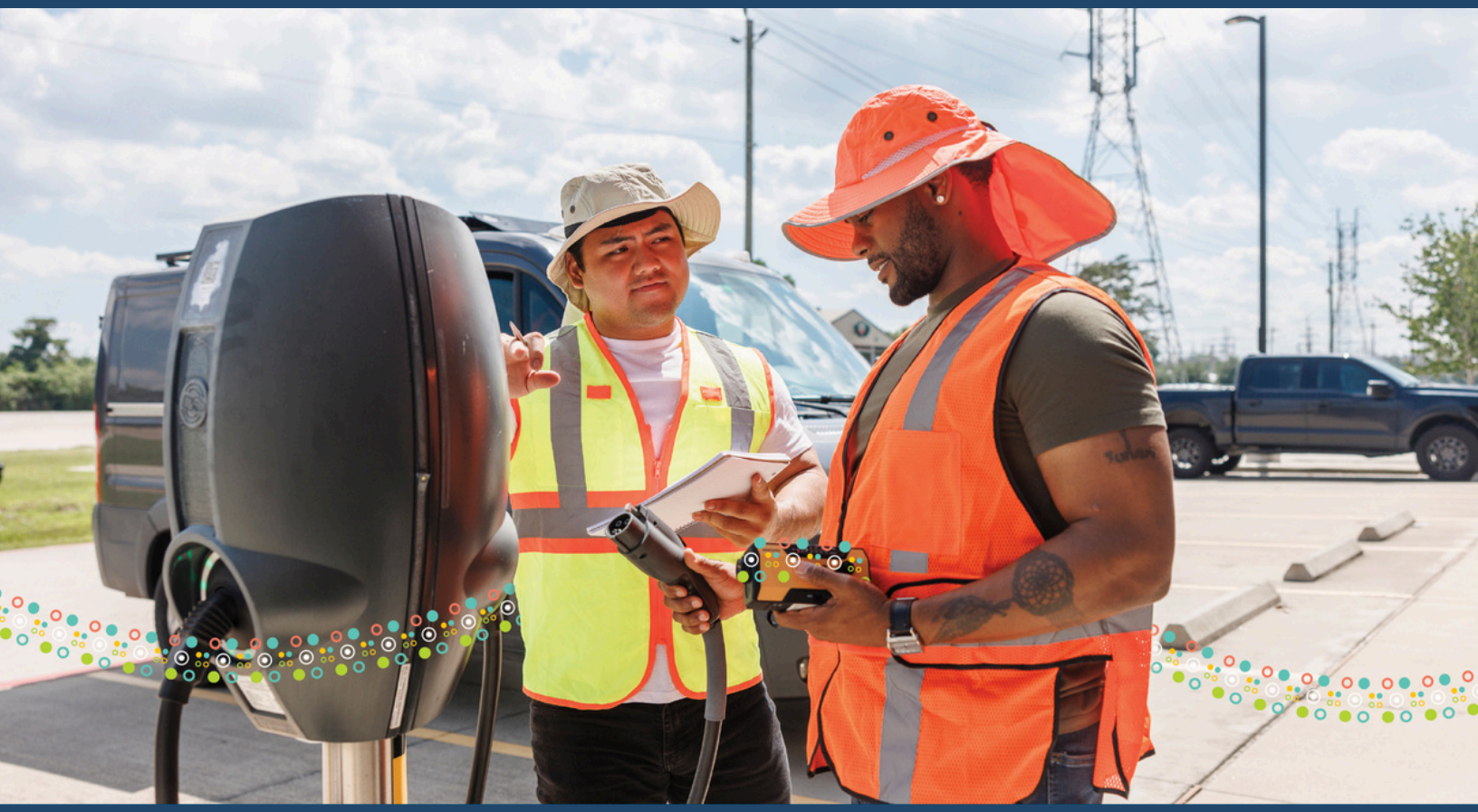
EVCAN

Charge Station Management Systems Technical Specification



V1.0

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Introduction

As the demand for scaled EV charging installations increase, there is a need for smart, efficient, and scalable charging systems that enhance reliability; orchestrate with other building loads, distributed energy resources (DERs), and grid needs, and overcome barriers at capacity-constrained locations. This need can be met by an effective Charge Station Management System (CSMS), which is a software system capable of "controlling the amount of power exchanged between chargers and electric vehicles to meet customer's charging needs while also responding to external power demand, pricing or other signals to provide load management, resilience, or other benefits to the customer and electric grid." (Black et al 2024). The CSMS manages electric vehicle (EV) charging stations, enabling safe, secure, and streamlined delivery of charging services. It provides multiple functions that support the Charge Point Operator (CPO) role and, in some cases, features to support an e-Mobility Service Provider (eMSP).

The Charge Station Management System Technical Specification Version 1.0 is designed to promote interoperability, enhance cybersecurity, enhance safety and reliability, and encourage consistent adoption of key standards. Version 1.0 lays the groundwork for accepted charge station management system interoperability and cybersecurity standards while providing comprehensive guidance on the expected capabilities for monitoring, control, safety and reliability, energy management, data and reporting, and product documentation. Version 1.0 focuses on site-independent technical capabilities and aims to be agnostic of the selected technical architecture used to deliver the defined capabilities.

The technical specification was developed through collaboration with industry experts and stakeholder advocates; research into existing standards, guides, and regulations on the electric vehicle charging infrastructure; and research into energy management systems (EMS) and their respective requirements on a CSMS (direct and indirect).

The technical specification establishes eligibility for EV Charge Station Management Systems to be listed on the EVCAN qualified product list (QPL) based on capabilities and technical criteria. The EVCAN QPL will be an accessible resource for utility program managers, municipalities, government agencies, and advocacy groups seeking objective information about charge station management system performance. A qualified CSMS that is listed on the QPL provides transparency in the CSMS's ability to integrate with multiple electric vehicle supply equipment (EVSE) brands and energy management systems (EMS) for private and/or public use cases. Private use cases include single or multiple family residential charging, and commercial charging. Public use cases include the management

of public charging infrastructure (e.g., charging stations located in parking lots, shopping centers, dedicated charging stations, etc.). More information on the application process, timelines, and technical assistance will be shared on the EVCAN website in Q3 2025.

