

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

**Arrangements for Assignment of the Spectrum in the
6/7 GHz Band for the Provision of Public Mobile Services
and the Related Spectrum Utilisation Fee**

1 March 2024

PURPOSE

This Statement promulgates the decision of the Communications Authority (“CA”) on the allocation of spectrum in the frequency range of 6425 – 7075 MHz to mobile service on a co-primary basis and the associated arrangements for assignment of a total of 400 MHz of spectrum in the frequency ranges of 6570 – 6770 MHz and 6925 – 7125 MHz (“6/7 GHz band”) for the provision of public mobile services including the fifth generation (“5G”) services. This Statement also announces the decision of the Secretary for Commerce and Economic Development (“SCED”) on the arrangements for the related spectrum utilisation fee (“SUF”).

EXECUTIVE SUMMARY

S1. The CA decides to amend the Hong Kong Table of Frequency Allocations to allocate the 6425 – 7075 MHz band to mobile service on a co-primary basis in addition to the existing allocations to fixed service (“FS”) and fixed satellite service (“FSS”) (Earth-to-space).

S2. The CA decides to adopt a market-based approach for assignment of a total of 400 MHz of spectrum in the 6/7 GHz band for the provision of public mobile services.

S3. The spectrum in the 6/7 GHz band will be divided into 20 frequency blocks with a bandwidth of 20 MHz each. A spectrum cap of 140 MHz (i.e. 7 x 20 MHz) will be imposed on each bidder when bidding for the 6/7 GHz band in the auction.

S4. The spectrum in the 6/7 GHz band will be put to auction under a clock auction format consisting of two bidding stages, namely, Quantity Stage and Assignment Stage. Bidders will bid for the number of frequency blocks they wish to acquire in the Quantity Stage, followed by the Assignment Stage to determine the contiguous frequency blocks that will be assigned to bidders. Subject to the connected bidder restriction, any interested parties, including incumbent mobile network operators (“MNOs”) and new entrants, can apply for participation in the auction. The CA targets to conduct the auction before the end of 2024, and will provide the details at an appropriate time before the auction.

S5. The CA targets to assign the spectrum in the 6/7 GHz band before the end of the first quarter of 2025 for a term of 15 years based on the principle of technology neutrality. Applications for the swapping of frequency assignments within the first three years of spectrum assignment will generally not be considered.

S6. Each successful bidder of the spectrum in the 6/7 GHz band will be required to provide a minimum coverage of 50% of the population within the first five years of the spectrum assignment and lodge a performance bond as a guarantee of its compliance with the network and service rollout obligations.

S7. The SUF of the spectrum in the 6/7 GHz band will be determined through auction, subject to a reserve price (for each frequency block) to be specified by SCED nearer the time of the auction. In terms of the method of payment, spectrum assignees will be given a choice to pay the SUF either by lump sum payment upfront or by annual instalments, with the first instalment equivalent to the lump sum payment divided by 15 and with subsequent instalments increased every year by 2.5% to reflect the time value of money.

INTRODUCTION

The spectrum in the 6/7 GHz band, being the largest block of the mid-band spectrum¹ that can be made available for mobile services, will enable the deployment of 5G networks and services with speeds and capacity vital to the future sustainable development of the digital economy and mobile broadband connectivity. The 3rd Generation Partnership Project (“3GPP”) introduced in June 2022 the 6425 – 7125 MHz band as one of the International Mobile Telecommunications (“IMT”) licensed bands for 5G New Radio (“NR”) (i.e.

¹ Mid-band spectrum for mobile services generally refers to the 1 – 7.125 GHz band.

band n104) to Release 17 of the 3GPP specifications. 3GPP has developed the specifications on radio frequency characteristics of this band for both network and user equipment, stipulating the technical standards for the industry to develop the relevant products. Besides, the Ministry of Industry and Information Technology (“MIIT”) announced in June 2023 that the whole or part of the 6425 – 7125 MHz band would be identified for IMT services in the Mainland with effect from 1 July 2023² to promote 5G and the future sixth generation (“6G”) mobile communications technology and industry innovation. In this regard, the CA updated the Spectrum Release Plan³ on 18 July 2023 to inform the industry of the potential supply of 415 MHz of spectrum in the frequency ranges of 6570 – 6770 MHz and 6910 – 7125 MHz for the provision of public mobile services.

2. The CA and SCED jointly issued a consultation paper on 18 July 2023 (“Consultation Paper”)⁴ to seek views and comments of the industry and other affected persons on the proposal to allocate the 6425 – 7075 MHz band to mobile service on a co-primary basis in addition to the existing allocations to FS and FSS (Earth-to-space), and the proposed arrangements for the assignment of a total of 400 MHz of spectrum in the 6/7 GHz band⁵, as well as the SUF payable for using the frequency spectrum concerned.

3. In the World Radiocommunication Conference held by the International Telecommunication Union (“ITU”) in Dubai, the United Arab Emirates, from 20 November to 15 December 2023 (“WRC-23”), the 6425 – 7125 MHz band has been identified for IMT in Region 1 (Europe and Africa) and some countries in Region 2 (Americas) and Region 3 (Asia and Oceania)⁶, while the 7025 – 7125 MHz band has been identified for IMT in Region 3 (“WRC-23 Decisions”).

² The announcement of MIIT (in Chinese only) is available at:
https://www.gov.cn/lianbo/bumen/202306/content_6888759.htm.

³ The updated SRP for 2023 – 2025 is available at:
https://www.ofca.gov.hk/filemanager/ofca/en/content_144/updated_spectrum_plan2023_en.pdf.

⁴ The Consultation Paper is available at:
https://www.coms-auth.hk/filemanager/en/content_711/cp20230718.pdf.

⁵ 15 MHz of spectrum in the frequency range of 6910 – 6925 MHz will be left over as reserve.

⁶ These countries are Brazil and Mexico in Region 2, and Cambodia, Laos and Maldives in Region 3.

4. Upon the close of the consultation, nine submissions were received⁷. Having carefully considered the above and the submissions received, the CA and SCED set out in this Statement their respective decisions on the arrangements for the allocation and assignment of the spectrum in the 6/7 GHz band and the related SUF. Salient views and comments of the respondents, as well as the responses of the CA and SCED, are summarised in **Annex A**.

LEGISLATIVE AND POLICY FRAMEWORK

5. 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 allocate and 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. Sections 32I(2) and 32I(4) of the TO empower SCED to prescribe the level of SUF or the method for determining the SUF.

6. 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 matters which appear to the CA 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).

7. The Radio Spectrum Policy Framework (“Spectrum Policy Framework”)⁸ promulgated by the Government in April 2007 sets out the policy objectives and guiding principles in spectrum management which the CA should take into account in discharging its spectrum management responsibilities under the TO. By a statement issued in April 2007, the former Telecommunications Authority (“TA”) explained that, in exercising his statutory powers under the TO,

⁷ Submissions to the Consultation Paper are available at: https://www.coms-auth.hk/en/policies_regulations/consultations/completed/tele_services/public_consultation_exercise_9_1/index.html.

⁸ The Spectrum Policy Framework is available at: <https://www.cedb.gov.hk/assets/resources/ccib/policies/spectrum.pdf>.

he would, in addition to all relevant considerations as required by law, give due regard to the Spectrum Policy Framework to the extent that there would be no inconsistency with the objectives and provisions of the TO⁹.

8. Pursuant to the Spectrum Policy Framework, the policy inclination is that a market-based approach will be used in spectrum management wherever the CA considers that there are likely to be competing demands for the spectrum from providers of non-Government services, unless there are overriding public policy reasons to do otherwise.

THE CA’S DECISION ON THE ALLOCATION OF THE 6425 – 7075 MHz BAND TO MOBILE SERVICE

9. To enable the use of the 6/7 GHz band for the provision of public mobile services, the CA proposed in the Consultation Paper to allocate the 6425 – 7075 MHz band to mobile service on a co-primary basis in addition to the existing allocations to FS and FSS (Earth-to-space). Having carefully considered the submissions received and taking into account the demand for the use of spectrum to provide public mobile services and the development of the use of the 6425 – 7125 MHz band for IMT, **the CA decides to amend the Hong Kong Table of Frequency Allocations by allocating the 6425 – 7075 MHz band to mobile service on a co-primary basis in addition to the existing allocations to FS and FSS (Earth-to-space) with effect from 1 January 2025.** The current and new frequency allocations of the 6425 – 7125 MHz band are shown in Figure 1 below.

