COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON COMMUNICATIONS, INFORMATION TECHNOLOGY AND THE ARTS

Reference: Wireless broadband technologies

TUESDAY, 2 JULY 2002

MELBOURNE

BY AUTHORITY OF THE HOUSE OF REPRESENTATIVES

INTERNET

The Proof and Official Hansard transcripts of Senate committee hearings, some House of Representatives committee hearings and some joint committee hearings are available on the Internet. Some House of Representatives committees and some joint committees make available only Official Hansard transcripts.

The Internet address is: **http://www.aph.gov.au/hansard**

To search the parliamentary database, go to: **http://search.aph.gov.au**

HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON COMMUNICATIONS, INFORMATION TECHNOLOGY AND THE ARTS

Tuesday, 2 July 2002

Members: Mr Pyne *(Chair)*, Mr Hatton *(Deputy Chair)*, Mr Baldwin, Mr Ciobo, Ms Grierson, Mr Johnson, Mr Pearce, Mr Sercombe, Mr Tanner and Mr Ticehurst

Members in attendance: Mr Ciobo, Ms Grierson, Mr Hatton, Mr Johnson, Mr Pearce, Mr Pyne and Mr Ticehurst

Terms of reference for the inquiry:

To inquire into and report on the current and potential use of wireless technologies to provide broadband communication services in Australia, including regional Australia, having particular regard to the following:

- The current rollout of wireless broadband technologies in Australia and overseas including wireless LAN (using the 802.11 standard), 3G (eg UMTS, W-CDMA), bluetooth, LMDS, MMDS, wireless local loop (WLL) and satellite;
- The inter-relationship between the various types of wireless broadband technologies;
- The benefits and limitations on the use of wireless broadband technologies compared with cable and copper based broadband delivery platforms;
- The potential for wireless broadband technologies to provide a 'last mile' broadband solution, particularly in rural and regional areas, and to encourage the development and use of broadband content applications;
- The effect of the telecommunications regulatory regime, including spectrum regulation, on the development and use of wireless broadband technologies, in particular the Radiocommunications Act (1992) the Telecommunications Act (1997), and Parts XIB and XIC of the Trade Practices Act:
- Whether Government should make any changes to the telecommunications regulatory regime to ensure that Australia extracts the maximum economic and social benefits from the use of wireless broadband technologies; and
- Likely future national and international trends in the development and use of wireless broadband technologies.

WITNESSES

Committee met at 9.04 a.m.

CHAIR—I declare open this hearing of the House of Representatives Standing Committee on Communications, IT and the Arts. Today the committee will take evidence as part of our inquiry into wireless broadband technologies. In simple terms, broadband allows for high-speed data transfer, providing vastly improved Internet access with a far higher level of interactivity. Broadband also enables services such as digital video on demand, simultaneous phone and data and a range of applications and content that can reduce the cost of doing business and delivering government services. Wireless technology can be used to provide broadband services over the airwaves, thereby providing unwired networking and online services, mobility and convenience for business users, an alternative to existing wired networks and a new range of specialist applications.

The committee is examining current wireless broadband technologies in Australia and overseas and the likely future national and international trends in their development and use. We are looking at the interrelationship between the various types of wireless broadband technologies and examining their benefits and limitations compared with cable and copper based broadband delivery platforms.

The committee is particularly interested to explore the potential for wireless broadband technologies to provide a last-mile broadband solution in rural and regional areas—that is, to connect businesses and households which are currently unable to receive broadband services. We are also looking at how wireless technologies can encourage the development and use of broadband content applications. In addition, the committee is examining the effect of the telecommunications regulatory regime, including spectrum regulation, on the development and use of wireless broadband technologies.

[9.06 a.m.]

VANDERSLIK, Mr Robert Anthony, Regional Sales Manager, Australia, NZ and South Pacific Islands, SR Telecom Pty Ltd

CHAIR—Welcome, Mr Vanderslik. I warn you that, although the committee does not require you to give evidence under oath, the hearings are legal proceedings of the parliament and warrant the same respect as proceedings of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. Do you wish to make an opening statement?

Mr Vanderslik—Yes, I do. SR Telecom would like to thank the committee for giving us the opportunity to provide a submission in what we see as an extremely important and worthwhile study. The key points I would like to deal with cover three issues: who we are; what we do and our credentials; the wireless broadband opportunity and the enabling technologies to make it happen. Firstly, SR Telecom is a world leader in fixed wireless access solutions for Internet, voice and data applications. With over 20 years experience, fixed wireless is our focus. We provide solutions to over 110 countries worldwide and provide not only technology but also full turnkey services such as design, installation, project management, maintenance and support.

The main application is to provide affordable, carrier-class telecommunications services for network operators. These systems are point-to-multipoint radio and are aimed at part of the market where low density is the prime factor. The density here means traditional wire and cable methods prove uneconomical. To serve these low teledensity areas, wireless methods prove the most economical alternative. Large networks utilising our technology are deployed in places including Canada, Thailand, Mexico and Australia. For the Australian untimed local call project, SR Telecom is providing the technology. Recent announcements have been made about the success of this project in delivering high quality service levels to rural and remote Australia.

In relation to wireless broadband opportunity, low-density areas provide unique challenges for providing reliable, scalable services. These services are usually not financially lucrative for operators but service to these areas gives an immense social benefit. Governments around the world realise this and therefore the only way for more remote users to have services relies on funding to assist the operators to do so. With broadband the needs of low-density areas also have to be addressed. SR Telecom understands the constraints at play and has invested in technology that enables existing platforms to cater for new features required for broadband connectivity. Broadband, to SR Telecom, means greater than 128 kilobits per second.

The investments made in rural and remote areas typically are in place for long periods so it is important to choose platforms that cater for future services. The untimed local call platform being built today utilises point-to-multipoint technology and allows the possibility of adding new broadband services. This is possible by combining traditional circuit switch methods and packet switch transmissions more suited to broadband and allowing them to coexist on the same system. However, just as with the untimed local call project, further government financial assistance would be required to expand existing infrastructure to enable broadband.

The enabling wireless technologies that will bring about higher data speeds for low density areas, whether they be in urban, rural or remote parts of Australia, are tried, proven, standardised and here today. The technology SR Telecom uses for high speed wireless connectivity is known as DECT—digital enhanced cordless telephone. We use DECT as an access mechanism for wireless local loop in conjunction with our point-to-multipoint backbone systems. The reasons for using DECT are that it is designed as a wireless local loop technology for fixed applications, it is a simple technology, it is widely available and it is mature. It is also standardised. It ensures a high grade of service, its protocol is designed to support the plain telephone and data, it has an evolution path for broadband built into the standard, and there is no need for complex frequency planning. The implementation at the customer end just involves connecting to a simple customer terminal adaptor.

From a regulatory point of view, DECT wireless local loop applications are unable to be used in urban areas due to regulatory constraints. There are no regulatory constraints in rural and remote areas. The concern of local regulatory bodies is the coexistence of wireless local loop DECT systems deployed by operators and personal DECT telephones used as cordless phones in homes. SR Telecom has carried out independent studies on this, and the conclusion is that, due to the inherent channel-sharing characteristics of DECT, wireless local loop systems and cordless systems can share the same spectrum without degradation of service. Studies by standards bodies and operators around the world also support this view. In summary, we are a leader in the low density market—that is our focus—we understand the needs for broadband and we have the technologies to make it happen. We are pleased to be part of the government's initiatives on wireless broadband.

CHAIR—In your submission and in your opening statement you talk about broadband being defined as anything greater than 128 kilobits per second. My recollection is that the Canadian committee that inquired into a topic similar to this one came up with the same definition. Could you expand on how and why you define it that way?

Mr Vanderslik—We define it that way because it is based on current technologies that are available today. For example, up to 128 kilobits is typically the ISDN type speed that is there today. Anything beyond that we consider to be broadband. So it is better than ISDN type speeds. We understand that various people have different definitions so there is no standard definition worldwide of what it is, but that is the basis of it. It is going beyond standard ISDN type speeds.

CHAIR—Is 128 kilobits per second capable of transmitting video in real time?

Mr Vanderslik—If it is compressed enough. That is, the equipment on the ends has to be capable of compression techniques that allow 128 kilobits, and those technologies have been around for many years now. It is always a trade-off between the cost of the equipment on the ends and the transmission mechanism in between. If you have simpler compression techniques, you need higher bandwidth, therefore the equipment on the ends is cheaper but the transmission mechanism in between has to have broader band capability. However, there have been many videoconferencing systems that have been around for the last five to 10 years that can transmit video applications easily at 128 kilobits.

CHAIR—You talked about the digital enhanced cordless telephone WLL—wireless local loop—system and said that there were regulatory restraints in the urban areas. Could you outline what those regulatory restraints are? And are they policed by the ACA?

Mr Vanderslik—They are policed by the ACA. The regulatory constraints concern the actual band that is allocated for DECT, which is from 1,880 to 1,900 megahertz. There is a particular spectrum allocated for it. The purpose of DECT has been for cordless telephones, PABXs and wireless local loop applications. In Australia, it has been designated that it will be used for cordless telephones, so it is for personal use in the home. The way DECT operates is that you have a number of channels available that everybody can use. When you make a call, the system decides which one it will use. The concern has been that when you deploy DECT in concentrated urban areas, because there could be a number of telephones vying for that same spectrum, if somebody comes along and operates a wireless local loop network on top of that, that will then block out the use of the personal cordless system. That is the concern that is in place. Therefore, the regulatory constraint does not apply in rural and remote areas because the densities are not there—so there are plenty of channels available for everybody—but there has been a blanket restriction on urban areas. We see the blanket restriction as being unfounded, because of the inherent characteristics of DECT to share those channels around. There are enough to go around for everybody.

CHAIR—What are you doing about trying to get the ACA to change their position on that? Are you making any efforts to do that?

Mr Vanderslik—Specifically from SR Telecom's point of view, I have not, but it has been brought to the ACA's attention over the last couple of years that this is something that it would be good to change. I cannot speak on behalf of other parties. I know other parties are also pushing for change.

CHAIR—Right.

Ms GRIERSON—Could you explain to me what the problem is—and you recommend against doing this—when you try to mix fixed and mobile services on the same system, using the same spectrum or a common spectrum?

Mr Vanderslik—Using a common spectrum?

Ms GRIERSON—Yes. Why not use fixed and mobile services on the one spectrum?

Mr Vanderslik—We do not recommend it because, with the particular spectrums that are in place now, when you have a system that has to allocate channels within that system, the way it is done is you give a blanket amount of spectrum to a particular application. Then, within that particular application—say it is mobile—the actual system will work out which frequencies are going to be in place at any one time. If you then start to add a fixed system, it will have its own way of allocating its spectrum. The potential then is that a mobile phone call could be operating and a fixed system sitting over the top will say, 'I want that channel as well,' and it will block out the call. So you will end up with some spectrum interference issues. It is purely related to the way in which the various systems operate and allocate spectrum.

Mr PEARCE—I am interested to know a little more about the digital enhanced cordless telecommunications infrastructure that currently exists in Australia and your experience with that. What is the roll-out like for DECT-type technologies here?

Mr Vanderslik—In rural and remote areas there are plans to use it as a wireless local loop technology, so operators will actually use that DECT.

Mr PEARCE—Where are those plans at? What do you mean?

Mr Vanderslik—At the moment it is in a trial phase. Nothing has been deployed at this stage. But for PABX use and personal use, DECT is readily available. You can go to the store now and buy a DECT cordless phone, and for PABX applications as well. There are some other companies that offer DECT as an extension to PABX, so that you can have wireless connectivity around offices. That has been around for a number of years now. So that is the sort of market where DECT has been used. It probably started off more in the PABX market and is now in the cordless telephone market to the home. We are looking at how we can extend that into the wireless local loop, the public arena.

Mr PEARCE—Regarding those trials or pilots that are taking place now, what is your expectation in terms of time frame?

Mr Vanderslik—They are happening now and they are technical trials, so it is just about integration issues. We expect to see that rolled out within the next six months or so, as I say, in more rural and remote areas. The expectation is that it would be good to then bring that into the more urban areas. My point here is that the target for urban areas is not the densely populated parts, it is the less dense urban parts. When you look at why you need the technology, it is because you do not have density. Typically, when you have density, you have copper cables, and there is probably no need for the technology anyway.

CHAIR—What would you hope to be able to transport on your DECT technology?

Mr Vanderslik—Currently, the DECT standard supports plain telephone. It supports data speeds, so for dial up speeds—if you are going over the plain telephone service on it—up to the V9056 kilobit which is the standard that is used today. It also supports ISDN type speeds at the moment. Mid next year, it will support up to 384 kilobit and there is scope to go beyond that.

CHAIR—Your proposal is that the DECT would be mainly for rural, not urban areas?

Mr Vanderslik—At the moment, it can only be used in rural and remote areas due to regulatory constraints, but we see that it can be used in urban areas as well.

CHAIR—Do you see it as a solution for rolling out wireless broadband technologies around Australia?

Mr Vanderslik—As I said, it is a solution for lower density urban areas for rolling out wireless.

CHAIR—What is SR Telecom's forward plans with respect to this kind of technology? Are they expecting to roll it out Australia wide over a period of years into the future, or what are they planning on doing with it?

Mr Vanderslik—Absolutely. We are here now because of our rollout with the untimed local call project. The plan is to extend beyond that for broadband capabilities. That is the next step and the company is putting all its development resources into broadband development.

CHAIR—Of course, some of the companies are just trying to pick a particular area, like SaskTel is targeting the Newcastle and Lake Macquarie area. But you are aiming for a wider application than them?

Mr Vanderslik—We are aiming for a wider application, yes.

Ms GRIERSON—Do you have any contractual relationship with Telstra at this stage to do that?

Mr Vanderslik—At this stage we do, yes. We have a contract in place at the moment. It is a three-year contract to provide the technology for what we call multi-access radio in rural and remote areas.

CHAIR—Also in your submission you talk about spectrum issues and the management of spectrum. Do you have any suggestions about how the management of spectrum could be improved by the Australian Communications Authority?

Mr Vanderslik—I have spoken in relation to DECT and that is probably where I see changes should be made.

CHAIR—Just in relation to the urban areas versus the rural areas?

Mr Vanderslik—The urban part of DECT.

Mr TICEHURST—What sort of distance can you achieve with your wireless links?

Mr Vanderslik—With the DECT technology, it is around 15 kilometres.

Mr TICEHURST—What bandwidth? Do you lose bandwidth as you get further out?

Mr Vanderslik—No. When you get further out, it is a case that signal strength dies. You have to maintain a certain signal level to maintain a quality of service on the line. So the further you go, that will degrade.

CHAIR—So where do you send your signal from? Do you have base stations or what do you do?

Mr Vanderslik—At the moment, we have a point to multipoint system which you emanate from an exchange. You can go out up to 1,000 kilometres and you go at various radio hops.

Along the way, you pick up customers. It is a trunk shared by many customers and that is why we call it a point to multipoint system. With DECT, at these stations along the way, we can then plug in a wireless connectivity to the customer. At the moment, what we have is wired, so you have to be a certain distance from the exchange to get the wire out. Although cable goes a long distance, of course it is the economics which drive it. The economics of putting cable out to some of these places is prohibitive. It also suffers from a lot from interference, faults and those sorts of things. A wireless solution will improve those service qualities as well.

CHAIR—Where are your base stations operating at the moment?

Mr Vanderslik—We basically cover the map of Australia, outside urban areas. Any of the more rural or remote communities are covered by our technology.

CHAIR—It is not like the old party line where the more people who are connecting to it the greater the interference?

Mr Vanderslik—It is not a party line. The reason for this technology coming in was to get rid of party lines.

Mr PEARCE—You have not built dedicated base stations. You are disseminating out of existing PSTN exchanges, aren't you?

Mr Vanderslik—That is what we are talking about doing with the wireless broadband—that is, offering the capability to use an existing platform to combine voice services, which is what they support today, and putting broadband services on top of that.

Mr JOHNSON—In your submission you talked about some experiments in relation to interference that have been conducted in Europe and Asia. When were they? Were they undertaken in high-density or low-density areas?

Mr Vanderslik—They were in higher density areas. The purpose of the study was to look at urban areas and the coexistence of DECT with cordless systems. For example, one of the studies was done in Germany in a fairly densely populated area. Also, it was carried out by ETSI, the European Telecommunications Standards Institute.

Mr JOHNSON—Have you compared data on that?

Mr Vanderslik—I have the summaries. I do not have the detail here, but the conclusion is that there is no need to be concerned about coexistence.

Mr JOHNSON—When did that take place?

Mr Vanderslik—It was in 2000.

Mr JOHNSON—So it is relatively recent.

CHAIR—Thank you, Mr Vanderslik, for coming here today and giving us your evidence.

Proceedings suspended from 9.28 a.m. to 9.39 a.m.

INSHAW, Mr Robert, Product Manager—Wireless Internet Solutions, Nortel Networks (Australia) Pty Ltd

KING, Dr Graeme William, Specialist, Regulation and Policy (South Asia), Nortel Networks (Australia) Pty Ltd

McDIARMID, Mr Brad Douglas, Senior Account Manager, Nortel Networks (Australia) Pty Ltd

CHAIR—Welcome. Although the committee does not require you to give evidence under oath, I do have to advise you that the hearings are legal proceedings of the parliament and warrant the same respect as the proceedings of the House. The giving of false or misleading evidence is a serious matter and may be regarded as contempt of parliament. If you would like to proceed with your opening statement we will then proceed to questions.

Dr King—Thank you. Nortel Networks is a global major provider of systems to large carriers and large corporations. Over the 10-plus years that Nortel has been in Australia we have made significant investments in Australia, including over $800 million in exports. We have an R&D centre in Wollongong which has done more than $120 million in R&D. Last year an optical training centre, into which we put $5 million worth of equipment, and trained the staff, was established at the North Sydney TAFE. That is being used to train Australian students, Australian customers, our staff in Australia and Asian customers. Locally we supply equipment to Telstra, Optus, PowerTel, Primus, Qantas, the Australian Stock Exchange and the Department of Defence, so we have a wide range of customers here.

There are several key points in our submission that we wish to emphasise. Firstly, broadband and broadband provision of services in the bush should look at both fixed and mobile services. The data capability and the user experience that need to be provided by broadband will evolve over time and people will need increasingly high data rates in the future. Users also expect a carrier grade service with high degrees of reliability and redundancy, and this is essential for business and government to make use of these services. Various technologies can fulfil the technical requirements of bridging the last mile gap between high capacity networks and their users. Each technology has unique capabilities and its own disadvantages and advantages. These technologies compete with each other, appealing to users on the basis of performance, price, quality of service et cetera. To achieve the maximum social and economic benefits of a broadband deployment, the technology must be cost effective for the consumer but still provide the opportunity for the service provider to make a reasonable return on the investment.

There are many wireless technologies that can be appropriate in different circumstances. These technologies provide the access to the customer but must have an appropriately sized back haul network. Fast access to a bottleneck is not at all sensible, and a total solution is needed. The availability of high speed broadband back haul in country areas is as equally important as the access infrastructure. To provide the greatest benefits to country users it needs to be ensured that technologies are reliable, secure, evolvable, scalable, manageable and sustainable. Otherwise the users and government will not make full use of the infrastructure that

is put in place. The provision of 3G mobile data services to rural and regional users is a major challenge. These technologies will start to be deployed in urban areas in the near term.

The infrastructure established can also be used to provide fixed services such as wireless local loop for voice and data. Nortel Networks supplies GSM, CDMA, GPRS, CDMA2000 and UMTS and does not favour any technology. But in the Australian context Nortel recognises the unique ability of CDMA2000 to provide broad coverage of a 3G service across country Australia. It is unlikely to be provided in the near term by an other technology. We expect that the coverage will be roughly equivalent to the planned voice coverage of the existing CDMA network and trials have shown that data rates are maintained across that designed propagation area. CDMA2000 in its initial form—1xRTT—is a rapidly growing technology and even though it did not start deployment until late 2001 there are now 15 operators in seven countries and 10 million users, and the number of users is growing at over 1½ million a month.

Wireless LAN technologies can be appropriate for some situations but we do not believe that they are particularly suitable for wide area coverage. Globally they are recognised as having a major role in filling hotspots, where users are largely stationary and unable to use broadband capabilities, such as users with lap tops in airport lounges or coffee shops. In the future we will see automatic roaming between 3G networks and these 802.11 networks so users can seamlessly move from one to the other.

In our submission we did not comment about the regulatory aspects at all, and I would like to turn to that briefly. We believe that regulation must be technology and user neutral otherwise there is a serious risk of creating anomalies, which will cause problems in the future. Whenever there are dividing lines in regulation that tends to distort investment decisions to exploit those dividing lines, so the particular investment strategy sits on one side or the other, depending on the advantages that provides. We believe that wireless LANs should be subject to some regulation, particularly in areas such as censorship, billing accuracy, law enforcement and deception et cetera, and should not be completely divorced from regulation. We also believe that spectrum should not be limited to not-for-profit networks for wireless LANs. As these mobile roaming capabilities between 3G networks and 802.11 networks become available it will be important that there are commercial providers providing these wireless LANs because they will put in place the necessary infrastructure to make this roaming happen. Otherwise Australia will have 3G networks which are different to the rest of the world where these features are likely to become standard. Thank you.

CHAIR—One of the aspects of our hearings yesterday in Adelaide was a discussion more about the services that would be provided by broadband rather than the technologies. I know that Nortel's expertise is in the technologies, but one of the things that the inquiry has not really delved into deeply is the demand for the services. Has Nortel done any work or research or have any views on what sort of demand there would be for the services that could be provided by wireless broadband and which services would be the most likely to be taken up and used?

Mr Inshaw—Our current view is that, from a services point of view, initially the services would be no different than what we can do today. A lot of the services will be dominated by email, web browsing type applications. Moving forward, and in particular with more of the 3G technologies, other services that are using location services will become available, and that is starting to happen already. Already there are people starting to develop applications based

around location based services. At the moment, the other types of services that we are seeing are more centred around mobile type applications such as multimedia messaging services, which is an extension of SMS. But for a fixed broadband type technology, it is our belief that it will be no different than other services that are being offered today—primarily Internet and email will be the key drivers.

CHAIR—One of the applications that we talked about yesterday with m.Net was the capacity for doctors to use a clinicians palm pilot type set-up, which allowed them to film the patient that they were dealing with at that particular time out in a remote location and go directly back to the hospital at, say, Whyalla or Port Augusta and talk to other specialists who were there about the problems with that particular patient, right on the spot in real time. That is, at the moment, a research project and it is not even a trial; it is just an attempt to see how it would work. I can see that as a very useful take-up of wireless broadband, but what are the cost inhibitions of something like that?

Dr King—Mr Chairman, can I just backtrack a bit. At the Wollongong R&D centre, where they are actually developing Nortel's global location based system—

CHAIR—Which centre?

Dr King—We have an R&D centre at Wollongong University. One of the applications they have been working on with the ambulance services is the ability to transmit data between moving ambulances and medical experts, particularly for burns patients at this stage. In the ambulances—there is a pilot going now, I think, or they have been demonstrating to the ambulance services—there will be a system with a camera on it so that photographs can be taken of the burns victim and transmitted to the hospital. For the people with serious burns, they can then make sure they are getting the right pre-hospital treatment and also that the right systems are in place at the hospital for the particular burns situation. That is one kind of application that we are working on at the moment. We are also demonstrating for rural communities how in auction systems for selling cattle that can be done using a PDA type device that is hooked to a 3G network.

CHAIR—Is it possible that, in the initial stages of these sorts of applications, the cost would be so prohibitive that only government will take up the services in the area of health and education and that it will take much longer for business to see that as a cost they would be happy to incur because of the benefits it will bring about? Or do you think that business will be ahead of these emergency applications?

Dr King—In terms of mobile data, rather than fixed, the pricing models we are seeing from overseas are, at this early stage, considerably more expensive than fixed. They are in the range of $A2 to $A5 per megabit so they are expensive, but it is very early days in the pricing of these technologies and we would expect to see considerable price falls in the future.

