WISE Wireless Safety for Employees
An INTERREG IV Project for safe wireless communication in industrial and work environments: exposure and propagation

INTERREG IV France - Wallonie - Vlaanderen
Interreg efface les frontières
Interreg doet grenzen vervagen

Exposure in industry: WiSE tool for prevention advisors

Lille, September 17, 2014

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- Context and goal
- Risk analysis of EM-fields
- Source classification based on risk
- Structure of software tool
- Conclusion
- Demo

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Context and goal

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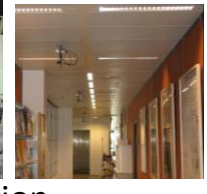
- Electric equipment generates electromagnetic waves
  - Equipment for wireless communication







  - BUT also other sources generate RF radiation

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Context and goal

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- Goal of tool: to provide
  - Guide for prevention advisers
  - Electric and magnetic field values as function of distance around different equipment
  - Comparison with exposure limits of EU-directive
  - Category to which a machine/equipment belongs
  - Specific actions that can be taken to satisfy EU-directive

→ This tool has no intention to replace measurements

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Risk analysis of EM-field

- Assessment of risk:
  - Comparison with the EU-directive
    - action levels
    - limit values
  - Define safety rules
    - safety distances
    - deactivation during maintenance
    - …
  - Advise employees
  - Satisfy EU directive

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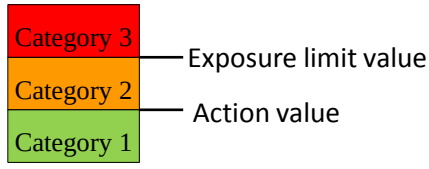
Classification based on risk

- Working environments / equipment can be divided into 3 categories (based on a study of Bolte and Pruppers)
  - Category 1
    - Under normal conditions the action values will not be exceeded
  - Category 2
    - Action values can be exceeded but the exposure limit values will not be exceeded under normal conditions
  - Category 3
    - Exposure limit values can be exceeded



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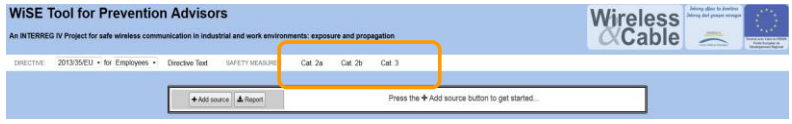
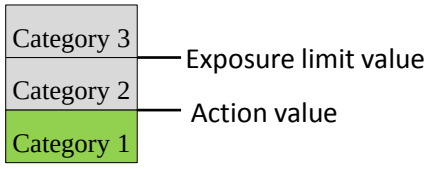
Classification based on risk

- Depending on the category actions must be taken to minimize EM-field levels

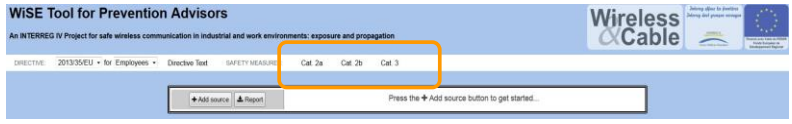




- Category 1: No measures need to be taken

Classification based on risk

- Depending on the category actions must be taken to minimize EM-field levels



Category 3 — Exposure limit value

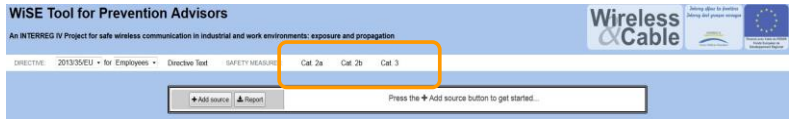
Category 2 — Action value

Category 1

- Category 2a: only brief instructions are needed e.g. keeping a safe distance

Classification based on risk

- Depending on the category actions must be taken to minimize EM-field levels



Category 3 — Exposure limit value

Category 2 — Action value

Category 1

- Category 2b: Technical measures are needed e.g. shielding, fence around appliance.

