VOLKSWAGEN

GROUP OF AMERICA

Mr. James Owens
Acting Administrator
National Highway Traffic
Safety Administration
1200 New Jersey Ave S.E.,
Washington DC 20590-0001

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March 6, 2020 Date

Re: Notice of Request for Comment: Advanced Driver Assistance Systems Draft Research Test Procedures, Docket No. NHTSA-2019-0102

Dear Mr. Owens,

Volkswagen Group of America (VWGoA) is pleased to provide a response to the National Highway Traffic Safety Administration's (NHTSA's) Request for Comment (RFC) published in the Federal Register on Nov 21th 2019. Driver safety and safety of road users in general is of the utmost importance for VWGoA and we believe that well designed Advanced Driver Assistance Systems (ADAS) research test procedures have the potential to effectively evaluate the performance of these systems.

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VWGoA understands that NHTSA's goal for these procedures is to further its research by better understanding system operation, performance, and limitations. Our comments focus on the following test procedures: Active Parking Assist (APA), Blind Spot Detection (BSD), Blind Spot Intervention (BSI), Intersection Safety Assist (ISA), Opposing Traffic Safety Assist (OTSA), Pedestrian Automatic Emergency Braking (PAEB), Rear Automatic Braking (RAB), and Traffic Jam Assist (TJA).

VWGoA does not sell heavy vehicles in the US market, so comments for those corresponding test procedures were omitted.

Attached to this letter are more detailed technical comments and answers to the seven questions for each test procedure. Please accept these comments not as criticisms of the test procedures, but as feedback to help further develop certain aspects of them.

On behalf of VWGoA, I would like to thank you for the opportunity to provide our feedback. If you have any questions or require further clarification, please feel free to contact me, or Myles Wilson, a member of my staff at 248-754-6435, at your earliest convenience.

Sincerely,
VOLKSWAGEN GROUP OF AMERICA, INC.

Thomas Zorn
Senior Director
Safety Affairs and Advanced Research

Glossary

ADAS	advanced driver assistance systems
APA	active park assist
BSD	blind spot detection
BSI	blind spot intervention
ELK	emergency lane keeping
EuroNCAP	European New Car Assessment Program
GVT	Global Vehicle Target
IDIADA	Institute for Applied Automotive Research
IIHS	Insurance Institute for Highway Safety
ISA	intersection safety assist
LKS	lane keeping system
LSS	lane support systems
LV	lead vehicle
NHTSA	National Highway Traffic Safety Administration
OTSA	oncoming traffic safety assist
PAEB	pedestrian automatic emergency braking
POV	principle other vehicle
PTM	pedestrian test mannequin
PV	parked vehicle
RAB	rear automatic braking
RCAR	Research Council for Automobile Repair
SHRP	Strategic Highway Research Program
SV	subject vehicle
TJA	traffic jam assist
VWGoA	Volkswagen Group of America

I. Questionnaire for Active Park Assist (APA)

1. Can the test procedures be expected to assess adequately for the purposes of research, within practical limitations, the performance of the underlying ADAS technologies? If not, please provide specific reasons why, and suggestions for how they may be improved.
   No. See Comment 1 in Table 1, Section II.

2. Do any of the draft research test procedures contain elements that may potentially confound the system operation and/or test results (e.g., regarding test conduct)? If so, please indicate what those elements are and how they might be addressed and/or mitigated?
   Yes. The front encroaching pedestrian scenario might not be detected by certain systems due to sensor range limitations.

3. Are the draft research test procedures clearly written, understandable, and executable? If not, please provide specific areas for which clarification is necessary, and suggestions for how they may be improved.
   No. See Comment 6 in Table 1, Section II. Regarding the accelerator and brake pedal override, we believe that it would be more effective for a pedal input to brake the car rather than cancel the system.

4. Are the ranges of test speeds, speed combinations, and/or speed increments specified within each draft research test procedure reasonable? If not, please provide any data or evidence to support any claim of unreasonableness from a research perspective.
   Yes. 6mph for the detection stage is reasonable. However, for the encroaching pedestrian scenarios, the vehicle speed during the execution stage is not regulated. This will have an effect on the impact point.

5. To reduce test burden for the assessment of some technologies for research purposes, the number of repeated trials per test condition is proposed to be less than or equal to seven based on our experience from past test procedure design work. Is this adequate, or should another number of repeated trials be performed for all technology/condition combinations to support an assessment of whether differences in the test results, for a given condition, are statistically significant?
   Yes. To determine the success rate we recommend using the current NCAP protocol that requires passing 5 out of 7 valid test runs.

