Licensing Framework
For Deployment of Broadband Wireless Access

Consultation Paper

20 December 2004

INTRODUCTION

The development of broadband wireless access (BWA) technologies for fixed telecommunications services has attracted substantial interest lately. There are technical trials and commercial deployments of such technologies in the Mainland of China, the United States, the United Kingdom and South Korea. The rapid development of BWA is also witnessed by the substantial progress made recently by the Institute of Electrical and Electronics Engineers (IEEE) and the World Interoperability for Microwave Access Forum (WiMAX) on standardisation and equipment certification.

2. The advancement in wireless technologies and growing demand for both residential and corporate broadband access services have given rise to a potential market for BWA deployment in Hong Kong. There has been increasing interest expressed by network operators to deploy BWA in the local market.

3. Currently there are ten licensees of Fixed Telecommunications Network Services (FTNS), five of which are actively offering public services to end-users. Some fixed network operators have started offering IP telephony services which allow the users to make and receive telephone calls using broadband Internet connections instead of

traditional direct exchange lines. BWA provides a possible alternative to the conventional wireline technologies (including digital subscriber line (DSL), fibre-to-the-building, cable modem and metro Ethernet) that a FTNS operator may consider adopting for speedy rollout of a broadband network. The deployment of BWA may spur further increase in the broadband penetration in Hong Kong, which would in turn promote the development of IP based telephony and advanced multimedia services.

4. As regards mobile services in Hong Kong, there are six mobile network operators and six mobile virtual network operators offering second generation (2G) mobile services on a competitive basis. There are also four licensees of third generation (3G) mobile services, one of which has already launched service. A wide range of mobile data services are now offered by both 2G and 3G service operators. Data service in Hong Kong is therefore well accepted not only by fixed service customers but also by mobile service customers. While BWA at this stage may not be mature for mobile services, the Telecommunications Authority (TA) recognises that such technologies have the potential to support fully fledged mobile services.

5. This paper discusses the various issues concerning the introduction of BWA services and consults the industry and interested parties on these issues prior to establishment of the regulatory framework for BWA services in Hong Kong. The TA also invites views on whether BWA should be licensed in Hong Kong and if yes, the appropriate timing for inviting applications for such licences. Preliminary views on and proposed approaches to various issues relating to the subject are expressed in this paper for the purpose of consultation only and do not represent the decision of the TA on the issues. Those issues remain the

subject of consideration by the TA. Nothing in this paper should be construed as indicating that the TA has formed any opinion or decision on those issues.

APPLICATIONS OF BWA

6. Typically, BWA is deployed to serve a wide area. It may be used as wireless backhaul for fixed or mobile networks, backhaul for connecting hot spots of Wi-Fi[1] wireless local area network, or wireless local loop for broadband customers (in place of copper-based DSL, co-axial cable or optical fibre connections).

7. Practical limitations (such as the lack of underground ducts and in-building cabling facilities) prevent cable and DSL technologies from reaching certain potential customers. Traditional DSL is also subject to a certain limit of reach from the telephone exchange. As for broadband connections by optical fibre or coaxial cable, the deployment cost may be a deterrent to the extension of wired broadband service in areas with low subscriber density. Rural and outlying areas with low population density may as a result be deprived of broadband service coverage. BWA deployment may overcome the limitations posed by traditional wired-based broadband connections by virtue of its wide-area coverage through wireless means.

[1] The Wi-Fi Alliance is a non-profit international association that certifies interoperability of wireless local area network products based on IEEE 802.11 specification. Products upon being certified are entitled to use the Wi-Fi CERTIFIED logo for its marketing.

8. BWA technologies enable a service provider to deliver broadband service within a relatively short period of time. Depending on the business model and strategy of the operators, it may be a viable alternative to other broadband access technologies. It even allows the offer of instantly configurable "on demand" high-speed connectivity for temporary events that may involve massive deployment of Wi-Fi hotspots. Wireless technology makes it possible for the service provider to scale up or down service levels swiftly in response to customer demands. "On demand" connectivity also benefits some businesses like temporary construction sites that have a need for ad hoc broadband connectivity.