Figure 1: Allocation of the 6425 – 7125 MHz band in Hong Kong

Current Frequency Allocation

FIXED FIXED-SATELLITE (Earth-to-space)	FIXED MOBILE
6425	7075
	7125 MHz

⁹ The former TA Statement on the Spectrum Policy Framework is available at: https://www.coms-auth.hk/filemanager/common/policies_regulations/ca_statements/ta20070424_en.pdf.

New Frequency Allocation

FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	FIXED MOBILE
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642570757125
MHz

10. Under the above arrangement, FS, FSS (Earth-to-space) and mobile service will be the primary services operating in the 6425 – 7075 MHz band, i.e. on a co-primary basis. To protect radio stations of co-primary FS, FSS (Earth-to-space) and mobile services operating in the 6425 – 7075 MHz band, any new radio station must refrain from causing harmful interference to, and will not be entitled to claim protection from harmful interference caused by, radio stations of other co-primary services already in existence. In gist, the radio stations of co-primary users will be protected on a first-come-first-served basis. The CA considers that such an arrangement would strike the right balance between the need to provide an appropriate level of protection to the relevant co-primary users, and the benefits of opening up the 6425 – 7075 MHz band for new services, thereby allowing fair access to the spectrum by the relevant co-primary users.

11. Having regard to the studies on sharing and compatibility between IMT and the incumbent services operating in the 6425 – 7125 MHz band, ITU has adopted a set of technical conditions¹⁰ in the WRC-23 with which IMT systems shall comply, with a view to protecting the incumbent services. The CA will give due consideration to the conditions set out by ITU in regulating the deployment of IMT stations operating in the 6/7 GHz band in Hong Kong, and continue monitoring the latest development of the 6425 – 7125 MHz band, including the relevant studies and recommendations of ITU on this matter.

THE CA’S DECISION ON THE ARRANGEMENTS FOR THE ASSIGNMENT OF THE SPECTRUM IN THE 6/7 GHz BAND

Demand for Spectrum in the 6/7 GHz Band

12. The CA has set out its assessment in the Consultation Paper that there would likely be competing demands for the spectrum in the 6/7 GHz band,

¹⁰ The relevant technical conditions are set out in Resolution COM4/7 entitled “Terrestrial component of International Mobile Telecommunications (IMT) within the frequency band 6425 – 7125 MHz” in the Provisional Final Acts of WRC-23 published by ITU, which is available at: https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.15-2023-PDF-E.pdf.

taking into account the scarcity and limited supply of spectrum in the mid-band spectrum which provides comparatively longer range propagation than other high-band spectrum above 7 GHz, and wider bandwidth than the lower-band spectrum below 1 GHz. Therefore, the mid-band spectrum is very suitable for supporting cost effective provision of mobile broadband services to meet both coverage and capacity demands. The CA notes that the respondents generally do not dispute the existence of competing demands for spectrum in the 6/7 GHz band, and some of them even urge the CA to release the entire 700 MHz of spectrum in the frequency range of 6425 – 7125 MHz for the provision of 5G mobile services, suggesting the anticipated need for greater supply of spectrum in the band.

13. The demand for mobile data connectivity has continued to grow rapidly in recent years owing to the growing use of mobile broadband services and applications. As at October 2023, local mobile subscriber penetration rate reached 314.0%, and the monthly mobile data usage reached 24.2 gigabytes per capita, an increase of 20.4% compared with 20.1 gigabytes in October 2022. The growth of mobile data usage is expected to continue in view of the ongoing development of new innovative broadband applications enabled by 5G services and beyond. Accordingly, notwithstanding that the proposed assignment of spectrum in the 6/7 GHz band would expand the overall supply of spectrum for use for mobile services, it is expected that the overall demands would exceed the supply and there are therefore likely to be competing demands for the spectrum concerned.

14. Having regard to the submissions received and taking into account the above considerations, **the CA maintains its view that there are likely to be competing demands for spectrum in the 6/7 GHz band when it is released to the market.**

Assignment of Spectrum by Auction

15. In accordance with the guiding principles in the Spectrum Policy Framework for the management of spectrum, and considering that there are likely to be competing demands from providers of non-Government services, the CA proposed in the Consultation Paper to adopt a market-based approach for the assignment of the spectrum in the 6/7 GHz band. The CA considers auction to be the most appropriate approach since it provides a fair, transparent, objective and economically efficient means to determine to whom the spectrum should be assigned. Auction is also commonly used by both the CA and many overseas administrations in the assignment of spectrum for providing public mobile services.

16. Whilst a number of respondents to the consultation support or do not object to the proposal of assigning spectrum in the 6/7 GHz band by way of auction, some incumbent MNOs suggest assigning spectrum in the 6/7 GHz band administratively as they consider that it will reduce their financial burden, help the industry to focus their efforts in enhancing the 5G networks and encourage them to develop innovative mobile services. Some incumbent MNOs further suggest that only incumbent MNOs should be eligible to participate in the spectrum assignment (whether it is to be conducted administratively or by way of an auction).

17. Since the 400 MHz of spectrum in the 6/7 GHz band to be assigned is newly identified for the provision of public mobile services, the issue of customer service continuity does not arise in this instance. On the other hand, assigning the new spectrum by a market-based approach, particularly an auction that is open to all interested parties (subject to minimal qualification requirements and the connected bidder restriction¹¹) will allow the spectrum to be assigned to those MNOs and new entrants (if any) which value it the most and therefore will be expected to put it to the most efficient use, including by improving the data speed and quality of services provided using the spectrum during the assignment term, thus promoting effective competition that will ultimately benefit customers. Assignment of spectrum by a market-based approach will also encourage investment and promote the introduction of innovative services, particularly as MNOs acquiring additional spectrum will be investing in their network infrastructure to enable them to deploy the new spectrum effectively. Furthermore, it is a misguided presumption that assigning spectrum in the 6/7 GHz band administratively will definitely reduce the financial burden of spectrum assignees. Given SUF should be levied for use of spectrum in the congested frequency bands, the proposed administrative assignment will not relieve the obligation of paying SUF by the prospective spectrum assignees. In fact, fixed links and satellite uplinks currently operating in the 6425 – 7100 MHz band are subject to payment of SUF as determined by SCED. The same will apply if the spectrum in the 6/7 GHz band were assigned for mobile service by an administrative means rather than via an auction.

¹¹ Spectrum auctions in Hong Kong are invariably subject to the connected bidder restriction that a bidder must not be a connected bidder in relation to another bidder. A company (“Company A”) is treated as a connected bidder with another company (“Company B”) if –

- (a) Company A holds a material interest (e.g. holding 25% or more of shares) in Company B;
- (b) Company B holds a material interest in Company A; or
- (c) a person holds a material interest in both Company A and Company B.

18. Having regard to the above considerations, the CA has not identified any overriding public policy reason not to adopt a full market-based approach, specifically an auction that is open to all interested parties (subject to minimal qualification requirements and the connected bidder restriction), for the assignment of the spectrum in the 6/7 GHz band. Further, confining participation in the auction to the incumbent MNOs only, as suggested by some of the respondents, will undermine the principle of the market-based approach under the Spectrum Policy Framework.

19. Based on the above considerations, **the CA maintains its view and decides to assign the spectrum in the 6/7 GHz band by way of auction and all interested parties, whether they are incumbent MNOs or new entrants, may apply for participation in the auction**, subject to the connected bidder restriction and the following minimal qualification requirements –

- (a) lodging with the Government a specified amount of deposit which may be forfeited if the bidder violates the auction rules or fails to take up the licence after winning the auction; and
- (b) demonstrating its capability to provide services in fulfilment of the licensing obligations to the satisfaction of the CA and submitting any other relevant supporting information which the CA may deem necessary.

