



**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**

Response to Consultation Paper

1 September 2020



INTRODUCTION

1. Hong Kong Telecommunications (HKT) Limited (“**HKT**”) welcomes the opportunity to provide its comments in response to the proposals put forward by the Secretary for Commerce and Economic Development Bureau (“**SCED**”) and the Communications Authority (“**CA**”) in the Consultation Paper issued on 22 July 2020 regarding *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* (“**Consultation Paper**”).
2. The Consultation Paper concerns the detailed provisions for the release of further blocks of spectrum in the 4.9 GHz band for mobile services following the assignment of spectrum in the same band via auction in October 2019.

Key Messages

3. HKT is pleased to see more spectrum being released for the provision of 5G mobile services in Hong Kong. While 5G networks are still being rolled out across the territory, the demand for 5G mobile services is expected to increase significantly as more and more applications are identified. This requires a substantial amount of spectrum.
4. The 4.9 GHz band is an important 5G band for Hong Kong since, unlike other mid-band 5G spectrum currently in use (i.e. 3.3 GHz, 3.5 GHz), it can be used both indoors and outdoors without any geographical restrictions. That is why it is imperative for the CA to free up as much as possible of the 4.9 GHz band in order to allow for mobile use, even if this means relocating Government use spectrum.
5. The previous spectrum auction in the 4.9 GHz band took place during a time of civil disturbance in Hong Kong. While, thankfully, the spectrum assignment process was relatively unscathed by events, since then we have experienced continued social unrest and the onslaught of COVID-19, both of which have had an unprecedented damaging impact on the local economy so far, including the telecommunications sector,



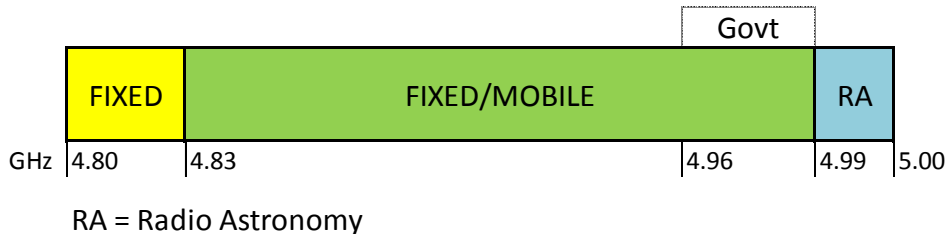
and is forecast to have a continuing impact in the next year. To a certain extent, this has adversely affected 5G network investment.

6. On this basis, HKT would like to take this opportunity to urge the CA and the SCED to identify ways of making any new 5G spectrum available to the mobile operators at a lower cost in order to assist the telecommunications industry through this financially trying period and so as not to severely curtail the development of 5G mobile services in Hong Kong.

7. HKT's responses to each of the specific questions raised in the Consultation Paper are outlined in the following sections.

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

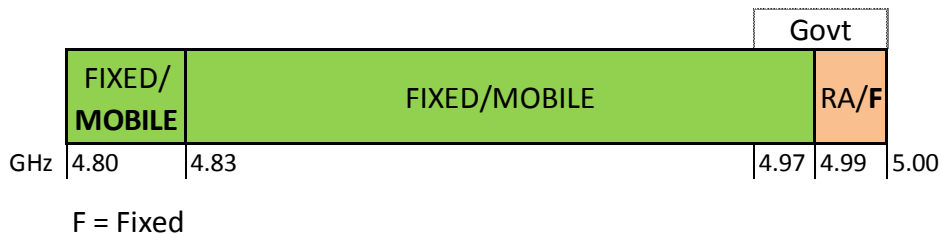
8. The existing Hong Kong Table of Frequency Allocations (“**Frequency Allocation Table**”)¹ shows the following allocations for the frequency range from 4.8 to 5.0 GHz:



Per the Frequency Allocation Table, the frequency block 4.96 – 4.99 GHz (30 MHz) is currently being utilized by the Government.

