Workshop “Innovations in engineering design”

29-30. November 2010, Kragujevac

Innovations in the development of microelectronics components

dr Goran Stojanović, associate professor

CIMC, FTN, Novi Sad

This project has been funded with support from the European Commission

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About CIMC:

- Established 2004. with the idea to connect researchers from the Faculty of Technical Sciences in the field of electronics and multidisciplinary fields.
- Within the Center 3 FP7 projects, 2 EUREKA projects, 3 COST projects are currently in progress.
- Well-established and developed cooperation with industry.
- Around 16 published papers, per year, in leading peer-reviewed journals with impact factors.
- Staff: 12 professors, 15 young researchers or PhD students and 4 technicians.
- Plans – to be the Center of excellence in electronics and leader in this field in SEE region.

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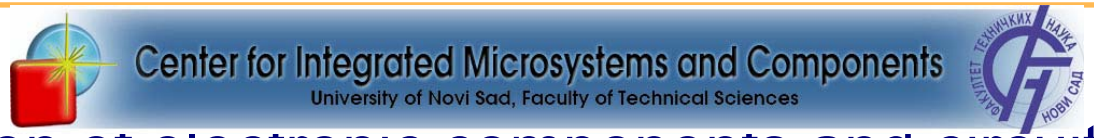

Services:

- Design and fabrication of electronic components and circuits on the PCB (printed circuit board) using modern rapid prototyping machine LPKF ProtoMat S62.
- Design and fabrication of components, circuits and systems (such as RFID tags, ID cards, sensors, etc.) on flexible substrates (paper, foil, ceramics) using Dimatix printer.
- Design, modeling, simulation and fabrication of different type of sensors (temperature, pressure, humidity, etc.) for application in automotive industry, civil engineering, food industry, medicine, etc.
- Specialized training courses in the field of software tools for simulation of electronic components as well as in the emerging fields such as embedded systems, organic electronics, nanotechnology.

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International projects:

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University of Novi Sad, Faculty of Technical Sciences

1. FP7, REGPOT project: "*Reinforcement of Research Potentials of the Faculty of Technical Sciences in the Field of Post Silicon Electronics*" (APOSTILLE - no. 256615, coordinator: prof. Goran Stojanović), 2010-2013.

2. FP7, ICT-2009.6.3.b, project: "*Smart Control of Demand for Consumption and Supply to Enable Balanced, Energy-Positive Buildings and Neighborhoods*" (SmartCoDe - no. 247473, coordinator: prof. Veljko Malbaša), 2010-2013.

3. FP7, IRSES project: "*Multiband Electronically Reconfigurable Microwave Devices and Antennas for a New Generation of Wireless Systems*" (MultiWaveS, coordinator: prof. Vesna Crnojević-Bengin), 2010-2013.

4. EUREKA project: "*New Generation of 3D Integrated Passive Components and Microsystems in LTCC Technology* " (IPCTECH no. E!4570, coordinator: prof. Goran Stojanović), 2009 – 2011.

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National projects:

"*Novel configurations of ferrite transformers and EMI suppressors for DC/DC converters and telecommunications modules*", project no. 11023, 2008 – 2011, (coordinator: prof. Ljiljana Živanov)

"*Realization of high performances micro-sensors for operation in extreme environmental conditions*", project no. 114-451-01009/2008-01, 2008-2011, (coordinator: prof. Goran Stojanović)

"*Synthesis nano powders and ceramics for application in new technologies*", (project no. 142059), 2005-2011, (coordinator: prof. Mirjana Damnjanović).

"Development of systems and instruments for water, oil and gas research", project no. 11006, 2008 – 2011, (coordinator: prof. Miloš Živanov).

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Cooperation with industrial sector:

- *Littelfuse Ireland Limited, Ireland*
- *Test Laboratories International Inc., USA*
- *ELSYS Design, Paris, France*
- *STMicroelectronics, Pavia, Italy*
- *Hotwell, Klingenbach, Austria*
- *Fotec, Wiener Neustadt, Austria*
- *HDL Design House, Belgrade, Serbia*
- *ICM Electronics, Novi Sad, Serbia*
- *IRITEL, Belgrade, Serbia*
- *NIS – Naftagas, Novi Sad, Serbia*
- *Panakva, Novi Sad, Serbia*

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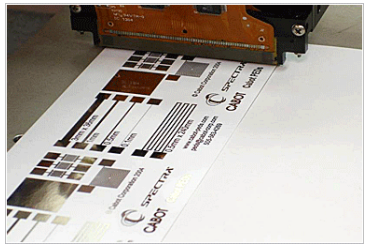
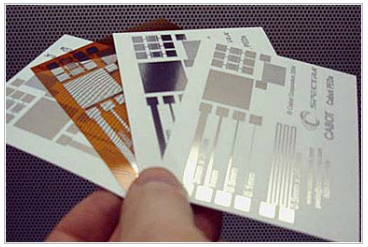
Equipment – fabrication facilities – flexible substrate:

