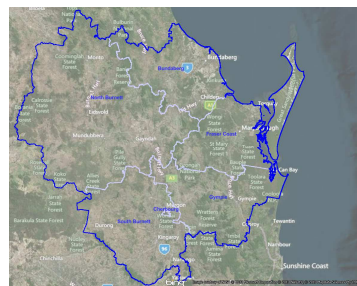


Wide Bay Burnett Regional Organisation of Councils Independent Broadband Testing Report

10 February 2014



DIGITAL
ECONOMY
GROUP



Strategy, Planning & Development
Implementation Programs
Research, Analysis & Measurement
Independent Broadband Testing
Digital Mapping



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Terms and Abbreviations

| Term/Abbreviation | Definition |
|---|---|
| ACMA | ACMA – Australian Communications Media Authority |
| IBT | Independent Broadband Testing by the Digital Economy Group |
| NBN | National Broadband Network |
| Mbps | Megabit per second – The most common measurement of internet data transfer |
| 2G & 3G | <p>2G When a call is made on 2G, a line is held open for the user's conversation throughout the duration of the call.</p> <p>3G, or third generation networks, operate in a different way to 2G networks. With 3G networks, the data sent across them is divided up into little 'data packets' which are reassembled in the correct order at the receiving end. This smart encoding means more data can be sent and it is sent more efficiently. In addition, 3G handsets can be in contact with more than one base station at a time and this provides improved performances in voice quality and data rates. Some people call 3G "mobile broadband" because the evolution is similar to the difference between dial up internet and the always available broadband internet services.</p> <p>http://www.emfexplained.info/?Page=25196</p> |
| dB | Decibel (a unit for power measurement) used here to quantify the ratio between values of raw signals and a meaningful set of numbers. The IBT uses a value range of 0-31. 0 is extremely poor through to 31 – top of the range. |
| GSM Mobile Telephony Mobile Broadband | <p>Global System for Mobile Communication</p> <p>Mobile Broadband enabled through HSPA technology is like having your home cable broadband experience delivered to your mobile phone or notebook.</p> <p>HSPA is part of the GSM 3G network and is (predominately) a software upgrade of the network infrastructure. To use the high speed variant, you need a mobile device that is HSPA-enabled - most new mobile phones and high-end notebooks have these as standard. For a full list of Mobile Broadband devices, click here.</p> <p>HSPA has a great legacy, coming from the GSM family, which delivers mobile communications to over a third of the world's population. It is the latest technology to enable even faster data rates for mobile users available today. The evolution has seen familiar acronyms such as GPRS (the first packet technology giving around 128kb/s) to EDGE (an enhanced version offering around 240kb/s) and then the introduction of 3G networks increasing the data rate to 384kb/s.</p> <p>The various enhancements on the HSPA route are as follows:</p> <p>HSDPA – High Speed Downlink Packet Access – the ability to receive large files to your mobile device such as email attachments, PowerPoint presentations or web pages. HSDPA 3.6mbps network can download a typical music file of around 3Mbytes in 8.3 secs and a 5Mbps video clip in 13.9 secs. Speeds achieved by HSDPA top 14.4Mb/s but most network operators provide speeds up to 3.6Mbps, with the rollout of 7.2Mbps quickly growing. HSDPA networks have been around for about 2 years and are deployed and offering mobile broadband right across the world.</p> <p>HSUPA – High Speed Uplink Packet Access – this is a further enhancement to increase the speed by which you communicate from your mobile device – for example, this enables you to upload videos to YouTube in seconds so that you can share the experience in real time. The upload speeds which were at 384kb/s with HSDPA are now increased to a maximum of 5.7Mb/s.</p> <p>HSPA+ – this is also known as HSPA Evolved, is the next step and is more focused on delivering data services enabling speeds of up to 42Mb/s in the downlink and 11Mb/s in the uplink. HSPA Evolved will be available in late 2008 early 2009.</p> <p>GSM is now used in 219 countries and territories serving more than three billion people and providing travellers with access to mobile services wherever they go.</p> <p>GSM An open, digital cellular technology used for transmitting mobile voice and data services</p> <p>GPRS A very widely deployed wireless data service, available now with most GSM networks</p> <p>EDGE GSM Evolution (EDGE) technology provides up to three times the data capacity of GPRS</p> <p>3G/WCDMA</p> |

| Term/Abbreviation | Definition |
|----------------------------|--|
| | <p>The air interface for one of the International Telecommunications Union's family of third-generation mobile communications systems</p> <p>HSPA</p> <p>The set of technologies that defines the migration path for 3G/WCDMA operators worldwide</p> <p>LTE</p> <p>Designed to be backwards-compatible with GSM and HSPA, Long Term Evolution incorporates MIMO in combination with OFDMA</p> <p>Services</p> <p>GSM is fast becoming the most popular way to deliver information, communication and entertainment services to people worldwide</p> <p>GSM Roaming</p> <p>The ability for a customer to make and receive calls, send and receive data, or access other services when travelling outside the coverage area of their home network</p> <p>IMB</p> <p>A technology, defined as a part of the 3GPP Rel. 8 standard, which enables spectrally-efficient delivery of Broadcast services using TDD radio techniques.</p> <p>http://whirlpool.net.au/wiki/mobile_phone_frequencies</p> |
| WiMAX | WiMAX, the Worldwide Interoperability for Microwave Access, is a telecommunications technology aimed at providing wireless data over long distances in a variety of ways. |
| Wi-Fi | Wi-Fi, short for Wireless Fidelity, is the term used to describe high speed wireless connection over short distances between mobile computing devices such as laptops and the internet. |
| Femtocells | Femtocells are low-power wireless access points that combine mobile and Internet technologies within the home and operate similar to a cordless phone. |
| Bluetooth | Bluetooth wireless technology is a short-range radio technology that uses radio frequency fields to transmit signals over short distances between telephones, computers and other devices. The technology offers simplified communication and synchronization between devices without the need for cables. |
| DECT | DECT stands for Digital Enhanced Cordless Telecommunication. DECT is a common standard for cordless telephones and is a radio technology suited for voice, data and networking applications in residential, corporate and public environments. Many cordless phones used in residential homes use DECT technology. |
| LTE | LTE (Long Term Evolution) is the next major enhancement to mobile radio communications networks. LTE is a standard that is being finalised as part of the future evolution of 3G, 4G and beyond, which incorporates significantly increased data rates and better performance to enhance the mobile broadband experience. |

Sources - Various including:

<http://www.emfexplained.info/?ID=25216>

<http://www.gsmworld.com/technology/index.htm>

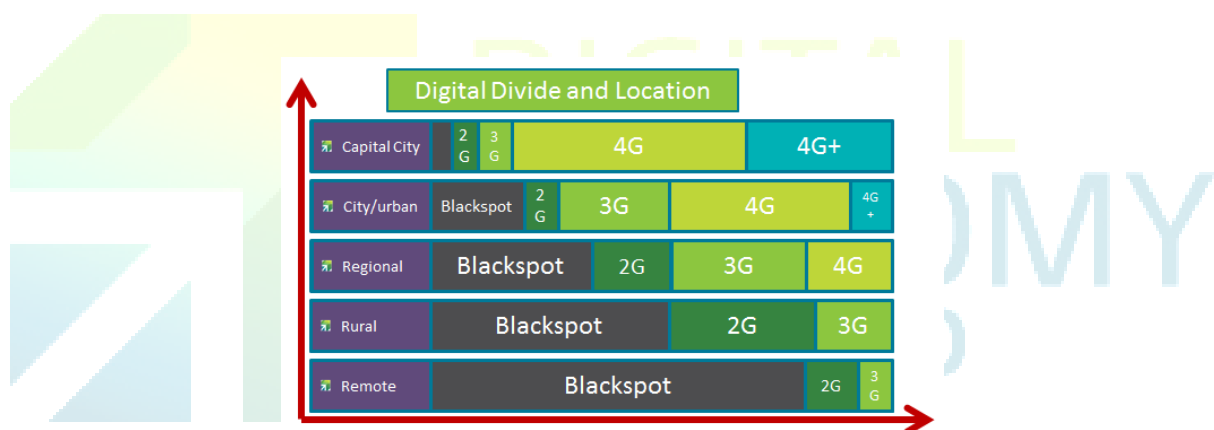
<http://www.gsmmobilebroadband.com/about/>

1. Executive Summary

Mobile connectivity, for phone calls and broadband, has become a utility expected by business, residents and the community where ever they go. The rapid development of new technologies and faster connection options has resulted in regional and rural areas of Australia being on the wrong side of the 'Digital Divide'. In our capital cities there are virtually no Blackspots for coverage and rapid deployment of the latest generation of connectivity. On the other side of the 'Digital Divide' Blackspots form the largest part of the landscape and their townships have technology a generation or two behind.






For regions like Wide Bay Burnett, the challenge is to find ways to partner with the three privately owned carriers to reduce the extent of Blackspot coverage. They must seek to drive expanded and advanced deployment of the best generation technology the carriers are prepared to invest in to generate their private company need for profit. Another avenue to improve coverage is to access the Blackspot Funding Program to be developed as a result of the policy released in the lead up to the Federal election.

For local government, managing the region in times of disaster or emergency, to providing a positive experience for visitors and delivering greater productivity for businesses is now a constant requirement for successful regions.



The Digital Economy Group (DEG) has been working with local governments and regional organisations for a number of years to benchmark carrier performance and identify priorities to reduce Blackspots and improve coverage for their communities. DEG also helps with the advocacy with the carriers and building the long term partnerships needed to improve the regions position on the digital divide.

The Wide Bay Burnett Regional Organisation of Councils (WBBROC) engaged DEG earlier this year to:

-  identify the Blackspots for each council,
-  test the network performance to identify where network upgrades are required
-  list the priority locations and short list for the region to pursue
-  prepare an advocacy program for the WBBROC to work through with the carriers and other levels of government
-  facilitate the initial meeting with carriers and guide councils on the best methods to partner with carriers to see the priorities delivered on.


A total of 2682 klms of roads were driven following a review process where each council identified priority locations for testing. Additional testing above the 2000klm base was completed in respective council areas in response to local priorities, predominantly focused around informing disaster management plans.

A total of 115 individual network site tests were completed across the region to test the validity of the coverage maps and confirm the signal strength maps translated into actual connectivity. Ten time series network tests were performed to illustrate the quality of each respective network and associated reliability. The individual council priorities have been developed based on the tests collected across the region and assessed against the carrier network infrastructure.

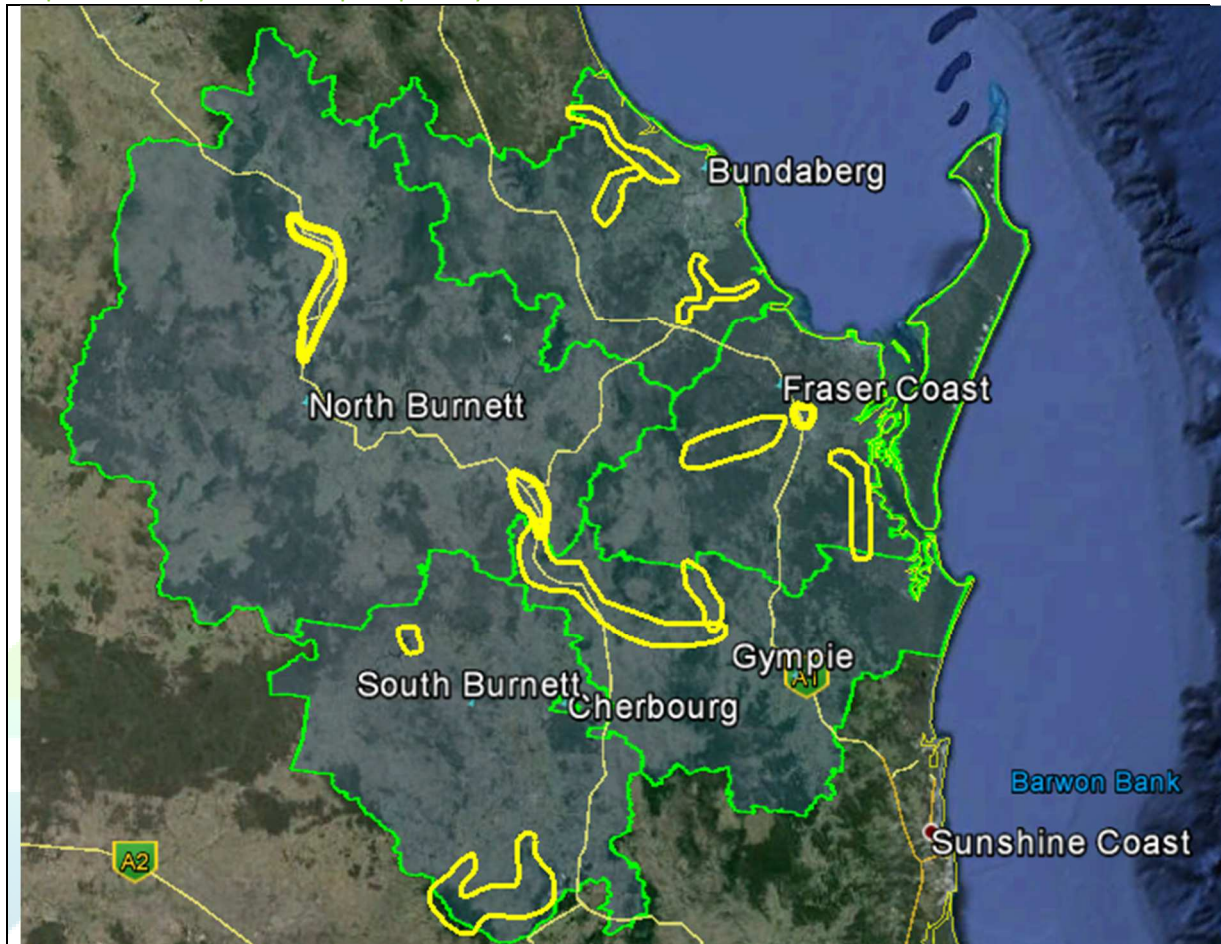
The following short listed regional priorities have been selected as the top two priorities for each of the 5 major local government areas (Cherbourg is included with South Burnett). All test results have been used to prepare the final coverage maps and inform the top priority locations for the region

The 10 top priority locations for WBBROC are:

-  **[Regional Priority - Bundaberg]** A radius of 15klms around Goodwood (towards Childers, Bundaberg and Woodgate). These three road sections have Blackspots for all three carriers, combinations of two or individual carries. Black Spot Funding
-  **[Regional Priority - Bundaberg]** Bucca, surrounds and Bundaberg-Lowmead Rd. Pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding.
-  **[Regional Priority – Fraser Coast]** The Maryborough-Biggenden Rd Blackspot from Aramara to west of the Bruce Highway This road section has Blackspots for all three carriers, combinations of two or individual carriers. Black Spot Funding
-  **[Regional Priority – Fraser Coast]** The Cooloola Coast Road to the boundary with Gympie. Pervasive Blackspots for all three carrier, combinations of two or individual carrier. Blackspot Funding
-  **[Regional Priority] – Gympie]** The Burnett Hwy (NBRC boundary - Tansey), Kilkivan Tansey Rd, Wide Bay Hwy (Kilkivan - Bells Bridge) to the Bruce Highway. Extensive pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding. Consider joining with North Burnett as the Blackspot extends to Ban Ban Springs.
-  **[Regional Priority- Gympie]** The Broweena—Woolooga Rd from Broweena to the boundary with Gympie. Woolooga in particular appears to be a growing township with no coverage. Pervasive Blackspots for all three carriers, combinations or two or individual carrier. Blackspot Funding. Consider joining with the Maryborough to Broweena
-  **[Regional Priority – North Burnett]** Burnett Highway from Ceratodus to south of Monto – extensive and pervasive Blackspot area for all three carriers. Occasional coverage patches along a major inland transport route. A candidate for the Blackspot Funding Program
-  **[Regional Priority- North Burnett]** Burnett Highway from boundary with Gympie to Ban Ban Springs. Potential to partner with Gympie and extension of this Blackspot almost to the Bruce Highway. Occasional coverage patches along a major inland transport route. A candidate for the Blackspot Funding Program
-  **[Regional Priority - South Burnett and Cherbourg]** Bunya Mountains – Some limited coverage interspersed with sections of three carrier and two carrier Blackspots. Significant tourism area for South Burnett with active farming businesses along the affected route. A candidate for the Major transport route or seasonal Blackspot Funding Program

-  **[Regional Priority- South Burnett and Cherbourg]** Boodooma Dam and surrounds. Telstra Blackspot at the Dam and Blackspot for Optus and Vodafone in sections from Proston. Candidate for the Seasonal Blackspot Funding Program

Map 1: Wide Bay Burnett top 10 priority Areas



Source: Bing, MapInfo, Queensland Local Government Areas, ASGC 2008; DEG 2013

The DEG report forms the initial basis for effectively seeking to reduce Blackspots and progress to a higher standard of communications coverage.

The regional Councils will now build a partnership with the carriers based on knowledge of their networks and an insight into Carriers intent to deliver a high standard where it is commercially viable. A key part of building the partnership with carriers is to demonstrate a willingness to encourage the uptake of services on the network by providing a good communications program. When developed in consultation with the carriers, independent of individual carriers, business and community can identify ways to use mobile networks to achieve productivity benefits for their business. This helps carriers to achieve greater viability for investment.

The Mobile Coverage Funding Programme to be released by the Commonwealth Government this year is another important opportunity. With a total of \$100mil available to leverage carrier investments and in partnership with local government and other regional stakeholders, WBBROC is well positioned to seek a proportion of this funding for the region. The preparation of a business case for specific locations that builds on this report is strongly recommended to help prepare the region for the release of 'requests for proposals' during 2014.

Finally, advocacy by the key political representatives of the region highlighting the need for reducing Blackspots, preparing the region for periods of disaster and attracting greater business investment will be critical.

Through ongoing WBBROC facilitation of mobile communications coverage and good partnerships the Wide Bay Burnett region has the potential to influence the carrier investment programs, achieve better services for the region and move to the right side of the digital divide.



2. Introduction

Mobile Phone and Broadband services continue to be the major growth area of the Australian telecommunications market. Mobile use of the internet for business and personal use is a major influence in this growth.

At the time Australia's population had reached 22.8 million (30 June 2011¹) there were 29.28 million mobile services (voice and data). Telstra reported recently that 4G data use was doubling every 4 months and the number of 4G customers had doubled in 6 months. This is significant for all areas of Australia as the rapid growth is forecast to continue creating a digital divide for those areas where mobile connectivity is reduced or compromised compared with the capital cities.

In the recent federal election campaign, the Coalition released a policy² based on one of the recommendations of the 2011-2012 Regional Telecommunications Review³. Their policy focusses on the need for mobile coverage Blackspots to be co-funded by the government and carriers and looks to state and local government for in-kind support. Communities with the independent analysis and an advocacy plan (including the level of localised support) will be best placed to have success in this competitive process.



In recognition of these significant trends, the Wide Bay Burnett Regional Organisation of Councils (WBBROC) has engaged Digital Economy Group (DEG) to undertake Independent Broadband Testing (IBT) in the six council areas across the region. Throughout the testing and report preparation, DEG has worked closely with WBBREDAC, the advisory committee to WBBROC for economic Development. WBBREDAC has representatives from the Economic Development Units of each of the ROC member Councils as well as representatives from Regional Development Australia (RDA), Queensland Department of State Development Infrastructure and Planning and the business community. The WBBREDAC is responsible for representing the regional economic development interests of WBBROC and manages implementation of five priority projects of regional significance focused on the following concepts:

1. 'Liveable Cities – Liveable Towns'
2. Digital Economy Support
3. Rural Innovation Centre
4. Experiential/Outdoor/Eco-Tourism
5. Economic Scenario Planning.

The WBBROC councils have identified that mobile broadband is as critical to the regions success as the deployment of the National Broadband Network fixed broadband services. The objective for WBBROC in using the IBT is to establish the current level of mobile broadband infrastructure in the region. Through advocacy and communication strategies WBBROC is seeking to increase carrier competition, coverage and capacity.

2.1. IBT Next Steps

With the completion of the final report, the next steps are:

-  Advocacy meetings with Telstra, Optus and Vodafone including both informal discussions and a workshop style meeting
-  Beyond the initial DEG contract WBBROC are encouraged to

¹ Australian Bureau of Statistics, 2006 Census.

² <http://lpaweb-static.s3.amazonaws.com/Policies/MobileBlackSpotProgramme.pdf>

³ http://www.rirc.gov.au/2011-12_report/

- continue to meet with the carriers on a regular basis and offer to facilitate the identification and support (appropriately) any Development application for new sites
- develop communications materials (web-based) in partnership with, but independent of, the carriers providing business and the community with independent advice on how to connect to and use broadband to improve connectivity and productivity
- prepare detailed business cases for priority Blackspot locations as a precursor to the release of the Mobile Blackspot funding program








3. Methodology

The methodology used by DEG for Independent Broadband Testing (IBT) has been developed over four years of ground proofing and evolving discussions with carriers. The methodology follows seven steps:

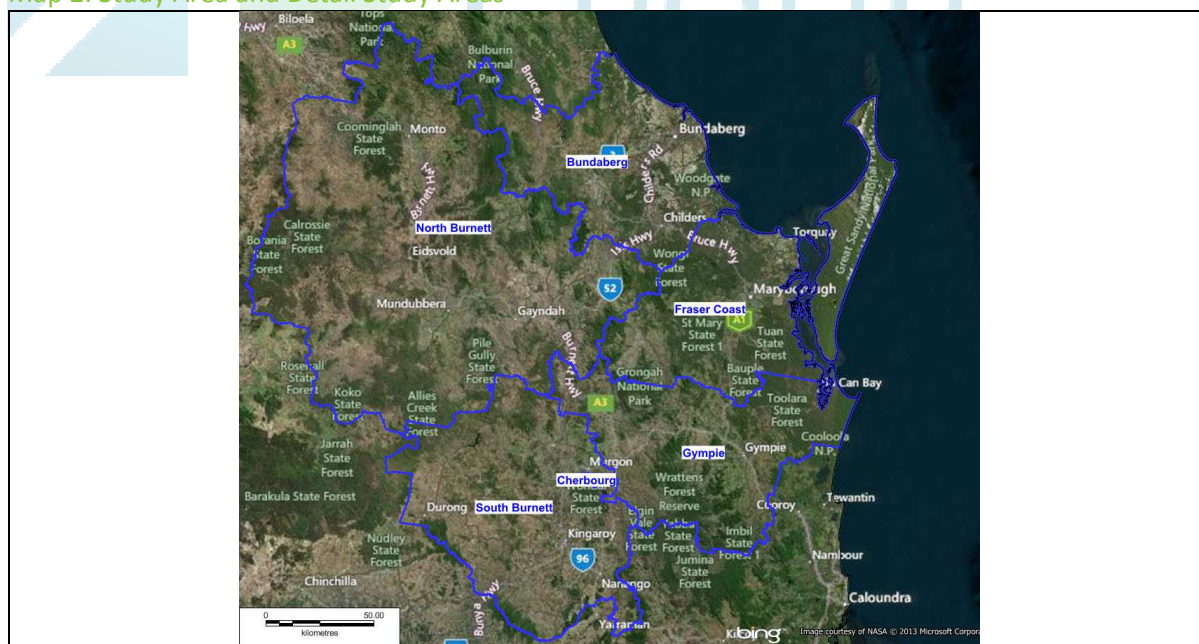
1. Understanding the study area
2. Capturing current carrier coverage maps
3. Using ACMA⁴ radio licence information for current carrier infrastructure
4. Identifying priority routes and network site testing locations to validate the network performance
5. Completing the three selected core testing methods:
 - 5.1. Mass Signal Test
 - 5.2. Network Site Test and
 - 5.3. Time Series Test
6. Comparing and contrasting the information sourced from the first five stages to determine priority network upgrades
7. Either advocating for the upgrades on behalf of the client or providing a detailed implementation plan for localised implementation

3.1. The Study Area

The whole WBBROC area forms the study area. The study area has been further split into detailed study areas for each of the local governments. Cherbourg is included with South Burnett throughout the report. The areas are as follows:

-  1 – Bundaberg RC
-  2 – Fraser Coast RC
-  3 – Gympie RC
-  4 – North Burnett RC
-  5 – South Burnett RC and Cherbourg ASC

Map 2: Study Area and Detail Study Areas



Source: Bing, MapInfo, Queensland Local Government Areas, ASGC 2008; DEG 2013

⁴ ACMA – Australian Communications Media Authority

3.2. Current Carrier Coverage

Each of the three current active carriers publish indicative mobile broadband coverage maps on their respective websites^{5 6 7}. Carrier coverage maps are updated and modified from time to time. The capture of this information allows DEG to establish the baseline coverage for each carrier in each of the detailed study areas (Attachment 1). These maps will allow the reader to compare current advertised coverage for each of the carriers as it relates to their own localities. This baseline information is a key reference point for expectations relating to the service levels of each of the carriers.

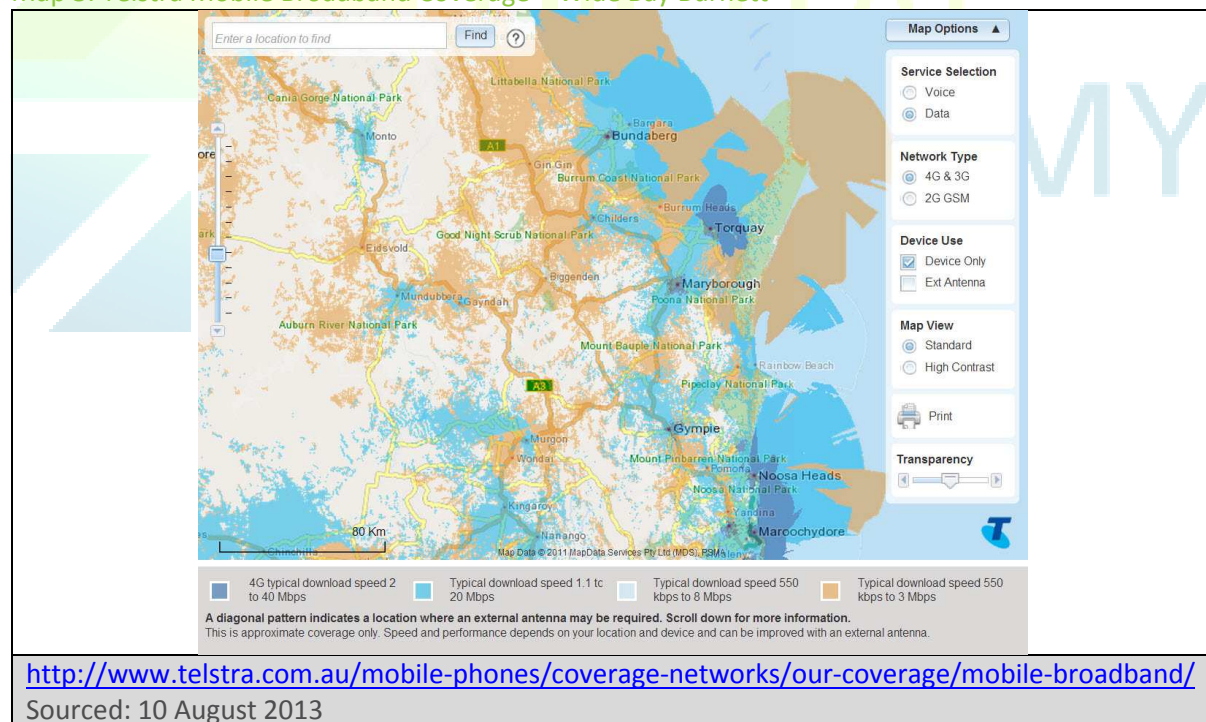
Note: Each of the carriers provide detailed caveats regarding the propagation characteristics of networks and mobile broadband. Current versions of these considerations can be found on the relevant carrier websites as it changes from time to time.

Telstra initial observations

Based on an initial scan of the following map, a number of initial observations can be made about the mobile broadband coverage by Telstra:

- Gympie, Maryborough, Torquay and Bundaberg each have 4G services (dark blue areas)
- the Sunshine Coast in contrast has extensive 4G coverage from the northern Noosa to south of Caloundra
- large areas of non-service particularly in the hinterland

Map 3: Telstra Mobile Broadband Coverage – Wide Bay Burnett



Optus initial observations

Based on an initial scan of the following map, Optus has:

- no 4G services currently established in any of the WBBROC areas
- they have identified future 3G service expansions proposed for 3 broad areas of WBBROC

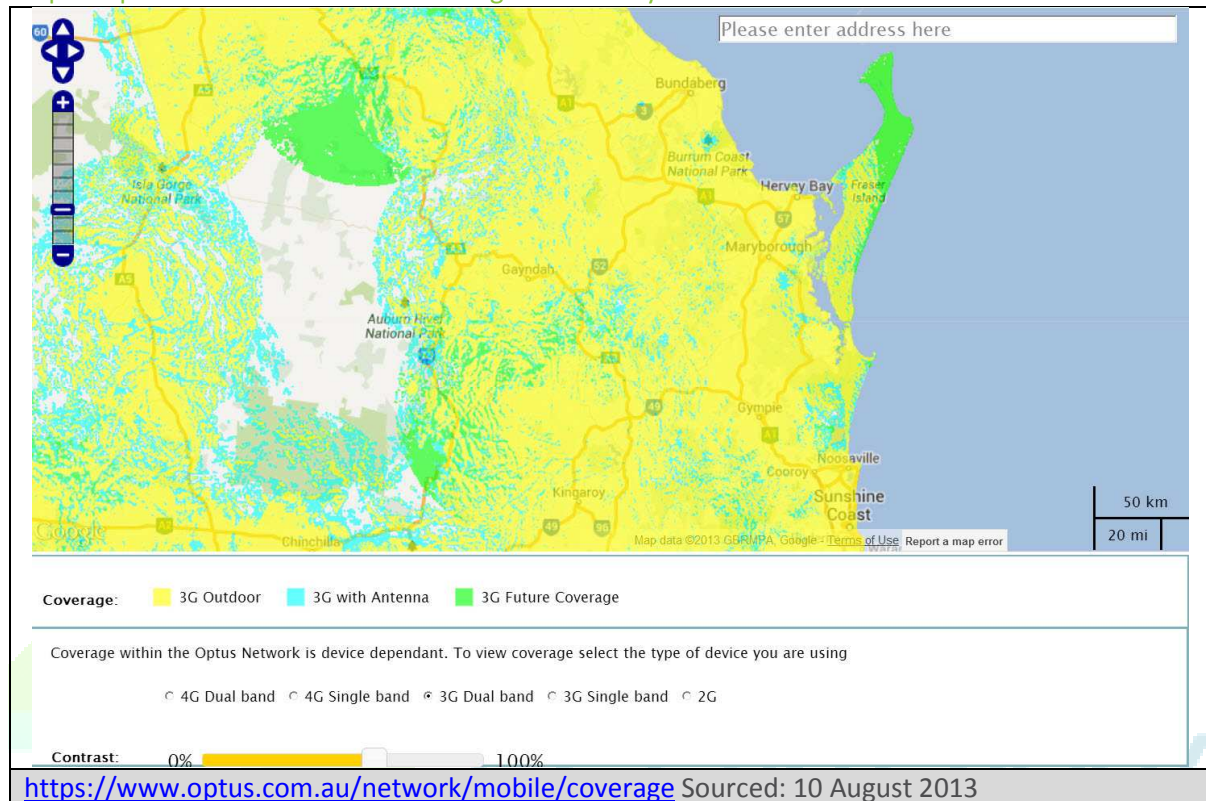
⁵ <http://www.telstra.com.au/mobile-phones/coverage-networks/our-coverage/mobile-broadband/>

⁶ <http://www.vodafone.com.au/aboutvodafone/network/checker>

⁷ <https://www.optus.com.au/network/mobile/coverage>

- Indicate stronger coverage of the region for mobile broadband than Telstra. The IBT process will seek to validate this.

