

# Spectrum Response

ACMA Options Paper – 1880-1920 MHz



Department  
of Transport  
and Planning

## Covering Letter

The Department of Transport and Planning, on behalf of the Victorian Government welcomes the opportunity to participate in the 'Exploring future use of the 1.9 GHz band' consultation by commenting on the submissions made in response to the Australian Communications and Media Authority's (ACMA's) *"Replanning of the 1880-1920 MHz band" options paper*.

As spectrum is a scarce and valuable resource, the opportunity to reconsider the usage of the spectrum in the 1890-1920 MHz band (the 1900 MHz band) is timely, given competition for this resource is increasing across both commercial and social dimensions.

## Comments on industry submissions

The Victorian Government welcomes the opportunity make a submission to the 'reply to comment' period on the 'Exploring future use of the 1.9GHz band consultation. The Victorian Government broadly supports the Australasian Railway Association's (ARA) position on rail which was developed in consultation with national rail authorities (including the Department of Transport and Planning [DTP] and other Victorian transport representatives) and supports the introduction of Railway Mobile Radio (RMR) into the 1900-1910 MHz band as the primary use, as per Option 3 in the original paper.

Submissions from commercial operators including Telstra and Optus support Option 4, which would require RMR to share spectrum with Short Range Wireless Broadband (SR WBB) technologies, and therefore increase risk of interference on their current non-rail services and may limit the effectiveness of any additional technologies on the same spectrum, i.e., RMR, which is a safety critical public service.

It will also ensure that there is adequate time to plan, develop and deploy the next generation of rail communication systems to meet the needs of Victoria's growing population.

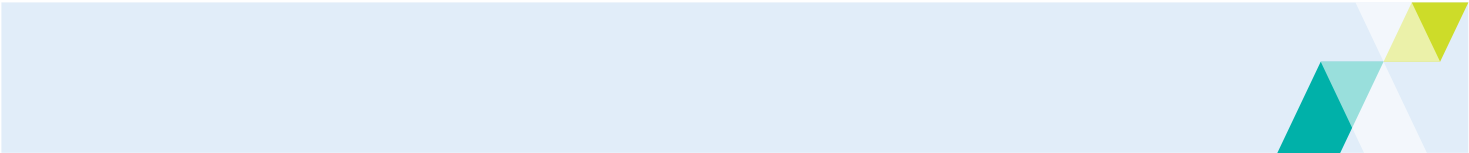
## Overview of the Victorian Government's spectrum needs and priorities for rail

As the Victorian Government utilises existing spectrum across multiple frequency bands for transport and a range of other critical public services including emergency management, justice, health and education, the outcomes of any changes to spectrum uses will present implications for how public services are delivered in Victoria. Accordingly, this position has been developed in consultation with other Victorian Government spectrum users and telecommunications policy areas but focuses on rail as a primary user of the 1880-1920 MHz band.

In Victoria, usage is underpinned by the principle that agencies should use the full capacity of their specific spectrum allocation and explore efficiencies where practicable. This shifts the usage of Victorian Government spectrum towards high value use cases (critical service delivery such as public transport) and minimises the risk that spectrum is withheld unnecessarily at the expense of other higher value uses.

The spectrum needs of Victoria's public rail operations are growing and evolving over time, which is the case for all government states, and it is critical that the ACMA's spectrum management approach accounts for this reality. Changes are driven by:

- The continuous growth in public transport service demand and delivery, as well as population increases, demographic, and environmental changes.
- The rail sector's infrastructure expansion, evidenced by Victoria's multi-billion dollar transport "Big Build" program
- The national plan to align rail technology to enable interoperability across the network and support regional development, economic growth, and productivity.
- Technological transformations that present opportunities to improve the accessibility, quality, and safety of government services.



It is critical that the ACMA applies a holistic view to 'public interest' spectrum needs when making decisions through this review, and any other relevant spectrum reviews. Victoria's access to its existing spectrum allocations for rail is crucial, as is flexibility around the allocation of additional 'public interest' spectrum on other bands (such as 1900 MHz) as emerging needs are identified.

Public interest allocations should be provided at a reasonable cost (preferably a cost recovery basis) in recognition of their criticality to essential service delivery and to reduce the financial burden purchases place on states. Such an approach will not only ensure safe and efficient service delivery in coming years, but it will ensure that replacement technologies are more affordable for governments.

