this band for 5G. Spectrum is a renewable resource that does not diminish in value from use. Instead, the welfare benefits of spectrum are completely lost if left unallocated and unused.

In addition, market signals generated by the ACMA in consulting on the future use of the 3700 to 4200 MHz band, would cause consternation to both satellite operators and their clients. As the ACMA concedes, the importance of C-band and its value to the FSS has been significantly debated and acknowledged in the *FYSO Consultation Draft*. That service will be relied on globally for many years to come. Satellites already launched were designed for 15+ years and the ACMA needs to take care with its decisions which may fundamentally cause shock waves to the satellite industry structure. Even with the outcomes of the recent 3.6 GHz band auction, the business planning of one wholesale small cell 5G operator may be undermined by such a consultation. At the same time, hardship has already been forced on traditional earth station operators requiring relocation to make way for terrestrial IMT/5G services.

At some stage the ACMA needs to call an audit, when it comes to fair and sensitive treatment of incumbents versus increasing demands for spectrum from the protagonists of IMT/5G. Compensation is not offered to assist relocation as it is in C-band in the US, so that would require consideration if the US model were to be further studied. The ACMA should be proactive and influential because of its understanding of the industry, and be willing to actively address this issue of compensation. Compensation has some factual history in Australia with the broadcasting services.

The ACMA sets great store by international developments and closely monitors the ITU developments. However, it is a fact that over the next four-year ITU cycle, IMT studies will give little consideration to the 3700 to 4200 MHz band in general. An agenda item, AI 1.2, was created at the last WRC for the WRC-23 cycle to focus on possible identification of IMT in the 3600 to 3800 MHz band, specific to Region 2, with opposition from the other ITU Region 1 and Region 3 members, including Australia being a part of Region 3.

The SSWG supports adherence to the ITU/WRC process. It also supports the protection of existing earth stations across the entire 3700 to 4200 MHz band and a reconciliation of spectrum demands against actual usage before potentially destabilising steps are taken.

For all the reasons outlined above, it would be premature and almost certainly welfare destructive to make available more C-band spectrum above 3700 MHz to terrestrial 5G, given the detrimental impact on FSS operations. Consequently, the SSWG strongly recommends that the 3700 to 4200 MHz band be kept at the 'Preliminary replanning' stage and postpone the proposed consultation in Q2/Q3. This would not only avert resource consuming efforts within the ACMA and industry stakeholders but would offer time to observe more clarity and to avoid inciting market uncertainty.

3.5 X-Band (7010 to 7750 MHz)

The 7010 to 7075 MHz band is currently used in Australia to provide satellite feeder link services.

The SSWG notes that the 7025 to 7125 MHz band is one of the bands to be studied for consideration at WRC-23 for possible identification for IMT, and that the ACMA has specified this Agenda Item for inclusion in its monitoring stage. The SSWG supports the need for sharing and compatibility studies for this band to protect the continued use of this band for Australia's gateways that are crucial to provide satellite feeder link services for global satellite providers.

3.6 13 GHz (12.75 to 13.25 GHz)

The SSWG welcomes this item in the *FYSO Consultation Draft* and believes it should be advanced to the 'Initial Investigation' stage rather than the 'Monitoring' stage. This is one of the topics where the cumbersome approach of one stage at a time is disadvantageous and may well hold back innovation through regulatory inertia of a 'one step at a time' planning program. Timely innovation and industry development in Australia may well be the victim of this inertia caused by ACMA resource constraints and this does not bode well for the public benefit and economic advantage of future service introduction in Australia. Perhaps further thought needs to go into a more cooperative acceleration of the ACMA's work, taking advantage of support by industry.

Agenda Item 1.15 was created at WRC-19 to harmonise the use of the 12.75 to 13.25 GHz (Earth-to-space) frequency band by earth stations on aircraft and vessels communicating with geostationary space stations in the fixed-satellite service globally, in accordance with Resolution 172 (WRC 19).

In-flight and maritime connectivity is one of the fastest growing segments in the satellite industry. Consumers now expect full connectivity in flight or on a cruise, and this requires additional uplink spectrum. Furthermore, Agenda item 1.15 is meant to give administrations added flexibility in using their AP30B allotments in applications that rely on earth stations on mobile platforms, and Australia is uniquely positioned to benefit from this, given its size and extremely long coastline. Nonetheless technical studies are required to ensure protection of existing FS links and FSS use in accordance with Appendix 30B. Incidentally there is already an existing European harmonised framework ECC Decision (19)04[5] for earth stations on aircraft.

