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SUBMISSION TO THE ACCC CONSULTATION PAPER:
Allocation limits advice for the 26 GHz spectrum allocation

BAI Communications Australia (BAI) welcomes the opportunity to provide input to the ACCC on the allocation limits for the 26 GHz spectrum allocation. My apologies for the late submission.

BAI Communications is a neutral host communications service provider in Australia, USA and Canada, and provider of communications services in Hong Kong. In Australia, BAI provides managed services and portal services to broadcasters as well as site access arrangements to telecommunications and radiocommunications operators. In the USA and Canada, BAI Communications companies provide neutral host communications services within the New York and Toronto subway systems as well as telecommunications, Wi-Fi and emergency services communications.

BAI offers the following input on the ACCC consultation paper:

- BAI supports the ACCC intent to ensure future competition and proposes that a maximum of **600 MHz** in the 26 GHz spectrum range be allocated to any single market player or joint venture. BAI believes the proposed allocation limit strikes a balance between ensuring future high bandwidth applications are economically enabled and encouraging future new infrastructure-based competition in both mobile and fixed services.
- BAI proposes that any market player is limited, in any individual geography, to a total of **1000 MHz** of total spectrum from all regulated spectrum and apparatus license bands, including the 26 GHz and 28 GHz bands. BAI believes an upper limit on total spectrum allocations will encourage competition in new services, particularly in the 28 GHz band, whilst still providing ample spectrum for large operators to offer high bandwidth services through the efficient use of valuable spectrum resources across all bands
- BAI believes a minimum allocation of **400 MHz** per market player, in any given geography, is required in the proposed 28 GHz apparatus bands to ensure future high bandwidth services and competition are encouraged in the market.
- BAI believes an optimum allocation for any individual market player across the 28 GHz band would be **800 MHz**, in any given geography. This size of allocation is desirable as it enables exciting new very high bandwidth services such as high-end manufacturing and autonomous logistics and mobility services, all enabled by the geographic focus of the apparatus and new area wide licensing arrangements proposed by ACMA for this frequency band.

- BAI supports the current 3GPP standard for allocation increments as they align with the proposed primary use cases for the 26 GHz and 28 GHz bands, namely:
 - 26 GHz band allocation increments of 50 MHz, 100 MHz, 200 MHz and 400 MHz, and
 - 28 GHz band allocation increments of 100 MHz, 200 MHz and 400 MHz.

Attached are BAI's answers to the specific questions outlined in the ACCC consultation paper.

Kind Regards,

Stephen Farrugia
Chief Technology Officer
BAI Communications Australia

APPENDIX

Consolidated list of issues and BAI comments

1. Do you have any competition concerns about the allocation of spectrum licenses in the 26 GHz band? If so, how do you think these concerns should be address?
 - *Yes, BAI does have concerns and suggests that there be a 600 MHz allocation limit in the 26 GHz band for any market player in any given geography and an overall 1000 MHz limit in total across all licensed frequency bands for an individual market player in any given geography.*
2. Does this allocation impact your ability to compete effectively in relevant markets in the short and/or long-term? If so, please provide examples.
 - *Yes, BAI is concerned that if the major carriers obtain the majority of the spectrum allocation in both the 26 GHz and the 28 GHz frequency bands then it will be very difficult for new competitors and application suppliers to enter the 5G millimeter market. BAI believes this will not only substantially lessen competition in this new technology but also severely limit innovation and the speed of rollout of new services on 5G millimeter technology. BAI is proposing an overall cap of 1000 MHz across all frequency bands from 700 MHz to 30 GHz to ensure a competitive and innovative market for 5G based services in any given geography.*
3. Do you have any competition concerns about the relationship between spectrum and apparatus licenses in the 26 GHz and 28 GHz bands? If so, how do you think these concerns should be addressed?
 - *Yes, as per our response to question 2 above, BAI believes the competition concerns about the relationship between spectrum and apparatus licenses in the 26 GHz and 28 GHz bands can be address by the introduction of an overall cap of 1000 MHz across all frequency bands from 700 MHz to 30 GHz.*
4. Do you view the apparatus licenses as complements or substitutes for the 26 GHz spectrum licenses?
 - *BAI believes the most efficient outcome for the market is for the licenses to be complementary and we also believe this is ACMA's intent, particularly through the proposed new geographic structure for the area wide apparatus licenses in the 28 GHz band. However without the allocation limits suggested by BAI, there is a danger that new market entrants will not gain enough spectrum bandwidth to economically supply high capacity services in the 28 GHz band, leaving this market to the major carriers who can utilize large potential 26 GHz spectrum allocations to supply these services with reduced competition.*
5. What are the likely intended uses of 26 GHz and/or 28 GHz spectrum in Australia? Do you expect these intended uses to change over the term of the license/s?
 - *BAI's expectation is that the 26 GHz spectrum will be utilized for high speed mobility services such as high-speed mobile broadband communications. BAI expects that the 28 GHz spectrum will be utilized for ultra-high speed fixed wireless applications such as mass-market fixed broadband and industrial automation applications. As the technology evolves, we would expect more services to be introduced but the broad split of the frequency bands between mobile (26 GHz) and fixed (28 GHz) services will remain due to the dramatically different geographic granularities of the licenses.*

