項 次	Euro NCAP Protocol	修訂內容	新增項目	頁碼	Euro NCAP 版本別
1	3.10緊急煞車輔助系統之試驗規章		◎	P.1-44	Version 1.1
2.	2.1成人保護(AOP)評等規章-2.1.6緊急煞車輔助之市區系統評等		◎	P.45-49	Version 7.0.3
3.	2.4 安全輔助(SA)評等規章-2.4.3 緊急煞車輔助之快速道路系統評等		◎	P.50-62	Version 7.0

3.10 緊急煞車輔助系統之試驗規章

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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 (2010) standard reference test tyre, in accordance with ASTM Method E 1337-90 (reapproved 1996), at a speed of 64.4km/h, without water delivery. 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.	3.10.1 名詞釋義 ~~此規章中使用名詞如下：~~ 3.10.1.1 最高煞車係數（Peak Braking Coefficient, PBC）：根據滾動輪胎最大減速度計算出輪胎與路面摩擦力，本數值係使用美國材料和試驗協會（American Society for Testing and Materials, ASTM）E1136-10（2010）標準試驗輪胎，且符合美國材料和試驗協會E1337-90（1996年重新核可)試驗方法，以時速64.4km/h於乾燥路面上試驗，或依「車輛安全檢測基準」項次「四十三之二」6.2.5.1 所規範之方法。 3.10.1.2 緊急煞車輔助系統（Autonomous emergency braking, AEB）：車輛偵測到可能發生碰撞情況下自動煞車，致使車輛減速並避免碰撞情事發生。	

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Forward Collision Warning (FCW) – an audiovisual warning that is provided automatically by the vehicle in response to the detection of a likely collision to alert the driver.	3.10.1.3 前方碰撞預警系統（Forward Collision Warning, FCW）：車輛偵測到可能發生碰撞情況下，為了警示駕駛而自動發出之視聽覺警告信號。	
Dynamic Brake Support (DBS) – a system that further amplifies the driver braking demand in response to the detection of a likely collision to achieve a greater deceleration than would otherwise be achieved for the braking demand in normal driving conditions.	3.10.1.4 動態煞車輔助系統（Dynamic Brake Support, DBS）：在車輛偵測到可能發生碰撞情況下，此系統能加強煞車效能，達到比平時行駛作動煞車時更大的減速度。	
Car-to-Car Rear Stationary (CCRs) – a collision in which a vehicle travels forwards towards another stationary vehicle and the frontal structure of the vehicle strikes the rear structure of the other.	3.10.1.5 前車靜止情境試驗（Car-to-Car Rear Stationary, CCRs）：係指後方車輛往前行駛接近靜止的前方車輛，且行駛車輛之車頭碰撞靜止車輛之車尾。	
Car-to-Car Rear Moving (CCRm) – a collision in which a vehicle travels forwards towards another vehicle that is travelling at constant speed and the frontal structure of the vehicle strikes the rear structure of the other.	3.10.1.6 前車移動情境試驗（Car-to-Car Rear Moving, CCRm）：係指後方車輛往前行駛接近以恆定速度行駛之前方車輛，且行駛車輛之車頭碰撞以恆定速度行駛車輛之車尾。	
Car-to-Car Rear Braking (CCRb) – a collision in which a vehicle travels forwards towards another vehicle that is travelling at constant speed and then decelerates, and the frontal structure of the vehicle strikes the rear structure of the other.	3.10.1.7 前車煞車情境試驗（Car-to-Car Rear Braking, CCRb）：係指後方車輛往前行駛接近原以恆定速度行駛而後減速之前方車輛，且行駛車輛之車頭碰撞減速車輛之車尾。	
Vehicle under test (VUT) – means the vehicle tested according to this protocol with a pre-crash collision mitigation or avoidance system on	3.10.1.8 受驗車輛（Vehicle under test, VUT）：係指配備減緩碰撞或預防碰撞系統，並依據此規章進行試驗之車輛。	

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board. Euro NCAP Vehicle Target (EVT) – means the vehicle target used in this protocol as specified in ANNEX A. Time To Collision (TTC) – means the remaining time before the VUT strikes the EVT, assuming that the VUT and EVT would continue to travel with the speed it is travelling. T_{AEB} – means 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/s^2, and then going back to the point in time where the acceleration first crossed -0.3 m/s^2. T_{FCW} – means the time where the audible warning of the FCW starts. The starting point is determined by audible recognition. Vimpact – means the speed at which the VUT hits the EVT. Vrel_impact – means the relative speed at which the VUT hits the EVT by subtracting the velocity of the EVT from Vimpact at the time of collision.	3.10.1.9 T-NCAP 目標車（T-NCAP Vehicle Target, EVT）：3.10.8 所規範之目標車。 3.10.1.10 碰撞時間（Time To Collision, TTC）：若受驗車輛與目標車皆依其速度向前行進，受驗車輛會碰撞目標車之預估時間值。 3.10.1.11 緊急煞車輔助系統觸發時間（T_{AEB}）：觸發時間點的定義方式為找出最後一個濾波後加速度信號低於-1 m/s^2 的數據點，再往回找出加速度首次達到-0.3 m/s^2 的數據點，該點之時間即為觸發時間點。 3.10.1.12 前方碰撞預警系統觸發時間（T_{FCW}）：前方碰撞預警系統之聲音警示觸發的時間，起始點以聲音辨識作判定。 3.10.1.13 碰撞速度（V_{impact}）：受驗車輛碰撞目標車(EVT)時的速度。 3.10.1.14 碰撞相對速度（Vrel impact）：受驗車輛碰撞目標車時的相對速度，計算方式為碰撞速度減去目標車遭碰撞時之速度。	

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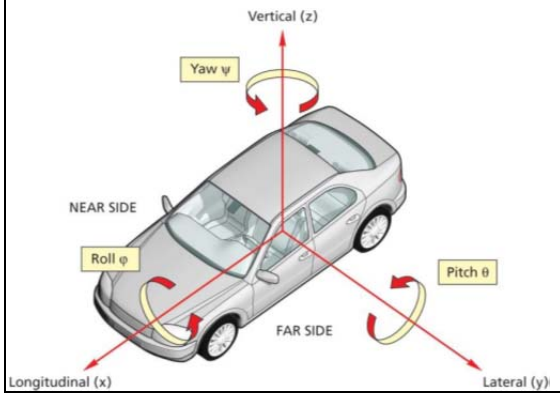
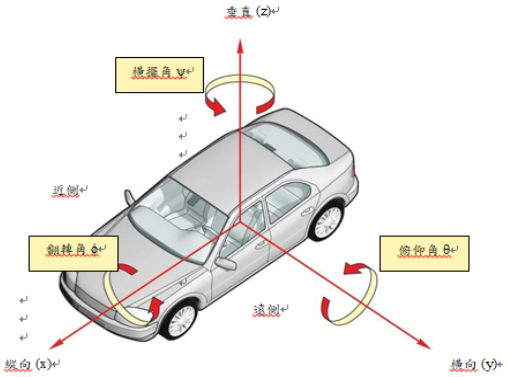
3 REFERENCE SYSTEM 3.1 Convention 3.1.1 For both VUT and EVT use the convention specified in ISO 8855:1991 in which the x-axis points towards the front of the vehicle, the y-axis towards the left and the z-axis upwards (right hand system), with the origin at the most forward point on the centreline of the VUT for dynamic data measurements as shown in Figure 1. 3.1.2 Viewed from the origin, roll, pitch and yaw rotate clockwise around the x, y and z axes respectively. Longitudinal refers to the component of the measurement along the x-axis, lateral the component along the y-axis and vertical the component along the z-axis. 3.1.3 This reference system should be used for both left and right hand drive vehicles tested.  	3.10.2 參考系統 3.10.2.1 通則 3.10.2.1.1 受驗車輛與目標車皆使用 ISO 8855:1991 之通則進行動態數據測量。此通則中 X 軸指向車頭、Y 軸指向車輛左側、Z 軸則指向車頂（右手座標系統），原點則是受驗車輛中線之最前點，如圖 1 所示。 3.10.2.1.2 以原點為中心，翻轉角（roll）、俯仰角（pitch）與橫擺角（yaw）分別以順時針方式繞 X 軸、Y 軸與 Z 軸。縱向為沿著 X 軸的測量方式、橫向為沿著 Y 軸的測量方式、垂直向則是沿著 Z 軸的測量方式。 ~~3.10.2.1.3 左駕及右駕受驗車輛皆使用此參考系統。~~  	

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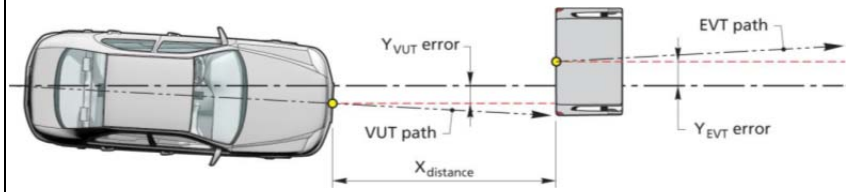
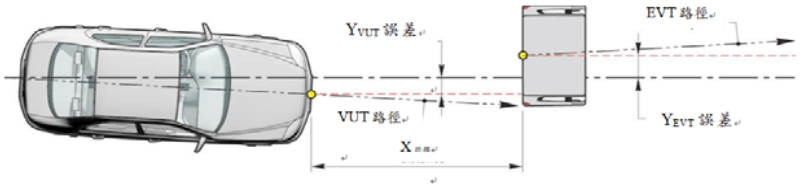
Figure 1: Coordinate system and notation 3.2 Lateral Offset 3.2.1 The lateral offset is determined as the lateral distance between the centre of the front of the VUT and the centre of the rear of the EVT when measured in parallel to the intended straight lined path as shown in the figure below. Lateral offset = Y_{VUT} error + Y_{EVT} error  Figure 2: Lateral offset	圖 1：座標系統與標記 3.10.2.2 側向偏移量 3.10.2.2.1 側向偏移量（lateral offset）之定義為受驗車輛前方中心與目標車後方中心，其欲達成之直線路徑平行測量所得之側向距離誤差值，如下圖所示。 側向偏移量＝Y_{VUT} 誤差＋Y_{EVT} 誤差  圖 2：側向偏移量	
4. MEASURING EQUIPMENT 4.1.1 Sample and record all dynamic data at a frequency of at least 100Hz. Synchronise using the DGPS time stamp the EVT data with that of the VUT. 4.2 Measurements and Variables	3.10.3 量測配備 3.10.3.1 所有動態數據之採樣及記錄頻率不得低於 100Hz。使用差分全球定位系統時間標記（DGPS time stamp）將目標車數據與受驗車輛數據同步。 3.10.3.2 量測與變數	

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4.2.1 Time	T	3.10.3.2.1 時間	T	
•CCRs and CCRm: T_0 equals TTC = 4s	T_0	(1) 前車靜止與前車移動：T_0等於碰撞時間 =4s（前車煞車：T_0為目標車開始減速）	T_0	
(CCRb: T_0 when EVT starts decelerating)				
•T_{AEB}, time where AEB activates	T_{AEB}	(2) 緊急煞車輔助系統啟動時間	T_{AEB}	
•T_{FCW}, time where FCW activates	T_{FCW}	(3) 前方碰撞預警系統啟動時間	T_{FCW}	
•T_{impact}, time where VUT impacts EVT	T_{impact}	(4) 受驗車輛碰撞目標車之時間	T_{impact}	
4.2.2 Position of the UT during the entire test	X_{VUT}, Y_{VUT}	3.10.3.2.2 試驗過程中受驗車輛之位置	X_{VUT} Y_{VUT}	
4.2.3 Position of the EVT during the entire test	X_{EVT}, Y_{EVT}	3.10.3.2.3 試驗過程中目標車之位置	X_{EVT} Y_{EVT}	
4.2.4 Speed of the VUT during the entire test	V_{VUT}	3.10.3.2.4 試驗過程中受驗車輛之速度	V_{VUT}	
•V_{impact}, speed when VUT impacts EVT	V_{impact}	(1) 碰撞速度：受驗車輛碰撞目標車時的速度	V_{impact}	
•$V_{rel,impact}$, relative speed when VUT impacts EVT	$V_{rel,\ impact}$	(2) 碰撞相對速度：受驗車輛碰撞目標車時之相對速度	$V_{rel,\ impact}$	
4.2.5 Speed of the EVT during the entire test	V_{EVT}	3.10.3.2.5 試驗過程中目標車之速度	V_{EVT}	
4.2.6 Yaw velocity of the VUT during the entire test	$\boldsymbol{\Psi}_{VUT}$	3.10.3.2.6 試驗過程中受驗車輛之橫擺角速度	$\boldsymbol{\Psi}_{VUT}$	
4.2.7 Yaw velocity of the EVT	$\boldsymbol{\Psi}_{EVT}$	3.10.3.2.7 試驗過程中目標車之	$\boldsymbol{\Psi}_{EVT}$	

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during the entire test 4.2.8 Acceleration of the VUT A_{VUT} during the entire test 4.2.9 Acceleration of the EVT A_{EVT} during the entire test	橫擺角速度 3.10.3.2.8 試驗過程中受驗車輛 A_{VUT} 之加速度 3.10.3.2.9 試驗過程中目標車之 A_{EVT} 加速度	
4.3 Measuring Equipment	3.10.3.3 量測配備精度	
4.3.1 Equip the VUT and EVT with data measurement and acquisition equipment to sample and record data with an accuracy of at least: •VUT and EVT speed to 0.1km/h; •VUT and EVT lateral and longitudinal position to 0.03m ; •VUT and EVT yaw rate to 0.1°/s; •VUT and EVT longitudinal acceleration to 0.1m/s^2; •VUT steering wheel velocity to 1.0 °/s.	3.10.3.3.1 受驗車輛與目標車應配備數據量測與採集配備，用以抽樣及記錄數據，其精準度最低要求如下： (1) 受驗車輛與目標車速度：0.1km/h (2) 受驗車輛與目標車之橫向及縱向位置：0.03m (3) 受驗車輛與目標車橫擺角速度：0.1°/s (4) 受驗車輛與目標車縱向加速度：0.1m/s^2 (5) 受驗車輛方向盤轉速：1.0 °/s	
4.4 Data Filtering	3.10.3.4 數據濾波	
4.4.1 Filter the measured data as follows:	3.10.3.4.1 依據下列原則對量測所得數據進行濾波：	
4.4.1.1 Position and speed are not filtered and are used in their raw state.	3.10.3.4.1.1 位置與速度不需濾波，直接使用原始數據。	
4.4.1.2 Acceleration with a 12-pole phaseless Butterworth filter with a cut off frequency of 10Hz.	3.10.3.4.1.2 加速度：由 12-pole phaseless 巴特沃斯濾波器(Butterworth filter)及 10Hz 之截止頻率進行濾波。	

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4.4.1.3 Yaw rate with a 12-pole phaseless Butterworth filter with a cut off frequency of 10Hz. 4.4.1.4 Force with a 12-pole phaseless Butterworth filter with a cut off frequency of 10 Hz.	3.10.3.4.1.3 橫擺角速度：由 12-pole phaseless 巴特沃斯濾波器(Butterworth filter)及 10Hz 之截止頻率進行濾波。 3.10.3.4.1.4 力度：由 12-pole phaseless 巴特沃斯濾波器(Butterworth filter)及 10Hz 之截止頻率進行濾波。	
5 .EURO NCAP VEHICLE TARGET 5.1 Specification 5.1.1 Conduct the tests in this protocol using the Euro NCAP Vehicle Target V1 (EVT) as shown in Figure 3 below. The EVT replicates the visual, radar, LIDAR and PMD attributes of a typical M_1 passenger vehicle, and is impactable at differential speeds up to 50km/h without causing damage to the VUT or EVT.  Figure 3: Euro NCAP Vehicle Target (EVT)	3.10.4 T-NCAP 目標車 3.10.4.1 規格 3.10.4.1.1 進行試驗時，應使用 T-NCAP 目標車(EVT)，如圖 3 所示。目標車模擬一般 M_1 類小客車之視覺、雷達、光達（LIDAR）與 PMD 特性，另受驗車輛或目標車於碰撞速度 50km/h 以下時應不會造成損壞。  圖 3：T-NCAP 目標車	

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5.1.2 To ensure repeatable results the propulsion system and EVT must meet the requirements as detailed in ANNEX A. 5.1.3 The EVT is designed to work with the following types of sensors: •Radar (24 and 77 GHz) •LIDAR •Camera •PMD When a manufacturer believes that the EVT is not suitable for another type of sensor system used by the VUT but not listed above, the manufacturer is asked to contact the Euro NCAP Secretariat.	3.10.4.1.2 為確保試驗結果之再現性，推進系統與目標車應符合 3.10.8 規定。 3.10.4.1.3 設計之目標車應能辨識下列各型式之感測器： (1) 雷達（24 與 77 GHz） (2) 光達 (3) 攝影機 (4) PMD 如車輛業者認為受驗車輛裝設非上述之感測器且不適用於目標車時，則車輛業者應與 T-NCAP 執行機構聯繫。	
6. TEST CONDITIONS 6.1 Test Track 6.1.1 Conduct tests on a dry (no visible moisture on the surface), uniform, solid-paved surface with a consistent slope between level and 1%. The test surface shall have a minimal peak braking coefficient (PBC) of 0.9. 6.1.2 The surface must be paved and may not contain any irregularities (e.g. large dips or cracks, manhole covers or reflective studs) that may give rise to abnormal sensor measurements within a lateral distance of 3.0m to either side of the test path and with a	3.10.5 試驗條件 3.10.5.1 試驗道路 3.10.5.1.1 試驗道路應乾燥（試驗路面無明顯可見之水分）、平整、固態鋪設之路面，坡度應介於水平至 1%之間。試驗路面之最高煞車係數（PBC）應大於等於 0.9。 3.10.5.1.2 試驗道路應為鋪設路面，試驗路徑兩側 3.0m 內及試驗結束時受驗車輛前方 30m 內，不得有任何可能造成感測器偵測異常之不平整處（如：驟降斜坡、裂縫、人孔蓋或反光路釘）。	

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longitudinal distance of 30m ahead of the VUT when the test ends.		
6.1.3 The presence of lane markings is allowed. However testing may only be conducted in an area where typical road markings depicting a driving lane may not be parallel to the test path within 3.0m either side. Lines or markings may cross the test path, but may not be present in the area where AEB activation and/or braking after FCW is expected.	3.10.5.1.3 試驗道路可設有車道標線。然而，試驗路徑兩側 3.0m 內不得有平行於路徑之一般車道標線。指示線或標線可以通過試驗路徑，但不得出現於預計會觸發緊急煞車輔助系統，及/或前方碰撞預警系統作動後之煞車處。	
6.2 Weather Conditions	3.10.5.2 天氣條件	
6.2.1 Conduct tests in dry conditions with ambient temperature above 5°C and below 40°C.	3.10.5.2.1 試驗應於環境溫度 5°C 至 40°C 間之乾燥環境進行。	
6.2.2 No precipitation shall be falling and horizontal visibility at ground level shall be greater than 1km. Wind speeds shall be below 10m/s to minimise EVT and VUT disturbance.	3.10.5.2.2 降雨時應不得進行試驗，且地面水平能見度應大於 1km。風速應小於 10m/s，以使目標車與受驗車輛所受干擾降至最低。	
6.2.3 Natural ambient illumination must be homogenous in the test area and in excess of 2000 lux for daylight testing with no strong shadows cast across the test area other than those caused by the VUT or EVT. Ensure testing is not performed driving towards, or away from the sun when there is direct sunlight.	3.10.5.2.3 試驗區域的自然光線應均勻照射，白天試驗時照度應高於 2000lux，且除了受驗車輛與目標車之陰影外，不得有其他陰影籠罩試驗區域。試驗時應確保車輛行進方向非直接朝向或背向陽光之照射方向。	

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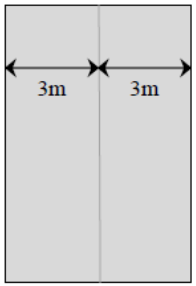
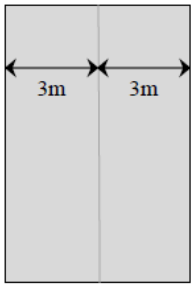
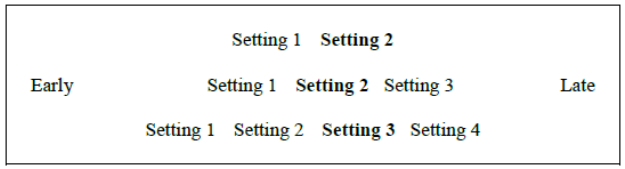
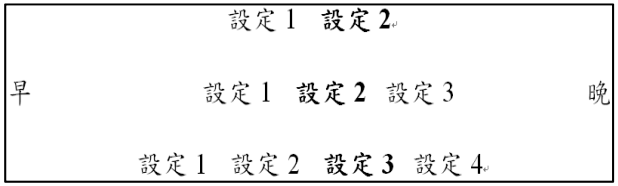
6.2.4 Measure and record the following parameters preferably at the commencement of every single test or at least every 30 minutes: a) Ambient temperature in °C; b) Track Temperature in °C; c) Wind speed and direction in m/s; d) Ambient illumination in Lux.	3.10.5.2.4 應於每次試驗開始前或至少每隔 30 分鐘，測量及記錄以下參數： (1) 現場環境溫度，以攝氏記錄； (2) 路面溫度，以攝氏記錄； (3) 風速與風向，以m/s記錄； (4) 環境照度，以lux記錄。	
6.3 Surroundings	3.10.5.3試驗環境	
6.3.1 Conduct testing such that there are no other vehicles, highway furniture, obstructions, other objects or persons protruding above the test surface that may give rise to abnormal sensor measurements within a lateral distance of 3.0m to either side of the test path and within a longitudinal distance of 30m ahead of the VUT when the test ends (Figure 4).	3.10.5.3.1 試驗時試驗路徑兩側 3.0m 內及試驗結束時受驗車輛前方 30m 內（如圖 4），應無其他車輛、高速公路設施（highway furniture）、障礙物、其他物體或人員，以避免造成感測器偵測異常。	
6.3.2 Test areas where the VUT needs to pass under overhead signs, bridges, gantries or other significant structures are not permitted.	3.10.5.3.2 試驗區域不得設置於受驗車輛會從標誌、橋樑、門架(gantries)，或其他大型建築物下方通過之場地。	
		

Euro NCAP 原文	T-NCAP條文草案	說明
Figure 4: Free surroundings	圖4：空曠的環境	
6.3.3 The general view ahead and to either side of the test area shall comprise of a wholly plain man made or natural environment (e.g. further test surface, plain coloured fencing or hoardings, natural vegetation or sky etc.) and must not comprise any highly reflective surfaces or contain any vehicle-like silhouettes that may give rise to abnormal sensor measurements.	3.10.5.3.3試驗區域前方與兩側之基本視野應為單純之人造建設或自然環境（如：測試路面的延伸、素色圍籬或圍牆、天然植被或天空等），且不得有高度反光表面或任何類似車輛之輪廓，以免造成感測器偵測異常。	
6.4 VUT Preparation 6.4.1 AEB and FCW System Settings	3.10.5.4受驗車輛整備 3.10.5.4.1緊急煞車輔助系統與前方碰撞預警系統設定	
6.4.1.1 Set any driver configurable elements of the AEB and/or FCW system (e.g. the timing of the collision warning or the braking application if present) to the middle setting or midpoint and then next latest setting similar to the examples shown in Figure 5.	3.10.5.4.1.1緊急煞車輔助系統及/或前方碰撞預警系統之駕駛可調整設定選項（如：碰撞預警時機，或煞車作動時機，若有設置）調整至中段選項或距中間點位置但較晚發出警示之選項，如圖5所示。	
 Figure 5: AEB and/or FCW system setting for testing	 圖 5：緊急煞車輔助系統及/或前方碰撞預警系統試驗設定	
6.4.2 Deployable Pedestrian/VRU Protection Systems	3.10.5.4.2 行人/弱勢道路使用者保護系統（Deployable Pedestrian/VRU Protection Systems）	

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When the vehicle is equipped with a deployable pedestrian/VRU protection system, this system shall be deactivated before the testing commences.	如受驗車輛配備其他行人/弱勢道路使用者保護系統，試驗前應關閉上述保護系統。	
6.4.3 Tyres Perform the testing with new original fitment tyres of the make, model, size, speed and load rating as specified by the vehicle manufacturer. It is permitted to change the tyres which are supplied by the manufacturer or acquired at an official dealer representing the manufacturer if those tyres are identical make, model, size, speed and load rating to the original fitment. Inflate the tyres to the vehicle manufacturer's recommended cold tyre inflation pressure(s). Use inflation pressures corresponding to least loading normal condition.	3.10.5.4.3輪胎 試驗應使用車輛業者指定之型式、尺寸、速度代號及載重能力指數之全新原廠輪胎。試驗時，可更換車輛業者或代理商所提供之輪胎，前提是新的輪胎應符合原廠規格之型式、尺寸、速度代號及載重能力指數。將輪胎充氣至車輛業者建議之冷胎胎壓。使用之輪胎胎壓應至少與一般負載狀態之胎壓(least loading normal condition）相同。	
Run-in tyres according to the tyre conditioning procedure specified in 7.1.3. After running-in maintain the run-in tyres in the same position on the vehicle for the duration of the testing.	依 3.10.6.1.3 節進行輪胎磨合（run-in），磨合完畢之輪胎於整個試驗過程中應維持於車輛相同位置。	
6.4.4 Wheel Alignment Measurement The vehicle should be subject to a vehicle (in-line) geometry check to record the wheel alignment set by the OEM. This should be done with the vehicle in kerb weight.	3.10.5.4.4 車輪定位測量（Wheel Alignment Measurement） 受驗車輛應以車輛業者之設定進行車輛幾何檢查（vehicle (in-line) geometry check），以紀錄其車輪定位，受驗車輛應為空車重量。	
6.4.5 Unladen Kerb Mass	3.10.5.4.5 空車重量（Unladen Kerb Mass）	

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6.4.5.1 Fill up the tank with fuel to at least 90% of the tank's capacity of fuel.	3.10.5.4.5.1 車輛燃油箱至少裝滿 90%容量的燃油。	
6.4.5.2 Check the oil level and top up to its maximum level if necessary. Similarly, top up the levels of all other fluids to their maximum levels if necessary.	3.10.5.4.5.2 檢查機油油位，必要時加注至最高油位；同樣地，其他液體若有需要也可加注至其最高限值。	
6.4.5.3 Ensure that the vehicle has its spare wheel on board, if fitted, along with any tools supplied with the vehicle. Nothing else should be in the car.	3.10.5.4.5.3 確認備胎及其他隨車工具已在車上，除此之外，車內不應有其他物品。	
6.4.5.4 Ensure that all tyres are inflated according to the manufacturer's instructions for the appropriate loading condition.	3.10.5.4.5.4 確認所有輪胎依車輛業者之建議進行充氣至適當負載狀態（appropriate loading condition）。	
6.4.5.5 Measure the front and rear axle masses and determine the total mass of the vehicle. The total mass is the 'unladen kerb mass' of the vehicle. Record this mass in the test details.	3.10.5.4.5.5 測量前軸及後軸重量，並計算車輛之總重量。此重量即為「空車重量」，將該數據記錄於試驗資料。	
6.4.5.6 Calculate the required ballast mass, by subtracting the mass of the test driver and test equipment from the required 200 kg interior load.	3.10.5.4.5.6 試驗規定需配重（ballast mass）200 公斤，且此重量應包含試驗駕駛及試驗配備之重量。	
6.4.6 Vehicle Preparation	3.10.5.4.6 車輛整備	
6.4.6.1 Fit the on-board test equipment and instrumentation in the	3.10.5.4.6.1 將車載資料擷取配備裝在車輛內，並裝配所有相關電	

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vehicle. Also fit any associated cables, cabling boxes and power sources.	線、接線盒及電源。	
6.4.6.2 Place weights with a mass of the ballast mass. Any items added should be securely attached to the car.	3.10.5.4.6.2 置放相當於配重之重量（weights）。所有物品皆應穩當地固定於車內。	
6.4.6.3 With the driver in the vehicle, weigh the front and rear axle loads of the vehicle.	3.10.5.4.6.3 駕駛上車後，分別量測車輛前後軸重量。	
6.4.6.4 Compare these loads with the “unladen kerb mass”	3.10.5.4.6.4 將上述車輛負載狀態與空車重量進行比較。	
6.4.6.5 The total vehicle mass shall be within ±1% of the sum of the unladen kerb mass, plus 200kg. The front/rear axle load distribution needs to be within 5% of the front/rear axle load distribution of the original unladen kerb mass plus full fuel load. If the vehicle differs from the requirements given in this paragraph, items may be removed or added to the vehicle which has no influence on its performance. Any items added to increase the vehicle mass should be securely attached to the car.	3.10.5.4.6.5 車輛總重應為空車重量加上 200 公斤，容許誤差值為±1%。前軸/後軸之空車重與加滿燃油配重後，前軸/後軸重量變化皆在 5%以內。若受驗車輛無法符合此規範，可於車輛內移除或增加與性能表現無關之物品。任何用以增加重量之物品應穩當地固定於車內。	
6.4.6.6 Repeat paragraphs 6.4.6.3 and 6.4.6.4 until the front and rear axle loads and the total vehicle mass are within the limits set in paragraph 0. Care needs to be taken when adding or removing weight in order to approximate the original vehicle inertial properties as close as possible. Record the final axle loads in the test details. Record the	3.10.5.4.6.6 重複 3.10.5.4.6.3 與 3.10.5.4.6.4 步驟，直至前後軸重量及車輛總重符合條文 3.10.5.4.6.5 之規定。增加或移除重量時應謹慎執行，以維持車輛之慣性屬性（inertial properties）。試驗內容應記錄最終之軸重。試驗條件應記錄受驗車輛之軸重。	

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axle weights of the VUT in the 'as tested' condition.		
7. TEST PROCEDURE 7.1 VUT Pre-test Conditioning 7.1.1 General 7.1.1.1 A new car is used as delivered to the test laboratory. 7.1.1.2 If requested by the vehicle manufacturer, drive a maximum of 100km on a mixture of urban and rural roads with other traffic and roadside furniture to 'calibrate' the sensor system. Avoid harsh acceleration and braking. 7.1.2 Brakes 7.1.2.1 Condition the vehicle's brakes in the following manner: •Perform ten stops from a speed of 56km/h with an average deceleration of approximately 0.5 to 0.6g. •Immediately following the series of 56km/h stops, perform three additional stops from a speed of 72km/h, each time applying sufficient force to the pedal to operate the vehicle's antilock braking system (ABS) for the majority of each stop.	3.10.6 試驗程序 3.10.6.1 受驗車輛試驗前調整 3.10.6.1.1 一般通則 3.10.6.1.1.1 以新車送至檢測機構。 3.10.6.1.1.2 若車輛業者要求，受驗車輛可行駛於市區及鄉村道路之交通環境及設施下最多 100 公里，以校準感測器系統。行駛時，應避免劇烈加速及煞車。 3.10.6.1.2 煞車 3.10.6.1.2.1 依下列方式調節車輛煞車： (1) 自車速 56km/h 以平均減速度為 0.5 至 0.6g 之方式執行 10 次煞停。 (2) 完成上述 56km/h 一系列煞車後，緊接著再以 72km/h 的速度煞停 3 次，每次應以足夠的力度踩下煞車，讓車輛的防鎖死煞車系統（antilock braking system，ABS）可於每次煞車時充分作動。	

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•Immediately following the series of 72km/h stops, drive the vehicle at a speed of approximately 72km/h for five minutes to cool the brakes.	(3) 完成上述 72km/h 一系列煞車後，隨即應以 72km/h 的速度行駛 5 分鐘以冷卻煞車。	
•Initiation of the first test shall begin within two hours after completion of the brake conditioning	(4) 第一項試驗應於調整煞車後 2 小時內開始進行。	
7.1.3 Tyres	3.10.6.1.3 輪胎	
7.1.3.1 Condition the vehicle's tyres in the following manner to remove the mould sheen:	3.10.6.1.3.1 以下列方式調節車輛輪胎，以磨除輪胎之毛邊:	
•Drive around a circle of 30m in diameter at a speed sufficient to generate a lateral acceleration of approximately 0.5 to 0.6g for three clockwise laps followed by three anticlockwise laps. •Immediately following the circular driving, drive four passes at 56km/h, performing ten cycles of a sinusoidal steering input in each pass at a frequency of 1Hz and amplitude sufficient to generate a peak lateral acceleration of approximately 0.5 to 0.6g. •Make the steering wheel amplitude of the final cycle of the final pass double that of the previous inputs.	(1) 測試車輛沿直徑 30m 之圓環並以能產生接近 0.5 至 0.6g 側向加速度之速度繞行，先以順時針方向行駛 3 圈接著以逆時針方向行駛 3 圈。 (2) 使用頻率 1 赫茲之正弦轉向模式，與符合最高側向加速度 0.5 至 0.6g 之方向盤轉角振幅極值，且車速為 56km/h，使車輛繞行 4 次，並於每次進行 10 次之正弦轉向循環。 (3) 最終次之最終循環之方向盤轉角振幅應為前次循環之 2 倍。	
7.1.3.2 In case of instability in the sinusoidal driving, reduce the amplitude of the steering input to an appropriately safe level and continue the four passes.	3.10.6.1.3.2 如正弦轉向模式（sinusoidal driving）致使車身不穩定，則應減少方向盤輸入之振幅至安全水平，並完成 4 次操作。	