Mr HATTON—CDMA is using the 800 megahertz band, and you have suggested that this provides an integrated way of moving forward, because as CDMA develops its specifications, it will be backward compatible, so people will not have to buy new handsets. We had a suggestion previously from Lucent that the committee and government should look at opening up the 400

megahertz band to allow that to be used as well. Do you have any views on the utility of the 400 megahertz band over the 800 megahertz band?

Dr King—Firstly, Australia has almost the greatest amount of mobile phone spectrum in the world released. I think New Zealand might be the only other country which is getting near the total quantity of release. So Australia has an enormous amount of spectrum release, a large portion of which is not being used at this stage, and there is an issue about whether there is a need to release more spectrum. Secondly, there are a lot of users in that band. That current spectrum is used for taxis and all kinds of two-way radio systems, so there would be considerable cost and difficulty in relocating other users. Thirdly, that 450 megahertz band is not used very much overseas, and any systems deployed in that band would have very limited coverage and the ability for people to get handsets would be limited. There would be very few countries in the world which would have the same kind of platform. So, although that band was used for the Nordic Mobile Telephone System, it is not getting widespread coverage in the world. The main emphasis is going to be on bands at 800, 1,800, 1,900 and 2.1 megahertz.

Mr HATTON—From memory, their argument was that, because it was a longer wavelength, you get penetration, it would go further and, for rural and remote areas, there was some benefit in that. The other side of it was that there were a number of countries taking it up because they were trying to develop it for the Asian region and so on.

Mr Inshaw—At the moment, yes, you are right; that 400 megahertz is going to propagate further than 800 and 2.1. The benefit we see is leveraging off existing infrastructure that is already out there. The 800 megahertz system provides a fairly widespread coverage through Australia already, and the cost efficiencies of using existing infrastructure, we believe, is a big benefit of using 800 megahertz. I work throughout the region and I have not seen much demand throughout Asia for a CDMA 2000 at 450 megahertz.

Mr HATTON—But we already have dual band systems in operation currently and some triband systems as well. I think that is becoming more prevalent because people are travelling through different usage zones and so on.

Dr King—There are triband handsets and the existing CDMA as well. But the triband ones that exist for CDMA are 800, 1,800 and 1,900 handsets; they do not include 450. The networks for that will be very small, which means that the infrastructure will be more costly and handsets will come from a much smaller range of suppliers.

Mr HATTON—I am aware that 450 is not covered, but there is a triband facility—that is becoming more apparent—and their argument is that, if you bolt this longer wavelength stuff on, it could be incorporated. I will move on to a further point. In other evidence we have had, there is a suggestion that all the future 3G stuff is really CDMA. If you look at GPRS, GSM and UMTS it is essentially CDMA 200 technology anyway. Is that correct?

Mr Inshaw—UMTS uses CDMA technology, and it is quite similar to current CDMA network technologies that we have in Australia. There are a lot of similarities between CDMA2000 and UMTS. The main difference is that UMTS works over a wider spectrum—one channel uses five megahertz—as opposed to CDMA2000 which just uses 1.25 megahertz. The

frequency that the UMTS operates at is currently the 2.1 gigahertz spectrum whereas CDMA2000 covers 800 and 1,900 megahertz.

Mr HATTON—You have mentioned that in passing. What is the practical effect of that? Is what you are arguing that the 800 megahertz that is currently there for CDMA in the country can be bolted on—it has the benefit but it is a longer wavelength; you can get a further reach—and that UMTS and the other versions of the GSM stuff would primarily be in the cities and be developed on the basis of what is there already?

Mr Inshaw—Yes. Without really knowing exactly what all the operators' mind-sets are, our belief is that UMTS is not going to be cost effective to go out into the more remote parts of Australia. Certainly, to get the same footprint as the CDMA network there today you would require a considerable increase in base stations beyond what is there already.

Mr HATTON—Is that why we have two systems in Australia now—we have GSM in the cities and we have CDMA in the country because of that problem?

Mr Inshaw—That covers the propagation effects. There are also timing limitations that you have to take into account. Current implementations of UMTS have timing limitations around 35 to 40 kilometres, so they cannot be used beyond those distances from a cell site. CDMA2000 does offer the capability of a timing limitation up around the 200-kilometre mark. It is a combination of the lower frequency and the timing limitations being removed that makes CDMA2000 a more cost-effective solution for rural Australia.

Mr HATTON—3G promises a lot, and we have heard a lot about 3G, 4G and 5G. We are still on 2G or 2½G. Can you explain practically the differences in the technology from 2G or 2½G to 3G, where you get a video picture download in 2.1 seconds instead of 23 minutes and for a page on the Internet you wait one second instead of 30. What is the technical difference that is allowing that in 3G?

Mr Inshaw—We believe that GPRS is a 2.5G technology. The current 2G technologies are doing circuit switch data between 9.6 and 14.4 kilobits per second. With the first evolution of CDMA2000, which is the 1xRTT, we are getting up to 153 kilobits per second peak data rates. With UMTS, current implementations have 384 kilobits per second on the downlink and 64 kilobits on the uplink, as was said today. What enables that is the coding and the way that they use that 1.25 megahertz. Generically, CDMA sends one bit and uses many bits to represent that one bit. To get those high speeds, every one bit you send is represented by a smaller number of bits. By doing that you are enabling a lot more throughput to a user.

Mr HATTON—So it is more tightly written and the specifications are a bit tighter?

Dr King—GSM was developed in the eighties and CDMA2000 is a late 1990s-2000 technology. The main change has been the efficiency at which you can transmit bits of information through the spectrum. GSM requires lots of hertz to transmit one bit. With CDMA, and the development that is going forward, it is getting more and more efficient. Now we are starting to see 1 hertz equals 1 bit. Instead of having several hertz to carry a bit, we now see one. That has allowed the data rate to come up and hence web pages and so on can be loaded much faster.

Mr HATTON—I have a final question on this. Most of what we have heard has been about mobile phones with very small screens. In the future, they might be in colour. But to get those download times you can understand that with just the small screen resolution that you need. You are also suggesting this for use at home for user CDMA network. So you would use it for the computer at home. What is the effect on download times of using 3G for pictures that are much bigger than those you are going to have on a mobile phone? Therefore, you would need a much higher resolution than the one that you are going to have on a mobile phone. Are there problems in trying to provide for both of these usages?

Mr Inshaw—From the current technology in the trials that we have been doing in Australia and in the commercial deployments that are around the world, using 3G technology on a computer is just as relevant and can deliver reasonable performance. We have done video streaming of pictures that are coded at 98 kilobits per second. That is delivering a large picture—the streaming of a movie preview. We have seen those sorts of applications, and they have worked with good resolution. Typical average speeds that we will get with CDMA2000 will be around the 60 to 70 kilobits per second. So any application that can work well in those types of speeds will work, whether it is on a phone or on a PDA or a laptop.

Dr King—For a PC type full picture, there will be twice the rate most people get on normal dial up today.

Mr HATTON—So you will still be able to have large pictures, which they will want?

Dr King—Yes. In our submission, the web pages we quote are full-sized web pages rather than micro ones.

Mr PEARCE—In your submission, you say that CDMA2000 has unique abilities. It is not entirely clear to me: can you tell us precisely what you consider to be those key unique abilities of CDMA2000?

Dr King—CDMA2000 in the Australian context we see as having unique abilities mainly for two reasons. One is that it uses the 800 megahertz spectrum, which gives it good range. It depends very much on the geographic location, but ranges approaching 100 kilometres are possible when you have a tower on a very high mountain and the user is standing on a hill on the other side of a large plane. In some circumstances, you can get a very long range and that is a feature of that part of the radio frequency spectrum. When you go to UMTS, you are in a higher frequency band and you cannot get that type of range. There is also the timing issue that my colleague mentioned before. In fact, the timing stops UMTS going past 35, 40 kilometres anyway.

The other part of it is that Telstra has a CDMA network that today provides voice coverage that is more than twice that of GSM, and I think will approach three times that of GSM in the next year or so. With a relatively simple and not particularly costly upgrade to that network, that can be changed to have CDMA2000 capabilities across the entire coverage that it has today. That is why we see it as having a unique ability. If we attempted to do the same thing with UMTS, we would be largely constructing a new network with many more towers than we have today. And the ability to roll out 3G services that way across rural Australia would not be at all economic.

Mr PEARCE—From a technological viewpoint, the uniqueness, in your view, really only stems from the fact that it operates in 800 and it has that coverage in that range? The other point is the fact that it is existing infrastructure, per se. Is that right?

Mr McDiarmid—Yes, and the timing limitation.

Mr Inshaw—If you look at the typical average size cell site in rural Australia, which has a radius somewhere between 30 and 50 kilometres, the uniqueness is that we can provide capacity to deliver data services over that range of a cell site from a single location point. Obviously that infrastructure is there and the backhaul is there to get that transmission back through to the rest of the network.

Mr PEARCE—What is involved in the upgrade? Presumably there have to be some software and hardware. You talk about a relative cost. Can you tell us what would be involved?

Mr Inshaw—Yes. You need a new card in a base station—that is the hardware. You need some upgrades to a few cards back in the base station controller. There will be new cards required there. Then all that is required is a software upgrade. There is one other name that we need to add which is called a PDSN—packet data service node—which is the connectivity back into the rest of the IP.

Mr PEARCE—Is that a node?

Mr Inshaw—It is a box, effectively. It is called a packet data service node, and that is providing connectivity back into the IP. There is software, a card in each base station and initially the network will be using CDMA2000.

Mr TICEHURST—A point of explanation that was not coming through is the difference of range on CDMA, the GSM or UMTS. For some of the members here, the handset requires a signal to go from the handset to the cell and back again. That has to be received in a finite time. For the GSM, that equates to about 30 or 35 kilometres. With CDMA you really have line of sight providing your signal strength holds up. It is a bit like the AMPS, in that sense. If you have a decent antenna on AMPS, you can get a pretty long range. From my understanding, CDMA works the same. With the 3G and the CDMA2000, really what you are looking at there is just increasing bandwidth. If you look at data rate on CDMA now it is something like about 14k.

Dr King—Yes.

Mr TICEHURST—I have the advantage of using both CDMA and the old AMPS as well as now being on the GPRS. The limitation that I found with CDMA is that when you have a lot of concurrent users you can actually still have a set that will search for a signal, even though you are in a high signal area. How can you overcome this in a real situation where you might have long-range users, which is using that feature of CDMA? What about the number of users? If there are a lot of users on, does that affect the range capability?

Mr Inshaw—I will answer the last question first. When we design a CDMA network we design it based on a fully loaded condition. To have a fully loaded carrier in CDMA versus having

no load there is a coverage difference. In technical terms, that is a 3DB difference. We design a network based on all the link budgets that we use which have that 3DB loss already in there. It is possible, initially, when you roll out a CDMA network, and this is independent of the type of CDMA network—whether it is UMTS or CDMA2000—there may be some more fortuitous coverage beyond where the coverage will be when it is fully loaded. That represents about 3DB loss of coverage between no load and fully loaded.

Mr TICEHURST—In the rural situation, you will be looking at, say, fixed as well as mobile. If you have a fixed set-up you are obviously going to get better range than with a mobile. With graphics technology improving all the time you are really using less data to get the same quality in both still and movie type applications. You are looking at getting high throughput at long-range using existing technology which, I guess, is quite an advantage. Do you see CDMA as primarily regional and rural or are you looking at competing with GSM in the city areas?

Dr King—If we look around the world and into the future, CDMA is going to be used everywhere. In the Australian context, although it has coverage everywhere, I think from a consumer perspective it is much more important in rural areas because it has so much more rural coverage at this stage. Going forward it will be ubiquitous.

Mr Inshaw—There is no reason why CDMA will not work just as effectively in an urban suburban environment as other 3G technologies like UMTS.

Mr TICEHURST—Do you have the UMTS technology as well? Are you selling that?

Dr King—Yes, we are. In Europe we are supplying BT and Deutsche Telecom and quite a few big companies.

Ms GRIERSON—Unfortunately for me, you made the CDMA 2000 upgrade sound so simple that I wonder why Telstra perhaps has not done that already. Could you comment on that? Is it that simple? Is it very costly? What incentives would be needed to make sure that happened and what would be the cost sharing, would you imagine?

Mr Inshaw—I do not want to comment on why Telstra has or has not done the upgrade. In terms of our cost, I think we quoted from some research that we got from the CDMA developments group and the paper quoted around $US3 per population covered—that is not subscribed population. Those values would probably hold true for the infrastructure. Obviously, the operator has to do additional investment over that for all their back-office billing or the other requirements that they need to take care of. From an infrastructure point of view, yes, that $US3 per population covered seems to be a reasonable figure. In terms of the ease of the network upgrade, it is certainly a lot easier than rolling out a brand new network. All the site requirements are there and Nortel believes that a rollout could be done well within a six-month time frame.

Ms GRIERSON—What incentives do you think would be required to have that happen nationally? If the government was committed to providing that sort of access and service to rural and regional Australia, do you have any suggestions on what would be required?

Dr King—Usually these things come down to money, unfortunately, don't they?

Ms GRIERSON—Or competition.

Dr King—Telstra is in a unique position in that there is no competition to do this. They are the only carrier that has rural coverage in CDMA 800 megahertz. So the rural issue comes down to government talking to Telstra about what the business case for it is and what the hurdles are to making it a business case that is attractive to the Telstra board so that it approves the capital expenditure.

Ms GRIERSON—If that was the option used for rural and regional Australia, would that be a limited option or are you saying it is an unlimited option for the future in terms of access to new technology and high speeds?

Dr King—In relation to the CDMA 2000, the upgrade we are talking about is to a former CDMA 2000 called 1xRTT. That has a development path to CDMA 1xEV, evolution, which has much higher data speeds. This could be seen as the first step to providing increasingly higher data speeds to rural users.

Ms GRIERSON—Is it feasible to have a rural and regional option and different options for metropolitan areas? That has already happened really, hasn't it? Are there any problems with it?

Mr Inshaw—From a technology point of view there is no reason why you would need to. Obviously, when we are talking about CDMA 2000 there is no technological reason why you would need it differentiated there. With other technologies such as UMTS, I do not think the cost benefit is there and it will be too cost prohibitive to roll out as widely as CDMA 2000.

Mr CIOBO—I am interested in a couple of things. One is the evolution aspect that you have talked about with CDMA 2000, but I am also interested in knowing whether you have heard of the unwired trial that is taking place in Paddington in Sydney.

Dr King—Yes.

Mr CIOBO—They are utilising CDMA technology, aren't they, for that rollout?

Dr King—Yes. They are using a version of CDMA, which is optimised for fixed users and uses a different frequency band of 3.4 gigahertz.

Mr CIOBO—They currently get transmission rates of 10 megabits per second, with a view to taking it up to 54 megabits per second. When you say it is optimised for fixed point, how does roaming affect transmission rates? I am interested in the technology behind that and why you are saying there is a trade-off there.

Mr Inshaw—Additional signalling to do hand-offs between cells is required for a mobility network and, fundamentally, we need to take into account mobility as well as fixed. There are different, additional signalling requirements. The other limitation is that CDMA 2000 is an evolution of a 2G voice network, so we need to be backwards-compatible with that technology

to support those users. It is sort of evolutionary rather than revolutionary, whereas there are, obviously, options for new technologies to come in and use a completely different type of encoding scheme and possibly get better throughputs.

Mr CIOBO—You are saying that that is what Unwired is using.

Dr King—Yes. There are many forms of CDMA, and Unwired is using a different development operation.

Mr CIOBO—Is it feasible to get the mobility with that sort of throughput, or is it fairly limited? With the technology that you are using, is there—and I take it from your submission that there is—upward scalability in terms of constantly increasing the packet rate and—

Mr Inshaw—Currently, with the first step—1xRTT—the peak data ray is 153.6 kilobits per second. With the next evolution, which is called 1xEV Data Only, you require a dedicated data carrier. Also working in 800 megahertz and in the 1.25 megahertz's spectrum, that will provide peak data rates of 2.4 megabits per second. The average throughput per user would be lower than that, I would expect, in a commercially deployed network—maybe around 200 to 300 kilobits per second. Then the next step is 1xEV-DV, which is incorporating data and voice into the single 1.25 megahertz carrier. We expect that that would provide similar speeds as 1xEV-DO.

Mr CIOBO—If you go to the data and voice aspect of it, how many steps are there? You are saying that is basically the third step along but, in terms of the upgrade of the existing CDMA network—

Mr Inshaw—1xRTT supports voice and data. It provides voice benefits as well as data benefits. That happens with 1xRTT.

Mr CIOBO—Okay.

Mr Inshaw—There is 1xEV-DO, which is a data only service. Looking further out, basically, they are going to incorporate DO capabilities with voice services. If you were to do DO and you required voice, you would need a hybrid 1xRTT/EV-DO terminal. It would use the DO part of that terminal to do the data and the 1xRTT part of that terminal to do voice. You can also interwork between the two so, if you do not deploy DO everywhere, you can hand-down to 1xRTT and continue data sessions on 1xRTT.

Mr CIOBO—The acronyms are going over my head. I am interested in finding out what sort of rollout limitations there are on something like that other terminal that you are speaking about, which has a higher throughput in data and voice on a broad scale to get that higher throughput.

Mr Inshaw—The timing is one. Really, to go beyond this first step is probably a 2005 technology. To lay out the time lines, 1xRTT is commercially deployed today, so that is the first step. We then have the data only option, which is going into trial networks towards the end of this year in the US and which will be commercially available probably around the middle of next year. As for the evolution for data and voice, the long term that you are talking about—1xEV-DV—we believe is a 2005-type technology.

Mr CIOBO—My concern from a regulatory point of view—and maybe the market will drive this at the end of the day; I am not sure—is that if we push down that path and create incentives, as Ms Grierson perhaps mentioned, do we then simply have a bandaid measure that ties us for the next 18 to 24 months until we have new technology there, which needs to be rolled out again? I am getting some idea of the various stages involved so that we are not jumping headlong into something that, effectively, will provide a solution for only 18 to 24 months.

Dr King—Basically, the CDMA2000 family is different to the UMTS family in that it has the ability to evolve more slowly under the current infrastructure. We mentioned in the introduction that 15 carriers at the moment use this technology, including New Zealand. They are able to make that upgrade now. It gives them a business case to do the upgrade now; it gives them experience with handling data and users get more experience with handling data. As the data needs increase and users want more throughput and applications, they then have the ability to go to the next evolution of the product—for example, 1xEV in its various forms. It actually provides a very efficient way of rolling things forward each time rather than making a huge quantum leap with a very large capital investment in the first step. In terms of expenditure, although it could be anticipated that there would be further expenditure in the future, it actually provides the ability to do it in much smaller quanta, spread out over a longer period of time.

Mr Inshaw—And we would continue with all those evolutions. To use the current base stations, there would be similar card and software type upgrades as we go forward through each of these evolution stages.

Mr CIOBO—That is great—thanks.

Mr HATTON—With your help, we know that DO means 'data only' and DV means 'data and voice'. I am guessing that EV means 'evolution', but that might not be the case.

Mr Inshaw—It is.

Mr HATTON—Good. With those, it is 1x evolution to data only and 1x evolution to data and voice, which is the next step up. And 1xR is probably 'radio' but the TT, for the life of us, we have not get yet.

Mr Inshaw—We use it so generically that we have forgotten what the acronym means.

Dr King—I think it means 'radio transmission technology'.

Mr Inshaw—Yes, I think so.

Mr HATTON—That sounds good anyway; we will take that as read. I think we have been successful if we have got that far. I will take you to page 11—and this cruel, but I will do it—in the third paragraph, it says:

Although wireless LAN offers high data rates, it has a coverage link budget that is approximately 30-40dB—

I am guessing that that means decibels—

—worse than 3G cellular technologies limiting its application to isolated hot spots and in-building systems.

Does that mean that there is a problem in terms of the amount of noise generated by the wireless LAN and, therefore, there is greater interference because that is a higher decibel rating?

Mr Inshaw—So DV is a measurement of RF signal strength. It is a relative signal strength. That means that, with 3G cellular technologies, we have a fairly large path loss over the propagation of that signal from the transmit power to what is received at the mobile. Looking at the link budgets of wireless LAN type technologies, the path loss that you can tolerate—

Mr HATTON—What do you mean by 'link budget'?

Mr Inshaw—It is the amount of power that you transmit from the base station to what is the minimum power that you can receive at the terminal to support that radio link, and the amount of propagation loss that you can tolerate is a representation of the link budget requirement.

Mr CIOBO—Is that signal strength?

Mr Inshaw—Exactly. What we are saying here is that you can tolerate much less loss with a wireless LAN system than you can with 3G technology.

Mr HATTON—With that explained, I think we had a demo of one of the wireless LANs and, even in a room this big, having a computer over at the other end of the room, there seemed to be signal loss along the way, whereas with 3G you can go much further.

Dr King—So 3G is a combination. You have much more power at the transmitter, much more sensitive receivers at the transmitter, and higher gain ones, and also the ability to tolerate more loss in the transmission path between the transmitter and the user and back again.

Mr TICEHURST—You said you are doing some experiments with location based services. In the US now they have got a requirement for mobile phones to be located fairly accurately, I guess with on board GPS. With the CDMA location base you are using now, are you relying on time difference of arrival at various cell stations?

Dr King—To go back to the beginning, the Wollongong R&D centre is actually developing the location based systems for all our technologies: GSM, CDMA et cetera. That has been sold to seven customers in the US and Canada now to meet the FCC and the Canadian regulator requirements in terms of accuracy. So it depends a bit on what is available. If the consumer has a new terminal with a GPS receiver in it then they can get much more accurate location than they can if they do not. If they do not, they can use a combination of techniques, including time lags where it can be seen from multiple cell sites with triangulation and so on to refine the accuracy. It is a combination.

CHAIR—As there are no further questions, I thank Nortel for appearing before us today.

[10.31 a.m.]

O'Shannassy, Mr Bernard Thomas, Director Telecommunications Government Relations, Motorola Australia Pty Ltd

CHAIR—On behalf of the committee, I welcome Mr Bernard O'Shannassy of Motorola. The committee does not require you to give evidence under oath but I should advise you that the hearings are legal hearings of the parliament and warrant the same respect as proceedings of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. I will ask you to give an opening statement and we will then ask you questions. Thank you for being so kind as to not be upset that you are giving evidence after Nortel.

Mr O'Shannassy—We are on very good terms with Nortel, so that gives us no problems. I am pleased to be able to assist the committee in any way that I can. I will not go into our paper in detail but I will make one or two opening remarks. As you are no doubt aware, Motorola is a large international company with technologies that embrace many aspects of the things that this broadband inquiry will be looking at. We have a great deal of experience in both research and development, in marketing, and in the implementation of technologies and products that are of interest to this committee. We feel that we would like to have our say, and hope that we can be of assistance to you.

I have dealt with the terms of reference in a fairly broad way. After listening to the questions and to the answers of my friends from Nortel, I do not think I would be able to answer some of the questions that you put to them in that degree of detail. I do not have that degree of familiarity with the product right down to that level. My view of this subject is from rather higher up and is broader—looking at trends, making broad comparisons of technologies, and so on. If I can assist you on those sorts of things, I would be only too happy to do so.

On page 5 of my paper, there is a summary of the points that I have made therein. I will run through those, and that will possibly indicate the sorts of ways in which I can help you. Firstly, in the area of broadband, there is clearly no one technology that does it all and a choice must be made for each situation. We then say that in regulating wireless broadband services, the existing Radiocommunications Act and Telecommunications Act should not just be used as they are without due consideration to the fact that technologies are changing. Those acts were made before many of these technologies were even dreamt of.

