

12 June 2013

Dr Jane Thomson
A/g Committee Secretary
Parliamentary Joint Committee On
Law Enforcement



Email: le.committee@aph.gov.au

Inquiry into the spectrum for public safety mobile broadband

Dear Dr Thomson,

Tait offers this submission to the inquiry into the spectrum for public safety mobile broadband being conducted by the Parliamentary Joint Committee on Law Enforcement.

Entering its fifth decade, Tait continues to deliver radio solutions for a variety of organisations and industries including public safety agencies, government services, utilities and urban transport providers. While several corporate functions are based in Christchurch, New Zealand, Tait has an international customer base and global support network serviced by wholly owned subsidiary companies based in Australia, the USA, Europe, Canada, England, Singapore, and China.

The private business of Tait continually re-invests heavily in research and development including strong links with New Zealand Universities and Crown Research Institutes. One example is Tait's support for the national Wireless Research Centre (WRC) at the University of Canterbury in New Zealand. The goal of the WRC is to become a centre of excellence for mobile communications through collaboration between academia and industry.

Our comments on Public safety mobile broadband are based on our experience, our research and our international communications committee and standards representation along with our appreciation of the distinctiveness of the Australian critical communications environment.

Response to Inquiry Questions

(a) how much broadband spectrum law enforcement agencies need to be able to communicate safely and effectively during mission-critical events such as natural disasters and potential terrorist incidents;

Tait supports the allocation of nationwide broadband spectrum to be controlled and used by public safety agencies in the establishment of private networks (dedicated channels) for public safety. Only a private network will provide public safety with the quality of service, reliability, security and control they need to undertake their core business roles.

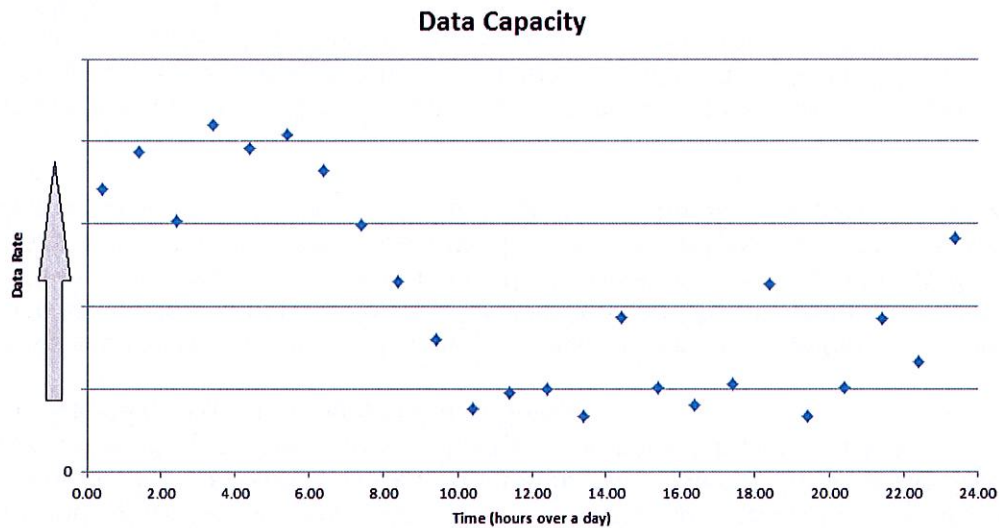
The amount of broadband spectrum required is dependent upon the use cases and operational scenarios combined with the selection of network architecture. Tait has

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examined the data capacity needs in other regions but to offer a considered answer to this question for Australia Tait would need to work with a selection of users to estimate the capacity need.

Operationally there is a significant difference between a consumer designed network and a public safety network. A consumer network (commercial carrier) is typically designed for data download with equitable user access, whereas a public safety network needs to be designed for data upload and have predetermined user access priorities. Access to a commercial network is directly related to the number of users (the public) attempting access and the type of applications. The image below shows an example observation of the way in which capacity can vary through a day. Here, a commercial modem was used to observe available data rate using a fixed application in a fixed location on a commercial network over the period of a day. The plot aptly illustrates the variable nature of availability.

