**Proposed framework for long-term licensing of radionavigation-satellite service (RNSS) retransmission technologies**

Consultation paper

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Executive summary

The radionavigation-satellite service (RNSS) generally describes any satellite constellation that provides positioning, navigation and timing services. RNSS encompasses a number of ubiquitous systems, including Global Positioning System (GPS) and GLONASS (a type of global navigation satellite system).

Loss of RNSS coverage in indoor and underground locations is common, as RNSS signals are not powerful enough to penetrate many underground or enclosed environments. This loss of RNSS coverage inconveniences many RNSS users.

RNSS repeaters are radiocommunications devices designed to receive RNSS signals from space and re-transmit them terrestrially into areas that have poor-to-no reception of RNSS signals. The devices, if deployed, can provide more RNSS availability in poor coverage areas. Increased coverage can benefit the consumer, commercial and safety sectors, as well as the transport, mining, aviation and agriculture industries, among others.

In this paper, we present a framework to implement a long-term licensing mechanism for RNSS retransmission technologies. We are also consulting on technical guidelines and pricing arrangements to be implemented as part of the overall licensing framework.

We welcome comments on the matters raised in this consultation paper.

# Issues for comment

This consultation welcomes your feedback on:

the proposed approach for the long-term licensing of RNSS repeaters, outlined in this paper

the draft RALI found in the [key documents section of this consultation](https://www.acma.gov.au/consultations/2024-06/proposed-new-framework-licensing-radionavigation-satellite-service-retransmission-technologies).

# Introduction

RNSS retransmission devices re-transmit or generate modified RNSS signals for a range of consumer, commercial and safety applications. Examples of retransmission devices include RNSS repeaters, RNSS simulators and pseudolites.

RNSS repeaters retransmit radio signals received from satellites to determine the position of an object on Earth, while RNSS simulators and pseudolites generate modified RNSS signals within a closed system. Simulators and pseudolites are designed for use in open-air applications, and pseudolites can also be used in   
indoor settings.

The devices are generally designed for use in areas with low-to-no RNSS coverage.

## Review of banned equipment arrangements

In 2020, we initiated a review of the [banned equipment and exemptions framework](https://www.acma.gov.au/consultations/2022-07/new-arrangements-banned-equipment-and-exemptions-framework-consultation-232022) under the *Radiocommunications Act 1992* (the Act). Under the previous framework, certain beneficial RNSS technologies were incidentally excluded for use due to the permanent ban on RNSS jamming equipment.

Over the course of the review, we made arrangements to ensure that a permanent ban remained in place for RNSS jamming equipment, while also allowing for publicly beneficial RNSS retransmission technologies to be considered for licensing by the ACMA. This involved facilitating short-term trials of RNSS repeater devices in road tunnels and changing the scope of the ban on RNSS technologies to devices specifically designed to cause interference.

We finalised the review of the banned equipment and exemptions framework in March 2023, with a major outcome being the ability for the ACMA to consider licensing a broader range of RNSS retransmission devices.

Allowing more RNSS availability in RNSS-denied environments such as an aircraft hangar, tunnel or mine will assist in providing better timing and navigation information.

While short-term trials can be facilitated under assigned scientific licences, there is no mechanism in place for longer-term licensing of RNSS retransmission technologies.

## Existing regulatory framework for RNSS repeaters

Although RNSS repeaters have been deployed in some jurisdictions abroad, RNSS repeaters are not authorised for long-term use and deployment under the Australian radiocommunications framework.

Under the Act, it is unlawful for a person to operate or possess a radiocommunications device that is not authorised by either a spectrum licence, an apparatus licence or a class licence.

Class licensing arrangements only permit the use of RNSS receivers[[1]](#footnote-2) in authorised frequency ranges, and the [Australian Radiofrequency Spectrum Plan 2021](https://www.acma.gov.au/australian-radiofrequency-spectrum-plan) (Spectrum Plan) does not directly support the use of RNSS repeaters in these frequency ranges.

