

ENERGY STAR Program Requirements for Electric Vehicle Supply Equipment

Revised Comments of ChargePoint

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General Recommendation

Issue: Lighting & Display

Discussion: This standard should address a power allowance for additional lighting such as area down lighting, status displays, low resolution displays. There are other useful light/displays that are completely separate from the concept of a “high resolution display.”

Recommendation: EPA should include additional content to address other types of displays and lighting.

PAGE , LINES 4-9

EPA Content: Definition of EVSE: “delivering energy from the premises wiring (if available) to the electric vehicle.”

Discussion: By adding DC to the scope of this Energy Star specification, the definition of EVSE needs to either be updated to align with the NEC or modified since the present wording suggests delivery of AC power to the vehicle.

Recommendation: Align with the 2020 NEC OR as follows: “~~delivering~~ transferring energy ~~from~~ between the premises wiring (if available) to the electric vehicle

PAGE , LINES 14-16

EPA Content: Definition of DC-output: “A method that uses dedicated direct current (DC) electric vehicle/plug-in hybrid 14 electric vehicle (EV/PHEV) supply equipment to provide energy from an appropriate off-board 15 charger to the EV/PHEV in either private or public locations.

Discussion: This definition creates a new term which is not defined: ‘EV/PHEV supply equipment,’ which raises several concerns:

1. There is no need to create new terms in general;
2. It is not readily apparent that the word ‘dedicated’ contributes anything to the definition;
3. Prior definitions for Level 1 and Level 2 include the words ‘galvanically-connected’ so I would have expected the definition for DC to include ‘galvanically isolated.’ The new definition is inconsistent with the previous definitions.

Recommendation: ‘EVSE with a galvanically- isolated dc output.’

PAGE , LINE 17

EPA Content: 4) Wireless / Inductive: A non-galvanically-connected EVSE.

Discussion: DC output is not galvanically connected to the vehicle so this creates ambiguity. It would be preferable to indicate is that the vehicle does not have a galvanic connection to the EVSE. The wording “non-galvanically-connected EVSE” does not convey whether the non-galvanic connection involves the source or vehicle.”

Recommendation: “EVSE which transfers energy to the vehicle without a galvanic connection between the vehicle and EVSE.”

PAGE , LINE 41

EPA Content: Public access control (RFID card, authorization, etc.)

Discussion: It is unnecessary to include a modifier specifying ‘public.’ Deployments could be public, private, or quasi-public (e.g., workplaces), which would artificially limit applicability. Furthermore, it would be inappropriate to include ‘etc.’ in a specification. While RFID is a good example of one method of authentication, it is not the only one.

Recommendation: ~~Public a~~Access control (RFID card or other authentication means. ~~authorization, etc.~~).

PAGE , LINE 48-50

EPA Content: DC output configurations: “1) Cabinet/Dispenser Product Configuration: A DC-output EVSE that has its components in separate enclosures - one (or more) including power conversion equipment (i.e., cabinet) and one (or more) enclosure that connects to the vehicle and has the user interface (i.e., dispenser).”

Discussion: This definition does not cover all configuration iterations. Examples of configurations include, but are not limited to: systems might have multiple power cabinets with a single vehicle port; multiple ports could share the same user interface; one power cabinet could serve multiple vehicle ports; one port could be served by one or more power conversion cabinets; a single enclosure could have multiple vehicle ports housed within. Changing this definition would be simple and encompass any possible combination of the distribution of functions and ports. If accepted, this revised definition would require related changes to other clauses.

Recommendation: 1) ~~Cabinet/Dispenser~~ **Distributed** Product Configuration: A DC-output EVSE that has its **functional** components distributed between more than one separate enclosure. ~~in separate enclosures—one (or more) including power conversion equipment (i.e., cabinet) and one (or more) enclosure that connects to the vehicle and has the user interface (i.e., dispenser).~~

PAGE , LINE 51-52

EPA Content: a) Minimum Dispenser Configuration: The configuration of a DC-output EVSE in which the minimum recommended number of dispensers are connected to a single cabinet.”

Discussion: Dispenser is not a defined term and the specification should be written to accommodate different technology arrangements rather than being inspired by a particular architecture we have seen. We don’t really know what a system could look like.

Recommendation: a) Minimum ~~Dispenser~~ **Distributed** Configuration: The **minimum** configuration of a DC-output EVSE ~~in~~ which **results in a functional product.** **Note: depending on the product design this could be more than a single port.** ~~the minimum recommended number of dispensers are connected to a single cabinet.~~

PAGE , LINE 85-86

EPA Content: Power Management: Automatic control mechanism that achieves the lowest power consistent with a pre-determined level of functionality.

Discussion: The purpose of power management is to deliver the highest possible power within some constraints, not the lowest.

Recommendation: Power Management: Automatic control mechanism that achieves the ~~lowest~~ highest power consistent with a pre-determined level of functionality.

