University of Pavia
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SEMINAR

The Future of Cellular IoT Connectivity
The Narrow-Band Internet of Things

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Abstract: The Narrow-Band Internet-of-Things (NB-IoT) is a standard-based low power wide area (LPWA) technology developed to enable a wide range of new IoT devices and services. NB-IoT significantly improves the power consumption of user devices, system capacity and spectrum efficiency, especially in deep coverage. Battery life of more than 10 years can be supported for a wide range of use cases. New physical layer signals and channels are designed to meet the demanding requirement of extended coverage and ultra-low device complexity. Supported by all major mobile equipment, chipset and module manufacturers, NB-IoT can co-exist with 2G, 3G, and 4G mobile networks. It also benefits from all the security and privacy features of mobile networks, such as support for user identity confidentiality, entity authentication, confidentiality, data integrity, and mobile equipment identification. Inside this scenario, an integrated passive device (IPD) solution is introduced. This IPD device implements a dedicated RF front-end (RF-FE) for Narrow-band Internet-of-Things (NB-IoT) modules. Adopting ST-proprietary IPD technology it is possible to integrate in a unique device several stand-alone RF functions. Specifically, a prototype embedding balun, low-pass filters and a coupler has been conceived, designed, and experimentally validated. In addition, this solution is highly versatile, providing compatibility with both the design of planar technology modules, molded modules and stacked modules, making it attractive for the implementation of the future generation of radio modules.

Bio: Enrico Massoni (E.M.) was born in Broni (PV), Italy, on January 23th, 1991. Past graduate from the University of Pavia (BSc ‘13, MSc ‘15, Licensed Engineer ’16 and Ph.D. ‘18), Faculty of Engineering, Microwave Laboratory. E.M. lived abroad in Ghent, Flanders, Belgium (‘15) and Montréal, Québec, Canada (‘18). E.M. joined STMicroelectronics November ‘18, and he was appointed “Senior R&D Engineer (RF/Microwave Expert)”, inside Analog MEMS and Sensors Group. Afterwards, E.M. graduated from the “Collège des Ingénieurs” M.B.A. Alumni Class ’21. More recently, E.M. has been appointed Team/Programme Leader (NB-IoT Champion), inside IPC Division, AMS Group of STMicroelectronics. Active member of cultural and scientific associations like AEIT-AMES, IEEE and EuMA, E.M. is personally and professionally interested in cutting-edge engineering technologies, especially in the RF and Microwave fields, both with implications of innovation, industrialization and business opportunities.

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