

Assignment of the Available Radio Spectrum in the 2.5/2.6 GHz Band for Wireless Broadband Services

Statement of the Communications Authority

4 July 2012

INTRODUCTION

With the increasing popularity of smart phones, notepads and other advanced communications devices, mobile services in Hong Kong have continued to grow rapidly in recent years. Adequate and timely supply of radio spectrum to meet the incessant demand for additional network capacity is considered essential and critical to the healthy development of the mobile industry.

2. According to the Spectrum Release Plan (“SRP”) for 2012 – 2014¹ published by the former Office of the Telecommunications Authority (“OFTA”)² on 19 December 2011, a total of 50 MHz of radio spectrum in the 2515 – 2540 MHz band and 2635 – 2660 MHz band (the “2.5/2.6 GHz Band”) is available for assignment. The spectrum in the 2.5/2.6 GHz Band is in the same frequency range as the 90 MHz of radio spectrum assigned in the auction held in 2009 (the “2009 Auction”)³, and can be used to deploy similar technology, notably the long term evolution (“LTE”)⁴ technology for the provision of wireless broadband services.

3. Under sections 32G, 32H and 32I of the Telecommunications Ordinance (“TO”) Cap. 106, if radio spectrum is to be released for assignment subject to payment of spectrum utilization fee (“SUF”), consultation should be carried out with the telecommunications industry and

¹ The SRP is available at http://www.ofca.gov.hk/filemanager/ofca/common/Industry/broadcasting/spectrum_plan2011_en.pdf.

² Pursuant to the Communications Authority Ordinance (Cap 616), with effect from 1 April 2012, all duties and powers of the Telecommunications Authority (“TA”) are conferred on the Communications Authority (“CA”), and all duties and powers of the OFTA are conferred on the Office of the Communications Authority (“OFCA”), the executive arm of the CA.

³ The detail of the auction is available at http://tel_archives.ofca.gov.hk/en/industry/broadband/main.html.

⁴ LTE is a technical standard developed by the 3rd Generation Partnership Project (“3GPP”) for high-speed mobile communications services, commonly known as fourth generation (“4G”) services.

parties who may be directly affected by the exercise. In this connection, a public consultation paper entitled “Assignment of the Available Radio Spectrum in the 2.5/2.6 GHz Band for Wireless Broadband Services” (the “Consultation Paper”) was issued on 29 December 2011⁵ to solicit views from the industry and interested parties on the arrangements of the radio spectrum assignment in the 2.5/2.6 GHz Band and related licensing matters.

4. In response to the Consultation Paper, a total of nine submissions⁶ were received from the following parties (listed in alphabetical order).

- (1) China Mobile Hong Kong Company Limited (“CMHK”)
- (2) CSL Limited (“CSL”)
- (3) Genius Brand Limited (“Genius”)
- (4) GSM Association (“GSMA”)
- (5) Hong Kong Broadband Network Limited (“HKBN”)
- (6) Hong Kong Telecommunications (HKT) Limited (“HKT”)
- (7) Hutchison Telephone Company Limited (“HTCL”)
- (8) Qualcomm (“Qualcomm”)
- (9) SmarTone Mobile Communications Limited (“SmarTone”)

5. Having considered the submissions and other relevant factors, the Communications Authority (“CA”)² sets out in this Statement its decisions on the assignment of the available radio spectrum in the 2.5/2.6 GHz Band and the related licensing matters.

ASSIGNMENT OF THE AVAILABLE RADIO SPECTRUM

Method of Assignment

6. According to the Radio Spectrum Policy Framework (“RSPF”)⁷ promulgated by the Government in April 2007, whenever the former Telecommunications Authority (“TA”)² and now the CA considers that there are likely to be competing demands for the spectrum from providers of

⁵ The Consultation Paper is available at http://tel_archives.ofca.gov.hk/en/report-paper-guide/paper/consultation/cp20111229.pdf.

⁶ All submissions are available at http://tel_archives.ofca.gov.hk/en/report-paper-guide/paper/consultation/20120306/table.html.

⁷ The RSPF is published at <http://www.cedb.gov.hk/ctb/eng/legco/pdf/spectrum.pdf>.

non-Government services, a market-based approach⁸ (such as auction) should be used for spectrum assignment unless there are overriding public policy reasons to do otherwise. The former TA believed that there would be competing demands for the spectrum and he proposed to assign the spectrum by auction. Against this assessment, the following question was raised in the Consultation Paper:

Question (1): Do you agree that an auction should be conducted to determine to whom the 2.5/2.6 GHz Band should be assigned?

