



AT A GLANCE

THz communication is a complementary wireless technology, offering very large transmission capacities (> 100Gb/s) for applications such as backhaul/fronthaul, fixed wireless access and indoor short range in future 6G networks.

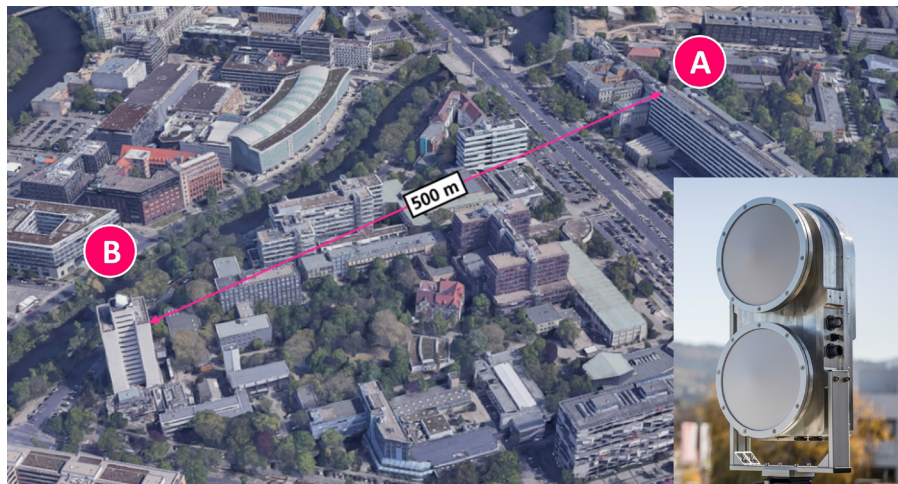
Fraunhofer HHI is active in research, development and standardization of THz communication technology together with various partners from academia and industry.

Applications

- Backhaul/fronthaul
- Point-to-point
- Redundancy
- Wireless fibre extender
- Fixed wireless access
- Indoor short-range
- IoT dense environment
- Last mile access

Technical Background

The carrier frequencies used in THz communication are above 100GHz. At these high carrier frequencies, the available bandwidth is several tenths of GHz, which is one order of magnitude larger compared to other wireless technologies, like mmWave. This high bandwidth enables wireless transmission capacities above 100Gbit/s. Furthermore, the high carrier frequency significantly reduces the physical dimension of the antennas. Thus, compact high-gain THz antennas and compact antenna arrays are feasible.



Fraunhofer HHI THz-wireless outdoor testbed (500m link distance, 300 GHz carrier frequency)

300 GHz Outdoor Installation

To systematically evaluate the time-dependent system and network characteristics of fiber-integrated THz-wireless links, Fraunhofer HHI established an outdoor testbed in Berlin (Germany). It comprises a THz-wireless link of 500 m using wide-band THz-wireless outdoor unit (ODU) prototypes based on electronic THz components (supporting symbol rates up to 32 GBd) and high-gain antennas (55 dBi). The ODU prototypes optionally comprise fiber-optical transceiver frontends allowing a seamless connection to fiber-optical modems via deployed fiber, forming a fiber-integrated THz transmission testbed. Additionally, the testbed features a complete telemetry pipeline to monitor and record data sets of component and link performance as well as local weather data.

Prototype Specifications

- Full-duplex operation
- 300 GHz carrier frequency
- 20 GHz electrical bandwidth (baseband)
- 100 Gb/s transmission capacity using high-speed modem
- 32 GBd dual-polarized QPSK modulation
- Up to 1 km wireless link distance using high gain (Cassegrain) reflector antennas



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