



**Submission of Comment on the Consultation Paper on Licensing for
Deployment of Broadband Wireless Access issued on 20 December 2004**

Submission by Hong Kong Broadband Network Limited to the
Telecommunications Authority of Hong Kong

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Part A- Executive Summary

1. Hong Kong Broadband Network Limited (“HKBN”) welcomes the opportunity to comment on the proposed licensing framework for deployment of broadband wireless access (“BWA”) technologies for fixed telecommunications services in Hong Kong.
2. We support the proposal of the Telecommunications Authority (“TA”) to deploy BWA to fixed carriers as a wireless extension of the conventional wireline based fixed network service in Hong Kong. HKBN believes that such an approach would be very valuable in facilitating fixed network operators to rollout their services in a speedy manner through the BWA technology.
3. This would no doubt promote competition in Hong Kong’s telecommunications market, which is in line with the TA’s policy objectives and for the benefits of the general public. The TA should proceed with the allocation of spectrum speedily without delay in order to allow the market to capture the ever developing technology on one hand and not leaving Hong Kong lagging behind other areas where BWA is being fully deployed and developed for the benefits of their people.
4. Since there is still considerable uncertainty surrounding the technical standards, frequency band allocations and likely services/applications for the deployment of BWA, HKBN considers it is imperative that the regulatory environment set by the TA for BWA technologies should allow maximum flexibility so as to enable future incorporation of standards and band

allocations set by the International Telecommunications Union (“ITU”), which may require changes to any existing use of certain spectrum bands.

5. Besides, in consistent with the TA’s technology neutral stance, any regulation of BWA, no matter (UTMS or TDD, ETSI HiperMAN or IEEE 802.16 as advocated by the WiMAX Forum) should offer equal obligations/opportunities to licensees and TA should not favor any underlying technology in any manner whatsoever.
6. Any spectrum allocation to be granted for BWA should have a sufficient usage period and should be upgradeable to full mobility subject to certain licence conditions to be further discussed so that licensees can make the most use of BWA technology as it shall advance in a long run.

Part B - Statement of Interests

7. HKBN is a FTNS in Hong Kong, having been granted a license to provide local wireline-based FTNS services by the TA on April 16, 2002.
8. HKBN has successfully established one of the largest Metro Ethernet IP network in the world, and has extended its network coverage to 1.2 million homes, representing 60% of the total number of households all over Hong Kong. With the support of an advanced Metro Ethernet network platform, HKBN realized its target for “triple-play” strategy: delivering broadband Internet access, local telephony and pay-TV services, and intending to further develop its fixed telecom network business to allow the widest possible choice for the customers as a whole.
9. Utilizing its own self-owned infrastructure and advanced technology, HKBN aims to provide diversified telecommunications services to the public, and move towards the leading position in the industry. This submission represents the views of the Company.
10. HKBN makes this submission in response to the consultation paper issued by the TA on 20 December 2004 in regard to the licensing for deployment of BWA (“Consultation Paper”).
11. HKBN provides herein its specific response to the questions raised by the TA in the Consultation Paper.

Part C - Specific Comments

Spectrum Issues

Spectrum for BWA in Hong Kong

12. *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 3.5GHz band is a possible and could be the most appropriate licensed band for BWA deployment in Hong Kong.*
13. Although BWA technologies may operate in various frequency bands and there are no internationally harmonized frequency band for their deployment at present. HKBN considers that the TA could take into account the general practice of other jurisdictions, such as the Australia and the U.K. in allocating spectrum for BWA services.
14. HKBN believes that by fully utilizing the frequency spectrum to issue a new type of BWA licence in Hong Kong, the licensing regime should cater the following objectives: -
- to maximize the number of BWA licence to fixed carriers;
 - to maximize the availability of BWA services in the future;
 - to enhance the momentum for the development of BWA services, such as the provision of ad hoc broadband connectivity (i.e. wireless hotspot, location require temporary broadband access);
 - to enhance last-mile access for fixed carriers;

Spectrum Sharing between FSS and BWA

15. *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.*
16. HKBN agrees with TA's view in taking into account the international deployment of spectrum for BWA in Hong Kong. However, the deployment of BWA technology may not just bring benefits with the gradual withdrawal of the mandatory Type II interconnection policy but can also help to solve various practical difficulties which fixed operators face in gaining access for the provision of the "last-mile" with a view to providing FTNS services.
17. For the allocation and assignment of frequency between BWA and FSS services, HKBN believes the TA and the industry could further discuss and examine this issue in respective Radio Spectrum Advisory Committee meeting.