PAGE , LINE 95-96

EPA Content: Duty Cycle: The ratio or a given time interval of the uninterrupted duration at the high logic state to the total time.

Discussion: This definition is not used in the document other than a note to stakeholders. In EV charging, the concept of ‘duty cycle’ is less likely to be (i) an on-period and an off-period, with some percentage of on-time, and more likely to be (ii) a reduction in output power under certain unfavorable conditions including but not limited to high ambient temperature and low line voltage. Presumably, any charging station tested would be able to perform at 100% load for a long enough period of time to acquire efficiency measurements. A question might be raised as to whether the station’s efficiency is lowered during conditions unfavorable enough to result in reduce power output.

Recommendation: ~~Duty Cycle: The ratio or a given time interval of the uninterrupted duration at the high logic state 95 to the total time.~~

PAGE , LINE 107-109

EPA Content: High Resolution Display: A screen device that converts a video signal into a visual output and is capable of displaying a minimum of 480x234 native resolution and has a backlight (e.g., LCD panel, OLED panel).

Questions: Why does the definition reference ‘high resolution’? Is there a low-resolution display that should be handled separately? Is there any power allowance for a low-resolution display, like an LED bar that could display something very simple like ‘Available’ that could be seen from a distance?

PAGE , LINE 179

EPA Content: “iv. DC-output EVSE with output power less than or equal to 350 kW.”

Discussion: It is not clear why a limit of 350kW has been proposed. I think there may have been previous stakeholder discussion suggesting that 350 kW was the practical limit for non-actively cooled cables and that the spec would have to be modified in some way to cover higher power. However, doing the math clearly demonstrates that no special consideration is needed for actively cooled cables as the losses should amount to <1% efficiency loss.

Recommendation: iv. DC-output EVSE ~~with output power less than or equal to 350 kW.~~

PAGE , LINE 185

EPA Content: “i. DC-output EVSE with power greater than 350 kW.”

Discussion: See previous explanation.

Recommendation: ~~i. DC-output EVSE with power greater than 350 kW.~~

PAGE , LINE 209

EPA Content: 3.2.1 Each EVSE submitted for ENERGY STAR certification shall be Listed by a Nationally Recognized Testing Laboratory (NRTL) for safety.

Discussion: While I agree with the intent, the present wording suggests that the Energy Star testing may not be started until after the product has completed NRTL 3rd party listing. In some cases, it may be necessary to start the testing before completion of NRTL listing. In order to reasonably accommodate this type of scenario, the requirement should be rephrased to should indicate that NRTL 3rd party listing should be a requirement for receiving Energy Star Certification, not a condition for initiating the process.

Recommendation: 3.2.1 To be eligible to receive ~~Each EVSE submitted for~~ ENERGY STAR certification, EVSE shall be Listed by a Nationally Recognized Testing Laboratory (NRTL) for safety.

PAGE , LINES 299-302

EPA Request for Feedback Regarding: Log function for no vehicle mode allowance.

Discussion: It is necessary to clarify the request in order to provide substantive feedback. Specifically, can EPA provide a rationale statement to explain why the equation was chosen and what it was based on?

PAGE , LINE 303-307

EPA Request for Feedback Regarding: “No Vehicle Mode” Power

Discussion: In larger-power and relatively-large applications and equipment, it might make sense to put less emphasis on the power consumed by a high-resolution display as it becomes a smaller percentage of the total power required for “No Vehicle Mode.” As mentioned previously, there is also a critical need to consider other lighting (e.g., such as status displays, indicators, area lighting). Alternatives for addressing this include:

- Providing a power combined allowance for all lighting; and
- Break out the display while adding an additional and separate allowance for other lighting and low-resolution displays.

Recommendation: Consistent with the discussion above, alternative options could include:

- $P_{\text{lighting and display}} \rightarrow$ allowance provided up to X watts based on these considerations: a, b, c.
- $P_{\text{display}} \rightarrow$ Remains as proposed by EPA;
- $P_{\text{aux. lighting and displays}} \rightarrow$ New component for non-display lighting with separate allowance.

PAGE , LINE 349-379

EPA Content: Efficiency tested across 4 power levels, 25, 50, 75, and 100% and across 3 temperatures, 20, 68, and 104°F.

Discussion: This represents the need to reach equilibrium at twelve (12) different test conditions, which would be unnecessarily expensive and time consuming. It would be more efficient and effective to narrow to two (2) temperatures and two (2) power levels, which would result in four (4) test conditions?

Recommendation: Consider testing across 2 power levels, 20 and 80% and 2 temperatures, 25°C and max rated ambient.

LINES 393-396

EPA Content: Report the measured Idle Mode Power for DC-output EVSE per the ENERGY STAR DC-output EVSE Test Method.

Discussion: This state does not quite map to DC, although something similar (i.e., cable check) exists in limited circumstances. This state also does not map to the CHAdeMO protocol.

