EUROPEAN NEW CAR ASSESSMENT PROGRAMME
(Euro NCAP)

ASSESSMENT PROTOCOL – SAFETY ASSIST
SAFE DRIVING

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1 INTRODUCTION

The following protocol deals with the assessments in the area of Safe Driving, specifically for Occupant Status Monitoring and Speed Assist Systems.

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).

2 METHOD OF ASSESSMENT

Unlike the assessment of protection offered in the event of a crash, the assessment of Safety Assist functions does not require destructive testing of the vehicle. Assessment of the Safety Assist functions is based on performance requirements verified by Euro NCAP. The intention is to promote standard fitment across the car volume sold in the European Community in combination with good functionality for these systems, where this is possible.

It is important to note that Euro NCAP only considers assessment of safety assist systems that meet the fitment requirements for base safety equipment or dual rating (as defined in the Vehicle Specification, Selection, Testing and Re-testing protocol). For the performance assessment of seat belt reminder and speed assistance systems, the car is subjected to a number of trial sequences designed to highlight the effectiveness of the systems. The car performance is scored using the observations made by the inspector during driving. In addition to the basic Euro NCAP assessment, additional information may be recorded that may be added to the Euro NCAP assessment in the future.

3 OCCUPANT STATUS MONITORING

3.1 Introduction

Human factors are common causes of accidents. In general, two kinds of mistakes can be observed: violations, of which speeding and driving under the influence of alcohol or drugs are most common; and human “errors”, in which the driver state - inattentiveness, fatigue, distraction - and inexperience play an important role. In an aging society, sudden medical incapacitation is also a growing cause of road crashes.

Already, driver advisory systems such as Speed Assistance Systems (SAS) and Attention Assist target the human element in crashes by alerting the driver in critical situations and, ultimately, by supporting the driver to improve his behaviour. In addition, adapting intervention criteria to individual drivers and the driver’s state may provide a significant potential for earlier interventions in the future without compromising false-positive levels.

Euro NCAP envisages an incentive for driver monitoring systems that effectively detect impaired and distracted driving and give appropriate warning and take effective action e.g. increasing sensitivity of ADAS systems or initiating a safe evasive manoeuvre. Implementation in the overall rating is planned in phases, starting with systems that have already entered the market. The assessment will evolve around how reliably and accurately the status of the driver is detected and what action the vehicle takes based on the information.

3.2 Definitions

Throughout this protocol the following terms are used:

Seat Belt Reminder (SBR) – Seat Belt Reminder that indicates the status of the seatbelt whether it is in use or not in use

Driver State Monitoring (DSM) – Driver State Monitoring system that is able to (in)directly determine the state of the driver

Direct Monitoring – Where driver state determination is supported by sensor(s) directly observing the driver.

Indirect Monitoring – Where driver state determination is achieved indirectly through means other than sensor(s) directly observing the driver (e.g. steering input).

Impaired driving – A driver who is disconnected from the driving task or not in a physical state that is sufficient for safe driving, either due to distraction, fatigue or sickness.

Distraction – Anything (e.g. secondary tasks) that reduces the driver's focus on the primary task of driving/controlling the vehicle.

- **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.

Fatigue – State of the driver where he/she is not awake enough to properly perform the driving task

- **Drowsy –** State of the driver where tiredness has an adverse effect of the driver's ability to focus on the driving task.
- **Microsleep –** A microsleep is a temporary episode of sleep 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 adapted vehicle mode after an impaired driving has been detected

- **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

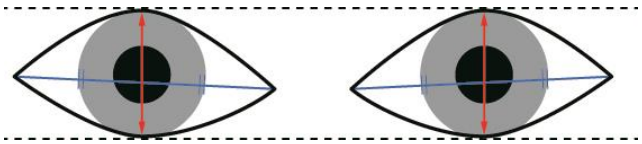
- **Minimum Risk Manoeuvre** – Emergency manoeuvre where the vehicle will come to either a controlled stop or speed of <10km/h without input from the driver.

Owl type movement – A shifting 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 degraded in this assessment when an entire 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.

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.

3.3 Prerequisites

In order to be rewarded any points in each of the individual assessment areas of this protocol, SBR, DSM and SAS systems must be fitted as standard equipment to the model tested as defined in the Euro NCAP Vehicle Specification, Sponsorship Testing and Re-testing Protocol.

To be eligible for scoring points in DSM:

- All seating positions must have met the SBR requirements detailed in Section 3.4. However, the fitment of rear seat occupancy detection and compliance with Section 3.4.3.2.3 is NOT a prerequisite for scoring in DSM.
- The vehicle under assessment must be equipped with an AEB system (meeting the Euro NCAP C2C and VRU preconditions as a minimum) and an LSS.

3.4 Seat belt reminder assessment

All seating positions in the vehicle will be assessed including optional and removable seats. All front row seating positions must meet the assessment criteria of Section 3.4.1 and 3.4.2 as a prerequisite of scoring.
All rear seating positions must be equipped with SBR and meet the assessment criteria of Section 3.4.1 and 3.4.3. Only those rear seating positions equipped with occupant detection that are also compliant with Section 3.4.3.2.3 will be eligible for SBR scoring.

3.4.1 General requirements

The seatbelt reminder system should "start" at the commencement of each "journey" that the vehicle makes. Short breaks in the journey are allowed, where the reminder system is not required to start again. Such short breaks, of up to 30 seconds, are to allow for events such as stalling of the engine where passengers may remain in the vehicle.

For the purpose of defining the start of the final audible signal, forward motion at less than 10 km/h, or rearward motion, is not deemed to be motion.

3.4.1.1 Signal

All seatbelt reminder systems shall be audio-visual, where there must be a clear and obvious link between the audible and visual signals. As soon as the audible part of the seatbelt reminder signal starts, the visual signal needs to flash and be synchronised (not necessarily at the same frequency, but an integer multiple of each other, e.g. two flashes with every chime) with the audible part.

The first 8 seconds after ‘ignition on’ are not considered for initial and/or final audible signal quality assessments, and the synchronisation requirements above do not apply during this time.*

Any visual signal must be clearly visible to the driver, without the need for the head to be moved from the normal driving position (e.g. instrument panel, head-up display, rear-view mirror, centre console). Any final audible signal must be "Loud and Clear" for the driver.

* This is to avoid conflict with some US FMVSS 208 compliant SBR warning configurations.

