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**House of Representatives Standing Committee On  
Communications, Information Technology And The Arts:  
Inquiry Into Wireless Broadband  
Communications Technologies**

***Submission from  
m.Net Corporation Ltd***

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## Introduction

m.Net Corporation Limited is a company formed by a large consortium of Australian and multinational organisations with a common interest in facilitating the emergence of a robust new industry, focussed on the development of mobile wireless Internet services. The Commonwealth Department of Communications, Information Technology and the Arts has funded an m.Net proposal under its Advanced Networks Program. This proposal provides for the creation of next generation infrastructure and supporting services that can assist Australian developers and content creators to take a leadership role in the creation of new mobile data services for global markets.

Wireless technologies can provide mobile communications services (such as mobile telephony and mobile data services) or fixed links (such as wireless local loop) as a replacement for the fixed wireline infrastructure (eg copper cable). In this context, wireless technologies may provide a viable option for last mile broadband solutions, offering opportunities for:

- facilitating competition with the entrance of new telecommunications carriers (by reducing the significant barriers to entry arising from high infrastructure costs);
- providing regional and rural communities with the ability to obtain high capacity connections in areas of low to medium population densities where spectrum congestion is not an issue; and
- allowing a new breed of mobile workers to remain connected to their customers and offices providing for significant productivity improvements.

It is not the intention of this submission to provide a detailed analysis of the various wireless technologies available, but rather to attempt to provide some insight into the salient issues associated with these technologies and their application from a service delivery viewpoint.

Prospective wireless broadband technologies include those listed below:

- Wireless Local Area Networks (LAN) using IEEE 802.11 standards (HyperLAN in Europe) and other local wireless technologies such as Bluetooth
- Point-to-multipoint systems such as Local Multipoint Distribution System (LMDS) and Microwave Multipoint Distribution System (MMDS)
- Wireless Local Loop (WLL) based on Digital Enhanced Cordless Telephone or CDMA standards
- Satellite (geo-synchronous or Low Earth Orbiting)
- New generation cellular technologies conforming to either of the 2 favoured technology roadmaps:
  - GPRS and 3G (UMTS and W-CDMA)
  - 1XRT and CDMA2000;
- New generation cellular technologies using the unpaired spectrum such as I-Burst.

## **Wireless-LAN**

Wireless LANs were originally developed to provide access to Ethernet local area networks within corporate premises. In recent times however, we have seen applications outside of this area ranging from Internet Service Providers offering W-LAN “hotspots” within public locations such as coffee shops and airport lounges, to entrepreneurial hobbyists and community groups using W-LANs in order to connect local residential users as a “last mile” alternative. Current W-LAN implementations support data rates up to 11Mbit/s and operate in unlicensed frequency bands.

However, there are several issues which may limit the use of W-LAN technologies for last mile connections. These include:

- limited range - less than 5km due to low power levels and antenna design
- potential congestion - due to a lack of carrier-grade network and traffic management tools,
- security - although new variations and updates to the wireless LAN protocols promise to address this issue,
- spectrum – wireless LANs operate in the unlicensed ISM bands (both 2.4GHz and 5.8GHz) which gives rise to possible interference from other unlicensed users,
- The associated communications protocol does not support use while moving at any significant speed, and
- other issues such as a lack of intelligent access-point handoff in high density environments.

Wireless LAN has yet to evolve into a robust carrier-grade technology and it is perhaps premature at this time to expect it to offer a viable last mile alternative.

## **Bluetooth**

Bluetooth (IEEE 802.15.1) is a very short-range wireless technology principally used as a replacement for using cables to connect peripherals etc. Bluetooth is limited in range to about 10m, supports data rates up to 1Mbit/s and, like W-LANs, operates in the unlicensed frequency band. Its very low power and range limit its use as a serious last-mile broadband option.

## **Point-to-Multipoint Systems**

While point-multipoint systems promised to provide low cost broadband wireless access, its impact in Australia has been far less successful than might have been expected. In the case of LMDS, for example, a lack of equipment availability and a high cost structure has seen limited deployment in Australia.