Applications





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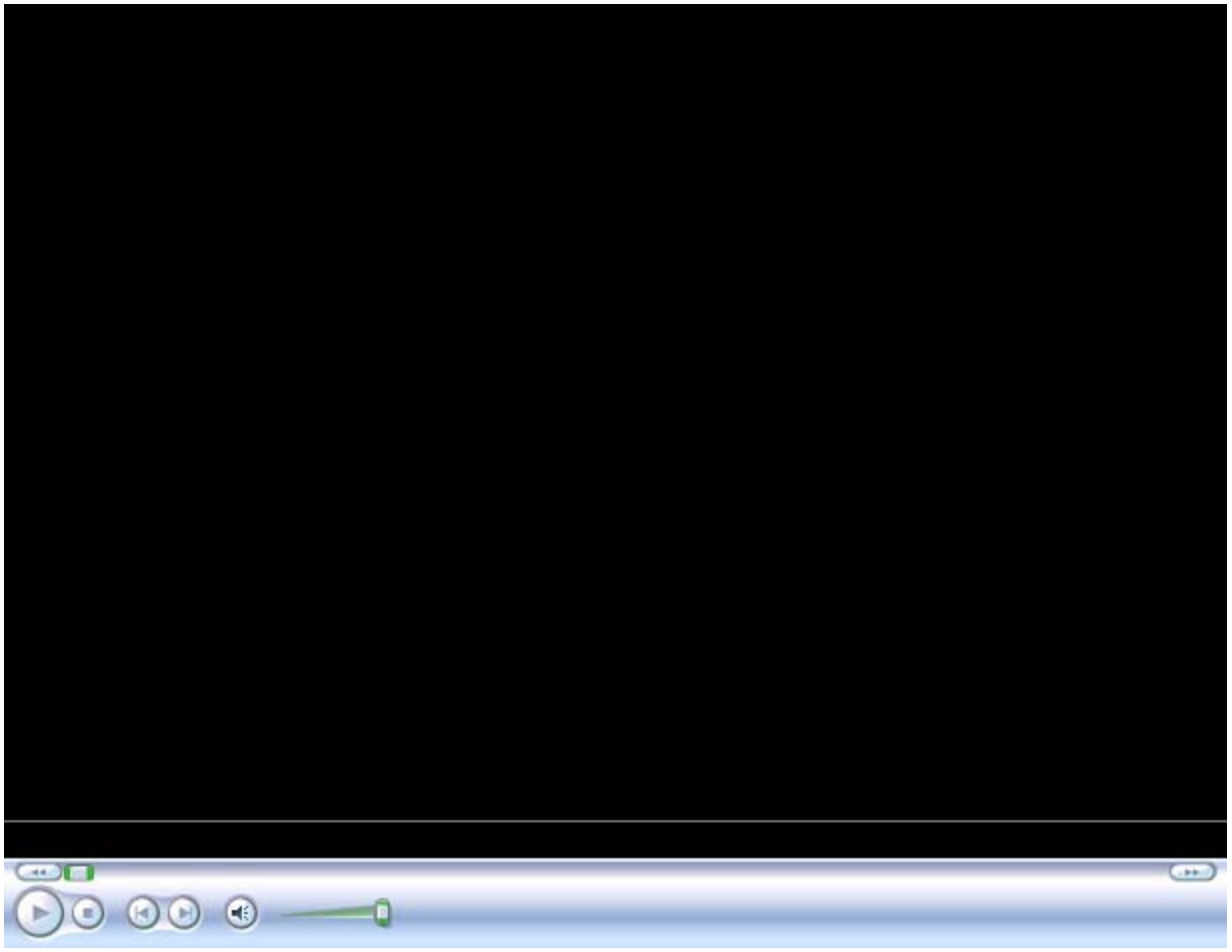

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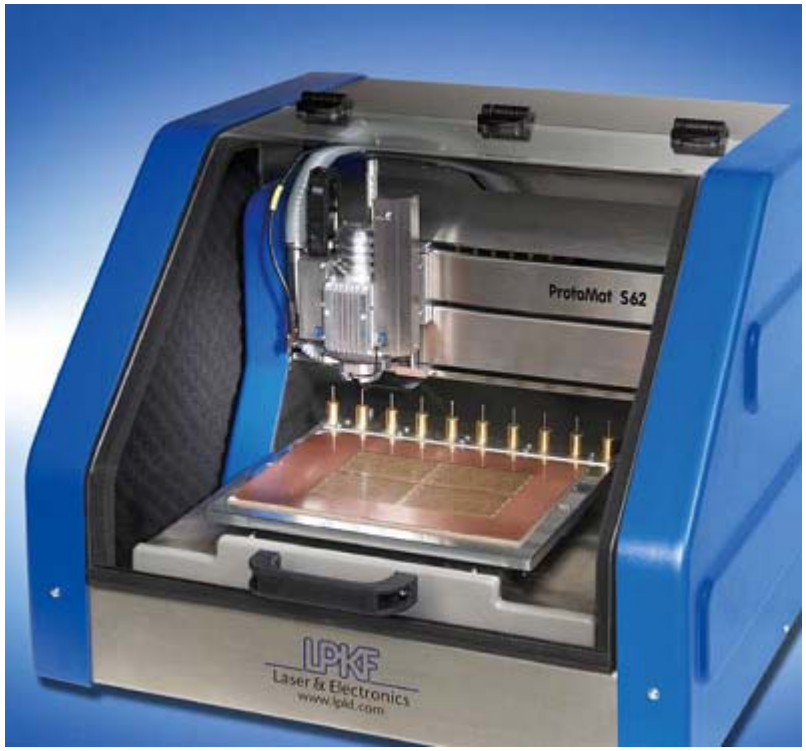
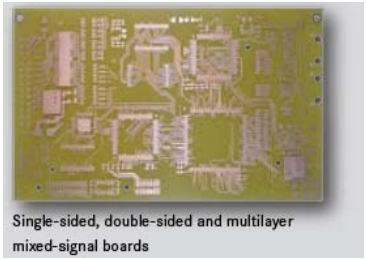
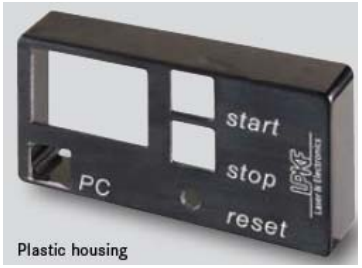
Equipment – fabrication facilities – rigid substrate (PCB):