9. In order to release more spectrum for mobile services and to facilitate the relocation of spectrum bands currently being used for Government services, the CA proposes that the Frequency Allocation Table be amended as per the diagram below such that:

- (i) The 4.80 – 4.83 GHz band be allocated to fixed and mobile services on a co-primary basis; and
- (ii) The 4.99 – 5.00 GHz band be allocated to radio astronomy and fixed services on a co-primary basis.



In amending the Frequency Allocation Table as per above, the CA intends to relocate the 30 MHz spectrum currently being used by the Government in the 4.96 – 4.99 GHz range to the 4.97 – 5.00 GHz range,

¹ Per latest version published on OFCA’s website dated April 2020.

thereby retaining the Government's use of 30 MHz of spectrum in this frequency 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?*

10. As previously suggested by HKT², there is no reason why the entire 4.80 – 5.00 GHz band cannot be allocated for use by mobile services, albeit on a co-primary basis with other services. Permitting mobile use in the entire 4.80 – 5.00 GHz band would be consistent with the approach adopted in the Mainland and would pave the way for a contiguous band of 200 MHz of spectrum in the 4.9 GHz range to be available for the development of 5G mobile services in Hong Kong.³

11. Accordingly, while HKT agrees with the CA's proposal to extend allocation of the 4.80 – 4.83 GHz band to mobile services, it also sees no reason why mobile use cannot also be extended to include the 10 MHz of spectrum in the 4.99 – 5.00 GHz range. In fact, allowing mobile services in the entire 4.80 – 5.00 GHz would still be compliant with the global frequency allocation for Region 3 of the International Telecommunications Union.

² Refer to the submission by HKT on 26 September 2018 in response to the Consultation Paper on *Arrangements for Assignment of the Spectrum in the 3.3 GHz and 4.9 GHz Bands for the Provision of Public Mobile Services and the Related Spectrum Utilisation Fee*.

³ This point is expanded upon later on in response to Question 3.

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

Demand for Spectrum in the 4.9 GHz Band

12. In Hong Kong, 2 blocks of spectrum (40 MHz each) in the 4.9 GHz band were successfully auctioned off in October 2019⁴. With the proposed amendments to the Frequency Allocation Table and the relocation of the spectrum used by the Government to the 4.97 – 5.00 GHz band, this has now made available spectrum in the 4.80 – 4.84 GHz band (“**Block B3**”) and the 4.92 – 4.96 GHz band (“**Block B4**”), after allowing a 10 MHz guard band between the newly released spectrum and the spectrum used by the Government:

	Block B3 (New)	Block B1 (Assigned)	Block B2 (Assigned)	Block B4 (New)	Guard Band	Government Use	
GHz	4.80	4.84	4.88	4.92	4.96	4.97	5.00

13. With there being existing holders of spectrum in the 4.9 GHz band, the CA considers that there is incentive for these spectrum assignees to acquire more of the spectrum since the incremental equipment cost for deploying additional spectrum in this band would be minimal. In addition, the CA assumes that those operators who failed to bid for 4.9 GHz spectrum in the October 2019 auction may now take the opportunity to acquire some of the newly available spectrum. Accordingly, based on a few suppositions, the CA concludes that there are likely to be competing demands for the spectrum to be released in the 4.9 GHz band without seeking any concrete evidence of such.

14. The existence of competing demand for spectrum cannot be truly ascertained until operators fully understand the terms, conditions and pricing of the relevant spectrum and then react to these. In practical terms, this means the real demand for spectrum cannot be assessed until operators are presented with the details of the spectrum and are required to express their demand for the spectrum. Depending on the

⁴ The 2 blocks of spectrum were assigned by auction as follows: (i) 4.84 – 4.88 GHz (“**Block B1**”) to China Mobile Hong Kong Company Limited (“**CMHK**”); and (ii) 4.88 – 4.92 GHz (“**Block B2**”) to HKT.

amount of spectrum required by each operator and the amount of spectrum available, the CA should then have a more realistic idea as to whether competing demand exists.

