

BETTER CONNECTIONS, EVERYWHERE.



10 November 2022

The House of Representatives Standing Committee on Communications and the Arts
PO Box 6021
Parliament House
Canberra ACT 2600

Terms of Reference

The House of Representatives Standing Committee on Communications and the Arts will inquire into and report on the experience, opportunities and challenges for co-investment in multi-carrier regional mobile infrastructure.

The Committee will:

- 1) Report on the costs, feasibility and public benefits associated with the deployment of:
 - a. infrastructure which supports a single mobile carrier, and
 - b. the various models for infrastructure which supports multiple mobile carriers;
- 2) Report on community views on single carrier vs multi-carrier outcomes; and
- 3) Report on examples of successful multi-carrier outcomes and their applicability in the Australian context.

Dear Committee,

Pivotel Group Pty Limited (Pivotel) is pleased to provide a submission to the House of Representatives Standing Committee on Communications and the Arts inquiry into the experience, opportunities and challenges for co-investment in multi-carrier regional mobile infrastructure.

Pivotel Background

Pivotel is an Australian owned and operated company which commenced operations in 2003. Pivotel maintains a mobile carrier license and operates a mobile network with ground infrastructure in Australia, making it the fourth mobile carrier in the country. Pivotel's network infrastructure, representing an investment of approx. \$100M over the past 25 years, is almost entirely dedicated to the provision telecommunications services in regional, rural and remote Australia. In addition to the operation of its terrestrial 4G services Pivotel utilizes its mobile network infrastructure in the provision of mobile satellite services and is the only Australian carrier with direct connection to all four global mobile satellite networks (Iridium,

BETTER CONNECTIONS, EVERYWHERE.



Inmarsat, Thuraya and Globalstar) as well as NBN and emerging LEO and MEO satellite providers such as OneWeb, SES and Starlink.

Pivotel employs over 145 staff predominantly in Australia, as well as New Zealand, the USA and Indonesia, with its Australian offices located on the Gold Coast, Sydney, Melbourne, Dubbo and Perth. In regional Australia Pivotel supports over 160 dealers and 100 value added resellers.

Pivotel's mobile network, marketed as ecoSphere® (see Appendix 1), delivers mobile / broadband services to rural and remote Australians. Using innovative small cell technology and a unique network architecture, ecoSphere® can cost effectively deliver wide area 4G (and 5G where appropriate) cellular and IoT coverage to remote communities, mining, agriculture and pastoral properties using high speed terrestrial backhaul. With recent advancement in LEO and MEO satellite technologies Pivotel's ecoSphere® can provide metro like services in the most remote places of Australia's mainland and external territories.

Pivotel has 25 4G base stations in operation and is planning for a further 23 4G / 5G base stations to be added to the networks by mid 2024. Pivotel has been awarded funding by the Commonwealth and relevant state governments under RCP2, to build a 15 site network in Western Victoria, and a 3 site mobile network North West of Dubbo providing high speed mobile broadband to homesteads and business as well as mobile and IOT connectivity in areas where there is poor broadband and mobile availability.

Through its ~20 years' experience in regional and remote communications, strategic satellite holdings and 4G / 5G / NB-IOT mobile network, Pivotel is well placed to comment on this Parliamentary Inquiry into multi-carrier regional mobile infrastructure.

Comments on Terms of Reference

It is a well-known fact that two thirds of Australia's land mass does not have the privilege of having access to mobile connectivity (as well as fixed broadband), resulting in a lack of the enabling digital access required to drive adoption of new technologies that improve not only our quality of life, but has the ability to improve productivity and workforce capability driving higher yields at lower costs, deliver e-education, e-health, improved health and safety outcomes and connectivity during natural disasters.

