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# **TII492 Intelligent Transport Systems (ITS) - Equipment Supply and Installation Framework - Generation 2 - Lot 2**

**Volume A: Works Requirements**

**Part 3: Technical Specification  
Section 7: Emergency Roadside Telephones**

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# 1. Introduction

## 1.1 General

This document sets out the technical requirements for the supply, installation, testing and commissioning of Emergency Roadside Telephone (ERT).

ERTs shall be capable of making calls to the Motorway Operations Control Centre (MOCC). This phone number shall be easily changeable by the Contractor or by the TII ITS Equipment Maintenance contractor.

All ERTs shall connect to the existing MOCC PABX and Remote Diagnostics and Maintenance Terminal (RDMT), which is hosted on a MOCC virtual server.

All ERTs provided must be capable of communicating using a Session Initiation Protocol (SIP) to have Voice Over IP (VoIP) enabled. A machine-to machine (M2M) protocol must be available for diagnostic faults signal handling.

## 1.2 Scope

The scope of the works to be undertaken by the Contractor shall include, but is not limited to:

- The Contractor shall decommission, disassemble and remove all components, then advise the Employer's Representative on their condition.
- The Contractor shall store and make available for inspection and collection by the TII ITS Equipment Maintenance Contractor and the Employer's Representative all removed components unless otherwise instructed by the Employer's Representative.
- Upon instruction by the Employer's Representative, the Contractor shall dispose of any components that the Employer's Representative does not wish to retain from the ERTs removed as part of these works. The Contractor shall do so at its own expense. Evidence of disposal in accordance with the other requirements of these Works Requirements shall be provided to the Employer's Representative.
- The Contractor shall supply and install Emergency Roadside Telephones in accordance with this specification.
- The Contractor shall supply and install ERTs, with their locations confirmed by the Employer's Representative.
- The Contractor shall supply and deliver ERTs, along with components and spares, in accordance with TII's call-off contracts.
- The ERTs shall be capable of supporting multiple SIM types, including, but not limited to, the standard SIMs, M2M SIMs and eSIMs. The MOCC ERT system associates existing SIM cards with the location of the ERT. The Contractor shall ensure that the SIM cards are installed in the new ERT at the same location.
- The Contractor shall be responsible for the supply and installation of any peripheral devices necessary to connect the supplied ERT with the existing RDMT.
- The Contractor shall be responsible for the set-up and testing of all ERT on the existing systems.
- The Contractor shall provide a manufacturer's warranty of 2 years for each item of equipment supplied as part of the Works. This is a guarantee provided by the manufacturer, to the Employer, offering to repair or replace the product if it develops any defects or malfunctions in the first 2 years of operation.

## 2. ERT Requirements

### 2.1 General Requirements

During the period of call establishment, the ERT user shall be provided with all the standard call progress tones (i.e. dial tone, ring tone, dialling tones and busy tone).

The ERT shall have one button designated for call initialisation and be prominent and shall be clearly marked as to its function.

The buttons shall have the following properties:

- The maximum height of the operating buttons shall be 1200 mm above ground level;
- The minimum height of the operating buttons shall be 900mm above ground level; and
- Minimum diameter - 15mm.

The ERT shall have one or more speakers to broadcast the ringtone and voice communications. The speaker(s) shall be fully adjustable, with a maximum voice output of at least 90dB SPL peak.

The ERT shall have one or more microphones to monitor voice communication. Microphones shall be noise cancelling and shall be designed to filter out noise from adjacent traffic.

The ERT shall provide adaptive full-duplex speech operation. The ERT shall be able to discriminate the caller's speech from background noise of up to 95dB.

ERTs shall be designed and installed to filter out traffic and other unwanted noise and shall have internal adjustment to 'fine tune' the phone to its surrounding environment.

The ERT system shall be self-checking against faults.

The ERT shall be capable of "On request" and scheduled fault identification through the use of the RDMT equipment.

The ERT shall be capable of communicating the following diagnostic functionality as a minimum:

- Operational status
- Battery status and level
- Open door detection
- ERT Orientation (i.e. ability to detect if the ERT has been knocked over.)
- ERT Volume;
- Security Access Numbers;
- Configuration of dial out numbers for Voice Communications

The ERT shall be of robust and sturdy construction and comply with the environmental requirements stipulated in 'ERT Material Requirements' section of this document and shall require minimal preventive maintenance.