Applications


Single-sided, double-sided and multilayer mixed-signal boards


Aluminum housing



Plastic housing

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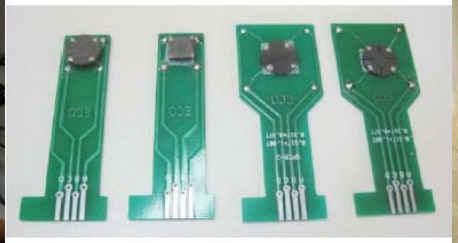
Some specific pieces of equipment for characterization:

- N5230A Agilent PNA-L Network Analyzer, 10MHz-50GHz
- E5071B Agilent Vector Network Analyzer, 300 kHz-8.5 GHz
- 4191A RF Impedance Analyzer, 1 MHz-1GHz
- 4194A Impedance/Gain Phase Analyzer, 100Hz-40MHz
- RF/Microwave Wafer Probe Station, SUSS PM5
- Hall Effect Measurement System HMS-3000
- HP 4277 A LCZ Meter to 1 MHz



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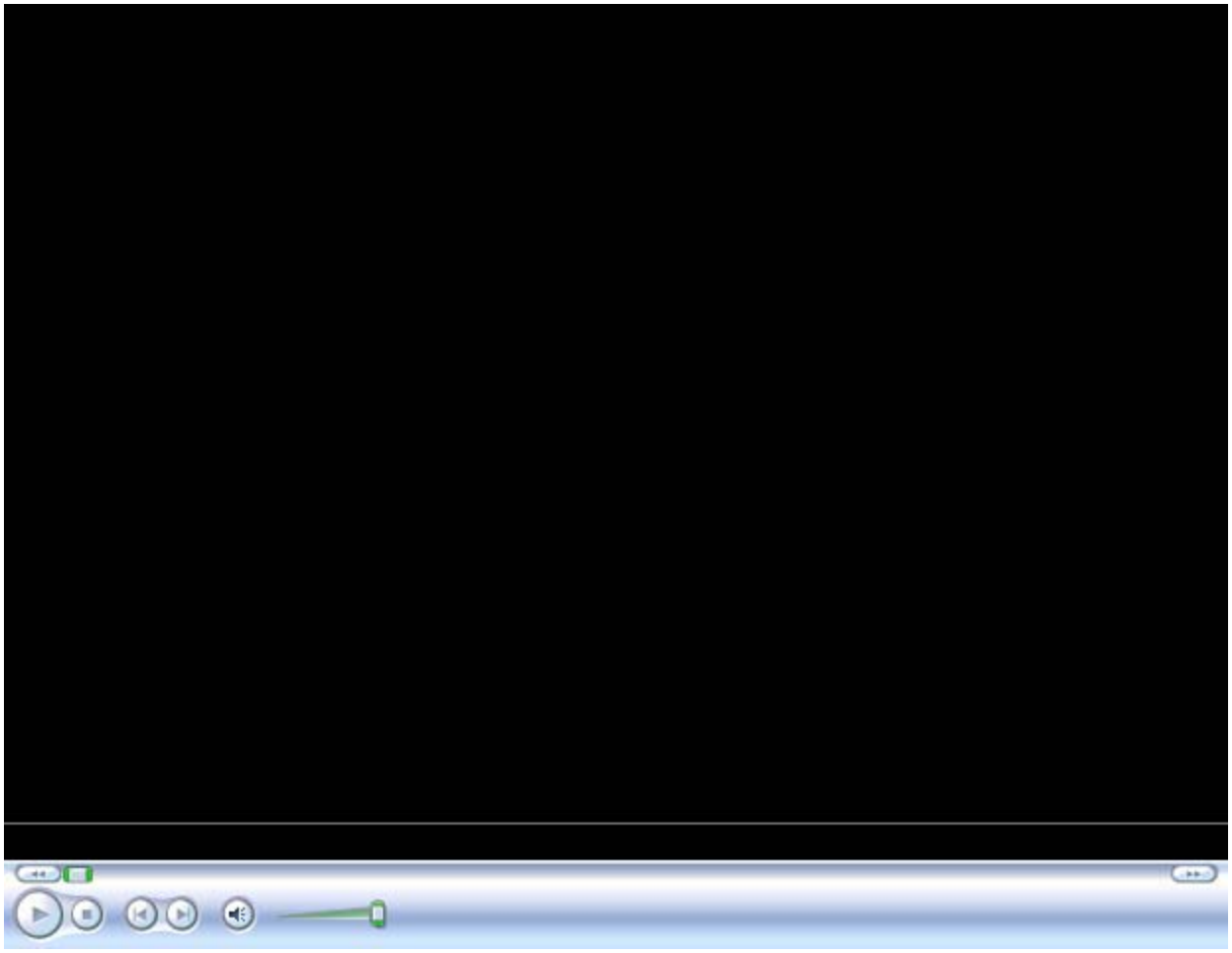

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Selected publications:

1. H. Liu, Veljko Malbaša, Ivan Mezei, A. Nayak, Ivan Stojmenović: "Coordination in Sensor, Actuator and Robot Networks", In: Wireless Sensor and Actuator Networks: Algorithms and Protocols for Scalable Coordination and Data Communication, Wiley Blackwell, Jan. 2010, pp. 233-262.

2. Goran Stojanović, Milan Radovanović, Mirjana Malešev, Vlastimir Radonjanin, "Monitoring of Water Content in Building Materials Using a Wireless Passive Sensor", *Sensors* (IF: 1.821), vol. 10, no. 5, pp. 4270-4280, 2010.

