This is a translation to English for reference purpose of JNCAP test method which is originally prescribed in Japanese language.
Please be sure to refer to the Japanese test method if you need to be precisely correct.

AUTONOMOUS EMERGENCY BRAKING SYSTEM [FOR PEDESTRIAN DAYTIME] PERFORMANCE TEST PROCEDURE

Created: April 1, 2016
Revised: April 25, 2023
March 23, 2022
March 31, 2020

1. Enforcement Date

This test procedure is enforced as of April 1, 2016. The test procedure revised as of April 25, 2023 is enforced as of April 25, 2023.

2. Scope of Application, etc

This test procedure applies to the vehicles exclusively used for carrying passengers with riding capacity of less than ten (10) persons and the vehicles used for carrying cargo with gross vehicle weight 2.8 tons or less equipped with the Autonomous Emergency Braking System [for Pedestrian Daytime] as part of the tests conducted under the new car assessment program by the National Agency for Automotive Safety and Victim's Aid (hereinafter, referred to as "NASVA").

3. Terms

Throughout this test procedure, the following terms are used:

(1) **"AEBS (Autonomous Emergency Braking System)"** refers to a system that automatically operates brakes to avoid collision with a crossing pedestrian or reduce the collision speed.

(2) **"FCWS (Forward Collision Warning System)"** refers to the warning system using a combination of either "auditory and visual information" or "auditory and haptic information" for the purpose of urging the driver to operate brakes depending on the degree of risks of colliding with a crossing pedestrian.

(3) **"AEBS Activation Point"** refers to the time when the deceleration by AEBS first crossed $0.3m/s^2$.

(4) **"FCWS Activation Point"** refers to the time when the warning using audio information by FCWS started.

(5) **"Test Target"** refers to the test device that simulates crossing pedestrians (adult and child) as indicated in Annex A.

(6) **"CPN (Car-to-Pedestrian Nearside)"** refers to a test scenario in which the Test Target

crosses from the left side of the travelling direction of the test vehicle.

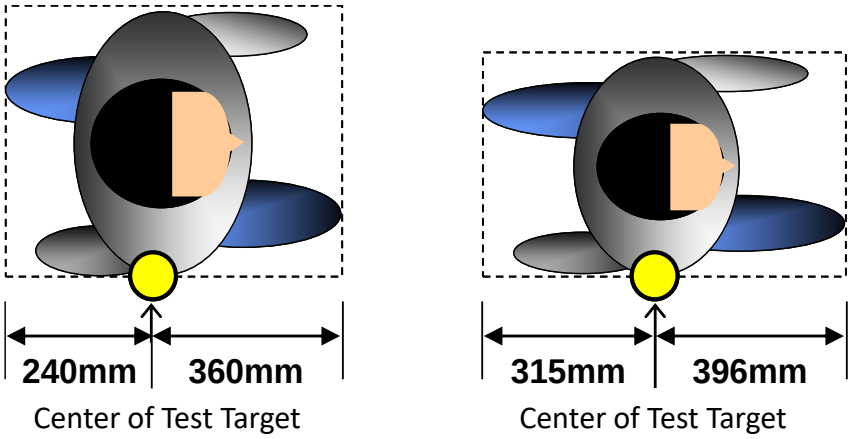
(7) **"CPNO (Car-to-Pedestrian Nearside Obstructed)"** refers to a test scenario in which the Test Target crosses from the left side of the travelling direction of the test vehicle with screening vehicles as shown in Annex B placed just short of the Test Target.

(8) **"Standard Crossing Line"** refers to a target course at which a side edge of the Test Target (on the side where the test vehicle approaches) passes.

(9) **"Standard Track"** refers to a target course for the test vehicle to run, which is set to be perpendicular to the Standard Crossing Line.

(10) **"TTC (Time To Collision)"** refers to the remaining time to the Standard Crossing Line, assuming the test vehicle maintains the current speed.

(11) **"Target Interference Area"** refers to an imaginary rectangular parallelepiped that surrounds the outermost of the Test Target that is used to judge collision with the test vehicle. (Diagram 1)



(a) Adult dummy (b) Child dummy

Diagram 1: Definition of Target Interference Area

(12) **"Approximate Bumper Line"** refers to a line that approximates the shape of the front bumper of the test vehicle that is used to judge collision with the Test Target. The Approximate Bumper Line is indicated by a line segment that is obtained by connecting intersections of each of the parting lines that are obtained by diving the overall width less 50mm on each side equally into six parts on the bumper. (Diagram 2)

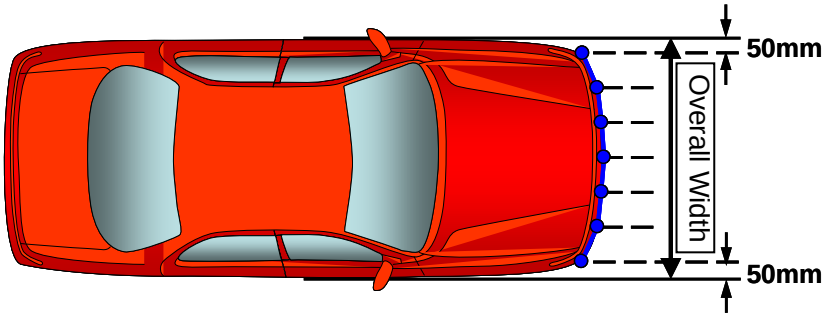


Diagram 2: Definition of Approximate Bumper Line

(13) **"Collision"** refers to a condition under which the Approximate Bumper Line of the test vehicle

enters the Target Interference Area.

(14) **"Collision Speed"** means the travel speed at the moment of collision between the test vehicle and the test target.

(15) **"Initial Speed"** refers to the running speed of the test vehicle at the AEBS Activation Point for the AEBS Test and at the FCWS Activation Point or AEBS Activation Point, whichever occurs first, for the FCWS Test.

(16) **"Velocity Reduction Amount"** refers to a value obtained by subtracting the Collision Speed from the Initial Speed.

(17) **"Velocity Reduction Rate"** refers to a value obtained by dividing the Velocity Reduction Amount by the Initial Speed.

(18) **"Lateral Position"** refers to the lateral distance to the Standard Track at each of the front edge center of the test vehicle and the Test Target. (Diagram 3)

(19) **"Offset Amount"** refers to the difference in the Lateral Position of the test vehicle and the Test Target. (Diagram 3)

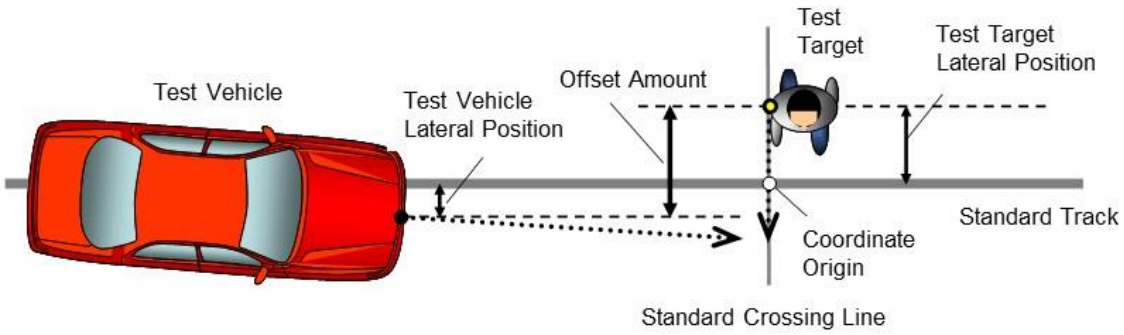


Diagram 3: Definition of Lateral Position and Offset Amount

(20) **"Wrap Rate"** refers to a value obtained by dividing the difference between the Lateral Position of the left edge (for CPN and CPNO) of the test vehicle and the Lateral Position of the Test Target by the total width of the test vehicle, expressed in percentage terms.