Related to that is the next recommendation, that we believe that regulatory provisions should be applied as lightly as possible; we do not believe that they should be applied with a heavy hand. We also say in the area of regulations that we expect to see wide variations in demand for various types of broadband technologies and services. The take-up rates can be all over the place. This is to be expected and must be allowed for in any regulatory sense.

One of the other points that we make is that, in regard to the standards and the technology used, Australia historically has always taken technology from the United States and North American sources, from European sources and to some extent from Japan. The classic example

is the original arrangement whereby we had AMPS, which is essentially North American technology, and GSM, which is European technology. This is very healthy from the point of view of competition, but it does introduce problems of standards and clashes of interference and so on when these things coexist. However, we believe that, on balance, it is better to take equipment and to use technologies from all around the world and to sort out the problems of keeping the two coexisting rather than just taking one or the other.

As always, we say that the regulators in the area of wireless broadband should consult extensively with industry. That is perhaps more important than ever before because of the intensely complex nature of the technologies and the fast pace at which they are moving. Lastly, we say that wireless broadband should be introduced in a framework of technology neutrality. That summarises the broad overview that I took of the subject and I do not have anything more to say at this point.

CHAIR—Thank you. In your submission, you talk about the Telecommunications Act and Radiocommunications Act and you say that some of the applications in the act do not apply to wireless or that they treat wireless differently to wireline. Other people who have appeared before us have said similar things. In fact, the ACA says that they think there is a bias in the act against wireless and in favour of wireline, which is probably more a feature of rapidly changing technology than any deliberate strategy. Would you like to comment on the suggestion that the act is biased against wireless and in which case, if you think so, how you see it as biased against wireless?

Mr O'Shannassy—I assume that when you say 'the act' that it must be the Telecommunications Act and not the Radiocommunications Act. The Telecommunications Act has a much longer history. It had its basis in telegraphy, originally. It has attempted to regulate and deal with problems that pertain to the use of that sort of technology: where you are going across property boundaries with wires, where you are going long distances, and where you can control where the signals go by virtue of where you place your wires or cables. When you start to use radiocommunications technology, you have only limited control over where the signal can go. You certainly cannot make it stop abruptly at a property boundary. I think that is the fundamental reason why there are difficulties—the fact that the radio signals just keep going and you cannot stop them abruptly and make them behave in the way that you can with wires and cables. When you get down to the nuts and bolts of it, you tend to see this in small ways, but I would be hard put to produce an instance from memory right now.

CHAIR—A witness that appeared before us yesterday talked about the 500-metre rule. Are you familiar with this rule in the act?

Mr O'Shannassy—No, I am not. My knowledge of the Telecommunications Act 1997 is not as good as my knowledge for the Radiocommunications Act 1992.

CHAIR—He talked about it with great conviction, so I did not wish to ask him exactly what it was that he was talking about. I was in a state of some confusion and I thought you might be able to clear it up today.

Mr O'Shannassy—No, I am sorry I cannot help you on that one.

Mr HATTON—We will keep trying!

CHAIR—We will ask the next person and see if they will help us. Alcatel have suggested that in assisting the ACA an industry body that was particularly wireless broadband technology specific, a consultative industry group, would be of assistance. Would you agree with Alcatel in that suggestion?

Mr O'Shannassy—I think it would be a very good idea in the implementation of this area to consult with industry. I have been involved with and chaired numerous groups in the radiocommunications area where this has been done and I would have no hesitation in saying this has always resulted in a better outcome. You can feel, at the end of the day, when you achieve consensus that the result is well worth it. I would certainly recommend that.

CHAIR—The impression we got from the ACA in Canberra was that they were very keen to work with industry and that they had a very open mind about how to make this area work successfully. Is that the impression of Motorola, or do you see any hurdles with respect to the relationship between industry and the ACA?

Mr O'Shannassy—I do not think so. In addition to my position with Motorola, I have been for many years chairman of the Wireless Technology Forum, which is an industry group specifically put together with the object of working with the ACA. We have had a lot of influence on the implementation of the Radiocommunications Act 1992 and the associated regulations. We find working in the radiocommunications area with the ACA to be well worth the effort we have put into it as an industry.

Mr HATTON—Your submission is neatly argued and it even gives us recommendations to run with, which should help us when we get to the writing-up stage. I think you have a wonderful sense of understatement on page 4 when you are talking about general comments on take-up by households and businesses. You say:

> It could hardly be said that in either area is there a danger of the market getting out of control.

It is not only wonderfully understated but also true. What has become very evident is that broadband take-up has been extremely slow and that there is a competitive cost that Australia is probably paying because of this. Do you think that the efflorescence of approaches in the wireless area might help us to bridge the gap that is there already and provide that impetus, or do you think more likely it is a cost problem that prevents people from taking up these services?

Mr O'Shannassy—I would imagine there are a lot of people in my industry who will not agree with what I am about to say. I am speaking here more as an individual. I do not have any significant use of broadband services in my home because I have not felt the need. This is a problem that the industry has to deal with. There has been a huge uptake in cellular phones. People love their cellular phones and cannot do without them to the point where sometimes that is almost a nuisance. Likewise with email: those of us who have children overseas or relations interstate find on a personal level that email is a godsend. Those fields are two examples where technology has mushroomed.

Then you look at some of the broadband technologies that we talk about—perhaps iMode in Japan, which has mushroomed. I suspect that iMode will never mushroom in Australia because it just does not appeal to Australian people. It has a fiddly little handset and a little screen. I do not know what comes out of it, but it just does not appeal. That is what I was referring to. I do not see anything suddenly popping up there that is going to cause a huge demand and allow a snowball effect to develop. If demand gets there, not only is there demand for that product but the demand tends to drag other products along with it. So other services benefit as a result of the introduction of a new catch-on service.

Mr HATTON—That is an underlying problem that we have come across. The expectation is great that we are on the edge of a new frontier, but the evidence so far is that, although that frontier is unexplored, there may not be many people willing to explore it. As you have pointed out, that may be because they do not see the necessity for those services yet; they are not compelling enough.

Mr O'Shannassy—Exactly.

Mr HATTON—Part of the problem is the expectation to do with the direct broadcast services we have now. Only a certain proportion of the population have taken up pay TV, and it could be the same with a lot of the services proffered. We will only find out over time, I suppose. In more specific terms, on page 3 of your submission you refer to RLANs 'for short-range data or data and voice communications'. Am I correct in saying that they use 802.11 and are thus in the public arena?

Mr O'Shannassy—Yes.

Mr HATTON—That area could be greatly overused because it is free. The evidence we have had so far is that there is a lot of expectation that that could rapidly fill up, leading to a great deal of interference between users. Why is Motorola looking at that in particular?

Mr O'Shannassy—Motorola is essentially an equipment supplier; we are not so much a supplier of services—although we are doing that in various parts of the world, including Australia. But essentially we are an equipment supplier, or a supplier of semiconductors for equipment, and a supplier of software for the equipment and the semiconductors. So we tend to focus on equipment and technologies rather more than, say, Nortel—a previous witness from Nortel spoke more about the provision of large systems and services.

We put a lot of effort into the regulatory area for 2.4 gigahertz and 5 gigahertz because we can see the benefits of having an unlicensed market—'unlicensed' is a term that is used more around the world; in Australia we use 'class licensing' for the radio systems for these two bands. They enable the very rapid deployment of new equipment, but if you go on cramming more and more users into the same bandwidth, ultimately something has to give. If you are sitting in a coffee shop using a computer with an 802.11 system and typing away quite happily, and someone else comes in, sits down beside you and does the same thing, it works. If you get more and more people coming into the coffee shop, you might find that your throughput rate will drop. You can either live with that or decide to move closer to the transmitter and get an advantage over those further away. It is that sort of situation. The thing does not suddenly

collapse and stop working; people get slower and slower service and have to move closer and closer to the centre of the service to continue using it.

I think that will particularly be the case with Bluetooth. Bluetooth is a technology that has enormous potential, but I think some people expect too much out of Bluetooth. They want to extend its range and they feel that they can run all sorts of Bluetooth services together at once. They will find that they will not be able to do that when they get a lot of users and will find that they have to move closer to the other service they are communicating with and maybe accept a slower throughput rate. I do not know whether I have answered the question that you asked. It is that balance between range, distance and the number of users that I was trying to get across.

Mr HATTON—I understand that point. You also made the point that Motorola is not generally in the business of providing specific products or services. But it has in the past been party to some satellite provision, which struck a few problems.

Mr O'Shannassy—Yes.

Mr HATTON—But it also has Canopy, which is a product that they are specifically selling. Can you tell us a bit more about that product?

Mr O'Shannassy—Canopy is a technology that we are only just introducing to the market. It is a wireless LAN technology. It comes in a couple of different versions. One version is for short range. It is more like an 802.11 type of classical short-range 802.11 use—the coffee shop type of use. It works in the 5 gigahertz class licence span. It can be nicely deployed for, say, an outdoor situation like a small village or a small country town. It would be very good in a situation where you are relatively isolated from the rest of the world and there is a need to provide a service. To my knowledge—and this system is so new that I am not terribly familiar with it—if it were to be deployed in a very busy CBD I think it would probably break down. It is not meant for that; it is more for the outlying urban, suburban and rural areas or in an enclosed space like a room where it does not have to compete with a lot of other services. It is specifically designed to operate in what the US called 'unlicensed bands' and we call 'class licence bands', so that it can be deployed quickly without having to go through the process of getting the system coordinated with other users.

Mr HATTON—One of your last points is that it is important that an approach to this should be technology neutral and you say that the government should have a very light regulatory hand. But, given the variety of evidence that has come before us so far, and even just given the argument that Nortel put in terms of the superiority of CDMA2000 versus the WLAN sort of approach, is there a potential problem, seeing that we have so different possibilities to choose from, that we will get too many and the mix will be too great and it will not be an integrated enough system, that it could be too fragmented and therefore not work properly?

Mr O'Shannassy—I think there would be a problem if there are so many competitors that, instead of having a nice clean race, it just becomes a bunfight. On the other hand, if you select one and back it, you may well back the wrong horse. Then we could find that Australia falls behind because we have chosen a technology that the rest of the world discards or does not use with the same degree of vigour. It is a difficult problem. That is why I have said that you have to approach the problem cautiously. By approaching it cautiously, not regulating with a heavy

hand, and consulting the industry, you have the best chance of picking out of that very difficult problem a solution that works well for Australia. It is a philosophical answer to a philosophical problem.

Mr TICEHURST—It seems you have a foot in all camps with chips for all applications and making a bit of hardware and software. I have a question on Canopy. Do you see an application for that where you might be able to use it to essentially retransmit pay TV in an apartment situation?

Mr O'Shannassy—I am trying to recollect the details of the system. Yes, it could do that. Of course, if it is pay TV then possibly the content provider may not be too happy to see it retransmitted unless he has some say in it. The point of Canopy is that it is an unlicensed or class licence user, so you to not have recourse to government records. You just put in the system and it works, just like Bluetooth or 802.11. Does that answer the question?

Mr TICEHURST—Yes, it does. Apartment buildings seem to have a problem with pay TV—the covering difficulties.

Mr O'Shannassy—There is a problem, though, that at the frequencies it uses you would not penetrate walls and floors very easily. If you had a high building, I do not think it would be appropriate. It is more appropriate for a scattered hamlet or village or the open air stuff.

Mr CIOBO—Canopy operates at which spectrum?

Mr O'Shannassy—At 5.7 gigahertz.

Mr CIOBO—It adopts an 802.11 standard, does it?

Mr O'Shannassy—Yes, it is one of those standards.

Mr CIOBO—We have had submissions that have stipulated that 802.11 should be limited to indoor use only. I take it Motorola would stand opposed to that.

Mr O'Shannassy—Yes, we would, in principle.

Mr CIOBO—The argument has been put to this committee that 802.11's purpose should be confined to indoor use only, because of the extent of its propensity to be subject to interference. If you are saying, 'Okay, we would recommend that the regulatory regime should not confine it to indoor use only, rather it should be allowed to be broadcast on a certain level,' from your point of view, would that involve amplification of the signal so that it is not as prone to interference?

Mr O'Shannassy—First of all, in the five gigahertz band, there is provision in the present ACA regulations for part indoor use and part outdoor use. With outdoor use you can have a higher level of power, which enables you to achieve greater distances. That is are very sensible arrangement. If you were to confine it to indoor use, for instance, it would prevent the use of Canopy, as I said, in a small rural community, which would be a very good way to distribute the

signal and rapidly set up a system and run it at a relatively low cost to distribute signals around the village or town. If you had a restriction which said you were not to use this sort of stuff except indoors, then you would not be able to do that.

If you are out in the rural areas, there is no great interference problem. There are not a lot of other users that you would have to worry about, so that would just be an unfortunate consequence of having that rule. However, in the city, it makes more sense. The whole point of this 802.11 use is it has no interference protection. You are not guaranteed that you will get a service. You have to put up with the interference. You are supposed to not cause the interference by observing the rules. It is just like walking down the street: you do not just put your head down and go straight ahead and bump into people. Each user takes minor action to avoid having a collision, and it works. It is another form of that in a more technological area.

Mr CIOBO—So you would seek to have attached to the regulatory framework, for example, power caps on the signal strength—that is the terminology I will use; I am sure you know what I mean—and then also caps in relation to degrees of interference. So you would then differentiate between areas of low likelihood of interference versus areas of a higher likelihood, and more often than not that may be based on population density and those types of things.

Mr O'Shannassy—That is right. I could imagine a different set of rules for the country to the city.

Mr CIOBO—We have also had submissions before this committee that we should establish a database, so to speak, of people who are broadcasting in those frequencies. I take it you would see there to be a coordinating role for the regulator when it comes to these public bands?

Mr O'Shannassy—The point of the unlicensed band is that there is no coordination. You start using it and put up with the consequences or take avoiding action if you find something there that you did not expect. You try to solve the problem yourself. On the other hand, if you are trying to span large distances where there are a lot of other users with a lot of information, I think you have to coordinate that. Striking the balance between when to coordinate and when not to coordinate is the ACA's role. Their role is to take into account all the evidence they can, consult with the users and with industry and make a decision about where to coordinate and where not to coordinate. If you were to try to build that into the legislation, I think you would fall on your face very quickly. It is something for the regulator to do. I see it very much as being their task to strike that balance.

Mr CIOBO—Wouldn't it be fairly reasonable to foresee that you could have a situation where at the outset a particular town need not be coordinated but over time, as there is an increase in the number of users in that part of the spectrum, there would subsequently be a need to coordinate the service? I gather from your initial statement that Motorola would be quite happy for there to be an uncoordinated use of that part of the spectrum and if that means you are getting interference, the company or the individual would take whatever steps are required to try to overcome that interference.

Mr O'Shannassy—I think what you are saying is that ultimately it must reach a point of saturation where there is such intense use of the spectrum that avoiding interference becomes almost impossible or you have to severely disrupt the service or cut it back. If that happens, you

have to go to a coordinated part of the spectrum, pay more for the privilege of using the spectrum, take out a full licence and do the job in that way, but at greater cost.

Mr CIOBO—I take it from what you have said that you see no need for there to be coordination of that part of the spectrum, though?

Mr O'Shannassy—No; I am saying that there are benefits to the community by having some parts of the spectrum uncoordinated. For example, we have our CB bands for UHF users. But there are also benefits from having, and there is a need to have, other parts of the spectrum that are coordinated and that operate under strict rules. Users make the choice. That is the point: you need both.

Mr CIOBO—But Motorola obviously see a business case for operating in that part of the spectrum.

Mr O'Shannassy—Yes. We are saying that, in the present amount of spectrum and with the present density of users around the place, it makes good business sense to deploy systems to take advantage of that unlicensed or class licence spectrum and to build up a business on that basis. We make the technical judgment that the interference over the lifetime of the system will be manageable. We make the call. If interference builds up, the customer will become dissatisfied with us and we will suffer the consequences.

Mr CIOBO—I find that interesting. I am not disagreeing with you, but I think it is fair to say that most submissions to this committee up to this point, on the basis of what you have said, have tended to overstate the level of interference. I find it interesting that, from a commercial point of view, you feel that it is manageable.

Mr O'Shannassy—If you are in the business of providing a voice service—such as an ordinary telephone service—over this sort of technology, the problem is that the expectation of the users is that they will get copper wire reliability and performance. If you are charging the same sort of money as you would for a copper wire service and you are putting it over an 802.11 link, I think you are putting your head in a commercial noose. That is not the intent. Again, if someone wants to make that business decision, let them, but I think they might regret it.

Mr JOHNSON—I am interested in your comments on the industry's interaction with government. Being a global company, can you give me some idea of the extent of Motorola's submissions on, support of or involvement with regulatory frameworks elsewhere?

Mr O'Shannassy—Motorola has always regarded the use of the radiofrequency spectrum as being something that has to be very carefully managed and worked out all around the world with governments. We put a lot of effort into ITU. I belong to a team in the Asia-Pacific region; in fact, only last weekend we had a meeting of the regional people, my peers—there are nine of us—for the Asia-Pacific region. In the Europe, Middle East and Africa region there is probably a similar number of people and in the US, North and South America probably three times that number. So, overall, I would think the team of people dealing with just these sort of issues, that Motorola dedicates to the task, would be in the order of 100 to 150 people around the world. We take it very seriously.

Mr JOHNSON—Right. Are there some markets where the emphasis or involvement is perhaps heavier than others?

Mr O'Shannassy—The US is the classic example.

Mr JOHNSON—I am particularly keen on the Asia-Pacific region compared to, say, Europe.

Mr O'Shannassy—In the Asia-Pacific region, certainly Australia is regarded as a role model of how to regulate both telecoms and radiocoms. A large part of my work is in giving advice to my peers in the region on how they should approach their governments on general principles and on particular issues, based on my experience with Australia. I am not sure I am answering the question.

Mr JOHNSON—No, that is fine. Thank you.

Mr HATTON—Mr O'Shannassy, on page 7 is the table you provided—'Characteristics of broadband technologies'. I am grateful to you because, in the past, we have had mention of various iterations of 802.11. You have mentioned A and B and we have heard of G and L and so on. But there is one sort of subspecies that has not come to our attention so far and that is 802.16, part of the wide area matrix. This is interesting because, whereas the others are down in the small number of metres, from five to 40 and so on, this looks like it will run in the several kilometres range, operating in the 10 to 66 gigahertz band, and with a very high data rate—more than 120 megabits per second—and coming soon. Could you tell us about this?

Mr O'Shannassy—Oh dear! Let me explain how I put this table together. After I had written the submission, I felt that a table like this was the obvious way to try and summarise and put it all together. That is the unfortunate consequence of being an engineer: you just cannot live without tables, so if you could not get it into a table it did not make sense. I did not have a great deal of difficulty with the short range ones, but seeing that I had mentioned wireless local loop I felt obliged to have a go at the wide area ones. I took some advice from a contemporary in the US and at the last minute we put this table together and 802.16 crept into the table, and I know nothing about it. I know it exists. I know about as much as it says there, that it is new, it is upcoming and that it is for high data rates and, consequently, needs quite an amount of bandwidth. I know little more than that. I could possibly find out more and advise the committee.

Mr HATTON—If it is possible for you to find out a bit more and extract it from your associates, we would appreciate that. Otherwise, I am sure I will keep this little bit and antagonise other people as they come along.

CHAIR—You can ask them about that and I will ask them about the 500-metre rule. I have a question on community networks. Does Motorola have an attitude towards community operators operating in a small area regardless of their connectivity to others, interference issues and commercial issues?

Mr O'Shannassy—I do not see this as a great problem—in the radiocommunications bands we have always been very supportive of things like CB. Motorola has been instrumental in getting instituted the family radio service in the US—an uncoordinated service, like our CB. So our

history is that we have supported and encouraged the community to try to go it alone and set up these services. I do not think there is anything in our history to suggest that they get wildly out of control so that we regret it. Generally, the experience is that, after using services like CB, people discover its limitations, and if those limitations affect them they go on to a more serious licensed product and pay more money for it and extract more value. That scenario has been repeated over a number of years, so I do not think we would have any difficulty with that.

CHAIR—Some of the people who have given us evidence say that there is the potential for this unlicensed spectrum to become so jammed with people operating in it that they kill the goose that laid the golden egg, which is why groups like Unwired purchased their own part of the spectrum so they would not have those sorts of issues. But obviously Motorola is not concerned about that?

Mr O'Shannassy—What we are saying is there need to be rules and there needs to be an allocation. If you have got an allocation of unlicensed spectrum that people can use, and you have the licensed spectrum that operates through a more stringent set of rules under the coordination of the ACA and licence fees are paid, then it looks after itself. As the unlicensed area becomes busier and busier and there is more and more interference, those that really care about it move out of that spectrum and pay more for the service that they need. Those that do not care put up with it, so it looks after itself. CB radio is a classic example of that.

CHAIR—So you are basically saying that there is an unlicensed spectrum that anybody can use, and it would be wrong for government or ACA to say that, because there are these well-established people now using the unlicensed spectrum, the government should step in and do something about dividing it up and putting in rules and regulations. You say that it is more for the people who are coming in and trying to use it for things that it was not intended for to beware, and that if that is the problem they should move out and buy some other spectrum in the future.

Mr O'Shannassy—I think you need to write the rules carefully. If you write the rules properly, the situation is self-healing. Again, I will go back to CB as a good example of that: we have had instances where someone has elected to use CB on a building site between the crane driver and the man on the ground. That is absolute insanity. To rely on a band where there can be sudden interference and you have no recourse in such a life-threatening situation is silly. You do not fix that by going to the Radiocommuncations Act; that is done elsewhere. CB is a very good solution for people in rural areas, where the population density is low, they can communicate using a common band, and it is a great success which costs them little. If you go into the city, you could not run a courier business on CB—you would have too much interference. There is nothing about broadband usage that would say you could not repeat the same sort of experience.

CHAIR—Thank you very much, Mr O'Shannassy.

[11.24 a.m.]

CLUGG, Mr Tyson, Treasurer, Melbourne Wireless Inc.

DREIS, Mr Darren Sean, Vice President, Melbourne Wireless Inc.

HAIGH, Mr Steven Mark, President, Melbourne Wireless Inc.

POLLOCK, Mr James, Member, Melbourne Wireless Inc.

CHAIR—I welcome the representatives from Melbourne Wireless Inc. to the hearings today. Thank you for attending this morning and for filling in for the company that could not turn up at the last minute. Do you have an opening statement you wish to make?

Mr Haigh—Yes.

CHAIR—Before you make your opening statement, I should let you know that, although the committee does not require you to give evidence under oath, the hearings are legal proceedings of the parliament and warrant the same respect as proceedings of the House, so the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament.

Mr Haigh—We would like to start off by saying a couple of things regarding the current broadband market. As you mentioned before, broadband uptake has not been what we expected, but it is being slowly taken up. We believe that is mainly because of all the limitations placed on the market by the ISPs. These limitations are along the lines of speed restrictions; transfer caps—meaning you can transfer only so many megabytes per month; cost; value for money; availability—Darren, for example, cannot get broadband where he is at the moment; and the fact that the current plans that the current providers have are not what the consumers actually want from broadband.

You also made reference to the 802.11, and I noticed that the matter of interference was mentioned quite a lot. When the 802.11 equipment was designed, it was designed to incorporate and still operate with all these different devices. Garage door openers, cordless phones and TV transmitters all operate in that ISM band which is shared with 802.11 equipment. The 802.11 was designed with that in mind. It actually uses spread spectrum, which means that it hops around the centre of the channel in use to basically eliminate any interference. You actually get a lot more interference from old faulty microwaves than you do from other stations that are nearby.

With respect to a question that you asked earlier about whether 802.11 should be restricted to indoor use only, we actually believe that the ways the channels are laid out with the current licensing, you are limited up to four watts ERP output power on, I think, the first 11 channels and the top two channels are limited to 200 milliwatts, so there is a lot less power. It is designed to be used indoors wherever possible simply because you do not have signal emitting out of your premises there is less interference to be caused.