The ERT shall be passively safe.

The size and shape of the ERT Housing shall be of sufficient size for easy identification from a distance. However, the width and depth of the casing shall not exceed 350mm (width) x 500mm (depth).

The ERT Housing shall be orange in colour for easy identification at night and have labelling as detailed in this document.

Screws and fittings shall not be exposed.

The door of the ERT Housing shall be lockable. The contractor shall provide 3 sets of keys and have spare set of keys available upon request.

The Contractor shall ensure the availability of all spares required for the ERTs for a minimum of five years after completion of the works.

All ERT user interfaces shall be in the English language.

The Contractor shall provide fault reporting protocols to the Employer, before installation of any ERTs, so that the ERTs can be integrated on to the existing RDMT.

All ERTs shall be installed in accordance with TII CC-SCD-01562 where the ERT is located behind a safety barrier and in accordance with TII CC-SCD-01560 where the ERT is not located behind a safety barrier.

All ERTs shall be able to communicate with hearing aids and shall comply with DMRB: Control and Communications Technology TD 131 Version 0.1.0 Control and communications technology. Design. Roadside technology and communications, and

Other relevant standards shall be complied with, include but are not limited to:

- CC-SCD-01560 - Installation Drawing TCC - Telephone Installation Without Safety Barrier;
- CC-SCD-01561 - Installation Drawing TCC - Telephone Installation With Ducting/Chamber Details;
- CC-SCD-01564 - Installation Drawing TCC - ERT Plinth - Level with Road Surface and Kerb Around Plinth to Maintain Drainage;
- CC-SCD-01565 - Installation Drawing TCC - ERT Unique Identification Number – Label; and
- CC-SCD-01566 - Installation Drawing TCC - ERT Unique Identification Number - Label Small. The supplier shall provide warranties ensuring that spares will be available for a period of 10 years from the date of purchase.

The Contractor shall provide a warranty of 1 year following substantial completion of the works. As part of this warranty, the Contractor shall agree to repair or replace all equipment that are found to be faulting in the warranty period. The Contractor shall provide technical support to the ITS Maintenance Contractor during the warranty period.

## **2.2 Approval of Equipment Provided**

The Contractor shall arrange a Factory Acceptance Test in Ireland during which a sample shall be provided to be approved by the Employer prior to the order of ERTs. The Contractor shall install this on a demonstration site at a premises to be approved by the Employer and shall configure it to communicate with the MOCC PABX and Maitrise HMI 921 RDMT.

The sample installed at the demonstration site shall demonstrate fault testing capabilities and the protocol to be exported to the RDMT.

## **2.3 ERT Material Requirements**

### **2.3.1 CE Certification**

All ERTs shall be CE marked.

### **2.3.2 Environmental Requirements**

The outdoor roadside equipment shall be designed to satisfy the following requirements:

- The enclosure of the ERT shall be of the dust and weatherproof type conforming to no less than IP55 standard, as stipulated in EN 60529. Gaskets shall be fitted to door gap and all ventilation openings shall be such that water, dust, insect and rodent ingress shall be prevented.
- All screws and fitting parts used shall also be of the anti-rust type.
- All screws, bolts and nuts shall be fitted with vibration proof washers in view of the vibrations generally experienced on an elevated road structure.
- All steelwork for the anchor bolt assemblies shall be hot dipped galvanised.
- The ERT shall have an operating temperature range of between -20°C to +70°C continuous.
- The ERT must remain operable after withstanding wind speeds of up to 150km/h.
- The ERT Housing shall be vandal and impact resistant to prevent unauthorised access to the internal equipment. Vandal and impact resistant can be defined as being able to remain functional while withstanding moderate to severe blows by handheld objects in most circumstances without suffering more than cosmetic damage.

### **2.3.3 Frangibility**

The ERT and associated equipment combination shall be so designed as to be frangible in the event that it is hit by an errant vehicle. The frangibility requirements must comply with the definition and requirements of EN 12767. Proof of EN12767 certification shall be provided to TII before an ERT will be considered for deployment on a motorway.

The ERT Housing weight, including the phone equipment, shall be less than 40 Kg.

### **2.3.4 Use of fire-resistant materials**

Materials and components used in the equipment shall be selected so as to minimise the risk of fire. The exterior parts of housings shall use materials which are inherently fire-resistant. Fire resistant materials shall be non-toxic and halogen free.

