

Information Memorandum

Public Safety for Citizens: nP2M technology needs Harmonized Spectrum for PPDR and other Applications

1. Introduction

In recent years there has been significant development in broadband point-to-point communication. The efforts aimed at making efficient use of Europe's digital dividend are a part of this development.

An often overlooked supplementary development has been that of narrowband communication between various centralised information sources and many, sometimes many million, simultaneous recipients. This development is referred to in the following as narrowband point-to-multipoint (nP2M) communication, specialised kind of "data broadcast communication". nP2M is a major component of the chain of actions that are necessary to alert services and warn the population in an emergency. nP2M is used today by a growing number of rescue services for population warning in crisis situations, and to supply European consumers and households with critical and non-critical weather information. Chip-sets for "embedded solutions" are currently in preparation, such as chips providing additional warning functions embedded into smoke-detectors.

2. Deficiencies in Wireless Communication, Especially with Regard to Security Applications

Although particular attention has been given to communication between emergency services (TETRA et al), to communication by the population to government agencies (hence the Europe-wide introduction of 112), and to other communication needs, there is still a grave lack of media for warning and informing the population, that is, for communication from government agencies to the population in emergencies.

Such media must possess at least the following characteristics:-

- Very high reliability
- Very high degree of independence from power supplies
- Very high degree of independence from public telephone networks
- Ability to alert and inform affected citizens simultaneously
- Addressable to specific locations (town, district, street)
- Addressable to specific groups (fire fighters, ambulance men, etc)
- Simple installation by non-technical persons
- Good reception in any household and in any facility
- Simultaneous reception by all users with low latency
- Good integration in widely used appliances
- Very low price bracket

There are no solutions that come close to fulfilling the criteria listed above without using nP2M-technology.

3. Current State of Development of nP2M Communication in Europe

While nP2M today still includes the professional use of paging, it has been developed far beyond traditional paging features and applications. In addition to the millions of users in the first-responder sector alone, there are large groups of emergency alerting users among government agencies and industry.

For the past two years, the rapid expansion of nP2M technology has been entering more and more European households. Nearly two million households in Germany and France today have personal weather stations — acquired in the past two years — that are supplied with content over nP2M networks. Warning sirens ensure that public facilities such as pre-schools, schools and hospitals receive warnings by nP2M, even in emergency conditions. Examples, please, see in annex. Even today, the prerequisites are already in place to provide 65 million households with 137 million people in Germany and France with nP2M technology immediately, thus enabling them to receive warnings and alerts issued by government agencies. The only thing that is not sufficiently certain is the future of frequency allocation.

nP2M receiver modules that cost the end user less than €3 already exist. They have excellent reception characteristics with very low network costs, and permit pinpoint alerting and information down to individual house numbers.

nP2M makes it possible to set up fast, efficient services with complete national coverage and extremely little use of resources, and hence high sustainability.

Energy Resources

The mains power consumption required for nP2M coverage is much less than 0.001 kWh/km², a hundredth of that required for other mobile communication networks. nP2M user devices use about 0.05% as much power as mobile phones.

Transmitter Resources

The number of transmitter sites required to build a nP2M network with nationwide coverage is around 2% of the number required for mobile phone networks.

Financial Resources

The construction and operational costs for nP2M networks are a fraction of the costs of other networks. User device receiver modules cost about €3, in respective volumes between a tenth and a hundredth of the cost of very simple GSM modules.

Frequency Allocation Issues

Various member states have allocated spectrum in the 440–470 MHz band for the applications mentioned above. This spectrum needs to be harmonised across Europe with a stipulation that it is used for nP2M. A general allocation of spectrum, without the stipulation, might obstruct the construction of nationwide nP2M services due to hoarding by other public and non-public networks.

4. Future Developments in nP2M Communication

In Great Britain, the Netherlands, Belgium, Austria, Germany, Switzerland and France — to name just a few — nP2M networks are being used increasingly to alert emergency and first responder services, including volunteer services in many cases.

This trend will continue, although integrated user devices that support multiple networks and hence access multiple communication services, as described in ETSI EMTEL TS 102 182, will be increasingly used. The proximity to the transmitting frequencies used by other emergency applications (TETRA, among them specialised PPDR, networks in the 380–400 MHz and 410–430 MHz bands; short data service in the 433 MHz band, etc.) will be increasingly used is critical for the economic feasibility of integrating such features.

More and more dual-purpose user devices will incorporate population alerting. Their dual functions will motivate citizens to buy them and thus relieve government budgets while driving a qualitative leap in warning networks — with maximum redundancy in relation to existing power and telephone networks. New nP2M user devices will also be developed. The introduction of new family of user devices has been announced for the Security fair in Essen — the world's largest fair for security applications — in November, 2010.

5. The Need for a Harmonized Spectrum

Floods do not stop at national borders, as the latest floods along the Oder and its tributaries demonstrated once again. Consequently, information addressed to the citizens of affected areas by government and other agencies should not stop at national borders either.

Furthermore, solutions must be within the budgets of the affected councils, mayors or other agencies, and also affordable for the citizens themselves. Maximum economies of scale are attainable only by harmonizing the frequency bands. The potential export advantage for European manufacturers and service providers is an additional incentive.

nP2M requires a narrow channel, just 25 kHz wide. The band can be used all the more efficiently by taking advantage of nP2M's inherent ability to address tens of thousands, or even millions, of EU citizens simultaneously. The wide variety of applications and the need to provide guaranteed message latency requires a little redundancy in frequency use. Experience in Germany and France has shown that just ten available channels would provide a high Quality of Service to the population. Ten channels means only 250 kHz of European harmonised spectrum, in the 430 to 470 MHz band.

