
COMMONWEALTH OF AUSTRALIA

# Official Committee Hansard

# HOUSE OF REPRESENTATIVES

## STANDING COMMITTEE ON COMMUNICATIONS, INFORMATION TECHNOLOGY AND THE ARTS

**Reference: Wireless broadband technologies**

THURSDAY, 13 JUNE 2002

SYDNEY

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**HOUSE OF REPRESENTATIVES**

**STANDING COMMITTEE ON COMMUNICATIONS, INFORMATION TECHNOLOGY AND THE ARTS**

**Thursday, 13 June 2002**

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

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

### Terms of reference for the inquiry:

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

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

## WITNESSES

**Committee met at 9.08 a.m.**

**ANDERSEN, Ms Linda Elizabeth, Policy and Regulatory Affairs Executive, ntl Australia Pty Ltd**

**HILLIGER, Mr David Alan, Business Development Manager, New Media, ntl Australia Pty Ltd**

**MORTON, Mr Clive Howard, Broadcast Services Director, ntl Australia Pty Ltd**

**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 our inquiry into wireless broadband technologies. This is in fact our first hearing of this inquiry, and we have many others to come. We are going to Melbourne, Newcastle, the Gold Coast, Adelaide and Canberra, and will probably come back to Sydney at some point.

I welcome representatives of ntl Australia to our public hearing. We have a few formalities to go through and then we will ask you if you would like to make an opening statement before we proceed to questions. Although the committee does not require you to give evidence under oath, I 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. Would you like to make an opening statement before we proceed to questions?

**Mr Morton**—Yes, I would like to make an opening statement.

**CHAIR**—Please proceed.

**Mr Morton**—Mr Chairman, I would like to thank the committee for the invitation and for the opportunity for us to appear before you and to talk to you about ntl Australia and wireless broadband, including our BushNet product. Our company, ntl Australia, which I will refer to as ntl, is a major provider of broadcast transmission services in Australia. It owns and operates the National Transmission Network acquired from the Commonwealth in 1999. Until recently we were owned by ntl Inc., a major international telecommunications and broadcasting company operating in the UK, Europe and Australia, but in April this year we were purchased by Macquarie Bank Ltd and ntl is now 100 per cent Australian owned.

Ntl's major customers are the national broadcasters, ABC and SBS. Ntl transmits its radio and television services from approximately 600 terrestrial transmission sites around Australia, predominantly in regional and rural areas, and, from these facilities, reaches 98.5 per cent of the Australian population. The ntl infrastructure is also used to provide services to other broadcasters and radio and telecommunications service providers.

It is ntl's view that wireless technology can contribute significantly to the provision of broadband services to rural and regional Australia. As the committee would know, wireless can incorporate a number of technologies ranging from very short distance line of sight to long distance over-the-horizon applications. Consequently, ntl advocates a horses for courses

approach, as it is our view that no particular application, whether it be wireless or wireline, can meet all the needs of users or is suited across all situations.

As its contribution to the development of broadband services, ntl has developed a product called BushNet. BushNet utilises wireless technology to deliver high-speed Internet products to regional and rural Australia. BushNet is essentially the provision of a high-speed Internet service to households and small businesses in regional areas using a digital broadcast channel. A digital channel represents bandwidth of approximately 20 megabits per second. The service would use existing broadcast infrastructure that is used to transmit ABC and SBS television, which, as I mentioned previously, reaches over 98 per cent of the Australian population. In effect, the ntl transmission network can reach Australian community groups down to sizes of 200 or so. It might be useful, at this stage, to provide you with a diagram that we have developed which readily explains how BushNet works. Mr Chairman, I would be happy to take you through it, if that would be of benefit.

**CHAIR**—I am sure it would. Do you want us to take that as an exhibit or is it part of your submission?

**Mr Morton**—It is part of the submission but I am more than happy for you to keep it.

**CHAIR**—If it is already in the submission, that will be fine. It will have been taken as evidence.

**Mr Morton**—To keep this fairly simple, the conventional Internet delivery mechanism is really just the bottom line. You have the Internet cloud on the left with the usual routine server arrangements. That is delivered normally over a public telephone dial-in network. The PSTN is described via the modem into the computer, whether it is a home computer or a domestic device. The rate of download is limited by the capability of that pipe, the telephone connection, back to the server. Internet delivery is generally what we call asymmetric inasmuch as the requirement to download or pull in information is very much greater than the very simple and straightforward commands which go back into the network requesting those file downloads. It is that bottleneck approach that causes the slow download.

The advantage of the BushNet proposal is to provide a fast-forward channel which is an over-air transmission using the broadcast technology. It provides the forward routing by converting the Internet signals into signals that comply with, or are in the right format for, digital television type transmissions. They are fed into a discrete transmitter and coupled into the existing antenna infrastructure and tower infrastructure. That forward information could be delivered at high speed over air. With a small receiver about the size of a normal desktop telephone, it could sit on top of, or close to, the computer, and a plug and play via the USB port would be a very simple straightforward connection. The over-air facility allows people within the range of the transmitter—that is, people who are, say, capable of receiving ABC television services—to plug this extra box into the domestic antenna on the house using, again, the existing domestic infrastructure of the computer.

BushNet has the advantage that, generally speaking, anyone who can receive terrestrially delivered ABC television would have the capacity to receive BushNet. BushNet has the capacity to substantially resolve the last-mile problem of delivering high-speed services in

many parts of rural and regional Australia. We have undertaken testing and proved this product technically. The next step in the development of BushNet is to pilot the product in regional or rural locations, and this will allow us to test our assumptions and gather real-time, real-life information that will inform us as to the viability of a widespread commercial rollout of the product. ntl has noted that this inquiry has referred mainly to telecommunications products in its terms of reference. ntl believes it is important that the inquiry understand that a product like BushNet, which utilises broadcasting spectrum, has the capacity to deliver broadband to rural and regional areas and be very cost competitive.

You will note in our submission that ntl has compared various wireless technologies against key performance indicators. This was to calibrate each technology in real-world terms rather than specific technical parameters, and again demonstrate the need for a horses-for-courses approach. Rather than taking up more time in presenting information already contained in our submission, the team and I would now be very happy to answer any questions you might have.

**CHAIR**—Thank you, Mr Morton.

**Mr HATTON**—You talked about this effectively being a set-top box that people can access—it is a plug-and-play, telephone-sized system for which people can just use a normal USB connection. Given the amount of information that could potentially be coming down this pipe, which could be significant, we would not be looking at the current USB 1.1 standard but at a USB 2.0 or FireWire connection standard that would need to be adopted; otherwise you would have a lot of information coming down and then a trickle actually into the computer.

**Mr Hilliger**—I would like to address that question. The receiver we have trialed to date is a USB plug-and-play type receiver. Other form factors are available, such as a plug-in card for the PC, and we anticipate handheld portable terminals downstream as well. With the USB equipment we have used to date, we have achieved close to one megabit per second real-time download speeds without any particular or specialised configuration. We have also used that very same receiver to receive digital television signals onto the desktop PC. The standard definition signal that is broadcast today runs at about five to six megabits per second and we are successful in delivering that across the USB interface from the receiver into the PC. From that point of view we are pretty confident about the ultimate speed capability of this system.

**Mr HATTON**—So you can currently do that at one megabit per second. As people adopt the FireWire technology or USB 2.0, which can do 400 or 480 megabits per second, you can certainly take in broadcast TV content at five or six megabits per second?

**Mr Hilliger**—Yes.

**CHAIR**—Does the government need to do anything to facilitate the rollout of BushNet, or is the current regulatory environment that the government has in place adequate for ntl?

**Mr Morton**—One important factor is the issue of access to spectrum. Certainly, in the regional and rural areas, unlike Sydney and the Central Coast, for example, once you get into those more remote areas then the availability of spectrum itself is not overly congested, so spectrum will be available. In order to make this a viable proposition, clearly the cost of access

to spectrum through whatever regime the ACA were to put in place would have to be sensibly priced, otherwise the cost of entry would defeat the whole viability of this process.

**CHAIR**—Do you think that the current process by which spectrum is allocated through the auction et cetera has been a successful one? How would you see it being changed for the future?

**Mr Morton**—I think it would be more appropriate to have a revenue based regime for access to spectrum, certainly for this application and probably for a datacasting channel.

**CHAIR**—Explain to the committee how that would work.

**Mr Morton**—There would be a levy based on the revenue drawn down through the use of that spectrum for the purpose of this allocation. The percentage at which that was set, I guess, would be part of the commercial discussions.

**CHAIR**—Based on your profits.

**Mr Morton**—I would say just profit based. So the scheme for this particular—

**CHAIR**—That would have some impact on the government revenues, though, surely?

**Ms Andersen**—If I may say something here. The current system, we believe, is more suited to metropolitan spectrum than regional spectrum. The way in which we have suggested it might be approached is that the regional spectrum is of very little demand, if you like, and therefore of low value and it affects the viability. Any sort of revenue based system would have no up-front, initial cost but depend on the profitability of the venture that was being used for that spectrum. That would parallel what is happening, for example, with the commercial broadcasting spectrum at the moment. So it would allow the business to get off the ground and then generate revenues once it became a viable industry. One of the issues for us was that, with datacasting, there was no business case for spectrum but there was a price being put on spectrum, so that particular auction process failed as a result. It is more about allowing your business to develop and then generating revenue from it.

**CHAIR**—So you would expect the government to take a bit of a leap of faith and basically allow spectrum under certain conditions and then recoup their revenues in the future, based on your success as opposed to money up front. In the past, money up front has been the advantage for the government with respect to spectrum because, obviously, when the first spectrum was issued for all of these licences, we made quite a windfall gain out of it, considering that there was great competition and everyone thought that if they spent hundreds of millions of dollars on spectrum it would all be returned. Of course, that has not been the case, but the government still got some money. So, for the government's purposes, it was quite a good and successful enterprise. Rather than that, your proposal is basing it on the revenues of the companies.

**Ms Andersen**—I suppose it depends on whether you want the industries or not—if you want the product out there at the end of the day. We believe that that is a way of assuring an outcome rather than putting a hurdle up front for the business to jump in the first instance.

**CHAIR**—I am not advocating a particular method; I am just putting the other view, a revenue based view from the Commonwealth government. Are there other questions?

**Mr PEARCE**—I would like to ask a few more questions about BushNet in particular. This is a product that you have developed. So it is not actually in commercial operation at this stage?

**Mr Morton**—No, it is not. We completed some technology trials in the Canberra area and in Sydney some time ago.

**Mr PEARCE**—Is the platform based on any other similar networks around the world that you are aware of? Is there any evidence to suggest it, any track record anywhere else in the world?

**Mr Morton**—There are a couple of pockets of activity. There is an application in the United States by Clear Channel Communications in Cincinnati, which I believe was commercially launched as of a few months ago but is in its very early stages of roll-out. Whilst the early numbers suggest success, the numbers are so small that the commercial success is yet to be tested. I believe there have been a few technology trials in both Finland and Sweden but, again, very small trials. David Hilliger may be able to talk to that.

**Mr Hilliger**—Certainly, I am happy to add to that. There have been technology trials, as Clive has referred to, in Europe. There is the initial commercial roll-out in the US and these are all based on the terrestrial or digital broadcasting channel. Looking for similar models of the delivery of Internet data over a broadcasting channel, perhaps the most successful would be satellite delivery of Internet because, effectively, it is a broadcast channel and it has been adapted to deliver Internet data. That has been quite successful in addressing regional and rural communication needs and is certainly the solution of last resort across the country. This is a similar adaptation of broadcasting technology. It uses the same family of DVB standards that is deployed both for satellite and terrestrial digital television. So the technology is really there, the standards are there. It is innovative in the sense of a business model and a service delivery model but it is using currently available and well-proven technologies.

**Mr PEARCE**—Tell me, within the bounds of this inquiry, it is a very entrepreneurial thing for your organisation, ntl, to be doing. To create this platform and undertake this pilot, you obviously see some commercial future in this particular area.

**Mr Morton**—What we are keen to test is the commercial viability and the extent of it. Like all service operations where there is an up-front establishment cost and then an ongoing requirement, it is all about having enough people within the capture area or the reach area of that facility to take up those services. There is a finite bandwidth to the pipe inasmuch as it is a seven megahertz channel with circa 20 megabits per second. It is a matter of asking: how do you slice up the cake between so many people in the local community and so many small businesses within that reach? At the end of the day, if you divide that cake or that pipe up too many times, you are just back to your early days of Internet access, of trickle feed, because there are too many people on the Internet.

So there is an upper limit which we are obviously keen to test. We have done some mathematical analyses to suggest that the number of subscribers might be up to about 25,000, but

when you start to test it in the field you understand the concurrent use of patterns, and that is likely to vary from locality to locality. For example, in a rural area you might get a lot of early morning activity, with people working on the land. In other communities, it might be more of an evening or daytime thing.

The topography and demographic distribution of people will determine whether it is a fairly low power facility, and therefore relatively low capital cost serving a fairly tightly knit group, or some area that is probably still reaching 20,000 people who are spread over a 100 kilometre radius. So there is quite a large spread in terms of communities where it will work. Although you could set the technology up in a metro area, you are likely to have gross oversubscription from an early stage or there would be no advantage over alternative technologies, as we have set out in the paper. This lends itself to those areas or applications where there is probably only one other alternative, and that is satellite beyond the reach of ADSL cabling et cetera: you are in an area that will never be fibred or that is highly unlikely to be in the foreseeable future.

**Mr PEARCE**—So let us take an outside-in view. Obviously I read your submission about what you consider to be the benefits of BushNet. But from an end user perspective, what do you consider to be the principal benefit of BushNet if somebody who is living in a rural or regional area had access to this platform?

**Mr Morton**—I think it does give you that higher speed access. We believe it is plug and play. Provided people can get a reasonable television picture, they should be able to take the set-top box—we did not actually bring the example with us—and run an antenna lead into one port and the USB cable out to the PC. It should be as straightforward as that. I would expect that in 90 or 95 per cent of applications that will work. I guess with some sort of telephone help support line, the majority of the rest could be taken through.

**Mr PEARCE**—So ease of installation and actual speed are what you consider?

**Mr Morton**—That is right. And obviously it has to be affordable. David, I am not sure whether you can comment on the cost of the boxes at the moment.

**Mr Hilliger**—Certainly the boxes that we have available to us now are of the order of $A400 to $A500, however, that is before full production. Bearing in mind we had a very small production run for the seven megahertz channel spacing we use in Australia, ultimately it will go down below that. Certainly with any volume we are assured it would go below that. I will reinforce the points that Clive was making earlier, and certainly the points you have brought forward about ease of installation. A key benefit, we believe, for people who live some distance from a town centre is that ease of installation. That is a benefit both to the user and to the service provider in that there is no what we call truck roll or professional installation required of any antenna, if a person has an existing television antenna. So the ease of installation also brings a lower cost of entry in that there is no up-front installation fee to be recovered. We think lowering that cost of entry barrier is also of benefit to the end user.

**Ms Andersen**—There is also one other major benefit—that is, it is a mobile application. So a man could be driving his tractor and getting the Internet off-air, basically. We see that as a major benefit of BushNet.

**Mr Hilliger**—If I could reinforce that, we can deliver, with today's technology, high-speed mobile access in this same model by using current mobile phone networks for the return path, be they GSM or GPRS. That is fully consistent with the model of asymmetrical access. Once the service is launched, it is a mobile reception, and using the current mobile network for the return path gives you a mobile service at high speed today, without waiting for future networks and future technologies to roll out.

**Mr HATTON**—I want to look at a couple of different aspects of this. One is the comparison with satellite technology. We have difficulty getting Internet services to four per cent of people in rural and remote Australia. You have already indicated that satellite can provide part of their access, and you can provide a similar one. What are the differences in capacity that you see between satellite provision and what you can provide?

**Mr Hilliger**—With respect to the differences in capacity, it is a little of an apples and oranges comparison, because the satellite capacity is, of course, effectively national, with a national footprint, whereas what we are proposing with a terrestrial broadcast, town by town, is a certain capacity for that local area. For example, typically, a digital broadcasting service can deliver 23 megabits of capacity on a single channel to that service area. So a small town is sharing that 23 megabits, for example. That capacity is reused town by town. So each time you launch a new service in a town, it is that local area that is sharing that capacity, whereas with satellite we are comparing the total bandwidth available to the total footprint, and the comparisons are not easy to make directly.

To calibrate that, I would be very surprised if there were any regional or rural towns in particular that had a capacity of 23 megabits of Internet access into the town, let alone shared between the users. So what we are talking about with BushNet is a fairly high-speed, last-mile connection, or what we could call a last 50-mile connection, that is shared within that local area. So bandwidth is reused across service areas. I hope that answers the question.

**Mr HATTON**—Have you done any cost comparisons when you have been building your model to look at the current cost of satellite provision versus what it would cost someone trying to gain access through your BushNet?

**Mr Hilliger**—We have. Again, I would refer to our earlier comments on our desire and interest to take this to a pilot phase to determine some of the unknowns. We have worked with several ISPs in regional areas of Australia to look at the cost of what might be involved in delivering this service. We do believe from the modelling we have done so far that it is achievable at prices that are comparable with what is in the market. Some of the unknowns are the elements we are looking for out of the pilot, and they do relate ultimately to how the market receives this product. It is a new model for service delivery. It is not satellite; it is not ADSL. Some indications we have had from the ISPs are that they are very keen, that they believe it would work well, but it really has not gone out already to any large degree anywhere in the world that we can use as a model for our calculations.

**Mr HATTON**—Apart from not being able to get to communities with fewer than 200 people—you indicated that in your opening comments—what are the other constraints in relation to this? We have already had the experience of going from the analog telephone system to CDMA, where they chose a relatively high bandwidth—1800 and 1900—and that has provided prob-

lems in terms of access for people in rural areas. In moving from analog to digital—and this would be a digital service—what kind of topographical constraints are there? What difficulties have you got in terms of delivering the service in particular areas?

**Mr Morton**—In terms of the reach, it again all goes back to your ability to receive existing terrestrial broadcast signals. If you can get those, if you can get the TV, and provided this BushNet transmission facility is co-located on that same tower with broadly the same transmitter power and frequency band, then you will be within range of the BushNet. In addition, because it is a digitally encoded signal, as with the DVB digital terrestrial television, it is a very robust medium. It will cope with poor reception: ghosting or poor looking pictures in the analog mode would get through in digital TV and BushNet form. Clearly the topography would impact, but, being a digital transmission standard, you can actually reuse those channels with less of a geographic space than you would have to otherwise use in an analog TV mode. Also, you would tailor the antenna patterns, as you do now for broadcasts with its own reuse of spectrum, to make sure that you serve the area of interest without unnecessary overspill. So there would be careful tailoring to that the patchwork quilt of service areas could be optimised.

**Mr HATTON**—Currently when you go to a country town there is digital, whether it is GSM or CDMA coverage, and the GSM coverage is close around the town and when you go further out there is CDMA. But once you get beyond those spill points at the end the rest of the people have not got digital coverage—it does not go as far as the analog. That is still a problem, even though you are broadcasting in the same sort of way. So you would be equivalent to—

**Mr Morton**—Wherever the existing broadcast reach dies off, the BushNet would die off if it were set up with the same parameters. Clearly if you were to run more power it would have a greater reach, but increasing the power would increase the capital cost and it may have spectrum reuse implications for the next town. There are various trade-offs.

**Mr HATTON**—So those people who are remote from towns would be looking at satellite?

**Mr Morton**—I think it is absolutely fair to say that for people who are very remote the only alternative they have, as we see it for the foreseeable future, would be satellite. That is true.

**CHAIR**—Is there an advantage inasmuch as your BushNet would be operating in a different bandwidth than, for example, wireless local area networks, where the greater the use, of course, the likelihood for greater congestion, whereas you would want to operate on the same bandwidth that you use for datacasting transmissions?

**Mr Morton**—That is right. By having the channel of 20 or so megabytes, you have got that much greater capacity. If you are in a regional area where there is still sufficient capacity in the broadcast service bands, you could actually double up and have a second seven-megahertz channel or even a third, if that was required. It is all about the spectrum available in that particular locality. In certain regional areas there could well be five or more seven-megahertz channels that in theory you could stack up and use in this way.

**Mr HATTON**—I want to explore the asymmetric nature of this service. You can dump a lot of information down to people, but what are the constraints on the information being uploaded

back? How much information can actually be unloaded at any particular time through the service?

**Mr Morton**—It is back to the narrowest point in the chain. The back channel on the diagram is depicted as the telephone network. It is the capability of that or the capability of the GSM or CDMA channel if you are using a mobile phone. Generally the frustration is waiting for the download. User patterns could be such that, if you have a megabyte file to send, you just hit the send key and you go and do something else whilst it is going out.

**Mr HATTON**—As members of parliament we all understand that in our electorate offices—the eternal wait! I am interested in the impact on people who are running businesses in country areas—not just farm businesses but also possibly publishing or media businesses—and who currently use Internet services, although the services may not be as fast as those that people in the city can use. If they had a lot of material to upload, do you think there would be a particular problem for them using your service? Is there a comparison between what is currently available and what would be available in your service?