3.4.1.2 Airbag deactivation switch

There must be no link between the front seat passenger airbag and the front seat passenger SBR signals. It is NOT acceptable to Euro NCAP for the passenger seat SBR to be disabled via the passenger airbag switch.

3.4.1.3 Occupant detection

In the case of the driver's seat, occupancy can be assumed so the system does not have to be capable of detecting whether or not the seat is in use. For all front seat passengers, seat use must be detected. For all rear seat passengers, only those equipped with occupant detection

that are also compliant with Section 3.4.3.2.3 will be eligible for SBR scoring. Euro NCAP defines occupancy as use by an occupant larger, taller or heavier than a small female (5th percentile).

3.4.1.4 Secondary buckles

Monitoring of rear seat belt secondary buckles that require a tool to unlock, is not required.

3.4.1.5 Change of Status

During a change of status (from buckled to unbuckled) at speeds over 25 km/h, the system must immediately deploy the audio-visual signal meeting the requirements of section 3.4.2 for the front seats and that of section 3.4.3 for the rear seats.

Where the change of status occurs below 25km/h, and no doors are opened, the signal may be delayed until before at least one of the below requirements (at the choice of the manufacturer) are met:

- The car has reached a forward speed of 25 km/h, or
- The car has been in "Forward Motion" for 500 meters.

Where the change of status occurs below 25km/h, and doors are opened, the system should consider this situation as a “new journey” and warn accordingly.

Where the system is able to track the number of buckled positions in the rear, no change of status signal (for the rear seats) is required as long as all doors remain closed, and the number of buckled positions remains the same. This is to minimise the number of false positives (ex: children remaining in the vehicle but swapping seats in the rear while at a traffic light).

3.4.1.6 End of signal

Once the audible part of the SBR signal has started, it must only stop under one of the following circumstances.

- The signal has operated for the duration as specified in 3.4.2.3.
- The related seat belts are put into use. Where the system is able to track the number of buckled positions in the rear, the change of status signal (for the rear seats) can be terminated as long as all doors remain closed, and the number of buckled positions remains the same.
- The vehicle speed is below 10 km/h. When no doors have been opened, and the seatbelts remain unbuckled, the signal must resume again when the vehicle speed goes above 25 km/h.

3.4.2 Front seating positions

3.4.2.1 Visual signal

A visual signal must be activated when the ignition switch is engaged (engine running or not) and the seatbelt is not fastened, and in case of a change of status as defined in 3.4.1.5. This signal must remain until the seatbelt is fastened and recommence once a seatbelt is unfastened.

3.4.2.2 Initial Audible Signal

An Initial Audible Signal needs to be deployed before at least one of the following (at the choice of the manufacturer):

- The car has reached a forward speed of 25 km/h, or
- The engine has been running for 60 seconds, or
- The car has been in "Forward Motion" for 500 meters.

The duration of the initial audible signal can have a maximum duration of 30 seconds and must start with a positive audio-visual signal (not a gap). There must be no gaps greater than 10 seconds.

3.4.2.3 Final Audible Signal

A Final Audible Signal (Loud and Clear) is to be deployed before at least one of the following (at the choice of the manufacturer):

- The car has reached a forward speed of 40 km/h, or
- The engine has been running for 90 seconds, or
- The car has been in "Forward Motion" for 90 seconds, or
- The car has been in "Forward Motion" for 1000 meters, or
- The Initial Audible Signal (lasting maximum 30 seconds) is finished.

The duration of the final audible signal must be at least 90 seconds not counting gaps exceeding 3 seconds and must start with a positive audible signal (not a gap). There must be no gaps greater than 10 seconds.

NOTE: The manufacturer has the option to utilise the Initial Audible Signal as the Final Audible Signal, as long as it is “Loud and Clear”, and the duration is at least 90 seconds not counting gaps exceeding 3 seconds and must start with a positive audible signal (not a gap). There must be no gaps greater than 10 seconds.

3.4.3 Rear seating positions

3.4.3.1 Visual signal

3.4.3.1.1 A visual signal must be activated when the ignition switch is engaged (engine running or not), and any of the rear seatbelts are not fastened. No signal is required if the system is able to determine that there are no occupants in the rear seating positions. The signal must remain for at least 60 seconds or until the rear belts are buckled for the seats in use.

3.4.3.1.2 The system may allow the driver to acknowledge the signal, switching it off for this unique event (a new trigger of the warning should not be prevented).

3.4.3.1.3 For systems with seat occupant detection on all rear seating positions, the visual signal does not need to indicate the number of seat belts in use or not in use, but the signal must remain as long as the seatbelt remain unfastened on any of the occupied seats in the rear.

3.4.3.1.4 For systems without occupant detection on all rear seating positions, the visual signal must clearly indicate to the driver the seating positions showing the rear seat belts in use and not in use. No signal is required if all of the rear occupants are belted.

3.4.3.2 Audible signal

3.4.3.2.1 In addition to a visual signal, a “Loud and Clear” audible signal is to be deployed for all rear seating positions in case of a change of status (from buckled to unbuckled) as defined in 3.4.1.5.

3.4.3.2.2 Except for change of status events, the system may allow the driver to acknowledge the signal, switching it off for this unique event (a new trigger of the warning should not be prevented).

3.4.3.2.3 For systems with occupant detection on any rear seating positions, a “Loud and Clear” audible signal needs to be deployed before at least one of the following (at the choice of the manufacturer) when any of those seats are occupied and the belt of the occupied seat is unbuckled.

- The car has reached a forward speed of 25 km/h, or
- The car has been in "Forward Motion" for 500 meters.

The duration of the audible signal must be at least 30 seconds not counting gaps exceeding 3 seconds and must start with a positive audible signal (not a gap). There must be no gaps greater than 10 seconds. The system may allow the driver to acknowledge the signal, so switching it off.
Alternatively, the manufacturer may use the same warning strategy (including initial and final warning) as described in Section 3.4.2 in case of occupant detection in all rear seating positions.

3.5 Driver State Monitoring

For the evaluation of Driver State Monitoring systems (DMS), Euro NCAP requires a dossier from the OEM containing a detailed technical assessment.
The dossier should contain:

- Sensing, providing evidence that the sensing system is capable of sensing a wide variety of different drivers and that is able to operate in a wide range of circumstances.
- Driver state, demonstrating which elements of Distraction, Drowsiness and Unresponsive Driver can be identified by the system
- Vehicle response, detailing the vehicle response to a certain driver state.

