

# Safe Driving Driver Engagement

## Protocol

Implementation January 2026

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## **PREFACE**

During the test preparation, vehicle manufacturers are encouraged to liaise with the laboratory and to check that they are satisfied with the way cars are set up for testing. Where a manufacturer feels that a particular item should be altered, they should ask the laboratory staff to make any necessary changes. Manufacturers are forbidden from making changes to any parameter that will influence the test, such as vehicle setting, laboratory environment etc.

It is the responsibility of the test laboratory to ensure that any requested changes satisfy the requirements of Euro NCAP. Where a disagreement exists between the laboratory and manufacturer, the Euro NCAP Secretariat should be informed immediately to pass final judgment. Where the laboratory staff suspect that a manufacturer has interfered with any of the set-up, the manufacturer's representative should be warned that they are not allowed to do so themselves. They should also be informed that if another incident occurs, they will be asked to leave the test site.

Where there is a recurrence of the problem, the manufacturer's representative will be told to leave the test site and the Euro NCAP Secretariat should be immediately informed. Any such incident may be reported by the Euro NCAP Secretariat to the manufacturer and the person concerned may not be allowed to attend further Euro NCAP tests.

**DISCLAIMER:** Euro NCAP has taken all reasonable care to ensure that the information published in this protocol is accurate and reflects the technical decisions taken by the organisation. In the unlikely event that this protocol contains a typographical error or any other inaccuracy, Euro NCAP reserves the right to make corrections and determine the assessment and subsequent result of the affected requirement(s).

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## DEFINITIONS

Throughout this protocol the following terms are used:

**Adaptive Cruise Control (ACC)** – a system that controls the vehicle speed whilst maintaining a set distance to vehicles ahead.

**Lane Centering (LC)** – a function which assists the driver in keeping the vehicle within the chosen lane, by influencing the lateral movement of the vehicle.

**Assisted Mode** – Combination of ACC and LC.

**Driver State Monitoring (DSM)** – Driver State Monitoring system that can to determine the state of the driver.

**Transient state** – A state during which the driver's focus on the primary task of driving/controlling the vehicle is temporarily reduced, but can be immediately reversed (e.g. visual inattentiveness due to engaging in secondary tasks).

- **Long Distraction** – A single long duration distraction which takes the driver's gaze away from the forward road view.
- **Short Distraction / Visual Attention Time Sharing (VATS)** – Repeated short duration gazes away from the forward road view, which cumulatively reduce the driver's awareness of the driving situation, until their attention returns to the driving task for long enough for them to fully assess the driving situation.
- **Phone Use** – A subset of short distraction (VATS) where the object the driver's attention is shared with is their mobile phone.

**Non-transient state** – A state that partially or fully reduces the driver's capability to maintain focus and properly perform the driving task and that cannot be reversed without appropriate recovery time outside of the driving session.

- **Impairment** – Impaired driving negatively impacts driving performance, resulting in an increased crash risk. Impairment may either build up over time (typically drowsiness/sleepiness), or present itself from the start of the journey (non-fatigue related, e.g., from the use of alcohol and/or drugs that impair driver performance).
- **Microsleep** – A microsleep is a temporary episode of sleep after fatigue builds-up, which may last up to several seconds.
- **Sleep** – In this assessment sleep is considered as when a driver has been in a state of unconsciousness due to fatigue for a period of greater than a few seconds.
- **Unresponsive Driver** – Where a driver becomes unresponsive during driving, likely due to an onset of sudden sickness or extreme fatigue.

**Impaired driving vehicle response** – Warning and/or intervention vehicle response after a driver has been classified as impaired.

- **Impaired driving warning** – Warning issued in case the system determines an impaired driver
- **High sensitivity mode** – A more sensitive and earlier warning and/or intervention of Safety Assist systems to compensate for the driver state

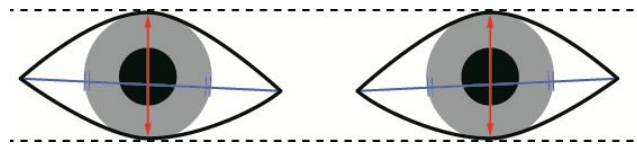
**Owl type movement** – A shift of visual attention away from the road and forward-facing position that is primarily achieved by head rotation followed by the eyes.

**Lizard type movement** – A movement in which the driver focuses on a task by moving primarily their eyeline away from the road with their head/face remaining in the forward-facing position.

**Degraded system** – A direct driver monitoring system is considered to be degraded in this assessment when a subsystem becomes fully unavailable. E.g. a direct driver monitoring system which uses head pose tracking and eye tracking would be considered degraded if eye tracking became fully unavailable therefore preventing the system identifying any lizard type movements.

**Non-functional system** – A direct driver monitoring system is considered to be not functional in this assessment when the entire system becomes fully unavailable.

**Eye lid aperture** – Distance between the point where the straight line drawn in the y-axis direction from the midpoint of line segment connecting the outer and inner corners of the driver's eye overlaps the lower edge of the upper eyelid and upper edge of the lower eyelid. Measured when driver is awake and attentive.



**In-vehicle infotainment (IVI) system** – The area containing the infotainment system and/or vehicle controls, typically located centrally ahead of the front row seating in the conventional passenger car layout.

**Emergency Function (EF)** – Function which, in the event that a driver becomes unresponsive, can automatically decelerate and divert the vehicle to a safe stop or speed of <10km/h whilst maintaining the distance to vehicles travelling ahead and maintaining its lane. The targeted stop area may be the original lane, a slower moving lane, the hard shoulder, or an emergency area.