This study complements Australian downlink arrangements in the 10.7 to 11.7 GHz band which support ubiquitous, uncoordinated terminals on a non-protection basis from point-to-point stations. For Australia, this uplink could pair with AP 30B downlinks in the 10.7 to 10.95 GHz and 11.2 to 11.45 GHz bands and balance up this capacity.

The study also offers catch up investigations with aeronautical in-flight connectivity which is growing rapidly within both the Ku and Ka-bands. The largest market at Q3 2019 was North America. At Q3 2019, the net installed base for L-band was 600, Ku-band was estimated at 4687, and Ka-band was estimated at 1900. At 1597, the Air-To-Ground (ATG) base continues to decline. This underlines the relevance and relative importance of the Ku-band studies at 13 GHz. This is evidenced by the NSR Aero Market Study[6] showing a ten-Year Growth to approach 10%, mainly propelled by in flight connectively market rebound from Covid-19 and a long-term requirement for connectivity with $5B in annual retail revenues by 2029. The

[5] ECC/DEC/(19)04 The harmonised use of spectrum, free circulation and use of earth stations on-board aircraft operating with GSO FSS networks and NGSO FSS systems in the frequency bands 12.75-13.25 GHz (Earth-to-space) and 10.7-12.75 GHz (space-to-Earth) https://www.ecodocdb.dk/document/13856

[6] Northern Sky Research Aeronautical Satcom Markets, 8th Edition Report. https://www.nsr.com/aero-ifc-market-facing-slump-due-to-covid-19-but-long-term-fundamentals-remain-solid/

next 24 months will be a challenge, no doubt – but IFC plans are largely delayed, not cancelled. Hence the SSWG promotes the higher category of investigation for this band.

3.7 Ka-band (26 GHz and 28 GHz bands)

The SSWG notes the consideration of these bands and future allocations proposed. Many SSWG members have taken part in the ACMA 26/28 GHz Technical Liaison Group (TLG) process which has addressed technical basis to support allocation and licensing. The SSWG supports the ACMA's desire to move the 26 GHz spectrum to auction and believes that appropriate protections have been included.

However, the latest 28 GHz discussions in the TLG have raised some concerns about terrestrial operations and proposed licensing arrangements and the SSWG recommends separating the work into two proceedings, to allow for more study in the 28 GHz band. The SSWG looks forward to supporting the ACMA in the successful and inclusive operations and outcomes of the TLG process.

3.8 Q and V bands

From a satellite industry perspective, the Q and V bands can be summarised as relating to particular allocations to the FSS, MSS and BSS in the 37.5 to 52.4 GHz frequency range. This includes the additional 51.4 to 52.4 band allocated to the FSS at WRC-19.

Whilst current usage of C, Ku and Ka-bands will continue to be vital for satellite operators, the Q/V bands represent the new frontiers for next generation High Throughput Satellites (HTS) and Very High Throughput Satellites (VHTS). This is for the purpose of feeder links and user terminals. Most major satellite operators already have concrete plans in development, and some current satellites have a Q/V band capability in their transponder design for feeder link purposes

Satellite operators need ongoing access for gateways in the 37.5 to 42.5 GHz, 47.2 to 50.2 GHz and 50.4 to 51.4 GHz bands. It should be noted that in mmWave bands, gateways may not be traditional single antenna systems but may also be gateway arrays distributed over a significant area.

Specifically, satellite operators require access to service bands for ubiquitous operation at the 48.2 to 50.2 GHz and 40 to 42 GHz bands. These bands should not be identified for mobile broadband while the gateway bands may have sharing potential provided the needs of gateway arrays are taken into account.

Where these FSS bands are not identified in Region 3, the ACMA should consider supporting identification of the bands for HDFSS.

This is evident as many satellite operators which currently use the lower frequency bands (C-band, Ku-band, Ka-band) have already launched or are developing systems that will use the Q/V band allocations in the near future. Licensing of Q/V band services has already occurred within the FCC.

In summary, many operators have concrete plans for the use of Q/V band in Europe[7]. Use for gateway earth stations implies the need for access to large amounts of spectrum required for feeder links. However, use of these bands by gateway stations will be feasible on a shared basis with terrestrial services due to the relatively large (i.e. low sidelobe) antennas required and due to the relatively limited number of stations needed.

[7] The following ECC Decisions apply to the Q/V band allocations with respect to the use of those bands by the FSS/MSS/BSS. DEC (00)02, DEC (02)04, DEC (05)08

Treatment of the bands involved in the FYSO occurs somewhat piecemeal in the *FYSO Consultation Draft*, though some bands are not mentioned. Interest of the satellite industry is noted with some bands. However, the SSWG believes that an increased level of priority and investigation into the Q/V bands should be considered in the FYSO, for Australia to remain relevant with developments in these bands.