6. Are there additional ADAS technologies NHTSA should be evaluating for research purposes? If so, please indicate what they are
   Yes. Active parking assist systems might also be based on ultrasonic and/or camera systems. Those sensors should also be considered in the test specifications and environmental conditions.

7. Are there existing, alternative test procedures for the ADAS technologies identified in this notice that NHTSA should consider? If so, please identify them and provide any comparisons/contrasts that might be useful to the agency
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II. General Comments for Active Park Assist (APA)

Table 1: Comments for APA

#	Page	Section	Comment
1	5	4.3.1	The absolute size of parking spots will bias test results for long (>5m) or wide (~2m and above) vehicles, as the space relative to the Parked Vehicles (PV) will be smaller. We propose to use a parking spot dimensions that depend on the size of the actual Subject Vehicle (SV) (e.g. width of SV + 2' to each side for perpendicular parking).
2	6	4.4.2	Test conditions should also be limited to a moderate temperature range to achieve comparable results.
3	7	4.5.1	We recommend that the size and class of the PVs be representative of US market sales.
4	7	4.5.2	Surrogate vehicles need to also be comparable to actual vehicles in terms of optical and ultrasonic reflective properties.
5	8	4.5.3	Surrogate Pedestrians need to also be comparable to actual pedestrians in terms of optical and ultrasonic reflective properties. Furthermore, the influence of non-articulating limbs needs to be taken into account. For example, based on the Doppler Effect theory, radar typically needs articulation from the legs to better identify the object as a pedestrian.
6	12	5.4	From the test procedures, it is not clear if the vehicle shall be parked forward or backward into the parking space.
7	14	5.4.3	Considering a test trial as failed if the SV does not finish parking within 60s seems unreasonable. Certain parking strategies, especially forward perpendicular, require several moves. Also, sensor inaccuracies might inflict correctional moves. Instead of taking a binary pass/fail scale, using the duration as a measure of usability from the customer point-of-view (smaller is better) is preferable.
8	14	5.4.4	Why are vehicles supposed to be aligned with the inboard edge? Alignment with the outboard edge is equally justifiable strategy, especially for vehicles without line marking detection. SVs that are significantly shorter than the PVs that align the parking position with the outboard edge may fail this test. That is, the pass/fail criterion should take into account the actual sizes.
9	14	5.4.4	Concerning the two notes after the enumerations on the page; What is the benefit of a vehicle not crossing the inboard perpendicular edge? If there is space in the real world, why not use the inboard edge during low-speed maneuvering? If there is a high obstacle (e.g. a wall, lamp post), state-of-the-art parking systems are expected to detect and react accordingly.
10	16	5.5.1	We recommend designing the encroaching pedestrian scenarios based on representative scenarios in the US.
11	18	5.5.1.4	The driver response time should be based on a TTC rather than a fixed time of 2 seconds because vehicle speed is not regulated during the execution stage.

12	21	5.6.2	The test procedure requires that a gas pedal stroke shall terminate the parking process. This seems unreasonable. In our experience, drivers may want to rest their foot on the gas pedal or may inadvertently touch the gas pedal.
13	21	5.6.3.1	The test procedure requires that a brake pedal stroke shall terminate the parking process. The driver may want to slow down the vehicle (to increase their sense of security) or to let obstructing PVs or pedestrians pass while parking. In such situations, continuation of the parking process is desirable from the customer point-of-view. If a brake pedal stroke is incorporated into the test procedures, that input into the brake pedal should test that the brake allows the driver to stop the vehicle rather than cancel the parking system.
14	22	5.6.3.2	The timeout is too short. From a driver perspective, this may be a nuisance. The driver may want to pause for a short period before the parking maneuver has completed for various reasons. It would be a nuisance to require the driver to reactivate the park system or for the driver to lose the functionality.

III. Questionnaire for Blind Spot Detection (BSD)

1. Can the test procedures be expected to assess adequately for the purposes of research, within practical limitations, the performance of the underlying ADAS technologies? If not, please provide specific reasons why, and suggestions for how they may be improved.
   Yes.

2. Do any of the draft research test procedures contain elements that may potentially confound the system operation and/or test results (e.g., regarding test conduct)? If so, please indicate what those elements are and how they might be addressed and/or mitigated?
   Yes. See Comment 2 in Table 2, Section IV.

