ASEAN NCAP
www.aseancap.org

Assessment Protocol – MOTORCYCLIST SAFETY

VERSION 2.0
MAY 2024

ASEAN NCAP PROTOCOL

2026-2030

Preface

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 required parameter that will influence the test, such as dummy positioning, vehicle setting, test 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 a final judgement. Where the laboratory staff suspects 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 the necessary steps 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 vehicle preparation. A vehicle handbook should be provided to the test laboratory prior to the assessment.

ASSESSMENT PROTOCOL – MOTORCYCLIST SAFETY

Table of Contents

1 INTRODUCTION..2
2 METHOD OF ASSESSMENT 3
3 ASSESSMENT OF BLIND SPOT DETECTION OR VISUALIZATION 4
4 ASSESSMENT OF ADVANCED REAR VISUALIZATION (ARV).....................................8
5 ASSESSMENT OF PEDESTRIAN PROTECTION (PP)...13
6 ASSESSMENT OF AUTO HIGH BEAM (AHB) AND ADAPTIVE DRIVING BEAM (ADB)............................15
7 ASSESSMENT OF AUTONOMOUS EMERGENCY BRAKING CAR TO MOTORCYCLIST (AEB CM) 22
8 ASSESSMENT OF ADVANCED MOTORCYCLIST SAFETY TECHNOLOGY (MST)..................................22
9 REFERENCES..... 30
APPENDIX I.. 32
APPENDIX II...33

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

ASSESSMENT PROTOCOL – MOTORCYCLIST SAFETY

1 INTRODUCTION

ASEAN NCAP is committed to ensuring the safety of motorcyclists in Southeast Asia. It is a known fact that motorcyclists make up the largest group and represent 80 percent of the total number of road users in ASEAN countries. Unfortunately, the region has also witnessed a significant rise in terms of motorcyclist fatalities; hence, the issue of powered two-wheeler safety must not be overlooked. Thailand, Malaysia, Indonesia, and Vietnam have already taken the lead in championing this cause, and at the same time, ASEAN NCAP will follow suit by putting motorcyclist safety at the forefront of its road safety agenda. ASEAN NCAP releases individual documents for the four main areas of assessment, namely:

- Assessment Protocol – Adult Occupant Protection;
- Assessment Protocol – Child Occupant Protection;
- Assessment Protocol – Safety Assist; and
- Assessment Protocol – Motorcyclist Safety.

The Motorcyclist Safety Pillar contributes 20% to the overall rating with a maximum of 24 points focusing on six aspects, which are Blind Spot Technology (BST), Advanced Rear Visualization (ARV), Auto High Beam (AHB) and Adaptive Driving Beam (ADB), Pedestrian Protection (PP), Autonomous Emergency Braking Car to Motorcyclist (AEB CM), and Advanced Motorcyclist Safety Technology (MST). The score calculation for specific elements in each domain is based on the Fitment Rating System (FRS). Moreover, Advanced MST will reward 2 points to a maximum of 24 points for any two technologies that could help reduce the possibility of motorcycle collisions.

The following protocol deals with the assessments in the areas of the Motorcyclist Safety Pillar; BST, comprising Blind Spot Detection (BSD) and Blind Spot Visualization (BSV), ARV, AHB and ADB, PP, AEB CM, and MST.

2 METHOD OF ASSESSMENT

Unlike the assessment of protection offered in the event of a crash, the assessment of motorcycle safety pillar functions does not require destructive testing of a vehicle. The assessment of the motorcyclist safety pillar can be based both on fitment and performance requirements verified by ASEAN NCAP. However, in the case of pedestrian protection, ASEAN NCAP only requires a certificate and test report for the assessment. The intention is to promote standard fitment across the car variants in the ASEAN region combined with good functionality for these systems, where this is possible.

For the performance assessment of BST, ARV, AHB, ADB, and AEB CM systems, a car is subjected to a number of trial sequences designed to highlight the effectiveness of the systems. The car's performance is measured using observations conducted by the inspector, driver, and rider during the assessment. Furthermore, the ASEAN NCAP assessment may include additional recorded information in the future.

3 ASSESSMENT OF BLIND SPOT DETECTION OR VISUALIZATION

3.1 Introduction

It is common to see a car manoeuvring into the path of an approaching motorcycle and violating the motorcycle’s right of way. According to established studies, the lack of motorcycle conspicuity and misjudgement of speed or distance are the two main causes of road collisions. As a result, authorities have introduced and legalized numerous efforts to enhance the conspicuity of motorcycles and motorcyclists to other motorists.

