

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

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

30 March 2021

PURPOSE

This Statement promulgates the decision of the Communications Authority (“CA”) on the arrangements for allocation of spectrum in the 4.80–5.00 GHz band and assignment of an additional 80 MHz of spectrum (viz. 4.80 – 4.84 GHz and 4.92 – 4.96 GHz) in the 4.80 – 4.96 GHz band (“4.9 GHz band”) for the provision of public mobile services, including the fifth generation (“5G”) services, as well as 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 4.80 – 4.83 GHz band to mobile service on a co-primary basis in addition to fixed service, and the 4.99 – 5.00 GHz band to fixed service on a co-primary basis in addition to radio astronomy service.

S2. The CA decides to adopt a market-based approach for the assignment of the additional 80 MHz of spectrum in the 4.9 GHz band for the provision of public mobile services.

S3. The additional spectrum in the 4.9 GHz band will be configured as two frequency blocks with a bandwidth of 40 MHz each. A spectrum cap of 40 MHz will be imposed on each bidder in the auction when bidding for the additional spectrum in the 4.9 GHz band, i.e. each bidder will be eligible to bid for one of the two additional blocks.

S4. The additional spectrum in the 4.9 GHz band will be put to auction together with other available spectrum (namely spectrum in the 600 MHz, 700 MHz, 850 MHz, and 2.5/2.6 GHz bands) under a single auction in the simultaneous multiple round ascending (“SMRA”) format. All interested parties, including new entrants and existing assignees of spectrum in the 4.9 GHz band, may apply for participation in the auction for assignment of the additional spectrum in the 4.9 GHz band. The CA targets to conduct the auction in the fourth quarter of 2021, and will provide details of the auction nearer the time.

S5. The additional spectrum in the 4.9 GHz band will be assigned around end-2021 for a term of 15 years. Frequency swapping within the first five years of the spectrum assignment will generally not be considered.

S6. Within the first five years of spectrum assignment, each successful bidder of the additional spectrum in the 4.9 GHz band will be required to provide a minimum coverage of 50% of the population using the newly assigned spectrum. To guarantee compliance with the rollout obligations, each successful bidder will be required to lodge a performance bond (in the case of a new assignee of spectrum in the 4.9 GHz band) or provide an undertaking in lieu (in the case of an existing assignee of spectrum in the 4.9 GHz band).

S7. The SUF of the additional spectrum in the 4.9 GHz band will be determined through auction, subject to an auction reserve price to be specified 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% to reflect the time value of money to the Government.

INTRODUCTION

In accordance with the results of the auction conducted in October 2019, 80 MHz of spectrum in the 4.9 GHz band (viz. 4.84 – 4.92 GHz) was assigned to two mobile network operators (“MNOs”)¹ on 30 December 2019. As

¹ China Mobile Hong Kong Company Limited (“CMHK”) and Hong Kong Telecommunications (HKT) Limited (“HKT”).

part of an on-going effort to identify and release more spectrum for the provision of public mobile services including 5G services, the CA has recently vacated a further 50 MHz of spectrum within the 4.9 GHz band by relocating the original Government users to other frequency bands. Together with the 30 MHz of spectrum (viz. 4.83 – 4.84 GHz and 4.92 – 4.94 GHz) reserved in 2019, an additional 80 MHz of spectrum in the 4.9 GHz band (viz. 4.80 – 4.84 GHz and 4.92 – 4.96 GHz) would be available for the provision of high value-added mobile services such as 5G (see Figure 1 under paragraph 10 below).

2. Against the above background, the CA and SCED jointly issued a consultation paper on 22 July 2020 (“Consultation Paper”)² to seek views and comments of the industry and other affected persons on the proposals for the allocation of the 4.80 – 4.83 GHz band to mobile service on a co-primary basis in addition to fixed service as well as the 4.99 – 5.00 GHz band to fixed service on a co-primary basis in addition to radio astronomy service, the approach and licensing requirements for assignment of the additional 80 MHz of spectrum in the 4.9 GHz band for the provision of public mobile services, as well as the SUF payable for using the frequencies concerned.

3. Upon the close of the consultation, nine submissions were received³. Having carefully considered the views and comments received, the CA and SCED set out in this Statement their respective decisions on the arrangements for the allocation of spectrum in the 4.9 GHz band and the assignment of additional spectrum in the band for the provision of public mobile services as well as 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

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)

² The Consultation Paper is available at:
https://www.coms-auth.hk/filemanager/en/content_711/cp20200722.pdf.

³ Submissions to the consultation paper are available at:
https://www.coms-auth.hk/en/policies_regulations/consultations/completed/tele_services/index_id_2261.html.

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.

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 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).

6. The Radio Spectrum Policy Framework (“Spectrum Policy Framework”)⁴ 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 the TO. By a statement issued in April 2007, the former Telecommunications Authority (“TA”) explained 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 Spectrum Policy Framework to the extent that there would be no inconsistency with the objectives and provisions of the TO⁵.

7. 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.

⁴ The Spectrum Policy Framework is available at:
<https://www.cedb.gov.hk/assets/resources/ccib/policies/spectrum.pdf>.

⁵ The TA Statement on the Spectrum Policy Framework is available at:
https://www.coms-auth.hk/filemanager/common/policies_regulations/ca_statements/ta20070424_en.pdf.

