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# **NIR-Monitoring in Europe**

## Short Report on Country Activities

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# Short Report on the State of NIR-Monitoring in Europe

## 1. Survey

In the context of a feasibility study on NIR-monitoring options for Switzerland, a small survey about the state of monitoring activities in Europe was performed. This short report informs about the main outcomes of the survey.

## 2. Method

In order to get an acceptable response rate, the questionnaires were e-mailed to the country representatives of COST Action BM0704 (fall 2011). The Excel-based form was very short (see Fig. 1). If answers were hard to interpret, the respondents were contacted and asked for short clarifications.

The following countries replied to the questionnaire: AT, BG, CRO, CY, DE, ES, FIN, FR, GR, HU, IRL, MT, NO, PT, RO, SE, SI, SK, UK. For Italy, an important country in the context of NIR-monitoring, the relevant information was retrieved from published documents (<http://efhran.polimi.it/>, [http://www.bruitparif.fr/sites/forum-des-acteurs.bruitparif.fr/files/ressources/annexes\\_etude\\_faisabilite\\_ondesparif\\_1.pdf](http://www.bruitparif.fr/sites/forum-des-acteurs.bruitparif.fr/files/ressources/annexes_etude_faisabilite_ondesparif_1.pdf)). This data was included into the survey-results.

Overall, the present report informs about NIR-monitoring activities in 20 European countries. It gives probably the most complete picture available at present.

The received Excel-forms were analysed manually. In accordance with the survey-design, result reporting in this document is structured into data about measurement activities and data about simulation/modelling activities. For both activities, results are reported separately for ELF, broadcasting, and mobile communication. The responses have been categorised into: no activity, ad-hoc activity small/limited, ad-hoc activity large, systematic activity small/limited, systematic activity large, full inventory, no response/other.

## 3. Results

The overall picture looks as follows:

- NIR-monitoring activities are quite common and widely applied in Europe.
- Scale and scope of the activities are very diverse (absence of any common framework/paradigm)
- Most activity is oriented towards measurement campaigns. Modelling is rather exceptional.
- Monitoring of ELF fields does almost not exist.
- The most frequent activity concerns field measurements in response to citizen requests, mostly in the context of newly erected base-station antennas
- The design of measurement campaigns in terms of number of sites and applied measurement protocol differs very much between the countries.
- Several "systematic" measurement campaigns (including web-based communication of the data) exist in Europe. In some countries (e.g. France), citizen requests provoked a large amount of measurement data that is analysed as a whole every few years.

The results are presented in the figures below. Fig. 2 and Fig. 3 give an overall picture in the format of tables, Fig. 4 to Fig. 9 show – in the format of maps – the monitoring situation for measurement activities and simulation/modelling activities, broken down into 3 domains (ELF, broadcasting, mobile communication).

### **Disclaimer**

Please note that the country responses do not have the status of official statements by national authorities. The results should be considered as a non-official picture.

### **Acknowledgement**

I am very much indebted to all the colleagues and professionals that contributed with their responses to this survey. This survey was funded by grant 07.0111.PJ / K273-0769 of BAFU (Swiss Federal Office for the Environment FOEN).