## General Vehicle Controls

**Direct physical input** - An interaction modality that provides haptic feedback (feeling of movement) to the driver once operated, with a mechanical movement for activation (i.e., press feels like a button), and that allows the driver to discover its location by tactility, with none to minimum gaze off-road time.

Alternative advanced solutions which do not include a mechanical movement but which meet all the other requirements of a Direct physical input may be taken into consideration as long as the function implementation is always responding to a driver's input regardless of the driver's characteristics (for example when a driver (temporarily) experiences reduced skin conductivity due to e.g. cold fingers, dry fingers, calloused fingers, scarred fingers, dirty/ oily/ wet/ sweaty

fingers, hands with lotion, or wearing non-conductive gloves). The Euro NCAP Secretariat will decide whether the alternative function implementation is admissible.

**Direct touch input** - An interaction modality which allows for providing input by touch and is always accessible (e.g. an interaction area located on the home screen of an in-vehicle infotainment screen).

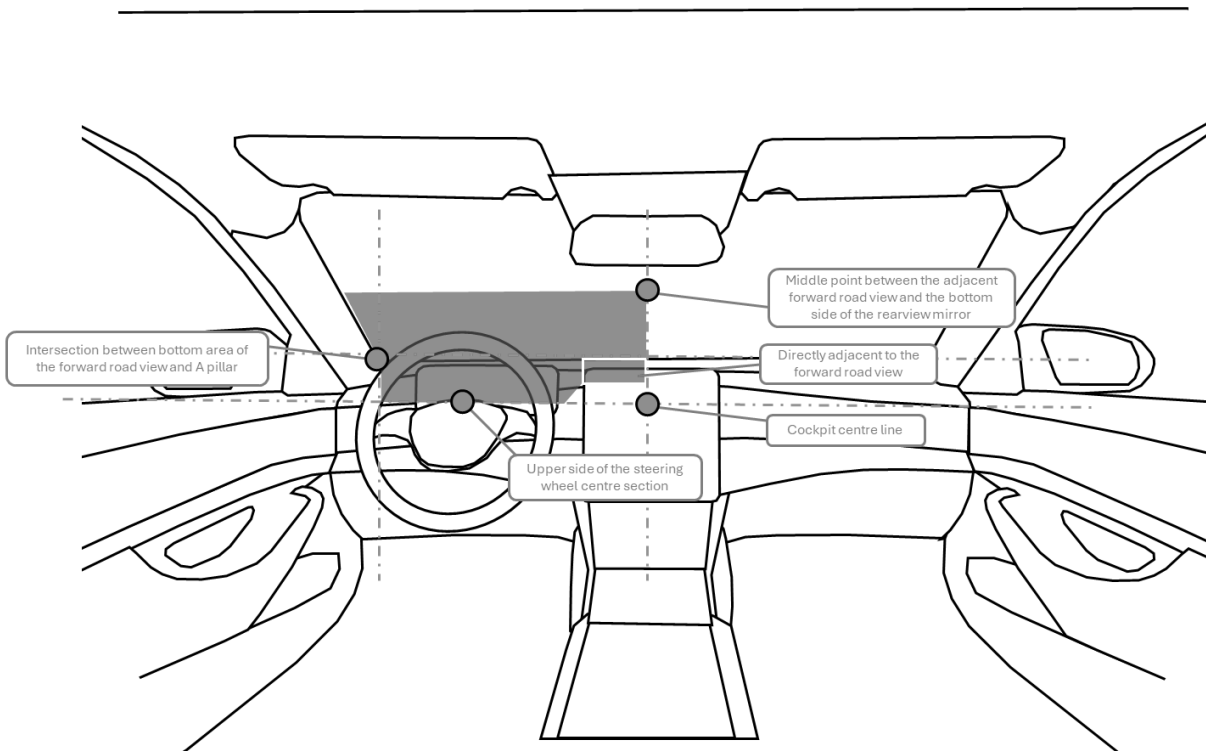
**Menu-based touch input (max. 2 steps)** – An interaction modality which allows for providing input by touch, and consisting of a menu structure of maximum 2 steps. The starting point of counting steps is the home screen.

**Direct voice input** – An interaction modality that allows the driver to operate devices, applications, and services using voice commands.

**Touchscreen** – A screen which can be operated by touching it. A touchscreen based on resistive touch requires pressure to the screen in order to respond, a touchscreen based on capacitive touch requires (skin) conductivity to the screen in order to respond.

**Essential driving information** – visual feedback provided to the driver with information frequently monitored during normal driving, e.g., vehicle speed, applicable speed limit, ADAS status, and all exterior light status.

**Direct driver's line of sight** – this is the area in the vehicle which the driver can easily monitor (peripherally) when looking at the road ahead. An example of the accepted area to display information in the direct driver's line of sight is indicated in grey in the image below. If a control cannot be seen anymore, e.g. because the driver's view is obstructed by the steering wheel, the control is no longer in the direct driver's line of sight.



