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**Allocation limits advice for 850 MHz expansion band and
900 MHz band spectrum allocation**

Response to ACCC Consultation Paper

18 December 2020

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Pivotel welcomes the opportunity to comment on the ACCC's consultation paper 'Allocation limits advice for 850 MHz expansion band and 900 MHz band spectrum allocation'.

CONTEXTUAL STATEMENT

- Pivotel is well placed to comment on spectrum matters impacting regional and remote Australia through its experience and focus on the provision of tailored voice, messaging and data solutions to these communities since 2003.
- Pivotel operates a mobile and satellite telecommunications network pursuant to a carrier licence issued by the Australian Communications and Media Authority 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.
- Pivotel's 4G LTE mobile network solution, ecoSphere®, is designed to provide terrestrial wireless services to rural and remote Australians. Whilst ecoSphere® is a cost effective and innovative approach to providing connectivity in regional and remote areas, the largest obstacle is access to suitable spectrum. The radio base stations deployed by Pivotel use mainly 2,100MHz apparatus licences, this results in the need to deploy a higher number of sites to cover an equivalent area with lower propagation characteristics, than what could be delivered using low band (i.e. < 1GHz) spectrum.
- Pivotel, and other smaller providers, are effectively locked out from accessing the most suitable spectrum for covering large regional and remote areas, resulting in higher costs and a lower level of service for end users in these areas.
- The 850 extension and 900 MHz spectrum lots allocation process is an ideal opportunity to provide a means for providers like Pivotel, to access suitable spectrum to build cellular networks, enhancing competition and productivity outcomes in regional and remote areas.
- Competition in regional Australia is held back by a lack of domestic roaming and the restriction on MVNOs, such as Pivotel, in accessing the full Telstra mobile coverage footprint. Pivotel's rural networks strategy relies on the use of dual SIM handsets with customers needing to have two subscriptions, or accept a single subscription two SIM offer from Pivotel that supplements Pivotel's own coverage with MVNO access to Telstra's reduced coverage wholesale network.
- As an mobile operator focussed on regional and remote Australia, we observe that rural community communication needs are constantly evolving and Pivotel is keen to see equitable spectrum allocation methodologies that allow us to server these markets now and into the future.

1. What are the likely intended use for spectrum in the 850 MHz expansion band and the 900 MHz band?

As correctly identified in the ACCC paper, low band spectrum is particularly advantageous in regional areas where capacity demand is lower but achieving maximum coverage is the primary objective. Low band spectrum is also used in urban and suburban environments to provide a 'glue' function between high capacity demand areas that are being served by high capacity cells using mid or high band spectrum. The statement that low band spectrum provides superior in-building coverage is technically correct, but really only applies in areas of lower population density; in a high capacity-demand areas such coverage will be provided by a combination of in-building, pico, and micro cells using mid and high band spectrum¹.

Pivotel's desired use of low band spectrum is entirely for use with 4G/5G services in regional and remote Australia such that coverage can be maximised using less infrastructure, and thereby improving the commercial viability of a network deployment. The business case for these networks is often challenging as evidenced by the fact that the major MNOs have failed to address the need due to the relatively low population densities of these areas.

2. If you intend to use the spectrum for mobile services:

(a). Do you intend to acquire spectrum in the 850 MHz expansion band or the 900 MHz band or both?

(b). How much spectrum do you want to acquire?

(c). How are you planning to use any spectrum you acquire? Is there likely to be any difference in how you will use the spectrum in metropolitan areas and regional and remote areas? Please also comment on the extent to which the acquisition would support deployment in 4G and 5G services.

- (a) Pivotel is extremely interested in gaining access to both the 850 MHz expansion and 900 MHz bands (indeed, any low band spectrum that can be used with standard mobile devices), particularly in the approximately two-thirds of the Australian landmass that does not receive any mobile service.
- (b) Pivotel considers that 2 x 10 MHz of spectrum is the minimum amount of spectrum that can meet today's consumer expectations with respect to mobile device performance. With LTE technology this amount of spectrum can provide uncontended peak speeds of approximately 50 Mbps downlink and 20 Mbps uplink.
- (c) As stated previously, Pivotel's interest in acquiring low band spectrum is only for use in regional and remote Australia. At present, Pivotel deploys 4G LTE networks as these are considered sufficient to meet current demand needs. Pivotel will look to deploy 5G networks when the demand in rural areas exists – factors driving 5G adoption are likely to be the need for very low latency connections (i.e. for autonomous vehicles), network slicing, and potential coverage improvements through the use of massive MIMO technology.