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7.1.4 AEB/FCW System Check	3.10.6.1.4 緊急煞車輔助系統/前方碰撞預警系統檢測	
7.1.4.1 Before any testing begins, perform a maximum of ten runs at the lowest test speed the system is supposed to work, to ensure proper functioning of the system.	3.10.6.1.4.1 試驗開始前，應以可觸發系統之最低試驗速度行駛至多 10 次，以確保系統正常運作。	
7.2 Test Scenarios	3.10.6.2 試驗情境	
7.2.1 The performance of the VUT AEB system is assessed in the CCRs, CCRm and CCRb scenarios as shown in Figure 6abc.	3.10.6.2.1 受驗車輛之緊急煞車輔助系統試驗，係以前車靜止情境試驗（CCRs）、前車移動情境試驗（CCRm）及前車煞車情境試驗（CCRb）作評等，如圖 6abc 所示。	
7.2.2 For testing purposes, assume a straight line path equivalent to the centreline of the lane in which the collision occurred, hereby known as the test path. Control the VUT with driver inputs or using alternative control systems that can modulate the vehicle controls as necessary to perform the tests.	3.10.6.2.2 試驗路徑應維持於車道中線。可由駕駛直接控制受驗車輛，另試驗若有需要，可以使用調節車輛控制之控制系統作替代。	
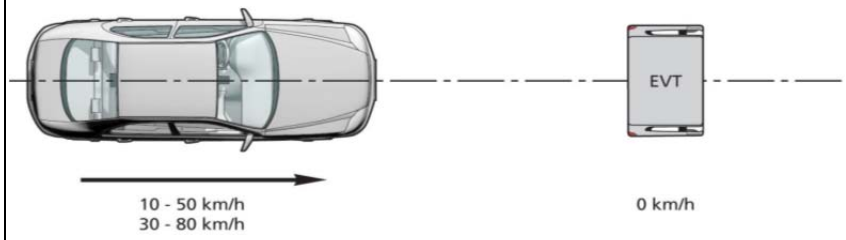	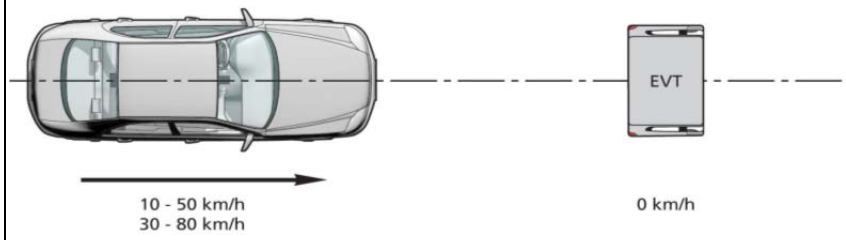	
Figure 6a: CCRs scenario	圖 6a：前車靜止情境試驗	

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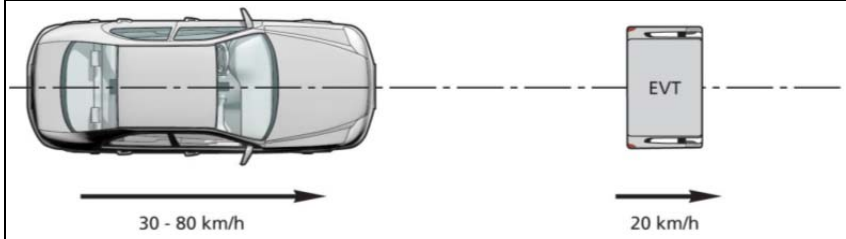
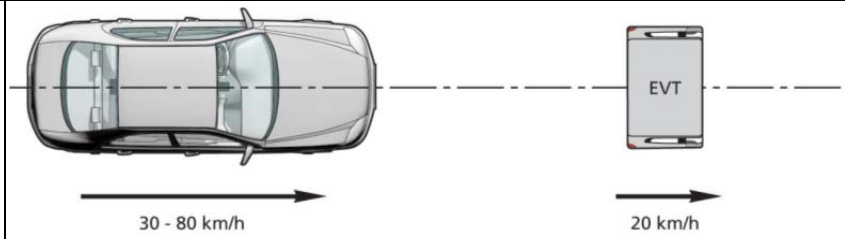
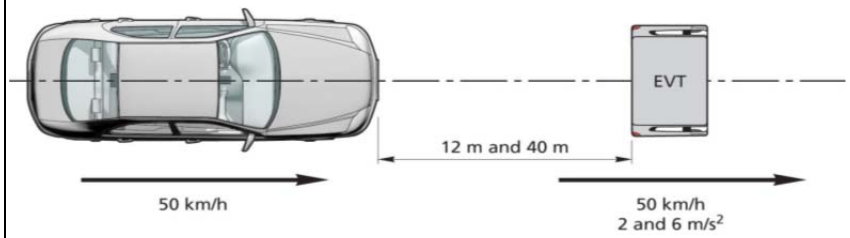
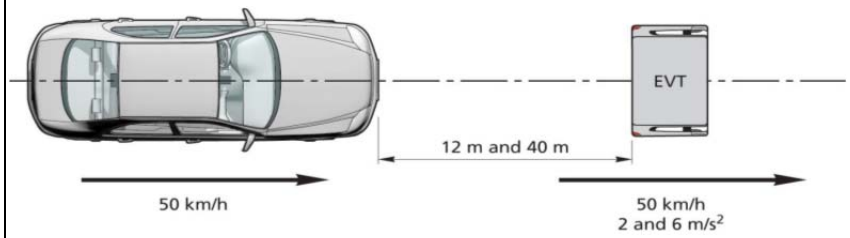
 Figure 6b: CCRm scenario	 圖 6b：前車移動情境試驗	
 Figure 6c: CCRb scenario	 圖 6c：前車煞車情境試驗	
7.2.3 The CCRs and CCRm tests will be performed with 5km/h or 10km/h incremental steps (see 7.4.4) within the speed ranges shown in the tables below.	3.10.6.2.3 前車靜止情境試驗與前車移動情境試驗應於下列表格之速度範圍內，以 5km/h 或 10km/h 之遞增步驟（incremental steps）進行（參 3.10.6.4.4）。	

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	CCRs			
	AEB+FCW combined		AEB only	FCW only
	AEB	FCW		
AEB City	10-50 km/h	-	10-50 km/h	-
AEB Inter-Urban	-	30-80 km/h	30-80 km/h	30-80 km/h

	前車靜止情境試驗(CCRs)			
	AEB+FCW 整合		僅有 AEB	僅有 FCW
	AEB	FCW		
緊急煞車輔助之市區系統	10-50 km/h	-	10-50 km/h	-
緊急煞車輔助之快速道路系統	-	30-80 km/h	30-80 km/h	30-80 km/h

	CCRm			
	AEB+FCW combined		AEB only	FCW only
	AEB	FCW		
AEB Inter-Urban	30-70 km/h	50-80 km/h	30-80 km/h	50-80 km/h

	前車移動情境試驗CCRm			
	AEB+FCW 整合		僅有 AEB	僅有 FCW
	AEB	FCW		
緊急煞車輔助之快速道路系統	30-70 km/h	50-80 km/h	30-80 km/h	50-80 km/h

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The CCRb tests will be performed at a fixed speed of 50km/h for both VUT and EVT with all combinations of 2 and 6m/s^2 deceleration and 12 and 40m headway.

		CCRb	
		AEB+FCW combined,AEB only&FCW only	
		2m/s^2	6m/s^2
AEB Inter-Urban	12m	50km/h	50km/h
	40m	50km/h	50km/h

3.10.6.2.4 前車煞車情境試驗中，受驗車輛及目標車皆以 50km/h 之恆定速度行駛，減速度為 2 及 6 m/s^2，間距（headway）為 12 及 40m。

		前車煞車情境試驗CCRb	
		AEB+FCW 整合 僅有AEB、僅有FCW	
		2m/s^2	6m/s^2
緊急煞車輔助之快速道路系統	12m	50km/h	50km/h
	40m	50km/h	50km/h

7.2.4.1 The desired deceleration of the EVT shall be reached within 1.0 seconds and shall not vary by more than ± 0.25 m/s^2 of the desired level at any point in time until the end of test.

3.10.6.2.4.1 目標車應於 1.0 秒內達到規定之減速度，且試驗過程中不得與規定之減速度相差超過± 0.25 m/s^2。

7.3 Test Conduct

3.10.6.3 試驗規範（Test Conduct）

7.3.1 Before every test run, drive the VUT around a circle of maximum diameter 30m at a speed less than 10km/h for one clockwise lap followed by one anticlockwise lap, and then manoeuvre the VUT into position on the test path. If requested by the OEM an initialisation run may be included before every test run. Bring the VUT to a halt and push the brake pedal through the full extent of travel and release.

3.10.6.3.1 每次試驗前，受驗車輛應以低於 10km/h 之速度繞著最大直徑 30m 之圓圈行駛，先以順時針方向行駛一圈，接著以逆時針方向行駛一圈，最後再將受驗車輛開到試驗道路上的預備位置。若車輛業者要求，可於每項試驗前進行此啟始程序(initialization run)。待受驗車輛完全停止，將煞車踏板踩到底再放開。

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7.3.2 For vehicles with an automatic transmission select D. For vehicles with a manual transmission select the highest gear where the RPM will be at least 1500 at the test speed. If fitted, a speed limiting device or cruise control may be used to maintain the VUT speed, unless the vehicle manufacturer shows that there are interferences of these devices with the AEB system in the VUT. Apply only minor steering inputs as necessary to maintain the VUT tracking along the test path.	3.10.6.3.2 若車輛為自動變速者，應選擇前進檔位 D。若車輛為手排變速者於試驗速度行駛時，應選擇轉速可達 1500rpm 之最高檔位。若有配備，可用車速限制裝置或定速巡航維持受驗車輛之速度，若車輛業者認為該裝置會干擾受驗車輛中的緊急煞車輔助系統除外。應盡量減少轉動方向盤，以維持受驗車輛行駛於試驗道路。	
7.3.3 Perform the first test a minimum of 90s and a maximum of 10 minutes after completing the tyre conditioning, and subsequent tests after the same time period. If the time between consecutive tests exceeds 10 minutes repeat the tyre conditioning procedures and recommence testing.	3.10.6.3.3 應於輪胎調節後 90 秒至 10 分鐘內進行第一次試驗，並於同樣的時間範圍內進行其他試驗。如試驗間隔超過 10 分鐘，則應重複輪胎調節程序，再繼續進行試驗。	
Between tests, manoeuvre the VUT at a maximum speed of 50km/h and avoid riding the brake pedal and harsh acceleration, braking or turning unless strictly necessary to maintain a safe testing environment.	等待下一次試驗時，行駛速度不得高於 50km/h，且非必應儘量避免踩踏煞車（riding the brake pedal）、劇烈加速、煞車或轉彎，以維持安全的試驗環境。	
7.4 Test Execution	3.10.6.4 試驗執行	
7.4.1 Accelerate the VUT and EVT (if applicable) to the respective test speeds.	3.10.6.4.1 受驗車輛與目標車（若適用）應各自加速至試驗規定速度。	

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7.4.2 The test shall start at T_0 (4s TTC) and is valid when all boundary conditions are met between T_0 and T_{AEB}/T_{FCW}: -Speed of VUT (GPS-speed) Test speed + 1.0 km/h -Speed of EVT (GPS-speed) Test speed ± 1.0 km/h -Lateral deviation from test path 0 ± 0.1 m -Relative distance VUT and EVT (CCRb) 12m or 40m ± 0.5m -Yaw velocity 0 ± 1.0 °/s -Steering wheel velocity 0 ± 15.0 °/s	3.10.6.4.2 試驗於 T_0（4s TTC）開始，若 T_0 與 T_{AEB}/T_{FCW} 之間符合下列所有限制條件，則該次試驗認定有效: (1) 受驗車輛速度（GPS-速度）試驗速度+1.0 km/h (2) 目標車速度（GPS-速度）試驗速度±1.0 km/h (3) 行駛路徑側向偏移距離 0 ± 0.1 m (4) 受驗車輛與目標車相對距離（CCRb）12m or 40m ± 0.5m (5) 橫擺角速度 0 ± 1.0 °/s (6) 方向盤轉速 0 ± 15.0 °/s	
7.4.3 The end of a test is considered when one of the following occurs: -V_{VUT} = 0km/h -V_{VUT} < V_{EVT} -Contact between VUT and EVT	3.10.6.4.3 發生下述條件其中之一時試驗即結束: (1) 試驗過程中受驗車輛之速度= 0km/h (2) 試驗過程中受驗車輛之速度<試驗過程中目標車之速度 (3) 受驗車輛與目標車發生碰撞	
7.4.4 A system can consist of a combined AEB and FCW function or separate AEB or FCW functions. For combined systems, both sections 7.4.4.1 and 0 apply. Where the functions are separate, section 7.4.4.1 applies to the AEB function and 7.4.4.2 applies to the FCW.	3.10.6.4.4 緊急煞車輔助系統與前方碰撞預警系統可整合功能成一整合系統，或是緊急煞車輔助系統或前方碰撞預警系統之功能各自獨立。整合系統應符合 3.10.6.4.4.1 與 3.10.6.4.4.2 之規定。若為獨立系統者，緊急煞車輔助系統之測試程序應符合 3.10.6.4.4.1 之規定，另前方碰撞預警系統測試程序應符合 3.10.6.4.4.2 之規定。	
7.4.4.1 For AEB systems tests, when there is complete avoidance, the subsequent test speed for the next test is incremented with 10km/h.	3.10.6.4.4.1 執行緊急煞車輔助系統試驗時，若未發生碰撞者，則下一次的試驗速度應增加 10 km/h。若發生碰撞，則以發生碰撞	

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When there is contact, first perform a test at a test speed 5km/h less than the test speed where contact occurred. After this test continue to perform the remainder of the tests with speed increments of 5km/h by repeating section 7.3.1 to 7.4.3. Stop testing when the speed reduction seen in the test is less than 5 km/h.	之試驗速度減 5km/h 進行試驗。此次試驗後，繼續再以 5 km/h 之遞增速度進行後續的試驗，重複 3.10.6.3.1 至 3.10.6.4.3 之步驟。試驗中車速減低量低於 5 km/h 時停止試驗。	
For manual or automatic accelerator control, it needs to be assured that during automatic brake the accelerator pedal does not result in an override of the system.	不論人員駕駛或使用自動控制裝置，應確保受驗車輛自動煞車作動期間，加速踏板不應凌駕(override)煞車系統。	
7.4.4.2 For FCW system tests, when there is complete avoidance, the subsequent test speed for the next test is incremented by 10km/h. When there is contact, first perform a test at a test speed 5km/h less than the test speed where contact occurred. After this test continue to perform the remainder of the tests with speed increments of 5km/h by repeating section 7.3.1 to 7.4.3. In the AEB Inter-Urban CCRm and CCRb scenarios, only perform tests at the test speeds where there was no avoidance in the AEB function tests, where applicable. Stop testing when the speed reduction seen in the test is less than 5 km/h or the relative impact speed is more than 50 km/h.	3.10.6.4.4.2 執行前方碰撞預警系統試驗時，若未發生碰撞者，則下一項試驗速度應增加 10km/h。若發生碰撞，則以發生碰撞之試驗速度減 5km/h 進行試驗。此次試驗後，繼續再以 5km/h 之遞增速度進行後續的試驗，重複條文 3.10.6.3.1 至 3.10.6.4.3 之步驟。緊急煞車輔助之快速道路系統之前車移動情境試驗與前車煞車情境試驗中，僅需以緊急煞車輔助系統試驗中發生碰撞的速度進行試驗即可（如適用）。試驗中車速減低量低於 5km/h 或碰撞相對速度高於 50km/h，即停止試驗。	
7.4.4.3 The FCW system tests should be performed using a braking robot reacting to the warning with a delay time of 1.2 seconds to account for driver reaction time.	3.10.6.4.4.3 使用於前方碰撞預警系統試驗之煞車自動控制裝置(braking robot)，應於警示響起 1.2 秒後作動，以模擬駕駛之反應時間。	

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7.4.4.4 Braking will be applied that results in a maximum brake level of -4 m/s^2 - 0.25 m/s^2 when applied in a non threat situation. The particular brake profile to be applied (pedal application rate applied in 200ms (max. 400mm/s) and pedal force) shall be specified by the manufacturer. When the brake profile provided by the manufacturer results in a higher brake level than allowed, the iteration steps as described in ANNEX B will be applied to scale the brake level to -4 m/s^2 - 0.25 m/s^2. 7.4.4.5 When no brake profile is provided, the default brake profile as described in ANNEX B will be applied.	3.10.6.4.4.4 在非緊急煞車時，煞車減速度最大值為-4 m/s^2 至- 4.25 m/s^2。車輛業者應提供確切的煞車踏板作動速度（於 200ms 時所施加之踏板速率（最高 400mm/s），以及控制力）。若車輛業者建議之煞車踏板作動速度高於上述規定之煞車減速度，應使用 3.10.9 之疊代步驟(iteration steps)將煞車減速度調整至-4 m/s^2 至- 4.25 m/s^2。 3.10.6.4.4.5 若未提供煞車設定者，則應使用 3.10.9 之預設煞車設定。	
8. PHOTOGRAPHIC AND VIDEO REQUIREMENTS 8.1 Vehicle Markings 8.1.1 Euro NCAP markings will be attached to the exterior of the vehicle in the following locations; upper half of driver's door, upper half of front passenger's door and on the front half of the roof of the vehicle, left and right sides. 8.1.2 Test house logos may be added to the vehicle provided that they do not detract attention from the Euro NCAP markings. Suitable locations for such markings would be the lower half of the rear doors and on the bonnet at the base of the windscreen.	3.10.7 靜態與動態攝影要求 3.10.7.1 車輛標記 3.10.7.1.1 應於下列車身位置貼上 T-NCAP 標記：駕駛座車門上半部、副駕駛座車門上半部及車頂前半部之左側及右側。 3.10.7.1.2 可於車身貼上檢測機構之標記，惟其不得造成 T-NCAP 標記之被關注程度降低。檢測機構之標記可貼於後座車門下半部或擋風玻璃下方前方車蓋上。	

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		3.10.7.1.2 條文所提圖示，擬待完成 T-NCAP LOGO 後，再配合修正該圖示。
8.2 Event Recording	3.10.7.2 試驗紀錄	
8.2.1 Each VUT shall be photographed in test condition prior to test: these photographs should effectively show positioning of the test equipment within the vehicle and good general reference photographs of all sides of the exterior of the vehicle. Where applicable a photographic record of the chassis plate including Vehicle Identification Number should also be made.	3.10.7.2.1 試驗前應先拍照記錄受驗車輛之狀況：照片應能呈現出車內試驗配備之位置及車輛外部每側之參考照片。應以照片記錄車輛底盤銘牌(若適用)，其應包括車身號碼（Vehicle Identification Number）。	
8.2.2 Each test run should be filmed from an external position to effectively record any behavioural characteristics of the vehicle for each run. This should be filmed in a way to best allow a clear and repeatable view of all test runs and camera location shall not alter once testing has commenced, although camera “panning” can be used. The camera should be positioned at normal height and not elevated.	3.10.7.2.2 應從外部位置，有效的記錄每一次試驗之車輛動態特性實境。影片應清楚呈現試驗全程，且可以重複播放。試驗開始後，不得移動攝影機，但可水平轉動攝影鏡頭。攝影機應架設於正常高度。	
8.2.3 On-board cameras should be used to further record vehicle behaviour from inside the vehicle.	3.10.7.2.3 應使用車內攝影機，從車內角度記錄車輛於試驗時之動態狀況。	

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ANNEX A EVT SPECIFICATIONS The Euro NCAP Vehicle Target (EVT) which is used for AEB City and Inter-Urban testing is developed to have the radar signature, reflectivity and visual signature comparable to that of a 'C' segment vehicle in order to aid radar, LIDAR, PMD and camera detection respectively. Known suppliers of the EVT meeting these specifications are Messring (www.messring.de) and Moshon Data (www.moshondata.com). The EVT is build up out of a balloon structure that is covered by a PVC cover on which a vehicle is printed. For both a detailed description is provided within this ANNEX. A.1 Balloon Vehicle Structure The balloon structure consists of polyester, polyethylene, PA 6.6, polychloroprene and nylon. The outer dimensions of the balloon structure are 1600 mm wide and 1350 mm tall with a tolerance of ± 10mm. More detailed dimensions can be found in the front and side view in Figure A.1-1 and Figure A.1-2.	3.10.8 目標車規格 緊急煞車輔助之市區系統(AEB City)與緊急煞車輔助之快速道路系統(AEB Inter-Urban)試驗使用之 T-NCAP 目標車(EVT)，擁有相當於小型家庭用車（C-segment vehicle）之雷達標記（radar signature）、反射率（reflectivity）與視覺標記（visual signature），以協助雷達、光達、PMD 與攝影機進行偵測。 符合上述規格目標車之供應商有 Messring（ www.messring.de）與 Moshon Data（www.moshondata.com）。 目標車係為充氣式車輛結構，其上面覆蓋印有車輛圖樣之 PVC 材質外罩。此附件中提供前述兩項之詳細規範。 3.10.8.1 充氣式車輛結構 充氣式車輛之構造係由聚酯纖維（polyester）、聚乙烯（polyethylene）、聚醯胺 6.6（PA 6.6）、聚氯丁烯（polychloroprene）與尼龍（nylon）製成。充氣式車輛結構之外部尺寸為寬 1600mm、高 1350mm，容許誤差範圍為± 10mm。圖 7 充氣式車輛結構前視圖及圖 8 充氣式車輛結構側視圖之尺寸規格如下。	

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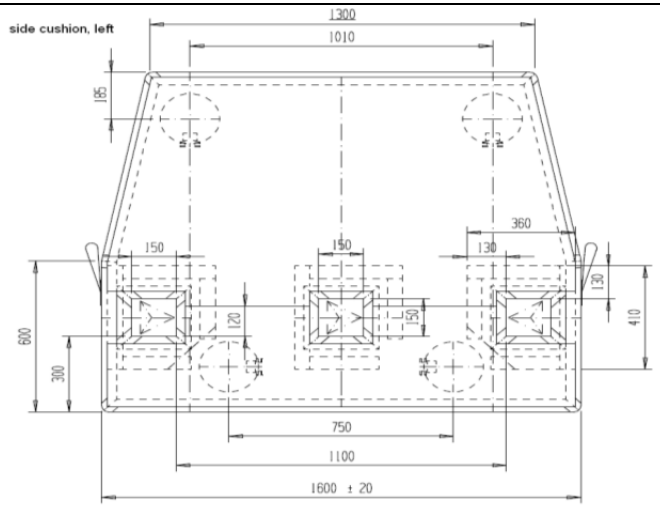
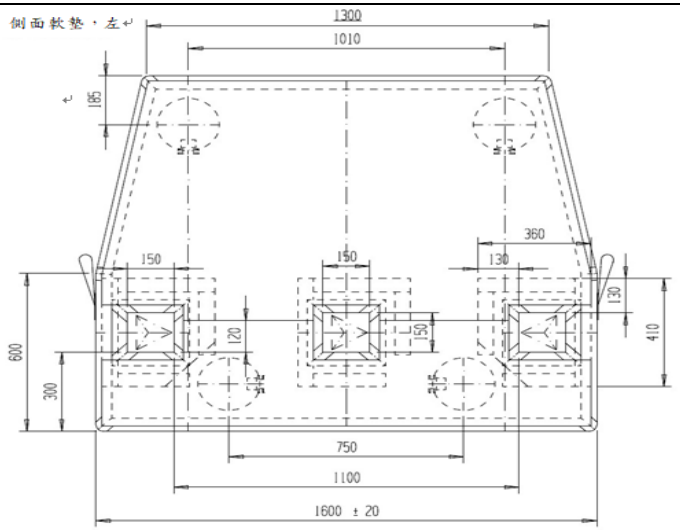
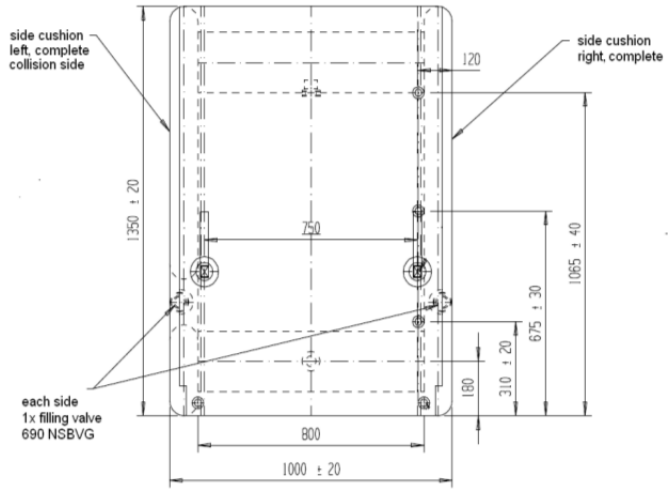
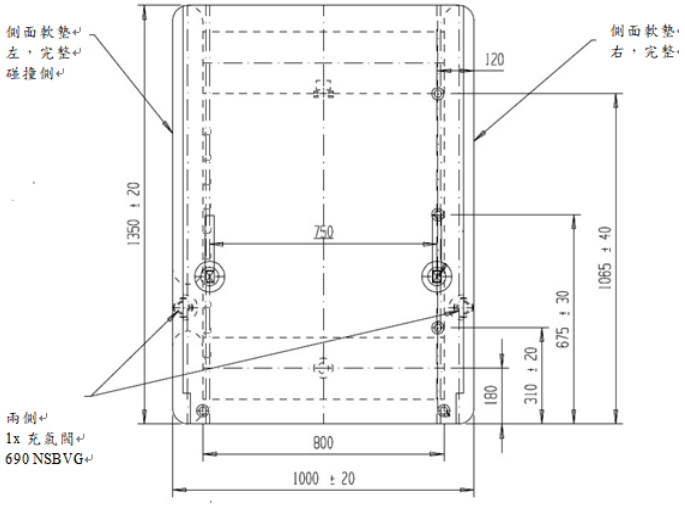
 Figure A.1-1: Balloon structure front view	 圖 7：充氣式車輛結構前視圖	
 Figure A.1-2: Balloon structure side view	 圖 8：充氣式車輛結構側視圖	

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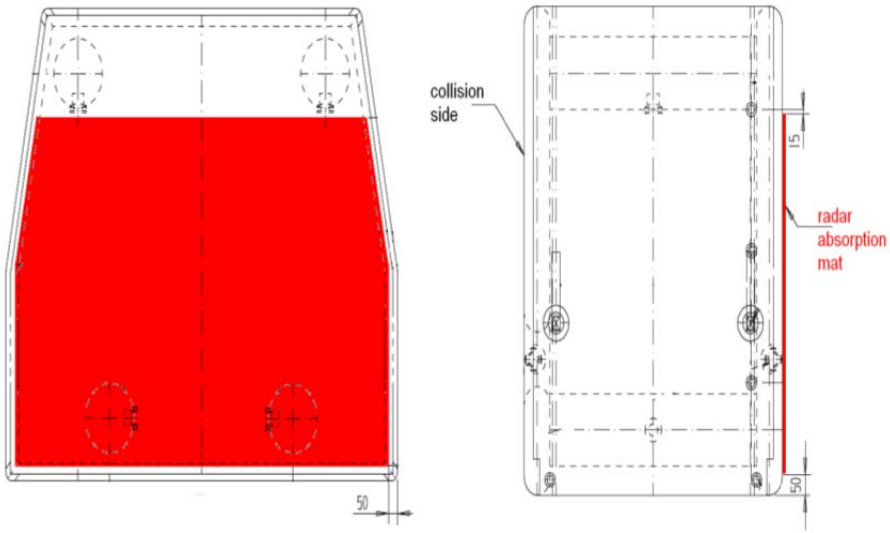
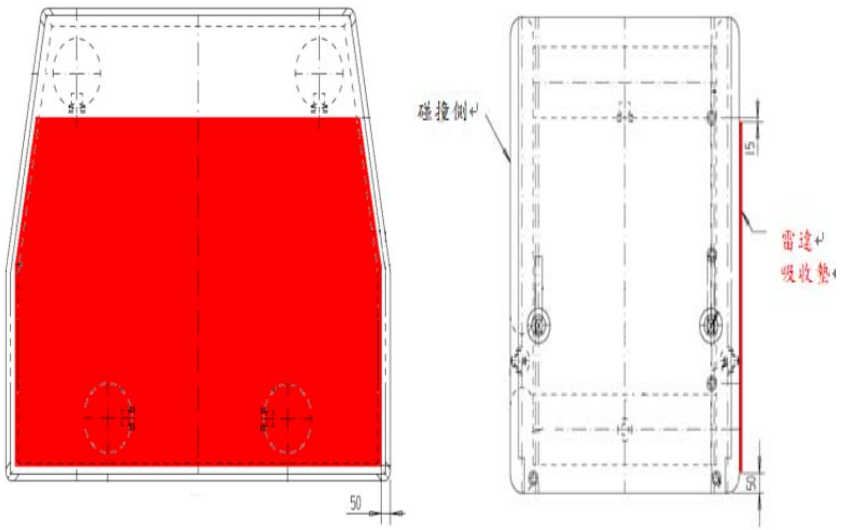
A.1.1 Radar Absorption Mat At the impact side and rear of the balloon target a layer of radar absorbing material is applied. The exact position and dimensions of these radar absorption mats are shown in Figure A.1.1-1 and Figure A.1.1-2. The material properties of the radar absorption mat are detailed in paragraph A.1.1.1  Figure A.1.1-1:Rear and side view of balloon structure including the rear radar absorption mat	3.10.8.1.1 雷達吸收墊 充氣式車輛結構的碰撞側及後側有一層雷達吸收材質。雷達吸收墊之確切位置及尺寸參圖 9 與圖 10。雷達吸收墊之材質特性參條文 3.10.8.1.1.1。  圖 9：充氣式車輛結構後視圖及側視圖，包括後方雷達吸收墊	

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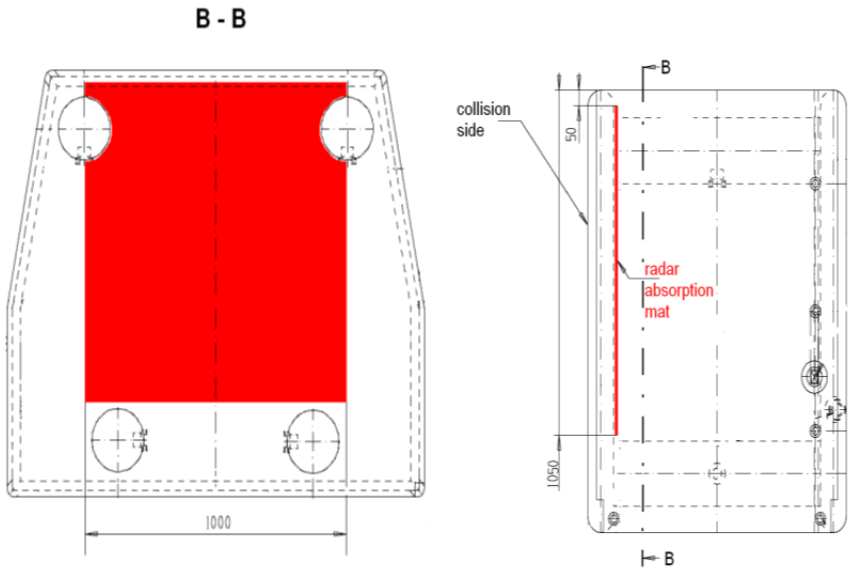	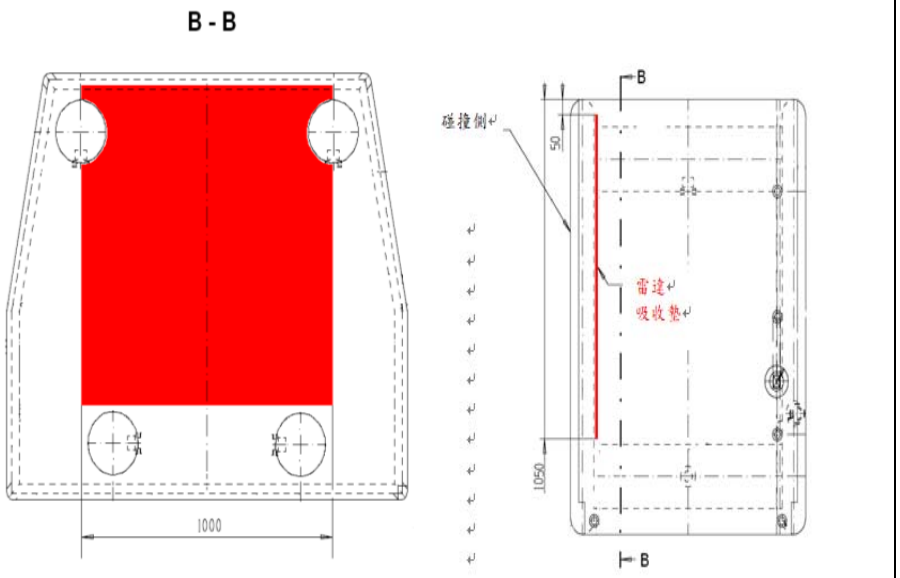	
Figure A.1.1-2: Section B-B and side view of balloon structure including the front radar absorption mat	圖 10： B-B 斷面圖與充氣式車輛結構側視圖，包括前方雷達吸收墊	
A.1.1.1 Material Properties	3.10.8.1.1.1 材質特性	
The radar absorption mats are according to ASTM-D 1692-68 and are made of Polyurethane foam EC 712 with the attenuation in dB as shown in the table below. The absorber can be loaded with 2 mW per mm ².	雷達吸收墊應符合 ASTM-D 1692-68 規定，且以聚胺酯（Polyurethane）發泡材料 EC 712 製成，dB 衰減應符合下述表格之規定。此吸收材質每 mm²可吸收 2mW。	

