

# measurements on location

## Low and High Frequency Measurements on Location

### EMF Measurements/EM Measurement/ electromagnetic radiation

Electromagnetic fields cause interference with electronics and may affect the health of human beings. It is important to recognize this at an early stage. This can be done at a future construction location as well as while construction is in progress, so that budgets are not exceeded. By means of field-strength measurements one can chart the existing electromagnetic fields and radiation emitted by, GSM, UMTS antennas and transformer spaces, to name but a few. Based on these measurements the best location may be determined for rooms where sensitive measurements are to take place, for example in hospitals or nano laboratories. And lastly, field-strength measurements can detect sources of interference and be part of a scheduled check of existing screened spaces and Faraday cages.

#### Magnetic field-strength ELF-measurements

Measurements can be carried out in the low-frequency spectrum (0 Hz DC - 30 MHz) for magnetic fields around installations through which high currents flow. In most cases the frequency is 50/60Hz, for example in transformer spaces, overhead lines, bushbar systems, switchboard cabinets and close to high-voltage cables, train and underground railway lines.

#### Electric field-strength EMF-measurements

Likewise measurements can be carried out in the high-frequency spectrum (9 kHz - 22 GHz) for measuring electric fields generated by transmission equipment/installations among which C2000, GSM and UMTS towers, radar systems, wireless devices etc.

Tests may be performed to meet ICNIRP standardizations or alternative health recommendations such as SBM-2008.

#### Why measure?

It is extremely complicated to approach electromagnetic radiation from a theoretical angle - it can even be said to be impossible, due to the many variables in the environment. That is why measurement on location is often essential to chart the prevailing electromagnetic fields and to localize possible sources of interference.



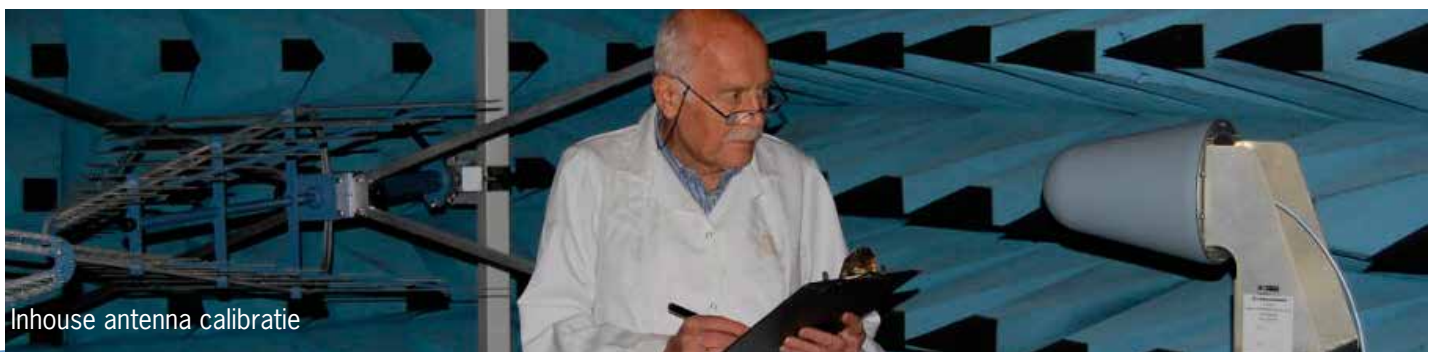
Magnetic field-strength measuring after shielding



Electric field strength measurement on location

#### Applications

- Baseline
- Elektromagnetic fields (V/m) or (W/m<sup>2</sup>)
- EMF measurement
- ELF measurement of transformer room (nano Tesla)
- Detection of sources of interference
- Established norms for health, environment, licenses, arbo regulations
- Determining location for rooms to conduct sensitive measurements
- Check of shielded areas
- Assessment for the opposing party



Inhouse antenna calibration

### Advantages

- Measurement on location
- Cost-effective
- Clear reporting
- Expertise in all screening/shielding disciplines
- Recommendations with regard to reduction of the fields
- Certification