## **3. Install**

### **3.1 ERT Power Supply**

The ERT shall be powered by batteries charged with solar panels.

All ERTs shall be capable of operating using both mains supply/battery and solar panel/battery units.

All electrical installations shall be carried out in accordance with the most up-to-date version of Ireland's National Rules for Electrical Installations (I.S. 10101:2020+A1:2024).

The ERT shall have provision for connection of a backup power supply. The connection shall be weatherproof.

The testing and performance of battery in Photovoltaic -based system should comply with IEC 61427-1 Secondary cells and batteries for renewable energy storage - General requirements and methods of test - Part 1: Photovoltaic off-grid application.

### **3.2 Battery**

The battery shall have the following characteristics:

- Operating Temperature range, -20° C - +70° C;
- Sealed rechargeable; and
- Minimum 3 years float service life.

Disconnection of the battery from the ERT shall not require a reconfiguration of the ERT. The use of volatile memory for configuration data is not permitted.

The battery shall be charged with a Solar Cell with 230Vac equipped for redundancy.

The power supply and charging system shall incorporate battery management to monitor the status of the battery charge and maintain it at its rated float voltage.

Should the battery voltage fall below 90% of its nominal float voltage an alarm shall be raised to the RDMT.

The ERT shall have a full battery talk time of 20 hours and a built-in standby time of 20 days without charge. The Contractor shall demonstrate this through the submission of calculations clearly showing power consumption and recharge cycle. This requirement should be based on minimum daylight hours for the Republic of Ireland. The batteries provided shall be a minimum of 22A-h.

The ERT shall not enter power saving or sleep modes. ERTs shall be capable of receiving and sending fault status updates at all times.

### **3.3 Solar Panel**

The solar panel shall be of sufficient size and wattage to ensure the ERT battery receives sufficient charge to ensure that the ERT shall be capable of a combined total of 50 minutes of conversation between any one ERT and the Control Centre over any 24-hour period, under weather conditions commonly experienced in the Republic of Ireland.

The Solar panel shall form an integrated part of the complete ERT assembly/housing.

The Solar panel shall be vandal resistant and attached to the mounting such that it cannot be removed without special tools as specified by the supplier.

The direction and orientation of Solar panel shall be adjustable, and it shall be adjusted by the installer as so to be optimised for an ERT's location.

The solar panel shall be sized to consider the availability of adequate sun light if the solar panel is mounted near a bridge abutment, building, large trees or other potential sources of constant or intermittent shade.

The fixing of the solar panel should be angled to minimise the accumulation of dust, water, snow or ice affecting battery charging efficiency.

### **3.4 Surge Protection**

The equipment shall be designed to withstand transient disturbances and surges induced onto the mains supply, such as by lightning. The equipment shall provide surge protection to withstand the surges specified in The Electromagnetic Compatibility Directive: EMC 2014/30/EU.

### **3.5 ERT Communications**

TII operate an ERT In-station in the MOCC. This In-station, incorporating the PABX, answers and routes telephone calls, and provides location specific information to the operator. This information is based on the GSM phone number of the ERT retrieved from the PABX. The In-station does not incorporate or include the RDMT.

All ERT shall be capable of operating with GSM and VOIP communications and shall be constructed and configured as a Master type arrangement. Each ERT shall have a unique phone number.

The coverage from the identified communications network provider shall be established before the ERT is installed.

### **3.6 SIM Cards**

The Contractor shall transfer SIM cards from the existing ERTs being replaced, as part of the works, to the new ERT installed at the same location.

### **3.7 Antenna**

The Antenna shall provide clear and uninterrupted communication.

An antenna suitable for operating the phone over both GSM and VOIP shall be firmly, either external or internal, attached to the top of the ERT Housing.

The antenna shall be attached to the housing such that it cannot be removed without special tools.

The cable from the antenna to the ERT shall be installed within the body of the ERT so as not to be accessible to the public.

The effects of Radio Frequency Interference (RFI) shall be reduced to a minimum.

### **3.8 Compatibility of Emergency Roadside Telephones**

ERTs shall be fully compatible with the TII Open architecture telephone system/ERT In-station (3CX PABX) located at the TII Motorway Operations Control Centre (MOCC), and will not impact on the functionality of existing or future ERT (of various manufacturers) connectivity to the existing ERT In-station.

