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## **TELSTRA LIMITED**

### **Submission to ACMA Consultation:**

### **Allocation of area-wide apparatus licences in the 3.8 GHz band**

#### **Public Submission**

1 August 2023

## Table of Contents

<b>EXECUTIVE SUMMARY</b>	<b>4</b>
<b>1 Introduction</b>	<b>5</b>
<b>2 Nurturing new use cases and optimising spectrum utility</b>	<b>6</b>
2.1. Assignment policy should move small geographies to the top of the band	6
2.2. Introduce “indoor only” AWLs in the 3.8 GHz band	7
<b>3 Comments on the proposed allocation process</b>	<b>7</b>
3.1. Application restrictions on entities should be based on use, not association	7
3.2. Option 1 negatively impacts planning, optimisation, and adds administrative overhead	9
3.3. The “Nil MHz” limit should only apply to AWL tx licences, not AWL rx licences	10
3.4. We support all licences expiring on 13 December 2030	11
3.5. We support the inclusion of an advisory note regarding renewal of 3.8 GHz band AWLs	11
3.6. The maximum in-band allocation quantum policy should be 50 MHz	11
3.7. Cross-band allocation limit	12
3.8. Allocation windows	12
3.9. Draft instrument for limits on licence transfer and third-party authorisations	13
3.10. Draft instrument for AWL allocation limits	13
3.11. Draft interpretation (amendment) instrument	13
<b>4 Comments on proposed RALI MS-47 updates</b>	<b>15</b>
4.1. Comment on Section 1.4 Operation of the technical framework	15
4.2. Comment on Section 2.2 Channel arrangements	15
4.3. Comment on Section 3.2.1 AWL issue policy	15
4.4. Comment on Section 4.10 Coexistence with earth receive stations	16
4.5. Comment on Radio Altimeter protection in section 4.9.3.2.	16
4.6. Other matters, typos, etc.	16
<b>5 Comments on proposed RAG Tx updates</b>	<b>17</b>
5.1. The proposed minimum frequency response for FSS earth receive filter still needs some work	17
5.2. Protection requirements – FSS Earth receive stations operating in the 3750-4000 MHz band under area wide receive licences	18
5.3. Coexistence between AWL transmitters operating above 3.7 / 3.8 GHz and adjacent frequency AWL tx.	18
<b>6 Incumbent apparatus licence types</b>	<b>18</b>
6.1. P2P Apparatus Licences	18
6.2. FSS Earth Receive Apparatus Licences	18
<b>7 Other matters</b>	<b>19</b>

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7.1.	A TLG is required to review RA mitigations commencing in June 2025	19
<b>Appendix 1: Response to ACCC consultation questions</b>		<b>20</b>
A1.1	Use Cases	20
A1.2	Downstream Markets	21
A1.3	Alternative Spectrum	21
A1.4	Pricing	22

## EXECUTIVE SUMMARY

We welcome the opportunity to make this submission to the Australian Communications and Media Authority's (ACMA) consultation on **Allocation of area-wide apparatus licences in the 3.8 GHz band**. Our submission is a joint submission representing the views of Telstra and Aqura.

We acknowledge the Government is keen to facilitate the introduction of new use cases into this band, which necessarily means preventing NBN and the three incumbent mobile network operators (MNOs) from applying for licences until demand for new use cases has been ascertained and satisfied. In order to achieve this, the ACMA proposes to adopt an associates policy, which not only prevents NBN or the three MNOs from applying for licences, but also restricts any associates of those four entities from applying where the associated party is an associated entity or has an arrangement in relation to AWLs in the 3.8 GHz band.

We consider this approach will inadvertently restrict many new use cases, as some developers of private 4G-LTE and 5G networks are now associated with major telecommunications companies, such as the association between Aqura and Telstra. Instead of an associates policy, we propose a more effective restriction would be to limit spectrum in the 3.8 GHz band from being used as part of one of the four named entities' public networks in metro and regional areas. This would deliver the stated goal of restricting the four named entities from acquiring further spectrum in the 3.4 – 4.0 GHz range for their public networks without the unintended consequence of limiting a subset of new private network use cases developed and facilitated by businesses associated with the four named entities.

Commensurate with our proposal to replace the proposed associates policy with a use-limitation policy, of the two options proposed by the ACMA for the initial allocation approach, we consider Option 2 to be the option that delivers the greatest benefit. We consider Option 1 to be suboptimal, as it does not provide the ACMA with a full understanding of the likely demand for spectrum in the 3.8 GHz band, provides no additional benefit to prospective licensees by giving them a "head-start" over NBN and the three MNOs, and adds additional administrative overhead by forcing a second round of applications from NBN and the three MNOs once the initial "nil MHz limit" period has expired. In contrast, Option 2 imposes none of these drawbacks, yet still gives the ACMA the ability to prioritise LA WBB, PTP and FSS use cases, as it does not have to award licences to applicants it believes would not use 3.8 GHz band spectrum for these cases.

To frame our views on why the associates policy is inferior to a restriction on use of the spectrum, and why we consider Option 2 is the preferred approach, we commence our submission with some constructive suggestions that will maximise the utility of the band, including a modification to the assignment policy contained in RALI MS-47 and the introduction of a new "indoor only" AWL subtype. We also support the ACMA's proposal to include an advisory note on AWLs issued in this band, and we suggest that beyond simply testing whether the AWL has been used, the process for dealing with expiring 3.8 GHz band AWLs is aligned with, and considered as part of the process for expiring spectrum licences in 3.4-3.8 GHz.

To support our position, our submission includes case studies to provide examples of some innovative use cases developed by Aqura to help illustrate the types of activity that would be blocked by the ACMA's proposed associates policy.

Our submission also includes comments on the draft amendments to RALI MS-47, the 3400-4000 MHz Transmitter RAG, and the three draft instruments provided as part of this consultation package, and Aqura has provided answers to the nine questions from the ACCC about future use of the band.

## 1 Introduction

We welcome the opportunity to make this submission to the Australian Communications and Media Authority's (ACMA) consultation on **Allocation of area-wide apparatus licences in the 3.8 GHz band**. Our submission is a joint submission representing the views of Telstra and Aqura.<sup>1</sup>

The Ministerial Policy Statement (**MPS**) for the 3.4-4.0 GHz band states “A *Government communications policy objective in relation to the 3.4–4.0 GHz band is to support a range of use cases and users.*” The MPS goes on to observe “*Wide-area subscriber networks ... are already supported through existing spectrum licences in parts of the 3.4–3.7 GHz range.*” While this MPS was issued by the former Federal Minister for Communications, as the consultation paper notes the current Federal Minister and Government have maintained implicit support for this policy position. Therefore, the ACMA is seeking to allocate spectrum in the 3.8 GHz band in metro and regional areas using Area-Wide apparatus Licences (AWLs), with constraints to prevent NBN and incumbent mobile network operators (MNOs) applying for AWLs until other interested parties have had adequate opportunity.