Respondents' Views and Comments

7. CMHK, HKBN and Qualcomm supported the proposal.

8. Three mobile network operators (“MNOs”), namely Genius, HKT and HTCL, disagreed and argued that the spectrum should be assigned administratively. Genius and HKT considered that the spectrum in the 2.5/2.6 GHz Band should be assigned on an administrative basis in five equal blocks to the five MNOs that are actively providing mobile services to the end customers⁹ (viz. CMHK, CSL, HKT, HTCL and SmarTone). In order to meet the tremendous growth in mobile data services in recent years, Genius and HKT were of the view that there were overriding public policy reasons to justify a departure from the traditional auction approach to the assignment of spectrum. HTCL held somewhat similar views and suggested that in the interest of spectrum efficiency¹⁰, the three successful bidders in the 2009 Auction (viz. CMHK, CSL and Genius), each holding 15 MHz x 2 of spectrum in the 2500 – 2690 MHz band, should be administratively assigned with an additional 5 MHz x 2 of spectrum, and the rest of the 2.5/2.6 GHz spectrum could be made available for auction by all operators, including new entrants and the incumbents.

⁸ “Market-based approach” for spectrum management means methods relying on market forces to ensure the efficient use of spectrum as a public resource.

⁹ Genius is a 50:50 joint venture between HKT and HTCL. It is understood that Genius only provides wholesale service to its two shareholders and it has no plan to provide any service to end customers.

¹⁰ HTCL argued that in the light of the technical specification, 20 MHz of paired spectrum can maximize the efficiency of the relevant spectrum, providing the highest data rate and the best customers' experience. As such, the most effective way to use the radio spectrum in the 2.5/2.6 GHz Band is for the relevant MNOs to hold at least 20 MHz x 2 of spectrum in order to maximize the LTE efficiency.

CA's Considerations and Decision

9. The CA finds the arguments advanced by some respondents lacking in justifying a departure in this case from the well accepted market-based approach of spectrum assignment which has been used in Hong Kong for more than a decade. While the supply of additional spectrum in the 2.5/2.6 GHz Band may facilitate the incumbent MNOs to expand their network capacities, there are no overriding public policy justifications to just assign the spectrum to these operators administratively as proposed by Genius and HKT. Rather, through participation in the spectrum auction on equal footing as other interested parties, the incumbent MNOs would be motivated to make informed decision as to what is the most cost effective way for them to expand their network capacities, viz. by acquiring additional spectrum or by making additional network investment. The CA considers that the proposal of Genius and HKT cannot be acceded to as there is no overriding public policy reason to do so.

10. While the proposal of HTCL would leave 10 MHz x 2 of spectrum in the 2.5/2.6 GHz Band for open bidding by all interested parties, neither can the CA identify any justification to restrict a new entrant from bidding for all of the 25 MHz x 2 of available spectrum, considering that the technical efficiency argument¹¹ is applicable no less to a totally new entrant. Even if a new entrant can successfully bid for the whole of the remaining 10 MHz x 2 of spectrum, the new entrant will be effectively handicapped in building a network that can compete on an equal footing in terms of network capacity with the incumbents like CMHK, CSL or Genius. HTCL's proposal cannot be a fair arrangement as it inherently hampers a new player from bidding for all of the available spectrum in competition with Genius, CMHK or CSL.

11. Furthermore, to ensure that the spectrum will be put to the most

¹¹ The technical efficiency of the 20 MHz x 2 of spectrum as advocated by HTCL needs to be examined with caution. Even though spectrum efficiency may be higher with the 20 MHz x 2 of spectrum, same degree of efficiency may be achieved with a contiguous 20 MHz x 2 blocks with the current stage of technological development. However, the proposal by HTCL may help create contiguous 20 MHz x 2 blocks only for Genius and CSL, but not CMHK, given the existing frequency allocation among the three MNOs.

economically efficient use¹², aside from the technical efficiency argument advanced by HTCL, it is also important to ensure allocative and dynamic efficiencies in utilising radio spectrum as a scarce public resource. For example, a company with a flawed business model may fail in the market place without putting the spectrum into efficient uses even though it has established a technically efficient network. The concern is who can put the spectrum to the most efficient uses now and in the future. It follows that we need a mechanism to identify the players who are able to put the spectrum to the most productive uses or derive the highest value from the uses. Instead of assigning the spectrum administratively as proposed by Genius, HKT and HTCL, the auction may identify the players who will make better use of the spectrum through the application of the latest technologies, provision of innovative services or development of new business paradigms, and such players are the ones who are willing to pay the most for the spectrum under the auction. Such players could be new entrants, or an incumbent MNO like SmarTone which does not currently hold spectrum in the 2.5/2.6 GHz band. The market-based approach of spectrum assignment will thus better achieve overall economic efficiency in spectrum utilisation through innovations and enhanced competition in the mobile services market.

