Topic	Subtopic	Stakeholder Comment	EPA Response
General		A stakeholder supported the ENERGY STAR EVSE effort as it will facilitate energy efficiency and demand response efforts by utilities. Another stakeholder noted that EVSE are essentially an extension cord with optional safety functions and there is very little power used by these devices in comparison with the losses in power transfer from the premise wiring to the vehicle (especially for cord sets and basic wall mounted units). The vehicle energy loss is about 100 times the energy loss of EVSE.	EPA appreciates the support and feedback from stakeholders. The data presented in the ENERGY STAR Scoping Report published in 2013 (energystar.gov/scoping) demonstrates that the potential energy savings, especially from Level 2 EVSE, are significant. Based on this report and conversations with stakeholders, EPA considers that product differentiation based on energy efficiency is possible and an opportunity exists to encourage the market toward more efficient products.
Definitions	Level 1/Level 2	A stakeholder noted that residential and commercial EVSE vary in both function and energy demands. One difference is that commercial systems will have non-charging ancillary services such as lighting, displays, and communications for transactional purposes. These units should not be subject to any criteria that would reduce the utility of the EVSE, such as automatic brightness control (ABC) or auto-power down (APD), because of their commercial nature. Another stakeholder supported the EVSE and Level 1/2 definitions included in the Draft 2 Test Method.	EPA appreciates stakeholder input on functional differences between residential and commercial EVSE that will drive differing energy consumption. In the Draft 2 test method, EPA has proposed ABC and APD requirements that are sensitive to the needs of commercial EVSE. For the specification, EPA welcomes comments on the amount of power required for additional features and services such as lighting and communications. In response to feedback, EPA proposes retaining the Level 1 and Level 2 EVSE definitions developed in the Draft 2 test method and transferred into the Draft 1 specification.
Definitions	Operating States	Two stakeholders requested changes to the operating states definitions: 1. Definitions for "A", "B", and "C" should be added and align with SAE J1772. 2. Harmonize any applicable definitions to the SAE J2894/2 standard as it is intended to address EVSE operating states. 3. Define "L1", L2", and Duty Cycle.	EPA has aligned the definitions for States A, B1, B2, and C with the SAE J1772 standard. EPA has also clarified L1 and L2 and defined Duty Cycle. Also, EPA has provided footnotes referring to definitions in industry standards where appropriate. EPA notes that any definition of a mode will be incomplete and that the mode will be fully specified only through the test setup and test conduct instructions in the body of the test method. Since these specific instructions will be different than those in other industry standards, EPA considers it less confusing to use the more general function categories rather than existing definitions.

Topic	Subtopic	Stakeholder Comment	EPA Response
Definitions	Modes	A stakeholder suggested refining the definitions of Partial On mode and Idle Mode as they appear to overlap - EPA should clarify whether the ability to promptly provide a primary function is the same as a Wake-up function. They also noted that the definitions of secondary and tertiary function appear to overlap as they both include examples of lighting. They recommended consolidating the list of functions with the operating mode definitions to provide further clarity. Another stakeholder noted that a primary purpose of the EVSE is to address risks of electric shock and fire so these requirements should be considered under primary functions. They also noted that the following functions are safety related so it may be redundant to have safety functions listed separately: • Communicating with the vehicle • Control Pilot Signal	EPA has amended the definitions for Idle Mode and Partial On Mode to remove the overlap between the two definitions and also to harmonize with SAE J1772. EPA considers the wake-up functions as secondary functions. Promptly providing a primary function refers to transitory states where, for example, the product is already drawing higher power and is awaiting input (e.g., interface is in SAE J1772 state B2), rather than needing to first wake up. Finally, EPA acknowledges that some safety functions may only be present when the EVSE is operating (primary), while others are always operating (tertiary), and has removed safety functions from the functions list. Instead, EPA has added a mandatory requirement for certification to UL 2594 to address safety concerns.
Scope		A stakeholder requested clarification on why DC EVSE, Wireless/Inductive EVSE, and power electronic components inside the vehicle are not included in the scope as they represent the largest waste of energy. In contrast, another stakeholder supported the Test Boundaries presented as limited to the EVSE itself.	EPA already maintains a fuel efficiency vehicle labelling program, which includes labeling electric vehicles and calculating battery charging efficiency. EPA's fuel efficiency label for electric vehicles already accounts for the energy efficiency of on-board charger inside the vehicle. In contrast, at this time the ENERGY STAR program is addressing the off-board EVSE in the Version 1.0 specification to differentiate the energy efficiency of standalone EVSE. With a significantly greater installed base, national savings from AC EVSE are expected to be significantly higher than from DC EVSE. EPA will continue to monitor the market and will consider DC fast and slow chargers for inclusion in future versions of the EVSE specification.