3. Mirjana Damnjanović, Ljiljana Živanov, Goran Stojanović, Aleksandar Menićanin, "Influence of Conductive Layer Geometry on Maximal Impedance Frequency Shift of Zig-Zag Ferrite EMI Suppressor", *IEEE Transactions on Magnetics* (IF: 1.061), vol. 46, no. 6,pp. 1303-1306, 2010.

4. Goran Radosavljević, Ljiljana Živanov, Walter Smetana, Andrea Marić, Michael Unger, Laslo Nađ: A Wireless Embedded Resonant Pressure Sensor Fabricated in the Standard LTCC Technology, *IEEE Sensor Journal* (IF: 1.61), vol. 9, no. 12, pp. 1956-1962, 2009.

5. Rastislav Struharik, Ladislav Novak, "IP Core Implementation of Decision Trees", *IET Computers and Digital Techniques* (IF: 0.629), vol. 3, no. 3, pp. 259-269, 2009.

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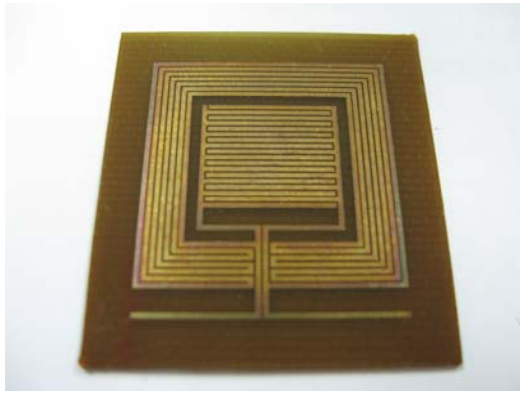
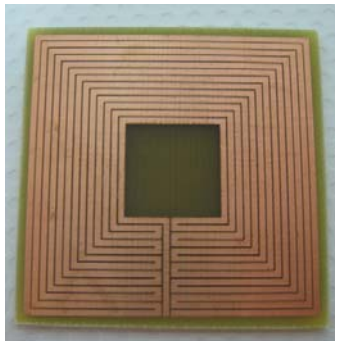
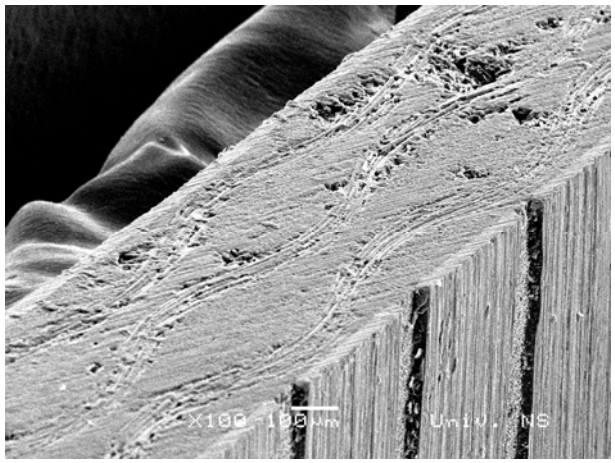
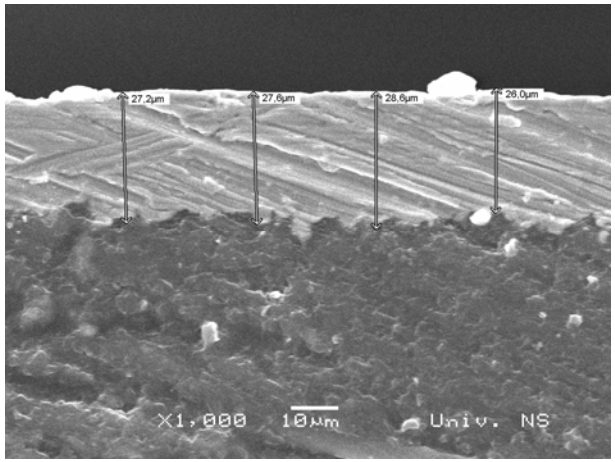
Examples of our innovations in microelectronic components:

1a. WIRELESS LC SENSORS FOR MONITORING WATER CONTENT IN BUILDING MATERIALS - PCB









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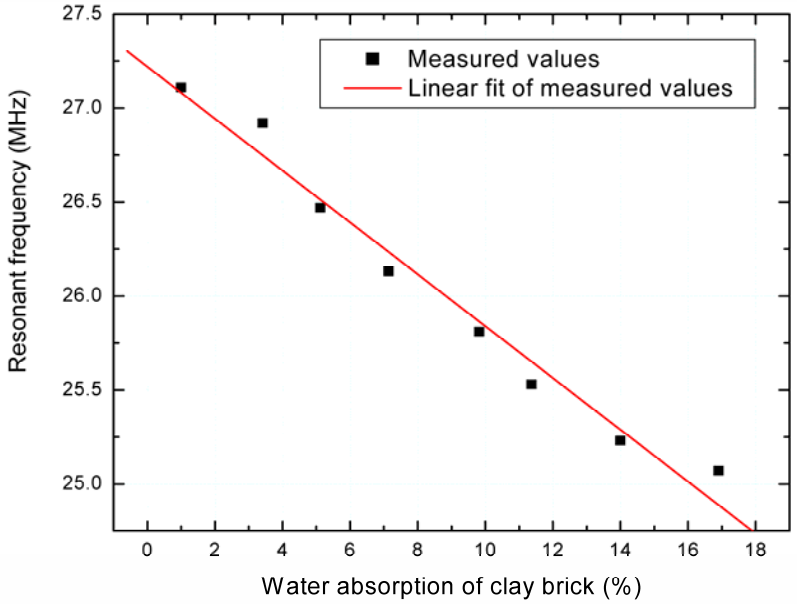