12. **To conclude, the CA cannot see any compelling technical, economic or policy reason to deviate from the well-established market-based approach such that spectrum should be reserved for certain existing MNOs only in the current exercise. The CA decides that auction will be used for the assignment of the available radio spectrum in the 2.5/2.6 GHz Band.**

Eligibility of Bidders

13. With 50 MHz of spectrum available for assignment, it is feasible for a new entrant to acquire sufficient spectrum for setting up an entirely new territory-wide public mobile network and for the existing MNOs to expand their network capacity to meet the booming market demand for mobile data service. Following the time-proven pro-competition and pro-market policy,

¹² It should be noted that one of the telecommunications policy objectives in Hong Kong is “that telecommunications services should be provided in the most economically efficient manner possible” (<http://www.cedb.gov.hk/ctb/eng/telecom/tp.htm>).

it was proposed that the available radio spectrum should be open for bidding by all interested parties, including new entrants and existing MNOs. The following question was raised in the Consultation Paper:

Question (2): Do you agree that the radio spectrum in the 2.5/2.6 GHz Band should be open for bidding by all interested parties, including new entrants and existing MNOs?

Respondents' Views and Comments

14. CMHK supported the proposal. HKBN also agreed but considered that the prevailing market-based approach in assigning frequency spectrum has left all radio spectrum in the hands of giant enterprises with strong financial capacity. HKBN suggested adopting a hybrid approach in this exercise, namely making available part of the radio spectrum open for bidding by any interested parties and reserving the remaining for bidding by new entrants only, such that there is scope for new entrants to rollout innovative services to the public.

15. Genius and HKT disagreed with the proposal and considered that the available radio spectrum should be made open to existing MNOs only. HTCL also disagreed with the proposal if the available radio spectrum is to be released by way of auction only.

CA's Considerations and Decision

16. Regarding HKBN's suggestion to reserve part of the available radio spectrum for new entrants only, the CA is aware that certain overseas economies have given priority to new entrants for spectrum auction on such policy consideration as enhancing competition in the market. The mobile market in Hong Kong is however very competitive already. The CA cannot identify in the present case any overriding public policy reason to justify the reservation of radio spectrum for new entrants only. As regards HKBN's view that the market-based approach through auction has left all radio spectrum in the hands of giant enterprises without room for new market entrants, the concern is not borne out by actual experience in Hong Kong. The CA notes that in the most recent auction of spectrum in the 2.3 GHz

band held in February 2012, a new entrant has successfully acquired 30 MHz of radio spectrum and obtained a licence to provide public telecommunications service¹³. This demonstrates that new players will be able to enter the market given the right business opportunity and a fair and transparent regulatory regime enabling it to compete on a level playing field with the incumbents in the market.

17. On the suggestion of Genius, HKT and HTCL, that the bidding should be restricted to existing MNOs, as explained in paragraphs 9 to 12 above, the CA considers that due to a lack of overriding public policy justifications, their proposals to administratively assign the concerned spectrum cannot be acceded to.

18. Based on the above considerations, **the CA decides that the bidding should be open for participation by all interested parties, including existing MNOs and new entrants.**

Qualification Requirements

19. Similar to the previous spectrum auctions, it was proposed that there should only be minimal qualification requirements for registering bidders' interest and for demonstrating the technical and financial capability of the bidders. The following requirement was proposed for imposition on a bidder before it is to be qualified, i.e. for it to -

- (a) lodge 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) submit any other relevant supporting information that the CA may deem necessary.

¹³ Two existing MNOs (CMHK and HTCL) and one new entrant (21 ViaNet Group Limited) have successfully bid for a total of 90 MHz of radio spectrum in the 2.3 GHz band auction held in February 2012. The detail of the auction is available at http://tel_archives.ofca.gov.hk/en/industry/2.3GHz/main.html.

20. The following question was raised in the Consultation Paper:

Question (3): Do you agree that the qualification requirements for participation in the auction should be kept to the minimal, as per paragraph 12 (of the Consultation Paper)?

Respondents' Views and Comments

21. CMHK, HKT and HTCL supported the proposal. HKBN suggested a beauty contest approach to be used to qualify new entrants under its proposed hybrid approach as mentioned above.

CA's Considerations and Decisions

22. If a beauty contest is to be used for screening individual applications for participation in the auction, all the applicants will be required to submit detailed business proposals for using the radio spectrum to provide telecommunications services. The CA will need to draw up a set of assessment criteria¹⁴, conduct another round of consultation on the criteria, and assess each application on the basis of such pre-defined assessment criteria. Such an exercise will prolong the application process and delay the release of the available spectrum which is much needed by the market to meet the aspiration of service users. Given the minimal qualification requirements used in the past auctions are objective, transparent and effective and they have been applied smoothly in all the auctions conducted, the CA cannot see any valid reason or advantage in introducing a more stringent and complicated assessment process in this auction through a prequalification exercise. Hence, **the CA affirms its view that the qualification requirements for participation in the auction should be kept to the minimal.**

¹⁴ Beauty contest approach was once adopted 12 years ago, in 2000, in the licensing of local wireless fixed networks. The licence applications were assessed based on a wide range of criteria, including (a) coverage of services; (b) financial soundness and commitment to invest; (c) technical soundness and service quality; (d) proven managerial and technical expertise; (e) technological innovation and services; (f) rapid deployment of the network and early introduction of service; (g) quality of proposal; (h) benefits to Hong Kong; and (i) corporate structure.