Map 4: Optus Mobile Broadband Coverage – Wide Bay Burnett



Vodafone initial observations

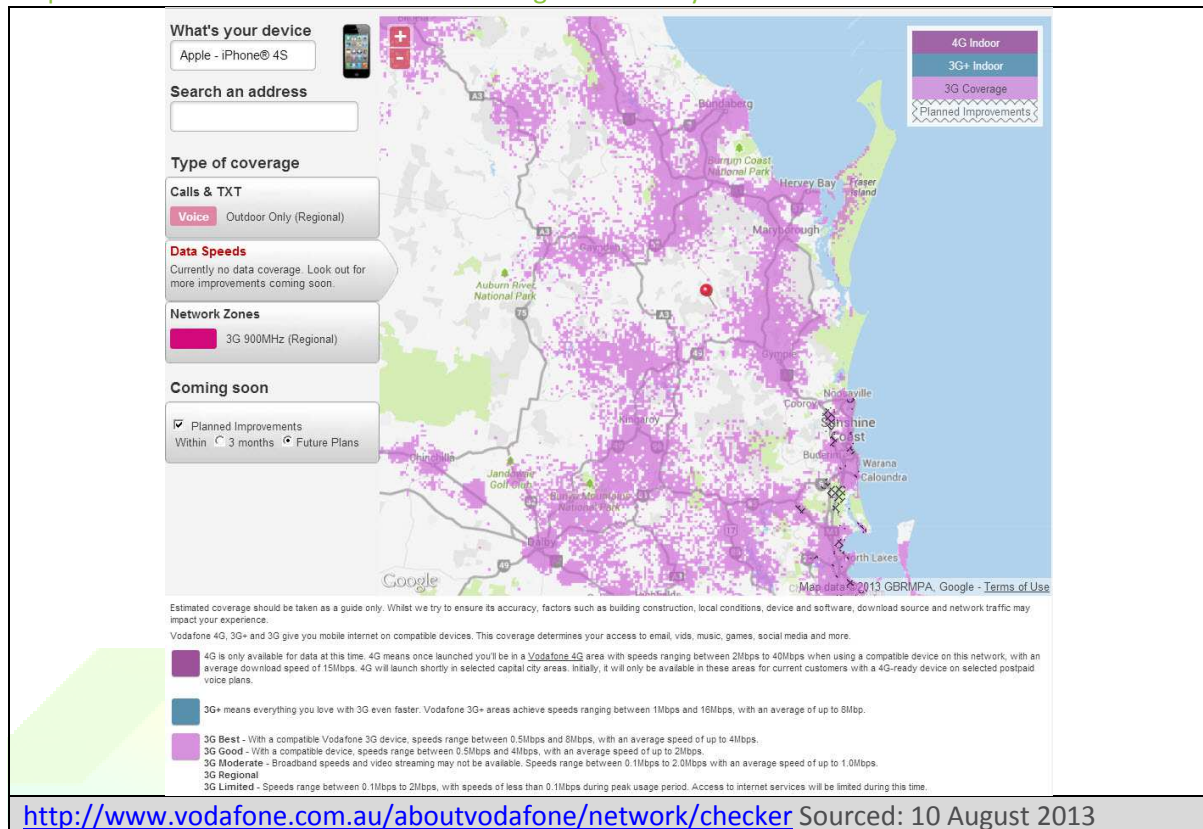
Based on an initial scan of the following map, a number of initial observations can be made about the mobile broadband coverage by Vodafone:

- there is currently no 4G coverage in any location across the study area
- 3G is limited across the region and outside of the heavily urbanised areas is unlikely to support a mobile workforce.

Vodafone notes on their network

- the 2G network is a basic mobile phone network which covers 94.5% of the places you live and work. It is generally stronger outdoor than indoor. Where you have 2G coverage, you should be able to call, text, PXT, instant message and use voicemail.
- the 3G 900MHz network is suited to rural areas where there is a large distance between cell sites. Where you have 900MHz coverage you should be able to call, text, PXT, use voicemail access the internet and send and receive emails (although speeds will be slower than 3G 2100/850MHz area). You will need a compatible device to access the network.
- the 3G 2100MHz network is ideal in urban areas where there is a small distance between the cell sites. It allows more people to use the same cell. Where you have 900MHz coverage you should be able to call, text, PXT, use voicemail access the internet and send and receive emails. You will need a compatible device to access the network.
- the 3G 850MHz network is designed to deliver better call quality, fewer dropped calls and faster data speeds than ever before. You will need a compatible device to access the network.
- the 4G 1800MHz network is designed to deliver faster data rates than ever before. You will need a compatible device to use this *data only* network

Map 5: Vodafone Mobile Broadband Coverage – Wide Bay Burnett



3.3. Testing Methodology

The Digital Economy Group IBT has used three of its four testing methods for this report. They are:

1. Mass Signal Test
2. Network Site Test
3. Time Series Test

Each testing method serves to build a comprehensive picture of the service standards from all three carriers and inform the priority builds across the tested area.

The WBBROC have contracted DEG to undertake all three testing methodologies

3.3.1. Mass Signal Testing

The Mass Signal Testing in the WBBROC area will include approximately 2,000kms tested roads for each of the three carriers using Telstra, Optus and Vodafone devices with markers generated every 100 metres. This will produce almost 60,000 markers for the whole region.

The tests are exported to a GIS platform to allow a rapid on site assessment of the full range of signal strengths from Low Signal Range to High Signal Range and Blackspot locations. This assessment phase also involves a comparison of the test results with the carrier advertised coverage maps.

The Mass Signal Test involves the capture of modem signal strengths from 0 through to 31. Where the signal is zero, a Blackspot is registered. The remaining 31 bands are broken into:




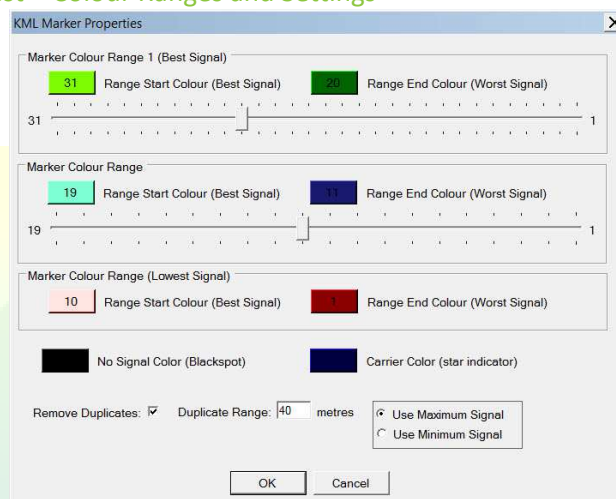
-  1-10 (red shades) as the Low Signal Range, poorest signals
-  11-20 (blue shades) as the Mid Signal Range representing the middle of the spectrum and
-  21-31 (green shades) representing the High Signal Range and the strongest signals possible.

Figure 1: Mass Signal Testing – outlying subdivision (left) & Mass Signal Testing – Town Centre (right)



Sources: Google Earth Pro and DEG IBT 2012

Figure 2: Mass Signal Test – Colour Ranges and Settings



Blackspots and the Poor Signal Range become the priority locations for more detailed assessments. The IBT testing team drive the major arterials and key roads of the chosen testing area. More detailed Mass Signal Testing is undertaken closer to the major urban locations. Distances between testing frequencies can vary but typically 100 m intervals provide a high standard coverage.

The Mass Signal Test evaluates the strength of the signal from the local tower to the testing location.

3.3.2. Network Site Tests

The Network Site Tests in the WBBROC area will include approximately 100 tests spread across all of the 6 local government areas. These tests are sited to evaluate the performance of specific Carrier sites and where possible also test spectrum performance.

The Network Site Tests (NST) are completed to validate the MST results and to challenge the carrier network with download, upload and network response time. This test methodology reflects a real world scenario for a user, downloading a 2Mb item and uploading a 500kB item. Both tests are aggregated into a score as seen in Table 1 below.

Table 1: Network Site Test Scores and Relative User Experience

| Score | Download Speed ⁸ | Upload Speed | User Experience |
|-------|-----------------------------|--------------|---|
| 0 | 0 | 0 | Black spot – unable to connect to a remote server |
| 1 | 0.01 – 0.25 | 0.01-0.06 | Narrow Band - Dial Up Speeds - Slow page loads suits text only |
| 2 | 0.26-0.50 | 0.07-0.10 | Very Slow Broadband - Slow page loads suits text and small photos only |
| 3 | 0.51- 0.99 | 0.11-0.15 | Entry level broadband – 3G very little interaction. Can download multi-media but slow and unreliable experience |
| 4 | 1.00 -1.99 | 0.16-0.26 | Passable broadband – 3G very some interactivity, can download multi media |
| 5 | 2.00 -2.99 | 0.27-0.51 | Medium speed for single one way experience. Provides a low two way experience |
| 6 | 3.00 – 3.99 | 0.52-0.77 | High speed for 3G connections – provides a medium level one way experience and some two way experience |
| 7 | 4.00 – 4.99 | 0.78-1.00 | Very high speed for 3G connections – provides a high level one way experience and entry level two way experience |
| 8 | 5.00 – 9.99 | 1.01-1.50 | 4G – only currently available on Telstra network in the study area. Optus and Vodafone are now beginning to deploy their 4G networks. 4G is a data network and takes the pressure off the 3G phone and data network. |
| 9 | 10.00 – 19.99 | 1.51-2.00 | 4G – Ultra high speeds in close proximity to access nodes and providing great consumer and business experiences. |
| 10 | 20.00 – 49.99 | 2.01-2.50 | 4G networks in some locations are achieving speeds in this level. Business to Business solutions |

Tests are re-run in locations where the result is incongruous with the coverage maps. In the result validation stage some results are removed to ensure a clean and accurate set of results are presented. As a result there is not always an equal number of test results.

3.3.3. Time Series Testing

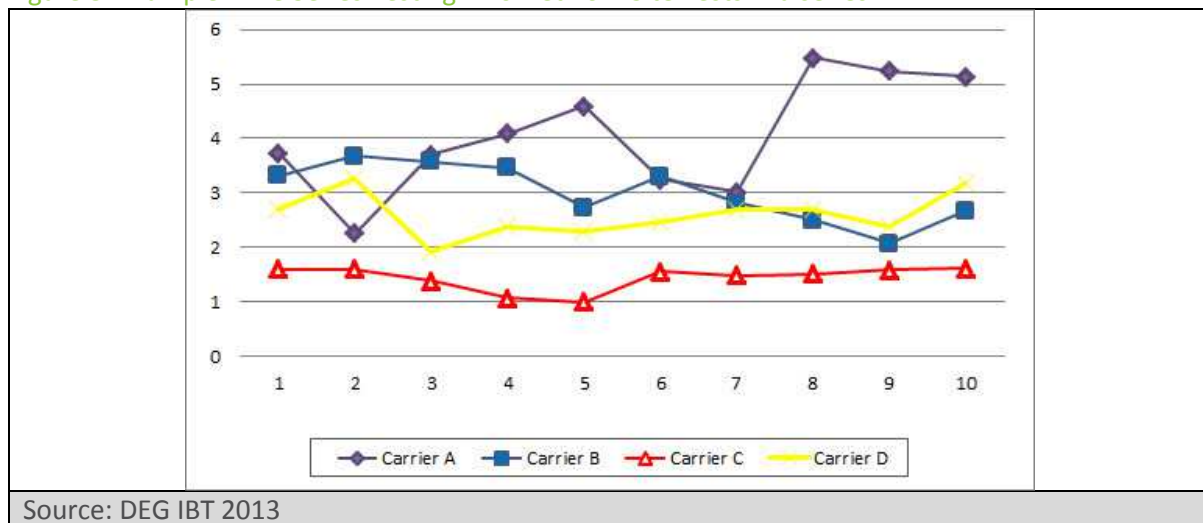
The primary Time Series Test (TST) used in the Independent Broadband Testing program is 10 Network Site Tests in a series. This serves to validate the individual Network Sites Tests and puts the individual networks and the devices under a spot light. The overlay of all three test results onto the same graph (sample below) clearly illustrates the network performance.

A sample of 10 Time Series Tests combined with up to 100 individual Network Site Tests establishes a robust profile of the carrier performance confirms strengths and highlights weaknesses.

The 10 sites to be used for the WBBROC testing program will be spread across the 6 local government areas and aim to illustrate the performance of networks with higher and lower investment strategies.





⁸ 8 Mbps – Megabits per second

Figure 3: Example Time Series Testing – 10 Network Site Tests in a series



3.3.4. Testing Equipment and Presentation Limitations

While all care is taken to ensure the highest quality data capture and result presentation, there are a number of known limitations:

-  tests are taken at a point in time and repeated tests may show some variation due to network performance, weather and electronic interference. Where Time Series Testing is used, this serves to validate the Network Site Test results.
-  any network based on radio technology, device quality or local conditions may prevent or interfere with mobile reception within coverage areas. e. g. inside concrete buildings, lift wells, basements, tunnels and road cuttings. High rise buildings may also suffer degradation of service
-  all results are indicative of signal strength at one point in time at any given location from a given provider, are not represented in a time scale over, and therefore are not necessarily representative of the mean signal strength in any place over a given period of time
-  variations between equipment can assist or limit the results. DEG use identical notebooks, cables etc. to remove most of the potential variables.

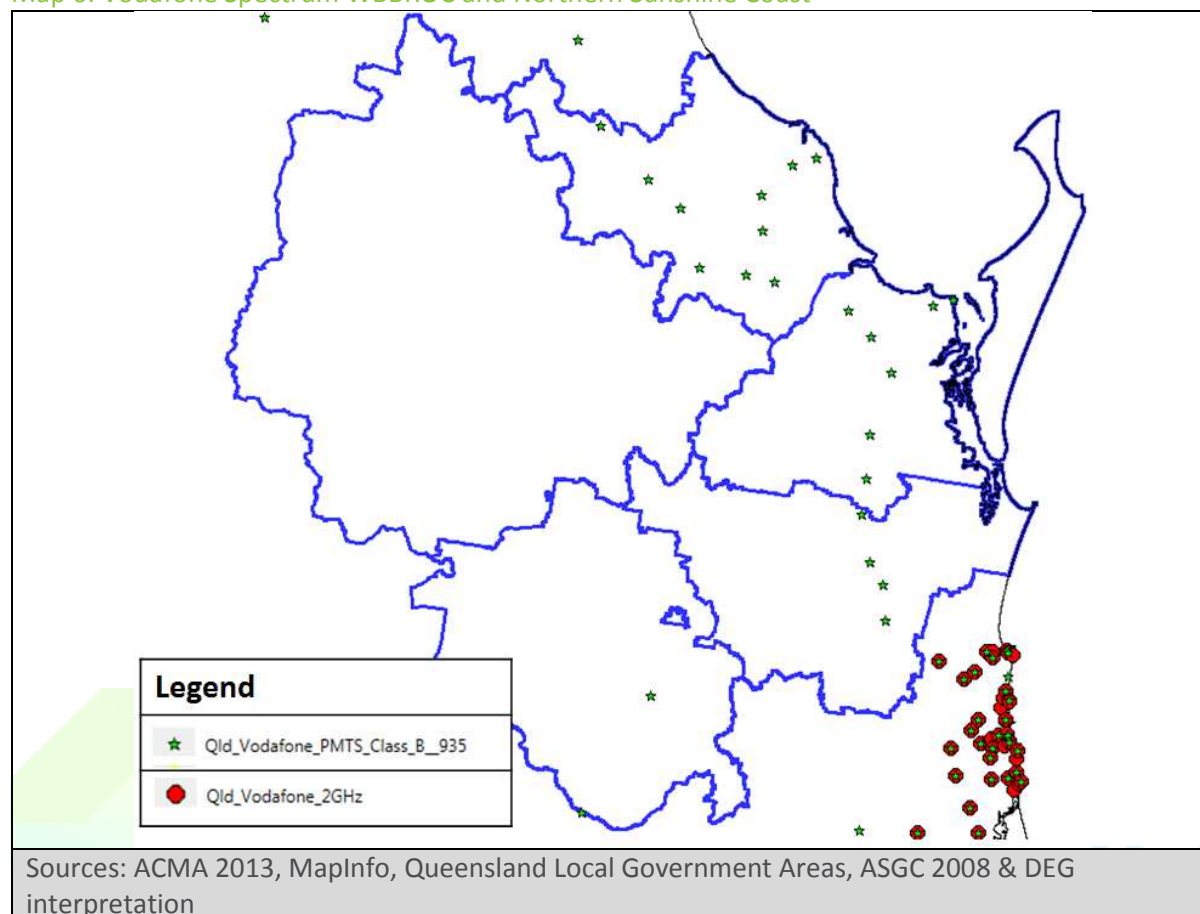
3.4. Carrier Infrastructure Baseline and Benchmarking

The carrier infrastructure baseline establishes the number of sites each carrier has in the area, the number used for retransmission only and the spectrum currently deployed. Each of these components are mapped and captured into a table for the whole WBBROC area and individual detailed study areas.

This information is then used by each council as the starting point for their digital infrastructure portfolio and associated advocacy discussions with carriers.

Benchmarking against other regions helps to inform the gap analysis and potential network investment upgrades carriers are prepared to make. The Map below highlights the benefit of benchmarking. Vodafone currently has 23 sites in the study area providing a single band of coverage (900MHz) as shown by the green stars. The Sunshine Coast in contrast has two bands of coverage across most of its area. The deployment of two or even three bands of spectrum by carriers provides for stronger network performance in and out of buildings. The utilisation of benchmarking comparisons will be important during the advocacy phase and the development of business cases for investment.

Map 6: Vodafone Spectrum WBBROC and Northern Sunshine Coast



3.4.1. Carrier Baseline

The carrier baseline developed below uses the most recent release of ACMA data (capturing licence information up to the 30th June 2013). The full database contains over 30 columns of information and many thousands of licences for all radio frequency licences in Australia. This has been filtered to ensure only the Telstra, Optus and Vodafone radio licence information is used. This is further filtered to remove satellite earth receive and send sites, navigation and aeronautical equipment maintained by these companies.

Mobile broadband networks have two key components. The first is the transmission network which sends and receives data signals to the site and the second is the local access network – from the user to the tower. The transmission network can be connected to a tower in two ways – either directly by optic fibre or wireless microwave. Carriers prefer to have optic fibre connectivity for all sites however the microwave wireless network is more cost efficient to deploy to distant sites or in locations with relatively small data transfers. In rural areas it is more common to have microwave connectivity.

The transmission network usually consists of two types of set up. Point to point and point to multi point. Locations set up as point to point only are retransmission sites. They therefore have the potential to be upgraded with far less cost than a completely new site. A business case demonstrating the number of clients served or strategic benefit is still required. Of the three carriers, Telstra has more of these assets than Vodafone and Optus.

The local access network has one or more bands of spectrum deployed based on owned spectrum for the areas, expected traffic demands on the site and other related factors. Local Access licences

breakdown into the bands of spectrum deployed in the area. The acquisition of spectrum is expensive and complex as parts of Australia are broken into areas including urban and non-urban. Depending on the area and the population carriers, will seek to deploy spectrum to reflect their licences and the strongest attributes to give “coverage” to achieve the best possible results. Having two bands of spectrum deployed across the region is the minimum objective.

The table below illustrates the number of sites for each carrier by LGA and a total figure for the whole Wide Bay Burnett area. The final column includes the total number of licences for each category.

Both Telstra and Optus have deployed three bands of spectrum throughout the Wide Bay Burnett area. The 2GigHertz and 900MegHertz spectrum are deployed in more built up locations. In and around Brisbane, for example, these are the primary 3G networks.

The 2100 MHz (Mega Hertz) spectrum is typically used in more rural areas. Vodafone have only one spectrum deployed on the Wide Bay Burnett area and have the greatest potential for improvements.

Table 2: Carrier sites and spectrum licences

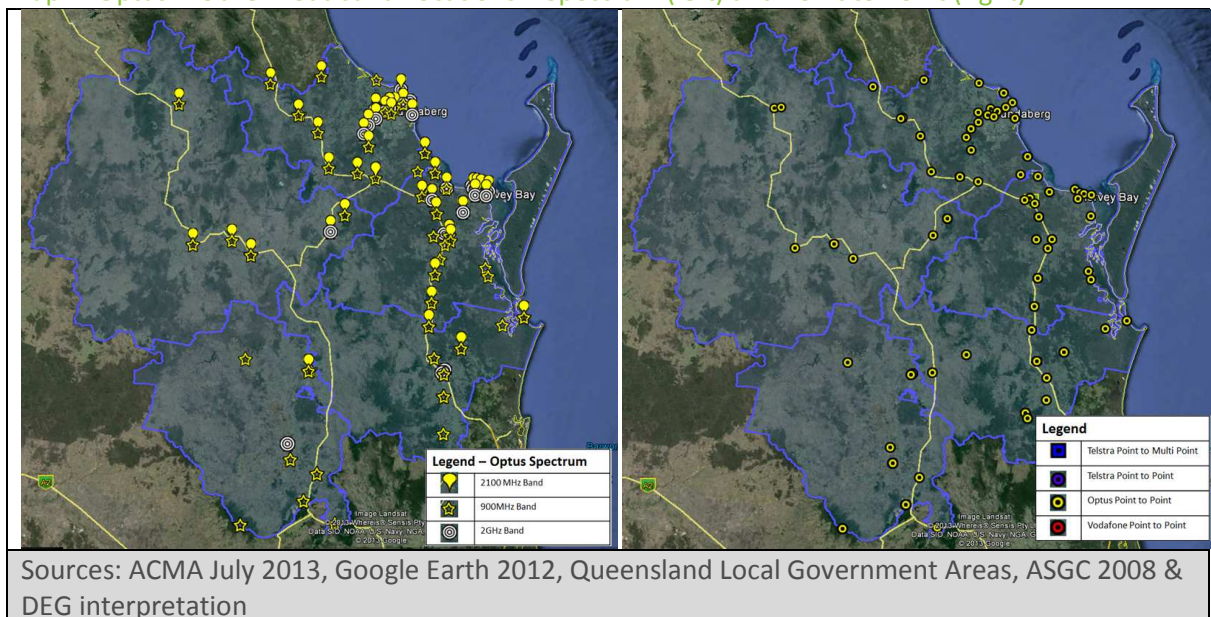
| Carrier | Bundaberg | Fraser Coast | Gympie | North Burnett | South Burnett & Cherbourg | Total Sites | Total licences |
|----------------------|-----------|--------------|--------|---------------|---------------------------|-------------|----------------|
| Telstra | | | | | | | |
| Point to Point | 22 | 48 | 15 | 56 | 22 | 163 | 608 |
| Point to Multi Point | 3 | 0 | 0 | 4 | 0 | 7 | 16 |
| 900MHz | 17 | 23 | 16 | 6 | 8 | 70 | 140 |
| 2100MHz | 22 | 24 | 1 | 1 | 11 | 59 | 210 |
| 2GHz | 4 | 7 | 3 | 0 | 1 | 16 | 130 |
| Optus | | | | | | | |
| Point to Point | 24 | 19 | 12 | 7 | 9 | 71 | 246 |
| 900MHz | 24 | 25 | 11 | 6 | 10 | 76 | 256 |
| 2100MHz | 20 | 16 | 3 | 6 | 1 | 46 | 184 |
| 2GHz | 11 | 10 | 3 | 1 | 1 | 25 | 168 |
| Vodafone | | | | | | | |
| Point to Point | 9 | 6 | 5 | 0 | 1 | 21 | 113 |
| 900MHz | 10 | 7 | 4 | 0 | 2 | 23 | 90 |
| 2GHz | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Source: ACMA July 2013 data with DEG interpretation

3.4.2. Optus

Optus currently has some 76 sites providing local access mobile phone and broadband coverage. The majority of these sites have 900MHz together either 2Ghz or 2100 MHz spectrum. The delivery of two spectrum bands and occasionally three is expected to generate strong network performance in the areas covered.

Map 7: Optus Mobile Broadband Locations – Spectrum (left) and Point to Point (right)



The Optus Vodafone Joint Venture formalised in late 2012 will potentially improve their respective coverage by leveraging each other’s network sites. Vodafone have significant coverage assets in the capital cities and Optus have strong coverage from capital cities through to regional and rural Australia.

Optus have “land banked” a number of sites in the WBBROC area. Land banking is where locations for network expansion have been identified, the landowner has provided in principle agreement and typically some environmental analysis has been completed. Two remaining steps are required prior to operation of the network – financial commitment by the carrier and the council development assessment process. Identification of current “land banked” sites and the prospect of progressing these to operational status will form part of the advocacy plan for all three carriers.

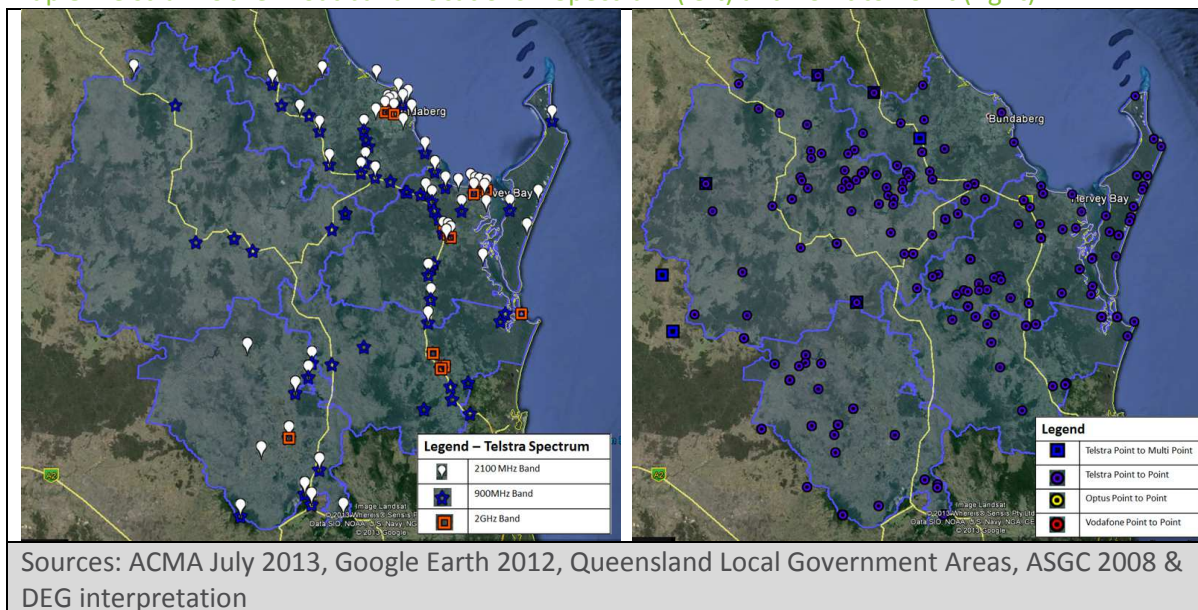
The key priority for Wide Bay Burnett is to establish the current benchmarks, current plans for the area from the Joint Venture and add the local priorities to the list of locations to be added or upgraded.

3.4.3. Telstra

Telstra has the strongest presence in the region with 97 sites using a combination of three different licenced spectrums (900MHz, 2100MHz and 2 GHz). 4G data spectrum is limited to only a few discrete locations.

Telstra has announced that there is substantial investment to occur in the WBBROC region over coming months to deliver additional 4G coverage. These additional locations will be confirmed once operational. Nationally, 200 regional towns are expected to benefit. Translating into a number of sites in the WBBROC area (see Attachment 3 for the Telstra media release dated 18 July 2013). This coincides with confirmation that data use on their 4G network is doubling every 4 months.

Map 8: Telstra Mobile Broadband Locations – Spectrum (left) and Point to Point (right)





3.4.4. Vodafone

Vodafone has an extensive network of infrastructure in Australia. Most of this network is concentrated on the capital cities. Across the Wide Bay Burnett, and other regional or rural areas of Australia, the coverage is substantially lower.

In Queensland, Vodafone ownership of spectrum licences is as follows:

Vodafone Hutchison Australia Pty Limited

-  2 GHz Band,
-  Point to Point

Vodafone Australia Pty Limited

-  PMTS Class B (935-960 MHz)

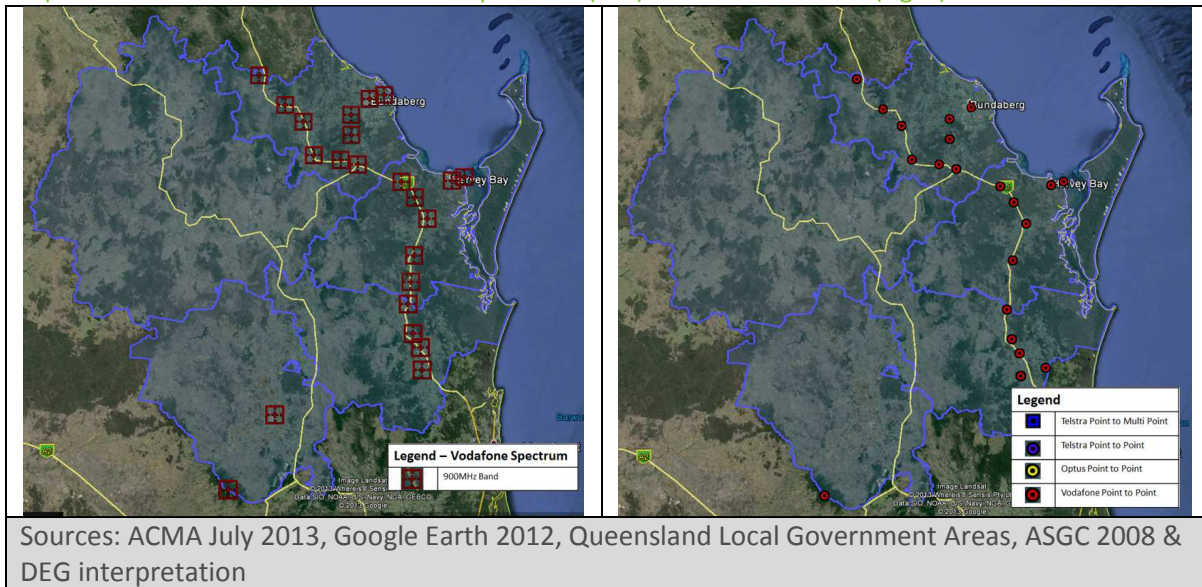
In the Wide Bay Burnett area, Vodafone has 23 local access sites with 900MHz spectrum deployed. With only one band of spectrum available, connectivity will be affected by physical constraints and have increased potential for call drop outs and poor data downloads. For visitors from capital cities, the user experience will be especially heightened as Vodafone has a strong network presence in Australia’s east coast capital cities and major urban places.

To overcome the limitations of their own network Vodafone, have an exclusive arrangement with Optus, who provide “roaming” for Vodafone on their network. Even with this roaming agreement, Vodafone mobile connectivity in the region is comparatively limited and shows capacity for expansion, upgrades and improvements.

There are 3 sites that are connected via optic fibre and not reliant on microwave point to point.

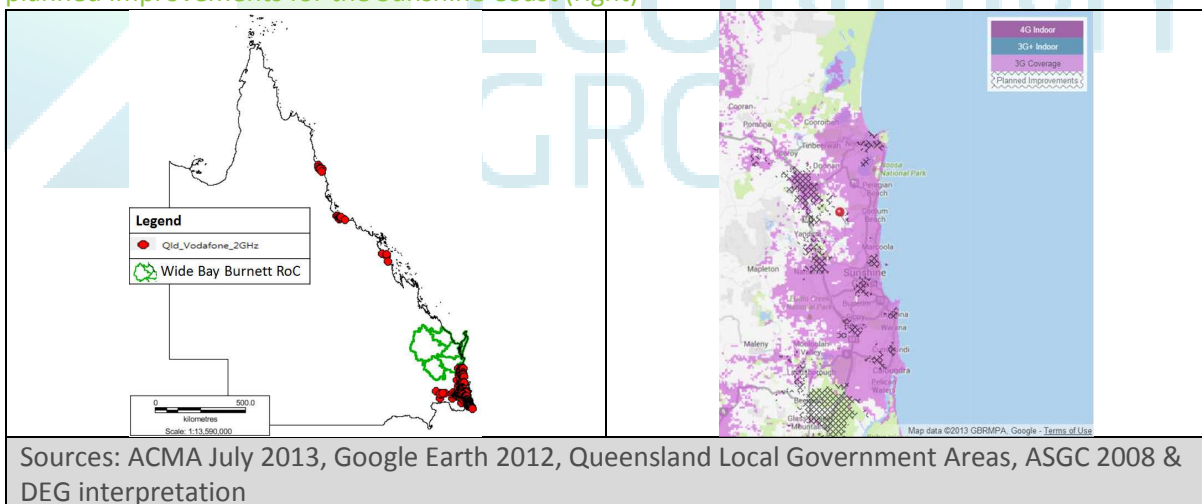
The Vodafone 2GHz spectrum represents a clear opportunity for improvement in the Wide Bay Burnett area. The map of Queensland below shows the extensive deployment in Southeast Queensland together with selective deployment in Mackay, Townsville and Cairns. The addition of the 2GHz spectrum in selected Wide Bay Burnett locations would provide significant improvement to connectivity and data capacity.