15. Accordingly, HKT would suggest that, as a matter of general procedure, the CA undertake a more stringent assessment before concluding there to be competing demand for any spectrum blocks to be released. At the very least, the CA could invite the industry and other interested parties to express their interest in using the spectrum blocks in question, similar to the exercise conducted for the 26/28 GHz band in December 2017.

16. Nevertheless, for the purposes of this submission, HKT will adopt the CA's assumption that competing demand does exist for the spectrum.

Assignment of Spectrum by Auction

17. Given that the CA considers there to be competing demand for spectrum in the 4.9 GHz band, in accordance with the principles in the Radio Spectrum Policy Framework⁵, the CA proposes to adopt a market-based approach (i.e. auction) to assign newly released Blocks B3 and B4 as it does not consider there to be any public policy reasons to do otherwise. This approach would be in line with the auction arrangements that were previously adopted for Blocks B1 and B2 in the same band.

18. In consideration of the likely market demand and competition landscape, the CA also proposes that all interested parties, including existing assignees of spectrum in the 4.9 GHz band, be allowed to participate in the auction as long as they meet the minimal qualification requirements namely, the lodging of a specified deposit (which may be forfeited under certain conditions) and demonstrating technical and financial capability to provide services with the use of the spectrum under the licence.

⁵ Radio Spectrum Policy Framework promulgated by the Government in April 2007.

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?*

19. As the spectrum being made available is new spectrum and not a re-assignment of spectrum in existing use, given that the CA assumes competing demand for the spectrum, HKT does not object to the use of an auction to assign the spectrum. This would also be consistent with the manner in which the two blocks of spectrum in the same band (Blocks B1 and B2) were previously assigned.

20. Placing no restrictions on who may participate in the auction (as long as they satisfy the minimal requirements) would also be consistent with the application arrangements for the previous 4.9 GHz spectrum blocks and hence HKT has no objection. This would mean that even the two operators who were assigned spectrum from the October 2019 4.9 GHz band auction should not be barred from participating in the forthcoming auction for the new 4.9 GHz blocks.⁶

Band Plan

21. A total of 80 MHz of spectrum in the 4.9 GHz band will become available for release after allowing for Government use spectrum in the 4.97 – 5.00 GHz band and a guard band of 10 MHz in the 4.96 – 4.97 GHz range.

22. Given that the 5G equipment and devices technical specification adopted by the 3rd Generation Partnership Project allows for channel bandwidths in the 4.9 GHz band of 40 MHz, 50 MHz, 60 MHz, 80 MHz and 100 MHz, the CA proposes that the newly available spectrum of 80 MHz be split into 2 blocks (Blocks B3 and B4) of 40 MHz each as follows:

⁶ This would be fair given that, all operators had the opportunity to participate in the October 2019 auction and all 4 operators originally applied to participate in the auction, although two of them subsequently withdrew their applications voluntarily.



	40 MHz	40 MHz	40 MHz	40 MHz	40 MHz		
	Block B3 (New)	CMHK	HKT	Block B4 (New)	Guardband	Government Use	
GHz	4.80	4.84	4.88	4.92	4.96	4.97	5.00

23. This would enable effective deployment of the new spectrum by incumbent or non-incumbent assignees in the 4.9 GHz band and maximize overall efficient use of the spectrum.

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?*

24. Consistent with the block sizes adopted for the previous 4.9 GHz band spectrum auction in October 2019, HKT agrees with creating 2 more blocks of spectrum at 40 MHz each, located on either side of the 2 blocks of spectrum already assigned. This would facilitate the current spectrum assignees combining the blocks with their existing spectrum or new operators making use of the spectrum.

