Orange horizons pty ltd

11th June 2013

Committee Secretary,
Parliamentary Joint Committee on Law Enforcement,
PO Box 6100
Parliament House
Canberra ACT 2600

Dear Secretary,

Ref – Spectrum for Public Safety Mobile Broadband

The following information is presented for the information of the committee, it must be highlighted that the information contained in this submission is based to a large extent on anecdotal sources and the experience of the author. The submission is made by Ian Miller, Managing Director of Orange Horizons Pty Ltd., an independent radio communications consultancy, Ian has approaching five decades of background and experience in the Land Mobile Radio (LMR) industry and has developed a broad range of knowledge over this time. Ian has also in past years been a volunteer firefighter within the Country Fire Authority and had dealings with many clients and users within the Public Safety Agencies; this offers some insight into the requirements and operational needs of the users in these agencies and is background for the following comments.

Orange Horizons has no links or business arrangements with any suppliers or network operators that could be seen to be beneficiaries of any portion of the Public Safety Mobile Broadband system. In a voluntary role, Ian Miller is the Spectrum & Technical Coordinator for the Australian Radio Communications Industry (ARCIA) Inc. and has had some input into the present discussions regarding the PSMB and its Overflow Augmentation, it must be stressed that this submission is from Ian Miller and is not in any way meant to be representative of ARCIA or its members.

In preparing and presenting this response the terms of reference have been broadened slightly to embrace the Public Safety Agencies (PSA's) such as Fire and Ambulance as well as the Law Enforcement sector, these other agencies have a critical role to play and must be considered as part of the essential users of Public Safety Mobile Broadband system.

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Response to the terms of reference.

(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.

This is a question that not even the agencies themselves will be able to answer at this stage, the agencies were asked some two or more years ago to estimate their usage, however, basically none of the agencies have had any experience with the facilities offered by mobile broadband, nor have they developed any real understanding of how it will be used in the future. As a parallel, the public carriers have been doing forecasting on their predicted needs for mobile broadband for many years, yet each time they prepare forecasts of usage they have found that the actual demand has far exceeded their initial estimates, there is no reason to believe that the situation will be any different with the Emergency Services.

As PSA's become more familiar with the benefits of mobile data, plus as technology opens up more features, applications (apps) and options the utilisation of mobile data will increase. It is therefore most likely that present estimates of usage will be well short of the actual requirements in years to come. It would be a very short-sighted view to limit the amount of spectrum to the proposed 2 x 5 MHz blocks based on meeting current usage without having sufficient spectrum in reserve to meet actual demands in the future; this decision could have a serious impact on future emergency management capabilities.

It should be borne in mind that in the United States of America (USA) there has been an allocation of 2 x 10 MHz of spectrum for their version of PSMB (FirstNet), some opinion has been expressed here that as our population is much lower than the USA that we won't need as much spectrum. Consider the following –

- Our major cities would rank in size as comparable to many of the larger cities in the USA, this will mean that the demand for mobile broadband in our cities will be similar, data requirements are more a result of population density rather than national population, and therefore it will mean that a similar allocation to the USA would be justified.
- In the USA the bulk of jurisdictions are relatively small, in many cases based on areas no greater than our local government areas and so demand within an area is limited to local requirements. Here in Australia most jurisdictions are state-based and there is a resultant need for data to be shared over larger areas and provided to state operations centres for analysis and support functions. This wider area of operations will result in a higher data usage in many areas as it is operated in parallel with other operational areas and agencies.

(b) Which of the 700 or 800 MHz bands is the most appropriate for law enforcement agencies given the current licencees occupying the spectrum.

This is a question with many answers, but consideration must be given to the 'commercial practicalities' of the decision both in the short and longer terms. From a purely technical point of view the transmission characteristics are effectively the same from both bands, there is no technical advantage between the bands.

As the International Telecommunications Union (ITU) has divided the world into three zones with regard to many issues, including spectrum regulation, there is a justification for maintaining compatibility with the ITU moves for mobile data allocations for public safety purposes in Zone 3, this would appear to be moving towards utilising 800 MHz spectrum and should be as advised by the ACMA as the Australian regulator.

Outside of these parameters, consider the following –

- The present allocations to FirstNet in the USA are not compatible with the spectrum plan implemented with the digital dividend (700MHz) spectrum here in Australia, this effectively means that products developed for the USA markets would still require modification for use in Australia; this negates much of the price benefits.
- In considering the 700 MHz band (APT700) the alignment with public carrier systems such as Telstra and Optus is far more important as these will most likely form the 'augmentation' necessary for the PSMB system for overflow and 'out of footprint' coverage areas. Given that this section of spectrum (APT700) has not yet been utilised for LTE systems, it will be some time before networks and products will become available. It should also be borne in mind that once the product requirements move into the 'consumer markets', the manufacturers are looking at production runs of tens of thousands of devices to gain the benefits of factory loading and to achieve the 'price points' required for mass marketing. The PSMB total requirement would most likely only equate to a single production run.
- As the APT700 band is new spectrum that is yet to be completely cleared of previous licencees, there could be a lengthy delay in installation of equipment for the carriers.
- If the 800 MHz band is considered, there are LTE products available in markets around the world at present and there are existing LTE bands operated by our public carriers with multi-band LTE devices in operation. This would potentially mean that products could be available to operate on both the existing carriers LTE networks plus a future PSMB network when finally installed, with a resultant PSMB facility becoming available to agencies very quickly. With the rapidly approaching G20 conference in Queensland, perhaps this is an indication that 800 MHz is a better option on an augmentation basis.