Map 9: Mobile Broadband Locations – Spectrum (left) and Point to Point (right)



Vodafone have improved the level of detail on their coverage map to include “planned improvements”. The map below on the right hand side illustrates the extent of current “planned Improvements” for the Sunshine Coast. An early objective of the advocacy plan with Vodafone will be to identify equivalent improvement locations and then seek to have these reflected on their coverage maps.

Map 10: Vodafone 2GHz spectrum deployment across Queensland (left) and Vodafone map showing planned improvements for the Sunshine Coast (right)



The Optus Vodafone Joint Venture is expected to provide the opportunity for Vodafone to substantially improve its network performance here. The objective through the advocacy plan will be to demonstrate that the Wide Bay Burnett area is driving uptake of the digital economy in the community and that advanced deployment is warranted over other areas that are not pursuing the digital economy in their areas.

3.4.5. NBN Co

NBN Co has been set with the challenge to deploy approx. 2,400 sites by mid-2015. NBN Co has appointed Ericsson on a \$1Billion plus contract. Many of the 2,400 sites required will have to be new

sites (particularly in regional and rural areas) as the existing three carriers have not extended their reach to many of these areas.

The Bundaberg “cluster” has recently been presented to the Bundaberg, Fraser Coast and Gympie Councils with a total of approximately 60 sites in total. Some sites are colocation (using existing radio transmission sites) with the balance being Greenfield sites in new areas potentially providing future mobile network expansion with reduced cost and timeframe. Combining information from earlier cluster releases together with the most current proposed cluster, 79 sites are planned for the region. With 54 to be greenfields and 25 colocations. NBN Co have advised that the following proposed Greenfield and colocation breakup for the Wide Bay Burnett Area

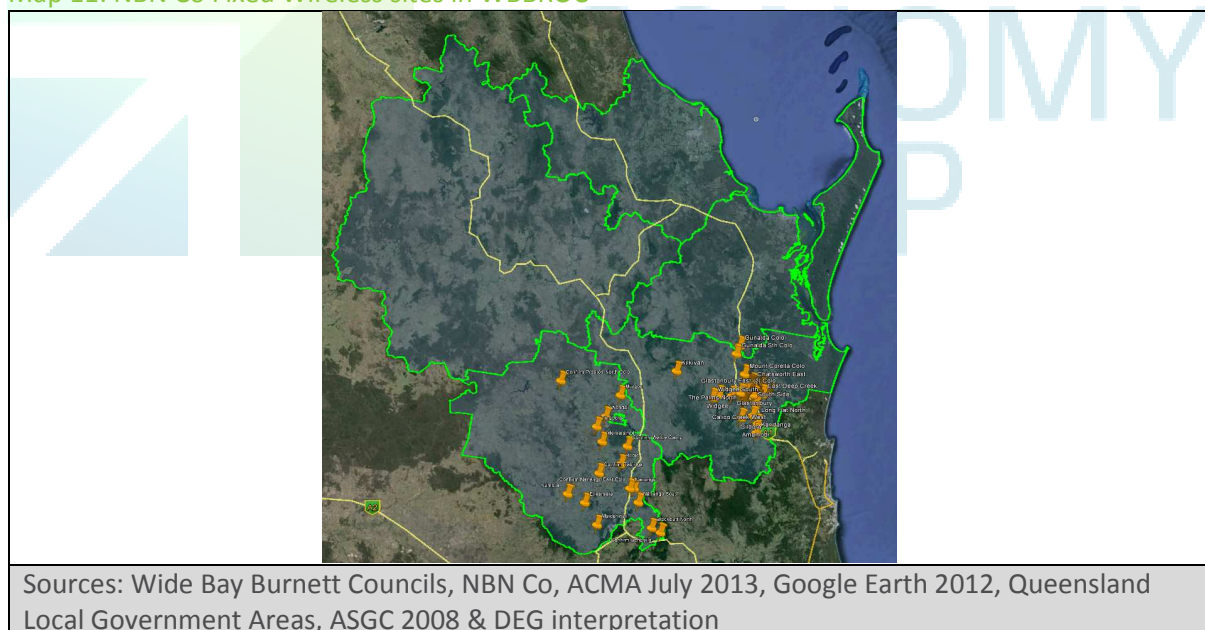
Table 3: Wide Bay Burnett NBN Co proposed Fixed Wireless program

| Proposed Sites Summary | Bundaberg | Fraser Coast | Gympie | North Burnett ¹ | South Burnett | Total ¹ |
|---------------------------------------|-----------|--------------|-----------|----------------------------|---------------|--------------------|
| Greenfields | 16 | 6 | 16 | | 16 | 54 |
| Colocation (with existing facilities) | 6 | 12 | 5 | | 2 | 25 |
| Total | 24 | 18 | 23 | | 18 | 79 |

Notes: 1 – details are not yet known for the North Burnett

South Burnett and Gympie Councils have provided DEG with current NBN Co Fixed Wireless network deployments. These locations are illustrated in the map below.

Map 11: NBN Co Fixed Wireless sites in WBBROC



Note: NBN Co sites are indicative only and subject to change.

Current NBN Co build plans target mid 2015 as the fully operational timeframe for the network. Some sites are already constructed and operational; however most of the network will not be constructed until 2014 when the national transit network is completed. This provides some lead time for colocation discussions to occur with other carriers.

NBN Co sites are valued at approximately \$500-700k and will provide benefited premises with significant broadband speed and capacity improvement over their current access options. Future Long



Term Evolution (LTE) improvements will potentially feed through to the NBN and help improve work and digital economy options for businesses and premises.

The new NBN Co network sites also represent excellent potential for mobile networks to expand where they have not previously been due to cost of infrastructure. This will be one of the key avenues for WBBROC to pursue new mobile broadband network sites. The NBN Co Fixed wireless sites will feature as key network expansion opportunities in the advocacy plan section of this report.

3.5. Mobile Coverage Funding Programme

The Coalition Mobile Black Spot Program policy (Attachment 2) released as part of the election campaign has now been developed by the Department of Communications into the Mobile Coverage Funding Programme. A Discussion Paper has now been released submissions due by 28 February 2014. Following the review of the Discussion Paper Submissions, a call for Expressions of Interest will occur.

The purpose of the program is to remove Blackspots through carrier, local and state partnerships matched by a funding program with a \$100 Million commitment. The Program has two parts:

-  \$80mil allocated to a Mobile Network Expansion Program for coverage along major transport routes, in small communities and locations prone to natural disasters,
-  \$20Mil allocated to unique mobile coverage problems, such as locations with seasonal demand. Locations where seasonal visitor numbers fluctuate with holiday periods is cited as an example.

The program identifies the NBN Co greenfields sites as assets to potentially harness and increase the number of sites that can be covered as many of these are being built or planned for locations where mobile Blackspots currently exist.

With the Independent Broadband Testing report as a base, WBBROC now has a strong evidence base to prepare for the release of the funding program. There are three other priorities to pursue at this time to ensure WBBROC has the greatest chance of success.

A business case that addresses the key words used in the policy can now be developed in consultation with the key stakeholders. The key areas to address are:

1. major transport routes, small communities and locations prone to natural disasters
2. unique mobile coverage Blackspot locations, such as locations with seasonal demand. Locations where seasonal visitor numbers fluctuate with holiday periods is cited as an example.
3. traffic counts, relevant population data, local direct and indirect business numbers affected and emergency services (including first response, QLD fire and rescue, ambulance, helicopter rescue, and other relevant organisations)
4. document specific emergencies or disasters where mobile communications (in Blackspot areas) has caused delayed responses or contributed to loss of life
5. demonstrate the disaster and non-disaster communications plans councils will undertake to help the community to use increased knowledge (for example correct use of 000 or 112 emergency numbers) or appropriate technology (aerials or remote suitable handsets) to reduce the area of Blackspots that needed to be funded by the program.
6. capture anecdotal evidence from community members to be used as part of the narrative (this humanises the lack of connectivity rather than making it a technology issue).

The facilitated collaboration of all key stakeholders during the pre-funding program release will be key to the WBBROC success. By proactively identifying and bringing these groups together WBBROC will highlight the need for the political investment to occur.

The advocacy for funding at a political level cannot be underestimated. This needs to combine a mixture of public statements referring to WBBROC pursuing access to the funding for the regional priority locations. In addition, regional politicians need to utilise their connections to show their region is prepared and ready to implement a positive solution that will also generate good leverage for the funding program.

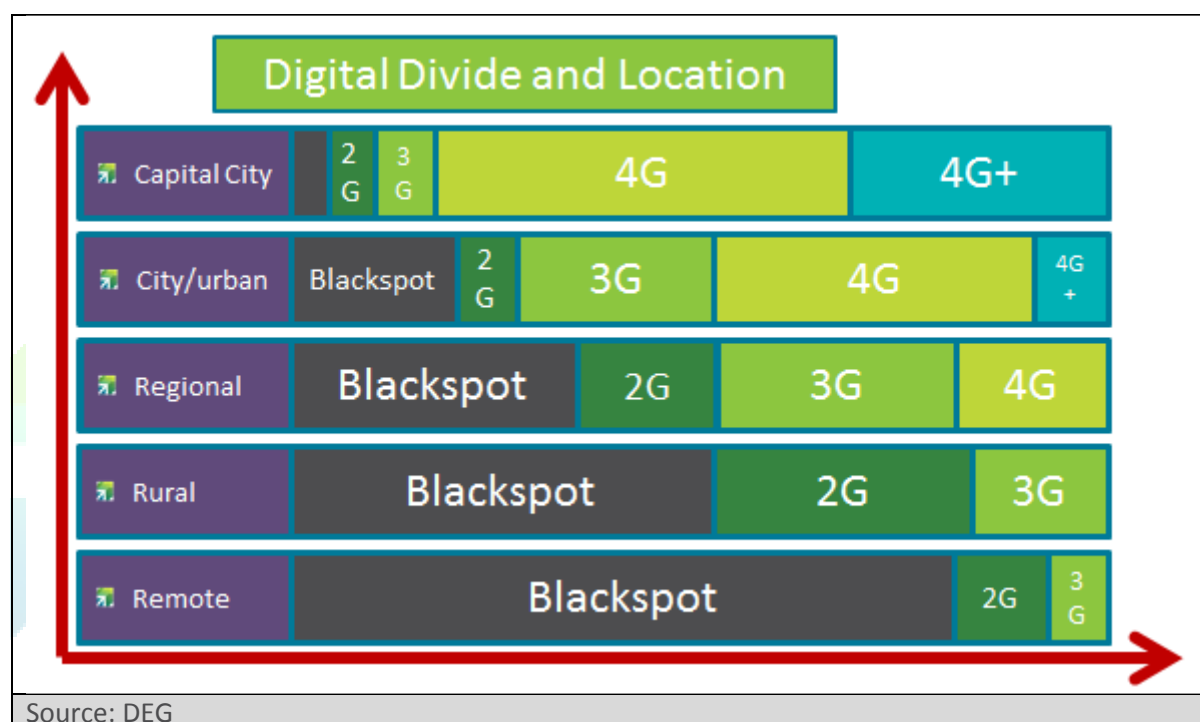


4. Independent Broadband Testing Results

The Independent Broadband test results for the Wide Bay Burnett highlights the digital divide that the region is seeking to overcome. There are no areas with 4Gplus services from any of the carriers and only limited 4G in some select urban areas. Bundaberg and Fraser Coast best fit into the ‘regional’ category in table 4 below. Gympie fits somewhere between the ‘Rural’ and ‘Regional’ categories While North and South Burnett and Cherbourg are at the bottom end of Rural.

The efforts of each council will revolve round reducing the extent of Blackspot coverage, pushing for higher penetration of 4G and 4G Plus in the urban areas. Capital cities and urban locations may always have another level of technology first, but regions need to push to narrow the divide and remain attractive to retain population and attract new investment.

Table 4: Digital Divide and Location Comparison








4.1. Priority Areas

The WBBROC priority areas is a consolidation of the Blackspot results and Network Site testing for each of the local governments.

The first two from each of the five areas are proposed for shortlisting as the ‘regional’ priorities. These may be changed to reflect local priority assessments.

The five top priority locations for Bundaberg are:

-  **[Regional Priority]** A radius of 15kms around Goodwood (towards Childers, Bundaberg and Woodgate). These three road sections have Blackspots for all three carriers, combinations of two or individual carries. Black Spot Funding
-  **[Regional Priority]** Bucca, surrounds and Bundaberg-Lowmead Rd. Pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding.
-  Moore Park Beach, Burnett Heads, Bagara, Innes Park and Elliott Heads – All of these coastal urban communities are candidates for 4G services from all three Carriers. Within a year they should also be considered for 4G Plus. Network Improvements.






-  Bundaberg and all suburbs together with Childers – There is some 4G coverage by Telstra only. This should be extended to the whole urban area for all three carriers with 4GPlus by end 2014. Network Improvements.
-  Apple Tree Creek – This Bruce Highway location should provide 3G or better coverage for all three carriers. Network Improvements.


Map 12: Bundaberg Priority Map



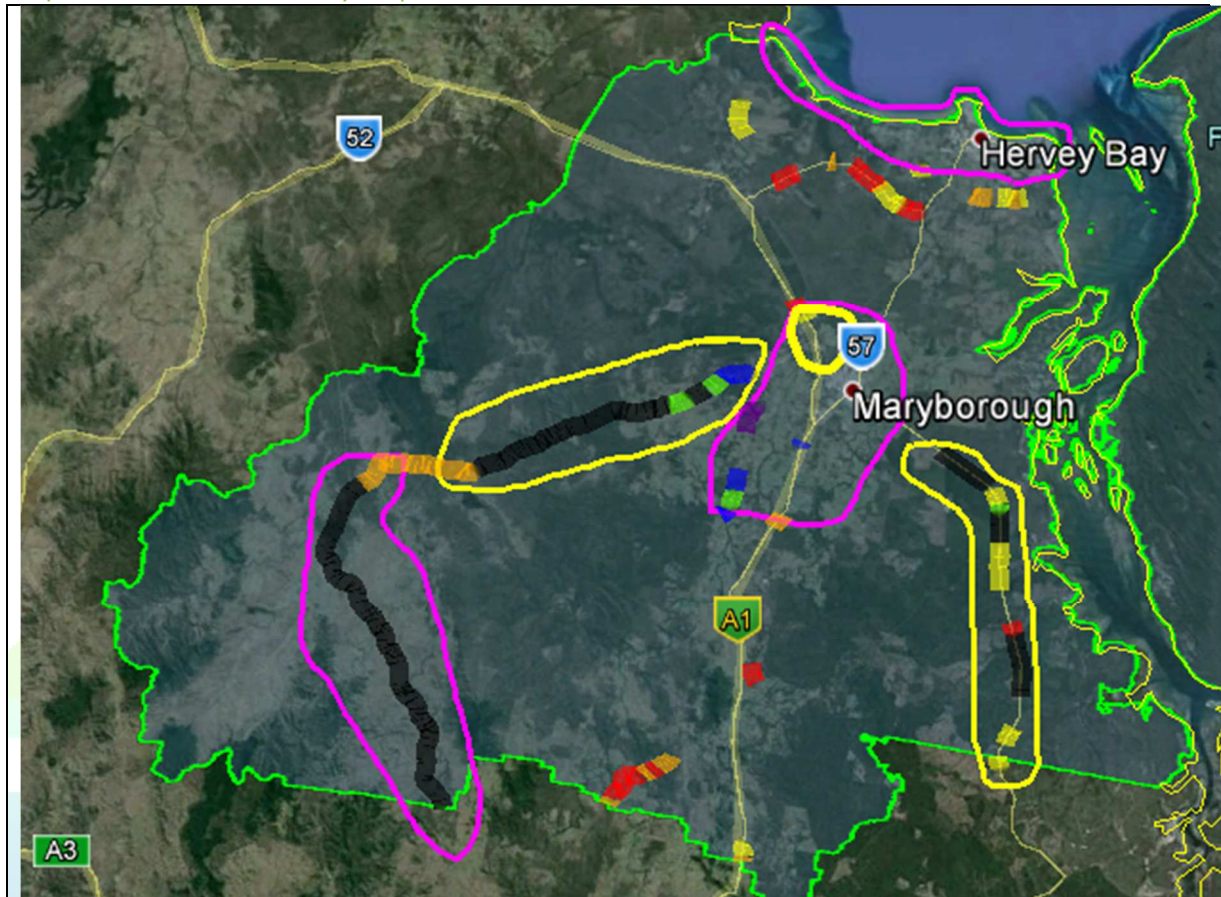
Sources: Wide Bay Burnett Councils, ACMA July 2013, Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

The top priority locations for the Fraser Coast are:

-  **[Regional Priority]** The Maryborough-Biggenden Rd Blackspot from Aramara to west of the Bruce Highway This road section has Blackspots for all three carriers, combinations of two or individual carries. Black Spot Funding
-  **[Regional Priority]** The Cooloola Coast Road to the boundary with Gympie. Pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding
-  Bruce Highway North of Maryborough – in the vicinity of the existing Moonaboola Industrial Estate. This area has poor reception for all three carriers and with current and proposed development represents a location of strategic importance for network upgrades
-  The Hervey Bay communities – focusing on increasing 4G and 4GPlus coverage and removing isolated Blackspots
-  Maryborough and surrounds – focusing on increasing 4G and 4GPlus coverage and removing isolated Blackspots. A particular focus on the area around Aldershot on the Bruce Highway. Industrial development area with very poor coverage






-  The Broweena—Woolooga Rd from Broweena to the boundary with Gympie. Pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding. Consider joining with the Gympie side to Woolooga

Map 13: Fraser Coast Priority Map

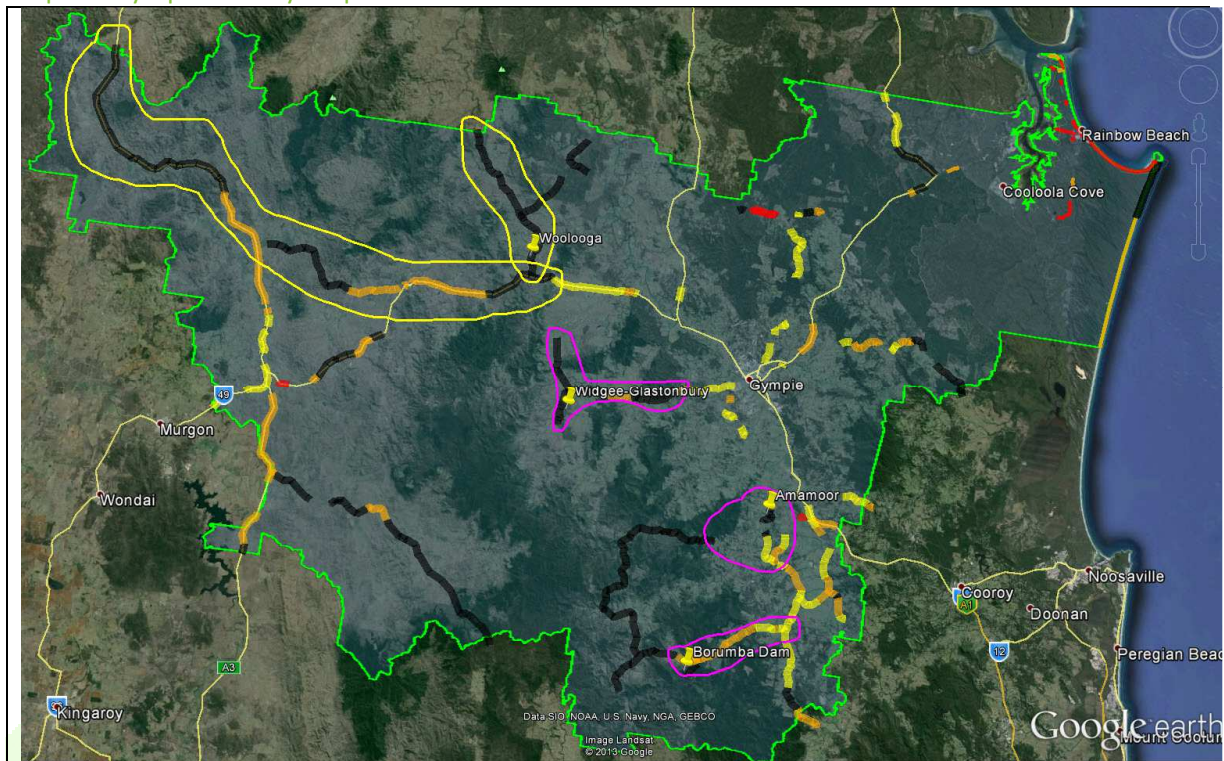


Sources: Wide Bay Burnett Councils, ACMA July 2013, Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

The five top priority locations for Gympie are:







-  **[Regional Priority] – Gympie]** The Burnett Hwy (NBRC boundary - Tansey), Kilkivan Tansey Rd, Wide Bay Hwy (Kilkivan - Bells Bridge) to the Bruce Highway. Extensive pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding. Consider joining with North Burnett as the Blackspot extends to Ban Ban Springs.
-  **[Regional Priority]** The Broweena—Woolooga Rd from Broweena to the boundary with Gympie. Woolooga in particular appears to be a growing township with no coverage. Pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding. Consider joining with the Maryborough to Broweena
-  Widgee and Glastonbury – Each of these growing localities and the roads that service them contain pervasive Blackspots for all three carriers and isolated sections of Optus and Vodafone Blackspots.
-  Amamoor and surrounds. Location for the Gympie National Country Music Muster. Potential Candidate for the Seasonal Blackspot Funding Program
-  Borumba Dam and Valley to Imbil – Pervasive Blackspots for all three carriers, combinations of two or individual carrier. Potential Candidate for the Seasonal Blackspot Funding Program.


Map 14: Gympie Priority Map



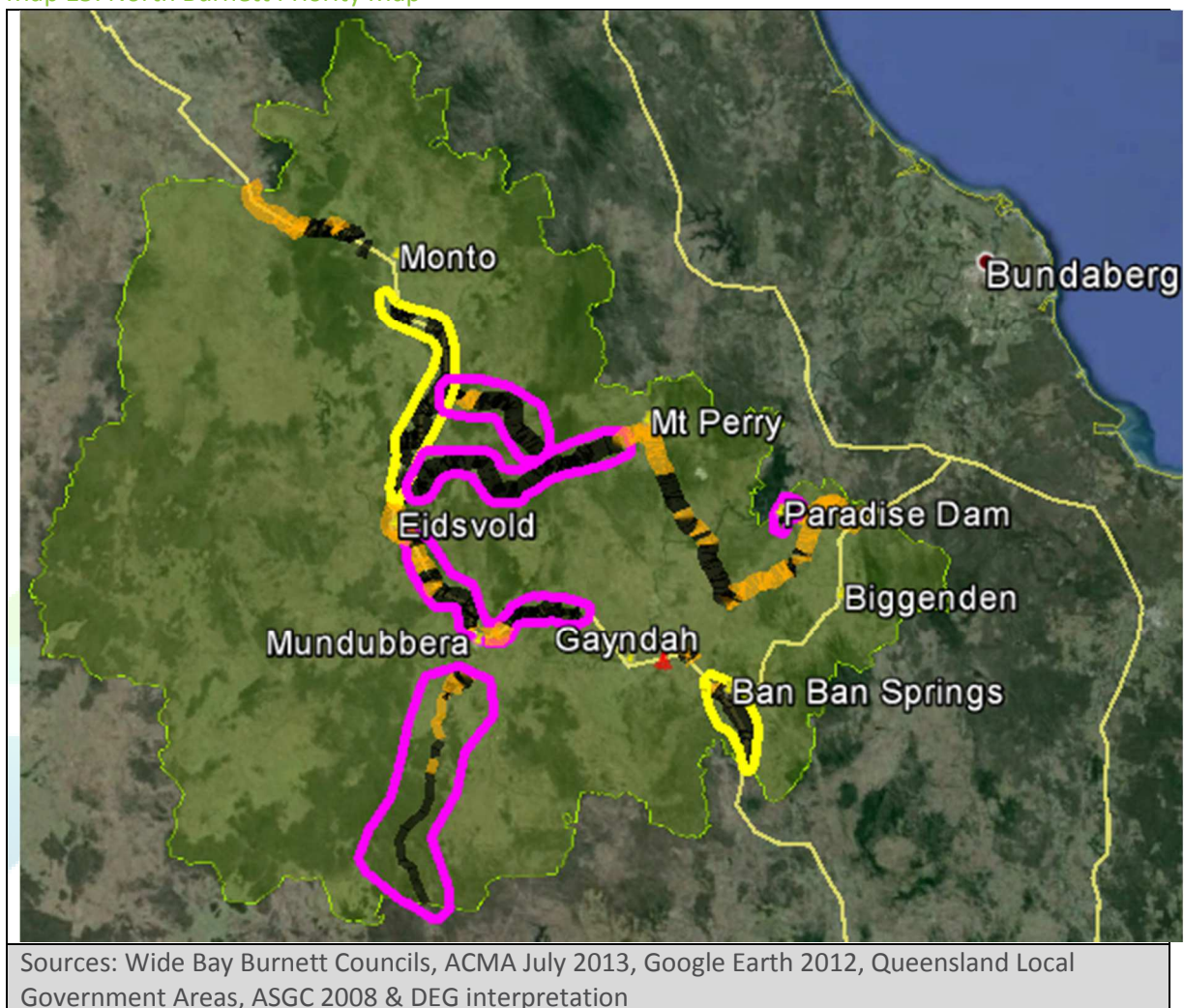
Sources: Wide Bay Burnett Councils, ACMA July 2013, Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

The top priority locations for the North Burnett are:




-  **[Regional Priority]** Burnett Highway from Ceratodus to south of Monto – extensive and pervasive Blackspot area for all three carriers. Occasional coverage patches along a major inland transport route. A candidate for the Blackspot Funding Program
-  **[Regional Priority]** Burnett Highway from boundary with Gympie to Ban Ban springs. Potential to partner with Gympie and extension of this Blackspot almost to the Bruce Highway. Occasional coverage patches along a major inland transport route. A candidate for the Blackspot Funding Program
-  Paradise Dam. Very weak signals at the site and extensive Blackspots in the surrounding area for all three carriers at the site, is limiting the reputation for the growing RV market. Candidate for the Seasonal Blackspot Program
-  Mount Perry to the Burnett Highway extensive and pervasive Blackspot area for all three carriers. Occasional coverage patches along a transport route. A potential candidate for the Blackspot Funding Program
-  Burnett Highway from Eidsvold to almost Gayndah. Blackspot area for all three carriers. Occasional coverage patches along a transport route. A potential candidate for the Blackspot Funding Program
-  Mundubbera to border with South Burnett along the Mundubbera-Durong Rd. Blackspot area for all three carriers. Occasional coverage patches along a transport route. A potential candidate for the Blackspot Funding Program. The area was not specifically tested, however the identification as a Blackspot is consistent with the carrier mapping for this area.

-  Mt Perry Road - between Monto and Mount Perry – (Gravel section). Blackspot area for all three carriers. Occasional coverage patches along a transport route. A potential candidate for the Blackspot Funding Program. The area was not specifically tested, however the identification as a Blackspot is consistent with the carrier mapping for this area.

