

MOTORCYCLE BRAKES GTR – ACTION LIST ON 05 – 06 – 29 (AFTER 57/GRRF)

GTR Paragraph	Details of issue	Actions or Possible options	Comments	IMMA comments	TC comments	U.S. Comments	Project leader
1.0 Scope	In the current text there is a sentence containing “..safe braking performance under normal and emergency riding conditions.” This is similar to the contents of FMVSS 135/ECE 13H but should it be included ?	Possible options: a. Delete this sentence b. Provide definitions of “safe” and “emergency ”	Also, is the contents of Scope sufficient ?	IMMA proposes deletion of the phrase because the terms cannot be defined.		Current text is consistent with words used in all FMVSS brake regulations w/o definition	IMMA
1.0 Scope	The description of vehicle categories are taken from SR1 that is currently being developed in AC3 and not finalised.	Action: Monitor vehicle category development.		Wait until SR1 has been finalised Now agreed JC to act			TC
1.0 Scope	The contrasting types of vehicles in use in Europe v N.America and other regions. This issue occurs throughout the GTR. For example, comparing 3 wheelers, in Europe, a typical 3-5 is a low speed utility vehicle using car type construction and brake system – panel drum brakes and single pedal actuation. In N.America, a 3-5 could be high powered trike using motorcycle construction and single brake systems.	Action Discuss at the next GTR meeting.	This issue applies in some part to all tests in the GTR This general issue has been highlighted in a letter from TC to IMMA.	IMMA will prepare a proposal by the end of May, taking into account the general review of definitions and scopes started by the EU in WP29. The main need is to find a separation criterion for the typical European 3-wheelers and those which can reach much higher speeds. Vmax 80 km/h See each test			TC

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1.0 Scope	The GTR currently includes vehicles with a minimum vehicle Vmax of 25 km/h. Acceptable?	Options: a. 25 km/h as ECE Reg 78 b. Another value		Leave the 25 km/h in the GTR, these vehicles are too slow to do the tests. It would require major re-writes and discussion to change this long-standing convention in the Regulations (see also R13H)	TC flexible, can agree to option a., Vmax ≥ 25	US agrees with Option (a)	TC
3.1.3 Brake System Requirements	This section covers 3 wheelers only and is based on the ECE text but with a modification from TC to include e.g. N. American vehicles. Acceptable?	Action: GTR Group to consider current text.		IMMA is satisfied with this text			TC
3.1.5 Master cylinder reservoir	NHTSA suggest that there is a statement on reservoir capacity in the GTR.	Possible option Extract from ECE 13H section 5.2.12	Group to agree this minor addition at the next meeting.	IMMA does not think that this is necessary but is ready to discuss any test procedure proposed by NHTSA for the 4 th Informal group meeting		Use Std 122 requirement of 1.5 times displacement	NHTSA
3.1.6 SSB warning lamp	In the current text, the words “clearly visible to the rider” are included. This is not definable.	Options: a. Prepare a definition b. Modify the text	All the text in this paragraph should be checked.	IMMA does not think a definition or test procedure is necessary but is ready to discuss any test procedure proposed by NHTSA for the 4 th Informal group	Suggest “in clear view of the rider”, as per FMVSS	Use “...in clear view of the driver...”	NHTSA

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				meeting			
3.1.7 ABS warning lamp	Same general issue as for SSB lamp plus confirmation of what the lamp is checking for.	Options: a. Text as in current document b. "...whenever there is a malfunction that affects the generation or transmission of response or control signals in the vehicle's antilock brake system."	Group to decide at next meeting.	IMMA finds the text ambiguous. IMMA proposes the modification of the text to say "...generation OR transmission..."		U.S. supports its proposal in Option (b)	NHTSA
3.2 Brake System General Operation.	This section gives a general description of the layout of the overall brake system. Included in ECE 13H etc. TC wish to review the content.	Action: General review of this section of the GTR at the next meeting.		As discussed in Montreal, this is a description of what a brake is meant to do. These three types of brake system should also be separately defined (see new text proposed by IMMA).	TC can accept as is.	U.S. can accept	TC
3.2.3 Parking brake system	The text states that the parking brake be applied by "solely mechanical means" and "in the absence of the driver". Acceptable? TC say must be held in position by mechanical means. NHTSA want with driver.	Action Review this paragraph at next meeting.		This is a laden test and therefore the mass of the driver is included. In principle, the brake should work when the driver is absent. The second sentence should be separated into two bullet points to	TC can accept as is.	No need to say "in absence of the driver"	TC

