

**For information  
On 14 March 2005**

**Legislative Council Panel  
on Information Technology and Broadcasting**

**Licensing Framework for  
Deployment of Broadband Wireless Access**

**INTRODUCTION**

This paper briefs Members on the consultation exercise launched by the Office of the Telecommunications Authority (OFTA) on 20 December 2004 concerning the licensing framework for deployment of broadband wireless access (BWA) technologies. The consultation period will end on 14 March 2005.

**BACKGROUND**

2. The development of BWA technologies for fixed telecommunications services has attracted substantial attention lately. There are technical trials and commercial deployments of BWA in the Mainland and some developed countries, including the United Kingdom and South Korea. In Hong Kong, network operators have expressed increasing interest to deploy BWA. Over the past year, a number of them and equipment vendors conducted technical trial of such technologies to evaluate their performance in the local context.

3. On 20 December 2004, OFTA issued a consultation paper to discuss the various issues concerning the introduction of BWA services and consult the industry and interested parties on the regulatory framework for such services. The Telecommunications Authority (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.

## **THE CONSULTATION PAPER**

### **Potential Applications of BWA**

4. BWA technologies are wireless technologies that enable a service provider to deliver broadband service to both network operators and end users, for example, the backhaul for fixed and mobile networks and Internet access service for residential users within a relatively short period of time. It even allows the offer of instantly configurable “on demand” high-speed connectivity for temporary events that may involve massive deployment of Wi-Fi<sup>1</sup> hotspots. Wireless technology makes it possible for the service provider to scale up or down service levels swiftly in response to customer demands.

5. In a dense city environment like the urban parts in Hong Kong, BWA links may be deployed to replace the underground cables in areas which would otherwise be uneconomical to serve due to limited number of users or which 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 would be withdrawn by 30 June 2008, except for buildings meeting the “essential facilities” criterion. For those FTNS operators relying heavily on Type II interconnection, BWA is a possible alternative to enable operators to retain their access to the buildings they serve as Type II interconnection is gradually withdrawn.

### **Standards**

6. While there are various proprietary solutions for BWA, some “industry standards” have been established, for example, the IEEE 802.16 standard published by the Institute of Electrical Engineers (IEEE), the ESTI HiperMAN standard published by the European Telecommunications Standards Institute (ETSI) and the UMTS TDD standard of the Third Generation Partnership Project (3GPP). Consistent with the technology neutrality principle, the TA does not intend to mandate the technology to be used in the delivery of BWA services in Hong Kong.

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<sup>1</sup> 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.

## **Spectrum for BWA in Hong Kong**

7. 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.

8. While BWA deployment is possible on the shared spectrum in the 2.4 GHz or 5 GHz bands, the licence-exempt nature of such spectrum could result in mutual interference between equipment, rendering 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. The Mainland and some countries including Australia and the United Kingdom have also allocated the 3.5 GHz band for BWA. As the Mainland 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.

9. In Hong Kong, the 3.4 – 4.2 GHz band has so far been allocated to the downlink segment of fixed satellite service (FSS). Due to the small geographical size of Hong Kong, BWA is likely to cause interference to the receiving earth stations on co-frequency operation. 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<sup>2</sup>. The “secondary basis” spectrum allocation arrangement for FSS is believed to be a practically feasible solution to allow the co-existence of both BWA and FSS service in the same frequency band.

## **Frequency Blocks Available**

10. Based on OFTA’s technical assessment, 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

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<sup>2</sup> 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.

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. Subject to 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.

## **Licensing Issues**

11. The Government has announced on 29 November 2004 that a spectrum policy review would be conducted. Policies on the allocation and assignment of spectrum for mobile and fixed services would be included. 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. On the other hand, deployment of BWA for full mobile service at this moment in time is considered not necessary and could be reviewed later.

12. 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.

13. 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.

## **Spectrum Assignment**

14. The arrangements for assigning limited spectrum to telecommunications licensees largely fall into two categories: by assessment of competing bids based on their merits or by spectrum auctioning.

15. The advantage of the former 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 as judged against set 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.

16. As for the latter, 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, 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.

17. Taking into account the pros and cons of the two options, the TA is of the preliminary view that the BWA spectrum may be assigned by auction.

### **Payment Approach**

18. On the assumption that a market-based approach to assign spectrum via auction is adopted, the outcome of the auction will be a Spectrum Utilisation Fee (SUF) with the charge level set by 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.

19. 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. An 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. As such, the TA proposes that that SUF for BWA spectrum may be charged annually on a per MHz basis.

### **Spectrum Usage Period**

20. 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. 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. The TA is of the preliminary view that there is no need to link the spectrum usage period to the licence validity period. To ensure that spectrum would not lie idle, the TA proposes 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.

21. The TA proposes a spectrum usage period of ten years, which is considered 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**

22. 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.

23. 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**

24. 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.

## **WAY FORWARD**

25. The TA will consider all the submissions from respondents to the Consultation Paper and take them into account in reaching his final decision on the licensing of the BWA services in Hong Kong. If everything proceeds smoothly, it is hoped that BWA spectrum would be allocated in the first half of 2006.

**Communications and Technology Branch  
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