

# **Assignment of the Available Radio Spectrum in the 850 MHz, 900 MHz and 2 GHz Bands**

## **Statement of the Telecommunications Authority**

**31 March 2010**

### **INTRODUCTION**

The Telecommunications Authority (“TA”) published the updated Spectrum Release Plan (“SRP”) in April 2009 to inform the industry of the potential supply of frequency spectrum which might be made available to the market in 2009/10 – 2011/12. According to the SRP, frequency spectrum in the following bands is available for assignment:-

#### 850 MHz Band

832.5 – 837.5 MHz paired with 877.5 – 882.5 MHz (“Block A”)

#### 900 MHz Band

885 – 890 MHz paired with 930 – 935 MHz (“Block B”)

#### 2 GHz Band

2010 – 2014.8 MHz unpaired (“Block C1”)

2014.8 – 2019.7 MHz unpaired (“Block C2”)

2. On 20 November 2009, the TA issued a consultation paper<sup>1</sup> entitled “Assignment of the Available Frequency Spectrum in the 850 MHz, 900 MHz and 2 GHz Bands” (the “Consultation Paper”) to seek

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<sup>1</sup> The consultation paper is available at <http://www.ofta.gov.hk/en/report-paper-guide/paper/consultation/cp20091120.pdf>.

comments from the industry and interested parties on the assignment of the available frequency spectrum. The TA also invited expression of interests from interested parties who might wish to bid for the relevant frequency spectrum.

### ***Submissions in Response to the Consultation***

3. In response to the Consultation Paper, the TA received a total of nine submissions (the “Submissions”) from the following parties (listed in alphabetical order).

- (1) Alcatel-Lucent (“Alcatel”)
- (2) China Mobile Hong Kong Company Limited (“CMHK”)
- (3) China Telecom Corporation Limited (“CT”)
- (4) CSL Limited (“CSL”)
- (5) Ericsson Limited (“Ericsson”)
- (6) Hutchison Telephone Company Limited (“HTCL”)
- (7) PCCW-HKT Telephone Limited (“PCCW”)
- (8) Qualcomm Incorporated (“Qualcomm”)
- (9) SmarTone Mobile Communications Limited (“SmarTone”)

The full Submissions may be downloaded from website of the Office of the Telecommunications Authority (“OFTA”)<sup>2</sup>. The TA also received four expressions of interests.

4. After considering the Submissions and expressions of interests received, the TA sets out in this Statement his views on the Submissions and his decisions on the assignment of Blocks A, B, C1 and C2.

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<sup>2</sup> The document is available at <http://www.ofta.gov.hk/en/report-paper-guide/paper/consultation/20100201/table.html>.

## THE AVAILABLE FREQUENCY SPECTRUM

### 850 MHz Band

5. Block A consists of a total of 5 MHz x 2 (832.5 – 837.5 MHz paired with 877.5 – 882.5 MHz) of frequency spectrum.

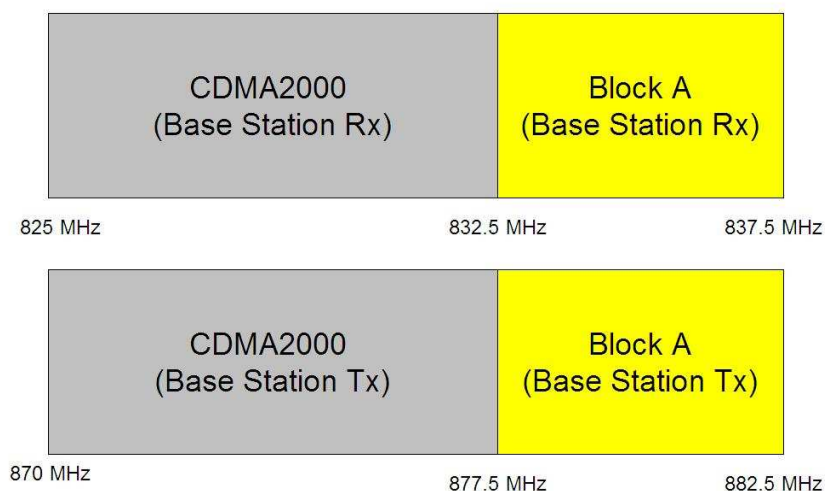


Figure 1 The available radio spectrum (Block A)  
in the 850 MHz band

### *Views and Comments from Respondents*

6. Alcatel, Ericsson, CMHK and CSL proposed to revise the allocation of Block A from 832.5 – 837.5 MHz/877.5 – 882.5 MHz to 880.0 – 885.0 MHz/925.0 – 930.0 MHz. CMHK was of the view that the revised Block A would fall into the 900 MHz band. As a result, this would enable the deployment of GSM and WCDMA technologies, which are supported by a much wider range of handsets worldwide and would hence facilitate customers to switch service providers of their choice.

7. CT supported the auction of Block A and expected that the

successful bidder could introduce a second CDMA2000 network in this frequency band. This would shape a better competitive environment for the CDMA2000 service in Hong Kong and enhance the CDMA2000 roaming and economic ties with other places in the world. The rest of respondents did not comment on the TA's proposal of auctioning Block A.

### *TA's Considerations and Decisions*

8. The TA would like to point out that the proposed revised allocation of Block A is not possible because the 925 – 928 MHz band is currently allocated by the TA as the guard band between the Radio Frequency Identification (“RFID”) devices, which operate in the 920 – 925 MHz band, and the Extended Global System for Mobile Communications (“EGSM”) systems, which operates in the 930 – 935 MHz band.

9. In Hong Kong, the 920 – 925 MHz band is allocated for RFID applications. Users of the RFID equipment in this band are exempted from licensing in accordance with the Telecommunications (Telecommunications Apparatus) (Exemption from Licensing) (Amendment) Order 2005<sup>3</sup>. Without the guard band of 3 MHz (i.e. 925 – 928 MHz), the operation of RFID systems would cause interference to the EGSM systems. The allocation of the 925 – 928 MHz band as a guard band was fully discussed at the 28<sup>th</sup> and 29<sup>th</sup> Radio Spectrum Advisory Committee in 2004/2005<sup>4</sup>. The band plan was also described in detail in the consultation paper entitled “Licensing of Spectrum in the

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<sup>3</sup> A copy of the exemption order can be downloaded from <http://www.ofta.gov.hk/en/ta-regulations/es22005090922.pdf>.

