



Why allocating the full 1 200 MHz of 6 GHz spectrum
for Wi-Fi systems via the LIPD Class Licence is the
best outcome for all Australians.

DSA Policy Position Paper

1. About DSA.

The Dynamic Spectrum Alliance (DSA) is a global, cross-industry, not for profit organization advocating for laws, regulations, and economic best practices that will lead to more efficient utilisation of spectrum and foster innovation and affordable connectivity for all.

DSA is a global organisation focused on promoting spectrum sharing innovation to get the most out of wireless resources. Our team is made up of worldwide technology experts, making the DSA the shared spectrum go-to organisation for regulators and policymakers all over the world.

We advocate for policies that promote unlicensed (also known as Class Licenced in Australia) and dynamic access to spectrum to unleash economic growth and innovation. Additionally, we advocate for a variety of technologies that allow dynamic access to spectrum. To that end, we advocate for technology neutral Class Licensed rules.

2. The AMTA 5G Policy Position Paper.

Recently the Australian Mobile Telecommunications Association released a Policy Position paper discussing future spectrum requirements for 5G services. DSA believes that in the case of 6 GHz Wi-Fi (RLAN) spectrum AMTA/GSMA have largely missed the point or have failed to consider some important facts. In this paper DSA would like to take the opportunity to address these issues so that the ACMA and Government can make the right decisions for Australia's connected future.

3. The real need for 6 GHz as 5G spectrum.

On Page 21 of the AMTA paper, quoting a Windsor Place Study, the authors state:

"The major reasons for this recommended approach articulated in the report which are applicable in Australia are:

- *A need for additional mid-band spectrum in Australia given lack of C-Band and low-band spectrum which could be partially addressed by the partitioning of the 6 GHz band. Early field studies show that the 6 GHz band is a very good substitute for the 3.5 GHz band in terms of performance;"*

The DSA does not understand this statement. Australia leads the world in both the provision of low and C Band (mid-band) spectrum. The APT 700 MHz plan was largely an Australian/ACMA initiative, the ACMA has recently auctioned additional 850 MHz spectrum and has reallocated 900 MHz spectrum making it 'fit for purpose' 5G spectrum.

In (and around) the 3.6 GHz band Australia was again 'in the lead' making moves to release 3.6 GHz Fixed Wireless Access (FWA) spectrum in 2007 and has recently repurposed this spectrum for 5G mobile applications. With 3.4 – 4.2 GHz (a total of 800 MHz) being potentially

available there, with a very small number of licenced C Band satellite services, there is potentially more spectrum available in Australia than in most developed economies. For example, in the US where the full 1200 MHz of the 6 GHz band has been allocated to Wi-Fi, mobile operators must avoid or work around various government services meaning the band is not available in its entirety in either the spectrum or geographical dimensions.

The ACMA has recently released spectrum in 850 MHz, it has replanned spectrum in the 900 MHz band and the Australian Government is investigating ways to make parts of the 600 MHz band available. A few months ago, the ACMA successfully auctioned the 26 GHz band with lower parts of this band being available by other means. Australia leads the world in 5G spectrum availability.

The following table represents spectrum available to 5G services. DSA acknowledges that this spectrum is not all available as a spectrum licence, however each licence type does give degrees of flexibility to operators and allows them to dimension their networks accordingly.

| Band | Available Bandwidth | Comment |
|----------|---------------------|---|
| 700 MHz | 90 MHz | Spectrum Licenced |
| 800 MHz | 60 MHz | Spectrum Licenced |
| 900 MHz | 50 MHz | Spectrum Licenced |
| 1800 MHz | 150 MHz | Spectrum Licenced |
| 2 GHz | 120 MHz | Spectrum Licenced |
| 2.3 GHz | 98 MHz | Spectrum Licenced |
| 2.5 GHz | 140 MHz | Spectrum Licenced |
| 3.4 GHz | 225 MHz | Spectrum Licenced |
| 26 GHz | 2400 MHz | Mix of Spectrum Licences, Apparatus Licences and a Class Licence. |
| 28 GHz | 2000 MHz | Available as primary AWLs over 600 MHz and secondary AWLs over the full 2 GHz Australia wide. For FWA only. |

