29/03/2023

Australian Mobile Telecommunications Association

AMTA Submission

Australian Communications & Media Authority

Draft allocation and technical instruments for the 3.4/3.7 GHz bands auction Consultation Paper

About AMTA

The Australian Mobile Telecommunications Association (AMTA) is the peak industry body representing Australia's mobile telecommunications industry. Its mission is to promote an environmentally, socially and economically responsible, successful and sustainable mobile telecommunications industry in Australia, with members including the mobile network operators and service providers, handset manufacturers, network equipment suppliers, retail outlets and other suppliers to the industry. For more details about AMTA, see http://www.amta.org.au.

Introduction

AMTA appreciates the opportunity to comment on the draft technical instruments for the auction of the 3.4 and 3.7 GHz bands. We note that our response focuses on the “Issues for comment” numbered #22 and #23, on the draft technical instruments, and on the industry questions in Appendix A, of the ACMA’s consultation paper *Draft allocation and technical instruments for the 3.4/3.7 GHz bands auction* (“the consultation paper”). For “issues for comment” numbered #1 through #5 on the draft marketing plan, and #6 through #21 on the draft allocation determination, members will submit their views in their individual responses to the public consultation.

Referring to our previous comments made in our submission to the ACMA’s *3400-4000 MHz Technical Liaison Group Paper 4*, dated 14 October 2022 ("the October 2022 TLG v4 response”), we note that the ACMA has addressed several of our recommendations and requests, in particular the maintenance of the more stringent device boundary for AWL transmitters within 200 km of the geographic boundary of a co-channel spectrum licence—which is implemented in section 4.1.2 of draft RALI MS 47—and the adoption of restricted use bands—which is implemented in Part 11 of the draft update to the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters — 3.4 GHz Band) 2015* (“the Tx RAG”). As such, we refer the ACMA to that previous submission and request that those views from 2022 be taken into account in considering this submission.

Also of particular importance to note up-front, we strongly support the ACMA’s preliminary view to apply interim mitigations—intended to ensure coexistence with radio altimeters operating in 4200-4400 MHz—only to transmitters *above* 3800 MHz. We agree with the ACMA that there is no evidence that mitigations need to be implemented to spectrum-licensed transmitters operating below 3800 MHz, a full 400 MHz below the radio altimeter operating band. We also believe there is an opportunity to improve the efficient use of spectrum by aligning the end of the interim mitigations with the end of similar mitigations set by the US Federal Aviation Authority (FAA) on 1 February 2024[1].

Lastly, we reiterate the importance of tightening the assumed RF filter rolloff characteristics in Part 4.3 of the Tx RAG, with a view to reducing the spectrum denial caused by earth station receivers to spectrum-licensed services below 3800 MHz.

[1] FAA 14 CFR Part 39, https://public-inspection.federalregister.gov/2023-00420.pdf

Coexistence with AWL

As mentioned above in the introduction, we strongly support the maintenance of the more stringent device boundary for AWL transmitters within 200 km of the geographic boundary of a co-channel spectrum licence (which is implemented in section 4.1.2 of draft RALI MS 47). We seek for this to apply to AWLs within the “Rural Australia” area in 3750-3800 MHz also, although we note that this will be the subject of future consultation for AWLs within metropolitan and regional areas.

We acknowledge other suggestions/requests from the mobile industry adopted by the ACMA, and appreciate the ACMA’s response on these matters:

- omitting AWL receivers from Part 8.2 of the draft update to the Tx RAG.
- the ACMA’s adoption of restricted use (RU) bands—implemented in Part 11 of the draft update to the Tx RAG.
- that existing mechanisms in the AWL and spectrum licence frameworks do offer a path for flexibility, potentially without formal agreement between AWL licensees and spectrum licensees.

