

What is Unique

Concept

MAGPy V1.0 is a stand-alone system designed for easy-to-use *in situ* exposure evaluations of EM sources operating between 3 kHz and 10 MHz, in particular, for demonstrating compliance with national and international EM safety guidelines (e.g., for wireless power transfer systems). The system capitalizes on the premise that all strong sources lead to local exposures, i.e., body tissues close to the source are the highest exposed tissues. To simplify the evaluation, the standards were interpreted conservatively with a focus on local exposures (see Manual).

Unique Feature

MAGPy V1.0 is the only measurement system capable of estimating the induced values, i.e., the basic restrictions. A probe consisting of eight fully isotropic magnetic (H-) field sensors with 1 cm² loops measures the H-field and its gradient in the time domain. One electric (E-) field sensor determines the E-field. The induced fields are estimated using the novel GGSM method defined in the latest draft of IEC PAS 63184 and compared with the basic restrictions of the selected guideline.

Compliance Testing

Compliance with Basic Restrictions

Compliance with the basic restrictions is demonstrated using the recommended simple nine-step procedure, while assuming the following:

- The source has a dominant frequency component, i.e., the second largest frequency component is smaller than -30 dB of the dominant frequency component; otherwise the analysis described in the Manual must be performed
- The probe scans the surface closest to the source at which a human body might be located, whereas, the body surface is always normal to the probe axis at the center (Setting: Center) or tip (Setting: Tip) of the probe
- Compliance is successfully demonstrated if both the maximum induced field quantities are smaller than the basic restrictions AND the maximum incident E-field is smaller than the reference levels

Compliance with Reference Levels

Compliance with the reference levels can also be demonstrated at the probe center or probe tip (Setting: Center or Tip):

- Scan the volume of the exposure characterization and determine the max H-field and E-field. Compare these values with the reference levels that are directly provided in the REL mode



MAGPy at a Glance

s p e a g

WWW.SPEAG.SWISS

Schmid & Partner Engineering AG
Zeughausstrasse 43, CH-8004 Zurich, Switzerland
Phone: +41-44-245-9700
info@speag.swiss

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MAGPy V1.0 User Interface

Evaluation frequency & bandwidth

Applied standard

Induced E-field current density & SAR

- computed by the GGSM method from the incident values (IEC PAS 63184)
- latest/maximum value and standard limit in numerical values/bar graph

values at probe tip or center

Incident H-field

- 3D magnetic field measured by the MAGPy-8H3D+E3D probe

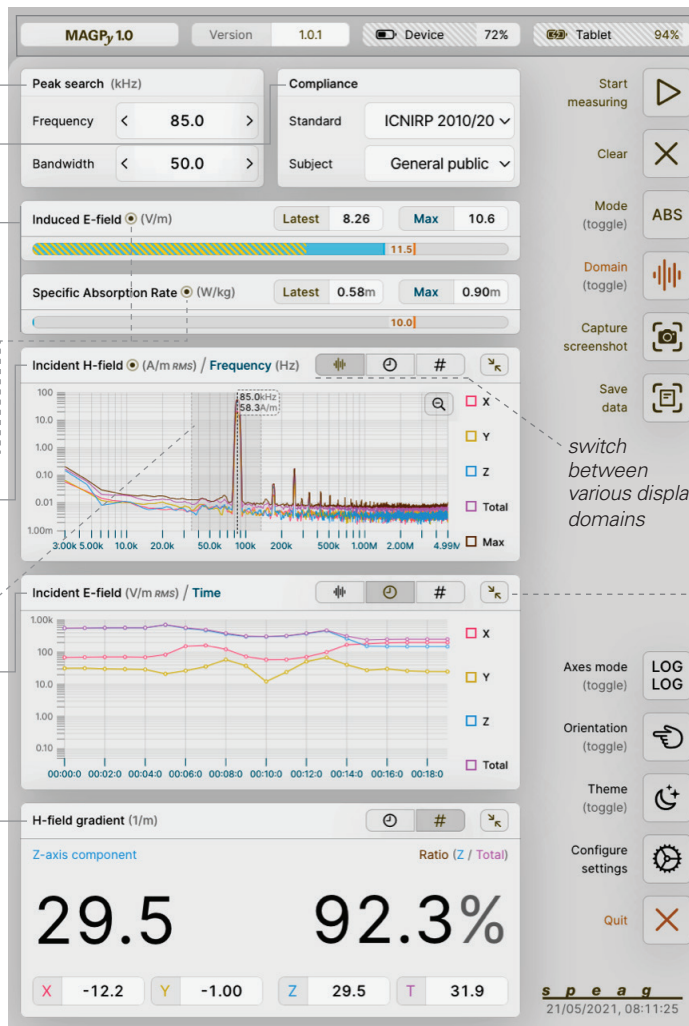
easily zoom-in/out by dragging across the display