To be eligible to score points the OEM must demonstrate by means of a dossier that they meet the general requirements set out in 3.5.1 and the noise variable requirements (direct monitoring systems only) set out in 3.5.2.
To score points the OEM must demonstrate by means of a dossier that they meet both the detection requirements set out in 3.5.3 **and** the related response requirements set out in 3.5.4.
The breakdown of points available is set out in 3.6.
Euro NCAP test labs will conduct (spot) testing to validate the data supplied in the dossier.

3.5.1 General requirements

To be eligible for scoring points in DSM, the system needs to be default ON at the start of every journey and deactivation of the system should not be possible with a momentary single push on a button.

Direct monitoring systems must be active at all times when the vehicle is in forward motion at speeds ≥10km/h. A cumulative period of up to 1 minute of driving at speeds ≥10km/h is permitted for the system to begin measuring the driver state, this is acceptable providing it is detailed in the OEM provided dossier. For fatigue-related driving behaviour, a learning period of up to 30 minutes is permitted from the start of every journey (see 3.5.3.2)

Indirect monitoring systems must be active when the vehicle is in forward motion at speeds ≥65km/h.

3.5.2 Noise Variables

3.5.2.1 Drivers

A sensing system which is robust and covers a wide variety of the driver population will be eligible for scoring points. Covering the full range of each driver variable detailed here is a prerequisite to scoring points in the DSM assessment. The OEM needs to demonstrate, by means of a dossier, that the sensing system was verified using a population covering at least the following ranges and elements:

- Age	Youthful (16-18) – aged (≥80)
- Sex	All
- Stature	AF05 – AM95
- Skin Complexion	Fitzpatrick Skin Type (1 - 6)
- Eye lid aperture[1]	From 6.0mm up to 14.0mm

It is acknowledged that system performance may be affected by some combinations of noise variables. The OEM must demonstrate that system performance does not deviate strongly with different noise variables e.g. gender, age, ethnicity etc. The OEM's supporting evidence may be generated by sampling different noise variable combinations.

3.5.2.2 Occlusion

There are a number of variables seen in real world driving that may occlude the driver's facial features from the DSM system. A robust system must not be degraded by the most common occlusion variables. Covering the full range of each occlusion variable detailed here is a prerequisite to scoring points in the DSM assessment. The OEM must demonstrate, by means of a dossier, that the DSM system performance in not degraded in the following ranges and elements:

- Lighting	Daytime (100,000 lux) – night-time (1 lux) when measured outside the vehicle, using the method stated in Annex B.7 of AEB VRU systems test protocol.
- Eyewear	Clear glasses and sunglasses with >70% transmittance including those with thick rims.
- Facial hair	Short facial hair (<20mm in length)

There are a number of variables that may occlude a driver's face which may prevent a suitably robust system from maintaining a consistent level of performance. A robust system should be able to recognise when its performance is degraded. The OEM must demonstrate, by means of a dossier, that when faced with the following ranges and elements the DSM system is **either** not degraded in performance **or** that performance is degraded and the driver is informed within 10s of the occlusion being present with visual and/or audible information. It is sufficient for the information on performance degradation to appear once per journey.

[1] Comparative Evaluation of Asian and White Ocular Topography, Hickson-Curran et al, 2014.

- Hand on wheel — One hand on wheel at 12 o'clock position
- Facial occlusion — Face-mask, hats, long head hair fringe obscuring eyes
- Eyewear — Sunglasses with a <15% transmittance
- Eyelash makeup — Thick eyelash makeup
- Facial hair — Long facial hair (>150mm in length)

3.5.2.3 Driver behaviours

There are a number of common driver behaviours that have the potential to affect the performance of the DSM system. The OEM must demonstrate, by means of a dossier, if and how the DSM system performance is affected by the following driver behaviours. There is no performance requirement.

- Eating
- Talking
- Laughing
- Singing
- Smoking / Vaping
- Eye scratching / rubbing
- Sneezing

3.5.3 Detection of Driver State

When the general requirements are met, the system is eligible for scoring points in Distraction, Fatigue and Unresponsive Driver.

3.5.3.1 Distraction

Where applicable, Owl (head movement), Lizard (eye movement) and body lean looking behaviours are used to assess detection of driver distraction in three main areas:

- Long Distraction
  - Away from forward road, non-driving task
  - Driving task
- Short Multiple Distractions (VATS)
  - Away from forward road, non-driving task
  - Driving task
  - Away from road (multiple locations)
- Phone Usage
  - Phone Use Detection – Basic (Phone not within driver's view of windscreen)
  - Phone Use Detection – Advanced (Phone within driver's view of windscreen)

3.5.3.1.1 Driver Gaze locations

The OEM must demonstrate, by means of a dossier, that the driver is classified as distracted in the following combinations of distraction scenario, movement type and gaze location.
For Long Distraction and Short Distraction (VATS), PASS / FAIL is assessed per movement type; all gaze locations listed per movement type must be covered to be awarded a PASS.
For Phone use, PASS / FAIL is assessed per distraction scenario; all movement types and gaze locations listed per distraction scenario must be covered to be awarded a PASS.

Distraction Type	Distraction Scenario	Movement Type	Gaze Location
Long Distraction	Away from forward road / 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
Short Distraction (VATS)	Away from forward road / non-driving task	Owl	In-vehicle infotainment system Passenger side window Passenger footwell
		Lizard	Driver side window In-vehicle infotainment system Passenger footwell
	Driving Task	Owl	Rear view mirror Passenger side mirror Driver side mirror
		Lizard	Instrument Cluster Driver side mirror Rear view mirror
	Away from road (multi-location)	Lizard	Any combination of non-driving task locations
Phone use	Phone Use Detection - Basic	Owl	Driver knee driver side Driver knee passenger side Driver lap Phone mounted on dashboard driver side Phone in OEM designed charge port or dedicated phone holding position
		Lizard	Driver knee driver side Driver knee passenger side Driver lap Phone mounted on dashboard driver side Phone held in 9-11 o'clock region on wheel (uppermost position below windscreen view and outside of cluster view) Phone held centre of steering wheel (below cluster view) Phone in charge port or dedicated phone holding position within vehicle
	Phone Use Detection - Advanced	Lizard	Phone held in view of windscreen Phone held in view of instrument cluster Phone mounted in forward view of windscreen

3.5.3.1.2 Long Distraction

A long distraction is considered a single long duration driver gaze away from the forward road to one consistent location of ≥3 seconds. Euro NCAP understands that dangerous situations can occur both within this 3 second period as well as after this time. Therefore:

- The detection requirements for issuing a warning as detailed in 3.5.4 are any single gaze away from forward road view to one consistent location of ≥ 3s (+1 second with compelling evidence for implementation) – as per following diagram:

Where:

T_0	Start of test (Taway – 4.0s or Tclose – 4.0s)
T_{away}	Time of first eye movement looking away from forward road view
T_{gaze}	Time of glance first landing on gaze location
T_{warn}	Time of first instance of audio/visual warning

- The detection requirements for vehicle response vary depending on the response action of the vehicle and are listed alongside the vehicle response in 3.5.4.1. The detection requirement can be as low as gazes away of ≥1 second.

