Duration: 13:50 - 17:50
Room: Istanbul

WM-05
Connecting to MMIC at Millimeter-Waves

Organisers:
Jan Hesselbarth, University of Stuttgart, Germany

Abstract
Advances in high-speed integrated circuit technologies led to various new applications for millimetre-wave systems in communication and radar. Besides requiring fast active elements, millimetre-wave systems make heavy demands on assembly precision, materials and technologies, all needed for low loss connections from the MMIC to the operating environment. This workshop will highlight advances and limitations of various techniques available to route millimetre-wave signals to/from MMIC. Presentations will include different aspects of bonding technologies, such as wire-bonds, ribbon bonds, flip-chip bonds, as well as direct connections between the MMIC and non-planar waveguides. In addition, packaging of millimetre-wave chips is discussed. In a first presentation, flip-chip interconnects operating up to 500 GHz are presented by the FBH institute, Berlin. Thereafter, performance of advanced wire-bonds at millimetre-waves and the characteristics of CMOS on-chip antennas are discussed by Tel Aviv University. Next, Fraunhofer IAF, Freiburg, discusses low-loss on-chip transmission lines and shows novel concepts to couple chips directly to the rectangular waveguide fundamental mode by means of on-chip field probes. In the second half of the workshop, Northrop Grumman brings more aspects of direct coupling from on-chip dipoles to rectangular waveguide, including waveguides made by DRIE. Then, Infineon presents concept and advanced features of the embedded wafer level ball grid array (eWLB) package for millimetre-wave applications. Finally, University of Stuttgart discusses coupling from chip to dielectric or metallic waveguide by means of on-chip resonators.

Programme

13:50 - 14:23 Flip-Chip Interconnects for DC to 500 GHz
Michael Hrobak, Ralf Doerner, Franz-Josef Schmueckle, Nils Weimann, Siddhartha Sinha, Sirinpa Monayakul, Viktor Krozer, Wolfgang Heinrich, Ferdinand-Braun-Institut, Germany

14:23 - 14:56 Interfacing CMOS Circuits to Waveguides and Free Space in the 60-600GHz Range
Eran Socher, Tel Aviv University, Israel

14:56 - 15:30 Novel Concepts for On-Chip Interconnects and Waveguide Packaging Enabling Advanced Multifunction ICs up to 1 THz
Michael Schlechtweg, Fraunhofer IAF, Germany

15:30 - 16:10 Break

16:10 - 16:43 Submillimetre Wave InP HEMT Packaging
Bill Deal, Kevin Leong, Northrop Grumman Corp., USA

16:43 - 17:16 Packaging Trends for mm-Wave Radar and Communication Systems
Maciej Wojnowski, Vadim Issakov, Infineon Technologies, Germany

17:16 - 17:50 Coupling of Metal and Dielectric Waveguides to Integrated Circuits
Jan Hesselbarth, University of Stuttgart, Germany