eMall - e-Mobility for All

Acceptance Test Document

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Version 1

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Software Engineering 2 Project

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1 INTRODUCTION

1.1 Referenced project

Link to the repository

https://github.com/MarcelloDeSalvo/DeSalvoDubiniGrossoni

Authors

- Marcello De Salvo
- Francesco Dubini
- Riccardo Grossoni

Main reference documents we have considered

- RASD
- DD
- ITD

1.2 Purpose

This document aims at describing the acceptance testing activity our team has performed on the referenced prototype and the obtained results.

1.3 Scope

The referenced implementation needs to be thought of as a minimum viable product, so the testing activity will focus not on the exhaustiveness of the implemented features, but on the stability of the product and the coherence with reference to the delivered documentation.

We have chosen to perform a set of tests extracted by analyzing the requirements described by their team and the list of features that they have actually developed.

1.4 Acronyms

Within this document we have chosen to use the nomenclature specified by the other team, reported below.

Term	Definition
User	eMSP’s end user
CPOW	Charge Point Operator Worker, CPMS’s user

1.5 Revision History

- 12/02/2023: Version 1

2 INSTALLATION SETUP

The installation steps were carefully explained and the procedure succeeded seamlessly.

We correctly installed a local instance of the backend for the CPMS and for the eMSP, as well as the frontend app.

The provided link for the environment accessible online was available and functioning.

3 ACCEPTANCE TEST CASES

The acceptance tests we performed are referred to the following documented features:

- eMSP
    - User registration
    - User login
    - Charging station status monitoring
    - Creation of a booking
    - Deletion of a booking
    - Visualization of user's bookings
    - Activation of a charge
    - Ending of a charge
- CPMS
    - CPOW registration
    - CPOW login
    - Charging station status monitoring
    - Change the power sources (battery and DSO) of a station
    - Addition of a discount
    - Deletion of a discount.

In the tables reported below, we describe the conducted tests and the corresponding results.

Id	Test-eMSP-1
Name	User signs up
Initial page	Home page
Preconditions	- The user is not logged in - There is no user related to the email address "test@mail.com" in the system

Steps	1) The user presses the “Sign up” button at the top of the home page 2) The form to sign up is shown to the user 3) The user fills the form inserting the first name, last name, “test@mail.com” as the email address, “test-password” as password 4) The user presses the button “Register Account”
Expected result	The user is registered in the system and presented with the home page or the login page.
Actual result	The user is registered in the system and is presented with the login page.
Issues	Nothing to report

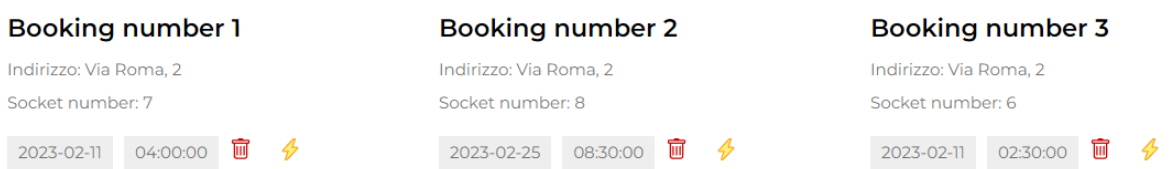
Id	Test-eMSP-2
Name	User logs in
Initial page	Home page
Preconditions	- The user is not logged in - The user related to the email address “test@mail.com” is already registered in the system
Steps	1) The user presses the “Sign in” button at the top of the home page 2) The form to sign in is shown to the user 3) The user fills the form inserting “test@mail.com” as email address and “test-password” as password 4) The user presses the button “Sign in”
Expected result	The user is logged in.
Actual result	The user is logged in and the charging station list page is shown to them.
Issues	Nothing to report

Id	Test-eMSP-3
Name	User monitors the status of a selected charging station
Initial page	Charging station list page (eMSP)
Preconditions	- The user is logged in
Steps	1) The user taps the card of a charging station from the list
Expected result	Information related to the selected charging station's status is shown to the user.
Actual result	A new page is shown to the user, which includes the address, price, active discounts, socket list and status for the selected charging station.
Issues	Nothing to report