From a vehicle safety perspective, certain manufacturers have incorporated emerging technologies into their cars capable of detecting other vehicles in blind spot zones, especially smaller ones such as motorcycles and bicycles. This is to compensate for car drivers’ expected errors in noticing motorcyclists in the blind spot zones, particularly during lane-changing action. People commonly refer to it as Blind Spot Technology (BST).

With the mission to save motorcyclists through the fitment of crash avoidance technology in cars, ASEAN NCAP has introduced BST into its rating system starting in 2017. With extensive use in the future, BST has the potential to minimize collisions between cars and motorcycles due to blind spot issues. In general, BST can be categorized into two types: detection and non-detection.

3.2 Functional Definitions

3.2.1 The detection type, termed by ISO 17387 as Lane Change Decision Aid Systems (LCDAS), is fundamentally intended to “warn the driver of the subject vehicle against potential collisions with vehicles to the side and/or rear of the subject vehicle and moving in the same direction as the subject vehicle during lane change manoeuvres."

3.2.2 As for the non-detection type (visualization), the system shall be able to provide a live visual of the vehicle static in the same direction and on the side and/or rear of the subject vehicle, which can be activated manually or via a turn signal action. The system must be able to perform well during the day and at night.

3.3 Requirements for BST

3.3.1 To encourage manufacturers to fit these systems more broadly, ASEAN NCAP rewards both detection and non-detection types equally, with a maximum of 8 points.

3.3.2 ASEAN NCAP assesses compliance based on the "Functional Definitions" as described in Section 3.2.

3.4 Scoring

3.4.1 Vehicles for which the BST system meets all the requirements, as defined in paragraph 3.2, will be eligible for a maximum score of 8 points. Refer to the ASEAN NCAP Fitment Rating System Version 2.0.

Table 1: Blind spot detection test scoring point

Side	Lateral distance TV to SV (meter)	Status	Points
Driver	2 to 3	Detect (total of 3 runs)	4 (Max)
	6.0	Not detect (1 run)	
Passenger	2 to 3	Detect (total of 3 runs)	4 (Max)
	6.0	Not detect (1 run)	

Table 2: Blind spot visualization test scoring point

Side	Lateral distance TV to SV (meter)	Status	Points
Driver	2 to 3	Clearly visible	4 (Max)
Passenger	2 to 3	Clearly visible	4 (Max)

3.4.2 The test vehicle must meet all requirements to reach the maximum points in the assessment.

3.4.3 Vehicles for which the BST system does not meet the above requirements (Table 1 or Table 2) or are not eligible for BST assessment receive no point.

3.5 Performance Testing

3.5.1 Performance testing is conducted in order to evaluate the functionality and performance of both BST types with regard to the detection of motorcyclists.

3.5.2 The system equipped in the subject vehicle will use ISO 17387 as the basis to demonstrate the functionality and performance for detection type BST. The target vehicle (i.e., a vehicle closing in on the subject vehicle from behind or any vehicle that is located in one of the adjacent zones) will be a motorcycle, as specified in ISO 17387. The dimensions of the motorcycle (length, width, and height) will be based on one of the most common motorcycle models by body type (underbone) as well as its make (brand) in the region. Refer to the ASEAN NCAP BST Detection Test Protocol Version 2.0.

3.5.3 For non-detection BST, functionality assessment is based on the system requirement. The car will be subjected to a number of trial sequences designed to highlight the effectiveness of the system. Refer to the ASEAN NCAP BST Visualization Test Protocol Version 2.0.

3.5.4 Assessments of both detection and non-detection BST will be performed by an ASEAN NCAP inspector, rider, and driver. If the manufacturer requests to perform an in-house test, the ASEAN NCAP inspector, rider, and driver must be present and conduct the test according to the protocol.

4 ASSESSMENT OF ADVANCED REAR VISUALIZATION (ARV)

4.1 Introduction

ASEAN NCAP believes that car drivers can avoid collisions with motorcyclists by being extra alert to their surroundings within a 30-meter radius. Hence, Advanced Rear Visualization (ARV) will assist in determining the presence of motorcycles and other small vehicles.

In the ASEAN region, a number of motorcycles run not only in the same lane as the preceding vehicle but also on the left and right lanes and freely move into a lane or overtake a vehicle. Therefore, it is very important to always be aware of motorcycles around the vehicle when changing lanes and turning left or right.

During the lane change manoeuvre, drivers are expected to check the surrounding condition of their vehicle by using the rear-view mirror before making the decision to change lanes or not.

The benefit of ARV is to increase situation awareness while driving to recognize motorcyclist behaviour not only behind but also around the vehicle, such as rear side lanes. Its effectiveness will be determined during the phase of "before making lane change decisions," whereas the effectiveness of the BST is determined during the phase of "lane change manoeuvres".

