



COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

**HOUSE OF
REPRESENTATIVES**

STANDING COMMITTEE ON COMMUNICATIONS,
INFORMATION TECHNOLOGY AND THE ARTS

Reference: Wireless broadband technologies

THURSDAY, 8 AUGUST 2002

SYDNEY

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**

Thursday, 8 August 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, 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

| | |
|--------------------------------------------------------------------------------------------------------|------------|
| BRAY, George Karl Dewitt (Private capacity) | 457 |
| DAVIDSON, Mr Keith Charles, Chief Executive Officer, Norlink Communications Ltd..... | 437 |
| LAWRENCE, Mr Keith, Director, Networks and Technology, Austar United Communications | 443 |
| McDONNELL, Mr Mark, Adviser and Member, Australian Telecommunications Users Group | 427 |
| MOON, Mr Peter John Anthony, Managing Director, BALTECH Pty Ltd | 448 |
| RULE, Mr Ted, Board Director, CKW Wireless Pty Ltd..... | 414 |
| SALUJA, Mr Kanwar, Manager, Strategic Planning, CKW Wireless Pty Ltd | 414 |
| SCHARBOW, Ms Janet Elizabeth, Project Manager, Norlink Communications Ltd | 437 |
| SINCLAIR, Mrs Rosemary Anne, Managing Director, Australian Telecommunications Users Group | 427 |
| STEVENS, Mr Brian, Director, Norlink Communications Ltd..... | 437 |

Committee met at 9.44 a.m.

CHAIR—I declare open this meeting of the House of Representatives Standing Committee on Communications, Information Technology and the Arts. Today the committee will take evidence as part of its inquiry into wireless broadband technologies. 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 of the various types of wireless broadband technologies and examining their benefits and limitations compared with the 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.

[9.45 a.m.]

RULE, Mr Ted, Board Director, CKW Wireless Pty Ltd

SALUJA, Mr Kanwar, Manager, Strategic Planning, CKW Wireless Pty Ltd

CHAIR—It gives me great pleasure to call representatives from CKW Wireless before the committee today. Welcome. Although the committee does not require you to give evidence under oath, I should advise you that 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. Would you like to make some introductory remarks before the committee proceeds to questions?

Mr Rule—To give you some background on CKW Wireless, I will basically speak to the brief summary which we sent to you. CKW Wireless is a 100 per cent owned subsidiary of ArrayComm Inc. and is based in Australia. ArrayComm Inc. was incorporated in California in April 1992 and is a leader in smart antenna technology. It has developed and licensed these communications related technologies, which enhance the spectral efficiency and cost effectiveness of voice and data transmissions. ArrayComm Inc. has developed a technology called i-BURST that will deliver low cost, high speed and widely available wireless broadband services to customers, allowing them the freedom to move. CKW Wireless purchased spectrum in the Australian spectrum auctions last year and will be progressively deploying an i-BURST network in all capital cities over the next few years. In June, CKW Wireless announced a consortium agreement with Vodafone, OzEmail, TCI and Crown Castle to deploy phase 1 of this network from October this year. We think that this is very exciting news for us and for Australia. It will be Australia's first wide area, carrier grade wireless broadband system that offers customers the freedom of mobility. It is also one of the first such systems in the world. CKW Wireless will be a wholesale network operator and a provider of wireless broadband access services.

We would like to make a very short statement and then we will answer some questions for you. Twenty years ago people started making telephone calls on the move, rather than being tied to a phone line. In other words, they were free to communicate whenever and from wherever they wanted. This very simple concept of mobility has since created new industries, new technologies and new companies valued in the billions of dollars and all focused on the opportunity of providing wireless voice services to consumers and to businesses alike. It is our view that this simple concept of mobility, when applied to data services, will generate the same radical changes around the world as mobile phone services have.

In fact, we believe that the arrival of the Internet into the wireless space will emerge as one of the most significant product cycles of the coming years. We believe this is because there are important and unstoppable drivers underpinning this shift. These are the proliferation of Internet usage across the community and in all aspects of government and business; the rapid increases in computer literacy and the use of wireless services, particularly in the younger generations; the simple convenience of being able to communicate on the move, whether using voice or data services; the growing need for companies and businesses to be able to work remotely in order to

remain competitive and to get the competitive edge; and the increased utility of and demand for hand-held, laptop and other portable services.

These underlying customer demands are, in turn, leading to rapid improvements in wireless broadband technologies, as companies seek to leverage and create value from the market opportunities that are available. In other words, the underpinning drivers for wireless broadband services are as much about consumer demand and generational change as they are about underlying technology, capability and evolution. In our view, when customer demand underpins change, that change is always sustainable. In this context there are six summary points we would like to make to your inquiry.

Our first point is that wireless broadband and data services, although still in their relative infancy, have the same potential as mobile voice services to change how we communicate and to generate social improvement and economic growth. Our second point is that no single broadband technology will provide all the answers, just as there is no single technology in the voice world. In reality, it will be a combination of evolving wireless and fixed broadband solutions that will deliver consumers the full potential of broadband. In an analogy with voice services, we have fixed phones, we have cordless phones with limited range and we have cellular phones where you can go almost anywhere. Similarly, the same is emerging in relation to data or broadband services. We have fixed data services, such as cable and ADSL; we have the equivalent of cordless data services with a limited range, such as 802.11 technologies; and we have emerging cellular-like broadband data services like ours and others.

Our third point is that, while there will be many solutions, there will also be some false starts as customers vote with their feet as a result of the limitations of various offerings and technologies. What is important with these false starts is that they are seen by policy makers as part of the natural development of a new industry rather than as limitations in the potential of broadband wireless or areas to be further regulated.

Our fourth point is that Australia, comparatively speaking, is well positioned to take advantage of the growth in wireless broadband services. Our spectrum options have delivered some sensible commercial outcomes. Indeed, the Australian government's decision to auction paired and unpaired spectrums separately was world leading. Our regulatory regime, while always adjusting and improving, delivers on the important principles of competition, choice, accountability, spectrum efficiency and effectiveness, and public benefit. Wireless broadband service offerings are being developed and are already commercially available, and investments are in place to deliver these new broadband wireless technologies.

Our fifth point is that it is our view that the role of government is simply to ensure that the broader parameters are in place. These include putting in place the right regulatory and policy settings, creating the right investment climate, promoting competition, ensuring efficient spectrum management, supporting technology neutrality, protecting property rights and supporting the development of global standards. We do not believe that the government should be involved in subsidising technologies or in picking winners.

Our sixth point is that, no matter what we believe the future of wireless broadband is today, we can be absolutely certain that it will be different to what we think it is going to be. What we can be sure of is that the market will play the most prominent role in deciding which wireless

broadband solutions, or indeed fixed broadband solutions, will be sustainable and which will fail. Wireless broadband solutions will play a significant role in delivering Australians choice in broadband services wherever they live and, once customers and companies have access to these services, they will migrate exponentially to the freedom and mobility that they offer. That is basically the statement that we sent to you. I should apologise because all of our serious technical people are away in San Jose on a talkfest today. I cannot offer myself up as a serious technical person at all, but I think I can give you a serious layman's view of these things.

CHAIR—That is all right; I am not a serious technical person either. Mr Ticehurst, however, is a serious technical person, so you are not off the hook!

Mr Rule, in your opening statement, you said that government should not be involved in picking winners and particular technologies, but one of the things that seems to be coming out of the evidence that the committee has taken is that obviously the Internet is the engine for a lot of these technologies being required and wanted and, therefore, you need broadband to be able to deliver the Internet. And mobility is, as you say, the next big thing. But in a lot of rural and remote areas in Australia they cannot even get the Internet yet. In urban areas, everybody is doing quite well. They can basically get the Internet and they can get access to broadband solutions. Mobility will be the next big thing for them. But a lot of Australians are missing out altogether on everything.

Mr Rule—Absolutely.

CHAIR—If government is not involved in trying to find a technology that will be a solution to their difficulties, who is going to do that? I am being the devil's advocate here—I am in favour of free enterprise in the market—but if it is not going to be profitable for the market and private companies to deliver services to those people, then who is going to do it?

Mr Rule—I think you can look at it from a number of points of view. It is really a government decision as to how the government intends to make these services available at a reasonable cost to people outside the places where it is going to be economic. Question No. 1 that I think you have to ask yourself concerns the direct subsidies to people who are perhaps outside the economic range of where these things can be delivered. Obviously, at that stage you have to decide for yourself how much you are going to pay, and I would imagine there is a role for you to say, 'There are certain technologies which we believe can be sensibly delivered at a sensible price which we are prepared to subsidise.'

Where does that stop? For example, it seems to me that there are technologies available now which can deliver broadband at a reasonable price within a certain range of population density. I do not know the answer to what that population density is as yet and, frankly, I do not think anybody else knows the answer either. But within those areas—and I am thinking off the top of my head—you are probably looking at areas down the highways within a couple of hundred miles of Sydney, Melbourne, Brisbane and probably up the Queensland coast. It would seem to me that if these things can be delivered at a reasonable price which the consumers are prepared to pay then there is not a particular role for government to make any decisions on it. Now when you get to very remote communities or people who are even tens or hundreds of miles from any sort of a population centre, I think it is obvious that government may well have a role in making a decision there.

CHAIR—In that case, the government might have to pick technologies that they think are the right ones for those sorts of communities if they are going to be subsidising them.

Mr Rule—Let me emphasise that it is my view at the moment that it is probably going to be a fairly limited range of communities and probably a limited range of people.

CHAIR—What about your i-BURST technology? What can that do for those sorts of communities?

Mr Rule—When we went into the spectrum option, spectrum was available in the eight capital cities—including Darwin, Canberra, Hobart et cetera—and that was what we bought. Frankly, it makes a lot of sense to us to serve a highly densely populated area, but we believe that for certain regional areas and for relatively densely populated regional areas it may well be a solution. But I have to emphasise that we are talking off the top of our heads—we have not done any specific work on it. For example, we think we could probably do Goulburn with two base stations, and those base stations cost about \$US100,000 each. Typically speaking in a place like Sydney, the range of our base stations is always going to depend on the number of people using them at any one time. An example of our phase 1, which is a proving phase of our technology in Sydney where we are doing 10 base stations—

CHAIR—We might take this as an exhibit at some point.

Mr Rule—Yes, absolutely. You will notice that we have different ranges around the different base stations. So at Macquarie University, you are probably looking at about a five-kilometre diameter; it is the same thing at Parramatta, down at the airport and at the University of New South Wales. Once you get into the CBDs where there are a lot more people using it at any one time, that shrinks and you will have a maximum of about a half a kilometre radius from the base station. That is all theoretically very interesting but when we actually ran those things through Vodafone's frequency planning tools we discovered that in fact those 10 base stations cover that whole area.

CHAIR—Right.

Mr Rule—But that is of course because there is only one person in each of the cells. Our technical advisers, who are Arthur D. Little, say that they believe that the radius around each base station could probably be about 15 kilometres depending on the number of people in the area. We believe that is enough for us to become quite interested in what we could possibly do in rural regions. We do not think this is the technology for very remote regions.

CHAIR—Do you think they would have to be serviced by satellite?

Mr Rule—I suspect that satellite is probably going to be the only way that you could do it. I cannot see any other economic technology capable of doing that and, of course, the limitations of satellite are there with the Internet—the uplink and the downlink of satellite and the time which passes between the uplink and the downlink. I cannot think of any other technologies off the top of my head which could actually work in a very remote situation. In what I would call a regional situation—which is most of Victoria, most of eastern New South Wales, a fair amount

of eastern Queensland, and south-west and western Australia—I believe there are technologies, probably including this one, which could work in an economic and efficient way.

CHAIR—The other aspect of government's involvement is that there seems to be a proliferation of people involved in your industry who are offering solutions to accessing the Internet through wireless broadband. They seem to also be in particular regions. So you have Norlink in northern New South Wales and TransACT in Canberra et cetera, and certainly in Sydney, Melbourne, Adelaide and Brisbane—we have not been to Perth—there are lots of different people. Is there the potential for a particular region to accept and develop a particular technology through community activity and through groups of people coming together—for example, local government with local business and chambers of commerce—and then find in 10 or five years or even less that the technology will be utterly obsolete? They will find themselves at quite a disadvantage in comparison to people that did not go with that particular kind of technology, and they will turn around and say to government, 'Why wasn't government regulating this proliferation of technologies so that Australia had the best in the world rather than this patchwork of some that are very good and some that are now obsolete?' That has to be an issue for government, doesn't it, to try to not have a situation like America does with cable television?

Mr Rule—Perhaps that is an issue for politics rather than government. I would make the suggestion that a lot of these things are probably going to be weeded out by the investment process. In other words, I think that if you are not going to be able to deliver a national service—which people in the investment community, the people who are actually going to pay for this, think is going to work—then, particularly in the current climate, it is highly unlikely that it is going to be properly funded. I would make a general point, too. If you look at the technology cycle at the moment, it seems to me that it is getting quicker and quicker. What is new now is not going to be new in three years time. I was horrified in 1995 about the idea that I was going to have to get rid of my analog mobile phone by 2000. I think I have probably gone through two or three phones since then. The reason why I have gone through them is that they have gotten cheaper, they have gotten better and it makes sense.

CHAIR—Laptops are going in the same direction.

Mr Rule—Absolutely. Even with the technology that we are talking about, we are talking about delivering one megabit per second at the moment. We have a road map to go out to four megabits per second, and hopefully we will achieve that in two or three years time. At that stage there is a whole new set of investment that goes on. From a political point of view, I think that is a very important thing in that, even if some of these things do become obsolete over a period of time, people will accept the technology but they are also willing to accept new technologies—or not as the case may be. It is similar to CDMA. I think CDMA is a much better technology than GSM, but you do not see too many people in the cities taking on CDMA.

Mr TICEHURST—You were saying that your technology is complementary to a 2.5G and 3G. Is your i-BURST an antenna technology that could work with GSM or with CDMA, or is it something entirely different?

Mr Rule—There are two technologies involved. There is the IntelliCell technology, which is a smart antenna cell technology. If I could give you an idea of how it works, perhaps that might

help our discussion. In a normal cell you have got a base station sitting in the middle, which is pumping out energy. If you happen to be somewhere in that cell, you receive what it is pumping out, but it is still being pumped out to all the other parts of the cell. Effectively, what that means is that you are pumping out energy that you do not need to pump out. It is bouncing around, causing interference and generally limiting what can go into any particular device within that cell.

Instead of that, we have an array of between 9 and 12 antennae—thus the name ArrayComm. I like to say that it is a bit like binocular vision in the sense that each one of these antennae is transmitting and receiving at any one time. It can pinpoint exactly where you are within that cell. There are a number of algorithms within there that can predict where you are going to be literally in the next micro millisecond. What happens is that you have a wireless wire going to you and there is your own little personal cell of energy, which develops around you. That means that you do not have this stuff bouncing around all over the place, it is easier to suppress the interference and you get a multitude better use out of it. This is a technology which can be used with just about anything. It is at present being used with PHS, which is one of the standards for mobile phones in Japan. When ArrayComm brought it in, it improved the performance of PHS by a factor of nine. In other words, you could do nine times the amount of data. In that sense, yes, you can apply this to WCDMA, to CDMA, to GPRS and to GSM.

Mr TICEHURST—Does it let you have more users per cell?

Mr Rule—It will allow you to have more users per cell but we also have an air interface which allows us to have that. The second part is the actual i-BURST technology, which allows us to get that data delivery per second up to one megabyte. So the answer is yes, you can use it with other technologies. In fact, people in San Jose are working on that as we speak. The real joy comes from the combination of that technology and the i-BURST technology, which is a software technology, an air interface.

Mr TICEHURST—At the moment, are you working with Vodafone? It was indicated that you were setting up your own network.