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				clarify what is required.			
3.3.2 friction material thickness	For checking drum lining thickness, the text states that “a pointer device designed for that purpose” is written.	Action Group to confirm text at next meeting		IMMA agrees with the proposed text.	TC can accept as is.	US agrees with idea but need to refine text "assessed by means of a device designed for that purpose"	TC
4 Tests	To ensure reasonable repeatability, all parameters should have a tolerance e.g. speed, control force	Action NHTSA/TC to provide proposal	Correction factors required?	IMMA is awaiting the NHTSA/TC proposal.(In Montreal, we agreed to specify a tolerance and a correction factor within that, in line with current USA practice; text required.)	Propose range when specifying baseline deceleration, in 4.6.3 and 4.7.3.1	For stopping distance SAE J299 for speed correction or can include equation directly into text within ± 3.2 km/h; ISO and JSS General tolerance of $\pm 5\%$ unless otherwise specified	NHTSA
4.1.1. Test surface friction	At GRRF meeting, it was confirmed that any values specified could only be approximate due to many variable e.g. tyres, weather. Similarly, it was not necessary to specify the method of measurement.	Option Use text from Car GTR “ the surface shall have an adhesion coefficient (PFC) ≥ 0.85 unless otherwise specified."	Group to discuss at next meeting	IMMA can accept this version of the text.		Recommend “nominal PFC 0.9 or less unless otherwise specified ”	NHTSA

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4.1.4 Test speed	For vehicles that are unable to reach the specified test speed, it would be convenient to have a standard requirement of 0.8 or 0.9 Vmax. For some tests and models, it may require a long track to reach 0.9 Vmax and so manufacturers would prefer 0.8V max throughout.	Action Group to discuss the use of 0.8Vmax throughout GTR at next meeting.	Also applies to 4.4.2, 4.5.2, 4.9.5.1	For practical reasons (length of test track and time needed for testing), IMMA proposes 0.8, because these are low performance vehicles.	Unless clear benefit, suggest maintain initial parameters of existing adopted requirement s... no additional justification required.	US supports 0.9Vmax for dry stops; 0.8Vmax for high speed and ABS; R78 2.1 and 2.2 use 0.9Vmax	IMMA
4.1.5 Auto transmission	NHTSA wish to include the sentence “If an auto transmission has a neutral” currently written into the text.	Action: IMMA to check if this relevant		IMMA can accept this proposal, even if it does not apply to current production.	TC can accept.		NHTSA
4.2.3 Control lever application point Manufacturers to check	NHTSA have proposed a clearer way of defining the front force application point based on measurement from the end of the handgrip instead of lever end – see current text for details.	Action: Group to confirm the proposal at the next meeting.	Group must ensure that the currently specified input force values in the GTR are comparable when the new proposed method is used.	IMMA can accept both methods. However, the USA method can miss the brake lever altogether, therefore IMMA prefers the R78 method, of measuring along the lever for 50mm. The drawing should	[50mm from the outermost point of the lever, measured along the axis of the handlebar grip: the force shall be applied as in	Using handgrip edge vs hand lever edge as reference point for distance would be easier to enforce; US is open to 50 mm	NHTSA

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				specify both the direction and the point of force application.	<p>FMVSS, with a diagram]</p> <p>30 mm from end of handgrip may not be sufficient due to lever length, lever location at rest (lever angle to the handle grip) and handgrip designs. As such, force may be applied on lever “ball” or may miss the lever completely. Suggest 50 mm from end of handle grip or measure from lever end as opposed to handle grip end, similar</p>		

