AUSTRALIAN AUTOMOTIVE
AFTERMARKET ASSOCIATION

ADAS -
MODIFICATIONS CODE OF CONDUCT

The AAAA ADAS Modifications Code of Conduct outlines best practices and guidelines for the Modification of vehicles equipped with advanced driver assistance systems (ADAS) ensuring safety and compliance with evolving technologies.

PREFACE

Australia's automotive aftermarket has a proud tradition of making vehicles fit for purpose. Whether it's equipment for trade and fleet use, mobility needs, regional work, towing, off-road touring, or specialist applications, vehicle modification is part of how Australians live and work — and it will remain essential.

At the same time, modern vehicles are increasingly defined by safety technologies — particularly Advanced Driver Assistance Systems (ADAS). These systems are designed to prevent crashes and reduce the road toll. As an industry, we have a clear responsibility: to ensure that when we modify vehicles, we do so in a way that protects the integrity of critical safety functions.

That is why the Australian Automotive Aftermarket Association (AAAA) leads voluntary, industry-developed Codes of Conduct. As vehicle technology changes rapidly, practical guidance shaped by the people who do the work every day helps the sector stay ahead and meet community expectations for safety, quality, and professionalism.

This ADAS Modifications Code of Conduct has been developed by an expert Technical Working Group made up of AAAA members with deep technical capability and real-world experience. It reflects a simple truth: we can do both — we can continue to modify vehicles in Australia, and we can ensure ADAS continues to operate as intended.

This Code focuses on Advanced Emergency Braking (AEB). It provides a practical, repeatable approach to verifying that AEB functionality remains present and satisfactory following aftermarket modification, without the need to conduct a full re-test to the Australian Design Rule for AEB. The Code reflects the expert input of the Technical Working Group, with all testing and document drafting undertaken by the Auto Innovation Centre to ensure a robust, evidence-based outcome.

The Code is particularly relevant where modifications may influence system performance — including frontal protection systems, significant ride height changes, tyre size changes, braking modifications, or any modification that alters sensor position or visibility.

Importantly, this is a voluntary industry guideline. It is designed to support best practice and provide a clear pathway for responsible modification work, but it does not override regulatory requirements, certification obligations, or manufacturer instructions. Users should always ensure compliance with all applicable laws, standards and approval pathways.

I want to personally thank every member of the Technical Working Group for their leadership and commitment. Their work demonstrates exactly what the Australian automotive aftermarket does best: we collaborate, we take responsibility, and we lift standards — not because we are forced to, but because it is the right thing to do.

This Code of Conduct is also a strong signal to regulators, insurers, certifiers, and the broader community: our industry recognises the significance of ADAS, and we are prepared to lead. With the support of the AAAA and our partners — including the Auto Innovation Centre — we will continue to back the training, tooling, and practical guidance needed to keep Australians safe, while ensuring vehicles can still be adapted to meet the real-world needs of owners and businesses.

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Advanced Emergency Braking In-Service Test Protocol

1 Scope

1.1 The proposed protocol outlines the testing procedures available to verify the presence and satisfactory function of the Advanced Emergency Braking System (AEBS) fitted to modified motor vehicles of the Categories M1 and N1. Category M1 vehicles include passenger cars, forward-control passenger vehicles and off-road passenger vehicles, whilst N1 vehicles are defined as light goods vehicles.

1.2 The purpose of this document is to validate ongoing compliance to Australian Design Rule 98 – Advanced Emergency Braking for Passenger Vehicles and Light Good Vehicles (ADR98) following aftermarket modifications to a vehicle where ADR98 compliance is met via the applicable Federal approval for the First Stage vehicle pre-modification. This protocol is derived from ADR98 and its purpose is to verify the first stage AEBS is still present and functioning without the need to conduct a full ADR98 re-test of the system.

1.3 Modifiers shall familiarise themselves with the full ADR98 regulations and requirements. This testing protocol serves to support most common modifications but does not absolve the modifier from non-compliance.