Footprint	Thickness	<1GHz	3 GHz	5 GHz	10 GHz	18 GHz
500x500mm	10mm	---	10	25	35	40

面積	厚度	<1GHz	3 GHz	5 GHz	10 GHz	18 GHz
500x500mm	10mm	---	10	25	35	40

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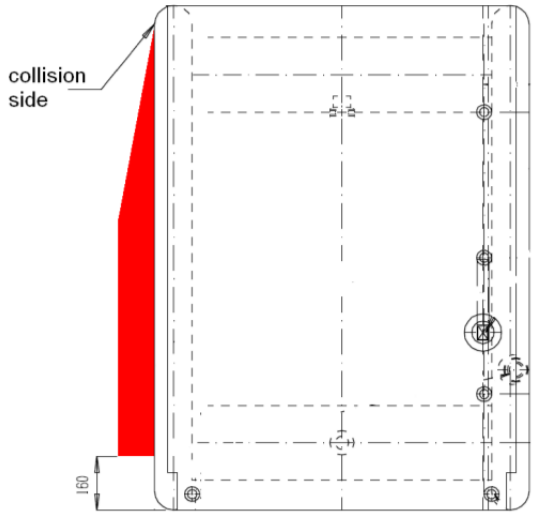
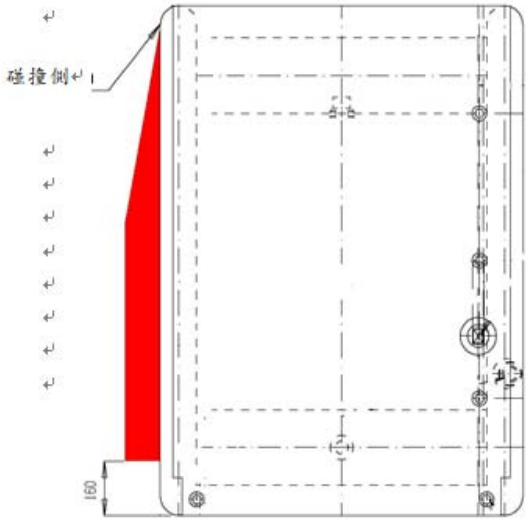
A.1.2 Bumper At the impact side, a bumper plate is attached to front of the balloon structure to create a more vehicle like contour. The dimensions and position of the bumper element are shown in Figure A.1.2-1 and Figure A.1.2-2. The tolerances on the dimensions are ± 10mm.  Figure A.1.2-1: Side view of balloon structure including the bumper element	3.10.8.1.2 保險桿 充氣式車輛結構之碰撞側應裝設保險桿，以模擬真實車輛輪廓。保險桿之尺寸及位置參圖 11 與圖 12。尺寸容許誤差範圍為 ±10mm。  圖 11：充氣式車輛結構側視圖，包括保險桿	

Euro NCAP 原文	T-NCAP條文草案	說明

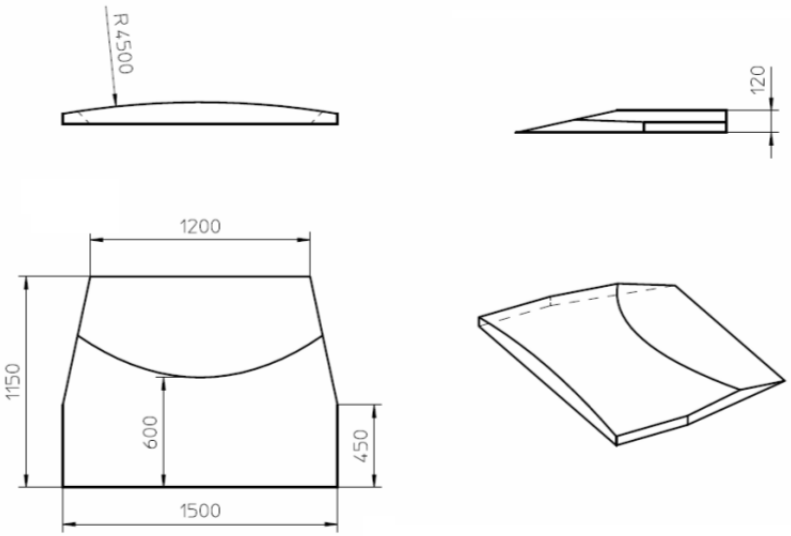
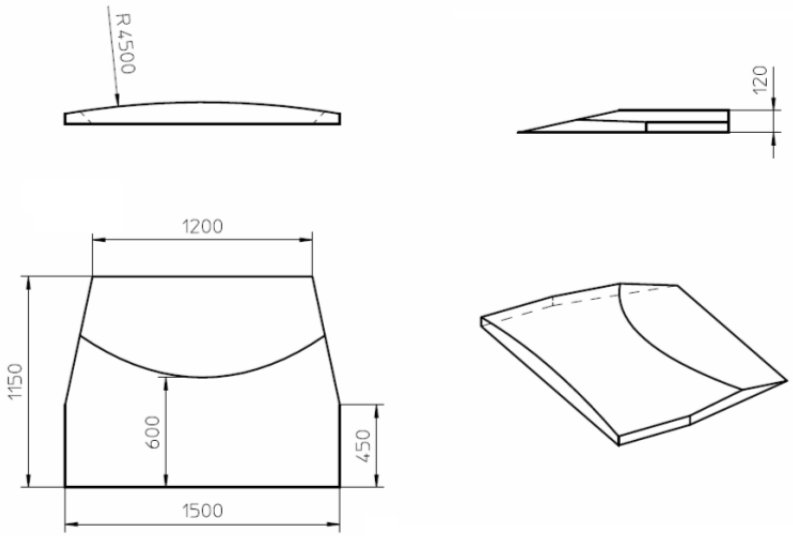
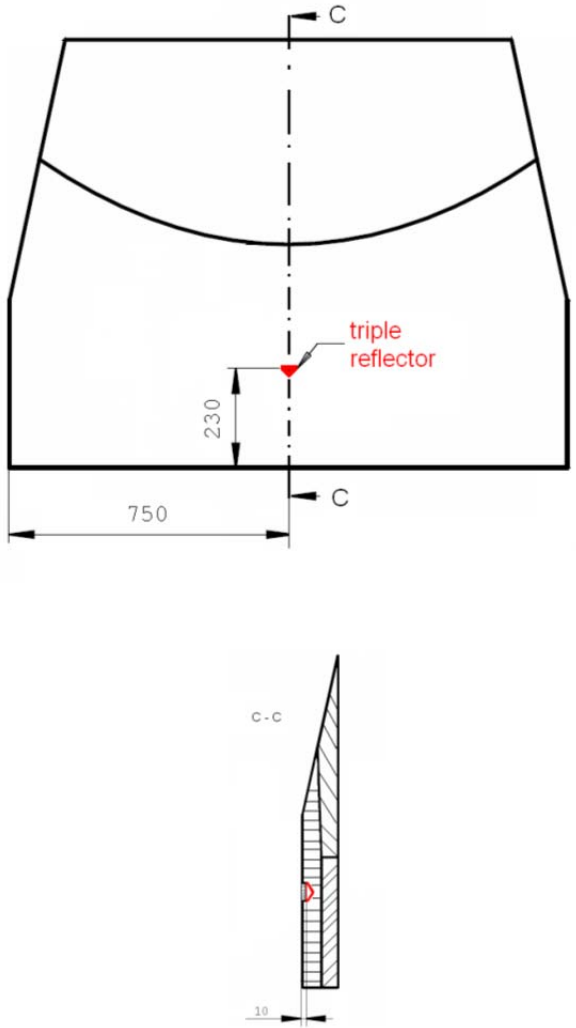
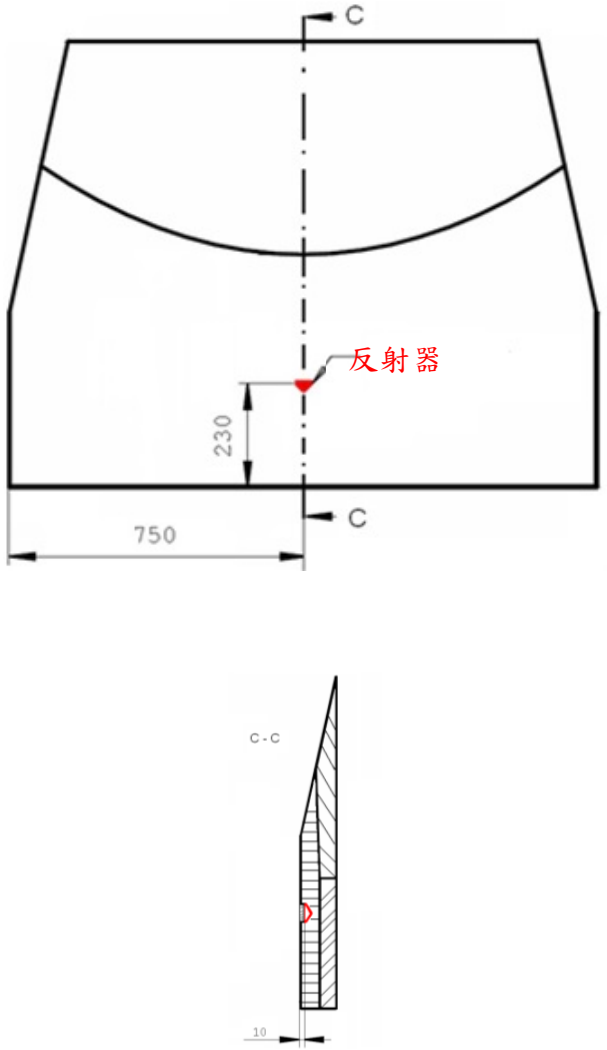
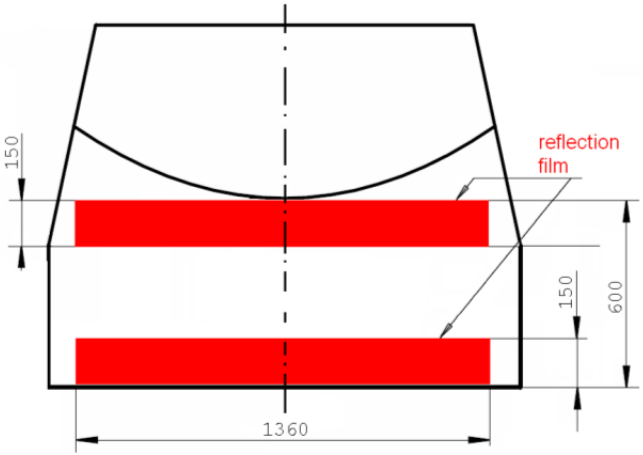
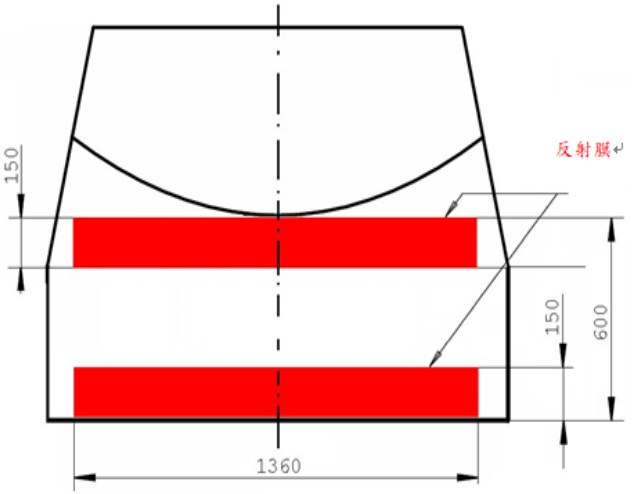

	

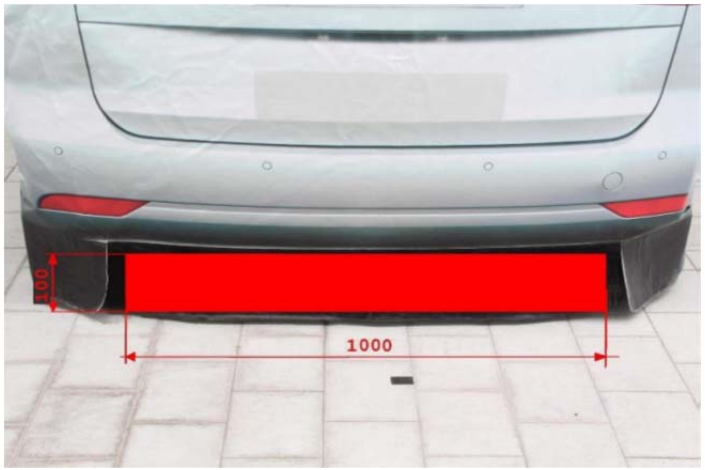
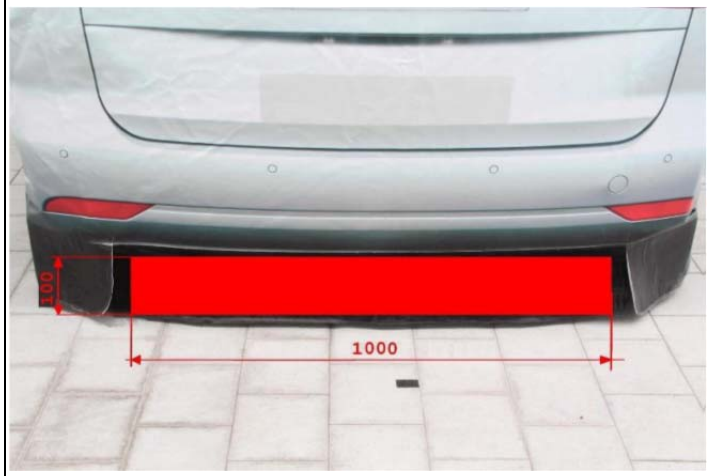
Figure A.1.2-2: Top, side, front and ISO view of bumper element.	圖 12：保險桿之上視、側視、前視及立體圖	
A.1.3 Radar Reflector	3.10.8.1.3 雷達反射器	
Within the bumper element, a radar reflector is incorporated. The reflector has an inside edge length of 55mm and imitates a surface of 2.5m² at 77GHz. The position and orientation of the radar reflector within the bumper element is shown in Figure A.1.3-1.	保險桿中裝設有雷達反射器。雷達反射器之內側邊緣長為 55mm，且於 77GHz 雷達之偵測狀態下模擬 2.5m²之表面。雷達反射器於保險桿中之位置與方向參圖 13。	

Euro NCAP 原文	T-NCAP條文草案	說明
 Figure A.1.3-1: Front and side view of the radar reflector within the bumper element	 圖 13：保險桿中雷達反射器前視面及側視面	

Euro NCAP 原文	T-NCAP條文草案	說明
A.1.4 Reflective Film In addition to the radar reflector, two reflective films of 1360mm wide and 150mm high are glued onto the bumper element as shown in Figure A.1.4-1. The films are made of polyester and are provided by Bruin Plastic Company INC (http://www.bruinplastics. com/index .html) under the product name of Energy Shield 200 - 10 oz. If another reflection film is used, the reflection characteristics have to be identical as for the Energy Shield 200.  Figure A.1.4-1: Front view of the reflective film on the bumper element	3.10.8.1.4 反射膜 除了雷達反射器以外，保險桿上另外會貼上兩條寬 1360mm、高 150mm 的反射膜，如圖 14。反射膜由聚酯纖維製成，由 Bruin 塑膠股份有限公司（http://www.bruinplastics.com/index .html）提供，產品名稱為 Energy Shield 200 - 10 oz。如使用其他的反射膜，其反射特性應與 Energy Shield 200 相同。  圖 14：保險桿上反射膜之前視圖	

Euro NCAP 原文	T-NCAP條文草案	說明
A.2 EVT Outer Cover The balloon structure is covered by a PVC cover with a picture of an actual car is printed. The cover material is produced by Complot Papier Union (http://www.complottpapierunion.de/) with the product name PowerJet Poly Banner Frontlit 550 B1, which is a 550 g/m² tarpaulin. The generic artwork that needs to be printed onto the EVT cover can be provided by Euro NCAP. The artwork should be printed full colour to at least (100dpi) to give the correct contrast in colours of the vehicle rear. A.2.1 Retro- Reflective Film Retro-Reflective film is attached to the cover to replicate the reflectivity of the rear lights as shown in Figure A.2.1-1. The retro-reflective tape for the lights is produced according to the norm ECE 104. The top rear light retro-reflection film has to be in the upper middle of the car. The left and right have to been stuck congruent to the normal back lights and have to look like the original one.	3.10.8.2 目標車外罩 充氣式車輛結構上面覆蓋印有車輛圖樣之 PVC 材質外罩。外罩材料係由 Complot Papier Union（http://www.complottpapierunion.de/）生產，產品名稱為 PowerJet Poly Banner Frontlit 550 B1，為 550 g/m²之防水布。 目標車外罩上應印製的通用圖樣可由 T-NCAP 執行機構提供。圖樣應以全彩印製（至少 100dpi），以真實呈現車尾之顏色對比。 3.10.8.2.1 復歸反射膜 外罩上應黏貼復歸反射膜（Retro-Reflective film），以模擬車尾燈之反光特性，如圖 15。復歸反射膜應依據聯合國法規 R104 製造。模擬第三煞車燈之復歸反射膜應於車尾上方中間處。模擬左右尾燈之復歸反射膜應黏貼於外罩尾燈處，以貼近模擬真實情況。	

Euro NCAP 原文	T-NCAP條文草案	說明
 Figure A.2.1-1: Front view of the EVT with the location of the retro-reflective tape	 圖 15：目標車前視圖，包括復歸反射膜之位置	
A.2.2 Radar Absorption Mat At the impact side of the EVT a layer of radar absorbing material is applied to the bottom of the target to replicate the shadow between the wheels. The material of the absorption mat is the same as specified in A.1.1. The dimensions of the mat are shown in Figure A.2.2-1 with a thickness of 20mm. The absorption mat is sewn into the EVT outer cover and is behind three layers of leather which were stuck together.	3.10.8.2.2 雷達吸收墊 應於目標車之碰撞側底部增加一層雷達吸收墊，以模擬車輛輪距間之陰影。雷達吸收墊之材質應與 3.10.8.1.1 規定之材質相同。雷達吸收墊之尺寸如圖 16，厚度為 20mm。雷達吸收墊應縫入目標車外罩內之三層皮革後方。	

Euro NCAP 原文	T-NCAP條文草案	說明
  Figure A.2.2-1: Left, Front view of the EVT with the location of the lower radar absorption mat. Right, different layers of absorption mat	  圖 16：上方圖片為目標車之前視圖，包括下側雷達吸收墊之位置；下方圖片為不同層之吸收墊	

Euro NCAP 原文	T-NCAP條文草案	說明
A.3 EVT Test Position The ground clearance of the balloon structure for testing is set to 70mm as shown in Figure A.3-1.  Figure A.3-1: Front view of the EVT showing the ground clearance	3.10.8.3 目標車位置 充氣式車輛結構距地面之距離應為 70mm，如圖 17。  圖 17：目標車前視圖，標示距地面之距離	

Euro NCAP 原文	T-NCAP條文草案	說明
ANNEX B BRAKE APPLICATION PROCEDURE	3.10.9 煞車應用程序	
The braking input characterisation test determines the brake pedal displacement and force necessary to achieve a vehicle deceleration typical of that produced by a typical real world driver in emergency situations.	煞車輸入特性試驗主要藉由煞車踏板位移量及控制力，以確認真實情況下駕駛因緊急致動煞車所得之車輛減速度。	
B.1 Definitions	3.10.9.1 名詞釋義	
T_{BRAKE} - The point in time where the brake pedal displacement exceeds 5mm.	3.10.9.1.1 T_{BRAKE}：煞車踏板位移大於 5mm 之時間點。	
T_{-6m/s^2} - The point in time is defined as the first data point where filtered, zeroed and corrected longitudinal acceleration data is less than -6m/s^2.	3.10.9.1.2 T_{-6m/s^2}：濾波、歸零及校正後，第一次縱向加速度數據低於 -6m/s^2 之時間點。	
T_{-2m/s^2}, T_{-4m/s^2} - similar to T_{-6m/s^2}.	3.10.9.1.3 T_{-2m/s^2}, T_{-4m/s^2}：與上述 T_{-6m/s^2}相似。	
B.2 Measurements	3.10.9.2 量測	
Measurements and filters to be applied as described in Chapter 4 of this protocol.	量測及濾波方法應依此附件之條文 3.10.9.4 執行。	
B.3 Brake Characterization Procedure	3.10.9.3 煞車特性試驗程序	

Euro NCAP 原文	T-NCAP條文草案	說明
First perform the brake and tyre conditioning tests as described in 7.1.2 and 7.1.3. The brake input characterisation tests shall be undertaken within 10 minutes after conditioning the brakes and tyres.	依條文 3.10.6.1.2 及 3.10.6.1.3 進行煞車與輪胎調節程序。煞車輸入特性試驗應於調節煞車系統與輪胎後 10 分鐘內進行。	
B.3.1 Brake Displacement Characterisation Tests	3.10.9.3.1 煞車位移特性試驗	
•Push the brake pedal through the full extent of travel and release.	(1) 將煞車踩到底再釋放，讓煞車踏板回到原本位置。	
•Accelerate the VUT to a speed in excess of 85km/h. Vehicles with an automatic transmission will be driven in D. For vehicles with a manual transmission select the highest gear where the RPM will be at least 1500 at the 85km/h.	(2) 受驗車輛加速至超過 85km/h。自排變速車輛應打前進擋；手排變速車輛應選擇最高擋，速度為 85km/h 時，轉速應至少為 1500rpm。	
•Release the accelerator and allow the vehicle to coast. At a speed of 80 ± 1.0km/h initiate a ramp braking input with a pedal application rate of 20±5mm/s and apply the brake until a longitudinal acceleration of -7m/s² is achieved. For manual transmission vehicles, press the clutch as soon as the RPM drops below 1500. The test ends when a longitudinal acceleration of -7m/s² is achieved.	(3) 釋放油門踏板讓車輛滑行。速度為 80 ± 1.0km/h 時，以 20±5mm/s 的踏板速度（pedal application rate）作動煞車（ramp braking input），持續施壓，直至達到-7 m/s^2 的縱向加速度。如果為手排變速車輛，轉速降至低於 1500rpm 時，立刻踩下離合器。縱向加速度達到-7 m/s^2 時，試驗結束。	
•Measure the pedal displacement and applied force normal to the direction of travel of the initial stroke of the brake pedal, or as close as possible to normal as can be repeatedly achieved.	(4) 測量第一次踩下煞車踏板時，踏板行程的位移與控制力，或盡可能接近正常可重複達成之狀況。	

Euro NCAP 原文	T-NCAP條文草案	說明
•Perform three consecutive test runs. A minimum time of 90 seconds and a maximum time of 10 minutes shall be allowed between consecutive tests. If the maximum time of 10 minutes is exceeded, the tyre and brake conditioning procedures shall be repeated before restarting the brake pedal force characterisation tests.	(5) 連續進行三次試驗，試驗間隔最短為 90 秒，最長為 10 分鐘。若超過 10 分鐘，應重複輪胎與煞車調整程序，才能進行本項試驗。	
•Using second order curve fit and the least squares method between T_{-2m/s^2}, T_{-6m/s^2}, calculate the pedal travel value corresponding to a longitudinal acceleration of -4 m/s² (=D4, unit is m). Use data of at least three valid test runs for the curve fitting.	(6) 於 T_{-2m/s^2}，T_{-6m/s^2}之間，利用二階曲線擬合（second order curve fit）及最小平方法（least squares method）計算對應-4 m/s²（=D4，單位為 m）之煞車踏板縱向行程值。使用至少三次有效試驗計算曲線擬合（curve fitting）。	
•This brake pedal displacement is referred to as D4 in the next chapters.	(7) 此煞車踏板位移簡稱為 D4。	
•Using second order curve fit and the least squares method between T_{-2m/s^2}, T_{-6m/s^2}, calculate the pedal force value corresponding to a longitudinal acceleration of -4 m/s² (=F4, unit is N). Use data of at least three valid test runs for the curve fitting.	(8) 於 T_{-2m/s^2}，T_{-6m/s^2}之間，利用二階曲線擬合（second order curve fit）及最小平方法（least squares method）計算對應-4 m/s²（=F4，單位為 N）之煞車踏板力量值。使用至少三次有效試驗計算曲線擬合（curve fitting）。	
•This brake pedal force is referred to as F4 in the next chapters.	(9) 此煞車踏板力量值簡稱為 F4。	
B.3.3 Brake Force Confirmation and Iteration Procedure	3.10.9.3.2 煞車控制力確認及重複程序	

Euro NCAP 原文	T-NCAP條文草案	說明
•Accelerate the VUT to a speed of 80+1km/h. Vehicles with an automatic transmission will be driven in D. For vehicles with a manual transmission select the highest gear where the RPM will be at least 1500 at the 80km/h.	(1) 受驗車輛加速至 80+1km/h 的速度。自排變速車輛應打前進擋；手排變速車輛應選擇最高擋，速度為 80km/h 時，轉速應至少為 1500rpm。	
•Apply the brake force profile as specified in B.4, triggering the input manually rather than in response to the FCW. Determine the mean acceleration achieved during the window from TBRAKE +1s TBRAKE +3s. If a mean acceleration outside the range of -4-0.25m/s^2 results, apply the following method to ratio the pedal force applied.	(2) 依據 3.10.9.4 產出之數據，以非前方碰撞預警系統而觸發。計算 T_{BRAKE} +1s 至 T_{BRAKE} +3s 間達到之平均加速度。若計算結果超出-4 m/s^2 至- 4.25 m/s^2，應利用以下方式計算煞車踏力。	
F4new = F4original * (-4/mean acceleration), i.e. if F4original results in a mean acceleration of -5m/s^2, F4new = F4original * -4 / -5	(3) 新 F4 = 原 F4 *（-4/平均加速度），例：若原 F4 計算結果中平均加速度為-5m/s^2，則新 F4 = 原 F4 * -4/-5	
•Repeat the brake force profile with this newly calculated F4, determine the mean acceleration achieved and repeat the method as necessary until a mean acceleration within the range of -4-0.25m/s^2 is achieved.	(4) 使用計算出最新 F4 煞車力量作動煞車，並確認已達到目標加速度。可依需求，重複此步驟，直到計算出-4 m/s^2 至- 4.25 m/s^2 範圍內之平均加速度。	

Euro NCAP 原文	T-NCAP條文草案	說明
•Three valid pedal force characteristic tests (with the acceleration level being in the range as specified) are required. A minimum time of 90 seconds and a maximum time of 10 minutes shall be allowed between consecutive tests. If the maximum time of 10 minutes is exceeded, the tyre and brake conditioning procedures shall be repeated before restarting the brake pedal force characterisation tests.This brake pedal force is referred as F4 in the next chapters.	(5) 應進行三次有效煞車踏力試驗（加速度應達到規定之範圍）。試驗間隔最短為 90 秒，最長為 10 分鐘。若超過 10 分鐘，應重複輪胎與煞車調節程序，才能進行煞車踏力試驗。此煞車踏板力量值簡稱為 F4。	
B.4 Brake Application Profile	3.10.9.4 煞車應用設定（Brake Application Profile）	
•Detect T_{FCW} during the experiment in real-time.	(1) 於試驗中即時偵測 T_{FCW}。	
•Release the accelerator at T_{FCW} + 1 s.	(2) T_{FCW}+1s 時，放開加速踏板。	
•Perform displacement control for the brake pedal, starting at T_{FCW} + 1.2 s with a gradient of the lesser of 5 x D4 or 400mm/s (meaning the gradient to reach pedal position D4 within 200ms, but capped to a maximum application rate of 400mm/s).	(3) 進行煞車踏板之位移控制時，從 T_{FCW} +1.2s 開始，梯度(gradient)為 5 x D4 或 400mm/s(即為於 200ms 內達到踏板位置 D4 所需之梯度，但上限為 400mm/s)，取較低者。	
•Monitor brake force during displacement control and use second-order filtering with a cutoff frequency between 20 and 100	(4) 位移控制期間應監控煞車力度，使用二階濾波（second-order filtering），截止頻率 20 至 100Hz。	

Euro NCAP 原文	T-NCAP條文草案	說明
Hz (online) as appropriate. •Switch to force control with a desired value of F4 when i. the value D4 as defined in B.3 is exceeded for the first time, ii. the force F4 as defined in B.3 is exceeded for the first time, whichever is reached first. •The point in time where position control is switched to force control is noted as T_{switch}. •Maintain the force within boundaries of F4 ± 25% F4. A stable force level should be achieved within a period of 200 ms maximum after the start of force control. Additional disturbances of the force over ± 25% F4 due to further AEB interventions are allowed, as long as they have a duration of less than 200ms. •The average value of the force between T_{FCW} + 1.4s and the end of the test should be in the range of F4 ± 10 N.	(5) 於下述時間點轉換成目標值為 F4 之力量控制： (A) 首次超過 3.10.9.3 定義之 D4 位移值 (B) 首次超過 3.10.9.3 定義之 F4 力量值，以先達成之條件為準。 (6) 位移控制轉變成控制力控制之時間點為 T_{switch} 。 (7) 開始控制力量之後，應以小於 200ms 之時間達到穩定之控制力層級。力量值應維持在 F4 ±25% F4 之限值內，惟因緊急煞車輔助系統作動而造成超過± 25% F4，且持續時間小於 200ms 者不在此限。 (8) T_{FCW} +1.4s 至試驗結束之間平均力量應落在 F4 ±10N 範圍內。	

2.1 成人保護(AOP)評等規章-2.1.6緊急煞車輔助之市區系統評等

增/修內容	修訂T-NCAP條文草案	說明
7.ASSESSMENT OF AEB CITY SYSTEMS	2.1.6 緊急煞車輔助之市區系統評等	
7.1 Introduction	~~6.1 簡介~~	
For the assessment of AEB City systems, two areas of assessment are considered; the Autonomous Emergency Braking function and the Human Machine Interface. The AEB function is assessed in one type of scenario. At this stage the HMI operation is assessed in a general way as scientific evidence regarding quality of warning is lacking.	~~緊急煞車輔助之市區系統（AEB City Systems）評等兩個領域，緊急煞車輔助系統（Autonomous emergency braking ,AEB）與人機介面（Human Machine Interface，HMI）。AEB 評等僅採用一種情境試驗。另現階段由於仍缺乏相關高品質警示之科學證據佐證，故人機界面僅進行一般要求評等。~~	
7.2 Definitions Throughout this protocol the following terms are used:	2.1.6.1 名詞釋義 ~~此規章中使用名詞如下：~~	
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.	2.1.6.1.1 緊急煞車輔助系統（Autonomous emergency braking, AEB）：車輛偵測到可能發生碰撞情況下自動煞車，致使車輛減速並避免碰撞情事發生。	
Car-to-Car Rear Stationary (CCRs) – a collision in which a vehicle travels forwards towards another stationary vehicle and the frontal structure of the vehicle strikes the rear structure of the other.	2.1.6.1.2 前車靜止情境試驗（Car-to-Car Rear Stationary, CCRs）：係指後方車輛往前行駛接近靜止的前方車輛，且行駛車輛之車頭碰撞靜止車輛之車尾。	

增/修內容	修訂T-NCAP條文草案	說明
Vehicle under test (VUT) – means the vehicle tested according to this protocol with a pre-crash collision mitigation or avoidance system on board.	2.1.6.1.3 受驗車輛（Vehicle under test, VUT）：係指配備減緩碰撞或預防碰撞系統，並依據此規章進行試驗之車輛。	
Euro NCAP Vehicle Target (EVT) – means the vehicle target used in this protocol as specified in Annex A of the AEB test protocol.	2.1.6.1.4 T-NCAP 目標車（Euro NCAP Vehicle Target, EVT）–緊急煞車輔助系統試驗規章(AEB test protocol)之 3.10.8 中使用之目標車。	
Vrel_test – means the relative speed between the VUT and the EVT by subtracting the velocity of the EVT from that of the VUT at the start of test.	2.1.6.1.5 試驗相對速度（Vrel test）：受驗車輛與目標車之間的相對速度，計算方式為試驗開始時，將受驗車輛速度減去目標車速度。	
V_{impact} – means the speed at which the VUT hits the EVT.	2.1.6.1.6 碰撞速度（V_{impact}）：受驗車輛碰撞目標車(EVT)時的速度。	
Vrel_impact – means the relative speed at which the VUT hits the EVT by subtracting the velocity of the EVT from Vimpact at the time of collision.	2.1.6.1.7 碰撞相對速度（Vrel impact）：受驗車輛碰撞目標車時的相對速度，計算方式為碰撞速度減去目標車遭碰撞時之速度。	
7.3 Preconditions for Scoring AEB City	2.1.6.2 AEB City 得分的前提條件	
AEB City points are awarded only when the Whiplash score for the front seat is at least 1.5 points or “Good” (from section 6.3.1.2). Additionally, full avoidance needs to be achieved for test speeds up to and including 20 km/h.	第一排座椅鞭甩分數應至少達到 1.5 分或“佳”（第 2.1.5.3.1.2 節），才能給予緊急煞車輔助之市區系統分數。此外，試驗車速若小於等於 20 km/h，應達到完全避免碰撞。	

增/修內容	修訂T-NCAP條文草案	說明
7.4 Criteria and Scoring	2.1.6.3 標準與評分	
7.4.1Human Machine Interface (HMI)	2.1.6.3.1 人機介面（Human Machine Interface，HMI）	
To be eligible for scoring points for HMI, the AEB system needs to be default ON at the start of every journey.	人機介面試驗之得分，每次啟動車輛時，緊急煞車輔助系統之預設狀態為「開啟」。	
When the prerequisite mentioned above is met, points can be achieved for the following:	若符合上述前提之得分規範如下：	
- Deactivating AEB system 2 points De-activation of the AEB system should not be possible with a single push on a button.	關閉緊急煞車輔助系統 2 分 緊急煞車輔助系統:不得僅按一鍵即關閉。	
7.4.2 Autonomous Emergency Braking (AEB)	2.1.6.3.2 緊急煞車輔助系統（AEB）	
For the AEB function tests, the assessment criteria used is the relative impact speed Vrel_impact. The available points per test speed are awarded based on the relative speed reduction achieved at every test speed. Where there is no full avoidance a linear interpolation is applied to calculate the score for every single test speed.	針對 AEB 功能試驗，使用的評等標準是碰撞相對速度(Vrel impact)。每個試驗速度點相對應可得分數是根據相對速度減低值。若無法達到完全避免碰撞，則每個單一試驗車速應使用線性內插法計分。	
$Score_{test\ speed}=((Vrel\_test-Vrel\_impact)/Vrel\_test)\times points_{test\ speed}$	得分$_{試驗速度}$= ((試驗相對速度 － 碰撞相對速度)/試驗相對速度)×分數$_{試驗速度}$	

<table>
<tr><th>增/修內容</th><th>修訂T-NCAP條文草案</th><th>說明</th></tr>
<tr><td>The points available for the different test speeds for CCRs are detailed in the table below:

<table><tr><td>Test speed</td><td>Points_{test speed}</td></tr><tr><td>10 km/h</td><td>1.000</td></tr><tr><td>15 km/h</td><td>2.000</td></tr><tr><td>20 km/h</td><td>2.000</td></tr><tr><td>25 km/h</td><td>2.000</td></tr><tr><td>30 km/h</td><td>2.000</td></tr><tr><td>35 km/h</td><td>2.000</td></tr><tr><td>40 km/h</td><td>1.000</td></tr><tr><td>45 km/h</td><td>1.000</td></tr><tr><td>50 km/h</td><td>1.000</td></tr><tr><td>Total</td><td>14.000</td></tr></table>
7.4.3 Total Score
The scoring is based on normalized scores of the AEB function. The test results are used to calculate a normalised AEB score. This results in a single percentage for AEB. The HMI score is the normalised score of the points achieved under section 7.4.1.

