

WBT INQUIRY  
Submission No. 46



THE CABINET OFFICE  
NEW SOUTH WALES

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The Secretary  
House of Representatives Communications,  
Information Technology & the Arts Committee  
Suite R1, 116  
Parliament House  
Canberra ACT 2600

**INQUIRY INTO THE CURRENT AND POTENTIAL USE OF WIRELESS  
TECHNOLOGIES TO PROVIDE BROADBAND COMMUNICATION  
SERVICES IN AUSTRALIA**

Enclosed is the New South Wales Government submission on the House of Representatives Standing Committee on Communications, Information Technology & the Arts inquiry into wireless technologies.

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To discuss the assessment of access network technologies, please contact Mr Joe Tokarczuk, Manager, Wireless Development, Office of Information Technology, Department of Information Technology and Management. Mr Tokarczuk can be reached on (02) 9236-7719 or e-mail: [joe.tokarczuk@ditm.nsw.gov.au](mailto:joe.tokarczuk@ditm.nsw.gov.au).

Yours sincerely

A handwritten signature in black ink, appearing to read 'RW', with a long horizontal flourish extending to the right.

Roger B Wilkins  
Director-General

**INQUIRY INTO THE CURRENT AND POTENTIAL USE OF WIRELESS  
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**HOUSE OF REPRESENTATIVES STANDING COMMITTEE ON  
COMMUNICATIONS, INFORMATION TECHNOLOGY & THE ARTS**

**SUBMISSION FROM THE NEW SOUTH WALES GOVERNMENT**

The NSW Government is pleased to respond to the Commonwealth House of Representatives Standing Committee on Communications, Information Technology and the Arts inquiry into current and potential use of wireless technologies to provide broadband communications services in Australia.

The overlap of issues between this inquiry and the current review of the Radiocommunications Acts being conducted by the Productivity Commission relating to the regulation of radio spectrum is noted.

***Introduction***

The NSW Government is committed to supporting the implementation and use of broadband services across NSW. The current lack of cost-effective bandwidth is an important constraint to the development of a wide range of new services, industries and jobs. The rapid emergence of the internet and new delivery systems has led to an increasing demand for cost-effective bandwidth.

The NSW Government, through its agencies, is a major purchaser of telecommunications services. Many agencies, such as those in education, health, justice and emergency services are considering new and innovative applications which require significant increases in bandwidth. The implementation of these applications by agencies is constrained by a lack of capacity, coverage and the attendant high cost of telecommunications bandwidth. Although all the Government's agencies have some level of interconnectivity, opportunities exist to develop highly scalable and cost-effective bandwidth solutions.

The continuing development and growth of the telecommunications sector in NSW underpins the increasing prosperity and well being of the State and its economy. Growth and competition in the sector has and will continue to deliver significant benefits to NSW. This is occurring on several levels, namely:

- as a direct contribution to the State's economy;
- by facilitating the efficient operation of an economy highly focussed on services industries; and

- by highlighting the place of NSW as a significant player in the information economy of the region.

### *The NSW Government Approach*

Deployment of cost-effective broadband services in NSW will allow citizens access to a wider range of services from any region in NSW and will help the State's industries realise new opportunities in the global economy.

The NSW Government recently announced a four year strategy to deliver improved broadband technology to schools and hospitals across NSW. The strategy will aim to use public owned fibre optic cables to provide high speed reliable connections carrying internet, video, voice and data into classrooms and hospitals with ease.

The NSW Government has been very active in exploring the potential of various access technologies to deliver broadband services for Government agencies and the broader community. To this end the Government has sponsored and supported a number of projects.

The NSW Department of Education and Training and the NSW Rail Infrastructure Corporation are undertaking a broadband pilot project to provide 2 to 4 Mbps services to 9 metropolitan schools, using the Rail Infrastructure Corporation's fibre network as a backbone and optical fibre infrastructure to provide last mile access. The Government will monitor this pilot and its impact on improving services to these schools. The service performance outcomes will guide development of the most appropriate framework for leveraging State owned infrastructure, as well as the appropriateness and effectiveness of various access systems.

The Government is coordinating the rollout of Rural Link, a Networking The Nation supported project, which will deliver asymmetric satellite services to about 90 rural communities across NSW. As part of this project the NSW Government is funding the last mile wireless service connections to three sites within each town, for the first 30 towns.

The Government is funding the last mile hubbing infrastructure for the Norlink e-Towns pilot project, also an Networking The Nation supported project which will provide improved broadband services to Lismore, Kyogle, Maclean and Byron Bay/Balina.

The Government has also participated in a number of broadband service delivery trials under the NSW Government Department of Information Technology and Management 2001 service agreement. Examples of delivering competitive infrastructure into regional and rural communities are:

- Trial of Wireless Local Loop in Tamworth
- Trial of Satellite Services into Manilla and Brewarina
- High Speed Broadband between John Hunter Hospital and Tamworth Hospital
- Wireless Local Loop in Dungog

Beneficiaries of the above projects, other than State Government agencies, include local governments, private schools, private medical facilities, community organisations and the private sector.

