

# Tesla Charging

Feb 2026

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July 2025



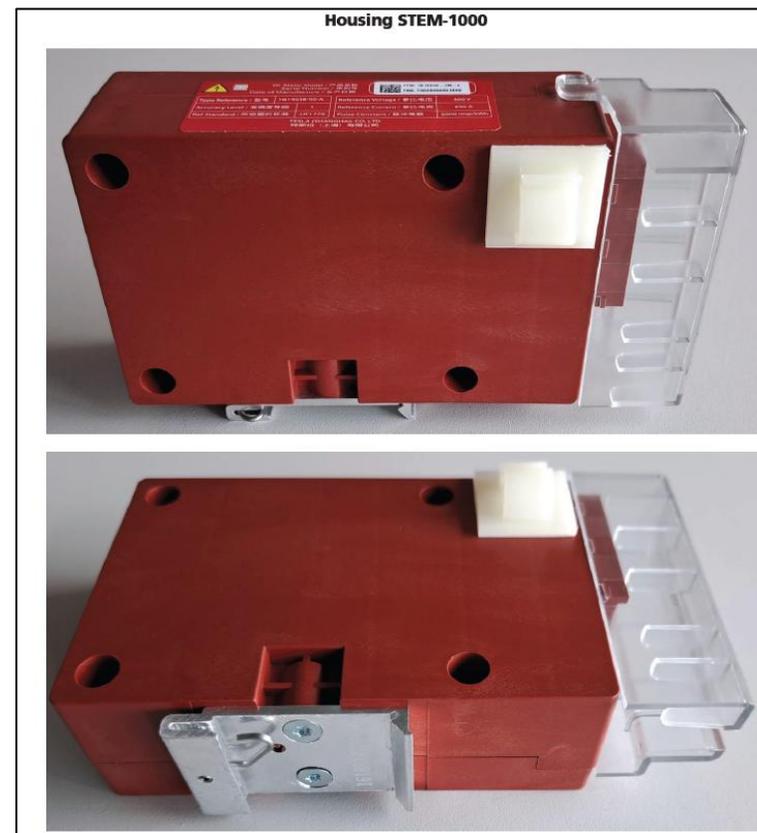
V3 Supercharger



V4 Supercharger

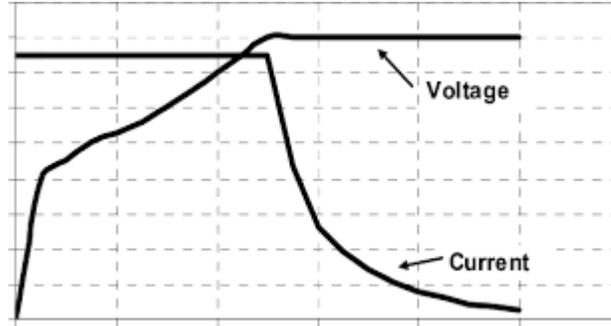


## STEM – Stationary Energy Measurement

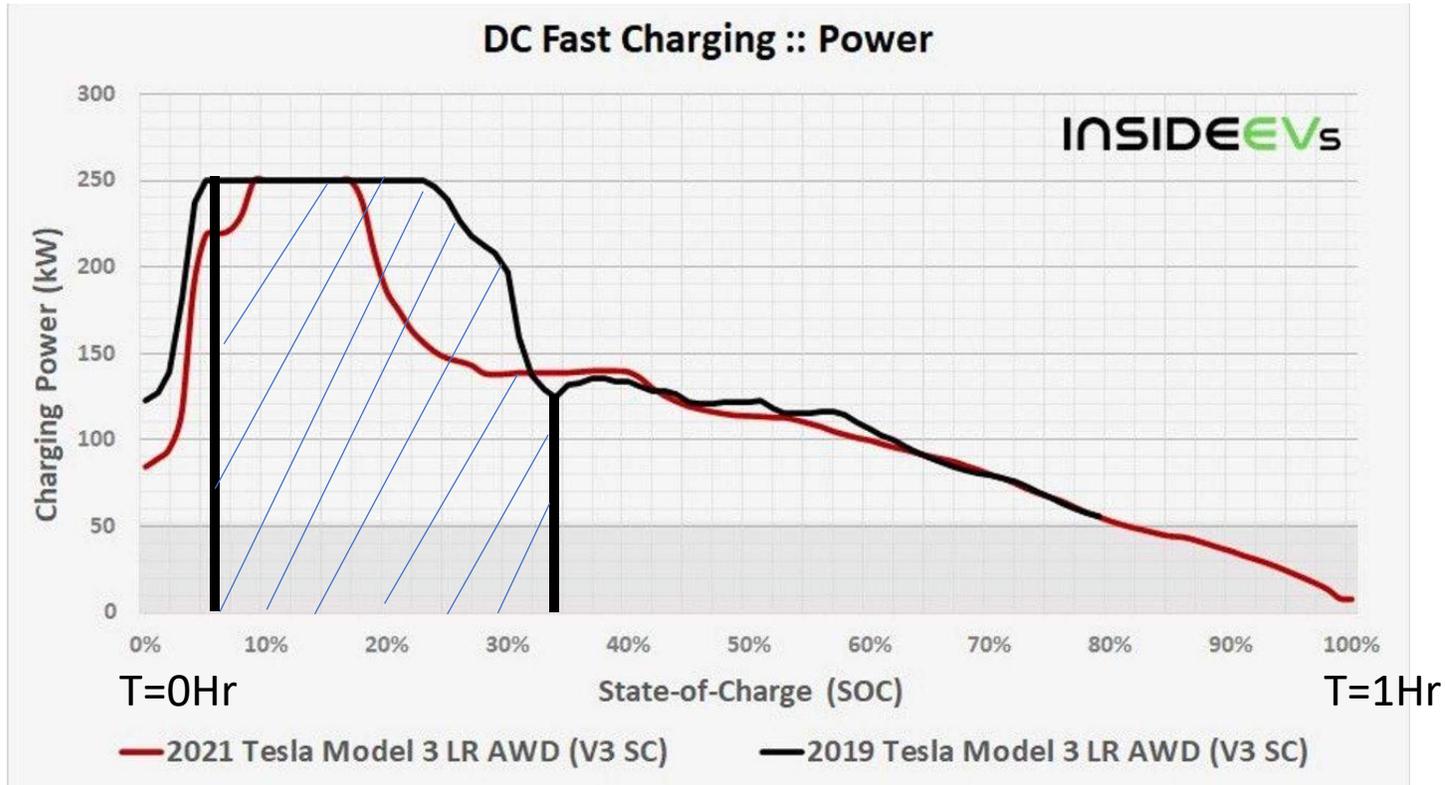


