

**Joint Statement of the Communications Authority and  
the Secretary for Commerce and Economic Development**

**Arrangements for Assignment of the Spectrum in  
the 3.3 GHz and 4.9 GHz Bands for the Provision of  
Public Mobile Services and the Related Spectrum Utilisation Fee**

**13 December 2018**

**PURPOSE**

This Statement promulgates the decision of the Communications Authority (“CA”) to adopt a market-based approach to assign spectrum in the 3.3 GHz band (3.3 – 3.4 GHz) and the 4.9 GHz band (4.83 – 4.93 GHz). This Statement also announces the decision of the Secretary for Commerce and Economic Development (“SCED”) on the method for determining the related spectrum utilisation fee (“SUF”), which is proposed to be prescribed by subsidiary legislation.

**INTRODUCTION**

2. On 26 July 2018, the CA updated the Spectrum Release Plan (“SRP”)<sup>1</sup> to inform the industry that 100 MHz of spectrum in the 4.9 GHz band which may be used in any locations of the territory, and another 100 MHz of spectrum in the 3.3 GHz band designated for indoor use only will be made available in 2019 for the provision of public mobile services, including the fifth generation mobile (“5G”) services.

3. On 28 August 2018, the CA and SCED jointly issued a consultation paper<sup>2</sup> entitled “Arrangements for Assignment of the Spectrum in the 3.3 GHz and 4.9 GHz Bands for the Provision of Public Mobile Services and the Related Spectrum Utilisation Fee” (the “Consultation Paper”) to seek views and comments on the allocation and assignment arrangements of a total of 200 MHz of spectrum in the 3.3 GHz band and the 4.9 GHz band for the

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<sup>1</sup> The SRP is available at:  
[https://www.coms-auth.hk/filemanager/en/content\\_613/spectrum\\_plan2018\\_en.pdf](https://www.coms-auth.hk/filemanager/en/content_613/spectrum_plan2018_en.pdf).

<sup>2</sup> The consultation paper is available at:  
[https://www.coms-auth.hk/filemanager/en/content\\_711/cp20180828\\_e.pdf](https://www.coms-auth.hk/filemanager/en/content_711/cp20180828_e.pdf).

provision of public mobile services, and the related SUF. Seven submissions were received in response to the Consultation Paper<sup>3</sup>. Having considered and examined the views and comments received, the CA and SCED set out in this Statement their respective decisions on the arrangements for allocation and assignment of the spectrum and the related SUF. Major views and comments of the respondents received in the consultation exercise as well as the responses of the CA and SCED are summarised in the **Annex**.

## **LEGISLATIVE AND POLICY FRAMEWORK**

4. Under section 32G(1) of the Telecommunications Ordinance (Cap. 106) (“TO”), the CA has the statutory duty to promote the efficient allocation and use of the radio spectrum as a public resource of Hong Kong. Sections 32H(2) and 32I(1) of the TO empower the CA to assign radio frequencies and to designate which of them shall be subject to the payment of SUF following consultation with the telecommunications industry and other affected persons as required under section 32G(2) of the TO.

5. Section 4(4) of the Communications Authority Ordinance (Cap. 616) (“CAO”) stipulates that the CA, in performing its functions, must have regard to the following as appear to it to be relevant in the circumstances: (a) the fostering of an environment that supports a vibrant communications sector to enhance Hong Kong’s position as a communications hub in the region; (b) the encouragement of innovation and investment in the communications market; (c) the promotion of competition and adoption of best practices in the communications market for the benefit of the industry and consumers; and (d) acting in a manner consistent with the provisions of the Hong Kong Bill of Rights Ordinance (Cap. 383).

6. Sections 32I(2) and 32I(4) of the TO empower SCED to prescribe the method for determining the SUF and to specify the minimum fee of the SUF (including the minimum fee or reserve price of an auction where it is used for determining the SUF).

7. The Radio Spectrum Policy Framework (“Framework”) promulgated by the Government in April 2007 sets out the policy objectives and the guiding principle in spectrum management which the CA should take into account in discharging its spectrum management responsibilities under

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<sup>3</sup> The submissions in response to the consultation paper are available at: [https://www.coms-auth.hk/en/policies\\_regulations/consultations/completed/index\\_id\\_471.html](https://www.coms-auth.hk/en/policies_regulations/consultations/completed/index_id_471.html).

the TO<sup>4</sup>. The former Telecommunications Authority (“TA”) explained in his statement issued in April 2007 that, in exercising his statutory powers under the TO, he would, in addition to all relevant considerations as required by law, give due regard to the Framework to the extent that there would be no inconsistency with the objectives and provisions of the TO<sup>5</sup>. The Framework states that the policy inclination is that a market-based approach in spectrum management will be used wherever the CA considers that there are likely to be competing demands from providers of non-Government services, unless there are overriding public policy reasons to do otherwise.

## **THE CA’S DECISION ON THE ALLOCATION AND ASSIGNMENT ARRANGEMENTS FOR THE SPECTRUM IN THE 3.3 GHz AND 4.9 GHz BANDS**

### **Amendment to the Hong Kong Table of Frequency Allocations**

8. In the Consultation Paper, the CA proposed to amend the Hong Kong Table of Frequency Allocations to allocate the 3.3 – 3.4 GHz band and the 4.83 – 4.94 GHz band to mobile service on a co-primary basis in addition to the respective existing uses. All four mobile network operators (“MNOs”) unanimously support the proposed amendment to the Hong Kong Table of Frequency Allocations so that the spectrum will be released in a timely manner for the provision of public mobile services. Furthermore, they request to allocate the entire 200 MHz of spectrum in the 4.8 – 5.0 GHz band to mobile service. A satellite operator argues that mobile services operating in the 3.3 GHz and 4.9 GHz bands might interfere with fixed satellite service operating in adjacent frequency bands.

9. Regarding the interference issue, the CA considers that the proposed use of the 3.3 GHz band will unlikely cause any harmful interference to fixed satellite service operating in the 3.4 – 4.2 GHz band. This is because the use of the 3.3 GHz band for indoor use only will be limited to low transmitting power and such use cannot cause interference to the incumbent radiolocation services operating outdoors. On the other hand, the frequency band adjacent to the 4.9 GHz band, i.e. the 4.5 – 4.8 GHz band, is allocated to, among others, fixed satellite service although there is no actual use in Hong Kong for the time being. As a general principle, the operator of any

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<sup>4</sup> The Framework is available at:  
<http://www.cedb.gov.hk/ccib/eng/legco/pdf/spectrum.pdf>.

<sup>5</sup> The TA Statement on the Framework is available at:  
[http://tel\\_archives.ofca.gov.hk/en/tas/others/ta20070424.pdf](http://tel_archives.ofca.gov.hk/en/tas/others/ta20070424.pdf).

radiocommunications service should be prepared to resolve any compatibility issues including potential interference caused by other primary services operating in the same band or adjacent band already in existence. In the light of the above, the CA considers that there is room for the co-existence of fixed satellite service and mobile service in the 3.3 GHz and 4.9 GHz bands. As such, the potential interference issue should not be a barrier to the proposed frequency allocation.