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					to ECE R60		
<p>4.2.4 Brake temp measurement</p> <p>Test track</p> <p>TUV: which method?</p>	<p>To date, the GTR has included 2 methods of measurement –</p> <p>a. Rubbing thermocouple on disc or drum surface</p> <p>b. Thermocouple embedded in friction material. a and b are not comparable, a is considered to have certain advantages, but b has been convention in NA. NHTSA now state that a. could be standardised.</p>	<p>Actions prior to next meeting</p> <ul style="list-style-type: none"> - IMMA to provide NHTSA with information on the installation of rubbing thermocouples etc.. - NHTSA to consider . 	<p>Discuss at next meeting. More detail e.g. drawings required in text.</p>	<p>For the in-pad method , it is difficult to drill the hole, and to clear the callipers etc the insert has to be from the edge of the pad. The method provides stable but not quickly responsive pad temperature measurements, and the integrity of the pad is disturbed. Heat transfer and build-up are different in organic and sintered pads.</p> <p>The rubbing thermocouple method is easy to install and has quick temperature response; but there are the problems of disc holes, weak springs that allow the thermocouple to jump, and temperature variations according to the</p>	<p>Neither method is perfect. Rubbing thermocouple have issues with installation and read higher temperature due to self-heating. If accepted, should IBT be revised to account for self-heating? No issue with [installation of plug type thermocouple] Only one that works on all systems</p>	<p>Do we have data on correlation between 2 methods? Will we need to revise IBT if rubbing method used?</p>	

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				<p>position on the disc. The absolute temperature will be higher because of the additional friction between the disc and the thermocouple (<20°C)</p> <p>IMMA's conclusion is that both options should be allowed , to cater for different configurations. The absolute temperature is only significant for the initial brake temperature; other temperature references are relative. Industry experience is that the choice of method makes no difference in practice.</p> <p>If consistency is thought essential, the method of measurement could be recorded in the test documentation.</p>			

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<p>4.3.2 Dry Stop Test IBT</p> <p>05-BHTF-05</p> <p>Ask TUV about the CBS problem</p>	<p>NHTSA proposes an IBT of $\geq 55^0$ - $\leq 100^0$ C for all performance tests whilst IMMA states that $\leq 100^0$ C is acceptable stating that the min. temp. inclusion does not affect brake performance results and adds time and complexity to the testing.</p>	<p>Action</p> <ul style="list-style-type: none"> - IMMA has carried out a series of tests with a range of motorcycles and has presented the data to NHTSA/TC. - NHTSA/TC to study the data and report back to the Group. 	<p>Applies also to 4.4.2, 4.5.2, 4.7.2.2, 4.7.3.1, 4.8.2, 4.9.3.1</p>	<p>IMMA maintains its position, based on the data presented to NHTSA and TC during 57/GRRF, that an IBT of $<100^0$C is enough.</p> <p>IBT = hottest brake: and must be in range 55-100 C.</p> <p>No need to make a temperature requirement for the colder brake</p>	<p>Some IMMA test results show braking distance varies with IBT. In others, IBT from 0 to 100 seems to have no effect on brake performance. Prefer narrower temp. range to minimize variables / assure more consistent, comparable, repeatable results.</p>	<p>U.S. reviewed IMMA data; mixed results. Keep 55-100C as proposed</p>	<p>IMMA</p>

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4.3.3 Dry Stop Test – single brake control activated Performance Requirements	TC wish to add a note “ If both braking devices are CBS, the manufacture must specify which is the dominant brake and which the secondary brake”	Action: Group to review this proposal and report	Discuss at next meeting	IMMA agrees.	Remove request. This information is only for certification verification and compliance testing, and is not a performance requirement. Thus should not be part of this regulation.	Should be stated in preamble but not included in regulatory text	TC
	TC wish to include s. distance/MFDD requirements for split service brake systems in the table and suggest they should be the same values as for CBS.	Options: a. Same brake performance as CBS b. Other values	Group to consider at next meeting	IMMA agrees that all SSB systems should be tested to the same values as CBS			TC
	TC wishes to add performance requirement for category 3-5 vehicles equipped with independent service brake systems.	Options: a) Same performance requirements as for category 3-3. b) Other values.	Group to consider at next meeting		Agree with option a. Category 3-3 and 3-5 have to meet same performance requirements in U.S. and Canada. Agree with option a.		

