

**ITU Workshop on
“Practical measurement of EMF exposure”**

(Gaborone, Botswana, 25-26 July 2011)

**EMF Measurement Protocol and
equipments (part II)
Country Experience : France**

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Introduction

- Two French agencies have the responsibility of working out regulation on public exposure to EMF and enforcing it:
 - The French agency for Food, Environmental and Occupational Health Safety (**ANSES**) assesses research about the biological effects of non-ionizing electromagnetic radiation.
<http://www.anses.fr>
 - The National Frequencies Agency (**ANFR**) checks that the operators abide by the law before granting authorization for the installation or modification of a radio station.
<http://www.anfr.fr>

Missions of ANFR

- Created in 1997, the Agence nationale des fréquences (ANFR) is a public agency in charge of:
 - Spectrum Planning and International Negotiations
 - National Frequency Management
 - Spectrum Monitoring
- On the national territory and overseas territories.

Missions of ANFR as regards general public exposure to electromagnetic fields

- To ensure the respect of the limit values of the electromagnetic field. ANFR agreement is required before implementation of a new installation.
- To check conformity of the Radio and Telecommunication Terminal Equipments (R&TTE) to the European Union regulation (essential requirements as defined by EU standards): monitoring of the radio terminal equipment market.
- To keep up to date the measurement protocol (order) which is used to carry out field measurements in order to check the compliance with the general public exposure limits.