(21) **"Set Collision Point"**, which is set for each test scenario, refers to a value obtained by converting the Lateral Position of the Test Target when the test vehicle running in the Standard Track reaches the Standard Crossing Line without the AEBS activated into the Wrap Rate.

(22) **"Expected Collision Point"** refers to a value obtained by converting the Lateral Position of the Test Target in 4.0 seconds after measurement start (when TTC reaches 4.0 seconds) into the Wrap Rate.

(23) **"Standard Evaluation Test"** refers to the evaluation tests conducted for every test vehicle speed using the following combination of setup conditions in the CPN and CPNO test scenarios:

① Set Collision Point: 50%

② Test Target speed: 5km/h

③ Test Target type: Adult dummy

(24) **"Partial Evaluation Test"** refers to an evaluation test that is conducted using one of the following setup items changed from the Standard Evaluation Test conditions and at Representative Speed only.

① Set Collision Point : 25% and 75% (applicable to the CPN scenario)

② Test Target speed: 8km/h (applicable to the CPN scenario)

③ Test Target type: Child dummy (applicable to the CPN and CPNO scenarios)

(25) **"Representative Speed"** refers to the speed condition at which the social loss amount shown in Annex C among the speed condition becomes the largest within a scope of speeds at which Velocity Reduction Amount of 5km/h or more is obtained in a Standard Evaluation Test. When every Velocity Reduction Amount in a Standard Evaluation Test is lower than 5km/h, it shall be the speed condition of the largest Velocity Reduction Rate.

(26) **"Brake Pedal Stroke"** refers to the amount of the brake pedal stroke of the test vehicle.

(27) **"Accelerator Stroke"** refers to the amount of the accelerator pedal stroke of the test vehicle.

(28) **"Mass at Vehicle Delivery"** refers to the condition of the test vehicle loaded with the fuel, lubricants, coolants and the like in the engine and the fueling system, and equipped with onboard tools, a spare tire and standard accessories.

(29) **"Brake Temperature before Braking"** refers to the higher of the average temperature of the left wheel or the right wheel of each axle when the temperature of the brake lining or pad of each wheel is measured, pursuant to the procedures of JIS D 0210, immediately before the start of each run for braking with the vehicle in fixed position.

(30) **"Brake Temperature Check Unit"** refers to a device to check the Brake Temperature before Braking of the test vehicle by thermocouple measurement.

4. Test Conditions

4.1 Provision of Data from Vehicle Manufacturer, etc

Vehicle manufacturers, etc shall provide NASVA with the following data required for test preparation (Attached Table 1).

4.2 Test Vehicle Status

The test vehicle shall be in the following status:

(1) Load Condition: The mass of the test vehicle with one driver and including the measurement equipment shall be the Mass at Vehicle Delivery + 200kg (±1%). Front axle/rear axle weight distribution (%) shall be on a par (±5%) with that of the Mass at Vehicle Delivery.

If the preceding requirement is not met, parts may be removed or installed within a scope of not affecting the performance. Parts to be installed to increase weight should be securely fitted.

(2) Tire: The tires installed at the time of purchase of the test vehicle shall be used. Tire running-in shall be performed in conjunction with the brake conditioning stipulated in section 5.1. In addition, the tire air pressure shall be set before running (normal temperature) on a level surface at the value for ordinary run as described in the specification sheet, etc.

(3) Brake system: The brake discs, drums and linings that are installed at the time of the purchase

of the test vehicle shall be used. The brake system shall be adjusted properly without any impact of abnormal heat history, getting wet or the like.

(4) Drive axle: When the drive axle can be selected, choose the one(s) normally used.

(5) AEBS and FCWS setup: When the driver can set up the timing of activation of AEBS and/or FCWS, use the median of the scope that is allowed to be set up. When there is no median (when the setup options are even number), choose the value that is closest to the median on the side on which the timing of activation start will be later.

(6) Protection devices: When passenger protection devices or pedestrian protection devices are installed, set such devices not to be activated.

4.3 Test Track

The test track shall meet the following requirements:

(1) The test track shall be flat, clean paved road surface without any leaves, dirt or the like, and dry.

(2) The test track shall have friction coefficient of about 0.9 under dry condition. The measurement procedure in this case shall comply with ASTM E1337, test tires ASTM E1136, test load 4586±67N, tire air pressure 241±3kPa, and the speed 64±0.8km/h.

(3) During testing, there shall be no obstacles within a lateral distance of 3.0m to either side of the Standard Track and with a longitudinal distance of 30m ahead of the test vehicle when the test ends. In addition, there shall be no road paint or marking at the points where AEBS activation or deceleration by braking after FCWS is expected to take place.

4.4 Weather Conditions

(1) Temperature during testing shall be within a scope of -5°C-40°C.

(2) Average wind speed during testing shall be 5m/s or less.

(3) Visibility during testing shall be 1km or more.

(4) Under the following conditions, the test may be avoided upon declaration of the vehicle manufacturer, etc:

① When illumination during testing is 2000lx or less;

② When there is a strong shadow near the Standard Track other than that of the test vehicle and the Test Target; or

③ Direct sunlight shines on the test vehicle from the front or the rear.

④ Temperature at time of testing below 5°C.

4.5 Measurement Items

The items of measurement during the test shall be as described below and the sampling frequency shall be 100Hz or more. Further, for the yaw rate and the longitudinal acceleration, the high-frequency component shall be eliminated at cutoff frequency of 10Hz.

(1) AEBS Activation time

(2) FCWS Activation time

(3) Collision time

(4) Test vehicle and Test Target positions

(5) Test vehicle and Test Target speeds
(6) Test vehicle yaw rate
(7) Test vehicle longitudinal acceleration
(8) Test vehicle steering wheel velocity
(9) Brake Pedal Stroke
(10) Accelerator Stroke
(11) Brake Temperature before Braking

4.6 Measurement equipment

The measuring equipment listed below that is used for testing shall be capable of smoothly performing handling of data of the measurement items prescribed in Item 4.5. In addition, before conducting the test, the test vehicle position shall be verified and for the other measurement equipment, accuracy shall be checked based on the results of calibration by the measurement equipment manufacturer, etc.

(1) Test vehicle position measurement device: Accuracy of test vehicle position for each test shall be within ±0.03m.
(2) Test vehicle speed measurement device: Accuracy of test vehicle speed for each test shall be within ±0.1km/h.
(3) Yaw rate measurement device: Accuracy of yaw rate for each test shall be within ±0.1°/s.
(4) Longitudinal acceleration measurement device: Accuracy of longitudinal acceleration for each test shall be within ±0.1m/s^2.
(5) Steering wheel velocity measurement device: Accuracy of steering wheel velocity for each test shall be within ±1°/s.
(6) Brake pedal stroke measurement device: Accuracy of brake pedal stroke for each test shall be within ±1mm.
(7) Accelerator stroke measurement device: Accuracy of accelerator stroke for each test shall be within ±1%.
(8) Brake Temperature Check Unit: Accuracy of temperature of each test shall be within ±3%.
(9) Test Target position measurement device: Accuracy of Test Target position of each test shall be within ±0.03m.
(10) Test Target speed measurement device: Accuracy of Test Target speed of each test shall be within ±0.01km/h.

