ERICSSON AUSTRALIA - RESPONSE TO HOUSE OF REPRESENTATIVES INQUIRY INTO WIRELESS BROADBAND

"Ericsson is shaping the future of Mobile and Broadband Internet communications through its continuous technology leadership. Providing innovative solutions in more than 140 countries, Ericsson is helping to create the most powerful communication companies in the world."

Ericsson is the leading provider for 2G and 3G mobile services providing industry leading edge total system elements; infrastructure; terminals, applications and expertise.

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INQUIRY INTO WIRELESS BROADBAND

1   INTRODUCTION

Ericsson Australia welcomes the opportunity of providing comments to the House of Representatives Inquiry into Wireless Broadband. Ericsson's comments are made in the context of being the dominant supplier both globally and in Australia of mobile communications systems covering both cellular and fixed wireless systems.

Ericsson is shaping the future of Mobile and Broadband Internet communications through its continuous technology leadership. Ericsson dominated the telecom industry's global move towards second-generation digital networks and services. Half of all GSM calls made anywhere in the world are now connected through an Ericsson system.

With its world leadership in WCDMA and its key role as a global driver of services and applications, Ericsson is now taking the leading role in third-generation telecommunication -- the move towards broadband, multimedia, data telecom networks. Ericsson has globally won to date 40% of contracts for 3G networks.

In the area of Fixed Wireless solutions Ericsson provides a leading micro-wave product – MINI-LINK. MINI-LINK BAS outperforms its competitors in terms of the bandwidth that can be delivered.

Ericsson is developing solutions and leading the standards groups in integrating WLAN access networks with WCDMA networks. This will enable users to logon to both a WCDMA and WLAN network transparently using one sign-on, similar to the method used today with GSM phones.

Ericsson globally expends annually in excess of 15% of turnover on research and development ($US6bl) which places it in the top 10 of global corporations in commitment to research. This sustained investment underpins Ericsson's global leadership in a range of communications technologies. The Ericsson Asia Pacific labs based in Melbourne are Australia's largest private sector research centre and employ 500 scientists/engineers.

Ericsson is considered to be the premier player in the mobile systems market "by means of its quality reputation, client relationship and capacity to deliver large quantities of equipment" (Dresdner Kleinwort Wasserstein (DKW) "Mobile Infrastructure" Jan 2002). In Australia 70% of mobile calls are on Ericsson equipment and Ericsson is a supplier of GSM systems to Telstra and Vodafone and of WCDMA to Hutchinson. In Fixed wireless, Ericsson has 100% of the LMDS market and approximately 25% of the point-to-point microwave market share.

Wireless based systems offer many compelling attractions. Cellular systems such as 3G and GSM, as well as WLAN, offer flexibility, location independence, always on services, and removal from the tether and cost of fixed line. The huge uptake of existing digital cellular systems and penetration rates exceeding 70% in many developed markets, highlights the advantage to consumers of such services.

Fixed wireless systems such as LMDS and MMDS wireless broadband offer ease of installation, cost efficient systems and the ability to transmit large volumes of information. Wireless deployments can be a favourable cost alternative to directly connecting businesses with fibre and network build, and offer quicker activation of services for end-users.

Ericsson's submission will briefly canvass the technologies under consideration and highlight the degree to which they offer complimentary services, not substitutable services and, in combination, provide the opportunity to enhance the ease of communications and personal interaction.

Notwithstanding the current difficult market conditions for the telecommunications sector and low levels of infrastructure investment, Ericsson is confident of the long term growth prospects of the wireless sector. Global investment in mobile infrastructure has been relatively constrained over the past year with estimates that the market declined by 5% in 2001. However whilst the fall in demand for the traditional wireline market has structural as well as economic roots, expectations are that the fall in demand for mobile systems is more of a cyclical nature. [the slight decline in mobile systems expenditure needs to be considered relative to declines in wireline systems, (down 20-25%), semiconductors, (down 35-40%) and personal computers, (down 10-15%)].

Dresdner has forecast that total investments in mobile systems are expected to nearly double to US $90-100bn by 2005, with WCDMA achieving the dominant market share. In this respect it has also forecast some consolidation of the industry with Ericsson, Nokia and Siemens/NEC expected to maintain strong positions as suppliers of WCDMA.

In general there are few regulatory constraints within Australia to the wireless sector and Ericsson will make a number of comments on spectrum regulation (based in part on recent response to Productivity Commission Draft Report on Radiocommunications Administration.) The Australian approach of technology neutrality and relatively liberal carrier licence conditions has avoided some of the negative impacts associated with regulation such as in Europe with roll-out/coverage requirements. In particular Ericsson believes that the ACA has performed admirably in its administration of the Radiocommunications Act.

2   WHAT IS BROADBAND

A "broadband" telecommunications access provides for very high speed communications to and from a subscribers' premises, in order to carry voice (e.g. telephony, hi-fi music), video (e.g. broadcast TV, Pay TV, Video-on-Demand, Video-conferencing), data (e.g. Internet, games), and other applications (e.g. two-way electricity meters). Information or content may be carried between subscribers (e.g. audio conference-call), or to/from a service or content provider (e.g. security monitoring service). The minimum requirement for a "future-proof" broadband access is a symmetric service at a minimum of 100Mbps (which allows for multiple individuals individually using multiple concurrent services). [Note: viewing a single HDTV channel uses approximately 20Mbps.]

Just as the national road system is a physical infrastructure which has become a crucial social and commercial infrastructure (by allowing the rapid movement of people and goods), so a national broadband infrastructure is a physical infrastructure which will change and accelerate the movement of commerce and social exchange within Australia. A national broadband infrastructure will quickly become as commercially significant as the road and rail networks are today. The majority of developed countries are building or planning on building their national broadband infrastructure today.

For example at the recent Lisbon meeting of the European Council, it was proclaimed "a competitive and dynamic knowledge-based economy" demands "an extensive, world-class communications infrastructure."

Ericsson believes it is important from a regulatory perspective that technology neutrality is pursued such that it is left to the market to determine appropriate broadband access technologies. It is not for the Government to mandate technologies to deliver various applications.   If Government is to provide funding for trials or network deliveries in say rural areas the choice of technologies should be left to applicants.