Goals for Version 1.0

- Validate end-to-end integration and interoperability of Charge Station Management Systems to enable scaled deployment and avoid premature obsolescence.
- Enable reliable and efficient charge and energy management functions to support a variety of use cases.
- Accelerate deployment of safe, reliable, accessible, and connected EV charging systems.
- Drive the adoption of industry-leading standards.

Requirements Not Addressed in This Document

EVCAN recognizes existing cross-industry initiatives and efforts to establish comprehensive technical criteria for individual hardware equipment and software. This document does not address requirements for the functions below. The first two apply to requirements on an EVSE, which is outside of the scope of this specification. The third applies to public charging payment services, which is excluded to keep the specification use case agnostic.

1. EVSE electrical/connector standards including, but not limited to, UL safety standards, EV to EVSE connection, power quality, SAE standards, energy metering, RF emissions.
2. EVSE physical standards including, but not limited to, temperature rating and outdoor suitability, cabling, warranty terms, ADA compliance, and installation support.
3. Some aspects of public charging communications including payment options and pricing communication.

For a list of specific industry standards not covered in this Specification that are covered in other public resources, refer to Appendix A.

Manufacturer and Network Provider Guidance

Original equipment manufacturers, software providers, and private label manufacturers will have an opportunity to apply for qualification under the requirements established in this Specification. Refer to the EVCAN website for details and helpful resources to prepare and complete the application process. Getting your system qualified will provide clarity on

performance characteristics and suitability for an operator's charge management needs; and will streamline the operator's ability to participate and receive benefits from local utility managed charging programs.

Acronyms and Definitions

This section defines the terminology and abbreviations used throughout this document. The terminology and abbreviations have been derived from accepted industry nomenclature and established standards for charge station management systems.

The relationships between the typical entities in the EV infrastructure can be seen in Figure 1. As noted in the definitions, the relationship between the CPO and eMSP may vary by application. Sometimes these two entities are distinct, sometimes they overlap partially, and sometimes both functions are provided by a single entity.

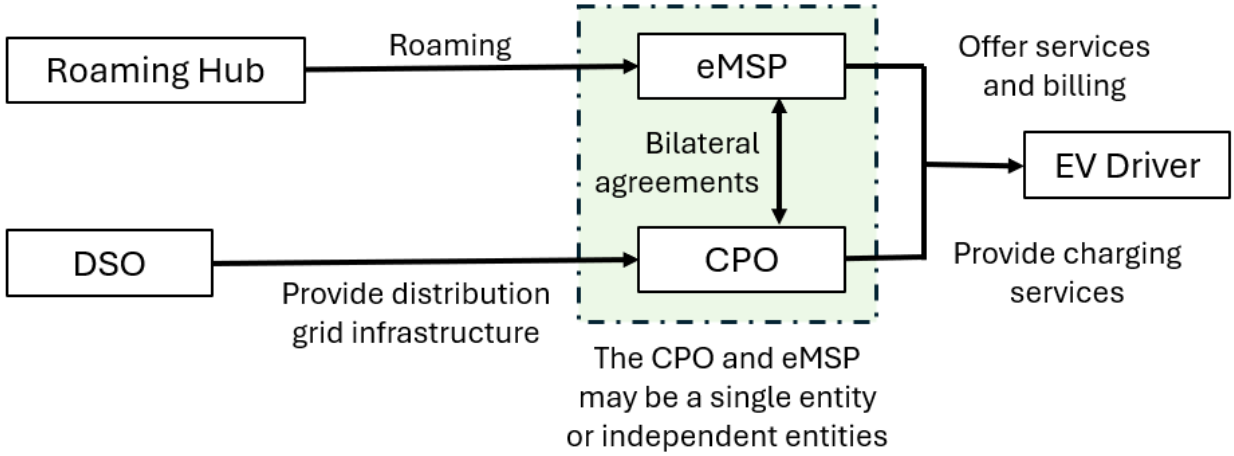

Figure 1. Main Entities in Electric Vehicle Charging Infrastructure

The definitions of connector, EVSE, and charging station that are found in Table 1 below and are used in this document, are consistent with OCPP, OCPI, and IEEE 2030.13. For clarity, Figure 2 illustrates each of these terms and their relationship with each other.

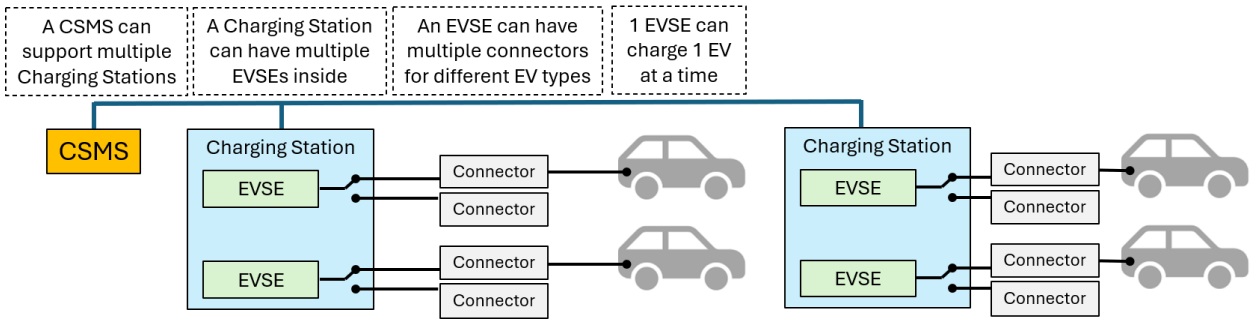

Figure 2. Terminology Classification at an EV Charging Site (adapted from OCPP 2.0.1)

Table 1. Terminology Definitions and Acronyms. ***Definitions adapted from sources as noted below.***