3. Are the draft research test procedures clearly written, understandable, and executable? If not, please provide specific areas for which clarification is necessary, and suggestions for how they may be improved.
   Yes. See Comment 1 in Table 2, Section IV.

4. Are the ranges of test speeds, speed combinations, and/or speed increments specified within each draft research test procedure reasonable? If not, please provide any data or evidence to support any claim of unreasonableness from a research perspective.
   Yes.

5. To reduce test burden for the assessment of some technologies for research purposes, the number of repeated trials per test condition is proposed to be less than or equal to seven based on our experience from past test procedure design work. Is this adequate, or should another number of repeated trials be performed for all technology/condition combinations to support an assessment of whether differences in the test results, for a given condition, are statistically significant?
   No, BSD systems are typically symmetric. The test burden can be reduced by only testing one side of the car

6. Are there additional ADAS technologies NHTSA should be evaluating for research purposes? If so, please indicate what they are
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7. Are there existing, alternative test procedures for the ADAS technologies identified in this notice that NHTSA should consider? If so, please identify them and provide any comparisons/contrasts that might be useful to the agency
   Yes. See Comment 2 in Table 2, Section IV.

IV. General Comments for Blind Spot Detection (BSD)

Table 2: Comments for BSD

#	Page	Section	Comment
1	11	5.3.1.4	It is unclear what exactly is meant by "any part of Principle Other Vehicle (POV)." For example, would the side mirrors be included in the definition of 'any part of the POV'? If yes, it might be difficult for certain radar systems to detect a side mirror within the blind spot zone while the rest of the car is outside of the zone. We recommend that such terminology be explicitly defined for test repeatability purposes.
2	13	5.3.2.4	The requirement that the BSD warning has to remain on while any part of the POV reside within the blind zone could be difficult in a situation where the rearmost part of the POV is just behind Line A according to Figure 1. In this case, the POV is likely out of range of the SV's BSD sensors. We recommend that the ISO 17387 test requirements be used. It specifies the requirement that a BSD warning only needs to be issued when the POV is entirely behind the equivalent of Line A in Figure 1.

V. Questionnaire for Blind Spot Intervention (BSI)

1. Can the test procedures be expected to assess adequately for the purposes of research, within practical limitations, the performance of the underlying ADAS technologies? If not, please provide specific reasons why, and suggestions for how they may be improved.
   Yes.

2. Do any of the draft research test procedures contain elements that may potentially confound the system operation and/or test results (e.g., regarding test conduct)? If so, please indicate what those elements are and how they might be addressed and/or mitigated?
   No.

3. Are the draft research test procedures clearly written, understandable, and executable? If not, please provide specific areas for which clarification is necessary, and suggestions for how they may be improved.
   Yes.

4. Are the ranges of test speeds, speed combinations, and/or speed increments specified within each draft research test procedure reasonable? If not, please provide any data or evidence to support any claim of unreasonableness from a research perspective.
   Yes.

5. To reduce test burden for the assessment of some technologies for research purposes, the number of repeated trials per test condition is proposed to be less than or equal to seven based on our experience from past test procedure design work. Is this adequate, or should another number of repeated trials be performed for all technology/condition combinations to support an assessment of whether differences in the test results, for a given condition, are statistically significant?
   Yes.

6. Are there additional ADAS technologies NHTSA should be evaluating for research purposes? If so, please indicate what they are
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7. Are there existing, alternative test procedures for the ADAS technologies identified in this notice that NHTSA should consider? If so, please identify them and provide any comparisons/contrasts that might be useful to the agency
   Yes. As part of their Lane Support Systems (LSS) Protocol, the European New Car Assessment Program (EuroNCAP) evaluates BSI systems. It's referred to as the Emergency Lane Keeping (ELK) Overtaking scenario. However, EuroNCAP only tests this scenario with the LSS system on and only if the default is on.

VI. General Comments for Blind Spot Intervention (BSI)

Table 3: Comments for BSI

#	Page	Section	Comment
1	16	5.3.5.4	Steering robot torque should not override the vehicle's intervention.
2	30	5.3.7.7	For the false positive test, we recommend allowing a false positive warning as long as a false positive intervention does not occur. A false warning does not pose the same risks as a false intervention.

VII. Questionnaire for Intersection Safety Assist (ISA)

1. Can the test procedures be expected to assess adequately for the purposes of research, within practical limitations, the performance of the underlying ADAS technologies? If not, please provide specific reasons why, and suggestions for how they may be improved.
   Partially. See comments.