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Classification based on risk

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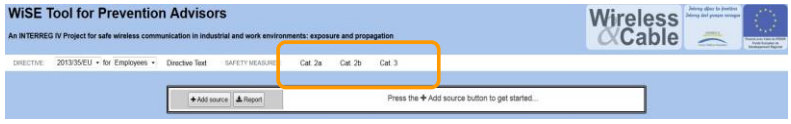

Category 3 — Exposure limit value

Category 2 — Action value

Category 1

- Category 3: extensive measures needed e.g. factory reorganization

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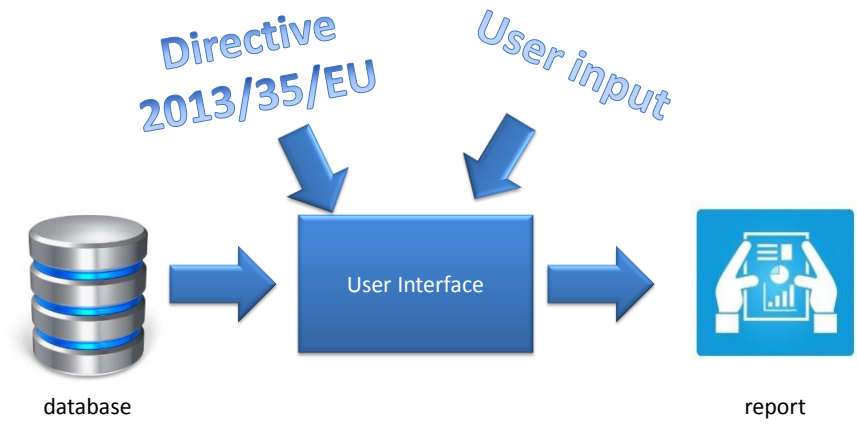
Structure of tool



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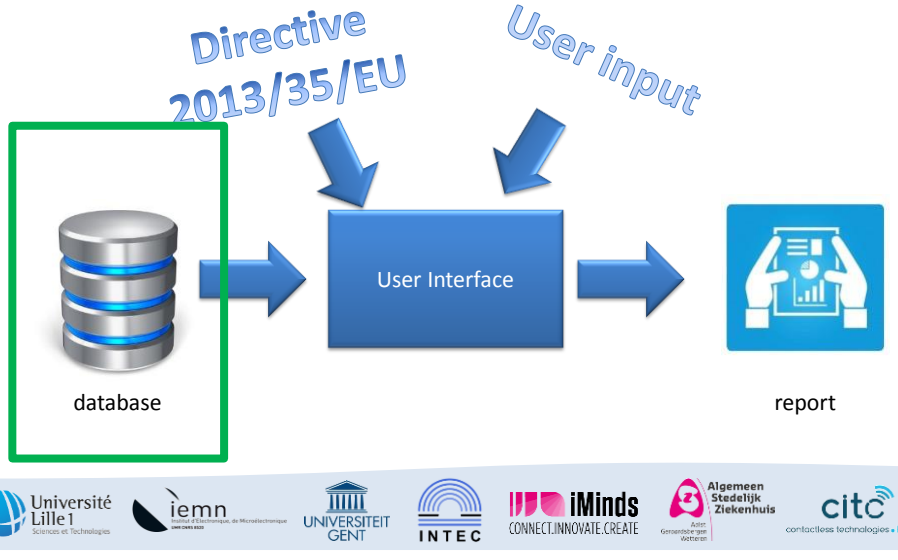

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Software tool: appliance list

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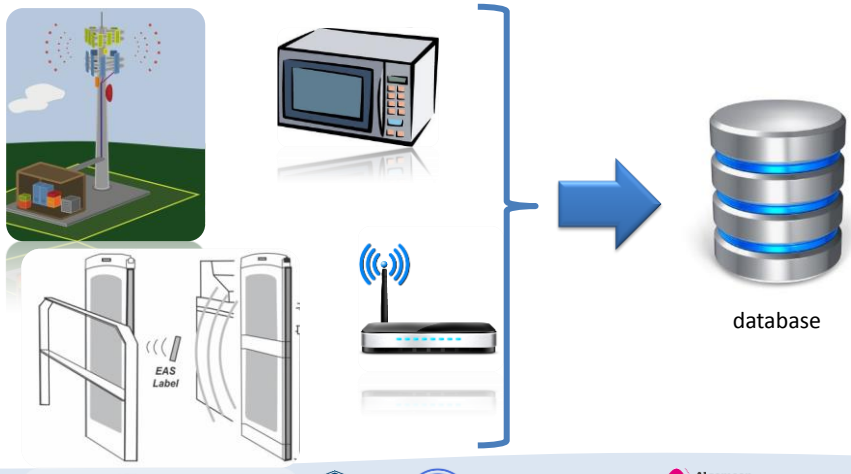
- Inventory of electrical equipment