We wish to reiterate some of our previous comments from our October 2022 TLG v4 response, namely:

- If interference does occur between (a) SL station complying with its licence conditions and device boundary requirements; and (b) an AWL station also complying with its licence conditions and device boundary requirements, it is expected that the SL would have priority over the co-channel AWL, and it would be incumbent on the AWL licensee to result the interference issue.
- In the unlikely case of interference—in situations where both services are complying with their licence conditions—the SL service has priority over the AWL service.
    - Note: Pivotel has some different views in this regard (with respect to both points above), and these will be presented in Pivotel’s individual submission.
- We don’t agree with the “multimode” approach of registering multiple sectored antennas under a single Station with no azimuth recorded, due to the reduced efficiency of spectrum use that can result.
- We believe that the minimum HCIS unit size for this frequency band should be HCIS Level 1.

Coexistence with SL

We support the draft updates to the technical instruments, namely the *Radiocommunications (Unacceptable Levels of Interference — 3.4 GHz Band) Determination 2015* (“the s145 Determination”), the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 3.4 GHz Band) 2015* (“the Rx RAG”) and the Tx RAG. We are also supportive of the core conditions in the draft sample spectrum licence.

Other amendments to the technical instruments that we recommend:

1. We suggest that the receiver performance characteristics in the Rx RAG be updated to the format recently adopted for the 850/900 MHz and 2 GHz bands.
2. Section 5.1 regarding broadband wireless access (BWA) services, might benefit from the work ‘incumbent’ or ‘legacy’ to differentiate these from newer wireless broadband services to be authorised under AWLs.
3. Section 6.2 of the Tx RAG: The proposed addition of the clarification that protection requirements for radiolocation services—explicitly stated to be in 3100-3600 MHz—don’t apply to ARNS in 4200-4400 MHz, is unnecessary. Furthermore, this clarification refers to Part 11, which is not about ARNS at all. Presumably this is a typographical error and it was intended to say “Part 13” instead, but this Part is proposed to be removed. As such, this entire clarification proposed to be included after section 6.2 should be removed.
4. Definition of ***receiver blocking***: the wording *“on frequencies other than those of an adjacent channel”* may be confusing. We suggest changing this to: *“on frequencies other than (i) those overlapping the receiver channel and (ii) on the first adjacent channel”* or *“on frequencies beyond the first adjacent channel”*.

Other comments on the Tx RAG and Rx RAG relevant to coexistence with radio altimeters and earth stations are included in the relevant sections below.

Coexistence with radio altimeters

We wish to reiterate our views expressed in AMTA's response to IFC 11/2022 and in the October 2022 TLG v4 response; namely that we do not support additional mitigations beyond the 200 MHz guard band without sufficient evidence. We are very pleased that the ACMA appears to have taken our representations on board and is not proposing to impose any mitigations for spectrum licences to be awarded in the 3700-3800 MHz range. We refer the ACMA to the arguments made in the section titled *"Coexistence with radio altimeters"* in our October 2022 TLG v4 response, around spectrum licence rights, the high level of certainty expected to be afforded spectrum licence holdings, and the importance of uniform technical conditions across the 3.4 GHz band to support future defragmentation activities.

The onus should be on the aviation industry to address this issue and ensure its equipment is operating within its licensed bands. The interim mitigations should not extend beyond 1 February 2024 which is the deadline set by the FAA for retrofitting receiver filters or replacement radio altimeters.

We note that a proposed ongoing mitigation in the form of a "general guidance clause", requesting spectrum licensees considering WBB deployments to consider radio altimeter services around airports and heliports, has been included in Part 13 of the Tx RAG (in turn referenced in Licence Schedule 4 "Other conditions"). We acknowledge that the ACMA does not intend to proceed with these provisions, and we support their omission.

The remainder of our comments with respect to coexistence with radio altimeters is included in the responses to the ACMA's questions contained in Appendix A to the consultation paper.

Question 1: Are there current or potential future industry coordination mechanisms where WBB operators and the aviation community can coordinate and communicate regarding WBB deployments?

