



AMTA

Australian Mobile
Telecommunications
Association

27 March 2026

Submission to the Australian
Communications & Media Authority

Response to consultation on Review of the 850 MHz and 1800 MHz spectrum licence technical frameworks



Response on 850 & 1800 MHz

The Australian Mobile Telecommunications Association (AMTA) is the peak industry body of Australia's mobile telecommunications industry. Our purpose is to be the trusted voice of industry, promoting the adoption, monetisation and sustainability of mobile telecommunications technology for the benefit of all Australians.

AMTA members include the mobile network service providers, handset manufacturers, network equipment suppliers, retail outlets and other suppliers to the industry.

AMTA welcomes the opportunity to provide this submission in response to the ACMA's consultation on "Review of the 850 MHz and 1800 MHz spectrum licence technical frameworks".

If you have any queries or comments in relation to the content of our submission, please contact Chris Coughlan, Head of Spectrum and Network Infrastructure, on 0401 988 322 or by email: chris.coughlan@amta.org.au.



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Executive Summary

AMTA welcomes the opportunity to be able to provide its views on the ACMA's proposed licence conditions for 850 MHz and 1800 MHz spectrum licences, which are flagged to be renewed in June 2028, as outlined in its Consultation paper—*Review of the 850 MHz and 1800 MHz spectrum licence technical frameworks* (“the consultation paper”). We acknowledge that plans to renew existing spectrum licences do not apply to existing 1800 MHz spectrum licences held by state rail authorities in 1870–1880 MHz in Adelaide and in 1865–1880 MHz in the other mainland State capital cities, and that these spectrum spaces are intended to be transitioned to apparatus licensing arrangements after the June 2028 expiry. In general, we support the ACMA's position that the 850 MHz and 1800 MHz spectrum licence technical frameworks (SLTFs) were reviewed relatively recently (2021), and that a full review of the SLTFs is not required. We agree with the ACMA's view that changes should be made in respect of the following issues:

1. introduction of provisions for wideband amplifiers;
2. implementation of 1 MHz downshift in 850 MHz band spectrum licences;
3. review of unwanted emission limits for 1800 MHz upper band—nominally base station (BS)—transmitters; and
4. removal of conditions specific to GSM-R from the 1800 MHz band spectrum licences.

However, we do not entirely agree about the specific approaches to addressing the first three issues listed above, and provide our views in the body of this document. By way of brief summary, these can be described as:

1. Provisions for wideband amplifiers need to provide greater flexibility and clarity, including that:
 - a. the transmitter does not necessarily need to be *operating* in both applicable bands for the provision to apply;
 - b. that the provisions should expand to situations where the two relevant licences may be held by different licensees, but there is an agreement between them;
 - c. the provisions reflect that the unwanted emissions permitted to be exceeded are the generic spurious emission limits that apply to very broad frequency ranges, e.g. 1 GHz to 12.75 GHz, and not any deliberate unwanted emission limits specifically introduced with a view to facilitate certain coexistence scenarios; and
 - d. that any unwanted emission limits on the other licence that are applicable to user equipment (UEs) are not required to be adhered to by BS transmitters (and vice versa).
2. Recommendations for correction of errors in the Core conditions of 850 MHz spectrum licences, along with a request to revise the registration exemption thresholds.
3. Views on unwanted emission limits for 1800 MHz upper band transmitters:
 - a. We present new options for unwanted emission limits, with a view to reduce the impost on mobile network operators (MNOs) by aligning with 3GPP Category B Option 1 (CBO1) limits wherever this is possible.



- b. Where absolutely necessary to facilitate coexistence with adjacent-band service, then the ACMA should fall back to the limits for 3GPP Category B Option 2 (CBO2) *from the relevant band edge* (e.g. above 1865 MHz within relevant metro areas, where the relevant adjacent-band service is GSM-R), rather than to the block edge¹, which unnecessarily constrains spectrum licences that are not abutting the relevant band edge.
- c. With respect to adjacent-band services like military aeronautical services and DECT, we acknowledge the ACMA's cautious approach in maintaining the existing limits in the absence of definitive information. However, we consider that further investigation of these uncertainties would be well aligned with the ACMA's regulatory role. In this context, we would welcome a collaborative approach to assessing the protection of military aeronautical services in the 1800 MHz mid-band gap, rather than placing this responsibility solely on the mobile industry.

With respect to #3 above, an overarching theme to be kept in mind throughout this process is that we are setting the licence conditions for **15-year licences**. This process should be dictated by long-term considerations of the utility of the band, and not by temporary issues like the presence of GSM-R 1800—which the rail industry is either upgrading from or is moving to another band—nor by timeframes associated with the ESL process.

Also with respect to #3 above, the discussion on changes to unwanted emission limits for 1800 MHz upper band transmitters is limited to “non-spurious” emissions within 1795–1890 MHz. There should be **no changes** to the spurious emission limits currently in Tables 7 and 8 of the existing 1800 MHz band spectrum licences, and there should be **no change** to the frequency range of applicability (i.e. outside 1795–1890 MHz).

Furthermore, we cannot yet agree to the proposed structural changes as we have not seen any draft spectrum licences, but do not object to this proposal in principle. Given the time pressure to prepare and release the licence application packs, we can accept the postponement of further consideration of (i) registration of base stations close to geographical boundaries between spectrum- and apparatus-licensed areas, and (ii) registration exemption limits for 1800 MHz band UEs, provided that these can be re-visited at a later date, potentially via section 72 licence variations. Also, we have considered the high-level licensing arrangements for post-expiry 1800 MHz rail service apparatus licences and provided some initial comments—however we believe these should be able to be re-considered as part of the subsequent consultation process flagged for later this year.

¹ To avoid ambiguity with use of the word ‘band’, we reserve the use of the word ‘band’ to refer to the frequency range that will be spectrum-licensed in a particular geographical area, typically supporting multiple licensees. For the frequency range in which a particular spectrum licensee is authorised to operate—referred to as “frequency bands” in Licence Schedule 1 of the existing 850 MHz and 1800 MHz spectrum licences—we instead refer to **licensed bandwidth**. The edges of these licensed bandwidths are referred to as **block edge**, to align with the terminology used in CEPT Report 80.