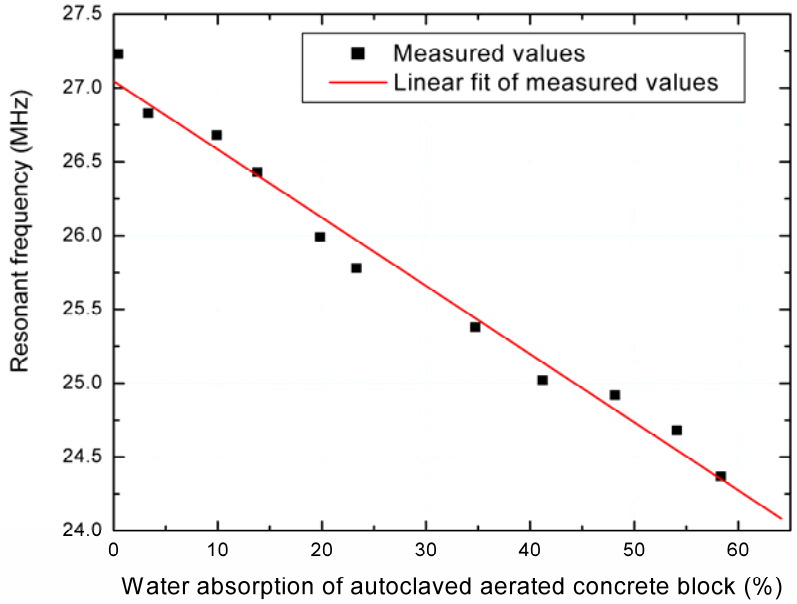

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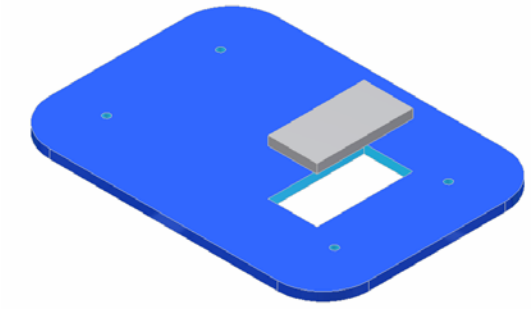
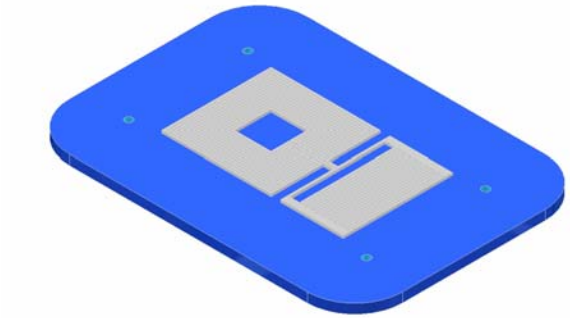
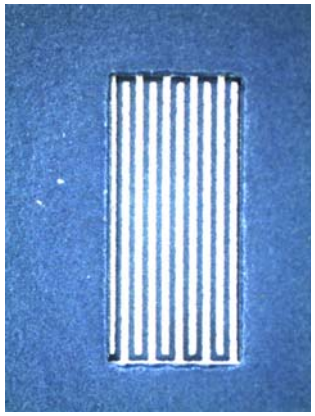
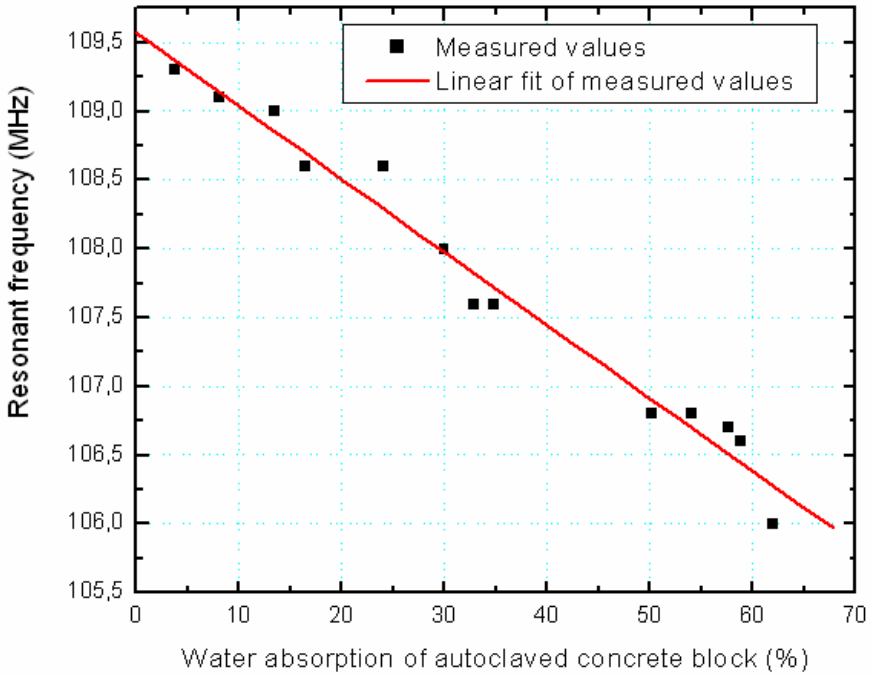
1b. WIRELESS LC SENSORS FOR MONITORING WATER CONTENT IN BUILDING MATERIALS - LTCC