10. The CA notes that MNOs would like to have more spectrum in the 4.9 GHz band for provision of 5G services. At present, both the 4.80 – 4.83 GHz and 4.94 – 4.99 GHz bands are being used by the Government, with the latter band being designated for Public Protection and Disaster Relief operations by the International Telecommunication Union on a global basis. The CA is of the view that it has to give due regard to the spectrum policy objectives as stipulated in the Framework, and in particular the one to ensure that necessary spectrum is reserved for services to be provided by or on behalf of the Government. The CA is minded to strike a balance between the spectrum needs of 5G services and the Government services when allocating spectrum in the 4.8 – 5.0 GHz band to mobile service. Furthermore, since relocation of the existing users out of the band would be involved, the coordination process will take time. As such, the CA considers it more appropriate to release the 100 MHz of spectrum already made available in the 4.9 GHz band to the market first, and to continue its work in making available additional spectrum concurrently. With the above considerations, **the CA decides to amend the Hong Kong Table of Frequency Allocations by allocating the 3.3 – 3.4 GHz band and the 4.83 – 4.94 GHz band to mobile service on a co-primary basis in addition to the respective existing uses with effect from 1 January 2019.**

### **Assignment of Spectrum by Auction**

11. Taking into account the scarcity and limited bandwidth of radio spectrum in frequency bands below 6 GHz suitable for mobile use, the use of the 3.3 GHz and 4.9 GHz bands for deployment of 5G services, and the expected supply of 5G standard compliant equipment and devices supporting these two bands, the CA is of the view that there are likely to be competing demands for the spectrum concerned. The CA therefore proposed in the Consultation Paper to assign the spectrum by way of auction as it provides a fair, transparent, objective and economically efficient means to determine the prospective assignees.

12. The CA notes that some MNOs express reservation in their submissions on the competing demands for the spectrum concerned, and

suggest that the administrative assignment approach should be adopted. If auction is conducted, one MNO further suggests that participation should be confined to incumbent MNOs as no other party would be able to demonstrate technical and financial capacity to provide services. On the other hand, the CA notes the keen support from the MNOs about the allocation of the 3.3 GHz and 4.9 GHz bands to mobile services. In particular, they have requested for the release of more spectrum in the 4.8 – 5.0 GHz band. This is one of the many clear manifestations that spectrum below the 6 GHz band is suitable for the deployment of public mobile services and is eagerly sought after by the industry (other manifestations are stated in paragraphs 10 to 13 of the Consultation Paper). Since the CA does not identify any overriding public policy reason to administratively assign spectrum in the 3.3 GHz and 4.9 GHz bands after taking into account the received submissions, the CA affirms its view that there is a likelihood of competing demands for the bands. To ensure that the available spectrum would go into the hands of those who can make the most efficient use of it, the CA maintains that the relevant spectrum should be assigned by way of auction and that the auction should be open for bidding by any interested party, be they incumbent MNOs or new entrants, who are able to fulfil the minimal qualification requirement for registering bidders' interest and for demonstrating their capability to provide satisfactory services.

13. Based on the above considerations, **the CA decides to assign the spectrum in the 3.3 GHz and 4.9 GHz bands by way of auction.**

### **Band Plan**

14. In the Consultation Paper, the CA proposed that the bandwidth of each frequency block in the 4.9 GHz band should be up to 50 MHz, while the spectrum in the 3.3 GHz band should be divided into 10 frequency blocks, each with a bandwidth of 10 MHz. From the submissions received, there are different views among the respondents on the CA's proposal. Some MNOs support or indicate no objection to the proposed band plan. One MNO submits that if more spectrum in the 4.9 GHz band can be made available, each frequency block should be set to a bandwidth of 40 MHz instead, and that the available spectrum in the 3.3 GHz band should be divided into four 20-MHz blocks and two 10-MHz blocks to allow possible options of carrier bandwidths ranging from 10 to 100 MHz. Another MNO submits that a single auction should be conducted and all the available bands should be divided into blocks with a bandwidth of 50 MHz each.

15. The proposed band plans for the 3.3 GHz and 4.9 GHz bands are so designed to allow bidders to acquire the amount of spectrum they would need through competitive bidding, having regard to the latest 5G technical

specification on the carrier bandwidths supported. Given the different deployment characteristics of the 3.3 GHz and 4.9 GHz bands, auctions for these bands will be conducted using different auction formats with different set of rules. Hence, it is technically not feasible to conduct a single auction with different formats and rules prescribed for the two frequency bands.

#### 4.9 GHz band

16. As mentioned in paragraph 10 above, spectrum adjacent to the 4.9 GHz band (i.e. 4.80 – 4.83 GHz and 4.94 – 4.99 GHz bands) is currently used by the Government. The CA will continue to explore the possibility of making available additional spectrum for allocation to mobile service as illustrated in paragraph 10 above. With this in mind, the CA considers it advisable to adopt a forward looking approach in devising the band plan for the 4.9 GHz band on the assumption that the adjacent bands can be vacated for allocation to mobile service in future. In this regard, **the CA decides to divide the available spectrum in the 4.9 GHz band into two blocks with a bandwidth of 40 MHz each. Two 10-MHz blocks (i.e. 4.83 – 4.84 GHz and 4.92 – 4.93 GHz) will be reserved and may be combined with the spectrum which may be made available in future for assignment at a later stage.**

#### 3.3 GHz band

17. As regards the 3.3 GHz band, the CA notes that the proposed block size of 10 MHz each already provides the maximum flexibility for bidders to acquire their desired number of blocks subject to their commercial decisions. Taking into account the submissions received, **the CA decides to divide the available spectrum in the 3.3 GHz band into 10 frequency blocks, each with a bandwidth of 10 MHz.**

### **Spectrum Cap**

18. The CA proposed in the Consultation Paper that a bidder in the auction of the 3.3 GHz band can only acquire a maximum of 40 MHz of spectrum; while a bidder in the auction for the 4.9 GHz band can only acquire one frequency block with a bandwidth of up to 50 MHz of spectrum. There are mixed views in the submissions as to whether a separate spectrum cap or a single cap should be imposed on the frequency bands. One respondent objects to the imposition of any spectrum cap. Having considered the comments received, and taken into account the different deployment characteristics of the 3.3 GHz and 4.9 GHz bands, the need to prevent over-concentration of spectrum holding by any individual operator, and the band plans as stated in

paragraphs 16 and 17 above, **the CA maintains its view to impose a spectrum cap of 40 MHz on any bidder in the auction of the 3.3 GHz band.** Taking into account the decision in paragraph 16 above, **the CA decides to limit any bidder in the auction of the 4.9 GHz band to acquire only one frequency block with a bandwidth of 40 MHz of spectrum.** This would allow more than one mobile network operator to provide service in each of the 3.3 GHz and 4.9 GHz bands.