2. Do any of the draft research test procedures contain elements that may potentially confound the system operation and/or test results (e.g., regarding test conduct)? If so, please indicate what those elements are and how they might be addressed and/or mitigated?
   ISA-Crossing: Yes. The near miss distance of 2m is too close and our internal testing has shown that it's difficult for robots to consistently reproduce test runs within the defined tolerances.
   ISA-Turning: Yes. The lateral acceleration may be too high for the robot to maintain grip during the turn and our internal testing has shown that it's difficult for robots to consistently reproduce test runs within the defined tolerances.

3. Are the draft research test procedures clearly written, understandable, and executable? If not, please provide specific areas for which clarification is necessary, and suggestions for how they may be improved.
   Partially. See comments.

4. Are the ranges of test speeds, speed combinations, and/or speed increments specified within each draft research test procedure reasonable? If not, please provide any data or evidence to support any claim of unreasonableness from a research perspective.
   No. We recommend using representative US crash data to establish test velocities.

5. To reduce test burden for the assessment of some technologies for research purposes, the number of repeated trials per test condition is proposed to be less than or equal to seven based on our experience from past test procedure design work. Is this adequate, or should another number of repeated trials be performed for all technology/condition combinations to support an assessment of whether differences in the test results, for a given condition, are statistically significant?
   Yes. See Comments 5 and 10 in Table 4, Section VIII.

6. Are there additional ADAS technologies NHTSA should be evaluating for research purposes? If so, please indicate what they are
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7. Are there existing, alternative test procedures for the ADAS technologies identified in this notice that NHTSA should consider? If so, please identify them and provide any comparisons/contrasts that might be useful to the agency
   Yes. The Institute for Applied Automotive Research (IDIADA) is leading a private research initiative with other automakers in Europe called Evade 2022. They have finished testing methodologies for both ISA-Crossing and ISA-Turning scenarios.

VIII. General Comments for Intersection Safety Assist (ISA)

Table 4: Comments for ISA

#	Page	Section	Comment
General Comments			
1	14, 23, 30	5.3.5, 5.3.7, 5.3.8	We recommend using representative US crash data to establish test velocities.
2	14, 23, 30	5.3.5, 5.3.7, 5.3.8	To distinguish between different system designs or detection widths, different velocity combinations are necessary. It is not possible to answer which system design would be more effective if only one combination of speed is tested.
3	14, 23, 30	5.3.5, 5.3.7, 5.3.8	For evaluating these scenarios, we recommend weighting each A, B, and C sub scenario based on their frequency in representative US crash data.
4	general		The Evade 2022 working group in Europe has found that the accelerating and decelerating maneuvers (especially while turning) are not feasible at the moment because of the reproducibility of the robots. The dynamic driving behavior differs between OEMs so it has been difficult to consistently repeat the acceleration profiles between OEMs.
5	13	5.3.5	There would be over 100 test runs for each ISA scenario if every level of automation and speed combination is used. For research activities, if the purpose of the methodology is to understand the impact of the levels of automation on AEB performance, then the combination of all parameters is comprehensible and potentially necessary to establish a baseline/foundation. But we do not think that it is feasible to have that many runs if the test procedures will be included in NCAP.
6	21	5.3.6.3	If 3 test runs will be performed what is the criterion for pass/fail?
ISA Scenario 1: POV Straight Across SV Path			
7	41	5.3.11	The evaluation criteria is only based on avoidance. We also propose including mitigation as a performance metric. Not only will the velocity be reduced, but the impact location in a mitigation scenario would be more towards the rear of the POV.
8	14	5.3.5	To further test the robustness of the system, we have two recommendations: • Use a distance greater than 2m when the SV passes behind the POV • Utilize a scenario where the POV decelerates to a stop at the stop bar and the SV passes in front of the stopped POV
9	14	5.3.5	The 2m pass by distance for the near miss is very close for test speeds of 25mph and would like cause the SV to decelerate greater than 0.5g.