5. Test Procedure

5.1 Brake Conditioning

To condition the brake discs, drums and linings of the test vehicle (excluding those on which brake conditioning has been performed for other tests), the process of accelerating to 64km/h, braking to result in deceleration of 3.7m/s^2 and vehicle stop shall be repeated 200 times. The interval between the initial and second braking shall be either the time required to reduce the brake temperature to 110°C-132°C or the distance of 1.6km, whichever occurs earlier. After every stop,

the vehicle shall be accelerated to 64km/h and keep that speed until the next braking. (Brake Conditioning is equivalent to that provided in FMVSS105 S7.4.1.1.)

Further, upon request of the vehicle manufacturer, etc, it is allowed to run up to 100km in ordinary road, etc for the initialization of sensor units. As long as the conditions required for initialization are met, the initialization work may be performed in conjunction with the above conditioning run.

5.2 Re-brake conditioning

In the case of the first braking system test for the test car (generic term of the test carrying out brake conditioning of item 5.1), before starting the test, repeat the process of Item 5.1 at least 35 times in principle for re-conditioning. Further, when the period from the conditioning run of 5.1 to the test exceeded two weeks, the process may be repeated up to 50 times depending on the condition of the brake system in the test vehicle.

In the case of second or more braking system test (same when it takes multiple days in the same test), 35times if one week or more has passed since the previous test data, and 50 times at most if two weeks or more have passed, it is possible to carry our re-brake conditioning.

If re-brake conditioning test is not carried out on the day of test, warm up run should be carried out until the brake temperature exceed 100 degrees by the procedure of the item 5.1

6. Test method

6.1 Standard Evaluation Test

(1) Test scenario: For each of the AEBS Test and the FCWS Test, two types shall be performed: CPN and CPNO. (See Diagram 4 (a) (b).) The initial Lateral Position of the Test Target shall be 4.0m and an acceleration area of 1.0m may be set.

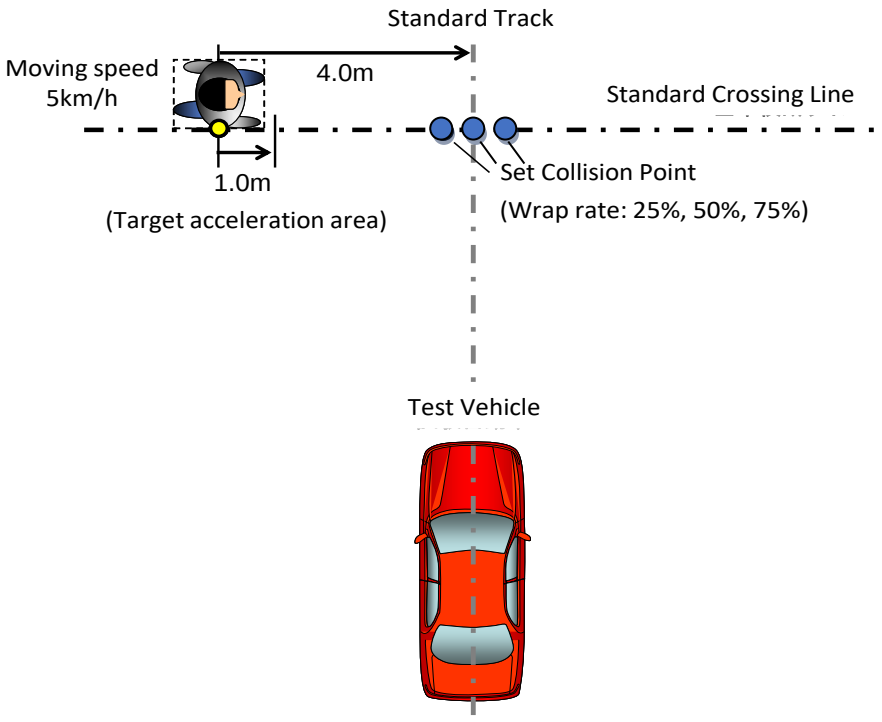


Diagram 4 (a): CPN

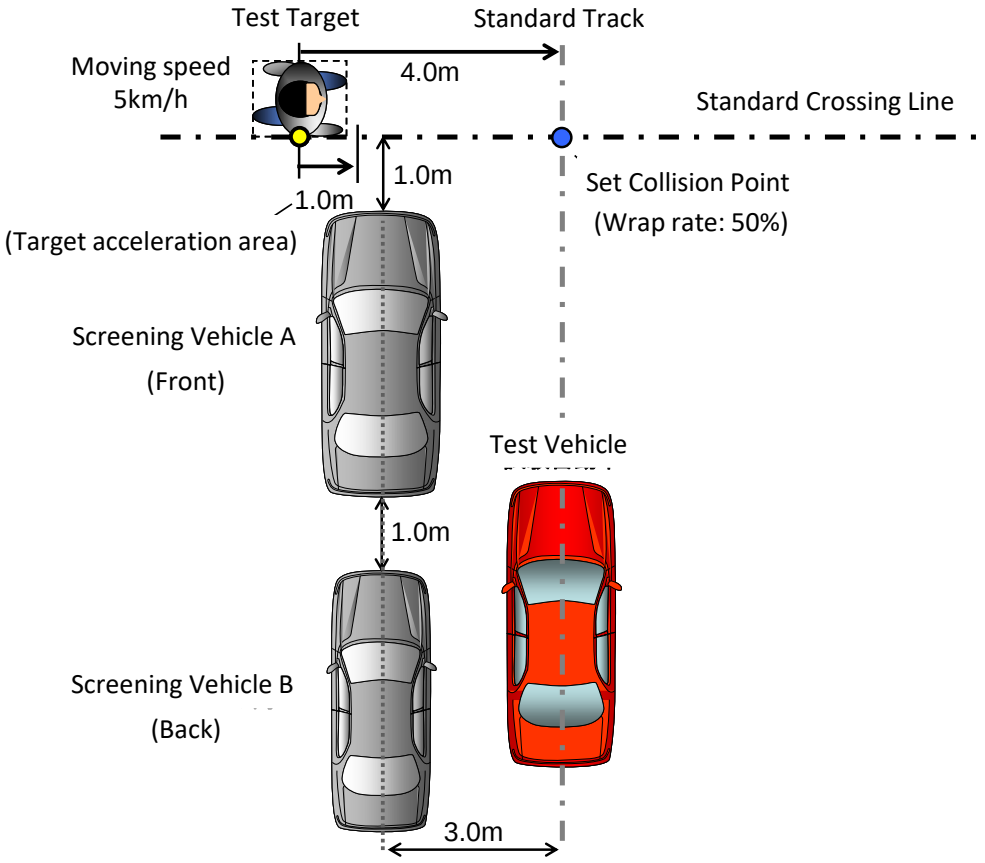


Diagram 4 (b): CPNO

(2) Test Vehicle Speed: The test speed of the test vehicle shall be in a scope described in Table 1, and the test will be performed by starting at the lowest speed and increasing in increments of 5km/h or 10km/h. Further, the starting vehicle speed may be raised upon declaration of the vehicle manufacturer, etc. Likewise, the ending vehicle speed may be lowered upon declaration of the vehicle manufacturer, etc. However, in either case, for the speeds not tested, results shall be handled in the same way as no activation of systems.

Table 1: Test Speed

	AEBS Test	FCWS Test
CPN	**10-60km/h**	**10-60km/h**
CPNO	**25-45km/h**	**25-45km/h**

(3) Transmission: For the test vehicles with automatic transmission, select D. For vehicles with manual transmission, select the highest gear where the RPM will be at least 1500 at the test speed and do not throw out a clutch during testing.