Map 15: North Burnett Priority Map

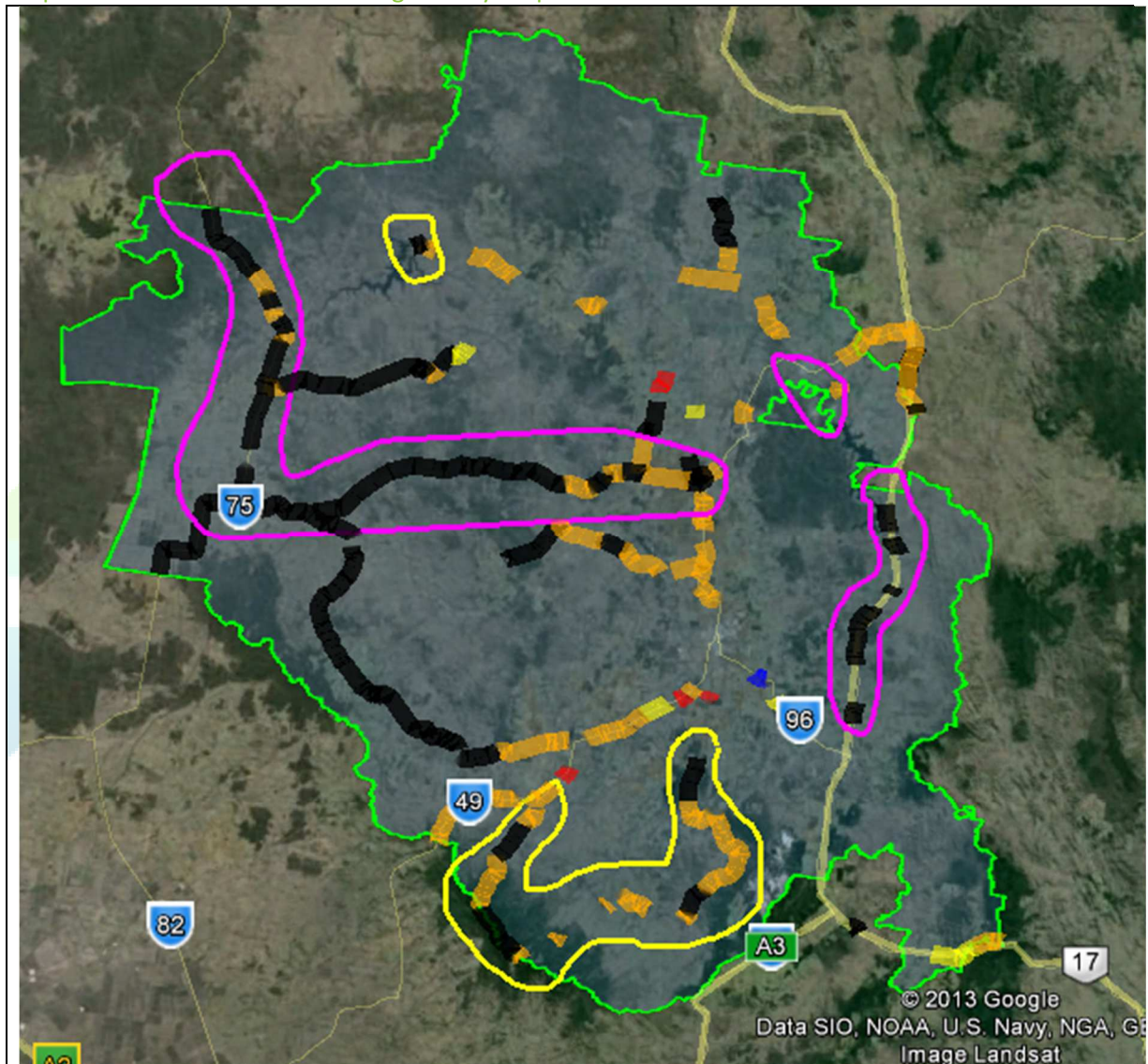


The five top priority locations for the South Burnett & Cherbourg are:

-  **[Regional Priority]** Bunya Mountains – Some limited coverage interspersed with sections of three carrier and two carrier Blackspots. Significant tourism area for South Burnett with active farming businesses along the affected route. A candidate for the major transport route or seasonal Blackspot Funding Program
-  **[Regional Priority]** Bondooma Dam and surrounds. Telstra Blackspot at the Dam and Blackspot for Optus and Vodafone in sections from Proston. Candidate for the Seasonal Blackspot Funding Program
-  Chinchilla-Wondai Rd Tingoorra to Durong and extending north to the boundary with North Burnett along the Mundubbera-Durong Rd. Extensive and pervasive Blackspots for all three carriers and sections of Blackspot for Optus and Vodafone only. Candidate for the major roads Blackspot Program

- Murgon and Cherbourg – Both communities have signal and coverage, however actual speed tests show poor performance in contrast to the population base and position in the economic supply chain. Network performance upgrades for all three carriers as a priority.
- Burnett Highway from north of Nanango to the boundary with Gympie. Patchy Blackspot area for all three carriers. Occasional coverage patches along a major transport route. A potential candidate for the Blackspot Funding Program

Map 16: South Burnett & Cherbourg Priority Map



Sources: Wide Bay Burnett Councils, ACMA July 2013, Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

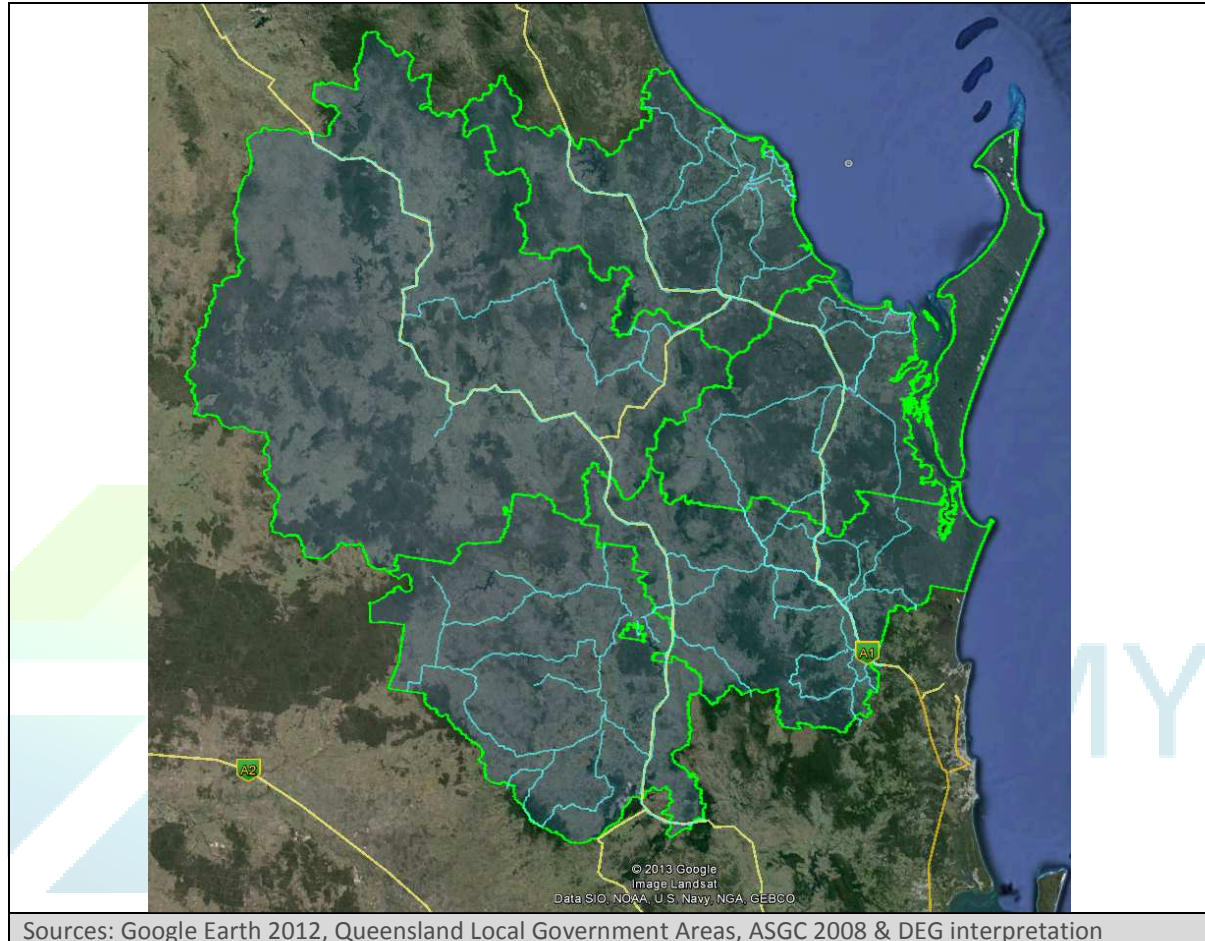
4.2. Tested Routes

The final testing routes for all 6 councils includes a total of 2,982 kms of testing. The breakdown of each local government area can be seen in the Table below and the Map illustrates the actual routes covered across the region. The additional kms of data collected varies for each of the council areas and was influenced by a number of different factors. These ranged from assessments for disaster management purposes through to testing known or anecdotal evidence of poor coverage compared to the carrier coverage maps.

Table 5: Final Testing Routes by LGA

| | Bundaberg | Fraser Coast | Gympie | North Burnett | South Burnett | Total |
|------|-----------|--------------|--------|---------------|---------------|-------|
| Klms | 483 | 407 | 703 | 450 | 749 | 2,692 |

Map 17: IBT Testing Routes






4.2.1. Blackspots

Blackspots are locations or sections of road where no signal can be found resulting in failure to connect to the network. The identification of region wide Blackspots (Map below) begins with the signal strength markers collected across the region.

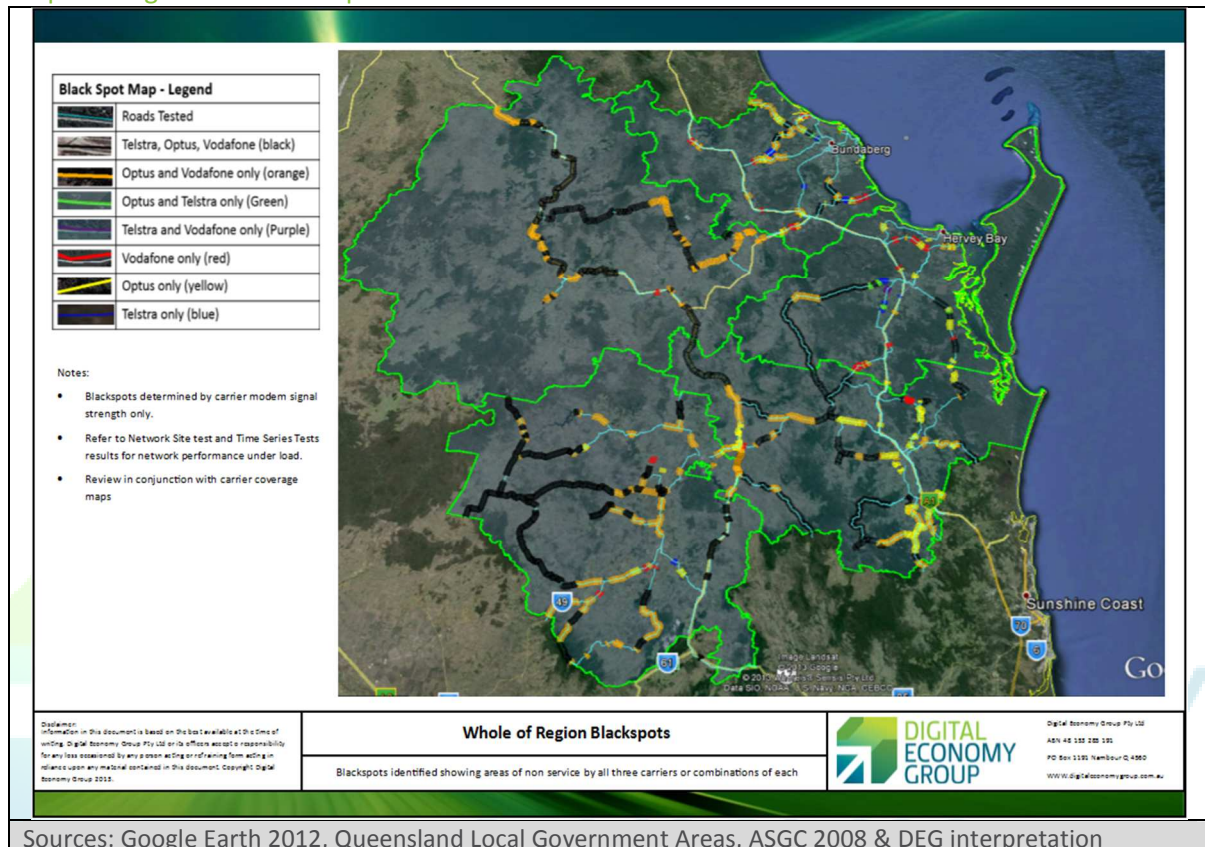
The Independent Broadband Testing for Wide Bay Burnett covered over 2.680klms and generated approx. 26,800 markers for each of the three carriers (with signal strength taken every 100m). The resultant 80,000 markers provide a strong and detailed evidence base showing the real extent of network coverage for mobile broadband modems.

This data is then filtered and mapped to highlight coverage Blackspots. The Map below shows the roads tested and the extent of Blackspots in the area. The colour code is as follows and is listed in order from most to least common:

-  Black – no signal for Telstra, Optus and Vodafone
-  Orange - Optus and Vodafone have no signal– Telstra is generating a signal
-  Yellow – No Optus signal – Telstra and Vodafone have signal

- Red - No Vodafone signal – Telstra and Optus have signal
- Blue – No Telstra signal – Optus and Vodafone have signal
- Green – Telstra and Optus have no signal – Vodafone has signal
- Purple – Telstra and Vodafone have no signal – Optus has signal

Map 18: Region Wide Blackspots



Sources: Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

Identification of the most significant Blackspot areas for the three carriers in the 6 council areas has revealed major areas where there is no signal for all three carriers or two of the three. The following Table summarises the results from all the council areas.

Comparing the proportion of Blackspots to the distance tested, North Burnett (57%) has the highest proportion of Blackspot followed by Gympie (52%) and North Burnett (42%). Bundaberg and Fraser coast both have 24%, however Bundaberg has the lowest proportion of three carrier Blackspots.

The recommendations and subsequent advocacy plan will prioritise which of these areas is a priority and will need to be balanced against the network site tests and time series test results. Each of the REDAC representatives will be encouraged to determine their own priorities and how they fit with the regional priorities.

Table 6: Summary of Major Blackspots by Council area

| Category | Bundaberg | Fraser Coast | Gympie | North Burnett | South Burnett | Total |
|--------------------------|-----------|--------------|--------|---------------|---------------|-------|
| Three Carrier Blackspots | 35 | 85 | 220 | 209 | 238 | 787 |

| Category | Bundaberg | Fraser Coast | Gympie | North Burnett | South Burnett | Total |
|--|-----------|--------------|--------|---------------|---------------|---------|
| Single or Dual Carrier Blackspots | 85 | 15 | 138 | 48.5 | 81.5 | 368 |
| Total | 120 | 100 | 338 | 258 | 319.5 | 1,155.5 |
| Klms Tested | 485 | 407 | 703 | 450 | 750 | 2,795 |
| Source: DEG Independent Broadband Testing September 2013 | | | | | | |

Note: Each council area had many other smaller sections of road or isolated Blackspots. Due to the pervasiveness Blackspots, only the most significant have been documented.

4.2.2. What options are there to address the Blackspots?



Business and community members who regularly live and work in areas of persistent Blackspots often identify alternative means of communications or accept that there are no options available. There are a number of ways that network users can improve their mobile broadband access in vehicles, at their home, office or workplace. Councils that have developed independent information for community and businesses to help them make informed decisions provide a faster transition for their area to a digital economy. Also, the increased uptake of carrier networks will increase the viability of deploying a network.

The three carriers all have websites and commercial information about options for connectivity, however this information about how to augment their network connectivity using aerials and other devices is often hidden in the small print or at the very least not listed clearly. The reason for this is carriers do not want to create the perception that users will need to spend extra to connect or acknowledge that the network has weaknesses.

A possible solution for council's in the Wide Bay Burnett region is to have a number of council pages dedicated to connecting to Broadband (mobile and fixed) and how connectivity can help businesses with their bottom line. These pages would be regularly updated showing the latest options from the carriers with a particular focus on connecting remotely, checklists for connecting and other ways to deliver localised connectivity where there currently is none.

Overview of proposed content for your local council area and updated regularly with minimal input.

Getting connected

-  mobile Phone and Broadband solutions
 - o Telstra, Optus & Vodafone
 - o handsets recommended to increase coverage in rural areas
 - o car kits, Antennas, Aerials and signal amplification devices
 - o coverage out to sea and limitations
-  fixed Broadband connection options
 - o ADSL (residential only)
 - o DSL (business only)
 - o optic Fibre
 - o fixed Wireless solutions (for businesses – farming, rural, in town)
 - o NBN Co Where, When and how to find out when you can connect)

Using digital in your business

-  how to make money with digital solutions in your business

- how using the “cloud” can save your business from data loss help you compete locally nationally and internationally
- additional or relevant national and international reports or studies highlighting the digital economy
- digital skilling and development programs calendar and information

Case Studies, local Maps and Technology sections

- each of the sections will have supporting case studies,
- maps covering local infrastructure (as relevant)
- sections explaining technology terms and concepts

Benefits

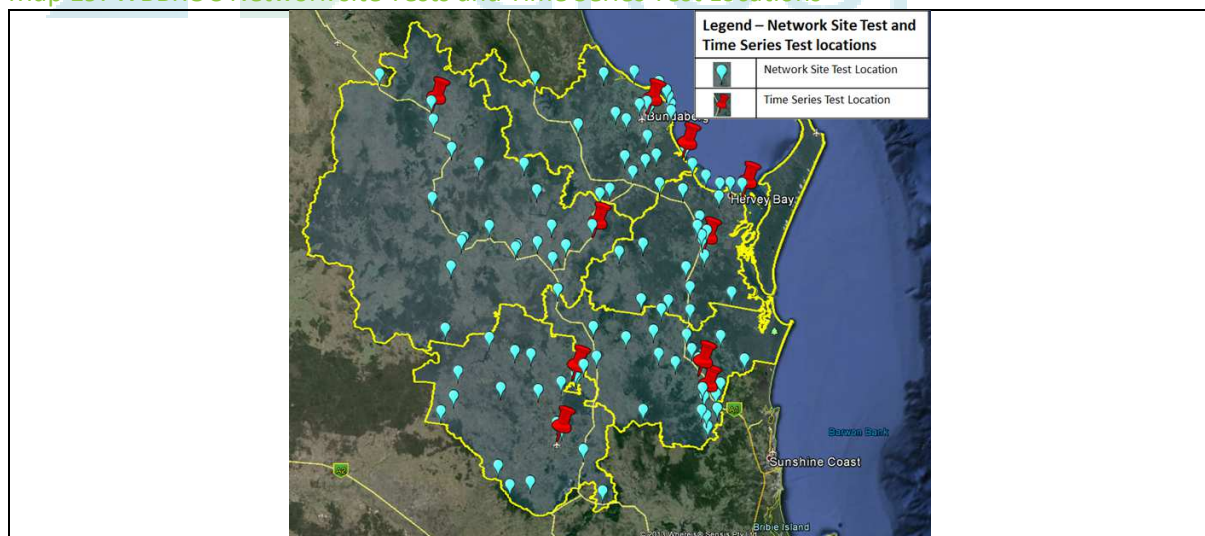
- updated regularly (complete review every 3 months with individual times added and removed according to relevance and currency)
- requires minimal input to deliver increased profile and outcomes for your area of council
- demonstrate to businesses, carriers, regional organisations, other levels of government and potential investors to the region that you are committed to facilitating a strong digital economy.

4.2.3. Network Site Test locations and assessment overview

The Independent Broadband Testing contract includes a requirement for 100 Network Site Tests (NSTs) and 10 Time Series Tests to be completed across the whole region. A total of 115 NSTs were completed:

- Bundaberg – 23
- North Burnett - 22
- Fraser Coast – 21
- Gympie – 26
- South Burnett - 23

Map 19: WBBROC Network site Tests and Time Series Test Locations



Sources: Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

A table compiling locality, test result, quality assessment and proposed action assessment has been prepared for each of the local government areas. An associated map highlights the locations of each

test. The selection of the site test locations was predominantly determined by localities and or major road junctions or council boundaries.

The quality assessment introduces a colour code (green, white, amber and red over the results core. The purpose of this is to indicate whether the result is considered to be very good (green), acceptable (white), poor (amber) or very poor (red) depending on the location. A score of 5 for a carrier in a designated 4G coverage area is considered acceptable. This score in a location at the edge of coverage would be very good. A score of 0 in a location with very low population and very low expectation of coverage, is rates as an amber. A location with a 0 in a locality where there are a concentration of homes and businesses is rates as red as this type of location is considered a higher priority.

The proposed action assessment takes the information relating to the locality, the scores, colour rating and identifies the typical actions the carriers may have to undertake to improve the competition, coverage and capacity targets to a high standard.

The advocacy plan will rely heavily on this assessment and the Blackspots section to determine the regional priorities and initial dialogue with the carriers.

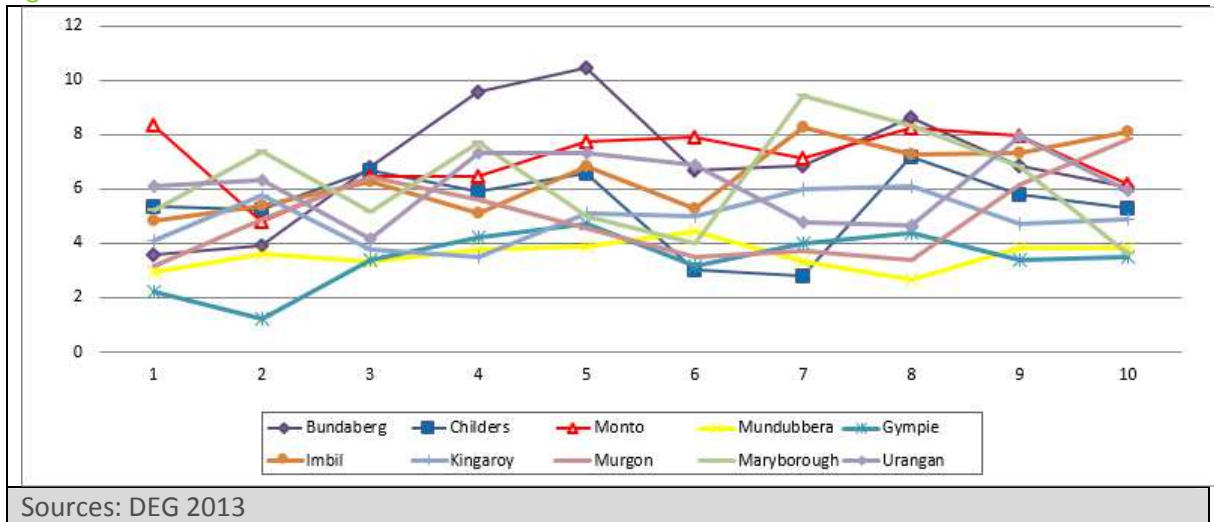
4.2.4. Time Series Test Locations and Assessment overview

The Time Series Tests serve to confirm that the Network Site Tests are typical of the networks performance in the area. When carriers first see poor Network Site Test results, they suggest that it is only a single point in time and that the network may be performing poorly due to “load” on the network. These are valid concerns, however the collation of the ten regional Time Series Tests for each carrier into the same table establishes a clear illustration of the network performance over 10 tests

The Telstra combined Time Series Test graph below shows that results below 3Mbps and above 8Mbps are unusual and the majority of tests in the 4-7Mbps range. Compared with Optus and Vodafone, the Telstra network is strong and consistent in each of the locations. This demonstrates that Telstra has good backhaul (connection to and from the internet to the tower) combined with good local access equipment.

A comparison with capital city network performance will demonstrate the digital divide. Results of 10Mbps and above are often experienced at major airports, city centres and other key nodes. Key to maintaining comparable results will be the ongoing upgrade of network equipment, new (infill) sites and the deployment of 4G and subsequent Long Term Evolution (LTE) infrastructure

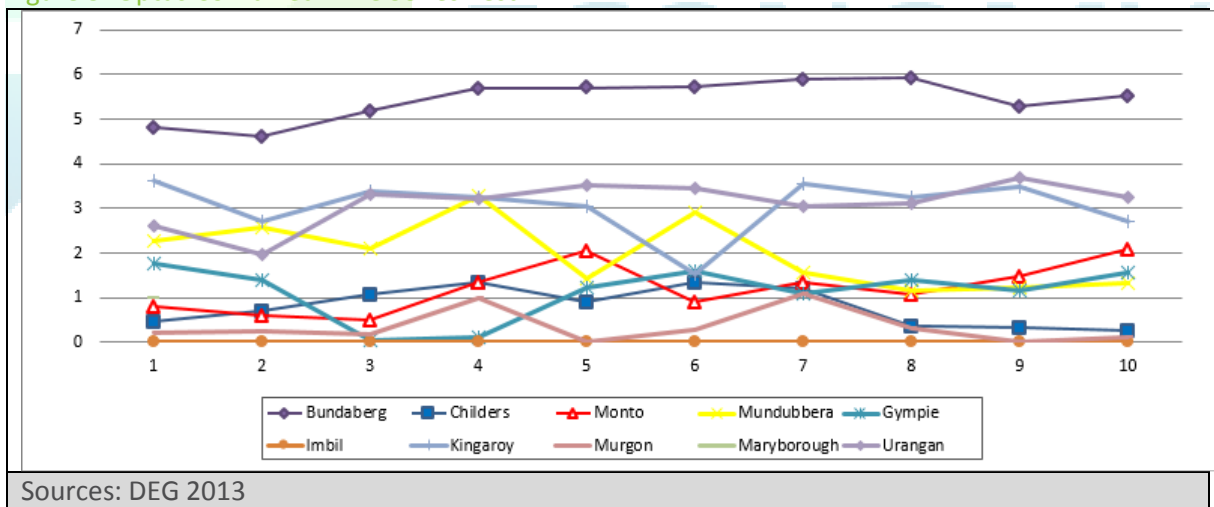
Figure 4: Telstra combined Time Series Test



Sources: DEG 2013

The Optus Time Series Test results show that the network coverage is not as strong as their coverage maps suggest and that it is not yet comparable with Telstra’s. The best Optus result (at Bundaberg) is a consistent 5Mbps, however the Telstra result for the same location is consistently better with a burst to 10Mbps. A number of locations have generated similar profiles to Vodafone results with the balance in a band around 3Mbps. Network upgrades, 4G and new sites are a critical priority for Optus to rise close to Telstra’s performance and introduce genuine competition in the region.

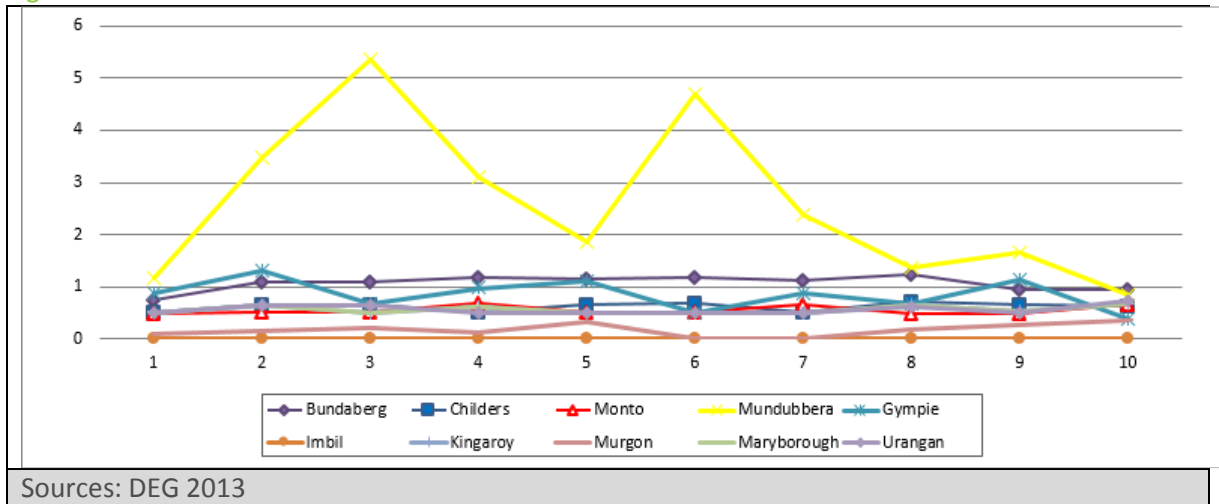
Figure 5: Optus Combined Time Series Test



Sources: DEG 2013

Of the three carriers, Vodafone performed the most poorly. The only site where Vodafone achieved test results above 2Mbps was at Mundubbera. The consistent result of between 0 and 1.25Mbps highlights the need to be aware that coverage signal does not always translate into capacity (speed and throughput). These results, combined with the 115 network site tests, provide a clear evidence base for Vodafone to accelerate its deployment of Joint Venture solutions with Optus in the region

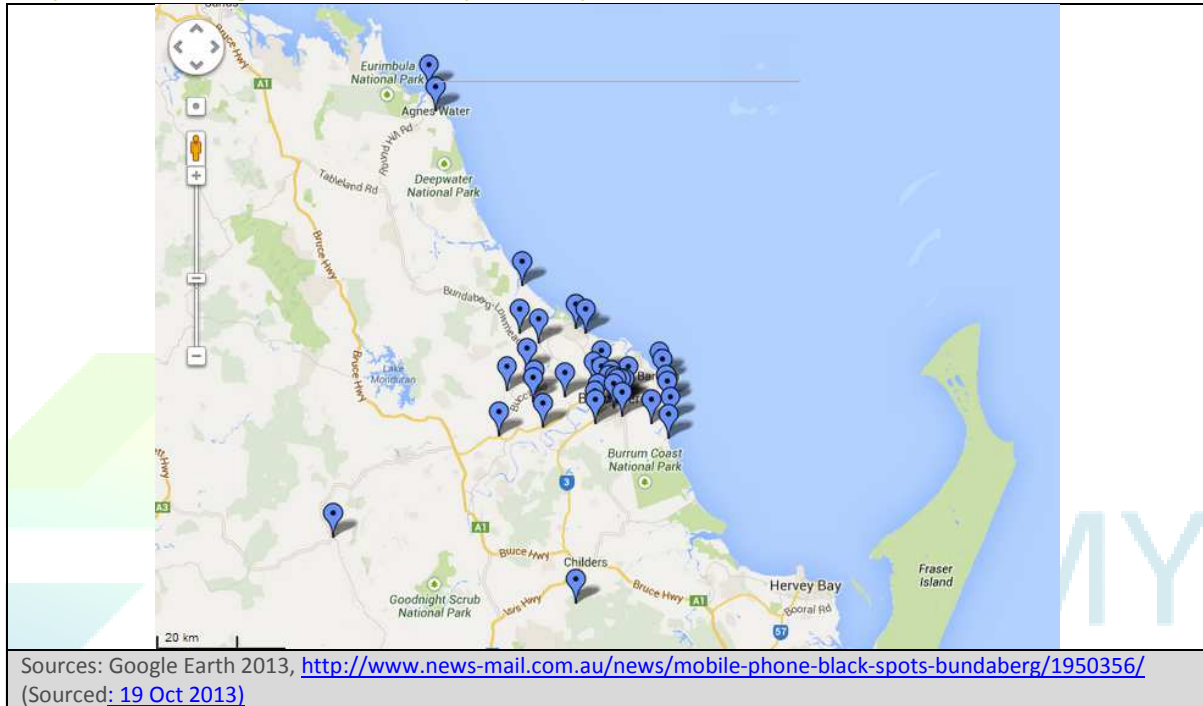
Figure 6: Vodafone Combined Time Series Test



4.3. Bundaberg Regional Council

The Bundaberg region enjoys some of the strongest carrier investments and coverage of all the Wide Bay Burnett councils. Despite this strong position the July News Mail survey⁹ of mobile Blackspots generated significant results as illustrated by the Map below. Created on July 17 this year, the map has now had some 936 views. Although the survey does not qualify which carrier or device was causing the issue, this simple sample clearly serves to demonstrate community awareness around connectivity issues and that there is a real value in councils seeking to facilitate improved competition, coverage and capacity for all three networks.

Map 20: Bundaberg News-Mail Blackspot Survey Results



The Signal strength testing and site tests reinforce the News Mail survey findings with Blackspots for all three carriers' right across the Bundaberg region. The time series testing completed in Bundaberg West and Childers highlights the performance of the networks over repeated tests and reinforces the need for continued reinvestment by the carriers.






The recent federal election has impacted on the deployment of the fibre networks until a review is completed, but it has not impacted on the Fixed Wireless network deployment. Bundaberg is now in the initial stages of a 2 year NBN Co Fixed Wireless program and according to NBN Co will have approx. 22 sites (16 greenfields and 6 colocation) The greenfield sites will potentially become strategic assets for the region as mobile carriers will consider using these sites for their expansion as they provide a quicker and more cost effective deployment option.

The Coalition Mobile Black Spot Program will be key to discussions with carriers for the Bundaberg area.

⁹ <http://www.news-mail.com.au/news/mobile-phone-black-spots-bundaberg/1950356/>

4.3.1. Priority Locations for Bundaberg








The five top priority locations for Bundaberg are:

-  A radius of 15klms around Goodwood (towards Childers, Bundaberg and Woodgate). These three road sections have Blackspots for all three carriers, combinations of two or individual carries. Black Spot Funding
-  Bucca, surrounds and Bundaberg-Lowmead Rd. Pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding.
-  Moore Park Beach, Burnett Heads, Bagara, Innes Park and Elliott Heads – All of these coastal urban communities are candidates for 4G services from all three Carriers. Within a year they should also be considered for 4G Plus. Network Improvements.
-  Bundaberg and all suburbs together with Childers – There is some 4G coverage by Telstra only. This should be extended to the whole urban area for all three carriers with 4GPlus by end 2014. Network Improvements.
-  Apple Tree Creek – This Bruce Highway location should provide 3G or better coverage for all three carriers. Network Improvements.

4.3.2. Carrier Blackspots

Mass signal testing in Bundaberg identified the extent of mobile broadband signal strength for approximately 485klms of national, state and local road systems. Captured at a rate of one per hundred metres, some 4,850 markers were generated for each of the three carriers.