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4.4.2 Dry Stop test – all brakes Minimum test speed	Currently the value is 45 km/h for this test but this is under review. NHTSA suggest 25 km/h in line with FMVSS 122	Action: Group to review minimum speed for this test		IMMA does not think that this additional test is necessary for mopeds, which are low speed vehicles and well covered by the single tests. Restrict this test to L3, L4, L5 (Mopeds are not common in the USA and this is probably why the present regulation does not distinguish between them and motorcycles.)	TC requires this test to minimum speed of 25 km/h. Cannot relax present level of stringency, ?? unless demonstrated to be obsolete or no longer applicable. Include options in the gtr?	Use 100 km/h or 0.9 Vmax; R78 Para 2.1.1 requires 0.9 Vmax	TC
4.4.2 Brake actuation force	Current values are based on FMVSS 122 : Hand \leq 250N Foot \leq 400N (500N for 3-5 vehicles) NHTSA propose that these are reduced to align with test 4.3 i.e. Hand \leq 200N Foot \leq 350N (500N for 3-5)	Action: Group to consider the 2 options		IMMA's view is that the test was developed with these particular forces and should stay that way. Changing the forces would require considerable further test work which is not justified, and which	TC could accept either. The force application location may have a greater effect than the force itself.	U.S. can accept either; lower forces make reqmts more stringent; are actual forces anywhere close to these limits?	IMMA

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				would delay the GTR unnecessarily.			
4.4.3 Dry Stop Test – all brake controls activated. Performance Requirements	This test is taken from FMVSS 122 and converting the stopping distance requirement to MFDD produces an unexpectedly high figure of 7.6 m/s ²	Action Group to discuss at next meeting.		IMMA is still studying this issue.	Present requirement in North-America. TC can accept.	Just use stopping distance for this test	IMMA
	At present, this test is applicable to all vehicle types. This should be reviewed based on the general comments made regarding categories in 1.0 Scope in this paper.	Options: a. Modify text or test procedure b. Include power/weight ratio c. Exempt certain vehicles.	Group to discuss at next meeting.	This is linked to the definitions issue (see above).	Present requirement in N-A. TC can accept as is. Piaggio to reconsider in view of latest agreement on performance		IMMA
4.5.1 High speed test Categories	At present, this test applicable to 3-3, 3-4, and 3-5 vehicle types. Is this satisfactory ?	Action Group to discuss at next meeting.		This is linked to the definitions issue (see above).	TC can accept.	US can accept as written	IMMA
4.5.2 High speed test Minimum speed	TC propose 100 km/h instead of original 80 to prevent overlap with test 4.4.	Action Group to confirm at next meeting		IMMA agrees with TC		See US proposal for speed ranges; If $V_m \leq 125$ km/h, no test; If $V_m > 125$ & < 200 km/h use $0.8V_m$;	TC

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						If $V_m \geq 200$ km/h, use 160 km/h test speed	
4.7.5 Performance Requirements (Heat Fade Test)				<p>Editorial corrections: “If based on MFDD, $\geq 60\%$ of the MFDD recorded in test 4.7.2.”</p> <p>“S_1 = stopping distance in metres achieved in baseline test 4.7.2.”</p>			
4.6.1 Wet brake test - brake types	<p>GTR text states that all brake types must be tested.</p> <p>For ECE Reg 78, category 3-5 vehicles are exempt because in Europe these are typically “car type vehicles” with panel type drum brakes. Wet brake tests are not included in car regulations. N.American trikes are 3-5 vehicles and can have exposed disc brakes that should be wet tested. How to deal with ?</p>	<p>Possible option: - Test all vehicle types but exempt car type drum brakes (panel brake) Propose a definition of panel brake.</p>	Discuss at next meeting	<p>IMMA agrees with the proposal and is preparing a definition of a "panel brake"</p> <p>Exempt all drum brakes, like ECE and JSS. Add the qualification in JSS § 1.5.1 for air intakes. Spray to be applied at the same point in front of the opening as for the disc test.</p>	It was agreed that drum brakes for all other vehicle categories must be tested, in the event there is water penetration. It might be difficult to substantiate exemption of the panel (i.e. drum)	US wants all types to be tested	IMMA