Mr Rule—We are. We are working on it at the moment. We have done a consortium. The members of the consortium at the moment are OzEmail and Vodafone, which you would be familiar with; Crown Castle, who own mobile phone tower sites around Australia; and TCI, which is basically a construction project management company. Although this is a proven technology, it is proven in certain areas. We are working up on our first phase—which we hope to start sometime over the next couple of months—and will build 10 base stations in Sydney with 250 customers. The objective of this is to integrate all of the systems right down from the base stations to the users and the billing.

Mr TICEHURST—I suppose you use existing Vodafone sites.

Mr Rule—That is right; that is the plan.

Mr TICEHURST—So now with \$US100,000 for base stations, you need quite a few customers to support it. You have got a very limited range; it is a 15k range.

Mr Rule—We can cover Sydney with about 180 base stations, which compares to about 300 base stations, for example, for a mobile phone system. The capital investment in this compared to just about anything else I can think of is actually relatively small. It is about \$200 million. It is a big number but when you compare that to wiring up where we have to go in Australia, or other technologies, it is a very small amount of money.

Mr TICEHURST—The CDMA network normally has a much longer range than the GSM because of that technology. Were you to use this i-BURST on CDMA, would you expect to get a better range?

Mr Saluja—We should just revisit ArrayComm's business. We have this IntelliCell technology, which can be overlaid onto wideband CDMA or GSM. ArrayComm then created i-BURST technology, its own open-access air interface. So i-BURST cannot be overlaid onto GSM or CDMA in that sense; i-BURST is ArrayComm's unique wireless data solution, which is much more efficient than even wideband CDMA or GSM enhanced with IntelliCell. So i-BURST is its own unique solution.

Mr TICEHURST—So that is where you are talking about it being complementary.

Mr Saluja—Exactly.

Mr TICEHURST—Can you do voice-over IP?

Mr Saluja—Yes, we can.

Mr Rule—Anything you can do on a packetised service on the Internet you can do over this.

Mr TICEHURST—I noticed in your submission you were drawing the line on a compromise on the voice systems, and your data rates and special efficiency were much greater. If you have got voice-over IP on top of either the IntelliCell or i-BURST, you are going to have a good solution. My electorate is on the Central Coast—

Mr Rule—You are my local member.

Mr TICEHURST—Right. There are a lot of areas there where we have problems. People have problems in places like Wamberal, where they are on pair gain at the moment.

Mr Rule—The forgotten part of the world.

Mr TICEHURST—Exactly. That is the case even at places like the Ourimbah campus of the university. My mobile phone is lucky to be able to work on that site, and they have got a connect.IT set-up there. There are problems even in an area such as that where we are pretty well covered mobile phone wise. Vodafone were the first one up there. My first phone was on Vodafone because they had the best coverage on the Central Coast. I had CDMA for other purposes, and that worked for a while too. There are going to be low numbers of users in parts of these rural areas, and that was why I was asking whether you can overlay it onto CDMA.

Mr Rule—In theory you can. People are working on that today. I cannot say to you that this technology as it stands is something that will be used with CDMA. The answer is yes, you can do it, but that is not the technology we are talking about.

Mr TICEHURST—It is a bit like the Virgin Blue solution: they want to come in and work on the 80 per cent of the business with 20 per cent of the customers, so any high-cost technology is going to follow that same line.

Mr Rule—Absolutely. Let me emphasise to you that the reason why we are in the cities is that that is what was offered. I do believe that in fact this is actually quite applicable to particularly the Central Coast. On the Central Coast I think it would work extremely well.

Mr TICEHURST—You do not have spectrum up there, do you?

Mr Rule—No, we have not.

Mr Saluja—The spectrum was not released for auction, I think partly because the ACA probably did not think there was anyone who was interested in it. They were fortunate in a sense that there was interest in the TDD unpaired spectrum which we bought. That was a great move on behalf of the ACA that was innovative. It was the first time in the world that the TDD spectrum had been auctioned separately. Things like that are what government can do to stimulate new technologies and competition.

Mr TICEHURST—I have been the member only since November, so all of that happened before I was involved. It is good point: we need to chase them up on that. You are also suggesting that, as with the voice, where you have got fixed, cordless and mobile, you see the same thing with this data technology.

Mr Rule—Very much so. We do not do the same things that 3G does. We do not do voice, for example. We do not have a new handset which does certain things; we just use an ordinary laptop or an ordinary computer.

Mr TICEHURST—I have got a Bluetooth chip in my Palm Pilot which will communicate through the phone, so with an i-BURST handset that is Bluetooth enabled you can still run this sort of technology.

Mr Rule—We are working on not so much Bluetooth. Bluetooth is fine for certain applications but it is not really as broadband as we are offering. We are offering one megabit per second. The technology which we are probably more interested in is 802.11, where you see a lot of hotspot technology in a range of 50 or 100 yards around the base station which can produce very good data rates. I can see a situation where, for example, there are people who use 802.11 in buildings. We had a card which was enabled for both i-BURST outside the building and then once you are in the building it goes into the 802.11. I think that would work extremely well, and that is something that we find quite interesting.

Mr TICEHURST—The other suggestion you make is that government should hold the spectrum users accountable for spectrum efficiency. That is an interesting point.

Mr Saluja—For example, in the United States auto manufacturers are required to achieve certain levels of fuel efficiency for different classes of cars. We believe spectrum is a natural resource that belongs to all the citizens of every country. Why are the owners of that spectrum not held accountable for the efficiency in which they use it?

Mr Rule—Let me emphasise that this is a regulatory issue and not a property rights issue. I think you have to separate these things very carefully, because we think property rights in spectrum are extremely important as a driver of economic efficiency—very, very important. One point that I would make here—and I do not think we made it in our submission to you—is that we believe the 15-year spectrum life is actually too short, and there is a funding issue in there. It works without us, but it will not work with a lot of technologies. The reason for that is that, in valuing and funding these technologies, it is obviously necessary for the value of the concession—that is, whatever you paid for your spectrum—to be depreciated over the life of the concession and, in that case, 15 years.

In our case, because nobody else knew what to do with the spectrum, we think we got it at a very reasonable price of \$9.5 million. That means that our depreciation every year is \$9.5 million divided by 15, and that is a manageable sum of money. For people who are paying \$100 million, \$250 million or whatever, it starts to become pretty interesting at that stage. As a general rule, in my experience in dealing with concessions of this nature, 20 years is probably the minimum, 30 years is a lot better, and I would invite you to consider the possibility of actual freehold rights to spectrum and just simple tradeability, which I think has a lot of economic efficiency arguments going for it.

Mr TICEHURST—Would this technology support, say, interactive TV type applications?

Mr Rule—Theoretically it is a megabyte so, yes, in theory it would. In fact, if you look at most of the interactive TVs, as they are being done around the world, you are looking at a megabyte. I think we would be happier if it rates over a megabyte, don't you think, Kanwar?

Mr Saluja—Yes, interactive TV in the sense that maybe you are watching a commercial on television and there is the ability to have a link to a product that you can then purchase online instantaneously. But I think being able to videostream real time using i-BURST technology, while it may be possible for short periods of time, would be difficult economically.

Mr Rule—You are working on the principle that, at any given time, the number of people who are actually on the airwaves is limited—and we are talking about 2,000 people per cell. Once you start getting more people than that, there are two possibilities, which are that your data rate starts dropping off—you are still getting pretty good data rates; you will be getting better data rates than off the Optus cable for quite a while—or that you can start putting in more base stations. The technology, as we have it at the moment, starts to become quite expensive if you have very large numbers of people watching, effectively, interactive television over this. The short answer to your question is, yes, it can be done, but we think it is probably not economic at data rates of one megabyte per second; at data rates of four megabytes per second, maybe. We will see what happens in the next couple of years. That is what makes it all such fun.

Mr CIOBO—I am interested in a couple of things that you have raised in relation to spectrum efficiency. I agree with the point that you made about it being a natural resource and

so people should be held accountable. What do you see as some of the key performance indicators of measuring spectrum efficiency? I also see that tying back into the right regulatory settings that you spoke about and the role government can play in making sure that the regulatory framework is one that promotes a sense of efficiency, whether it is dynamic, allocated or whatever, and also promotes that competition and investment in new technologies.

Mr Rule—Frankly, I think the issue at the moment is very simply a competition issue in the sense that we are now living with an oligopoly, and it looks to me as though it is a pretty solid oligopoly. I do not see a lot of reason why any of the players in that oligopoly are going to change that very much in the near future. Like all oligopolies, they go through phases of competing on price and then they stop. It seems to me—forgetting about the regulatory regime, because I do not really think I am qualified to talk about that—that anything that can be done to promote actual competition in that space in Australia is going to be very important.

Mr CIOBO—What do you see at the moment? Are there still barriers to entry? What are the inhibitors, at the moment, to competition?

Mr Rule—It is a really difficult question. We have gone through a period of so many years now where, theoretically, it has been totally open to anybody who wants to come in and compete. As a general point, the position of Telstra, being the owner of the fixed line and the wholesaler and retailer, is a general inhibitor to competition throughout the whole of the telephony business within Australia. Realistically, that basically rubs over into the mobile business, even though the mobile's base is theoretically free. The fact is that everybody is dealing with somebody who has enormous market power and has enormous financial power. It is very difficult to compete against them.

Mr CIOBO—It seems to me that the application of your technology would effectively undercut any solution that Telstra operates because you are actually moving into quite a separate market, aren't you?

Mr Rule—I am making a general point.

Mr CIOBO—Yes.

Mr Rule—One of the beauties of what is happening here—and congratulations to the government for allowing TDD spectrum in new potential ways into the market—is that it means that certainly in the data business there is now a potential competitor who not only provides the ISP services but also provides the last mile, and that is the first time. Yes, I agree that that is very important in the data space. There is a general point to be made about the whole telephony business in Australia; that is, it is very difficult to compete with Telstra.

Mr CIOBO—I take your point on board.

Mr Rule—It is very important, and the movement of separating wholesale and retail in Telstra is a very good start. That is a personal view, by the way.

Mr CIOBO—Yes. My interest in relation to the parameters of this inquiry, though, pertain to the regulatory setting that we can affect, which might have impact on where you are seeking to

operate in the marketplace. That is what I am saying. Just limiting yourself to comments in relation to this area, aren't you effectively now having the opportunity to enter into a different market—

Mr Rule—Absolutely.

Mr CIOBO—by providing alternative technology? Is there anything else that government can do to further promote that?

Mr Rule—If I could re-sing the song, I think property rights are very important in all of these things. We need proper regulation of property rights, and I made my point about the 15 years because I think that is actually a very important part of it. Tradeability of the property rights is extremely important because it allows people to change their competitive situation vis-a-vis each other and certainly vis-a-vis the incumbents. I would hesitate to say that you should set a regulatory standard for the efficiency of use of spectrum, but I certainly believe that it is something that should be looked at very closely, possibly by the Australian Competition and Consumer Commission, and reported on at regular intervals so that people can understand what is going on. I hesitate to put the standards on because this is such a rapidly moving part of the world at the moment, but I think it is something that governments should take interest in and be fully informed on. It is also something that the public ought to be fully informed on.

Mr CIOBO—Would you foresee a requirement, for example—and I am just crystal ball gazing—whereby if someone purchases spectrum there would be a requirement, coupled with that purchase, that they have to use it?

Mr Rule—No, I would not say that at all. The reason I say that is that when you do this there is usually another roll-out requirement et cetera. To my mind, that puts unnecessary pressure on the investor to do things which he may or may not wish to do, and which may or may not make market sense at a given time. My point is that, if there are proper property rights in these things, if a person cannot use it they can sell it to somebody. There is very large value in that in getting things done. I can imagine there can be such a thing as a pure trader in spectrum but, generally speaking, at the end of the day, people want to use things and make money out of them.

Mr CIOBO—What prompted your decision to purchase spectrum rather than just operate in the ISM band or something?

Mr Rule—Kanwar, you were there. Kanwar is the 'K' in CKW.

Mr Saluja—In deploying a new technology like i-BURST it is important that you own some physical real estate to demonstrate your credibility and your long-term commitment to the technology and to the market. For that reason it was very important that we physically owned the spectrum, especially when dealing with our partners and prospective investors.

Mr CIOBO—Does that area of the spectrum have an impact as far as technology goes as well, though?

Mr Saluja—i-BURST can operate in many different frequencies: from the lower hundreds all the way up to three gigahertz. So 1.9 was a very nice piece of spectrum to get, but we can operate in other bands as well.

Mr Rule—I think the key thing was that it was TDD spectrum. The FDD has the uplink and the downlink separated by frequency, as you well know. We are a packetised service, so we do not need an uplink and a downlink and we do not need a paired spectrum. This was one of the first times it was available anywhere in the world. Obviously, that was the other driver of our decision.

Mr CIOBO—You said in your opening statement that governments should not be subsidising technology. I guess that picks up on some of the points that Mr Pyne made. I think it is a universally recognised requirement on government to service CSOs; doesn't that sit uncomfortably with the statement that we should not be subsidising technology? Otherwise we have vast tracts of Australia—with limited population, granted—that do not have access to a lot of the services that the capital cities take for granted.

Mr Rule—As I said to you before, once it becomes uneconomic we move out of it, frankly. We are a business. Without wishing to make your decision for you, it seems to me that the decision to be made is one between subsidies. Personally, I am a great believer in direct subsidies to people to do things, rather than hidden subsidies or anything else. At the end of the day, you are going to have to pay a subsidy. Perhaps your decision on which technology you are going to back comes in at, 'How much are you prepared to pay?' I think that is a perfectly reasonable decision. I agree with you that, if you cannot service people economically, there obviously has to be a role for government in subsidising it. But I do not think it necessarily follows that you will subsidise the development of technology A, technology B or whatever. I think it is perfectly reasonable for you to say, 'There are these two, three or four technologies'—or even just this one technology. 'We believe that it makes economic and budgetary sense for the government to subsidise them. We're not going to subsidise something that needs 75 base stations within a small rural area.' That is a legitimate decision for government, because it is paying the money—or we are paying the money, as the case may be.

Mr CIOBO—Sure. The governments do not have money, only taxpayers.

Mr TICEHURST—Would the i-BURST operate on cable? Is it restricted to wireless?

Mr Rule—In what sense?

Mr TICEHURST—If it is software driven technology, would it work on a cable rather than across an air environment?

Mr Saluja—No, it is a wireless technology.

Mr Rule—It is a wireless technology but, obviously, we have to backhaul. So, once your signal gets back to the base station, it has to be backhauled on fibre, which is somewhere or other.

Mr Saluja—Think of i-BURST as a sort of wireless extension of DSL or cable. That is what we have.

CHAIR—I am looking forward to doing our Wamberal base station.

Mr Rule—Terrific!

CHAIR—Mr Rule, the document you gave us says, ‘CKW Wireless. Confidential.’ Does that mean you do not want us to take it as an exhibit?

Mr Rule—No, you can take that as an exhibit.

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

That this committee receives as evidence and includes in its records as an exhibit for the inquiry into wireless broadband technologies the document received from CKW Wireless, titled ‘PowerPoint slides ArrayComm’.

CHAIR—Thank you very much for appearing before us today and thank you for your submission. I look forward to seeing you again sometime.

Proceedings suspended from 10.30 a.m. to 10.47 a.m.

McDONNELL, Mr Mark, Adviser and Member, Australian Telecommunications Users Group

SINCLAIR, Mrs Rosemary Anne, Managing Director, Australian Telecommunications Users Group

CHAIR—I welcome the Australian Telecommunications Users Group, specifically Mrs Rosemary Sinclair. Although the committee does not require you to give evidence under oath, I advise you that the hearings are legal proceedings of the parliament and warrant the same respect as proceedings of the House. Further, 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?

