

**SINGAPORE TELECOMMUNICATIONS LIMITED RESPONSE TO
CONSULTATION PAPER: DEPLOYMENT OF WIRELESS BROADBAND
TECHNOLOGIES IN SINGAPORE**

1. INTRODUCTION AND STATEMENT OF INTEREST

- 1.1 Singapore Telecommunications Limited (SingTel) is pleased to be given the opportunity to comment on the *Consultation Paper: Deployment of Wireless Broadband in Singapore*, issued by the Info-communications Authority of Singapore (IDA) for comment on 2 April 2004 (Consultation Paper).
- 1.2 SingTel is licensed to provide telecommunications services in Singapore. It was corporatised on 1 April 1992. SingTel is committed to the provision of state-of-the-art telecommunications technologies and services in Singapore. SingTel has a comprehensive portfolio of services that includes voice and data services over fixed, wireless and Internet platforms. Servicing both corporate and residential customers, SingTel is committed to bring the best of global communications to its customers in the Asia Pacific and beyond.
- 1.3 As a leading provider of telecommunications services including wireless services and broadband services, SingTel has a strong interest in the proposed licensing of spectrum for wireless broadband technologies in Singapore.

2. EXECUTIVE SUMMARY

- 2.1 Our views and comments may be summarised as follows:
- As an access method, the services/applications provided using wireless broadband technologies are likely to be the same, or equivalent to, the services/applications currently provided to end users via other access methods such as DSL, cable modem, ISDN, local leased circuits etc.
 - To avoid co-channel interference, SingTel recommends the allocation of independent frequency blocks. The minimum amount of spectrum should be 5MHz.
 - The key driver of spectrum value is the value of the services that can be provided using that spectrum. Consistent with a technology neutral approach, the spectrum fee paid by wireless broadband licensees should be equivalent to the spectrum fees paid by other licensees offering the same or equivalent services using other access methods and/or spectrum.

- The key features and service obligations should be the same or equivalent to those adopted when auctioning and licensing other parties to provide the same, or equivalent services using other access methods and/or spectrum. Licensees should be subject to investment commitments, nationwide roll commitments, service rollout commitments, QoS, license fee payments etc.
- The spectrum should be auctioned in generic lots. However, there should be separate auctions for 2.3GHz and 2.5GHz as bidders may have a preference for a specific frequency. The lot size should be 5MHz. We also recommend that there is preferably some guard band in between the blocks to minimise interference.
- The maximum amount of spectrum that a bidder should be able to acquire in the auction should be set at 10MHz. This amount is more than sufficient to deploy nationwide and to deliver wireless broadband services to end users.
- Existing 3G and broadband infrastructure providers should be eligible to bid for the spectrum and should be treated no differently to any other bidder. No special caps and/or restrictions should be imposed on the amount of spectrum they can bid for.
- The proposed commercial trial framework should be reduced to a 3 month + 3 month period.

3. VIEWS AND COMMENTS

3.1 The IDA has sought views and comments with respect to the following:

- (a) ***The potential of and benefits arising from the deployment of wireless broadband technologies, the likely services/applications to be deployed and the potential demand from businesses and consumers***

With respect to the potential of and benefits arising from the deployment of wireless broadband technologies, the primary benefit of deploying wireless broadband technologies is in providing end users with another access method.

The deployment of wireless broadband technologies complements, and competes with other access methods such as Digital Subscriber Line services, Integrated Services Digital Network (ISDN) services, Wireless Local Loop services (e.g. WiFi), Cable Modem services, Local Leased Circuits (LLC), Free Space Optics, Microwave Links, UMTS and GPRS etc.

As an access method, the services/applications are likely to be the same as those currently provided to end users via other access methods such as DSL, cable modem, ISDN, local leased circuits etc.

- (b) ***The allocation of the 2.3 GHz and 2.5 GHz bands for wireless broadband technologies and the harmonization of spectrum at the border areas.***

What are the coexistence issues that need to be considered with regards to the deployment of systems (FDD & TDD) in the same geographical area in adjacent frequency blocks, and the deployment of systems across geographic boundaries in the same frequency blocks? What are the technical assessment and methodology to be used for the deployment and coordination of systems, including separation distances, power spectral flux density limits, out-of-band-emission limits, frequency guard bands etc, to ensure coexistence of system operations? What are the mitigation techniques that could be employed in case of co-channel interference between systems operating in adjacent geographical areas?

