ASEAN NCAP PROTOCOL

2021 – 2025

TEST PROTOCOL – BLIND SPOT VISUALIZATION

Version 1.0
November 2019

Preface

Where text is contained within square brackets, this denotes that the procedure being discussed is currently being trialled in ASEAN NCAP. Its incorporation in the Test Protocol will be reviewed at a later date.

During the test preparation, vehicle manufacturers are encouraged to liaise with the laboratory and to check that they are satisfied with the way cars are set up for testing. Where a manufacturer feels that a particular item should be altered, they should ask the laboratory staff to make any necessary changes. Manufacturers are forbidden from making changes to any parameter that will influence the test, such as dummy positioning, vehicle setting, laboratory environment etc.

It is the responsibility of the test laboratory to ensure that any requested changes satisfy the requirements of ASEAN NCAP. Where a disagreement exists between the laboratory and manufacturer, the ASEAN NCAP secretariat should be informed immediately to pass final judgement. Where the laboratory staff suspect that a manufacturer has interfered with any of the setup, the manufacturer's representatives should be warned that they are not allowed to do so themselves. They should also be informed that if another incident occurs, they will be asked to leave the test site.

Where there is a recurrence of the problem, the manufacturer’s representatives will be told to leave the test site and the Secretariat should be immediately informed. Any such incident may be reported by the Secretariat to the manufacturer and the persons concerned may not be allowed to attend further ASEAN NCAP tests.

DISCLAIMER: ASEAN NCAP has taken all reasonable care to ensure that the information published in this protocol 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, ASEAN NCAP reserves the right to make corrections and determine the assessment and subsequent result of the affected requirement(s).

In addition to the settings specified in this protocol, the following information will be required from the manufacturer of the car being tested in order to facilitate the vehicle preparation. A vehicle handbook should be provided to the test laboratory prior to preparation.

TEST PROTOCOL –
BLIND SPOT VISUALIZATION

Table of Contents

NEW CAR ASSESSMENT PROGRAM FOR SOUTHEAST ASIAN COUNTRIES (ASEAN NCAP)

TEST PROTOCOL – BLIND SPOT VISUALIZATION

1 INTRODUCTION

Each year, passenger vehicles are fitted with new innovative mechanical and electronic features to enhance drivability and safety. The Blind Spot Technology (BST) systems are an example of such features. BST can be categorized into two types; detection and non-detection. The detection type refers to BSD (Blind Spot Detection system), whereas non-detection type refers to BSV (Blind Spot Visualization system).

BSD uses sensors to detect one or more vehicles in adjacent lanes that may not be directly observable by the driver. The system warns the driver of the approaching vehicle to help facilitate safe lane changing.

Not all BST have the same detection capabilities or operating conditions. In the vehicle owner’s manuals, many automotive manufacturers state that their systems are designed to detect only highway vehicles, not other objects including bicycles, motorcycles, humans, or animals. Various systems have a threshold speed whereby if the speed of the equipped vehicle is below the threshold speed, typically ranging from 5 to 20 km/h, the system is inactive. BSV displays image according to the driver's operation from 0 km/h to the maximum speed.

2 DEFINITIONS

Throughout this protocol the following terms are used:

2.1 Subject vehicle (SV)

Vehicle equipped with the system in question and related to the topic of discussion

2.2 Target vehicle (TV)

Motorcycle that is closing in on the subject vehicle from behind, or any vehicle that is located in one of the adjacent zones

2.3 Coverage zone

Entire area to be monitored by a BST, a system's coverage zone consisting of a specific subset of the following zones: left adjacent zone, right adjacent zone, left rear zone and right rear zone

2.4 Adjacent zones

Zones to the left and right of the subject vehicle

2.5 Visualization function

As for non-detection type, the system shall be able to provide a live visual of the vehicles moving in the same direction, and on the side and/or rear of the subject vehicle which can be activated manually or via turn signal action.

NOTE: A target vehicle located within the coverage zone will thus be visualized by the system.

3 REFERENCE SYSTEM

The International Standard specifies the system requirements and test methods for Lane Change Decision Aid Systems (LCDAS) LCDAS are fundamentally intended to warn the driver of the subject vehicle against potential collisions with vehicles to the side and/or to the rear of the subject vehicle, and moving in the same direction as the subject vehicle during lane change maneuvers. Hence, the detection and visualization technology will reduce motorcyclist injuries and deaths in Southeast Asia.