Lastly, we note that unwanted emission limits for UEs have not been discussed at all in the consultation paper. We have concerns about the application of stringent emission limits below 1710 MHz, seemingly imposed for the sake of protecting just five (5) meteorological-satellite (MetSat) Earth station receivers (ESRX) in 1700–1710 MHz. We would appreciate the opportunity to discuss this further with the ACMA.



Provisions for wideband amplifiers

We fully support the ACMA's intention to introduce provisions to spectrum licences to support the operation of multi-band radios, which the ACMA refers to as "wideband amplifiers". Last year, AMTA supported the introduction of initial provisions to support these via regulatory forbearance, although this was very tightly limited in scope. In the 2.5 GHz Technical Liaison Group (TLG) of late 2025, AMTA supported a new, more generic provision which meant that a licensee only had to adhere to, essentially, an 'envelope' of all the unwanted emission limits for all its licences. The shortfall of this more flexible provision was that stringent unwanted emission limits designed to deliberately protect specific frequency ranges/services had the potential to be covered (and exceeded) by any spurious emission limits applicable to licences in other bands. In the consultation paper, the ACMA explicitly seeks to address this in its second dot point which says that the proposed condition should *"require the amplifier to meet the unwanted emission limits on the other licence, if the other licence specifies a more restrictive unwanted emission limit in the same frequency range"*.

What's missing from this description—and makes the two dot points (at the top of pg 11 of the consultation paper) appear to directly contradict each other—is that the only limits which are proposed to be allowed to be exceeded are **spurious** emission limits applicable over very broad frequency ranges (but only outside the non-spurious domain). Typically, these are specified as -30 dBm/MHz conducted for Non-AAS transmitters and -21 dBm/MHz TRP for AAS transmitters, and applied over a very broad frequency range, e.g. 1 GHz to 12.75 GHz. The ACMA's abandonment of the terms "spurious" and "non-spurious" in spectrum licence conditions around a decade ago has unexpectedly resulted in these provisions being more difficult to describe. For this purpose, we suggest that it may be useful to re-introduce at least the term **spurious** into the relevant descriptions. While we consider the addition of the word 'spurious' to the relevant emission limits which can be exceeded, we hesitate to describe the unwanted emission limits on the other licence, which cannot be exceeded, as 'non-spurious'. This is because some of these are technically in the spurious domain, e.g. limits applicable to 2.5 GHz upper band transmitters for unwanted emissions above 2700 MHz.

We have some further specific comments as follows:

- With respect to point (b) in the ACMA's proposed condition, we note that the need to be exempted from the relevant licence's spurious emission limits, in and around the licensed band of the other licence, is not just about when the transmitter is operating simultaneously in both bands. All that matters is that the licensee holds licences in both bands (covered by points (a) and (c)), and that the device is *capable* of operating in both bands. Therefore, AMTA



proposes replacing the term “*operates simultaneously*” with “**is capable of operating under both of**”. Linking the wideband amplifier provision to operation starts to creep into the territory of mandatory operation requirements, which we wish to avoid.

- Given that licences are not held by people, rather companies, should the term “*person*” be replaced with “*entity*”? Also, given that across different bands, the spectrum licensee can actually have a different entity name—even if for all intents and purposes it’s the same company—point (c) should be expanded to include “**or there is an agreement with the holder of the other licence to exceed spurious emission limits in accordance with (d) and (e) below**”?
- We propose edits to clarify that these provisions address both (i) frequency ranges for which the other licence specifies [non-spurious] emission limits, and (ii) the in-band part of the other licence.
- We propose edits to clarify that unwanted emission limits intended to apply to UEs, specified on the other licence, do not need to be adhered to by a BS (and vice versa).

With all the above points in mind, AMTA proposes the following revised condition:



Where a radiocommunications transmitter:

(a) is authorised to operate under both this spectrum licence and another licence (the **other licence**) in another frequency band (the **other band**); and

(b) is capable of operating under both this spectrum licence and the other licence; and

(c) the holder of this spectrum licence and the holder of the other licence are the same entity, or there is an agreement between the holders of both licences in respect of this provision for wideband amplifiers;

the radiocommunications transmitter, when operating under this spectrum licence and with respect to spurious emissions outside of the frequency range [*specify the non-spurious domain frequency range for this band*]:

(d) must comply with the unwanted emission limits in a particular frequency range that are specified in the other licence and that would be applicable to the transmitter's operation in the other band[†] ~~(to the extent that those limits differ from the unwanted emission limits described in Core Conditions 8*/10** and 9*/11** of this spectrum licence for that particular frequency range)~~; and

(e) **may exceed the spurious unwanted emission limits** described in Core Conditions 8*/10** and 9*/11** of this spectrum licence ~~in respect of operation in~~, within the following frequency ranges:

(i) frequency ranges for which unwanted emission limits are specified in the other licence which would be applicable to the transmitter's operation in the other band^{††}, subject to clause (d) above; and

(ii) licensed frequency bands set out in the other licence which would be applicable to the transmitter's operation in the other band^{††}.

[†] For example, if the radiocommunications transmitter in question is a base station capable of operating in the upper sub-band of the other band, then the unwanted emission limits applicable to (and optimised for) UEs in the lower sub-band of the other band, do not need to be adhered to.

^{††} For example, if the radiocommunications transmitter in question is a base station capable of operating in the upper sub-band of the other band, then the frequency ranges and frequency bands applicable to (and optimised for) UEs in the lower sub-band of the other band, are not relevant for the purposes of clause (e).

NOTE: Clause (d) is intended to have the effect of ensuring that any unwanted emission limits on the other licence that are more restrictive than the spurious emission limits on this licence, are still adhered to.



Applicability of wideband amplifiers provision to UEs

The above revised condition was drafted with base station transmitters in mind. However, **we don't see a reason why the same provisions wouldn't also apply to UEs**, since they are also essentially multi-band radios.