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Software tool: appliance list

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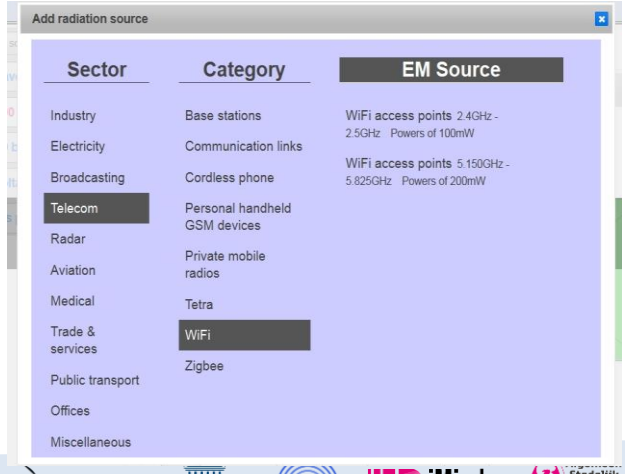
- Categorization of RF equipment
  - based on the sector > category > EM sources



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Software tool: EMF Data

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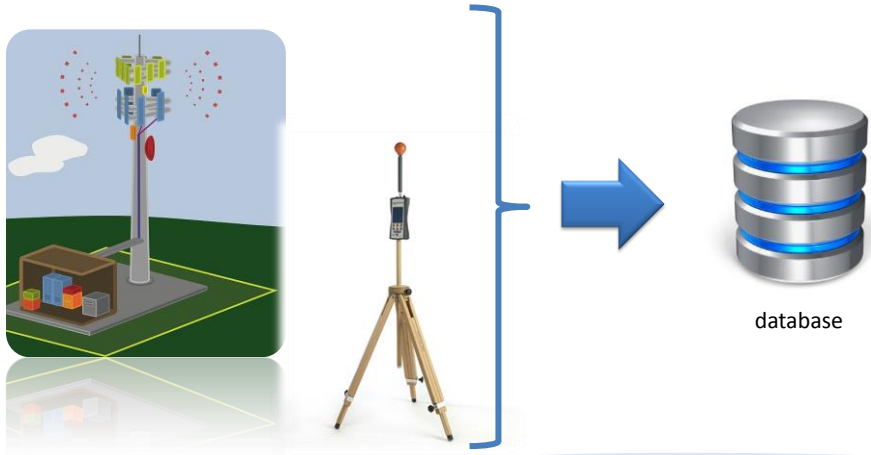
EMF data of sources



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Structure of tool: EMF Data

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- EMF data
  - Measurements
    - Differences in measurement protocol and equipment depending on the technology, frequency, …
    - Time consuming
  - Simulations
  - International papers and studies
  - Existing databases

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Structure of tool

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- Current database status
  - 117 EM sources are categorized
  - Total of 16805 records
    - Total of 7811 measurement points
    - Total of 8994 simulation points

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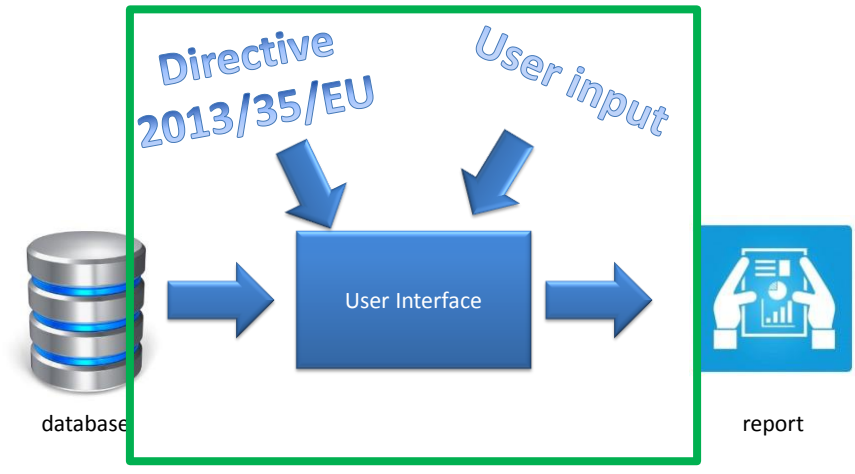

