



ARA Submission

Approach to expiring spectrum
licences

Consultation Paper

9 August 2023

ABN 64 217 302 489

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 220 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.

We believe the rail industry has a crucial role to play in the region's sustainable development and growth, and know that the industry 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 [REDACTED], [REDACTED] via [REDACTED].

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 2019, the rail industry contributed around \$30 billion to the Australian economy and employed more than 165,000 workers (directly and indirectly in full-time equivalent terms, FTE). The industry is made up of around 900 businesses that are located in approximately 20 major hubs.

General Comments

Australia is facing a number of challenges including widespread skills shortages, cost-of-living pressures, housing shortages, and the impacts of climate change. In connection with these challenges, our cities and regional areas are seeing growing populations and shifting settlement patterns, increasing congestion, and the investing in technology that enables a net zero future. These challenges must be dealt with in a holistic manner in conjunction with the Australian Government's wider policy objective of making communities better places to live¹ by investing in infrastructure to spread wealth and opportunity, and to build a better, more connected nation.²

The Council of Australian Governments' 2011 Intergovernmental Agreement on Rail Safety Regulation and Investigation Reform committed the parties to improved rail safety and seamless national safety regulation of rail operations. Consistent with that agreement, the Australian Government has decided to promote a nationally consistent allocation of spectrum to the Rail Authorities in the 1800 MHz band for Rail Safety and Control Communications. Further, the Australian Government has committed to a workplan with the states and territories that includes improving the interoperability of rail systems.³

All mainland states agreed to standardise on 1800 MHz to ensure future passenger and freight interoperability for a national Defined Interstate Rail Network (DIRN) through suburban rail networks. This standardisation was enabled by rail operators securing 15 MHz of the 1800 MHz spectrum for rail safety systems use. Billions of dollars have been invested in train radio and safety and control networks to operate essential public transport services and facilitate the movement of freight that are compatible with the 1800 MHz spectrum and fulfill the safety responsibilities under the Rail Safety National Law. Further, the use of the 1800 MHz band by rail operators aligns with the objective of the *Radiocommunications Act 1992* to promote the long-term public interest derived from the use of the spectrum as well as facilitating the public safety use of the spectrum.

In contrast to Europe, Australian rail operators lack viable and equivalent alternative spectrum options if the 1800 MHz band becomes unavailable. Consequently, the failure to renew the 1800 MHz licences could bring about a catastrophic halt for hundreds of millions of commuters and hundreds of millions of tonnes of freight and significant financial consequences for the Australian economy. Safeguarding the availability of the 1800 MHz band is essential to ensure the continued functionality of vital transportation networks, underscoring the urgency of renewing these licenses.

¹ [Speech to the Australian Local Government Association National General Assembly | Ministers for the Department of Infrastructure](#)

² [AFR Infrastructure Summit 2022 | Ministers for the Department of Infrastructure](#)

³ [AFR Infrastructure Summit 2022 | Ministers for the Department of Infrastructure](#)

Issues For Comment

The following information is provided by the ARA to address the issues for comment presented in the Approach to Expiring Spectrum Licences Consultation Paper.

1. What are your views on the proposed public interest criteria? Are there other criteria we should consider?

What are your views on the proposed public interest criteria?

The ARA wishes to highlight that state governments (e.g. *Essential Services Act 1988* (NSW)) consider passenger rail as an essential public service and according to the Explanatory Memorandum to the Reform Bill:

“... some of the matters that ACMA may consider in making a decision regarding the public interest of renewing a spectrum licence include: if the licence is used to supply essential public services and there is the potential that a change in licensees may put at risk delivery of services to a significant number of people, whether the incumbent can demonstrate substantial investment and past long-term use of the licensed spectrum, and considerations of the highest value use of the spectrum”.⁴

ARA members strongly recommend that spectrum licences are renewed for a minimum period of 20 years. This would allow rail jurisdictions to fully utilise equipment life-cycles, to plan for upgrades and replacements, to align with mobile network radio technology generations, and would permit certainty of spectrum availability for essential services.

