Australasian Railway Association

ACMA Submission

Review of the 850 MHz and 1800 MHz spectrum licence technical frameworks

21 April 2026

ABN: 64 217 302 489

Australasian Railway Association

The ARA

The Australasian Railway Association (ARA) is the peak body for the rail sector in Australia and New Zealand, and advocates for more than 230 member organisations across the industry.

Our membership covers every aspect of the rail industry, including the:

- passenger and freight operators that keep essential rail services moving;
- track owners, managers, and contractors that deliver a safe and efficient rail infrastructure network; and
- suppliers, manufacturers, and consultants that drive innovation, productivity, and efficiency in the rail industry.

Our members are driven to support vibrant, sustainable and connected communities through greater use of rail across Australia and New Zealand. We bring together industry and government to help achieve this ambition.

Our advocacy is informed by an extensive research program to ensure we offer solutions that are grounded in evidence and focused on delivering tangible value in our daily lives.

The rail industry has a crucial role to play in the region's sustainable development and growth and offers meaningful and rewarding careers for tens of thousands of people in the regions.

Our significant program of work is focused on supporting a strong advocacy agenda, and creating opportunities for the rail industry to network, collaborate and share information, and maximise the benefits we have to offer the wider community.

The ARA thanks the Australian Communications and Media Authority for the opportunity to make this submission, which has been developed in consultation with ARA member organisations.

Any questions regarding this submission should be directed to Joanne Wilson-Ridley, Policy Manager via jwilsonridley@ara.net.au.

Australia's Rail Industry

Rail is a significant industry in Australia, creating economic activity through its operations and capital investments. It is an industry with activities across every major metropolitan and regional area and is supported by the full spectrum of skills in the Australian workforce.

In 2024, the rail industry contributed around $39 billion to the Australian economy and employed more than 196,000 workers (directly and indirectly in full-time equivalent terms, FTE). There is currently $162 billion of investment in rail civil construction and maintenance projects forecast over the next 10 years.

Railway response

The ARA welcomes the ACMA's invitation to respond to questions raised in ACMA's paper ***Review of the 850 MHz and 1800 MHz spectrum licence technical frameworks consultation paper, February 2026*** (referred to as *the paper*). The ARA's response is set out below noting that comments are provided on behalf of and in consultation with rail industry representatives, including jurisdictions that currently hold licences to use spectrum in the 1800 MHz band.

The ARA is providing comments in the context of previous submissions to the ACMA by the ARA (and the rail industry) relating to the current Expiring Spectrum Licence process for the 1800 MHz band. That is:

1. The rail industry sees no clear pathway for existing rail users to exit the 1800 MHz band;
2. The ACMA should consider 1800 MHz and 1900 MHz as a paired, interdependent rail allocation - not independent or substitutable bands;
3. Continued access to 1800 MHz spectrum is necessary for long-term rail operations to support current systems, equipment replacement cycles, and to maintain parity with EU/UK FRMCS/RMR directions and applications that require access to two separate spectrum bands: a 900 MHz primary band; and a 1900 MHz complementary band; and
4. Decisions affecting 1800 MHz technical framework directly constrain the future utility of 1900 MHz, because:
    a. FRMCS/RMR architectures assume coordinated planning of primary and complementary bands; and
    b. Migration, parallel running, and redundancy depend on predictable coexistence rules across both bands.

The ARA notes separate discussions are taking place with the ACMA regarding the renewal of rail industry licences for the 1800 MHz band. Rail's use of the 1.9 GHz band—following EU/UK developments—can only be supplementary to the existing allocation and licensing of spectrum in the 1800 MHz band.

Assumption of non-renewal of Rail Spectrum Licences

The ACMA's proposed future arrangements for rail services authorised under apparatus licences is of major concern to the ARA as the ACMA continues to emphasise that this is the likely outcome of the Expiring Spectrum Licence process.

The ARA understands the ACMA has included information on these future arrangements in *the paper* to help rail evaluate any impacts of the ACMA's preferred view to not renew rail spectrum licences and transition rail to a PTS apparatus licence.

The ARA acknowledges *the paper* assumes no rail spectrum licences will be renewed despite legislation requiring the ACMA to evaluate individual applications for spectrum licence renewal. As such, the ARA has prepared this response to *the paper based* on this same assumption. This assumption does not indicate that rail spectrum licensees will refrain from applying for 1800 spectrum licence renewal.