We have collaborated with a range of emergency services and road transport stakeholders on proposals to facilitate trials and small-scale deployments of certain RNSS repeaters in road tunnels under assigned scientific apparatus licences. This has been accompanied by the issue of preliminary guidelines by the ACMA that set out the technical operating parameters for approved short-term deployments.

Conducting trials helps us to investigate the risks, costs and operational requirements associated with the devices. Data gathered during trials assists in determining the most optimal configuration of the devices and informs the development of a long‑term licensing framework.

# Proposed licensing approach

## Issues and considerations

We examined the likely uses, utilities and characteristics of RNSS retransmission devices. We also considered the operating parameters for how these devices may be deployed to minimise potential risks of interference to other radiocommunication services.

RNSS repeaters are typically deployed as a system, consisting of a number of devices in an enclosed area to provide RNSS coverage throughout.

When we [consulted on arrangements](https://www.acma.gov.au/sites/default/files/2020-05/Facilitating%20trials%20of%20RNSS%20repeater%20devices%20in%20road%20tunnels_consultation%20paper.docx) to trial RNSS repeater devices in road tunnels in May 2020, we indicated our preference for using apparatus licensing, rather than class licensing, to authorise the licensing of RNSS repeaters. Although RNSS repeaters have low‑power and low-interference features, devices that are poorly installed (due to location choice or improper configuration) can generate emissions that radiate beyond the designated deployment area and prevent nearby RNSS receivers close to the opening of an enclosed area from receiving signals.

Our preference for using an apparatus licensing arrangement remains unchanged following trials. Under class licensing, we would not have visibility over the repeaters to monitor features such as the location of the station, interference and electromagnetic exposure. There would also be few mechanisms for an apparatus or spectrum licensee to seek redress or protection from interference in the event of an incident, due to the limited visibility over who is operating the repeaters.

This preference for apparatus licensing was also expressed by some stakeholders to the banned equipment and exemptions framework review, largely due to the desire for visibility of where the devices are being deployed and who is operating them.

Our inclination is to exclude simulators and pseudolites from the proposed framework, as they require more rigorous examination of the potential risk of interference to other spectrum users due to their use in open-air environments. We also propose to limit the use of RNSS repeaters to indoor, undercover and underground environments only.

## Proposed licensing arrangements

RNSS repeaters receive and re-transmit RNSS signals from space to provide RNSS coverage in low and no-coverage areas. For the repeaters to operate as intended, accurate positioning, velocity and timing must be retransmitted.

Following assessment of the apparatus licensing framework, we identified a licensing option that best complements the radionavigation purposes of the repeaters, that is a subtype of the radiodetermination transmitter licence type. The [Radiocommunications (Interpretation) Determination 2015](https://www.legislation.gov.au/F2015L00178/latest/versions) defines a radiodetermination licence as a licence issued for a station using radio waves to determine the position, velocity or other characteristics of an object, or to obtain information relating to those characteristics.

Although the repeaters receive RNSS radiocommunications from satellites, these radiocommunications are then retransmitted as terrestrial radiocommunications, meaning the radiodetermination licence type applies.

RNSS repeaters will be permitted to operate in the following frequency bands that are allocated for the radionavigation-satellite service in the Spectrum Plan:

* 1164–1215 MHz
* 1215–1240 MHz
* 1240–1300 MHz

1559–1610 MHz.

A licensee will be required to observe the conditions set out in the [Radiocommunications Licence Conditions (Apparatus Licence) Determination 2015](https://www.legislation.gov.au/F2015L00210/latest/versions), or any instrument which replaces that instrument, and in individual licence/s.

A licensee will also need to meet the conditions outlined in a Radiocommunications Assignment and Licensing Instruction (RALI). The draft RALI – detailed further in the next section – sets out the required technical, regulatory and frequency requirements. The RALI also provides for a registration process to give us oversight of device locations and operators, and we would require potential licensees to be satisfied the deployment met the conditions in the RALI.

# Technical framework

Improper use or deployment of RNSS repeaters poses a risk of interference to other radiocommunication services. To minimise the risk of interference, mandatory operating and technical conditions will need to be met.

## Proposed technical arrangements

The conditions are set out in the draft RALI, which can be found in the key documents section of this consultation.