(4) Test Measurement Sections: Measurement shall be commenced when the test vehicle

approaches the Test Target and TTC reaching 4.0 sec. Measurement shall be ended when reaching any of the following conditions:

① When the test vehicle is stopped;

② When the rear edge of the target interference area exceeds the side edge of the approximate bumper line.

③ When the test vehicle collides with the test target.

(5) Successful Completion of Test: During the period from the start of measurement until the Initial Speed Difference is obtained, when the prescribed measurement items deviate from the permissible error shown in Table 2 and when the test video of 6.4 is not acquired (except when the driving status of the test car, the operating status of the test target and the collision / avoidance status can be confirmed by the in-vehicle video or the outside video), the attempted test shall be deemed invalid (foul) and shall not be counted in the number of tests. In addition, the measured value etc. shall round off the value less than the unit in each item. (Same below in this test method)

If any abnormality is observed in the operation of the test target, the recorded test video shall be checked and if the abnormality is evident, it shall be considered as a foul and shall not be included in the test count. The criteria shown in Annex D may be used for such determination.

Table 2: Test Condition Permissible Error

Test Condition	Permissible Range
Test Vehicle Speed	**Test Speed +0.5 km/h**
Test Target Speed	**Set speed ±0.2 km/h (excluding Target Acceleration Section)**
Test Vehicle Lateral Position	**Standard Track ±0.05 m**
Expected Collision Point	**Set Collision Point ± 5% (At measurement start only)**
Yaw Rate	**±1.0°/s**
Steering Wheel Velocity	**±15.0°/s**
Brake Temperature Before Braking	**65-100°C**

(6) Number of Tests: The tests shall be performed 1 time for each test vehicle speed. However, if manufacturers etc submitted the pre-test data beforehand, and the speed reduction for this test is deviated more than 5km / h against the median speed reduction for pre-test data, test is conducted three times.

The third test may be omitted in the following cases:

・When a collision is avoided twice in a row.

・When the same Velocity Reduction Rate is obtained twice in a row.

The pre-tests shall be performed once for each test speed in case of collision avoidance. In case of other than collision avoidance, it shall be performed three times for each test vehicle speed. Third test can be omitted if it falls under above 2 cases.

(7) Test Implementation Procedures: The tests shall be conducted in an order of the CPNO test followed by the CPN test, starting at the lowest speed condition or the speed condition declared by the vehicle manufacturer, etc. The interval of raising the test speed shall be 5km/h; however, when avoiding collisions for 1 time test or more than 2 times out of 3 tests for the case deviated from pre-test result, the test speed may be raised by 10km/h (the 5km/h increment to be passed). When collisions are avoided also under a condition of an increase to 10km/h, collisions are deemed to be avoided for the 5km/h increment that is passed. However, when collisions could not be avoided for 1 time test or more than 2 times out of 3 tests for the case deviated from pre-test result, the test speed shall be lowered by 5km/h and the test for the 5km/h increment that is passed must also be performed.

Subsequently, take the same procedures to conduct tests up to the highest speed condition or the one declared by the vehicle manufacturer, etc. However, the test will be ended when the collision speed exceeds 40 km/h once in one test or when the two out of three tests due to deviation from the prior data.

Further, the speed conditions in a CPNO test at which collision was avoided may be passed on by deeming collision was avoided in the same way in a CPN test.

(8) Accelerator Operation during the AEBS Test: In the measurement section, the Accelerator Stroke shall be held constant so as not to cause any impact on the activation of AEBS. Further, for those test vehicles on which the accelerator is controlled when AEBS is activated, upon consultation with the vehicle manufacturer, etc, the Accelerator Stroke during AEBS activation may be adjusted.

(9) Accelerator/Brake Operation during the FCWS Test: The accelerator of the test vehicle shall be released 1.0 second after the FCWS Activation Point. The brake pedal shall be pressed down 1.2 seconds after the FCWS Activation Point, taking 0.2 seconds to reach the point where deceleration under non-threat situation of 4.0 (+0.25)m/s^2 is generated (however, maximum pedal application rate is 400mm/s), and prescribed pedal force shall be maintained. For these brake operation setup values (Brake Pedal Stroke, application rate and pedal force), the values declared by the vehicle manufacturer, etc shall be used. When the vehicle manufacturer, etc submits no setup values or when the deceleration under non-threat situation exceeds the permissible range (4.00-4.25m/s^2), the setup shall be performed by NASVA in accordance with the steps described in Annex E.

Further, to perform these tests for precision, it is desirable to equip the test vehicle with such operation input equipment as an automatic driving device.

(10) When it is obvious that the same results as the AEBS Test will be obtained in a FCWS Test,

regardless of with or without the FCWS function, the results of the AEBS test may be taken as those of such test. Likewise, when TTC from the FCWS Activation Point in an AEBS Test is 1.2 sec. or less, the results of the AEBS Test shall be those of such test.

6.2 Partial Evaluation Test

(1) Test scenario: Upon completion of the Standard Evaluation Test, for the AEBS Test and the FCWS Test, the Partial Evaluation Tests shall be implemented in accordance with the following setup conditions. Further, for the test of (iii), the initial Lateral Position of the Test Target in Diagram 4 (a) shall be changed to 6.0m and the Acceleration Section to 1.5m.

(i) CPN: Set Collision Point 25%, Test Target speed 5km/h, Adult dummy

(ii) CPN: Set Collision Point 75%, Test Target speed 5km/h, Adult dummy

(iii) CPN: Set Collision Point 50%, Test Target speed 8km/h, Adult dummy

(iv) CPN: Set Collision Point 50%, Test Target speed 5km/h, Child dummy

(v) CPNO: Set Collision Point 50%, Test Target speed 5km/h, Child dummy

(2) Test Speed: Based on the result of the Standard Evaluation Test, it shall be the Representative Speed of the applicable test.

(3) Test Implementation Procedures: The tests shall be conducted in an order of (i) through (v). Further, when collision is avoided at the Representative Speed in a Standard Evaluation Test, for the Test (ii), it is deemed that collision is avoided in the same way. In addition to conducting testing in the order of (i) through (v), the Test (v) may be conducted immediately after the completion of the CPNO Standard Evaluation Test.

(4) Other procedures: Provisions of sections 6.1 (3) through (6) and 6.1 (8) through (10) shall be applied mutatis mutandis.

6.3 Measurement Data and Recording

(1) Confirmation of Completion of Testing: For each test, confirm whether the test conditions meet the permissible error of Table 2.

(2) Collision Avoided or Not: For each test, confirm whether collisions were avoided, and record collisions or not and the measurement data for the next and subsequent items in Attached Table 2.

(3) Initial Speed: Record in 0.1 km/h increments.

(4) Velocity Reduction Amount: Record in 0.1 km/h increments.

(5) Velocity Reduction Rate: Find and record the Velocity Reduction Ratio to second decimal place, rounding off to the third decimal place.

6.4 Recording Video Picture of Testing

(1) Image of inside vehicle: Pictures of the front of the test vehicle, near driver's seat and the FCWS activation status shall be recorded by video cameras installed in the test vehicle interior. (Shooting may be ended due to difficulties in taking pictures inside the vehicle for sunshine or the like upon consultation with the vehicle manufacturer, etc.)

(2) Image of outside vehicle: A video camera installed at the side of the test track and in front of the test track at the point where a collision between the test vehicle and the test target is expected to

occur will record the driving conditions of the test vehicle and the operation and collision/avoidance conditions of the test target.

