Abstracts

Two-Dimensional Fiber-Optic Control of a True Time-Steered Array Transmitter (Dec. 1996, Part II [T-MTT])

M.Y. Frankel, P.J. Matthews and R.D. Esman. "Two-Dimensional Fiber-Optic Control of a True Time-Steered Array Transmitter (Dec. 1996, Part II [T-MTT])." 1996 Transactions on Microwave Theory and Techniques 44.12 (Dec. 1996, Part II [T-MTT] (1996 Symposium Issue)): 2696-2702.

We report a first demonstration of a fiber-optic beamformer for independent two-dimensional (2-D) true time-delay steering of a transmitter array. The fiber-optic beamformer is based on a simple dispersive prism optical delay approach, with separate azimuth and elevation control stages. The azimuth dispersive prism stage includes an amount of dispersion in each link proportional to the corresponding column position in the array. The microwave signals, properly time-delayed for azimuth steering, are amplified and serve as inputs to identical dispersive prisms feeding the elements in each column. The elevation dispersive prism stages include an amount of dispersion in each link proportional to the corresponding row position in the array. Each time-delayed microwave signal feeds a single flared-notch element in a 4 x 4 array. The 2-D array pattern measurements in an anechoic chamber clearly demonstrate independent ±30° azimuth and ±30° elevation steering. There is no observed squint over the microwave-component determined bandwidth of 6-18 GHz.

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