Table One
Spectrum Available to 5G in Australia in 2021

This is a total of 5333 MHz of bandwidth currently available to 5G services in Australia via various licencing arrangements. There are other bands currently being considered by the ACMA (see the ACMA’s Five Year Spectrum Outlook¹) meaning 5G operators have significantly more spectrum available than suggested by AMTA’s estimation on Page 20 of their paper.

DSA suggests that with only one band currently available and suitable for most advanced and the next generation of Wi-Fi, known as Wi-Fi 6E and Wi-Fi 7 respectively, it would be a tragedy for future communications if the full 1200 MHz were not allocated for those services.

¹ <https://www.acma.gov.au/five-year-spectrum-outlook>

The AMTA paper goes on to assert:

Crucially such an approach preserves future flexibility as any assignment of the 6 GHz band to unlicensed use is not a decision that can be reversed, unlike the assignment of the 6 GHz band to licensed uses.

DSA finds this statement to be misleading. Historically in Australia all heavily used mobile bands have been renewed in the public interest. It is not simple to reverse an allocation which has been made by auction and has been in use for 15 – 20 years and is heavily represented by connected devices in the market. The recent difficulties faced by the ACMA in simply redesigning the ‘legacy’ GSM bands (900 MHz) are proof of this.

4. The need for a long term perspective.

DSA agrees with AMTA, the Government and ACMA should have a long term perspective for spectrum management, and DSA is assured that the ACMA does.

AMTA shows an estimate of the number of 5G mobile and FWA services they expect in the future, DSA has no reason to doubt these figures. However most if not all of these devices connect the 5G service to the user device via Wi-Fi. Be it internet, television, security, supervision, control or data acquisition, Wi-Fi has become both indispensable to family and industry alike and is becoming congested. Indeed, many carriers are shipping Wi-Fi modems with built in SIM cards to act as standby systems if the cabled ADSL systems fail. Wi-Fi is an integral part of the 5G journey.

However unlike terrestrial mobile systems, Wi-Fi supports other users and other systems. From drones to car alarms, remote controls to content measurements in water tanks, Wi-Fi is ubiquitous. It also enables communities, farms, factories and mines to take charge of their own communications and automation needs. Wi-Fi is a vital economic enabler and the returns from this activity far exceed any potential auction revenue foregone.

AMTA has shown there will be an exponential growth in 5G services and DSA agrees with them. What AMTA has missed is that in many cases the distribution of these services is enabled by Wi-Fi which means, adding in the additional uses described above, Wi-Fi spectrum demand is likely to outstrip that of 5G because the limited Wi-Fi bands will be fed by low, mid and mmWave 5G bands.

DSA is assured the ACMA has monitored the growth of existing Wi-Fi demand and their decision to allocate the lower 500 MHz of the 6 GHz band is proof of this. While there are other options for 5G mid-Band spectrum, there are no such options for Wi-Fi and failure to allocate the full 1200 MHz now would result in a future data bottleneck that would be disastrous for Australia’s economy. AMTA contend the ACMA should take guidance from other Administrations such as the U.S., DSA agrees and the ACMA should likewise allocate the full 1200 MHz to Wi-Fi.

5. Is it one or the other?

AMTA contends that *“generally the Wi-Fi standard and devices are not spectrally efficient. Part of the reason for this is they always provide backward compatibility and do not adopt difficult and complex transition paths. It is contended that the lack of spectral efficiency may underpin requests for the 1,200 MHz of the 6 GHz band to be made available for Wi-Fi services rather than being partitioned between Wi-Fi and IMT services”*.

