

# ON BOARD UNIT INTEROPERABILITY DSRC/GNSS SOLUTION

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**Keywords:** Interoperability; Electronic toll collection; Vehicle identifier; DSRC/GNSS

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## ABSTRACT

The current scenario for electronic toll collection across Europe, where most countries have developed national or even regional closed systems based on heterogeneous technologies such as Dedicated Short Range Communications (DSRC), Global Positioning System (GPS) and or Global System for Mobile Communications (GSM) will change in a quite near future. Despite regulations and initiatives to normalize systems and services in Europe such as the new CEN Medium Data Rate (MDR) DSRC sub-standard that mostly addresses large investments to accommodate existing systems, infrastructures and vehicle devices, there is no clear trend towards a harmonized schema for tolling services. Even worse, most states and local authorities are introducing additional tolling taxes to support road investments, improve mobility or environmental protection. In most of the cases, deploying closed systems based on existing technologies while an obstacle to the Pan-European interoperable road pricing supporting ICT infrastructure.

Under this scenario of heterogeneity of devices, equipments and systems, we present a new multi-system vehicle device which enables communications via DSRC-MDR technology using low-level software (embedded micro-controller) in order to simplify the required hardware, while equally operating as a virtual tolling GPS-based system whereby messaging is provided by General Packet Radio Service (GPRS) or Short Message Service ("SMS") systems. This new On Board Unit Interoperability (OBUi) DSRC/GNSS operates in hybrid mode and thereby combines both systems, thus eliminating extra costs for infrastructure operators.

Interoperability among technologies and systems' is a key issue for OBUi. It enables vehicles equipped with this multi-technology OBU to run across different tolling models, either real (DSRC) or virtual (GPS), both by collecting and communicating toll information.



*On Board Unit Interoperability (OBUi) DSRC/GNSS device prototype*

Beyond the multi-system technological solution for vehicles, there is a long way to agree on service contracts, enforcement methods and data exchange among service providers. For the user/driver side there is an enormous convenience and success formula to come up: one device - one contract – one invoice – multiple services.