4 Specific comments on the FYSO Consultation Draft

4.1 Proposal for a mid-band spectrum tune-up

With the cancelling of the ACMA Radcomms 2020, without any indication of the timing for a future replacement, and that the last Radcomms was held in October 2018, the SSWG suggests that the ACMA may wish to consider in the interim a Spectrum Tune-Up dedicated to a general consolidated assessment of the mid-band spectrum needs within Australia, and options for IMT together with an audit of actual spectrum uptake for IMT, and with considerations for incumbent users, taking into account the 2 GHz band and others. This consideration would be of significant guidance to both IMT proponents and potentially displaced satellite stakeholders. The SSWG would be pleased to take part if such a tune-up was organised by the ACMA.

4.2 Appetite for commencement of replanning work in the 40, 46 and 47 GHz bands

As noted in the *FYSO Consultation Draft*, these bands were considered at WRC-19, with interest from both terrestrial and satellite communications sectors (in the case of 40 and 47 GHz bands) for broadband use. Of these, the 40 GHz and 47 GHz bands are the most mature, in terms of standardisation and equipment availability.

The ACMA cites the U.S. as having established arrangements supporting both terrestrial 5G and satellite broadband services in the 40 GHz and 47 GHz bands. The ACMA also notes that the best spectrum management outcomes are likely to be achieved when both bands are considered simultaneously

The SSWG supports this approach. The SSWG would also suggest that, as the 47 GHz band designation for IMT is only between 47.2 and 48.2 GHz, consideration should also be given to spectrum planning of the adjacent band up to maybe 52.4 GHz to take account of segments for ubiquitous and Gateway satellite Earth Stations and terrestrial services.

One SSWG member is looking at procuring new generation VHTS satellites which have significant flexibility in band usage and coverage area. These satellites will have the capability to operate in the 40 and 47 GHz bands, but not the 46 GHz band. From overseas observation, The SSWG agrees that a segment of the 40 GHz band - probably around 2 GHz in bandwidth - should be reserved for ubiquitous Earth-receive stations, with the remainder of the spectrum shared between IMT and FSS gateways, with appropriate sharing arrangements which might include the gateways being located in less populous regions.

Although the new flexible VHTS spacecraft will not be in orbit for several years, the establishment of associated Gateway Earth Stations in the 40 and 47 GHz bands will be needed by that date and an early consideration of which segments are available for ubiquitous Earth Stations would also assist in network deployment.

4.3 ACMA's satellite activity planning

The SSWG would like to make the following comments on the ACMA's key satellite spectrum planning priorities Satellite Activities planned for 2020–21 (FYSO *Consultation Draft* Page 61):

'provide ongoing operational support for Australian-filed satellite networks'

The SSWG supports the position that the ACMA will continue providing ongoing operational support for Australian-filed satellite networks, as well as look into updating procedures for related submissions to the ITU. One SSWG member advises that it is looking at procuring new satellites to replace the life-expired satellites around 2024. These new satellites may operate in frequency bands not currently provided on its existing spacecraft.

'the implementation of outcomes of the review of the 28 GHz band including expansion of fixed-satellite services (FSS) use to ubiquitous FSS operating in the 27.5–28.3 GHz band Australia-wide. How this is implemented is subject to further investigation of coexistence measures'

The SSWG supports this priority as it expects to include this band on future satellites. In addition, The SSWG is looking at provision of existing and future Earth Station sites for GSO and NGSO Operators in this band.

'improvements to licensing procedures for space-based communications including consideration of the areas of improvement flagged in the November 2019 consultation'

The SSWG supports this priority and encourages simplification to the maximum extent possible of the ACMA's licensing procedures for space-based communications.

'the use of small satellites focusing on short-duration satellite missions for experimental purposes'

The SSWG does not have strong views on this item. The SSWG notes that the frequency bands used by this technology are usually different from those used in traditional commercial satellites.

'expansion of RALI MS 45 on frequency coordination requirements between apparatus-licensed fixed point-to-point links and FSS earth stations communicating with geostationary orbit satellites to include other frequency bands and requirements for earth station receivers'

The Earth stations of SSWG members access other regional and international GSO operators' satellites as well as Australian satellites where this sharing is involved. In that regard, the SSWG supports this priority.

4.4 Updating procedures for submission of Australian satellite networks to the ITU

The SSWG supports the view of 'targeted updates' to these procedures (*Consultation Draft* Page 62).

