

5.2.5. The activated system shall detect the risk of an imminent collision e.g. with another road user ahead or beside the vehicle, due to a harsh decelerating lead vehicle, a suddenly cutting in vehicle or a suddenly appearing obstacle and shall automatically perform an appropriate emergency manoeuvre as specified in paragraph 5.3.

The system shall not deactivate or unreasonably switch the control strategy under conditions not tested in Annex 5. This shall be demonstrated in accordance with Annex 4 of this Regulation.

5.2.5.1. The activated system shall avoid a collision with a leading vehicle which decelerates up to its full braking performance provided that there was no undercut of the minimum following distance the ALKS vehicle would adjust to a leading vehicle at the present speed due to a cut in manoeuvre of this lead vehicle.

5.2.5.2. The activated system shall detect the risk of an imminent collision with a suddenly cutting in vehicle and avoid a collision,

- provided the cutting in vehicle maintains its longitudinal speed and

- when the distance between the vehicle's front and the cutting in road user's rear corresponds to a distancetime-to-collision calculated by using the three dimensional interpolation of the following table equation:

$$TTCL_{LaneIntrusion} > v_{rel} / (2 \cdot 6 \text{ m/s}^2) + [0.35 \text{ s}]^{\dagger}$$

Minimum DTC beginning of lateral movement

V_{rel} (km/h) \ $V_{Lateral}$ (m/s)	0	10	20	30	40	50
0	N/A	N/A	N/A	N/A	N/A	N/A
0.5	5.0	9.6	19.8	31.0	45.0	N/A
1.0	5.0	6.6	13.7	22.0	32.3	N/A
1.5	5.0	5.6	11.6	18.4	26.4	N/A
1.8	N/A	N/A	N/A	N/A	N/A	N/A

Where:

v_{rel} = relative velocity between both vehicles, positive for vehicle being faster than the cutting in vehicle

$V_{Lateral}$ = average lateral speed of the cutting in vehicle

$TTCL_{LaneIntrusion} - DTC_{LaneIntrusion}$ = The distancetime-to-collision value when foremost point the outer edge of the front tire of

[†] Parameters defining a manoeuvre that shall be avoided have to be reviewed.

cutting-in side of the intruding vehicle has fully crossed the lane marking.

- 5.2.5.3. The activated system shall detect the risk of an imminent collision with an unobstructed crossing adult pedestrian in front of the vehicle and avoid a collision. This shall be tested according to the test procedure in UN Regulation No. 152.
- 5.2.5.4. It is recognised that the fulfilment of the requirement in paragraph 5.2.5. may not be fully achieved in other conditions than those described above. However, the system shall not deactivate or unreasonably switch the control strategy in these other conditions. This shall be demonstrated in accordance with Annex 4 of this Regulation.

Annex 5 Test Specifications for ALKS

3.2. Test parameter variation

The manufacturer shall declare the system boundaries to the Technical Service. The Technical Service shall define at least 3 different combinations of test parameters (e.g. present speed of the ALKS vehicle, type and offset of target, curvature of lane) which shall clarify which conditions are covered in the following 3 conditions for each of the test scenarios listed under paragraph 4.

- a collision or leaving its lane is avoided by regular manoeuvre,
- a collision is avoided by emergency manoeuvre,
- a collision cannot be avoided but emergency manoeuvre is executed.

If a collision cannot be avoided for some test parameters, the manufacturer shall demonstrate either by documentation or if possible by [verification/testing] that the system doesn't unreasonably switch its control strategy.

5. Additional verification

5.1. The Technical Service shall assess the detection areas of the ALKS to the side and to the front according to paragraphs x.x.x. of this Regulation.

5.2. Compliance with the following provisions shall be demonstrated by the manufacturer and assessed by the Technical Service at the time of type approval:

	Test/Cheek Test Overview
6.2.2.	Off mode after new engine start/run
6.2.3	System can only be activated if <ul style="list-style-type: none"> - driver is in driver seat & belt is fastened - driver is available - no failures - DSSAD operational - conditions are within system limits <u>etc.</u>
6.2.1 6.2.4 6.2.5 6.2.6	Means of deactivating <ul style="list-style-type: none"> - Dedicated means to activate and deactivate - protected against unintentional action - Steering - Holding wheel and brake/accelerate - Driver holds steering wheel in response to transition and MRM - After deactivation <u>etc.</u>
6.3	Means to override the system <ul style="list-style-type: none"> - Steering control

	<ul style="list-style-type: none"> - Braking input higher than system - Accelerating to speed within system limits <u>etc.</u>
6.1.3.1.	Criteria for deeming driver available
5.1.3	Driver support systems active
6.3.1.1.	Driver attentiveness
5.5	System behaviour during a Minimal Risk Manoeuvre <ul style="list-style-type: none"> - Driver take over - Standstill (hazard lights) - Re-activation disabled if reached standstill <u>etc.</u>
5.1.4 5.1.5 5.4	Transition demand & behaviour/escalation <ul style="list-style-type: none"> - Driver resumes control - Without driver response (MRM) - Planned transition - Unplanned transition <u>etc.</u>
6.1.2 6.1.3	Driver presence and Driver availability During operation <ul style="list-style-type: none"> — Exceed system parameters — Failure — Detectable collision - Driver not present <u>etc.</u>
5.3	System behaviour for Emergency Manoeuvre <ul style="list-style-type: none"> - Resulting in standstill - Not resulting in standstill
7.1	System detection areas
7.1.1	- Front
7.1.2	- Sides
7.1.3	Visibility

Note:

RM	Regular Manoeuvre.
EM	Emergency Manoeuvre.
NAS	Non-Avoidable Situation.

	Potential test area that can be selected by the technical service in addition to the mandatory testing. Note pass/fail criteria for NAS tests does not apply, mitigation strategy will be assessed by the technical service.
X	Mandatory test area to be tested by the technical service. Each 'X' indicates that a mandatory single test is to be carried out. Additional testing may be carried out in this area at the request of the technical service with varied parameters compared to the testing already performed.
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