

Brussels, XXX  
[...] (2020) XXX draft

ANNEXES 1 to 3

## ANNEXES

to the

**Commission Delegated Regulation (EU) 2020/... of XXX**

**supplementing and amending Regulation (EU) 2019/2144 of the European Parliament and of the Council by laying down detailed rules concerning the specific test procedures and technical requirements for the type-approval of motor vehicles with regard to intelligent speed assistance and for the type-approval of these systems as separate technical units**

## **ANNEX I**

### **PART 1**

#### **Section A**

##### **Information document for EU type-approval of motor vehicles with regard to the intelligent speed assistance system**

###### **MODEL**

Information document No ... relating to the EU type-approval of a vehicle with regard to the intelligent speed assistance system.

The following information shall be supplied in triplicate and include a list of contents. Any drawings or pictures shall be supplied in appropriate scale and in sufficient detail on size A4 or on a folder of A4 format. Photographs, if any, shall show sufficient detail.

- 0.
- 0.1.
- 0.2.
- 0.2.1.
- 0.3.
- 0.3.1.
- 0.4.
- 0.5.
- 0.8.
- 0.9.
- 1.
- 1.1.
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- 2.
- 2.6.
- 4.
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4.5.1.

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4.8.1.

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6.6.1.1...

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12.6.5.1.

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12.6.5.2.

12.6.5.2.1.

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12.6.5.3.

12.6.5.4.

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*Explanatory notes*

Information document numbering in accordance with the template laid down in Annex I to Regulation (EU) 2018/858

DRAFT

## Section B

### Information document for EU type-approval of an intelligent speed assistance system as a separate technical unit

#### MODEL

Information document No ... relating to the EU type-approval of an intelligent speed assistance system as STU.

The following information shall be supplied in triplicate and include a list of contents. Any drawings or pictures shall be supplied in appropriate scale and in sufficient detail on size A4 or on a folder of A4 format. Photographs, if any, shall show sufficient detail.

- 0.
- 0.1.
- 0.2.
- 0.3.
- 0.3.1.
- 0.5.
- 0.8.
- 0.9.
- 1.
- 1.1.
- 12.6.5.
- 12.6.5.1.2.

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#### *Explanatory notes*

Information document numbering in accordance with the template laid down in Annex I to Regulation (EU) 2018/858

## PART 2

### Technical requirements and test procedures

1. General requirements
  - 1.1. An intelligent speed assistance (ISA) system shall comprise a speed limit information function (SLIF) and either a speed limit warning function (SLWF) or a speed control function (SCF).
    - 1.1.1. The ISA system of a vehicle shall comply with this Regulation and in particular:
      - (a) system requirements laid down in points 2.1., 2.2. and 2.3.; and
      - (b) SLIF requirements laid down in point 2.4.; and
      - (c) SLWF requirements laid down in point 2.5. or SCF requirements laid down in point 2.6.
    - 1.1.2. Where the motor vehicle is fitted with an ISA STU, the vehicle and its system shall comply with this Regulation and in particular:
      - (a) system requirements laid down in points 2.1., 2.2. and 2.3.; and
      - (b) SLIF requirements laid down in point 2.4.1. and 2.4.2.1.1. to 2.4.2.1.4.; and
      - (c) SLWF requirements laid down in point 2.5. or SCF requirements laid down in point 2.6.
    - 1.1.3. Type-approval of an ISA STU shall be subject to the STU complying with this Regulation and in particular the SLIF requirements laid down in point 2.4.2.
  - 1.2. Subject to the provisions below, the ISA system shall be designed to avoid or minimise the error rate under real driving conditions.
  - 1.3. The prescriptions set out in this Regulation shall at least apply when the vehicle is operated on a public road or street located within the territory of the European Union, as defined at the time of type-approval.
  - 1.4. Privacy and data protection.
    - 1.4.1. The ISA system shall offer the required functionality in the normal operation mode without the use of biometric information, including facial recognition, of any vehicle occupants.
    - 1.4.2. The ISA system shall not continuously record nor retain nor transmit any data related to incidents of exceeding the speed limit other than what is necessary in relation to perform the required ISA functionality or other EU specific regulatory acts regarding vehicle type-approval (e.g. event data recorder).
2. Specific requirements.
  - 2.1. ISA failure warning.
    - 2.1.1. A constant optical warning signal shall be provided when there is a failure in the ISA system that prevents the requirements of this Regulation of being met.

- 2.1.1.1. There shall not be an appreciable time interval between each ISA self-check, and subsequently there shall not be a delay in displaying the warning signal, in the case of an electrically detectable failure.
- 2.1.1.2. Upon detection of any non-electrical failure condition (e.g. sensor obscuration excluding temporary obscuration such as sun glare) a failure warning signal as laid down in point 2.1.1 shall be activated.
- 2.1.1.3. Failures that must activate the warning signal mentioned above, but which are not detected under static conditions, shall be retained upon detection and continue to be displayed from start-up of the vehicle after each activation of the vehicle master control switch, as long as the failure or defect persists.
- 2.2. ISA control.
- 2.2.1. It shall be possible for the driver to manually deactivate the ISA system, either fully, or partially with information about the perceived speed limit still provided. Both the full and partial deactivation of the ISA system shall require a sequence of actions to be carried out by the driver. A supplementary partial deactivation mode may be provided with an active optical warning function, but without ~~audible or~~ haptic warning or SCF intervention. The following conditions shall apply as appropriate.
- 2.2.1.1. The ISA system shall be automatically reinstated in normal operation mode upon each activation of the vehicle master control switch. This provision may be conditional upon the driver's door having been opened as well.
- 2.2.1.2. A constant optical warning signal shall inform the driver that the ISA system has been fully deactivated. An optical warning lasting at least 10 seconds or until manually cancelled shall inform the driver that the ISA system has been partially deactivated. The failure warning signal specified in point 2.1.1 may be used for this purpose.
- 2.2.1.3. Following manual deactivation of the ISA system, it shall be possible for the driver to re-activate the system with no more than the number of actions required to deactivate it.
- 2.2.2. Automatic deactivation of ISA is permitted in situations when automated systems control the speed of the vehicle, that is, those systems which perform the object and event detection and response dynamic driving subtask (e.g. automated lane keeping system (ALKS)). Such deactivation does not need to be signalled to the driver.
- 2.2.3. To minimise the discrepancy between the speedometer speed and the true speed of the vehicle, the vehicle manufacturer may provide for an automatic or manual vehicle speedometer calibration function (e.g. after tyre replacement), as long as it is ensured that the requirements of UN Regulation No 39<sup>1</sup> are always complied with. In addition, the vehicle manufacturer may take into account a tolerance of  $\leq 3.0\%$  as regards the perceived speed limits used to activate information and warnings.
- 2.2.4. The speedometer speed is considered equal to the perceived speed limit if the speedometer speed indication is  $\leq 1.0$  km/h over the perceived speed limit.

<sup>1</sup> Regulation No 39 of the United Nations Economic Commission for Europe (UNECE) – Uniform provisions concerning the approval of vehicles with regard to the speedometer and odometer equipment including its installation.

**Commented [FM1]:** We call for the deactivation of the ISA system to require a sequence of actions by the driver, in order to make the difference between overriding and turning off clearer to the driver.

**Commented [FM2]:** We call for acoustic warnings not be included in the delegated act. References to the acoustic warnings, and all cascading warnings, have therefore been removed throughout this delegated act. See the attached file on explanations for a detailed justification.

**Commented [FM3]:** See point 2.1.6.9.

2.2.5. In the case where the tolerances of the speedometer's measuring mechanism are minimal, the provisions in points 2.2.3. and 2.2.4. mean that the information laid down in point 2.4.1.2. and the warning laid down in point 2.5.1. may be triggered at an indicated speedometer speed and true speed of the vehicle that is above the perceived speed limit.

2.3. Provisions for periodic ~~roadworthiness testing~~technical inspections.

At periodic roadworthiness testing it shall be possible to verify the correct functionality and the software integrity of the ISA system via the use of the electronic vehicle interface as required in point 14 of Annex III of Directive 2014/45/EU of the European Parliament and of the Council.<sup>2</sup>

~~2.3.1. For the purpose of periodic technical inspections, the correct operational status of the ISA system shall be confirmed by a visible observation of the failure warning signal status following the activation of the vehicle master control switch and any bulb check. Where the failure warning signal is displayed in a common space, it must be checked first that the common space is functional prior to the failure warning signal status check.~~

~~2.3.2. At the time of type approval, the means to protect against simple unauthorised modification of the operation of the ISA system and failure warning signal chosen by the manufacturer shall be confidentially outlined. Alternatively, this protection requirement is fulfilled when a secondary means of checking the correct operational status of the ISA system is available.~~

~~2.3.3. If electronic data (e.g. map data) is used by the system, it shall be possible to easily verify that the data is up to date.~~

2.4. SLIF requirements.

2.4.1. SLIF display.

2.4.1.1. The display of the SLIF shall be located in the direct field of vision of the driver and be clearly identifiable and legible both day and night. Additional displays of similar information at other locations in the vehicle (e.g. on navigation screen) are permitted and they shall not be subject to these requirements.