Band Plan

23. In the Consultation Paper, it was proposed to divide the available spectrum into five frequency bands, each with a bandwidth of 5 MHz x 2, as shown in below -

Frequency bands and bandwidths

Frequency bands	Frequency range (in MHz)	Bandwidth
A1	2515 – 2520 paired with 2635 – 2640	10 MHz
A2	2520 – 2525 paired with 2640 – 2645	10 MHz
A3	2525 – 2530 paired with 2645 – 2650	10 MHz
A4	2530 – 2535 paired with 2650 – 2655	10 MHz
A5	2535 – 2540 paired with 2655 – 2660	10 MHz

24. The following question was raised in the Consultation Paper:

Question (4): Do you agree that the radio spectrum in the 2.5/2.6 GHz Band should be divided into five frequency bands, each with a bandwidth of 5MHz x 2, as shown in above for assignment?

Respondents' Views and Comments

25. CMHK, CSL, GSMA, HKT, HTCL and Qualcomm agreed to the proposal.

CA's Considerations and Decisions

26. The proposal has the support of the six respondents responding to this question and there are no adverse views expressed by the other respondents. **The CA decides that the available spectrum should be divided into five frequency bands, each with a bandwidth of 5 MHz x 2.**

Spectrum Cap

27. Following the successful completion of the auction of 90 MHz of spectrum in the 2.3 GHz band in February 2012, the total amount of spectrum that has been assigned for the provision of mobile services has increased to 560 MHz. The total spectrum available for auction this time is 50 MHz and this represents only about 9% of the existing pool of assigned spectrum for mobile services. The mobile market in Hong Kong is extremely competitive and there is no regulatory barrier for any of the incumbent 2G and 3G MNOs to upgrade their networks using the state-of-the-art technology for providing higher capacity communications services. In the Consultation Paper, it was proposed not to impose any restriction on the amount of spectrum that a bidder could acquire. The following question was raised in the Consultation Paper:

Question (5): Do you agree that there should be no spectrum cap imposed upon any bidder in the auction to be conducted for the 2.5/2.6 GHz Band?

Respondents' Views and Comments

28. There were mixed responses to this question. While CMHK, CSL and Qualcomm supported the proposal, HKBN, HKT, HTCL and SmarTone disagreed and suggested different spectrum caps for the CA's consideration.

29. HKBN considered that spectrum cap should be imposed on existing MNOs in order to allow more opportunities for innovative new entrants. On public interest grounds, HKBN considered that it was not beneficial to release further spectrum to the existing MNOs solely due to their ability to pay the huge SUF.

30. Genius and HKT were of the view that a spectrum cap of 10 MHz per MNO should be set. If the available radio spectrum were to be assigned via an administrative allotment, the CA should take into account the spectrum holdings of each MNO to ensure that contiguous blocks could be arranged for

assignment to the operators concerned¹⁵. If an auction were to be held, HKT suggested that the CA should adopt the UK approach to assist those operators with less radio spectrum as this will, in the mid and long-term, enhance competition and user benefits. This could mean barring the one or two licensees with the most spectrum holding from the auction, or allowing the one or two licensees with the least spectrum holding to acquire more than the 10 MHz cap, or granting SUF “credits” (e.g. 50%) in the auction in order to prevent spectrum hoarding and help ensure a level playing field.

31. HTCL was of the view that in the absence of a spectrum cap, there is a risk that all of the available spectrum would be acquired by one single operator resulting in that operator dominating the LTE market and suggested a spectrum cap of not more than 30 MHz by reference to the 2009 Auction.

32. SmarTone considered that taking into account the 3GPP specification for Frequency Division Duplex¹⁶ (“FDD”) LTE and the fact that the maximum carrier bandwidth for LTE is 20 MHz x 2, the spectrum cap for existing MNOs holding 15 MHz x 2 frequency in the 2.5/2.6 GHz Band should be 5 MHz x 2. The spectrum cap for other interested parties should be 20 MHz x 2.