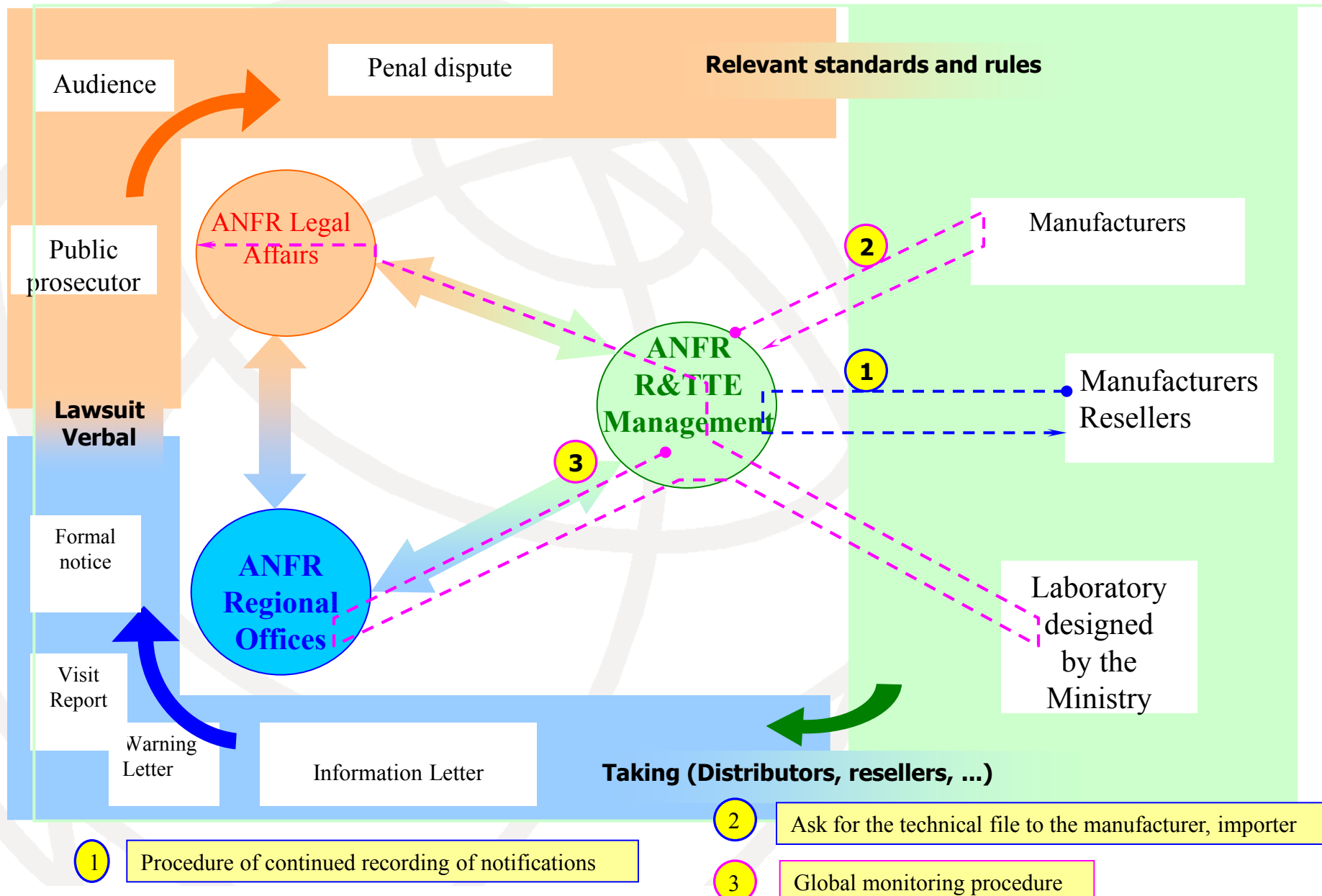
French laws

as regards limit values

- Decree n°2002-775 (3 Mai 2002) : limit values for radio stations.
- Order (8 October 2003) : technical requirements for terminal equipments (SAR limits).

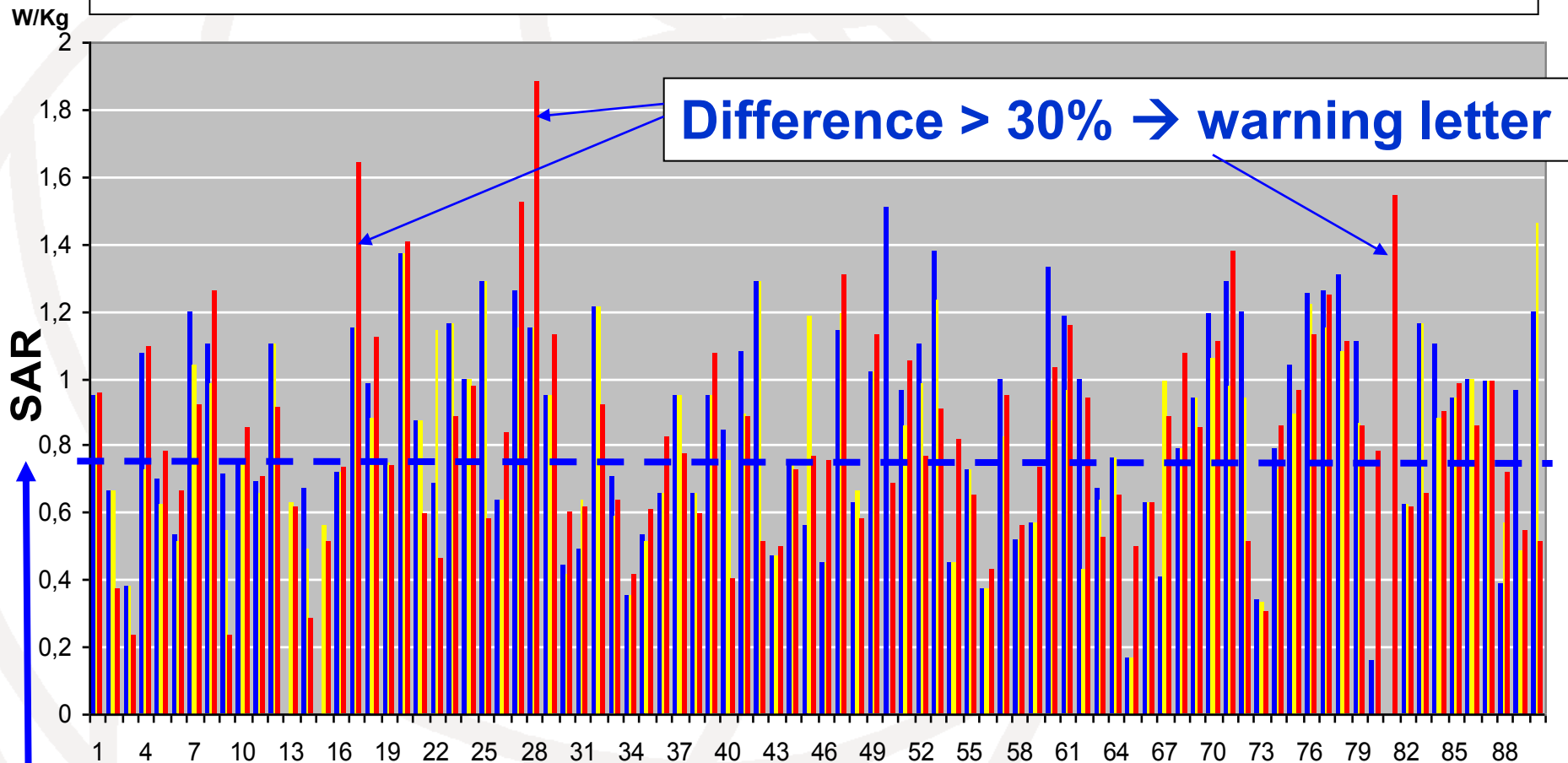
Limit values are the same as in the EU Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (1999/519/EC) and based on ICNIRP Guidelines