9. In a dense city environment like the urban areas in Hong Kong, BWA links may be deployed to replace the underground cables which would otherwise be uneconomical to serve due to limited number of users or require disruptive road digging for laying the cables. It is therefore seen as a viable solution for the "last mile" access. In accordance with the TA Statement issued on 6 July 2004 on Review of Type II Interconnection Policy, mandatory Type II interconnection at telephone exchanges (i.e. Type II interconnection at Point A) would be withdrawn by 30 June 2008, except for buildings meeting the "essential facilities" criterion. Before this date, the withdrawal of mandatory Type II interconnection will be implemented gradually on a building-by-building basis, depending on whether the building has been connected to an alternative customer access network. For those FTNS operators relying heavily on Type II interconnection, BWA is a possible alternative that operators may consider to replace the installed Type II interconnection link in an efficient manner.

SPECTRUM ISSUES

Spectrum for BWA in Hong Kong

10. BWA technologies may operate in various frequency bands, including the licence-exempt bands in the 2.4 GHz and 5 GHz bands as well as other licensed bands in the 1.9 GHz, 2.0 GHz, 2.3 GHz, 2.5 GHz and 3.5 GHz bands. There is no internationally harmonised frequency band for their deployment at present.

11. While BWA deployment is possible on the shared spectrum in the 2.4 GHz or 5 GHz bands, the uncoordinated nature of such spectrum usage render its viability for public service provision questionable. As for those licensed bands in which BWA systems may operate, all have already been allocated for other services in Hong Kong. Nevertheless, the 3.5 GHz band stands out as the most suitable licensed band for BWA deployment in Hong Kong. Further information about this frequency band is provided below, while the status of the other candidate frequency bands is outlined in the **Annex** to this consultation paper.

12. The Mainland of China and some countries have allocated the 3.5 GHz band for BWA. The actual frequency allocations are different in different countries, but they all fall within the 3.4 – 3.6 GHz range, as outlined below.

(a) In the United Kingdom, a total of 20 MHz x 2 spectrum in the 3.48 – 3.5 GHz / 3.58 – 3.6 GHz band has been allocated to BWA.

(b) In Australia, a total of 50 MHz x 2 spectrum in the 3.425 – 3.442 GHz / 3.475 – 3.492 GHz and 3.442 – 3.475 GHz / 3.542 – 3.575 GHz bands has been allocated.

(c) In the Mainland of China, the 3.4 – 3.43 GHz / 3.5 – 3.53 GHz band (i.e. 30 MHz x 2) is opened for the implementation of BWA services. Tenders for the implementation of BWA in the Mainland of China have been awarded to operators by phases since 2001 and some of them have already launched commercial services. Due to lack of spectrum in the 3.5 GHz band, they are now exploring the possible use of other frequency bands.

13. As the Mainland of China is a large market for BWA, it is expected that Hong Kong will benefit if the spectrum allocation for BWA is harmonised with that adopted in the Mainland of China. In Hong Kong, the 3.4 – 3.7 GHz band has so far been allocated to the downlink segment of fixed satellite service (FSS) in the extended C-band. Due to the small geographical size of Hong Kong, BWA is likely to cause interference to the receiving earth stations on co-frequency operation. The issue of interference between BWA and FSS will be addressed in subsequent paragraphs.

14. There is a wide range of BWA equipment operating in the 3.5 GHz band already available on the market. Various vendors offer BWA solutions based on IEEE 802.16a-2003, UMTS TDD or their own proprietary technologies. Equipment of different brands may however be non-interoperable in general, even if they are based on the same standard. WiMAX-certified products, expected to be interoperable

across different brands, are scheduled to reach market by 2005.

15. Having regard to the gradual withdrawal of mandatory Type II interconnection by 2008, the considerations above and the unavailability of spectrum in other candidate frequency bands for BWA, the TA is of the preliminary view that the 3.5 GHz band is a possible and could be the most appropriate licensed band for BWA deployment in Hong Kong.

Spectrum Sharing between FSS and BWA

16. At present, the 3.4 – 4.2 GHz band is allocated for FSS (downlink) on a primary basis. To make available spectrum for BWA, OFTA has proposed at the Radio Spectrum Advisory Committee (RSAC) to revise the allocation of the 3.4 – 3.6 GHz sub-band for Fixed Services (including BWA) on a primary basis and FSS on a secondary basis[2]. The proposed revision will make available 200 MHz for BWA deployment in Hong Kong. An alternative proposal of allocating the 3.4 – 3.6 GHz band to BWA and FSS on a co-primary basis was also discussed. The RSAC did not reach any conclusion on the allocation plan for BWA. It instead recommended that the issue be further consulted with the industry in this exercise.

