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COMMISSION IMPLEMENTING REGULATION (EU) …/...

of XXX

laying down rules for the application of Regulation (EU) 2019/2144 of the European Parliament and of the Council as regards uniform procedures and technical specifications for the type-approval of fully automated motor vehicles with regard to their automated driving system (ADS)

Text with EEA relevance)

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Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2019/2144 of the European Parliament and of the Council of 27 November 2019 on type-approval requirements for motor vehicles and their trailers, and systems, components and separate technical units intended for such vehicles, as regards their general safety and the protection of vehicle occupants and vulnerable road users, amending Regulation (EU) 2018/858 of the European Parliament and of the Council and repealing Regulations (EC) No 78/2009, (EC) No 79/2009 and (EC) No 661/2009 of the European Parliament and of the Council and Commission Regulations (EC) No 631/2010, (EU) No 406/2010, (EU) No 672/2010, (EU) No 1003/2010, (EU) No 1005/2010, (EU) No 1008/2010, (EU) No 1009/2010, (EU) No 19/2011, (EU) No 109/2011, (EU) No 458/2011, (EU) No 65/2012, (EU) No 130/2012, (EU) 347/2012, (EU) No 351/2012, (EU) No 1230/2012 and (EU) 2015/166[1], and in particular Article 11 (2) thereof,

Whereas:

(1) It is necessary to adopt the implementing legislation for the type-approval of fully automated vehicles with regard to their automated driving system i.e. systems listed in points (a), (b), (d) and (e) of Article 11 (1) of Regulation (EU) 2019/2144. Driver availability monitoring systems should not apply to fully automated vehicles in accordance with Article 11 (1) of Regulation (EU) 2019/2144. In addition, the harmonised format for the exchange of data for instance for multi-brand vehicle platooning is still subject to standardisation activities and shall not be included in this regulation at this stage. The approval of the automated driving systems of automated vehicles should not be covered by this regulation as it is intended to cover them with a reference to UN Regulation 157 on automated lane keeping systems[2] in Annex I to Regulation (EU) 2019/2144 listing the UN regulations that shall apply on a compulsory basis in the EU.

(2) For the whole-vehicle type-approval of fully automated vehicles, the type-approval of their automated driving system under this Regulation should be complemented with the requirements set out in Annex II, Part I, Appendix 1 of Regulation (EU) 2018/858 of the European Parliament and of the Council [3].

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1 OJ L 325, 16.12.2019, p. 1.

2 OJ L 82, 9.3.2021, p. 75

3 Regulation (EC) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and

(3) The assessment of the automated driving system of fully automated vehicles, as proposed by this regulation, relies heavily on the traffic scenarios that are relevant for the different uses cases of fully automated vehicles. It is therefore necessary to define those different use cases. The review of such use cases, and their amendment if required, to cover additional use cases should be conducted on a regular basis.

(4) The information document, referred to in 24(1) (a) of Regulation (EU) 2018/858 to be provided by the manufacturer for the type-approval of the automated driving system of fully automated vehicles should be based on the template laid down for the whole vehicle type-approval in Annex II to Commission Implementing Regulation (EU) 2020/683[4]. However to ensure a consistent approach, it is necessary to extract the entries of the information document that are relevant for type-approval of automated driving system of the fully automated vehicle.

(5) Given the complexity of automated driving systems, it is necessary to supplement the performance requirements and tests provided in this Regulation by manufacturer documentation demonstrating that the automated driving system is free of unreasonable safety risks to vehicle occupants and other road users during its lifetime. In this respect, it is necessary to lay down the safety management system to be put in place by the manufacturers, to set for manufacturers and authorities the parameters to be used for the traffic scenarios relevant for automated driving system, to establish criteria to assess whether the safety concept of the manufacturer addresses the relevant traffic scenarios, hazard and risks, and to establish criteria to assess the validation results from the manufacturer in particular validation results from virtual toolchains. Finally it is necessary to specify the relevant in-use data that shall be reported by the manufacturer to the type-approval authorities.

(6) The EU type-approval certificate and its addendum, referred to in Article 28(1) of Regulation (EU) 2018/858, to be issued for the automated driving system of fully automated vehicles, should be based on the respective templates laid down in Annex III to Commission Implementing Regulation (EU) 2020/683[5]. However to ensure a consistent approach, it is necessary to extract the entries of the EU type-approval certificate and its addendum that are relevant for type-approval of the automated driving system of the fully automated vehicles.

(7) Subject to the provisions of Article 6 (5) of Regulation 2018/858 and any relevant EU legislation, this regulation is without prejudice to the right of Member States to regulate the safety of operation of fully automated vehicles in traffic and the safety of operation of those vehicles in local transport services.

(8) The measures provided for in this Regulation are in accordance with the opinion of the Technical Committee – Motor Vehicles,

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separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC (OJ L 151, 14.6.2018, p. 1).