Regarding commercial operations in the ISM band, we do not believe that it would be viable for a lot of companies to set up 802.11 equipment. That simply comes down to the fact that, at the end of the day, it is an unlicensed spectrum, which means that it is very hard to guarantee a quality of service or even guarantee that the network will not drop out when someone fires up their cordless phone or microwave, which is the nature of the ISM band.

We acknowledge that this broadband inquiry is not just into 802.11 technologies and that there are also things like 3G and what was mentioned before by Motorola, but we are mainly focusing on the 802.11 side of things because, as a group, we mainly represent the consumers in these things. We believe that, for what we want to do, there is a lot more promise in the 802.11 band than anywhere else.

We started about 18 months ago. Melbourne Wireless actually started up under the name Melbourne Digital and Wireless, which got chopped down because it was a bit too long to type. We have grown to include over 500 registered individuals at the moment who have put their details into our system, basically saying, 'Here I am; if anyone in our area wants to link up, this is my location, this is the equipment I am using.' They also have an email address listed saying, 'This is how you can contact me if you wish to hook up to us.' We have a varied skill base among our members. We have network designers, RF experts, someone who designed an antenna that we can use at 2.4 gig, a lot of amateur radio operators who are good with the RF side of things, and people who work for Telstra in their routing side who are looking at how we can make this network work.

We believe that there is not a great deal we cannot achieve as a group. At the end of the day, we exist because people are not happy with what is currently available in broadband. One thing I suppose that makes us a lot different from the other commercial people you have seen is that we do not want to make money out of this. We are doing it because we can see a need for broadband that cannot at the moment be fulfilled and we intend to fill that gap. Under the current telecommunications law, depending on definition and how you want to read it, we may be allowed to operate or we may be ruled as illegal by the existing law. It all depends on interpretation and, to be honest, we would rather not wait until a court case to find out which side of the line we would be on.

The objectives that we have put in our submission are in regard to the Telecommunications Act 1997. We do believe there are very admirable goals set out in the act, but, due to the fact that we could be ruled as either legal or illegal depending on which way you interpret the act, at the moment it rules us out from actually trying to achieve the goals in the act, and that is something we would like to have rectified.

CHAIR—Thank you. You have raised a few issues there. You said that wireless broadband was not being taken up with great alacrity because you felt it was not offering what consumers want.

Mr Haigh—Sorry, I meant wired broadband.

CHAIR—Okay, wired broadband. What do you think consumers do want out of this technology?

Mr Haigh—I will give you an example. I am an Optus subscriber at home at the moment. Their Netstat system allowed you to download up to 10 times the amount of the average user. They took their entire user base, performed a calculation—I think they took off the top five per cent and the bottom five per cent and averaged it out—and in one day you could download up to 10 times what the average person was downloading. In their current changes they have gone down the lines of Telstra, unfortunately. They have said, 'For X dollars you can get three gigabytes per month; after that we're going to restrict to slower than a dial-up account,' which is not really within the spirit of broadband. They also limit your upstream data transfer, so if I want to send some photos to my friend in the next suburb it takes a lot longer than it should do with broadband because they have placed the upload cap on that. There are a lot of other restrictions that we believe the consumers do not really want.

Mr Clugg—Simple things that we would expect to be able to do with the broadband technology have been limited in use because of the restrictions put in place by the providers. For example, if I wanted to watch Wayne Gretzky's play of the day on the National Hockey League site—that is in video format and you see full screen video on your computer of the ice hockey or whatever else—I was not able to do that on my Telstra broadband cable connection because the speed was not there. Another example is being able to listen to Internet radio. Due to the restrictions on how much I can download per month, I am not able to listen to my favourite music from a foreign web site that is operating perfectly within legal bounds. Unfortunately, due to these restrictions, I cannot listen to this sort of thing; I am restricted to the technologies that are available from other means. Broadband is not providing solutions to these problems that I would like to see addressed.

CHAIR—You raised the legality of your existence under the Telecommunications Act. Could you expand on what you meant by that? What aspects of the act do you think put your existence at risk, and why should the government be concerned about that?

Mr Pollock—I turn to section 3.4 on page 13.

CHAIR—Is that page 13 of your submission or of the act?

Mr Pollock—That is page 13 of our submission. I think it covers that fairly well. We may be legal or we may not be legal; depending upon which way you read the legislation, you can come up with both views. In relation to section 28(1) of the Telecommunications Act 1997, our submission says:

> On the other hand pursuit of Melbourne Wireless's aims may be illegal since the establishment of a wireless network would appear to constitute a "designated radiocommunications facility" and under Section 28(1) of the Telecommunications Act 1997 would be considered a "network unit."
>
> Under Section 42 of the Telecommunications Act 1997, a network unit cannot be used to supply a carriage service to the public unless the owner of the network holds a carrier licence.

So it would appear that, since we do not have a carrier licence, what we want to do may be illegal. On the other hand, if you read section 34(3), it says:

> … a network is an *exempt network* if:
>
> (a) the network is used, or for use, for the sole purpose of supplying carriage services on a non-commercial basis …

Basically, we do not know where we stand.

CHAIR—You would probably be an exempt network, on the basis of that.

Mr Pollock—Yes, but does section 34 apply to the entire act or just this small area? We do not know, and that is where the confusion arises. We want to be legal; we want to operate inside the law.

CHAIR—I know what Mr Hatton is going to say about this. The ACA have been looking at these discrepancies and trying to make clear what is meant by these definitions in the Telecommunications Act. They have made some statements on this recently. Have you caught up with their most recent comments on it?

Mr Pollock—Personally, I have not; no. I have read in the newspapers that the ACA is looking at this problem of definition and legality. But personally, I have not caught up with it.

CHAIR—Of course, the intention is for this band not to be licensed and not to be overly regulated.

Mr Pollock—I think that the intention, as set out in the objects of the 1997 act, is very clear. The only trouble is that the rest of the act seems to totally go against the objects as stated.

CHAIR—It always depends on what you want the endgame to be. So, of course, if you want it to be open, you should read it in an open way; if you want it to be closed, you should read it in a closed way.

Mr Pollock—But it is not a case of the way we would like to read it; it is a case of what the law is and what is legal.

CHAIR—That is always open to interpretation, sir.

Mr Pollock—I suppose we could set up and wait for something to happen, but we do not have the funds to fight a legal battle.

Mr HATTON—I was going to suggest that, even though it might be illegal in this sense, the chair might offer his services pro bono to the group to sort it out. But, given what he has just said, I do not think that will be much help in this instance. Given that you are in Melbourne when Gareth Evans is in town, you might be able to have a bit of a talk to him, but the other alternative is to pull in some legal people who are interested in wireless broadband. Further, there is what the chair alluded to with the ACA.

When we had our first hearings in Sydney, there was a group very similar to yours operating in Sydney with the same kinds of reasons for getting together and they identified the same sorts of problems with the legislation: they wanted to act legally, but were uncertain what position they were in. From the evidence we took from the ACA, the ACA had already talked to that group, they were open in terms of their attitude towards what they were trying to do and they were very willing to try to facilitate sorting this out in the legislation. So I think it would be a

good idea for you to have a talk to the ACA to get an idea of what their approach is and start to set up a dialogue. Obviously, this is a problem that not only the committee will have to deal with, but also the groups who intend to go down this path will have to deal with, and it is right that you want certainty. You do not want to be placed in a position where you are jeopardised legally; you are right to try to sort it out in the first instance.

That having been said, it is interesting what drives you and what makes you different from what others might do—the approach you have. You want higher downloads, so you want a lot more information probably than most other people, and you want to be unrestricted in regard to that. That is understandable if you are large-scale users. You want a lot of information and you want to be able to use it whenever you want to. All of the major carriers, even though they promised at the start that you would be able to do whatever you wanted to do, have tightened up considerably, which I imagine is one of the driving forces for you looking at this as an open and free area. Is that the case, that that is the key driver?

Mr Clugg—Despite the fact that we might be considered to be high-use users—that is, we really do use the full potential of what services are made available to us—I feel that does not necessarily put us at the extreme end of the scale. When you look at the uptake of something rather simple like SMS text messaging on mobile telephones, years ago that was considered a gimmick and not many people were using it. People who used it then were considered to be high-use users of mobile phones. Nowadays, it is commonplace to use such a technology because it has been made available and because it is available on every device. It is not necessarily that the general public does not want to use broadband—it is just that it has not necessarily been available for them to use in the fashion that they wish to use it.

Mr HATTON—Does anyone else wish to comment?

Mr Dreis—I think a lot of it has to do with need versus price and what people's needs are and whether it is worth them paying to have that. As Steve said earlier, unfortunately where I live I cannot get any broadband at all, and I live within 16 kilometres of the CBD, which is quite depressing. So a lot of it has to do with need versus price. With the recent increase in competition, obviously the situation is improving, but there are still a lot of limitations in terms of download limits and speed caps and things like that.

Mr HATTON—I can understand why you want to take that approach. Can you give us some practical examples? It is an interesting argument that you put about the SMS text messages. We have been promised a great deal through 3G. One of the first ads that came out was that life was going to be in colour, everything will be remarkable, 3G will be able to deliver heavy content—video content and other content—that you could not actually push down the lines at the moment because it would be too cost intensive, I suppose. We are promised that. At the moment, that is too much. I think there is a 3 gigabyte limit with Telstra. Can you give me some practical examples of what that would involve—3 gigabytes a month? What would you be able to do?

Mr Clugg—Unfortunately, not a great deal.

Mr HATTON—People say that is a limit. What do people know about 3 gigabytes? If they use computers, they have some understanding of that. But practically, what can you do; how much can you pull down?

Mr Clugg—I used the example before of an Internet radio station. I am not entirely certain, but I think the calculations came out to be around 28 hours a month of radio. That is, you have used your limit with an hour a day of listening to the radio on your broadband service. To listen to the radio is one thing. If that is all you are using it for, an hour a day might be enough. But then to go and watch a movie and something else as well will put you well through that, I believe.

Mr HATTON—Do you know how much it would be to download streaming video? I imagine it would use more bandwidth than the radio.

Mr Clugg—Certainly. A full screen video probably comes down to about five megabytes per minute of full stream, if it is highly compressed, which does eat through your bandwidth quite quickly. So, if you wanted to watch a small clip of five minutes of the latest ABC news report, for example, that would be 25 megabytes perhaps. That might be all you can watch per day before you go through your limit imposed by the carrier.

Mr HATTON—That is very useful, because one of the key things that is missing from a lot of this is practical illustrations of what the constraints are. That explains why this technology is important to you and it might explain why it might be important to other people, if those constraints are still there. Telstra, Optus and other providers at the start promised almost unlimited access, but their explanations for the restrictions they have imposed recently have essentially come down to a cost. To provide high bandwidth access to a lot of people is going to cost the provider a great deal. That is a problem. Effectively, how is access to 802.11 costless? How do you envisage that? Where are the costs in the way that would be used? If all of the members of your organisation and lots of other people take it up, will that continue to be costless or would we hit some hard realities here?

Mr Haigh—I believe that we still have our aims around the wrong way in that regard. To go with a commercial broadband, you physically have to wait for someone to roll a cable past your doorstep. With what we are trying to do, you actually build the network yourself. If you want a link to here, you build that link yourself. You do not have to wait for a commercial company to roll a cable past your door to make it happen.

Mr HATTON—You are just talking about peer-to-peer links?

Mr Haigh—The way things are presenting themselves at the moment is that we are going to have little pockets of connectivity all over the place. They go by the buzz word ‘hotspots’ at the moment. Sooner or later, as more people come on board, those hotspots are going to start linking up. That is how we envisage the network will grow until, eventually, one day we will hopefully have a full mesh network which will not be reliant on one single area to make the whole thing work.

Mr Clugg—Each individual node in these hotspots—to set up access within a café, for example—costs less than $1,000. This is really low cost service that provides reasonable bandwidth. We are not talking about excellent bandwidth. It provides value for its service. It does not necessarily provide a quality service. We do not envisage replacing any communications provider in providing quality service; 3G and other technologies will certainly address that issue. We are trying to build a value for money service that anyone can join and can use the band-

width, and that is not restricted. For example, if the ABC wished to provide a server on this service, they could provide streaming video over this service. They could provide any other thing they wanted to. They could join at very little cost, the same cost as any of our members could join up for.

This sort of technology is not necessarily just limited to—if I can use a common term—a geeky persona. Some people might want to use this for other things as well. If you were sitting in a cafe just over the road and it was connected, and of course interconnected to everywhere else, then you would be able to watch that ABC news broadcast that over the current broadband services you could only watch one of a day. You could watch that in the cafe. It would download at reasonable speed. Even width saturation, an issue which was brought up before, is probably not going to be much of an issue. But certainly those services would be available to the general public to use in the manner that they see fit, without the restrictions imposed by the carriers on cost of the network, simply because the cost of bringing the network up is so low and it is distributed across many people.

Mr HATTON—I can understand the peer-to-peer stuff and the fact that you might create your network in that way. I can also understand that, if the ABC wishes to be philanthropic and set up a server to provide that network with streaming video of ABC news or anything else, that would be relatively low in cost. But otherwise wouldn't all the people using your network have to go to an ISP and wouldn't they have the problem that the ISP would say, 'This is your download limit,' unless you have philanthropic nodes where they are going to pump information out to you?

Mr Haigh—I do not believe we are actually looking at replacing ISPs. We are looking at something to add on, as well as an ISP. Like I said, we do not actually want to replace any ISPs.

Mr HATTON—I do not understand how you get your downloads otherwise. If the major providers are providing the backbone, they say it is costly to provide that backbone infrastructure. If the ISPs are hanging off them, dependent upon that infrastructure backbone, and they are providing services to people, they have basic costs. Those basic costs are related to the amount of downloading that is done. If they want to download at a wider bandwith, they have to spend money to increase their capacity. Therefore, they have to charge people. How do we get around that?

Mr Dreis—It is a matter of where the content is coming from. The cost is associated with where the content is coming from. Obviously, in the case of Optus and Telstra, international content is costing them money; local content is not costing them money. In our situation, it is a case of how much content originates from within the network and how much content is shared with other networks in possible peering arrangements and situations like that. For example, it is possible that we might peer with other networks around the country, not necessarily with ISPs. We also might peer with ISPs, so there might be a situation where we can offer local content at no cost. International content will always be a difficult situation because of the cost of bringing it across from wherever it originates. We would hope to see a lot of content originating from within, such as community based content. A lot of people within the group are hoping to promote that through all sorts of means. The ABC is a good example of Australian content, but there is also local government and things like that. We are keenly interested in a lot of that, but

we have put those plans on the backburner, because there has been a lot of concern in regard to the Telecommunications Act and where we stand, before we start jumping the gun.

Mr Clugg—I would like to add to that. There is an idea that to get content to somewhere you must go through an ISP, which is not necessarily the case. Anyone who plugs into the Internet is able to provide content. It is not the case that this technology is limited to an ISP. You will find that the ABC and many other providers might house their computers at an ISP, but all that is really required is a network connection from that computer to the greater network. In the case of the Internet, the ISPs have the large backbones to do that. However, in the case of the network that we are hoping to build, to provide such a service simply means that you put a computer somewhere. It does not necessarily have to be at an ISP, as long as that somewhere has connectivity to the wireless network. So it does not necessarily have to be the case that an ISP controls how this can run. The only problem, of course, is the idea that users cannot run services because that would be providing carriage to the public. That stands in our way as a hurdle that means that we cannot operate our own services, for example. We cannot make our own video and redistribute that to the public. Under the current legislation, that would be providing carriage to the public and that would be illegal.

Mr HATTON—Essentially, you see it operating as a peer-to-peer network. There is a possibility, though, that Melbourne Wireless could be an Australian version of Napster with multimedia content, because Napster got into trouble in terms of its model and the way it was doing things. They operated on a peer-to-peer basis. They had content which came to them in a certain way and people shared that on a peer-to-peer basis. You could argue that that was not providing a service; it was just people sharing things. We have seen a lot of that happen throughout the US universities and college campuses and so on. Another potential for this is in operating within the free area of 802.11, isn't it? It has no cost so you are not having to pay the carriers, but it could and probably will be used heavily in that sort of way.

Mr Haigh—Unfortunately, that kind of thing is one of the things that you are never going to be able to stop. Even though Napster did get shut down eventually, they are now looking at a paper service type of system. Others have cropped up, such as Kazaa and Morpheus, that essentially do the same thing. Even though these services still exist, there are a lot of private arrangements between a hell of a lot of people on the Internet. At the end of the day, there is no way that that will be able to be stopped.

Mr TICEHURST—I think the first thing you have to realise is that there is no such thing as a free lunch. Somewhere along the line, if you are going to pull data off the Internet, someone is paying to have it carried in. If you are talking about the ABC, it is the taxpayer who is paying for the ABC, so if you are going to retransmit any of their data you have probably got issues other than data carriage. From what I can understand, you are trying to have essentially a closed user group. If you are transmitting your own generated information then maybe that is a different story.

Mr Haigh—We do not really wish it to be closed. One of the things we try to make a point of saying is that any member of the public can access the network at any time from anywhere that is accessible. We have a definition now, because we are an incorporated association, that obviously we must have members. We have put down a $5 membership fee which basically covers

the right to vote and discounts that we may negotiate with vendors, but you can still access the network without being a member.

Mr TICEHURST—You are talking about transferring data. I think you used the example earlier on that 3 gig of radio was an hour a day. If you are going to run this thing full time, it would be a huge amount of data that you would pull across. If it is coming off the Internet, somebody else is paying for it.

Mr Haigh—At the moment, we are not focusing on having it Internet connected. That may happen at some stage down the track. At the moment, our plan is to build a separate network, which is mainly because of the legalities involved. Hopefully, when those clear up, we can consider it, but at the moment we are more focused on building a network than we are connecting it to the Internet.

Mr Clugg—One thing that was discussed was the idea that an ISP could set up a computer connection to this network as well and that users could connect to that computer using what is known as VPN technology, whereby you establish a private link over a public network. This is typically used on the Internet. Using that private link, people would be effectively dialling in over the wireless network as opposed to the public telephone network and would be able to access the Internet using a standard account—except that, rather than using a telephone to connect or an HFC cable network to connect, they would be using the wireless network to connect in a secure manner and in a way that can be accounted for and billed for. If the network exists and that is an option—if the ISPs are there—then users can use that and it can be paid for.

Mr TICEHURST—That would work.

Mr Haigh—You essentially have the two networks overlaid: the ISP's network, which would take care of all the billing et cetera; and the local network, which in our case would be Melbourne Wireless. There would be free content within Melbourne Wireless. If you wanted to access something over the Internet, you would be able to connect to your ISP through our network and go from there.

Mr TICEHURST—That is not going to get around your data caps to any large extent, unless you have an agreement with the ISP.

Mr Dreis—No, it will not.

Mr Haigh—One of the things we were hoping is that if we provide a network the ISPs can decide to connect up and simply the competition between ISPs on that level would hopefully bring some good value-for-money access to people.

Mr PEARCE—In your submission there are the three basic rules that your members are required to adhere to. One rule is: 'The network cannot be used for commercial purposes.' What do you propose your members typically will use the network for?

Mr Haigh—Basically, what we mean by commercial purposes is office X linking to office Y utilising our resources purely for business, as in BHP—that is a bad example—connecting to another of their offices via our network.

CHAIR—They may be on hard times, but it is not that bad!

Mr PEARCE—Your typical member is not going to be a profile of the BHP kind, I would presume.

Mr Haigh—No.

Mr PEARCE—Given that profile, what would you anticipate your members to be using the network for? To take Mr Clugg's point, would it be entertainment style options or recreational style activities?

Mr Haigh—A bit of both, really.

Mr Dreis—Possibly.

Mr Clugg—I would anticipate that the network would be used for whatever you would use the Internet for today; that is, to check the news, to check your email, to do whatever it is you feel that you need to do. I think what was being touched upon there was that this sort of network is operating in the class-licence area of the 2.4 gigahertz spectrum, and other areas of course. The 802.11a technology will come up, and we may migrate to that; it might be used. Other technology is certainly coming up. We talked about 802.16 previously, which would certainly be a nice thing for us to play with. The idea is that class licensing separates the community from the businesses.

An example came up before of a crane operator and the safety officer for that crane communicating via a UHF or CB radio. That would be ludicrous. They would not get the quality of service that they require. For a commercial entity to be using our network in that fashion would probably be a gross misjudgment on their part as well. They certainly should be looking at alternative frequencies that they can purchase to guarantee they are going to get the service they require. But for the community things like CB radio are certainly acceptable and work very well. We would certainly expect that the community could use our system without having to purchase carrier licences or anything else. So we can operate in a manner that serves the community.

Ms GRIERSON—I very much welcome your submission. I think you have raised some issues the committee really do need to consider. Most of the experience of the people in this room regarding access to broadband technology is very much about professional or commercial gain. It is very hard sometimes for members of the committee and our related colleagues to understand how other people—the community and youth culture particularly—are using this sort of technology.

My colleague just asked what they used it for. I can tell you I missed Napster when it disappeared from our PC desktop at home but I was absolutely astounded by how quickly it was replaced by so much other enabling software that is free and that is constantly used. I do not think the problem of how you stop it is one that we can solve. The other thing people use it for, in my experience, is a swapping and sharing culture that is quite entrenched and that, in a way, identifies people. It is a leap in the use of technology that is really about who people are. I think there

is an absolute community need for technology that is affordable and unrestricted in some ways. It is fine to have that philosophy, but in practice it has some problems.

For the benefit of the committee, I want to put on record the September 11 experience that I had personally with young people around me. Whereas I watched the broadcast on television, they instantly went to the Internet and talked to people all over the world. They downloaded what they could from other news services around the world. They talked in chat rooms—'What are you seeing? What is happening?' It was a very different access that they wanted, and they rely on that very much as part of their lives. I think it is important for us to try to understand that use, because it is very hard to restrict and limit that use.

In terms of your operation—and you have not been doing it for very long—we as a committee do have to come to terms with some of the copyright and privacy issues, and the interference and commercial loss that could perhaps come about from your sort of network. Have you had any challenges to your network, under those sorts of provisions, at this stage? Has anyone come to you? Are you causing interference at a commercial level with anyone? Has there been any of those sorts of copyright or privacy issues raised with your service yet?

Mr Haigh—It is a funny story—we have had a lot of companies coming to us asking, 'How can we help you achieve what you want to do?' We have had people, all the way down from telco licensed installers asking, 'How can we help you get your network running?' to distributors of cards—Interrasys Networks have been doing a number of deals with us on buying cheap equipment for members, and D-link are hopefully visiting our next monthly meeting to do a presentation on their new technology and their new generation cards, which were released yesterday. Hopefully, they will bring one to the meeting. We have had no real negative comments whatsoever directed to us regarding the network.

Ms GRIERSON—So the antennas and things you are using are not causing any major problems?

Mr Haigh—Not that we are aware of. No-one has said anything.

Mr Clugg—With respect to privacy, national security and other such issues, the question, 'How do you regulate such a network?' has crossed our minds. The concepts involved with regulating class-licence networks and class-licence spectrum are certainly very different to those of licensed spectrum, whereby someone controls it. The idea was bandied about only just last night, for the second time, so we have not had much time to look at it. We did come up with some good ideas, but I think we should take that question on notice and address that more thoroughly.

Ms GRIERSON—Thank you.

Mr Pollock—I think there was another point you raised about getting commercial interests offside. One thing that I noted when I put together a fair bit of the original submission is that, if you read the objects of the Telecommunications Act, a main object of that act is to benefit the end user, not necessarily the commercial interests. It does not mention the commercial interests that feed the end user. The end user is important. I think healthy competition is something to be

commended. If we can provide a better service than one of the entrenched commercial operators, so be it. Perhaps they had better pull their socks up.

