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Editorial

Flexible Substrate Antennas

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Flexible electronics can currently be considered a well-established technology that has reached a certain degree of maturity in meeting the requirements of tightly assembled electronic packages, providing reliable electrical connections where the assembly is required to flex during its normal use or where board thickness, weight, or space constraints are driving factors.

In this context, flexible substrate antennas (FSAs) play a key role in the integration and packaging of wireless communication devices and sensor networks. Those antennas, which are designed such that the resonant peak frequency remains unaffected after bending, stretching, or twisting, are currently being embedded into materials such as textile fabrics, bandages, stickers, and bendable displays. FSAs are rapidly emerging as a popular choice for radio frequency identification (RFID) tags, multisystem wireless communication gadgets, wearable computer systems, and smart clothing and spurring new applications in wireless sensing such as monitoring of civil construction, health care supervision, or the integration in search and rescue satellite systems.

The introduction of new design concepts, new materials and new fabrication processes is adding momentum and interest to the development of flexible antennas for consumer electronics. Researchers are continuingly relying on flexible antenna technology to solve the problems of efficiency, reliability, cost, weight, shape, and reproducibility. There is also the need of using environmentally friendly and low-cost materials and production processes, in order to allow for the easy disposal of a massive number of those devices. This special issue aims at reflecting current research trends and new approaches in FSAs, collecting 13 peer-reviewed articles (with an acceptance ratio of 52%) reporting original research coming from 46 authors of 19 institutions of 14 countries.

Authors of this special issue used a variety of materials such as silver nanoparticle ink printed on Kapton polyimide film, ceramic-polymer and carbon-epoxy composites, conductive polymers such as PEDOT or PPy, metamaterial-based artificial magnetic conductor structures, or a copper-plated nylon fabric that acts as a conductive electrotextile material. They addressed a number of technologies located in different frequency bands, including near field communications (13,56 MHz), UHF RFID tag antennas (860 MHz), global navigation satellite systems (L2 band at 1.227 GHz and L1 band at 1.575 GHz), L-band DVB-H (1452–1492 MHz), GSM1800 (1710–1880 MHz), PCS1900 (1859–1990 MHz), UMTS (1900–2170 MHz), wireless local area networks such as WiFi and WiMAX (2.4-, 3.6-, and 5-GHz), Bluetooth (2.4 GHz), ultra-wideband (3.1 to 10.6 GHz), and even scientific applications at the Ku-band (12–18 GHz). This diversity reflects the lively momentum that research of FSAs is experiencing, as corroborated by the number of scientific publications on the topic shown in Figure 1.

Acknowledgments

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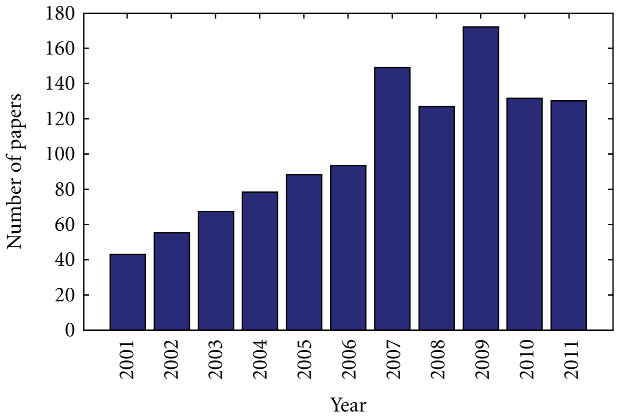

FIGURE 1: Number of papers that matches the search "flexible antennas" at the Thomson Reuters' Web of Science, using data from the Science Citation Index Expanded (SCI-EXPANDED) and Conference Proceedings Citation Index-Science (CPCI-S) databases.

reviewers who provided feedback on multiple versions of the papers.

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