



EUROPEAN NEW CAR
ASSESSMENT PROGRAMME

Technical Bulletin

Test of Emergency Steering Support Systems

Version 1.0

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TB 037

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Preface

DISCLAIMER: Euro NCAP has taken all reasonable care to ensure that the information published in this document is accurate and reflects the technical decisions taken by the organisation. In the unlikely event that this protocol contains a typographical error or any other inaccuracy, Euro NCAP reserves the right to make corrections and determine the assessment and subsequent result of the affected requirement(s).

EUROPEAN NEW CAR ASSESSMENT PROGRAMME (Euro NCAP)

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1. Introduction

This Technical Bulletin (TB 037) defines the performance requirements and testing procedure for the assessment of Emergency Steering Support (ESS) Systems.

Where Autonomous Emergency Braking (AEB) systems are not able to fully avoid impacts and accidents (especially at higher speeds), an additional ESS function that supports the driver steering around a hazard and avoiding imminent collisions and help to step back in-lane is beneficial. These ESS functions are considered a supplementary function to the AEB system.

This document should be used in conjunction with the Euro NCAP AEB Car-to-car Test protocol, the AEB/LSS VRU Test protocol and the Safety Assist Assessment Protocol – Collision Avoidance.

2. General Requirements for ESS Systems

2.1 ESS scenario

2.1.1 The Car-to-Car Rear (CCRs -50) FCW scenario shall be used – a collision in which a vehicle travels forwards towards another stationary vehicle and the frontal structure of the vehicle strikes the rear structure of the other.

2.1.2 It is also possible to use the CPLA25 and CBLA25 scenarios with ESS.

2.2 ESS system requirements

ALL of the following requirements must be met in order to qualify for ESS rewards:

2.2.1 ESS is defined as an AEB supplementary function, vehicles without an AEB system do not qualify for an ESS reward.

2.2.2 The system must be default ON.

2.2.3 An ESS system requires driver initiation and steering wheel input to trigger the ESS manoeuvre.

2.2.4 The ESS system must support the driver's steering inputs to avoid collision with the target and initiate a controlled steer back straight to minimise the overshoot outside of the adjacent lane.

2.2.5 A forward collision warning (FCW) must be issued, the FCW requirements are defined in the Safety Assist Assessment Protocol – Collision Avoidance.

2.2.6 While an ESS manoeuvre is being conducted, the ESS system must not be deactivated by slight driver braking actions.

2.2.7 The system must function symmetrically for both left hand and right hand drive versions of the vehicle (i.e. evasion support towards the far side).

2.2.8 The system shall be available for speeds of 50km/h and above (V_{VUT}).

2.2.9 Systems that give support beyond 80km/h (V_{VUT}) in the CCRs-50 scenario or, alternatively, systems that comply with these requirements at differential speeds >80 km/h, qualify for additional rewards as defined in the HMI section of the Safety Assist Assessment Protocol.

2.2.10 During and after the ESS support, a visual warning to inform the driver that there is/was a hazard or system action is recommended, but not required for scoring

2.2.11 The OEM must inform the test laboratory of the system functionality prior to testing. Where an ESS system requires a driver's hands to be in contact with the steering wheel the vehicle may not detect the presence of a steering robot. In this case, the laboratory will deactivate the 'hands on' detection for the test. If this is not possible, the OEM shall bring information of how to activate 'hands on' detection while testing.

3. Performance Requirements

3.1 ESS system rewards

An ESS system qualifies for rewards if the requirements detailed in Section 2 are met and testing has demonstrated that:

- 3.1.1 The VUT avoids any impact with the target (including side mirrors and other exterior components) and,
- 3.1.2 The VUT does not cross outside of the adjacent lane (i.e. DTLE < -0.3m of adjacent lane) for at least 2 seconds after TTC=0.

4. Test Execution

4.1 ESS test parameters to apply

- 4.1.1 The test shall be performed in two fully marked lanes, each lane shall be 3.5m in width with solid lines on the outside. See Figure 1
- 4.1.2 The VUT is driven in a straight line in the middle of the ego lane in accordance with the tolerances specified in the relevant AEB C2C or VRU AEB testing protocols.
- 4.1.3 For CCRs -50, the GVT shall be set to -50% overlap position relative to the VUT, see Figure 1 (where applicable).
- 4.1.4 Alternatively, for VRU scenarios the EPT or EBT shall be set to CPLA25 or CBLA25 scenarios respectively, see Figure 2 (where applicable).
- 4.1.5 At a time of 1 second after FCW initiation, a steering wheel input shall be applied to the VUT's steering wheel with an angular rate of $150^{\circ}/s$ ¹. The 1 second delay to the steering input corresponds to a typical driver reaction time.
- 4.1.6 After reaching a steering wheel angle of 15° ¹, the steering robot shall be released to free mode for the remainder of the test.
- 4.1.7 The accelerator pedal shall be held constant while the ESS system is active and released as soon as the initial VUT test speed is reduced by 5km/h.
- 4.1.8 The test ends 2 seconds after the VUT front passing the rear of the target.