### **3.9 Labelling and Unique Identification Number**

Each installed ERT shall be provided with a unique identification number. The unique identification number for each new ERT will be provided by the Employer three weeks prior to installation and shall be confirmed with the Employer's Representative prior to the order of labels. In case of replacements, they will adopt the number of the phone they are replacing.

All installed ERTs shall be supplied with labelling in accordance with CC-SCD-01565 and CC-SCD-01566 and installed. TII ERT GDPR labels are to be provided by others.

SOS telephone symbols shall be reflective or fluorescent material and installed on all sides of the ERT casing visible from the roadside and shall be both simple and prominent to ease the identification of location by motorists at night.

The ERT Unique Identification Number shall be displayed on the side of the casing facing the user and shall be both simple and prominent to ease the identification of location by motorists.

All labelling on the ERT shall be retro-reflective, durable, weatherproof and shall be subject to the approval of the Employer's Representative.

The labelling shall be 3M Scotch lite 3200 class 2 engineering grade reflective material with an enclosed lens retro reflective sheeting (or equivalent) and shall be subject to the approval of TII.

Labelling shall be provided and installed which shows approval marks of standards to which the equipment complies and power supply information.

### **3.10 ERT Civil Infrastructure**

It shall be the responsibility of the Contractor to provide adequate means of securely mounting the ERT on the plinths provided. The Contractor's proposal shall be subject to approval by the ER prior to the installation being carried out.

Where ERT Housings are not located behind safety barrier, the ERT shall be installed so that the rear of the housing faces on-coming traffic.

Where ERT Housings are located behind safety barrier, the ERT shall be installed as such that the housing will be turned through 90° to allow access from the traffic side of the safety barrier.

All support structures of the ERT shall comply with the latest version of EN 12767:2019+A1:2024: Passive safety of support structures for road equipment - Requirements and test methods.

### **3.11 ERT In-Station**

TII operates a Motorway Operations Control Centre (MOCC). All ERT provided as part of this Contract are required to integrate seamlessly into this existing TII PABX and MOCC based ERT in-station system. The Contractor shall consult with TII to allow sufficient time for the Contractor to identify and

rectify any potential integration issues and provide advanced details of the ERT to allow for the in-station configuration. The Contractor shall be responsible for in-station configuration.

The TII in-station system hardware, or software, shall not be altered to facilitate any proprietary ERT system software requirements.

Any new ERT proposed by the contractor must be fully compatible with the existing TII ERT in-station and allow the TII operator to make and receive calls to any ERT in a similar manner to using standard telephone and satisfy other requirements defined in this document.

The Operator shall be able to establish full duplex voice communication with the caller, in a similar manner as conversing over an ordinary telephone.

The Operator shall be able to call back the caller in a similar manner as that of dialling a normal telephone using the existing TII ERT In-station/PABX software.

### **3.12 Telephones “Not in Use”**

ERT “Not in Use” bags shall be used to cover ERT in the following situations:

- When ERT have been installed but not commissioned.
- Where ERT have been decommissioned but not replaced by new ERT.
- Where traffic management is in operation and the use of ERT has been deemed unsafe by the ER or by the An Gardaí Síochána. In such circumstances, either the ERT shall be disabled or additional temporary ERT shall be provided.

### **3.13 Cybersecurity**

The Contractor shall provide adequate security controls together with the supply and install of proposed equipment and system.

The Contractor shall ensure the secured communication between ERT and PABX, and RDMT and ERT.

The Contractor shall ensure proper access management in place for ERT, including physical security and information security.

The Contractor shall ensure the proposed equipment and system can be upgraded to its newest available version by TII approved third parties.

The Contractor shall ensure the compatibility between the ERTs and the wider systems.

The Contractor shall ensure there is proper security control and data validation when interfacing with a data management system.

## **4. Testing**

### **4.1 General Testing Requirements**

The Contractor shall comply with all requirements of TII250 Intelligent Transport Systems (ITS) Equipment Supply and Installation Framework Volume A: Part 4: Testing and Commissioning Specification.

### **4.2 Test Specification**

The Contractor shall prepare Factory Acceptance Test and Site Acceptance Test documentation to demonstrate the compliance of the supplied equipment with the specification, and that the equipment is operating as intended.

