Japan Comments for GTR22

@EVE57

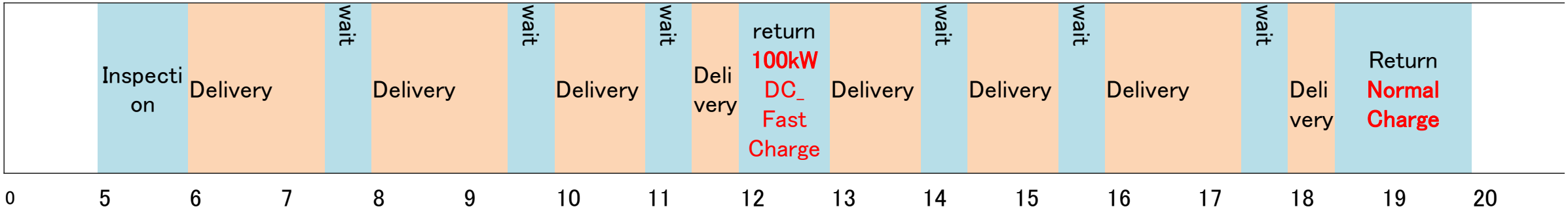
Contents
1. MPR for Category 2
2. Data acquisition issues in ANNEX 2（#9&10）

21. September.2022

1.MPR for category 2

< JAPAN Comment >
Considering the commercial use of Category 2 (Heavy weight, long hours of heavy load use, etc.), the MPR of Category 1 may not be satisfied.
Since the degradation distribution depending on how it is used are unknown, the MPR for Category2 should be decided after monitoring.

Commercial Use Case Examples; Local delivery pattern.



However, considering the high priority for EC,
Japan is keen to be involved in the discussion prior to monitoring phase.

2.Data acquisition issues in ANNEX 2（＃９＆１０）

1.History

1) EVE54 (held in February 2022)

・ Japan proposed the application to the SAE meeting in March for ANNEX2 from # 1 to # 8 including SOCE/SOCR.

・ Regarding # 9 & 10, there are issues, and Japan declared to propose the measures at EVE 55 .

2) JSAE proposed to SAE meeting about the ANNEX2 # 1 to # 8 . and Proposal was agreed in March. Waiting to Publish SAE Document.

3) EVE 55 (held in April 2022)

・ Japan made the proposal for # 9 & 10

No conclusion was reached, and it was carried over to the next EVE.

4) EVE 56 (held in May 2022)

・ Japan explained concerns of # 10 (ambient temperature measurement)

・ Proposal by EC/EPA to measure battery temperature instead of ambient temperature

・ EC (JRC) proposed the harmonization with European battery regulation.

The arguments diverged and no conclusion was reached as EVE.

2.Next Step

1) In a situation where discussions on the measurement of ambient temperature have not converged, the measurement of battery temperature is proposed as information that affects battery degradation more, but it has not been decided yet.

Japan Proposal:

If it is decided the “adoption of battery temperature instead of ambient temperature",
We recommend to refer to the ACC2 of CARB and the SAE discussions.

- average battery temperature are proposed and finalized(see P.7) .
- Details of battery temperature measurement are under discussion at SAE.

2) During the previous meeting, JRC has proposed two additional data in Annex II considering the European battery Regulation. This reminds us the possibility to harmonize both requirement.

