PROVIDING RADIO SPECTRUM FOR BROADBAND WIRELESS ACCESS SERVICES

Statement of the Telecommunications Authority

3 December 2007

INTRODUCTION

Broadband Wireless Access ("BWA") is a radio access technology that can support a variety of wide area high-speed wireless data services. In addition to deployment in customer access networks (such as broadband wireless local loops for fixed customers or direct access networks for fixed or mobile customers), the technology may also be used as wireless backhaul for fixed or mobile networks. A number of economies including Australia, New Zealand, France, Germany, the UK, Japan, Singapore, South Korea, Taiwan and the US have already deployed or planned to deploy BWA services shortly.

2. The Telecommunications Authority (the "TA") has conducted public consultation on the deployment of BWA services in Hong Kong in December 2004 (the "First Consultation Paper")[1], August 2005 (the "Second Consultation Paper")[2] and May 2007 (the "Third Consultation Paper"). In the First and Second Consultation Papers, it was proposed to allocate the 3.4 – 3.6 GHz band for BWA services. However, after conducting detailed studies and extensive field tests, the TA decided to withdraw the proposal as the proposed allocation might cause interference to fixed satellite services operating in the adjacent frequency band.

3. The TA issued the Third Consultation Paper[3] on 11 May 2007 to solicit views and comments from industry stakeholders and interested parties about the allocation of the 2.3 – 2.4 GHz band (the "2.3 GHz band") and the 2.50 – 2.69 GHz band (the "2.5 GHz band") for the provision of BWA services in Hong Kong. The TA also invited expression of interests from interested parties who might wish to provide BWA services in Hong Kong.

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[1] "Licensing Framework for Deployment of Broadband Wireless Access" issued on 20 December 2004 (http://www.ofta.gov.hk/en/report-paper-guide/paper/consultation/20041220.pdf).

[2] "Second Consultation Paper on Licensing Framework for Deployment of Broadband Wireless Access" issued on 31 August 2005 (http://www.ofta.gov.hk/en/report-paper-guide/paper/consultation/20050831.pdf)

[3] "Third Consultation Paper on Providing Radio Spectrum For Broadband Wireless Access Services" issued on 11 May 2007 (http://www.ofta.gov.hk/en/report-paper-guide/paper/consultation/20070511.pdf).

Submissions in response to the Third Consultation

4. In response to the Third Consultation Paper, the TA received a total of seventeen written submissions (the "Submissions") from the following parties (listed in chronological order).

(1) Alcatel-Lucent Asia Pacific ("Alcatel-Lucent")
(2) Nortel
(3) Ericsson Limited, Hong Kong ("Ericsson")
(4) The WiMAX Forum
(5) China Mobile Peoples Telephone Company Limited ("Peoples")
(6) Nokia and Nokia Siemens Networks ("Nokia&NSN")
(7) Hong Kong Internet Service Providers Association ("HKISPA")
(8) Hong Kong Broadband Network Limited ("HKBN")
(9) SmarTone Mobile Communications Limited ("SmarTone")
(10) PCCW-HKT Telephone Limited ("PCCW")
(11) Qualcomm International Inc. ("Qualcomm")
(12) Consumer Council ("CC")
(13) BTconsultancy LLC and Wrege Associates ("BTc&WA")
(14) New World Telecommunications Limited ("NWT")
(15) Wharf T&T Limited ("Wharf T&T")
(16) Hutchison Telecommunications (Hong Kong) Limited ("HTHK")
(17) Hong Kong CSL Limited and New World PCS Limited ("CSLNWM")

The TA also received four expressions of interests.

5. The TA has duly considered the views and comments received in response to the Third Consultation Paper. This Statement sets out the considered views of the TA on the relevant issues and the regulatory framework for licensing BWA services in Hong Kong.

SPECTRUM SUPPLY AND AVAILABILITY

6. The Third Consultation Paper proposed to allocate the 2.3 GHz band for BWA services in Hong Kong. A frequency allocation plan as depicted in Annex 1 was proposed. The 2.3 GHz band would be divided into 20 blocks of 5 MHz width, with 18 frequency blocks (Block 2 to 18 and conditionally for Block 1) made

available for BWA deployment[4].

7. The Third Consultation Paper identified that there were competing demands for third generation mobile services ("3G"), BWA and mobile TV services to operate in the 2.5 GHz band in Hong Kong. Furthermore, the World Radiocommunication Conference 2007 ("WRC-07")[5] of the International Telecommunication Union ("ITU") would discuss the sharing criteria between space services and terrestrial services in the 2.5 GHz band. In the public consultation paper entitled "Consultation on Digital Broadcasting: Mobile Television and Related Issues" issued by the Communications and Technology Branch of the Commerce, Industry and Technology Bureau on 26 January 2007, it was proposed that the deployment of the frequency channels in the 2.5 GHz band for mobile TV would be subject to the outcome of the WRC-07. In the light of the above, the Third Consultation Paper indicated that it might be pre-mature to consider the allocation of the 2.5 GHz band for BWA services, but the TA would nonetheless keep in view the development in WRC-07 and determine the way forward for the 2.5 GHz band.

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

Question (1): *Do you agree that the 2.3 GHz band be allocated for BWA services? If agreed, when the spectrum should be made available?*

Question (2)*: Do you agree that the opening up of the 2.5 GHz band for BWA should be considered at a later stage? If agreed, when and how much of the bandwidth should be made available to the market?*

Question (3)*: Do you have any preferred frequency bands for BWA services? When the spectrum should be made available to the market?*[6]

Views and Comments from Respondents on the 2.3 GHz Band

9. Alcatel-Lucent, Nortel, Nokia&NSN, NWT and Wharf T&T supported the use of the 2.3 GHz and 2.5 GHz bands for BWA services. However, HTHK proposed only making available part of the 2.3 GHz band for fixed wireless or backhaul deployment first. Furthermore, HTHK considered that the issue regarding the spectrum allocation for the expansion of 3G services in the 2.5 GHz

[4] There will be 20 frequency blocks of 5 MHz each starting from 2.3 GHz. The 19th and 20th block will form guard bands while the remaining 17 blocks are available for BWA services. Block 1 may also be used for BWA with some special arrangements.

[5] The WRC-07 was held in Geneva, Switzerland from 22 October 2007 to 16 November 2007.

[6] This is only part of the original question. The remaining part of the question is addressed in paragraph 21.

band should be resolved first. On the other hand, HKBN and CSLNWM argued that there was insufficient information to consider whether the 2.3 GHz band was the appropriate band for BWA. Ericsson and Qualcomm opined that the 2.3 GHz band should be allocated for mobile services only.

Views and Comments from Respondents on the 2.5 GHz Band

10. The views and responses received can be broadly classified into three groups: (a) Peoples, HKBN, SmarTone, PCCW, Qualcomm and Wharf T&T considered that the opening up of the 2.5 GHz band for BWA should be considered at a later stage, (b) Nortel, the WiMAX Forum and NWT supported that the 2.5 GHz band be released as soon as possible, and (c) Ericsson, HTHK and CSLNWM considered that the 2.5 GHz band should be used for the expansion of 3G mobile services. The following table depicts an overview of the comments of the respondents on the frequency allocation plan of the 2.5 GHz band.