Mr CIOBO—I am interested in one aspect, principally, and that is interference. You may have heard me mention to other witnesses before this committee that it has been put to us that there is a significant amount of interference that arises as a result of the use of 802.11 in this line of spectrum. I am interested in your comments on that because it has been put to us that there should be a limitation placed on it for indoor use only, and that people are using high-gain antennas and omnidirectional antennas to build community networks, and that this has the potential to cause a myriad of problems that would lead to the degeneration of the whole part of the spectrum.

Mr Haigh—I believe that is really more scare-mongering than anything else. We can sit three access points on the table right next to us, all three of them right next to each other operating on different channels, all of them full 11 megabit—and there would be no interference whatsoever. There are all sorts of tips and tricks you can use for long links: you can polarise your signals differently so you have got one horizontally polarised and one vertical, which cuts down interference dramatically. I do not see where the degree of interference will actually come from that these people speak of as going to cause everything to come to a grinding halt. I do not see that as being a problem.

Mr CIOBO—So, in your experience, that case is significantly overstated?

Mr Haigh—I believe so, yes.

Mr CIOBO—What about from a regulatory point of view? There has been a proposition put to us that the government or the ACA should play a coordination role, whereby we enable a web based database built upon each and every group requiring a licence, which could be done for a nominal fee, who then determine, 'We operate in this area at this level,' and so on. That way you start to build up a database of who is operating and to what extent, so that it can be coordinated. Then, if you are receiving interference problems, you can just have a look and go, 'Yep, okay. That potentially could be the cause there.' Would that be something you would support, or would you rather a free-for-all?

Mr Haigh—I do not believe that that would even work. I will draw a parallel between that scenario and what happened to CB radios and their licensing. That was basically abolished because, at the end of the day, it was too hard to police. I have still got a piece of paper that is a CB radio licence from many years ago. What made that so hard is that you can walk down to any shop, pay $99, get your radio, go home and set it up. To register that with someone and to identify who is actually using that radio is almost a nightmare in itself just to even think about. With technology like this being available to anyone who can walk into a shop off the street, I believe that would be very hard to police.

Mr Clugg—One thing I would like to add is the fact that, in CB radio terms, there is certainly provision for CB radio users, if they feel that someone is causing undue interference, to notify the authorities, such as the ACA, and to make them aware of the users that are not using the technology within the appropriate bounds. This self-regulation certainly comes into play. Melbourne Wireless, as a committee, just last week intervened when someone was talking about

simply upping their output power to above the four watt EIRP. We stepped in and said, 'If you do this, we will notify the authorities.' So it can be self-regulated. As a community, we want to see this work; we do not want to see someone hogging part of the spectrum by putting out too much power. We want to all work together, but to that end we must also make sure that our users are not disobeying any laws or guidelines that are in place and that our users are operating within the bounds of what is happening. It is useless for someone to operate their directional antenna over, say, a two-kilometre link at absolute full power because it does not improve the signal to any degree. They can probably operate over a two-kilometre link at something as low as perhaps one watt EIRP—a quarter of what is available for them to use—and that would still produce the same results. The other thing that that would do is reduce interference to everyone else around them. So our recommendation to our users, that they run within what is required as opposed to what they can actually do at legal limits, certainly comes into play.

Mr CIOBO—One final point: it has been put to us that, for those that breach the power caps, there should be significant fines as a way to create an incentive for people to remain within them. Would that be something you would support?

Mr Haigh—One of the things we talked about last night was, if someone was found guilty of breaching any kind of law—as in the station putting out too much power—we would give them a written notice to say, 'Look, we know this is the situation. What you are doing is basically against the law. To correct this, you can do this, this and this,' and give them a set period of time. Then, if they are still outside the legal limits at the end of that, we would inform the ACA.

Mr Clugg—A lot of this comes down to the fact that these devices are available off the shelf and, using off-the-shelf equipment, it is possible to breach the current guidelines on what should be used. Our advice to our users can certainly be of value in restricting that so that they do not go out and say, 'Well, I'm not sure how much I need, so I'll go out and I'll buy an amplifier. I'll go out and buy a very powerful card and a very high gain antenna,' so that they can output as much power as they need without realising exactly how much power that is. Our advice can certainly help them on that. We can notify them and, if they are unwilling to comply with any advice or regulations, then certainly we can notify the ACA and fines can be imposed. That would be appropriate.

Mr Haigh—As a practical example, in one of the trials that we have done with some off-the-shelf equipment, we used Compaq cards hooked up through 15 metres of cable—so you get a fair bit of loss in the cable to simulate a normal house install—to a medium gain directional antenna. We managed to get a full 11 megabyte link at about 14½ kilometres. That is a fair way. This stuff was mainly designed with indoors in mind, but these applications are very valid and very easy to do. We believe we could probably get 30 kilometres. Theory states you could possibly get 100 kilometres. But trying to find two links that can see each other at 100 kilometres—

Mr HATTON—Mr O'Shannassy from Motorola did not know the answer to this question, so I will put it to Mr Clugg or any of the other members of Melbourne Wireless. Do you know of 802.16?

Mr Haigh—We have heard a little bit about it. Apparently, it will be a 2006 release and it will be up to about 210 megabyte. That is about all we know at this stage.

Mr Dreis—As far as we know, they have only set up an 802.11 working group for .16. But, as far as we know, there is no official specification. I think they have said what they think they can achieve with that technology, but we do not know of anything officially yet.

Mr Clugg—I think if you limit yourself to particular technologies, as opposed to class licensing, you will find that you will be waiting a very long time or you will be stuck in a rut, so to speak—you will be relying on a particular technology which may or may not work or which may or may not be here at the time that you need it. So, to wait until 2006 for 802.16 and to put all of the reliance on one particular technology could be a gross misjudgment of the committee.

Mr HATTON—We have no intention of waiting; it was just a question of interest in the background that it was brought up.

Ms GRIERSON—I understand that Melbourne Wireless are willing to put forward a paper and some suggestions on self-regulation within community users. Is that right?

CHAIR—You might make a supplementary submission.

Ms GRIERSON—We would welcome that.

Mr Haigh—We could certainly do that.

CHAIR—The evidence you gave was contrary to evidence we received yesterday from Integrity Data Systems about the capacity for self-regulation of community networks and amplification.

Mr Haigh—There is a funny story. Integrity Data Systems actually supplied Canberra with the first cards that started one of the first community networks in Australia. So that is a rather interesting viewpoint that they have.

CHAIR—Things change in politics, and I am sure they do elsewhere as well.

Mr Clugg—I think the point to be made is that we are certainly willing to work with the ACA or any other regulatory body and other community network groups to establish a set of guidelines that can be used and to make sure that we are getting the correct view of the public, of our users and the government regulatory bodies.

CHAIR—Thank you for your evidence.

Proceedings suspended from 12.19 p.m. to 2.16 p.m.

GOSMAN, Mr Alexander Tod, General Manager, Government and Regulatory, Ericsson Australia

MOORHEN, Mr Scott Andrew, General Manager, 3GSM Solutions, Ericsson Australia

CHAIR—Welcome. Thank you for making a submission to the inquiry. Do you wish to make an opening statement?

Mr Gosman—A very brief one.

CHAIR—Do you want to talk to this in your opening statement?

Mr Gosman—Yes, we can.

CHAIR—We will take that as an exhibit as well.

CHAIR—Although the committee does not require you to give evidence under oath, you need to be advised that the hearings are legal proceedings of the parliament and warrant the same respect as proceedings of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. You could make an opening statement and then we will ask you some questions.

Mr Gosman—I would like to make a few remarks and Scott will make some as well. Ericsson is the leading provider of 2G and 3G mobile services, providing leading-edge total system elements. We have a 40 per cent global market share in mobile systems. In Australia, our customers in 2G are Telstra and Vodafone. We have 40 per cent of the global share of 3G contracts and we have a contract with Hutchison in Australia, providing a 3G network.

Ericsson is a true international company. Four per cent of our sales occur in our home market of Sweden and 96 per cent of our sales occur globally. When other companies talk about being global companies, generally you will find they have 50 to 60 per cent of market share at home. We are very much a global company and have been in Australia for over 100 years. We operate in 140 countries. In Australia, we have the largest private sector research and development centre with over 400 scientists and engineers, and we provide a range of regional support services from Broadmeadows. Scott will make a number of comments on technical issues and I will come back and make some comments on regulatory matters.

Mr Moorhen—By way of opening, it is fair to say that wireless over the last decade has been a very exciting ride for our business. While there is a degree of uncertainty about the business environment at the moment, we have a very bright view of the future. The industry at the moment is facing a number of challenges with a range of technologies coming into existence. Clearly, while causing some confusion, the technologies on the whole are very much complementary. They add up to a very compelling range of services and experiences for consumers and users going forward.

Mr Gosman—As a company that provides mobile systems, spectrum is really our lifeblood. Therefore, we have taken a strong interest in the regulatory arrangements that apply in Australia, particularly as administered by the Australian Communications Authority. We believe the ACA does a world-class job and the approach adopted in Australia is also very appropriate—that is, relying on technology neutrality and generally fairly liberal carrier licence conditions.

Australia is globally aligned in such areas as standards. We accept products on international standards. Spectrum allocations are also consistent with the ITU. The processes of the ACA are also very transparent and consultative. Concerning what we believe it is to be world class, we note that both the United Kingdom and the United States—where they are doing some work on spectrum administration—have approached the ACA as the first overseas agency in terms of seeking assistance. That is all to the benefit of Australia.

In our submission we have made a number of comments on regulatory issues and I would like to highlight the four major ones. We believe that with convergence occurring in the industry it no longer makes sense for spectrum to be treated differently between the broadcasting and telecommunications sector. This has caused and will cause increasingly market rigidities and we believe that spectrum allocation for both industry sectors should be brought under the administration of the Australian Communications Authority. We believe that the length of spectrum licences should be looked at and that it should be possible to renew those licences at an earlier date than is provided under current legislation, which allows renewal two years out from the end of the 15-year licence. That arrangement does not provide any certainty and can in fact lead to an investment drought. We believe that the Radio Communications Act 1992 should be amended to provide a presumption of renewal for licence holders. Also we have made a number of comments on rural funding arrangements where the government has provided a number of projects and Ericsson, in conjunction with both Telstra and Vodafone, has been successful on the mobile highway coverage and more recently on the extended zone.

Turning to the exhibit which you all have copies of, I will briefly talk through the slides that we have provided. I heard a number of the presentations and discussions on Friday afternoon and some comments were made about the growth of the wireless industry. It is interesting that a lot of people made comments about various technologies and their future commercial value. One thing that all these various predictions for various technologies show is that you should not make such predictions. The second slide shows communications as a percentage of final household consumption. As you can see, from the mid-1980s there has been a significant increase right across a range of OECD countries in the proportion of expenditure on communications, and that highlights the growing importance of communications. Also, the figure since the early 1990s reflects the uptake of mobiles. People now supplement their ordinary phone at home with a range of mobile services and therefore communications expenditure has increased from about 0.5 per cent to nearly three per cent of the average final household consumption and with the uptake of broadband into the future that figure will increase further.

It is interesting to look at the US experience of the uptake of various technologies in terms of when they reached 15 per cent penetration. Mobile phones took nine years to reach that figure whereas it took the ordinary telephone 40 years. More recently it has taken the Internet three years. One of the results has been that business velocity increases and, in the example of getting

a Dell computer, what used to take six weeks now takes 24 hours. We believe that a lot of the future growth in the mobile area will be because of that business velocity and people wanting to be able to do business instantaneously. The final diagram shows the transition from the fixed to the mobile world and there are now more subscribers to mobile systems than there are to fixed systems. There are over one billion mobile subscribers in the world and in Australia there are now more mobile subscribers than there are fixed line subscribers. There is a proven case for wireless technology meeting a need out there.

CHAIR—Thank you. The committee receives as evidence and will include in its records as an exhibit for the inquiry the document received from Mr Alex Gosman entitled 'Supporting papers to the hearing presentation for Ericsson Australia.'

Mr HATTON—Thank you for the handout; it is good. The other best example of getting predictions wrong was IBM arguing that there would be a need for only about five mainframes worldwide—I think they said that in the 1950s. Referring to page 1 of this document, it is wonderful to have the OECD figures but where does Australia fit? Australia is not on this.

Mr Gosman—In Australia it is about 2.5 per cent.

Mr HATTON—We are about one per cent down on the top—but still relatively in the top band?

Mr Gosman—Australia has been an early adopter of technology.

Mr HATTON—I turn to page 3. The radio penetration was, of course, in the twenties and thirties, so you are talking about a five-year period of take-up being a very quick take-up of that technology—the early adoption of it and putting it on a commercial basis. If we go to page 4 and look at business velocity increases, probably the most impressive are the production factors: in six weeks to 24 hours in terms of Dell. Can you explain to me what the third one means? For 'call centre inquiries', it says 'eight hours to 10 seconds'. Anyone who rang a call centre and got an answer in 10 seconds would be doing pretty well these days. I suppose you would do better with a call centre than you would by ringing a company direct and getting all the redirection services which take a minute or a couple of minutes to wander through, with all the advertisements that happen. What do you mean by that?

Mr Moorhen—We are reflecting that, with the sort of call centre transaction that we have come to take for granted now, the level of information that can be exchanged relatively easily that is at a typical operator's fingertips to help you with an inquiry is considerably greater than, say, a decade ago.

Mr Gosman—In the past, if you rang up and wanted to query a bank statement, the person would say that they would get back to you and would go off and extract a paper copy of your statement, do all the checking and get back to you in eight hours. If you ring up now, they will click onto your account on the computer and can generally come back to you instantaneously.

Mr HATTON—That makes more sense than it otherwise would. Your submission is very interesting because it is full of conundrums. You argue for regulation and then against it. You are all for saying that certain parts of the spectrum need to be regulated but you argue that:

It will become increasingly difficult to guarantee quality service with regards to interference if these bands are not regulated in some way.

That is basically the 802.11 stuff—the 2.4 gigahertz and the 5 gigahertz bands. You say that governments need to take that into account to ensure that:

... the spirit of unlicensed frequencies is maintained, together with regulations that help preserve the quality of service for WLANs.

You say that that issue needs to be tackled together with industry, so regulation is very important when we come to that public part. We have had other submissions which have said, 'Just leave it alone. Let them work it out themselves. Even though it is relatively unlicensed and relatively uncontrolled, let the market do what it needs to do. If it gets stuffed up because too many people go into it and it becomes too compacted, those who really need the information will take themselves out and pay more money to someone else.' On the one hand you are arguing that there needs to be really strong regulation, because you see that as a particular problem in terms of quality of service, but on the other hand you have basically put the argument that it should be:

…left to the market to determine appropriate broadband access technologies. It is not for the Government to mandate technologies to deliver various applications … the choice of technologies should be left to applicants.

This is particularly the case with regard to what the government may or may not want to do in rural and remote communities. My first comment is that this is an interesting set of opposites. It is a conundrum to me how you can hold both of these balls in the air at the same time. Would you like to tell me why you have these two opposites?

Mr Gosman—You have two arguments. In terms of the public PAL access with Wireless LAN, it is like the commons issue: if you make something free to everybody, you run the risk that it will end up being overused and the value to everybody will come down to nil. We believe that there is a philosophy behind there that people should be relatively free, but, at the end of the day, you make the comment that others have said, 'People will move if they are being interfered with.' The experience we have seen with the introduction of second-generation and third-generation spectrum allocations from the existing holders of spectrums—be it utilities or broadcasters—is that they do not like to move. They already have significant investments in infrastructure and want to see some provision to protect it. So I do not think that people will move easily. There is a conundrum there and it is a fine line.

In relation to what we said about broadband, what we are really arguing is a broader position in terms of whether people want to make the solution by fixed line, by fixed wireless, by cellular, by wireless LAN: at the end of the day, leave it to the market. But we recognise that, behind that, there is a range of regulations that apply. And if I can talk about spectrum allocation, we very much support the approach that the ACA has taken in Australia where we have aligned globally. You could contrast it with the US approach where they have tended to go their own way and they are still trying to clear spectrum to provide some of the future services that had been resolved on a global basis everywhere else three or four years ago. So I do not think, at the end of the day, there is a contradiction in what we are saying.

Mr HATTON—I want to explore that a little bit more because you have used the example of the US and you have also used in your paper an example of what happens in Europe and elsewhere, in terms of the ACA being 'particularly good'. What really has happened in the other environments where we have not had regulation and it has been as liberal? What sorts of difficulties have been created?

Mr Gosman—I am not sure if it is a question of being liberal. On a traditional basis within the telecommunications sector, we have had bodies such as the ITU establishing standards, establishing spectrum allocations, and generally Australia has fallen into line with that. What that has meant is that we have been able to get the benefit of product coming to market early. We have been able to get the benefit of the economies of scale that come because major markets—Europe, Australia, Asia, the US, in some cases Latin America—are producing to that product. At the end of the day it has not been liberal; it has just been a generally accepted approach that it makes sense to have coordination. The one success of telecommunications is that you can be anywhere in the world, pick up a telephone and ring home and be put through within 10 to 15 seconds generally with 99 per cent reliability. Compare that to the IT sector, which has let the market set the standards a lot more and there have been different standards operating: we all know the experience of computers crashing on a fairly monotonous basis. I give a personal example: when the Sydney Olympics were on I happened to be in China for a meeting, I worked out when the 1,500 metre swimming was on, I was at the Great Wall and I rang up my wife two seconds after Grant Hackett finished and got the result. That is a great demonstration of 100 years of history in telecommunications, of international standards and international alignments, that I could do that.

Mr HATTON—And that, interestingly, goes to part of the core of this, of what I think is still a conundrum. We could have had fax machines operating in, roughly, the 1850s. In fact, there were fax machines operating in the 1850s, but they could only communicate if you had exactly the same fax machine manufactured by exactly the company and it was exactly the same part of the series of what they manufactured. So communications could have been a lot better a lot earlier if there had been standards that allowed everybody to take part in it. So the example you use of the computer industry versus the communications industry is correct, but there is also a longer history to that. It was the very lack of standardisation that led to the problems.

If we pull forward to where we are now and the comments you have made about this, you have argued, and there has been a series of arguments before this committee, that basically it should be hands off because we do not yet know where these communication technologies are going. There has been a plethora of possible solutions for different parts of the market and for different usages, but some of it overlaps considerably. Given that that is there, it is probably a lot more than what we saw in the VCR wars between Sony and JVC and so on—we only had a couple of standards running there, and one of them won out. In this situation we are being told that, but the government has a problem: one, it does have to regulate in certain instances and, two, it has to put its money up front. You are saying, 'If you want to put your money up front in order to guarantee services to the bush, you leave it to us, or somebody else in the market, to determine what kind of technologies are going to be put into place.'

I want to throw you back a few years—a decade or so. If we had adopted the approach of 'just let everybody work out what was going to happen', would we have ever put in an analog service that could have been used from one end of the country to the other? If we did not have a

standard system that had been legislated and was regulated, if it had not been mandated by the government, would we have had a workable system or not?

Mr Gosman—I do not argue that. Rollouts applied with the analog and rollout requirements applied with GSM. Those were policies that were in place at that point in time. The government has decided not to do rollouts with 3G. At the end of the day, the marketplace will determine the speed of the rollout of 3G. I can only agree with you that there was government policy.

Mr HATTON—Our problem is that, in terms of what has been put to us, governments have decided these things in the past and will probably have to decide them in the interim and relatively near future as well. Europe as a whole ended up with GSM. They had different applications from the United States. We have different standards in different places; whereas, the world market recognises that you are better off if you basically have one standard where you can get that increased interoperability. We are going to have make some decisions about what is probably the best way of doing things in the bush.

Mr Moorhen—Things have matured a little bit since, say, a decade ago. Although, as you say, there is a plethora of technology, when you actually look at the technologies that fall in as sensible options for a business to explore, in a lot of cases they are reasonably self-evident. There is not always one horse to back, but it is possible to make a sensible business decision. Compared with a decade ago, there were far fewer standards to choose from or at least the volumes involved with wireless were a lot smaller. Things have changed in that regard a little bit. It is not a complete open slather. If you left it to business to make pure business decisions, there would quite clearly be some technologies that self-select depending on the application.

Mr HATTON—In a way, maybe CDMA self-selected as a replacement for analog because it established a certain dominance in the marketplace.

Mr Moorhen—Yes, that is one example.

Mr HATTON—In the wireless area, in delivery to rural and regional Australia—we will leave remote Australia to the satellites or some other combination—have we got a self-selector, a technology, that would best provide in that area?

Mr Moorhen—There is one in the form of CDMA, but there are also others that, as you can see, are in play now in the US. There are basically, from a cellular point of view, two broad families of standards. One is based around the CDMA evolution which leads to CDMA2000 et cetera. The other is based around GSM and wideband and includes EDGE as a technology. When you look at the performance of the respective technologies, they are all there to solve the same sorts of underlying needs for capacity and extra capability for end-users. In the case of Australia, CDMA is one possible solution but it is also possible to solve the same problems with EDGE, for example.

Mr HATTON—This may be impossible answer: how long do you think we have as a time frame ahead of us in which to make decisions about what is necessary in order to provide broadband to the bush? Some people have argued that at the moment they are not mature technologies but, in three years time or so, most of the technical issues will be worked out and we will be in a position to make better determinations about the best way to go.

Mr Moorhen—From a cellular point of view, the situation is fairly clear today. I do not think that there will be any substantial changes in the road maps or basic building blocks within the next few years that will substantially shift the cellular story. There is a lot of confusion around technology, such as wireless LAN and other such technologies, and they are being stretched into areas where they do not really naturally fit. They will technically not deliver what is being put forward. That is taking some time to work its way through the industry and for a clear understanding of those issues to form. In some ways, they could be seen perhaps from a disruptive point of view—they have become distractions. For instance, if somebody came along and said, 'We are going to deliver a national or nation wide 802.11 network covering the country to the same degree as the CDMA network today,' good luck to them.

Mr HATTON—Exactly. We have had evidence this morning from Nortel and wonderful new acronyms to deal with. They rolled out 1xRTT and then 1xEBO.

CHAIR—1xEV-DV and 1xEV-DO.

Mr HATTON—So, they have laid forward a path. Their argument was, if you go down the CDMA2000 route and you have what is currently there, the government could jack up the capacity with a relatively small amount of money and six months worth of work, and we could get to the 1xRTT level, so you would have more data being able to be pushed out. Some years further down the track, you would go to either a data only service or a data and voice service, which would basically put the current CDMA together with the 1xRTT, and that would work at faster speeds. The alternative to that is the GSM-type stuff, which is operating in a different frequency and so on. How do you see it? You will make money no matter what happens because you are providing equipment to everyone. How do you see it in terms of CDMA versus the GSM-UMTS stuff? Is one more appropriate to the city and one to the country, in terms of delivery?

Mr Moorhen—It is fair to say that wideband is more of a metro-style solution, partly as a function of the band that it operates in and the consequences of that. But when it comes to rural areas, CDMA is one possible path, but the GSM EDGE track is an equally viable track. It really comes down to the organisation involved and the business circumstances that they are faced with—I cannot make a judgment on their behalf. They are both equally viable; they are both playing out quite vigorously, especially in the US at the moment. They have both evolved for the same reasons: to introduce higher capabilities for users on an individual basis and also there are capacity needs. As you roll out different scenarios and increase usage, there are clear capacity needs as well as individual capability needs.

Mr PEARCE—I am interested to know your suggestions or recommendations on the government's role in providing assistance to broadband technologies? You talk about that in your submission. What do you see as our role in that regard?

Mr Gosman—Are you speaking generally, as distinct from regional and rural areas?

Mr PEARCE—Particularly in regional and rural areas.

Mr Gosman—From a more general perspective, at the end of the day the marketplace will deliver those solutions. The cost of a broadband network is significant. There is a lot of debate

about whether you build the network or whether it will be the applications that will lead to demand. My personal view would probably be for government to establish the network. I think that will be done on a commercial basis in metropolitan areas but in rural and remote areas, given the geography of Australia, there will be a case for government support to make sure that there is equal access.

Mr PEARCE—What do you mean by support?

