Mobile Coverage Programme Discussion Paper
Submission Cover Sheet

Submission Information	
This cover sheet should be attached to submissions made to the Department of Communications in relation to the Mobile Coverage Programme Discussion Paper.	
Contact Details	
Name of respondent:	[redacted]
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Date:	28 Feb 2014

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All submissions and comments, or parts thereof, will be treated as non-confidential information unless specifically requested, and acceptable reasons should accompany each request. Email disclaimers will not be considered sufficient confidentiality requests.

Respondents lodging a submission should be aware that submissions (excluding any information agreed to be treated as confidential information) will be made publicly available, including on the Department of Communications' website. Submissions and comments will be subject to freedom of information provisions. Despite a submission being identified as confidential or sensitive, submissions may be disclosed where authorised or required by law, or for the purpose of parliamentary processes.

Do you want all or parts of the submission to be treated as confidential? **Yes** ☐ **No** ☒

If yes, identify below which parts of the submission are to be treated as confidential (and provide a reason):

If the submission contains personal information of any third party individual, indicate on this Submission Cover Sheet if that third party individual has not consented to the publication of his or her personal information:

Submission Instructions

Submissions are to be made by **5:00pm (AEST) Friday 28 February 2014**.

Where possible, submissions should be lodged electronically, preferably in Microsoft Word or other text-based formats via the email address mobilecoverage@communications.gov.au

Alternatively, submissions can be sent to the postal address below (to arrive by the due date):

The Manager
Mobile Coverage Programme
Department of Communications
GPO Box 2154
CANBERRA ACT 2615

All submissions lodged will be acknowledged by the Department of Communications by email (or by letter if no email is provided). Respondents lodging a submission who do not receive acknowledgement of their submission should contact the Department. Submissions which are not acknowledged by the Department as being received may not be considered. Respondents should be aware that emails greater than 10Mb may not be successfully delivered.

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Response to the:

Mobile Coverage Programme - Discussion Paper

February 28th, 2014

Contents

Summary

IPSTAR Australia Pty Ltd thanks the Department of Communications for the opportunity to respond to this paper. IPSTAR understands that Australian Government seeks input from the telecommunications industry on the best way to deliver the Government's funding commitment of $100 million towards a program to improve mobile coverage and competition in regional Australia.

We further understand that $20 million of the fund is allocated to improve mobile coverage in locations with unique coverage problems, such as small rural and remote communities and seasonal tourist destinations outside of present mobile coverage areas.

In this paper IPSTAR seeks to answers questions raised by the Department and provides information on how Mobile Black Spots Project fund can be utilised to better serve Australians in hard to reach areas that currently may or may not be of little commercial interest to the 3 major MNO's presently operating in Australia.

Due to our experience to date in other countries with similar challenges, we believe that the vision of mobile voice and broadband services in rural areas can be realistically implemented using existing broadband satellite backhaul and small cell technology.

Satellite backhaul is used globally to deliver cellular access to emerging markets, mobile black spots and other areas where the delivery of fibre or microwave back haul is either too difficult or too costly.

In Australia, the major Telecommunications Companies are focussed on providing state of the art cellular networks to areas where population density allows for a higher TCO rollout. As the populations of towns and communities get smaller as the distance from major population centres increases the TCO of delivering state of the art cellular networks is no longer economical / not as high a priority.

IPSTAR proposes to build, own and operate a network of base stations in rural and remote communities that utilise satellite backhaul whereby we develop an open access wholesale mobile network capability onto which MNOs could roam locally. We have already successfully used this model to deploy 3600 satellite backhaul BTS for the 3 major mobile carriers in Japan.

Considerations for Expressions of Interest

Paul Fletcher recently presented at the "ACCAN Connecting the Country: Rural, Regional and Remote Mobile" Forum, and agreed that the towns/communities that lobby the hardest will be the communities that will be more likely to receive funding to tackle mobile connectivity. We suggest some complementary methods to bolster a fair approach to determine a better balance of the Black Spot allocation.