| NIR-Monitoring: European Survey   |                                       |                                  |  |
|---|---------------------------------------|----------------------------------|--|
| <i>Please fill in what your country implemented with regard to NIR-monitoring</i> |                                       |                                  |  |
| Country:  | <input type="text"/>                  |                                  |  |
| Your Name/Contact:  |                                       |                                  |  |
| Your Email/e-contact:   |                                       |                                  |  |
| Authorization procedure (Legal Requirements)                                      |                                       |                                  |  |
|   | Measurements                          | Calculations                     | Your Comments                          |
|   | Please select                         | Please select                    | Please specify, if necessary / helpful |
| Radio/TV  | <input type="text"/>                  | <input type="text"/>             |  |
| Mobile Comm.  | <input type="text"/>                  | <input type="text"/>             |  |
| Powerlines, other ELF   | <input type="text"/>                  | <input type="text"/>             |  |
| Other   | <input type="text"/>                  | <input type="text"/>             |  |
| Domestic compliance tests of appliances   | <input type="text"/>                  |                                  |  |
| Monitoring during Business Operation  |                                       |                                  |  |
|   | Measurements                          | Modelling/Calculations           | Your Comments                          |
| <b>Any Activity?</b>  | Please select                         | Please select                    | Please specify, if necessary / helpful |
| Radio/TV  | <input type="text"/>                  | <input type="text"/>             |  |
| Mobile Comm.  | <input type="text"/>                  | <input type="text"/>             |  |
| Powerlines, other ELF   | <input type="text"/>                  | <input type="text"/>             |  |
| Other   | <input type="text"/>                  | <input type="text"/>             |  |
| <b>Intensity</b>  | Please select                         | Please select                    | Please specify, if necessary / helpful |
| Radio/TV  | <input type="text"/>                  | <input type="text"/>             |  |
| Mobile Comm.  | <input type="text"/>                  | <input type="text"/>             |  |
| Powerlines, other ELF   | <input type="text"/>                  | <input type="text"/>             |  |
| Other   | <input type="text"/>                  | <input type="text"/>             |  |
| <b>Site Selection</b>   | Please select                         | Please select                    | Please specify, if necessary / helpful |
| Radio/TV  | <input type="text"/>                  | <input type="text"/>             |  |
| Mobile Comm.  | <input type="text"/>                  | <input type="text"/>             |  |
| Powerlines, other ELF   | <input type="text"/>                  | <input type="text"/>             |  |
| Other   | <input type="text"/>                  | <input type="text"/>             |  |
| <b># of Sites</b>   | Please give approx. # or specify      | Please give approx. # or specify | Please specify, if necessary / helpful |
| Radio/TV  |                                       |                                  |  |
| Mobile Comm.  |                                       |                                  |  |
| Powerlines, other ELF   |                                       |                                  |  |
| Other   |                                       |                                  |  |
|   | Please list relevant/helpful weblinks |                                  |  |
| general:  |                                       |                                  |  |
| data:   |                                       |                                  |  |
| reports, other:   |                                       |                                  |  |
| <b>Contact:</b> gregor@mobile-research.ethz.ch; www.mobile-research.ethz.ch       |                                       |                                  |  |

**Response Categories**

Authorized Procedures:

- yes, in any case
- yes, if close to limits
- yes, places of concern
- yes, other rationale
- no

Monitoring; any activity

- yes
- no

Monitoring; intensity, for measurement:

- longterm
- several times per year
- yearly
- less / unregular
- other
- online Provider/Site Data
- periodic Provider/Site Data

Monitoring; intensity, for calculations:

- yearly updates
- less than yearly
- other

Monitoring; site selection

- Sample
- Hot Spot
- All Sites

**Fig. 1: NIR-questionnaire**

|          | Radio/TV  | Mobile Communication Networks   | ELF  |
|----------|---|---|--|
| Austria  | ad hoc, and workplace conformity check by AUVA in case of suspected problems with limits  | ad hoc, and workplace conformity check by AUVA in case of suspected problems with limits                      | ad hoc, and workplace conformity check by AUVA in case of suspected problems with limits |
| Bulgaria | no, only when antenna characteristics change  | no, only when antenna characteristics change  | no, measurements when antenna characteristics change                                     |
| Cyprus   | all sites every 6 months  | all sites every 6 months  | measurements at about 10'000 locations   |
| Germany  | yearly measurements, sample size 2'000 (Radio/TV/Mobile) selected by chance, total immission  |   | no monitoring  |
| Spain    | yearly measurements, sample size 150, various selection criteria, changing sites, total RF immission  |   | new infrastructure; measurement protocol not specified                                   |
| Finland  | ad hoc  | ad hoc  | ad hoc   |
| France   | per year ca. 2500 measurement at hot spots, mostly requested by citizens, mostly mobile   |   | ad hoc measurements  |
| Greece   | ad hoc  | 20% of all sites selected by chance   | ad hoc   |
| Hungary  | sample of 5 installations, yearly measurements and calculations   | sample of 60 installations (yearly measurements), 25 installations selected for calculations                  | sample of 5 sites for yearly measurements  |
| Ireland  | since 2003, measurements at 900 installations (mainly base stations), at present, roughly 20-30 per year. Frequency selective peak measurements, no calculations.                             |   | ad hoc   |
| Italy    | yearly measurements at (various and variable) several hundred installations (mainly base stations), broadband measurements, no differentiation between broadcasting and mobile communication. |   | measurements in Torino (2006-2008)   |
| Croatia  | yearly about 10% of all installations (measurements and calculations)   | yearly about 10% of all installations (measurements and calculations)   | not specified  |
| Malta    | yearly, all installations (20)  | yearly all installations (500)  | not specified  |
| Norway   | ad hoc  | ad hoc  | ad hoc   |
| Portugal | ad hoc (about 100 measurements per year, no differentiation between broadcasting and mobile)  |   | not specified  |
| Romania  | ad hoc on request, about 20 per year  | ad hoc on request, about 100 per year   | not specified  |
| Sweden   | no monitoring   | 10 sites permanent measurements, and 5 sites annually selected by chance. Calculations at selected hot spots. | no monitoring  |
| Slovakia | at least all three years measurements at all installation sites.  | At least all three years measurements at all installation sites.  | ad hoc measurements and calculations   |
| Slovenia | yearly monitoring measurements at a few dozen installations   | yearly monitoring measurements at a few dozen installations   | yearly monitoring measurements at a few dozen installations                              |
| U.K.     | no measurements   | ad hoc measurements on request, roughly 50 sites per year   | a few ad hoc measurements on request   |