<sup>4</sup> See paragraphs 22 – 28 of the minutes of the 28<sup>th</sup> RSAC meeting (<http://www.ofta.gov.hk/en/ad-comm/rsac/minutes/rsm28.pdf>) and paragraphs 6 – 9 of the minutes of 29<sup>th</sup> RSAC meeting (<http://www.ofta.gov.hk/en/ad-comm/rsac/minutes/rsm29.pdf>).

850 MHz Band to Enable the Provision of CDMA2000 Service” issued by the TA on 27 October 2006<sup>5</sup>.

10. Regarding the point made by CMHK about the availability of handsets, the TA notes that many customer devices supporting multi-systems quad-bands (850/900/1800/2100 MHz) are widely available in the market and customers should therefore have abundant choices of GSM/WCDMA handsets in either the 850 MHz band or the 900 MHz band. As it is currently planned, Block A can support both the CDMA2000 family and the WCDMA family of technologies. The TA is of the view that such a band plan provides for maximum flexibility to potential investors and enhances consumer welfare in the long run.

11. Having considered the comments made by the respondents, **the TA decides to make available Block A with a total of 5 MHz x 2 (832.5 – 837.5 MHz paired with 877.5 – 882.5 MHz) for assignment in the forthcoming auction.**

### **900 MHz Band**

12. Block B consists of a total of 5 MHz x 2 (885 – 890 MHz paired with 930 – 935 MHz) of frequency spectrum. The TA indicated in the Consultation Paper that it would be feasible for Guangzhou-Shenzhen-Hong Kong Express Rail Link (“XRL”) and any other future cross-border railways running within underground tunnels, to share the use of the spectrum with public mobile services. Block B is thus ready for assignment on a shared basis for the following:

(a) Deployment of the spectrum of 885 – 889 MHz paired with

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<sup>5</sup> See paragraphs 25 and 26 of the paper, which may be retrieved at <http://www.ofta.gov.hk/en/report-paper-guide/paper/consultation/20061027.pdf>.

930 – 934 MHz (4 MHz x 2) (“Block bb”) for the railway communications and control system of the cross border railways (including the XRL and possibly the Hong Kong-Shenzhen Western Express Line (“WEL”));

- (b) Provision of public mobile services in the country parks and remote areas (the “Designated Area”)<sup>6</sup>; and
- (c) Provision of public mobile services elsewhere in the territory.

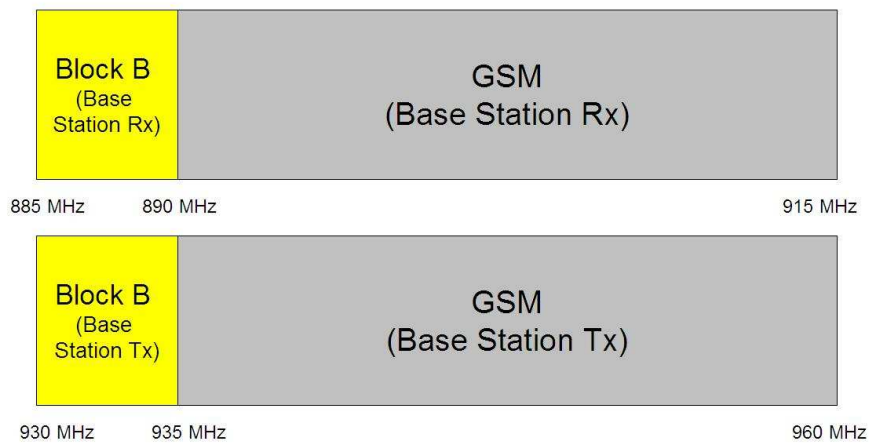


Figure 2 The available radio spectrum (Block B) in the 900 MHz band

***Views and Comments from Respondents***

13. SmarTone was of the view that in the auctioning of 1780.1 – 1785/1875.1 – 1880 MHz band in June 2009, the TA divided the spectrum into six 0.8 MHz x 2 blocks. The spectrum was then acquired

<sup>6</sup> The country park areas and boundaries are defined in the Country Park Ordinance (Cap. 208). The remote areas are located in Robin’s Nest, Sai Kung, Lai Chi Wo, Tai Wan Tau and Lung Shan. The exact boundary of these areas will be specified in the bidding document issued nearer to the time of auction.

and used by different mobile operators and so far there was no evidence of any problem with the deployment. As such, SmarTone suggested that Block B could also be divided into several smaller blocks. On the contrary, CMHK agreed with the TA's proposal and considered that the frequency block should not be further divided into smaller size. Otherwise, it would seriously affect the usability of the spectrum.

### *TA's Considerations and Decisions*

14. In the Consultation Paper, the TA proposed to release a total of 20 MHz of paired spectrum (i.e. two blocks of 5 MHz x 2) and 9.7 MHz of unpaired spectrum (i.e. two blocks of 4.8 MHz and 4.9 MHz) in this exercise. With this amount of spectrum, it is feasible for a new entrant to set up an entirely new territory-wide public mobile network. The TA proposed that the four blocks of frequency spectrum should be open for bidding by any interested parties including incumbent mobile network operators ("MNOs") and new entrants. If Block B is divided into smaller discrete blocks, new entrants or incumbent mobile operators who currently do not have 900 MHz spectrum may find it difficult to deploy Block B to set up a new WCDMA network because the prospect for them to bid successfully for all the blocks and aggregate them as a single block of spectrum would be slim.

15. Having considered the comments made by the respondents, the TA concludes that **Block B will be made available for assignment and it will be assigned in one single block in the auction.**

### *2 GHz Band*

16. Block C consists of a total of 9.7 MHz (2010 – 2019.7 MHz unpaired) of frequency spectrum. At present, popular technical

standards for this frequency band include the Time Division Duplex (“TDD”) standard developed by the 3rd Generation Partnership Project (“3GPP”) and the Time Division-Synchronous Code Division Multiple Access standard championed by the Mainland of China. In line with the existing frequency band plan, the TA has divided the available frequency spectrum in Block C into two blocks, with Block C1 having 4.8 MHz and Block C2 having 4.9 MHz.