7. Sorting Out of Test Results

Record test results, etc. in Attached Table 2.

The Velocity Reduction Rate of each test shall be the median of 1 effective test result or 3 effective test results for the case deviated from pre-test. However, the Velocity Reduction Rate of the condition when collisions are avoided shall be 1.00.

Further, when testing is ended after conducting 2 tests in accordance with the proviso of sections 6.1 (6) and (7), 6.1 (6) shall be the Velocity Reduction Rate obtained and 6.1 (7) shall be the lower value of the test results.

Annex A: Test Target Specification

For the Test Target, those having specifications equivalent to those of the Euro-NCAP (Test Protocol - AEB VRU systems Version1.0.1 July 2015 ANNEX A EPT SPECIFICATIONS) shall be used.

Attached Diagram A shows external appearance of the Test Targets (adult/child), and the drive unit and the platform to move the Test Target. In addition, measurement specifications of the adult and child dummies are shown in Attached Diagram A.

The Test Target shall be designed to have characteristics that are similar to those of human pedestrians in terms of being detected by such sensors as laser radars, millimeter-wave radars and cameras. Also, the platform shall be designed to be very thin at 2.5cm so as not to cause any impact on pedestrian detection by various sensors.

(a) Adult Movable Dummy

(b) Child Movable Dummy

(c) Test Target Drive Unit

Attached Diagram A: External Appearance of Test Target

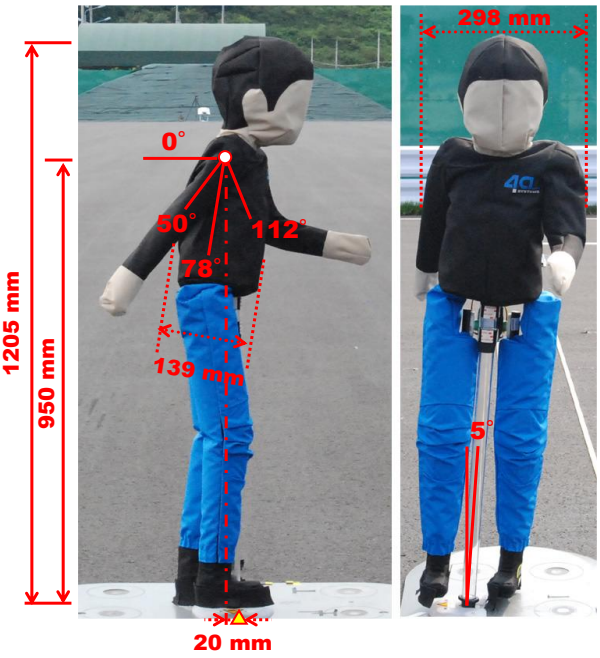
Attached Table A: Test Target Specifications

(a) Adult Movable Dummy Specifications

Item		Dimension
Walking posture height		1,800±20 [mm]
Shoulder center (diagram ○) height		1430 [mm]
Horizontal distance between shoulder center and platform center (diagram △)		-40 [mm]
Distance between right heel and left toe (max value during walking)		550±50 [mm]
Distance between elbows		500±20 [mm]
Torso thickness		235±20 [mm]
Forward tilt angle		85±2 [deg]
Strut angle (toward vehicle traveling direction)		5±2 [deg]
Upper arm angles	Right	60±2 [deg]
	Left	110±2 [deg]
Weight		MAX 4 [kg]

(b) Child Movable Dummy Specifications

Item		Dimension
Walking posture height		1,205±20 [mm]
Shoulder center (diagram ○) height		950 [mm]
Horizontal distance between shoulder center and platform center (diagram △)		-20 [mm]
Distance between right heel and left toe (max value during walking)		400±50 [mm]
Distance between elbows		298±20 [mm]
Torso thickness		139±20 [mm]
Forward tilt angle		78±2 [deg]
Strut angle (toward vehicle traveling direction)		5±2 [deg]
Upper arm angles	Right	50±2 [deg]
	Left	112±2 [deg]
Weight		MAX 2 [kg]



Annex B: Specifications of Screening Vehicle Used for Testing

For the two screening vehicles used for the CPNO, commercially available vehicles meeting the specifications of Attached Table B-1 shall be used. As to the vehicle shapes, the screening vehicle A (front) shall be a minivan type of a kei vehicle and the screening vehicle B (back) a minivan type of a small-sized or standard-sized vehicle.

Attached Table B: Specifications of Screening Vehicles for CPNO

(a) Screening Vehicle A (Front)

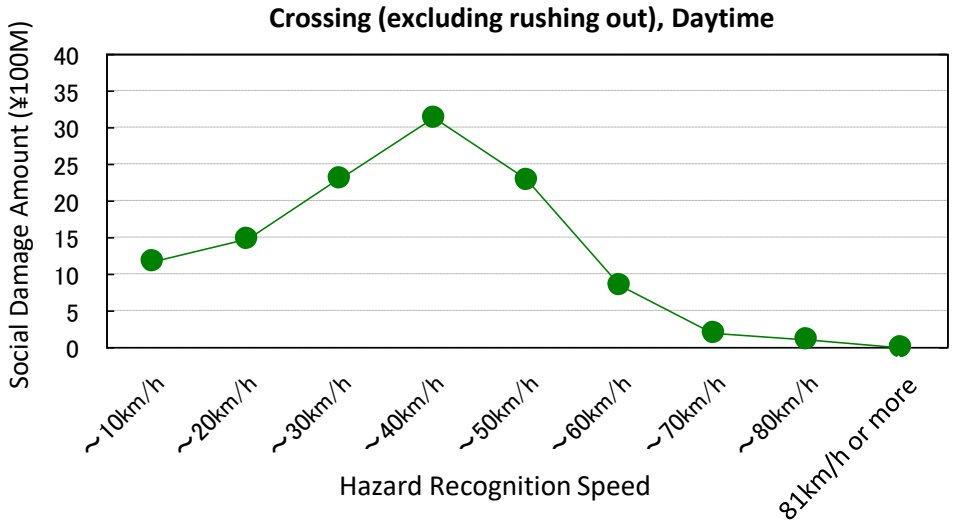
Length	3,375±25 [mm]
Width	1,475±25 [mm]
Height	1,800±200 [mm]
Body color	White

(b) Screening Vehicle B (Back)

Length	4,800±200 [mm]
Width	1,780±100 [mm]
Height	2,100±200 [mm]
Body color	Black

Annex C: Amount of Social Damage Used for Selection of Representative Vehicle Speed

For the selection of the representative vehicle speed for the Partial Evaluation Test, statistics data on accidents, based on which the social damage amounts by hazard recognition speed in Attached Diagram C-1 were calculated, shall be used. When the representative vehicle speed candidates are listed in the order of larger social damage, it shall be 40km/h, 35km/h, 45km/h, 30km/h, 50km/h, 25km/h, 55km/h, 20km/h, 15km/h, 10km/h and 60km/h, from which the representative vehicle speed shall be set pursuant to the definition of the main rule.



Attached Diagram C: Social Damage Amount of Accidents by Hazard Recognition Speed (Daytime)

Annex D: Criteria for Judging Movement Status of Test Target

D.1 Judgment by Behavior of Target Head and Leg

D.1.1 Measurement Item

On the Standard Crossing Line, measure the “speed of the Target head” between a point 3m short of the Standard Track to reaching the original point (intersection with the Standard Track), and the “right leg position” and the “left leg position” at four points that result from trisecting the section. The image of the measurement shall be recorded at a sampling rate of 60FPS and have a resolution of 200 pixel/m. Further, when the Test Target did not (did) reach the original point under the condition of preset collision point 25%, judgment of leg positions at the original points shall be excluded and the head speed shall be measured until immediately before the collision.