Term	Definition
Charge Point Operator (CPO)[a]	The person or organization that manages, maintains, and operates the EVSE, which includes maintenance and coordination with the distribution system operator (DSO) and EV fleet operator to meet the charging needs of the EVs while optionally participating in DSO programs. The Charge Point Operator may be a homeowner with a single EV. The CPO and eMSP roles can often be served by the same entity, and there may be some overlap in some applications. Also known as Charging Station Operator (CSO), Charge Network Operator (CNO) or Electric Vehicle Service Provider (EVSP).
Charge Station Management System (CSMS)[b]	A system that manages and controls one or more EVSEs, enabling real time monitoring, remote configuration, and energy management. It can have the ability to control the amount of power exchanged between EVSE and an EV, to optimize grid interaction through load management and integration with local energy resources, to support efficient and reliable charging operations. Also known as Charge Management System (CMS), Electric Vehicle Energy Management System (EVEMS), and Charge Point Management System (CPMS).
Charging Station[c]	A Charging Station is a physical object where an EV can be charged. It includes one or more EVSEs with the infrastructure managing the interaction between the user and the charging process for one or more EVs. Also known as Electric Vehicle Charging Station / Charging Pole / Charging Dock
Connector[c]	A connector is the physical interface between the EVSE and the EV through which the electric energy is delivered. This may consist of a plug, an induction plate or a pantograph.
Distribution System Operator (DSO)[c]	"The organization that designs, operates and maintains the public distribution medium and low voltage grid through which charging spots are supplied."
Electric Vehicle Supply Equipment (EVSE)[c]	An EVSE is the part of the charging station that delivers electrical energy to an EV. An EVSE may have one or more connectors to accommodate different vehicles but can only be used to charge one vehicle at a time. Also known as Charging Point / Charging Position

Term	Definition
Energy Management System (EMS)[d]	An EMS controls, monitors, and optimizes energy usage of various sources and loads. This system is responsible for grid interaction, including meeting grid interconnection requirements and provisioning grid and ancillary services. A CSMS performs the same function as an EMS specifically for EV load and may include a subset of these features. There may be some overlap between the role of a CSMS and EMS, depending on the application. In some cases, the CSMS and EMS may be combined in a single system, in which case the CSMS could provide all of the features of an EMS as well as the ability to dispatch EV load and generation. If a separate EMS exists, the EMS will focus on dispatching loads and DER in general while the CSMS focuses specifically on management of EV loads and generation.
e-Mobility Service Provider (eMSP)[c]	"The entity with which the EV driver has a contract for all services related to the EV operation. Typically, the eMobility operator will include some of the other actors, like an energy provider or a CPO, and has a close relationship with the Distribution System Operator (DSO) and meter operator. A car manufacturer or utility could also fulfil such a role. The eMobility operator authenticates contract IDs from its customers received either from the eMobility operator clearing house, CPO or other eMobility operators it is in relation with." The CPO and eMSP roles can often be served by the same entity and there may be some overlap in some applications. An eMSP enables EV drivers to access multiple charging networks easily, without the need for separate network subscriptions. Also known as Charge Network Operator (CNO), Mobility Service Provider (MSP), Electric Vehicle Service Provider (EVSP)
Roaming[c]	"EV roaming enables EV drivers to charge at each charging station and manages the billing of the charge action towards the driver." This enables a shared use of EV infrastructure.
Roaming Hub[c]	"A central organization that facilitates information exchange between multiple market players. Roaming platforms connect different market players to create a digital and cross-border charging network for electric vehicles"
Fail-Safe Mode[e]	"A state where any or all the following conditions apply: a) actual load does not exceed the ampere rating of the circuit; and/or b) at the EVSE level, or another level, a pre-configured (default) state that prevents the actual load exceeding the ampere rating of the circuit."

[a] Based on the definition of a Charging Station Operator in SEPA's Interoperability Profile for Electric Vehicle Fleet Managed Charging)

[b] Adapted from the definition of "smart charge management" in LBNL's Survey and Gap Prioritization of U.S. Electric Vehicle Charge Management Deployments, and "Charge Station Management system" in IEEE 2030.13, "Guide for Electric Transportation Fast Charging Station Management System Functional Specification")

[c] Adapted from the Netherlands Enterprise Agency's January 2019 Electric vehicle charging definitions and explanation document, OCPP 2.01, and OCPI.

[d] Adapted from IEEE 2030.13, Guide for Electric Transportation Fast Charging Station Management System Functional Specification.

[e] Adapted from CSA SPE 343, Electric vehicle energy management systems.

Table 2. Additional Acronyms

Acronyms	Definition
ANSI	American National Standards Institute
BMS	Building management system[1]
BTL	BACnet Testing Laboratories
CSA	Canadian Standard Association
CSIP	Common Smart Inverter Profile
CT	Current transformer
DERMS	Distributed energy resource management system
DER	Distributed energy resource
DRMS	Demand response management system
DSO	Distribution system operator
EV	Electric Vehicle
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISA	International Society of Automation
ISO	International Organization for Standardization
MGC	Microgrid controller
NEVI Formula Program	National Electric Vehicle Infrastructure Formula Program
OCA	Open Charge Alliance
OCPI	Open Charge Point Interface
OCPP	Open Charge Point Protocol
OEM	Original Equipment Manufacturer
PCI DSS	Payment Card Industry Data Security Standard
POI	Point of interconnection
QPL	Qualified Product List
SoC	State of Charge
SOC 2	Service Organization Control Type 2
UL	Underwriters Laboratories

[1] In the context of EV charging stations, "BMS" may refer to "Building Management System" or to "Battery Management System". As used in this document, it refers to Building Management System.

Scope of Technical Specification

This technical specification-covers the core functionality of Charge Station Management Systems (CSMS) utilized across private and public use cases focusing on safety, reliability, interoperability, grid integration, cybersecurity, and data reporting. Private use cases include single or multiple family residential charging, and commercial charging. Public use cases include the management of public charging infrastructure (e.g., charging stations located in parking lots, shopping centers, dedicated charging stations etc.).

There are various implementation techniques and control approaches that a CSMS can use. For example, CSA SPE 343 lists four control approaches within which CSMSs typically reside:

1. Cloud-based: The control logic, resources, services and applications are hosted, managed, and delivered over the Internet by remote servers rather than on local, physical hardware. Servers can be self-hosted (infrastructure owned by the system provider) but are typically hosted by third-party providers (e.g., AWS, Azure, etc.).
2. Local Server/Controller: The control logic runs on a dedicated or local area network (either online or offline), managing the electric vehicle supply equipment (EVSE) and monitoring devices.
3. EVSE-based: Control logic is embedded in the EVSE using a primary-secondary or client/server setup with smart, networked chargers. The EVSE-based control approach can comprise multiple EVSEs acting as one or multiple EVSEs communicating with a primary EVSE.
4. Hybrid Systems: Some EVSEs function as multi-port units or use a local controller/server to meet response time needs while also interacting with cloud servers for configuration, demand response, and software updates.