Updates to technical frameworks

The ARA appreciates that the ACMA intends to update the technical frameworks for 850 MHz and 1800 MHz bands to:

- reflect ACMA's preferred views on Expiring Spectrum Licences in these bands;
- improve the utility of the spectrum;
- harmonise with international standards; and
- remove unnecessary conditions.

The ARA recognises the importance of this consultation in looking to support wideband amplifiers operating across multiple licences and multiple bands. This regulatory change would reduce network costs and simplify network design. The ARA considers this would be useful to rail infrastructure managers (RIM) as a potential solution to migration and upgrades where rail has access to multiple bands and where equipment is available to aggregate 1800 and 1900 licences using wideband amplifiers.

The ARA is deeply concerned that the ACMA is considering relaxing unwanted emission limits and, instead, the ARA proposes that adoption of 3GPP Category B Option 2 UEL would:

- reduce overall interference to adjacent services and bands;
- better protect other low power services; and
- better protect existing 1800 and future 1800 and 1900 FRMCS/RMR rail services.

Terms and abbreviations

Term	Definition
1800	1800 MHz band (1710 MHz to 1785 MHz and 1805 MHz to 1880 MHz)
1900	1.9 GHz band (1900 MHz to 1910 MHz)
AAS	Active Antenna System
ARTC	Australian Rail Track Corporation
BS	Base Station
ES	Enhanced Selectivity and BS receiver compliant to ETSI TS 103 807
IB	In band
MCX	Mission Critical Services
MNO	Mobile Network Operators
NTC	National Transport Commission
ONRSR	Office of the National Rail Safety Regulator
OOB	Out of band
RIM	Rail Infrastructure Manager as defined in Rail Safety National Law
RMR	Railway Mobile Radio. It is a generic term for a system used to carry rail safety and control communications. In this context, RMR refers to a system operating in 1800 MHz or 1.9 GHz bands.
UEL	Unwanted Emission Limits

The ARA response to the ACMA questions

Question 1

Do you agree that the existing section 145 determinations and advisory guidelines for the 850 MHz and 1800 MHz band can remain unchanged to support the renewed spectrum licences?

The ARA response to Question 1

The ARA understands that current section 145 determinations and advisory guidelines for 1800 suggest that in an interference scenario between an 1800 BS under a spectrum licence and an 1800 BS under an apparatus licence, that the spectrum licence would have a higher level of rights than the apparatus licence.

This means:

- Spectrum licences do not need to coordinate with apparatus licensees; and
- Apparatus licensees must coordinate around spectrum licensees.

Can the ACMA confirm this interpretation?

If so, the ARA would consider apparatus licences to be inappropriate for rail safety and control communications services if these licences are adjacent to spectrum licences with high-power transmitters: the ARA is concerned that rail has not been fully informed of all consequences of moving from a spectrum licence to an apparatus licence – in effect rail safety would be considered a secondary service.

The ARA would like the ACMA to state what reduction in rights and participation in spectrum management process are expected for proposed apparatus licences in 1800.

Specifically, the ARA would appreciate the ACMA's detailed answers to these questions:

Technical Frameworks

Would a change of licensing arrangement impact on rail licensees' ability to participate in Technical Framework changes with equal status as other licence holders. The ARA notes that as part of the ESL process, technical framework changes are being considered to take effect in June 2028. Post spectrum licence expiry, will rail apparatus licence holders be invited to participate in any TLG established to consider changes affecting the 1800 spectrum?

Certainty of Licence

ARA members holding spectrum licences have certainty that they can use spectrum to deploy networks to meet public rail transport needs. Spectrum licences provide certainty necessary to invest for long-term, and transport agencies need to know that rail has certainty of continued access to spectrum before they commit to long-term communication and control system projects.

Can the ACMA assure future rail apparatus licence holders that 1800 MHz spectrum will be available while rail needs it?

Impact of Reduced Fees

The ARA understands that overall regulatory cost of apparatus licensed spectrum is lower than spectrum licensed spectrum. When a cost is reduced there is an expectation that there will be a reduction in service.

What service reduction can rail licence holders expect?

Device Registration

With a rail apparatus licence for 1800 MHz spectrum, will there be any changes to device registration requirements or arrangements?

Frequencies

What restrictions will be placed on frequencies that rail can use in the 1800 MHz band?

Locations

What restrictions will be placed on where rail may site base stations using the 1800 MHz band?