The total score in points is the weighted sum of the AEB score and HMI score as shown below.</td><td>前車靜止情境試驗（CCRs）不同試驗速度之可得分數，詳見下表：

<table><tr><td>試驗速度</td><td>分數_{試驗速度}</td></tr><tr><td>10 km/h</td><td>1.000</td></tr><tr><td>15 km/h</td><td>2.000</td></tr><tr><td>20 km/h</td><td>2.000</td></tr><tr><td>25 km/h</td><td>2.000</td></tr><tr><td>30 km/h</td><td>2.000</td></tr><tr><td>35 km/h</td><td>2.000</td></tr><tr><td>40 km/h</td><td>1.000</td></tr><tr><td>45 km/h</td><td>1.000</td></tr><tr><td>50 km/h</td><td>1.000</td></tr><tr><td>總分</td><td>14.000</td></tr></table>
2.1.6.3.3 總分
評分係依據 AEB 功能的常態化分數。使用試驗結果計算常態化 AEB 分數。AEB 結果為百分比值。HMI 分數依 2.1.6.3.1 節進行常態化分數。

總分為緊急煞車輔助系統分數與人機界面分數加權總和，公式如下：</td><td></td></tr>
</table>

<table>
<tr><th>增/修內容</th><th>修訂T-NCAP條文草案</th><th>說明</th></tr>
<tr>
<td>

$AEB\ City\ total\ score$=($AEB\ score\ x$ 2.5)+($HMI\ score\ x$ 0.5)

Scoring Example of AEB City system:

a) AEB test results.

<table>
<tr><th>Test speed</th><th>Points_{test speed}</th><th>Vrel_ impact</th><th>Score_{test speed}</th></tr>
<tr><td>10 km/h</td><td>1.000</td><td>0 km/h</td><td>1.000</td></tr>
<tr><td>15 km/h</td><td>2.000</td><td>0 km/h</td><td>2.000</td></tr>
<tr><td>20 km/h</td><td>2.000</td><td>0 km/h</td><td>2.000</td></tr>
<tr><td>25 km/h</td><td>2.000</td><td>0 km/h</td><td>2.000</td></tr>
<tr><td>30 km/h</td><td>2. 00</td><td>10 km/h</td><td>1.333</td></tr>
<tr><td>35 km/h</td><td>2.000</td><td>25 km/h</td><td>0.571</td></tr>
<tr><td>40 km/h</td><td>1.000</td><td>35 km/h</td><td>0.125</td></tr>
<tr><td>45 km/h</td><td>1.000</td><td>-</td><td>0.000</td></tr>
<tr><td>50 km/h</td><td>1.000</td><td>-</td><td>0.000</td></tr>
<tr><td>Total</td><td>14.000</td><td></td><td>9.029</td></tr>
<tr><td colspan="2">Normalised score</td><td colspan="2">64.5%</td></tr>
</table>

b) HMI score. The system is always ON and could not be switched OFF. The HMI score = 100%.

c) AEB City total score. Applying the formula above, the total score equals: 2.5x64.5% + 0.5x100% = 2.113 points.

</td>
<td>

緊急煞車輔助之市區系統總分=(緊急煞車輔助系統得分×2.5)+(人機介面得分×0.5)

AEB City 的評分範例:

(1) AEB 試驗結果

<table>
<tr><th>試驗速度</th><th>分數_{試驗速度}</th><th>碰撞相對速度</th><th>得分_{試驗速度}</th></tr>
<tr><td>10 km/h</td><td>1.000</td><td>0 km/h</td><td>1.000</td></tr>
<tr><td>15 km/h</td><td>2.000</td><td>0 km/h</td><td>2.000</td></tr>
<tr><td>20 km/h</td><td>2.000</td><td>0 km/h</td><td>2.000</td></tr>
<tr><td>25 km/h</td><td>2.000</td><td>0 km/h</td><td>2.000</td></tr>
<tr><td>30 km/h</td><td>2.000</td><td>10 km/h</td><td>1.333</td></tr>
<tr><td>35 km/h</td><td>2.000</td><td>25 km/h</td><td>0.571</td></tr>
<tr><td>40 km/h</td><td>1.000</td><td>35 km/h</td><td>0.125</td></tr>
<tr><td>45 km/h</td><td>1.000</td><td>-</td><td>0.000</td></tr>
<tr><td>50 km/h</td><td>1.000</td><td>-</td><td>0.000</td></tr>
<tr><td>總分</td><td>14.000</td><td></td><td>9.029</td></tr>
<tr><td colspan="2">常態化分數</td><td colspan="2">64.5%</td></tr>
</table>

(2) HMI 分數。系統持續維持在「開啟」，且無法切到「關閉」。HMI 分數=100%。

(3) AEB City 總分。採用上述方程式，總分等於 2.5x64.5% + 0.5x100% = 2.113 分。

</td>
<td></td>
</tr>
</table>

2.4 安全輔助(SA)評等規章-2.4.3緊急煞車輔助之快速道路系統評等

增/修內容	修訂T-NCAP條文草案	說明
5. ASSESSMENT OF AEB INTER-URBAN SYSTEMS	2.4.3 緊急煞車輔助之快速道路系統評等	
5.1 Introduction	~~3.1 簡介~~	
AEB Inter-Urban systems are AEB systems that are designed to work at speeds typical for driving outside of the city environment, for example on urban roads or highways. For the assessment of AEB Inter-Urban systems, three areas of assessment are considered: the Autonomous Emergency Braking function, Forward Collision Warning function and the Human Machine Interface (HMI). The AEB function is assessed in two different types of scenarios, while the FCW function is scored separately and assessed in three different types of scenarios. The FCW function is only considered when the system provides dynamic brake support.	~~緊急煞車輔助之快速道路系統之行駛速度，其適用於市區外之郊區道路或高速公路。緊急煞車輔助之快速道路系統之評等有三大項目：緊急煞車輔助系統功能、前方碰撞預警系統功能及人機介面。緊急煞車輔助系統功能以兩種情境試驗評等，而前方碰撞預警系統則以三種情境試驗評等後，再分別給分。受驗車輛之前方碰撞預警系統應與動態煞車輔助系統搭配使用。~~	
At this stage the HMI operation is verified in a general way as scientific evidence regarding quality of warning is lacking. The current emphasis in the assessment of AEB Inter-Urban lies on the AEB function. It is expected that the requirements will be updated in the future when more real-life evidence is available.	~~現階段由於仍缺乏相關高品質警示之科學證據佐證，故人機介面僅進行一般要求評等，故目前緊急煞車輔助之快速道路系統評等主要著重於緊急煞車輔助系統功能。待後續累積更多實績後，再行更新此規定。~~	

增/修內容	修訂T-NCAP條文草案	說明
5.2 Definitions Throughout this protocol the following terms are used: 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. Forward Collision Warning (FCW) – an audiovisual warning that is provided automatically by the vehicle in response the detection of a likely collision to alert the driver. Dynamic Brake Support (DBS) – a system that further amplifies the driver braking demand in response to the detection of a likely collision to achieve a greater deceleration than would otherwise be achieved for the braking demand in normal driving conditions. Car-to-Car Rear Stationary (CCRs) – a collision in which a vehicle travels forwards towards another stationary vehicle and the frontal structure of the vehicle strikes the rear structure of the other. Car-to-Car Rear Moving (CCRm) – a collision in which a vehicle travels forwards towards another vehicle that is travelling at constant speed and the frontal structure of the vehicle strikes the rear structure of the other.	2.4.3.1 名詞釋義 ~~此規章中使用名詞如下：~~ 2.4.3.1.1 緊急煞車輔助系統（Autonomous emergency braking, AEB）：車輛偵測到可能發生碰撞情況下自動煞車，致使車輛減速並避免碰撞情事發生。 2.4.3.1.2 前方碰撞預警系統（Forward Collision Warning, FCW）：車輛偵測到可能發生碰撞情況下，為了警示駕駛而自動發出之視聽覺警告信號。 2.4.3.1.3 動態煞車輔助系統（Dynamic Brake Support, DBS）：在車輛偵測到可能發生碰撞情況下，此系統能加強煞車效能，達到比平時行駛作動煞車時更大的減速度。 2.4.3.1.4 前車靜止情境試驗（Car-to-Car Rear Stationary, CCRs）：係指後方車輛往前行駛接近靜止的前方車輛，且行駛車輛之車頭碰撞靜止車輛之車尾。 2.4.3.1.5 前車移動情境試驗（Car-to-Car Rear Moving, CCRm）：係指後方車輛往前行駛接近以恆定速度行駛之前方車輛，且行駛車輛之車頭碰撞以恆定速度行駛車輛之車尾。	

增/修內容	修訂T-NCAP條文草案	說明
Car-to-Car Rear Braking (CCRb) – a collision in which a vehicle travels forwards towards another vehicle that is travelling at constant speed and then decelerates, and the frontal structure of the vehicle strikes the rear structure of the other.	2.4.3.1.6 前車煞車情境試驗（Car-to-Car Rear Braking, CCRb）：係指後方車輛往前行駛接近原以恆定速度行駛而後減速之前方車輛，且行駛車輛之車頭碰撞減速車輛之車尾。	
Vrel_test – means the relative speed between the VUT and the EVT by subtracting the velocity of the EVT from that of the VUT at the start of test	2.4.3.1.7 試驗相對速度（V_{rel} test）：受驗車輛與目標車之間的相對速度，計算方式為受驗車輛於試驗開始時之速度減去目標車之速度。	
V_{impact} – means the speed at which the VUT hits the EVT	2.4.3.1.8 碰撞速度（V_{impact}）：受驗車輛碰撞目標車(EVT)時的速度。	
Vrel_impact – means the relative speed at which the VUT hits the EVT by subtracting the velocity of the EVT from Vimpact at the time of collision	2.4.3.1.9 碰撞相對速度（V_{rel} impact）：受驗車輛碰撞目標車時的相對速度，計算方式為碰撞速度減去目標車遭碰撞時之速度。	
5.3 Criteria and Scoring	2.4.3.2 標準與得分	
5.3.1 To be eligible for scoring points in AEB Inter-Urban, the AEB and/or FCW system must operate up to speeds of at least 80 km/h.	2.4.3.2.1 緊急煞車輔助之快速道路系統評等之得分，緊急煞車輔助系統及/或前方碰撞預警系統適用車速應至少達到 80 km/h。	

增/修內容	修訂T-NCAP條文草案	說明
5.3.2 Human Machine Interface (HMI)	2.4.3.2.2 人機介面	
5.3.2.1 To be eligible for scoring points for HMI, the AEB and/or FCW function needs to be default ON at the start of every journey and the warning of the FCW system (if applicable) needs to be loud and clear.	2.4.3.2.2.1 人機介面試驗之得分，每次啟動車輛時，緊急煞車輔助系統及/或前方碰撞預警系統之預設狀態應為「開啟」；且前方碰撞預警系統之警示（如適用）應大聲且清楚。	
5.3.2.2 When these prerequisites are met, HMI points can be achieved for the following:	2.4.3.2.2.2 若符合上述前提之人機介面得分規範如下：	
•Deactivating AEB and/or FCW system 2 points De-activation of the AEB and/or FCW system should not be possible with a single push on a button.	(1) 關閉緊急煞車輔助系統及/或前方碰撞預警系統 2 分 緊急煞車輔助系統及/或前方碰撞預警系統：不得僅按一鍵即關閉。	
•Supplementary warning for the FCW system 1 point In addition to the required audiovisual warning, a more sophisticated warning like head-up display, belt jerk, brake jerk or any other haptic feedback is awarded.	(2) 前方碰撞預警系統之輔助警示 1 分 除規定的視聽覺警示，若有較先進警示，如抬頭顯示器、安全帶震動、煞車震動或任何其他觸覺警示，即可獲得分數。	
NOTE: The supplementary warning point is not applicable to AEB only systems	附註：輔助警示得分不適用於僅有緊急煞車輔助之系統。	
•Reversible pre-tensioning of the belt in the pre-crash phase 1 point When the system detects a critical situation that can possibly lead to a crash, the belt can already be pre-tensioned to prepare for the	(3) 碰撞前之安全帶預負載裝置 1 分 系統若偵測到可能造成碰撞之緊急狀況，安全帶可預先縮緊，以因應即將發生之碰撞。	

增/修內容	修訂T-NCAP條文草案	說明
oncoming impact. 5.3.2.3 The HMI score is calculated by dividing the points achieved by 4. 5.3.3 Autonomous Emergency Braking (AEB) / Forward Collision Warning (FCW) 5.3.3.1 For both AEB and FCW system tests, the assessment criteria used is the relative impact speed Vrel_impact. The available points per test speed are awarded based on the relative speed reduction achieved at every test speed. Where there is no full avoidance a lineair interpolation is applied to calculate the score for every single test speed. For CCRb scenarios, the relative test speed is assumed equal to the initial test speed. $Score_{\ test\ speed} = ((Vtest - Vimpact)/Vtest) \times points_{test\ speed}$ The maximum points available for the different test speeds for CCRs, CCRm and CCRb are detailed in the table below:	2.4.3.2.2.3 將人機介面總分除以 4。 2.4.3.2.3 緊急煞車輔助系統及/或前方碰撞預警系統 2.4.3.2.3.1 緊急煞車輔助系統與前方碰撞預警系統之評等準則為碰撞相對速度。每一試驗速度之可得分數，其依不同試驗速度所減少的相對速度給分。若有發生碰撞，則使用線性內插法計算每一試驗速度之得分。前車煞車情境試驗中，假設相對試驗速度等於初始試驗速度。 得分$_{試驗速度}$ = （（試驗相對速度—碰撞相對速度）/ 試驗相對速度）× 分數$_{試驗速度}$ 前車靜止情境試驗、前車移動情境試驗與前車煞車情境試驗所提供之最高分數如下表所示：	

增/修內容	修訂T-NCAP條文草案	說明

Test speed	CCRs		CCRm		CCRb	
	AEB	FCW	AEB	FCW	AEB	FCW
30 km/h	-	2.000	1.000	-	-	-
35 km/h	-	2.000	1.000	-	-	-
40 km/h	-	2.000	1.000	-	-	-
45km/h	-	2.000	1.000	-	-	-
50 km/h	-	3.000	1.000	1.000	4x 1.000	4x 1.000
55 km/h	-	2.000	1.000	1.000	-	-
60 km/h	-	1.000	1.000	1.000	-	-
65 km/h	-	1.000	2.000	2.000	-	-
70 km/h	-	1.000	2.000	2.000	-	-
75 km/h	-	1.000	-	2.000	-	-
80 km/h		1.000	-	2.000	-	-
Total	-	18.000	11.000	11.000	4.000	4.000

5.3.3.2 The scoring is based on normalized scores of the AEB and FCW functions. For combined systems, AEB only and FCW only respectively, the score calculation is detailed in separate sections below.

試驗速度	前車靜止情境試驗		前車移動情境試驗		前車煞車情境試驗	
	AEB	FCW	AEB	FCW	AEB	FCW
30 km/h	-	2.000	1.000	-	-	-
35 km/h	-	2.000	1.000	-	-	-
40 km/h	-	2.000	1.000	-	-	-
45km/h	-	2.000	1.000	-	-	-
50 km/h	-	3.000	1.000	1.000	4x 1.000	4x 1.000
55 km/h	-	2.000	1.000	1.000	-	-
60 km/h	-	1.000	1.000	1.000	-	-
65 km/h	-	1.000	2.000	2.000	-	-
70 km/h	-	1.000	2.000	2.000	-	-
75 km/h	-	1.000	-	2.000	-	-
80 km/h		1.000	-	2.000	-	-
總共	-	18.000	11.000	11.000	4.000	4.000

2.4.3.2.3.2 計分方式為依據緊急煞車輔助系統與前方碰撞預警系統功能之常態化分數。若為整合系統、僅有緊急煞車輔助系統或僅有前方碰撞預警系統，計分方式如下：

增/修內容	修訂T-NCAP條文草案	說明
•AEB + FCW (combined) For each scenario (CCRs, CCRm and CCRb) normalised scores are calculated for AEB and FCW separately where available. The total AEB and FCW scores are calculated by averaging the scenario scores. This results in two separate percentages for AEB and FCW. •AEB only For systems that only offer the AEB function, the results of tests at all speeds (covering AEB and FCW) are used to calculate separate normalised AEB and FCW scores for each scenario. Where AEB and FCW test speeds are overlapping, the test result of AEB is duplicated for FCW. The total AEB and FCW scores are calculated by averaging the scenario scores. This results in two separate percentages for AEB and FCW. •FCW only For systems that only offer the FCW (with brake support) function, the test results are used to calculate a normalised score for each FCW scenario. The total FCW score is calculated by averaging the scenario scores. This results in a single percentage for FCW, where the AEB score is set to 0%.	(1) 緊急煞車輔助系統＋前方碰撞預警系統（整合） 應分別計算緊急煞車輔助系統與前方碰撞預警系統於每一情境試驗（前車靜止、前車移動及前車煞車）之常態化分數（如適用）。緊急煞車輔助系統與前方碰撞預警系統總得分為各情境試驗得分之平均。其結果將獲得兩種系統各別的百分比。 (2) 僅有緊急煞車輔助系統 若僅提供緊急煞車輔助系統功能者，應以各個試驗速度（包括緊急煞車輔助系統與前方碰撞預警系統）之試驗結果計算兩種系統分別的常態化分數。兩種系統之試驗速度重疊時，直接使用緊急煞車輔助系統之試驗結果作為前方碰撞預警系統之試驗結果。將各個情境試驗得分平均，計算兩種系統之總得分。其結果將獲得兩種系統各別的百分比。 (3) 僅有前方碰撞預警系統 若僅提供前方碰撞預警系統（含煞車輔助）功能者，應以各個試驗速度之試驗結果計算各別前方碰撞預警系統情境試驗之常態化分數。前方碰撞預警系統之總得分為各情境試驗得分之平均。其結果將獲得前方碰撞預警系統之百分比，而緊急煞車輔助系統之得分設為 0%。	

增/修內容	修訂T-NCAP條文草案	說明
5.3.4 Total AEB Inter-Urban Score The total score in points is the weighted sum of the AEB score, FCW score and HMI score as shown below. $AEB\ Inter\ Urban\ total\ score$=($AEB\ score\ x$ 1.5)+($FCW\ score\ x$ 1.0)+($HMI\ score\ x$ 0.5) Example of a combined AEB + FCW system a) AEB function test results in CCRm scenario.	2.4.3.2.4 緊急煞車輔助之快速道路系統總得分 總得分為緊急煞車輔助系統得分、前方碰撞預警系統得分與人機介面得分之加權總和，如下所示。 緊急煞車輔助之快速道路系統總得分 =（緊急煞車輔助系統分數×1.5）+（前方碰撞預警系統分數×1.0）+（人機介面分數×0.5） 範例：緊急煞車輔助＋前方碰撞預警系統整合 (1) 前車移動情境試驗中之緊急煞車輔助功能試驗結果	說明

Vtest	Vrel_test	Points test speed	Vimpact	Vrel_impact	Score test speed
30 km/h	10km/h	1.000	0km/h	0km/h	1.000
35 km/h	15km/h	1.000	0km/h	0km/h	1.000
40 km/h	20km/h	1.000	0km/h	0km/h	1.000
45km/h	25km/h	1.000	0km/h	0km/h	1.000
50 km/h	30km/h	1.000	30km/h	10km/h	0.667
55 km/h	35km/h	1.000	45km/h	25km/h	0.286
60 km/h	40km/h	1.000	55km/h	35km/h	0.125
65 km/h	45km/h	2.000	-	-	0.000
70 km/h	50km/h	2.000	-	-	0.000
Total		11.000			5.078
Normalised score (AEB)					46.2%

試驗速度	試驗相對速度	分數試驗速度	碰撞速度	碰撞相對速度	得分試驗速度
30 km/h	10km/h	1.000	0km/h	0km/h	1.000
35 km/h	15km/h	1.000	0km/h	0km/h	1.000
40 km/h	20km/h	1.000	0km/h	0km/h	1.000
45km/h	25km/h	1.000	0km/h	0km/h	1.000
50 km/h	30km/h	1.000	30km/h	10km/h	0.667
55 km/h	35km/h	1.000	45km/h	25km/h	0.286
60 km/h	40km/h	1.000	55km/h	35km/h	0.125
65 km/h	45km/h	2.000	-	-	0.000
70 km/h	50km/h	2.000	-	-	0.000
Total		11.000			5.078
常態化分數（緊急煞車輔助系統）					46.2%

增/修內容	修訂T-NCAP條文草案	說明
AEB function test results in CCRb scenario.	前車煞車情境試驗中之緊急煞車輔助功能試驗結果	

Test	Points test speed	Vimpact	Vrel_ impact	Score test speed
50 km/h, 12m, 2m/s²	1.000	0 km/h	0km/h	1.000
50 km/h, 12m, 6m/s²	1.000	20 km/h	20km/h	0.600
50 km/h, 40m, 2m/s²	1.000	25 km/h	25km/h	0.500
50 km/h, 40m, 6m/s²	1.000	20 km/h	20km/h	0.600
Total	4.000			2.700
Normalised score (AEB)				67.5%

試驗	分數 試驗 速度	碰撞速度	碰撞相對 速度	得分 試驗 速度
50 km/h, 12m, 2m/s²	1.000	0 km/h	0km/h	1.000
50 km/h, 12m, 6m/s²	1.000	20 km/h	20km/h	0.600
50 km/h, 40m, 2m/s²	1.000	25 km/h	25km/h	0.500
50 km/h, 40m, 6m/s²	1.000	20 m/h	20km/h	0.600
Total	4.000			2.700
常態化分數（緊急煞車輔助系統）				67.5%

b)FCW function (assumed normalized scores for this example).

•Normalized score in CCRs scenario: 84.7%
•Normalized score in CCRm scenario: 76.4%
•Normalized score in CCRb scenario: 100.0%
The FCW score is 87.0% (average).

(2) 前方碰撞預警系統功能（假設下述範例為常態化分數）

(A) 前車靜止情境試驗之常態化分數：84.7%
(B) 前車移動情境試驗之常態化分數：76.4%
(C) 前車煞車情境試驗之常態化分數：100.0%
前方碰撞預警系統分數為 87.0%（平均）

增/修內容	修訂T-NCAP條文草案	說明
c) HMI operation. Prerequisites are not met: the system can be switched OFF with a single button. HMI score is 0%.	(3) 人機介面操作。未符合前提條件：僅按一鍵即關閉系統。人機介面得分為 0%。	
d) AEB Inter-Urban total score. Applying the above formula renders: 1.5x56.9% + 1.0x87.0% + 0.5x0% = 1.724 points (out of 3 points)	(4) 緊急煞車輔助之快速道路系統總得分。利用上述方程式計算：1.5× 56.9%+ 1.0× 87.0% + 0.5× 0% = 1.724 分（總分為 3 分）	
Example of AEB only system	範例：僅有緊急煞車輔助系統	
a) AEB function (normalized AEB scores as in above example). •Normalized score in CCRm scenario: 46.2% •Normalized score in CCRb scenario: 67.5% The AEB score is 56.9% (average).	(1) 緊急煞車輔助功能（常態化緊急煞車輔助系統分數同前一範例）。 (A) 前車移動情境試驗之常態化分數：46.2% (B) 前車煞車情境試驗之常態化分數：67.5% 緊急煞車輔助系統分數為 56.9%（平均）。	
b) AEB test results for FCW function assessment in CCRs scenario.	(2) 前車靜止情境試驗之緊急煞車輔助系統試驗結果用於前方碰撞預警系統功能評等。	

Test speed	Points test speed	Vimpact	Vrel_ impact	Score test speed
30 km/h,	2.000	0 km/h	0 km/h	2.000
35 km/h,	2.000	0 km/h	0 km/h	2.000
40 km/h,	2.000	0 km/h	0 km/h	2.000
45 km/h,	2.000	0 km/h	0 km/h	2.000
50 km/h,	2.000	10 km/h	10 km/h	2.400
55 km/h,	2.000	25 km/h	25 km/h	1.091

試驗速度	分數 試驗速度	碰撞速度	碰撞相對速度	得分 試驗速度
30 km/h,	2.000	0 km/h	0 km/h	2.000
35 km/h,	2.000	0 km/h	0 km/h	2.000
40 km/h,	2.000	0 km/h	0 km/h	2.000
45 km/h,	2.000	0 km/h	0 km/h	2.000
50 km/h,	2.000	10 km/h	10 km/h	2.400
55 km/h,	2.000	25 km/h	25 km/h	1.091

增/修內容					修訂T-NCAP條文草案					說明
60 km/h,	1.000	35 km/h	35 km/h	0.417	60 km/h,	1.000	35 km/h	35 km/h	0.417	
65 km/h,	1.000	-	-	0.000	65 km/h,	1.000	-	-	0.000	
70 km/h,	1.000	-	-	0.000	70 km/h,	1.000	-	-	0.000	
75 km/h,	1.000	-	-	0.000	75 km/h,	1.000	-	-	0.000	
80 km/h,	1.000	-	-	0.000	80 km/h,	1.000	-	-	0.000	
Total	18.000	-	-	11.908	Total	18.000	-	-	11.908	
Normalised score				66.2%	常態化分數				66.2%	
AEB test results for FCW function assessment in CCRm scenario.					前車移動情境試驗之緊急煞車輔助系統試驗結果用於前方碰撞預警系統功能評等。					
Test speed	Points test speed	Vimpact	Vrel_ impact	Score test speed	試驗速度	分數 試驗速度	碰撞速度	碰撞相對速度	得分 試驗速度	
50 km/h,	1.000	30 km/h	10 km/h	0.667	50 km/h,	1.000	30 km/h	10 km/h	0.667	
55 km/h,	1.000	45 km/h	25 km/h	0.286	55 km/h,	1.000	45 km/h	25 km/h	0.286	
60 km/h,	1.000	55 km/h	35 km/h	0.125	60 km/h,	1.000	55 km/h	35 km/h	0.125	
65 km/h,	2.000	-	-	0.000	65 km/h,	2.000	-	-	0.000	
70 km/h,	2.000	-	-	0.000	70 km/h,	2.000	-	-	0.000	
75 km/h,	2.000	-	-	0.000	75 km/h,	2.000	-	-	0.000	
80 km/h,	2.000	-	-	0.000	80 km/h,	2.000	-	-	0.000	
Total	11.000	-	-	1.078	總共	11.000	-	-	1.078	
Normalised score				9.8%	常態化分數				9.8%	
AEB test results for FCW function assessment in CCRb scenario.					前車煞車情境試驗之緊急煞車輔助系統試驗結果用於前方碰撞預警系統功能評等。					

增/修內容					修訂T-NCAP條文草案					說明
Test speed	Points test speed	Vimpact	Vrel_ impact	Score test speed	試驗速度	分數 試驗速度	碰撞速度	碰撞相對速度	得分 試驗速度	
50 km/h, 12m, 2m/s^2	1.000	0 km/h	0 km/h	1.000	50 km/h, 12m, 2m/s^2	1.000	0 km/h	0 km/h	1.000	
50 km/h, 12m, 2m/s^2	1.000	20 km/h	20 km/h	0.600	50 km/h, 12m, 2m/s^2	1.000	20 km/h	20 km/h	0.600	
50 km/h, 12m, 2m/s^2	1.000	25 km/h	25 km/h	0.500	50 km/h, 12m, 2m/s^2	1.000	25 km/h	25 km/h	0.500	
50 km/h, 12m, 2m/s^2	1.000	20 km/h	20 km/h	0.600	50 km/h, 12m, 2m/s^2	1.000	20 km/h	20 km/h	0.600	
Total	4.000			2.700	總共	4.000			2.700	
Normalised score				67.5%	常態化分數				67.5%	
Combining the results of all scenarios, the FCW score is 47.8% (average).					加總所有情境試驗結果，前方碰撞預警系統得分為 47.8%（平均）。					
c) HMI operation. Prerequisites are not met: the system can be switched OFF with a single button. HMI score is 0%.					(3) 人機界面操作。未符合前提條件：僅按一鍵即關閉系統。人機介面得分為 0%。					

增/修內容	修訂T-NCAP條文草案	說明
d) AEB Inter-Urban total score. Applying the above formula renders: 1.5x56.9% + 1.0x47.8% + 0.5x0% = 1.332 points (out of 3 points).	(4) 緊急煞車輔助之快速道路系統總得分。利用上述方程式計算：1.5 ×56.9% + 1.0 × 47.8% + 0.5×0% = 1.332（總分為 3 分）。	

項 次	Euro NCAP Protocol	修訂內容	新增項目	頁碼	Euro NCAP 版本別
1	3.11緊急煞車輔助之弱勢道路使用者系統試驗規章		◎	P.1-30	Version 1.0.1
2	2.3行人保護(COP)評等規章-2.3.3緊急煞車輔助之弱勢道路使用者系統評等		◎	P.31-39	Version 8.1