Yes, MNOs have enforceable obligations under the Mobile Base Station Deployment Code[2] to notify and consult with the community and interested parties when deploying base stations.

Question 2: What are your views on any or all aspects of the recent Canadian consultation that would be relevant in the Australian context. What, if any, aspects of the revised mitigations should be adapted for use in Australia, and why?

We note that the exclusion and protection zones proposed in the Canadian ISED consultation on SRSP-520, issue 3 and RSS-192, issue 5[4] ("the Canadian consultation") are significantly smaller than the exclusion and restricted zones proposed by the ACMA in Appendix D of the Coexistence Report. We agree with the Canadian methodology and application of smaller exclusion and restricted zones, in particular noting the extent of the currently proposed zones in cities where demand for 5G may be highest.

However, what we don't support from the Canadian consultation is the uniform applicability of these zones (except for the protection zones, which are smaller for the "3500 MHz band") across 3450-3900 MHz. We consider this to be an excess of caution considering that systems in the 3500 MHz band have a 550 MHz guard band with respect to radio altimeters, and that existing base station transmitters in the band are permitted to continue operating unaffected (in accordance with the existing SRSP-303.4, issue 3).

The pfd limits in the Canadian consultation are comparable to those proposed by the ACMA; the skyward pfd limit is -34.21 dBW/m2/5MHz and is equivalent to approx. -41 dBW/m2/MHz, which is the same value proposed by the ACMA for the lowest 50 MHz (3800-3850 MHz)[5]. While the ACMA value was derived from the RTCA Interference Tolerance Mask (ITM) values (interpolated for frequency and altitude), the Canadian value was derived separate ITMs developed from its own body of work.

In the proposed amendments to RSS-192, ISED is proposing spurious emission limits of -33 dBm/MHz in the band 4200-4400 MHz. We do not support spurious emission limits any more stringent than 3GPP, so no lower (more stringent) than -30 dBm/MHz conducted power / TRP. Furthermore, the proposed limit of -33 dBm/MHz was based on Canada's domestic studies, which

---

[2] The Mobile Base Station Deployment Code C564:2020: https://www.commsalliance.com.au/Documents/all/codes/c564

[4] ISED, Dec 2022, *Consultation on SRSP-520, issue 3 and RSS-192, issue 5*, available here: https://ised-isde.canada.ca/site/spectrum-management-telecommunications/en/learn-more/key-documents/consultations/consultation-srsp-520-issue-3-and-rss-192-issue-5

[5] The Canadian limit is applicable at a slightly lower altitude (107 metres as opposed to 140 metres), which translates to approx. 2.4 dB less free space loss (FSL).

appear to adopt the 3 dB reduction below -30 dBm/MHz to account for 35 ft altitude (rather than 50 ft)[6]. If these had have considered 3 dB polarisation discrimination, they would have arrived at -30 dBm/MHz, in line with 3GPP.

Related to the Canadian studies summarised in Annex A to the Canadian consultation and in clauses 3.58-3.60 and 3.72-3.75 of the ACMA's coexistence report, we note some key observations:

- That in the quantitative Canadian over-the-air (OTA) tests, none of the Category 1 RAs experienced any interference from the 5G transmissions. The only two models that were impacted were Categories 2 & 3.
    - The commercial aircraft landing at major airports identified by CASA should be Category 1[7].
- While ensuring that the combined mechanical & electrical tilts of 5G BS remains below the horizon does provide additional protection outside urban centres, limiting vertical scanning of AAS had little impact in the simulations (relevant to Q8 below).
- Addition of a bandpass filter to the RA completely resolves the interference.
- In the qualitative OTA tests, there were no observable effects that the flight crews noticed.