This must be implemented covering the driver gaze locations as set out for Long Distraction in 3.5.3.1.1. Gaze locations are considered to be the primary input in determining distraction. However, an OEM may use additional inputs to determine if the driver is truly distracted or if a gaze away from the forward road view is appropriate for the driving situation. These inputs should be detailed in the dossier.

3.5.3.1.3 Short Distraction (VATS)

A short distraction (or visual attention time sharing) event is considered to be repeated glances away from the forward road view either repeated towards one location, or to multiple different locations. A short distraction event is a build-up of multiple glances away from the forward road view and is considered to end 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.

An example of suitable requirements for a driver to be classified as distracted is when a driver glances away from the forward road view for a cumulative 10 seconds within a 30 second time period, where the time period is reset if the driver's glance returns to the forward road view for a period of ≥ 2 seconds. This must be implemented covering the driver gaze locations as set out for Short Distraction (VATS) in 3.5.3.1.1.

The OEM must provide information, by means of a dossier, of the requirements of their system to classify a driver as distracted. Where the OEM's approach meets the requirements set out above, the system will be accepted. Where the OEM's approach differs from the requirements set out above, the OEM must provide compelling evidence to demonstrate the

safety benefits of and justify the implementation of their approach. It is permissible for the OEM to implement different strategies for driving related and non-driving related tasks.

3.5.3.1.4 Phone use

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

The detection requirements for phone use mirror those set out in 3.5.3.1.3, in combination with the gaze locations set out for phone use in 3.5.3.1.1.

3.5.3.2 Fatigue

Fatigue is a typical behaviour that builds up over time. Euro NCAP rewards detection of and response to different stages of fatigue:

- Drowsiness
- Microsleep
- Sleep

A maximum of 30 minutes from the beginning of the journey may be used to form a baseline of driver behaviour.

3.5.3.2.1 Drowsiness

The OEM must provide information, by means of a dossier, demonstrating the requirements of their system to classify a driver as drowsy.
The OEM must provide evidence that their system will classify a driver as drowsy when the driver reaches a KSS level >7 at the latest, or an equivalent measure.
Both direct and indirect monitoring systems are rewarded for detection of drowsiness.

3.5.3.2.2 Microsleep

A common symptom of a microsleep is an eye closure of <3s although Euro NCAP recognises that non-eye closure microsleep events are possible.
The OEM must provide information, by means of a dossier, demonstrating the requirements and ability of their system to detect microsleep events.
An example of a suitable system is one able to detect a short duration eye closure (1-2 seconds) after a build-up of drowsiness has been seen in the driver. If the OEM's approach is unable to meet this requirement, the OEM must provide compelling evidence to justify their approach and demonstrate the safety benefits.

3.5.3.2.3 Sleep

A driver is considered to be asleep in this assessment when displaying a continued eye closure >3 seconds.
The OEM must provide information, by means of a dossier, to demonstrate the ability to detect a long eye closure event. If the OEM uses other inputs to determine a driver is asleep, this is permitted and these inputs should be detailed in the dossier.

3.5.3.3 Unresponsive driver

Where a driver becomes unresponsive during driving, likely due to a sudden onset of sickness. It is likely, but not certain, that initially an unresponsive driver will be determined as either distracted or asleep.
An unresponsive driver is determined as a driver who either does not return their gaze to the forward road view within 3 seconds of an inattention warning being issued or a driver whose gaze has been away from the forward road view or has been eyes closed for ≥ 6 seconds.

If an OEM uses more advanced systems using different/ additional inputs to determine the driver is unresponsive, this is permitted and these inputs should be detailed in the dossier.

3.5.4 Vehicle Response Requirements

When the system is able to detect certain elements specified in 3.5.3, a vehicle response in terms of warning and/or intervention is required.

For each inattention category, intervention requirements are listed including a list of suitable intervention strategies. Where the requirements state "any other intervention that the OEM considers to be appropriate", the OEM must provide information, by means of a dossier, detailing their intervention strategy and provide compelling evidence of the safety benefits of their implementation. These will be rewarded subject to review by Euro NCAP.

3.5.4.1 Distraction

3.5.4.1.1 Long Distraction

Warning Requirements:

- When the vehicle is travelling at ≥ 20km/h, a visual + (haptic and/or audible) warning must be issued immediately after the driver is classified as distracted, as per the OEM information provided to satisfy 3.5.3.1.2.

Intervention Requirements:

- High sensitivity FCW setting, to be activated ≤ 1 second of continuous gaze away from forward road view, until driver attention is restored. Further details for high sensitivity FCW are set out in 3.5.4.4.
  or
- Low level braking intervention, where low level braking begins immediately after the driver is classified as distracted, as per the OEM information provided to satisfy 3.5.3.1.2, and continuous until driver attention is restored.
  or
- Any other intervention that the OEM considers to be appropriate.

3.5.4.1.2 Short Distraction (VATS)

Warning Requirements:

- When the vehicle is travelling at ≥ 20km/h, a visual + (haptic and/or audible) warning must be issued immediately after the driver is classified as distracted, as per the OEM information provided to satisfy 3.5.3.1.3.

Intervention Requirements:

- High sensitivity FCW setting, to be activated immediately after driver is classified as distracted, as per the OEM information provided to satisfy 3.5.3.1.3, until driver attention is restored. Further details for high sensitivity FCW are set out in 3.5.4.4.

  or

- Low level braking intervention, where low level braking begins immediately after driver is classified as distracted, as per the OEM information provided to satisfy 3.5.3.1.3, until driver attention is restored.

  or

- Any other intervention that the OEM considers to be appropriate.

