CMA White Paper - exploring the potential of the three radio technologies for alerting

Using a supplementary radio network for alerting can improve coverage substantially, and at lower overall cost

In an emergency, the right first responders must be mobilised as quickly as possible to protect lives and property.

But while fire and rescue operations are becoming an increasingly professionalised service, fire crews in many countries rely heavily on part-time volunteer firefighters to sustain or supplement their efforts.

Radio pagers are widely used to summon these volunteers. Since the POCSAG digital protocol emerged in 1981 as an international standard, it has become the dominant radiopaging technology – in Europe alone there are about 10,000 installed POCSAG base stations.

With the move to digital radio networks for voice and data transmission, alerting tasks can also be handled via other technologies, such as TETRA, GSM or LTE.

However, with these it may not be possible to provide the same level of alerting performance seen with POCSAG systems.

The importance of rapid and accurate alerting has been underlined by numerous recent events such as:

- Natural disasters (e.g. floods in West Virginia, 2016)
- Industrial accidents (e.g. Fukushima, 2011)
- Terrorist attacks (e.g. Manchester and London, 2017)

Such increasingly frequent events call for highly available, robust alerting networks and communication systems. These networks form a basis for effectively managing crises and emergencies during their initial phase

Alarm solutions today

Broadcast. Alerting networks are based on the broadcast method. A broadcast can deliver information to any number of users in a single operation. This method is ideal for simultaneously contacting almost any number of people. It virtually rules out the possibility of the network being overloaded. Classic alerting terminals – pagers – are usually designed solely to receive information. Nothing can be sent back in response to a received message, so the base station cannot be overloaded or blocked. One-way communication with POCSAG can be supplemented with a GSM module to send responses or status messages. In contrast to POCSAG, cell-based TETRA and GSM employ a point-to-point approach: the base station addresses end devices individually – making them bottleneck-prone. Any sudden increase in users and data traffic in cell-based networks may overload individual base stations, creating long delays.

Low carrier frequency. In many countries, frequencies in the VHF range 136–174 MHz or low UHF range (300 MHz-600 MHz) have been widely used for POCSAG alerting. This relatively low frequency band provides a greater transmission range. Signals are also better at penetrating obstacles such as house walls. Thus, in comparable circumstances, radio networks with a low operating frequency (such as dedicated alerting networks) require fewer base stations to deliver equivalent signal coverage than networks at higher operating frequencies (such as TETRA or mobile phone systems).

Practical requirements

As well as good coverage, radio alerting networks need:

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