### **Auction Format and Timing**

19. With a view to facilitating successful bidders to achieve better technical efficiency for use of spectrum in contiguous blocks, the CA proposed in the Consultation Paper to adopt the clock auction format for the 3.3 GHz band, followed by an assignment stage to determine the contiguous frequency blocks that may be assigned to bidders. For the 4.9 GHz band, since each bidder would be eligible to bid for only one frequency block, the CA proposed in the Consultation Paper to adopt the simultaneous multiple-round ascending auction (“SMRA”) format for the auction.

20. One MNO questions why the SMRA format cannot be adopted for both the 3.3 GHz and 4.9 GHz bands and suggests to conduct one single SMRA auction for all 5G bands. The other three MNOs in general consider that the auctions for the 3.3 GHz and 4.9 GHz bands, as well as the 3.5 GHz band (3.4 – 3.6 GHz) should be held at the same time. They are of the view that a single auction or holding the auctions at the same time may allow the bidders to have an overview of the availability and pricing of the spectrum and to make informed decisions.

21. The CA notes that the industry would like to have the auctions for the 3.3 GHz band, the 4.9 GHz band and the 3.5 GHz band to be conducted at about the same time. As illustrated in paragraph 15 above, there is a need to adopt different auction formats with different sets of rules for the spectrum in the 3.3 GHz, 3.5 GHz, and 4.9 GHz bands. It is therefore technically not feasible to conduct a single auction for all these bands. Taking into account the concerns of MNOs, the CA would strive to adopt a well-knit timetable such that auctions for these three frequency bands will be conducted one by one consecutively. The CA’s current plan is to arrange the auction for the 3.5 GHz band first in around July/August 2019, to be followed by the other two auctions for the 3.3 GHz and 4.9 GHz bands. Bidders would therefore be able to make informed decisions as to their bidding strategy and network rollout plans, and may adjust their bidding strategies taking into account the results of the preceding auctions. The CA will provide details of the auction rules in the

terms and conditions of the auctions and the respective Information Memoranda, which will be issued nearer the time of the auctions.

22. Having considered the submissions received and based on the above considerations, **the CA decides to conduct separate auctions for the 3.3 GHz and 4.9 GHz bands, with the former using the clock auction format and the latter using the SMRA format.**

## **Licensing Arrangements**

### Licensing and Validity Period

23. In line with the existing licensing regime for the provision of public mobile services, any new entrants or incumbent operators which have successfully bid for the 3.3 GHz and 4.9 GHz bands will each be granted a new Unified Carrier Licence (“UCL”) to effect the assignments of the successfully acquired spectrum with a validity period of 15 years for the provision of public mobile services. For existing UCL holders who successfully acquire spectrum in the proposed auction, it is their own choice and initiative to apply to the CA for combining their existing UCLs with the new UCL to be issued. As the licensing arrangement concerned has been consistently followed in the past and only one respondent suggests a longer period of spectrum assignment (for at least 20 to 25 years) for recouping its investment, **the CA has no intention to alter the prevailing assignment term of 15 years for spectrum used for the provision of public mobile services.**

### Restriction of Frequency Swap

24. With regard to the proposed requirement of restricting successful bidders to swap assigned frequency blocks within the first five years, the CA notes that only one respondent considers that the obligation is not required. The CA’s proposed restriction of frequency swap is to ensure genuine competition in the auctions, such that the spectrum would be efficiently assigned to bidders who value it most in order to realise the full market value of each frequency block in the auctions. Hence, **the CA decides that swapping of any frequency assignment in the 3.3 GHz and 4.9 GHz bands within the first five years counting from the date of the frequency assignment will generally not be considered.**

## Network and Service Rollout Obligations

25. The CA proposed in the Consultation Paper that each successful bidder of the 3.3 GHz band would be required to establish 500 indoor base stations operating at the band, whereas each successful bidder of the 4.9 GHz band would be required to roll out its network and service for providing a minimum coverage of 50% of the population with regard to its mobile services provided using its assigned spectrum in the band, both within the first five years from the date of issue of the licence. Each successful bidder would be required to lodge a performance bond as a guarantee of its compliance with the aforesaid network and service rollout obligations.

26. The respondents indicate concern in fulfilling the proposed requirement of installing 500 indoor base stations within five years for the 3.3 GHz band. They consider the target to be too high as compared with their current actual number of indoor base stations. They referred to difficulty of obtaining agreement of site owners to install indoor cell sites and to co-ordinate common antenna systems among operators. As for the 4.9 GHz band, one respondent specifically asks that the minimum population coverage of the subject band be set at 10%. Some MNOs consider it unnecessary to impose any network and service rollout obligations in the subject bands due to the keen competition among the operators to roll out 5G network in Hong Kong.

27. In order to prevent spectrum hoarding in the 3.3 GHz band and to ensure that the auctioned spectrum will be put into efficient use for the timely provision of advanced telecommunications services for the benefit of the general public, the CA maintains its view that network and service rollout obligations, together with the performance bond requirement, should be imposed. The obligation for each successful bidder to establish at least 500 indoor radio base stations operating in the 3.3 GHz band within the first five years from the date of issue of the licence was proposed in the Consultation Paper with reference to the average number of indoor radio base stations so far established by an MNO. Taking into account the concerns from MNOs as described in paragraph 26 above, the CA accepts that such obligation may be lessened to enable a higher level of flexibility for the successful bidders in rolling out their networks without materially compromising the extent of indoor service coverage to be provided with the use of the 3.3 GHz band. In this regard, the CA is prepared to suitably adjust the obligation by requiring each successful bidder of the 3.3 GHz band to establish at least 400 indoor radio base stations operating in the band.

28. As regards the 4.9 GHz band, it should be pointed out that the 50% of population coverage has in general been adopted as the minimum

rollout requirement for a number of frequency bands such as the 1.9 – 2.2 GHz, 2.3 GHz and 2.5/2.6 GHz bands assigned through auctions in the past. Since the rollout requirement is for the purpose of avoiding spectrum hoarding, the CA maintains the view that the minimum coverage should be 50% of population.

29. Based on the above considerations, **the CA decides to require each successful bidder of the 3.3 GHz band to establish at least 400 indoor base stations operating in the band within the first five years from the date of issue of the licence, and to require each successful bidder of the 4.9 GHz band to roll out its network and service for providing a minimum coverage of 50% of the population with regard to mobile services provided using its assigned spectrum in the band within five years from the date of issue of the licence. Successful bidders should lodge a performance bond as a guarantee of its compliance with each of the aforesaid network and service rollout obligations.** Details of the performance bond requirement will be specified by the CA when the respective Information Memoranda for the auctions of the 3.3 GHz and 4.9 GHz bands are issued.