4.2 Functional Definitions

4.2.1 General definition

A system designed to provide enhanced live rear view, which displays the view images created from the rearward camera. When the system is in the built-in monitor combined with the traditional inside rear-view mirror, it is switchable from the traditional rear-view mirror to the rear-view image from the camera, or vice versa, by the driver's single action.

4.2.2 Additional features

4.2.2.1 Night adaptation

An image processing of night exposure adjustment to increase rearward visibility.

4.2.2.2 Glare adaptation

An image processing of image glare by sunlight from the rear side to increase rearward visibility.

4.2.2.3 Weather adaptation
Wiping function or other function for making camera view clear or camera location inside the rear wiping range for increasing visibility of rearward in bad weather condition such as rain.

4.3 Requirements for Advanced Rear Visualization

4.3.1 ASEAN NCAP assesses compliance based on the "Functional Definitions" as described in Section 4.2.

4.4 Scoring

4.4.1 Vehicles whose ARV systems meet the requirements as defined in Section 4.3 will be eligible for a maximum score of 3 points. Refer to the ASEAN NCAP Fitment Rating System Version 2.0.

4.4.2 Scoring policy
Scoring is based on the visibility of rearward objects (motorcycle riders) based on proximity (just behind the vehicle) and field of view expansion. The clear visibility of the provided camera images is used as a criterion to evaluate the visibility of objects behind the vehicle over long distances. Night visibility is also an important factor in situation awareness. Thus, it is defined as a multiplicative factor. Additional features such as glare and rain-weather adaptation are defined as additional points.

4.4.3 Proximity visibility

If the number of poles at the proximity line (1.5 m) in the camera image is larger than the inside mirror, 0.5 points will be given.

4.4.4 Field of view expansion

- If the number of poles at 10.0 m in the camera image is larger than the inside mirror, 0.5~0.0 points will be given.
- If the numbers of poles counted at a 10m rearward position by using rear view technology are larger than the numbers of poles counted by using an inside mirror, the field of view expansion gets the points (full points: 0.5 points).
- If the poles are seen over 3.0 m, a 0.5 point will be given.
- If the poles are seen below 3.0 m, but the field of view is expanded by rear view technology, 0.3 points will be given.
- If the field of view is not expanded by rear-view technology, no points will be given.

4.4.5 Long distance visibility

- If the image of poles at 20.0 m and 30.0 m in the camera image is clearer than the inside mirror, 0.5~0.0 points will be given, respectively.
- If the poles are seen over 5.25 m on each side, 0.5 points will be given.
- If the poles are seen over 3.50 m on each side, 0.4 points will be given.

- If the poles are seen over 1.75 m on each side, 0.3 points will be given.
- If the poles are seen below 1.75 m on each side, no points will be given.

4.4.6 Night visibility

If the system has a night adaptation function that meets the criteria defined in paragraph 5.2.3 of the ARV test protocol of Version 2.0, the night visibility index shall be 1.0. If the system does not have this function, the index will be 0.5.

4.4.7 Environmental condition visibility

- If the system has a glare adaptation function that meets the criteria defined in paragraph 5.3.3 of the ARV test protocol Version 2.0, a 0.5 point will be given.
- If the system has weather adaptation functions that satisfy the criteria defined in paragraph 5.4.1 of the ARV test protocol Version 2.0, a 0.5 point will be given.

The environmental score is the sum of those 2 points.

4.4.8 Total score calculation

ARV total score = (Proximity score + Field of view score + Long distance score) X Night visibility index + (Environmental score)

<u>Example of full score</u>

Proximity score: 0.5 (1.5 m)
Field of view score: 0.5 (10 m)

Long distance score: 0.5 + 0.5 = 1 (20,30 m)
Night visibility index: 1.0
Environmental score: 0.5 + 0.5 = 1.0
ARV total score = (0.5+0.5+1.0) X 1.0 + 1.0 = **3.0**

4.5 Performance Testing

4.5.1 Performance testing is conducted in order to evaluate the functionality and performance of the ARV system with regard to the detection of motorcyclists.

4.5.2 The result page will show the detailed specification and test performance, making it known to the public. Refer to ASEAN NCAP ARV Test Protocol Version 2.0.

5 ASSESSMENT OF PEDESTRIAN PROTECTION (PP)

5.1 Introduction

Pedestrian Protection (PP) is a safety technology that allows vehicle components that may come into contact with a pedestrian in a collision to deform or break apart easily for better impact energy absorption.

The issue of pedestrian safety may not be too worrying in ASEAN countries. Regardless, ASEAN NCAP believes it is still important to lend support to the existing initiatives introduced by several car manufacturers pertaining to pedestrian protection.