THE CA'S DECISION ON THE AMENDMENT TO THE HONG KONG TABLE OF FREQUENCY ALLOCATIONS FOR THE 4.9 GHz BAND

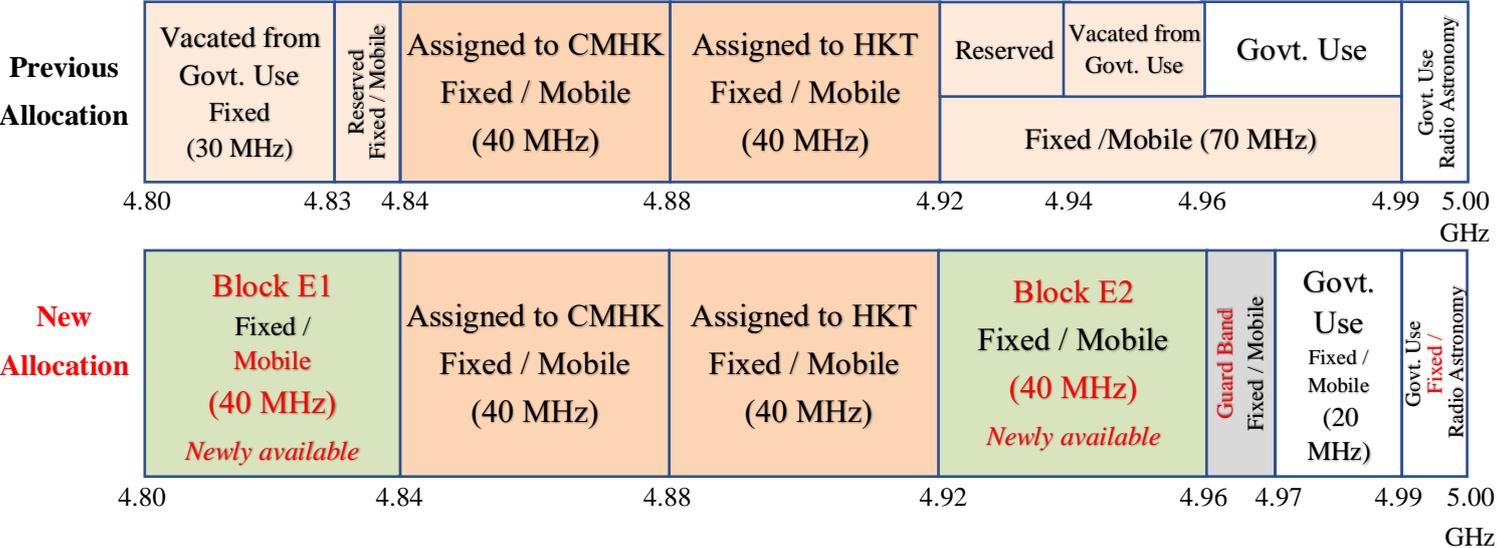
8. In April 2019, the Hong Kong Table of Frequency Allocations was updated to reflect the co-primary allocation of the 4.83 – 4.99 GHz band to mobile and fixed services. To prepare for the assignment of additional spectrum in the 4.9 GHz band for public mobile services, the CA proposed in the Consultation Paper to further amend the Hong Kong Table of Frequency Allocations to allocate the 4.80 – 4.83 GHz band to mobile service on a co-primary basis in addition to the existing allocation for fixed service and the 4.99 – 5.00 GHz band to fixed service on a co-primary basis in addition to the existing allocation for radio astronomy service. All respondents support the proposed amendment to the Hong Kong Table of Frequency Allocations to allocate the 4.80 – 4.83 GHz band to mobile service so that the spectrum will be released in a timely manner for the provision of public mobile services. Some respondents further request the CA to allocate more spectrum adjacent to the 4.9 GHz band, namely the frequency in the ranges of 4.4 – 4.8 GHz and 4.96 - 5.00 GHz, to mobile service.

9. At present, the 4.4 – 4.8 GHz band is allocated to fixed service on a primary basis and the 4.5 – 4.8 GHz band is additionally allocated to fixed-satellite service (space-to-Earth) (i.e. satellite downlink) on a co-primary basis, while the latter allocation is the same as that on the Mainland. To enable the use of the 4.4 – 4.8 GHz band for mobile services, it is necessary to ascertain the compatibility with satellite downlinks operating both within Hong Kong and the neighbouring areas of the Mainland for avoiding interference and the feasibility of relocating existing fixed links operating in the band. In addition, the compatibility of ultra-wide band devices currently operating in the 4.2 – 4.8 GHz band on an uncoordinated and unprotected basis with any mobile services operating in the 4.4 – 4.8 GHz band in future needs to be studied. The 4.96 – 5.00 GHz band is to be retained for government use⁶. While the CA notes the demand from the industry for more spectrum for the provision of advanced public mobile services including 5G services, it is considered appropriate to release the additional 80 MHz of spectrum available in the 4.80 – 4.84 GHz and 4.92 – 4.96 GHz bands to the market at this stage. The CA will continue to explore the potential supply of additional spectrum for mobile services including that in the 4.4 – 4.8 GHz band.

⁶ It should be noted that the Government services previously operating in the 4.94 – 4.99 GHz band had previously been relocated to the 4.97 – 5.00 GHz band, with the establishment of a guard band in the 4.96 - 4.97 GHz range.

10. With the above considerations, the CA decides to amend the Hong Kong Table of Frequency Allocations by allocating the 4.80 – 4.83 GHz band to mobile service on a co-primary basis in addition to fixed service, and the 4.99 – 5.00 GHz band to fixed service on a co-primary basis in addition to radio astronomy service. Together with the 30 MHz of spectrum reserved in 2019, two additional 40 MHz blocks can be formed for release to the market for public mobile use (i.e. Block E1 and Block E2 under New Allocation in Figure 1 below).