3   TECHNOLOGIES UNDER STUDY

Bluetooth is a wireless personal area networking standard (WPAN) for low power, short range communications (typically under 10 metres) using unlicensed microwave spectrum (at 2.45Ghz). Bluetooth will be the glue between a range of devices – the main advantages of Bluetooth are that it will vastly simplify communications for consumers and take mobility one step further into home and office markets. Bluetooth chips should eventually eliminate the need for cabling between laptop PCs, PDAs and cellular phones and eventually encompass a wide range of devices. Cost of adding Bluetooth to devices should not add significantly to the cost of end products.

Ericsson developed the technology (and holds the patents) but has made the technology freely available as it believes growing the market for Bluetooth enabled devices and hence raising consumer utility is the first order priority. A number of Sony Ericsson mobile phones now include Bluetooth chips.

Local Multi-Point Distribution Services (LMDS) is the first industry wide effort at establishing a world standard for broadband fixed wireless at frequency bands above 20 GHz.   It can provide bandwidths of up to 30 Mbits to an end-user and operates on a point to multi-point basis. The development of a common standard has overcome issues with past fixed radio access technology which has been relatively complex and expensive due to its proprietary nature and lack of volume deployments. LMDS is used to connect small and medium sized businesses with up to a net shared 30 Mb/s link per radio channel to a centralised base station. Wireless deployments can be a favourable cost alternative to directly connecting businesses with fibre and network build. It is carried out by deploying base stations covering a cell range of up to 5km in radius depending on propagation conditions.

Ericsson is supplying a LMDS system to AAPT.

Wireless Local Loop refers to the connection between a customer and the service provider being provided by radio, i.e. the use of radio access technology to link subscribers into the fixed public telecom network. The use of fixed (point to multipoint) radio in the local loop is often referred to as Wireless Local Loop (WLL). A range of technologies can be used to provide WLL. Cellular mobile telephone systems are often used to provide basis telephony services to fixed customers, particularly in developing countries. However as the current cellular mobile network infrastructure is primarily suited for mobile, it is not considered an ideal solution in providing services to a large base of fixed customers.

WLL is a niche market and cost effective technology that may be used to deliver telephony and high speed data services in regional areas that are not well served with wireline network infrastructure.

MMDS (Multichannel Multipoint Distribution System) is a wireless system that has historically been used to deliver one-way pay television broadcasts in the 2-3 GHz band, but is now seen as a way to provide advanced two-way digital broadband access. The frequency plan has been upgraded to allow communications in both directions. It has been reported that MMDS is usually limited to customers within a 50km radius of a transmission tower.

GSM (Global System for Mobile communications), is the most widely adopted mobile standard in the world and provides digital voice services. With over 578 million subscribers in 400 networks in 171 countries, more than 1 in 10 people on the planet use GSM technology. Half of all GSM calls made anywhere in the world are connected by an Ericsson system. Ericsson is the number one supplier of GSM networks in the world.

GPRS reflect a range of enhancements that are being introduced as a transitional step to WCDMA from existing GSM services. General Packet Radio Service (GPRS) is an enhancement to the GSM network that introduces packet data transmission and as such gives more access bandwidth than over a standard connection. Enhanced Data rates for Global Evolution (EDGE) provides an enhanced radio modulation technique for GSM and when combined with GPRS gives a maximum bandwidth of 384kbits per subscriber.

WCDMA is a third generation interface technology that is optimised for wideband radio access to support 3G high-speed multimedia services such as video, Internet and videoconferencing. A new generation of fast, data-rich, multimedia services accessed instantly over mobile handsets will be provided. Third generation telecommunications will unite mobile radio with Internet technology to provide consumers with a new world of rich multimedia services via their mobile phones. [What does 3G offer? Watching cartoons, doing the laundry, taking photos, playing with the kids, designing graphics, sitting in traffic, knowing where you are in faraway towns in the busiest of streets, chatting in the gym, starring on the small screen, enjoying mysteries, love stories, soaps and playing games, solving puzzles, glimpsing life-changing news, organizing a life lived seamlessly on the move, checking shares, opening an account, walking in warm rain, just wondering aloud…]

CDMA2000 is a solution built upon data-driven technology. Fuelled by the Mobile Internet revolution, Ericsson's cutting-edge CDMA2000 solution enables smooth and cost-effective 3G roll-out. It opens up exciting new market and revenue opportunities for CDMA operators.

Wireless LAN (WLAN) is a technology that has been around for some time. WLAN allows users to access a data network like the Internet at high-speeds (up to 11 Mbits/sec) as long as users are located within a relative short range (typically 30-50 meters indoor and 100-500 metres outdoors) of a WLAN base station (or antenna). At present most WLAN deployments have been part of internal company wireless intranet solutions. However there has been a great deal of effort amongst telecommunication suppliers to provide an integrated public WLAN solution, allowing an operator to deploy WLAN as a complement to their existing and future GPRS and 3G Wide Areas Networks. The European community, through ETSI, have standardized a WLAN called HiperLAN2. The American community, through IEEE have created a standard called 802.11b, 802.11a and recently 802.11g. In the market we have come to know 802.11 as Wi-Fi.

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Microwave Point to Point - Point-to-point radio is mainly used for mobile backhaul connections, or even to connect very large business customers when a fibre-optic connection is either impossible or not economically viable. An alternative use is for resilience options when there is only one fixed-line access into a building. These systems are usually PDH or SDH-capable to provide carrier class of service

Satellite -Demand for high-speed Internet and email has never been greater. Firing this demand has been a variety of enabling technologies, but most have been limited by infrastructure costs to high-density metropolitan areas. Satellite broadband Internet has closed the technology gap, extending the benefits of broadband Internet access to rural and remote Australia.

- *Speed -* With Internet download speeds of up to 400kbps - at least 7 times faster than 56k dial-up - and data downloads up to 5Mbps (Package Delivery), broadband Internet via satellite is fast.

- *Accessibility -* Australia-wide accessibility makes broadband Internet via satellite the ideal solution for people who want high speed Internet access, but don't have access to broadband cable or ADSL services.