We have previously voiced our concerns that this could lead to poor utilisation of scarce and valuable spectrum, for example, where a highly-localised operator obtains a licence early on in the allocation, causing there to be “holes” in spectrum that could otherwise be used for metro-wide innovative new use cases. However, given we have previously voiced this opinion, we will not re-prosecute that argument in this submission.

We have some suggestions intended to ensure the band is made as productive as possible. Our suggestions include proposals such as an allocation policy that would see highly localised licences be moved to the top of the band (3.95 GHz) and wider area licences to the bottom (3.8 GHz) to minimise the risk of spectrum fragmentation and denial between different use cases. We also propose the ACMA offer overlapping indoor-only use (i.e., in-building coverage) licences with exterior emission limits, such that if a private operator wanted to deploy coverage inside a factory or warehouse, they could do so without causing spectrum denial to an innovative new, wider area, outdoor use case.

Our submission is structured as follows:

- Section 2 commences by explaining why we consider the allocation rules for this band should be designed to facilitate and nurture new use cases, rather than designing the rules to restrict incumbent spectrum licensees below 3.7 GHz from acquiring spectrum.
- Section 3 contains our comments on the ACMA's proposed **Allocation Process**, including our strong preference for Option 2 and comments on several other aspects such as minimum geographies, renewal statements and the draft instrument to restrict transfers and/or subleasing.
- Section 4 contains our comments on the updates to RALI MS-47.
- Section 5 contains our comments on the updates and the RAG Tx.
- Section 6 contains comments on ongoing access to P2P and FSS Earth Receive apparatus licences.
- Section 7 contains a few other matters that have not been considered by the ACMA's consultation paper, that are important for the ACMA to make decisions on.
- Finally, Appendix 1 contains our answers to the ACCC's nine consultation questions.

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<sup>1</sup> See <https://aqura.com.au/our-story/> for further details.

## 2 Nurturing new use cases and optimising spectrum utility

The bulk of the ACMA's consultation focuses on how it plans to restrict incumbent 3.4 GHz and 3.6 GHz licensees from accessing the 3.8 GHz band until a pre-defined period has passed to afford new users the opportunity to acquire spectrum. The consultation paper chapter on the Allocation Process is devoted to a range of restricting mechanisms including allocation windows, allocation limits, cross-band limits, and associates policies. Little, if any, of the chapter is devoted to how the ACMA plans to provide the greatest opportunity to the greatest number of prospective licensees through assignment policy (e.g., highly localised at the top of the band), or minimum contiguous bandwidth assignment policy (e.g., narrow bandwidth requests clustered together), or indoor-only use and renewal statements.

This chapter of our submission outlines opportunities the ACMA may like to consider in designing the Allocation Process, to further assist different use cases in the 3.8 GHz band.

### 2.1. Assignment policy should move small geographies to the top of the band

The ACMA notes it plans to allow licensees to acquire geographic areas as small as an HCIS Level 0 in this allocation round.<sup>2</sup> We note Table 1 on p.2 of the consultation includes a fourth allocation round called "*highly localised apparatus licences*" which will be constrained to 3.95-4.00 GHz. This is slightly confusing. Given this consultation allows licence applications for a minimum size of HCIS Level 0,<sup>3</sup> we can only assume the ACMA's concept of "highly localised" (for the next allocation round in 3.95-4.00 GHz) is even smaller again, namely HCIS Level 00. We, however, consider HCIS Level 0<sup>4</sup> to be very localised, and recommend any requests for one or more adjacent HCIS Level 0 licences (but collectively smaller than one HCIS Level 1 block) should also be assigned in the 3.95-4.00 GHz block at the top of the band. Following that, our recommendation is smaller geographic areas, which we consider to be anything smaller than the boundaries for the 3.7 GHz band (i.e., 3.7-3.8 GHz) in metro and regional areas, should be assigned starting at 3.95 GHz and working downwards through the band.

We acknowledge our proposal is contrary to what the ACMA have designed in RALI MS-47 §3.2.6(c), which states that licences are to be assigned simply in ascending order.<sup>5</sup> Nonetheless, if the ACMA intends to allow localised licences in this current allocation round, stacking them up at 3.95 GHz and working downwards will ensure requests for areas that match the metro and regional boundaries for 3.7 GHz band are closest to the 3.8 GHz boundary, and aligned with the 3.7 GHz boundaries. We strongly recommend the ACMA modifies their proposed assignment priority to "group" highly localised (i.e., small geography) deployment together in one part of the band.

We note the ACMA's intention is to also assign AWL Rx licences starting at the top of the band and working downwards, and we consider that AWL Tx licenced devices operating in a very localised geography (e.g., a

<sup>2</sup> Consultation paper, p.32 where the ACMA says "*The effective population of a single HCIS 0 cell (the minimum cell size) ...*".

<sup>3</sup> In fact, the consultation does not explicitly specify a minimum geographic area that a prospective licensee must purchase. The closest we could find to guidance on the minimum geography is in the section of the consultation paper on Pricing, where there are multiple references to examples that use HCIS Level 0 as the "minimum", for example, see chevron 3 in the section on Pricing, p.32, where it says "*The effective population of a single HCIS 0 cell (the minimum cell size) ...*". Of course, to make a geographic shape like a circle, a prospectively licensee might use a mixture of HCIS Level 1 and Level 0 cells to make the shape, and hence it is relevant to consider the pricing mechanism down to the **granularity** of an HCIS Level 0 cell, but granularity does not necessarily mean *minimum geographic area*. Technically, the ACMA is silent on a minimum geographic area for any given licence.

<sup>4</sup> HCIS Level 0 is 1 minute of arc x 1 minute of arc, which is roughly 1.8km by 1.8km.

<sup>5</sup> We appreciate RALI MS-47 §3.2.6 also says AWL Rx licences are to be assigned in descending order from the top of the band down, with the intention being to keep the "receive only" AWL licences away from AWL Tx licences.

few HCIS Level 0 cells or smaller) could better coexist with AWL Rx licensed devices, on the assumption that the AWL Tx licensee complies with the DBCs at the perimeter of their (small) geography.

## 2.2. Introduce “indoor only” AWLs in the 3.8 GHz band

In-building coverage (IBC) systems are designed to operate effectively inside enclosed buildings co-channel with outdoor, macro base stations and without either causing interference to the latter in most cases. Leveraging this precedent, it should be possible to allow indoor-only use to coexist with AWL Tx licences where there is adequate shielding, such as an enclosed building, factory or warehouse, and limits are set on the level of emissions permissible outside of the structure. We propose the ACMA consider designing an “indoor-only” AWL that could be acquired by innovative new operators who only wish to deploy IBC systems. Our proposal is that an indoor-only AWL, with a properly designed technical framework, should not cause denial to a regular AWL Tx licence, which could coexist (overlap) with the indoor-only AWL.

Unlike spectrum-licensed space, where the spectrum licensee is not required to register IBC systems because the low power of IBC systems is below the registration exemption threshold, we consider it would be appropriate for overlapping indoor-only AWLs to be registered given they may be operated by a different entity to the outdoor deployment on the same (or overlapping) frequencies.<sup>6</sup> Having site registration details recorded on the ACMA’s Register of Radiocommunications Licences (RRL) would assist in frequency planning and/or resolving any claims of interference in the highly unlikely event that they occur.