'It is also possible that the outcome of the Communications portfolio five-yearly Portfolio Charging Review[8] will require a review of our satellite filing cost recovery process to ensure that practices are consistent with outcomes of that work'

The SSWG encourages the ACMA to ensure that Australian satellite operators do the maximum amount of work themselves in the establishment and frequency co-ordination of their networks and that the ACMA's role is limited to the processing of formal correspondence with the ITU and other Administrations.

[8] The ACMA component of the Portfolio Charging Review process will review all existing and potential charging activities, evaluate the performance of charging activities, identify opportunities to amend or discontinue specific charging activities and assess the effectiveness of stakeholder engagement strategies and opportunities for improvement. Like all current charges, ACMA satellite filing charges will be reviewed in that process.

4.5 Ongoing review of spectrum planning, assignment and coordination requirements

'Coordination requirements for earth station protection zones were updated in August 2019, following the December 2018 consultation on changes to RALI MS 44' (FYSO *Consultation Draft* Page 64)

> The SSWG continues to support the principle of Earth Station Protection Zones (ESPZ) being established to ensure that earth stations can continue to operate over the long-term, even though spectrum band arrangements may change. In particular, the SSWG supports the establishment of two diverse ESPZs in Eastern Australia, with initial consideration being given to areas around Moree, Quirindi and Roma.
>
> The SSWG notes that the Queensland State Government is looking at sites near Roma, Charleville and Augathella as potential ESPZ locations and the SSWG would agree to giving these locations consideration.
>
> The SSWG also considers there is still a need to establish a second geographically and connected infra-structure distinct ESPZ in Western Australia as a back-up to the current Mingenew site. The SSWG further considers later establishing an ESPZ in Northern Australia.

4.6 20 GHz and 30 GHz band spectrum licences

As interested parties, SSWG members are pleased to provide comments raised in the consultation paper: 'Expiry of the 20 and 30 GHz spectrum licences'[9], that is concurrently out for industry consideration.

The SSWG recognises the importance of the 20.2 to 21.2 GHz band (the 20 GHz band) and the 30 to 31 GHz band (the 30 GHz band) used by the Australian Department of Defence. Of the options presented in the discussion document, it would seem entirely appropriate for authorisation to be continued by a reissue of the current spectrum licence granted to the Department of Defence. Continuity in this way, as opposed to other alternative allocation approaches, is based on the important nature of the public interest considerations of Defence satellite communications capabilities involved.

A price-based allocation process, or a reversion to an apparatus licensing regime would not seem relevant. This, however, does not rule out other non-Defence uses of the band, but a safeguard exists in the ARSP which requires consultation with the Department of Defence. The SSWG believes that this condition should also be carried forward in future revisions of the ARSP.

4.7 Spectrum pricing

The *FYSO Consultation Draft* (Pages 80-81) discusses the implementation of the Government's Spectrum Pricing Review under its activities planned for 2020-2021. The ACMA released a consultation paper on the *Implementation of the Spectrum Pricing Review - Proposed guidelines and focus areas for change*[10] concurrently with this FYSO consultation. The SSWG

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[9]ACMA Expiry of the 20 and 30 GHz spectrum licences - consultation 10/2020 https://www.acma.gov.au/consultations/2020-04/expiry-20-and-30-ghz-spectrum-licences-consultation-102020

[10] ACMA Implementation of the Spectrum Pricing Review - consultation 07/2020. Closing 30 June 2020.

will provide a submission to this ACMA consultation; a copy to be available on the Communications Alliance submissions website.[11]

The SSWG submission on spectrum pricing proposes a number of innovations: providing comparisons with similar Administrations, a 'discount' based on the ability of systems to share the same band and an alternative way of considering stand-alone terminals and those which are co-located. The ACMA is directed to this submission for further information on the satellite industry proposed approach for changes to spectrum pricing and apparatus licence fees.

4.8 Spectrum sharing

The *FYSO Consultation Draft* (Page 33) provides a summary of the ACMA's thinking and its consultation on spectrum sharing. Subsequent to the release of the *FYSO Consultation Draft*, the ACMA published its *New approaches to spectrum sharing - Next steps* paper in May 2020.[12]

As mentioned in our previous submission on this topic[13], the SSWG acknowledges that dynamic spectrum sharing could offer some benefits to the satellite industry, but there is a concern that it will rarely be the beneficiary of a dynamic shared spectrum regime whereby the satellite industry obtains access to new spectrum in a sustainable way. We agree with the ACMA's assessment that the development of a formal, ongoing DSA regime should not be prioritised at this time and Australia should adopt a wait-and-see approach to learn from international examples such as the US Citizens Broadband Radio Service (CBRS) rollout. We support the ACMA's intention to support industry-led trials of dynamic spectrum allocation and other non-traditional spectrum sharing arrangements.

