

Hazard ID	Situational Analysis						
	Operational Mode	Operational Scenario	Environmental Details	Situation Details	Other Details (optional)	Item Usage (function)	Situation Description
HA-001	OM03 – Normal driving	OS04 – Highway	EN06 – Rain (slippery road)	SD02 – High speed		IU01 – Correctly used	Lane Departure Warning applies too large a vibration, causing the driver to lose control.
HA-002	OM03 – Normal driving	OS03 – Country Road	EN01 – Normal conditions	SD02 – High speed		IU02 – Incorrectly used	Driver misuses Lane Keeping Assistance function by treating it as an autonomous function and taking both hands off of the steering wheel.
HA-003	OM03 – Normal driving	OS02 – City Road	EN01 – Normal conditions	SD01 – Low speed		IU01 – Correctly used	Lane Keeping Assistance misidentifies lane markings, causing it to direct the car away from the center of the lane.
HA-004	OM03 – Normal driving	OS02 – City Road	EN01 – Normal conditions	SD01 – Low speed		IU01 – Correctly used	Lane Departure Warning applies too large a vibration, causing the driver to lose control.

Hazard Identification					
Function	Deviation	Deviation Details	Hazardous Event (resulting effect)	Event Details	Hazardous Event Description
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	High haptic feedback can affect driver's ability to steer as intended. The driver could lose control of the vehicle and collide with another vehicle	The LDW function applies too high an oscillating torque to the steering wheel (above limit).
Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV03 – Function always activated	THE LKA function stays activated after driver begins misuse.	EV00 – Collision with other vehicle	Removing the driver's hands from the steering wheel reduces the driver's ability to react to potential hazards, such as colliding with another vehicle entering the ego lane.	The driver misuses the LKA function by taking both hands off the steering wheel.
Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV11 – Actor effect is wrong	The LKA function steers the car away from the ego lane.	EV-02 – Side collision with other traffic	The LKA steers the vehicle away from the center of the lane, which could cause the vehicle to collide with another vehicle.	The LKA incorrectly steers the vehicle away from the center of the lane.
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	High haptic feedback can affect driver's ability to steer as intended. The driver could lose control of the vehicle and collide with another vehicle	The LDW function applies too high an oscillating torque to the steering wheel (above limit).

Hazardous Event Classification					
Exposure (of situation)	Rationale (for exposure)	Severity (of potential harm)	Rationale (for severity)	Controllability (of hazardous event)	Rationale (for controllability)
E3 – Medium probability	Normal driving on wet highway roads occurs quite often.	S3 - Life-threatening or fatal injuries	Vehicle is traveling at high speeds	C3 – Difficult to control or uncontrollable	Excessive vibrations of the steering wheel would be difficult for the average driver to control.
E2 – Low probability	Driving on a country road and misusing the system occurs sometimes.	S3 - Life-threatening or fatal injuries	Vehicle is traveling at high speeds	C3 – Difficult to control or uncontrollable	A vehicle accident is uncontrollable because the driver does not have their hands on the steering wheel.
E4 – High probability	Driving on a city road occurs regularly.	S2 – Light and moderate injuries	Vehicle is traveling at low speeds and making a side impact with another vehicle.	C3 – Difficult to control or uncontrollable	The LKA is controlling the vehicle in the wrong manner, giving the driver no control.
E4 – High probability	Driving on a city road occurs regularly.	S2 – Light and moderate injuries	Vehicle is traveling at low speeds.	C3 – Difficult to control or uncontrollable	Excessive vibrations of the steering wheel would be difficult for the average driver to control.

Determination of ASIL and Safety Goals	
ASIL Determination	Safety Goal
C	The oscillating steering torque from the lane departure warning function shall be limited.
B	The lane keeping assistance function shall be time limited and the additional steering torque shall end after a given time interval so that the driver cannot misuse the system for autonomous driving.
C	The lane keeping assistance function shall how a small enough torque that the average driver can override it and steer the vehicle correctly.
C	The oscillating steering torque from the lane departure warning function shall be limited.