Hutchison Telephone Company Limited

Proposed Allocation of the 26 GHz and 28 GHz Bands to Mobile Service and the Associated Arrangements for Spectrum Assignment and Spectrum Utilisation Fee

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I. Introduction

1. Hutchison Telephone Company Limited ("**Hutchison**") makes this submission in response to the Consultation Paper entitled "Proposed Allocation of the 26 GHz and 28 GHz Bands to Mobile Service and the Associated Arrangements for Spectrum Assignment and Spectrum Utilisation Fee" (the "**Consultation Paper**") jointly issued by the Communications Authority (the "**CA**") and the Secretary for Commerce and Economic Development (the "**SCED**") on 26 July 2018 .

2. Hutchison welcomes the CA's proposal to make available the spectrum in the 26 GHz band (24.25 GHz - 27.56 GHz) and 28 GHz band (27.5 GHz - 28.35 GHz) (collectively referred to as the "**26/ 28 GHz Band**") for the provision of 5G mobile services in Hong Kong. However, we are very concerned about the assignment arrangement of the shared spectrum.

3. Part II of this submission contains our answers to the specific questions raised in the Consultation Paper.

II. Response to the Specific Questions in the Consultation Paper

Question 1:	What are your views on the proposed allocation of the 26/28 GHz bands to mobile service and of the sub-band of 24.25 – 24.45 GHz to fixed service, both on a primary basis? What are your views on the protection of radio stations of co-primary users on a first-come-first-served basis?

4. We welcome the proposal to allocate the 26/28 GHz Band to mobile service and the sub-band of 24.25 – 24.45 GHz to fixed service, both on a primary basis.

5. However, on the protection of radio stations of co-primary users on a first-come-first-served basis, we would like to seek clarifications from the CA. It is briefly explained in the Consultation Paper that "A new base station of a co-primary service must refrain from causing harmful interference to, and will not be entitled to protection from harmful interference caused by, stations of other co-primary users already in existence".[1] However, it is unclear as to what it is meant by "already in existence". Would the "existence" be judged by the time of filing application with or grant of right by the CA, by installation of telecommunications or satellite equipment, or by the actual usage of the spectrum? A clear definition and guideline are called for to avoid future disputes.

[1] Paragraph 16, the Consultation Paper.

Question 2:	Do you have any views on adopting an administrative assignment approach for the release of spectrum in the 26/28 GHz bands?

6. We welcome the adoption of the administrative assignment approach by the CA for the release of the spectrum in the 26/28 GHz Band. We agree with the application and assignment schedules.

Question 3:	Do you have any views on the proposed band plan with frequency slots of 100 MHz each?

7. Considering that (1) the comments by equipment vendors who have indicated that the 5G equipment supports channel bandwidths of 50 MHz, 100 MHz, 200 MHz and 400 MHz[2] and (2) the standards set by the 3rd Generation Partnership Project ("**3GPP**"), a consortium of industry associations and standard organizations, we propose that a channel bandwidth of 50 MHz, instead of 100 MHz, should be adopted. This would increase flexibility, making a total of 82 frequency slots for the 4100 MHz of spectrum in the 26/28 GHz Band.

Question 4:	Do you have any views on the proposal of assigning (a) 3300 MHz to 3700 MHz of spectrum in the 26/28 GHz Band for the provision of large scale public 5G services; and (b) the remaining 400 MHz to 800 MHz of spectrum in the two remaining frequency bands to other entities for the provision of 5G services in specified locations on a shared basis?

8. The 26/28 GHz Band is high frequency spectrum (also known as "**mmWave spectrum**") which offers very high data capacity and speeds but with a limited range. Provision of large scale public 5G services requires extensive network roll-out and huge investment. Considering the technical characteristics of spectrum in this high frequency band and the number of mobile network operators ("**MNOs**") in Hong Kong (not to mention potential new entrants), we opine that 3700 MHz or more of spectrum should be assigned for the provision of large scale public 5G services, so as to ensure better user experience for the benefits of the general public in Hong Kong.

[2] Paragraph 22, the Consultation Paper.