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					brake for category 3-5 only. Support testing all brakes, all categories.		
4.6.2 Wet brake test - CBS laden test	When CBS fitted, ECE (and GTR) states that it should be tested laden and unladen. The unladen test is more severe for CBS due to lower brake forces to cut through the water film etc. so review the need for the laden test.	Action Discuss at next meeting.		IMMA proposes the deletion of the laden test	Is there a rational for laden and unladen tests for CBS brakes. Keep both	US does not support dropping test w/o full understanding reasons for including originally	TC
4.6.3 Wet brake baseline test TUV: how do they establish the force values for each stop	The text currently states "...measure the brake control force that will produce an average vehicle deceleration of 2.5 m/s ² " It will require more than 1 stop to produce a robust value. Further instructions may also be necessary to assist the tester.	Possible option: Modify the definition of Baseline to specify the no. of stops to arrive at a repeatable value e.g. 6 max., 3 min.	Group to comment on this proposal and the complete paragraph. Also applies to 4.7.2 – Heat Fade baseline. See new "Baseline" definition.	IMMA agrees the proposal for 3-6 tests, with the clarification that the result shall be the control force values which give the deceleration nearest to the required value	Propose a range, as it is impossible to obtain exactly 2.5 m/s ² . JSS uses 2.5 to 3.0 m/s ² . Also suggest FMVSS method whereby the control force is based on the average of 3 stops.	US supports average of 3 stops to determine control force; also supports range of 2.5-3.0 m/s ² ;	IMMA
4.7.3.1 Heat Fade	These 10 stops are performed with a constant	Options:	Group to discuss this	IMMA	Propose a	R78: 1 st stop	NHTSA

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heating procedure How to determine the average	control force that gives 3 m/s ² for the first stop. It is difficult to achieve both constant control force and constant deceleration.	a. Use constant decel. but modulate control force. (but what is used for the remaining stops?) b. Do a pre test to find a constant force that gives an average decel of 3 m/s ²	and other possible options.	recommends option "b", because it is more practical	range, as it is impossible to obtain exactly 3.0 m/s ² . JSS uses 3.0 to 3.5 m/s ² .	between 3.0 to 3.5 m/s ² and measure pedal/lever force; use same force for subsequent stops. Is it average or max force? Also supports range of 3.0-3.5 m/s ² ;	
4.7.2.2 Heat Fade Test conditions and procedures	Should this test also apply to category 3-1 and 3-2 vehicles	Group to discuss at next meeting	All category 3 vehicles must pass this test in Canada	IMMA does not think that this is necessary for mopeds, because of their limited performance and mass. Experience does not show heat fade to be a problem for mopeds. Does TC have evidence of fade with mopeds?	Required for Canada To discuss having no requirement, based on world experience		
4.8.2 Parking brake test – actuation forces	NHTSA are concerned that the specified forces of 400N hand and 500N foot may be too high and wants the group to consider reducing the forces to those as for performance tests ie. 250/400N.	Discuss at next meeting	Note that car regs FMVSS 135 specify 400N hand/500N foot	This is like cars; the whole arm and whole leg are used to set the brake. IMMA thinks that the values should		U.S. accepts current R78 forces	

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				be left unchanged.			
Servo failure test	Not in GTR at present. Consider the need for a new test following information from UK.	Discuss at next meeting.		<p>Such a test is not necessary if there is a second totally independent system.</p> <p>If the servo effects all systems, the residual performance requirement should be that for the Secondary brake performance within the input force requirements for the secondary brake system, applied each control which would activate the servo, independently</p> <p>This is currently how type approvals for servo systems are carried out.</p>		US supports secondary performance if we decide to include	
4.9 ABS tests	In general the content of this section requires review	Discuss at next meeting					
4.9.1 ABS tests – list of tests	NHTSA believe complete stops on high and low friction surfaces (a,b) are not required due to duplication.	Discuss at next meeting	Stops a + b are the only ones carried out from the test speed	see comments on § 4. 9. 3. 2	Should have a test which verifies ABS	High friction test needed to get high	