Respondents	Allocation of the 2.5 GHz band
Nortel, the WiMAX Forum, HKBN and PCCW	Limited to BWA services only
Qualcomm	BWA services using 3G technology
Nokia&NSN, NWT	Mixed BWA and 3G services
Ericsson, HTHK and CSLNWM	3G services only
Peoples and SmarTone	To decide after WRC-07 made the decisions
Wharf T&T	Further discussions needed

11. As a general comment, CC suggested that the amount of spectrum in the 2.5 GHz band should be disclosed as soon as the frequency allocation plan was settled in order that bidders will not overbid for the 2.3 GHz band. PCCW also suggested that the TA should wait for the outcome of WRC-07 before making any decision to release the 2.3 GHz band in Hong Kong. It further proposed that the 2.3 GHz and 2.5 GHz bands should be released at the same time.

Subsequent Developments and TA's Considerations

12. The WRC-07, which was held in Geneva, Switzerland from 22 October to 16 November 2007, has identified the 2.3 GHz band for International Mobile Telecommunications ("IMT") including IMT-2000[7] and IMT-Advanced[8]. This

[7] International Mobile Telecommunications-2000 (IMT-2000) is the global standard for third generation (3G) wireless communications as defined by the ITU.

[8] International Mobile Telecommunications - Advanced (IMT-Advanced) is a concept of the ITU for mobile communication systems with capabilities which go further than that of IMT-2000.

identification does not preclude the use of the band by any application of the services to which they are allocated and does not establish priority in the ITU Radio Regulations.

13. The ITU Radiocommunication Assembly ("RA-07"), which was held on 15 – 19 October 2007, also approved the inclusion of WiMAX[9] as one of the radio interface standards of the IMT-2000 family in the Recommendation ITU-R M.1457[10]. With this arrangement, WiMAX being a member of IMT-2000 family can coexist with other IMT-2000 standards in the spectrum identified for IMT, including the 2.3 GHz band and the 2.5 GHz band.

14. It is noted that the technological development of BWA products and BWA deployment will become clearer and more mature in 2008. According to the WiMAX Forum, mobile WiMAX certified equipment will begin to be added to the product registry in 2008. Alcatel-Lucent, Nortel and Nokia&NSN indicated that BWA network equipment for the 2.3 GHz band and the 2.5 GHz band is readily available on the market. As a matter of fact, the TA notices that a number of economies have already made available the required spectrum and even issued the licences for BWA services. For example, Singapore and Taiwan have conducted BWA auctions and issued the relevant licences in 2005 and 2007 respectively. The TA considers that it is appropriate time to make available spectrum to the market for timely introduction of BWA services in Hong Kong. After considering the decisions of WRC-07 and RA-07 and the availability of BWA equipment for both the 2.3 GHz band and the 2.5 GHz band, the TA considers that both the 2.3 GHz band and the 2.5 GHz band should be made available to the market.

15. CSLNWM urged the TA to provide more information on the frequency coordination with the mainland authorities in relation to the use of the 2.3 GHz and 2.5 GHz bands for BWA in Hong Kong. Peoples and SmarTone considered that the 2.3 GHz band should only be released after all frequency coordination issues with the mainland have been resolved. As stated in the Third Consultation Paper, Hong Kong and Guangdong have already had an established mechanism in place for frequency coordination. As a matter of fact, the Office of the Telecommunications Authority ("OFTA") has already completed the initial coordination[11] with its mainland counterparts regarding the use of the 2.3 GHz

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[9] WiMAX, which refers to Worldwide Interoperability for Microwave Access, is one of the emerging radiocommunication technologies which supports fixed and mobile BWA services based on the IEEE 802.16 standard. The mainland of China has reserved its position in the RA-07 to include WiMAX into the IMT-2000 family.

[10] "Detailed specifications of the radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)" issued by the ITU-R.

[11] Frequency coordination is an on-going process. Hong Kong will follow up with the mainland authorities in accordance with the established frequency coordination agreement to avoid excessive signal overspill and mutual radio interference to the respective services across the borders.

band.

16. OFTA and the Guangdong authorities have been coordinating on the use of the 2.5 GHz band in Hong Kong, Shenzhen and Zhuhai. According to the frequency plan adopted in the mainland of China, the sub-band 2535 – 2599 MHz is allocated for Microwave Multipoint Distribution System ("MMDS"), which is deployed for distribution of television programmes. OFTA will follow the established procedure to coordinate the use of the sub-band for BWA services in Hong Kong. OFTA expects that the initial coordination of the 2.5 GHz band can be completed by the fourth quarter of 2008, when the spectrum for BWA services will be auctioned.

17. Further, the TA is aware that the mainland of China is planning to launch a satellite in 2008 for broadcasting satellite service in the sub-band 2635 – 2660 MHz. The service has come to be known as China Mobile Multimedia Broadcasting ("CMMB"). As explained in paragraph 7, this sub-band is also a candidate band for mobile TV services in Hong Kong. In this connection, the TA will put aside the 2635 – 2660 MHz sub-band for the time being until a decision is made by the Government about the provision of mobile TV services in Hong Kong. There may be a need to make available guard bands on both sides of the sub-band to protect the services. Subject to the result of the coordination with the mainland in relation to the use of the sub-band 2535 – 2599 MHz (as referred to the above paragraph) and the sub-band 2635 – 2660 MHz (as explained in this paragraph), it is anticipated that an amount of about 100 – 150 MHz in the 2.5 GHz band will be available for BWA services. A tentative band plan for this band is depicted in Annex 2. The exact band plan will be finalised and announced in the Information Memorandum published for the auction.

18. In the light of the above considerations and the strong competing demands on the use of frequency spectrum for various services, the TA decides to allocate the following bands for BWA services:

(a) the whole of the 2.3 GHz band (with a total of 90 MHz of frequency spectrum); and
(b) the whole of the 2.5 GHz band, with the exception of the sub-band 2.635 – 2.660 GHz which will be further addressed in the forthcoming consultation exercise on mobile TV services. Subject to the coordination with the Guangdong authorities, about 100 – 150 MHz of frequency spectrum in the 2.5 GHz band can be made available for BWA services.

The TA will amend the Hong Kong Table of Frequency Allocations and allocate the 2.3 GHz and the 2.5 GHz bands to "FIXED" and/or "MOBILE"

services.

19. As IMT is an international standard approved by the ITU for the 2.3 GHz and 2.5 GHz bands, it could be a candidate technology for BWA which could be fixed, mobile or fixed-mobile convergence services. In the rest of this Statement the term "BWA" will cover BWA and IMT services unless specifically stated otherwise. The detailed frequency plans of the 2.3 GHz and 2.5 GHz bands will be discussed later in this paper.

BAND PLAN

20. The Third Consultation Paper proposed a frequency allocation plan (as depicted in Annex 1) for the 2.3 GHz band. The band was to be divided into 20 blocks of 5 MHz width, with 18 frequency blocks (Block 2 to 18 and conditionally for Block 1) made available for BWA deployment.

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

Question (3)*: How much spectrum do you need initially and for future expansion (number of blocks, spectrum width of each block, in which bands?*

Question (4)*: Do you agree with the proposed frequency allocation plan given in Annex 1? If not, what is your proposal?*

Question (5)*: Do you agree that a BWA licensee should be assigned with no more than six 5 MHz blocks of the BWA spectrum?*

Question (6)*: If the result of the coordination with the mainland authorities confirms that 85 MHz bandwidth in the 2.3 GHz band can be made available, do you agree that the TA should make available all the 85 MHz bandwidth for BWA services? If not, what is your proposal with reasons?*

Question (7)*: Do you have any views on the frequency allocation plan for the 2.5 GHz band?*

Views and Comments from Respondents

22. SmarTone questioned why each BWA licensee would be assigned six 5 MHz blocks. It opined that a detailed study on spectrum efficiency would be necessary before deciding the amount of spectrum to be allocated to a bidder of the BWA auction. HKBN considered that, if a bidder could only bid for a maximum of six blocks of BWA spectrum (i.e. 30 MHz of spectrum), it would restrict the services to be offered. CSLNWM was uncertain whether 30 MHz would be sufficient for BWA deployment and whether a higher spectrum cap would be necessary for a viable commercial deployment of BWA services.