[2] Stations of secondary service :
(a) shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;
(b) cannot claim protection from harmful interference from stations of a primary services to which frequencies are already assigned or may be assigned at a later date; and
(c) can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

17. BWA may cause interference to the receiving earth stations of FSS on co-frequency operation. According to the ITU–R Recommendation SF.1486, a distance separation of several kilometres is required with the aid of 40 dB shielding to protect the FSS receiving station for co-frequency sharing between two systems. Co-existence between FSS and BWA is therefore not feasible in a small and dense place like Hong Kong due to the potentially massive deployment of BWA stations in the territory. Unless there are studies to prove that the co-existence of two systems is feasible without any undue constraints imposed on the implementation of BWA, the TA does not propose to consider co-primary allocation for FSS and BWA in the 3.4 – 3.6 GHz band for the time being.

18. In Hong Kong, there are currently a number of Satellite Master Antenna Television (SMATV) systems receiving at 3.473 GHz from the Palapa C2 satellite and 3.4 – 3.6 GHz from Thaicom 3 satellite. If 3.4 – 3.6 GHz band is to be allocated for BWA, these systems, representing about 1.3 % of the overall SMATV systems operating in the 3.4 – 4.2 GHz band in Hong Kong, may potentially suffer interference from BWA. However, taking into account the following considerations, the TA is of the preliminary view that the 3.4 – 3.6 GHz band may be allocated for Fixed Services (including BWA) on a primary basis and FSS on a secondary basis –

(a) other frequency bands are not available for the immediate implementation of BWA in Hong Kong on a protected basis (please see **Annex**);

(b) there is at present a bandwidth of 800 MHz, spanning from 3.4

GHz to 4.2 GHz, allocated to FSS in the C-band and extended C-band. In the event that the allocation of 200 MHz in 3.4 - 3.6 GHz band is removed from FSS allocation on a primary basis, there still remains 600 MHz of spectrum allocated for such use. This should be sufficient for the operation of FSS downlink in Hong Kong; and

(c) it is possible for FSS such as SMATV systems to continue to operate and receive satellite signals in the 3.4 – 3.6 GHz band on a secondary basis.

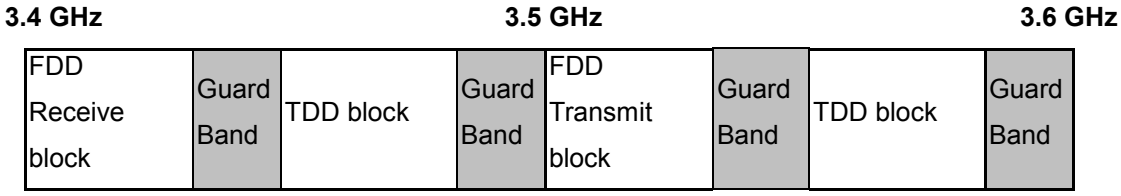
19. Having considered the international deployment of spectrum for BWA, the possible benefit that BWA may bring into Hong Kong, the gradual withdrawal of mandatory Type II interconnection in the run up to 2008, the equipment availability, the co-existence between BWA and FSS, the TA is of the preliminary view that the 3.4 - 3.6 GHz band may, depending on the actual requirement of BWA, gradually be allocated to BWA on a primary basis. FSS may still be used in this band on a secondary basis, or in a 600 MHz band outside the 3.4 – 3.6 GHz band on a primary basis. The TA invites views from the industry on this spectrum management issue.

Spectrum Sharing between FDD and TDD

20. There is interference concern about the coexistence of FDD and TDD in adjacent frequency blocks but in the same geographical area, or in the same block but across geographical boundaries. The extent of interference between TDD and FDD depends on the frequency separation between the frequency blocks and physical distance between the

concerned radio stations, among others.

21. OFTA has not yet finalized the band plan in the 3.4 – 3.6 GHz range for TDD and FDD usage. One possible band plan is depicted in the diagram below:



Depending upon the demand for spectrum for FDD and TDD systems, the TA will exercise flexibility in the allocation of paired and unpaired spectrum in the 3.4 – 3.6 GHz band.

22. For coexistence of TDD and FDD services within the 3.4 – 3.6 GHz band, proper band plan will be devised to address the interference issues. Proper geographical separation of TDD and FDD systems will also be arranged where possible. The TA invites views from the industry on any other measures that will help tackling the interference issue. The TA would also like to receive input from interested parties on their expected bandwidth requirement and modes of operation (TDD or FDD) for BWA.