2.4.1.2. In the absence of conditions leading to the deactivation of the system according to points 2.1. and 2.2., the SLIF shall display the perceived speed limit to the driver ~~at least when the speedometer speed > the perceived speed limit.~~

2.4.1.2.1. The perceived speed limit shall be displayed either:  
(a) on the speedometer in a manner that is clearly noticeable and distinguishable and which does not reduce the speedometer's legibility (e.g. optical mark); or  
(b) as a numerical value, using a symbol resembling a speed limit traffic sign in accordance with the Vienna Convention on Road Signs and Signals; or  
(c) text consisting of the value and the unit of measurement (e.g. km/h).  
Display of additional sub-sign information is permitted in all cases.

**Commented [FM4]:** We support the International Motor Vehicle Inspection Committee (CITA)'s proposal for the text on periodic roadworthiness testing, as we feel that the delegated act on ISA should facilitate the work of entities performing periodic roadworthiness testing as best as possible.

**Commented [FM5]:** In order to aid the driver being aware of the applicable speed limit, we call for the speed limit information to always be provided to the driver, unless the ISA system is fully deactivated.

<sup>2</sup> Directive 2014/45/EU of the European Parliament and of the Council of 3 April 2014 on periodic roadworthiness tests for motor vehicles and their trailers and repealing Directive 2009/40/EC, OJ L 127, 29.4.2014, p. 51–128



2.4.1.3. When no perceived speed limit is available by the ISA system, due to one or more conditions laid down in points 4.3.1. to 4.3.3., a dedicated optical warning, making clear to the driver this particular situation, shall be provided with or without an assumed speed limit indication on the SLIF. The failure warning signal specified in point 2.1.1. shall not be used for this purpose. Alternatively, there shall be complete absence of perceived speed limit information, a question mark “?” shall be displayed prominently adjacent to a numerical assumed speed limit as indicated on the SLIF or a question mark “?” or two hyphens “--” or three hyphens “---” shall be displayed instead of a numerical value on the SLIF.

2.4.1.4. ~~When the SLIF displays the perceived speed limit even when the speedometer speed < perceived speed limit (e.g. always on or on-demand with activated ISA) (The system shall also provide a subtle and not-annoying audible notification each time when the perceived speed limit changes. This feature may be user configurable (e.g. sound, volume, permanently switched off).~~

**Commented [FM6]:** To reflect the new requirement in 2.4.1.2.

2.4.1.5. When the ISA system is deactivated, display of the perceived speed limit is permitted. ~~In such condition compliance with point 2.4.1.4. is not required.~~

**Commented [FM7]:** Justification: the “gazing by the driver” problem is regardless of whether the SLI is provided with the ISA on or off, and the bong should therefore continue to be used.

2.4.2. Speed limit determination.

2.4.2.1. ~~Region or~~ Country of operation setting.

2.4.2.1.1. If speed limit determination requires knowledge of the country ~~or region~~ of operation, the ISA system shall ~~fulfil either requirement (a) or (b) below:~~  
~~(a) The system shall be able to automatically detect the region- or country-code and set it with or without user confirmation. (b) It shall remain be possible for the driver to manually set the region- or country-code.]~~  
~~If the speed limit determination requires knowledge of the region of operation, the system may adopt the lowest relevant applicable speed valid throughout the various regions of that country.~~

**Commented [FM8]:** In order to enhance the ease with which drivers can use the ISA system, we call for the setting of the applicable region and/or country to be done automatically, while preserving the possibility for the driver to set it manually.

**Commented [FM9]:** We call for regions to be reinstated in the requirements, as depending on the country, they are a determining factor for the applicable speed limit.

2.4.2.1.2. The system shall retain the manually set country of operation, even after re-activation of the vehicle master control switch.

**Commented [FM10]:** I would argue we would need to keep this provision, in case for example the driver needs to adjust the country when a system sets the wrong location.

2.4.2.1.3. The manual setting procedure for the country ~~or region~~ of operation shall be intuitive and through a non-complex interface. In particular, it shall be easy to toggle between current and previous country ~~or region~~ of operation choices.

2.4.2.1.4. In case of the need for ~~manual setting or~~ user confirmation, the motor vehicle’s user instructions (e.g. owner’s manual, vehicle handbook) shall clearly specify that this procedure is required for correct operation of the system. ~~These user instructions should also clearly indicate how drivers can manually set the region- and country-codes.~~

**Commented [FM11]:** See point 2.4.2.1.1.

2.4.2.2. Perceived speed limit determination through observation of explicit speed limit signs.

2.4.2.2.1. In the absence of conditions leading to the deactivation of the system according to points 2.1. and 2.2., the SLIF shall be able, through direct visible observation of road signs or other effective methods, to recognise all explicit speed limit signs where the associated applicable speed limit for the category of vehicle to be approved matches

the numerical value shown on the sign, and determine the applicable speed limit  $\leq$  ~~0.7-2.0~~ seconds after the manufacturer's declared reference point on the motor vehicle (also to be specified for STUs) passes the road sign, at least when:

- (a) the signs meet all criteria specified in point 2.4.2.2.2.; and
- (b) the signs are encountered in the operational and environmental conditions specified in point 2.4.2.2.3.

This shall be demonstrated in accordance with the relevant tests and documentation specified in point 3.1.

For vehicle driving speeds  $< 50$  km/h it is acceptable that the applicable speed limit is determined within 10 m rearward of the above mentioned reference point.

#### 2.4.2.2.2. Road sign conditions:

- (a) of a design and size conforming to the applicable standards in the EU Member State concerned;
- (b) positioned in a way conforming to the applicable standards in the EU Member State concerned (e.g. relating to lateral distance to the road edge, height, rotation and tilt);
- (c) showing no significant damage (e.g. fading, reduced retro-reflectivity, bending, cracking, vandalism) that materially affects their visual properties; and
- (d) not partially or fully covered (e.g. foliage, snow or dirt obscuring the sign, or deliberate invalidation during roadworks).

#### 2.4.2.2.3. Operational and environmental conditions:

- (a) full operating speed range of the vehicle;
- (b) with unobstructed view of the road sign for a continuous period of at least ~~1.0-5.0~~ seconds;
- (c) in all illumination conditions without direct blinding sunlight and with passing beam head lamps illumination if appropriate; and
- (d) in the absence of weather conditions affecting the visibility of road signs (e.g. fog, heavy rain, snow).

#### 2.4.2.3. Perceived speed limit determination through observation of road signs and signals.

- 2.4.2.3.1. In the absence of conditions leading to the deactivation of the system according to points 2.1. and 2.2., the SLIF shall be able, through observation of road signs and signals using all relevant system inputs (e.g. camera, electronic map data), to determine the road speed limits associated with all applicable road signs as included in the catalogue of road signs in Part 4, for the category of vehicle to be approved,  $\leq$  ~~0.7-2.0~~ seconds after the reference point mentioned in point 2.4.2.2.1. passes the road sign. This requirement shall be met at least when:

- (a) the signs meet all criteria specified in point 2.4.2.2.2.; and
- (b) the signs are encountered in the operational and environmental conditions specified in point 2.4.2.2.3.

This shall be demonstrated in accordance with the relevant tests specified in point 3.2.

For vehicle driving speeds  $< 50$  km/h it is acceptable that the applicable speed limit is determined within 10 m rearward of the above mentioned reference point.

- 2.4.2.3.2. ~~With the exception of vehicle category, time of day and time of year,~~ the SLIF is not required to take into account special variable conditions influencing the applicable speed limit (i.e. conditions which require information going beyond the

**Commented [FM12]:** The first draft of the delegated act required the applicable speed limit to be determined within 10 meters after the declared reference point. At 50km/h, this translates into 0.7 seconds. Allowing for up to 2 seconds would almost double the amount of meters at 50 km/h, and provides over 5.5 times the distance at 100 km/h. This in our view represents a serious weakening of the performance requirements. In order to take into account that 0.7 seconds would represent less than 10 meters at speeds lower than 50 km/h, we propose that for vehicle driving speeds below that value it would remain acceptable that the applicable speed limit is determined within 10 meters.

**Commented [FM13]:** Reverted back to the value in the first draft of the delegated act. In its response to the stakeholder comments, the Commission saw no justification from a technical point of view to extend this period.

**Commented [FM14]:** While understanding of the intentions of the paragraph, we feel that it exempts three key elements that can be known to the system: vehicle categories, time of day and time of year. We feel that these should not be exempted, but instead should be required to be identified by the system. With regards to time of day/year, both the camera (reading sub-signs) as maps (provided through the data) could identify that the road's speed limit is dependent on the time, which can then be checked against the system/vehicle time as set by the driver, automatically, or from other systems. The three conditions are very important to prevent false positives and therefore for user acceptance/annoyance.

current region or country of operation and the current road class, e.g. trailer status, prevailing environmental conditions, ~~time of day, time of year~~, driver age or experience, standing passengers, dangerous goods, oversized load). In the case that special variable conditions may be present and the system is not capable of taking them into account, the speed limit determination shall default to the assumed most common condition in typical normal operation.