## **THE DECISION OF SCED ON THE RELATED SPECTRUM UTILISATION FEE**

### **Level of SUF**

30. Given that radio spectrum is a scarce public resource, it is incumbent upon the Government to ensure that the SUF of spectrum is set to reflect as close as possible its full market value so that spectrum assignees, which run their commercial operation in a fully liberalised market, would put the spectrum so acquired to its most efficient use.

31. In paragraphs 11 to 13 above, the CA concludes that there are likely to be competing demands and that auction as a market-based approach should be used for the assignment of the 3.3 GHz and 4.9 GHz bands. The SUF would therefore naturally be determined through auction whereby the bidders would determine the level of their bids based on clear information on the supply of spectrum and their assessment of the business potential and opportunities. The auction results would reflect the full market value of the 3.3 GHz and 4.9 GHz bands. SCED decides to propose a regulation under section 32I(2) of the TO to prescribe that the SUF of the spectrum in the 3.3 GHz and 4.9 GHz bands be determined by auction, subject to an auction reserve price to be specified nearer the time of the auctions.

32. SCED has taken note of the need for substantial upfront investments required for operators to roll out their 5G network infrastructure, and the fact that bidders will take into account those costs in planning their bidding prices to be put up at the auction. With this in mind, SCED does not intend to set an auction reserve price at a high level which might discourage competition and bidders' eagerness to participate in the auction. Rather, SCED considers that it should be set at a level that represents the minimum base value of the spectrum for the purpose of kick-starting the competitive bidding process, while balancing the need to forestall non-serious bidders. This coincides with MNOs' views received from the consultation that the auction reserve price should not be set at a high level, such that their investment in deploying 5G networks and services in Hong Kong need not be severely increased.

33. SCED will take into account various factors outlined in the preceding paragraphs when determining the auction reserve price nearer to the time of the auction.

### **Method of Payment**

34. The current assignment exercise involves a total of 180 MHz of spectrum, and the amount of SUF involved is potentially substantial. There is a need to allow for greater flexibility for spectrum assignees to make financial arrangement for the payment of SUF having regard to their individual circumstances. In view of the above, SCED proposed in the Consultation Paper that spectrum assignees would be given a choice to pay the SUF either by lump sum payment upfront or annual instalments.

35. The majority of the responding MNOs welcome the additional choice to pay the SUF by annual instalments. SCED decides to propose a regulation under section 32I(2) of the TO to prescribe that all spectrum assignees (which may include the MNOs and new entrants into the market) will be given a choice to pay the SUF either by -

- (a) lump sum payment upfront, which is the lump sum amount determined in auctions as elaborated in paragraphs 31-32 above; or
- (b) annual instalment, with the first instalment equivalent to the lump sum amount obtained in (a) above divided by 15 (i.e. the number of years of assignment), and subsequent instalments increased

every year by 2.5%, the latest medium-range underlying inflation forecast, to reflect the time value of money to the Government.

36. If a spectrum assignee chooses to pay the SUF by annual instalments, the Government would require a five-year rolling guarantee of the SUF payment throughout the whole assignment period. This is because of the potential size of the SUF, and the Government needs to ensure the security of its cash flow.

37. The regulation referred to in paragraph 35 will be tabled at the Legislative Council for negative vetting.

38. As to the annual royalty payment approach proposed by some MNOs, please refer to paragraph 48 of the **Annex** for reasons why the approach is not adopted for the assignment exercise.

## **IMPLEMENTATION OF THE SPECTRUM ASSIGNMENT ARRANGEMENTS**

39. The CA and SCED will make the necessary arrangements to enable the assignment of the spectrum in the 3.3 GHz and 4.9 GHz bands to proceed as per their respective decisions in this Statement, including the necessary legislative amendments. Subject to the completion of the legislative process, the CA targets to conduct the auctions of the 3.3 GHz and 4.9 GHz bands in around July/August 2019.

40. For the avoidance of doubt, nothing in this Statement will affect, limit or prejudice the exercise of the powers of the CA and SCED under the CAO, TO or its subsidiary legislations.

**Communications Authority**  
**Secretary for Commerce and Economic Development**  
**13 December 2018**

**Summary of Submissions in Response to the Consultation Paper and  
the Responses of the Communications Authority and  
the Secretary of Commerce and Economic Development**

**INTRODUCTION**

On 28 August 2018, the Communications Authority (“CA”) and the Secretary for Commerce and Economic Development (“SCED”) jointly issued a consultation paper to seek the views and comments of the industry and interested parties on the arrangements for allocation and assignment of the spectrum in the 3.3 GHz band (3.3 – 3.4 GHz) and the 4.9 GHz band (4.83 – 4.93 GHz) for the provision of public mobile services and the related spectrum utilisation fee (“SUF”) (the “Consultation Paper”).

2. At the close of the public consultation on 26 September 2018, submissions were received from the following seven respondents (listed in alphabetical order) –

Organisations

- (a) Asia Satellite Telecommunications Company Limited (“AsiaSat”)
- (b) China Mobile Hong Kong Company Limited (“CMHK”)
- (c) Hong Kong Telecommunications (HKT) Limited (“HKT”)
- (d) Hutchison Telephone Company Limited (“Hutchison”)
- (e) SmarTone Mobile Communications Limited (“SmarTone”)

Individuals

- (f) Mr Francis Fong
- (g) The Honourable Charles Peter Mok (“Hon Charles Mok”)

3. The CA and SCED set out in this Annex their respective responses to the views and comments received in the public consultation. The CA and SCED have taken into account and given thorough consideration to all the submissions which are relevant to the arrangements for allocation and assignment of the spectrum in the 3.3 GHz and 4.9 GHz bands for the provision of public mobile services and the related SUF, though, for practical reasons, not all of the issues raised may specifically be mentioned or addressed herein. Please refer to the statement (the “Statement”) to which this

Annex is attached for the respective decisions made by the CA and SCED after the public consultation on the matter.

4. The responses set out in this Annex are without prejudice to the exercise of the powers by the CA or SCED under the Communications Authority Ordinance (Cap. 616), Telecommunications Ordinance (Cap. 106) (“TO”) or any subsidiary legislation.

