

Application Story - Electronic Toll Collection

Introduction of an electronic toll system - German system for commercial vehicles

A new toll system was introduced 2005 on the 12,000 km of German motorway for all trucks with a maximum weight of 12t and above. The new toll system, called LKW-Maut, is a governmental tax for trucks based on the distance driven in kilometres, number of axles and the emission category of the truck. The tax is levied for all trucks using German motorways, whether they are full or empty, foreign or domestic. The toll system ensures that the collection of road tolls does not disrupt traffic flow. The system is based on GPS satellite technology combined with GSM cellular technology.



Electronic Toll Collection

The technology behind the toll collection

Electronic Toll Collection (ETC) is a technology applied to eliminate the delays found on toll roads by collecting tolls electronically. Many tolling authorities searched for ways to improve the toll collection process.

Most of today's toll collection systems are based on two main technologies: DSRC (Microwave) based technologies

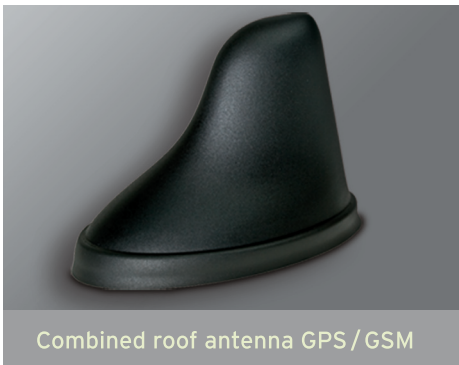
for single and multi-lane free-flow systems. And a satellite-based system (e.g. GPS) in combination with a cellular network (e.g. GPRS).

For some local road pricing concepts (e.g. congestion pricing) optical character recognition technologies (automatic number plate recognition) have been established.



Antennas must perform

- Mechanical antenna design waterproof from outside and inside the truck
- Antenna parts exposed to outside and inside the truck fully non-corrosive
- GPS function not interrupted by any spurious radio emissions, e.g. of cellular communication
- Cellular communication assured even under harsh environmental and topographic conditions
- Quality coaxial cables with low attenuation and automotive approved FAKRA connectors
- Suitable to mount on any make of truck's roof running on the national highways



Antenna solution

- Shark fin combination roof-mount antenna for Cellular and GPS.
- Individual single Cellular and GPS antennas where roof mount is not possible.
- Roof mount combi-antenna with non-metallic base plate to avoid corrosion
- Completely sealed antenna with "breathing" element (membrane) for pressure and humidity control to avoid material fatigue
- Complete elimination of metal components for housing and mounting nut
- Truck manufacturer's specific variant, bridging both truck makers mechanical demands and the tolling authority's specifications

Hirschmann Solutions Advantages

- Full customer support in application analysis
- Customized product development
- Outstanding RF know-how for custom developments
- An authority in the design of coexisting multi-band antennas
- Fast realisation of prototypes achieving superior field test results
- Fast implementation of requested changes
- Certified automotive quality
- High volume, high quality manufacturing capabilities
- Local sales and application support
- Local project management

The principle of the electronic toll collection

