

Arete M Feedback to the Second 5G Spectrum Public Consultation

1. AreteM is an FBO license holder and is applying for a PMNO license to deploy and operate Private LTE Network for mission critical communication applications and is a first mover innovator of using the 1.79GHz-1.80GHz constrained frequency band.
2. The frequency spectrum in the sub-6GHz spectrum are valuable and limited national resources that have a big impact to the industry development and adoption of 5G and future wireless communication technology.
3. AreteM is requesting some of the frequency in 3.6GHz-3.7GHz (proposed Guard Band) to be allocated for Private 5G deployment as a constrained band to serve the Industry 4.0 Transformation which require mission critical, low latency communication and control with total isolation from the internet and public networks.
4. The frequency band can be used for mission critical communication network using Private 5G, Enterprise 5G, Mission Critical 5G, Public Safety LTE/eLTE/Private LTE/Tetra LTE infra-structure. AreteM could consider to deploy using 2 blocks of 20MHz TDD spectrum to provide sufficient capacity and resiliency for the big industries and government agencies.
5. The 2 Blocks of 20MHz could be 3.62GHz-3.64GHz and 3.65GHz-3.67GHz giving 20MHz Guard Band from the 3.55GHz-3.60GHz band, 30MHz guard band from 3.70GHz band and above, plus a 10MHz guard band in 3.64GHz-3.65GHz to cater for different up:down ratio implementations of the two frequency bands.
6. These two bands should be constrained bands and proper band pass filters are to be deployed to ensure no unacceptable interference into the 3.55GHz-3.60GHz band users and the satellite users above 3.70GHz. With proper band-pass filters, it also eliminate the need for synchronisation and to use the same up:down ratio.
7. User of the 3.55GHz-3.60GHz and the 3.50-3.55GHz users should also deploy band pass filters to cater for potential different up:down ratio deployment in the same geographical locations and retain the possibility of allocating 3.60GHz and above for Private 5G or Public 5G in the future.
8. AreteM suggest that these two 20MHz bands should be allocated on an administration assignment to selected FBO license holders as deployment are on demand basis by enterprises that require specific mission critical applications and requirements. If the spectrum is allocated to FBO license holder, the allocated

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spectrum can be utilised more efficiently by using some form of shared spectrum management platform.

9. AreteM will be keen to take up a leading role together with IMDA to perform some trials and non interference tests using these proposed bands especially on the impact to the Fixed Satellite Services operating from 3.7GHz and above.
10. As most industrial mission critical infra-structure might need to have more than 10-15 years life cycle, we also suggest that these 2 blocks of frequency band should be allocated as technology neutral bands so to avoid limiting to 5G NR only. In fact, Private LTE infra-structure and eco-systems are already available in these two bands and can be deployed immediately rather than waiting for the maturity of 5G NR and also to enable upgrade to future 6G NR.
11. The traditional MNO are currently weak in serving the vertical industries and does not have the deep domain knowledge to serve the various vertical industries and are still struggling in firming up business models for the eMTC and URLLC sectors.
12. The two MNO winners should invest heavily in the SA 5G Network coverage and capacity with stipulated timeline as obligation to serve the eMBB opportunities in Singapore and with slicing to serve majority of the needs of the various industries that requires some level of priority access and low latency.
13. eMTC and URLLC sectors might requires different business models including CapEx models rather than the standard subscription and usage models with eMBB and the traditional MNO might not be able to accommodate with their legacy organisation structure and business mindset.
14. IMDA should put in requirement for the two MNO winners of the 5G NR spectrum to collaborate with Private Network Operator and Solution Platform Provider like AreteM to provide a more holistic solution to the Big Enterprise, Big Industries and government agencies that requires total isolation from the internet and with guarantee QOS with no congestion to fulfil the eMTC and URLLC requirements.
15. The two MNO winners should also put forward plans to offer the SA 5G Network and their existing 4G networks to partners like AreteM to become MVNO to bundle in their Private Network solution platform to achieve higher level of resiliency to serve the URLLC and eMTC opportunities.
16. AreteM is very keen to use this spectrum allocation via CFP opportunity to partner with M1 commercially so that our usage of the 1.79GHz-1.80GHz as Private Network will face less interference complain from M1 and can become a very good supplement to Public LTE and Public 5G network to better serve the eMTC and URLLC opportunities that requires Total Isolation with no congestion and with

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public network as additional connectivity and redundancy to increase the overall resiliency of the mission critical network.

17. We believe that we are first mover innovator in using such a multi-carrier module that utilises both the Private and Public Networks for high resiliency robotic applications and we look forward to IMDA to promote such new innovations and enable Singapore companies to reference in Singapore before expanding globally.
18. We will be keen to explore with IMDA to make available additional frequency spectrum that can be used for Private Network starting with Private LTE follow by Private 5G after a few years.
19. We suggest that one of the 800MHz block in the 26GHz and the 28GHz be reserved for Private 5G that requires localised very high speed URLLC requirements that require Total Isolation.
20. We also suggest to allocate L-Band for Private LTE/Private 5G for localised coverage for high security applications which are less cost sensitive as the ecosystem development is rather limited.
21. We hope that IMDA will take a more pro-active role to allocate more spectrum for Private Licensed Network to encourage more Industry 4.0 Transformation and Innovation, and uses Smart Regulation to enable new Innovations rather than overly concern with preventing potential bad things from happening and remains a follower in the cut throat competition in Technology Innovation.
22. We also hope that IMDA will only allocate the Private Network spectrum to non-incumbent MNO to encourage competition and innovations. Incumbent MNO with their investments and focus in 5G technology will promote Virtualized Network technology and sliced network approaches to offer industrial network services to the local industries. Hence, we strongly urge IMDA to prevent MNO in bidding for the Private Licensed Network spectrum bands.
23. As a small country and a small economy, we hope that IMDA will take the leadership position with a more aggressive policy to promote some of these emerging technologies and give local non-MNO companies an opportunity to be first mover innovators and to promote collaborations and competitions.