Radio Equipment Market Monitoring



Local SAR (Head) : 2010 measurement campaign

■ Specification sheet SAR ■ TCF SAR ■ ANFR measurement



SAR Average : 0.82W/Kg

EMF in situ measurement

Current version : ANFR/DR 15 v2.1, edition 2004 [\[1\]](#)

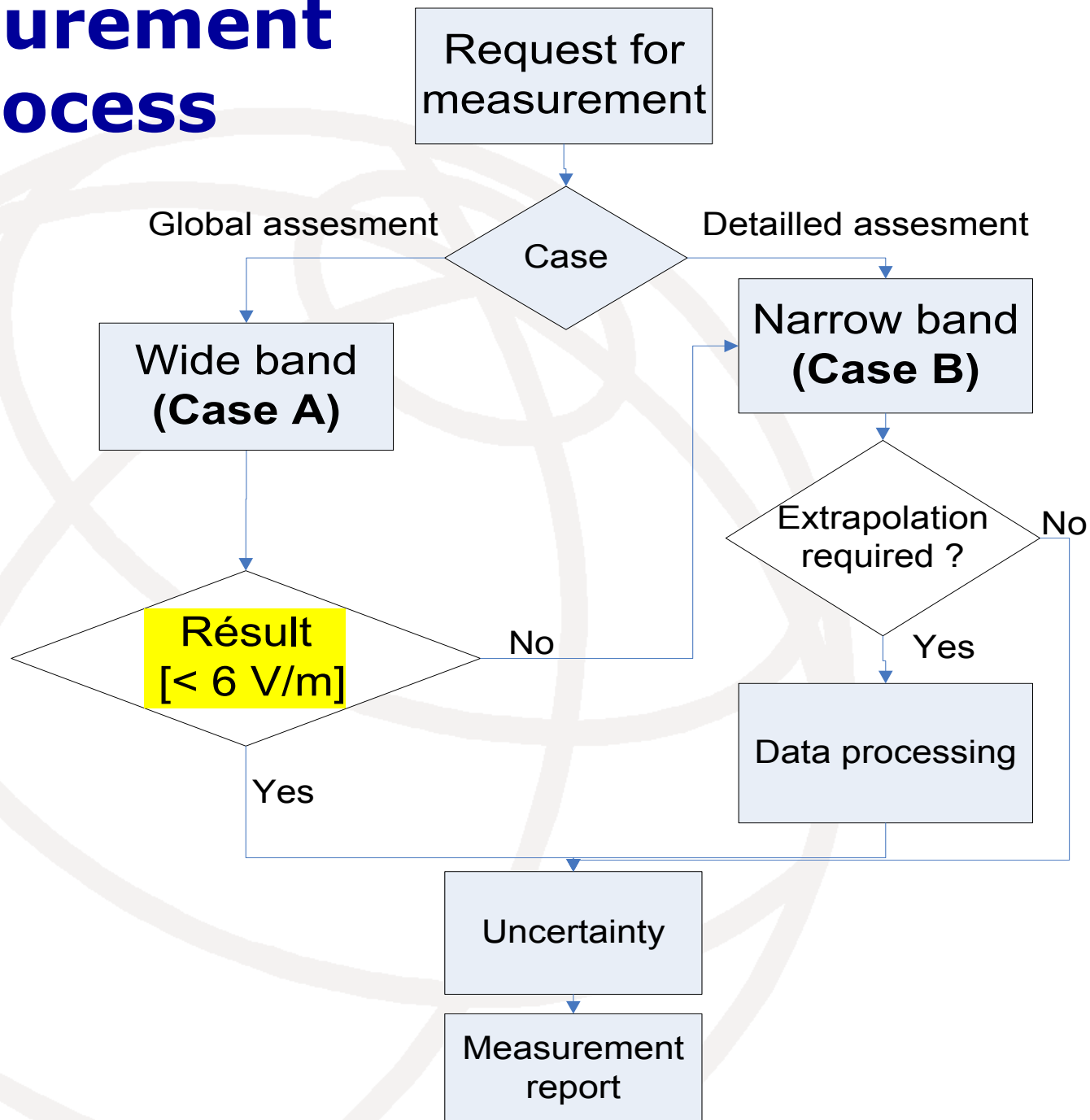
Main goal of the new version : to take into account NF EN 50492 standard