Band Plan

20. Having considered that the minimum and maximum allowable channel bandwidth for 5G NR in the 6425 – 7125 MHz band adopted by 3GPP are 20 MHz and 100 MHz respectively¹², the CA proposed in the Consultation Paper to assign 400 MHz of spectrum (out of 415 MHz of spectrum in the frequency ranges of 6570 – 6770 MHz and 6910 – 7125 MHz) in the 6/7 GHz band for the provision of public mobile services, leaving the residual 15 MHz of spectrum in the frequency range of 6910 – 6925 MHz as reserve, and that a total of 400 MHz of spectrum in the 6/7 GHz band be divided into 20 frequency blocks, with a bandwidth of 20 MHz each. Five respondents suggest assigning the entire 700 MHz of spectrum in the 6425 – 7125 MHz band for the provision of mobile services to harmonise the assignment arrangement with the Mainland and argue that the proposed assignment of 400 MHz of spectrum of the 6/7 GHz

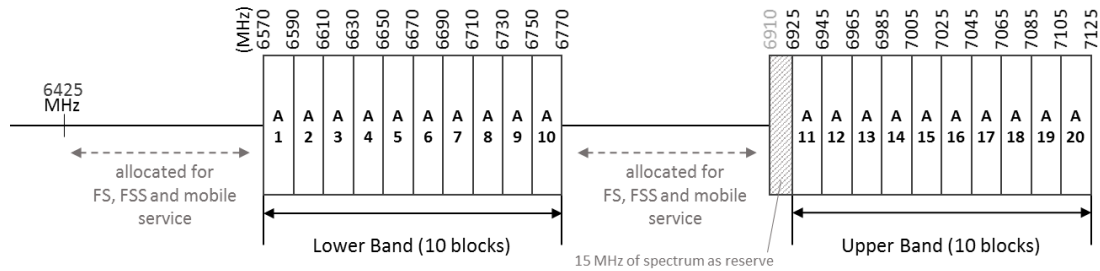
¹² According to the 3GPP technical specification TS 38.104, the allowable channel bandwidths for 5G NR in the 6425 – 7125 MHz band (band n104) are 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 70 MHz, 80 MHz, 90 MHz and 100 MHz.

band in two tranches, i.e. in the frequency ranges of 6570 – 6770 MHz and 6925 – 7125 MHz will lead to fragmentation. In regard to the proposal to divide the 6/7 GHz band into 20 frequency blocks with a bandwidth of 20 MHz each, two respondents say that they would agree with the proposal in the event that only 400 MHz of spectrum is made available for assignment, while other respondents do not opine on the block size.

21. To make spectrum available in the 6/7 GHz band for public mobile services and minimise the potential impact on the incumbent users in the 6425 – 7125 MHz band, the CA has arranged to relocate the concerned users of fixed links and outside broadcasting links operating in the frequency ranges of 6570 – 6770 MHz and 6910 – 7125 MHz to other frequency bands with a view to making available 400 MHz of spectrum for public mobile services. The CA considers that assignment of 400 MHz of spectrum in the 6/7 GHz band, rather than all the spectrum in the 6425 – 7125 MHz band, for public mobile services can strike a balance of the spectrum needs between the existing services (i.e. fixed links and satellite uplinks) and the prospective mobile services. The 400 MHz of spectrum will become a substantial input of public resources to support 5G development in the coming years. In this regard, **the CA maintains its view to assign a total of 400 MHz of spectrum in the 6/7 GHz band for the provision of public mobile services.**

22. On the band plan, the CA notes the main concern shared by the respondents regards the total amount of spectrum available for assignment rather than the block size (although a respondent has suggested that 50 MHz or 100 MHz would be the appropriate bandwidth if the entire 700 MHz would be made available for assignment). Indeed, as pointed out by one of the respondents, dividing the 6/7 GHz band into 20 frequency blocks with a bandwidth of 20 MHz each will provide the maximum flexibility for MNOs wishing to acquire spectrum in this band because the minimum allowable channel bandwidth within this frequency range for 5G NR technology is 20 MHz. The division of spectrum in such manner will allow MNOs to acquire a maximum channel bandwidth of 100 MHz by acquiring five contiguous blocks of 20 MHz, while at the same time affording high flexibility for bidders to acquire any other amount of spectrum based on their own business and technical consideration (subject to the proposed spectrum cap). On this basis, **the CA maintains its view and decides that the spectrum in the 6/7 GHz band will be divided into 20 frequency blocks with a bandwidth of 20 MHz each**, as depicted in [Figure 2](#) below.

Figure 2: Band Plan for the 6/7 GHz Band



Spectrum Cap

23. Having considered the overall spectrum holdings of the incumbent MNOs in various frequency bands (excluding spectrum in the 26/28 GHz bands¹³) as shown in Table 1 below, the CA proposed in the Consultation Paper to set a cap for each bidder at 140 MHz (i.e. 7 x 20 MHz) for the 6/7 GHz band, in order to prevent the over-concentration of spectrum in the low- and mid-frequency bands (below 7 GHz band) in the hands of any single spectrum assignee which may have the potential effect of restricting competition. One MNO opines that if the entire 700 MHz of spectrum is available for assignment, the proposed spectrum cap of 140 MHz could be raised for greater spectral efficiency, while another MNO considers that the CA should provide more clarification on how the proposed spectrum cap of 140 MHz was set.

¹³ Assessment on spectrum holdings by MNOs does not include spectrum assignments in the 26/28 GHz bands, as this millimetre-wave spectrum is of different radio propagation characteristics and serves different purposes as compared to the low- and mid-band frequencies in the provision of mobile services.

**Table 1: Distribution of spectrum below 7 GHz band (in MHz)
by MNOs as of 31 March 2024**

	700 MHz	850 MHz ¹	900 MHz ¹	1800 MHz	1.9 - 2.2 GHz	2.3 GHz ¹	2.5/ 2.6 GHz ²	3.3 GHz	3.5 GHz	4.9 GHz	Total	Share in Total
CMHK	20		10	40	19.6	30	40	20	60	80	319.6	28.7%
HKT	20		20	40	29.6		65	30	50	40	294.6	26.5%
SmarTone	10	25	10	40	39.6		20	20	50	40	254.6	22.9%
Hutchison	20		20	30	29.6	30	15	30	40		214.6	19.3%
VNET						30					30	2.7%
Total	70	25	60	150	118.4	90	140	100	200	160	1113.4	100%

Note: 1 Auction of 10 MHz of spectrum in the 850 MHz band, 10 MHz of spectrum in the 900 MHz band and 90 MHz in the 2.3 GHz band is expected to be held in 2024. Calculation of the above table is based on existing spectrum distribution in the 850 MHz, 900 MHz and 2.3 GHz bands.

2 Distribution of the spectrum in the 2.5/2.6 GHz band is based on assignment of 50 MHz of spectrum in May 2013 and re-assignment of another 90 MHz of spectrum to be effective in March 2024. In addition, it is assumed that the spectrum in the 2.5/2.6 GHz band of Genius Brand Limited is split 50:50 between HKT and Hutchison.