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			down to standstill. All the others are check stops or snubs.		operation down to standstill, on high and low friction surfaces	value for low-to-high transition test; assume wetted low friction and wetted high friction	
4.9.1 EMC tests	NHTSA require a specific test procedure	Options: a. ECE R10 b. Manufacturers data	Discuss at next meeting	DELETE			
4.9.3.2 ABS High friction stops	At 57/GRRF, UK was concerned that the ABS tests did not include any measurement of stopping performance. It was agreed that the Group would consider this	Possible option: For the tests on the high friction surface, the stopping distance shall be \leq or MFDD shall be \geq the values for the relevant part of Dry Stop – single brake control activated table in 4.3.3.	Should not be necessary to measure stopping performance on low friction surface as there is nothing to compare with and not so important as on high friction.	Theoretically UK's concern is correct, even though no responsible manufacturer would use an ABS which was not effective in stopping the motorcycle. Any test on a low μ surface would raise the same issues as the existing adhesion utilisation test, (and so not acceptable to the USA), because there is no point of reference for the comparison.	Agree with the option to meet the requirements in 4.3.3 for single brake control. Suggest also requirement in 4.4.3 (all service brake controls activated) if ABS on front and rear wheels. If available, would also support low friction surface	Agrees with option for dry surface but will be difficult for low friction surface	

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				<p>The only option which IMMA can see, is to perform the high μ surface stop, with the ABS cycling, and to require the motorcycle to meet [70%] of the relevant dry stop requirement. (The % figure comes from the current adhesion utilisation test requirement).</p> <p>In principle this aligns the test with the minimum requirement acceptable for each brake in the dry test, where a "best stop" could be exactly on the limit value.</p>	performance requirements, as ABS operation will likely be more frequent on such surfaces.		
4.9.5.1 ABS check stops	A note is included in the text stating that the test may be terminated when the speed has fallen by 20 km/h.	Action Group to discuss	Also applies to 4.9.6.1	IMMA agrees with this proposal, because it covers the period in which wheel-lock is most likely to occur.	Could agree if full ABS stops are conducted elsewhere, on high and low friction surfaces.	Agrees with snubs for wheel lock checks	

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4.9.6.1 Wheel lock check	Editorial: Revise test speed per Reg78, which states: “passage from one surface to the other is made at (about) 0.5 Vmax not exceeding 50 km/h.”	Action Group to discuss	Also applies to 4.9.7.1				
4.9.7.2 ABS low to high friction check	How to check that the system responds correctly to the increase in surface friction?	Option: Prescribe that the vehicle decel rises to the MFDD value for the Dry Stop table 4.3.3 in X secs.	Group to discuss at next meeting.	<p>IMMA has discussed the issues involved and has concluded that a subjective assessment by an experienced test rider remains the most appropriate method. (This is what is included in the car GTR and R13H.)</p> <p>A new test would be expensive to develop and not cost effective.</p> <p>If the existing requirement is not acceptable, the requirement should be deleted.</p> <p>The motorcycle shall remain stable and the [deceleration] shall</p>	Time limit (or other parameter) necessary for performance measurement	US expects that IMMA and/or Test Authorities should have values for us to review since this is an existing requirement in R78	