10	13	5.3.5	The POV crossing from left or right direction leads to the same system reactions because it's designed symmetrically. To reduce the test burden, we recommend only testing one side or doing a variation of left and right test runs for each scenario.
11	general		Current VWGoA systems are designed to protect the SV driver and prevent the SV from being impacted in the side by the POV. Higher test speeds (25mph) in this case run the risk of the SV braking but then stopping in front of the POV. VWGoA systems are therefore limited to a max speed of 6 mph. We believe this potential risk should be considered by NHTSA in their research and testing.
ISA Scenario 2: POV Left Turn Across SV Path			
12	23	5.3.7	The avoidance potential is limited for higher SV velocities; 25mph is already challenging. We believe there is a risk to the robustness of the tests procedures as well as the potential for false interventions. Therefore, we propose that NHTSA should test for both avoidance and mitigation.
ISA Scenario 3: SV Left Turn Across POV			
13	30	5.3.8	The SV has the intention to turn, so we propose that the turn signal be activated.
14	30	5.3.8	The lateral acceleration during a 15mph turn seems too high for a normal turning maneuver. The standard intersection from EuroNCAP has a larger corner radius and lower velocities. We propose that NHTSA harmonize these parameters with the EuroNCAP tests procedures
15	40	Table 5	We propose that NHTSA use real world data or naturalistic driving studies to derive parameters such as turning radii and accident trajectories. The Second Strategic Highway Research Program (SHRP 2) study might be one example of such a naturalistic driving study.
16	general		Current systems may only operate at speeds below 10 - 15kph. This is to ensure that the SV can brake and remain in its lane. Higher speeds could result in the SV braking and remaining stationary in the oncoming traffic lane.

IX. Questionnaire for Opposing Traffic Safety Assist (OTSA)

1. Can the test procedures be expected to assess adequately for the purposes of research, within practical limitations, the performance of the underlying ADAS technologies? If not, please provide specific reasons why, and suggestions for how they may be improved.
   Partially. See Comment 1 in Table 5, Section X.

2. Do any of the draft research test procedures contain elements that may potentially confound the system operation and/or test results (e.g., regarding test conduct)? If so, please indicate what those elements are and how they might be addressed and/or mitigated?
   Yes. See comments.

3. Are the draft research test procedures clearly written, understandable, and executable? If not, please provide specific areas for which clarification is necessary, and suggestions for how they may be improved.
   Partially. See Comment 4 in Table 5, Section X.

4. Are the ranges of test speeds, speed combinations, and/or speed increments specified within each draft research test procedure reasonable? If not, please provide any data or evidence to support any claim of unreasonableness from a research perspective.
   No. See Comments 2 and 3 in Table 5, Section X.

5. To reduce test burden for the assessment of some technologies for research purposes, the number of repeated trials per test condition is proposed to be less than or equal to seven based on our experience from past test procedure design work. Is this adequate, or should another number of repeated trials be performed for all technology/condition combinations to support an assessment of whether differences in the test results, for a given condition, are statistically significant?
   Yes.

6. Are there additional ADAS technologies NHTSA should be evaluating for research purposes? If so, please indicate what they are
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7. Are there existing, alternative test procedures for the ADAS technologies identified in this notice that NHTSA should consider? If so, please identify them and provide any comparisons/contrasts that might be useful to the agency
   Yes. EuroNCAP has a similar scenario as part of their LSS protocol.

X. General Comments for Oncoming Traffic Safety Assist (OTSA)

Table 5: Comments for OTSA

#	Page	Section	Comment
1	13	5.3.4	Is the intent of this to eliminate the effect the Lane Keeping System (LKS) system may have on the function of the OTSA system? Having a system that is able to control lateral support by detecting lane lines reduces the risk of a collision and should therefore be allowed to be left ON. EuroNCAP allows the LKS system to be left on during its LSS testing.
2	17	Table 2	Sensor range requirements would need to be greater than 250m in order to account for the worst case scenario: SV speed = 45mph, POV = 45mph. The Lead Vehicle (LV) would also limit the SV sensor's visibility.
3	17	Table 2	Allowing the system to function at low speeds (25mph) means the system would be active in dense urban environments with higher likelihood of false positive events and reduced customer acceptance.
4	19	5.3.6.4	When the lateral position of the SV becomes less than 1.5ft to the POV, what relative distance will be measured between the vehicles? Vehicle front end, outer edge of tire, etc.? VWGoA prefers the requirement to be collision avoidance and not a distance based criteria.

XI. Questionnaire for Pedestrian Automatic Emergency Braking (PAEB)

1. Can the test procedures be expected to assess adequately for the purposes of research, within practical limitations, the performance of the underlying ADAS technologies? If not, please provide specific reasons why, and suggestions for how they may be improved.
   Yes.