#### 2.4.2.4. Speed limit determination real-world driving reliability.

2.4.2.4.1. In the absence of conditions leading to the deactivation of the system according to points 2.1. and 2.2., the SLIF shall be able, through observation of road signs and signals (using all relevant system inputs, for example, camera input and electronic map data, where provided in-vehicle for this purpose), to reliably determine the applicable speed limits associated with all applicable road signs as included in the catalogue of road signs in Part 4, for the category of vehicle to be approved, at least when:

- (a) the signs meet all criteria specified in point 2.4.2.2.2.; and
- (b) the signs are encountered in the operational and environmental conditions specified in point 2.4.2.2.3.

2.4.2.4.2. Reliable determination of the applicable speed limit is fulfilled if both performance requirements, (a) and (b), are met in real-world driving:

(a) Event-based performance

- True positive rate  $TP_E$ : The correct applicable speed limit shall be determined for ~~≥ 99%~~ of sign passing events. A sign passing event is an instance where the vehicle passes a road sign as specified in point 2.4.2.4.1. and, without prejudice to point 4.3.6., where no special variable conditions according to point 2.4.2.3.2 apply. Instances where identical road signs are positioned on both sides of the carriageway shall be considered as a single sign passing event.

- False positive rate  $FP_E$ : The false positive rate shall be  $\leq 2.0$  reflecting the number of instances per 100 km of driven distance. A false positive event is an instance where ~~an object or a sign other than an applicable road sign is used to incorrectly determine the applicable speed limit~~ is determined incorrectly.

(b) Distance-based performance

- True positive distance  $TP_D$ : The correct applicable speed limit shall be determined for ~~≥ 99%~~ of distance driven at least for applicable speed limits as specified in point 2.4.2.4.1. and where no special variable conditions according to point 2.4.2.3.2 apply.

This shall be demonstrated in accordance with a real-world driving test as specified in point 3.3.

2.4.2.4.3. Before conducting the real-world driving test, in agreement between the technical service, the type-approval authority and the vehicle or STU manufacturer, a route outline shall be selected that is:

- (a) located on public roads within the territory of the European Union; and
- (b) unbiased, that is, chosen with the intention to generate a passed or failed test by virtue of the technical performance of the system and not by virtue of an extreme route choice.

2.4.2.4.4. To demonstrate system performance European Union-wide, the vehicle or STU manufacturer shall provide technical documentation that contains at least:

**Commented [FM15]:** High performance requirements for speed limit determination should be set, in order to prevent driver annoyance which may lead drivers to turn off the systems thereby reducing effectiveness.

**Commented [FM16]:** The original text would exclude incorrectly determined speed limits based on erroneous map data. We feel that false positives due to incorrect map data should count towards the  $FP_E$  rate as well. Drivers will not differentiate in false positives resulting from either the camera or map - they will just perceive it as a false positive regardless. False positives due to incorrect map data - or any other source to stay technologically neutral - should therefore count towards  $FP_E$ . An example to clarify this is in the case a map erroneously indicates a speed limit change, without there being a speed limit sign. In that case, there was no sign to take precedence over the other sources - the camera could not have picked it up - and it would therefore be unreasonable to exclude it from the  $TP_E$ .

(a) The basic design of the system and a description of the speed limit determination system, including the sensors and, if applicable, electronic map data sources used;

(b) Description of due diligence activities performed to provide evidence that the requirements in point 2.4.2.4.1. are met for operation in all European Union Member States. Examples of relevant activities include:

i. Challenging situations in European Union Member State(s) identified for the relevant vehicle category and applicable speed limits, and the relevant analysis performed to show how requirements are met;

ii. For a system that uses electronic map data, an assessment of the acceptability level of the integrity and reliability of the electronic map data throughout all European Union Member States which indicates that requirements are met; and also make associated evidence available for audit.

The technical service shall assess the documentation provided and audit associated evidence to judge that reasonable and adequate steps have been taken to ensure that the requirements in point 2.4.2.4.1. are met for operation in all European Union Member States.

#### 2.4.2.4.5. Life cycle performance

2.4.2.4.5. The vehicle manufacturer shall ensure that the reliability of speed limit determination is maintained ~~for at least 10 years after the production of the vehicle type is definitely discontinued~~ annually for the lifetime of the vehicle until scrapped. This is also the case when an STU is fitted. This applies in particular to applicable speed limits in point 2.4.2.4.1. as applicable to the approved vehicles at the time of the last extension of its EU vehicle type-approval.

**Commented [FM17]:** We support the position of the FIA that the reliability of the speed limit determination should be maintain for the lifetime of the vehicle.

2.4.2.4.5. If electronic data is used to achieve the required performance, it shall be easy to verify the version level information and the vehicle manufacturer shall provide at least quarterly ~~at least quarterly~~ data updates to vehicle owners. These updates shall be made available to vehicle owners [free of charge] (except for the possible cost associated to e.g. common storage media, use of personal computer, operating system, private or mobile internet charges, travel costs to authorised dealer, repairer, distributor or independent repairer). The owner's manual (vehicle handbook) shall clearly specify that periodical updates are required to maintain performance and explain the available procedures to obtain and, if applicable, to perform these updates. Updates may be provided automatically e.g. over-the-air.

**Commented [FM18]:** In order to ensure reliability of map data, we feel that the update frequency should be clearly specified and propose that map data is updated at least on a quarterly basis.

#### 2.5. SLWF requirements.

**Commented [FM19]:** Most amendments in section 2.5 aim to remove the cascading warnings.

2.5.1. In the absence of conditions leading to the deactivation of the ISA system according to points 2.2.1. and 2.2.2., if the perceived speed limit is known and the speedometer speed exceeds it, the SLWF shall warn the driver as specified in point 2.5.2.

2.5.2. The warning indication shall be provided by:  
~~(a) a visual warning and a cascaded acoustic or a visual warning and cascaded haptic warning; or~~  
~~(b) a visual warning and~~ a haptic warning ~~alone~~.

At times when the driving speed of the vehicle is actively controlled by a vehicle system where the driver is not expected to be touching the accelerator control (e.g. cruise control) the use of a haptic warning is not permitted. In this case the system

shall attempt to reduce the driving speed to the perceived speed limit automatically, e.g. by reducing engine power, ~~or a visual warning and a cascaded acoustic warning shall be used. A warning, either acoustically or through vibrating the accelerator control, shall instead be provided when the following conditions apply:~~

- a) the speed at which other systems aim to keep the vehicle speed equals the perceived speed limit; and
- b) ~~the driver accelerates the vehicle using the accelerator controls.~~

~~The warning shall be provided within 1.5 seconds when the speedometer speed > perceived speed limit and until the speedometer speed ≤ perceived speed limit or until > 5.0 seconds after initial activation of the warning. In no case shall the warning last > 8.0 seconds, also in case of successive speed limit changes, in order to minimise driver annoyance. If an acoustic warning is provided, it should be unique and easily recognisable.~~

**Commented [FM20]:** We propose that acoustic or vibrating warnings are only appropriate in situations where systems such as cruise control are aiming to drive the vehicle at the posted speed limit, while the driver wishes to accelerate. As the driver thereby, deliberate or undeliberate, overrides the SCF, the warning should instead be provided to warn drivers they are speeding.

#### 2.5.2.1. Visual warning ~~and cascaded acoustic or haptic warning.~~

2.5.2.1.1. The visual warning shall be noticeable and easily recognisable by the driver and be provided by flashing of the SLIF display or flashing of an additional visual signal adjacent to the SLIF display. It shall be provided within 1.5 seconds when the speedometer speed > perceived speed limit and until the speedometer speed ≤ perceived speed limit or ~~≥ 22 seconds after the initial activation of the haptic warning in accordance with 2.5.2.1.3, until ≥ 15 seconds after initial activation of cascaded acoustic warning or ≥ 22 seconds after initial activation of cascaded haptic warning.~~

~~2.5.2.1.2. The cascaded acoustic warning shall be noticeable by the driver, unique and easily recognisable and be provided by a continuous or intermittent sound signal or by vocal information. Where vocal information is employed, the vehicle manufacturer shall ensure that it is easily configurable by the driver to use any of the Union's official languages. The acoustic warning may be varied to indicate the magnitude or time that the perceived speed limit has been exceeded for.~~

2.5.2.1.2. The haptic warning ~~or cascaded haptic warning~~ shall be noticeable by the driver and be provided directly or indirectly through the accelerator control when the driver maintains an application force as well as a driving speed > perceived speed limit. This shall be achieved by:

- ~~(a) increasing the restoring force of the accelerator control; or~~
  - ~~(b) vibrating the accelerator control.~~
- ~~Haptic warning alone shall not employ a vibrating accelerator control.~~

2.5.2.1.4. The cascaded acoustic and cascaded haptic warning shall be provided, at least, when any of the following conditions are met, for constant vehicle speeds:

- ~~(a) Speedometer speed ≥ 130% perceived speed limit, for ≥ 3.0 seconds;~~
- ~~(b) Speedometer speed ≥ 120% perceived speed limit, for ≥ 4.0 seconds;~~
- ~~(c) Speedometer speed ≥ 110% perceived speed limit, for ≥ 5.0 seconds; or~~
- ~~(d) Speedometer speed > perceived speed limit, for ≥ 6.0 seconds.~~

~~The system may be designed in such a way that it employs a linearly interpolated time between the respective speed and time values for (a) and (d).~~

2.5.2.1.4. When the vehicle is accelerating, the manufacturer shall select the appropriate time for cases (b), (c) or (d) or 3.0 seconds as well as any duration between these two values.