In support of these objectives, the attached document lays out the Victorian Government's response to others submissions, using the following structure:

1. Specific comment on the ARA submission
2. Key outcomes required
3. Victorian rail context
4. Considerations beyond rail

## Specific comment on the ARA submission

The paper outlines four options for replanning of the 1890-1920 MHz band to address desirable planning outcomes based on ACMA's spectrum planning options framework. The Victorian Government has considered these options as summarised below:

- Option 1: no change to existing conditions, and therefore does not accommodate Railway Mobile Radio (RMR) in the specified frequency range
- Option 2: expanded spectrum for commercial use (Short Range Wireless Broadband [SR WBB]) - which does not accommodate RMR
- Option 3: allows for RMR Australia-wide in the 1900-1910MHz range through apparatus licenses
- Option 4: like Option 3 but also allows for SR WBB expanded spectrum (as per Option 2), which poses a risk of unquantifiable and uncoordinated interference to RMR with SR WBB

The ARA submitted a response to the ACMA options paper positioning Option 3 as the preferred option for rail operations nationally. From the submissions made to the ACMA, the Victorian Government broadly supports the ARA's position on rail but reinforces a few broader points (further elaborated in Section **Error! Reference source not found.**):

Issues for comment (ACMA)	ARA position	The Victorian Government response to ARA position
<b>Comments on the proposed desirable planning outcomes</b>		
<b>1. Maintain arrangements for existing services</b>	Agrees in principle	Agree
<b>2. Expand arrangements for short range wireless broadband (SR WBB) services</b>	Does not support expansion of SR WBB where this would lead to unquantifiable and uncoordinated interference	Agree
<b>3. Introduce arrangements for new railway mobile radio (RMR) services</b>	Strongly agrees	Agree, and emphasise that RMR would need to be a primary service to minimise interference risks from other services.
<b>4. Maintain coexistence with 1.9 GHz band services</b>	Agrees	Agree
<b>5. Maintain coexistence with adjacent band services</b>	Agrees	Agree
<b>Comments on the replanning options, especially the preliminary preferred option in this paper, and any alternative options</b>		
<b>Option 1: Maintain existing arrangements</b>	Does not support this option	Agree
<b>Option 2: Expand SR WBB arrangements from exclusive use in 1880-1900 MHz to include shared use in the 1900-1920 MHz frequency range Australia wide, with no other change to current arrangements</b>	Does not support this option	Agree



<b>Option 3: Introducing arrangements to allow for RMR in the 1900-1910 MHz frequency range on an Australia-wide basis, with no change to current arrangements in the other segments.</b>	Supports this option	Agree
<b>Option 4: Extending arrangements for SR WBB to the 1880-1920 MHz frequency range to allow shared use of the 1900-1920 MHz frequency range Australia-wide. Introducing arrangements to allow for RMR in the 1900-1910 MHz range Australia-wide on a shared and coordinated basis with other services while maintaining arrangements for LA WBB and PTP in regional and remote areas</b>	Supports the introduction of RMR in 1900-1920 MHz Australia-wide. However, jurisdictions cannot accept sharing spectrum with SR WBB	Agree
<b>Other issues for comment:</b>		
<b>Is personal handy phone system (PHS) technology still required to be included in the cordless communication devices class license?</b>	No view	Agree
<b>The 1900-1920 MHz frequency band plan will sunset on 1 April 2023. Is the band plan still required, or can the band plan be allowed to sunset?</b>	Should the 1900-1920 MHz band plan be allowed to sunset and RMR is permitted in the 1900-1910MHz, a new band plan would be required to ensure RMR in the 1900-1910MHz is considered a primary service.	Agree
<b>Comments on coexistence considerations, and analysis on coexistence issues for the proposed options in this band.</b>	As suggested in the options, paper, the ARA agrees that further analysis should be carried out to determine interference risk, mitigating measures and overall, least restrictive technical conditions for RMR operating in 1900-1910 MHz	Agree



## 1. Key outcomes required

The following six sections summarise the key outcomes that the Victorian Government is seeking through this submission to the ACMA:

### 1.1. Substantial economic and social good

Passenger and freight services operate across Victoria's rail system to enable ~690K metropolitan and regional passenger trips<sup>1</sup> and ~740K tonnes of commercial goods per day<sup>2</sup>. Victoria's population is predicted to reach 10 million in 2050. Passenger and freight operators rely on Victoria's rail telecommunications network to provide a safe and efficient rail service. Rail is among the most efficient and lowest emitting modes of transport, with a diverse energy source given a higher reliance on electricity. Globally, rail networks carry 8% of the world's motorised passenger movements and 7% of freight transport, but only contributes 2% of energy use across the transport sector<sup>3</sup>.