**Mr Hilliger**—It is fair to expect that for at least a proportion of small businesses there would be more of a requirement for upload data. We acknowledge that. At this stage, in terms of what we can deliver today, we are dependent on the return path for the upload capacity and that is via either PSTN or mobile networks. We believe that in the future other mobile networks will offer higher capabilities. In particular, I refer you to some comments in the submission about the work going on within the DVB standards group and the UMTS Forum about integration of these technologies with 3G networks downstream. We are saying that we can deliver today an effective and working service that integrates with the technologies that will evolve out of 3G and UMTS moving forward. To address that point in a slightly different way—and this is purely anecdotal—the US experience with Clear Channel Communications is that they have had a good reception from home users, but they have also had some very positive experiences with small businesses that have been unable to get an effective high-speed, low-latency service to operate their business. Again, it is early days with commercial deployment and we are unable to say too much more at this point.

**Mr HATTON**—Given that the download service is virtually the old style of party line, so the more people you have on it the less there is for them and the slower it might get, and given that only some people would have high upload demands, is there the same kind of equivalence—that is, if you have only a small number of the 25,000 maximum trying to upload back through the service, could they push more through?

**Mr Hilliger**—That would depend on their last mile connection. I think it is fair to say that most of the issues that arise out of this discussion, and many of the issues the inquiry will be addressing, relate to that last mile issue. Although there may be few people on the service at any one time, the present download and upload limitations across the PSTN are those that exist across the last mile. That would remain even if there were few people uploading. So I guess the answer to that is no.

**CHAIR**—Any final questions?

**Mr CIOBO**—With regard to the saturation point of 10,000 to 20,000 users, would it be fair to say that as content becomes more multimedia focused, that number would continue to decline as people's need to download information increases?

**Mr Morton**—I guess so, yes.

**Mr CIOBO**—So what happens then? You obviously have an antenna that is transmitting a signal at the moment. If you want to try to boost the number of users you can tackle, but not the range, is it a case of simply attaching an additional cell or is it feeding off what is already there?

**Mr Morton**—That is right—you could double up on the transmission infrastructure because you would have a second channel. If your first channel was on UHF31 and you started to reach capacity or your capacity ceiling was coming down for the reasons you explained, then—assuming there is spare spectrum in that locality—you could double up your facility and have a second channel.

**Mr CIOBO**—Would that just come down to making a commercial decision?

**Mr Morton**—That is right. It is similar to widening the pipe in existing Internet access.

**Mr CIOBO**—That is what I wanted to know. With regard to auction versus the tender process, I notice you said in your submission that you feel that the auction process tends to serve as a barrier to entry. I understand why you say that. I am wondering, though, why you feel that the tender process produces a more optimal outcome and has a lower barrier to entry than the auction process. I am interested in your thinking behind that statement.

**Ms Andersen**—It reduces the error rate. It gives the opportunity for people to be selected by their qualifications to undertake the particular task at hand. We think it is probably a slightly fairer process.

**Mr CIOBO**—And you incorporate greater qualitative type factors?

**Ms Andersen**—Yes, issues such as experience in the industry and financial backing which do not necessarily come out in an auction process.

**Mr CIOBO**—But there would not necessarily be a marked difference between the prices though?

**Ms Andersen**—It is the difference between upfront and as you go. Upfront forces you to get a return early on, whereas as you go allows you to develop the business and get a return in the normal process of getting a return. It also forces you to generate greater returns in order to service the upfront payment. Whereas again, if you can establish a business, then you might end up providing revenue to the government which is even greater than maybe was gained in the auction process because you have also got an established business.

**Mr Morton**—Certainly, the issue for BushNet is that there will be some community groups that might number, say, 10,000 but because of the geographic diversity and the capital infra-

structure required to serve them, it may not be commercially viable. If there is then a further barrier to upfront cost to gain access to that spectrum, that just makes it even less viable or reduces that viability opportunity across a large number of areas. That is clearly a factor that is part of the equation.

**Mr PEARCE**—I would just like to come back to the end user point of view again. On the basic system diagram, am I right in saying that if I am at my PC and I dial up via my modem into my ISP, I am going to retrieve some data and it is going to be broadcast to me across BushNet? I am going to go into some creation and collect whatever I want. But when I want to respond to that, I am going to go back via the PSTN, aren't I?

**Mr Hilliger**—Correct.

**Mr PEARCE**—So what sort of difference is there going to be between the performance of retrieval versus return?

**Mr Hilliger**—In terms of delay or latency and so on?

**Mr PEARCE**—Performance, from an end user's point of view?

**Mr Hilliger**—It is quite transparent to the end user. This is handled by the protocols, by the routing at the ISP and in fact there is almost no change required at the PC for the user. It is completely compatible with purely a dial-up connection, and to the end user there would not be any perceptible difference.

**Mr PEARCE**—Between retrieving and returning?

**Mr Morton**—The retrieval side would be that much faster. In terms of the upload of information, the actual request in terms of kilobits per second, or bits per second, is very simple. David can phrase it better than I can, but it is a very small packet of information and therefore it can be virtually instantaneous.

**Mr Hilliger**—I apologise, I may have misinterpreted it to be a question about the response time. Typically, Internet traffic runs of the order of 10 to 1 asymmetry. Certainly, when you click on a link, there is a very small amount of information that is sent upstream which takes a very small amount of time to traverse that channel, even on a low-speed channel, and the big load is on the data coming downstream usually back to your computer.

**CHAIR**—Thank you very much for appearing today.

[9.49 a.m.]

**BIRD, Dr Trevor Stanley, Sector General Manager, Information and Communication Technologies, Telecommunications and Industrial Physics Division, Commonwealth Scientific and Industrial Research Organisation**

**MURRAY, Mr Boyd McGregor, Telecommunications Research Engineer, Telecommunications and Industrial Physics Division, Commonwealth Scientific and Industrial Research Organisation**

**YOUNG, Dr Alan Christopher, Research Leader, Mobile Communications Systems, Commonwealth Scientific and Industrial Research Organisation**

**CHAIR**—I welcome representatives from the CSIRO Telecommunications and Industrial Physics Division, particularly Dr Trevor Bird and Mr Boyd Murray, and I notice that Dr Alan Young is with you. Although the committee does not require you to give evidence under oath, I will 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 some introductory remarks before we proceed to questions?

**Dr Bird**—If it is possible, I would like to give a brief background to our work and to our submission, to cover the submission very briefly and then move to questions.

**CHAIR**—Certainly.

**Dr Bird**—CSIRO has been involved in broadband telecommunications for many years, and I point to some work in satellite communications in the 1980s and 1990s. During the 1990s we were involved in developing background technologies for the current 802.11a wireless LAN system, which is currently being rolled out. We have also been involved in a range of other technologies from Emergency Mine Communications to multi-beam antennas and so on. We come from a technological perspective, and you probably saw that throughout our submission. Along the way, of course, we pick up a little information and understanding of the market, but that is probably not the strength that we come with.

The main points in the submission are that we think broadband wireless is here to stay, that we are expecting greater mobility and certainly reconfigurability in technological developments over the next years and that we anticipate lower costs. For Australia to keep up with the rest of the world, we think that the benefit of broadband wireless has to be demonstrated to the general public. The underlying importance of broadband wireless, as many countries are currently seeing—for example, Sweden and Korea—is that broadband wireless is likely to provide greater access to emerging electronic commerce and so on. One of the other points we made in our submission is that there may not necessarily be technological limitation at the moment but certainly costs and undemonstrated value of a broadband are possibly inhibiting some of the deployment not only here in Australia but elsewhere. That is one aspect of our submission.

The other aspect is that, to encourage the uptake of broadband services, we think some pilot studies should continue to be done—for example, dealing with the last mile solution and the connection of services within rural towns. There are some activities within CSIRO planned for the future where we might be looking to connect up some rural towns to actually demonstrate these particular values. Funds and demonstrators such as the BITS program and the National Communications Fund that have been essentially encouraging broadband applications have not necessarily had an emphasis in the wireless area, and we think there would be value in having trials of broadband wireless on a similar scale. Maybe some of the emerging technologies could also be demonstrated, but maybe not quite in terms of the expenses involved in the NCF. We are saying that the pilot studies could be used to demonstrate improved productivity in particular industries—for example, fishing. You might be able to look at some of the vertical integration within an industry and how you might be able to improve the productivity through ICT, or you could improve productivity across a sector such as education by delivering broadband wireless services to various schools and so on.

As an example of a pilot, we are currently involved in a study—and Mr Murray will be able to tell you more about it—which consists of a wireless access point 11 megabits per second broadband access to multiple wireless clients. We are doing that in the Epping-Marsfield area. Initially, the trial was directed at rural communications but the results apply to suburban access as well. This experience is providing valuable insights into how wireless technology might be able to be implemented in the last-mile type solution.

One of the other things that we pointed out in our submission—and I think other people have too—is that this last-mile problem is likely to affect as many people in cities as in the country because they are not able to get cable or ADSL access.

Another point we made was to do with the use of broadband technologies and the use of the spectrum. We feel that the spectrum in certain areas should be either freed up or made available for the future in terms of high-speed systems. For example, future high-speed wireless local area networks are expected to use frequencies above 5 gigahertz and some experimental systems are now operating at 60 gigahertz. They will obviously be short-range systems but they might form part of what is not necessarily going to be one technological solution to the last-mile problem. There will be many different technologies ranging from wireless LAN to maybe fixed wireless access to satellite. Satellite is an area that has been with us for a number of years. It is certainly at its best in providing coverage into wider areas, particularly into the bush. But at the moment the asymmetrical link is an issue in terms of what we think is broadband access.

In terms of a technological solution, Ka-band, which is around 20 and 30 gigahertz, is likely to provide greater uplink speeds in the future, but that will be in around five or so years. I guess with the tech wreck that may have been delayed—and may be delayed—even further. So Ka-band is coming and some of the first trials are going to be developed. We mentioned our future technological solutions and they are summarised in the paper.

One other point is that the use of the spectrum and also some of the technology should be reasonably compatible with some of the major users in order to be able to maximise our cost advantages to Australian consumers and also to companies. For example, the five-gigahertz bandwidth in Australia has different mandated usage from, say, the US, and so solutions which are developed in the US may not be able to be easily applied to Australia. So it works the other

way, too. If you develop equipment that is specific to the Australian market, it does not make economic sense. We saw an example many years ago with the BMAC type receiver system for satellite. However, if we are able to adopt and develop equipment ahead of the market and trial them here, the Australian market is a good way to do it. It puts our companies in a good position to compete overseas.

The final point we have made is that, while CSIRO has been involved in advising government on a range of things, partly in the broadband area—and we are participating there—from the skills we have built up over a number of years in the technological area, we feel that, given the opportunity, we can probably contribute more than we are doing currently. They are the five points we have made in our submission.

**CHAIR**—Thank you, Dr Bird. One of the problems that intrigues me about the wireless broadband issue is that of convincing legislators and consumers of the benefits of what can be delivered through wireless broadband in areas like e-health, e-education, e-content and e-business. It seems that there is a select group of people who understand the enormous potential of broadband but that it will not succeed in taking over in the next 20, 25 or 30 years—if you look in the long term—unless consumers see its benefits and a market comes into being. So it becomes a bit of a chicken-and-egg argument. There is not much point in people who are interested in communications being the only ones who know the potential that is available and it never actually achieving its full potential. Does the CSIRO have any advice for us, as a committee researching how to achieve the extension of wireless broadband, about how we could go about advertising the potential that is present with wireless broadband that is not being tapped at the moment?

**Dr Bird**—An example of how that may be tapped is, as we have pointed to, through having pilot studies or demonstrators. That particular question is being looked at within CSIRO at the moment under some of our national priority activity. Rather than being a technological type solution, it has to be a benefit type solution. As I mentioned, that may be by adopting a town and delivering to, and placing in, that town all the services that we are able to deliver with the latest technology. Not only that, you would be connecting up to hospitals and linking up perhaps to the local councils, businesses and industries. Some of that has already been foreshadowed in some trial examples—under the National Communications Fund there are similar things—but this would be done on a more concentrated scale. In terms of advice, it would be to provide the opportunities—with encouragement either through funding or publicity of such things—to enable these trials to happen. I think the benefit really needs to be demonstrated. Alan, do you want to say anything?

**Dr Young**—Yes, I think that is a very strong point you made. At the end of the day, the cost to the user has to be lower than his perceived value of the service; he has to see enough value there. You mention consumers but, in fact, it is small businesses. We have been looking particularly at the rural area, where small businesses, hospitals, educational facilities and things like that are also included. If you can demonstrate benefit to those people, it may well be that the infrastructure will be in place to go ultimately more to the consumers. But you really do not get people investing in the infrastructure until they are willing to pay for it, and that means they have to perceive the value to be there. In the two projects we have going—as part of the BITS program we have a CeNTIE program: it is not wireless but for the next generation Internet—we are demonstrating the uses of very wide bandwidth and making sure that the system is

ultimately tailored to the users. Under the NCF, we have a project proposal for health and education out into rural areas in New South Wales.

**CHAIR**—I have two things and I could put this to the CSIRO as they are one of the few government bodies appearing before us that have some expertise in this area. Firstly, is the market the best mechanism of how these examples of wireless broadband can be used? Are they the best mechanism to create the demand for it or will they only supply what the consumers demand and, if the consumers do not know what is available, continue to supply what they are supplying now in terms of mass scale? Secondly, is the NTN funded mNet project in Adelaide, which was used for the IT world congress in Adelaide recently, an example of what you are talking about where wireless broadband is used? Do you want that replicated and is the CSIRO or a government agency better placed in the market to provide those kinds of examples? That is a request for large amounts of money—it leaves the opening.

**Mr Murray**—I just attended an IEEE conference, which happened to be about 200 metres from this building, about two weeks ago. I walked into the conference, in a large cavernous area, and was greeted by the appearance of about 300 people sitting with their laptops communicating via a wireless local area network to a local hub which then went out on to the Internet. Compared to what I have seen in Australia that experience was a shock to me—to know that that existed in the world. When you see things like that you want them. To answer your question: when people see it they want it, but if they do not see it they do not know that they want it.

I think the answer to your question is, yes, if you can demonstrate to the public what is available they will want it. That kind of phenomenon applied to mobile telephones, which started off slowly and when the youth market, in particular, got involved in it with SMS, and they saw all their friends using SMS, the whole thing took off like a rocket. So I think the value of pilots is very high—to have certain hot spots of technology which can effectively demonstrate the value of the technology; then to invite other people in to see it, and those people will go away thinking about how they can do it. That is how I think these kinds of things can be spurred on.

**CHAIR**—Is the mNet project the only pilot that you are aware of under consideration at the moment that is actually happening?

**Dr Bird**—Wireless?

**CHAIR**—Wireless broadband.

**Dr Bird**—We are not sure what has come out of bids under the National Communications Fund recently—there may be some there—but certainly, mNet is the only one. I believe there was a pilot study in Tasmania but I am not sure about what the outcomes of that were. To answer the second part of your question, and to follow on from what Boyd was saying: it is the ability to have a number of pilots, and mNet is one example and there are several others that are done on wired systems. Alan referred to the CeNTIE system where they are demonstrating linking to and value to the film industry and the health industry. That is the main aim of that particular project. I think a similar activity needs to be done in the broadband wireless area. So mNet is an exemplar of one of the things that could be done and that is being done in a

particular area. It needs to be done in a range of communities and in a range of environments with the different technologies because, as I said, we do not think there is one technological answer.

**CHAIR**—Does the CSIRO have a proposal for such a pilot that they would run themselves?

**Dr Bird**—We have a pilot that is currently going, which I alluded to at the beginning, in regard to our wireless LAN system using 802.11b arrangement. We do have some plans. These may roll out over the next few months, under a national priority project which roughly comes under the heading 'e-Australia', which will be attempting to demonstrate the value of using ICT. That will be ICT in general, not necessarily only broadband wireless, but we think that broadband wireless is so important that it probably needs some particular kick along, like it has been getting in places such as Sweden and Korea, where there has been quite strong government support of that area to get the population hooked up to the broadband system.

**CHAIR**—Dr Young, would you like to add to that?

**Dr Young**—Yes: your question was basically around the trials to get people interested in broadband—and not just in wireless. If you can get them interested in broadband wireless as a means to achieve that in some areas, it will apply to the whole broadband area, wired or not. So I think you can have demonstrators that show the benefit of it, some of which may be wired and some of which may be wireless—not uniquely wireless.

**CHAIR**—So the combination of wire line and wireless—

**Dr Young**—It has to be always a combination.

**CHAIR**—'Always a combination'? So you see them as inextricably linked?

**Dr Young**—I think you use wireless where it makes sense to, and wired where it does. It is a combination of those.

**Mr Murray**—We have been throwing around ideas at CSIRO because we are very keen on being able to demonstrate the technology. Probably six months ago, I noticed two newspaper articles which appeared very close together, in the same week. One was talking about the deficiency of broadband services—or any kinds of data services—to schools. The other was about the inefficient use of state telecommunications assets—in particular, State Rail fibre located around Sydney, which is actually quite extensive. I think the New South Wales Surveyor-General is at the moment assessing how the state telecommunications infrastructure can be used more efficiently.

I put forward an idea within CSIRO. There is a statistic that says that many schools—I think it is 80 per cent of them—are within two kilometres of a railway line within New South Wales, for example. So why don't we put wireless access points on the top of railway stations and then use the State Rail fibre to backhaul it to the Internet? Everything is in place. That was one idea. We have not gone very far with that idea yet; it is just being tossed around and developed. We may go ahead with it if we can get agreement from the various parties which would have to be agreeable.

**CHAIR**—Thank you. I have asked too many questions now, so we will see if anyone else would like to ask one.

**Mr HATTON**—I would like to take up some of the issues of demand, but there is also a question of what the current state of use is in regard to broadband other than wireless, because that is part of what we want to look at. What is your view of the current situation in terms of the use of the infrastructure that is there?

**Mr Murray**—Do you mean the extent of the use?

**Mr HATTON**—The extent of the use.

**Mr Murray**—Let us say the penetration. Trevor has a slide that compares Australian uptake to that of other countries.

**Dr Bird**—You may have already seen this; I knocked it out last night from some of the data—

**CHAIR**—Is that part of your submission?

**Dr Bird**—Not really, no, it is not.

**CHAIR**—Would you like us to take it as an exhibit?

**Dr Bird**—It is not much of an exhibit.

**CHAIR**—I have seen much less of an exhibit before.

**Mr HATTON**—If it tells a story about Korea, it might be the World Cup—

**Dr Bird**—That is right, the World Cup!

**CHAIR**—Why don't we take it as an exhibit, so we can add it—

**Dr Bird**—Yes. I took it out of *Exchange* from 5 April. I guess it is showing the percentage of Internet accounts that are broadband—and this is all broadband, not only wireless. I forgot to put Sweden on it. They had some data, although in fact I do not think Sweden was in the article, as it is an independent. It shows Australia and the UK are lagging behind many of the others. But the one to point out is Korea. There has been particular stimulus given to the use of the broadband there. It may reflect that government stimulus. It may also reflect what is actually happening. It may also reflect what infrastructure they had beforehand that meant they were able to implement broadband.

So, taking it on face value, it is a bit hard to say. But it does indicate that the uptake in Australia is low. To partly answer your question, around the country we have very good wired services—I do not know what the percentage is but I hear figures of somewhere around the high 90 per cent—but it would appear that it is not getting to the consumer. It is probably going to

head-ends and so on but it is not able to be distributed. That is one part. As we said, we think there is also the value of it—whether people are clamouring to use it is another thing. It is a little hard to tell from the figures because it is not our area to dig down that deep. There are a number of factors behind why we are at the lower end of the uptake.

**CHAIR**—Thank you. The committee receives as evidence, and includes in its record as an exhibit for the inquiry, the document received from CSIRO titled 'Percentage Internet accounts broadband graph'.

**Dr Young**—On the question you asked, you were talking about the HFC cables, the ADSL and things like that. The HFC cable is the infrastructure used—it is patently not used. It has a very low usage rate. We could ask why that is; I have it myself but it is a costly thing to keep going. You really have to understand the value before you can pay that sort of money. It is higher than in other countries, but that may not be the entire question. ADSL is also not well used. It is becoming much more available and the take-up is still fairly poor and there are some questions about its availability at times.

**Mr HATTON**—I think that is a basic flaw that is important to look at. In your submission you have undemonstrated value and cost. From my perspective, I think cost is the greatest problem. The service cost is so high I have not signed up to it. I know other people have not signed up to it because of that. In looking at the enormous cost of the provision of that cabling to the community, we can see that we are not getting value back out of that.

**Mr Murray**—There seems to be a magic number that gets bandied around and that is $50 a month for a broadband service with unlimited download.