Figure 1: Allocation of the 4.9 GHz Band



THE CA’S DECISION ON ARRANGEMENTS FOR ASSIGNMENT OF ADDITIONAL SPECTRUM IN THE 4.9 GHz BAND

Demand for Additional Spectrum in the 4.9 GHz Band

11. The CA’s initial assessment in the Consultation Paper was that there would likely be competing demands for the additional 80 MHz of spectrum in the 4.9 GHz band, as MNOs which did not hold any spectrum in the band might take the opportunity to acquire the newly available spectrum, while incumbent assignees of the band might also have an incentive to acquire additional spectrum in the band to expand their network capacities in a cost-effective manner. This was in view of the good radio propagation characteristics of spectrum below 6 GHz for the provision of wide area coverage, and the capability of it for deployment at all indoor and outdoor locations in Hong Kong. 5G network equipment and user terminals

operating in this band were also expected to be increasingly available. As a matter of fact, the 80 MHz of spectrum assigned to two MNOs in December 2019 has already been deployed for the provision of 5G services.

12. The CA notes that respondents in general recognise the importance of the 4.9 GHz band for the provision of 5G services in Hong Kong as well as the technical advantages for deploying the band for 5G implementation. In fact, some of them urge the CA to release more spectrum adjacent to the 4.9 GHz band for the provision of public mobile services. There are also suggestions to limit the demand by offering a right of first refusal in relation to the newly available spectrum in the 4.9 GHz band to non-incumbent assignees of the band. All these responses indicate clear demand from the industry for the additional spectrum available in the 4.9 GHz band. As such, **the CA maintains its view that there are likely to be competing demands for the additional spectrum in the 4.9 GHz band.**

Assignment of Spectrum by Auction

13. In accordance with the guiding principle in the Spectrum Policy Framework for the management of spectrum for which there are likely to be competing demands, the CA proposed in the Consultation Paper to adopt a market-based approach for assignment of the additional spectrum in the 4.9 GHz band. Auction was considered 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. It is also commonly used by many overseas economies in the assignment of spectrum for providing public mobile services.

14. While the incumbent assignees of spectrum in the 4.9 GHz band do not object to the use of auction for assignment of the additional 80 MHz of spectrum in the band, the two non-incumbent MNOs propose that each of them should be offered a right of first refusal in relation to 40 MHz of the additional spectrum. The MNOs which currently do not hold any spectrum in the 4.9 GHz band would have an equal opportunity to bid in an auction for the additional 80 MHz of spectrum in the 4.9 GHz band and the new spectrum in other frequency bands (including the 600 MHz and 700 MHz bands) to be released by the CA this year. They can also refarm the existing spectrum they hold in various frequency bands for the provision of 5G services. Accordingly, the CA does not see any overriding public policy reason which would justify deviation from the

market-based approach in the assignment of the additional spectrum in the 4.9 GHz band and offering a right of first refusal to the non-incumbent MNOs to ensure assignment of the concerned spectrum to them. So doing will deprive incumbent assignees of their equal opportunity in acquiring additional spectrum to build additional network capacity using the 4.9 GHz band and it would not be conducive to the objective of promoting efficient use of the scarce spectrum resource.

15. Based on the above considerations, **the CA decides to assign the additional spectrum in the 4.9 GHz band by way of auction and all interested parties may apply for participation in the auction**, subject only to 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

16. The CA proposed in the Consultation Paper that the additional spectrum in the 4.9 GHz band should be released in the form of two 40 MHz blocks. All respondents support or indicate no adverse comments on the proposed band plan. Therefore, **the CA decides to maintain its view to divide the available additional spectrum in the 4.9 GHz band into two blocks with a bandwidth of 40 MHz each** (viz. 4.80 – 4.84 GHz and 4.92 – 4.96 GHz, depicted as Block E1 and Block E2 in the lower part of [Figure 1](#)).

Spectrum Cap

17. Having considered the overall spectrum holdings in various frequency bands of the incumbent MNOs, including the spectrum in the 3.3 GHz, 3.5 GHz and 4.9 GHz bands acquired by them from the auctions conducted in 2019, the CA proposed in the Consultation Paper that each bidder in the auction for the additional spectrum in the 4.9 GHz band can acquire a maximum of 40 MHz of spectrum. The

CA considers the setting of the spectrum cap to be necessary to prevent over-concentration of spectrum that may adversely affect the competitive supply of mobile services. There are diverse views in the submissions as to whether a spectrum cap should be imposed at all on the frequency band, or, if a cap is to be imposed, the appropriate level and whether it should be applied to the whole 4.9 GHz band (i.e. totalling 160 MHz of spectrum) or only to the additional 80 MHz of spectrum in the band.

18. Some respondents express concern about over-concentration of spectrum in the 4.9 GHz band as well as the 5G mid-bands (i.e. the 3.3 GHz, 3.5 GHz and 4.9 GHz bands), if the additional spectrum in the 4.9 GHz band is acquired by the incumbent assignees of the 4.9 GHz band. Nevertheless, in view of the growing support of network equipment and user devices for multiband and multimode operation, and the flexibility available to MNOs to refarm the spectrum they hold in various frequency bands for more advanced generations of mobile services, the CA considers that when assessing spectrum concentration it should have regard to the MNOs' holdings of spectrum in all the relevant frequency bands, including all the spectrum in the low-bands and mid-bands that could be deployed for the provision of public mobile services (including 5G services), as listed in the table at **Annex B**. In addition, apart from the additional spectrum in the 4.9 GHz band, the CA will release new spectrum in other frequency bands to the market which could be used for the provision of 5G services in both indoor and outdoor locations at the same time⁷. Accordingly, the CA sees no justifiable reason to apply the proposed spectrum cap across the whole 4.9 GHz band, which will effectively place the incumbent assignees in a passive position for acquiring additional spectrum in the band. In line with the approach adopted in past auctions, all interested parties should in general be given an equal opportunity to bid for the available spectrum.

