PROPOSED APPROACH TO FIXED-WIRELESS BROADBAND NETWORK DEPLOYMENT AND SERVICE PROVISIONING IN SINGAPORE

SUBMITTED TO THE
INFOCOMM DEVELOPMENT AUTHORITY OF SINGAPORE

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by

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Introduction

This paper outlines Newbridge's response to the IDA's *Proposed Approach to Fixed-Wireless Broadband Network Deployment and Service Provisioning in Singapore*, dated 16 February 2000.

Newbridge's responses are keyed to the IDA consultation document questions.

(a) the potential of and benefits arising from the deployment of fixed-wireless broadband network, the likely services/applications to be deployed and the potential demand from business and consumers.

Newbridge's view from our global experience is that the potential of, and benefits arising from, the release of fixed-wireless broadband spectrum are very much as IDA has outlined.

(Fixed) Broadband Wireless Access (BWA) technologies such as LMDS, MVDS and MMDS offer significant opportunities to increase competition in broadband access services.

It is Newbridge's view that **effective competition in broadband access services** is critical for driving down the cost of existing and next-generation telecommunications services and hence enabling Singapore's Internet economy.

It could be argued from comparing current Singapore broadband access prices with those of highly competitive markets such as the Finland, U.S. and Canada that Singapore does not benefit today from affordable broadband access, particularly in the Small and Medium Enterprise (SME) market. What's more, this situation could continue for some time if effective competition in broadband access is not quickly attained.

Newbridge does not believe that BWA, or any other single technology, is the "silver bullet" which will enable effective competition in broadband access. BWA, cable, fibre, DSL and broadband satellite all have roles to play in enabling effective competition.

What we do believe is that Singapore has a limited window of opportunity to become a regional leader in broadband access and services, e-commerce and next-generation Interactive Broadband Multimedia (IBBMM) content creation and delivery. What BWA offers, if IDA moves quickly and releases spectrum appropriately, is a means to fast-track effective competition in broadband access and assure Singapore's regional leadership by leveraging the advantages BWA technologies such as LMDS have over other broadband access technologies[1]:

- Lower entry and deployment costs;
- Faster realization of profitability through faster & easier deployment;
- Scaleable build-up based on demand;
- Cost shift from fixed to variable;

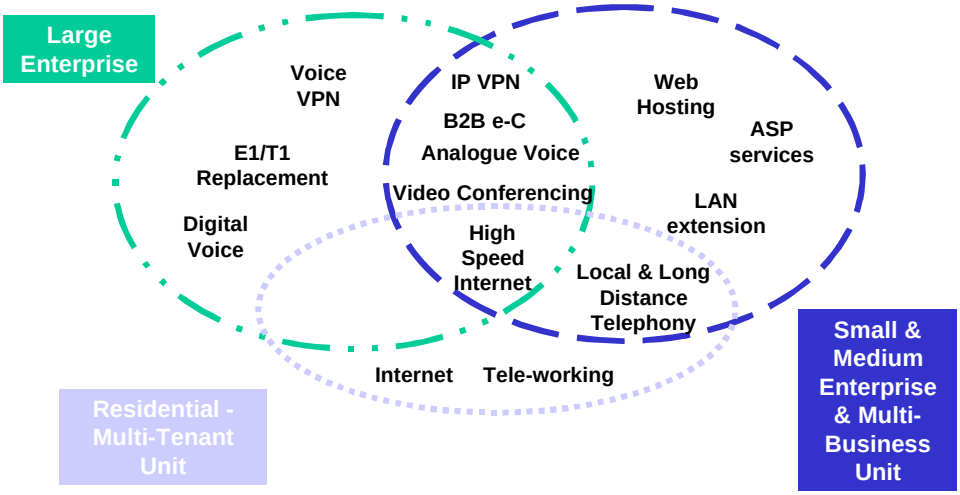
[1] Lehman Brothers Report, dated August 1999

- Quicker response to market opportunities; and
- Lower network maintenance, management and operating costs.

In terms of likely services/applications to be deployed and the potential demand from business and consumers, Newbridge's global experience from operators who have deployed LMDS is that its "sweet spot" is:

- (primary) for large, medium and small businesses, bundled existing and next-generation IBBMM services – for small businesses, particularly if customers are co-located in Multi-Business Units (MBUs);
- (secondary) for residential customers, IBBMM services and replacement (and/or complementary) voice services – only if the residential customers are located in high density Multi-Dwelling Units (MDUs) which enable operators to amortize CPE costs over a number of residential customers.

