



OPTUS SUBMISSION ON BROADBAND SOLUTIONS FOR RURAL AND REMOTE AREAS

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1 Executive Summary

The Australian Government has already demonstrated the importance of delivering high speed broadband to Australian consumers and businesses by its policy commitment to contribute \$4.7 billion of public funding for the deployment of a National Broadband Network (“NBN”) to 98% of Australian homes and businesses.

The Government’s commitment to the Regional Telecommunications Independent Review Committee’s work exploring long-term options to ensure rural and remote areas of Australia have access to the best available broadband services represents a significant opportunity.

Optus believes some key points should be observed in allocating funding for improved broadband services to rural and remote Australia.

- Funding should be allocated through a competitive, open and transparent tender process. The tender process should be complementary to the current NBN process and should seek the following outcomes:
 - a pro-competitive, ‘genuine’ open access network providing equivalence of access both on price and non price terms and conditions; and
 - the delivery of high speed broadband services at metro-comparable price, service level and performance quality.
- The tender process should include a clear statement of the Government’s requirements including the appointment of suitable experts, details of the timetable, and the ability for proponents to determine and justify their choice of technology.
- Proposals that form part of an NBN solution should be considered suitable for delivering broadband services for at least the last 2 per cent of premises.
- Government funding should be made available as a contribution to the capital costs of the project and on a per customer connection. The tender process should invite from proponents the required level of funding necessary to deliver the Government’s minimum requirements.
- The requirement that a broadband solution for the last 2 per cent of Australian premises should be operational before the completion of the NBN.
- The preservation of the Australian Broadband Guarantee until the NBN is deployed and an appropriate solution is implemented to cover the last 2 per cent of Australian premises.
- A review of the regulatory environment to support the delivery of high speed broadband services to rural and remote areas.

Optus’ considered position is that a state-of-the-art satellite delivery solution is the most suitable technology to provide high speed broadband to at the least the last 2 per cent of Australian homes and businesses. The availability of Ka-band spectrum and its ability to support satellite delivery of broadband at higher speeds, lower cost and improved serviceability make the Ka-band satellite proposal the optimal solution for the delivery of broadband services to rural and remote Australia.

2 A proposal for a high speed broadband solution to rural and remote Australia

The Australian Government has already demonstrated the importance of delivering high speed broadband to Australian consumers and businesses by its policy commitment to contribute \$4.7 billion of public funding for the deployment of a National Broadband Network (“NBN”) to 98% of Australian homes and businesses.

The Government’s commitment to the Regional Telecommunications Independent Review Committee’s work exploring long-term options to ensure rural and remote areas of Australia have access to the best available broadband services represents a significant opportunity to develop a broadband infrastructure proposal combined with a transparent competitive funding process for the delivery of broadband services to the 2 per cent of premises outside of the NBN.

Without a significant investment in broadband infrastructure and a specific funding process, the current disparity faced by rural and remote Australians in accessing competitively priced broadband services at metro-comparable pricing and performance levels will be exacerbated over time as the NBN is deployed.

Optus welcomes the opportunity to continue its innovative work to deliver credible telecommunication solutions to the Government. This submission is intended to demonstrate to the Government that a credible broadband solution for rural and remote Australians is achievable. Optus believes this policy proposal will deliver on the Government’s aspiration to ensure rural and remote areas of Australia have access to the best available broadband services through future-proof telecommunications infrastructure.

This proposal outlines:

- A policy and funding framework for consideration by Government;¹
- Possible technology solutions and advises on the most appropriate for rural and remote areas;
- The significant improvements in broadband delivery being realised through satellite technology; and
- Optus’ specific capabilities.

A competitive policy and funding framework

Optus believes some key points should be observed in allocating funding for improved broadband services to rural and remote Australia.

