

Unconventional tiled array antennas for long-range wireless power transmission

Long-range wireless power transmission (WPT) systems comprise a transmitting (TX) device capable of focusing the beam towards a desired region, usually consisting of a phased array (PA) antenna, and a receiving (RX) device, namely a rectenna, converting the electromagnetic power of the impinging microwave radiation into direct current. To maximize the end-to-end transmission efficiency, the transmitter must be able to focus the power on a limited spatial region, possibly just as large as the rectenna aperture. This imposes non-negligible challenges in the design of the transmitting antenna system, further highlighted when the TX and RX antennas are located far away.

Additionally, conventional PAs allow for highly flexible beam-forming but they are extremely expensive and difficult to realize if large antennas are needed. In this context, the proposed research activity focuses on the study of innovative unconventional PA solutions based on modular architectures able to offer optimal trade-offs between antenna complexity and transmission efficiency.

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