3.5.4.1.3 Phone Usage

Warning Requirements:

- When the vehicle is travelling at ≥ 20km/h, a visual + (haptic and/or audible) warning must be issued immediately after driver is classified as distracted, as per the OEM information provided to satisfy 3.5.3.1.4.

Intervention Requirements:

- High sensitivity FCW setting, to be activated immediately after driver is classified as distracted, as per the OEM information provided to satisfy 3.5.3.1.4, until driver attention is restored. Further details for high sensitivity FCW are set out in 3.5.4.4.

  or

- Low level braking intervention, where low level braking begins after immediately after driver is classified as distracted, as per the OEM information provided to satisfy 3.5.3.1.4, until driver attention is restored.

  or

- Any other intervention that the OEM considers to be appropriate.

3.5.4.2 <u>Fatigue</u>

3.5.4.2.1 Drowsiness

Warning Requirements:

- A visual + (haptic and/or audible) warning must be issued immediately after driver is classified as drowsy, as per the OEM information provided to satisfy 3.5.3.2.1.

Intervention Requirements:

- High sensitivity FCW **and** LDW setting, to be activated immediately after driver is classified as drowsy, as per the OEM information provided to satisfy 3.5.3.2.1, for the remainder of the journey. Further details for high sensitivity FCW and LDW are set out in 3.5.4.4.

  or

- Any other intervention that the OEM considers to be appropriate.

3.5.4.2.2 Microsleep

Warning Requirements:

- A visual + (haptic and/or audible) warning must be issued immediately after a

microsleep is detected, as per the OEM information provided to satisfy 3.5.3.2.2.

Intervention Requirements:

- High sensitivity FCW **and** LDW setting, to be activated immediately after a microsleep is detected, as per the OEM information provided to satisfy 3.5.3.2.2, for the remainder of the journey. Further details for high sensitivity FCW and LDW are set out in 3.5.4.4.

  or

- Any other intervention that the OEM considers to be appropriate.

3.5.4.2.3 Sleep

Warning Requirements:

- A visual + (haptic and/or audible) warning must be issued immediately after the driver is classified as asleep, as per the OEM information provided to satisfy 3.5.3.2.3.

Intervention Requirements:

- High sensitivity FCW **and** LDW setting, to be activated immediately after the driver is classified as asleep, as per the OEM information provided to satisfy 3.5.3.2.3, for the remainder of the journey. Further details for high sensitivity FCW and LDW are set out in 3.5.4.4.

  or

- Any other intervention that the OEM considers to be appropriate.

3.5.4.3 Unresponsive driver

Intervention Requirements:

- A minimum risk manoeuvre, meeting the requirements of UNECE R79 risk mitigation function, should be initiated, where the distinct warning phase begins <1 second after a driver is classified as unresponsive as per 3.5.3.3.

3.5.4.4 High Sensitivity FCW and LDW

To ensure a safety benefit is realised by the implementation of a more sensitive FCW when the driver is detected as inattentive, the OEM shall demonstrate an optimised (advanced) warning timing. In cases where the driver is detected as attentive, warnings can be delayed.

Where high sensitivity LDW is also required (Drowsiness and Microsleep); an LDW system must be activated and set in the most sensitive setting available. Noting that an LDW system is not required to be default on by Euro NCAP, so system activation may be required at this time. For this strategy to be rewarded, the LDW system must be capable of meeting the LDW requirements, as set out in the Euro NCAP SA – Crash Avoidance protocol once activated.

Where the protocol states that the high sensitivity setting shall remain until the end of the journey, the FCW / LDW system must remain in the highest sensitivity setting until the next ignition cycle of the vehicle. Exceptions to this requirement are:

- If the driver state monitoring system continues to measure the driver's state and determines the driver's attentiveness has been restored.
- It is permissible for the driver to override the system and return the FCW / LDW systems to a reduced sensitivity level.

3.6 Scoring & Visualisation

A maximum of 3.0 points can be scored for Occupant Status Monitoring in 2023:

- Up to 1.0 point for SBR
- Up to 2.0 points for DSM

3.6.1 Seatbelt Reminder

1.0/n points is available for each rear seating position with occupant detection systems that is also compliant with Section 3.4.3.2.3, where n is the total number of rear seating positions.

3.6.1.1 SBR Scoring examples

- 5-Seater (2 Front + 3 Rear) with occupant detection on all seats
  - Row 1 Driver & Passenger — prerequisite
  - Rear occupant detection on 3 seats — 1.000 Points
    $(\frac{1.0}{n}) * \#\ of\ seats\ with\ detection = (\frac{1.0}{3}) * 3$
  - Total SBR Score — 1.000 Points

- 5-Seater (2 Front + 3 Rear) with occupant detection on outboard rear seats.
  - Row 1 Driver & Passenger — prerequisite
  - Rear occupant detection on 2 seats — 0.667 Points
    $(\frac{1.0}{n}) * \#\ of\ seats\ with\ detection = (\frac{1.0}{3}) * 2$
  - Total SBR Score — 0.667 Points

- 6-Seater (3 Front + 3 Rear) with occupant detection on outboard rear seats.
  - Row 1 Driver & Passengers — prerequisite
  - Rear occupant detection on 2 seats — 0.667 Points
    $(\frac{1.0}{n}) * \#\ of\ seats\ with\ detection = (\frac{1.0}{3}) * 2$
  - Total SBR Score — 0.667 Points

- 7-Seater (2 Front + 3 2nd Row + 2 3rd Row) with occupant detection on all seats in the 2nd row.
  - Row 1 Driver & Passenger — prerequisite
  - Rear occupant detection on 3 seats — 0.600 Points
    $(\frac{1.0}{n}) * \#\ of\ seats\ with\ detection = (\frac{1.0}{5}) * 3$
  - Total SBR Score — 0.600 Points

- 7-Seater (2 Front + 3 2nd Row + 2 3rd Row) with occupant detection on outboard seats in the 2nd row only.
  - Row 1 Driver & Passenger — prerequisite
  - Rear occupant detection on 2 seats — 0.400 Points
    $(\frac{1.0}{n}) * \#\ of\ seats\ with\ detection = (\frac{1.0}{5}) * 2$
  - Total SBR Score — 0.400 Points

- 7-Seater (2 Front + 3 2nd Row + 2 3rd Row) with occupant detection on outboard seats in the 2nd row, and no SBR in the third row.
  - Row 1 Driver & Passenger — prerequisite
  - Rear Seats — 0.000 Points
  - Total SBR Score — 0.000 Points
  - Vehicle NOT eligible for DSM scoring

3.6.2 Driver State Monitoring

The Euro NCAP Secretariat will review the DSM dossier provided by the OEM and will ask the test laboratory to spot check a number of Distraction, Fatigue and Unresponsive Driver situations before awarding the points.