**Ms GRIERSON**—Is that a multiple service?

**Mr Murray**—That is a broadband service which would mainly be data, but possibly you could bundle voice-over IP or whatever with it at a later date—although we have quality of service issues with that at that moment which are being resolved. There seem to be two psychological barriers. There is the $50 mark, whether it be $US50 in the US or $50 in Australia. There is the download limit psychological barrier, and that is that people are worried that if they sign up to this their teenage kids are going to get on and go over the download limit and they are going to be paying a $300 bill for the month. When those two things are addressed, as they have been in the US—according to my IEEE colleagues I was speaking to a few weeks ago—people seem to think, '$50 a month is okay; that is all I am going to pay. I'll take it up.' When it is more than that and you have download limits there is a fear factor involved.

**Dr Bird**—The other side of the question is that even when the costs do come down—there is evidence from Sweden—there have to be demonstrations and stimulus to get people to actually use it. This happened in Sweden when the government wanted them to become more educated with the Internet and so on. That is the other side of the thing: the demonstration of the value. We think that is an important part, not just the cost.

**Mr HATTON**—That is probably also indicated by the experience in Singapore, where they are very wired but the take-up rate in terms of usage is very low. We have had the same problem in the ACT.

**Dr Bird**—Yes. All that people think about is what they can look at on the Internet and so on, but it is about all the other very important services that come into communities that can be provided via high-speed Internet. There can be a transfer of images between regional hospitals and central hospitals. You can have the top surgeons nearby to provide advice in rural areas. But with either a thin pipe or a low data rate system it is very difficult to do. You need to have images and video, and that is where the broadband becomes very important. Those things—and that was one example—need to be demonstrated not only to consumers but to business and to governments, including state governments.

**Mr HATTON**—The same operative things, cost and demonstrated value, would relate to the wireless services, because we are looking at those in terms of the last mile situation. We have under-utilisation in the fibre network. There is the question of whether people will readily take up these wireless technologies.

**Dr Bird**—That is right. If it were available and if it were cheap, I am sure that people would take it up, and there is some evidence that they would. But to demonstrate the real benefit of using broadband we need to have these pilots.

**Mr HATTON**—So the pilots would be useful for that. Would CSIRO also be useful in terms of dealing with the gold rush mentality with a lot of this? When people develop new technologies and push them forward, they do so with a great deal of emphasis and support and try to push a particular technology as a key solution to the problems that there are, and that can be quite confusing for people.

**Dr Young**—That is right. Often it wanes very quickly afterwards if it does not prove to be of value. LMDS is a case like that.

**Dr Bird**—That is another important reason why the pilot studies need to be done. There are some technologies that look really good now, but to have wide implementation may not be the right solution. A pilot would very easily demonstrate that. For example, LMDS, which Alan referred to, was rolled out after fairly limited studies in various parts of the world. Spectrum was being sold without some of the issues being fully dealt with, like the cost of the equipment. Technological issues had not really been solved and the whole thing was bundled together, which meant that it was going to be a bit of a flop. That is why pilot studies are very important.

**Mr PEARCE**—Mr Murray touched on some aspects of my question, but I do see a lot of parallels between broadband and mobile communications. Essentially, we are just repeating history here. We all know that the mobile subscriber growth was a result of the reduction in cost and the addition of value added services, like SMS, message bank et cetera. A lot of this debate is centred on the technology, but at the end of the day the technology is a means to an end. When you talk about pilots, are you talking about pilots of technology or pilots of applications? I think it is the application that the end user is the most interested in. I do not think they really care if it goes across—

**Dr Bird**—We are talking about pilots as applications. What happens is that, once you start putting some of these things in and trying them out, new applications arise. You might target a particular segment, which might be one particular industry or service area. But certainly it is the applications that we are talking about. It is using the technology as a means to an end.

**Dr Young**—I think that is right. Our bid into the NCF was about providing infrastructure, which is what the NCF is all about, but it acts as a demonstrator. It is closely coupled with the health departments, the universities, TAFES et cetera that have these. Applications are a fundamental part of it. There is no point in just putting the technology in.

**Mr PEARCE**—So in terms of this debate about the take-up rate and how we compare ourselves to other countries, is that something that we should largely ignore for the short term? It probably is really just a life cycle matter, isn't it, where you have got the initial phase and the early adopters come on in et cetera and, as the applications become more available and more broadly consumer friendly, the take-up will actually develop itself. For example, when we compare ourselves to Korea, I do not know a lot about the Korean market but I bet you one of the major drivers behind the take-up is the broad range of applications that are available today for them versus what is available today for us.

**Dr Bird**—I think that is a reasonable proposition. I guess the concern is that with a lot of those areas you only have to be a year or so behind and you hardly ever catch up. It is not necessarily reflecting a technological edge but maybe, as you say, emphasising an application edge, which may mean that one of the important contributions to the economy and industry we see is from the e-revolution. What is of concern to us is that if we get behind some of these countries like Korea, Sweden and so on it is reflecting on our ability to compete with these countries. I guess that is what I feel is behind the comparison.

**Mr PEARCE**—Again we can draw parallels, can't we, with mobile communications. If you look at Sweden, they were very early adopters a lot of the time. Not so much Korea but Japan, of course; DoCoMo was very popular and is very value added application driven.

**Dr Bird**—It actually came on a little bit later, but they had a new application which was really a new paradigm.

**Dr Young**—Sure. So you are right, and the take-up will probably happen. The question then is: are we prepared to do that, just let it happen slowly? What is the impact on our economy, and does that affect our ability to compete? My feeling is that it does.

**Mr PEARCE**—If the CSIRO were to go ahead and do pilots, at what stage of readiness are you in relation to these application pilot ideas? Do you have a set of fixed pilot applications in mind now that would target various segments of the community by either demographics or industry?

**Mr Murray**—A lot of the applications are already available on the wired network. For example, for videoconferencing you can use the software package called NetMeeting which is freely available. If you know the IP address of somebody else, you can set up a videoconference with your laptop. It is very easily done. People do that in the corporate setting, but if they could do it from their home using the same laptop it is actually an application which could be quite valuable.

**Mr PEARCE**—That is an idea you would have.

**Mr Murray**—We have already demonstrated that several times to various government departments. It is a very easy demonstration to do. There is, for example, application sharing, where you have a spreadsheet or something like that going and you can have a simultaneous videoconference while you are working on your spreadsheet with somebody else. That software is already available in the corporate network. So those kinds of things are there, and wireless networking will allow you to use those out in the residential setting.

**Dr Young**—We have explored a lot of applications in some of these other trials. We mentioned the post-production industry for films. We are exploring a whole lot of applications in the health industry for transfer of X-rays and ultrasound.

**Dr Bird**—The haptic workbench.

**Dr Young**—The haptic workbench as well, where we can actually show training at a distance. In education, we are working with Charles Sturt University on distance learning applications. So we have a lot of experience in getting applications up over trials like that.

**Dr Bird**—Wired.

**Dr Young**—On wired networks. Wired or wireless, it does not make a great difference. Wireless has some unique restrictions that you have to take into account. In terms of the collaborative things that Boyd Murray was talking about, we are looking at a whole range of those sorts of technologies and collaboration over a distance. Then there are the consumer level ones. I think we are not so big in that area.

**Mr PEARCE**—It would be interesting I think—whether or not there are any particular applications that are available—for interactive remote and rural learning particularly in the education field where, for example, a group of school children can be online together in an interactive classroom sense. That is the sort of application that will have—

**Mr Murray**—This is the kind of thing—and this relates to that trial or pilot that we have been throwing around—where once you get broadband into the actual school there are bound to be a few bright sparks—for example, IT cognisant teachers who are enthusiasts—who decide to see whether they can hook it up to the school 10 kilometres down the road. They might get something going then somebody will hear about that and a company might come in and take it up and make it more extensive. There are two modes of promoting it—through organisations like CSIRO and through natural interest and industry interest. But it cannot really happen unless the infrastructure is there in the first place. Picking up on one thing you said earlier on—that it is just going to happen by itself—that may well happen but it may not happen if the business cases are not right for the access providers.

**Ms GRIERSON**—We are talking about demand and increasing uptake, but we have had the benefit of looking at a Canadian inquiry into wireless broadband. In that case clear targets were set. Every school and every hospital was the priority within a very short time frame. What do you see as advantages and disadvantages for government to actually adopt a strategy that says: that is our target and that is our priority? That is my first question. Second, pilots are fine but are your pilots, or your strategies for pilots, linked to industry demand or are they ones you are initiating yourself? Are there joint ventures happening or not?

**Dr Bird**—On those two questions, yes, it is important to have a focus and, if these are national priorities, that is where—as I was alluding to earlier—CSIRO has adopted six or seven national priority projects. One of them is called e-Australia. All of these provide focus. There is concern in the health area about how health is going to be delivered in the future. If we use the existing means it is not going to be cost effective. Electronic and digital means seem to be the way to go. There would seem to be a big advantage in having a target to achieve a certain outcome by a certain time. It actually allows both government—

**Ms GRIERSON**—Would you say that is leading demand?

**Dr Bird**—I would think that it would certainly stimulate demand and get a whole load of people involved. I do not know whether that actually turned out to be the case in Canada but from some of the other Canadian experiences that I have seen it has certainly brought industries and the community on board. I am aware of the space industry and how that was stimulated by providing a focus. On the second question, the pilot studies are being done in consultation with user communities—this is for CSIRO. We have had consultation with the health industry, small business and large business. As we have been developing the e-Australia priority project, we have had a number of consultations. The idea is that it will be done in partnership with state governments and regional centres.

**Ms GRIERSON**—So user focus rather than provider focus?

**Dr Young**—In the BITS CeNTIE program that we have, the BITS program has about $12 million or $14 million from government, but there is about $20 million or $25 million from supporting industry. That one has a major involvement with Nortel Networks, for instance. The NCF bid we have in has a lot of industry or partners in that area, the major one being FLOW Communications. So, yes, it is not just the industry groups, as Trevor pointed out, but it is the providers—the carriers and suppliers.

**Dr Bird**—It is the providers as well. So it is a sort of combination. In other words it has not just been a technological push or the fact that we have had a good idea. It has actually been coming from the users.

**Mr Murray**—To add to the answer to your question, the stand-out in the graph that we submitted earlier on was Korea. I believe that they really had a national priority. They wanted to be a broadband society and that is the result.

**CHAIR**—As there are no other questions, I thank you for attending today and giving us the evidence from the CSIRO. We look forward to seeing you again some time. Your evidence has been very useful.

**Dr Bird**—Thank you and good luck with the inquiry. It is an important issue.

**CHAIR**—We will take a short break.

**Proceedings suspended from 10.36 a.m. to 10.41 a.m.**

**COUGHLAN, Mr Christopher James, Director, Mobility Australia/New Zealand, Lucent Technologies Australia**

**MEGALE, Ms Luis, Director, Corporate Communications, Lucent Technologies Australia**

**CHAIR**—Welcome. While 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—not that we are expecting you to do that, but we formally have to give you notice of that before you give your evidence.

**Mr HATTON**—They could end up in prison.

**CHAIR**—Indeed. We have not imprisoned anyone for a while but, you never know, we might like to do so; it might take our fancy. If you have any introductory remarks you might make them, and then we will go to questions, and we will finish up at about 11.30 a.m.

**Mr Coughlan**—I would like to thank you for inviting us to submit a paper to your committee. In writing the paper, I looked at the developments around the globe and considered how they would apply in the Australian environment. In particular, I considered UMTS, 802.11 and CDMA 2000. UMTS is an IMT-2000 standard that was primarily developed to suit the requirements of the European market. Because it is employed in relatively high frequency, it has relatively small cells when compared to other cellular technology. In Europe, this is not such a problem because you have high population densities. However, in Australia, with the exception of the capital cities, we do not have the population densities to really make a global UMTS solution work for country Australia.

We looked at 802.11, which was designed as wireless LAN application. It operates in unregulated spectrum; it is, therefore, susceptible to interference, which is fine if it is in an environment where you can control interference. So if you have a floor where you can control cordless devices, other wireless LANs, baby minders and all those other things that can interfere with the service, it is fine. It also has fairly limited coverage—about 100 metres when used within its design specifications. CDMA was designed right from the outset as a data carrying technology. It was developed in the late nineties, whereas other cellular technologies such as GSM were developed in the late eighties. Hence, it uses spread spectrum as an air interface. This air interface is actually used in 802.11 and UMTS, so it is really the only air interface to use in a data environment to provide data services.

CDMA 3G1X is available now and can provide up to about three times dial-up type access speeds. We are currently deploying one of those networks in New Zealand. By the end of this year or early next year, IXEV-DO will provide data speeds at better than 10 times dial-up. If we couple the obvious benefits of CDMA as a data carrying device technology and deploy it at lower frequencies, all of a sudden we have a fairly powerful solution for the Australian environment. We are deploying CDMA 3G1X in the 450 megahertz Nordic Mobile Telephony bands in Romania and Russia at the moment. This has proven to provide the benefits of CDMA

2000—that is, the data speeds—but with much greater cell sizes. The lower the frequency, the bigger the cell size. I refer to table 1, page 5 of my pack where you will see that—

**CHAIR**—The table is on page R61, for the benefit of the committee.

**Mr Coughlan**—if we consider the number of base stations for 50,000 square kilometres at 450 megahertz—I think we have it written in the table as 127—in 3G spectrum, all of a sudden we are looking at in excess of 700 base stations. This can obviously provide greater coverage at substantially reduced capital cost. The benefit for urban and metro Australia is that 450 megahertz provides for much better building penetration. The fact that less infrastructure is needed for coverage and that operators' launch capital expenditure will be many times less compared to an equivalent covered 3G spectrum network means that capital expenditure for a 450 megahertz operator will be linked more closely to capacity requirements and, hence, revenue growth.

Currently, there are two handsets available for 450 megahertz networks. As more networks are deployed and demand increases, handset vendors will produce more handsets. They are basically CDMA 3G1X handsets. There are about 20 available now in the 850 band, so it is not a big development to down-band them. It will not be overly difficult for handset vendors also to produce dual band handsets that would operate both in the 850 band that is currently deployed in Australia and in the 450 band.

An alternative strategy to a full CDMA 2000 450 megahertz network would be to deploy data only or data first—that is, rather than spend the capital on building both data and voice requirements into the network, leave out the voice requirements, leave out the switches, leave out the need to provide interconnect into other networks and optimise for data. That would further reduce the capital expenditure to provide broadband wireless to country Australia. The user device is simply a card that you plug into your laptop PC or your PDA. To make this available in Australia, some of the 450 megahertz spectrum would have to be cleared. That ends my opening statement.

**CHAIR**—Well done. Are there any questions from members of the committee? I am happy to ask one. Lucent has been involved with the SuperNet program in Alberta. Is that right? You referred to it in your submission.

**Mr Coughlan**—No. I think I referred to it; but, no, we have not.

**CHAIR**—You are obviously familiar with it?

**Mr Coughlan**—I have read the paper on it, yes.

**CHAIR**—Do you think what they are doing in Alberta is potentially a blueprint for Australia?

**Ms Megale**—I believe that it is a fundamental blueprint. The government of Alberta—and I have here a paper to submit, and my apologies for not submitting it initially—have said that their infrastructure will be open to all. They have provided the interconnects with all the small rural and regional communities in Alberta. They have created a network across what is a very

dispersed population. We see huge parallels between what they have done there and what we can do in our rural and remote areas. They have made that open access. The business case in the paper I have here runs through the numbers. Without referring to them specifically I will just table the paper, if that is okay.

**CHAIR**—We will take that as an exhibit. So the government of Alberta have decided to make it a public policy issue?

**Ms Megale**—Yes.

**CHAIR**—This is the roll-out of broadband?

**Ms Megale**—That is right. It would be ubiquitous: it would be available to all. They ran through some policy which would not allow anyone who owned currently existing infrastructure to get in the way of this roll-out. When it was economically unviable to hook up the 60 or 70 people in a small outpost, they provided some initial funding for that to happen and then had vendors and network providers fill in all the gaps, so that they got ubiquitous coverage across the state.

**CHAIR**—Where the government were not funding the roll-out were they involved in public-private partnerships involving private companies?

**Ms Megale**—Yes, they were.

**CHAIR**—Do those private companies tender to be part of that process or do they use the previous government owned telecommunications company to do so?

**Ms Megale**—A mixture of both: there were some areas where, clearly, coverage was already available—in their more heavily populated urban areas—but then they tendered out all of the opportunities to join the SuperNet where there were effectively black spots, to make sure that it was ubiquitous coverage.

**CHAIR**—They did that because they wanted all the various applications of broadband to be available to all the Alberta citizens?

**Ms Megale**—That is right. There is a fundamental belief that it was an economic enabler, particularly because, as Alberta has a geographic spread which is not dissimilar to Australia's, they were getting the same sort of divide that we were finding here, an urban-rural divide, and they wanted the same sorts of speeds and the same sorts of opportunities available to them for their schools and for telemedicine, in particular in fact for their hospital system. Those were their particular drivers at that point.

**CHAIR**—Was the Alberta experience using CDMA 450 or is it your suggestion that if you were to follow a similar proposal you would use CDMA 450?

**Ms Megale**—It is technology agnostic, and I cannot remember.

**Mr Coughlan**—I think it is a wide system. We are just saying that, from a policy perspective, the policy is probably something that we should use in the Australian environment because we have similar sorts of problems.

**Ms Megale**—It will always be uneconomic. It is an unfortunate fact of life that it is always going to be uneconomic for some people in Australia to download from satellite if the costs are prohibitive. To get a wireline DSL connection out to a rural community is going to be cost prohibitive; it will never happen. So with what existing infrastructure we have with the five networks in Australia, we are saying that the lower frequency at 450 makes enormous sense, because you would not have to put that much more infrastructure into rural and remote areas to get the spread. One base station which is currently rolling out 3G only has this much radius; for the exact same base station—it has the same civil works and the same site acquisition and the start-up costs are already done—with CDMA 450 you get a much bigger coverage, a much bigger radius. So for the Australian market a wired solution will still be prohibitive, which is why I think the Albertans have done that, but a wireless solution using CDMA 450 would be a business case that is supportable.

**CHAIR**—This is just a matter of interest. Does Alberta contain populations of Inuit people?

**Ms Megale**—Yes, it does.

**CHAIR**—That is up in the north of Alberta?

**Ms Megale**—Yes.

**CHAIR**—So your suggestion is that the market would not provide the services for the last mile because of the uneconomic nature of the costs, and therefore the government should provide those services in Australia in the same way as the government of Alberta has done.

**Ms Megale**—I do believe it is cost prohibitive and there is not the incentive to provide that last-mile service to the one or two because of the costs involved. So the government should either 'incent' or somehow help with access to those last two. The help we are suggesting at this point is making the 450 spectrum available. I will not pretend to sit here and be a policy person. That is your job, not mine.

**CHAIR**—Sure, that is fine. I want you to do my job for me as well.

**Ms Megale**—Please; I am struggling to do mine at the moment! CDMA 450 would be the most viable technology from an economic standpoint. It is deployable now; we are not talking about a technology that three years hence will be available—the equipment is available now and it is already being rolled out around the world. We are doing it all through eastern Europe and are soon to do it in China—in any event I think we are having discussions in China.

**Mr Coughlan**—We have done trials in Sweden of all places—the home of GSM—and Portugal. There are a lot of European countries with existing NMT analog operators who think their networks are in decline and this is a viable alternative. It really gives them a very much lower capital cost compared to the 3G operators.

**CHAIR**—As part of its licensing and regulatory environment the government could, rather than itself rolling out to remote communities, require that as part of the sale of licences to private companies. Of course, the cost of the licence would therefore be reduced commensurately with that.

**Mr Coughlan**—That is right.

**CHAIR**—That would be another way of doing it.

**Mr HATTON**—I note that 'incentivation' may have made a comeback here, to pick up on the comment to 'incent' the participants. Is this a proposal, not just for 'incentivation', but also to lock the alternatives out? I understand your argument that it is not cost effective and so on, but if Lucent are going to be locked into this—with Lucent providing on the 450 band—does that lock everybody else in the market out? Or are you just providing the backbone infrastructure here with people then being able to participate?

**Mr Coughlan**—If we are talking about locking out alternative technologies, I think fundamentally they are locked out for economic reasons. If we want to look at the cheapest cellular technology to provide broadband wireless services, this is it. On the question of whether we are locking other people out: there is no reason why other vendors could not produce this equipment at this frequency range.

**Mr HATTON**—But the government is undertaking this inquiry and other inquiries. You have recommended a public policy approach where the government mandates a particular way of going about it. I think that would effectively lock out the other solutions that may be there, whether they are young and nascent or more developed. You have argued that it is essential to do that in order to provide a protected area, if you like.

