Safety Concept for Cooperative HAD Vehicles

LEVELS OF AUTOMATION

<table>
<thead>
<tr>
<th>Level</th>
<th>Name</th>
<th>Narrative Definition</th>
<th>Exercise of SAE Level 3 Requirements Definition</th>
<th>Monitoring of Driving Environment</th>
<th>Feedback Elements of Driving Test</th>
<th>System Clarification (Level 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No</td>
<td>No driver assists the driving environment</td>
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<tr>
<td>1</td>
<td>Low</td>
<td>Limited driving assistance</td>
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<td>2</td>
<td>Moderate</td>
<td>Moderate driving assistance</td>
<td></td>
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<tr>
<td>3</td>
<td>High</td>
<td>High driving assistance</td>
<td></td>
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<tr>
<td>4</td>
<td>Full</td>
<td>Full driving assistance</td>
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TESTING OF LEVEL 3 SYSTEMS

Specification of Cooperative HAD Function SAE Level Effort

Objectives for Cooperative HAD Function Level 3
- Highly Available Components
- Series-grade Development Process
- Series-grade Validation and Testing

Cooperative HAD Function under Test Level 2 Arrangements for Safe Testing

ARRANGEMENTS FOR SAFE TESTING

Safety Requirements for Cooperative HAD

<table>
<thead>
<tr>
<th>Opel</th>
<th>Audi</th>
<th>BMW</th>
<th>Bosch</th>
<th>Teves</th>
<th>IFF</th>
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Test on public roads with safety driver

Operator for supervising the closed-loop test

Emergency button to interrupt the actuator commands

Deactivation of the driving function
- by brake pedal
- by activation button
- by emergency button
- by steering-wheel torque > x Nm
- by acceleration pedal

Activation of the driving function
- by explicit activation through the safety driver
- after system deactivation by explicit activation through the safety driver

Driver monitoring

Actuator commands
- Steering torque or similar commands
- Engine torque or similar commands
- Deceleration or similar commands

Alerts

All required alarms are active. Only in reasonable cases they are masked, such as limited monitors.

Additional parts, such as monitors or buttons, are safely installed.

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