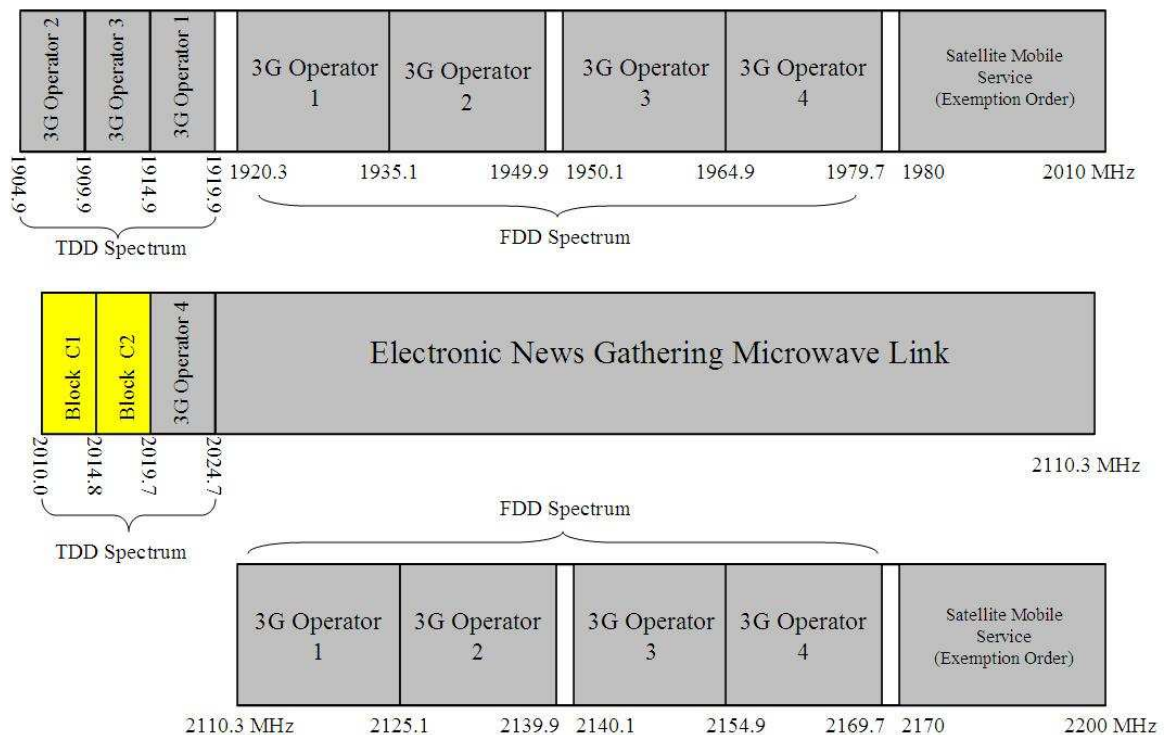


Figure 3 The available radio spectrum (Blocks C1 and C2) in the 2 GHz band

### *Views and Comments from Respondents*

17. PCCW drew the TA’s attention to the development of Integrated Mobile Broadcast (“IMB”) technology as published by the GSM Association (“GSMA”) in its White Paper in September 2009. The IMB

technology is defined as a part of the 3GPP Release 8 standard<sup>7</sup> that enables delivery of mobile broadcast services using 1.9 GHz TDD spectrum<sup>8</sup> (i.e. 1900 – 1920 MHz). PCCW claimed that OFTA’s current assignment of a 0.4 MHz guard band is not adequate to prevent interference caused by the IMB systems, if it is to be introduced in 1914.9 – 1919.9 MHz band, into the adjacent Third Generation (“3G”) Frequency Division Duplex (“FDD”) spectrum band of 1920.3 – 1935.1 MHz. PCCW therefore opined that Blocks C1 and C2 should be withheld at the moment and these blocks should be swapped with the 1909.9 – 1914.9 MHz and 1914.9 – 1919.9 MHz bands which are presently assigned to two 3G operators. After swapping of the frequency blocks, the TA may then allocate the 1914.9 – 1919.9 MHz band as guard band. By doing so, IMB technology can be deployed in Hong Kong and the 3G services in the 1920.3 – 1935.1 MHz band will not be interfered by the IMB systems.

### *TA’s Considerations and Decisions*

18. The TA notes the new technology mentioned by PCCW and its suggestions. However, the proposed frequency allocation of the 1900 – 1920 MHz band for the deployment of IMB systems is incompatible with the existing band plan in Hong Kong. Other than the allocation of 1904.9 – 1919.9 MHz and 2019.7 – 2024.7 MHz bands for 3G TDD services, the 1895.0 – 1906.1 MHz band is also allocated for private cordless telephones conforming to the Personal Handy-phone System standards<sup>9</sup> (“PHS”) and the 1880 – 1900 MHz band is allocated to low

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<sup>7</sup> <http://www.3gpp.org/Release-8>

<sup>8</sup> The following spectrum allocation plan is proposed in the GSMA White paper which can be downloaded at [http://www.gsmworld.com/documents/GSMA\\_IMB\\_WP\\_final.doc](http://www.gsmworld.com/documents/GSMA_IMB_WP_final.doc):

- ◆ The band 1900-1910 MHz for IMB.
- ◆ The band 1910-1915 MHz requires further study on how to use it for IMB services.
- ◆ The band 1915-1920 MHz as a guard band.

<sup>9</sup> The Personal Handy-phone System apparatus for private use in Hong Kong is covered by the Telecommunications (Telecommunications Apparatus) (Exemption from Licensing) Order at

power devices. Therefore, even if the TA agrees to PCCW's proposal and takes the necessary actions to clear the PHS spectrum and swap the bands, the 1900 – 1905 MHz band (or part thereof) will remain unavailable for IMB because a sufficient guard band is required to prevent interference from the exempted devices in 1880 – 1900 MHz band. Thus, only the 1905 – 1910 MHz band may be available in Hong Kong for IMB i.e. only Operator 2 (who is being assigned with the TDD block 1904.9 – 1909.9 MHz, as indicated in Figure 2) may deploy IMB systems locally. While the TA would like to thank PCCW for bringing up the point about IMB to him, he does not consider it necessary to take it on board.

19. In view of the above, **the TA maintains the view that Blocks C1 and C2 with a total of 9.7 MHz (2010 – 2019.7 MHz unpaired) as proposed in the Consultation Paper should be made available for assignment.**

## **ASSIGNMENT OF THE AVAILABLE RADIO SPECTRUM**

### **Eligibility of Bidders**

20. A total of 29.7 MHz frequency spectrum is proposed to be released in this exercise. With this amount of spectrum, it is feasible for a new entrant to set up an entirely new territory-wide public mobile network. The TA therefore proposed that the four blocks of frequency spectrum should be open for bidding by any interested parties, including incumbent MNOs and new entrants, for the provision of public mobile services.