3.11 緊急煞車輔助之弱勢道路使用者系統試驗規章

Euro NCAP 原文	T-NCAP條文草案	說明
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 (2010) standard reference test tyre, in accordance with ASTM Method E 1337-90 (reapproved 1996), at a speed of 64.4km/h, without water delivery. 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.	3.11.1 名詞釋義 ~~此規章中使用名詞如下：~~ 3.11.1.1 最高煞車係數（Peak Braking Coefficient, PBC）：根據滾動輪胎最大減速度計算出輪胎與路面摩擦力，本數值係使用美國材料和試驗協會（American Society for Testing and Materials, ASTM）E1136-10（2010）標準試驗輪胎，且符合美國材料和試驗協會E1337-90（1996年重新核可)試驗方法，以時速64.4km/h於乾燥路面上試驗，或依「車輛安全檢測基準」項次「四十三之二」6.2.5.1 所規範之方法。 3.11.1.2 緊急煞車輔助系統（Autonomous emergency braking, AEB）：車輛偵測到可能發生碰撞情況下自動煞車，致使車輛減速並避免碰撞情事發生。	

Euro NCAP 原文	T-NCAP條文草案	說明
Forward Collision Warning (FCW) – an audiovisual warning that is provided automatically by the vehicle in response to the detection of a likely collision to alert the driver.	3.11.1.3 前方碰撞預警系統（Forward Collision Warning, FCW）：車輛偵測到可能發生碰撞情況下，為了警示駕駛而自動發出之視聽覺警告信號。	
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 mud-guards and the deflected part of the tyre side-walls immediately above the point of contact with the ground.	3.11.1.4 車輛寬度（Vehicle width）：車輛最大寬度不包括後視鏡、側方標識燈、胎壓偵測裝置、方向燈、位置燈、活動式擋泥板及位於地面接觸點正上方之輪胎胎壁（side-wall）最突出部分。	
Car-to-VRU Farside Adult (CVFA) – a collision in which a vehicle travels forwards towards an adult pedestrian crossing it's path running from the farside and the frontal structure of the vehicle strikes the pedestrian at 50% of the vehicle's width when no braking action is applied.	3.11.1.5 遠端成人碰撞情境試驗 50%（Car-to-VRU Farside Adult, CVFA）：車輛行進時，前方有成人行人自遠端跑步穿越其路徑；若未煞車，車輛正面寬度百分之 50 處會碰撞行人之情境。	
Car-to-VRU Nearside Adult (CVNA-25) – a collision in which a vehicle travels forwards towards an adult pedestrian crossing it's path walking from the nearside and the frontal structure of the vehicle strikes the pedestrian at 25% of the vehicles width when no braking action is applied.	3.11.1.6 近端成人碰撞情境試驗 25%（Car-to-VRU Nearside Adult, CVNA-25）：車輛行進時，前方有成人行人自近端走路穿越其路徑；若未煞車，車輛正面寬度百分之 25 處會碰撞行人之情境。	
Car-to-VRU Nearside Adult (CVNA-75) – a collision in which a vehicle travels forwards towards an adult pedestrian crossing it's path walking from the nearside and the frontal structure of the vehicle	3.11.1.7 近端成人碰撞情境試驗 75%（Car-to-VRU Nearside Adult, CVNA-75）：車輛行進時，前方有成人行人自近端走路穿越其路徑；若未煞車，車輛正面寬度百分之 75 處會碰撞行人之情境。	

Euro NCAP 原文	T-NCAP條文草案	說明
strikes the pedestrian at 75% of the vehicles width when no braking action is applied.		
Car-to-VRU Nearside Child (CVNC) – a collision in which a vehicle travels forwards towards a child pedestrian crossing it's path running from behind and obstruction from the nearside and the frontal structure of the vehicle strikes the pedestrian at 50% of the vehicle's width when no braking action is applied	3.11.1.8 近端兒童碰撞情境試驗 50%（Car-to-VRU Nearside Child, CVNC）：車輛行進時，前方有兒童行人自近端有障礙物之後方跑步穿越其路徑；若未煞車，車輛正面寬度百分之 50 處會碰撞行人之情境。	
Vehicle under test (VUT) – means the vehicle tested according to this protocol with a pre-crash collision mitigation or avoidance system on board	3.11.1.9 受驗車輛（Vehicle under test, VUT）：係指配備減緩碰撞或預防碰撞系統，並依據此規章進行試驗之車輛。	
Euro NCAP Pedestrian Target (EPTa) – means the adult pedestrian target used in this protocol as specified in ANNEX A	3.11.1.10 T-NCAP 目標成人行人（Euro NCAP Pedestrian Target, EPTa）：3.11.7 使用之目標成人行人。	
Euro NCAP Child Target (EPTc) – means the child pedestrian target used in this protocol as specified in ANNEX A	3.11.1.11 T-NCAP 目標兒童行人（Euro NCAP Child Target, EPTc）：3.11.7 使用之目標兒童行人。	
Time To Collision (TTC) – means the remaining time before the VUT strikes the EPT, assuming that the VUT and EPT would continue to travel with the speed it is travelling.	3.11.1.12 碰撞時間（Time To Collision, TTC）：若受驗車輛與目標行人皆依其速度行進，受驗車輛會碰撞目標行人之預估時間值。	

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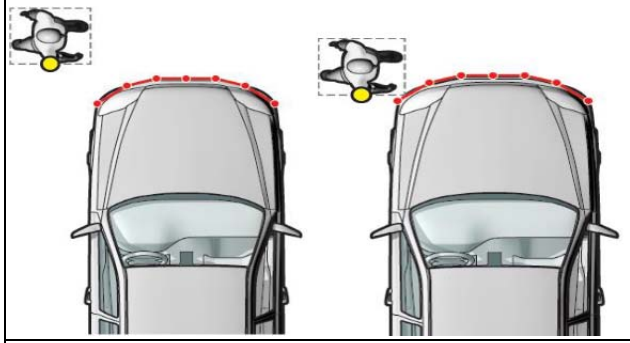
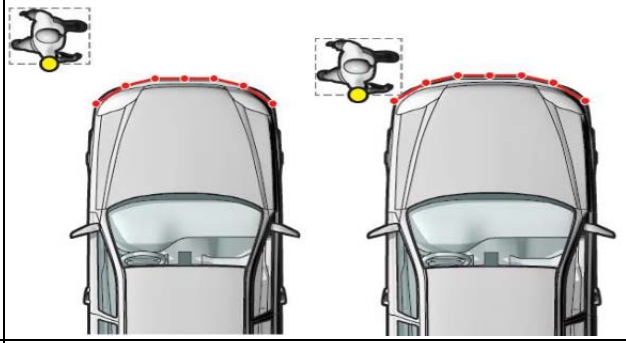
T_{AEB} – means the time where the AEB system activates. Activation time is determined by identifying the last data point where the filtered acceleration signal is below -1 m/s^2, and then going back to the point in time where the acceleration first crossed -0.3 m/s^2 T_{FCW} – means the time where the audible warning of the FCW starts. The starting point is determined by audible recognition V_{impact} – means the speed at which the profiled line around the front end of the VUT coincides with the square box around the EPTa and EPTc as shown in the figure below. 	3.11.1.13 緊急煞車輔助系統觸發時間（T_{AEB}）：觸發時間點的定義方式為找出最後一個濾波後加速度信號低於-1 m/s^2 的數據點，再往回找出加速度首次達到-0.3 m/s^2 的數據點，該點之時間即為觸發時間點。 3.11.1.14 前方碰撞預警系統觸發時間（T_{FCW}）：前方碰撞預警系統之聲音警示觸發的時間，起始點以辨識到聲音作判定。 3.11.1.15 碰撞速度（V_{impact}）：受驗車輛之車頭標示線與 T-NCAP 目標成人行人（EPTa）及目標兒童行人（EPTc）周圍的虛擬正方形範圍碰撞時的速度，如下圖所示。 	
3 REFERENCE SYSTEM 3.1 Convention 3.1.1 For both VUT and EVT use the convention specified in ISO 8855:1991 in which the x-axis points towards the front of the vehicle, the y-axis towards the left and the z-axis upwards (right hand system),	3.11.2 參考系統 3.11.2.1 通則 3.11.2.1.1 受驗車輛與目標行人皆使用 ISO 8855:1991 之通則進行動態數據測量。此通則中 X 軸指向車頭、Y 軸指向車輛左側、Z 軸則指向車頂（右手座標系統），原點則是受驗車輛中線之最	

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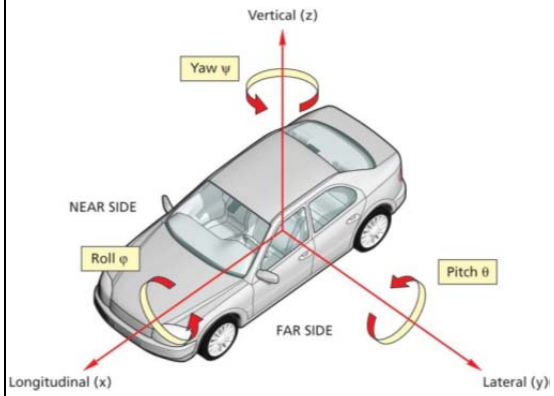
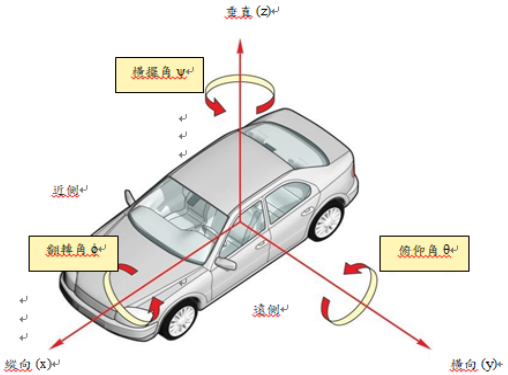
with the origin at the most forward point on the centreline of the VUT for dynamic data measurements as shown in Figure 1.	前點，如圖 1 所示。	
3.1.2 Viewed from the origin, roll, pitch and yaw rotate clockwise around the x, y and z axes respectively. Longitudinal refers to the component of the measurement along the x-axis, lateral the component along the y-axis and vertical the component along the z-axis.	3.11.2.1.2 以原點為中心，翻轉角（roll）、俯仰角（pitch）與橫擺角（yaw）分別以順時針方式繞 X 軸、Y 軸與 Z 軸。縱向為沿著 X 軸的測量方式、橫向為沿著 Y 軸的測量方式、垂直向則是沿著 Z 軸的測量方式。	
3.1.3 This reference system should be used for both left and right hand drive vehicles tested.	~~3.11.2.1.3 左駕及右駕受驗車輛皆使用此參考系統。~~	
 Figure 1: Coordinate system and notation	 圖 1：座標系統與標記	
3.2 Lateral Offset 3.2.1 The lateral offset is determined as the lateral distance between the centre of the front of the VUT when measured in parallel to the	3.11.2.2 側向偏移量 3.11.2.2.1 側向偏移量(lateral offset)之定義為受驗車輛前方中心，其與欲達成之直線路徑平行測量時所得到側向距離誤差值，如	

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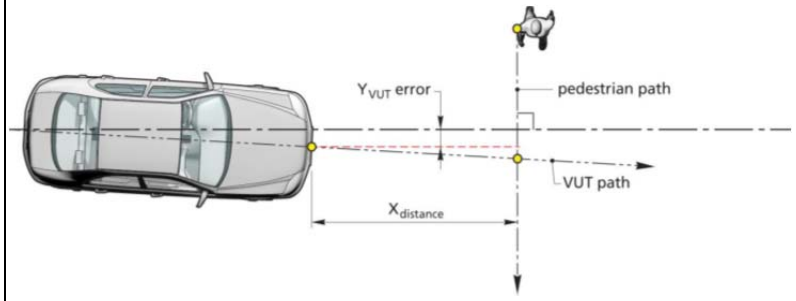
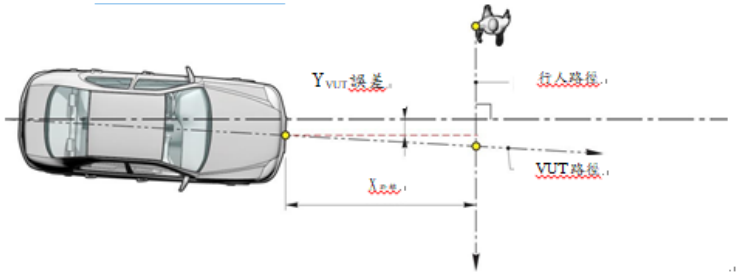
intended straight lined path as shown in the figure below. Lateral offset = Y_{VUT} error  Figure 2: Lateral offset 3.3 Profiles for impact speed determination 3.3.1 A virtual profiled line is defined around the front end of the VUT. This line is defined by straight line segments connecting seven points that are equally distributed over the vehicle width minus 50mm on each side. The theoretical x,y coordinates are provided by the OEMs and verified by the test laboratory.	下圖所示。 側向偏移量＝Y_{VUT} 誤差  圖 2：側向偏移量 3.11.2.3 碰撞速度之標示線 3.11.2.3.1 受驗車輛之車頭有虛擬標示線。此標示線由車寬最外緣兩側處各減 50mm，並由平均劃分之七條平行線與車頭碰觸處連接而成。x,y 座標理論值應由車輛業者提供，由檢測機構驗證。	

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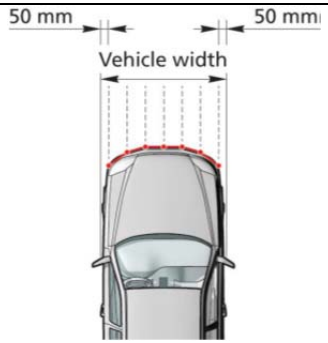
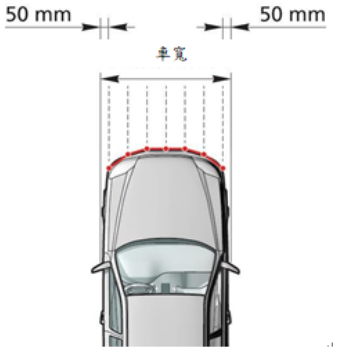
 Figure 3: Virtual profiled line around vehicle front end	 圖 3：車頭之虛擬標示線	
3.3.2 Around the EPT a virtual square box is defined which is used to determine the impact speed. The dimensions of this virtual box are shown in Figure 4 below.	3.11.2.3.2 目標行人周圍亦標示虛擬正方形，用來測量碰撞速度。此虛擬正方形之尺寸如圖 4 所示。	
 Figure 4: Virtual box dimensions around EPTa and EPTc	 圖 4：目標成人行人與目標兒童行人周圍之虛擬正方形尺寸	

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4 MEASURING EQUIPMENT 4.1.1 Sample and record all dynamic data at a frequency of at least 100Hz. Synchronise using the DGPS time stamp the EPT data with that of the VUT.		3.11.3 量測配備 3.11.3.1 所有動態數據之採樣及記錄頻率不得低於 100Hz。使用差分全球定位系統時間標記（DGPS time stamp）將目標行人數據與受驗車輛數據同步。		
4.2 Measurements and Variables		3.11.3.2 量測與變數		
4.2.1 Time	T	3.11.3.2.1時間	T	
•T_0 equals TTC = 4s	T_0	(1) T_0等於碰撞時間= 4s	T_0	
•T_{AEB}, time where AEB activates	T_{AEB}	(2) 緊急煞車輔助系統觸發時間	T_{AEB}	
•T_{FCW}, time where FCW activates	T_{FCW}	(3) 前方碰撞預警系統觸發時間	T_{FCW}	
•T_{impact}, time where VUT impacts EPT	T_{impact}	(4) 受驗車輛碰撞目標行人之時間	T_{impact}	
4.2.2 Position of the VUT during the entire test	X_{VUT}, Y_{VUT}	3.11.3.2.2試驗過程中受驗車輛之位置	X_{VUT} Y_{VUT}	
4.2.3 Position of the EPT during the entire test	Y_{EPT}	3.11.3.2.3試驗過程中目標行人之位置	Y_{EPT}	
4.2.4 Speed of the VUT during the entire test	V_{VUT}	3.11.3.2.4試驗過程中受驗車輛之速度	V_{VUT}	
•V_{impact}, speed when VUT impacts EPT	V_{impact}	(1) 碰撞速度：受驗車輛碰撞目標行人時之速度	V_{impact}	
4.2.5 Speed of the EPT during the entire test	V_{EPT}	3.11.3.2.5 試驗過程中目標行人之速度	V_{EPT}	
4.2.6 Yaw velocity of the VUT during the entire test	$\dot{\Psi}_{VUT}$	3.11.3.2.6 試驗過程中受驗車輛之橫擺角速度	Ψ_{VUT}	
4.2.7 Longitudinal acceleration of the VUT during the entire test	A_{VUT}	3.11.3.2.7 試驗過程中受驗車輛之縱向加速度	A_{VUT}	

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4.2.8 Steering wheel velocity of the VUT Ω_{VUT} during the entire test	3.11.3.2.8 試驗過程中受驗車輛之方向盤轉速 Ω_{VUT}	
4.3 Measuring Equipment	3.11.3.3 量測配備精度	
4.3.1 Equip the VUT and EVT with data measurement and acquisition equipment to sample and record data with an accuracy of at least:	3.11.3.3.1 受驗車輛與目標行人應配備數據量測與採集配備，用以抽樣及記錄數據，其精準度最低要求如下：	
•VUT speed to 0.1km/h; •EPT speed to 0.01km/h; •VUT lateral and longitudinal position to 0.03m ; •EPT lateral position to 0.03m ; •VUT yaw rate to 0.1°/s; •VUT longitudinal acceleration to 0.1m/s^2; •VUT steering wheel velocity to 1.0 °/s.	(1) 受驗車輛速度：0.1km/h (2) 目標行人速度： 0.01km/h (3) 受驗車輛之橫向及縱向位置： 0.03m (4) 目標行人橫向位置： 0.03m (5) 受驗車輛橫擺角速度： 0.1°/s (6) 受驗車輛縱向加速度： 0.1m/s^2 (7) 受驗車輛方向盤轉速： 1.0 °/s	
4.4 Data Filtering 4.4.1 Filter the measured data as follows:	3.11.3.4 數據濾波 3.11.3.4.1 依據下列原則對量測所得數據進行濾波：	
4.4.1.1 Position and speed are not filtered and are used in their raw state.	3.11.3.4.1.1 位置與速度不需濾波，直接使用原始數據。	
4.4.1.2 Acceleration with a 12-pole phaseless Butterworth filter with a cut off frequency of 10Hz.	3.11.3.4.1.2 加速度：由 12-pole phaseless 巴特沃斯濾波器(Butterworth filter)及 10Hz 之截止頻率進行濾波。	

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4.4.1.3 Yaw rate with a 12-pole phaseless Butterworth filter with a cut off frequency of 10Hz.	3.11.3.4.1.3 橫擺角速度：由 12-pole phaseless 巴特沃斯濾波器(Butterworth filter)及 10Hz 之截止頻率進行濾波。	
5 . EURO NCAP PEDESTRIAN TARGET 5.1 Specification 5.1.1 Conduct the tests in this protocol using the Euro NCAP Pedestrian Target (EPTa and EPTc) dressed in a black shirt and blue trousers, as shown in Figure 5 below. The EPT replicates the visual, radar, LIDAR and PMD attributes of a typical pedestrian, and is impactable at differential speeds up to 60km/h without causing significant damage to the VUT or EPT.  Figure 5: Euro NCAP Pedestrian Targets (EPTa and EPTc)	3.11.4 T-NCAP 目標行人 3.11.4.1 規格 3.11.4.1.1 進行試驗時，請使用穿著黑色上衣、藍色長褲之 T-NCAP 目標行人（目標成人行人與目標兒童行人），如圖 5 所示。目標行人模擬一般行人之視覺、雷達、光達（LIDAR）與 PMD 特性，且在碰撞速度在 60km/h 以下時，應不會造成受驗車輛或目標行人嚴重損壞。  圖 5：T-NCAP 目標行人（目標成人行人與目標兒童行人）	

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5.1.2 To ensure repeatable results the propulsion system and EPT must meet the requirements as detailed in ANNEX A. 5.1.3 The EPT is designed to work with the following types of sensors: •Radar (24 and 77 GHz) •LIDAR •Camera •PMD When a manufacturer believes that the EVT is not suitable for another type of sensor system used by the VUT but not listed above, the manufacturer is asked to contact the Euro NCAP Secretariat.	3.11.4.1.2 為確保試驗結果之再現性，推進系統與目標行人應符合 3.11.7 規定。 3.11.4.1.3 設計之目標行人應能辨識下列型式感測器： (1) 雷達（24 與 77 GHz） (2) 光達 (3) 攝影機 (4) PMD 如車輛業者認為受驗車裝設非上述所提及型式之感測器系統且不適用於目標行人時，則車輛業者應與 T-NCAP 執行機構聯繫。	
6. TEST CONDITIONS 6.1 Test Track 6.1.1 Conduct tests on a dry (no visible moisture on the surface), uniform, solid-paved surface with a consistent slope between level and 1%. The test surface shall have a minimal peak braking coefficient (PBC) of 0.9. 6.1.2 The surface must be paved and may not contain any irregularities (e.g. large dips or cracks, manhole covers or reflective studs) that may give rise to abnormal sensor measurements within a lateral distance of 3.0m to either side of the test path and with a	3.11.5 試驗條件 3.11.5.1 試驗道路 3.11.5.1.1 試驗道路應乾燥（試驗路面無明顯可見之水分）、平整、固態鋪設之路面，坡度應介於水平至 1%之間。試驗路面之最高煞車係數（PBC）應大於等於 0.9。 3.11.5.1.2 試驗道路應為鋪設路面，試驗路徑兩側 3.0m 內及試驗結束時受驗車輛前方 30m 內，不得有任何可能造成感測器偵測異常之不平整處（如：驟降斜坡、裂縫、人孔蓋或反光路釘）。	

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longitudinal distance of 30m ahead of the VUT when the test ends.		
6.1.3 The presence of lane markings is allowed. However testing may only be conducted in an area where typical road markings depicting a driving lane may not be parallel to the test path within 3.0m either side. Lines or markings may cross the test path, but may not be present in the area where AEB activation and/or braking after FCW is expected.	3.11.5.1.3 試驗道路上可設有車道標線。然而，試驗路徑兩側 3.0m 以內不得有平行於路徑之一般車道標線。指示線或標線可以通過試驗路徑，但不得出現於預計會觸發緊急煞車輔助系統及/或前方碰撞預警系統作動後之煞車處。	
6.2 Weather Conditions 6.2.1 Conduct tests in dry conditions with ambient temperature above 5°C and below 40°C.	3.11.5.2 天氣條件 3.11.5.2.1 試驗應於環境溫度 5°C 至 40°C 間之乾燥環境進行。	
6.2.2 No precipitation shall be falling and horizontal visibility at ground level shall be greater than 1km. Wind speeds shall be below 10m/s to minimise EVT and VUT disturbance.	3.11.5.2.2 降雨時不得進行試驗，且地面水平能見度應大於 1km。風速應小於 10m/s，以使目標行人與受驗車輛所受干擾應降至最低。	
6.2.3 Natural ambient illumination must be homogenous in the test area and in excess of 2000 lux for daylight testing with no strong shadows cast across the test area other than those caused by the VUT or EVT. Ensure testing is not performed driving towards, or away from the sun when there is direct sunlight.	3.11.5.2.3 試驗區域的自然光線應均勻照射，白天試驗時照度應高於 2000lux，且除了受驗車輛與目標行人之陰影外，不得有其他陰影籠罩試驗區域。當陽光直接照射時，應確保試驗時之車輛行進方向非直接朝向或背向陽光照射方向。	

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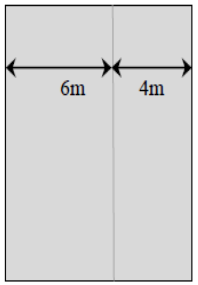
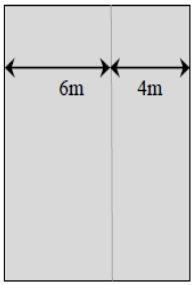
6.2.4 Measure and record the following parameters preferably at the commencement of every single test or at least every 30 minutes: a) Ambient temperature in °C; b) Track Temperature in °C; c) Wind speed and direction in m/s; d) Ambient illumination in Lux.	3.11.5.2.4 應於每次試驗開始前或至少每隔 30 分鐘，測量與記錄以下參數： (1) 現場環境溫度，以攝氏記錄； (2) 路面溫度，以攝氏記錄； (3) 風速與風向，以m/s記錄； (4) 環境照度，以lux記錄。	
6.3 Surroundings 6.3.1 Conduct testing such that there are no other vehicles, highway furniture, obstructions, other objects or persons protruding above the test surface that may give rise to abnormal sensor measurements within a lateral distance of 6.0m on the driver side and 4.0m on the passenger side of the VUT test path, 1.0m around of the EPT and within a longitudinal distance of 30m ahead of the VUT when the test ends (Figure 6).	3.11.5.3試驗環境 3.11.5.3.1 試驗時試驗路徑之駕駛側橫向距離 6.0m 內、乘客側橫向距離 4.0m 內、目標行人周遭 1.0m 內、及試驗結束時受驗車輛前方 30 公尺內（如圖 6），應無其他車輛、高速公路設施（highway furniture）、障礙物、其他物體或人員，以避免造成感測器偵測異常。	
6.3.2 Test areas where the VUT needs to pass under overhead signs, bridges, gantries or other significant structures are not permitted.  Figure 6: Free surroundings	3.11.5.3.2 試驗區域應不得設置於受驗車輛會從標誌、橋樑、門架(gantries)，或其他大型建築物下方通過之場地。  圖6：空曠的環境	

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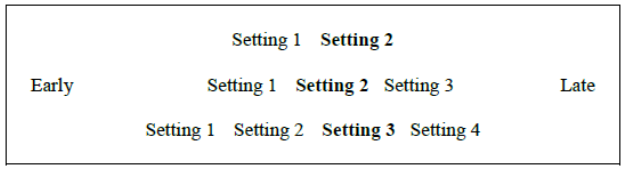
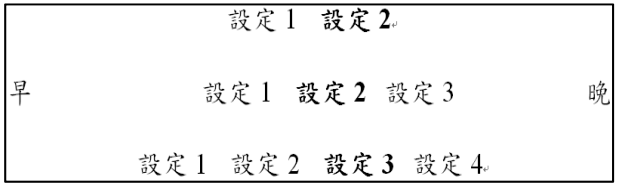
6.3.3 The general view ahead and to either side of the test area shall comprise of a wholly plain man made or natural environment (e.g. further test surface, plain coloured fencing or hoardings, natural vegetation or sky etc.) and must not comprise any highly reflective surfaces or contain any vehicle-like silhouettes that may give rise to abnormal sensor measurements.	3.11.5.3.3試驗區域前方與兩側之基本視野應為單純之人造建設或自然環境（如：測試路面的延伸、素色圍籬或圍牆、天然植被或天空等），且不得有高度反光表面或任何類似車輛之輪廓，以免造成感測器偵測異常。	
6.4 VUT Preparation 6.4.1 AEB and FCW System Settings	3.11.5.4受驗車輛整備 3.11.5.4.1緊急煞車輔助系統與前方碰撞預警系統設定	
6.4.1.1 Set any driver configurable elements of the AEB and/or FCW system (e.g. the timing of the collision warning or the braking application if present) to the middle setting or midpoint and then next latest setting similar to the examples shown in Figure 7.	3.11.5.4.1.1緊急煞車輔助系統及/或前方碰撞預警系統之駕駛可調整之設定選項（如：碰撞預警時機，或煞車作動時機，若有設置）調整至中間選項或距中間位置但較晚發出警示之選項，如圖7所示。	
 Figure 7: AEB and/or FCW system setting for testing	 圖 7：緊急煞車輔助系統及/或前方碰撞預警系統試驗設定	
6.4.2 Deployable Pedestrian/VRU Protection Systems	3.11.5.4.2 行人/弱勢道路使用者保護系統（Deployable Pedestrian/VRU Protection Systems）	

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When the vehicle is equipped with a deployable pedestrian/VRU protection system, this system shall be deactivated before the testing commences.	如受驗車輛配備其他行人/弱勢道路使用者保護系統，試驗前應關閉上述保護系統。	
6.4.3 Tyres Perform the testing with new original fitment tyres of the make, model, size, speed and load rating as specified by the vehicle manufacturer. It is permitted to change the tyres which are supplied by the manufacturer or acquired at an official dealer representing the manufacturer if those tyres are identical make, model, size, speed and load rating to the original fitment. Inflate the tyres to the vehicle manufacturer's recommended cold tyre inflation pressure(s). Use inflation pressures corresponding to least loading normal condition.	3.11.5.4.3輪胎 試驗應使用車輛業者指定之型式、尺寸、速度代號及載重能力指數之全新原廠輪胎。試驗時，可更換車輛業者或代理商所提供之輪胎，前提是新的輪胎應符合原廠規格之型式、尺寸、速度代號及載重能力指數。將輪胎充氣至車輛業者建議之冷胎胎壓。使用之輪胎胎壓應至少與一般負載狀態之胎壓(least loading normal condition）相同。	
Run-in tyres according to the tyre conditioning procedure specified in 7.1.3. After running-in maintain the run-in tyres in the same position on the vehicle for the duration of the testing.	依 3.11.6.1.3 節進行輪胎磨合（run-in），磨合完畢之輪胎於整個試驗過程中應維持於車輛相同位置。	
6.4.4 Wheel Alignment Measurement	3.11.5.4.4 車輪定位測量（Wheel Alignment Measurement）	
The vehicle should be subject to a vehicle (in-line) geometry check to record the wheel alignment set by the OEM. This should be done with the vehicle in kerb weight.	受驗車輛應以車輛業者之設定進行車輛幾何檢查（vehicle (in-line) geometry check），以紀錄其車輪定位，受驗車輛應為空車重量。	

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6.4.5 Unladen Kerb Mass	3.11.5.4.5 空車重量（Unladen Kerb Mass）	
6.4.5.1 Fill up the tank with fuel to at least 90% of the tank's capacity of fuel.	3.11.5.4.5.1 車輛燃油箱至少裝滿 90%容量的燃油。	
6.4.5.2 Check the oil level and top up to its maximum level if necessary. Similarly, top up the levels of all other fluids to their maximum levels if necessary.	3.11.5.4.5.2 檢查機油油位，必要時加注至最高油位；同樣地，其他液體若有需要也可加注至其最高限值。	
6.4.5.3 Ensure that the vehicle has its spare wheel on board, if fitted, along with any tools supplied with the vehicle. Nothing else should be in the car.	3.11.5.4.5.3 確認備胎及其他隨車工具已在車上，除此之外，車內不應有其他物品。	
6.4.5.4 Ensure that all tyres are inflated according to the manufacturer's instructions for the appropriate loading condition.	3.11.5.4.5.4 確認所有輪胎依車輛業者之建議進行充氣至適當負載狀態（appropriate loading condition）。	
6.4.5.5 Measure the front and rear axle masses and determine the total mass of the vehicle. The total mass is the 'unladen kerb mass' of the vehicle. Record this mass in the test details.	3.11.5.4.5.5 測量前軸及後軸重量，並計算車輛之總重量。此重量即為「空車重量」，將該數據記錄於試驗資料。	
6.4.5.6 Calculate the required ballast mass, by subtracting the mass of the test driver and test equipment from the required 200 kg interior load.	3.11.5.4.5.6 試驗規定需配重（ballast mass）200 公斤，且此重量應包含試驗駕駛及試驗配備之重量。	

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6.4.6 Vehicle Preparation	3.11.5.4.6 車輛整備	
6.4.6.1 Fit the on-board test equipment and instrumentation in the vehicle. Also fit any associated cables, cabling boxes and power sources.	3.11.5.4.6.1 將車載資料擷取配備裝在車輛內，並裝配所有相關電線、接線盒及電源。	
6.4.6.2 Place weights with a mass of the ballast mass. Any items added should be securely attached to the car.	3.11.5.4.6.2 置放相當於配重之重量（weights）。所有物品皆應穩當地固定於車內。	
6.4.6.3 With the driver in the vehicle, weigh the front and rear axle loads of the vehicle.	3.11.5.4.6.3 駕駛上車後，分別量測車輛前後軸重量。	
6.4.6.4 Compare these loads with the “unladen kerb mass”	3.11.5.4.6.4 將上述負載與空車重量進行比較。	
6.4.6.5 The total vehicle mass shall be within ±1% of the sum of the unladen kerb mass, plus 200kg. The front/rear axle load distribution needs to be within 5% of the front/rear axle load distribution of the original unladen kerb mass plus full fuel load. If the vehicle differs from the requirements given in this paragraph, items may be removed or added to the vehicle which has no influence on its performance. Any items added to increase the vehicle mass should be securely attached to the car.	3.11.5.4.6.5 車輛總重應為空車重量加上 200 公斤，容許誤差值為±1%。前軸/後軸之空車重與加滿燃油配重後，前軸/後軸重量變化皆在 5%以內。若受驗車輛無法符合此規範，可於車輛內移除或增加與性能表現無關之物品。任何用以增加重量之物品應穩當地固定於車內。	
6.4.6.6 Repeat paragraphs 6.4.6.3 and 6.4.6.4 until the front and rear axle loads and the total vehicle mass are within the limits set in paragraph 6.4.6.5. Care needs to be taken when adding or removing weight in order to approximate the original vehicle inertial properties	3.11.5.4.6.6 重複 3.11.5.4.6.3 與 3.11.5.4.6.4 之步驟，直至前後軸重量及車輛總重符合條文 3.11.5.4.6.5 之規定。增加或移除重量時應謹慎執行，以維持車輛之慣性屬性（inertial properties）。試驗內容應記錄最終之軸重。試驗條件應記錄受驗車輛之軸重。	