This specification focuses on site-independent requirements and aims to be agnostic of the selected architecture.

To ensure CSMSs are interoperable with different charger types, systems must use secure, non-proprietary communication protocols. Consequently, some EVSEs with embedded CSMS functionality that use proprietary communication protocols may not meet the requirements established for interoperability within the EVCAN technical requirements. For more details on the accepted communication protocols, refer to the Communication Interfaces section below.

Furthermore, the focus is solely on the CSMS and will not include any requirements or evaluation of hardware standards for the EVSE's physical and electrical features to supply power to the onboard battery in the vehicle.

Definition of Required Versus Reported System Capabilities

The technical requirements are based on **required** and **reported** system capabilities.

Required System Capabilities: Systems must be capable of the listed required capabilities to be eligible for QPL listing. Systems without these capabilities are ineligible for the QPL. Eligible systems must provide information on the required capabilities and characteristics. Key information provided by the system provider will be published on the QPL.

Reported System Capabilities: EVCAN reports on the presence or absence, type, and/or characteristics of each reported capability for a qualified system. While CSMSs are not required to include these capabilities to be listed on the QPL, an eligible system must provide information on the presence or absence of these capabilities and their characteristics. Key information provided by the system provider will be published on the QPL.

Reported capabilities are used to report on features that may not be applicable to every application of a CSMS (e.g., capabilities only used in commercial applications), or ones that may not be standardized across CSMS implementations, or where requirements are not yet mature enough to develop detailed specifications as required capabilities. For example, while integration to a Building Management System through the BACnet protocol might be important in some applications, it is not a universal requirement and is classified as a reported capability.

Structure of Capabilities

Each reported or required capability is based on a **clause** and a **method of evaluation**.

Clause: A clause defines each capability and provides information on what functionality or certification is needed to adhere to the capability.

Method of Evaluation: The method of evaluation defines how the EVCAN team will evaluate a clause. Common examples include the following:

1. Certification: Some capabilities are evaluated based on certification completed by a recognized third-party laboratory and provided by the system provider at the time of evaluation. Capabilities that include this method have information on the proof of compliance needed in separate tables.
    - For example, for OCPP certification, a qualified CSMS provider must obtain a verified OCPP certificate from the OCA.

2. Customer Available Information: Some capabilities are evaluated based on publicly available customer literature submitted by the system provider. “Customer available” means the documentation is for a finished product available publicly on a website, and/or included with the product packaging; and/or mentioned on a website as available, and provided to the customer upon request. It cannot be a document produced for the sole purpose of EVCAN’s evaluation without further use or availability for customers. EVCAN reserves the right to accept, reject, or require changes to documentation to satisfy this requirement.
    - For example, Demand Response Capabilities are evaluated based upon customer available information that are provided by the system provider that specifies that the system has the capability, with instructions, for how to configure and use this feature.
3. CSMS Output Data Examples: Some capabilities are evaluated based on data examples with appropriate data headings provided by the system provider. The application form may specify in more detail the exact requirements and accepted data format.
    - For example, the capability to report specific uptime data collection metric(s) and data types via CSV file is evaluated based on examples of data provided by a system provider.

The technical requirements specifically note the metrics, fields, certifications, or otherwise that will be published and publicly available after qualification.

Requirements Other Than Capabilities

In addition to the capabilities listed in this document, Table 3 describes requirements for all EVCAN-qualified CSMSs beyond the capabilities listed in Tables 4–13.

Table 3. Additional Requirements Other Than Capabilities

Requirement	Definition
Product Information	General system information including manufacturer's name, product name, and type(s) of charging supported.
Warranty or Service Contract	EVCAN requires a minimum warranty, or available maintenance and support contract, of three years for all components (networking hardware, software and cloud services) of the system addressed by the requirements.
Commercial Availability and Verification	Before they can be listed, all CSMS must be commercially available in the U.S. and/or Canada, must be able to be purchased, and must have complete, final documentation and literature readily available on the system provider's website or available to the customer upon request, as described above in the "Customer Available Information" subsection of the "Structure of Capabilities" section. EVCAN requires that a qualified system has been installed and operated successfully in at least one field installation at a third-party site (not occupied by the system provider or an agent of the system provider).
Case Study, Customer Interview	EVCAN requires either a published case study or a customer reference for a field site where the CSMS system has been installed, which EVCAN may contact. This will verify that the system has been implemented before and that the system provider has experience providing and implementing systems that support the required capabilities. The site may not be an office of the system provider or a business partner directly connected to the system provider, such as an investor or equipment sales representative. EVCAN wishes to confirm with an unbiased third party that the system has been installed and operated successfully in at least one actual field installation. The facility may be of any size where all the EVCAN required capabilities are functional. Multiple sites may be used. For instance, EMS communication may be implemented at one site and DERMS communication at another. This contact information will not be shared with any other parties.

Standard Technical Requirements

1.0 Communication Interfaces

For EVCAN qualification, a CSMS must control, monitor, and communicate with external systems. The communication of systems or system components and the ability to act upon the communicated information without requiring significant customization or manual intervention is referred to as interoperability. In this context, interoperability means the ability for different hardware and software to safely and reliably work together in end-to-end load management across different utilities, aggregators, vehicle types, and chargers[2] (Black et al., 2024).

This focus area ensures that a qualified CSMS communicates through interoperable industry-standard interfaces. Adhering to established standards supports communications between different systems, devices, and networks that are part of the EV charging ecosystem, such as EVSEs, payment systems, EMSs, DERMS, demand response management systems (DRMS), electric utility grid management systems, and back-end services. This area aims to promote compatibility, flexibility, and scalability while enabling operators to manage a diverse network of chargers efficiently and facilitating the integration of new technologies as they emerge.

Table 4 highlights the required and reported capabilities for the Communication Interfaces focus area. Further information regarding the needed proof of compliance with the recognized communication standards are in Table 5.

Multiple qualification pathways are available for certain required capabilities. For example, in Table 4, a CSMS can qualify either through OCPP v1.6 or v2.0.1 certification.