- ~~2.5.2.1.4. When the vehicle is decelerating and none of the conditions laid down in point 2.5.2.1.9. are met, the manufacturer shall select the appropriate time for cases (a), (b) or (c) or 6.0 seconds as well as any duration between those two values.~~
- ~~2.5.2.1.4. When the vehicle is decelerating and one or more of the conditions (b), (c), (d) and (e) of point 2.5.2.1.9. occurs, the cascaded acoustic warning and vibrating haptic warning shall not be provided and shall be terminated immediately.~~
- ~~2.5.2.1.5. The cascaded acoustic warning shall be provided until the speedometer speed  $\leq$  perceived speed limit or until  $\geq 5.0$  seconds after initial activation of the cascaded warning. In no case shall the acoustic warning last  $> 8.0$  seconds, also in case of successive speed limit changes, in order to minimise driver annoyance.~~
- ~~2.5.2.1.6. The cascaded haptic warning shall be provided until the speedometer speed  $\leq$  perceived speed limit or until  $\geq 10$  seconds after initial activation of the warning. In no case shall the haptic warning in the form of vibration last  $> 15$  seconds, also in case of successive speed limit changes, in order to minimise driver annoyance.~~
- 2.5.2.1.3. The haptic warning ~~alone~~ shall be provided within 1.5 seconds when the speedometer speed  $>$  perceived speed limit and until the speedometer speed  $\leq$  perceived speed limit or until  $\geq 15$  seconds after its initial activation. ~~In no case shall the haptic warning in the form of vibration last  $> 20$  seconds, also in case of successive speed limit changes, in order to minimise driver annoyance. If in the case of haptic warning alone a visual warning is also provided on a voluntary basis, it shall be ensured that the system is designed in such a way that the visual warning does not end at the same time as the haptic warning when speedometer speed  $>$  perceived speed limit.~~
- ~~2.5.2.1.8. It is not permitted that a haptic warning system is combined with an acoustic warning function, even if provided on a voluntary basis, unless all requirements for cascaded acoustic warning are also met.~~
- 2.5.2.1.9. Any termination of warnings linked to the duration of time laid down in points 2.5.2.1.1. and 2.5.2.1.53, ~~to 2.5.2.1.7.~~ is without prejudice to the requirements laid down in point 2.4.1.2. In addition, termination of warnings shall be limited to the point in time when:
- (a) the speedometer speed  $\leq$  the perceived speed limit;
  - (b) full release of the accelerator control  $> 3.0$  seconds, except in the case when the driving speed of the vehicle is actively controlled by a vehicle system;
  - (c) disengagement of vehicle system controlling driving speed;
  - (d) activation of the service braking system  $> 3.0$  seconds;
  - (e) activation of an endurance braking system; and/or
  - (f) the perceived speed limit has changed to a lower value;
- after which warnings shall be provided again if a relevant condition applies.
- 2.5.3. The vehicle may be equipped with a means to suspend the SLWF warning to allow for the presentation of more critical warnings (e.g. forward collision warning, lane keeping assistance). The manufacturer shall demonstrate that all applicable warnings are presented to the driver appropriately.

- 2.5.4. The SLWF of vehicles of categories M<sub>2</sub>, M<sub>3</sub>, N<sub>2</sub> and N<sub>3</sub> that are equipped with a speed limitation device and tachograph<sup>3</sup> may be suspended from 9 km/h below the applicable speed limitation setting, and higher vehicle driving speeds, when the relevant perceived speed limit is not provided by means of an explicit speed limit sign or electronic map data based on the presence of an explicit speed limit sign (i.e. implicit speed limit is applicable at the driving location). This means that the SLWF shall operate normally in case of the presence of a relevant explicit speed limit sign. The SLWF shall operate normally at speeds of 10 km/h below the applicable speed limitation setting, and lower vehicle driving speeds.
- 2.5.5. The SLWF warning function shall be demonstrated in accordance with the relevant tests specified in point 3.4.
- 2.6. SCF requirements
- 2.6.1. In the absence of conditions leading to the deactivation of the ISA system according to points 2.2.1. and 2.2.2., the SCF shall attempt to limit the speedometer speed to the perceived speed limit.
- 2.6.1.1. The SCF shall attempt to limit the speedometer speed to a stabilised speed by reducing the vehicle's propulsion power (i.e. reducing driveline torque). The SCF shall not actuate the vehicle's service braking system except for vehicles of categories M<sub>1</sub> and N<sub>1</sub>, where the vehicle's service braking system may be actuated. An endurance brake (e.g. retarder) may be incorporated only if it operates after the SCF has restricted the propulsion power to a minimum. The deceleration rate of the vehicle shall be  $\leq 3.0 \text{ m.s}^{-2}$ .
- 2.6.1.2. The SCF intervention shall start  $\leq 1.5$  seconds after the speedometer speed  $>$  the perceived speed limit.
- 2.6.1.3. When stable speed control has been achieved, the speedometer speed shall not vary by more than 4% or 2 km/h, whichever is greater, in relation to the stabilised speed, and the rate of change of speedometer speed shall be  $\leq 0.2 \text{ m.s}^{-2}$  when measured on a period  $> 0.1$  seconds. The stabilised speed shall fall within the following range: (perceived speed limit – 5 km/h)  $\leq$  stabilised speed  $\leq$  perceived speed limit. In order to minimise driver annoyance, the vehicle manufacturer shall endeavour to stay as close to the perceived speed limit as possible.
- 2.6.1.4. It shall be possible for the driver to override the SCF intervention by performing a positive action, for example by pressing the accelerator control harder or deeper. However, it shall not be permitted that this can be achieved only through accelerator control kick-down (i.e. full depression of accelerator control). When the driver has overridden the SCF, it shall be temporarily suspended and shall be re-initiated after:
- (a) the speedometer speed  $\leq$  the perceived speed limit;
  - (b) full release of the accelerator control  $> 3.0$  seconds;
  - (c) activation of an endurance braking system; and/or
  - (d) the perceived speed limit has changed to a lower value.

<sup>3</sup> Regulation (EU) No 165/2014 of the European Parliament and of the Council of 4 February 2014 on tachographs in road transport, repealing Council Regulation (EEC) No 3821/85 on recording equipment in road transport and amending Regulation (EC) No 561/2006 of the European Parliament and of the Council on the harmonisation of certain social legislation relating to road transport (OJ L 60, 28.2.2014, p. 1)



In case of re-initiation of the SCF as described above for cases (b) and (c), the vehicle shall not slow down abruptly, but it shall be to a rate similar to the deceleration rate of the vehicle just before the re-initiation.

- 2.6.1.5. It is permitted that the driver can select a positive action setting that is more restrictive (e.g. kick-down necessary to override) on a voluntary basis.
- 2.6.1.6. It is permitted that the driver can engage a manual speed limitation function, provided that it does not automatically switch off the ISA system at the same time.
- 2.6.1.7. The SCF shall permit a normal use of the accelerator control for gear selection.

2.6.1.8. The SCF shall not accelerate the vehicle.

**Commented [FM21]:** We propose to add this point as a clarification.

2.6.1.9. The SCF intervention should be accompanied by a visual warning. The visual warning shall be noticeable and easily recognisable by the driver and be provided by flashing of the SLIF display or flashing of an additional visual signal adjacent to the SLIF display. The visual warning should last until stable speed control has been achieved. In case of a driver override of the SCF in line with point 2.6.1.4, the visual warning should be provided for  $\geq 22$  seconds after the initial override of the SCF by the driver.

**Commented [FM22]:** We propose that a visual warning should accompany the SCF intervention, in order to inform the driver of the intervention. The requirement for the visual warning to last until stable speed control has been achieved has been chosen to cover to warn the driver in situations where the SCF is unable to limit speeding (e.g. on a downhill stretch.). The requirement for a visual warning to be provided when overriding is to inform drivers that they have overridden the SCF and alert them that they are currently speeding.

2.6.2. At times when the driving speed of the vehicle is actively controlled by a vehicle system where the driver is not expected to be touching the accelerator control (e.g. cruise control), and in the absence of conditions leading to the deactivation of the ISA system according to points 2.2.1. and 2.2.2., the requirements of point 2.6.1. shall continue to apply ~~unless a SLWF is activated instead.~~ A warning, either acoustically or through vibrating the accelerator control, shall instead be provided when the following conditions apply:

**Commented [FM23]:** We propose that an ISA with a SCF should also use SCF in situations as described in 2.6.2. (without the exception in the subsequent sentence).

a) the speed at which other systems aim to keep the vehicle speed equals the perceived speed limit; and

b) the driver accelerates the vehicle using the accelerator controls.

The warning shall be provided within 1.5 seconds when the speedometer speed  $>$  perceived speed limit and until the speedometer speed  $\leq$  perceived speed limit or until  $\geq 5.0$  seconds after initial activation of the warning. In no case shall the warning last  $> 8.0$  seconds, also in case of successive speed limit changes, in order to minimise driver annoyance. If an acoustic warning is provided, it should be unique and easily recognisable.