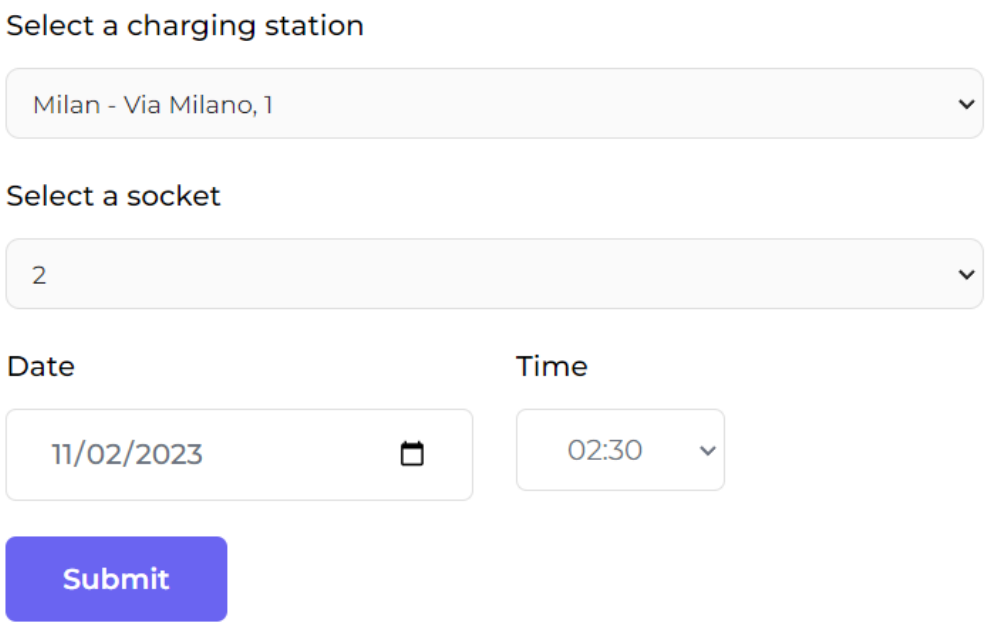
Id	Test-eMSP-4
Name	User lands on the booking page
Initial page	Charging station page (eMSP)
Preconditions	- The user is logged in
Steps	1) The user taps the icon button "Book" to book a certain socket
Expected result	The user is presented with a page through which they can submit a new booking.
Actual result	A precompiled booking form is shown to the user with the selected charging station and one of its sockets.
Issues	A minor note on the precompiled form: accessing it by selecting a socket from the charging station page, it would be appreciated if the preselected socket in the form would be the one selected from the charging station page and not the first between the available ones.

Id	Test-eMSP-5
Name	User creates a booking
Initial page	Booking page, accessed from the charging station page (eMSP)
Preconditions	- The user is logged in
Steps	1) The user fills the form inserting the desired socket, future date and future time 2) The user taps the button “Submit” at the bottom of the page
Expected result	The newly created booking appears in the booking list page with the same information inserted by the user in the booking creation form. The same booking also appears on the related charging station page of the CPMS view.
Actual result	The user is presented with the page of the booking list, where they can see the newly created booking. For the newly created booking, the page shows the booking identifier, inserted start date time, the assigned socket identifier and the selected charging station address. The same booking also appears on the related charging station page of the CPMS view.
Issues	If two bookings related to different charging stations and/or sockets and/or made by different users have the same date and time, an error message is shown during the creation of the second booking saying that the said time slot is already booked. This results in undesired behaviour because it would mean that a time slot could be occupied by a unique booking in the whole system.

Here the booking list page is shown at the moment of the tempted creation of the booking reported in the screen below. We can notice that booking number 3 is associated with the timeslot 11/02/2023, 02:30.



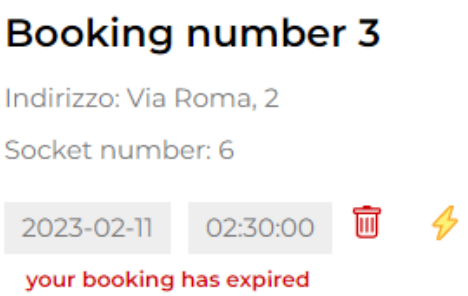
If we want to create a new booking in a different charging station associated with the same timeslot (11/02/2023, 02:30) an error message is shown.



Id	Test-eMSP-6
Name	User activates a booking within the correct timeframe
Initial page	Booking list page (eMSP)
Preconditions	- The user is logged in - The user has already created a booking which has not been activated nor deleted - The test is conducted in an instant within the time slot specified by the booking + 15 minutes
Steps	1) The user presses the icon button “Lightning” next to the details of the created booking
Expected result	The selected booking’s status appears to the user as “activated” and the selected socket’s status appears to the user as “occupied”, both in the eMSP page and in the CPMS page.

