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Tutorial

EMF Safety of a WPT System to Recharge a Compact Electric Vehicle



Organizer:

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Abstract

Due to the increasing environmental concerns, renewable energy sources have recently attracted a lot of attention from both industry and academia. A key technology following this trend is the usage of electric vehicles (EVs), whose widespread diffusion is still limited by the charging infrastructure and their on-board energy storage systems, mainly batteries. To overcome the so-called “range anxiety”, static or dynamic wireless power transfer (WPT) systems have been proposed to recharge EVs either while they are parked or in movement. However, one of the main issues related to EV-WPT systems is the large electromagnetic field (EMF) emissions during recharging operations.

The goal of this tutorial is therefore to provide the state-of-art about EMF safety compliance of WPT systems against international safety standards and guidelines, such as the ICNIRP and IEEE-TC95. In particular, the influence of the posture of drivers or bystanders in the EV, of the WPT coil position and configurations (aligned or misaligned) and of the EV chassis material will be considered.

ABOUT THE ORGANIZER

VALERIO DE SANTIS (M'05-SM'15) received the Laurea degree (with honours) in telecom engineering and the Ph.D. degree in electrical and computer engineering, both from the University of L'Aquila, L'Aquila, Italy, in 2006 and 2010.

He joined the Foundation for Research on Information Technologies in Society, IT'IS Foundation, Switzerland, from 2011 to 2013, holding the position of Project Leader and he was an Assistant Professor at the Nagoya Institute of Technology, Nagoya, Japan, from January to March 2015. He is currently an Associate Professor at the University of L'Aquila, L'Aquila, Italy. His current research interests include wireless power transfer, numerical methods and techniques, electromagnetic compatibility and human exposure safety.

Dr. De Santis is participating and leading several standardization efforts in the human exposure and product safety domain. He is a member of IEC TC 106, and IEEE ICES TC95.

Dr. De Santis received the Second Best Student Paper Award at the Bioelectromagnetics Society (BEMS) Annual Meeting, Cancun, Mexico, 2006, the Best Student Paper Award at the IEEE International Symposium on EMC, Honolulu, USA, in 2007, and the Leo L. Beranek Travel Grant at the IEEE International Symposium on EMC, Detroit, USA, in 2008.

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