

# Arete M Feedback to the Proposed Policy Framework For The Allocation of 800MHz, TDD 1900MHz and FDD 2100 MHz Spectrum Bands

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 proposed policy framework spectrum bands are valuable and limited national resources that have a big impact to the industry development and adoption of Enterprise Network using Licensed Frequency Spectrum for mission critical communication.
3. AreteM suggest that IMDA to put higher priority to allocate more frequency spectrum for Private Mission Critical Enterprise Network that requires Total Isolation from the Internet with Guarantee No Congestion. This is a new trend in advanced countries like USA, Germany, Japan and China where frequency spectrum bands are allocated to the vertical industries to build Private Localised Network using Licensed Frequency Spectrum Bands to encourage innovations in Industry 4.0 Transformation.

## **800MHz Spectrum Band**

4. AreteM does not have any objection to the proposed allocation approach for the 800MHz spectrum bands for one or two Enterprise Network Operators to deploy nationwide network to serve the subscription-based enterprise network users.
5. It might be prudent for IMDA to prevent the MNO from bidding for this spectrum band so to prevent spectrum hoarding at high price that stiffer off innovation in the Enterprise Network space.
6. MNO can use their public LTE/5G network to compete in the enterprise market and already have a big investment into the virtualised network with slicing capabilities and is already competing in the Push To Talk market segment.
7. AreteM also support the allocation of 2 X 10MHz spectrum band for PPDR to enable Public Safety Agencies to build Private Mission Critical Network that has Total Isolation from the Internet and Public Network and is free from the congestion of public users that could surge during emergency.

8. This frequency spectrum can be auction with a minimum reserved price as it is likely to be a single nation wide operator that will deploy such a network to serve the mission critical communication applications with an estimated market size and business plan.
9. As a Nationwide Public Enterprise Network Operation, IMDA should impose a coverage obligation on the two lots of 2X5 MHz bands and might not impose any coverage obligation if the 2X3 MHz band is used for Private Enterprise Network applications which is based on serving individual user group that requires on-demand deployments.

## **The 1900 MHz Spectrum Band**

10. AreteM welcomes the allocation of this 1900 MHz TDD spectrum band for enterprise network.
11. AreteM suggest that this 10MHz band 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 with Total Isolation from the Internet and with guarantee QOS.
12. If the spectrum is allocated to FBO license holder that understand how to deploy private networks, the allocated spectrum can be utilised more efficiently by using some form of shared spectrum management platform to serve multiple users.
13. AreteM will be keen to take up a leading role together with IMDA to discuss and to perform some trials for such a shared spectrum management platform if necessary.
14. In order to avoid any potential interference between the 1900 TDD and the 2100 FDD uplink, we suggest that both spectrum bands should use a band-pass filter as part of their technical deployment requirements.
15. This approach is similar to the technical framework of Band 7 which is FDD and Band 38 which is TDD.
16. With only 10MHz, AreteM believes that many Private Enterprise Network can be deployed but will have an average capacity limit of approximately 20Mbps per sector.
17. 10MHz is insufficient for Private Enterprise Network that requires many channels of live video streaming for real-time control and AI analytics. Japan is considering to allocate the whole 40MHz of band 39 for Private Enterprise Network applications possibly by 2021. We encourage IMDA to explore whether additional bandwidth

in band 39 can be allocated for Private Enterprise Network deployment in Singapore.

18. As most industrial mission critical infra-structure might need to have more than 10-15 years life cycle, we also suggest that this frequency band should be allocated as technology neutral bands so to avoid limiting to 4G or 5G NR only as 6G will be available possibly from 2030 onward.
19. 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 mMTC and URLLC sectors.
20. MNOs should invest heavily in their virtualized 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 with low latency.
21. mMTC and URLLC sectors might requires different business models including CapEx models rather that 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.
22. IMDA should not allow MNO to apply for the 1900 TDD spectrum as they might hoard the spectrum and prevent innovation that might compete with their business models using network slicing technology.
23. Since Private Enterprise Network does not have a proven business model and is normally allocated based on specific coverage locations needed by different users, AreteM suggest that it should not have a reserve price and should not be auctioned based on spectrum price. Other countries like CBRS in USA, the 3.7GHz-3.8GHz in Germany, the Band 62 in China and Band 39 in Japan are not allocated based on auction price alone.
24. Since Private Enterprise Network is an emerging and new business model with no proven business track record and is likely based on deployment only upon request by customers approach, we suggest that it should not have a coverage obligation.
25. Singapore being a small country with a small geographical area could consider to allocate the spectrum to a selected few FBO licensee that can deploy this frequency band more effectively by shared spectrum approach to better serve many user groups.
26. We believe that we are among the 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.

27. 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
28. 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.
29. 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.
30. 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 on 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.
31. As a small country and a small economy, we hope that IMDA will take the leadership, pro-industry and pro-innovation 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.
32. With the support of IMDA, AretéM is keen to form an Industry Cluster for Private Enterprise Network and promote innovations among Singapore based companies and to attract innovating companies from around the world to operate from Singapore.