Japan wants to confirm the following:

a) Current status of European battery regulations and other battery related regulation, if available.
b) What kinds of actions should EVE IWG take to avoid the potential future confusion ?
(please refer slide_8&9)

ATTACHMENT I-2.1

Proposed 15-day Modifications to Text of the Proposed Amendments to Regulation Order

Amendments to Section 1962.5, Title 13, California Code of Regulations

Data Standardization Requirements for 2026 and Subsequent Model Year Light-Duty Zero Emission Vehicles and Plug-in Hybrid Electric Vehicles

[Note: The proposed modifications, referred to as 15-Day Changes, to the originally proposed regulations are shown below. The 15-Day Changes are provided in a tracked-changes format to improve the accessibility and readability of the regulatory text. The initially proposed amendments that were made available for public comment for at least 45

CARB ACC2 draft

(D) Vehicle Operation Tracking Requirements:

1. Manufacturers shall implement software algorithms to individually track and report the following in a standardized format in accordance with SAE J1979-3 and SAE J1979-DA:

   a. Total distance traveled

   b. Total number of propulsion system active trips (where a trip is satisfied whenever the propulsion system active state has been met for at least two seconds plus or minus one second)

   c. Total positive kinetic energy

   d. Total electric motor output energy

   e. Total propulsion system active time

   f. Total idle propulsion system active time (where idle is defined as accelerator pedal released by driver and vehicle speed less than or equal to 1.6 kilometers per hour)

   g. Total city propulsion system active time (where city is defined as vehicle speed greater than 1.6 kilometers per hour and less than or equal to 60 kilometers per hour)

   h. Total fuel cell system active time (if equipped with a fuel cell system), defined as the total time in which the fuel cell stack consumes hydrogen and generates electricity in any mode of operation

   i. Total fuel cell system energy generated (if equipped with a fuel cell system)

   j. Total hydrogen fuel consumed (if equipped with a fuel cell system)

   k. Total net battery current in the state of propulsion system active

   l. Total net energy consumed in the state of propulsion system active

m. Total energy into battery (e.g., from regenerative braking) during the state of propulsion system active.

n. Total grid energy into the battery during off-board charging.

o. Total grid energy into the battery from off-board direct current (DC) charging.

p. If equipped with the capability to determine alternating current (AC) power into the vehicle or on-board charger during off-board charging, total grid energy into the vehicle from off-board AC charging.

q. Total battery energy supplied to an off-board usage (e.g., grid, power port) during propulsion system non-active operation (e.g., vehicle to home).

r. Average battery temperature during charging, during propulsion system active, and, if equipped, during non-usage of the vehicle (i.e., non-propulsion system active, non-charging).

s. Total time at low, mid, and high state of charges where total time includes cumulative time during propulsion system active, time during charging, and, if equipped, time during non-usage of the vehicle (i.e., non-propulsion system active, non-charging).

t. Total number of charge events following a low, medium, or high depth of discharge of the battery.

Parts of European Battery Regulation_1

Article 10

*Performance and durability requirements for ~~rechargeable~~**LMT batteries,** industrial batteries and electric vehicle batteries*

1. From ~~[~~*12 months after entry into force of the Regulation*~~]~~, ~~rechargeable~~ **LMT batteries,** industrial batteries **with a capacity above 2 kWh, except those with exclusively external storage,** and electric vehicle batteries ~~with internal storage and a capacity above 2 kWh~~ shall be accompanied by a ~~technical documentation~~ **document** containing values for the electrochemical performance and durability parameters laid down in Part A of Annex IV.

ANNEX IV

Electrochemical performance and durability requirements for ~~rechargeable~~LMT batteries, industrial batteries and electric vehicle batteries with a capacity above 2 kWh

Part A

Parameters related to the electrochemical performance and durability

1. Rated capacity (in Ah) and capacity fade (in %).
2. Power (in W) and power fade (in %).
3. Internal resistance (in □) and internal resistance increase (in %).
4. Energy round trip efficiency and its fade (in %).
5. An indication of their expected life-time under the conditions for which they have been designed.

'*Rated capacity*' means the total number of ampere-hours (Ah) that can be withdrawn from a fully charged battery under specific conditions.

'*Capacity fade*' means the decrease over time and upon usage in the amount of charge that a battery can deliver at the rated voltage, with respect to the original ~~rated~~**measured** capacity ~~declared by the~~

3a. The Commission shall be empowered to adopt delegated acts in accordance with Article 73 to amend the electrochemical performance and durability parameters laid down in Annex IV in view of market development and technical and scientific progress, including in particular related to technical specifications of the informal UNECE Working Group on Electric Vehicles and the Environment.

refer MPR ?