D.1.2 Judgment criteria for validating the test

Measurement items for D.1.1 shall be within the permissible range described in the Attachment D1 (in case of CPN and CPNO)

Attached Table D-1: Permissible Error for Target Head and Leg Behavior (CPN and CPNO)

(a) Adult dummy; Walking speed：5km/h

Measurement Point	2m short
Head Speed [km/h]	5.0±1.0
Right Leg Position [m]	2.38±0.10
Left Leg Position [m]	1.80±0.10

(b) Child dummy; Walking speed：5km/h

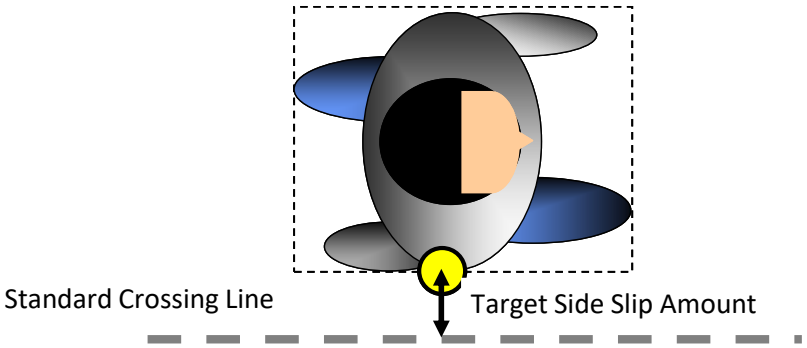
Measurement Point	2m short
Head Speed [km/h]	5.0±1.0
Right Leg Position [m]	1.86±0.10
Left Leg Position [m]	2.28±0.10

(c) Adult dummy; Walking speed：8km/h

Measurement Point	2m short
Head Speed [km/h]	8.0±1.0
Right Leg Position [m]	1.74±0.10
Left Leg Position [m]	2.36±0.10

D.2 Judgment by Target Moving Path

In the same measurement section as D.1.1, the “target side slip amount (distance from the Standard Crossing Line)” shown in Attached Diagram D shall be within a scope of ±0.1m. However, when it is difficult to directly measure such index, it may be estimated using the distance between two points at which relative positional relationship is equivalent.



Attached Diagram D: Definition Target Side Slip Amount

Annex E: Brake Operation Setup Procedure for FCWS Test

E.1 Definition

(1) T_{BRAKE}: When the brake pedal stroke exceeded 5mm

(2) T_{2m/s^2}: When the filtered deceleration data exceeded 2m/s^2 for the first time

(3) T_{6m/s^2}: When the filtered deceleration data exceeded 6m/s^2 for the first time

E.2 Measurement Procedure

Apply the measurement procedure and filtering described in Chapter 3.

E.3 Test Procedure for Brake Input Characteristics

E.3.1 Test Preparation

Perform the warm-up run described in as specified in the remarks to section 5.2 first before conducting the FCWS Test. The brake input characteristics shall be set immediately before the above.

E.3.2 Brake Input Characteristics Setup:

(1) Accelerate the test vehicle to be 85km/h or more. For the test vehicles with automatic transmission, select D. For the vehicles with manual transmission, select the highest gear where the RPM will be at least 1500 at the test speed.

(2) Release the accelerator and when the speed becomes slower than 80 (±1) km/h, start applying brakes at the pedal application rate 20 (±5) mm/s until deceleration becomes 7m/s^2. For manual transmission, throw out a clutch at the earliest timing possible before RPM will be 1500rpm or less. When the deceleration becomes 7m/s^2, end the run and measure the Brake Pedal Stroke and pedal force in operation.

(3) Perform the above run 3 times in a row. The interval between tests shall be 90 seconds or more but 10 minutes or less, and when 10 minutes is passed, perform the warm-up operation again before resuming the run.

(4) Based on the deceleration data from the Brake Pedal Stroke between T_{2m/s^2} and T_{6m/s^2}, apply quadratic curve approximation using least square, and calculate the Brake Pedal Stroke corresponding to deceleration 4m/s^2 (which shall be "D4" in unit of m). For the pedal force as well, use the same method to obtain the pedal force value corresponding to deceleration 4m/s^2 (which shall be "F4" in unit of N).

E.3.3 Brake Pedal Force Setup Procedure and Repeating Procedure

(1) Run the test vehicle constantly at 80 (+1) km/h. The test vehicle gear position shall be the same as E.3.2.

(2) By manual trigger, not in response to FCWS, apply brakes in accordance with the steps described in E.4. Based on the measured deceleration data, obtain average deceleration of the

sections from T_{BRAKE}+1 sec to T_{BRAKE}+3 sec. If the average deceleration deviates from 4 (+0.25) m/s^2, use the correction formula below to correct the F4 value.

$F4_{new} = F4_{original} * (4 / \text{average deceleration})$

(e.g., when average deceleration is 5m/s^2, $F4_{new} = F4_{original} * 4 / 5$)

Use the corrected F4 and repeat brake operations of E.4 so that the average deceleration will be within a scope of 4 (+0.25) m/s^2.

E.4 Brake Operation Procedure during FCWS Test

(1) Detect the activation of FCWS, time of which shall be T_{FCW}.

(2) Release the accelerator at T_{FCW}+1 sec.

(3) Brake pedal stroke control shall start at T_{FCW}+1.2 sec, and the application rate shall be either D4×5 mm/s or 400mm/s, whichever is smaller. (In other words, it shall be the speed at which the stroke reaches D4 in 200ms, and the upper limit value shall be 400mm/s.)

(4) Monitor the pedal force values processed by second-order filtering with a cutoff frequency 20Hz or by moving average at 50ms, and upon reaching either of the following, switch to the pedal force control with target value of F4. The time of the switch shall be recorded as T_{switch}.

① When the stroke D4 defined in E.3 is exceeded for the first time.

② When the pedal force value F4 defined in E.3 is exceeded for the first time.

Further, when it is shifted to pedal force control before reaching enough pedal stroke after performing filtering, etc, upon consultation with the vehicle manufacturer, etc, Tswitch timing may be adjusted. (For example, take a measure for not switching to pedal force control until reaching certain pedal stroke.)

(5) At T_{switch} onward, control the brake pedal in such a way that the pedal force will be F4±25%. Stable pedal force control should be realized within 200ms from T_{switch}; however, even when the pedal force value exceeds F4±25% due to intervention by AEBS, it shall be acceptable when duration is 200ms or less.

(6) It is desirable that the pedal force average value will be in the range of F4±10N from T_{FCW} +1.4 sec to the end of the test.

Attached Table 1: Autonomous Emergency Brake System [for Pedestrian Daytime] Performance Test Conditions and Test Vehicle Specification

[To be filled in by the Vehicle Manufacturer, etc]

1. Test Vehicle Specification

(1) Model/Type (Model Name):_____/_____(_____)

(2) Sensor System:_____

(3) Installed Tire

	Front	Rear
Size		
Brand/Type		
Air Pressure (kPa)		

2. Declarations, etc by Vehicle Manufacturer, etc

(1) AEBS Test Start Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(2) AEBS Test End Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(3) FCWS Function Available or Not: Available / Not Available

(4) FCWS Test Start Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(5) FCWS Test End Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(6) FCWS Function Specification: "Auditory and visual information" and "auditory and haptic information"

Frequency of auditory information: Hz Hz

Attach a document stating the location of the provision of such information (speaker location, display location, etc.).