Last mile access is pivotal to the delivery of broadband services. Wireless technologies are seen as a viable, low cost technology that can be readily deployed to provide access to broadband telecommunications services. The Committee's letter refers to a range of wireless technologies, mixing mobile, wireless point to point, wireless point to multipoint and wire line replacement technologies. The NSW Government will continue to monitor developments within the industry.

### *Emerging Technologies*

Attached is an overview and assessment of emerging access technologies. This document provides an extensive review of last mile access technologies and the current state of play in the market. The paper discusses the relative merits of a wide range of access schemes, including wireless and copper based platforms.

### *Potential for Wireless Technologies to provide "Last Mile" Broadband Solutions*

One of the biggest barriers to broadband take-up by Government and within communities is the cost of providing last mile infrastructure, be that copper, fibre or wireless. Although industry asserts that there is "lots of broadband capacity throughout NSW", obtaining access to that capacity at an affordable price remains a major challenge for the Government, over and above meeting the cost of the broadband backbone infrastructure.

The NSW Government has fibre that extends along the rail, electricity and road corridors and intends to harness under-utilised capacity in these fibres to provide better access for users in NSW. Wireless technologies have enormous potential to provide cost effective and timely "last mile" access to broadband services throughout the state, particularly in rural and regional communities.

In relation to the deployment of wireless in general, indications are that a hybrid optical fibre-wireless based network infrastructure will be the network architecture implemented in the longer term. The question being posed today is how "deep" the rollout of fibre goes into the network. This will vary depending on the environment, whether it be urban, suburban, regional and/or rural areas.

There are strong indications that optical fibre access will be extended to the building (office or multiple dwelling unit) in urban areas, to the neighbourhood in suburban areas, and to the closest town in rural areas. Consequently, access solutions based around wireless infrastructure will have applications as wireless Local Area Networks (LANs) in urban areas, last mile broadband wireless access in suburban areas and larger regional centres, and as broadband wireless systems operating over longer distances in rural areas.

Broadband spread spectrum point to multi-point wireless technologies operating in the 1 to 6 GHz spectrum band (such as those based around the 802.11 standards) seem to best fit these applications. These systems have the characteristics of reasonable system gain and a relatively high bandwidth carrying capability, together with lower cost and relatively speedy deployment even in difficult terrain environments. However, they do require line-of-sight deployment which restricts the technology's application in urban areas.

### *Comments on the Telecommunications Regulatory Regime*

#### Licensing for wireless Local Area Networks

The ACA has a well established regulatory regime for managing point to point and point to multipoint services that are licenced on an individual basis. This framework appears to effectively deal with interference management and dispute resolution within the licencing arrangements and more generally it appears to be effective in managing licenced wireless services.

Wireless services based around the 802.11 standard which operate under a class licence arrangement, however do not extend the same rights and privileges to users, particularly in interference management and protection that individual licence holders enjoy.

These class-licenced services operate in the 2.4GHz, 5.2 and 5.8GHz ISM frequency bands under a non-exclusive frequency sharing arrangement. It is important that users and industry develop co-operative arrangements to manage issues of coexistence and interference amongst a broad mix of services and users. User-based self-regulatory arrangements will need support from the Australian Communications Authority, possibly by placing appropriate licence conditions on the class licence and through active support for any self regulatory initiatives from the industry.

#### Availability of spectrum for wireless technology

There continues to be considerable unmet demand for spectrum, particularly in and around high density areas. This will continue to grow as the demand for better telecommunications services is met through the deployment of broadband wireless technologies. An area of growing concern is the availability of suitable class licenced spectrum to meet the growing deployment of wireless 802.11 based systems.

#### Commercialisation of spectrum

Traditionally, spectrum for fixed wireless access systems has been allocated under an apparatus licencing regime. However, in recent years the Commonwealth has focused on the sale and commercialisation of radio spectrum, such as spectrum suitable for mobile telephony and former Defence spectrum at 3.4 GHz, through the public auction of spectrum licences.

In relation to the possibility of further sale and commercialisation of spectrum, particularly for fixed microwave services, the Commonwealth would need to carefully assess any potential impact on incumbent services, in particular, the impact on State governments' use of radio spectrum in the delivery of essential public safety services, such as emergency services.

There should also be close monitoring of any anti-competitive practices, as spectrum licencing provides purchasers with a means of controlling competition by denying spectrum to others through the purchase and long term control of spectrum.

The NSW Government's views on the further commercialisation of spectrum are elaborated in the NSW Government's submission to the Productivity Commission's review of the Radiocommunications Acts.

## *Overview of Emerging Technologies*

### **Mobile Data Communications**

1. GPRS (General Packet Radio Service)

An enhancement of the existing GSM Mobile telecommunications infrastructure that will allow mobile telephone handsets to be connected all the time and exchange data using packet switched protocols at speeds up to 115kbps.

