



10 July 2007

Office of the Telecommunications Authority
29/F, Wu Chung House
213 Queen's Road East
Wan Chai, Hong Kong
Attention: Senior Telecommunications Engineer (R11)

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Dear Sir

Submission on "Providing Radio Spectrum for Broadband Wireless Access: Third Consultation Paper"

Nortel is pleased to provide the following submission in relation to the above consultation paper and congratulates the Telecommunications Authority on its comprehensive consultation process.

Nortel is a leading developer and supplier of WiMAX network equipment and has established an ecosystem of CPE providers.

WiMAX will be an important technology for the delivery of mobile broadband services which have the potential to become more important than fixed broadband for many consumer and business users and uses.

WiMAX provides a platform for the provision of converged fixed and mobile services because it is an end-to-end IP network so it can carry services as applications and often those applications will be the same for both fixed and WiMAX networks. The Telecommunications Authority's conclusions in April this year on "Deregulation for Fixed-Mobile Convergence" provide an important underpinning for this by allowing FMC to be market driven in response to consumer demand and without unnecessary regulatory constraints.



Responses to questions raised in the Consultation Paper

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?

2.3 GHz is going to be a widely used band for mobile WiMAX because it has better transmission characteristics than 3 GHz band frequencies for mobile WiMAX allowing more cost efficient network deployments with fewer base stations.

The spectrum should be made available as soon as the coordination with Mainland authorities and development of technical requirements is completed. This will ensure that Hong Kong obtains the economic benefits from BWA services with minimum delay.

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?

Nortel agrees that the 2.5 GHz band should be opened for BWA as soon as possible and recommends that all the band be made available.

Question (3): Do you have any preferred frequency bands for BWA services? How much spectrum do you need initially and for future expansion (number of blocks, spectrum width of each block, in which bands) and when the spectrum should be made available to the market?

For mobile BWA, frequency bands in lower frequency bands that align with international usage are preferred. Currently for WiMAX this is the 2.3 and 2.5 GHz bands but discussions on bands below 1 GHz for IMT-2000 are part of the WRC '07 agenda.

Frequencies in the 3 GHz band are also suitable for WiMAX. The WiMAX Forum has developed, and is developing, certification profiles for various bands and the TA should be considering opening spectrum in all possible bands in the future.



The minimum spectrum allocation per operator is 15 MHz which allows 5 MHz channels to be deployed in an N=3 frequency reuse pattern. However, a 30 MHz allocation is preferred because allows 10 MHz channels to be deployed in an N=3 design and this should provide sufficient capacity to meet medium term needs.

The spectrum should be made available as soon as the coordination with Mainland authorities and development of technical requirements is completed. This will ensure that Hong Kong obtains the economic benefits from BWA services with minimum delay.

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

While a 5 MHz raster aligns with the WiMAX Forum certification profile for the band, the profiles also provide for 10 MHz channels and operators should be able to use these wider channels if they fit within their spectrum.

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

Spectrum for TDD usage should be allocated in blocks of a minimum of 15 MHz as discussed above. While the greater amount of spectrum allocated to an operator allows more efficient network deployments, the maximum amount should be determined by a combination of competition policy considerations and the amount of spectrum that is desirable for efficient deployments. As in the answer to question (3), on technical grounds 30 MHz of contiguous spectrum is preferred for TDD usage.

A further consideration is the provision of guard bands. TDD mobile WiMAX needs operators to synchronize their transmissions or 5 MHz guard band. Given the limited spectrum in the 2.3 GHz band, licensees will either need to synchronize their networks or provide a guard band from with their own 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 service? If not, what is your proposal with reasons?

While Nortel understands the need for guard bands to protect services above and below the band, in other markets a 5 MHz guard band at the top of the 2.3 GHz band to protect WiFi and other 2.4 GHz services has been considered adequate. This is something that could be re-evaluated in discussion with suppliers about the performance of their filters.

In either case, the entire available spectrum should be offered for BWA.

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

Nortel recommends that the 2.5 GHz band be divided into 15 MHz or 30 MHz lots and be issued on a technology neutral basis.

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?

Nortel strongly supports this view.

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?

Nortel strongly supports this view.

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?

Nortel supports this view as a result of the limited spectrum in the 2.3 GHz band. In bands with greater amounts of spectrum it may be desirable to have some spectrum designated for local services.



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

Any different numbering of FMC services needs to be considered with a forward looking view that all services will one day be provided converged platforms and that all services will migrate overtime into this environment. Having different numbers may require all consumers to change their numbers in the future and this should probably be avoided.

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?

Nortel is not convinced that a distinction between "limited mobility" and "full mobility" BWA service will be sustainable. For example India has, in effect, had to remove its distinction between "fixed" FWA using cellular technologies and "mobile" services using the same cellular technologies.

Also as voice services on WiMAX will be applications, other parties could provide VoIP services independent of the network and probably across both fixed and "full mobility" BWA. In some markets this is already being done by Skype.

To avoid future complications, it may be better to use the same numbering arrangements as used of VoIP services.

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 2.3 GHz band to use the spectrum 2.300 - 2.305 GHz as stated in paragraph 60?

See response to Q(6).



I can be contacted at graemek@nortel.com or telephone +61 2 6279 7710 if you have any follow up questions.

Yours faithfully

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