19. The CA also notes that, even if the MNO which is an existing assignee of 40 MHz spectrum in the 4.9 GHz band and currently holds the largest amount of spectrum overall acquires another 40 MHz of the additional spectrum in the 4.9 GHz band, its share of all the spectrum available for the provision of public

⁷ Including 70 MHz of spectrum in the 700 MHz band and 15 MHz of spectrum in the 850 MHz band, which has better radio propagation capability than the mid-band spectrum and can be deployed in both indoor and outdoor locations. See the respective statements of the CA and SCED issued on the same day: https://www.coms-auth.hk/filemanager/statement/en/upload/558/600_700_mhz_statement.pdf and https://www.coms-auth.hk/filemanager/statement/en/upload/557/850_mhz_statement.pdf.

mobile services will only increase slightly from 30.5% to 32%⁸, while spectrum holdings of the other major MNOs will be in the range of 19% – 30%. Spectrum holdings at these levels are unlikely to adversely affect effective competition in the mobile telecommunications market. Therefore, having taken into account the views and comments received in response to the Consultation Paper, **the CA maintains its view to impose a spectrum cap of 40 MHz on each bidder in the auction of the 80 MHz of additional spectrum in the 4.9 GHz band, irrespective of whether or not it is an incumbent assignee of spectrum in the band.**

Auction Format and Timing

20. Since each bidder would be eligible to bid for only one block out of the two frequency blocks available in the 4.9 GHz band in the auction, the CA proposed in the Consultation Paper to adopt the SMRA format for the auction. All respondents support or indicate no adverse comments on adoption of the SMRA auction format. Taking into account also the submissions received in response to the proposed assignment and re-assignment arrangements for the other frequency bands which were the subject of public consultations around the same time as that of the additional spectrum in the 4.9 GHz band⁹ and the analysis set out in the respective statements issued on the same day¹⁰, **the CA decides that the additional spectrum in the 4.9 GHz band will be put to auction together with the available spectrum in other available bands (namely spectrum in the 600 MHz, 700 MHz, 850 MHz, and 2.5/2.6 GHz bands) under a single auction in the SMRA format.** Putting these bands in the same auction in the SMRA format will enable bidders to

⁸ Calculation of the percentage spectrum holdings of the MNOs does not include spectrum assignments in the 26 GHz and 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 for the provision of public mobile services.

⁹ Apart from consultation on the assignment of additional spectrum in the 4.9 GHz band, the CA and SCED also issued consultation papers on their proposals on the arrangements for assignment of spectrum in the 600 MHz and 700 MHz bands and re-assignment of spectrum in the 850 MHz band and the related SUF in August 2020, and on the arrangements for re-assignment of spectrum in the 2.5/2.6 GHz band and the related SUF in September 2020, which are available at:
https://www.coms-auth.hk/filemanager/en/content_711/cp20200819_1.pdf,
https://www.coms-auth.hk/filemanager/en/content_711/cp20200819_2.pdf and
https://www.coms-auth.hk/filemanager/en/content_711/cp20200923.pdf.

¹⁰ Statements on the arrangements for assignment of spectrum in the 600 MHz and 700 MHz bands, re-assignment of spectrum in the 850 MHz band and re-assignment of spectrum in the 2.5/2.6 GHz band and the related SUF are available at:
https://www.coms-auth.hk/filemanager/statement/en/upload/558/600_700_mhz_statement.pdf,
https://www.coms-auth.hk/filemanager/statement/en/upload/557/850_mhz_statement.pdf and
https://www.coms-auth.hk/filemanager/statement/en/upload/556/2_5_2_6_ghz_statement.pdf.

switch their bids between different frequency bands during the bidding process based on their business needs and taking into account the actual bidding situation for all the available frequency blocks, thus allowing maximum flexibility for bidders to devise their bidding strategy in a holistic manner. The CA targets to conduct the auction in the fourth quarter of 2021, and will provide details of the auction in the information memorandum to be issued nearer the time of the auction.

Licensing Arrangements

21. MNOs in their submissions to the consultation are in general supportive of the proposed licensing arrangements, except for the comments on the lodging of a performance bond for guaranteeing compliance with the proposed network and service rollout obligations which will be discussed in paragraphs 26 – 28 below.

Licensing and Validity Period

22. 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 additional spectrum in the 4.9 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. Schedule 2 of the Telecommunications (Carrier Licences) Regulation (Cap. 106V) requires UCLs to be issued for a term of 15 years from the day on which they are issued. The term of the frequency assignments will be for 15 years from around end-2021 and be coterminous with that of the newly issued licences, as has been consistently adopted for spectrum assigned for the provision of public mobile services in the past. For existing UCL holders which successfully acquire spectrum in the coming auction, they may apply to the CA to combine their existing UCLs with the new UCL to be issued.

Technology Neutrality

23. The additional spectrum in the 4.9 GHz band will be assigned based on the principle of technology neutrality. At any time during the term of the spectrum assignment, MNOs will be free to reform the spectrum concerned for more advanced uses in tandem with the developments in mobile technologies, provided that the technology adopted is of a widely recognised standard for service provision,

and subject to compliance with the licence conditions of the UCL to be granted for use of the spectrum.

Restriction on Frequency Swap

24. With regard to the proposed requirement restricting the successful bidders from swapping their assigned frequency blocks within the first five years of spectrum assignment, two respondents consider that permitting frequency swaps would allow MNOs to achieve contiguous frequency blocks and hence improve spectral efficiency.

