



GEFÖRDERT VOM

## Small-Scale Propagation Characterization at 300 GHz in an industrial Environment

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What are the fading characteristics and which model is suitable for a THz channel in an industrial environment? What is the stationary distance of a THz channel in such environment? What is the radio link reliability without the use of any diversity scheme? What is the coherence-time and coherence-bandwidth of such channel?



The goal of the real-time measurement was to emulate a line-of-sight (LoS) communication between a robot and an access point (AP) installed on the upper corridor of the facility as the robot moves farther away from it. Placed on a rail, Rx was pulled by hand away from the transmitter (Tx) for a distance of 2.28 meters, with almost constant velocity (0.38 m/s).

## **KEY FINDINGS**

The stationary distance of the channel was found to be in the range of a few dozens of centimeters. The channel was found to be Rician distributed and its fading statistics point out a link reliability, inside the coherent-time of the channel, without the use of diversity schemes, of 99.9908%. For the 0.5 correlation coefficient, the coherent-bandwidth was found to be in the order of 2.3 GHz. The assumption of multipath components with uniformly phase distribution still being valid in the THz domain, even considering that robots will move with very low speed and high directive antennas.

C. E. Reinhardt, V. V. Elesina, J. M. Eckhardt, T. Doeker, L. C. Ribeiro and T. Kürner, "Channel Measurements in an Industrial Environment for Access Point-to-Sensor Communication at 300 GHz," 2024 15th German Microwave Conference (GeMiC), Duisburg, Germany, 2024, pp. 308-311

L. C. Ribeiro and T. Kürner, "Small-Scale Propagation Characterization at 300 GHz in an industrial Environment," 2024 19th International Symposium on Wireless Communication Systems (ISWCS), Rio de Janeiro, Brazil, 2024, pp. 1-6