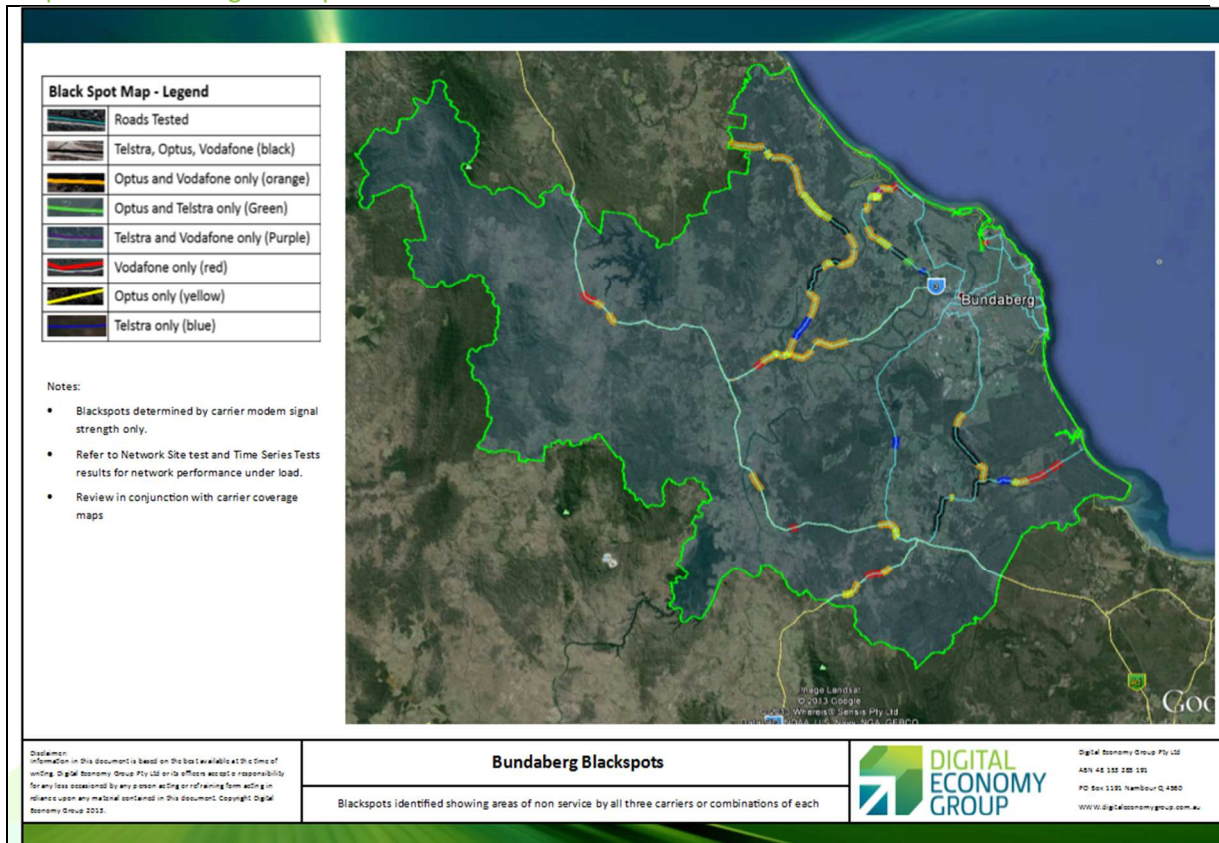
This data is then filtered and mapped to highlight coverage Blackspots. The Map below shows the roads tested and the extent of Blackspots in the area. The colour code is as follows and is listed in order from most to least common:

-  Black – no signal for Telstra, Optus and Vodafone
-  Orange - Optus and Vodafone have no signal– Telstra is generating a signal
-  Yellow – No Optus signal – Telstra and Vodafone have signal
-  Red - No Vodafone signal – Telstra and Optus have signal
-  Blue – No Telstra signal – Optus and Vodafone have signal
-  Green – Telstra and Optus have no signal – Vodafone has signal
-  Purple – Telstra and Vodafone have no signal – Optus has signal

The table below identifies the 10 most significant or persistent Blackspot areas for Bundaberg. Not all areas identified by Digital Economy Group have been identified in this table.

Five road sections totalling 35klms have no signal strength for any of the three Carriers in the Bundaberg region. These Blackspots represent areas where mobile communications and mobile broadband is extremely limited, reducing safety in times of emergency and placing community residents and businesses in the area (farming, tourism or other) onto the wrong side of the digital divide.

Map 21: Bundaberg Blackspots



Sources: Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

The last five carrier Blackspots on the table are a mixture of carrier Blackspots: Optus and Vodafone, Optus only, Vodafone only and Telstra only. In total, this introduces a further 85klms of carrier Blackspots, highlighting that even in coastal regional centres like Bundaberg, extensive Blackspots exist and remain.

Table 7: Bundaberg Blackspot Assessment





| Site | Road Section to between | Blackspot Colour | Action Assessment |
|------|---|------------------|---|
| 1 | Part of Childers to Goodwood (11klms) | | Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 2 | Part of Goodwood Rd (near Goodwood) (8klms) | | Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 3 | Section of Bundaberg-Lowmead Rd near Avondale (4klms) | | Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 4 | 2 sections on North Bucca Rd (9klms) | | Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 5 | Section of Moorlands Rd (3klms) | | Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 6 | Maroondan to South Kolan (18klms) | | Blackspot for Optus & Vodafone. Requires new sites and or upgrades to remove this 2 carrier Blackspot |

| Site | Road Section to between | Blackspot Colour | Action Assessment |
|------|--|---------------------------|---|
| 7 | From near Rosedale to turnoff to Smiths Crossing Lowmead Rd (33klms & includes 4klms section in 3 above) | Yellow | Blackspot for Optus & Vodafone. Requires new sites and or upgrades to remove this 2 carrier Blackspot |
| 8 | Bruce Highway – 3 sections(Approx. 15 klms) | Red, Yellow, Green | Blackspot for Optus & Vodafone. Requires new sites and or upgrades to remove this 2 carrier Blackspot |
| 9 | Childers to boundary with North Burnett (11klms) | Yellow, Yellow, Red | Blackspot for Optus & Vodafone. Requires new sites and or upgrades to remove this 2 carrier Blackspot |
| 10 | Goodwood to Woodgate (12 klms) sections of Blackspots for each of the three carriers. | Blue, Yellow, Red, Yellow | Blackspot for Optus & Vodafone. Requires new sites and or upgrades to remove this 2 carrier Blackspot |

4.3.3. Network Site Test Results and Assessment

Network Site Tests (NST's) were conducted in 23 locations across the Bundaberg Regional Council area in September 2013. The testing methodology (outlined above) replicates a real world user experience. Whilst the individual site tests do allow for network performance variation, the sample Time Series Tests referred below demonstrate that network performance generally remains within a band. As a result network performance results are generally within plus or minus one of that score achieved when repeated over time.

The overall performance of each of the three carriers is highlighted in four colour bands to inform the assessment and proposed priorities for the Bundaberg region. The four colour bands are:

-  Green: Good results- matched expectations set by coverage maps and current technologies used to service that location.
-  White – Acceptable results, largely consistent with coverage map expectations but not necessarily reaching the advertised technology speeds of the carrier.
-  Amber – Poor results inconsistent with coverage maps and/or not performing to the standards/expectations set by advertising, this is a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations
-  Red – Blackspot or very poor results and may be inconsistent with coverage maps or not performing to the standards/expectations set by advertising or a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations

The Map below identifies each of the test locations with a number reference that can be matched to the table.

Telstra Network Site Test results and Action Assessment

Overall Telstra performed well with 14 green, 5 white and the 4 amber out of a total of 23. The key priorities for working with Telstra in Bundaberg will be increasing the capacity (speed & performance) through increased 4G deployment, network infill sites and network upgrades in areas where the tests were at the lower end of the range or expectation.

Optus and Vodafone (JV) Network Site Test results and Action Assessment

Within the Optus and Vodafone Joint Venture (JV), Vodafone achieved the poorest results, generally consistent with their current limited presence in the region. Out of the 23 test results, Vodafone has 7 red, 2 amber and the remainder were white. There were no green results for Vodafone. Optus achieved 8 green, 3 white, 3 red and 4 amber.

The key priorities for working with The Optus and Vodafone JV will include new sites, network upgrades to improve both coverage and capacity. 4G deployment will also be a critical priority.

Unlike other local governments in the Wide Bay Burnett region, no targets for the \$20 million Blackspot program were identified.

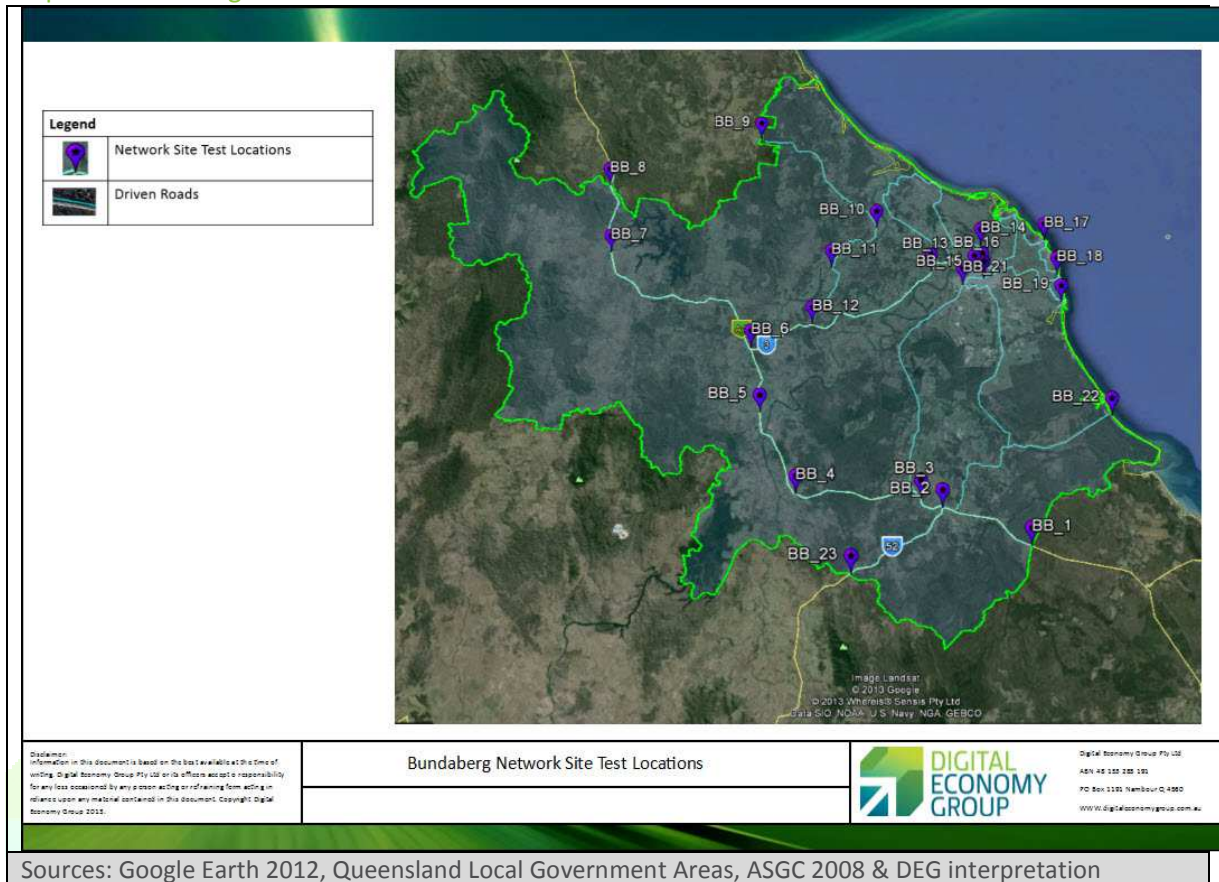
Table 8: Bundaberg Network Site Test Results and Assessment

| Site | Locality | Telstra | Optus | Vodafone | Action Assessment |
|------|--------------------------------|---------|-------|----------|---------------------------|
| 1 | BRC/Fraser Coast boundary (A1) | 2 | 2 | 1 | Telstra - NetUp; JV NetUp |
| 2 | Childers (A1) | 5 | 2 | 1 | JV upgrade; 4G all |
| 3 | Apple Tree Creek (A1) | 1 | 1 | 0 | JV upgrade; 4G all |
| 4 | Booyal (A1) | 5 | 4 | 2 | JV upgrade; 4G all |
| 5 | Wallaville (A1) | 5 | 1 | 2 | JV upgrade |
| 6 | Gin Gin (A1) | 5 | 2 | 1 | JV upgrade; 4G all |
| 7 | Kalpovar Rd (A1) | 2 | 1 | 0 | Telstra NetUp; JV NetUp |
| 8 | BRC/Gladstone Bdy West (A1) | 6 | 5 | 2 | JV upgrade |
| 9 | BRC/Gladstone Bdy East | 1 | 0 | 0 | JV colo |
| 10 | Rasmussen Rd | 2 | 0 | 0 | JV colo |
| 11 | Bucca | 1 | 0 | 0 | New site/coverage all |
| 12 | Bullyard | 1 | 1 | 0 | New site/coverage all |
| 13 | Sharon | 4 | 5 | 3 | Telstra NetUp; JV upgrade |
| 14 | Gooburru | 7 | 3 | 2 | JV upgrade |
| 15 | Isis Hwy Bundaberg Centre 1 | 6 | 4 | 3 | 4G JV |
| 16 | Isis Hwy Bundaberg Centre 2 | 7 | 4 | 3 | 4G JV |
| 17 | Bagara | 7 | 5 | 3 | 4G JV |
| 18 | Innes Park | 5 | 4 | 2 | 4G JV |
| 19 | Elliott Heads | 5 | 5 | 3 | 4G All |
| 20 | Walkerville | 5 | 5 | 3 | 4G All |
| 21 | Bundaberg West (Isis Hwy) | 5 | 5 | 3 | 4G All |
| 22 | Woodgate | 5 | 4 | 3 | 4G All |
| 23 | Bundaberg/North Burnett Bdy | 3 | 3 | 1 | JV upgrade |

Notes:

- 1- Site results colour grading - Green – in target range, White – acceptable, Amber – poor, Red – very poor.
- 2- Action Assessment codes - Telstra NetUp - Telstra Network Upgrade; JV NetUp - Optus and Vodafone Joint Venture - Network Upgrade. JV colo - Optus and Vodafone Joint Venture - potential new colocation site? 80mil Bspot - \$80 million Blackspot Program Candidate - major highway Blackspots. 20mil Bspot - \$20 million Blackspot Program Candidate - Seasonal locations

Map 22: Bundaberg Network Site Test Locations

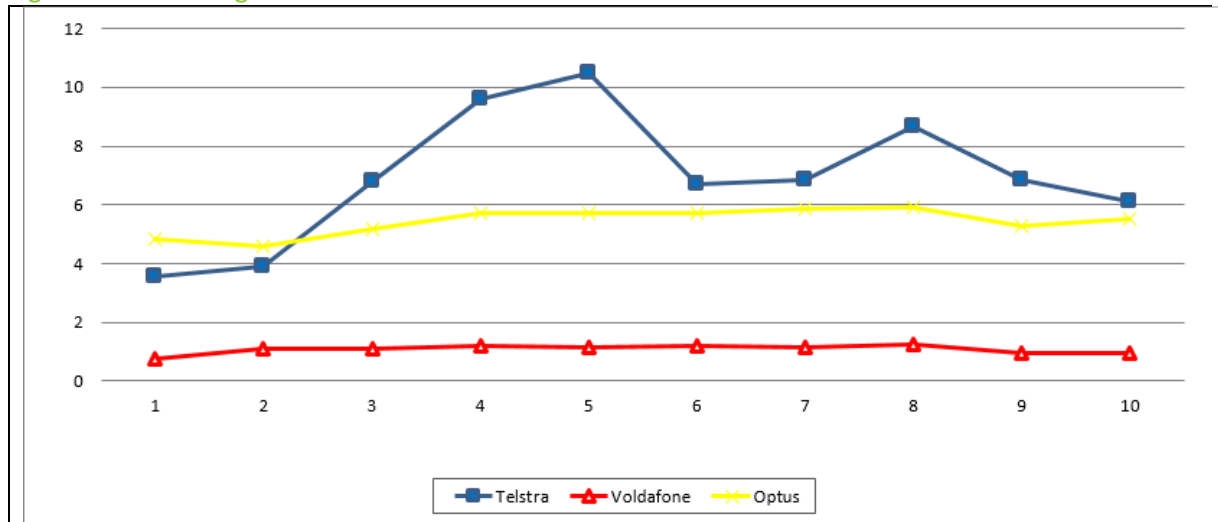


4.3.4. Time Series Test Results and Assessment

The Time Series Tests (TST's) in the Bundaberg region were completed at Bundaberg West (Cnr Hiedke St & Isis Highway) and Childers (Cnr Cevn St and Isis Highway). The Bundaberg West site was selected (at the edge of the Telstra 4G coverage area) to establish the quality of the network performance compared to the carriers without 4G deployed there. The Childers site was selected to demonstrate that “coverage” does not always translate to user experience.

Over ten tests at Bundaberg, Telstra fluctuated from just under 4 to over 10 Mbps with 8 out of 10 results above 6Mbps. In contrast Vodafone was more consistent, albeit at around 1Mbps. Optus remained at 5-6Mb for the entire time.

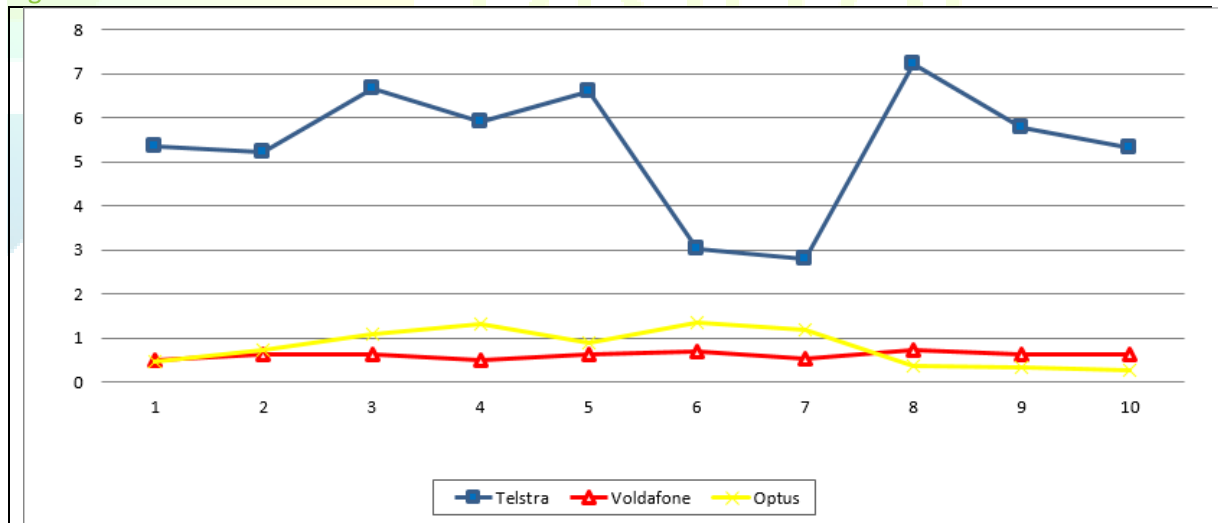
Figure 7: Bundaberg Time Series Test



Sources: DEG2013

All three carriers need to prioritise deployment of 4G capability in this commercial area of Bundaberg. Vodafone performance gains will potentially be the best coming from a low base. Optus clearly has additional spectrum or network equipment delivering results at near to Telstra’s in this location.

Figure 8: Childers Time Series Test



Sources: DEG 2013

The Childers results again highlight the performance of Telstra, although not to the same speed levels as the time series test in Bundaberg and with fluctuations in network performance from 3Mbps to 7Mbps. Both Optus and Vodafone deliver poorer results than Telstra. Additional network upgrades here which may already be part of their combined investments for the region, need to be deployed urgently to bring their performance in-line with Telstra.

4.4. Fraser Coast Regional Council

The Fraser Coast region enjoys some of the strongest carrier investments and coverage of all the Wide Bay Burnett councils. Despite this comparatively strong position the region have extensive areas with little or no signal. If a similar news story had been run in Fraser Coast to the one in Bundaberg by their News Mail, with a google map highlighting locations where the community experience Blackspots, the results would have been similar.

The testing by Digital Economy Group in the Fraser Coast area in September 2013 confirms the anecdotal advice information - whilst some areas do have good coverage, there are persistent Blackspots across the region for all three carriers. The time series testing completed at Maryborough and Urangan highlight the benefits of 4G where it is deployed and the disparity between the current networks performance in those locations.

The recent federal election has impacted on the deployment of the fibre networks until a review is completed, but it has not impacted on the Fixed Wireless network deployment. Fraser Coast is now in the initial stages of a 2 year NBN Co Fixed Wireless program and according to NBN Co will have approx. 18 sites (6 greenfields and 12 colocation) The greenfield sites will potentially become strategic assets for the region as mobile carriers will consider using these sites for their expansion as they provide a quicker and more cost effective deployment option.

The Coalition Mobile Black Spot Program will be key to discussions with carriers for the Fraser Coast.

4.4.1. Priority Locations for Fraser Coast








The top priority locations for the Fraser Coast are:

1. **[Regional Priority]** The Maryborough-Biggenden Rd Blackspot from Aramara to west of the Bruce Highway This road section has Blackspots for all three carriers, combinations of two or individual carries. Black Spot Funding
2. **[Regional Priority]** The Cooloola Coast Road to the boundary with Gympie. Pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding
3. Bruce Highway North of Maryborough – in the vicinity of the existing Moonaboola Industrial Estate. This area has poor reception for all three carriers and with current and proposed development represents a location of strategic importance for network upgrades
4. The Hervey Bay communities – focusing on increasing 4G and 4GPlus coverage and removing isolated Blackspots
5. Maryborough and surrounds – focusing on increasing 4G and 4GPlus coverage and removing isolated Blackspots. A particular focus on the area around Aldershot on the Bruce Highway. Industrial development area with very poor coverage
6. The Broweena—Woolooga Rd from Broweena to the boundary with Gympie. Pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding. Consider joining with the Gympie side to Woolooga

4.4.2. Carrier Blackspots

Mass signal testing in the Fraser Coast area identified the extent of mobile broadband signal strength for approximately 407kms of national, state and local road systems. Captured at a rate of one per hundred metres, some 4070 markers were generated for each of the three carriers.

This data is then filtered and mapped to highlight coverage Blackspots. The Map below shows the roads tested and the extent of Blackspots in the area. The colour code is as follows and is listed in order from most to least common:

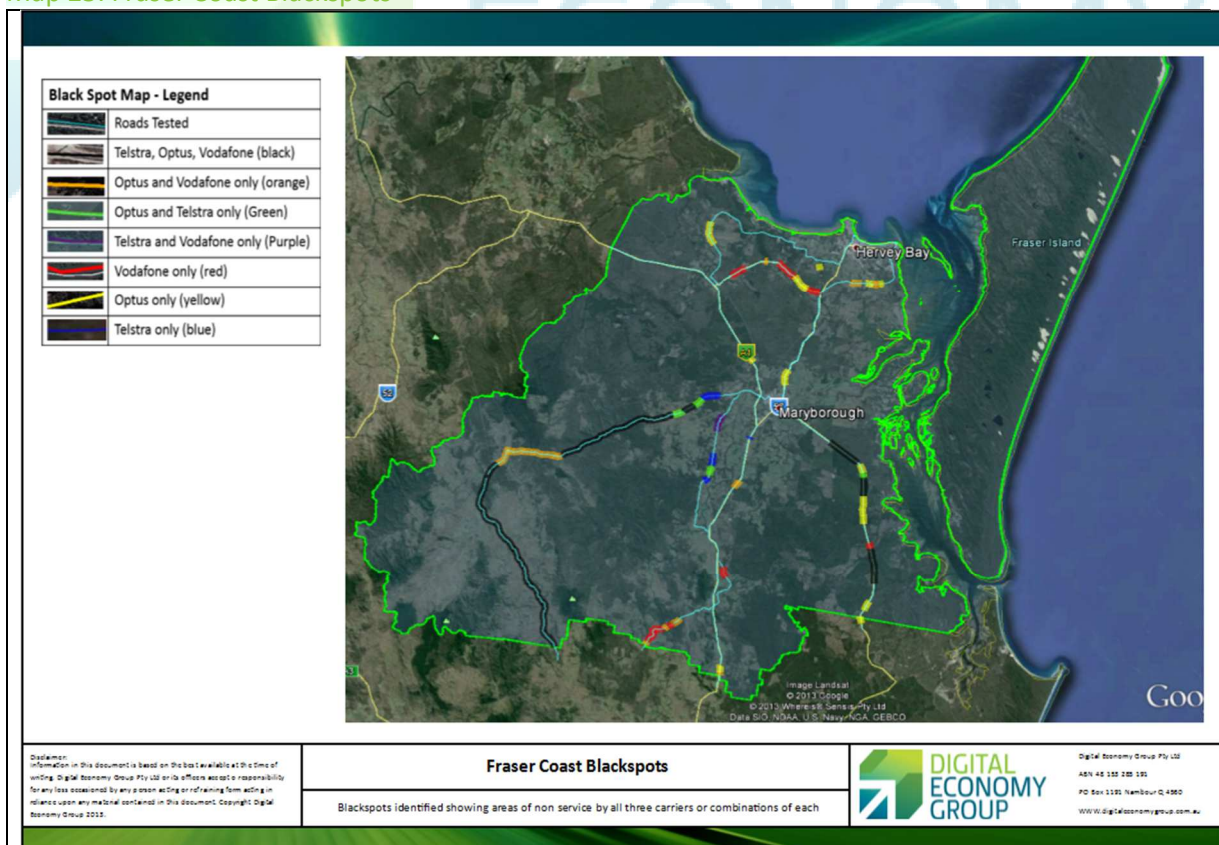
-  Black – no signal for Telstra, Optus and Vodafone
-  Orange - Optus and Vodafone have no signal– Telstra is generating a signal
-  Yellow – No Optus signal – Telstra and Vodafone have signal
-  Red - No Vodafone signal – Telstra and Optus have signal
-  Blue – No Telstra signal – Optus and Vodafone have signal
-  Green – Telstra and Optus have no signal – Vodafone has signal
-  Purple – Telstra and Vodafone have no signal – Optus has signal

The table below identifies the most significant or persistent Blackspot areas for Fraser Coast. Not all areas identified by Digital Economy Group have been identified in this table.

Four road sections totalling 82klms have no signal strength for any of the three Carriers in the Fraser Coast region. These Blackspots represent areas where mobile communications and mobile broadband is extremely limited, reducing safety in times of emergency and placing community residents and businesses in the area (farming, tourism or other) onto the wrong side of the digital divide.

The remaining carrier Blackspots on the table are a mixture of carrier Blackspots: Optus and Vodafone, Optus only and Vodafone only. In total, this introduces a further 15klms of carrier Blackspots, highlighting that even in coastal regional centres like Fraser Coast, Blackspots exist.

Map 23: Fraser Coast Blackspots



Sources: Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

There are a number of other smaller Blackspot locations with a mixture of carrier variations. As these are shorter sections and are not three carrier Blackspots, they do not represent the same priority as those listed above.



Table 9: Fraser Coast Blackspot Assessment



| Site | Road Section to between | Blackspot Colour | Action Assessment |
|------|--|------------------|---|
| 1 | From Aramara for almost 25klms on the Maryborough-Biggenden Rd towards Maryborough | | Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 2 | Brooweena-Woolooga Rd from the Fraser Coast Gympie Boundary North for 38klms | | Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 3 | Cooloola Coast Road (1) 12klms of Blackspot with a sort section in the centre with poor signal strength | | Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 4 | Cooloola Coast Road (2) 7klms of Blackspot only a short distance from the black spot identified above. | | Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 5 | Between Torbanlea and Walligan Optus and Vodafone both have sections of combined on individual Blackspots. (4klms) | | Blackspot for Optus & Vodafone. Requires new sites and or upgrades to remove this 2 carrier Blackspot |
| 6 | Booral Road Optus and Vodafone both have sections of combined on individual Blackspots totalling almost 4klms | | Blackspot for Optus & Vodafone. Requires new sites and or upgrades to remove this 2 carrier Blackspot |
| 7 | Bauple-Woolooga Rd (7klms) | | Blackspot for Optus & Vodafone. Requires new sites and or upgrades to remove this 2 carrier Blackspot |

4.4.3. Network Site Test Results and Assessment

Network Site Tests (NST's) were conducted in 21 locations across the Fraser Coast Regional Council area in September 2013. The testing methodology (outlined above) replicates a real world user experience. Whilst the individual site test do allow for network performance variation, the sample Time Series Tests referred elsewhere demonstrate that network performance generally remains within a band. As a result network performance results are generally within plus or minus one of that score achieved when repeated over time.

The overall performance of each of the three carriers is highlighted in four colour bands to inform the assessment and proposed priorities for the Fraser Coast region. The four colour bands are:

-  Green: Good results- matched expectations set by coverage maps and current technologies used to service that location.
-  White – Acceptable results, largely consistent with coverage map expectations but not necessarily reaching the advertised technology speeds of the carrier.

-  Amber – Poor results, inconsistent with coverage maps and/or not performing to the standards/expectations set by advertising or a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations
-  Red – Blackspot or very poor results and may be inconsistent with coverage maps or not performing to the standards/expectations set by advertising or a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations

The Map below identifies each of the test locations with a number reference that can be matched to the table.

Telstra Network Site Test results and Action Assessment

Overall Telstra performed well with 12 green, 2 white and the 7 amber out of a total of 23. The key priorities for working with Telstra in Fraser Coast will be increasing the capacity (speed & performance) through increased 4G deployment, infill sites and network upgrades in areas where the tests were at the lower end of the range or expectation.

Optus and Vodafone (JV) Network Site Test results and Action Assessment

In the Fraser Coast, Vodafone achieved the poorest results, generally consistent with their current limited presence in the region, although not as poorly as the inland parts of the region. Out of the 23 test results, Vodafone has 3 red, 7 amber and 10 were white. There were no green results for Vodafone. Optus on the other hand had 2 green, 11 white, 8 amber and no reds.

The key priorities for working with The Optus and Vodafone JV will include new sites and network upgrades to improve both coverage and capacity. 4G deployment will also be a critical priority in the locations with higher population densities.