25. The CA considers that the restriction on frequency swapping within the first five years of spectrum assignment strikes a balance between promoting competitive bidding to reflect the full market value of each individual frequency block on the one hand and facilitating efficient spectrum utilisation on the other. Further, given that only two blocks in the 4.9 GHz band will be available for bidding, the SMRA auction format should allow bidders to acquire the desired frequency block without difficulty. Therefore, **the CA decides to maintain its position that frequency swapping within the first five years of assignment of the additional spectrum in the 4.9 GHz band will generally not be considered.**

Network and Service Rollout Obligations

26. The CA proposed in the Consultation Paper that each successful bidder of the additional spectrum in the 4.9 GHz band would be required to roll out its network and services using the newly assigned spectrum to provide a minimum coverage of 50% of the population within the first five years from the date of spectrum assignment. Each successful bidder would be required to lodge a performance bond guaranteeing its compliance with the aforesaid network and service rollout obligations, unless the successful bidder is an existing assignee of the spectrum in the 4.9 GHz band in which case it will be offered an option to provide an undertaking in lieu of a performance bond.

27. While most of the respondents support or have no adverse comments on the network and service rollout obligation, there are diverse views on the offering of an option to an existing assignee of spectrum in the 4.9 GHz band to provide an undertaking in lieu of a performance bond. The CA would like to emphasize that in principle each successful bidder is required to lodge a

performance bond for guaranteeing its compliance with the network and service rollout obligations. The option of providing an undertaking in lieu of a performance bond by the existing assignees of spectrum in the 4.9 GHz band is acceptable because each of them has already lodged a performance bond to guarantee the rollout of a mobile network deploying the 4.9 GHz band assigned to it in December 2019. Given that from a technical angle, the same mobile network can readily be used to deploy any additional spectrum acquired in the same band, the CA considers that requiring an additional performance bond from an existing assignee to guarantee the deployment of additional spectrum in the band would not be necessary. It will help to do away with unnecessary compliance cost by the industry in general.

28. Based on the above considerations, **the CA maintains its view to require each successful bidder of the additional spectrum in the 4.9 GHz band to roll out its network and services using the assigned spectrum to provide a minimum coverage of 50% of the population within the first five years from the date of spectrum assignment. Each successful bidder should lodge a performance bond (in the case of new assignees of spectrum in the 4.9 GHz band) or provide an undertaking (in the case of existing assignees of spectrum in the 4.9 GHz band) guaranteeing its compliance with the aforesaid network and service rollout obligations.** The CA will specify the details of the performance bond and undertaking requirements when the information memorandum for the auction of the additional spectrum in the 4.9 GHz band is issued.

THE DECISION OF SCED ON THE RELATED SPECTRUM UTILISATION FEE

Level of SUF

29. 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.

30. In paragraphs 11 – 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 additional spectrum in the 4.9 GHz band. 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 additional spectrum in the 4.9 GHz band. SCED decides to prescribe that the SUF of the additional spectrum in the 4.9 GHz band will be determined by auction in accordance with section 32I(2) of the TO, subject to an auction reserve price to be specified nearer the time of the auction.

31. SCED has taken note of the prevailing global and local economic and investment environment, as well as the substantial investments required during the current early stage of 5G rollout. 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 the respondents' views received from the consultation that the auction reserve price should not be set at a high level.

Method of Payment

32. To allow for greater flexibility for spectrum assignees to make financial arrangement for the payment of SUF having regard to their individual circumstances, 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.

33. The majority of the respondents 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) 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%, the latest medium-range underlying inflation forecast, to reflect the time value of money to the Government.

IMPLEMENTATION OF THE SPECTRUM ASSIGNMENT ARRANGEMENTS

34. The CA and SCED will make the necessary arrangements to enable the assignment of the additional spectrum in the 4.9 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 additional spectrum in the 4.9 GHz band and complete the associated assignment in the fourth quarter of 2021.

35. 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
30 March 2021

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

INTRODUCTION

On 22 July 2020, the Communications Authority (“CA”) and the Secretary for Commerce and Economic Development (“SCED”) jointly issued a consultation paper, seeking views and comments of the industry and other affected persons on the proposals in relation to arrangements for assignment of additional 80 MHz of spectrum in the 4.80 – 4.96 GHz band (“4.9 GHz band”), configured as two 40 MHz blocks (viz. 4.80 – 4.84 GHz and 4.92 – 4.96 GHz), for the provision of public mobile services and the related spectrum utilisation fee (“SUF”) (“Consultation Paper”).

2. At the close of the public consultation on 1 September 2020, submissions were received from the following nine respondents listed in alphabetical order –

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”)

Other Commercial Firms or Industry Organisations

- (e) Comba Telecom Limited (“Comba”)
- (f) Ericsson Limited (“Ericsson”)
- (g) Qualcomm Incorporated (“Qualcomm”)
- (h) The GSMA
- (i) ZTE (H.K.) LIMITED (“ZTE”)

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 relevant issues raised in the submissions received, though not all of the issues raised may be 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 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 legislations.

PROPOSED AMENDMENT TO THE HONG KONG TABLE OF FREQUENCY ALLOCATIONS FOR THE 4.9 GHz BAND

Question 1: Do you have any views on the proposed amendment to the Hong Kong Table of Frequency Allocations as regards the allocation of the 4.80 – 4.83 GHz band to mobile service on a co-primary basis in addition to fixed service, and the 4.99 – 5.00 GHz band to fixed service on a co-primary basis in addition to radio astronomy service?