Please note that in Fig. 3 (below) broadcasting and mobile communication is always shown in separate categories, even in those cases (DE, ES, FR, IRL, IT, PT) where broadband measurements without frequency selectivity have been applied.

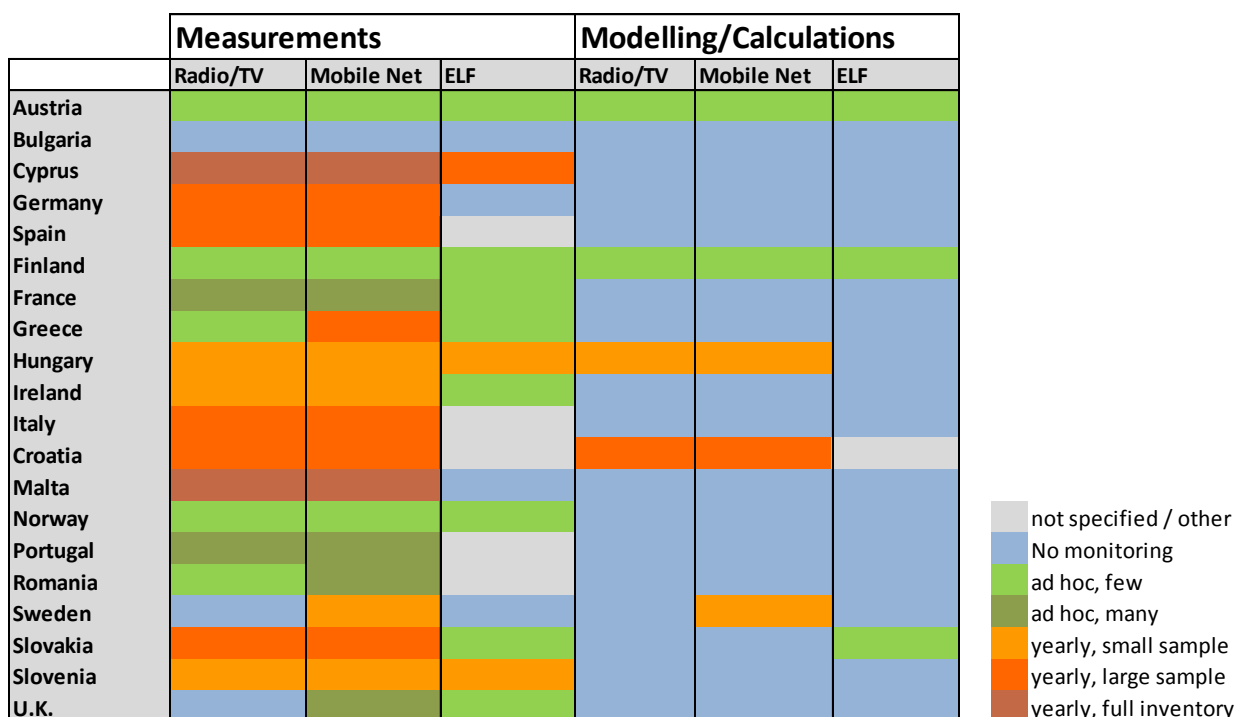
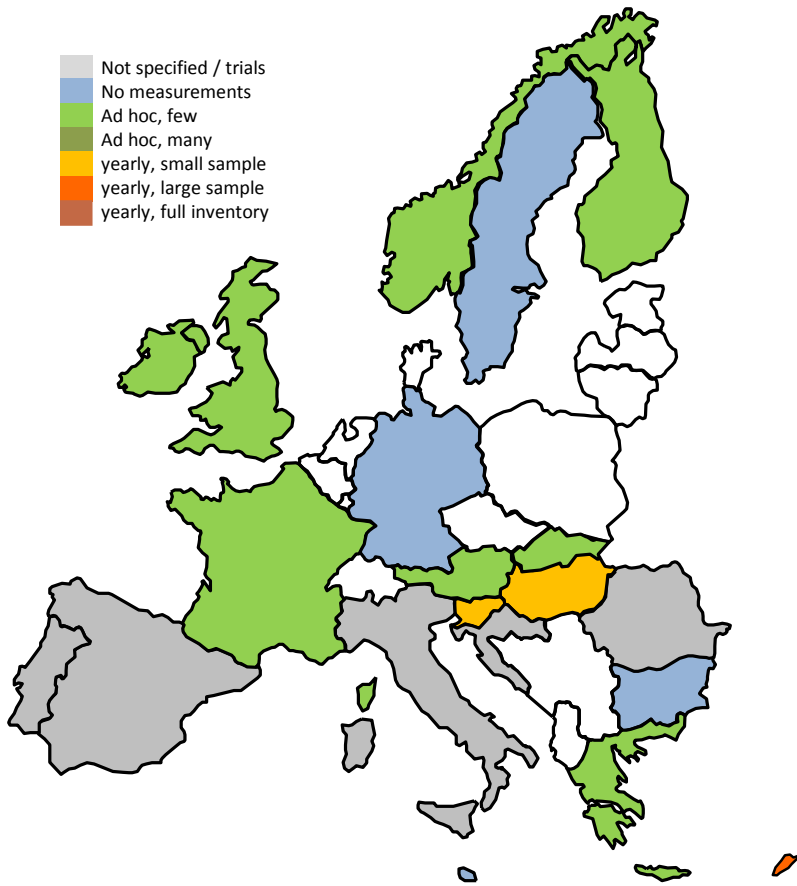
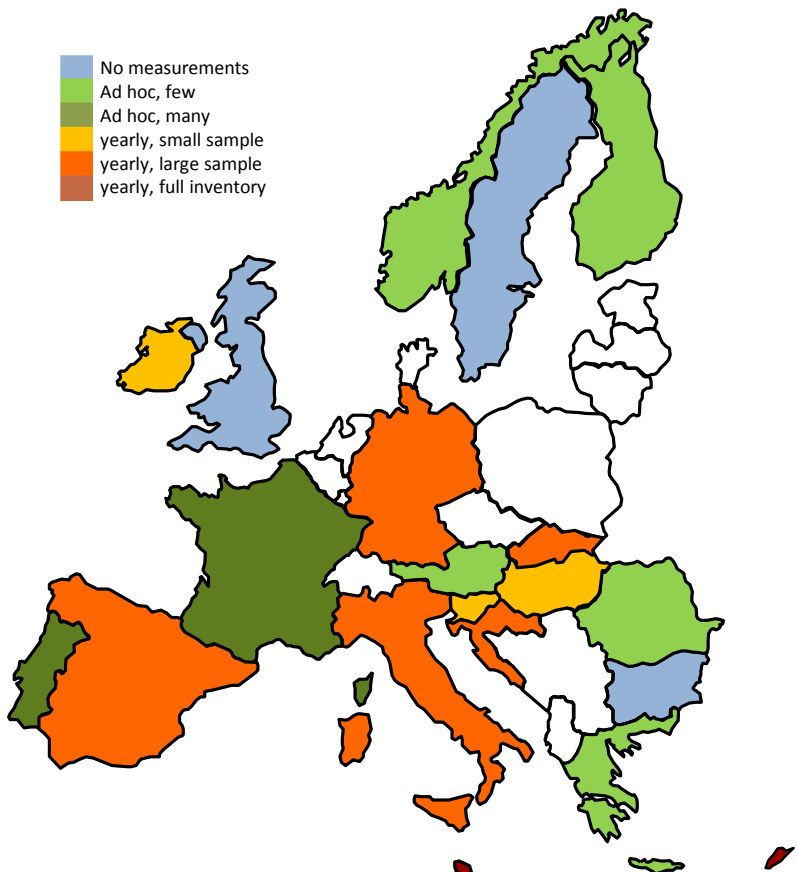