Question 3: Are the findings from the NTIA ITS report regarding 5G base station emission levels and pattern measurements applicable to Australian WBB deployments? If not, on what basis would equipment deployed in Australia have a materially different performance than the emission levels and pattern measurements outlined in the NTIA study? What are the implications and costs of using equipment that does meet the measurements observed by the NTIA study?

In general, there is nothing about the NTIA setup which is not directly applicable or feasible in an Australian environment. However, we do note the following:

- Section 4.5.2.2 of the NTIA ITS Report indicates that beamforming only uses the codebook approach, which AMTA has identifies as resulting in reduced performance and throughput (see our response to Q8 below).
- NTIA tested one radio model per manufacturer, so the performance of those won't necessarily match all radios. Future radios will be designed to support multiple bands, requiring components to fit into smaller packages, and smaller filters will provide reduced attenuation. These mass-produced filters won't be able to perform to the same margin below 3GPP specified limits as the equipment tested by NTIA.

For the reasons above, we object to the NTIA input study parameters being codified in ACMA licence conditions or in ACMA licensing policy/rules.

---

[6] Clause 7.81 of the ACMA's Coexistence Report.

[7] End of Clause 4.34 of the ACMA's Coexistence Report.

Question 4: What are the effects on WBB deployments if all WBB deployments were restricted to an EIRP of 62 dBm/MHz (rather than a TRP limit) on an ongoing basis (other than those in restricted cell segments with lower powers)? If any, what are the implications and costs of being restricted to this EIRP value, and is there an alternative that would be practicable and appropriate?

(The NTIA ITS report notes practical limitations on current equipment limiting operation to an EIRP of 62 dBm/MHz for most bandwidths. The majority of current Australia deployments operate below this figure, as per the RA report Appendix.)

We do not agree with EIRP limits being applied to WBB base stations, particularly AAS base stations, and especially not to spectrum-licensed base stations (AAS or Non-AAS) below 3800 MHz.

Firstly, we note that the in-band limit of 48 dBm/5MHz TRP will already apply. For an AAS beamforming array with 25-27 dBi gain, this results in an equivalent per-MHz EIRP PSD of 66-68 dBm/MHz EIRP, which is not too far above the EIRP limit being discussed.

The only way that the EIRP will be exceeded even further beyond this—and noting that the TRP limit will be in place—is if a higher-gain antenna array is employed, which will have an even narrower, more directional beamformed beam, and therefore the interference reduction margin—due to the potential victim being illuminated for a lower percentage of time—is greater and counters the increase in EIRP. This interference reduction margin is a fundamental concept in the introduction of AAS and is behind the 9 dB AAS factor adopted in 3GPP Technical Specifications and the 8 dB AAS factor adopted in spectrum licence technical framework, for example, in the difference between Level of Protection (LOP) for Non-AAS and AAS in multiple s145 Determinations.

An EIRP limit precludes the use of smarter, more directional beams that would be less likely to illuminate the potential victim receiver, particularly in the case of aircraft which will be above the base stations which are in turn primarily communicating with UEs at lower elevations. Recent technical frameworks have pivoted towards the adoption of TRP to support 5G NR AAS, and we don’t support a backwards step with the adoption of EIRP limits.

Question 5: What, if any, are the implications if conducted unwanted emission levels are specified lower than the 3GPP TS.38.104 spurious domain Category B limits of -30 dBm/MHz (or a TRP equivalent) specifically considering possible ongoing limits of -33 dBm/MHz, -35 dBm/MHz, -40 dBm/MHz or -48 dBm/MHz? Where applicable, both equipment nominally designed for both band n77 and n78 band equipment should be considered, with spectrum allocations up to 3800 MHz for n78 equipment and 4000 MHz for n77 equipment assumed.

(The NTIA ITS report indicates that, in practice, 5G base stations have better unwanted emissions levels – i.e., have lower emissions – than included in 3GPP specifications.)

