Department of Transport and Main Roads, Queensland

**Submission in response to:** Future use of the 1.5GHz and 3.6GHz bands

**Submitted:** 9 December 2016
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Introduction
The Department of Transport and Main Roads ("TMR") Queensland welcomes this opportunity to discuss the future and highest-value use of the 3.6GHz band, in response to the Future Use of the 1.5GHz and 3.6GHz bands Discussion Paper by the Australian Communications and Media Authority ("the Discussion Paper").

Executive Summary
TMR monitors Intelligent Transport Solutions implemented within the 3.6GHz band across Queensland, by way of its Traffic Management Centres. These services populate a large percentage of the 3.6GHz band in Queensland and are constantly expanding. The fate of this band has a high impact on these incumbent licensees, which provide key Intelligent Transport Solutions to the Queensland public.

Below is an overview of the application of the band in Queensland. ITS Solutions are used, most principally, for emergency, heavy and peak-hour traffic preemption at intersections, control of variable speed and message signage, incident detection, floodway devices, lane use management and closed circuit surveillance installations. Hence, ongoing access to this band is necessary to ensure reliable systems which provide for public safety. The following Figure can be used to assess the current highest-value use of the 3.6GHz band in Queensland.

<table>
<thead>
<tr>
<th>Traffic Management Centre</th>
<th>Area Managed</th>
<th>Current Use</th>
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<tbody>
<tr>
<td>Townsville</td>
<td>Townsville, Ingham, Burdekin, Mt Isa</td>
<td>150+ intersections, CCTV installations, VMS</td>
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<tr>
<td>Cairns</td>
<td>Cairns</td>
<td>30 application, projected to increase to over 50 in 2017</td>
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<tr>
<td>Mackay</td>
<td>Mackay, Whitsunday region</td>
<td>30 applications, set to surpass 50 with plans for expansion in 2017.</td>
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<tr>
<td>Rockhampton</td>
<td>Rockhampton, Gladstone and Yeppoon</td>
<td>120+ intersections, CCTV installations, VMS services</td>
</tr>
<tr>
<td>Bundaberg</td>
<td>Wide Bay Area (Bundaberg, Hervey Bay, Kingaroy, Maryborough, Gympie)</td>
<td>130 intersections, CCTV installations and VMS services</td>
</tr>
<tr>
<td>Toowoomba</td>
<td>Toowoomba and Darling Downs</td>
<td>130+ intersections, CCTV installations and VMS services</td>
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The ACMA’s Discussion of the highest-value use of the 3.6GHz band acknowledges correctly that “any re-farming [to allow for the rollout of high-density MBB services]...has the potential to affect all incumbent licensees, including point-to-multipoint licensees.” As a major overseer of the use of the spectrum, TMR wishes to discuss its position on its highest value usage and the effects that migration of MBB services will have on incumbent services operating in this band. Evidenced by the wide array of applications of ITS systems Statewide, TMR is of the view that the current state of ITS systems operating in the band is high-value use of the spectrum as it provides for public benefit and ensures future expansion.

TMR supports enhancement of the spectrum’s future use a way that increases public benefit into the future. Henceforth, it supports geographical reconsideration of the band. In alignment with Areas 2 and 3 of Figure 5 of the Discussion Paper, a lift of the 2009 Embargo on the spectrum to expand the geographical availability of the band would be suitable to relieve interference if there was an increased population of the band, and allow for expansion and improvement of Intelligent Transport
Solutions incumbent and to be implemented in Queensland. Most pertinently, lifting of Embargo 42 would have a high public benefit, in providing for the ongoing delivery of Transport and Main Roads Services, such as Traffic Preemption and Variable Speed and Message Signage, to the Queensland public. Moreover, to ensure that the lifting of the Embargo has a positive impact on the use of the spectrum, TMR is against the introduction of sharing arrangement between devices inhabiting the band. The propensity for sharing licenses to result in local interference presents a threat to the reliability of ITS in Queensland that could be avoided.

The 2009 ACMA Discussion Paper, *Planning for intelligent transport systems*, proposes a migration of ITS in Australia to the 5.9GHz band on the vehicle-to-vehicle and vehicle-to-infrastructure levels. TMR asserts that migration would not be possible for the services it provides throughout Queensland. However, its current network, inhabiting the 3.6GHz band, could complement the proposal as a Wide Area Network which provides backhaul and distribution. Then, devices on the 5.9GHz band could act as a LAN for access and aggregation. This integration would hybridise the two bands into a compromised solution that allows for the reliable provision of Intelligent Transport Solutions and effectively allocated spectrum in both bands. Hence, TMR urges ongoing access to the 3.6GHz band for incumbent services now and into the future, but acknowledge the possibilities of integrating 5.9GHz capabilities into the ITS framework.
Proposal 1: Lift the 2009 Embargo to avoid interference

<table>
<thead>
<tr>
<th>Consultation Questions addressed:</th>
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<tbody>
<tr>
<td>1: Should the 3.6GHz band be progressed from the <em>initial investigation</em> to the <em>preliminary re-planning</em> stage in the ACMA’s process for consideration of additional spectrum for MBB services? Why/Why not?</td>
</tr>
<tr>
<td>18: If the 3.6GHz band is re-farmed for MBB services, what geographical areas should be considered?</td>
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</table>

TMR of Transport and Main Roads aims to aid the ACMA in reviewing the current state of the 3.6GHz band and considering strategies to optimise its future use. The introduction of high-density MBB services to this band would have the propensity to diminish service through local interference. Thus, the best foreseen option would be no change to the current situation, so as to allow the continuing provision of essential services.