3.1 Type I systems

These systems shall provide the blind spot warning function only. They are intended to warn the subject vehicle driver of target vehicles in the adjacent zones. They are not required to provide warnings of target vehicles that are approaching the subject vehicle from the rear. The subject vehicle driver shall be made aware of the limitations of such systems, at least in the owner's manual. In particular, the owner's manual shall include the following statement: "This system provides support only within a limited area beside the vehicle. The system may not provide adequate warning for vehicles approaching from the rear."

4 MEASURING EQUIPMENT

The basic measurements include video logger and performance meter for event recording, turn signal indicators and BSV live visual system.

4.1 Zone Instrumentation

4.1.1 Blind Spot Technology (BST) assessment jig

The setup process includes preliminary plotting of blind spot zone, fitment angle of video logger and performance meter camera and onboard equipment. Precise and accurate measurement is essential to ensure the superiority and reliable output from the assessment.

Referring to Figure 1-1 below, BST jig setup is divided into two parts which are part **A** and **B.**

Figure 1-1: Blind spot zone setup

Part **A** is a video logger jig frame for outside camera and is located on the top side of main windshield.

Part **B** is a jig for pre-setup of blind spot zone level 3 for viewing in live-feed video recording taken by the video logger and performance meter.

The assessment will be based on video recording system using video logger and performance meter applications which require pre-setup of zone area level 3 in the live-feed view. These two parts are designed to be used in any passenger car and is removeable with static measurement at any flat surface.

As shown in Figure 1-2, the four main components to complete the jig structure include:

- Component **A** - Black metal connector pipe **C1-24** (Length 130mm x diameter 33mm x hollow 38mm) x 5 pcs.
- Component **B** - Black metal connector pipe **C2-5** (Length 130mm x diameter 33mm x hollow 33mm) x 4 pcs.
- Component **C** - Black metal connector pipe **C3-11** **(**Length 84mm x diameter 33mm x hollow 36mm) x 4 pcs and the last component is a standard steel pipe (diameter 28mm) with 2 different length 1465mm (10 pcs) and 1965mm (2 pcs).

The tools required for setup process include: Allen-key size 3mm to tighten the connector and aluminium hollow pipe.

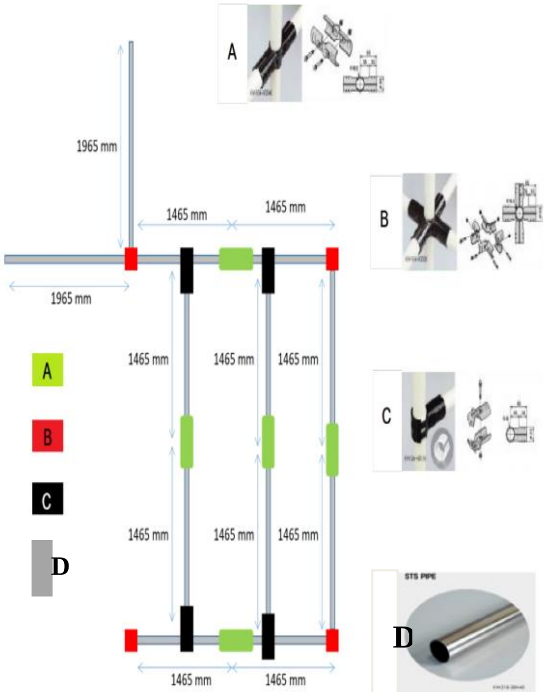

Figure 1-2: Blind spot coverage zone jig

5 TEST CONDITIONS

The test location shall be on a flat, dry asphalt or concrete surface. The ambient temperature during testing shall be within the range of 5 °C - 40 °C. The test shall be conducted during the day and at night (without street lamp or any other lamp).

5.1 Test Track

5.1.1 Conduct tests on a dry (no visible moisture on the surface), uniform, solid-paved surface with a consistent slope between level and 1%.

5.1.2 The surface must be paved and may not contain any irregularities (e.g. large dips or cracks, manhole covers or reflective studs).

6 TEST PROCEDURE

6.1 Conditioning

6.1.1 General
A car (test vehicle) is used as delivered to the laboratory. There is no restriction on car selection.

6.1.2 Vehicle Preparation
Setup the on-board test equipment and instrumentation in the vehicle. Also fit any associated cables, cabling boxes and power sources.

6.1.3 Test Target Vehicle
The main objective of BST testing is to check the functionality of BST with regard to visibility of motorcycles which is a prevalent issue in the ASEAN region.