- *Additional Functionality -* Broadband Internet via satellite opens doors into a new world, beyond email and static web pages. Fast downloads bring mission-critical applications to users' desktops when they need them - and enhance the experience by providing real time, high quality audio and video. An example of an application is remote education.

- *Ease of Use -* Broadband Internet via satellite requires minimal, compact indoor hardware. Software is easy to use and all services come with common activation, billing and customer support.

4   TRANSITION TO 3G

People seem to be always searching for faster, cheaper access solutions to the Internet and access to data (corporate connectivity) and services (eg location information, messaging, video conferencing) that require higher data speeds. As has been witnessed with voice services over the years, the benefits that mobility adds to a solution generates great appeal for users – namely its "anywhere, anytime" features. Migrating this philosophy across to the data world, i.e. providing users access to the Internet while on the move or away from their desk or office, promises to deliver many benefits for both corporate and consumer users.

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Most of the operators around the world today offer GPRS services. Many others are beginning to roll-out 3G services. Such Wide Area Wireless networks are designed so that users are able to connect to data service, like the Internet with the same coverage and convenience as their voice services today. GPRS and 3G enable the users to always remain connected to the *mobile internet*. This will mean that users will be able to access their corporate applications and intranets, stream video and audio clips from news or sports services, engage in video conference calls, send multimedia messages, and access the same services that they can today from a dial-up or broadband connection using their GPRS and 3G device with the convenience of access at virtually any location. The great change that GPRS and 3G will deliver is the ability to provide convenience and personalization for the user, in the same way that mobile phones changed the way in which users used the phone; therefore transforming communication into a personal communication experience for not only voice but data and multimedia as well (*includes the Internet and Intranet*). The *mobile internet* promises to change the way people use and interact with the Internet.

Evolution

Every telecom operator, developer and vendor in the world is going to be affected as telecommunication migrates towards a third generation of networks, services and applications.

The good news is that the transition towards this exciting new technology will be safe, manageable and gradual. Partnering with Ericsson, operators can tailor their migration towards 3G telecommunications according to their business needs. 3G is an industrial evolution not an industrial revolution. 3G migration can be carefully managed and profitable for operators, smooth and seamless for users.

Working with Ericsson, operators can keep their core technologies and investments in place, while enhancing their systems for the third generation. Operators do not have to throw away their original investments - they can move towards full 3G services at their own speed, according to their own needs.

Because WCDMA, the 3G network, is an evolution of GSM technology, operators do not have to transform their networks when they move from 2G to 3G, or throw infrastructure away and start from scratch. The move to 3G optimises operators existing 2G infrastructure, enabling it to co-exist profitably with the new WCDMA system.

The operators' GSM equipment - incrementally enhanced by GPRS and EDGE - can continue to offer services and generate revenues within the 3G system. The current and the new technology complement each other, forming a highly flexible, seamless network system.

Seamless migration, seamless networks, seamless revenues - WCDMA will dominate 3G and is fully compatible with GSM.   However GSM operators can also choose to deploy EDGE in their existing GSM spectrum - alone or with WCDMA. EDGE is defined as a 3G technology, according to IMT-2000. Most of the world's operators have chosen to use WCDMA as their 3G technology.

TDMA operators have three migration paths to choose from. They can migrate to GSM and from there on to WCDMA, or they can go via CDMA to CDMA2000. Alternatively they can go to EDGE. Ericsson is a proven and experienced partner in TDMA/ CDMA technology as well as GSM.
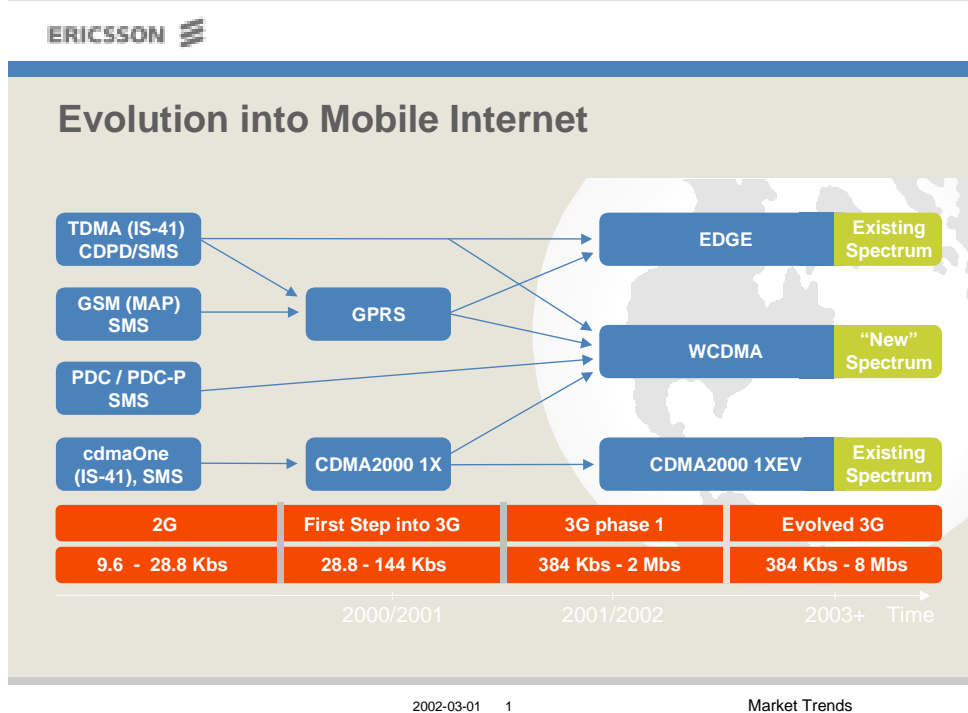
Evolution Path

All telecom roads lead to 3G. Because Ericsson offers a full range of second and third-generation solutions it can ensure that whatever 2G system operators are using, their core networks and competencies can be updated and retained during migration to 3G.

Operators can implement the capacity they need when they need it, progressing towards 3G safe in the knowledge that their migration is smooth and profitable.

Ericsson has a contract with Hutchison Australia to supply a 3G system which is expected to commence operations in late 2002. Optus is also investing in a 3G network although the time of introduction is unclear. Telstra, Vodafone and Optus are all offering GPRS services.

