Abstracts

A smart antenna receiver array using a single RF channel and digital beamforming (Dec. 2002 [T-MTT])

J.D. Fredrick, Yuanxun Wang and T. Itoh. "A smart antenna receiver array using a single RF channel and digital beamforming (Dec. 2002 [T-MTT])." 2002 Transactions on Microwave Theory and Techniques 50.12 (Dec. 2002 [T-MTT] (Special Issue on 2002 International Microwave Symposium)): 3052-3058.

A new type of smart antenna array receiver with adaptive beamforming is proposed. The novel system offers a drastic reduction in hardware requirements for the smart antenna system through the use of a new Spatial Multiplexing of Local Elements (SMILE) scheme. In this scheme, a single element of the array is sequentially connected to signal processing circuitry in order to sample the incoming modulated carrier. The sampling rate is higher than the signal bandwidth so that the information of the original signal can be fully restored in the post stages using low-pass filters. This system offers an N times reduction in RF hardware for an N-element array. A four-element prototype is built. System principles, SNR, advantages, and hardware, including a new type of array feed network, are discussed. The system performance is validated through a link test with digitally modulated data.

❑ Return to main document.