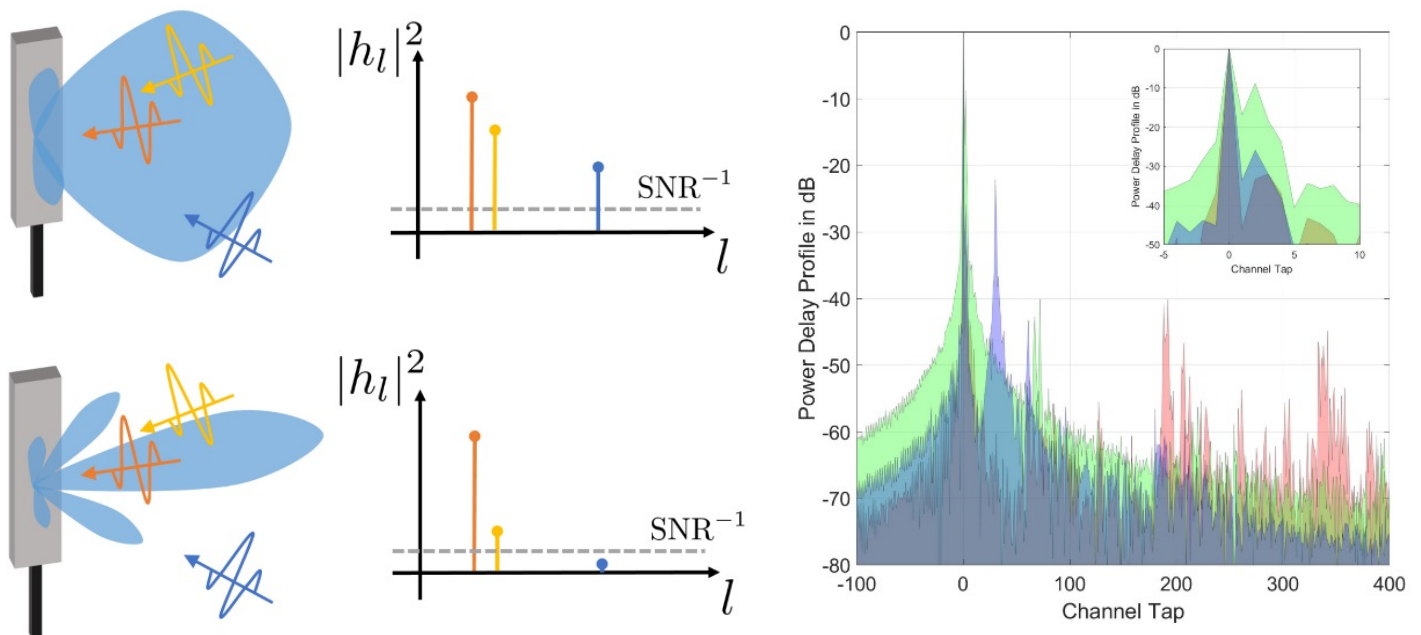


Little or No Equalization is Needed in Energy-Efficient Sub-THz Mobile Access

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Are complex modulation and equalization techniques really necessary for energy-efficient sub-THz mobile access?



Using highly directive antennas can drive most multipath components below the noise floor. This in turn can reduce inter-symbol interference, and hence greatly simplify modulation and equalization. We verify this effect experimentally by evaluating real channel measurements using a novel information theoretic methodology.

KEY FINDINGS

By trading coverage and hardware complexity for abundance of spectrum, sub-THz mobile access networks are expected to operate under highly directive and relatively spectrally inefficient transmission regimes, while still offering enormous capacity gains over current sub-6 GHz alternatives. Building on this assumption, and supported by extensive indoor directional channel measurements at 160 GHz, this study advocates the use of very simple modulation and equalization techniques for sub-THz mobile access. Specifically, we demonstrate that, under the aforementioned transmission regimes, little or no equalization is needed for scoring significant capacity gain targets. In particular, we show that single-carrier or low-number-of-subcarriers modulations are very attractive competitors to the dramatically more complex and energy-inefficient traditional multi-carrier designs.

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