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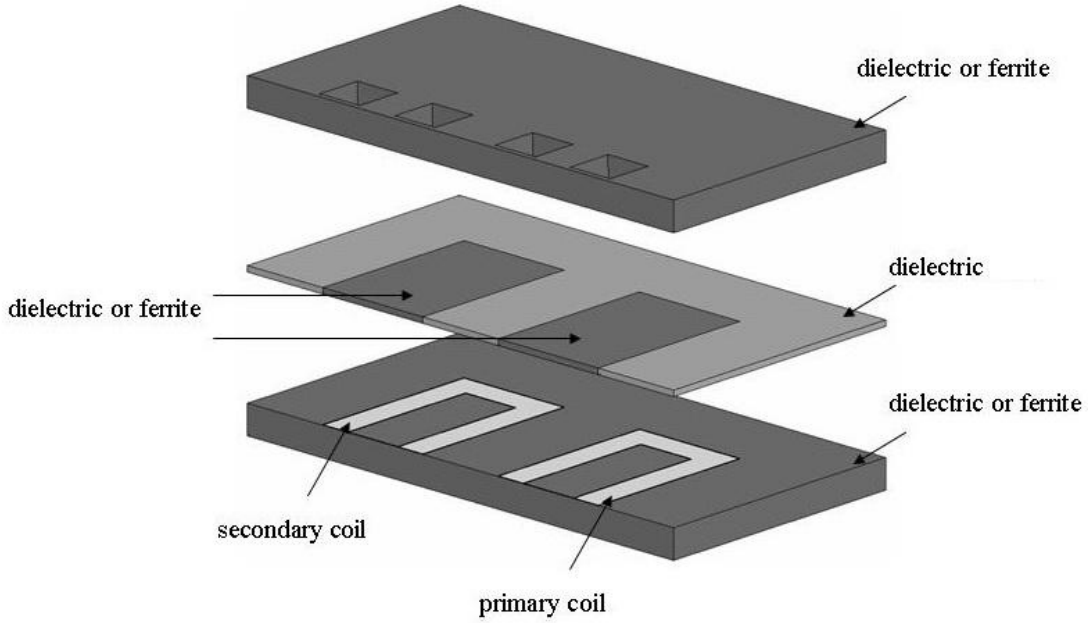
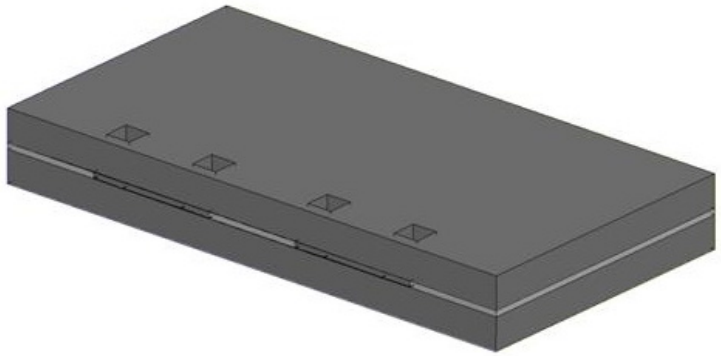
2. COMPACT MICROTRANSFORMER – LTCC TECHNOLOGY

The integration of magnetic properties into existing dielectric LTCC structures would have a dramatic impact on the miniaturization and application potential of LTCC devices in modern electronics – DC/DC converters





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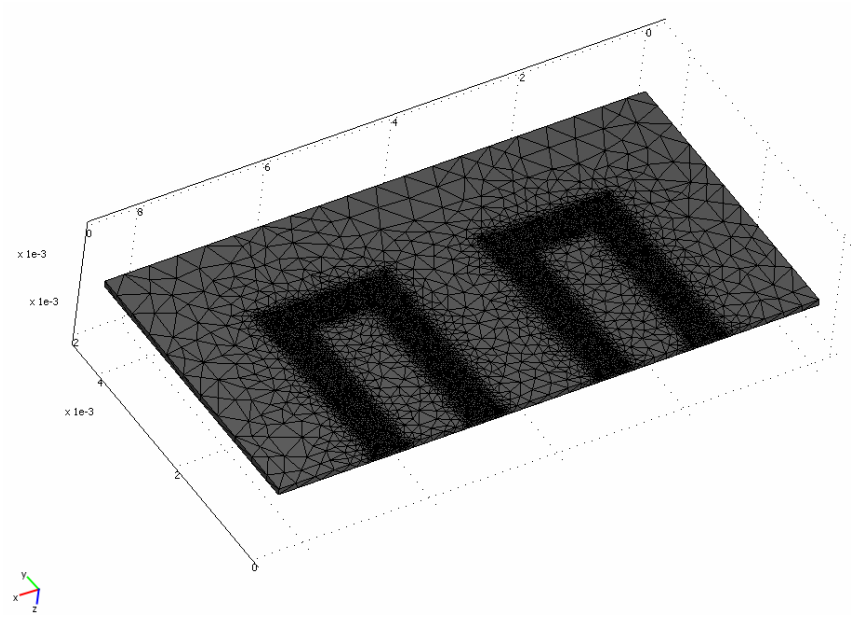
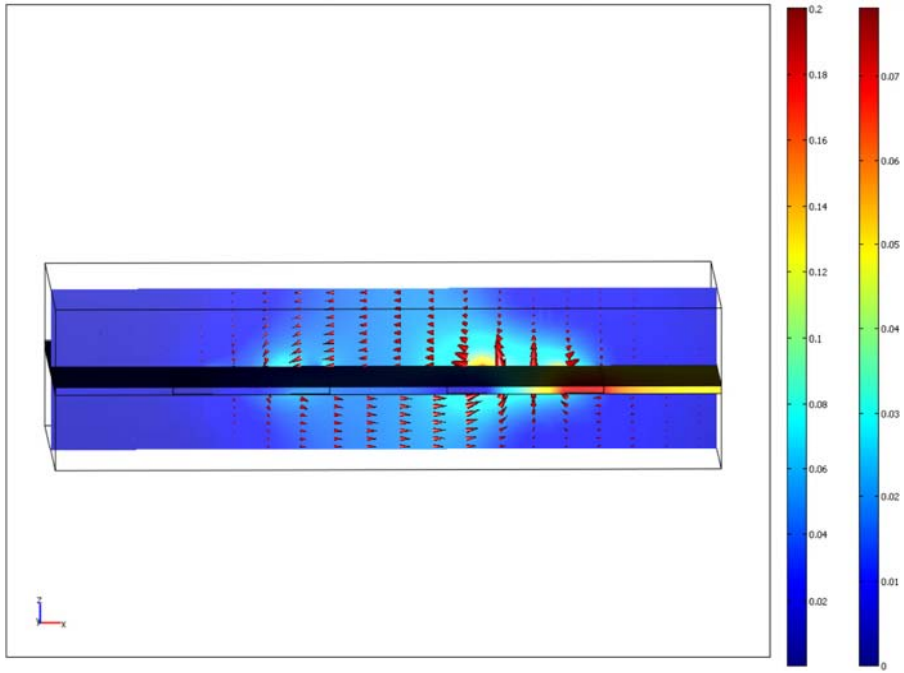
As a first step COMSOL Multiphysics was used for performances analysis of the presented LTCC ferrite transformer