2 Applicability

2.1 This test protocol shall be used to validate:

- 2.1.1 Individual modified in-service vehicles
- 2.1.2 In-Service type approval for specific modifications on a given vehicle make, model and Federal Approval.
- 2.1.2.1 In the case of type approval testing the scope of coverage and any limitations shall be included in the test report

2.2 Vehicles built under a Federal Vehicle Type Approval in the first stage which do not meet ADR98 need not comply with this standard.

3 Alternative Standards

3.1 A test that satisfies the requirements of ADR98/00 or 98/01 conducted by a Test Facility authorised at the time of testing by the Federal Department of Transport in accordance with the Road Vehicle Standards Rules 2019, on a vehicle built under the same VTA with the same modifications is deemed to have met this test protocol.

4 Definitions

4.1 Definitions as described in ADR98.00/01

4.2 ***AEBS Calibration*** - The process of calibrating the systems and sensors utilized by a vehicle for the functions of the vehicle's AEBS as approved under ADR98 for the vehicle type

4.3 ***OEM AEBS Calibration*** - The act of performing an ***AEBS Calibration*** by following the entirety of the process as stipulated by the vehicle manufacturer including targets and positioning on a given vehicle, except for those details pertaining to the vehicle's condition

4.4 ***Modified AEBS Calibration*** - The act of performing an ***AEBS Calibration*** by following a process that is based on the OEM process but with modifications to support the successful calibration and performance validation of a modified vehicle

5 AEBS General Requirements

5.1 The AEBS shall automatically detect an imminent forward collision, provide the driver with an appropriate warning and activate the vehicle braking system to decelerate the vehicle in the event that the driver does not respond to the warning, with the purpose to avoid or mitigate the severity of rear-end in lane collisions with a passenger car.

5.2 In the circumstance of a failure in the AEB system, the safe operation of the vehicle shall not be endangered.

5.3 During any actions taken by the AEB system, the driver can, at any time through conscious action, take control and override the system.

5.4 The vehicle manufacturers modification or 'body builders' guides should be consulted where available and adhered to with respect to AEBS sensor fields of view and placement.

6 AEBS Calibration Requirements

6.1 An ***AEBS Calibration*** shall be completed in the modified condition as part of the design and testing phase to determine if

- 6.1.1 A calibration can be completed following the ***OEM AEBS Calibration*** procedure; or
- 6.1.2 A ***Modified AEBS Calibration*** is required to achieve a successful calibration and/or to meet the performance requirements within this code

6.2 Not withstanding 6.1, A ***Modified AEBS Calibration*** is required at the point of end-user installation when

- 6.2.1 an AEBS sensor is re-mounted in a different position to the OEM condition, or
- 6.2.2 it is required to meet the requirements of the testing, or
- 6.2.3 if the approval holder deems it necessary

6.3 If a ***Modified AEBS Calibration*** is required, the approval holder shall ensure that all installations of the products/modifications covered by the testing are calibrated at the time of installation. Clear instructions on how to perform the modified calibration used to meet the testing in the modified condition shall be provided to every end user in a hard copy to be kept in the vehicle.

6.4 In the case of modifications that are eligible to retain the ***OEM AEBS Calibration*** procedure, if the modifier is seeking the ability to perform the end-user modifications without re-calibrating the vehicle from its OEM calibration, testing shall be met by the modified vehicle with either the OEM Calibration or with a re-calibration in the modified condition following the ***OEM AEBS Calibration*** procedure.

6.5 The AEBS must not show any warnings or errors in the modified condition either during normal operation or start up initialisation

7 Modifications affecting AEBS performance requirements

7.1 The alteration of various aspects including the vehicle's maximum and minimum masses, Centre of Gravity (CoG), AEBS sensor(s) and their visibility range and placement, overall suspension ride height, vehicle body pitch angle, tyre diameter, and braking system modifications, can affect the AEBS performance.