The recently published Agri-tech Expert Working Group (AEWG) report, commissioned by the DTIRDC and prepared on behalf of the Australian Broadband Advisory Council (ABAC)¹, provided some useful insights into the issue of inadequate digital connectivity for regional and remote users. "The main finding of our discussions is that across the country, beneath the broad brush strokes of mobile

¹ <https://www.infrastructure.gov.au/department/media/publications/agri-tech-expert-working-group-june-2021>

BETTER CONNECTIONS, EVERYWHERE.



coverage and National Broadband Network (NBN) fixed and wireless networks, there are localised connectivity gaps on, across and between farms. We have called this patchiness ‘salt and pepper connectivity’”.

It goes on to say “National carriers may continue to be the primary providers of connectivity in rural Australia, but their focus – in terms of both technology and business outcomes – is on serving premises and ‘people on the move’ along transport corridors. It is not reasonable to expect that the national carrier business models, even with stepped up ‘push-pull’ approaches from government, will solve what is essentially a local scale problem. As a result, what we have seen is the emergence of alternative approaches in the market, including farmers installing bespoke solutions, as well as a cohort of second tier retail service providers (RSPs) who are filling in the salt and pepper.”

A range of Small and Medium Enterprises across the country are deploying connectivity solutions at a fraction of the cost of the main carriers. Some of these small networks operate as substitutes for the carrier network, others extend the range of the carrier networks. A cohort of Australian and international companies offering Low Earth Orbit (LEO) satellite communication solutions is also emerging. These solutions range from low cost narrowband Internet of Things (IoT) technology, to ‘always on’ broadband coverage.”

Pivotel falls into this camp of second tier RSPs, with the proven ability to build mobile networks, connected via fibre backhaul, and / or existing and emerging LEO / MEO satellites, delivering broadband connectivity exclusively focussed on regional and remote communities.

It has been a feature of past Commonwealth government programs that the majority of grant funding has been issued to incumbent operators (80% of sites funded through the Commonwealth MBSP program has been provided to Telstra, two thirds of RCP Round 1 funding was issued to Telstra and NBN, RCP Round 2 funding 50% issued to Telstra and 28% to NBN). This has resulted in Telstra effectively extending it’s footprint and technology and increasing its competitive dominance, despite the emergence of new and innovative providers who are ideally placed to deliver more targeted solutions, better able to reach areas of little interest to incumbents more cost effectively and through a more focussed strategy and association with local stakeholders.

As highlighted in the AEWG report, incumbent mobile network operators are focussed on the provision of connectivity to townships and major roads, providing limited or no coverage at the homestead and across the broader rural property. Their business models do not support broad area coverage of remote communities and rural properties.

Additionally, through its discussions with regional stakeholders and data acquired demonstrating experience on the ground, Pivotel is aware of many areas that may show demonstrable 4G coverage in a particular area per a provider’s coverage

BETTER CONNECTIONS, EVERYWHERE.



maps, where the network claims and speeds are unstable and/or inferior to what is being claimed.

Pivotel has consistently advocated for a Shared Radio Access Network (Shared RAN) network approach whereby Mobile Network Operators share all passive and active infrastructure in regional areas that are economically challenging, in order to provide enhanced coverage to all mobile users and greater competitive choice. This could be delivered via a number of different technological approaches including domestic roaming, Mobile Operator Core Network (MOCN) or MORAN (Multi Operator RAN).

Domestic Roaming occurs when “Traffic from a subscriber of one operator is carried and routed on the network of another operator with this arrangement underpinned by a roaming agreement”.² Domestic Roaming allows end users of a mobile service to automatically make and receive voice calls, send and receive text and data and access other services, even when traveling outside the geographical coverage area of their own mobile service provider, by means of using the RAN of the host network.

MOCN occurs when “Radio access networks and spectrum are shared, and core network sharing, where servers and core network functionalities are shared”³. i.e. “two or more core networks share the same RAN (and spectrum). The existing core networks could be kept separate. MOCN is the most resource efficient solution as it gives the mobile operators the opportunity to pool their respective spectrum allocations, resulting in improved trunking efficiency”⁴.

With MORAN “Radio access networks are shared, and dedicated spectrum is used, by each sharing operator”⁵ “everything in the RAN (antenna, tower, site, power) except the radio carriers is shared between two or more operators”⁶.

