Exploring RLAN use in the 5 GHz and 6 GHz bands

Discussion and options paper

April 2021

Response by Pivotel

The Manager
Spectrum Planning Section
Australian Communications and Media Authority
PO Box 78
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By email: xavier.halliwell@acma.gov.au.

Dear Mr Halliwell,

ACMA Consultation 12/2021: *Exploring RLAN use in the 5 GHz and 6 GHz bands.*

Introduction and Background

Pivotel Group Pty Ltd (*Pivotel*) is pleased to provide comments on the ACMA's Discussion and options paper of April, 2021 titled ***Exploring RLAN use in the 5 GHz and 6 GHz bands***.

Pivotel operates a mobile and satellite telecommunications network pursuant to a carrier licence issued by the ACMA in accordance with the Telecommunications Act 1997 (Cth) (Telco Act) and operates ground infrastructure in Australia, making it the fourth public mobile carrier in the country. It is the only Australian carrier with direct connection to all four major mobile satellite networks: Iridium, Inmarsat, Thuraya and Globalstar and is also a reseller of the NBN Sky Muster and BSS satellite services.

Pivotel owns and operates the Globalstar ground infrastructure acquired in 2003 from Vodafone. Among other things, the acquisition included 3 major gateway stations at Dubbo, NSW, Mt. Isa, QLD and Meekatharra, WA with operational feeder up and feeder down links respectively in the 5 and 7 GHz bands. Specifically, the Globalstar satellite constellation and ground infrastructure utilises the 5 091 – 5 250 MHz frequency band for its Earth to space feeder links and the 6 875 – 7 055 MHz frequency band for its space to Earth feeder links. The Globalstar satellite and ground infrastructure also employs Australia wide customer service links in the 1.6 GHz (E-to-s) and 2.4 GHz (s-to-E) bands. The Globalstar constellation and ground infrastructure has been operating for the past 21 years under apparatus licences authorising use of the four frequency bands.

We have provided comments below to each of six items raised in your options paper.

Item 1

What is the demand for spectrum for RLAN use in the 6 GHz band (5925–7125 MHz)?

Pivotel does not have data regarding demand for spectrum for RLAN use in the 6 GHz band. Pivotel is supportive of all initiatives to maximise the utility of scarce spectrum resources across both licenced and unlicenced bands however this must occur in a manner that protects incumbent users of existing spectrum to the maximum extent possible.

Item 2

Should the ACMA proceed, as proposed, to consult on a formal variation to the LIPD class licence that adds the frequency range 5925–6425 MHz for RLAN use, bounded by the parameters described in the ACMA's preliminary view section of this paper?

Pivotel is generally supportive of a consultation to support variations to the LIPD class licence into the 5 925-6 425 MHz range.

Item 3

If class licensing arrangements are to be made in the lower 6 GHz band (by variation to the LIPD class licence), should alternative/additional power limits and/or other conditions be considered?

Pivotel does not have a specific view on point 3.

Item 4

Is it appropriate to consider inclusion of the upper 6 GHz band (6425–7125 MHz) in the LIPD class licence or should this be deferred to monitor future developments (for example, in the wide-area International Mobile Telecommunications (IMT) space) as outlined in the ACMA's preliminary view? We invite comments from submitters on the utility of the band for IMT use.

Pivotel does not support the reallocation of the upper part of the 6 GHz band identified in Figure 1 of ACMAs paper as "block C" for use by either RLAN equipment or future IMT use without significant further study and analysis of their interference potential. Pivotel's view is that a decision on the future operation of RLANs in the 6 425 to 7 125 MHz band should be deferred until these further studies have been conducted. We also note that WRC-23 Agenda item 1.2 is examining the possibility of terrestrial IMT in the 7 025 to 7 125 MHz band and we are participating in the ITU-R studies on this matter.

Many fixed satellite services operate across the 6 GHz band and may be subject to unacceptable levels of interference from RLANs operating in that band. A very reliable means of protecting primary receiving earth stations from class licensed RLANs in the relevant parts of the band will be required.

Pivotel uses the 6 875 MHz to 7 055 MHz band for our feeder down links for the Globalstar non-GSO constellation and the links operate from near horizon to horizon (down to 5degress of elevation) during each satellite pass making them susceptible to interference from nearby terrestrial sources.