Globally Ericsson has major customers such as:

- NTTDoCoMo – co-supplier of radionetworks
- AT&T USA
  Vodafone UK
- Telecom Italia (Italy) – with Siemens/NEC
- Telefonica Spain – with Motorola, Nokia
- Sonera Finland – with Nokia
- Telia/Tele2 - Sweden
- Swisscom - Switzerland

Expectations are that by end 2003 data and video applications will account for 20% of traffic volume on a mobile phone network as against less than 2% in 1999. (BIS Shrapenel – "Telecommunication Infrastructures in Australia 2001").

5   FUTURE APPLICATIONS

Hundreds of millions of consumers all over the world have already taken the crucial step towards embracing Mobile Internet and 3G services. With 16 billion text messages (SMS) a month sent in 2001, the idea of using your handset for informative, colourful, entertaining services, way beyond voice, is no longer a big thing.

It does need to be recognised that there are differences in services and therefore user behaviour between fixed and mobile services. The Fixed internet (i.e. computer) offers a big screen, keyboard, time to surf. As such it is ideally applied to applications such as planning/research/learning. WLAN offers these advantages plus limited mobility.

In contrast wireless services such as cellular offer services based on my time, position known and always on. These advantages then lead to new applications – applications that satisfy instant needs.

Consumers now use their handsets as essential venues, as portals to endlessly busy, intriguing and vital communities. Mobile applications and services are now a graphic, convenient, *regular* part of everyday life. Welcome to the Mobile Internet.

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At the moment…

1,000,000	new mobile phones
500,000	new subscribers
100,000	new Mobile Internet users

…per day!

15% of mobile operators income comes from SMS

Source: Ericsson

Mobile Internet – Ericsson's view and solutions – Rev B   2001-02-01   Niklas Rosvall - Core Unit Service Network & Applications

Services and Applications are *driving* 3G
Sending *graphics,* ***playing*** *games,* ***locating*** *a restaurant,* ***booking*** *a ticket,* ***reading*** *news updates,* ***checking*** *a bank statement,* ***starring*** *in a long-running interactive soap opera …*

Ericsson knows that whatever people are doing right now over their mobile handsets, if it is useful, entertaining, fun and easy to use, they will keep doing it and keep paying for it.

New revenue streams
Enjoyable, easy-to-use applications that people are willing to pay for are the market drivers and new revenue streams of 3G. Ericsson is totally committed to driving and supporting the R&D and marketing of new services and applications for mobile handsets and telephony throughout the industry, throughout the world.

Dynamic new communities
The development of new mobile applications has created dynamic, innovative new communities within the telecom industry, and Ericsson is at the heart of these new communities. Ericsson has created global networks offering support, partnership and investment to Mobile Internet service providers and content developers worldwide.

Ericsson Mobility World

Ericsson Mobility World is a global network supporting service providers and application developers through nearly 30 local centers around the globe. Mobility World helps developers create revenue-generating applications and content for 2.5G and 3G networks. By the end of 2002 Ericsson Mobility World will have more than 200,000 individual members and support more than 1,000 companies throughout the world with expertise, advice and investment.

Ericsson Application Test and Evaluation

This global testing facility helps operators test and evaluate new apps and services. Extensive testing carried out with real consumers and focus groups helps operators and content developers come up with applications that will be popular and profitable.

ATE has developed exciting new software tools for testing and evaluation that are used by about 20 local Ericsson Mobility World centers. ATE has carried out more than 300 tests worldwide, 70 in commercial networks. Operators already working with ATE on their applications and content include Vodafone UK, KPN in Holland and China Mobile.

A world of services

For many consumers in Southeast Asia, Europe and parts of the US, applications like the ones below have suddenly gone from being high-tech ideas to everyday services creating rich new revenue streams and attracting major development and marketing all over the world.

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N-top service - SK Telecom:

Service similar to I-mode

- Character download
- Melody download
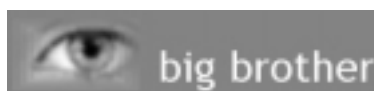- Mobile chatting
- Gaming

인터넷 TOP
n.TOP
www.n-TOP.com

15 million customers - more than 50% are using n-TOP!

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UK: Big Brother T V show

Big Brother WAP Game   big brother

BTcellnet

7 million daily hits !

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Messaging: e-mail and multimedia messages delivered in an instant. You can now combine text, pictures, photos, animations, speech and audio for the ultimate messaging experience. You can also send your messages regardless of the handset you are using - from mobile phone, PDCs, Palm Pilots, or PCs.

A multimedia message can, for example, be a photo or picture postcard annotated with text and/or an audio clip, a synchronized playback of audio, text, photo or, in the near future, a video emulating a free-running presentation or a video clip. It can also simply be a drawing combined with text.

Gaming: improved graphics and instant response for interactive game playing.

Location Based Services: an increasing boom in SMS and WAP-based Location Based Services is letting operators create exciting new business and revenue streams with new services. Location Based Services are not only a lot of fun for users; they also increase personal safety and help optimize performance and efficiency in business and work life.

Personal information management: synchronization of calendar and address book between mobile phone, PDA and PC

Personalized portals: fast, easy access to services with the user's own tag.

Entertainment: faster downloading of multimedia content.

Banking and finance: check access to account details, payment facilities, stock news and prices.

Standardisation No matter who or where they are all mobile phone users share some basic expectations of the kind of service they want from their devices. They all want their calls to be instantly connected and high quality. What they don't want to think about are the hundreds of thousands of different components and networks every single one of their calls must go through.

Ericsson drives global standards
Making sure consumers' calls *are* carried seamlessly over different networks and components is all about creating the same basic standards across the global telecom industry.

Ericsson is one of the industry's key drivers of global, open standards. Ericsson believes global open standards generate worldwide traffic and revenue for operators, and ensure a smooth, seamless experience for consumers.