## 3 Comments on the proposed allocation process

The ACMA sets out two options for an Allocation Process for this allocation round, with varying restriction periods and limits between the two options. The ACMA cites its preference for Option 1, which has an initial period where NBN and the three MNOs, along with any associates of those four entities are excluded. Our preference is for Option 2,<sup>7</sup> and in this chapter of our submission we explain why this should be the preferred option. We start, however, by explaining the need to decouple associated entities from any restrictions imposed on NBN and the three named MNOs.

### 3.1. Application restrictions on entities should be based on use, not association

The ACMA proposes to include an associates policy,<sup>8</sup> which would prevent anyone associated with NBN or the three MNOs from acquiring spectrum in the initial round (under Option 1). The intention of the associates policy is to prevent the four named parties from using an associate as a proxy to purchase spectrum in the 3.8 GHz band on their behalf.

We are concerned about the unintended consequences of this policy. While it may have the effect of blocking proxy acquisitions, it also has the unintended effect of blocking entities who would seek access to

<sup>6</sup> Note: if an AWL Tx (i.e., outdoor) licensee wishes to deploy an IBC within their own licensed space, the IBC deployment would not need to be recorded on the RRL. The scenario we’re envisaging here is where an innovative new operator wishes only to deploy indoor coverage for a new use case that only requires indoor deployment (e.g., pallet tracking inside a warehouse). In this case, the indoor user will be a different entity to an outdoor, macro-level operator.

<sup>7</sup> Consultation paper, p.28. Option 2 is the ACMA’s proposal for a **general allocation window approach**. Option 2, if adopted by the ACMA, would allow **all** parties to be allocated and issued AWLs (that is, without imposing a nil MHz allocation limit on any person), subject to a time-limited cross-band allocation limit and an in-band ‘allocation quantum policy’ (AQP) and use the allocation principles to sufficiently prioritise LA WBB, PTP and FSS use cases.

<sup>8</sup> Consultation paper, p.27 in the section titled Associates Policy.



this spectrum for the deployment of the type of new use cases the ACMA and government are specifically trying to encourage into this band.

In 2022, Telstra acquired<sup>9</sup> [Aqura Technologies](https://purple.telstra.com.au/news-media/telstra-purple-acquires-alliance-automation-and-aqura-technologies)<sup>10</sup> to enhance its capabilities in providing customised solutions for a range of industry verticals including resources, energy and defence. Aqura Technologies provides bespoke, private LTE and 5G communications networks that can be used either stand alone or in conjunction with other Telstra Purple<sup>11</sup> capabilities spanning networks, cyber security, cloud, software development, data, AI, and workplace technologies to deliver seamless enterprise and industry solutions. Introducing an associates policy, as proposed by the ACMA in the consultation paper, will limit this innovation. We note it is often not possible to use spectrum we hold below 3.7 GHz with our associates for their private network deployments, as we already have insufficient spectrum to meet the demands of our public network.

Aqura have been involved in the deployment of several private networks at locations across Australia since they were founded in 2014. Aqura has procured spectrum directly, and has assisted numerous of its clients with the acquisition of spectrum. As a result, Aqura has used the spectrum for the deployment of customised private network solutions for its clients. For example, Aqura are currently assisting mining companies to procure 5G AWLs in remote areas for the deployment of private network solutions suitable for the mining environment. Under the associates policy proposed by the ACMA, clients considering using Aqura would be blocked from accessing spectrum in this band.<sup>12</sup> This is an unreasonable restriction on Aqura and its clients.

The GSMA also has a recently released report<sup>13</sup> describing the opportunities for private networks in industrial applications. The report contains several useful case studies of both indoor and outdoor applications, which supports our suggestion in section 2.2 that there would be benefit in creating an indoor-only licence type that would be highly unlikely to cause interference to outdoor (macro) deployment.

Therefore, we propose the ACMA **replace the associates policy** with a limitation that the spectrum acquired in the 3.8 GHz band cannot be used as part of a public network (fixed or mobile) owned or operated by NBN, Telstra, Optus or TPG (i.e., the four named entities). This would achieve the ACMA's goal of preventing the four named entities from acquiring additional spectrum for their public network via proxy, while avoiding the unintended consequence of limiting innovative new use cases. The limitation preventing use of the licence for a public network could be captured as a condition on the licence.

From a compliance and monitoring perspective, we consider it would be simple for the ACMA to audit any licensee who both acquires an AWL in the 3.8 GHz band and is an associate, to ascertain whether the spectrum was used for a private solution or for a public network (the latter being in contravention of the proposed rule).

For clarity, our proposal to replace the associates policy with a policy prohibiting use of spectrum for public networks (regardless of who acquires the spectrum) should apply irrespective of which allocation option the

<sup>9</sup> <https://purple.telstra.com.au/news-media/telstra-purple-acquires-alliance-automation-and-aqura-technologies>

<sup>10</sup> Aqura Technologies. <https://aqura.com.au/>

<sup>11</sup> <https://purple.telstra.com/about-us>

<sup>12</sup> The draft Radiocommunications (Limitation of Authorisation of Third Party Users and Transfer of Area-Wide Licences) Determination 2023, clause 5(2)(d) notes that an associate of a named person includes “any person who ... has an arrangement, agreement or understanding with a named person **or another associate of a named person**...” [emphasis added]. We understand the phrase “or another associate of a named person” would capture Aqura as an associate of Telstra, and a *client* of Aqura is someone who has an arrangement with them (supplier / client arrangement).

<sup>13</sup> GSMA. Private 5G Industrial Networks. Available at: <https://www.gsma.com/iot/wp-content/uploads/2023/06/GSMA-Private-5G-Industrial-Networks-Report-June-2023.pdf>



ACMA elects to proceed with (i.e., either Option 1 or Option 2). In other words, the associates policy should be removed from the “nil MHz limit” under Option 1, as well as the “time-limited cross-band allocation limit” that are present under both Options.<sup>14</sup> Of course, the policy we propose that would prohibit use of the spectrum for a public network would apply for the duration of the licence (as a licence condition), which is substantially beyond the duration of the nil MHz limit, the AQP or the cross-band allocation limit.

We also support the ACMA introducing either transfer limits or subleasing arrangements (or both) to NBN or any of the three major MNOs to assist in preventing any of the four named entities from acquiring spectrum for a public network through an associate. See section 3.9 of our submission for further detail.

### 3.2. Option 1 negatively impacts planning, optimisation, and adds administrative overhead

The ACMA proposes two options for the allocation process, which apply differing types and levels of restriction on the ability of NBN and the three major MNOs to apply for AWL Tx licences. Both options include temporal components and quantity limits, and the ACMA’s preference is Option 1, which includes the additional “nil MHz limit” period of notionally 6 months during which time NBN and the three MNOs are prohibited from applying for AWLs. Our strong preference is for Option 2, and in this section we explain why we consider Option 2 is preferable on the basis that Option 1 delivers an inferior outcome for the ACMA in regards to maximising the utility of the band, and therefore a poorer outcome for the overall public benefit arising from use of the spectrum.

