

In this paper, the performance of a universal mobile telecommunication system (UMTS)-based passive multistatic radar in a line-of-sight (LoS) environment is studied. The presence of LoS component from the target considerably alters the received signal model, therefore, its characterization is necessary and is the main subject of this work where the transceivers and a target are localized in a three-dimensional Euclidean space. The probability density function (PDF) of the received signal in the presence of LoS is derived and the closed-form expressions of the modified Cramér-Rao lower bounds (MCRLBs) on the Euclidean coordinates of target's position and velocity are found. It is shown that modified Fisher information matrix (MFIM) is a combination of MFIMs due to non-LoS (NLoS) components and LoS component. With the aid of numerical examples, it is verified that by exploiting LoS, the target radar cross section (RCS) increases, which improves the accuracy of target's detection and parameter estimation. In addition, it is also shown that by exploiting LoS component, the performance limits of a waveform can be determined for a generalized radar cross section model (GRCSM), which provides the characterization of a waveform for a broader range of radar applications.