



AUTHENTICATION FUNCTION FOR EV CHARGING EQUIPMENT & INFRASTRUCTURE SOLUTION FOR PORTABLE BATTERY CHARGING IN PUBLIC AREAS

1 INTRODUCTION

1.1 The Land Transport Authority (LTA) spearheads land transport developments in Singapore. We plan, design, build and maintain Singapore's land transport infrastructure and systems. We aspire to strengthen Singapore's land transport connectivity and integrate a greener and more inclusive public transport system complemented by walk and cycle options. We harness technology to strengthen our rail and bus infrastructure and develop exciting options for future land transport.

1.2 As we embark on our strategies that are encapsulated under the Land Transport Masterplan 2040 (LTMP2040), the operating environment in the land transport sector will continue to evolve rapidly. Hence, we encourage interested innovators, via this Call-For-Solution (CFS) on "Authentication Function for EV Charging Equipment & Infrastructure Solution for Portable Battery Charging in Public Areas", to co-create solutions to solve land transport sector challenges and achieve cost effectiveness, manpower optimisation, environmental sustainability, reliability, and safe operations.

2 PROBLEM STATEMENT

2.1 Due to safety considerations, the use of detachable electric vehicle (EV) charging equipment (e.g. Mode 2A/2B chargers, detachable cables) in public premises is currently prohibited.

2.2 We recognise that, facilitating the safe use of such detachable EV charging equipment could support Singapore's transition to EVs; reduce costs for EV charging operators and charger downtime; and enable more parking lots to be EV-ready. Furthermore, having the option to charge portable electric motorcycle (eMC) batteries safely in public premises could potentially facilitate more eMC models to be brought into Singapore market.

2.3 To address the safety and security concerns on the use of detachable EV charging equipment in public premises, engineering solutions can be explored.

- a. **Authentication of Charging Equipment:** One such example is the usage of an authentication function (e.g. Radio Frequency Identification (RFID)) to verify that the charging equipment is an authorised equipment before any charging event can occur. Such an authentication function can form part of a larger infrastructure solution, which would further allow the charging process to proceed securely (i.e. anti-theft/sabotage) and to be interoperable (i.e. across various types of vehicles/batteries).

- b. **Infrastructure Solution for Safe Charging of Portable Battery:** To support eMCs with portable batteries, there is a need to provide infrastructure for safe charging of such batteries in public areas. This infrastructure solution may come in the form of a battery charging cabinet that have the necessary provision (e.g. 15A sockets for Mode 2B chargers) for the charging of batteries and can contain battery fires if they occur during the charging process.

2.4 The authentication function and/or infrastructure solution would be implemented on any number of the 3 scopes:

- (a) low power portable chargers (Mode 2A), up to a max of 3.6kW;
- (b) detachable cables for use on Mode 3 AC chargers; and
- (c) charging of portable eMC batteries (Mode 2B)

3 WHAT ARE WE LOOKING FOR?

3.1 We have identified 3 use cases for a common authentication function for authorised EV equipment, and of which Use Case C will also have an infrastructure solution for portable eMC battery charging. The solution should address one or more of the 3 use cases as shown below:

	Use Cases ¹	Authentication Solution	Infrastructure Solution for Portable Battery Charging
A	Mode 2A low power portable EV chargers, up to a max of 3.6kW	√	
B	Use of detachable cables on Mode 3 AC chargers	√	
C	Charging of portable eMC batteries using mode 2B chargers from 15A sockets	√	√

3.2 For the authentication function, the proposal should state and describe the technology in use (e.g. RFID), and also elaborate how the solution will be set up and operated. The solution submitted should demonstrate how the authentication solution (e.g. RFID) can be:

- a. embedded onto the detachable EV charging equipment and how authentication can take place;
- b. able to disallow a charging activity without successful authentication of the EV charging equipment;

¹ Please refer to TR25:2022 for the definition of Mode 2A, 2B and 3 chargers.