Item 5

Should standard power (that is, higher power devices, including for outdoor use) operating under a dynamic spectrum access system such as the automatic frequency coordination (AFC) system adopted in the USA, be adopted in Australia for some or all of the 6 GHz band? Is there an appetite and capability for industry to provide the necessary systems to enable such use? We welcome views and evidence on the commercial and technical feasibility of introducing AFC systems in the band.

Pivotel is not supportive of adoption of AFC systems for frequency coordination and interference mitigation for any future use of all or part of the 6GHz band, and are not aware of any industry players with the required capability to deploy such a system in Australia,

Item 6

Should the higher power regulatory arrangements and associated interference mitigation measures added to the International Telecommunication Union (ITU) Radio Regulations at WRC-19 (see Resolution 229 (Rev WRC-19)) in the 5 GHz band be included in any amendment to the LIPD class licence?

Pivotel does not support any changes to the existing LIPD class licensing arrangements currently in place for the 5 150 to 5 250 MHz band. The feeder uplinks from Pivotel's gateway sites, which use the 5 091 to 5 250 MHz band to access Globalstar's non-GSO MSS satellites, would be vulnerable to increased interference from outdoor RLANs operating in the 5 150 to 5 250 MHz frequency band. Unlimited deployment of RLANs, especially outdoors and at high power, poses a long-term threat of aggregate interference to our feeder link satellite receivers. The feeder links "see" all RLAN transmitters within their coverage area and, at large enough levels of RLAN deployment, would lead to a serious degradation of link performance.

This topic was covered extensively at WRC-19 and having carefully reviewed the WRC-19 AI 1.16 decisions and noted that Australia's public position at the Conference was for No Change (**NOC**) on the 5 150-5 250 MHz band, we feel that Australia should continue with the current LIPD class licensed arrangements for RLANs in the band which allow indoor operation at 23 dBm (200 mW) maximum e.i.r.p. Existing arrangements have served both the satellite and RLAN user communities well to date and we see no justification in modifying these arrangements to suit what would purportedly be a small number of potential RLAN users at the risk of causing significant interference to the incumbent satellite users of the band.

Pivotel would also like to highlight that, outside of the USA, there has been little appetite for changing the existing arrangements for use of the 5 150 to 5 250 MHz band, with the majority of administrations electing to stay with the current "Indoor + 200mW" restrictions currently mandated in Australia, as clearly shown in Figure 2 of appendix B in the ACMA discussion paper.

Further information and background on this topic are provided in the attached appendix.

Yours sincerely,

Peter Bolger

Peter Bolger

CEO

Pivotel Group Pty Limited

Appendix A – WRC Considerations into the 5 150 – 5 350 MHz Frequency Bands

This appendix provides a short commentary on the ITU-R studies on AI 1.16 and on the subsequent AI 1.16 deliberations at WRC-19.

In late 2015 Pivotel (and Globalstar) became aware of a decision by World Radiocommunication Conference 2015, in its Resolution **239 (WRC-15)**, to create WRC-19 Agenda item 1.16 to consider issues related to wireless access systems in most of the 5 GHz frequency range. And that, over the next 4 years, for our specific 5 150-5 250 MHz band, the ITU-R would be asked:

To conduct studies with a view to identify potential WAS/RLAN mitigation techniques to facilitate sharing with incumbent systems in the frequency bands 5 150-5 350 MHz, 5 350-5 470 MHz, 5 725-5 850 MHz and 5 850-5 925 MHz, while ensuring the protection of incumbent services including their current and planned use; and

To perform sharing and compatibility studies between WAS/RLAN applications and incumbent services in the frequency band 5 150-5 350 MHz with the possibility of enabling outdoor WAS/RLAN operations including possible associated conditions.

As our frequency band had last been reviewed only 3 years earlier at WRC-12, with the decision being taken to retain the maximum power restriction on RLANs of 200 mW (23 dBm) e.i.r.p., together with mandatory indoor only use to ensure ongoing protection of incumbent services such as our feeder uplinks, we decided to participate strongly in the AI 1.16 domestic activities in Australia, in the regional APT APG meetings and in the international ITU-R meetings leading up to and including WRC-19.

Commentary 1: Four years of ITU-R studies with little support for change

In 2016, with the decision taken to conduct the AI 1.16 sharing and compatibility studies in Working Party 5A (WP 5A), Australia established a domestic WRC-19 AI 1.16 coordination group of industry and government experts to steer the work and to recommend draft views to the Department and the ACMA for ratification as Australia's evolving AI 1.16 public positions. Pivotel/Globalstar participated strongly in the coordination group, authoring five papers on 5 150-5 250 MHz band sharing issues that became Australia's sole contributions on AI 1.16 to successive WP 5A meetings.