Again, DSA believes this statement is misleading. Wi-Fi services many different devices while mobile telephony generally services only the mobile handset. While handsets are notorious for their fast turnover, mining automation, farming equipment, expensive remotely piloted aircraft and even the humble laptop are not. So while 5G is moderately more spectrally efficient when compared on a per MHz basis with 4G it does not service the same complex equipment environment. By building in a certain amount of backwards compatibility Wi-Fi designers ensure the best economic outcome for the users without relying on high end user terminal turnover, Furthermore, WAS/RLAN devices would coexist with incumbents in the 6 GHz band, which is ultimately the most efficient use of that band, maintaining the current services and in addition to that, having Wi-Fi.

On Page 20 AMTA assert: *“Importantly, the total allocation of mid-band spectrum to LIPD/Wi-Fi services was comparable to the entire allocation of IMT spectrum to mobile operators (i.e. 630 MHz versus 668 MHz) prior to the assignment of the 3.6 GHz and mmWave band. Following the allocation of an additional 500 MHz in the lower 6 GHz band to LIPD/Wi-Fi uses, the total amount of spectrum of allocated to such services (a total of up to 1,130 MHz) will greater exceed the total amount of IMT spectrum allocated to all Australian mobile operators including the 3.6 GHz band licences.”*

Again this statement is misleading. By making assumptions ‘*prior to the assignment of 3.6 GHz licences*’ the paper ignores the fact that 5G has very significant access to spectrum in the mid band. The statement also entirely ignores the 26 GHz ‘mmWave’ spectrum (allocated using various methods) and the 600 MHz of primary 28 GHz FWA spectrum which can be used by 5G fixed services in most populated areas with 2 GHz of secondary spectrum which can be used anywhere. It also does not appear to take into account recent low band auctions and potential future allocations in C Band. For a current estimate of spectrum available to 5G services see Table One above.

There are also multiple other bands being investigated (and also discussed in the AMTA paper) as a result of the outcomes of World Radiocommunications Conference WRC 2019 (Sharm El Sheikh) and the agenda of WRC-23, including the 10 GHz band as well as the 600 MHz broadcasting bands currently being investigated by the Australian Government.

Critically there is only one potential Wi-Fi band being looked at globally and if this opportunity is missed there may never be another. Mobile operators have significantly more spectrum than Wi-Fi and have a significant amount of opportunity in the future to access much more. While we agree with AMTA on their estimation of 5G (and 6G) devices that will be sold in the

future we are disappointed that they have ignored the fact that most of these devices will rely to a certain extent on Wi-Fi for an end user connection to other devices.

Perhaps the most disappointing omission in the AMTA paper is that the so called 'Wi-Fi' spectrum (both existing and new) can and is used by the carriers to offload data and even voice calls. So any new Wi-Fi spectrum also benefits the mobile carriers. But beyond offload, the ACMA created a Class Licence based on a low potential for interference, they rarely define a technical standard. This means that provided the 5G services can operate within the parameters outlined in the Class Licence they could also use the spectrum, again benefitting the carriers without the inefficiency of defined spectrum blocks by band or geography. A Wi-Fi band is everybody's band, and that includes the 5G operators.

6. Summary

An allocation of 1200 MHz of 6 GHz spectrum to Wi-Fi by way of the LIPD Class Licence is an allocation for the whole community, families, industry, mines, farms and telecommunications carriers. All of these sectors rely on Wi-Fi now in bands that are already congested. While the additional 500 MHz of spectrum proposed by the ACMA is a welcome addition and will in the short term relieve the congestion that amount will not future proof Wi-Fi. AMTA is right, the number of connected devices will increase significantly in the future and so will their throughput, all of these devices rely on Wi-Fi in one way or another. But as these devices increase in number so will farm and mine automation, rural and regional reticulation of broadband data, educational and medical uses of Wi-Fi and also the number of connected devices in the home. DSA supports AMTA in their quest for adequate spectrum, we simply contend that the best use of the 1200 MHz in the 6 GHz band, for all of us, is an allocation to Wi-Fi via the LIPD Class Licence.