Access to spectrum enables Victoria to operate rail services across the network safely and efficiently. Across Victoria, passengers rely on rail for social and economic purposes. Victoria's current telecommunications systems is an essential enabler to each passengers' experience, through the delivery of safe and efficient services, and supporting timely access to journey information and ticketing. Access to a safe and efficient rail system promotes tourism and interconnectivity across the country to drive economic growth and revitalise Central Business Districts (CBDs).

Availability of a reliable rail service (and broader public transport) promotes equity and social inclusion by enabling regional connectivity and protecting the vulnerable. Victoria's demand for train services is growing and current infrastructure is capacity constrained. Next generation ETCS will help unlock capacity by increasing the frequency of services. In 2022, researchers from the University of Sydney published a paper<sup>4</sup> that discusses the connections between mobility and the positive impact that it has on inclusion. Improving access to public transport and its supporting infrastructure helps promote social inclusion and lowers the risk of societal costs associated with social exclusion. Benefits of passenger rail, include quantifiable benefits such as reduced road congestion costs, lower greenhouse gas emissions, and productivity improvements especially in dense urban settings. This research found that the capacity to be mobile (e.g., through increased access to public transport) reduces the risk of social exclusion.

Moving freight on rail offers advantages over road freight by more efficiently moving large volumes of freight and is less costly and damaging to the environment. The ARTC reports<sup>5</sup> that rail freight is more cost effective and fuel efficient – a typical freight train carries 300 shipping containers, while trucks can only carry 3 to 10. Maintaining and increasing the opportunity to move freight in Victoria and across Australia's East Coast, like ARTC's Inland Rail project, connects regional producers, manufacturers, and distributors to national and global markets to increase national productivity. The ARTC estimates that the rail industry generates almost \$30 billion in economic activity annually and supports 165,000 Australian jobs directly and indirectly.

Access to the 1800 and 1900MHz spectrum is a foundational capability allowing the nation to access this economic and social benefit.

### 1.2. Benefits of new digital rail systems

Following on from the 2019 launch of the National Rail Action Plan, in March 2023, an Australian-first Memorandum of Cooperation was signed between federal and state transport ministers and the ARA on behalf of senior rail leader industry leaders<sup>6</sup> to work together to improve national rail interoperability. Since Federation, rail has run as a series of independent rail networks, which has led to a range of challenges that impact national rail productivity and innovation. These include use of different rail gauges, signalling systems, rolling stock and safe working arrangements. This leads to different workforce requirements, less transferability across different networks, and impacts service frequency and reliability. Nationally, many state governments have a "once-in-a-generation opportunity" to align telecommunications system technology, including train radio and signalling systems. Like Victoria, other states including New South Wales,

<sup>1</sup> Transport for Victoria (now Department of Transport and Planning), Growing our Rail Network, 2018-2025


<sup>2</sup> Department of Transport (now Department of Transport and Planning), Delivering the Goods, Creating Victorian Jobs – Victorian Freight Plan, February 2019

<sup>3</sup> International Energy Agency, The Future of Rail, Opportunities for energy and the environment, 2019

<sup>4</sup> Stanley JK, Hensher DA, Stanley JR, Place-based disadvantage, social exclusion, and the value of mobility, Transportation Research Part A: Policy and Practice (Volume 160, June 2022, Pages 101-113)

<sup>5</sup> ARTC Inland Rail website, accessed March 2023, accessed March 2023

<sup>6</sup> The Hon. Catherine King MP, media release, Once-in-a-generation opportunity to get Australian rail back on track, 24 March 2023



Queensland and Western Australia are reaching a point where current communications systems will be replaced in the near future<sup>7</sup>, and there is an opportunity to harmonise telecommunications systems to support national interoperability.