(a) Funding should be allocated through a competitive, open and transparent tender process. The tender process should be complementary to the current NBN process and should seek the following outcomes:

- a pro-competitive, ‘genuine’ open access network providing equivalence of access both on price and non price terms of conditions; and

¹ Including transition of Australian Broadband Guarantee

- the delivery of high speed broadband services at metro-comparable price, service and performance quality.
- (b) The tender process should include the following:
- a clear statement of the Government's requirements for metro-comparable broadband services (both in terms of price, service and performance quality); a clear definition of the addressable market²; the amount of public funding to be made available and on what commercial terms; and the evaluation criteria for selection;
 - the appointment of suitable expert technical, economic, competition and other advisors to objectively test the suitability of proposals;
 - details of the timetable, mile-stones and completion date for the project; and
 - the ability for proponents to determine and justify their choice of technology.
- (c) Proposals that form part of an NBN solution should be considered suitable for delivering broadband services for at least the last 2 per cent of premises.
- (d) Government funding should be made available as a contribution to the capital costs of the project and the utilisation of a per customer connection. The tender process should invite from proponents the required level of funding necessary to deliver the Government's minimum requirements (such as price and performance levels).
- (e) The requirement that a broadband solution for the last 2 per cent of Australian premises should be operational before the completion of the NBN.
- (f) The preservation of the Australian Broadband Guarantee until the NBN is deployed and an appropriate solution is implemented to cover at least the last 2 per cent of Australian premises.
- (g) A review of the regulatory environment to support the delivery of high speed broadband services to rural and remote areas.

Suitable technology options and their suitability to rural and remote Australia

Optus' considered position is that state-of-the-art satellite delivery is the most suitable technology to provide high speed broadband to at the least the last 2 per cent of Australian homes and businesses.

A state-of-the-art satellite solution is the most appropriate for the following reasons:

- Satellite is capable of providing services to all underserved and unserved premises, underserved and unserved premises being all premises across Australia that do not have access to metro comparable broadband³.
- Recent developments in Ka-band spectrum satellites can now provide ADSL2+ broadband services.
- Existing satellites provide high capacity broadcast services to 100% of Australia which will readily complement satellite delivered broadband services.

² Optus recognises that this will ultimately be dependent on what the winner to the NBN process proposes

³ This may be due to blackspots, geographic issues, rims/pair gains and exchange boundaries

- Satellite arrangements can support the provision of wholesale services on a fair and transparent basis.
- The ability of satellite to provide instantaneous coverage of large geographic areas, as well as more localised allocated capacity to support delivery of specific and/or special Government needs such as education, health and indigenous services.
- The suitability of satellite as an easily scaleable solution.
- Satellite is already a proven technology in the delivery of sensitive commercial and Government related services such as Defence, CentreLink, ABC and SBS services and Distance Education Learning.
- Satellite currently delivers broadband services to consumers and small business in rural and remote locations.
- Satellite solutions have demonstrated the ability to meet the changing requirements of customers and is a recognised “*future-proof telecommunications infrastructure*”⁴

In terms of ensuring the optimal delivery of high speed broadband services, Optus is proposing that a future national satellite broadband initiative use spectrum in the Ka-band. This is for the following reasons:

- Greater availability of Ka-band orbital locations (secured under ITU guidelines) versus the current limited service provided by the existing Ku-band.
- The majority of existing satellites serving Australia use the lower frequency Ku Band to provide a range of business and broadcast television services and therefore less Ku band spectrum is available.
- The higher frequency of the Ka-band rather than the existing Ku-band provides a number of distinctive advantages for the delivery of high speed broadband including:
 - smaller ‘spot beams’ and higher frequency ‘re-use’ means an increase in satellite capacity, improving the speed and number of users per satellite, resulting in lower costs.
 - the Ka-band system is proven in delivering ADSL2+ comparable speeds.
 - reduction in the size of customer premise antenna/satellite dishes to approximately 60cm can be utilised making them similar to broadcast television installations.

The significant availability of Ka-band spectrum in Australia makes it a timely and efficient use of existing spectrum resources. Currently there are two blocks of 500Mhz spectrum which would be suitable if the appropriate class licence regime is allocated. Regulatory approvals will need to be secured to realise the delivery of high speed broadband to rural and remote areas using Ka band spectrum.

Optus’ extensive experience in the delivering broadband services to rural and regional Australia and its expertise in satellite delivery more generally re-affirms Optus’ view that state-of-the-art developments in satellite technology make it the most suitable technology to reach the remaining 2 per cent of Australian homes and businesses.

