Sapienza PhD in ICT

Doctoral program in Information and Communications Technologies at Sapienza Università di Roma, Rome, Italy

Seminar series of
Enabling Advances in Technology (EAT) @ DIET

Seminar Announcement

October 1st, 2015 - DIET Dept. Room 206, 1:15 p.m.

UWB radar systems for breath activity monitoring

Speaker: Dr. Erika Pittella

Abstract: An analytical model of an ultra wideband range gating radar will be presented. The model is used for the system design of a radar for breath activity monitoring having submillimeter movement resolution and fulfilling the requirements of the Federal Communications Commission in terms of effective isotropic radiated power. The radar is tested for remote breath activity monitoring, showing recorded respiratory signals in very good agreement with those obtained by means of a conventional technique employing a piezoelectric belt. Moreover, the interaction of UWB signals with the human body will be presented considering a plane wave incident on a layered model of the thorax taking into account the frequency dependence of the dielectric properties of the tissues. The results show that the signal reflected from the air–skin interface can be used to detect the respiratory activity when the radar is placed at distance from the human body. On the other side, if the UWB source is placed close to the human body, a small reflection, well distanced in time from the reflections due to the first layers of the body model, can be used to detect lung and heart changes associated with the cardio-respiratory activity.

Bio: Erika Pittella received the M.S. (cum laude) and Ph.D. degrees in electronic engineering from Sapienza University of Rome, Italy, in 2006 and 2011, respectively. She is currently a research associate with the Department of Information Engineering, Electronics and Telecommunications (DIET), Sapienza University of Rome. Her main research activities are related to the modeling of ultra wideband radars for the remote monitoring of cardio-respiratory activity and to the design of sources, antennas, and receivers of such systems. Her research interests also include dosimetric aspects of the interaction between electromagnetic fields radiated by ultra wideband radar systems and exposed subjects.