Table 10: Fraser Coast Network Site Test Results and Assessment

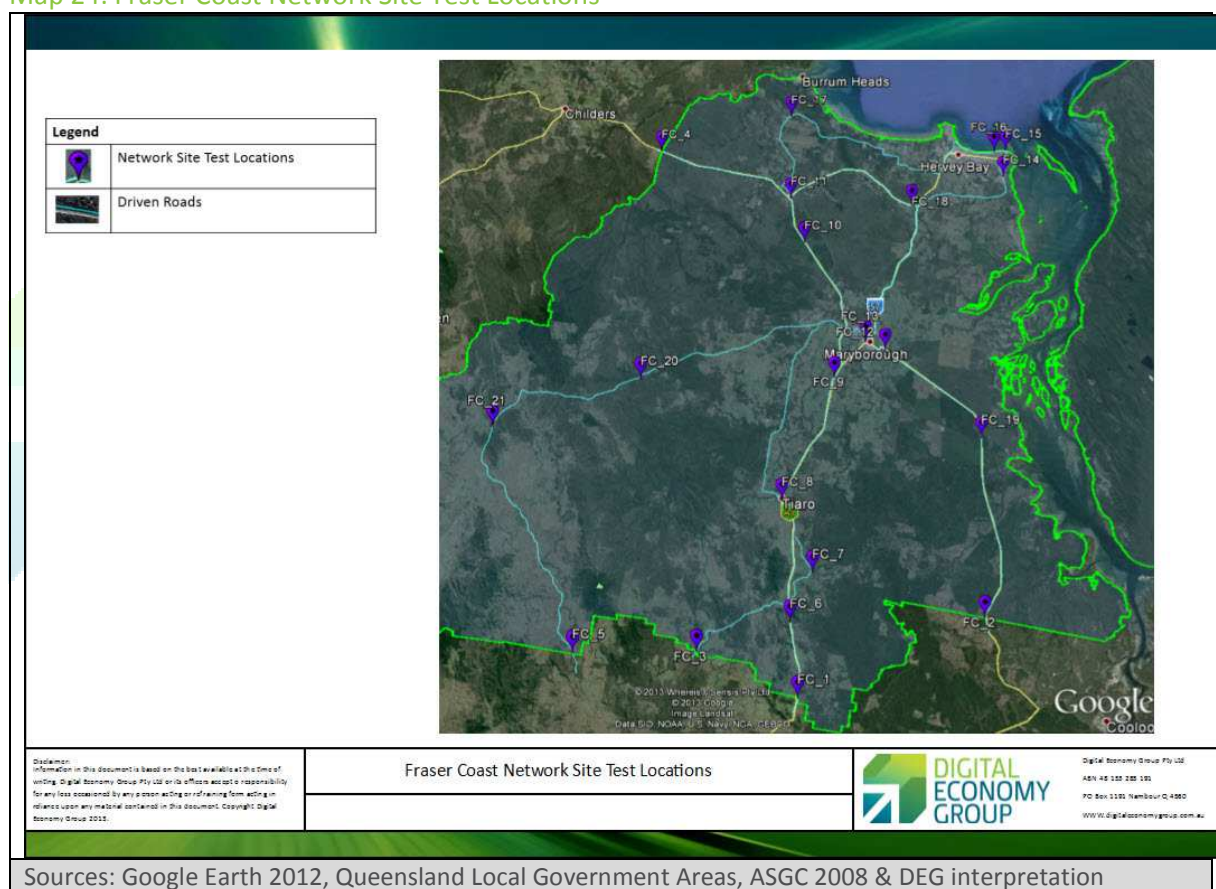
| Site | Locality | Telstra | Optus | Vodafone | Action Assessment |
|------|-------------------------------------|---------|-------|----------|---------------------------------|
| 1 | FC Bdry Gympie (A1) | 5 | 3 | 2 | JV NetUp |
| 2 | FC Bdry Cooloola Coast Rd | 4 | 3 | 1 | JV NetUp |
| 3 | FC Bdry Bauple-Woolooga Rd | 1 | 0 | 0 | Telstra NetUp; JV Colo Priority |
| 4 | FC Bdry Bundaberg (A1) | 2 | 1 | 0 | Telstra NetUp; JV NetUp |
| 5 | FC Bdry Gympie Broweena-Woolooga Rd | 0 | 0 | 0 | 80mil Bspot - Priority |
| 6 | Sheenans Rd (A1) | 5 | 4 | 2 | JV NetUp |
| 7 | Bauple | 5 | 4 | 1 | JV NetUp |
| 8 | Tiaro (A1) | 5 | 4 | 2 | JV NetUp |
| 9 | Tinana South | 1 | 2 | 0 | Telstra NetUp; JV NetUp |
| 10 | Colton | 5 | 4 | 2 | JV NetUp |
| 11 | Torbanlea | 5 | 5 | 2 | JV NetUp |
| 12 | Maryborough East (Granville) | 7 | 4 | 2 | 4G JV |
| 13 | Maryborough Central (Alice Street) | 7 | 4 | 3 | 4G JV |
| 14 | Hervey Airport | 7 | 5 | 1 | 4G JV:JV NetUp |
| 15 | Urangan | 6 | 4 | 2 | 4G JV:JV NetUp |
| 16 | Torquay | 7 | 4 | 2 | 4G JV:JV NetUp |

| Site | Locality | Telstra | Optus | Vodafone | Action Assessment |
|------|-------------------------------------|---------|-------|----------|-------------------------|
| 17 | Barrum River | 1 | 1 | 0 | Telstra NetUp: JV NetUp |
| 18 | Walligan | 3 | 1 | 0 | Telstra NetUp: JV NetUp |
| 19 | Cooloola Coast Road (SW of Maaroom) | 0 | 0 | 0 | Telstra NetUp: JV NetUp |
| 20 | Broweena | 1 | 0 | 0 | 80mil Bspot |
| 21 | M'borough-Biggenden Rd turnoff | 0 | 0 | 0 | 80mil Bspot |

Notes:

- 3- Site results colour grading - Green – in target range, White – acceptable, Amber – poor, Red – very poor.
- 4- Action Assessment codes - Telstra NetUp - Telstra Network Upgrade; JV NetUp - Optus and Vodafone Joint Venture - Network Upgrade. JV colo - Optus and Vodafone Joint Venture - potential new colocation site 80mil Bspot - \$80 million Blackspot Program Candidate - major highway Blackspots. 20mil Bspot - \$20 million Blackspot Program Candidate - Seasonal locations

Map 24: Fraser Coast Network Site Test Locations



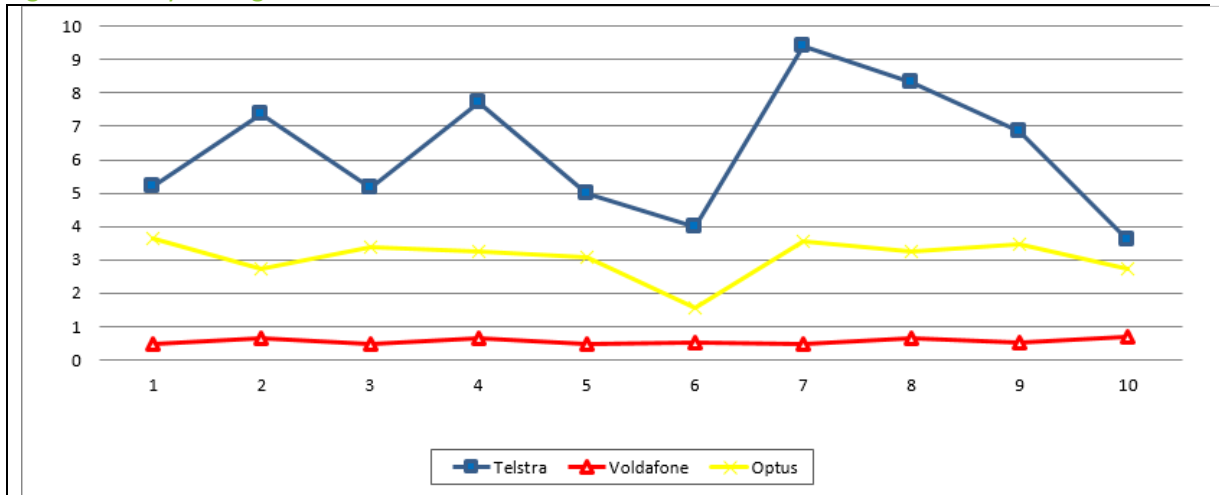
4.4.4. Time Series Test Results and Assessment

The two Time Series Tests in the Fraser Coast region were completed at Maryborough (central) and Urangan (Esplanade). The Maryborough site was selected (to be within the Telstra 4G coverage area) to establish the quality of the network performance compared to the carriers without 4G deployed there. The Urangan site was selected to demonstrate that “coverage” does not translate to user experience.

Over ten tests at Maryborough, Telstra fluctuated from just over 3Mbps to over 9 Mbps with 8 out of 10 results above 5Mbps. In contrast Vodafone was more consistent, albeit at around .65Mbps. Optus remained at 3Mbps for the entire time.

Vodafone performance gains will potentially be the best coming from a low base. Optus can also benefit from additional investment to come close to competing with Telstra.

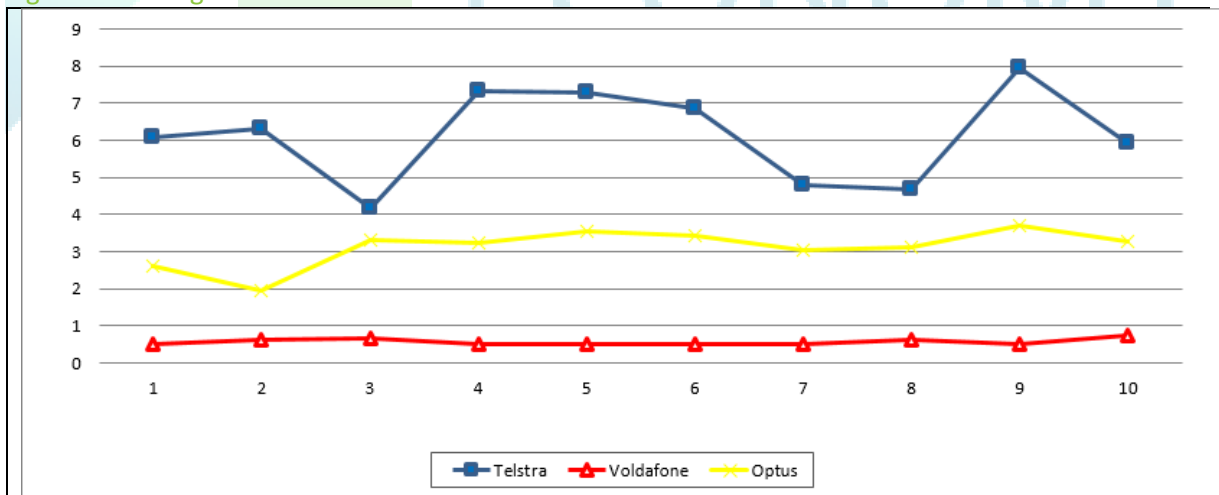
Figure 9: Maryborough Time Series Test



Sources: DEG 2013

The Urangan results again highlight the performance of Telstra, although not to the same speed levels as Bundaberg and with fluctuations in network performance from 4Mbps to 8Mbps. Both Optus and Vodafone reflected their performance in Maryborough with similar needs to invest in infrastructure to achieve comparable and competitive results to Telstra.

Figure 10: Urangan Time Series Test



Sources: DEG 2013

4.5. Gympie Regional Council

The Gympie Council have recognised the value of establishing Blackspots within their area and added almost 200klms to the testing base. The testing results now be able to reliably inform council during times of disaster.

The testing by Digital Economy Group in the Gympie area over a number of days in September 2013 confirmed the anecdotal advice information - whilst some areas do have good coverage, there are persistent Blackspots across the region for all three carriers.






The time series testing completed at Gympie and Imbil highlight the benefits of 4G where it is deployed and the disparity between the current networks performance in those locations.

The recent federal election has impacted on the deployment of the fibre networks until a review is completed, but it has not impacted on the Fixed Wireless network deployment. Gympie is now in the initial stages of a 2 year NBN Co Fixed Wireless program and according to NBN Co will have approx. 23 sites. Out of the 23 proposed NBN Co sites, it will be the new sites that will potentially become strategic assets for the region as mobile carriers will consider using these sites for their expansion as they provide a quicker and more cost effective deployment option.

The Coalition Mobile Black Spot Program will be key to discussions with carriers for the Gympie region.

4.5.1. Priority Locations for Gympie

The five top priority locations for the Gympie are:







-  The Burnett Hwy (NBRC boundary - Tansey), Kilkivan Tansey Rd, Wide Bay Hwy (Kilkivan - Bells Bridge) to the Bruce Highway. Extensive pervasive Blackspots for all three carriers, combinations of two or individual carrier. Blackspot Funding. Consider joining with North Burnett as the Blackspot extends to Ban Ban Springs.
-  The Broweena—Woolooga Rd form Broweena to the boundary with Gympie. Woolooga in particular appears to be a growing township with no coverage. Pervasive Blackspots for all three carriers, combinations or two or individual carrier. Blackspot Funding. Consider joining with the Maryborough to Broweena
-  Widgee and Glastonbury – Each of these growing localities and the roads that service them contain pervasive Blackspots for all three carriers and isolated sections of Optus and Vodafone Blackspots.
-  Amamoor and surrounds. Location for the Gympie National Country Music Muster. Potential Candidate for the Seasonal Blackspot Funding Program
-  Borumba Dam and Valley to Imbil – Pervasive Blackspots for all three carriers, combinations or two or individual carrier. Potential Candidate for the seasonal Blackspot Funding Program.

4.5.2. Carrier Blackspots

Mass signal testing in Gympie identified the extent of mobile broadband signal strength for approximately 703klms of national, state and local road systems. Captured at a rate of one per hundred metres, some 7,030 markers were generated for each of the three carriers.

This data is then filtered and mapped to highlight coverage Blackspots. The Map below shows the roads tested and the extent of Blackspots in the area. The colour code is as follows and is listed in order from most to least common:

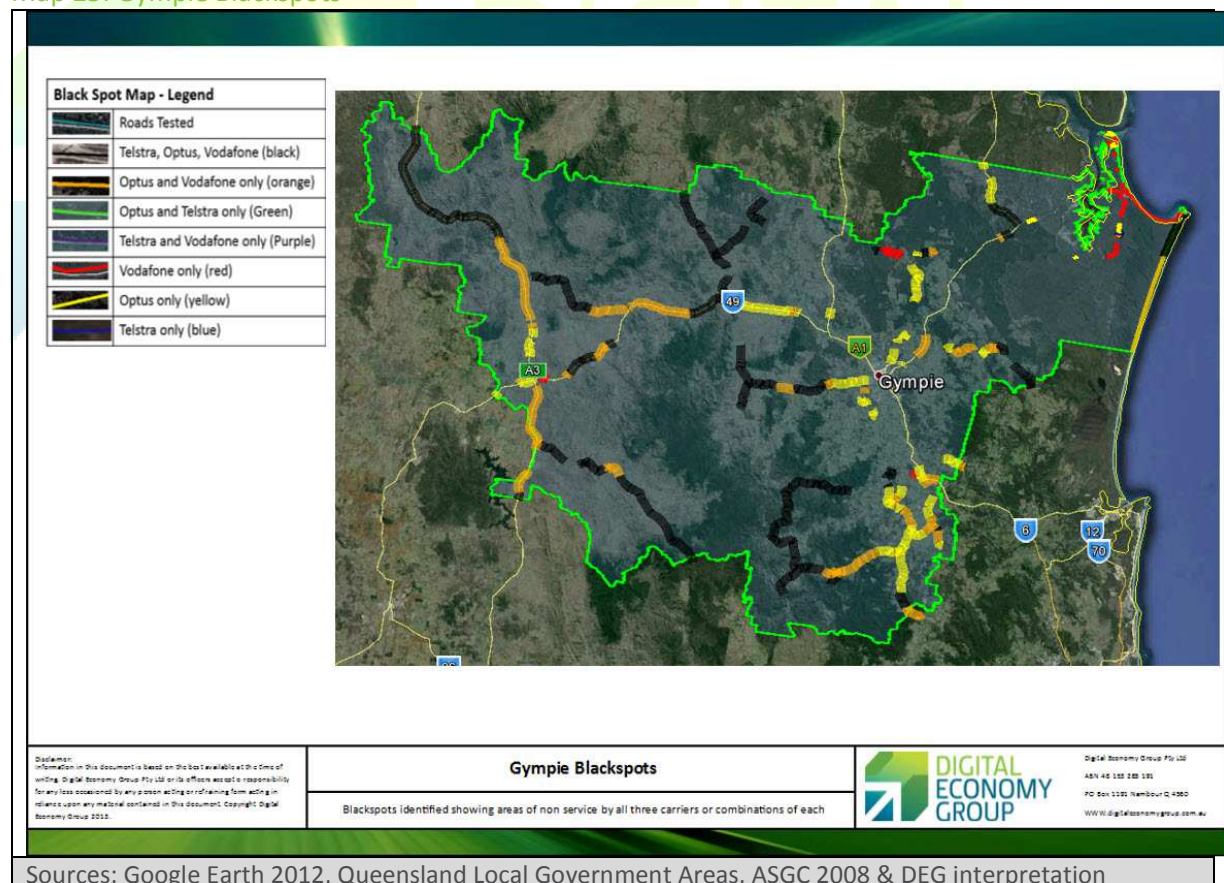
-  Black – no signal for Telstra, Optus and Vodafone

-  Orange - Optus and Vodafone have no signal – Telstra is generating a signal
-  Yellow – No Optus signal – Telstra and Vodafone have signal
-  Red - No Vodafone signal – Telstra and Optus have signal
-  Blue – No Telstra signal – Optus and Vodafone have signal
-  Green – Telstra and Optus have no signal – Vodafone has signal
-  Purple – Telstra and Vodafone have no signal – Optus has signal

The table below identifies the 10 most significant or persistent Blackspot areas for Gympie. Not all areas identified by Digital Economy Group have been identified in this table. There are a number of other smaller Blackspot locations with a mixture of carrier variations. As these are shorter sections and are not three carrier Blackspots, they do not represent the same priority as those listed above.

Over 220kms of nearly 700kms tested for Gympie were rated as three carrier Blackspots. A further 138kms was identified as a two carrier Blackspot (Optus & Vodafone) or had significant non service areas for one of these two carriers. Approximately half of these roads are highways or major connecting roads with high or consistent use. These Blackspots represent areas where mobile communications and mobile broadband is extremely limited, reducing safety in times of emergency and placing community residents and businesses in the area (farming, tourism or other) onto the wrong side of the digital divide.

Map 25: Gympie Blackspots



Sources: Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

A number of these Blackspot roads extend beyond the local government boundary into adjoining areas and through the Wide Bay Burnett REDAC. This represents an excellent opportunity to collaborate and seek partnerships with the carriers, state and federal government to address these common issues. This will be promoted through the advocacy plan for this project.

Table 11: Gympie Blackspot Assessment





| Site | Road Section to between | Blackspot Colour | Action Assessment |
|------|--|---------------------------|--|
| 1 | Burnett Highway between the North Burnett Boundary and the Bruce Highway. | Black | Total section 93.9klms. 55klms Blackspot for all three carriers. 38.9klms Blackspot for two carriers. Possible Coalition Blackspot funding program candidate |
| 2 | Lower Wonga to Southside | Black | Total section 34.5klms. 23.8klms Blackspot for all three carriers. Balance 10.4klms Blackspot for 1 or two carriers Possible Coalition Blackspot funding program candidate |
| 3 | Burnett Highway to Woolooga and both Bauple- Woolooga Rd and Brooweena-Woolooga Rd | Black | Total Section 35.7klms. Very short sections of signal in 2 parts of these roads. Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 4 | Kilkivan and Goomeri | Black | 10.3klms - Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 5 | Amamoor, Amamoor Creek, Upper Kandanga and Lake Borumba | Black | 48.5klms. Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 6 | Kilcoy Murgon Rd | Black | Section 36klms: 32.5klms Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 7 | Burnett Highway South Burnett Boundary to Tansey | Orange Yellow | Section 39.9klms Blackspot for Optus & Vodafone or Vodafone for over 35klms of the section. Requires new sites and or upgrades to remove this 2 carrier Blackspot |
| 8 | Pomona Kin Kin Rd through Wolvi | Black Orange Yellow | Section 20.3klms. Blackspot for all three carriers (6klms) Blackspot for Optus & Vodafone or just Optus 15klms. Requires new sites and or upgrades to remove this multi carrier Blackspot |
| 9 | Areas of Imbil, Carters Ridge, Bollier, Brooloo & Kandanga together with parts of the Bruce Highway (old and new in the Southern area of Gympie. | Orange Yellow Red | Estimated total over 20klms. Testing of several roads in this area identified Blackspot for Optus & Vodafone. Requires new sites and or upgrades to remove this 2 carrier Blackspot |
| 10 | Rainbow Beach Road and areas around Rainbow Beach | Black Yellow Red | Estimated total over 30klms in total. Isolated area with no coverage by Telstra. Otherwise a few areas with no Optus coverage. Balance area Blackspot for Vodafone only. Requires network upgrades predominantly by Vodafone |

4.5.3. Network Site Test Results and Assessment

Network Site Tests (NST's) were conducted in 26 locations across the Gympie Regional Council area in the original testing. Additional testing was completed in the Tin Can Bay and Rainbow Beach area generating a further 14 tests. The testing methodology (outlined above) replicates a real world user experience. Whilst the individual site tests do allow for network performance variation, the sample Time Series Tests referred elsewhere demonstrate that network performance generally remains

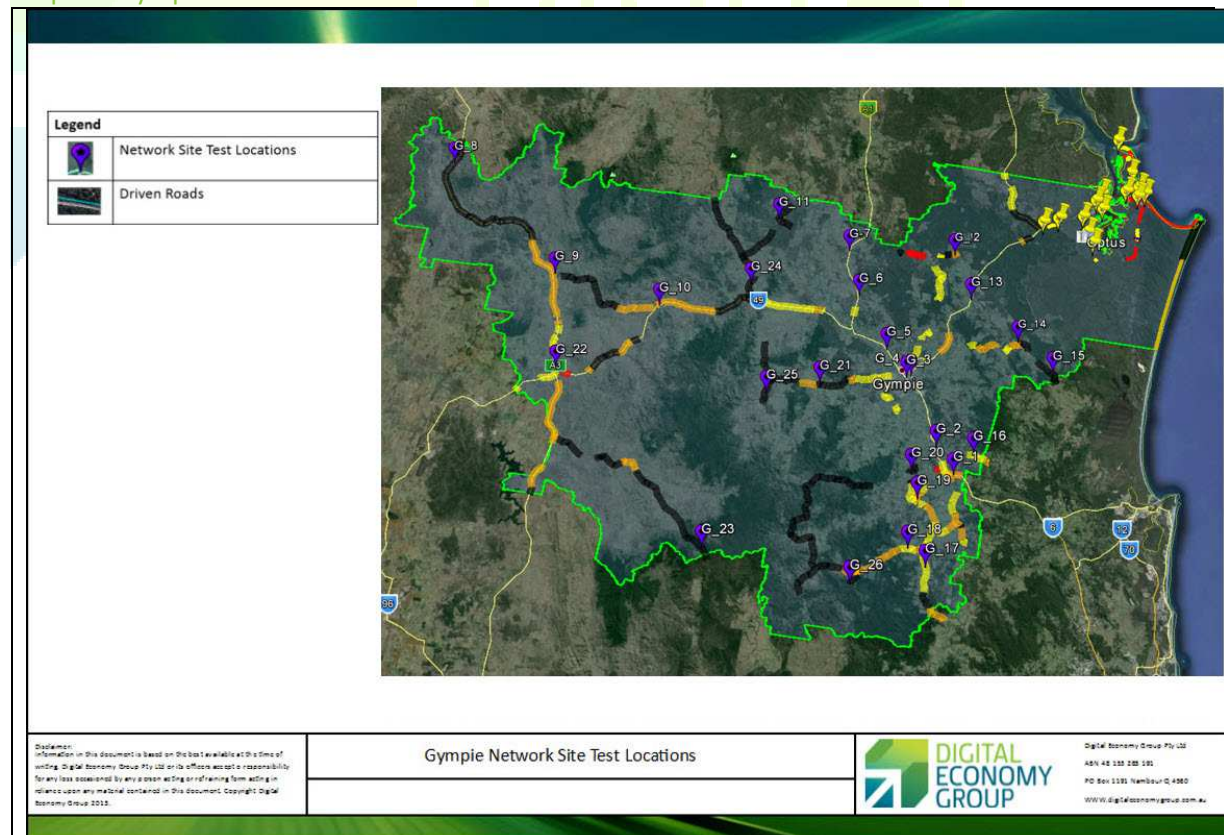
within a band. As a result network performance results are generally within plus one or minus one of that score achieved when repeated over time.

The overall performance of each of the three carriers is highlighted in four colour bands to inform the assessment and proposed priorities for the Gympie region. The four colour bands are:

-  Green: Good results- matched expectations set by coverage maps and current technologies used to service that location.
-  White – Acceptable results, largely consistent with coverage map expectations but not necessarily reaching the advertised technology speeds of the carrier.
-  Amber – Poor results, inconsistent with coverage maps and/or not performing to the standards/expectations set by advertising or a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations
-  Red – Blackspot or very poor results and may be inconsistent with coverage maps or not performing to the standards/expectations set by advertising or a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations

Map 20 below identifies each of the test locations with a number reference that can be matched to the table.

Map 26: Gympie Network Site Test Locations



Sources: Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

Telstra Network Site Test results and Action Assessment

Overall Telstra performed reasonably well with 7 green, 5 white, 7 amber and 6 red out of a total of 26. The communities of Amamoor, Glastonbury, Woolooga, Widgee and tourism destination – Lake Borumba all warrant investigation for new sites and coverage.

Additional testing in the Tin Can Bay and Rainbow Beach area highlighted that most of the area is services with mobile phone coverage and blocks of good mobile broadband, there are areas with potential for improvement. Although not specifically tested, the highly frequented beach roads of Cooloola (Rainbow sands and Tewantin to Double Island Point) have sections with no coverage.

Beyond that, the key priorities for working with Telstra in Gympie will be increasing the capacity (speed & performance) through increased 4G deployment and Network Upgrades in areas where the tests were at the lower end of the range or expectation.

Optus and Vodafone (JV) Network Site Test results and Action Assessment

The Optus and Vodafone Joint Venture (JV), did not achieve any green ratings, meaning their networks did not generate strong positive results in the locations tested. Both achieved 10 white, 8 amber and 8 or 9 red ratings. As a result there are many areas and ways that both Vodafone and Optus can improve their network performance in Gympie. New sites/coverage are recommended for Glastonbury, Woolooga, Kandanga, Imbil, and Kilkivan, the boundary with the Sunshine Coast, Widgee and tourism destination – Lake Borumba.

Additional testing in the Tin Can Bay and Rainbow Beach area highlighted the urgent need for investment by Vodafone across the entire area. Optus have coverage, however network upgrades are required to provide high quality mobile broadband coverage. Although not specifically tested, the highly frequented beach roads of Cooloola (Rainbow sands and Tewantin to Double Island Point) have extensive sections with no coverage for Optus and Vodafone. In this area the record of accidents and delayed response times due to mobile coverage warrants additional consideration for carrier investment.

Beyond those specific locations, the key priorities for working with The Optus and Vodafone JV will include network upgrades to improve both coverage and capacity. 4G deployment will also be a critical priority in larger centres.

There are a number of clear candidates for the \$80 mil Coalition Blackspots program and Lake Borumba is possibly a candidate for the \$20million Blackspot program with specific investigation.

Table 12: Gympie Network Site Test Results and Assessment

| Site | Locality | Telstra | Optus | Vodafone | Action Assessment |
|------|----------------------------|---------|-------|----------|-------------------------|
| 1 | Gympie Bdry Sun Coast (A1) | 6 | 0 | 2 | JV NetUp |
| 2 | Kybong (A1) | 4 | 4 | 2 | Telstra NetUp; JV NetUp |
| 3 | Gmpie Central (A1) | 5 | 4 | 3 | JV upgrade; 4G all |
| 4 | Gmpie East | 5 | 2 | 2 | JV upgrade; 4G all |
| 5 | Chatsworth (A1) | 7 | 5 | 3 | JV NetUp |
| 6 | Curra (A1) | 6 | 3 | 2 | JV NetUp |
| 7 | Gunalda (A1) | 5 | 4 | 3 | Telstra NetUp; JV NetUp |
| 8 | Gympie North Burnett Bdy | 0 | 0 | 0 | 80mil Bspot |
| 9 | Tansy - Kilkivan Rd | 1 | 0 | 0 | JV colo/NBN Co site? |
| 10 | Kilkivan | 5 | 0 | 0 | JV colo/NBN Co site? |

| Site | Locality | Telstra | Optus | Vodafone | Action Assessment |
|------|-----------------------------|---------|-------|----------|--------------------------------------|
| 11 | Bauple-Woolooga Rd (Miva) | 0 | 0 | 0 | New site/ NetUp all Carriers |
| 12 | Neerdie | 4 | 0 | 0 | JV NetUp colo |
| 13 | Goomboorian | 6 | 4 | 2 | JV NetUp |
| 14 | Wolvi | 6 | 0 | 0 | JV NetUp colo |
| 15 | Pomona Kin Kin Rd (Bdry SC) | 0 | 0 | 0 | New site/ NetUp all Carriers |
| 16 | Traveston | 3 | 0 | 1 | Telstra Net Up, JV colo/NBN Co site? |
| 17 | Brooloo | 1 | 0 | 0 | Telstra NetUp; JV NetUp |
| 18 | Imbil | 6 | 0 | 0 | JV Colo |
| 19 | Kandanga | 4 | 0 | 0 | Telstra NetUp; JV Colo |
| 20 | Amamoor | 0 | 3 | 2 | Telstra Colo; JV NetUp |
| 21 | Glastonbury | 0 | 0 | 0 | 80mil Bspot |
| 22 | Goomeri | 6 | 4 | 2 | JV & NetUp |
| 23 | Kilcoy-Murgon Rd (Sth Bdy) | 0 | 0 | 0 | New site/ NetUp all Carriers |
| 24 | Woolooga | 0 | 0 | 0 | New site/ NetUp all Carriers |
| 25 | Widgee | 0 | 0 | 0 | New site/ NetUp all Carriers |
| 26 | Lake Borumba | 0 | 0 | 0 | 20mil Bspot |

Notes:

- 1- Site results colour grading - Green – in target range, White – acceptable, Amber – poor, Red – very poor.
- 2- Action Assessment codes - Telstra NetUp - Telstra Network Upgrade; JV NetUp - Optus and Vodafone Joint Venture - Network Upgrade. JV colo - Optus and Vodafone Joint Venture - potential new colocation site 80mil Bspot - \$80 million Blackspot Program Candidate - major highway Blackspots. 20mil Bspot - \$20 million Blackspot Program Candidate - Seasonal locations

Table 13: Additional Gympie Network Site Test Results and Assessment

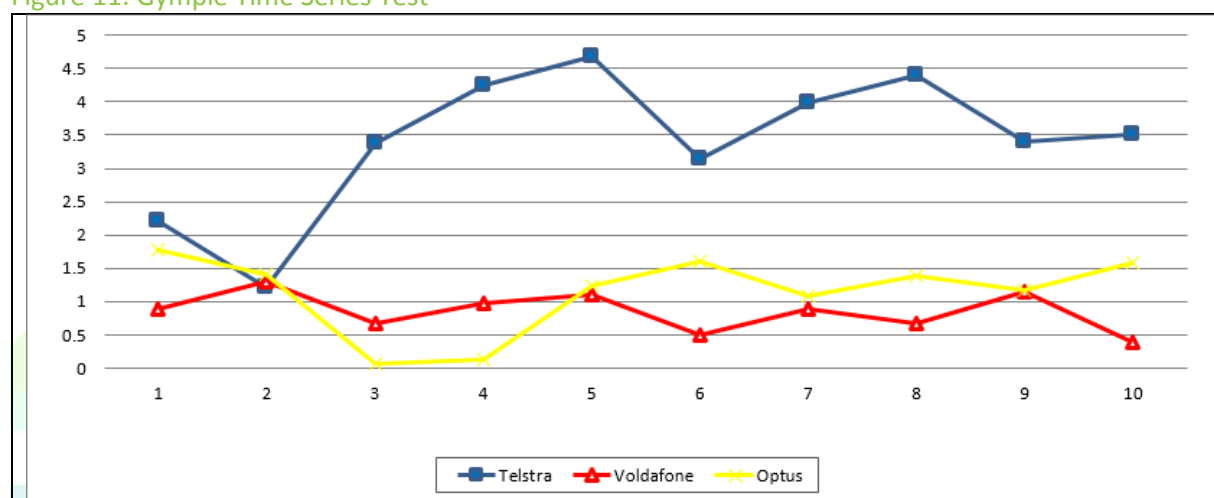
| Site | Locality | Telstra | Optus | Vodafone | Action Assessment |
|------|--|---------|-------|----------|-------------------------|
| 1 | Osborne Ct Tin Can Bay Rd | 3 | 4 | 0 | Telstra NetUp; JV NetUp |
| 2 | Cnr Tin Can Bay Rd & Rainbow Beach Rd | 5 | 4 | 1 | Telstra NetUp; JV NetUp |
| 3 | Cnr Tin Can Bay Rd & Bayside Rd | 5 | 3 | 0 | JV upgrade; 4G all |
| 4 | Tin Can Bay IGA | 7 | 3 | 0 | JV upgrade; 4G all |
| 5 | Cnr Tin Can Bay Harbour | 6 | 4 | 0 | JV NetUp |
| 6 | Toolara Rd | 5 | 2 | 0 | JV NetUp |
| 7 | Cooloola Cove Woolworths | 4 | 3 | 0 | Telstra NetUp; JV NetUp |
| 8 | Cnr Investigator Ave & Queen Elizabeth Drive Cooloola Cove | 4 | 3 | 0 | Telstra NetUp; JV NetUp |
| 9 | Rainbow Beach Primary School | 5 | 3 | 0 | Telstra NetUp; JV NetUp |
| 10 | Carlo Rd | 5 | 3 | 0 | Telstra NetUp; JV NetUp |
| 11 | Rainbow Beach Sewerage Treatment Works | 5 | 1 | 0 | Telstra NetUp; JV NetUp |
| 12 | Inskip Point | 5 | 4 | 0 | Telstra NetUp; JV NetUp |
| 13 | Rainbow Shores | 6 | 1 | 0 | JV NetUp |
| 14 | Rainbow Beach Shops | 4 | 1 | 0 | Telstra NetUp; JV NetUp |

4.5.4. Time Series Test Results and Assessment

The Time Series Tests (TST's) in the Gympie region were completed at Gympie and Imbil. The Gympie site (Bruce Hwy, McDonald's) was selected to highlight Telstra performance and test Optus and Vodafone on the Highway. The Imbil site was selected to validate the indicative coverage there by all three carriers and demonstrate that "coverage" does not translate to user experience.