24. The CA has decided on the appropriate spectrum cap based on the overall supply and distribution of spectrum in the low- and mid-frequency bands (below 7 GHz band), all of which may be used for the provision of public mobile services. Having considered the overall relevant spectrum holdings of the incumbent MNOs in frequency bands below the 7 GHz band as summarised in Table 1 above, and the amount of spectrum available in the 6/7 GHz band, being the largest block of the mid-frequency bands that can be made available for mobile services, the CA considers that the proposed 140 MHz-cap, which will allow a successful bidder to acquire up to 35% of the total of the 400 MHz of spectrum in the 6/7 GHz band and ensure that the spectrum to be assigned will be in the hands of at least three assignees, will be appropriate in terms of preventing the undue concentration of spectrum in the hands of any single assignee. For instance, if the incumbent MNO currently holding the largest amount of spectrum acquires in total 140 MHz of spectrum in the 6/7 GHz band, its share of all the spectrum available for the provision of public mobile services will only increase slightly from 28.7% to 30.4%¹⁴, while the shares of spectrum

¹⁴ Calculations of spectrum holding shares by MNOs do not include spectrum assignments in the 26/28 GHz bands, as the millimetre-wave spectrum is of different radio propagation characteristics and serves different purposes as compared to the low- and mid-band frequencies in the provision of public mobile services.

holding of the other major MNOs will be in the range of 14.2% – 28.7%. The CA considers that, in the context of the competitive landscape of Hong Kong’s public mobile services market, particularly the high level of competition between incumbent MNOs and the current distribution of spectrum holdings between major MNOs, spectrum holdings at these levels are unlikely to prevent effective competition in the mobile telecommunications market. Therefore, **the CA decides to maintain its view to impose a spectrum cap of 140 MHz on each bidder for spectrum in the 6/7 GHz band.**

Auction Format and Timing

25. The CA proposed in the Consultation Paper to adopt the clock auction format in the auction for the assignment of the spectrum in the 6/7 GHz band, with a view to facilitating successful bidders to achieve higher spectral efficiency of the acquired spectrum in the 6/7 GHz band. Three MNOs are in general supportive or have no adverse comment on the proposal of the adoption of a clock auction format. In view of the support from the respondents, **the CA maintains its view and decides that the clock auction format will be adopted in the auction for the assignment of the spectrum in the 6/7 GHz band.**

26. Having considered the comments received, the CA decides that the clock auction will consist of two stages, namely, Quantity Stage and Assignment Stage. Under the Quantity Stage, bidders will bid for the number of frequency blocks they wish to acquire at the stipulated round price. Bidding will take place over a number of rounds, with the round price increasing in each round in which the demand from bidders exceeds the available supply, until the total demand for frequency blocks from all bidders is equal to or less than the total supply. Following completion of the Quantity Stage, there will be the Assignment Stage at which each of the successful bidders may place a one-round sealed bid to determine their priority for the assignment. To ensure the assignment of contiguous frequency blocks of bandwidth up to 100 MHz to each successful bidder as far as practicable, the Office of the Communications Authority (“OFCA”) will work out a Provisional Assignment Plan, based on a set of predefined general principles which will be published in the Information Memorandum to be issued for this spectrum auction, for comment by all successful bidders within a specified and reasonable time period. OFCA will at its sole and absolute discretion finalise the Assignment Plan taking into account the comments received. Alternatively, successful bidders may agree among themselves an Alternative Assignment Plan and make a joint submission with full justifications for consideration by OFCA. The detailed frequency

assignment arrangement to be adopted at the Assignment Stage is illustrated at **Annex B** for reference.

27. Four MNOs consider that the planned assignment date of the 6/7 GHz band in the first quarter of 2025 is premature due to the lack of ecosystem and available equipment in this band. The CA recognises the importance of keeping pace with the global trend, as well as to align with the Mainland's plan, in the use of the 6/7 GHz band to promote 5G and further develop 6G mobile communications technology and industry innovation. The introduction of 3GPP's specifications of the 6425 – 7125 MHz band in June 2022, coupled with the WRC-23 Decisions, have also enabled and accelerated the development of the network and user equipment in the 6/7 GHz band. An industrial organisation¹⁵ also highlights that 2 000 MHz of mid-band spectrum bandwidth would be needed in the 2025 – 2030 timeframe for the development of 5G and future generations of mobile technologies. Based on such a proposition, it calls for an additional supply of about 1 000 MHz of mid-band spectrum in Hong Kong during the said timeframe. Therefore, the CA considers the assignment of the 400 MHz of spectrum in the 6/7 GHz band (in addition to other mid-band spectrum which has been and will be assigned), sooner rather than later, before the end of the first quarter of 2025 to be an important step to ensure a timely assignment of spectrum to meet the growing demand for mid-band spectrum for development of 5G services and mobile technologies. Therefore, **the CA considers it appropriate to conduct the auction for the spectrum in the 6/7 GHz band before the end of 2024 and to assign the spectrum before the end of the first quarter of 2025**, and will provide details of the auction in the Information Memorandum to be issued nearer the time of the auction.

Licensing Arrangements

Licensing and Validity Period

28. Two respondents either support or have no adverse comment on the proposed validity period of 15 years for assignment of the spectrum in the 6/7 GHz band. One respondent suggests extending the assignment period to at least 20 to 25 years, thus allowing the spectrum assignees sufficient time to recover their investment cost.

¹⁵ See the submission to the Consultation Paper from the GSM Association which is available at: https://www.coms-auth.hk/filemanager/common/policies_regulations/consultations/submissions/20230830/20230830_05.pdf.

29. In line with the existing licensing regime for the provision of public mobile services, any new entrants or incumbent MNOs which have successfully bid for the spectrum in the 6/7 GHz band will each be granted a new Unified Carrier Licence (“UCL”) to effect the assignment of the acquired spectrum for the provision of public mobile services. The CA considers that a term of 15 years for the spectrum assignment, which is coterminous with the validity period of the UCL in accordance with Schedule 2 of the Telecommunications (Carrier Licences) Regulation (Cap. 106V) and has been consistently adopted by the CA previously for spectrum assignment or re-assignment exercises, provides certainty and predictability to facilitate the operators’ long term network resource planning. Accordingly, **the CA decides to maintain its view that the spectrum in the 6/7 GHz band will be assigned for a term of 15 years.**

Restriction on Frequency Swap

30. With regard to the proposal of restricting successful bidders from swapping their assigned frequency blocks within the first five years of the spectrum assignment, the majority of the MNOs do not object to the proposal, except for one MNO which disagrees as a matter of principle with the proposal, contending that the swapping of frequency assignments allows operators to achieve a more efficient use of their spectrum resources by combining spectrum blocks swapped with other operators to form contiguous frequency blocks thereby achieving higher spectral efficiency, and hence minimise costs arising from carrier aggregation.

31. The CA recognises the potential benefits of achieving higher spectral efficiency through frequency swapping between MNOs, but is at the same time mindful that allowing frequency swapping too early may disincentivise bidders from bidding competitively in the auction. Taking into account the comments received, the CA considers it reasonable to adjust the restriction period from five years to three years and that this will not undermine the principle of competitive bidding to realise the full market value of the spectrum. Therefore, **the CA decides that any swapping of frequency spectrum assigned in the 6/7 GHz band within the first three years of spectrum assignment will generally not be considered.**

Technology Neutrality

32. The CA proposed in the Consultation Paper to adopt a technology neutral approach whereby the spectrum assignees would be free to use whatever

technology they would choose based on widely recognised standards for service provision. Given that most respondents either support or have no adverse comment on the proposal, **the CA decides to maintain its position to adhere to this technology neutral approach in assigning and licensing the spectrum in the 6/7 GHz band**, unless there is any overriding reason warranting regulatory intervention (such as any electromagnetic compatibility issue with the use of spectrum by other assignees in the same and adjacent frequency bands). The CA further reiterates that the assignees should use the spectrum in accordance with the band plans given in paragraph 22 above for providing 5G or other generations of mobile services under their UCLs.

Network and Service Rollout Obligations

33. The CA proposed in the Consultation Paper that each successful bidder of the spectrum would be required to roll out its network and services with the use of the assigned spectrum to provide a minimum coverage of 50% of the population of Hong Kong within five years from the date of the spectrum assignment. Each successful bidder would also be required to lodge a performance bond for guaranteeing its compliance with the aforesaid network and service rollout obligations. Respondents' views are diverse. One MNO supports the proposed network and service rollout obligations which are the same requirements imposed for new mid-band spectrum such as 4.9 GHz band, while another MNO suggests that the rollout obligations should be revised to require assignees to establish at least 200 base stations with the use of the assigned spectrum given its view that the 6/7 GHz band will be mainly used for capacity enhancement and future services to be provided using this band will be limited to hotspots rather than territory-wide coverage. Similarly, other MNOs suggest that the rollout obligations might not be suitable or necessary for the spectrum in the 6/7 GHz band as it is better suited for densely populated areas or hotspots, and that the rollout obligations should be relaxed as there are uncertainties of the supply of network equipment in the 6/7 GHz band.