## SCORING

<b>Driver engagement assessment</b>	<b>Total points 30</b>
<b>Driver Monitoring</b>	<b>25</b>
Transient	15
Non-Transient	10
<b>Driving Controls</b>	<b>5</b>
Driving	2.5
Comfort & infotainment	2.5



# 1 DRIVER MONITORING

Driver Monitoring assessment	Total points 25
<b>Transient driver states</b>	<b>15</b>
Long distraction	5
Short distraction	5
Phone Use	5
<b>Non-Transient driver states</b>	<b>10</b>
Impairment	4
Microsleep	2
Sleep	2
Unresponsive	2

The Euro NCAP Secretariat will review the DSM dossier provided by the Vehicle Manufacturer and will ask the test laboratory to spot check several Transient, Non-Transient, and Unresponsive Driver states before awarding the points. The test provisions for spot checks are outlined in Technical Bulletin SD-202.

## 1.1 General Requirements

To be eligible for scoring points in Driver Monitoring, the following conditions shall be met:

- The DSM system shall be default ON at the start of every journey and deactivation of the system shall not be possible with a momentary single push on a button.
- The driver state detection sensitivity shall not be manually adjustable.
- The DSM system shall continuously monitor the driver state. For the system to start measuring the driver state, a total of 1 minute of driving at forward speed of at least 10 km/h is allowed.
- For the distraction, microsleep, sleep and unresponsive driver states, the vehicle shall warn and/or intervene at forward speed of at least 20 km/h or for Lane Support at the lowest operational speed. For the impairment driver states, when the vehicle is moving forward at a speed of at least 50 km/h and for detection of these impairment states, a learning period at a speed of at least 50 km/h of up to 10 minutes is permitted from the start of every journey.
- Where the vehicle offers an assisted driving system as option or standard, the system shall meet a minimum score of 50% of Driving Collaboration and Driver Monitoring respectively, in accordance to the 2026 Assisted Driving Grading Protocol, to prevent overreliance.

- For any driver state where the system offers performance in transient and/or non-transient states, the Vehicle Manufacturer shall report the TPR as indicated in Technical Bulletin SD-201.
- The DSM system shall meet a minimum level of user acceptance during day-to-day real world driving situations. This aspect shall be evaluated as described in Euro NCAP VSSTR guidelines.

### 1.1.1 Noise Variables

A robust DSM system is expected to cover a wide variety of drivers, occlusions and driver behaviours to provide the highest societal safety benefit. To receive points in the DSM assessment, the whole range of each driver, occlusion and behaviour listed below shall be covered.

The Vehicle Manufacturer shall demonstrate, by means of a dossier, that the DSM system meets the performance requirements.

#### 1.1.1.1 Drivers

Noise Variables	Ranges / Elements	Performance Requirement
Age	Youthful [16-18] – aged [80]	Functional
Sex	Male, Female	Functional
Stature	AF05 – AM95 (in all suitable seating positions*)	Functional
Skin complexion	Fitzpatrick Skin Type 1 – 6 (or other suitable scales)	Functional
Eye lid aperture	From 6.0mm up to 12.0mm	Functional

\* Any seating position enabling any driver to correctly perform the driving task i.e., reaching the pedals and steering wheel, and able to see the forward road view.

### 1.1.1.2 Occlusion

Noise Variables	Ranges / Elements	Performance Requirement
Lighting	Daytime (100,000 lux) – night-time (1 lux)	Functional
Eyewear	Clear sunglasses with >70% transmittance *	Functional
	Sunglasses with a <15% transmittance*	Inform if not functional
Facial hair	Short facial hair (<20mm in length)	Functional
	Long facial hair (>150mm in length)	Functional
Hand on wheel	One hand on wheel at 12 o'clock position	Inform if not functional
Facial occlusion	Face-mask (Protective equipment guarding the airways)	Functional
	Hats	Inform if not functional
	Long head hair fringe obscuring eyes	Inform if not functional
Eyelash makeup	Thick eyelash makeup	Inform if not functional

\* Referred to light in the wavelength operated by the camera (Transmittance of sunglasses shall correlate to the light used by the sensor).

"Inform if not functional" means that when performance is compromised to the point where the system is non-functional or inactive, the driver is notified with visual and/or auditory cues within ten seconds of the occlusion being present. The auditory information regarding non-functional condition may only be shown up once every journey. For as long as the system is non-functional, a visual information shall be displayed either permanently or every [10] minutes .

### 1.1.1.3 Driver Behaviours

Driver behaviour	Performance Requirement
Eating	N/A
Talking	Functional
Laughing	N/A
Singing	N/A
Smoking / Vaping	N/A
Eye scratching / rubbing	N/A
Sneezing	N/A

For monitoring purpose, the Vehicle Manufacturer shall describe whether and how that driving behaviour affects the DSM performance.

## 1.2 Transient Driver States

Transient driver states	Total points 15
<b>Long distraction</b>	<b>5</b>
Non-driving task related	3
Driving task related	2
<b>Short distractions (VATS)</b>	<b>5</b>
Non-driving task related	2
Driving task related	2
Away from road (multiple locations)	1
<b>Phone Use</b>	<b>5</b>
Basic	2.5
Advanced	2.5

Where applicable, Owl (head movement), Lizard (eye movement) and body lean looking behaviours are used to assess the detection of driver distraction.

### 1.2.1 Long Distraction

A long distraction is defined as a single long duration driver gaze away from the forward road between 3 and 4 seconds. During the verification, it shall be ensured that the distraction is preceded by a four second on-road gaze. The gaze locations for Long Distraction are:

Glance Target Type	Movement Type	Gaze Location
Non-Driving task	Owl	Driver side window
		Passenger side window
		Passenger footwell
		Passenger face
		In-vehicle infotainment system
	Lizard	In-vehicle infotainment system
		Glovebox
	Body Lean	Passenger footwell
		Rear passenger
Driving task	Owl	Rear view mirror
		Passenger side mirror
		Driver side mirror
	Lizard	Instrument Cluster
		Driver side mirror
		Rear view mirror

For the assessment of Long Distraction, PASS / FAIL is assessed per Movement Type; all Gaze Locations listed per Movement Type shall be covered to be awarded a PASS.