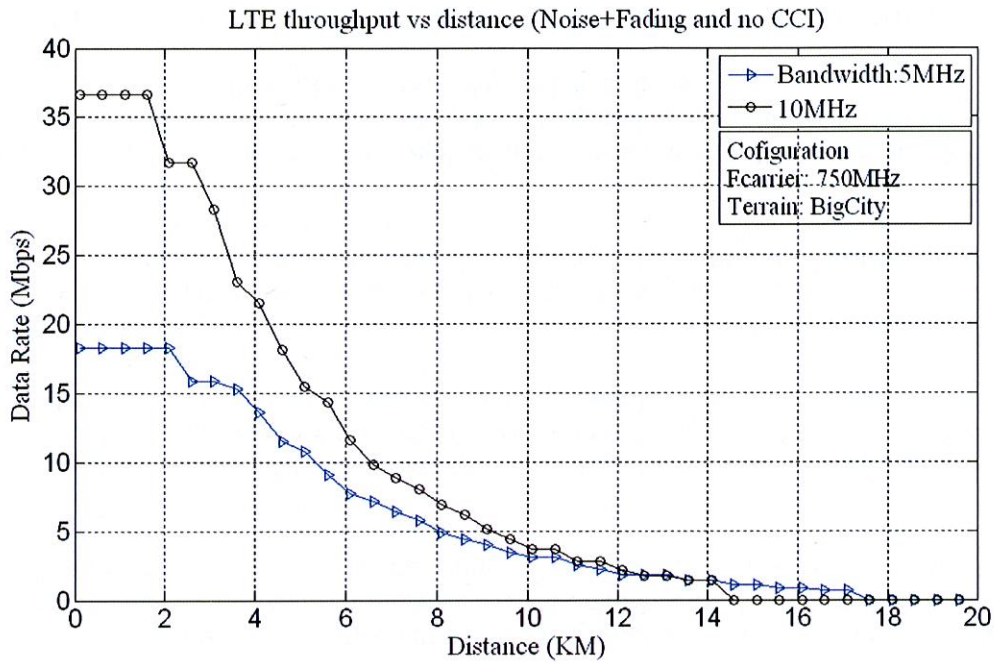


It should be stated that this does not exclude a Carrier from providing a public safety centric broadband network, just a difference in the network design philosophy required.

The practical performance of a network is dependent upon many design factors including site density, operating frequency, bandwidth and capacity requirements. It is important to note wider operating bandwidths will yield a higher throughput but that benefit will generally be seen only close to the cell centre.

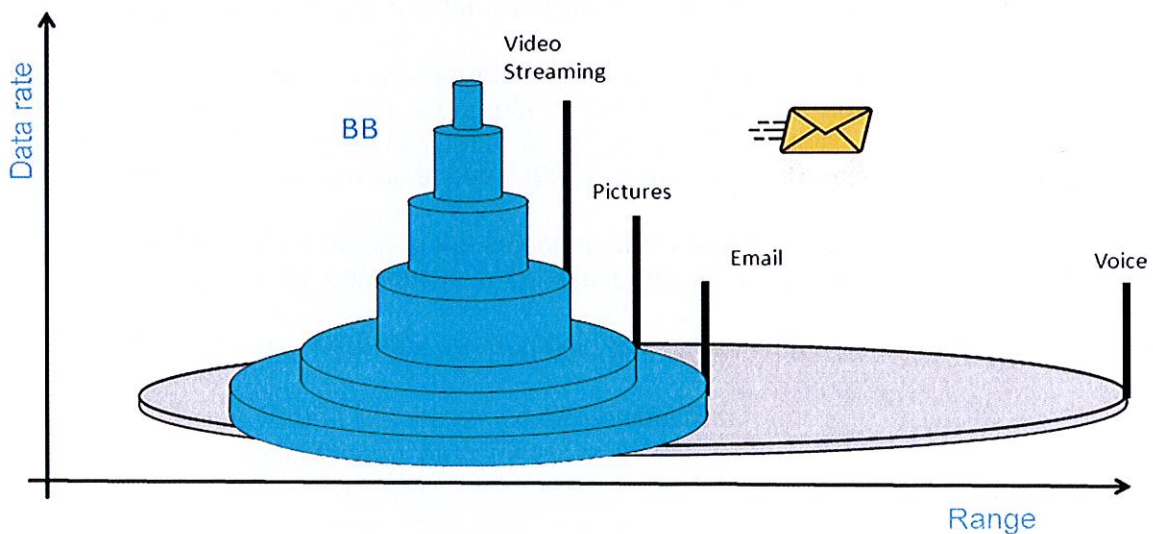
The image below compares the downlink performance of 5MHz and 10MHz solutions where only the bandwidth has changed. Here we observe two key points;

- Data rate (network capacity) is greater close into the site.
- At cell edge the observed performance can be very similar (at the 10km point in this instance).