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Standardization & Co-operation

Rich

• M-services Initiative (handset & app. requirements)

• Wireless Village (instant messaging)

• Mobile Games Interoperability Forum

• Mobey Forum (mobile security)

GSM Association

W@P Forum

WAP 2.0 new features:

• Colour screen

• File downloading

• Improved navigation

• Multimedia messaging

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6   ISSUES CONCERNING WLAN

The subject of Wireless LAN has received considerable attention recently, partly reflecting announcements on broad scale roll-outs. WLAN provides a number of advantages, notably ease of access and ability to undertake work in particular environments without being dependent on wired access. However they do have a number of limitations, notably relatively restricted broadcasting capabilities, location dependency, subject to interference and causing interference. This is partly as a result of regulatory arrangements preclude providing general public services, as distinct from "community" services.

WLAN operates in two unlicensed bands:

1.   802.11b and 802.11g operate in the 2.4GHz band, together with many other devices including Bluetooth and,
2.   802.11a operates in the 5GHz band, which at this point is relative free of interference from other electrical devices operating in this band.

Today there are three key market areas for WLAN :

*   **Enterprise:**
    Usage is mainly as an adjunct to corporate fixed LAN allowing users freedom to move within the office and conference rooms.

*   **SOHO:**
    WLAN's are used as the major hub for all wireless internet connections within home or office. WLAN access points usually connect to a major backbone via the fixed or wireless networks, e.g. an ADSL/Cable modem, Satellite, LMDS etc.

*   **PAL (Public Access Lan):**
    Usually referred to as Public *hot-spots.*
    Provides public access usually in highly targeted areas where business users frequent and are relatively stationary (or places where people wait), e.g. Airports, train stations, coffee shops, hotels, shopping centers.

Public Access LAN (PAL)

PAL's are a new breed of access and one which is being hotly debated by observers in the market place, especially in relation to complementing GRPS/3G solutions. PAL companies provide Internet access in public environments. These companies are usually referred to as WISP's (Wireless ISP's).

The major needs of this segment are:

- **Coverage**. As has been demonstrated time and again during the history of wireless service, coverage is the single most important factor for making a new wireless technology a success.

- **Roaming**. As the user may move from Hotel to Airport etc., what is needed is service roaming and secure authentication, accounting (one bill) and administration.

How do WLAN and Mobile systems converge -

GPRS and 3G provide global coverage and Quality of Service, therefore a user can be given guaranteed bandwidth on demand. This means applications such as video conferencing, streaming video and voice can be delivered in a guaranteed fashion without any degradation in quality. WLAN is designed to cover small areas, typically WLAN cells are around 30-50 meter radius, whereby a GRPS & 3G cell can by from 1-20 km radius, making WLAN suitable for small *hot-spot* locations, and GPRS/3G for broad umbrella coverage. Typically WLANs would be installed in areas that are frequently populated by people, areas such as airports, train stations, shopping centres, coffee shops, hotels and convention centres. In such areas the density of users wanting to access both voice and data services are high. Operators with their GPRS/3G network could add WLAN to the offering, enabling them to provide their customers with the broadest coverage and access possibilities for voice, data and multimedia services in areas where there are a high density of users.

WLAN in such areas could be used to deliver cheaper, best-effort quality of service, enabling users to access their corporate applications and Internet. WLAN users would use their GPRS/3G devices to access services requiring higher quality of services such as voice, video streaming, video conferencing. Of course users could choose to access the same applications and services as WLAN using their GPRS/3G device, in the end the user is open to choose the best available connection for the application they are using at that time.

Ericsson is developing solutions and leading the standards groups in integrating WLAN access networks with GPRS/3G networks. This will enable users to logon to both a GPRS/3G and WLAN network transparently using one sign-on, similar to the method used today with GSM phones. From a user point of view they are able to use WLAN and GPRS/3G services transparently and receive one bill. From an operator point of view they are able to offer an integrated set of services, and are able to provide more freedom to the user, enabling them to access their services using whichever network makes sense at the time. This provides greater flexibility and freedom for both the operator and user.

In the near future (6-18 months), we will begin to see multi-mode type devices entering the market. These devices will be capable of accessing WLAN, GPRS/3G and Bluetooth networks all from the one device. Such devices will be integrated into mobile phones, personal digital assistants (e.g. pocket PC, palm etc.), and laptop PC's. Software within these devices will enable users to configure rules that will determine the best choice of network for a particular application.

Regulation

One of the most talked about issues regarding WLAN is regulation. WLAN operates in the 2.4 GHz and 5GHz bands. Both bands today stipulate regulations relating to power outputs. Since these bands are classified as unlicensed they are free to be used by whomever as long as they adhere to the relevant power outputs, which have been designed to be low enough to limit interference. The issue is that companies, including operators, are considering offering public services over WLAN in these unlicensed bands. It will become increasingly difficult to guarantee quality of service with regards to interference if these bands are not regulated in some way. Governments, around the world will be forced to tackle this issue together with industry, in coming up with ways in which the spirit of unlicensed frequencies is maintained, together with regulations that help preserve quality of service for WLANs.

7   BROADBAND FIXED WIRELESS ACCESS

Broadband fixed wireless access (BFWA) is a technology that will allow carriers to provide broadband services to residential and business customers while avoiding the pitfalls of local loop unbundling and as such is potentially a rapidly deployable solution. However gaining a licence, locating and acquiring base station sites and deploying a backhaul network takes time.   BIS have estimated that microwave can offer cost savings of up to 40% compared to a fixed network through the ease of deployment, not the high bandwidth.

In addition to possible residential services microwave services also provide transmission services for example for backhauling calls from mobile base stations to their switches.

With current technologies, 26-40GHz BFWA equipment should be thought of as a large-business solution for densely populated areas.   In many countries geographical roll-out requirements exist or strict regulations are imposed that only allow BFWA to be used as an access solution.

Broadband wireless offers point-to-multipoint systems for connecting customers to broadband services in areas that are expensive or impractical to reach via fibre optics or xDSL or for network resilience when two fixed-line accesses are not possible. For new entrants, BFWA is an option for supplying services to business and residential customers while avoiding the costs, delays and other pitfalls of the local loop unbundling process.