### 1.2.2 Short Distraction (VATS)

A short distraction (or VATS – visual attention time sharing) event is an accumulation of repeated glances away from the forward road view and ends when the driver’s attention returns to the forward road view for a period long enough for the driver to fully interpret the road situation.

It is defined as a driver who glances away from the forward road view for a cumulative 10 seconds within a 30 second time period. Alternative detection strategies are also eligible for points.

It is permissible for the Vehicle Manufacturer to implement different detection strategies for driving related and non-driving related tasks.

Glance Target Type	Movement Type	Gaze Location
Non-Driving task	Owl	In-vehicle infotainment system
		Passenger footwell
	Lizard	Passenger footwell
		In-vehicle infotainment system
Driving task	Owl	Rear view mirror
		Passenger side mirror
		Driver side mirror
		Passenger side window
	Lizard	Instrument Cluster
		Driver side mirror
		Rear view mirror
		Driver side window
Multi-location	Lizard	Combination of non-driving task locations

For the assessment of Short Distraction, PASS / FAIL is assessed per Movement Type; all Gaze Locations listed per Movement Type shall be covered to be awarded a PASS.

### 1.2.3 Phone Use

Phone use is a specific type of short distraction (or visual attention time sharing) event where the driver’s repeated gaze is towards their mobile phone.

Glance Target Type	Movement Type	Gaze Location
Basic phone use	Owl	Driver knee outboard
		Driver knee inboard
		Driver lap
		Phone mounted on dashboard outboard
		Phone in Vehicle Manufacturer designed charge port or dedicated phone holding position
	Lizard	Driver knee outboard
		Driver knee inboard
		Driver lap
		Phone held centre of steering wheel (below cluster view)
		Phone in Vehicle Manufacturer designed charge port or dedicated phone holding position *
Advanced phone use	Lizard	Phone mounted on dashboard outboard
		Phone held in 9-11 or 13-15 o'clock region on wheel (uppermost position below windscreen view and outside of cluster view)
		Phone held in view of windscreen (excluding central area within the driver’s horizontal field of view, e.g., offset right or left)
		Phone held in view of instrument cluster

\* Warning may be suppressed provided that the phone screen is not visible when placed in the dedicated charge port, and intervention strategy shall apply in all cases.

For the assessment of Phone use, PASS / FAIL is assessed per Glance Target Type; all Movement Types and Gaze Locations listed per Glance Target Types shall be covered to be awarded a PASS.

## 1.3 Non-Transient Driver States

This assessment includes different impairment elements covering drowsiness and non-fatigue related states, which are rewarded separately.

Non-transient driver states	Total points 10
<b>Impairment</b>	<b>4</b>
Non-fatigue related	2
Drowsiness	2
<b>Microsleep</b>	<b>2</b>
<b>Sleep</b>	<b>2</b>
<b>Unresponsive</b>	<b>2</b>

### 1.3.1 Non-fatigue related

Systems capable of detecting impairment unrelated to fatigue, such as that resulting from alcohol and/or drugs that impair driver performance are eligible to score points. This does not include interlock interfaces.

### 1.3.2 Drowsiness

Systems capable of detecting a driver reaching a KSS level  $>7$  at the latest, or an equivalent metric appropriate to assess risky levels of drowsiness are eligible to score points. The system shall be functional from 50 km/h.

### 1.3.3 Microsleep

A driver is considered to be undergoing a microsleep event when displaying a short duration eye closure (1-2 seconds). The Vehicle Manufacturer may use additional inputs that are considered necessary to enhance microsleep detection, e.g., prior accumulation of drowsiness.

### 1.3.4 Sleep

A driver is deemed asleep when displaying a continued eye closure  $\geq 3$  seconds. The Vehicle Manufacturer may use additional inputs that are considered necessary to enhance sleep detection.

### 1.3.5 Unresponsive Driver

A driver may be classified as unresponsive when their gaze does not return to the forward road view within 3 seconds after a distraction warning being issued or when the eyes have been closed for  $\geq 6$  seconds.

Other means to determine an unresponsive driver at an earlier timing may also be used.



## 1.4 Vehicle Response

Driver State	Distraction Type	Glance Target Type	Movement Type	Maximum available points					
				Warning	Intervention			Sub Total	Total
					Forward Support Sensitivity	Lane Support Sensitivity	Total		
Transient	Long Distraction	Non-Driving Task	Owl	0,5	0,4	0,1	0,5	1	5
			Lizard	0,5	0,4	0,1	0,5	1	
			Body Lean	0,5	0,4	0,1	0,5	1	
		Driving Task	Owl	-	0,8	0,2	1	1	
			Lizard	-	0,8	0,2	1	1	
	Short Distraction (VATS)	Non-Driving Task	Owl	0,5	0,4	0,1	0,5	1	5
			Lizard	0,5	0,4	0,1	0,5	1	
		Driving Task	Owl	-	0,8	0,2	1	1	
			Lizard	-	0,8	0,2	1	1	
		Multi-target	Lizard	0,5	0,4	0,1	0,5	1	
	Phone Use	Basic	Owl + Lizard	1,25	1	0,25	1,25	2,5	5
		Advanced	Lizard	1,25	1	0,25	1,25	2,5	
	Non-transient	Impairment	Drowsiness	0,5	1,5			2	4
			Non-fatigue	0,5	1,5			2	
Microsleep			0,5	1,5			2	2	
Sleep			0,5	1,5			2	2	
Unresponsive driver			-	2			2	2	
<b>Total</b>								<b>25</b>	

When the system can detect certain Driver State(s) specified in 1.2 and 1.3, a vehicle response in terms of warning and/or intervention is required to score points.