23. PCCW opined that at least 40 MHz would be needed for the provision of comprehensive BWA services and quoted examples in New Zealand and Taiwan where the two regulators have offered six BWA licences respectively. It also argued there should not be spectrum cap for a bidder as the bidding process would naturally determine the appropriate amount of spectrum to be allocated and any hoarding issues could be dealt with by applying section 7K or 7L of the Telecommunications Ordinance ("TO"). On the other hand, NWT expressed doubt about the effectiveness or efficiency of *ex post* regulation which might entail time-consuming debate and inadequate remedy even if it was determined that a contravention had occurred.

24. Ericsson, Nokia&NSN, Qualcomm and NWT proposed that the frequency allocation plan of the 2.5 GHz band should be referenced in accordance with the Recommendation ITU-R M.1036[12], and particularly the C1 and C2 plans. The two band plans both consisted of three sub-bands: lower sub-band (2500 – 2570 MHz) for FDD uplink, centre sub-band (2570 – 2620 MHz) for TDD (in the case of C1 plan) or external FDD downlink (in the case of C2 plan) and upper sub-band (2620 – 2690 MHz) for FDD downlink.

25. Further, Nokia&NSN and NWT were of the view that the 2.5 GHz band should be packaged for technology neutral use to meet competing demands from 3G services, BWA services and mobile TV services, where the TDD part could be used for BWA services and the FDD pairs be reserved as expansion bands for 3G services.

[12] "Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications-2000 (IMT-2000) in the bands 806-906 MHz, 1710-2025 MHz, 2110-2200 MHz and 2500-2690 MHz" issued by the ITU-R.

26. The following table summarizes the respondents' views about the amount of spectrum required for BWA licensee in the 2.3 GHz band:

Respondents	Proposed Spectrum Allocation per BWA licensee
HKBN	5 MHz
HTHK	15 MHz
Alcatel-Lucent, Nortel, the WiMAX Forum, Peoples and NWT	≦ 30 MHz
Nokia&NSN and Wharf T&T	≧ 30 MHz
PCCW	≧ 40 MHz

TA's Considerations

27. Regarding the appropriate amount of spectrum required for each BWA licensee, the TA notes that there is general support from the respondents including the WiMAX Forum, equipment suppliers as well as existing fixed and mobile operators that a bidder should be allowed to bid for a maximum of six frequency blocks (i.e. 30 MHz of spectrum) for BWA services. With reference to similar exercises in Singapore, Taiwan, South Korea, Japan, and Malaysia, they all set a spectrum cap of 30 MHz for each BWA licensee in either or both of the 2.3 GHz and 2.5 GHz bands. As a result, the TA considers that the proposal for a maximum of six frequency blocks (i.e. a total of 30 MHz) per BWA bidder is justifiable.

28. HTHK suggested that a similar spectrum cap of 15 MHz adopted in the 3G auction should apply and that each bidder should be allowed to bid for a maximum of 15 MHz for BWA. PCCW proposed to allow operator to bid for 40 MHz or even unrestricted spectrum width in the 2.3 GHz band. The TA considers that the appropriate amount of spectrum for an operator should be determined on a case-by-case basis with regard to the relevant technologies and standards adopted and the coverage and service requirements. It is inappropriate for the TA to adopt an identical spectrum cap for different types of services. As far as BWA services are concerned, the TA has made reference to the approaches of other economies and the opinion of the WiMAX Forum. The TA is of the view that an amount of 30 MHz should be technically sufficient for a BWA network to provide acceptable coverage and quality services. The TA notes that whilst under-assignment would create technical difficulties to the operator, over-assignment would not be conducive to the efficient use of spectrum. In deciding that 30 MHz is the appropriate amount of spectrum to be assigned to each BWA licensee, the TA considers that he has struck the proper balance. Further, it is worth noting that each

3G licensee has actually been assigned two blocks of 15 MHz of Frequency Division Duplex ("FDD") plus one block of 5 MHz spectrum for Time Division Duplex ("TDD") i.e. a total of 35 MHz spectrum. HTHK's concern is therefore misconceived.

29. The TA notes that PCCW is in favour of having *ex post* regulation in relation to the allocation of the spectrum to each BWA licensee. However, NWT favoured the use of *ex ante* measures. Taking into account of the views and considerations expressed in the above paragraphs, the TA is of the view that the proposed approach to limit the maximum number of frequency blocks to be assigned to a BWA licensee should be maintained.

30. SmarTone commented that the proposed frequency allocation plan was not in line with the fixed WiMAX profiles as given in paragraph 10 of OFTA CCS WG paper no. 7/2007[13]. In response, the TA wishes to point out that paragraph 10 of OFTA CCS WG paper no.7/2007 referred to the fixed WiMAX profiles for the 3.5 GHz band and the 5.8 GHz band, instead of the 2.3 GHz band. As a matter of fact, paragraph 12 of the same CCS WG paper already pointed out that the proposed allocation plan in the Third Consultation Paper was in line with the mobile WiMAX profiles in the 2.3 GHz band as approved by the WiMAX Forum in 2006.

31. With reference to the ECC Decision ECC/DEC/(05)05[14], which receives the support from many respondents, a tentative band plan, which divides the 2.5 GHz band into 5 MHz blocks, is depicted in Annex 2. It provides a bandwidth separation of 120 MHz between the lower and the upper sub-bands (each with 70 MHz spectrum) for using as FDD uplink and FDD downlink respectively. The 50 MHz wide centre sub-band can be used for TDD technology based services. The TA considers that similar to the arrangement in the 2.3 GHz band, the 2.5 GHz band should also be divided into 5 MHz frequency blocks in accordance with the ECC Decision.

32. Having considered the views and comments of the respondents, the TA decides that while **bidders will be permitted to bid for any of the frequency blocks in the 2.3 GHz and 2.5 GHz bands, the maximum amount of spectrum that each bidder can bid will be 30 MHz.** The exact band plan will be finalised and announced in the Information Memorandum published for the

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[13] "Update on Development of IEEE 802.16 Standards and WiMAX" issued in July 2007 (http://www.ofta.gov.hk/en/ad-comm/tsac/cc-paper/ccs2007p07.pdf).

[14] "ECC Decision of 18 March 2005 on harmonised utilisation of spectrum for IMT-2000/UMTS systems operating within the band 2500 – 2690 MHz" issued by European Conference of Postal and Telecommunications Administrations ("CEPT"). This ECC Decision decides that CEPT Member administrations shall make available for terrestrial IMT-2000/UMTS systems as from 1 January 2008. The proposed frequency plan in the ECC Decision complies with the Recommendation ITU-R M.1036-2.

auction.

