Hazard ID			
	Operational Mode	**Operational Scenario**	**Environmental Details**
HA-001	OM03 – Normal driving	OS04 – Highway	EN06 – Rain (slippery
HA-002	OM03 – Normal driving	OS04 – Highway	EN06 – Rain (slippery
HA-003	OM03 – Normal driving	OS04 – Highway	EN06 – Rain (slippery
HA-004	OM03 – Normal driving	OS03 – Country roads	EN01 – Normal
HA-005	OM03 – Normal driving	OS04 – Highway	EN02 – Sun Blares
HA-006	OM03 – Normal driving	OS01 – Any road	EN01 – Normal

Situational Analysis

Situation Details	Other Details (optional)	Item Usage (function)	Situation Description
SD02 – High Speed		IU01 – Correctly	Normal driving on a highway during rain
SD02 – High Speed		IU01 – Correctly	Normal driving on a highway during rain
SD02 – High Speed		IU01 – Correctly	Normal driving on a highway during rain
SD02 – High Speed		IU02 – Incorrectly	Normal driving on country roads during
SD02 – High Speed		IU02 – Incorrectly	Normal driving on a highway with bright
SD01 – Low Speed		IU01 – Correctly	Normal driving on any road during normal

Hazard Identificatio			
Function	**Deviation**	**Deviation Details**	**Hazardous Event (resulting**
Lane Departure	DV04 – Actor	The LDW function applies	EV00 – Collision with
Lane Departure	DV04 – Actor	The LDW function applies	EV00 – Collision with
Lane Departure	DV05 – Actor	The LDW function applies	EV00 – Collision with
Lane Keeping	DV03 –	The LKA function is always	EV00 – Collision with
Lane Keeping	DV11 – Actor	The LKA function’s car	EV00 – Collision with
Lane Departure	DV04 – Actor	The LDW function applies	EV00 – Collision with

on	

Event Details	Hazardous Event Description	Exposure (of situation)
High haptic feedback can affect	The LDW function applies too	E3 – Medium
High frequency haptic feedback	The LDW function applies	E3 – Medium
Low frequncy haptic feedback	The LDW function applies	E3 – Medium
The LKA function being constantly	The LKA function is always	E2 – Low
The driver could assume that the	The LKA function’s car display	E1 – Very low
High haptic feedback can affect	The LDW function applies too	E4 – High

Hazardous Event Classification			
Rationale (for exposure)	**Severity (of potential harm)**	**Rationale (for severity)**	**Controllability (of hazardous event)**
Driving at high speed in the rain	S3 – Life-threatening or	Losing control of a	C3 – Difficult to control or
Driving at high speed in the rain	S3 – Life-threatening or	Losing control of a	C3 – Difficult to control or
Driving at high speed in the rain	S3 – Life-threatening or	Losing control of a	C2 – Normally
The driver will likely not misuse	S3 – Life-threatening or	Losing control of a	C3 – Difficult to control or
The driver will likely not misuse	S3 – Life-threatening or	Losing control of a	C2 – Normally
Driving at low speed is very	S1 – Light and moderate	Losing control of a	C3 – Difficult to control or

	Determination of ASIL and Safety Goals	
Rationale (for controllability)	**ASIL Determination**	**Safety Goal**
Strong vibrations applied to the steering wheel	ASIL C	The oscillating steering torque from the
Strong vibrations applied to the steering wheel	ASIL C	The oscillating steering torque frequency
Vibrations applied to the steering wheel could be	ASIL B	The oscillating steering torque frequency
It is difficult to control the vehicle if you are not	ASIL B	The lane keeping assistance function
It is difficult to control the vehicle if you are not	QM	The lane keeping assistance function’s
Strong vibrations applied to the steering wheel	ASIL B	The oscillating steering torque from the

Hazard & Risk Analysis Defir

Operational Mode

ID	Mode
OM01	Parked
OM02	Ignition on
OM03	Normal driving
OM04	Backward driving
OM05	Degraded driving
OM06	Towing (active)
OM07	Towing (passive)
OM08	Service
OM09	N/A

