

Monitoring to EMF exposure in France with autonomous probes and in situ measurements

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In France, the society raises questions about the impact of new technologies, among them people's exposure to electromagnetic fields is an important topic. Bibliography of the assessment of EMF exposure is significant either on downlink human exposure to cellular base station or on the exposure due to wireless communicating devices. Agence nationale des fréquences (ANFR) and its partners carry out thousands in situ measurements each year [1] and have finely evaluated the level of exposure due to the deployment of 5G NR technology through measurements and simulations. Moreover, compact electronic integration enables to create new techniques for EMF monitoring. Actually, city councils and ANFR have installed tens of autonomous monitoring probes which carry out broadband measurements of electric field many times per day [2]. For the first time, measurement from monitoring probes and in situ indoor and outdoor measurement are compared. The knowledge of radio environment close to the measurement and probe locations enable to carry a deeper statistical analysis.

Three types of data are going to be used: data from monitoring probes, data from accredited in situ measurements and data from base stations. Monitoring probe were designed by EXEM company and are autonomous broadband probe measuring the electric field between 80 MHz and 6 GHz. There are 152 autonomous probes installed among different cities in France since 2019. The probes measure at multiple times of the day and night: every two hours between 1:00 AM and 11:00 PM and each measurement is averaged over 6 minutes. For the accredited in situ measurement, ANFR is maintaining up to date measurement protocols to evaluate compliance of EMF exposure with regulatory limits. Every resident in France can ask for a measurement for free in their home or in any public places. The measurements are carried out by ISO 17025 accredited laboratories following ANFR protocol. Depending on the demand, the evaluation is either global by using broadband measurement system or detailed by using frequency selective measurement system in order to know the contribution of each technology/band. After installation of the monitoring probes, accredited in situ measurements have been carried out under each probe on the ground level.

The variability is explored in function of time variation (seasonal, weekly and daily variations) and in function of the diversity of radio environment locations. Time and space similarities and differences will be presented in order to better understand EMF exposure variability. Cross analysis and conclusion will be shared with other European laboratories within SEAwave project funded by the Horizon Europe Research and Innovation program.

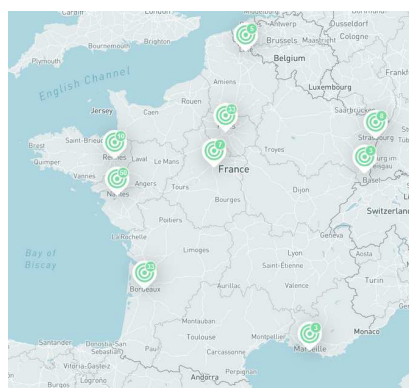


Figure 1. Map of France with indication of the number of monitoring probes installed.

References

- [1] Cartoradio by ANFR, Map of base station antennas and EMF measurement, <https://www.cartoradio.fr/>.
- [2] Observatoire des ondes, Map of monitoring probes in France, <https://www.observatoiredesondes.com/fr/carte-des-ondes/>

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