[2] Adapted from the definition for "interoperable" in Doug Black et al., *Survey and Gap Prioritization of U.S. Electric Vehicle Charge Management Deployments*, LBNL-2001589 (June 2024), https://transportation.lbl.gov/publications/survey-and-gap-prioritization-us.

Table 4. Capabilities for the Interface Focus Area

Required Capabilities		
Capability[3]	**Clause**	**Method of Evaluation**
CSMS – EVSE communication	**Pathway 1:** The system obtained the OCPP v1.6 full certificate from the OCA.	Valid OCPP v1.6 Full certification
	Pathway 2: The system obtained the OCPP v2.0.1 core certificate from the OCA.	Valid OCPP v2.0.1 Core certification
EVSE Interoperability	The system can interface with EVSEs, from at least 3 different manufacturers, that are certified to the applicable OCPP certification	Customer Available Information
Standard DERMS / DRMS communication	**Pathway 1:** The system obtained Sunspec IEEE 2030.5 certification to enable communication with an aggregator/DERMS through IEEE 2030.5.	Valid Sunspec IEEE 2030.5 certification
	Pathway 2: The system obtained OpenADR certifications to enable communication with an aggregator/ DERMS through OpenADR v2.0b.	Valid OpenADR v2.0b certification
	Pathway 3: The system obtained OpenADR certifications to enable communication with an aggregator/ DERMS through OpenADR v3.0.	Valid OpenADR v3.0 certification

Reported Capabilities		
Capability	**Clause**	**Method of Evaluation**
OCPP v1.6 Secure Certification	The system has obtained the OCPP v1.6 security certificate from the OCA.	Valid OCPP v1.6 security certification

[3] To be listed, a qualified CSMS only needs to adhere to one of the clauses for each required capability in the below table.

Reported Capabilities		
Capability	**Clause**	**Method of Evaluation**
OCPP v2.0.1 Advanced Security Certification	The system has obtained the OCPP v2.0.1 Advanced Security certificate from the OCA.	Valid OCPP v2.0.1 Advanced Security certification
Standard EMS Communication	**Pathway 1:** The system supports the Modbus protocol to enable communication with an EMS.	Customer Available Information
	Pathway 2: The system supports the DNP3 protocol to enable communication with an EMS.	Customer Available Information
BACnet Integration	The system has obtained BACnet testing certification from a BACnet-accredited testing lab.	Valid BTL Certification Program Certificate of Conformance
Roaming[4]	The capability to communicate to eMSPs according to OCPI v2.2.1 or higher.	Customer Available Information

Table 5. Proof of Standard Compliance for Communication Interfaces

Standard	Proof of Requirement
OCPP	OCPP certificate by the OCA
IEEE 2030.5	SunSpec IEEE 2030.5 CSIP certification tested through a SunSpec Authorized test lab.
OpenADR	OpenADR certificate by the OpenADR Alliance
BACnet	BACnet conformance certificate

[4] Relevant only to a CSMS meant for commercial applications.

2.0 Cybersecurity

The rise of EV adoption has made EV infrastructure a critical component of modern transportation systems, as it directly interfaces with energy grids, personal data, and vehicle operations. As the EV infrastructure grows and becomes increasingly interconnected, cyber threats become more likely. Cyber threats can include unauthorized access, data breaches, and operational disruptions. Given that the CSMS market lacks a comprehensive cybersecurity standard that covers all aspects of a CSMS, these technical requirements divide the required capabilities into three groups: Cloud, Process, and Payment. For each of these groups, the specification allows for various certification pathways to meet these requirements. The full list can be found in Table 7 where only one certificate is needed to adhere to each group. At a minimum, this focus area requires systems to have one certification for Process. One certification for Cloud services is only required if the system is cloud-based, and certification for Payment is only required if the system has access to cardholder data.

This focus area ensures a qualified CSMS has robust cybersecurity processes to protect the integrity of charging operations, safeguard sensitive user information, and maintain trust in the EV ecosystem.

Cybersecurity Standards Definition

Cloud Services: Standards for cloud services that address secure integration with services from a remote cloud computing provider.

Process: Standards that address the development process to reduce the number of cybersecurity vulnerabilities that are designed into components, systems, and services and that manifest over the product lifecycle.

Payment: Standards that address the security of payment sessions and the protection of cardholder data during the payment of charging sessions.

Cybersecurity Capabilities

Table 6 highlights the required capabilities for the Cybersecurity focus area. These capabilities have been derived from industry best practices, further information regarding the valid certification for each capability and the needed proof of compliance can be found in Table 7 and Table 8, respectively.

EVCAN will confirm that the cybersecurity certification will be valid for at least 12 months after the time of application submission. If the certification expires within a year, the EVCAN manufacturer must submit a letter of intention of renewal with the application and

must provide an updated certificate upon its expiration to avoid being delisted. EVCAN will reconfirm all qualified products annually. If a certificate has lapsed, a system must be recertified to avoid being delisted. If a certificate has no expiry date, renewal is required at least every 3 years for a certificate to remain valid.

Table 6. Capabilities for the Cybersecurity Focus Area

Required Capabilities		
Capability	**Clause**	**Method of Evaluation**
Process Compliance	The system has obtained a cybersecurity certification that meets the criteria for process compliance outlined below.	Valid certification
Cloud Services Compliance	The system has obtained a cybersecurity certification that meets the criteria for compliance with cloud services. If the CSMS does not interface with the cloud, this capability is not required.	Valid certification, or attestation by the system provider that no cloud services are offered
Payment Services Compliance	If payment services are offered, PCI DSS v2.0 certification is required. If a third-party payment service is used, the vendor must provide proof of the third-party system's compliance. If the CSMS does not have access to cardholder data, this capability is not required.	PCI DSS certification, or attestation by the system provider that no payment services are offered

Criteria for Acceptable Cybersecurity Standards

EVCAN recognizes cybersecurity standards that meet criteria 1–3 (below):

1. Certifiable with a methodology established through one of the following:
    a. A voluntary consensus process such as ANSI, ISO, IEC, etc.
    b. A federal agency of the USA or Canada
    c. A collaborative multi-stakeholder engagement process such as the Cloud Security Alliance
2. Applies to one or more of the following:

a. Product development process lifecycle
b. Cloud services
c. Payment

3. Includes at least 3 of the following technical content for (2.b) above:
   a. Penetration testing
   b. Communication robustness testing
   c. Vulnerability identification testing
   d. Multiple levels of security
   e. Root of trust with trusted boot and secure storage of encrypted data
   f. Assessment by an accredited entity

Recognized Cybersecurity Standards

Cybersecurity standards and cybersecurity services that meet the criteria listed above are shown in Table 7. As new cybersecurity standards and/or certification pathways become available, EVCAN will evaluate them and update these tables accordingly.