$$P=V*I$$

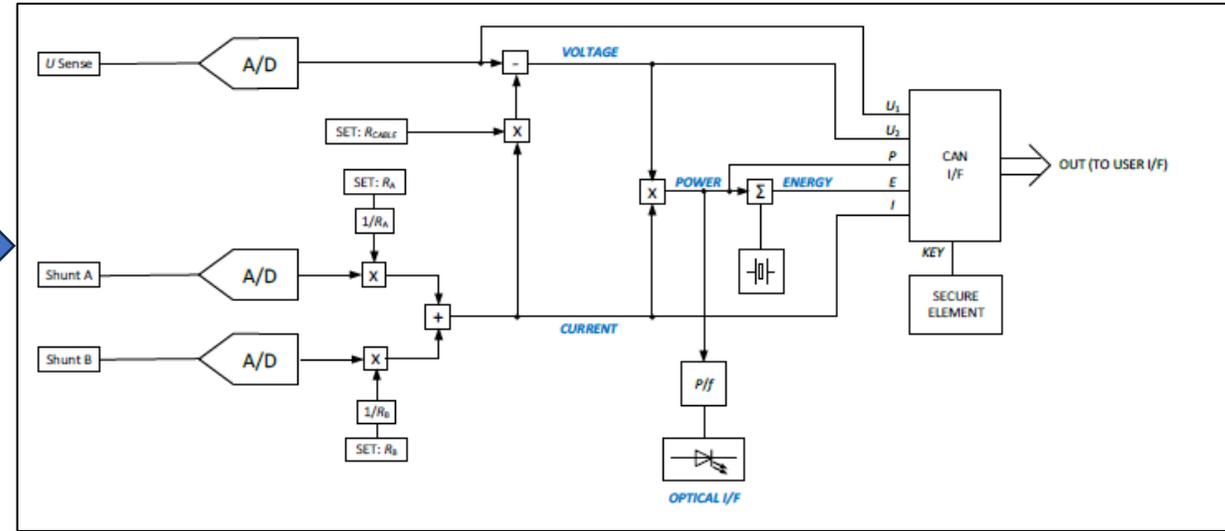
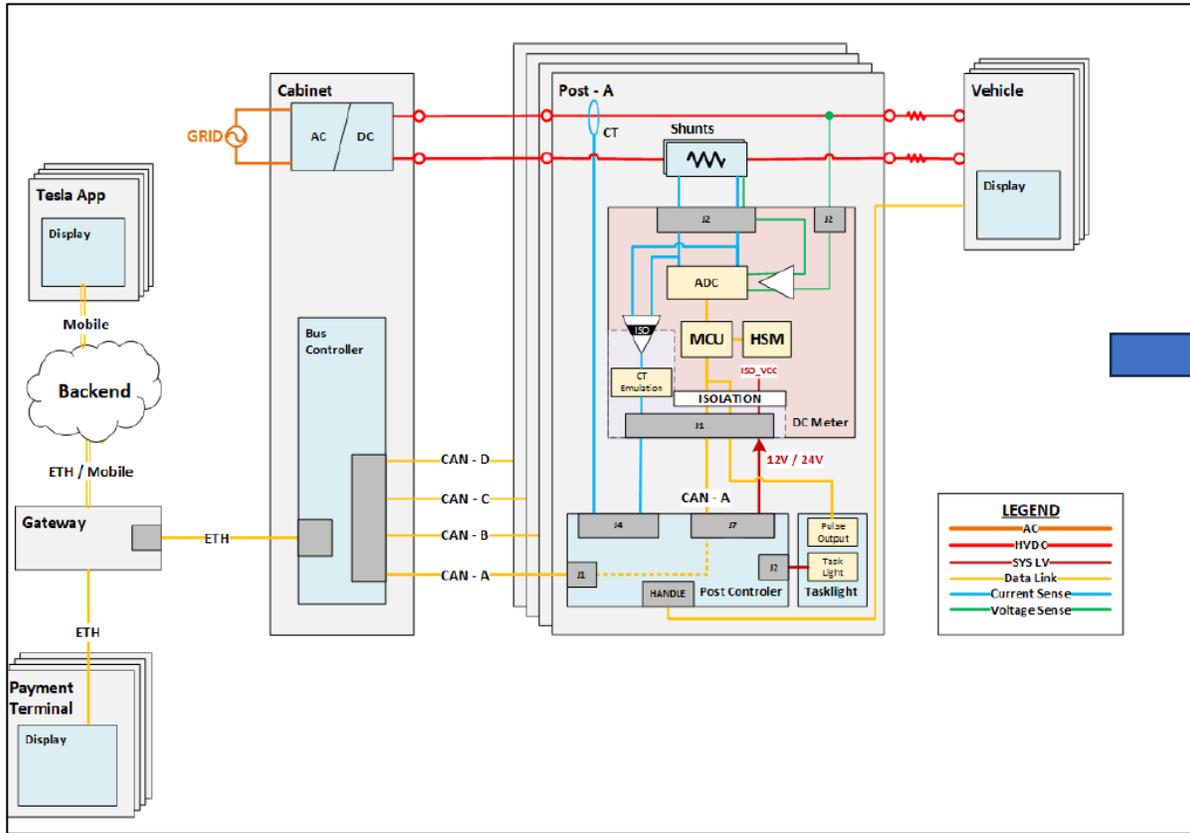
As battery voltage increases charging current decreases.



$$E=P*t$$



# Supercharging Topology and Measurement Processing



# EVSE Marking and