We do recognise that spurious emission limits of -30 dBm/MHz (Non-AAS) and -21 dBm/MHz (AAS) should apply to n77 equipment above 4200 MHz, as opposed to above 4240 MHz (i.e. 40 MHz above the operating band edge of 4200 MHz). Globally, deployments are being restricted to some upper limit below the 4200 MHz band edge, and therefore practical deployments will not be operating all the way up to 4200 MHz, and equipment designs will have this in regard.

However, as stated in multiple fora, we are opposed to emission limits more stringent than 3GPP. Our understanding is that the most stringent emission limit of -48 dBm/MHz is derived for a "near-collision" scenario in DO-399 in which the lateral minimum distance between the aircraft and IMT antenna is just 10 metres, which is a very unlikely and emergency case and very demanding to guarantee compatibility for.

Noting that certain RAs deploy a technique where they are not using the maximum sensitivity at low altitudes—which makes them more able to cope with more than -30 dBm/MHz—we submit that the development of the radio altimeter standards need to support RA design strategies which are adequately robust in the presence of unwanted emissions falling in the RA band.

The ability of RAs to cope with the 3GPP spurious emission limit of -30 dBm/MHz is supported by the findings of the Canadian studies, for which even the worst-case ITM threshold of -91 dBm/MHz was not exceeded at 50 ft for a spurious emission level of -30 dBm/MHz[8].

Furthermore, we also note that FCC regulations[9] for unwanted emissions from unintentionally-radiating electronic equipment—e.g. computers, cables, warning lights—have emission limits comparable to or even higher than the most stringent limits of -40 dBm/MHz and -48 dBm/MHz, so these options should not be entertained any further.

While we do agree that practical equipment will likely perform better than the 3GPP limits—as these are hard design constraints—we do question the magnitude of the margins involved,

[8] Clause 7.81 of the ACMA's Coexistence Report.

[9] FCC Title 47 Part 15 Subpart B "Unintentional Radiators", 15.109 "Radiated emission limits" specify a field strength limit of 500 uV/m at 3 metres, for emissions above 960 MHz.
EIRP [dBm] = E [dBuV/m] + 20log10(d [m]) – 104.8 = 20log10(500 [uV/m]) + 20log10(3 [m]) – 104.8 = -41 dBm

particularly with the NTIA's method of derivation to estimate emission levels below the noise floor of the measuring equipment.

Question 6: Can WBB equipment comply with the ACMA proposed interim unwanted emission EIRP limits proposed in the RA report main body and Appendix D, in addition to the TRP and conducted per port limits proposed in the sample spectrum licence contained in the marketing plan? What, if any, are the implications if unwanted emissions are specified as an EIRP rather than a TRP or conducted limit on an ongoing basis?

See our response to Questions 4 and 5 above.

If we accept that the spurious domain commences somewhere between 4000 MHz and 4200 MHz (but not above 4200 MHz, even for n77 equipment), then even the 3GPP spurious emission limit of -21 dBm/MHz (including 9 dB AAS factor) is lower than the -20.3 dBm/MHz TRP limit calculated by the ACMA. This value was derived to satisfy the RTCA ITM threshold of -82.3 dBm/MHz for 92.5m separation, and includes the excessive 18 dBi grating lobe gain discussed below.

As such, we believe there's no need to specify any EIRP limits, and instead rely on TRP limits based on 3GPP.

Question 7: What evidence is there for using lower maximum side-lobe gains, and what alternative value could be used? What would be a practical elevation pattern envelope that both non-AAS and AAS WBB base stations could reasonably implement and commit to, in order to manage grating lobes and beam pointing?

(The interim mitigation zone calculations use an assumed WBB antenna side-lobe gain level of 18 dBi, as per RA report Appendix D. We note feedback from some TLG members that suggests this value is significantly too high.)