Criterion 1: Facilitates efficiency

The ARA is concerned that, while rail jurisdictions are using or migrating to more technically efficient equipment, it would be difficult to demonstrate productive efficiency if compared to commercial carriers. The nature of rail safety and control systems require dedicated networks which, in turn, require relatively large spectrum allocations; higher capital costs; and higher labour costs per registered user. In part, these higher costs are due to specific engineered networks being focused on delivering mobile coverage at high levels of availability to few direct users, with the objective of maintaining rail safety while minimising train separation and maximising network utilisation.

The ARA suggests that productive efficiency is a relative measure for a given industry and – in case of rail transport - should be determined by comparing previous traditional signalling systems to spectrum dependant, modern, signalling and train control systems which increase the efficiency of rail networks. By having a highly reliable and secure rail network, economic savings can be achieved from reduced and or eliminated train delays that can adversely impact economic activity. ARA members holding 1800 MHz spectrum licenses are concerned this criterion would negatively impact

⁴ https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/bd/bd2021a/21bd025

their ability to have spectrum re-issued. These concerns are exacerbated by the fact that the deployment of international standardised railway telecommunication systems require spectrum allocations not available in Australia. The ARA believes changes to how spectrum is re-issued should not be retrospective and impact existing licence holders.

International standards for rail safety and control systems are generally based on proven and mature technologies. Due to the nature of safety systems, these standards and associated technologies generally do not change at the same rate as commercial networks, which may implement newer technologies to capture market advantage. This may not necessarily lead to the most efficient planning, allocation and use of spectrum. For example, the European Train Control System (ETCS) is currently based on 2G (GSM-R), while the rail industry is working towards a 5G replacement solution. Standards for this solution are not expected to be finalised until 2026. Hence, the Australian rail industry is somewhat constrained in the choice of technologies by following international standards and best practice.

Use of spectrum for rail safety and control communications is very different to spectrum used for commercial mobile networks. Rail safety and control systems need to be highly available and reliable, often with duplicate systems to provide redundancy. Additional spectrum is also required to transition to new technologies while maintaining operation of rail safety and control systems on a live rail network.

Criterion 2: Promotes investment and innovation

The ARA is concerned that criterion 2 focuses on commercial and direct use of spectrum as a driver of long-term investment and innovation.

The ARA suggests that state railway authorities may not be able to provide evidence of secured budget for investment and innovation in radiocommunication systems. This position is primarily due to the uncertainty on the retention of the existing spectrum licences, which is needed to inform business cases for State budget cycles. Instead, each State may be able to provide strategic intentions and proposed investment and innovations.

Criterion 3: Enhances competition

The ARA agrees that spectrum has varying utility for different use-cases. Rail jurisdictions were initially unable to deploy the GSM-R based system due to the lack of availability of spectrum in Australia. Five states worked together to secure commercial spectrum to deploy next-generation train control systems.

Rail jurisdictions welcome consideration of holding unused spectrum. As an essential public service industry, suburban rail jurisdictions plan decades in advance to upgrade and replace control system infrastructure and this necessarily means that some spectrum will be held to enable these future investments. Indeed, some states may not need to utilise spectrum for a number of decades, however retaining future access to spectrum is critical.

The ARA considers this criterion is suitable for commercial entities applying for ESLs but introduces a significant disadvantage to state railway authorities. Transport infrastructure is considered as

Critical Infrastructure under the Security of Critical Infrastructure Act 2018. The ARA suggests it is inappropriate to evaluate the 'public interest' of the ESLs used to operate transport infrastructure against this criterion.

Criterion 4: Balances public benefits and impacts

The ARA agrees that spectrum is an essential input to transport services including public rail transport.

Criterion 5: Supports relevant policy objectives

The ARA supports consideration of long-term public interest criterion for expiring spectrum licences as this supports state and Commonwealth government policy objectives.

It is important to recognise that last year, Australia's National Cabinet agreed to a set of priority areas to focus their efforts, including a priority of "improving the interoperability of rail systems". To address this issue, the Infrastructure and Transport Ministers Meeting (ITMM) agreed that the National Transport Commission (NTC) focus on five priority areas identified as critical pain points for the rail industry. One of the five priority areas is particularly relevant, as it specifically focussed on 'aligning train control and signalling technology on the eastern seaboard'.