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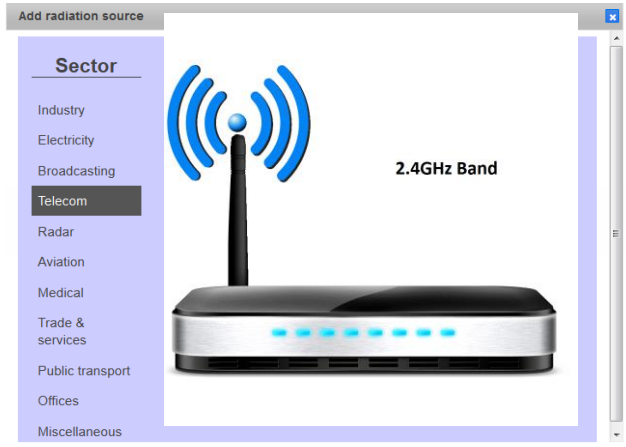
Example: WiFi access point



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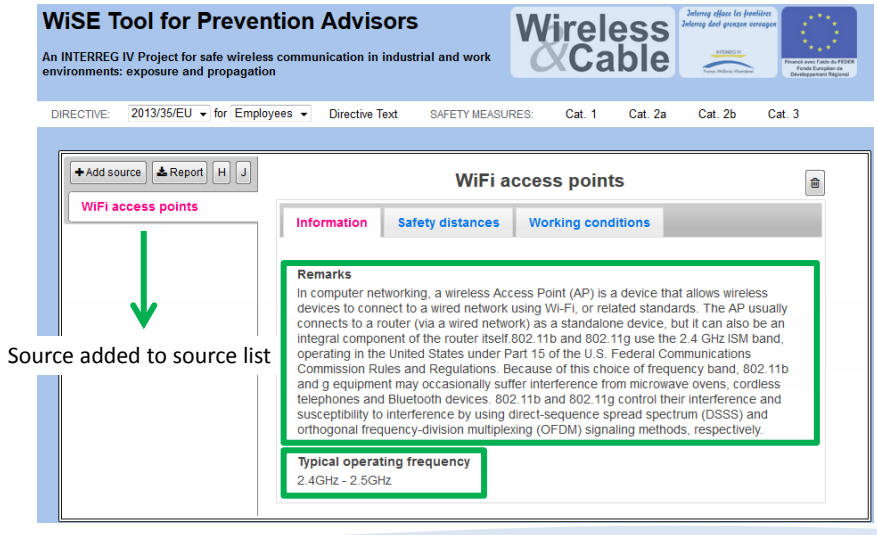

Source added to source list

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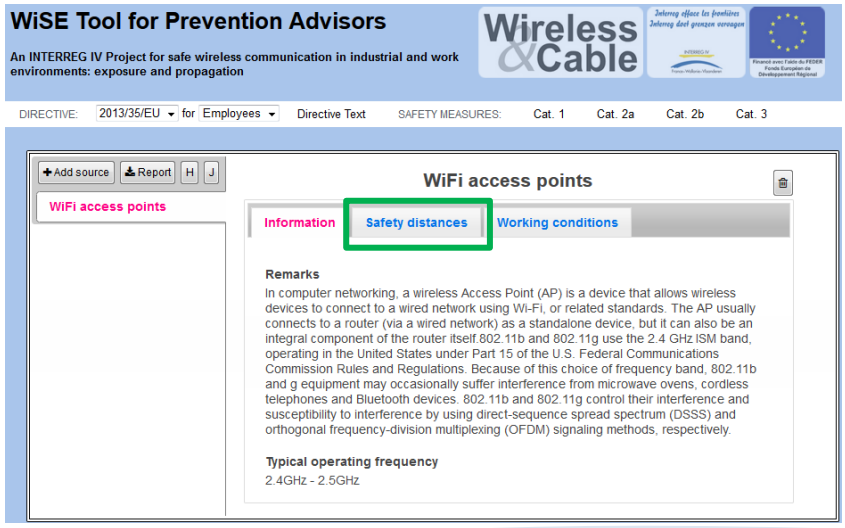

