Arrangements for Assignment of the Spectrum in

the 3.4 – 3.6 GHz Band for the Provision of Public Mobile Services

and the Related Spectrum Utilisation Fee ("Consultation Paper")

Submission by

SmarTone Mobile Communications Limited ("SmarTone")

Introduction

1. SmarTone is pleased to provide its comments on the Consultation Paper jointly issued by the Communications Authority ("CA") and the Secretary for Commerce and Economic Development (SCED") on 2 May 2018.

2. 5G is one of the key technology drivers that is vital to the development of Smart City. The Smart City Blueprint published by the Office of the Government Chief Information Officer ("OGCIO") in December 2017 has noted that the 5G mobile network is one of the important Smart City infrastructure:

> *"Fifth generation (5G) mobile networks can offer ultra-high speed and high capacity, support device-to-device ultra-reliable/low-latency communications, and enable massive machine-to-machine communications for better implementation of the Internet of Things (IOT). Hong Kong is all geared up for the commercial launch of 5G services and applications in 2020"*

3. The upcoming 5G network will be a vital building block of the Smart City development by providing even higher capacity and low-latency mobile connectivity, that is required by future Smart City applications. Given the propagation characteristics of spectrum at low frequencies (sub-6 GHz) and the global development of spectrum for 5G services, the 3.5 GHz band is a core band for providing territory-wide 5G mobile coverage in Hong Kong.

4. With the above in mind, SmarTone would like to provide its views and comments on the questions raised in the Consultation Paper in the following sections for the CA's consideration.

Question 1: Do you have any views on assigning the spectrum in the 3.5 GHz band through an auction?

5. We note the CA's analysis of the demand for the radio spectrum in the 3.5 GHz band and have no particular comment on the issue.

Question 2: Do you have any views on the proposed band plan with division of the available spectrum into ten frequency blocks, each with a bandwidth of 20 MHz?

6. As mentioned in the Consultation Paper (paragraph 13), there is a range of carrier bandwidths (range from 5 MHz to 100 MHz) for deploying 5G radio access network in the 3.5 GHz band. The current proposal is to divide the 200 MHz bandwidth into ten frequency blocks, each with a bandwidth of 20 MHz.

7. To allow more flexibility in configuring carrier bandwidths, SmarTone suggests that the 200 MHz bandwidth could be divided into 20 Frequency blocks, each with a bandwidth of 10 MHz.

8. It is noted that in the recent auction exercise of 3.5 GHz band to be conducted in South Korea, a bandwidth of 10 MHz is adopted.

Question 3: Do you have any views on the proposed spectrum cap of 100 MHz to be imposed on any bidder in the auction?

9. Given the propagation characteristics of the 3.5 GHz band, it will be used for 5G macro base station to provide territory wide coverage and hence it is generally regarded as the core band for 5G network. It is therefore important to ensure that there will be no over-concentration of spectrum in this band, otherwise it may significantly affect competition in the 5G mobile services market.

10. The current proposal of 100 MHz spectrum cap is equivalent to 50% of the total available spectrum in the 3.5 GHz band. This is the highest spectrum cap as compared to previous auctions where spectrum caps were imposed. In order to prevent the risk of spectrum over-concentration in this important band, it is our view that the spectrum cap should be set at 40% of the total available spectrum, that is 80 MHz.

Question 4: Do you have any views on the proposed format of and timing for the auction?

11. As mentioned above, the 3.5 GHz band will be used for 5G macro cells to provide territory-wide 5G mobile coverage. On the other hand, the upcoming 5G network will also use the millimeter wave spectrum bands, such as the 26/28 GHz band, for 5G small cells so as to increase data capacity at hotspots. Hence the future 5G mobile network will comprise of both macro cells covering large geographical areas and small cells covering much smaller areas. Hence the timing for the assignment of the 3.5 GHz band and the 26/28 GHz band would be ideally coincided so that operators can have a better picture for spectrum and network planning.

12. As regard the proposed auction format, which is a clock auction plus an assignment stage, it is a new format to Hong Kong. The industry therefore would require more details about the auction format and time to prepare for the auction.

