

## Chapter XXXV

# Cell Broadcasting Opportunities of Modern Mobile Communications and Its Usage in Emergency Warning Facilities

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### ABSTRACT

*In the scope of the present chapter, the authors evaluate several potential opportunities from the suggested use of cell broadcasting systems in mobile communications and its specific usage mainly in emergency warning facilities, at the global level. Cell Broadcasting (CB) is a cellular-based public notification system, existing in the vast majority of all modern mobile infrastructures, worldwide. It can instantly (within a brief timeframe of some seconds) broadcast a cell phone text alert or message to a large number of people (independently of their network operators) specific to a geographical area, covered either by a single cell or by the entire (regional or national) network. Thus, CB technology enables governmental and other appropriate authorities/entities to securely transmit emergency alerts of natural or manmade disasters to the cellular phones of the subscribers in specific areas. Simultaneously, it can offer multiple extra advantages for further market offerings and development. This chapter discusses the challenge imposed by the fast development of the corresponding cellular facilities and, after providing some fundamental technical informative background, it focuses on the advantages offered due to CB with an overview of the current European and international market. The chapter then analyzes options for further evolution in several sectors (political issues, technical matters, and regulatory perspectives). CB is a strong, viable, and immediate communications solution, which can be put in place to better alert citizens.*

## INTRODUCTION

In modern societies, the assurance of an appropriate level of fundamental communications facilities and/or any other appropriate means towards realizing this aim can be considered as a major duty and a high priority of public authorities in the scope of their activities. The challenge becomes greater for state, regional and local authorities (and for the appropriate response teams) when there is a strong need for immediate, efficient and “wide” warning of (and/or communication with) citizens in emergency cases during times of crisis. Consequently, there is a necessity for developing high quality communication techniques and infrastructures to fulfil this prerequisite.

After numerous recent natural disasters (floods, forest fires, hurricanes (like hurricanes Katrina and Rita in the US and the 2004 tsunami in Asia), earthquakes, landslides, etc.) and several cases of accidents (chemical and industrial accidents, nuclear emergencies, transport accidents, technological disasters, etc.) a lot of effort has been spent on developing ways people could be timely informed in emergency cases. In the same scope, the increased criminal and/or terrorist events in the international scenery have also imposed the necessity for immediate notification/warning of the public in cases of attacks and for civil protection. Specific strategic initiatives have been deployed, worldwide, (for example see: European Commission, 1999) to efficiently deal with various kinds of disasters.

The current effort intends to examine possible benefits, for both users and (market) operators, of mobile networks’ potential usage in emergency situations. The fast deployment of mobile infrastructures (and of related facilities) has been performed at the global level: More specifically, the Western European and some Asian markets have reached a very high level of mobile usage penetration. The same is true for the American market when considering moderate- to high-level spending customers. However, this does not necessarily mean that the growth in number of subscriptions will end, since there is still a large untapped subscriber potential in new markets as well as emerging applications (Ericsson, 2006).

Currently, mobile applications comprise a “basic” feature of our every-day life, in multiple societies. Recent studies have demonstrated that there are more than 2 billion mobile phones in use all over the world, of which 1.5 billion are GSM (Global System for Mobile Communications) phones, representing the well-known “second generation” mobile system. Due

to their extended penetration and under appropriate circumstances, mobile devices could be considered as “proper” means in public warning systems. More specifically, as millions of people (not only in the European Union (EU) but internationally) are existing users of GSM amenities (European Commission, 2001) such systems can provide a remarkable prospect for the growth of civil protection-oriented facilities, dealing with crisis management on hazardous events, and thus providing immediate and reliable notification to the public.

In parallel, we provide some fundamental information about the existing GSM system/infrastructure, while explain how it operates and on how it could be further deployed. Since the main advantage of cellular networks is the provision of ubiquitous connectivity along with the localization and a broadcasting option in their packets, fast and direct warning of people in emergency situations (of various nature) can be achieved.

Cellular communication networks/systems are still developing very rapidly, and apart from their commercial benefits they are able to provide significant advantages to benefit civilians, governments, homeland security and crisis management. These systems can save lives by informing the people located in a certain area immediately. Furthermore they can prevent from accidents, help in traffic problems (e.g. by informing about traffic jams) and be used as a new way of advertisement, promoting new business applications (Watson, 1993; European Commission, 2003).

## BACKGROUND: FUNDAMENTAL ARCHITECTURAL ISSUES OF CELLULAR NETWORKS

During the last decade of the 20<sup>th</sup> century and following to requirements imposed by the extreme international revolutionary progress of cellular telephony, ETSI (European Telecommunications Standards Institute) has described “GSM” as a “*European digital cellular model of telephony offering high voice quality, call privacy and increased network security*” (ETSI, 1993). Then, an additional feature has been introduced and incorporated, called as “*Cell Broadcast*”; currently, all GSM phones and base stations have this specific feature latent within them, though sometimes it is not “enabled” in the actual network. Before its usage there were other methods of fast informing (Redl, Weber, & Oliphant, 1995).

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