

Action IC0803 RF/Microwave Communication Subsystems for Emerging Wireless Technologies (RFCSET)

Participating countries: BE, CH, CY, CZ, DE, DK, ES, FI, FR, GR, HU, IT, NO, PL, PT, RS, SE, SK, UK

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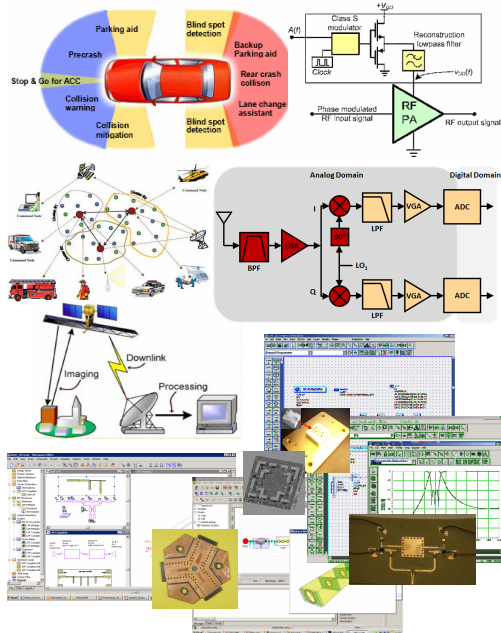


Figure 1: Illustrative image of the WG research lines.

Objectives:

- Advance European research towards the implementation of better RF/microwave wireless communication subsystems.
- Bring together experts from RF/ μ W engineering and signal processing.
- Explore multi-disciplinary design and optimization methodologies, combining electromagnetic (EM) simulation techniques with circuit analysis, nonlinear simulation and signal processing, in order to obtain an optimum performance.
- Encourage the collaboration between Academia and Industry by focusing onto commonly recognized problems of interest for real-world applications such as smart systems and sensor networks.
- Educate highly qualified young researchers and Ph.D. students in the field of communication subsystems that can fuel the European Industrial and Academic community.

Working Group 1 Ultra low power and power efficient RF technologies

The research activity in this working group targets energy efficient systems, both in terms of reducing the overall power dissipation as well as improving the efficiency of high power systems. Correspondingly, one can identify efforts towards extremely low power sensors and RFIDs on one hand, and system and circuit architectures aiming to maximize the efficiency of power amplifiers. The research topics include integrated RF sensors such as microwave radiometers for fire detection, as well as digital pre-distortion techniques to minimize the distortion of power amplifiers.

Working Group 2 Smart and reconfigurable RF radio transceivers

The second research area contains efforts towards subsystems with multiple and reconfigurable functionalities. A characteristic example of the efforts in this group includes signal processing and radio design efforts for software-defined radio. One can identify efforts for very wideband and for multi-band RF front-ends that support multiple standards and operate in different frequency bands, and novel algorithms for interference rejection. Another topic includes multiple input multiple output (MIMO) systems that adapt their functionality according to the user and network requirements.

Working Group 3 Design and optimization methods towards highly integrated and efficient terminals

The activity in this group aims at the developing of innovative and efficient CAD techniques for the analysis, design and optimization of passive and active microwave and millimeter-wave circuits. Novel optimization techniques combining global optimization and convex analysis with EM simulation are also part of this WG. A characteristic example consists of development of libraries of functional blocks of communication components based on advanced circuitry, signal processing, and adaptive subsystems. Research efforts in this working group provide the foundation for efficient CAD methodologies for the circuits and systems that are the design objective of WG1 and WG2.

Main Achievements:

- Setup of external Action Website providing the central database for the Action publications and activities
- Balanced participation of Industry and Academia in the leading activities of WG. Identification of the interests and potential of each participating research group within the WGs
- Formation of 6 additional focus areas (FA) to support the WGs
- Special issue in the Radio engineering journal, and Special session in the 2009 IEEE AP-S Conference. In addition, the 2nd MC/WG meeting included a Workshop with 33 presentations from the Action members
- Nomination of Assessment Panel for the STSM program and completion of 3 STSM involving ESR, initiating collaboration activities between Action members