We recommend that the Department of Communications considers the following additional factors when accessing validity of EOI.

1. Type of Service Required

The question for remote communities should determine what services they would want. If the result is that they want voice and SMS then suitable technology should be deployed. Ensuring that the right service goes to the right communities would keep the cost down per community allowing more communities to be served.

2. Zoning Australia

To quantify which areas qualified for funding, we recommend that the Department of Communications adopts ARIA+ from the University of Adelaide. ARIA+ is the standard Australian Bureau of Statistics (ABS) endorsed measure of remoteness and was developed by Professor Graeme Hugo. For further information on ARIA+ contact Jarrod Lange, Senior Research Consultant Australian Population and Migration Research Centre (incorporating GISCA - The National Centre for Social Applications of GIS), University of Adelaide.

The benefits of zoning are:

a. The ability to determine a ratio of budget by zone. Communities within each zone would then submit their case for funding approval.

b. For the technology provider the benefit of zoning is the ability to provide a bespoke solution. For example, some zones might have a lower requirement than others, thus CAPEX requirements for each site would vary.

Figure 1 illustrates how zoning works under the ARIA programme.

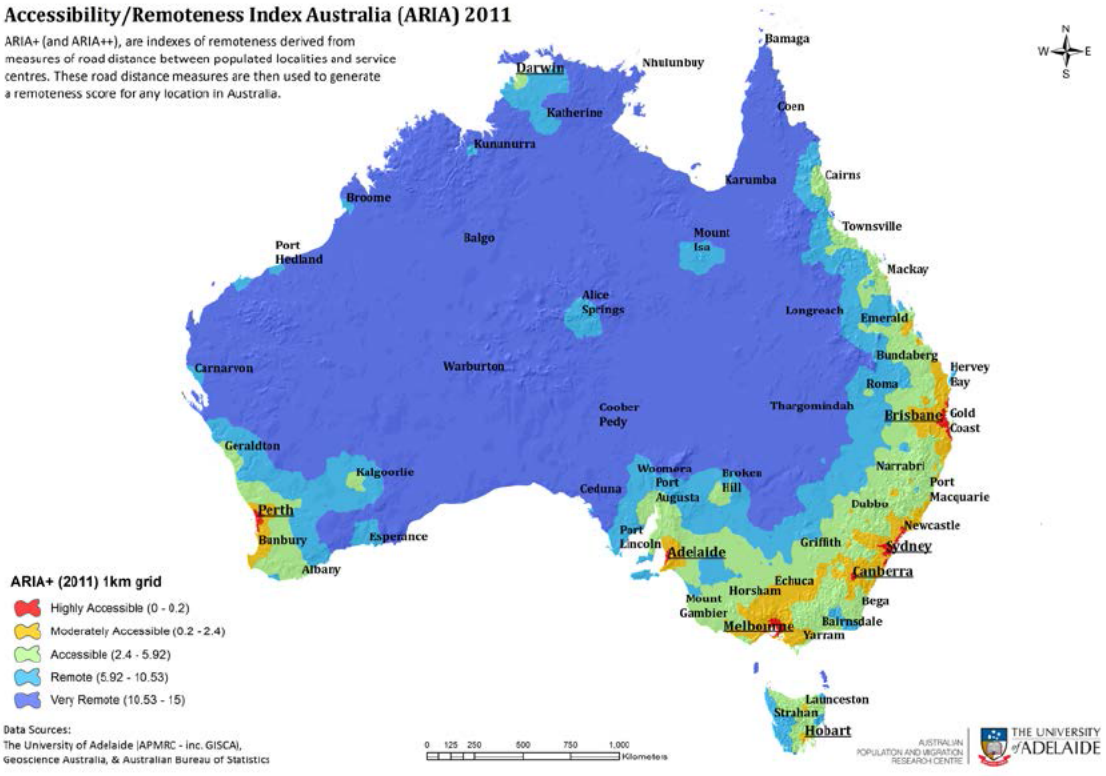

Figure 1: ARIA Remoteness Index

Using these 2 factors in combination with other factors provide:

1. Needs and use basis per community
2. Bespoke approach to the technology types available for each zone

Finally, we support any program to improve communications in Australia, whether IPSTAR Australia is part of it or not. We believe that satellite has a role in Australian telecommunications and that IPSTAR would be able to contribute effectively to this black spots project.