[4] Commission Implementing Regulation (EU) 2020/683 of 15 April 2020 implementing Regulation (EU) 2018/858 of the European Parliament and of the Council with regards to the administrative requirements for the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (OJ L 163, 26.5.2020, p. 1).

[5] Commission Implementing Regulation (EU) 2020/683 of 15 April 2020 implementing Regulation (EU) 2018/858 of the European Parliament and of the Council with regards to the administrative requirements for the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (OJ L 163, 26.5.2020, p. 1).

HAS ADOPTED THIS REGULATION:

Article 1

Scope

This Regulation applies to the type-approval of fully automated vehicles of category M and N, with regard to their automated driving system, for the following use cases:

(a) Fully automated vehicles designed and constructed for the carriage of passengers or carriage of goods on a predefined area in an urban or suburban environment.

(b) "Hub-to-hub": fully automated vehicles or dual mode vehicles designed and constructed for the carriage of passengers or carriage of goods on a predefined route with fixed start and end points of a journey/trip and which may include urban or suburban or motorway environment.

(c) "Automated valet parking": dual mode vehicles with a fully automated driving mode for parking applications within predefined parking facilities. The system may use or not external infrastructure (e.g. localization marker, perception sensors, etc.) of the parking facility to perform the dynamic driving task.

The manufacturer may apply for the individual or the type-approval under this Regulation of the automated driving system of vehicles defined in Article 2(3) of Regulation (EU) 2018/858, provided that those vehicles fulfil the requirements of this Regulation.

Article 2

Definitions

In addition to the definitions in Regulation (EU) 2018/858 and Regulation (EU) 2019/2144, for the purpose of this regulation, the following definitions shall apply:

1. "Automated Driving System" (ADS) means the hardware and software as listed in points (a), (b), (d) and (e) of Article 11 (1) Regulation (EU) 2019/2144, that are collectively capable of performing the entire DDT of the fully automated vehicle on a sustained basis.

2. "ADS fall-back response" means an ADS-controlled procedure to place the fully automated vehicle in a minimal risk condition.

3. "ADS feature" means an application of ADS hardware and software designed specifically for use within an ODD.

4. "ADS function" means an application of ADS hardware and software designed to perform a specific portion of the DDT.

5. "Dynamic Driving Task ('DDT')" means all real time operational functions and tactical/manoeuvring functions required to operate the vehicle, excluding strategic functions such as trip scheduling and selection of destinations and waypoints.

6. "operational functions" of the DDT means functions delivered over a time constant of milliseconds and which include tasks such as steering inputs to keep within a lane or braking to avoid an emerging hazard.

7. "tactical/manoeuvring functions" of the DDT means functions delivered over a time constant of seconds and including tasks such as lane choice, gap acceptance and overtaking.

8. "fault" means an abnormal condition that can cause a failure. This can concern hardware or software.

9. “failure” means the termination of an intended behaviour of a component or a system of the ADS due to a fault manifestation.

10. “in-service monitoring” means data collected by the manufacturer and data from other sources, to get evidence on the in service safety performance of the ADS in the field.

11. “in-service reporting” means data reported by the manufacturer to demonstrate evidence on the in service safety performance of the ADS in the field.

12. “lifetime of the ADS” means the period of time during which the ADS system is available, as a function, on the vehicle.

13. “lifecycle of the “ADS” means the period of time that consists of the design, development, production, field operation, service and decommissioning phases.

14. “malfunctioning behaviour” means a failure or unintended behaviour of a component or a system of the ADS with respect to its design intent

15. “minimum Risk Manoeuvre (‘MRM’)” means a manoeuvre aimed at minimising risks in traffic by stopping the vehicle in a safe condition (i.e. minimum risk conditions).

16. “minimum Risk Condition (‘MRC’)” means a stable and stopped state of the vehicle that reduces the risk of a crash.

17. “Operational Design Domain (‘ODD’)” means operating conditions under which a given ADS is specifically designed to function, including, but not limited to, environmental, geographical, and time-of-day restrictions, and/or the requisite presence or absence of certain traffic or roadway characteristics.

18. “Object and Event Detection and Response” (‘OEDR’) means the detection by an ADS of circumstances that are relevant to the immediate driving task, as well as the implementation of the appropriate response to such circumstances.

19. “nominal traffic scenarios” means reasonably foreseeable situations encountered by the ADS when operating within its ODD. These scenarios, often referred to as “traffic scenarios”, represent the non-critical interactions of the ADS with other traffic participants and generate normal operation of the ADS.

20. “critical scenarios” means scenarios related to edge-cases (e.g. unexpected conditions with an exceptionally low probability of occurrence) and operational insufficiencies, not limited to traffic conditions but also including environmental conditions (e.g. heavy rain or low sunlight glaring cameras), human factors, connectivity and miscommunication leading to emergency operation of the ADS.

21. “failure scenarios” means the scenarios related to ADS and/or vehicle components failure which may lead to normal or emergency operation of the ADS depending on whether the minimum safety level is preserved or not.