Metrology Markings

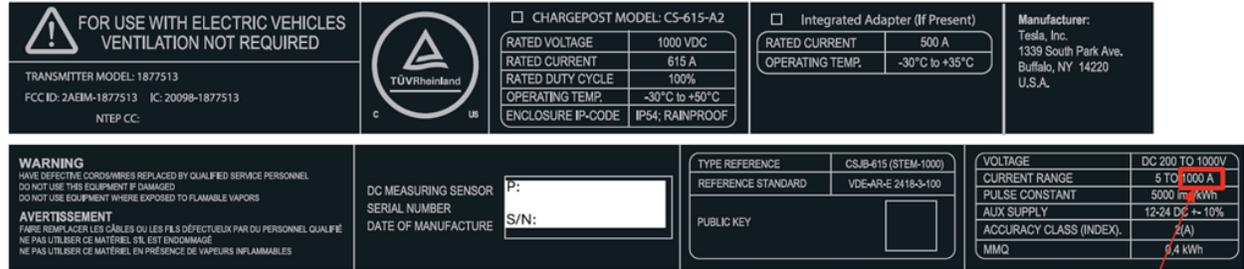


Figure 3. Example ID label for Model CS-615-A2

Maximum Current Deliverable (MCD) indication

- CTEP + NTEP Marking Requirements
- HB.44
- EVSE Marking Requirements (TUV, UL etc)
- UL2202, UL2231-1,2 etc.