Overseas the main targets are densely populated areas that have a high number of potential business customers in close proximity. This allows the carrier to gain a higher customer penetration for each base station, which often have a very short reach. Unfortunately, these areas also have the most competition and a number of new entrants in the US and Europe have experienced great difficulties in sustaining financial positions. While some operators have experienced difficulties compounded by Government mandated roll-out requirements, the most significant issue affecting the business case is, where they apply, excessive spectrum licence fees paid at auctions in some markets like the US, UK and Germany.

Overseas, particularly in the US, regulators have tried to push BFWA as a means of increasing competition and speeding up the deployment of broadband services. As a result they have often placed strict requirements on the licence winners - for example, requiring network rollout within a certain time limit, and ruling that the licence may be used only for access purposes.   In Australia this has not been the case and Ericsson supports the approach of leaving deployment decisions to operators.

Overall broadband wireless in Australia is still in its relatively early days with roll-outs of LMDS networks proceeding relatively cautiously.

8   SATELLITE SERVICES – CURRENT BROADBAND APPLICATIONS

The ACA recently examined the costs of alternate services for providing USO services – satellite was considered the most suitable for providing services to customers 20km beyond local exchanges. It is therefore ideally suited to providing services in rural areas.

As an outcome of a $150 million Commonwealth initiative, Telstra is progressively offering extended zone customers an Internet service that utilises satellite technology. Ericsson, via its relation with Hughes Network Services is providing Telstra with the satellite equipment.

Telstra BigPond's broadband 2-way Satellite Internet service, with a choice of data rates and monthly access charges (see below), is being offered to extended zone customers. For a limited time in each extended zone, one free installation is allowed at each address.

Telstra is offering free installation of the hardware (for example, antenna, modem and cabling) required to access the service to customers who:

- sign up to a service plan for 18 months;

- arrange for the installation during Telstra's rollout in that area;

- have or purchase a computer that supports the service;

- have a Telstra fixed line account or valid credit card and satisfy credit validation checks;

- provide suitable 240V/50Hz power; and

- have a clear view of the northern sky from their premises and appropriate power to support the service.

The service is provided through Telstra's 2-way BigPond broadband Satellite Internet service. Customers are also being offered the option of buying personal computer packages from IBM Australia, to be installed with the satellite service. The cost of the computer packages range from $1,649 to $2,549.

Where there are multiple dwellings at a single property, each with independent telephony services, one free installation will be allowed per dwelling.

Other benefits of the 2-way Satellite Internet service;

- Telstra will progressively roll out online customer support services on the 2-way satellite Internet service (such as online fault reporting, online billing) specifically for extended zone customers.

- Each 2-way service will be able to receive interactive distance learning with the installation (at no extra charge) of software for the SkyConnect Tutor service.

- Telstra will support communities, where possible, through commitments such as employment of local staff, support of Indigenous communities and by working with remote communities to develop products and services.

- Video conferencing, provided by satellite, will be available for either point-to-point or point-to-multipoint (using a video bridge).

Rates for extended zone customers:

Package	Speed downup to Usage charges**	Speed uplink – up to Min. 18 mth contract cost	Access charges
Home Sat	33.6 kbps 33.6 kbps	$16.95/mth $305.10	1st 150 MB/mth free, 26.4c/MB thereafter
Basic Sat	64 kbps 64 kbps	$44/mth $792.00	1st 250 MB/mth free, 26.4c/MB thereafter
Business Sat	400 kbps 64 kbps	$60.50/mth $1 089.00	First 1000 MB/mth free, 26.4c/MB thereafter

**All costs inclusive of GST.

Note: Although customers must remain connected to the service for a minimum of 18 months, they are not 'locked in' to the plan they initially select and can switch between plans as required.

Limitations

- Where terrestrial solutions are available there are quite often cost advantages to utilising this type of network.
- While Broadband Satellite is a Wireless technology, it does not offer mobility to the end user. However, it is possible to combine Satellite with Wireless LAN to enhance mobility for the end user.

Satellite trends to future (and implications for providing last mile solutions)

Broadband Satellite platforms have reached maturity and a degree of market penetration that has ensured that cost per end user is reducing. As the next generation of Ka band satellite technologies reach the market over the coming 3 years, and more satellites are launched in this timeframe, costs to the end user will reduce further. The maturity of the technology has also seen a dramatic increase in the variety and complexity of applications available over the platform. The increasing proliferation of corporate applications like VPN's and multimedia content value is added to the internet access that underpins the service.

9   TELECOMMUNICATIONS REGULATORY REGIME

Recognising that spectrum is the "lifeblood" of the mobile industry, Ericsson has taken a strong interest in administrative arrangements applying to radio-communications both through its membership of such Associations as AMTA, involvement in various working groups of the Australian Communications Authority, etc. Globally Ericsson is a major industry participant in the ITU including meetings of the World Administrative Radiocommunications Congress.

In general, Ericsson believes that the existing arrangements as administered by the Australian Communications Authority, are working well, and have worked well over the past several years with the allocation of some major spectrum blocs via competitive processes. It is recognised that in an industry that has changed rapidly and introduced many new technologies (in a short time frame), challenges are posed for administration. The ACA has risen to these challenges. Fundamental changes have been made to Radiocommunications administration over the past decade to introduce market mechanisms for determining the most efficient use of spectrum in significant areas. Despite considerable scepticism about the potential outcomes of such reforms, in general the results have been very positive.

In particular, Ericsson has found the consultative, transparency and openness of the ACA's processes to be first class. Furthermore as a global company, Ericsson believes it is important that individual country administrations maintain alignment with global developments both in areas of spectrum and standards. Australia's consistent approach of adopting ITU recommendations on spectrum allocation, as well as the acceptance of international standards and proof of compliance on a global basis, has enabled the early introduction of new services and products to the benefit of users and the productivity of the economy.

Recent reports have spoken of the need for improved provisions for secondary trading. Some comments in relation to progress or whether secondary markets have developed, appear to underplay the realities of the recent substantial changes to the dynamics of the telecommunications industry, and particularly the mobile industry. Over the past two years there has been a significant re-evaluation of the industry arising from the dot-com crashes, and consequent pressures from the stock market and the collapse of a number of new carriers (e.g. OneTel in Australia, Global Crossing in the US). In many markets, high levels of mobile penetration have been achieved. 3G services are being introduced on a global basis with significant technical and commercial issues. As a result there has been a significant process of industry consolidation in the face of an "overhang of capacity". Demand for spectrum has lessened considerably as has the pressure for secondary trading.