Other important goals:

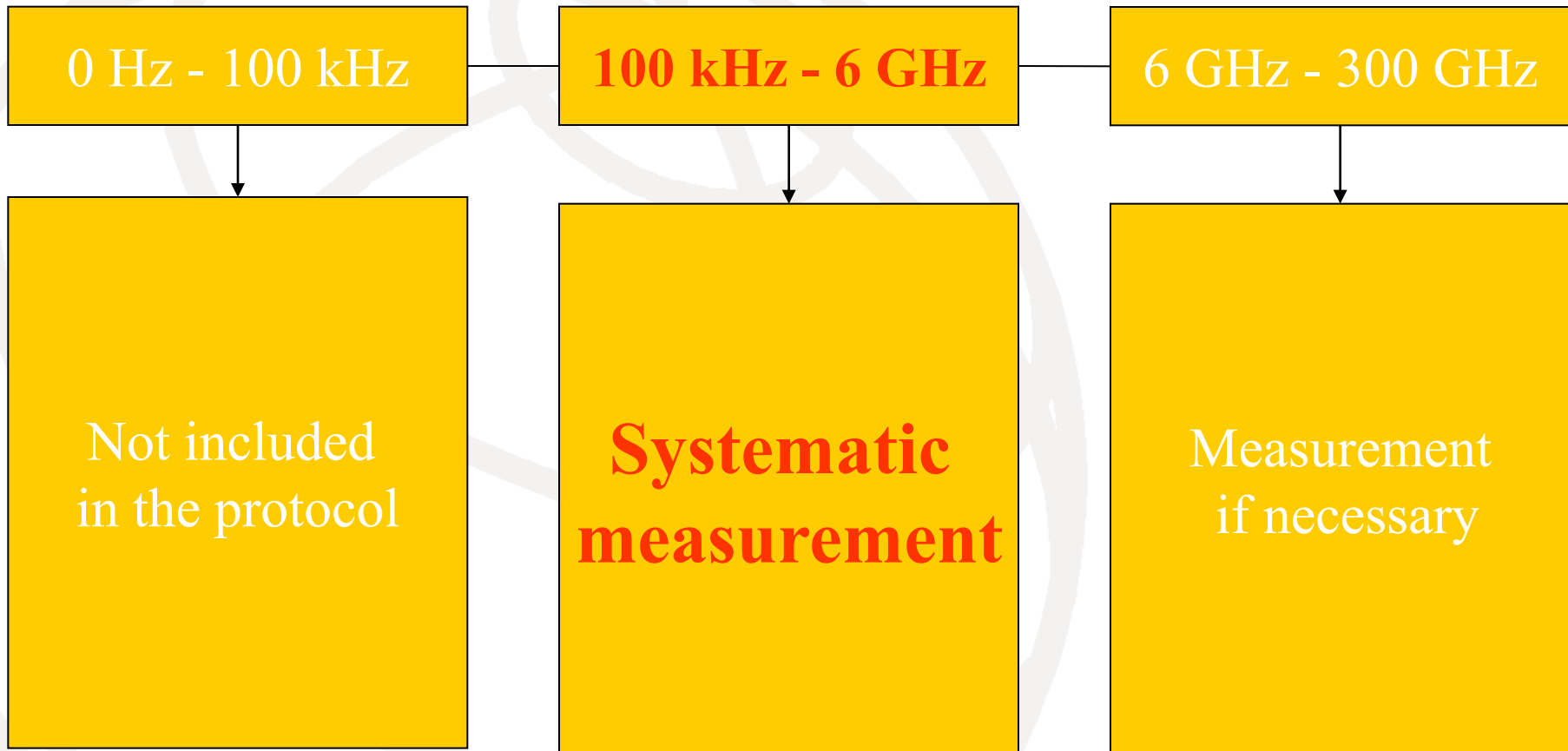
- Additional quality requirement (a maximum fixed uncertainty shall not be exceeded)
- Measurement process simplification
- Increased number of accredited laboratories (ISO/CEI 17025)