Note on above image: This simulation assumed a 10watt transmitter equipped with a directional antenna. Noise and fading are included but it is assumed there is no adjacent cell.

The following is a translation of the above into a graphic showing the bandwidth ‘steps’ and the associated application type compatibility.



(b) which of the 700 or 800 MHz bands is the most appropriate for law enforcement agencies given the current licensees occupying spectrum;

There is little difference between 700 and 800MHz operation from a coverage perspective.

Although the proposed network is a private network, the availability of equipment (or modules) capable of operating in the selected bands is important.

Tait recommends selection of a band that matches a 3GPP band that is either; used overseas for commercial deployments or is within the capability of existing commercial equipment. Tait has identified a number of suppliers offering equipment in the 800MHz band which ensures that devices for the public safety network will be available.

Note: 3GPP is the organisation that developed the 4G LTE suite of standards, including frequency band plans. Consequently manufacturers will only provide equipment that operates according to those standards and within those band plans.

(c) how the necessary spectrum for public safety should be secured in a timely manner;

The spectrum should be secured through the ACMA process to re-farm the 800 MHz and 900 MHz bands that is currently underway. The public Discussion Paper "The 803-960 MHz Band-exploring options for future change addresses the issue of Public Safety spectrum."

Tait understand the extent of the frequency re-farming required to release the proposed 800MHz public safety broadband spectrum. The time required for this provides a window of opportunity for agencies to progress business cases, funding submissions and project planning.

(d) what arrangements should be put in place to ensure that, in extreme circumstances, law enforcement agencies can effectively use spectrum of commercial carriers to protect public safety and maintain public order;

In extreme circumstances such as a major disaster, it is important to recognise the need of the public to access commercial networks. It would be of concern if Public Safety appropriation of commercial spectrum excluded public access.

During a disaster or major incident the public still need access to emergency services (000) and socially they need to be able to contact relatives and friends for peace of mind and to determine if help is required. Business will also need communications for the good of the community, the economy, and a subsequent recovery.

Further, Public Safety needs the commercial networks to be operational to provide a channel for public information, a good example being via social media. The point is that the modern social and economic structure is based upon the availability of mobile commercial communications. Tait therefore urges careful consideration of any approach that may severely limit public access in favour of emergency response.

This will require considerable consultation to provide a balance between public safety demand and community needs during a disaster.

Additional work will also be required on the methodology by which the public safety users transfer to the commercial network. Issues requiring resolution include:

- the associated priority that each respective public safety user is assigned on the commercial network upon transfer,
- resolving the interconnectivity between the public safety broadband network and the commercial network including open-standard interfaces and network software version compatibility, and
- integrated priority management system.

Ideally these issues will be addressed and resolved at the Overflow Subcommittee.