**Mr Coughlan**—Yes.

**Mr HATTON**—But otherwise you do not think there would be provision for that?

**Ms Megale**—On the back of cost. From what we currently know from around the world, it would be too expensive to deploy other technologies—which are very good; UMTS is an excellent technology if you are in a high-density urban environment, or even a regional environment, but as soon as you move it beyond the region it starts becoming prohibitive. If someone wants to roll out a UMTS network to run broadband wireless in Australia they can go forth and multiply and we are happy for them to do it. But we have had experience with companies that go out of business, and the rationalisation in telecommunications actually means that people are very wary of putting down their capital expenditure right now, and are cutting back on it until they can see that they are going to get a return. We took that into consideration, so we are promoting the 450 megahertz technology because we have looked at the business case as well and we know that it can work.

If you currently have all this equipment and all you effectively need to do is put a little bit more equipment onto the network, as opposed to building more poles that require local council approval and rights of way and that have all sorts of access issues—if you have that already and you have done all the hard yards there—then this is just equipment. But if you know of anyone

who wants to roll a UMTS network out we would happily provide the equipment for them as well.

**Mr HATTON**—Is this partly in response to the fact that enormous prices were paid for 3G in Europe? The equivalent prices were not paid here, thankfully, and therefore there is not that kind of cost to the community.

**Mr Coughlan**—I think the spectrum fee was one part of the cost paid to Europe. They did pay too much, let's be frank. In Australia people paid what I would consider a reasonable amount for spectrum; it was a reasonable price. My view, though, is that there is no way you would get an adequate return on deploying infrastructure outside the capital cities. Hence, from an economic point of view, UMTS in the medium term will really only be a capital city network.

**Mr HATTON**—As has been the case with GSM, essentially.

**Mr Coughlan**—Yes, that is right.

**Mr HATTON**—Which is why we had CDMA. In terms of its coverage, it has a big footprint of 100 kilometres or so. It is a bit like whale song: because it is at a lower frequency you get that spread out over a wider area.

**Mr Coughlan**—That is right.

**Mr HATTON**—If that was applied to the CDMA network for voice, would we be back into the situation we were in with analog? There are a lot of complaints about the current coverage of CDMA. If that was provided at 450, would that coverage be equivalent to what the analog coverage used to be? Would that be a way to sort out the difficulties people have with the introduction of CDMA?

**Mr Coughlan**—With analog technology you get aberrations. You get boosters and all that sort of stuff, so you can actually get a lot more range out of analog in good transmission circumstances than with digital technologies. Coverage at 450 does provide a substantially greater reach than 850 CDMA. I have not done the numbers to know whether it is equivalent to analog.

**Mr HATTON**—More broadly, if you look at the provision within the capital cities, our terms of reference also include how well broadband is working. We have had an enormous amount of money put into fibre infrastructure. Since Optus and Telstra spent $8 billion we have had lots of other companies coming along putting in their own optical fibre loops. We also have Next-Gen. We are looking at something like $US600 million being put into that technology. What is your view of the adequacy of provision and of the underutilisation of that infrastructure? How do you think Next-Gen slots in? What are the prospects in terms of usage for that?

**Ms Megale**—I will just talk about how Next-Gen slots in first. For the record, Lucent is providing all the equipment for Next-Gen and we are also fundamental in setting it up. I will state that up-front. The Next-Gen model basically is lots of fibre in the ground. A lot of it is dark and will never be lit, because it has a water peak, which means that it breaks down at a certain

range. I think that is 1.4, but I will have to check. Next-Gen is putting in fibre that was designed for long haul backbone stuff in the ground. It was not necessarily designed for that. The basic argument is that, with a Next-Gen model, it becomes almost a commodity play and no-one would ever put fibre in the ground again, because you have a wholesaler and it is open and free to everybody. It is a backbone infrastructure, open and free to everyone.

To answer the first part of your question on usage rates, opinion would suggest that residents or individuals have not taken it up, but machine-to-machine transmissions are still growing. The Sydney to Melbourne link, if you are a major law firm who wants to have disaster company facilities off site and back up your data, is the sort of stuff that is growing at a phenomenal amount. It is exponential because this LAN talking to that LAN talking to that LAN is not three, it is times nine. That sort of traffic is still growing at an ever increasing rate. Right now a lot of companies would run that traffic themselves. The Next-Gen model, and probably the models going forward, would suggest that you would outsource the data carriage to somebody else, like a Next-Gen or a Telstra or an Optus. We do not run a retail model. While retail has probably been a wee bit disappointing for everyone in the broadband space, the device-to-device broadband usage has increased by orders of magnitude and will continue to do so.

**Mr HATTON**—Can you tell me a bit more about what you see as the technical problems with the pre-existing fibre? If we have spent $8 billion between Optus and Telstra and we are not going to actually get value out of that because of underutilisation and technological problems, I would like to know more.

**Mr Coughlan**—I can talk about cellular technology but I cannot really talk about the fibre.

**Ms Megale**—We do have fibre experts, particularly Andrew Cockcroft, and I am happy for him to write to the committee and let you know what the answer to that would be. Neither of us could answer that question.

**Mr HATTON**—Chair, that would be useful, given that we are looking at a double-layered set of questions here. If we have had expenditure in the billions on infrastructure and we are running out of time before it is even used and taken up, then that is a significant question in terms of public policy. More broadly in regard to the Next-Gen model, Telstra, when it was Telecom and when it was wholly owned by the government, used to provide the backbone for the entire network; there are some proposals around, in fact, that suggest that they could buy back those bits and provide the backbone for the entire network. But that was the plain old telephone system. Are you saying that Next-Gen has leapfrogged the existing provision?

**Ms Megale**—We would have to speak to Next-Gen about their own business model, but we say that the technology we have provided Next-Gen—the DWDM fibre, the photon equipment and the optical equipment—is the best there is in Australia; it is the most advanced equipment. In three years from now, if someone was to be so foolish as to put more fibre in the ground—again, I would like to know them—then they would be able to make the same claim. But I can sit here and say quite happily that the stuff we are putting in the ground for Next-Gen is the best that there is right now for long haul systems.

**Mr HATTON**—Can you tell me about the capacity of that system? I understand that the amount of information running around the world at the moment is about one terabyte: what is the capacity of the Next-Gen system?

**Ms Megale**—I am not as current as I should be and I am not sure what they are actually lighting up. The capacity is enormous, but what they actually light up is the important part. I will get back to you on that one as well.

**Mr HATTON**—Chair, are Next-Gen putting in a submission?

**CHAIR**—We have asked Next-Gen to make a submission and they have indicated that they do not wish to make a written submission. We might ask them—and you might encourage them, Ms Megale—to come to our public hearing in Canberra or maybe even to come to Newcastle, which is close by, and appear before us in person. I do not know why they do not want to make a written submission, but they could perhaps appear in person and we could talk to them about some of those issues. That would be a good idea. I visited them here in Sydney and maybe they have mistaken that for having dealings with the committee

**Ms GRIERSON**—You mentioned that the 400 to 500 spectrum currently has users that would have to vacate it: how does that happen and who bears the cost of that?

**Mr Coughlan**—That is a good question. At the moment it is occupied by things like trunk radio and taxis, for example. The basic applications that are run by those users could easily be ported across to this technology.

**Ms GRIERSON**—Would they have to buy in for that?

**Mr Coughlan**—There would have to be some expenditure. I do not propose to say who should meet that bill.

**Ms GRIERSON**—Do you know if that has happened in other countries and how that has been dealt with?

**Mr Coughlan**—No, in other countries this band has been free because it has been allocated to mobile telephony in the past.

**Ms GRIERSON**—Thank you.

**CHAIR**—You said in your submission that CDMA 2000 and CDMA 450 had a proven track record internationally. Could you take us through some of the examples where that has been the case?

**Mr Coughlan**—There is Verizon in the US. We have just upgraded their network to 3G1X. Currently, I think they have approximately 26 million subscribers—more than the population of Australia. Sprint in the US: again, I think they have over 10 million subscribers on this technology. In Australia, Telstra has CDMA technology, which you would be very familiar with. That could be easily upgraded to 1X capability. In New Zealand, we have deployed a 3G1X network

for TNZ, which will be launched within the next month or so. That has a fairly good track record. Currently, I think there are about 100 million users on CDMA based networks and around four million—I think I have quoted in my paper—3G1X customers. It is a fairly robust technology. In those markets it has been driven more by requirements for capacity. With an upgrade from CDMA to 3G1X, you also double the voice capacity in the network. In countries with high density populations, capacity is more of an issue than anything else. Doubling capacity and doing a technology upgrade is a fairly effective way of managing the asset you have, which is spectrum.

**Mr HATTON**—At the bottom of page 3, which we have as page 59, there is the speed at which this runs. You say currently it is 153 kilobits per second?

**Mr Coughlan**—Yes. That is the maximum output.

**Mr HATTON**—It is an average of 70 kilobits per second. Then you are looking at going to 2.4 megabits per second and an average of around 800. I think we know, given the state that our offices have been in, if you have got 70 kilobits, you have not got much in terms of speed and accessing and downloading times. You are only looking at going up to 2.4 megabits per second. That is reasonably high, but your average is still under one megabit per second. How do you see that in terms of people being able to use this system at relatively useful speeds? That is fairly slow. It is a lot faster than a lot of people may have but in terms of downloading, which is a key problem, how do you see that evolving?

**Mr Coughlan**—Seventy kilobits per second is almost double what dial-up is. If you consider 35 or 45 kilobits per second is about as best as you can get from dial-up. There is a maximum of 56 kilobits—but whoever gets that? So it is a marked improvement on dial-up. Most people's perception of download speed is predicated on dial-up. A few do have the luxury of cable modems and ADSL. But, once you have gone that route, it is really hard to go back to dial-up. Eight hundred kilobits per second is equivalent to what people experience currently with cable modems and ADSL technology. I do not see that as being slow at all in terms of users' experience.

**Mr HATTON**—But how will that impact in the future when there will be greater multimedia content?

**Mr Coughlan**—In the future, there might be a requirement to add more capacity to these networks. Adding more users will impact the data throughput, and so you will need to add more carriers and more capacity to cater for more users. But you could probably continue to provide the same sorts of speeds. Eight hundred kilobits per second is enough to provide video streaming. So, if multimedia is your video streaming type technology, that is pretty good video streaming. Most videoconferences are run at 2 x 128 kilobits per second.

**Mr HATTON**—That is fine if three people in the cell are doing it, but we have a party line effect here, haven't we?

**Mr Coughlan**—That is right. And that is why I said 800 because 800, in effect, caters for that shared usage of bandwidth. Our real world experience with 1X is that, while it might be

153 kilobits per second, because you have a lot of users accessing the same carriers it does drop down to around the 70 kilobits per second mark.

**Mr HATTON**—But is that based on our current models, which have relatively low take-up of these services?

**Mr Coughlan**—It is.

**Mr HATTON**—If we actually break through the barrier and have a lot of people taking up the services—

**Mr Coughlan**—Then we just add more capacity.

**Mr HATTON**—Okay. So if it is economic for the company to do that, you do it.

**Mr Coughlan**—Yes. If you have more users, it is a good problem to have because you can add capacity but you have a revenue stream that pays for it.

**Mr HATTON**—What about the handset situation in terms of multifunctionality? If you buy one you can use in the States, it would be a Motorola or something; I bought one a while ago because I had to go to the States and that had, I think, 1,800 and 1,900 bands—there was one that was missing out. You mentioned different handsets being available.

**Mr Coughlan**—Yes. Currently there are two handsets available.

**Ms Megale**—At 450.

**Mr Coughlan**—At 450. But there are only two because there are only two networks. There is a Romanian network and there is a Russian network. As we deploy more networks, demand will get other vendors. As soon as you open up a market, demand pulls handset vendors. It will not be long before that same demand says, 'Well, we want to roam with these handsets. We can't roam to any network other than a 450 megahertz network.' It is not a big development to make these dual-band or even tri-band, and this phone is a tri-band GSM. So it could operate at the 450, 850 and 1,900 PCS band in the US. Basically all the bands currently have CDMA deployed on them.

**Mr HATTON**—Is that more viable because of what you are doing in Asia and the take-up of this technology?

**Ms Megale**—Eastern Europe.

**Mr HATTON**—Eastern Europe. But do you think you have the potential in Asia?

**Mr Coughlan**—The potential in Asia again is driven by reduced capital expenditure. I think Indonesia is one of the first countries that is looking at deploying these sorts of networks. As I said, it is all about—and I am a pure believer in—market dynamics. Market dynamics ensure (1) that there is terminal availability and (2) that the terminal costs come down. Unless cellular

technology is drawing out something like a million-plus handsets of one model type, the cost almost becomes not viable. When you look at specialised proprietary technologies, that is generally where they fail, because the cost per user tends to escalate to a point where it becomes not viable. You are dragging 10,000 units out of a manufacturing plant rather than 10 million units.

**Mr HATTON**—In one of your previous answers, you said that, if you were deploying this out in the country areas, if you knocked the voice capacity down you could have greater provision.

**Mr Coughlan**—That is right.

**Mr HATTON**—Would you envisage normally having both data and voice in operation using this? Otherwise people would have two different hits.

**Mr Coughlan**—It depends on the business model. You could deploy it more rapidly if you did only data. That is mainly because of regulatory requirements, to be honest. Regulatory requirements around voice—as far as voice intercept goes, as far as getting a number range and getting that number range conditioned in other networks—add almost 12 months to the deployment of a network. With data, take away all of those voice problems and it becomes much easier to deploy. It also becomes much cheaper because all of a sudden you do not need a voice switch. You basically have a radio network that works into a packet infrastructure and that is it, rather than the circuit switch infrastructure as well.

**Mr HATTON**—Psychologically, how do you think people would operate if this were to be taken up and they were told, 'If you want data, you go and get one handset, and then if you want to use your phone in country areas, you've got to have a CDMA set'?

**Mr Coughlan**—The device would be different. If you were only offering data, there would be a card that plugged into your data device. The PCMCI card is plugged into a laptop or into the back of—

**Mr HATTON**—Like an ISD card or something like that?

**Ms Megale**—That is right. Right now people carry their laptops and their phones anyway.

**Mr JOHNSON**—You have mentioned the year of trial efforts in Eastern Europe, particularly Romania, as well as in Russia and Hungary. Can you give me some idea of the conclusions that came from that 12 months? Was it only 12 months?

**Mr Coughlan**—In Romania, we have rolled out a network that is commercially available. We covered 42 per cent of Romania with 160 cell sites; that is physical landmass. I am not sure what the landmass of Romania is, but not that many cells are required to cover 42 per cent of the country.

**Mr JOHNSON**—Russia and Romania are two different landmasses. Referring to Russia, are you talking about the whole—

**Mr Coughlan**—No, I am talking about a province. I do not have a lot of detail on that, but I do have a fair bit of detail on Romania.

**Mr JOHNSON**—With China, you mentioned just one area, and that was Daqing. When you refer to Russia, do you mean the entire landmass of Russia?

**Mr Coughlan**—No.

**Mr JOHNSON**—With China, you refer not to its entire landmass but just to one area.

**Mr Coughlan**—It is not the whole landmass of Russia. We are targeting individual operators in Russia on a regional basis.

**Mr JOHNSON**—Does that apply to all those countries?

**Mr Coughlan**—In most countries in Europe, excluding Russia, like Portugal or the Nordic countries, generally licences are national.

**Mr HATTON**— Effectively, your business models so far are a closed shop. The government decides to do something about Internet provision in remote regional and rural areas; Lucent gets the business; and you provide the infrastructure and do business from there.

**Ms Megale**—We are not a service provider. We are like an arms dealer—that is a turn of phrase—we will supply to anybody. We will provide the equipment. We would work closely with whoever the service provider was and their engineering departments to get this up.

**Mr HATTON**—So, whether or not the government mandates and supports it—and you are recommending that it should, given the circumstances of remote and regional Australia—a service provider would have to decide whether they want to be out there in the maverick land of the free market, mixing it with the cowboys, the 802.111b lot, and providing a service: 'If we think there's some kind of economic case for it, we'll then go after it.' You would then provide them with the equipment to do that, and that would be the extent of your involvement.

**Mr Coughlan**—That is right. We would go and solicit operators—and there are a number of global operators that would be very interested if this 450 megahertz spectrum became available.

**Mr HATTON**—The benefit to Lucent then is—

**Mr Coughlan**—The equipment sale.

**Mr HATTON**—The bigger the area covered, the bigger the equipment sales in regard to that.

**Mr Coughlan**—Yes.

**Ms Megale**—Right now our competitors do not have it; but, equally, if it were to be made available, they could re-engineer our equipment and put it on the market.

**Mr HATTON**—You are not suggesting that people might re-engineer your equipment and that it might be done worldwide?

**Ms Megale**—With Bell Laboratories? No, I would not mention that at all. It would not be that Lucent could be the only provider. At this point, we believe that we are the ones with the equipment.

**Mr Coughlan**—There are a number of vendors who have the capability to quickly provide CDMA 450. Any vendor that now provides CDMA 3G1X capabilities could easily provide it at 450 megahertz. It is just different amplifiers and filters, at the end of the day; it is not a big development.

**Mr HATTON**—Why did you determine it would be 450? What is the benefit of 450 to 500 versus going lower in the spectrum?

**Mr Coughlan**—To be pragmatic, it was more that it was available. There were operators operating analog networks at 450 who were looking for a digital path forward, and so it was market demand.

**CHAIR**—There being no further questions, thank you for attending today. It has been very interesting. Hopefully, we will see you again.

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

That this committee receives as evidence and includes in its records as an exhibit for the inquiry the document received from Lucent Technologies Australia, an article from the January/February 2002 edition of *iQ Magazine*, entitled 'The Alberta Connection'.

**Proceedings suspended from 11.25 a.m. to 2.32 p.m.**

**HARPER, Mr Philip Roy, Deaf Telecommunications Access and Networking Project Officer, Australian Association of the Deaf, through Mr Andrew John Carmichael, interpreter**

**CHAIR**—Mr Harper, thank you very much for coming along this afternoon. There are a few formalities that I have to tell you about before we get under way. Although the committee does not require you to give evidence under oath, I have to advise you that the hearings are legal proceedings of the parliament and they do warrant the same respect as proceedings of the House. So the giving of false or misleading evidence is a serious matter and could be regarded as a contempt of parliament. You may wish to make some introductory remarks to the committee and speak to your submission, and then we will go to questions. If you would like to make some introductory statements we look forward to hearing from you.

**Mr Harper**—Thank you very much for inviting me here this afternoon, I am very pleased to have the opportunity to speak before you. We believe as a community that this is a great opportunity to be able to express face to face some of the issues in terms of access that is going to impact upon our constituency in the area of telecommunications. I am sure you have all read the paper that we have submitted, so I do not want to go over that in too much depth, but I will reiterate the more salient points from our paper.

The first part of the paper talks about who our constituency is and how many people they may well number. We are looking at a figure of about 485,000 people in Australia who have a severe to profound hearing loss, which means that for that number of people there is quite a large impact on their access to telecommunications, because their skills of being able to hear and pick up information over the phone in the regular way are hindered by their loss of hearing. This leads to a large number of communication and access issues for that community. I hope you are all clear exactly where we got that number from. It is from the most recent research and evidence regarding the demographic of people that have a hearing loss in Australia. In the past we have relied on the Australian Bureau of Statistics for numbers that, as I am sure you are all aware, are never entirely accurate and always slightly ambiguous. Their numbers have managed to vary to the degree of 20 and 30 per cent in their accuracy from study to study. So this is the most recent and what we believe, hopefully, to be the most accurate study. It was undertaken by the South Australian government on their population centres and has then been extrapolated. If you need to reference that, I feel that we have managed to lay out fairly clearly in this paper how we arrived at the number of 485,000 people in Australia. In terms of a follow-up, I am happy to supply any more details and information, should you require it.

**CHAIR**—Is this something that we have had in your submission?

**Mr Harper**—No. This is an addendum just to give a little bit more background information regarding the numbers of deaf people.

**CHAIR**—We will have Brendan prepare a motion to take this as an exhibit, which is an extra aspect of your submission, so that it can be taken as evidence.

**Mr Harper**—That is fine. Thank you. The focus of this inquiry is specifically in regard to broadband access and services. As I am sure you are all fully aware, broadband itself is a very

wide area and covers lots of different facilities, services and packages such as videoconferencing. Some of the more interesting ones include medical telephony and interpreting. It has implications on education which we have laid out fairly clearly in our paper. You can clearly take from our paper that deaf people would like to enjoy the exact same access to broadband facilities and services as their hearing counterparts in Australian society. Unfortunately, in some areas those services are not going to be realised because of the difficulty in access to technology or for a host of other reasons where deaf people have found themselves stymied in terms of accessing the potential of broadband.

When you look at the past record in Australia and in many other countries, when new technologies are released on a national or international standard the deaf community is often left behind and forgotten in the equation. A good example of this type of process is that when the mobile analog networks were closed down a lot of deaf people who were using TTYs in order to access colleagues and friends with mobile phones suffered a complete loss of access as the analog network was shut down without any consultation. That is a rather large negative impact. The deaf community was only informed after the decision was made. When the GSM networks took on, those wearing hearing aids suffered a severe negative impact in that the phones were not compatible with the hearing aids. So two large decisions that were made recently in the area of telecommunications have had a rather negative impact on our constituency and we are now retrospectively trying to fix up those things in negotiation with service providers and government. In talking about developing new services in terms of third generation mobiles or the introduction of broadband access for the general population, we think it is very important that the stakeholders are made aware of the particular factors that impact on the deaf community before the technology is rolled out in order to prevent this sort of thing from happening again.

