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## **Real-Time Channel Emulation of a Geometry-Based Stochastic Channel Model on a SDR Platform**

In wireless vehicular communication scenarios the channel properties change rapidly over time. Both, the transmitter and the receiver, are moving, which generates not only time and frequency (doubly) selective channels but also channel statistics that are non-stationary, i.e., they change over time. New wireless vehicular communication systems within connected autonomous vehicles require validation and verification in vehicular environments to assure their proper functionality. To avoid time intensive, costly and {difficult to repeat} real-world measurements on the road, real-time channel emulators that target on emulating the wireless vehicular channel as accurately as possible, are needed. In this paper we present a real-time channel emulator based on a software defined radio platform that is able to emulate real-valued path delays and Doppler shifts within a certain delay and Doppler region. The emulator uses a low-complexity subspace expansion model where the emulation complexity on the field programmable gate array (FPGA) is independent from the number of propagation paths. This makes it suitable to emulate realistic geometry-based non-stationary channel models with a large number of propagation paths.

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