

Introduction

Connected Farms welcomes the consultative aims of the advice for the 850MHz expansion bands and 900MHz band spectrum allocation in the hope that it leads to improved flexibility and spectrum availability along with reduced regulatory barriers, thus helping ensure the spectrum availability is fit for purpose in a rapidly changing wireless and mobile telecommunications environment.

Connected Farms Pty Ltd is an Australian owned and operated company and a licenced telecommunications carrier. Connected Farms was formed to specifically provide connectivity solutions to the agriculture sector in regional and remote Australia with the vision of enabling digital agriculture with three key areas of offering:

1. Improved business grade broadband to the farm office/ house
2. Over the farm coverage preferably to mobile quality coverage to allow improved voice and data communications (and this coverage can also collect IoT data). Effectively this required the use of privateLTE technology.
3. Regional / local edge micro datacentres – to reduce latency in autonomous applications and allow better near farm data processing of all the various data sources such as IoT sensors

Our technical solutions are tailored to a farm's particular requirements and the most significant obstacle in the provision of acceptable handset coverage across regional and remote farmland is the availability of spectrum to enable the use of privateLTE solutions.

Lower band spectrum such as the 700MHz, 850MHz and 900MHz are more suited to over the farm coverage than spectrum currently available under apparatus licences. Lower bands offer much better area coverage performance than the currently available higher frequencies. While in theory the existing spectrum holders can commercially make spectrum available, their default position is to refuse any request to share spectrum in these lower bands. The inability to access the lower band spectrum is affecting the use of privateLTE in regional and remote Australia across diverse industries such as agriculture, mining, gas extraction and transport/logistics.

Existing mobile operators holding the spectrum have demonstrated their lack of appetite to share the lower band spectrum while simultaneously neglecting to deploy coverage into areas that do not fit within their coverage thresholds (e.g. populated areas). Black spot initiatives have also tended to be aimed at population or highway coverage and not to areas serving rural businesses such as mining and farming.

When national spectrum allocations were first developed and utilised, solutions such as privateLTE were clearly not contemplated (as they did not exist). As a result, there is minimal opportunity for licensed telecommunications carriers to use privateLTE technologies other than in very small space restricted environments. The lack of available lower band spectrum is now a material factor in constraining the development of advances in agriculture and other remote industries. (*Commercial in Confidence – sentences removed for Public Submission*)

A fit for purpose spectrum allocation that better reflects modern spectrum and supply chain needs is of critical importance for Australia's economic and social well-being. Connected Farms is concerned to ensure that the spectrum allocation has the appropriate settings to encourage investment and innovation **equally** across metropolitan and rural/remote areas and that it is equipped to respond changes in demand.

Demand for spectrum and connected communications solutions for rural/remote farms and business is a significant growth area. Any proposed reforms in spectrum management must have regard to

the unique challenges and opportunities in rural/remote areas and provide flexible regulatory settings and adaptive responses. Connected Farms considers that the separation of regional and remote Australia from metropolitan areas is an essential step for the effective allocation of these spectrum bands.

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Connected Farms – response to questions

Connected Farms' response to consultation paper questions are set out below.

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

Connected Farms will not speculate on intended use by the larger mobile operators in regional and remote areas – as to date they have not been covering much of these areas. Their uses may well relate more to metro and outer metro areas.

The uses that Connected Farms see are related to the availability of spectrum for a Public Safety Mobile Broadband (PSMB) use and the use in remote and regional Australia of private LTE deployments to support industries such as infrastructure construction, transport/logistics, mining, gas field operations and of course the agriculture sector

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?

(Commercial in Confidence - Paragraph removed for public submission)

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

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(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.

(Commercial in Confidence - Paragraph removed for public submission)

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

The relevant downstream markets in metro areas are likely to be mobile services however in regional and remote areas the downstream services will be more industry specific so in farming it will relate to elements such as Ag-tech and automation, in transport / logistics it will tend to autonomous working systems and in the energy sector it will be industry specific uses. The key point is that the downstream markets will more likely be serviced by specific operators related to their specific industry than by the existing mobile network operators.

The lack of available spectrum for private and industrial LTE networks is severely impairing the development and use of private LTE which is becoming essential as a foundation technology enabler as Industry 4.0 develops in regional and remote based industries. Examples are the effective use of autonomous plant in mining and also the adoption of AgTech in agriculture. This is unique to remote and regional Australia where coverage requirements are likely to be geographically larger than other industry 4.0 private LTE systems as would be deployed in a factory or similar urban workplace. By their very remote nature the areas where private LTE coverage is required are in effect “walled garden” that could be seen as small pockets of isolated coverage provided for specific purposes and would not be close enough to or powerful enough to create any interference issues.

Other aspects to consider are the developments in telehealth / emergency triage and in online education in regional and remote Australia.

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

Yes – the growth in demand for private LTE is one such relevant market that has not been identified and there are others.

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?

The current approach to only allocate to mobile operators in these bands has the practical effect of killing off any effective competition particularly in the use of industrial private LTE in metro areas, while the existing poor connection to mobile technologies will continue in regional and rural Australia. While there is undeniably a need for the existing MNO’s to have allocations of 850/900MHz it should not be for all the available spectrum nor in all areas. In the same way that spectrum is set aside for PSMB allocations should be made for private LTE applications and uses and evolving business cases that to date are hampered by the lack of spectrum.