To retread a little bit back to the Telecommunications Act itself in 1997, the number one purpose of that act is obviously to make sure that services are available to as wide a range of people as possible in Australia. It mentions diverse applications and telecommunications services. The act itself is there to protect and make sure that people do indeed access these new networks and services, and that by default includes deaf people in Australia. That is why we feel there are a lot of issues that we need to raise in our paper that come under the act. We feel that much consideration needs to be given in terms of access for deaf people. Specifically on page 3 of our submission—

**CHAIR**—Which is page 95 of our book.

**Mr Harper**—we cover areas of what is going to be possible and effective in terms of wireless broadband technology and how it can work for deaf people and not against deaf people. First of all, we talk about regulations. Currently telecommunications regulations ensure that access is included, for example, with a statement saying it applies to any connectivity. That actually then means that deaf people have a right to access the full gamut of services that are available. Most people think of themselves as using their voice for the telephone, but this also includes data transmission and Internet type access. It also importantly includes access to text information for deaf people, such as TTYs. Many deaf people whose first language is Auslan use a visual language of communication, so video telephony, videoconferencing, heralds what could be a bright new era for deaf people. We would like to ensure that any connectivity mentioned in the Telecommunications Act is carried forward to this, that it does not refer only

to voice communication or vocal communication but it includes text information and video telephony and videoconferencing.

The second area that we are talking about is international standards in terms of telecommunications. There are two very important areas that have an impact on us, and the first is V18. That particular standard has not been adopted in Australia as yet. It is most popular in Europe because of the wide variety of technologies that were employed in Europe and the many protocols that exist in Europe. It serves their purposes to have this V18 standard to try and harmonise services and access over there. So V18 was really written for that purpose, but it does include text communication. In Europe deaf people can access mobile phones like this handset I have here, which is one of the Nokia 9000 range. This is the 9210 specifically. Deaf people use these predominantly in Europe to communicate with each other in a mobile fashion. In Europe these handsets can access the home TTYs that deaf people also use, giving deaf people a much wider accessibility to the telecommunications network. You can call a TTY at home from this mobile handset or you can fax, email, phone, text message or access the relay services that exist over there. So the suite of services that is available to deaf people is far more wide-ranging than in Australia. In Australia deaf people only use a normal phone with SMS text messaging and then rely on Internet and email access for other text communication, which is not mobile.

The international standard of V18, as it applies in Europe, is a voluntary standard. It is not mandatory. We would like to encourage the Australian government to look at incorporating V18 into our practice, thereby enabling deaf people to access a wider variety of services, as do their counterparts in Europe.

I will move on to (c). The third main point in this part of the paper is about compatibility and interconnectivity between wireless technology, mobiles and TTYs. There was one interesting development in Europe that was sponsored by the European Commission with a mixture of different organisations involved, including Ericsson, Nokia and the British Deaf Association. I think there were seven different organisations, including the European Commission. One of them funded a $6 million project to investigate how deaf people can become more mobile while they are accessing telephony services.

As I have said, not only can these handsets call TTYs, email and fax but visual communication as it pertains to these kinds of handsets is being looked at. In particular, that investigation is going to look at the third generation of mobiles and the impacts therein to ensure that the technology that is developed is compatible with the handsets that deaf people are using now so that the systems do not exist in a parallel and non-compatible way, as they do here in Australia. They are trying to harmonise that system. This is again something that has been set up over in Europe. A separate system with different standards has been set up in Australia, and obviously it is important to us, as members of the deaf community here, to be looking to those higher standards and encouraging the government to take them on board.

The fourth area in the paper talks about effective broadband access. We are looking mainly at deaf people using videoconferencing and videophones for effective, clear, speedy, simultaneous, flowing communication in sign language. There is a minimum of 128 kilobits per second as a standard for carrying that information clearly. Most videoconferencing facilities operate at that standard, but broadband as it is being rolled out for most home users in Australia will only be

64 kilobits per second, which will not be sufficient to allow deaf people to access visual communication using this system.

Here again, we should think about a deaf person being able to use their preferred language using the telephone system. For example, if I wanted to ring you, Mr Pyne, I could use a TTY and call the National Relay Service and they would voice relay the conversation between you and me or I could email you or I could use my mobile phone and text message you. But my preferred mode of communication, my natural language, is Auslan, which is a visual language. If I talk to you directly, at the moment I have to use my second language, which is English. This is where many deaf people find a lot of frustration. They will get by with very limited access but without a great deal of comfort. Where videophones, videotelephony and videoconferencing are available for deaf people to express themselves in their first and natural language, we are asking for the system to be able to accommodate that kind of communication by having a minimum standard that is higher than the one that is currently being suggested.

This is a very important area of access for deaf people in terms of looking at the future of telecommunications. We are very happy to assist in researching how deaf people would best access these kinds of services. I think it is worth again adding some examples from overseas. In Finland two years ago the government announced that they would provide video telephones to all young deaf people, all over the country, free of charge as part of the universal services that they provide. As you know, most Scandinavian countries have a very developed welfare support system. As part of that and in order to provide access to communication for deaf people, they have made a commitment to providing videophones to all young Finnish deaf people. They have said their reasoning for this is that they are satisfied that Finnish deaf people are being stymied in their access to telecommunications by not being able to express themselves in their first and preferred language.

In Germany, the government has agreed to provide a subsidy to cover the ISDN rates for deaf people who are going to have visual videophone communications at home. In the USA, some states have set up video relay services and they also subsidise the cost of line charges and phone charges for deaf people so that deaf people's expenses are the same as those of their hearing counterparts. They are brought in line because it is widely accepted, researched and understood that deaf people pay more for their telecommunications services than hearing people do, which means they are in an inequitable situation. So the charges that deaf people accrue come out the same as voice calls for hearing people.

That is a summary of the main points as we have laid them out in the paper. I hope that you feel that I have provided some backing statements. I am more than ready to take questions.

**CHAIR**—Thank you very much. Are there questions from other committee members?

**Mr HATTON**—You said that the minimum bandwidth you need to be able to use sign language, which is your natural and preferred language, is 128 kilobits per second but the preference is for about 384 kilobits per second. You also indicate in the paper that you need 25 frames per second in order to be able to effectively communicate in that way. That is the basic power standard. The demonstrations we have seen of Internet video are much lower than that—they are very choppy and mixed up. For people who need to communicate by sign, having a

lower frame rate means that you cannot effectively communicate by sign and you cannot understand each other properly—is that the case?

**Mr Harper**—Yes, it is. I think you have managed to explain it very clearly. You are absolutely right. I have been involved in the last couple of years with the Deaf Australia Online project, where we have been investigating that very aspect of video communication for videoconferencing, video telephony and Internet access. We have been trying to find the best, most compatible solution that provides the smoothest communication for deaf people. We have found that the 128 kilobits per second access is basically acceptable for social communication, but for more complex items, such as finger spanning within the language, it has proven inadequate.

The 384 kilobit per second facility is far more preferable. Obviously the system is working at a higher speed but, as you know, information on video or a lot of information on a screen has to be very quickly put down the line in order for it to be clear at the other end for facial expression, for the nuances of sign language. For example, if you are talking about the importance of these kinds of services and remote interpreters, then you are going to get not only a degradation in the video visual image but also degradation in the quality of the voice that is carried through the system, if it is not working at an adequate speed.

The issue of video over the Internet is one big problem area. As you know, the cables all need to be shared by different people on the network. Queues and blockages occur which affect the speed. If a deaf person had their own cable no problems would exist because no other users could come onto the same line. That is one of the biggest issues that I think we are going to need to face. It is very early days for video over the Internet, but our investigation has shown—and it is my belief—that most people now have some sort of computer at home and do have a modem so they do use the Internet in an ordinary fashion. If we are looking at video telephony for deaf people, it would make more sense for us to persevere with this area rather than look at videoconferencing or videophones and the related apparatus set-up which would mean a whole new system which would be more expensive and actually more limiting. So video over the Internet, although in its infancy, shows the most promise because some of the infrastructure already exists. There are more applications and it can be exploited for visual communication, plus it does give deaf people the option of using data only information, text information. Should they then wish to do so, it would all be contained in one package.

**Mr HATTON**—It is a fully integrated system rather than being a niche product as are videoconferencing and other modes.

**Mr Harper**—Absolutely. Yes, you are quite right.

**Mr HATTON**—So there is a great deal of promise for people who are hearing impaired in the technological developments that have been made so far.

**Mr Harper**—Yes.

**Mr HATTON**—And, I imagine, a great deal of frustration as well.

**Mr Harper**—Yes. We have a very limited stake or say in working with the people who carry the power and control and make the decisions regarding this kind of technology. We have tried

to work with them to investigate how to best improve access for deaf people. We sit on telco committees and try to explain to them where we are coming from. I really feel that this document that we have submitted for this inquiry adequately summarises most of our major concerns and expresses the need and desire on our part to work very cooperatively, much akin to our deaf counterparts in Europe, rather than trying to reinvent the wheel over here in Australia. That does not seem to make any sense to us. To use some of the European examples as blueprints seems to us to provide the clearest route to giving deaf people true access. But this will require significant changes, such as those to the regulations that I have already mentioned.

**Mr HATTON**—I can appreciate how important it is to have the ability to naturally express yourself through those communication methods when for non-hearing impaired people the Internet is frustrating enough because we cannot get downloads quickly enough or the information quickly enough. For you it is a case of simply not being able to communicate.

I just want to look at another aspect. There are 485,000 people within the Australian community who are using TTYs and there is a larger number of people who have increasing deafness, particularly with age—and, as the community age structure changes, we will end up with more than a quarter of the population within that age band—and so I expect that this problem will become greater. Do agree with that?

**Mr Harper**—I agree. I think the Australian Communication Exchange, in their submission, make mention of this too. With the 485,000, as I have said, we talk about people who already have a severe to profound hearing loss, and so their communication is significantly impacted. It does not mean that they all use a TTY as yet or that they all use sign language, but the majority probably do use some form of speech and hearing aids for day-to-day communication, as I do. I have what is described as 'severe to profound', and I am somewhere in the middle. In my left ear I can sometimes hear a little bit of conversation; but, when I am faced with a committee such as this, it is much more difficult and so much easier and more natural for me to use sign language. So it very much depends on the situation and the communication requirements of that situation. If I cannot see somebody's face, which I cannot do on the phone at the moment, I am stuck. I do need to rely on text information at the moment, whether it be via TTY or Internet. So we have made a significant step forward in the use of text communication for deaf people, but we need to follow through on that.

Just as a point of interest, since mobile phones have had the capacity to carry SMS text messages, we have done a little bit of anecdotal research into how many times deaf people would usually send a MSM per month and compared it with our hearing counterparts. We have found that deaf people send 10 times more SMS text messages than their average hearing counterpart. So deaf people are obviously delighted that they have this, albeit limited, form of access. SMS is one-way communication: you have to send a message and wait for a response. It is not real-time conversation by any means, and it is also often in their second or preferred language.

**Mr HATTON**—But with a higher rate of RSI.

**Mr Harper**—We will see. We may well get a wave of that starting soon.

**Mr HATTON**—I would like to apologise for the obvious hurt that you and others in the deaf community had with the closure of the analog network and the technical problems that occurred with the introduction of the GSM network. You have mentioned the Finnish experience and the German experience: the Finnish experience of directly giving the equipment to the young people; and the German experience of subsidising ISDN access. Obviously you would think that some similar form of program would be necessary for that nearly half a million Australians who are in a similar position to that outlined in this paper.

**Mr Harper**—Yes, similar to how the Disability Equipment Program was set up. If you can remember, say, seven or eight years ago, deaf people had to buy their own TTY in order to access the phone network—unless they were talking to another person with a TTY, and then they might not need the handset too. So we had to pay for that ourselves. On top, we had to pay elevated phone costs, because a TTY call takes six to eight times longer than a normal voice call and there were no special allowances made on the tariffs. So imagine making a STD call and having to pay six to eight times more. Deaf people themselves had to shoulder that bill. The government then announced that they were finally taking responsibility for giving deaf people slightly more equitable access to services. Telstra then provided TTYs on the Disability Equipment Program, which was a great burden that was taken off deaf people. This was around the same time that the National Relay Service was set up and, again, the burden of having access to communication blocked was lifted somewhat from deaf people. So we have seen improvements on the Australian landscape; but for every improvement I think there are 10 blockages.

**Mr HATTON**—Thank you. You have a very impressive natural speech. I can only hope that, as members of parliament, we might pick up our speeches in the parliament and we make them as expressive as your natural language is.

**Mr Harper**—Thank you very much for your comments.

**Mr JOHNSON**—I have one question, Mr Harper. I am not sure if my colleagues are interested in this as well. One of the key constituencies for us whose concerns have to be expressed are people in rural and regional Australia. You mention a figure here of almost half a million, and my colleague Mr Hatton mentioned that. Could you tell me or give me an idea of how many Australians living in rural or regional areas are deaf or have substantially impaired hearing difficulties?

**Mr Harper**—I am going to have to apologise and say that there is no way I can give you any accurate numbers. Again, we are faced with a similar problem of getting clear and accurate data pertaining to deaf or hearing impaired people. The 485,000 number is our best and closest guess for the national statistic—we talk about the whole of the population there. However, particular demographic information about whether they live in urban or rural areas is not available. I think if you extrapolate to where the general population lives, what we know from experience is that the only thing that would make the rural situation slightly different is that, because of the machinery and equipment that farm workers often use, acquired hearing loss is at a slightly higher percentile rate than it is for urban dwellers.

**Mr JOHNSON**—Thank you.

**Mr Harper**—A little bit off the track. Rural and regional deaf people suffer a double isolation in that not only are they isolated linguistically but they are isolated physically. With the roll-out of wireless local calls—

**Mr HATTON**—Local loop.

**Mr Harper**—Yes, thank you. It is the interpreter's lack of technical knowledge!

**Mr HATTON**—WLL.

**Mr Harper**—Yes. TTY access is not available there, so you can imagine that being a double handicap. Telstra have taken this point on. They are aware of this blockage in the system, and they need to investigate the best way of solving that problem. But, once again, I think the issue is that they, or other telcos, might decide for themselves how best to solve that without truly consulting and discussing the issue with the people that it actually affects. We have a great desire to work together more closely to work towards the best solutions that work effectively for everybody, but that has not often been the case in the past.

**Mr CIOBO**—Can I firstly apologise for being a little bit late. I missed the first few minutes of your presentation but I want to ask about two points. One was with regard to broadband. I understand and I can see the tremendous benefits that potentially flow from broadband technology and how it will be of assistance to the deaf community. In terms of what is currently there in broadband technology, which I recognise is expensive, what sort of feedback and anecdotal experiences have you had from members of the community that can afford to pay for these services? How have they found it has impacted on their lives? The second point was about the WISDOM developments in Europe. In particular, I am interested in knowing any anecdotal experience that you may not have touched on in your presentation. I do not know if you did or not. If you have I will read the transcript, but if you have not I would be interested in your comments.

**Mr Harper**—Thank you very much. They are both very good questions. The first question was about the experience thus far of deaf people in Australia using broadband technology for visual communication. If you go back to the research that we did through the Deaf Australia Online program, for which we received two years funding through DCITA, the idea of the research was really to understand what the needs of deaf people were in accessing online services generally, not only in terms of communication but in terms of education and understanding how to use the Internet generally, and that of course included visual communication.

We trialled various technologies, including videoconferencing, videophones, and video through mobile technology. We also ran an SMS text trial. At the moment, obviously, a lot of deaf people cannot afford mobile phones. They have a TTY that is provided by Telstra. Another part of the research was exploring how TTY and videotelephones can be more compatible. So we set up some of these systems across these different technologies and invited deaf people to come in and trial them. Obviously, as these are new devices for deaf people, they were a little bit confused at first. But, once they had got used to the technologies, most of them proved incredibly popular with the deaf subjects. They were very warmly responded to. These people commented that they were very relaxed, that they could not believe they were able to use their

first language in telecommunications. If I can try and compare it with hearing people: the first time you ever used the phone to talk to somebody who was not in the same place as you, how convenient and easy you must have thought that was. They had very much the same kind of positive response.

Obviously, the major prohibitions are the costs of any of this technology at the moment, not only in terms of you accessing it; if you can afford it, but who else is going to have the technology. Of course, these kinds of phones and telecommunications rely on all your friends and colleagues and people with whom you wish to communicate also having the same devices. And that would be one of the major stumbling blocks or hurdles. The deaf community understands completely that the roll-out of such technology is going to be a long-term process and is not something that is going to happen overnight. But we wish to raise the questions of any connectivity at the moment so that we ensure that any kind of visual communication system that gets established is compatible and suitable for our needs. Hopefully, that answers your first question. I will happily send you information about the Deaf Australia Online project. I have a web site address from which you can download the information.

Your second question specifically pertains to the Wisdom Project in Europe. That project started two years ago. At the moment they are very much still investigating the technologies. They have not yet come up with any specific prototypes. At the moment they are working with third-generation mobile manufacturers. As you would know, this is something that is still very new. What they are trying to ensure is that real-time videocommunication is included as part of the suite of services in these phones. That would be one step towards what we are now seeing evidenced in Japan, where they seem to be just a little bit ahead of us in terms of video mobile phones.

Whilst that Wisdom Project is ongoing in the United Kingdom itself, a number of community and government organisations have come together and bought a number of videotelephones and set them up in their local environs—such as local government offices, libraries and fire and police departments—to make those services accessible and available to deaf people who also have videotelephones. Fortunately for them in Britain, the prices of videotelephones are much cheaper than they are here, and the access to broadband technologies is far more widespread in the United Kingdom than it is in Australia currently.

**CHAIR**—Mr Harper, in your opening statement, you talked about the experience in Europe—and a little bit about that in the United States—regarding deaf people. How does the United States compare to Australia in its provision of broadband facilities for deaf people? In particular, one of the things that we are looking into as an inquiry is the technology of wireless broadband and what it can be used for. I think that you have covered that aspect extremely well from the point of view of deaf people, so we are grateful for that. Would you like to add anything about the use of wireless broadband to assist people with some kind of disability besides deafness—if you feel you can? You do not have to if you do not want to.

**Mr Harper**—First of all, to talk about the USA comparatively, certainly in the mid- to late nineties the FCC—the Federal Communications Commission, which is similar to the ACA here in Australia—made a ruling that relay services in America must also include the provision for video relay services. They call it video relay interpreting over there; VRI is the abbreviation.

The purpose of that, as I explained before, is to provide access to deaf people who prefer to use their first language: sign language.

The other reason—we have mentioned it in our paper and it is also very well detailed in the Australian Communication Exchange paper—relates to service provision generally, but once again also relates to deaf people living in rural and regional areas, particularly where they do not have access to the kinds of services that we enjoy in the city, such as sign language interpreters. The concept in America, with VRI, is to overcome that problem, so that deaf people living in isolated areas do not need to be in the same place as an interpreter to access interpreting services. That is why it has been rolled out much more vigorously in America. We have done some research, and the Australian Communication Exchange has done some research in that area, too. There is a lot of worthwhile evidence to show that such a system would be incredibly advantageous to deaf people living in rural and regional Australia.

Some of the states in the USA have also set up video phone services, either connected to the regular relay service or separate from it, to make video communication available and accessible to deaf people in that country. The application of such technology is not what you would call widespread in America yet, but they are certainly a few years ahead of us.

Recently, the FCC made another ruling about emergency services, in that all 911 services must be accessible to mobile phones, including mobile phones being used in a text only capacity. This meant that deaf people who were involved in a car accident, for example, or were stuck somewhere where they needed assistance, and did not have access to a TT wire or a fixed phone line but had a mobile phone with them, could use the text facility on their phone to alert emergency services to their predicament. That is something that the FCC passed recently, ensuring that all 911 emergency services had to be compatible and allow that kind of access. The second question that you asked you might have to remind me about, I am afraid.

**CHAIR**—The second question was a bit of an ambit claim about other people with disabilities, besides deaf people, and their access to these technologies that you have talked about. We have not had any other submissions from groups like the deaf community, so I thought that you might have had contact with similar groups and be able to talk a bit about other services for non-deaf people or people with other disabilities.

**Mr Harper**—Certainly we have mentioned before that the larger community of hearing impaired are people who have an acquired hearing loss. We have spoken of that a little before. They might be able to hear a little, but they also enjoy face-to-face communication. They are able to lip read and would benefit hugely from videocommunication over the telephone network. Also, speech impaired people would be, I think, probably the third largest group of people who would benefit considerably. We often work together with those groups in lobbying because, though our disabilities are different, sometimes our needs dovetail and are compatible. Many people who have a speech impairment use a TTY for the opposite reason that deaf people use one in that they cannot speak, and they use the National Relay Service to communicate with service providers. So, again, any kind of visual or video face-to-face communication where you can see the other person and they can see you would be very important for those two large constituent groups also. They obviously stand to reap a great deal of benefit, as does the deaf community.