Electric vehicles (PEV only? OVC-HEV? NOVC-HEV?) need to comply with Battery Regulation in addition to GTR#22 ?

or this requires for Batteries installed in the vehicles, not for vehicles ?

Parts of European Battery Regulation_2

Article 14

*Information on the state of health and expected lifetime of batteries **using a battery management system***

1. ~~Rechargeable industrial~~ **Industrial** batteries ~~and electric vehicle batteries with internal~~**, except those with exclusively external** storage ~~and~~**, LMT batteries with** a capacity above 2 kWh **and electric vehicle batteries that use a battery management system,** shall ~~include a~~ **contain in their** battery management system ~~containing~~ **up-to-date** data on the parameters for determining the state of health and expected lifetime of batteries as laid down in Annex VII.
2. ~~Access~~ **Read-only access** to the **values** data ~~in~~**of the parameters referred to in Annex VII through** the battery management system referred to in paragraph 1 shall be provided**, respecting intellectual property rights of battery manufacturer,** on a non-discriminatory basis to the legal or natural person who has legally purchased the battery **or to waste management operators** or any third party acting on their behalf at any time for the purpose of:

~~(a~~

(a) making the battery available to independent aggregators or market participants through energy storage.

(b) evaluating the residual value **or remaining lifetime** of the battery and capability for further use**, based on the estimation of the state of health**;

(~~b~~**c**) facilitating the **preparing for re-use, preparing for repurpose, or repurposing or remanufacturing of the battery;**

2a. The battery management system shall be designed in a way that economic operators carrying out preparing for reuse, **preparing for repurpose,** repurposing or remanufacturing ~~of~~**, can upload the necessary software for the purpose and application for which** the battery~~;~~ **will be used after such operations.**

~~(c) making the battery available to independent aggregators or market participants through energy storage.~~

ANNEX VII

Parameters for determining the state of health ~~of batteries~~ and expected lifetime of industrial batteries, LMT batteries with a capacity above 2 kWh, and electric vehicle batteries

Parameters for determining the state of health of **LMT batteries, industrial batteries with a capacity above 2 kWh, and electric vehicle** batteries:

1. Remaining capacity;
2. Overall capacity fade;
3. Remaining power capability and power fade;
4. Remaining round trip efficiency;
5. Actual cooling demand;
6. Evolution of self-discharging rates;
7. Ohmic resistance and/or electrochemical impedance.

Parameters for determining the expected lifetime of batteries:

1. The dates of manufacturing of the battery ~~and~~**or, if applicable, the date of** putting into service;
2. Energy throughput;
3. Capacity throughput**;**.

Proposed to be added to GTR#22 by JRC

4. Tracking of harmful events, such as the number of deep discharge events, time spent in extreme temperatures, time spent charging during extreme temperatures;