Does the 5 MHz, 5.5 MHz or 6 MHz channeling plan for the 2.3 GHz band and the 2.5 GHz band meet industry requirements? What is the appropriate duplex separation (Transmit/Receive) for the FDD wireless broadband technologies in the 2.3 GHz and 2.5 GHz bands respectively? What is the minimum, as well as optimal amount of spectrum required by an operator for specific geographical deployment or nationwide deployment? Please provide supporting reasons for each comment and proposal made.

With respect to co-channel interference, a more effective means of avoiding such issues is for independent frequency blocks to be allocated rather than spatial sharing of the same frequency blocks across geographic boundaries. Accordingly, SingTel recommends the allocation of independent frequency blocks.

The minimum amount of spectrum required for deployment of a nationwide wireless broadband network is 5MHz. Wireless broadband networks have been deployed using 5MHz in other jurisdictions such as Australia where, for example, Personal Broadband Wireless Australia is deploying ArrayComm's i-Burst technology using only 5 MHz in the 1.9 GHz band in Sydney and has plans to deploy in all capitals. Accordingly, SingTel recommends a minimum of 5MHz.

- (c) ***The key features and service obligation to be applied for auctioning the spectrum for the deployment of wireless broadband technologies. If the key features are not appropriate, please provide supporting reasons why they are not.***

The key driver of spectrum value is the value of the services to be provided using that spectrum. To date, the nascent wireless broadband technologies have been deployed primarily to offer broadband access in competition with access technologies such as DSL and cable modem. Notwithstanding this, in future wireless broadband technologies may develop in such a way as to enable the provision of other services. Consistent with a technology neutral approach, the

spectrum fee paid by wireless broadband licensees should be equivalent to the spectrum fees paid by a licensee offering the same or equivalent services using other access methods and/or spectrum. By way of example, if IDA licenses the spectrum to provide services the same as, or equivalent to, those of an existing 2G or 3G licensee, the spectrum fee should be equivalent to that charged to 2G or 3G licensees offering those same services over other spectrum.

In terms of the key features and service obligations, in keeping with the technology neutral approach, the key features and service obligations should be consistent with those adopted when auctioning and licensing other parties to provide the same, or equivalent services using other access methods. Wireless broadband technologies should not be subject to less or different features and service obligations than other access technologies. Accordingly, SingTel submits that licensees should be subject requirements such as:

- (i) Investment commitment;
- (ii) Nationwide roll commitment;
- (iii) Service rollout commitment;
- (iv) QoS;
- (v) License fee payments etc.

With respect to license period and renewability, the basis for the IDA setting of a spectrum right of 7 years is unclear. Further, the IDA should clearly specify the conditions for renewal.

(d) Whether spectrum should be auctioned in generic lots or in blocks with specified frequencies; the appropriateness of the lot sizes; and the maximum amount of spectrum to be set.

As there is no significant technical advantage in having lots with specific frequencies within the spectrum allocation, the spectrum should be auctioned in generic lots. However, SingTel believes that there should be separate auctions for 2.3GHz and 2.5GHz as bidders may have a preference for a specific frequency.

In relation to lot size, SingTel submits that the lot size should be 5MHz. This lot size is consistent with other spectrum auctions such as 3G and is the minimum required spectrum for nationwide deployment. We also recommend that there is preferably some guard band in between the blocks to minimise interference.

With respect to the maximum amount of spectrum that a bidder may acquire in the auction, SingTel believes that the maximum should be set at 10MHz. This amount is more than sufficient to deploy nationwide and deliver wireless broadband services to end-users.

As the IDA recognizes, spectrum is a limited and scarce resource and as such, the remainder of the spectrum should be retained for future use and potential growth.

- (e) ***The deployment of wireless broadband technologies in the 3G spectrum bands. Are there any technical considerations that IDA should consider? Please provide detailed supporting reasons for each comment and proposal made.***

Using 3G spectrum to deploy wireless broadband technologies is not recommended.