33. As explained in paragraph 18, depending on the result of frequency coordination with the mainland authorities, about 190 – 240 MHz of frequency spectrum will be available for BWA services. Consistent with the Spectrum Policy Framework[15], the Government will have to rely on market powers to ensure the efficient use of frequency spectrum as a public resource. Rather than deploying the conventional command-and-control approach and deciding beforehand on the number of licences that should be issued, the TA has decided that he will put out all the available frequency spectrum for BWA services for auction. As the maximum amount of frequency spectrum that each bidder may have is 30 MHz, this implies that **there is enough spectrum for at least six licences. The actual number of licences that will be issued will be determined by the outcome of the auction and the commercial decisions of interested parties.**

TECHNICAL ISSUES RELATED TO THE USE OF FREQUENCIES

34. As different BWA operators may deploy different technologies for BWA services, there may be mixed use of TDD and FDD modes of operation in the adjacent frequency blocks in both the 2.3 GHz band and the 2.5 GHz band. The Third Consultation Paper proposed certain technical measures which may address the problem. In particular, the following questions were asked:

Question (19)*: Do you agree with the proposed approach as stated in paragraph 58 of the Third Consultation Paper to resolve adjacent channel interference issues?*

Question (20)*: Do you agree with the proposed guard bands for the 2.3 GHz band? Do you agree with the arrangement for the spectrum holder at the lower edge of the 2.3 GHz band to use the spectrum 2.300 – 2.305 GHz as stated in paragraph 60 of the Third Consultation Paper?*

Views and Comments from Respondents

35. SmarTone raised concerns of interference in relation to the use of Blocks 1, 2, 19 and 20. Nortel and the WiMAX Forum suggested using Block 20 alone as the guard band at the top of the 2.3 GHz band, noting that some markets allow for only a 5 MHz guard band between WiMAX and the exempted frequency band in the 2.4 GHz band.

[15] According to the Spectrum Policy Framework announced by the Government in April 2007, the policy inclination is that a market-based approach in frequency spectrum wherever the TA considers that there are likely to be competing demands from providers of non-government services.

36. Peoples, HKBN, NWT and Wharf T&T supported the proposed usage of Block 1 for BWA services. Moreover, Wharf T&T considered that, by using Block 1, the available spectrum in the 2.3 GHz band would be sufficient to accommodate three BWA licensees, each to be allocated with six frequency blocks. However, as there would be additional cost implications due to the technical measures to protect the ENG/OB links[16] operating in the adjacent band from radio interference by BWA operating in Block 1, Wharf T&T considered that the SUF for Block 1 should be lower than those of the others. HKBN also shared the view that the SUF should be adjusted accordingly in this regard so as to encourage operator in utilizing the frequency spectrum more efficiently. PCCW considered it unfair to require the BWA licensee with spectrum assigned at the lower edge of the 2.3 GHz band to make special arrangement to ensure no interference with ENG/OB links and suggested retaining a 15 MHz guard band between ENG/OB links and BWA, as the TA considered that 10 MHz still carried some risks of interference.

37. On the adjacent channel interference issue, most respondents supported the TA's proposal of resolving the interference issues via technical coordination among BWA licensees in preference to using emission masks. PCCW suggested the TA to give initial guidance on block edge emission masks for reference by BWA licensees to facilitate their coordination. CSLNWM expressed doubt whether the issues would be resolved even with the implementation of emission masks, and suggested the TA to undertake technical tests or to consider other solutions such as guard bands. In order to tackle the interference problem, HKBN suggested deploying out-of-band emission masks, limiting radiated power of BWA base station transmitters, and adding adjacent channel rejection filtering on the receiver side.

TA's Considerations on the 2.3 GHz band

38. The upper edge of the 2.3 GHz band, i.e. 2.400 – 2.4835 GHz (the "2.4 GHz band"), is exempted from licensing and is widely used by Bluetooth devices, various types of wireless apparatus and Wireless LAN (based on the Wireless-Fidelity ("Wi-Fi") standards) in Hong Kong. Recently the Government has announced a plan to provide free Wi-Fi services to the public in Government premises. Some operators have also actively rolled out their public Wi-Fi services in Hong Kong. The number of public Wi-Fi access points has increased rapidly in the past months. The TA considers that suggestions of Nortel and the WiMAX Forum to deploy a guard band of only 5 MHz at the upper edge of the 2.3 GHz band is not advisable as this may cause mutual interference between BWA in

[16] ENG/OB links refer to Electronic News Gathering / Outside Broadcast links.

the 2.3 GHz band and services operating in the 2.4 GHz band. Such arrangement will not be conducive to the Government's initiative to develop Hong Kong into an advanced wireless city. The TA considers it necessary to maintain a 10 MHz guard band (i.e. Block 19 and 20) to prevent interference between BWA and services operating in the adjacent bands. If and when new technology that allows co-existence of BWA and Wi-Fi devices with only 5 MHz guard band appears, the TA may revisit the issue and consider allocating Block 19 for BWA services.

39. Concerning the potential use of Block 1 for BWA, the TA shares the views of Wharf T&T and HKBN that such use should be encouraged as far as practicable on condition that appropriate measures should be taken by relevant users to protect themselves from mutual radio interference between the BWA services and the ENG/OB links. As to whether the SUF for Blocks 1 and 2 should be lower than other frequency blocks, the TA considers that the fair market price for these two blocks of frequency spectrum should be decided by the subsequent auction. If the measures required to be taken for mitigation of interference warrant an adjustment of the SUF, this would be reflected in the bids offered by the bidders.

40. **With the support of the majority of the respondents, the TA decides to make available Block 1 for BWA services. That is, the entire 90 MHz bandwidth (Blocks 1 to 18) of the 2.3 GHz band will be made available for allocation to BWA licensees.** The TA will encourage the BWA operators to coordinate with each other and to agree on the technical measures to be taken to minimise mutual interference. Where necessary, the TA may issue relevant guidelines or a code of practice requiring the licensees to take reasonable measures, for example, use of emission masks, to prevent interference.

TA's Considerations on the 2.5 GHz band

41. As indicated in paragraph 31, the 2.5 GHz band will be planned in accordance with the ECC Decision ECC/DEC/(05)05. However, as is clear from paragraphs 16 – 17, there is a need to coordinate with the Guangdong authorities regarding the deployment of the 2.5 GHz band for the MMDS and the CMMB services in Shenzhen and Zhuhai. While OFTA will use its best endeavour to maintain the integrity of the band plan so that interested parties may be able to deploy ECC/DEC/(05)05 standard profile equipment in the 2.5 GHz band as far as possible, it should be clear that this may not be achievable. For example, if the Government decides that the sub-band 2635 – 2660 MHz is to be deployed for mobile TV services in Hong Kong, then ECC/DEC/(05)05 standard profile equipment cannot be deployed for the frequency blocks labelled as UL04 – UL08 paired with DL04 – DL08 in Annex 2. In this situation, bidders who get the frequency blocks UL04 – UL08 may need to operate non-ECC compliant TDD

equipment for their BWA services.

42. It is expected that different services may be deployed in the 2.5 GHz band using FDD and/or TDD technologies. In order to avoid mutual interference, a guard band of 5 MHz may be required between adjacent FDD and TDD frequency blocks. To minimize any potential mutual interference between TDD and FDD systems, licensees may settle the problems among themselves through technical coordination and deploy additional mitigation measures, such as using the emission masks as discussed in the Third Consultation Paper for the 2.3 GHz band. Similar to what is stated in paragraph 40, the TA will encourage the BWA operators to coordinate with each other and to agree on the technical measures to be taken to minimise mutual interference. The TA may issue relevant guidelines or a code of practice requiring the licensees to take reasonable measures to prevent interference.

LICENSING ISSUES

Unified Carrier Licences ("UCL"), Interconnection Terms and Authorisation under Section 14

43. The TA indicated in the Third Consultation Paper that the intention is to license BWA services under the UCL with a validity period of 15 years and proposed granting building access right to BWA licensees following the same principles as applied to the existing fixed/mobile network operators depending on the nature of the particular installation.