### 1.4.1 Transient state warning requirements

When the vehicle is travelling at  $\geq 20$ km/h, a visual and (haptic and/or audible) warning shall be issued immediately after the driver is classified as distracted.

For DSM systems offering a vehicle response consisting on warning and intervention, a warning suppression strategy may be implemented for all transient states upon driver acknowledgment of the first instance of a warning. The strategy shall be reinstated at the start of a new journey.

### 1.4.2 Non-Transient state warning requirements

A visual and (haptic and/or audible) warning shall be issued immediately after driver is classified as impaired, sleeping or unresponsive.

Microsleep and sleep warnings shall be distinct and deliver a higher perceived level of urgency than the distraction and impairment warnings.

Alternatively, prompting rest areas in the navigation system are allowed as a warning for impaired states.

### 1.4.3 Intervention requirements

For detected transient and non-transient states, the intervention strategy shall be a change in Forward Support Sensitivity which can, or in some cases shall be accompanied with a change in Lane Support Sensitivity.

End of state in impaired cases is allowed to cover for false detections. The Vehicle Manufacturer shall provide compelling information how the vehicle can determine that the impaired state is not present. End of state is allowed as an intervention termination condition if the driver state monitoring system continues to measure the driver's state and determines the driver's attentiveness has been restored. It is not allowed for the driver to manually override the system and restore sensitivity level to baseline levels.

Behaviour	Intervention type	Intervention termination condition
All transient states	Forward Support w/wo Lane Support	$\geq 2$ s after end of state
$\leq 1$ s off-road glances	Forward Support w/wo Lane Support**	$\geq 1$ s after continuous gaze towards forward road view
None-fatigue related	Forward Support w/ Lane Support	End of journey or end of state
Drowsiness		End of journey or end of state*
Microsleep	Forward Support w/ Lane Support	End of journey or end of state
Sleep	OR Assisted Mode	
Unresponsive	Emergency Function	Driver response

\* "End of state" termination condition for drowsiness only allowed if the DSM system offers microsleep and sleep functionality

\*\* Lane Support intervention may be suppressed for short off-road glances deemed necessary for driving-related tasks e.g., monitoring traffic in adjacent lanes for intentional lane changes.

For Forward Support Sensitivity, the intervention strategy shall be activated  $\leq 1$  second of any continuous gaze away from forward road view.

For Lane Support Sensitivity, the intervention strategy shall be activated:

- At the latest when the driver state has been classified as transient.
- $\leq 1$  second of any continuous gaze away from forward road view if the estimated time to LKA intervention is shorter than the long distraction time ( $T_{LKA} < T_{Long\ distraction}$ )

The intervention strategy for Forward and/or Lane Support Sensitivity shall continue after the driver's glance has returned to the forward road view:

- For at least 2 seconds if the driver state has previously been classified as long distraction or VATS,
- For at least 1 second for previous gaze away from the road view shorter than the long distraction time.

#### 1.4.3.1 Forward Support Sensitivity

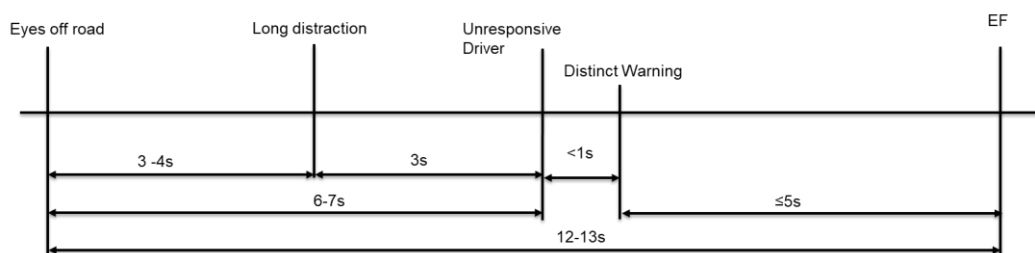
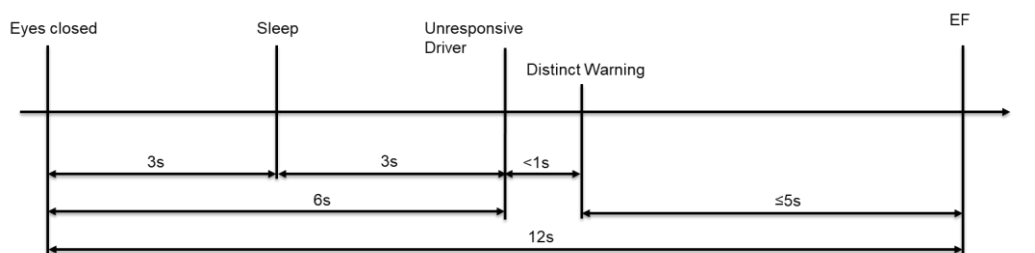
As a minimum requirement, FCW and/or AEB systems shall differ at least 200ms between a distracted and/or impaired driver and an attentive driver, to account for longer driver reaction times. The performance of the more sensitive FCW and/or AEB system shall be awarded in Crash Avoidance.