6. What do you consider is the optimal allocation of 26 GHz and/or 28 GHz spectrum to support your likely intended uses? What is the minimum allocation necessary?
 - *In the 26 MHz band BAI believes 200 MHz is the minimum allocation for each market player to enable high speed mobile wireless 5G millimeter services and the optimal allocation for each market player is 400 MHz.*
 - *In the 28 GHz band BAI believes 400 MHz is the minimum allocation per each market player to enable ultra-high speed fixed wireless 5G millimeter services and the optimal allocation per market player is 800 MHz.*
7. How does this spectrum support the technical requirements for the deployment of 5G services?
 - *BAI's proposed allocations recognize the much higher capacity requirements of high-speed fixed services, 5-10 times that of mobile services, whilst adjusting for the higher density of mobile services, 2-3 times that of high-speed fixed services in a given geography.*
 - *The proposed spectrum allocations are also consistent with the 3GPP standards for 5G spectrum allocation increments*
8. Does your demand for spectrum differ across geographic areas, such as metropolitan and regional areas? If so, please provide examples.
 - *Due to the decrease in mobile user and household density in areas outside the defined areas the optimal allocations per market player, in these more regional geographies, is estimated at 200MHz for the 26 GHz band and 400 MHz for the 28 GHz band.*
9. What, if any, additional investment is required to deploy this spectrum for your likely intended uses? Please provide examples.
 - *Due to the more limited propagation characteristics of 5G millimeter spectrum, 5 to 10 times as many small cells are required in a given geographic area when compared to 5G 3.5 GHz and 4G rollouts. Also, the 5G millimeter small cells will most likely need to be connected by fiber. Both these requirements substantially increase the capital expenditure required to provide high-speed 5G millimeter wireless services in an area.*
10. What are the relevant downstream markets for the purpose of advice on allocation limits for spectrum licenses, noting that markets may have particular geographic dimensions? Please provide reasons for your view.
 - *BAI proposes that in addition to the telecommunication and media companies, large manufacturing, mining, healthcare, logistics/distribution companies should also be consulted given the likely use cases for 5G millimeter services.*
 - *BAI would also suggest that the large system and IT integrators should be consulted as they will be responsible for the implementation of many of the 5G millimeter deployments across the industry verticals and will bring an international view of the requirements.*
11. What are the relevant downstream markets for the purpose of considering competition issues associated with apparatus licenses, noting that markets may have particular geographic dimensions? Please provide reasons for your view.
 - *BAI would suggest the same companies listed in the answer to question 10 should be consulted about competition as well as allocation issues*
12. Are there likely to be future relevant markets that have not been identified?
 - *BAI would suggest that the V2X market (road and rail) is a future relevant market that has not been identified. However, the mining industry sector is a likely early adopter of V2X 5G millimeter technology for smart mining applications, as are manufacturing and warehouse environments. BAI believes more public V2X applications such as autonomous cars are likely to focus on the use of lower band 5G based solutions initially given coverage requirements.*

13. Do you have any views on the state of competition in the relevant markets?

- *BAI considers the current competition for mobile services in these relevant markets is currently very limited and dominated by the three main mobile infrastructure-based carriers. There is a real opportunity with the introduction of 5G millimeter services to dramatically improve competition and therefore innovation in the high-speed mobile broadband market as well as in high-speed fixed broadband market. However, this opportunity is at significant risk if the millimeter spectrum is largely locked up by the three main carriers.*

14. Do you have any concerns about future competition in the relevant markets as a result of the allocation of spectrum and/or apparatus licences?

- *Yes, BAI's proposed allocation minimums and limits address the key concerns we have around competition in the relevant markets. These allocations combined with the very geographic specific area wide apparatus licensing proposed ensures significant competition in the 26 GHz rural and 28 GHz Australia wide licensing bands.*

15. Do you consider that substitutable spectrum exists for the likely intended uses of the 26 and 28 GHz spectrum? To what extent are these fully effective substitutes?

- *BAI considers the combination of coverage and capacity offered by 26 GHz and 28 GHz based 5G millimeter services as relatively unique however future >30 GHz 5G millimeter frequency bands may provide partial substitution at the expense of less coverage.*