

Hazard ID	Situational Analysis					
	Operational Mode	Operational Scenario	Environmental Details	Situation Details	Other Details (optional)	Item Usage(function)
HA-001	OM03 - Normal driving	OS03 - Country Road	EN06 - Rain (slippery road)	SD02 - High speed	No Lane Marking	IU01 - Correctly used
HA-002	OM03 - Normal driving	OS04 - Highway	EN01 - Normal conditions	SD02 - High speed	NA	IU02 - Incorrectly used
HA-003	OM03 - Normal driving	OS02 - City Road	EN01 - Normal conditions	SD01 - Low speed	NA	IU01 - Correctly used
HA-004	OM03 - Normal driving	OS09 - Road tunnel	EN01 - Normal conditions	SD02 - High speed	No Illumination on road	IU02 - Incorrectly used

Situation Description	Function	Deviation
Normal driving on a highway during rain (slippery road) with 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
Normal driving on country roads during normal conditions with high speed	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 a city road during normal conditions with low speed	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	DV01 - Function not activated
Normal driving in road tunnel with high speed and no illumination on road	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)
The LDW function applies an oscillating torque with very high torque (above limit)	EV08 - Collision with other vehicle
The driver misuses the function by taking both hands off the wheel and incorrectly treating the car as a fully autonomous vehicle	EV08 - Collision with other vehicle
The driver misuses the function by taking both hands off the wheel and incorrectly treating the car as a fully autonomous vehicle	EV08 - Collision with other vehicle
The LDW function unexpectedly activated and detect wrong lane marking due to low illumination	EV08 - Collision with other vehicle

Event Details	Hazardous Event Description	Exposure (of situation)
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	Torque to the steering wheel is too high	E3 - Medium probability
The driver misuses the function by taking both hands off the wheel and incorrectly treating the car as a fully autonomous vehicle which may lead to crashes	Lane keeping function is activated always	E2 - Low probability
The driver misuses the function by taking both hands off the wheel and incorrectly treating the car as a fully autonomous vehicle which may lead to crashes	Lane keeping function is not activated and driver consider car as fully autonomous	E4 - High probability
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	Loss of steering control due to high speed driving in tunnel and low illumination	E2 - Low probability

**Hazardous Event Classification**

<b>Rationale (for exposure)</b>	<b>Severity (of potential harm)</b>	<b>Rationale (for severity)</b>	<b>Controllability (of hazardous event)</b>
Highway driving is part of regular driving however, rain does not occur often	S3 - Life-threatening or fatal injuries	High speed collisions could be fatal	C3 - Difficult to control or uncontrollable
Driving in the country road may not happen often	S3 - Life-threatening or fatal injuries	High speed collisions could be fatal	C3 - Difficult to control or uncontrollable
City driving is part of regular driving, hence occurs normally	S1 - Light and moderate injuries	Low speed collisions is usually cause no injury	C0 - Controllable in general
Tunnel driving with high speed is not regular activity for most of the driver	S3 - Life-threatening or fatal injuries	High speed collisions could be fatal	C3 - Difficult to control or uncontrollable

	Determination of ASIL and Safety Goals	
Rationale (for controllability)	ASIL Determination	Safety Goal
Excessive vibration will make it difficult for most drivers to control steering	C	The oscillating steering torque from the lane departure warning function shall be limited
Vehicle accident would not be controllable as the driver's hands are not on the steering	B	The lane keeping assistance function shall be time limited and the additional steering torque shall end after a given timer interval so that the driver cannot misuse the system for autonomous driving
Easy to control at low speed	QM	The camera ECU shall send signal to Car Display ECU if LKA is activated or not
Excessive vibration will make it difficult for most drivers to control steering	B	The LKA function shall stop when camera will unable to detect road markings and notify to driver