4.9 Trends in the satellite communications sector

The SSWG suggests that the section on satellite communication (FYSO *Consultation Draft* Page 30) would benefit from further information expanding on the trends in the satellite industry.

The SSWG Working Group Paper *Ensuring the Future of Australian Satellite Services*[14] provides information which may be useful to draw upon on High Density Fixed Satellite Services (HDFSS), services via High Throughput Satellites (HTS) and Mobile Satellite Services (MSS) and the global continuous broadband connectivity being provided by Earth Stations in Motion (ESIM). Further details on the evolving nature of communications satellite services follow.

Traditionally, satellite networks have been those communicating with geostationary satellites. These were thought of as being the Fixed Satellite Service (FSS), but this is rapidly changing as

[11] Communications Alliance submissions website https://www.commsalliance.com.au/Documents/Submissions

[12] ACMA New approaches to spectrum sharing - consultation 25/2019. https://www.acma.gov.au/consultations/2019-10/new-approaches-spectrum-sharing-consultation-252019

[13] SSWG submission – Spectrum sharing -overview and new approaches; September 2019: https://www.commsalliance.com.au/__data/assets/pdf_file/0006/66732/CA-SSWG-response-to-ACMA-Spectrum-sharing-Overview-and-new-approaches.pdf

[14] Ensuring the Future of Australian Satellite Services - A Communications Alliance Satellite Services Working Group Paper MAY 2018. https://www.commsalliance.com.au/__data/assets/pdf_file/0015/60315/SSWG-Ensuring-the-Future-of-Australian-Satellite-Services.pdf

new technologies emerge. Over the last few decades, the mobile satellite service has grown rapidly. The MSS traditionally provided communications to handsets similar to those used in a terrestrial network (in fact some handsets can communicate with both) but now also provide different services, including internet of things (IoT) type services, to many different industries, governments and individuals.

MSS satellite systems can be in Non-Geostationary Orbits (NGSO) with networks of one to many active satellites. For example, the Iridium NGSO MSS has 66 active satellites with some in-orbit spares. However, some mobile satellite services are provided from geostationary satellites in (amongst others) L-band (1.5 GHz). In a similar fashion NGSO networks can also provide fixed satellite services (e.g. 03b).

Over the last decade or so the boundary between MSS and FSS has blurred and the ITU has permitted a variety of mobile platforms to access the fixed satellite service including Earth Station on Vessels (ESV), Aeronautical Earth Stations (AES) and Earth Stations in Motion (ESIM). These effectively reflect a similar service, but in different bands, and the different names result from discussions and compromises within the ITU, as reflected in various ITU World Radiocommunication Conference (WRC) Resolutions.

Satellite services thus provide a great variety of services that have the advantage of being able to serve all areas of Australia, including its territorial waters. Many systems can also cover all of Australia's Antarctic territories providing valuable safety services to ships and aircraft.

The services provided by satellite networks need to be 'anchored' to the ground by way of a large Earth station or an array of smaller Earth stations known as gateways. These are the feeder links for the spacecraft in orbit. The ability to place these gateways in areas where they have access to high speed, high reliability fibre is vital. Other networks such as SANs (Satellite Access Networks) use an array of smaller antennas to achieve the system gain required and these need to be carefully placed to both serve as an array and to access reliable high-speed fibre. No easy task.

Also transmitting to and from the satellite are the service links to user terminals on the ground. These terminals are generally smaller antennas (although not always) and in the case of the Ka-band, these terminals operate on a shared basis with the Fixed Service (RALI FX-3 18 GHz Plan). The ability to share with other services means satellite services combined with another service often delivers a higher combined value of uses than that of a single service such as mobile which cannot share spectrum.

In the past, network operators have approached Australia to host a gateway or network of gateways and but have sometimes been dissuaded by high, inequitable spectrum pricing. This costs Australia jobs, both in constructing and in maintaining the gateway and entitlement to modern developing services. It also creates additional network complexity in some instances which disadvantage Australian users. Equitable spectrum pricing is vital if a growing Australian space industry, in line with Government policy, is to be nurtured contributing to the economic growth of Australia.