The availability of Ka-band spectrum and its ability to support satellite delivery of broadband at higher speeds, lower cost and improved serviceability make the Ka-band satellite proposal the optimal solution for the delivery of satellite broadband services to rural and remote Australia.

⁴ Call for submissions on broadband solutions for remote areas.
http://www.minister.dbcde.gov.au/media/media_releases/2008/025

In addition to providing high speed broadband to at least the last 2 per cent of rural and remote Australians, Optus proposes to use Ka-band spectrum to provide the following services to 100% of Australians⁵ on both a retail and wholesale basis:

- ADSL2+ comparable broadband (peak speeds of 12 to 20 Mbps);
- VoIP over Satellite (not intended as a primary voice service); and
- Backhaul for remote, isolated 3G/4G mobile and WiMax spots.

Optus capabilities

Optus is well established in the delivery of satellite services in Australia and has made a renewed long-term commitment to its satellite business and customers.

To date Optus has launched 10 satellites and in December 2003, Optus signed the purchase agreement for two new state-of-the-art satellites, Optus 'D1' and Optus 'D2'. In 2006, Optus recognised the need to significantly increase its satellite capacity and added the Optus 'D3' satellite to its long-term capital investments, providing 30% capacity growth across its satellite fleet.

The purchase and development of the 'D series' satellites mark a significant milestone in the maturation of the satellite business within Optus and within Australia. Once 'D3' has been launched successfully, Optus will have one of the youngest satellite fleets in the world, providing a strong foundation for its business as well as growth capacity for the foreseeable future. These satellites have a 15 year life span, bringing Optus' satellite business and capabilities to provide services well beyond the end of the next decade.

Optus has a number of characteristics which makes it uniquely placed in Australia to deliver a state-of-the-art satellite broadband network. These include:

- The ownership of four Optus satellites in orbit, with an additional satellite under construction
- Optus' extensive experience in the design, construction, launch, operation and control of satellites and in delivering services across multiple satellite vehicles.

From a services perspective, Optus has successfully developed and marketed broadcasting products (analogue and digital distribution as well as contribution and broadcast platform services) and VSAT services (satellite data, both national and international)

- Optus' support to telemetry, tracking and control (TTAC) services for a number of international satellite companies.
- The development by Optus of leading edge software and satellite modelling tools.
- Optus is heavily involved in international radio spectrum coordination for telecommunication satellites and plays a leading role in some of the spectrum coordination forums supporting both Optus' and Australian interests with world recognised expertise in the satellite coordination. As such, Optus has in-house expertise to ensure the international filing and frequency coordination aspects of any process will be managed successfully

⁵ Subject to capacity constraints



Finally, the scale and maturity of its satellite business, Optus brings dedicated and highly skilled engineering, operations and marketing teams to successfully develop and run a satellite broadband network for Australia.

3 A discussion on possible technology options for delivering high speed broadband to rural and remote Australia

As part of the current NBN process the Government's intent is to provide 98 per cent of Australian homes and businesses with access to⁶:

- High speed broadband services with a minimum 12Mbps;
- A broadband network which utilises fibre to the node ("FTTN") or fibre to the premise ("FTTP") technology;
- Uniform retail prices; and
- A broadband regulatory framework which promotes the long term interests of users and facilitates competition through 'genuine' open access arrangements.

This will leave the last 2 per cent of Australian homes and businesses with no comparable broadband service. The terrestrial broadband technologies which are being proposed to reach 98 per cent (principally fibre) will not be the most economical or efficient to reach the last 2 per cent of homes and businesses. The reasons for these limitations are explained in greater detail below.

Fibre to the premise ("FTTP"):

The top-tier solution in rolling out optical fibre is direct to the customer premises. This solution provides the highest transmission speeds (well over 100 megabits per second can easily be achieved) but requires individual fibre (or pairs) to be laid all the way to the premises, effectively replacing previously laid copper. The costs of rolling out such a network to rural and regional areas are prohibitive and uneconomic due to the low population densities and significant distances involved.