If re-farming were to occur, geography should be considered to avoid interference in the band. To combat interference, it is imperative that the ACMA considers lifting the 2009 embargo on the spectrum to comply with the Ministerial Discretion, RALI MS39 and the Re-Allocation Declaration (see Figure 5 of the Discussion Paper, Areas 2 and 3). A situation in which the spectrum’s geographical boundaries are expanded would allow for continuation of reliable Transport services in the current licensed areas and enhance the services provided to areas currently embargoed.
Proposal 2: Allow ongoing access to the 3.6GHz band, without interference, to incumbent services in order to preserve their reliability

Consultation Questions addressed:

19: If the 3.6GHz band is re-farmed for MBB services, should existing users (some or all) be allowed to continue operation within the band either temporarily or on an ongoing basis? Should/could sharing arrangements be developed? Should sharing only be considered for some services or specific licenses?

If MBB services were to be introduced into the 3.6GHz band, incumbent services providing ITS will require continued operation within the band, on an ongoing basis, in order to preserve their reliability. Emergency vehicle, heavy vehicle and peak hour traffic pre-emption, CCTV and VMS are integral applications of the band which provide indispensable Transport Services. Thus, it would be advisable to avoid a situation which could compromise their reliability.

Sharing arrangements in the 3.6GHz band, especially without lifting Embargo 42, could be detrimental to the delivery of services in regional Queensland. Thus, TMR recommends that incumbent licenses not have sharing arrangements developed, so as to avoid local interference.
Proposal 3: Refrain from mandating migration of ITS to alternative spectrums, including the 5.9GHz band.

Consultation Questions addressed:

20. If the 3.6GHz band is re-farmed for MBB services, and migration of incumbent services is required, are their alternative spectrum or delivery options?

It can be foreseen that, in accordance with the 2009 Discussion Paper Planning for intelligent transport solutions (ACMA), a call for incumbent licenses to migrate to the 5.9GHz spectrum may occur. However, this is not conducive to the Queensland ITS environment, as an environment in which all vendors are intercommunicating in this band would leave little room for backhaul. In saying this, it is possible that the 5.9GHz band could act to complement the 3.6GHz band as an edge, providing a Local means to access and aggregate the Wide area, long-range networking capability of the 3.6GHz band which provides backhaul and carrier-class access and reliability. Thus, the 5.9GHz band may be useful in complementing current ITS arrangements, but it could not support full migration of incumbent licenses inhabiting the 3.6GHz band.

The ad-hoc nature of 5.9GHz migration is not viable for a network providing ITS on an ongoing business, thus would not be the highest-value use and allocation of spectrum. To that end, the geography of Australia and especially regional Queensland is not conducive to the short-range, Client-to-Client links supported by this band. Thus, as affirmed by the Discussion Paper, “[terrain and clutter] would provide additional propagation loose and result in further decreases in the required separation distances” between devices. In the context of regional Queensland, wherein some areas, such as Mackay, have average links of 21 kilometres, it is not advisable to migrate towards spectrum without the capability for such a link. Links such as this require 33dBm EIRP, creating need for large, high-gain directional antennas which rely upon 3.6GHz band’s carrier-class access and reliability for effective implementation.

In summary, TMR advises strongly against migration of ITS to alternative spectrum. However, we do acknowledge the merit of the 5.9GHz spectrum, complemented by the 3.6GHz band, in a hybridised solution, for effective, high-value use of the spectrum which optimises the network for ensuring public safety.
Consequences of the November Amendments to Embargo 42

Due to the embargo placed upon the 3.6GHz band, approved 9/11/2016, the Department of Transport and Main Roads Queensland, has been forced to cancel ITS projects, affecting revenue and livelihoods of its partners such as BMS Network Solutions. These partners provide services to Regional Australian small and medium enterprise and government sectors. The recent embargo increase will also impact on the growth of these companies, their revenue, and ability to provide essential services to Australians inhabiting regional areas. Moreover, it has hampered essential guarantees of public safety, in the state of Queensland e.g. Stage 2 of the ITS network and Ring Road Project in Mackay, Queensland.¹

It is obvious, then, that re-farming of the 3.6GHz spectrum in a way that ITS services cannot be effectively provided, has the propensity for a detrimental impact on the state of public safety.

TMR urges against the ACMA’s proposal to re-farm the spectrum and advises lifting Embargo 42 and allowing incumbent licensees ongoing access to this integral band. We remind the Authority of its core principle, under the Australian Communications and Media Authority Act 2005 (Cth), to “maximize…the overall public benefit derived from using the radiofrequency spectrum,”² and stress that it is this very issue which is at stake.

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¹ ACMA, Radiocommunications Assignment and Licensing Instruction (RALI) MS03: Spectrum Embargoes, Updated Nov 2016
² ACMA, Future use of the 1.5GHz and 3.6GHz bands, p.7, October 2016