Mr Gosman—On-going funding support, because we have a competitive telecommunications market and participants are operating on a commercial basis, and to provide some of those services out to rural and remote areas will not be a commercial undertaking. If it is decided that it is important they be provided with equal or near equal access, it will be a government role to provide the funding mechanism. Having participated in the extended zone tender, we think that is a good example of a process by which the government went around providing solutions to the 20,000 most remote residences in Australia—the specifications were left open to the tenderers in terms of how they would meet that requirement.

Mr TICEHURST—In your submission you say that you are providing a 3G network to Hutchison. Is that CDMA2000?

Mr Moorhen—No, that is a wideband CDMA network.

Mr TICEHURST—How does that vary from CDMA2000?

Mr Moorhen—That is a good question. It has a number of technical variations underneath. They are both essentially based on a CDMA technology, but one is designed as an evolution for what is called cdmaOne, IS95 networks, and it has certain issues for backward compatibility into that technology. Wideband CDMA was designed—and specified from day one—to coexist with the GSM family of technologies. There are a number of specific technical differences that lead to a situation where a handset that is designed for CDMA2000 will not operate on a network that is designed for wideband CDMA. They are essentially two separate technologies from that point of view.

Mr TICEHURST—Do you still get the range advantage that CDMA has or do you have the time limitation of the GSM?

Mr Moorhen—The two technologies at present operate in different parts of the spectrum. CDMA2000 in Australia will probably be deployed in the AMPS of the analog spectrum—800 meg—whereas wideband in Australia is being deployed, as per international standards, in the 2 gigahertz region. That leads to different performance, because of the nature of the performance of radio at different frequencies.

Mr TICEHURST—If a decision were made to change the existing CDMA network to a CDMA2000 network, would you be able to offer equipment for that?

Mr Moorhen—Yes, it is possible for us to do that. We offer equipment for all major cellular standards.

Mr TICEHURST—In an article I read, an Australian company reckoned they had a software solution that could turn a cell into all things for all men. Is that a reality?

Mr Moorhen—It is a technology called software radios. I think all major vendors are working on such a technology, but it is still some years away from being a viable alternative.

Mr TICEHURST—Thank you.

Ms GRIERSON—Just how hard or easy is it to achieve technology consistency without having some sort of technology choices and options dictated by government?

Mr Moorhen—It is fair to say it varies, depending on the different types of technology. By that I mean in the cellular environment, as with all wireless technology, cellular is very much a volume game. Businesses make choices where ideally they do not end up with an orphan solution—that is, it ends up costing them through the nose and they end up being uncompetitive, although it may give them a short-term advantage. The same is true for other technologies—wireless LAN et cetera—but it is probably fair to say that, if you compare wireless LAN and cellular, cellular has enjoyed 10-plus years of industry development and settling down. Some of these other technologies are relatively new but are going through the same sort of rationalisation process. So in the cellular frame it is dead easy. A typical business will choose a major standard of some description—whatever fits their needs. There are very clear, well-defined standards to choose from. In the wireless LAN and wireless local loop arena, there are still technologies evolving. It is still a little difficult to say which ones will end up on top and which ones will fall out, but that process is taking place in the natural cycle of business as we speak.

Ms GRIERSON—I have a question on R&D. Your submission shows that you spend a great deal on R&D. You have some R&D ventures in Australia. Can you tell me how many or where they are located or what they specialise in?

Mr Gosman—We have one located about a kilometre away from here, at Melbourne Central. We have about 450 scientists and engineers and we are doing research into a number of global products for the Ericsson suite of products. We are the largest private sector R&D centre in Australia. We spend about $80 million to $90 million a year in R&D.

Ms GRIERSON—Did you receive any incentives to locate to Melbourne, historically? I do not know.

Mr Gosman—It is an interesting story. We have supplied a lot of technology to, and we have a close working relationship with, Telstra and Telecom. As part of that, we were modifying the global product to the Australian requirements and we developed particular skills. Those skills have become recognised within Ericsson globally, so we have the competency to undertake a number of major tasks. We have not received any specific government assistance; we do not get the tax concession. But at the end of the day, the issue for Ericsson is availability of skills, and a tax concession does not get somebody with the skills through the door. We see the training and education programs as being vital to our future in Australia.

Ms GRIERSON—Globally, do your R&D centres specialise?

Mr Gosman—With the state of the industry at the moment we are going through a process of rationalisation, but we have something like 20 centres of excellence around the world, of which Melbourne is one. In Melbourne we specialise in a range of interception related products which are then sold globally.

Mr CIOBO—What sort of throughput rates are you able to get with your 3GSM?

Mr Moorhen—It depends which technologies you are talking about. We state in our submission that today with GSM and GPRS we have throughputs to a user of up to around 40 kbps anywhere in the network. With EDGE we can get up to 384 kbps or a little bit higher, and with wide-band CDMA we are up to ultimately around 2 Mbps with the current specification. I should say though that with all cellular standards, as we have experienced with GSM, we are doing things now in the network that we never thought were possible when the network was introduced. All standards will continue to develop along those sorts of lines. There is already discussion about applying techniques such as turbo-coding to some of these standards to further boost bit rates.

Mr CIOBO—In terms of your wide-band rollout—if you are going down that path—at this point in time your expectation is around 2 Mb?

Mr Moorhen—As a maximum in ideal conditions, but I suppose for typical users we will see anywhere between 100 and 300 kbps. I should stress that it is very much driven by the commercial objectives of the organisation involved—how they want to deploy their network and what sort of service levels they want to design to.

Mr CIOBO—We had some testimony this morning concerning the rollout of CDMA2000. What sort of obstacles are there and what are the processes for a rollout of 3GSM?

Mr Moorhen—I do not know that there are any real differences between any cellular technology. You are always playing with a triangle of capacity, performance and coverage. While there are specific technical jobs that are different between the different standards, essentially they are all to achieve the same sort of outcome. Typically between the standards they are all, more or less, achieving similar outcomes for users. There is a lot of discussion around 1xRTT, 1xEV-DO, 1xEV-DV and what sort of end-user bit rates they are going to deliver. The same sorts of issues come up depending on what you design to. We have had the luxury of a lot of experience with GSM and GPRS in the real world. The industries have yet to go through that real world experience for some of wide-band technologies and some of the CDMA2000 technologies. We have done some studies and some trials but, compared to the experience of, say, 10 years of GSM, it is a different experience base.

Mr CIOBO—Based on Ericsson's experience overseas, in which direction are a number of overseas jurisdictions going?

Mr Moorhen—By volume of take-up, the greatest volume is with GSM and wide-band technologies, almost to the tune of 5 to 1. In our own projections that we have published we expect the CDMA family of technologies to reach around 20 per cent of the world cellular market—the rest will be predominantly wide-band and GSM.

Mr CIOBO—Is that operating in the same spectrum internationally as well?

Mr Moorhen—Yes.

Mr CIOBO—The main obstacle then would be that it is not backwards compatible compared to CDMA2000.

Mr Moorhen—No, not necessarily. A way to look at it would be that the GSM community is facing the same set of issues globally, so the same set of solutions that are developed will apply globally. While wide-band is a different technology, that is very well understood and the solutions that are being put together to arrive ultimately in the consumer's hand will recognise that and make the experience as transparent as possible. That will be a standard solution that will be deployed, as I said, in around 80 per cent of the market.

Mr CIOBO—What percentage of the Australian population is covered by GSM at this stage?

Mr Moorhen—That is a good question. It is around 95 or 96 per cent of the population. CDMA, by comparison, covers one or two per cent more. But when you start talking regional, or rural and remote—

Mr CIOBO—Then it is CDMA?

Mr Moorhen—Yes. You get a relatively small return in terms of customers covered compared to the extra land you need to—

Mr CIOBO—Yes, sure. But if I have a 2G or 2½G GSM mobile now, will it still operate on the same network when you roll out 3G?

Mr Moorhen—Yes. It depends where the operators elect to roll out wide-band CDMA, but the user experience will be that your phone will move between the two networks seamlessly. In fact, the intelligence of the network is the same core for the different types of radio access.

Mr JOHNSON—I read the comments of Ericsson in relation to spectrum with interest. It seems to me that you feel that, from the government's perspective, revenue raising and the allocation of the spectrum cannot really be consistent; they cannot sit side by side. Can you expand on that for me?

Mr Gosman—At the end of the day, the government's intent in the act itself is that spectrum administration is all about efficient spectrum allocation and not about revenue raising. We support that intent. Other administrations have the intent of revenue raising. So I do not think there is a contradiction there. We believe that the approach that Australia has followed, with the allocation of some major spectrum blocks, has been quite successful. It has focused on making sure the spectrum is allocated in an efficient way, and the revenue raising aspects have not been the predominant point of view—whereas in Europe, some of the experiences have been that in the way the spectrum was allocated the raising of the revenue became the major aspect.

Mr JOHNSON—The committee has heard submissions from some organisations that they are not too pleased with the way the government has been raising revenue. You are comfortable with current practices?

Mr Gosman—Taking everything into account, I think the Australian allocation of 3G spectrum two-gigahertz band was a success. It was a bit over a billon dollars. I do not think that has loaded any of the carriers in Australia with significant debt burdens as has been the case in Europe. So that should not stop rapid roll-out of the new services. It has been a win-win situation for the industry and for the government.

Mr JOHNSON—You talked about the limitations in the US. Can you highlight some of those?

Mr Moorhen—The US has tended to go down its own path and allocate spectrum to different uses from those allocated on a global basis. For example, at the moment, there is quite a debate about getting access to, I think it is, the 700-megahertz band. There are defence applications in that band. Given September 11, to have Defence move out of that band to make it available for civil uses is quite difficult. They also have the provision in the US where the Congress might say to the FCC, 'We want you to raise $US2 billion this year.' The only process by which they can do that is to sell spectrum, and that has nothing to do with the efficient allocation, when or where the demand would be or what the state of the technology is. It is all about raising money for budgetary purposes. We think that is a pretty poor way of running your spectrum administration.

Mr JOHNSON—I was interested in the point you made about the suggestion that three years notice be provided before the reallocation: why would you want that to stand?

Mr Moorhen—We are talking about the spectrum licences?

Mr JOHNSON—Yes.

Mr Moorhen—We are arguing for greater than three years. Under the existing process, it is a 15-year spectrum licence and it is not until the last two years that any decision is made as to whether that spectrum licence will be reauctioned—whether it will go to the incumbent or not. We believe that that decision should preferably be made in year 9 or year 10 of a 15-year licence, because then it provides a certainty for ongoing investment. Most members here would probably agree that we would not want a rerun of the analog situation, where you effectively turned off a technology that five or six million Australians were accessing. That is why we believe that if you could make a decision three-quarters or two-thirds of the way through the length of the licence and if the incumbent was to be successful in continuing to own that spectrum for, say, five or 10 years then it would give the encouragement for it to continue to invest and provide the service to its customer base.

Mr JOHNSON—Would you want that mandated?

Mr Gosman—I think it would a question of changing the act to say, 'no later than five years before the expiry of a spectrum licence,' and that would give the ACA and the government

flexibility, whether they did it in year 8 or year 9, but they would have to have it done by year 10 under that provision.

Mr JOHNSON—In relation to the presumption of renewal, in the paragraph that you have here, it seems to me that it might give the advantage to some of the heavier players in this field. You talk in terms of securing finance and capital. Am I reading that right?

Mr Gosman—The last decade has shown that, with the growth in the mobile industry—which has far exceeded everybody's expectation—spectrum is now a valuable resource. At the end of the day, with the government's approach and one that Ericsson would support, price is the best method by which you can determine the value somebody is putting on that spectrum. When you go through a reallocation process to clear a band, the option is there for anyone to make a bid for that price. What has happened is that the big players, who are doing the cellular roll-outs or some of the upper fixed wireless roll-outs, have valued that spectrum more than some of the smaller users. I suppose that has been inherent behind the government's intent of saying that it is all about spectrum efficiency.

Mr JOHNSON—In a nutshell, I guess it would give you certainty. Is that pretty much what you are saying?

Mr Gosman—Yes. It is interesting that a lot of the utilities and the broadcasters have argued that they do not have certainty under the existing arrangement and yet they can actually get a five-year licence. Ninety per cent of them choose to have a licence for only one year. At the end of each year, they have to go back and get the licence renewed again. They do so on the basis that they expect that that licence will be renewed. We are saying that that expectation should be codified and put it into legislation so there is that presumption of renewal.

Ms GRIERSON—It could be alleged that the value of spectrum and licences has been a lot more about having some sort of market primacy than any other factor. Because of that, it has been suggested in other people's submissions that the price paid for spectrum and licences has slowed the roll-out of infrastructure improvements in broadband generally. What is your comment on that?

Mr Gosman—I would probably argue the opposite. If you are expending a sizeable amount of money to get access to spectrum, you are not going to sit around not providing a service and not getting a commercial return. So the incentive is to be getting the network out there as soon as possible and getting that return in. Over the last three years, probably what has happened is that we have gone from the dot com boom to the dot com crash. That has certainly changed a lot of the projections, expectations of demand, take-up and the backing of a lot of players. Particularly in Europe, we have seen quite a shake-up with a lot of the newer carriers who have fallen over because of some of these issues. At the end of the day, if people are being granted spectrum for a very low price, they will not put a lot of value on it and then the incentive to roll out the new services will be minimised.

Ms GRIERSON—You suggested there may be some need to replan some of the spectrum. In a complete flight of fancy, and putting aside any of your associations and partnerships, what would you suggest would be important in terms of replanning the spectrum—not reallocating it, but perhaps replanning its use?

Mr Gosman—I am not sure that we have said that we believe there is any need for that spectrum to be replanned.

Ms GRIERSON—Yes, you did. I could find it for you if I had enough time.

Mr Gosman—I am just trying to think of the context.

CHAIR—We might get back to that. Mr Hatton has a couple of questions, then we can come back to Ms Grierson before we finish.

Mr HATTON—First, I will comment on one of the comments you made about research and development. In the last parliament, in the industry, science and resources committee, Ericsson made a submission in regard to the R&D inquiry that we were conducting. It was very interesting because the argument you put was, 'We're not interested in R&D concessions. What we are interested in is trained engineers, trained scientists. Put up the amount of money to go into the education system and give us those people because we do not have enough.' I think you reiterated that today in terms of what the needs of the country really are.

In terms of using our current mobile phones, because we are human we can compensate for a lot of the problems in service provision. If you wander around in Parliament House trying to use your phone, the best place to use it is right up next to a window so you can get a bit of signal. If you wander in and out of Sydney, where I come from, you are often gasping to try to get a bit of signal. Simply because of the nature of the networks and the extent of the coverage, they are not the last answer in reliability, largely because of competition and because not enough money has been put into adequate provision, I think. Data services are really dependent upon accurately getting information through to people. How can we be assured that is going to be sustainable in wireless services, that we are going to get high accuracy rates, whether it is delivered as packet data or otherwise?

Mr Moorhen—There are two parts to the answer. First of all, in the general market and in the general user community I do not know that there is necessarily an expectation that fixed data services and wireless data services, from a cellular point of view, are going to be dead equal. The vagaries of radio and the vagaries of cellular do not magically disappear in the world of data. Having said that, the more recent cellular standards do go a long way towards addressing consistent performance—consistency in an end result. So while the result may not be always perfect, you know what you are going to get, just as you do today with voice calls on a cellular network. You have a reasonable expectation that you are going to get service and you know what is going to happen when you hit the 'yes' button. I would say that most people are happy with that service. We have yet to reach that level of maturity with data services. There is still a way to go for the user community to understand and experience what data means in a cellular environment. I do not think we should necessarily set the expectation that, magically, we are going to have perfect service from a cellular perspective.

Before we lump cellular in amongst all of the wireless local loop technologies, wireless local loop will be a little different in that you remove the vagaries involved in mobility and moving around the network. Inherently, I think those services will be more reliable, more like fixed services. With cellular, because you have the additional trade-off of handling how people move

around the network, in some cases performance may be a little suboptimal, but in most cases it will be fine.

Mr HATTON—And you think that will be covered by the fact that there are different services, it is location specific and people want just a bit of information?

Mr Moorhen—Yes. We talk about these services in quite an abstract way but, ultimately, they are out there to provide a benefit or to make money for an entity somewhere, be it a carrier or a service provider. Ultimately, it either delivers and they get a return for it or it does not deliver and it dies in the market.

Mr HATTON—So far, as far as I know, in all of the submissions we have had there have been some comments about difficulty of terrain and other problems you might have with wireless in Australia. In the monsoon period in the north—Queensland, the Northern Territory, Western Australia—wireless has a lot of problems with the big wet. Are there still real difficulties still with using wireless technologies to provide Internet services in the north?

Mr Moorhen—I do not think there is anything that cannot be accommodated. I think the performance of all of these different systems under various weather conditions and so on is well understood, and it is a matter of the service provider taking that into account when the service is deployed. I do not think there is any mystery in that area.

Mr HATTON—Are some bands better than others? We have heard from Unwired that the band that they have bought is pretty resistant to leaves, rain and so on.

Mr Moorhen—Some are better than others. It is a trade-off. It is a mixture of the band, the performance of the protocols and the way that the information is coded. It is swings and roundabouts with each, but there are solutions out there to cover the situation.

Mr HATTON—To finish, I will be a bit party political. I go to page 25 of your submission, page 163 of our consolidated submissions. Ericsson is not backward in putting points of view and being opinionated. Here you are talking about rural and remote communities, that the provision of services to them is going to be uneconomic and the government is going to have to do it:

> Such projects which could be funded by further sales of Telstra should be of sufficient size to make them attractive for potential tenderers.

I am sure that this would not be music to the ears of most people in regional and rural Australia and probably not music to the ears of a lot of National Party members of parliament—although I do not think we have any with us today. But it would certainly fly in the face of what has been a consistently voiced view around Australia, despite what the minister and some others may think. I know it is easy for you to say it. In submissions, we get a lot of these things in other areas; companies talk to us about tax purity and how the government should be more even-handed in terms of what they do. They run through the whole series of expected observations. I would not particularly think that this would be an expected observation. There are lots of ways that governments can pay for ongoing services and improved services in the bush. This is the key political question, I would think, between the parties in Australia—one that is yet to be

resolved. You have a dividend stream of $1 billion to $2 billion a year running back to you, and that dividend stream comes in year upon year. I would note that Ericsson and most of the private companies that are still running worldwide depend on dividend streams rather than selling themselves off, don't they?

Mr Gosman—I do not want to make any political statements, but there are a number of options. The Australian Telecommunications Users Group has proposed an option where you could essentially establish a rural trust fund with any proceeds from an annuity. We are not saying whether that is a great idea; there are a number of options for providing it. But, at the end of the day, providing a lot of these services will not have commercial merit, so they will be required to be provided by other decision processes—whether it comes out of the budget or wherever.

Mr HATTON—Despite the fact that it is not fashionable, things can still come out of the budget. I noted the other day in question time that the Deputy Prime Minister and Minister for Transport and Regional Services actually made the point that, even if Telstra were sold, every year there would be a demand for extra expenditure to provide for rural telecommunications, something that would need to be taken into account. This is not going to go away. If Telstra was sold off, the government has already said that all that money will go to pay off debt. Nothing will directly come back unless it is part of a deal. So I understand why you are putting that forward, but I think we need to think in broader terms. There is nothing wrong with this. Elsewhere in the world governments have retained 50 per cent of the telecommunications companies. Have a look at Singapore and elsewhere. If they choose to do so, they can quite adequately continue to provide not only to rural, regional and remote Australia, but also more broadly. We used to own 100 per cent of the whole show. A lot of countries have determined that it is better to have 50 per cent and to have a choke chain kept on the dominant player in the market rather than let that once totally monopolistic player control the whole show.

CHAIR—This is not so much a question as an adjournment debate.

Mr HATTON—It does not really need an answer.

Mr Gosman—The last thing I would want to write in here is for there to be an allocation from the budget.

CHAIR—Ms Grierson, have you found that reference you were looking for?

Ms GRIERSON—It is on page 22 of your submission—the second-last paragraph at the bottom of the page—where you say you support administrations having the ability to replan spectrum, which includes reissue et cetera. At the end of that you give an example of the 2GHz band, which is spectrum that will not be available in this country.

Mr Gosman—They have allocated that spectrum—that was done by auction 18 months ago. The government has then provided a period of two years for the incumbent to clear out, so that is why the spectrum will not be available until October 2002.

Ms GRIERSON—Do you think we need to clear out any other spectrum and shift people from one to another?

Mr Gosman—Over the last three or four years the government has done all the major spectrum sales and I think, given the state of the industry at the moment, the demand out there for new spectrum sales is not going to be major. So I think we are in for a quiet period.

Ms GRIERSON—What does WARC stand for?

Mr Gosman—It is the World Administrative Radio Communications Conference. It is the major four-yearly conference, held in very exotic locations, where they allocate spectrum 10 years out. I would not recommend that you go to it because it is four weeks of techos.

CHAIR—Thank you very much for appearing today, Mr Gosman and Mr Moorhen. We appreciated your evidence.

[3.18 p.m.]

SKINNER, Mr Christopher John, Chairperson, National Reference Architecture Working Group, Intelligent Transport Systems Australia Incorporated

CHAIR—Welcome and thank you very much for appearing before the committee today. I am sorry we are running a little bit behind time, but hopefully we might be able to make up some of that time. It is unusual for a committee not to run a little bit behind time, especially with Mr Hatton's appalling party political performance with the previous witness!

Mr HATTON—But effective!

CHAIR—I am sorry you missed that. Although the committee does not require you to give evidence under oath, I should advise you that the hearings are legal proceedings of the parliament and warrant the same respect as proceedings of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. I now invite you to make an opening statement.

Mr Skinner—Thank you very much, Mr Chairman. I am representing Intelligent Transport Systems Australia Incorporated, a not-for-profit organisation representing various parts of the transportation and communication industries. For the record, I am also a chartered professional engineer, a member of the Institution of Engineers, Australia and of the Australian Computer Society, and I practise in the field of software and systems engineering. I am not specifically a communications engineer but I deal with many of the issues and work closely with such people.

I will move into my opening statement, Mr Chairman. Firstly, I would like you to note that Mr Colin Jensen, the President of ITS Australia, and Mr Brent Stafford, the Executive Director who is currently in South Korea, extend their apologies for being unable to appear before the committee this afternoon.

'Intelligent transport systems' is a term that is defined in our submission, but I think it is important to note that it applies to computer and communications technologies as applied to transportation systems, with a particular emphasis on safety, security and efficiency. In addition, it contributes to the reduction of adverse environmental effects and can lead to enhanced communication in various other ways. I would also like to make a point of defining a related term—that of telematics. 'Telematics' is defined in a similar way as the application of information and communications technologies to the enhancement of safety, security and efficiency of vehicle operations. It covers the vehicle segment of the intelligent transport systems domain.

I think it is important to make both of those definitions known because the two communities that are developing and furthering the exploration of interoperability are coming from completely opposite poles in that intelligent transport systems tend to be the domain of large organisations—often government organisations. Telematics, on the other hand, is something closely associated with vehicle manufacturing and the services and products that go with that and, hence, is very much something that may be regulated by government but is essentially a

private industry area of activity. Intelligent Transport Systems intends to cover both of these domains fully and to lead to the harmonious interoperability and efficient deployment of all of the aspects of both areas.

ITS Australia's interest in this inquiry is threefold. Firstly, there is the desire to ensure that the needs of travellers and carriers of valuable goods and freight are fully taken into consideration in the development of policy relating to wireless broadband communications services. I would very much like to emphasise that point. We noted in the terms of reference for this inquiry, for example, that transportation was not given any special mention. On the one hand, perhaps it does not deserve to, but we think that there is such enormous activity—almost a tidal wave—going on in transportation which has direct bearing on wireless broadband, that it is important for us to emphasise this area.

Secondly, ITS Australia desires to offer an informed input to the process of policy development in the area of wireless broadband communications services, not as a communications technology exponent but as a user and a specifier of such services and, perhaps we could say, an informed customer of such services for transportation. Clearly, there are many other fields that are informed customers of those services.