**Commented [FM24]:** We propose that acoustic warnings are only appropriate in situations where systems such as cruise control are aiming to drive the vehicle at the posted speed limit, while the driver wishes to accelerate. As the driver thereby, deliberate or undeliberate, overrides the SCF, an acoustic warning should be provided to warn drivers they are speeding instead.

2.6.2.1. Vehicle systems referred to in 2.6.2. shall not use the perceived speed limit as set by the speed limit determination system of the ISA system to accelerate the vehicle, unless confirmed by the driver.

**Commented [FM25]:** We propose that systems such as ACC may not accelerate the vehicle based on ISA speed limit information without driver confirmation to approve the acceleration.

2.6.3. The SCF intervention shall be demonstrated in accordance with the relevant tests specified in point 3.5.

2.6.4. An ISA system comprising of SLIF and SLWF may additionally have SCF-like characteristics, as long as the essential positive action requirements laid down in point 2.6.1.4. are observed.

3. Test procedures.



- 3.1. SLIF: Perceived speed limit determination through observation of explicit speed limit signs test.
- 3.1.1. Subject vehicle conditions:
- 3.1.1.1. Test mass:  
The vehicle mass shall be the mass in running order.
- 3.1.1.2. Tyres:  
The tyres shall be bedded in and the tyre pressures shall be adjusted in accordance with the vehicle manufacturer's specifications.
- 3.1.1.3. Pre-test conditioning:  
If requested by the manufacturer the subject vehicle may be driven a maximum of 100 km on a mixture of urban and rural roads with other traffic and roadside furniture to calibrate the sensor system, and the country or region of operation can be set (manually or automatically) to that of test.
- 3.1.2. Road signs:  
The objective of these tests is that e.g. temporary signs placed on the side of a road by a competent authority are duly recognised by the ISA system. This may be achieved by the use of an observation sensor, but also on the basis of real-time information shared by other vehicles.  
The road signs used for the tests shall be explicit speed limit signs where the associated applicable speed limit for the category of vehicle to be approved matches the numerical value shown on the sign. These signs shall meet all criteria specified in point 2.4.2.2.2. The signs shall be positioned in a way to avoid multiple signs being in the system's field of view simultaneously.  
A minimum of ~~105~~ different signs of the type above (including non-electronic road signs and those displayed on a variable message sign) as used in the Member State where testing takes place shall be selected by the technical service for testing. The signs used for the tests shall be recorded in the test report. To test the perceived speed limit determination through direct or indirect visible observation, the position of the signs used for testing shall not be included in the electronic map data of the vehicle. The manufacturer shall demonstrate, through the use of documentation, compliance with all other explicit speed limit signs as included in the catalogue of road signs in Part 4, for the category of vehicle to be approved, where the associated applicable speed limit for the category of vehicle to be approved matches the numerical value shown on the sign. Any such documentation shall be appended to the test report dossier.
- 3.1.3. Testing conditions:  
The tests shall be performed:  
(a) on a flat surface which is free from uneven patches, standing water, snow and ice, and provides the driver an unobstructed view of the road sign for a continuous period of at least 1.0 seconds;  
(b) in all illumination conditions without direct blinding sunlight and with passing beam head lamps switched on if appropriate; and  
(c) in the absence of weather conditions affecting the visibility of signs (e.g. fog).  
At the manufacturer's discretion and with the agreement of the technical service the tests may be performed under conditions deviating from what is described above.

**Commented [FM26]:** See proposed test in point 3.2a.

**Commented [FM27]:** We feel that with the removal of explicit speed signs from 3.2.2., the total number of different signs that are required to be checked becomes too low. We therefore call for at least 10 different explicit speed limit signs in 3.1.2. to be checked, and at least 10 different implicit speed limit signs to be checked in 3.2.2..

- 3.1.3.1. With agreement between the manufacturer and the technical service, the tests can be performed either:  
 (a) on a public road; or  
 (b) on a test track, provided the SLIF does not require electronic map data to function correctly, unless it is included in the data.  
 In both cases the environment may be such that other vehicles are being driven on the same test route as the subject vehicle, for instance to facilitate the availability of real-time data that can be used by other vehicles without a camera-based observation system. The relevant necessary conditions shall be specified in detail by the manufacturer and agreed by the technical service and type-approval authority prior to the tests taking place. This agreement shall be based on a positive assessment of the reasonability, practicability and authenticity of real-world application.  
 In both cases the different signs shall be selected and placed by the technical service. This means that all signs used for the tests on public roads shall differ from the ones that are normally present, or be temporarily modified ones, in order to assess the observational capacity, or equivalent, of the system.
- 3.1.4. Test procedure:  
 Drive the subject vehicle in a smooth manner so that its attitude is stable past the road sign selected for testing at:  
 (a) a speedometer speed > speed indicated on explicit sign; and  
 (b) the centre of the test lane.  
 By agreement between the manufacturer and the technical service the test track-based procedure described above can be replaced with a laboratory-based procedure that has been shown to be equivalent.
- 3.1.4.1. The test requirements are fulfilled if the SLIF displays the perceived speed limit value that is equal to the speed limit shown on all road signs tested  $\leq 2.00.7$  seconds after the vehicle's reference point passes the relevant signs. For vehicle speeds < 520 km/h this shall be within 10 m behind the vehicle's reference point.
- 3.2. SLIF: Perceived speed limit determination through observation of road signs and signals test.
- 3.2.1. The subject vehicle conditions are those as specified in points 3.1.1. to 3.1.1.3.
- 3.2.2. Road signs:  
 The road signs used for the tests shall be implicit speed limit signs. These signs shall meet all criteria specified in point 2.4.2.2.2. The signs shall be positioned in a way to avoid multiple signs being in the system's field of vision simultaneously.  
 A minimum of 510 different signs of the type above (including non-electronic road signs and those displayed on a variable message sign) as used in the Member State where testing takes place shall be selected by the technical service for testing. The signs used for the tests shall be recorded in the test report.  
 The manufacturer shall demonstrate, through the use of documentation, compliance with all other applicable road signs as included in the catalogue of road signs in Part 4, for the category of vehicle to be approved. Any such documentation shall be appended to the test report dossier.
- 3.2.3. Testing conditions:  
 The testing conditions are those as specified in point 3.1.3.

**Commented [FM28]:** See point 2.4.2.2.1.

**Commented [FM29]:** See proposed test in 3.2a.

**Commented [FM30]:** We feel that with the removal of explicit speed signs from 3.2.2., the total number of different signs that are required to be checked becomes too low. We therefore call for at least 10 different explicit speed limit signs in 3.1.2. to be checked, and at least 10 different implicit speed limit signs to be checked in 3.2.2..

- 3.2.3.1. With agreement between the manufacturer and the technical service, the tests can be performed either:
- (a) on a public road; or
  - (b) on a test track resembling a realistic road environment to allow the SLIF to determine the road type, provided the SLIF does not require electronic map data to function correctly, unless it is included in the data.

In both cases the environment may be such that other vehicles are being driven on the same test route as the subject vehicle, for instance to facilitate the availability of real-time data that can be used by other vehicles without a camera-based observation system. The relevant necessary conditions shall be specified in detail by the manufacturer and agreed by the technical service and type-approval authority prior to the tests taking place. This agreement shall be based on a positive assessment of the reasonability, practicability and authenticity of real-world application.

In both cases the different signs may be selected and placed by the technical service or may be existing signs, also when at the same time part of the real-world driving reliability test in point 3.3., in agreement with the manufacturer.

- 3.2.4. Test procedure:

Drive the subject vehicle in a smooth manner so that its attitude is stable past the road sign selected for testing at:

- (a) a speedometer speed:
  - (i)  $\leq 20\%$  lower than the sign indicates for tests on a public road; and
  - (ii)  $\geq 10\%$  greater than the sign indicates for tests on test track; and
- (b) the centre of the test lane.

By agreement between the manufacturer and the technical service the test track or road-based procedure described above can be replaced with a laboratory-based procedure that has been shown to be equivalent.

- 3.2.4.1. The test requirements are fulfilled if the SLIF determines the perceived speed limit value that is equal to the applicable speed limit associated with all signs tested as included in the catalogue of road signs in Part 4, for the category of vehicle to be approved, and if the SLIF displays the perceived speed limit when the speedometer speed  $>$  perceived speed limit associated with those signs,  $\leq 2.007$  seconds after the vehicle's reference point passes the relevant signs. For vehicle speeds  $< 50$  km/h this shall be within 10 m behind the vehicle's reference point. Appropriate results from the real-world driving reliability test can also be used to demonstrate fulfilment of the requirements.

3.2a. SLIF: Perceived speed limit determination performance test.

3.2a.1. The subject vehicle conditions are those as specified in points 3.1.1. to 3.1.1.3.