21. Interested parties were asked for their views on the following question:

***Question (1): Do you agree that the frequency blocks should be open for bidding by any interested parties, including the existing MNOs and new entrants, for the provision of public mobile services?***

### ***Views and Comments from Respondents***

22. CT, Qualcomm, Ericsson, and CMHK supported that the bidding should be open to any interested parties including the existing MNOs and new entrants for the provision of public mobile services. CT further opined that the new entrant should be given first priority. SmarTone had no objection to the proposal if the TA ensured that there was a level playing field for both the new and existing licensees.

23. PCCW, CSL and HTCL considered that there was no real advantage in permitting new entrants to bid for the spectrum. They opined that bidding should be restricted to the existing MNOs so that the spectrum could be used to improve network coverage and expand their ranges of services. CSL also considered it not possible for a new entrant to offer a robust mobile network with the four non-contiguous frequency blocks currently being considered.

### ***TA's Considerations and Decisions***

24. On the suggestions that the bidding should be restricted to existing MNOs, the TA wishes to point out that it is always Government's policy to leave it to market forces to determine the number of market players, unless there are constraints imposed by the nature,

such as spectrum availability. As regards CT's opinion that the new entrant should be given first priority, the TA is aware that in some overseas economies priority may be given to new entrants on certain occasions for various policy reasons, including the need to enhance competition in the market. As pointed out by the TA in paragraph 21 of the Consultation Paper, the existing mobile market in Hong Kong is extremely competitive. In June 2009, the mobile service penetration in Hong Kong reached 167%, one of the highest in the world. There are five MNOs offering facility-based competition for both 2G and 3G services. With the recent assignment of spectrum in the 2.5/2.6 GHz bands, more advanced and innovative mobile broadband services are expected in the near future.

25. As the amount of 29.7 MHz spectrum can provide sufficient capacity to allow a new entrant to set up a new mobile network, the TA considers that the investors, including existing MNOs or new entrants, are in the best position to make their commercial decisions on whether there is a business case for bidding for the spectrum for either the establishment of a new mobile network or the expansion of an existing network. The TA is not convinced that the bidding should be restricted to existing MNOs or priority should be given to new entrants.

26. Regarding CSL's comment concerning the possibility for a new entrant to offer a robust mobile network with the four non-contiguous frequency blocks, the TA is of the view that the market is more knowledgeable about the amount of spectrum and the frequency bands that will be required, as well as the optimal technology that should be deployed with the concerned spectrum. Under the technology neutrality policy, existing MNOs or new entrants can provide services using any recognised open standards in the frequency blocks that they have successfully acquired in the auction.

27. Having considered the comments of the respondents, the TA maintains his view that **the bidding should be open for participation by all interested parties including existing MNOs and new entrants under a fair and transparent process.**

### *Spectrum Cap*

28. At present, more than 430 MHz of the radio spectrum is assigned for mobile services. The total spectrum offered in this consultation exercise is 29.7 MHz and this represents a small fraction of the pool of existing assigned spectrum. The TA was of the preliminary view that it is not necessary to impose any restriction on the amount of spectrum that a bidder can acquire during the upcoming auction.

29. Interested parties were asked for their views on the following question:

***Question (2): Do you agree that there should be no spectrum cap imposed upon any bidder in the auction to be held for Blocks A, B, C1 and C2?***

### *Views and Comments from Respondents*

30. CT and SmarTone considered that spectrum cap should be imposed in the auction as sufficient safeguards were necessary to prevent spectrum hoarding. CT considered that bidder should only be allowed to bid for one frequency block. SmarTone noted that the TA had imposed a spectrum cap of 30 MHz for each bidder in the auction of the

2.3 GHz and 2.5/2.6 GHz bands in January 2009<sup>10</sup>. As such, they opined that a spectrum cap of 5 MHz x 2 on Blocks A and B would be an appropriate measure in view of the scarcity of FDD spectrum and to allow more participants using the spectrum to provide a wider variety of services to the public.

31. Qualcomm, Ericsson, CMHK, PCCW, HTCL and CSL expressed support to the TA's proposal. They all agreed that the amount of spectrum released for this auction only accounted for a small fraction of the total amount of spectrum already assigned to MNOs. In addition, CSL and PCCW were of the view that any potential abuse could be addressed by the competition provisions under the Telecommunications Ordinance (the "Ordinance").

### *TA's Considerations and Decisions*

32. The TA notes CT and SmarTone's concern of spectrum hoarding. To address this issue, the TA (as discussed in below paragraphs 62 – 63) will impose network and service rollout obligation on the successful bidder(s) to prevent spectrum hoarding and to ensure the timely provision of advanced telecommunications services for the benefits of general public. The TA will also require the successful bidder to lodge a performance bond to ensure its compliance with the rollout obligations. Furthermore, the TA would like to assure the industry that any potential abuse may be tackled by the competition provisions under the Ordinance.

33. Regarding SmarTone's comments on scarcity of FDD spectrum, while the TA concurs that radio spectrum, be it FDD or TDD spectrum, is

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<sup>10</sup> The TA statement entitled "Providing Radio Spectrum for Broadband Wireless Access Services" dated 3 December 2007 which can be downloaded at <http://www.ofta.gov.hk/en/tas/others/ta20071203.pdf>.

a scarce public resource, the TA is not convinced that imposing a spectrum cap on FDD spectrum (i.e. Blocks A and B) will allow more participants using the spectrum to provide a wide variety of services to the public. The Spectrum Policy Framework<sup>11</sup> promulgated by the Government in April 2007 stipulates that a market-based approach should be used for spectrum wherever there are likely to be competing demands from providers of non-government services. The Government firmly believes that market force will ensure the efficient use of frequency spectrum and MNOs would deploy new and innovative services using the FDD or TDD spectrum based on their own business cases. In any case, the spectrum cap of 30 MHz for the auction of 2.3 GHz and 2.5/2.6 GHz bands in January 2009 (as quoted by SmarTone) is not a useful reference for this case as the current exercise only involves a total of 29.7 MHz spectrum, which is less than one sixth of the total spectrum made available in the 2009 auction.