Spectrum Allocation

23. According to the information provided by the WiMAX Forum, the channel bandwidth recommended for IEEE 802.16 or ETSI HiperMAN systems operating in the 3.5 GHz band is either 3.5 MHz or 7 MHz. Assuming a 4-sector cell configuration, a minimum of 14 MHz x

2 duplex spectrum is required. As for UMTS TDD system, a channel bandwidth of 5 MHz or 10 MHz is required. Allocation of a 20 MHz unpaired band therefore allows for a 4-sector UMTS TDD cellular infrastructure to be deployed.

24. The TA is of the preliminary view that a paired band of 14 MHz x 2 for each block for IEEE 802.16 or ETSI HiperMAN service provision and an unpaired band of 20 MHz for each block for UMTS TDD service provision may serve the need of BWA in the 3.5 GHz band. The TA invites views from the industry on the proposed channel bandwidth and bandwidth for each block.

25. Subject to the industry demand, the TA may ultimately allocate roughly three 14 MHz x 2 paired frequency blocks and four 20 MHz unpaired frequency blocks. The frequency spectrum allocated for BWA in the initial phase may however be limited, and the TA will decide the spectrum pool to be offered based on the industry's immediate need. The TA invites views from the industry on the total bandwidth allocated for BWA in the initial phase.

STANDARDS ISSUES

26. There are various proprietary solutions for BWA. Some industry standards are also available for this technology. Some examples are those published by the IEEE, the European Telecommunications Standards Institute (ETSI) and the Third Generation Partnership Project (3GPP). These regional standards are outlined in the following paragraphs.

IEEE

27. The IEEE approved the initial 802.16 standard for wireless metropolitan area network (MAN) in the 10 – 66 GHz frequency band in December 2001, titled IEEE 802.16-2001. An extension of the standard to support the frequency band below 11 GHz was subsequently published as IEEE 802.16a-2003. Earlier this year, the IEEE 802.16-2004 standard was released, which consolidates IEEE 802.16-2001 and IEEE 802.16a-2003, as well as IEEE 802.16c-2002 that covers the interoperability aspect. The IEEE 802.16 standard typically offers a data throughput of around 40 Mbps using 10.5 MHz bandwidth in the 3.5 GHz band, with a radio reach up to around 50 km. It also allows for non line-of-sight operations[3], thus facilitating more flexible deployment in built-up metropolitan areas and for indoor applications as well. There are a number of vendors now offering equipment on the market which is claimed to be in conformance with the IEEE 802.16a-2003 standard.

28. A further enhancement of IEEE 802.16-2004 for limited mobility is currently in progress under the IEEE work group of 802.16e. The IEEE 802.16e enhancement is expected to bring about some mobile and roaming support to the current standard. The enhancement covers a frequency range up to 6 GHz only and a lower data throughput, but support mobility at vehicular speed, roaming as well as a break-before-make handoff on crossing the boundary of a radio cell site. Products conforming to IEEE 802.16e are expected to be on the market in the next two to three years.

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[3] It should be noted that the peak technical performance could not be achieved for non line-of-sight applications.

ETSI

29. The ETSI is developing its HiperMAN standard which serves to provide an interoperable air interface for fixed wireless access in the 2 – 11 GHz band. The HiperMAN standard uses the basic media access control layer of the IEEE 802.16-2001 standard. It has been developed in close co-operation with IEEE 802.16 such that the HiperMAN standard and a subset of the IEEE 802.16-2004 standard will be interoperable.

WiMAX

30. There are multiple implementation options for IEEE 802.16-2004, implying that hurdles for interoperability under a mass adoption environment may arise. The WiMAX Forum was accordingly established in 2001 to promote the deployment of this standard by certifying compatibility and interoperability of 802.16-2004 equipment, as well as HiperMAN equipment. WiMAX is essentially a specific implementation of IEEE 802.16-2004, focusing on a physical mode of 256-point orthogonal frequency division multiplexing (OFDM). Initial profiles of WiMAX-certified equipment cover 2.4 GHz, 2.5 GHz, 3.5 GHz and 5.8 GHz bands.