3.2a.2. Road signs:  
The objective of these tests is that the applicable speed limit is duly recognised by the ISA system in situations with more than one road sign in the vehicle's field of view, which challenge the speed limit determination system.  
The road signs used for the tests shall be an undetermined mix of multiple non-speed limit signs, explicit speed limit signs and/or implicit speed limit signs. The speed limit signs shall meet all criteria specified in point 2.4.2.2.2. The signs shall be positioned in a way to recreate situations that challenge the speed limit determination

**Commented [FM31]:** See point 2.4.2.2.1.

**Commented [FM32]:** We feel that the delegated act is too restrictive in terms of the possibilities for the Technical Services to perform tests they may want to conduct. We understand that the purpose of track tests in 3.1.2. and 3.2.2. is to verify that the system correctly identifies (a sample of) the explicit and implicit speed signs, whereas the real world driving test seeks to assess reliability in the real world. However, we feel that the delegated act is too restrictive as it does not allow a technical service to assess more challenging situations in tests other than the real world test drive.

We feel that technical services should be allowed to complement the tests in 3.1.2. and 3.2.2. with additional tests on a test track or in the real world under artificial conditions (e.g. by temporarily placing speed limit signs) that would allow the technical service to assess scenarios they would desire to test, but which could not be encountered during the real world test drive due to routing issues. Such tests would currently be prohibited as part of 3.1.2. and 3.2.2. due to the current text of the requirements (as well as the purpose of those tests). The prohibition stems from allowing only one speed limit sign in the field of view, and only allowing speed limit signs – and no other types of signs – to be placed.

Providing the technical services the discretion to perform additional "track" tests may furthermore help determining suitable routes more easily, as this would allow the technical service to subject the vehicle to more challenging situations they may wish to assess during additional tests.

We therefore call for a requirement that the technical service has to test [5] challenging situations in tests supplementing the tests in points 3.1.2., 3.2.2., and 3.3.. The provisions as included in our proposed changes to the draft delegated act in point 3.2a. are flexible in the sense that they would allow the technical services to include these tests as part of the real world test drive, while at the same time give them the discretion to perform them separately upon their wishes and needs.

See the accompanying word document for examples.

system, yet are conceivable to be encountered during real world driving in the Member State where testing takes place.

A minimum of 5 different situations shall be tested by the technical service. The signs and their positioning as used during the tests shall be recorded in the test report.

3.2a.3. Testing conditions:

The testing conditions are those as specified in point 3.1.3.

3.2a.3.1. With agreement between the manufacturer and the technical service, the tests can be performed either:

(a) on a public road; or

(b) on a test track resembling a realistic road environment to allow the SLIF to determine the road type, provided the SLIF does not require electronic map data to function correctly, unless it is included in the data.

In both cases the environment may be such that other vehicles are being driven on the same test route as the subject vehicle, for instance to facilitate the availability of real-time data that can be used by other vehicles without a camera-based observation system. The relevant necessary conditions shall be specified in detail by the manufacturer and agreed by the technical service and type-approval authority prior to the tests taking place. This agreement shall be based on a positive assessment of the reasonability, practicability and authenticity of real-world application.

In both cases the different signs may be selected and placed by the technical service or may be existing signs, or both, also when at the same time part of the real-world driving reliability test in point 3.3., in agreement with the manufacturer.

3.2a.4. Test procedure:

Drive the subject vehicle in a smooth manner so that its attitude is stable past the road sign selected for testing at:

(a) a speedometer speed:

(i)  $< 20\%$  lower than the sign indicates for tests on a public road; and

(ii)  $\geq 10\%$  greater than the sign indicates for tests on test track; and

(b) the centre of the test lane.

3.2a.4.1. The test requirements are fulfilled if the SLIF determines the perceived speed limit value that is equal to the applicable speed limit associated with all signs tested as included in the catalogue of road signs in Part 4, for the category of vehicle to be approved, and if the SLIF displays the perceived speed limit when the speedometer speed  $>$  perceived speed limit associated with those signs,  $\leq 0.7$  seconds after the vehicle's reference point passes the relevant signs. For vehicle speeds  $< 50$  km/h this shall be within 10 m behind the vehicle's reference point. Appropriate results from the real-world driving reliability test can also be used to demonstrate fulfilment of the requirements.

3.3. SLIF: Speed limit determination real-world driving reliability test.

3.3.1. The test drive shall:

(a) be appropriate to measure the system's performance at correctly determining the applicable speed limit using the performance criteria specified in point 2.4.2.4.2.;

(b) involve driving on public roads and streets within the territory of the European Union, as agreed between the manufacturer, the technical service and the type-approval authority;

(c) involve driving on urban roads and streets, non-urban roads, and motorways/expressways/dual carriageways, where each of the three road types shall represent at least 20%, 25% and 25% respectively, of the total distance of the route. The route shall be one consecutive route with the same start and end point, where any repeated parts of the route in the same direction shall not count towards the test distance. The length of an individual section of urban road or street, non-urban road and motorway/expressway/dual carriageway travelled continuously shall not be greater than 20 km, 40 km and 40 km respectively;

(d) involve driving in daylight and darkness conditions, where darkness shall represent at least 15% of the total distance; and

(e) consist of a test distance between 300 and 500 km and sufficient sign passing events such that the performance metrics  $TP\_E$  and  $TP\_D$  variation  $\leq \pm 5.0\%$  within the final 50 km of the route when calculated on a continuous basis.

The technical service may agree to accept in house test data for certain portions of the type-approval test.

- 3.3.2. Performance metric calculation:  
The performance metrics shall be calculated as:

$$TP\_E = (n(TP) / (n(TP) + n(FN))) * 100\%$$

$$FP\_E = n(FP) / d\_total$$

$$TP\_D = (d\_correct / d\_total) * 100\%$$

where:

$n(TP)$  – Number of sign passing events where the correct speed limit was concluded within the prescribed time or distance after passing the sign

$n(FN)$  – Number of sign passing events where no or an incorrect speed limit was concluded within the prescribed time or distance after passing the sign

$n(FP)$  – Number of false positive events

$d\_total$  – Total distance driven for test drive where the applicable speed limit was indicated by a road sign as specified in point 2.4.2.4.1.

$d\_correct$  – Distance driven for test drive where the applicable speed limit was indicated by a road sign as specified in point 2.4.2.4.1., and during which the perceived speed limit matched the applicable speed limit or, where special variable conditions according to point 2.4.2.3.2. applied, the applicable speed limit for the assumed most common condition.

- 3.4. SLWF: Speed limit warning function test.

- 3.4.1 The subject vehicle conditions are those as specified in points 3.1.1. to 3.1.1.3.

- 3.4.2 The technical service shall select suitable road signs for the test as specified in point 3.1.2.

- 3.4.3 The testing conditions are those as specified in point 3.1.3.

- 3.4.4 Test procedure for ~~system options (a) and (b):~~

**Commented [FM33]:** The following amendments to the test procedure reflect the removal of cascading warnings.

~~(a) Visual warning and cascaded acoustic or cascaded haptic warning:~~

~~Part 1: Warnings test:~~

~~The technical service shall select a test speed limit. The initial speed limit shall be  $\geq$  38% higher than the test speed limit. The perceived speed limit shall be set at the initial speed limit.~~

~~The subject vehicle shall be driven with an activated SLWF using the accelerator control in a smooth manner so that its attitude is stable past a road sign indicating the test speed limit at:~~

~~(i)  $1\% \leq \text{speedometer speed} \leq 8\%$  higher than the test speed limit;  
(ii)  $11\% \leq \text{speedometer speed} \leq 18\%$  higher than the test speed limit;  
(iii)  $21\% \leq \text{speedometer speed} \leq 28\%$  higher than the test speed limit; and  
(iv)  $31\% \leq \text{speedometer speed} \leq 38\%$  higher than the test speed limit;  
and at a distance from the road edge such that the position of the sign meets applicable standards in the Member State concerned.~~

~~Continue at a constant speed until the point in time that a cascaded acoustic or cascaded haptic warning is noticed, and after which to:~~

~~—continue at the constant speed for a further 11 seconds and then slow down within 4 seconds to a speedometer speed  $\leq$  test speed limit before 15 seconds have passed, for the visual warning and cascaded acoustic warning check; or  
—continue at the constant speed for a further 18 seconds and then slow down within 4 seconds to a speedometer speed  $\leq$  test speed limit before 22 seconds have passed, for the visual warning and cascaded haptic warning check;  
and to repeat the test at the constant speed until the visual warning ends or for a maximum of 60 seconds. The relevant times shall be recorded in the test report.~~

~~Part 2: Deactivation (no warnings) test:~~

~~The ISA system shall be deactivated and a test repeated as in Part 1 at a speedometer speed selected by the technical service. The perceived speed limit shall be set, or attempted to be set, at the initial speed limit.~~

~~Part 3: SLWF with driver aid control test:~~

~~In the case that the vehicle type may be equipped with a driver aid where the driver is not expected to be touching the accelerator control (e.g. cruise control), an additional test shall be performed with an activated SLWF and the driver aid controlling the speed of the vehicle for least one speedometer speed selected by the technical service.~~

~~(b) Haptic warning alone:~~

~~Part 1: Warnings test:~~

~~The technical service shall select a test speed limit. The initial speed limit shall be  $\geq$  38% higher than the test speed limit. The perceived speed limit shall be set at the initial speed limit.~~

The subject vehicle shall be driven with an activated SLWF using the accelerator control in a smooth manner so that its attitude is stable past a road sign indicating the test speed limit at a speedometer speed  $\geq 1\%$  higher than the test speed limit and at a distance from the road edge such that the position of the sign meets applicable standards in the Member State concerned.