Recently, car designers have incorporated pedestrian protection into their designs. Since pedestrian safety falls under the vulnerable road user category, ASEAN NCAP feels that pedestrian protection must be regarded as part of the Motorcyclist Safety segment.

5.2 Requirements for PP

5.2.1 The manufacturer must provide a certificate showing UNECE Regulation No. 127, 'Uniform Provisions Concerning the Approval of Motor Vehicles with Regard to Their Pedestrian Safety Performance', approval of the vehicle type being assessed.

5.2.2 A certificate or technical test report from a laboratory or technical service is acceptable as, at the time the vehicle is assessed by ASEAN NCAP, all homologations should have been completed and a certificate or technical test report should have been obtained. Refer to ASEAN NCAP Guideline for In-House Test Report Documentation Submissions, Version 1.0.

5.2.3 During type approval, the Technical Service does not need to test the same variant as the ASEAN NCAP test variant. However, if it is not, it should be clear that the certificate of approval covers all variants, including the ASEAN NCAP test variant.

5.3 Scoring

5.3.1 Manufacturers must submit the certification of UNECE Regulation No. 127/03 or later series or a technical test report from a laboratory or technical service to an ASEAN NCAP inspector for assessment.

5.3.2 Vehicles whose systems meet the requirements mentioned in paragraph 5.3.1 will be eligible for a maximum score of 2 points and can be referred to as ASEAN NCAP Fitment Rating System Version 2.0.

5.3.3 If the manufacturer is unable or unwilling to submit documents as stated in paragraph 5.3.1, ASEAN NCAP will not reward any points.

6 ASSESSMENT OF AUTO HIGH BEAM (AHB) AND ADAPTIVE DRIVING BEAM (ADB)

6.1 Introduction of AHB

Automatic high beam (AHB) technology is one of the features of the automatic driver assistance system (ADAS), which detects oncoming and preceding vehicles and automatically switches between high and low beams during night driving, making it easier for the driver to recognize hazards such as impending motorcyclists.

Motorcycles in certain areas have subpar conditions on the road, with some of their equipment not in working order. For example, the headlight or the taillight might not work.

The issue pertaining to the conspicuousness of motorcyclists will definitely result in a dangerous situation, which could eventually lead to road crashes. This stems from the difficulty faced by car drivers in noticing the presence of nearby motorcyclists.

With the AHB function in a new car, this problem may reach a solution and may result in a significant reduction of motorcyclist fatalities in the ASEAN region.

6.2 Functional Definitions

6.2.1 Lighting function refers to the light emitted by a device to illuminate the road and objects in the direction of vehicle movement with sufficient illumination.

6.2.2 ‘Automatic switching type’ refers to the function that has the capability to automatically switch between the high beam and the low beam.

6.2.3 The system must be able to automatically change from low beam to high beam or vice versa based on vehicle speed, traffic, or the surroundings in front of the vehicle.

6.2.4 The system shall be able to switch the headlights to low beam when the vehicle is driven in brightly lit urban areas or at speeds below 50 km/h when the high beam is not required.

6.2.5 The system shall provide automatic modifications, such as when good road illumination is achieved, and no discomfort is caused to both the driver and other road users.

6.3 Requirements for AHB

6.3.1 ASEAN NCAP assesses compliance based on the "Functional Definitions" as described in Section 6.2.

6.4 Performance Testing

6.4.1 Performance testing is conducted in order to evaluate the functionality and performance of AHB with regard to the detection of motorcyclists.

6.4.2 The detailed specification and test performance will be showcased on the result page and made known to the public. Refer to Auto High Beam Test Protocol Version 2.0.

6.4.3 Assessments on the AHB system will be performed by an ASEAN NCAP inspector, driver, and rider. If a manufacturer requests to perform an in-house test, the ASEAN NCAP inspector, driver, and rider must be present and conduct the test according to the protocol.

6.5 Equivalent Test Procedure

6.5.1 Manufacturers must provide a certificate that shows the approval of the vehicle type being assessed according to UN Regulation No. 48-06 (or later), Section 6.1.9.3.3.2, UN Regulation No. 112-01 (or later), Section 6.3.3 class B, UN

Regulation No. 123, Section 6.3.2, or UN Regulation No. 149.

6.5.2 A certificate or technical test report from a laboratory witnessed by the technical service provider or tested by the technical service is acceptable as, at the time the vehicle is assessed by ASEAN NCAP, all homologations should have been completed and a certificate should have been obtained. Refer to ASEAN NCAP Guidelines for In-House Test Report Documentation Submissions, Version 1.0.

6.5.3 During type approval, the Technical Service does not need to test the same variant as the ASEAN NCAP test variant. However, if it is not, it should be clear that the certificate of approval covers all variants, including the ASEAN NCAP test variant.