4.2 OEM data

- 4.2.1 For assessment years 2023 & 2024 only, the OEM may present an alternative test method to demonstrate ESS system functionality and performance.
- 4.2.2 Where the assessment is based upon OEM data, a dossier must be presented to the Euro NCAP Secretariat and demonstrate functionality with the use of flowcharts, photographs, videos, plots and written descriptions.

¹ Derived from naturalistic driving study EVADE Project

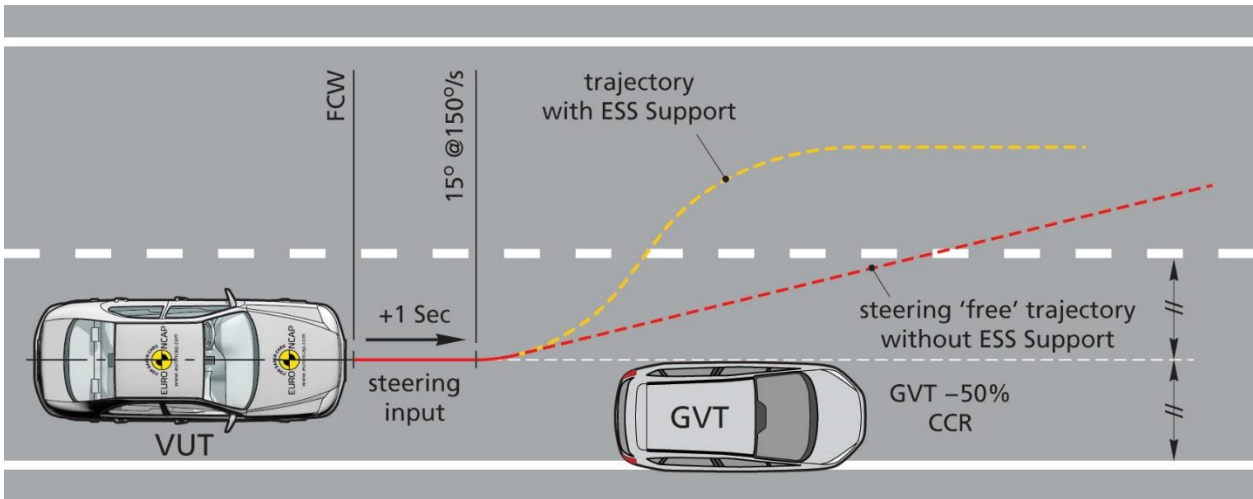


Figure 1: ESS Test diagram using CCRs -50 scenario

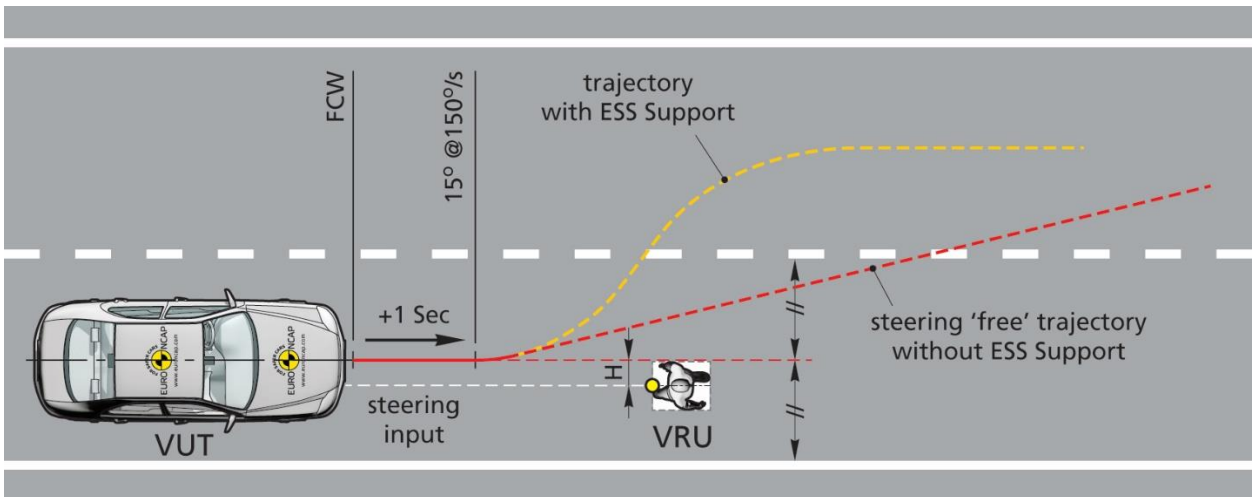


Figure 2: ESS Test diagram using CPLA25 scenario