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as close as possible. Record the final axle loads in the test details. Record the axle weights of the VUT in the 'as tested' condition. 6.4.6.7 Verify the x-y coordinates for the virtual front end vehicle contour given by the manufacturer. When the coordinates given are within 10mm of those measured by the test laboratory, the coordinates as provided by the manufacturer will be used. When the coordinates are not within 10mm, the coordinates as measured by the laboratory will be used.	3.11.5.4.6.7 應驗證車輛業者提供之車頭虛擬標示線 x,y 座標。若提供之座標與檢測機構測量出之座標誤差小於 10mm，則直接使用車輛業者提供之座標。若誤差大於 10mm，則應使用檢測機構測量之座標。	
7. TEST PROCEDURE 7.1 VUT Pre-test Conditioning 7.1.1 General 7.1.1.1 A new car is used as delivered to the test laboratory. 7.1.1.2 If requested by the vehicle manufacturer, drive a maximum of 100km on a mixture of urban and rural roads with other traffic and roadside furniture to 'calibrate' the sensor system. Avoid harsh acceleration and braking. 7.1.2 Brakes	3.11.6 試驗程序 3.11.6.1 受驗車輛試驗前調整 3.11.6.1.1 一般通則 3.11.6.1.1.1 以新車送至檢測機構。 3.11.6.1.1.2 若車輛業者要求，受驗車輛可行駛於市區及鄉村道路之交通環境及設施下最多 100 公里，以校準感測器系統。行駛時，應避免劇烈加速及煞車。 3.11.6.1.2 煞車	

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7.1.2.1 Condition the vehicle's brakes in the following manner: •Perform twenty stops from a speed of 56km/h with an average deceleration of approximately 0.5 to 0.6g. •Immediately following the series of 56km/h stops, perform three additional stops from a speed of 72km/h, each time applying sufficient force to the pedal to operate the vehicle's antilock braking system (ABS) for the majority of each stop. •Immediately following the series of 72km/h stops, drive the vehicle at a speed of approximately 72km/h for five minutes to cool the brakes. •Initiation of the first test shall begin within two hours after completion of the brake conditioning	3.11.6.1.2.1 依下列方式調節車輛煞車： (1) 自車速 56km/h 以平均減速度為 0.5 至 0.6g 之方式執行 20 次煞停。 (2) 完成上述 56km/h 一系列煞車後，緊接著再以 72km/h 的速度煞停 3 次，每次應以足夠的力度踩下煞車，讓車輛的防鎖死煞車系統（antilock braking system，ABS）可於每次煞車時充分作動。 (3) 完成上述 72km/h 一系列煞車後，隨即應以 72km/h 的速度行駛 5 分鐘以冷卻煞車。 (4) 第一項試驗應於調整煞車後 2 小時內開始進行。	
7.1.3 Tyres 7.1.3.1 Condition the vehicle's tyres in the following manner to remove the mould sheen: •Drive around a circle of 30m in diameter at a speed sufficient to generate a lateral acceleration of approximately 0.5 to 0.6g for three clockwise laps followed by three anticlockwise laps.	3.11.6.1.3 輪胎 3.11.6.1.3.1 以下列方式調節車輛輪胎，以磨除輪胎之毛邊: (1) 測試車輛沿直徑 30m 之圓環並以能產生接近 0.5 至 0.6g 側向加速度之速度繞行，先以順時針方向行駛 3 圈接著以逆時針方向行駛 3 圈。	

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•Immediately following the circular driving, drive four passes at 56km/h, performing ten cycles of a sinusoidal steering input in each pass at a frequency of 1Hz and amplitude sufficient to generate a peak lateral acceleration of approximately 0.5 to 0.6g.	(2) 使用頻率 1 赫茲之正弦轉向模式，與符合最高側向加速度 0.5 至 0.6g 之方向盤轉角振幅極值，且車速為 56km/h，使車輛繞行 4 次，並於每次進行 10 次之正弦轉向循環。	
•Make the steering wheel amplitude of the final cycle of the final pass double that of the previous inputs.	(3) 最終次之最終循環之方向盤轉角振幅應為前次循環之 2 倍。	
7.1.3.2 In case of instability in the sinusoidal driving, reduce the amplitude of the steering input to an appropriately safe level and continue the four passes.	3.11.6.1.3.2 如正弦轉向模式（sinusoidal driving）致使車身不穩定，則應減少方向盤輸入之振幅至安全水平，並完成 4 次操作。	
7.1.4 AEB/FCW System Check	3.11.6.1.4 緊急煞車輔助系統/前方碰撞預警系統檢測	
7.1.4.1 Before any testing begins, perform a maximum of ten runs at the lowest test speed the system is supposed to work, to ensure proper functioning of the system.	3.11.6.1.4.1 試驗開始前，應以可觸發系統之最低試驗速度行駛至多 10 次，以確保系統正常運作。	
7.2 Test Scenarios	3.11.6.2 試驗情境	
7.2.1 The performance of the VUT AEB system is assessed in the CVFA, CVNA-25, CVNA-75 and CVNC scenarios as shown in Figure 8abc.	3.11.6.2.1 受驗車輛之緊急煞車輔助之弱勢道路使用者系統試驗，係以遠端成人碰撞情境試驗、近端成人碰撞情境試驗 25%、近端成人碰撞情境試驗 75%與近端兒童碰撞情境試驗作評等，如圖 8abc 所示。	

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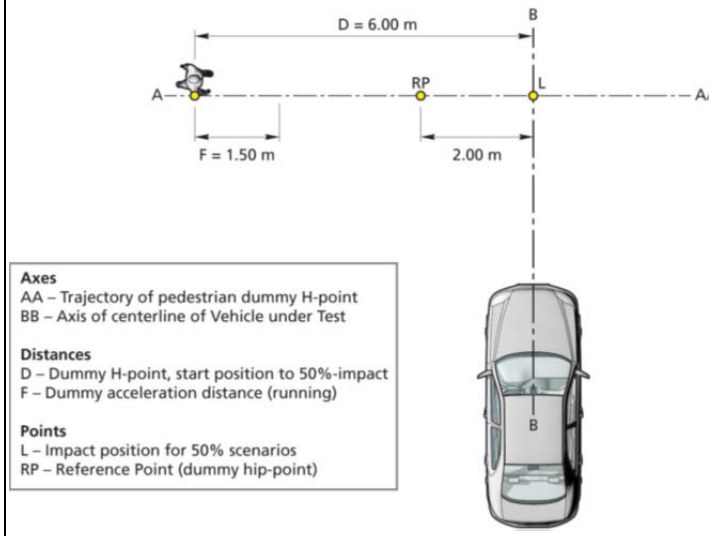
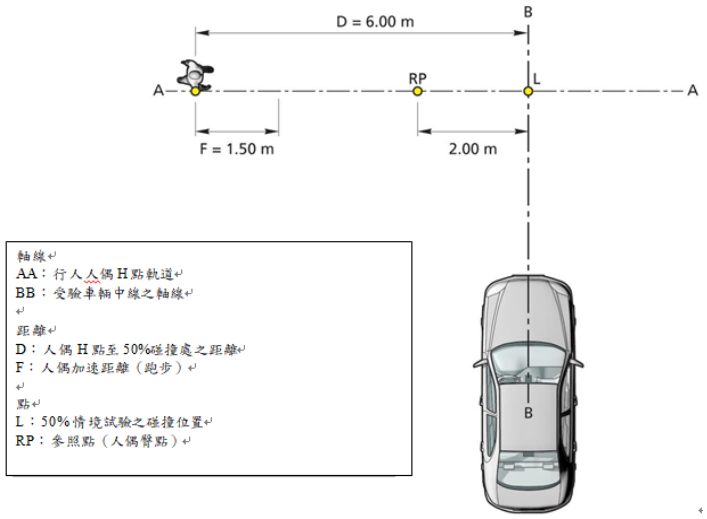
7.2.2 For testing purposes, assume a straight line path equivalent to the centreline of the lane in which the collision occurred, hereby known as the test path. Control the VUT with driver inputs or using alternative control systems that can modulate the vehicle controls as necessary to perform the tests.  Figure 8a: CVFA scenario, Adult running from Farside	3.11.6.2.2 試驗路徑應維持於車道中線。可由駕駛直接控制受驗車輛，另試驗若有需要，可以使用調節車輛控制之控制系統作替代。  圖 8a：遠端成人碰撞情境試驗，成人行人自遠端跑步穿越其路徑	

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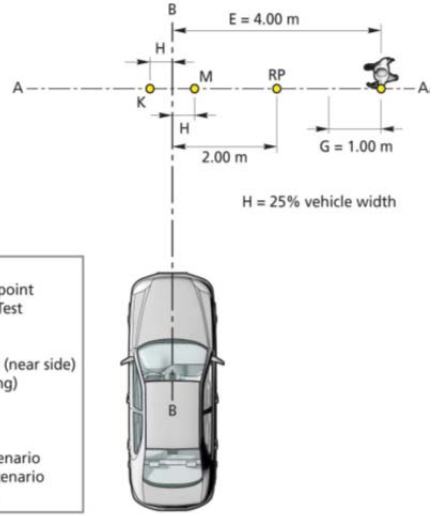
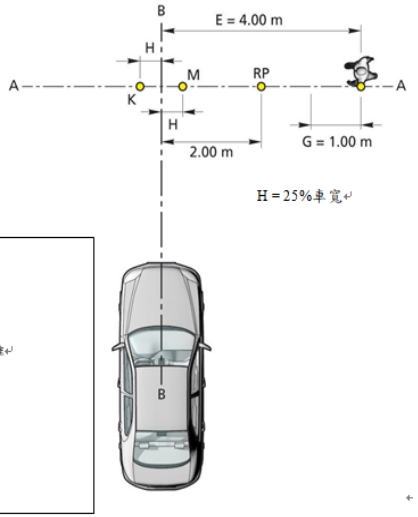
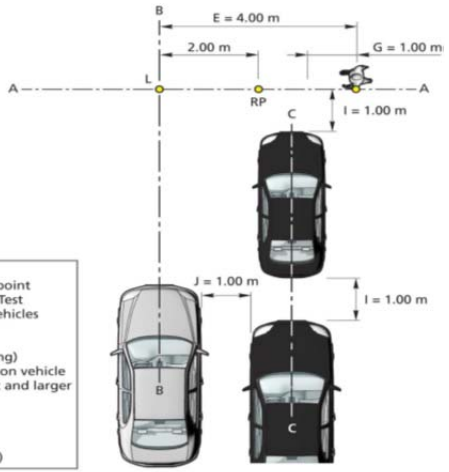
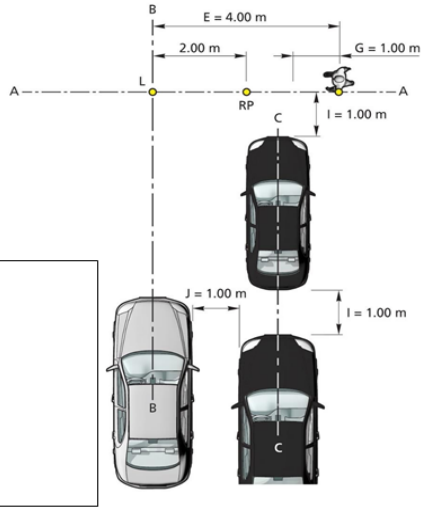
 Figure 8b: CVNA-25 & CVNA-75 scenarios, Walking Adult from Nearside	 [圖 8b：近端成人碰撞情境試驗 25%及近端成人碰撞情境試驗 75%，成人行人自近端走路穿越其路徑]	
 Figure 8c: CVNC scenario, Running Child from Nearside from	 [圖 8c：近端兒童碰撞情境試驗，兒童行人自近端障礙物之後方跑]	

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Obstruction vehicles (see Annex B)	步穿越其路徑（參 3.11.8）	
7.2.3 All tests will be performed with 5 km/h incremental steps (see 7.4.4) within the speed range of 20-60 km/h.	3.11.6.2.3 所有試驗應於 20 至 60 km/h 速度範圍內，以 5 km/h 之遞增步驟（incremental steps）進行（參 3.11.6.4.4）。	
7.2.4 For the CVNA-75 scenario the following additional tests are performed	3.11.6.2.4 近端成人碰撞情境試驗 75%應額外進行以下試驗：	
- Test speed of 20km/h with an EPTa speed of 3 km/h - Test speed of 10 and 15 km/h with an EPTa speed of 5 km/h	(1) 試驗速度為 20km/h，目標成人行人速度為 3 km/h。 (2) 試驗速度為 10 及 15 km/h，目標成人行人速度為 5 km/h	
7.3 Test Conduct 7.3.1 Before every test run, drive the VUT around a circle of maximum diameter 30m at a speed less than 10km/h for one clockwise lap followed by one anticlockwise lap, and then manoeuvre the VUT into position on the test path. If requested by the OEM an initialisation run may be included before every test run. Bring the VUT to a halt and push the brake pedal through the full extent of travel and release.	3.11.6.3 試驗規範 3.11.6.3.1 每次試驗前，受驗車輛應以低於 10 km/h 之速度繞著最大直徑 30m 之圓圈行駛，先以順時針方向行駛一圈，接著以逆時針方向行駛一圈，最後再將受驗車輛開到試驗道路上的預備位置。若車輛業者要求，可於每項試驗前進行此啟始程序(initialization run)。待受驗車輛完全停止，將煞車踏板踩到底再放開。	
7.3.2 For vehicles with an automatic transmission select D. For vehicles with a manual transmission select the highest gear where the RPM will be at least 1500 at the test speed.	3.11.6.3.2 若車輛為自動變速者，應選擇前進檔位 D。若車輛為手排變速者於試驗速度行駛時，應選擇轉速可達 1500rpm 之最高檔位。	

Euro NCAP 原文	T-NCAP條文草案	說明
7.3.3 Perform the first test a minimum of 90s and a maximum of 10 minutes after completing the tyre conditioning, and subsequent tests after the same time period. If the time between consecutive tests exceeds 10 minutes perform three brake stops from 72 km/h at approximately 0.3g. Between tests, manoeuvre the VUT at a maximum speed of 50km/h and avoid riding the brake pedal and harsh acceleration, braking or turning unless strictly necessary to maintain a safe testing environment. 7.4 Test Execution 7.4.1 Accelerate the VUT and EPT to the respective test speeds. 7.4.2 The test shall start at T_0 (4s TTC) and is valid when all boundary conditions are met between T_0 and T_{AEB}/T_{FCW}: -Speed of VUT (GPS-speed) Test speed + 0.5km/h -Lateral deviation from test path 0 ± 0.05 m -Yaw velocity 0 ± 1.0 °/s -Steering wheel velocity 0 ± 15.0 °/s - Speed of EPT during steady state - CVFA 8 ± 0.2 km/h - CVNA 5 ± 0.2 km/h	3.11.6.3.3 應於輪胎調節後 90 秒至 10 分鐘內進行第一次試驗，並於同樣的時間範圍內進行其他試驗。若試驗間隔時間超過 10 分鐘，則應以 72k m/h 的速度煞停 3 次，減速度約為 0.3g。 執行下次試驗前，行駛速度不得高於 50 km/h，且非必要情況下，應儘量避免踩踏煞車（riding the brake pedal）、劇烈加速、煞車或轉彎，以維持安全的試驗環境。 3.11.6.4 試驗執行 3.11.6.4.1 讓受驗車輛與目標行人各自加速至試驗規定速度。 3.11.6.4.2 試驗於 T_0（4s TTC）開始，若 T_0 與 T_{AEB}/T_{FCW} 之間符合下列所有限制條件，則該次試驗認定有效: (1) 受驗車輛速度（GPS-速度）試驗速度+0.5 km/h (2) 行駛路徑側向偏移距離 0 ± 0.05m (3) 橫擺角速度 0 ± 1.0 °/s (4) 方向盤轉速 0 ± 15.0 °/s (5) 目標行人於穩定狀態之速度 (A) 遠端成人碰撞情境試驗 8 ± 0.2 km/h (B) 近端成人碰撞情境試驗 5 ± 0.2 km/h	

Euro NCAP 原文	T-NCAP條文草案	說明
- CVNC 5 ± 0.2 km/h - EPT Steady state - Nearside 3.0 m from vehicle centerline - Farside 4.5 m from vehicle centerline	(C) 近端兒童碰撞情境試驗 5 ± 0.2 km/h (6) 目標行人穩定狀態 (A) 近端 距離車輛中線 3.0 m (B) 遠端 距離車輛中線 4.5 m	
7.4.3 The end of a test is considered when one of the following occurs: - V_{VUT} = 0km/h - Contact between VUT and EPT - EPT has left the VUT path	3.11.6.4.3 發生下述條件其中之一時試驗即結束: (1) 受驗車輛速度 = 0 km/h (2) 受驗車輛與目標行人發生碰撞 (3) 目標行人已離開受驗車輛路徑	
7.4.4 For manual or automatic accelerator control, it needs to be assured that during automatic brake the accelerator pedal does not result in an override of the system. The accelerator pedal needs to be released when the initial test speed is reduced by 5 km/h. There shall be no operation of other driving controls during the test, e.g clutch or brake pedal.	3.11.6.4.4 不論使用自動控制裝置或人員駕駛受驗車輛，應確保自動煞車作動期間，加速踏板不會凌駕(override)煞車系統。試驗初始速度降低 5 km/h 時，應放開加速踏板。試驗進行時，不得使用其他駕駛控制功能，如：離合器或煞車踏板。	
7.4.5 The subsequent test speed for the next test is incremented with 5km/h. Stop testing when the actual speed reduction seen in the tests above 40 km/h is less than 20 km/h or when the manufacturer predicts no performance.	3.11.6.4.5 下一次試驗之速度應增加 5 km/h。當試驗速度高於 40 km/h 後，速度減少幅度若小於 20 km/h 時；或當車輛業者預測系統無法發生效用時，則應停止試驗。	

Euro NCAP 原文	T-NCAP條文草案	說明
7.4.6 When the impact speed recorded in the test differs from the manufacturer predicted performance by more than 5 km/h, the test shall be repeated a further two times for monitoring purposes. These results will be discussed between Euro NCAP and manufacturer to determine which results are to be used for the assessment (most representative) for the vehicle under test.	3.11.6.4.6 若試驗中記錄之碰撞速度與車輛業者預測之表現差異大於 5 km/h 時，應以監控為目的額外進行兩次試驗。T-NCAP 執行機構與車輛業者應討論試驗結果，決定受驗車輛應使用哪幾次結果（最具代表性之結果）。	
ANNEX A EPT SPECIFICATIONS A.1 Pedestrian Target Dimensions The tables and figured below specify the dimensions of the target dummies used. Table A.1: Euro NCAP Adult Pedestrian Target (EPTa) dimensions	3.11.7 目標行人規格 3.11.7.1 目標行人尺寸 以下表格及圖示說明目標人偶之尺寸。 表 1：T-NCAP 目標成人行人尺寸	

Euro NCAP 原文	T-NCAP條文草案	說明

Description	Dimension
Total height in walking posture	1800 ± 20mm
H-point height	923 ± 20mm
Heel to heel distance - Longitudinal - Lateral	 315 ± 20mm 147 ± 10mm
Step width	600 ± 20mm
Shoulder width	500 ± 20mm
Torso depth	235 ± 10mm
Front hand to back side	530 ± 20mm
Torso angle	85 ± 1 deg
Upper arm angle - Non-struck side - Struck side	 60 ± 2 deg 110 ± 2 deg
Support tube in driving direction	5 ± 2 deg
Weight	Max 4 kg

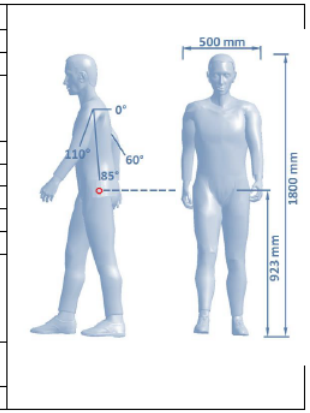
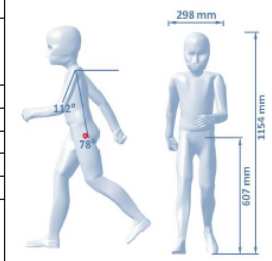


Table A.2: Euro NCAP Child Pedestrian Target (EPTc) dimensions

Description	Dimension
Total height in running posture	1154 ± 20mm
H-point height	607 ± 20mm
Heel to heel distance - Longitudinal - Lateral	 494 ± 20mm 129 ± 10mm
Step width	711 ± 20mm
Shoulder width	298 ± 20mm
Torso depth	139 ± 10mm
Front hand to back side	362 ± 20mm
Torso angle	78 ± 1 deg
Upper arm angle - Non-struck side - Struck side	 50 ± 2 deg 112 ± 2 deg
Support tube in driving direction	5 ± 2 deg
Weight	Max 2 kg



描述說明	尺寸
走路姿勢之總高度	1800 ± 20mm
H 點高度	923 ± 20mm
腳跟間距離 -縱向 -橫向	 315 ± 20mm 147 ± 10mm
步伐寬度	600 ± 20mm
肩膀寬度	500 ± 20mm
軀幹厚度	235 ± 10mm
前手至後背距離	530 ± 20mm
軀幹角度	85 ± 1 deg
上臂角度 -非碰撞側 -碰撞側	 60 ± 2 deg 110 ± 2 deg
推進方向之支撐管	5 ± 2 deg
重量	最重 4 公斤

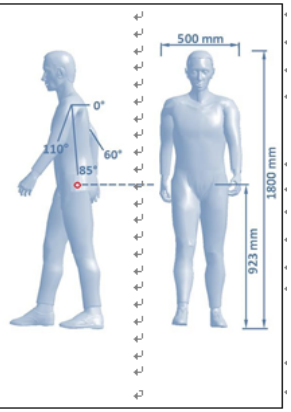
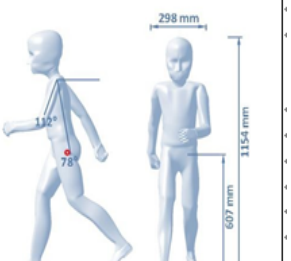


表 2：T-NCAP 目標兒童行人尺寸

描述說明	尺寸
跑步姿勢之總高度	1154 ± 20mm
H 點高度	607 ± 20mm
腳跟間距離 -縱向 -橫向	 494 ± 20mm 129 ± 10mm
步伐寬度	711 ± 20mm
肩膀寬度	298 ± 20mm
軀幹厚度	139 ± 10mm
前手至後背距離	362 ± 20mm
軀幹角度	78 ± 1 deg
上臂角度 -非碰撞側 -碰撞側	 50 ± 2 deg 112 ± 2 deg
推進方向之支撐管	5 ± 2 deg
重量	最重 2 公斤



Euro NCAP 原文	T-NCAP條文草案	說明
A.2 Pedestrian Target visual and infrared properties The targets must be clothed with a long-sleeved shirt in the colour black and long trousers in blue. Skin surface parts (face and hands) have to be finished with a non-reflective flesh-coloured texture or paintwork. The infrared (IR) reflectivity (within 850-910nm wavelength) of the clothes and "skin" shall be within 40-60%. For the hair this shall be within 20-60%. The colour of stiffening ropes must be light grey and low optical reflective. Textile specification outer cover: - Area weight: < 300 g/m² - Water resistance (AATCC 127): > 600 mm - strength (ASTM D5034): > 350 lbs - light fastness (AATCC 169): > 6000 h - wear resistance ASTM (D3884): > 500 cycles A.3 Pedestrian Target Articulation The legs of the dummy shall be articulated to mimic the leg movement of a real pedestrian. Specific corridors between which the targets needs to be within and a corresponding test method will be introduced in a later stage when independent measurement tools are	3.11.7.2 目標行人之外觀與紅外線特性 目標行人應穿著黑色長袖上衣與藍色長褲。露出的皮膚（臉與手）應使用不反光之膚色質地或顏料。 衣物與「皮膚」之紅外線反射率（波長介於 850-910nm）應介於 40-60%範圍內；頭髮則是 20-60%範圍內。 支撐管應為淺灰色，以及低光學反射度。 外層布料規格： (1) 區域重量：< 300 g/m² (2) 防水（AATCC 127）：> 600 mm (3) 強度（ASTM D5034）：> 350 lbs (4) 耐光性（AATCC 169）：> 6000 h (5) 耐磨耗性（ASTM D3884）：> 500 cycles 3.11.7.3 目標行人腿部彎曲 人偶腿部應能彎曲，以模擬真實行人之腿部動作。~~後續待可取得獨立量測工具時，再研訂目標行人腿部彎曲之特定範圍與對應試驗方式。~~	

Euro NCAP 原文	T-NCAP條文草案	說明
available. A.4 Pedestrian Target radar properties The radar reflective characterisitics of the pedestrian targets should be similar to a real pedestrian of the same size. Specific corridors between which the targets needs to be within and a corresponding test method will be introduced in a later stage when independent measurement tools are available. A.4.1 Doppler Effect of Articulation The micro-Doppler effect shall be comparable to a real pedestrian and a homogenous distribution of the RCS over the whole dummy height must be ensured. Specific corridors between which the targets needs to be within and a corresponding test method will be introduced in a later stage when independent measurement tools are available.	3.11.7.4 目標行人雷達特性 雷達反射目標行人之特性應相當於身材相同之真實行人。~~後續待可取得獨立量測工具時，再研訂目標行人雷達特性之範圍與對應試驗方式。~~ 3.11.7.4.1 都卜勒效應(Doppler Effect) 產生之微都卜勒效應與真實行人作比較，且應確保雷達散射截面均勻分布於整個人偶身高。~~後續待可取得獨立量測工具時，再研訂目標行人都卜勒效應之範圍與對應試驗方式。~~	

ANNEX B OBSTRUCTION VEHICLE DIMENSIONS

B.1 Smaller obstruction vehicle

The smaller obstruction vehicle should be of the category Small Family Car and is positioned closest to the pedestrian path. The smaller obstruction vehicle should be within the following geometrical dimensions and needs to be in a dark colour.

	Vehicle Length	**Vehicle width (without mirrors)**	**Vehicle Height**	**Bonnet length (till A pillar)**	**BLE height**
Minimum	4100 mm	1700 mm	1300 mm	1100 mm	650 mm
Maximm	4400 mm	1900 mm	1500 mm	1500 mm	800 mm

B.2 Larger obstruction vehicle

The larger obstruction vehicle should be of the category Small Offroad 4x4 and is positioned behind the smaller obstruction vehicle. The larger obstruction vehicle should be within the following geometrical dimensions and needs to be in a dark colour.

	Vehicle Length	**Vehicle width (without mirrors)**	**Vehicle Height**
Minimum	4300 mm	1750 mm	1500 mm
Maximum	4700 mm	1900 mm	1800 mm

3.11.8 障礙車輛尺寸

3.11.8.1 小型障礙車輛

小型障礙車輛應屬於小型家庭房車類別，且置於距離行人路徑最近之位置。小型障礙車輛應符合以下尺寸，外觀顏色應為深色。

	車輛長度	車輛寬度（不包含後視鏡）	車輛高度	前方車蓋長度（到A柱）	前方車蓋前緣高度
最小值	4100 mm	1700 mm	1300 mm	1100 mm	650 mm
最大值	4400 mm	1900 mm	1500 mm	1500 mm	800 mm

3.11.8.2 大型障礙車輛

大型障礙車輛應屬於小型休旅車類別，且置於小型障礙車輛後方。大型障礙車輛應符合以下尺寸，外觀顏色應為深色。

	車輛長度	車輛寬度（不包含後視鏡）	車輛高度
最小值	430mm	1750 mm	1500mm
最大值	470mm	1900 mm	1800mm

2.3 行人保護(COP)評等規章-2.3.3緊急煞車輔助之弱勢道路使用者系統評等

增/修內容	修訂T-NCAP條文草案	說明
1.ASSESSMENT OF AEB VULNERABLE ROAD USER SYSTEMS	2.3.3 緊急煞車輔助之弱勢道路使用者系統評等	
1.1 Introduction AEB Vulnerable Road User (VRU) systems are AEB systems that are designed to brake autonomously for pedestrian and/or cyclists crossing the path of the vehicle. For the assessment of AEB VRU systems, two areas of assessment are considered; the Autonomous Emergency Braking function and the Human Machine Interface. The AEB function is assessed in three different types of scenarios. At this stage the HMI operation is assessed in a general way as scientific evidence regarding quality of warning is lacking. The current emphasis in the assessment of AEB VRU lies with the AEB function as typically there is not enough time for the driver to react to the unavoidable collision.	~~1.1 簡介~~ ~~緊急煞車輔助之弱勢道路使用者（VRU）系統為設計於車輛突遇行人及/或自行車騎士穿越道路時之自動緊急煞車輔助系統。緊急煞車輔助之弱勢道路使用者系統（AEB VRU）評等分為兩大部分：緊急煞車輔助功能及人機介面，緊急煞車輔助功能又區分為三種試驗情境。~~ ~~現階段由於仍缺乏相關高品質警示之科學證據佐證，故人機界面僅進行一般要求評等。目前緊急煞車輔助之弱勢道路使用者系統（AEB VRU）評等重點為緊急煞車輔助功能，在駕駛沒有足夠的反應時間下避免碰撞事故發生。~~	
1.2 Definitions Throughout this protocol the following terms are used: 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	2.3.3.1 名詞釋義 ~~此規章中使用名詞如下：~~ 2.3.3.1.1 緊急煞車輔助系統（Autonomous emergency braking，AEB）：車輛偵測到可能發生碰撞情況下自動煞車，致使車輛減速並避免碰撞情事發生。	

增/修內容	修訂T-NCAP條文草案	說明
collision. Forward Collision Warning (FCW) – an audiovisual warning that is provided automatically by the vehicle in response to the detection of a likely collision to alert the driver. Car-to-VRU Farside Adult (CVFA) – a collision in which a vehicle travels forwards towards an adult pedestrian crossing it's path running from the farside and the frontal structure of the vehicle strikes the pedestrian at 50% of the vehicle's width when no braking action is applied. Car-to-VRU Nearside Adult (CVNA-25) – a collision in which a vehicle travels forwards towards an adult pedestrian crossing it's path walking from the nearside and the frontal structure of the vehicle strikes the pedestrian at 25% of the vehicles width when no braking action is applied. Car-to-VRU Nearside Adult (CVNA-75) – a collision in which a vehicle travels forwards towards an adult pedestrian crossing it's path walking from the nearside and the frontal structure of the vehicle strikes the pedestrian at 75% of the vehicles width when no braking action is applied.	2.3.3.1.2 前方碰撞預警系統（Forward Collision Warning, FCW）：車輛偵測到可能發生碰撞情況下，為了警示駕駛而自動發出之視聽覺警告信號。 2.3.3.1.3 遠端成人碰撞情境試驗 50%（Car-to-VRU Farside Adult, CVFA）：車輛行進時，前方有成人行人自遠端跑步穿越其路徑；若未煞車，車輛正面寬度百分之 50 處會碰撞行人之情境。 2.3.3.1.4 近端成人碰撞情境試驗 25%（Car-to-VRU Nearside Adult, CVNA-25）：車輛行進時，前方有成人行人自近端走路穿越其路徑；若未煞車，車輛正面寬度百分之 25 處會碰撞行人之情境。 2.3.3.1.5 近端成人碰撞情境試驗 75%（Car-to-VRU Nearside Adult, CVNA-75）：車輛行進時，前方有成人行人自近端走路穿越其路徑；若未煞車，車輛正面寬度百分之 75 處會碰撞行人之情境。	

