



SINGTEL MOBILE SINGAPORE PTE LTD

RESPONSE TO PUBLIC CONSULTATION ON NEXT WAVE OF 5G GROWTH & DEPLOYMENT IN SINGAPORE: POLICY ISSUES & PROPOSED REGULATORY DESIGN FOR 2.1 GHZ BAND

1. INTRODUCTION

1.1. Singtel Mobile Singapore Pte Ltd (**Singtel Mobile**) welcomes the opportunity to respond to the public consultation on the Next Wave of 5G Growth & Deployment in Singapore: Policy Issues & Proposed Regulatory Design for 2.1GHz Band (**Consultation Paper**).

1.2. This submission is structured as follows:

Section 2 – Summary of Major Points

Section 3 – Statement of Interest

Section 4 – Specific Comments

Section 5 – Conclusion

2. SUMMARY OF MAJOR POINTS

2.1. Singtel Mobile supports the IMDA's policy objective to allocate the 2.1GHz spectrum for 5G services in Singapore while also allocating a small and necessary amount of the 2.1GHz band to support the continued provision of 3G services. Singtel Mobile is committed to the deployment of a 5G SA network as one of the two successful bidders in the 5G Call For Proposal (**CFP**) and agrees with the IMDA that there is still a strong need to ensure that there is 3G service continuity and minimal disruption to existing 3G subscribers, which are not insignificant in number.

2.2. Singtel Mobile also supports IMDA's proposal that only existing MNOs should have the opportunity to acquire spectrum in the 2.1GHz given the scarcity of spectrum available. This



will minimise disruption to existing MNO networks and allow a more efficient use of the scarce spectrum resources.

- 2.3. Singtel Mobile supports the IMDA's proposal to allocate 2.1GHz spectrum lots on an FROR basis to existing MNOs to ensure that there is 3G service continuity. However, Singtel Mobile submits that while it is possible to pair the proposed allocation of 1 paired FROR lot of 2x5MHz in the 2.1GHz spectrum band with 1 paired lot of 2x5MHz in the 900MHz spectrum band to support existing 3G services and provide adequate 3G coverage, we would highlight that there are some 3G devices that only support 2.1GHz spectrum band and not the 900MHz spectrum band. These 3G users/devices will be adversely affected should there be an increase in congestion at existing 3G sites. [start c-i-c] [end c-i-c]
- 2.4. Singtel Mobile submits that the IMDA should retain its original position in 2019 and allocate 2 paired FROR lots of 2x5MHz on the 2.1GHz spectrum band as the proposed allocation of 1 paired FROR lot of 2x5MHz to the existing 3G spectrum right holders is not sufficient to ensure 3G service continuity and minimise disruption to existing 3G subscribers.
- 2.5. Singtel Mobile supports the IMDA's position that MNOs that had jointly bid for the 3.5GHz spectrum and decide to jointly bid for 2.1GHz spectrum should be collectively subject to the spectrum cap (including any FROR lots). Further, in the event that these MNOs decide to bid separately, and then subsequently seek to aggregate their respective 2.1GHz spectrum holdings, they should collectively be subject to the spectrum cap (including any FROR lots). The MNOs should be required to return any 2.1GHz spectrum in excess of the spectrum cap.
- 2.6. Singtel Mobile welcomes the IMDA's position that the reserve price should be set at a level that is both reflective of the intrinsic value of the 2.1GHz spectrum and international benchmarks of reserve and bid prices for similar spectrum bands. In this regard, Singtel Mobile submits that the IMDA set the reserve price at the lower end of the proposed fair value range of S\$10 – S\$15 million per 5MHz (paired) lot, namely set the reserve price at S\$10 million. This takes into account the continuous and significant investment that MNOs will need to make in deploying nationwide 5G SA networks in Singapore.