### **PROPOSED AMENDMENT TO THE HONG KONG TABLE OF FREQUENCY ALLOCATIONS FOR THE 3.3 GHz AND 4.9 GHz BANDS**

5. Under the Hong Kong Table of Frequency Allocations, the 4.80 – 4.94 GHz band is at present allocated to fixed service only, whereas the 3.3 – 3.4 GHz band is allocated to radiolocation service only. To enable the use of the 3.3 GHz and 4.9 GHz bands for the provision of public mobile services including 5G services, the CA proposed to amend the Hong Kong Table of Frequency Allocations pursuant to section 32H of the TO with effect from 1 January 2019. Details are as follows –

- (a) the 4.83 – 4.94 GHz band to be allocated to mobile service on a co-primary basis in addition to the existing allocation for fixed service, with 100 MHz of spectrum in the 4.9 GHz band to be used for the provision of public mobile services; and 10 MHz of spectrum in the 4.93 – 4.94 GHz band to be partitioned as a guard band to minimise potential mutual interference with the government services currently operating in the 4.94 – 4.99 GHz band; and
- (b) 100 MHz of spectrum in the 3.3 – 3.4 GHz band to be allocated to mobile service on a co-primary basis in addition to the existing allocation for radiolocation, and the prospective mobile service operating in the 3.3 GHz band will be restricted to indoor use only.

#### Views and Comments of the Respondents

6. The four mobile network operators (“MNOs”) support allocating the 3.3 GHz and 4.9 GHz bands to mobile service on a co-primary basis and agree with the proposed amendment to the Hong Kong Table of Frequency Allocations. They also consider that more spectrum should be released in the 4.9 GHz band by allocating the entire 200 MHz of spectrum in the 4.8 – 5.0

GHz band to mobile service. Furthermore, HTCL seeks clarification on how the radio stations of co-primary users operating in these two bands will be protected, and the criteria for protection, such as “first-come-first-served”.

7. AsiaSat submits that indoor deployment of 5G in the 3.3 GHz band would still be a source of interference to satellite reception, and 5G services in both the 3.3 GHz band and the 3.5 GHz band (3.4 – 3.6 GHz) would lead to higher aggregated interference level at the receiving antenna for fixed satellite service (“FSS”). AsiaSat considers that appropriate requirements in respect of power levels and unwanted emissions of 5G equipment together with restriction zones around the earth stations (albeit possibly smaller than those required for 5G operation in the 3.5 GHz band) would be required for the 3.3 GHz band. For the planned FSS band in the 4.5 – 4.8 GHz band, AsiaSat considers that a guard band of only 30 MHz is very tough for FSS to avoid the potential interference caused by 5G services operating in the 4.9 GHz band.

#### Responses of the CA

8. The CA notes the support from the MNOs on the proposed allocation of the 3.3 GHz and 4.9 GHz bands to mobile service. As regards their request to provide a total of 200 MHz spectrum in the 4.8 GHz to 5.0 GHz band, the CA would like to emphasise that according to the Radio Spectrum Policy Framework (“Framework”)<sup>1</sup>, one of the key spectrum policy objectives is to ensure that necessary spectrum is reserved for services to be provided by or on behalf of the Government. The 4.80 – 4.83 GHz and 4.94 – 4.99 GHz bands are being used by the Government. The 4.94 – 4.99 GHz band has in fact been designated for Public Protection and Disaster Relief operations by the International Telecommunication Union (“ITU”) on a global basis. The CA is minded to strike a balance between the spectrum needs of 5G services and the Government services when allocating spectrum in the 4.8 – 5.0 GHz band to mobile service. Since relocation of existing users out of the band would be involved, the coordination process will take time. As such, the CA considers it more appropriate to release the 100 MHz of spectrum already made available in the 4.9 GHz band to the market first, and to continue its work in making available additional spectrum concurrently.

9. Regarding the sharing of spectrum by primary users, a new radio station of a co-primary service in the 3.3 GHz or 4.9 GHz bands must refrain from causing harmful interference to, and will not be entitled to claim

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<sup>1</sup> The Framework is available at:  
<http://www.cedb.gov.hk/ccib/eng/legco/pdf/spectrum.pdf>.

protection from harmful interference caused by, stations of other co-primary users, already in existence, i.e. the radio stations of co-primary users will be protected on a first-come-first-served basis. Moreover, following the existing practice, all radio users should comply with any requirements of the CA for, among other things, ensuring electromagnetic compatibility with existing radio stations, including those operating in adjacent bands. As explained in the Consultation Paper, in order to avoid causing interference to or suffering interference from the territory-wide radiolocation service being operated in outdoor environment, the prospective mobile service operating in the 3.3 GHz band will not only be restricted to indoor use but should also not cause any harmful interference to other lawful telecommunications services in Hong Kong and neighbouring territories.

10. In relation to the interference concern raised by AsiaSat, the CA notes that the proposed use of the 3.3 GHz band by 5G services for indoor use will be limited to low transmitting power and such use should not cause interference to incumbent radiolocation service operating outdoor. The CA considers that the use of the 3.3 GHz band is not likely to cause any harmful interference to FSS operating in the 3.4 – 4.2 GHz band, with such likelihood being increased only where the interference source is in close proximity to the satellite station concerned. Indeed, the CA has already decided to effect the re-allocation of the 3.4 – 3.6 GHz band to mobile service for use by 5G services starting from 1 April 2020, while the use of the said band for FSS will continue to be allowed only in the existing Telemetry, Tracking and Control stations in Tai Po and Stanley. Furthermore, the 3.3 GHz band and the 3.4 – 4.2 GHz band do not overlap in frequency. Satellite operators should also have the expertise to implement protection measure in their earth stations, if they consider it necessary, for additional safeguard.

11. In contrast to the 3.4 – 4.2 GHz band which is being extensively used by the satellite industry, the 4.5 – 4.8 GHz band has yet to be put to use for FSS in Hong Kong. Since the use of the band is subject to a specific allocation plan covered under Radio Regulations (“RR”) of the ITU and any local satellite operator who wishes to use the band needs to satisfy the relevant requirements of RR, there is no exact time frame for use of the band for FSS in Hong Kong. In any event, as a general principle, the operator of any radiocommunications service should be prepared to resolve any compatibility issues including potential interference caused by other primary services operating in the same band or adjacent band already in existence. In light of the above, the CA considers that there is room for co-existence of FSS and mobile service operating in the 3.3 GHz and 4.9 GHz bands. As such, the potential interference issue should not be a barrier to the proposed frequency allocation.

12. Based on the foregoing, the CA maintains its view to allocate the 3.3 GHz and 4.9 GHz bands for mobile service on a co-primary basis in addition to the respective existing uses.

## **PROPOSED ARRANGEMENTS FOR ASSIGNMENT OF THE SPECTRUM IN THE 3.3 GHz AND 4.9 GHz BANDS**

### **Assignment of Spectrum by Auction**

13. Taking into account the fact that there are likely to be competing demands for the spectrum in the 3.3 GHz and 4.9 GHz bands, and the guiding principle in spectrum management as set out in the Framework whereby a market-based approach will be adopted in spectrum management wherever the CA considers that there are likely to be competing demands from providers of non-Government services unless there are overriding public policy reasons to do otherwise, the CA proposed in the Consultation Paper to assign the spectrum in the 3.3 GHz and 4.9 GHz bands for the provision of public mobile services by way of auction.