- c. integrated into an EV Charging Operator's (EVCOs) backend system for identification and verification prior to the commencement of a charging session;
- d. integrated with payment function for ease of transaction after the completion of an EV charging session;
- e. able to detect and prevent the use of adapters, extensions, and unauthorised devices (i.e. devices not paired with authentication tool);
- f. seamless and not introduce delays and other complications that might lengthen the charging process (e.g. charging should start within 10 seconds from point of authentication); and
- g. prevented from being duplicated/cloned.

3.3 Proposals that can clearly describe how the authentication solution can be demonstrated to be interoperable across multiple EVCOs and across any approved detachable EV charging equipment will be strongly preferred. For solutions addressing Use Case C, the solution provided should allow for interoperability of Mode 2B charging devices across various brands of eMCs. Detachable EV charging equipment used in the trials must demonstrate compliance with (i) TR25 or (ii) internationally recognised standards (e.g. IEC 61851, 62196). If non-TR25 certification is provided, the applicant will need to map the test documents from the international standard to demonstrate that the proposed standard used is of an equal or higher standard compared to TR25.

3.4 For solutions addressing Use Case C, the proposal submitted should demonstrate how the chargers and the batteries will be secured or housed during the charging process to guard against theft, misuse, vandalism or sabotage (e.g., payment security, physical infrastructure), and fire risks (e.g., safeguards in place to prevent overcharging, detecting and cutting off power in the event of faulty or overheated device/battery; fire containment solutions; fire extinguishing features, etc.). The infrastructure solution should not require more than 3 phase, 40A of electrical intake. This must include the necessary supply connection works from identified power sources for installation of infrastructure solutions (e.g. 15A sockets or Mode 3 chargers). Interested participants may also demonstrate how such infrastructure solutions can be extended to other mobility applications, such as the charging of portable Active Mobility Device (AMD) batteries.

3.5 Interested participants should ensure that their proposals are complete by addressing the integration of both the EV charging equipment (i.e. mode 2A charger, detachable cable, portable eMC battery using mode 2B charger) and the authentication and/or infrastructure solution, as a single participant or a partnership. Interested participants who can only provide a proposal with either the EV charging equipment portion or the authentication and/or infrastructure solution portion, may fill up [this form](#) and LTA may cross-share particulars submitted to facilitate a partnership between participants. The deadline for this form will be on **21 Aug 2024**. Participants can choose to respond with proposals for any or all of the 3 use cases above. Please note that should your proposal cover solutions for more than 1 use case, LTA reserves the right to select a subset of the use cases from your proposal for Phase 1 of the trial.

3.6 Shortlisted proposal(s) will be subjected for up to two phases of evaluation. In Phase 1, shortlisted applicant(s) shall demonstrate the feasibility of the solution in a laboratory-based or controlled environment. Applicant(s) who has successfully demonstrated feasibility of its solution will move on to Phase 2. In this phase, applicant(s) will set up and operate their authentication and charging solution, as per the proposal, in actual car park environment and

under sandbox conditions. Exact car park locations will be confirmed after the completion of Phase 1 by LTA. Please refer to the table below for site requirements. Under sandbox conditions, LTA may also impose additional requirements (e.g. to require such cabinets to also charge AMD batteries) for the infrastructure trial to facilitate its policy objectives. Shortlisted applicants will have to undertake necessary supply connection works and liaising with the premise owner for installation of infrastructure solutions, including obtaining approvals from relevant stakeholders.

	Use Cases	Number of socket/inlets per site per participant	Number of sites per participant
A	Mode 2A low power portable EV chargers, up to a max of 3.6kW	9	10
B	Use of detachable cables on Mode 3 AC chargers	3	10
C	Charging of portable eMC batteries using mode 2B chargers from 15A sockets	-	5

3.7 Co-funding will be provided for both the authentication and infrastructure solution in Phase 1, with the actual amount to be determined on a case-by-case basis. No funding will be provided for phase 2, but operators may retain all revenue generated during the duration of the sandbox.

