



# 20th International Zurich Symposium on Electromagnetic Compatibility

## Topical Session on Wednesday, 14 Jan, 8:20 – 12:00

Title	Traceable measurement of field strength and SAR for the Physical Agents Directive
Organizer's name	George Teunisse, gteunisse@nmi.nl
Organizer's affiliation	NMi Van Swinden Laboratorium B.V., Delft, The Netherlands

### Programme

Time	Topic	Speaker
8h20	EMF and SAR: An overview about the European Joint Research Project	Thorsten Schrader (PTB Braunschweig; DE)
8h45	Traceable Field strength measurements based on laser spectroscopy techniques	Mustafa Cetintas (UME; TR )
9h10	Calibration and characterisation of probes for measuring specific absorption rate	Benjamin Loader (NPL; UK)
9h35	Feasibility of a broadband SAR-probe calibration cell	Kazemipour Alireza (LNE; FR)
10h00	Coffee break	
10h30	An overview of traceable methods for the measurement of the dielectric properties of liquids used in SAR measurements	Andrew Gregory (NPL; UK)
10h55	A Boundary Element approach for low frequency SAR computation in homogeneous objects	Luca Zilberti (INRIM; IT)
11h20	Electromagnetic field measurements based on Magnetic Resonance Imaging	Frank Seifert (PTB Berlin; DE)
11h45	Discussion	

## **Target group**

- Experts involved in conformity assessment measurements and trainings regarding EMF
- Representatives of public and private organisations and members from standardisation committees dealing with topics related to human exposure to EMF

## **Purpose**

The workshop is meant to exchange information and discuss on the developments within a EU supported joint research project at national standard laboratory level on the techniques, accuracy and traceability regarding EMF measurements.

The objectives of the joint research project in connection to the need for traceable measurement techniques for EMF measurements with regard to international regulations and the Physical Agents Directive

The workshop will contain several presentations by participants in the project on the proceedings on subjects dealt with in the project. Furthermore it will give the opportunity to deliver input from the stakeholders as to fine-tune the needs for the research.

## **Background**

Due to the pervasive use of broadcasting devices for mobile applications, the ambient levels of RF power, particularly in cities and work places, are rapidly rising. Also, the frequency range of exposure and the complexity of the signal modulation are increasing. RF technologies that will be widely deployed include RFID, tagging, remote sensing of environmental changes, earth observation, management of traffic flow, driver assistance in vehicles, monitoring of food quality, plastics welding, and industrial heating and processing. In medicine, high RF exposures to the human body occur during magnetic resonance imaging (MRI) and thermotherapy.

*Lacking metrology Gaps in present metrology*

Existing physical standards within Europe do not give comprehensive coverage for measurement traceability over the range covered in the basic restrictions of ICNIRP: e.g. artefact standards for SAR exist only within the frequency range 380 MHz to 6 GHz, and for Power Flux Density up to 45.5 GHz.

Therefore an important topic of the international joint research project is the establishment of the necessary artefact standards, measurement techniques and expertise essential to minimise the adverse economic impact of the EC Directive 2004/40/EC “Physical Agents Directive” by putting in place the required standards, measurement techniques and expertise at standard laboratory level to allow European companies to demonstrate compliance with this legislation.

The project brings together the activities of all the European NMI’s active in this area, and maximises the social, scientific and economic impact by co-ordinating these activities to prevent duplication of existing European standards and by combining resource and expertise in those research areas which are seen as high priority in order to achieve the required critical mass

## **Contents of the workshop**

The presentations in the workshop will address the needs identified in the metrology environment for traceable Specific Absorption Rate dosimetry and traceable EM field strength measurements at all frequencies that are in wide-spread public use including the effect of digital modulation, multi-frequency and broadband signals, as encountered in real environments.

Furthermore they will address the needs for, and progress on, the development of the expertise, devices and measurement techniques to make these standards widely accessible for exposure assessment in the environment, and during MRI, for product compliance testing, and for studies into biological effects of EMF which underpin the international exposure limits.

*Topics will be (not extensive list):*

- The current state-of-the-art of electromagnetic field measurements like probe technology; probe calibration and present limitations.
- The current state-of-the-art of SAR measurement; like probes and liquids; calibration and present limitations.
- Research planned within the JRP on:
  - o Field strength generation and measurement
  - o Measurement of dielectric properties
  - o Low frequency SAR
  - o High frequency SAR
- SAR measurements below 380 MHz
- Linking of SAR measurements with induced RF body current measurement
- Etc.

This workshop would be well in line with the dissemination activity planned within the EU supported Joint Research Project (iMERA-plus) between physical standards laboratories on the topic of traceable measurements of Field Strength and SAR for the Physical Agents Directive. (EMC Zürich TC-11 topic)

Further for your information:

Participants in the JRP project are NPL (UK); PTB (DE); INRIM (IT); LNE (FR); STUK (FI); UME (TR) and NMi-VSL (NL)  
PTB (Mr Thorsten Schrader) is the coordinator of the project.