34. Therefore, **the TA considers that it is not necessary to impose any restriction on the amount of spectrum that a bidder can acquire during the upcoming auction.**

### **Technical Consideration**

#### **850 MHz Band**

35. In the band plan shown in Figure 4 below, there is a guard band of 2.5 MHz between Block A (base transmit) and Block B (base receive). However, it is still necessary for the successful bidder of Block A to prevent and tackle any potential interference to the systems operating in Block B, in particular the GSM-R<sup>12</sup> system(s) for the cross border trains.

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<sup>11</sup> <http://www.cedb.gov.hk/ctb/eng/legco/pdf/spectrum.pdf>

<sup>12</sup> GSM-R is a wireless communication standard for railway network based on the European GSM

In case of unresolved interference, it was suggested in the Consultation Paper that priority of use will generally be given in the following descending order: GSM-R system(s) for railway operation, base stations of another MNO which have an earlier installation date.

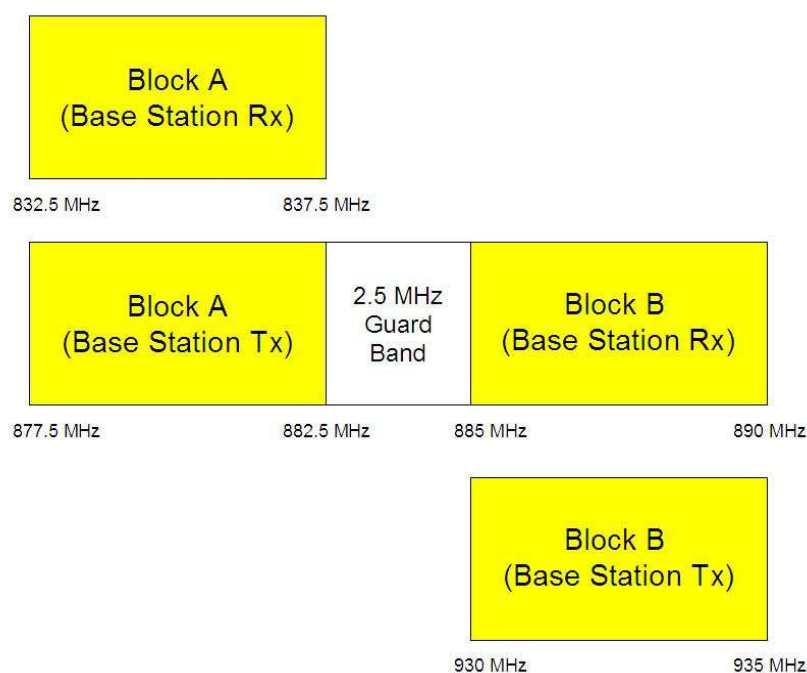


Figure 4 Guard band between Block A and Block B

### **900 MHz Band**

36. Some frequency channels in Block B have been assigned to MNOs for coverage in the Designated Areas, and Block bb has been reserved for the GSM-R system(s) to be used along the routes of the XRL, WEL and other future cross border railways. To avoid radio interference between the different systems, the proposed assignment of Block B is restricted for provision of mobile services outside the Designated Areas and away from the rail link(s).

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standard.

37. It is necessary for the successful bidder of Block B to coordinate closely and to resolve any co-channel and adjacent channel interference issues with the railway operator and MNOs using frequency channels in Block B in the Designated Areas. In case of unresolved interference, the TA proposed that priority of use will generally be given in the following descending order: GSM-R system(s) for railway operation, base stations for public mobile services within the Designated Areas and last of all, base stations for public mobile services outside the Designated Areas.

### **2 GHz Band**

38. According to the SRP, the 2 GHz band is allocated for fixed and mobile services. The available TDD spectrum in the 2 GHz band will be used by the existing 3G operators and the successful bidders of Blocks C1 and C2. All parties using the 2 GHz band should prevent or tackle any potential interference to and from base stations in the vicinity.

39. Interested parties were asked for their views on the following question:

***Question (3): Do you have any view about the interference control measures to be applied to the successful bidder(s) of the four frequency blocks?***

### ***Views and Comments from Respondents***

40. CMHK and CSL raised concern on the interference control between Block A and Block B. Based on the experience in other countries such as Australia and New Zealand, Alcatel believed that filters were likely to be needed on the CDMA base stations for the co-existence

of different band systems in Block A and Block B.

41. Qualcomm, Ericsson, SmarTone, PCCW and Hutchison agreed with the interference control measures as described in the Consultation Paper. Qualcomm advised that a 2.5 MHz guard band should provide sufficient separation between Block A and Block B. SmarTone opined that the industry's practice to resolve any interference through collaboration and coordination had been applied successfully in the past. In this connection, SmarTone believed that the same principle could be applied to the shared use of the 900 MHz spectrum in the Block B. PCCW concurred that the GSM-R systems should always have priority over other neighbouring bands.

42. CSL also raised other concerns on the interference control within Block B, and Blocks C1 and C2.

### ***TA's Considerations and Decisions***

43. The TA notes that only CSL and CMHK had reservation of the adequacy of the 2.5 MHz guard band between Block A and Block B. Some equipment vendors namely Qualcomm and Ericsson explicitly supported TA's proposals on interference control. On the other hand, Alcatel considered that customized filters were likely to be needed on the CDMA base stations for the co-existence of the 850 MHz and 900 MHz band systems. With the support of most of the respondents, particularly the equipment vendors, the TA believes that the 2.5 MHz guard band should provide sufficient separation between Block A and Block B. While the TA believes that most of the potential interference issues could be minimized and resolved through technical coordination among MNOs, MNOs can make their own commercial decisions as to whether and what filters (as recommended by Alcatel) are to be deployed.

44. Regarding Block B, CSL opined that the co-existence of different users in that band might lead to interference issues. The TA would like to point out that, while some frequency carriers of 200 kHz in Block B have been assigned to MNOs for coverage in the Designated Areas, such assignment is restricted for use solely within the Designated Areas. Similarly, in assigning Block bb for railway communications and control, the TA is minded to impose conditions to minimize the problem of signal overspill so as to ensure that the radio transmissions are confined as far as possible along the cross-border railway(s) and their immediate vicinity. With the aforesaid measures and given that, under the preliminary design, WEL and XRL are mostly underground, the TA considers that it is technically feasible to share use the same band if the users of the same frequency spectrum work together closely to prevent mutual interference.

45. For Blocks C1 and C2, CSL opined that interference problem might exist if the two blocks were assigned to different operators. As discussed before, the TA is of the view that most of the potential interference issues could be minimized and resolved through technical coordination among MNOs. The TA also notes a similar view shared by SmarTone that it is a common practice for MNOs to resolve the interference issue through collaboration and coordination, and such principle has been largely applied successfully in the past and the same can be adopted for the use of the proposed spectrum blocks.