13. It is stated in paragraph 23 of the Consultation Paper that the bidding will take place until the total demand for frequency blocks is equal to or less than the total supply. It is not clear at the moment how unsold spectrum block would be dealt with. Also, it is stated in the same paragraph that the arrangement in the second stage of the auction will ensure that all spectrum will ultimately be assigned contiguous frequencies without further details on how it could be done. It is suggested that the details of the auction format and rules should be made available at an early stage and more time be allowed for the industry to understand and familiarize themselves with the proposed auction format.

14. Since the value of the frequency blocks would be determined in the first stage of the auction (i.e., the clock auction), and the assignment stage is just for the determination of the priority to select the locations of the contiguous frequency blocks, we would like to propose the following arrangement for the assignment stage for the CA's consideration.

15. While a successful bidder may bid for the priority to select the locations of the contiguous frequency blocks in the assignment stage, it may not be able to make any selection if its bid is the lowest among the others. Also, a successful bidder may be willing to accept the less preferable frequency block at the lower edge of 3.4 GHz (given the issue highlighted in paragraph 30 of the Consultation Paper) if appropriate compensation is provided. We therefore would like to propose that there should be a mechanism for compensating the bidders which are unable to make any selection in the assignment stage. The amount of the compensation could be the bid prices submitted by the other

successful bidders in the assignment stage. This arrangement would compensate the assignee of less preferable frequency block at no additional funding from the Government.

Question 5: Do you have any views on the proposed Open Network Access ("ONA") requirement?

16. The requirement of ONA was first introduced in the 3G spectrum assignment exercise in 2001. The same requirement was extended to 2G licensees in 2005/2006. However, since 2016, there is no longer any operator subject to the ONA requirement. As shown in OFCA's website, there are currently 29 Mobile Virtual Network Operators (MVNOs). It is not aware that any of the MVNOs has requested the intervention of the CA related to the interconnection issues with the mobile network operators. Given that the Hong Kong's mobile market is one of the most competitive in the world, it is considered that the ONA requirement is unnecessary, as evidenced from the fact that all MVNO arrangements have been reached commercially without the need of regulatory intervention.

Question 6: Do you have any views on the proposed requirements (Protection of TT&C Stations) as set out in paragraphs 29 to 31 above?

17. The restriction zone set out in Annex B of the CA's Statement entitled "Change in the Allocation of the 3.4 – 3.7 GHz band from Fixed Satellite Service to Mobile Services" on 28 March 2018 (the "Re-Allocation Statement") will affect a large number of Hong Kong's population. According to the Census and Statistics Department, the total population in Tai Po, Ma On Shan, Sha Tin and Fanling/Sheung Shui was about 1.19 million in 2016[1]. While only part of Sha Tin and Fanling/Sheung Shui would be covered by the proposed restriction zone, the population being affected is still very large. Also, the restriction zone will cover the Science Park and the Chinese University of Hong Kong, which are two vital bases for science and technology research and development in Hong Kong.

[1] https://www.bycensus2016.gov.hk/data/snapshotPDF/Snapshot07.pdf

18. The Re-Allocation Statement also specifies that 100 MHz of spectrum in the 3.6 - 3.7 GHz band will be partitioned as a guard band to minimize radio interference to fixed satellite service operate in the 3.7 - 4.2 GHz band.

19. The four mobile network operators jointly issued a letter to the Office of Telecommunications Authority ("OFCA") on 24 May 2018 expressing their views on the restriction zone and setting out three additional mitigating measures which could help to minimize the Restriction Zone area. The three measures are 1) adding shielding cover for the TT&C Stations, 2) optimizing the radiation directions of mobile base station antennas and 3) relocation of the existing TT&C station from Tai Po to remote areas. SmarTone would like to take this opportunity to urge the CA to consider the above proposals which aim to minimize the restriction zone as much as possible.