The draft RALI incorporates the technical guidelines that applied to approved trial deployments of RNSS repeater devices in a road tunnel located in New South Wales.

The arrangements in the draft RALI include the:

authorised frequency bands on which the repeaters can be operated

limits on the maximum system gain

limits on spurious emissions from each antenna

limits on emissions from antennas installed at a distance of 30 metres from any edge of the service area

standards that device operators will need to comply with

licence conditions and advisory notes that are to be included in the licence.

The spurious emission limits in Tables 1 and 2 of the draft RALI are largely based on the European Telecommunications Standards Institute (ETSI) EN 302 645.[[2]](#footnote-3) However, the more stringent spurious emissions limits (Table 2 of the draft RALI) have been modified to align with the frequency band configurations used in Australia. That is, the arrangements for PCS 1900 in Table 3 of EN 302 645 have been replaced with the frequency arrangements for 2 GHz spectrum licences.

We are interested in industry views on whether the more stringent limits in Table 2 of the draft RALI are needed, and what impact the variation compared to EN 302 645 would have on the deployment of RNSS repeaters.

# Fees

Since RNSS repeaters are expected to be deployed in environments with minimal or no RNSS coverage, it would follow that there would be less likelihood of competing spectrum users being present. However, under current licensing and tax arrangements, deploying RNSS repeaters would result in costly licensing fees (approximately $51,000 per year).[[3]](#footnote-4)

Deployment will likely consist of multiple RNSS repeaters in an enclosed area. Some deployment locations could also occur within a high-density urban area (for example, road tunnels). This will also include authorised operation in frequency bands designated for radionavigation-satellite purposes.

Taking these factors into account, applying the apparatus licence tax that is calculated on the basis of location, bandwidth used and population density in the [Radiocommunications (Transmitter Licence Tax) Determination 2015](https://www.legislation.gov.au/F2015L00322/latest/versions) (TLT Determination) for licensing under a radiodetermination licence will result in high licensing costs that may be a disincentive to deploy the devices.

We consider that the current radiodetermination licence taxes outlined in the TLT Determination are not appropriate for RNSS repeaters. This is because the devices are expected to be deployed in areas where they will have a negligible effect on spectrum denial.

## Proposed new taxation and charging arrangements

We see value in allowing RNSS repeaters to be deployed with low licensing fees, given the potential benefit to be gained from the devices. They would also be operating in environments where there is less likelihood of spectrum denial and low potential for interference with other devices when used correctly.

To set more appropriate licensing fees, we propose, when remaking the TLT Determination, to tax RNSS repeaters as a system by applying a flat amount of tax, regardless of the bandwidth used. The applicable fees for issue of a radiodetermination licence to authorise the operation of a RNSS repeater system would consist of:

a fixed tax amount of the minimum annual tax amount prescribed under the TLT Determination (currently $41.86) regardless of the number of transmitters or bandwidth used

administrative charges of $482 at issue (as specified under the [Radiocommunications (Charges) Determination 2022](https://www.legislation.gov.au/F2022L01245/latest/versions) (Charges Determination))

a $4 at renewal charge (as specified under the Charges Determination).

# Proposed changes to remade instruments

The proposed framework comes at a time when the relevant instruments face sunsetting. As such, implementing the new framework will involve changes to several instruments, when these are remade. These instruments are:

[Radiocommunications (Interpretation) Determination 2015](https://www.legislation.gov.au/F2015L00178/latest/versions)  
(Interpretation Determination)

[Radiocommunications (Radionavigation-Satellite Service) Class Licence 2015](https://www.legislation.gov.au/F2015L01510/latest/versions) (RNSS class licence)

[Radiocommunications (Low Interference Potential Devices) Class Licence 2015](https://www.legislation.gov.au/F2015L01438/latest/versions) (LIPD class licence)

[Radiocommunications (Transmitter Licence Tax) Determination 2015](https://www.legislation.gov.au/F2015L00322/latest/versions)

(TLT Determination).

Consultation on those specific instruments will take place as part of their forthcoming sunsetting consultations. However, below we provide visibility on the changes to the Interpretation Determination and TLT Determination we consider necessary to implement a long-term licensing solution for RNSS retransmission technologies, and consequential changes to the LIPD and RNSS class licences.

