*"**TCCA Hybrid Study**"*

= A discussion on the use of commercial and dedicated networks for delivering Mission Critical Mobile Broadband Services

= A CCBG Initiative

Background

Scope of the "Hybrid Study"

➔ Objective: Give Advice to

➔ Target Groups: PPDR Operators & Politicians

➔ Subject: on how to decide on implementing broadband
                      scenarios for Critical Communications.

➔ **Hybrid "Business" Scenarios**:
                      Only the options with both commercial and
                      publicly owned components ("hybrid")

➔ Method: Literature study & expert contributions

➔ Outcome: Topics and criteria to be considered when
                      selecting an adequate target scenario for
                      establishing a broadband network for mission
                      critical communications

➔ **The Team: European Operators, vendors and consultants**

Definition of "hybrid"

Note:

For the purposes of this paper the term **"Hybrid Infrastructure"** is used to describe a combination of dedicated infrastructure and services provided by commercial MNOs.

Roadmap

- Kick-off at CCBG Plenary Meeting – Trondheim, NOR
  21 April, 2016

- First workshop – Berlin, 19 May 2016

- Second workshop – Berlin, 6 July 2016

- Third workshop – Rome, 8 September 2016

- Presentation of draft at the CCBG Plenary in Berlin:
  12 October 2016

- Deadline for comments by CCBG Members:
  31 October 2016

- Approval by the TCCA Board: December 2016

- Publication at TCCA web site: January 2017

- **Presentation and discussion of the finalised study the European Operators' Meeting in Copenhagen – 7 February 2017**

Input Studies

- TCCA: Tendering Mission Critical Service
- Nordic White Paper on 700 MHz
- TCCA: MC BB Delivery Options
- Australia: Productivity Commission
- Germany: Future PPDR Network Architecture
- Finland: Strategic Guidelines for CC
- SCF: Is Commercial Cellular Suitable for MC BB
- Company white papers.
    - *ALU / Nokia: Ultra-broadband PMR.*
    - *Motorola: A Continuum of Public Safety LTE Network*
    - *Airbus: Hybrid networks – a flexible way forward*
    - *Others...*
- and many more ...

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Mobile Broadband for Critical Communications Users

A discussion on the use of commercial and dedicated networks for delivering Mission Critical Mobile Broadband Services

TETRA + Critical Communications Association

Considerations

Mission Critical services –
a quick reminder

- For safety critical applications such as dispatching ambulances, passing details of terrorist suspects and dealing with major incidents, it is essential **that networks are employed that are suited to mission critical communication (coverage, availability, reliability, latency etc.)**. **There are lives at risk!**

- Public Safety organisations in Europe and the rest of the world currently provide mission critical mobile radio communication services using dedicated radio networks. **Voice is considered to be essential.**

- Premise I: **the demand for mobile broadband capability for data exchange is already established.**

- Premise II: the internationally agreed **LTE standard** (Release 13 onwards) **is to be employed in providing mission critical mobile broadband services** to mobile resources.

Mission Critical services –
a quick reminder

There are many services that are utilised by Public Safety users that are unique to their operations – and not offered by current commercial networks.

Such services include –

- emergency pre-emption where existing traffic is interrupted in order for emergency communication to get through immediately

- mutual authentication to ensure that only legitimate users are allowed access to the network

- multiple priority levels that are used to ensure senior staff can manage resources, especially at a major incident

- dynamic groups that enable special groups to be created temporarily to deal with a particular event or incident

Where are you now?

- **Decisions will be different depending on where in the life cycle your systems are**:

  – Relatively new networks should continue to carry voice

  – End of Life networks require thoughts on how to deliver voice in the future

- **You also have to consider the reusability of your current infrastructures!**

Spectrum

- is Key to the whole concept
- Three options:
  - having control over spectrum
  - having funding available to buy the services you need from the market
  - Exercising Government regulation
- The choice of spectrum relies on international coordination
- 700MHz "Pioneer band" for 5G

Conclusions

Conclusions I

- **Spectrum remains key**: Without access to LTE spectrum there is little opportunity for a Public Safety network operator to build their own infrastructure be it dedicated or hybrid.

- **Security is an issue**

  Security of commercial networks is a potential risk compared to dedicated networks. At this time, LTE does not have the same level of security embedded into the standard as is currently available in TETRA networks.

- **There ownership issues**: If a Government is concerned about controlling Public Safety communications, and the network over which it is carried, then some dedicated network capability is essential.

  + Commercial businesses can be bought and sold and not always to friendly countries

  + New owners may have different business priorities

  + Concerns about some foreign suppliers

  + UK have been using a commercial supplier for 10 years or more

Conclusions II

- **Funding depends on circumstances**:

  - ➤ A nationwide infrastructure will be costly and an optimal balance between dedicated and commercial networks will need to be found. It is likely that the reuse of existing infrastructure can mitigate some of these costs.

  - ➤ Dedicated networks are capital intensive at the early stage of deployment but total cost of ownership over 10 – 15 years could be less. The use of commercial networks will significantly reduce the capital investment for public safety.

- **Ownership issues**: If a Government is concerned about controlling Public Safety communications, and the network over which it is carried, then some dedicated network capability is essential.

  - – Commercial businesses can be bought and sold and not always to friendly countries
  - – New owners may have different business priorities
  - – Concerns about some foreign suppliers
  - – UK have been using a commercial supplier for 10 years or more

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Conclusions III

- **Interest from MNOs**: It should not be assumed that all MNOs will be willing to take on the responsibility for providing sufficient coverage, reliability and functionality for Public Safety users.
Early engagement with MNOs is strongly recommended!

- **Involvement in the (long) decision process**: Every country will have a different political backdrop and it is vital to establish who, within Government, will be involved in the process. This may include Ministry of Interior, Ministry of Finance, Ministry of Defence, Ministry of Transport and others. **Early engagement with the appropriate parties is strongly advised!**

- **Competent Resources:** Creating Hybrid networks will require personnel with appropriate and up to date knowledge of LTE network design. Negotiating integration of dedicated networks and subscribers with a commercial operator will be a complex task, as will the development, oversight and management of any required SLA's.
Public Safety operators will need to ensure that sufficient competent personnel are available!

Conclusions IV

From 4G to 5G:

- **Public safety users are not a target group for 5G.** 5G is a basket of standards, most of which are aimed at the future Internet of Things (IoT), automotive applications and other sectors with very high numbers of devices.

- **The technology is still in development** and it will likely be mid 2020s before the wide scale deployment of networks has taken place.

- **5G in 700MHz will be based closely on 4G's LTE Advanced Pro** and will therefore be a migration rather than a replacement. The need for mission critical mobile broadband exists today and 4G LTE can satisfy that need.

- **There is an expectation but no guarantee that current LTE Public Safety functionalities standardised in 3GPP will be carried across to 5G**

- **There would be little benefit in waiting for Public Safety 5G** especially as its capability and availability are still under discussion.

There is no ideal solution for everybody!

➢ use the information and criteria provided by the White Paper and related TCCA documents to evaluate your situation

➢ talk to all relevant stakeholders in politics, regulation, standardisation and industry to investigate your options

On behalf of TCCA:

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Ongoing 5G activities:

- EU COM already initiated a 5G Programme in 2014
- EU COM Communication on 5G -> proposal to make the 700MHz band a "Pioneer Band" for 5G
- Lobbying Group 5GPP pushes EU governments to sponsor 5G research and provide spectrum
- Release 15: Standardisation is starting at 3GPP
- There is an expectation but no guarantee that LTE Public Safety functionalities will be carried across to 5G

Critical Communication users need to get involved in order to safeguard their interests!