At the most recent ITMM in June 2023, Ministers agreed to codify a small number of high-impact interoperability standards required to achieve nation-wide safety and productivity benefits. The standards will be performance-based with a priority focus on digital train technology, a single on-board interface for drivers and crew, and streamlining rolling stock approvals.

This work has been bolstered by a Memorandum of Cooperation agreement that commits rail operators, builders, manufacturers and government to work together to make rail more interoperable, particularly for any future major rail investments. Signatories to the agreement include federal and state transport Ministers, the ARA, and several large rail supply chain businesses. This historic agreement will improve rail's competitiveness, boost national productivity and improve connections between cities, regions and ports. The unprecedented focus on addressing rail interoperability by all jurisdictions is reflective of the fact that there is a \$154 billion pipeline of rail investment over the next 15 years.

Ensuring that the rail industry has access to critical spectrum to facilitate greater interoperability and more productive and safe rail operations is essential for the future of the industry. This fact must be appropriately recognised in the expiring spectrum license process.

Are there other criteria we should consider?

The ARA would like to highlight that investment in 1800 MHz by rail has been significant and it is rail jurisdictions' expectation that use of spectrum for rail safety and control systems will continue for decades. This investment continues to benefit the network, as it permits rail to more easily upgrade and deploy new technology as it is standardised and becomes commercially available.

Another factor that the ACMA should consider is migration. Unlike other licensees, the rail industry has a small spectrum holding in a single competitive and desirable band. However, it is unable to easily migrate to other spectrum bands even if another spectrum band becomes available. Recent history has shown that the rail industry is unable to compete with commercial carriers to secure spectrum even in regional areas, let alone metropolitan areas. Without dedicated spectrum, the rail industry in metropolitan areas has had to focus on a single spectrum band.

Additional Criterion

The ARA proposes an additional criterion, 'precedence', be introduced to reflect the relevance of historic licensing decisions. This criterion should review whether the spectrum licence allocation was previously assessed as being in the 'public interest' and if the conditions and rationale of that assessment are still valid. Consideration of precedence may accelerate the ACMA process. This additional criterion further acknowledges that there may be impacts on a particular industry if spectrum is not renewed. It is important that these impacts be considered, including the industry's ability and timeframe to secure and adapt to the use of different spectrum.

2. What are your views on the proposed 4-stage approach to undertaking the ESL process?

Stage 1: Consultation on process (Q2 2023)

The ARA welcomes a 5-year consultation period before the 1800 MHz band spectrum licences expire.

Stage 2: Finalise process and gather information (Q1-4 2024)

The ARA has no comment.

Stage 3: Preliminary views (Q4 2024)

The ARA supports consideration of specific matters relevant to each licensee. The ARA's view is that Australian passenger rail services are an essential public service with specific requirements and needs that are unlikely to be shared with mobile phone and other service providers. Rail has a small spectrum holding in a single band and does not offer a public mobile service, however, that spectrum holding helps facilitate the provision of essential freight and public transport services to millions of Australians every day.

The ARA supports an early indication of the ACMA views in advance of licence expiry, as rail is an asset intensive engineering industry requiring long-term investment plans to provide essential transport service.

The ARA recognises that the ACMA has included Stage 3 to provide an early indication of the ACMA's preferred outcome for ESL. Some state railway authorities may use this 'preliminary view' to request funding through state budget processes, but any substantial changes to the 'preliminary view' may result in failing to secure funding to purchase the spectrum.

Stage 4: Renewal application and decision-making periods (commencing 2025)

The ARA notes that for 1800 MHz band review of the technical framework has been completed which should simplify this ESL process.

3. Are there any band-specific issues that we should consider as part of this ESL process?

The ARA believes that licensee specific issues should be considered. Of concern to ARA members are issues of interference, geographical boundaries, and application of public interest pricing.

The ARA considers that the 1800 MHz band is unique in that rail jurisdictions hold spectrum licences for rail safety and control use.