¹ Evidence of this can be inferred from the fact that it is virtually impossible to purchase pico and micro cell equipment operating using low-band spectrum.

3. What are the relevant downstream markets for the purpose of assessing the impact of the 850/900 MHz allocation on competition?

With its regional network deployments Pivotel currently concentrates on four markets:

- (a) Private Enterprise (e.g. mining);
- (b) Agriculture;
- (c) Remote Communities;
- (d) Emergency Services (permanent and temporary deployments)

Category (a) networks are private and do not normally provide service to the general public. Categories (b) and (c) are designed to support general public access and category (d) networks may provide public access depending on the requirements of the Emergency Services. Therefore, Pivotel consider markets (b) and (c) to be a part of the retail mobile services market, and a relevant downstream market. Pivotel agrees that this market is a national one, with equivalence of service to metropolitan areas seen as a 'right' (partly driven by uniform national pricing by the MNOs) but which is not delivered in many rural and remote areas.

As the ACCC has identified in its discussion on the need for allocation limits (Section 8), spectrum is an essential input for any MNO. However, the 'volume' of spectrum required to deliver an equivalent service to a user is proportional to population density and the desired peak data throughput speeds. Therefore, in the case of national spectrum allocations, the need for capacity in metropolitan areas will determine the amount of spectrum auctioned, but will be allocated nationwide, whether or not it is required. As a consequence, rural and remote markets can be disadvantaged because other operators are prevented from stepping in to serve these non-metropolitan markets. Outside of the scope of this response, the other significant barrier to entry for an aspiring operator has been the reticence of incumbent MNO(s) to engage in national roaming solutions.

4. Are there likely to be future relevant markets that have not been identified?

When consulting with groups representing regional and remote Australia, the need to provide better and more reliable communications for rural citizens remains the primary market driver. However, the driving factors around Pivotel's decision to deploy a remote area network increasingly rely on supplementary (non-human) usage, such as M2M systems (video surveillance, water management, weather stations) and IoT devices such as sensors measuring temperature, soil moisture, fence integrity etc.). Some of these needs can be satisfied using satellite solutions, but a high bandwidth or low latency requirement necessitates the deployment of LTE infrastructure. At this point in time we do not consider these to be relevant market services, but they could become so in future when, for example, driverless vehicles dependent on an external data connection become commonplace.

5. Do you have any comment on the state of competition in the national mobile services market or other relevant markets that you consider should be taken into account? What do you think are the key competition issues arising from the 850/900 MHz allocation in these markets?

Australia has variously 'experimented' with up to six MNOs at any one time (e.g. One.Tel, AAPT, Hutchison; 3 and TPG prior to merger; alongside Optus, Telstra, and Vodafone). However, history shows that for Australia's market size, three networks appear to be the sustainable number with, for many years, 'classic' market shares of 50/33/17 percent. MVNOs play a useful role in providing niche services to the market but if they become significant in size the likelihood is that they

eventually will be absorbed or controlled by their host MNOs (c.f. Virgin, Crazy Johns, Amaysim, Lebara, Boost).

Retail mobile services competition is multi-faceted; there is no doubt that healthy product competition exists and is driven by those seeking the latest features. Network quality can be impacted by a lack of spectrum, but other factors such as density of base stations, network design and the pricing of data-hungry services all affect overall performance and hence influence a customer's choice of MNO.

Another aspect to competition that applies in a large country such as Australia is coverage. This is where Telstra has established a large, and seemingly, unassailable lead (arguably assisted by government funded programs). In remote areas mobile market shares are completely unbalanced with Telstra having the vast majority of connections. As evidenced by the latest Mobile Black Spot Program (MBSP) Round 5 which was undersubscribed for the first time, there is now little incentive for the major MNOs to build in these areas unless providing coverage in some way benefits their metropolitan customer base.

Continuity of service will be a key consideration for MNO's and it is noted that Optus and TPG 3G services are at risk due to the forthcoming 900 MHz auction whereas Telstra's are not. TPG has more options in that it could move 3G services to 850 MHz and use its significant 700 MHz holdings for 4G and 5G, but at a cost. Optus has no such option. Therefore, there is merit in ensuring that the auction process allows both Optus and TPG to retain access 2 x 5 MHz of spectrum to maintain continuity of these services.

6. How would the allocation of the 850/900 MHz band impact investment in regional and remote Australia?

It is Pivotel's view that the method by which spectrum is allocated in regional and remote Australia will have a direct impact on operator investment decisions. We consider that any form of nationwide allocation of lots, without competition limits, will result in all regional spectrum being allocated to the three major MNOs resulting in minimal to zero further investment by them (with or without government subsidies).