9. We note that the CA proposes to assign the remaining 400 MHz to 800 MHz of spectrum to other entities interested in providing specified location services, such as university campus, industrial estates, airport and technology parks, on a shared basis ("**Shared Spectrum**"). The aggregate network coverage by each assignee of Shared Spectrum is proposed to be not more than 50 square kilometers.[3]

10. In this respect, we are very concerned about the assignment arrangement of the Shared Spectrum, particularly the size of the specified locations, the purpose of the assignment, the licensing and regulatory framework, and potential confusion caused to consumers.

11. First of all, just look at the size of 50 square kilometers. It is actually as huge as Kowloon peninsula in Hong Kong. If specified location services are to be provided at the locations cited by the CA, the 50 square kilometers threshold is far too excessive, given our findings below:

Size of university campus, for instance:
(a) The Hong Kong Polytechnic University: ~0.15 square km
(b) City University of Hong Kong: ~0.16 square km
(c) The University of Hong Kong: ~0.53 square km
(d) Hong Kong University of Science and Technology: ~0.60 square km
(e) The Chinese University of Hong Kong: ~1.34 square km

Size of industrial estates, for instance:
(a) Yuen Long industrial area: ~0.67 square km
(b) Tai Po industrial area: ~1.4 square km

Size of technology parks, for instance:
(a) CyberPort: ~ 0.24 square km
(b) Hong Kong Science & Technology Park (Tai Po): ~ 0.33 square km

12. Secondly, we are doubtful about the purpose of assigning the Shared Band, which is said "to widen the scope of 5G services and the choice of service suppliers in the 5G era"[4]. If so, the CA could allocate unlicensed band to potential service suppliers for potential 5G services, just as it did for wireless Internet of Things ("**WIoT**"). On 1 December 2017, the CA announced the creation of a new licensing regime for the provision of WIoT platforms and services using the shared frequency band of 920 - 925 MHz for the purpose of preparing Hong Kong to embrace "the new era of the Internet of Things (IoT) and the fifth generation (5G) mobile services, as well as various smart city applications in the future"[5]. In the premises, a separate licence for the Shared Spectrum is absolutely unnecessary.

[3] Paragraph 34, the Consultation Paper.
[4] Paragraph 24, the Consultation Paper.
[5] Details available at: https://www.coms-auth.hk/en/media_focus/press_releases/index_id_1570.html.

13. Thirdly, it is ambiguous as to whether the 5G services undertaken by Shared Spectrum assignees would be for public use or private, non-commercial, non-profit deployment only. It is also uncertain as to the type of licence to be granted. In the Consultation Paper, the CA has emphasized that the proposed assignment of 3300 MHz to 3700 MHz of spectrum is for "large scale public 5G services". Nevertheless, the deployment for the Shared Spectrum could also be "large scale" given the 50 square kilometers threshold. This is confusing.

14. Moreover, the assignees of 3300 MHz to 3700 MHz of spectrum are required to fulfil network and service roll-out obligations, pay relatively high spectrum utilization fee ("**SUF**") (as compared to the SUF for the Shared Spectrum) and provide as much as $800 million of performance bond to the CA. Nonetheless, Shared Spectrum assignees are exempted from the above-mentioned obligations. This is inequitable.

15. In the premises, should the Shared Spectrum assignees be subject to the same licensing conditions and obligations, as well as the same roll-out, SUF and performance bond obligations, as holders of unified carrier licence ("**UCL**")?

16. In fact, if entities are desirous to provide "large scale" 5G services, the CA has already set out an application process open to all incumbent MNOs and potential new entrants to apply. For the sake of fairness, we submit that the CA should maintain a level playing field in order to facilitate healthy and fair competition in the telecommunications market in Hong Kong. Otherwise, the market will be distorted.

17. Fourthly, from the perspective of the general public, the provision of specified location services by Shared Spectrum assignees could cause confusion. In case a Shared Spectrum assignee is to be assigned with as much as 400 MHz of the Shared Spectrum for network coverage of as large as 50 square kilometers, it is indeed a defacto mobile network operator. Would it be misleading to the general public? How would consumers differentiate the two? What regulations would be imposed to avoid such confusion?