Actual result	A new page is presented to the user, where the related socket identifier, its speed, price and the status of the charge are shown. The charging station page shows the selected socket's status as "Occupied" on the EMSP page and "Unavailable" on the CPMS page.
Issues	The activation of a booking successfully occurs only within the first 15 minutes from the date and time specified by the booking. After the said interval, activation is not allowed anymore. However, the user can book the related socket from the charging station page (icon button "Start charge"). This behaviour is coherent with the documentation ([R30] "The CPMS subsystem should unlock the reserved charging spot if the user doesn't show up"), but the valid activation time slot is not explicitly shown to any of the users nor to the CPOW. A minor note: when trying to activate an already activated booking, an error message is shown to the user. The desired behaviour would be clearly showing to the user that the booking is already active and/or preventing its re-activation by making the related button disabled. Another observation: in the CPMS charging station page it would be useful to distinguish the status "Unavailable" due to an activated booking or due to any other reasons. Indeed, on the eMSP charging station page, the two statuses are differentiated into "Occupied" and "Unavailable".

The reported error message is shown after trying to activate the booking associated with the timeslot 11/02/2023, 02:30 at 02:45.



The reported error message is shown after trying to activate a booking which has been already activated.

Id	Test-eMSP-7
Name	User stops an activated charge
Initial page	Charge page (eMSP)
Preconditions	- The user is logged in - The user has already created a booking which has been activated and has not finished yet
Steps	1) The user presses the button “Finish charging” at the bottom of the page
Expected result	The selected booking’s status appears to the user as “stopped” and the selected socket’s status appears to the user as “available”, both in the eMSP page and in the CPMS page.
Actual result	The status of the charge shown on the page is now “Finished Charging”. The charging station page shows the selected socket’s status as “Available”, both on the eMSP page and on the CPMS page.
Issues	After the user has stopped a charge, they can go back to the booking list page: while the user tries to re-activate the associated booking within the first 15 minutes, the charge gets activated again and can be stopped. The result is that a booking can be activated and blocked an unlimited number of times within the first 15 minutes, a behaviour which is not explicitly presented to the user. Moreover, in the documentation it is said that “[R7] The eMSP subsystem must notify the user when the charge has finished”, but no notifications are shown to the user.

Id	Test-eMSP-8
Name	User deletes a booking
Initial page	Booking list page (eMSP)
Preconditions	- The user is logged in - The user has already created a booking which has not been activated nor deleted
Steps	1) The user presses the icon button “Trash bin” next to the details of the created booking
Expected result	The selected booking’s status appears to the user as “deleted” or the selected booking disappears from the booking list page.
Actual result	The deleted booking is not shown on the booking list page anymore, both on the eMSP page and on the CPMS page. All the other bookings on the page are shown without changes.
Issues	A minor note on the booking list page shown after the booking deletion: it would be appreciated if the identifier of the deleted booking would not be re-assigned to another booking left in the list after the deletion.

Id	Test-eMSP-9
Name	User activates a charge through a specified socket
Initial page	Charging station page (eMSP)
Preconditions	- The user is logged in - There is at least one socket whose status is “Available” in the selected charging station
Steps	1) The user presses the icon button “Start charge” next to the details of a certain socket whose status is “Available”
Expected result	The activation of the charge is confirmed to the user and the selected socket’s status appears to the user as “occupied”.

Actual result	A new page is shown to the user, where the related socket identifier, its speed, price and the status of the charge are shown. The charging station page shows the selected socket's status as "Occupied" on the eMSP page and "Unavailable" on the CPMS page.
Issues	Nothing to report

Id	Test-CPMS-10
Name	CPOW signs up
Initial page	Home page
Preconditions	- The CPOW is not logged in - There is no user related to the email address "cpo@mail.com" in the system
Steps	1) The CPOW presses the "CPMS Register" button at the bottom of the home page 2) The form to sign up is shown to the CPOW 3) The CPOW fills the form inserting first name, last name, "cpo@mail.com" as the email address, "cpo-password" as password 4) The CPOW presses the button "Register Account"
Expected result	The CPOW is registered in the system.
Actual result	The CPOW is registered in the system and is presented with the charging station list page.
Issues	Nothing to report

Id	Test-CPMS-11
Name	CPOW logs in
Initial page	Home page

Preconditions	- The CPOW is not logged in - The CPOW related to the email address “cpo@mail.com” is already registered in the system
Steps	1) The CPOW presses the “CPMS Sign in” button at the top of the home page 2) The form to sign in is shown to the CPOW 3) The CPOW fills the form inserting “cpo@mail.com” as email address and “cpo-password” as password 4) The CPOW presses the button “Sign in as CPOW”
Expected result	The CPOW is logged in.
Actual result	The CPOW is logged in and the charging station list page is shown to them.
Issues	Nothing to report

Id	Test-CPMS-12
Name	CPOW monitors the status of a selected charging station
Initial page	Charging station list page (CPMS)
Preconditions	- The CPOW is logged in
Steps	1) The CPOW taps the card of a charging station from the list
Expected result	Information related to the selected charging station’s status is shown to the CPOW.
Actual result	A new page is shown to the CPOW, which includes address, price, active discounts, socket list and their status, sources of energy (battery and DSOs) and their status, and bookings for the selected charging station.
Issues	Nothing to report