2. EDGE (Enhanced Data for GSM Evolution)

A new modulation scheme that leverages existing GSM Mobile telecommunications infrastructure to enable data rates up to 384kbps. This is often referred to as 2½ G.

3. IMT 2000 (International Mobile Telecommunications 2000), UMTS (universal mobile Telecommunications Service) and 3G (3<sup>rd</sup> Generation Mobile Services)

An emerging European based mobile telecommunications standard that has been designed to facilitate data rates up to 384kbps upstream (mobile to head-end or server) and up to 2 megabits per second downstream. The standard is designed to support data intensive applications such as streaming video to a mobile handset.

4. WAP (Wireless Application Protocol)

An application protocol that resides on top of existing mobile infrastructure, designed to allow mobile users access to and interaction with information and services over the Internet.

5. CDMAone

CDMAone, also referred to as 1xRTT technology will provide fast access to email and corporate networks for mobile access to desktop applications, as well as the Internet via mobile phones, handheld computers and laptops. There is some anecdotal evidence of data speeds of up to 150 kbps being achieved.

6. W-CDMA

Wideband Code Division Multiple Access (W-CDMA) is the infrastructure technology the Global System for Mobile Communications (GSM) carriers are expected to use to migrate their services to 3G capabilities. Most Code Division Multiple Access (CDMA) carriers are expected to move to Third Generation capabilities with cdma2000. Third Generation technology will provide high-speed mobile access to Internet-based services, as described above.

## Wireless Local Area Networks

7. There are currently three Local Area Networking technologies available based around the IEEE 802.11 standards, having a range of about 100 metres. This technology is designed to support flexible office based networking of computers and peripheral devices, including internal office mobility and replacement of wires in the office. Depending on technology choice, data rates from around 11 megabits per second for 802.11b access devices to 54 megabits per second for 802.11a and the emerging 802.11g standard access devices.

There is significant current interest in the potential use of this technology to provide "last mile" access to broadband services, including internet access.

### 8. LMDS

Local multipoint distribution system (LMDS) is the broadband wireless technology used to deliver voice, data, Internet, and video services in the 25-GHz and higher spectrum. Services in this spectrum are licenced and coordinated by the Australian Communications Authority (ACA).

These technologies can support broadband wireless access at very high data rates, well in excess of 2Mbps per access point, but high start-up costs appear to be a barrier to service take up.

### 9. MMDS

Multipoint Multichannel Distribution System (MMDS) was developed to deliver video program content for entertainment and to deliver video for distance-learning activities. MMDS services operate in the 2.1 to 2.6 GHz frequency bands. Services in this spectrum are licenced and coordinated by the Australian Communications Authority (ACA).

With the spectral efficiencies of digital-video compression, MMDS based services can provide broadband (>10Mbps) high-speed data services to Internet and other broadband data users.

### 10. Fixed Wireless Access

Fixed Wireless Access (FWA) services operate in the MMDS bands and also in the 3.4 GHz frequency band, formerly allocated to Defence. FWA has evolved from voice only suite of products to support voice and data services. The 3.4 GHz band is the emerging global standard for FWA.

Developments in this technology have advanced to the point where FWA can provide replacement of existing copper based access and support data rates up to 50 Mbps and span distances up to 20 Km.



## **Personal Wireless Communications**

### 11. Bluetooth

A widely adopted industry based standard, using ultra-low power levels. It is designed to allow a number of personal portable devices to communicate with each other, such as electronic diaries, laptop computers, mobile phones. The standard originally developed from the perceived need to replace remote earpieces and microphones that have been used with mobile phones with a cordless device. It has generally been designed to support local mobile communications with a range of about 10 metres. Devices do not have to be in line-of-sight, as is currently required with infrared enabled devices.

### 12. Personal Area Networks

Leading edge research and development is being undertaken in the USA into techniques to network and support multiple personal communications devices within in the immediate (less than 1 metre) vicinity of an individual. The devices are often carried on the person. The research includes techniques for seamless data interchange between individuals, using ultra-low power levels (approaching 0 power) without the need to access existing mobile communications networks.

## **Interactive Television**

13. Examples of interactive television include a number of commercially based platforms, such as Liberate, Opentv and Channel plus. These support access to a range of information services, including e-mail via the television and access to the internet. The platforms are generally independent of the television broadcast stream, whether it be analog or digital, and are capable of integrating broadcast content with other sources. Various backchannel accesses include telephone dialup via a modem, permanent connection via a cable TV service and also via a mobile telephone. All of these platforms allow users to customise and interrogate content via the television, using a simple remote control and infrared keyboard.

### 14. Datacasting

This is a uniquely Australian service innovation that has emerged as a consequence of a conversion to digital television broadcasting. The intention has been to harness the wideband channel capability of a 7 MHz broadcast channel to push out data intensive services up to 19.3 megabits per second. Because of its unique association with to the Australian digital television market, and the genre constraints imposed by the Federal Government on datacasting content, it is unclear whether the service will get off the ground.