**CHAIR**—Also you talked—and Mr Hatton touched on this—about the problems you experience in moving from analog to GSM, but in your opening statement you did say that you were on a number of advisory committees for telecommunications corporations. Could you tell us which telecommunications corporations are working with the deaf community and what progress perhaps is being made for future roll-out of new technologies that you might be able to access?

**Mr Harper**—The AAD, Australian Association of the Deaf, is involved in quite a number of committees, usually via their consumer liaison forums or councils. For example, Telstra's is called the TCCC, Telstra Consumer Consultative Council, on which I am the AAD representative and now have been for 10 years. Another separate group is the disability forum. There we work with Telstra more specifically. Whenever new services are posited by the company, they do sit down and talk to us and try and make themselves aware of the concerns that we have, and we give them advice and feedback. Sometimes decisions are made before they truly consult us. But we do work closely with them, sometimes in a more positive vein than others. There is the Optus Consumer Liaison Forum, and twice a year I am involved in discussions with that group.

I am also involved with the ACA and the National Relay Service Consultative Council, which also meets twice a year, focusing very specifically on the National Relay Service itself and issues pertaining to that service. For example, the 106 emergency number service was developed as a result of that group having met. The National Relay Service contract, interestingly, is up for renewal soon. One of the issues there is whether the National Relay Service should include a new service: the video relay interpreting service, which we have talked about before. That is something that is very close to our heart and high on the agenda at the moment. We are working very closely in that regard with the ACA, the AAD and the Australian Communication Exchange. Of course, I work and have many discussions and meetings with the CSL.

**CHAIR**—Would you say that the regulatory environment, as administered by the Commonwealth, is able to place sufficient responsibilities on private corporations to take heed of the needs of the deaf community, or is the regulatory environment too loose for private corporations?

**Mr Harper**—That is a pointed question. From our experience, it has always been a battle trying to make the corporation sit down and understand our needs and concerns. As to whether they are prepared to really put the research and development work into ensuring best access is another question. We do not have the strength of a particular act to force their hand in any regard. We do not believe that the act is strong enough to enable us to effectively persuade them to come round to our arguments, to work with us better, and in that regard we often have to refer to the DDA to twist their arm.

**CHAIR**—What is the DDA?

**Mr Harper**—The Disability Discrimination Act. Telstra and Optus do have disability action plans in place. Those plans obviously try to identify ways where their services can be more accessible to disabled people. We sit down and regularly talk about that too. But, once again, at the end of the day it is their decision whether they adopt any of our suggestions or

recommendations or concerns, or whether they can dilute any of our recommendations by making them more general, which is what they often do.

**CHAIR**—You have talked a bit about Europe and the USA. If you generally were thinking about the western nations, would you say that Australia was at the top end of the scale of countries that were looking after the deaf community in this technological era or at the bottom or in the middle?

**Mr Harper**—Western countries?

**CHAIR**—Europe, Canada, America et cetera.

**Mr Harper**—Certainly not be at the top, and not at the bottom either. It would be difficult to place Australia exactly. With the USA, for example, their Telecommunications Act is incredibly specific and their standards that flow on from that are very specific about what the carriers must provide. They have a specific section within the act that pertains to deaf issues. They specify what percentage of payphones must have a TTY facility and where they must be. In Australia we do not have anything like that in our act. The Americans are supported by their Americans with Disabilities Act, the ADA, which is also stronger and more specific than our Disability Discrimination Act. That is why America is positioned further ahead than Australia, because of the specificity of both of those acts, whereas in Australia the two comparable acts are much more general.

In the UK, for example, OTFEL, which is their equivalent of the ACA, talk about universal service and they have some very specific points about ensuring where access is provided. For example, for people who have text phones, like a TYY, the carriers are obligated to provide a discount on the call costs because of—as I mentioned earlier—the longer time it takes to make a TTY call compared to a voice telephone call. Our regulations do not have any such provision in Australia.

**Mr HATTON**—Do you get any discount here, given that there is no regulatory provision? Do the companies provide a discount?

**Mr Harper**—No.

**Mr HATTON**—Hence the importance of videophone access for deaf people. The actual costs of making calls would fall dramatically, apart from the initial set-up costs.

**Mr Harper**—That is absolutely correct. I will illustrate the point using another example. In Australia the regulations under the Telecommunications Act talk about equipment for people with a disability. They list different items that are needed to provide disabled people with standard telephone services. Hearing people have normal access and make a voice phone call; deaf people use the TTY. It is accepted and understood that that is part of standard telecommunications services. One problem we have recognised is that that list is fixed and finite, so it does not include emerging technologies or more developed versions of existing technologies. We would like to see that part of the act become more flexible so that in future it could include video telecommunications, mobile phones with text and video capacity. That is one major stumbling block that we face and that we have recognised in the current legislation.

We have been lobbying and campaigning to have that section of the legislation made more malleable.

**CHAIR**—You promised Mr Ciobo that you would get him more information on WISDOM, so could you make a note of that and send it to us? Could you also, for my benefit, send us the parts of the United States act that are specific to non-hearing people and then the committee can circulate that to members who are interested. In closing, I would like someone to move that the committee receive as evidence and as an exhibit the document received earlier from Mr Philip Harper entitled *ACIF Disability Advisory Board: facts relating to TTY use*.

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

That the committee receives as evidence, and includes in its records as an exhibit for the inquiry, the document received from Mr Philip Harper entitled *ACIF Disability Advisory Board: facts relating to TTY use*.

**CHAIR**—Thank you very much, Mr Harper, for coming and giving us your evidence today. I also thank Andy Carmichael, the interpreter, who has quite a specific gift that has left me in awe of both of you, so thank you also for coming and observing and keeping an eye on him.

**Mr Harper**—Thank you very much for the opportunity. It has been a pleasure.

[3.38 p.m.]

**FOWLER, Mr Ross Ian, Chief Executive Officer, Alcatel Australia**

**NELSON, Mr Scott William, Chief Technology Officer and Director of Customer Solutions, Alcatel Australia**

**CHAIR**—I welcome representatives from Alcatel Australia. The committee does not require you to give evidence under oath, but I have to advise you that these hearings are legal proceedings of the parliament and they warrant the same respect as proceedings of the House. The giving of false or misleading evidence is therefore a serious matter and would be regarded as a contempt of parliament. Would you like to make any introductory remarks?

**Mr Fowler**—In terms of our submission, we really came from three angles: the first was to give an indication of our view of where the markets are heading for wireless broadband technology; the second was to give a brief overview of the various technologies that are in the mobiles and wireless area; and the third was to give our view of how those various technologies can be positioned—it is not exactly horses for courses as you get different technologies that are best suited to different applications in the marketplace. We did not have any particular technology to push or any real regulatory issue to push. Our submission aimed at providing the inquiry with an understanding of where we believe the market is going and what various technology options there are.

**CHAIR**—You gave us a very comprehensive submission, which is excellent, and thank you very much for it. You seemed in your submission to be suggesting that wireless broadband potentially had a lot of applications in the future but that the costs of it were almost prohibitive at this time. The question that I took from your submission was: what is a realistic time frame for the establishment of wireless broadband on a mass basis in competition with the cabling and MMDS and other technologies that are out there now which are also in a nascent form?

**Mr Fowler**—I am not so sure we stated that it was too expensive to be economical for the mass market. What we did say is that the cost per bit for delivery of broadband information on a wireless or mobile network will always be more expensive than fixed; it was just a statement of fact that it is more expensive. Therefore, we said that it will lag behind fixed broadband access and will be best suited for applications which require location based services or mobility services or for applications where it is not possible to deliver broadband over fixed networks. So for remote or rural applications where it is just not economically feasible or technically possible to deliver over fixed networks, that is when it comes to the fore. What we set out to do was to say that it is not a replacement for fixed network broadband access; it has its place but it has to provide benefits in terms of mobility or reach.

**CHAIR**—So how would you see it therefore operating as an integrated network that had both wireline and wireless for remote and rural areas? How far would you see the wireline extending before wireless would be the technology that would be used to deliver services to rural and remote areas? We talk about rural and remote areas but we have not really defined it for this

committee, so I am not sure whether that is Wagga Wagga or whether it is remote areas beyond the back of the black stump.

**Mr Nelson**—It is more in terms of remoteness from the fixed network as it already exists. So at Wagga Wagga, for example, it is perfectly feasible to deliver broadband services over the fixed network, because there is a fixed network there. I do not know Wagga Wagga, but I imagine that all of the town could be served by wireline technology. Those areas that are outside the reach of existing technology may be better served by wireless technologies. But in the end it is just a straight economic business case issue: I will either roll out more cable or more fibre, which costs money, or I will roll out wireless infrastructure. I will always get more bandwidth over the fixed network, and that is one of the main messages intended to come out of the paper. I can get terabytes of data over a fibre; I cannot get terabytes of data over the wireless network, it is just not possible.

**CHAIR**—Of course the downside is that the fibre is not rolled out.

**Mr Nelson**—Exactly, that is the point. If it is not already rolled out then there is little doubt that wireless offers a viable alternative, but at some point it will be cheaper to roll it out. It might not have to be fibre, it could be copper.

**Mr Fowler**—But that really depends on the bandwidth, so are you really talking about cost per bit, in the end?

**Mr Nelson**—It is cost per bit, but it is also density. It is more an issue of subscriber density, not necessarily its remoteness. The two tend to go together but, if there is not much density, then it is not worth anyone rolling out the copper or the fibre or, if you are too far and the copper technologies will not work and the ADSL at some point runs out, then it may be more cost efficient to use wireless.

**CHAIR**—You say with great conviction that fibre will always be cheaper than wireless. If wireless is more prevalent—or more ubiquitous, as people say in this area—the costs come down for the technology as it is better developed in the future and economies of scale are starting to be achieved, is it never possible that wireless in fact will be just as capable of delivering substantial bits at the same price?

**Mr Nelson**—In the foreseeable future, the fixed technology will always deliver more bandwidth than the wireless technology.

**CHAIR**—Is that in five, 10 or 20 years time?

**Mr Nelson**—It is for as far as I can see, which would be 10 or 20. The issue is how much bandwidth the applications need. Take the voice network, where we do not need a lot of bandwidth. It is quite possible that I can deliver voice over a wireless network rather than a fixed network because I do not need much bandwidth, and there is enough bandwidth available to do that in a country like Australia without having to go to next generation technologies. That is not the case when I want to deliver video; I want to deliver more bandwidth.

**CHAIR**—The Canadian parliament defined broadband as any end to end system that could provide full motion video.

**Mr Nelson**—That is an arbitrary definition.

**CHAIR**—That is right. But, in this area, everyone seems to have a definition of their own, don't they?

**Mr Nelson**—I would have thought that there is—

**CHAIR**—And they are all arbitrary!

**Mr Fowler**—The OECD defined it as 256 kilobits per second, from memory.

**Mr Nelson**—You raise an interesting point, and I was going to dare to ask you that question: how do you define that?

**CHAIR**—That is what we are trying to understand. The Canadian parliament had a similar inquiry to this one about a year ago, and they decided that, because the technology was changing so quickly and because people had so many variations of what they regarded as broadband, they would try not to pin it down to megabits because that was always altering. Instead, they decided they would try and say what the application was that would use the most megabits that they would define as, therefore, broadband capable.

**Mr Nelson**—I will offer a reason why that is not a good idea. I can deliver full motion video to a 3G handset at about 100 kilobits on a screen this big, and it looks great. If you blow that up onto a screen that big, and it looks absolutely pathetic. It is a function of the user's screen size and viewing area to determine how much bandwidth full motion video needs to look satisfactory. If you are going to blow it up that big, you need three or four megs. I think that, if we are going to define broadband, we need to do it based on bit rate, not on application, because the application has wide and varied application. I would be very wary of that. That does not mean it is not a valid thing to do, but be wary that it will then have a different meaning in a different environment.

**Mr PEARCE**—I am interested to know whether you have any comments regarding the take-up of broadband in Australia and what factors might be adding to or taking away from that. Given your organisation's global reach, are there any lessons that have been learnt in other countries throughout the world that you would want to share with the committee?

**Mr Fowler**—The take-up of broadband in Australia has been limited in the past by the reach of the ADSL services for example, but I think that has been largely addressed. The coverage is pretty good these days. I think there has been a lack of awareness amongst the consumers. Again, since about March, that has been addressed. There has been more promotion and more awareness. It is difficult these days to pick up a newspaper without some mention of broadband in it. There are still some constraints in terms of applications. At the moment, high-speed Internet access is the primary driver for it and, if we are going to have continued growth in broadband demand, there need to be other applications coming onto it. That is why I think it is

quite important for the content providers to be working with the service providers to get the two working together.

**Mr Nelson**—I would add that in those markets where it has been strongest there is little doubt that there has been government sponsorship of it.

**CHAIR**—Government sponsorship of people taking it up.

**Mr Nelson**—Of actually getting it rolled out.

**Mr PEARCE**—We touched on that earlier this morning in relation to one country in particular which has had some stimulus, if you like.

**Mr Nelson**—This is Korea?

**Mr PEARCE**—Yes. The second part of my question was, are there any observations that Alcatel have made in other countries in regard to broadband roll-out, any experiences that you could share with the committee that might help us?

**Mr Fowler**—There is obviously the one about Korea. The interesting thing about Korea is that the majority of the usage now is not just Internet access. Playing games over the broadband network is extremely popular and in fact growing a lot of the traffic on the broadband network in Korea. What was originally seen as a fairly trivial application is turning into one that is quite important. I know from my own experience at home: I got ADSL on basically for Internet access but my kids use it for the chat lines, the counterstrike games and the like. It has actually changed the use of the telecommunications service since that has been in.

The other thing on the involvement of government is that, as Scott mentioned, the areas where we found that government could play a role without just providing subsidies and incentives is to actually use it in their own operations. The two areas that seem to be quite successful are education and health. In the case of education, you have already got the content there. You typically have scarce resources in terms of teaching staff and you need wide reach. If you combine that content with the need to get that information widely disseminated and a scarcity of skilled resources, it is a good fit. In health you have once again got the need for broad reach and you have got demand for fairly rich content to be transmitted, things like imaging and medical records. As government plays a key role in those education and health sectors, they have a role in stimulating the demand and the applications for broadband. So I think the areas where government has played an active role without just subsidies are the education and health sectors.

**CHAIR**—Isn't another reason, though, that the take-up of broadband in countries like Korea as opposed to Australia is because of the low quality of the telecommunications infrastructure throughout Asia in comparison to countries like Australia, the US and the UK anyway? Here people think everyone is going to suddenly rush into digital television but, because our free-to-air television is so good now, most people wonder why they would want to get pay TV and digital television. Isn't it a bit similar to this area, where in Korea and Asia generally the infrastructure is not nearly as good historically as our infrastructure and, because we can do all the things with optic fibre and copper we seem to feel that we need to do at the moment, the

take-up of broadband is pretty limited. Is that more of a factor than government subsidies or government support or incentive?

**Mr Fowler**—I think there are many countries in Asia which have a relatively poor telecommunications infrastructure. I am also not sure that South Korea would fall into that category. We have been supplying switching systems in particular for South Korea for many years using the same technology that we are deploying here in Australia. In other countries, particularly the more remote areas of China, sure, their infrastructure has not been very strong. In fact, as a result their real focus at the moment is just to get narrowband in and they have not really had a big push in broadband. If you look at the main cities in China, they have got the narrowband infrastructure in there already and they are now rolling out broadband. I have not observed any countries where they have leapfrogged the old narrowband technology and gone straight into broadband. They usually deploy a narrowband network and through DSL put broadband on top of it.

**CHAIR**—One of the boasts of the Canadian government is that they intend to have every public library, hospital and school in Canada broadband connected by, I think, 2004. Do not hold me to the year but it is about that period. Australia is a long way from that, isn't it?

**Mr Fowler**—Yes. But I think the basic infrastructure is in there to allow that to happen, and it is a matter of bringing the various parties together to make sure that the end result is that ADSL technology that is already deployed is linked into the applications and the users. The potential is there.

**CHAIR**—Is there a real danger in Australia dragging its feet in the rollout of broadband and seeing countries like Canada, the United States and other Western countries getting themselves into the position where their telecommunications are so much better than Australia's that we cannot compete in trade, exports, health and education standards?

**Mr Fowler**—Absolutely. In fact, towards the end of last year I was extremely concerned and quite vocal about it. I must say that there have been a lot of new initiatives since that time that give me some hope.

**CHAIR**—Things like the UN ICT Task Force, the Broadband Advisory Group and so on?

**Mr Fowler**—Yes, and even the fact that now Telstra appear to be very serious about broadband. As everyone knows, there were a number of technical difficulties in the network up to the end of last year. They were holding back the promotion of it and holding back the nurturing of applications around broadband. I have seen a complete change. They are actively promoting it. The orders they are placing on us for DSL are increasing. The signs are there that they are getting serious about it: the government initiatives, the initiatives of the press in making broadband such an issue and the World Congress on Information Technology that took place in Adelaide in February. It was an IT congress, and the main topic was broadband. It is beginning to get momentum. I think it is a matter of keeping that momentum up. If we can get some of these initiatives, like the Canadian government, for sectors like health and education, we could really get it rolling.

**CHAIR**—So you noticed it first in about November or December last year, did you?

**Mr Fowler**—No, I noticed it in about February this year. I saw the turning point as the world congress. That is where it really got on the front page. Almost every speaker at that world congress was talking about broadband. Telstra announced its initiatives; the government announced its initiatives there—that is when things started to move.

**CHAIR**—That is when this inquiry began. Turning to the World Congress on Information Technology, one of the applications of broadband that was used there was developed by m.Net and that was a hand-held PAQ system. Alcatel has had something to do with the m.Net project. Could you perhaps explain a little bit about what m.Net is doing?

**Mr Fowler**—Yes. We joined the m.Net consortium for the very reason of developing applications for broadband. If you look at 3G mobile in particular, many of the carriers are holding back on their investment until the killer application comes out. I do not believe there is going to be one killer application. It is going to be a range of applications that will really stimulate it. We had a choice: either we wait for our potential customers to come up with these magic applications or we invent them ourselves, or we work with partners that are probably better positioned than either of us to develop those.

We entered into this consortium with a number of universities, with a number of other industry partners and with the government. The whole purpose of it is to develop applications that will stimulate broadband mobile businesses. The benefit for us is that it will grow the infrastructure market and our contribution to this was to provide the 3G mobile infrastructure. You mentioned the wireless LAN. That is obviously a very key component of it, but it is sitting on the back of a true 3G UMTS network supplied by Alcatel. So we are supplying that infrastructure.

The real beauty of this is that it allows application developers to develop their applications on a real network. It is one thing to develop in a backroom laboratory; it is another thing to develop and test them in a real environment. This is quite a unique initiative. We have seen a number of 3G trial networks run right around the world. I think we have about 15 that Alcatel has embarked upon, but this is the first one anywhere in the world that has had active involvement by a government and active involvement by educational institutions, particularly the universities in South Australia.

We expect it to do two things for us. One is to stimulate the demand for broadband mobile and two is to hopefully develop applications here in Australia that can be taken to the rest of the world and develop an export industry, not necessarily from Alcatel but from the other partners that were working with us. So we think it is a great initiative.

**CHAIR**—And Telstra is involved with that?

**Mr Fowler**—Telstra is involved in it as well. For this to work you have to have your core network but you need the base stations. They provided the sites for the base stations and also the underlying transmission infrastructure that allows the network to go together, so we could not have done this without a carrier. When Telstra was approached to join the consortium they were more than willing to do it. We also needed access to the spectrum, which is quite important.

**Mr HATTON**—Historically we have had some interesting sorts of issues. When Telstra was rolling out ISDN in Australia it did so at great cost to the consumer for many years. There was a very slow take-up of it, whereas the Europeans were providing that technology at a much cheaper rate so the take-up was much greater. At that time Telstra was making assumptions about the cost of providing optical fibre access and not running out optical fibre because they thought ISDN would be superior in terms of cost. All of that has changed. Going back to an earlier question, you are absolutely firm in this paper that the fixed network will provide those lower prices and lower costs because of its greater capacity. What part of the fixed network are you talking about? Are you talking about the optical fibre cable, the big trunks running down the eastern seaboard, or are you talking about ADSL stuff into the home?

**Mr Nelson**—We are talking about fibre in CBD environments such as where we are at the moment, and we are talking about copper in the other areas where it exists. It is not about fibre running up and down the backbone. That is a given. That just kills radio absolutely dead. You get 40 by 10 gigs on a single fibre versus 155 meg. on a single radio line.

