

Statement of Requirements - CCS2 EVCC

(Electric Vehicle Communication Controller)

1. Overview

This project aims to develop an Electric Vehicle Communication Controller (EVCC) that manages the communication between an Euler electric vehicle (EV) and an Electric Vehicle Supply Equipment (EVSE) or charging station of all makes available in India. The EVCC will facilitate safe and efficient charging and monitor the process based on standardised communication protocols.

2. Objectives

- Enable reliable communication between EV and EVSE
- Comply with several ISO and IEC standards to ensure interoperability, safety, and efficiency:

Standard	Description
ISO 15118	Communication interface for EV and charging station; supports V2G.
ISO 61851	General requirements for EV charging systems, covering AC and DC methods.
DIN SPEC 70121	High-level communication over pilot signals in DC charging sessions.
IEC 62196	Specifications for connectors and interfaces used in EV charging.

- Ensure Rapid charging in both AC & DC mode
- Prioritise cybersecurity and data protection for the communication process.
- Provide a robust and scalable solution adaptable to different EV architectures and charging infrastructures.

3. Functional Requirements

3.1 Communication Protocols

- Power Line Communication (PLC): Facilitates data exchange between the vehicle and charger.
- ISO 11898 CAN Interface: Facilitates efficient data exchange between electronic control units (ECUs).
- Control Pilot (CP) Line: Manages the communication during charging sessions using PWM signalling as per IEC 61851-1.

3.2 Charging Modes

- **AC Charging:** Ensure support for standard AC charging modes, including Level 1 (120V) and Level 2 (240V).
- **DC Charging:** Support DC fast charging with scalable power levels up to 350kW

3.3 Cybersecurity

- ~~**Authentication and Authorization:** Ensure user authentication and vehicle identity verification for Plug & Charge functionality.~~
- ~~**Data Encryption:** Encrypt all sensitive data transmission (e.g., customer ID, payment information) following current cryptographic standards.~~
- ~~**Firmware Updates:** Implement secure, over-the-air firmware update capabilities to keep up with evolving cybersecurity requirements and protocol versions.~~

3.4 Data Logging and Diagnostics

- Log session data, charging events, faults, and other relevant diagnostic data.
- Real-time monitoring of charging parameters such as voltage, current, temperature, and power.
- Support for on-demand and scheduled diagnostic reports.

3.5 Human Machine Interface (HMI) Support

- ~~Integration with a user-friendly interface on the EV display, if applicable, for monitoring charging status and controlling charge settings.~~

3.6 Vehicle and Network Compatibility

- Support integration with only Euler vehicles
- Compatibility with all EVSE networks, including public charging infrastructure and home charging available in India.

4. Technical Specifications

Parameters	Description
Charging Mode	CCS2.0 (ISO15118)
Operation Voltage Range	DC 9V-15V with Vin 12V DC
CAN Interface	ISO11898 CAN Interface
Baud Rate	250kbps
Byte Order	Intel
Cycle Time	100ms
Current Consumption @ Active	< 150mA
Current Consumption @ Peak with Inlet Lock Control	1.5A with Vin DC12V & Lock Control with 12V
Wake-up	PD, CAN, IO, CP-Optional
Current Consumption @ Standby with Unplug	< 2mA @ PD Wakeup < 1mA @ CP Wakeup
Operation Temperature	-30°C ~ +85°C
IP Rating	IP67 (Dust & Water Resistant)
Dimension	Open for discussion
Additional Features	- Error handling for all exceptions - Easy Control & Monitoring using RS232 - Thermal Management

5. Non-Functional Requirements

5.1 Performance

- Communication latency below 100 ms for real-time monitoring.
- High availability and uptime, with minimal downtime during firmware updates.

5.2 Scalability

- Design for adaptability to support emerging charging standards.
- Support for seamless integration with both existing and future networked charging infrastructure.

5.3 Reliability

- Design for operational robustness across different environmental conditions.
- Meet or exceed industry standards for Mean Time Between Failures (MTBF).

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