Exceedance of unwanted emission limits by agreement of affected licensees

Related to this issue, we believe this is a good opportunity to introduce flexibility by way of agreements, into the spectrum licence conditions. As such, AMTA advocates for a more general provision whereby:

The unwanted emission limits applicable to a radiocommunications transmitter, for emissions falling within a particular frequency range, can be exceeded with the agreement of all **affected licensees**. For the purposes of this provision, “affected licensees” means:

- (a) If at the radiocommunications transmitter's location, the particular frequency range in question is spectrum-licensed, the holders of the spectrum licences within that particular frequency range and at the radiocommunications transmitter's location; and
- (b) If at the radiocommunications transmitter's location, the entirety of the particular frequency range in question is covered by AWLs which overlap the radiocommunications transmitter's location—the holders of those AWLs; and
- (c) If at the radiocommunications transmitter's location, the entirety of the particular frequency range in question is covered by PTS licences for which the related HCIS Level 2 tile overlaps the radiocommunications transmitter's location—the holders of those PTS licences.

This exemption does not apply if the radiocommunications transmitter is required to coordinate with other registered receivers within the particular frequency range, unless the coordination has adequately taken into account the higher unwanted emission level and the relevant coordination requirements are still satisfied, and/or agreement from the licensee of the registered receiver has been obtained.

We note that clause (a), for agreement between multiple spectrum licensees, is already covered by Core condition #3 in each of the 850 MHz and 1800 MHz band spectrum licences. As such, this new proposed provision could simply be limited to situations where the affected licensees are AWL or PTS licensees.

The proposed exemptions should come with an explanatory note issuing a warning along the lines of *“take advantage of this exemption at your own risk”*. The presence of same-area licensees which can provide agreement is only applicable at a particular point in time and can change at any moment—it's up to the licensee to assess the risk/likelihood of such changes and accept it.



Exceedance of unwanted emission limits where spectrum is not licensed to services afforded protection

AMTA also further advocates for another general exemption whereby the unwanted emission limits applicable to a radiocommunications transmitter, for unwanted emissions falling within a particular frequency range, can be exceeded if that particular frequency range is not occupied by any existing spectrum, apparatus or class licence in the same geographical area. **The largely unoccupied guard bands in 3800–3820 MHz in metro and ‘inner regional’ areas, and in 3750–3770 MHz in ‘rural’ areas, are pertinent examples that need addressing urgently.**

The protection for class licences should explicitly exclude those for non-assigned services (i.e. for which no specific frequency range is specified e.g. Amateur, Science & Research), as well as for certain items in the LIPD Class Licence, for example, for ultra-wide broadband (UWB) transmitters, wall- and ground-penetrating radars, and underground transmitters. Rather, the intention behind including class licences in the list above is intended to protect, for example: Cordless Communications Devices (CCD) including DECT in 1880–1900/1920 MHz, Wireless audio devices in 520–694 MHz and 1785–1800 MHz, the 2.4 GHz ISM band, Radio Altimeters, etc.

As per the previous section, there should be a warning to licensees that making use of this exemption is at the licensee’s own risk. Assessing the risk that the ‘unlicensed’ spectrum may be licensed in the future is up to the licensee to assess and accept.

Extension to AWL and PTS licences

Lastly, we note that the ACMA recognises that the provisions for wideband amplifiers will only work if the same condition is also reflected on the other licence (e.g. in the 2 GHz band), and that it commits—if the provisions are adopted—to go through a process of varying spectrum licence conditions in all frequency bands (excluding 20/30 GHz band defence spectrum licences) so that wideband amplifiers can be operated before spectrum licences are due to start expiring. The ACMA also proposes to consult on the necessary changes that would be needed to expand these wideband amplifier provisions to area wide licences (AWLs) and to public telecommunications service (PTS) licences, and we support this proposal.



850 MHz spectrum licences

Unwanted emission limits in 850 MHz spectrum licences

The ACMA's proposal to change frequency breakpoints on the 850 MHz spectrum licences, with a view to reflecting the planned 1 MHz downshift, is logical and straightforward. Basically, the ranges 870–890 MHz, 825–845 MHz and 849–900 MHz (for the 'non-spurious' domain) will be changed to 869–889 MHz, 824–844 MHz and 849–899 MHz, respectively. In this regard, we believe that the dot point at the bottom of pg. 13 of the consultation paper has a typo: "*Unwanted emissions that apply inside or outside the range 849–~~890~~ 900 MHz be changed to 849–~~889~~ 899 MHz*".

However, we have reviewed the unwanted emission limits in the Core conditions of the 850 MHz spectrum licence, for upper band (BS) transmitters, and found the following errors:

- Core condition #8 specifies the limits on spurious emissions outside the range 849–900 MHz, for Non-AAS transmitters. The description provided is: "*The unwanted emission limits in Table 3, measured over the measurement bandwidth, apply to non-AAS transmitters operating in the frequency range 870 MHz–890 MHz ~~from~~ for emissions falling ~~into~~ outside the frequency range 849 MHz–900 MHz*".
- Core condition #9 specifies the limits on spurious emissions outside the range 849–900 MHz, for AAS transmitters.
 - The description provided is: "*The unwanted emission limits in Table 4, measured over the measurement bandwidth, apply to radiocommunications transmitters with AAS operating in the frequency range 870 MHz–890 MHz ~~from~~ for emissions falling ~~into~~ outside the frequency range 849 MHz–900 MHz*".
 - The emission limits are specified in terms of dBm EIRP; this needs to be changed to **Total Radiated Power / TRP (dBm)**.

We also reviewed the unwanted emission limits for lower band (UE) transmitters, and request that the 'non-spurious' limits of Core condition #10 apply for $f_{\text{offset}} < 25$ MHz (not ≤ 25 MHz), and that the spurious emission limits of Core condition #11 apply for $f_{\text{offset}} \geq 25$ MHz (not > 25 MHz). Having variable frequency offsets that are functions of channel bandwidth—as proposed in the 2.5 GHz TLG—could also be considered. These changes should also be made to the spectrum licences in the 850 MHz "expansion band" (814–824 MHz BRx paired with 859–869 MHz BTx), and to the adjacent 900 MHz band; noting that the 850 MHz expansion band and 900 MHz were auctioned as the same spectrum licence product.



Registration exemption threshold in 850 MHz spectrum licences

We note that the ACMA has not touched on the issue of the registration exemption thresholds for the 850 MHz band at all. The current threshold in 850 MHz band licences is 30 dBm/MHz EIRP.