CA’s Considerations and Decisions

33. On Genius and HKTs’ suggestion to assign contiguous blocks under their proposal to administratively assign the 2.5/2.6 GHz Band, as explained above, the CA considers that due to the absence of overriding public policy justifications, the proposal of Genius and HKT on administratively assigning the spectrum cannot be acceded to. If relevant MNOs consider that there are efficiency and cost reasons to acquire contiguous blocks, they should make their best efforts to win in the open auction based on their commercial considerations. On the UK approach suggested by HKT, the CA notes that the Office of Communications

¹⁵ Genius and HKT suggested that HKT or HTCL (as equal shareholders in Genius) should be assigned the frequency band A1 which is right next to the existing holdings under Genius. CSL should be assigned frequency band A5 which is adjacent to its current holdings. The remaining frequency bands (viz. A2, A3 and A4) should then be assigned to the three remaining MNOs (viz. CMHK, SmarTone, and either HKT or HTCL (whichever does not receive spectrum on behalf of Genius) on an ad hoc basis.

¹⁶ FDD is a duplex scheme in which uplink and downlink transmissions use different frequencies.

(“Ofcom”) in the UK is making reference to the amount of spectrum already held by the existing MNOs to establish the eligibility criteria for participation in the future auction of spectrum in the 800 MHz and 2.6 GHz bands¹⁷. It will be the largest ever single spectrum auction in the UK and the total amount of available radio spectrum to be awarded will be 250 MHz, which is equivalent to **three-quarters** of the radio spectrum currently in use in the UK. As Ofcom is concerned that the level of competitive intensity will be reduced if only one operator acquire the entire available spectrum, Ofcom considers it appropriate to impose a spectrum cap to promote competition. For the current exercise in Hong Kong however, the situation is different and there is no similar competition concern as in the UK. The total spectrum available in this exercise only represents **9%** of the existing pool of assigned spectrum for mobile services. Even if all of the available radio spectrum were acquired by one bidder (which may be an incumbent MNO), there will not be any significant impact on the competition landscape in Hong Kong.

34. On the issue of spectrum hoarding, the CA will impose network and service rollout obligation (as discussed in paragraph 62 below) on the successful bidder(s) to prevent spectrum hoarding and to ensure the timely provision of services for the benefits of the general public. The CA will also require the successful bidder(s) to lodge a performance bond (as discussed in paragraph 65 below) to ensure its compliance with the rollout obligations.

35. Based on the above considerations, **the CA decides that it is not necessary to impose any restriction on the amount of spectrum that a bidder can acquire during the upcoming auction, i.e. no spectrum cap will be applied.**

Technology Neutrality

36. In line with the established technology neutral policy, it was proposed not to mandate any specific technology to be adopted for provision of services using the radio spectrum in the 2.5/2.6 GHz Band. However, the technology to be deployed should be a recognised open standard and it

¹⁷ The “Second Consultation on Assessment of Future Mobile Competition and Proposals for the Award of 800 MHz and 2.6 GHz Spectrum and Related Issues” issued by Ofcom on 12 January 2012.

should not cause any harmful interference to legitimate services operating in the adjacent frequency bands. The following question was raised in the Consultation Paper:

Question (6): Do you agree that there should be no technical restriction on the use of the frequency bands A1 to A5, provided that the technical standards to be adopted conform to widely recognised open standards and no harmful interference is caused to legitimate services operating in the adjacent frequency bands?

Respondents' Views and Comments

37. CMHK, CSL, GSMA, HKBN, HKT, HTCL and Qualcomm supported the proposal. HKT considered that the restrictions on the use of 825 – 832.5 MHz paired with 870 – 877.5 MHz band assigned for CDMA2000 services, and the 678 – 686 MHz band assigned for broadcast-type mobile TV services should be removed.

CA's Considerations and Decisions

38. Regarding HKT's opinion in removing the current restrictions in the frequency band of 825 – 832.5 MHz paired with 870 – 877.5 MHz and the frequency band of 678 – 686 MHz, the restrictions were based on relevant policy considerations¹⁸ that had undergone industry consultation before the said frequency bands were released for auction in 2007 and 2010 respectively. Such a restriction is a material term of that auction and shall remain to be an important condition of use of radio spectrum under the respective licences throughout the whole duration of the spectrum assignment. In any case, the restrictions for the use of radio spectrum in those two frequency bands are matters separate from the use of the radio spectrum in the 2.5 / 2.6 GHz Band under consideration in this exercise.

39. As there is no objection from the respondents, **the CA decides**

¹⁸ Please refer to the Authority's Statement, "Licensing of Spectrum in the 850 MHz Band to Enable the Provision of CDMA 2000 Service" issued on 27 April 2007, and the "Framework for Development of Broadcast-type Mobile TV Services in Hong Kong" issued in February 2010 for more details.

not to impose any particular technical standards on the use of radio spectrum in the 2.5/2.6 GHz Band.

Technical Consideration

40. As mentioned before, a total of 90 MHz of radio spectrum in the 2500 – 2690 MHz band has already been assigned in 2009. All parties using spectrum in the 2500 – 2690 MHz band, including the existing MNOs assigned with the spectrum previously auctioned in 2009 and the future successful bidder(s) of the 50 MHz of radio spectrum made available in this exercise, should take effective measures to prevent their radiocommunications facilities from causing interference to other legitimate telecommunications facilities installed in and close to the border of Hong Kong.