Mrs Sinclair—Just very briefly.

CHAIR—Please make your opening statement and then we will ask you questions.

Mrs Sinclair—ATUG is an organisation that has been interested in telecommunications policy development for over 20 years. Way back at the beginning of deregulation we were taking an interest in these matters, and we come today to make whatever contribution the committee feels will be useful. I have asked my colleague Mark McDonnell to join us. He has been assisting us with two important pieces of work. One is the top 100 survey that we did of corporate users of telecommunications. If we want to get into detail on that, Mark is the person, because he conducted the telephone interviews. The second piece of work that Mark has been advising ATUG on is our proposal for the Regional Telecommunications Infrastructure Fund. Again, if we want to get into some detail on that, then Mark's input would be useful.

In general terms, our view on all the submissions we make is that telecommunications now is a very complicated industry where a number of factors have to be considered at once—technology, what the market is interested in and will pay for, what the regulatory framework delivers by way of support for competition in telecommunications and, lastly, what the interests of the financial sector are in telecommunications, because we are at a point now where communications infrastructure is, by and large, privately funded. That, I think, has led to a number of interesting developments for the sector in terms of new initiatives and the roll-out of new services.

By way of summary on each of the terms of reference, we have not made a great contribution to the technology elements in the terms of reference but, having leafed through various submissions that you have received, we feel that that field has been pretty well covered by equipment and service suppliers. However, we have had an extremely useful discussion with Joel Martin of IDC Australia and would recommend him if the committee wanted to have another summary view of technology.

Regarding the benefit and limitations term of reference, I have put in the reality at the user end of things. People look at new services taking account of a number of factors. The first, of course, is price—and not only the price of the communications service but also the price of the

customer terminal equipment. As we saw with GPRS, sometimes these things get out of balance. Service quality and reliability are two big issues for the ATUG members around the use of wireless services and information security. That is just a list of factors that users take into account when they are contemplating the range of technologies that are on offer now.

In terms of the regulatory regime, we have always had a position that regulation should be technology neutral. In the wireless space spectrum that is a big issue. Spectrum auctions have been a feature of the landscape recently and have, we think, imposed financial burdens in terms of, particularly, 3G roll-out. Access regulation is very important, particularly for people rolling out wireless broadband infrastructure to be able to interconnect with the main network. It will be a key feature of the success of their endeavours. Then we got to the point of changes to the regulatory regime.

Our comments come from the survey that Mark undertook for us. Out of the survey and general discussion within ATUG, we are seeing that the one size fits all regulatory regimes that we have had in telecommunications may need some adjustment going forward. In fact, I think we have seen some practical adjustment of that post Besley, where the government has funded a number of initiatives that have delivered services into regional and remote Australia that would not have got there otherwise. The role of the ACCC in the industry is extremely important as far as we are concerned. Their deliberations at the moment about the use of information as a regulatory tool are very important.

We have been doing some work on a Regional Telecommunications Infrastructure Fund which would, if you like, continue the work that had been seen as a result of the post Besley government funded projects in the mobile space. That model, we think, is of relevance going forward in broadband—and wireless is one form of broadband—but in regional markets. We think that, in capital cities, there is sufficient population and market for a truly competitive, completely market led approach to work, but outside the capital cities there is a need for a different model. They are the brief opening comments I would like to make at this stage.

CHAIR—A couple of interesting aspects of the Australian Telecommunications Users Group submission that have not been previously canvassed by other witnesses have been the trust fund and the role of the ACCC. I would like to pursue both of those. Could you perhaps expand on how you see the Regional Telecommunications Infrastructure Fund operating—the funding for it, the sorts of things that you would expect it to be doing and the sorts of problems you would be hoping it would solve.

Mrs Sinclair—We see that wireless broadband is a technology platform solution which will deliver results in certain areas. But I will go back to my point now about infrastructure being privately funded in telecommunications. When you sit down and do the business plan and look at the ROI and so on, in the sorts of markets that are represented by regional Australia it is very difficult, doing those sorts of calculations, to get these projects over the line.

CHAIR—And turn a profit.

Mrs Sinclair—Exactly. We have seen the reality of that, we think, with mobile development. It was only when the government came in with Networking the Nation type funding, and latterly with national communications type funding, that we got progress in these areas. With

the whole debate that is going on at the moment, we have been thinking about the adequacy of services in regional Australia and trying to put forward a model which might help to address the concerns that are expressed in that debate, not only looking at whether faults get fixed in time or new services get connected in time but also looking at the longer term to make sure that there is parity of access to new services.

Whilst mobiles is the one that is on the agenda at the moment, we are really convinced about the role of broadband as the future communications capability which can be used to deal with the tyranny of distance not only in the delivery of services, such as education and health services and a raft of other government services, but also, importantly, in the economic and other social development of regional Australia. There is interesting data from the OECD that draws a significant correlation between this level of data connectivity and export trade in goods and services.

CHAIR—Can you get hold of that OECD information for us and perhaps get it to Brendhan?

Mrs Sinclair—Yes. In fact, I will send you a whole pack on broadband and the way the OECD is looking at broadband. It is really about economic growth and productivity. That is at the centre of their interest in the whole subject. I will send the whole presentation, but I will highlight to Brendhan where that particular graph is, because it is very good.

CHAIR—That will be very helpful.

Mrs Sinclair—We have to think about all of that and review the results of our top 100 survey. That is a very interesting piece of work because, albeit we were contemplating the trust fund idea anyway in parallel to the top 100, out of top 100 came an interesting piece of information which says that corporate Australia is as interested in regional communications services as anybody else. It seems obvious, when you think about it for just a minute, because they are out there with bank branches, retail branches and mining operations and they have a need for national communications infrastructures. They say to us that they think there is pretty good competition in the CBD and capital services but, outside of that, there is not good competition.

They also express a preference for dealing with infrastructure owners. We put those two elements together and thought that a large, long-term vision and a funding mechanism were needed. We can do a couple of things that are different from Networking the Nation, which has achieved a range of very good outcomes but has been community led and, in that sense, we are concerned about the sustainability of those projects to deal with the sorts of issues that our top 100 survey raises.

The work we have been doing says that we need a long-term commitment of private and public money combined to lower the cost of capital and the risk, but the projects need to be market led so that their carriers and service providers are taking responsibility. We have been thinking through the detail of that because our scheme is not, 'Here is a lump of money; the objective is to spend the money come hell or high water.' We are focused on outcomes. A key to our fund idea is good projects, and accountability is a key to the fund's success. We want good, strong monitoring of the commitments to service outcomes, for which some government money is provided in conjunction with private sector money.

CHAIR—So you would see government funds being put into the trust.

Mrs Sinclair—Yes.

CHAIR—Which industry players do you think would be keen to contribute to a trust of that kind?

Mrs Sinclair—We have spoken to a number of carriers and equipment providers. It has all been quite informal. Suffice to say that the major players in the telecommunications industry have all indicated their interest and support.

CHAIR—Members of ATUG.

Mrs Sinclair—Yes, of which we have a number of carrier members. In particular they are those carrier members of ATUG, but there are also some other people who are not members of ATUG.

CHAIR—So it might be like some kind of voluntary levy.

Mrs Sinclair—No.

CHAIR—Or would there be one-off contributions?

Mrs Sinclair—It would be project by project. If someone comes up with a good, solid idea which works at every level except for the cost of capital, it is that element in the equation which means, 'I cannot see the ROI for 10 years.' That is the point when the trust funds would come in to combine with private sector funding to shorten the ROI on that particular project. I will ask Mark to advise us on this because he has been doing a lot of work for many years in the equity markets, so he brings a pretty hard-headed approach to the deployment of funds and the sorts of returns and time frames that people are looking for, combined with a good knowledge of government concerns in terms of its use of public moneys.

Mr McDonnell—It is a very big topic, but where we are with it is looking at the practical options as to the sourcing of the capital sum. The kinds of options we are looking at are, firstly, a one-off capital injection. Hypothetically, that might be sourced from, for example, sale proceeds in the event that there is a further sale of shares in Telstra. Some moneys might be advanced into a long-term investment vehicle, and the annuity that that creates would provide ongoing funds for capital investment in new services in regional and rural areas. The second approach would be a legislated regime whereby, in addition to setting up the trust, there is some formula agreed as to an amount of money that might be provided on an ongoing basis, and that would then be funded through normal budgetary allocation. A third approach would be a Commonwealth guarantee and we would be looking at something more in the nature of a bond, which would then potentially secure private banking contributions against that guarantee in much the same way as a 10-year bond currently operates. So there are a number of distinct options around the financing, all of which relate to well-known constructs in finance that provide a mechanism for a reasonably considerable sum.

We have also looked at the appropriate quantum of funds having regard to the level of investment that is currently made in telecommunications. If you look at Telstra's track record, for example, it has been spending about \$4 billion per annum for some years Australia-wide, and there has been some modelling undertaken as to how that might be allocated on a regional basis. But in principle we would be looking in the order of at least hundreds of millions annually allocated to this purpose so that over a period of time it would be quite substantial. It would support competitive outcomes in the sense that different carriers would be eligible to participate in the scheme and it could in fact support the penetration of competitive services into regional areas in a way that has not been achieved hitherto.

CHAIR—One of the most important issues facing the inquiry is how to make sure that rural and regional Australia does not miss out on both Internet access and mobile broadband services. I will not pursue the ACCC now because my colleagues might wish to put questions on that, but I will come back to that if they do not.

Mr TICEHURST—In regard to your ATUG members, you said you also have carriers as part of your membership?

Mrs Sinclair—Yes.

Mr TICEHURST—Does that include all the major carriers?

Mrs Sinclair—Yes—Telstra, Optus, Vodafone, AAPT, Hutchison, Macquarie, Primus, RSL, UE Comm.

Mr TICEHURST—Are they included in your top 100?

Mrs Sinclair—No. The carrier members are not on the ATUG board, either. What we were trying to do in the first instance with the top 100 was to get a picture of what ATUG members thought about the effectiveness of competition after five years. We decided to look at those companies that would have sufficient spend to be able to leverage their spend to secure competitive outcomes for themselves. It was a very particular view, but we went to the top 100 companies on the ASX by market cap and then we took out the Telstras, the Optuses, all the carriers, anyone who had significant financial interests in telecommunications such as AGL, and any financial vehicles—property trusts and so on. Then we wound up with 69 eligible companies of which Mark spoke directly to 30. Discussion occurred at the level of the person with final sign-off for telecommunications purchasing.

Mr TICEHURST—So there would not have been too many rural operators amongst them?

Mr McDonnell—There are actually quite a lot and, as Rosemary remarked earlier, it is not intuitively so whether head offices might be in Melbourne or Sydney but the nature of their operations take them into regional markets. Whether you are talking to a Qantas, a Coles Myer or any of the banks, certainly the mining companies, they all have significant operations in regional Australia. They said to us that one of the factors that has led to a situation in which Telstra enjoys comprehensive dominance of their business is because Telstra is the only solution in these locations and from that is able to leverage whole-of-business deals in some cases, or certainly much more significant business in metropolitan areas. So their perspective is, 'We

must deal with Telstra.' To service those requirements we therefore find that Telstra is able to garner a very significant share of our business across the board.

Mr TICEHURST—One problem is that a much smaller user would not be anywhere near this top 1,000 even.

Mrs Sinclair—No.

Mr TICEHURST—The most that people in pair gain situations are going to get out of an Internet connection is about 14k, if they are lucky, and I am talking about areas only 100 kilometres from here. Even the Ourimbah campus on the Central Coast has problems with communications. So there are a lot of other issues there. I guess these people would not be members of ATUG, but that is the range of problems we are looking at. In your submission you were talking about a Swedish model for rural areas and that New Zealand had done something about broadband. What did you find in those areas?

Mrs Sinclair—Even this week we have been hearing directly from Martin Harriman, who is on the UK government's broadband stakeholders group. The same sort of model applies in the UK, where the government has provided funding to be used in conjunction with private funding to roll out broadband services outside the capital cities. So it is the idea of our rural fund really, of combining private sector and public sector money to extend new services.

Mr TICEHURST—So you would see this incorporated into this rural fund?

Mrs Sinclair—Yes, it is that sort of vehicle. At the essence of it is a government vision that says, 'We want this sort of communications capability for everybody,' although we have had some interesting discussion this week about universal access versus ubiquitous availability of services. I think that is actually a very important distinction, because they are saying that you can have education services or health services available to everybody but you do not need to have a school or a hospital on everybody's farm. It is an important difference. But once that vision is in place, everybody is dealing with the reality of geography which says that you cannot expect private funders of infrastructure to roll out that infrastructure into areas where there is not a population to support the revenue streams. At that point, you need a combination of public sector-private sector money carefully managed and targeted. That is what we are seeing in all those examples.

Mr TICEHURST—Doesn't the USO require the 64k to be available to anyone in the country?

Mrs Sinclair—That is the digital data service. It does, but the delivery mechanism for doing that is ISDN, and that is where you come back to my point about the users making decisions on prices and the actual connection. The installation price for ISDN is not competitively comparable to the monthly charge that we are now seeing for narrowband and, indeed, broadband access.

Mr TICEHURST—Does ISDN operate across those pair gain circuits?

Mrs Sinclair—That is a question I could not answer.

Mr TICEHURST—In that sense, they are not providing the USO in those cases?

Mrs Sinclair—Depending on the answer to that question. I am not sure.

Mr TICEHURST—For the cities, you are suggesting a European model?

Mrs Sinclair—Yes, and that brings us back to the role of the ACCC. Our view of telecommunications competition regulation is that—and it is very easy for me to say this five years down the track looking back—the light touch role that is embedded in our model for the ACCC has not been effective. That problem, or issue, is under debate in many other places, including in Europe, where they are reconsidering the role of their national regulatory authorities and competition bodies. What they are just now moving to put in place is a new approach to telecommunications regulation which says that, when a provider has significant market power measured at 25 per cent of an available market, a higher degree of regulatory supervision of that player applies. So that is quite a different approach and puts their regulatory people much more in an interventionist role, if you like. The view is that 25 per cent of a market gives an operator significant power which needs to be managed.

Mr TICEHURST—Do you have ISPs among your members?

Mrs Sinclair—Some; yes, we do.

Mr TICEHURST—We get complaints from ISPs in relation to Telstra pricing where effectively the wholesale and the retail groups provide competition for ISPs. One operator in my area has got about 120 call lines coming into his location and the price Telstra are charging him for each of those lines is actually more than what BigPond charge individual users for access to one line. Is this an area of regulation or do you think ACCC should be involved? Effectively that creates a further monopoly.

Mrs Sinclair—I think we saw effective management by the ACCC of that sort of issue around the price of the unbundled local loop last September. Unhappily, they got to the point of issuing a competition notice against Telstra, which is a very heavyweight move and can lead to substantial fines. But the result of that action led to a significant reduction in the wholesale price for the basic service upon which other providers need to build their offerings, and that enabled them to achieve a retail price which actually gave them some margin and created a profitable business for them. I think we have now seen the emergence of a number of competitive broadband DSL providers because of that move.

Mr TICEHURST—What is happening in this situation, though, is that Telstra are not viewing some of those customers as being wholesalers. I am not sure where the line is drawn where they determine that an ISP is a wholesaler. In the example I gave he is buying 120 or more lines. I do not know where that cut-off is, but essentially they are undercutting their own customers with BigPond.

Mrs Sinclair—Our position on that is that people who wish to buy access to Telstra's network at wholesale prices ought to be able to do that at non-discriminatory prices and terms and conditions, which is the other thing that is very important. You need to not only have a price but to have good provisioning arrangements, billing arrangements and repair and maintenance

arrangements. The non price terms and conditions are as important to the wholesale buyers as any other. We think that the simplest way of doing that is that the ACCC ought to set indicative prices for declared services, and the services these ISPs would be wanting would be declared services. Then that price ought to prevail in the absence of a better commercial agreement. So our policy on open access is really centred on quite a different role for the ACCC that puts them into the process at the beginning rather than what we have now, which is that commercial negotiation is the first option but the track record of that being successful in a timely manner is not very good.