### Views and Comments of the Respondents

14. HTCL expresses reservation on the existence of competing demands for the spectrum concerned as it considers that no in-depth analysis of the demand for these two bands has been conducted. HKT also considers that there is no substantial data or analysis to support the findings that there are competing demands for these bands, nor any discussion of the pros and cons of alternative market-based approaches. CMHK and HTCL suggest to adopt an administrative assignment approach. CMHK adds that spectrum in the 3.3 GHz and 4.9 GHz bands should be administratively assigned to those MNOs who have acquired spectrum in the 3.5 GHz band, in proportion to the amount they have acquired to supplement their services in the restriction zones. The Hon Charles Mok suggests that the Government should review the existing price-based auction format.

15. HKT further opines that participation in the auctions, if conducted, should be confined to MNOs as no other party would be able to demonstrate technical and financial capacity to provide services. On the other hand, the Hon Charles Mok considers that the Government should facilitate entry of new competitors and encourage investments in 5G to expedite Hong Kong's development as a genuine smart city.

## Responses of the CA

16. The CA has already stated its considerations leading to the proposal of adopting the market-based approach in paragraphs 10 – 13 of the Consultation Paper. In fact, in response to other sections of the Consultation Paper, all four MNOs have requested the CA to release more spectrum in the 4.8 – 5.0 GHz band, i.e. the whole 200 MHz block from 4.8 – 5.0 GHz, which manifests a high demand for the spectrum below the 6 GHz band. From the submissions received, the CA does not identify any overriding public policy reason which justifies assigning spectrum in the 3.3 GHz and 4.9 GHz bands administratively. Hence, the CA maintains its view of assigning the spectrum in these two frequency bands by way of auction.

17. On the eligibility criteria of bidders, while HKT suggests the auction to be restricted to the incumbent MNOs, the Hon Charles Mok supports facilitating entry of new competitors so as to increase competition and encourage investments in 5G. To ensure that the spectrum would go into the hands of those who can make the most efficient use of it, the CA maintains that the spectrum auction should be open for bidding by any interested party, be they incumbent MNOs or new entrants, who are able to fulfil the minimum qualification requirements for registering bidders' interest and for demonstrating their capability to provide satisfactory services.

### **Band Plan**

18. To cater for different amounts of spectrum that may be required by MNOs for meeting their demands and taking into account the technical standards which future network equipment and user terminals would adopt, the CA proposed in the Consultation Paper that the bandwidth of each frequency block in the 4.9 GHz band should be up to 50 MHz whereas the 3.3 GHz band should be divided into 10 frequency blocks, each with a bandwidth of 10 MHz.

## Views and Comments of the Respondents

19. There are different views among the respondents on the CA's proposal. HTCL generally supports the proposed band plans. SmarTone indicates no objection to the proposed band plan for the 3.3 GHz band, but considers it premature to provide a definitive view on matters related to the 4.9 GHz band and considers that more spectrum in the band should be made available. HKT shares the view that more spectrum in the 4.9 GHz band should be made available and proposes to conduct a single auction to assign the 3.3 GHz, 3.5 GHz and 4.9 GHz bands at the same time and to divide all

bands into blocks with a bandwidth of 50 MHz each. On the other hand, CMHK suggests that if more spectrum can be made available in the 4.9 GHz band, the frequency blocks in the 4.9 GHz band should be set to 40 MHz each and the MNOs should be allowed to shift their acquired frequency assignments to enable contiguous blocks. CMHK also proposes that the available spectrum in the 3.3 GHz band should be divided into four blocks of 20 MHz each and another two blocks of 10 MHz each to allow possible options of carrier bandwidths ranging from 10 to 100 MHz.

### Responses of the CA

20. According to the technical specification adopted by the 3rd Generation Partnership Project (“3GPP”)<sup>2</sup> for 5G equipment and devices, the minimum allowable channel bandwidths for the 3.3 GHz and 4.9 GHz bands are 10 MHz and 40 MHz respectively. The proposed band plans for the 3.3 GHz and 4.9 GHz bands are so designed to allow bidders to acquire the amount of spectrum they need through competitive bidding, having regard to the latest 5G technical specification on the carrier bandwidths supported. Given the different deployment characteristics of the 3.3 GHz and 4.9 GHz bands, auctions for these bands will be conducted using different auction formats with different set of rules. Hence, it is technically not feasible to conduct a single auction with different formats and rules prescribed for the two frequency bands.

#### *4.9 GHz band*

21. As mentioned in paragraph 8 above, spectrum adjacent to the 4.9 GHz band (i.e. 4.80 – 4.83 GHz and 4.94 – 4.99 GHz bands) is currently used by the Government. The CA will continue to explore the possibility of making available additional spectrum for allocation to mobile service as detailed in paragraph 8 above. With this in mind, the CA considers it advisable to adopt a forward looking approach in devising the band plan for the 4.9 GHz band on the assumption that the adjacent bands can be vacated for allocation to mobile service in future. In this regard, the CA decides to divide the available spectrum in the 4.9 GHz band into two blocks with a bandwidth of 40 MHz each. Two 10-MHz blocks (i.e. 4.83 – 4.84 GHz and 4.92 – 4.93 GHz) will be reserved and will be combined with the spectrum which may be made available in future for assignment at a later stage.

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<sup>2</sup> The 3GPP technical specification TS 38.104 entitled “NR; Base Station (BS) radio transmission and reception” specifies that the channel bandwidths in the 3.5 GHz band range from 10 MHz up to 100 MHz (see NR Band n77 and n78). The 3GPP technical specification TS 38.104 is available at: <https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3202>.

### *3.3 GHz band*

22. As regards the 3.3 GHz band, the CA's proposal of dividing the spectrum into 10 frequency blocks of 10 MHz each provides the maximum flexibility for bidders to acquire their desired number of blocks subject to their commercial decisions, which also achieves the purpose of providing different options of carrier bandwidths as mentioned by CMHK. Hence, the CA decides to divide the available spectrum in the 3.3 GHz band into 10 frequency blocks, each with a bandwidth of 10 MHz.

### **Spectrum Cap**

23. The CA proposed in the Consultation Paper that a bidder in the auction for the 3.3 GHz band can only acquire a maximum of 40 MHz of spectrum; while a bidder in the auction for the 4.9 GHz band can only acquire one frequency block. The proposal aims at preventing over-concentration of spectrum holding by any individual operator, having regard to the different deployment characteristics of the 3.3 GHz and 4.9 GHz bands.

### Views and Comments of the Respondents

24. CMHK and SmarTone agree with the proposed cap of 40 MHz for the 3.3 GHz band. CMHK suggests to allow successful bidders to share the spectrum and jointly build an indoor system to maximise the download speed. CMHK also agrees with the proposed cap for the 4.9 GHz band. HKT opposes the imposition of any spectrum cap on grounds that any arbitrary limitation is effectively preventing operators from achieving economies of scale. However, if a cap is imposed, HKT proposes to adopt an overall spectrum cap based on the total amount of spectrum acquired by a bidder in the combined 3.3 GHz, 3.5 GHz and 4.9 GHz bands due to the similarity in radio characteristics. The Hon Charles Mok also supports an overall spectrum cap on grounds that this can prevent an MNO from acquiring a large amount of 5G spectrum through multiple auctions.