Views and Comments of the Respondents

5. All respondents support the proposed amendment to the Hong Kong Table of Frequency Allocations to allocate the 4.80 – 4.83 GHz band to mobile service on a co-primary basis in addition to the existing allocation for fixed service. CMHK, Hutchison and Comba either support or raise no objection to the proposed allocation of the 4.99 – 5.00 GHz band to fixed service on a co-primary basis in addition to radio astronomy service. HKT, SmarTone, Ericsson, GSMA and Qualcomm consider that the spectrum in the frequency ranges of 4.4 – 4.8 GHz and 4.96 – 5.00 GHz should also be released and allocated to mobile service.

Responses of the CA

6. The CA notes the support from the respondents on the proposed allocation of the 4.80 – 4.83 GHz band to mobile service on a co-primary basis in addition to the existing allocation for fixed service. In regard to the request to release more spectrum in the 4.4 – 4.8 GHz range to mobile services, as explained in

paragraph 9 of the Statement, it is necessary to look into the compatibility of mobile use with satellite downlinks operating both within Hong Kong and the neighbouring areas of the Mainland for avoiding interference. Furthermore, under the Class Licence for Short Range Device, ultra-wide band (“UWB”) devices are also allowed to operate in the 4.2 – 4.8 GHz band on an uncoordinated and unprotected basis at a low power level conforming to the requirements of the class licence. The compatibility between these UWB devices and mobile services would also need to be studied. The CA will continue to monitor the market demand and explore the feasibility of re-allocating part of the spectrum in the 4.4 – 4.8 GHz band for public mobile services in Hong Kong. Any re-allocation of the spectrum concerned will undergo a separate consultation with stakeholders in the future.

7. As regards the 4.96 – 5.00 GHz band, ITU has designated the 4.94 - 4.99 GHz band for Public Protection and Disaster Relief (“PPDR”) ¹ operations, and this band has long been used by Government users. In order to free up the 4.94 – 4.96 GHz band for public mobile services, some Government services previously operating in the 4.94 – 4.99 GHz band have been re-located to operate in the 4.97 – 5.00 GHz band (see Figure 1 under paragraph 10 of the Statement). The CA would like to highlight that, as stipulated in the Radio Spectrum Policy Framework (“Spectrum Policy Framework”) ² promulgated in April 2007, the CA has the responsibility to ensure that necessary spectrum is reserved for services to be provided by or on behalf of the Government. In order to strike a balance between the need for spectrum for Government services and for public mobile services, the 4.97 – 5.00 GHz band should be retained for government use with the establishment of a guard band in 4.96 – 4.97 GHz separating the two services to ensure electromagnetic compatibility.

8. Therefore, the CA maintains its view to allocate the 4.80 – 4.83 GHz band to mobile service on a co-primary basis in addition to fixed service and the 4.99 – 5.00 GHz band to fixed service on a co-primary basis in addition to radio astronomy service.

¹ With reference to ITU glossary, broadly speaking, PPDR concerns the maintenance of law and order in society and the dealing with serious disruptions in the functioning of society posing threat to human life, among others.

² The Spectrum Policy Framework is available at:
<https://www.cedb.gov.hk/assets/resources/ccib/policies/spectrum.pdf>.

PROPOSED ARRANGEMENTS FOR ASSIGNMENT OF ADDITIONAL SPECTRUM IN THE 4.9 GHz BAND

Assignment of Spectrum by Auction

Question 2: Do you have any views on assigning the additional spectrum in the 4.9 GHz band by way of auction and allowing all interested parties to apply for participation in the auction?

Views and Comments of the Respondents

9. CMHK and HKT do not object to the CA's proposal of assigning the additional spectrum in the 4.9 GHz band by way of auction and allowing all interested parties to apply for participation in the auction. GSMA supports in principle a market-driven spectrum assignment method based on thorough public consultation and stakeholder feedbacks.

10. Hutchison, SmarTone, Comba and ZTE propose that the CA should assign administratively 40 MHz of the additional spectrum in the 4.9 GHz band to each of the two MNOs which had not acquired any spectrum in the band from the auction conducted in October 2019. They consider that the two non-incumbent MNOs should be given a right of first refusal in relation to the additional spectrum. Hutchison and SmarTone add that it would be in public interest to do so since this would maintain a level playing field in the industry in terms of spectrum holdings by the four major MNOs, thereby promoting a competitive 5G market. SmarTone, Ericsson and Qualcomm opine that a minimum of 80 – 100 MHz of spectrum in the mid-frequency bands should be accessible by each MNO in order to unleash the full potential of 5G services in terms of speed, capacity and coverage.

Responses of the CA

11. Spectrum in the 4.9 GHz band has good radio propagation characteristics for providing wide area coverage and is suitable for deployment of 5G services. It can be deployed at all indoor and outdoor locations in Hong Kong, and the two incumbent assignees who acquired spectrum in the auction in October 2019 have already used the spectrum concerned for the provision of 5G services. The momentum of worldwide deployment of 5G networks using the 4.9 GHz band and supply of user devices for this band is growing. Hence, there are likely to be

competing demands for the additional spectrum in the 4.9 GHz band as indicated by the request for an administrative assignment to ensure that the non-incumbent assignees will be assigned the additional spectrum in the band and the request for supply of more spectrum in the 4.4 – 4.8 GHz and 4.96 – 5.00 GHz bands.