Id	Test-CPMS-13
Name	CPOW adds a discount
Initial page	Charging station list page (CPMS)
Preconditions	- The CPOW is logged in
Steps	1) The CPOW presses the button “Add new discount” at the top of the page 2) The form is shown to the CPOW 3) The CPOW fills the form selecting one of the listed charging stations, the initial date, the final date and the discount amount
Expected result	The newly created discount appears in the discount page with the same information inserted by the CPOW in the discount creation form. The same discount, if currently active, also appears on the related charging station page.
Actual result	The CPOW is presented with the page of the discount list, where they can see the newly created discount. For the newly created discount, the page shows the discount identifier, inserted start date, end date and the discount amount and the related charging stations’ identifiers. The same discount, if currently active, also appears on the related charging station page.
Issues	In the RASD and DD documents it is said that the discount creation form allows the CPOW to associate the new discount to a list of charging stations, but the implementation allows the CPOW only to select one charging station from the given list. This inconsistency is confirmed by the fact that the newly created discount has a label “Stations”, where all the related charging stations’ identifiers would be listed. A minor note: it would be more intuitive if the button useful to add new discounts was on the discount page instead of on the station list page.

Id	Test-CPMS-14
Name	CPOW deletes a discount

Initial page	Discount page (CPMS)
Preconditions	- The CPOW is logged in
Steps	1) The CPOW presses the button “Delete” associated with a certain discount
Expected result	The selected discount’s status appears to the CPOW as “deleted” or the selected discount disappears both from the discount page and from the related charging station’s one.
Actual result	Nothing changes, neither on the discount page nor on the related charging station’s one.
Issues	The discount is not deleted from the system. The same behaviour occurs by trying to delete a discount from the related charging station’s page. A minor note: with reference to the incoherence issued in Test-CPMS-13 about multiple charging stations selection, the button “Delete” in the associated charging station page would not clearly suggest the expected behaviour of the button (between “deleting the discount from only that charging station” or “deleting the discount from the system”).

Id	Test-CPMS-15
Name	CPOW activates (or deactivates) the use of the battery as a source of energy for a charging station
Initial page	Charging station page (CPMS)
Preconditions	- The CPOW is logged in
Steps	1) The CPOW presses the button “Activate” (or “Deactivate”) associated to a certain station battery
Expected result	The selected station battery’s status appears to the CPOW as “activated” (or “deactivated”).
Actual result	The selected station battery’s status appears to the CPOW as “Active” (or “Inactive”).
Issues	Nothing to report

Id	Test-CPMS-16
Name	CPOW changes the DSO to activate as a source of energy for a charging station
Initial page	Charging station page (CPMS)
Preconditions	- The CPOW is logged in
Steps	1) The CPOW presses the button “Activate” associated to a certain DSO
Expected result	The selected DSO’s status appears to the CPOW as “active”, while all the other DSOs appears as “inactive”.
Actual result	The selected DSO’s status appears to the CPOW as “Active”, while all the other DSOs appear as “Inactive”.
Issues	A minor note: the chosen UI components do not support the user experience, indeed the list of “Activate” buttons would suggest that multiple DSOs could be activated at the same time.

4 DOCUMENTS INSPECTION

4.1 RASD

The RASD document is well structured and can be understood by both a technical and a non-technical stakeholder.

The goals are well formulated and capture the main interests of the users of the system.

Another positive remark is the description of the product functions: a comprehensive list of the main functionalities of the system is accompanied by a clear representation of the functions using a standard modelling language (BPMN).

4.2 DD

The DD describes the system's architecture at different levels of abstraction.

An overview of the main components is followed by a description of some relevant non-logical elements (firewalls in particular).

A more detailed view of each sub-component is presented, along with the exposed interfaces.

There is a runtime view of the main described use cases, whose granularity allows us to understand the interactions between the sub-components.

Additionally, wireframes provide a clear representation of the UI, along with an indication of the relations between different wireframes.

5 CONCLUSION

The implementation is coherent with the ITD. The prototype demonstrates the main use cases described in the ITD.

Minor problems emerged from our test process, but they are easily solvable given the appropriate feedback.

6 EFFORT SPENT

Section	Total effort spent
Installation	1 h
Test design	2 h
Test execution	2 h
Documentation	7 h

Team member’s contributions:

Brugnano Matilde 6 hours
Buttiglieri Giorgio Natale 6 hours

7 REFERENCES

1. “Assignment IT AY 2022-2023”