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Aug 9, 2017

The Manager, Spectrum Planning Section

Spectrum Planning and Engineering Branch

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PO Box 78, Belconnen, ACT 2616

**Re: “Future use of the 3.6 GHz band Options paper”.**

**About Ruckus Wireless**

Beginning operations in June 2004, Ruckus Wireless, Inc. is one of the world’s fastest growing wireless technology companies. Ruckus offers a broad range of advanced indoor and outdoor “Smart Wi-Fi” systems for service providers and enterprises. The company is credited with developing the first adaptive antenna (Smart Wi-Fi) technology that improves the reliability, performance and capacity of Wi-Fi networks. Ruckus recently announced its line of “OpenG” LTE products, which bring the simplicity and economics of Wi-Fi to the market for in-building cellular services.

According to Dell’Oro’s Q3 2015 report, Ruckus is #1 in the Service Provider Wi-Fi market with 38% marketshare and #3 in the Enterprise Wireless LAN market. With approximately 61,000 end customers and more than 10,000 channel partners worldwide, Ruckus sells its Wi-Fi systems directly to broadband providers and indirectly to enterprise customers through a global network of value-added partners.

Ruckus Wireless is a business unit of Brocade Communications Systems, Inc.

**Responses to consultation questions**

**1. Should the 3.6 GHz band be progressed from the preliminary replanning stage to the re-farming stage in the ACMA’s process for considering additional spectrum for MBB services? Why/Why not?**

With Europe, US, Japan and South Korea already moving along the path of actively planning how to accommodate 5G mobile services in the 3.4 – 3.8 GHz band any further delay in Australia doing likewise runs the risk of delaying the introduction of these new services to Australian citizen consumers. In addition, visitors to Australia, both business travellers and tourists, reasonably expect a similar service level in Australia from their mobile devices to that which they receive in their home countries. If Australia is slow on the allocation of suitable spectrum for these services, then this will be the case.

**2. Do the areas identified in this analysis cover the likely areas of high demand for access to the 3.6 GHz band? Would smaller or larger areas be more appropriate? Why?**

Ruckus would agree with the initial analysis performed by ACMA and the definition of areas based upon the geographical and population descriptions. However, Ruckus would like to raise the subject of in-building coverage. The building attenuation of signals at 3.6 GHz will have a significant impact on coverage and service usability and as a consequence we expect to see the deployment of in building small cells to maintain the user experiences. However, this brings its own dilemma as who will pay for the cost of in building coverage where the macro cell model is based upon multiple competing providers. Ruckus believes that introducing new players to the value chain, expanding the use cases, and opening up a broader set of deployment models are all key to realizing the densification and in-building coverage goals of 5G. While existing mobile operators will continue to lead, new players with access to cellular-oriented spectrum via sharing frameworks are needed to deploy networks in all manner of indoor and outdoor areas. These networks can be utilized for internal services (e.g. Private Cellular or Industrial IOT) and also made available to the subscribers of the mobile operators via Neutral Host Networking (NHN) mechanisms currently being developed. This distributed deployment model has been phenomenally successful for Wi-Fi, and is a natural evolution for cellular architectures as we move to much denser deployments at higher frequencies.

**3. If any part of the 3.6 GHz band is re-allocated for the issue of spectrum licences is seven years a suitable re-allocation period? If not, what period of time would be appropriate?**

The 3.6 GHz band is part of the larger 3400 – 3800 MHz band that will be a 5G pioneer band in many parts of the world, Europe, US, Japan, South Korea etc. The issues being discussed in the document by ACMA are in many ways identical to those being addressed by many national regulatory authorities in other regions. With such a global interest, equipment manufacturers and service providers will be looking to leverage the benefits of the global market and consequently the availability of spectrum needs to be synchronised in order for consumers to be able to gain access to the new services that this spectrum will be able to deliver. Which much of Europe talking about a 2020 -2022 timeframe for the launch of 5G services in this band a seven-year re-allocation period would appear to be on the long side.

**4. Should different re-allocation periods be considered for different areas? For example, should a longer period be considered for services outside Area 1?**

The areas outside area 1 with their lower population densities will by nature have a lower user demand for services in the 3.6 GHz band. This may mean that sharing with incumbent services may be easier to manage as, in all likelihood, there will be fewer incumbents to manage as well. In light of this a slower re-allocation process may well suffice. However, this should be reviewed once service rollout is under way in area 1 and genuine consumer demand starts to materialize.

**5. Are these guidelines appropriate? Why?**

No comments.

**6. Are there any other issues that affect the usability of an area-wide licence that should be taken into account when defining the licence area?**

No comments

**7. If point-to-point licences are affected by replanning activities in the 3.6 GHz band, are the options identified for point-to-point licences suitable? Are there any alternative options that should be considered?**

Relocating existing 3.6 GHz band point to point link in another part of the band would be the most straight forward and potentially lowest cost option as, depending upon the individual radios used, it may be a simple matter of a software update to change the operating channel. If this were not possible for any reason then the other sub 10 GHz bands have similar enough propagation characteristics that the application may easily be supported in one of the other bands e.g, 6 GHz, 6.7 GHz 7.2 GHz, 7.5 GHz, 8 GHz and 8.3 GHz. It is also worth noting that there is a wider choice of manufactures producing radios in these bands than there are at 3.6 GHz owing to the declining market for 3.6 GHz point to point radios. The final option of a wired (or fibre) alternative may not be either practical nor cost-effective in some cases, but should remain as an option that may be suitable in certain instances.