Incident E-field

- 3D electric field measured by the MAGPy-8H3D+E3D probe

Incident H-field gradient (∇H)

- magnetic field gradient value determined by the 8 magnetic field sensors



Status bar

- software version
- MAGPy-DAS & Tablet PC battery statuses

Start/stop the measurement

Clear the max hold values

Switch between absolute & relative modes

- Display values relative to limits in standards

Various types of display domains

- frequency spectrum
- time evolution
- latest/maximum values

Capture screenshot

- saves the current display as an image

Save data

- saves measurement and compliance data to an archive as CSV files

expand/collapse panel

Axis mode selection

- log/linear mode in x/y axis

Display orientation

- for both right-/left-handed users

Display theme

Configure settings

- access to advanced settings

Quit the software

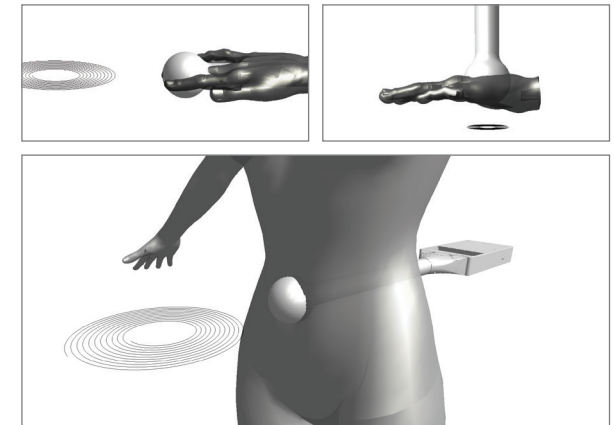
Measurement Procedure

MAGPy V1.0 evaluates electromagnetic (EM) sources (3 kHz – 10 MHz) in nine simple steps:

- 1 Switch on the MAGPy V1.0 system (MAGPy-DAS and the Surface Tablet) and launch the MAGPy software
- 2 Configure the System Settings: Safety Guidelines/Standards, Language, etc.
- 3 Scan the source and analyze the incident H-field spectrum at a location close to the EM source
- 4 Set the analyzing center frequency and bandwidth
- 5 Clear the max hold values
- 6 Search for the maximum induced quantities of interest (e.g., E-field, J, SAR) while guiding the probe tip towards the EM source (see Figure below) for all body locations/distances to be assessed for compliance/exposure;
- 7 Compare the measured fields with the limits (ABSolute or RELative mode)
- 8 Capture and save screenshots or measurements to files for later analysis and documentation
- 9 Repeat steps 5 to 8 if needed

Troubleshooting Steps

- Hardware: Check all cable connections and the battery status of the Surface Tablet and MAGPy-DAS.
- Reset: Switch Off/On the Surface Tablet and MAGPy-DAS.
- Consult the manual for more detailed troubleshooting guidelines.



Top left: Exposure evaluation when a hand reaches close to the magnetic field source from the side; Top right: when a hand is placed on top of the magnetic field source (e.g., mobile charger); Bottom: when the body is in close proximity to the source.