Fig. 3: NIR-monitoring activities in Europe – summary



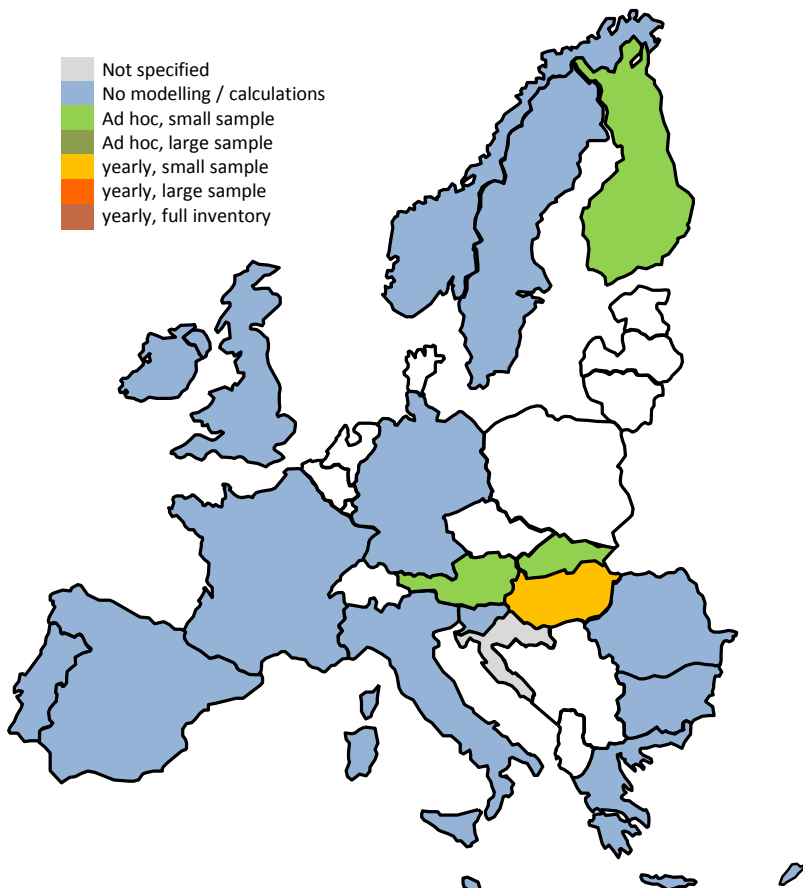
**Fig. 3: ELF magnetic fields measurements for monitoring purposes in Europe**