Continue at a constant speed until the point in time that a haptic warning is noticed, and after which to:

- continue at the constant speed for a further 11 seconds and then slow down within 4 seconds to a speedometer speed  $\leq$  test speed limit before 15 seconds have passed, for the haptic warning only check;

and repeat the test at the constant speed until the haptic warning ends or for a maximum of 60 seconds. The relevant times shall be recorded in the test report.

Part 2: Deactivation (no warnings) test:

The ISA system shall be deactivated and a test repeated as in Part 1 at a speedometer speed selected by the technical service. The perceived speed limit shall be set, or attempted to be set, at the initial speed limit.

Part 3: SLWF with driver aid control test:

In the case that the vehicle type may be equipped with a driver aid where the driver is not expected to be touching the accelerator control (e.g. cruise control), the test procedure above for system option (a) as laid down in its Part 1, shall be performed with an activated SLWF and the driver aid controlling the speed of the vehicle.

For all tests ~~under options (a) and (b)~~, by agreement between the manufacturer and the technical service, the test track-based procedures above can be replaced with laboratory-based procedures that have been shown to be equivalent.

3.4.4.1. The test requirements for ~~system options (a) and (b)~~ the haptic warning are fulfilled if:

~~(a) Visual warning and cascaded acoustic or cascaded haptic warning:~~

~~Part 1: Warnings test~~

~~A visual warning compliant with the requirements set out in point 2.5.2.1.1. is provided within 1.5 seconds plus the time or distance allowed for the perceived speed limit determination after passing the sign and a cascaded acoustic or cascaded haptic warning compliant with the requirements set out in points 2.5.2.1.2. to 2.5.2.1.6. and 2.5.2.1.8. is present and noticeable as follows:~~

~~(i) For  $1\% \leq$  speedometer speed  $\leq 8\%$  higher than the test speed limit: from  $\leq 6.0$  seconds after passing the sign;~~

~~(ii) For  $11\% \leq$  speedometer speed  $\leq 18\%$  higher than the test speed limit: from  $\leq 5.0$  seconds after passing the sign;~~

~~(iii) For  $21\% \leq \text{speedometer speed} \leq 28\%$  higher than the test speed limit: from  $\leq 4.0$  seconds after passing the sign; or~~  
~~(iv) For  $31\% \leq \text{speedometer speed} \leq 38\%$  higher than the test speed limit: from  $\leq 3.0$  seconds after passing the sign;~~  
~~plus the time or distance allowed for the perceived speed limit determination after passing the relevant signs.~~

~~Part 2: Deactivation (no warnings) test:~~

~~No warnings (visual, haptic or acoustic) are presented.~~

~~Part 3: SLWF with driver aid control test:~~

~~Visual and acoustic warnings are presented as for Part 1.~~

~~(b) Haptic warning alone~~

Part 1: Warnings test:

A haptic warning compliant with the requirements set out in points 2.5.2.1.7. and 2.5.2.1.8. is provided within 1.5 seconds plus the time or distance allowed for the perceived speed limit determination after passing the relevant sign.

Part 2: Deactivation (no warnings) test:

No warnings (visual ~~or~~ haptic ~~or~~ acoustic) are presented.

Part 3: SLWF with driver aid control test:

~~Visual and acoustic warnings are presented as for system option (a) and its Part 1. An SCF intervention compliant with the requirements set out in point 2.6. and its sub points is initiated.~~

### 3.5. SCF: Speed control function tests

#### 3.5.1. Subject vehicle conditions

3.5.1.1 The subject vehicle conditions are those as specified in points 3.1.1. to 3.1.1.3.

3.5.1.2 The gearbox type, tyre size and gear selection for the tests shall be based on a worst-case selection for the type to be approved, in agreement with the technical service.

3.5.1.3 The settings of the drivetrain of the test vehicle shall conform to the specifications of the vehicle manufacturer.

3.5.2 The tests shall be performed on a test track or on a chassis dynamometer.

3.5.2.1 Test track conditions.



- 3.5.2.1.1 The test track surface shall be suitable to enable a stabilised speed to be maintained and shall be free from uneven patches, standing water, snow and ice. Gradients shall be  $\leq 2\%$  and shall not vary by more than  $\pm 1\%$  excluding camber effects.
- 3.5.2.1.2 Ambient weather conditions for track test shall be as follows. The mean wind speed measured at a height at least 1 m above the ground shall be less than 6 m/s with gusts not exceeding 10 m/s.
- 3.5.2.1.3 At the vehicle manufacturer's discretion and with the agreement of the technical service the tests may be performed under conditions deviating from what is described above, provided that they are worst-case.
- 3.5.2.2 Chassis dynamometer specifications.
  - 3.5.2.2.1 The equivalent inertia of the vehicle mass shall be reproduced on the chassis dynamometer with an accuracy of  $\pm 10\%$ . The time shall be measured with an accuracy of  $\leq 0.1$  seconds.
  - 3.4.2.2.2 The power absorbed by the dynamometer brake during the test shall be set to correspond with the vehicle's resistance to progress at the tested speeds. This power may be established by calculation and shall be set to an accuracy of  $\pm 10\%$ .
- 3.5.3 Speed control function test procedures.
  - 3.5.3.1 SCF acceleration test.
    - 3.5.3.1.1. The test specified in point 3.5.3.1.2. shall be repeated for three different speed limits:
      - (a) Urban speed limit: Initial speedometer speed  $\leq 20$  km/h; test speed limit = 50 km/h;
      - (b) Inter urban speed limit: Initial speedometer speed  $\leq 50$  km/h; test speed limit = 80 km/h; and
      - (c) Motorway speed limit: Initial speedometer speed  $\leq 100$  km/h; test speed limit = 130 km/h.
 Only those tests where the test speed limit is lower than the vehicle's maximum design speed have to be performed.
    - 3.5.3.1.2. The subject vehicle shall be driven with an activated SCF within the initial speedometer speed range. The perceived speed limit shall be set to the test speed limit (e.g. by presenting the vehicle with a road sign displaying the test speed limit). The vehicle shall then be accelerated, without applying a positive override action, until an SCF intervention is initiated. While the intervention remains active, the vehicle shall be driven long enough to allow an assessment of the stabilised speed. During the test, the speedometer speed shall be continuously recorded. The stabilised speed shall be calculated by averaging the speedometer speed over a time interval of 20 seconds beginning 10 seconds after the speedometer speed first reached the perceived speed limit minus 10 km/h.
    - 3.5.3.1.3. The test requirements are fulfilled if the stabilised speeds lie within the following boundaries:
      - (a) Urban speed limit:  $45 \text{ km/h} \leq \text{stabilised speed} \leq 50 \text{ km/h}$ ;
      - (b) Inter urban speed limit:  $75 \text{ km/h} \leq \text{stabilised speed} \leq 80 \text{ km/h}$ ; and
      - (c) Motorway speed limit:  $125 \text{ km/h} \leq \text{stabilised speed} \leq 130 \text{ km/h}$ .

#### 3.5.3.2. SCF response test

3.5.3.2.1 The test specified in point 3.5.3.2.2 shall be performed at the urban speed limit with:  
70 km/h  $\leq$  initial speedometer speed  $\leq$  79 km/h;  
Initial speed limit = 80 km/h;  
Test speed limit = 50 km/h.

3.5.3.2.2. The subject vehicle shall be driven with an activated SCF at a constant speed within the initial speedometer speed range and the perceived speed limit shall be set to the initial speed limit so that no SCF intervention is active. The perceived speed limit shall then be set to the test speed limit (e.g. by presenting the vehicle with a road sign displaying the test speed limit) and the vehicle shall continue to be driven at a constant speed within the initial speedometer speed range long enough to initiate an SCF intervention.

3.5.3.2.3. The test requirements are fulfilled if an SCF intervention is initiated no later than 1.5 seconds after the vehicle's perceived speed limit was set to the test speed limit, taking into account the time or distance allowed for the perceived speed limit determination after passing the relevant road sign.

#### 3.5.3.3. SCF deactivation test.

3.5.3.3.1. The test specified in point 3.5.3.3.2. shall be performed at the urban speed limit with:  
Initial speedometer speed  $\leq$  35 km/h; and  
Test speed limit = 50 km/h.

3.5.3.3.2. The subject vehicle shall be driven with a deactivated SCF within the initial speedometer speed range. The perceived speed limit shall be set, or attempted to be set, to the test speed limit (e.g. by presenting the vehicle with a road sign displaying the test speed limit). The vehicle shall then be accelerated, without applying a positive override action, for well in excess of 1.5 seconds and subsequently kept at a relatively stable speed once the test speed limit has been exceeded by a significant margin.

3.5.3.3.3. The test requirements are fulfilled if no SCF intervention is initiated and no speed limit warning (visual, acoustic or haptic) is issued.

#### 3.5.3.4. SCF override test.

3.5.3.4.1. The test specified in point 3.5.3.4.2 shall be performed at the urban speed limit with:  
Initial speedometer speed  $\leq$  35 km/h;  
Test speed limit = 50 km/h; and  
Final speedometer speed  $\geq$  65 km/h.