Thus, the dimension of target vehicle used in this protocol will be as follows:

Table 1.0 Target vehicle dimension

	Dimension (m)
Length	1.8 to 2.0
Width	0.6 to 0.8
Height	1.0 to 1.4

6.2 Test Conduct

6.2.1 Static straight-lane Tests

The test SV is subjected to one type of performance tests namely static straight-lane tests.

In the static straight-lane test series, both SV and TV are placed on separate but parallel lanes with the target vehicle positioned in the lane next to the SV either on the driver or passenger side as depicted in Figure 3-1.

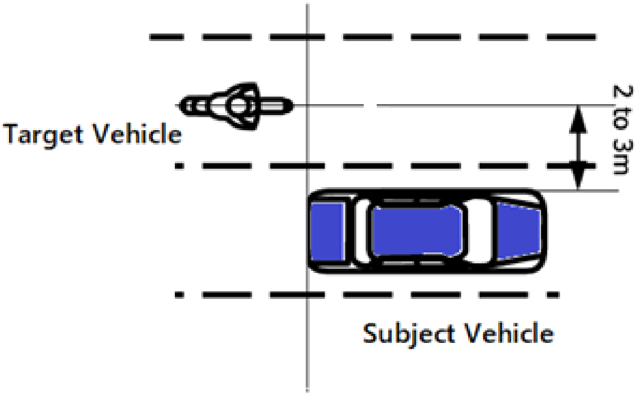

Figure 3-1: Target Vehicle and Subject Vehicle position

The static straight-lane tests are performed on a controlled straightaway test facility containing equal or more than three parallel lanes of concrete surface roadway. All tests are performed during the day or/and at night.

Once these measurements are completed for the passenger-side, the entire test is repeated for the driver-side sensor.

*In order to identify the system's interaction with the application of the SV's turn signals, the test series are repeated with the turn signal activated.

Note: Manufacturer is required to provide information for specific model.

6.2.2 Functionality Check and Scoring

Check the functionality whether the BSV system provides adequate live visual of static vehicle when test is performed according to the test procedure with the target vehicle described in the 6.2.2.1.

6.2.2.1 Static test

In the static test, the target vehicle will be positioned at 5 different locations in the lane next to the subject vehicle in between 2 to 3 meters adjacent as described in Figure 3-2. Confirm that the target vehicle is visible at each place and distance.

The locations of target vehicle must be as follows (in respect to subject vehicle rear);

a) 30m zone
b) 20m zone
c) 10m zone
d) 3m zone, and
e) Blind spot zone

For BSV type system, the system must be able to provide a live visual of the static vehicle in the same direction, and on the adjacent side of the subject vehicle. The result should be based on the following Table 1.1.

Table 1.1: BST Visualization type requirements

Live visual video	Must be clearly visible
Distance	In 30-meter zone from SV trailing edge to blind spot zone

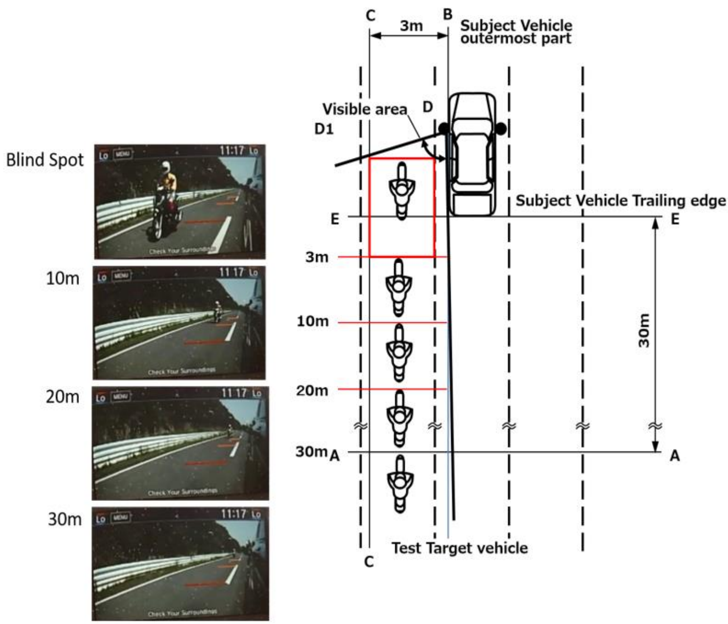

Figure 3-2: Functionality check and score

If the subject vehicle does not meet all the requirements as described in Table 1.1, no point will be rewarded.