With both MOCN and MORAN “mobile operators can choose between sharing the transmission backhaul or having them separate (in the same physical link)”⁷.

Pivotel is currently engaged with the Department of Regional NSW Mobile Coverage Project - Active Sharing Partnership, where incumbent MNO’s and several Infrastructure providers are participating across several solutions workstreams such as MOCN, Roaming, MORAN and Open RAN. This project is designed to deliver extended coverage through a shared RAN, lower cost, targeted rural mobile approach, delivering the benefits of the digital economy to regional and remote parts of NSW.

² Department of Regional NSW, Mobile Coverage Project – Active Sharing Partnership Grant Guidelines, Appendix C: Glossary

³ Department of Regional NSW, Mobile Coverage Project – Active Sharing Partnership Grant Guidelines, Appendix C: Glossary

⁴ Parallel Wireless, <https://www.parallelwireless.com/products/multi-tenant-and-sharing/>

⁵ Department of Regional NSW, Mobile Coverage Project – Active Sharing Partnership Grant Guidelines, Appendix C: Glossary

⁶ Parallel Wireless, <https://www.parallelwireless.com/products/multi-tenant-and-sharing/>

⁷ Parallel Wireless, <https://www.parallelwireless.com/products/multi-tenant-and-sharing/>

BETTER CONNECTIONS, EVERYWHERE.



This program supports the exploration of active sharing through various workstreams focussed on specific technologies with participation from all Mobile Network Operators (MNOs), Telstra, Optus, TPG and Pivotel, and prospective Mobile Network Infrastructure Providers (MNIPs) who propose to build neutral host networks for the MNO's to actively share on.

The historical approach to Commonwealth and State government funding programs has been to fund tower infrastructure to support expanded regional coverage. Whilst these programs have increasingly sought to enable passive tower sharing, 80% of sites funded under the MBSP has been granted to Telstra (see Table 4.3 below), which has had the ultimate effect of further extending its network well beyond its competitors, thus creating an effective 'moat' between its outer coverage areas and competitor networks.

“In recent years, one of the most significant co-contribution programs is the Federal Government's MBSP. As at 31 January 2022, Telstra had deployed 788 sites with the assistance of funding from this co-contribution program. This is significantly more co-funded sites than Optus and TPG combined (table 4.3). Table 4.3 also shows that a continuing majority of the Federal Government's MBSP funded sites are in Inner and Outer Regional Australia with a small number of sites located in Major Cities. There were a total of 273 co-funded sites across the MNOs in Remote and Very Remote areas in 2022, up from 245 in 2021 and 217 in 2020.”⁸

⁸ 2022 ACCC Mobile Infrastructure Report, page 13

BETTER CONNECTIONS, EVERYWHERE.



Table 4.3: Total number of Federal Government Mobile Black Spot Program sites by MNO & ABS Remoteness Area – 2020 to 2022

	2020	2021	2022
Major Cities of Australia			
Telstra	8	11	14
Inner Regional Australia			
Optus	22	26	41
Telstra	187	222	234
TPG	8	8	8
Outer Regional Australia			
Optus	21	22	30
Telstra	276	320	340
TPG	44	44	43
Remote Australia			
Optus	16	17	21
Telstra	87	96	102
TPG	8	8	8
Very Remote Australia			
Optus	34	37	44
Telstra	72	87	98
Total			
Optus	93	102	136
Telstra	630	736	788
TPG	60	60	59

Figure 1: Table 4.3 from ACCC Mobile Infrastructure Report 2022⁹

Despite this level of funding, particularly in regional and remote Australia, the level of passive sharing to date has been limited, “As at 31 January 2022, Telstra had the lowest percentage of co-location with 35% of its total sites co-located with another MNO. Rates of co-location vary across ABS Remoteness Areas and decreases across all MNOs as you move to less populous regional and remote areas. Co-location by all 3 MNOs was the most common co-location combination and TPG & Telstra was the least common.”¹⁰

“Telstra has the lowest percentage of co-location across the MNOs. Of its total active sites in 2022, 35% were co-located with another MNO. The percentage of co-location was much higher for Optus and TPG with co-location occurring at 70.5% and 90% of their total active sites, respectively (table 4.5).