18. In view of the above, we oppose to the proposal of assigning 400 MHz to 800 MHz as the Shared Spectrum.

Question 5:	Do you have any views on the proposed caps of (a) 800 MHz of spectrum in the 26/28 GHz bands for spectrum designated for the provision of large scale public 5G services; and (b) 400 MHz of the Shared Spectrum designated for the provision of specified location services?

19. We have no adverse comment to the proposed cap of 800 MHz of spectrum in the 26/28 GHz Band designated for the provision of large scale public 5G services.

Given our submission in Question 4 above, setting spectrum cap for the Shared Spectrum is no longer relevant.

Question 6:	What are your views on the proposed method of assigning spectrum in the 26/28 GHz band to qualified applicants for the provision of large scale public 5G services?

20. Licence Validity Period: The proposed assignment period is for 15 years from 1 April 2019 to 31 March 2034. We call for a longer licensing period because 5G and subsequent generations of technology require formidable investment. A longer licensing period of over 20 years would enable MNOs to plan for long-term network infrastructure investment – all to the benefit of the market and Hong Kong's standing as a centre of technological excellence.

21. Pre-Qualification Exercise: The CA has listed out the qualification requirements, such as submission of a deposit, service plans, and evidence to demonstrate technical, organizational and financial capabilities. However, details of the selection criteria are missing. How to determine an applicant as a qualified candidate? What is the marking scheme? Would it be based on merits of the proposals, financial capabilities, or else? More details should be provided to facilitate our understanding of the pre-qualification exercise.

22. Two-Stage Approach: After completing the two-stage of distribution, the CA will decide the exact positions of the frequency slots to be assigned to each applicant by drawing lots. In this respect, we opine that the principle is to assign the contiguous spectrum within the band acquired for the benefit of 5G development in the long run. Save for the above, we do not have adverse comment to the proposed two-stage distribution mechanism if the total amount of spectrum applied for exceeds the amount available.

Question 7:	Do you have any preference on the assignment of spectrum in either the 26 GHz or 28 GHz band?

23. We welcome the assignment of 26/28 GHz Band for 5G development in Hong Kong, as both bands are the most promising high frequency ranges for 5G early commercialization globally. For comparison of the two bands, we nevertheless prefer 26 GHz to 28GHz.

Question 8:	What are your views on the proposed assignment method for the Shared Spectrum?

24. Please refer to paragraphs 9 to 18 of our submission above for details.

Question 9:	What are your views on the network and service rollout obligations proposed to be imposed on the use of spectrum assigned for the provision of large scale public 5G services?

25. We do not agree with the network and service rollout obligations as proposed under Paragraphs 35 and 36 of the Consultation Paper. The CA requires that "a minimum of 5000 radio base stations should be established and put into use within the first five years following the spectrum assignment". However, the term "radio base stations" was not defined at all. Should the term be referred to conventional "radio base stations" for 2G, 3G and 4G networks, then such 5000 figure is unrealistic and impractical, given the number of radio base stations currently installed by the incumbent MNOs.

26. In view of international standards and use cases, small cells or radio heads (similar to access points for Wi-Fi services) would be installed for deployment of 26/ 28 GHz Band. This is largely due to the characteristics of 26/28 GHz Band, which is high-frequency mmWave spectrum with relatively high propagation loss. It is generally characterized as having a very low maximum cell range (fewer than 500m) but a very high capacity (over 100 Gbps). Should the CA insist on the 5000 figure, radio heads (instead of traditional radio base stations) should be taken into account.

27. In addition, a restriction is proposed to be imposed on the minimum number of base stations to be installed each year during the first five years. Such roll-out condition is unprecedented and ignores the market force. Bearing in mind that 26/28 GHz Band is likely be the first batch of 5G spectrum available in Hong Kong, the market development and supply/demand for 5G mobile services remain to be seen. The number of radio heads to be installed each year should be based upon the market conditions and 5G development from time to time. Such mandatory constraint should not be imposed; otherwise, it would set a bad precedent.