6.5.4 The manufacturer shall submit sufficient documentation to prove the capability of the system to comply based on the "Functional Definitions" as described in Section 6.2.

6.6 Introduction of ADB

Adaptive driving beam (ADB) is an advanced drive-assist technology for an automobile headlight that provides drivers with visibility of high contrast and illuminance at night without causing temporary blindness to other drivers in a projected light's glare.

The adaptive beam pattern is able to change based on the presence of oncoming vehicles or objects that are automatically recognized by the on-board computer vision system.

ADB technology will be placed under the same item as AHB technology. This means an additional 1 point will be added for the ADB technology installed, making the total score for AHB and ADB, 3 points.

6.7 Requirements for ADB

6.7.1 The goal of ADB is to aid the driver in seeing the roadway environment by providing upper beam illumination in some parts of the roadway. At the same time ADB will shade the area in which another vehicle is located/driving by so as to not expose them to more glare than would be seen with lower beam headlamps.

6.7.2 As such, applying maximum illuminance, or glare limit, values to illuminance data measured at points on the other stimulus vehicle or test fixture can provide information as to whether ADB succeeds in achieving its goal.

6.8 Performance Testing

6.8.1 Performance testing is conducted in order to evaluate the functionality and performance of ADB with regard to the detection of motorcyclists.

6.8.2 The detailed specification and test performance will be showcased on the result page and made known to the public. Refer to Auto High Beam/Adaptive Driving Beam Test Protocol Version 2.0.

6.8.3 Assessments on the ADB system will be performed by an ASEAN NCAP inspector, driver, and rider. If a manufacturer requests to perform an in-house test, the ASEAN NCAP inspector, driver, and rider must be present and conduct the test according to the protocol.

6.9 Equivalent Test Procedure

6.9.1 Manufacturers must provide a certificate that shows the approval of the vehicle type being assessed according to UN Regulation No. 112-01 (or later) or UN Regulation No. 149.

6.9.2 A certificate or technical test report from a laboratory witnessed by the technical service provider or tested by the technical service is acceptable as, at the time the vehicle is assessed by ASEAN NCAP, all homologations should have been completed and a certificate should have been obtained. Refer to ASEAN NCAP Guidelines for In-House Test Report Documentation Submissions, Version 1.0.

6.9.3 During type approval, the Technical Service does not need to test the same variant as the ASEAN NCAP test variant. However, if it is not, it should be clear that the certificate of approval covers all variants, including the ASEAN NCAP test variant.

6.10 Scoring

6.10.1 Vehicles for which the AHB system meets the requirements mentioned in paragraph 6.3.1 will be eligible to get a maximum score of 2 points.

Table 3: Auto high beam test scoring point

Test	Headlight	Activated Speed or Distance	Status	Point
Operational speed	Low to high beam and vice versa	< 50 km/h	Auto switching	1
Illuminance measurement	High beam	100 meters	5 Lux (Min)	1

6.10.2 The test vehicle must meet all requirements in Table 3 to attain maximum points in the assessment. Refer to the ASEAN NCAP Fitment Rating System Version 2.0.

6.10.3 Vehicles for which the AHB system does not meet the above requirements (Table 3) receive no points.

6.10.4 If the manufacturer is unable or unwilling to perform testing or to submit documents of UNECE Regulation No. 48-06, Section 6.1.9.3.3.2, and UNECE Regulation No. 112-01, Section 6.3.3 class B, UN Regulation No. 123, Section 6.3.2, UNECE Regulation No. 149, or a technical report from a technical service approval of the AHB system, ASEAN NCAP will not reward any points.

6.10.5 Vehicles for which the ADB system meets the requirements as mentioned in Section 6.7 will be eligible to get a maximum score of 1 point.

Table 4: Adaptive driving beam test scoring point

Test	Headlight	Activated speed or distance	Status	Point
Operational speed	Low to high beam and vice versa	< 50 km/h	Auto adapting	1

6.10.6 The test vehicle must meet the requirement in Table 4 to attain maximum points in the assessment. Refer to the ASEAN NCAP Fitment Rating System Version 2.0.

6.10.7 Vehicles for which the ADB system does not meet the above requirements (Table 4) receive no points.

7 ASSESSMENT OF AUTONOMOUS EMERGENCY BRAKING CAR TO MOTORCYCLIST (AEB CM)

7.1 Introduction to AEB CM

Autonomous Emergency Braking Car to Motorcyclist (AEB CM) is the technology that is able to detect the presence of a motorcycle in order for the car to avoid colliding with the preceding vehicle.