增/修內容	修訂T-NCAP條文草案	說明
Car-to-VRU Nearside Child (CVNC) –a collision in which a vehicle travels forwards towards a child pedestrian crossing it's path running from behind and obstruction from the nearside and the frontal structure of the vehicle strikes the pedestrian at 50% of the vehicle's width when no braking action is applied.	2.3.3.1.6 近端兒童碰撞情境試驗 50%（Car-to-VRU Nearside Child, CVNC）：車輛行進時，前方有兒童行人自近端有障礙物之後方跑步穿越其路徑；若未煞車，車輛正面寬度百分之 50 處會碰撞行人之情境。	
Vehicle under test (VUT) – means the vehicle tested according to this protocol with a pre-crash collision mitigation or avoidance system on board	2.3.3.1.7 受驗車輛（Vehicle under test, VUT）：係指配備減緩碰撞或預防碰撞系統，並依據此規章進行試驗之車輛。	
Euro NCAP Pedestrian Target (EPT) – means the pedestrian target used in this protocol as specified in Annex A of the AEB VRU test protocol	2.3.3.1.8 T-NCAP 目標行人（Euro NCAP Pedestrian Target, EPT）：緊急煞車輔助之弱勢道路使用者系統試驗規章之 3.11.7 所規範之目標行人。	
V_{impact} – means the speed at which the profiled box around the VUT coincides with the square box around the EPT	2.3.3.1.9 碰撞速度（V_{impact}）：受驗車輛之車頭標示線與 T-NCAP 目標行人周圍的虛擬正方形範圍碰撞時的速度。	
1.3 Criteria and Scoring	2.3.3.2 標準與得分	
To be eligible for scoring points in AEB VRU, the AEB system must operate (i.e. warn or brake) from speeds of 10 km/h in the CVNA-75 scenario In addition, the system must be able to detect pedestrians walking as slow as 3 km/h and reduce speed in the CVNA-75 scenario at 20 km/h. The system may also not automatically switch off at a speed below 60 km/h.	緊急煞車輔助之弱勢道路使用者系統(AEB VRU)試驗之得分，在 CVNA-75 情境下，緊急煞車輔助系統應從 10km/h 時作動（例如：警示或煞車）。此外，在 CVNA-75 情境下，該系統在 20 km/h 時應能偵測到以 3km/h 走動之行人並減速。該系統在 60 km/h 情況下不得自動關閉。	

增/修內容	修訂T-NCAP條文草案	說明
The total score is also conditional to the subsystem test score, see section 0.	總得分係由各子系統之試驗得分計算加總，參 2.3.3.3.3 節。	
1.3.1 Human Machine Interface (HMI)	2.3.3.2.1 人機界面（HMI）	
To be eligible for scoring points for HMI, the AEB and FCW function (if applicable) needs to be default ON at the start of every journey.	人機界面試驗之得分，每次啟動車輛時，緊急煞車輔助功能與前方碰撞預警功能（若適用）之預設狀態為「開啟」。	
When the prerequisites mentioned above are met, points can be achieved for the following:	符合上述前提之得分規範如下：	
Deactivating AEB and FCW system (if applicable) 2 points	(1) 關閉緊急煞車輔助與前方碰撞預警系統（若適用） 2 分	
De-activation of the AEB and FCW (if applicable) system should not be possible with a single push on a button.	緊急煞車輔助系統與前方碰撞預警系統（若適用）：不得僅按一鍵即關閉。	
FCW system 1 point	(2) 前方碰撞預警系統 1 分	
When at test speeds over 40 km/h detects a critical situation that can possibly lead to a crash with a vulnerable road user, a loud and clear audiovisual warning is issued to alert the driver of the oncoming collision. The warning needs to be issued at least 1.2 seconds TTC (assessed at 45 km/h in the CVNA-75 scenario), to leave sufficient time for the driver to react to the warning.	試驗速度大於 40km/h 時，若系統偵測到可能與弱勢道路使用者發生碰撞之危急情況時，車輛應能發出大聲且清楚的視聽覺警示，警告駕駛即將可能發生之碰撞情況。在 CVNA-75 情境下，應以試驗速度 45km/h 之情況作評等，其至少應於碰撞時間（TTC）1.2 秒前發出警示，讓駕駛有足夠時間反應。	

增/修內容	修訂T-NCAP條文草案	說明
Not switching off at low ambient lighting conditions 1 point The system may not switch off at low ambient lighting conditions (<1000lux). 1.3.2 Autonomous Emergency Braking (AEB) For the AEB system tests, the assessment criteria used is the impact speed. For test speeds up to 40 km/h, the available points per test speed are awarded based on the relative speed reduction achieved. Where there is no full avoidance a linear interpolation is applied to calculate the score for every single test speed. $Score_{\ test\ speed} = ((Vtest - Vimpact)/Vtest) \times points_{test\ speed}$ For test speeds above 40km/h points are available on a pass/fail basis. For each of these test speeds points are awarded when a speed reduction of at least 20 km/h is achieved related to actual test speed. The points available for the different test speeds are detailed in the table below:	(3) 照明不佳環境下不得關閉 1 分 系統不得於照明不佳環境下（<1000lux）關閉。 2.3.3.2.2 緊急煞車輔助系統（AEB） 緊急煞車輔助系統試驗評等之標準係為碰撞速度。對於試驗速度小於等於 40km/h 者，其得分依所可達成之相對減速度。另以線性內插法計算每項試驗速度之得分。 得分試驗速度 =((試驗速度 –碰撞速度)／試驗速度) x 分數試驗速度 對於試驗速度大於 40km/h 者，其得分以通過/未通過計算得分。每一試驗速度之得分，其實際試驗速度應至少達到減速 20km/h。 不同試驗速度之得分，詳見下表：	

增/修內容	修訂T-NCAP條文草案	說明

Test speed	CVFA	CVNA-25	CVNA-75	CVNC
20 km/h	1.000	1.000	1.000	1.000
25 km/h	2.000	2.000	2.000	2.000
30 km/h	2.000	2.000	2.000	2.000
35 km/h	3.000	3.000	3.000	3.000
40 km/h	3.000	3.000	3.000	3.000
45 km/h	3.000	3.000	3.000	3.000
50 km/h	2.000	2.000	2.000	2.000
55 km/h	1.000	1.000	1.000	1.000
60 km/h	1.000	1.000	1.000	1.000
Total	18.000	18.000	18.000	18.000

1.4 Scoring and Visualisation

The scoring is based on normalized scores of the AEB function.

1.4.1AEB score

For each scenario (CVFA, CVNA-25, CVNA-75 and CVNC) normalised scores are calculated for AEB. The total AEB score is calculated by averaging the scenario scores. This results in one percentage for the AEB performance.

試驗速度	遠端成人碰撞情境試驗	近端成人碰撞情境試驗25%	近端成人碰撞情境試驗75%	近端兒童碰撞情境試驗
20 km/h	1.000	1.000	1.000	1.000
25 km/h	2.000	2.000	2.000	2.000
30 km/h	2.000	2.000	2.000	2.000
35 km/h	3.000	3.000	3.000	3.000
40 km/h	3.000	3.000	3.000	3.000
45 km/h	3.000	3.000	3.000	3.000
50 km/h	2.000	2.000	2.000	2.000
55 km/h	1.000	1.000	1.000	1.000
60 km/h	1.000	1.000	1.000	1.000
總分	18.000	18.000	18.000	18.000

2.3.3.3 評分說明

得分係依據緊急煞車輔助系統功能之常態化分數計算。

2.3.3.3.1 緊急煞車輔助系統分數

計算出各緊急煞車輔助系統情境（CVFA、CVNA-25、CVNA-75及CVNC）的常態化分數。緊急煞車輔助系統總分計算方式應為所有情境分數之平均。緊急煞車輔助系統表現結果係以百分比呈現。

增/修內容	修訂T-NCAP條文草案	說明
1.4.2 HMI score The HMI score is the normalised score of the points achieved under section 1.3.1. 1.4.3 Total AEB Vulnerable Road User score The total score in points is the weighted sum of the AEB score and HMI score as shown below. $AEB\ VRU\ total\ score = (AEB\ score\ x\ 5) + (HMI\ score\ x\ 1)$ AEB VRU scoring is conditional to the total points achieved in subsystem tests, i.e. the sum of pedestrian Headform, Upper Legform & Lower Legform scores: If the subsystem total test score is lower than 22 points, no points are available for AEB VRU, regardless whether the system is fitted and would achieve a good score.	2.3.3.3.2 人機界面分數 人機界面之常態化分數係指符合條文 2.3.3.2.1 之分數。 2.3.3.3.3 緊急煞車輔助之弱勢道路使用者系統總分 總分為緊急煞車輔助系統分數與人機界面分數加權總和，公式如下： 緊急煞車輔助之弱勢道路使用者系統總分 =(緊急煞車輔助系統分數×5)+(人機界面分數 ×1) 緊急煞車輔助之弱勢道路使用者系統之得分，其建立於其他子系統之分數加總，例如：行人頭部、上腿部與下腿部之分數總和： 若子系統試驗加總分數低於 22 分，即使安裝此系統且試驗獲得高分，緊急煞車輔助之弱勢道路使用者系統(AEB VRU)得分仍為零。	

增/修內容	修訂T-NCAP條文草案	說明
Example: AEB function test results in CVFA scenario (table) AEB function (assumed normalized scores for this example) - Normalized score in CVNA-25 scenario: 76.7% - Normalized score in CVNA-75 scenario: 100.0% - Normalized score in CVNC scenario: 45.3% AEB score = 75.7%	範例： 遠端成人碰撞情境試驗之緊急煞車輔助功能試驗結果 (table) 緊急煞車輔助系統功能（範例：假設之常態化分數） (1) 近端成人碰撞情境試驗 25%之常態化分數：76.7% (2) 近端成人碰撞情境試驗 75%之常態化分數：100.0% (3) 近端兒童碰撞情境試驗之常態化分數：45.3% 緊急煞車輔助系統分數= 75.7%	

Vtest	$points_{test\ speed}$	Vimpact	$Score_{test\ speed}$
20 km/h	1.000	0 km/h	1.000
25 km/h	2.000	0 km/h	2.000
30 km/h	2.000	0 km/h	2.000
35 km/h	3.000	0 km/h	3.000
40 km/h	3.000	20 km/h	1.500
45 km/h	3.000	25 km/h	3.000
50 km/h	2.000	30km/h	2.000
55 km/h	1.000	40km/h	0.000
60 km/h	1.000	Not tested	0.000
Total	18.000		14.500
Normalised score			80.6%

試驗速度	$分數_{試驗速度}$	碰撞速度	$得分_{試驗速度}$
20 km/h	1.000	0 km/h	1.000
25 km/h	2.000	0 km/h	2.000
30 km/h	2.000	0 km/h	2.000
35 km/h	3.000	0 km/h	3.000
40 km/h	3.000	20 km/h	1.500
45 km/h	3.000	25 km/h	3.000
50 km/h	2.000	30km/h	2.000
55 km/h	1.000	40km/h	0.000
60 km/h	1.000	未測試	0.000
總分	18.000		14.500
常態化分數			80.6%

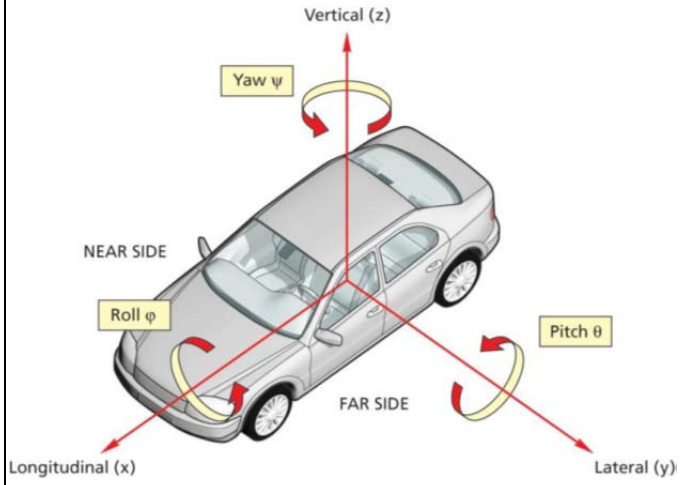
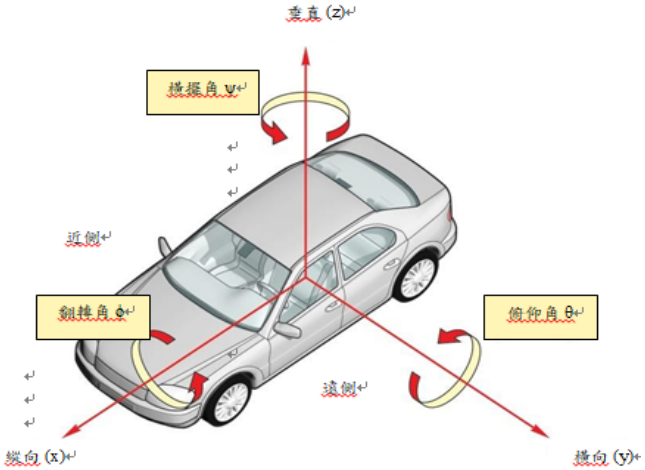
增/修內容	修訂T-NCAP條文草案	說明
HMI score: Prerequisites met. -De-activation of the AEB and FCW (if applicable) system not be possible with a single push on a button. 2 points - No FCW at speeds over 40 km/h 0 points - System switches off at low ambient lighting conditions 0 points HMI score = 50.0% AEB VRU total score = 5.0 x 75.7% + 1.0 x 50.0% = 4.285 points	人機界面分數： 應符合前提要求： (1) 緊急煞車輔助與前方碰撞預警系統（若適用）不得僅按一鍵即關閉 2 分 (2) 試驗速度大於 40km/h 時，前方碰撞預警系統未作動 0 分 (3) 系統於照明不佳情況下關閉 0 分 人機界面分數= 50.0% 緊急煞車輔助之弱勢道路使用者系統(AEB VRU)總分 = 5.0 x 75.7% + 1.0 x 50.0% = 4.285 分	

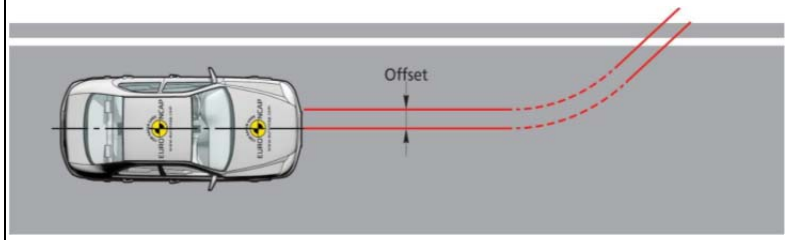
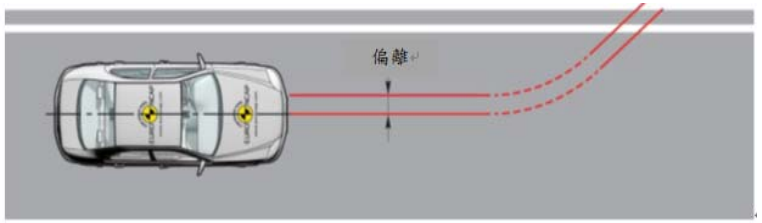
項 次	Euro NCAP Protocol	修訂內容	新增項目	頁碼	Euro NCAP 版本別
1	3.12車道輔助系統之試驗規章		◎	P.1-21	Version 1.1
2	2.4安全輔助(SA)評等規章-2.4.4車道輔助系統評等		◎	P.22-26	Version 7.0

3.12車道輔助系統之試驗規章

Euro NCAP 原文	T-NCAP條文草案	說明
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 (2010) standard reference test tyre, in accordance with ASTM Method E 1337-90 (reapproved 1996), at a speed of 64.4km/h, without water delivery. Alternatively, the method as specified in UNECE R13-H. Lane Keeping Assist (LKA) – heading correction that is applied automatically by the vehicle in response to the detection of the vehicle that is about to drift beyond a delineated edge line of the current travel lane. Lane Departure Warning (LDW) – a warning that is provided automatically by the vehicle in response to the vehicle that is about to	3.12.1 名詞釋義 ~~此規章中使用名詞如下：~~ 3.12.1.1 最高煞車係數（Peak Braking Coefficient, PBC）：根據滾動輪胎最大減速度計算出輪胎與路面摩擦力，本數值係使用美國材料和試驗協會（American Society for Testing and Materials, ASTM）E1136-10（2010）標準試驗輪胎，且符合美國材料和試驗協會E1337-90（1996年重新核可)試驗方法，以時速64.4km/h於乾燥路面上試驗，或依「車輛安全檢測基準」項次「四十三之二」6.2.5.1 所規範之方法。 3.12.1.2 車道維持輔助系統（Lane Keeping Assist, LKA）：車輛偵測到即將偏離目前行駛之車道邊界標線時，所自動施加之方向性修正。 3.12.1.3 車道偏離輔助警示系統（Lane Departure Warning, LDW）：車輛偵測到即將偏離目前行駛之車道邊界標線時，所自動出現	

Euro NCAP 原文	T-NCAP條文草案	說明
drift beyond a delineated edge line of the current travel lane. 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 mud-guards and the deflected part of the tyre side-walls immediately above the point of contact with the ground. Vehicle under test (VUT) – means the vehicle tested according to this protocol with a Lane Keep Assist and/or Lane Departure Warning system. Time To Line Crossing (TTLC) – means the remaining time before the VUT crosses the line, assuming that the VUT would continue to travel with the same lateral velocity towards the lane marking. Distance To Line Crossing (DTLC) – means the remaining lateral distance (perpendicular to the line) between the inner side of the lane marking and most outer edge of the tire, before the VUT crosses the line, assuming that the VUT would continue to travel with the same lateral velocity towards the lane marking.	之警示。 3.12.1.4 車輛寬度（Vehicle width）：車輛最大寬度不包括後視鏡、側方標識燈、胎壓偵測裝置、方向燈、位置燈、活動式擋泥板及位於地面接觸點正上方之輪胎胎壁（side-wall）最突出部分。 3.12.1.5 受驗車輛（Vehicle under test, VUT）：係指配備車道維持輔助（LKA）及/或車道偏離輔助警示（LDW）系統，並依據此規章進行試驗之車輛。 3.12.1.6 越線剩餘時間（Time To Line Crossing, TTLC）：假設受驗車輛持續以相同側向速度偏離向車道標線，受驗車輛距越線前所剩餘時間。 3.12.1.7 越線剩餘距離（Distance To Line Crossing, DTLC）：假設受驗車輛持續以相同側向速度偏離向車道標線，車道標線內緣與輪胎外緣間距越線前所剩餘距離（與車道標線垂直）。	
3 REFERENCE SYSTEM 3.1 Convention	3.12.2 參考系統 3.12.2.1 通則	

Euro NCAP 原文	T-NCAP條文草案	說明
3.1.1 For the VUT use the convention specified in ISO 8855:1991 in which the x-axis points towards the front of the vehicle, the y-axis towards the left and the z-axis upwards (right hand system), with the origin at the most forward point on the centreline of the VUT for dynamic data measurements as shown in Figure 1. 3.1.2 Viewed from the origin, roll, pitch and yaw rotate clockwise around the x, y and z axes respectively. Longitudinal refers to the component of the measurement along the x-axis, lateral the component along the y-axis and vertical the component along the z-axis. 3.1.3 This reference system should be used for both left and right hand drive vehicles tested.  Figure 1: Coordinate system and notation	3.12.2.1.1 受驗車輛使用 ISO 8855:1991 之通則進行動態數據測量。此通則中 X 軸指向車頭、Y 軸指向車輛左側、Z 軸則指向車頂（右手座標系統），原點則是受驗車輛中線之最前點，如圖 1 所示。 3.12.2.1.2 以原點為中心，翻轉角（roll）、俯仰角（pitch）與橫擺角（yaw）分別以順時針方式繞 X 軸、Y 軸與 Z 軸。縱向為沿著 X 軸的測量方式、橫向為沿著 Y 軸的測量方式、垂直向則是沿著 Z 軸的測量方式。 ~~3.12.2.1.3 左駕及右駕受驗車輛皆使用此參考系統。~~  圖 1：座標系統與標記	

Euro NCAP 原文	T-NCAP條文草案	說明
3.2 Lateral Deviation from Path 3.2.1 The lateral deviation from path is determined as the lateral distance between the centre of the front of the VUT when measured in parallel to the intended path as shown in the figure below. This measure applies during both the straight line approach and the curve that establishes the lane departure. Lateral Deviation from Path = Y_{VUT} error  Figure 2: Lateral Deviation from Path	3.12.2.2 側向偏離路徑 3.12.2.2.1 側向偏離路徑之定義為受驗車輛前方中心與預定路徑平行之側向距離，如下圖所示。本量測適用於直線行進後偏移之車道偏離。 側向偏離路徑 ＝Y 受驗車輛 誤差  圖 2：側向偏離路徑	3.10.7.1.2 條文所提圖示，擬待完成 T-NCAP LOGO 後，再配合修正該圖示。
4 MEASURING EQUIPMENT 4.1.1 Sample and record all dynamic data at a frequency of at least 100Hz. 4.2 Measurements and Variables	3.12.3 量測配備 3.12.3.1 所有動態數據之採樣及記錄頻率不得低於 100Hz。 3.12.3.2 量測與變數	

Euro NCAP 原文		T-NCAP條文草案		說明
4.2.1 Time	T	3.12.3.2.1 時間	T	
•T_0, time where manoeuvre starts with 2s straight path	T_0	(1) T_0，直線行進兩秒之開始時間	T_0	
•T_{LKA}, time where LKA activates (for calibration purposes only if required)	T_{LKA}	(2) T_{LKA}，LKA系統啟動時間（視需要進行校正）	T_{LKA}	
•T_{LDW}, time where LDW activates	T_{LDW}	(3) T_{LDW}，LDW系統啟動時間	T_{LDW}	
•Tcrossing, time where VUT crosses the line	$T_{crossing}$	(4) $T_{crossing}$，受驗車輛越線時間	$T_{crossing}$	
4.2.2 Position of the VUT during the entire test	X_{VUT}, Y_{VUT}	3.12.3.2.2 試驗過程中受驗車輛之位置	X_{VUT} Y_{VUT}	
4.2.3 Speed of the VUT during the entire test	$Vlong_{VUT}$	3.12.3.2.3 試驗過程中受驗車輛之速度	$Vlong_{VUT}$	
•Vcrossing, speed when VUT crosses the line	$Vlat_{VUT}$ $V_{crossing}$	(1) $V_{crossing}$，受驗車輛越線時之速度	$Vlat_{VUT}$ $V_{crossing}$	
4.2.4 Yaw velocity of the VUT during the entire test	$\dot{\Psi}_{VUT}$	3.12.3.2.4 試驗過程中受驗車輛之橫擺角速度	Ψ_{VUT}	
4.2.5 Steering wheel velocity of the VUT during the entire test	Ω_{VUT}	3.12.3.2.5 試驗過程中受驗車輛之方向盤轉速	Ω_{VUT}	
4.3 Measuring Equipment		3.12.3.3 量測配備精度		
4.3.1 Equip the VUT with data measurement and acquisition equipment to sample and record data with an accuracy of at least:		3.12.3.3.1 受驗車輛應配備數據量測與採集配備，用以抽樣及記錄數據，其精準度最低要求如下：		
•VUT longitudinal speed to 0.1km/h;		(1) 受驗車輛縱向速度：0.1km/h；		
•VUT lateral and longitudinal position to 0.03m;		(2) 受驗車輛之橫向及縱向位置：0.03m；		

Euro NCAP 原文	T-NCAP條文草案	說明
•VUT heading angle to 0.1°; •VUT yaw rate to 0.1°/s; •VUT longitudinal acceleration to 0.1m/s^2; •VUT steering wheel velocity to 1.0°/s.	(3) 受驗車輛方向角（heading angle）：0.1°； (4) 受驗車輛橫擺角速度：0.1°/s； (5) 受驗車輛縱向加速度：0.1m/s^2； (6) 受驗車輛方向盤轉速：1.0°/s。	
4.4 Data Filtering	3.12.3.4 數據濾波	
4.4.1 Filter the measured data as follows:	3.12.3.4.1 依據下列原則對量測所得數據進行濾波：	
4.4.1.1 Position and speed are not filtered and are used in their raw state.	3.12.3.4.1.1 位置與速度不需濾波，直接使用原始數據。	
4.4.1.2 Acceleration, yaw rate and steering wheel torque with a 12-pole phaseless Butterworth filter with a cut off frequency of 10Hz.	3.12.3.4.1.2 加速度、橫擺角速度及方向盤扭力由 12-pole phaseless 巴特沃斯濾波器(Butterworth filter)及 10Hz 之截止頻率進行濾波。	
5. TEST CONDITIONS 5.1 Test Track	3.12.4 試驗條件 3.12.4.1 試驗道路	
5.1.1 Conduct tests on a dry (no visible moisture on the surface), uniform, solid-paved surface with a consistent slope between level and 1%. The test surface shall have a minimal peak braking coefficient (PBC) of 0.9.	3.12.4.1.1 試驗道路應乾燥（試驗路面無明顯可見之水分）、平整、固態鋪設之路面，坡度應介於水平至 1%之間。試驗路面之最高煞車係數（PBC）應大於等於 0.9。	
5.1.2 The surface must be paved and may not contain any irregularities (e.g. large dips or cracks, manhole covers or reflective	3.12.4.1.2 試驗道路應為鋪設路面，試驗路徑兩側 3.0m 內及試驗結束時受驗車輛前方 30m 內，不得有任何可能造成感測器偵測	

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studs) that may give rise to abnormal sensor measurements within a lateral distance of 3.0m to either side of the test path and with a longitudinal distance of 30m ahead of the VUT when the test ends.	異常之不平整處（如：驟降斜坡、裂縫、人孔蓋或反光路釘）。	
5.1.3 Line Markings	3.12.4.1.3 車道標線	
5.1.3.1 The LDW and LKA tests described in this document require use of two different types of lane markings conforming to one of the lane markings as defined in UNECE Regulation 130 to mark a lane with a width of 3.5 to 3.7m: 1. Dashed line with a width between 0.10 and 0.25m 2. Solid line with a width between 0.10 and 0.25m	3.12.4.1.3.1 ~~車道維持輔助系統及車道偏離輔助警示系統試驗，應使用聯合國 UN R130 規範之下述兩種類型車道標線，車道寬度介於 3.5 至 3.7m。~~車道維持輔助系統及車道偏離輔助警示系統試驗，其試驗車道寬度不得小於 3m。車道標線應使用白虛線，線段長 4 m，間距 6 m，線寬 10cm。路面邊線應使用白實線，線寬為 15cm。 ~~(1) 虛線寬度介於 0.10 至 0.25m。~~ ~~(2) 實線寬度介於 0.10 至 0.25m。~~	
The lane markings should be sufficiently long to ensure that there is at least 20m of marking remaining ahead of the vehicle after the test is complete.	當試驗完成後，車輛前方之車道標線距離應確保至少有 20m。	

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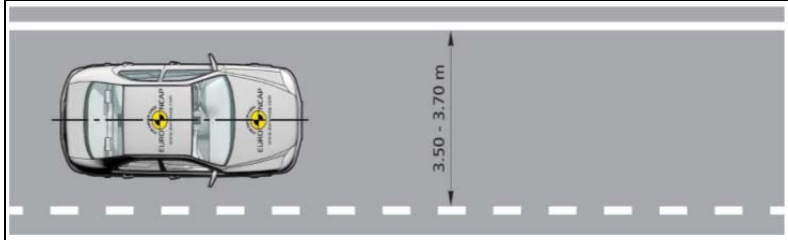
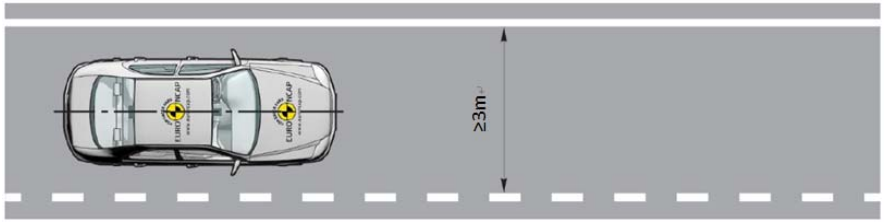
 Figure 3: Layout of the lane markings	 圖 3：車道標線示意圖	
5.1.4 Conduct tests in dry conditions with ambient temperature above 5°C and below 40°C.	3.12.4.1.4 試驗應於環境溫度 5°C 至 40°C 間之乾燥環境進行。	
5.1.5 No precipitation shall be falling and horizontal visibility at ground level shall be greater than 1km. Wind speeds shall be below 10m/s to minimise VUT disturbance.	3.12.4.1.5 降雨時不得進行試驗，且地面水平能見度應大於 1km。風速應低於 10m/s，以使受驗車輛干擾應降至最低。	
5.1.6 Natural ambient illumination must be homogenous in the test area and in excess of 2000 lux for daylight testing with no strong shadows cast across the test area other than those caused by the VUT. Ensure testing is not performed driving towards, or away from the sun when there is direct sunlight.	3.12.4.1.6 試驗區域的自然光線應均勻照射，白天試驗時照度應高於 2000lux，且除了受驗車輛之陰影外，不得有其他陰影籠罩試驗區域。當陽光直接照射時，應確保試驗時之車輛行進方向非直接朝向或背向陽光照射方向。	
5.1.7 Measure and record the following parameters preferably at the commencement of every single test or at least every 30 minutes: a) Ambient temperature in °C; b) Track Temperature in °C; c) Wind speed and direction in m/s; d) Ambient illumination in Lux.	3.12.4.1.7 應於每次試驗開始前或至少每隔 30 分鐘，測量與記錄以下參數： (1) 現場環境溫度，以攝氏記錄； (2) 路面溫度，以攝氏記錄； (3) 風速與風向，以m/s記錄； (4) 環境照度，以lux記錄。	

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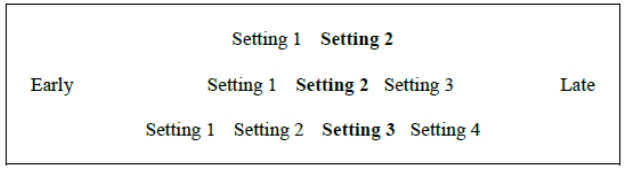
5.2 VUT Preparation	3.12.4.2受驗車輛整備	
5.2.1 LKA and LDW System Settings	3.12.4.2.1LKA與LDW系統設定	
5.2.1.1 Set any driver configurable elements of the LKA and/or LDW system (e.g. the timing of the Lane Departure Warning or the Lane Keep Assist if present) to the middle setting or midpoint and then next latest setting similar to the examples shown in Figure .	3.12.4.2.1.1 LKA及/或LDW系統之駕駛可調整之設定選項（例如：LKA或LDW系統啟動時機，若有設置）調整至中間選項或距中間位置但較晚發出警示之選項，如圖4所示。	
 Figure 4: LKA and/or LDW system setting for testing	 圖 4：LKA 及/或 LDW 系統試驗設定	
5.2.2 Tyres	3.12.4.2.2輪胎	
Perform the testing with new original fitment tyres of the make, model, size, speed and load rating as specified by the vehicle manufacturer. It is permitted to change the tyres which are supplied by the manufacturer or acquired at an official dealer representing the manufacturer if those tyres are identical make, model, size, speed and load rating to the original fitment. Inflate the tyres to the vehicle manufacturer's recommended cold tyre inflation pressure(s). Use inflation pressures corresponding to least loading normal condition.	試驗應使用車輛業者指定之型式、尺寸、速度代號及載重能力指數之全新原廠輪胎。試驗時，可更換車輛業者或代理商所提供之輪胎，前提是新的輪胎應符合原廠規格之型式、尺寸、速度代號及載重能力指數。將輪胎充氣至車輛業者建議之冷胎胎壓。使用之輪胎胎壓應至少與一般負載狀態之胎壓(least loading normal condition）相同。	

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Run-in tyres according to the tyre conditioning procedure specified in 6.1.3. After running-in maintain the run-in tyres in the same position on the vehicle for the duration of the testing.	依 3.12.5.1.3 節進行輪胎磨合（run-in），磨合完畢之輪胎於整個試驗過程中應維持於車輛相同位置。	
5.2.3 Wheel Alignment Measurement	3.12.4.2.3 車輪定位測量（Wheel Alignment Measurement）	
The vehicle should be subject to a vehicle (in-line) geometry check to record the wheel alignment set by the OEM. This should be done with the vehicle in kerb weight.	受驗車輛應以製造廠之設定進行車輛幾何檢查（vehicle (in-line) geometry check），以紀錄其車輪定位，受驗車輛應為空車重量。	
5.2.4 Unladen Kerb Mass	3.12.4.2.4 空車重量（Unladen Kerb Mass）	
5.2.4.1 Fill up the tank with fuel to at least 90% of the tank's capacity of fuel.	3.12.4.2.4.1 車輛燃油箱至少裝滿 90%容量的燃油。	
5.2.4.2 Check the oil level and top up to its maximum level if necessary. Similarly, top up the levels of all other fluids to their maximum levels if necessary.	3.12.4.2.4.2 檢查機油油位，必要時加注至最高油位；同樣地，其他液體若有需要也可加注至其最高限值。	
5.2.4.3 Ensure that the vehicle has its spare wheel on board, if fitted, along with any tools supplied with the vehicle. Nothing else should be in the car.	3.12.4.2.4.3 確認備胎及其他隨車工具已在車上，除此之外，車內不應有其他物品。	
5.2.4.4 Ensure that all tyres are inflated according to the manufacturer's instructions for the appropriate loading condition.	3.12.4.2.4.4 確認所有輪胎依車輛業者之建議進行充氣至適當負載狀態（appropriate loading condition）。	