The rationale for this is that the opportunity has been in place since 1993 (when the 900 MHz band was first allocated on a nationwide basis) and even though subsequent auctions have had regional allocations, they have been so broad brush in nature, and in all cases have included the entire Australian land mass, such that all lots have inevitably been taken up by the major MNOs, tying up strategically valuable spectrum in areas where there has been little to no intent shown to use the resource. This is evidenced by the fact that, even today, only around one third of Australia's land mass enjoys mobile coverage, the bulk of which is provided by Telstra either directly or with the help of Government funding such as the Mobile Blackspot Program.

Pivotel's view is that much finer granularity with regard to the size of geographic lots should be applied, with perhaps some more remote areas of Australia not included in the auction at all. This would leave aside some spectrum for specific areas where there is demand, access to backhaul and potential for government co-contributions which are all necessary to determine commercial viability, but which can only be determined on a case by case basis. As such auctioning spectrum for this use case is not viable as the specific area business case viability needs to be determined after validating a number of key assumptions which will not be known prior to auctioning spectrum licences on a remote / regional / sub-regional basis as has been suggested by the ACMA. It is far more appropriate to allocate spectrum using existing Apparatus or AWL mechanisms to operators wishing to provide services in regions outside of the spectrum licensed areas, which is also consistent with

the ‘place based’ approach adopted recently in the Federal Governments Regional Connectivity Program.

The ACMA has previously put forward the view that smaller geographic lots for low band spectrum are problematic because of “spill-over” from one geographic region to the next. Pivotel does not support this view; the European continent is criss-crossed with hard national boundaries and the national MNOs have successfully engineered abutting networks using low band spectrum for the last 30 years without apparent problems. Some careful radio engineering near network boundaries is required, but it is quite feasible.

7. Should existing spectrum holdings in sub-1 GHz bands (i.e. 700 MHz and 850 MHz bands) be considered in any assessment of allocation limits? Please provide evidence and reasons for your view.

Yes, Pivotel considers that existing holdings in the 700 MHz and 850 MHz bands are entirely relevant to the consideration of allocation limits. Today’s devices are capable of operating on all three low band allocations (700, 850, and 900 MHz) and techniques such as carrier aggregation allow for the delivery of high speed services even if the spectrum is not available in contiguous lots.

Older devices may not support all bands or carrier aggregation, but by the time the spectrum allocation is complete it can be confidently stated that the overwhelming majority of devices will support all these capabilities. This is based on the fact that, due to high replacement rates, the mobile device ‘half life’ (i.e. the time for a new capability to be present in 50% of mobile devices) is typically 18 months. For those remaining small number of older handsets that are not capable of operating on the available frequencies MNOs and MVNOs have experience with executing handset replacement programs.

The table below shows the total allocation of current low band spectrum in regional and remote Australia

MNO	700 MHz	850 MHz	900 MHz	Total
Optus	2 x 10	0	2 x 8.3	2 x 18.3
Telstra	2 x 20	2 x 15	2 x 8.3	2 x 43.8
TPG Telecom	2 x 15	2 x 5	2 x 8.2	2 x 28.2

When considering the urban (capacity-driven) areas the situation is slightly more balanced:

MNO	700 MHz	850 MHz	900 MHz	Total
Optus	2 x 10	0	2 x 8.3	2 x 18.3
Telstra	2 x 20	2 x 10	2 x 8.3	2 x 38.8
TPG Telecom	2 x 15	2 x 10	2 x 8.2	2 x 33.2

8. Should existing spectrum holdings in bands other than the sub-1 GHz bands be considered in any assessment of allocation limits? Please provide evidence and reasons for your view.

The response to this question is different for metropolitan (capacity-driven) environments than for regional and remote (coverage-driven) environments.

In the case of regional and remote environments, Pivotel does not consider that holdings of mid or high band spectrum should have a strong weighting with respect to allocation limits. This is because in these regions, low band spectrum forms the service's coverage layer and generally provides sufficient capacity; mid and high band holdings are therefore largely irrelevant. If capacity hot spots do exist, they are generally served with mid band spectrum, in turn relieving the demand load on the low band coverage layer.

In metropolitan high capacity areas, the low band spectrum is used to meet both coverage and capacity roles and there may be some merit in applying some form of allocation limit. Please also see our response to Question 9.

9. If the ACCC were to consider existing spectrum holdings in its assessment of possible allocation limits, what factors do you think would need to be considered?