- 2.7. Singtel Mobile submits that the spectrum cap be increased from 2x25MHz (i.e. 5 paired lots of 2x5MHz) to 2x30MHz (i.e. 6 paired lots of 2x5MHz). The higher spectrum cap would not only provide the three existing 3G spectrum right holders with the ability to better serve their 3G subscribers whilst concurrently providing the opportunity for an improved 5G experience for 5G subscribers. A spectrum cap of 2x30MHz (i.e. 6 paired lots of 2x5MHz) is also more technically feasible as 2x30MHz is in the 3GPP specifications and is therefore supported by the chipset vendors and the equipment vendors.
- 2.8. With reference to paragraph 51 of the Consultation Paper, Singtel Mobile notes that the IMDA proposes a 15-year spectrum right duration. This does not provide the required investment certainty, given the level of investment in a 5G SA network is a multiple of that required in respect of previous mobile network generations such as 3G and 4G. Singtel Mobile submits that a spectrum right of 20 years is more appropriate in the circumstances – a duration of 20 years would be the same as the duration of the spectrum right for 2.1GHz spectrum when allocated to 3G network deployment. Reference to other countries such as UK and Germany would also suggest that a longer duration for spectrum rights is important as it contributes to investment predictability. It is also important to note that recent 2.1GHz spectrum auctions around the world have assigned an average of 18.3 years for the spectrum duration in order to ensure investment and regulatory predictability.
- 2.9. Singtel Mobile submits that the proposed migration of services no later than 3 months after the existing spectrum rights in the 2.1GHz band expire on 31 December 2021 is far too short a period to complete the highly complex migration exercise. [start c-i-c] [end c-i-c] The entire exercise would minimally take 20 months or more to complete.

3. STATEMENT OF INTEREST

- 3.1. Singtel Mobile has a comprehensive portfolio of mobile services that includes voice and data services over 3G and 4G networks. With the conclusion of the 5G CFP on 24 June 2020, Singtel Mobile was awarded one of the two 5G licences to deploy nationwide 5G networks after an extensive 5G CFP evaluation process undertaken by the IMDA. Singtel Mobile services both



corporate and residential customers and is committed to bringing the best of global information communications to its customers in Asia Pacific and beyond.

- 3.2. Singtel Mobile welcomes the opportunity to make this submission on the Consultation Paper.
- 3.3. Singtel Mobile would be pleased to clarify any of the views and comments made in this submission, as appropriate.



4. SPECIFIC COMMENTS

Proposal to Allocate 2.1GHz for 5G in Singapore

- 4.1. In relation to paragraph 29(ii) of the Consultation Paper, Singtel Mobile would request that the IMDA provide greater clarity on the way in which MNOs can use the 2.1GHz spectrum to deploy their respective network(s). Specifically, Singtel Mobile seeks greater detail on the criteria to be used to assess the manner of deployment and how this would relate or apply in respect to a 5G SA network that is jointly deployed.
- 4.2. In respect to paragraph 36 of the Consultation Paper, we welcome and support the IMDA's position to allow the MNOs currently using the 2.1GHz spectrum to support 4G services, to continue to do so. We would request the IMDA's confirmation that (i) Dynamic Spectrum Sharing (DSS) will continue to be allowed on the 2.1GHz spectrum and for the IMDA to (ii) allow MNOs that have currently deployed the 2.1GHz spectrum using DSS, to determine the amount of 2.1GHz spectrum acquired through the auction to be allocated between DSS and 5G SA based on its network planning requirements to meet customer needs.
- 4.3. Singtel Mobile also submits that it logically follows that an MNO that is not currently using the 2.1GHz spectrum for 4G services should only be able to use 2.1GHz spectrum for 5G SA services, in contrast to existing MNOs who are already currently using the 2.1GHz to support 4G services. Singtel Mobile requests that the IMDA provide confirmation in this regard.

Resilience and Cybersecurity Requirements

- 4.4. Singtel Mobile submits that the existing 5G FBO licensees should not need to demonstrate compliance with the conditions of the auction, including but not limited to the regulatory requirements indicated in paragraph 29 of the Consultation Paper given that these conditions were already part of the 5G CFP requirements.