Operational Scenario

ID	Scenario
OS01	Any Road
OS02	City Road
OS03	Country Road
OS04	Highway
OS05	Mountain Pass
OS06	Off Road
OS07	Road with gradient
OS08	Road with bump
OS09	Road tunnel
OS10	Road with construction site
OS11	N/A

Situation Details

ID	Scenario
SD01	Low speed
SD02	High speed
SD03	Normal acceleration
SD04	High acceleration
SD05	Normal braking
SD06	High braking
SD07	N/A

Item Usage

ID	Mode
IU01	Correctly used
IU02	Incorrectly used
IU03	N/A

Environmental Details

ID	Scenario

EN01	Normal conditions
EN02	Sun blares (degraded view)
EN03	Fog (degraded view)
EN04	Snowfall (degraded view)
EN05	Cross-wind (lateral force)
EN06	Rain (slippery road)
EN07	Snow (slippery road)
EN08	Glace (slippery road)
EN09	N/A

ıitions

Remarks
Car is parked, ignition is off
Car is parked, ignition is on
Car is driving
Car is driving
Limp home mode
Towing another car
Beeing towed by another car
Vehicle is in repair garage
not applicable or not relevant

Remarks
road type
road type
road type
road type
road type
road type
road attribute
road attribute
road attribute
road attribute
not applicable or not relevant

Remarks
driving attribute
driving attribute
driving attribute
driving attribute
driving attribute
driving attribute
not applicable or not relevant

Remarks
Intended usage
Unintended usage (foreseeable)
not applicable or not relevant

Remarks

weather attribute
weather attribute
weather attribute
weather attribute
weather attribute
road attribute
road attribute
road attribute
not applicable or not relevant

Reference
OM01 - Parked
OM02 - Ignition on
OM03 - Normal driving
OM04 - Backward driving
OM05 - Degraded driving
OM06 - Towing (active)
OM07 - Towing (passive)
OM08 - Service
OM09 - N/A

Reference
OS01 - Any Road
OS02 - City Road
OS03 - Country Road
OS04 - Highway
OS05 - Mountain Pass
OS06 - Off Road
OS07 - Road with gradient
OS08 - Road with bump
OS09 - Road tunnel
OS10 - Road with construction site
OS11 - N/A

Reference
SD01 - Low speed
SD02 - High speed
SD03 - Normal acceleration
SD04 - High acceleration
SD05 - Normal braking
SD06 - High braking
SD07 - N/A

Reference
IU01 - Correctly used
IU02 - Incorrectly used
IU03 - N/A

Reference

EN01 - Normal conditions
EN02 - Sun blares (degraded view)
EN03 - Fog (degraded view)
EN04 - Snowfall (degraded view)
EN05 - Cross-wind (lateral force)
EN06 - Rain (slippery road)
EN07 - Snow (slippery road)
EN08 - Glace (slippery road)
EN09 - N/A

Deviation

ID	Deviation (Guideword)	Remarks
DV01	Function not activated	Activation error
DV02	Function unexpectedly activated	Activation error
DV03	Function always activated	Activation error
DV04	Actor effect is too much	Quantitative error
DV05	Actor effect is too less	Quantitative error
DV06	Actor action too early	Timing error
DV07	Actor action too late	Timing error
DV08	Actor action before	Sequence error
DV09	Actor action after	Sequence error
DV10	Actor effect is reverse	Logical error
DV11	Actor effect is wrong	Logical error
DV12	Sensor sensitivity is too high	Quantitative error
DV13	Sensor sensitivity is too low	Quantitative error
DV14	Sensor detection too early	Timing error
DV15	Sensor detection too late	Timing error
DV16	Sensor detection before	Sequence error
DV17	Sensor detection after	Sequence error
DV18	Sensor detection is reverse	Logical error
DV19	Sensor detection is wrong	Logical error
DV20	N/A	not applicable or not relevant

Hazardous Events (possibe effects)