3GPP

31. The 3GPP published specifications of the Universal Mobile Telecommunication System (UMTS) in 1999, which covers both Frequency Division Duplex (FDD) and Time Division Duplex (TDD) modes. Commercial products of UMTS TDD for broadband wireless

access are available in various frequency bands, including 1.9 GHz, 2.0 GHz, 2.5 GHz and 3.4 – 3.6 GHz. The UMTS TDD standard supports full vehicular mobility and wide non line-of-sight coverage. As it is inherently a 3G technology, it offers both cell handoff and roaming capabilities. It also provides for adjustable asymmetric traffic, which better suits typical Internet usage pattern, in contrast to the symmetric upload and download capabilities of FDD technologies. For UMTS TDD, the equipment market is largely dominated by a few manufacturers.

32. Consistent with the technology neutrality principle, the TA does not intend to mandate which technology or technologies should be used in the delivery of BWA services in Hong Kong. The TA invites views from the industry on this proposal. In addition, he would like to invite views as to whether the concerned equipment market being dominated by one or just a handful of manufacturers should be a valid regulatory concern from a competition perspective.

LICENSING ISSUES

33. While the focus of BWA is on the fixed service market segment at the moment, there are certain inherent features of mobility in some of these standards. For instance, there is a forthcoming enhancement to WiMAX products which will bring about some handoff and roaming capabilities. While the spectrum allocation for BWA may be for fixed services initially, the capability to support mobile services may emerge in the near future. Depending on the technology adopted and vendor solution chosen, some technologies can even support mobile applications now. As the regulatory frameworks for fixed and mobile services are

quite different at present, the TA intends to determine the scope of BWA service in the current licensing framework.

34. According to the Government's conclusion on the review of Type II interconnection policy, mandatory Type II interconnection at the telephone exchange level will be progressively withdrawn. The TA considers that BWA may be a viable substitute of existing Type II interconnection links for facilitating the progressive withdrawal of such links in the coming years. It is thus expected that there may be a potential demand for BWA deployment for the delivery of fixed network services.

35. The Government has announced on 29 November that a spectrum policy review would be conducted. Policies on the allocation and assignment of spectrum for mobile and fixed services would be included. The review shall be conducted with a view to constructing a responsive, transparent and market-led spectrum policy for allocating and assigning such spectrum resources. However, the TA considers that in the light of the recent development of broadband wireless access technologies and the Government's decision to gradually withdraw mandatory Type II interconnection, there is a need to start discussions with the industry and the public for the release of spectrum for fixed services. However, deployment of BWA for full mobile service at this moment in time is considered not necessary and could be reviewed later having regard to the outcome of the spectrum policy review.

36. The TA is aware of the technology development resulting in a growing trend of fixed-mobile convergence. There are views that BWA is a candidate technology realising such trend. Nevertheless, fixed

access is likely to be the major commercial application of BWA in the near future. The TA considers that the licensing framework for BWA as a fixed service initially may serve as a transitional arrangement in such a context, with possibility of future migration to mobile services, subject to the subsequent development of the technology, the market, and the regulatory framework.

37. The TA is of the preliminary view that BWA in Hong Kong may initially be offered as a wireless extension of the conventional wireline based fixed network service. Under this proposal, BWA spectrum should be reserved for carriers with an intention to establish fixed networks in Hong Kong. Interested parties who are not already fixed carrier licensees should apply for a fixed carrier licence before they are eligible to bid for the BWA spectrum.

38. To differentiate BWA services from a full mobile service, the TA proposes that the service offered by a fixed carrier licence through BWA would only be allowed to have 'limited mobility'. 'Limited mobility' here shall be interpreted as no cell handoff capability allowed.

39. The TA would like to invite views from the industry on this proposed licensing arrangement for BWA in Hong Kong as given in paragraphs 37 and 38.

ASSIGNMENT OF SPECTRUM

Spectrum Assignment Method

40. The arrangements for assigning limited spectrum to telecommunications licensees largely fall into two categories: by beauty contest or by spectrum auctioning.

41. The merit of selection by beauty contest is that the TA may use a set of criteria to assess the proposals from different interested parties. This will enable the TA to pick the best proposals scored against the set of criteria. The disadvantage of such an approach is that, as the licensees will not be required to bid for the spectrum financially, they may have less incentive to use the radio frequency in the most efficient way possible.

42. The alternative for assigning spectrum is by auction. An auction approach is in general taken as a fair, transparent, objective and economically efficient means leaving the market to decide who will be assigned the spectrum. The major arguments against spectrum auction are potential for overpricing, speculative bidding for subsequent spectrum trading, and inherent competitive advantage of big players with financial strength to out-bid smaller players. However, these concerns may be mitigated by a prudently designed set of auction rules.