Mr TICEHURST—It is just entrenching that further monopoly and it is limiting competition. That is the way we see it. Whether it is designed to force out these other ISPs is another thing.

Mr CIOBO—Just picking up on some of those points you made then, I get the impression that what you are essentially advocating is a price surveillance type formal price monitoring role.

Mrs Sinclair—Yes. We are really worried about what the reaction to the recent relaxation of the price control regime has been. I should hasten to add that ATUG, particularly given its constituency of members, is not a great advocate for a lot of regulation at every level. That is not where our heartland is.

On the other hand, when we see things such as mobile prices coming out of the price control regime and the very next week there is an announcement by a couple of operators that indicates that the price of the most popular mobile phone services—SMS, to take one point, and fixed to mobile calls, to take another example—is going up, we have to say that it seems to us that what was keeping the prices down was the price control regime, not the strength of the competitive market. That is the first real issue. If we are not having the price control regime any more, and this is the behaviour that we see immediately, then we need to contemplate a role for the ACCC ex ante the process. At the moment, their powers are limited to a procedural review of the mechanism for moving the prices, but they have to wait for 12 months to see whether the kind of rebalancing that is required, under what is left of the price control regime, actually happens.

The second real issue for us is that we were happy to accept that line access is operated at a 'deficit'. In other words, it costs Telstra—and I am focusing on Telstra at the moment because of their position in the fixed network—more to deliver that service than residential users pay in line rentals. That skews a whole raft of pricing decisions. We said that we are prepared to accept the ACCC's number on what that costs, and prices for rental should move to cost plus—being realistic about it—but call charges ought to move down pretty much in concert to get rebalancing.

What we saw again, the minute this was possible, was business line rental—which already more than covers the ACCC version of the costs—move up. That is a very strong signal that this price control regime is not working. There is absolutely nothing in that regime that will prevent residential line rentals moving above cost when we get to that point. None of us will be sure about the call charges coming down, as they are supposed to, by 4½ per cent. None of us is going to know about that for 12 months. My question is: when that review is done, are we all going to get our money back if we do not have the sums right? I do not think so. There needs to

be a much more transparent process at the beginning, where the referee says, 'This is okay'. It is not in the long-term interests of end users for people not to be making proper returns in the telecommunications industry. That is not in anybody's interests; neither is it in our interests for people to be cream skimming out of certain bits of the industry when that is not a transparently run process.

Fixed to mobiles is the other point that we would give as an example here. I do not think people realise that there are more mobile phones than there are fixed phones. We all sit at our fixed phone; we pick it up and ring our 15-year-old son—who has a mobile—who has not turned up when he is supposed to. We sit there and pick up this phone and think that it is a local call because he is only at the station. The fact of the matter is that that call costs you 30c flag fall and then 44c per minute to ring a mobile. The reason it costs 44c per minute is because of the interconnect rate that the operators have set amongst themselves, whereby they pay each other about 24½c per minute to terminate that call on a mobile network. That is completely obscure to the users, and it is not subject to any effective regulation.

We think that all of that needs a completely different approach. We are, in fact, looking at whether the general powers of the ACCC in regard to price surveillance are the tool, now that the telecommunications specific price control regime has been reduced in its impact. What we have seen is people taking the opportunity that that has presented to really do the wrong thing by end users.

Mr CIOBO—I guess that covers the regulatory side, and it may even answer your question, Mr Chairman, with regard to the role of the ACCC.

CHAIR—Just before you move to a new subject, Mrs Sinclair, have you had discussions with the ACCC about the prospect of using their powers in this particular area?

Mrs Sinclair—Indeed I have.

CHAIR—Good.

Mrs Sinclair—I have not heard back from them, but I asked them the specific question of whether, now that these matters are not covered by telecommunications specific legislation, they felt the general powers of price surveillance apply. This has all happened quite recently, so I have not heard back from them on that. I am also exploring that with some other legal eagles that have much more knowledge of the general provisions of the Trade Practices Act.

CHAIR—If you get a response from the ACCC and it is not confidential, would you be able to forward that to the committee?

Mrs Sinclair—Yes.

Mr CIOBO—I was going to ask a question about the other side of the equation, and that is the role of competition in helping to curb costs from being passed on, which promotes a more efficient market. I am interested in ATUG's view on the way in which government can promote wireless local loop, wireless broadband and all of those technologies as a way to increase the market size.

Mrs Sinclair—I think the role of government is important at various levels. There is the policy role and there is the potential of the funding role. Then, of course, there is the government's own use of technology to deliver services—if you like, being a champion of the use of these technologies in the day-to-day business of government. I think the bonus that was paid for the introduction of the GST, some hundreds of dollars to buy an online—

CHAIR—It was \$200 for small businesses.

Mrs Sinclair—That is right. Those sorts of initiatives really help get people over the line and raise awareness, particularly in the small business sector where people have to do one particular thing or another. An initiative like that can alert them to the fact that there are other ways of doing this, and the little bit of money that is targeted at that helps people over the line. So there are those sorts of practical things. There are also the useful initiatives like the government services online initiative, where the PM announced, 'We will have government services delivered online by 2001.' That had a remarkably catalysing effect on a number of departments, so I think the further extension of that sort of initiative is very important.

One of the things that has been exercising our minds is how we get this whole debate out of the communications specific areas, because if it stays there, it is always going to be about policy and platforms. If we can get the debate out of there and into the education and health sectors, then we get much more down the content, services and outcomes end of things. There need to be commitments, such as having around five per cent of government health services being delivered through broadband. I do not even know that I would limit it to wireless broadband because you have to leave people room to make the most suitable technology decisions for their particular circumstances. There needs to be some quantifiable commitment like that or perhaps some government support for competitive offerings. Given the size of the spend of the government, not only on communications services but, for example, in the health and education budgets, there are significant amounts of money to be considered. The counter point—and this has always got to be factored into these sorts of suggestions—is that for people delivering health and education services, that is their main priority and focus: to deliver the best, most economical and efficient services they possibly can. You have somehow got to find a communications objective that does not interfere with that but, rather, supports it.

The state governments are very interesting to talk to about the issue of how you deliver the most economic and efficient services for the public dollar and at the same time promote competition and innovation in communications services. They wrestle with that pretty much on a day-to-day basis. The work and initiatives that New South Wales and Victoria—really all of them—have put in place to achieve those multiple outcomes are worth looking at. Perhaps an easy way of doing that is the broadband advisory group that I am a member of. One of the pieces of work we commissioned was a review by NOIE of the initiatives of all the state governments in terms of using broadband, particularly for health and education service delivery. There is a wealth of good information in the report NOIE delivered to the second meeting of the broadband advisory group.

CHAIR—Mrs Sinclair and Mr McDonnell, thank you very much for your very useful evidence today on subjects that we have not covered before. It was very helpful. Hopefully we will see you again some time.

[11.41 a.m.]

DAVIDSON, Mr Keith Charles, Chief Executive Officer, Norlink Communications Ltd

SCHARBOW, Ms Janet Elizabeth, Project Manager, Norlink Communications Ltd

STEVENS, Mr Brian, Director, Norlink Communications Ltd

CHAIR—I welcome the representatives from Norlink. 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. Do you wish to make any introductory remarks before we proceed to questions?

Mr Davidson—Yes, I do.

CHAIR—You may do that now.

Mr Davidson—Norlink Communications Ltd is one of the few organisations in Australia that is establishing itself as a last mile telco in a specific regional market. The company is regionally owned and is focused to provide high quality, cost-effective, fast and accessible telecommunications services to all in the Northern Rivers of New South Wales. We expect to begin delivering full commercial services over our own infrastructure before the end of this year. Our strategic direction has been the result of five years fairly long, hard planning and research. The community has come together to achieve this. Sometimes this has been difficult. However, the region's peak bodies have always maintained strong support for this, to achieve some real economic and social outcomes through better telecommunications.

Norlink is implementing a new, alternative wireless local loop broadband access technology to connect residents and business organisations for the provision of voice and data services. As with all infrastructure initiatives, funding is a critical issue, and our initial roll-out has been majority funded through federal and state government sources. We appreciate this opportunity, because this provides us with an opportunity to test and review our business model. Unlike most other organisations, we are focused on achieving full commercial viability that can be replicated in the majority of communities in regional Australia, not just major centres, and not just by delivering services to those enterprises and agencies that can be cherry picked. We would like to build on the capacity of those agencies that have an immediate demand for high service and roll out full service to the entire community.

Community ownership and participation by the community are key components of our business model. Our eTown program has been designed to enable us to fulfil our objectives and to create a model that is transferable to any community in Australia. We believe that a commercially viable microtelco model is the only way that smaller communities in regional Australia will gain value from the ever-increasing advances in technology. Wireless technology is the most cost-effective way to establish a high-speed telecommunications infrastructure in the

short to medium term. In the longer term—15 to 20 years—it is our belief that optical fibre will become predominant in the local loop.

The issue is how to fund this significant capital outlay for small regional areas, and the answer lies in community ownership of the infrastructure assets, the reinvestment of profits and, to some extent, cross-subsidisation. Large corporate organisations that rely on a quick return on investments will never be able to justify the expenditure to wire up smaller communities. Therefore, the onus returns to the smaller community to fund its own infrastructure. It is clear from recent years, through programs like Networking the Nation, that these communities will work to achieve this.

Wireless technologies are an enabler for the microtelco and, therefore, access to the technology, expertise and spectrum are all key ingredients for a successful outcome. We believe that for the long-term benefit and the viability of a microtelco regulations must be in place to provide the ability to ensure clients a continuity of service, particularly with regard to access to and management of spectrum.

In its submission, Norlink made a number of recommendations. I will briefly state them: determine methods of providing security of access to spectrum for community-based regional telcos; a review of the rules made by the ACA that require spectrum licence holders and sublessees to agree to a termination for whatever reason; ongoing funding of research into the needs of regional communities for broadband technology and its innovative deployment; and continued government support for the economic and social development of small communities through better telecommunications. We are happy to take some questions in regard to these recommendations. We would like to specifically request that the discussions with regard to access to spectrum and the radiocommunications rules be held in camera because of some commercial-in-confidence issues. Thank you.

CHAIR—Would you like to do the in camera part now?

Mr Davidson—It is probably appropriate.

Evidence was then taken in camera, but later resumed in public—

CHAIR—Norlink is a model that is particularly interesting to the committee because it is trying to get wireless broadband services out into regional Australia. What has made it work for the Northern Rivers area that could be a model for other regional areas in Australia, or is it unlikely to be able to be spread much beyond areas like the Northern Rivers?

Mr Davidson—I believe that what we are developing is a model that will be able to be deployed elsewhere.

CHAIR—What are the characteristics of the Northern Rivers model that make it conducive to this kind of project being successful?

Mr Davidson—Firstly, it was the community coming together in a way that brought in the entire community, not just one sector. Usually, a lot of the community funded processes that happen through Networking the Nation, and then go through state government agencies such as regional development boards and things like that, focus on one sector. We brought all the

players in together. The owning company of Norlink Communications, Norlink Ltd, is a company limited by guarantee and its membership is made up of eight community based organisations, which include New South Wales farmers, local chambers of commerce, the Northern Rivers Development Board, which is a state government agency, the Northern Development Task Force, which is a non-government development agency, the Southern Cross University, regional tourism, NOROC—the Northern Rivers Regional Organisation of Councils—and an IT industry association. It was not one set of interests being addressed; it was actually the whole region's interests. That was one of the really important things.

The next thing was that we went through a very long process of finding out and understanding what the community's real needs were. I think that each community's needs are quite different. As I said earlier, what is suitable for the Northern Rivers is not necessarily exactly the same thing that needs to be deployed in another area. That could be because of geographic issues: the Northern Rivers, particularly the northern part, is fairly undulating—hilly might be the word—so that creates special considerations from our point of view in deploying a wireless service. But we have done our work and know that that can work. What you ultimately deploy will vary but the technology is available. We are now testing it in communities as small as 3,000 people to see how it would work. In deploying our model somewhere else, the things we have learned and invested in, such as the negotiation of the carriage services, the provision of billing systems and things like that, we or others could, for example, bureau service and wholesale those sorts of services so that others would not have to negotiate that project. It would be taking a component of what Norlink has done that could be done anywhere else, and building the business model around that.

CHAIR—Have you got much evidence of it being copied elsewhere?

Mr Davidson—It has not been deployed yet, so it is a bit difficult to do.

Mr Stevens—In addition to my position on the Norlink board, I was originally contracted to Norlink as a telecommunications consultant. I represent the telecommunications expertise on the Norlink board. The company I am associated with is called Housley Consulting, which is a 30-year veteran of telecommunications in Australia. We have undertaken regional and rural projects in the New England, the mid North Coast, Norlink and the Riverina region, as well as large corporate and government organisations around the area. What makes Norlink different to any other region that we have dealt with is the fact that Norlink had a structure in place already. They had an organisation, a peak body, that was set up to do telecommunications only. No other region had a Norlink type entity to leverage off. That is the difficulty in many of the regions—that, unless you have something to start with, you cannot springboard from there. You are at a different level to try to get the parties together to agree to get a Norlink started, rather than having a platform to work from there.

CHAIR—What was the Commonwealth and state government's involvement in bringing this project together at the beginning?

Mr Davidson—They did not have any involvement. Norlink came together first, and then determined that they were going to seek government support to help them deploy telecommunications in the region. Part of the reason was that in the region there is the university base and there are a lot of web developers that have a fairly strong background in IT

and multimedia, so there are a lot of people coming out of the university to be what they call 'professional web developers'—there is some argument about that—but there is a whole range of people focused in the creative industries who have a lot of broadband need. There were a lot of people milling around early on—we are talking about 1993-94. One of the first telecottages was established in Byron Bay in 1993 and a lot of the original Norlink coming together was out of the sort of work that happened back in those days. The catalyst was there, and then we had to work out how to resolve the situation that came forward out of a large number of workshops. Some of that work was funded through a regional development program in the first instance, back in 1993 or 1994.

Ms Scharbow—In answer to your earlier question about whether there is anyone else copying this kind of technology, this is an Australian first, I think, so it has certainly not been done anywhere in Australia before, and there are only a very small number in the US that we have been able to find that have been deploying this.

Mr Stevens—There are a lot of data-only type networks. Norlink is a voice and data network, which has its own significant challenges from having voice added to it. That makes it unique in Australia at the moment and in most of the other implementations around the world.

Mr TICEHURST—You have just answered my first question. What speed can you get across in data terms?

Mr Stevens—The technology can broadcast up to 30 megabits downstream, that is, from the transmission down to the receiver, and it can do up to about nine megabits from the subscriber back to the base station. It is shared bandwidth, and you can do high speeds like that. The model will be similar to ADSL models, where you might get one megabit down and 250k backwards. But it is much more advanced than what is available on any other service.

Mr TICEHURST—So you would see this as a replacement for the CAN network up there? There are a lot of problems, I believe, in these areas with the old copper lines.

Mr Davidson—When we did one of our research projects, we clearly identified the difficulties with the copper network and the pair gain systems that you referred to earlier.

Mr TICEHURST—Have you had any jelly filled cable problems up there? I saw recently that the jelly filled cables have had all sorts of problems, with the jelly eating into the insulation.

Mr Stevens—In all regional areas there are cable issues and, whether it is in the ground or the cable is laid above the ground, whether they have got pair gain systems or aerial cables or whatever, the cable plant is old. In regional areas it is worse than in metropolitan areas.