#### 1.4.3.2 Lane Support Sensitivity

As a minimum requirement, Lane Support Systems (LSS) shall be coupled to the driver state so that warning and/or intervention are always active (i.e., not suppressed) for distracted and/or impaired drivers and sensitivity is reduced (down to warning and/or intervention suppression) for attentive and unimpaired drivers.

#### 1.4.3.3 Emergency Function

The EF intervention shall start soon enough so that the vehicle is engaged into Assisted Mode, and no later than 5 seconds after the distinct warning phase has started.



## 2 DRIVING CONTROLS

Driving Controls assessment	Total points 5
<b>Driving</b>	<b>2.5</b>
Driving controls	1
Vision	0.5
Lights	0.5
ADAS	0.5
<b>Comfort &amp; Infotainment</b>	<b>2.5</b>
Audio entertainment	0.5
Calling & dialling	0.5
Navigation system	0.5
Climate controls	0.5
Windows	0.25
Other	0.25

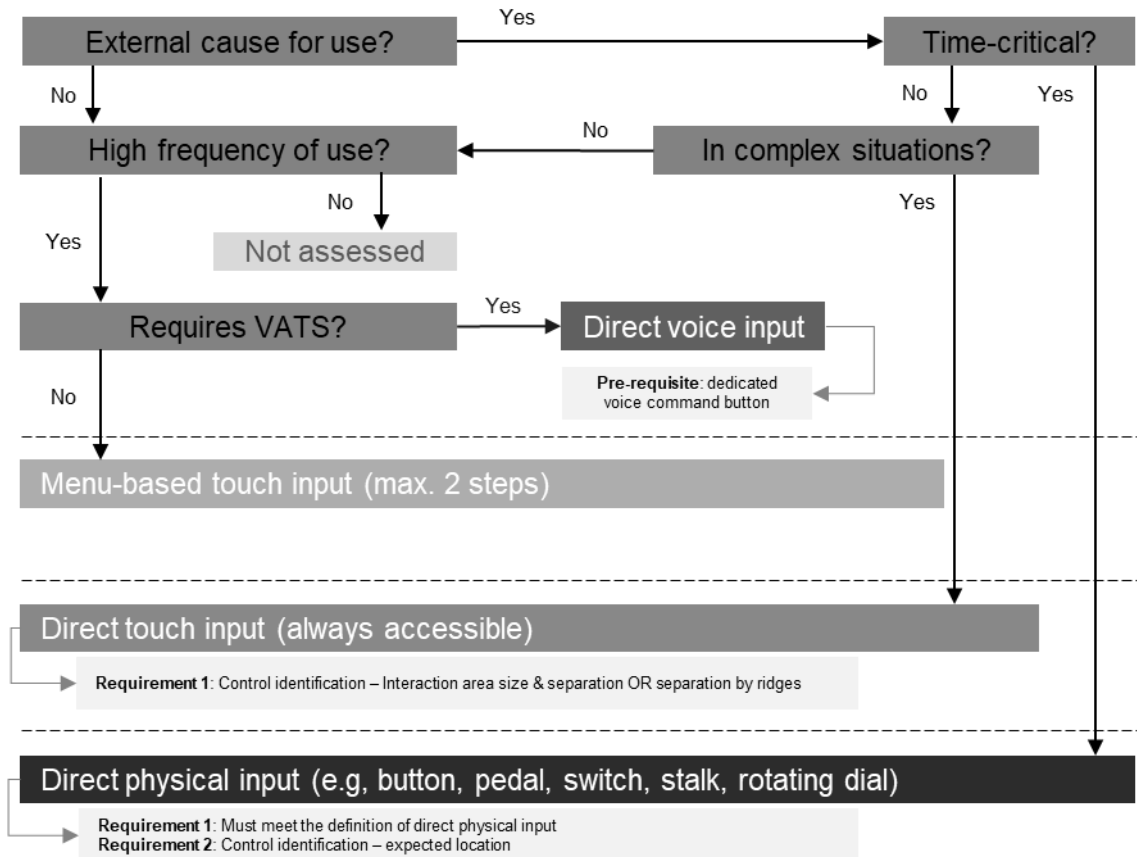
The General Vehicle Controls (GVC) assessment contains two main categories, Driving and Comfort & Infotainment, which consist of multiple subcategories. Points can be scored per subcategory, where all the functions and related actions/tasks in a subcategory meet the requirements.

In case any of the Functions and/or Actions/Tasks pertaining to a subcategory are not available on the vehicle with standard equipment (e.g., heated steering wheel), higher levels of equipment where that function is available shall be assessed. In this case, the Vehicle Manufacturer shall liaise with Euro NCAP prior to the assessment.

## 2.1 Assessment criteria

The General Vehicle Controls assessment follows an acceptance criteria intended to promote human machine interface (HMI) designs that minimizes distraction (gaze off-road duration).

For each of the actions/tasks in the scope of the assessment, there are associated factors (e.g., time criticality) motivating the use of the most appropriate function implementation (e.g., direct physical input). The function implementation is in some cases required to follow specific design guidelines to pass the criteria. A general overview of the criteria<sup>1</sup> is reflected in the flow chart below:



## 2.1.1 Function implementation requirements

### 2.1.1.1 Direct physical Input

Direct physical inputs in this assessment shall meet all the following requirements to pass the assessment:

- Definition of direct physical input: An interaction modality that provides haptic feedback (feeling of movement) to the driver once operated, with a mechanical movement for activation (i.e., press feels like a button), and that allows the driver to discover its location by tactility, with none to minimum gaze off-road time.
- Control identification – expected location: The expected location defines the area in which the direct physical input shall be located, as indicated in Technical Bulletin SD-203.