(7) FCWS Test Brake Operation Setup Values

Brake Pedal Stroke: _____mm Application Rate: _____mm/s Pedal Force: _____N

(8) Activation Start Timing Manual Setup: Yes (_____) / No

(9) Limit on Sunlight Conditions: Yes / No (No need to consider shadow, back light, etc)

(10) Limit on number of AEBS activations: Yes (up to ___ times per run) / No

(11) Approximate Bumper Line Setup Values [mm]:

Vehicle overall width: _____

A = (_____ , _____)

B = (_____ , _____)

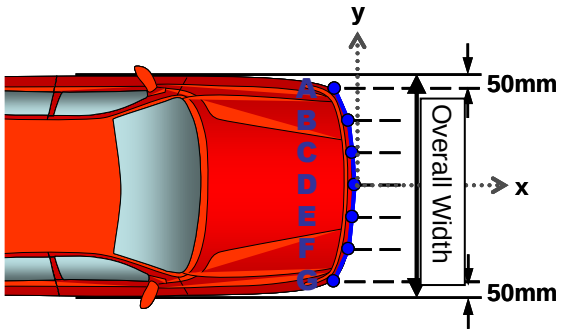
C = (_____ , _____)

D = (0 , 0)

E = (_____ , _____)

F = (_____ , _____)

G = (_____ , _____)



(12) Protection System: Document describing how to deactivate the Passenger Protection System and the Pedestrian Protection System, or document describing brief overview of the modification for deactivation

(13) Advance data submission: __Yes (Appendix Table 3 or equivalent) __/__No

(14) Notes

3. Functions, Cautions, etc of Systems to Support Users

Documents shall be attached relating to the subjects and conditions of activation under the environment determined by the vehicle manufacturer, etc and the idea of functions of the system.

Attached Table 2: Autonomous Emergency Brake System [for Pedestrian Daytime] Performance Test Result **(Daytime test)**

[To be filled in by Testing Institute]

Test date (YYYY/MM/DD):_____ Place:_____

1. Test Vehicle Specification

(1) Model/Type (Model Name):_____/_____(_____)

(2) Frame number:_____

(3) Sensor system:_____

(4) Installed Tire

	Front	Rear
Size		
Brand/Type		
Air Pressure (kPa)		

(5) Test Vehicle Load Distribution

		Left Wheel	Right Wheel	Subtotal	Grand Total	Front-rear Distribution
Load Distribution at Vehicle Delivery (daN)	Front Axle					%
	Rear Axle					%
Load Distribution at Testing (daN)	Front Axle					%
	Rear Axle					%

(Note) Indicate as 1daN = 1kgf

2. Test Conditions Setup, etc

(1) AEBS Test Start Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(2) AEBS Test End Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(3) FCWS Test Available or Not: Available / Not Available

(4) FCWS Test Start Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(5) FCWS Test End Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(6) Specifications of FCWS function: "Auditory and visual information" and "auditory and haptic information"

(7) FCWS Test Brake Operation Setup Values

Test Implemented or not: Yes / No

Pedal depression amount:____mm Depression speed:____mm/s Pedal force:_____N

(8) Activation Start Timing Manual Setup: Yes (_____) / No

(9) Approximate Bumper Line Setup Values [mm]:

Vehicle overall width: _____

A = (_____ , _____)

B = (_____ , _____)

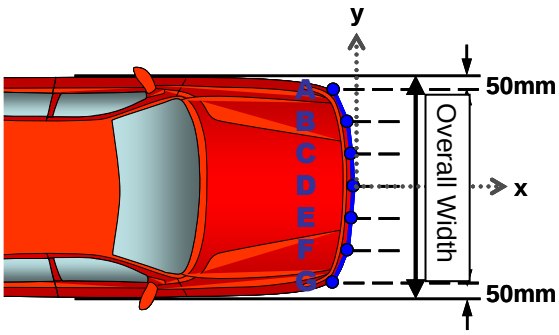
C = (_____ , _____)

D = (0 , 0)

E = (_____ , _____)

F = (_____ , _____)

G = (_____ , _____)



(10) Partial Evaluation Test Representative Speed:

CPN: _____km/h CPNO: _____km/h

3. Environmental Condition

Day 1 Test date (YYYY/MM/DD):_____ Place:_____

Start Time:_____ Weather:_____ Temp.:_____ Wind Speed:_____

End Time: _____ Weather:_____ Temp.:_____ Wind Speed:_____

Remarks:_____

Day 2 Test date (YYYY/MM/DD):_____ Place:_____

Start Time:_____ Weather:_____ Temp.:_____ Wind Speed:_____

End Time: _____ Weather:_____ Temp.:_____ Wind Speed:_____

Remarks:_____

Day 3 Test date (YYYY/MM/DD):_____ Place:_____

Start Time:_____ Weather:_____ Temp.:_____ Wind Speed:_____

End Time: _____ Weather:_____ Temp.:_____ Wind Speed:_____

Remarks:_____

4. Test Result

(1) Standard Evaluation Test: AEBS test for CPN

			(a)	(b)	(c)=(a)-(b)	(d)=(c)/(a)	
Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
10km/h	1st						
	2nd						
	3rd						
15km/h	1st						
	2nd						
	3rd						
20km/h	1st						
	2nd						
	3rd						
25km/h	1st						
	2nd						
	3rd						
30km/h	1st						
	2nd						
	3rd						
35km/h	1st						
	2nd						
	3rd						
40km/h	1st						
	2nd						
	3rd						
45km/h	1st						
	2nd						
	3rd						
50km/h	1st						
	2nd						
	3rd						
55km/h	1st						
	2nd						
	3rd						
60km/h	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation, －: Not implemented

(2) Standard Evaluation Test: FCWS test for CPN

			(a)	(b)	(c)=(a)-(b)	(d)=(c)/(a)	
Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
10km/h	1st						
	2nd						
	3rd						
15km/h	1st						
	2nd						
	3rd						
20km/h	1st						
	2nd						
	3rd						
25km/h	1st						
	2nd						
	3rd						
30km/h	1st						
	2nd						
	3rd						
35km/h	1st						
	2nd						
	3rd						
40km/h	1st						
	2nd						
	3rd						
45km/h	1st						
	2nd						
	3rd						
50km/h	1st						
	2nd						
	3rd						
55km/h	1st						
	2nd						
	3rd						
60km/h	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(3) Standard Evaluation Test: AEBS test for CPNO

			(a)	(b)	(c)=(a)-(b)	(d)=(c)/(a)	
Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
25km/h	1st						
	2nd						
	3rd						
30km/h	1st						
	2nd						
	3rd						
35km/h	1st						
	2nd						
	3rd						
40km/h	1st						
	2nd						
	3rd						
45km/h	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(4) Standard Evaluation Test: FCWS test for CPNO

			(a)	(b)	(c)=(a)-(b)	(d)=(c)/(a)	
Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
25km/h	1st						
	2nd						
	3rd						
30km/h	1st						
	2nd						
	3rd						
35km/h	1st						
	2nd						
	3rd						
40km/h	1st						
	2nd						
	3rd						
45km/h	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(5) Partial Evaluation Test: AEBS test for CPN

Wrap rate: 25%

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Wrap rate: 75%

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Pedestrian speed: 8km/h

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Child dummy

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(6) Partial Evaluation Test: FCWS test for CPN

Wrap rate: 25%

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Wrap rate: 75%

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Pedestrian speed: 8km/h

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Child dummy

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(7) Partial Evaluation Test: AEBS test for CPNO

Child dummy (a) (b) (c)=(a)-(b) (d)=(c)/(a)

Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(8) Partial Evaluation Test: FCWS test for CPNO

Child dummy (a) (b) (c)=(a)-(b) (d)=(c)/(a)

Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

Attached Table 3: Autonomous Emergency Brake System [for Pedestrian Daytime] Performance Test Result

[For advance data as stipulated in the detailed regulations of the New Car Assessment Information Provision Project]

*Only the results of tests conducted on the same type of vehicle as the assessment test vehicle (with optional equipment similar to that of the test vehicle) using the test methods specified by NASVA may be submitted.