3.5.3.4.2. The subject vehicle shall be driven with an activated SCF within the initial speedometer speed range. The perceived speed limit shall be set to the test speed limit (e.g. by presenting the vehicle with a road sign displaying the test speed limit). The vehicle shall then be accelerated, without applying a positive override action, until an SCF intervention is initiated. While the intervention is active, a positive override action as specified by the vehicle manufacturer shall be applied to accelerate the vehicle to the final speedometer speed range. The vehicle shall then be decelerated to a speedometer speed below the test speed limit and accelerated

again, without applying a positive override action, until an SCF intervention is initiated.

3.5.3.4.3. The test requirements are fulfilled if:

- (a) the SCF intervention is temporarily suspended when the positive override action is applied, so that the vehicle can be accelerated to the final speedometer speed, and
- (b) an SCF intervention is initiated during the subsequent acceleration.

3.6. The test procedures of points 3.1., 3.2., 3.4. and 3.5 may be combined to demonstrate compliance with the requirements in a more efficient manner, with the agreement of the technical service.

4. Driving scenarios, provisions for limitations and system performance.

4.1. The observation sensor of the speed limit determination system that is used to assess real-world road signs (e.g. camera) shall not be required, when approaching to observe more than the field of vision? view as that of the driver through the motor vehicle's front windscreen (or a reasonable alternative field as agreed between the vehicle manufacturer, technical service and type-approval authority when the vehicle is not fitted with a front windscreen), as determined using the driver's ocular points as defined in UN Regulation No 46<sup>4</sup>. Any visibility obstruction due to structure below the observation sensor (e.g. bonnet) may be disregarded if this is located below a plane declining forward 4° below the horizontal, starting from the ocular points. The vehicle manufacturer may demonstrate compliance on the basis of documentation.

4.2. In order to improve the system performance, the observation field of view may shift as a function of e.g. steering input, vehicle trajectory, use of direction indicators and/or anticipation by predictive systems.

4.3. For the purpose of calculating the true positive rate  $TP_E$ , false positive rate  $FP_E$  and the true positive distance  $TP_D$ , the following applies to passing events of road signs as included in the catalogue of road signs in Part 4, for the category of vehicle to be approved.

4.3.1. A sign passing event shall not be taken into account when the related sign was not completely visible for at least 0.51-0 seconds from the driver's ocular points as defined in UN Regulation No 46, while driving straight ahead and while cornering.

Commented [FM34]: See point 2.4.2.2.3.

4.3.2. Where the related sign is missing or positioned ambiguously in terms of location to an extent that an average driver travelling on the relevant road section for the first time would be uncertain to whether or not it applies to that driver, as checked and agreed by the technical service for each instance, the sign passing event shall not be taken into account.

4.3.3. Where a sign or multiple signs (e.g. with sub-signs) are conveying ambiguous, additional, complementary or diverging information in terms of applicability to e.g. vehicle categories, technically permissible maximum laden mass, vehicle dimensions, time of day, weather conditions, adjacent lanes or direction of travel, as

Commented [FM35]: See point 2.4.2.3.2

<sup>4</sup> Regulation No 46 of the United Nations Economic Commission for Europe (UNECE) – Uniform provisions concerning the approval of devices for indirect vision and of motor vehicles with regard to the installation of these devices.

checked and agreed by the technical service for each instance, the sign passing event shall not be taken into account.

- 4.3.4. A particular false positive detection event may be omitted from the false positive rate calculations, subject to the agreement by the technical service for each individual case, and shall then also not be considered a sign passing event, where a non-applicable road sign was somehow displayed in a very realistic or life-like manner. However, this shall not apply to false positive events due to such non-applicable road signs being affixed onto the rear of a vehicle that is moving at speed. In order to improve performance of ISA systems installed on motor vehicles in the Union, it shall thus be avoided that symbols and marks resembling speed limit traffic signs in accordance with the Vienna Convention on Road Signs and Signals are affixed to e.g. the rear of other vehicles.

~~4.3.5. When, within 12 months before the type approval test, a change occurred in a Member State as regards the applicable speed limit linked to an implicit speed limit sign that is included in the catalogue at time of the type approval of the vehicle or STU, the sign passing event shall not be taken into account unless when requested by the manufacturer.~~

- 4.3.6. However, although the above sign passing events shall not be taken into account, any correct perceived speed limit determination events may be taken into account on the request of the manufacturer, on case-by-case basis, e.g. when the system outperforms these provision. This also means that, depending on the state of infrastructure on the real-world driving test route, the true positive rate  $TP_E$  could exceed 100%, especially in the case where manufacturers for instance employ a combination of an optical observation sensor + GNSS based location determination system + digital maps, being the preferred option with the greatest reliability.

- 4.4. The system shall retain the perceived speed limit or information in accordance with point 2.4.1.3., even after re-activation of the vehicle master control switch, unless the system can normally determine the perceived speed limit using relevant system inputs (e.g. electronic map data) when the motor vehicle enters or starts driving on a public road.

- 4.5. System logic and strategies.

- 4.5.1. The manufacturer may design the intelligent speed assistance system to incorporate a logic or strategy that takes into account e.g. other vehicles' movements, merging traffic lanes, crossing of road markings, traffic lights, intersections, speed bumps and pedestrian crossings, in order to anticipate a change of speed limit even in absence of relevant road signs.

- 4.5.2. In the case that the system relies on e.g. machine learning, this shall be duly taken into account when assessing the real-world driving reliability. This means that the technical service shall permit a pre-conditioning of the vehicle in accordance with the manufacturer's specifications that may be in excess of 100 km as laid down in point 3.1.1.3., but which shall be reasonable. It shall however be prohibited that the preconditioning takes place on any part of the test drive route as determined and agreed in accordance with points 2.4.2.4.3. and 3.3.1.

- 4.6. For the purpose of conformity of production and market surveillance testing, the manufacturer, technical service and national authorities shall consider the most

**Commented [FM36]:** We call for the deletion of this paragraph, as we strongly feel that at the time of type approval, the system should know the correct speed limits for all catalogue speed signs. It would be difficult to understand for a consumer that their newly purchased vehicle does not know the 'new' speed limit of a sign that was changed possibly over a year earlier.

recent available system updates at the time of testing, when made available in accordance with point 2.4.2.4.5.2.

4.6.1. When, within 12 months before the test, an update of the catalogue reflected a change that occurred in a Member State as regards the applicable speed limit linked to a specific implicit speed limit sign that was included in the catalogue at time of the type-approval of the vehicle or STU, the sign passing event shall not be taken into account unless when requested by the manufacturer.

4.6.12. Any expansion of the catalogue in terms of additional implicit signs that were not included at time of the type-approval of the vehicle or STU, shall not be taken into account for the purpose of conformity of production and market surveillance testing unless when requested by the manufacturer.

**PART 3**

**Section A**

**EU TYPE-APPROVAL CERTIFICATE (VEHICLE SYSTEM)**

**Communication concerning ... of a type of vehicle with regard to the intelligent speed assistance system**

...

**SECTION I**

...

**SECTION II**

...

***Addendum***

**to EU type-approval certificate number ...**

1. Additional information:

...

5. Remarks:

**Section B**

**EU TYPE-APPROVAL CERTIFICATE (SEPARATE TECHNICAL UNIT)**

**Communication concerning ... of a type of separate technical unit with regard to  
intelligent speed assistance systems**

...  
**SECTION I**

...  
**SECTION II**

...  
*Addendum*  
**to EU type-approval certificate number ...**

1. Additional information:

...

5. Remarks:

## Section C

### EU type-approval mark of separate technical units

1. The EU type-approval mark for separate technical units referred to in Article 38(2) of Regulation (EU) 2018/858 shall consist of:
- 1.1. A rectangle surrounding the lower-case letter 'e', followed by the distinguishing number of the Member State which has granted the type-approval for the component or separate technical unit:

1	for Germany	19	for Romania
2	for France	20	for Poland
3	for Italy	21	for Portugal
4	for The Netherlands	23	for Greece
5	for Sweden	24	for Ireland
6	for Belgium	26	for Slovenia
7	for Hungary	27	for Slovakia
8	for the Czech Republic	29	for Estonia
9	for Spain	32	for Latvia
12	for Austria	34	for Bulgaria
13	for Luxembourg	36	for Lithuania
17	for Finland	49	for Cyprus
18	for Denmark	50	for Malta

- 1.2. In the vicinity of the rectangle, two digits indicating the series of amendments laying down the requirements with which this separate technical units complies, "00" at present, followed by a space and the five-digit number referred to in point 2.4 of Annex IV of Regulation (EU) 2018/858.
2. The type-approval mark of the separate technical units shall be indelible and clearly legible.
3. An example of an EU separate technical unit type-approval mark is shown in Figure 1.

*Figure 1*

#### Example of EU separate technical unit type-approval mark

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Explanatory note



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technical unit was approved according to this Regulation.

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PART 4

Catalogue of road signs

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**ANNEX II**

**Amendments to Regulation (EU) 2019/2144**

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**ANNEX III**

**Amendments to Regulation (EU) 2020/683**

Regulation (EU) 2020/683 is amended as follows:

Annex I is amended as follows:

The following points 12.6.5. to 12.6.5.4 are inserted:

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