Interference

What IB or OOB interference will rail 1800 BS, mobile stations, and cab radios need to accept from spectrum licence transmitters compared to operating within a spectrum licence?

Question 2

A) Do you think that that the proposed condition to support the operation of wideband amplifiers would facilitate scenarios envisioned by licensees?
B) In which frequency bands do licensees intend to operate wideband amplifiers?
C) Should these arrangements also be included in the technical framework for AWL and PTS apparatus licences?

The ARA response to Question 2

A) The ACMA describes a problem where a licensee with, say, two licences in different frequency bands, wishing to operate a wideband amplifier across these licences is required to comply with different licence UELs.

The ARA is generally concerned that any changes to 1800 licence conditions preserve or improve the current interference environment. In considering future 1900 use, the ARA is also looking to the ACMA to ensure future systems in 1800 and 1900 are protected from wideband interference and OOB emissions from adjacent services.

The ARA wishes to remind the ACMA that current design guidelines for GSM-R require high signal levels, 95% coverage, large handover areas, and high connection success probabilities to ensure Rail Emergency Calls and movement authorities—that keep trains apart—are not delayed.

The ACMA provides a helpful example of a licensee with an 1800 spectrum licence and a 2 GHz spectrum licence wishing to operate a wideband amplifier across both licences as per Figure 1.

Figure 1 shows an 1800 Tx operating at 50 dBm/10 MHz in 1870-1880 MHz (band edge) and a 2 GHz Tx operating at 50 dBm/10 MHz in 2110-2020 MHz (band edge). The figure shows different UEL for each licence: for 1800 licence, it seems to represent current 1800 licence UEL for an AAS system; and an illustrative 2 GHz UEL for an AAS system which are importantly shown to be different.

The ACMA discussed this problem with other industry parties, and a preferred solution is to introduce a licence condition that permitted a licence UEL to be exceeded.

The ACMA suggests this is to permit wideband amplifier operation “while not altering the existing interference environment”.

The ARA supports an intention to not alter the existing interference environment but suggests this wording does not provide sufficient clarity.

The ARA notes that the ACMA writes that “... the proposed condition should:

- Permit the amplifier to exceed the unwanted emission limits on one licence, if there is a less restrictive unwanted emission limit (for the same frequency range) specified on the other licence, and where the radiated emissions do not exceed that limit.
- 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."

The ARA finds this proposed condition difficult to follow, in part because it does not distinguish which UEL condition applies - the ACMA should distinguish in-band (IB) UEL, out-of-band (OOB) UEL, and operating power limits.

The ARA interprets ACMA's proposed condition as follows. That an amplifier:

- operating across multiple frequency bands (e.g. 1800 and 2 GHz);
- is authorised by two or more spectrum or apparatus licences (e.g. 1800 licence and 2 GHz licence);
- Licence conditions should make it clear which UEL applies:
    - For OOB UEL (e.g. Core condition 10 and 11 on 1800 licences), most restrictive UEL applies. The ARA understands this to be outside of 1795 - 1890 MHz for 1800 licences; and
    - For IB UEL, most permissive UEL applies to enable operation of wideband amplifier. The ARA understands this to be typically licenced frequency range +/- 5.8 MHz (1800) or 10 MHz (2 GHz).

The ARA proposes changes to proposed conditions (d) and (e) to address possible differences in OOB UELs, other licence IB UEL, and other licence operational power emissions:

> the radiocommunications transmitter, when operating under this spectrum licence:
>
> (d) must comply with the out-of-band unwanted emission limits in a particular frequency range that are specified in the other licence, to the extent that those limits ~~**differ**~~ **are more restrictive** than 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 out-of-band unwanted emission limits described in Core Conditions 8*/10** and 9*/11** of this spectrum licence in respect of in-band **and maximum permitted level of radio emissions caused by the operation of radiocommunication transmitters specified in Core Condition <850 #>*/21**** ~~**operation**~~ in frequency bands set out in the other licence.

B) Rail industry can see potential use of wideband amplifiers across 1800 and 1900 should standards and equipment support this combination. This will permit parallel use of, say, half of 1800 licence with half of 1900 licence using same site and same wideband amplifier and antenna systems. The other half of licences can then be used to deploy replacement network when required and to provide redundancy and capacity when operating in parallel. This configuration also enables optimum allocation of spectrum to each network to ensure current and replacement networks have sufficient capacity to carry rail safety and control communications.