AMTA agrees with, as a general practice, the mitigation iv. for networks to be designed such that grating lobes are minimised. Grating lobes radiated above the horizon are only formed for beams scanning at steep *downwards* angles, which can be avoided by applying mechanical tilt in cases where nearby areas need to be covered. For steep downward angles, the UE would typically be located closer to the BS, therefore lower power is required to communicate with it. However, we maintain that it should be applied to above 3800 MHz, as with all the interim mitigations.

That said, we believe that the magnitude of the grating lobes has been overestimated with the use of 18 dBi for the grating lobe gain. Firstly, the highest grating lobes would not exceed 12 dBi at most. Secondly, they occur at lower elevation angles than the zenith, and therefore the application of the grating lobe to the worst-case scenario of the aircraft being directly above the BS is incorrect. This is supported by the NTIA Report which indicates that the gain in the direction of the aircraft is at least 20 dB less than the main beam gain when the aircraft is flying above the BS. A lower angle leads to longer LOS path lengths, greater path losses, and this in turn impacts the zone dimensions and the resulting pfd limit altitudes and unwanted emission levels.

More importantly, the discussion above is relevant to the operating band of the 5G NR BS. For out-of-band emissions (OOBE) falling into the RA operating band, the emissions from the AAS antenna elements are no longer correlated, and the beam pattern does not hold, and the gain in the direction of the aircraft would approximate the gain of the single antenna element in that direction.

Lastly, it is worth noting that grating lobes only occur for AAS, and that the ACMA's initial coexistence study highlighted that Non-AAS was of greater concern than AAS, with the latter presenting a lower interference potential due to the dynamic beamforming.

Question 8: Are there any technical limitations for WBB AAS base station systems that would make compliance with a requirement to not scan or point the main beam above the horizon impracticable to implement?

While BS antennas are typically designed to be oriented at or below the horizon, through a mechanical and/or electrical tilting, there may be certain urban environments where BS could be up-tilted to serve multi-level residential and office buildings. As such, an ongoing restriction on antenna pointing is not desirable, and certainly not below 3800 MHz.

Beyond that, AMTA confirms that a limitation on the net antenna orientation—through either mechanical tilting, electrical tilting, or a combination of both—to at or below the horizontal plane, is practically feasible to implement. However, limitations on vertical scanning of beamformed beams is not practical.

While it is technically possible with a "codebook" approach, whereby beams are selected from a pre-defined set or grid of beams. MNOs have experienced poor performance whereby UEs are located between beams or even selecting sub-optimal beams, leading to reduced throughput for 5G cells. This is heavily dependent on the performance and capabilities of the handsets, as opposed to the MNO's network design. If we establish that true beamforming, in which beams are directed towards the target UE, is the best approach, then limiting vertical scanning is not feasible.

Finally, as supported by the results of the Canadian study, *"the results of simulations demonstrated that limiting the vertical scanning below the horizon had little impact when the combined digital and mechanical tilts were already kept below the horizon"*[10].