Topic	Subtopic	Stakeholder Comment	EPA Response
Scope	Cords	A stakeholder requested that the test method or specification exclude the output cable because the losses in the wiring are much greater than those in the EVSE itself. For this reason, the stakeholder also recommended excluding Level 1 EVSE, where the cable resistance is an even greater contributor to energy consumption.	EPA is proposing to separate fixed losses from conductive losses to account for the difference in impact between losses in the output cable and the EVSE circuitry. Using only terminal (input/output) voltage and current measurements, one can separate conduction losses from fixed losses while the EVSE is delivering full rated output. Nonetheless, with Draft 1, EPA is not proposing requirements for Operation Mode due to the relatively longer paybacks for efficiency improvements in this mode, which result primarily from using thicker output cables. Although EPA found that conductor size can achieve savings of approximately 10 kWh/yr for a 30 A EVSE, these savings would not be cost effective for the average user. In particular, the low utilization of EVSE and high cost of EVSE-rated cable likely extends the payback beyond the expected lifetime of the EVSE. The energy saving benefits of the non-operational mode requirements that are in Draft 1 will apply to both Level 1 and Level 2 EVSE.
Test Setup	Instrumentation	A stakeholder noted that all high current loads tested will primarily show cord loss only within the resolution of loads above 100W being +/- 1W as the EVSE circuitry will typically be less than 0.5% of total load. The 1.0W minimum resolutions is not accurate enough to reliably test losses as they are typically under 10W.	The accuracy of the power measurement has been significantly improved in the Draft 3 Test Method. The new procedure measures power indirectly by multiplying differential current by input voltage and differential voltage by input and output current, thereby eliminating instances when meter inaccuracies are multiplied by both a large current and large voltage. EPA believes that this revised approach will result in acceptable accuracy. EPA also wants to clarify that the test method specifies a minimum resolution of 0.01W for measurement values less than 10 W, 0.1W for measurements between 10 and 100W, and 1.0W for measurement values greater than 100W.
Test Setup	Input Supply Requirements	One stakeholder commented that since cable power loss is 10 times the EVSE losses, a 4% error in voltage may result in a variance greater than the EVSE power loss.	As mentioned above, EPA is proposing to separate fixed losses from conductive losses.
Test Setup	Cords	A stakeholder recommended EVSE to be tested with the cord shipped with the EVSE. If multiple options are available, then the cord with the highest losses (calculated based on 2014 NEC Chapter 9) should be considered.	EPA agrees that EVSE should be tested with the cord shipped with the model. For EVSE with multiple charge cable options, EPA intends to permit an approach that includes evaluation of construction and wire gauge, such that testing of only the longest available cable is appropriate, as long as the wire is same gauge. However, these issues would only affect power measurements in Operation Mode, with load, and EPA is still considering whether to propose Operation Mode requirements.

Topic	Subtopic	Stakeholder Comment	EPA Response
Specification	Cords	A stakeholder requested that EPA set a benchmark for minimum length of cord to the vehicle, as well as input power supply cord, to prevent unrealistic cord lengths being used.	At this point, EPA is not proposing requirements for Operation Mode due to the long paybacks of efficiency improvements (primarily thicker output cables) in this mode. Although EPA found that some savings (on the order of 10 kWh/yr for a 30 A EVSE) can be achieved by increasing conductor size, these savings would not be cost effective for the average user. In particular, the low utilization of EVSE and high cost of EVSE-rated cable extended the payback beyond the expected lifetime of the EVSE. EPA used the following assumptions when calculating the payback and welcomes stakeholder input on the validity of these assumptions: • Utilization: 8% of time in Operation Mode for residential, 6% for private nonresidential, and 3% for publicly accessible (EV Project Electric Vehicle Charging Infrastructure Summary Report, July 2014) • Wholesale EVSE cable cost: $2/foot for 10 AWG and $3/foot for 8 AWG (EVSE manufacturer source, 2016) • Combined manufacturer and retailer markup: 3x In addition to comments, EPA invites stakeholders to share additional Operation Mode data for EVSE to further inform the energy savings potential. For stakeholders performing Operation Mode testing, EPA wishes to note the new differential measurements in the Draft 3 test method. These revised measurement instructions should address measurement uncertainty issues and ensure that any data shared with EPA can be reliably used to calculate the Operation Mode savings potential.
Test Setup	Power Factor	A stakeholder recommended that EPA reconsider collecting power factor as lower power factors have the potential to create added stress on the electric power generation, transmission, and distribution systems.	Although EPA does not expect power factor to be a significant issue, its measurement is likewise not overly burdensome as power meters typically measure it during power measurement. Therefore, EPA is proposing to include power factor measurement if it is of value to stakeholders and requests feedback.