## ***Wireless Local Loop***

Wireless Local Loop is a generic term used to describe a customer access arrangement whereby the conventional copper wire connection from the local exchange is replaced by a wireless link.

To date, there has been very limited use of WLL in Australia, mostly due to economic rather than technical factors, it promises to be the technology of choice for new entrants, particularly in regional and rural areas as well as for the incumbent carrier (Telstra) for new or upgraded local loop infrastructure.

## ***Satellite***

In Australia, satellite services have three types of applications:

- Providing high capacity trunk connections used as backup to terrestrial optical fibre on national and international routes.
- Services to end-users such as broadcasting (pay TV in regional areas) and point-point applications using VSAT (Very Small Aperture Terminals)
- In recent times, mobile satellite services have become much more widespread with the advent of LEO (Low Earth Orbiting) satellites.

While costs are still quite high, these services offer reasonable, voice-only quality virtually anywhere on the surface of the Earth but data transmission rates remain very modest.

Recently, operators such as Telstra and Optus have begun to offer two-way broadband satellite terminals and services at more reasonable costs and are proving to be a viable alternative for remote users. In the future, Teledesic has proposed to offer true satellite broadband services beginning in 2005 using a new constellation of LEO satellites.

## ***New Generation Cellular Technologies***

Current second generation (2G) cellular mobile technologies cannot offer broadband data rates, although an interim (2.5G) technology known as GPRS (General Packet Radio Services) is able to offer higher data rates together with the advantage of being “always on”. It is not until the advent of third generation or 3G mobile technology that true broadband data rates in a mobile environment will be possible. The likely standard for 3G will be based upon CDMA and the two contenders are CDMA2000 which will most likely see deployment in North America and Korea, and Wideband CDMA (W-CDMA). Current W-CDMA network specifications provide for data rates up to 384kbit/s. 3G technology will support both packet switched data suitable for “always on” internet data services and circuit-switched suitable for telephony.

The alternative 2.5G evolution path to 3G is from the current IS95 CDMA platform to 1XRT which is being taken up strongly in Korea but is still not deployed commercially in Australia. This moves to the EV standard and then to CDMA2000, but is more “evolutionary” than the Wideband-CDMA (UMTS) approach.

The m.Net Australia Project is in the final stages of building a UMTS 3G test bed network covering areas in the Adelaide CBD and in Whyalla, north of Adelaide. The intention is to offer Australian application developers the ability to test and trial mobile services and applications in a supportive pre-commercial environment.

The anticipated widespread coverage by 3G networks in Australia will also provide an opportunity for broadband data services to be offered to users, not only in a mobile sense, but also in a “fixed” mobile sense. In other words, 3G could conceivably offer last mile broadband connections, at speeds comparable to the lower end of ADSL.

## **Regulatory Issues Associated with the Use of Wireless LAN**

There are several regulatory issues that emerge when one considers the potential for WLAN technology to provide public telecommunications services.

The first is a purely radio regulatory issue arising from the fact that WLAN uses the ISM bands and therefore operates under a Spectrum Class Licence. As such there are radio emission limits which would be exceeded if greater gain antennae are used, presenting a very difficult interference issue both between WLAN systems and other devices (eg Bluetooth devices) operating in the same band. Conversely, since the ISM band is used, there may be instances where there is interference (eg ISM equipment) into these WLAN systems impacting on service and there would be no legal recourse.

The second issue is that if operators use such systems to “provide service to the public”, they require a carrier licence and are subjected to all of the provisions for carriers under the Telecommunications Act. This would include customer service guarantees, which may prove risky given the vulnerability to interference of outdoor WLAN technology.

The third area may require positive regulatory intervention to enable (in fact encourage) local WLAN providers to interoperate without the risk of contravention sanctions under the Trade Practices Act. Further, such services could be considered for Declaration under the Act to enable the ACCC to arbitrate in resolving any impasse in reaching an access agreement in the event that any of the large carriers have a dominant market position in any market.

