Abstracts

A smart antenna receiver array using a single RF channel and digital beamforming (2002 Vol. I [MWSYM])

J.D. Fredrick, Yuanxun Wang, Seong-Sik Jeon and T. Itoh. "A smart antenna receiver array using a single RF channel and digital beamforming (2002 Vol. I [MWSYM])." 2002 MTT-S International Microwave Symposium Digest 02.1 (2002 Vol. I [MWSYM]): 311-314 vol.1.

A new type of smart antenna array receiver with adaptive digital beamforming is proposed. The proposed 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 modulated carrier signal. The sampling rate is higher than the signal bandwidth so the information of the original signal can be fully restored in the post stages using low pass filters. The reconstructed baseband data is then used for adaptive digital beamforming. This system offers an N times reduction in RF hardware for an N element array. A four element prototype is built and discussed, including a new type of array feed network.

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