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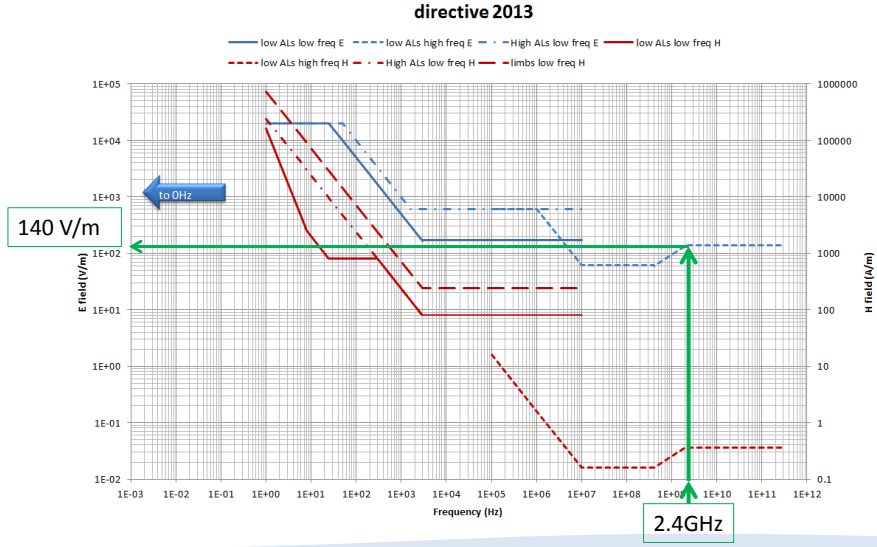

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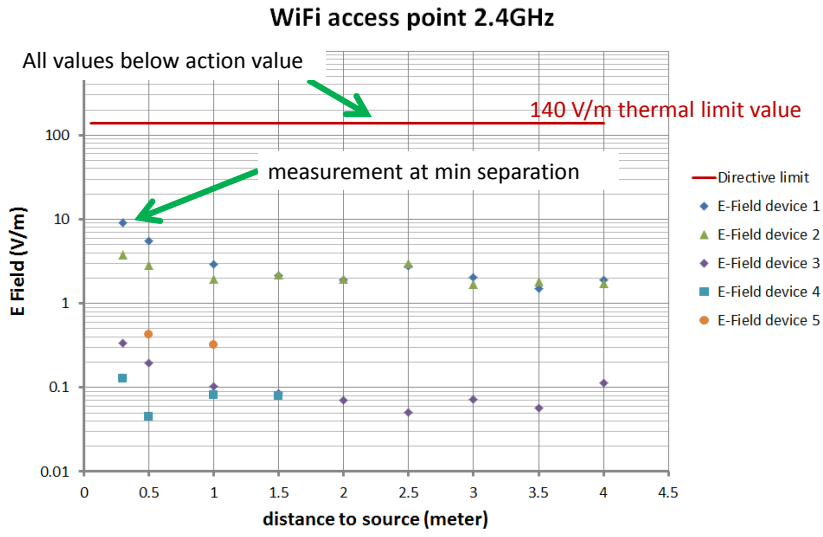

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Risk analysis: example

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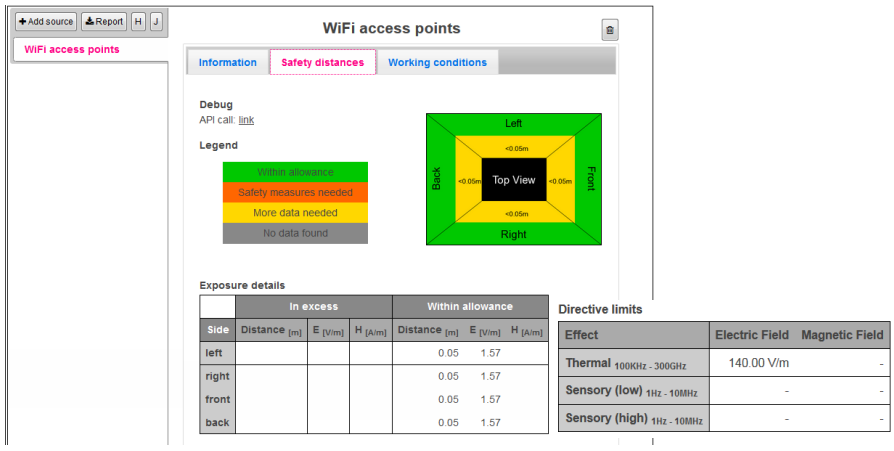
- Safety distances tab



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- Values exceed directive limits
  - Worst-case data will be presented
    → *overestimation is possible*