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				increase.			
4.10 Partial failure test	As originally agreed, the text was based on “the remaining sub system having to meet the relevant Dry Stop- single brake control activated test requirement”. TC propose that the text is based on FMVSS S7.8.2 Partial service brake system test, which is included in the current text	Action Group to consider the TC proposal Assume unladen test.	Note the inconsistencies between the proposed vehicle deceleration and the Dry stop test – single brake control actuated figures.	Now that SSB systems are to meet the CBS requirements it is logical that the partial failure mode should also meet the Secondary brake system requirements.	Do this test as in FMVSS		
Definitions- ABS	NHTSA have proposed an alternative to that which is in the text as follows: A portion of the service brake system that automatically controls the degree of rotational slip during braking by 1) sensing wheel slip of angular rotation of the wheels; 2) transmitting signals regarding the rate of wheel angular rotation to a controlling device that interprets those signals and generates responsive controlling output signals; and 3) transmitting those control signals to a modulator device which adjusts brake actuating forces in response to those signals.	Action Group to agree whether to use this new proposal or that which already in the document.	[A system which senses wheel slip and automatically modulates the pressure producing the braking forces at the wheel(s) to limit the degree of wheel slip]	This proposal is design restrictive because it assumes electronic systems. IMMA prefers the ISO text, which has been included in the GTR.		ABS definition included in our brake standards; U.S. has done this to keep out “pedal pumpers” pseudo-ABS that duplicate ABS pumping and mimic operation but without wheel sensors.	
Definitions- V max	New proposal from NHTSA	Action Group to review	See definition in text	IMMA's view is that this issue can be dealt with in the		Manufacturer s' declaration OR the	

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				<p>same way as burnishing or PFC. The definition should say what Vmax is. Then, either Contracting Parties are allowed to measure it in accordance with their own legislation, if that is necessary; or a reference method is defined for general use.</p> <p>Manufacturers have to use the EU method in any case and therefore have the data available for self-certification purposes.</p> <p>This is why the emissions GTR defines Vmax as follows: <u>"Maximum vehicle speed"</u> (v_{max}) is the maximum speed of the vehicle as</p>		<p>FMVSS 135 over a distance of 1.6 km instead of 3.2 km</p>	

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				<p>declared by the manufacturer, measured in accordance with European Union (EU) Directive 95/1/EC (on the maximum design speed, maximum torque and maximum net engine power of two- or three-wheel motor vehicles).</p> <p>IMMA proposes putting a full stop after the word "manufacturer" and adding a reference to the EU Directive as a footnote when the concept of Vmax is first mentioned in the text.</p>			
Definitions-PFC	In the light of a less specific method of measuring surface friction, should this definition be changed?	Action Group to review		<p>IMMA agrees that something less specific should be used and proposes: "PFC means the friction of the test</p>	Propose acceptable method(s) be referenced / specified.	Keep definition but without last phrase stating what method; allow use of	

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				surface, measured in accordance with the method specified in national legislation".		ASTM or ISO	
Definitions-Laden	SR1 definition is “Gross vehicle mass” which is the maximum mass of the fully laden vehicle based on its construction and design performances, as declared by the manufacturer. <u>"Gross vehicle mass"</u> of a vehicle means the maximum mass of the fully laden solo vehicle, based on its construction and design performances, as declared by the manufacturer. This shall be less than or equal to the sum of the maximum axles’ (group of axles) capacity.	Action Group to review	? Change text from “laden” to “Gross vehicle mass” throughout	IMMA recommends that the official GTR terms in SR1 are used throughout the document; either by copying the text or by making a cross reference, once SR1 has been agreed.	Agree		
Definitions-Unladen	SR1 definition is “Mass in running order” which is the sum of the nominal mass of the complete vehicle (As determined by SR1) and the driver’s mass. <u>"Mass in running order"</u> means the nominal mass of a vehicle as determined by the following criteria: Sum of unladen vehicle mass and driver’s mass. The driver’s mass is applied in accordance with paragraph	Action Group to review	? Change text from “unladen” to “Mass in running order” through.	IMMA recommends the use of the SR1 term “Mass in running order” throughout the document. However, for brake testing, a reference to "test equipment" has to be added.	Specify that additional mass of rider and test equipment does not exceed 90 kg (FMVSS origin). On category 3-1 and 3-2, this may exceed the vehicle		

GTR Paragraph	Details of issue	Actions or Possible options	Comments	IMMA comments	TC comments	U.S. Comments	Project leader
	<p>6.1. below.</p> <p>In the case of category 1-2 vehicles, additional crewmembers for which seating positions are provided shall be included, their mass being equal to, and incorporated in the same way as, that of the driver.</p>				gross vehicle mass. In this case there is no need to test laden and unladen.		
General tolerances				Unless otherwise specified, the general tolerance for parameters in this GTR shall be $\pm 10\%$.			