RF2THzSiSOC-
From RF to MMW and THz Silicon SOC Technologies

Goal of RF2THzSiSOC project is the establishment of silicon technology platforms for emerging Radio Frequency (RF), Millimeter-Wave (MMW) and Terahertz (THz) consumer applications such as: 77GHz/120GHz automotive radars, MMW Imaging and Sensing, fast measurement equipment, 60GHz wireless networking and fast downloading transmitter(Tx)/receiver(Rx), 400Gbit/s optical data communications, 4G photonic mobile communication transceiver and RF wireless communication requiring high performance devices (transmitted power, consumption, integration, isolation), as well as two-way satellite communication systems. Moreover it targets at the creation of a platform for various MMW and THz applications from different disciplines like health science, material science, genetic screening, security, industrial automation.

The RF2THzSiSOC project relates to the CATRENE program White Book, Technologies work areas "Technology platform for process options ('more than Moore') and heterogeneous systems integration" and especially "Mixed signal analogue/digital and RF technology", „BiCMOS and RF power technology". It is supporting the European effort towards strengthening the global position of the European semiconductor industry and its supply chain with European technology content.

University of Siegen, Silicon Radar GmbH and IHP GmbH target at the creation of a 130nm BiCMOS SiGe 245GHz-platform for applications in THz imaging. Silicon Radar GmbH and IHP GmbH design and fabricate wideband Tx and Rx elements. University of Siegen is responsible for building up a 3D THz imaging demonstrator for in-line nondestructive testing (NDT) of automotive lightweight materials. Research activities include: Sparse linear array design, real-time FPGA based data-acquisition and processing, RF electronics and demonstrator and 3D image reconstruction of 32 Tx/Rx elements aiming for 1mm lateral resolution.

Fig. 1

Fig. 2

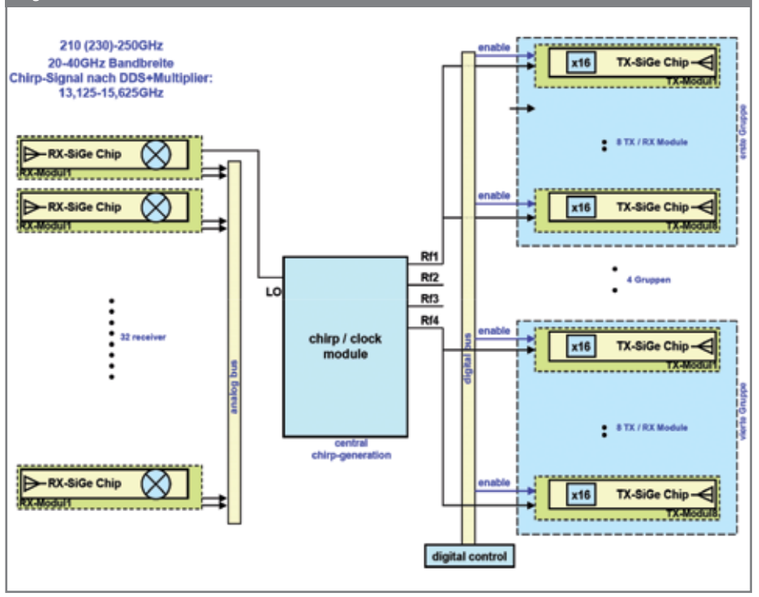
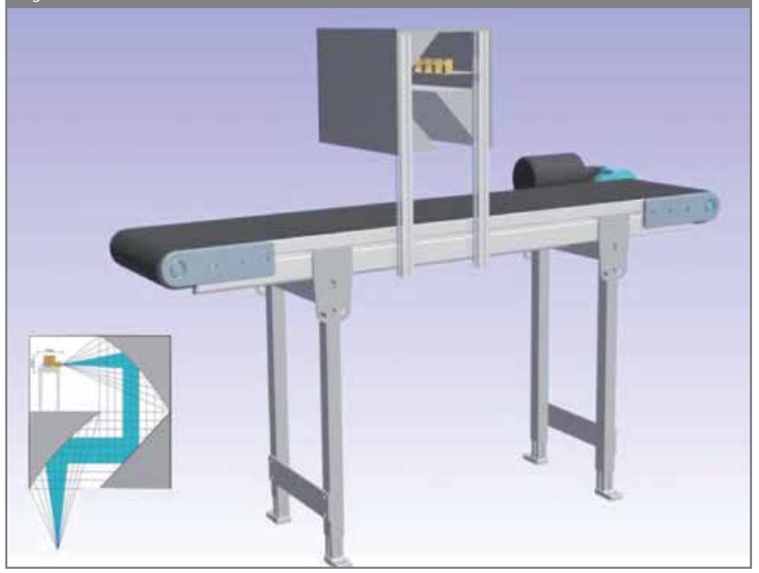


Fig. 1: Testing Rx SiGe chip(Quelle: SiliconRadar GmbH)

Fig 2: Overview Rx/Tx and RF electronics

Fig 3: 3D-model of planned demonstrator

Fig. 3



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