Over ten tests at Gympie, Telstra fluctuated from just 1Mbps to just over 5 Mbps with 8 out of 10 results above 3Mbps. Whilst this is better than Optus and Vodafone, it is poor compared with the Telstra results in Bundaberg, Childers, Urangan, Maryborough, Monto and Kingaroy. Vodafone were both more consistent although with results ranging between 0.5Mbps and 2Mbps, neither of these carriers generated spectacular results.

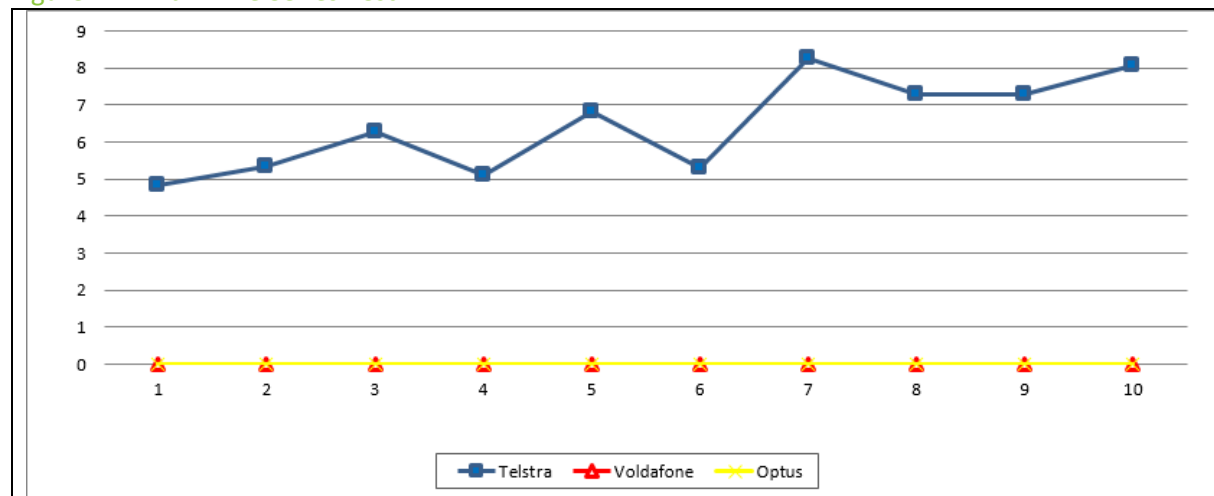
Figure 11: Gympie Time Series Test



Sources: DEG 2013

The Imbil testing reflected the coverage map for the area. Both Optus and Vodafone show no coverage here in this popular tourist destination on the Mary Valley Rattler. Telstra performed better here than in Gympie.

Figure 12: Imbil Time Series Test



Sources: DEG 2013

4.6. North Burnett Regional Council

North Burnett has the largest land area to population ratio in the 6 councils in the Wide Bay Burnett region. This places it at a disadvantage for attracting investment by carriers when compared to more commercially attractive and heavily populated areas. The increasingly heavy use of the Burnett Highway for the Central Queensland mining traffic may help increase the traffic counts and help justify their subsidising of carrier builds here.

The testing by Digital Economy Group in the North Burnett area in September 2013 confirms the anecdotal advice information - whilst some limited locations, there are persistent Blackspots across the region for all three carriers. In fact most of the roads tested were categorised as having Blackspots for one, two or three of the carriers







The time series testing completed at Monto and Mundubbera highlight the need for 4G in the urbanised parts of North Burnett.

The recent federal election has impacted on the deployment of the fibre networks until a review is completed, but it has not impacted on the Fixed Wireless network deployment. The NBN Co North Burnett Fixed Wireless program is progressing through a 2 year NBN Co Fixed Wireless program and according to NBN Co will have a small number of sites. Where these sites are new, they will potentially become strategic assets for the region as mobile carriers will consider using these sites for their expansion as they provide a quicker and more cost effective deployment option.

The Coalition Mobile Black Spot Program will be key to discussions with carriers for the North Burnett region.

4.6.1. Priority Locations for the North Burnett

The top priority locations for the North Burnett are:

-  **[Regional Priority]** Burnett Highway from Ceratodus to south of Monto – extensive and pervasive Blackspot area for all three carriers. Occasional coverage patches along a major inland transport route. A candidate for the Blackspot Funding Program
-  **[Regional Priority]** Burnett Highway from boundary with Gympie to Ban Ban springs. Potential to partner with Gympie and extension of this Blackspot almost to the Bruce Highway. Occasional coverage patches along a major inland transport route. A candidate for the Blackspot Funding Program
-  Paradise Dam. Very weak signals at the site and extensive Blackspots in the surrounding area for all three carriers at the site, is limiting the reputation for the growing RV market. Candidate for the Seasonal Blackspot Program
-  Mount Perry to the Burnett Highway extensive and pervasive Blackspot area for all three carriers. Occasional coverage patches along a transport route. A potential candidate for the Blackspot Funding Program
-  Burnett Highway from Eidsvold to almost Gayndah. Blackspot area for all three carriers. Occasional coverage patches along a transport route. A potential candidate for the Blackspot Funding Program
-  Mundubbera to border with South Burnett along the Mundubbera-Durong Rd. Blackspot area for all three carriers. Occasional coverage patches along a transport route. A potential candidate for the Blackspot Funding Program. The area was not specifically tested, however the identification as a Blackspot is consistent with the carrier mapping for this area.

- Mt Perry Road - between Monto and Mount Perry – (Gravel section). Blackspot area for all three carriers. Occasional coverage patches along a transport route. A potential candidate for the Blackspot Funding Program. The area was not specifically tested, however the identification as a Blackspot is consistent with the carrier mapping for this area.

4.6.2. Carrier Blackspots

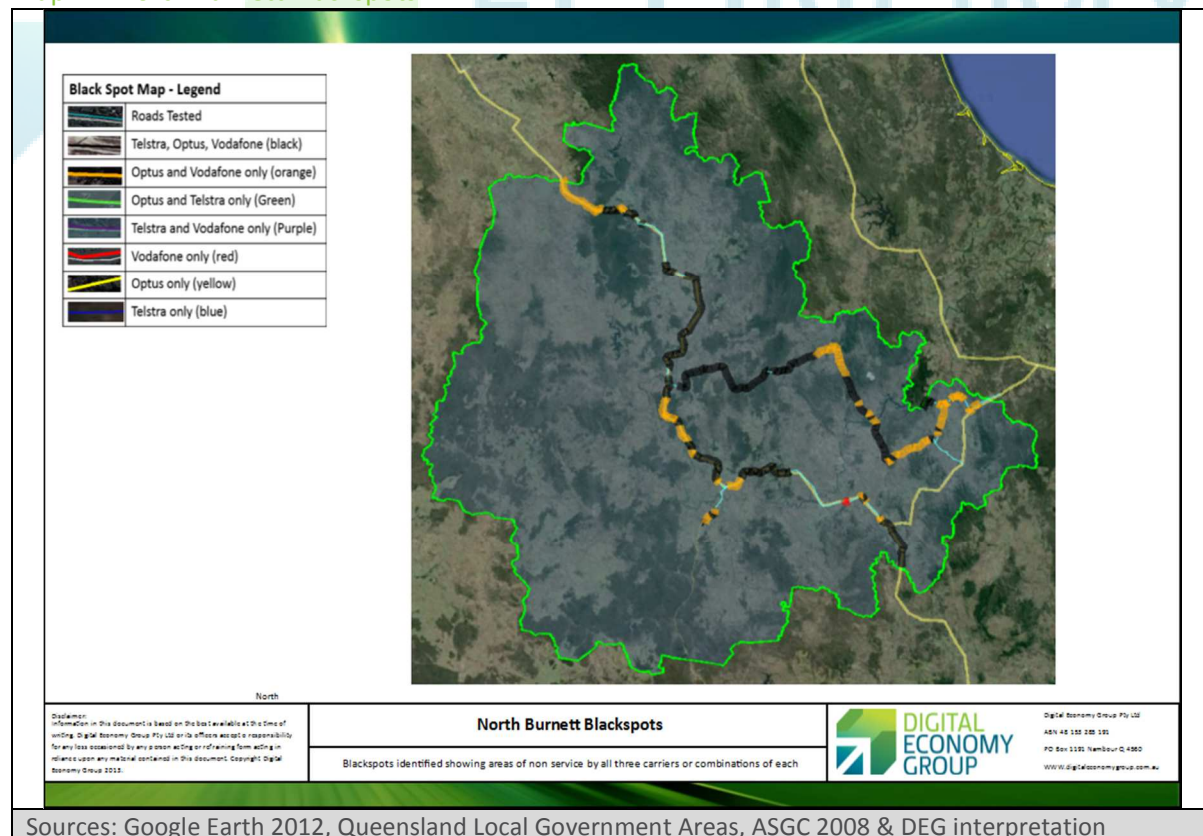
Mass signal testing in North Burnett identified the extent of mobile broadband signal strength for approximately 450kms of national, state and local road systems. Captured at a rate of one per hundred metres, some 4,500 markers were generated for each of the three carriers.

This data is then filtered and mapped to highlight coverage Blackspots. The Map below shows the roads tested and the extent of Blackspots in the area. The colour code is as follows and is listed in order from most to least common:

- Black – no signal for Telstra, Optus and Vodafone
- Orange - Optus and Vodafone have no signal– Telstra is generating a signal
- Yellow – No Optus signal – Telstra and Vodafone have signal
- Red - No Vodafone signal – Telstra and Optus have signal
- Blue – No Telstra signal – Optus and Vodafone have signal
- Green – Telstra and Optus have no signal – Vodafone has signal
- Purple – Telstra and Vodafone have no signal – Optus has signal

The table below identifies the most significant or persistent Blackspot areas for North Burnett. Not all areas identified by Digital Economy Group have been identified in this table.

Map 27: North Burnett Blackspots



Sources: Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

Almost half (209klms) of the roads tested in North Burnett (450klms in total) were three carrier Blackspots. These Blackspots represent areas where mobile communications and mobile broadband is extremely limited, reducing safety in times of emergency and placing community residents and businesses in the area (farming, tourism or other) onto the wrong side of the digital divide.

Of the remaining road sections almost half again were Blackspots for Optus and Vodafone.

The test results will provide a strong business case for subsidised carrier builds in these areas where it is unlikely that the carriers will see investments in network between centres viable.





Table 14: North Burnett Blackspot Assessment

| Site | Road Section to between | Blackspot Colour | Action Assessment |
|------|--|------------------|---|
| 1 | Burnett Hwy Ceratodus to Monto | | Section 64klms - 48.5klms Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 2 | Ceratodus to Mount Perry | | Section 69klms: 59klms Blackspot for all three carriers. 6klms two carrier Blackspot. Possible Coalition Blackspot funding program candidate |
| 3 | Reids Creek to Ceratodus (Burnett Highway) | | Section 74 Klms - 43klms Blackspot for all three carriers. Much of the balance is a two carrier Blackspot Possible Coalition Blackspot funding program candidate |
| 4 | North of Ban Ban springs to the boundary with Gympie along the Burnett Highway (Connects with another large Blackspot top the south) | | Section 17klms (part of a longer and more pervasive Blackspot to the South. 15klms Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 5 | Paradise Dam – Campbell’s Creek Road | | 5klms Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 6 | Mount Perry to Didcot via Gooroolba | | Section 57Klms: 28klms Blackspot for all three carriers and 23klms identified as a two carrier Blackspot Possible Coalition Blackspot funding program candidate |
| 7 | Monto to the Northern boundary with Banana shire | | Section 40klms 11klms Blackspot three Carriers; 19.5klms two carrier Blackspot |

4.6.3. Network Site Test Results and Assessment

Network Site Tests (NST’s) were conducted in 22 locations across the North Burnett Regional Council area in September 2013. The testing methodology (outlined above) replicates a real world user experience. Whilst the individual site test do allow for network performance variation, the sample Time Series Tests referred elsewhere demonstrate that network performance generally remains within a band rather than being extremely erratic. As a result network performance results are generally within plus or minus one of that score achieved when repeated over time.

The overall performance of each of the three carriers is highlighted in four colour bands to inform the assessment and proposed priorities for the North Burnett region. The four colour bands are:

-  Green: Good results- matched expectations set by coverage maps and current technologies used to service that location.
-  White – Acceptable results, largely consistent with coverage map expectations but not necessarily reaching the advertised technology speeds of the carrier.
-  Amber – Poor results and inconsistent with coverage maps and or not performing to the standards/expectations set by advertising or a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations
-  Red – Blackspot or very poor results and may be inconsistent with coverage maps or not performing to the standards/expectations set by advertising or a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations

Map 22 (below) identifies each of the test locations with a number reference that can be matched to the table.

Telstra Network Site Test results and Action Assessment

Overall Telstra achieved acceptable results, although compared to the coastal regional partners, Telstra’s results were poor in North Burnett. Only 4 green rated locations with 9 white (acceptable), 3 amber and 6 red results. Telstra may consider placing new sites for the following localities: Mulgilde, Ceratodus, Philpot, Binjour Ban Ban Springs and another site near the southern boundary. All of these locations are along the A3 Burnett Highway.

Optus and Vodafone (JV) Network Site Test results and Action Assessment

Vodafone generated stronger results than Telstra in Mundubbera and within the Optus and Vodafone Joint Venture (JV), Vodafone achieved the poorest results, generally consistent with their current limited presence in the region. Out of the 22 test results, Vodafone has 12 red, 6 amber 2 white and 2 green. Optus also had 12 red, 4 amber, 5 white but only 1 green.

Both Optus and Vodafone need to consider adding new sites, in addition to the one noted for Telstra as above, to Mt Perry, Grosvenor and Mundubbera South. Otherwise the key priorities for working with The Optus and Vodafone JV will include network upgrades to improve both coverage and capacity. 4G deployment will also be targeted where urban centre size warrants it.

Table 15: North Burnett Network Site Test Results and Assessment

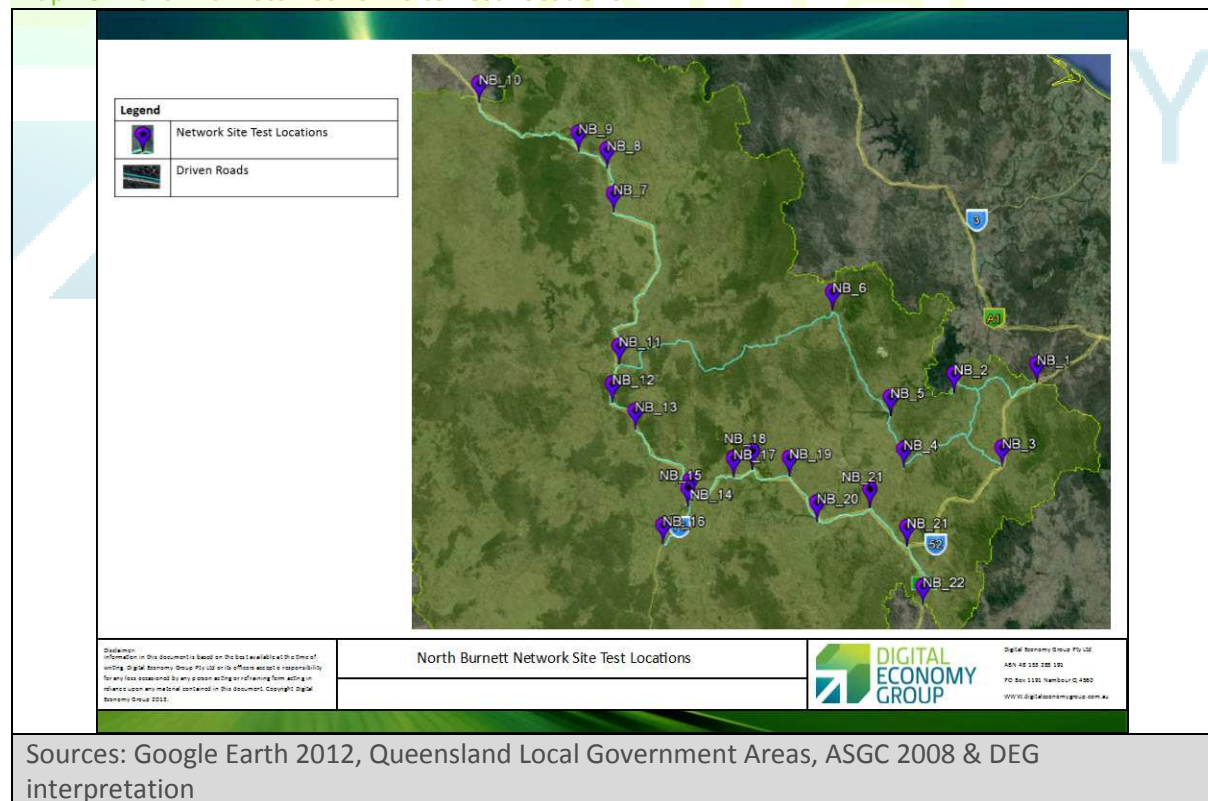
| Site | Locality | Telstra | Optus | Vodafone | Action Assessment |
|------|---------------------------------|---------|-------|----------|-----------------------------------|
| 1 | BRC/NBSC Bdy | 3 | 3 | 1 | Telstra NetUp; JV NetUp |
| 2 | Paradise Dam | 2 | 1 | 1 | Telstra NetUp; JV NetUp |
| 3 | Biggenden | 5 | 4 | 5 | 4G all |
| 4 | Gooroolba | 4 | 4 | 3 | No action |
| 5 | Gayndah Mt Perry Rd | 0 | 0 | 0 | 80mil Bspot Priority? |
| 6 | Mt Perry | 3 | 0 | 0 | Telstra NetUp; JV Colo |
| 7 | Mulgilde (A3) | 0 | 0 | 0 | 80mil Bspot |
| 8 | Monto (A3) | 5 | 3 | 2 | Telstra NetUp;JV NetUp; 4G all |
| 9 | Staaaz Rd (North of Monto) (A3) | 3 | 1 | 0 | JV colo/NetUp |
| 10 | Banna Shire Boundary (A3) | 2 | 0 | 0 | JV Colo Priority? |

| Site | Locality | Telstra | Optus | Vodafone | Action Assessment |
|------|--------------------------------|---------|-------|----------|-------------------------|
| 11 | Ceratodus (A3) | 0 | 0 | 0 | 80mil Bspot |
| 12 | Eidsvold (A3) | 4 | 0 | 0 | JV colo/ NetUp |
| 13 | Grosvenor (A3) | 2 | 0 | 0 | Telstra NetUp; JV colo |
| 14 | Mundowran (A3) | 6 | 3 | 3 | JV NetUp |
| 15 | Mundubbera | 4 | 4 | 5 | 4G all |
| 16 | Hakwood Rd (Sth of Mundubbera) | 1 | 0 | 0 | Telstra NetUp; JV NetUp |
| 17 | Philpott (A3) | 0 | 0 | 0 | 80mil Bspot |
| 18 | Binjour (A3) | 0 | 0 | 0 | 80mil Bspot |
| 19 | Reids Creek (A3) | 4 | 3 | 2 | Telstra & JV NetUp |
| 20 | Gayndah (A3) | 4 | 1 | 2 | JV upgrade; 4G all |
| 21 | Ban Ban Springs (A3) | 0 | 0 | 0 | 80mil Bspot |
| 22 | Gympie Bdy (A3) | 0 | 0 | 0 | 80mil Bspot |

Notes:

- 1- Site results colour grading - Green – in target range, White – acceptable, Amber – poor, Red – very poor.
- 2- Action Assessment codes - Telstra NetUp - Telstra Network Upgrade; JV NetUp - Optus and Vodafone Joint Venture - Network Upgrade. JV colo - Optus and Vodafone Joint Venture - potential new colocation site? 80mil Bspot - \$80 million Blackspot Program Candidate - major highway Blackspots. 20mil Bspot - \$20 million Blackspot Program Candidate - Seasonal locations

Map 28: North Burnett Network Site Test Locations

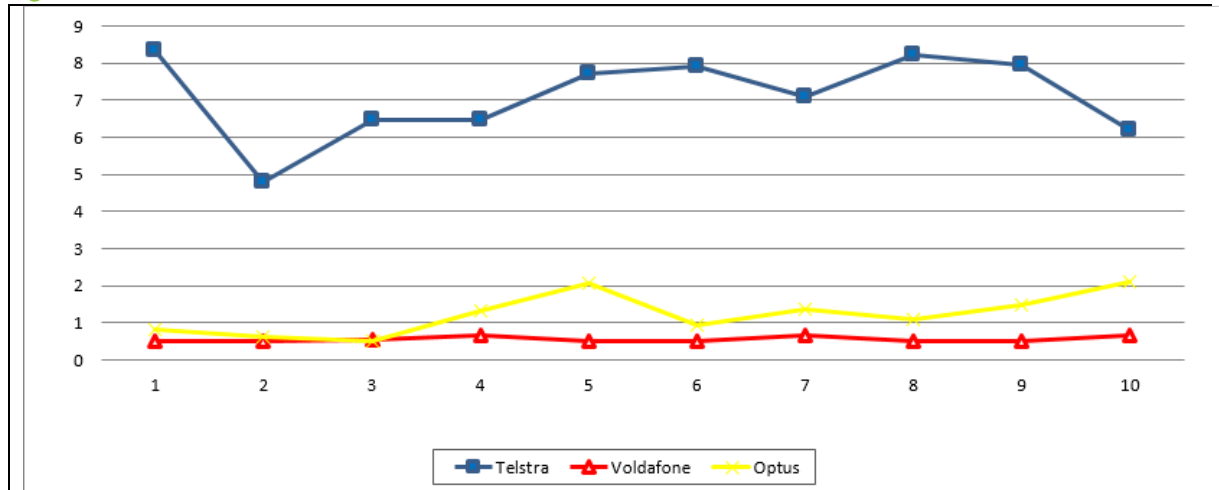


4.6.4. Time Series Test Results and Assessment

The Time Series Tests (TST's) in the North Burnett were completed at Monto and Mundubbera.

Over ten tests at Monto, Telstra fluctuated from just under 5 to over 8 Mbps with 8 out of 10 results above 6Mbps. In contrast Vodafone was more consistent, albeit at around 0.6Mbps. Optus ranged between 0.5Mbps to 2Mbps over the test timeframe.

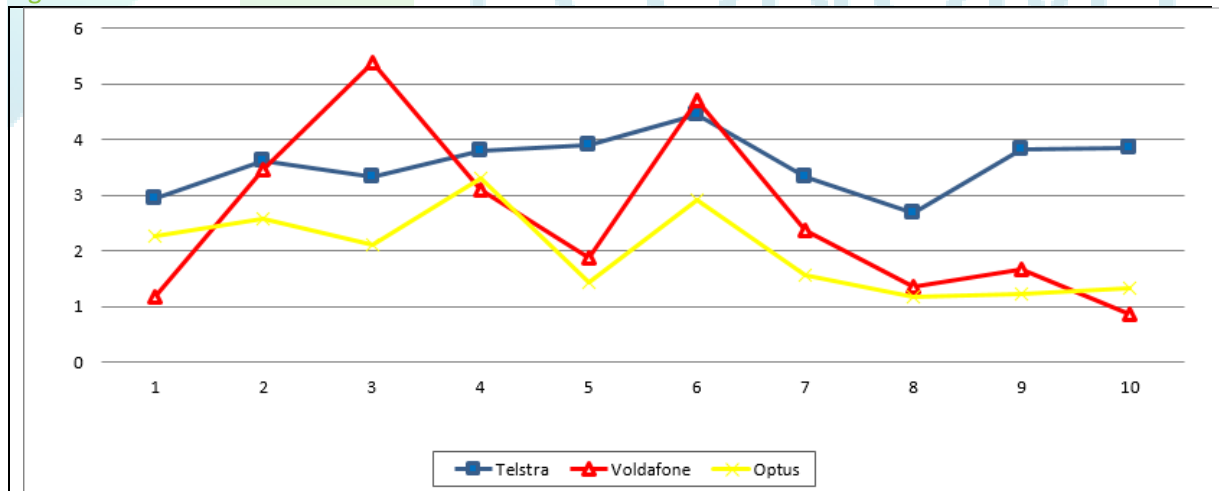
Figure 13: Monto Time Series Test



Sources: DEG 2013

The Mundubbera results were the in contrast to the time series test results for all other locations. Telstra was between 3-4 Mbps and Vodafone achieved higher results on two of the tests. Optus was better than in many of the locations, but unfortunately not to the same standard as either Telstra or Vodafone.

Figure 14: Mundubbera Time Series Test



Sources: DEG 2013

4.7. South Burnett Shire Council and Cherbourg Aboriginal Shire Council

The independent broadband testing was undertaken on the in September 2013. The test results for South Burnett Council also include testing results and assessment of the Cherbourg Aboriginal Council. There are some areas of good carrier coverage, but many of the rural highways and connection roads have pervasive Blackspots for all three carriers and many again where Optus and Vodafone have very limited or no coverage.

The South Burnett Council elected to increase the base testing to include a number of areas where isolation can be a concern during times of emergency. The final testing route provided for almost 760kms of roads to be tested. The testing results will now be able to reliably inform council during times of disaster.

Twenty three network site tests were completed and the two time series tests were completed in Murgon and Kingaroy respectively.

The recent federal election has impacted on the deployment of the fibre networks until a review is completed, but it has not impacted on the Fixed Wireless network deployment. South Burnett is progressing through the early stages of a 2 year NBN Co Fixed Wireless program and according to NBN Co will have approx. 18 sites. The 16 proposed NBN Co greenfields sites will potentially become strategic assets for the region as mobile carriers will consider using these sites for their expansion as they provide a quicker and more cost effective deployment option.

The Coalition Mobile Black Spot Program will be key to discussions with carriers for the South Burnett region.

4.7.1. Priority Locations for South Burnett and Cherbourg








The five top priority locations for the South Burnett and Cherbourg are:

1. Bunya Mountains – Some limited coverage interspersed with sections of three carrier and two carrier Blackspots. Significant tourism area for South Burnett with active farming businesses along the affected route. A candidate for the Major transport route or seasonal Blackspot Funding Program
2. Bondooma Dam and surrounds. Telstra Blackspot at the Dam and Blackspot for Optus and Vodafone in sections from Proston. Candidate for the Seasonal Blackspot Funding Program
3. Chinchilla Wondai Rd Tingoora to Durong and north to the boundary with North Burnett along the Mundubbera Durong Rd. Extensive and pervasive Blackspots for all three carriers and sections of Blackspot for Optus and Vodafone only. Candidate for the major roads Blackspot Program
4. Murgon and Cherbourg – Both communities have signal and coverage, however actual speed tests show poor performance in contrast to the population base and position in the economic supply chain. Network performance upgrades for all three carriers as a priority.
5. Burnett Highway from north of Nanango to the boundary with Gympie. Patchy Blackspot area for all three carriers. Occasional coverage patches along a major transport route. A potential candidate for the Blackspot Funding Program.

4.7.2. Carrier Blackspots

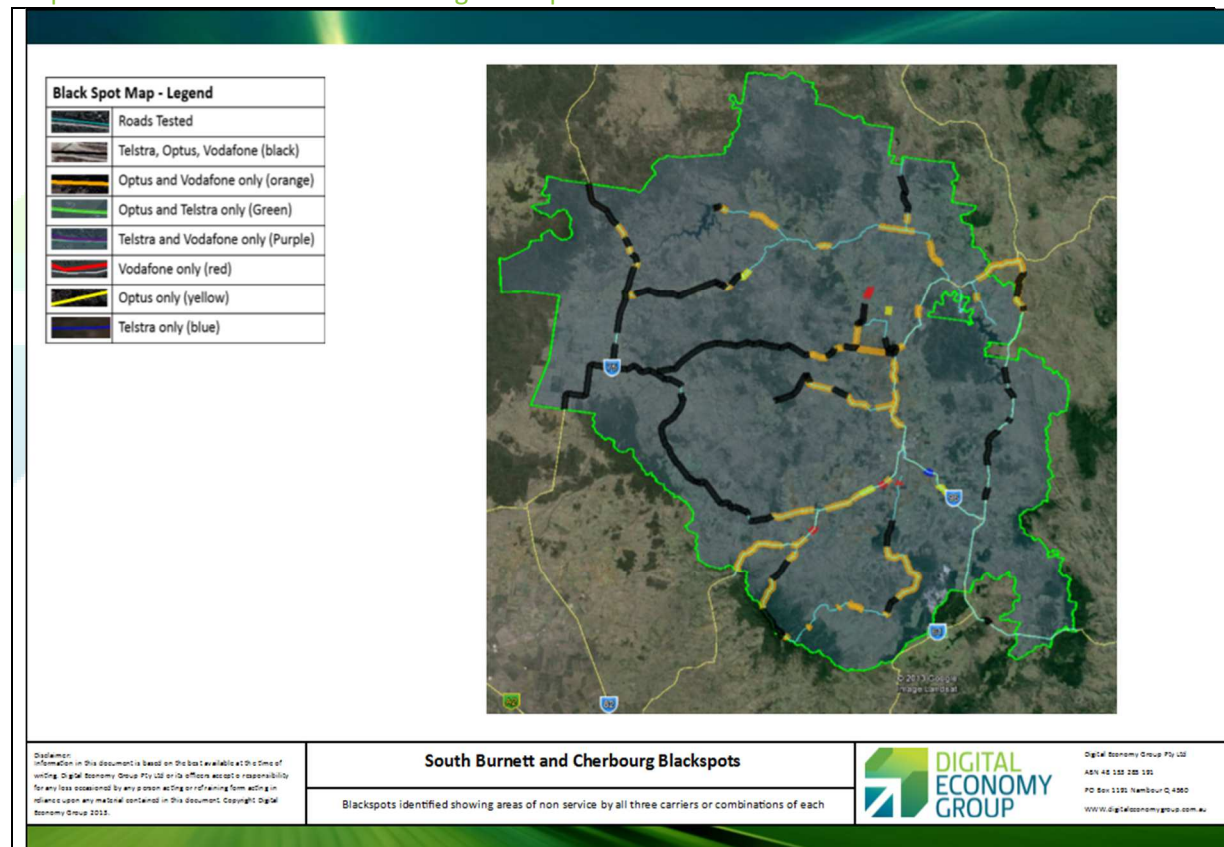
Mass signal testing in South Burnett and Cherbourg identified the extent of mobile broadband signal strength for approximately 760kms of national, state and local road systems. Captured at a rate of one per hundred metres, some 7,600 markers were generated for each of the three carriers.

This data has subsequently been reviewed and mapped to highlight coverage Blackspots. The Map below shows the roads tested and the extent of Blackspots in the area. The colour code is as follows and is listed in order from most to least common:

-  Black – no signal for Telstra, Optus and Vodafone
-  Orange - Optus and Vodafone have no signal– Telstra is generating a signal
-  Yellow – No Optus signal – Telstra and Vodafone have signal
-  Red - No Vodafone signal – Telstra and Optus have signal
-  Blue – No Telstra signal – Optus and Vodafone have signal
-  Green – Telstra and Optus have no signal – Vodafone has signal
-  Purple – Telstra and Vodafone have no signal – Optus has signal

The table below identifies the 10 most significant or persistent Blackspot areas for South Burnett. Not all areas identified by Digital Economy Group have been identified in this table.

Map 29: South Burnett and Cherbourg Blackspots



Sources: Google Earth 2012, Queensland Local Government Areas, ASGC 2008 & DEG interpretation

Seven road sections totalling 238klms have no signal strength for any of the three Carriers in the South Burnett region. These Blackspots represent areas where mobile communications and mobile broadband is extremely limited, reducing safety in times of emergency and placing community residents and businesses in the area (farming, tourism or other) onto the wrong side of the digital divide.

Many of the Blackspots sections identified above are interspersed with, or adjacent to, a further 81.5 kilometres of road with a mixture of carrier Blackspots: Optus and Vodafone, Optus only and Vodafone only.