Whilst technically, a 3G licensee could deploy wireless broadband technologies using the 5MHz of TDD spectrum, 3G licensees require this TDD spectrum for future development of 3G services. This spectrum can only be used for one or the other i.e. a 3G licensee could not use the frequency for future 3G services and also for the deployment of wireless broadband technologies.

We would note that there are no wireless broadband services currently being developed utilising this spectrum. In addition, as we understand, there is currently only one vendor providing equipment which could be used by a 3G licensee to deploy wireless broadband using the 5MHz of TDD spectrum. Clearly, the lack of service development and vendors makes the use of 3G spectrum not attractive.

In light of the above, we would recommend that 3G licensees be given the flexibility and eligibility to bid for wireless broadband spectrum.

- (f) ***The eligibility of existing 3G and broadband infrastructure providers for the 2.3 GHz and 2.5 GHz spectrum, and the limit on the spectrum amount for which they could bid.***

Existing 3G and broadband infrastructure providers should be eligible to bid for the spectrum and should be treated no differently to any other bidder.

As we have indicated above, the use of 3G spectrum to deploy wireless broadband technologies is limited. Furthermore, it would require a 3G licensee to forgo the use of the 3G spectrum for future 3G services. Accordingly, in the event that a 3G licensee wishes to deploy wireless broadband technologies, it should be eligible to bid for 2.3GHz and 2.5GHz spectrum and there should be no special cap imposed with regard to the amount of spectrum they can bid for.

With respect to existing broadband infrastructure providers, we fail to see any reasonable basis for preventing or limiting participation. Existing broadband infrastructure providers should be able to deliver their services to end users using any access method that meets their requirements. Like DSL and cable modem, wireless broadband technologies is another method access and an existing

broadband infrastructure provider should not be prevented from investing and deploying in these new technologies simply by reason of having invested and deployed in other technologies. Existing broadband infrastructure providers should not be prevented from evolving and developing their infrastructure as technology changes, new technologies emerge. Excluding or limiting existing broadband infrastructure providers' participation in an auction of 2.3GHz and 2.5GHz would have the effect of reducing investment and competition.

Further, the purpose of an auction system is to ensure that scarce spectrum is allocated at market value and on a market needs basis. Imposing limitations or restriction on certain operators would appear to be contrary to this auction principle.

In light of the above, an existing 3G and broadband infrastructure provider should be eligible to bid for the spectrum and there should be no special cap imposed with regard to the amount of spectrum they can bid for.

- (g) ***Whether there are issues that may pose problems to achieving transparent and seamless interconnection and open access. IDA further seeks comments on the type and level of QoS standards that will be appropriate and whether the existing set of QoS standards for broadband service providers are applicable for service delivery using wireless broadband networks. Please provide supporting reasons for each comment and proposal made.***

With respect to interconnection and open access, wireless broadband technologies are access methods and should be able to access the internet in the same way that other access methods such as DSL and cable modem do today.

In relation to QoS, the services provided using wireless broadband technologies should be subject to the same QoS as those that are imposed on services provided using other access methods. There is no reason why QoS should be technology dependent i.e. a QoS is imposed on services offered through cable modem and DSL and not imposed on services offered through another access method.

In light of the above, wireless broadband technologies should be subject to QoS requirements. The QoS requirement imposed should be the same as that imposed on the same or equivalent services provided using other access methods.

(h) The Market Trial License framework and the specific features set out in Annex 2. Is the market trial licence framework conducive in helping market participants test the commercial viability of innovative service? Are there additional issues that IDA should consider? Please provide detailed supporting reasons for each comment and proposal made.

In general we support the proposed commercial trial framework, however, we believe that the 6 month + 6 month trial period is excessive and should be reduced to 3 month + 3 month period.

The reason for a reducing the commercial trial period to a 3 month + 3 month period is because a commercial trial of up to 6 months should be sufficient to test various business models and end user behaviour. Further, there is a risk that a long commercial trial of up to 12 months may inhibit or deter the launch of commercial services in the market due to the potential of a competitor's commercial trial affecting the ability to attract customers e.g. a licensee launches a commercial service in the market and a competitor launches a commercial trial. The commercial trial may be used to affect or disrupt the commercial service.

In light of the above, we would recommend a trial period of 3 month + 3 month.