Table 7. Recognized Cybersecurity Standards

Standard	Process	Cloud Services	Payment
ANSI/UL 2900-1	Y		
ANSI/ISA/IEC 62443-4-1	Y		
CSA/ANSI T200	Y		
SOC 2	Y	Y	
ISO 27001	Y		
ISO 27017		Y	
FedRAMP		Y	
CSA STAR		Y	
PCI DSS			Y

Table 8. Proof of Cybersecurity Standard Compliance

Standard	Proof of Requirement
ANSI/UL 2900-1	Certification claim listed on the system provider's website, plus a compliance letter or copy of a certificate issued by an accredited certification body.
ANSI/ISA/IEC 62443-4-1	Certificate of ISASecure registry as a Certified Development Organization from an accredited lab listed on the website of the ISASecure Certification Bodies IECEE certificate from an accredited lab listed on the website of the IECEE CB Scheme Members
CSA/ANSI T200	Certification claim listed on the system provider's website and a compliance letter; or Certificate from CSA; or Certificate from an accredited lab along with a copy of a letter of accreditation from CSA.
SOC 2	Type 1 or Type 2 Certification claim listed on system provider's website, plus a compliance letter from a third-party auditor. The claim should state whether process and/or cloud services are covered.
ISO 27001	Certification from a member of the ANSI-ASQ National Accreditation Board as listed at http://anabdirectory.remoteauditor.com; or Certification from an organization accredited as "Management Systems Certification Bodies" for ISO 27001 by the International Accreditation Service (IAS) at https://www.iasonline.org/search-accredited-organizations-2
ISO 27017	Certification from a member of the ANSI-ASQ National Accreditation Board as listed at http://anabdirectory.remoteauditor.com
FedRAMP	"Authorized" at https://marketplace.fedramp.gov/product
CSA STAR	"Certification" or "Attestation" at https://cloudsecurityalliance.org/star/registry
PCI DSS	Attestation of Compliance completed by a valid Quality Security Assessor as listed at https://www.pcisecuritystandards.org/assessors_and_solutions/qualified_security_assessors/

3.0 Monitoring and Control of EVSE

An EVCAN-qualified CSMS needs to provide an operator with the ability to monitor the EVSEs and sufficient control to operate the infrastructure efficiently and effectively. By providing a comprehensive view of the EVSE's status and performance, a CSMS can ensure that operators can make informed decisions, optimize energy use, and maintain the reliability and safety of the charging infrastructure. This focus area ensures that a qualified CSMS enables a user to properly control and monitor an EVSE for reliable, safe, and optimized operation.

Table 9 highlights the required and reported capabilities for the Monitoring and Control focus area. These capabilities have been derived from required OCPP functions as well as industry best practices. For these capabilities, customer available information submitted for evaluation must specify that the system has the capability, with instructions on how to configure and use the feature.

Table 9. Capabilities for the Monitoring and Control Focus Area

Required Capabilities		
Capability	**Clause**	**Method of Evaluation**
EVSE Status Monitoring	The capability for an administrator to monitor and visualize the status of each EVSE, including: - EVSE Status - Connector Status - EVSE Network Status (Online/Offline)	Customer Available Information
EVSE Measurement Monitoring	The capability for a user or an administrator to monitor and visualize measurements from each EVSE, including: - Current Imported/Exported - Active Energy Imported/Exported - Active Power Imported/Exported - Power Factor or Reactive Power Imported/Exported - State of Charge (SoC) - Voltage - Current Offered or Power Offered	Customer Available Information

Reported Capabilities		
Capability	Clause	Method of Evaluation
EVSE Reset Capabilities	The capability for a user or an administrator to reset the EVSE from the CSMS.	Customer Available Information
Reservation[5] Capabilities	The capability for a user or an administrator to reserve and cancel a reservation for an EVSE for charging from the CSMS.	Customer Available Information
Unlock Capabilities	The capability for a user or an administrator to unlock a connector for a specific EVSE from the CSMS.	Customer Available Information
Firmware Management	The capability for an administrator to update the firmware for an EVSE from the CSMS and display whether the firmware update was successful.	Customer Available Information
Remote Control Capabilities	The capability for a user or an administrator to remotely start and stop charging from the CSMS.	Customer Available Information
Transaction Measurement Monitoring[6]	The capability for a user or an administrator to monitor and visualize transactional data from a charging session, including: - Total energy delivered - Total price of energy sale and unit price of energy - Maximum rate of energy transfer during the session - Additional charges included in the transaction - Total price of the complete transaction	Customer Available Information

[5] Relevant only to a CSMS meant for commercial applications.
[6] Relevant only to a CSMS meant for commercial applications.

4.0 Energy Management

To enable smart grid functionality, a CSMS needs to support various energy management functions. This focus area reports on a qualified CSMS's ability to perform energy management to enable smart EVSE loads, ensuring efficient utilization of power resources, minimizing operational expenses, and supporting grid stability while meeting the charging demands of electric vehicles.

The scope of the current technical requirements focuses solely on the energy management of an EVSE. By effective management, the CSMS can improve grid stability and contribute to the overall efficiency of the electric vehicle charging ecosystem.

Table 10 highlights the required and reported capabilities for the Energy Management focus area. These capabilities have been derived from NEVI Formula Program, and CEC requirements, as well as from standards such as IEEE 1547, IEEE 2030.13, CSA SPE 343:21 and UL 3141, in addition to industry best practices. For these capabilities, customer available information submitted for evaluation must specify that the system has the capability, with instructions, for how to configure and use the feature.

The expectation is that systems utilize the required communication interfaces as defined in Table 4, to execute these capabilities.

