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# 1 General Information

In this document the Keyless Entry and Start System (Kessy) is introduced.

Keyless Entry Systems are the consequent development of well-known Remote Keyless Entry Systems (RKE), the usage of the key fob with button pressing is still possible, but not necessary anymore to enter the vehicle or to start it.

With the Hella Components UID, Door Handle Sensors, LF antennas and **Keyless Entry ECU** it's possible to equip a vehicle with only a few components and realize this very convenient and luxury feature.

The Model Name of the described ECU is:

## MQB-B B

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## 2 LF- Performance in Typical Application

In the Kessy (Keyless Entry and Start System) the Hella ECU is connected with Hella LF Antennas.

A UID – also manufactured from Hella – is to be found inside our outside the vehicle, whether a special occasion happens.

Here are some examples:

- Passive Entry / Exit

A Person with the UID nears to the locked vehicle. If he grabs the door handle capacitive unlock sensor is activated and the complete Keyless Entry Protocol is started:

The door handle antenna is transmitting LF data and a carrier signal, which can be recognized and judged by quantity (RSSI-measurement) by the UID.

If the magnetic field strength is high enough (a certain border is reached) the UID stays “awake” for additional LF communication by the other antennas driven sequentially.

The additional LF communication guaranties the functionality, that only the valid key OUTSIDE the vehicle authenticates the system to unlock the car passively.

If the magnetic field strength is not high enough (e.g. the UID is too far away from the vehicle, the border is not reached), the UID shuts down again and waits for the next LF Data. The vehicle is still locked.

A Person with the UID is leaving the vehicle. If he touches the capacitive lock sensor at the door handle, the complete Keyless Exit Protocol is started:

The door handle antenna is transmitting LF data and a carrier signal, which can be recognized and judged by quantity (RSSI-measurement) by the UID.

If the magnetic field strength is high enough (a certain border is reached) the UID stays “awake” for additional LF communication by the other antennas driven sequentially.

The additional LF communication guaranties the functionality, that only the valid key OUTSIDE the vehicle authenticates the system lock the car passively. If the UID is left inside the car, the car won't lock.

If the magnetic field strength is not high enough (e.g. the UID is too far away from the vehicle, the border is not reached), the UID shuts down again and waits for the next LF Data. The vehicle is still open.

- Passive Start

A Person with the UID inside of the vehicle is pressing the Start-Stop-Switch. The Start-Stop-Switch activates the complete Keyless Start protocol:

The interior antenna IN2 is transmitting the LF Data and a carrier signal, which can be recognized and judged by quantity (RSSI-measurement) by the UID. The other two interior antennas IN1 and TRUNK transmit two additional carrier signals sequential.

If the magnetic field strength of one of these transmits is high enough (a certain border is reached) then the UID authenticates the system to start the vehicle.

If the magnetic field strength of all antenna transmits are too low (the field strength border is not reached, maybe the UID is laying outside or is held 10cm outside the vehicle) the car won't start.

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## 2.1 LF Antenna Positions in Vehicle