Another issue facing satellite operators globally is the insatiable appetite for spectrum from the terrestrial mobile sector, which includes satellite spectrum already used for satellite services. In the 28 GHz band, the ACMA has taken a holistic view of spectrum availability in the adjacent 26 GHz band and did not allocate any of the 28 GHz band to mobile. The SSWG praises this outcome which we understand must have been difficult in the face of intense lobbying from the mobile sector. In order for the space industry in Australia to grow, satellite operators need the sort of spectrum security the ACMA has delivered with the

28 GHz plan and this decision will go a long way to ensuring equitable access to broadband services for all Australians no matter where they may be located or do business.

4.10 Industry impact from the COVID-19 pandemic

Communications satellite operators in Australia and across the globe have experienced major disruption among their customer bases during the COVID-19 pandemic, while also seeing demand for satellite-based communications services grow by between 15% and 70%.

The operators have 'stepped up' to help financially-challenged customers stay connected, to assist the medical community through enhanced telemedicine and other initiatives, to help first responders, to provide additional capacity to end users and to assist those on ships, in quarantine and otherwise impacted by COVID-19.

In Australia, nbn co and Telstra are among the players that have been recognised by the Global Satellite Coalition (GSC) for their efforts to reduce the impact of the pandemic on customers. The international operators present in the Australian market are significant global contributors to the COVID-19 efforts[15].

At the same time, the disruptive effects of the pandemic have made it harder for satellite operators to cope with the everyday regulatory burden under which they operate. Disruption to customers invariably also brings financial repercussions for operators as business costs and bad-debt rise in tandem. Some recent serious cases have caused Chapter 11 relief applications during 2020 to date.

Enlightened Governments and regulators have identified the pandemic as an opportunity to fundamentally re-examine their modes of operation, the taxes, levies and other costs they impose and the efficiency of their processes. It is not clear what the ACMA response is intended to be, except to so far give some recognition to stakeholder efforts. Indeed, it is questionable whether the planning for spectrum management via the FYSO and Work Program report is relevant to COVID-19 as this is a fast-moving phenomenon outside the more ponderous planning process for spectrum management.

While the effects of the pandemic are globally tragic, they might also offer the opportunity for a 'regulatory re-set' – a chance to simplify the regulatory framework and make it more progressive and less burdensome for all stakeholders.

From the *FYSO Consultation Draft*, it seems the ACMA has identified an opportunity to take into account the impact of COVID-19 to industry and to adjust their regulatory response accordingly. Therefore, immediate support and recovery measures, including spectrum pricing relief to hardship cases within the industry would be an obvious candidate for the regulator to consider. Recovery may extend well into the future. The FYSO may not be the right platform for consideration and broader more relevant evaluation by the ACMA Board which may care to address what the regulator can do as its part of all stakeholders' efforts in this pandemic and its longer term effects. Lessons learned could also feed into future contingency arrangements. Some of those lessons might also involve the recognition of more efficient working arrangements within the regulator, so as to reduce the current overburden of the Work Program and the need to prioritise activities and thus not hold back progress of planning activities.

The SSWG would welcome the opportunity to work with the ACMA on the identification of such opportunities and the ways in which industry and the Regulator might move rapidly to execute upon them.

[15] The Global Satellite Industry and COVID19. https://gscoalition.org/library/news/2020/the-global-satellite-industry-and-covid19

The medium-term impacts of COVID-19 on the satellite sector are not easy to predict and will vary in their nature and intensity around the globe. As the effects of the first wave of COVID-19 begin to recede in national markets, the demand for satellite-based services will likely stabilise or move back some way in the direction of pre-pandemic levels, as many workers begin to transition back to 'new normal' working arrangements. Nonetheless, it appears that many work practices will continue to make greater use of work-from-home arrangements, which could see a smaller but sustained uplift in demand over time.

The economic hangover of the pandemic, conversely, will likely have a negative impact on some services, such as DTH video, as higher unemployment levels put pressure on discretionary consumer spending. Similar effects are also likely in specific industry verticals, that will be slower to recover, such as cruise-ships, aviation and tourism in general.

The occurrence of second or subsequent waves of COVID-19 are, of course, an unpredictable variable at this stage.

In Australia, the communications satellite sector is not immune to negative factors, but the medium-term outlook remains relatively positive. Customers on Sky Muster-based services are continuing to make strong use of the network and the agricultural and mining sectors – large users of satellite services are generally continuing to show high levels of activity.

Appendix A: SSWG priorities

These tables from the *FYSO Consultation Draft* are appended to provide SSWG feedback to the ACMA's published timing and priorities. The SSWG priorities are identified in bold type.