This technology is a significant milestone for vehicle safety as it is targeted at reducing the number of fatalities involving motorcyclists. ASEAN NCAP shall award a maximum 6 points for this newly introduced item.

7.2 Definitions

Throughout this protocol the following terms are used.

Peak Braking Coefficient (PBC) – the measure of tyre to road surface friction based on the maximum deceleration of a rolling tyre, measured using the American Society for Testing and Materials (ASTM) E1136-10 (2019) standard reference test tyre, in accordance with ASTM Method E 1337-2019, at a speed of 64.4 km/h, without water delivery. Alternatively, the method as specified in UNECE R13-H.

Autonomous Emergency Braking (AEB) – braking that is applied automatically by the vehicle in response to the detection of a likely collision to reduce the vehicle speed and potentially avoid the collision.

Lane Support System (LSS) – a system that corrects the vehicle's driving direction by keeping the vehicle within its driving lane and/or warns the driver.

Emergency Lane Keeping (ELK) – default on heading correction that is applied automatically by the vehicle in response to the detection of the vehicle that is about to drift beyond a solid line marking, the edge of the road or into oncoming or overtaking traffic in the adjacent lane.

Car-to-Motorcyclist Rear moving (CMRm) – a collision in which a vehicle travels forward towards a motorcycle going at a constant lower speed and the frontal structure of the vehicle strikes the rear structure of the motorcycle.

***Car-to-Motorcyclist Front Turn Across Path (CMFtap)* –** a collision in which a vehicle turns across the path of an oncoming motorcyclist travelling at a constant speed, and the frontal structure of the vehicle strikes the front of the motorcycle.

Car-to-Motorcyclist Crossing (CMCrossing) – the situation of crash is represented by the VUT and the AMT driving straight and perpendicularly at an intersection.

Car-to-Motorcyclist Oncoming (CMOncoming) – the scenario represents the passenger car drifting into the lane of the motorcycle which is coming from the opposite direction.

Vehicle under test (VUT) – the vehicle tested according to this protocol with a pre-crash collision mitigation or avoidance system on board.

ASEAN NCAP Motorcyclist Target (AMT) – refers to the motorcyclist target used in this protocol.

Vehicle width – the widest point of the vehicle ignoring the rear-view mirrors, side marker lamps, tyre pressure indicators, direction indicator lamps, position lamps, flexible mudguards and the deflected part of the tyre sidewalls immediately above the point of contact with the ground.

Time To Collision (TTC) – the remaining time before the VUT strikes the AMT, assuming that the VUT and AMT would continue to travel with the speed it is travelling.

T_{AEB} – the time where the AEB system activates. Activation time is determined by identifying the last data point where the filtered acceleration signal is below -1 m/s², and then returning to the point in time where the acceleration first crossed -0.3 m/s².

T_{FCW} – the time where the audible warning of the Forward Collision Warning (FCW) starts. The starting point is determined by audible recognition.

7.3 Assessment of AEB CM

The following points are available for the different test speeds in each AEB/FCW/LSS Motorcyclist scenario.

Table 5: Assessment points for AEB CM

Test Speed, km/h	AEB/FCW*										LSS
	CMRm (50%)			CMRm (25%)			CMFtap			CMCrossing	CMOncoming
	30 km/h	45 km/h	60 km/h	30 km/h	45 km/h	60 km/h	30 km/h	45 km/h	60 km/h	20 km/h	60 km/h
10							1.000	1.000	1.000		
15											
20							1.000	1.000	1.000	1.000	
25										1.000	
30										1.000	
35										1.000	
40	1.000/1.000*			1.000*						1.000	
45	1.000/1.000*			1.000*						1.000	
50	1.000/1.000*			1.000*						1.000	
55	1.000/1.000*	1.000/1.000*		1.000*	1.000*					1.000	
60	1.000/1.000*	1.000/1.000*		1.000*	1.000*					1.000	
65	1.000*	1.000*		1.000*	1.000*						
70	1.000*	1.000*	1.000*	1.000*	1.000*	1.000*					
72											1.000
75	1.000*	1.000*	1.000*	1.000*	1.000*	1.000*					
80	1.000*	1.000*	1.000*	1.000*	1.000*	1.000*					
Total	**25.000**			**18.000**			**6.000**			**9.000**	**1.000**
Scenario Point	**1.500**						**1.500**			**1.500**	**1.500**
	6.000										

*For FCW assessment

7.4 Scoring Example

As a guide in obtaining the AEB CM points, the following Table 6 lists scoring examples of an AEB CM simulated assessment.

