World Academy of Science, Engineering and Technology International Journal of Electronics and Communication Engineering Vol:14, No:05, 2020

Impairments Correction of Six-Port Based Millimeter-Wave Radar

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Abstract : In recent years, the presence of short-range millimeter-wave radar in civil application has increased significantly. Autonomous driving, security, 3D imaging and high data rate communication systems are a few examples. The next challenge is the integration inside small form-factor devices, such as smartphones (e.g. gesture recognition). The main challenge is implementation of a truly low-power, low-complexity high-resolution radar. The most popular approach is the Frequency Modulated Continuous Wave (FMCW) radar, with an analog multiplication front-end. In this paper, we present an approach for adaptive estimation and correction of impairments of such front-end, specifically implemented using the Six-Port Device (SPD) as the multiplier element. The proposed algorithm was simulated and implemented on a 60 GHz radar lab prototype.

Keywords: radar, FMCW Radar, IQ mismatch, six port

Conference Title: ICRST 2020: International Conference on Radar Science and Technology

Conference Location: Amsterdam, Netherlands

Conference Dates: May 14-15, 2020