3.8 Phase 2 (i.e. the sandbox) is estimated to end in 2028. Should you intend to continue operating beyond the sandbox period, LTA may introduce additional requirements for authentication to enable interoperability of the charging solution across multiple EVCOs.

	Phase 1 (CFS/Trial)	Phase 2 (Sandbox)
Objective	Product development and integration of the authentication function and infrastructure concept onto EV charging equipment	To demonstrate the viability and technical safety of the integrated solution in real-world settings
Location	Laboratory, Workshops etc.	Carparks and other authorised locations
Funding	Co-funding provided	No funding provided
Duration	Estimated 6 to 9 months	Estimated end 2025 to 2028

3.9 Shortlisted proposals will be surfaced for further clarifications and/or a more detailed submission after the close of the Call for Solutions.

4 EVALUATION GUIDELINES

4.1 The proposal/solution should:

- a. Demonstrate and provide a comprehensive understanding of how the authentication function and infrastructure solution will work, and how it can be deployed in any number of the 3 use case scenarios above.
- b. Demonstrate how the solution will meet the various requirements for the authentication function, and the safe charging of portable eMC batteries. This includes (but is not limited to) requirements on metering, security, and interoperability. Where possible, please provide the architecture of the solution at the system level.
- c. Include the requirements for installation of the solutions. We strongly encourage that the proposal takes into account the electrical connection requirements and feasibility of the solution to be deployed in public car parks.

5 TECHNICAL BRIEFING

LTA will hold a briefing to provide more information on the problem statement on 19 Aug 2024 at the Land Transport Authority (LTA) – Bedok Campus Office (71 Chai Chee Street, Singapore 468981). If you are interested to attend the briefing, please [register here](#) by **14 Aug 2024**.

All proposals must be submitted by 11 Sep 2024, 1600 hours (SGT/GMT+8) via this [submission form](#).

We encourage interested parties to visit the [Land Transport Innovation Portal](#) for the latest updates.

6 GUIDELINES FOR PARTICIPATION

- a. The purpose of this brief is to provide preliminary information on the problem statement on [Authentication Function for EV Charging Equipment & Infrastructure Solution for Portable Battery Charging in Public Areas](#). Please note that the information provided does not form part of any subsequent contract.
- b. To register for this Call for Solutions, you must be from one of the following:
 - i. Private company, with local business registration;
 - ii. Tertiary institution based in and operating from Singapore;
 - iii. Research institution based in and operating from Singapore; or
 - iv. A consortium of any of the above.
- c. If you will be registering as a consortium, do appoint a lead member as the main applicant and make all submissions through this lead member. The actions by the lead member of the team will be treated as representative of the consortium. All correspondence will be directed to the lead member.
- d. Please provide relevant information on your (or consortium members') past experiences that are relevant for this submission.

- e. Do note that all proposals submitted through this CFS are for LTA's preliminary evaluation and shortlisting only. If LTA is keen to find out more about your solution after the close of this call, we will contact you for further clarifications. You may be asked to make presentations and/or provide more information on your solution to LTA and/or requested to host LTA at any proposed venue and/or facilities for visits and better understanding of the proposed solution.
- f. Eligibility for funding will be considered separately, and if your proposal is shortlisted, you may be asked to fill up further application forms with more details on your proposed solution. Do also note that you may be required to co-fund part of the solution development trial, subject to the respective funding guidelines.
- g. Any documents submitted will be treated as confidential and not be returned. By submitting any documents, you hereby consent to any disclosure by LTA of your documents to the Government of Singapore, the relevant Government Agencies, and/or government-related agencies, as LTA considers appropriate in our discretion for purpose of evaluation in this Call for Solutions.
- h. Notwithstanding any other provision in this Call for Solutions, LTA may amend, suspend or withdraw all or any part of the Call for Solutions or the Call for Solution process, which will be informed via the [Land Transport Innovation Portal](#).

7 CONTACT US

Should you have any further queries regarding this Call for Solutions, please direct them via email to inno@lta.gov.sg.