7.2 The following modifications have an effect on the performance of the AEBS and require validation testing to this code to verify the baseline functionality of the system is still present:

7.2.1 Fitment of a Frontal Protection System (FPS)

7.2.2 Modified ride height (>50mm) in the unladen condition between the ground and body of the vehicle

7.2.3 Modified body pitch angle from OEM condition*

7.2.4 Change to a vehicle's maximum or minimum mass condition

7.2.5 Change in tire dimensions (>50mm)

7.2.6 Modification to braking system

7.2.7 Modifications that alter the position, visibility or components of the AEBS sensors

7.2.7.1 * VSB14 does not allow any change to pitch angle. Ride height tolerances and load conditions vary pitch angle and engineering judgement should be used to determine if pitch angle has changed significantly from OEM and if testing is required

8 Carryover Requirements from First Stage Vehicle

8.1 The following extracts from the ADR are not mandatory to validate within this code unless modifications have altered these functions from the base vehicle approval. However, it is strongly advised that all modifiers understand and check the functionality in the modified condition.

8.2 The following requirements from the Specifications section of ADR98 are assumed to be carryover from the base vehicle as validated by the first stage manufacturer. It is up to the manufacturer or certifier of the aftermarket parts or modifications to determine if any items listed below may be affected and should be validated in the modified condition.

8.2.1 Section 5.1.2

8.2.2 Section 5.1.3

8.2.3 Section 5.1.4

8.2.4 Section 5.1.7

8.2.5 Section 5.3

8.2.6 Section 5.4

8.2.7 Section 5.5

8.2.8 Section 5.6

8.2.9 Section 6.8

8.2.10 Section 6.9

8.2.11 Section 6.10.3

9 Performance Requirements

9.1 The as-modified vehicle shall be tested by meeting one or both requirements listed in Clauses 10.4 and/or 10.5. The preferred test method is dependent upon the availability of appropriate testing locations, investment in equipment and the degree of subject vehicle and vehicle target damage. Clause 10.7 shall also be satisfied.

9.2 Collision warning

9.2.1 In addition to the warnings described in 3.1, the system shall provide the driver with the following appropriate warning(s) in vehicle-to-vehicle scenarios:

9.2.1.1 When a collision with a preceding vehicle of Category M1, in the same lane, is imminent, a collision warning shall be provided.

9.2.1.2 The collision warning shall be triggered at the latest 0.8 seconds before the start of emergency braking. However, in case the collision cannot be anticipated in time to give a collision warning 0.8 seconds ahead of an emergency braking, a collision warning shall be provided. This shall be provided no later than the start of emergency braking intervention.

9.2.1.3 The collision warning may be aborted if the conditions prevailing a collision are no longer present.

9.3 Emergency Braking

9.3.1 When the system has detected the possibility of an imminent collision, the AEBS will automatically command an emergency braking event. There shall be a peak braking deceleration of at least 5.0 m/s^2 generated by the service braking system of the vehicle.

9.3.2 The emergency braking may be aborted if the conditions prevailing a collision are no longer present.

9.4 Speed reduction by braking demand

9.4.1 In the absence of driver's input which would lead to interruption, the AEBS shall be able to achieve a relative impact speed that is less or equal to the maximum relative impact speed:

9.4.1.1 For collisions with unobstructed and constantly travelling or stationary targets;

9.4.1.2 On flat, horizontal and dry roads;

9.4.1.3 In maximum mass and mass in running order conditions;

9.4.1.4 In situations where the vehicle longitudinal centre planes are displaced by not more than 0.2 metres;

9.4.1.5 In ambient illumination conditions of at least 1000 Lux without direct blinding sunlight;

9.4.1.6 In absence of weather conditions affecting the dynamic performance of the and in absence of extreme driving conditions.

9.4.2 The system shall not deactivate or unreasonably switch the control strategy in other conditions not aforementioned.

Relative Speed (km/h)	*Stationary*	*Moving*
10	0.00	0.00
15	0.00	0.00
20	0.00	0.00
25	0.00	0.00
30	0.00	0.00
35	0.00	0.00
40	0.00	0.00
42	10.00	0.00
45	15.00	15.00
50	25.00	25.00
55	30.00	30.00
60	35.00	35.00

Table 1. Maximum relative Impact Speed (km/h) for M_1 vehicles

Note: For relative speeds between the listed values (e.g. 53 km/h), the maximum relative impact speed (i.e. 30/30 km/h) assigned to the next higher relative speed (i.e. 55 km/h) shall apply. For masses above the mass in running order, the maximum relative impact speed assigned to the maximum mass shall apply.