We have compared registration exemption thresholds across low-band spectrum. The table shows inconsistent arrangements across the four low-band bands. With a view to supporting Power Class 1 (PC-1), we are seeking an increase in the registration exemption threshold for lower-band transmitters from 25 dBm [TRP²] to 33 dBm TRP in the 850 MHz expansion band and the 900 MHz band. With this in mind, and to avoid having inconsistent registration exemption requirements within the 803 to 960 MHz range, we suggest that the renewed 850 MHz band licences be renewed with this revised value of 33 dBm TRP.

Table 1—Comparison of registration exemption thresholds across low-band spectrum

700 MHz band	850 MHz expansion band	850 MHz band	900 MHz band
23 dBm EIRP per occupied bandwidth However, this will be varied (via s72) to 35 dBm EIRP per occupied bandwidth [There is also registration exemption for upper-band tx (BS) radiating <= 30 dBm EIRP per occupied bandwidth]	25 dBm [TRP ²] per occupied bandwidth [There is also registration exemption for upper-band tx (BS) radiating <= 30 dBm [TRP ²] per occupied bandwidth]	30 dBm/MHz EIRP	25 dBm [TRP ²] per occupied bandwidth [There is also registration exemption for upper-band tx (BS) radiating <= 30 dBm [TRP ²] per occupied bandwidth]

AMTA requests that the ACMA amend the current registration exemption threshold from 30 dBm/MHz EIRP to 33 dBm TRP per occupied channel, to accommodate PC-1 user equipment devices and present consistent requirements across 803 to 960 MHz.

² While these thresholds are actually specified in terms of EIRP in the spectrum licences, we understand that this is an error, which the ACMA has offered to correct from EIRP to TRP. As such, for the purposes of comparison, we have assumed that these are actually TRP for all intents and purposes.



Unwanted emission limits for 1800 MHz spectrum licensed upper band transmitters

Up-front, we wish to clarify that this discussion on changes to unwanted emission limits for 1800 MHz upper band transmitters is limited to “non-spurious” emissions within 1795–1890 MHz. There should be **no changes** to the spurious emission limits currently in Tables 7 and 8 of the existing 1800 MHz band spectrum licences, and there should be **no change** to the frequency range of applicability (i.e. outside 1795–1890 MHz).

We appreciate the background that the ACMA has provided to explain why unwanted emission limits that are more stringent than CBO1 were adopted in the 1800 MHz band during the 2021 update to the spectrum licences. It follows that the ACMA has proposed three options³:

- Option I: no change
- Option II: adopt CBO1 limits in all spectrum-licensed areas
- Option III: adopt CBO1 limits except at frequencies above 1870 MHz in Adelaide and above 1865 MHz in all the other mainland State capital cities. The existing limits would apply above 1865/1870 MHz in these metro areas.

AMTA supports the ACMA’s Option II: adoption of CBO1 limits in all spectrum-licensed areas. The use of the 1800 MHz band for public cellular mobile broadband networks is the highest value use of the band in the long-term, and this consultation process is focussed on the creation of a technical framework for licences which will be in place until 2044. On the other hand, rail services in 1800 MHz are only envisioned for the short-to-medium term, reason for which the ACMA has decided not to renew spectrum licences in this top 2 x 10/15 MHz of the band. Further, only the networks still operating GSM-R really need any additional protection, and this is an obsolete technology from which some rail authorities have already migrated away from e.g. the WA Public Transport Authority’s rail network which uses a private 4G/LTE network. Existing cellular networks provide ample evidence that cellular mobile networks can operate on immediately-adjacent channels without the need for stringent unwanted emission limits, provided that the network has BS deployed with sufficient density to ensure good wanted signal level at the mobile station receivers such that they don’t suffer from interference from adjacent-channel networks due to the “near-far problem”. In this sense, we believe that some of the onus needs to be placed back onto the state rail network operators, to:

³ Note: we have used Roman numerals to denote the ACMA’s proposed Options (I, II, III), to avoid confusion with the two Options (1 and 2) for 3GPP Category B limits.



- ensure that their network is deployed with sufficient density such that their mobile stations and cab radios are not relying on a “noise-limited” environment;
- have sufficient selectivity to ensure that any interference occurring in practice is not actually happening due to receiver blocking (instead of unwanted emission levels falling within the receiver channel); and
- remove restrictions for MNOs to deploy BS along rail corridors—co-siting of adjacent-channel infrastructure networks helps with the “near-far problem”.

The above paragraph represents AMTA’s position, however, we note that the ACMA has already expressed its preliminary view that their Option I is preferred (i.e. no change). As such, in case our preferred option (Option II) is not acceptable to the ACMA, we wish to propose an alternative Option (IV), which would consist of two sets of limits:

- A. All transmitters in the 1800 MHz band are to adhere to a first set of unwanted emission limits based on CBO1 (“the A-limits”)—this is with a view to avoid unnecessarily restricting transmitters that do not pose an interference risk to rail services. These limits are specified as a function of frequency offset from the block edges.
- B. Certain relevant BS transmitters are to adhere to a second set of unwanted emission limits based on CBO2 (“the B-limits”), intended to ensure protection of upper-adjacent rail services. These limits are specified as a function of frequency offset from 1865 MHz in the relevant metro areas (Brisbane, Sydney and Melbourne, noting that Adelaide does not have an existing rail network, while Perth has transitioned to a 4G/LTE-based network).

The relevant BS transmitters to which these more stringent emission limits apply are those for which coordination against notional mobile station receivers would fail, with unwanted emission levels consistent with CBO1. In line with the approach currently in RALI MS 34, the notional mobile station receivers would be modelled at the location of the **registered GSM-R BS**⁴, with antenna gain representative of a typical mobile station / cab radio and with protection criterion TBD. To allow greater flexibility, we proposed that this second set of unwanted emission limits—applicable only in the case of coordination failures—be specified in RALI MS 34 itself, rather than as a core condition of the spectrum licences themselves. That way, as things develop,

⁴ Note that the proposed coordination requirements rely on registration of GSM-R base stations. This means that, for example, MNO BS in Adelaide would not be impacted, because the SA Department of Planning, Transport and Infrastructure is not actually operating an 1800 MHz GSM-R network. Furthermore, MNO BS in Perth would also not be impacted, because the Public Transport Authority of WA is operating a Private LTE network (not GSM-R).



restrictions can be modified via updates to RALI MS 34 as opposed to changes to spectrum licences or legislative instruments.