25. Spectrum in the 4.9 GHz band is prime spectrum for 5G mobile services. As has been suggested in paragraph 14 of the Consultation Paper, compared to spectrum in the 3.3 GHz and 3.5 GHz bands, the 4.9 GHz band has the advantage of being able to support the development of 5G mobile services at all indoor and outdoor locations in Hong Kong without any geographic restriction.

26. Accordingly, in recognition of the importance of the 4.9 GHz band to the mobile industry, the Government should critically assess its current utilization of spectrum in the 4.96 – 4.99 GHz range and seek to vacate the band by looking at alternative spectrum or means of service provisioning.

27. By doing so, this will enable a block of 40 MHz of spectrum to be created in the 4.96 – 5.00 GHz range which would be in addition to the 2 blocks of 40 MHz spectrum proposed to be created by the CA (Blocks B3 and B4). Given that the CA does not intend to conduct the spectrum auction until the fourth quarter of 2021, this additional block of spectrum could be offered at auction at the same time as Blocks B3 and

B4, thereby increasing the supply of much needed spectrum. At the same time, the proposed 10 MHz guard band in the 4.96 – 4.97 GHz range would not be needed and hence result in a more efficient utilization of the limited spectrum resources.

Spectrum Cap

28. The CA has considered the existing spectrum holdings of the incumbent mobile operators in the 4.9 GHz band as well as the frequency bands as a whole, and has concluded it sufficient to set a cap of 40 MHz per bidder for the newly available spectrum in order to prevent over-concentration of spectrum holding by any single mobile operator.

29. A cap of 40 MHz was also imposed in the previous October 2019 auction for 4.9 GHz band spectrum. Notably, this would allow the existing spectrum assignees in the 4.9 GHz band (CMHK and HKT) to acquire a further 40 MHz of spectrum in addition to their current holding of 40 MHz each.

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

30. As a matter of principle, HKT is against the imposition of any spectrum caps unless there is a need to address a clearly identified competition concern. Restricting the amount of spectrum that can be acquired by a single operator is effectively preventing that operator from achieving economies of scale in using the spectrum with its equipment. Indeed, in paragraph 15 of the Consultation Paper, the CA has clearly recognized that:

[...] the incremental equipment cost for deploying additional spectrum in the same frequency band would be minimal.

Hence, a cap can only be justified if the CA can demonstrate that, without the cap, there would be an anti-competitive outcome.

31. In paragraph 21 of the Consultation Paper, the CA justifies the imposition of a 40 MHz cap by explaining that with this cap, the



maximum holding of spectrum in the 4.9 GHz band by any one operator would be 80 MHz or 50% of the spectrum available in this band, and that this would not give rise to any competition concerns since the mobile operators have already been assigned hundreds of MHz of spectrum across the frequency bands, including spectrum which can be used for 5G mobile services, and any 2G/3G/4G spectrum can also be refarmed for 5G use.

32. Specifically, the CA suggests that even if the operator who currently holds the largest amount of spectrum (i.e. HKT) were to acquire another 40 MHz of spectrum in the 4.9 GHz band, that operator's share of the total spectrum available for mobile services would only increase slightly to 32% and that this would not have any impact on effective competition in the mobile market especially given that the CA intends to identify and release more spectrum for mobile use in the future.

33. However, the CA has not explained why it is necessary to impose any spectrum cap at all. There is no analysis or consideration of whether anti-competitive effects would result even if an operator already holding spectrum in the 4.9GHz band is permitted, and subsequently proceeds, to acquire all 80 MHz of the new spectrum being offered. Specifically, the CA has not carried out any evaluation to determine, nor has it indicated (based on a rigorous analysis of the market) what level of spectrum holding by a single mobile operator might raise competition concerns and what specifically these competition concerns are.

34. In the absence of such an analysis, it is difficult to see how any spectrum caps can be justified.

Auction Format

35. As there are only 2 frequency blocks being made available for auction, the CA intends to adopt the Simultaneous Multiple Round Ascending ("**SMRA**") auction format to assign the spectrum. Under this format, auction participants bid for specific blocks of spectrum at pre-set round prices. The industry is already familiar with the SMRA auction



format and the same format was adopted in the October 2019 auction for the 4.9 GHz band.