34. To ensure efficient use of the spectrum and prevent spectrum hoarding, the imposition of network and service rollout obligations on spectrum assignees together with the performance bond requirement have long been adopted for spectrum assignments in low, mid and high frequency bands. With this in mind, the CA considers there is no overriding reason to deviate from the current practices. In addition, given its radio frequency characteristics, the 6/7 GHz band can enable further development of 5G networks and services with coverage, speed and capacity. As such, the CA anticipates that the 6/7 GHz band will not only be deployed in indoor environments or hotspots, but will also be

suitable for the outdoor environments to provide full network coverage with speed and capacity enhancement. Regarding the supply of network equipment, as explained in paragraph 27 above, the CA notes that the introduction of 3GPP's specifications of the 6425 – 7125 MHz band in June 2022, together with the WRC-23 Decisions, have enabled and stimulated the development of both the network equipment and user devices for the 6/7 GHz band.

35. Based on the above considerations, **the CA decides to maintain its view that each successful bidder of the spectrum in the 6/7 GHz band will be required to provide a minimum coverage of 50% of the population of Hong Kong by using the spectrum assigned within the first five years from the date of spectrum assignment. Each successful bidder of spectrum in the 6/7 GHz band will also be required to lodge a performance bond for guaranteeing its compliance with the aforesaid network and service rollout obligations.** The CA will specify the details of the performance bond requirements in the Information Memorandum for the auction of the spectrum in the 6/7 GHz band to be issued in due course.

THE DECISION OF SCED ON THE RELATED SPECTRUM UTILISATION FEE

Level of SUF

36. 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 closely 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.

37. In paragraphs 12 – 14 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 available spectrum. The SUF would therefore naturally be determined through auction where the bidders would decide on the level of their bids based on clear information provided in respect of the spectrum to be assigned and their assessment of the corresponding business potential and opportunities. The outcome of the auction would reflect the full market value of the available spectrum. **Accordingly, SCED decides that the SUF of the available spectrum will be determined by auction in accordance with section 32I(2) of the TO, subject to a reserve price (for each frequency block) to be specified nearer the time of the auction.**

38. Given the objective to continue expanding 5G network coverage and capacity, as well as encourage growing investments in telecommunications infrastructure in Hong Kong, SCED does not intend to set the auction reserve prices at a high level which might discourage competition and bidders' interest 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 deter non-serious bidders. This coincides with the respondents' views received from the consultation that the auction reserve price should not be set at a high level.

Method of Payment

39. To allow for greater flexibility for spectrum assignees to make financial arrangements for the payment of SUF having regard to their individual circumstances, SCED proposed in the Consultation Paper that the spectrum assignees would be given a choice to pay the SUF either by lump sum payment upfront or annual instalments.

40. The majority of the respondents welcome the flexibility to choose between the said two payment options. SCED thus 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 auction; 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.

IMPLEMENTATION OF THE SPECTRUM ASSIGNMENT ARRANGEMENTS

41. The CA and SCED will make the necessary arrangements to enable the assignment of the spectrum in the 6/7 GHz band to proceed as per their respective decisions promulgated in this Statement. The CA will amend the

Hong Kong Table of Frequency Allocations and SCED will prepare for the making of subsidiary legislation under the TO to prescribe the methods for determining the SUF of the spectrum and the choices of methods of SUF payment. Subject to the completion of the legislative process, the CA targets to conduct the auction for the spectrum in the 6/7 GHz band before the end of 2024 and complete the associated assignment before the end of the first quarter of 2025.

42. 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 or the TO or its subsidiary legislations.

Communications Authority
Secretary for Commerce and Economic Development
1 March 2024

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

INTRODUCTION

On 18 July 2023, the Communications Authority (“CA”) and the Secretary for Commerce and Economic Development (“SCED”) jointly issued a consultation paper to seek views and comments of the industry and other affected persons on the proposed allocation of the 6425 – 7075 MHz band to mobile service on a co-primary basis in addition to the existing allocations to fixed service (“FS”) and fixed satellite service (“FSS”) (Earth-to-space), and the proposed arrangements for assignment of a total of 400 MHz of spectrum in the frequency ranges of 6570 – 6770 MHz and 6925 – 7125 MHz (“6/7 GHz band”), as well as the methods for setting the related spectrum utilisation fee (“SUF”) (“Consultation Paper”)¹.

2. At the close of the public consultation on 29 August 2023, submissions were received from the following nine respondents listed in alphabetical order² –

Mobile Network Operators (“MNOs”)

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

Satellite Operators

- (e) APT Satellite Company Limited (“APT”)
- (f) Asia Satellite Telecommunications Company Limited (“AsiaSat”)
- (g) Viasat / Inmarsat (“Viasat”)

¹ The Consultation Paper is available at: https://www.coms-auth.hk/filemanager/en/content_711/cp20230718.pdf and https://www.cedb.gov.hk/assets/resources/cedb/consultations-and-publications/cp20230718_e.pdf.

² Submissions to the Consultation Paper are available at: https://www.coms-auth.hk/en/policies_regulations/consultations/completed/tele_services/public_consultation_exercise_9_1/index.html.

Industry or Other Organisations

- (h) James Lung International Arts and Cultural Exchange Association (“James Lung”)
- (i) The GSM Association (“GSMA”)

3. The CA and SCED set out in this Annex their respective responses to the views and comments received in the public consultation. For the avoidance of doubt, the CA and SCED have taken into account and given thorough consideration to all the submissions which are relevant to the arrangements for assignment of the spectrum in the 6/7 GHz band for the provision of public mobile services and the related SUF, though, for practical reasons, not all of the issues raised are specifically mentioned or addressed herein. Please refer to 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), the Telecommunications Ordinance (Cap. 106) (“TO”) or any other relevant legislation.

PROPOSED AMENDMENTS TO THE HONG KONG TABLE OF FREQUENCY ALLOCATIONS FOR THE 6425 – 7075 MHz BAND

Question 1: Do you have any views on the proposed amendments to the Hong Kong Table of Frequency Allocations regarding the allocation of the 6425 – 7075 MHz band for mobile service with Fixed Service (“FS”) and Fixed Satellite Service (“FSS”) (Earth-to-space) on a co-primary basis?

Views and Comments of the Respondents

5. Six respondents (CMHK, HKT, Hutchison, SmarTone, James Lung and the GSMA) support the proposed allocation of the 6425 – 7075 MHz band to mobile service, whereas two respondents (AsiaSat and Viasat) suggest not to make the proposed allocation unless measures to ensure compatibility between International Mobile Telecommunications (“IMT”) services and FSS (Earth-to-space) have been agreed.

6. Two MNOs (CMHK and HKT) are concerned about the potential interference to IMT services if the allocation to mobile service is made on a co-primary basis with FS and FSS (Earth-to-space), and an MNO (CMHK) suggests that the entire 6425 – 7125 MHz band should be allocated to mobile service. AsiaSat suggests that IMT stations should operate on a non-protected basis in respect of transmitting earth stations or avoid using overlapping frequency in the vicinity of transmitting earth stations.

7. Three respondents (APT, AsiaSat and Viasat) propose measures for protection of satellite uplinks operating in the 6425 – 7075 MHz band from potential interference arising from IMT systems, such as imposing power limits on IMT stations, controlling airborne applications using IMT systems and protecting satellite links (including existing and new ones) established in the existing earth station sites.