Table 10. Capabilities for the Energy Management Focus Area

Required Capabilities		
Capability	**Clause**	**Method of Evaluation**
Demand Response Capabilities	The capability to reduce or shift charging loads in response to an external signal from an entity such as a grid operator, aggregator, or controller (e.g., EMS/MGC/BMS).	Customer Available Information
Dynamic Load Management	The capability to dynamically allocate and adjust the distribution of electrical power among multiple EVSE units in real-time for optimal use of available power, charging prioritization, preventing grid overload, or balancing charging demands with grid constraints.	Customer Available Information

Reported Capabilities		
Capability	**Clause**	**Method of Evaluation**
Ride Through IEEE 1547 Functions	The capability to dispatch EVSEs and other DERs to support the grid voltage and frequency by implementing the following. - Voltage ride through - Frequency ride through	Customer Available Information
Volt-Watt IEEE 1547 Functions	The capability to dispatch EVSEs and other DERs to curtail active power injection at the point of interconnection (POI) based on a defined curve.	Customer Available Information
Volt-Var IEEE 1547 Functions	The capability to dispatch EVSEs and other DERs to adjust reactive power at the POI based on a defined curve.	Customer Available Information
Power Factor IEEE 1547 Functions	The capability to dispatch EVSEs and other DERs to adjust reactive power at the POI based on a power factor setpoint.	Customer Available Information
Configurable Load Management	The capability of the CSMS to consider network topology, how EVSEs are connected (e.g., series or parallel connections), and equipment ratings when performing dynamic load management.	Customer Available Information
Maximum Power Limit Control	The capability for the CSMS to maintain its configured maximum power limits for which no external system of function can cause it to exceed.	Customer Available Information
Device Monitoring	The capability to monitor devices other than EVSEs (e.g., meters, environmental sensors, breaker statuses, etc.).	Customer Available Information

5.0 Data Analytics and Reporting

This focus area reports on the type of data a specific CSMS reports on to ensure it collects, analyzes, and reports the necessary data from EVSEs to comply with regulations, support the operation of the charging station, and support grid operators. By leveraging data analytics, the CSMS can provide actionable insights that help operators optimize charging station performance, track trends, and enhance maintenance practices.

Table 11 states the reported capabilities for the Data Analytics and Reporting focus area.

Data analytics and reporting functions are evaluated through customer available information, an example CSV report file, and/or a screenshot or video recording of the user interface.

Table 11. Capabilities for the Data Analytics and Reporting Focus Area

	Required Capabilities	
Capability	**Clause**	**Method of Evaluation**
API Data Example	The capability to provide secure access to authorized third parties to access historical data through an API.	Customer Available Information or screenshots or video recording of user interface
CSV Data Example	The capability to provide secure access to authorized third parties to access historical data through CSV files.	Data Example and Customer Available Information demonstrating CSV function

Reported Capabilities		
Capability	**Clause**	**Method of Evaluation**
Maximum Frequency of Data Collection	The maximum frequency at which the CSMS can collect monitoring data from EVSEs.	Customer Available Information
Maximum Record Length	The system must retain all collected and processed data for a minimum period of one (1) year. This retention period applies to all data types, including but not limited to time-series data, event logs, diagnostic codes etc.	Customer Available Information or data retention policy documentation and screenshots or video recording of user interface

Reported Capabilities		
Capability	**Clause**	**Method of Evaluation**
Uptime Data Collection	The capability to report the following information: - Charging station port uptime - T_outage[7] - T_excluded[8]	Data Example
Charging Session Data Collection	The capability to report the following information for each charge session for each EVSE: - Start time - Stop time - Energy delivered - Peak power - Error code for unsuccessful sessions - Charger ID - Charging port ID - Connector ID - Transaction ID - User ID - Payment method used - Session sale amount ($)	Data Example

[7] Defined in 23 CFR 680.116(c) as the total minutes of outage in the previous year.
[8] Defined in 23 CFR 680.116(c) as the total minutes of outage in the previous year caused by reasons outside a CPO's control

Reported Capabilities		
Capability	**Clause**	**Method of Evaluation**
Roaming Data Collection and Sharing[9]	The capability to make the information below available to third-party software developers free of charge: - Charging station name/ID - Address - Geographic coordinates - Charging station operator name - eMSP name - Charging station status - Charging station access limitations (e.g., hours of availability) - Charging port information - Pricing and payment information - Charging level (Level 2, DCFC) - Port connector type (CCS, NACS)	Data Example
Energy Data Collection	The capability to report the following time-series energy data for each EVSE: - Cumulative energy delivered - Voltage - Current - Power	Data Example
Fault and Diagnostic Data Collection	The capability to report the following fault diagnostic data (event-based or time-series) for each EVSE. - Network status (online/offline) - EVSE status	Data Example
Security and Access Logs Accessibility	The capability to report the following logs for each EVSE: - Successful and unsuccessful authentication attempts - Firmware updates	Data Example

[9] Relevant only to a CSMS meant for commercial applications.

Reported Capabilities		
Capability	**Clause**	**Method of Evaluation**
Demand Response Participation Data Collection	The capability to report data for each demand response event that the CSMS participated in, including: - Event ID - Event start time - Event end time or duration - Load reduction requested - Load reduction achieved - CSMS response (e.g., accepted or rejected)	Data Example
CO_2 Savings Data Collection	The capability to report on carbon emissions avoided by EV charging.	Data Example and Customer Available Information describing the calculation methodology
Energy Efficiency Data Collection	The capability to report on energy losses during charging sessions.	Data Example
Operational Metric Visualization	The capability to analyze operational data and visualize the following metrics per EVSE: - Utilization metrics (e.g., charge session frequency, idle time, peak usage periods) - Connector use (e.g., usage statistics per connector type)	Customer Available Information or screenshots or video recording of user interface functions with mock data Demonstrate function through API
Energy Metrics Visualization	The capability to analyze energy data and visualize the following metrics: - Energy profiles over specific periods (e.g., daily, weekly, monthly) for each EVSE and per station - Maximum power profiles over specific periods (e.g., daily, weekly, monthly) for each EVSE and per station	Screenshots or video recording of user interface, or an energy report (.CSV), of the energy profiles for each EVSE and per station Demonstrate function through API

6.0 Operations, Safety, and Reliability

An EVCAN qualified CSMS must be able to operate an EVSE safely and reliably, by continuously monitoring faults, errors, and various other signals and taking the necessary actions to ensure the safety of people and preventing damage to equipment. This focus area addresses this capability by reporting on a qualified CSMS's capability to detect, report, and diagnose faults or warnings that may arise during operation, thereby minimizing the risk of safety hazards or service disruptions.