<p>Question 5: <i>Do you have any views on adoption of the SMRA auction format for the assignment of the additional spectrum in the 4.9 GHz band?</i></p>

36. The use of an SMRA auction format seems appropriate given that there are only 2 blocks of spectrum being offered for bidding and hence a simple, single stage auction in which both price is determined and frequency bands are assigned at the same time would make most sense. The use of this auction format would also be consistent with the previous 4.9 GHz spectrum auction.

LICENSING ARRANGEMENT

Licensing and Validity Period

37. As with previous spectrum assignments, the CA proposes to assign the spectrum in the 4.9 GHz band for a period of 15 years. Bidders who successfully acquire the spectrum at auction will be granted a new Unified Carrier Licence (“UCL”) which will be coterminous with the 15 year spectrum assignment period. Incumbent licensees may apply to the CA to combine their existing UCL with the new licence.

38. In principle, HKT supports longer spectrum assignment/licence terms in order to allow operators sufficient time to recoup their investment (i.e. price paid for the spectrum as well as the network rollout costs). Accordingly, an assignment/licence term of at least 20 to 25 years would make more commercial sense. Indeed, across the globe, some major markets have already moved towards longer licence terms, unlimited licence terms and an expectation of renewal, so Hong Kong appears to be lagging behind in this area.

39. Nevertheless, in the interests of consistency with the basis on which the previous blocks of 4.9 GHz spectrum have been assigned (Blocks B1 and B2), HKT does not object to the adoption of a 15 year spectrum assignment/licence term for the new blocks to be released in the 4.9 GHz band.

Restriction on Frequency Swap

40. The CA proposes to prohibit the swapping of frequency blocks in the 4.9 GHz band during the initial 5 years after the spectrum is assigned. This is intended to allow the full market value of the spectrum to be realized at auction.

41. As a matter of principle, HKT disagrees with the imposition of any ban on spectrum swapping. Spectrum swapping allows operators to make the most efficient use of their spectrum resources by combining spectrum blocks acquired from other operators in order to achieve



contiguous frequency bands and hence minimize costs arising from carrier aggregation.

42. By only permitting spectrum swapping after the initial 5 years, this increases operators' costs compared to allowing spectrum swapping right from the very start. In fact, it is difficult to see the rationale behind the CA imposing such a restriction other than to maximize the revenues derived from the spectrum auction.

43. However, in order to avoid any discrimination against the operators who were assigned Blocks B1 and B2 in the same band (who are not permitted to swap their assigned spectrum during the first 5 years of assignment), HKT is prepared to accept the same restriction being applied to the new spectrum blocks to be assigned in the 4.9 GHz band.

Technology Neutrality

44. As per (almost all of) the previous spectrum assignments, the CA intends to impose no requirements on the technology that can be used with the spectrum as long as it is based on widely recognized standards and does not cause any harmful interference to other legitimate services.

45. HKT supports this approach. In fact, HKT considers that any technology restrictions that are currently being applied to any of the spectrum assigned to the mobile operators should be abolished immediately.

Network and Service Rollout Obligations

46. In line with past spectrum assignments, the CA proposes that successful bidders of the 4.9 GHz band spectrum be required to roll out their network and services with the use of the frequency band to provide a minimum coverage of 50% of the population within the first 5 years of the date the spectrum is assigned.

47. This is intended to prevent spectrum hoarding and ensure that the spectrum is put to timely use for the provision of mobile services for the benefit of the general public.