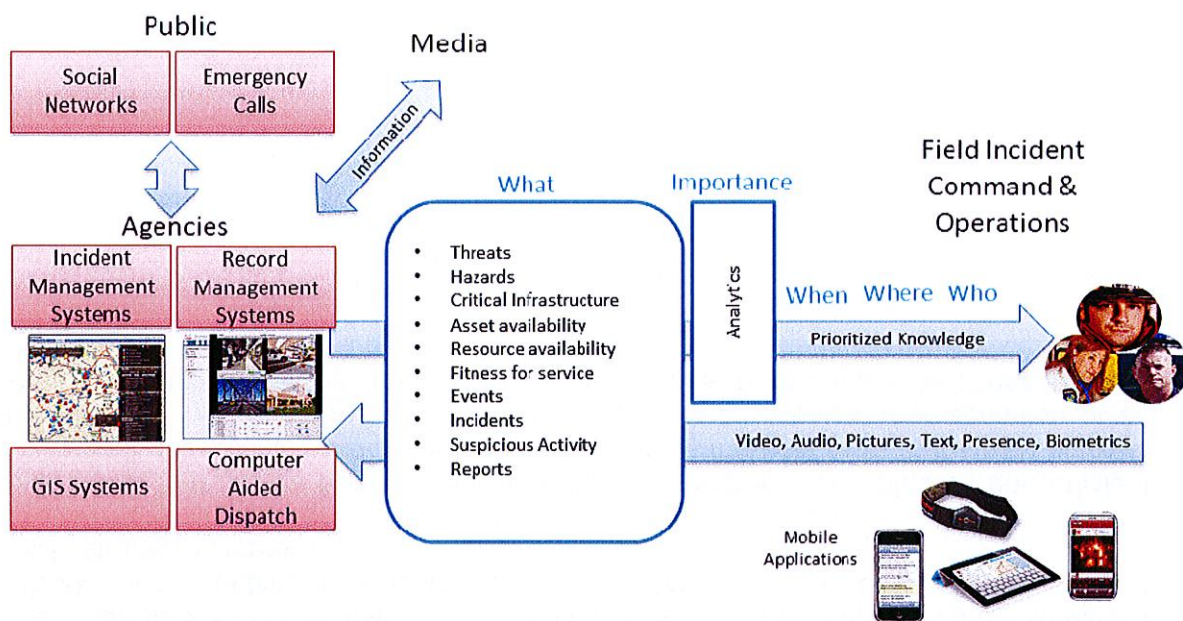
There is a strong business case for installing permanent public safety private broadband networks in larger metropolitan areas. Outside of these areas deployable broadband nodes will be the most financially viable option.

The challenge is how to connect these deployable nodes to the permanent public safety networks. Tait proposes a hybrid approach utilising the National Broadband Network (NBN) infrastructure and/or commercial network infrastructure. At a minimal cost, public safety specific secure connection points could be placed in fibre nodes and wireless towers.

(e) what applications dependent on broadband spectrum will contribute significantly to saving lives and property;

Workforce mobility demand is rapidly increasing as business and Government Agencies are realising efficiency and cost benefit from the affordable mobile technologies available in the marketplace. Public Safety already has limited broadband capability via commercial networks and is putting it to good use learning about the benefits to its productivity a mobile strategy can produce.

Applications that enable Public Safety Mobility will result in more effective and efficient deployment of available public safety resource. Having the right skills at the right place at the right time will save lives and property. Below is a graphical representation of an example of information flow from public safety systems to front line emergency services personnel.



Examples of applications include mobile officer dispatch, remote video and audio collaboration tools and mobile access to critical data such as building floor plans, imagery, incident data and offender history and alerts.

Generally access to mobile information creates a wider situational awareness that contributes to operational efficiency and officer safety. Examples include: streaming video from accident site to dispatchers to deploy appropriate apparatus, ambulatory staff streaming video and patient health to hospital staff while en-route, central dispatch pushing pictures and mapping locations of suspicious persons to in-field commanders, real-time identity checks of vehicles, suspects and locations, and providing full visibility to central fire command of resource availability and response time during volunteer call outs. Maximising operational frontline hours and minimising administrative hours through automation of reporting using mobile devices will deliver results to the community as frontline staff will have more time to patrol and respond to emergencies.

(f) the impact on law enforcement agencies which utilise the available spectrum in relation to budgets, implementation strategies, current infrastructure and existing technology;