20. It is expected that when the above measures are put in place, the requirement of guard band would also be minimized. Given the global spectrum planning for the 3300 – 3800 MHz band as highlighted in the operators' joint letter, it is essential to make available as much as possible spectrum in the band for mobile services to ensure that Hong Kong would not lag behind in the 5G service development in the future. SmarTone recalls that in the joint submission of the GSM Association and the Global Mobile Suppliers Association in response to the CA's Consultation Paper "Proposed Change in the Allocation of the 3.4 – 3.7 GHz Band from Fixed Satellite Service to Mobile Service", two overseas studies on the appropriate size of the guard band were quoted, in which it was suggested that a guard band size of 25 or 26 MHz should be sufficient.

21. In this regard, we would like to ask the CA to further reduce the size of the guard band between mobile and satellite services in Hong Kong, in order to maximize the amount of spectrum to be made available for mobile services. If necessary, this issue can be further discussed in the technical working group on mitigating measures related to the use of spectrum in the 3.5GHz band.

22. In paragraph 30 of the Consultation Paper, it is stated that there is a TT&C channel of some 1 MHz bandwidth in operation at the lower edge of the 3.5 GHz band would require greater protection to avoid co-channel interference. Spectrum assignee of the Frequency Block A1 is required to take reasonable measures to install, maintain and operate the service and the network, and in particular the operation of the radio channel overlapping with the 3.400 – 3.405 GHz range, in such a manner as to not cause any harmful interference to the operation of that TT&C channel within the restriction zones.

23. In order to understand the implications of the above, we would like to seek clarifications on the following:

- What is the exact frequency range of the TT&C channel of some 1 MHz bandwidth?
- Why the some 1 MHz bandwidth will affect the whole 3.400-3.405 GHz range, which is 5 MHz bandwidth?
- What exact protection measure the spectrum assignee of the concerned frequency block would need to do?

Question 7: Do you have any views on the proposed subsidy scheme for the upgrade of existing SMATV systems, including the funding and administrative arrangements for issuing the amount of subsidies to the affected system owners/users?

24. SmarTone is of the view that the proposed subsidy scheme for the upgrade of existing SMATV systems should be managed by OFCA for the following reasons:

- The successful bidders do not know the identity of SMATV licensees licensed by OFCA and therefore are unable to verify whether a SMATV licensee is qualified for the subsidy.
- Since there are about 1,600 existing SMATV systems in Hong Kong, upgrade of all the systems would take some time to complete. If the scheme is set up by OFCA, SMATV licensees can proceed to upgrade their systems as soon as possible. Otherwise the SMATV licensees would have to wait for the setting up of the scheme by the successful bidders, which could only be arranged after the auction of the spectrum. The latter would result in delay in the upgrade of SMATV systems which would ultimately affect the SMATV users.
- The funding of the scheme should be come from the proceeds of the auction of the 3.5 GHz band. OFCA is also equipped with experienced staff and resources that are capable to provide the administration support of the scheme.

25. All in all, SmarTone is of the view that it would be more efficient and cost-effective for OFCA to run the scheme with the proceeds from the auction. This would save the efforts and resources of the successful bidders which would be better used in the development and provision of 5G mobile services for Hong Kong.

Question 8: Do you have any views on the adoption of a technology neutral approach in respect of the use of spectrum in the 3.5 GHz band?

26. SmarTone supports the adoption of a technology neutral approach in respect of the use of spectrum in the 3.5 GHz band.

Question 9: Do you have any views on the proposed network and service rollout obligations, as well as the associated performance bond to be imposed on successful bidders?

27. We have no particular comment on this issue, except that in the determination of whether the minimum coverage of 50% of the population has been met, consideration should be given to any restriction zone requirement imposed such that the population in the restriction zone should be excluded.

Question 10: Do you have any views on the proposals in relation to SUF above?

28. SmarTone supports the proposal that the spectrum assignees will be given a choice to pay the SUF either by lump sum payment upfront or annual instalments.

29. It is noted that the auction reserve price will be specified by SCED nearer the time of the auction. SmarTone considers that it is not desirable to set a high reserve price for a competitive bidding, or it will run the risk of intervening market forces in determining an economically efficient price for the spectrum. The risk of setting a high reserve price is examined in a recent report released by the GSMA in February 2017 entitled "*Effective Spectrum Pricing: Supporting better quality and more affordable mobile services*".

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