Inattention Type		Distraction Scenario	Movement Type	Warning	Intervention	Sub Total	Total
Distraction	Long distraction	Away from road / non driving task	Owl	0.03	0.03	0.06	0.30
			Lizard	0.03	0.03	0.06	
			Body Lean	0.03	0.03	0.06	
		Driving Task	Owl	0.03	0.03	0.06	
			Lizard	0.03	0.03	0.06	
	Short Distraction (VATS)	Away from road / non driving task	Owl	0.03	0.03	0.06	0.30
			Lizard	0.03	0.03	0.06	
		Driving Task	Owl	0.03	0.03	0.06	
			Lizard	0.03	0.03	0.06	
		Away from road (multi-location)	Lizard	0.03	0.03	0.06	
	Phone Use	Phone Use Detection - Basic	Owl + Lizard	0.05	0.10	0.15	0.30
		Phone Use Detection - Advanced	Lizard	0.05	0.10	0.15	
Fatigue	Drowsy			0.25	0.10	0.35	0.35
	Microsleep			0.20	0.10	0.30	0.30
	Sleep			0.05	0.20	0.25	0.25
Unresponsive Driver					0.20	0.20	0.20
Total							**2.00**

4 ASSESSMENT OF SPEED ASSIST SYSTEMS

4.1 Introduction

Excessive and inappropriate speed is a factor in the causation and severity of many road accidents. Speed restrictions are intended to promote safe operation of the road network by keeping traffic speeds below the maximum that is appropriate for a given traffic environment, thereby protecting vehicle occupants and other road users, both motorised and non-motorised. These maximum speeds are intended to control energy levels in typical crashes and to allow sufficient time for drivers to react to traffic situations. Properly selected speed limits should facilitate efficient traffic flow, reduce violations and promote safe driving conditions. Greater adherence to speed limits would avert many accidents and mitigate the effects of those that occur.

By July 2022, the Intelligent Speed Assistant ISA will be mandatory for new types of vehicles under EU 2021/1958 due to the update of the EU 2019/2144 General Safety Regulation (GSR). All vehicles in the market follow in July 2024. Euro NCAP requirements for speed limitation devices are a mean to improve accuracy and reliability of this kind of systems and to promote best practice while using them. Euro NCAP hopes to encourage manufacturers to promote such enhanced speed-limitation functionalities and to fit them as standard equipment. This, it is hoped, will lead to greater demand by consumers and an increased introduction of speed limitation systems.

The margins for alarm activation set out in this document are based on prevailing speedometer accuracy, which is specified by regulation and typically overstates the vehicle speed by several km/h.

This version of the protocol contains technical requirements for both speed limit information functions to continuously inform the driver of the speed limit and speed warning and control functions supporting the driver in his driving task by limiting or maintaining the set speed.

4.2 Definitions

Throughout this protocol the following terms are used:

Vindicated – The speed the vehicle travels as displayed to the driver by the speedometer as in ECE R39.

Vlimit – Maximum allowed legal speed for the vehicle at the location, time and in the circumstance the vehicle is driving.

Speed Limit Information Function (SLIF) – SLIF means a function with which the vehicle knows and communicates the speed limit.

Speed Limit Warning Function (SLWF) – SLWF means a function that alerts the driver that the Vindicated is exceeding the perceived speed limit

Adjustable speed (Vadj) – Adjustable speed Vadj means the voluntarily set speed for the speed control functions, which is based on **Vindicated** and includes the offset set by the driver.

Speed Limitation Function (SLF) – SLF means a system which allows the driver to set a vehicle speed Vadj, to which he wishes the speed of his car to be limited and above which he wishes to be warned.

Intelligent Speed Limiter (ISL) – ISL is a SLF combined with SLIF, where the Vadj is set by the SLIF with or without driver confirmation.

Intelligent Adaptive Cruise Control (iACC) – iACC is an ACC combined with SLIF, where the speed is set by the SLIF with or without driver confirmation.

The following term is used for the assessment of the Speed Limitation function:

Stabilised speed (Vstab) – Stabilised speed Vstab means the mean actual vehicle speed when operating. Vstab is calculated as the average actual vehicle speed over a time interval of 20 seconds beginning 10 seconds after first reaching Vadj – 10 km/h.

4.3 Requirements for SLIF and Speed Control Functions

The Speed Assist Systems is developed in such a way that it allows different types of Speed Assist Systems to be assessed in two areas; SLIF and Speed Control Functions which may be combined.

4.3.1 Speed Limit Information Function

- Basic SLIF meeting the General Requirements on this protocol (4.4.1) and the ones set by GSR ISA EU 2021/4455 (SLIF Technical Requirements – chapter 3.4)
- Advanced Functions
    - Conditional speed limits
    - Road features
    - Local hazards
    - System updates
- Warning function

4.3.2 Speed Control Function

- Speed Limitation Function (without SLIF coupling)
- Intelligent Speed Limiter (SLIF and Speed Limitation Function coupled)
- Intelligent ACC (SLIF and ACC coupled)

4.4 Speed Limit Information Function

The Speed Limit Information Function can be a standalone function or an integrated part of a Speed Control Function. Any SLIF using all relevant system inputs, for example camera input and electronic map based or a combination of both, is eligible for scoring points for Advanced Functions when meeting the General Requirements when the SLIF is default ON at the start of a journey.

4.4.1 General Requirements

The speed limit shall be shown using a traffic sign and shall be clearly seen in the direct field of view of the driver, without the need for the head to be moved from the normal driving position, e.g. instrument cluster or head-up display.

The speed limit information must be shown at all times (excluding the initialization period and temporary interruption for safety reasons). The indicated speed limit information may indicate the level of reliability of the speed limit.
In the presence of conditional speed limits (see for examples Appendix I) the system needs to either:

- Properly identify and show (for example when raining) the applicable speed limit or
- Needs to indicate the presence of a conditional speed limit which the system is not able to compute, in addition to the non-conditional speed limit.

Manufacturers must supply Euro NCAP with background information of the SLIF (if applicable to the technology).