**Mr HATTON**—Yes, but they are not running into our homes, are they?

**Mr Nelson**—No, but they are delivering the content. It is also worth while looking at how many competitive carriers have attempted to set up wireless based access technologies and how many of them still exist. There are not a lot.

**Mr HATTON**—Most of those have failed so far, then?

**Mr Nelson**—I think all of them have failed, except in areas where there is no comprehensive fixed infrastructure. That does not mean there is not a role for it.

**Mr HATTON**—But so far, despite the fact that $8 billion has been spent by Telstra and Optus running optical fibre down every street, there is not a very big take-up of that technology. We are in a similar situation to where we were with ISDN with business in terms of the take-up, and one would expect that there is a direct cost related problem in regard to it. The cost of the service is high enough that people are highly resistant. Isn't that an area where the wireless access can substitute for it, despite what you think about its ineffectiveness? They can come in at a lower cost. You argue in the paper there is always going to be higher cost.

**Mr Nelson**—The answer is that if it were a cheaper cost it would have already been done.

**Mr HATTON**—If they are using 802.11b and it does not cost them anything to use it because they do not have to pay anyone licence fees and so on, does that change the cost equation or not?

**Mr Nelson**—If you want to roll out the 50,000 end points, it is going to cost you a lot of money, and that is ignoring the fact that because it is unlicensed it interferes with itself and it interferes with everything else, as we have made reference to in the paper.

**CHAIR**—Is another word for 'end' point 'access' point?

**Mr Nelson**—You are going to put in wireless LAN technology. It does not have a very large reach, so you have to get pretty close to all the customers. It is going to be pretty expensive.

**Mr HATTON**—But it is going to be pretty expensive if you are going to put optical fibre into every house.

**Mr Nelson**—I have not promoted the use of optical fibre into everyone's house yet, but eventually it may happen.

**Mr HATTON**—It may, but we have still got problems getting copper in there using ADSL.

**Mr Nelson**—We do not have problems getting copper in there using ADSL—sorry.

**Mr HATTON**—We do not have technical problems getting it in; we have a problem with people paying for the service, or taking up the service.

**Mr Nelson**—You need to ask the carriers why they are charging what they are charging. The inherent technology is cheaper than the wireless alternatives.

**Mr HATTON**—In terms of capacity, we heard earlier today that with ADSL you are looking at half a meg. or so at the most.

**Mr Fowler**—No, 1½.

**Mr HATTON**—Really?

**Mr Nelson**—It depends how far away you are.

**Mr HATTON**—And on how many people are using it?

**Mr Nelson**—No.

**Mr HATTON**—Just on the distance?

**Mr Nelson**—It depends on the distance and the size of the copper cable.

**Mr HATTON**—It is 802.11b operating in a LAN situation within about 11 megabits per second.

**Mr Nelson**—Yes—shared amongst as many users as you get to.

**Mr HATTON**—So the level then drops as the number of users increases within that environment?

**Mr Nelson**—You have to use those shared 11 megabits amongst the number of users you get to. If that is 100 people, that is 100 people sharing 11 megabits.

**Mr HATTON**—So therefore there is a degradation?

**Mr Nelson**—A rather large degradation.

**Mr HATTON**—So you do not have that degradation using ADSL?

**Mr Nelson**—Absolutely not.

**Mr HATTON**—So the effective bit rate is comparable then, and that is the basis that you start on.

**Mr Nelson**—No, every user on an ADSL service will get, on the ADSL portion of his service, whatever it is that he can; he does not interfere with anybody else. If it is 1½ megabits then he gets 1½ megabits; if it is 512k, he gets 512k. There are some deliberately congested points put back in the network so that we do not take two megs all the way back for everybody, because that is just not necessary, but you would apply exactly the same design rules for a wireless solution.

One thing to point out is that the use of wireless LAN technologies off the fixed network is an absolutely viable option, and that is something that will get a lot of traction. But, as we use the term in the paper, it is a cordless technology. Instead of having a cord from here to there, we use a wireless technology here, just to save us the aggravation of having to lay out all the cables. It is not the technology option for mobility—not at this point. A derivative of it may be the fourth generation of mobile technologies in another five or 10 years, but it is not a true competitor for mobility.

**Mr HATTON**—So what is the real competitor in terms of mobility?

**Mr Nelson**—Mobility is 3G. There will be a 4G later, then there will a 5G and a 6G. It will just keep going.

**Mr HATTON**—Even though 3G is some years away, in Australia at least, in 2005? Plus, before we start to get some iteration of that and at relatively low—

**Mr Nelson**—No, as Ross pointed out, we have that technology operating in Adelaide at the moment.

**CHAIR**—As a pilot.

**Mr Nelson**—Yes, but the technology, with real handsets et cetera: it will take two years, maybe a bit longer, for people to roll it out in anger, based on the—

**Mr HATTON**—Which takes us to 2004 or 2005.

**Mr Nelson**—But the technology is there today; it is the commercial reasons. The real technology for mass rollout might not be here until 2003-04.

**Mr HATTON**—So at the moment—apart from the fixed network, which is a crazy enough quilt as it is in terms of how it has been developed and the problems we have had with the multiplication of the amount of infrastructure we have got put in—you can look at the radio stuff as almost a rat's nest of possibilities, given that the different technologies are able to be used in different environments and it depends on how far you throw. Bluetooth is just around here; if you go to 802.11b, you are looking at a much bigger area; if you go to the other technologies, you get wider again. Do you think that the technologies that survive and prosper in this environment will slot into the areas where they would naturally fit, or are we going to see a process of the cowboys trying to expand it? We have had some indication with 802.11b that, because they do not have to pay the licence fees, people are possibly using that where they should not be using it for point-to-point applications and they are turning up the amount of power that is being used behind it. Do you have any indication of that?

**Mr Nelson**—I am glad you used the term 'cowboys'. By definition, they will end up in their natural place. That does not mean that people will not find an unnatural place for them or will not find a niche where they sit perfectly.

**Mr Fowler**—There will be some overlaps.

**Mr Nelson**—There will be different niches. But if you start deploying an 802.11 network, with its ability to interfere with everybody else and the ability of everybody else to interfere with it, partly because it is in an unlicensed part of the world, then you are just asking for trouble. You could set up a perfectly good service today in certain areas—there is the story of the Starbucks in the US; there is the story of the airports et cetera—and in an enclosed environment you will get away with it. But if I put a Starbucks next door to someone else and they start turning up their power, and the guys do not coordinate what they are doing, then they will just interfere with each other: the service will be bad for everybody.

**Mr Fowler**—This is why, in our paper, we have categorised cordless, fixed wireless and mobility—to differentiate. We thought it may help you in your inquiry to at least have those categories that you could then put them in. Even in discussions we have had with our colleagues in the US they have been using the term 'cordless' for technologies like Bluetooth.

**Mr Nelson**—The announcement Alcatel happened to make yesterday is one example. We have a 2G mobile handset using Bluetooth as a cordless technology for around a cordless office environment. It is the same handset: I use it for my telephone in the enterprise but it is also my mobile handset. It uses Bluetooth technology as the cordless technology and it uses GSM as the mobile technology. That is probably the way of the future.

**Mr Fowler**—And we will see the same with PCs. In an office environment they will use wireless LAN and if they go into the public arena they will use 3G. Maybe the same card will do it, or there will be a separate card inside the laptop.

**Mr Nelson**—Or they may use wireless LAN inside the airport or inside the other environment. They will not be able to use wireless LAN driving down the street, off their PDA. That would not work. You may be able to put 10 base stations down George Street and it would work for the first year and a half, but once you try to make money out of it you will not be able to because the service will be too bad. One other point I would like to make there is that these

technologies that use the unlicensed spectrum interfere with each other, and that is partly because it is unlicensed.

**Mr HATTON**—But at the moment there are not many of them interfering with each other.

**Mr Nelson**—Wireless LAN interferes with Bluetooth. Digital cordless handsets interfere with wireless LAN.

**CHAIR**—Do you think the congestion will eventually make them unattractive?

**Mr Nelson**—That is not even congestion; that is just straight radio interference. The bits which are regulated are regulated not to interfere with each other.

**CHAIR**—That is their advantage.

**Mr Nelson**—That is their advantage, but cost disadvantage. The reason the others are cheap from a technology point of view is because nobody cares. There is more work going into making them care but we have to be careful: if we go in unregulated, unlicensed spectrum, we may end up with a problem. I do not mean that we always would but there is the possibility that we would.

**CHAIR**—In your submission you made some suggestions with respect to spectrum issues. In the last few minutes, do you want to make any comments about the management of spectrum, spectrum auctions and spectrum caps?

**Mr Fowler**—I think the main comment was that in the use of the 3G extension you need some time to plan in advance. Obviously the spectrum needs to be vacated to allow for that 3G expansion. If it gets to a point where that spectrum is needed it should be identified early to allow for the transition plan. I think that was the key area. Our other comment was that we endorse the adoption of the international standards for allocation of spectrum. It does result in a cheaper service for consumers because the terminals can be used in various parts of the world. So we endorse that.

**CHAIR**—You also, I think, suggested that there should be an industry advisory group on spectrum, or that it should be looked at. Is that right?

**Mr Nelson**—That might have been on the convergence.

**Mr Fowler**—We did not offer a solution there. We just said that we need to recognise that the broadcast world and the telecoms world are converging. It starts with the convergence of the technology; ultimately the industries converge. There may need to be a body to recognise that convergence and to plan ahead for it. It is a tough area to address, but whether we like it or not they are converging.

**Mr HATTON**—Can I come back to where it may converge. Toshiba and a whole stack of other firms have already put WiFi into their newest portables. Once they have done that, when Intel goes a step further and writes it down into the silicon and when 802.11b and then 802.11a

and the other iterations—g and the rest of them—are available very widely, the probability is that lots of services will be instituted using those.

Where is the intersection going to come with 3G, with putting the phone service and the Internet service together in one usable format, whether you call it a phone or a PDA or whatever? That is sort of operating now. But what about that full intersection with computers? And could you see 3G displacing the 802.11 devices in that environment or not?

**Mr Fowler**—Scott might want to make a comment, but I do not think it is a matter of 'replacing'. What we want to point out is that there are horses for courses, so we put the WiFi clearly into the cordless category and they can coexist with 3G. We put 3G into a true mobility technology, a public space mobility, whereas cordless is getting access when you are in an office environment or an airport or a cafe, in that localised environment—that is where we placed it.

**Mr Nelson**—We see them as being complementary, not as being direct competitors. The cordless technologies can interwork to the fixed network. In the airports, at the other end of the wireless LAN there is a piece of fibre, probably, taking all the bandwidth out of the airport; there is not another radio link. You can interface with a radio link if you want to get that mobility aspect and you want to get that true immediacy and get it anywhere. I can connect those cordless technologies to anything. I can connect to a satellite, I can connect to a fixed wireless, I can connect to copper fibre, or a true mobile solution. It is not that they cannot coexist; it is not that they will not coexist. Whether we end up with everything in the one terminal is something that I personally doubt.

I will draw the analogy of a penknife: if you want a decent screwdriver and you want a decent knife, you buy a knife and you buy a screwdriver; if you are not too sure you want a knife or a screwdriver, and you want one device, you buy a penknife. You will pay more for the penknife than you will for the decent knife and the decent screwdriver. That does not mean there is not a market for all three. It will exist in this environment as well. We will have some devices do everything, but if I have got a PDA I am not likely to want to put the PDA to my head and talk into it. I may end up with a Bluetooth earpiece et cetera talking to the PDA, which may be 3G or wireless LAN or both. That will emerge. Or will it turn out to be the 4G one? If we knew the answer to this, the actual answer—

**CHAIR**—We would rush out and buy shares.

**Mr Nelson**—We will not be limited by the technology. That is all I know.

**Mr HATTON**—Whereas in the wireless area there are definite physical limits because there are physical laws in regard to it in terms of how—

**Mr Nelson**—There are always physical laws.

**Mr HATTON**—What is the nature of not being limited by the technology in the 3G, 4G, 5G area?

**Mr Nelson**—There will always be the next technology coming. The reality is that we do not have an infinite amount of spectrum—well, actually, there is an infinite amount of spectrum but

we are not able to take advantage of it yet. There are some technologies on the horizon which may actually be able to, but maybe that is a subject for another day.

**Mr HATTON**—But in all of these areas real money has to be spent.

**Mr Nelson**—Exactly.

**Mr HATTON**—I imagine it is now quite a difficult and confused period in which to make decisions because we have had lots of examples of a lot of money being paid for 3G in Europe, we have had companies fold—not only in that area but in a range of other areas—and companies are looking to put money into new technologies. At the moment, we have an explosion in possibilities without the whole thing settling down, particularly within the area of wireless. Would that be a reasonable sort of assessment of the situation?

**Mr Fowler**—The value proposition for the end consumer and ensuring that each person in the supply chain is able to make a viable business out of it: that is the challenge.

**CHAIR**—Thank you very much.

**Mr Fowler**—You are welcome.

**CHAIR**—Thank you for coming and talking to us today. We might get the chance to talk you again as part of the process.

[4.20 p.m.]

**ANDERSON, Ms Judith Lee, Manager, Regulatory Policy, Optus**

**LEAKE, Mr Nick, Marketing Manager, Satellite Services, Optus**

**CHAIR**—Welcome. I should advise you that, although the committee does not require you to give evidence under oath, the hearings are legal proceedings of the parliament and warrant the same respect as proceedings of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of the parliament. That of course is not designed to intimidate you into not answering any questions; it is just a formal requirement. If you would like to make any introductory remarks, you can make those now.

**Ms Anderson**—I will kick off with some opening comments and then hand over to Nick, who will drill down into more of the detail about the satellite products we have on offer. Before I start, I will just mention that I have another copy of our submission which I will table for you to take away with you. There was a typographical error in the submission: we mentioned Telstra instead of Optus, inadvertently.

**CHAIR**—Maybe you know something we do not know.

**Ms Anderson**—I have some comments to start with. Sustainable infrastructure competition is the only way people in rural and remote areas will receive the services that meet their needs. Competition delivering new technology and services will not only deliver competitive connection and repair times but also keep people in rural and remote areas abreast of the latest technological developments so they can access broadband services. For alternative providers to compete against the incumbent, Telstra, they need economies of scale to deliver the services at affordable levels. Necessary scale is only possible with the right incentives to encourage competing providers to build capital-intensive infrastructure.

Currently, very little government funding has gone to non-Telstra providers. It has not delivered competitive infrastructure and services to rural and remote areas. Funding allocations have been ad hoc and piecemeal. They have not been either designed or delivered in a way that enables alternative infrastructure providers to get over that high cost hurdle. Government funding has largely bolstered Telstra's existing and often outmoded infrastructure, making competition more difficult for new entrants. Looking forward, funding initiatives need to be designed so that they actively promote competition for the delivery of sustainable, competitive infrastructure. This will be the best way to ensure Telstra improves its services and standards and keeps delivering services that people want, regardless of who owns it.

Optus is committed to providing services in rural and remote areas. Satellite technology is the technology of choice for rural and isolated regions. It is cost effective, it is available throughout Australia with very rapid rollout capabilities and it is here and now and available. Optus's commitment to rural Australia is demonstrated in its investment and design of very sophisticated satellite broadband solutions. Optus has been first to market with a range of these solutions. I will now invite Nick Leake to explain to the committee our advanced solutions in

the satellite area and the services that we have available using this technology. Then we will throw it open to the questions and answers.

**Mr Leake**—A little bit about my background: I have been in Australia about 2½ years and I came from a company called Hughes Network Systems, which is a manufacturer of VSAT units. I ran a company in Europe called HOT Telecommunications and we were running about 10,000 corporate customers on broadband, two-way VSAT technology.

When I came to Australia, a Hughes network systems platform was already running in the Optus network, providing broadband services to things like FordStar, which carries out interactive distance learning to 300 of their dealer outlets for training mechanics on warranty repairs on their cars and those types of things. Also, we were involved in the State Telecommunications Enhancement Program in Western Australia where we run bandwidth-hungry applications to 90 remote police stations that need to have two-way communications. What I have basically done over the last two and half years is try to upgrade the platforms and to introduce new platforms based on IP technology. We have introduced a number of new services in which we have started to see significant wins, particularly in education.

The first contract that we are currently running is for the Northern Territory's Electronic Outback program. A VSAT connection, using two megabits, is connecting 14 Aboriginal communities, which are now running videoconferencing, pay telephony—pay phones—and the Internet. Last year, we won the contract to provide NT Education with an asynchronised satellite system where they use Optus Net Dial-up to download all their Internet content via the satellite. To give you an example of how satellite is scaleable: a year ago they contracted for 512 kilobits per second; they are now on 4.5 megabits per second, because once they get to use the system they really hammer it and download a lot of information.

On our two-way system, we have won a contract with New South Wales Education. We now provide 165 remote schools with their Intranet services two-way communications. Another case we did was with the Health Television Network, who are an existing customer. We worked with those guys and the rural doctors to provide not only the business TV of training the rural doctors in the latest health products but also an Internet service so that they could have the Internet. Through their set-top boxes, they can receive remote area broadcasting ABC and SBS. So it is a good case study of how, through a single dish, you can provide multiple applications through all the content that is running through the Optus satellites.

More recently, we have signed two contracts. One is with a company called Apertura in South Australia. With these guys, we are using the broadband delivery of satellite to remote communities and then reticulating that out by wireless IP local loop. In Port Lincoln, currently eight people are using a wireless system that is coming back via the satellite. Satellite has always been a good salve to the tyranny of distance but, if you are going to put in wireless system into remote and rural Australia, how are you going to get that broadband connectivity in the first place? We have demonstrated—and this is a live service being run down there at the moment—that we can do this here and now. We are also working with people like Bendigo Community Telco who, along with the Bendigo Bank, have the philosophy: if a community needs telecoms, let me come in and provide you all those services. They are taking our one-way and two-way VSAT services and are also looking at that broadband delivery, wireless reticulation, into their communities.

We have sponsored a number of other initiatives. The Methodist Ladies College in Sydney are basically doing a virtual classroom in Broken Hill. We have sponsored them by giving them a two-way connection. They are using Apple Mac wireless LAN. They are all using their little Apple PCs with their little wireless connection to keep in contact with their parents. That is a three-month sponsorship by Optus. We also sponsored TekTrek, who ended up at the IT Congress in Adelaide. He had attached to the front his bus a pole on which, when he stopped, he stuck on his two-way dish. He had the Cisco wireless LAN and he went into schools and communities to demonstrate that the technology was available for them to get broadband into those communities. Satellite is independent of what piece of wireless you put at the back. We have demonstrated with a number of wireless products that we are just an IP delivery mechanism. We do not really care what you put on the back of it—we are kind of equipment agnostic—as long as we can increase our bandwidth sales and get access into those areas.

I have a couple of press releases here, but one of the significant things we did was a trial of an interactive distance learning application with the School of the Air in the Northern Territory and New South Wales. That gives live video of the teacher delivering the message, with data and voice coming back so that they can interact. I sat with the principal of School of the Air and he said, 'If you close your eyes and try to imagine how you talk a child through learning long division without physically showing them how to do that, it is impossible. These children are disadvantaged.' When we showed them a PC where, for the first time, they could see their teacher—interact, talk and answer questions—it was a totally new learning experience. These are the types of applications I have introduced from Europe and the US that we intend to try to roll out across the whole of remote and rural Australia. They could probably get a better education than they would in Sydney. These examples are factual. These are things that we have done and are doing, and we want to continue to do them. We just want the government to support that and we can start rolling these systems out now.

**CHAIR**—Okay.

**Mr HATTON**—That is blunt.

**CHAIR**—Optus's submission was very straight to the point and blunt as well.

**Mr HATTON**—'Give us money.'

**Mr PEARCE**—What satellites are you using?

**Mr Leake**—We are using the Optus B3 satellite.

**Mr PEARCE**—That is geo, right?

**Mr Leake**—That is geostationary, yes. It is the satellite that carries Foxtel-Austar.

**Mr PEARCE**—What is the life expectancy?

**Mr Leake**—We are basically replacing B3 with C1 at the end of this year.

**Mr PEARCE**—How long is C1 expected to last?

**Mr Leake**—15 years.

**Mr PEARCE**—Can you go back to one or two of the examples you have spoken about and give us some indicative pricing? Can you compare them to any alternative approaches? In other words, how can we position satellite? Ms Anderson, in your opening comments I think you said that it is cost effective. I would like to get a better understanding of what it is cost effective in comparison to.

**Mr Leake**—Most of the examples I have given you are of private networks, except for a school network, and they purchased that from us because there was basically no alternative. There was long-haul copper and they did not have Internet access. Because they are private networks and state government networks, I cannot really give the price. For the Health Television Network we were providing multiple applications. Basically it is a little USB modem and they are using the existing dish on which they receive their business TV service. The cost of installation is below $500 and the cost of a basic Internet service is around $70. That is for a one-way system. Because you need a radio to transmit two-way communications, a two-way system costs about six and a half grand to install. Once the service is in there, depending on what level of service you want, the cost can be between $70 and $140.