**manufactured device.** – Any commercial weighing or measuring device shipped as new from the original equipment manufacturer. [1.10] (Amended 2001)

**mass flow meter.** – A device that measures the mass of a product flowing through the system. The mass measurement may be determined directly from the effects of mass on the sensing unit or may be inferred by measuring the properties of the product, such as the volume, density, temperature, or pressure, and displaying the quantity in mass units. [3.37]

**master meter, electric.** – An electric watt-hour meter owned, maintained, and used for commercial billing purposes by the serving utility. All the electric energy served to a submetered service system is recorded by the master meter. [3.40] (Added 2022)

**master meter test method.** – A method of testing milk tanks that utilizes an approved master meter system for measuring test liquid removed from or introduced into the tank. [4.42]

**master weight totalizer.** – A primary indicating element used with a belt-conveyor scale that incorporates the function of an integrator to indicate the totalized weight of material passed over the scale. (Also see “integrator.”) [2.21] (Amended 2013)

**material test.** – The test of a belt-conveyor scale using material (preferably that for which the device is normally used) that has been weighed to an accuracy of 0.1 %. [2.21] (Amended 1989)

**maximum capacity.** – The largest load that may be accurately weighed. [2.20, 2.24] (Added 1999)

**maximum cargo load.** – The maximum cargo load for trucks is the difference between the manufacturer’s rated gross vehicle weight and the actual weight of the vehicle having no cargo load. [5.53]

**maximum current deliverable (MCD).** – The maximum current that the EVSE can deliver as installed under optimum conditions. [3.40] (Added 2024)

**maximum deliverable amperage (MDA).** – The maximum current available from the EVSE at the time of the test as determined by the Control Pilot Pulse Width Modulation signal or via digital communication between the EVSE and EV or test equipment. [3.40] (Added 2024)

**measurement field.** – A region of space or the measurement pattern produced by the measuring instrument in which objects are placed or passed through, either singly or in groups, when being measured by a single device. [5.58]

**measuring element.** – That portion of a complete multiple dimension measuring device that does not include the indicating element. [5.58]

**meter, electricity.** – An electric watt-hour meter. [3.40] (Added 2022)

This publication is available free of charge from <https://doi.org/10.6028/NIST.HB.44-2025>

# Testing in the Field (MDA, MCD)

## Testing in Field Variables:

- Number of chargers occupied
  - Power available at site
- State of charge of vehicle
- Temperature at site or of charger
  - Thermal de-rating
- ....
- MDA serves to be a variable quantity to allow testing under various conditions.
- Testing in the field is different than in a lab

**N.3.3. Performance Verification in the Field of a DC EVSE.** – Accuracy tests shall be performed at any voltage and the following current levels:

- (a) A point between 10 % and 20 % of the MDA, but not less than 30 A; and
- (b) A point between 25 % and 100 % of the MDA, with the recommendation to test at the maximum power level within that range that is possible using the test load and test standard available.

**Note:** The test points (a) and (b) above must not be at the same current level. It is recommended that the current levels should be separated to the extent that the test load and test standard will allow.

For DC systems it is anticipated that an electric vehicle may be used as the test load. Under that circumstance, testing at the load presented by the vehicle shall be sufficient for field verification provided that it is greater than 40 % of the MDA and no less than 30 A.

All DC EVSE placed into service prior to January 1, 2025 are exempt from this requirement until January 1, 2028.