Relative Speed (km/h)	Stationary/Moving			
	Maximum mass		Mass in running order	
	α>1.3	α≤1.3	α>1.3	α≤1.3
10	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00
32	0.00	15.00	0.00	0.00
35	0.00	15.00	0.00	0.00
38	0.00	20.00	0.00	15.00
40	10.00	20.00	0.00	15.00
42	15.00	25.00	0.00	20.00
45	20.00	25.00	15.00	25.00
50	30.00	35.00	25.00	30.00
55	35.00	40.00	30.00	35.00
60	40.00	45.00	35.00	40.00

Table 2. Maximum relative Impact Speed (km/h) for N_1 vehicles

Note: For relative speeds between the listed values (e.g. 53 km/h), the maximum relative impact speed (i.e. 35/40/30/35 km/h) assigned to the next higher relative speed (i.e. 55 km/h) shall apply. For masses above the mass in running order, the maximum relative impact speed assigned to the maximum mass shall apply.

Alpha Calculation

With $\alpha = W_r/W \times L/H$, where:

W_r is the rear axle load

W is the subject vehicle mass in running order

L is the subject vehicle wheelbase

H is the subject vehicle centre of gravity height in running order

At the request of the manufacturer a N1 vehicle may be assessed according to the Requirements for α >1.3 regardless of its α value.

10 Test Procedure

10.1 Testing conditions

10.1.1 The test shall be performed on a flat dry concrete or asphalt surface affording good adhesion.

10.1.2 The test surface has a consistent slope between level and 1 per cent.

10.1.3 The ambient temperature shall be in the range of 0oC and 45oC.

10.1.4 The horizontal visibility range shall allow the target to be observe throughout the test.

10.1.5 The tests shall be performed when there is no wind that is liable to affect results.

10.2 Vehicle conditions

10.2.1 The vehicle shall be tested:

10.2.1.1 At, or below, Test Mass 1, which is the unladen mass of the vehicle less spare wheel and tools, >90% fuel level, and an additional mass of maximum 200 kg. The additional mass includes the measuring equipment and passenger(s).

10.2.1.2 10.2.1.2 At, or above, the maximum mass of the vehicle (GVM).

10.2.2 The load distribution at the maximum mass shall be according to the manufacturer's recommendation and be annexed to the test report. No alteration shall be made once testing has begun.

10.2.3 During the test runs, the fuel level may decrease but shall never fall below 50%.

10.2.4 If requested by the vehicle manufacturer, there may be pre-test conditioning as per 6.2.2.1 of ADR98.

10.2.5 The mounted tyres shall be identified and recorded in the vehicle type approval documentation.

10.3 Test targets

10.3.1 The target used for the vehicle detection test shall be either:

10.3.1.1 A passenger car of Category M1 AA saloon or AB Hatchback; or

10.3.1.2 A soft target representative of such a vehicle in terms of its identification characteristics applicable to the sensor system of the AEBS under test according to ISO 19206-1:2018. The reference point for the location of the vehicle shall be the most rearward point on the centreline of the vehicle

10.4 Vehicle to Vehicle Stationary Target Warning and Activation Testing

10.4.1 This method involves warning and activation testing of a subject vehicle with a stationary vehicle target.

10.4.2 Tests shall be conducted at vehicle speeds of 20, 42 and 60 km/h (with a tolerance of +0/-2 km/h

10.4.3 The functional part of the test shall start when the subject vehicle is travelling at a constant speed and is at a distance corresponding to a Time To Collision (TTC) of at least 4 seconds from the target.

10.4.4 The subject vehicle shall approach the stationary target in a straight line for at least two seconds prior to the functional part of the test with a subject vehicle to target centreline offset of not more than 0.2m.

10.4.5 From the start of the functional part until the point of collision there shall be no adjustment to any control of the subject vehicle by the driver other than slight adjustments to the steering control to counteract any drifting.