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5.2.4.5 Measure the front and rear axle masses and determine the total mass of the vehicle. The total mass is the ‘unladen kerb mass’ of the vehicle. Record this mass in the test details.	3.12.4.2.4.5 測量前軸及後軸重量，並計算車輛之總重量。此重量即為「空車重量」，將該數據記錄於試驗資料。	
5.2.4.6 Calculate the required ballast mass, by subtracting the mass of the test driver and test equipment from the required 200 kg interior load.	3.12.4.2.4.6 試驗規定需配重（ballast mass）200 公斤，且此重量應包含試驗駕駛及試驗配備之重量。	
5.2.5 Vehicle Preparation	3.12.4.2.5 車輛整備	
5.2.5.1 Fit the on-board test equipment and instrumentation in the vehicle. Also fit any associated cables, cabling boxes and power sources.	3.12.4.2.5.1 將車載資料擷取配備裝在車輛內，並裝配所有相關電線、接線盒及電源。	
5.2.5.2 Place weights with a mass of the ballast mass. Any items added should be securely attached to the car.	3.12.4.2.5.2 置放相當於配重重量（weights）。所有物品皆應穩當地固定於車內。	
5.2.5.3 With the driver in the vehicle, weigh the front and rear axle loads of the vehicle.	3.12.4.2.5.3 駕駛上車後，分別量測車輛前後軸重量。	
5.2.5.4 Compare these loads with the “unladen kerb mass”	3.12.4.2.5.4 將上述車輛負載狀態與空車重量進行比較。	
5.2.5.5 The total vehicle mass shall be within ±1% of the sum of the unladen kerb mass, plus 200kg. The front/rear axle load distribution needs to be within 5% of the front/rear axle load distribution of the	3.12.4.2.5.5 車輛總重應為空車重量加上 200 公斤，容許誤差值為±1%。前軸/後軸之空車重與加滿燃油配重後，前軸/後軸重量變化皆在 5%以內。若受驗車輛無法符合此規範，可於車輛內移除	

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original unladen kerb mass plus full fuel load. If the vehicle differs from the requirements given in this paragraph, items may be removed or added to the vehicle which has no influence on its performance. Any items added to increase the vehicle mass should be securely attached to the car.	或增加與性能表現無關之物品。任何用以增加重量之物品應穩當地固定於車內。	
5.2.5.6 Repeat paragraphs 5.2.5.3and 5.2.5.4 until the front and rear axle loads and the total vehicle mass are within the limits set in paragraph 5.2.5.5. Care needs to be taken when adding or removing weight in order to approximate the original vehicle inertial properties as close as possible. Record the final axle loads in the test details. Record the axle weights of the VUT in the 'as tested' condition.	3.12.4.2.5.6 重複 3.12.4.2.5.3 與 3.12.4.2.5.4 之動作，直到前後軸重量及車輛總重符合條文 3.12.4.2.5.5 之規定。增加或移除重量時應謹慎執行，以維持車輛之慣性屬性（inertial properties）。試驗內容應記錄最終之軸重。試驗條件應記錄受驗車輛之軸重。	
5.2.5.7 Vehicle dimensional measurements shall be taken. For purposes of this test procedure, vehicle dimensions shall be represented by a two dimensional polygon defined by the lateral and longitudinal dimensions relative to the centroid of the vehicle using the standard SAE coordinate system. The corners of the polygon are defined by the lateral and longitudinal locations where the plane of the outside edge of each tyre makes contact with the road. This plane is defined by running a perpendicular line from the outer most edge of the tyre to the ground at the wheelbase, as illustrated in Figure 5.	3.12.4.2.5.7 應進行車輛尺寸量測。在此試驗中，車輛尺寸應按標準美國自動車工程協會（SAE）座標系統（SAE coordinate system）規範呈現，包含以 2D 多邊形定義出相對於車輛中心之橫向與縱向尺寸。多邊形係以各輪胎外緣與路面接觸之平面所得之橫向與縱向位置組成。平面係指輪胎的最外緣與軸距垂直相交至地面，如圖 5 所示。	

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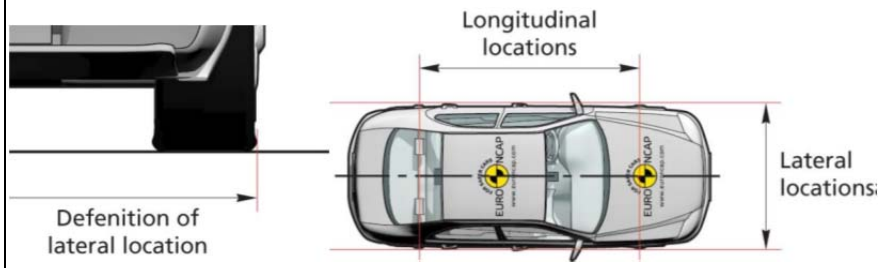
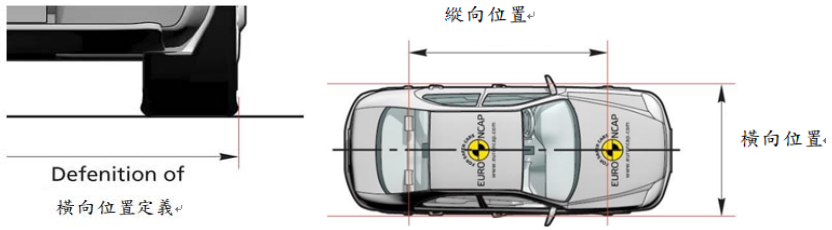
 Figure 5: Vehicle dimensional measurements 5.2.5.8 The vehicle's wheelbase and the lateral and longitudinal locations shall be measured and recorded.	 圖 5：車輛尺寸量測 3.12.4.2.5.8 車輛軸距及橫向與縱向位置皆應量測並記錄。	
6. TEST PROCEDURE 6.1 VUT Pre-test Conditioning 6.1.1 General 6.1.1.1 A new car is used as delivered to the test laboratory. 6.1.1.2 If requested by the vehicle manufacturer, drive a maximum of 100km on a mixture of urban and rural roads with other traffic and roadside furniture to 'calibrate' the sensor system. Avoid harsh acceleration and braking. 6.1.2 Brakes 6.1.2.1 If not performed already for other tests, or when the vehicle	3.12.5 試驗程序 3.12.5.1 受驗車輛試驗前調整 3.12.5.1.1 一般通則 3.12.5.1.1.1 以新車送至檢測機構。 3.12.5.1.1.2 若車輛業者要求，受驗車輛可行駛於市區及鄉村道路之交通環境及設施下最多 100 公里，以校準感測器系統。行駛時，應避免劇烈加速及煞車。 3.12.5.1.2 煞車 3.12.5.1.2.1 若尚未進行過其他試驗，或車輛業者要求，應依下列	

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manufacturer requests, condition the vehicle's brakes in the following manner:	方式調節車輛煞車：	
•Perform ten stops from a speed of 56km/h with an average deceleration of approximately 0.5 to 0.6g.	(1) 自車速 56km/h 以平均減速度為 0.5 至 0.6g 之方式執行 10 次煞停。	
•Immediately following the series of 56km/h stops, perform three additional stops from a speed of 72km/h, each time applying sufficient force to the pedal to operate the vehicle's antilock braking system (ABS) for the majority of each stop.	(2) 完成上述 56km/h 一系列煞車後，緊接著再以 72km/h 的速度煞停 3 次，每次應以足夠的力度踩下煞車，讓車輛的防鎖死煞車系統（antilock braking system，ABS）可於每次煞車時充分作動。	
•Immediately following the series of 72km/h stops, drive the vehicle at a speed of approximately 72km/h for five minutes to cool the brakes.	(3) 完成上述 72km/h 一系列煞車後，隨即應以 72km/h 的速度行駛 5 分鐘以冷卻煞車。	
•Initiation of the first test shall begin within two hours after completion of the brake conditioning	(4) 第一項試驗必須於調整煞車後 2 小時內開始進行。	
6.1.3 Tyres	3.12.5.1.3 輪胎	
6.1.3.1 Condition the vehicle's tyres in the following manner to remove the mould sheen:	3.12.5.1.3.1 以下列方式調節車輛輪胎，以磨除輪胎之毛邊:	
•Drive around a circle of 30m in diameter at a speed sufficient to	(1) 測試車輛沿直徑 30m 之圓環並以能產生接近 0.5 至 0.6g 側向	

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generate a lateral acceleration of approximately 0.5 to 0.6g for three clockwise laps followed by three anticlockwise laps.	加速度之速度繞行，先以順時針方向行駛三圈接著以逆時針方向行駛三圈。	
•Immediately following the circular driving, drive four passes at 56km/h, performing ten cycles of a sinusoidal steering input in each pass at a frequency of 1Hz and amplitude sufficient to generate a peak lateral acceleration of approximately 0.5 to 0.6g.	(2) 使用頻率一赫茲之正弦轉向模式，與符合最高側向加速度 0.5 至 0.6g 之方向盤轉角振幅極值，且車速為 56km/h，使車輛進行四次，並於每次進行 10 次之正弦轉向循環。	
•Make the steering wheel amplitude of the final cycle of the final pass double that of the previous inputs.	(3) 最終次之最終循環之方向盤轉角振幅應為前次循環之二倍。	
6.1.3.2 In case of instability in the sinusoidal driving, reduce the amplitude of the steering input to an appropriately safe level and continue the four passes.	3.12.5.1.3.2 如正弦轉向模式（sinusoidal driving）致使車身不穩定，則應減少方向盤輸入之振幅至安全水平，並完成四次操作。	
6.1.4 LKA/LDW System Check	3.12.5.1.4 車道維持輔助/車道偏離輔助警示系統檢查	
6.1.4.1 Before any testing begins, perform a maximum of ten runs at the lowest test speed the system is supposed to work, to ensure proper functioning of the system.	3.12.5.1.4.1 試驗開始前，應以可觸發系統之最低試驗速度行駛至多十次，以確保系統正常運作。	
6.2 Test Scenarios	3.12.5.2 試驗情境	
6.2.1 The performance of the VUT LSS is assessed in the LDW-SL, LDW-DL, LKA-SL scenarios as shown below.	3.12.5.2.1 車道輔助系統之受驗車輛性能，應以下圖所示之 LDW–實線、LDW–虛線、LKA–實線情境進行評等。	

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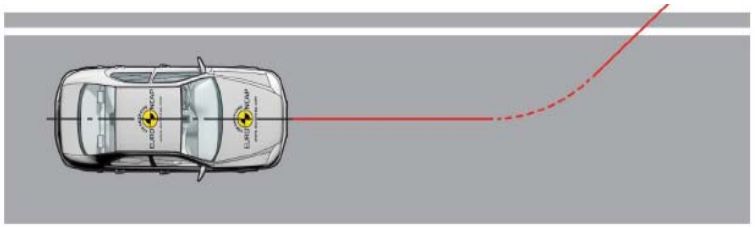
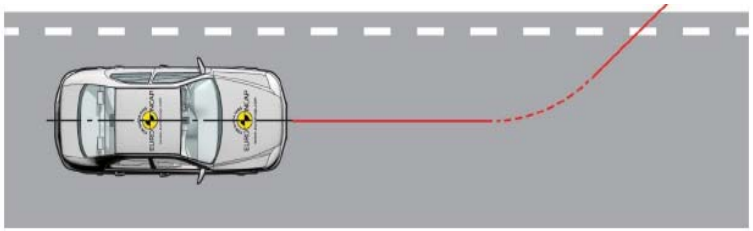
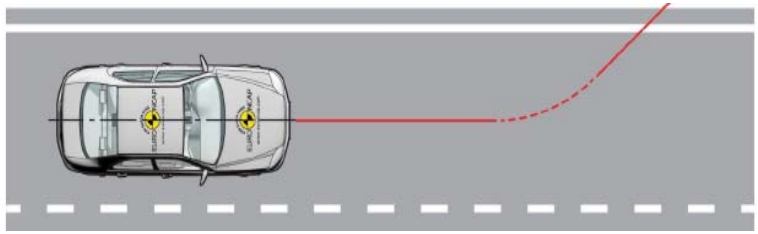
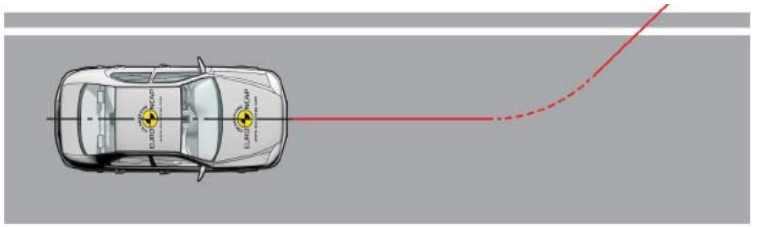
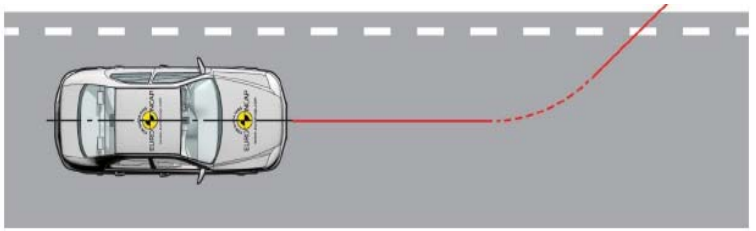
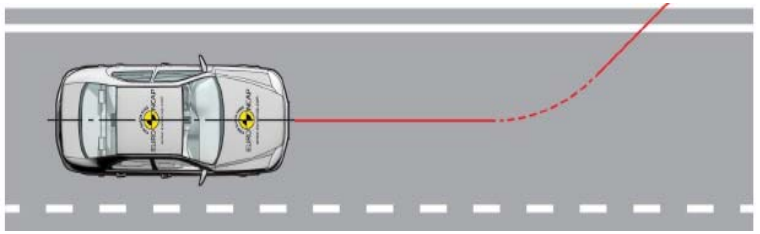
 LDW-Solid Line  LDW-Dashed Line  LKA-Solid Line (Full lane marking) 6.2.2 For testing purposes, assume an initial straight line path followed by a fixed radius of 1200m followed again by a straight line, hereby known as the test path. Control the VUT with driver inputs or using alternative control systems that can modulate the vehicle controls as necessary to perform the tests.	 車道偏離輔助警示系統–實線  車道偏離輔助警示系統–虛線  車道維持輔助系統–實線（完整車道標線） 3.12.5.2.2 試驗過程中，假設試驗路徑一開始為直線，緊接以固定半徑 1200 公尺弧度，再接著又為直線之路徑。可由駕駛直接控制受驗車輛，另試驗若有需要，可以使用調節車輛控制之控制系統作替代。	

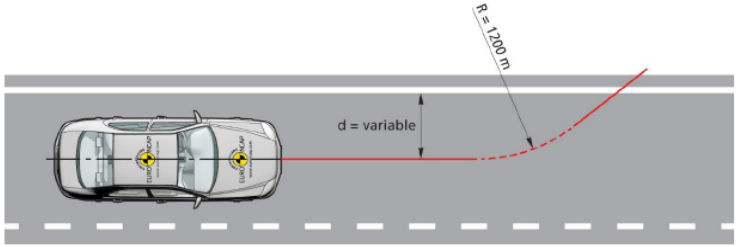
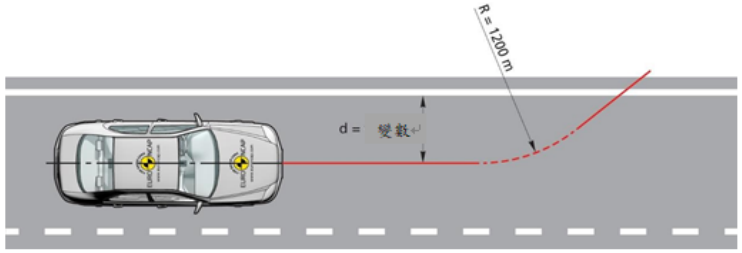
Euro NCAP 原文	T-NCAP條文草案	說明
6.2.3 LDW tests will be performed with lateral velocities of 0.3m/s and 0.5m/s for both left and right hand side departures.	3.12.5.2.3 車道偏離輔助警示系統試驗應以側向速度為 0.3m/s 與 0.5m/s，分別執行左右側車道偏離試驗。	
6.2.4 LKA tests will be performed with 0.1 m/s incremental steps (see 6.4.5) within the lateral velocity range of 0.1 to 1.0m/s for both left and right hand side departures. For lateral velocities of 0.6m/s and greater, continue testing as long as the LKA system continues to intervene.	3.12.5.2.4 車道維持輔助系統試驗應在側向速度為 0.1 至 1.0m/s 範圍內，以每次增加 0.1 m/s 側向速度（參 3.12.5.4.5）分別執行左右側車道偏離試驗。若側向速度等於或大於 0.6m/s，且車道維持輔助系統仍持續介入即可繼續進行試驗。	
6.2.4.1 The vehicle manufacturer shall provide information describing the location when the closed loop path and/or speed control shall be ended so as not to interfere with LKA intervention for each test. Otherwise for each lateral velocity, two calibration runs shall be performed in order to determine when the LKA activates. Compare steering wheel torque, vehicle speed or yaw rate of both runs and determine where there is a notable difference that identifies the location of LKA intervention.	3.12.5.2.4.1 車輛業者應提供描述閉迴路路徑（closed loop path）及/或速度控制之結束時機點資訊，以避免每次試驗時干擾 LKA 系統作動；否則應於每次側向速度試驗前，應進行兩次校準行駛，以判定 LKA 系統何時啟動。比較兩次駕駛之方向盤扭力、車輛速度、或橫擺角速度（yaw rate）是否顯著不同，以識別 LKA 系統介入時機。	
Run 1: Complete the required test path with LKA turned OFF and measure the control parameter	第一趟：關閉車道維持輔助系統狀態下完成要求之試驗路徑，以及量測控制參數。	
Run 2: Complete the required test path with LKA turned ON and measure the control parameter	第二趟：開啟車道維持輔助系統狀態下完成要求之試驗路徑，以及量測控制參數。	

Euro NCAP 原文	T-NCAP條文草案	說明
6.2.4.2 Complete the LKA tests while ending the closed loop control before LKA activation as defined in 6.2.4.1. In the case of calibration runs the release of steering control should occur on the test path and no less than 5m longitudinally before the location of LKA intervention.	3.12.5.2.4.2 車道維持輔助系統啟動前結束閉迴路控制下，完成車道維持輔助系統試驗，如 3.12.5.2.4.1 規範。於試驗路徑進行之校準行駛，應至少於車道維持輔助系統介入位置前之縱向 5m 處解除(release)轉向控制。	
6.2.5 The following parameters should be used to create the test paths:	3.12.5.2.5 應使用以下參數建置試驗路徑：	

Lateral velocity [m/s]	Radius of Turn [m]	Yaw Angle [°]	Lateral deviation during curve establishing yaw angle [m]	Lateral distance travelled during Vlat steady state [m]	Lateral Offset [m]
0.1	1200	0.29	0.02	0.40	$d = d1$
0.2		0.57	0.06	0.70	
0.3		0.86	0.14	0.90	
0.4		1.15	0.24	0.80	
0.5		1.43	0.38	0.75	
0.6		1.72	0.54	0.60	
0.7		2.01	0.74	0.53	
0.8		2.29	0.96	0.40	
0.9		2.58	1.22	0.23	
1.0		2.86	1.50	0.00	

側向速度 [m/s]	轉彎半徑 [m]	橫擺角 [°]	橫擺角曲線建立時之側向偏離距離 [m]	越線側向速度穩定狀態之側向位移距離 [m]	側向偏離 [m]
0.1	1200	0.29	0.02	0.40	d = d1
0.2		0.57	0.06	0.70	
0.3		0.86	0.14	0.90	
0.4		1.15	0.24	0.80	
0.5		1.43	0.38	0.75	
0.6		1.72	0.54	0.60	
0.7		2.01	0.74	0.53	
0.8		2.29	0.96	0.40	
0.9		2.58	1.22	0.23	
1.0		2.86	1.50	0.00	

Where the offset from lane marking (d1):	車道標線偏離（d1）：	
d1 = Lateral distance travelled during Vlat steady state (m)	d1 =越線側向速度穩定狀態之側向偏離距離（m）	
+ Lateral deviation during curve establishing yaw angle (m)	+ 橫擺角曲線建立時之側向偏離距離（m）	
+ Half of the vehicle width (m)	+ 車輛寬度的一半（m）	

Euro NCAP 原文	T-NCAP條文草案	說明
 6.3 Test Conduct 6.3.1 Before every test run, drive the VUT around a circle of maximum diameter 30m at a speed less than 10km/h for one clockwise lap followed by one anticlockwise lap, and then manoeuvre the VUT into position on the test path. If requested by the OEM an initialisation run may be included before every test run. 6.3.2 For vehicles with an automatic transmission select D. For vehicles with a manual transmission select the highest gear where the RPM will be at least 1500 at the test speed. Between tests, manoeuvre the VUT at a maximum speed of 50km/h and avoid riding the brake pedal and harsh acceleration, braking or turning unless strictly necessary to maintain a safe testing environment. 6.4 Test Execution	 3.12.5.3 試驗規範（Test Conduct） 3.12.5.3.1 每次試驗前，受驗車輛應以低於 10km/h 之速度繞著最大直徑 30m 之圓圈行駛，先以順時針方向行駛一圈，接著以逆時針方向行駛一圈，最後再將受驗車輛開到試驗道路上的預備位置。若車輛業者要求，可於每項試驗前進行此啟始程序(initialization run)。 3.12.5.3.2 若車輛為自動變速者，應選擇前進檔位 D。若車輛為手排變速者於試驗速度行駛時，應選擇轉速可達 1500rpm 之最高檔位。 執行下次試驗前，行駛速度不得高於 50km/h，且非必要情況下，應儘量避免踩踏煞車（riding the brake pedal）、劇烈加速、煞車或轉彎，以維持安全的試驗環境。 3.12.5.4 試驗執行	

Euro NCAP 原文	T-NCAP條文草案	說明
6.4.1 Accelerate the VUT to 72 km/h.	3.12.5.4.1 受驗車輛加速至 72km/h。	
6.4.2 The test shall start at T_0 and is valid when all boundary conditions are met between T_0 and T_{LKA}/T_{LDW}: - Speed of VUT (GPS-speed) 72 ± 1.0km/h - Lateral deviation from test path 0 ± 0.05m - Steady state lane departure lateral velocity ± 0.05m/s - Steering wheel velocity ± 15.0°/s	3.12.5.4.2 試驗於 T_0 開始，若 T_0 與 T_{LKA}/T_{LDW} 之間符合下列所有限制條件，則該次試驗認定有效: (1) 受驗車輛速度（GPS - 速度）72 ± 1.0km/h (2) 行駛路徑側向偏離距離 0 ± 0.05m (3) 穩定狀態之車道偏離側向速度 ±0.05m/s (4) 方向盤轉速 ± 15.0°/s	
6.4.2.1 Steer the vehicle as appropriate to achieve the lateral velocity in a smooth controlled manner and with minimal overshoot	3.12.5.4.2.1 應盡可能控制車輛使其平穩且在最小偏離條件下達到規定之側向速度。	
6.4.3 The end of an LDW test is considered as when the warning commences.	3.12.5.4.3 車道偏離輔助警示系統試驗結束時機點為警示啟動時。	
6.4.4 The end of an LKA test is considered as when one of the following occurs: - The LKA system fails to maintain the VUT within the permitted lane departure distance. - The LKA system intervenes to maintain the VUT within permitted lane departure distance, such that a maximum lateral position is achieved that subsequently diminishes causing the VUT to turn back	3.12.5.4.4 車道維持輔助系統試驗結束時機點為下述任一情況發生時： (1) 車道維持輔助系統並未讓受驗車輛維持在允許之車道偏離距離內。 (2) 車道維持輔助系統介入，將受驗車輛維持在允許之車道偏離距離內，例如在達到最大側向位置後修正回到原車道內。	

Euro NCAP 原文	T-NCAP條文草案	說明
towards the lane. The test is considered complete 2 seconds after one of the above occurs. 6.4.5 The subsequent lateral velocity for the next test is incremented with 0.1m/s.	上述任一情況發生兩秒後，試驗視同結束。 3.12.5.4.5 下一次試驗之側向速度應增加 0.1m/s。	

2.4安全輔助(SA)評等規章-2.4.4車道輔助系統評等

Euro NCAP 原文	T-NCAP條文草案	說明
6. ASSESSMENT OF LANE SUPPORT SYSTEMS	2.4.4 車道輔助系統評等	
6.1 Introduction Lane support systems are becoming increasingly widespread and Euro NCAP has acknowledged their safety potential via the Euro NCAP Advanced award process. From 2014, these systems are included in the Safety Assist score.	~~4.1 簡介~~ ~~車道輔助系統越來越普遍，T-NCAP 執行機構亦透過協會頒發之先進安全獎認可其安全保護效能。車道輔助系統自 2014 年起納入安全輔助系統計分項目。~~	
Euro NCAP has developed tests which complement any legislative requirements, to be able to rate lane support systems in more detail.	~~T-NCAP 執行機構已發展出多項評估車輛是否符合規範之試驗，能更詳盡地評等車道輔助系統。~~	
6.2 Definitions	2.4.4.1 名詞釋義	
Lane Keeping Assist (LKA) – heading correction that is applied automatically by the vehicle in response to the detection of the vehicle that is about to drift beyond a delineated edge line of the current travel lane.	2.4.4.1.1 車道維持輔助系統（Lane Keeping Assist, LKA）：車輛偵測到即將偏離目前行駛之車道邊界標線時，所自動施加之方向性修正。	
Lane Departure Warning (LDW) – a warning that is provided automatically by the vehicle in response to the vehicle that is about to drift beyond a delineated edge line of the current travel lane.	2.4.4.1.2 車道偏離輔助警示系統（Lane Departure Warning, LDW）：車輛偵測到即將偏離目前行駛之車道邊界標線時，所自動出現之警示。	

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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 mud-guards and the deflected part of the tyre side-walls immediately above the point of contact with the ground.	2.4.4.1.3 車輛寬度（Vehicle width）：車輛最大寬度不包括後視鏡、側方標識燈、胎壓偵測裝置、方向燈、位置燈、活動式擋泥板及位於地面接觸點正上方之輪胎胎壁（side-wall）最突出部分。	
Vehicle under test (VUT) – means the vehicle tested according to this protocol with a Lane Keep Assist and/or Lane Departure Warning system.	2.4.4.1.4 受驗車輛（Vehicle under test, VUT）：係指配備車道維持輔助（LKA）及/或車道偏離輔助警示（LDW）系統，並依據此規章進行試驗之車輛。	
Time To Line Crossing (TTLC) – means the remaining time before the VUT crosses the line, assuming that the VUT would continue to travel with the same lateral velocity towards the lane.	2.4.4.1.5 越線剩餘時間（Time To Line Crossing, TTLC）：假設受驗車輛持續以相同側向速度偏離向車道標線，受驗車輛距越線前所剩餘時間。	
Distance To Line Crossing (DTLC) – means the remaining lateral distance (perpendicular to the line) between the inner side of the lane marking and most outer edge of the tire, before the VUT crosses the line, assuming that the VUT would continue to travel with the same lateral velocity towards the lane marking.	2.4.4.1.6 越線剩餘距離（Distance To Line Crossing, DTLC）：假設受驗車輛以相同側向速度偏離車道標線，車道標線內緣與輪胎外緣間距越線前所剩餘距離（與車道標線垂直）。	
6.3 Criteria and Scoring	2.4.4.2 標準與得分	
6.3.1 To be eligible for scoring points in Lane Support Systems, the vehicle must be equipped with an ESC system that complies with	2.4.4.2.1 車道輔助系統評等之得分，車輛應裝設符合聯合國 UN R13H 或 R140 規範之車輛穩定性電子式控制系統，或車輛安全	

Euro NCAP 原文	T-NCAP條文草案	說明
UNECE Regulation 13H.	檢測基準「八十五、車輛穩定性電子式控制系統」。	
6.3.2 Human Machine Interface (HMI) HMI points can be achieved for the following:	2.4.4.2.2 人機介面 人機介面之得分規範如下：	
•Default ON 0.2 points	(1) 預設啟用 0.2 分	
All LKA and/or LDW systems are default ON at the start of every journey.	所有車道維持輔助系統及/或車道偏離輔助警示系統在每一趟旅程開始時之預設狀態為「開啟」。	
•Haptic/Supplementary Warning 0.2 points	(2) 觸覺/輔助警示 0.2 分	
For LDW systems a more sophisticated haptic warning like a vibrating steering wheel is awarded.	若車道偏離輔助警示系統設有進階之觸覺警示，如震動方向盤，即可獲得分數。	
For LKA a supplementary warning which is issued simultaneously to the intervention or when the LKA cannot keep the car in lane is awarded. When an LKA system ensures that the vehicle will not leave the lane in any of the Euro NCAP tests, points are awarded by default.	若車道維持輔助系統介入作動時或無法讓車輛維持在車道內時發出輔助警示，即可獲得分數。若車道維持輔助系統能確保車輛於全程試驗過程中維持在車道內，即可獲得分數。	
•Blind Spot Monitoring 0.1 points	(3) 盲點偵測系統 0.1 分	
The vehicle is additionally equipped with a Blind Spot Monitoring system to warn the driver of other vehicles present in the blind spot.	車輛額外配備之盲點偵測系統，用以警示駕駛已有其他車輛進入至駕駛視線之盲點區。	

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6.3.3 Lane Keeping Assist (LKA) / Lane Departure Warning (LDW)

6.3.3.1 For both LKA and LDW system tests, the assessment criteria used is the Distance to Line Crossing, DTLC. The limit value for DTLC for LDW is set to -0.3m, meaning that the vehicle is allowed to cross the inner edge of the lane marking by a maximum of 0.3m before the warning occurs. The limit value for DTLC for LKA is set to -0.4m, meaning that the LKA system must not permit the VUT to cross the inner edge of the lane marking by a distance greater than 0.4m.

The available points per test are awarded based on a pass/fail basis. The points available for the different systems are detailed in the table below:

Lateral speed	LKA	LDW	
	Solid line on fully marked lane (left and right side)	Single dashed line (left and right side)	Single solid line (left and right side)
0.1m/s	Pass/Fail	-	-
0.2m/s	Pass/Fail	-	-
0.3m/s	Pass/Fail	Pass/Fail	Pass/Fail
0.4m/s	Pass/Fail	-	-
0.5m/s	Pass/Fail	Pass/Fail	Pass/Fail
Total	1.0	1.5	

2.4.4.2.3 車道維持輔助系統/車道偏離輔助警示系統

2.4.4.2.3.1 車道維持輔助系統及車道偏離輔助警示系統，其使用之評等標準為越線剩餘距離。車道偏離輔助警示系統之越線剩餘距離限制值為-0.3m，意即車輛最多可越過車道邊界標線內緣 0.3m 前應出現警示。車道維持輔助系統之越線剩餘距離限值則為-0.4m，意即車輛最多可越過車道邊界標線內緣 0.4m 前應作動。

每項試驗之得分以通過/未通過作判定；LKA/LDW 系統之得分條件如下表所示：

側向速度	車道維持輔助系統	車道偏離輔助警示系統	
	完整實線（左右側）	單一虛線（左右側）	單一實線（左右側）
0.1m/s	通過/未通過	-	-
0.2m/s	通過/未通過	-	-
0.3m/s	通過/未通過	通過/未通過	通過/未通過
0.4m/s	通過/未通過	-	-
0.5m/s	通過/未通過	通過/未通過	通過/未通過
總分	1.0	1.5	

Euro NCAP 原文	T-NCAP條文草案	說明
6.3.3.2 Points for the LKA function are awarded when the VUT passes 3 out of 5 tests (on both left and right side), while for the LDW function all tests need to pass to get the points.	2.4.4.2.3.2 受驗車輛應通過車道維持輔助系統五項試驗中的三項（左右側皆須通過），即可獲得之分數；受驗車輛應通過車道偏離輔助警示系統所有試驗才能獲得分數。	
•LKA + LDW (combined) Systems offering both LKA and LDW functions, these functions are tested and assessed separately.	(1) 車道維持輔助系統＋車道偏離輔助警示系統（整合） 若受驗車輛同時提供車道維持輔助系統與車道偏離輔助警示系統功能，則這些功能應分別進行試驗及評等。	
•LKA only A systems that only offer the LKA function will be tested and assessed in both the LKA and LDW scenarios.	(2) 僅有車道維持輔助系統 若受驗車輛僅提供車道維持輔助系統功能，則其功能應於車道維持輔助系統與車道偏離輔助警示系統情境試驗中試驗及評等。	
•LDW only For systems that only offer the LDW function, the function will be tested and assessed in the LDW scenarios only.	(3) 僅有車道偏離輔助警示系統 若受驗車輛只提供車道偏離輔助警示系統功能，則其功能僅需在車道偏離輔助警示系統情境試驗中試驗及評等。	
6.3.4 Total LSS Score The total score in points is the sum of the HMI score, LKA score and LDW score.	2.4.4.2.4 車道輔助系統總得分 車道輔助系統總得分為人機介面得分、車道維持輔助系統得分及車道偏離輔助警示系統得分之總和。	