Table 6: Scoring examples for AEB CM

AEB/FCW/LSS Motorcycle	Points	Score point	Percentage, %	Weightage	Total score
CMRm	43	40	93.02	1.50	1.395
CMFtap	6	5	83.33	1.50	1.250
CMCrossing	9	7	77.78	1.50	1.167
CMOncoming	1	1	100.00	1.50	1.500
TOTAL	**59**	**53**		**6.00**	**5.312**

8 ASSESSMENT OF ADVANCED MOTORCYCLIST SAFETY TECHNOLOGY (MST)

8.1 Introduction

Thus far, there have been very few existing safety technologies fitted in a car that have the potential to increase motorcyclist safety. As a means to further encourage the use of such inventions, ASEAN NCAP wishes to reward an additional 2 points for any two technologies that could benefit to reduce the possibility of a crash between a car and a motorcycle.

8.2 Functional Definitions of Technologies that are considered by ASEAN NCAP

8.2.1 Any technology that could help reduce the injury and possibility of a collision between a car and a motorcycle such as:

i. Motorcyclist Head Protection (MHP); or
ii. Rear Cross Traffic Assist with Alert (RCTA) or Braking (RCTB).

8.2.2 Advanced MST proposed by manufacturers are subject to ASEAN NCAP approval.

8.3 Requirements for Advanced MST

8.3.1 Currently, ASEAN NCAP will not perform any field tests to assess the functionality and performance of Advanced MST. Nevertheless, it is the responsibility of ASEAN NCAP to ensure that the system works and functions as intended. Therefore, as an alternative and to promote the fitment of Advanced MST in the region, ASEAN NCAP assesses compliance based on the "Functional Definitions" as described in Section 7.2. If needed, the manufacturer is requested to perform a full demonstration of the proposed technologies to ASEAN NCAP.

8.4 Scoring

8.4.1 A maximum of 2 points is awarded for each MST proposed by the manufacturer based on the following conditions.

- The MST is equipped as a standard or optional fitment.

If there are any technical issues that may impede the performance of any technology due to various reasons in a certain country and the manufacturer wishes to waive the requirement, a detailed justification report shall be submitted to ASEAN NCAP for consideration.

If the tested model is available in more than one country in any sector (refer to country score in Assessment Protocol - Fitment Rating System Version 2.0), the technology shall be available in at least one country in the respective sector. For example, Vehicle Model A is available in Malaysia and Thailand, which are under Sector 1. If the technology is available in any other country, then the tested model qualifies for 1 point.

9 REFERENCES

ECE Regulation 127 – Uniform provisions concerning the approval of motor vehicles with regard to their pedestrian safety performance, Date of entry into force; 17 March 2010.

ISO 17387 – Intelligent transport systems – Lane change decision aid systems (LCDAS) – Performance requirements and test procedures (First edition), date of entry into force; 1 May 2008.

Regulation No. 112 – Uniform provisions concerning the approval of motor vehicle headlamps emitting an asymmetrical passing beam or a driving beam or both and equipped with filament lamps and/or light-emitting diode (LED) modules.

Regulation No. 123 - Uniform provisions concerning the approval of adaptive front-lighting systems (AFS) for motor vehicles.

Regulation No. 48 - Uniform provisions concerning the approval of vehicles with regard to the installation of lighting and light-signalling devices.

Regulation No. 149 - Uniform provisions concerning the approval of road illumination devices (lamps) and systems for power-driven vehicles.

EEVC WG17 Report, 'Improved Test Methods to Evaluate Pedestrian Protection Afforded by Passenger Cars', September 2002.

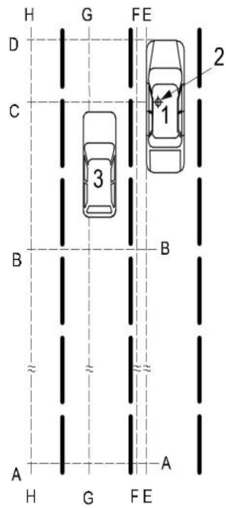
IISH. Headlight Test and Rating Protocol (Version II). November 2016.

APPENDIX I

Blind spot warning example cases

ISO 17387:2008(E)

A.5 In this case, the blind spot warning function must give a warning. The target vehicle is entirely behind line C.