Proposed Auction Format

4.5. Singtel Mobile supports the IMDA's proposed auction format.

1 Paired FROR lot of 2x5MHz on the 2.1GHz band

4.6. Singtel Mobile supports the IMDA's proposal to allocate 2.1GHz spectrum lots on an FROR basis to existing MNOs to ensure that there is 3G service continuity. However, Singtel Mobile submits that 1 paired FROR lot of 2x5MHz on the 2.1GHz spectrum band is not sufficient to ensure 3G service continuity and to minimise service degradation to existing 3G subscribers.

4.7. Based on Singtel Mobile's simulation and statistical analysis, the IMDA's position that 1 paired FROR lot of 2x5MHz of 2.1GHz spectrum and 1 paired lot of 2x5MHz of 900MHz spectrum to support 3G services will result in an increase in the number of congested sites (i.e. with utilization > 75%). This will cause service degradation for the 3G subscribers. [start c-i-c] [end c-i-c]

4.8. [start c-i-c] [end c-i-c]

4.9. Singtel Mobile would also highlight that 3G-only or non-VoLTE phone usage are largely contributed by foreign workers and inbound roamers from other countries. Therefore, the utilisation will likely increase once the COVID-19 situation improves as workers' segregation is removed or when there is another lockdown where the workers have to remain in the dormitories most of the time or when COVID-19 restrictions are relaxed and Singapore starts to welcome foreign visitors again. This will worsen the congestion in the 3G network.

4.10. [start c-i-c] [end c-i-c]

4.11. In addition, even if Singtel Mobile were to explore site expansion to address the service degradation, based on past experience and the work needed, this option would take at least 6 months or more, which is in turn subject to the approval of the relevant Building Owner(s) and



regulatory authorities' approval (if applicable). In this scenario, 3G subscribers would still experience significant service degradation during this period.

- 4.12. In light of the above, in order to ensure 3G service continuity and to minimise service degradation to existing 3G subscribers, Singtel Mobile submits that the IMDA should retain its original position in 2019 and allocate 2 paired FROR lots of 2x5MHz on the 2.1GHz spectrum band to the existing 3G spectrum right holders.

Spectrum Caps

- 4.13. Singtel welcomes and supports an increase in the spectrum cap. In relation to IMDA's proposed spectrum cap of 5 lots of paired 2x5MHz (including the FROR lot(s)) (i.e. 2x25MHz), Singtel Mobile submits that the spectrum cap be increased to 2x30MHz (i.e. 6 paired lots of 2x5MHz). The higher spectrum cap would provide the existing 3G spectrum right holders with the ability to better serve their 3G subscribers whilst concurrently providing the opportunity for an improved 5G experience for 5G subscribers.
- 4.14. As IMDA has acknowledged, 2x25MHz is commercially less common. Currently, the chipset vendors and the equipment vendors do not have firm plans to support 2x25MHz and the MNOs would need to wait for the ecosystem to develop and mature. In contrast, 2x30MHz is in the 3GPP specifications and is therefore supported by the chipset vendors and the equipment vendors.
- 4.15. With respect to paragraph 49 of the Consultation Paper, to ensure fair and consistent treatment, if upon aggregation by MNOs, the aggregated 2.1GHz spectrum exceeds the spectrum cap (including any FROR lots), the MNOs should be required to return any 2.1GHz spectrum in excess of the spectrum cap without compensation of the sums paid.



Reserve Price

4.16. Given the nascent stage of 5G technology development and ecosystem readiness, particularly with respect to 5G SA, and the level of investment required in building 5G networks, the MNOs are bearing significantly higher risks and substantially higher costs, including (without limitation):

- the requirement for 5G networks to be built using SA infrastructure;
- higher network equipment costs given deployment in the early phase of 5G SA development;
- 5G SA network design and resiliency requirements; and
- other capital and operating costs reflecting the short-wave nature of 5G technology, such as an increased number of base stations and small cells.