### 2.1.1.2 Direct Touch Input

Direct touch inputs in this assessment shall meet either of the following requirements to pass the assessment:

- Control identification – tactility\*: It shall be possible to identify the interaction area by tactility (e.g., ridges) AND the interaction area of clustered controls of the same category (e.g., set speed +/-) or Individual controls shall be bounded from controls of other categories with physical boundaries.
- Control identification – interaction area: The interaction area must be sufficiently large and sufficiently separated from other areas:
  - o For digital touch interfaces, a minimum target size of 10 by 10mm and a minimum of 4mm separation between interaction areas are required.
  - o If the minimum target sizes are exceeded, then the 4 mm minimum distance can be relaxed.

*\* Only applicable for controls located on the steering wheel.*

### 2.1.1.3 Essential driving information in direct driver's line of sight

The status/information of each of the following controls shall be in direct driver's line of sight (see Definitions) for that specific action/task to be awarded a pass:

- Light functions (e.g., exterior lights on/off, full beam on/off, auto mode on/off)
- Vehicle assistance activation/deactivation (e.g., lane centering active/standby)
- Vehicle assistance speed control (e.g., Current vehicle speed, SLIF, ACC mode)

### 2.1.1.4 Voice input

For each of the Functions that allow a pass for direct voice input there shall be an alternative control to the voice command and there must be a dedicated button (direct physical input or direct touch input) for voice command.

## 2.2 Driving controls

Driving controls	Total points 2.5
Driving	1
Vision	0.5
Lights	0.5
ADAS	0.5

Each of the actions/tasks under each of the subcategories listed below must meet Requirements 1 and 2 (where applicable) and must meet the acceptable function implementation for that action/task to be awarded a pass.

### 2.2.1 Driving

Driving functions	Actions / Tasks
Direction Indicator	Activate left and right
Gear selector	Select Forward then Neutral then Rearward position
Hazard light	Activate and deactivate
e-Call*	Activate
Horn	Activate

\*Note: for the driving function e-Call opening the safety cap shall not be considered as a 'step'.

Driving functions	Requirements	Function implementation
Direction Indicator		
Gear selector	Must meet the definition of direct physical input	Direct physical input
Hazard light		
e-Call*	Control identification - Expected Location	
Horn		

### 2.2.2 Vision

Vision functions	Actions / Tasks
Wiper front	Activate / Change speed / Deactivate (Manual mode) Activate washing fluid (Manual mode) Activate / Deactivate / Change Sensitivity (Auto Mode)
Wiper rear	Activate / Change speed / Deactivate (Manual mode) Activate washing fluid (Manual mode)
Demist / Defrost	Activate / Deactivate front Activate / Deactivate rear
Side Mirrors (external)*	Adjust to your liking

\*Note: the vision function Side Mirrors (external) can be a 2-step operation and approved as a Direct touch input, where:

- Both steps must be always accessible,
- Both steps are located in the same area,
- First step is used for switching left/right sides.

Vision functions	Requirements	Function implementation
Wiper front	Must meet the definition of direct physical input	Direct physical input
Wiper rear		Activate / Deactivate / Change Sensitivity (Auto Mode) may also be direct touch or menu-based touch input (max. 2 steps)
Demist / Defrost	Must be possible to identify the interaction area by tactility (e.g., ridges) or the interaction area must be sufficiently large and sufficiently separated from other areas	Direct physical or direct touch input
Side Mirrors (external)*		
	For the auto mode requirements are N/A	
	For rear demist/ defrost requirements are N/A	



### 2.2.3 Lights

Lights functions	Actions / Tasks
Exterior lights	Turn on / off (also activate/deactivate auto)
Full Beam	Turn on / off (also override auto)
Headlight height adjustment	Adjust all the range (if automatic adjustment is not available)
Front fog light	Activate and deactivate (if fitted)
Rear fog light	Activate and deactivate

Lights functions	Requirements	Function implementation
Exterior lights	Essential driving information - must be in direct driver's line of sight	Direct physical input, direct touch or menu-based input (max. 2 steps)
Full Beam	Must meet the definition of direct physical input  Control identification - Expected Location and Essential driving information - must be in direct driver's line of sight	Direct physical input
Headlight height adjustment		Direct physical input, direct touch or menu-based input (max. 2 steps)
Front fog light	Must be possible to identify the interaction area by tactility (e.g., ridges) or the interaction area must be sufficiently large and sufficiently separated from other areas  Essential driving information - must be in direct driver's line of sight	Direct physical input or direct touch input
Rear fog light		

## 2.2.4 ADAS

ADAS functions	Actions / Tasks
Vehicle Assistance	Activate / Deactivate Set following distance (if not automatically adjusted according to environment) Set speed Change between different Speed Control Functions (SCF)

ADAS functions	Requirements	Function implementation
Vehicle Assistance - Activation/Deactivation and setting following distance*	Must be possible to identify the interaction area by tactility (e.g., ridges) or the interaction area must be sufficiently large and sufficiently separated from other areas  Essential driving information - must be in direct driver's line of sight	Direct physical input or direct touch input
Vehicle Assistance – setting speed	Must meet the definition of direct physical input  Control identification - Expected Location and Essential driving information - must be in direct driver's line of sight	Direct physical input

\*Setting following distance not applicable if automatically adjusted according to ODD.

