Ministry of Transportation and Communications

Taiwan New Car Assessment Program (TNCAP)

Second Version

1.3 Application of Star Rating Protocol

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1.3.1 Definitions

1.3.1.1 Original Assessment or Originally-Assessed Vehicle: an assessment of a vehicle not previously rated by TNCAP. For an assessment vehicle, it shall be named according to its commercial model name.

1.3.1.2 Variant: a vehicle model identified by the vehicle type code listed in the Vehicle Safety Type Approval Certificate shares the following parameters with the originally-assessed vehicle:

(1) Make (brand).

(2) Model name (additional descriptions such as 'hatch', 'sportswagon' etc are allowed so long as the basic model name is the same).

(3) All equipment having an influence on safety.

(4) All important structural elements related to safety performance. Where these differ (number of side entry doors, for example), additional data is required.

The data as per the provisions of 1.3.3.2 shall be submitted to prove no differences from the originally-assessed vehicle.

1.3.1.3 Partner: has the same relationship to the originally-tested vehicle as a variant (same brand) but has a different model name. All important structural elements related to safety performance must be the same as the originally-tested vehicle. Where these differ, additional data is required. Safety equipment and its fitment must be the same as the originally-tested vehicle. See 1.3.3.4 for a full description.

1.3.1.4 Corporate Twins: differ with regard to make (brand) and model name but are identical to the originally-tested vehicle in all regards, including the fitment of safety equipment and interior parts and trim. Partners may differ only with regard to minor styling differences such as headlamp and grille shape. See 1.3.4 for a full description.

1.3.2 Validity of Star Ratings

1.3.2.1 Once the TNCAP executive agency has published the base star rating and related information on its website, the vehicle has obtained a valid rating.

1.3.2.2 In some circumstances, the star rating may be carried over from the original test model to a facelifted model, another variant or twin model, Specific conditions apply as laid out in sections 1.3.3 and 1.3.4 respectively.

1.3.2.3 If the vehicle model that has received a TNCAP rating no longer meet the criteria for the original star rating, the TNCAP executive agency the discretion to waive the applicability of that star rating.

1.3.3 Variants and Partner Models

The TNCAP executive agency shall provide clear information to consumers,

including a comprehensive list of all variants in the model range on the TNCAP website, and indicate whether the published rating applies to each variant. Prior to testing, the equipment matrix shall be provided within the deadline, disclosing all applicable variants, including partners, and apply for sharing star ratings. The TNCAP executive agency will evaluate the applicability of star ratings based on the data and the supporting documents. Where a manufacturer fails to apply for shared star ratings before testing, the TNCAP executive agency shall proceed as per the provisions in section 1.3.3.5.

1.3.3.1 Main Assessment: The TNCAP executive agency shall test a single variant according to Section 1.4.

1.3.3.2 Application of Star Ratings to Other Variants

1.3.3.2.1 Variants may share the rating of the tested vehicle if the manufacturer provides data to demonstrate that all the requirements set out in section 1.3.6 are met, and upon approval by the TNCAP executive agency.

1.3.3.2.2 Except where official tests are explicitly demanded in Section 1.3.6, in-house data shall be provided as supporting evidence.

1.3.3.3 Variants Not Covered by the Rating

1.3.3.3.1 Variants that do not meet the requirements of section 1.3.3.2 will be considered not to be covered by the star rating.

1.3.3.4 Partner Models

1.3.3.4.1 Certain variants may be marketed under a different model name to the originally-tested vehicle. Manufacturers may apply for the star rating to be applied to such ‘partner models’ following the procedures set out in sections 1.3.3.2 to 1.3.3.3.

1.3.3.4.2 The manufacturers may request approval from the TNCAP executive agency for the star rating be applied to partner models during the initial assessment phase.

1.3.3.5 Application Year

1.3.3.5.1 Variants

1.3.3.5.1.1 Manufacturers may apply for the star rating to be applied to other variants within four years from the date of the rating was originally published. The requirements applicable at the time of the original rating shall be adhered to. Manufacturers are also required to provide supporting data as specified in 1.3.3.2.1.

1.3.3.5.1.2 There no additional review fee for other variants during the equipment matrix submission phase. However, where the application is submitted at a later date, an additional fee for reviewing the rating sharing application must be paid. The applicant

needs to bear the associated testing costs if additional testing is necessary.

1.3.3.5.2 Partner Models

1.3.3.5.2.1 A partner model may not share the original rating if it is released in a calendar year more than 3 years later than the date stamp of the original assessment.