Mr TICEHURST—Where you had a cell set-up, would you be looking for some sort of optical fibre link into that?

Mr Davidson—Currently, we will have our base stations located around the region with a backhaul network to a central point in Lismore, and then we will interconnect with our backbone network from there to purchase services. There are plenty of those.

Mr Stevens—We are currently using microwave to link the towers together. It is a microwave service from the tower at Byron Bay to a tower at Lismore and then, from there, into a major switching centre.

Mr TICEHURST—Are Country Energy involved with this at all?

Mr Davidson—No, they are not. There is potential for them to be involved later on and there is an opportunity to bring in competitive services over the same network.

Mr TICEHURST—NorthPower set up a turbo web at one stage. I do not know how that finished up.

Mr Davidson—It is now called Country Energy.

Mr TICEHURST—Yes, they are linked with all the other regionals.

Mr Davidson—They have an arrangement with one of our suppliers to deliver services to them, so ultimately we do see that Country Energy's ISP services may have some delivery over our network.

Mr TICEHURST—Do you see a potential for being able to deliver ISP services over powerlines?

Mr Stevens—Powerline carrier is the new technology that is being investigated in lots of places, and a lot of claims have been made on the ability of it. I think it will be a number of years before it becomes commercial.

Mr Davidson—I should say that in our earlier research NorthPower, prior to the amalgamation of the power utilities, did indicate that they had done a lot of studies on creating their own carrier. It had not been necessary and the return on investment had not been as attractive as it should be.

Mr CIOBO—We had a witness earlier this morning who, when I asked them whether there should be a coupling between those that purchased spectrum and the need to use that part of the spectrum, took the position that there should not be any such requirement because that could prematurely force the hand of commercial backers and so on. What is your response to that?

Mr Davidson—I am not sure what you mean.

Mr CIOBO—We had discussions earlier about the mothballing of spectrum. A contrary point of view that is being put is that people should be allowed to purchase spectrum and be allowed to mothball it, so to speak, on the basis that they will make a commercial decision at the appropriate juncture about what is the best thing to do given the technology developments and those sorts of things. I would like to hear your arguments, either in favour or against.

Mr Davidson—I am neither in favour nor against that—it is a commercial decision for those companies to make. My view would be that regional communities should be able to have access

to a band of spectrum. If those companies want to make a commercial decision in regard to spectrum and mothball it, that is their decision, but regional communities should not pay the price for their commercial decisions.

Mr Stevens—The other thing is that spectrum is a limited resource, and if any resource—gold, oil, whatever—was stockpiled by somebody there would be an uproar. You would think, therefore, that a resource such as spectrum, which is limited, would have issues in the public domain the same as if someone had purchased something and was not using it to the full advantage of the community.

Mr CIOBO—So it almost has a community service obligation component to it.

Mr Davidson—I guess, but we do not think that regional communities would not pay for that when they actually are deploying services. We believe that spectrum should be paid for. It is a delivery mechanism for generating revenue, so logically it should be paid for.

Mr Stevens—Our modelling would suggest that if the spectrum was fully utilised via a regional micro telco model then perhaps more money would be generated than the sale of that spectrum—over a longer period of time, obviously.

Mr CIOBO—Multiple sales, so to speak.

Mr Stevens—Yes.

Mr CIOBO—To paraphrase your submission, you make the comment that the regulatory framework has to provide the ability for Norlink to guarantee quality of service. What are the nuances involved there? Are you saying that the regulatory regime does not currently provide a quality of service—or cannot provide the assurance of quality of service—and, if so, why?

Mr Stevens—It goes back to the rules we were talking about earlier. For example, if a service was in place and it had to be pulled down for some commercial reasons—

Mr CIOBO—Sure. So that is basically the issue?

Mr Stevens—Yes.

CHAIR—Thank you very much for appearing today.

Proceedings suspended from 12.18 p.m. to 1.28 p.m.

LAWRENCE, Mr Keith, Director, Networks and Technology, Austar United Communications

CHAIR—Thank you very much for your patience. We are very grateful to Austar. 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 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 want to speak to your submission before we ask any questions?

Mr Lawrence—Yes. It is very important to think of our submission in the context of the last 12 to 18 months that Austar has been operating in its various fields. Austar, as you know, is a pay TV company primarily. We provide subscription television to over 400,000 homes in regional and rural Australia. We provide also narrowband Internet services, dial-up, to 70,000 users in both regional and rural areas and capital city areas at this stage. We also have a mobile service that provides services to 16,000 subscribers.

In the last year to 18 months, Austar has gone through some fairly significant changes. Our strategy in 1999-2000 was to broaden our offering of services from purely subscription TV and mobile to an Internet product and also a broadband product. At that stage we embarked on a series of acquisitions, including spectrum, the TARBS spectrum in the capital cities and MMDS spectrum in the regions in the 2.3 gigahertz band. Primarily, the regional spectrum was to be used for pay TV retransmission from satellite broadcasts into those areas where we were not able to provide satellite footprint. The TARBS spectrum obviously was purchased to provide a fixed wireless broadband offering into the capital cities at a time that was suitable to Austar.

In 2001, the capital markets dried up and our particular position meant that we were not able to fund, from a capital perspective, the deployment of infrastructure, although we had actually embarked at that stage on a trial of an MMDS two-way broadband product platform in Newcastle. We decided at the end of 2001 that we would have to place our wireless broadband infrastructure plans on hold. Therefore we find ourselves in late 2001-02 in a position where we own licences for 2.3 gigahertz spectrum across the country—I think we cover in excess of 95 per cent of the population with our spectrum licences. We are very keen to use every opportunity to promote wireless broadband, particularly in the regions, which is where we see the major opportunity to use this technology to provide broadband services to consumers and businesses.

Our submission is very much based around, in that context, the promotion of broadband take-up in Australia. We are very keen to continue to be able to offer those services to our customers. We do run a substantial ISP and believe that in the two- to three-year time frame it is likely that the demand for broadband particularly amongst narrowband users will increase quite dramatically. We are obviously very keen to see broadband as a product become a lot more ubiquitous from the company perspective but also from a user's perspective. In terms of investment, we have certainly invested in the region of \$200 million in the spectrum. We have invested over a billion dollars in the regions in providing subscription pay TV services to our customers. It would not be too much of an exaggeration to say that we are one of the heaviest

investors in technology in telecommunications services in regional areas of anyone. We have very much an interest in making this work, particularly again in regional and rural areas.

The reason for our choice of wireless technology is fairly clear. In our markets in particular the alternative technologies such as ADSL, fibre and so on are relatively scarce, particularly in the more remote areas. With the wireless technology that we were trialling in Newcastle last year we were achieving line of sight service up to 50 kilometres away from a headend, which of course gives you a fairly compelling reason to deploy wireless technology.

We believe that the cost of deploying a wireless network under those circumstances and particularly into our markets is fairly reasonable from an economic perspective. The component that Austar has experienced, particularly when we were putting together our business plans in early 2001 and late 2000, was the cost of the CPE, the customer premises equipment. With the technology that we were looking to deploy, the cost of CPE at that stage was anything ranging from \$1,100 for data only to \$1,300-plus for data and voice services, which clearly presented us with an economic problem from a business planning perspective. Do we subsidise CPE or do we try to charge the user for the majority of the cost of the CPE unit? At those prices it becomes a very difficult equation.

We have found through continuing to look at the market, again with a view to promoting the use of the spectrum in the 2.3 gigahertz band over the last six months or so, that there are a number of new technologies that are becoming available, not only in the DOCSIS wireless cable area that we have been trialling but also in the CDMA 3G technology area, which means from a broadband provider's perspective that the CPE can become self-installed. There is no longer a requirement to send a technician to the home, which makes a significant difference to the economics.

To summarise our position, again in that context, we are very keen to see the government take action to promote wireless broadband use. We are technology agnostic in the sense that we would like to see the best technology deployed. We are seeing a significant growth in the number of economic solutions that are being deployed overseas and that are starting to be deployed here in Australia as well. We would certainly like to see the spectrum for which we own licences used more significantly in Australia.

CHAIR—In your submission you talked about some of the barriers to wireless technology deployment and one of them is the lack of awareness of broadband among customers. One of the things that we have found in this inquiry is that there is a lot of terrific technology that is being talked about, but I wonder whether there is demand for it, because most people seem happy with the things they can access now through broadband, the Internet and the technology that they have at the moment. Is there a danger that maybe we are saturating consumers with so much capacity that in fact it will not be taken up for some time into the future? They are still getting used to the idea of the ubiquitousness, if you like, of mobile phones—and now SMS—and they are enjoying all that. Is there a danger that people are happy with what they have and they are not going to pay for anything particularly new for a long time? In that way, has Austar found that there has not been tremendous demand?

Mr Lawrence—What we have seen is somewhat unique to Australia. Certainly over the last 12 months we have seen a massive take-up of broadband services in certain markets. I think you

have to look at it from two perspectives. One is the value proposition for the customer—purely a cost perspective. We are still seeing broadband at fairly high levels of cost in Australia that, at least from an economic perspective, are not matched in overseas locations. Also if you take, for example, Korea, the take-up of broadband has been spurred by the popularity of games over that platform and so it makes a lot of sense to do that.

I think part of what we are saying in our submission is that we believe also that there is not a great awareness of broadband, particularly in our markets. It is something that to an extent is being addressed. Again in the last few months we have seen a lot more media promotion of broadband. But until there is a general understanding of, firstly, the benefits of broadband relative to a narrowband offering, and also that there are content and applications that are able to use broadband capability, then we believe there is not going to be a sudden take-up.

CHAIR—There seems to be a great knowledge of the capacity of wireless broadband in the IT community and the business community in the capital cities in particular, especially those capital cities that have quite a high-tech industry, and that seems at the moment to be Adelaide, Sydney, Melbourne and perhaps Brisbane and the Gold Coast. But, outside that business community and the IT community, perhaps the average consumer does not want to have all these fabulous things that they can do at home, and maybe that is a major problem. Telstra has got all that covered because Telstra is offering them everything they have always had and they are quite happy with that. Maybe they think that this is something for other people, so we are establishing two classes of people in Australia, the first being people who see the potential for this broadband and the business applications it can bring for them, people in the health system and education system who see the potential and the benefits that it can bring, and they will all take it up over time. But it might be that there is an element of our society that never bothers to take up any of these types of technology. Or do you think it will be like the phone, that eventually everybody will have wireless broadband capacity in their homes?

Mr Lawrence—I wish I had a crystal ball and could answer that convincingly. I think you have to look at the data that is available now, and from our perspective, with a narrowband dial-up ISP customer base of 70,000-plus, we do talk to our customers obviously on a fairly regular basis and we do see an increase in the interest in taking up broadband services. If you then extrapolate that back, clearly there is benefit to small to medium enterprise and obviously to large corporate business to use broadband. Of course, that is already happening anyway in the capital cities, as you mentioned. But the growing interest in the consumer base in the home, if you like, for broadband services is certainly something that we have noticed over the last six months.

CHAIR—Can the Australian government do something to encourage this awareness of wireless broadband and the capacity that mobility will bring and the benefits? I think that is one of the reasons for this inquiry, that the government is concerned that Australia is not poised to take full advantage of these technologies whereas other countries like Korea, China and Canada are putting quite a bit of effort into the idea that this will be the future.

Mr Lawrence—There are a number of fronts on which the government could help. One is awareness. I will use the example of interactive TV, which Austar, as you know, has launched into its customer base in regional and rural Australia. There is not a great awareness of what interactive TV is or what it means to the customer, although it provides a fairly significant

improvement in the viewing experience and interaction with programming that the customer can experience. Likewise, broadband is not well understood. It may be seen to be purely an increase in the speed of applications that are currently used on a narrowband offering, on a 56-kilobit connection. But I think there is not a good understanding of the other benefits and the other applications that could be delivered over a broadband connection, and that is something that would be really useful.

The other aspect of it is the economic aspect, particularly in rural and regional areas where the cost of that call is obviously more than it is in capital cities. The cost of delivering content over the World Wide Web is fairly significant for ISPs and other Internet providers, and then the cost of network infrastructure and all the components at the back end is fairly significant as well. If we can drive down the cost of that or assist in the development of a wireless network infrastructure as well as providing incentives for operators to deploy CPE to customers' homes, which is a significant component of the cost, I think we would see significant growth.

Mr TICEHURST—How many users do you need to make your headend a viable proposition in an area?

Mr Lawrence—It really varies. There is a base configuration which would provide you with a minimal number of channels utilising the spectrum that is available for us. I cannot remember the exact number that we determined in Newcastle, but we would certainly have been looking at something in the region of 4,000 to 8,000 subscribers for a particular headend. But that can be increased by increasing the capacity in the headend. I would like to confirm that number with you separately; I do not remember exactly which one it is.

Mr TICEHURST—With that service, were you providing voice as well as data?

Mr Lawrence—Yes, we were; we were trialling voice-over IP as well as data.

Mr TICEHURST—What happened in Newcastle? That was obviously a short-range trial that has been and gone.

Mr Lawrence—We have now ceased the Newcastle trial, yes. We went through a fairly extensive acceptance test plan and the results were shared with our vendor partners in the trial. The technology itself is being marketed elsewhere in Australia at the moment, and we hope to see it deployed. We were keen to see the solution that we had trialled used elsewhere in Australia.

Mr TICEHURST—You were also talking about two-way satellite Internet at one time, weren't you?

Mr Lawrence—We did provide a one-way satellite broadband service to a very few customers with a dial-up return path, but we never got to the stage of offering a two-way service. We had contemplated it, but we gave up on the idea.

Mr TICEHURST—So you have a substantial investment in the wireless local loop, but you have not really had any return so far?

Mr Lawrence—We have a substantial investment in the spectrum, yes.

Mr TICEHURST—Do you have any plans to convert that into users somewhere along the line?

Mr Lawrence—We would like to see it used and we are talking to a number of companies around Australia and overseas about the possibility of partnering or coming to some sort of commercial arrangement with the spectrum. Obviously, our limiting factor is capital, so we would be looking to somebody with some capital or funding to provide the infrastructure. We would certainly be interested in providing broadband services over that infrastructure at some stage in the future. That is really where we are going.

Mr TICEHURST—Some of the complaints we get from constituents relate to people on the end where they are using pair gain; they are in isolated rural and regional areas. So, if you are looking at up to 10,000 users to justify putting a headend in, it is going to be a little difficult to solve the problem for those people, isn't it?

Mr Lawrence—It is a difficult problem, and we have looked at it in one or two areas. There is potentially a solution, particularly for remote areas, and that is to use either a VSAT two-way service or a very cheap wireless technology. Again what we are seeing is that the price of that technology is coming down. But you are right. There is a point below which the service becomes uneconomic, purely from a commercial perspective.

Mr TICEHURST—That is always a problem.

Mr Lawrence—Yes.

Mr TICEHURST—That is all I have, Mr Chair.

CHAIR—As there are no further questions, we need to move that the committee receive as evidence and include in its records an exhibit for the inquiry into wireless broadband technologies. It is a document received from Austar titled *Wireless Broadband Technology MMDS Frequencies*. There being no objection, it is so resolved. Mr Lawrence, is there anything you would like to add to what you have already said?

Mr Lawrence—I do not think so at this stage. Thank you very much for the opportunity to speak with you.

CHAIR—Thank you very much for coming.

[2.04 p.m.]

MOON, Mr Peter John Anthony, Managing Director, BALTECH 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 proceedings of the House. The giving of false or misleading evidence is a serious matter and may be regarded as contempt of parliament. Do you wish to make any introductory remarks?

Mr Moon—If I could, please.

CHAIR—Please make your remarks and then we will ask you some questions.

