

BEYOND 5G



D-band Radio solution Enabling up to 100 Gbps Reconfigurable Approach for Meshed beyond 5G networks



Dream project will bring wireless systems to the speed of the optical systems

The vision

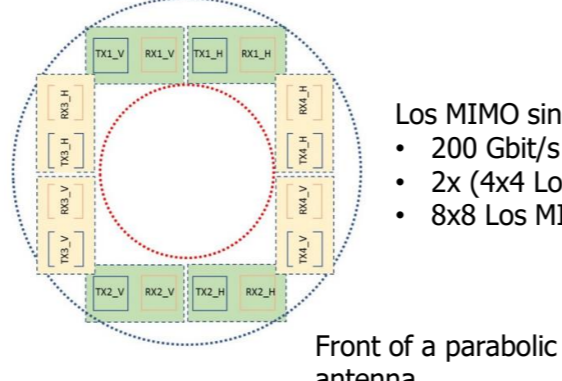
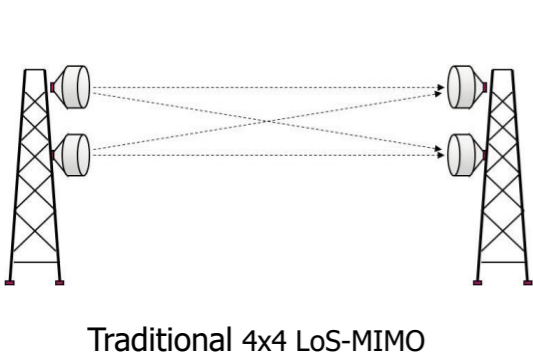
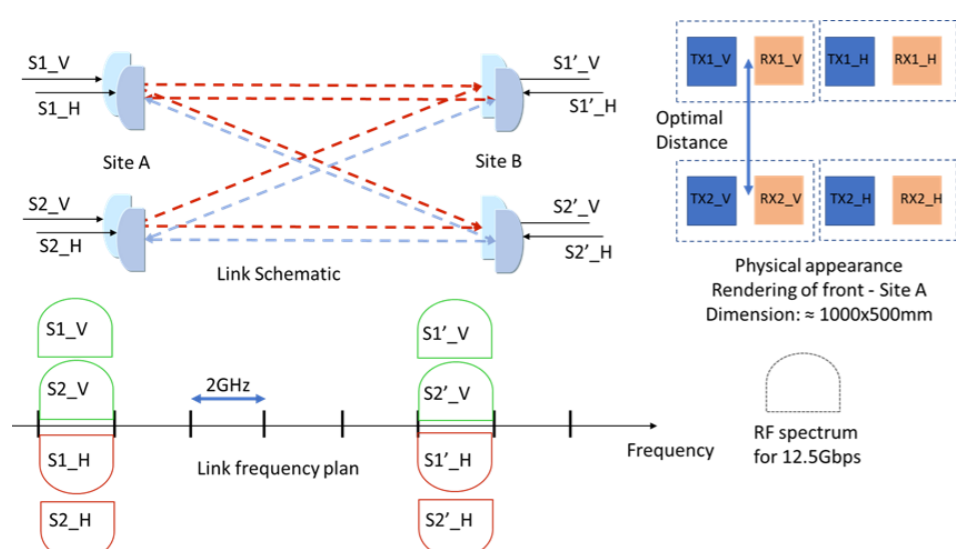
Exploitation of the radio spectrum in **D-band (130-174.8 GHz)** with beam steering functionality enables wireless links with data rate exceeding current V band and E band wireless backhaul solutions by at least a factor of 10 and brings wireless systems to the speed of optical systems.

Technical objectives

- Capacity between two nodes up to 100 Gb/s
- Network and frequency plan allowing at least 3 connections per node
- Hop length up to 300 m
- Availability > 99.9%
- Beam steering capabilities, with +/- 45° steerability
- Use of D-band (130-175 GHz), according to ECC recommendations
- Adaptive code and modulation (ACM)
- Gross system gain up to 140 dB