4.17. Deploying a 5G SA network requires a level of investment which is a multiple of that required in respect of previous mobile network generations. The business case for 5G is both high risk and uncertain. This is especially the case in the Singapore market, given the IMDA's requirement for a nationwide 5G SA network. Other jurisdictions have adopted a lower-cost, evolutionary approach to 5G infrastructure investment (e.g. through augmentation of LTE networks or other LTE-Pro features).

4.18. In light of the above, Singtel Mobile submits that the IMDA set the reserve price at the lower end of the proposed fair value range of S\$10 – S\$15 million per 5MHz (paired) lot, namely set the reserve price at S\$10 million. This takes appropriate account of the continuous and significant investment that MNOs will need to make in deploying nationwide 5G SA networks in Singapore.



Spectrum Right Duration

4.19. Singtel Mobile notes that the IMDA proposes a spectrum right duration of 15 years. This does not provide the required investment certainty, given the level of investment required in a 5G SA network and the high risk and uncertain business case. As indicated in paragraph 4.16 above, given the nascent stage of 5G technology development and ecosystem readiness, the high cost of 5G SA deployment, as well as the IMDA's emphasis on MNOs' nationwide network rollout, network design and resiliency, Singtel Mobile submits that a spectrum right of 20 years is more appropriate in the circumstances – a duration of 20 years would be the same as the duration of the spectrum right for 2.1GHz when allocated to 3G network deployment. Reference to other countries such as UK and Germany suggests that a longer duration for spectrum rights is important as it contributes to investment predictability, which will in turn promotes faster network roll-out and better service quality, both of which are aligned with IMDA's long term policy objectives of facilitating the deployment of 5G SA networks so that businesses and consumers can experience the full suite of capabilities and services that 5G SA networks can offer beyond just increased speeds. It is also important to note that recent 2.1GHz spectrum auctions around the world have assigned an average of 18.3 years for the spectrum duration in order to ensure investment and regulatory predictability.

Migration of Services

4.20. In relation to the proposed migration of services no later than 3 months after the existing spectrum rights in the 2.1GHz spectrum band expire on 31 December 2021, Singtel Mobile submits that the transition period is far too short to complete the highly complex migration exercise.

4.21. There are currently more than [start c-i-c] [end c-i-c] in-building CAS combiners and more than [start c-i-c] [end c-i-c] tunnel combiners and there will be substantial costs and disruption involved in retrofitting or changing-out the affected modules. Any changes to the 2.1GHz frequency assignment for each MNO would require an extensive and time-consuming exercise



of between 20 to 24 months (for CAS combiners, repeaters and tunnel sites) to complete the change-out and retrofitting required.

4.22. The IMDA would recall, for the change-out and retrofitting for the combiners in the 1800MHz and 2600MHz spectrum bands, the entire exercise had taken 2 years spanning from 2014 to 2016. The proposed timeline would also be dependent on the following:

- i. Prompt approval from building owners for access;
- ii. Approval from building owners and SMRT/SBST for longer working hours; and
- iii. Person-in-Charge (**PIC**) staff from SMRT/SBST for tunnel night works.

4.23. Singtel Mobile would further highlight that with the change-out and retrofitting, there will be potential mobile service disruption in the buildings and tunnels. There are 2 types of combiners currently deployed by MNOs. For non-modular combiner change-out, as the entire cabinet for all spectrum bands has to be replaced, this will inevitably lead to mobile service disruption in the other spectrum bands (900MHz, 1800MHz, 2600MHz and 800MHz) in addition to the 2.1GHz spectrum band. For modular combiner change-out, there will be service disruption in the 2.1GHz spectrum band. [start c-i-c] [end c-i-c]

4.24. In view of the above, Singtel Mobile submits IMDA should extend the transition period for the migration of services to at least 24 months.

5. CONCLUSION

5.1. Singtel Mobile would be pleased to clarify any of the views and comments made in this submission, as appropriate.