Abstract:
The requirements for mobile wave-propagation modeling become more and more demanding. This is especially true for automotive radar and for car-to-car or car-to-infrastructure communications, in which none of the antennas has an elevated position, and the consideration of near-field effects becomes mandatory for good wave-propagation modeling results. Due to the complexity of mobile propagation scenarios, ray-tracing simulators appear to be the method of choice. However, since ray concepts are based on far-field assumptions in many respects, their applicability must be extended in order to be accurate enough for the described mobile scenarios. One way of extending the applicability of ray methods is the use of bistatic scattering-center representations of complex scattering objects such as cars, where incoherent scattering centers are utilized in this work. The parameterization of the scattering centers by ray-tracing simulations, based on a very detailed faceted model of the scattering object and the utilization of the scattering-center representation within wave propagation system simulations of mobile scenarios, is discussed. Example results for the bistatic radar cross sections of several characteristic scattering centers of a sports utility vehicle are shown and discussed. Results of a mobile communication system simulation, employing scattering-center representations, are also shown.