Views and Comments from Respondents

44. Wharf T&T and NWT gave their explicit support to use UCL for licensing BWA services with a 15-year licence term. CSLNWM, on the other hand, opined that it was inappropriate to ask for respondents' views on the UCL when the special conditions of the UCL were still unclear and suggested that the UCL should be readily in place prior to the BWA spectrum auction. HKISPA opined that a licence period of 15 years was too long. It may create wastage of spectrum if it becomes technically feasible to accommodate more than three fully-fledged BWA operators in the 2.3 GHz band in the future.

45. Wharf T&T expressed concern that difficulties in classifying a particular installation as a fixed or mobile services might delay OFTA in processing applications for granting building access for BWA licensees. CSLNWM considered that such an arrangement would also create an anti-competitive situation between fixed operators and mobile operators. It urged the TA to

reconsider the position in granting section 14(l) authorizations to network operators and provide more details on handling road opening right for BWA licensees and other mobile network operators as well.

TA's Considerations

46. The TA notes CSLNWM's comment that UCL should be in place before the spectrum auction for BWA services. As stated in the FMC Statement[17], the TA will recommend the Secretary for Commerce and Economic Development ("SCED") to create the UCL. The SCED will conduct a consultation soon on making regulation for the creation of the UCL. The auction of BWA spectrum is targeted to be conducted in the fourth quarter of 2008. By then the legislative process for making regulations for UCL should have been completed. The TA will ensure that the UCL is in place and all information about the UCL is available when the BWA auction is conducted.

47. The TA has considered the concern raised by HKISPA. A long licence period of 15-year, similar to other carrier licences, is considered necessary in order to encourage the significant investment required for the underlying infrastructure. The scenario presented by HKISPA about spectrum wastage of the 2.3 GHz band is also hypothetical. As the technology and the market in Hong Kong are undergoing rapid development, it is difficult to postulate at this juncture whether or not the designated amount of spectrum will result in wastage, or whether or not it can cope with the market demand in the future.

48. The TA acknowledges that for certain innovative services that may appear in the future, it may be difficult to define whether a service is a fixed or a mobile service. However, at this stage the TA maintains the view that assessments should be made on requests for building access rights on a case-by-case basis.

49. CSLNWM suggested the TA to further shorten the 2-year transitional period for withdrawal of the existing regulatory regime for Fixed Mobile Interconnection Charge ("FMIC"), which is April 2009 in accordance with the FMC Statement. It is worth noting that, according to the current schedule, the auction for the BWA spectrum will be conducted in the fourth quarter of 2008. BWA licensees should take 6 to 12 months to roll-out the networks. By the time when the BWA licensees launch services, the existing regulatory arrangement on FMIC will have been withdrawn. It is thus unnecessary to further shorten the transition period in order to cater for the introduction of BWA services.

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[17] "Deregulation for Fixed-Mobile Convergence" issued on 27 April 2007 (http://www.ofta.gov.hk/en/tas/others/ta20070427.pdf).

50. In response to CSLNWM's question as to whether BWA operators will be granted with road opening right, the TA wishes to make it clear that, as explained in the FMC Statement, road opening works will only be granted to operators who have genuine need to lay cables for the provision of public wireline-based telecommunications network services. The TA will duly consider each application from UCL licensee for the right of road opening.

Permitted BWA Services, Standards and Territory-wide Assignment

51. As stated in the Third Consultation Paper, the TA was of the preliminary view that it would not restrict the types of applications and services which might be provided using the BWA spectrum. Moreover, in line with the technology neutrality principle, no particular standard or technology will be prescribed provided that the proposed BWA technology would conform to recognised open standards and be compatible with the use of the radio spectrum allocated for such applications in Hong Kong. The TA intended to assign the frequency blocks for BWA services on a territory-wide basis. The following questions were asked:

Question (8)*: Do you have any comment on the TA's preliminary view that no restrictions should be imposed on the types of applications and services that may be provided using the BWA spectrum?*

Question (9)*: Do you have any further comments on the preliminary view of the TA that he should not prescribe any particular standard or technology for the BWA deployment?*

Question (10)*: Do you have any further comments on the TA's preliminary view that assignment of the frequency blocks for BWA services should be made on a territory-wide basis?*

Views and Comments from Respondents

52. All the respondents except HTHK expressed support to the TA's proposals. HTHK argued that the TA should first designate part of the 2.3 GHz band specifically for fixed or backhaul BWA deployment as the fixed BWA technology is relatively more mature than its mobile version, and that fixed BWA services should not be subject to the requirement of territory-wide deployment due to its intrinsic service nature.

53. NWT proposed that the TA should make available at least one block of BWA spectrum for fixed services use only. It is because some operators might have no interest in offering mobile BWA services. NWT considered it unfair

where operators were forced to pay for a licence fee for mobile services if they would only offer fixed services. It was also unfair to consumers who might want to enjoy BWA for fixed services only but need to bear the cost burden of non-essential mobile licence. Although it shared the view that technology neutrality for BWA deployment should be maintained, NWT alleged that the TA was sending mixed messages in this respect. NWT considered that the TA has described BWA as WiMAX, ETSI HiperMAN[18] and UMTS TDD[19] in the First Consultation Paper. But on the other hand, there were other potential uses for the spectrum which was outside the TA's concept of BWA e.g. mobile telephony services using 3G technologies and mobile multimedia services using S-DMB.

TA's Considerations

54. As technology standards are rapidly evolving, the TA does not agree that there is a need to designate part of the spectrum for certain services for the reason that a particular technology is relatively more mature. Rather, the TA shares CSLNWM's view that deployment of BWA services shall conform to open standards and adhere to the technology neutrality principle. Indeed, the market, rather than the regulator, is more knowledgeable about the market environment including demands, trends and preferred choice of technologies and services.

55. In order to maintain a level-playing field, the TA sees no reason for setting any unnecessary *ex ante* restriction on the types of BWA applications or services to be offered as proposed by NWT. The TA also wishes to respond to NWT's allegation of sending mixed messages in the respective consultation papers for BWA. The TA notes that Recommendation ITU-R M.1801[20] specifies the radio interface technologies (including the IMT-2000) for BWA. Indeed, the 2.3 GHz band can be used for a wide range of BWA applications and services using different radio interface technologies for fixed and mobile services. Since the First Consultation Paper was issued in 2005, the telecommunications industry has been rapidly evolving. New technologies are emerging at a fast pace. When the different consultation papers were issued at different point of time, the TA found it necessary to give a brief update in the relevant paper to address the latest development on spectrum utilization in the world and particularly in Hong Kong.

56. Further, the TA would like to clarify that, by authorising the BWA

[18] HiperMAN refers to High Performance Radio Metropolitan Area Network which is a standard of the European Telecommunications Standards Institute (ETSI) Broadband Radio Access Networks (BRAN) group for wireless network communication in the 2 - 11 GHz bands.

[19] UMTS refers to Universal Mobile Telecommunication System is a 3G technology by 3GPP.

[20] "Radio interface standards for broadband wireless access systems including mobile and nomadic applications, in the mobile service operating below 6 GHz". Recommendation ITU-R M.1801 includes references to IMT-2000, IEEE 802.16, ETSI BRAN HIPERLAN, ATIS WTSC wireless wideband internet access (WWINA), Next-generation PHS and etc.

licensees to provide territory-wide services in Hong Kong, the TA does not intend to impose a territory-wide roll-out obligation or requirement on the BWA licensees except for the roll-out requirement as described in paragraph 74.