2. Do any of the draft research test procedures contain elements that may potentially confound the system operation and/or test results (e.g., regarding test conduct)? If so, please indicate what those elements are and how they might be addressed and/or mitigated?
   Yes. See Comments 7 and 8 in Table 6, Section XII.

3. Are the draft research test procedures clearly written, understandable, and executable? If not, please provide specific areas for which clarification is necessary, and suggestions for how they may be improved.
   No. See Comment 2 in Table 6, Section XII.

4. Are the ranges of test speeds, speed combinations, and/or speed increments specified within each draft research test procedure reasonable? If not, please provide any data or evidence to support any claim of unreasonableness from a research perspective.
   Yes.

5. To reduce test burden for the assessment of some technologies for research purposes, the number of repeated trials per test condition is proposed to be less than or equal to seven based on our experience from past test procedure design work. Is this adequate, or should another number of repeated trials be performed for all technology/condition combinations to support an assessment of whether differences in the test results, for a given condition, are statistically significant?
   Yes.

6. Are there additional ADAS technologies NHTSA should be evaluating for research purposes? If so, please indicate what they are
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7. Are there existing, alternative test procedures for the ADAS technologies identified in this notice that NHTSA should consider? If so, please identify them and provide any comparisons/contrasts that might be useful to the agency
   Yes. EuroNCAP and the Insurance Institute for Highway Safety (IIHS) both have test procedures for PAEB.

XII. General Comments for Pedestrian Automatic Emergency Braking (PAEB)

Table 6: Comments for PAEB

X	Page	Section	Comment
1	7	4.3.2	Articulated dummies are not used in this procedure. Two kinds of dummies raises verification efforts. For detection reasons, articulated dummies with at least moving legs are strongly required because of the Doppler effect that is important for radar sensors.
2	12	6.1.2.5	The protocol explains implicitly that driver has to remove his foot from the gas pedal. This action needs further specification because there are currently implemented suppression mechanisms based on driver pedal input. A detailed definition of an applicable throttle release gradient would be needed for completeness.
3	12	6.1.2.8	To measure brake temperature at each wheel raises the effort in measurement technique. The measurement of the brake temperature at one front wheel should be enough.
4	13	7.0	In regards to the gearing for manual transmissions, the EuroNCAP specification is more precise in this point. RPM shall be at least 1500 at the test speed.
5	-	8.0	A calibration run/procedure similar to that of EuroNCAP should be added. A minimum of 100 km shall be driven on a mixture of urban and rural roads with other traffic and roadside objects to calibrate the sensor system.
6	-	9.1.5.4	The required pass/fail ratio seems to be missing. We recommend using an evaluation criteria that takes into account the warning, mitigation, and avoidance capabilities of the test vehicle.
7	17	9.1.3	Regarding S1f, the stopping location of the Pedestrian Test Mannequin (PTM) is a relative dimension compared to the SV width. This causes complexity for test setup because the PTM stops relative to the width of SV. We recommend choosing a fixed stopping point based on the width of the roadway or relative to the SV centerline.
8	17	9.1.3	Regarding S1g, the triggered timing and location of the PTM is a relative dimension compared to the SV width. This causes complexity for test setup because the PTM location as the SV nearly misses it is relative to the width of SV. We recommend choosing a trigger point and PTM location based on the width of the roadway or relative to the SV centerline.
9	18	9.1.5	It's unclear what should happen in cases of invalid test runs due to external factors such as wind or surface conditions. Should the test runs be considered invalid or should the tests be redone?
10	19	9.1.5.1	There is just an upper time requirement for the SV throttle release. The lower border of the time interval is not specified. That means, there is no gradient for throttle release specified. If the accelerator pedal is released too fast, it could activate a suppression mechanism.
11	27	9.2.5.4	The required pass/fail ratio seems to be missing. We recommend using an evaluation criteria that takes into account the warning, mitigation, and avoidance capabilities of the test vehicle.

XIII. Questionnaire for Rear Automatic Braking (RAB)

1. Can the test procedures be expected to assess adequately for the purposes of research, within practical limitations, the performance of the underlying ADAS technologies? If not, please provide specific reasons why, and suggestions for how they may be improved.
   Partially. This procedure is relatively simple because it uses a stationary pedestrian. Current systems may be able avoid the stationary pedestrian using ultrasonic sensors for detection, but those sensors aren't necessarily identifying the pedestrian as a "pedestrian." It's likely the system only recognizes the pedestrian as any other object.

