

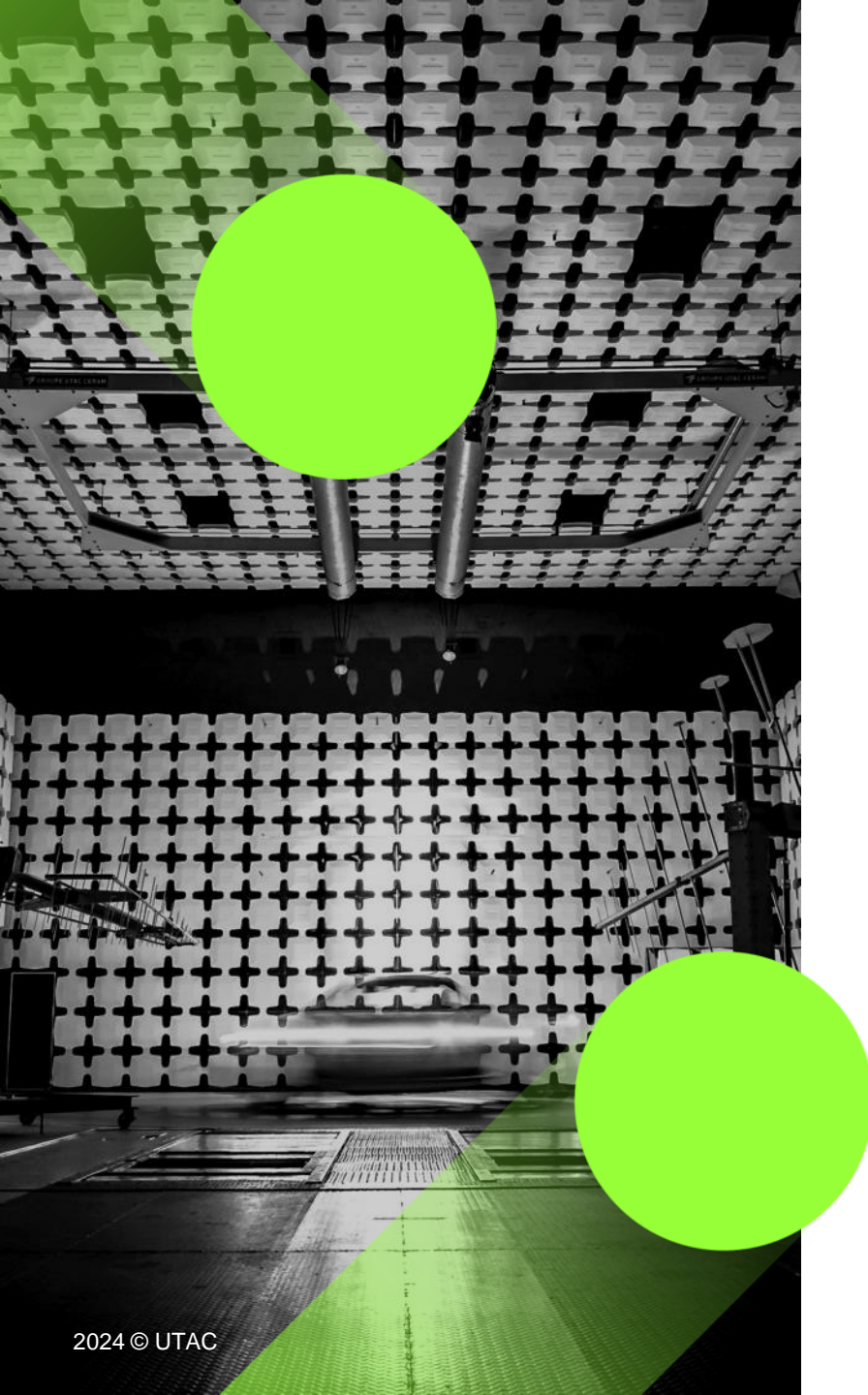


UTAC

ADVANCING MOBILITY SINCE 1924

# Immunity related functions, vehicle test conditions and other regulations

47th IWG meeting – online



- 01** General

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- 02** List of regulation calling EMC

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- 03** Synthesis

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- 04** Immunity related function update proposal