The ACMA notes “*The extent of demand for AWLs in the 3.8 GHz band remains uncertain currently...*”,<sup>15</sup> which we agree with – the extent of demand for AWLs in the 3.8 GHz band is not fully known or understood at this time, and will only be known once the ACMA invites applications for licences in this band. Option 2 allows NBN and the three MNOs to apply for (and thereby register their interest) AWL Tx licences in metro and regional areas from the point in time where they first become available. Applications are still subject to both an in-band allocation quantum policy (AQP) and the proposed overall cross-band limit. The “allocation principles” for Option 2 also provide the ACMA with the ability to preference the awarding of licences to innovative use cases over awarding them to incumbent wide-area operators through.<sup>16</sup>

Importantly, and unlike Option 1, the key benefit of Option 2 is that it provides the ACMA with a total view of demand for the band. It provides this benefit without any obligation on the ACMA to award licences to NBN or the MNOs.<sup>17</sup> This is the best option for providing the ACMA with sufficient visibility of demand to enable it to fulfil Government policy objectives and maximise the utility of the spectrum. Option 2 also affords the ACMA the ability to prioritise LA WBB, PTP and FSS use cases.<sup>18</sup>

<sup>14</sup> The ACMA proposes the associates policy will apply to both the “nil MHz limit” and the cross-band limit. See consultation paper, p.27, where it says: “*The ACMA proposes that the **nil limit** and the **cross-band limit** would apply to MNOs and NBN Co, and each of the following...*” [emphasis added.] We note, however, that the draft Allocation Limits Determination instrument only imposes the associates policy on the nil MHz limit, so there is some confusion as to where the ACMA intends to apply the Associates Policy.

<sup>15</sup> Consultation paper, bottom of p.15.

<sup>16</sup> Consultation paper, p.28, where the ACMA observes: “*Option 2 would allow all parties to be allocated and issued AWLs (that is, without imposing a nil MHz allocation limit on any person), subject to a time-limited cross-band allocation limit and an in-band ‘allocation quantum policy’ (AQP) and **use the allocation principles to sufficiently prioritise LA WBB, PTP and FSS use cases.***” [emphasis added]

<sup>17</sup> Consultation paper, p.28, where the ACMA also observes: “*...under this option, while applications from MNOs and NBN Co would be considered, it would still be the ACMA’s intention to initially prioritise LA WBB, PTP and FSS use cases over WA WBB applications received during the allocation window.*”

<sup>18</sup> Consultation paper, p.28 under the subheading “Option 2: General allocation window approach”.

Further, Option 1 cannot be justified on the grounds of providing adequate time for prospective LA WBB licensees to consider their needs and develop plans, as the ACMA makes it clear there is only a 4-week application window under Option 1 within which applications must be lodged.<sup>19</sup> Prospective licensees will already need to be planning and considering their needs in order to lodge their applications within the 4-week period, so restraining NBN Co and the three MNOs for the additional six months it takes for the initial round under Option 1 cannot be justified on the basis of providing sufficient planning time to LA WBB operators.

Therefore, the additional “nil MHz” 6-month limit contained in Option 1: a) provides no additional benefit to prospective licensees by giving them a “head-start” over NBN and the three MNOs; b) prevents the ACMA from obtaining a full picture of demand for the band, thereby negatively impacting its ability to plan and optimise use of the band; and c) adds additional administrative overhead with a second round of applications from NBN and the three MNOs once the initial “nil MHz limit” period has expired.

We consider there to be only downside associated with choosing Option 1 over Option 2. So, we strongly recommend the ACMA proceed with Option 2 in preference to Option 1.

As a final note to this section, and commensurate with our advocacy in section 3.1, Option 2 can coexist with replacement of the associates policy with a limited use policy, because it would be apparent that any application from NBN or the three MNOs when AWL Tx licences first go on sale, would be for use with their public network(s).

### 3.3. The “Nil MHz” limit should only apply to AWL tx licences, not AWL rx licences

As we outlined in section 3.2, our strong preference is for Option 2, which does not include a “Nil MHz limit”. However, should the ACMA proceed with Option 1, one point that requires clarification is whether the “Nil MHz limit” is intended to apply to all AWL licence types, or only to AWL tx licences. The ACMA’s description of the proposed “Nil MHz limit” simply states the ACMA intends to apply a “...time limited nil MHz limit on WA WBB providers, specifically NBN Co, TPG, Telstra and Optus, and their associates ...”.<sup>20</sup> There is no description to say it applies to certain licence sub-types, so it has to be assumed that a “Nil MHz limit” means what it says, which is that named entities cannot apply for any bandwidth, which necessarily means under any licence type.

We consider it important that Named Entities are given the opportunity to acquire AWL rx licences for satellite earth receivers. RALI MS-47 makes it clear<sup>21</sup> that “traditional” FSS Earth Receive apparatus licences will no longer be supplied in the 3400-4000 MHz range in metro and regional areas, meaning AWL rx licences are the only mechanism to licence earth station receivers in metro and regional areas in this frequency range. Telstra has several FSS Earth Receive apparatus licences impacted by the reallocation declaration which it is seeking to shift to alternate frequencies higher in the band, but has been unable to do so because of Embargo 78.<sup>22</sup>

We request the ACMA clarify that Named Entities are not prohibited from acquiring AWL rx licences under the “Nil MHz limit”, in the event the ACMA proceeds with Option 1 (which we disagree with). This means, the

<sup>19</sup> Consultation paper, Figure 3, p.22. At the top of the figure, the ACMA notes there is an initial 4 week allocation window.

<sup>20</sup> Consultation paper, bottom of p.25.

<sup>21</sup> Draft RALI MS-47, §3.4, third chevron, p.12, which states, “No new earth receive apparatus licences are to be issued **in the 3400-4000 MHz range within regional and metropolitan areas** defined at Appendix A.” [emphasis added]

<sup>22</sup> Embargo 78. Available at: <https://www.acma.gov.au/sites/default/files/2020-07/Embargo%2078.pdf>

draft *Radiocommunications (Area-Wide Licence Allocation Limits) Determination 2023* will also have to be amended to show that Named Persons, and/or their associates, are permitted to purchase AWL rx licences outside of the Nil MHz limit.

### **3.4. We support all licences expiring on 13 December 2030**

We support aligning the expiry of the 3.8 GHz band AWLs with the expiry of existing 3.4 GHz band and 3.6 GHz band spectrum licences on 13 December 2030. Aligning the expiry date provides an opportunity for ACMA to consider how the AWL allocations in this band were used, and potentially change the allocation framework based on the lessons learned to make the next allocation more efficient and effective.