Rail holds these licences to deploy radiocommunication based train control systems to enable higher utilisation during peak periods and to enable supervised and automatic train operation into the future. Each jurisdiction has different timeframes, schedules, and needs for deploying systems utilising spectrum, however common spectrum and common equipment remains a high priority for freight, passenger, and supply interoperability.

Leading up to 2013, the ACMA assessed rail spectrum requirements in the 1800 MHz band. This was undertaken in consultation with rail representatives. As a result of that assessment, the ACMA concluded that 2x10 MHz is the maximum amount of spectrum required to support rail safety services and applications during the next spectrum licence period (to 2028).

It is ARA's view that continued operation of voice radiocommunication and deployment of radiocommunication based train control systems will require 1800 MHz spectrum for decades.

Recent changes to the 1800 MHz band technical framework permit the introduction of multiple high-power 5G transmitters that could adversely interfere with current GSM-R networks. To mitigate this, it is estimated that 2 x 3 MHz of spectrum will need to be set aside to establish a guard band between nearest commercial carrier and rail base stations. Rail jurisdictions considered that 2 x 10 MHz of spectrum was required for radiocommunications based train control for a future increase in rail traffic of 50%. In this assessment, approximately 2 x 0.4 MHz was set aside for a guard band to nearest commercial carrier. With current changes it is estimated that 2 x 13.4 MHz of spectrum will be required to meet this increase in rail traffic.

4. Are there any other matters that we should consider in connection with the ESL process?

The ARA considers use of spectrum by rail to be an ongoing and permanent requirement that does not easily fit into current renewal timeframes that appear to be more supportive of commercial use of spectrum.

The ARA suggests that direct allocation and reservation of spectrum for non-commercial use, such as essential public transport services, should be considered in this process.

The ARA would refer the ACMA to the UK/European example for rail spectrum where specific spectrum is allocated to rail for long-term use, and thus reduces or eliminates burden of spectrum licence renewal applications on state government public services.

5. What are your views on the proposed approaches to valuing the spectrum and payment arrangements?

Pricing

The ARA supports a transparent valuation of spectrum based on licence area, density of sites, power limits, handover distance, necessary guard bands, and required carrier interference ratio. For rail, this is a different calculation to that of commercial carriers so that, for instance, train movement authorities are delivered with high certainty.

Auction avoidance pricing

The ARA has no comment.

Public interest pricing

The ARA supports public interest pricing for sufficient 1800 MHz spectrum for state-provided essential services. This reflects non-profit and community service pricing of passenger services and lowers cost of public transport.

In support of previous decisions, the Australian Government decided that some spectrum covered by expiring licences should be re-issued to rail jurisdictions at a price less than commercial rates. This public interest price was 50 per cent of set spectrum access charges otherwise payable for re-issued spectrum licences in the 1800 MHz band as per the pricing direction.

The Minister's Direction to the ACMA to provide for a public interest price for Re-issued Rail Spectrum Licences is consistent with the Act:

- A key object of the Act is to maximise, by ensuring the efficient allocation and use of spectrum, the overall public benefit derived from using the radiofrequency spectrum; and to
- make adequate provision of the spectrum for use by public or community services and paragraph; and to
- provide an efficient, equitable and transparent system of charging for the use of spectrum, taking account of the value of both commercial and non-commercial use of the spectrum.

The ARA notes an explanatory note from Radiocommunications (Spectrum Access Charges) Direction 2013:

"The Rail Authorities require spectrum in the 1800 MHz band to support the future deployment of their advanced train control systems. These systems use digital wireless voice or data communications for the safe operation of trains and on-track work. The advanced train control systems will enable higher frequency train services on existing track without compromising safety. This will increase the capacity of the rail network and enable more

travellers to choose rail over road transport, thereby also reducing road congestion. Deployment of the new systems will also advance the interoperability of rail communication systems as interstate and regional-urban services enter a Rail Authority's urban network, further promoting safety and efficiency. Additionally, these interoperable systems will generate efficiencies in the market in terms of access to, and supply of, technology and equipment."⁵

Licence conditions

Rail industry requirements require higher quality radiocommunication designs that necessarily impose more restrictive and lower risk designs. Typically, these involve larger guard bands and closer site spacing along rail corridors. Spectrum pricing should account for specific application use in line with licence conditions.