Table 12 states the reported capabilities for the operations, safety, and reliability focus area. For these capabilities, customer available information submitted for evaluation must specify that the system has the capability, with instructions for how to configure and use the feature. Even though safety is critical, these capabilities are all reported as the relevant standards and certification process are not mature enough to be a required capability.

The expectation is that systems utilize the required communication interfaces as defined in Table 4, to execute these capabilities. If other communication interfaces are used, this must be specified in Customer Available Information.

Table 12. Capabilities for the Operations, Safety, and Reliability Focus Area

Reported Capabilities		
Capability	**Clause**	**Method of Evaluation**
Fail-safe Operation Capabilities	The capability to go into a fail-safe mode if the EVSE load does not comply with the EVSE quota dictated by the CSMS for that portion of the distribution.	Customer Available Information
Proper Safety Load Management	The capability to monitor inactive safety loads for activation signals. If triggered the CSMS system must have the capability to disconnect EV loads quickly enough to avoid compromising the safety loads if the CSMS can use the unused capacity of those loads (e.g., fire pump).	Customer Available Information
Communication Malfunction Detection	The capability of placing an EVSE in a fail-safe mode on the detection of a communication malfunction or loss of communication (includes but is not limited to communication to power monitoring devices, CTs, and the EVSE).	Customer Available Information

Reported Capabilities		
Capability	**Clause**	**Method of Evaluation**
EVSE Diagnostic Monitoring	The capability to monitor and visualize diagnostic information for each EVSE, including: - EVSE uptime - Last known boot-up - Fault diagnostic code	Customer Available Information
EVSE Uptime Detection	The capability to detect when and why an EVSE is considered "up" or "when its hardware and software are both online and available for use, or in use, and the charging port successfully dispenses electricity in accordance with requirements for minimum power level."[10] The recommended method is to use the OCPP heartbeat and Status Notification message to keep track of the uptime for each connector, as defined in Improving Uptime Monitoring with OCPP v1.1. If the CSMS monitors uptime in a different way, this must be stated in customer available information to qualify.	Customer Available Information
EVSE Log Accessibility	The capability to download logging information from EVSE faults and from the CSMS that include EVSE error codes as defined in OCPP v1.6 or v2.0.1.	Customer Available Information

7.0 Technical Resources

This focus area ensures that a CSMS presents sufficient technical resources to installers, operators, technicians, and administrators to effectively understand, configure, operate, troubleshoot, and maintain the system. This promotes consistent performance, safety, and compliance with operational and regulatory requirements.

Table 13 highlights the reported capabilities for the Technical Resources focus area. For these capabilities, customer available information submitted for evaluation must clearly

[10] Based on the definition of "uptime" from the NEVI Final Rule

label the type of documentation, as stated in the clause, and the system provider must attest to making the document publicly available or available upon customer request. For more information, see Table 3.

The documentation can be submitted in various electronic formats, including manuals and online documentation, etc.

Table 13. Capabilities for the Technical Resources Focus Area

Reported Capabilities		
Documentation Type	**Clause**	**Method of Evaluation**
Operation Documentation	Documentation that defines the operation and administration of the system.	Customer Available Information
Installation Documentation	Documentation that describes the installation and configuration of the system.	Customer Available Information
Maintenance Documentation	Documentation that describes the maintenance of the system.	Customer Available Information
Security Considerations Documentation	Documentation addressing security considerations on the system's intended use and configuration.	Customer Available Information
Security Configuration Documentation	Documentation addressing the environment in which the product is intended to be used, including product limitations and configuration requirements and recommendations on the product to ensure security.	Customer Available Information
External Interfaces Documentation	Documentation listing all external interfaces offered by the CSMS and all communication protocols used externally by the product, including which external interfaces support which protocols.	Customer Available Information

Reported Capabilities		
Documentation Type	**Clause**	**Method of Evaluation**
Authentication and Authorization Methods Documentation	Documentation that states the authentication and authorization methods used, including details on the specific methods implemented, their setup, and any associated security measures.	Customer Available Information
Incident Management and Change Control Documentation	Availability of documentation/systems to track changes and manage incidents effectively.	Customer Available Information

Specification Clarifications and Updates

Date updated	Subject	Change Type	Description	Affected Page(s)
06/03/2025	Standard EMS Communication	Change "Required" to "Reported"	In Table 4, change the "Standard EMS Communication" capability from "Required" to "Reported", in recognition that some CSMS use cases do not need EMS communication.	15, 16
06/03/2025	OCPP 2.0.1	Clarification	Update the name of OCPP v2.0.1 Advanced Security certification	15, 16
06/03/2025	Screenshots or video	Clarification	Eliminate Product Demonstration. To evaluate some capabilities, if Customer Available Information is not available, screenshots or video recording of user interface may be substituted	12,25,28
06/03/2025	Corrections	Addition	Add Table 14 to track corrections	32

References

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2. OCPP 2.0.1 Part 1 - Architecture & Topology, Figure 1. https://openchargealliance.org/my-oca/ocpp/. (Accessed April 2025)
3. SEPA. Interoperability Profile for Electric Vehicle Fleet Managed Charging. June 2022. (Accessed April 2025)
4. IEEE 2030.13. Guide for Electric Transportation Fast Charging Station Management System Functional Specification. https://ieeexplore.ieee.org/document/10577619 (Accessed April 2025)
5. Netherlands Enterprise Agency. January 2019. Electric vehicle charging definitions and explanation document, OCPP 2.01, and OCPI. (Accessed April 2025)
6. CSA Group. CSA SPE 343, Electric vehicle energy management systems. 2021. https://www.csagroup.org/ (Accessed April 2025)

Appendix A

This appendix lists industry standards that are out of scope for this CSMS specification. These standards should be considered when evaluating EVSE-only capabilities and State-specific requirements for public charging:

UL 2594
UL 1998
UL 2251
UL 2202
UL 2231-1
UL 2231-2
UL 2750
SAE J1772
SAE J3068
SAE J3400
SAE J3105
SAE J2897/1
ISO 15118
FCC Part 15
NIST Handbook 44 Energy Metering Requirements
State Specific Requirements for publicly available electric vehicle supply equipment