Spectrum Sharing between FDD and TDD

18. *For coexistence of TDD and FDD services within the 3.4 – 3.6GHz 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 the interested parties on their expected bandwidth requirement and modes of operation (TDD or FDD) for BWA.

19. For measures regarding the interference issue for coexistence of TDD and FDD services within the 3.4 – 3.6 GHz band, there have been extensive study performed by the ITU. The techniques considered include site placement, antenna separation, antenna polarization, adaptive antennas, transmitter/receiver improvements, TDD power control and FDD power control.
20. While co-channel interference usually has to be solved on a case-by-case basis and despite many decades of experience in the wireless industry both for regulators and operators, no simple and enforceable set of rules has been found to address co-channel interference that can guarantee a solution. If the rules are too detailed and complex, that might become inflexible and difficult to enforce.
21. In this relation, a more effective means to deal with this issue is to allocate independent frequency blocks rather than spatial sharing of the same frequency blocks across geographic boundaries. Accordingly, HKBN would support the allocation of independent frequency blocks to licensees. By all means, given its technology neutrality principal, the TA should allow successful spectrum holder to decide whether adopt TDD or FDD or other systems in their business model.

Spectrum Allocation

22. *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.*
23. Frequency spectrum is a scarce public resource, and must be used as efficiently as possible for provision of services to the populace. By taking into account the bandwidth requirement for wireless broadband networks in Australia are 5 MHz in the 1.9 GHz band in Sydney, HKBN considers that the proposed paired band of 14 MHz x 2 and the unpaired band of 20 MHz may serve the need of BWA in the 3.5 GHz band.
24. HKBN believes in the initial stage, the TA may adopt the proposed paired band of 14 MHz x 2 and the unpaired band of 20 MHz for the deployment of basic BWA service in Hong Kong.
25. On the other hand, HKBN thinks guard bands are not necessary as there are a number of ways to tackle adjacent-channel interference, such as to use out-of-band emissions masks and radiated power limits on the transmitter side, and Adjacent Channel Rejection filtering on the receiver side.
26. *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.

27. To ensure there is an efficient use of these public resources, TA should allocate the greatest number of bandwidth to the fixed carriers in the initial stage as soon as possible, albeit such allocation might be subject to subsequent confirmation/legislative procedures which might be required. This could allow the fixed carriers to have sufficient time to make preparations like locating and negotiating for necessary stations for deploying BWA, sourcing of equipment and recruiting personnel well before the actual launch of BWA in the market.
28. Equipment vendors, successful spectrum holders and any interested parties could also have sufficient time to perform radio station planning, equipment testing and manufacturing which suit the regulatory environment of Hong Kong.
29. Therefore, HKBN is keen to see that TA shall provide for all necessary means to allow Hong Kong to take advantage of the latest BWA technology and experience of BWA deployments in Hong Kong. TA should in no way leaving Hong Kong be lagging behind other areas like Europe, Australia, UK and Singapore in providing a regulatory framework for the introduction and development of the BWA.

Standard Issues

30. *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.

31. Under the technology neutrality principle, HKBN believes it is not necessary for the regulator to prescribe which technology should be applied for BWA services in Hong Kong. Besides, in consistent with the TA's technology neutral stance, any regulation on BWA, no matter (UTMS or TDD, ETSI HiperMAN or IEEE 802.16 as advocated by the WiMAX Forum) should offer equal obligations/opportunities to licensees and not to favor any underlying technology or manufacturer in any manner whatsoever.
32. For the provision of equipment, since BWA still rest in the early stage of development, HKBN considers it is more appropriate for the market to determine the future growth and development of BWA rather than TA intervening.

Licensing Issues

33. *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.*

34. In response to the TA's proposal, HKBN welcomes the licensing arrangement of adopting BWA for fixed carriers as a wireless extension of the conventional wireline based fixed network service. Under such a competitive environment in the fixed network market in Hong Kong, HKBN foresees BWA would be very important and provides an effective alternative solution for fixed carriers in rolling out and expanding their service for the consumers in the following manner:

- a speedy and economic solution for fixed carriers in providing affordable fixed network services to rural and outlying areas with low population density or isolated blocks ;
- enable fixed carriers to deliver service within a relatively short period of time without additional wiring works in those heavily congested lead-in conduits or very old buildings without any trunking at all;
- enable the provision of services to buildings which have problems in gaining in-building access to common parts of buildings e.g. single-owned premises ; and
- provision of services to restricted zones and areas which have practical limitations in hosting telecommunications equipments or require disruptive road digging to lay underground cable ducts

35. On the other hand, 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. Certainly there will be a reduction of choice for consumers to choose alternative wireline broadband service providers, which amounted to 40% of existing telecom

service consumers in Hong Kong. Thus, HKBN foresees, with the introduction of BWA to the fixed market, consumers currently enjoying fixed services at locations through Type II interconnection would benefit from it.