Recommendation: ~~Report the measured Idle Mode Power for DC-output EVSE per the ENERGY STAR DC-output EVSE Test Method.~~

LINES 403-409

EPA Request for Feedback Regarding: Demonstrating connected functionality via documentation vs. testing.

Discussion: As suggested by EPA, it would be costly and burdensome to establish additional testing requirements.

LINES 429-437

EPA Content: Subclauses to “3.10.1 – Grid Communication:

- i. Products that include a communication link that uses Open Charge Point Protocol (OCPP) also comply with this criterion.
Note: Effective November 24, 2015 OCPP is being developed by Open Charge Alliance as the Standard Development Organization with a goal of integrating OCPP with the International Electrotechnical Commission (IEC) framework. EPA is proposing to include OCPP since it is widely used and is in the process of being established as an open standard.
- ii. In the absence of OCPP, the EVSE shall meet the communication and equipment performance standards for SEP 2.0, CTA-2045A, and/or OpenADR 2.0.
- iii. It is mandatory to report whether the EVSE complies with ISO 15118.”

Discussion: ChargePoint has recommendations regarding subclause (iii), which relates to ISO-15118. ChargePoint is concerned that, as currently drafted, subclause (iii) is overly vague and unclear. There are a variety of features that can theoretically be enabled via ISO-15118: transmitting vehicle data; enabling “plug-and-charge” payments; and energy management. As currently drafted, subclause (iii) would fail to provide consumers with specific and relevant information.

The different features of ISO-15118 are being adopted at widely varying paces, which varies between and within vehicle class. Currently, the energy management features of ISO-15118 are not being implemented, nor is the “plug-and-charge” feature. Relatively few light-duty EV models are capable of using ISO-15118 to transmit vehicle data, and, on the heavier-duty side, most buses do not support ISO-15118.

Given the breadth of features within and lack of ubiquity in adoption of ISO-15118, we recommend clarifying that the report required under subclause (iii) specify whether the EVSE supports *energy management features* in ISO-15118-2 or later, SAE J1772, IEC 61851-1, or CHAdeMO 2.0.

We further recommend specifically referencing Revision 1 of ISO-15118, which should be noted as “ISO-15118-~~2~~.” Given that Revision 2 is currently working through the ISO process, we also suggest identifying “or later” to capture future revisions to the standard.

Recommendation: Strike the subclauses to “3.10.1 – Grid Communication:

“3.10.1 – Grid Communications: The product shall include a communication link that is capable of bi-directional data transfer between the EVSE and one or more external applications, devices or systems. This link shall use open standards, as defined in this specification, for all communication layers.

Note: The communication device(s), link(s) and/or processing that enables Open Standards-based communication between the EVSE and external application / device / system(s) either individually or together, could be within the EVSE, and/or an external communication module, a hub/gateway, or in the Internet/cloud.

- i. Products that include a communication link that uses Open Charge Point Protocol (OCPP) also comply with this criterion.

Note: Effective November 24, 2015 OCPP is being developed by Open Charge Alliance as the Standard Development Organization with a goal of integrating OCPP with the International Electrotechnical Commission (IEC) framework. EPA is proposing to include OCPP since it is widely used and is in the process of being established as an open standard.

- ii. In the absence of OCPP, the EVSE shall meet the communication and equipment performance standards for SEP 2.0, CTA-2045A, and/or OpenADR 2.0.
- iii. It is mandatory to report whether the EVSE ~~complies with~~ supports energy management features of at least one of the following station-to-vehicle protocols: ISO 15118-2 or later, SAE J1772, IEC 61851-1, or CHAdeMO 2.0.”

LINES 542-543

EPA Content: Products shall be tested for certification at the relevant input voltage/frequency combination for each market in which they will be sold and promoted as ENERGY STAR.

Discussion: It would be onerous to run the entire test program at 50 and 60 Hz across multiple voltages.

Recommendation: Products shall be tested for certification at the relevant input voltage/frequency combination for each market in which they will be sold and promoted as ENERGY STAR. **Exception: The equipment may be tested at the last favorable voltage/frequency combination if all program requirements can be met.**

LINE 576 – APPENDIX A

EPA Content: Footnote 11 in the Demand Response Message Mapping table refers solely to OCPP 2.0.

Discussion: It would be inappropriate to preferentially identify one sole version of OCPP.

Recommendation: We recommend that EPA identify “OCPP versions 1.6 or later,” which would be consistent with EPA’s own approach in the Table following Line 640.

LINES 648-649

EPA Content: Final sentence in description of OCPP 1.6, 2.0: “OCPP is often used for financial transactions involved in charging, and for that reason is already included in many chargers located in public spaces, and some in private homes as well.”

Discussion: This statement is subjective and fails to capture the range of protocols, and protocol extensions, that can, or are necessary to, carry out financial transactions.

Recommendation: ~~“OCPP is often used for financial transactions involved in charging, and for that reason is already included in many chargers located in public spaces, and some in private homes as well.”~~