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Technologies Enabling Future Mobile Connectivity and Sensing

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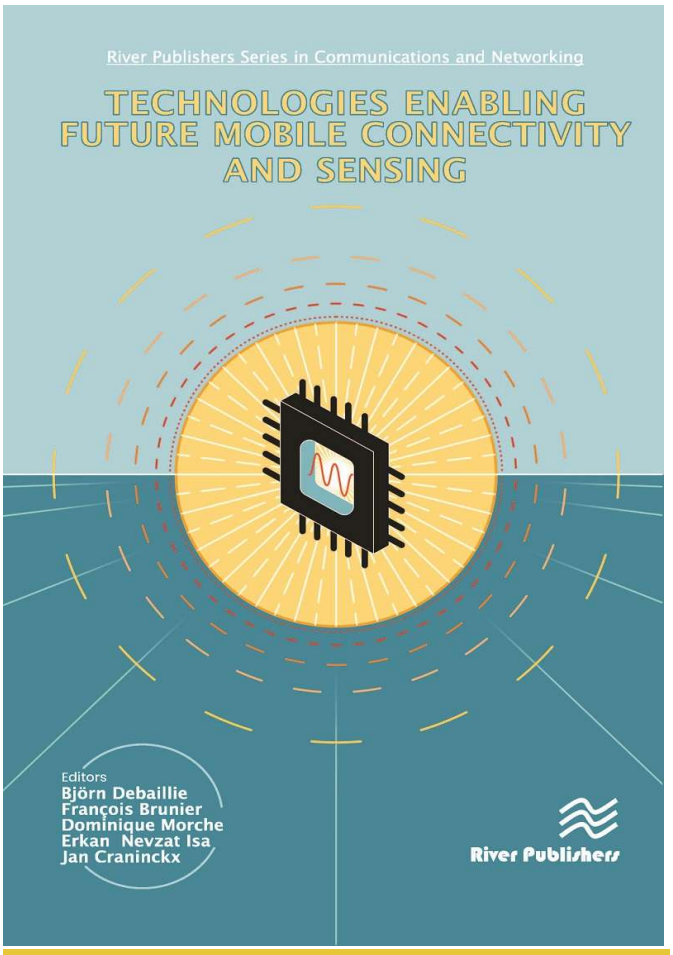
This book provides an overview of the latest research results in RF and digital SOI technology development for 5G and 6G, device and substrate characterization, packaging technology, and the realization of full systems including power amplifiers, linearization techniques, beamforming transceivers, access points, and radar detection.

In today's connected world, the demand for mobile communications and instant access to information, anytime and anywhere, has drastically changed the electronics landscape, both consumer and industrial. Novel 5G and 6G systems will enable connectivity in all forms between humans, devices, machines, and any objects. They will provide virtually ubiquitous, ultra-high bandwidth and low latency network access to individual users, as well as to all objects benefiting from being connected. They will be the "eyes and ears" of Artificial Intelligence systems as it will provide real-time data collection and analysis. Such diversity calls for a new paradigm in terms of flexibility, not only related to performance, but also in terms of scalability and cost.

5G and 6G communication systems imply a major stake of sovereignty and autonomy for the communication sector and digital infrastructures of the future. All products related to IoT, traffic, and health care, supported by connectivity will benefit the citizens in their daily lives to improve everything from business to private affairs. Together, this will influence society as much as smart phones did in the recent past. It is all about communication and connectivity.

This book provides an overview of the latest research results in this field. It is based on the close collaboration in the BEYOND5 project, extended with vision and roadmap insights by European experts leading the 6G development. The BEYOND5 project has built a completely European supply chain for Radio-Frequency Electronics, enabling new RF domains for sensing, communication, 5G radio infrastructure and beyond. Moving forward into higher frequency bands above 100 GHz for 6G, also more disruptive technologies, using heterogeneous integration of CMOS, SOI, and III/V components such as GaN or InP, and advanced packaging techniques will be necessary to realize the objectives of ubiquitous, ultra-high bandwidth and low latency networks.

The book bundles the scientific content of the International Workshop on "Technologies enabling future mobile connectivity & sensing" in Lisbon, Portugal 10 September 2023, as part of the ESSCIRC/ESSDERC 2023 European Solid-state Circuits and Devices Conference. Through articles and abstracts, a combined view of experts and practitioners representing academia, research, and industry in the field of wireless communication systems is given. They cover the topics of RF and digital SOI technology development for 5 and 6G, device and substrate characterization, packaging technology, and the realization of full systems including power amplifiers, linearization techniques, beamforming transceivers, access points, and radar detection.



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