

| Hazard ID |                       |                      |                             |
|-----------|-----------------------|----------------------|-----------------------------|
|           | Operational Mode      | Operational Scenario | Environmental Details       |
| HA-001    | OM03 - Normal driving | OS04 - Highway       | EN06 - Rain (slippery road) |
| HA-002    | OM03 - Normal driving | OS03 - Country Road  | EN01 - Normal conditions    |
| HA-003    | OM03 - Normal Driving | OS04 - Highway       | EN03 - Fog ( Degraded view) |
| HA-004    | OM03 - Normal Driving | OS03 - Country Road  | EN07 - Snow(Slippery road)  |

**Situational Analysis**

| <b>Situation Details</b> | <b>Other Details<br/>(optional)</b> | <b>Item Usage<br/>(function)</b> | <b>Situation Description</b>   |
|--------------------------|-------------------------------------|----------------------------------|--|
| SD02 - High speed        |                                     | IU01 - Correctly used            | Normal driving on a highway in rain (slippery road) with high speed and correctly used system.                 |
| SD02 - High speed        |                                     | IU02 - Incorrectly used          | Normal driving on country roads in normal conditions with high speed.  |
| SD02 - High speed        |                                     | IU01 - Correctly used            | Normal driving on a highway in Foggy weather conditions with high speed and correctly used system.             |
| SD02 - High speed        |                                     | IU01 - Correctly used            | Normal driving on a country road with Snow on road( Slippery road ) with high speed and correctly used system. |

| Hazard Identification   |  |  |                                      |
|---|--|--|--------------------------------------|
| Function  | Deviation                              | Deviation Details  | Hazardous Event (resulting effect)   |
| Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback | DV04 - Actor effect is too much        | The LDW function applies an oscillating torque with very high torque (above limit).  | EV00 - Collision with other vehicle  |
| Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane             | DV03 - Function always activated       | LKA function is always activated.  | EV00 - Collision with other vehicle  |
| Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback | DV02 - Function unexpectedly activated | The camera sensor stop working and the Lane Departure Warning function continue to be activated.                                       | EV00 - Collision with other vehicle. |
| Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane             | DV02 - Function unexpectedly activated | The camera sensor stop working and is unable to identify lane lines and the Lane Keeping Assistance function continue to be activated. | EV00 - Collision with other vehicle. |

| Event Details   | Hazardous Event Description  | Exposure (of situation) |
|---|--|-------------------------|
| Driver's ability to steer as intended is affected. The driver could lose control of the vehicle and collide with another vehicle or with any other object on road.                          | The LDW function applies too high an oscillating torque to the steering wheel (above limit). | E3 - Medium probability |
| Driver treats the function as if it were meant for fully autonomous driving and therefore can't react on critical situations.   | The LKA function is always activated and the driver stops focusing on driving the car.       | E2 - Low probability    |
| The Lane Departure Warning continue to be activated and start executing random torque to the steering wheel making the driver to loose control with potential collision with other vehicle. | The Lane Departure Warning start acting randomly when the camera sensor is not working.      | E3 - Medium probability |
| The Lane Keeping Assistance continue to be activated starting executing random torque to the vehicle making the driver to loose control with potential collision with other vehicle.        | The Lane Keeping Assistance start acting randomly when the camera sensor is not working.     | E3 - Medium probability |

### Hazardous Event Classification

| Rationale<br>(for exposure)   | Severity<br>(of potential harm)         | Rationale<br>(for severity)                          | Controllability<br>(of hazardous event)     |
|---|---|--|---|
| Driving on a highway during rain can happen once a month or more depending on driver's location.  | S3 - Life-threatening or fatal injuries | Driver is traveling at high speed.                   | C3 - Difficult to control or uncontrollable |
| The driver is on a country road and misusing the system.  | S3 - Life-threatening or fatal injuries | Driver is traveling at high speed.                   | C3 - Difficult to control or uncontrollable |
| Driving on a highway with rain could happen between 1% and 10% of the time operating the vehicle. | S3 - Life-threatening or fatal injuries | Collisions at high speed could cause fatal injuries. | C3 - Difficult to control or uncontrollable |
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|  | Determination of ASIL and Safety Goals |   |
|--|--|---|
| Rationale<br>(for controllability)   | ASIL<br>Determination                  | Safety Goal   |
| Overreaction of wheel's vibration is very distracting and uncontrollable resulting into accidents.           | C                                      | The oscillating steering torque from the LDW function shall be limited.   |
| LKA is always on, driver could take hands off the wheel and therefore loses control entirely.                | B                                      | LKA function shall be time limited and the additional steering torque shall end after a given timer interval so that the driver can not misuse the system for autonomous driving. |
| When the driver loses control of the vehicle is very difficult to realize the situation and act accordingly. | C                                      | The Lane Departure Warning function shall be deactivated when the camera sensor stops working.  |
| When the driver loses control of the vehicle is very difficult to realize the situation and act accordingly. | C                                      | The Lane Keeping Assistance function shall be deactivated when the camera sensor stops working.   |