6. Socio-economic Advantages

nP2M applications can serve a majority of initial PPDR activities with very efficient use of resources.¹ That is, with the lowest possible cost in terms of energy, finance, frequency and environmental resources.

The advantages of harmonized frequency bands for nP2M are significant and will provide for very early warning of coming crises and emergencies. Among them are:

¹ Often stated in discussions at the PPDR workshop in Mainz (see Annex 7.1): there is a lack of warning and alerting media.

- Saved lives due to timely warning
- Saved lives due to timely dispatching (alerting) of rescue and aid services
- Minimized injury to persons and goods
- Saved suffering for victim and their families
- Reduced and more manageable loads on hospitals and healthcare facilities
- Reduced network loads in emergency situations
- Redundant, complementary infrastructures that are relatively independent of cellular (GSM, UMTS, TETRA, etc.) and IP networks: a prerequisite for business continuity
- The ability to define separate levels of warning and alerting for different regions, and groups, using a single infrastructure
- Interoperability, including interoperability between government and private networks
- Significantly improved ability to aid potential crisis regions outside Europe
- Savings in terms of money, energy and other resources (including transmitter site costs)
- Lower costs through economies of scale at the European level
- World leadership for European technology

It should also be noted that nP2M does much more than inform PPDR personell. It can be use dfor non emergency information as well, such as weather, “green energy” (mass control of electrical devices incl street lights, factory / office / household devices etc., transmission of dynamically forecasted energy prices) nP2M has a purely economic case as well.

7. Conclusions

nP2M is complementary and provides needed redundancy to other wireless communication media, it is absolutely necessary for the transmission of emergency and other information to mass recipients simultaneously with guaranteed latency. There is no substitute for nP2M technology at such low cost. nP2M has an enormous advantage over other technologies with regard to the energy consumption of the network and the user devices.

The ability to develop and provide new services for Europe, including first and foremost warning and alerting services, requires the forward-looking allocation of the required frequency band, even if this band has not been the object of manufacturers’ expensive lobbying efforts.

The allocation of 250 kHz in the 430 to 470 MHz band beginning in 2016, harmonized in Europe, would lay the foundation for social advantages for European society in case of crisis or emergency. It would also lay the foundation for novel offerings by European industry on the world market, for which no simple substitute could be supplied by low-wage manufacturing in non-European countries.

The interests of the European Community, the member states, their citizens and the participating European players give rise to a unique opportunity to safeguard our citizens and to reap significant commercial gains.

8. Sources

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Love Parade Duisburg, July 2010

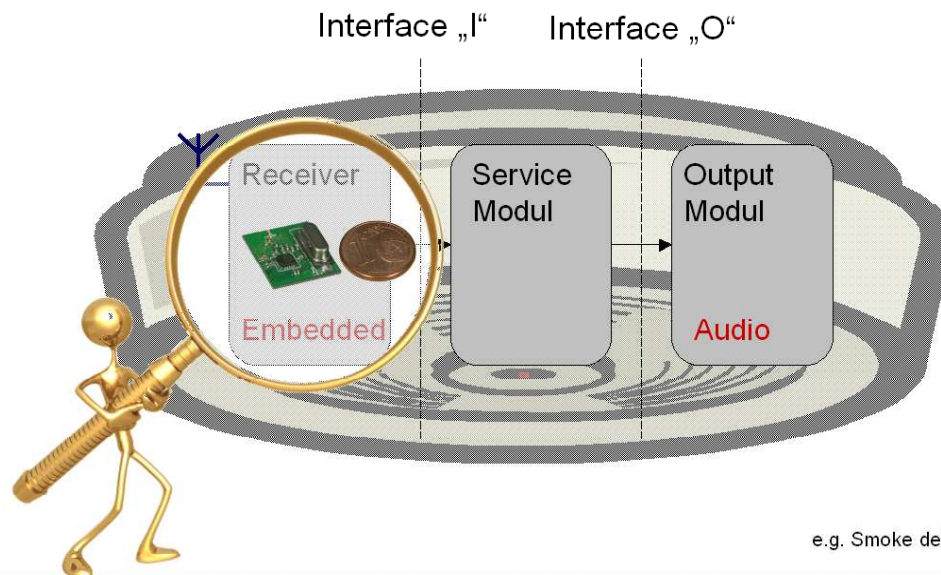


Annex

Narrow Band Point-to-Multipoint* innovative applications with
European wide potential

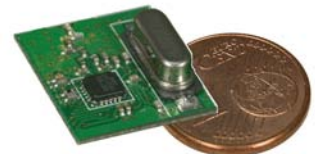
(Examples)

Smoke Detectors with integrated public warning receiver



Highlights:

- smoke detectors with additional receiver for public warning
- for a reasonable price
- with a battery life of about 10 years
- with wake up effect
- regional addressing down to single houses (20 meter)



Supported by:

- German Fire Service Association (DFV)
- Bundesamt für Bevölkerungsschutz und Katastrophenhilfe BBK (German Civil Protection Agency)
- EU Project CHORIST (FP 6 Program)
- Fraunhofer Gesellschaft (Institute ISST)



e*Warn Siren



Dedicated warn device used in households and public places e.g. kindergarten, school, office, ...

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- Fraunhofer Gesellschaft (Institute ISST)
- EU Project OPTI-ALERT (prospected FP 7 Program)

Weather Stations with forecast



Weather Stations with radio module to receive weather forecasts. Used in Germany and France within much more than 1 million households.

- reasonable price
- up to date weather forecast information
- including alerts

Dynamic Energy Price Display Device



In Field since 2008.
Legislative pressure from 2013 on.