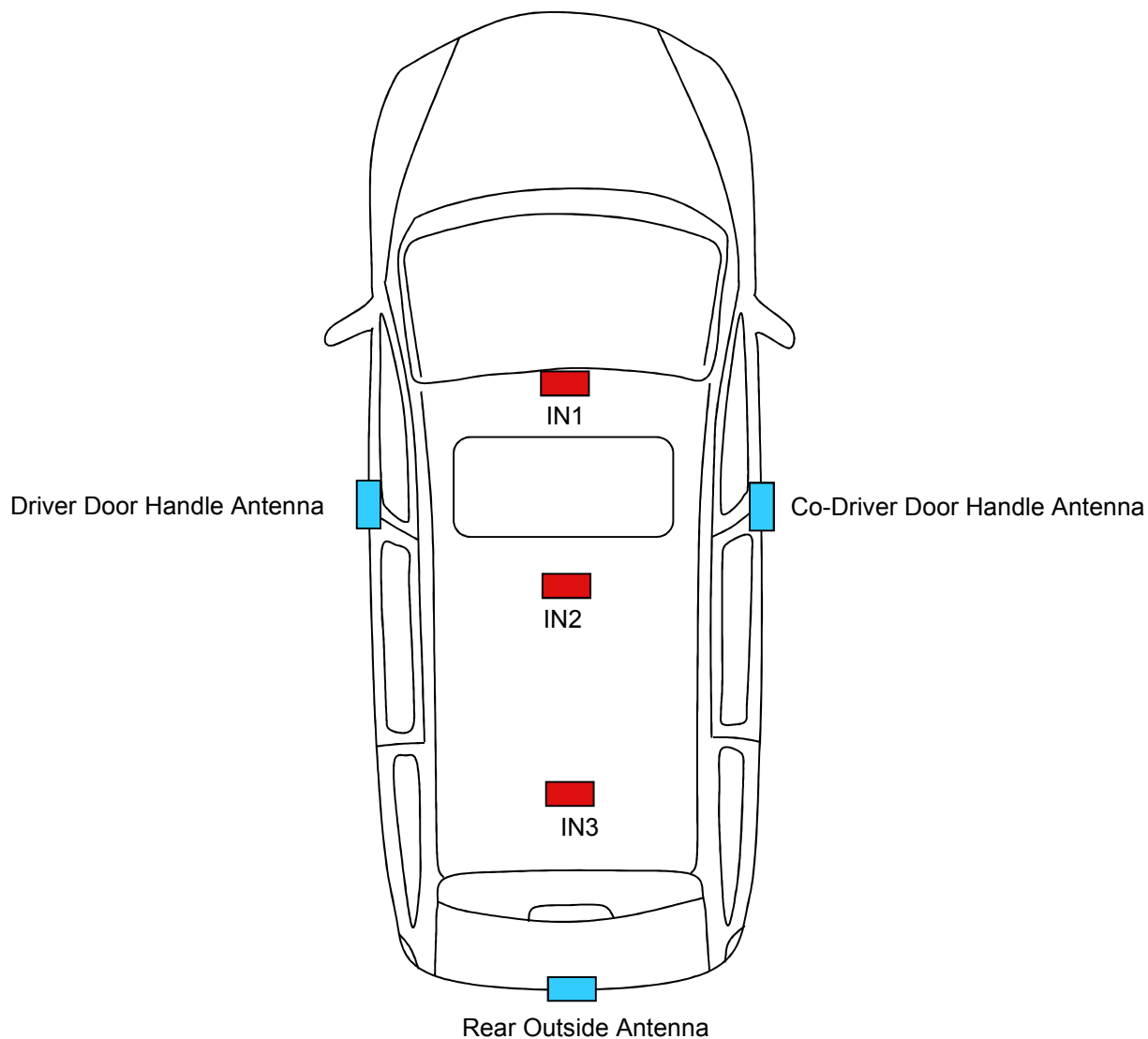


Fig. 1 Antenna Positions at a Keyless Entry / Keyless Start Vehicle

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## 2.2 Authentication Ranges Inside and Outside the Vehicle