The ARA supports consideration of licence conditions on spectrum pricing. Specific conditions that limit spectrum use, or make deployment of equipment more complex, necessarily reduce spectrum value.

Restricted use of spectrum licences

ARA licence holders understand that spectrum licenced in the public interest will be restricted to non-commercial use. Specific conditions on rail safety and control systems suggest that this spectrum should be reserved for rail use rather than licenced for a period that requires the licensee to apply for renewal.

The ARA notes that ITS spectrum has been reserved for specific road transport use and 2.5 GHz mid-band gap spectrum has been reserved for electronic news gathering services.

6. What are your views on the proposed approach to examining use under existing spectrum licences?

Approaches to examining use

The ARA supports efficient use of spectrum, however both commercial carriers and rail operators are generally limited by the current state of technology standards and equipment availability for their respective industries. These limitations can appear as inefficient use, however it is a consequence of different asset life-cycles, industry requirements, and in the case of rail, industry developments in other countries and regions.

Rail licensees have different timeframes and schedules for using 1800 MHz spectrum. Some states have been early adopters based on demand for GSM-R driver radio communications and radio communication based train control systems. For other states, driver communications is adequately served by conventional radio systems and they are currently deploying radio communication based

⁵ <https://www.infrastructure.gov.au/sites/default/files/Radiocommunications-Spectrum-Access-Charges-Direction-2013.pdf>

train control systems. Whereas there will be other rail jurisdictions that will use spectrum in future years.

The ARA wishes to highlight an upcoming problem that is related to improving redundancy, elimination of single points of failure, and migration to replacement technologies including Future Railway Mobile Communication System (FRMCS) also known as Railway Mobile Radio (RMR). A solution to these problems requires spectrum to improve coverage and to run parallel networks during network upgrades (similar to proven processes in commercial carrier networks) where at least two generations of equipment are operating in parallel but at different life-cycle stages.

Service coverage

The ARA iterates that standardised assumptions for commercial carrier networks would be insufficient for rail networks where coverage probability is a minimum of 95 per cent. Handover overlaps in rail are designed to handover with high certainty. The ARA expects this to be different to commercial carriers where handover overlaps reduce site coverage and therefore increases network costs.

Spectrum utilisation

The ARA recognises ACMA's concern about the complexity of specifying a licence area, noting that even HCIS level 2 cells represent a large geographic area with differing spectrum needs.

Rail corridors generally attract suburban development and economic centres, which places them in areas of high population or high bandwidth demand. This could be seen as a way to value spectrum in these areas more highly, but this would negatively impact state government rail transport jurisdiction's ability to compete for, or retain, the necessary spectrum.

Investment and innovation

The ARA understands the desire to link licence durations with likely investment cycles but cautions that this should be on a per-industry basis and not a band decision. For example, in 1800 MHz, rail investment cycles are different and not synchronised with other licensees.

Use-cases

Due to the limitation of the current GSM-R technology, a range of rail operational use-cases cannot be supported by the existing technology until the new system (FRMCS) is implemented. The potential use of the spectrum to support those use-cases should be considered under this assessment, as well as the existing 2G use-cases. The ARA is concerned that assessment on current limited use-cases will restrict the benefits to the railway jurisdictions in the future.

End-users

Delivering a highly available, reliable, and secure rail network meets the best interest of the public and requires dedicated spectrum. It not only serves public commuters and freight customers but also improves the productivity and efficiency of the end-users who operate the railway network. Rail jurisdictions have fewer end-users compared to other carrier networks. However, the impact and



functions played by those critical railway end-users should not be considered negligible under this assessment.

Proposed approach

The ARA is concerned that this assessment of use will harm members' ability to renew spectrum licences. Rail jurisdictions do not offer mobile services to the public and therefore have few end-users which are limited to a single frequency band consisting of cab radios, trackside workers, station services, yards, and network monitoring systems.