To elaborate on the proposal to specify the B-limits in RALI MS 34 itself, we outline some further thoughts here. For example, the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 1800 MHz Band) 2023* (“the 1800 MHz Tx RAG”) could describe, at a high-level, the following requirement: where the unwanted emissions (consistent with the core condition limits) of a 1800 MHz spectrum-licensed transmitter are predicted to exceed the protection criterion specified for GSM-R mobile stations, **at the location of the associated GSM-R BS that is registered**, then that 1800 MHz spectrum-licensed transmitter is required to adhere to more stringent unwanted emission limits, in accordance with 3GPP Category B Option 2. However, the detail of this requirement including the calculation methodology, protection criterion and fallback emission mask, should be specified in RALI MS 34. It should be noted that neither the 1800 MHz Tx RAG nor RALI MS 34 should state or imply that this constitutes a requirement imposed on 1800 MHz spectrum-licensed transmitters to protect GSM-R mobile radios, nor that they cannot be registered if they exceed the protection criterion. Rather, this coordination requirement is simply to trigger the application of the more stringent limits.



Unwanted emission limits for AAS transmitters

For AAS transmitters, Figure 1 below shows a comparison of the A-limits for a spectrum licence whose licensed bandwidth is completely below 1850 MHz, along with the B-limits applicable above 1865 MHz. It shows that the existing emission limits are actually higher than the alternative CBO2 limits, so we are happy for the **existing emission limits in Core condition #7 of the 1800 MHz band spectrum licences to be adopted for the B-limits for AAS transmitters, except that the frequency offset is relative to a fixed upper band edge**. The fixed upper band edge is 1865 MHz in the relevant metro areas (Brisbane, Sydney, Melbourne).

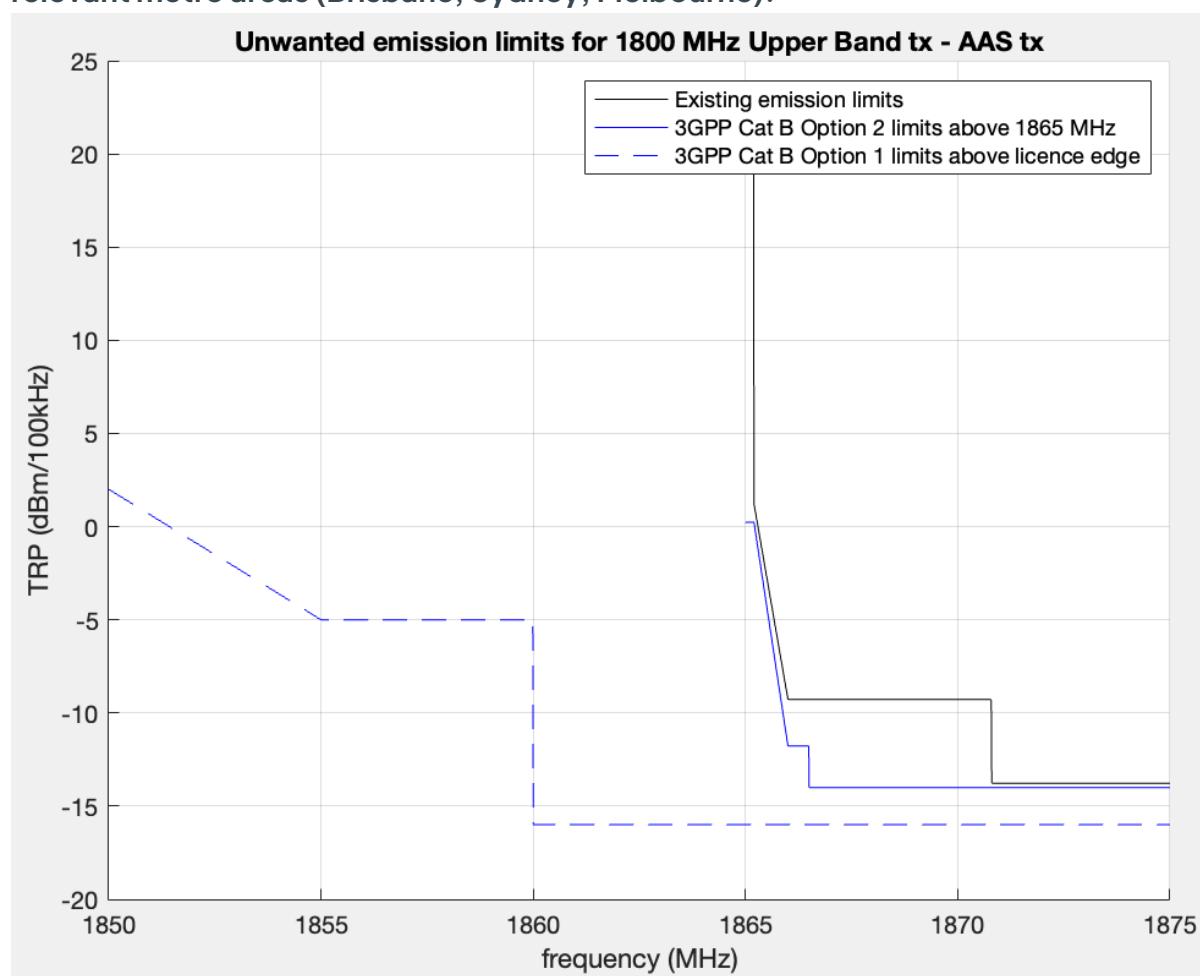


Figure 1—comparison of potential emission limits for AAS transmitters.



