

Test Procedure of UN-R130 Lane Departure Warning System (LDWS)

16, July, 2019

Koji Urate

National Traffic Safety and Environment Laboratory
Automobile Type Approval Test Department

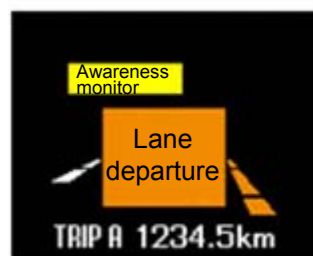
Outline of Lane Departure Warning System (LDWS)



White line recognition camera

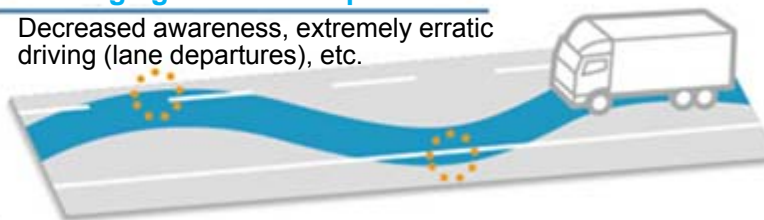


Example of the image perceived by the camera



Warning against lane departure

Decreased awareness, extremely erratic driving (lane departures), etc.



Recognizes the lane by a camera.



If the vehicle deviates or is about to deviate from the lane, provide lane departure warning.



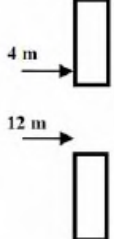



Helps avoid lane departure.

Scope of application: **vehicles of categories M2, N2, M3 and N3**

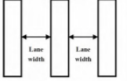
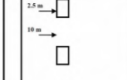



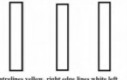



Operating vehicle speed: at least at vehicle speeds above 60 km/h

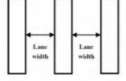
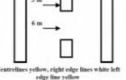



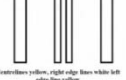



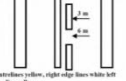



Visible lane markings

The visible lane markings used in the lane departure warning tests shall be those of one of the Contracting Parties as identified in Annex 3 to this Regulation

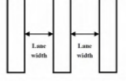
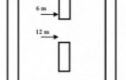



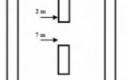



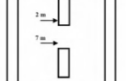



Pattern			Country	Width		
Left edge lane marking	Centre line	Right edge lane marking		Left edge lane marking	Centre line	Right edge lane marking
			JAPAN			

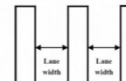
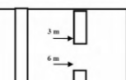



Annex 3
Visible lane marking identification

Pattern			Country	Width		
Left edge lane marking	Centre line	Right edge lane marking		Left edge lane marking	Centre line	Right edge lane marking
			Definition of lane width for the purpose of this Regulation			
			CANADA			
			CANADA Traffic flowing in opposite direction			

Pattern			Country	Width		
Left edge lane marking	Centre line	Right edge lane marking		Left edge lane marking	Centre line	Right edge lane marking
			Definition of lane width for the purpose of this Regulation			
			CANADA Traffic flowing in same direction			
			CANADA Traffic flowing in opposite direction with lane changing prohibited			
			CANADA Traffic flowing in opposite direction with lane changing allowed only from one lane			

...

Pattern			Country	Width		
Left edge lane marking	Centre line	Right edge lane marking		Left edge lane marking	Centre line	Right edge lane marking
			Definition of lane width for the purpose of this Regulation			
			SWITZERLAND			
			UNITED KINGDOM Motorway			
			UNITED KINGDOM Other Category			

Pattern			Country	Width		
Left edge lane marking	Centre line	Right edge lane marking		Left edge lane marking	Centre line	Right edge lane marking
			Definition of lane width for the purpose of this Regulation			
			UNITED KINGDOM Single Category (speed limit <40 mph)			

Test Lane Marking

The width between the left and right lane markings (lane width) is **3.5 m or more**.

The visible lane markings are assumed to be **white**.