57. **In order that the BWA regulatory framework will allow versatile and sustainable developments over the term of the licence, the TA decides that there will be no restriction on the applications and services for the BWA licences. Also, no particular standards or technologies will be prescribed for BWA deployment as far as it conforms to the widely recognized international standards. The frequency blocks for BWA will be assigned on a territory-wide basis**. This is in line with our technology-neutral approach in assignment of frequency spectrum.

Spectrum Utilization Fee ("SUF") and Payment method

58. The TA proposed in the Third Consultation Paper that the BWA spectrum should be assigned by a hybrid selection method comprising a simple pre-qualification and an auction, and that an up-front lump sum basis should be adopted for the payment of the SUF. The following questions were asked:

Question (12)*: Do you agree with the proposed frequency assignment method as stated above?*

Question (13)*: Do you have any further comments on the TA's preliminary view that that an up-front lump sum payment basis should be adopted for SUF, the amount of which will be determined through an open auction?*

Views and Comments from Respondents

59. Alcatel-Lucent, Peoples, SmarTone, PCCW, Qualcomm, BTc&WA, NWT, HTHK and CSLNWM supported the spectrum assignment by way of an auction. PCCW suggested that bidders should be permitted to specify frequency blocks that they wished to bid and that bidding information should not be made known to other bidders (dark room approach) during the auction. The latter view was shared by BTc&WA and HTHK and, in particular, when competition was thin so as to prevent anti-competitive behaviour amongst bidders. HTHK opined that a pre-qualification process would effectively screen out "connected bidders".

60. BTc&WA recommended the TA to adopt a simultaneous multiple round ascending ("SMRA") auction where bidders would be allowed to submit bids on a licence-by-licence basis. It opined that the TA should offer all spectrum blocks for bidding at same time and conduct a series of distinct timed bidding rounds

where bidders could place bids electronically. NWT was also in favour of an open bidding process using SMRA and suggested that the reserve auction price should cover administrative cost only.

61. SmarTone was of the view that, when devising the reserve auction price, consideration should be given to similar spectrum auctions in Hong Kong and other countries. NWT referred to comments made by Ofcom in the UK that any change in the prevailing market conditions over time was not a source of discrimination or unfairness. NWT rejected any proposal that the SUF for BWA be commensurate with royalties paid by MNOs for the 3G spectrum.

62. On the contrary, HKISPA, HKBN and Wharf T&T considered that auction, which only measured financial strength, was not the best approach to assign spectrum and that an upfront lump sum payment method would favour conglomerates with extensive financial capital, rather than creativity on using the BWA spectrum. They suggested that the payment of the SUF should be more flexible, such as in the forms of an up-front payment, phased payment or royalty over the BWA licence term. HKISPA advocated that BWA auction should incorporate the number of operators as a parameter for maximizing public interests and, in the event of few bidders, include a reserve mechanism for future assignment or issuance of BWA licences. HKBN viewed that auction might act as a hurdle to new entrants and strongly suggested adopting the "selection by merits" approach. Wharf T&T opined that auction was not economically efficient, and welcomed further information from the TA on the pre-qualification requirements. Wharf T&T believed that, among others, such pre-qualification requirements should include roll-out plan for BWA services. Wharf T&T further submitted that the incumbent 2G and 3G operators and their related parties should be disqualified from participating in the auction to avoid spectrum hoarding.

TA's Considerations

63. The TA notes that the majority of the respondents supported the proposal to assign the BWA spectrum by auction. According to the Spectrum Policy Framework ("SPF") promulgated by the Government in April 2007, the policy inclination is that a market-based approach in spectrum management will be used for spectrum wherever the TA considers that there are likely to be competing demands, and that the potential supply of spectrum from the TA will be achieved through an open, competitive bidding or tendering process. The TA cannot see any valid reason to deviate from the SPF and use other approaches, such as "selection by merit". Similarly, the TA does not agree that priority be given to assign the BWA spectrum to the existing fixed operators. The TA maintains the view that both new entrants and existing carrier licensees may participate in the auction to acquire the BWA spectrum i.e. the auction will be open to all.

64. The TA shares the views of BTc&WA and NWT that auction be conducted using the SMRA approach whereby bidders can place bids on multiple frequency blocks in each bidding round. The TA will recommend the SCED to make a regulation under section 32I(2) such that the SCED may specify the minimum fee of the SUF (i.e. the reserve auction price) and the TA may specify the terms and conditions of the auction. In setting the reserve auction price, the Government will take into account the recent prices paid for comparable spectrum in other economies with adjustments to take account of different environments and market specific factors, such as population, GDP, licence period, bandwidths and number of operators.

65. As discussed in paragraph 63 above, the auction will be open for all. Both new entrants and existing fixed/mobile carrier licensees may participate in the auction to acquire the BWA spectrum. This is consistent with the approach in the 3G and CDMA2000 auctions. Details of the procedures and rules of the auction, including bidder association or ownership rules and the format of the auction, will be specified by the TA in the Information Memorandum.

66. The TA has also considered the proposal of some respondents that the BWA licensees should be given an option to make phased payments over the validity period of the licence. If such proposal was adopted, necessary measures would be required to prevent any default. Following the licence requirements imposed on the existing 3G licensees, a performance bond in an amount equivalent to the SUF for the next five years would be required. For the sake of fairness, licensees who make deferred payment should also be required to pay interests. After deliberation, the option of phased payment appears to be rather administratively burdensome and may not be conducive to lower the entry barrier for small players. As such, the TA considers that an up-front lump sum payment method for the SUF, which is simpler and incurs less administrative costs, should be adopted.

67. To conclude, **the TA will recommend the SCED to make a regulation under section 32I(2) of the TO specifying that the SUF for the BWA spectrum will be determined by auction. The bidder who offers the highest bid will be the successful bidder. The SUF will be in the form of an upfront lump sum payment.**

Roll-out Obligation, Open Network Access ("ONA") and Denial of Service to Suspected Stolen Apparatus

68. In the Third Consultation Paper, the TA asked the following questions:

Question (11)*: Do you have any further comments on the TA's preliminary view that BWA licensees will be required, under the licence, to roll out the services within 24 months from the date when the licence is issued and that performance bond will also be required?*

Question (14)*: Do you agree that BWA licensees should not be subject to an ex ante ONA requirement?*

Question (18)*: Do you agree that BWA licensees should be subject to the requirement of denial of service to suspected stolen apparatus?*

Views and Comments from Respondents

69. In general, most respondents supported the TA's preliminary views. Qualcomm strongly believed that BWA licensees should be subject to the same regulatory regime and licensing requirements as the 3G licensees. PCCW suggested that the TA should specify the extent of service roll-out, elaborate on the consequences of failing to meet with the obligations and particularly the effects of such failure on the performance bond. HKBN was of the view that BWA should not be subject to less features and service obligations than or different from other access technologies. If BWA would be allowed to provide both mobile and fixed services, the TA should make reference to the service obligations currently imposed for the relevant licences. Wharf T&T considered that with the imposition of the SUF payment the roll-out obligation was not necessary.

70. CSLNWM believed that the proposed period of 24 months might not be realistic if BWA equipment and systems were not readily available. It further pointed out that Singapore had required an 18-month roll-out schedule for the 2.5 GHz band and a 36-month roll-out schedule for the 2.3 GHz band for BWA. Besides, the BWA roll-out schedule should be consistent with the previous roll-out obligations imposed by the TA on other licences (e.g. 2G licences).