[\[1\] http://www.anfr.fr/fr/protection-controle/exposition-du-public.html](http://www.anfr.fr/fr/protection-controle/exposition-du-public.html)

Measurement process



Emissions taken into account



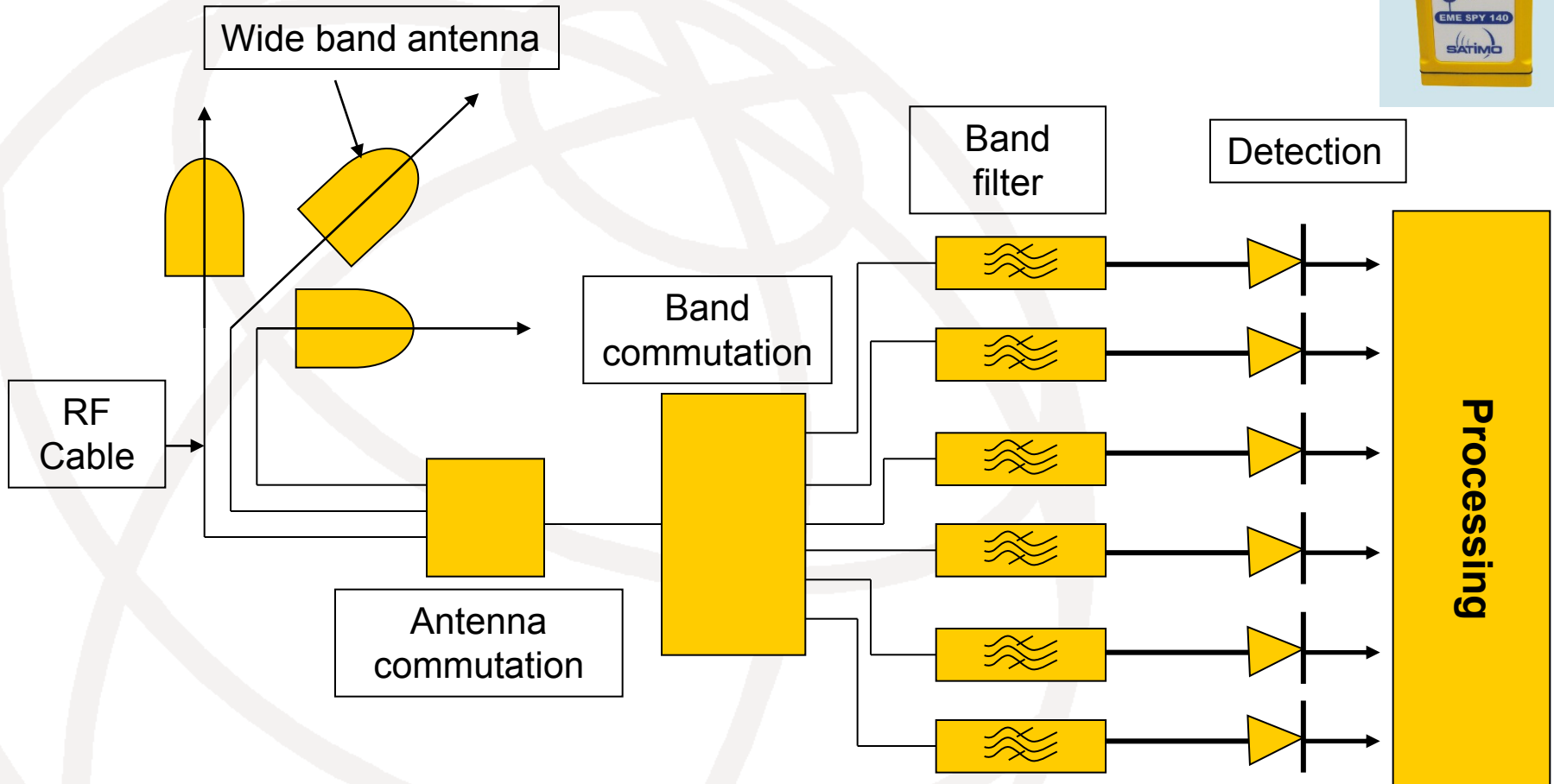
CASE A

- RMS measurement over 6 minutes
- Spatial average on 3 points (6 points are possible to reach a lower uncertainty)
- Optional measurements are possible for different services (At least : FM, TV, GSM, DECT, UMTS, WIFI, WIMAX)



Optional measurements

The use of a selective band probe is possible



An important criteria for this type of equipment is the selectivity of the filter