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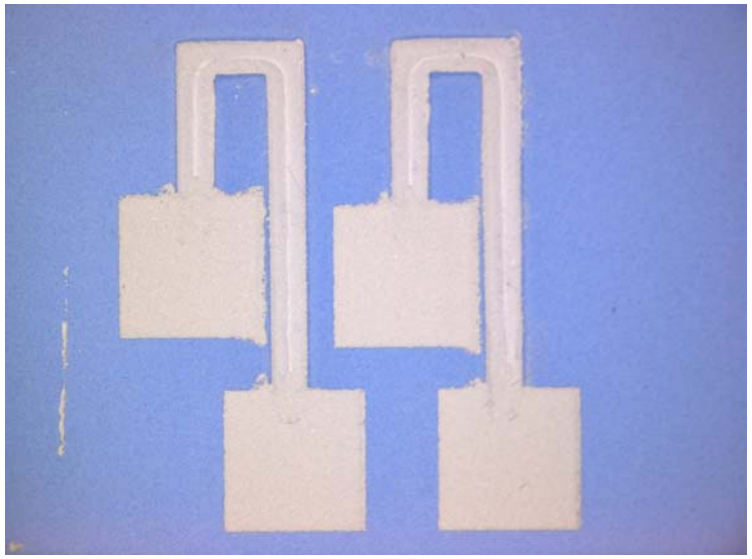