- Values do not exceed directive limits
  - Worst-case measurement at min separation is shown

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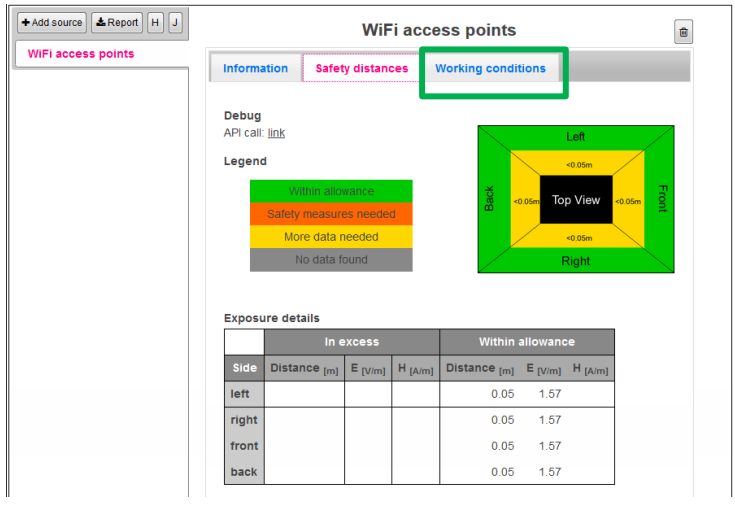

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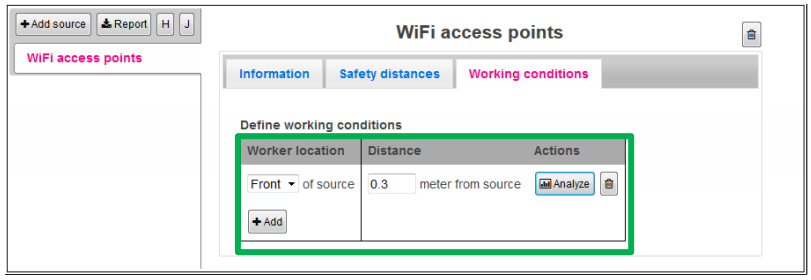

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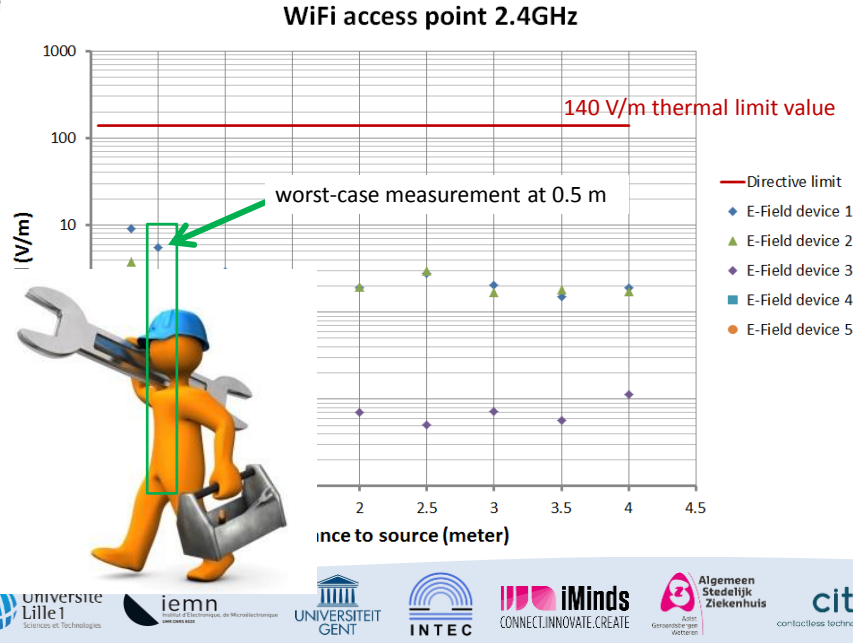

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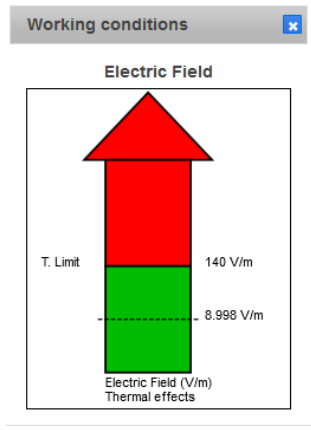