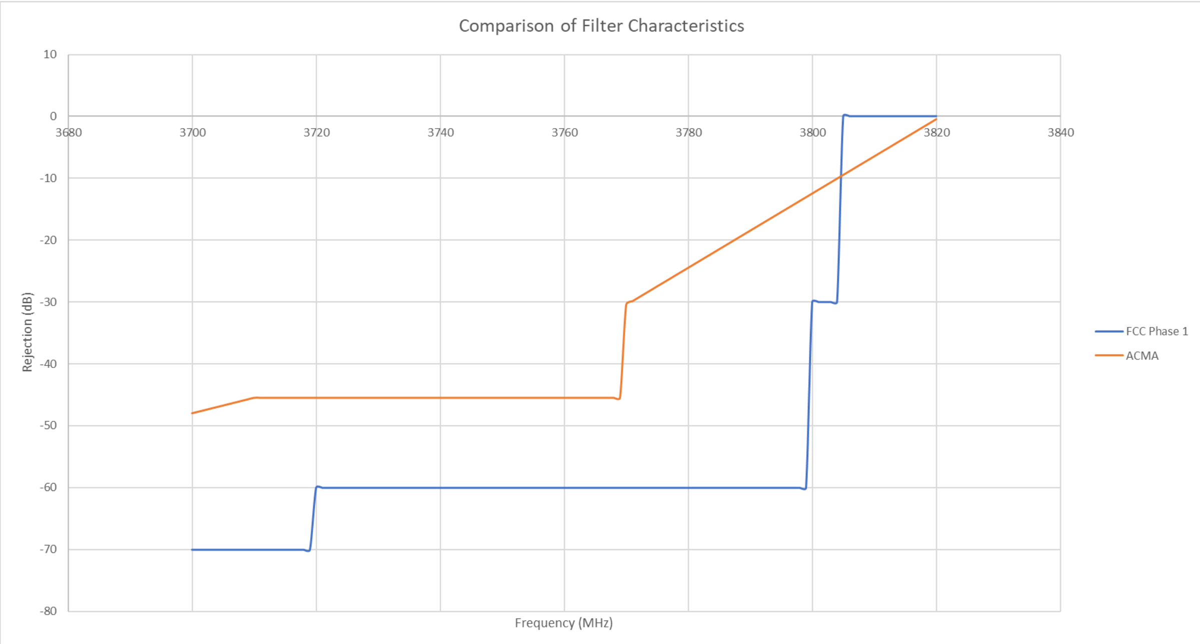
As such, we submit that the interim mitigation iii. *"requiring WBB base station antennas to point or scan below the horizon only"* should be amended to delete the words *"or scan"*. The mitigation could benefit from clarification that *"to point"* refers to the aggregate of the mechanical and fixed electrical tilt—noting that the fixed electrical tilt is different to the dynamic vertical scanning.

[10] Clause 7.77 of the ACMA's Coexistence Report.

Coexistence with earth stations

We refer the ACMA to our October 2022 TLG v4 response, and again stress the importance of reviewing the notional receive filter characteristic for the ESRX licence, in both the Part 4.3 of the Tx RAG (for SL transmitters) and section 4.8 of RALI MS 47 (for AWLs).

As per our previous submission, we note that the current *"minimum RF filtering level described in Table 1"* in Part 4.3(4) of the Tx RAG ("the ACMA mask") is much less stringent than that adopted by the FCC in the US[11], with up to 47 dB less attenuation for the worst point (offset of 20 MHz) and at least 15 dB less attenuation for a wide range of 100 MHz (assuming an ESRX with the lower edge at 3820 MHz), for particular points on the masks. When integrated over a 50 MHz bandwidth (3750-3800 MHz), the difference is up to 38 dB for a ESRX with its lower edge at 3820 MHz, and at least 13 dB for ESRX higher in the band. Even a 13-15 dB difference results in significantly lower spectrum denial caused by and risk of interference to earth station receivers. Of note is the fact that the FCC mask was not proposed by the regulator, rather by the satellite industry itself *"the C-Band Alliance proposed the following definition of the FSS earth station filter mask"*.



We have multiple examples of commercially-available products available that provide sharper roll-off than what is provided by the existing table in the Tx RAG.

[11] FCC Rule 85 FR 22804, April 2020, *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, III. Report and Order, D. Technical Rules for the 3.7-4.2 GHz Band, 7. Protection of Incumbent FSS Earth Stations, available here: https://www.federalregister.gov/documents/2020/04/23/2020-05164/expanding-flexible-use-of-the-37-to-42-ghz-band

- A well-known antenna and filter manufacturer sells filters which are able to provide between 35 and 70 dB of attenuation within a guard band of just 15 MHz (depending on the model), and 70 dB within just 25 MHz.
- Satcom Resources MFC C-band 5G mitigation red filter provides attenuation compliant with the FCC mask[12]
- Norsat's C-band interference solution includes an "extreme" band-pass filter providing at least 60 dB rejection for offsets greater than 20 MHz[13]
- SES is providing Passband Filters compliant with the FCC mask[14]
- An Intelsat White Paper identifies "Filter C" which can provide at least 60 dB rejection for offsets greater than 20 MHz, although it does acknowledge that this filter is "gold standard"[15].