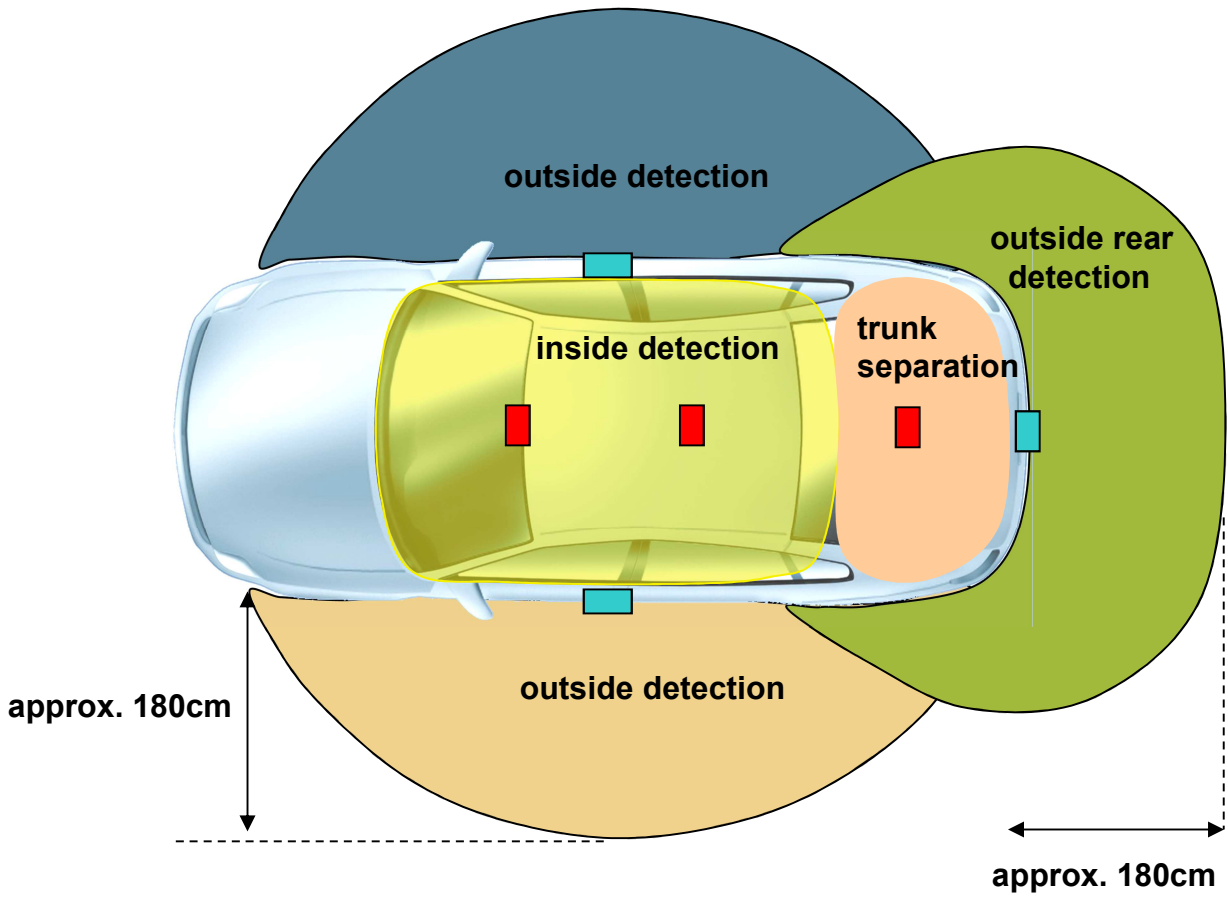


Fig. 2 Principle of Magnetic Field Detection Areas

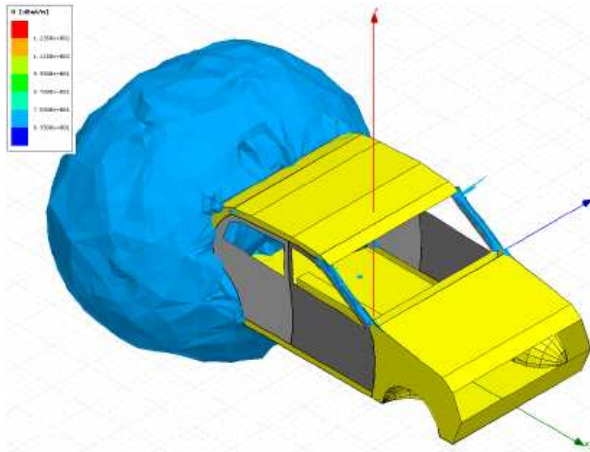


Fig. 3 Cloud view of Rear-LF-Scan

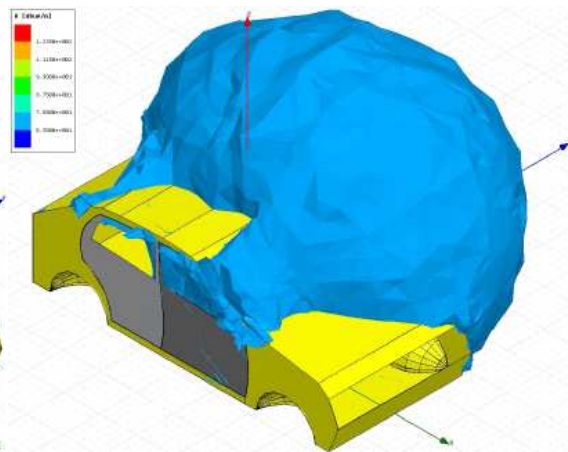
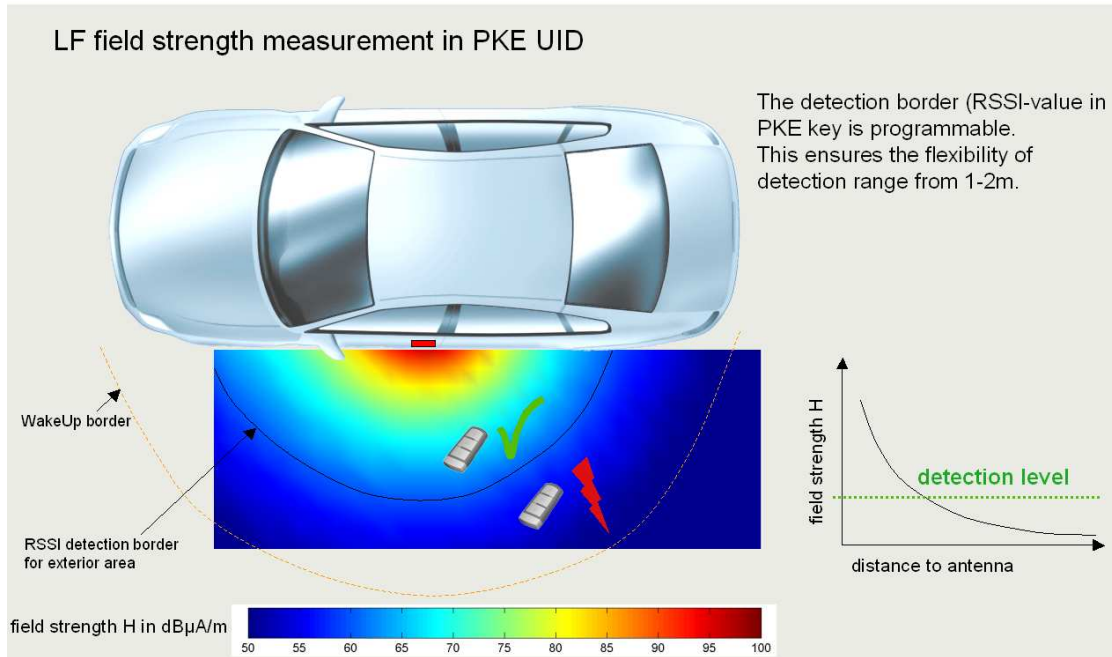


Fig. 4 Cloud View of Side-LF-Scan

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**Passive Entry, Exterior Scan**  
*Principle of Field Strength Measurement*



**Fig. 5 Principle of Field Strength Measurement in the UID**

### 3 Statement and Warning

**FCC statement**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Warning**

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

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