48. Normally, the network and service rollout obligation is backed up by a performance bond to be submitted to the CA by the spectrum assignee. However, since performance bonds have already been submitted by the 2 operators who were previously awarded spectrum in the 4.9 GHz band (i.e. the current holders of Blocks B1 and B2), and the same network can be readily used for any newly acquired 4.9 GHz spectrum, the CA is prepared to allow these 2 operators to provide an “undertaking” instead of a network/service rollout performance bond for the newly acquired 4.9 GHz spectrum should they be successful in securing additional 4.9 GHz spectrum at the auction.

<p>Question 6:</p>	<p><i>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 ensure compliance?</i></p>
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49. Generally speaking, given the competitive conditions in the Hong Kong mobile market, operators who have been successfully assigned spectrum would be keen to roll out their network and service as quickly as possible, so there is little incentive for operators to hoard spectrum or delay provisioning service. Accordingly, as a matter of principle, HKT does not consider it necessary to require spectrum assignees to provide a performance bond to guarantee network and service rollout.

50. Nevertheless, if the CA considers a performance bond a necessary prerequisite for assignment of the spectrum then, in the interests of consistency, this should be on the same terms, conditions and amount as the performance bond that was imposed on the operators who were previously assigned with Blocks B1 and B2 in the same frequency band.



51. HKT notes that no details are supplied as to the “undertaking” that is required to be provided in lieu of a performance bond by existing holders of spectrum in the 4.9 GHz band. This is a new option that has never been offered by the CA before. Accordingly, HKT is unable to provide any substantive comments on the undertaking.

52. However, if the objective of the undertaking is to relieve the licensee from providing a further financial commitment in order to ensure that its required network and service rollout milestones are achieved, then HKT would be in favour of such an approach for operators who have already provided performance bonds for significant sums in respect of spectrum blocks in the same frequency band.

SPECTRUM UTILISATION FEE (“SUF”)

53. While the exact level of the SUF will be determined by auction, the initial reserve price to kick start the bidding is to be set by the SCED.

54. As per the recent spectrum auctions, the SCED proposes to allow spectrum assignees to pay their SUF either in one lump sum upfront (which is the SUF amount determined at auction), or in 15 annual instalments, with the first instalment being the SUF determined at auction divided by 15, and each subsequent instalment being calculated as the previous year’s instalment increased by a fixed percentage (to reflect the time value of money to the Government).

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 above?*

55. HKT, along with the other mobile operators in the industry, have all along urged the SCED to set minimal reserve prices for spectrum auctions, as the reserve price is merely intended to be an opening price to kick start the bidding process. The reserve price should allow ample room for the bidding process to discover the true market price for the spectrum and hence should not be set with reference to any assumed current market price for the spectrum. Setting the reserve price at too high a level will simply hinder the bidding process.

56. In the previous 4.9 GHz band spectrum auction held in October 2019, as well as the spectrum auctions for the 3.3 GHz band (November 2019) and the 3.5 GHz band (October 2019), HKT is pleased to note that the SCED heeded the call of the industry and set minimal reserve prices for each of the auctions.⁷

57. Accordingly, HKT would once again urge the SCED to set a minimal reserve price for the 4.9 GHz band spectrum auction, particularly given the impact on operators’ cash flow caused by the ongoing impact of COVID-19 on the local economy. Since the reserve price for the 4.9 GHz

⁷ The auction reserve prices previously set were as follows: (i) 4.9 GHz band at \$3m per MHz; (ii) 3.3 GHz band at \$2m per MHz; and (iii) 3.5 GHz band at \$4m per MHz.



band auction in October 2019 was set at \$3m per MHz, it would be rational for the SCED to set the opening price for the forthcoming 4.9 GHz band auction at no higher than that used in the previous auction.

58. To further ease the pressure on operators' cash flow, HKT supports the option to allow SUF payments to be made by instalment instead of in one lump sum upfront. This would be consistent with the approach taken in recent spectrum auctions. Nevertheless, in view of the decreasing cost of funds, the SCED could consider reducing the pre-set fixed percentage which is currently being applied to uplift each annual SUF instalment.

Submitted by
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