Thirdly, ITS Australia would like to make this point: although it is vital that there be consideration of the technologies as they are currently, and as they are expected to be over the next few years, in some ways it is less than the full set of issues in that the longer term issues of interoperability will flow beyond any particular technology. We assume that in any intelligent transport system not a single piece of hardware, software, firmware or operating procedure will still be used in 10 years time. All of it will have been replaced, so the issues will go on beyond that. What is important is that an environment is created where that evolutionary process of orderly and efficient replacement of parts of the architectural make-up can take place without leading to massive dislocations or excessive costs or any reduction in service—far from it, there should be a steadily increasing improvement in service.

Finally, the various members of the working group, which I have the privilege to chair, have come to some interesting but very preliminary conclusions which we would offer for consideration by the committee. We would suggest that in looking at geographical coverage of wireless broadband communications, employing whatever technology and, for the time being, at whatever cost—in that there is no implication that this should be free or subsidised necessarily—there would be five planks or principles. Firstly, throughout all of the land area of Australia and the nearby maritime areas there would need to be universal coverage for distress and emergency calls. We believe that this is inherently feasible. It would not come cheaply, initially at least, and in some areas it would be much more difficult than others but, nevertheless, it would seem to be a laudable objective. There is obviously no time scale connected to that, but it may be something to strive for in future.

Secondly, all intermodal transfer points for both freight and passengers must be covered fully with wireless broadband technology of the appropriate kind, such that full service of whatever is current at the time is available at any of those points. Some of those, of course, are urban areas but some of them are not and those other areas should be given the same amount of attention. Thirdly, all main transport routes need to be similarly regarded, and that raises a point that we tried to make in our submission. If you regard transient travellers or freight vehicles as

occupants of the geographical area with standing equal to the people who dwell there on a permanent basis, then it seems to put a whole different complexion on how you decide on coverage for the future.

Fourthly, all tourist and traveller locations, any areas of congregation of people—whether it be national parks or whatever—need to be provided full coverage unless there is very good reason on environmental or ecological grounds not to do so. Finally, the same level of service could be provided in other areas not mentioned in my first four points purely on a cost-benefit basis. There will be many areas that would not qualify for that.

Thank you for the opportunity to make this statement. ITS Australia regards itself as an advocate and a friend of the transportation industry and all of the suppliers of communication information services and related services that help to make that industry efficient, safe and secure.

CHAIR—Thank you. I do apologise that transport was not part of our terms of reference. It is an interesting oversight because the transport applications for wireless broadband are immense. Yesterday in Adelaide we met with m.Net, which are running a research project in Adelaide as part of the Networking the Nation program of the federal government. They made the point that they had six subjects that they were particularly interested in, and they talked about what services would be required with wireless broadband and how it could be used. They said that transport was the largest of the six and that they thought it had great potential for the application of wireless broadband. Yet most of the private corporations that have met with us have, when asked about services that this technology can be used for, tended to talk about what consumers want—video applications, data and so on—and not really about transport applications. If you pardon the pun, in this area the rubber seems to hit the road with wireless broadband, and I am very glad that you have appeared before us. It is a shame that it was not part of our terms of reference. That said, of course, it does not matter—we can inquire into it because it fits into any of the other terms of reference.

In your submission and in your statement, you also talked about the potential in transport for wireless broadband applications. You have given us some examples in your submission of where it is occurring right now. One of them is the CityLink transport system that operates in Victoria. Would you like to expand on that and how it is used in Victoria for transport, tolls et cetera? We are looking for some real-life examples of where wireless broadband operates right now.

Mr Skinner—I will certainly try, Chair. I do not have any personal familiarity with CityLink, but I greatly admire the scale and the reach of the project in that it has gone well beyond anything elsewhere in the world in many respects. It has come out very well. It is an example of dealing with mobile platforms that are communicating in some semi-automatic way in very large numbers. That, in some ways, is the most interesting part of CityLink. Hundreds of thousands of vehicles are fitted. The capacity of the various parts of the tollways to handle large, dense flows of traffic at high speed is really cutting edge. That is the sort of issue that has to be dealt with wherever vehicles are involved with wireless broadband. Things that can be optimised for, say, a building line of sight, or whatever, can never work in the same way with a moving vehicle, especially the faster that it moves. Having said that, there are rapid strides being made in digital signal processing techniques that make that problem likely to go away

within a few years such that various optimisations that now might take tens or hundreds of milliseconds might be done in fractions of that and therefore you can handle a higher speed of motion of the vehicle.

In other respects of CityLink, huge numbers of e-tags have been issued, which is partly applicable to what I was saying before. The other uses for those tags are really interesting, too, in that once you have got some transpondable device in a vehicle, it can then be used for all sorts of other purposes, some of which may raise some questions such as privacy and the ability to track where people are and how much protection that should be given. Equally, if you want to buy fast food from a drive-through outlet and you do not have cash, why not use the same account?

It has really opened up a whole new business model of vehicle-based financial transactions. The owner or operator of the vehicle has got reasonably good visibility as to what is going on, so they can control where it is used. It is extremely convenient and can be put to all sorts of new uses which people have not even thought of yet. I am sure that will occur.

CHAIR—What technology does CityLink use between the vehicle and the—

Mr Skinner—It is a form of what is called dedicated short-range communications. There is a standard attached to that, and that is about the limit of my knowledge. I would be happy to obtain more data and bring it back for the committee.

CHAIR—That would be helpful. That was an opening question; I am sure there are others.

Mr TICEHURST—With respect to universal coverage for distress and emergency calls, are you proposing you would link in with the normal cellular phone system?

Mr Skinner—Not necessarily. Currently in the outback areas, people are sometimes encouraged to carry high frequency radio, which can be used for distress calls. Alternatively, they will use the EPIRB personal distress location beacons that yachtsmen use, which are satellite relayed. But I think it is very likely indeed that there will be real time satellite coverage restored after Iridium and so on went broke, such that that would then be readily available. One of the enabling technology developments for this to occur is that, within the automobile industry, the integration of electronics within those vehicles are well advanced. There are at least three examples of software and hardware platforms having been developed which can accommodate a number of different communications technologies, so that as you move from, say, an urban area with GSM or some other high usage cellular you can move into a rural area where there is a different coverage and then on into a remote area where there is no cellular coverage but there is satellite coverage. As far as the vehicle platform is concerned, it is an easy transition. It is expected that people will move from one type of coverage to another. Naturally there is a cost associated, and you will need to have subscriptions to various services or pay for them on an 'as used' basis and so on. But the business model is not in place; the technology is well advanced.

Mr TICEHURST—You also mentioned the 911 requirement in America for location. Isn't that primarily based on cell phones?

Mr Skinner—Yes it is, but there is no reason why it need only be based on cellular phones. The cost of global positioning system chips and the antennas that go with them is falling so rapidly that it is almost a trivial cost now. So any communications link can be used to relay that information. It could be attached to those HF radios that I mentioned that are used in the outback now, if you wanted to; I am sure somebody has done that. Cellular is one way of locating somebody. It is not a particularly elegant solution because you have got to be covered by more than one of the towers or base stations.

Mr TICEHURST—Unless you have GPS.

Mr Skinner—But if you have got GPS—I think you can get it for a wristwatch for $45—then attaching that to any communications device would be equally good.

Mr TICEHURST—Yes, fair enough.

Mr HATTON—Mr Skinner, it is a very sane and balanced piece that you have put in to the committee. I note last parliament this committee was actually transport and communications; we have been divided, and that may be why we missed out on the transport part of it. You made a very sensible point arguing about the redundancy of equipment and the fact that in a 10-year cycle the technologies will have changed dramatically, but will the particular spectrum needs of transport have changed? Take the example of the CityLink project. I know the company that put that together had lots of problems. They have had problems conversing with their counterparts in Sydney, where we have had three different incompatible standards, and there is a big problem trying to mesh that together. Are there specific parts of the spectrum that need to be put aside for this?

Mr Skinner—With the caveat that I am not a communications expert but I do follow this as best I can, my impression is that it is being done. I am not aware of any particular part of the spectrum that has been overlooked and will be a major problem later on. I am happy to be proven wrong on that, but my impression is that the Spectrum Management Authority is keeping well abreast of international developments. I noticed the previous speaker perhaps gave an impression that things that happen in North America are one way and the rest of the world does it another way. I do not really agree with that. I think if you look carefully there are variations all around the world. Japan tends to do it differently to everybody else; in some parts of Europe it is different—the UK does it differently to France and so on. So provided we maintain our role in the international fora that deal with these issues, and provided the issues have bubbled up from groups such as our own, I am reasonably confident that these things will be foreseen. We have not identified anything within ITS Australia where there is a major drama that we would like to see overcome. We do keep in touch with the SMA and so on.

Mr HATTON—You have alluded to the fact that there are major changes happening in transport. We are aware of what is happening in rail with the change of ownership and the expectation that in the future there will be a lot more rail freight running more efficiently than ever before from one end of the country to the other. You also made the point, in one of your five major points, that there has to be full coverage for all intermodal transfer points. That is very significant for Sydney, for instance, because one of things that we are trying to do is keep the trucks out of Sydney. There are two major points where that is happening. One of them is Yennora, which is just outside my electorate. The Patricks organisation is taking the trucks there

and rail freighting into Port Botany. Can you give us some specific examples of how, in practice, the interoperability at those transfer points is important? What sorts of things is it used for?

Mr Skinner—I am thinking of the example of a container with valuable cargo which the shipper decides to track continuously door to door. It should not fall out of sight anywhere during the journey. An intermodal point is that it will move from one mode to another—taken off a train and put on a truck or whatever. You would hope that that would be just as well covered as any other part of the journey. If it is a very unusual side trip to deliver a single container, then it might be a bit unreasonable to expect coverage of that part of the journey, but certainly all the major routes and the transshipment points should be covered. Similarly, with passengers, where there are mainstreams there will be some very infrequently used routes that might not deserve that sort of coverage.

Mr HATTON—In terms of operational efficiency, there are all sorts of things that airlines are doing with barcoding and being able to track stuff all around the world. You can use barcoding and those wireless points to be able to help keep track of the goods.

Mr Skinner—In the last couple of days, I just happened to have been reading about barcodes versus various types of electronic related tags. There is a big difference. Really, barcode technology has gone about as far as it can go. It requires physical proximity and positioning to make use of it. With the tags, you do not require that. The tags work on the basis of proximity in any direction and can contain a vast amount of more information. You could have a whole air bill or way bill built into the tag and you could read that entire tag, whereas on a barcode you have so many characters and that is it; then you have to go somewhere else to look up what that tag means. So it is really a different generation. The principle seems similar, but you can do a lot more now with wireless technology.

Mr HATTON—I imagine having the extra information available in the tags would be useful for Customs and the police.

Mr Skinner—The whole manifest could be in the tag, yes.

Mr HATTON—For the companies, it would mean an enormous amount of time saved in dealing with manifest and so on?

Mr Skinner—Absolutely.

Ms GRIERSON—I do not know very much about your organisation. It seems to me that in 1992 to set up a cluster industry and industry development group like yours would have been quite visionary. Was it assisted by government at the time?

Mr Skinner—It had very strong support from the Australian Transport Council. There have been a number of programs that have been fully or partially funded. The Australia Transport Council has representation from all federal, state and territory governments and even has observer input from New Zealand.

Ms GRIERSON—Is that leading to some cross-state decisions?

Mr Skinner—I would not say 'decisions'. It certainly is looking at national recommendations and perhaps even a little bit beyond that. These are then brought forward by various means. Obviously, one of the key stakeholders is the Australian Transport Council, which might then be expected to act on that in whatever way it sees fit. ITS Australia is independent of the ATC. ITS Australia can act on its own behalf according to its charter and to its members, and it is responsible to the board of ITS Australia. Some of the members of that board have been put there by some of the bodies in the Australia Transport Council.

Ms GRIERSON—What are your links internationally? How do you access that?

Mr Skinner—All major developed countries have some form of similar organisation. They are in frequent contact with each other. There is a very wide sharing of information and collaboration at an annual event called the Intelligent Transport Systems World Congress. It rotates in three areas—that is, Europe, North America and the Asia-Pacific. The last Asia-Pacific world congress was in Sydney last year. The next one is in North America. It will then move to Europe and then back to the Asia-Pacific. Through such forums and several others that happen at a lower scale between that major event, there is an extremely wide range of international cooperation. It also extends through Standards Australia. There are various technical committees of the International Standards Organisation. Standards Australia is very active in a number of those. One in particular is related to the area of intelligent transport systems. Australia has always been active in that.

Ms GRIERSON—You think that the spectrum regulation is not affecting your area particularly. Is there a need for any particular dedicated spectrum for any specific user?

Mr Skinner—I am not aware of any particular spectrum that would want to be exclusive for the use of transportation. What I think does need to be given full account is the increasingly broad and varied usage of the spectrum for transportation. I say that because I think there has been some feeling within the organisation that it has not always been given the same weight as other uses of that same spectrum.

Ms GRIERSON—Just to be the devil's advocate, what if I suggested that the sorts of ventures you want to take on—taking into account the efficiencies and the safety of transport systems—are particularly oriented towards major population centres and will basically require quite a deal of the budget, if that is the way we go? Therefore, parts of Australia will continue to say, 'Yes, so much of our transport systems budget has been allocated to capital cities.'

Mr Skinner—With great respect, I would say that it is the other way around.

Ms GRIERSON—What an optimist!

Mr Skinner—The coverage in the major areas of population will be driven by other imperatives. Consequently, they will get the investment anyway. I think ITS Australia would be arguing that more investment should be put into the other areas that are not being covered in that manner, such as transport routes. Therefore, at any point in a major transport route there would be full coverage of a suitable technology that could be used for a distress call or for routine reporting or whatever level of service is regarded as being reasonable. So I would really say that it is the other way around.

Ms GRIERSON—There are obviously some generic needs that will benefit everybody. I would think that making the transport systems work, making the freeways and motorways much easier to operate, does suggest that funds will go to those directions.

Mr Skinner—True. But I do not really see this as being a motorway- or a tollway-related thing at all. I see it more in the long haul truck routes, the rail routes and in the air cargo, the moving of passengers around, so that people can make a distress call wherever they are in whatever vehicle they are in. That is what we are really on about.

CHAIR—In your submission on page 7 you talk about the ITS technology that is in taxis, saying that they are 'jammed with wireless technology'. You say that Australia, in particular, benefits from this, as opposed to places like New York and Tokyo, but you also say:

> Greater use of imaging and positioning in private transport, public transport, cash security vans, and other security related applications will only be possible if wireless broadband spectrum is allocated for this use.

Would you like to explain what you mean by that in terms of the spectrum being allocated for this use in particular?

Mr Skinner—We may have used the expression rather loosely there. We would not see this as being something that demanded additional, specific or dedicated spectrum. It is more an issue of quality of service. If, for example, security cameras in public transport buses are considered sufficiently important to protect passengers and the operators, then the reliability of that service has to be at a high level. That in turn means the geographical coverage and the capacity of the channels must be such. That is the sort of dedicated allocation that I think we really meant there. We had used the terms rather loosely.

CHAIR—As there are no further questions, thank you very much for your evidence. It has been extremely useful.

Mr Skinner—Thank you very much for the opportunity to speak.

[3.55 p.m.]

PARKER, Ms Catherine, Executive Officer, Australian Information and Communications Technology in Education Committee

RIGBY, Mr Bruce, Adviser, Australian Information and Communications Technology in Education Committee

TAYLOR, Professor James, AICTEC member representing the Higher Education Sector (Australian Vice-Chancellors Committee); and Deputy Vice-Chancellor (Global Learning Services), University of Southern Queensland

CHAIR—I welcome the representatives from AICTEC—Mr Rigby, Professor Taylor and Ms Parker—to the hearing of our committee today. Although the committee does not require you to give evidence under oath, I should advise you that the hearings are legal proceedings of the parliament and warrant the same respect as proceedings of the House. The giving of false or misleading evidence is a serious matter and may be regarded as contempt of parliament. Would you like to give some more information about yourselves?

Prof. Taylor—I am from the University of Southern Queensland, and I am the AVCC higher education representative on AICTEC.

Mr Rigby—I am from the Department of Education and Training in Victoria, and in this case representing the interests of AICTEC in relation to schools and also making reference to TAFE and vocational education and training.

CHAIR—Would you like to give your opening statement, and then we will go to questions.

Ms Parker—As a preview, I mention that AICTEC has been operating since 1996 as a cross-sectoral advisory committee to MCEETYA—the Ministerial Council on Education, Employment, Training and Youth Affairs—on the use of computers and online technologies in Australian education and training. I think it is a demonstration today of the cross-sectoral nature of the committee in that we have the higher education sector, the schools sector and AICTEC itself represented, and that is how we operate. I have provided an organisational chart to you as well, showing the relationships and how we operate.

As background, I might say that it is becoming increasingly recognised that education and training is a key industry in the Australian information economy, as a producer, consumer and export earner. The education and training industry produces skilled people, creates knowledge, provides access for the community to the lifelong benefits of learning and is an enabling force for other industries. Information and communications technologies—ICT—are being used to enhance and support every aspect of education in Australia and overseas: teaching, learning, management and administration, communications, assessment systems, library systems—I would say there is not an area that ICT does not touch to support teaching and learning. In fact, we would go so far as to say that technology is transforming teaching and learning. The

importance of technology can be summed up in the following statement from the United States CEO Forum on Education and Technology:

> The nation must see the development of 21st century skills as critical to the success of students. Today's student will require new abilities to thrive in the future. In the knowledge-based economy, knowing how to locate information quickly, weigh and evaluate information for bias and accuracy, and synthesize and apply that information to solve problems will be a primary asset. These 21st century skills include digital age literacy, inventive thinking, effective communication and high productivity abilities. The nationwide education technology efforts should focus on how to apply technology's powerful tools to achieve educational objectives.

We certainly believe the same is true in Australia. The level of expenditure on computers and systems in Australia is growing exponentially, as is the educational potential of new technologies in schools, homes and universities. The challenge we face as educators and as Australians is to make sure that all learners are provided with the same opportunities for access to learning through computers, using high-speed access to the Internet and other forms of online communication.

While Australian Internet use overall is increasing very rapidly, there are disparities in online access. People on low incomes, people without tertiary education, people living in rural and remote areas, people of Aboriginal and Torres Strait Islander heritage, people with disabilities, people with a language background other than English and people aged over 55 are less likely to use the Internet. ABS data at August last year shows 67 per cent of Australian households are not connected to the Internet. Australian adult Internet users tend to be younger, male, earning in excess of $75,000, employed and living in metropolitan areas. These disparities are reflected in our educational institutions.

I want to make a brief comment on the availability of broadband access in Australian schools. While an increasing number of Australian schools have Internet connections that enable multiple classroom use, a number—particularly in remote areas—still have only single line dial-up access and some have no access at all. In many schools, the increase in online activity means that a 64 kilobit per second connection is definitely inadequate. Disparities in access and cost between urban and rural areas present key equity issues as well as issues for regional industry development.

The vast majority of our schools do not have the level of broadband access that is needed to fully embrace a digital curriculum. There is a definite imbalance, but that is not to say that we are in crisis. We have come a long way since computers became ubiquitous in education in the nineties. In 1994, the then Premier of this fair state excitedly put out a news release that announced a new era for Victorian school children with the launch of interactive satellite television. In what was pronounced as a world first, satellite dishes had been installed in all government and independent schools across Victoria at a cost of almost $4 million. Programs would be beamed by satellite to schools to watch on TV, and students would be able to talk to the presenters of the programs and ask questions about the program using the telephone or fax machine.

Less than 10 years later the world has shifted, and there is an awesome range of new technologies to assist learning. Using their computers, students can now see and talk directly with astronauts in space. They can complete a substantial part of their work using digital cameras and scanners, use global positioning devices as resources in their geography lessons or get the feel of the Antarctic through a virtual reality simulation. Graphical calculators, digital

TV, PDAs, hand-held computers, portable computers, wireless local area networks, satellites and interactive whiteboards, and the list goes on—all of these applications mean increased bandwidth.

I would suggest that Australian education is changing to meet the challenges of the information economy, and we are having to make those changes very fast. Australian governments have made, and are continuing to make, major investments in information and communication technologies in schools, colleges and universities. Overall, the picture that emerges across jurisdictions is one where much progress has been made but where much remains to be achieved.

As mentioned in our submission, the survey into the extent of wireless broadband takeup in the education and training sector gives us a sense that we are on the verge of a technology boom in this area. Some institutions, though, are light years ahead of others; some are tentatively putting their toe in the water; while for some it is a case of: 'What's wireless?' So far, the main use of wireless networks in schools and colleges seems to have been as a supplement to bridge the gap between the fibre backbone and end users rather than as a stand-alone system, but there are exceptions. We get the sense that wireless is an evolving and exciting technology and that we are definitely well placed to move forward. The technologies offer us the advantages of increased mobility and flexibility and decreased costs. They definitely have a place in the education market as part of a complete infrastructure that enables the provision of broadband on demand.

We appreciate this opportunity to provide information to the committee and suggest that the policy discussion needs to keep in mind the agreement reached by state, territory and Commonwealth ministers of education in April 1999 to introduce the use of technology as part of the *Adelaide Declaration on National Goals for Schooling in the Twenty-first Century*. National goal 1.6 states:

... when students leave school, they should:

… … …

> be confident, creative and productive users of new technologies, particularly information and communication technologies, and understand the impact of those technologies on society.

And therein lies the challenge. We are very happy to answer questions. Thank you.

CHAIR—The Canadian parliament did an inquiry not dissimilar to this one a couple of years ago and handed down its report last year. One of the main recommendations of the report was that every school, hospital, library and government office should be connected through wireless broadband technology by a certain year—I think it was 2004.

Ms Parker—Yes.

CHAIR—I have two questions that I want to ask about that. Do you think that is a desirable goal? Have you done any work on the cost that that would entail, bearing in mind that the Canadian minister who apparently agreed to the recommendations of that inquiry has since been sacked because of the absurdity of the proposition in terms of cost? Perhaps they did not do it

quite in the right way and we might be able to come up with a better way of doing it. Have you done any work on the cost of such a proposal, just for schools, for example?

Ms Parker—Schools are starting to look at the overall cost of increasing broadband. At the next MCETYA meeting in August a report will be tabled that looks at the use of broadband in each of the states and territories across Australia and recommendations are going forward as to how that might be improved. We are still at the starting point in regard to costing any proposals. Bruce, would you say that is right?

Mr Rigby—I would. I would also make the point that we are really on about users, content and how the content gets to the users. This may take many paths; it is the lesson of the Internet. In the situation that you have just mentioned, wireless may be the most cost-effective solution or it may not. If you look at a CBD scenario it may well be cheaper to run fibre through existing channels and get a better benefit in the end so, I guess, it depends on what the other drivers are.

Looking at the schools sector, we would expect there to be a real patchwork of technologies with the most cost-effective technologies being used as appropriate, and seamless integration of those technologies. There are major benefits in terms of cost in old school buildings where it is often cheaper to use wireless right now. In new school buildings, it may well be cheaper to cable at the start of building. To achieve certain learning outcomes, mobility may be the No. 1 most important thing. We would feed all of those things into the equation but there are sets of issues that come out of that scenario that apply across the board.

Prof. Taylor—In the higher education sector, if you are interested, it is more clear cut. Teaching and learning is being transformed in every discipline and subject by the Internet and access to computing. Computer laboratories used to be built for people who were learning IT skills, now, whatever the subject area, the demand is for access to the Internet and access to software packages—it is part of the information revolution, as it were. It is simply not cost-effective to carry on building computer laboratories; you cannot sustain that in any way to meet the demand. So the answer is mobile access pocket PCs like this iPAQ Palm Pilot I have. I have downloaded some stuff through the wireless at the University of Southern Queensland which shows video and there are about a dozen novels on this device. You can access the e-library systems we have and it also provides access to a whole range of resources for teaching and learning as well as interaction with other people.

