Selected Topics on Communications & Information Technology

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Proceedings of the 3rd International Conference on Communications and Information Technology (CIT'09)

Vouliagmeni, Athens, Greece, December 29-31, 2009

Recent Advances in Computer Engineering
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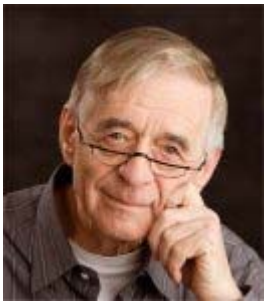
## Plenary Lecture 1

# Cell Phone Antenna, Problems and Solutions



**Professor Michael Bank**
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**Abstract:** A novel monopole internal antenna for mobile handsets is presented. The antenna, called the MB antenna, is a modified monopole whose radiating element is implemented in parallel proximity of a ground plane hence allowing for use as an internal antenna in handset applications. Simulation studies indicate that the proposed MB antenna has superior performance over PIFA antennas commonly used in modern handsets. Advantages include compact size, high gain and high efficiency. These characteristics make it very promising to use the proposed MB antenna in mobile handsets, including enhanced SAR reduction capabilities. The principle, design procedure, simulation results and comparison with PIFA also presented.

**Brief Biography of the Speaker:**
Professor Michael Bank received the B.A and M.Sc. degrees in communicational engineering from the Leningrad Institute of Communications in 1960, received the Ph.D. degree in 1969 in the field of FM signal detection. He received Doctor of Science degree (Russian equivalent of professor) in 1990. Since 1992 he is a consultant in Israel communicational company Bezeq and a professor in the Holon Institute of Technology (HIT). He wrote four books and more than hundred articles. Prof. Bank proposed new mobile communication method which named Frequency Bank Signal (FBS). His research interests include mobile communication systems theory and video and audio compression methods.

## Plenary Lecture 2

# Highly Efficient SAR Reduction using PIFA and MB Antenna in Mobile Handsets

**Professor Motti Haridim**
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**Abstract:** The field compensation method for creation of a weak field area near a transmitting antenna provides a generic method for reducing irradiation of mobile phone user's body, especially his head, without distorting the antenna's far field pattern in the horizontal plane. This method consists in adding an auxiliary antenna between the transmitting (main) antenna and the user's head.
In this work we've applied the field compensation method to the PIFA and the MB antenna. The former is widely used in nowadays mobile handsets, and the latter is an emerging printed antenna with promising characteristics for cellular handset applications and exhibits superior performance relative to the PIFA. The simulation results show a reduction of the total SAR by 2.5 dB, and the maximal SAR by 9.8 dB in the case of PIFA and a reduction of the total SAR by 15.5 dB, and the maximal SAR by 16.9dB in the case of the MB antenna.
The SAR reduction ability combined with the compact size and high gain features of the MB antenna make it a promising candidate for compact and safe cellular handset applications.

**Brief Biography of the Speaker:**
Motti Haridim received his M.Sc.E.E. degree from University of Washington and his Ph.D.E.E. from Technion Israel (1992). Since 1994 he has joined Holon Institute of Technology- HIT. During 2002-2008 Dr. Haridim was elected as the head of the Dept. of Communication Engineering at HIT. His research activities focus mainly on the physical layer of communication systems. Theses include optical communications, microwave photonics, RF communications, and antennas. He has published over 60 papers on theoretical and applied aspects of antennas, RF communications and optical communications. Dr. Haridim acts as a consultant in RF communication systems and antennas to several large Israeli companies.