5. Number of full charge-discharge cycles.

APPENDIX

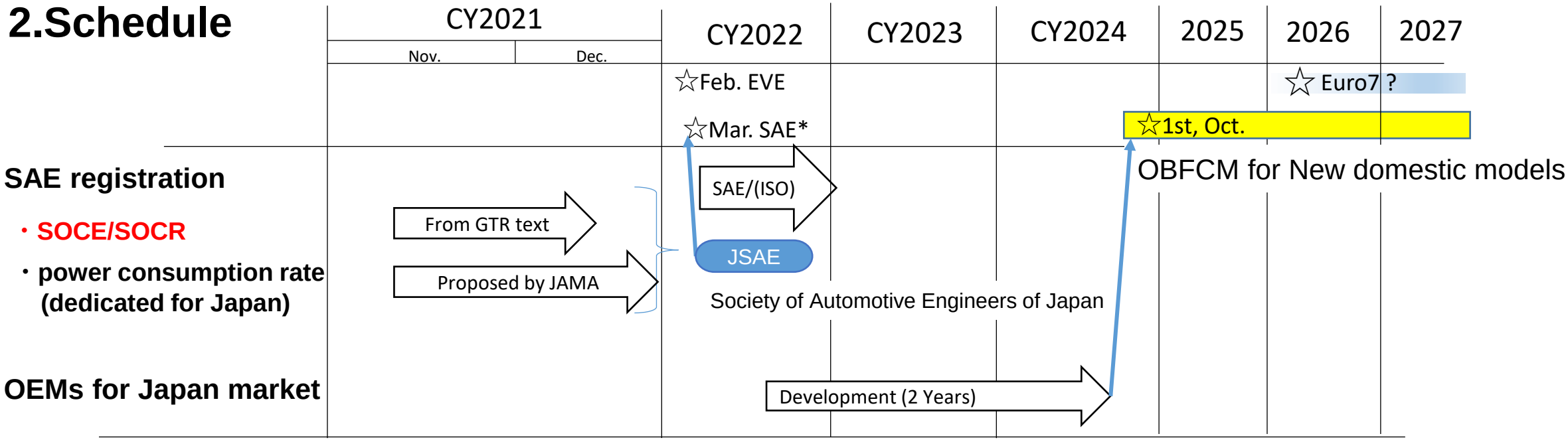
1.Application for registration of SOCE/SOCR to SAE

Quoted from EVE-54-02e_rev_Japan proposal for ANNEX2

< Background >
Japan decided to introduce the mandatory SOCE/SOCR monitoring from October 2024.
Based on the OEM development schedule, we believe that SAE registration is required in 2022.

< Proposal >
1.SOCE/SOCR SAE application will be submitted by Japan at the March 2022 SAE meeting.
2.May Japan consider ANNEX2 applications to SAE other than SOCE/SOCR?
Since there are some issues, the Japan proposal will be presented at EVE in April 2022.

2.Schedule



* J1979 TF Schedule @2022 (Since the revision of J1979 has been discussed as version 3, the number of SAE meetings has increased compared to the previous year.) < Jan.14, March.11, May 3, July22, Sept.16, Nov.18>

Data acquisition issues in ANNEX 2

Quoted and revised from EVE-54-02e_rev_Japan proposal for ANNEX2

9. Last charged by more than 50 percent SOC swing on [Date]
It is difficult to record the date. In general, **CAN typically has no date information**. If a vehicle doesn't have a cell phone connection, a vehicle can't get it. IG-ON time and/or distance from Last charged can be calculated.

10.Maximum, minimum, average ambient temperature the vehicle was exposed to **during its life time**.
Maximum, minimum and average ambient temperature during IG-ON can be calculated,
but "life time " is difficult. **If IG-OFF is included in this calculation, it is technically impossible or very difficult**.

The Japan proposal which can cope with above issues will be presented at EVE in April 2022.

J1979 Information (OBD standard of SAE) Revisions

1.In California, ACC2 regulations (including ZEV) after 26 MY are under discussion and CCR 1969* of ACC2 refers to J1979 -3, which is under discussion. (*California Code of Regulations, Section 1969)
2.The proposal and discussion of J 1979 -3 at SAE started from current conventional specification for ICE toward a "completely new revision" which will also cover ZEV or All electrified vehicles.
3.Any new input or read requirements added to EVE-GTR should also be included in J1979 -3.

Proposed DIDs

Quoted from EVE55_6e_Japan_Proposal_for_Annex2_9_10

9. Last charged by more than 50 percent SOC swing on [Date] Quoted from EVE-54-02e_rev_Japan proposal for ANNEX2

JSAE will propose DID indicated below to SAE.

Date is not available in most case, and use-case of this data is to confirm when last charged by more than 50 percent SOC swing happened.