Table 1: Planning—major band planning and replanning activities

Planning stage	Project priorities	Proposed timelines
Monitoring	600 MHz (617–698 MHz) 1900–1920 MHz 3.3 GHz (3300–3400 MHz) 4.5 GHz (4400–4500 MHz) 4.8 GHz (4800–4990 MHz) 13 GHz 40 GHz (37–43.5 GHz) 46 GHz (45.5–47 GHz) 47 GHz (47.2–48.2 GHz) Bands studied under WRC-19 agenda item 1.16 Bands being studied under WRC-23 agenda item 1.2 Bands being studied under WRC-23 agenda item 1.4	Continue to monitor domestic and international developments in these bands to identify usage trends **The SSWG proposes increased urgency with Q/V bands**
Initial investigation	'Extended MSS L-band' (1518–1525 MHz and 1668–1675 MHz)	Likely simultaneous review of the extended MSS L-band and the 1.5 GHz bands. **The SSWG would support decoupling in time between IMT and MSS.**
	2300–2302 MHz	Q4 2020: Following completion of Technical Liaison Group (TLG) process, consultation on possible changes to support 5G
Preliminary replanning	1.5 GHz	To be determined
	2 GHz (1980–2010 MHz and 2170–2200 MHz)	Q2–3 2020: Options paper Q4 2020: Planning decision paper **The SSWG agrees.**
	3700–4200 MHz	Q2–3 2020: Options paper Q4 2020: Planning decision paper **The SSWG would support later timeframe, following greater clarity.**

Planning stage	Project priorities	Proposed timelines
Replanning	850 MHz expansion band (809–824 MHz and 854–869 MHz)	Band is being cleared progressively. We continue to consider options for optimising its use. Allocation timeframes are tied to those of the 900 MHz band
	900 MHz (890–915 MHz and 935–960 MHz)	Allocation timeframes are tied to those of the 850 MHz expansion band
	1800 MHz (1710–1785 MHz and1805–1880 MHz) in remote areas	Q2–3 2020: Discussion paper
	3400–3575 MHz	Q3–4 2020: Finalise restack of incumbent services Q2–3 2020: Consultation on point-to-multipoint apparatus licence arrangements in regional and remote areas Q4 2020 – Q2 2021: If the Minister makes a decision to designate spectrum, conduct activities to convert NBN Co's apparatus licences to spectrum licences
	5.6 GHz	Q2–3 2020: Consult on revised arrangements
	26 GHz (24.25–27.5 GHz)	Q4 2020: Finalise licensing arrangements for services in this band
	28 GHz (27.5–29.5 GHz)	Q4 2020: Finalise licensing arrangements for services in this band **The SSWG suggests separating the 28 GHz band from the 26 GHz band process.**

Table 2: Planning—optimising established planning frameworks

Planning area	Project priorities	Proposed timelines
3400–3575 MHz	Optimise spectrum and apparatus licence arrangements in band adjacent to 3.6 GHz band	See Table 3: Forward allocation work plan
Broadcasting	Develop and consult on proposals for licence area plan (LAP) variations in Brisbane	Q3 2020: Consult
	Develop and consult on a proposal to vary the Deniliquin LAP	Q3 2020: Consult
	Develop and consult on proposals for variations in a number of licence areas in NSW to enable AM–FM conversions	Q3 2020: Consult
	Consult on the digital radio channel plan (DRCP) for the Gold Coast, taking into account the completion of frequency allotment planning	Q3 2020: Consult
	Further consultation on whether variations to the DRCP for Brisbane are appropriate to improve digital coverage	Q3 2020: Consult
	Develop and consult on proposals for variations to the Remote Central and Eastern Australia Radio LAP	Q4 2020: Consult
	Consult on potential for replanning analog radio services in Perth, following the clearance of Band II television in Bunbury	Q4 2020: Consult
Satellite	Consider applications for test and demonstration purposes in the 2 GHz band	Ongoing **The SSWG agrees.**
	Manage filing and coordination of Australian satellite systems	Ongoing **The SSWG agrees.**
Low interference potential devices (LIPD)	Monitor developments, including updates on low duty cycle 900 MHz changes and 26 GHz (as per planning decisions)	Ongoing—update planned for Q3 2020
Amateur service in the frequency band 5351.5–5366.5 kHz	Seek industry views on implementation issues, including appropriate technical conditions and in which part of the band the amateur service could be supported	Q2–3 2020: Consult