## Plenary Lecture 3

# MPEG-4 Standard and Digital Television: An Overview

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**Abstract:** Moving Picture Experts Group (MPEG) has set many widely used standards. MPEG-4 standard (formally ISO/IES International Standard 14496) has been developed to support a wide range of multimedia applications. It provides users a new level of interaction with visual contents, including techniques to view, access and manipulate objects rather than pixels with great error robustness at a wide range of bit-rates. Application areas are from digital TV (DTV) and streaming video to mobile multimedia. By adopting the object-based model, MPEG-4 starts a new generation of content representation of independent objects with their own coding and features. The power and advantages of the object-based representation paradigm, make MPEG-4 a standard that may applicable from low bit-rate personal mobile communications to high quality studio production. One topic common to most applications is the need for supporting interactivity with different kinds of data. A prime example is the introduction of DTV, instead of analog with obvious direct benefit such as improved quality and reliability. Once the content is in digital domain, new functionalities can easily be added. The MPEG-4 standard provides key technologies that will enable such functionalities. Spatial and temporal scalability are also supported in MPEG-4. Scalability is implemented in terms of layer of information, where the minimum needed to decode is the base layer. Any additional enhancement layer will improve the resulting image quality either in temporal or in spatial resolution. With the growth of the Internet the interest in advanced interactivity with content provided by DTV is increasing. Coding and representation of not only frames of video, but also individual objects in the scene (video objects) can open the door for completely new ways of television programming.

DTV delivers interference and distortion free audio and video signals, while achieving much higher spectrum efficiency than analog television. Also, DTV can seamlessly interface with other communication systems, computer networks and digital media, enabling data casting and multimedia interactive services. Digital and analog broadcasts are incompatible and new equipment is required both to transmit and receive the new services. Agreements for the DTV transition are being implemented with different emphasis in various countries, depending on network and station arrangements, government regulations, and market conditions. DTV increasingly impacts broadcasters, consumers and many related industries. The DTV systems that are now available worldwide, not only deliver crystal-clear picture, and high quality sound, but they also provide various innovative new services and programs, such as electronic program guide, personalized advertisements, control, IP encapsulation, data broadcasting various interactive services. High definition (HD) programming requires installation of completely new production and distribution equipment and systems. This is a major capital investment for a broadcaster. HDTV is a natural evolution of television. Important factors include the penetration and availability of HDTV displays, receiver devices and sufficient HDTV broadcasts.

This work seeks to provide an overview of the influence of MPEG-4 standard on DTV from perspective in Europe. The first part deals with some practical elements of the MPEG-4 standard. The focuses are on the set of technologies together with visual bit stream. The second part describes DTV development including DVB activities and achievements, as well HD system origination for DTV. Finally, the third part describes control and encoding for DTV, including the corresponding services

**Brief Biography of the Speaker:**

Prof. Dr Zoran Bojkovic is a professor of electrical engineering at the University of Belgrade, Serbia. He is the co-author of 4 international books: "Wireless Multimedia communications" (CRC Press, 2009), "Introduction to Multimedia Communications" (Wiley, 2006), "Multimedia Communication Systems" (Prentice Hall, 2002) and "Packet Video Communications over ATM Networks" (Prentice Hall, 2000). Also he is the first author of the international monography "Advanced Topics in Digital Image Processing" (Editura Politehnica, Romania 1997). He has been the

co-editor in the Proceedings of 33 International Conferences. Prof. Bojkovic is Editor-in-Chief in 2 International Journals, associated editor in 3, and member of editorial board in 5 International Journals. He has published in international peer-reviewed journals and participated in many scientific and research projects in industry, institutes and academia. He has presented and published many conference papers, has conducted seminars, special sessions, tutorials, keynote and plenary lectures on video/audio coding, standards, multimedia communications and networking, worldwide. Prof. Bojkovic is Senior Member IEEE, EURASIP and WSEAS member. Also he is Serbian Scientific Society member and full member of Yugoslav Academy of Engineering, Belgrade, Serbia.

Bojan Bakmaz received B.Sc. and M.Sc. degrees in telecommunication traffic from the Faculty of Traffic and Transport Engineering, University of Belgrade, Serbia in 2004 and 2007, respectively. He is currently a Ph.D candidate and a teaching assistant at the Department of Telecommunication Traffic and Networks. Bojan Bakmaz is the author of one monography ("Quality of Service in Heterogeneous Wireless Networks" in Serbian, 2008) and coauthor of more than 30 papers in International Journals and the Proceedings of the International Conferences. Also he participates in several projects in the domain of telecommunication traffic and networks. His research interests also include the field of multimedia wireless networks: standards, mobility, QoS and security. He is a Member of IEEE.