Comments and/or Recommendations regarding to The Revision of GTR22

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61st EVE IWG

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EVE-61-XXe

1. Additions to ANNEX 2

The #11,#12,#13 are no longer required under the European Battery Regulation,
but the EC proposed at EVE60 to retain them as Type Approval requirements.

#11 Energy throughput
#12 Capacity throughput
#13 Total time of use of the battery

＜JAPAN Comment＞

1.Harmonization with European battery regulations **was** the reason for the addition to GTR22,
it is not necessary to incorporate it, if European battery regulation **does not** require them.
2. If the EC introduces the 3 information into EURO7, harmonization with GTR22 should be considered.
In this case, the discussion of **clear definition and SAE application** are necessary at or by EVE.
Example:
What is Capacity throughput?
Definition of "Use of Battery" (Is it only during IG-ON? Does it include charging?)

2 Treatment of V2X and PTO (Power Take Off)

At EVE60, there was a discussion that V2X and PTO should be treated as different ways.
Should they be treated the same, or should they have different criteria?

< JAPAN Comment>

Since the effects on battery degradation are considered equivalent, V2X and PTO will be treated as the same.

3. On-board V2X (& PTO) Verification Method

Test Procedure

1.the vehicle family that applies for virtual distance by V2X is subject to the test.
2.The test must be possible to be conducted by a third-party organization.
3.The test must be possible to be conducted with general-purpose equipment.

1) PTO case

Comparison of battery output energy to the PTO measured by an external instrument and on-board V2X + PTO with and without PTO activation.

Sensor location; input to PTO

2) V2X case;

V2H and V2G require a dedicated distributor (see p.4) and are difficult to implement by a third-party organization.
Attach a portable power feeder to a vehicle's DC outlet and connect the several Electric loads.
Compare the V2X output energy measured by an external instrument and on-board V2X.

Sensor location: discussed on p. 5

＜need to consider>

V2H and V2G are not only discharged from batteries, but also charged from solar power and grid power.
1) Accumulation of discharge only: Described in GTR22. 2）Changed to sum of｜Discharge｜+｜Charge｜

In both cases 1) and 2),
operate for [2] hours and compare measured V2X (+PTO) and On-board V2X (+PTO)

Example of external power supply system

Power Supply		**V2H** DC external power supply	**V2L** AC external power supply	**V2L** accessory outlet	**V2L** AC external power supply
System	reference				
	Power supply capacity	DC: 6000~9000W	AC100V/1500W	AC100V/1500W	AC100V/~**9000W*1**
	vehicle operation	stationary	stationary	stationary ＆ driving	stationary
	Supply to housing	Whole house (When V2H device is used)	some room	some room	some room W/**Portable Power Feeder*2**
	Recognition by ECU that power is being supplied	possible	possible	possible	possible
V2X dedicated sensor	Current	No	No	No	No
	Voltage	No	No	No	No

Note:
*1; V2L can be validated more accurately in shorter time with higher output (e.g.9kW) .
*2; Third-party can purchase a potable power feeder and conduct validation tests with higher V2L output..

Electric Energy for virtual mileage conversion

	Energy for virtual mileage	How to calculate On board V2X energy	Pros	Cons	Judgment
Case_1	Actual Energy being supplied	Attach sensors to the V2X outlet (Technically correct)	Accurate and Explainability	Cost increases that do not add value for customer. Difficulty in dealing with already sold vehicles. OEMs who want accuracy will select	Selectable
Case_2	Actual Energy being supplied （some presumptions are included）	1. use the current & voltage sensors of the battery pack 2. Subtract the power (default value) of the load in use (A/C, heater, etc.) from the measured battery power	No additional sensors required (Load ON/OFF must be recognizable by the ECU)	Accuracy will be reduced. OEMs will be at a disadvantage if rated power is selected as a default value	Selectable
Case_3	Battery Energy	Use the current&voltage sensors of the battery pack	simple and no cost increase	Addition other than for V2X are possible, Accountability and transparency to authorities	Less likely

Judgment Criteria: The same statistical method as SOCE/R in Part A will be used.

from $x_i = SOC_{read,i} - SOC_{measured,i}$ **to** $\boldsymbol{x_i = V2X_{read,i} - V2X_{measured,i}}$

Criteria shall be [5] % on one side only

6.3.3. Statistical Method for Pass/Fail decision for a sample of vehicles

Separate statistics shall be calculated for the SOCR monitor and the SOCE monitor.

An adequate number of vehicles (at least 3 and not more than 16) shall be selected from the same monitor family for testing following a vehicle survey (see Annex 1) which contains information designed to ensure that the vehicle has been properly used and maintained according to the specifications of the manufacturer. The following statistics shall be used to take a decision on the accuracy of the monitor.

For evaluating the SOCR/SOCE monitors normalised values shall be calculated:

$$x_i = SOC_{read,i} - SOC_{measured,i}$$

Where

$SOC_{read,i}$ is the on-board SOCR/SOCE read from the vehicle i; and

$SOC_{measured,i}$ is the measured SOCR/SOCE of the vehicle i.

For the total number of N tests and the normalised values of the tested vehicles, $x_1, x_2, \ldots x_N$ the average X_{tests} and the standard deviation s shall be determined:

$$X_{tests} = \frac{(x_1 + x_2 + x_3 + \cdots + x_N)}{N}$$

and

$$s = \sqrt{\frac{(x_1 - X_{tests})^2 + (x_2 - X_{tests})^2 + \ldots + (x_N - X_{tests})^2}{N-1}}$$