### **3.5. We support the inclusion of an advisory note regarding renewal of 3.8 GHz band AWLs**

In parallel with this consultation, the ACMA is separately consulting on developing processes to accommodate Expiring Spectrum Licences.<sup>23</sup> We consider future decisions on expiring apparatus licences (AWLs) in the 3.8 GHz band should be informed by, and aligned with, the arrangements developed for expiring spectrum licences operating in the 3.4, 3.6 and 3.7 GHz bands.

The renewal arrangements developed for spectrum licences operating in the 3.4, 3.6 and 3.7 GHz bands (i.e., stage 4 of the ACMA's proposed process) will not be completed until 2027 or 2028, i.e., somewhere around 3 years prior to the licence expiry on 13 December 2030. These spectrum licences are likely to be subject to public interest tests to assess efficient and effective use of the spectrum. To ensure consistency in approach (licensees are treated equally) and optimal, efficient use of the 3.8 GHz band, we propose the ACMA align the approach for expiring 3.8 GHz band AWLs with the approach for expiring spectrum licences below 3.8 GHz. This will allow the entire 3.4-4.0 GHz band to be considered holistically, and for the band to be optimised, including potentially re-stacking parts of 3.8-4.0 GHz.

As such, we strongly recommend AWLs issued in the 3.8 GHz band in metro and regional areas contain an advisory note to the effect that the approach for expiring AWLs in the 3.8-4.0 GHz range will be aligned with the approach for expiring spectrum licences in the 3.4-3.8 GHz range, to facilitate optimisation and efficient use of the overall 3.4-4.0 MHz band, and potentially including rearrangement of AWLs within 3.8-4.0 MHz band to achieve this outcome.

### **3.6. The maximum in-band allocation quantum policy should be 50 MHz**

The ACMA invites views from stakeholders about the application of an in-band allocation quantum policy, and its relevant quantum. Based on the advocacy from LA WBB operators, private network operators and neutral host aspirants, it is reasonable to expect demand to exceed supply for this band, even without the presence of NBN or the MNOs. As such, we consider it important to introduce an in-band allocation quantum policy, and we consider the maximum in-band allocation should be set at 50 MHz in the first round. Given many of the aspirant applicants are likely to be deploying private or otherwise closed networks, it is also reasonable to assume the traffic on these networks will be far less than public networks, and hence, the

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<sup>23</sup> ACMA consultation on Expiring Spectrum licences. <https://www.acma.gov.au/consultations/2023-05/proposed-approach-expiring-spectrum-licences>

required spectrum to service the customer base on these networks should be commensurately less than the holdings of public network operators.

In the event demand does not materialise as predicted and the 50 MHz in-band allocation quantum policy results in some of the spectrum remaining fallow, additional allocations could be made at some future point in time (say, one year later) to licensees interested in acquiring more spectrum.

Setting a higher in-band allocation quantum policy (e.g., 70 MHz, which the ACMA proposes as one alternative) would allow the ACMA to observe whether there is demand for larger quantities of spectrum per licensee. However, we would be concerned that allowing a higher in-band AQP could result in applicants applying for more spectrum than they really need, and as we point out in the first paragraph of this section, the private / low-use nature of these networks means that 50 MHz should be more than adequate for most, if not all applicants.

### 3.7. Cross-band allocation limit

The ACMA proposes to introduce a cross-band allocation limit that will apply across the entire 3.40-3.95 GHz band. The ACMA proposes three options, the second of which aligns with the limits the ACMA has set for the price allocation (auction) of the 3.4-3.8 GHz band; namely, 140 MHz total cross-band limit in metro areas and 160 MHz total cross-band limit in regional areas.

We support the ACMA's second option of a cross-band limit of 140 MHz in metro areas and 160 MHz in regional areas in respect of the four Named Entities (i.e., the public mobile and fixed networks). As previously stated, the cross-band limit should not apply to associates of the four Named Entities, and hence, the associates policy should be replaced with a use limitation policy as described in section 3.1.<sup>24</sup>

### 3.8. Allocation windows

The ACMA proposes to use an "allocation window/allocation principles" approach to manage applications for each allocation round under each option. We strongly support the ACMA's proposal to use an "allocation window/allocation principles" approach in any allocation round (under either Option 1 or Option 2), as it allows the ACMA to understand total demand within each allocation round and it avoids the unsatisfactory outcomes that would inevitably occur under a "first-in-time" allocation approach.<sup>25</sup>

Other than in the heading in the first column of Figure 3 (p.22) where the allocation window for the first allocation process under Option 1 says "(4 weeks)", the ACMA does not provide any guidance on what it considers is an appropriate duration for any of the allocation windows under either allocation Option (i.e., Option 1 or Option 2). We recommend the ACMA uses a 4-week allocation window duration in any allocation process.

<sup>24</sup> As noted in Footnote 16, there is some confusion as to where the ACMA intends to apply the Associates Policy. In the consultation paper, p.27, the ACMA proposes the associates policy will apply to both the "nil MHz limit" and the cross-band limit. However, the draft Allocation Limits Determination instrument only imposes the associates policy on the nil MHz limit.

<sup>25</sup> The ACMA considers a "first-in-time" approach as one possible option for the second allocation process under Option 1 (see Consultation Paper, p.25). We are strongly opposed to this approach. Previous allocations by ACMA which were done this way led to dissatisfaction among applicants, as who gets their submission in first is a lottery, depending on the quite small time vagaries of the internet service of the applicant at the time.

### 3.9. Draft instrument for limits on licence transfer and third-party authorisations

The ACMA notes an additional measure that could be taken under Option 1 is to apply limits to the transfer of AWLs and authorising the operation of radiocommunications transmitters under AWLs to the MNO's and NBN Co, and their associates.<sup>26</sup> The ACMA has provided a draft instrument<sup>27</sup> that would give effect to each of these limit types.

Commensurate with our advocacy in section 3.1 to allow associates to acquire spectrum, we support the ACMA introducing either transfer limits or subleasing arrangements to NBN or any of the three major MNOs.

For completeness, we also consider these limits (and hence, this instrument) could be introduced under Option 2 to achieve the same effect, and we are unclear as to why the ACMA only proposes this for Option 1 and not for Option 2 as well.

### 3.10. Draft instrument for AWL allocation limits

The ACMA has provided a draft instrument<sup>28</sup> to limit the amount of spectrum the four named entities and their associates can acquire. We consider this instrument is not fit-for-purpose, and needs to be re-written to address two concerns:

- The instrument is written assuming Option 1 will be implemented. As we outlined in section 3.2, Option 1 will lead to suboptimal outcomes for the band, as it: 1) prevents the ACMA from obtaining a full picture of the demand; and 2) the ACMA has within its power the ability to manage any perceived risks concerning the four named entities acquiring spectrum and thereby denying LA WBB operators access to the spectrum under Option 2. Therefore, the instrument should be re-written for use with Option 2.
- The instrument is written to restrict any associates of the four named entities from acquiring spectrum, and as we outlined in section 3.1, there is a superior approach to manage this risk.

Therefore, the draft *Radiocommunications (Area-Wide Licence Allocation Limits) Determination 2023* is not fit-for-purpose and needs to be rewritten to address these two deficiencies.