41. In addition, the 2.5/2.6 GHz Band shall be used on a coordinated basis with the Mainland. The Consultation Paper highlighted the following arrangements which are in force for the coordinated use of the band:

- (a) in the Mainland, the band 2535 – 2570 MHz is allocated for multichannel multipoint distribution system, which is deployed for distribution of television programmes. Agreement has been reached such that spill-over signals to and from the Mainland shall be less than 35 dB μ V/m/5MHz in the band 2540 – 2570 MHz along the boundary areas between Hong Kong and the Mainland. Attempt is being made to extend this level of protection to the band 2535 – 2540 MHz;
- (b) the channel plan adopted by the Mainland allows space-to-Earth transmissions from a satellite for broadcasting services in the 2635 – 2660 MHz band. The power flux-density at the Earth's surface produced by the transmission from the satellite shall not exceed the limit given in Section V of Article 21 of the Radio Regulations; and

- (c) there is currently no specific coordination requirement for the band 2515 – 2535 MHz.

42. The following question was raised in the Consultation Paper:

Question (7): Do you have any view about the interference control measures to be applied to the successful bidders of spectrum in the frequency bands A1 to A5?

Respondents' Views and Comments

43. HKBN and HKT agreed that interference control measures should be adopted by operators who successfully acquire spectrum in the 2.5/2.6 GHz Band.

44. CSL opined that clear co-ordination guidelines must be given and maintained by the CA to prevent the interference caused to a mobile based communications system in Hong Kong by a Mainland based broadcasting system which will be broadcasting at a very high-power at the same frequencies as the mobile network receive band in Hong Kong. In addition, CSL recommended the Office of the Communications Authority (“OFCA”)² to conduct a radio signal survey in the 2.5/2.6 GHz Band along the border areas in order to assess the impact of interference on the mobile network receive band prior to the auction.

45. HTCL requested OFCA to provide information on how the spectrum in the 2515 – 2535 MHz band is allocated and used in the Mainland and the associated interference control issues and preventative measures, if any. HTCL raised concern on whether the same set of interference control measures as mentioned above would still apply if the Mainland authorities re-assign the 2.5/2.6 GHz Band spectrum for IMT service or other purpose.

CA's Considerations and Decisions

46. Regarding CSL's comments, OFCA has reached agreement with the Mainland authorities to limit the spill-over signals in the 2540 – 2570 MHz band to 35 dB μ V/m/5MHz. OFCA will liaise with the Mainland

authorities with a view to extending this limit to the spill-over signals in the 2535 – 2540 MHz band. Over the past few months, through regular radio monitoring of the 2.5/2.6 GHz Band, OFCA did not detect any radiocommunications transmissions from the Mainland. OFCA will continue to perform such monitoring and will keep the interested parties informed of the results in a timely manner.

47. Regarding HTCL’s comments, the CA would like to point out that based on the information given in the official document in the Mainland (see footnote 9 of the Consultation Paper¹⁹), the band 2570 – 2620 MHz has been allocated for IMT-TDD services whereas frequency planning for the remaining portion of the 2500 – 2690 MHz has yet to be finalised. The arrangements for the coordinated use of the 2.5/2.6 GHz Band are made on the basis of the current use of 2.5/2.6 GHz Band in the Mainland. To ensure efficient use of the 2.5/2.6 GHz Band, OFCA will continue to coordinate with the Mainland authorities and to keep in close touch with the relevant local operators on an on-going basis.

Auction Format

48. In the Consultation Paper, it was proposed that the frequency bands A1 to A5 should be assigned by way of a single auction using Simultaneous Multi-Round Ascending (“SMRA”) format. Under this format, all the available frequency bands will be auctioned simultaneously over multiple rounds with prices changing on each frequency band independently. The SMRA auction format is widely used in other advanced economies and has been adopted by the former TA in a number of radio spectrum auctions in Hong Kong in recent years²⁰. The following question was raised in the Consultation Paper:

Question (8): Do you have any view on the proposed SMRA auction format?

¹⁹ “工信部无〔2010〕428号《关于2.6吉赫兹（GHz）频段时分双工方式国际移动通信系统频率规划问题的通知》。”

²⁰ SMRA format was adopted in the 2009 Auction, the 1800 MHz band auction in June 2009, the 850MHz, 900 MHz and 2 GHz bands auction in February/March 2011, and the 2.3 GHz band auction in February 2012.

Respondents' Views and Comments

49. CMHK, CSL, HKT, HTCL and Qualcomm generally agreed to the proposal. HKT considered that if an auction were to be held, there would be no strong reason to switch over to any other type of auctioning method since operators who have taken part in the previous auctions have become accustomed to this auction format.