Topic	Subtopic	Stakeholder Comment	EPA Response
Test Conduct	Room Illuminance Conditions for Automatic Brightness Control (ABC) Testing	A stakeholder recommended that EPA require testing at 65% of maximum screen luminance for products with adjustable brightness settings as well as recording the maximum, minimum, and test values for luminance to ensure it is representative. In those regards, EPA should also reconsider the 300 lux setting as EVSE in parking structures will experience lower levels of lighting and those outdoors will experience much higher. To account for this, they suggested developing an outdoor daytime test procedure in a future version of the test method.	EPA chose 300 lux consistent with the level set in the ENERGY STAR Displays specification. A measurement of 300 lux represents the highest level of achievable brightness with the particular light source selected. If stakeholders have any data on more appropriate lighting conditions for EVSE, EPA welcomes this additional feedback and data. EPA will lower the dark illuminance condition to 10 ± 1.0 lux to align with a study on Lighting for Parking Facilities that was done by the Illuminating Engineering Society that recommends 10 lux for concrete parking facilities during normal operating hours. EPA believes that testing at 65% of maximum brightness for products with ABC enabled may cause too much testing burden by requiring measurements of display brightness (luminance) in addition to ambient illuminance as well as a specific test pattern fed into the EVSE display. EPA continues to believe that installers are most likely to keep manufacturers' default settings, and is therefore proposing to keep the EVSE in those settings for test.
Test Procedures	Automatic Power Down (APD)	A stakeholder supported the addition of the APD test and encouraged EPA to add a use case for an EVSE that is not connected to a vehicle, since the response may differ.	EPA agrees with this stakeholder comment and has added an APD test to measure power when the vehicle is connected to the EVSE (States B1 and C), as well as when the vehicle is not connected to the EVSE (State A).
Test Procedures	Network Connectivity - Partial On Model and Idle Mode Testing	A stakeholder noted that the Partial On Mode and Idle Mode tests do not address network connectivity and they recommended that EPA develop a protocol that will address bi-directional communication. In addition, they suggested that EPA collect data to determine variability in energy consumption between maximum data transfer rates, authentication, and routine maintenance activities. In addition, they noted that user interfaces generate revenue by displaying advertising and should be available to interact with the user and communicate with the network. Another stakeholder stated that when EVSE is not in charging mode there is basic functionality that is addressing safety risks, including assurance that the cord is de-energized, verification of the bonded grounding paths, and self-test functions that the cord is performing properly. Safety features must be continuously operational to meet some industry standards.	EPA will continue to propose the Partial On Mode and Idle tests as written. EPA understands that more power will be consumed when actively communicating but does not expect that such communication to be taking place the majority of the time. In addition, an active networking test method will add complexity. The issue of complexity for testing active networking extends to other consumer electronics and IT products under the ENERGY STAR scope and these products also do not have this test. EPA will recognize important functions such as safety controls and availability of a user interface in the specification when setting efficiency criteria.