Mr Moon—I am the managing director of Ballarat Technologies, BALTECH Pty Ltd. The company has been in existence since 1995. Firstly, I am not an electronics or communications engineer. I have a broad background in communications, having worked for the PMG, Telecom and Telstra for 29 years; I left Telstra in 1995. During my last six years at Telstra, I was heavily involved in electronic line fault analysis, management and detection and electronic pair gain adoption, development and utilisation. I have an empathy, therefore, for those who have less than equal access than their metro cousins to reliable telephony and, more importantly, adequate data communications. I came across a lot of that during my last few years with Telstra with the pair gain issues, which are still out there, as you well know.

You will have noted in BALTECH's submission that we are suggesting that a capability exists to deliver in excess of 200 kilobits per second and perhaps even in excess of 10 megabits per second to rural and remote customers over VHF links. We have welcomed the opportunity to submit and discuss the potential to achieve equitable broadband service outcomes to regional, rural and remote Australians.

A wireless broadband solution is achievable in a cost-effective manner by utilising commercial off-the-shelf systems, adaptation of existing communication technologies and the development of some specific software and hardware items, along with ramping up significant R&D works that are in progress around Australia at the moment—for instance, things like smart antenna developments, optimisational techniques related to modulation and modulation scheme enhancements. With regard to a solution over VHF, very high frequency, we would need access to available bandwidth and spectrum. Spectrum is a finite resource, as we all know. Our friends at the ANU, the BushLAN team—I am sure they have spoken to you guys quite a few times and we have been speaking to them quite a bit, too—have articulated very well which VHF, and we fully concur with them. A one-solution-fits-all scenario is an unlikely outcome. It is more likely that the solution will be a mix of broadcast, fixed point-to-point, multipoint and routed access.

Infrastructure access is also required, particularly in regional, rural and remote locations. New tower infrastructure can account for up to 30 per cent of a project. Some new towers may cost in the vicinity of \$20,000 to \$35,000 or more, depending on the location of the tower and the requirement for backup power et cetera. These are significant costs. Access to existing

government and state government infrastructure, therefore, would allow for a rapid deployment of a long-distance and, maybe, in some cases medium- and short-distance VHF solution. For instance, in Victoria the state government has 1,000 towers sites, through all instrumentalities. If in each state we could get access somehow to those facilities—and there would no doubt be government facilities there, too, like the department of communications and all those sorts of things—it would make the solutions work more quickly. We know that suitable infrastructure exists. Perhaps a process such as a revamped RTIF program could be utilised to put infrastructure in place in the national good. These sites could then be leased to providers or auctioned off with caveats to interested carriers. By caveats I mean that you would not want to just give all these sites to, say, XYZ telecommunications corporate company that runs the entire world. Do you know what I mean? You do not want to lock it up in one spot, so there would have to be some caveats in there. Additionally, there would need to be very close collaboration with the Australian Communications Authority and the Australian Broadcasting Authority, so much so that they should be a part of the process.

There has been a lot of discussion recently in the press and between groups like us and ANU and others about the cost of the user end of a wireless broadband system. You are all aware that a cable modem, a set-top box or wherever it sits in the lounge room, costs somewhere between \$300 and \$600, and that cost is generally atomised over a 12-month contract, like with a mobile phone. So the price point for a set-top box looks to be around \$600 to \$1,000 per user. The problem is though that that is an aim point. Getting to that price point would require a substantial commitment of money because there is some development to be done to create in a small box the radio bits and pieces that have to deliver or ask for this high-speed download. For instance, you can purchase phones from mobile phone companies for around \$100 to \$300, but to get to that price point the majors have spent hundreds and hundreds of millions of dollars to get the price down. I know that when I got my first mobile phone, about 10 years ago, it cost me \$A3,500.

I think that the government would maybe have to look at some dollar support mechanism for regional, rural and remote customers. We have the capability and the expertise in Australia to develop and roll out a wireless broadband solution that can be delivered over various RF bands—HF, UHF, VHF, spread spectrum, whatever—with high data rates over long distances, such as 50 kilometres to 200 kilometres, and also in the shorter range areas like local urban CAN—customer access network—scenarios.

CHAIR—Thank you. Could you tell us a bit about your collaboration with BushLAN and the ANU?

Mr Moon—It is very loose at the moment. I met with them about 18 months ago. I drove up to Canberra and had a chat to them. BALTECH have been doing some work in Ballarat, with a few other companies, on developing an orthogonal frequency division multiplexing technique, which is another modulation scheme. It is not a new invention; it is part of the European digital broadcasting scenario. They use OFDM and ADSL modems in the ground. They use the same sort of modulation technique. What we have been doing with OFDM is manipulating it in such a way as to provide high-speed data over HF and VHF links. We came across the BushLAN guys on some covert antenna work they were doing with the DSDO. It was more by accident than by design. We were sitting talking to them about what they were doing. They were talking about BushLAN and we said, ‘What do you do?’ They told us about their transmitter. They were

lining up about 100 kilometres and trying to get 200 kilobits. I said, 'What modulation technique are you using?' They said, 'FSK.' I said, 'Have you ever thought about using OFDM?' Of course, they had not—they do now. So that is where we got in touch with them. We have kept loosely in touch over the last 12 months. There are no formal arrangements between us, but they have agreed to us having them in our submission, and I was talking to them as late as yesterday. They have done some really good work with OFDM at ANU and Victoria University of Technology in Melbourne. We are associated with some others around the country.

The concept of taking the supposedly eventually redundant VHF channels from TV or broadcast and reusing them is a good idea. When they might become vacant is a bit of an issue. The whole issue of spectrum management and spectrum access needs to be looked at really closely. Clearly, with an OFDM waveform you can get much better data throughputs. It is almost totally resistant to multipathing effects, whereas other modulation techniques are not. We can get three to four bits per hertz using OFDM. I guess we are trying to influence BushLAN's direction on the modulation technique they might plug into this little radio that they are trying to design as part of their project. It is a loose association at this time and, hopefully, as we get further down this path, that association with BushLAN might become stronger. We have tentatively aligned ourselves with the Victoria University of Technology, a couple of groups in Adelaide and the BushLAN people with this proposal and with the proposal we are putting to the state government of Victoria for their CAN project. You might have heard of that one. It is a customer access network requirement and a similar requirement to what your terms of reference are about—that is, how do we fix up or provide better communications for rural and remote customers?

CHAIR—I was pretty impressed with the ANU's work, because it seemed to be very practical and achievable rather than requiring tremendous outlays of capital expenditure and lots of demand from potential subscribers and so on. All the proposals that we have seen before us seem to be very ambitious, whereas I got the impression that the ANU's work was less ambitious but with a practical outcome that would perhaps be taken up by rural and remote users. Perhaps BALTECH is a bit similar. Would you put it that way?

Mr Moon—Yes, exactly. We are not reinventing or trying to invent something that does not exist. BushLAN have taken existing technology and said, 'How can we use it better? Let us not try to do 155 megabits per second; let us be realistic,' and they have started off at about 100 kilobits per second. They know if they do the maths that they might get 200 kilobits per second out of it if they have the mast up high enough. If they have enough power pumping out and they have the licences, they might line up 50k to 100k. They might even get out a bit further. It depends on the lie of the ground and all sorts of issues. It is a practical approach and it is the same approach that we are taking. OFDM is not new; we did not invent it. We have created some smart algorithms and tricks to make it work a little differently in multipathing and delay and all that sort of stuff. So I think that the fit between them and us is pretty good. I have no expertise in RF at all. Those guys, obviously because they are students, have a ready-made resource of people who are interested and keen to do stuff. They did it fairly quickly and fairly cost effectively.

I am a great believer in reusing existing assets. We do not need to put up new towers. There may be the odd spot where you have to put up another tower, because it does not exist, but that

is the bit extra you have to pay to light up that 100-kilometre radius area and perhaps pick up 50 homesteads that may be two megabits or 356 kilobits per second on demand online all the time. The radios are a real issue. We discussed with them yesterday how to get that price point down so that the cable modem on the TV can run the Internet over the airwaves. To get that price down to \$600 is not going to be an easy fix. There is commercial off-the-shelf equipment you can use and modify but a bit of work has to be done with the antennas, because at the send end, of course, you have a huge mast, a big antenna and lots of power pumping out. At the customer end, some of these remote properties are not going to have mains 240-volt power. They will have generators, batteries, solar or whatever. You have to be a bit smarter: do we really need five megabits going that way? No, we do not. In reality, none of us do. I have a 32-byte modem at home, and I cope with that all right. I am about to join up to Neighbourhood Cable in Ballarat and maybe get 356 kilobits per second when there are not many people on the line. But, as more users come on, that drops down. It is no different with this; it is not a holy grail.

We are trying to say to people that we can pump out 10 or 15 megabits per second on this RF link to a number of customers, but each of those customers will get an aggregate bit of that; they will not all get that amount of throughput. If the uplink could be 32, 56 or 64 kilobits per second, that would be brilliant. If you could guarantee 64 kilobits downstream, that would be brilliant. But the science, the physics and the maths tell us—and it has been done. A lot of what I am talking about comes from the military. There has been a lot of work done overseas and with the small group that we work with here in Australia on actually achieving those sorts of throughputs on VHF. It is mostly with high-power, ship-to-ship, and over short ranges, up to 20 miles—40 kilometres. They are getting four or five megabits per second. They could get more, but they are sticking it out for a particular reason—to keep it reasonably covert. That is no secret I am giving away. So it is being done, and we are saying, ‘Let’s take some of that, put it into the commercial space and get some benefit out of it.’ I guess it has swung back a bit, and some of the military stuff is now coming back into the commercial sphere, whereas more recently a lot of the commercial stuff has gone into the military sphere. Perhaps we are getting a bit of our own back. It is not rocket science, but you should keep it practical and logical.

From memory, in my submission I suggested two to three years to develop the new radio and the whole thing so that it looks good, it sits on the table and it does not interfere with things. You could do a demonstration in six to eight months with the capability of getting 10 megabits or more throughput on a VHF link. But the piece of equipment at the host end would probably be a 19-inch rack of equipment, and the piece of equipment at the customer’s end would probably be half 19-inch rack of equipment. The capability just proves that you can do it. What we have to do is to shrink-wrap that customer end down. There are lots of things in that half 19-inch rack that they do not need, because it comes from a military perspective. So that is that adapting legacy equipment.

CHAIR—In urban areas it seems that there is a lot of interest in the provision of broadband services because of the potential commercial returns from businesses, hospitals, universities et cetera.

Mr Moon—Yes.

CHAIR—That is not the case in rural areas, where it is very hard for private operators to see a return on their investment. Do you see a role for government in involving itself in the

choosing of technology and the provision of technology to rural and remote areas or should the market determine those outcomes?

Mr Moon—I will give you two answers. To answer the second part of your question, if you leave it to the market to determine, what will happen is what is happening now. A lot of spectrum out there has been bought, and what is happening to it? Out of all the spectrum that has been sold off, what percentage has actually been put to use? Pardon my French, but bugger-all, because of the costs involved.

I think the government does have a role to play in regional, rural and remote requirements. Regional is a bit easier, like the Ballarats, the Wagga Waggas and the Tamworths; then you get out to the rural areas like the Dimboolas, the Nhills and the Wentworths; then you get out to the remote areas at the back of Woop Woop. Perhaps the price point support from government gets greater as you get further out. As I said before, I believe government should take a role and say, 'Look, we've got all these sites. Someone has to identify these sites. We'll make them available at no cost to put the infrastructure up'—as long as it is done to the rules and skeds of the ACI, the ABA or whoever's tower it is—'and we'll provide some money to help build the main infrastructure in those towns.'

Maybe the government would either manage those sites forever or you could auction them off. But if you auctioned them off, you would have to be very careful that, let's say, Telstra did not buy them all, because we would be back to the same point where we are now. You need a bit of competition. As you said, there are fewer customers out there, therefore the returns are not as great. I think government does have a role in managing the equitable access to those assets, because it is pretty easy to tie up the right corner of a shopping centre if that is the best spot—and that sort of thing. So I do believe the government does have a role.

On the other side of the coin, once you get this access out there you will find that those rural communities will actually use the data a lot more and get a lot more benefit out of it. If you have got 50 homesteads in a 100-kilometre radius and they are paying only \$50 a month, an operator is not getting a lot of revenue out of them, is he? That is the difficulty of the real scene. If you can provide better content than what is provided now, over cable or whatever, particularly to the rural users, maybe they will pay more money for better value content—whatever that might be. It might be something to do with their business. It could be remote sensing information coming out from the department of agriculture or something—all the spot satellites sending pictures out. If you have got a 10-megabit pipe which is accessible by 50 customers, at certain times of the night you could download the spot pictures while they are asleep. It is on all the time. One person might get stuff for his agribusiness, another guy gets all his stuff for his water catchment, another guy is into minerals and he gets all these funny photographs of where the mineral deposits are. There are all sorts of things you could do. It would be like telematics: 'You want this, it is going to cost you X dollars per minute or per megabyte of this data,' which they cannot access at the moment, unless they go into the city to a mapping or planning area somewhere to look at it. It needs a bit of thought. To summarise, government should have a role in there, I believe. If you leave it up to the commercial guys, it is difficult.

Mr TICEHURST—Are you talking about two-way broadband in this scheme?

Mr Moon—This will be what we call an unpaired channel, so it is one channel. For instance, if we were transmitting in a five-megahertz band, with OFDM we have basically got 500-plus independent modulated carriers in that five-megahertz band. If you imagine a modem—let's call them virtual modems, because it is easier to understand—in that five-megahertz band, we have got 500 virtual modems all running at the same time. We can turn any one of those on or off or increase the speed this way or decrease the speed that way, so we can do simultaneous data and voice. Voice takes up a lot of resources, so you use less voice than data, but you can do voice-over IP, like the Cisco stuff. The network would be an IP network.

Mr TICEHURST—So it would be duplex.

Mr Moon—Yes.

Mr TICEHURST—What about spectrum? What is your proposal for accessing spectrum?

Mr Moon—To be honest, that is a difficult one. I like the idea of assessing just what spectrum might be becoming available because of digital TV, but I do not think we should wait for that, because that could be two years or four years away—it jumps around a bit. If you read the paper next week it will be five years, and a few weeks ago it was three years. If you wanted to sit around and wait for some spectrum to become available, there is probably a better way to do it; that is, talking to the ACA and the ABA to see what spectrum they have got that they do not actually utilise or talking to some of the carriers who have got spectrum and leasing access to their spectrum.

Small groups such as ours do not have any money to buy spectrum. We have talked to a couple of groups that have shown some interest. One group has a licence and one group has a lot of spectrum, but access to the spectrum is difficult. As I said, we can run this OFDM type wave form—and that is not the only wave form that would be used, by the way; it is horses for courses—in the HF, VHF or UHF environment or in the spread spectrum arena.

Mr TICEHURST—What is your minimum frequency in HF?

Mr Moon—We have been working in the three-kilohertz band for the military. Currently, they get 300 megabits per second anywhere in the world. That is their speed of throughput for data on a good day, if they are lucky.

Mr TICEHURST—Could you use the 27-meg band?

Mr Moon—Yes. I do not know technically what you could actually physically, in distance, do with that. Spectrum is spectrum, and all we are going to do is to say, 'This bit will jam into lots of subchannels, electronic modems.'

Mr TICEHURST—There is still a citizen band in UHF, so that should be accessible, shouldn't it?

Mr Moon—Yes. Your data rates might be down because the pipe is not wide enough. OFDM is the best from the point of view of multipathing et cetera, but in cases where you had a 12-

kilohertz channel in VHF there would be questions about whether OFDM actually provides all the answers. Probably some other form—QPSK, for example—would be better in that case.

Mr TICEHURST—What is your minimum number of users in an area that would make this viable?