Unwanted emission limits for Non-AAS transmitters

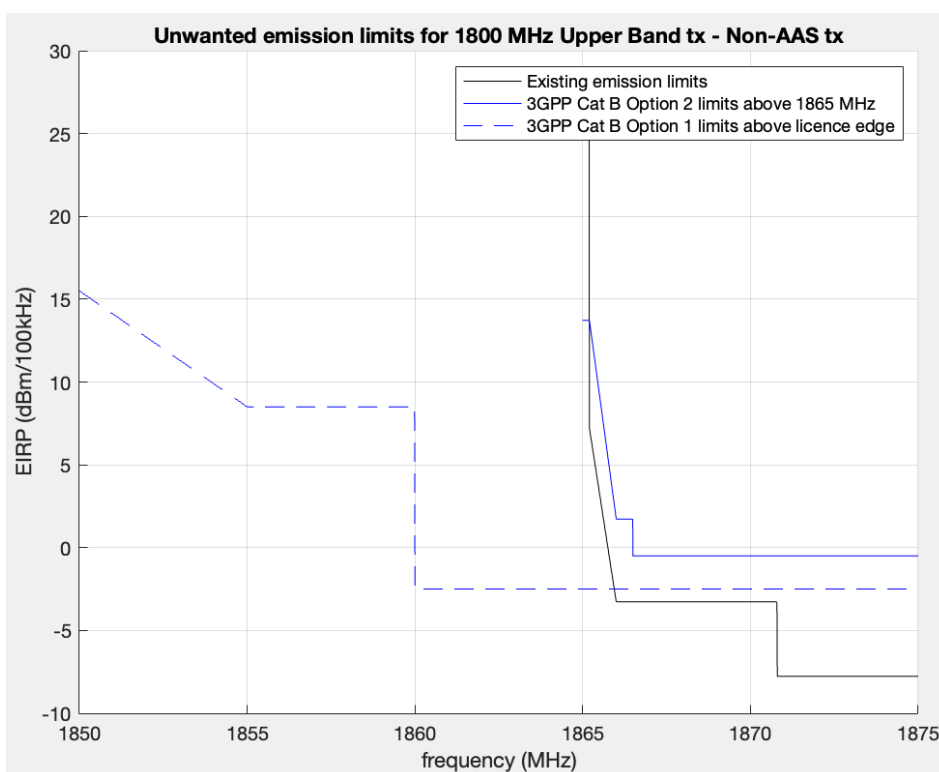
For Non-AAS transmitters, Figure 2 below shows a comparison of the A-limits for a spectrum licence whose licensed bandwidth is completely below 1850 MHz, along with the B-limits applicable above 1865 MHz. It shows that the alternative CBO2 limits are actually lower than the existing emission limits when antenna system gain is ≤ 15 dBi. We recognise that where the antenna system gain increases above this, the alternative CBO2 limits start to creep above the existing limits.

Within the first 5 MHz, and excluding the lowest 200 kHz (so the 4.8 MHz between 0.2 and 5.0 MHz offset), the existing EIRP limits are 17.3 dB higher than the CBO2 conducted limits. This means that the CBO2 conducted limits could be used with a system gain of up to 17.3 dB and would still be within the existing EIRP limits, while higher system gain values of X dB would be exceeding the existing EIRP limits by up to $(X-17.3)$ dB, i.e. up to 5.2 dB exceedance for system gain up to 22.5 dB.

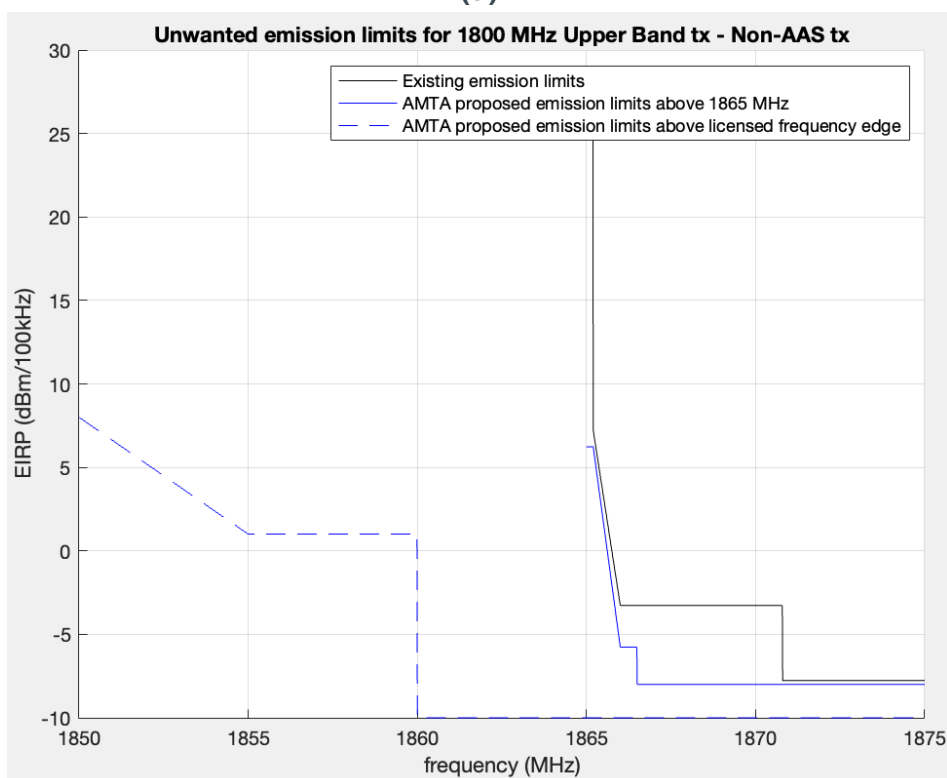
However, as explained earlier in this submission, we don't consider it fair or appropriate for MNOs to be solely responsible for this adjacent-band interference management, and some of this additional ≤ 5.2 dB increase in interference potential should be addressed by the rail operators, with a view to avoiding undue restrictions imposed upon MNO networks caused by having to satisfy Australia-specific emission limits. **Therefore, on balance, we consider it appropriate for CBO2 to be adopted for the B-limits for AAS transmitters, except that the frequency offset is relative to a fixed upper band edge. The fixed upper band edge is 1865 MHz in the relevant metro areas (Brisbane, Sydney, Melbourne). In line with progress made in other bands, we propose that these be stated in terms of conducted power per port rather than in terms of EIRP.**

CEPT Report 80⁵ developed least restrictive technical conditions (LRTC) including block-edge masks (BEM), which were in turn based on existing ETSI emission masks that are identical to CBO2. In section 3.2.2 of that report, CEPT considered GSM coexistence with systems that comply with the proposed technology neutral LRTCs, and in that section concluded that *"the proposed technology neutral LRTCs for AAS BS and non-AAS BS (including implementation of required frequency separation) as described in this Report will ensure that GSM remains protected"*. It follows that certainly nothing more stringent than CBO2 is needed to ensure coexistence with GSM-R.

