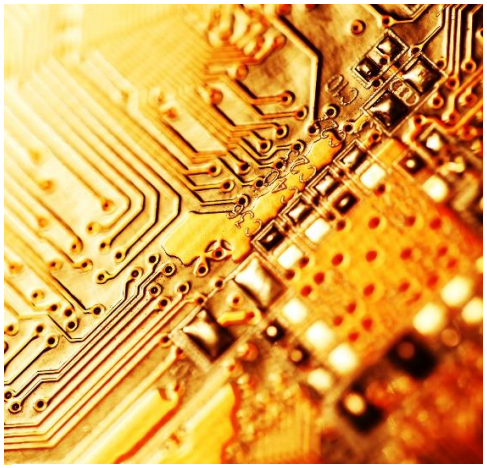
Institute for High-Frequency & Communication Technology

Master-Thesis

Towards the next generation of mobile communications (6G):

Design and verification of a packaging solution for the next generation of wireless RF tranceivers.



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In recent years, the demand for high data-rate wireless links has grown exponentially. At lower carrier frequencies with congested bandwidth, high-complexity high-order modulation is pushed to the limits to improve the speed of current communication systems. Driven by the demands of the future networks, the need for larger communication bandwidth in both indoor short-distance and outdoor large-distance point-to-point wireless links becomes evident, thus, motivating a gradual shift of carrier frequencies toward higher mmWave band. Carriers in the near-THz transmission window beyond 220 GHz with the still vast available spectrum are anticipated by the new IEEE 802.15.3d-2017 standards as promising for the realization of future 100+Gb/s data rates. The future 6G networks are envisioned to operate in this frequency range, with expected data-rates approaching to 1 Tb/s.

In this Master-Thesis, you will design a packaging solution for the wireless transceivers of the next generation (6G). The packaging scheme will be based on a (multi-level) printed circuit board (PCB). This PCB will handle two different kinds of signals: DC, used to power up and control the circuits within the chip, and baseband (BB) signals with a BW above 20 GHz capable of handling data-rates above 100 Gb/s. Your work will be to design and test this PCB, putting special attention to minimize the leakage oft he high-frequency BB signals, either to another BB path or to the DC supply lines.

Requirements:

- Previous knowledge in high frequency systems.
- Knowledge in PCB simulation tools (Altium) or high frequency simulators (HFSS) is desired.

After finishing this work, you will have good options to find a job in the following topics:

- RF systems
- PCB design.

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