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Mr Sean McQueen
Australian Communications and Media Authority

5 June 2024

Re: Expiring spectrum licenses: stage 2¹ - Information gathering, and views on uses of frequency bands and alternative licence conditions, March 2024

Dear Mr McQueen,

Consunet Pty Ltd is a prospective alternative licensee, a prospective trader in spectrum, and currently develops and sells spectrum management software and services.

1. Views on uses of frequency bands

- 1.1 Our research forecast anticipates a convergence of Telco and small infrastructure in the sector. This creates a significant potential for "wireless broadband (WBB) use of the 700 MHz, 850 MHz, 2 GHz, 2.3 GHz, 2.5 GHz and 3.4 GHz bands" to use Wi-Fi protocols and standards just as they do in 2.4GHz ISM and 5 GHz bands, but with higher transmit power and hence range potential, to compete with 4G and 5G services. The technical feasibility of secure, wide-area Wi-Fi in infrastructure mode to deliver communication services has been proven through Community Wi-Fi both overseas (e.g. guifi.net in Spain) and in Australia via wide public access areas in select cities. Despite protestations from spectrum incumbent Telcos, this evolution would clearly be in the national interest with the potential to better serve and connect Aussie battlers, including first nations peoples. It would also spur significant new national technological and service innovations and investments in Australia. ACMA will be well-aware of the success of overseas initiatives, such as the US Citizen Band Radio Service (CBRS) which through innovative new forms of spectrum regulation, have resulted in a significant growth of new competitive services, technologies and companies. Where (1) spectrum demand is low, (2) telco 4G and 5G services are deemed by carriers to be uneconomical, and (3) services are not covered by government grants, the opportunity to reuse or share various spectrum bands outside of ISM using Wi-Fi (or other adaptable wideband signalling) is likely to foster the emergence of innovative new approaches by small and medium enterprise (SMEs) providers or through not-for-profit Community-based alternatives that the market will ideally decide. This innovation-based benefit to society, however, is dependent on the regulatory mechanisms first being established. Indeed, even specifying the means carries the risk of tying spectrum source to a technology which will change, whereas the spectrum resource need will not.
- 1.2 ACMA will be aware of the NEMA project to develop a Public Safety Mobile Broadband (PSMB) service. This relates to resilience and temporary disaster response capabilities. The PSMB service aims to assist the thousands of emergency workers who remain unable to communicate effectively across Australia. Adding satellite services is necessary but insufficient as a long-term resilient solution. To achieve both greater national resilience *and* efficiency given existing infrastructure and spectrum, it is necessary to access any spectrum used by any available equipment/asset without interference, or over-riding as a priority on a temporary basis. For example, clipping together radio links at a location using different bands can extend both reach and bandwidth. Looking at it from this perspective, greater assurance is possible through multiple means of simultaneous connectivity. No system will be perfect; however, this form of dynamic spectrum exploitation is an important addition to satellite services. Further, and critically, subsequent network analysis could be used to identify gaps and choke points where further investment in infrastructure and spectrum resources may be targeted, prioritized and most efficiently resourced.

¹ See: [Expiring spectrum licences \(stage 2\) – information gathering, and views on uses of frequency bands and alternative licence conditions | ACMA](#). Consultation closes 15 May 2024.

This approach might also be applied to emergency services for the general public, noting the Australian Public generally expect and believe that a mobile phone call to Triple Zero (000) is possible anywhere in Australia, when in fact it is not, anywhere outside of mobile coverage areas – putting lives and property at risk.