   The ARA views this as a possible mechanism to continue use of a guard band (if required); to utilise both bands efficiently; and to follow EU/UK requirements by maintaining primary and complementary bands for migration and capacity - especially where rail traffic is high.

C) Given rail interest in carrier aggregation and multi-band wideband amplifiers for 1900 and 1800, PTS apparatus licence should be included.

Question 3

Do you agree with the proposed changes to incorporate the frequency downshift in renewed 850 MHz band licences?

The ARA response to Question 3

The ARA does not anticipate material impacts on rail communications systems arising from the proposed downshift in the 850 MHz band. The ARA in general, supports maintenance of protection from adjacent band interference.

The ARA notes that the frequency downshift establishes a necessary guard band between 850 and 900 MHz bands where there is a difference in device power output.

The ARA is also reminded that during previous 1800 SLTF discussions that a 3 MHz guard band was considered minimum necessary to provide equivalent protection for GSM-R from a high-power wideband (4G/5G) AAS transmitter in an adjacent channel to rail licences in 1800.

Question 4

What are your views on the proposed removal of rail-specific conditions from renewed 1800 MHz band spectrum licences?

The ARA response to Question 4

The paper proposes – based on the transition of rail services to apparatus licences - to remove conditions specific for rail services: EIRP; GSM-R cab radios; and GSM-R mobile radios.

Given that conditions can be added to spectrum licences for each licensee, the ARA suggests that GSM-R specific conditions mentioned in Schedule 2 (20a, and 21a) and Schedule 3 (4b, and 4c) can be removed from non-rail spectrum licences but should remain in any spectrum licence or apparatus licence issued to a RIM.

The ARA considers these conditions to be necessary for continued operation of GSM-R as these are specific to GSM-R operation in 1800 for rail safety and control communications.

Question 5

What are your views on the proposed options for unwanted emissions for transmitters in the upper 1800 MHz frequency segment?

The ARA response to Question 5

The paper proposes three options for altering Unwanted Emission Limits (UEL).

The ARA notes that the ACMA prefers Option 1 and to make no change to UEL because:

- "Reported instances of interference to rail mobile terminals mean that relaxing the unwanted emission limits outside the upper frequency segment cannot be considered without further evidence that the potential for increased interference to adjacent band rail services is sufficiently low."; and
- "The effects of Options 2 and 3 on adjacent band services, cordless communications devices directly above 1880 MHz and aeronautical mobile in the mid-band gap are currently unknown."

The ARA acknowledges the ACMA's consideration of the importance of rail services by stating that:

> "Subject to assessment of the impact to cordless communications devices and aeronautical mobile services adjacent to the band, we are of the view that, if we were to make a change from Option 1, that Option 3 be considered, on the basis that the:
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> • Relaxation would not impact rail services. While utility for rail services near the geographical boundaries may be degraded, the nature of rail services largely being confined to rail corridors means that the impact would not be significant..."

The ARA would like to highlight that both Option 2 and Option 3 would also increase permitted interference into rail licences by up to 19 dB where an adjacent licence has deployed AAS. The ARA considers that to be a significant increase and is likely to increase instances of harmful interference to rail services.

The ARA supports Option 1 in absence of any other alternative.

The ARA welcomes and agrees that "[f]or Option 2 to be considered, if [ACMA] were to make a change from Option 1, [ACMA] would need detailed evidence for coexistence and agreement between the current users of the band."

The ARA believes there is a fourth option that was first proposed in 2020/2021 1800 SLTF: to adopt 3GPP Category B Option 2 UEL. This would preserve UEL to levels equivalent to current levels and reduce impact on adjacent services and future services such as FRMCS/RMR in 1900. The ARA suggests that since this UEL is specified by 3GPP and is an option and may be applied regionally, that this UEL would be preferred to maintaining current 1800 UEL.

The ARA understands that 3GPP Category B Option 2 is specified for a number of 5G bands including 1800 (n3), 2 GHz (n1), 1900 (n101), 2500/2600 (n7), and 900 (n8).

Adopting 3GPP Category B Option 2 in 1800 and 2 GHz band – as ARA assumes would also be required to support wideband amplifiers using both bands - would also reduce interference to 2 GHz adjacent bands including FRMCS/RMR in 1900. The ARA encourages the ACMA to apply available 3GPP UEL options that exist to minimise OOB interference wherever practical and permitted by international standards.

Option 1: No change

The ARA supports Option 1 in absence of any other choice.

