North East Link Project - ACMA Submission – RNSS In Tunnel

10 July 2020

NORTH EASTLINK PROJECT

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0	10 July 2020	North East Link Project Chief Operating Officer – Jim Waller Principal Project Specialist, Zoltan Maklary	

Contents

1. North East Link Statement of Interest

1.1. Why is the North East Link Project Supporting the Use of RNSS Repeaters in Road Tunnels?

1.1.1 The North East Link Project (NELP) supports the use of Radio Navigation Satellite System (RNSS) in-tunnel navigation solutions that utilise RNSS repeaters as an effective and seamless means of providing accurate position information to motorists and emergency services in current and future Victoria road tunnels. The use of RNSS in-tunnel navigation is also supported by the Department of Transport – Roads, Victoria (reference: letter to the Executive Manager Executive Manager Spectrum Management Policy Branch, ACMA, dated 27 November 2019) and the Emergency Services Telecommunications Authority (reference: letter to the Executive Manager Spectrum Management Policy Branch, ACMA, dated 4 March 2020) .

1.1.2 The construction of road tunnels in Australia is accelerating. In Melbourne alone, the West Gate Tunnel and the North East Link Tunnel, when completed, will add approximately 27 kilometres of underground carriageways to the Melbourne metropolitan road network. In Sydney, the WestConnex Motorway project, the M6 Motorway, Western Harbour Tunnel and Beaches Link will form over 100 kilometres of continuous road tunnel network.

1.1.3 An objective of the North East Link Project is to provide motorist with a seamless and stress-free travelling experience. Through the provision of a RNSS in-tunnel navigation solution, motorists will benefit from uninterrupted navigation services and will continue to receive accurate position and direction information in the North East Link road tunnels. This will allow motorists to confidently select the correct exit point for their destination and remove wayfinding errors resulting from inaccurate navigation system directions.

1.1.4 Emergency services in Victoria (and elsewhere in Australia) use RNSS to accurately report the location of emergency service units in the field and to support timely navigation to an incident via the most expedient route. Consequently, emergency services will also benefit from the implementation of RNSS in-tunnel navigation solutions. In the event of a road tunnel fire, which, can reduce visibility to less than one metre, access to accurate navigations information via handheld devices could save lives.

1.1.5 RNSS in-tunnel navigation solutions using RNSS repeaters are superior to other solutions (i.e. Waze beacons, wi-fi location solutions, direct short-range communications) as they seamlessly work with any RNSS receiver without further integration via blue tooth communications or additional third-party applications.

1.2. When Is a RNSS In-Tunnel Solution Required?

1.2.1. North East Link Project

1.2.1.1 Completion of the North East Link Project is planned for 2027. For a RNSS in-tunnel navigation solution to be available on the first day of operation:

a. all necessary legislative support for RNSS repeaters must be in place by early 2023; and

b. RNSS in-tunnel trials, to support design and equipment selection, must be substantially complete by mid-2021.

1.2.2. Australian Road Tunnels

1.2.2.1 Many Australian Road Tunnels would immediately benefit from the installation of RNSS in-tunnel navigation solutions.

1.2.2.2 The completion of the M4-M5 Link Motorway (Sydney NSW) in late 2023 will create Australia's longest and most complex road tunnel network. RNSS in-tunnel navigation would greatly assist traffic operations and alleviate emergency services concerns with respect to incident response. RNSS in-tunnel trials must commence as soon as possible.

2. Facilitating Trials of RNSS Repeater Devices in Road Tunnels

2.1. Facilitation of Trials

2.1.1 NELP supports the conduct of RNSS in-tunnel navigation solution trials in Australia to:

a. improve Australian industry awareness of the available technologies; and

b. develop local understanding of how best to deploy the technologies in Australian Road Tunnels.

2.1.2 NELP notes that RNSS in-tunnel navigation solutions are already deployed in at least 5 rail subways in various parts of the world, therefore, the trials are not required to prove the technology, but rather to identify any specific issues involving road tunnels. Roads tunnels have a larger cross section than subways and carry a variety of vehicles, therefore trials will be useful to identify how a RNSS in-tunnel navigation solution might need to be modified compare to a subway implementation.

2.1.3 The ACMA has identified three options to facilitate the conduct of trials in Australia.

2.1.4 NELP does not support Option 1 which requires emergency services to seek an exemption and sponsor the trials. This is not the role of emergency services and this option is likely to lead to further delay.

2.1.5 NELP supports Option 2 for the following reasons:

a. a long-term solution is ultimately required, therefore option 2 is potentially the most efficient option in terms of time and resources;

b. For road operators to invest in RNSS in-tunnel navigations solution technologies, a long term-solution is required; and

c. NELP believes there is sufficient data about real-life applications to demonstrate that the risk of interference to other applications is low. See section 2.2 for further information.