36. Furthermore, with the experience in deploying wireless LMDS technology in Hong Kong, HKBN believes BWA is a good alternative for the conventional “last mile” access solution and would definitely enable fixed network operators to overcome various difficulties encountered by fixed carriers at locations with physical difficulties on in-building access in a prompt and efficient manner.
37. However, since there is limitation on the bandwidth available for BWA services in the 3.4 – 3.6 GHz frequency band, HKBN considers in the initial phase BWA should primarily serve as a supplement to the traditional wireline last-mile access solution in providing telecommunications service to consumers in rural areas and locations with physical difficulties by minimum service provisioning lead-time.
38. To ensure that consumers can truly enjoy high speed broadband service, TA may be reminded of the experience of the wireless FTNS licensees so that BWA should primarily be used as a supplement to the existing wireline networks in providing last-mile wireless access solution instead of a full wireless network.
39. Given the above reasons, HKBN would consider TA should reserve no less than half of the BWA spectrum only for fixed carriers in Hong Kong. Since the number of BWA frequency blocks available is limited, HKBN believes the

TA should first allocate the frequency block to the most active fixed carriers who currently hold a fixed carrier licence.

40. HKBN proposes the TA may adopt the first right of refusal precedence set for the recent 2G mobile licence renewal process, so that the most active fixed carriers, like PCCW, HKBN, HGC, WT&T and NWT should be given first right of refusal for the limited mobility BWA spectrum for the initial phase.
41. Such equal chance of right of first refusal would reduce the chances that incumbents with better financial backups would be able to capture the BWA spectrum just to avoid other fixed carriers making use of the spectrum but not otherwise.
42. *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.*
43. According to the TA's proposal, in the early phase BWA would only be served as an alternative access method rather than conventional wireline based access, such as Digital Subscriber Line services, Integrated Services Digital Network (ISDN) services, Wireless Local Loop services. As an access method, the services/applications are likely to be the same as those currently provided to end users via traditional last mile access methods.
44. In light of this, HKBN supports the TA's proposal to allow the service offered by a fixed carrier licence through BWA in the early phase to have 'limited mobility' with an option to be upgraded to "full mobility" as far as it shall be

supported by technology advancement. Subject to the development of BWA technology, the TA should provide an option for successful spectrum holder to expand to full mobility with such terms and conditions to be discussed in due course.

Assignment of Spectrum

Spectrum Assignment Method

45. *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.*
46. While a market-based approach to allocating spectrum via auction generally is favored by regulators in many jurisdictions given that it is generally regarded as a means of putting spectrum in the hands of those who value it most, it may not be the most appropriate mechanism for promoting competition in the broadband market in Hong Kong.
47. Firstly, allocating spectrum to the bidder who placed the highest bid may not achieve the best outcome in terms of development of competition. A potential new entrant may not possess the financial resources to place the highest bid, but its entry would benefit society in terms of introducing competition to existing broadband infrastructure providers.
48. Secondly, the incumbent operator may possess the financial means to potentially outbid aspiring new entrants. This leads to unfavorable results in that consumers as whole would not be able to benefit from competition with

the entry of a new service provider. In this way, the auction mechanism would favor the incumbent, and potentially deters the development of additional facilities-based competition, which is one of the key potential benefits of BWA technologies.

49. Thirdly, an auction presents a risk of a very high and economically non-viable final auction price. Under this scenario, the potential new entrant may experience difficulties in raising the capital to pay for the spectrum and also rollout the network. Essentially, a high spectrum price could take away capital from investments and marketing. Even if the capital can be raised, the high price of spectrum would eliminate the low cost advantages offered by BWA technologies, thus destroying the value of the BWA technologies substantially. This high spectrum price would ultimately be borne by consumers.
50. Fourthly, auction is susceptible to manipulation by bidders. Collusive bidding, speculation and predatory bidding could take place to raise the spectrum price and to deter entry of potential new entrants.
51. Given the above, HKBN has reservation to subscribe to the licensing method of auction as used in the last 3G licensing exercise conducted in 2001 for awarding the new licence for vacant spectrum. If the TA is to promote innovation, the award of new licenses should be based on ‘selection by merits’ approach, rather than by auction or the right of first refusal as above discussed. The selection criterion should by all means require new industry players to introduce the greatest economic benefit to the community and promote wider range of innovative services to the public.