CASE B

Three steps for the testing :

1. Wide band measurement (if case A is not performed)
2. a) Measurement by services
b) For each services the field levels of the significant emissions with a spectrum analyzer.
3. Extrapolation data processing for cellular networks

Extrapolation for outdoor cellular networks (GSM AND UMTS)

- Below 6 V/m [\[1\]](#) :
Statistical safety factors are used [\[2\]](#)
- above 6 V/m : the extrapolation is used to check the conformity.
True factor is considered according to a database (CI and LAC) for cell parameters which exceeds 98% of the statistic.
→ trace mobile is required

[\[1\]](#) the conformity is reached but a case B can be asked.

[\[2\]](#) The statistic includes at least 98 % of the cases.

Cartoradio (<http://www.cartoradio.fr>)

■ Database of the results per location.

■ All transmitters with EIRP above 5 W are located on the map (except defense, civil aviation and police for security reasons).

- Access to every file of result :
 - Description of the environment
 - Detailed results per frequency
 - Histogram per service
- Update of cartoradio is planned (end of 2011) with a new ergonomomy similar to "geoportail" (www.geoportail.fr) and to take into account the new protocol




UMTS decoder

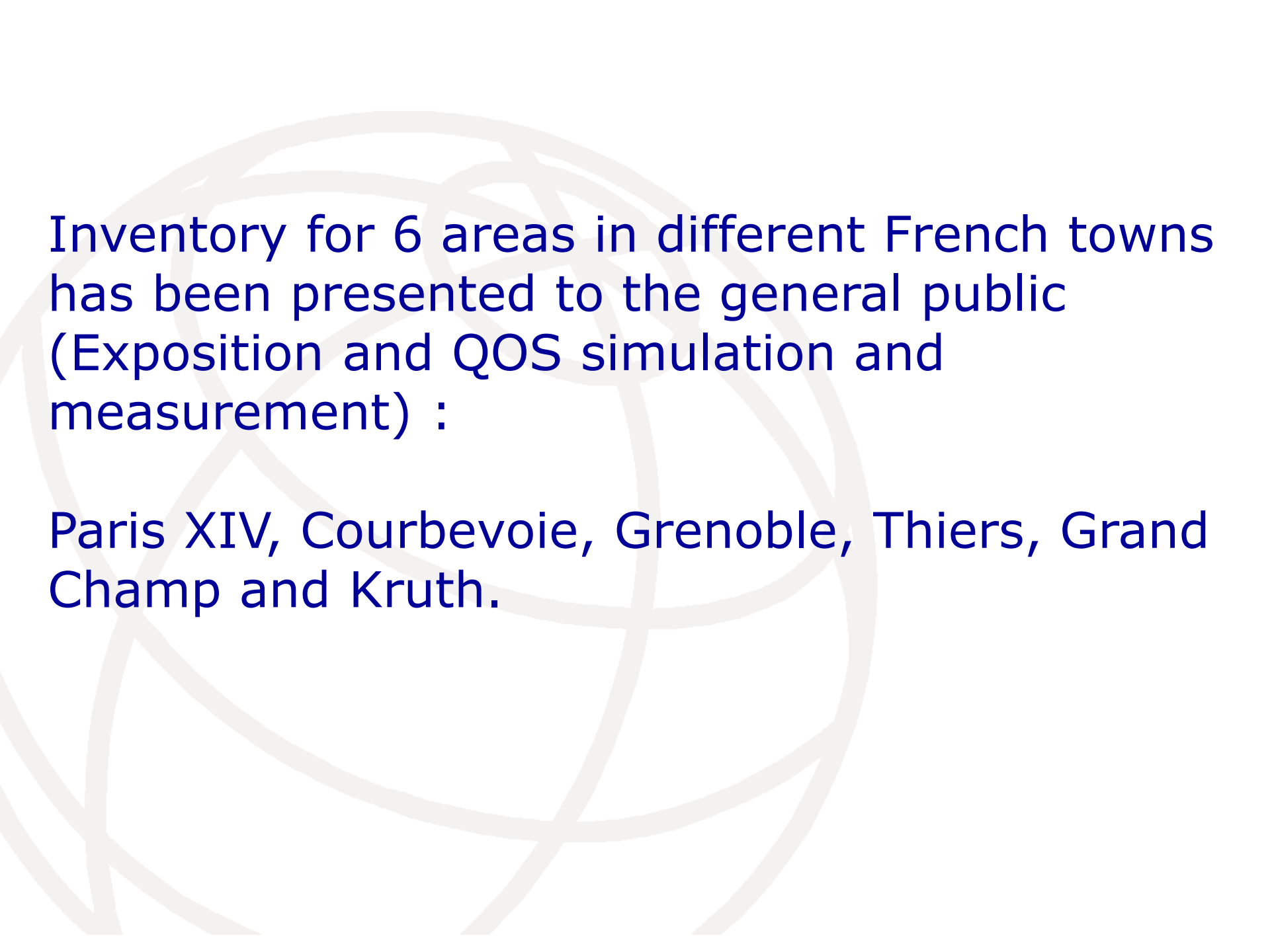
- Calibration is impossible to perform :
 - Method is established according to an agreement between the stakeholders (ISO/CEI 17025 standard requirement).
 - Measured value must be within ± 2 dB relative to reference emissions obtained with two different UMTS signal generators.



