RCS predictions through angle of ground moving target using LTE-based passive forward scattering radar

ABSTRACT

Moving target detection and location are a function of dependent bistatic Radar Cross Section (RCS) and radar design parameters, which in our experimental study used long term-evolution (LTE) signal as a source for passive forward scattering radar (PFSR). Moving target also can be classified in positions using conventional processing approaches, which we performed a simulation using Computer Simulation Technology (CST) Microwave studio. The target bistatic radar cross-section gives a realistic calculation on passive bistatic radar (PBR) performance with the requirement of complete treatment. A model of a car, Toyota Rush as a ground moving target had been designed to observe the performance of RCS due to the changes of bistatic angle between the transmitter and the receiver with the frequency transmit signal from LTE based station at 2.6 GHz and farfield conditions. The results of the simulation show that the largest area of moving target, which is 90 degree of transmitting signal had better outcome compared to the other angle, which is reliable with Babinetôs principle that declares a target of physical cross-sectional area is proportionate to RCS. Different angle of transmitting signal gave smaller RCS, which is the cause from the reduction area of reflected signal from the ground moving target such as 45 degree according to the front side view of Toyota Rush and 135 degree according to back side of Toyota Rush. This might improve the sensitivity of elevation targets with an adjustment of the receiver angle to the target and transmitter for a better RCS performance.

Keyword: Angle; CST; LTE; Moving target; RCS