



## Experimental investigation of beam-steering applied to $2 \times 2$ MIMO system with single receiving RF chain and time-modulated antenna array

International Journal of Microwave and Wireless Technologies

GRZEGORZ BOGDAN, KONRAD GODZISZEWSKI, YEVHEN YASHCHYSHYN

DOI: 10.1017/S1759078720000744

Published online: 19 June 2020, pp. 1-9

[Read this article for free](#)

### Abstract

Multiple antennas and multiple radio frequency (RF) chains in both the transmitter and receiver are required in conventional radio systems employing the multiple-input multiple-output (MIMO) method. This paper presents an experimental investigation of a beam-steering time-modulated MIMO receiver with a single RF chain. Implementation of the receiver is based on a time-modulated antenna array (TMAA) and a software-defined radio. The sidebands generated inherently by the TMAA are utilized as virtual spatial channels with the beam-steering functionality. Performance of the system is investigated experimentally. The bit error rate and condition number of the channel matrix are examined for different radiation patterns in order to determine favorable configurations in a given multipath environment. Obtained results show a considerable impact of the beam-steering on the performance of MIMO transmission.

### How does Cambridge Core Share work?

Cambridge Core Share allows authors, readers and institutional subscribers to generate a URL for an online version of a journal article. Anyone who clicks on this link will be able to view a read-only, up-to-date copy of the published journal article.