Planning area	Project priorities	Proposed timelines
Spectrum planning, assignment and coordination requirements	Ongoing review of the spectrum planning technical framework to ensure its currency and consistency with current technologies and operational practices	Ongoing Q4 2020: Consult on draft updated frequency coordination review work
Spectrum licence technical frameworks	Ongoing program of review of technical frameworks below 4 GHz	Ongoing
Spectrum sharing approaches	Ongoing consideration of new approaches to spectrum sharing	Q2–3 2020: Paper setting out next steps **The SSWG supports.**

Table 3: Forward allocation work plan

Project priorities	Proposed timelines—next steps
26 and 28 GHz bands	**SSWG supports moving forward with the 26 GHz band as soon as possible and the 28 GHz band separately.** Q3 2020: Consult on: > drafts of the technical framework instruments > coordination and licensing arrangements for new FSS gateway earth stations in the range 27–29.5 GHz Q2–3 2020: Consult on draft allocation instruments for spectrum licences Q3 2020: Consult on taxation and other matters for apparatus licenses in the 26 and 28 GHz bands Q4 2020: Some apparatus licences in 26 and 28 GHz become available for issue Q1 2021: Auction of spectrum licences
850/900 MHz	Q 3 2020: Consult on draft reallocation recommendation to Minister
3400–3575 MHz	**SSWG supports** Q3–4 2020: Finalise restack of incumbent services Q4 2020 – Q2 2021: If the Minister makes a decision to designate spectrum, conduct activities to convert NBN Co's apparatus licences to spectrum licences

Table 4: Licensing and licensing systems

Project priorities	Proposed timelines
Trial of mobile phone jammers at Goulburn Correctional Complex	Ongoing: Corrective Services NSW commenced a two-year trial on 13 December 2019 under the exemption determination
400 MHz band	Finalise the 400 MHz implementation project
Review of prohibition declarations and exemption determinations	Q2–3 2020: Consult on issues paper
Consider facilitating trials of RNSS repeaters	Q2–3 2020: Consult
Consider changes to regulatory arrangements for counter-drone equipment	Q2–3 2020: Consult
Review of non-assigned amateur and outpost licensing arrangements with a view to reform	Q2–3 2020: Consult
Review of the accredited persons scheme	Q2–3 2020: Consult with accredited persons on the efficiency and effectiveness of the scheme Q4: Where appropriate, consultation on operational and/or regulatory changes to the scheme

Table 5: Pricing

Project priorities	Proposed timelines
Pricing review implementation	Q3 2020: Publish response to submissions paper. This paper will outline the work program to implement the Spectrum Pricing Review over 2020 and 2021 **The SSWG strongly supports.**
Commercial broadcasting tax arrangements	Ongoing assessment of taxes throughout 2020–21
Preparation for review of *Commercial Broadcasting (Tax) Act 2017*	Q3, 2020: Release of the consultation paper Q1 2021: Report to the Minister
Ongoing maintenance of the current apparatus licence tax regime for matters like adjusting for inflation	2020–21 **The SSWG agrees.**

Project priorities	Proposed timelines
If the Minister directs the ACMA about implementing new taxation arrangements so that industry can contribute to the funding of EME research, implementation of new EME levy arrangements.	Q2–3 2020: Implementation, with: > amendment to apparatus licence tax determinations > consultation on changes to spectrum licence taxes > making of amendments **The SSWG agrees.**

Table 6: Compliance and enforcement

Project priorities	Proposed timelines
5G compliance program to ensure carrier's compliance with EME standards under their licence conditions and obligations under the Mobile Base Station Deployment Code	2020–21
Compliance activities to manage the risk of interference in two key areas: > unauthorised use of mobile phone repeaters > non-compliant activity in the construction/resources industry	2020–21

Table 7: International engagement

Project priorities	Proposed timelines
ITU-R Study Group 4 block meetings	Q4 2020 (21 October – 6 November 2020) **The SSWG supports.**
ITU-R Study Group 5 block meetings	Q3 2020 (7–31 July) Q4 2020 (4–24 November 2020 includes working party 5D) **The SSWG supports.**
ITU-R Working party 5D meetings	Q2–3 2020 (24 June – 1 August) Q4 2020 (7–14 October and 17–19 November) **The SSWG Supports.**
First meeting of the APT Conference Preparatory Group (Asia Pacific) for WRC-23 (APG23-1)	TBA (possibly August 2020) **The SSWG supports.**

Appendix B: Communications Alliance Satellite Services Working Group membership

Amazon Web Services
APN
Coutts Communications
EchoStar Global Australia
Foxtel
FreeTV
Inmarsat
Intelsat
Ipstar
Nbn
Omnispace
OneWeb
Optus
Orion Satellite Systems
Pivotel Satellite
SES
Skybridge
Speedcast
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Telstra
ViaSat

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