### Responses of the CA

25. Having regard to the submissions received, the CA maintains the view that any over-concentration of spectrum may potentially pose competition risks and hence a spectrum cap is required. As regards the request to have a single cap for all the spectrum concerned rather than individual caps, given that the technical characteristics, the scope of use, and hence demand for the different frequency bands are different, it is not

appropriate to treat them in a homogeneous manner and apply a single overall spectrum cap. The CA therefore considers it appropriate to maintain its proposals to impose an individual spectrum cap for the 3.3 GHz and 4.9 GHz bands.

26. Regarding the comment of network sharing raised by CMHK, this is a matter for MNOs and any other relevant parties to agree among themselves, so long as such arrangement or agreements meet the relevant regulatory requirements.

### **Auction Format and Timing**

27. With a view to facilitating successful bidders to achieve better technical efficiency for use of spectrum in contiguous blocks, the CA proposed in the Consultation Paper to adopt the clock auction format for the 3.3 GHz band, followed by an assignment stage to determine the contiguous frequency blocks that may be assigned to bidders, and to adopt the simultaneous multiple-round ascending auction (“SMRA”) format for auctioning the frequency blocks in the 4.9 GHz band. Taking into account the time needed for enacting the relevant legislative amendments, the CA proposed in the Consultation Paper to conduct the auctions of spectrum in the 3.3 GHz and 4.9 GHz bands in around mid-2019.

### Views and Comments of the Respondents

28. CMHK considers that if an auction is conducted, it agrees to adopt the clock auction format for the 3.3 GHz band and the SMRA format for the 4.9 GHz band, and the bid price for the assignment stage of a clock auction should be treated as a compensation to the last bidder who will likely end up with the less preferable frequency blocks. HKT sees no reason why the SMRA format cannot be adopted for both the 3.3 GHz and 4.9 GHz bands and proposes to conduct one single SMRA auction for all 5G bands. CMHK, HTCL and SmarTone also consider that auctions for 5G bands should be held at the same time. They are of the view that a single auction or holding the auctions at the same time may allow bidders to have an overview of the availability and pricing of the spectrum for making informed decisions.

### Responses of the CA

29. Regarding CMHK’s comment on compensation under the clock auction format, the CA would like to point out that the frequency blocks in the 3.3 GHz band are homogenous in nature. This being the case, no frequency block should be considered as less preferable from a technical perspective, and

hence no issue of compensation should arise. As regards HKT's suggestion to adopt the SMRA auction format for the 3.3 GHz band, the CA would like to reiterate that the clock auction format is proposed to ensure that contiguous frequency blocks can be assigned to the successful bidders. The SMRA auction format, used by the CA in some previous auctions, will not be able to guarantee contiguous assignment of frequency blocks. Hence, the CA maintains its proposal to adopt the clock auction format for auctioning the frequency blocks in the 3.3 GHz band and the SMRA format for auctioning the frequency blocks in the 4.9 GHz band.

30. The CA notes that MNOs would like to have the auctions for the 3.3 GHz band, the 4.9 GHz band and the 3.5 GHz band to be conducted at about the same time. As illustrated in paragraph 20 above, there is a need to adopt different auction formats with different sets of rules for the spectrum in the 3.3 GHz, 3.5 GHz, and 4.9 GHz bands. It is therefore technically not feasible to conduct a single auction for all of these bands. Taking into account the concerns of MNOs, the CA would strive to adopt a well-knit timetable such that auctions for these three frequency bands will be conducted one by one consecutively. The CA's current plan is to arrange the auction for the 3.5 GHz band first in around July/August 2019, to be followed by the other two auctions for the 3.3 GHz and 4.9 GHz bands. Bidders would therefore be able to make informed decisions as to their bidding strategy and network rollout plans, and may adjust their bidding strategies taking into account the results of the preceding auctions. The CA will provide details of the auction rules in the terms and conditions of the auctions and the respective Information Memoranda, which will be issued nearer the time of the auctions.

## **LICENSING ARRANGEMENT**

### **Licensing and Validity Period**

31. The CA proposed in the Consultation Paper to issue a new unified carrier licence ("UCL") to each successful bidder. In line with the term of a UCL, spectrum in the 3.3 GHz and 4.9 GHz bands will be assigned for a validity period of 15 years for the provision of public mobile services. For incumbent licensees who successfully acquire spectrum in the proposed auctions, they may apply to the CA for combining their existing UCLs with the new UCL to be issued.

## Views and Comments of the Respondents

32. HKT comments that a longer period of spectrum assignment for at least 20 to 25 years should be granted in order to permit operators sufficient time to recoup their investment. Other respondents have no comments.

## Responses of the CA

33. The CA considers that a 15-year term of spectrum assignment for the provision of public mobile services has long been adopted in Hong Kong and is well accepted by the industry. The CA is of the view that the MNOs, including HKT, and other interested parties can make informed decisions in considering the amount of investment for the spectrum and the associated network rollout against the 15-year term of spectrum assignment. As the licensing arrangement concerned has been consistently followed in the past, and there is nothing in the present circumstances to justify a departure, the CA has no intention to alter the prevailing assignment term of 15 years for spectrum used for the provision of public mobile services.

## **Restriction on Frequency Swap**

34. It is stated in the Consultation Paper that in order to realise the full market value of each individual frequency block in the auctions, the CA proposed that swapping of any frequency assignment in the 3.3 GHz and 4.9 GHz bands within the first five years counting from the date of the frequency assignment will generally not be considered.

## Views and Comments of the Respondents

35. Only HKT responds to this proposal and considers that the restriction on frequency swap would prevent operators from combining spectrum blocks acquired from different auctions to achieve contiguous spectrum for minimising costs arising from carrier aggregation. HKT criticises that the CA is trying to maximise revenues from auctions by creating an artificial scarcity for spectrum at each auction by holding separate auctions at different times, and by barring operators from swapping their spectrum holdings.

## Responses of the CA

36. The CA considers it appropriate and reasonable to maintain the proposed restriction on spectrum swap requirements in order to ensure genuine competition and to realise the full market value of each individual

frequency block. Henceforth, the CA decides that swapping of any frequency assignment in the subject bands within the first five years from the date of the frequency assignment will generally not be considered. In any case, the supply of 5G spectrum remains unchanged no matter the spectrum is auctioned all together or one frequency band after another, and with or without restriction on spectrum swap in place. Hence, HKT's accusation of the CA attempting to create artificial scarcity and to maximising revenues by conducting separate auctions and barring spectrum swap is ungrounded.