These last regulatory issues arise if it is deemed that the provision of such highly interoperable WLAN networks were desirable, but are unlikely to eventuate if left to market forces alone.

m.Net is considering a proposal from a number of its members to establish such an interoperable service in the Adelaide city environment, complementing the 3G roll out

and intends to look at both the technical and market issues of an integrated service option.

## **m.Net Interest in the Technology Options**

While m.Net Corporation Limited has a substantial investment in a pre-commercial 3G (UMTS) network and in wireless LAN (802.11b) assets, the company has no real vested interest in the success of one technology over another.

The wireless assets that m.Net has assembled are designed to provide a path for Australian developers to create and test applications and content for delivery to customers over wireless networks. m.Net is advocating an approach for developers that separates out any network specific elements into modules allowing them to deliver equivalent functionality over different networks and easily adapt to new networks as commercial opportunities are identified.

In this sense, m.Net is not a proponent for any particular network technology. The company's investment in wireless network assets is an investment on behalf of developers and the company's immediate focus is on facilitating the development of wireless services by other companies.

However this application focussed role ensures that m.Net takes an active and ongoing interest in the broad range of wireless network technologies and particularly in the context of their role as potential platforms or channels for the delivery of applications and content.

## **Summary – an Applications Focused Approach**

It is the view of m.Net that a thorough analysis of prospects for established and emerging wireless network technologies would benefit from a review of the application context for use of those technologies.

m.Net's ongoing investigation of the wireless application domain has yielded some interesting insights that may bear on the suitability of various wireless technology options.

Let us consider first the potential consumer market for wireless applications. This subject has been occupying the minds of many in the telecommunications industry as it is often seen as the key to generating sustainable returns from networks requiring larger investments. Prospects for the consumer market continue to be the stimulus for extensive speculation in relation to third generation networks.

However the consumer market is extraordinarily difficult to predict and an understanding of the type of applications that will drive the uptake of network services in this market remains elusive.

The nature of the enterprise market is a little more predictable. It is expected that enterprises will be inclined to wirelessly enable existing IT network applications, such as email, file access, customer relationship management and data collection, before considering the development of new applications that begin to leverage the mobility of the user as a basis for adding value. This has potential implications for cellular network operators as they are less likely to be seen as potential providers of anything more valuable than the transmission of 'bits'. This will limit the opportunity to generate the higher margin revenues that are required to provide an early return on major investments in new infrastructure.

The wireless enabling of enterprise applications may provide greater opportunity for companies providing networks that have evolved from traditional IT and Internet networks.

m.Net has chosen to focus more of its resources on exploring the opportunities for applications focussed on specific industry sectors, rather than either the consumer market or the broad enterprise market. We believe that this approach will identify better qualified, higher value opportunities as it is reasonable to expect that we may develop a better understanding of the requirements of well defined vertical markets. It is also likely that these areas will be the most likely to generate more advanced applications that leverage mobility in an earlier timeframe.

Clearly the nature of the required applications and the requirements of the customer will dictate what characteristics are required of the network. Similarly, the value that the application can deliver to the customer will be a primary factor in determining what that customer is prepared to pay for network access. Price sensitivity for wireless data services is expected to vary substantially across the markets.

Competition between network operators and between network technologies will, of course, play an important role in determining the value proposition for network access and will therefore be a factor in determining the commercial viability of applications, particularly those for which a business case is less compelling.

It seems likely that a number of successful wireless network technologies will coexist successfully in the marketplace, inter-operating with one another or complementing one another. M.Net is keen to explore the scope for interoperability between networks developed from the telecommunications sector and those that have evolved out of the IT and Internet domains. This would include the ability to access wireless LANs from within the office taking advantage of higher data rates and lower costs and using the same terminals to access a 3G network once out of range of the W-LAN.

m.Net sits at the nexus between the application approaches and business models being developed and explored by the telecommunications sector and those that are being explored by the IT sector. The convergence of two different industry cultures on the issues surrounding the perceived opportunity afforded by broadband wireless connectivity highlights the uncertainty that all of the players are dealing with.

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