Regulatory Arrangements

Ericsson strongly agrees that the primary objective of the Radiocommunications Act should relate to maximising the efficient allocation and use of spectrum. Issues such as revenue raising should be secondary to such an objective.

Issues such as interference have major implications for spectrum usage and are constraints on the adoption of simple property rights approaches based on land use.

Spectrum Administration

As previously noted, Ericsson as a global company (operating in 140 markets) strongly endorses the Australia approach towards spectrum allocations to maintain consistency with International Telecommunications Union allocations. This provides for productivity benefits associated with the introduction of new technology and the lower prices associated with economies of scale in production. The US approach towards spectrum allocation on the basis of national rather than international considerations, highlights limitations of such an approach. The Australian approach of spectrum licensees that do not define the technology application for the particular band has worked well.

Licensing

Ericsson considers security of tenure is an important element and notes the introduction of elements of uncertainty over recent years with the explosive growth of the mobile industry and its demand for spectrum in bands traditionally the preserve of fixed link operators.

Ericsson supports administrations having the ability to re-plan spectrum which includes the need to retain the ability to not re-issue licences, or to resume existing licences that are only part way through their term. The rapid growth of wide area mobile services has led to an escalating rate of change in band use which has often required the relocation of fixed link services, generally however with significant notice. For example the WARC Conference of 1992 identified the 2GHz band for use in the introduction of UMTS but it will not be until October 2002 that in Australia this spectrum becomes available.

Ericsson agrees that security of tenure is important for investment certainty and that the changes in spectrum usage over past decade have introduced uncertainty particularly for fixed link operators. It would appear many incumbent apparatus

licensees have operated on the basis of a presumption of renewal despite no such provisions within the *Radiocommunications Act 1992*. This would appear to partly account for the majority of licenses continuing to be for one year terms despite terms of up to five years being available.

Ericsson supports recommended changes to the Radiocommunications legislation to provide a presumption of renewal. Feedback from the financial sector is that a presumption of renewal with appropriate conditions would be an advantage over existing arrangements in securing finance.

Accompanying any such change should be a Forward Review process to examine likely changes in band use on a regular basis to include those bands where a change in use was anticipated, or at least possible. In particular such a Forward Review should be conducted in association with every WARC.

Ericsson supports retention of the existing maximum apparatus licence term of five years. Arrangements for the renewal or otherwise of a licence are more important to licence holders than the term of the licence itself.   A presumption of renewal and a forward review will provide additional certainty of tenure.   These issues have been recommended by the Spectrum Working Group of the Radiocommunications Consultative Committee.

ACA's management of the microwave spectrum bands is well organised and allows rapid roll-out of networks.

Competition Levels

Ericsson supports the recommendations of the Productivity Commission that competition limits under section 60 and 106 of the Radiocommunications Act 1992 be repealed. Such limits have only been used on a limited basis and Ericsson agrees that section 50 of the Trade Practices Act 1974 provides enough flexibility. As a matter of principle, Ericsson supports general provisions rather than specific regulatory instruments. It is noted that the UK Cave Review made similar recommendations.

Spectrum re-allocation

Spectrum licences have generally been issued for the maximum period (currently 15 years) allowable under the *Radiocommunications Act 1992*.

Ericsson notes the discussion by the Productivity Commission recommending that three years notice be provided before the process of re-allocating spectrum licences occurs.

Under Sections 78 to 84 of the Act, arrangements for re-issuing spectrum licences on their expiry are provided such that within two years prior to the expiry of licences, the ACA must:

- publish a notice in the Gazette regarding licences which are to expire and invite expressions of interest from persons interested in licences for those parts of the spectrum;

- prepare draft licences to replace (in whole or in part) the current licences; and

- conduct a price-based process for allocating the replacement licences.

The Act makes provision for re-issuing spectrum licences to the original licensees, without a further price-based allocation, where it is in the public interest to do so.

These arrangements have yet to be tested owing to the limited period of time for which spectrum licences have been in existence. However Ericsson believes that the relatively limited time provided under the ACT before the licences expire will cause uncertainties and constrain business confidence and reduce investment in the provision of services. Given that the uncertainties cannot be resolved until near the end of the licence period, and given the time necessary to achieve an appropriate return on investments in infrastructure to operate in the spectrum, it is unlikely that a licensee would have the incentive to invest in infrastructure beyond the initial rollout period.

Ericsson believes that approaches to re-issue spectrum licences should be considered significantly earlier than the final two years of a licence period, and desirably at least five years prior to the expiry date. The offer for an extension could be for a term of up to five or ten years from the date of examination. In making any consideration of this issue public interest would need to be a dominant consideration and provisions could include such issues as the services provided, customer numbers, etc.

Secondary Markets

Ericsson notes that provisions already exist for secondary trading of spectrum and that it may possibly be issues external to the industry that limit trading, eg taxation on spectrum. Whilst the identified technology and site specific nature of apparatus licences may restrict the potential for trade in these licenses, that is an inherent condition of the advantages of such licences. Current industry conditions also act as a constraint on interest in secondary trading.

Provision of services to Rural/Remote Australia

The Government has introduced a range of programs designed to enhance the access rural and remote communities have to the latest communications technologies, particularly focusing on mobiles and broadband eg Extended Zones, Networking the Nation, Improved Coverage of Highways/Small Towns. Ericsson has participated in a number of these projects as the supplier to the successful tenderer.

There is a role for such targeted programs into the future to ensure remote communities have access to wireless broadband technologies as highlighted by the Telstra BigPond's broadband 2-way Satellite internet service.

Ericsson considers there remains a compelling case for Government programs targeted towards providing high quality communications services for all Australians whether provision of such services are likely to be uneconomic. Such projects which could be funded via further sales of Telstra should be of sufficient size to make them attractive for potential tenderers.