2. Alternative licence conditions

- 2.1 Advances in radio communications technologies have accelerated far beyond current license conditions. These technologies are near-real time adaptable with programmable software-configured radios and antennas with spatial multiplexing, beamforming, null-forming, diversity coding, that are co-locatable, multi-band, multi-user, wide bandwidth and low cost (these antennas for Wi-Fi are now a commodity home consumer item). These technologies increasingly make the 100-year tradition of fixed boundaries and conservative separations to avoid interference the primary cause of inefficiency. Our estimate is that today's resulting spectrum utilisation efficiency is under 10%.
- 2.2 These fixed boundaries include exclusivity to the spectrum acquirer, and to the use to which it is put – both of which the US CBR system has now proven were in the US national interest to remove. However, there are more boundaries that may also be subject to review. Boundaries include fixed user, fixed use, fixed bands, fixed bandwidths, fixed locations, fixed time (i.e. for all times of the day every day to the end of the license period – up to 20 years) and fixed maximum power level. These constraints were necessary due to technical limitations at the time of their creation. Significantly better outcomes are available enabled by the modern technologies described previously. The regulatory opportunity that this collectively presents, is to set new license conditions that encourage process and technical innovation while maintaining interference-free conditions and increasing efficiency.
- 2.3 ACMA spectrum licenses auction winners have been dominated by a limited handful of large, well-capitalised Telcos. To achieve a more competitive market with healthier enterprise scale diversity, it is essential to introduce alternative regulatory strategies. For example, reserving a portion of primary allocations for trading would drive market liquidity in auction-based primary allocations for trading; and by directly improving the health of the secondary trading market in spectrum. New regulation in Radio-communications (Trading Rules for Spectrum Licences Determination 2023) now requires registration and ACMA to approve spectrum trades. Our research on spectrum trading since the adoption of the new legislation in early 2023, has uncovered significant omissions in the ACMA Register of Radio Licenses (RRL) database and Archive of the RRL ("Spectra_Extract" post 2 June 2014) databases records. This deficit prevents exposure of details of sub-letting or trade in commercial spectrum. Public visibility of spectrum secondary trading data requires all commercial trades be detailed by traded date and time (in effect), duration of the sub-let or trade, license number and details (e.g. band and bandwidth), the license assignment (location), buyer details and seller details.
- 2.4 To improve competition in the marketplace and further the long-term national interest, increasing spectrum market liquidity and stakeholder scale diversity must be a priority of the ACMA. The current barriers to dynamic trading need to be removed. Spectrum trading between parties as market-based, near-real-time, secure and non-repudiable exchange should be supported by an online trading market. Of course, all markets require regulation, with dynamic spectrum trading marking both a shift and an expanded role for the ACMA. This is not unfamiliar to the Government as nationally wholesale electricity is currently traded at 5-minute intervals through a spot market separate to the contract retail market. Further, we note, this works despite the electricity sector (like telecommunications) being capital intensive with a natural monopoly structure. The transmission and distribution businesses are regulated to replicate the incentive properties of a competitive market. The rules governing the economic regulation frameworks for the electricity sector enable the regulator to set the maximum revenues that electricity network businesses can charge for the services they provide. Despite the analogies, rather than a centralised ASX, we believe the spectrum market should be underpinned by a decentralised trading system (as it is for real-estate) with location-specific regulatory reporting with controls set by electronic policies (which include ACCC competition rules).

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- 2.5 Consunet's DUST technology owned and developed in Australia, was built for Defence, and might be used by ACMA for this near-real time trading of spectrum assets using micro-licenses (legal agreements). This would optimise competition and consumer benefit while also ensuring assurance of service. This technology is founded on a decentralised approach, necessary to ensure the transaction speed limits imposed by physics will not limit the ability to trade in these micro-licenses. DUST allows registered spectrum users to aggregate and trade spectrum assets securely on an ad-hoc basis and avoid co-interference, at timeframes of a second or longer – compared with fixed licenses of up to 20 years – represents nothing short of revolutionary as a platform for trade and further innovation. This permits the supply of spectrum to meet users' demand, over time, geographic area and spectrum resources that maximises efficient utility and market liquidity. Consunet would be pleased to demonstrate the technology to ACMA.
- 2.6 There is a commensurate opportunity for government to shift its spectrum revenue model to one which is healthier for competition and governed by the market value of spectrum according to its actual use, without being a disincentive to the market (such as the imposition of a tax on each trade would be). A levy on the actual use of spectrum at the user device level is one such approach. Considering that over \$8B in spectrum licenses was raised by government over the last 10 years from telcos, and those telcos naturally pass this cost onto their consumers, simply means that a levy on use would be more direct and fairer.
- 2.7 Use it or lose it / share it clauses may be a necessary short-term mechanism to prevent anti-competitive behaviour by incumbents in support of regulatory goals and prevent anti-competitive behaviour. However, if a proper market system is adopted, as outlined previously, ACMA will need to regulate national radio and infrastructure businesses in such a way that replicates the incentive properties of a competitive market. This may involve setting the maximum revenues that electricity network businesses can charge for the services they provide.
- 2.8 The value of spectrum is in accord with its demand, and that demand varies by location and time. Therefore, whether i) demonstrating through UIOLI/UIOSI, or ii) encouraging through price-setting the use of spectrum by an incumbent, the trading of licenses needs to be at the level of assignments commensurate with the adaptability of modern technologies outlined previously. ACMA currently defines a Spectrum Trading Unit (STU) as a 9x9km area and 1Hz bandwidth. So, there is potential for trading across many tens of thousands of STU assignments for some single licenses alone. An even finer granularity of trading unit that reflects the correlation of cell size and frequency would mean far greater competitiveness for SME businesses to afford to bid, diversifying the spectrum market away from the current system.
- 2.9 Apparatus licenses including area wide licenses (AWL) may also be subject to online competitive spectrum market bidding and trading directly with ACMA where there is demand by more than a single buyer.
- 2.10 Further, considering the Digital Divide imperative, ACMA may wish to consider AWL licenses primarily used by miners covering large and remote areas might be shared with First Nation's people to provide digital services.

Kind regards,

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Chief Executive Officer
Consunet Pty Ltd