IPSTAR responses to Discussion Paper Questions

1. Would an appropriate minimum quality standard be that base stations must provide high-speed 4G LTE mobile broadband data communication services and also high quality 3G mobile voice and broadband data services? If this is not an appropriate minimum quality standard, what is?

IPSTAR Response:

It is our assumption that the communities identified for solutions that would require a satellite backhaul are unlikely to have any existing access to cellular coverage at all.

In this case the community may not require much more that voice and SMS. So it is our view that a balance of the community requirements combined with suitable technology should be the minimum standard.

It must be noted that the terms of the agreement is 10 years. A ten year technology roadmap is difficult to produce due to the constant development of telecommunications equipment and methodologies. One factor that will not change over a ten year period is that satellite will continue to remain the most economic solution for backhaul from these remote communities.

2. What are the most appropriate indicators that could be used to specify the minimum quality standards that should apply to the mobile services being provided through the programme? For instance, should it be a minimum received service signal indication (RSSI) in decibel-milliwatts (dBm)? A similar approach was adopted recently in the UK where a comparable programme specified a minimum RSSI for 3G voice and basic data service of -85dBm on roads and -75dBm in community areas (outside premises).

IPSTAR Response:

IPSTAR has no opinion on the minimum quality standard for signal strength. That is a decision for the MNO.

3. Does delivery option 2 for the $80 million Mobile Network Expansion component raise any additional issues that need to be considered?

IPSTAR Response:

In the introduction of this document we discuss the zoning of Australia according to ARIA+. We recommend an order of merit within the zones rather than a National approach to create equivalence to all communities. Such an approach would ensure that communities within each zone are only assessed against similar communities.

4. Could options 3(a) or 3(b) for the $80 million Mobile Network Expansion Project be delivered in conjunction with options 1 or 2 to enable network infrastructure providers to compete with MNOs?

IPSTAR Response:

IPSTAR does not see any benefit in competing against MNOs. Our Asia Pacific experience in delivering small cell infrastructure has been through various partnerships with Solution Providers or with MNOs.

5. Should bidders be able to propose to incorporate the use of base stations owned by NBN Co as part of their bid?

IPSTAR Response:

IPSTAR believes that sharing infrastructure is the most cost effective approach.

6. Should a joint bid (between a specialist network infrastructure provider and a MNO) be permitted? Should it be encouraged?

IPSTAR Response:

Absolutely. IPSTAR has a proven record of joint bids in other markets and have found that they are the most effective method to provide a suitable solution.

7. Is it realistic to expect specialist network infrastructure providers to provide backhaul (recognising that they would presumably need to contract with a third party to provide this)?

IPSTAR Response:

IPSTAR would provide satellite backhaul as a wholesale open access service to any MNO. There would not be a requirement for a specialist network infrastructure provider to be involved in providing satellite backhaul to suitable communities.

8. Is option 3(b) suitable for Australia's regional mobile market?

IPSTAR Response:

Combining a joint bid with a wholesale model is suitable for the Australian regional mobile market due to the following facts:

1. The current method hasn't succeeded and the Dept of Communications has had to intervene to encourage expansion.
2. The ability to provide a wholesale model where any MNO can connect to the IPSTAR satellite backhaul to supply a cellular solution in areas otherwise currently deemed unserviceable due to high TCO.