⁵ CEPT Report 80, July 2021, available here: <https://docdb.cept.org/download/3466>



(a)



(b)

Figure 2—comparison of potential emission limits for Non-AAS transmitters, (a) when 22.5 dBi antenna system gain is assumed and (b) when 15 dBi antenna system gain is assumed.



Consideration of adjacent-band services above and below the 1800 MHz upper band

AMTA notes that the ACMA's preliminary view is that more stringent emission limits should be imposed on 1800 MHz BS tx with a view to not increasing the interference potential to adjacent-band services—namely aeronautical mobile services operated by the Department of Defence (“Defence”) and cordless communication devices (CCD) authorised by the *Radiocommunications (Cordless Communications Devices) Class Licence 2024* (“the CCD Class Licence”), including those using DECT technology. However, it has not determined whether these more stringent emission limits are required for adjacent-band compatibility, or whether this approach is justified on balance, noting the restriction caused to MNO deployments. We believe that the onus is on the ACMA (and the Department of Defence) to determine that unwanted emission levels, that are consistent with CBO1, would cause undue impact to these adjacent-band services.

An important part of these considerations would be the performance (i.e. frequency response) of the receivers of these adjacent-band services. If the adjacent-channel selectivity (ACS) of these services is less than the adjacent-channel leakage ratio (ACLR) of a band-edge 1800 MHz BS tx adhering to CBO1 (i.e. 45 dB), then it would be unwarranted to impose more stringent limits on 1800 MHz BS tx, since the dominant interference mechanism would be the frequency response of the ‘victim’ receivers.

Furthermore, we note that the relevant Defence services operate under Australia-wide Aeronautical licences are issued on a “no interference, no protection” (NINP) basis. While Defence would have to confirm, we suspect that there may be certain geographical locations from which these aeronautical services operate most regularly, reason for which it may be excessive to apply this protection uniformly across the entire country.

With respect to CCD/DECT, these also operate on a NINP basis under the CCD Class Licence. In the mainland state capital cities, there will be a 10–15 MHz guard band between MNO networks and CCD/DECT, and therefore no additional unwanted emission limit is required above 1880 MHz to protect CCD/DECT within these geographical areas. 1800 MHz BS tx operating below 1865 MHz and compliant with the (less stringent) mask of CBO1 will be radiating no greater than +7.5 dBm/MHz EIRP⁶, comparable to the per-MHz equivalent limit of +6.7 dBm/MHz EIRP⁷ that rail services immediately below 1880 MHz currently need to adhere to in 1881.2–1885.8 MHz, and well below the per-MHz equivalent limit of +13.8 dBm/MHz EIRP for 0.2–1.2

⁶ -15 dBm/MHz – 0.5 dB fixed losses + 17 dBi gain + 6 dB for 4TX = +7.5 dBm/MHz EIRP

⁷ -8.5 dBm/MHz EIRP + 10*log₁₀(1000/30) = +6.7 dBm/MHz EIRP



MHz from the licensed frequency edge. Therefore, no special action needs to be taken to ensure coexistence with CCD/DECT in these mainland state capital cities.

Further, and perhaps fortuitously, the highest concentration of CCD/DECT would likely be in inner-city areas of the mainland state capital cities, where they are already protected from MNO networks by the 10–15 MHz guard band as explained in the preceding paragraph. Outside of these areas, use of these intercom systems—which are normally used for high-intensity-radio-use environments like entertainment/sporting events—becomes more unlikely and certainly more geographically sparse. As such, imposing more stringent limits than 3GPP above 1880 MHz to *thousands* of base stations across regional (and remote) Australia, for the sake of protecting a potentially low-density-use service which is already licensed on a NINP basis, is not reasonable. Most DECT-proponent respondents to the ACMA's 1.9 GHz Band Options Paper⁸ assured that there is no geographical delineation between metro and regional areas, since the aim of DECT is that it can be set up anywhere, but anyone, on an as-needed basis. The ACMA has apparently not been convinced by this, as it has proposed to limit access to the additional 20 MHz of spectrum for short range wireless broadband (SR WBB) services (including DECT-2020) in 1900–1920 MHz to *metro areas*, instead opting to keep regional and remote areas available for fixed (point to point and point to multipoint) services.

In any case, the ACMA has not confirmed that there is an adjacent-band coexistence issue between CBO1-compliant networks below 1880 MHz and CCD/DECT above 1880 MHz.

That said, if the ACMA did determine that it was necessary for base stations to adhere to more stringent emission levels with a view to ensuring compatibility with these services, then—in a similar vein to our fallback Option IV presented earlier—we would ask that these should be (a) applied at the edges of the operating bands, not at the block edges, and (b) be no more stringent than what would be permitted by CBO2. For example:

- C. Relevant transmitters⁹ are also to adhere to a third set of unwanted emission limits based on CBO2, with a view to ensure protection of aeronautical services within the 1800 MHz mid-band gap (1785–1805 MHz). These limits are specified

⁸ Responses to the ACMA's discussion paper *Exploring future use of the 1.9 GHz band – consultation 40/2021* are available on the ACMA's website here: https://www.acma.gov.au/sites/default/files/2022-10/Submissions%20-%20IFC%2040%202021_2.zip

⁹ Limit this requirement to geographical areas from which Defence aeronautical services have a higher risk of being interfered with, for example, within defined proximity of relevant military facilities / training grounds.



as a function of frequency offset below the lower limit of the spectrum-licensed band, i.e. 1805 MHz.

- D. All transmitters, **outside of relevant¹⁰ metro areas only**, are also to adhere to a fourth set of unwanted emission limits based on CBO2, with a view to ensure protection of CCD/DECT above 1880 MHz. These limits are specified as a function of frequency offset above the upper limit of the spectrum-licensed band, i.e. 1880 MHz.