28. Notwithstanding the above, we fully understand the regulator's task to ensure timely and territory-wide network and service roll-out. Hence, we would accept the roll-out obligation (in term of the number of radio heads to be installed) based on a lump-sum figure within a five-year time, instead of a specific number to be counted on a year-to-

year basis. This proposed arrangement would increase flexibility and be driven by market force.

29. At this juncture, we would like to point out that a large number of outdoor hotspots, including dense urban streets, pavement, lampposts and street shops; and indoor hotspots, covering shopping malls, stadium and office buildings, are expected to be installed for 5G deployment. Given the demand for a huge number of 5G access points, we expect the site placement design for 5G to be very different from the previous generation of mobile technologies. Hence, for the purpose of efficient deployment of 5G services and realization of smart city initiatives, we suggest the Government take a proactive role in coordinating with various of its departments to facilitate mobile operators access to government premises, street furniture and new public development project sites for cell-site installation in a timely manner.

Question 10:	What are your views on the proposed performance bond for guaranteeing compliance with the proposed network and service rollout obligations for using spectrum assigned for the provision of large scale public 5G services?

30. We consider that the proposed size of the performance bond, i.e. $1 million per MHz of spectrum assigned for the provision of large scale public 5G services, is too high and should be reduced. For instance, with an assignment of 800 MHz of spectrum, a spectrum assignee will be required to submit a performance bond of $800 million to the CA.

31. Given our submission in paragraph 28 above on the roll-out obligations, we do not agree with the proposed arrangement to release the bond "in five phases on equal portions and in accordance with their fulfilment of the milestone set for each of the five years following assignment of the relevant spectrum[6]. Rather, we opine that the bond should be released in phases based on the roll-out schedules. For example, if 4000 radio heads are required to be installed within five years, then 25% of the bond will be released to the assignee after the establishment of 1000 (or one-fourth) radio heads and so on.

32. Should there be any Shared Spectrum assignees, we disagree that they should be exempted from network and service rollout obligations, as well as performance bond requirements. Please refer to paragraphs 9 to 18 of our submission above for details.

[6] Paragraph 37, the Consultation Paper.

Question 11:	Do you have any views on the proposal for SUF as set out in paragraphs 45 to 50 above?

33. We do not have adverse comment to SCED's proposal for setting the level of SUF at $21,6000 per MHz per annum, with reference to the SUF levied on carrier licensees for use of fixed links or satellite uplinks under the SUF Charging Scheme. The payment obligations will be triggered if the frequency bands are congested, i.e. 75% or more occupied. However, it is unclear how "congestion" is defined.

34. The charging timetable for the SUF Charging Scheme commenced on 1 January 2018, with the first two years SUF payment being set at $0. Thereafter, 30% of the SUF are payable for the third year in 2020, 70% payable for the fourth year in 2021, and 100% payable for the fifth year in 2022. Considering that the 26/28 GHz Band will be assigned not until 1 April 2019, and the SCED will conduct a review on the designation of frequency bands and levels of SUF every five years, we opine that a new charging scheme with commencement date on 1 April 2019, instead of 1 January 2018, should be adopted.

35. Should there be any Shared Spectrum assignees, we disagree that they should be subject to a substantially low SUF, i.e. $1,080 per MHz per annum per geographical coverage of 50 square kilometres. Please refer to paragraphs 9 to 18 of our submission above for details.

III. Conclusion

36. Hutchison welcomes the adoption of the administrative assignment approach by the CA for the release of the spectrum in the 26/28 GHz Band.

37. However, we oppose to the assignment arrangement for the Shared Spectrum due to the tremendous size of the specified locations, the ambiguous purpose of the assignment, the unclear licensing and regulatory framework, and the potential confusion to consumers.

38. We disagree with the proposed network and service rollout obligations for the provision of large scale public 5G services. Instead of traditional radio base stations, we opine that the number of small cells or radio heads should be taken into account. Further, the restriction on the minimum number of cell sites to be installed each year during the first five years of spectrum assignment should not be imposed.

~ THE END ~