

REPORT ON AN INTERNATIONAL EVENT

COST 281/EBEA FORUM

A Common COST 281/EBEA (European BioElectromagnetics Association) Forum on European Projects with two workshops "Emerging Technologies" and "Mobile Communication and Children" were held at the University of Rome "La Sapienza," Italy, Faculty of Electrical Engineering from May 2 to 5, 2002.

The previous workshop that focused on the electromagnetic aspects of emerging technologies was organized by COST 244bis in Southampton, UK, in September 1999. Recent years have brought great development in electronic article surveillance for anti-theft devices, radio frequency identification for access-control or warehousing and inventory tracking and new technologies in medical therapies and diagnostics. There have also been significant changes in the technology of various electronic communication systems, for instance, wireless networks, body-LAN, blue-tooth, and mobile radio communication such as the very popular UMTS.

On May 4, 2002, COST 281 organized a new "Emerging Technologies" workshop. It was chaired by Norbert Leitgeb from the Technical University of Graz, Austria, and Luc Martens from the Department of Information Technology, Ghent University, Belgium.

Luc Martens introduced the goal of the workshop. He emphasised the necessity to review and update the results of the 1999 workshop and to investigate emerging technologies stressing UMTS and the new 4G technologies.

The following papers were presented by experts:

- "Properties of UMTS baseband signals in time domain and frequency domain (UMTS air interface)" by T. Hesse and W. Schulz from the University of Paderborn, Germany, and Dietmar Gerhardt from E-Plus Mobilfunk, Düsseldorf, Germany. The authors showed significant differences between time and frequency domain characteristics of signals of existing GSM (Global System Mobile) and the soon-to-be introduced UMTS (Universal Mobile Telephone System). The basic principles used in the UMTS coding information method were presented together with their consequences for characteristics of electromagnetic radiation surrounding base stations and handsets. A comparison of typical GSM and UMTS radiation was also discussed.

- “Exposure aspects of W-CDMA” by J. Bach-Anderson from the University of Aalborg, Denmark. The characteristics of exposure caused by W-CDMA (Wideband Code Division Multiple Access) terminals and base stations constructed for UMTS systems were presented. J. Bach-Anderson discussed exposure evaluation and dosimetry problems and compared power and frequency of GSM and UMTS systems. Consequences of the introduction the power control system and type of modulation of the signal for the exposure level were also discussed.
- “Features of a generic UMTS-test signal for investigations of biological effects” by Hervé Ndoumbé-Mbonjo Mbonjo from the University of Wuppertal, Germany. The author presented the need for well-established features of electromagnetic signals for an experimental study on the biological effects of exposure to UMTS radiation. The characteristics of the proposed signal type, the so-called generic UMTS signal was shown and rationalized. The signal proposed for investigations of the biological effects of weak electromagnetic fields is in compliance with UMTS-FDD (Frequency Division Duplex) specifications.
- “First experiences with electromagnetic measurements around UMTS base stations” by Luc Martens from the University of Ghent, Belgium. The presentation focused on the frequency domain characteristic of W-CDMA signals used by UMTS systems and technical problems during environmental measurements of electromagnetic fields produced by UMTS base stations. The differences between UMTS and GSM signals were described. Preliminary results of measurements done near test UMTS base stations were presented and discussed.
- “First experiments and experiences with UMTS hand-sets” by Peter Harrison from Nokia, Finland. The great possibilities of many kinds of new optimized, personalized, UMTS-based multimedia products were presented. The main uses of UMTS technology are calling, messaging with the use of voice and text (SMS), multimedia messaging (imaging), WEB content consumption, communicators for advanced business services, entertainment (music, games, fun).
- “Wireless LANs (local area networks), wireless PANs (personal area networks) and developments beyond 3G” by Reinhard Giraud from Deutsche Telekom, Bonn, Germany. The evolution of mobile communications systems and current trends in data services technology were presented. The consequences of the introduction of packet-switched network systems, wideband signals, and very small segmented cells were discussed. The technological possibilities of introducing new products and services were presented, for example, software-defined radio, ad-hoc networks, smart antennas, and multiuser detection.

- “THz-BRIDGE: A European project for the study of the interaction of Terahertz radiation with biological systems” by G.P. Gallerano from ENEA UTS Tecnologie Fische Avanzate, Italy. The possible applications of sources operating in the THz¹ region of the frequency spectrum were presented, for example, imaging the internal structure of biological and technical samples. Currently there is no wide public exposure to THz radiation but further technological opportunities can lead to occupational and general public exposure to this radiation. The on-going project funded to study the interaction of THz radiation with biological objects was presented. Preliminary results of multidisciplinary research were shown, for example, spectroscopic absorbance of human blood samples and genotoxic effects in human lymphocytes.

Interesting discussions followed the presentations. The participants (about 100 people from many European countries) asked many questions and expressed interesting opinions. The workshop reviewed different aspects of dosimetry and evaluation of exposure introduced by new technologies that use electromagnetic fields. The presented subjects are very important for successful prediction and current and further evaluation of general public and occupational exposure to electromagnetic radiation occurring in the environment because of technological development. Now exposure to weak electromagnetic fields concerns the whole population. Hopefully only part of the population works under strong exposure. The situation is not likely to change in the nearest future.

Another workshop that was held during the Forum was called “Mobile Communication and Children.” Luc Martens from Department of Information Technology, Ghent University, Belgium, and Gerd Friedrich from Forschungsgemeinschaft Funk, Bonn, Germany, were co-chairs. The subjects were possible health effects and specific investigation problems related to the use of mobile phones by children (e.g., anatomical and physiological differences between adults and children, ethical aspects concerning studies with children). The presentations and discussions during this workshop complemented “Emerging Technologies” very well.

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¹ 1 THz = 1,000,000,000,000 Hz.