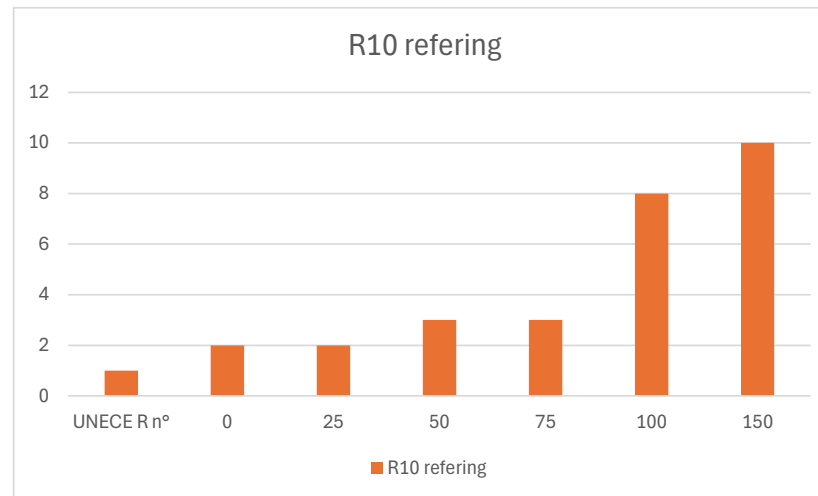
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- 05** Annex 6 update proposal

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## General

- The number of regulation calling R10 directly or indirectly is growing and accelerating



# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
13R14	Braking	5.1.1.4	The effectiveness of the braking systems, including the electric control line, shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of Regulation No. 10.	(a.i) degradation of brake	Yes in driving (vehicle speed / cluster) and braking (brake activated) cycles
19R04S8	Front fog lamps	5.11	The front fog lamp and its ballast system of light source control gear shall not generate radiated or power line disturbances, which cause a malfunction of other electric/electronic systems of the vehicle.  Compliance with the requirements for electromagnetic compatibility is relevant to the vehicle type.	No Is it related to (c.i) : optical disturbance	Only in emission (Annexes 4 & 5)
46R06S1	Devices for indirect vision and of motor vehicles with regard to the installation of these devices  Concerns indirect vision other than mirror	6.2.1.3	The effectiveness of the CMS of Classes I to VI shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with the technical requirements and transitional provisions of Regulation No.10, 04 series of amendments or any later series of amendments.	(a.iii) affecting driver visibility : indirect vision systems	Yes in driving cycle (rearview systems)



# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
62R01	Anti theft - Vehicles L1 to L7 - generic	5.12	<p>Electromechanical and electronic devices to prevent unauthorized use, where fitted, shall comply with the following requirements regarding electromagnetic compatibility.</p> <p>Tests shall be performed according to the relevant technical prescriptions and transitional provisions of UN Regulation No. 10, 06 series of amendments and according to the immunity test methods described in Annex 6 and according to the emission test methods described in Annexes 4 and 5.</p>	<p>(a.i) degradation of engine (c.ii) acoustical disturbance from antitheft alarm Partial</p>	<p>Yes in driving cycle (speed / cluster) But miss equivalent cycles not covered as described in R161, 162 &amp; 163</p>
67R03s3	Specific equipment of vehicle of categories M and N using LPG for their propulsion systems.	6.1	<p>The installation of LPG-equipment approved by this regulation shall comply with relevant electromagnetic compatibility (EMC) requirements according to Regulation No. 10, 02 series of amendments, or equivalent.</p>	<p>(a.i) degradation of engine</p>	<p>Yes in driving cycle (speed / cluster)</p>

# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
78R06s6	Braking (L)	5.1.1 4	The effectiveness of the braking systems, including the anti-lock system, shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of Regulation No. 10 (EMC).	(a.i) degradation of brake	Yes in driving (vehicle speed / cluster) and braking (brake activated) cycles
79R04S6	Steering	5.1.5	The effectiveness of the steering equipment, including the electrical control lines, shall not be adversely affected by magnetic or electric fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of Regulation No. 10	(a.ii) affecting friver position (steering wheel) (a.i) degradation of steering	Yes in driving cycle for position of the steering wheel, and no : how to manage the degradation of steering
89R00S3	Speed limitation devices (M2, M3, N2, N3)	5.1.8  5.2.2	The speed limitation function shall operate satisfactorily in its electromagnetic environment without unacceptable electromagnetic disturbance for anything in this environment.  The effectiveness of the ASLF shall not be adversely affected by magnetic or electric fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of UN Regulation No. 10.	(a.i) degradation of speed limitation device	No : no test condition related to speed limitation device

# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
99R00S14	gas-discharge light sources for use in approved lamps of power-driven vehicles	3	Moreover stray magnetic fields shall be avoided.	(a.iii) affecting drivers visibility dipped lights	Only in emission (Annexes 4 & 5) Yes in driving cycle (dipped beam / cluster)
110R06S1	vehicles using compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system	8.1.1	The specific components of vehicles using CNG/LNG in their propulsion system shall comply with relevant electromagnetic compatibility (EMC) requirements according to Regulation No. 10, 03 series of amendments, or equivalent.	(a.i) degradation of engine	Yes in driving cycle (Speed / cluster)
114R00 & 01	Airbag (aftermarket)	5.1.2	Interference from magnetic fields shall not disrupt the operation of the airbag system	(b.i) function related to user protection	Yes in driving cycle, but with front passenger airbag inhibited and <b>No front passenger airbag never homologated</b>

# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
116R01S2	Protection against unauthorized use	Annex 9	EMC	(a.i) degradation of engine (c.ii) acoustical disturbance from antitheft alarm Partial	Yes in driving cycle (speed / cluster/alarm) Specify equivalent cycles not covered as described in R161, 162 & 163
130R01	Lane Departure Warning System (LDWS)	5.1.2	The effectiveness of LDWS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of Regulation No. 10.	(b.i) function related to user protection	No Need a specific test condition & failure criteria
131R02S1	Advanced Emergency Braking System (AEBS) for M2, M3, N2 and N3 vehicles	5.1.2	The effectiveness of AEBS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with the 05 or later series of amendments to UN Regulation No. 10.	(a.i) degradation of brake	Yes in driving cycle (speed / cluster)



# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
139R00S2	Brake assist system	5.4	The effectiveness of the BAS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of Regulation No. 10.	(a.i) degradation of brake	Yes in driving cycle (vehicle speed / cluster)
140R00S6	ESC	5.4	The effectiveness of the ESC shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of Regulation No. 10.	(a.i) degradation of brake	Yes in driving (vehicle speed / cluster) and braking (brake activated) cycles
141R01S2	TPMS	5.1.2	The effectiveness of the TPMS, TPRS or CTIS fitted on a vehicle shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of UN Regulation No. 10.	(c.i) confusion to the driver : optical disturbance, add TPMS	Yes in driving cycle (cluster monitoring)

# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
143R00S1	Heavy Duty Dual-Fuel Engine Retrofit Systems (HDDF-ERS) to be installed on heavy duty diesel engines and vehicles	7.5.4.1	The engine retrofit system shall be compliant with Regulation R10	(a.i) degradation of engine	Yes in driving cycle (Speed / cluster)
144R01S1	AECS (eCall)	7.2	<p>If the applicant for approval so requests the Electro Magnetic Compatibility may be part of the approval of a type of AECC. In this case, the following provisions shall apply.</p> <p>The effectiveness of AECC shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with the technical requirements and transitional provisions of UN Regulation No. 10, 04 series of amendments or any later series of amendments.</p>	(b.i) driver / passenger protection	Yes in 07, AECS cycle

# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
149R00S8		4.5.2.4	<p>The headlamp of class D and/or class ES and its ballast system or light source control gear shall not generate radiated or power line disturbances, which cause a malfunction of other electric/electronic systems of the vehicle.</p> <p>→ Compliance with the requirements for electromagnetic compatibility is relevant to the vehicle type.</p>	(a.iii) affecting drivers visibility dipped lights	<p>Only in emission (Annexes 4 &amp; 5) Yes in driving cycle (dipped beam / cluster)</p>
151R00S4	Blind Spot Information System for the Detection of Bicycles	5.2.1	<p>The effectiveness of the BSIS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with the technical requirements and transitional provisions of UN Regulation No. 10, 04series of amendments or any later series of amendments.</p>	(a.iii) affecting drivers visibility blind spot systems	<p>No Need a specific test condition &amp; failure criteria</p>
152R02S3	Advanced EmergencyBraking System (AEBS) for M1 and N1 vehicles	5.1.2	<p>The effectiveness of AEBS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of the 06 series of amendments to UN Regulation No. 10.</p>	(a.i) degradation of brake	<p>Yes in driving cycle (vehicle speed / cluster)</p>

# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
157R01S3	Automated Lane Keeping Systems	5.1.7	The effectiveness of the system shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of 07 or later series of amendments to UN Regulation No. 10.	(a.i) degradation of active steering	no : how to manage the degradation of steering
158R00S4	Devices for reversing motion and motor vehicles with regard to the driver's awareness of vulnerable road users behind vehicles	16.4	The effectiveness of the RVCS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with the technical requirements and transitional provisions of UN Regulation No. 10, 05 series of amendments or any later series of amendments.	(a.iii) affecting drivers visibility / (b) other road user protection -> add RVCS	No Need a specific test condition & failure criteria in specific cycle

# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
159R00S2	Motor vehicles with regard to the Moving Off Information System for the Detection of Pedestrians and Cyclists	5.1.2	The effectiveness of the MOIS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with the technical requirements and transitional provisions of UN Regulation No. 10, 05series of amendments or any later series of amendments.	(a.iii) affecting drivers visibility / (b) other road user protection -> add MOIS	No Need a specific test condition & failure criteria
161R00S4	Protection against unauthorised use	Anne x 7	R10	(a.i) degradation of engine	Yes in driving cycle (speed / cluster) + Specific cycle R161
162R00S4	Immobilizers	Anne x 7	R10	(a.i) degradation of engine	Yes in driving cycle (speed / cluster) + Specific cycle R162
163R00S4	Alarm system	Anne x 7	R10	(c.ii) acoustical disturbance from antitheft alarm	Yes in driving cycle (Alarm) + Specific cycle R163



# List of regulation calling R10

Reg	Topic	§	Statement	Associated Imm. Rel. Func.	Included in R10
166R01	Motor Vehicles with Regard to the Driver's Awareness of Vulnerable Road Users in Close Proximity to the Front and Lateral Sides of Vehicles	16.8	The effectiveness of the FLVCS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with the technical requirements and transitional provisions of UN Regulation No. 10, 05 series of amendments or any later series of amendments.	(a.iii) affecting drivers visibility / (b) other road user protection -> add FLVCS	No Need a specific test condition & failure criteria
175R00	Acceleration Control for Pedal Error (ACPE)  System for taking control of throttle pedal in case of accelerating by error instead of breaking, shall override AEBS	5.1.8	The effectiveness of ACPE shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements and respecting the transitional provisions of the 06 or later series of amendments to UN Regulation No. 10.	(a.i) degradation of brake	Yes in driving (vehicle speed / cluster) and braking (brake activated) cycles

About 30 Regulations call for R10

- Concerning immunity related function, even if non exhaustive, at least need to add 4 item concerned by regulation
- Concerning Cycles / tests conditions and failure criteria
  - 2 cycles shall be added
  - 9 tests conditions and failure criteria shall be precised

Proposal : to update Immunity related function with the list of systems described in other regulations referring to R10 for immunity requirement

- (a) Functions related to the direct control of the vehicle:
  - ...
  - (iii) By affecting driver's visibility: e.g. dipped beam, windscreen wiper, indirect vision systems, blind spot systems, **rear view camera systems** (R158), **front and lateral view camera systems** (R166), **moving off information systems** (R159).
  
- (c) Functions which, when disturbed, cause confusion to the driver or other road users:
  - (i) Optical disturbances: incorrect operation of e.g. direction indicators, stop lamps, end outline marker lamps, rear position lamp, light bars for emergency system, wrong information from warning indicators **or TPMS function** (R141), lamps or displays related to functions in subparagraphs (a) or (b) which might be observed in the direct view of the driver;

# Annex 6 test condition and failure criteria update proposal

## Driving Cycle 1/4

<b>"50 km/h mode" vehicle test conditions</b>	<b>Failure criteria</b>	<b>Associated regulation</b>
Vehicle speed 50 km/h (respectively 25 km/h for L1, L2 vehicles) $\pm$ 20 per cent (vehicle driving the rollers). If the vehicle is equipped with a cruise control system <sup>(1)</sup> , it shall be used to maintain the required constant vehicle speed and maintained without any deactivation.	Speed variation greater than $\pm$ 10 per cent of the nominal speed. In case of automatic gearbox: change of gear ratio inducing a speed variation greater than $\pm$ 10 per cent of the nominal speed.	R10, R13, R78, R131 R139, R140 R152
	<b>no change of state of the immobilizer and/or device to prevent unauthorized use.</b>	R116 ; R161 ; R162
Dipped beams ON (manual mode)	Lighting OFF (front light and rear light)	R10, R149
Specific warning (e.g Rotating/flashing light, signaling bar, siren...) ON	Specific warning OFF	R10

Specification concerning cruise control:

**(1) Due to issues caused by the EMC laboratory environment, it may not be possible to activate automatic cruise control of the vehicle, in this case use non adaptive cruise control.**