Responses of the CA

8. To support the continued development of 5G services in Hong Kong, there is a need to make available additional radio spectrum. Among the potential sources of spectrum supply, the 6425 – 7125 MHz band is the largest block of the mid-band spectrum³ that can be made available for public mobile services, particularly suitable for the deployment of 5G networks and services with coverage, speeds and capacity. Since 2019, there have been discussions among economies around the world regarding the use of the spectrum in the 6425 – 7125 MHz band for IMT services. On 28 June 2023, the Ministry of Industry and Information Technology (“MIIT”) announced that the whole or part of the 6425 – 7125 MHz band would be identified for IMT in the Mainland with effect from 1 July 2023⁴. In the World Radiocommunication Conference held in Dubai, the United Arab Emirates from 20 November to 15 December 2023 (“WRC-23”), the 6425 – 7125 MHz band has been identified for IMT in Region 1 (Europe and Africa) and some countries in Region 2 (The Americas) and Region 3 (Asia and Oceania)⁵, while the 7025 – 7125 MHz band has been identified for IMT in Region 3 (“WRC-23 Decisions”). The CA considers that the proposal to make available additional spectrum in the 6425 – 7125 MHz band for the provision of public mobile services would be appropriate in the context of these developments.

³ Mid-band spectrum for public mobile services generally refers to the 1 – 7.125 GHz band.

⁴ The announcement of MIIT (in Chinese only) is available at: https://www.gov.cn/lianbo/bumen/202306/content_6888759.htm.

⁵ These countries are Brazil and Mexico in Region 2, and Cambodia, Laos and Maldives in Region 3.

9. Regarding the protection of radio stations of co-primary services, it has been an established practice in Hong Kong that a new radio station of a co-primary service must refrain from causing harmful interference to, and will not be entitled to claim protection from harmful interference caused by, radio stations of other co-primary services already in existence. In gist, the radio stations of co-primary users will be protected on a first-come-first-served basis. The CA considers that such an arrangement would strike the right balance between the need to provide an appropriate level of protection to the relevant co-primary users, and the benefits of opening up the 6425 – 7075 MHz band to the co-primary services.

10. The CA notes the concerns of the respondents about the compatibility between IMT services and FSS (Earth-to-space). The relevant working groups of the International Telecommunication Union (“ITU”) have conducted studies on the sharing and compatibility between IMT and the incumbent services operating in the 6425 – 7125 MHz band including FS and FSS (Earth-to-space) (“the Relevant Studies”). Having regard to the results of the Relevant Studies, ITU has adopted a set of conditions⁶ in the WRC-23 to ensure the coexistence and compatibility between IMT services and the incumbent services operating in the 6425 – 7125 MHz band. The CA will give due consideration to the conditions as set out by ITU in regulating the deployment of IMT stations operating in the 6/7 GHz band, with a view to protecting the FSS (Earth-to-space).

11. Having carefully considered the submissions received and taking into account the spectrum demand for 5G services, the CA decides to allocate the 6425 – 7075 MHz band to mobile service on a co-primary basis with FS and FSS (Earth-to-space), which complies with the frequency allocation for Region 3 (Asia and Oceania).

PROPOSED ARRANGEMENTS FOR THE ASSIGNMENT OF SPECTRUM IN THE 6/7 GHz BAND

Assignment of the Spectrum by Auction

⁶ The relevant conditions are set out in Resolution COM4/7 entitled “Terrestrial component of International Mobile Telecommunications (IMT) within the frequency band 6425 – 7125 MHz” in the Provisional Final Acts of WRC-23 published by ITU, which is available at: https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.15-2023-PDF-E.pdf.

Question 2: Do you have any views on assigning spectrum in the 6/7 GHz band by way of auction and allowing all interested parties, subject to minimal qualification requirements and the connected bidder restriction⁷, to apply for participation in the auction?

Views and Comments of the Respondents

12. Four respondents (HKT, Hutchison, James Lung and the GSMA) support or have no adverse comment on the CA's proposal of assigning the spectrum in the 6/7 GHz band by way of auction, while two MNOs (CMHK and SmarTone) suggest that the spectrum should be assigned administratively.

13. Hutchison agrees with the CA's proposal to allow all interested parties, subject to minimal qualification requirements and the connected bidder restriction, to apply for participation in the auction, while CMHK and HKT are of the view that only the incumbent MNOs should be eligible for the spectrum assignment.

Responses of the CA

14. The CA's assessment of whether there are likely to be competing demands for spectrum in the 6/7 GHz band is set out in paragraphs 12 – 14 of the Statement. The respondents generally do not disagree with the likelihood of competing demands for the spectrum to be assigned. In accordance with the guiding principle of spectrum management as set out in the Radio Spectrum Policy Framework ("Spectrum Policy Framework")⁸, where the CA considers that there are likely to be competing demands for the spectrum in question from providers of non-Government services, a market-based approach should be adopted for spectrum assignment unless there is any overriding public policy reason to do otherwise. As elaborated in paragraphs 17 – 18 of the Statement, the CA has not identified any public policy reason justifying deviation from adopting a market-based approach to assign the spectrum in the 6/7 GHz band. The CA considers the use of auction to be the most appropriate market-based approach as it provides a fair, transparent, objective and economically efficient means to determine the assignee who can make the best use of the spectrum, and values it most.

⁷ Spectrum auctions in Hong Kong are invariably subject to the connected bidder restriction that a bidder must not be a connected bidder in relation to another bidder. A company ("Company A") is treated as a connected bidder with another company ("Company B") if –
(a) Company A holds a material interest (e.g. holding 25% or more of shares) in Company B;
(b) Company B holds a material interest in Company A; or
(c) a person holds a material interest in both Company A and Company B.

⁸ The Spectrum Policy Framework is available at:
<https://www.cedb.gov.hk/assets/resources/ccib/policies/spectrum.pdf>.

15. Further, the CA finds no justification for restricting the eligibility for participation in the auction, so that only allowing incumbent MNOs to participate in the auction will undermine the benefits of a market-based approach. The CA therefore decides to maintain its proposal that all interested parties may apply for participation in the auction, subject to the connected bidder restriction, and their compliance with the minimal qualification requirements to register bidders' interest and demonstrate their capability to provide satisfactory services.

Band Plan

Question 3: Do you have any views on the proposal that 400 MHz of spectrum in the 6/7 GHz band be divided into 20 frequency blocks, with a bandwidth of 20 MHz each, for assignment?

Views and Comments of the Respondents

16. Five respondents (CMHK, Hutchison, HKT, SmarTone and the GSMA) propose assigning the entire 700 MHz of spectrum in the 6425 – 7125 MHz band to mobile service, considering that assigning the entire 700 MHz of spectrum will be aligned with the announcement by MIIT in June 2023 to identify the whole 700 MHz of spectrum in this band for IMT services, and assigning only 400 MHz of spectrum will lead to fragmentation of the band as a result of non-contiguous spectrum blocks being assigned and sub-optimal future spectrum assignment. Further, Hutchison recommends dividing the entire 700 MHz of spectrum into either 14 frequency blocks with a bandwidth of 50 MHz each, or seven frequency blocks with a bandwidth of 100 MHz each.

17. Hutchison supports the CA's proposed band plan in the event that only 400 MHz of spectrum is available in the 6/7 GHz band for assignment. HKT also supports the CA's proposal but adds that it would be feasible to divide the spectrum in the 6/7 GHz band into four frequency blocks with 100 MHz each.

Responses of the CA

18. At present, the 6425 – 7125 MHz band is primarily allocated for shared use by FSS (Earth-to-space) and FS including fixed links and outside broadcasting links in Hong Kong. In order to make available the 6/7 GHz band for public mobile services and minimise the potential impact on the incumbent users, the CA has arranged to relocate the concerned users of fixed links and outside broadcasting links operating in the 6570 – 6770 MHz and 6910 – 7125 MHz bands to other frequency bands with a view to making available

415 MHz of spectrum for public mobile services. The CA considers that 400 MHz of spectrum in the 6/7 GHz band⁹, rather than all the spectrum in the 6425 – 7125 MHz band, will strike a balance between the spectrum needs between the existing services (i.e. fixed links and satellite uplinks) and the prospective mobile services. The 400 MHz of spectrum will become a substantial input of public resources to support 5G development in the coming years. Nevertheless, the CA will keep monitoring the development of IMT services (including 5G services and beyond) and the utilisation of the remaining spectrum in the 6425 – 7125 MHz band before considering any plan for making available further spectrum in the band for public mobile services in Hong Kong. As explained in paragraph 21 of the Statement, the CA maintains its view to assign a total of 400 MHz of spectrum in the 6/7 GHz band for the provision of mobile services.