46. To conclude, **the TA is of the view that the interference control measures as depicted in paragraphs 35 – 38 should be maintained.**

## **METHOD OF ASSIGNMENT**

### **Auction Format**

47. The TA proposed in the Consultation Paper that the available frequency bands should be assigned by way of a single auction using Simultaneous Multi-Round Ascending (“SMRA”) format. The TA planned to conduct the auction in the last quarter of 2010 at the earliest.

48. Interested parties were asked for their views on the following question:

***Question (4): Do you have any view on the proposed auction format and the time frame for conducting the auction?***

### ***Views and Comments from Respondents***

#### **Auction Format**

49. PCCW said that the TA should make available the information namely which operator was bidding on which spectrum block at each stage of the auction and how many bidders were still left in the auction. It opined that, without this information, operators ended up blindly bidding and the price eventually paid for the spectrum would be higher than it needed to be. PCCW further suggested that the problem could be solved by changing the format of the auction so that operators do not bid “blindly” against each other.

50. Apart from PCCW, other respondents either agreed or had no objection to the TA’s proposal.

### Time Frame

51. CT, CMHK and Qualcomm requested to expedite the auction process whereas PCCW, HTCL and CSL opined that the auction should be postponed. PCCW and CSL commented that in view of the concerns as described in above paragraphs 17 (for Blocks C1 and C2) and 40 – 42 (for Block B) respectively, the time frame of the auction should be delayed. In particular, CSL suggested that the TA should wait and assess the situation of the WEL railway which was still at the preliminary design stage. HTCL pointed out that as the Government was proposing to introduce a spectrum trading regime in Hong Kong, auctioning the spectrum should only be held when the regulatory and implementation framework for spectrum trading have been finalised and promulgated.

52. The rest of the respondents either agreed or had no objection to the TA's proposal.

### ***TA's Considerations and Decisions***

#### Auction Format

53. The primary objective in the design of the radio spectrum auction is to minimise the possibility of collusion among bidders. In particular, bidders shall not coordinate their bidding with other bidders during the auction. Hence only a minimum yet sufficient set of information would be released to bidders. The disclosure of the identity of the standing highest bidder and the information about which bands bidders have placed bids on are highly susceptible to collusion by bidders. As such, the information should remain undisclosed in the auction. This practice is similar to those adopted in overseas economies such as Norway and Sweden in their 2.3 GHz and 2.5/2.6 GHz radio spectrum auctions.

54. In any case, the identity of qualified bidders will be published before the commencement of the auction. The auctioneer will, before the start of each round, announce the round price for each frequency band. At the end of each round, the number of bids received for each frequency band will be disclosed, and the auctioneer will notify each bidder whether it is the standing highest bidder for the frequency band concerned. The standing highest bidder may choose to submit a bid or not to submit a bid in the following round. The risk of the bidder continuing to raise its bid even when it is not outbid is entirely within its own control. It is not necessary for the standing highest bidder to keep raising its bid in order to remain in the auction. As such, the TA does not subscribe to PCCW's comment that bidders will end up "blindly bidding" under the SMRA auction format.

55. The SMRA auction format has been adopted in a number of previous radio spectrum auctions in Hong Kong and the industry has accepted and become familiar with this auction format. The TA notes that, except PCCW, all the respondents supported to adopt SMRA in the forthcoming auction. **The TA decides that SMRA should be adopted in the forthcoming spectrum auction.**

#### Time Frame

56. The interference issues raised by PCCW (for Blocks C1 and C2) and CSL (for Block B) have been adequately addressed in paragraphs 18-19 and 43-46 respectively. While there may be uncertainties posed by the possible interference issue of Block B (as pointed out by CSL), there are market demands urging the TA to expedite the auction process. Moreover, the respondents in general agree with the interference control measures (including the priority of use in case of unresolved interference)

as depicted in the aforesaid paragraphs 35 to 38. As such, the TA does not see any reason why the spectrum auction should be delayed.

57. While HTCL urged the TA to delay the concerned spectrum auction until the implementation framework for spectrum trading has been finalized and promulgated, it did not provide any argument supporting its position. As explained earlier, the Spectrum Policy Framework promulgated in April 2007 stipulates that a market-based approach should be used for spectrum wherever there are likely to be competing demands from providers of non-government services. The Framework stipulates the TA should publish annually a spectrum release plan about the potential supply of spectrum from the TA through an open, competitive bidding or tendering process in the following three years taking into account all relevant considerations. The idea is to give a clear picture to the industry about the supply of spectrum over a planning period of three years. The Framework also makes it clear that the policy inclination is to introduce spectrum trading in Hong Kong in the long term, subject to a feasibility study and resolution of various implementation issues. The TA therefore considers it illogical for HTCL to argue that the Government has to put on hold the supply of spectrum to the market until the implementation framework for spectrum trading has been finalized and promulgated.

58. Having considered the requests from the industry to expedite the auction process, the TA has decided to conduct the spectrum auction in a timely manner. Legislative procedures are required for the purpose of designating the relevant spectrum to be subject to Spectrum Utilization Fee (“SUF”) and specifying auction as the method of determining the SUF. **The earliest date that the auction may be held is the last quarter in 2010.**

## LICENSING ARRANGEMENT

### *Network and Service Rollout Obligation*

59. In order to prevent spectrum hoarding and to ensure the timely provision of advanced telecommunications services for the benefit of the general public, network and service rollout obligation will be imposed on the successful bidders of the frequency spectrum. The TA indicated in the Consultation Paper his intention to require the successful bidder to rollout its network and service in order to provide a minimum coverage of 50% of the population<sup>13</sup> within five years from the issue of the licence. The TA was also inclined to require successful bidders to lodge a performance bond to ensure compliance with the rollout obligations.

60. Interested parties were asked for their views on the following questions:

***Question (5): Do you agree that the licensee assigned with Block A, B, C1 or C2 should be subject to the network and service rollout obligation to provide a minimum coverage of 50% of population within five years from the grant of the licence?***

***Question (6): Do you agree that the successful bidder for Block A, B, C1 or C2 shall lodge a performance bond as a guarantee of its compliance with the aforesaid network and service rollout obligation?***

### *Views and Comments from Respondents*

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<sup>13</sup> The same requirement has been imposed for the 3G spectrum licensed in October 2001 and spectrum in the 2.5/2.6 GHz band licensed in March 2009.