Key
1 subject vehicle
2 centre of the 95th percentile eyellipse
3 target vehicles

Figure A.5

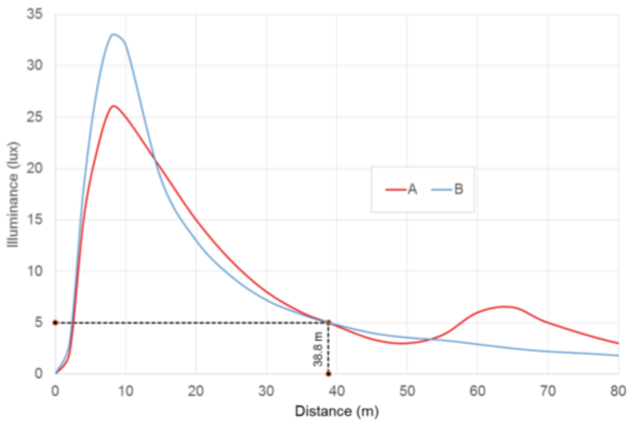
APPENDIX II

IIHS
Headlight Test and Rating Protocol Version II

Visibility Illuminance Examples

Figure B1 shows two example data curves, both of which result in 5 lux distances of 38.8 m. Although Example A initially reached the 5 lux level at a greater distance than this, the illumination fell below 5 lux again while the vehicle was still more than 10 m from the measurement point.

Figure B1
Example Visibility Illuminance Measurements



Glare Illuminance Examples

Figure B2 shows three example glare illuminance measurements for a left curved approach. All three fulfill the first glare criterion with maximum illuminance for 5-10 m below 10 lux. Examples A and B also remain under the threshold illuminance values for 10-120 m with identical illuminance threshold versus exposure distance curves (Figure B3). However, Example C does not remain below the allowable glare threshold. For example, the illuminance exceeds 2 lux for a total of 28.5 m of the approach distance, which is 8.5 m more than allowed. The arrows show the percentage by which Example C exceeds the limit at three different points. In this example, the maximum percentage over the limit is 33 percent. This percentage would be multiplied by the corresponding glare demerit multiplier in Table 4 to determine the number of glare demerits for this curve ($0.33 \times 6 = 2.0$ glare demerits).

Figure B2
Example Glare Illuminance Measurements

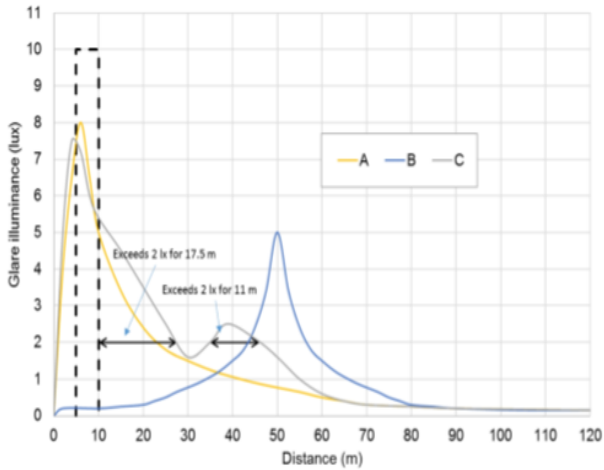
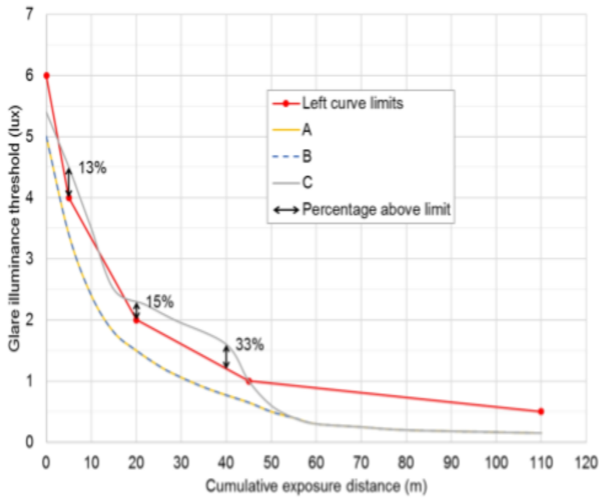


Figure B3
Example Glare Exposure Distances



ACKNOWLEDGEMENT

Editors

Ts. Mohd Amirudin Mohamad Radzi
Malaysian Institute of Road Safety Research (MIROS)

Ts. Yahaya Ahmad
Malaysian Institute of Road Safety Research (MIROS)

Dr. Fauziana Lamin
Malaysian Institute of Road Safety Research (MIROS)

Ts. Nurulhana Borhan
Malaysian Institute of Road Safety Research (MIROS)

Salina Mustaffa
Malaysian Institute of Road Safety Research (MIROS)

Associate Professor Ts. Dr. Siti Zaharah Ishak
Malaysian Institute of Road Safety Research (MIROS)

ASEAN NCAP **PROTOCOL**

2026–2030

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

+603-8924 9200

aseancapmedia@miros.gov.my

www.aseancap.org

https://www.facebook/AseanNcap

https://twitter.com/aseancap

https://www.instagram.com/aseancap

https://www.tiktok.com/@aseancap

https://www.youtube.com/@aseancapofficial