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	OS02 - City Road	EN01 - Normal conditions
HA-004	OM03 - Normal Driving	OS04 - Highway	EN06 - Rain (slippery road)

Situational Analysis

Situation Details	Other Details (optional)	Item Usage (function)
SD03 - High speed	Slippery roads	IU01 - Correctly used
SD03 - High speed		IU02 - Incorrectly used
SD03 - Low speed	Lane lines are unclear	IU01 - Correctly used
SD03 - High speed	Slippery roads	IU01 - Correctly used

Situation Description	Function	Deviation
Normal Driving on Highway during Rain (slippery roads) at High Speed with correctly used system	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	DV04 - Actor effect is too much
Normal Driving on Country Roads during Normal conditions with High Speed (the driver is misusing the lane keeping assistance function as an autonomous function)	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV03 - Function always activated
Normal Driving on City Road in Normal conditions at low speed with correctly used system, but lane lines are unclear	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV19 - Sensor detection is wrong
Normal Driving on Highway during Rain (slippery roads) at High Speed with correctly used system	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV02 - Function unexpectedly activated

Hazard Identification		
Deviation Details	**Hazardous Event (resulting effect)**	**Event Details**
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 or with road infrastructure.
The LKA function is being misused by the driver, which is taking both hands off the wheel and incorrectly treating the car as a fully autonomous vehicle	EV00 - Collision with other vehicle	By misusing the LKA function the vehicle could collide with another vehicle
Error in lane detection as lane lines are unclear, and lane keeping assistance trying to maintain car in an incorrect position in the lane	EV-02 - Side collision with other traffic	Vehicle crashes with side traffic
Lane keeping assistance still trying to correct steering even though car has its turn signal on	EV-03 - Rear collision with trailing traffic	Vehicle crashes with trailing car

Hazardous Event Description	Exposure (of situation)
The LDW function applies too high an oscillating torque to the steering wheel (above limit).	E3 - Medium probability
The lane keeping assistance was always on and had no time limit, so drivers could take both hands off the wheel	E2 - Low probability
LKA trying to maintain car in uncorrect position in the lane, hence increasing the probability of an accident with a side vehicle	E3 - Medium probability
LKA trying to keep car in ego lane even though driver wants to turn and has its turn signal on. This creates a hazardous situation because trailing car could speed up and eventually crash with vehicle	E3 - Medium probability

Hazardous Event Classification		
Rationale (for exposure)	**Severity (of potential harm)**	**Rationale (for severity)**
Rain once a month is a common situation	S3 - Life-threatening or fatal injuries	On highway speed of vehicle is expected to be high
The driver is on a country road and misusing the system and that combination probably does not happen often.	S3 - Life-threatening or fatal injuries	Speed of vehicle is high
In Chile, my homecountry, is common to see city roads with lane lines incomplete	S1 - Light and moderate injuries	In city traffiic, speed of vehicle is expected to be low
Rain once a month is a common situation in Chile	S3 - Life-threatening or fatal injuries	On highway speed of vehicle is expected to be high

		Determi
Controllability (of hazardous event)	**Rationale (for controllability)**	**ASIL Determination**
C3 - Difficult to control or uncontrollable	If the additional torque provided by the LDW is too high, hence the vehicle will be difficult to control	ASIL C
C3 - Difficult to control or uncontrollable	Because hands aren't on the wheel at high speeds, a vehicle accident would not be controllable.	ASIL B
C3 - Difficult to control or uncontrollable	Unless the car display shows the output of the computer vision module, when the LKA erronously detects lanes, less than 90% of drivers will be alert of the situation and turn of the Lane Assistance system	ASIL A
C2 - Normally controllable	90% or more of the drivers will understand that there is a problem with the LKA system that is also activated even with the turn signal on	ASIL B

nation of ASIL and Safety Goals

Safety Goal
The oscillating steering torque from the lane departure warning function shall be limited.
The LKA 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.
LKA shall only be activated when lane lines are detected with a high statistical confidence
LKA shall only be activated when turn signal is off