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Harmonised spectrum for Critical Communications

An Executive Summary

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Introduction

Society Public Protection and Disaster Relief (PPDR) services are of vital importance to our communities. In almost every country of the world these services are mandated by law to deliver the highest possible quality of service to society. As we go about our everyday lives it is easy to forget that PPDR staff work in very dangerous environments whilst working to save lives and protect our property. Governments have the responsibility of ensuring that they have a safe working environment and the best possible tools to carry out their vital work.

PPDR Needs

It should go without saying that PPDR organisations, which include Police, Fire and Rescue services, Ambulance and Civil Defence, should be able to take advantage of the most modern and innovative mobile communication tools. Due to the nature of their work, their needs are very different to those of ordinary citizens and commercial enterprises.

Mobile Broadband services are rapidly becoming available in most countries and it is already clear that the “man on the street” will be using these high speed data services for a wide variety of applications. Many individuals naturally assume that such capabilities would also be available for those looking after the health, welfare and security of our citizens. But the users of mission critical communications need solutions where reliability, availability, stability and security of the communication service are of the highest order if they are to be used where lives and property are at risk.

Mission critical communication is not just the domain of the law enforcement and the emergency services. Those responsible for the Critical National Infrastructure such as Gas, Electricity, Water, Transportation, Fuel and Petrochemical also need communications services that can withstand natural and man-made disasters. These systems include the hardware and software that are essential to enable staff to send and receive information between field units and command centres in a dependable and secure manner. Spectrum in which to operate these systems is a fundamental element, without which such systems cannot be implemented.

There are many different ways of delivering these services and the question of how such essential services can be provided is highly political. A Government may build a dedicated network with the functionality required by its emergency services, or may outsource to a commercial operator. Combinations of these approaches may include equipment and site sharing, spectrum sharing or simply buying capacity on a network through the MVNO model. But the political questions are more difficult to deal with. Will a government want to have full control over such essential services, or is it satisfied with leaving it to market forces? Is it politically acceptable to reduce the effectiveness of the emergency service agencies by forcing them to accept the service levels provided commercial mobile operators? Is it acceptable for our PPDR agencies to compete with music streaming services in order to send patient telemetry or download images of a missing child?

Regardless of which service delivery mechanism is chosen, the essential element for ensuring these agencies have options is to secure access to sufficient spectrum to meet their needs for day to day operations and during times of major incident.

The Radio Spectrum Policy Program - which is now a legally binding European Union measure - clearly commits the governments of Europe and the European Commission in its Article 8.3: "The Commission shall, in cooperation with the Member States seek to ensure that sufficient spectrum is made available under harmonised conditions to support the development of safety services and the free circulation of related devices as well as the development of innovative interoperable solutions for public safety and protection, civil protection and disaster relief."

Traditionally, emergency services throughout Europe use a part of 380-400MHz spectrum for voice communications. That band is a dedicated and harmonised spectrum band set aside for the exclusive use of the emergency services. The national systems deployed in most European countries using these frequencies are, today, providing excellent service to Public Safety organisations. Through the use of common technology, officers and staff can provide mutual aid across borders.

Experience with these systems shows that governments obtain substantial advantages if they take control of an adequate amount of additional radio spectrum, under harmonised conditions, in order for their PPDR organisations to deliver a future proof service to society. Maintaining control over spectrum allocated for PPDR services will provide a government with most flexibility.

The TETRA and Critical Communications Association strongly advocates that, whenever a government decides to implement a PPDR broadband service, it must be implemented within a spectrum range agreed in CEPT that permits seamless operation of broadband PPDR equipment across borders in Europe. A unique opportunity for such a decision is available at the World Radio Conference in 2015 where the future use of the 700 MHz band is on the agenda, in addition to finding a solution for PPDR spectrum needs.

The immediate beneficiaries of the freed up 700 MHz band are likely to be commercial mobile operators who offer mobile broadband services to the public. It is of the utmost importance for the European PPDR community that their needs for Broadband PPDR spectrum are found from within the 700 MHz band.

Some suggest that dedicating spectrum to PPDR can result in that spectrum being underutilised. This does not have to be the case. Spectrum sharing arrangements can ensure optimum use of spectrum but, ultimately, PPDR and other critical communications users need guaranteed access to spectrum in order to continue to provide the best possible service to the citizens.

Although we all take effective law enforcement and emergency services for granted, proponents want to auction off and commercialise all available spectrum to maximise income to the state. They claim that the communication capabilities needed by police, fire and rescue services can be purchased from the normal commercial mobile market players. This is a very dangerous assumption. It assumes that the market can and is willing to provide the coverage, availability and resilience that is needed by PPDR agencies. It has never been done before - anywhere in the world.

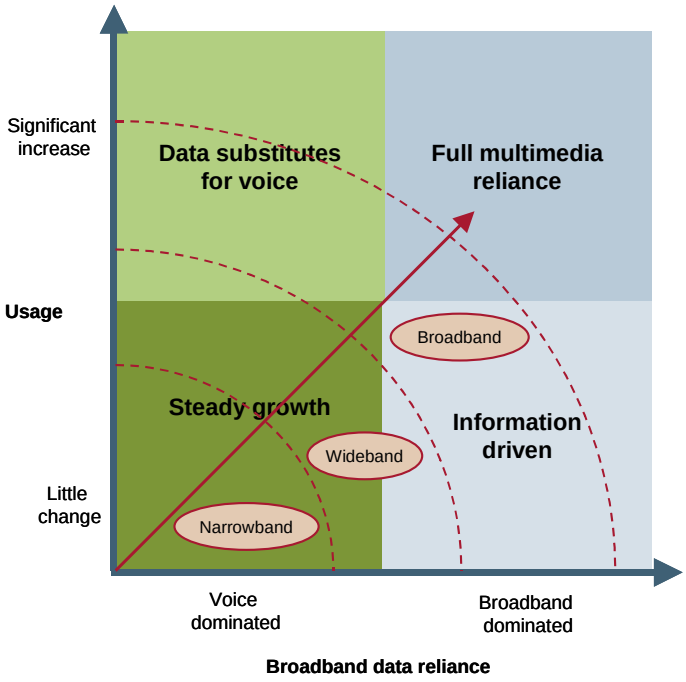
The argument of the proponents is clearly based solely on immediate economic benefits, without taking the value of effective emergency services into account going forward. Significant research into the longer term economic benefits demonstrates that the economic argument is actually in favour of providing spectrum to PPDR.