71. Peoples, Qualcomm, NWT, Wharf T&T, and HTHK considered that BWA licensees should not be subject to the ONA requirement. SmarTone, PCCW and CSLNWM gave their conditional support provided that the same requirement was relieved from the 2G and 3G licences to maintain a level-playing field. On the contrary, HKISPA and HKBN advocated that the ONA requirement should be imposed for BWA licences similar to that of the 2G and 3G licences.

72. Alcatel-Lucent, Peoples, SmarTone, PCCW, Qualcomm, NWT and HTHK supported the proposal on denial of service to suspected stolen apparatus. HKBN however opined that a feasibility study would be needed to identify the

needs and the cost involved in this respect. As an interim solution, HKBN suggested making reference to the current guidelines and code of practice developed by OFTA for the mobile operators. However, Wharf T&T did not believe that this requirement should be subject to commercial decision of the licensees. CSLNWM considered it premature to develop a licence condition in relation to suspected stolen apparatus as device authentication was out of scope of the current release of WiMAX End-to-End Network Systems Architecture. CSLNWM questioned whether the TA should apply such condition to all BWA licensees or only to those that offered retail services. In case there is no such condition in the UCL as applicable to BWA licensees, CSLNWM considered that the same licence condition in the existing 2G carrier licences should be removed or waived altogether.

TA's Considerations

73. The TA notes that some respondents have concerns about the licensing details for provision of BWA services including the network roll-out timeline, obligations, and the requirement of performance bond. The TA does not subscribe to Wharf T&T's view that roll-out obligation is unnecessary given that the BWA licensees have paid the SUF for the use of the BWA spectrum. As a matter of fact, payment of SUF is only one of the many factors that would influence the business decision of the BWA licensees. The TA considers that the network and service coverage obligation and the performance bond mechanism will be necessary to safeguard against potential spectrum hoarding and default. It also ensures that the general public will be able to enjoy innovative new services in a reasonable time.

74. The TA considers that the network and service roll-out for fixed and mobile BWA services are substantially driven by the diverse business needs of BWA licensees and market demands of the services. In this connection, the TA will adopt a light-handed approach such that BWA licensees will be required to roll-out their networks and services within a specified period after the licences are issued. Performance bonds will be required to ensure the roll-out requirements. At this juncture, the TA intends to require the BWA licensees to roll-out the networks and provide the services to the general public within 24 months from the issue of the licence and to provide a minimum coverage of 50% of population[21] (for provision of mobile services) or a minimum coverage of 200 commercial and/or residential buildings[22] (for provision of fixed services), the exact details of the roll-out

[21] Similar requirement has been imposed for the roll-out of 3G licensees, although the time frame for rolling out was longer because at the time of auctioning the 3G spectrum, the availability of 3G equipment was still uncertain.

[22] Among the fixed telecommunications network services ("FTNS") licensees licensed in 1995, New World Telecommunications Ltd ("NWT") was obliged to cover 175 commercial or residential buildings within three years. As BWA uses radio access technology instead of wire-line, it should be reasonable to expect a BWA licensee to be able to roll-out a similar network within 2 years.

requirement will be reviewed with regard to the technological development and availability of equipment nearer the time and specified in the Information Memorandum for the auction of the BWA spectrum.

75. The TA has decided not to include the ONA requirement for the CDMA2000 licence. The TA considers that the same policy considerations as stated in the CDMA2000 Statement[23] as well as the Third Consultation Paper remain valid. In the event that there is market failure because of the absence of ONA obligation in the BWA licences, the TA can have recourse to the powers under section 36A of the TO, which empowers the TA to determine the interconnection terms and conditions between BWA operators and any party requesting for access after taking into account various pertinent factors under section 36A(10) of the TO.

76. To combat the use of unlicensed or otherwise unlawful apparatus, the TA considers that measures to deny service for stolen apparatus is necessary. Starting with the renewal of the licences of the 2G operators, a licence condition is included in the mobile carrier licences providing the TA with the necessary power to require the licensees not to provide services to stolen apparatus. The TA considers it appropriate and reasonable to impose the same requirement on the new BWA licences. The TA is aware that specific feature for such an application is still under development by the WiMAX Forum and equipment suppliers. As such, the TA will fully consult the BWA licensees, the Hong Kong Police Force and equipment suppliers before exercising the power under the licence condition.

77. Having duly considered the views of the respondents, **the TA decides that there will not be any *ex ante* ONA requirement in the BWA licences and that BWA licensees will be subject to the requirement of denial of service to suspected stolen apparatus. BWA licensee will also be required, under the licence and guaranteed with a performance bond, to roll out the services within a specified period from the issuance date of the licence.**

Numbering and Number Portability

78. As stated in the Third Consultation Paper, the TA would invite the Telecommunications Numbering Advisory Committee ("NAC") to review the long-term development of the numbering plan and to see whether there would be a need to allocate new number ranges for FMC services. The Third Consultation Paper proposed that if it was decided that no new number range would be

[23] "Licensing of Spectrum in the 850 MHz Band to Enable the Provision of CDMA2000 Service" issued on 27 April 2007 (http://www.ofta.gov.hk/en/tas/mobile/ta20070427.pdf).

allocated for FMC services, the TA would then allocate fixed numbers (i.e. with prefixes "2" and "3") to fixed/limited mobility and mobile numbers (i.e. with prefixes "6" and "9") to full mobility services. It was also proposed that BWA licensees be subject to the number portability requirements[24]. In relation to the above issues, the following questions were asked:

Question (15)*: Do you consider that FMC services should be allocated with new number ranges?*

Question (16)*: Do you agree that numbers with prefixes "2" and "3" should be allocated to fixed/"limited mobility" BWA services while numbers with prefixes "6" and "9" should be allocated to "full mobility" BWA services?*

Question (17)*: Do you agree that BWA licensees should be subject to the requirement of facilitating both Operator Number Portability ("ONP") and Mobile Number Portability ("MNP"), including the Fixed Mobile Number Portability ("FMNP") to be introduced in the future?*

Subsequent Development

79. The issues covered by Questions (15) and (16) were subsequently deliberated by the NAC. In its meeting held on 6 November 2007, the NAC agreed that no special prefix would be allocated for FMC services. The NAC further recommended that the existing arrangement should continue. That is, fixed services will continue to be allocated with fixed numbers with prefixes "2" and "3" while mobile services will continue to be allocated with mobile numbers with prefixes "6" and "9". Since the prefixes "6" and "9" will soon be depleted, the NAC also recommended to the TA to open up numbers with prefix "5" for mobile services. **The TA has decided to adopt the recommendations.**

TA's Considerations on Numbering Issues

80. **The TA's decision made in paragraph 79 will be applicable to the BWA services. That is to say, for fixed/limited mobility BWA services, fixed numbers with prefixes "2" and "3" will be allocated. For mobile BWA services, mobile numbers with the prefixes "6" and "9" will be allocated; when these numbers are depleted, numbers with the prefix "5" will be allocated. To conclude, the TA will closely monitor the development of the**

[24] Number portability allows customers in Hong Kong to switch their services from one operator to another operator. Currently, customers with subscriber number assigned by a fixed network operator can only be allowed to switch to another fixed network operator via number portability but not to non-fixed operators unless FMNP between fixed and mobile network operators has been implemented. The same principle applies to the mobile side as well.

BWA services and will be prepared to issue where necessary code of practice and guidelines in accordance with Section 32F of the TO.