(Amended 2022 and 2024)

# Accuracy Testing – In Field



# Totalizer

1

tesla.com/charging/energy-totalizer

## Energy Totalizer

Select Type Of Charger

Supercharger

Destination Charger

Charger Serial Number

Submit

2

tesla.com/charging/energy-totalizer/TG323166001598/PTSCH

## Post Data

Timestamp  
Feb 11, 2026, 10:33 PM

Meter Serial Number  
TG323166001598

Energy Dispensed kWh  
212255.2516

# Event Logs

The image shows two browser windows. The left window, labeled '1', displays the Tesla Charging Transparency Software landing page. The right window, labeled '2', shows the 'Log Data' section for 'Record 0'. A green banner at the top of the log data section states 'Data is verified'. Below this, a JSON object is displayed with several fields highlighted by red boxes: 'fwVersion' (669E878617AEF9E6), 'serialNumber' (TG323144002CZL), and a log entry at index 0 with a timestamp of 'Thu, June 19, 2025 1:07 PM +00:00'. Other fields include 'partNumber', 'meterId', and 'pkLabelFormat'. The log entry at index 1 shows a 'timestampInvalid' status.

1

## Charging Transparency Software

As a consumer, you can use transparency software to verify the authenticity of digitally signed meter readings that are taken during EV charging processes. This allows you to confirm that the amounts charged to you have not been altered by any third parties.

System Log  
CSV file max size 1MB

Select File

Validate

2

## Log Data

Record 0

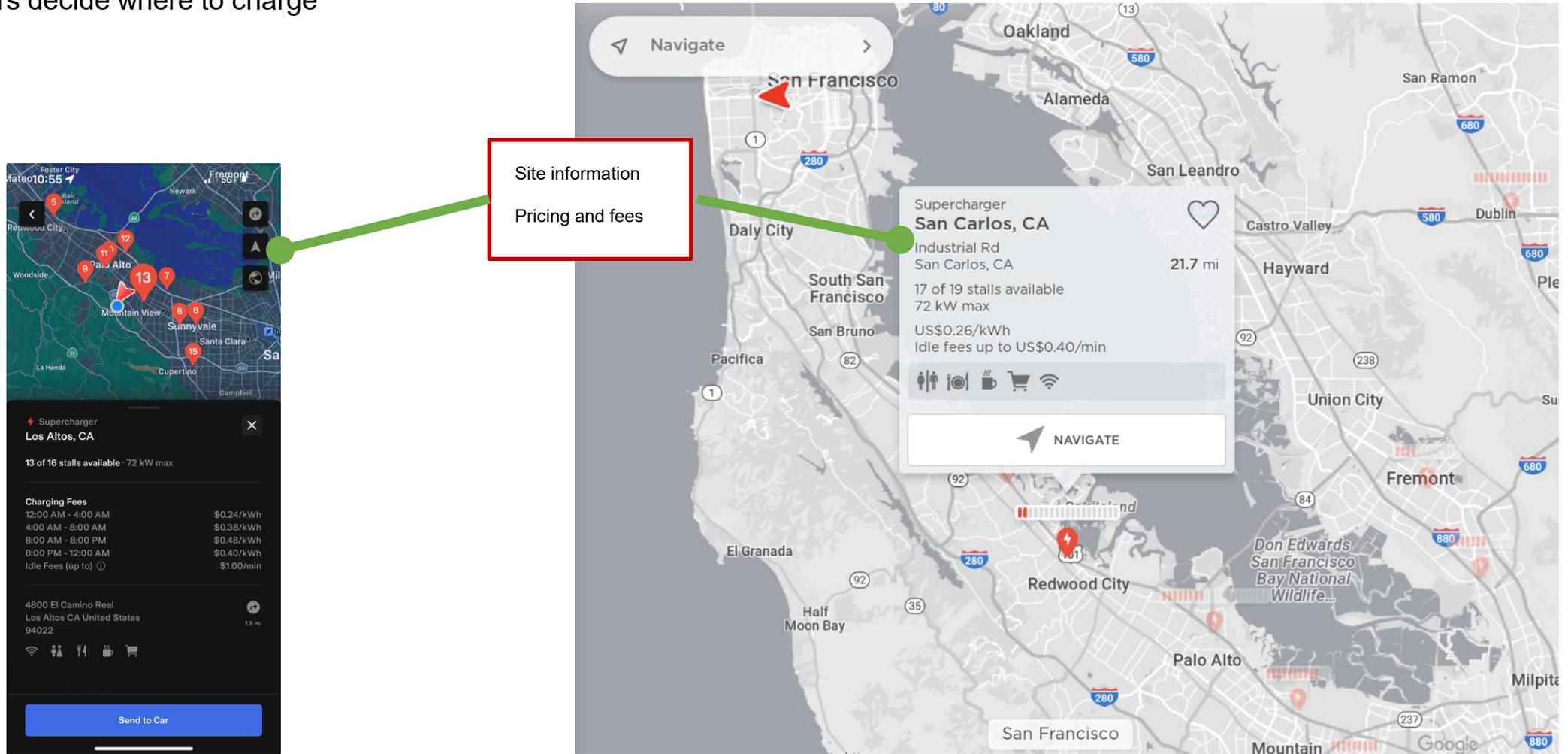
✔ Data is verified

```
{
  "root": {
    "stemInfo": {
      "fwVersion": "669E878617AEF9E6"
      "serialNumber": "TG323144002CZL"
      "partNumber": "3614038-00-C"
      "meterId": "P1614038-00-C:STG323144002CZL"
      "pkLabelFormat": "PUBLIC_KEY_LABEL_FORMAT_INVALID"
    }
    "singleStemLog": [
      0: {
        "timestamp": "Thu, June 19, 2025 1:07 PM +00:00"
        "logId": 554
        "logbookParameter": {
          "logbookEventType": "LOGBOOK_LOGS_EXPORTED"
          "exportSignature": {
            "type": "SIGNATURE_TYPE_ECDSA_SHA256"
            "asn1Der": "MEUCIQDf3sZr8F4W7Lhd/NSNu1IF6jOPM1TbEE2W9LSj6bbswIqNoRBJ0w0kfZ0UpLtt3/n7YJ2KdvdIeyWGN0VZ1S8Yto="
          }
        }
      }
      1: {
        "timestamp": "Thu, June 19, 2025 1:23 PM +00:00"
        "logId": 555
        "timestampInvalid": true
      }
    ]
  }
}
```