**8. Is the 5.6 GHz band a viable option for wireless broadband systems?**

Yes, opening the 5600 -5650 MHz band would have a far greater impact than just allowing the use of 50 MHz extra spectrum would at first appear. With this 50 MHz sub-band open Wi-Fi systems can make use of more wideband channels (see graphic below). These wider bandwidth channel are critical in delivering the high capacity services that subscribers are now expecting to be able to use.



**9. Under what circumstances should apparatus- and class-licensed arrangements be considered for the 5.6 GHz band?**

The DFS requirements in the latest version of EN 301 893, i.e. V1.8.1 or newer, have been shown to protect weather radars. Whilst it is recognised that there are still reports of interference into these radars in Europe these have been traced to devices non-compliant with EN 301 893 and not compliant devices. Therefore, there is an important market surveillance activity that is needed to ensure that only compliant device find their way onto the Australian market. Consequently, Ruckus believes that the 5600-5650MHz band should be included in the current class-licenced arrangement for the 5 GHz band

**10. If apparatus licensing arrangements are developed for wireless broadband systems in the 5.6 GHz band, are the notional arrangements proposed in Appendix 3 suitable?**

Leaving out the 5600 – 5610 MHz part of the band still disrupts the channel plan shown above and consequently Ruckus believes that the entire 5600 - 5650 MHz should be accessible to Wi-Fi type devices providing that the DFS is the equivalent to that in EN 301 893 v1.8.1 or newer.

**11. If point-to-multipoint licences are affected by replanning activities in the 3.6 GHz band, are the alternative options identified suitable? Are there any alternative options that should be considered?**

The use case for point to multipoint can be regarded as one of the applications provided by new MBB services destined for this spectrum. This together with the addition of the 5600-5650 MHz sub band in the 5 GHz band will more provide more widespread coverage for these services than is currently seen with the existing point to multipoint licences.

**12. The ACMA seeks comment on the suitability of the current west coast earth station protection zone located near Mingenew, WA, for long-term satellite service use. Are the current regulatory arrangements effective?**

No comments.

**13. In the event FSS earth stations are affected by replanning activities in the 3.6 GHz band, the ACMA seeks comment on:**

**a. Any issues surrounding the development and establishment of an east coast earth station protection zone; particularly on what factors would be necessary to make it an attractive option for earth station operations.**

**b. Whether there are any views on potential candidate locations to consider.**

**c. Whether there should there be more than one earth station protection zone on the east and west coasts of Australia.**

**d. If the identification of a central Australia earth station zone should be considered.**

No comments.

**14. Are the approaches for amateurs, radiolocation services, class licensed devices and TVRO systems suitable?**

Ruckus believes that the current sharing arrangements will remain suitable after the re-planning activities have taken place.

**15. Are there any other options for incumbent services, not identified in this paper, which should be considered?**

No comments.

**16. Should any of the sharing arrangements discussed in this section be considered for implementation in the 3.6 GHz band? Why or why not?**

Ruckus believes that a Coordinated Shared Spectrum framework, such as an enhanced or evolved LSA (eLSA or LSAevo), would enable shared commercial uses in the 3.575-3.700 MHz band while not requiring the wholesale clearing of Fixed Satellite Service and Fixed Wireless Service incumbents. Such an approach would provide much faster access to the band for new IMT services.

Additionally, due to the propagation characteristics of this band at small cell power levels, we encourage ACMA to consider a framework that supports in-building, and possibly localized outdoor, usage under a general authorization on a no-protection, non-interference basis. With centralized coordination, such as via an eLSA/LSAevo controller, the regulations for these types of general authorized uses are tracked and enforced, ensuring protections for both incumbents as well as LSA license holders.

**17. Are there any other sharing arrangements that should be considered?**

No comments

**18. Are there any other replanning options that should be considered?**

**19. Which replanning option should be implemented in the band? Why?**

Ruckus believes that in order to achieve full 5G coverage indoors a new approach is needed to provide the in building coverage where subscribers may be contracted to many different service providers. It is not feasible to expect all service provider to build small cells inside every office block/shopping mall, so a more innovative solution is required for these. The concept of permissive usage overcomes this problem by allowing the building or other entity to build the small cell infrastructure which can then be accessed by all subscribers.

**20. In the event an area-wide licensing option is implemented, in which of the defined areas (that is, Area 1, 2, 3 and Australia-wide as defined in Appendix 6) should these arrangements be implemented? Are the current area definitions appropriate? If not, what area should be defined?**

Area wide licensing is useful at the macro-cell level because it allows for coverage and scale to be built up. However, this should not be at the expensive of competing wide area operators and/or permissive use in the small cell sector particularly in-building coverage.

**21. If Option 4a is implemented, what frequencies and areas should be re-allocated for the issue of spectrum licences? How much spectrum should remain subject to site-based apparatus licensing arrangements? Should different amounts be considered in different areas?**

Ruckus do not believe that this option is appropriate.

**22. If Option 4b is implemented, what frequencies and areas (that is, incumbent apparatus licence services) should remain subject to site-based apparatus licensing arrangements?**

Ruckus do not believe that this option is appropriate.

**23. Comment is sought on the ACMA’s preferred option (Option 3c) for the 3.6 GHz band.**

For macro cell deployment Ruckus believes that option 3c is the appropriate option for ACMA to adopt. However, as mentioned in previous response we would also like to see scope for permissive use for satisfying in building demand for these services that would otherwise be cost prohibitive, if all cellular operators were required to build out small cell in building networks.

**Conclusion**

Thank you for the opportunity to provide Ruckus’ input to ACMA on these matters. If you have any questions, or require additional information, please let me know.

Sincerely,

Ian Marshall