12. In accordance with the Spectrum Policy Framework, a market-based approach should be adopted for spectrum assignment wherever there are likely to be competing demands for the spectrum in question. The CA has not identified any overriding public policy reason which would justify deviation from the market-based approach in the assignment of the additional spectrum in the 4.9 GHz band. The CA is of the view that all interested parties should be given a fair and equal opportunity to participate in the auction of the additional spectrum available in the 4.9 GHz band as spectrum is a scarce public resource. It will ensure that the spectrum will be put into the hands of the operators which value it most and can be expected to put it to the most efficient use for the benefit of the public at large. The incumbent MNOs may decide whether or not to participate in a particular auction based on their commercial considerations taking into account their existing spectrum holdings. It is worth noting that when the first batch of spectrum in the 4.9 GHz band was put to auction in October 2019, all the four major MNOs submitted applications for participation in the auction but two of them subsequently elected to withdraw their applications.

13. As regards the opinion of some respondents that a minimum of 80 - 100 MHz of mid-band spectrum should be accessible by each MNO in order to unleash the full potential of 5G services, the CA is mindful that each of the four major MNOs has already been assigned 40 – 60 MHz of mid-band spectrum in the 3.5 GHz band which is suitable for provision of 5G services, and they will also be given an equal opportunity to bid for 40 MHz of the newly available spectrum in the 4.9 GHz band. Further, they may also refarm the 60 – 90 MHz of spectrum they currently hold in the 1.9 – 2.2 GHz, 2.3 GHz and 2.5/2.6 GHz bands for provision of 5G services, and the CA notes that some of the MNOs have already done so.

Band Plan

Question 3: Do you have any views on the proposal to divide the additional spectrum in the 4.9 GHz band into two 40 MHz blocks?

Views and Comments of the Respondents

14. All respondents either express no adverse comments or support the proposed band plan.

Responses of the CA

15. With the support from the respondents, the CA will divide the additional spectrum in the 4.9 GHz band into two frequency blocks with a bandwidth of 40 MHz each.

Spectrum Cap

Question 4: Do you have any views on the proposed spectrum cap of 40 MHz to be imposed on each bidder?

Views and Comments of the Respondents

16. CMHK has no adverse comments on the proposal. HKT does not in principle support the imposition of any spectrum cap unless there is a need to address a clearly identified competition concern. Hutchison, SmarTone and Comba propose to impose a spectrum cap of 40 MHz across the whole 4.9 GHz band (i.e. totalling 160 MHz of spectrum), taking into account the existing holdings of spectrum of incumbent assignees in this band, instead of just the additional 80 MHz of spectrum as proposed in the Consultation Paper. Hutchison and SmarTone are also concerned about over-concentration of spectrum holding in the 5G mid-band (i.e. including the 3.3 GHz, 3.5 GHz and 4.9 GHz bands) which is being used for the provision of 5G services. They also do not concur with the CA taking into account the combined spectrum holdings of MNOs in all the low and mid frequency bands together when considering whether there would be an over-concentration of spectrum in the hands of an MNO. They regard this as a deviation from the CA's previous position that it is not appropriate to have a single cap for all the spectrum concerned where the technical characteristics, scope of use and hence demand for different frequency bands are or may be different. SmarTone and Comba further point out that refarming of spectrum in other frequency bands so that it can be employed for the provision of 5G services would be subject to limitations and would risk adversely affecting performance of existing services. It is therefore not a relevant consideration.

Responses of the CA

17. The CA is mindful to set a spectrum cap to prevent over-concentration of spectrum in the hands of any individual MNO which could have the effect of restricting competition in the mobile telecommunications market. In setting a spectrum cap, the CA considers it appropriate to take a holistic view of the MNOs' overall spectrum holdings. This is in view of the growing support of network equipment and user devices for multiband and multimode operation, as well as the flexibility available to the MNOs to refarm their existing spectrum for deployment of 5G services under the policy of technology neutrality in spectrum assignment. In fact, refarming of spectrum has been commonly adopted by MNOs with proven success in tandem with the progress in mobile technologies and market developments. Some MNOs have already refarmed part of the spectrum in the 1.9 - 2.2 GHz band for the provision of 5G services. Besides, with the deployment of advanced mobile technologies like dynamic spectrum sharing, the same spectrum can be used in a flexible manner for support of different generations of mobile services.

18. The CA would also emphasize that more spectrum will be released to the market for the provision of 5G services and that this will coincide with the additional spectrum in the 4.9 GHz band becoming available in the market. It will include 70 MHz of spectrum in the 700 MHz band and 15 MHz of spectrum in the 850 MHz band³. This 85 MHz of low-band spectrum has better radio propagation capability than the mid-band spectrum and can be deployed in both indoor and outdoor locations to enhance the coverage of 5G services.

19. Having regard to the considerations above, the CA considers that a spectrum cap of 40 MHz on each bidder (be it an incumbent assignee of the band or a non-incumbent) in the auction of the additional 80 MHz of spectrum in the 4.9 GHz band strikes the right balance between preventing over-concentration of spectrum holding by any individual MNO on the one hand, and allowing all interested parties (including the incumbent assignees of the band) an equal opportunity to participate in the auction to acquire the spectrum they need to launch new services or increase network capacity as explained in paragraph 18 of the Statement. Accordingly, the CA maintains its view to impose a spectrum cap of 40 MHz for the additional spectrum in the 4.9 GHz band as proposed.

³ See paragraph 20 of the Statement.

Auction Format and Timing

Question 5: Do you have any views on adoption of the simultaneous multiple round ascending (“SMRA”) auction format for the assignment of the additional spectrum in the 4.9 GHz band?

Views and Comments of the Respondents

20. Most respondents either express no comment or agree with the adoption of SMRA format for the auction, whilst Comba considers that the SMRA auction format is appropriate only if the non-incumbent assignees of the 4.9 GHz band give up the right of first refusal for acquiring the spectrum.