We therefore consider Table 1 in the Tx RAG should be amended, such that it at aligns with the FCC mask.

We do acknowledge the distinction that the ACMA's filter applies to the licence edges, whereas the FCC mask applies at an absolute frequency edge; 3.82 GHz for Phase I of the clearance of the band. *As a minimum,* the FCC stringent mask applicable to frequencies below the fixed frequency boundary of 3820 MHz should be adopted to at least minimise the spectrum denial to spectrum-licensed services below 3800 MHz. In this case, the FCC mask should be *in addition to* a mask applied to the licence edges—and the greater of the attenuation values provided by the two masks is to be assumed—such as the RF filter attenuation does not reduce below what is currently provided, for ESRX that are higher in the band, e.g. above 4.0 GHz.

To be clear, the initial rolloff of 20 MHz should not lie within the spectrum-licensed spectrum, and therefore the lower edge of the more stringent mask would need to start at 3820 MHz or higher. The relatively low number of earth stations in 3800-3820 MHz would need to be considered carefully, but moving forward, it may be necessary to prevent new earth station registrations below 3820 MHz—although we acknowledge that this is a matter for the upcoming consultation on the technical framework for metro & regional AWLs.

[12] www.satcomresources.com/MFC-C-Band-5G-Mitigation-Red-Filter

[13] https://www.norsat.com/blogs/case-studies-whitepapers/5g-interference-immunity-app-note

[14] https://www.ses.com/sites/default/files/2020-08/Earth%20Station%20Passband%20Filter%20-%20SES%20July%202020.pdf

[15] Intelsat White Paper, *Technical Compatibility Challenges between Fixed Satellite Service and 5G in C-band*, available here: https://www.intelsat.com/wp-content/uploads/2021/02/intelsat-C-band-whitepaper.pdf

Licence issue and device authorisation dates

AMTA appreciates the ACMA taking the time to address our concerns regarding the establishment date as raised in our October 2022 TLG v4 response. However, we do not agree with the ACMA's rationale that the issue is not significant due to:

a) the issue mainly being limited to when an apparatus licence is renewed in the 60-day period after it expired, as this could be a large proportion of all licences; and
b) the ACMA's view that the issue will not affect first-in-time determination because the first-in-time station will still be in the RRL to observe that it is 'first'.

With respect to point (b) above, we note the following cases:

- Applicable to spectrum licensed receivers: In the Rx RAG, interference management is handled via the more stringent DBC of RALI MS 47, however this only applies to apparatus licences issued after 9 March 2018 (3575-3700 MHz only) or 16 July 2022 (other parts of the 3.4 GHz band).
- Applicable to AWL receivers: The Special Condition *"Coexistence with existing apparatus licensed services"* that will apply to every AWL states that receivers registered under an AWL are *"not afforded protection from interference caused by a radiocommunications transmitter that: (a) is operated under another apparatus licence which was first issued before the commencement of this licence…"*. The time at which an AWL licensee performs coordination with a view to registering a receiver is not necessarily the same as the time of commencement of the AWL.
- Applicable to both SL and AWL transmitters coordinating with earth station receivers: the RF filter response is applied only to the lower frequency edge—as opposed to both lower and upper frequency edges—but only for earth station receivers licensed before 16 July 2022.

In each of the cases above, the licensee cannot check whether or not it is afforded protection, or correctly carry out coordination with earth station receivers, because the licence issue date is unreliable.

Australian Mobile
Telecommunications Association

PO Box 1507, North Sydney, NSW 2059

50 Berry St, Suite 504, Level 5, North Sydney NSW 2060

www.amta.org.au