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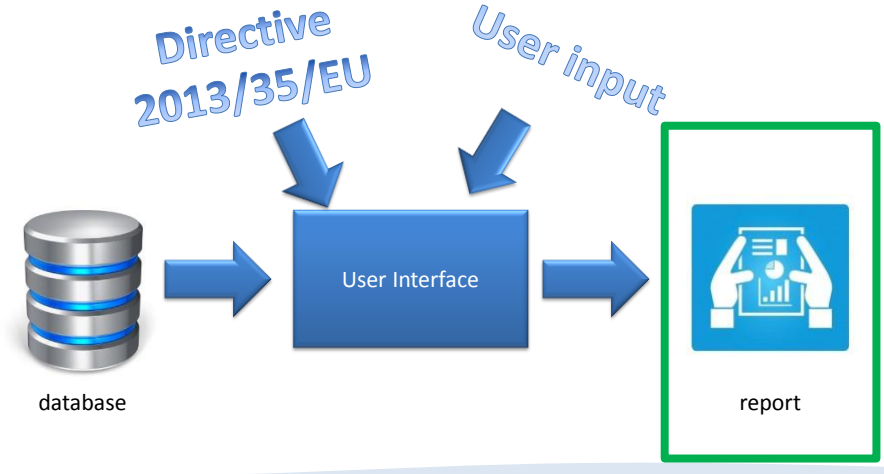
Structure of tool



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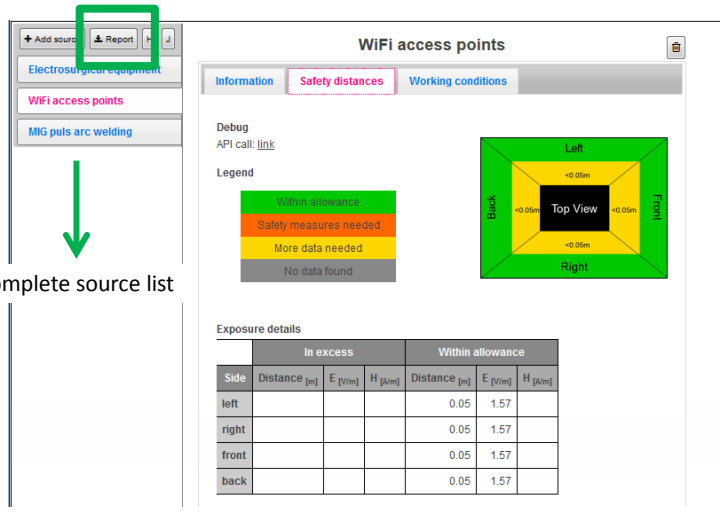

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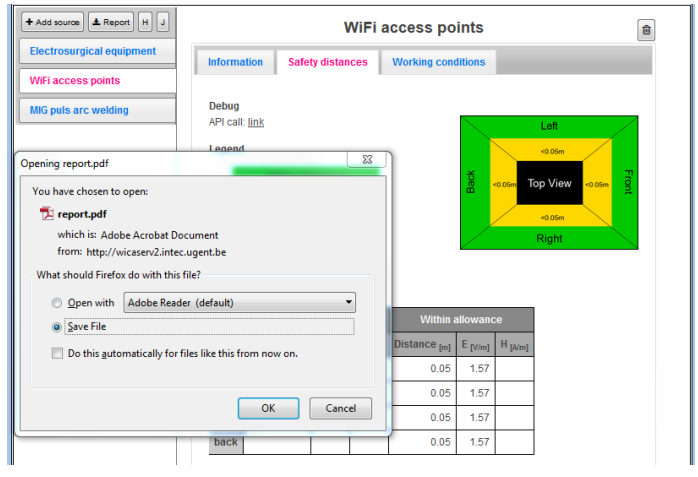

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Software tool

- General information on EU-Directive
- Definition of the action values
- Single sheet to asses all defined working conditions
- Detailed information on al selected sources
- Source specific recommendations

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Conclusions

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- Software tool is available online:
  - http://wicaserv2.intec.ugent.be/exposure-demo
- Ongoing (end project December 2014):
  - Database will be updated continuously
  - Extensive testing of the software tool: YOU!
  - Adding information to the tool (wizard)
- All data sources are cited within the tool
- Any remarks are welcome

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demo

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