### 3.11. Draft interpretation (amendment) instrument

The ACMA has provided a draft amendment instrument<sup>29</sup> to update the Radiocommunications (Interpretation) Determination 2015.<sup>30</sup> We observe the changes to the definition of area-wide service in the

<sup>26</sup> The licence transfer and third-party authorisation limits may be made under section 131AC and section 115 of the Act respectively and will restrict MNOs and NBN Co from obtaining access to the spectrum through the secondary market before the secondary allocation process commences.

<sup>27</sup> The draft *Radiocommunications (Limitation of Authorisation of Third Party Users and Transfer of Area-Wide Licences) Determination 2023*.

<sup>28</sup> The draft *Radiocommunications (Area-Wide Licence Allocation Limits) Determination 2023*.

<sup>29</sup> The draft *Radiocommunications (Interpretation) Amendment Determination 2023 (No. 1)*.

<sup>30</sup> The Radiocommunications (Interpretation) Determination 2015, F2015L00178. The current compilation, Compilation #5, is available at <https://www.legislation.gov.au/Details/F2021C00635>.

amendment instrument introduces transmission from stations on space objects (item (c) in the definition) and also introduces reception at an earth receive station (item (g) in the definition), as per the updated definition shown:

***area-wide service*** means a radiocommunications service that is used for radiocommunications from any of the following:

- (a) stations at fixed points;
- (b) mobile stations;
- (c) *stations on space objects*;

to any of the following:

- (d) stations at fixed points;
- (e) mobile stations;
- (f) space receive stations;
- (g) *earth receive stations*.

Note: An area-wide service may be used for radiocommunications to a space receive station on a space object, but that station on the space object will not be authorised by an area-wide licence.

It appears the update to the definition is required to facilitate AWL rx licences which now replace the traditional FSS Earth Receive apparatus licence, and we support the amendment in this regard.

However, the amendment also facilitates direct-to-device (DTD) communication from low earth orbit (LEO) satellites, as the proposed amendment allows for transmission from *any* of the first three items to *any* of the last four. Thus, transmission from *stations on space objects* (item (c)) to *mobile stations* (item (e)), is enabled.

We are concerned the ACMA has enabled DTD communication in AWLs without the commensurate changes to other instruments, and without proper due diligence on the interference management framework. For example, the Australian Radiofrequency Spectrum Plan (ARSP)<sup>31</sup> currently does not include an allocation for Mobile Satellite Service (MSS) in either the 3400-3600 MHz band or the 3600-4200 MHz band, and yet, the amendment to the interpretations instrument permits DTD communication (i.e., MSS) using AWLs in 3400-4000 MHz. Under the ARSP, this is an unspecified service.<sup>32</sup>

While the rules in the ARSP for unspecified use are sufficiently clear (unspecified use cannot cause interference to another user or claim protection from interference from another user), we are nonetheless concerned the ACMA appears to be enabling DTD communication without sufficient consideration of the impacts. We consider there is at least the potential for co-channel (adjacent) geography interference between LEOs and terrestrial base stations attempting to communicate with handsets, especially at the periphery of terrestrial coverage, and that coordination procedures need to be developed to ensure both co-channel and adjacent channel interference between LEOs and terrestrial base stations are properly managed.

We recommend that until such time as the coordination procedures for interference management are developed, the ACMA should re-draft the amendment instrument so that it does enable AWL rx use for fixed satellite services, but does not enable DTD communication from space to mobile stations.

<sup>31</sup> ARSP, dated 20 May, 2021. Available at: <https://www.legislation.gov.au/Details/F2021L00617>

<sup>32</sup> See definition of unspecified service, ARSP, clause 3(1).



## 4 Comments on proposed RALI MS-47 updates

This section of our submission contains our comments on the updated version of RALI MS-47.

### 4.1. Comment on Section 1.4 Operation of the technical framework

Section 4.1 of RALI MS-47 gives some very broad guidance regarding the need for prospective licensees regarding the dimensioning of the spectrum space needed for an AWL licence. It is noted that Appendix F of RALI MS-47 details how co-channel and adjacent channel “device boundaries” can be derived for Earth Receive stations, however this needs to be read in conjunction with the material on Section 4.10 of the same RALI. Telstra believes that MS-47 could be improved by providing appropriate cross-references, as well as referencing those relevant parts of MS-47 in the text of the RAG Tx.

The dimensions of the spectrum space required for an earth station registered under an AWL rx licence is very much dependent on a range of practical issues, including site location, local clutter and the characteristics of the blocking filter. While it is clear the ACMA have attempted to address the adjacent frequency blocking issue by mandating that steep roll-off bandpass filters be assumed when conducting coordination studies, there may be practical limitations on the minimum bandwidth which can be achieved with commercially available filters. The impact of this could be that a prospective AWL rx licensee needs to acquire substantially more spectrum space than they would otherwise need. Telstra considers this limitation might have unintended consequences in limiting the availability of spectrum space for other applications. We would welcome the opportunity to discuss this in further detail with ACMA staff if required.

### 4.2. Comment on Section 2.2 Channel arrangements

The draft amendments to RALI MS-47 state that the channel raster and minimum channel size requirements do not apply to an AWL rx licence, so under the proposed update an AWL rx could be issued for any frequency / bandwidth combination. One concern Telstra has with this approach is that it may lead to 10 MHz channels that are unusable for AWL tx purposes. In such cases, it seems reasonable that the AWL rx licence should be configured to include the entire 10 MHz (consistent with the channel raster) for the spectrum denial caused by the AWL rx licensee.

### 4.3. Comment on Section 3.2.1 AWL issue policy

Under the proposed arrangements,<sup>33</sup> the ACMA states that it will not issue an AWL authorising the operation of a radiocommunications transmitter in the 15 MHz block immediately adjacent to a spectrum licence. Telstra’s view is that this should be increased to 20 MHz to align with the channel raster described in Section 2.2 of the draft RALI MS-47. To reduce this guard band to 10 MHz would lead to potential adjacent channel interference should two services have unsynchronised or disparate frame patterns. Telstra’s experience is that a 20 MHz guard band should be sufficient to address this issue.

Additionally, we note this also is restricted by the text earlier<sup>34</sup> in the same section which states that the upper and lower frequencies authorised by the AWL tx licence should align with the channel raster detailed

<sup>33</sup> Draft RALI MS-47, section 3.2.1, seventh chevron, p.8.

<sup>34</sup> Draft RALI MS-47, section 3.2.1, second chevron, p.8.



in Section 2.2 of the RALI. If the ACMA retains the 15 MHz “guard band”, chevron 2 effectively means a licensee wishing to operate down to the 15 MHz boundary would need to obtain a 10 MHz wide licence but only use the top 5 MHz. For example, obtain a licence from 3.81-3.82 GHz in a metro area, but only use 3.815-3.820 GHz of that licence.

#### 4.4. Comment on Section 4.10 Coexistence with earth receive stations

Refer to the text in Section 4.1 of this response.