43. Taking into accounts the pros and cons as set out above, the TA is of the preliminary view that the BWA spectrum may be assigned by auction.

Payment Approach

44. On the assumption that a market-based approach to assign spectrum via auction is adopted, the outcome of the auction will be an SUF with the charge level set by the market forces. The imposition of SUF is justified as the use of BWA frequency spectrum, a scarce public resource, for the provision of commercial public telecommunications services should be subject to a charge. There is however a number of options for the SUF payment, e.g. up-front cash payment, deferred cash payment and royalties.

45. Up-front cash payment has the advantage of being conceptually simple and easy to administer. However, they place a heavy upfront financial burden on licensees and may stifle network roll-out and deter entry.

46. Deferred cash payment is pre-determined cash payments spread over the period of spectrum usage by the licensee, typically on a straight line or increasing scale. Like the up-front cash payment, it is conceptually simple as the SUF amount is already predetermined at the time of auction. Furthermore, the immediate financial burden on the licensees is alleviated. However, the Government does carry a credit risk on bidders in the event they hand back the licence prematurely, unless the payments are guaranteed by an independent financial institution.

47. Another option is to collect royalties, typically expressed as a percentage of revenues. This is the approach for the third-generation mobile services licences and the new licences for second-generation

mobile services. Royalties do not load the successful bidder upfront with lumpsum payment, as they need not be paid until services revenues are actually received. Nevertheless, royalties may lead to over-bidding if the bidder is too aggressive, which may undermine the viability of BWA deployment. Furthermore, as BWA may be only one of the access technologies adopted by a fixed carrier licensee, if royalties on BWA spectrum usage are charged, there may be a need to separately identify the revenue relevant to the BWA part only. This would entail complicated accounting separation requirements in order to ensure accurate determination of payment of royalties by licensees.

48. Having regard to the above considerations, the TA is of the preliminary view that the SUF for BWA spectrum should preferably be simple and easy to administer, following a deferred cash payment approach. A SUF chargeable on a per MHz basis therefore appears to be desirable as this would create a financial incentive for licensees to return unused spectrum, thereby enhancing the efficient use of spectrum. Such approach is also adopted for the minimum SUF payment under licensing framework for new mobile carrier licences issued on expiry of existing licences for 2G mobile services.

49. Based on the consideration above, the TA is of the preliminary view that SUF for BWA spectrum may be charged annually on a per MHz basis.

Spectrum Usage Period

50. Under the current licensing framework, subject to fulfilling licensing requirements, any party may obtain a fixed carrier licence at any

time. Thus, the successful bidders for the spectrum for BWA services may hold fixed carrier licences with different expiry dates. The TA is of the preliminary view that there is no need to link the spectrum usage period to the licence validity period. BWA is not an essential access technology for a fixed carrier, but a supplementary tool to expand the coverage of its fixed network. Granting of the right to use the spectrum should not give rise to any legitimate expectation for renewal of the licence held by the successful bidder even if the licence may expire earlier than the right to use the spectrum. Bidders shall therefore take into account the outstanding validity period of their licences and the risk of non-renewal of their licences when they offer their bids. To ensure that spectrum would not lie idle, we consider that the Government should have the power to require a bidder holding spectrum usage right but without any licence to return the spectrum to the Government.

51. We are mindful that a spectrum usage period which is a too short might discourage bidding incentive, while too long a period could unnecessarily delay possible spectrum refarming for more efficient applications in the event that there is such a need. Taking into account the expiry date of existing FTNS licences, a spectrum usage period of ten years is considered to strike a reasonable balance.

52. The TA is of the preliminary view that a usage period of ten years may be sufficient for successful bidders of BWA spectrum. The actual spectrum usage period will however be subject to the licence validity period as mentioned above.

Surrendering Spectrum

53. As the deployment of BWA worldwide is still at the early stage, there may be uncertainties regarding the market development in Hong Kong. The TA considers that a provision for a licensee to surrender unused BWA spectrum (thereby reducing the burden of SUF payment) will allow for more flexibility for the operators to rollout their network and adjust their business plan in response to the changing market condition. A provision to permit surrendering of spectrum is consistent with the licensing framework for mobile services upon expiry of existing second generation mobile service licences. The SUF charge basis of per MHz also facilitates licensees to surrender part of assigned spectrum. Nevertheless, there should be some provisions to restrict full return of the allocated spectrum in the initial years in order to prevent strategic bidding to hoard spectrum for the purpose of delaying entry by competitors.