## Interpretation Determination

The Interpretation Determination is due to sunset in April 2025. As part of the sunsetting process, we propose to remake the Interpretation Determination to enable licensing of RNSS repeaters as a system. This would be achieved by expanding the list of definitions to include ‘RNSS receiver’, ‘RNSS repeater station’ and ‘RNSS repeater system’. These proposed definitions are:

***RNSS receiver***means a radiocommunications receiver used for receiving RNSS radiocommunications.

***RNSS repeater station*** means a station that:

(a) is used for the reception and automatic retransmission of RNSS radiocommunications; and

(b) for the automatic retransmission of RNSS radiocommunications, is authorised by a radiodetermination licence; and

(c) is located:

(i) indoors; or

(ii) in an underground environment; or

(iii) in a tunnel; and

(d) is operated in the following frequency ranges only:

(i) 1164 MHz to 1215 MHz;

(ii) 1215 MHz to 1240 MHz;

(iii) 1240 MHz to 1300 MHz;

(iv) 1559 MHz to 1610 MHz; and

(e) for which the ACMA, or a person accredited under section 263 of the Act, undertakes coordination procedures for the purpose of minimising interference.

***RNSS repeater system*** means a system comprising one or more RNSS repeater stations that are operated for the reception and automatic retransmission of RNSS radiocommunications between RNSS repeater stations or to a RNSS receiver.

The proposed definitions to be placed into the Interpretation Determination to enable long-term licensing of RNSS retransmission technologies would also require other definitions to be placed into the Interpretation Determination. These other definitions would be:

***indoors***means a space that is:

(a) enclosed by permanent walls on all sides, a permanent roof and a permanent floor; and

(b) permanently fixed to a location.

***radionavigation-satellite service (RNSS)***has the meaning given by subsection 3(1) of the spectrum plan.

***RNSS radiocommunication***means a radiocommunication that is transmitted at a frequency allocated to RNSS under the spectrum plan.

## TLT Determination

The TLT Determination is due to sunset in April 2025. It is our intention to remake the instrument to specify a new tax amount for a RNSS repeater system operating under a radiodetermination licence – as outlined in the [Proposed new taxation and charging arrangements](#_Proposed_new_taxation) section above.

## LIPD class licence

The definition of ‘indoors’, which is proposed to be placed into a remade Interpretation Determination, is currently in the LIPD class licence, which is due to sunset in October 2025. It is our intention to remake that instrument without the definition of ‘indoors’, as it would then be in the Interpretation Determination.

## RNSS class licence

The definition of ‘RNSS radiocommunication’, to be placed into a remade Interpretation Determination, is currently in the RNSS class licence, which is due to sunset in October 2025. It is our intention to remake that instrument without the definition of ‘RNSS radiocommunication’, as it would then be in the Interpretation Determination.

# Invitation to comment

## Making a submission

We invite comments on the issues set out in this consultation paper.

[Online submissions](https://www.acma.gov.au/have-your-say) can be made by uploading a document. Submissions in PDF, Microsoft Word or Rich Text Format are preferred.

Submissions by post can be sent to:

The Manager

Spectrum Licensing Policy Section

Australian Communications and Media Authority

PO Box 13112 Law Courts

Melbourne VIC 8010

The closing date for submissions is **COB,** **Wednesday 17 July 2024**.

Consultation enquiries can be emailed to [SLPSConsultations@acma.gov.au](mailto:SLPSConsultations@acma.gov.au).

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1. The [Radiocommunications (Radionavigation-Satellite Service) Class Licence 2015](https://www.legislation.gov.au/F2015L01510/latest/versions) authorises a person to operate an RNSS receiver to receive RNSS radiocommunications in authorised frequency ranges. [↑](#footnote-ref-2)
2. Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Global Navigation Satellite Systems (GNSS) Repeaters; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive. [↑](#footnote-ref-3)
3. Assuming $1,280 per station per year multiplied by approximately 40 devices. [↑](#footnote-ref-4)