#### 4.5. Comment on Radio Altimeter protection in section 4.9.3.2.

We welcome the ACMA’s 3 July 2023 clarification<sup>35</sup> of the language for restrictions on mechanical and electrical tilt in RALI MS-47 (clause 4.7.3.2 in the current published version, and clause 4.9.3.2 in the proposed updated version of RALI MS-47 contained in this consultation). We understand the proposed update contained in the clarification on the ACMA’s website to mean that *neither* the mechanical tilt, *nor* the electrical tilt (either one in isolation) can be above the horizon, even if the aggregate combination of both methods were to result in pointing below the horizon. For example, a deployment with a 5° mechanical downtilt and a 3° electrical uptilt resulting in an overall 2° downtilt is not permitted because the electrical tilting is upward (i.e., above the horizon it is working to).

While we understand the ACMA’s intent, we agree with the observation in AMTA’s submission to this consultation that the revised definition unnecessarily restricts individual components, when really the ACMA’s aim is to ensure that the net beam tilt is below the horizon. As such, we suggest that the text in RALI MS-47 Section 4.7.3.2 be amended to the following: “*The licensee must ensure that the net combination of fixed mechanical tilt and fixed electrical tilt component is oriented below the horizon.*”

#### 4.6. Other matters, typos, etc.

We consider the following matters need to be addressed in RALI MS-47.

- Section 3.2.1, top of p.9. The first chevron on this page says “*each AWL tx is not to be assigned more than [T.B.D] MHz of spectrum*”. TBD needs to be defined, although we appreciate determining this value is the subject of this consultation, as this limit is the “in-band allocation quantum policy”.
- Section 3.2.1, top of p.9. The first chevron on this page also says “*3400-4000 MHz range not in remote areas*”. The frequency range “3400-4000 MHz” for areas “outside remote” (i.e., for Metro and Regional) areas is not correct, as 3475-3800 MHz in metro areas, and 3400-3750 MHz in regional areas is spectrum licensed, so AWL Tx cannot be assigned in these frequency ranges “*outside remote areas*”.
- Section 3.2.2, p.9. The last instance of the acronym “AWLs” in this section should be “AWL txs” for consistency, because the ACMA is talking about issuing AWLs (in this case “AWL txs will not

<sup>35</sup> See entry for 3 July 2023 at: <https://www.acma.gov.au/publications/2023-06/instruction/rali-ms47-licensing-and-coordination-procedures-area-wide-licences-awl-3400-4000-mhz-band>

normally be issued”) rather than just AWLs in general. (The other subsections in section 3.2 have all been changed according, just this one was missed.)

- Section 4.2.1, p.13. Refers to the *Radiocommunications (Unacceptable Levels of Interference - 3.4 GHz Band) Determination 2015* (aka “ULOI”). The ULOI defines the 3.4 GHz band as only existing from 3400-3800 MHz (see the definitions in clause 5(1) of the ULOI). The frequency range of the band should be updated to 3400-4000 MHz, to ensure the ULOI takes effect to the top of the band.
- Appendix D, p.53-54. Tables A.1 and A.2, subsection A.1.1 and section A.2 should be “renumbered” as Tables D.1, D.2, and subsections D.1.1 and D.2 for consistency with the (correctly) numbered section D.1. Note that this also includes the references to subsections A.1.1 and A.1.2 inside Table A.1 (*which should be “Table D.1”*).
- Appendix F, p.56. There are two references to section 4.7.1 that have not caught up with the renumbering in section 4 arising from the insertion of new subsections. Both references to section 4.7.1 should be updated to “section 4.10.1”.

## 5 Comments on proposed RAG Tx updates

This section of our submission contains our comments on the updated version of the Transmitter RAG (RAG Tx). Importantly, the updates to the RAG Tx affect spectrum licensees for spectrum licences operating in the range 3.7-3.8 MHz (rather than AWL licensees, which is the subject of this consultation).

### 5.1. The proposed minimum frequency response for FSS earth receive filter still needs some work

The proposed treatment of new earth receive AWL rx licences where those receivers are assumed to have filters with high rejection at frequencies below 3.8 GHz (or 3.75 GHz in regional areas) significantly reduces the impact on adjacent frequency spectrum licenced services. Telstra notes that the proposed filter mask is based on the FCC C-band filter<sup>36</sup> which Telstra and AMTA proposed in previous submissions to the ACMA.

One remaining item the ACMA has not addressed is where new adjacent frequency SL or AWL transmitters are coordinating with existing Apparatus Licenced Earth Receive services. In this scenario, the Earth Receive receivers are still assumed to have filters with a less aggressive roll-off characteristic (the ‘ACMA filter’). Since some of these existing C-Band services operate on frequencies immediately adjacent to the block/s allocated for spectrum licensing (i.e., 3.8 GHz in metro or 3.75 GHz in regional) there is still an impact on incoming SL services below 3.75/3.80 GHz and for new WBB services operated under a new AWL for frequencies higher in the band.

This problem could be alleviated to a large extent if ACMA was to require existing Apparatus Licenced Earth Receive services to install filters with the same steep roll-off as being proposed for newly licensed AWL rx services. Installation of such filters on Apparatus Licenced Earth Receive stations should be assumed to be in place by 17 July 2027.

<sup>36</sup> FCC 20-22 GN Docket No. 18-122 ‘Expanding Flexible Use of the 3.7 to 4.2 GHz Band’, Report and Order of Proposed Modification Released: March 3, 2020. See page 48 of the PDF version. <https://www.federalregister.gov/documents/2020/04/23/2020-05164/expanding-flexible-use-of-the-37-to-42-ghz-band>

## **5.2. Protection requirements – FSS Earth receive stations operating in the 3750-4000 MHz band under area wide receive licences**

Telstra supports the proposed changes to Section 4.5 (new) of the RAG Tx.

We note the ACMA states its intention that prospective AWL rx licensees consider the **size** of the AWL spectrum space (both in **area** and **frequency**) required to ensure their service is provided suitable co-channel and adjacent -channel protection from **existing and future registered transmitters**. This can, for example, take into account the spectrum required for sufficient RF filtering roll-off to apply.

However, the RAG Tx does not provide any guidance to prospective licensees as to how to achieve the required protection for existing and future transmitters by ensuring AWL spectrum space is configured with adequate protection. Based on the details in RALI MS-47, it seems that the dimensions of the spectrum space required by any prospective AWL rx licensee is less dependent on the required channel bandwidth, and more heavily dependent on the characteristics of the blocking filter. Please refer to Telstra's comments in Section 4.1 of this submission for further detail.

We consider there is a need for additional guidance in RALI MS-47 (not the RAG Tx) for prospective AWL rx licensees on how to determine the appropriate size (both area and frequency) of the necessary AWL rx licence to ensure it receives protection from transmitters authorised either under a spectrum licence or an AWL tx licence in this band.

## **5.3. Coexistence between AWL transmitters operating above 3.7 / 3.8 GHz and adjacent frequency AWL tx.**

Telstra supports ACMA's proposal to create a guard band between AWL tx operating above 3.75/3.80 GHz and the adjacent spectrum licence as it will limit the interference effects brought about by adjacent-frequency networks being unsynchronised.