Topic	Subtopic	Stakeholder Comment	EPA Response
Test Procedures	Loading Conditions - Operation Mode Testing	A stakeholder noted that the nameplate maximum continuous current rating should be used instead of the pilot signal as the former will be more consistent unit-to-unit, and since the current will affect the losses, will result in more repeatable results.	Based on testing data, EPA determined that there is a lack of difference in energy losses between the nameplate and pilot (less than 0.5% on average). Thus, EPA continues to propose that the control pilot duty cycle be used to calculate the available current. In addition, reading the control pilot is more representative of real-world conditions.
Test Procedures	Warm-Up Test	A stakeholder requested clarification on the purpose of the warm-up period used in the test procedure.	EPA will shorten the length of the warm-up period to 5 minutes to reduce testing time but will still require that the unit be kept at ambient temperature for 30 minutes prior to testing. Doing so will prevent any changes in resistance due to temperature.
Connected Functionality (CF)	General	EPA received widely varying comments in response to considered Connected Functionality (CF) criteria, including: • The EVSE industry is in the very early R&D stage of development and standardization of grid connected functionality and associated communication protocols. • EVSE with CF should include AutoDR capabilities per California Title 24 Building Energy Efficiency Standards and the International Green Conservation Code (IgCC). • EVSE with CF should include responses to both price and direct load control signals. • Open Charge Point Protocol (OCPP) is another industry communication standard, in addition to OpenADR 2.0 and Smart Energy Profile 2.0. • Testing and certification of EVSE smart grid capabilities is of high importance. • Some DR programs place limits on consumers' ability to override DR. • EVSE can be owned by individuals or workplaces, or provide public charging services. EVSE owners and EV owner/lessee can be different. • While there are metering use cases in EVSE, there are also significant use cases where EVSE with CF does not need to include metering.	In response to the widely varying responses and in recognition of varied approaches to DR by utilities, EVSE manufacturers, DR aggregators and other third parties, EPA is considering a high-level, optional Connected Functionality (CF) designation based on: 1. Open standards for grid communications 2. Open access via an Application Protocol Interface (API) or similar documentation 3. Consumer override-ability 4. Submission of a summary description of Demand Response capabilities (<250 words) that will be available for each EVSE with CF on the EVSE Qualified Product List. EPA will recommend inclusion of key elements in this description including: a. Specific DR capabilities b. Open standards used c. Applicable certifications d. Metering capability, if implemented While EPA recommends that EVSE use open standards directly, EPA intends to allow certification of EVSE that enable open standards connectivity only through off-premises or cloud services. In regards to consumer override; while EPA recognizes that some DR programs include non-override-able events, EPA believes it important for consumers to retain the ability to override their EVSE's response to any signal; for example, in the instance that a DR response would impact their ability to use the EV as planned.

Topic	Subtopic	Stakeholder Comment	EPA Response
Connected Functionality (CF)	Scope	Two stakeholder noted that CF should not be required for all EVSE, including the following rationale: • A segment of commercial EVSE will be in an application where the owner will not be in a position to modify or stop charging of a vehicle (e.g., a retail store that offers free charging to customers). These units should still be able to be included in the ENERGY STAR program for meeting other energy efficiency criteria. • EVSE purchasers may prefer to install EVSE that is not DR capable to reduce upfront cost.	CF will not be required for EVSE to earn the ENERGY STAR. CF for EVSE will be included as on optional set of criteria that will further differentiate EVSE that include such capabilities.
Connected Functionality (CF)	Efficiency Criteria	Two stakeholders commented that: • Grid connected EVSE must maintain active communications at all times and should be tested with communications enabled. • A higher standby power limit should apply to EVSE with connected functionality and suggested 20 W standby for EVSE with CF, compared to 10 W for EVSE without CF).	After careful consideration, EPA recognizes that: 1. EVSE with CF must be tested with communications enabled to ensure that standby power consumption with active communication is representative of industry best practices in regards to energy efficiency. 2. The standby power consumption limit for EVSE with CF may be higher to enable persistent connectivity.
Connected Functionality (CF)	Certification	A stakeholder noted that they are not aware of any certification programs for EVSE connected functionality.	EPA appreciates this stakeholder feedback.
Data Assembly		A stakeholder requested the following changes to the Data Assembly Form: • Clarify operating modes under which testing occurs • Add data field for type and length of wire gauge of EVSE cord to vehicle • List illumination conditions during EVSE testing • List minimum and maximum luminance of EVSEs with Automatic Brightness Control (ABC) • List energy use for various types of network activity • Add data fields under Demand Response capabilities such as ability to operate using open standard	EPA appreciates this stakeholder feedback and will incorporate it in future data reporting requirements.

Topic	Subtopic	Stakeholder Comment	EPA Response
Specification Levels		A stakeholder suggested that EPA ensure there is a significant choice of models and manufacturers in each category of EVSE in order to avoid disproportionately limiting product choice.	ENERGY STAR's guiding principles include the provision that "energy-efficiency can be achieved through one or more technologies such that qualifying products are broadly available and offered by more than one manufacturer." As such, a good selection of EVSE models from a number of manufacturers are able to meet the criteria proposed in the Draft 1 specification for EVSE. Based on the data received from stakeholders, approximately 25% of those models will meet the criteria. Several different manufacturers are represented in these models that meet the criteria. This is consistent with the approach taken by EPA in the majority of product specifications.