A number of other smaller Blackspots have not been included in this summary to provide a focus on the largest areas or sections of Blackspots in South Burnett.





Table 16: South Burnett Blackspot Assessment

| Site | Road Section to between | Blackspot Colour | Action Assessment |
|------|---|------------------|---|
| 1 | Boundary with North Burnett along Mundubbera Durong Rd and Wondai Road to the boundary with Dalby | | Section 59klms: 49klms Blackspot for all three carriers: Balance (10klms) Blackspot for Optus and Vodafone. Possible Coalition Blackspot funding program candidate |
| 2 | Durong to Tingoora along Chinchilla Wondai Rd. | | Section 62klms: 56klms Blackspot for all three carriers: Balance (6klms) Blackspot for Optus and Vodafone. Possible Coalition Blackspot funding program candidate |
| 3 | Durong to Bunya Highway along Ironpot Rd | | Section 57klms: 48klms Blackspot for all three carriers: Balance (9klms) Blackspot for Optus and Vodafone. Possible Coalition Blackspot funding program candidate |
| 4 | Proston-Boondooma Rd from Munduberra –During Rd towards Proston | | Section 29.5klms: 21klms Blackspot for all three carriers: Balance (8.5klms) Blackspot for Optus and Vodafone. Possible Coalition Blackspot funding program candidate |
| 5 | between Nanango and Goomeri | | Several Short sections totalling 12klms: Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 6 | Bushcamp Rd Boondooma Dam | | 2 klms Blackspot for all three carriers. Possible Coalition Blackspot funding program candidate |
| 7 | Bunya highway from south of Kingaroy to the boundary | | Section 40.8klms: 28klms Blackspot for Optus and Vodafone: short sections of Blackspot for Optus or Vodafone 6klms total Possible Coalition Blackspot funding program candidate |
| 8 | Bunya Mountains Rd from Bunya Highway to Mowbullan | | Section 23.3klms: 11.5klms Blackspot for three carriers: 10.5klms Blackspot for Optus and Vodafone: Possible Coalition Blackspot funding program candidate |
| 9 | Merambi-Gordonbrook Rd and Dangore Mountain Rd | | Section 28.3klms: 10.5klms Blackspot for three carriers: 16.5klms Blackspot for Optus and Vodafone: Possible Coalition Blackspot funding program candidate |
| 10 | North of Kingaroy to just North of Tingoora along Bunya Highway. | | Section 19.6klms: 14.5klms Blackspot for two carriers - Optus and Vodafone Possible Coalition Blackspot funding program candidate |

4.7.3. Network Site Test Results and Assessment

Network Site Tests were conducted in 23 locations across the South Burnett Council area. The testing methodology (outlined above) replicates a real world user experience. Whilst the individual site tests do allow for network performance variation, the sample time series tests referred to elsewhere demonstrate that network performance generally remains within a band rather than being extremely erratic. As a result, network performance results are generally within plus or minus one of that score achieved when repeated over time.

The overall performance of each of the three carriers is highlighted in four colour bands to inform the assessment and proposed priorities for the South Burnett. The four colour bands are:

-  Green: Good results- matched expectations set by coverage maps and current technologies used to service that location.
-  White – Acceptable results, largely consistent with coverage map expectations but not necessarily reaching the advertised technology speeds of the carrier.
-  Amber – Poor results and inconsistent with coverage maps and or not performing to the standards/expectations set by advertising or a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations
-  Red – Blackspot or very poor results and may be inconsistent with coverage maps or not performing to the standards/expectations set by advertising or a location that is considered to be a priority for improved coverage/capacity to deliver the economic and community objectives of the local government and regional organisations

The Map below identifies each of the test locations with a number reference that can be matched to the table.

Telstra Network Site Test results and Action Assessment

Overall Telstra performed well with 10 green, 5 white and the 6 amber out of a total of 23. The two red rated sites are tourist and seasonal visiting locations that may be potential Blackspot funding program candidates. The key priorities for working with Telstra in South Burnett will be increasing the capacity (speed & performance) through increased 4G deployment and Network Upgrades in areas where the tests were at the lower end of the range or expectation.



Optus and Vodafone (JV) Network Site Test results and Action Assessment

Both Optus and Vodafone performed poorly, Optus only achieved one green (Kingaroy central). Otherwise Optus achieved 6 white, 12 amber and 3 red. Vodafone: no green, 1 white, 17 amber and 4 red.

The following sites are recommended as a priority for Optus and Vodafone to improve coverage and capacity:

-  Cherbourg, Wondai and Kumbia (specifically Vodafone)

The following sites are considered a potential sites for the 20mil Coalition Blackspot program:



-  Boondooma Dam
-  Bunya Mountains

The key priorities for working with The Optus and Vodafone JV will include new sites, network upgrades to improve both coverage and capacity. 4G deployment in populated centres will also be a critical priority.

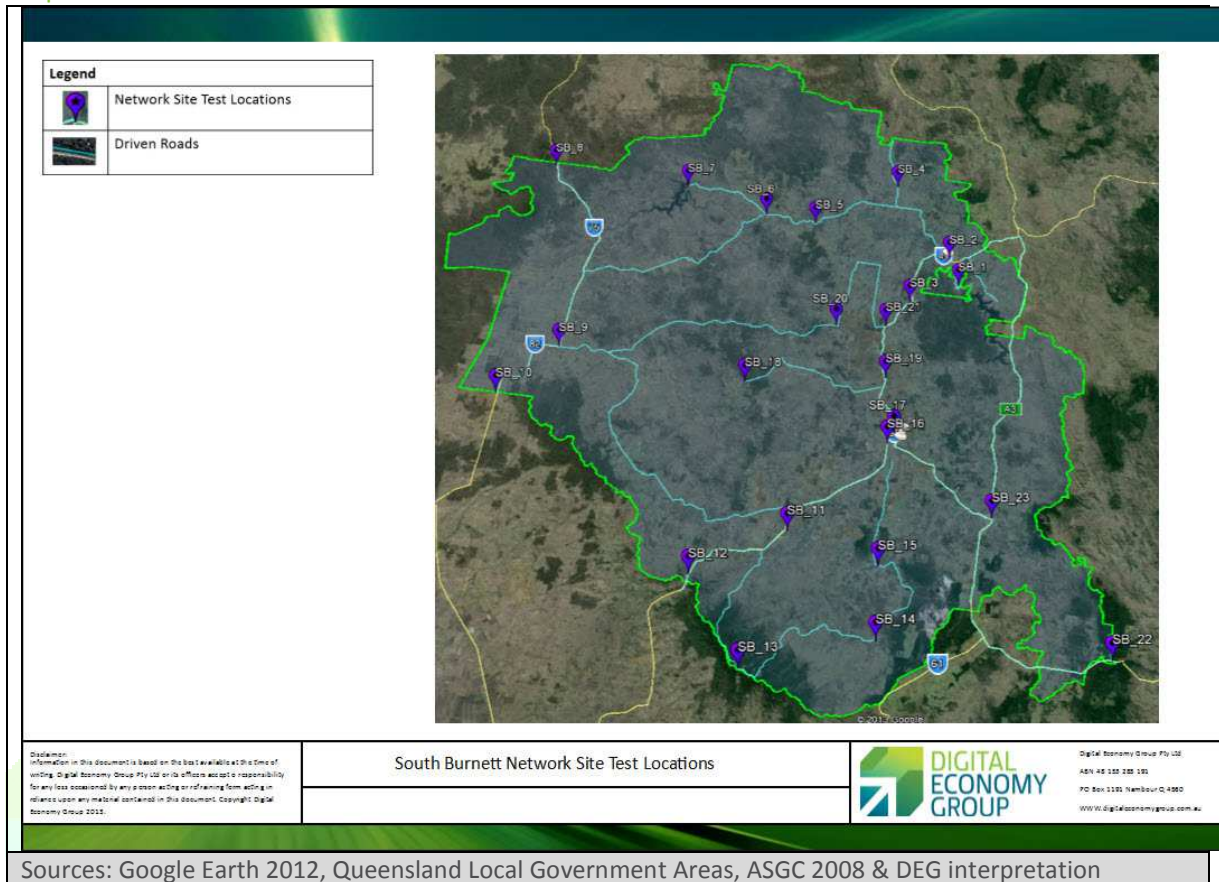
Table 17: South Burnett Network Site Test Results and Assessment

| Site | Locality | Telstra | Optus | Vodafone | Action Assessment |
|------|--------------------------|---------|-------|----------|---------------------------------|
| 1 | Cherbourg | 5 | 1 | 1 | Telstra NetUp; JV NetUp; 4G All |
| 2 | Murgon | 5 | 3 | 2 | Telstra NetUp; JV NetUp; 4G All |
| 3 | Wondai | 5 | 3 | 1 | JV NetUp; 4G All |
| 4 | Cloyna | 4 | 0 | 0 | Telstra NetUp; JV colo NetUp |
| 5 | Hivesville | 5 | 2 | 1 | JV NetUp |
| 6 | Proston | 6 | 4 | 2 | JV NetUp |
| 7 | Boondooma Dam | 0 | 0 | 0 | 20mil Bspot |
| 8 | Mundubbera Rd (NB bdary) | 0 | 0 | 0 | 80mil Bspot |
| 9 | Durong | 0 | 0 | 0 | 80mil Bspot |
| 10 | Wondai Rd (Boundary) | 0 | 0 | 0 | 80mil Bspot |
| 11 | Kumbia | 6 | 3 | 0 | JV NetUp/colo |
| 12 | Bunya Hwy (Boundary) | 0 | 0 | 0 | 80mil Bspot |
| 13 | Bunya Mtns Rd (Nat Park) | 0 | 0 | 0 | 20mil Bspot |
| 14 | Maidenwell | 5 | 0 | 0 | JV NetUp/colo |
| 15 | Brooklands | 5 | 0 | 0 | JV NetUp/colo |
| 16 | Kingaroy South | 5 | 1 | 2 | Telstra NetUp; JV NetUp; 4G All |
| 17 | Kingaroy | 5 | 5 | 3 | Telstra NetUp; JV NetUp; 4G All |
| 18 | Dangore Mtn Rd | 0 | 0 | 0 | New site/ NetUp all Carriers |
| 19 | Memerambi | 2 | 0 | 0 | Telstra NetUp; JV NetUp colo |
| 20 | Cushnie | 0 | 0 | 0 | 80mil Bspot |
| 21 | Tingoora | 2 | 0 | 0 | Telstra NetUp; JV NetUp colo |
| 22 | Blackbutt | 3 | 2 | 1 | Telstra NetUp; JV NetUp |
| 23 | Nanango | 4 | 4 | 2 | Telstra NetUp; JV NetUp |

Notes:

-  Site results colour grading - Green – in target range, White – acceptable, Amber – poor, Red – very poor.
-  Action Assessment codes - Telstra NetUp - Telstra Network Upgrade; JV NetUp - Optus and Vodafone Joint Venture - Network Upgrade. JV colo - Optus and Vodafone Joint Venture - potential new colocation site 80mil Bspot - \$80 million Blackspot Program Candidate - major highway Blackspots. 20mil Bspot - \$20 million Blackspot Program Candidate - Seasonal locations

Map 30: South Burnett Network Site Test Locations



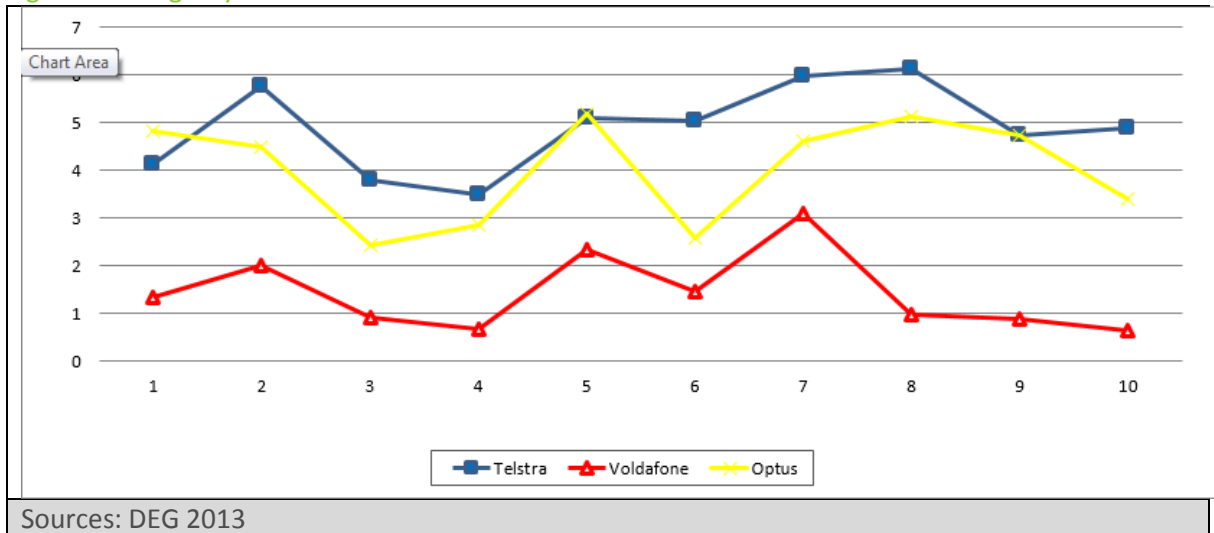
The Network Site Tests were completed in a range of locations across the South Burnett and Cherbourg local government areas. The following map illustrates the specific locations tested.

4.7.4. Time Series Test Results and Assessment

The Time Series Tests (TST's) in the South Burnett region were completed at Kingaroy and Murgon. The Kingaroy site was selected to confirm carrier coverage maps for this centre. The Murgon site was selected to demonstrate that "coverage" does not translate to user experience.

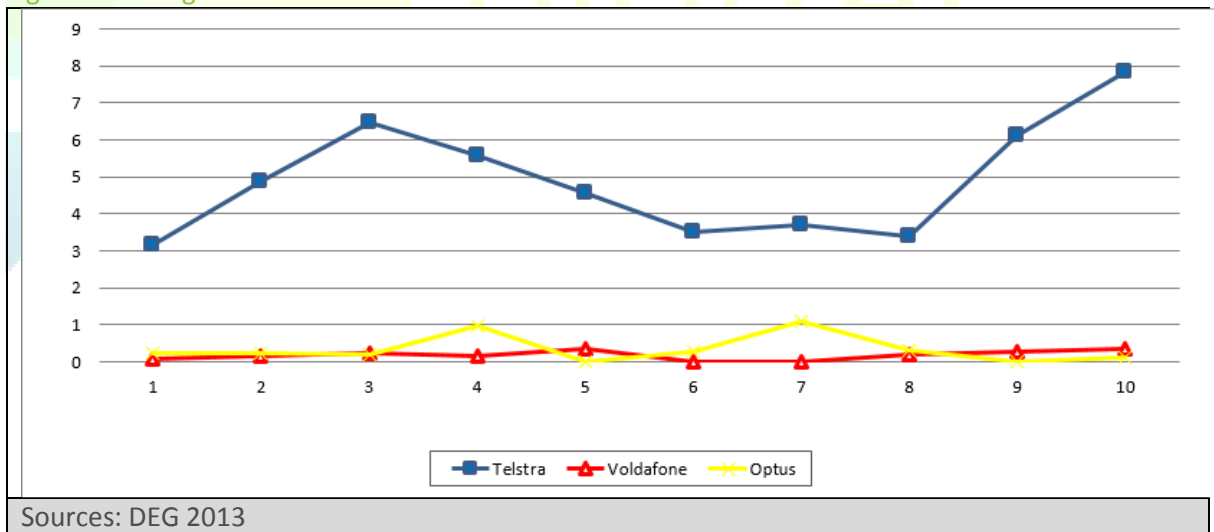
Over ten tests at Kingaroy, Telstra fluctuated from just under 4Mbps to almost 6 Mbps with 8 out of 10 results above 4Mbps. Optus fluctuated from 2.5Mbps and 5Mbps. Vodafone was stronger here than in many of the other test locations in Wide Bay Burnett at peaks of 3Mbps and an average of 1Mbps. Network performance upgrades would benefit all three carriers in Kingaroy.

Figure 15: Kingaroy Time Series Test



The Murgon results were similar to most other Time Series Tests for the region. Telstra performed consistently higher with results ranging from 3Mbps to a max of 8Mbps. Optus and Vodafone had disappointingly slow speeds under 1Mbps. Network performance upgrades for Optus and Vodafone are critical to improve this result.

Figure 16: Murgon Time Series Test



The time series results will help to influence the recommendations and proposed advocacy plan to follow the completion of this report. It is key to recognise that even where a signal is available, network performance is critical to the high quality user experience.



5. Conclusion and Recommendations

5.1. Conclusion

Having the mobile broadband black spots independently tested and mapped is the first step towards improving the mobile broadband basis for a strong digital economy. In the same way that local governments know understand and seek funding for priority infrastructure in their area, carrier network infrastructure is also critical.

The difference with mobile digital infrastructure to traditional council infrastructure is that it is privately owned. The primary tactic for facilitating increased investment is knowledge of the network, its performance and choosing priority locations (in partnership with the carriers.)

Carriers look to councils for two key types of support:

-  The first and most important is facilitation through the approvals process. Councils need to see the investment in new mobile sites (upwards of \$800,000 per site) in the same way that a development application delivering new employment or business growth gets support. The recent studies by Ericson and ¹⁰Chalmers University demonstrating that doubling broadband speeds increased the GDP by 0.3% needs to be considered
-  The second is the support where leases are required for use of council owned or controlled land. Often legal firms acting for councils or councils own representatives do not seek to facilitate the timely completion of a standard legal agreement. Each protracted completion or delay creates a reputation profile for the local government.

Carriers enter into a more productive dialogue when a local government or Regional Organisation of Councils has independently tested black spot mapping and a strong knowledge of the digital infrastructure of the area. Carriers ultimately have a large number of sites in various locations and jurisdictions. In locations where approvals and leases are completed easily will have networks established faster and sooner.

The Coalition Mobile Blackspot policy now provides the much needed leverage to encourage carriers to invest outside of the commercially viable coverage area. There is a need for councils to add their voice to encouraging the government (specifically ACMA and possibly through legislation) change to introduce to further achieve coverage and competition outside of commercially viable locations.

The Advocacy Plan will need to involve discussion with the Department (of Communications) to implement the policy. It is important for regional Australia has the time to prepare the evidence base, investigate the potential for partnerships with the carriers and then be in a position to submit the requisite expression of interest (or whatever funding program application form is called).

Regional Australia constantly plays “catch-up” to capital cities and the Wide Bay Burnett is no exception. The Independent Broadband Testing has confirmed that the digital divide between Australian capital cities and the Wide Bay Burnett remains as wide as ever.

The region scores poorly on the three key measures of mobile broadband connectivity: Competition, Coverage and Capacity. The following rankings are for all three mobile broadband carriers for all six local governments in the study area.

¹⁰ <http://www.ericsson.com/n4ews/1550083>

5.1.1. Competition

Mobile broadband competition is rated at moderate for the whole region. Telstra and Optus both have network presence in the major urban areas and rural towns. Vodafone is present, but not on a level that users would comfortably be able to use the network with high levels of confidence. This assessment is based on the number of carriers active in the region and their overall network presence (sites and spectrum).

Competition rating: 5 out of 10

5.1.2. Coverage

The Wide Bay Burnett area coverage is rated very poor to poor (2) for Vodafone, very good (6) for Telstra and very good (4) for Optus. Testing of network coverage is completed using Mass Signal Tests. Note: Optus have in all other test areas been described as ‘optimistic’ in terms of their coverage maps. If their network is consistent with other area, their score will also drop by as many as 3 points.

Competition rating: 3.5 out of 10

5.1.3. Capacity

When compared with east coast capital cities, the Wide Bay Burnett capacity (data speeds and actual throughput upload and download) is rated as poor. Spectrum deployed throughout the region is typically suited to large coverage and sparse population. Only one carrier currently has 4G coverage in some discrete locations. Optus and Vodafone are yet to deploy this technology here at all. Telstra has a limited number of sites with expected coverage increased by December 2013.

Capacity rating: 3 out of 10

5.1.4. Connectivity Rating

The overall connectivity rating for Wide Bay Burnett is a low 11.5 out of 30. This aggregate measure takes the results of all three key measures (competition, coverage and capacity) individual rating. A clear program of action over a sustained period of time will be necessary to improve the rating of connectivity for Wide Bay Burnett.

Overall Wide Bay Burnett Connectivity rating: 11.5 out of 30

5.2. Recommendations

The following recommendations have been drafted to provide Wide Bay Burnett with specific and measurable next steps using the baseline carrier information, benchmarking with other regions, Independent Broadband Testing results and discussions with carriers.

Advocacy plan

Seeking increased local investment from commercially driven carriers requires a combination of facilitation and direct action. The “squeaky wheel” receives more attention, forms a central part of a successful advocacy plan. Regional representatives – political, executive and business leaders need to remain focussed using the same key messages and regional priority locations.

There are a number of different avenues and actions that Wide Bay Burnett could take with each of the carriers. These are outlined below and each action will contribute towards the proposed advocacy plan.

Recommendation: prepare a regional Advocacy Plan targeting key regional mobile broadband priorities and maintain whole of region consistent key messages.

Land banking

Optus have confirmed that they have a number of “land banked” sites in the Wide Bay Burnett area.

Recommendation: Include identification and progression of land banked sites to operational status for all three carriers with a particular focus when they match council identified priorities.

Communication

Mobile broadband infrastructure is constantly advancing in terms of speed and capacity to deliver volumes of data. The Wide Bay Burnett councils will need to implement a sustained and multi-faceted approach to facilitating capital city comparable competition, coverage and network capacity. A communication plan is proposed to help each council and/or Wide Bay Burnett to raise awareness of mobile broadband and ways the business and residential community can achieve increased “digital” productivity and therefore improve their bottom line and potentially increase employment or sustainability

Carrier investment programs respond to increased traffic and growth of users on their networks. It is therefore as important for councils to help drive use of the networks that are currently available.

Recommendation: Digital Economy Group to prepare printable and internet ready documents covering mobile broadband coverage and digital productivity information for each local government on a fee for service basis.

Digital Infrastructure Portfolio

Documenting the regions digital portfolio will confirm the significant capital investment carriers make and provides council (councillors and executive) with an understanding of the value of these networks to their region. As initial progress is made with new investments and improvements in the relationship with the carriers, additional linkages and opportunities are often identified.

Recommendation: Digital Economy Group to prepare an initial high level digital infrastructure portfolio for each local government. Additional detailed digital infrastructure portfolios to be prepared as required and on a fee for service basis.

Carriers

Telstra, Optus, Vodafone and NBN Co are the four key stakeholders for Wide Bay Burnett to focus on. The first three: Telstra, Optus and Vodafone are the primary targets as they collectively control the mobile networks in Australia. Other companies offer mobile coverage plans, but only through one of the three carriers who have network in place. NBN Co is strategically important as they are deploying new Fixed Wireless infrastructure that will potentially be candidates for the mobile carriers to use for “colocation”.

Recommendation: WBBROC and Digital Economy Group progress the initial stages of a regional advocacy plan involving all four carriers identified as stakeholders in the mobile and Fixed Wireless infrastructure environment.

Commonwealth Government

The Department of Communications (DComms) oversees the *Telecommunications Act (1997)* and other relevant legislation and regulation that relates to mobile broadband including the Australian Communications Media Authority (ACMA) who manage the spectrum licences. Both political and bureaucratic dimensions of the Commonwealth Government logically form part of the advocacy initiatives for the Wide Bay Burnett region.

Recommendation: WBBROC to proactively use the IBT report as part of the political advocacy program for the region.

Mobile Coverage Funding Programme

The Mobile Coverage Funding Programme to be released by the Commonwealth Government this year is another important opportunity. With a total of \$100mil available to leverage carrier investments and in partnership with local government and other regional stakeholders, WBBROC is well positioned to seek a proportion of this funding for the region. The preparation of a business case for specific locations that builds on this report is strongly recommended to help prepare the region for the release of 'requests for proposals' during 2014.

Recommendation: WBBROC to proactively use the IBT report as part of the political advocacy program for the region.



6. Advocacy Plan

The advocacy plan is the “implementation” plan for the recommendations identified as part of the Independent Broadband Testing (IBT) report. The Wide Bay Burnett councils will need to implement a sustained and multi-faceted approach to facilitating capital city comparable competition, coverage and network capacity. The following advocacy plan has been crafted to improve the regions overall connectivity rating when compared to the capital cities.

Carrier investment programs respond to increased traffic and growth of users on their networks. It is therefore important for councils to help drive use of the networks that are currently available.

6.1. General

There are a number of general advocacy actions that need to be undertaken by the Wide Bay Burnett to achieve improvements in mobile broadband coverage. They are:

1. Develop a regional (high-level) Digital Infrastructure Portfolio for all 4 carriers
2. Commonwealth government and Federal opposition advocacy

6.2. Telstra – Mobile

Telstra has the largest and most dominant network in Australia with 18,000 sites (DEG interpretation of ACMA data) and a reported 15million customers and 29million mobile devices connected. Telstra are prepared to meet with the Wide Bay Burnett REDAC to discuss their current build, proposed upgrades and areas for additional network.

Telstra Advocacy Actions

3. Confirm Telstra’s build plans for Wide Bay Burnett for 2013-14 and beyond
 - 3.1. New Sites
 - 3.2. Land banked sites
 - 3.3. Spectrum deployment
 - 3.4. 4G deployment
 - 3.5. Network upgrades
 - 3.6. Transmission network upgrades (adding optic fibre connectivity to microwave)
 - 3.7. Network performance upgrades for specific regional events
 - 3.8. May also include availability of Cells on wheels for major events (planned or unplanned)
4. Confirm Telstra’s preparedness to use NBN Co Fixed Wireless sites for coverage expansion
5. Clarify Telstra’s response to identified non-service areas and Blackspots
6. Clarify Telstra’s response to demand aggregation and community awareness or increase traffic/use of their networks.
7. Clarify Telstra’s response to community demand for new sites in non- service areas (where there is no coverage by all three carriers) where community funding to 100% is achieved.
8. Request guidelines/process/methodology from the carriers for the development of a business case for investment in the region
9. Identify top 5 new sites per LGA priorities (including local knowledge)
10. Top 5 site upgrades (beyond current planned upgrades) using local knowledge and test results

6.3. Optus, Vodafone and the Joint Venture

Optus and Vodafone have entered into a formal Joint Venture (JV). The JV is an extensive collaboration resulting in both carriers expanding equipment on to respective partner sites and the sharing of specific equipment. Vodafone has more sites in the major capital cities and Optus has more sites in regional and rural Australia. The JV has the potential to improve coverage, capacity and competition right across the Wide Bay Burnett area. The role of the DEG Independent Broadband Testing will be to highlight the gap between the plans for the Wide Bay Burnett and other areas and facilitate additional deployment or advances over other regions.

DEG has made contact with both Optus and Vodafone reps for Queensland and they are prepared to meet with Wide Bay Burnett REDAG reps to discuss their network and provide an overview of their current and future plans for the area.

Optus is currently reviewing their method of delivering Mobile Networks in Australia and an announcement is expected in November 2013. The new entity will manage the network and make decisions around investments and upgrades. The impact on the Wide Bay Burnett Independent Broadband Testing project is not yet known.

Optus Vodafone Joint Venture Advocacy plan

11. Confirm Optus Vodafone JV build plans for Wide Bay Burnett for 2013-14
 - 11.1. New Sites
 - 11.2. Land banked locations
 - 11.3. Additional sites for Vodafone and Optus through network sharing arrangements
 - 11.4. Spectrum deployment
 - 11.5. 4G deployment
 - 11.6. Network upgrades
 - 11.7. Transmission network upgrades (adding optic fibre connectivity to microwave)
 - 11.8. Network performance upgrades for specific regional events
 - 11.9. May also include availability of Cells on wheels for major events (planned or unplanned)
12. Confirm Optus Vodafone JV preparedness to use NBN Co Fixed Wireless sites for coverage expansion
13. Clarify Optus Vodafone JV response to identified non-service areas and Blackspots
14. Clarify Optus Vodafone JV response to demand aggregation and community awareness or increase traffic/use of their networks.
15. Clarify Optus Vodafone JV response to community demand for new sites in non-service areas (where there is no coverage by all three carriers) where community funding to 100% is achieved.
16. Identify top 5 new sites per LGA priorities (including local knowledge)
17. Top 5 site upgrades (beyond current planned upgrades) using local knowledge and test results
18. Request guidelines/process/methodology from the carriers for the development of a business case for investment in the region

6.4. NBN Co – Fixed Wireless

NBN Co has been set with the challenge to deploy approx. 2,400 sites across Australia by mid-2015. Many of the 2,400 sites required will have to be new sites (particularly in regional and rural areas) as the existing three carriers have not extended their reach to many of these areas.

Current NBN Co build plans target mid 2015 as the fully operational timeframe for the network. Some sites are already constructed and operational; however most of the network will not be constructed

until 2014 when the national transit network is completed. This provides some lead time for colocation discussions to occur with other carriers.

NBN Co sites are valued at approximately \$500-700k and will provide benefited premises with significant broadband speed and capacity improvement over their current access options. Future Long Term Evolution (LTE) improvements will potentially feed through to the NBN and help improve work and digital economy options for businesses and premises.

The new NBN Co network sites also represent excellent potential for mobile networks to expand where they have not previously been, due to cost of infrastructure. This will be one of the key avenues for Wide Bay Burnett to pursue new mobile broadband network sites.

NBN Advocacy plan

19. Confirm NBN Co Fixed Wireless build plans for the LGA
 - 19.1. Discuss potential for Economic Development to be the “single point of contact” for the NBN rollout or the facilitation point where issues arise.
 - 19.2. If no current announced network deployment plans seek clarification and expedite
20. Confirm current status/timeframe
 - 20.1. Request identification of green and red rated sites and specific NBN Co plans to progress the implementation of a locally acceptable solution.
21. Ensure any currently communicated network deployments cover the entire LGA
22. Confirm NBN Co preparedness (in writing) to design their build to be capable of mobile carrier networks co-locating on their sites.



7. Attachment List

Attachment 1 – Google Earth layers used for the Independent Broadband Testing report

Attachment 2 – Coalition Policy – Mobile Blackspots Program

Attachment 3 – Telstra Countrywide Sunshine Coast - Gladstone Media release – 18 July 2013



Attachment 3 – Telstra Countrywide Sunshine Coast - Gladstone Media release

18 July 2013 – Forget the standard socks and undies, this Christmas residents will be getting superfast downloads when Telstra’s 4G mobile coverage is switched on locally in among 200 regional towns and holiday spots that will get improved service before the end of the year, following unprecedented demand from locals for superfast mobile services.

The speedy new service will offer typical downloads speeds of between 2- 40 megabits per second – making streaming movies, downloading music and internet browsing all much quicker when on the go.

“Telstra 4G offers an exciting new era of communication, allowing local customers to use their phones in ways they never knew they could, offering a world of convenience and opening up access to smart new technologies to help keep them entertained at home and productive when on the road for work.”

Telstra’s latest 4G roll out will take Telstra’s 4G coverage to 85 per cent of the population by Christmas this year, up from 66 per cent at the end of June.

“Last August, we committed to rolling out our 4G coverage to 66 per cent of the Australian population and we pushed through that target, installing 4G equipment on over 1000 mobile base stations in 2012/13. We now commit to having superfast services in place for 85 per cent of the population by the end of the year, making Australia one of the leading 4G nations,” Mr Carver said.

“As part of the roll out we’ve upgraded more than 2000 base stations and will upgrade another 1500 base stations before Christmas to meet our 85 per cent target.”

Mr Carver said in response to extraordinary customer demand for 4G services Telstra had grown its range of 4G devices.

“We now have 30 4G devices and we continue to collaborate with manufacturers around the world to ensure we can give our customers a great range of 4G devices now and into the future.

“Data use on Telstra’s 4G is now growing at approximately 23 per cent each month, meaning it more than doubles every four months. And now locals in Bargara and Biloela will be able to enjoy the benefits of these advanced devices and superfast network.”