54. The TA is of the preliminary view that successful bidders of BWA spectrum may be given the option to return any unused BWA spectrum to the Government, thereby reducing the level of SUF payment, over the spectrum usage period except for the initial 5 years.

Change of Spectrum Usage

55. The SUF paid by a successful bidder is for fixed access applications only. Any plan to support full mobile applications will require the prior approval of the TA, the subsequent successful application for a mobile carrier licence and payment of the adjusted SUF commensurate with the mobile usage. The change of spectrum usage by assigned users and the need to make additional payment to reflect the new

spectrum usage will be some of the issues to be considered in the spectrum policy review.

56. The TA would like to invite comments from the industry on his preliminary views concerning the various issues on SUF for BWA as given in paragraphs 43, 49, 52 and 54.

INVITATION FOR COMMENTS

57. The TA would like to seek views from the industry and any interested party on the various issues on BWA discussed in this consultation paper. Views and comments should reach the TA, preferably in electronic form on or before 21 February 2005.

58. The TA reserves the right to publish all views and comments and to disclose the identity of the source. Any part of the submission, which is considered commercially confidential, should be clearly marked. The TA would take such markings into account in making his decision as to whether to disclose such information or not. Submissions should be addressed to:

Office of the Telecommunications Authority
29/F, Wu Chung House
213 Queen's Road East
Wan Chai
Hong Kong
[Attention: Senior Telecommunications Engineer
(Technical Regulation) 2]

Comments may also be sent by fax to 2803 5112 or by email to BWA@ofta.gov.hk.

Office of the Telecommunications Authority

20 December 2004

Annex

Outline of the Existing Status of BWA Candidate Bands (other than the 3.5 GHz Band) in Hong Kong

1.9 GHz and 2.0 GHz Bands

The 1.9 GHz and 2.0 GHz bands are designated for 3G services in Hong Kong. These bands are therefore not available for BWA.

2.3 GHz Band

2. In Hong Kong, a few frequency slots in this band are being used for electronic news gathering/outside broadcasting links and fixed links. A large part of this band is vacant. Recently, Mainland China has decided to use the 2.3 – 2.4 GHz band for the future expansion of 3G service. The current status of the band will be maintained for the time being until there is a clearer picture on the 3G development.

2.4 GHz Band

3. The 2.4 – 2.4835 GHz band is currently exempt from licensing in Hong Kong. Deployment of BWA systems within this band is now permissible provided that the requirements set out under the Exemption Order for Telecommunications Apparatus are met.

2.5 GHz Band

4. The 2.5 – 2.69 GHz band has been reserved for 3G expansion in Hong Kong. The band is therefore not available for BWA. However, the TA will closely monitor the international development regarding the future use of this band.

5 GHz Band

5. In Hong Kong, the 5.15 – 5.35 GHz and 5.725 – 5.85 GHz bands have been exempt from licensing. The 5.15 – 5.35 GHz band is restricted to indoor operation with a maximum EIRP of 200 mW and the 5.725 – 5.85 GHz band could be used for both indoor and outdoor applications with EIRP up to 4 watt. In the World Radiocommunication Conference 2003, a new co-primary allocation in the 5.47 – 5.725 GHz band was approved for mobile service for the implementation of wireless access systems. In Europe, the 5.47 – 5.725 GHz band is exempt from licensing and the United States allows the band for licence-exempt applications. Hong Kong may consider opening up the band for licence-exempt applications if the industry sees such a need. Currently, some FTNS operators are using the 5.725 – 5.85 GHz band to roll-out their wireless infrastructure. It is possible for BWA systems to operate in the 5.47 – 5.725 GHz and 5.725 – 5.85 GHz bands on an uncoordinated and unprotected basis.

6. In the 5 GHz band, there is also a 100 MHz block in the 5.85 – 5.95 GHz range which allows telecommunications licensees to provide fixed wireless access on a shared and uncoordinated basis. Interested parties may write to the Office of the Telecommunications Authority and authorization will be considered on a case by case basis. Deployment of BWA systems in the 5.85 – 5.95 GHz band is therefore possible, though on a shared and uncoordinated basis.