81. As stated in the USO Statement[25] issued on 8 June 2007, the sharing basis for Universal Service Contribution ("USC") will be changed by end of April 2009 when the current regulatory intervention in FMIC is withdrawn. After this day, the USC will be shared by the licensees according to the quantity of all telephone numbers that they have been allocated. This sharing basis will also apply to the BWA licensees.

Number Portability

Views and Comments from Respondents

82. Peoples, HKBN, SmarTone, Qualcomm, CC, Wharf T&T, HTHK and CSLNWM supported the proposal for BWA licensees to facilitate both ONP and MNP including FMNP in the future. HKBN commented that if BWA licensees could provide applications and services that were in the same grades and types of the existing fixed/mobile services, they should not be subject to less service obligations than or different from other access technologies. HTHK opined that FMNP should be an issue to be resolved after carrying out pertinent market study and public consultation. CSLNWM urged the TA to commence the FMNP market study as soon as possible. SmarTone strongly recommended the TA to implement FMNP, which could allow mixed use of fixed and mobile numbers to improve number usage efficiency. Among all the respondents, only PCCW did not agree that BWA licensees should be subject to number portability and it considered that any such need should be decided by the market.

TA's Considerations

83. In accordance with the FMC Statement and in order that the TA may assess the cost and benefit of introducing FMNP into Hong Kong, OFTA has commissioned a consultant to conduct a survey about the public demand on FMNP. The result of the survey should be available in the first quarter of 2008.

84. The TA notes that the majority of the respondents are supportive of the proposal that BWA licensees should be subject to number portability requirements. The TA therefore decides that the BWA licensee should be obliged to facilitate both ONP and MNP. Whether FMNP will become a mandatory licence obligation upon the issue and grant of the licence will depend on the outcome of the market

[25] "Review of the Regulatory Framework for Universal Service Arrangements" issued on 8 June 2007 (http://www.ofta.gov.hk/en/tas/ftn/ta20070608.pdf).

survey mentioned in the preceding paragraph. Nonetheless, to cater for the fast evolving market, the TA will need to retain the flexibility to direct the BWA licensee to facilitate FMNP during the term of the BWA licence. Therefore, the BWA licensees will be obliged under their licences to facilitate, in such a manner as the TA may direct, the portability of numbers assigned to any customer of any fixed carrier or fixed telecommunications network service licensee, mobile carrier licensee or Mobile Virtual Network Operator ("MVNO"), so that a customer of any licensee is able to become a customer of another licensee without changing his assigned number.

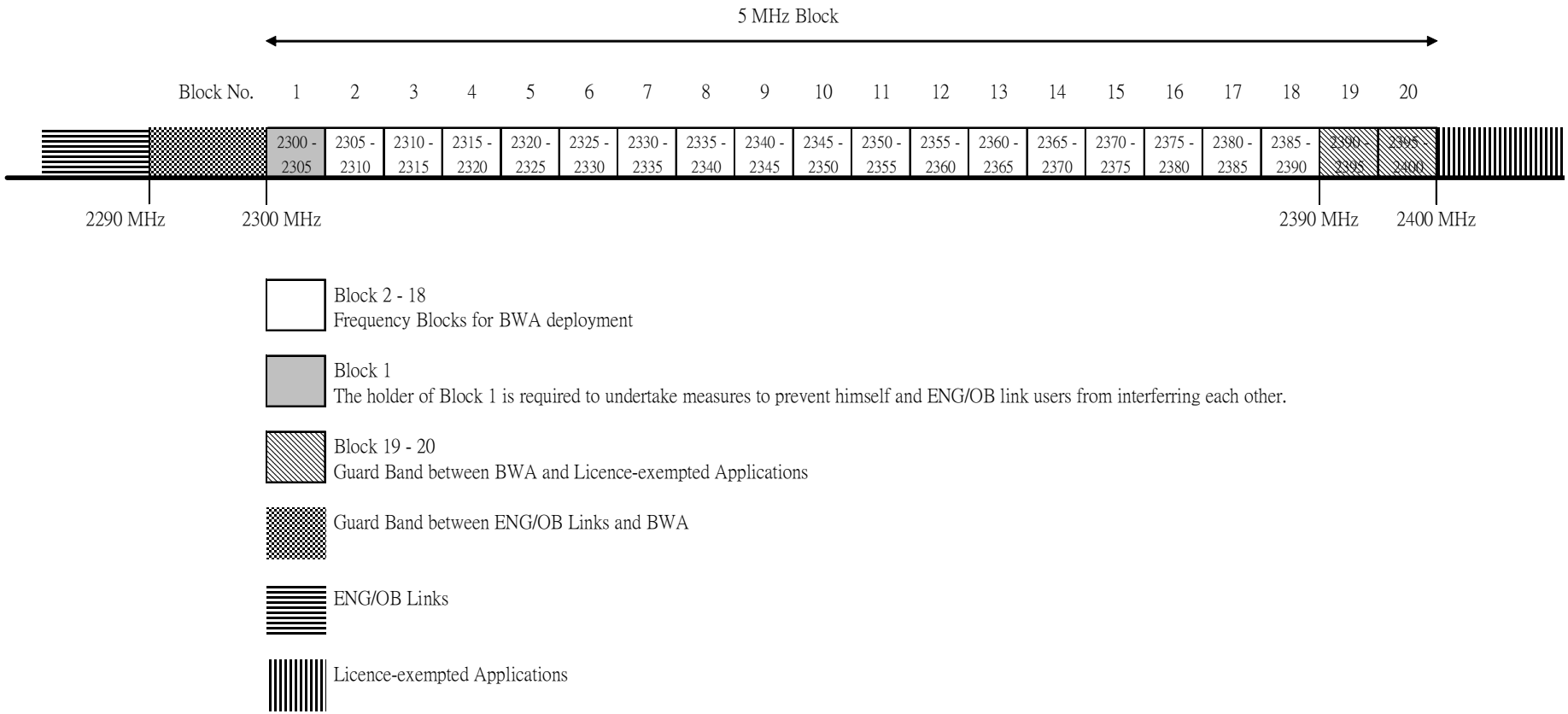
85. **The TA decides that BWA licensees will be obliged under their licences to facilitate, in such a manner as the TA may direct, the portability of numbers assigned to any customer of any fixed carrier or fixed telecommunications network service licensee, mobile carrier licensee or MVNO, so that a customer of any licensee is able to become a customer of another licensee without changing his assigned number. Upon the grant and issue of the BWA licence, the BWA licensees will be obliged under their licences to facilitate both ONP and MNP. Whether FMNP will become a mandatory licence obligation upon the issue and grant of the licence will depend on the outcome of the market survey mentioned in paragraph 83. Nonetheless, the TA will have the power to direct the BWA licensee to facilitate FMNP during the term of the BWA licence.**

WAY FORWARD

86. The TA will recommend to the SCED the enactment of the necessary regulation under section 32I(2) of TO to determine the SUF by auction. The TA will also in due course proceed to make an order under section 32I(1) of the TO designating the 2.3 GHz band and the 2.5 GHz band to be subject to the payment of the SUF. Upon completion of the relevant subsidiary legislations by the Legislative Council, the TA will publish an Information Memorandum giving details of terms and conditions of the auction and the licence conditions to be imposed for the new BWA licence. The plan is to conduct the auction in the fourth quarter of 2008.

Office of the Telecommunications Authority
3 December 2007

Annex 1 – Proposed Frequency Allocation Plan in the 2.3 GHz Band



Annex 2 – Proposed Frequency Allocation Plan in the 2.5 GHz Band