Fibre to the node ("FTTN"):

In this architecture, only the copper between the exchange and the node is replaced by fibre. The existing copper access lines are re-used employing DSL technology from the node. The shorter distances allow an increase in transmission speed to potentially tens of megabits per second. This architecture is being proposed as part of the NBN. The cost of rolling out FTTN to rural areas will also be prohibitive due to the significant distances between the exchange and the node and the costs involved in laying fibre over such distances. Additionally, the low population densities at the node will make any sustainable business case extremely challenging. Finally, the large distances between the node and premises make any DSL based technology unsuitable as the speeds achieved are likely to be significantly reduced.

In conclusion, the prohibitive costs of rolling out fibre networks to large areas with low population densities mean any fibre based solution will not be practical or economical.

⁶ Request for proposals to roll-out and operate a national broadband network for Australia – DCON/08/018

Wireless (terrestrial - 3G/3.5G/4G and WiMAX – both fixed and mobile):

In areas where a fibre rollout is not suitable, wireless technologies are potentially the next best approach utilising either 3G/3.5G/4G or WiMax. These technologies can provide speeds from tens to hundred megabits per second within a specified coverage area.

The main drawbacks (and limitations) of wireless technologies for rural and remote areas with low population densities are the dependency on terrain (buildings, landscape) and the sharing of capacity between users, impacting both the end user speeds and coverage. These limitations have the potential to create different service levels and even black spots where there may be no service at all.

Optus believes that state-of-the-art satellite communications therefore provide the best solution for the delivery of broadband services to the remaining 2 per cent of Australian homes and businesses not covered by NBN.

The strengths of satellite communications for the delivery of broadband services to rural and remote areas over other technologies are significant and include:

- The provision of services to all unserved (rural and remote areas) and underserved premises (premises who are within metro areas but do not have access to metro comparable broadband)⁷;
- State-of-the-art satellite technologies are now providing broadband services with ADSL2+ comparable speeds (see service descriptions in following sections for additional detail);
- Satellite allows for the provision of wholesale services on a fair and transparent basis;
- The ability to provide instantaneous coverage of large geographic areas, as well as more localised allocated capacity where required.
- Terrestrial solutions such as fibre and wireless are not suitable for areas where ‘infill’ is required;
- Satellite is the only solution which is flexible enough to accommodate a potential range of outcomes for the final 2 per cent of premises;
- Clear ‘line of sight’ requirements from the premise to the satellite is easily achieved;
- Satellite is an easily scalable solution and additional satellites can be launched if capacity demands increase or change; and
- Satellite solutions are already a proven technology for the delivery of broadband services to rural and remote locations

A clear requirement from the Government is that the process should “*explore long-term options*” and the services should be provided “*through future-proof telecommunications infrastructure*”⁸.

Both Optus’ satellite service history and the international satellite industry have demonstrated its capability of meeting the changing requirements of customers and demand and customer over the last 25 years.

For example, satellite fleets can be augmented with new satellites to meet increased and changing demand requirements. Current satellite design life is between 12 and 18 years and

⁷ This may be due to blackspots, geographic issues, rims/pair gains and exchange boundaries

⁸ Call for submissions on broadband solutions for remote areas.

http://www.minister.dbcde.gov.au/media/media_releases/2008/025



it is not uncommon to launch additional spacecraft halfway through the mission life of satellites to increase fleet capacity and or service capability. This ability to refresh the satellite technology provides excellent break points at which to reassess changes in demand and service requirements.

Additionally, satellite technology itself has significantly improved. 20 years ago satellites could only approach 1 Gbit/s of throughput capacity between large earth station facilities. These days' manufacturers are looking at spacecraft designs with the ability to provide 100Gbits/s of throughput per satellite using large numbers of beams and increased frequency reuse. These satellite designs deliver broadband services directly to the customer with antennas as small as 0.6m in diameter.

Most commercial satellite systems have concentrated on enhancing the RF transmission capability of the satellite and keeping the more complex signal processing systems within the ground network where it can be upgraded and managed by technicians. This approach minimises the complexity and subsequent cost of Customer Premise Equipment ("CPE"). It enables a single hub to support many remote customers and even different CPE as the network evolves, further future proofing the satellite solution.