61. The respondents generally agreed to the TA's proposal that the successful bidder for Block A, B, C1 or C2 should be subject to the same network and service rollout obligation to provide a minimum coverage of 50% of population within five years from the grant of the licence and shall lodge a performance bond as a guarantee of its compliance with the aforesaid network and service rollout obligation.

### *TA's Considerations and Decisions*

62. To better guarantee the fulfilment of the rollout requirement, a performance bond should be lodged. As pointed out in paragraph 35 of the Consultation Paper that an incumbent MNO can make use of its existing network (instead of establishing a completely new network) to fulfil the said network rollout requirement, the TA would like to reiterate that the concerned incumbent MNO is required to demonstrate to the satisfaction of the TA that the newly acquired spectrum has served the purpose of expanding the existing network. Once the roll-out obligation is fulfilled, the performance bond will be discharged.

63. Given that there is no objection to the proposals, the TA concludes that **the successful bidders for Block A, B, C1 or C2 should be subject to the network and service rollout obligation to provide a minimum coverage of 50% of population within five years from the grant of the licence and shall lodge a performance bond as a guarantee of its compliance with the aforesaid network and service rollout obligation.** The amount of the performance bond will be specified by the TA nearer the time of the auction.

### *Open Network Access Requirement*

64. With intense facilities-based competition in the market nowadays,

the TA did not intend to impose Open Network Access (“ONA”) requirement on the successful bidders of the spectrum bands in question. The TA also proposed to lift the ONA requirement currently imposed on the 2G and 3G licensees in this consultation exercise.

65. Interested parties were asked for their views on the following questions:

***Question (7): Do you agree that the licensee assigned with Block A, B, C1 or C2 should not be subject to the ONA requirement?***

***Question (8): Do you agree that the ONA requirement currently imposed on the 2G and 3G licensees should be lifted?***

### ***Views and Comments from Respondents***

#### ***ONA Requirement on Blocks A, B, C1 and C2***

66. Respondents generally supported the proposal that the licensee assigned with Block A, B, C1 or C2 should not be subject to the ONA requirement.

#### ***ONA Requirement on 2G and 3G Radio Spectrums***

67. Respondents generally agreed to or had no comment on TA’s proposal to lift the ONA requirement imposed on both 2G and 3G licensees.

68. However, CMHK, while agreeing to lift the ONA requirement imposed on 2G licensees, opposed to the proposal to lift the ONA requirement imposed on 3G licensees. CMHK considered that the ONA

requirement was a key part of the auction rules when the 3G spectrum was assigned and thus should not be removed.

### *TA's Considerations and Decisions*

#### *ONA Requirement on Blocks A, B, C1 and C2*

69. During the past decade, the market has changed rapidly and the TA is mindful that the regulatory regime has to be updated from time to time so that it may cope with the latest market development. In fact, the TA has no longer imposed any ONA requirement in the recent assignment of the CDMA2000 spectrum and spectrum in the 2.5/2.6 GHz band. The need or otherwise of the ONA requirement has also been discussed extensively during the formulation of the licensing framework for these two frequency bands. With the unanimous support of all the respondents, the TA **decides that the ONA obligation will not be imposed on Blocks A, B, C1 and C2.**

#### *ONA Requirement imposed on 2G and 3G licensees*

70. The TA has the duty to keep the regulatory regime, including the conditions of telecommunications licences, abreast of the industry development. The fact that licence conditions were part of the terms of the spectrum auction under which the licence was granted, should not prejudice or limit the discretion of the TA to amend the licence conditions under the powers conferred by the Ordinance or regulations thereunder. Carrier licences have a validity period of 15 years. It would be unreasonable if the TA did not, where the circumstances so warrant, consider any change of licence conditions throughout such a long period of time. Of course, in considering whether or not a licence condition should be amended, regard must be given to all relevant considerations.

These include, without limitation, whether the licence condition is a material term of the auction and continues to be material in the circumstances; and whether interests of the licensees and/or of other parties would be adversely and unreasonably affected.

71. The TA notes that the ONA requirement is imposed on 3G licensees as part of the terms of the 3G spectrum auction. The 3G licences were granted in 2001. Since then, more spectra have been released to the market. The TA has not so far received any requests for regulatory intervention under the ONA requirement. It transpires that the ONA requirement as a term of the auction, even if it was material at the time of the auction, may no longer be material in the present circumstances. Nevertheless, the TA takes note that the ONA requirement has been in place for more than eight years. The ONA requirement on the 3G licensees may serve as a potential mechanism for mobile virtual network operators and content providers to seek for access to the 3G networks. The TA has never heard from the 3G licensees that they encounter any difficulties because of the presence of the ONA requirement. Further, the 3G licences are due to expire by October 2016 i.e. some six years away. As such, **the TA decides that the ONA requirement should be retained in the 3G licences until their expiry.**

72. As far as 2G licensees are concerned, although the ONA requirement is incorporated into their licences, the TA has granted a waiver for them. Thus the ONA requirement for 2G licensees has, in effect, never come into operation. The TA does not see that, lifting of the ONA requirement for 2G licensees would adversely affect the interest of any third party. Having taken into account the reasons mentioned in paragraph 69 above and the unanimous support of all the respondents, **the TA decides to release the 2G licensees from the ONA requirement.** The 2G licensees may return their licences to OFTA for amending the

relevant licence condition.

## **SPECTRUM UTILIZATION FEE**

73. In the 2.5/2.6 GHz band auction and CDMA2000 auction, an upfront lump sum payment of SUF was adopted. This method has the merit of being simple and easy to administer. As mentioned in the Consultation Paper, the TA was inclined to adopt the same payment method for Bands A, B, C1 and C2.

74. If an incumbent MNO acquires Blocks B, C1 and C2, the frequency spectrum may be used interchangeably with its existing frequency spectrum. In the Consultation Paper, a simple pro-rata method was proposed to allocate the Network Turnover in proportion to the respective amount of radio spectrum<sup>14</sup>.