Table 4.5 also indicates that the level of co-location varies significantly across MNOs and across ABS Remoteness Areas. For example, co-location in 2022 is as high as 92.9% of TPG’s total sites in Major Cities but as low as 4.8% of Telstra’s sites in Very Remote Australia. The level of co-location declines across all MNOs as their site locations move from Major Cities to less populated Regional and Remote areas.

⁹ 2022 ACCC Mobile Infrastructure Report, page 14

¹⁰ 2022 ACCC Mobile Infrastructure Report, page 4

BETTER CONNECTIONS, EVERYWHERE.



This low level of co-location for Telstra flows through to a high number of ‘Telstra Only’ sites. Where co-location did occur, the most common combination was TPG & Optus in 2020 and then all 3 MNOs in 2021 and 2022. The least common combination of co-location was sites co-located by TPG & Telstra across all 3 years (table 4.6).¹¹

It is clear from these statistics that previous programs supporting passive site sharing have been somewhat effective at providing enhanced coverage on Telstra’s network benefiting users on that network only, whereas Optus and TPG have not been as successful with far less sites being funded. The ultimate effect of this historical approach is further investment in Telstra’s network, allowing it to grow more rapidly than its competitors’ networks, which has the adverse effect of making it far more challenging for Optus and TPG to successfully win grant funding as those programs are designed to fund new coverage only.

Table 4.5: Co-located sites as percentage (%) of total sites by MNO & ABS Remoteness Area – 2020 to 2022

	2020	2021	2022
Major Cities of Australia			
Optus	84.9	83.4	80.3
Telstra	46.0	46.2	46.4
TPG	92.2	89.1	92.9
Inner Regional Australia			
Optus	63.4	62.5	60.9
Telstra	35.5	35.3	35.8
TPG	85.3	85.4	85.4
Outer Regional Australia			
Optus	52.9	52.9	52.4
Telstra	26.1	25.9	25.6
TPG	75.7	75.3	75.7
Remote Australia			
Optus	40.9	41.2	41.1
Telstra	11.8	11.7	11.9
TPG	61.7	62.9	64.5
Very Remote Australia			
Optus	26.7	25.8	27.8
Telstra	4.7	4.4	4.8
TPG	62.5	62.5	62.5
Total			
Optus	73.7	72.7	70.5
Telstra	35.1	34.9	35.0
TPG	89.5	87.2	90.0

Figure 2: Table 4.5 from ACCC Mobile Infrastructure Report 2022¹²

¹¹ 2022 ACCC Mobile Infrastructure Report, page 15

¹² 2022 ACCC Mobile Infrastructure Report, page 16

Table 4.6: Total number of sites by MNO co-location combination - 2020 to 2022

	2020	2021	2022
Optus & Telstra	1,028	1,070	1,137
Optus ONLY	2,095	2,252	2,548
Telstra ONLY	6,787	7,005	7,149
TPG & Optus	2,441	2,446	2,440
TPG & Telstra	220	221	209
TPG ONLY	598	755	572
TPG, Optus & Telstra	2,416	2,470	2,507

Figure 3: Table 4.6 from ACCC Mobile Infrastructure Report 2022¹³

The most recent Commonwealth MBSP Round 5A did provide an allocation of funding for Trial Solutions that “deliver innovative solutions to users of mobile services...using a new technology or delivery model that is not, at the time of application, in widespread commercial use in Australia.”¹⁴ This resulted in a limited trial for domestic roaming and Active Neutral Host RAN Sharing between Field Solutions Group and Optus scheduled to be delivered by June 2023. Whilst this initiative was a well-intended step in the right direction, it was limited in its take up as there was little time to coordinate multi-party agreements and there is a general reluctance from incumbent MNO’s to agree on active site sharing.