**Figure 16.** Example of FW version listed with associated timestamp, serial number and log entry number.

## Prior to Arrival: Wayfinding and Price Discovery

- Display charging location, real-time pricing and fees to help drivers decide where to charge



## User Authentication, Charging Control, and Metrology

- Payment method input to Mobile App or web interface
- Start charging functionality on Mobile App (for non-Tesla EV)
- Real-time display in vehicle UI/Mobile App or web interface on metering, energy, session pricing

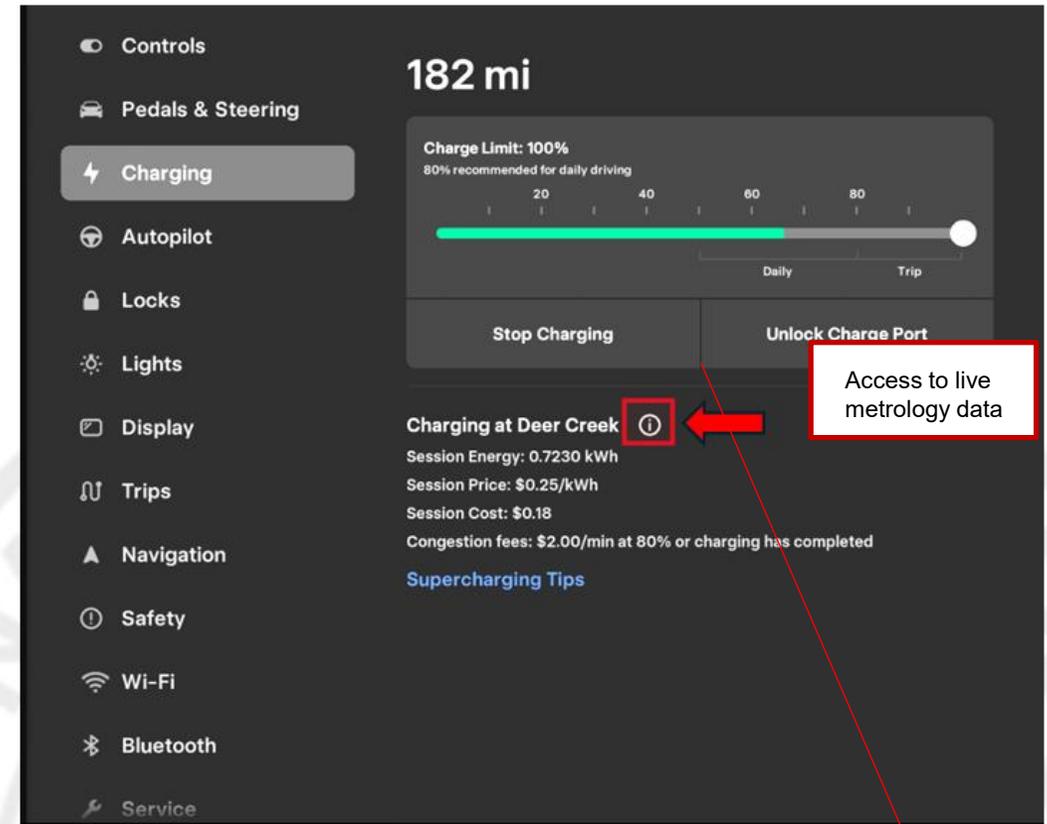
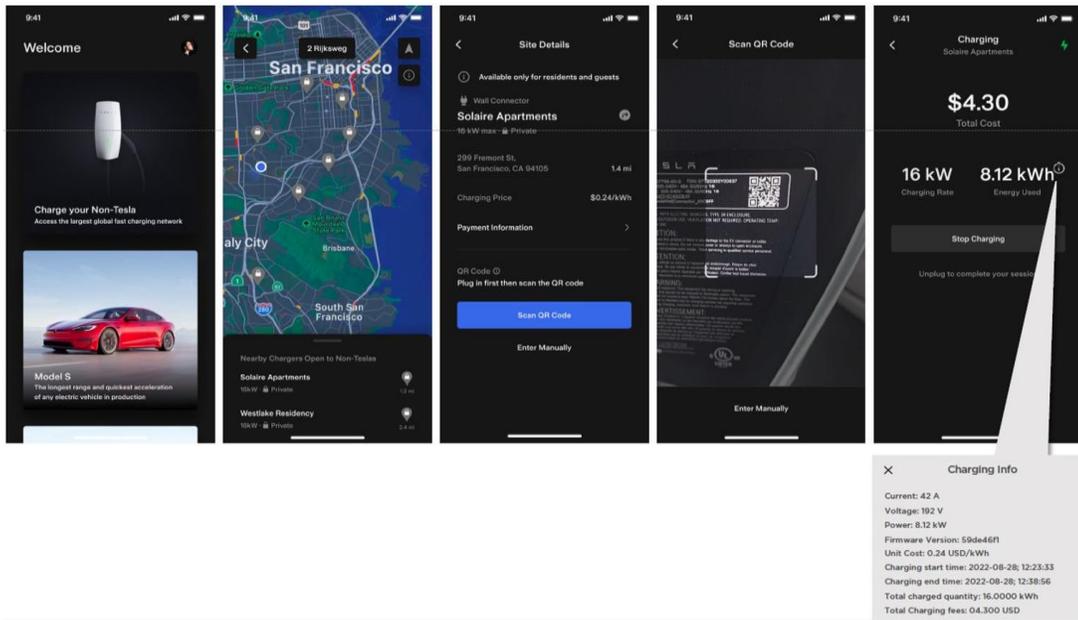
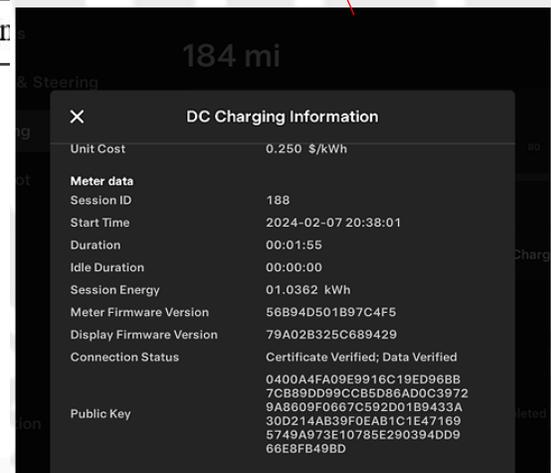
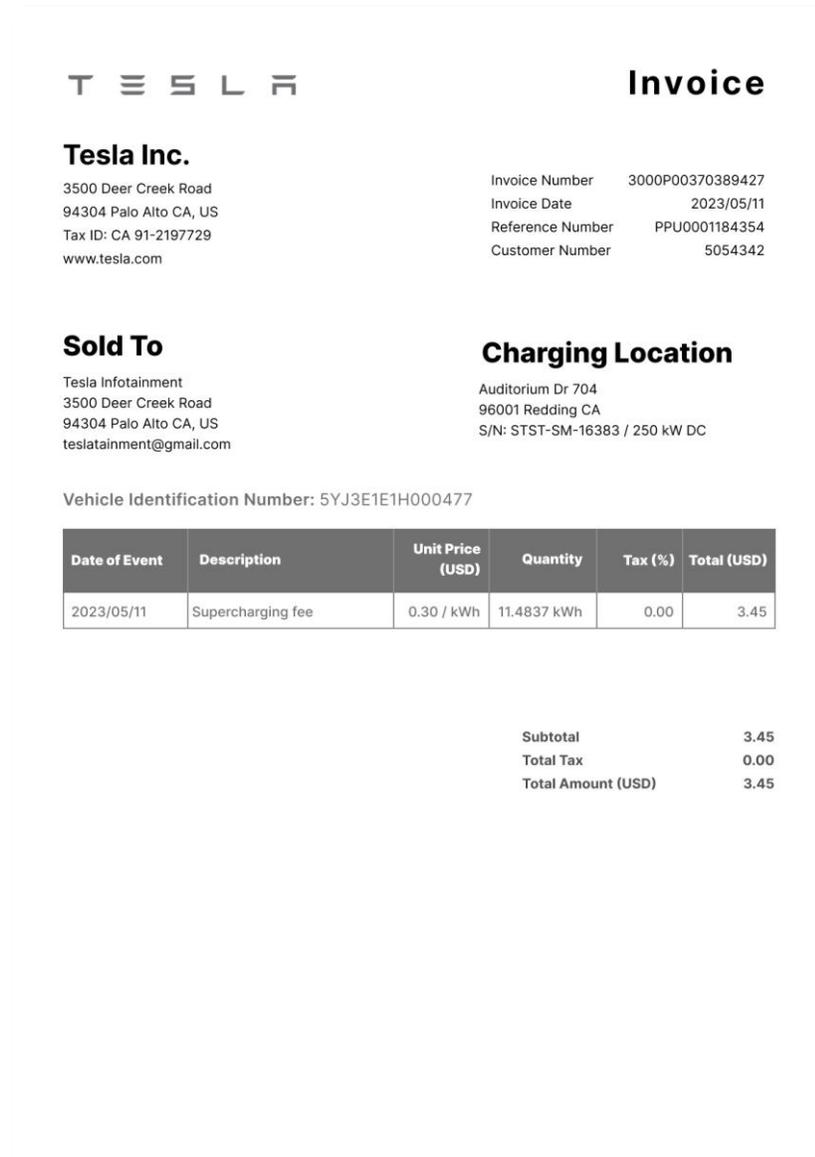
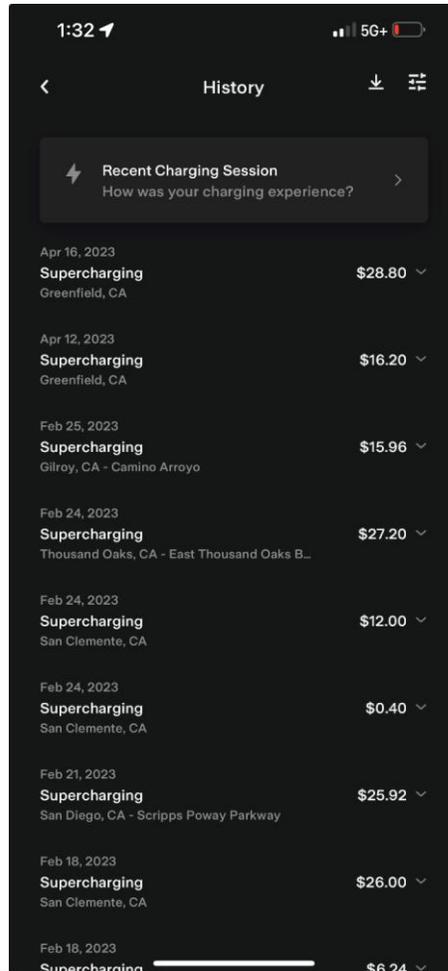


Figure 5. Tesla vehicle user interface



# After Charging: Receipt

- Receipt provided in Tesla account





# Tesla Supercharger Field Guide

- Available upon request
- Will be continually updated based on questions
  - NTEP certification
  - Meter tech
  - Time based charges
  - Minimum \$ billing



**TESLA SUPERCHARGER FIELD GUIDE**

CONFIDENTIAL INFORMATION

Rev. 1.1