

Artificial Neural Networks Based Calibration Approach for Six-Port Receiver

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Abstract : This paper presents a calibration approach based on artificial neural networks (ANN) to determine the envelop signal ($I+jQ$) of a six-port based receiver (SPR). The memory effects called also dynamic behavior and the nonlinearity brought by diode based power detector have been taken into consideration by the ANN. Experimental set-up has been performed to validate the efficiency of this method. The efficiency of this approach has been confirmed by the obtained results in terms of waveforms. Moreover, the obtained error vector magnitude (EVM) and the mean absolute error (MAE) have been calculated in order to confirm and to test the ANN's performance to achieve I/Q recovery using the output voltage detected by the power based detector. The baseband signal has been recovered using ANN with EVMs no higher than 1 % and an MAE no higher than 17, 26 for the SPR excited different type of signals such QAM (quadrature amplitude modulation) and LTE (Long Term Evolution).

Keywords : six-port based receiver; calibration, nonlinearity, memory effect, artificial neural network

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