We believe TPG has little interest to explore extended networks beyond Telstra’s coverage area as its own network is too far removed and it doesn’t make economic sense to invest in an island of coverage so far removed from its own network boundary. This is commonly termed as ‘the moat’ between Telstra’s network and competitor networks.

Optus has similar issues in relation to ‘the moat’ but has demonstrated its willingness to invest in regional networks and is more open to active and passive sharing with conditions.

Telstra on the other hand appears to only be interested in sharing on its own terms. The ACCC’s Mobile Infrastructure Report demonstrates Telstra’s strategy is to build its own infrastructure and limit the ability of others to gain access. Telstra has had considerable success in winning the majority of grant funding available to further build and invest in its regional infrastructure. Separately, Telstra has indicated it is not interested in active RAN sharing on other providers networks, or on an Active Neutral Host basis, as it claims it wants to control the network and ultimately the end user experience.

It's important to recognise that the recent application for Telstra MOCN sharing with TPG does not represent an opening up of its network for other operators. This proposed MOCN sharing deal with TPG makes sense to Telstra in isolation as it

¹³ 2022 ACCC Mobile Infrastructure Report, page 16

¹⁴ Mobile Black Spot Program – Round 5A Guidelines, page 12

BETTER CONNECTIONS, EVERYWHERE.



gains access to most of TPGs regional spectrum and is only giving up access to its wholesale network¹⁵ with stringent conditions. It is a good deal for Telstra as it:

- 1) will retain its substantial coverage advantage over the competition,
- 2) gain access to the largest spectrum holdings in regional areas (an unnatural and uncompetitive amount of spectrum),
- 3) it will receive financial compensation from TPG and,
- 4) it will have the effect of further limiting investment in regional coverage by competitors and new entrants.

Unless Telstra is willing to open its entire regional network to others, including TPG and Optus, the deal is heavily skewed in favour of Telstra and only serves to enhance its existing regional monopoly position. As such the Telstra / TPG MOCN sharing deal should not be viewed as Telstra providing 'Open Access' to its network.

If the proposed merger transaction is approved unencumbered, it is likely that mobile competition will be further reduced and Telstra's near monopoly position enhanced, with only two MNO's effectively competing in regional Australia, as Telstra will continue to retain its full retail footprint advantage of over 1 million km² of additional coverage, and will gain access to an unprecedented amount of additional spectrum. In order to improve competitive outcomes for regional Australia it is imperative that Telstra is required to provide access to its entire retail footprint, not just the wholesale footprint it is currently enabling for its MVNO customers and TPG under the proposed transaction.

As argued In Pivotel's submission on the ACCC preliminary views:

"Pivotel remains of the view that, without acceptable remedies, the proposed transaction is likely to result in a substantial lessening of competition in markets for supply of mobile voice and broadband services. These effects will be most significant in regional and rural Australia. This is largely because the proposed transaction will entrench Telstra's dominance in wholesale and retail markets and increase barriers to entry for smaller MNOs.

It will also diminish infrastructure-based competition in regional Australia by effectively making TPG simply another MVNO with a footprint similar to other MVNO's on Telstra's network...

If the merger parties are prepared to offer remedies which address some of the anti-competitive effects of the transaction, it would enable some of the claimed efficiency benefits and other public benefits to be enjoyed by the parties and the public more generally. These remedies, such as, the making available of Telstra's full retail network to MVNO's prepared to invest in a core network and the divestment of competitively significant amounts of spectrum, would likely result in the proposed transaction having a net positive effect on mobile services markets throughout

¹⁵ Telstra only allows access to a smaller network footprint to its wholesale customers, including TPG under the proposed merger transaction referred to as the 17% coverage zone. Telstra claims its wholesale footprint covers 98.8% of the population and more than 1.6m km² of landmass compared to its retail footprint which covers 99.4% of the population and over 2.6m km² of landmass.

BETTER CONNECTIONS, EVERYWHERE.