4.4.1.1 Warning Function

Any Speed Limit Information Function requires a warning function to indicate the driver that Vlimit is exceeded. The warning function shall be default ON. It may be switched OFF fully or partially by the driver, but it shall be reinstated in normal operation mode upon each activation of the vehicle master control switch.

- The warning shall be a flashing traffic sign used to communicate the speed limit or an additional visual signal adjacent to the traffic sign.

4.4.2 Advanced Functions

Those systems providing more advanced functions in the following three areas can score additional points:

- Conditional speed limits
- Road features
- Local hazards

These advanced functions are not required to be default ON.

For each advanced function, in order to be awarded with the corresponding points, the manufacturer must provide evidence that the advanced functions operate as intended, unless the infrastructure would not enable these functions. The evidence shall demonstrate that the features can support the driver during at least 80% of typical driving on public roads. This

requirement must be met in all the following conditions:

- In these specific countries: Austria, France, Germany, Italy, Luxemburg, the Netherlands, Spain, Sweden and the United Kingdom.
- In at least half of the countries of the Euro NCAP Application Area (as defined in TB002).

4.4.2.1 Advanced speed limits

Systems that are able to properly identify conditions and act accordingly can attract points based on the number of conditions it can identify compute and show correctly.

The speed limit under these conditions shall not be shown separately from the speed limit information requested in the general requirements (Section 4.4.1).

These functions are listed in the table below and example traffic signs of a limited number of countries are specified in APPENDIX I.

ADVANCED SPEED LIMITS			**Points**	**Required Action**
Conditional Speed limits	Weather	Rain / Wetness	2	Show correct speed limit
		Snow / Icy	2	Warning only and ignore if irrelevant
	Time	Time / Season	3	Show correct speed limit
	Distance	Distance for / in	1	Show correct speed limit
	Arrows	Arrows	1	Show correct speed limit / ignore if irrelevant
	Vehicle Categories	Other vehicle / weight categories	1	Show correct speed limit
Implicit Speed Limits		Highway / Motorway	2	Show correct speed limit
		City Entry / Exit	3	
		Residential zones	2	
Dynamic Speed Limits		Dynamic speed signs including roadworks	3	Show correct speed limit
		TOTAL	**20**	

4.4.2.2 Road Features

Systems that are able to properly identify road features where a speed, lower than the legal speed limit, is more appropriate and/or advised or the vehicle should come to a stop can attract points based on the number of road features. The recommended speed under these conditions may be shown separately from the speed limit information requested in the general requirements (Section 4.4.1).

These road features are listed in the table below and example traffic signs of a limited number of countries are specified in APPENDIX I.

ROAD FEATURES	Points	Required Action
Curves*	2	Show and start reducing to appropriate speed
Roundabouts*	2	Show and start reducing to appropriate speed
Junctions (without right of way)*	1	Show and start reducing to appropriate speed
Traffic Lights	2	Warning only
Stop Signs	1	Warning only
Yield Signs	1	Warning only
No Entry	1	Warning only
TOTAL	**10**	

* Only eligible for scoring when linked to ISL and/or iACC

4.4.2.3 Local Hazards

Systems that are able to receive messages and process them to warn for local hazards before the come within the field of view of the vehicle forward looking sensors can attract points for the features implemented. The possible features to select from are listed in the table below.

The information / warning referring to these conditions may be shown separately from the speed limit information requested in the general requirements (Section 4.4.1).

The hazard information/data could either be provided by vehicle-integrated devices or by mobile devices physically connected to the vehicle network (provided in all cases by standard vehicle-integrated driver interfaces). A list of compatible devices needs to be mentioned in the vehicle handbook.

LOCAL HAZARDS	Points	Required Action
Traffic Jams	2	Inform and Warn
Construction Zones	1	Inform and Warn
Accident Ahead	1	Inform and Warn
Wrong Way Driver	1	Inform and Warn
Stopped Vehicle on Hard Shoulder	1	Inform and Warn
Items on road (includes animals, persons, debris, etc)	1	Inform and Warn
Poor Road Conditions (incl. slippery roads)	1	Inform and Warn
Poor Weather Conditions (e.g. fog, heavy rain, etc)	1	Inform and Warn
Emergency Vehicle	1	Inform and Warn
TOTAL	**10**	

4.4.2.4 System Updates

Keeping systems updated is crucial for a high level of accuracy and acceptance over the lifetime of the vehicle. Systems updates might include map updates and/or any software updated related to the operation of the Speed Assist System in relation to speed limits, conditional speed limits and road features.

System updates with the latest and most-up-to-date knowledge can score points based on the frequency of updates when available without user action and free of charge for the duration of the rating.

SYSTEM UPDATES	Points	Required Action
Quarterly	5	Automatic update without user action
Continuous	10	Continuous (daily, weekly) update without user action
TOTAL	**10**	

4.5 Speed Control Function

Three speed control functions are considered in this section; Speed Limitation Function (manually set), Intelligent Speed Limiter and Intelligent Adaptive Cruise Control which need to meet the following requirements to score points:

SPEED CONTROL FUNCTION TYPES	Sections
Speed Limitation Function (SLF)	4.5.1, 4.5.2.1 & 4.5.3
Intelligent Speed Limiter (ISL)	4.5.1, 4.5.2.2 & 4.5.3
Intelligent Adaptive Cruise Control (iACC)	

4.5.1 Activation / de-activation of the function

- The speed control function must be capable of being activated/de-activated at any time with a simple operation. Functionalities above GSR ISA requirements could be configurable by customer, with the possibility of being defined as default ON or OFF.

4.5.2 Setting of Vadj

4.5.2.1 Manually setting the speed

- It shall be possible to set, by a control device operated directly by the driver, by steps not greater than 10km/h (5mph) between 30km/h (20mph) and 130km/h (80mph).
- It shall be possible to set it independently of the vehicle speed.

- If Vadj is set to a speed lower than the current vehicle speed, the system shall limit the vehicle speed to the new within 30s or shall initiate a warning (Section 4.5.3, para 7) no later than 30s after Vadj has been set.
- The Vadj value shall be permanently indicated to the driver and visible from the driver's seat. This does not preclude temporary interruption of the indication for safety reasons or driver's demand.