10.4.6 The testing shall be conducted at both Test Mass 1 and Maximum Mass conditions for each speed.

10.4.7 The testing shall obtain the following measurements:

10.4.7.1 Vehicle speed with accuracy +/- 0.1kph

10.4.7.2 Confirmation of measuring accuracy to verify lateral offset

10.4.7.3 Collision point and ability to measure speed at collision of the subject vehicle and the stationary target/vehicle.

10.4.7.4 Time to Collision (TTC) throughout run

10.4.7.5 Timing of Driver warnings

10.4.7.6 Emergency braking phase (start of emergency braking and peak deceleration

10.4.7.7 Offset of test vehicle to target

10.5 Vehicle to Vehicle Moving Target Warning and Activation Testing

10.5.1 This method involves warning and activation testing of a subject vehicle with a moving vehicle target.

10.5.2 The subject vehicle and the moving target shall travel in a straight line, in the same direction, for at least two seconds prior to the functional part of the test with a subject vehicle to target centreline offset of not more than 0.2m throughout the test.

10.5.3 Tests shall be conducted with the subject vehicle travelling at 30 and 60 km/h and target travelling at 20 km/h (with a tolerance of +0/-2 km/h) for both the subject and the target vehicles. Each testing vehicle speed shall be performed for both Test Mass 1 and Maximum Mass conditions.

10.5.4 The functional part of the test shall start when the subject vehicle is travelling at a constant speed and is at a distance corresponding to a TTC of 4 seconds from the target.

10.5.5 From the start of the functional part of the test until the subject vehicle comes to a speed equal to that of the target there shall be no adjustment to any subject vehicle control by the driver other than slight steering adjustments to counteract any drifting.

10.5.6 The testing shall obtain the following measurements:

10.5.6.1 Vehicle speed with accuracy +/- 0.1kph as per 10.4.7.1

10.5.6.2 Collision point and ability to measure speed at collision of the subject vehicle and the stationary target/vehicle.

10.5.6.3 Time to Collision (TTC) throughout run

10.5.6.4 Timing of Driver warnings

10.5.6.5 Emergency braking phase (start of emergency braking and peak deceleration

10.5.6.6 Offset of test vehicle to target

10.6 All of the above test scenarios, where a scenario describes one test setup at one subject vehicle speed at one load condition, shall be performed two times. If one of the two test runs fails to meet the required performance, the test may be repeated once. The testing shall be accounted as passed if the number of failed runs does not exceed 10% of the total performed test runs.

10.7 False reaction avoidance

10.7.1 The system shall be designed to minimise the generation of collision warning signals and to avoid advanced emergency braking in situations where the driver would not recognise an impending collision.

10.7.2 False reaction scenarios involve two stationary vehicles of Category M1 AA saloon or M1 AB hatchback positioned:

10.7.2.1 So as to face in the same direction of travel as the subject vehicle;

10.7.2.2 With a distance of 4.5m between them;

10.7.2.3 With the rear of each vehicle aligned with the other.

10.7.3 The subject vehicle shall travel for a distance of at least 60 metres at a constant speed in the range of speeds to pass centrally between the two stationary vehicles.

10.7.4 Speed may be selected from 18-20, 40-42 or 58-60 km/h.

10.7.5 During the test there shall be no adjustment of any subject vehicle control other than slight steering adjustments to counteract any drifting.

10.7.6 The AEBS shall not provide a collision warning and shall not initiate the emergency braking.

11 Documentation

11.1 A test report shall be prepared by a suitably qualified test facility and include at a minimum

11.1.1 Instrumentation used for the test

11.1.2 Details of equipment accuracy and suitability for the test and acceptance criteria inclusive of calibration dates

11.1.3 Vehicle details including

11.1.3.1 Make

11.1.3.2 Model

11.1.3.3 Federal Type Approval(s) FSM and SSM if appropriate

11.1.3.3.1 Modifications to vehicle including part Numbers of all modified products fitted

11.1.3.4 Vehicle masses and ride heights as tested

11.1.3.5 Tyres and pressures

11.1.3.6 Unique Braking System of vehicle tested

11.1.4 Results summary showing compliance with acceptable limits

11.1.5 Applicable variants and configurations covered by the test results

This COP shall be reviewed one year after implementation for edits and or additions.

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Organisation: AAAA ADAS TWG

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