19. Regarding the CA’s proposal of dividing the spectrum in the 6/7 GHz band into 20 frequency blocks, each with a bandwidth of 20 MHz, the CA notes the main concern shared by most respondents regards the total amount of spectrum available for assignment, which we have addressed above, rather than the block size. As mentioned in paragraph 22 of the Statement, spectrum in the 6/7 GHz band will be divided into 20 frequency blocks, i.e. Blocks A1 – A10 (the “Lower Band”) and Blocks A11 – A20 (the “Upper Band”), each with a bandwidth of 20 MHz. Such a division of frequency blocks will enable MNOs to attain the maximum channel bandwidth of 100 MHz by acquiring five contiguous blocks of 20 MHz, while at the same time affording higher flexibility for bidders to acquire any other amount of spectrum based on their own business and technical considerations (subject to the spectrum cap).

Spectrum Cap

Question 4: Do you have any views on the proposed spectrum cap of 140 MHz to be imposed on each bidder in the auction of spectrum in the 6/7 GHz band?

Views and Comments of the Respondents

20. Hutchison opines that if the entire 700 MHz of spectrum is available for assignment, the proposed spectrum cap of 140 MHz could be raised to achieve higher spectral efficiency, while HKT considers that the CA should provide more clarification on setting the proposed spectrum cap at 140 MHz.

⁹ 15 MHz of spectrum in the frequency range of 6910 – 6925 MHz will be left over as reserve.

Responses of the CA

21. The CA is mindful to set a spectrum cap to prevent an undue concentration of spectrum in the hands of any individual MNO that may give rise to competition concerns in the mobile telecommunications markets. As elaborated in paragraph 23 of the Statement, having considered the overall supply and distribution of spectrum in the low- and mid-frequency bands (below 7 GHz band), all of which may be used for the provision of public mobile services, and the relevant spectrum holdings of the incumbent MNOs in frequency bands below the 7 GHz band, the CA considers it appropriate to impose a spectrum cap for each bidder at 140 MHz for the 6/7 GHz band.

Auction Format

Question 5: Do you have any views on the proposed format of the auction for the assignment of spectrum in the 6/7 GHz band?

Views and Comments of the Respondents

22. Three MNOs (HKT, Hutchison and SmarTone) support or have no adverse comment on the adoption of the clock auction format for the auction for the assignment of spectrum in the 6/7 GHz band. HKT suggests amending Principle 3 of the guiding principle stated in the Annex to the Consultation Paper such that a bidder with a higher bid price at the Assignment Stage should have a higher priority to be assigned with contiguous blocks. SmarTone proposes that a reasonable time period should be allowed for the successful bidders to comment on the Provisional Assignment Plan, or to agree among themselves an Alternative Assignment Plan to make a joint submission.

Response of the CA

23. The CA notes the support from the respondents on the proposed format of the auction for assignment of the spectrum in the 6/7 GHz band. The CA considers that the clock auction format remains suitable to ensure that contiguous frequency blocks of bandwidth up to 100 MHz in the 6/7 GHz band can be assigned to successful bidders as far as practicable with a view to facilitating them to achieve higher spectral efficiency of the acquired spectrum in this band.

24. As regards HKT's comments on the general principles, the CA clarifies that OFCA will adopt a set of pre-defined general principles to designate

the Provisional Assignment Plan for the contiguous blocks of bandwidth up to 100 MHz in either the Lower Band or Upper Band in the 6/7 GHz band to the successful bidders as far as practicable. Regarding HKT's comment on Principle 3, the CA notes that Principles 1 and 2 should have already addressed HKT's concern. Under Principles 1 and 2, up to 100 MHz of contiguous frequency blocks will be assigned first to the bidder with the highest Assignment Stage bid price, followed by the bidder with the second highest Assignment Stage bid price, and so on. Principle 3 will only apply in the specific circumstances where contiguous frequency blocks of over 100 MHz need to be assigned to relevant successful bidder(s) to ensure consistency with the objective of assigning contiguous blocks of up to 100 MHz to all bidders. The CA will publish the final texts of the general principles and worked examples in the Information Memorandum for this auction for reference by the industry.

25. The CA notes that it will take time for successful bidders to consider the Provisional Assignment Plan and make submissions, and is minded to give reasonable and adequate time for them on this frequency assignment arrangement. More details will be provided in the Information Memorandum, which will be issued nearer the time of the auction.

Time to Release the Spectrum

Views and Comments of the Respondents

26. Four MNOs (CMHK, HKT, Hutchison and SmarTone) consider the planned assignment date of the 6/7 GHz band in the first quarter of 2025 to be premature due to the lack of ecosystem and available equipment in this band. They suggest that the CA postpone the assignment date so that the CA could have more time to clear out spectrum in the 6/7 GHz band to make available the entire 700 MHz of spectrum for mobile service, and allow more time for the ecosystem in the band to develop.

Responses of the CA

27. The CA notes the suggestion of the MNOs regarding the postponement of the assignment to make available more time for the development of the ecosystem and equipment in the 6/7 GHz band. In this regard, the CA considers that the introduction of 3rd Generation Partnership Project ("3GPP")'s technical specifications¹⁰ on radio frequency characteristics of the

¹⁰ The 3GPP introduced in June 2022 the 6425 – 7125 MHz band as one of the IMT licensed bands for 5G New Radio (i.e. band n104) to Release 17 of the 3GPP specifications.

6425 – 7125 MHz band in June 2022, coupled with the WRC-23 Decisions, has enabled and accelerated the development of both network and user equipment in the 6/7 GHz band including their prototypes. Further, the Mainland and some other countries have prepared for or expressed interest and the intention to use the 6425 – 7125 MHz band for IMT. The CA recognises the importance of keeping pace with the world trend in the use of the 6/7 GHz band to promote 5G and the future 6G mobile communications technology and industry innovation. GSMA also highlights that 2 000 MHz of mid-band spectrum bandwidth (representing an average value per market globally) is needed in the 2025 – 2030 timeframe for the development of 5G and future generations of mobile technologies. Based on such a proposition, it calls for an additional supply of about 1 000 MHz of mid-band spectrum in Hong Kong during the said timeframe. Therefore, the CA considers the assignment of the 400 MHz of spectrum in the 6/7 GHz band (in addition to other mid-band spectrum which has been and will be assigned), sooner rather than later, before the end of the first quarter of 2025 to be an important step to ensuring a timely assignment of spectrum to meet the growing demand for mid-band spectrum for development of mobile services. The CA therefore maintains its view that while the auction is planned to be conducted before the end of 2024, the assignment date will be targeted sometime before the end of the first quarter of 2025. The assignment date is also in line with the planned relocation of the existing users of fixed links and outside broadcasting links operating in the 6/7 GHz band to other frequency bands by 31 December 2024.

LICENSING ARRANGEMENTS

Question 6: *Do you have any views on the proposed licensing arrangements as specified in paragraphs 26 to 31 of the Consultation Paper? Among others, do you have any views on the network and service rollout obligations proposed to be imposed on the successful bidders of spectrum in the 6/7 GHz band?*

Licensing and Validity Period

Views and Comments of the Respondents

28. Two MNOs (CMHK and Hutchison) generally support or have no adverse comment on the proposed validity period of 15 years for the assignment of the spectrum in the 6/7 GHz band. On the other hand, HKT proposes

prolonging the spectrum assignment terms to at least 20 to 25 years to allow the spectrum assignees sufficient time to recover their investment cost.

Responses of the CA

29. As elaborated in paragraph 29 of the Statement, the CA considers that a term of 15 years for the spectrum assignment, which is the period of time that has been consistently adopted by the CA for spectrum assignment or re-assignment exercises, provides certainty and predictability to facilitate operators' long term network resource planning. The CA therefore maintains its view that the spectrum in the 6/7 GHz band will be assigned for a term of 15 years.