4.5.2.2 Automatic setting the speed

An automatic setting is using the speed limit information from the SLIF to set the Vadj. iACC and ISL automatic adjustments can be introduced with or without driver confirmation. Both ISL and iACC functions fulfilling the requirements from this section are eligible for scoring points:

- In case of ISL, the activation time for speed reduction and/or warning shall be according the general requirements of GSR ISA. In case of iACC, the system should adopt, or offer the driver to adopt, an adjusted Vadj within 5s after a change in the speed limit.
- If Vadj is set to a speed lower than the current vehicle speed, the system starts to limit the vehicle speed to the new Vadj or shall initiate a warning (Section 4.5.3, para 7) no later than 30s after Vadj has been set.
- A negative and/or positive offset with respect to the known speed limit is allowed but may not be larger than 10 km/h (5 mph). This offset is included in Vadj.
- The Vadj in the automatic mode of an ISL or iACC system may be retained at the end of a journey.
- Where Vadj is set to the speed limit advised (i.e. as per 4.4.2.2 Road Features) by the SLIF, the indication of Vadj may be suppressed.

4.5.3 Speed Control

- The vehicle speed shall be limited or controlled to Vadj.
- It shall still be possible to exceed Vadj by applying a positive action – e.g. pressing the accelerator harder/deeper or kickdown.
- After exceeding Vadj by applying a positive action, the speed control function shall be reactivated when the vehicle speed drops to a speed less than or equal to Vadj.
- The speed control function shall permit a normal use of the accelerator control for gear selection.
- The speed control function shall ensure that, when stable speed control has been achieved, Vstab shall be within -5/+0 km/h of Vadj (see test protocol)
- **NOTE:** For 2026, Euro NCAP will require a speedometer accuracy of -3/+0 km/h
- When the speed control function is not able to limit to and/or maintain Vadj and Vadj is exceeded, a warning will be issued according the SLWF Requirements of GSR ISA (i.e. warning type and total duration). No warning needs to be given when

Vadj is exceeded as a result of a positive action or when Vadj was advised (i.e. as per 4.4.2.2 Road Features) by the SLIF.

- For systems where active braking is applied to maintain and/or limit the speed, this warning requirement does not apply.

Note: The warning signal does not preclude temporary interruption of the indication for safety reasons.

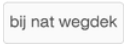
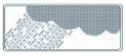
4.6 Scoring and Visualisation

The following points are awarded for systems that meet the requirements. These points will contribute to the Safety Assist score.

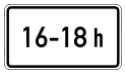
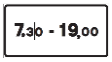
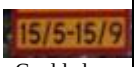
SPEED LIMIT INFORMATION FUNCTION	**Points**
Basic SLIF (Compliant with Euro NCAP and GSR SLIF General Requirements)	0.50
Conditional Speed Limits	0.25
Road Features	0.25
Local Hazards	0.25
System Updates	0.25
SLIF TOTAL	**1.50**
SPEED CONTROL FUNCTION	**Points**
Speed Limitation Function	0.50
Intelligent Speed Limiter, not default ON	1.00
Intelligent ACC or Intelligent Speed Limiter default ON	1.50
SPEED CONTROL FUNCTION TOTAL	**1.50**
SPEED ASSIST SYSTEM TOTAL	**3.00**

APPENDIX I
SPEED ASSIST SYSTEMS: EXAMPLES OF CONDITIONAL, IMPLICIT AND DYNAMIC SPEED LIMIT SIGNS

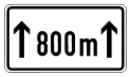
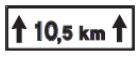
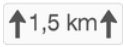
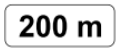
Weather Condition

	Austria	France	Germany	Italy	Luxembourg	Netherlands	Spain	Sweden	United Kingdom
RAIN AND/OR WETNESS									
SNOW AND/OR ICE									

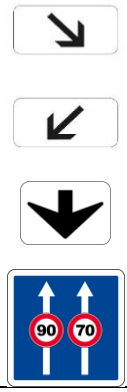
Date / Time Condition

	Austria	France	Germany	Italy	Luxembourg	Netherlands	Spain	Sweden	United Kingdom
TIME								 Black: Mo-Fri except holiday or day before holiday) (Black): Saturday or day before holiday Red: Sunday or holiday *Note! Can be one, two or all three*	
DATE								 Could also be in words: "1 juni – 31 augusti"	

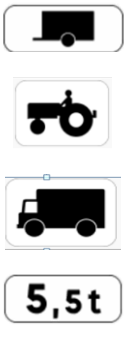
Distance Conditions

	Austria	France	Germany	Italy	Luxembourg	Netherlands	Spain	Sweden	United Kingdom
DISTANCE FOR									
DISTANCE IN									

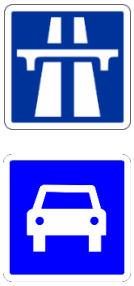
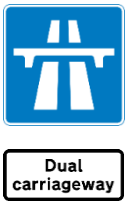
Arrows

	Austria	France	Germany	Italy	Luxembourg	Netherlands	Spain	Sweden	United Kingdom
ARROWS									

Other vehicle/weight categories

	Austria	France	Germany	Italy	Luxembourg	Netherlands	Spain	Sweden	United Kingdom
VEHICLE AND/OR WEIGHT									

Implicit Speed Limits

	Austria	France	Germany	Italy	Luxembourg	Netherlands	Spain	Sweden	United Kingdom
HIGHWAY AND/OR MOTORWAY									
CITY ENTRY AND/OR EXIT									
RESIDENTIAL ZONES									

Dynamic (variable) speed limit

	Austria	France	Germany	Italy	Luxembourg	Netherlands	Spain	Sweden	United Kingdom
		 	 			 			

APPENDIX II

Terms alignment for Euro NCAP Speed Assist Systems 2023 and GSR Intelligent Speed Assist Systems EU 2021/4455

Concept	**Term used in Euro NCAP SAS**	**Term used in GSR ISA**
General name of the system	SAS – Speed Assist System	ISA – Intelligent Speed Assist
Information function	SLIF – Speed Limit Information Function	SLIF – Speed Limit Information Function
Warning function		SLWF – Speed Limit Warning Function
Manual speed limiter function	SLF – Speed Limitation Function	-
Automated speed limiter function	ISL – Intelligent Speed Limiter	SCF – Speed Control Function
Automated speed control function	iACC – Intelligent Adaptive Cruise control	-

Test variable	**Term used in Euro NCAP SAS**	**Term used in GSR ISA**
Driving speed of the vehicle	Vindicated	Speedometer Speed
Legal speed limit	Vlimit	Applicable Speed Limit
Manually adjustable speed for SLF	Vadj – Adjustable Speed	-
Average speed	Vstab – Stabilised Speed	Stabilised Speed