There is alignment across the Eastern seaboard, where New South Wales and Queensland are both expected to move to the ETCS standard for signalling systems, implying that they are expected to move to the global standard FRMCS 5G solution when it's available from 2025. As stated in ARA's response to the ACMA's replanning options for the 1900 MHz spectrum, there is a unified need across state rail authorities to confirm long term allocation of the 1800 and 1900 MHz spectrum for rail / Government use. The decision on spectrum allocation is a prerequisite prior to further planning on train control systems, signalling and communications asset replacements, as it could significantly impact the available technology options.

### **1.3. Enable future critical non-rail services**

Currently, the Victorian public rail system uses its radio spectrum license to primarily operate core signalling and communications systems. Future allocations of the spectrum have the potential to facilitate emerging rail innovations. Similarly, further allocations of the 1800 and 1900 MHz spectrum may also complement critical public and emergency services, enabling high bandwidth data applications such as emergency video streaming, remote asset monitoring and incident management systems to further support emergency responders.

### **1.4. Access to deep pool of global equipment suppliers**

The global standard has been developed to enable greater competition between suppliers and offer stronger interoperability across products and prevent "vendor lock-in". On 17 November 2020, the European Conference of Postal and Telecommunications Administrations – Electronic Communications Committee (CEPT-ECC) decided on the harmonisation across Europe of dedicated frequencies for railway use in the 900 MHz and 1900 MHz bands. This decision was ratified by European Union (EU) member states in 2021. This was supported by conditions of use that allow for radio coexistence which protect against interference and reduce the cost of investment in 5G infrastructure.

In Europe, it is expected that rail systems and equipment currently being developed using the FRMCS standard will operate on the 1900-1910 MHz spectrum. This has been recommended for safety critical FRMCS applications due to superior latency and reliability results operating 5G on this band in comparison to 900 MHz<sup>8</sup>. Equipment vendors will develop RMR equipment designed for the 1900 MHz spectrum for Europe's market. It is also anticipated that next generation ETCS will be developed for the 1900 MHz band. If the ACMA made the 1900-1910 MHz spectrum available for RMR as a primary user, the Victorian Government and other jurisdictions could leverage the deep pool of global equipment suppliers developing equipment for the EU market. Victoria would be able to install the equipment on the network without the need to substantially modify for use with a different spectrum band, and leverage global support arrangements, resulting in material cost savings during the life of the asset. The additional bandwidth would also enable more high-bandwidth RMR applications such as remote asset monitoring and video surveillance streaming.

### **1.5. Support regional development**


Acquiring a license for RMR on the 1900 MHz spectrum could support regional development, economic growth, and productivity. There is an opportunity for Victoria and other jurisdictions to deploy RMR services along rail corridors and infrastructure located outside the existing 1800 MHz license. For Victoria, this could enable a single next generation DTRS to operate across metropolitan and regional rail lines supporting national interoperability targets. A single state-wide FRMCS platform will allow DTP to avoid duplicated costs of maintaining and upgrading multiple systems, and eventually remove the cost of interfaces on regional services currently moving between RRCN and DTRS. Access to the 1900 MHz spectrum for RMR would improve connectivity for regional communities, as future FRMCS telecommunications equipment are a key enabler of next generation signalling and train control systems. This would allow more services to safely operate on the rail network and reduce risks of derailment or collision particularly on regional lines.

Adoption of a global standard such as FRMCS for rail's safety-critical telecommunications assets could support localisation of component manufacturing and equipment support. In alignment with the National Rail Manufacturing Plan<sup>9</sup>

<sup>7</sup> ARA, 1800 MHz Spectrum Use by the Rail Industry, Environmental Scan, 9 May 2022

<sup>8</sup> Ericsson, 5G-powered FRMCS, White Paper, March 2022

<sup>9</sup> Australian Government, Department of Industry, Science and Resources, Press Release, 27 October 2022



announced in 2022, interoperability across more of Australia's rail networks and components support skills development and transferability of the workforce. While the plan is currently focused on passenger train manufacturing, it also more broadly looks to develop more capability in Australia across the value chain in the future.

## 2. Victorian rail context

### 3.1. Current landscape

The evolution of telecommunications technologies (e.g., 4G, 5G, etc.) has dictated that spectrum remains a limited resource with significant commercial value. Technical developments since 2014 have dramatically increased the commercial value of the 1800 MHz spectrum, as it is now attractive to commercial operators of telecommunications networks.

