

# Japan's GTR#21 Revised promotion plan

~ Expand the application of system bench ~

prepared by Japan

@EVE69

16<sup>th</sup> & 17<sup>th</sup> April 2024

## Proposal to apply the system bench to all type of veh

EVE#64  
Proposal document

### ■ System Power Measurement Techniques

Vehicle Type	Events	Measurement Techniques		
		CDY	Hub Dyno	System Bench
Vehicles whose maximum power exceeds that of readily available dynamometers	Homologation	NA (physically impossible)		✓
	COP* Authority verification*			✓**
Rest of vehicles	Homologation	✓	✓	NA → ✓
	COP* Authority verification*	✓	✓	NA → ✓**

\* : no description in current GTR but assuming that it's OK to apply different measurement techniques during homologation

\*\* : due to limited availability, few chance to apply system bench during COP and/or authority verification

- **Proposal** To apply the system bench measurement technique to all type of vehicles. In the case of verification by authority (and COP), currently available measurement techniques (CDY or Hub Dyno) can be applied.

- **Justifications**
  - System bench is well-recognized measurement technique (i.e. GTR4)
  - System bench is already one of measurement techniques for system power
  - Contribute efficient homologation process

### EVE#64 & #65 discussion content

- The use of the system is an exception for high-powered vehicles that cannot be measured with a dynamometer, and more rigorous verification and definition is required to apply the system to all vehicles, which has not yet been fully discussed.
- The risk of unexpected Loophole has not been eradicated and there appear to be unresolved issues regarding the definition of the system bench.

## ■ Action items

Promoting the two items ①accuracy assurance and ②technological appeal to expand the application of the system bench.

Item	Promotion details	Details
①accuracy assurance	Guarantee logic construction	Extract Loophole risks and build a logic with no omissions.
	verification of the actual equipment	Comparison of measurement results between the actual vehicle and the system bench to show that accuracy does not deteriorate when the system bench is used.
②technology appeal	Introduction to actual system bench equipment.	Invite EVE members to check the system bench in practice

## ■ Schedule

Year	2024										2025			
Month	3	4	5	6	7	8	9	10	11	12	1	2	3	4
EVE IF-WG		★ 16,17					★ 18,19				★			
①Accuracy assurance	Loophole item extraction		Risk aversion Organisation of thinking			summary								
			Verification of actual equipment			Selection of models		test preparation		test implementation		summary		
②Technology appeal	Bench selection		Demonstration content review		test preparation									
							★17		Scheduled date of implementation ※					

※Request to EVE-IWG members

We would like to invite you to attend a demonstration of the system bench on the day before the EVE IWG (17 September).

# Guarantee logic construction

DRAFT

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Primary Item	Secondary Item	Tertiary Item	Loophole risk	Risk aversion approach
System bench specification	Powertrain	Powertrain Specifications	Hardware specifications different from those of the actual vehicle are installed.	All powertrain components are basically the same as in the vehicle. Only if equivalence can be proved can it be replaced by simulation.
		Auxiliary load	Auxiliary loads are set lower than in the actual vehicle.	Follows the same approach as in the GTR21 actual vehicle regulations. "The default value shall be 1kW, or the results of actual vehicle measurements. (measured input current and voltage to the DC/DC converter onboard the vehicle) shall be reflected."
		ECU software	ECU data is modified for bench use.	Disclose any changes for measurement related to PT.
	Cooling system	Engine	Super-cooling shows performance above in-vehicle performance.	Temperature conditions specified in UNR85 shall be observed.
		Motor	Super-cooling shows performance above in-vehicle performance.	Temperature conditions specified in UNR85 shall be observed.
		Battery	Measurements are taken at temperatures that deviate from those of the actual vehicle, resulting in performance that exceeds the actual vehicle performance.	Disclose battery temperature data during testing and demonstrate that the temperature range is within the normal operating temperature range of the complete vehicle.
	Equipment requirements	Dyno accuracy	Use of inaccurate dynamometers, resulting in deteriorated measurement accuracy.	Vehicle speed accuracy requirements shall be the same as for C/D.
Test condition	Gasoline	–	Use of non-recommended petrol to control performance. 1): In systems where the octane value is deliberately lowered and the battery output increases as the engine output decreases, it is possible to increase the apparent system out. 2): Contrary to pattern (1), if the octane number is deliberately increased and system output can be reduced.	UNR85 default petrol type shall be used.
	Test methods	–	Controlling performance without opening the system to full throttle.	Provide data to prove full throttle.

- ✓ Discussions on the revision of GTR21 Phase 2 did not result in a decision to expand the application of the system bench to all vehicles, and discussions continued into Phase 3.
  
- ✓ Three initiatives are planned and promoted in the GTR21 Phase 3 revision to expand the application of the system bench.
  1. Identify Loophole risks and establish an assurance logic with no omissions.
  2. Prove the accuracy of the System Bench
  3. Planning demonstrations to familiarise people with the System Bench.
  
- ✓ Draft of the assurance logic of the System Bench has been completed and detailed discussions will start within JASIC/OICA.
  
- ✓ A demonstration of the system bench will be held in Japan in September and we would like you to participate.