## 2.3 Comfort & infotainment controls

Comfort & Infotainment	Total points 2.5
Audio entertainment	0.5
Calling & dialling	0.5
Navigation system	0.5
Climate controls	0.5
Windows	0.25
Other	0.25

Each of the actions/tasks under each of the subcategories listed below shall meet Requirements 1 and 2 (where applicable) and meeting the acceptable function implementation for that action/task to be awarded a pass.

ALL of the actions/tasks under each of the subcategories listed below shall pass for that subcategory to be awarded with the corresponding points.

### 2.3.1 Audio entertainment

Audio entertainment functions	Actions / Tasks
Audio entertainment functions	Change the audio source from radio to media
	Tune the radio to a pre-determined station
	Play <artist name/song title/genre type>
	Skip Song/station / next song/station
	Adjusting volume
	Mute the audio system (also allows pause/stop)

Action / Tasks	Requirements	Function implementation
Change the audio source from radio to media		Direct physical input, direct touch or menu-based input (max. 2 steps)
Tune the radio to a pre-determined station*	There must be an alternative to the voice command and there must be a dedicated button for voice command.	Direct voice input
Play <artist name/song title/genre type>*		
Skip Song/station / next song/station	Must be possible to identify the interaction area by tactility (e.g., ridges) or the interaction area must be sufficiently large and sufficiently separated from other areas	Direct physical input or direct touch input
Adjusting volume		
Mute the audio system (also allows pause/stop)**		
	For adjusting volume and muting the audio system: - Adjusting volume and Muting must be clustered to score points - Muting can be merged with volume if possible to do in one action	

\*see Technical Bulletin SD-203

\*\*Note: valid interaction implementations for Muting include a rotating dial, a slider etc (as long as it can be done in 1 "go"), and a long push. A long push on a button is accepted but a dedicated single push is encouraged.

### 2.3.2 Calling & dialling

Calling & Dialing functions	Actions / Tasks
Calling and dialling	Call <contact name>
	Answering an incoming phone call
	Reject an incoming phone call

Action / Tasks	Requirements	Function implementation
Call <contact name>*	There must be an alternative to the voice command and there must be a dedicated button for voice command	Direct voice input
Answering an incoming phone call	Must be possible to identify the interaction area by tactility (e.g., ridges) or the interaction area must be sufficiently large and sufficiently separated from other areas	Direct physical input or direct touch input
Reject an incoming phone call		

\*see Technical Bulletin SD-203

### 2.3.3 Navigation system

Navigation functions	Actions / Tasks
Navigation system	Navigate to <point of interest>
	Navigate to <a stored location>
	Navigate to <a location address>
	End navigation

Action / Tasks	Requirements	Function implementation
Navigate to <point of interest>*	There must be an alternative to the voice command and there must be a dedicated button for voice command	Direct voice input
Navigate to <a stored location>*		
Navigate to <a location address>*		
End navigation		Direct physical input, direct voice input or direct touch input

\*see Technical Bulletin SD-203

### 2.3.4 Climate Control

Climate Control functions	Actions / Tasks
Climate controls	Changing temperature setting
	Adjust fan speed to your liking (when no auto mode available linked to temperature)
	Vent control (flow direction, shut/open)
	Activate / Deactivate the air recirculation mode
	Deactivate the climate system
	Seat heating & Seat cooling
	Steering wheel heating

Action / Tasks	Requirements	Function implementation
Changing temperature setting*	Must be possible to identify the interaction area by tactility (e.g., ridges) or the interaction area must be sufficiently large and sufficiently separated from other areas	Direct physical input or direct touch input
Adjust fan speed to your liking (when no auto mode available linked to temperature)*		
Vent control (flow direction, shut/open)		
Activate / Deactivate the air recirculation mode		Direct physical input, direct touch or menu-based input (max. 2 steps)
Deactivate the climate system		
Seat heating & Seat cooling		
Steering wheel heating		

\*Note: the Actions/ Tasks 'Changing temperature setting' and 'Adjust fan speed to your liking' can be a 2-step operation and approved as a Direct touch input, where:

- Both steps must be always accessible
- Both steps are located in the same area
- First step is used for switching functionalities

### 2.3.5 Windows

Windows functions	Actions / Tasks
Windows	Open/close fully the driver/passenger window
	Open/close rear windows*

Action / Tasks	Requirements	Function implementation
Open/close fully the driver/passenger window	Must be possible to identify the interaction area by tactility (e.g., ridges) or the interaction area must be sufficiently large and sufficiently separated from other areas	Direct physical input or direct touch input
Open/close rear windows*		

\*Note: the Actions/ Tasks 'Open/close rear windows' can be a 2-step operation and approved as a Direct touch input, where:

- Both steps must be always accessible
- Both steps are located in the same area
- First step is used for switching functionalities

### 2.3.6 Other

Other functions	Actions / Tasks
Doors	Lock/Unlock doors
Seat adjustment	Adjust the seat forwards/backwards (distance & angle) to your liking
Interior Lights	Turn interior lights on /off

Action / Tasks	Requirements	Function implementation
Lock/Unlock doors	Must be possible to identify the interaction area by tactility (e.g., ridges) or the interaction area must be sufficiently large and sufficiently separated from other areas	Direct physical input or direct touch input
Adjust the seat forwards/backwards (distance & angle) to your liking		
Turn interior lights on /off		