**Mr PEARCE**—I think it is reasonable to say that some people would suggest that, of all the types of technology available, satellite can be one of the most expensive. You would have to agree that there is something of a perception out there that it is a huge up-front investment for satellite operators to manufacture, launch and run a satellite operation.

**Mr Leake**—Absolutely.

**Mr PEARCE**—There is a perception that satellite can be expensive. How do you counter that type of perception in the marketplace today?

**Mr Leake**—We have done a number of roadshows, and I think the NT are doing their IT congress next month. A lot of people are saying, even though it is $6,000 to get it installed, that they are prepared to pay that money just to get access to some level of broadband connectivity. The guy who is sitting there with his DRCS system and can hardly get a connection, cannot get even 2.4 to get access. It is a question of education and of showing what you can deliver with your service. The $70 a month for a one-way system is comparable to what you would pay for cable. It is not as good as what you get with cable, but if you are sitting in the middle of nowhere and you have never been able to get this access, it is something that people think is worth paying for. That is the kind of message we have had pushed back to us.

On the wireless connection, the company we are working with, Apertura, really focus on business users first and on giving them a business grade service. Their pricing is about $295 per month for a small business to have this broadband access. So the pricing is relatively high, but we are trying to deliver into areas where you do not have the infrastructure. The main costs are hardware and installation, and this is where we are seeking federal government money to put that infrastructure in place. That will then drive down the cost of the ongoing service.

**Ms Anderson**—My understanding of what we call satdata Star IP, which is the big satellite pipe and the wireless reticulation, is that, if you compare it against putting fibre into a town, for example, it is very cost effective. Fibre might cost a couple of million dollars—I do not know—but this could be as low as one-tenth of that.

**Mr PEARCE**—Where is your satellite gateway—where you are actually bringing it back?

**Mr Leake**—We have gateways in every capital city, but our main gateway, where we have the majority of our intelligent infrastructure, is in Belrose, in Sydney. So that we can provide additional value added services to our customer, we have also integrated the satellite into our Optus core network, where you can then provide VPNs and firewalls. If you take a community that has a number of agencies—Centrelink, the post office—you can provide them with VPNs through the Optus network and bring all those agencies and key businesses online.

**Mr PEARCE**—What is the footprint, in terms of the continent?

**Mr Leake**—These satellites are built and designed for Australia.

**Mr PEARCE**—Being geostationary, in particular.

**Mr Leake**—Yes, and we have the other state—New Zealand—that we bring online as well. It covers all of those.

**Ms Anderson**—The other issue with the VSAT two-way, which goes to individual homes, is that the cost of the equipment will come down the more you can get on. It is a classic economy of scale thing: the larger the contracts, the larger the number of services we can roll out, the more we can get vendor discounts.

**Mr Leake**—Exactly. A press release that went out from Hughes said that an order for 10,000 units of Telstra's two-way had been placed. If I could place an order of 10,000, I could get a very cheap price: below $US800 for a two-way unit. So there are economies of scale. If you give any manufacturer volume, they will give you a discount no matter what they are doing, whether it is PCs or anything.

**Mr HATTON**—You say in your submission that you provide GSM services, satellite and wireless local work using 802.11, but you prefer satellite for delivering broadband data services in remote areas, and you have just argued the case for that. You provide GSM primarily in the cities, down the eastern seaboard? You do not provide it in remote areas?

**Ms Anderson**—It is gradually going further and further out.

**Mr HATTON**—But there is a great cost to Optus to provide that?

**Mr Leake**—We have a product called MobileSat, which provides telephony and 2.4 data. We have just introduced a new application called Closed User Group, where a number of emergency services which have all the terminals can talk as though they are on an HF system. That goes 200 kilometres out to sea, so we do have mobile telephony outside our GSM coverage.

**Ms Anderson**—To answer your question, yes, we are growing the reach of our network. We are constantly looking at where we can effectively invest our capital to grow our network in high traffic areas and those sorts of areas. We recently submitted a tender to the Commonwealth government for mobile coverage in towns over 500. We were not successful in that; Telstra got that, but they threw in a lot of freebies along the way, which got them over the line. We do have an interest in extending the reach of our network, yes. But we do not have the extensive coverage Telstra has because, again, Telstra has had access to a lot of funding with its CDMA network.

**Mr HATTON**—Your preferences relate to your technical capacity; that is natural. You have the footprint over the whole of Australia. What is the technical situation in terms of the upload and download capacities that are provided out of the satellite? Do you have to put extra capital expenditure in to provide faster download services?

**Mr Leake**—The example I try to use is that satellite bandwidth is easy and flexible to upgrade. When a Northern Territory school asked to upgrade from 1 meg to 2 meg we did it in 30 minutes because you do not have to dig the road up to put a bit more cable in. The satellites have capacity and we do capacity planning. We always plan new satellites two to three years before the life expires on the next one. We want to put up bigger, better and more transponders as technology allows us to do that in the different modulation techniques that you can use.

On the uploads and downloads, the reason we have a one-way service, a two-way service and a satdata service is that each of them has a different market fit. The one-way requires the dial-up and the outbound is as much as you want it to be—it can be as much as 36 megabits per second. Unfortunately, I have not found a customer who wants that yet. The two-way—what we call our SatWeb two-way—has multiples of 76 kilobit inbounds, so your maximum request channel is up to about 56 k and it is all shared in a pool. Again, on the outbound, satellite never has problems because satellite are built for broadcast.

On the wireless gateway system the current inbound rate is 384 kilobits per second and it will be upgraded shortly to 2 meg. Once you get the 2 meg, obviously you can serve more people off that particular wireless system. What Apertura bring to the table is between the satellite gateway and the wireless. They have built a number of servers where we can cache, we can provide quality service across the wireless and the wireless can talk to the wireless, thus removing the necessity to always go back over the system to request further downloads. Being satellite we have to be a little bit smarter, maybe, than some of the terrestrial people. We have to use acceleration protocols and we have to use what we call TCP/IP spoofing—it is a very chatty application so you spoof it so it does not have to keep going back over the system.

In satellite everything is scalable. We have produced each of these products to fit, and we produce the wireless one to serve community. If you consider our solution as a doughnut, in the middle you have a community. You have a wireless system that can serve reliably up to, say, 15 to 20 kilometres. Outside of that area, what are those people going to have? They can have the single two-way satellite service. That is our basic concept—serve the majority of the community and anyone outside that can still take a satellite product to have access to broadband.

**CHAIR**—But how slow is that?

**Mr Leake**—We offer two services. One is up to 200 kilobits per second and the other is up to 400 kilobits per second—I have one at home because I am the marketing manager. I get anywhere between 350 and 400 k. When I am going onto the World Wide Web it depends on what site I hit and what peering arrangements exist between countries. You cannot guarantee throughput. It is very similar to what Telstra offer in terms of their one-way and two-way satellite offerings.

**Mr HATTON**—So the hearing impaired people we just spoke to need a minimum of 128 k and preferably 384 k in order to be able to use their natural speech method with their hands. You would be able to cover Auslan?

**Mr Leake**—Yes. With the wireless product, we do not just sell it to do wireless. We are looking at a number of different alternatives where a corporate, a hospital or whatever can just buy that single VSAT and use that 384 inbound carrier to do whatever they want. We have demonstrated video conferencing over it; we have demonstrated voiceover IP over it; we have telemedicine distance learning products that go over it. So it is very much application driven. We have basically listened. In health they want video conferencing. The School of the Air want to change away from this antiquated HF system and be able to teach their children more interactively so the children can physically see the teacher for the first time in their lives. Once you are doing that education with a child, you then turn to the adult—who, in many of these areas, suffers from isolation—so that they can then interact and see things and be able to use the Internet. We have a number of processes going through so that, once you deliver this type of distance learning service, it has other applications that can be used within the community—within TAFE outreach programs or within Aboriginal training—because they need that contact.

**Mr HATTON**—Over time, apart from economies of scale, are the costs of providing satellite services to Optus coming down or going up—that is, your fixed costs?

**Mr Leake**—The cost of a satellite is always going to be around $A500 million. But our intention is that, as you build these satellites, you collocate satellites in the same orbital location, you have more capacity to use and sell and that then brings economies of scale. You then have market forces. As we are all probably aware, there are people like New Skies, PanAmSat and Intelsat all seeing Australia as a nice little place to try to sell their satellite services, so we will be driven by market forces—like anyone else will be.

**Mr HATTON**—What is the current state of play with those other potential competitors? In particular, we started off with one satellite phone service, which sort of went west—

**Mr Leake**—Iridium went west; it has come back again.

**Mr HATTON**—It has come back in another form. There are also a series of others proposed: there is the Motorola group, which I think may have stopped, and the Microsoft one. Where are we with those?

**Mr Leake**—My personal view is that all these satellite constellations are LEOS, low earth orbit satellites. I think the concept, which was dreamt up 10 years ago, was that everybody would like to roam with their mobile phone and have these mobile phone services anyway. The concept is great but they have to operate 60 satellites that have to be replaced between five and

seven years; you just cannot operate that. For us, Optus, to launch one satellite every 15 years, we consider seriously the amount of capital investment that we have to put in place to do that. We have already seen Iridium go and come back. I do not know how long they will be able to operate all those satellites; they are going to have to launch some fairly quickly to maintain continuity of service. We have seen Globalstar going to chapter 11, and we also have Teledesic and ICO. My personal view is that they are not sustainable. Our mobile satellite service and the other one, Inmarsat, are geostationary services that can be operated through one satellite.

**Ms Anderson**—It has been in existence for 10 years.

**Mr Leake**—It has got a life expectancy of another 14 years.

**Mr HATTON**—You have been willing to flog your services to people who have been willing to pay, but, relatively speaking, they are in fairly small numbers. You said in your opening account that, if the government fronted up with the dough, you would be happy to expand it to all of remote and regional Australia and there would be savings or discounts in relation to that. There are some other potential ways of getting that service out to remote and regional Australia, and one is using the transmission infrastructure that is already there and linking that to wireless LAN—where, if they were determined to follow this route, the government would not be faced with the high costs of providing that infrastructure.

**Ms Anderson**—Are you talking about the terrestrial networks?

**Mr HATTON**—Yes.

**Ms Anderson**—But a lot of them do not reach these remote people. They might be on a radio system and the maximum they could get is 14.4 or 19.6.

**Mr Leake**—We are not waiting for government—Apertura, our partner, are not waiting for the government to give them money.

**Mr HATTON**—That is where my question is going: what are you going to do?

**Mr Leake**—Apertura have got a fantastic model. They are looking for distributors in each of the states and in communities, whereby they will lease the infrastructure to that distributor, who will not have to pay any bandwidth charges for three months so they can bring people online—so they basically get a holiday. Then each distributor will manage and grow that business within its community. It will therefore add jobs and give that local community representative revenue. Aperture has installed one of these systems on top of a Lutheran school in Tatachilla. Outside normal school hours, the children can dial back in and use that broadband connectivity to do their homework and access the Internet, so it is adding value to the community.

The next phase is to put the wireless on there and let them come via wireless so they do not have to do the dial up. It is adding value because that school is then generating revenue to buy their books and their PCs. The models that we are trying to put in place aim to add value to communities, not just go in there like a big brother and say, 'This is the service, this is what it costs'. We have allowed Apertura to run their own race, we just provide them with a wholesale

bandwidth charge and then they can put together their rate plan. So we are trying to enable that regional company to grow a new and exciting business.

**Mr HATTON**—What is the change, then, in the cost structures for regional and remote communities where you have not got every individual household willing to pay out large amounts of money but you are using the wireless local loop to provide most of it? The economies are entirely different to what you would otherwise expect.

**Mr Leake**—We can follow up that with the guys. They are very happy to come in and talk to you about the research they have done. In Port Lincoln, for instance, they just did not have broadband connectivity. It is a very prosperous area of Australia with all the tuna fishermen and all those types of guys. They were dying to get some level of broadband; that is what they want and they are prepared to pay.

**CHAIR**—That might be because there are more millionaires in Port Lincoln per capita than in any other place in Australia.

**Mr Leake**—Exactly, and we are not exploiting that fact!

**Mr HATTON**—It is one of the few places that could probably buy out Optus.

**CHAIR**—It is quite bizarre, really.

**Mr Leake**—But they do not have broadband and they were prepared to pay. Apertura still have to buy hardware and install it and they still have to buy our bandwidth. What comes out is a price to the end user that obviously includes their margin to be able to make some money. What everybody has to realise here is that we are still in business to make money for our shareholders, so we cannot enter into everything we would like to enter into unless the government helps.

**Ms Anderson**—The model that we have found works quite well in pushing this technology out there outside the corporates is where you get anchor tenants who are government organisations, or a group of government organisations like a hospital or a school or the local Centrelink or Medicare office or whatever. They are the ones who will say, 'We will start to put in some of the up-front capital costs and we will guarantee that we will use a certain amount of the service.' That then makes it affordable for other parts of the community to use it. That is a model that has worked really well.

**Mr Leake**—If I put my satellite hat to one side for a second, Optus Wholesale are part of the unwired trial that is going off in Paddington shortly, which Senator Alston went to see yesterday. We are providing the core infrastructure to be able to deliver that Internet content and voice to those particular end users. But the goal for unwired is to actually get further out away from the CBD and all those areas. To do that, we either have to stick fibre or some terrestrial network in there or, as we have been discussing with them, we will have to put in place this broadband concept of using satellite to get to a gateway and then deliver the other data via a wireless local loop of some kind.

**CHAIR**—Is there any significant delay in connecting yourself to the satellite in the first place?

**Mr Leake**—Our two-way service is a broadband always-on service. So, like you would with cable, you click your mouse, click on your web site and it will start downloading. It has got to go 36,000 kilometres up and down, but that is where we use our spoofing techniques and our acceleration techniques. So you get a broadband experience; you do not realise that you are a using satellite connection and it is going once around the moon and back down again.

**CHAIR**—Being the devil's advocate for the moment, if satellite is so brilliant then why isn't it being adopted by everybody?

**Mr Leake**—It has not been adopted by Australia. I think that since Telstra won the untimed local calls and has been trying to put free satellite services into the extended zones there has been more acceptance. Certainly, people have been talking about satellite over last 18 months like they have never spoken about satellite before, so it is getting there.

If you look at the American experience, the two-way platform that we installed last year is installed in a company called StarBand in the US, and they have 60,000 customers on there over a period of two years. We are talking about America being a country that has infrastructure to deliver broadband, and that is absolute rubbish. There are 50 million Americans in remote and rural America that do not have access to ADSL, frame or cable, so they are taking up the satellite option.

British Telecom in the UK has just bought the same platform as us. They are rolling out that broadband service to SMEs because their ISDN and DSL does not give them 100 per cent coverage of that area. Alcatel Space, Gilat and SES Astra have just formed a broadband alliance to deliver the same platform to the whole of Europe. Tiscali in Italy have bought that platform to provide broadband to all of Europe. So there is an acceptance. I think we are late adopters. What I am saying is that we have got it here, we have got it now, let us adopt it full heartedly at the federal and state government levels and let us start rolling these services out.

**Mr HATTON**—I note that you do not want to see unnecessarily high reserve prices for spectrum options, because they are a barrier to wide adoption. In Australia for 3G we did not spend—

**Ms Anderson**—The regular amounts.

**Mr HATTON**—very high amounts of money buying, unlike the ridiculous prices that they paid elsewhere in the world. Optus, however, did pay $4 billion to put some optical fibres in from one end of Australia to the other—they paid the same amount of money as Telstra. Are you disappointed with the amount of take-up that there has been, in terms of the use of that $4 billion worth of infrastructure?

**Ms Anderson**—You mean in terms of when we first kicked off?

**Mr HATTON**—Yes.

**Ms Anderson**—No, not at all. We have been able to run a business on it. There were two issues there. When we entered the market we entered a network development deed which included that massive roll-out plan, and the shareholders recognised that Optus needed some infrastructure on the ground to do it. The market strategy at that stage was to do long distance and to have optic fibre. That amount of optical fibre was considered necessary. Now it is our backbone network, and it has served us well.

**Mr HATTON**—So it is profitable as it is. What about the extension of that service beyond the television access and so on that people are paying for in the broadband access into homes—because the take-up rate is very small?

**Ms Anderson**—You mean in terms of our hybrid cable network?

**Mr HATTON**—Yes.

**Ms Anderson**—Optus is constantly relooking at that business because it has not been profitable. We are driving take-up. We are getting much better penetration levels than we have. We have been pushing the service, and our bundling strategies helped us in that regard. Indeed, the deal with Foxtel will help us on that path as well. The commitment by the company at this stage is to continue to try and make some money out of it, but if it all becomes unviable, for whatever reason, our owners have indicated that they will close it down or try and sell it off.

**Mr HATTON**—What is the technical state of the fibre? What sorts of problems has it got? When is its replacement date coming up?

**Ms Anderson**—I could not give you a short answer to that. In fact, I do not even know. But I do know that we are in the process of installing what is called DWDM, which is putting extra gadgets on the end of the fibre so we can get more capacity out of the fibre. For all intents and purposes, we are upgrading the fibre so that we can run more things over it. Given we are making those sorts of investments, I would not think that the fibres seem to have a life that is about to end.

**Mr HATTON**—It is a problem with all these technologies, because you make the infrastructure investment, you get a certain amount coming back out of that, and then with further development and research—some of it taking place in Sydney—the capacity of optical fibre is dramatically increased; you have got new generations of development. You have then got a problem, where you have had to backload the technology to try and increase the capacity of what you originally had there, but you would also then have to look at how you continue to develop that capacity in terms of just your long-distance network and what changes you would need to make there.

**Ms Anderson**—I think you will probably find that the fibre itself, which is the expensive part—that is, the part for which you have to dig up farms and what have you in order to roll it out—is reasonably stable. There has not been a lot of technological advancement with fibre. The next step is going to be some other sort of transmission technology coming down the path, but that will be something that is totally different to fibre. The biggest advancements, as you say, have been in what you add on the end to get more out of the fibre. There is not what you would call continual degradation of the actual fibre; it is quite a stable technology.

**Mr HATTON**—How do you see the competitive environment in that area with the introduction of Next-Gen and a considerable investment there—$US600 million with the consortium coming in with an extremely high capacity backbone. What is Optus's view of what you are up against?

**Ms Anderson**—We would see it as almost a totally competitive market. The market dictates the price. We are basically price takers. We have to respond to what the market is doing in terms of what we offer in prices on our fibre. But being able to use the newer technologies to push out more of the fibre is our way of competing with the Next-Gen and so forth, with DWDM and those sorts of technologies. We have to respond.

**Mr HATTON**—Telstra is in the same position, having its own infrastructure and developing that, whereas the Next-Gen people would argue that they have a much higher capacity optical network. That backbone is there for anyone to link into, so it is almost the perfect situation—it is access neutral. Optus or Telstra could link into it without reinvesting in those. Do you think that will happen or do you think you will just try and compete?

**Ms Anderson**—Wherever there is network available and it is available at a more affordable rate than we can install it, we will opt to use the available network. We are not wedded to having to keep rolling out infrastructure. If competitors are offering it more cheaply, of course we will look at what they are offering and use their network. We have done that with Telstra for a long time.

**Mr HATTON**—You have been involved with Bendigo. They are pretty good at coming up with new ideas and new ways of doing things.

**Mr Leake**—They are excellent, yes.

**Mr HATTON**—Have you had any activity with other regional groups? We have seen regional loops of optical fibre being put in on the South Coast of New South Wales running down through Victoria.

**Mr Leake**—That is southern telephony or something. The only exposure I have had to those guys was at the remote and rural communications show in Melbourne where Senator Alston spoke. They were really looking at low cost telephony rather than the data side of it. I know of their existence, but I have not worked with those people in providing satellite access.

**Mr HATTON**—The reason I introduced that was, firstly, to find out whether you had worked with them and, secondly, to ask whether we are getting into a period where we are layering the infrastructure and not getting optimal use out of it. I am guessing that that is the case, given our past experience. Are we now seeing a continued duplication and reduplication of the network in different parts of Australia to the point where it is going to cost us more as a country?

**Mr Leake**—I think the NTN funding is a result of that. You are providing money to nonprofitmaking organisations that are looking at little areas in which to provide technology instead of looking at the bigger picture. Somebody that can apply a seamless technology can, like Next-Gen, allow other operators to come in and buy capacity at proper wholesale rates that then make the services provided to the end user more competitive. I think you are right: there

could be duplication but then that may be the government's fault for giving money out to so many small players.

**Mr HATTON**—Maybe we should be properly networking the nation!

**Mr Leake**—With Optus!

**Ms Anderson**—Exactly! And introducing real competition.

**CHAIR**—Thank you very much for making the effort to come along this afternoon. You have been extremely helpful. We have had seven different contributions from people today, and they all have very different views. It is very interesting to all of us.

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

That the committee receive as evidence and authorise the publication of the replacement submission received from Optus for the inquiry into wireless broadband technologies.

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

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

**Committee adjourned at 5.04 p.m.**