# Annex 6 test condition and failure criteria update proposal

## Driving Cycle 2/4

<b>"50 km/h mode" vehicle test conditions</b>	<b>Failure criteria</b>	<b>Associated regulation</b>
Cluster operate in normal mode	Unexpected warning of <b>telltales related to immunity related functions</b> Inconsistent variation of the odometer	R10, R141
Rear view systems ( <b>internal and external</b> )	Unexpected movement of rear view mirror	R10
	Loss or freezing of the display (CMS)	R10, R46
	<b>Change of state of display (ON / OFF)</b>	R10, R158
Front wiper ON (manual mode) maximum speed	Complete stop of front wiper	R10
Direction indicator on driver's side ON	Frequency change (lower than 0.75 Hz or greater than 2.25 Hz). Duty cycle change (lower than 25 per cent or greater than 75 per cent).	R10
Adjustable suspension in normal position	Unexpected significant variation	R10



# Annex 6 test condition and failure criteria update proposal

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## Driving Cycle 3/4

<b>"50 km/h mode" vehicle test conditions</b>	<b>Failure criteria</b>	<b>Associated regulation</b>
Driver's seat and steering wheel in medium position	Unexpected variation greater than 10 per cent of total range	R10
Alarm unset	Unexpected activation of alarm	R10, R116, R163
Horn OFF	Unexpected activation of horn	R10
Airbag and safety restraint systems operational with inhibited passenger airbag if this function exists	Unexpected activation	R10, R114
Automatic <del>doors openings</del> closed	Unexpected opening of automatic doors	R10
	<b>Unexpected opening of windows / sunroof</b>	I/R b.i
Adjustable endurance brake lever in normal position	Unexpected activation	R10
ADS shall be operational <sup>(42)</sup>	ADS failure situation	R10

# Annex 6 test condition and failure criteria update proposal

## Driving Cycle 4/4

<b>"50 km/h mode" vehicle test conditions</b>	<b>Failure criteria</b>	<b>Associated regulation</b>
Brake pedal not depressed	Unexpected activation of brake and unexpected activation of stop lights	R10
automatic gearbox in Driving mode	change of gear mode of the gearbox	I/R a.i
tachograph operating	Recording of data with error (check the difference between beginning and of test, shall be less than 6 km)	I/R e
Blindspot detection operating	modification of the function state (e.g. unexpected deactivation) unexpected alert of the function.	I/R a.iii, R151
lane departure warning system operating.	modification of the function state (e.g. unexpected deactivation). unexpected alert of the function (seat, turnwheel, cluster, ...).	R130

## Braking Cycle 1/2

<i>« Brake mode » vehicle test conditions</i>	<i>Failure criteria</i>	<i>Associated regulation</i>
Vehicle in a state that allows the braking system to operate normally, parking brake released, vehicle speed 0 km/h. Brake pedal depressed to activate the brake function and the stop lights without any dynamic cycle.	Stop lights inactivated during mode Brake warning light ON with loss of brake function.	R10, R13, R78, R140, R152
Day running light (DRL) ON	DRL inactivated during mode	R10
ADS shall be operational <sup>(1)</sup>	ADS failure situation	R10
Airbag and safety restraint systems operational with non-inhibited passenger airbag	unexpected activation.	IR b.i, R114

## Braking Cycle 2/2

« Brake mode » vehicle test conditions	Failure criteria	Associated regulation
detection of pedestrian and cyclists while moving Off information system	modification of the function state (e.g. unexpected deactivation). unexpected alert of the function.	IR b.i, R159
System for taking control of throttle pedal in case of accelerating by error instead of breaking ready	change in the engine speed / torque applied to wheels unexpected alert of the function.	IR a.i, R175
vehicle in front drive, with the FLVCS operating.	modification of the function state (e.g. unexpected deactivation). unexpected alert of the function. Freezing of Front, lateral view camera systems	R166

## New speed limitation cycle for R89

<i>« Speed limit » vehicle test conditions</i>	<i>Failure criteria</i>	<i>Associated regulation</i>
Speed limit feature activated pushing the throttle pedal to reach a speed above the limit if the feature would not be activated	Speed exceedance of the limit.	R89



## New speed limitation cycle for R158

<i>« Rear gear » vehicle test conditions</i>	<i>Failure criteria</i>	<i>Associated regulation</i>
vehicle in rear drive, with the system operating	modification of the function state (e.g. unexpected deactivation). unexpected alert of the function. Freezing of rearview systems (only if no redundancy with a standard mirror)	R158

No change for AECS and AVAS test cycles

UTAC will propose in another paper for another meeting concerning

- Process for dealing with ADAS
- Process for dealing with turnwheel (wheel position)



**Thank you!**