Restriction on Frequency Swap

Views and Comments of the Respondents

30. CMHK, Hutchison and SmarTone have no objection to the CA's proposed restriction of frequency swapping within the first five years of spectrum assignment. On the other hand, HKT disagrees as a matter of principle with the proposal since frequency swapping allows operators to achieve more efficient use of their spectrum resources by combining spectrum blocks acquired from other operators to form contiguous frequency blocks thereby achieving higher spectral efficiency.

Responses of the CA

31. As elaborated in paragraph 31 of the Statement, while higher spectral efficiency may be achieved through frequency swapping, allowing frequency swapping too early after spectrum assignment could disincentivise bidders from bidding competitively in the spectrum auction. In determining the appropriate number of years following spectrum assignment within which frequency swapping is not allowed, the CA needs to strike a proper balance between facilitation of competitive bidding to reflect the full market value of each individual frequency block on the one hand and achievement of higher spectral efficiency on the other hand. Taking into account the comments received, the CA considers it appropriate and reasonable to shorten the restriction period of frequency swapping from five years to three years. In this regard, the CA decides that the swapping of any frequency assigned in the 6/7 GHz band within the first three years of the spectrum assignment will generally not be considered.

Technology Neutrality

Views and Comments of the Respondents

32. CMHK, HKT and Hutchison support or have no adverse comment on the CA's proposal to adopt a technology neutral approach whereby assignees are free to use whatever technology they choose based on widely recognised standards for service provision.

Responses of the CA

33. Given that respondents either support or have no adverse comment on the proposal, as elaborated in paragraph 32 of the Statement, the CA decides to maintain its position to adhere to this technology neutral approach in assigning and licensing the spectrum in the 6/7 GHz band, unless there is any overriding reason warranting regulatory intervention (such as any electromagnetic compatibility issue with the use of spectrum by other assignees in the same and adjacent frequency bands).

Network and Service Rollout Obligations

Views and Comments of the Respondents

34. HKT supports the proposed network and service rollout obligations to be imposed on successful bidders of spectrum in the 6/7 GHz band, which require the provision of a minimum coverage of 50% of the Hong Kong population within five years from the date of the spectrum assignment. These obligations are aligned with those of previous assignments of new mid-band spectrum such as the 4.9 GHz band. CMHK considers that the proposed rollout obligations should require establishment of at least 200 radio units, rather than a requirement based on population coverage, on the basis that the 6/7 GHz band will be mainly used for capacity enhancement and services to be provided using the 6/7 GHz band will be limited to hotspots rather than territory-wide coverage. Hutchison considers that the rollout obligations should be relaxed considering the uncertainties of the supply of network infrastructure and user equipment in the 6/7 GHz band. SmarTone is of the view that the rollout obligations might not be suitable as the 6/7 GHz band is better suited to meet demand for densely populated areas or hot spots.

Responses of the CA

35. To ensure efficient use of the spectrum and prevent spectrum hoarding in the 6/7 GHz band, the CA considers the imposition of network and service rollout obligations on the spectrum assignees to be necessary, noting also that this practice has been well established and accepted by the industry. As elaborated in paragraphs 34 – 35 of the Statement, the CA decides to maintain its view to require each successful bidder of the spectrum in the 6/7 GHz band to provide a minimum coverage of 50% of the population of Hong Kong by using the spectrum assigned within the first five years from the date of the spectrum assignment.

SPECTRUM UTILISATION FEE

Level of SUF and Method of Payment

Question 7: Do you have any views on the proposal in relation to the setting and collection of SUF as specified in paragraphs 32 to 34 of the Consultation Paper?

Views and Comments of the Respondents

36. The majority of the respondents support SCED's proposal that each spectrum assignee will be given a choice of paying the SUF by lump sum upfront or by annual instalments. Hutchison proposes that the spectrum assignees should be given the permission and flexibility to subsequently alter their chosen payment method upon having satisfied certain conditions set by SCED. HKT considers that the tax deductibility of SUF should be clearly specified in the Information Memorandum of the auction. CMHK considers that the spectrum concerned should be assigned administratively (instead of through an auction) and hence SUF is not applicable.

37. Regarding the level of SUF, the majority of the respondents consider that the reserve price (for each frequency block) should be set at a low or reasonable level.

Responses of SCED

38. SCED notes the support by the majority of the respondents for the choices provided for the payment method of SUF. In response to the proposed arrangement to allow alteration to the chosen payment method of the outstanding SUF during the assignment period, SCED sees the need to keep the payment

mechanism simple, and considers that the current options have already provided operators with sufficient flexibility in payment of SUF. The increment in the annual instalment payment will be set at 2.5%, which is in line with the latest lower medium range underlying inflation forecast.

39. As for the tax deductibility of SUF, the Government introduced the Inland Revenue (Amendment) (Tax Deductions for Spectrum Utilization Fees) Bill 2023 (the “Bill”) in December 2023 to implement the 2023-24 Budget initiative to provide for tax deductions for SUF to be paid by successful bidders in future spectrum auctions. Under the Bill, the SUF to be determined in future auctions is to be fully deductible from profits tax and the tax deduction will be spread over the spectrum assignment term. The proposal does not have retrospective effect, viz. SUF derived in all past auctions, whether they are already paid or to be paid, will not be affected and will remain non tax deductible. The Bill was passed in the Legislative Council on 10 January 2024. After gazettal, the Inland Revenue (Amendment) (Tax Deductions for Spectrum Utilization Fees) Ordinance 2024 took effect on 19 January 2024 to provide for tax deductions for SUF to be paid by successful bidders in future spectrum auctions, including the auction of the spectrum in the 6/7 GHz band to be conducted before the end of 2024.

40. 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 considers that the reserve price (for each frequency block) should be set at a level for kick-starting the competitive bidding process instead of a pre-estimated market price. A fine balance should also be achieved between ensuring the seriousness of bids and encouraging competition and participation in the auction exercise. When deciding the reserve prices nearer the time of the auction, SCED will take into account the prevailing global and local economic and investment environment, with a view to encouraging the telecommunications sector to continue investing in 5G infrastructure to promote Hong Kong as a smart city.

**Illustration of the Frequency Assignment Arrangement to be Adopted
at the Assignment Stage of the Clock Auction
for the Spectrum in the 6/7 GHz Band**

1. The purpose of the Assignment Stage is to determine the assignment of contiguous frequency blocks of bandwidth up to 100 MHz to each of the successful bidders in either the Lower Band or Upper Band in the 6/7 GHz band as far as practicable.
2. Each successful bidder will submit at the Assignment Stage a one-round sealed bid to determine its Assignment Priority.
3. The general principles to be adopted by OFCA to designate the Provisional Assignment Plan are as follows:
 - (a) Principle 1: Order of frequency block assignment is based on the bid prices at the Assignment Stage. The bidder with the highest Assignment Stage bid price will be assigned contiguous frequency blocks from Block A20 in the Upper Band first;
 - (b) Principle 2: Bidders will be assigned with contiguous frequency blocks with bandwidth up to 100 MHz as far as practicable; and
 - (c) Principle 3: If assignment of more than 100 MHz in either the Upper Band or Lower Band to any successful bidder is inevitable, bidder(s) with higher bid price(s) at the Assignment Stage will be afforded higher priority to be assigned with contiguous frequency blocks with bandwidth exceeding 100 MHz.

The aforementioned general principles are illustrated for reference only and subject to changes. The finalised set of principles will be published in the Information Memorandum to be issued for this spectrum auction.

4. Successful bidders are invited to comment on the Provisional Assignment Plan within the time period specified by OFCA. OFCA will at its sole and absolute discretion finalise the Assignment Plan taking into account the comments received. Alternatively, successful bidders may agree among themselves an Alternative Assignment Plan and make a joint submission with full justifications for consideration by OFCA.

5. Regarding the SUF payable by a successful bidder, the bidder with the highest bid price at the Assignment Stage needs to pay the sum of its bid prices placed at the Quantity Stage and the Assignment Stage. Other bidders are required to pay their bid prices placed at the Quantity Stage only irrespective of the amount of bid prices they placed at the Assignment Stage.

Communications Authority
Secretary for Commerce and Economic Development
1 March 2024