CEPT Report 80¹¹ developed least restrictive technical conditions (LRTC) including block-edge masks (BEM), which were in turn based on existing ETSI emission masks that are identical to CBO2. CEPT Report 80 *“defines an additional baseline power limit for non-AAS BS to protect adjacent services in addition to the out-of-block limits”*, which are also based on the same ETSI masks that are identical to CBO2, and concludes that coexistence is possible for all systems that comply with the new technology neutral LRTCs. Noting that CEPT Report 80 considered adjacent-band DECT, MetSat, fixed telemetry (defence) and radio microphones, it follows that certainly nothing more stringent than CBO2 is needed to ensure coexistence with these services.

Consideration of adjacent-band services above and below the 1800 MHz lower band

We have concerns about the application of stringent emission limits below 1710 MHz, seemingly imposed for the sake of protecting just five (5) meteorological-satellite (MetSat) Earth station receivers (ESRX) in 1700–1710 MHz, and we wish to discuss this further with the ACMA.

¹⁰ Brisbane, Sydney, Melbourne only, as explained earlier.

¹¹ CEPT Report 80, July 2021, *Report from CEPT to the European Commission in response to the Mandate “to review the harmonised frequency bands and to develop least restrictive harmonised technical conditions suitable for next-generation (5G) terrestrial wireless systems”, Report B: Channelling arrangements and least restrictive technical conditions suitable for ECS including 5G terrestrial wireless systems in the 900 MHz and 1800 MHz frequency bands, in compliance with the principles of technology and service neutrality*, available here: <https://docdb.cept.org/download/3466>



Proposed apparatus licence arrangements for rail services in the 1800 MHz band

In this section, we refer to the current spectrum space licensed to state rail authorities as “the rail spectrum”—i.e. 1870–1880 MHz BTx paired with 1775–1785 MHz BRx in Adelaide, and 1865–1880 MHz BTx paired with 1770–1785 MHz BRx in the other mainland state capital cities. We agree with the ACMA’s view that PTS: PMTS Class B is the appropriate licence subtype for any 1800 MHz BS used for rail safety and control communications in the rail spectrum. We also agree that—in line with the approach adopted for other services where the BS are authorised by PTS licences—the associated mobile stations (incl. cab radios) and remote stations be authorised by the *Radiocommunications (Cellular Mobile Telecommunications Devices) Class Licence 2024* (“the cellular mobile class licence”). Using the existing licence tax base rate of \$0.01/MHz/pop. for 1800 MHz PMTS Class B licences seems appropriate.

With respect to the proposed changes to support rail use:

- The issue of registering 1800 MHz base stations close to the geographical boundary between spectrum- and apparatus-licensed spectrum space (see following section below), should be able to be dealt with as a single general issue: we don’t believe that rail systems need to be treated any differently to other services in this regard.
- The proposal to ensure that the current spectrum space licensed to state rail authorities be reserved for rail use is reasonable. However, the ACMA should consider how to deal with entire spectrum licence areas (e.g. Adelaide) or significant portions of spectrum licence areas (e.g. southern Brisbane and Gold Coast), at which the state rail authorities have not deployed. Such valuable spectrum laying fallow in metro markets is very inefficient use of spectrum.
- We agree with the introduction of specific rules for the rail spectrum into RALI MS 34, including support for GSM-R (including 200 kHz channel widths) and support for allowing existing BS (that are transitioning from spectrum- to apparatus-licensing) to keep operating at higher power limits than the 50 dBm/30kHz EIRP level. However, we question whether it’s appropriate to maintain this exemption being maintained across the board for new deployments.
- We agree with the proposal to add a requirement for PMTS-B licences in rail spectrum to carry a special condition permitting the operation of rail safety and control communications only, and that this be expanded from the top 2 x 10 MHz to the top 2 x 15 MHz (except in Adelaide, of course).
- We agree that the rail spectrum provisions to be introduced into RALI MS 34 should have or refer to a time limitation, such as those discussed under the



section titled “**Licence durations**” in the consultation paper. Setting an “expiry no later than” date to provide certainty of access to rail operators for a reasonable amount of time, while also giving the ACMA time to carefully consider and determine what is the highest value use of the spectrum, is appropriate. However, we question whether 10 years isn’t too long to determine this.



Issues to postpone consideration of (for now)

AMTA can agree to the ACMA's position that consideration of the following items be postponed for now, with a view to allowing focus on the 850 MHz and 1800 MHz licence core conditions discussed in the preceding sections of this response. However, this tentative agreement is only on the condition that we can progress this work with the ACMA in parallel and either make changes to the Spectrum Marketing Plan (or whichever is the applicable documentation in force between June 2026 and June 2028) and/or vary spectrum licences beyond June 2028 using section 72 of the *Radiocommunications Act 1992*. Rushing to finalise the SLTFs with insufficient time, just for the proposed licensing details to be static for two years before renewal, is not optimal and can lead to long-term inefficiencies in spectrum use.

The issues for which we can delay further consideration are:

- Consideration of impact of relaxed OOBE on DECT in 1880–1900 MHz—unless this hinders adoption of AMTA's proposed unwanted emission limits for 1800 MHz upper band transmitters.
- Consideration of impact of relaxed OOBE on Defence aeronautical services in 1785–1805 MHz—unless this hinders adoption of AMTA's proposed unwanted emission limits for 1800 MHz upper band transmitters.
- Issue of registering 1800 MHz base stations up to the geographical boundary between spectrum- and apparatus-licensed spectrum space, especially noting the planning process for the 1800 MHz and 2 GHz bands outside spectrum-licensed spectrum space (for which AMTA submitted that the 1800 MHz band should be re-allocated for spectrum licensing in Remote areas). This AMTA proposal is with a view to—insofar as the 1800 MHz and 2 GHz bands are concerned—consolidate MNO holdings in the 1800 MHz band and to consolidate Non-MNO holdings (including Private LTE systems) in the 2 GHz band.
- Registration exemption up to Power Class 1 (PC1) power levels, in the 1800 MHz band.
- The proposed apparatus licensing arrangements for rail in the 1800 MHz band. There is considerable time to consider this, and we would appreciate the opportunity to provide all views as part of subsequent consultation processes (especially with respect to in-block power limits, unwanted emission limits, and receiver performance requirements).

