

DYNAMIC VEHICULAR CHANNEL EMULATION

Wireless communication links are a fundamental aspect for connected autonomous vehicles. In this scenario, wireless communication takes place between machines which demand fundamentally new communication system properties such as low-latency, defined error probability, an interface to control algorithms and the ability to operate in challenging environments.

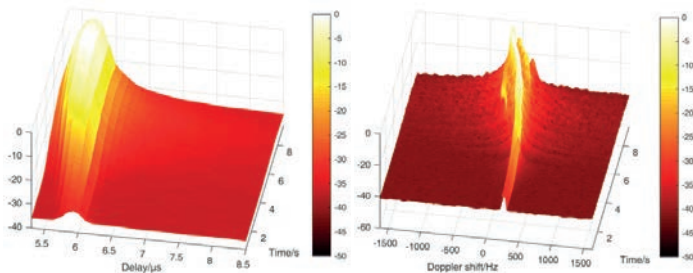
SOLUTIONS FOR INDUSTRY

REPEATABLE TESTS FOR CONNECTED AUTONOMOUS VEHICLES

For vehicular communication links (V2V and V2X) the received field strength varies randomly over time leading to varying frame error rates. This random process is determined by the environment of the communication link and the position of the transmitter and receiver. For the repeatable test of connected autonomous driving algorithms, we offer a dynamic real time wireless channel emulation system using software-defined-radio equipment.

AIT's solution allows for repeatable performance tests in a lab setup, avoiding expensive and labor-intensive driving tests on the road. The AIT dynamic channel emulator can be linked to a vehicle kinematic simulation such as IPG CarMarker to update the coordinate and velocity of the involved vehicles in real-time.

The AIT dynamic real-time channel emulator is independent of the used communication technology and can be applied for IEEE 802.11p (ITS G5, WAVE), LTE-Vehicular or 5G links.



Road crossing scenario - geometry based stochastic channel model (GSCM)





AVAILABLE HARDWARE, SOFTWARE AND SERVICES FROM AIT FOR DYNAMIC VEHICULAR CHANNEL EMULATIONS

SOFTWARE

- Real-time Emulator (PC and NI SDR component)
- Channel models
 1. Geometry based stochastic channel model (GSCM) for city road crossing
 2. GSCM for rural highway
 3. ETSI models
 4. Interface for a model provided by the customer

HARDWARE

- NI PXI Chassis (with Xeon 8-core controller)
- NI USRP RIO
- Dell Server with 32 Cores

