

# An Evaluation of Spatial Modulation for MIMO Systems with QO-STBC

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**Abstract.** Simplified designs of multi-antenna systems with optimum efficiency are receiving attentions. Such simplicities also involve low cost architectures. In this study, we report an evaluation of a new multi-antenna scheme, namely, spatial modulation (SM) that is compared with quasi-orthogonal space time block codes (QOSTBC) scheme over Rayleigh fading channel. The SM scheme has been, earlier, compared with space time block codes (STBC) – a two antenna transmit diversity scheme that achieves full diversity when only two antennas are used. This is extended to QOSTBC scheme that absolves some decoding limitations to attain full diversity. It will be shown that, using the QOSTBC of similar architecture with the SM, even better performance can be achieved in favour of QOSTBC.

**Keywords:** Spatial modulation · Space time block codes · Quasi-orthogonal space time block codes · MIMO

## 1 Introduction

Modern telecommunications expect to deliver the most dependable seamless quality of service to support infotainment, data and video transmissions. Data delivery is however by wireless communication and different data, infotainment and video delivery techniques are still evolving to offer the best service. Multiple input multiple output (MIMO) scheme exploits the fact that no two channel paths can be equally likely badly impaired. Thus increasing the number of transmitting and/or receiver elements can help a great deal in mitigating the hostile multipath channel fading problems. Because the receiver equipment exists in small sizes (miniature), then diversity techniques are best explored in the transmitter. Different and varied transmitter diversity techniques have been considered over time. Most recently is the spatial modulation (SM) technique [1, 2]. In SM diversity technique, multi-antenna systems can be designed that