Australia. Without those remedies, any benefits from the transaction will largely be enjoyed by the merger parties themselves and limited to short-term gains by consumers in metropolitan areas.”¹⁶

As regional networks extend into more marginal areas it becomes imperative to improve network economics through suitable network sharing arrangements, whereby the host operator receives appropriate financial consideration from other network operators for the provision of that coverage. The host operator need not be one of the incumbent operators. As has been demonstrated in New Zealand, government backed structures involving the MNO’s as JV partners is also a viable option.

Radio Access Network (RAN) sharing results in greater cost savings than simple co-location and tower sharing. Network operators have used the concepts of MORAN (Multi-Operator Radio Access Network) and MOCN (Multi-Operator Core Network) to reduce the total amount of infrastructure required to support their services. As mentioned above the key distinction between MOCN and MORAN is that the former includes sharing of spectrum, whereas the latter only shares hardware, typically through modular partitioning inside indoor cabinets.

While not currently used in Australia¹⁷, MOCN is being successfully used on 4G networks in other countries such as the Nordic countries in Europe, several Asian countries, and notably for the rural shared network in New Zealand. One of the key benefits of the MOCN form of sharing is that it makes the most efficient use of spectrum; this is particularly relevant to rural deployments where there is great benefit in using the less abundant low band (sub 1 GHz) spectrum due to its superior propagation characteristics. MOCN also has the benefit that the architecture is largely transparent to the services provided by each MNO. This is not always the case with other solutions such as national roaming because certain services may not map correctly to the hosting MNO.

Impediments to the use of Active RAN Sharing are largely strategic and commercial; policy interventions by government have been shown to be necessary to break down such barriers. Pivotel advocates that the MNO who becomes responsible to deploy a site subsidised by the public purse should provide Active RAN Sharing Access to other operators on a commercial basis.

Open access networks are an efficient and effective way to provide ubiquitous regional network access for all users irrespective of their network provider. Targeted regional network investments also deliver additional advantages such as improved safety and efficiencies and can help unlock significant productivity improvements across various sectors such as agriculture, mining, education, health etc whilst also improving the overall availability of mobile coverage for all users.

¹⁶ Pivotel submission on the ACCC preliminary views 191022 Final-Clean, Executive Summary, Clause 2

¹⁷ At the time of writing there is an ongoing inquiry into a MOCN sharing arrangement between Telstra and TPG before the ACCC.

BETTER CONNECTIONS, EVERYWHERE.



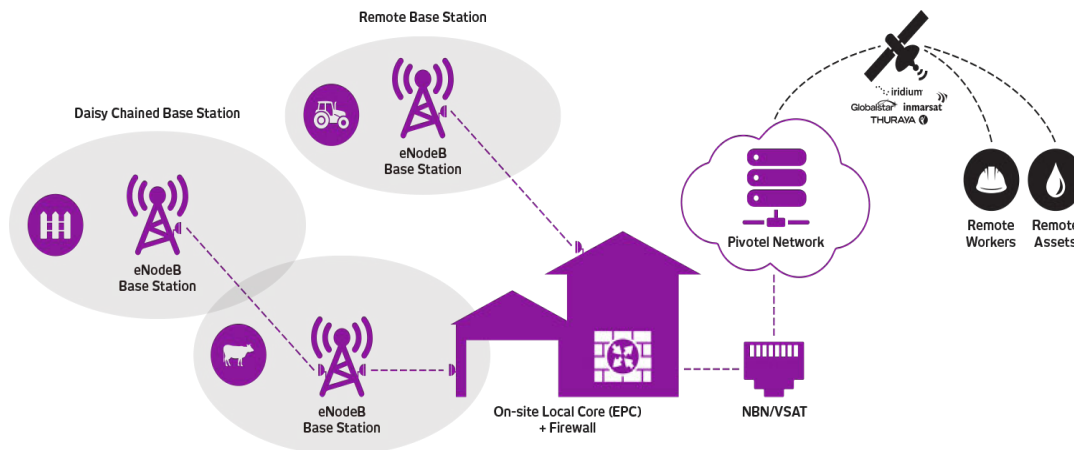
Pivotel is actively encouraging the adoption of Open Access Networks and is committed to acting as an 'Active Neutral Host', providing access to its existing and future networks to other MNO's on a shared RAN basis, subject to suitable technical and commercial considerations.