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

This can only be achieved through negotiation with the ACMA and setting in place a band plan to cater for present and future needs –

- Allocate 2 x 10 MHz of spectrum immediately for the PSMB, or
- Maintain the present 2 x 5 MHz allocation and hold in reserve (unallocated) a further 2 x 5 MHz segments for evaluation of needs within five years when the actual usage is identified and forecasts are realistic.
- Within the band plan, identify a <u>further</u> 2 x 5 MHz segments with a usage pattern and licencing method that would allow for future re-allocation of the segments to PSMB operations if necessary. This would mean the identified segments would remain allocated under the Apparatus Licence format rather than a Spectrum Licence, thus allowing for negotiation of relocation of services in the future if required.

(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.

There are two separate issues involved here and both will require much consideration and negotiation with the carriers –

- Reliability – unfortunately history shows that in times of emergency the public networks are amongst the first levels of communication to potentially fail. To address this the carriers must be 'encouraged' to improve the resiliency and redundancy of their networks, without attention to this requirement it is possible that when the PSA's look for the augmentation of their needs the support systems may not be available.
- Pre-emption to allow the Agencies to have priority traffic on the networks. This is easier said than done as once information (even voice) becomes data in the network it just becomes another item of data to be transmitted, there will need to be much thought given to how the carriers can identify 'mission critical' data and give higher access levels. The negative side to this is that if the PSA's have priority and portions of the carriers normal customer base lose access, then perhaps things like private video and other social media information that has been critical to resolving incidents will be lost or not available. It could also be that 'emergency warning systems' for the general public could be compromised if the 'pre-emption' was too great and the service levels compromised.

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

At this point in time the author does not feel that an answer can be provided, other than to point out that the 'Applications' field is very fluid and as the PSMB networks are installed around the world more specific 'Apps' will become available, many of which will involve actual users influencing the software and its effects.

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

Much of this information will be determined by the relevant agencies as part of their budgeting and forecasting processes. The only comment offered is to forewarn agencies of the potential costs involved in the longer term. If the PSMB users are oriented towards 'consumer' products for features and the initial price advantages, then it has another effect with regard to equipment reliability and replacement –

- Consumer products within the mobile telecommunications sector have a short lifespan due to the changes in features and options available within the products, as well as changes to the software of the operating platform (iPhone, Android, etc). This means that after a relatively short period of time the units will become obsolete and not able to be replaced with an identical device such as has been the case with PSA communications devices in the past.
- Being a consumer product, they are not built to the same rugged standards as historical PSA equipment; they are potentially a throw-away device when serious problems occur. This will mean agencies will have a much higher 'equipment replacement/maintenance' cost to budget for in future years
- With this potential for equipment from multiple suppliers or multiple models of equipment being used by operators, a hidden cost for training of users each time a new device is brought into the equipment fleet will occur. These hidden or supplemental costs can have an effect on already tight operating budgets, yet without proper training and support there is a much higher potential for mistakes to be made, in PSA operations simple mistakes can result in serious outcomes.

(g) Any other related matters.

Consideration must be given to the role of the NBN Co fibre optic network in the provision of the PSMB network. At this point in time the NBN Co advises that no consideration has been given to any form of 'Backhaul capabilities' in the network design. This would appear to be a serious oversight and because of the supposed 'no consideration' the NBN Co refuses to contemplate any form of support for PSA's or the PSMB. In reality, the design 'Upload' capacity of the NBN would offer significant benefit to the PSMB systems and the following should be considered as a matter of urgency –

- If the NBN network is constructed in the present FTTP (fibre to the premises) mode, then facilities should be incorporated into the operating software platforms for the 'fourth port' on the NBN terminal equipment to be configured to allow for external connection by the PSMB interfaces, or
- If the revised NBN network design is based on the FTTN (fibre to the node) format, then at each node a 'data hydrant' should be installed to allow for connection by the PSMB interfaces.
- With either of these connectivity options, the PSMB operations could be extended beyond the fixed service footprint by the addition of Cell-on-wheels (COWS) or Wi-Fi on Wheels (WOWS). Either of these options could then easily be interconnected into the PSMB network by utilising the NBN fibre optic network to give the backhaul capacity. The potential for WOWs becomes a very real possibility if vehicle mounted

Wi-Fi units are involved, an example could be where the Country Fire Authority in Victoria have many Forward Command Vehicles (FCVs) located around the state, by the simple installation of a small Wi-Fi unit in the FCV it could be driven to a local premises or node and connected to the NBN, thus giving a localised Wi-Fi connection point for PSA's

As indicated at the start of this document, the author does not claim to have technical or specialist expertise in this area, simply a desire to see the PSA's have a satisfactory outcome with regard to this very valuable future tool. The main purpose for this submission is to perhaps help the members of the committee to realise some of the questions that should be addressed as part of the enquiry and to present them in a manner that is not part of a particular point of view, more as an overview of some of the issues that could be involved. We wish the committee well in its deliberations and look forward to positive findings and a high degree of support for our Public Safety Agencies in their valuable role.

Yours sincerely,
Orange Horizons Pty Ltd.,

Ian Miller
Managing Director