Responses of the CA

21. The CA notes the general support of respondents to the SMRA auction format. As explained above, the CA considers that there is no overriding public policy reason that justifies giving non-incumbent assignees of the 4.9 GHz band priority to acquire the additional spectrum in the 4.9 GHz band. In addition, as elaborated in paragraph 20 of the Statement, the CA considers that the additional spectrum in the 4.9 GHz band could be put to auction together with the available spectrum in other available bands (namely spectrum in the 600 MHz, 700 MHz, 850 MHz, and 2.5/2.6 GHz bands) under a single auction in the SMRA format.

LICENSING ARRANGEMENTS

Network and Service Rollout Obligations

Question 6: Do you have any views on the network and service rollout obligations proposed to be imposed on the successful bidders of the additional spectrum in the 4.9 GHz band, and the associated performance bond (in the case of new assignees of spectrum in the 4.9 GHz band) or undertaking (in the case of existing assignees of spectrum in the 4.9 GHz band) proposed to be provided by successful bidders to secure compliance?

Views and Comments of the Respondents

22. ZTE considers the network and service rollout obligations proposed to be imposed on the successful bidders of the additional spectrum in the 4.9 GHz band to be a good way to help maximise utilisation of the band, while other respondents raise no particular comments on the proposal. In regard to the requirement to lodge a performance bond for guaranteeing compliance with the rollout obligations, GSMA considers that the amount should be better spent on network deployment. HKT in principle does not consider it necessary to provide a performance bond, but it supports the option of providing an undertaking, in lieu of a performance bond, in the case where the successful bidder is an existing assignee of the 4.9 GHz band. CMHK also welcomes the undertaking in lieu option available to an existing assignee of the 4.9 GHz band. On the other hand, Hutchison and SmarTone do not support the differential treatments in terms of performance bond requirements between the new and existing assignees of the 4.9 GHz band and are concerned that it would give an unfair advantage to the incumbent assignees.

Responses of the CA

23. The CA notes the respondents' support for the network and service rollout obligation. On the diverse responses to the performance bond requirement, as explained in paragraph 27 of this Statement, the provision of an undertaking in lieu of a performance bond is a special arrangement to do away with the unnecessary compliance cost. As a matter of fact, the CA did accept an alternative to a performance bond in the past to ensure that the network and service rollout obligations could be met by assignees of spectrum while minimising any unnecessary compliance costs for them. In the re-assignment of spectrum in the 900 MHz and 1800 MHz bands, if an incumbent assignee already held 50% or more of the spectrum in the block it successfully acquired from auction, it would be allowed to provide network coverage figures to demonstrate fulfillment of the minimum network coverage requirement in lieu of a performance bond. As for the details of the performance bond and undertaking requirements for assignees of the additional spectrum in the 4.9 GHz band, they will be specified in the information memorandum to be issued for the coming auction.

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 30 and 31 of the Consultation Paper?

Views and Comments of the Respondents

24. HKT and Hutchison support SCED's proposal to provide spectrum assignees with the option of paying the SUF by annual instalments. HKT proposes a reduction of the pre-set fixed percentage increments for instalments from the level currently being applied to the annual SUF instalment for spectrum in the 3.3 GHz, 3.5 GHz and 4.9 GHz bands.

25. On the level of SUF, HKT, SmarTone and Comba suggest setting the reserve price at a level not higher than that for the previous auction of the spectrum in the 4.9 GHz band. CMHK, Hutchison and GSMA propose to set the reserve price at a much lower level than that for the previous auction of the spectrum in the 4.9 GHz band in view of the current economic conditions caused by the COVID-19 pandemic.

Responses of SCED

26. SCED notes the general support by MNOs for the proposed choices of payment method for the SUF. In response to the proposed arrangement to pay off the outstanding SUF after the first assignment year under the option of making annual instalment payments, SCED sees the need to keep the payment mechanism simple, and considers that the current options have already provided operators flexibility in payment of SUF. Regarding the suggestion to reduce the pre-set fixed percentage increment applied to each SUF instalment, SCED responds that the increment has the function of reflecting the time value of money to the Government, such that the amount obtained by the Government would not be reduced in real terms. In line with the latest lower medium-range underlying inflation forecast, the increment has been reduced to 2%.

27. 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 auction reserve price 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 price nearer the time of the auction, SCED will take into account the prevailing global and local economic and investment environment, as well as the substantial investments required during the current early stage of 5G rollout.

Communications Authority
Secretary for Commerce and Economic Development
30 March 2021

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**Table 1: Distribution of spectrum below 6 GHz by major operators
as at 30 September 2021 (MHz)**

	850/ 900 MHz	900 MHz	1800 MHz [^]	1.9 - 2.2 GHz	2.3 GHz	2.5/ 2.6 GHz*	3.3 GHz	3.5 GHz	4.9 GHz	Total	Share in Total
CMHK		10	40	19.6	30	40	20	60	40	259.6	27.8%
HKT	15	20	40	29.6		60	30	50	40	284.6	30.5%
Hutchison	10	10	30	29.6	30	20	30	40		199.6	21.4%
SmarTone	10	10	40	39.6		20	20	50		189.6	20.3%
Total	35	50	150	118.4	60	140	100	200	80	933.4	100%

Notes:

- ([^]) Distribution of the spectrum in the 1800 MHz band is based on the arrangements for re-assignment of the spectrum to be effective on 30 September 2021.
- (*) Assuming that the 40 MHz of spectrum in the 2.5/2.6 GHz band held by Genius Brand Limited, a joint venture between HKT and Hutchison, is divided equally between HKT and Hutchison for calculation purpose.