IPSTAR's Solution: Overview of Satellite Backhaul for Mobile Operators

A broadband satellite like IPSTAR can provide diverse solutions for mobile operators for backhauling from their remote nodes to their core network. IPSTAR supports various cellular technologies such as

GSM, CDMA, and 3G. Depending on the type of backhaul link in deployment, either E1 or IP and the total backhaul bandwidth required, different end modem solutions can be used.

IP based remote base stations can be directly connected to the IPSTAR UT, or SCPC modems. For E1 based base stations, an IP-MUX (IP-Multiplexer) can be used for E1 to IP conversion. The mobile operators' core network needs to be connected to IPSTAR Gateway through leased lines.

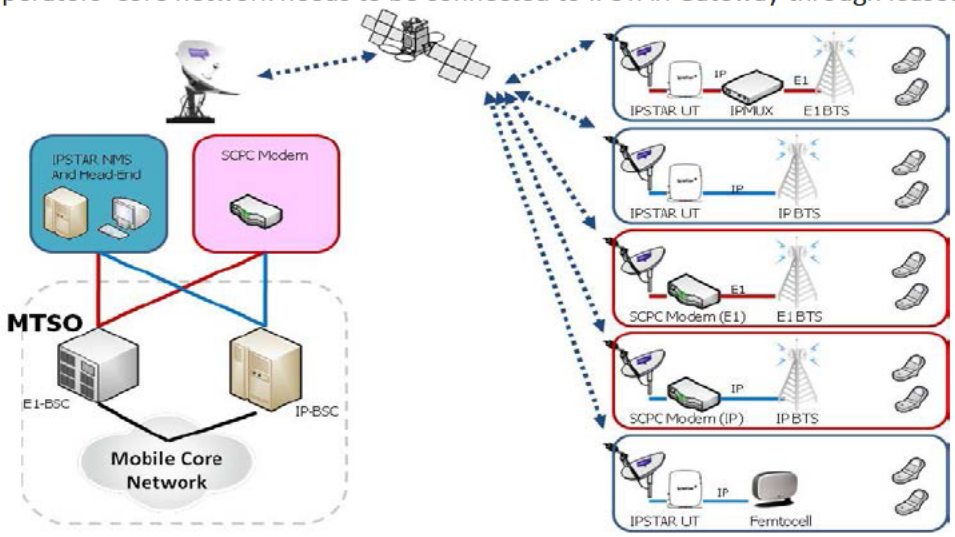

Figure 1: IPSTAR Backhaul for E1 & IP based base stations

TCO Comparison with Other Media

On a TCO (Total Cost of Ownership) comparison based on a 1 Mbps link, there is no doubt that fiber is the best medium for distances less than 15 Km from the base stations. For backhaul nodes located within 15-40 Km, microwave backhaul would be the preferred solution. However, microwave has limitations due to strict LoS (Line-of-Sight) requirements, limited availability of spectrum, and possibility of interference. For base stations located at distances further than 40 Km, a broadband satellite like IPSTAR is the optimum solution.

Small Cells - Solution for Rural Communities

A new technology in the field of mobile communications – Small Cells, is ideal for penetrating rural communities and providing cellular voice as well as broadband Internet services. A Small Cell is a cellular base station originally designed to be used in residential or small business environments, where the mobile network's coverage is weak or non-existent.

It was designed to connect to the mobile network using broadband ADSL or any other type of IP-based Internet connection. A small cell typically supports 8 or 16 concurrent voice calls, as well as access to data service. Small Cells from different telecom vendors are currently available for 2G, CDMA and 3G technologies—service providers can easily integrate them into their existing networks.

When a 3G small cell is chosen for deployment, it can easily provide the broadband speeds required for today's needs and applications. Although originally intended for indoor use with a small coverage of around 10 or 20 meters, Small Cells are increasingly being adapted for use outdoors with an extended range of up to 1 or 2 kilometers. Small Cells are plug-and-play devices with Ethernet interfaces and work immediately after connecting to a broadband Internet connection, without the need for any configuration.