ID	Hazardous Event	Remarks
EV-07	None	
EV-06	Front collision with oncoming traffic	
EV-05	Front collision with ahead traffic	
EV-04	Front collision with obstacle	
EV-03	Rear collision with trailing traffic	
EV-02	Side collision with other traffic	
EV-01	Side collision with obstacle	
EV00	Collision with other vehicle	
EV01	Collision with train	
EV02	Collision with pedestrian	
EV03	Car spins out of control	
EV04	Car comes off the road	
EV05	Car catches file	
EV06	N/A	

Reference
DV01 - Function not activated
DV02 - Function unexpectedly activated
DV03 - Function always activated
DV04 - Actor effect is too much
DV05 - Actor effect is too less
DV06 - Actor action too early
DV07 - Actor action too late
DV08 - Actor action before
DV09 - Actor action after
DV10 - Actor effect is reverse
DV11 - Actor effect is wrong
DV12 - Sensor sensitivity is too high
DV13 - Sensor sensitivity is too low
DV14 - Sensor detection too early
DV15 - Sensor detection too late
DV16 - Sensor detection before
DV17 - Sensor detection after
DV18 - Sensor detection is reverse
DV19 - Sensor detection is wrong
DV20 - N/A

Reference
EV-07 - None
EV-06 - Front collision with oncoming traffic
EV-05 - Front collision with ahead traffic
EV-04 - Front collision with obstacle
EV-03 - Rear collision with trailing traffic
EV-02 - Side collision with other traffic
EV-01 - Side collision with obstacle
EV00 - Collision with other vehicle
EV01 - Collision with train
EV02 - Collision with pedestrian
EV03 - Car spins out of control
EV04 - Car comes off the road
EV05 - Car catches file
EV06 - N/A

Exposure

ID	Description
E0	Incredible
E1	Very low probability
E2	Low probability
E3	Medium probability
E4	High probability

Severity

ID	Description
S0	No injuries
S1	Light and moderate injuries
S2	Severe and life-threatening injuries
S3	Life-threatening or fatal injuries

Controllability

ID	Description
C0	Controllable in general
C1	Simply controllable
C2	Normally controllable
C3	Difficult to control or uncontrollable

Duration (of situation)
Not specified
<1 % of average operating time
1 % to 10 % of average operating time
>10 % of average operating time

Remarks
No injuries
Light and moderate injuries
Severe and life-threatening injuries (survival probable)
Life-threatening injuries (survival uncertain), fatal injuries

Remarks
Controllable in general
99 % or more of all drivers or other traffic participants are usually
90 % or more of all drivers or other traffic participants are usually
Less than 90 % of all drivers or other traffic participants are usua

Frequency (of situation)	Reference
	E0 - Incredible
Occurs less often than once a year for the great majority of drive	E1 - Very low probability
Occurs a few times a year for the great majority of drivers	E2 - Low probability
Occurs once a month or more often for an average driver	E3 - Medium probability
Occurs during almost every drive on average	E4 - High probability

Probability of Injuries	Reference
AIS 0 and less than 10 % probability of AIS 1-6	S0 - No injuries
More than 10 % probability of AIS 1-6 (and not S2 or S3)	S1 - Light and moderate injuries
More than 10 % probability of AIS 3-6 (and not S3)	S2 - Severe and life-threatening injuries
More than 10 % probability of AIS 5-6	S3 - Life-threatening or fatal injuries

	Reference
	C0 - Controllable in general
able to avoid harm	C1 - Simply controllable
able to avoid harm	C2 - Normally controllable
lly able, or barely able, to avoid harm	C3 - Difficult to control or uncontrollable

Controllability	Exposure	Severity		
		S0	S1	S2
C1	E1	QM	QM	QM
	E2	QM	QM	QM
	E3	QM	QM	QM
	E4	QM	QM	A
C2	E1	QM	QM	QM
	E2	QM	QM	QM
	E3	QM	QM	A
	E4	QM	A	B
C3	E1	QM	QM	QM
	E2	QM	QM	A
	E3	QM	A	B
	E4	QM	B	C

S3
QM
QM
A
B
QM
A
B
C
A
B
C
D