52. In this connection, HKBN believes the interested fixed carriers will be evaluated on the amount of investment, technical strength, network rollout, financial capability and proposed innovative services. In this relation, new licenses shall be granted to those who can demonstrate the capability to run a business with new types of applications and services to the consumers. It should be emphasized that these factors are all important for the development of BWA technologies in Hong Kong and could be objectively assessed as well.

Payment Approach

53. *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.*

54. HKBN agrees with the TA's approach to adopt a simple and easy mechanism to manage the SUF for BWA spectrum. Similar to existing SUF adopted on FTNS/Fixed Carrier Licensees/MNO, a SUF chargeable on a per MHz basis appears to be desirable for licensees to return unused spectrum to the TA, thereby enhancing the efficient use of spectrum.

Spectrum Usage Period

55. *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.*

56. HKBN considers tenure of only 10 years to be insufficient for spectrum rights holders to recoup their commercial investment – particularly new entrants who

are likely to take significantly longer to achieve commercial viability. HKBN believes it is also inconsistent with Hong Kong and international precedent. For example, HKBN notes:

- In Australia, the equivalent spectrum is typically issued for periods of 15 years. In particular, HKBN notes that wireless broadband spectrum in the 3.4GHz and 27 GHz bands were issued for maximum of 15 years; and
- In the UK, radiocommunications for wireless broadband in the 3.4GHz and 2.8GHz bands were issued for a maximum of 15 years.

57. HKBN further submits that from an investment certainty perspective, this is wholly unsatisfactory. Potential investors in the wireless broadband market and, in particular, new entrants into the Hong Kong market, and definitely need certainty in order to make the initial investment in spectrum rights. Investment uncertainty can undermine investment incentives and, given the already risky nature of investment in wireless broadband technologies, an insufficient period of spectrum rights would deter investment in these often unproven technologies.

58. In addition, HKBN submits that the TA needs to provide greater clarity and certainty as to the renewal processes (if any) that are to apply at the end of the spectrum rights. Moreover, HKBN considers providing spectrum rights holders with certainty of tenure would also help to reduce the incentives to run down infrastructure in the latter part of the tenure period.

Surrendering Spectrum

59. *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.*
60. Since spectrum is a scarce public resource, underutilized or even unused radio spectrum, which formally allocated within the regulatory system to a particular licensee, would be impossible to infer by the TA for alternative wireless services. Therefore, HKBN considers that providing an option to allow spectrum rights holders to return any unused BWA spectrum to the TA over the spectrum usage period except for the initial 5 years is appropriate.
61. While the number of frequency blocks available in the 3.4 – 3.6 GHz band is limited, BWA would become a highly demanded solution for wireless last-mile access by fixed carriers, especially upon the expiry of mandatory Type II interconnection in 2008. Thus, HKBN considers that while TA shall adhere to the efficient use of scarce spectrum resources, means to prevent spectrum hoarding should be considered in the spectrum assignment exercise.
62. Furthermore, to allow maximum use of spectrum assigned, BWA spectrum holders should be required to commit to certain business milestones, which is similar to the licensing of Local Wireless FTNS licence in the year 2000. In case the successful spectrum holders are unable to achieve the milestone in the predefined time period, the spectrum assigned would be required to be returned to the TA for further assignment.

63. In this relation, new licensees could utilize the unused/low utilization spectrum to enter the BWA market and enhance the choice of consumers for BWA services.

Part D - Conclusion

64. With respect to the potential and benefits arising from the deployment of wireless broadband technologies, BWA would be an important alternative in the provision of wireless “last mile” services in the provision of fixed telecommunications services in Hong Kong.
65. Subject to the advancement of BWA technology in the days to come, the TA should facilitate the industry to provide fully mobile telecommunications services in Hong Kong through BWA technology in the future so that consumers could enjoy a broader range of mobile telecommunications services.
66. As the mandatory Type II interconnection would be expired on June 2008, the TA should allocate the BWA spectrum to the industry in the soonest possible so that the licensees could plan ahead for the prompt introduction of the service to the market.
67. For the interests of the general public as a whole, HKBN believes the TA should take into account both consumer interests as well as cost efficiency for operators when considering whether to introduce any additional regulations for the telecommunications market.