The ARA requests the ACMA to consider another option, namely, 3GPP Category B Option 2 that:

- updates UEL for 4G and 5G technologies;
- maintains non-AAS UEL;
- better supports wideband amplifier operation where equipment supports it;
- minimises interference into adjacent bands, licences, and services such as DECT, and FRMCS/RMR in 1900;
- permits rail option of considering wideband amplifier use in future; and
- permits rail to more easily deploy FRMCS/RMR in 1800.

Option 2: Adopt 3GPP Category B Option 1 limits in all spectrum-licenced areas

The ARA opposes Option 2.

Under this option, MNOs in 1800 are permitted to increase unwanted emissions into rail 1800 spectrum.

The ARA notes that option 2 permits higher UEL into DECT and mid band gap and, due to this, the ACMA states that "[f]urther examination of the impact to these services [DECT and aeronautical mobile services] would be required before a relaxation of unwanted emissions could be considered". The ARA suggests that this examination should take place before any decision on this paper is made to allow DECT users and aeronautical mobile services to consider impact and contribute submissions.

The ARA notes that Option 2 proposes to significantly relax UEL in first 200 kHz from licence edge. The ARA presumes this is to support operation of GSM-R services. The ARA acknowledges this allowance for GSM-R but holds a view that UEL should not stray from 3GPP UEL to ensure rail is able to deploy FRMCS/RMR in 1800 without high levels of UEL from adjacent channels and without special configuration or design.

The ARA notes that table 2 and graph of AAS UEL in figure 3 do not agree. Should it be +2 and not –2 in '-2 - (7/5) * f_{offset} / 100 kHz' to set AAS UEL at +9 dB as per p16.

The ARA considers changes to 1800 technical framework to be potentially harmful to rail services in 1800. Overall, UEL levels will be permitted to increase by up to 10 dB for non-AAS systems and up to 19 dB (compared to current 1800 UEL) for likely scenarios where a high-power transmitter using AAS is adjacent to a rail licence.

Option 3: Adopt 3GPP Category B Option 1 limits except at frequencies above 1865 MHz (in Brisbane, Sydney, Melbourne, and Perth) or above 1870 MHz (in Adelaide)

The ARA opposes Option 3.

The ARA notes that tables 3 and 4 appear to have the same TRP AAS formula error as table 2.

The ARA opposes Option 3 for these reasons:

- adjacent licences would be permitted to increase interference – by up to 10 dB - into first 10 MHz of rail licence;
- this would work in favour of adjacent licensees - permitting use of wideband amplifiers - but would make it difficult to operate future FRMCS/RMR in 1800 due to continuance of non 3GPP UEL that was designed to support GSM;
- it would make it difficult for rail to make use of wideband amplifiers in future; an
- due to higher permitted interference levels, rail would have more difficulty in utilising most of its licence and, in case of Adelaide, would have combined AAS and 3GPP Category B Option 1 limits up to 19 dB higher than present levels.

  The ARA considers Option 3 changes to 1800 technical framework to be potentially harmful to rail services in 1800. Overall, UEL levels will be permitted to increase by up to 10 dB for non-AAS systems and up to 19 dB (compared to current 1800 UEL) for likely scenarios where a high-power transmitter using AAS is adjacent to a rail licence.

Question 6

Can you provide any analysis or other evidence on coexistence with adjacent band services that would support consideration of Option 3?

The ARA response to Question 6

The ARA opposes Option 3.

The ARA understands Option 3 applies 3GPP Category B Option 1 to:

- Beyond metropolitan areas (defined by rail spectrum licences and specified in Appendix A); and
- Above 1865 MHz in metropolitan areas (1870 MHz in Adelaide).

The ARA understands that there is potential for increased interference near rail spectrum licence boundaries.

The ARA cannot provide any analysis, however, it is clear that if Option 3 is selected then adjacent services would not experience increased interference from rail services in 1800, however rail services would be impacted by this change.

The ARA considers Option 3 changes to 1800 technical framework to be potentially harmful to rail services in 1800. Overall, UEL levels will be permitted to increase by up to 10 dB for non-AAS systems and up to 19 dB (compared to current 1800 UEL) for likely scenarios where a high-power transmitter using AAS is adjacent to a rail licence.

Question 7

What are your views on the proposed high-level licensing and technical arrangements for rail services in the 1800 MHz band, which are intended to apply after the expiry of spectrum licences?