In the case the vehicle type may be **equipped with different variants of the LDWS with regional specific adjustments**; the manufacturer shall demonstrate through documentation that the requirements of this Regulation are fulfilled in all variants.

The test shall be performed under visibility conditions that allow safe driving at the required test speed.

Longitudinal vehicle speed : 65 ± 3 km/h

Lateral vehicle speed : between 0.1 and 0.8 m/s

(Departure speed) (0.36 and 2.88 km/h)

Lane Departure Warning Test

- Test speed:

Forward vehicle speed : 65 ± 3 km/h

Lateral vehicle speed : between 0.1 and 0.8 m/s

(Departure speed) (0.36 and 2.88 km/h)

- Direction of lane departure

Both to the left and the right



Within the limits of the departure speeds shown above, the test is conducted at a “relatively slow”, a “relatively fast” speed, and at a “moderate” speed.

- LDWS warning indication

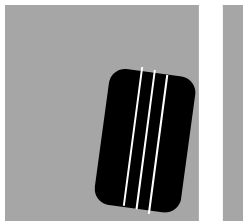
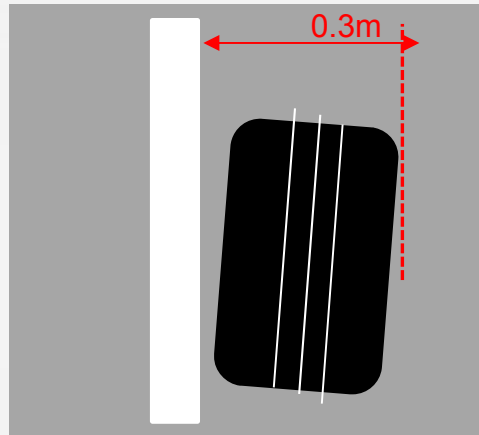
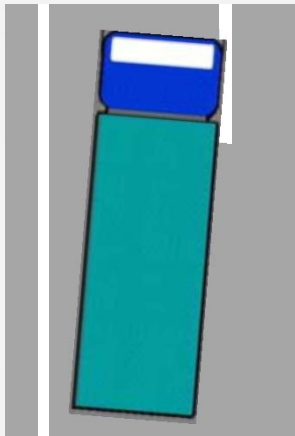
At least two warning means out of **optical, acoustic and haptic**

One warning means out of **haptic and acoustic, with spatial indication** about the direction of unintended drift of the vehicle.

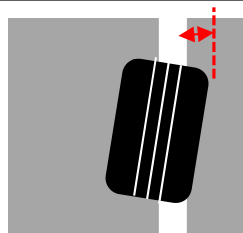
e.g. In case that vehicle is drifted to the left, acoustic warning is operated at left side (Operation at right side is also OK, but weaker than left side)

Lane Departure Warning Test

The LDWS shall provide the lane departure warning indication at the latest when the **outside of the tyre of the vehicle's front wheel closest to the lane markings crosses a line 0.3 m beyond the outside edge of the visible lane marking** to which the vehicle is being drifted.



In the case the lane departure warning indication is provided before vehicle's tyre pass the lane,
check by monitor camera is sufficient



In the case the lane departure warning indication is provided after vehicle's tyre pass the lane,
Measurement by GPS is necessary

Failure Detection Test / Deactivation Test

- Type of warning:

Optical (display) warning with a yellow telltale

1) Failure detection test

Simulate an failure (by powering off the component parts, breaking the electrical connection between the components, etc.).

Requirements:

- As long as the reproduced failure is simulated, the yellow telltale must turn on within 10 seconds after the vehicle runs at a speed over 15 km/h.
- After that, the telltale must turn on again after an ignition OFF/ON cycle.

2) Deactivation test

Activate the LDWS OFF switch (if equipped with).

Requirements:

- The yellow telltale must turn on when the LDWS is switched off.
- The yellow telltale must not turn on again after an ignition OFF/ON cycle (Confirmation of automatic restoration).



Thank very much for your attention.