The relationship between these services and markets is shown in the following diagram.



(b) the possible uses for the fixed-wireless broadband technology, and how the competing demands for the spectrum should be managed, including the allocation process, the timing of the process and criteria to be used. IDA also seeks comments on whether there are interconnection and access issues that may pose problems to achieving IDA's objective of transparent and seamless interconnection and open access; and how these may be practically and realistically addressed. IDA further seeks comments on the type and level of QoS standards, including both network and customer QoS standards, that would be appropriate to benchmark the quality of the network and services deployed.

So Singapore and Singaporeans may benefit from affordable broadband and traditional telecommunications services, and to make best use of LMDS's "sweet spot", Newbridge recommends that preference be given to incumbent and new operators who wish to use LMDS spectrum in a way which will move Singapore towards effective competition in broadband access (and traditional services).

Further, Newbridge recommends that the market be let decide the portfolios of traditional and IBBMM services which are provided and whether LMDS operators address the commercial or residential markets or a combination of both.

Newbridge recommends that IDA be guided by the objective of creating effective competition in the broadband access market in determining issues associated with open access and interconnection. Open access at all levels of investment may in fact reduce effective competition in broadband access by making operator investments less viable.

With respect to QoS standards, LMDS networks in all rain regions can be designed to support a minimum services availability of 99.99% or greater. Newbridge recommends that, for LMDS-delivered services, IDA applies the same service availability and QoS standards which apply to wireline networks today.

(c) the amount of spectrum that should be made available for terrestrial fixed-wireless broadband and satellite services, including the timing for review of spectrum reservation and allocation, where appropriate.

Newbridge suggests that effective competition in broadband access be used as the guiding principle for determining how much spectrum is released.

The total 3.55 GHz IDA has available should be more than enough to support 3 or possibly 4 operators (subject to the ***previous allocation test*** discussed below in response to item d)).

A question for IDA's consideration is whether 3 or 4 operators can support viable long-term businesses in BWA considering competition amongst the BWA operators themselves and other forms of broadband access. It is possible that in conjunction with other broadband access initiatives, the release of 2 or 3 BWA operator licences may better support effective competition in broadband access in the longer term.

(d) the optimal amount of spectrum to be allocated to each operator, including the detailed assumptions/basis/calculations used to derive the proposed spectrum bandwidth, and the timing of allocation where appropriate. IDA also seeks comments on the optimal number of operators that can be licenced, bearing in mind the growth of the broadband market in Singapore.

With regard to timing, Newbridge recommends that Singapore moves extremely quickly as the majority of Singapore's trading partners and neighbors have already released spectrum and hence have an early lead in creating effective competition in broadband access.

With regard to the size of individual operator spectrum blocks, as a general rule, Newbridge's preferred size for spectrum lots is blocks of 400-500MHZ or greater.

Reasons:

a. Block allocation, in the order of 500 MHz or greater, gives service providers the necessary bandwidth to offer high-speed data services (100 Base-T Fast Ethernet, Fractional OC-3, etc) as well as next-generation services such as video phones and streaming video.

b. Block allocation also provides service providers with the flexibility to configure up and down-link spectrum to support applications with asymmetrical up/down data requirements such as the World Wide Web.

c. Smaller block allocations, such as those used in Germany (~28-56 MHz), are sufficient to promote local loop competition in basic services. However, small block allocations also handcuff BWA operators to a limited service offering which will reach obsolescence very quickly as other competing technologies, including xDSL, offer stronger packages allowing them to capture the growing market for next-generation IBBMM services.

For a high population-density city-state such as Singapore, operator allocations of 1GHz are probably desirable.

Previous Allocation Test

In allocating individual operator spectrum, Newbridge's strong recommendation is that only spectrum which has previously been allocated elsewhere in the world for BWA be released.

If this is not possible, it is desirable to:

- Allocate spectrum which aligns with the majority of BWA band plans intended by other countries; and/or
- Allocate spectrum which significantly overlaps with that released to date in other countries.

Reasons:

c. Allocating spectrum which has not been allocated elsewhere disadvantages Singapore by:

   (i) delaying the roll-out of spectrum-holder networks as BWA equipment vendors build equipment for the "new" spectrum allocation - Newbridge's experience is that building, testing and integrating BWA radio equipment to support new spectrum can delay network roll-outs by 6-9 months. Any delay in network roll-out would in-turn delay the benefits of broadband access competition.