The ARA response to Question 7

The ARA supports continuation of current 1800 licence conditions including:

- Coverage of current spectrum licence area that supports current and planned FRMCS/RMR networks;
- Current EIRP and TRP limits; and
- Current licence and geographic boundary rules addressing harmful interference.

The ARA also supports extension of 'rail safety and control communications' condition that preserves spectrum for rail services and indicates that rail has no intention to profit from this spectrum and instead, requires this spectrum to provide an engineered network for control systems to keep trains apart and discharge duty set by Rail Safety National Law.

The ARA representing rail spectrum holders is willing to participate in work to demonstrate rail industry view that current and proposed rail spectrum is necessary and required for state rail operators to implement rail specific FRMCS/RMR networks and avoid dependencies on MNO and LIPD spectrum. RIMs are following EU/UK developments that require two spectrum bands: a primary and a complementary band to meet migration, and future rail applications as per CEPT Report 76.

The ARA, however, expects that a limitation on access to 1800 spectrum will concern all state governments deploying train control systems such as ETCS: Rail expects a long life from deployed assets and systems reliant on them – typically, for telecommunications assets rail expects a supported life exceeding 20 y (similar to MNO 3GPP generation life) that includes a mid-life upgrade before network needs to be replaced.

RIMs and rail operators are 'standards takers' and can't control standard development process, equipment availability, or network engineering service availability. This means Australian rail industry is dependent on following technology developments from EU/UK including access to two spectrum bands, noting that EU/UK consider 1900 band to be complementary to their primary band in 900 MHz. In Australia 1800 band is recognised as the primary band due to unavailability of spectrum in 900 MHz band.

Question 8

What are your views on the potential effect that the proposed changes to the 850 MHz and 1800 MHz band technical frameworks may have on other services?

The ARA response to Question 8

The ARA emphasises that railway communication networks support critical public transport infrastructure. Ensuring protection for these services should remain a priority in spectrum management decisions.

The ARA proposes a fourth option for UEL that was first made in 2020/2021 1800 SLTF: to adopt 3GPP Category B Option 2 UEL for wideband services. This balanced approach would preserve UEL to levels equivalent to current levels and minimise impact on adjacent services including future rail spectrum.

Adopting 3GPP Category B Option 2 in 1800 and 2 GHz band for wideband services – as the ARA assumes would also be required to support wideband amplifiers using both bands - would minimise interference to 2 GHz adjacent bands including FRMCS/RMR in 1900.

The ARA encourages ACMA to apply available UEL that exist to minimise OOB interference wherever practical and permitted by international standards.

The ARA supports further assessment of impact on cordless communications operating in 1880-1900 band.

Question 9

What are your views on the issues not being considered by this consultation?

The ARA response to Question 9

The ARA notes that some proposed changes impact the boundary between 1800 licence areas including rail licences. Depending on what options are implemented, the ARA expects that rail industry will be consulted, and studies performed to determine potential for increased interference to rail services and establish necessary limits conditions to mitigate harmful interference.

Question 10

Do you have further information on the use cases and coexistence of PC-1 devices with other services that can assist in the future consideration of this issue?

The ARA response to Question 10

The ARA notes that on page 30 “rail certain services” should probably be “certain rail services”.

The National Network for Interoperability (NNI) is a critical initiative by the National Transport Commission (NTC) designed to define the interstate freight and passenger rail corridors connecting Australia's major ports, regions, and cities. Approved by Australia's Infrastructure and Transport Ministers (ITMM), the NNI treats these individual rail networks as a single connected system to improve safety, productivity, and efficiency.

Mandatory Standards include a requirement that all future investments in digital train control systems on the NNI must comply with European Train Control System (ETCS) national standards to ensure seamless connectivity.

The ARA understands, as a direct consequence of the ITMM decision to mandate ETCS for NNI, that FRMCS will be standard for railway mobile communications – not just on the NNI, but across mainland Australia.

Many freight or NNI services traverse metropolitan rail networks (Perth, Adelaide, Melbourne, Sydney, and Brisbane) and therefore NNI will require FRMCS/RMR operation over a combination of public MNO, FRMCS/RMR networks, and satellite services.

As for FRMCS/RMR in 1800 and 1900, rail networks are designed for cab radio maximum output power of 33 dBm EIRP (31 dBm UE + 5 dBi – 3 dB cable loss). Therefore, permitting use of PC-1 cab radios in 850, and metropolitan and regional 1800 licences would permit same radio RF design to be used across all FRMCS/RMR networks and avoid requiring separate radios for metropolitan and regional use.