BETTER CONNECTIONS, EVERYWHERE.






Appendix 1

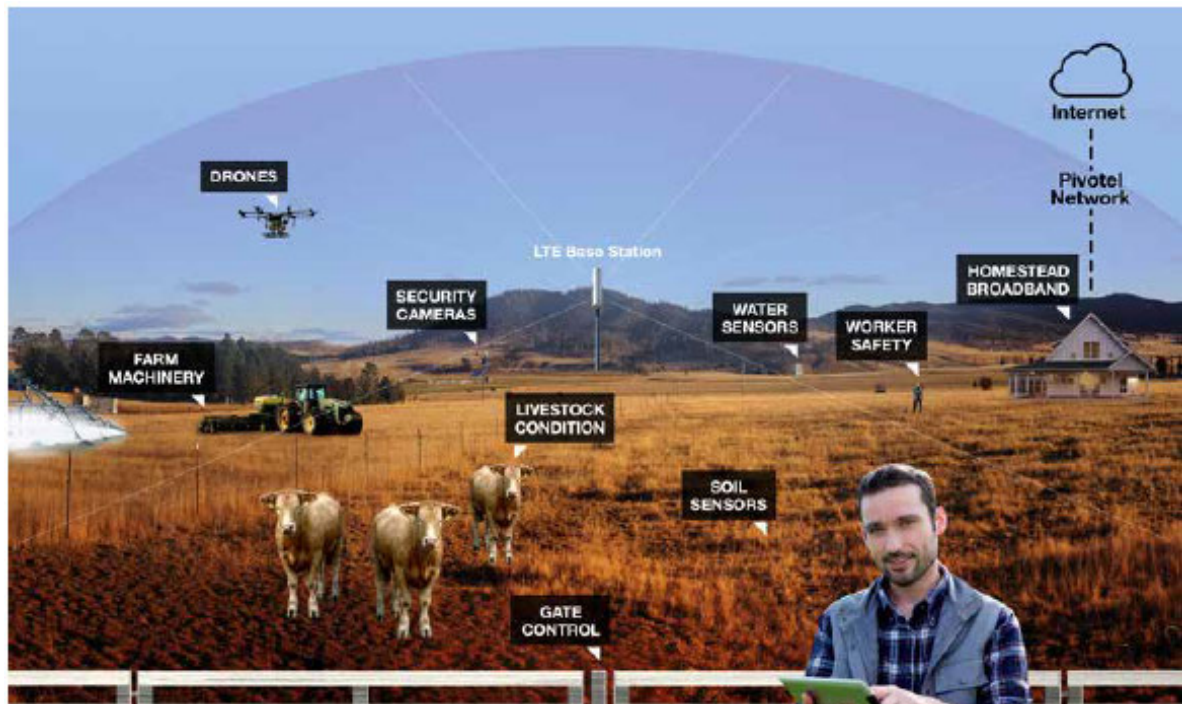
Pivotel ecoSphere®



The benefits of ecoSphere®

- **4G** 4G custom-built LTE (4G) mobile network designed to meet the specific requirements of organisations operating in remote areas.
-  Tailored solutions for agriculture, mining, oil, gas and community needs.
-  Support for telephony and data connectivity – voice over LTE and high speed data services.
-  Support for NB-IoT for narrow-band IoT to facilitate long range, low power, long battery life M2M communications and satellite point-to-point terminals for cost effective connectivity to very remote locations.
- **04** 4G voice connectivity utilises a Pivotel SIM card based service with 4G handsets running voice over IP applications with standard Australian “04” mobile numbering.

BETTER CONNECTIONS, EVERYWHERE.



Overview of an ecosphere network deployed in an agricultural environment