Mr Moon—It depends. If you mean viable from a commercial point of view, I could not answer that. If we got 10 megabits per second out with the BushLAN people over, say, 50 to 100 kilometres, with the smart antenna technologies that have been worked on and have been developed and are currently being worked on—you can reuse the frequencies and the channels and do all sorts of smart steering of the beams—with 10 megabits divided by 50 customers, you could get 200 kilobits or more per customer. There is no real impediment there. They all could not get three megabits per second, for instance. The number of customers is dependent on the amount of data throughput we can pump out, basically.

Mr TICEHURST—Before you can go live, you still have a fair bit of development work to do, haven't you?

Mr Moon—No, we could demonstrate the capability, but not the shrunken hardware, in six to eight months. It exists now. We could actually run a demonstration in six to eight months.

Mr TICEHURST—If you are going to set it up and sell it to users—and you would have to overcome the pair gain problems that you were talking about; we have them in our area, too—when would you have a commercial product?

Mr Moon—If I go back to my submission, I said in about two to three years. That time span could be reduced. As I said, there are commercial off-the-shelf radios that would need some adaptation to work with this different modulation technique. Probably in 12 to 18 months we could have a reasonable user and customer product. The headend, as I call it, is not the real issue, because that exists. As I said before, some of the things I am talking about today that will help these things work will be smaller, better and faster in a month's time. When we started our development we looked at FSK modems and then we went to OFDM. Now you have DSPs. A few years ago they either did not exist or they were so expensive that you could not get access to them. AC chips were a big name a couple of years ago. They are now going out and other things are coming in. All that continues to happen.

Mr CIOBO—I am interested in the different options that your OFDM technology offers. Is it just a performance thing for data transmission, or does it apply to videoconferencing, e-commerce, telemedicine et cetera?

Mr Moon—That is only data; we do not care.

Mr CIOBO—So it is across the board?

Mr Moon—It is a pipe and you pump water or oil down it; the pipe does not care. Seriously, if you want to do videoconferencing or e-this or whatever, you just shove it down the pipe, if the bandwidth is enough. You have got compressed video at 128 kilobits per second; you are not going to get streaming video. If you can get two megabits per second down that radio pipe and

it is on all the time and there are no fading channels—and utilising this technique you would not get that fading problem—you could run moving video. You could do videoconferencing over VHF—and UHF too, depending on shorter distances.

Mr CIOBO—So this could have particular applications for remote Australians.

Mr Moon—Telemedicine, telehealth, virtual medicine, expert consultancy—serious stuff. Also that stuff is off the shelf. It is working on copper lines now. You dial up and you do it, and it costs a lot of money. Regional communities with a health service or a regional district nurse, if they had one of these radio links, could take an X-ray or whatever and send it down the wire and someone could look at it and assess it and send back the information. You can do it online, depending on who is using the link. It is the same as in your street: if 50 people connect to your Internet line, you are not going to get the speed you got at two o'clock in the morning.

With this type of technology we are talking about you can also address bits. You can say, 'This bunch of bits goes to him and no-one else,' and someone else cannot access it. If you are someone important, such as the local mayor or the local fire brigade chief or something, we could give you 64 kilobits per second dedicated to you because of that disaster plan requirement. So you can actually address the bits. Even though it is a broadcast, you cannot sniff all the wind unless you have got access to the code. So we put addressing details on. That is an overhead also. Don't forget there is always an overhead when you are sending bits that have got to go to him and nobody else, so that takes away a bit of the throughput. We are only talking low numbers of customers, and in the outer regional, rural and inner remote areas the spread of population means that in 100 square kilometres you have got 100 people or something like that. It varies from area to area, so you are not looking at a lot of customers pumping data back and forth all the time. It is a different kettle of fish in the city. Kids come home and get on the Internet at night-time and it is pumping away. But out in the remoter areas you will find that those kids are being bussed back home anyhow. Because they are in different directions and the farms are not necessarily side by side, we can reuse the channel and the frequency. In a lot of cases one person is going to get five megabits per second and another is going to get two megabits per second or one is going to get 64K and another 64K. So it is not as though they all arrive together. It is a different kettle of fish when you have got 3,000 or 4,000 people in a long street, because they are all close and it is much harder to steer your beams and say, 'You can only get this bit.'

Mr CIOBO—When we were in Adelaide we spoke with a company called m.Net.

Mr Moon—Yes, I read that.

Mr CIOBO—You know about m.Net. Some of the possible applications you raise are applications they are looking at. Is it a case of competing technologies or, aside from what you have just raised, are there other advantages or disadvantages to what BALTECH is offering?

Mr Moon—Not really. If I recall rightly, m.Net were looking more at an urban solution, were they not?

Mr CIOBO—I think they are rolling across industry clusters but they are also in different terrains, for lack of a better word, including a rural and remote type setting.

Mr Moon—One they were looking at was a satellite downlink with a container on the ground set up as a base.

Mr CIOBO—That was Whyalla.

Mr Moon—There is a lot of point-to-point stuff. We are talking broadcast and point-to-point and multipoint. There is another one in there—ArrayComm or CKW array?—using similar technology but focused primarily in the urban areas, so high bandwidth, short range, working in the 2.4 gig or 3 gig area. It is horses for courses. What we are talking about is not a secret. Lots of people out there are working in the same space but their heads are in a different area. Where I come from, I do feel for these people in the rural areas. That is where I do a lot of my work. That is not to say I would not try to do an urban area if I could make a buck out of it. Of course you would. You would sell it to anyone—seriously.

There is no reason why, if we could get this technology going in 12 months in a reasonable sized set-top box, any operator could not buy it and plug it into his or her system. It would not have to be a VHF, X-broadcast channel. You could just plug it in anywhere and it could work from the HF—which we have not really talked about—all the way through. Let us go to remote and rural. I will not say never, because someone said it to us one day and we proved them wrong. A little story, quickly. Years ago when I started in the PMG we had a very good engineer. I said, ‘What’s this stuff?’ This was a two-megabit link, a 2048 link, repeaters every whatever it was—1,850 feet or something. I said, ‘What’s that?’ When he told me, I said, ‘Oh, that’s good.’ He said, ‘You’ll never go any faster than that.’ Of course, technology proved him wrong: ADSL, with no repeaters, is three to five ks. So I will never say never, but in the HF environment the speed of throughput we believe we could achieve with this type of technology would be in the order of 9,600 bits per second, maybe 12 kilobits per second, and we are talking effective data throughput. We are not talking data with a whole bunch of overheads, then you subtract those and have the real bit; we are talking effective data throughput. In those outer rural areas you could actually use an HF link. They are getting nothing at the moment. Imagine if all of a sudden you popped up with a 12-kilohertz link on your HF link. It would not be online all the time, but it would be actually accessed at 9,600 to 12 kilobits per second. So something will happen in the not too distant future, I am sure, that will allow us to achieve better throughputs even than that. That is a significant improvement: 300 bits per second to 9,600 bits per second. That is a fair improvement, isn’t it? It is not bad, although it is not good from our city perspective.

Mr CIOBO—That is terrific. Thank you.

CHAIR—Thank you very much for appearing today, Mr Moon. Thank you for much for making the effort to be here for us this afternoon, and we will look forward to seeing you again sometime.

[2.45 p.m.]

BRAY, George Karl Dewitt (Private capacity)

CHAIR—Welcome. I advise you that the committee does not require you to give evidence under oath, but 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. If you would like to make some introductory remarks, I now invite you to do so.

Mr Bray—Thank you. I am appearing as an enthusiast and watcher of the broadband and wireless development in Australia. My tech trek was a personal venture throughout rural and regional Australia to demonstrate and investigate the state of broadband services throughout Australia. I have presented my tech trek final report as evidence. I should clarify that I was sponsored by the Internet Industry Association. I was their roving ambassador in this broadband investigation. NOIE and Cisco Systems also provided funding to accomplish this goal. I am very happy to be here and have certainly enjoyed today. I will be happy to answer any questions you have.

CHAIR—Your submission is a very interesting one. You make a number of comments in it about issues to do with the Commonwealth's charges and restrictions on wired broadband services. Could you talk about whether the Commonwealth's restrictions, charges and regulations are dampening down demand in the area of broadband technologies? Are they making one type of technology more preferable to another? How do you see the future of the Commonwealth's involvement in regulation of the wireless broadband area?

Mr Bray—This was my major finding after asking people about their expectations and their understanding of broadband use. It was only six months ago that I did most of this investigation, but at that time a lot of potential consumers thought that broadband, as delivered through ADSL services, was too expensive for small to medium enterprises and home users. The primary reason for that is the data charging model given to subscribers from the carriers. This is one that charges for every bit of information. Your broadband account is capped at a set usage for the month, and if you go over that you will pay extra.

I was surprised at people's knowledge and involvement with broadband. A lot of people knew about the term and what it stood for in terms of simply faster Internet. But when it came to understanding the additional services, mainly using audio and video technologies over these links, they did not know, or even comprehend, that these sorts of things could be available—space-age stuff like videophones and those sorts of things; whereas in this intelligentsia, people who understand broadband know that it is that involvement of video and audio at a telephonic level between single parties or multi-parties that really gives the promise of all sorts of broadband applications.

It is my contention—simply from talking to people and interviewing them about how they see broadband services and the applications used—that carriers that supply a restricted service or a

capped service in terms of speed or volume use are detrimentally affecting the take-up of their own services and the use of high bandwidth and advanced applications on their networks.

The other part of your question related to the Commonwealth and its role in this whole area. It would be difficult for the Commonwealth to mandate what any carrier charges for its bandwidth use. Telstra, in this case as the major carrier in Australia, has the problem that its user base is using bandwidth from outside Australia and that, for Telstra, there is disparity between what it earns and what it costs. I am not purporting to solve that particular problem, but I think we should notice that one of driving factors for wireless services in Australia is that it is using unlicensed spectrum and, hence, is free from usage limitations. I have my wireless network on at home all the time. When I do video streaming from laptops around my house—and I am an advanced user and my family are advanced users—I know that that simply would not happen if I was only allowed to use five megabits of data a day, a month or whatever, if it is restricted. So it is a general point about the uptake of advanced services: if there is a charging model that can bite then it is a big downer for people taking it up.

The Commonwealth, in its majority ownership of Telstra, could mandate the rule that says any hardware network facilitating transfer of data in Australia becomes available at a reduced rate or at an uncapped rate. Hence, any interconnections with Internet service providers, public wireless networks or any downstream operations would have the benefit of uncapped usage—usage that actually encourages the developers to write applications, the users to use those applications and the carriers to deploy applications that stimulate everything that we want stimulated.

I feel quite strongly, and I may be alone in this, that by not taking advantage of wireless networks—the spectrum is there and if you do not use it this second, if you do not use that 2.3 gigahertz from here to there that second, it is gone—the value is gone and nobody can use it. My contention is that the bandwidth that is there should be used; encourage it at any level, whether it is VHF LAN, BushLAN, MMDS to solve a particular regional problem, 802.11 in airports or coffee shops or whatever. We should encourage the use of all of the technologies, not by picking a particular technology but by allowing the commercial operators and carriers—by USO requirements—to implement technology that they feel will last and provide a benefit.

CHAIR—Is it your experience that this proliferation of technologies all talk to each other, for want of a better description? Can they be easily updated in the future? Will shifting from one to the other be cost prohibitive? Will we end up with some areas that have gone down the track of a particular technology that may find themselves at a disadvantage because they cannot shift over to a better technology in the future?

Mr Bray—I think that there is always going to be a problem implementing a range of technologies to solve several geographical problems. For example, MMDS might be used in Newcastle to deliver 20,000 last mile connections and a technology comes around three years later that uses the same spectrum but gives more capacity and allows more subscribers per cell—or something like that. In that case, the technologies are going to evolve in their own strata. MMDS is going to evolve and pack more capacity into the same spectrum, as will 802.11 and long-haul microwave connection. Each individual technology will advance, and I do not see anything wrong with letting that happen.

The trouble in Australia is that we have many different geographical conditions to cope with, and in very remote and regional areas the VHF BushLAN technology will be the only chance they have to get one type of connection. Some other places are so remote that they might need a two-way satellite connection. Each of these individual technologies will evolve over time, and I doubt that there will ever be a single technology that you can pull out of your pocket and say, 'Right. I am on the high-speed video two-way audio network from anywhere that I choose to be in this country.' That will not happen. There will always be a combination of technologies used at the subscriber level and some smart carrier tricks to implement migration to and from different networks, migrating from GPRS into an 802.11 network, into a corporate network, a secure network. These are all things that will evolve and I can see that the solutions will become available to roam between them, but it will not be quick.

Mr TICEHURST—What was the experience with the one-way satellite in relation to broadband? How effective was that?

Mr Bray—The one-way satellite was a service provided by many operators, but I believe all of those operators use the Optus B3 satellite. You have a standard tin satellite dish, exactly the same as those that appear on hundreds of roofs all across towns in Australia. The back channel to the Internet usually goes through a PSTN telephone line. I found it to be better than a PSTN telephone line. It was faster on the downlink and provided the beginnings of one-way streaming video, listening to the radio over the Internet, and some of those first broadband services. It was quick to set up and reliable.

Mr TICEHURST—How did that compare with the two-way satellite?

Mr Bray—The two-way satellite that I had was from Optus. It was a larger dish—a 1.2-metre dish as opposed to a 90-centimetre dish—and it was significantly faster. As you were using it, the equipment was 400 kilobits up, and I had mine set at two megabits down. For our local area network of users, doing demonstrations from a wireless notebook and streaming stuff off a site in the US over this satellite, it was a terrific solution and one that could be used and shared as a ground station. That was what my demonstration was: park the bus in a piece of dust somewhere, point the satellite to a satellite dish at B3, turn on my wireless 802.11 network, plug it into a projector, and show people: 'This is the Internet; this could be in your home with the right technology.' For \$10,000, say, for installation of a two-way satellite system, a bit of antenna and wireless networking, that is a pretty cheap solution for delivering some high bandwidth. The trouble with a two-way solution is the latency that you get by communicating 28,000 kilometres in each direction, and it is completely unsuitable for videoconferencing.

Mr TICEHURST—What about voice-over IP on those two-way satellites?

Mr Bray—That would be doable but there would still be a delay, given physics.

Mr TICEHURST—With the 802.11 community type wireless LANs, we have heard from people who have made submissions here that they seem to be built something like the free citizen band type thing and there is an expectation that they should be able to link into the public network. That seems to be echoed in your report too—everybody wants something for nothing.

Mr Bray—Yes. 802.11 or WiFi is very popular for delivering Internet services, while in America it is very popular for delivering Internet services throughout a community of Internet users. The big frustration for those people is not being able to get to the real Internet. In a lot of cases these are community networks and they have got their own gaming servers and they are experimenters—they are the ham radio enthusiasts of today. In a case where I was going to demonstrate this equipment in a community that wanted to use it as a community thing, the requirement to become a telecommunications carrier to make that interconnection with the real Internet and hence provide a service—not necessarily a commercial service but a connection service—was a big problem. It is the 60s model of bandwidth: 802.11, it is free, I have bought the equipment and I have spent \$50 on the card to do it and it does not cost me anything to go from here to across the street. I do not want be tied back, I do not want to have my access to the real Internet, which is free and grassroots and 60s in itself, restricted.

Mr TICEHURST—What is the cost of a carrier licence?

Mr Bray—I believe it is \$20,000.

Mr TICEHURST—Per year?

Mr Bray—Yes, per year. It was in one of the submissions or one of the transcripts.

Mr TICEHURST—Did you find that people have a need for broadband—a real need?