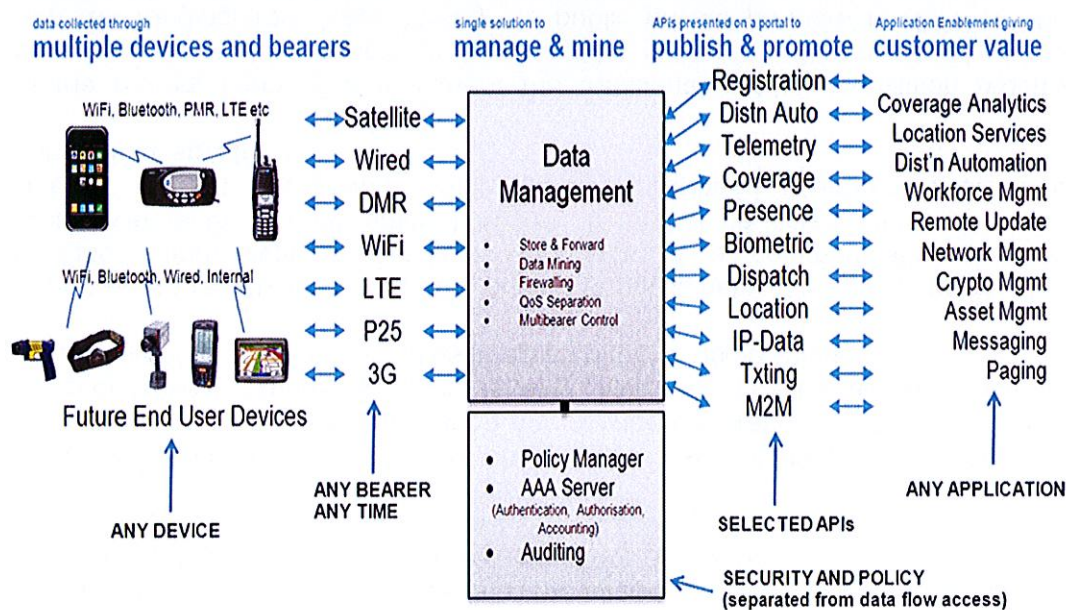
Tait believes that future public safety systems will represent a unified communications solution taking advantage of, and leveraging, all current business communication assets.

Public safety agencies have established voice radio communications networks; while some have low speed mobile data networks others have piloted mobility applications on commercial carrier networks. This experience provides the foundation for agencies to integrate broadband data thereby enabling the next stage of operational efficiency and effectiveness.

The planning for this integration will be more complex than traditional voice radio communications. It does not however differ too much from other data and communications integration seen in other business sectors. If we consider the inter-relationship between the systems it would possibly look like the following diagram.



Tait recommends a network-of-networks approach that leverages the attributes of existing installed public safety networks, integrates newer networks (public safety broadband and WiFi) while retaining simplicity and technological invisible to users. This will allow iterative investment, maximum user acceptance and measurable resultant operational improvement. An example is provided below.



Tait advocate an approach that uses all the available bearer assets in pursuit of improving productivity and efficiency. No single network or device represents an optimum solution. It is more important that all solutions are fit for purpose.

It should be noted the coverage of an LTE cell is substantially smaller than a traditional voice radio cell. As a result, covering a very wide geographic area with LTE will prove to be prohibitively expensive which is why Tait recommends an approach that takes advantage of multiple technologies integrated into a single solution.

One goal is to enable roaming from private to public networks. This is practical now using multiple communication modules. Continuity of a communication session during switchover is more challenging however. It should be noted this challenge will exist whether or not the private public safety broadband spectrum exists adjacent to commercial spectrum.

In the current financial environment the traditional capital acquisition procurement is becoming an unlikely option for large capital projects. Alternate funding models are required ranging from lease through to public private partnership (PPP). The biggest concern for public safety agencies is control and service continuity in the case of contract termination. Tait sees no barrier to achieving a suitable funding model without compromising agency control.

Whilst spectrum will be made available for public safety broadband, public safety WiFi and government voice communications there is concern that the take-up for new spectrum will be hindered by network funding restrictions. There is considerable work being undertaken by national committees of public safety and government representatives to ensure the implementation of standards and interoperability.

This national planning by agencies and regulators will be lost if agencies do not achieve funding commencing at the point where public safety spectrum is made available. Consideration should be given to a dedicated national fund made available to states to implement public safety broadband with the states funding their respective data integration strategies.

(g) any other related matters.

Note that forthcoming releases of LTE are aimed at plugging the capability gaps of the current LTE release such as Proximity Services (direct mode) and services to support group operations. This does not however hinder public safety agencies from installing and utilising this technology for data transactions such as video, photographs, database access, location services and tasking despatch prior to these features becoming available.

Tait has no objection to this response being published on the Parliamentary website and in print media.

Please contact Robert Hockings, Public Safety Specialist on (07) 3623 9555 if you require any clarification regarding our response.

Yours faithfully,

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Tait Electronics (Australia)