Small Cells and IPSTAR Backhaul – Perfect Combination for Rural Communication

A Small Cell base station backhauled over IPSTAR enables rapid installation and deployment by mobile operators. The remote Small Cells base station can be setup within a few hours using a standard electric pole. The Small Cell AP (Access Point), a signal booster, and satellite modem can be installed inside a small weatherproof box. A standard Ku-band satellite antenna can be strapped to the pole and the omni-directional cellular 3G antenna placed on top of the pole, providing circular coverage of up to 1 or 2 kilometers.

Due to the low power requirements of Small Cells, these remote sites can be powered using solar panels and other alternative energy sources, if grid electricity is not available. The inexpensive cost of Small Cell equipment and accessories enables deployment of this service using lower CAPEX as compared to traditional base stations. Also, the lower bandwidth costs of IPSTAR as compared to a conventional satellite allow for the feasible operation of Small Cell service with reduced OPEX.

Applications of IPSTAR Backhauled Cellular Service

Mobile Operators these days have a wide range of choice regarding base stations that be deployed – from macro BTS, and micro BTS, to pico BTS and Small Cells. This provides them with service diversity which they can deploy according to requirements – thus targeting services based on population density, coverage area required, and ARPU of the region. IPSTAR has already tested different end modems and ground systems which can be selected according to bandwidth capacity required by the MNO. There are three broad categories of applications for which cellular backhaul over IPSTAR can be used:

A. Rural voice and broadband service (USO)

IPSTAR is an ideal satellite to provide voice and broadband solutions in rural areas away from the reach of terrestrial backhaul networks. IPSTAR has been effectively used in microcell and macrocell backhaul in various countries using IPSTAR UT, SCPC modems, or other ground systems.

Teams from IPSTAR work with mobile operators, and mobile equipment vendors to fine tune the system and reduce jitter so that the service performs within adequate levels of voice quality. The advent of Small Cell technology in recent years has greatly bolstered the deployment capability of mobile operators, with base stations on a single pole that can be deployed within a couple of hours.

B. Interim Solutions

The advantages of IPSTAR backhauled cellular service can also be leveraged as an interim solution for temporary coverage. Mobile operators generally have deployment plans spread over a long period of time. To reach some of the outlying areas, deployment of fiber may take a year or more; deployment of microwave also requires several months, requires strict line of sight, and possibly repeaters where distances to be covered are large. However, using a broadband satellite like IPSTAR, remote base station deployments can be done immediately. This enables the mobile operator to start generating revenues right away instead of waiting for several months or even years. Once the designated area has been covered by fiber, the IPSTAR satellite unit can then be moved to a more remote location.

C. Emergency Communications and Network Coverage Recovery during Disasters

Cellular backhaul over broadband satellite proved to be highly useful in the aftermath of the Great East Japan Earthquake and Tsunami of 2011. In addition to the tremendous loss of lives, the disaster caused extensive and crippling structural damages, including to that of communication networks. All the 4 major mobile operators of Japan had their infrastructure destroyed—with NTT Docomo, KDDI,

Softbank Mobile (SBM) and Emobile losing 6720, 3680, 3800 and 878 base stations, respectively, in 11 prefectures. In the immediate aftermath of the disaster, the mobile operators also used instant IPSTAR backhaul to provide mobile phone and Internet services in emergency shelters, schools, and community centers.

SBM and KDDI used Small Cells to provide mobile coverage in designated locations. Coupled with IPSTAR User Terminals, Small Cells became the ideal platform to provide instantaneous cellular service in disaster and emergency situations. Additionally, the mobile operators also used IPSTAR for its instant backhaul capability to bring back their service into operation. Base stations of various capabilities such as Pico BTS, Micro BTS, and even full capacity Macro BTS made use of IPSTAR backhaul to connect to their core network. This backhaul over IPSTAR was continued until the service providers recovered their capability and reconnected their lost terrestrial networks. Up to 500 base stations were backhauled via IPSTAR, with most of the deployments in the hardest hit Iwate and Miyagi prefectures.