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

There are spectrum management reforms needed in rural/remote communications to remove barriers to market entry and incentivise investment opportunities in connectivity to support the Agriculture Industry and enable growth in sectors such as AgTech and Data Management, particularly over the farm. The spectrum allocation of the 850MHz expansion band and the 900MHz band presents the opportunity to put such reforms in place. Connected Farms understands the situation is the same in the mining, gas and transport/ logistic sectors and for major regional infrastructure construction projects. *(Commercial in Confidence – Sentence removed for Public Submission)*

The absence of dedicated spectrum in these lower bands set aside in regional and remote areas to allow tailored local connectivity solutions to be implemented means that investment in these areas will, without doubt be restricted and limited. History has demonstrated that the major mobile operators who hold the prime spectrum in the 700MHz and have had access to the 850MHz and 900MHz have neglected to provide adequate levels

of mobile coverage to support regional and remote Australian needs (such as agriculture) are pre-occupied with 5G deployments in metro areas. This is not to be critical of the mobile operators – their business models depend on the density of traffic found in metro areas and when they made their technology plans, Agtech and the like where not in demand as they are now.

The developments in private LTE (and that means both 4G and 5G technologies) will solve many connectivity issues for regional and remote Australia and provided spectrum is made available for such use, will encourage investments in these areas. Connected Farms and other similar companies providing connectivity solutions throughout regional and remote Australia have very different business models and economics as compared to the major mobile operators which again points to the need for some form of geographic separation between metro and regional/ remote Australia to be considered in the spectrum allocations.

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, other spectrum holdings in these sub 1GHz bands should be considered in any allocation limits. The reason would be that as these mobile operators have considerable holdings of 700MHz spectrum on a national basis it would be clear that if they were allocated further national lower band spectrum in the 850MHz and 900MHz bands they would have all the spectrum that is most suitable for private LTE in regional and remote Australia where this spectrum is desperately needed due to its coverage (range) characteristics.

This is a lesser problem in the metro areas where industrial private LTE, such as in factory complexes will be of smaller size and therefore will work well on the higher band spectrum available under apparatus licencing.

Spectrum sharing in these bands, while in theory supported, is not a commercial or practical reality. Unlike international markets, spectrum sharing is uncommon in the Australian market. Major mobile operators are not supportive of sharing any of their waterfront spectrum holdings – even in remote areas where the spectrum is unutilised.

Connected Farms is of the view that careful consideration of the amount of spectrum held in these sub 1GHz bands needs to be made with detailed independent utilisation reviews. That is, how much of these spectrum bands are used by the current major mobile operators in remote and regional areas and what is the opportunity cost of this underutilisation.

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.

Yes in the 1800MHz bands again in regional and remote Australia where certain major mobile operators have rights to spectrum in areas where they are clearly not using it. This prevents innovation in a range of other industries and sectors in regional/remote Australia and prevents new operators from offering services by spectrum hogging.

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?

The main factors would be:

- a) The areas the spectrum is held compared to the holding mobile operators' coverage areas. For example, does a mobile operator holding lower band spectrum on a national basis provide coverage in regional and remote Australia?
- b) The usage of the spectrum held – is the amount of spectrum held really required in all the areas it is held?
- c) The holders current and future plans for the spectrum holding (such as the close down of 3G and re-farming the spectrum for 5G)

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

No there are no grounds to guarantee Telstra (or any other major mobile operator) any spectrum in the allocation.

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

Yes some allocation limits or reservations are required. In the same way that 2 x 5MHz is planned to be reserved in the 850MHz expansion band for PSMB there should be a reservation made in both the 850MHz and the 900MHz bands for privateLTE to allow the development of Industry 4.0 and Agriculture 4.0. This is a particular pressing need in regional and remote Australia. Such a reservation could be made to only apply to these areas (which have little value to the major mobile operators in any case).

This reserved spectrum would, of course, have value and a valuation mechanism would need to be developed and applied. For example, possibly equating the area to be covered by a privateLTE network to the Australian land area and proportioning that against previous achieved regional spectrum sales.

It may also be worth exploring the use of the reserved PSMB spectrum for private networks operated by Licenced Telecommunication Carriers in a similar way to that used in the United States with their CBRS spectrum use:

(https://en.wikipedia.org/wiki/Citizens_Broadband_Radio_Service)

It is clear that investment in regional and remote Australia, particularly where it is needed in agriculture to reduce inputs and improve yields will not happen unless there is spectrum available to allow the provision of affordable over the land connectivity on a farm-by-farm basis.

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?

As outlined above, Connected Farms sees less need for allocation limits in metro areas as clearly the spectrum demands on the major mobile operators 5G networks will be significant. However, there is a major need for allocation limits in regional and remote Australia. Policy makers can encourage innovation and market development through allocation levers. Without a carefully planned spectrum allocations in these areas the downstream markets will be seriously and adversely affected.

While Connected Farms is not advocating separation of metro and regional/remote Australia across all available spectrum, we do consider that certain bands should be separated. This would still allow the maximisation of spectrum auction results as the major mobile operators would not be detracted in bidding if regional / remote areas were taken off certain allocations (in fact this could actually make the spectrum more attractive to the major mobile operators if a “use it or lose it” type of legislation was ever considered as part of the allocation considerations.

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

Yes there are other factors to consider:

- a) The likely availability of 600MHz spectrum in the future, the dimension of that spectrum pool and if the timelines associated with it becoming available are pertinent to the 5G network roll outs of the major mobile operators.
- a) Real consideration of the availability of these lower band spectrum allocations for use in private LTE networks in regional and rural Australia. (*Commercial in Confidence – Sentences removed for Public Submission*)