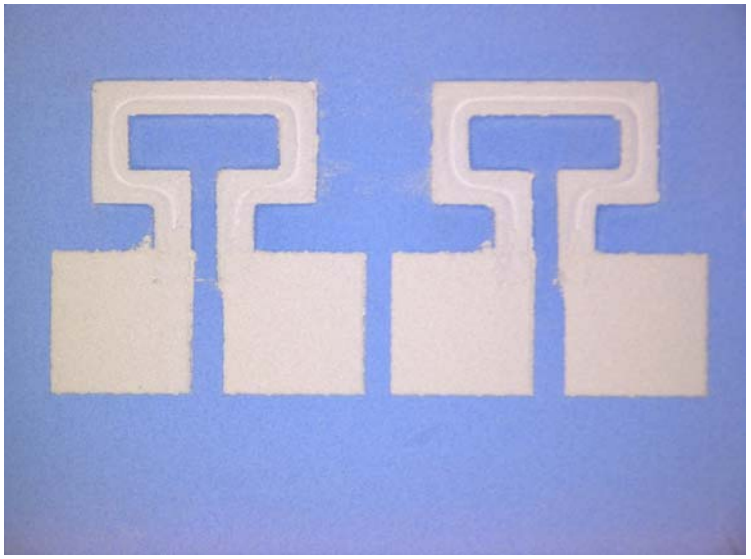

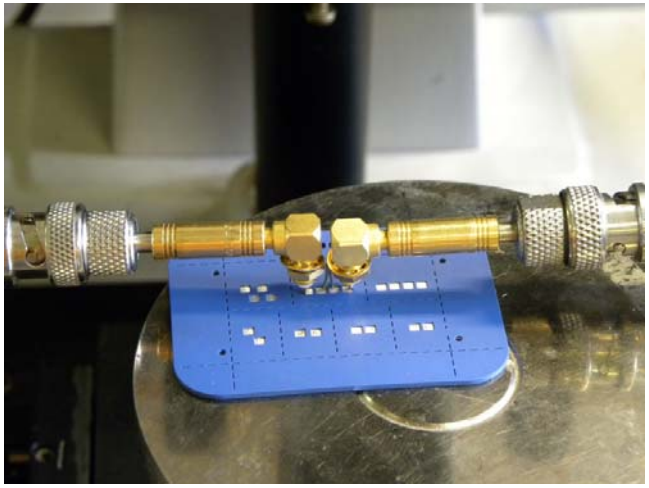

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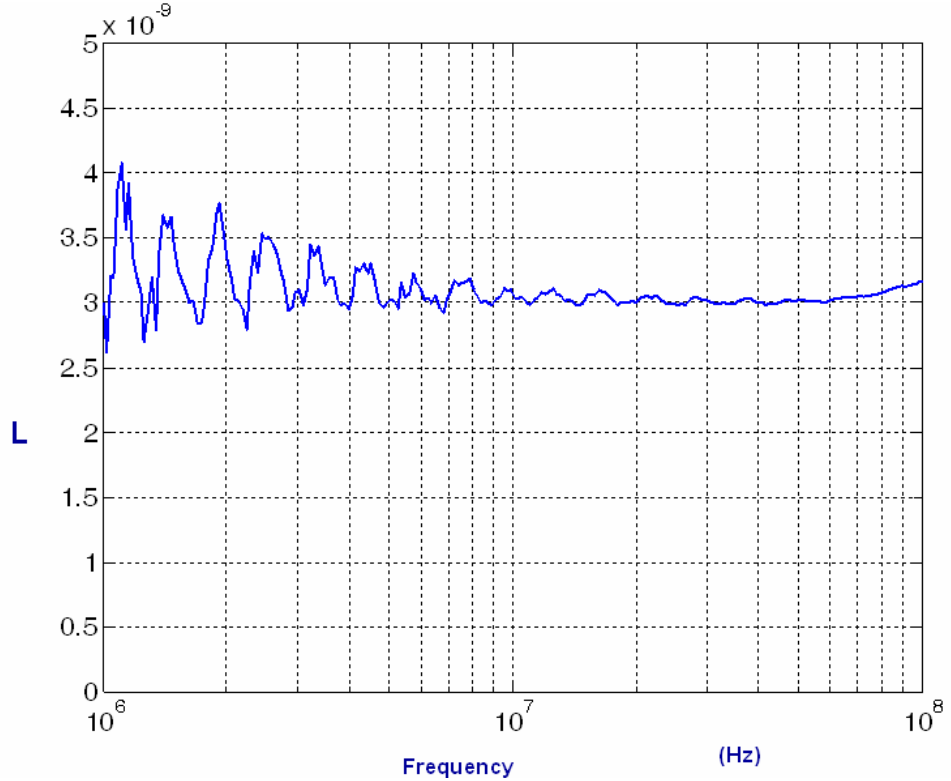

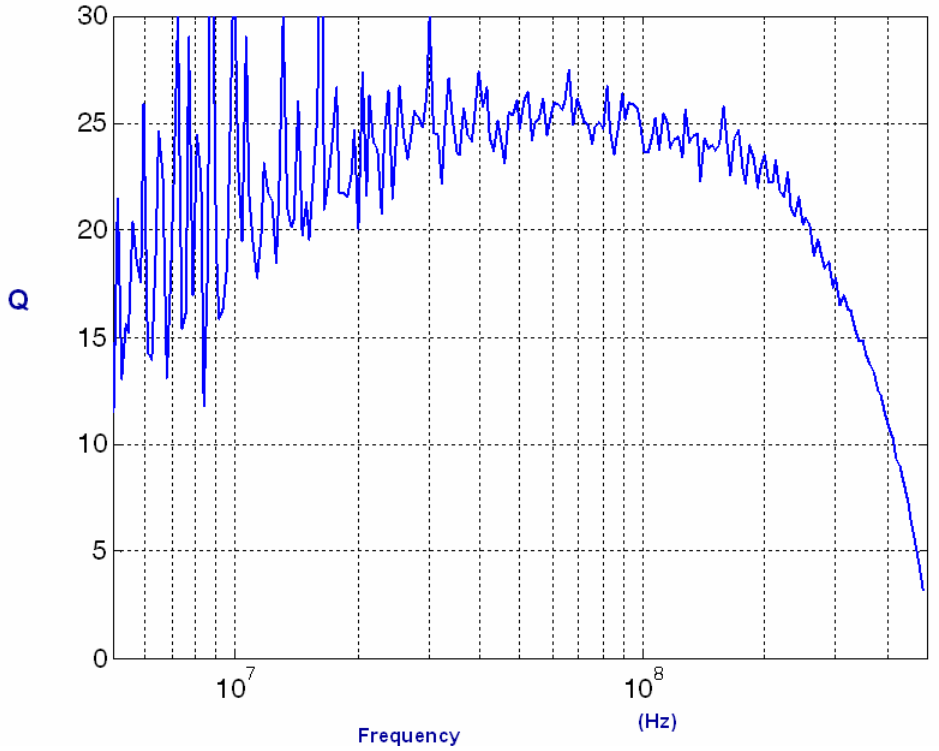

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The EPE - PEMC Council

On the occasion of 40th anniversary of EPE-PEMC conferences series

The Award Committee of the EPE-PEMC Council has the pleasure to Award

G. Stojanovic, A. Maric, G. Radosavljevic, E. Labourec and W. Smetana

The best paper award for adults for the paper

Performance analysis of LTCC transformers for application in DC/DC converters

Presented at the 14th International Power Electronics and Motion Control Conference EPE-PEMC 2010 Ohrid, Macedonia, September 06-08 2010

Prof. J.-L. Thomas
President
EPE Association

Prof. M. Kazmierkowski
Chairman of Award Committee
EPE-PEMC Council

Prof. I. Nagy
Chairman
EPE-PEMC Council

7 September 2010 Ohrid, Republic of Macedonia

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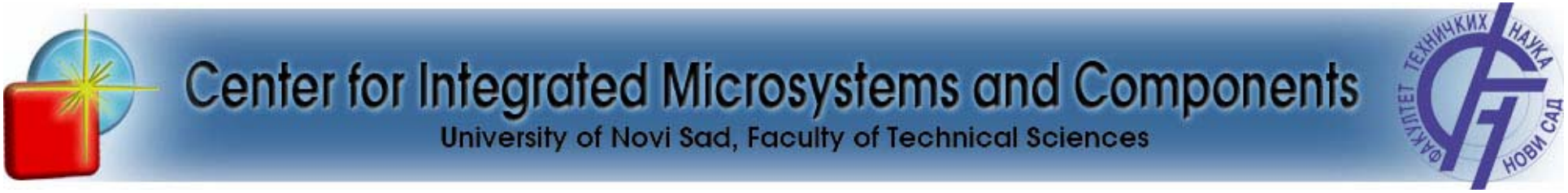

Thank you for your attention!

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