Comop workgroup



COMOP chaired by François Brottes (member of parliament) studies the feasibility of a reduction of the public exposure to EMF through modeling and experimentation in different towns. COMOP is also in charge to experiment in these towns new procedures of consultation and local information.



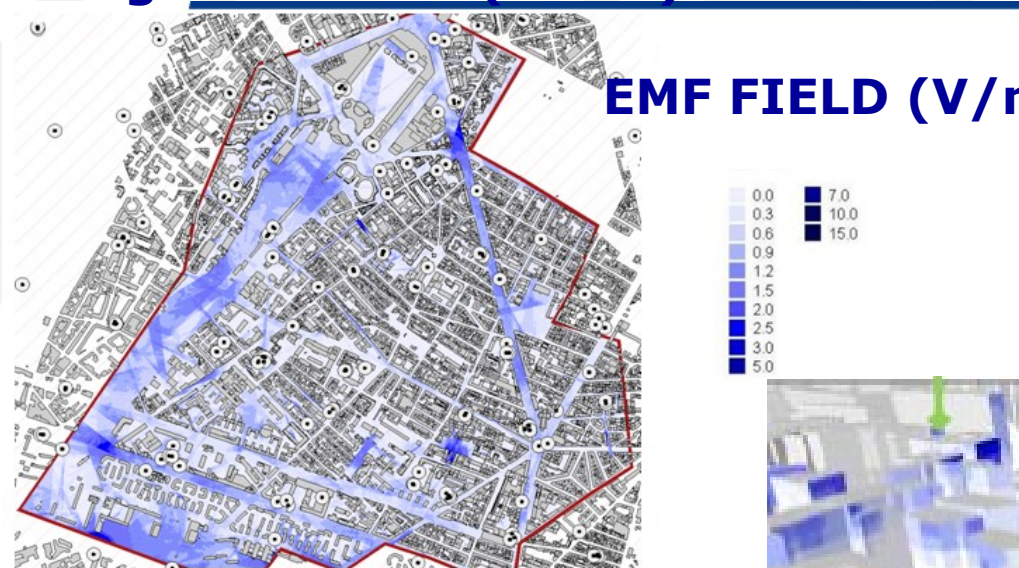
Inventory for 6 areas in different French towns has been presented to the general public (Exposition and QOS simulation and measurement) :

Paris XIV, Courbevoie, Grenoble, Thiers, Grand Champ and Kruth.

result examples (1/2)

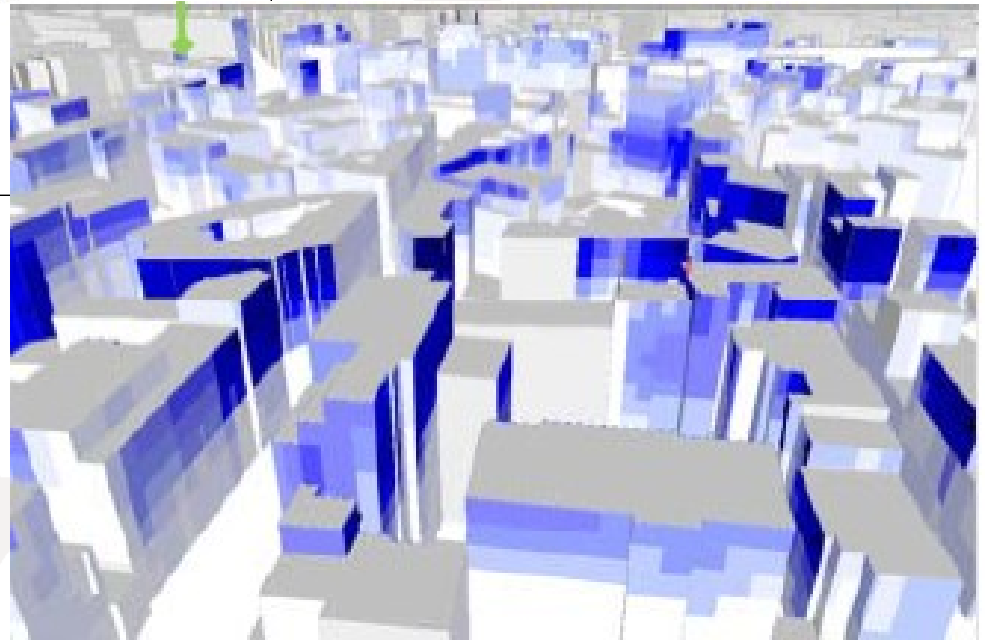
At ground level (1m50)