The test documents shall, for all levels of testing, separately detail in full how compliance with these requirements will be achieved and shall at a minimum include:

- Testing procedures including self-certification;
- Test set up including test equipment used;
- Desired results; and
- Format of test results documentation.

All test documentation shall be submitted to the Employer's Representative for comment at least 30 days prior to the tests being performed.

Should the equipment fail the Site Acceptance Test, the Contractor shall be required to remove the provided ERTs and reinstall the existing ERTs at the Contractor's own expense.

### **4.3 Test Results**

The test results document shall present, for all levels of testing, all test results obtained including:

- Details of equipment tested;
- Results obtained;
- Areas of non-compliance; and
- Remedial action taken or proposed for areas of non-compliance.

## **5. Handover Requirements**

### **5.1 Introduction**

The Contractor is responsible for the handover, to the Client or other contractors, of all items provided, delivered and/or installed as part of the Works.

A copy of the ERT firmware and any software that is needed to configure or maintain the ERTs shall be provided.

The Contractor shall assist the Employer in the handover of the installed equipment to the TII ITS Equipment Maintenance Contractor, following Substantial Completion of the Works or termination of the Contract.

### **5.2 As-Built Records**

Notwithstanding any other requirements of the Contract, prior to issue of the Taking Over Certificate, the Contractor shall provide a complete set of as-built drawings. Drawings shall provide the following information including, but not limited to:

- Construction drawings for each ERT location, including a photograph of the installed equipment for each of the four (4) faces;
- Drawings detailing the Cable Route, Cable type used at each location (where applicable)
- Drawings detailing the equipment locations, equipment type used at each location
- Test certificates for all Electrical Installations, as per ETCI requirements (where applicable)
- Schematic Wiring Diagrams of ERT and all installations
- Documentation detailing all Operations & Maintenance procedures in relation to the ERT equipment.
- An electronic copy of all software and firmware, including maintenance software, provided as part of the Contract.

### **5.3 Training**

#### **5.3.1 On Site Training**

The Contractor shall provide training in the operation, configuration and maintenance of all equipment, supplied under the Contract. Courses will be held at a site provided by the Contractor at a time to be agreed with the ER.

The duration of courses shall be sufficient to provide a clear understanding as to the design, maintenance and operation of each specific device.

The training course will be designed for up to ten maintenance staff/engineers. The Contractor shall provide all tuition, documentation packages and other items as may be required. The Contractor shall submit training course outlines to the Engineer for approval four weeks prior to the delivery of any training course. Training shall be carried out in advance of commissioning the system.

Qualified personnel shall present all lectures and demonstrations in person. The trainer shall have the required expertise in the subject area, and the ability to communicate concisely and effectively with the training participants. The ER will monitor the training programme.

Subject to the approval of the ER, the Contractor shall develop a means to assess the adequacy of the training sessions provided. If any of the sessions are deemed to be insufficient or inadequate, the Contractor shall be required to provide make-up training sessions on the topics in question at no additional cost to the Employer. The ER shall be the sole judge in this matter.

The Contractor shall supply all required consumables, test equipment and any other materials required for training.

### **5.3.2 Operator Training**

The Contractor shall provide training to the ER's (and/or their appointed representatives) personnel to provide them with a thorough understanding of the system to permit all operational and configuration tasks on the equipment to be undertaken. The training programme shall contain a portion that shall address strictly non-technical management personnel.

### **5.3.3 Maintenance Training**

The Contractor shall provide training in the maintenance of all elements of the equipment supplied of sufficient quality to provide a thorough understanding of the system and to allow maintenance personnel to perform first-line maintenance activities.

The Contractor shall provide training to the TII ITS Equipment Maintenance Contractor's Personnel in the use of the ERTs within 2 weeks of substantial completion of the works.

Training course shall at a minimum cover the following topics:

- System operation;
- System configuration, including instructions how to modify equipment and any parameters required for system operation;
- Overview of relevant documentation supplied by the Contractor in accordance with this Specification;
- Day-to-day operations;
- How to add / delete / modify settings;
- Overview of ERT system configuration/data reconfiguration;
- Instruction on routine operation and maintenance requirements;
- Overview of relevant documentation supplied by the Contractor in accordance with this Specification; and
- The Contractor shall submit all documentation for operation of the ERTs in advance of commencing training. The documentation shall include the operational manual, technical manual and any test reports.