Some of this research includes:

1) Analysys Mason (an independent consultancy used by Government) has produced a report[1] - "Public Safety mobile broadband and spectrum needs". An extract states:

   It appears that the capabilities of existing narrowband and wideband dedicated mobile networks currently used by the public safety sector will not be sufficient to meet future requirements under three of these four evolution paths. The only evolution path that could be accommodated by existing networks is the "steady growth" path. However, this is not sustainable in the longer term since there is already growing evidence of changes in working methods and trends within the public safety sector that suggest that this path will not match future demands.

   A summary of the four alternative evolution paths and their impact on network requirements is provided in Figure below.



The four alternative evolution paths and their impact on network requirements [Source: Analysys Mason]

Three of the four evolutionary paths developed for this study illustrate the public safety sector's need for a next generation of mobile broadband network to deliver the range of applications that are envisaged in the future.

[1] Link to document

As there is a limit to the range and volume of data and multimedia applications that existing dedicated narrowband and wideband networks, and existing commercial networks, can provide, if a new generation of mobile broadband network is not made available, some new applications cannot be delivered. Ultimately, this will affect how already emerging changes to ways of working within the public safety might evolve, and, in the longer term, constrain the further development of the sector.

2) London School of Economics and Political Science (LSE) has completed two reports titled "The Socioeconomic Value of Mission Critical Mobile Applications for Public Safety in the UK[2] and in the EU[3]: 2x10MHz in 700MHz." articulated the case where mission critical broadband spectrum can have socioeconomic benefits/consequences:

1. Safety of citizens and frontline officers
2. Efficiency
3. Dedicated Spectrum versus using only commercial service and the consequence of degradation of service availability to emergency services in times of mission critical dependency
4. Crime has a significant impact on society and the socioeconomic benefit of crime reduction on house prices has a significant impact of GDP.

LSE estimates a consolidated annual socioeconomic value of £5 billion from the use of 2x10 MHz in the 700MHz band for public safety in the UK and across EU28 countries, an annual value of approximately €34 billion is computed. Spectrum is valuable – also to society.

3) WIK-Consult in Germany[4] have with their discussion paper "The need for PPDR Broadband Spectrum in the bands below 1 GHz" presented the case for dedicate spectrum with some key findings:

1. There are substantial socio-economic benefits in ensuring that PPDR broadband networks can be implemented. As a practical matter, this requires spectrum under 1 GHz.

2. Multiple studies have shown a need for a minimum of 2 x 10 MHz of spectrum below 1 GHz for PPDR broadband in Europe.

3. The organisations responsible for PPDR are convinced that their needs for mission critical broadband services can only be met by dedicated harmonised spectrum.

4. Harmonised conditions for broadband PPDR offer obvious and substantial advantages (in terms of scale economies, equipment portability, cross border communications, and enhanced ability for one country to lend assistance to another) over country-specific allocations for PPDR.

[2] Link to document
[3] Link to document
[4] Link to document

5. At the present time, only the 700 MHz band range (between 694 and 790 MHz) appears to offer a realistic prospect of a globally harmonised European frequency range with the necessary characteristics.

6. Public safety broadband requirements cannot be met by relying exclusively on commercial networks.

TETRA and Critical Communication Association and key representatives from its 165 member organisations, have also produced material supporting the governmental organisations responsible for PPDR services:

1. The Strategic Case[5] for PPDR Broadband; a document that goes into detail on considerations that have to be made by the PPDR organizations.
2. Implementation options[6]; a thorough discussion paper on options available to governments with the associated risks and consequences.
3. How to source a Mission Critical services[7]; a document that summarizes the legal conditions governments until now has used to ensure guaranteed service from service providers. The document reminds readers of commitment periods where 10-15 years are normal and there are even contracts in place that runs into the 2030s.
4. Broadband spectrum for mission critical communication needed[8]; a position paper calling for help.
   "The public safety community needs your help - Spectrum saves lives".

Summary

Given that Analysys Mason claim that PPDR communication systems will not be sufficient to deliver broadband communications to meet growing capacity requirements and, given that WIK identifies that PPDR requirements cannot be met by commercial networks, it is reasonable to concur with the European Commission's Radio Spectrum Policy Program (RSPP) that sufficient spectrum should be made available for PPDR. WIK advocates that a minimum of 2x10MHz of harmonised 700MHz spectrum is the most viable option to which LSE estimates an annual €34 billion socio-economic benefit across EU28.

The TETRA and Critical Communications Association therefore proposes that:

- Maintaining control over spectrum allocated for PPDR services will provide a government with most flexibility.
- Governments are encouraged not to auction off all available spectrum in order to maximise an immediate one-time-only income to the state - the result could be a much higher societal cost later on.

[5] Link to Strategic Case paper to follow
[6] Link to Implementations paper to follow
[7] Link to document
[8] Link to document