*Attached Table 2 in the main rule shall be read as Attached Table 3.

Test date (YYYY/MM/DD):_____ Place :_____

1. Test Vehicle Specification

(1) Model/Type (Model Name):_____/_____(_____)

(2) Frame Number:_____

(3) Sensor System:_____

(4) Installed Tire

	Front	Rear
Size		
Brand/Type		
Air Pressure (kPa)		

(5) Test Vehicle Load Distribution

		Left Wheel	Right Wheel	Subtotal	Grand Total	Front-rear Distribution
Load Distribution at Vehicle Delivery (daN)	Front Axle					%
	Rear Axle					%
Load Distribution at Testing (daN)	Front Axle					%
	Rear Axle					%

(Note) Indicate as 1daN = 1kgf

2. Test Conditions Setup, etc

(1) AEBS Test Start Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(2) AEBS Test End Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(3) FCWS Test Available or Not: Available / Not Available

(4) FCWS Test Start Vehicle Speed: CPN:_____km/h CPNO:_____km/h

(5) FCWS Test End Vehicle Speed CPN:_____km/h CPNO:_____km/h

(6) Specifications of FCWS function: "Auditory and visual information" and "auditory and haptic information"

(7) FCWS Test Brake Operation Setup Values

Brake Pedal Stroke: _____mm Application Rate: _____mm/s Pedal Force: _____N

Test implemented or not: Yes / No

(8) Activation Start Timing Manual Setup: Yes (_____) / No

(9) Accelerator / brake operation: Automated / by driver

[When the driver performs accelerator / brake operation, submit a document that records actual measurement values for each accelerator / brake operation provisions in test method section 6.1 (9).]

(10) Approximate Bumper Line Setup Values [mm]:

Vehicle overall width: _____

A = (_____ , _____)

B = (_____ , _____)

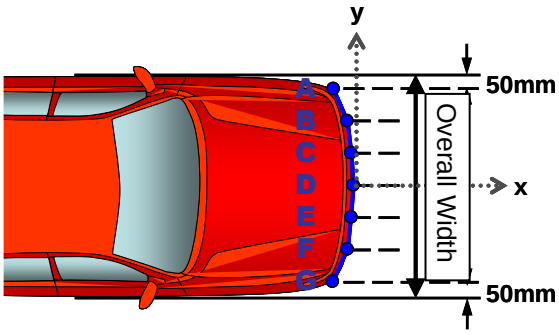
C = (_____ , _____)

D = (0 , 0)

E = (_____ , _____)

F = (_____ , _____)

G = (_____ , _____)



(11) Partial Evaluation Test Representative Speed:

CPN: _____km/h CPNO: _____km/h

3. Environmental Condition

Day 1 Test date (YYYY/MM/DD):_____ Place:_____

Start Time:_____ Weather:_____ Temp.:_____ Wind Speed:_____

End Time: _____ Weather:_____ Temp.:_____ Wind Speed:_____

Remarks:_____

Day 2 Test date (YYYY/MM/DD):_____ Place:_____

Start Time:_____ Weather:_____ Temp.:_____ Wind Speed:_____

End Time: _____ Weather:_____ Temp.:_____ Wind Speed:_____

Remarks:_____

Day 3 Test date (YYYY/MM/DD):_____ Place:_____

Start Time:_____ Weather:_____ Temp.:_____ Wind Speed:_____

End Time: _____ Weather:_____ Temp.:_____ Wind Speed:_____

Remarks:_____

4. Test Result

(1) Standard Evaluation Test: AEBS test for CPN

			(a)	(b)	(c)=(a)-(b)	(d)=(c)/(a)	
Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
10km/h	1st						
	2nd						
	3rd						
15km/h	1st						
	2nd						
	3rd						
20km/h	1st						
	2nd						
	3rd						
25km/h	1st						
	2nd						
	3rd						
30km/h	1st						
	2nd						
	3rd						
35km/h	1st						
	2nd						
	3rd						
40km/h	1st						
	2nd						
	3rd						
45km/h	1st						
	2nd						
	3rd						
50km/h	1st						
	2nd						
	3rd						
55km/h	1st						
	2nd						
	3rd						
60km/h	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation, －: Not implemented

(2) Standard Evaluation Test: FCWS test for CPN

			(a)	(b)	(c)=(a)-(b)	(d)=(c)/(a)	
Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
10km/h	1st						
	2nd						
	3rd						
15km/h	1st						
	2nd						
	3rd						
20km/h	1st						
	2nd						
	3rd						
25km/h	1st						
	2nd						
	3rd						
30km/h	1st						
	2nd						
	3rd						
35km/h	1st						
	2nd						
	3rd						
40km/h	1st						
	2nd						
	3rd						
45km/h	1st						
	2nd						
	3rd						
50km/h	1st						
	2nd						
	3rd						
55km/h	1st						
	2nd						
	3rd						
60km/h	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(3) Standard Evaluation Test: AEBS test for CPNO

			(a)	(b)	(c)=(a)-(b)	(d)=(c)/(a)	
Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
25km/h	1st						
	2nd						
	3rd						
30km/h	1st						
	2nd						
	3rd						
35km/h	1st						
	2nd						
	3rd						
40km/h	1st						
	2nd						
	3rd						
45km/h	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(4) Standard Evaluation Test: FCWS test for CPNO

			(a)	(b)	(c)=(a)-(b)	(d)=(c)/(a)	
Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
25km/h	1st						
	2nd						
	3rd						
30km/h	1st						
	2nd						
	3rd						
35km/h	1st						
	2nd						
	3rd						
40km/h	1st						
	2nd						
	3rd						
45km/h	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(5) Partial Evaluation Test: AEBS test for CPN

Wrap rate: 25%

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Wrap rate: 75%

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Pedestrian speed: 8km/h

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Child dummy

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(6) Partial Evaluation Test: FCWS test for CPN

Wrap rate: 25%

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Wrap rate: 75%

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Pedestrian speed: 8km/h

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

Child dummy

Speed Condition	Number of Tests	Avoided or Not (*)	(a) Initial Speed	(b) Speed at Collision	(c)=(a)-(b) Velocity Reduction Amount	(d)=(c)/(a) Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(7) Partial Evaluation Test: AEBS test for CPNO

Child dummy (a) (b) (c)=(a)-(b) (d)=(c)/(a)

Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented

(8) Partial Evaluation Test: FCWS test for CPNO

Child dummy (a) (b) (c)=(a)-(b) (d)=(c)/(a)

Speed Condition	Number of Tests	Avoided or Not (*)	Initial Speed	Speed at Collision	Velocity Reduction Amount	Velocity Reduction Rate	Velocity Reduction Rate Median
	1st						
	2nd						
	3rd						

(*) ○: Collision avoided, P: Passed (deemed avoided), △: Speed reduced, ×: No activation , ー: Not implemented