CA's Considerations and Decisions

50. The SMRA auction format is well-tested and familiar to the industry. Given the general support of the respondents, **the CA decides that SMRA format should be adopted in the forthcoming spectrum auction.**

Auction Timing

51. The current timetable indicates that the auction may be conducted in the first quarter of 2013 at the earliest after the amendments to be made to the subsidiary legislation under the TO to enable the auction to proceed and SUF to be imposed. The following question was raised in the Consultation Paper:

Question (9): Do you have any view on the time frame for conducting the auction?

Respondents' Views and Comments

52. HKT, HTCL and SmarTone supported the auction timing. HKBN and Qualcomm opined that the auction should be conducted as soon as possible.

CA's Considerations and Decisions

53. Legislative procedures are required for the purpose of designating the relevant spectrum to be subject to SUF and specifying auction as the method of determining the SUF. **Subject to the completion**

of the legislative work, the CA targets to conduct the auction in the first quarter in 2013.

LICENSING ARRANGEMENT

Licensing and Validity Period

54. The radio spectrum in the 2.5/2.6 GHz Band will be assigned with a validity period of 15 years under a unified carrier licence (“UCL”) for provision of fixed, mobile and/or converged services. In line with the current licensing regime, the successful bidder(s), be they new entrants or incumbents, will be issued with a new UCL. For an incumbent licensee, if it is a successful bidder in the proposed auction, it may apply to the CA for combining its existing UCL with the new UCL subsequent to the grant of the new licence.

Network and Service Rollout Obligation

55. In order to prevent spectrum hoarding and to ensure the timely provision of advanced telecommunications services for the benefit of the general public, it was proposed that network and service rollout obligation would be imposed on the successful bidders, requiring them to provide a minimum coverage of 50% of population as regards its mobile services, or a minimum coverage of 200 commercial and/or residential buildings as to its fixed services within five years from the issue of the licence. The following question was raised in the Consultation Paper:

Question (10): Do you agree that the licensee assigned with frequency bands A1 to A5 should be subject to the network and service rollout obligation to provide a minimum coverage of 50% of population as regards mobile services, or a minimum coverage of 200 commercial and/or residential buildings as to fixed services within five years from the grant of the licence?

Respondents' Views and Comments

56. CMHK supported the proposal. HTCL also gave its agreement provided that an incumbent MNO could make use of its existing network to fulfil the rollout requirement.

57. HKBN was of the view that new entrants and existing MNOs should be subjected to different rollout obligations. New entrants have to build the network from scratch. However, existing MNOs have already secured roof-top locations for cell sites, have experience in network planning and are equipped with well developed transmission network. If new entrants were obliged to roll out a network with a minimum coverage of 50% of population within five years from the grant of the licence, then existing MNOs should provide similar coverage within three years from the grant of the licence or provide a minimum coverage of 70% – 80% of population within five years from the grant of the licence. HKBN considered that such a variance is not to create asymmetric regulation, but to create a level playing field for new entrants and existing MNOs.

58. HKT opined that if each MNO was only assigned with 10 MHz of spectrum, this amount would not be sufficient to enable a full network / service to be rolled out. Accordingly, HKT considered that no network or service rollout obligation should be imposed.

CA's Considerations and Decisions

59. Regarding HTCL's comment, the CA would like to point out that, as already stated in the Consultation Paper, an incumbent MNO can make use of its existing network (instead of establishing a completely new network) to fulfil the said network rollout requirement if it can demonstrate that the newly acquired spectrum has been deployed in the network.

60. Regarding HKBN's comment, the CA does not subscribe to HKBN's view of imposing a more stringent rollout requirement on existing MNOs owing to their competitive advantage in rolling out the networks and services. The minimum rollout requirement is set to ensure the actual

deployment of the radio spectrum in the network and deter spectrum hoarding. While the same minimum requirement should provide a level playing ground for all successful bidders, individual operators should be given the flexibility to roll out their networks at such pace and scale based on commercial decisions.

61. Regarding HKT's comments, the CA would like to clarify that the rollout obligation is concerned with coverage requirement rather than capacity requirement to support a certain number of subscribers. With 10 MHz of radio spectrum, the successful bidders should be able to meet the rollout obligation as specified above.

62. Based on the above considerations, **the CA decides that the successful bidder(s) should be subject to network and service rollout obligation to provide a minimum coverage of 50% of population as regards mobile services, or a minimum coverage of 200 commercial and/or residential buildings as to fixed services within five years from the grant of the licence.**

Performance Bond

63. It was proposed in the Consultation Paper that the successful bidder(s) of the 2.5/2.6 GHz Band would be required to lodge a performance bond to ensure compliance with the network and service rollout obligation. The following question was raised in the Consultation Paper:

Question (11): Do you agree that each successful bidder for frequency bands A1 to A5 shall lodge a performance bond as a guarantee of its compliance with the aforesaid network and service rollout obligation?