2.1.6 NELP supports Option 3 if this is the most expedient means in the short term to facilitate the conduct of trials. The conduct of trials in Australia in 2020 will serve to promote the technology, improve investment confidence and ensure that a RNSS in-tunnel navigation solution remains part of the North East Link scope.

2.2. Long Term Licensing Arrangements

2.2.1 AM and FM radio signals have been rebroadcast within Australian Roads tunnels under class licensing arrangements since August 1992 (opening of the Sydney Harbour Tunnel). In that time the industry has shown it can design and implement radio rebroadcast systems that do not interfere with the reception of radio signals outside of the tunnel environment.

2.2.2 NELP believes a form of restricted class license, similar to the Radiocommunication (Body Scanning - Aviation Security) Class License 2018, may be the most appropriate long-term licensing arrangement for RNSS in-tunnel navigation solutions for the following reasons:

a. Road Authorities will not make revenue from the rebroadcasting of RNSS signals.

b. The license fees associated with an apparatus license will discourage the adoption of RNSS in-tunnel navigation solutions which clearly have a community benefit.

c. Unrestricted class licenses my not be appropriate for a technology that could be used to interfere with navigation systems.

2.2.3 Under a restricted class license, a 'Road Authority' (as delegated under each State's road management act and regulations), or road managers engaged to operate a road on behalf of a Road Authority, would be authorised to operate RNSS in-tunnel navigation solution equipment.

2.3. License Conditions for Road Tunnels

2.3.1 The following comments are offered on Technical Guidelines and License Conditions:

a. Specification of the frequency bands on which the device can be operated is supported.

b. Limitations on the maximum radiated power from each antenna may be problematic as tunnel geometries vary and RNSS retransmission may be from discrete antenna or leaky coaxial cable. It would be more appropriate to set limitations on the power measured at the road surface.

c. Limits on spurious emissions from each antenna is supported.

d. Limits on emissions from in-tunnel antennas installed at or near tunnel boundaries may be is supported. For example, NELP supports the following proposed technical guidelines:

(1) emissions radiated from any transmission point, on any permitted frequency will not exceed a level of -140 dBm/24 MHz measured by an isotropic antenna at a distance of 30 meters from the tunnel portal.

(2) This measurement is to be taken under clear sky conditions with no additional attenuation from the transmission point (i.e. based on free space propagation with no allowance for additional attenuation such as building attenuation).

2.3.2. Comments on EN 302 645

2.3.2.1 Compliance with the maximum retransmitted RNSS signal Effective Isotopically Radiated Power (EIRP) may be problematic in a tunnel environment for the following reasons:

a. RNSS signal retransmission may be through radiating cable (leaky coaxial cable), creating problems for how EIRP is measured in practice.

b. A higher signal strength may be required to overcome attenuation caused by trucks and other furniture in the tunnels.

c. A higher signal strength may be required to achieve an acceptable signal strength at the RNSS receiver. Depending on the tunnel geometry and location of the antenna, distances from the antenna to RNSS receiver could be over 100 metres.

2.3.2.2 It is noted that 1.3.1 of EN 302 645 states 'a maximum retransmitted RNSS signal EIRP is not prescribed. The technical guideline should state unambiguously that EN 302 645 does not need to be complied with in respect to the maximum retransmitted RNSS signal EIRP.

2.3.2.3 Compliance with the maximum gain (45db) may be problematic for a tunnel installation for the following reasons:

a. The distance from an outdoor antenna to the indoor amplifier or simulator may be significant. Current roads tunnels in Australian can be over 60 metres underground and over 9 km in length. Higher gains may be required to overcome cable length and radiating cable length.

b. RNSS in-tunnel navigation solutions will utilise RNSS simulators creating problems for how gain will be measured in practice.

c. For road tunnel installations utilising RNSS simulators, the maximum gain criteria should not apply.

2.3.2.4 Other requirements in EN 302 645 are acceptable.

2.3.3. Comment on ECC Recommendation (10)02

2.3.2 Similar to EN 302 645, the maximum system gains and the maximum EIRP recommendations should not apply to RNSS in-tunnel navigation solutions utilising RNSS simulators.

2.3.3 Other recommendations in ECC Recommendation (10)02 are acceptable.

3. Radio Communications Prohibitions and Exemptions Framework

3.1 NELP has no comments on the framework.

4. Draft Radio Communications Amendment Declaration

4.1 NELP supports the draft Radiocommunications (Prohibited Device) (RNSS Jamming Devices) Amendment Declaration 2020 (No. 1) and has no further comment.