The subject vehicle should be able to visualize other vehicles in the blind spot zones, especially smaller ones such as motorcycles (target vehicle) and provide adequate visibility as described in Figure 3-3.

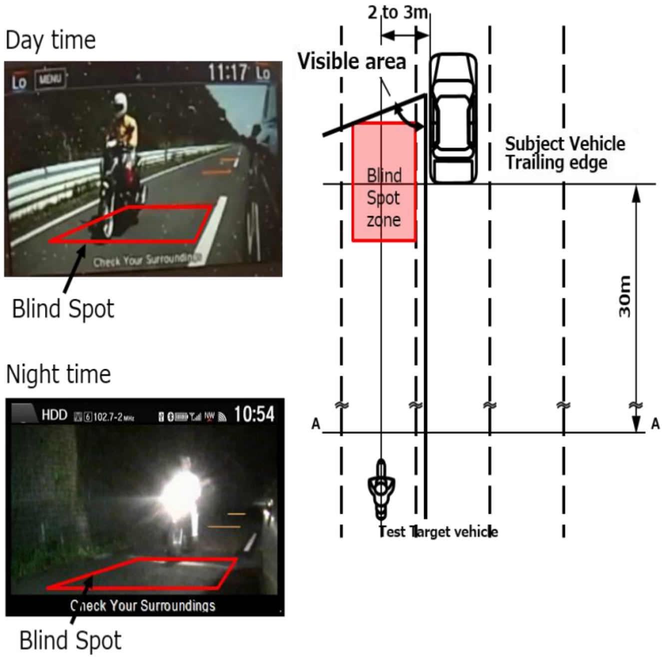

Figure 3-3: Zone requirements for BSV system live visual

*For assessment at night, the test needs to be conducted with a motorcycle with the head-light turned on.

Note: If required by ASEAN NCAP inspector.

ANNEX A

A.1

Figure 4-1: Video logger image of BSV test

A.2

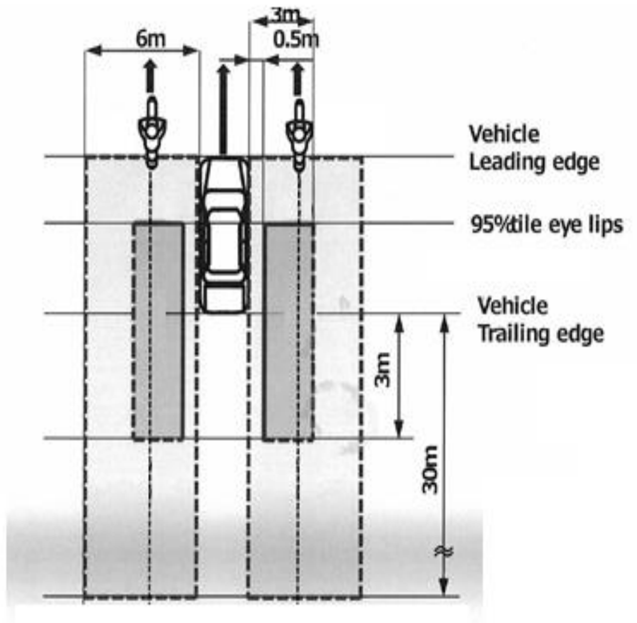

Figure 4-2: Blind Spot Zone

ACKNOWLEDGEMENT

Editors

Ir. Dr. Khairil Anwar Abu Kassim (Adjunct. Prof)
Malaysian Institute of Road Safety Research (MIROS)

Yahaya Ahmad
Malaysian Institute of Road Safety Research (MIROS)

Mohd Hafiz Johari
Malaysian Institute of Road Safety Research (MIROS)

Salina Mustaffa
Malaysian Institute of Road Safety Research (MIROS)

ASEAN NCAP PROTOCOL

2021 - 2025

ASEAN NCAP
Ground Floor, Lot 127,
Jalan TKS 1,
Taman Kajang Sentral,
43000 Kajang,
Selangor, Malaysia.

+603-8924 9200 (ext. 425)

+603-8733 2005

enquiries@aseancap.org

www.aseancap.org

https://www.facebook/AseanNcap

https://twitter.com/aseancap

https://youtube.com/ (Search: ASEAN NCAP)

https://www.flickr.com/photos/aseancap/

ASEAN NCAP
www aseancap org