1.3.3.5.2.2 If TNCAP protocol updates between the time of the original assessment and the release of the partner model, an additional data must be supplied according to the latest protocols to demonstrate that the partner model would not be rated more than one star less than the original assessment. For example, if a model was originally rated as five stars, a partner released in a subsequent protocol scheme must receive at least a four-star rating against the updated requirements. If the submitted data fulfills the criteria set by the TNCAP executive agency, the partner model may utilize the original rating.

1.3.3.6 Comparison of Test Data

The scores for all adult body regions and child dynamic test scores achieve at least 85% of the original test results during test data comparisons. Furthermore, the structural integrity and performance of safety equipment must align with the original test outcomes. Where these criteria are not met, an explanation for the discrepancies shall be provided to the TNCAP executive agency.

1.3.4 Corporate Twins

'Corporate Twins' are models which are identical to each other in all ways except for brand and model name i.e. they are examples of pure 'badge-engineering'. Visually, they are virtually identical and it is clear to consumers that they are, in effect, the same vehicle.

1.3.4.1 A vehicle's star rating can be applied to twins if:

(1) The TNCAP executive agency is satisfied that the twin is, apart from name and branding, identical to the vehicle tested in all ways related to safety.

(2) The twin has the same base safety specification as the vehicle tested, or better.

(3) The best-selling variant of the twin has the same body style and powertrain.

1.3.4.2 Manufacturers must provide an equipment matrix to apply the rating to all brand models.

(1) The manufacturers shall submit an equipment matrix in written form.

(2) The basic safety specifications and the best-selling variants shall be identified for each brand in the equipment matrix.

(3) The manufacturer shall notify the TNCAP executive agency of any changes to the standard/optional fitment of safety equipment.

1.3.4.3 Documentation shall be submitted to the TNCAP executive agency which highlights differences, if any, in

(1) Manufacturing plants.

(2) Suppliers of safety equipment.

(3) Powertrain options.

1.3.4.4 Where very minor differences exist, the twin model with the lowest safety specifications or poorer performance will be assessed.

1.3.4.5 Vehicle manufacturers must provide all relevant variants or parts of twin models as requested by the TNCAP executive agency for strip-down/parts check.

1.3.4.6 Manufacturers seeking to designate other brand models as corporate twins at the time the original assessment is to be done. The TNCAP executive agency does not accept retrospective applications for twins to share the original rating.

1.3.4.7 The TNCAP executive agency shall publish corporate twins based on the test results of the original model. TNCAP will make no distinction between the models.

1.3.4.8 Twins must have the same date stamp on the rating.

1.3.4.9 If the protocol regime has changed between the time of the original assessment and the release of a twin model, the twin model shall comply with the provisions specified in section 1.3.3.5.2.2.

1.3.5 Presentation on Website

1.3.5.1 Presentation of results on TNCAP website is as follows:

1.3.5.1.1 The model range list shall specify the variants to which the original assessment outcome applies.

1.3.5.1.2 Partners are presented as separate models to the originally-tested vehicle on the TNCAP website, with their own web pages. The results shown in the assessment of the partner will be a combination of those carried over from the originally-tested vehicle and any additional tests done specifically on the partner. The TNCAP website shall make clear to consumers that the partner is closely related to the originally-assessed vehicle, to explain why the visual media contains images of tests on that vehicle.

1.3.5.1.3 Corporate twins are presented as separate models to the originally-tested vehicle on the TNCAP website, with their own web pages. The results shown for twins will be those of the originally-tested vehicle as the worst-case will have been tested where small differences exist (e.g. pedestrian testing, owing to different grilles, headlamps etc). The

TNCAP website make clear to consumers that the twin is closely related to the originally-assessed vehicle, to explain why the visual media contains images of tests on that vehicle.

1.3.6 Shared Star Rating Regulations

Additional evidence is required for model variants failing to meet the criteria set out in the tables below. Additional evidence is test data produced in accordance with TNCAP protocol. In addition to the official tests mandated in Tables 1 to 4, the in-house data is required.

Table 1: Adult Occupant Protection

	Factor	Criterion
a)	Body Style (same number of side entry doors)	The structural diagram of the front seat belt anchorages (not rear seat belt anchorages) is required demonstrating that the design and structure of the front lateral vertical plane located 500mm rearward from the upper fixing point of the driver's seat belt are identical, thereby ensuring crashworthiness. Where differences in front structure or design (for example, to accommodate electrical architecture in a BEV, where a combustion-engined vehicle was originally tested), the manufacturer may apply for a vehicle to be considered a variant. In this case, additional tests may be required to demonstrate equivalent crash performance.
b)	Body style (different number of side entry doors)	1. Where a variant differs from the tested vehicle in the number of side entry doors (e.g. a 3 door where a 5 door was tested, or vice versa). However, its front-end structure is identical for crashworthiness purposes, additional evidence (side pole and side AE-MDB) must be provided according to the follows: (1) For variants (same brand, same model name) in-house data may be provided. (2) For partner models (same brand, different model names), official TNCAP tests must be done. The same rating can be used for the variant or partner in question if the results of the test are comparable, for adult and child dummies, with those of the originally-tested vehicle. 2. If the shape or H point of the rear seats is different from the tested variant, additional evidence may be requested to demonstrate equivalent performance for the full-width test.