The work on the 5 150-5 250 MHz band in WP 5A soon became a stand-off between a small number of administrations (led by USA) proposing that RLANs could operate outdoors and with significantly more radiated power (up to 36 dBm e.i.r.p.) than the existing maximum 23 dBm (200mW) e.i.r.p. with effectively no controls on the number of outdoor RLANs, and numerous other administrations, including Australia, who thought otherwise. USA chose to submit little in the way of supporting engineering studies and so had major difficulty in defending such radical proposed changes to the current worldwide RLAN operating rules in Resolution **229 (Rev.WRC-12)**.

After significant debate at seven WP 5A meetings in Geneva between Apr, '16 and May, '19, the majority of involved administrations (including Australia) continued to be unconvinced that incumbent services in the lower 5 GHz band, such as our Earth-to-space feeder links, would be adequately protected from harmful interference, as required by the cornerstone Resolution **239 (WRC-15)**. Which led to WP 5A being unable to complete its anticipated AI 1.16 sharing and compatibility Report, with nothing in the end being referred to the ITU-R for publication. Also, during this period, Australia's public position on AI 1.16 for the remaining APT APG meetings and for CPM-19 and for WRC-19 itself evolved to now formally support No Change (**NOC**) for the 5 150-5 250

MHz band. For which we had very strong support from numerous administrations in our Region and from around the world.

Commentary 2: WRC-19 decision on the 5 150-5 250 MHz band

In the absence of an agreed ITU-R sharing and compatibility Report from WP 5A, WRC-19 in Egypt found it very difficult to make progress on AI 1.16 in the lower 5 150-5 250 MHz band. And, as had been the case throughout the 4 years of ITU-R preparatory meetings, this was not helped by the absence of solid engineering evidence to counter the prediction from Australia and others that high powered outdoor RLANs would generate significant aggregate noise into co-band incumbent services. So, in the last week of the Conference with 15 meetings of the AI 1.16 working group not having been able to achieve any agreements, it looked like WRC-19 would simply decide to adopt the Australian position of **NOC** for the 5 150-5 250 MHz band.

However, with just 3 days of the 1-month Conference remaining and with still nothing agreed on the lower frequency band, the WRC-19 chair became involved at Plenary level and asked for one last try at achieving a possible compromise between the then warring parties. Which quickly led to the formation of a new group of just 8 specialists drawn from the most active AI 1.16 administrations on the 5 150-5 250 MHz band which met privately to thrash out the issues. Australia's AI 1.16 lead negotiator was one of the 8 experts.

After much debate, the expert group finally agreed the following compromise package for RLANs in the 5 150-5 250 MHz band:

- 23 dBm (200 mW) maximum e.i.r.p. together with mandatory indoor use would continue to be the cornerstone rule for RLANs in this band.
- As a concession, administrations would be permitted to operate 'limited' numbers of 'controlled' RLANs outdoors, at the same 23 dBm (200 mW) maximum e.i.r.p.
- As a further concession, for these 'controlled' outdoor RLANs (and also for indoor RLANs) up to 30 dBm (1W) e.i.r.p. could be used provided that a suitable RLAN antenna emission mask to protect incumbent satellite services was employed. Australia was asked to nominate a mask to protect the worldwide feeder links and recommended 23 dBm (200 mW) e.i.r.p. from 5 deg above the horizon and this was unanimously accepted.
- Finally, to further ensure protection of incumbent services, administrations would be required to limit the number of outdoor higher powered RLANs to less than 2% of their overall RLAN population.

Unfortunately, the package quickly unravelled after 1 administration objected to the 30 dBm e.i.r.p. concession going ahead and two further masks (one from Japan and one from USA) were then added to the Australian mask. Clearly, having a choice of 3 emission masks to accommodate, as well as having to limit the number of outdoor, higher powered RLANs to 2% of the overall RLAN population, would make it difficult for administrations to implement. Particularly as, in Australia, it would seem that the only practical way of limiting the number of outdoor RLANs would be to introduce individual apparatus licensing or registration which would clearly be a significant departure from the current LIPD *class licensed* arrangements applying to 5 150-5 250 MHz RLANs.