| 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 | EN08 - Glace(Slippery road) |

**Situational Analysis**

| Situation Details | Other Details (optional) | Item Usage (function) | Situation Description |
|---|---|---|---|
| SD02 - High speed | | IU01 - Correctly used | Normal driving on a highway during rain (slippery road) with high speed and correctly used system. |
| SD02 - High speed | | IU02 - Incorrectly used | Normal driving on a country road during normal conditions with high speed and incorrectly used systam. |
| SD02 - High speed | | IU01 - Correctly used | Normal driving on a highway during normal conditions with high speed and correctly used system. |
| SD02 - High speed | | IU01 - Correctly used | Normal driving on a country road during normal conditions with high speed and correctly used system. |

| Function | Deviation |
| --- | --- |
| Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback | DV04 - Actor effect is too much |
| Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane | DV03 - Function is always activated |
| Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback | DV09 - Actor action after |
| Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane | DV16 - Sensor detection before |

| Deviation Details |
| --- |
| The Lane Departure Warning function applies too much oscillation torgue (above limit.) |

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| Lane Keeping function is always activated |
| The Lane Departure Warning function applies very late due to fog conditions |
| The camera ECU detect lines before the actual lines |

| Hazard Identification |
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| **Hazardous Event (resulting effect)** |
| EV00 - Collition with other vehicle. |
| EV00 - Collition with other vehicle. |
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| EV00 - Collition with other vehicle. |

| Event Details | Hazardous Event Description |
|---|---|
| High haptic feedback can affect driver's ability to steer as intented. The driver loose control and could collide with another vehicle or side of the road. | The Lane Departure Warning function applies an oscillating torgue with very high torque (above limit.) |
| Driver use the function as if the car was a self-driving car and loose driving attention. | The driver do not use the function properly. |
| The Lane Departure Warning didn't work as intended to work due to sequence error | The LDW didn't work as inetended to work due to late response as due to which driver has less response time to react to accident |
| The Lane Keeping Assistance camera ECU detected lines before actual lines | The lanes detected by camera where not at time when car was actually on the lane due to which it has very abrupt behaviour |

| Hazardous Event Classificat | | | |
|---|---|---|---|
| **Exposure (of situation)** | **Rationale (for exposure)** | **Severity (of potential harm)** | **Rationale (for severity)** |
| E3 - Medium probability | Driving on a highway with rain could happen between 1% and 10% of the time operating the vehicle. | S3 - Life-threatening or fatal injuries | Collitions at high speed could cause fatal injuries. |
| E2 - Low probability | The conviation beween driving at a country road and misusing system should not happen oftern. Less than 1% of the time operating the vehicle. | S3 - Life-threatening or fatal injuries | Collitions at high speed could cause fatal injuries. |
| E2 - Low probability | Fog happens very low probability once a year | S3 - Life-threatening or fatal injuries | Collitions at high speed could cause fatal injuries. |
| E3 - Very Low probability | Driving on a highway with Glace road is very low as it could happen in times of winter only where temperature is below 10 | S3 - Life-threatening or fatal injuries | Collitions at high speed could cause fatal injuries. |

| tion | | Determin |
|---|---|---|
| **Controllability (of hazardous event)** | **Rationale (for controllability)** | **ASIL Determination** |
| C3 - Difficult to control or uncontrollable | It is difficult to stay calm and react properly when the steering well is moving too much. | C |
| C3 - Difficult to control or uncontrollable | When the driver loose focus on driving, it is difficult to re-focus in the case of inmminent collition. | B |
| C3 - Difficult to control or uncontrollable | When the driver loose control of the vechicle is very difficult to realize the situation and act accordently. | B |
| C3 - Difficult to control or uncontrollable | When the driver loose control of the vechicle is very difficult to realize the situation and act accordently. | A |

| ıation of ASIL and Safety Goals |
| --- |
| **Safety Goal** |
| The oscillating steering torque from the Lane Departure Warning function shall be limited. |
| The Lane Keeping Assistance function shall be time limited, and additional steering torque shall end after a given time interval so the driver cannot misuse the system for autonomous driving. |
| The Lane Departure Warning function shall be deactivated when it gives sequence error and latency in warnings |
| The Lane Keeping Assistance function shall be deactivated when the camera sensor detects wrong lanes . |