

Theme: Beyond 5G Communication Systems

- Sub Theme: Components for Terahertz Communication Systems

Terahertz (THz) frequency band, 0.1 to 10 THz, offers vast spectrum resources to support >100Gbps for beyond 5G communication systems. FCC is currently considering to open the 95 - 475 GHz range for commercial use. Key component challenges for THz communication are low noise/high gain amplification, high linearity transmit power generation, low noise oscillators, and THz frequency conversion. Short wavelengths (3mm @ 100GHz) THz present challenges in conventional antenna element fabrication, while on-chip antennas traditionally exhibit reduced efficiency. Additional challenges arise from increased path loss and the resulting increase in antennas required for sufficient link margin. The latter offers opportunities in spatial spectrum reuse by taking advantage of the resulting pencil-beam transmissions.

We are seeking cost-effective technologies for components capable of operating in THz bands which can be produced and operated robustly under common environmental conditions. Considering recent performance trends in CMOS technology, we are interested in the feasibility of CMOS at THz frequencies for communications links in the 100m-1km range and trade-offs with implementations in dedicated RF semiconductor technologies. Application of photonics are considered as well.

- On-chip antenna arrays with low loss and RF front-end integration
- PLL, VCO and mixer capable of operating in THz band
- High power PAs and low noise amplifiers in THz band

✘ The topics are not limited to the above examples, and the participants are encouraged to propose original idea.