Mr Bray—Simply to overcome the unreliability of getting to the Internet on a modem. If you take the assumption that being on the Internet, even at low bandwidth, simply to get email and web pages is beneficial—whether it is to the community, to the local SMEs or the farmers getting their prices, or whatever it is—then being on the Internet even reliably at 56K is a good thing. Broadband provides that, and very reliably, but they did not see any need for themselves having broadband services, apart from getting web pages faster. As soon as people have seen a broadband connection, they say, ‘This is great. I do not have to wait 45 seconds for this page to load.’ This simply means people can do the 21st century thing and fit more into their lives in the same space of time. It will be obvious that the applications that broadband will bring will be beneficial once they are here, but it is not obvious to the potential subscriber now. ‘I should get broadband because that means I am going to have access to videoconferencing, international television stations and all of the things that it will provide.’ As you were saying about the education aspect of it before, a lot of these things are being invented as we speak or not being invented due to certain restrictions.

Mr TICEHURST—Do you find it a little bit like, say, pay TV, in that anybody can get pay TV—either cable or satellite—but the uptake has not been really great. When you look at what the pay TV services provide, it is quite limited.

Mr Bray—Yes. Again it is a personal view, but I believe it is the billing model for pay television. I quizzed quite a few people in country areas where pay TV services are available. It might cost people \$45 or \$50 a month, and that is simply out of the question for them, especially when they are paying \$50 a month for 12 channels, 10 of which they do not care about and do not want. It has been my contention that the pay TV industry would get a lot more customers if they sold each channel for \$6 a month and let people pick exactly which three

channels they wanted. I might be paying only \$18 a month but I will be a customer, whereas I will not be a customer if they force me to take the whole bouquet, as it is called.

Mr TICEHURST—Broadband is much the same, isn't it? You can watch only one TV channel at a time—maybe two at the most on some TVs, but effectively it is one at a time.

Mr Bray—I would say that there is a need for broadband in rural areas because of the other services that are being shut down. For instance, you may suddenly have to replace a bank with an online banking application, which needs secure web site access and constant interaction. Banking online is, I would say, suitable only for a regular banker—a small business or a farmer who actually has to get that job done, and it is suitable only on a broadband connection. You see them today struggling, trying to get secure connections back to some huge data centre in Sydney over a modem through three ISPs and a piece of wet string. It is not fun. They are complaining, and rightly so.

Mr TICEHURST—You made a comment here about the power limitations of 802.11 within the Australian scene. Are you inferring that in the US they can have higher power?

Mr Bray—I believe that is the case. I guess I would have to refer to Mr Boyd Murray from the radiophysics department at CSIRO. I spoke to him just before all of this came on, and he was telling me that, with point-to-point links using 802.11a in the five gigahertz range, the power limitations are different in Australia from what they are in the US. I am sure that he made the point that we would need to make sure that we do not have any of those things different from the US. The US is where all the gear gets made, that is where all the protocols are invented, it is where all that happens. For us to have a restriction like that means that suddenly any vendor coming in wanting to sell 802.11a equipment needs to adapt it, fix it, or get the boys in California to write an Australian version. Suddenly it is a problem; whereas the alternative is that it follows the world standard. We can just plug it in and make it go.

CHAIR—Mr Ciobo, do you have any questions before you have to leave?

Mr CIOBO—Yes, I have one question. In your submission you made a comment on future trends. With respect to the use of, say, community networks of 802.11, you talk about your expectation that interconnection fees would probably be a debilitating factor. What is your basis for that, and do you foresee that the current regulatory regime takes adequate consideration of the potential for interconnection fees to be used as an inhibitor to widespread use of that free spectrum?

Mr Bray—My understanding of that has come from the current charging schemes and opportunities taken, as we heard this morning, when various pricing regimes are lifted—fixed to mobile telephony, SMS costs, business landline rental costs and those sorts of things. My feeling is that, if there is an opportunity to charge the customer or group of customers, it will be taken up wholeheartedly and used to its optimal strength. That in itself is an inhibitor to making community networks connect in some way.

Mr CIOBO—Can I clarify that? Do you see it as being used as an anticompetition mechanism or do you see it as purely done on a cost recovery basis?

Mr Bray—Such a circumstance could be used anticompetitively.

Mr CIOBO—Okay.

Mr Bray—The 802.11 community networks are appearing everywhere at the grassroots level. It is a bone of contention with carriers everywhere as to how they make or allow people to connect. There is physically nothing stopping you connecting an 802.11 access point right next to the box that does your ADSL and providing your whole block with broadband Internet access. It is unclear how carriers in the US and here are tackling that problem at the level of the terms of usage agreement—things that they get the customers to agree to. But the reason I feel community networks are so popular is the difference in speed available to the end user. In typical ADSL you get 512 kilobits per second coming at you; in an 802.11 it is 10 megabits plus—20 times greater—and it does not cost you anything. There is a huge discrepancy in broadband services that are currently billed and delivered at the wireline method and the wireless ones with potential, and it alludes to my point before that a broadband frequency is there all the time. The only restrictions on the use of a frequency at a particular time are that it is not commercially viable to do so or the infrastructure will not support that.

One point I would like to bring up is the difference between community applications and commercially derived applications. A lot of the 802.11 community networking stuff and ideas for its implementation are to do with banging an installation in a school and making the local church, the kindergarten et cetera all come on and doing simple things like that. In that scene there is no commercial imperative to have the cost of the equipment paid for by each subscriber or anything like that. The actual measurement of the benefit to society is a different number. In a lot of cases that number is insignificant when it comes to the hardware and the infrastructure required to roll out the service. I think you are in a difficult position of needing to perhaps facilitate bandwidth in the community—pick a slice of spectrum out of the sky for particular usage in a geographical area—whereas the government has been down the path of selling that spectrum and placing a value on it. I will not say whether that is an artificially high value or low value. The value measure of spectrum should be considered in terms of not only carriers and subscribers and the roll-out of hardware to achieve communications over that spectrum but also the down-to-earth community benefit of simply being able to have one school talking in real-time to another school.

CHAIR—I note that we have gone into subcommittee with the exiting of Mr Ciobo.

It seems to me that the easiest solution for the last mile is satellite technology with 802.11 or some other kind of technology at ground level for rural and remote Australia and even regional Australia. Do you think that, hypothetically, similar to the satellite mobile handset subsidy that Telstra has announced recently, that would be a candidate for a government subsidy, perhaps through a trust like a rural telecommunications development trust that has been proposed by ATUG? Do you think that would be the kind of thing that such a trust would do?

Mr Bray—Yes, I do. Such a trust, as was outlined by ATUG today, would work well and provide a pool of funds to deploy these things. There is a satellite phone subsidy and there is also a satellite delivered Internet subsidy, I believe. In the case of the phone subsidy you can get up to \$1,100 for purchasing a phone but then you have the privilege of paying whatever it is—\$2 a minute—for access on that phone. That does not really work out there with people. If you

were to say, 'Here's 10 grand for a satellite installation and 802.11 for your two or three blocks of communities in this area,' simply enabling them to pay bandwidth charges for a carrier or for an implementer is not really going to work very well. It is noble to provide funds to meet the cost of the infrastructure, but I still think there is a reticence by consumers to get locked into something that the kids can leave on, giving them a big bill at the end of the month. The other thing to mention is that we talk of 'the rural and regional solution', and there is a satellite in the middle of an 802.11 network which might be right for a town of 100 homes but it will not be right for Norlink delivering over four cities with 25,000 people. The technology should be used where it is best—

CHAIR—I am thinking more for those people for whom it is never going to be commercially viable for a commercial operator to try to reach. You can make money out of Wagga Wagga, Dubbo, Goulburn, Mount Gambier or Whyalla, but one wonders how on earth you could commercially make it viable to make money out of somebody living five kilometres from Coober Pedy.

Mr Bray—But does it have to be commercially viable to be done?

CHAIR—It does under the current model! The current model relies on the market and free enterprise. That is what we are trying to get to: whether government should have a role in this or whether the current model should continue to be the model that is used, and whether wireless broadband is so important that the government should play a role in requiring that it be rolled out much further than just where it is profitable. That is what we are talking about.

Mr Bray—Yes. We mentioned wireless broadband but it is really in the context of all broadband delivery and wireless is a great last mile technology. It certainly obviates the need for carriers to dig cables up and string them through the streets. Perhaps there could be a fund, together with a USO obligation saying, 'If you're a carrier in this country, you've got to supply the percentage of the market that you use up of all of the regional and uncommercial locations that we have.' Every year you get a bunch of applications from people who are out in the bush and who want broadband, but it is a big technical consideration to actually deliver a service there. You could see it costing hundreds of thousands of dollars to get Mrs McGillicuddy and her children on, five miles from Coober Pedy. But if the ideas of this committee are to deliver broadband equally to anybody in Australia who sees the need, then getting the telecommunications companies that make a profit out of major centres to fund that through a USO has worked to date. But my feeling is that handing the money out to the consumer to get them to pay for the gear will not be as highly regarded as making more of an effort to say: 'We really think it's valuable that you're on this network, that you use it, that you have the training and that all the community groups are involved.' It is one thing to deliver somebody a wireless card, but it has to work.

There is another thing I would like to mention. In terms of end user equipment, subscribers' PCs—we are talking about the people who we are wanting to get on the network and experience all of this—the equipment that we are relying on them to have is poor. We are talking about old PCs. They are not fast. They do not display things very well. The operating system that is installed is old, it has all the games and then this CD that somebody brought over. From an IT purist's point of view, it is a rats nest. If you were an IT manager managing a group of corporate machines to achieve a task, you would chuck that equipment out and replace it with something

that is designed to do the job. It does not quite fit into the wireless mandate, but it is an issue when delivering broadband services. You might deliver broadband to somebody but if they do not have a decent PC to display it on or if it is going to fall over every time it goes over some particular speed then that is a failure.

Mr TICEHURST—How reliable did you find these 802.11 community lines from a quality of service point of view?

Mr Bray—Very reliable for the range in which they are built as consumer devices, which is 100 metres. It is an ethernet cable in your office ceiling; you would have one on this side of the building and one on the other side of the building.

Mr TICEHURST—With these community networks, you are talking about linking the various users around a town?

Mr Bray—Yes.

Mr TICEHURST—What sort of reliability do they have?

Mr Bray—I am told it works. I have not tried it. I have taken my bus along, I have put my big antenna up, I have taken my wireless PC with a directional antenna eight kilometres away from the bus and pointed my directional antenna back at the bus and I am on the Internet, no problem. In terms of the technology, it can be delivered. An 802.11 community network needs to be simple enough that the infrastructure goes up, the church tower gets a big black rod on it and that is your 802.11. You have enough power to reach the houses. Ideally it is self-installable. People actually have something to stick on their wall and point roughly in the direction of the church and they might get something.

The 802.11 has the potential to deliver community wide services, but right now it is useful in cafes and around the home and businesses and those sorts of things. The 802.11 technology can handle the long-haul links with directional antennas, but in terms of distributing a broadband service to a valley or to a group of people, my feeling is MMDS is a much better technology for that. It is designed as a cable replacement, it does voice-over IP as well and there is quality of service built into the protocol. It is a carrier grade thing.

Mr TICEHURST—What gain antenna did you use on that eight-k link?

Mr Bray—That was using a 13½-DB omnidirectional. The directional was a 14-DB Yagi.

Mr TICEHURST—That is a fair bit of gain.

Mr Bray—Yes. Everything was optimal in my position. I had Cisco routers and access points and the best that they could do with antennas. It was good. But it was good to test that eight kilometres. Perhaps even further can be done: put the antenna on top of the Rock and you could go even further.

Mr TICEHURST—That can be a cheaper solution for some of these valley areas where you are probably talking about being only five or six kilometres from a particular point.

Mr Bray—Yes. I would also like to talk about integration with the existing networks, wherever they might be. In the transcript of several hearings mention has been made of the fact that the state rail authorities, the electricity companies and the gas companies have fibre in the ground ready to use but not being used. This is particularly true of New South Wales. A solution for Dorrigo—if the fibre goes past there, perhaps on the railway line—would be to put the access point at the train station. You are on the fibre there, and it is free to wire up whoever can be reached in Dorrigo.

These networks are owned by multiple entities in our society. Whether carriers of gas, electricity or water, they have put in these networks for good use in the community. The bandwidth that is available from the traditional carriers is not the only one around, and so perhaps there are creative ways of using this other public resource for public networking out in remote areas. That is a very valuable high-speed link and it would solve the first-mile problem for a lot of these places. If you can solve the last-mile problem in an innovative wireless way, whether MMDS, VHF or 802.11, that is better than having to use a modem.

Mr TICEHURST—You also made mention of using digital TV.

Mr Bray—I did.

Mr TICEHURST—I am not sure where we are up to with datacasting, because that all sort of disappeared into the ether somewhere along the line. But for some time I have been using VBI and analog TV for data, and that works very well.

Mr Bray—Teletext?

Mr TICEHURST—No; real-time signal. I have using that since about 1993 and it is still working very well. A digital TV could operate a bit like a one-way satellite: you could get the return signal through the digital circuit. Maybe you could get the same sort of thing through the subcarrier on FM radio.

Mr Bray—Yes. I was interested to hear the previous speaker from BALTECH say that his solution was not using the PSTN as a return channel but using the VHF radio as a return channel. Perhaps the same thing can be done with the digital television spectrum. That bandwidth is simply much more downstream and, presumably, it is all digital and you do not have propagation problems.

I thought it was a shame that the digital spectrum was mandated for television use only. It is a huge resource that can easily be tacked onto the existing television transmission networks and, by definition, a lot of the audience in Australia is being covered. The gear may not be cheap because we are pioneers with digital TV, and so the end user solution might have to be hybrid or developed here. We are talking about picking a technology or not picking a technology. If the case for delivering over the digital spectrum was good enough and you had the buy-in of the TV companies, the antenna owners and everything, it would be worth getting the ANU to do a special project—to say, 'Build us the end user equipment based on what you've done with

BushLAN in a digital reception TV environment.’ They would be able to come up with something. Obviously that would come under R&D but, at the end of it, you would have a technology that would service Australia very well.

Mr TICEHURST—With the VBI, it is very simple. We have a serial signal coming in from the Seven Network and we have a box that is not much bigger than a modem that gives a serial out. For digital I would not see it being any more complicated than that.

Mr Bray—That is right. All of the early work done in VBI and packet radio and everything has come to be of such advantage in the multigigabits of bandwidth that is available with DTV. The stuff that they do off existing satellites at 32 megabits per second from this bird 32,000 kilometres away is incredible. That is MPEG-2 digital compressed vision coming off 17 transponders. It is a lot of bandwidth and it is really reliable. As a distribution technology, digital television is terrific. One of the advantages is that you can deploy it through the existing television carriage architecture. If the back channel can be made to work—and there is end gear to make that happen—that itself is a whole-of-Australia solution rather than having different solutions with different technologies for different areas.

Mr TICEHURST—In fact, I am surprised that we have received no submissions on MPEG. A lot of data goes over the VBI on the Seven Network and SBS; they have VBI in certain areas. It is nothing new.

Mr Bray—VBI uses the space between the frames of a picture to carry data. But here we are talking about—just like BushLAN which uses the VHF television frequency—using the digital television frequency, which delivers HDTV and all the digital television signals, and creaming off one of those channels for a national Internet service. That is possible. It is a really valuable piece of spectrum that, again, is not being used at the moment and there are all sorts of troubles with who owns it and whether you are a television station and have to produce digital content to use it—and that is silly. The bandwidth is there and the technology is there. It should really be looked at and used nationally, I think.

CHAIR—Mr Bray, thank you very much for appearing before us today. What you have said has been very interesting and useful. You deserve a medal for being here all day and listening to everybody else who came before you, more so than we do.

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

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.

CHAIR—I also thank the secretariat, Sound and Vision—I still call you Sound and Vision—and Hansard for being here today and taking care of us. Also the ever-present Telstra gets an official welcome and farewell. We look forward to seeing everybody in Canberra in a couple of weeks time.

Committee adjourned at 3.33 p.m.