### **Network and Service Rollout Obligations**

37. The CA proposed in the Consultation Paper that in order to prevent spectrum hoarding and to ensure that the auctioned spectrum will be put into efficient use for the timely provision of advanced telecommunications services for the benefit of the general public, each spectrum assignee for the 4.9 GHz band will be required to roll out its network and service in order to provide a minimum coverage of 50% of the population with regard to its mobile services within the first five years from the date of issue of the licence. As for the 3.3 GHz band, since it can only be deployed indoors, the CA considers it necessary to impose a different network and service rollout obligation for the successful bidders. Drawing reference from the average number of indoor base stations currently established by the incumbent MNOs, the CA proposed to require each successful bidder of the 3.3 GHz band to establish at least 500 indoor base stations operating at the band within the first five years from the date of issue of the licence. The CA also proposed to mandate each successful bidder to lodge a performance bond for safeguarding its compliance with the network and service rollout obligations.

### Views and Comments of the Respondents

38. For the 3.3 GHz band, CMHK and HTCL consider it acceptable to use the number of 5G small cells installed as the service rollout obligation. HKT considers that the target of 500 indoor radio base stations for the 3.3 GHz band is too high as compared with its current actual number of indoor base stations. HKT and SmarTone express that they often experience difficulty in obtaining agreement of site owners to install indoor cell sites and to co-ordinate common antenna systems among MNOs. For the 4.9 GHz band, CMHK considers that the minimum coverage should be set at 10% of population, taking into account a number of factors including the characteristics of the bands, the overall 5G coverage operating in both the 3.5 GHz and 4.9 GHz bands, and the initial deployment of 5G base stations which will be at hotspots rather than for providing wide area coverage.

39. HKT and SmarTone in general do not support the proposal to impose network and rollout obligations and performance bond given the keen competition in the market for the MNOs to roll out their 5G networks. HKT further proposes that the amount of performance bond should be low and should be returned to the operator in phases, say annually, to reflect the extent of the operators' achievement in meeting the ultimate target.

#### Responses of the CA

40. In order to prevent spectrum hoarding in the 3.3 GHz band and to ensure the efficient use of spectrum, the CA maintains its view that network and service rollout obligations, together with the performance bond requirement, should be imposed. The obligation for each successful bidder to establish at least 500 indoor radio base stations operating in the 3.3 GHz band within the first five years from the date of issue of the licence was proposed in the Consultation Paper with reference to the average number of indoor radio base stations so far established by an MNO. Taking into account the practical concerns from MNOs as described in paragraph 38 above, the CA accepts that such obligation may be lessened to enable a higher level of flexibility for the successful bidders in rolling out their networks and without materially compromising the extent of indoor service coverage to be provided with the use of the 3.3 GHz band. In this regard, the CA is prepared to suitably adjust the obligation by requiring each successful bidder of the 3.3 GHz band to establish at least 400 indoor radio base stations operating in the band.

41. As regards the 4.9 GHz band, it should be pointed out that the requirement of 50% of population coverage has in general been adopted as the minimum rollout requirement for a number of spectrum bands such as the 1.9 – 2.2 GHz, 2.3 GHz and 2.5/2.6 GHz bands assigned through auctions in the past. The CA does not agree with CMHK's comment that the characteristics of the 4.9 GHz band is so different as to warrant a much lower level of minimum coverage. Since the rollout requirement is for the purpose of avoiding spectrum hoarding, the CA maintains the view that the minimum coverage for the 4.9 GHz band should be set at 50% of the population.

42. The CA would like to reiterate that the amount of performance bond to be imposed on each successful bidder should be set at a sufficient level to safeguard the compliance with the rollout obligations. The CA will specify the details of the performance bond requirement when the respective Information Memoranda for the auctions of the 3.3 GHz and 4.9 GHz bands are issued.

## **SPECTRUM UTILISATION FEE**

### **Level of SUF and Method of Payment**

#### Views and Comments of the Respondents

43. CMHK and Smartone support SCED's proposal to provide licensees with the choice of paying the SUF by lump sum upfront or by annual instalments. CMHK does not agree with SCED's proposed increment of a pre-set fixed percentage every year for subsequent instalments after the first payment, and considers that the annual instalments should only mean that the SUF can be split equally into 15 annual instalments.

44. On the level of SUF, CMHK considers that setting a high auction reserve price will create hindrance to investors. HKT considers that SCED should take this opportunity to revamp the current SUF charging methodology and consider levying a fee which is linked to the service provided by the operator using the spectrum rather than the bandwidth itself (e.g. based on a percentage of the revenues collected by the operator through the services it sells using the spectrum). HKT further submits that if SCED chooses to adopt the current method of spectrum pricing by auction, the auction reserve price should not be set in accordance with current market prices and that room should be left for the bidding process to discover the true market price.

45. HTCL views that the SUF charging scheme for spectrum assigned administratively should be adopted for the setting of SUF for the 3.3 GHz and 4.9 GHz bands.

#### Responses of SCED

46. SCED notes the general support by MNOs for the choices provided for the payment method of SUF. While CMHK expresses disagreement on the proposed increment of a pre-set fixed percentage every year for subsequent instalments after the first payment, SCED maintains the view that such increment has the important function of reflecting the time value of money to the Government. Non-inclusion of such increment would essentially reduce the amount obtained by the Government in real terms. It is also common international practice to include increments for instalment arrangements.

47. The level of SUF will be determined by way of auction, which is the method which the CA decides to adopt for assignment of the spectrum

concerned. SCED notes the view that the reserve price for the spectrum should not be set a high level. SCED needs to emphasise that, as in many previous auctions, SCED has no intention to set the auction reserve price as a pre-estimate of an expected market price. SCED considers that the level should be set so that it would serve the purpose of kick-starting the competitive bidding process. A fine balance should also be achieved between ensuring the seriousness of bids and encouraging competition and participation in the auction exercise. SCED notes the substantial upfront investments required for MNOs and non-MNOs to roll out their 5G network infrastructure. SCED also acknowledges the uncertainty of market value of the 3.3 GHz and 4.9 GHz spectrum, as full potential of 5G services is still unclear. SCED will take all these into considerations when he specifies the auction reserve prices nearer the time of the auctions.

48. Regarding the proposed approach by HKT to determine SUF by charging from economic activity from the use of the spectrum (i.e. annual royalty payment that links the amount of SUF to revenues of the MNOs), not only is this not common international practice, the approach would also impose administrative costs on both the Government and the MNOs in implementing accounting separation to ensure that all relevant revenues are suitably apportioned in the calculation of royalty payments. OFCA and MNOs will need to discuss and agree on the segregation methodology for determining network turnover attributable to different frequency bands. Past experience indicates that this accounting separation and reporting processes are resource-consuming and difficult to implement for both OFCA and MNOs.

**Communications Authority  
Secretary for Commerce and Economic Development  
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