In 2019, the Infrastructure and Transport Ministers' Meeting (ITMM) launched the *National Rail Action Plan*<sup>10</sup> to address key challenges across the Australian rail industry. Emerging from this was the need to drive greater interoperability between rail systems. This plan was subsequently adopted by National Cabinet as one of its ten key reform priorities for increasing productivity in the Australian economy. New technologies for signalling, train control systems and communications will rely heavily on the allocation of spectrum to enable their cost-efficient deployment across rail networks in Australia.

In Victoria, the government has a vision to establish Victoria as Australia's most connected state<sup>11</sup>, to support economic uplift, digital inclusion, and community safety and resilience. The state's ability to access affordable and reliable spectrum that is necessary for government service delivery is key to achieving this goal.

### 3.2. Victoria's rail system

Access to reliable radio spectrum is essential for the safe and efficient operation of the Victorian public rail network. The radio spectrum is an integral part of the telecommunications systems that form the backbone of heavy and light rail operation, which also includes transmission infrastructure (including wayside masts and train-borne receivers), enabling systems (such as dispatch and network management systems), and end points (including cab and portable radios). The telecommunications systems and availability of the required spectrum on an ongoing basis is critical to maintaining the rail system's safety accreditations and ability to operate.

Victoria's transport communications assets have been in place for many years and use previous generation technology. It currently operates on the publicly owned licenses on the 1800 MHz band. Victoria operates a number of transport telecommunications networks which would benefit from spectrum with rail-optimised use cases:

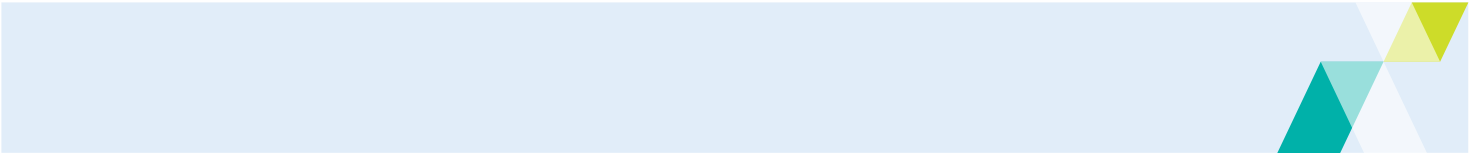
- Digital Train Radio System (DTRS) is the dedicated, government owned and operated metropolitan heavy rail communications network, primarily used for secure voice and messaging communications. DTRS is critical for safety by enabling voice communication between train drivers, maintenance staff at the tracks and dispatchers.
- Regional Rail Communications Network (RRCN) is the communications network for V/Line passenger rail and regional freight in Victoria. It is also primarily used for voice and low bit data communication.
- Digital Mobile Radio (DMR) facilitates voice radio communications between Operations Centre Controllers (OCC) and drivers and passenger announcements on trams. It also interfaces with Automatic Vehicle Monitoring (AVM) which provides location data to inform passenger information systems, notably tramTRACKER. Clarity of spectrum allocation will determine the replacement solution and / or contingency plan.

## 3. Considerations beyond rail

The Victorian Government delivers many critical services for a wide range of citizens and businesses across the State. Unlike the private sector, Government needs to deliver these services equitably and reach into geographic, socio-economic, cultural, and linguistically diverse communities. The telecommunications landscape is broad and dynamic, with technology and use cases evolving rapidly. Spectrum is used extensively by departments and agencies across the Victorian Government. This spans many areas beyond rail, including education (schools and TAFEs), infrastructure

<sup>10</sup> National Transport Commission website – National Rail Action Plan, accessed April 2023

<sup>11</sup> Victorian Government, Connecting Victoria Engagement Report (accessed March 2023)



authorities (Melbourne Water, Parks Victoria), health (hospitals, ambulance, care facilities), public facilities (Federation Square, Melbourne Park, Olympic Park), justice and public safety organisations (police, emergency services, corrections facilities) and other transport services (light rail, ports).

Use of the radio spectrum in the 1900 MHz band may welcome complementary applications across departments and beyond rail. Global case studies reveal that opportunities to utilise the 1900 MHz spectrum to improve delivery of crucial emergency services and more advanced telecommunications practices are emerging. A holistic approach to spectrum management could optimise department interdependencies and facilitate effective use of spectrum across multiple high-value areas not available through commercial mobile network services.