Subsidised technology or solutions do not need to be the latest and greatest bleeding edge, but should be very practical reasonable solutions. Compatibility with urban technologies as well as technology consistency between different regions, should be considered to avoid a proliferation of different technologies in different parts of Australia. This reduces possible economies of scale and means devices cannot be used in different parts of the country. Ericsson has always supported standardised and broadly accepted technologies.

Thought should also be given to whether capital funding should exclude end-user equipment. Since some operators take subscriber acquisition costs (e.g. handset subsidies) as a capital rather than operational expense, it could be included in the Rural Fund allocations as it presently stands.

Importance of Standardisation

No matter who or where they are, all mobile phone users share some basic expectations of the kind of service they want from their devices. They all want their calls to be instantly connected and high quality. What they don't want to think about are the hundreds of thousands of different components and networks every single one of their calls must go through.

Ericsson drives global standards. Making sure consumers calls are carried seamlessly over different networks and components is all about creating the same basic standards across the global telecom industry.

Ericsson is one of the industry's key drivers of global, open standards. Ericsson believes global open standards generate worldwide traffic and revenue for operators, and ensure a smooth, seamless experience for consumers.

Standardization is driving 3G. 3G systems will eventually be made from networks created by different operators and different components. Standardization is essential in ensuring the success of third-generation, multimedia, broadband tele-communication. Standardization is shaping the future of wireless communications.

2G to 2.5G: standardization drives progress. Open standards were the driving force behind the successful uptake of GSM technology around the world. Enhancing GSM

networks into GPRS systems has made Ericsson an expert on standardization and interoperability. Ericsson is now turning its experience in creating GPRS systems towards optimizing the smooth evolution from GPRS to multimedia WCDMA.

2.5 to 3G: standardization behind evolution to WCDMA. Standardization and interoperability of WCDMA technology has helped Ericsson take the lead in the development of WCDMA at every level. Working with standardization bodies such as the 3GPP, Ericsson is driving the establishment of universal, open standards in WCDMA.

Open standards: an open world. Whether crossing the language barriers and time zones of the expanding European Union, making their way through an ever more cosmopolitan China and culture hopping through a booming Southeast Asia, for today's telecom consumers wherever they take their handset is their home. For these consumers, standardized global networks offer a seamless telephone experience that helps enlarge their world while making it more navigable.

The Ericsson commitment is to open standards.   Ericsson plays a major and active role in the world's most influential standardization bodies, including the Third Generation Partnership Project (3GPP); the International Telecommunications Union (ITU); and the European Telecommunications Standards Institute (ETSI).

Managing Spectrum for non-commercial and broadcasting services

Ericsson believes "a system of explicit budgetary support should replace the current system of granting exemptions and concessions from spectrum charges to some non-government, non-commercial users."   Such would have the advantage of making spectrum usage transparent and assist in maximising the efficient use of spectrum through the establishment of pricing signals currently missing.

Broadcasting

Ericsson believes responsibility for planning and licensing the broadcasting services bands of the spectrum should be transferred from the ABA to the ACA and that licence fees and access to spectrum be based on "the opportunity cost of spectrum used." Such provisions are necessary in an environment of convergence to prevent distortions of technology usage in investment decisions.

Electro Magnetic Radiation

There is considerable debate associated with mobile telephony and claimed health effects from either the towers or handsets. Ericsson considers safety is not in question. In all of the recent reviews: World Health Organisation (WHO), International Commission on Non-Ionising Radiation Protection (ICNIRP), EC Expert Group, UK National Radiological Protection Board (NRPB), Royal Society of Canada Expert Group, UK Independent Expert Group on Mobile Phones (IEGMP), French Expert Report – all have reached a similar conclusion: The weight of scientific evidence is that RF exposures within accepted limits do not cause any adverse health effects.

The World Health Organisation last year endorsed the international guidelines developed by ICNIRP saying:

International guidelines developed by ICNIRP are based on a careful analysis of all scientific literature (both thermal and non-thermal effects) and offer protection against all identified hazards of RF energy with large safety margins.

The UK Independent Expert Group on Mobile Phones (Stewart Report) last year also recommended the ICNIRP guidelines in recommendation 1.27:

We recommend that, as a precautionary approach, the ICNIRP guidelines for public exposure be adopted for use in the UK charter rather than the NRPB guidelines. This would bring the UK into line with other countries in the European Union and accord with the recommendations of the House of Commons Select Committee on Science and Technology Report on Mobile Phones and Health (1999).

Australia is relatively unique in that currently mobile phones can only have maximum SAR emissions of 1.6watts per 10grams. SAR measures the level of emissions from a handset. The international standard (ICNIRP) which has been adopted for most countries is for a SAR of 2.0.

Australia has been considering adopting the international standard. Recently the Australian Radiation and Nuclear Safety Agency has, on the basis of an expert committee advice, recommended that Australia adopt the ICNIRP standard. However for mobile phones, this will be dependent on the Australian Communications Authority who has responsibility for telecommunications equipment making the ARPANZA recommendation into regulation.

Ericsson believes its is crucial that Australia fulfils its WTO requirements to accept international standards. The ARPANSA drafting process was consultative, inclusive of all relevant expertise and based on the most recent substantiated, world-wide scientific research. The ICNIRP guidelines provide a more rigorous tests regime to ensure products are safe in all circumstances.

AMTA supports a Government sponsored, independent public information program, funded separately from the NHMRC research program, to ensure that the community has ready access to reliable and accurate information about EME.

SAR information for new phone models will be included with the materials that come with the mobile phone. In addition, this information will be available from the website of the mobile phone manufacturer.

10 CONCLUSION

As this submission demonstrates wireless based systems offer many compelling attractions including flexibility, location independence, always on services and removal from the tether and cost of fixed line. The huge uptake of existing digital cellular systems and penetration rates exceeding 70% in many developed markets, highlights the advantage to consumers of such services.

Fixed wireless systems such as LMDS and MMDS wireless broadband offers ease of installation, cost efficient systems and the ability to transmit large volumes of information.

In general the regulatory arrangements applying to the wireless industry are well framed and administered.

Notwithstanding the current difficult market conditions for the telecommunications sector Ericsson is confident of the long term growth prospects of the wireless sector and its position as the dominant supplier of advanced mobile systems.

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