Respondents' Views and Comments

64. CMHK, HKBN, HKT and HTCL supported the proposal.

CA's Considerations and Decisions

65. Performance bond will give the incentive to the successful bidder(s) of the 2.5/2.6 GHz Band to comply with the rollout obligation. Noting that all respondents have expressed support of the proposal, **the CA decides that each successful bidder for frequency bands A1 to A5 shall lodge a performance bond as a guarantee of its compliance with the aforesaid network and service rollout obligation.**

SUF

66. Consistent with the RSPF, it was proposed in the Consultation Paper that SUF should be charged for the non-Government use of radio spectrum in the 2.5/2.6 GHz Band. Regarding the SUF payment method, it was proposed in the Consultation Paper to adopt an upfront lump sum method as this is simple and easy to administer and has been adopted in a number of previous radio spectrum auctions in Hong Kong²¹. The following question was raised in the Consultation Paper:

Question (12): Do you have any comment on adopting a one-off SUF payment for frequency bands A1 to A5?

Respondents' Views and Comments

67. CSL, CMHK, HTCL and Qualcomm generally agreed to the proposal. Genius, HKBN and HKT have different views.

68. Genius and HKT opined that the Government has very substantial reserves and hence there should be no SUF imposed on the use of frequency bands A1 to A5. They considered that the SUF payment would only serve to increase the MNO's costs and may limit competition. Without the SUF, operators will have more financial resources to invest in building, expanding or improving their networks to offer better, faster and more innovative services.

²¹ Upfront lump sum payment method was adopted in the CDMA 2000 auction in October 2007, the 2009 Auction, the UHF band auction in June 2010, the 850MHz, 900 MHz and 2 GHz bands auction in February/March 2011, and the 2.3 GHz band auction in February 2012.

69. HKBN suggested that payment of SUF should be spread over the term of the licence, so that innovative operators with limited financial resources could enter into the market and compete with existing MNOs which possess significant financial resources.

CA's Considerations and Decisions

70. The CA does not subscribe to the views of Genius and HKT on waiving the SUF as this is against the fundamental principle as stipulated in the RSPF. Under the market-based approach, the CA believes that the market will decide the appropriate level of SUF that reflects the economic value of the radio spectrum as a scarce public resource.

71. On HKBN's suggestion regarding SUF payment by instalments, the same issue had in fact been raised in the 2009 Auction. The considered decision then was to maintain the up-front lump sum payment of SUF²². If SUF payment by instalments were adopted and opted by individual successful bidder, then the CA would have to put in place the necessary measures in order to prevent any default and unfairness, e.g. drawing reference from the licence requirements imposed on the existing 3G licensees, a performance bond with an amount equivalent to the SUF for the next five years would have to be imposed on the licensees. This would require the licensees to secure additional credit from banks and might impose on them additional financial burden. Besides, in the interest of fairness, licensees who make deferred payment would also be required to pay interests. Hence, the SUF payment by instalments is considered administratively burdensome and not conducive to lowering the entry barrier for new entrants. Furthermore, the SUF is only one of the cost considerations that must be met by new entrants. The capability to pay the SUF upfront is a useful tool to measure the financial capability and commitment of the new entrants.

72. Based on the above considerations, **the CA decides that one-off SUF payment approach should be adopted for the forthcoming auction.**

²² See the second batch of questions and answers published by the former TA in the 2009 BWA exercise (http://tel_archives.ofca.gov.hk/en/industry/broadband/qa2.pdf).

WAY FORWARD

73. The CA will recommend to the Secretary for Commerce and Economic Development to introduce the necessary amendments to the regulation under section 32I(2) of the TO to determine the SUF of the frequency bands by auction. The CA will also make an order under section 32I(1) of the TO designating the frequency bands²³ to be subject to the payment of the SUF. Upon passing of the relevant subsidiary legislation by the Legislative Council, OFCA will publish the terms and conditions of the auction and other auction documents for the information of interested parties. The current timetable is to conduct the auction in the first quarter of 2013 at the earliest.

Office of the Communications Authority
4 July 2012

²³ It should be noted that part of the 2.5/2.6 GHz Band, viz. the 2515 – 2540 MHz band, has already been designated by order and amended by regulation in May 2008 for the 2009 Auction. However, the 2515 – 2540 MHz band was not released in that auction since coordination with the relevant Mainland authorities on technical issues in relation to the use of the radio spectrum in that frequency band was required at the time. The 2515 – 2540 MHz band is currently within the spectrum specified in Part 4 of the Schedule to Cap. 106Y. Hence, the current exercise to amend Cap. 106Y and Cap.106AC is concerned with the 2635 – 2660 MHz band only.