# **6 Incumbent apparatus licence types**

This section of our submission contains comments on incumbent Point-to-Point (P2P), Point-to-Multipoint (PMP) and Fixed Satellite Service (FSS) Earth Receive apparatus licences.

## **6.1. P2P Apparatus Licences**

Telstra supports the proposed arrangements in RALI MS-47 and RALI FX-3 for existing and new P2P Apparatus Licenced services.

## **6.2. FSS Earth Receive Apparatus Licences**

The proposed arrangements allow existing FSS services registered under Earth Receive Apparatus Licences to continue to renew those licences as required.

As mentioned in section 5.1 above, Telstra is concerned existing C-Band services operating on frequencies immediately adjacent to the block/s allocated for spectrum licensing (i.e., 3.80 GHz in metro or 3.75 GHz in regional) have an ongoing impact on incoming SL services below 3.75/3.80 GHz, as well as on the viability of WBB services operated under a new AWL at frequencies higher in the band (by virtue of the fact that, for

frequency coordination purposes, they are assumed to have relatively slow roll-off filters to avoid blocking interference from adjacent frequency services.)

One solution to this might be for ACMA to require satellite operators to employ filters with steeper roll-off as mentioned in section 5.1.

## 7 Other matters

### 7.1. A TLG is required to review RA mitigations commencing in June 2025

The ACMA proposes to keep one permanent mitigation in place after March 2026, which is the 72 dBm/5 MHz EIRP limit on transmissions above certain altitudes at certain positions around a nominated runway (as per Table 7 in RALI MS-47).

During the period between now and the end of March 2026, CASA will have worked with all aircraft owners to ensure their radio altimeters have been upgraded to incorporate receiver blocking filters capable of preventing receiver overload occurring as a result of emissions below 4.0 GHz.

We propose a Technical Liaison Group (TLG) should be convened 9 months prior to the expiry of the interim mitigations (i.e., TLG commencing in June 2025) to review the permanent mitigation measure, with a view to having it removed.

## Appendix 1: Response to ACCC consultation questions

This appendix contains our responses to the questions contained in the consultation paper. Owing to the nature of the ACCC's questions, our answers are provided from the perspective of the Aqura and Telstra Purple businesses.

### A1.1 Use Cases

#### 1. What are the likely intended uses of 3.8–3.95 GHz band spectrum?

We expect this band could be used for a wide variety of use cases based on 5G technology, including the following examples:

- Aqura and Telstra Purple are systems integrators and provide solutions to suit a wide variety of use cases and clients. There are numerous use case examples: manufacturing is an ideal use case for this band. 5G would be used to provide wireless connectivity to multiple sensors and machines in a manufacturing environment (i.e., a factory building). These sensors provide information required for AI, machine learning and advanced analytics to optimise processes and manufacturing output.
- Another use case to consider is container (shipping) ports where autonomous loading machines such as cranes straddle containers and carriers (trucks and other transporters). This scenario requires the reliable, low latency coverage of 5G technology. Localised Wi-Fi or other class-licensed solutions do not provide the requisite reliability or low latency. Press to talk voice can also be integrated and used to provide voice communications in the port area.
- A further example is wide-area 5G coverage in metro and regional areas which could be used to deliver Future Railway Mobile Communication System (FRMCS)<sup>37</sup> solutions to public rail transport corporations.
- 5G can be used for very localised deployments in the education sector (e.g., campus-wide networks) to provide the high capacity required for immersive learning experiences using virtual reality and augmented reality. Again, like the port scenario above, high reliability, low latency communication is required for these immersive experiences, making class-licensed solutions (e.g., Wi-Fi) unsuitable. High quality streaming and fast data transfer between peers will also be possible.
- Finally, the resource sector (mining, oil and gas) in regional areas will use 5G for autonomous operations (as described above), data collection from multiple sensors, worker safety, connected workers and mobile communications.

#### 2. In which geographic areas is the spectrum intended to be used?

Aqura and Telstra Purple will provide solutions in areas that clients operate in. For enterprise applications, the potential areas of use are anywhere in metro and regional areas. The spectrum can be used in regional areas such as mine sites, oil and gas production, rail corridors, airports and ports. 5G technology used in private network deployments could deliver a combination of outdoor and indoor / underground coverage in these scenarios.

<sup>37</sup> FRMCS is the replacement technology for legacy GSM-R technology.

In metro areas, again 5G technology used in private network deployments could be used for anything from wide-area IoT applications, or highly localised to in building coverage for manufacturing and industrial use cases.

**3. How much spectrum is needed to support the intended use case?**

Needs will vary dependent on use case, but Aqura and Telstra Purple consider a minimum bandwidth would typically be 20 MHz to provide a reasonable service, but some use cases could require 50 MHz or more.

## **A1.2 Downstream Markets**

**4. What is the good or service that the 3.8–3.95 GHz spectrum can support the production of?**

See our answer to Q1 above. The goods and services are reasonably well described by the use cases.

**5. Where is the good or service intended to be supplied to?**

Goods and services optimised by private network deployments could be delivered to either domestic or international markets. See answer to Q1 above for examples.

**6. Are there substitutes available to the good or service?**

N/A

**7. How could the spectrum allocation impact the state of competition and/or incentives to invest in downstream markets?**

The introduction of 5G and digitisation of industry is expected to lead to a 3.2-3.9% reduction in cost.<sup>38</sup> This cost reduction will make Australian goods and services more competitive domestically and internationally, leading to further investment in those sectors.

## **A1.3 Alternative Spectrum**

**8. Do you consider that substitutable spectrum exists for the 3.8–3.95 GHz bands that can similarly enable the production of the goods or services in downstream markets? If so, what spectrum bands do you consider to be substitutable?**

The 3.4-4.0 GHz band is one of the main 5G bands used worldwide, and is often used for enterprise solutions. Globally harmonised bands provide economies of scale and wide ecosystems of network and device equipment. Other mid band and low bands can be used for 5G, but may not offer as such a good combination of coverage, data capacity, and spectrum availability in many parts of Australia.

<sup>38</sup> PwC. 5G in Manufacturing: How the new wireless standard can accelerate automation. July 2020. See Exhibit 3, p.7.  
<https://www.pwc.com/gx/en/tmt/5g/pwc-5G-in-manufacturing.pdf>

#### **A1.4 Pricing**

##### **9. Do you have any comments on the suite of pricing arrangements proposed?**

In regional and remote areas, the pricing seems reasonable.

However, we are concerned that the pricing for an AWL in metro areas for a HCIS 0 area may be prohibitive due to the population density and the minimum size of HCIS 0 (approx. 1.8km x 1.8km). The HCIS 0 size may be too large for some highly localised applications i.e., small factory or warehouse. An example is HCIS0 cell NV7M6M (Sydney inner) where the cost for 40 MHz would be \$2,441 per year. This may discourage smaller businesses taking up 5G solutions in this band.

One solution we have proposed to address this potential barrier is the creation of an indoor-only AWL, which we discuss in section 2.2 of our submission.