22. “normal operation” means the ADS operation within specified operational limits and conditions to perform the designed activity.

23. “emergency operation” means the ADS operation due to the occurrence of events requiring prompt action to mitigate adverse consequences on human health or property damage.

24. “on-board operator” means a human who, where applicable to the ADS safety concept:

(a) provides assistance in duly identified emergency situations to the passengers of the fully automated vehicle,

(b) gives instruction to the ADS to perform a minimum risk manoeuvre, provides additional contextual information to the ADS in case of an unclear situation or validates manoeuvres proposed by the ADS.

In the above situations, the on-board operator shall not drive the fully automated vehicle and the ADS shall continue to perform the operational and tactical functions of the DDT.

25. “remote Intervention Operator” means, where applicable to the ADS safety concept, an authorized person located outside the fully automated vehicle who:
(a) activates, switches off the ADS, gives instruction to the ADS to perform a minimum risk manoeuvre, provides additional contextual information to the ADS in case of an unclear situation or validates manoeuvres proposed by the ADS“,
(b) gives instruction to the navigation system operating on the ADS to select or modify the planning of an itinerary or stopping points for the users.

In the above situations, the remote intervention operator shall not remotely drive (i.e. perform DDT) the fully automated vehicle and the ADS shall continue to perform the operational and tactical functions of the DDT.

26. "remote capabilities" mean capabilities specifically designed to support remote intervention.

27. "$R_{[PO: This Regulation]}$ Software Identification Number ($R_{[Regulation 2018/xx]}$SWIN)" means a dedicated identifier, defined by the vehicle manufacturer, representing information about the type approval relevant software of the ADS contributing to the type approval relevant characteristics of the ADS.

28. “unreasonable risk” means the overall level of risk for the vehicle occupants and other road users which is increased compared to a manually driven vehicle in comparable transportation services and situations within the operational design domain.

29. “functional safety”: absence of unreasonable risks under the occurrence of hazards caused by malfunctioning behaviour.

30. “operational safety” means the absence of unreasonable risk under the occurrence of hazards resulting from functional insufficiencies of the intended functionality (e.g. false/missed detection), operational disturbances (e.g. environmental conditions like fog, rain, shadows, sunlight, infrastructure) or by reasonably foreseeable misuse/errors by the vehicle occupants and other road users (i.e. safety hazards — without system faults).

31. "control strategy" means a strategy to ensure robust and safe operation of the ADS in response to a specific set of ambient and/or operating conditions (such as road surface condition, other road users, adverse weather conditions, imminent collision risk, failures, reaching ODD boundaries, etc.). This may include temporary performance restrictions (e.g. a reduction in the maximum operating speed, etc.), MRM manoeuvres, collision avoidance or mitigation, remote intervention, etc.

32. “Time to Collision” (TTC) means the distance on the not necessarily straight path coordinate divided by their first derivative, between either the fully automated vehicle and the impact point with respect to the road coordinate system or the Target and the impact point with respect to the road coordinate system, provided the speeds of the involved vehicles/objects/subjects would not change.

For pure longitudinal situations with constant speeds, unless differently specified in the text, this is obtained by dividing the longitudinal distance (in the direction of travel of the subject vehicle) between the subject vehicle and the target by the longitudinal relative speed of the subject vehicle and the target.

For pure crossing situations with constant speeds, unless differently specified in the text, this is obtained by dividing the longitudinal distance between the subject vehicle and the lateral line of movement of the target by the longitudinal velocity of the subject vehicle.

33. “vehicle type with regard to the ADS” means fully automated vehicles which do not differ in such essential aspects as:

(a) Vehicle features which significantly influence the performances of ADS;

(b) The system characteristics and design of ADS.

34. “dual mode vehicles” means vehicles with a driver seat designed and constructed:
(a) to be driven by the driver in the “manual driving mode” and
(b) to be driven by the ADS without any driver supervision in the “fully automated driving mode”.

The transition between the manual driving mode and the fully automated mode may only occur when the vehicle is at standstill, not when the vehicle is moving.

35. “transport service operator” means the entity providing a transport service using one or more fully automated vehicles.

Article 3

Administrative provisions and technical specifications for the type-approval of the automated driving system of fully automated vehicles

1. The relevant entries of information document, submitted in accordance with Article 24(1), point (a) of Regulation (EU) 2018/858 with the application for type-approval of the automated driving system of a fully automated vehicle, shall consist of the information relevant for that system as contained in Annex 1.

2. The type-approval of the automated driving systems of fully automated vehicles shall be subject to the technical specifications set out in Annex 2. Those specifications shall be assessed by the approval authorities or their technical services in accordance with Annex 3.

3. The EU type-approval certificate for a type of the automated driving system of a fully automated vehicle, as referred to in Article 28(1) of Regulation (EU) 2018/858, shall be drawn up in accordance with Annex 4.

Article 4

Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the Commission
The President
Ursula von der Leyen