### Prevailing fields and recommended standards

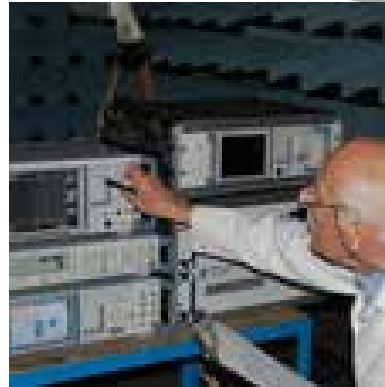
For both magnetic and electric fields there are recommended standards, set by the Health Council as limits in the Telecommunications Act. Particularly magnetic fields are considered a serious threat to health; for instance, there is wide-spread concern regarding the causal connection between exposure to magnetic fields and the occurrence of leukemia in children. Moreover there are numerous health complaints which are associated with (linked to) exposure to magnetic fields, for example headaches, depression and insomnia.

### Determining position of sensitive measurement room

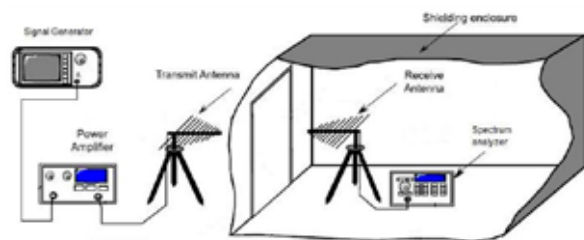
When a map is made of the existing prevailing electromagnetic fields during construction, in an existing building or during remodeling, recommendations can be made for the optimal position for a sensitive measurement room.

### Inspection measurements of Faraday cages

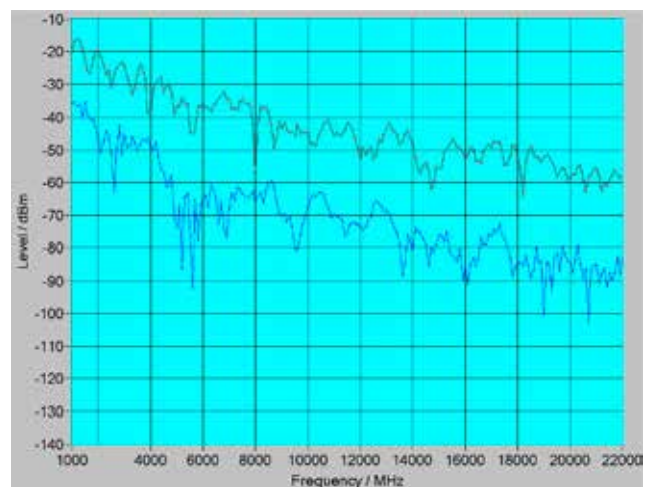
Every Faraday cage needs regular maintenance check-ups. This does not only apply to the workmanship of the door, because there can be many invisible reasons for a cage to become 'leaky' so it no longer works according to specifications. To check this we carry out control measurements on location. After the measurement, a certificate is provided. Periodic measurements are important for hospitals and companies with ISO (9000) certification.



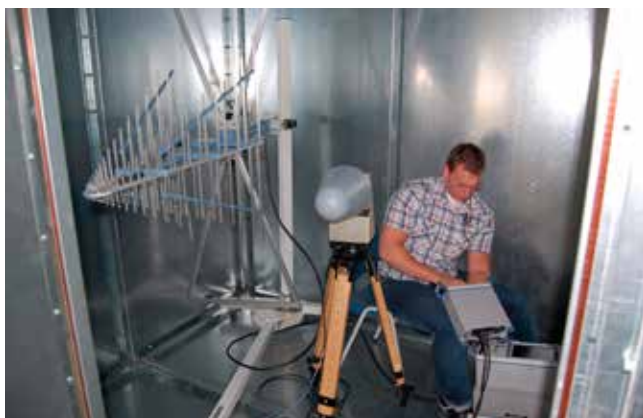
Electromagnetic Analysis Measurement



Setup reduction measurement



Damping characteristics + measurement calibration



Reduction performance measures 9 KHz to 22 GHz



Drawing test antenna mu-copper screened room