2. Do any of the draft research test procedures contain elements that may potentially confound the system operation and/or test results (e.g., regarding test conduct)? If so, please indicate what those elements are and how they might be addressed and/or mitigated?
   No.

3. Are the draft research test procedures clearly written, understandable, and executable? If not, please provide specific areas for which clarification is necessary, and suggestions for how they may be improved.
   Yes.

4. Are the ranges of test speeds, speed combinations, and/or speed increments specified within each draft research test procedure reasonable? If not, please provide any data or evidence to support any claim of unreasonableness from a research perspective.
   No. Test speeds are not defined and can vary depending on how fast a vehicle coasts in reverse. For example most electric vehicles (EVs) require accelerator pedal input before any movement occurs.

5. To reduce test burden for the assessment of some technologies for research purposes, the number of repeated trials per test condition is proposed to be less than or equal to seven based on our experience from past test procedure design work. Is this adequate, or should another number of repeated trials be performed for all technology/condition combinations to support an assessment of whether differences in the test results, for a given condition, are statistically significant?
   Partially. Systems are usually symmetric, so testing only one side is necessary.

6. Are there additional ADAS technologies NHTSA should be evaluating for research purposes? If so, please indicate what they are
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7. Are there existing, alternative test procedures for the ADAS technologies identified in this notice that NHTSA should consider? If so, please identify them and provide any comparisons/contrasts that might be useful to the agency
   Yes. EuroNCAP, IIHS, and the Research Council for Automobile Repair (RCAR) have test procedures for RAB.

XIV. General Comments for Rear Automatic Braking (RAB)

Table 7: Comments for RAEB

#	Page	Section	Comment
1	7	2.6	A passed test run is defined as avoiding impact with the mannequin. It may be worth including a requirement that specifies the amount of time the brakes should be held after avoidance.

XV. Questionnaire for Traffic Jam Assist (TJA)

1. Can the test procedures be expected to assess adequately for the purposes of research, within practical limitations, the performance of the underlying ADAS technologies? If not, please provide specific reasons why, and suggestions for how they may be improved.
   Yes.

2. Do any of the draft research test procedures contain elements that may potentially confound the system operation and/or test results (e.g., regarding test conduct)? If so, please indicate what those elements are and how they might be addressed and/or mitigated?
   Partially. See Comment 2 in Table 8, Section XVI.

3. Are the draft research test procedures clearly written, understandable, and executable? If not, please provide specific areas for which clarification is necessary, and suggestions for how they may be improved.
   Yes.

4. Are the ranges of test speeds, speed combinations, and/or speed increments specified within each draft research test procedure reasonable? If not, please provide any data or evidence to support any claim of unreasonableness from a research perspective.
   Yes.

5. To reduce test burden for the assessment of some technologies for research purposes, the number of repeated trials per test condition is proposed to be less than or equal to seven based on our experience from past test procedure design work. Is this adequate, or should another number of repeated trials be performed for all technology/condition combinations to support an assessment of whether differences in the test results, for a given condition, are statistically significant?
   Yes.

6. Are there additional ADAS technologies NHTSA should be evaluating for research purposes? If so, please indicate what they are
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7. Are there existing, alternative test procedures for the ADAS technologies identified in this notice that NHTSA should consider? If so, please identify them and provide any comparisons/contrasts that might be useful to the agency
   Yes. See Comment 2 in Table 8, Section XVI.

XVI. General Comments for Traffic Jam Assist (TJA)

Table 8: Comments for TJA

#	Page	Section	Comment
1	6	4.5.1 A. iii.	We recommend that that the backs of seats/head restraints, visible parts of the dashboard, and the center rear mirror should be visible to the vehicle(s) behind the POV. The camera uses all these details for plausibility. We do not recommend any homogeneous colored surface for the back window. The Global Vehicle Target (GVT) should be okay for this procedure.
2	14	5.3.5.2	According to ISO15622, the average automatic deceleration of ACC systems should not exceed 3.5m/s^2 when traveling above ~45mph and should not exceed 5m/s^2 when traveling below ~12mph. At the NHTSA test speed of 15mph the equivalent deceleration level is ~4.8m/s^2 and for 25mph, the deceleration level is ~4.4m/s^2. Due to the POV braking at a higher deceleration level of 5m/s^2, is it allowable for the Level 2 TJA system to "hand off" to the AEB system for higher forced braking?