75. Interested parties were asked for their views on the following question:

***Question (9): Do you have any comment on adopting a one-off SUF payment for each of Block A, B, C1 and C2?***

### ***Views and Comments from Respondents***

76. PCCW suggested that, in the interests of fairness, the SUF payable on Blocks B, C1 and C2 should adopt a calculation scheme

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<sup>14</sup> For example, if Network Turnover for an incumbent MNO holding existing frequency spectrum of 39.8 MHz in the 900 / 1800 MHz bands and newly acquired frequency spectrum of 10 MHz in Block B is HK\$100 million, the Network Turnover allocated to the existing frequency spectrum would be prorated to HK\$79.9 million only (i.e. HK\$100 million x 39.8MHz / 49.8 MHz). The remaining HK\$20.1 million of Network Turnover is not subject to the SUF formula since the incumbent MNO has already paid the upfront lump sum SUF for Block B.

similar to that presently used for 2G and 3G spectrum as the services provided under the said Blocks would compete directly with the existing 2G and 3G mobile services. This would alleviate the need of having to perform the pro-rata Network Turnover calculation proposed by the TA. Alternatively, to be consistent, PCCW considered that no further annual SUF should be paid on the 2G and 3G spectrum currently in use.

77. HTCL had no objection to adopting a one-off SUF payment for each of Block A, B, C1 and C2. However, as regards the simple pro-rata method to allocate the Network Turnover in proportion to the respective amount of radio spectrum, HTCL was of the view that the annual royalty of the spectrum in the 1.9 - 2.2 GHz Band subject to a minimum pre-determined annual amount for each licence year should be abolished. HTCL commented that an option should be provided to all spectrum holders of the 1.9 - 2.2 GHz Band to settle the SUF by way of a one-off upfront lump sum payment so that the spectrum could be fully tradable when the spectrum trading regime is introduced.

78. Other respondents either agreed or had no comment to TA's proposal to adopt a one-off SUF payment for each of Block A, B, C1 and C2.

### ***TA's Considerations and Decisions***

79. The TA has reviewed the mechanisms of charging SUF in terms of annual royalties and in terms of an upfront lump sum payment. The TA is of the view that the latter is simpler and incurs less administrative cost. Given that the proposed Blocks B, C1 and C2 may or may not be used for expansion of the existing 2G and 3G services, the TA does not subscribe to PCCW that the SUF calculation methodology for the blocks in question should follow strictly the one adopted for the existing 2G and

3G services.

80. Concerning PCCW's alternative proposal to change the existing charging method applicable to 3G spectrum, the TA would like to point out that the SUF payable by way of annual royalties (calculated with reference to the network turnover) were determined through the 3G auction under the stipulation of the Telecommunications (Method for Determining Spectrum Utilization Fees) (Third Generation Mobile Services) Regulation. It was a material term of the then 3G auction which might have a bearing on the commercial decision of the then potential bidders in determining whether or not to participate in the auction. The subsequent change proposed by PCCW would likely be challenged as unfair by the then potential bidders who had been discouraged by the annual royalties and had decided not to participate in the auction. Further, the annual royalties continue to be material as a Government revenue and considerable public interest is at stake. It is thus considered inappropriate to change the charging mechanism applicable to 3G spectrum.

81. In response to HTCL's comment about the relationship between SUF and spectrum trading, the TA considers that the SUF payment method, irrespective of whether it is a one-off upfront lump sum payment or a series of annual payments, should not affect the spectrum trading. All unfulfilled licence obligations should be taken into account by the seller and the buyer in a spectrum transaction and be suitably reflected in the transactional price. In formulating the future spectrum trading regime, the TA will ensure that all licence obligations which are continuing or unfulfilled shall properly be taken up by the transferee of the spectrum.

82. The TA notes the general favourable views held by the industry

that the one-off SUF payment approach applied by OFTA in recent spectrum auction is both simpler and easier to administer. To minimise the costs of the MNOs and the Government involved in the administration of the SUF collection, the TA considers that the one-off SUF payment approach should be adopted for the forthcoming auction.

83. As explained in paragraph 41 of the Consultation Paper, the TA is minded not to impose SUF on the use of the relevant spectrum for the provision of mobile services solely in Designated Areas and on the use of Block bb for railways communications and control along any cross-border railways between Hong Kong and Mainland China.

84. Based on these considerations, **the TA will recommend to the Secretary for Commerce and Economic Development (“the Secretary”)** that in the making of the regulation under section 32I(2) of the Ordinance, the level, or the method for determining the level, of SUF will be based on a scheme whereby the SUF is paid as a one-off lump sum and the use of the relevant spectrum for the purpose as stated in paragraph 83 will not be subject to SUF.

## **OTHER COMMENTS**

85. The respondents provided the following comments on the issues other than those elicited in the Consultation Paper.

### ***The Shared Use of the 900 MHz Spectrum in the Designated Areas***

86. Regarding the 900 MHz spectrum in Block B, SmarTone would like to know if OFTA would set an exit date for the shared use of the 900 MHz spectrum in the Designated Areas.

### *TA's Considerations and Decisions*

87. The TA considers that it is in the public interest to provide and maintain satisfactory mobile coverage in the Designated Areas. As discussed in paragraph 12 of the Consultation Paper and taken into account the public interest of having satisfactory mobile coverage in the Designated Areas, **the TA will maintain the policy of shared use of spectrum in these areas.**

### *PCCW's Obligation to Provide CDMA2000 Services*

88. PCCW considered that if the successful bidder of Block A wishes to use the spectrum to offer its own CDMA2000 service, PCCW should be released from its obligation to provide such services.

### *TA's Considerations and Decisions*

89. The TA would like to point out that the frequency band of 825 – 832.5 MHz paired with 870 – 877.5 MHz (7.5 MHz x 2) was released for auction on the basis that the frequency band would be used to provide CDMA2000 services. The condition that the frequency band should be used for CDMA2000 is a material term of the auction and continues to be material throughout the whole duration of the licence. **The TA would like to make it clear that PCCW's obligation to provide CDMA2000 service will remain for the whole duration of its licence.**

### **WAY FORWARD**

90. The TA will recommend to the Secretary to enact the necessary

regulation under section 32I(2) of the Ordinance to determine the SUF of Blocks A, B, C1 and C2 by auction. The TA will also make an order under section 32I(1) of the Ordinance designating Blocks A, B, C1 and C2 to be subject to the payment of the SUF. Upon passing of the relevant subsidiary legislation by the Legislative Council, the TA will publish the terms and conditions of the auction. Upon completion of the necessary legislative process, the TA will publish the bidding documents or Information Memorandum for information of interested parties in a timely manner. The current timetable indicates that the auction may be conducted in the last quarter of 2010 at the earliest.

**Office of the Telecommunications Authority**  
**31 March 2010**