#	Name	Byte	MIN/MAX	LSB	DISP	DID
	Elapsed time since Last charged by more than 50 percent SOC swing	2	0…65535 day	1 day	xxxxxx day	0xXX / 0xF4XX

In the case of On-Board SOCE more than [xx] days old from the time of ISC implementation day, it is considered that the latest degradation is not reflected, and the pre-conditioning can be conducted before ISC.

GTR22 needs to be amended at any opportunity.

10. Maximum, minimum, average ambient temperature the vehicle was exposed to during its lifetime

JSAE will propose DID indicated below to SAE

Module are only capable to capture AAT while PSA ON.

AAT: Ambient Air Temperature
PSA: Propulsion system Active

Pos	Name	Byte	MIN/MAX	LSB	DISP	DID
A	Maximum ambient temperature (Lifetime)	1	-40…215 deg C	1 deg C with -40 deg C offset	xxxxxx deg C	0xXX / 0xF8XX
B	Minimum ambient temperature (Lifetime)	1	-40…215 deg C	1 deg C with -40 deg C offset	xxxxxx deg C	0xXX / 0xF8XX
C	Average ambient temperature (Lifetime)	1	-40…215 deg C	1 deg C with -40 deg C offset	xxxxxx deg C	0xXX / 0xF8XX

Measuring the temperatures during IG OFF is difficult, data is recorded only when the Propulsion system is active during lifetime.

current

Annex 2

Values to be read from vehicles:

1. On board SOCE value
2. On board SOCR value
3. Odometer (in km)
4. Date of manufacture of the vehicle
5. Total distance (sum of the distance driven and the virtual distance) [km], if applicable
6. Percentage of virtual distance [in per cent], if applicable
7. Worst case certified energy consumption of PART B family [Wh/km], if applicable
8. Total discharge energy in V2X [Wh], if applicable
9. Last charged by more than 50 per cent SOC swing on [Date]
10. Maximum, minimum, average ambient temperature* the vehicle was exposed to during its lifetime

Note: * ambient temperature to be read as daily averages

Propose to amend

Annex 2

Values to be read from vehicles:

1. On board SOCE value
2. On board SOCR value
3. Odometer (in km)
4. Date of manufacture of the vehicle
5. Total distance (sum of the distance driven and the virtual distance) [km], if applicable
6. Percentage of virtual distance [in per cent], if applicable
7. Worst case certified energy consumption of PART B family [Wh/km], if applicable
8. Total discharge energy in V2X [Wh], if applicable
9. Elapsed time since last charged by more than 50 per cent SOC swing on [Day]
10. Maximum, minimum, average ambient temperature* the vehicle was exposed to during its lifetime

Note: * ambient temperature to be read as daily averages

"Lifetime" Temperature Measurement

Quoted from EVE-56-04e - Japan comments on Annex 2

Considering the additional observations below, Japan proposes:

1. **to re-visit and clarify the purpose of the lifetime temperature measurement; and**
2. **to discuss the definition of "lifetime" based on pros and cons* of whether the IG-OFF time should be included in the definition or not**

Additional observations for temperature measurement during parking, based on 55th EVE-IWG discussions

If the definition of lifetime includes IG-OFF time,

1. The measurement ECU, CAN-communication ECU, and data storage ECU must be operated at all times (or periodically wake up/sleep) while parked, which requires *additional electrical energy consumption (12 V battery dead, decrease in EV range, etc.).
2. There would be a high possibility of gaining *abnormal values and error factors in measurement during parking. This is because the position of an ambient air temperature sensor (AAT sensor) is often located around the radiator in front of the vehicle in order to accurately measure the ambient air temperature during driving (See page 3).)

<Example of error factors in parking>
effects of direct sunlight, reflection of sunlight from the ground (road surface temperature),
exhaust gas from other vehicles, snow, freezing, etc.

Reference

Quoted from EVE-56-04e - Japan comments on Annex 2