Pivotel would suggest that the following factors be considered:

- **Geographic distribution:** The distribution of existing lots by area on the basis that low band spectrum fulfils a different role in metropolitan (capacity-driven) environments than it does in regional and remote (coverage driven) environments;
- **For regional and remote Australia:** Inclusion of all low band spectrum holdings (i.e. 700 & 850 MHz bands) in the assessment;
- **For metropolitan areas:** Consideration of all mobile spectrum holdings (i.e. low, mid, and high band holdings).

There is of course the issue that an MNO with a larger customer base may argue that they require more spectrum to offer the same network quality as their smaller competitor; applying uniform caps could benefit the smaller MNOs whereas proportionate caps would help preserve the status quo. An alternative might be to limit assessment to bands primarily associated with coverage (i.e. low and mid bands) but not bands above 2 GHz that are primarily used for capacity enhancement.

10. Are there grounds to guarantee Telstra 2 x 5 MHz of spectrum in this allocation? Please provide evidence and reasons for your view.

With reference to the tables provided in Question 7, it is clear that the major MNO that is most disadvantaged with respect to low band spectrum is Optus. This would be a greater concern for Optus in regional Australia as in urban areas, mid and high band spectrum can usefully supplement low band shortfalls. Notwithstanding, it is worthy of note that Optus, with its second-best national coverage, appears to have successfully achieved this within the boundaries of its current spectrum holdings. This supports our view that the volume of spectrum required to service rural and remote areas is not that great.

Pivotel's view therefore is that there is no technical or operational reason to guarantee Telstra a minimum spectrum allocation.

11. Do you think that allocation limits are necessary for the 850/900 MHz allocation? Relevantly, would allocation limits be promote competition and encourage investments in regional and remote areas of Australia?

Yes, for reasons also discussed in our responses to Question 6 and 9, the amount of spectrum an operator considers they need in any one lot will be set by considerations of the peak population density, what other spectrum holdings are available to service those high capacity areas, and the peak speeds that they wish to claim their network can deliver. This means that, in lower capacity demand areas within the lot, the MNO will most likely have more spectrum than is necessary to provide its services but, as noted in Section 8, this may be ascribed a value by the MNO in that it deprives other potential operators of an essential input. It is for this reason that Pivotel has advocated for the greatest possible granularity in the size of spectrum lots so that in any one area only sufficient spectrum is allocated in order to maximise opportunity and, consequentially, the public benefit.

An alternative approach with perhaps an improved public benefit outcome would be to only offer spectrum lots in regions above a certain population density, relying on Apparatus and AWL licensing in regional and remote Australia. Pivotel does not consider that the major MNOs would be disadvantaged because they retain the use of sufficient nationwide spectrum in the 700 MHz and 850 MHz bands.

To summarise, allocation limits that are based purely on the amount of spectrum an operator can procure are one-dimensional and do not address the need to promote competition and encourage investments in regional and remote areas of Australia. A geographic form of allocation limit should be imposed in parallel in order to achieve the public benefit outcomes sought.

12. If so, what do you think the appropriate allocation limits should be? Do you think different allocation limits should apply to metropolitan and regional areas? How would the application of these allocation limits affect the downstream relevant market?

For the reasons stated previously, Pivotel strongly believes that different allocation limits should apply to metropolitan and regional areas, and that all low band spectrum should be considered collectively. For regional and remote Australia, Pivotel considers that an allocation of 2 x 20 MHz of low band spectrum is sufficient to meet current and forecast demands over the next few years. This is on the basis that mid band spectrum is available to the operator to help address any 'hot spots' within the coverage area. With these assumptions, the ability to provide the rural downstream relevant market with an equivalent product service to their metropolitan counterparts should not be overly constrained by spectrum. However, the very nature of rural coverage means that average field strengths are lower, meaning that the user is far less likely to be in a region where the highest speeds, enabled by a large spectrum allocation, can be achieved. In these circumstances the rural user does not enjoy a performance equivalence with their metropolitan counterparts, but it is not caused by a lack of spectrum.

13. Are there other factors that you consider the ACCC should consider in assessing the possible allocation limits to apply?

As referred to in our response to Questions 7 and 12, Pivotel does believe that it is appropriate to consider all low band spectrum holdings collectively because both network and device technology has evolved to the point where multiple bands can be used simultaneously. However, there are performance limitations, and it is more efficient for an MNO to use contiguous spectrum wherever possible. In the past the ACMA have facilitated spectrum block rearrangements to achieve this and

have also designed recent auctions such that this is sorted once spectrum lots have been secured – we see this as an important factor when considering allocation limits.