The other thing that I think needs to be broader in the higher education sector is that the system also deals with access to university services and systems. Not only is it teaching and learning but it is also enrolment, administration, payment of fees and customer relationship management, which we use for ECRMs. In terms of cost, it transfers the institutional variable cost back to the consumer so, in effect, we are expecting students to buy these in the way they would buy a mobile phone. They are used prolifically. Students like things that fit in their pocket.

We see this as providing access and, in a way, fundamentally changing the way that you would fund and cost access to the Internet on campus. It has been our experience that students are either using laptops with a wireless card or, increasingly, something like this. I know you have seen examples of this, but I can show you some video technology that has been downloaded off our web site. It is a fundamental change in higher education.

CHAIR—It is a very good technology and we should be grabbing it with alacrity. But isn't there the danger in schooling that, for example, the high end schools such as the Scotch Colleges, Shores, Riverviews et cetera, as part of the service offered to parents who want to send their children to those schools, might well be able to afford to provide access points in each classroom linked to wireless broadband technology and the students at those schools might well be able to afford laptops and, therefore, be vastly in front of the students in government schools or less well-endowed schools that have to continue to use computer labs, as you have pointed out? How do state and federal governments work together to try and make sure that that does not happen?

Mr Rigby—Firstly, the trend in government schools is exactly in the opposite direction to that. There are very few government schools that advocate laptop programs for students. Some would argue that it is cost driven, but there is a very good argument that the biggest benefit comes from focusing on a networked view of the world rather than a personal computing view of the world. There has actually been some concern about the use of notebook computers—that they become glorified note taking devices et cetera. Through notebooks or through, at the moment, hard wired PCs, the real benefits come from having access to a much broader range of information sources than you would ever pack onto a notebook, a range that can only exist and be accessible through a network—through collaborative opportunities that can only come through being networked.

At the moment there is a trend in schools to move away from labs and to fund the distribution of computers around each school campus, if not in individual classrooms then in pods between classrooms and so forth. The next step is the wireless step. That allows you to get even more flexibility in the way you use whatever resources are available. One of the clear trends is exactly the opposite of the computer lab learning experience. You do not say, 'Okay, we are going to do computer.' You have a learning environment that has beakers, books, people and flexible accommodation, and the technology appears as and when needed. The way that happens is through these things. At the moment it is through PCs or through notebooks on a trolley, but increasingly it is through these hand-held devices. They are relatively cheap and relatively robust and you do not have any of the hassles we have had with hard wired installations. One of the biggest barriers to the next wave of benefits from technology in schools is encouraging the majority of teachers to embrace these as an accessible part of their tool kit. At the moment, the barriers to getting technology in front of students are still pretty high, even if they are in the school. Compact portable devices are absolutely the way to go with that. They make the technology accessible, psychologically as well as physically.

Prof. Taylor—There is also a likelihood that the prices of devices like this will come down, if market demand is big enough. If you think of every schoolchild, every person at TAFE college and every student who might want to rent one like they rent a mobile phone, it might be that the device would come with them and you pay $30 a month for a certain amount of access. At USQ, we have been trying to get someone to build a low cost device for about two years, but I believe the industry is trying to milk the high end of the market at the moment so that, for example, this one of mine, which is a very flexible one, costs about the same as a PC. They are pushing that market now, but I think there is a place for this, below the level of a laptop and a PC, to give simple communication access to lots of resources. There is also a business opportunity there for a company who will explore that business model.

Mr HATTON—In direct regard to that, you should probably have a talk to Hewlett Packard, who have now joined with Compaq, and you should have a talk to the Argentinians who are in the process of building the nuclear reactor at Lucas Heights, because as a company they do a lot more than that. One of the people involved in that project has linked up with Hewlett Packard to put a new proposal together so that they provide satellite access to all schools in Argentina—this should have kicked off in about April last year. That satellite provision of Internet data would effectively then allow them to use Internet slates, originally. They were working with Hewlett Packard and trying to provide a cost-effective solution to this, with the end view of getting something in the $50 to $200 range, rather than having the sorts of costs we have with iPAQs and Toshiba PDAs and so on.

Even though you have already indicated that technologies are changing so much, the other factor that we will need to take into account is that in October this year the tablet computer and other forms come out and for school use in particular that technology has a very high screen readability and that dramatically changes the way in which all of that technology will be used. However, it is a pretty wonderful thing to have a committee that actually tries to get some standardisation between the states: in the teaching area, as in all other areas, I have seen that that is a pretty difficult thing to do. We have still got a problem, I think, with recognition of professional qualifications and recognition of qualifications of students—standards—across Australia, despite the fact that we have been trying to do that for a couple of decades. How difficult is it in this area for you to get commonality and standardisation of approach between the states, given that within the state provision you have to have different solutions for different areas?

Ms Parker—As you can appreciate, it certainly is difficult to get seven state school jurisdictions to agree on some sort of aggregation of demand—I think this is what we are talking about. Then, if you bring in 200 separate TAFE colleges and 40 separate universities, it is very hard to get everyone saying, 'Okay, let's pool our demand,' and 'This is what we are going to buy.' I think there are various ways that it is happening, both within the sectors and cross-sectorally. Within the sectors, the CEOs of each state and territory education and VET system meet together regularly as the Australian Educational Systems Officials Committee, and access to broadband generally is one of the leading items on their agenda. Within the states individually, there is recognition that states are locked into whole of government purchasing arrangements. They have tied up deals with some of the major telecommunications providers for five years or maybe longer, so getting them all to come together at the same time is like aligning the planets, I would suggest. But there is recognition, and there is also recognition that the system may not operate as well as it should and, in that, I really do think there is progress.

Prof. Taylor—I think there is an underlying optimism in the sector in general because of the commitment to interoperability that has been created, which is outside the users and the people who are developing the devices and the standards, like 802.11a and 802.11b, for interoperability of courseware through IMS specification. I honestly believe that that will create a base for mass markets in education in general and in sharing of courseware. The delivery mechanisms will also be managed through a commitment to interoperability of the manufacturers, so I do not see it as quite as difficult as Cath has made out.

Ms Parker—No, I would not say that. I am an optimist.

Mr Rigby—There are two outstanding examples of that. In the school sector, the learning federation initiative is one. It is a $68 million Commonwealth-state initiative to produce what you could fairly describe as next wave online learning materials. The premise is that the base materials know no borders. They are developed once and are able to be used in all the states; if required, they can be repackaged or reassembled to meet specific local needs. That initiative is in fact driving international standards development—the convergence of a number of different standards that need to be brought to bear on digital material.

There is a comparable example in the VET sector, which has produced a set of online learning tool boxes. Both of those initiatives have produced material that overcomes many of these boundaries. The discussions that have grown up through AICTEC—and through its predecessor, the EdNA reference committee around the EdNA online service—have led to a degree of discussion between jurisdictions that I do not think has been experienced before. Whilst we do get locked in to three- and five-year contracts for telecommunications and ICT hardware and so forth, it tends to be a case of following the leader with regard to best practice because there is a very good sharing of intelligence through that community, which has not been so evident before.

Prof. Taylor—The other view I have on that is that it does not matter what we do in Australia: in my view, we will be carried along by global development. If we are not part of that, we are on the way out in terms of achieving any sort of impact. So I think it is really important that the Department of Education, Science and Training pay the membership of IMS—the global learning consortium—and have active representation on the global standards developments for educational coursework.

Mr HATTON—As an aside, I suppose we should give you a gold medal for the acronym MCETYA, particularly given a certain company's direct interaction with schools. In terms of the expectations of kids using the Internet and getting information—and we are just bigger kids, I suppose—the key problem is latency and how long you have to wait to get the stuff coming through and that need for speed we have. If you look at the argument you put forward, it was primarily couched in those terms: we need wider, better bandwidth and more access, it needs to be quicker and so on. How much work is being done on slower access for schools—overnight trickle down of information, for instance, and provision of local area networks in schools where data that is needed is stored and accessed locally at very high speed and with a low download cost?

Mr Rigby—There are examples in several states. Some of them are being driven by systems, some by industry. They are very attractive. In addressing the bandwidth and download cost issues, we will have to look very hard at a distributed content model as opposed to a centralised and continuous flowthrough model. One of the solutions there is just what you have suggested. It does raise a few technical issues, however, about how to integrate content of that kind. There are some intellectual property issues as well. These things are still being tested at the moment.

One of the thoughts we have is that those approaches may be overtaken by increase in bandwidth generally, but that solution is definitely one of the ones that is being looked at and will be looked at more extensively over the next couple of years. There is a project called the Learning Systems Architecture Initiative. It is an initiative of the ICT in Schools Taskforce, which is a taskforce of MCETYA, and that is one of the issues being looked at through that group.

Prof. Taylor—In higher education it is a lot more advanced because of the existence of AARNet and the networking and sharing that already occurs there, and the costs of access have been coming down steadily over the last few years. So there are models, and as we get more and more access I think the trend will be that there will be less and less cost for the user because there will be more of it. So it is a matter of our making sure that the infrastructure can deliver; I think that will lead the usage. Making it much more cost-effective in terms of quantity will encourage usage, rather than making it some sort of exclusive privilege.

Mr HATTON—Given that the costs of accessing information over the Internet are still relatively high and given that Xerox is in a bit of trouble, I wonder if there is still a correlation between the amount of Internet access and the amount of money that Xerox is making out of our schools because of the high use of photocopiers within schools?

Mr Rigby—We are into another area there which is being closely examined under digital copyright; there are issues that are being actively pursued elsewhere.

Mr HATTON—Let me explain a bit further: in the old days, you did not have an information rich environment in which kids worked; primarily, you had textbooks and those textbooks were all some schools had, if they did not have library access. When schools moved beyond single textbooks, the tendency was to just belt stuff out on the xerox or gestetner machine, because people were trying to find lots of information from all over the place. Now the big information machine of the Internet is available. You can find lots of information. There is not necessarily much knowledge, but there is a lot of information out there; there is almost an overburden of it. But, in terms of the way teachers and schools use information, I suspect they are still stuck in the middle. The teachers are not allied to textbooks in the way they were, but there is still a big overuse of the paper based stuff and they are still relatively unsure about how to go with Internet access.

Mr Rigby—We have fairly extensive penetration of computer access into schools—nationally it is something like one computer per eight students and in this state it is one to 3.8. There are a lot of computers in schools, but one of the issues is that a lot of them are in labs and libraries and so accessing information as conveniently as on a handout is not so easy. But that is exactly where this kind of technology comes into its own, because there is no excuse for there not being access to a library of books or a journal article in every learning space, whether it be a classroom, a school oval or some other teaching situation. So the subject matter for this committee is prescribing a solution to that last leap from paper to digital.

Prof. Taylor—In the higher education sector, there has already been a huge leap. In our university we have four times as many electronic journals as we have print journals. The print model of access to monographs or journals is on the way out; it is dying rapidly. You can get much better access when journal articles are delivered directly from the aggregations that are available through systems like EBSCO host to one of these for everyone. In that sense, the future of all education is through electronic libraries or access to information through aggregated systems, because it is much quicker and much more cost effective—the difference can be measured in many percentage points. I think it is inevitable that schools will follow that pattern, once access to the Internet is more ubiquitous.

Mr Rigby—There is an integration factor here as well: there are learned journals, there are course materials produced by universities, schools and TAFE providers, there is information from the broad Internet and there are selected views of that. Now we are able to bring all that together in the learning environment so that students do not have to race out, use Google and take risks. You do not have be restricted to this or that or the other thing. The technology is making it possible, and in each of the states—although some are more advanced than others—a number of initiatives are actually implementing ways of getting the best value out of that much broader range of source materials. Again, one of the major benefits is coming through net-working, and that last leap is really about having proximity to the learner, rather than the learner having to go to the oracle to get the information.

Ms GRIERSON—I would suggest that interoperability and compatibility should be your major goals, rather than finding a universal solution. Universal solutions can be very costly, and economies of scale are totally lost when there is no effective use of those options. The extreme example was the roll out of satellite dishes and equipment in every school in New South Wales. That was done at considerable cost, with no funding for content and no incentives for people to provide anything on that equipment. At the level you are talking about now, perhaps higher education does not have that worry in terms of Internet, but certainly in the primary and secondary areas regurgitating rubbish off the Internet is not an advancement in technology. It seems to me that there needs to be more funding for the support services.

I think EdNA has been a very welcome initiative that has tried to provide some quality control and incentives to good content, but that is still a major issue. The software and the hardware sitting in schools do not necessarily ensure quality learning, quality content for learning or a support for learning. That is a major problem, and I would like to see that taken on side by side rather than in just one thing. Another thing I would like to ask is whether you are represented on the m.Net organisation at all? We had a presentation from m.Net yesterday in Adelaide. It has received over $9 million in Networking the Nation funds from the government. Education is one of its six major focus areas. Are you represented on that body?

Ms Parker—No. I am not aware of them.

Ms GRIERSON—I suggest you should take that up with someone.

Ms Parker—I would be interested to know who they are dealing with then.

Prof. Taylor—I think it is a danger that you think of the Internet as just access to information.

Ms GRIERSON—No, please do not ascribe that to me. I do not want to be seen in that way.

Prof. Taylor—In the education sector where we do research on interaction, we find that about 75 per cent of the interaction is between people and about 25 per cent is to do with accessing material. We are primarily looking at higher education and particularly at the postgraduate level. The pedagogical benefits are in that interaction.

Ms GRIERSON—Those interactions are most beneficial for any age group and in any sector. They are obviously the ones that need cultural change in terms of the facilitators of learning, and perhaps we are not there yet.

Ms Parker—We are certainly aware that quality resources through the Internet are what will drive it in education. The project that Bruce referred to—the Schools Online Curriculum Content Initiative, costing $68 million and jointly funded through state and Commonwealth moneys—is definitely intended to do that. If a teacher wants to look up frogs, they can go and find quality resources on frogs and not be distracted by all the rest in the pond.

Ms GRIERSON—I suppose I should have made the point to you that of equal importance is pedagogy and, therefore, cultural change in adapting the culture to use this in the most effective way. I guess it is a threefold thing: the provision of access to technology, content provisions and pedagogy itself.

Prof. Taylor—Which, in effect, points to staff development as a key issue.

Ms GRIERSON—There is huge underspending in this country.

Mr Rigby—Ironically, the thing that might seem most significant to teachers will be when we can give them a palm pilot and they can mark the roll and find out whether so and so is actually at school that day as they are not in the class.

Ms GRIERSON—If you could package time for them, that would be lovely.

Mr Rigby—Absolutely, we will throw that in as well. This is the psychology of the thing: technology is still seen by many teachers as an added burden, as well as giving them some wins in certain areas. So this next step is critical to make the leveraging of all these terrific things easy.

Ms GRIERSON—Yes, and I still see those satellite dishes having some wireless capabilities, so you never know.

Mr JOHNSON—I have one main question and that is about the informal survey. Has consideration been given to a formal survey being done? The second part to that is the response or the lack of a response from TAFE. Is there any thought that there will be a substantial request made from all the TAFE representatives?

Ms Parker—Yes, we were talking about this just before we came in. Certainly we find that if one sector takes the lead in something the others very quickly follow. An example was looking at the broadband needs in schools last year. This year a national survey, which was a major consultancy to look at the needs of the VET sector with bandwidth, has been undertaken. We expect that they will very quickly come on board and see this as an area of interest. It is not that they were not interested; with 200 separate organisations and a short lead-up to this inquiry, I think it was just the time that it would take. But we certainly welcome the inquiry. We think it has generated interest that, without the initiative, we possibly would not have brought together as an education and training sector. That was one aspect of your question.

Mr JOHNSON—I am interested in knowing a little bit more about the content of the informal survey and how you presented it.

Ms Parker—AICTEC has a working group to look at bandwidth issues, so this was obviously something that was going to be of interest. The terms of reference were sent out for comment to the members of the bandwidth working group. They were also sent out to individual AICTEC members, including representatives from each state and territory VET system. So there was an opportunity to feed in practical examples or issues with wireless technologies. It was a very informal, ad hoc survey, but it was a good start.

Mr JOHNSON—Another important constituent of the education arena may be the independent schools associations. Have they made any comment?

Ms Parker—Yes, they have. The independent schools sector is represented on AICTEC through the National Council of Independent Schools' Association, as is the Catholic sector. Both those sectors had input into the information that we have provided to the committee. The independent schools sector provided information on what was happening in New South Wales. It was probably still at quite a superficial level, and so it has been aggregated into the submission.

Mr Rigby—The independent schools sector is not highly integrated in the way that state school systems tend to be, so gathering aggregate data is not a straightforward matter.

Ms Parker—But they are certainly very willing.

Mr Rigby—There are many leading examples in non-government schools of the implementation of wireless technology, but it is not easy to gather it over a short period.

Mr JOHNSON—They seem to have their act together in my electorate, that is for sure.

Ms Parker—We could certainly have gathered more information with more time.

Mr JOHNSON—I was also wondering whether you are likely to try to get some sort of impression from the student body as opposed to, say, the teaching body—those who are the recipients as opposed to those who are the teachers?

Ms Parker—Ideally, we could conduct research into a million areas, and that would certainly be an area of interest.

Mr Rigby—Last week the MCETYA ICT in Schools Taskforce hosted a two-day research forum, aimed at identifying key areas for strategic research. The chief executives have retained some of the central funding for research, to direct to strategic applied research topics. One of the issues that arose from that forum was exactly the thing you have suggested—that the expectations of children in particular, and learners of all ages, were often way ahead of their teachers and the institutions that they attended. There are many references to SMS culture and the fact that children use these technologies with great ease, whereas their teachers often do not understand them at all. I think your point has been taken on board at a high level by those looking to direct research in the future.

Mr JOHNSON—I think it would be a very interesting commentary on the culture of the two groups and how they see things.

Mr Rigby—The impact on teaching and learning is incredible. If you have kids doing this—sending text messages—under the desk while you are trying to teach maths or something, you can see this. We have to adjust and accommodate those different expectations in a substantial way, and there is thinking along those lines.

Mr JOHNSON—So there is no danger that these contraptions will have games in them and they will be playing the games all the time?

Ms Parker—None at all.

Prof. Taylor—Do you want to play a game in the corridor?

Mr JOHNSON—No, it does not appeal to me.

Mr Rigby—Games are an important part of education into the future. The point has been made that the investment that is required to develop a game is huge and the life expectancy of a game is very short: therefore, any successful game has got part of that magic solution in it. If as educators we are not paying attention to those factors then we are missing an important part of the picture.

Mr HATTON—Can Internet access fix the misuse of apostrophes?

Ms Parker—Not with the American language that it is based upon. There are too many Americanisms in there, I think.

Mr HATTON—The key point with that goes to something much deeper: that is, we have a problem not only with grammar checkers in Microsoft Word, because they do not work and there is no real grammatical basis to what they put forward, but also there is a problem for children because, whatever the technology they use, they are using material from the Net that is inappropriate for them scholastically—not in any other sense, but the levels are not right. I think we also have another problem in that whatever the delivery mechanism—and this is an eternal problem in education—the materials are not written to fit the age level and the understanding levels of the children. Within the online curriculum materials that are being developed and then broadcast through wireless or through other means, how much emphasis is being placed on utilising the multimedia nature and graphical nature of the tools that are now available, to make things simpler and more comprehensible?

Prof. Taylor—I think it is an important issue that you raise but there is a project which is developing what is known as EML, which is educational mark-up language. That is a system which is part of the interoperability agenda which is going to document exactly the level, approach and applicability of certain courseware in terms of learning objects that will be able to be selected by teachers for certain age groups, objectives and types of applications.

Going to the other part of your question, the use of graphics and multimedia for online delivery is limited because of the concern about access and download. A lot of what is being

developed at the moment is restricted because of lack of bandwidth. If the bandwidth were there, there would be a huge amount of application. The problems that you are raising are being dealt with on an international basis and Australia will be part of that. I do not think we have to reinvent the solution, which is already being tackled elsewhere.

Mr Rigby—The Learning Federation materials will specifically address that as well over a five-year period and we are already coming to the end of the first year. There will be a pool of materials designed for interoperability complying with all the international standards—

Ms Parker—Based on Australian content too.

Mr Rigby—based on Australian content. Part of the IMS standard is a description of the audience, the level et cetera. The whole point of that is not just to produce one set of materials but also to develop the marketplace in such a way that the established publishers and providers of content will be able to blend in with that content set that is compliant with international standards. So, thanks to this joint Commonwealth, state and territory initiative, there is room for great optimism that we will have a compliant set of materials that addresses those concerns. It is also driving the standard up—raising the bar.

Ms Parker—It will be using Australian accents in the multimedia products too.

Mr HATTON—Having material that is written to a level appropriate for the students is probably the most important problem facing Australian education. Throughout the history of Australian education that has not been the case. It goes right up through to the tertiary level and it is one of the reasons I think we have had productivity losses. If we need to convert that, we can sell that kind of productivity gain and those better materials worldwide. You pointed very seriously to materials that came up in the survey. In the summary that has been provided, it said that it was found that they had to use optical fibre when they were connecting a computer lab to the wider school network. Secondly, it said that in Victoria 802.11b:

> has not lived up to expectations created by the industry, with security, lack of interoperability and performance being the key issues.

There were also problems with microwave. So far in the committee hearings we have heard lots of wonderful things about how just about everything has been fixed in these areas. Your survey indicates that, practically, that is not the case. To finish today, could you tell us a little more?

Mr Rigby—Being from Victoria, we produced that dirt. It is pretty typical of early roll outs, I would say. When we were beginning with this, wireless was very expensive. It was at that stage of the game where it was an expensive option but clearly it was the way of the future and in some settings it was a lot easier to implement than the alternatives. So some of that experience comes from the early days, but it is still the case that weather and bandwidth can be factors in some cases. Security is an issue, but we have found that security can be addressed at the local level. It is not intrinsically a problem with wireless, although clearly if you are walking past the school you have access to the data in effect, but you could walk into a classroom, plug in and have access to the data as well, so it is a question of degree. We do not think there is anything intrinsically insoluble; it is just that not all those things have been solved at the point we are now at.

If you look at our submission, it looks like there is a whole scatter of activity and that there is no coherence. That is because people are trying things out in different settings; they are trying out the PDAs and they are trying out this protocol and that protocol. But what is coming out of it is that it is absolutely the way to go in the future. Once we get over the hump of uptake and mainstreaming, wireless will be a critical part of realising the dream of all this. Wireless will also be a critical part of realising all that ICT has to offer. What we hope is that it remains freely available and becomes increasingly cost competitive and that we do not see a degradation of the service through competing uses that are allowed to overlap too extensively. We are aware that it is public spectrum. We are sharing the airwaves, so there does need to be some account taken of competition for use within particular areas.

Ms Parker—The question that generated those responses in the survey was, 'Has it lived up to the hype and expectations?' It depends how glossy the brochure was, I suppose. But, as Bruce said, there was nothing that could not be overcome or that they could not adjust.

Prof. Taylor—We have installed on three campuses, one of which you are going to visit—the Brisbane Centre of USQ. We also have a campus in Hervey Bay and a main campus in Toowoomba. We have not struck any insurmountable issues and we are managing security. You will hear more about that next week or whenever you go to Brisbane—quite soon, I think. I agree with Bruce's summation; I do not think there are any intrinsic hurdles that are insurmountable.

CHAIR—Thank you very much for appearing before us today and thank you for your evidence. We have had a very productive day.

Resolved (on motion by **Mr Ciobo**):

That this committee receives as evidence and includes in its records as an exhibit for the inquiry the document received at public hearing this day from AICTEC titled 'AICTEC organisational chart'.

Resolved (on motion by **Mr Hatton**):

That this committee authorises publication, including publication on the parliamentary database of the proof transcript of the evidence given before it at public hearing this day.

Committee adjourned at 4.50 p.m.