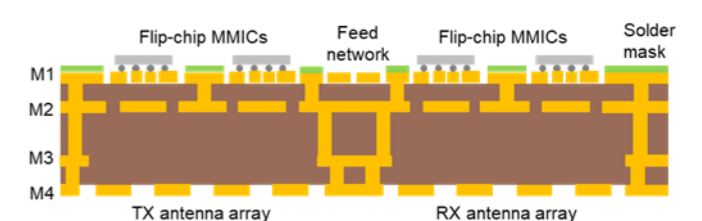
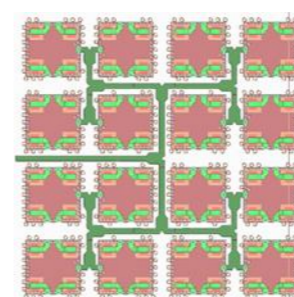
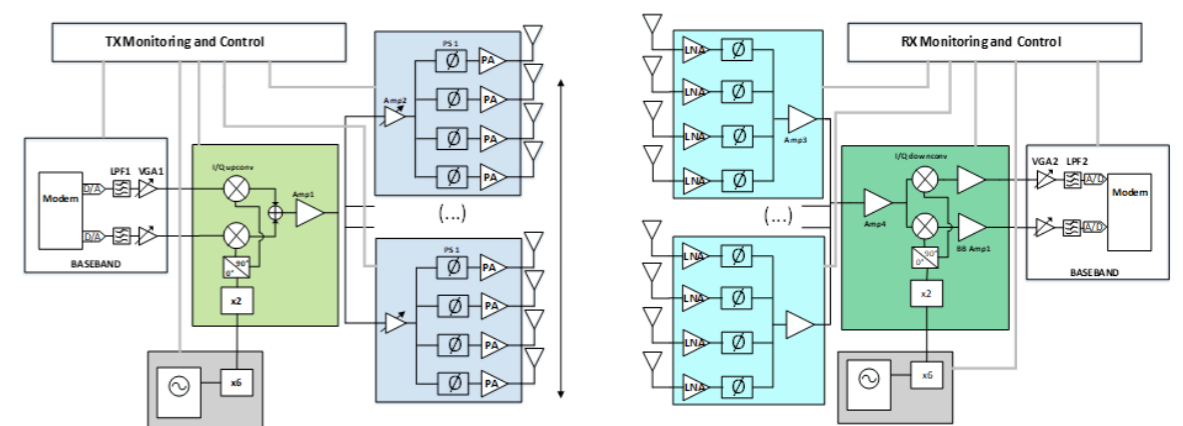
Approach

- 4x4 LoS MIMO
- 2-GHz channels, with flexible FDD.
- Full Duplexer FD to be investigated
- Up to 256-QAM modulation (ACM) -> 12.5 Gbps in each direction
- Up to 256 antenna elements
- Integrated on state-of-the-art STMicroelectronics 55-nm BiCMOS technology
- Modular and scalable arrangement. A multi-chip solution will be implemented.
- State-of-the-art PCB materials to minimize loss at D-band frequencies

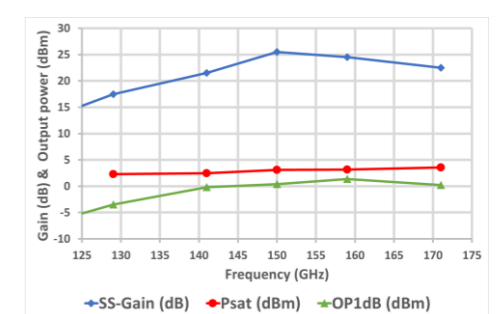
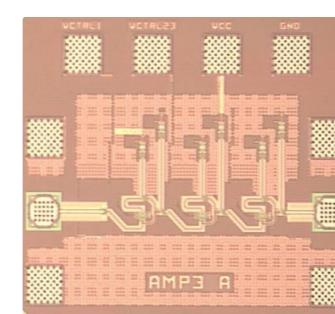


- Los MIMO single antenna:
- 200 Gbit/s
 - 2x (4x4 LoS MIMO) or
 - 8x8 LoS MIMO

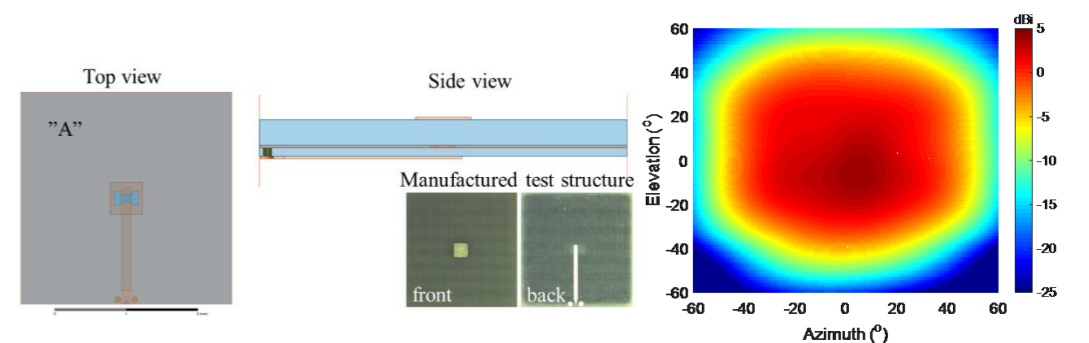
Transceiver architecture



Technologies for D-Band link



The photo and characteristics of the very compact and high-gain amplifier over full D-band (size without padding < 0.05 mm²) in 55 nm SiGe BiCMOS. It is built with the same 3 cascaded amplifiers to simplify future integration.



Patch antenna for D-band phased array. Simulation model and photograph of the manufactured antenna (left). Measured gain pattern at 150 GHz (right). Technology is PCB based on low-loss substrate material.

Info & contacts

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