c)	Kerb Mass	1. Variation up to ±10% of the mass of the frontal offset test vehicle is allowed, provided the car does not receive a modifier for body shell instability. Further evidence shall be required in cases where no modifier has not been applied but the stability is considered marginal. 2. For variants where the maximum kerb mass (including all options, safety-related or otherwise) differs by ±10%-20% from the mass of the frontal offset test vehicle, in-house data for the frontal ODB, side AE-MDB, and side pole impact tests shall be provided. 3. Where the maximum kerb mass is beyond 20 percent more or less than the mass of the frontal ODB test vehicle, the OEM must perform additional official frontal offset, side AE-MDB and side pole tests at a TNCAP technical service.
d)	Engine (displacement, cylinder configuration, aspiration, block size, type of fuel)	1. For internal combustion (IC) engines, the same block size & configuration is allowed, irrespective of displacement, aspiration, and fuel. Extra components within the engine bay such as LPG converters and turbo-chargers are acceptable provided that footwell and pedal intrusion are well controlled in the tested vehicle (i.e., 4 points scored for driver's feet and no footwell rupture). 2. Note that a 4-cylinder result cannot be used for a V6 result and a V6 result cannot be used for a V8, and vice versa, without additional evidence (in-house or official TNCAP frontal offset test). 3. Where an IC variant was originally tested, its test results cannot be applied to electric and hybrid vehicles. Additional official TNCAP tests are needed for frontal offset and side pole tests. Additional factors are checked during tests of electric vehicles, such as battery integrity.
e)	Transmission (manual or auto, number of gears)	Any transmission is acceptable.
f)	Driven wheels (4x4, 4x2, front-wheel drive, rear wheel drive)	1. Two-wheel drive results (either front or rear) are not interchangeable with an all-wheel-drive variant without additional evidence (frontal offset test) due to the effect of the rear driveline. Similarly, front-wheel drive results are not interchangeably with rear-wheel drive results, without additional evidence. 2. Driven wheel differences are acceptable for the side impact and pole tests.
g)	Ride height (e.g. height of	In general, a difference of ±50mm from the tested variant is acceptable for both the frontal offset test and the side AE-MDB test. However, OEM shall

	top of wheel arch) and tire diameter	submit data illustrating where critical structures are positioned relative to the deformable elements in these tests. The lead inspector may require additional evidence. In any case, additional evidence (AE-MDB) test is required where the ride height is more than 50mm lower than the tested variant.
h)	Wheelbase	Wheelbase variation up to ±10% is acceptable. Additional evidence (frontal offset test) is required for larger variations.
i)	Occupant restraint systems	Seat design must have similar restraint-related features, such as anti-submarining pans. Upholstery and adjustment features may vary. Where restraint systems differ, additional evidence is required (additional evidence required shall vary depending on the extent of differences).
j)	Whiplash	1. Cosmetic changes such as upholstery materials are acceptable. Where a different seat structure or mounting is used or the seat geometry is changed (other than due to easily compressible materials) additional evidence is required (static and dynamic whiplash tests). Control changes (electric/memory vs. manual) are acceptable. 2. Additional evidence is required for variants which have structures rearward of the driver seat to demonstrate that the mechanisms designed to control whiplash injuries have sufficient space to operate. For example, a dual-cab whiplash rating cannot be applied to a single cab variant without additional evidence (dynamic whiplash tests).
k)	Third Row Seats	1. Official TNCAP tests are needed for the following: rear whiplash assessment; CRS installation; SBR. 2. If points are lost relative to the tested variant in any of these assessments, the score of the poorer performing variant will be used for: (1) Variants that share the assessment (TNCAP website) (2) Partners which share a common assessment (TNCAP website) For partner models which have individual announcement on the website, the rating results shall be presented in aforementioned manner. 3. Where the H point of the second-row seats differs from that of the tested variant, the OEM must supply additional data demonstrating equivalent performance in the frontal ODB test and the side AE-MDB test.

l)	AEB City	1. Where a grid was submitted for the original rating (i.e. 2022 ratings) onwards, the OEM may submit a revised grid demonstrating equivalent performance for the new variant or partner model. TNCAP may ask for additional tests to verify the revised grid. 2. Where no grid was submitted, other variants must use the same components, human-machine-interface and software as the system tested. 3. To transfer the rating from the tested variant: (1) the system must have the same functional components (e.g., LIDAR, radar transmitter & receiver, and mono or stereo cameras), of the same brand, model, and series as tested by TNCAP-tested; (2) AEB software must be the same as that tested by TNCAP; (3) All transmitter, receiver and camera locations must be the same as those tested by TNCAP. Where these conditions are not met additional evidence (AEB) is required demonstrating that the system has the same or better performance than the system tested by TNCAP.