EMF FIELD (V/m)

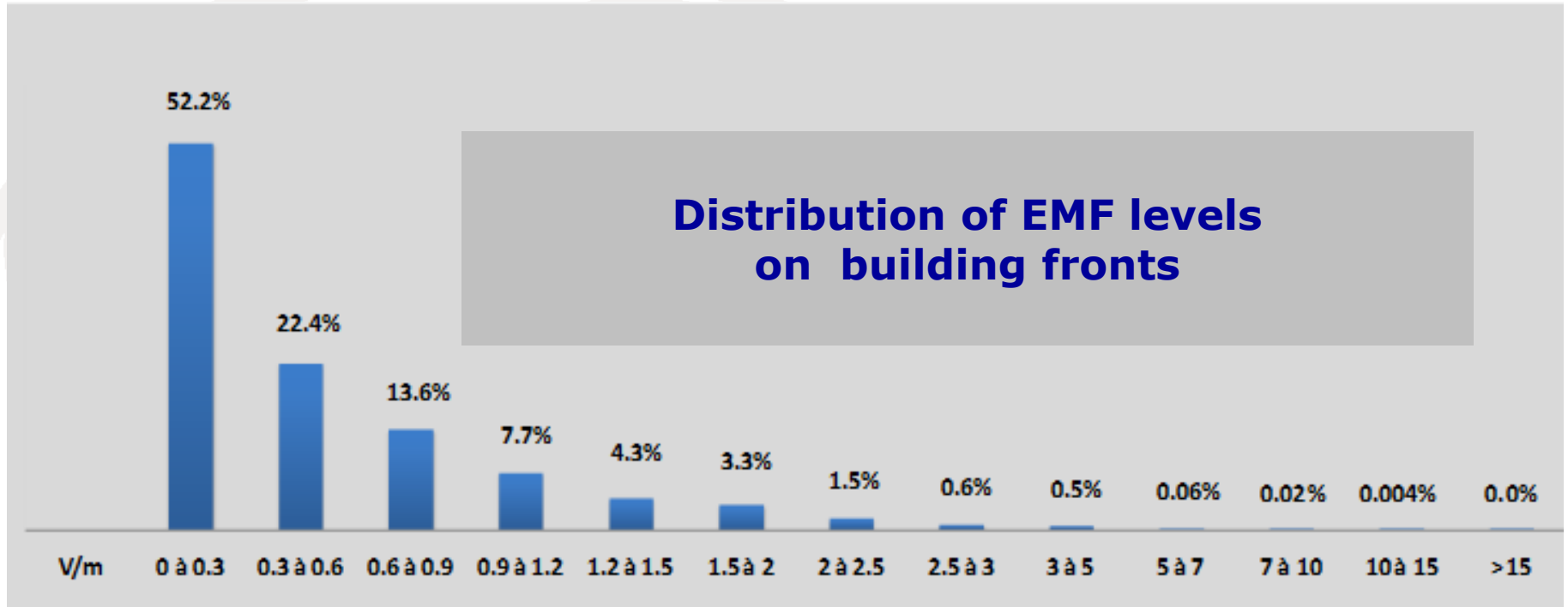


**BASE STATIONS EMF SIMULATIONS
IN PARIS AREA (PARIS XIV
district)**

On building fronts



result examples (2/2)



40000 buildings taking into account
Simulation done at maximum power of the transmitters
(GSM 900 1800 and UMTS)



Thank for your attention