Hazard ID	Situational Analysis			
	Operational Mode	**Operational Scenario**	**Environmental Details**	**Situation Details**
HA-001	OM03 - Normal Driving	OS04 - Highway	EN06 - Rain (slippery road)	SD02 - High Speed
HA-002	OM03 - Normal Driving	OS03 - Country Road	EN01 - Normal conditions	SD02 - High Speed
HA-003	OM03 - Normal Driving	OS03 - Country Road	EN01 - Normal conditions	SD01 - Low Speed
HA-004	OM03 - Normal Driving	OS04 - Highway	EN01 - Normal conditions	SD02 - High Speed
HA-005	OM03 - Normal Driving	OS02- City Road	EN01 - Normal conditions	SD01 – Low Speed

Other Details (optional)	Item Usage (function)	Situation Description	Function	Deviation
	IU01 - Correctly used	Normal driving on a highway with slippery condition due to rain at high speed and 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
	IU02 - Incorrectly used	Normal driving on a country road with normal driving conditions at high speed and incorrectly used system	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV03 - Function is always activated
Faded or missing lane markings	IU01 - Correctly used	Normal driving on a country road with faded or no lane markings at normal speed and correctly used system	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	DV19 - Sensor detection is wrong
	IU01 - Correctly used	Normal driving on a highway with normal driving conditions at high speed and correctly used system	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV04 - Actor effect is too much
Night time	IU01 - Correctly used	Normal driving on a city road with normal driving conditions at low speed and correctly used system	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	DV01 - Function not activated

Hazard Identification		
Deviation Details	**Hazardous Event (resulting effect)**	**Event Details**
Lane Departure Warning function applies very high oscillations which are above the limits	EV00 - Collision with other vehicle	Driver loose control of the vehicle due to high haptic feadback and collide with other vehicles
Lane Keeping function is always activated and driver has no hand on the steering wheel	EV00 - Collision with other vehicle	Driver treats the function as autonomous driving function and can't take control in emergency
Lane departure warning function is unable to detect the faded or missing lane markings on the road	EV-06 - Front collision with oncoming traffic	System gives false lane departure warnings due to misinterpretation of faded or mising lanes and turns the steering wheel which eventually results in driver loosing control of the vehicle
Some animal comes in the current lane	EV-04 - Front collision with obstacle	System does not let the driver to turn the vehicle from a safe distance
Lane Departure Warning function is not activated when required	EV00 - Collision with other vehicle	Driver doesn't pay attention and lane departure warning function is not activated when required

	Hazardous

Hazardous Event Description	Exposure (of situation)	Rationale (for exposure)	Severity (of potential harm)
Lane Departure Warning function applies very high oscillations which are above the limits	E3 - Medium probability	Driving on a highway with slippery conditions due to rain could happen only for around 1% to 10% of the driving time for an average driver	S3 - Life-threatening or fatal injuries
The driver does not use the function as intended	E2 - Low probability	Misuse of the system does not happen very often and should happen only for less than 1% of driving time	S3 - Life-threatening or fatal injuries
The Lane Departure warning function acts randomly due to incorrect detections of faded or missing lanes	E3 - Medium probability	An average driver may encounter country roads which have faded or missing lane markings 1% to 10% of the driving time	S2 - Severe and life-threatening injuries
The Lane Keeping Assistance system tries to keep the vehicle in its lane without avoiding collision with the animal in lane	E2 - Low probability	It may happen few times per year for a driver to encounter an animal on road, i.e less than 1% of the driving time	S2 - Severe and life-threatening injuries
Lane Departure warning function doesn't engage when required	E4 – High probability	Driving on a city road at night is very common	S2 - Severe and life-threatening injuries

s Event Classification			Determin
Rationale (for severity)	**Controllability (of hazardous event)**	**Rationale (for controllability)**	**ASIL Determination**
Collision at high speed may cause fatal injuries	C3 - Difficult to control or uncontrollable	It's difficult to take control of steering when vehicle has already lost balance	C
Collision at high speed may cause fatal injuries	C3 - Difficult to control or uncontrollable	It's difficult to take control of steering suddenly when not driving already or when vehicle has already lost balance	B
Collision may cause severe injuries	C2 - Normally controllable	Driver can hit the brakes further slow down the vehicle when already driving at low speed	A
Collision with a large animal at high speed may cause severe injuries	C2 – Normally controllable	Driver can hit the brakes to reduce the speed and impact, but may not do so in panic	QM
Collision may cause severe injuries	C2 - Normally controllable	Driver has more time to realise the situation and react when driving at low speed	B

ıation of ASIL and Safety Goals
Safety Goal
Steering wheel oscillations should be limited to reasonable levels
The Lane Keeping Assistance function must engage for certain number of times in given duration and thereafter alert the driver and disengage to prevent misuse
The Lane Keeping Assistance function should be deactivated when driving on roads with faded or missing lane markings
The amount of torque applied by Lane Keeping Assistance function on steering wheel should be limited and zero when driver applies torque more than some threshold
The Lane Departure Warning function must be deactivated in case of any discrepancy with the system