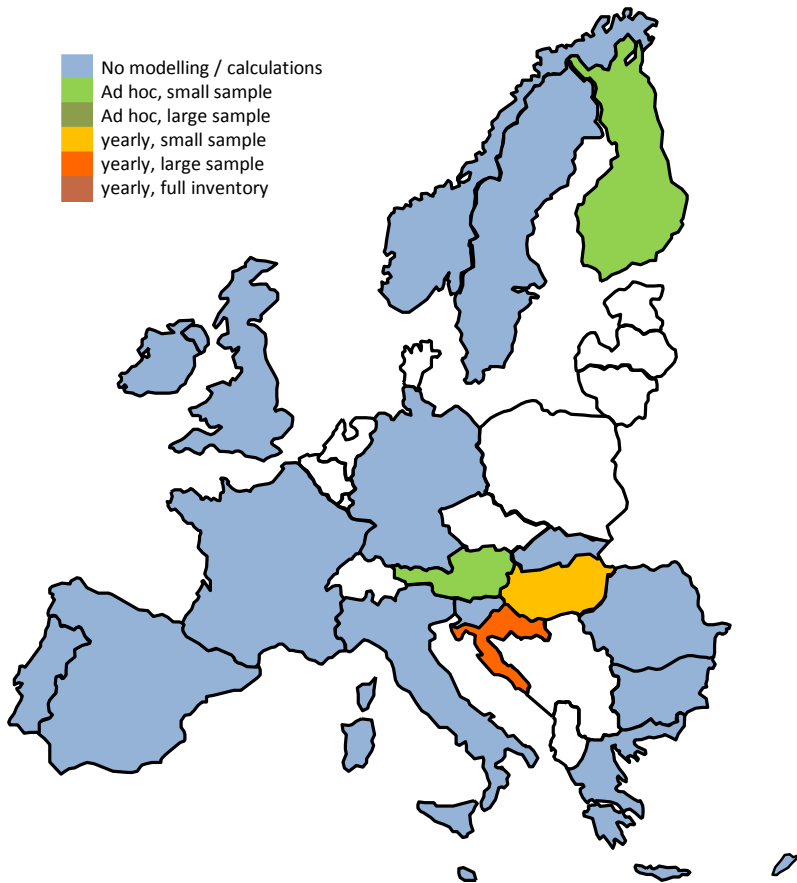
**Fig. 5: Broadcasting electric fields measurements for monitoring purposes in Europe**



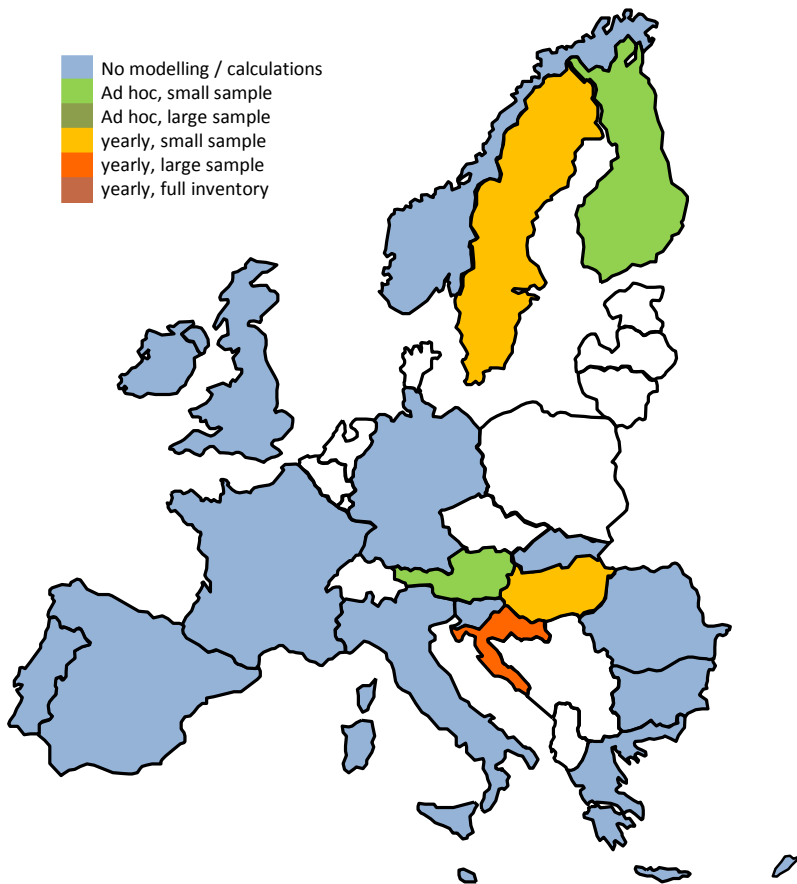
**Fig. 6: Mobile communication electric fields measurements for monitoring purposes in Europe**



**Fig. 7: ELF magnetic fields modelling for monitoring purposes in Europe**



**Fig. 8: Broadcasting electric fields modelling for monitoring purposes in Europe**



**Fig. 9: Mobile communication electric fields modelling for monitoring purposes in Europe**