Table 2: Child Occupant Protection

	Factor	Criterion
a)	Shape of rear bench	Where the rear seats differ from those in the tested variant, in shape, style or H-point, the OEM must provide data on these differences and additional evidence they may be required to demonstrate equivalent performance for child dynamic tests and CRS installation.
b)	Pretensioners and load-limiters	Where the rear restraints differ from those in the tested variant, additional evidence shall be submitted to demonstrate equivalent performance for child dynamic tests and CRS installation.
c)	Third Row Seats	Where the third-row seats differ from those in the tested variant, official TNCAP CRS installation check needed. Results presented as explained in Table 1, Adult Occupant Protection (Third Row Seats).

Table 3: Pedestrian Protection

	Factor	Criterion
a)	Head Impact Zones	1. Where the grids were submitted for headform testing of the original assessment, a modified grid shall be submitted for variants and partner models. TNCAP may require additional testing to verify some grid locations. 2. Where the grids were not originally submitted:

		(1) Where under-bonnet clearances are smaller than the tested variant and are within 50mm of the bonnet exterior outer surface, the additional evidence (pedestrian headform impact tests) is required. (2) Similarly, additional evidence is required where the stiffness of components within the prescribed adult and child head impact zones (and to a depth of 50mm below the exterior outer surface) is likely to be greater than the tested variant. 3. If the original assessment involved active pedestrian protection, such as a deployable bonnet, official TNCAP tests shall be needed for any variants that do not have such equipment.
b)	Upper Leg Impact Zones	Where the leading edge of the bonnet is changed in geometry or the stiffness of components within the prescribed zone is likely to be greater than the tested variant, the additional evidence (upper legform tests) is required.
c)	Lower Leg Impact Zones	Where the front bumper bar is changed in geometry or the stiffness of components within the prescribed zone is likely to be greater than the tested variant, the additional evidence (legform tests) is required.
d)	AEB VRU	1. Where an AEB VRU was awarded points, other variants must use the same components, human-machine-interface and software as the system tested by TNCAP. 2. To transfer the rating from the tested variant: (1) the system must have the same functional components (e.g., LIDAR, radar transmitter & receiver, and mono or stereo cameras), of the same brand, model, and series as tested by TNCAP; (2) the AEB software must be the same as that tested by TNCAP; (3) All transmitter, receiver and camera locations must be the same as those tested by TNCAP. Where these conditions are not met, additional evidence (AEB VRU) is required demonstrating that the system has the same or better performance than the system tested by TNCAP.
e)	Ride Height	The impact points for pedestrian protection tests depend on the ride height of the vehicle. Where the ride height differs from the tested variant by more than ±50mm, additional evidence for all pedestrian tests is required.

Table 4: Safety Assist

	Factor	Criterion
a)	Speed Assistance Systems	Where any of the following functions were awarded points, other variants must use the same components, human-machine interface, and software as the system tested TNCAP. (1) Camera-based speed limit information function (SLIF) (2) Digital map-based speed limit information function (SLIF) (3) Combined camera and digital map systems (4) Manual speed assistance (MSA) speed warning function, e.g. audible alarm (5) Manual speed assistance (MSA) speed limitation function (6) Intelligent speed assistance (ISA) Where these conditions are not met, additional evidence (speed assist) is required.
b)	AEB Inter-Urban	1. Where an AEB Inter-Urban was awarded points, other variants must use the same components, human-machine-interface and software as the system tested by TNCAP. 2. To transfer the rating from the tested variant: (1) functional components (e.g., LIDAR, radar transmitter & receiver, and mono or stereo cameras) must be the same brand, model, and series as tested by TNCAP; (2) AEB software must be the same or a later version than that tested by TNCAP; (3) All transmitter, receiver and camera locations must be identical to those tested by TNCAP. Where these conditions are not met, the additional evidence (AEB Inter-Urban) is required demonstrating that the system has the same or better performance than the system tested by TNCAP.
c)	Lane Support Systems	Where LSS system was awarded points, other variants must be equipped with a system of the same type (LDW/LKA) that uses the same components, human-machine-interface and software as the system awarded points by TNCAP. Where these conditions are not met, the additional evidence (LSS) is required.