   (ii) If similar radio spectrum is used for BWA across the globe BWA equipment vendors are able to benefit from economies of scale. These economies of scale are passed on to BWA operators and subsequently, end-users. If these economies of scale are not fully leveraged end-users will pay higher prices for broadband access delivered by BWA and the net-benefit BWA offers to Australia's internet economy will be reduced.

Countries which have not applied the *previous allocation test* and have released unique spectrum blocks have not been able to quickly benefit from effective competition in broadband access and risk their Internet economies being left behind those of their competitors.

Newbridge has made comment on the desirable number of operators in response to item c) above.

(e) the most appropriate licensing and spectrum allocation approach to adopt. Views are also sought on whether spectrum should be assigned in a phased manner or allocated fully to the operator at the grant of licence. Should there be a separate component for licence fees payable in addition to spectrum fees payable?

The principle Newbridge suggests should apply to the method of allocation, whatever it may be, is that the objectives of the method of allocation be:

- To maximize the long-term benefit to Singapore that availability and effective competition in broadband access will bring - even if doing so adversely impacts the short-term revenue benefits the government may be able to extract; and
- To facilitate the speedy release of spectrum and rollout of commercial services to customers.

Newbridge favors a pure auction-based approach as the most appropriate and fastest mechanism for the release of spectrum whereby the market decides the value of spectrum and the types of broadband access services which are rolled out. However Singapore will not have benefited if, 12 months from the award of licences, spectrum has been banked by the winning bidders and networks which utilize the spectrum have still not been rolled out.

The phased release of spectrum or a 12 month "use-it-or-lose-it" condition are two ways in which Singapore can gain some protection from spectrum banking.

Newbridge views spectrum block licencing as offering the greatest flexibility to BWA operators and as being preferable over the other forms of licencing discussed by IDA.

Limiting auction participation to StarHub, the new facilities-based operators announced on 29 March and the existing major licensees with expanded scope of operations and services, also announced on 29 March, may map in well to Singapore's planned telecommunications industry structure of infrastructure and service-based licensees. This approach would also ensure that LMDS operators have the means to provide complementary fixed network services.

(f) whether the proposed spectrum band in para 2.4.1 should be reserved primarily for IBBMM services or whether they should be assigned for broadcasters' usage.

Newbridge supports IDA desire to reserve the proposed spectrum primarily for IBBMM services.

(g) the appropriate licence duration for the provision of fixed-wireless broadband services.

Newbridge recommends that within the broadband access market, the maximum BWA spectrum licence term be such that BWA service providers not be unduly disadvantaged compared to service providers who utilize other broadband access technologies such as cable, xDSL or fibre.

Newbridge notes that, around the world, 15 years appears to be the norm for spectrum licence duration.

(h) the timeframe for award of licence as well as the time needed by the operators to roll-out their networks and offer commercial services to the public.

Newbridge recommends that IDA moves to release spectrum sooner than 3rd quarter 2000 if at all possible for the reasons of:

- generating effective competition in broadband access and its benefits;
- Singapore is already late to market with the release of spectrum; and
- There potentially being a limited window of opportunity for Singapore to attain a regional leadership role in IBBMM content delivery and development and e-commerce.

For spectrum which has been released recently it has been shown that, as long as *the previous allocation test* is met, commercial services can be offered to the public in 3-6 months.

(i) how the issues of rain attenuation and compliance with QoS standards would be addressed.

Maintaining QoS despite rain attenuation in high rain regions is addressed in the network design phase by setting a QoS target and then reducing LMDS cell size accordingly so that the QoS target is assured.

For an operator what this means is that, for a given customer density, fewer potential customers are within the footprint of an LMDS basestation within a high rain region than for a lower rain region – and therefore the return on a basestation investment is less.

(j) how operators plan to install their own internal wiring, the potential difficulties faced and the cost of doing so. IDA also seeks comments on how these difficulties can be practically and realistically addressed by potential operators and how IDA can facilitate the installation.

A number of options exist for in-building wiring at the customer-end including Category 5 cabling, the use of existing or new twisted pairs or existing or new cable.

The type of services provided, the type of end-customer and the size of the end-customer building are all variables which drive the cost and complexity of in-building wiring.

Newbridge suggest that open, timely and cost-effective access to in-building cable plant and ducts be provided to successful LMDS operators so that they may fully leverage the market responsiveness capabilities LMDS offers without being unduly hindered by customer-premise connectivity issues.