Limited Tender for Supply, Installation, Testing and Commissioning of Automatic Smart Card Recharge Machines (ASCRM) for Kolkata Metro (Phase-I)

श्रीस
CRIS

LIMITED TENDER FOR

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF TWO AUTOMATIC SMART CARD RECHARGE MACHINES (ASCRM) (PHASE-I)

TENDER DOCUMENT PART- II

SCOPE OF WORK AND SPECIAL CONDITIONS OF CONTRACT

[Note to Bidders: Please indicate your compliance to each clause on a copy of this document, and enclose it with your offer]

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1. INTRODUCTION:

The Centre for Railway Information Systems (CRIS) is an organization under Ministry of Railways which was established in 1986 as the umbrella organization for all computer activities on Indian Railways (IR). CRIS is a project oriented organization engaged in development of major computer systems for Indian Railways. Our presence across the country gives us global reach and a vast rollout support capability. Together with our formidable team of high-calibre ICT professionals, we have successfully positioned ourselves at the vanguard of the global IT services revolution. With such a rich practical experience, a dedicated team of professionals and its own R&D effort, CRIS aims to be a leader in this fast developing IT field. CRIS provides consulting and IT services to Indian Railways as partners to conceptualize and realize technology driven business transformation initiatives.

Indian Railways is amongst the largest Railway systems in the world, addressing a significant part of the country's transportation needs, both in the passenger and freight segment. Metro Railway Kolkata is the oldest metro of this country which operates over 24 Stations. Around 7 lakh passenger use this metro on a regular basis.

2. PROJECT BACKGROUND & GENERAL REQUIREMENTS:

2.1. **Background**:

Metro Railway, Kolkata is the first underground Metro Railway of India. It began operations in 1984.It extends from Dum-Dum to New Garia and Dum-Dum to Noapara , the busy north south axis of Kolkata over a length of 26.33Kms.There are twenty four stations en route, each about a kilometre apart. In 2011 CRIS has replaced the magnetic ticket and turnstile gate based non-centralized system with a new centralized system comprising of Retractable Flap Gates and RFID based Smart Card/Tokens. Smart Cards are used for muti-journey tickets and Tokens are used only for single journey requirement. The whole system has 280 Gates of different configurations, 208 Point of Sale Terminals and 60 nos. of Card/Token balance/status checking Terminals servicing 7 lakh passengers every day. In 2012 self operated Automatic Smart Card Recharge Machine had been introduced for evaluation of such machines.

2.2. **Earlier field trial of limited featured ASCRM**:

Initially Self Service AFC Kiosk was developed for recharging Smart Cards with only INR 100. Three such Kiosks loaded with CRIS developed S/W were installed at three stations of Kolkata Metro in 2012. Metro Railway, Kolkata provided necessary network connectivity and power supply for running these Kiosks in Metro Railway premises.

2.3. **Current Requirements**:

Metro Railway, Kolkata now wants to facilitate its commuters be able to recharge their Smart Cards for different top-up values and buy new Smart Cards through ASCRMs. To evaluate performance and user acceptance of such Kiosks in Phase-1, Metro Railway Kolkata has planned to install two nos. of ASCRMs with multiple recharge options and capability of selling new Smart Cards at some designated stations.

3. SCOPE OF WORK:

The scope of work of the Contractor shall include, but not be limited to, the design, manufacture (where applicable), supply, delivery, installation, testing, commissioning, on-site 1 year free maintenance support, supply of Contract Spares, O & M documentation, OEM certificates, standards compliance certificates, circuit drawings and training for the following items and works:

Two ASCRMs (Automatic Smart Card Recharge Machines) along with its peripherals (like Bank Note Accepter/Validator device, Smart Card Accepter/Dispenser device, Contact and Contact less Smart Card Reader/Writers, Electronic Cash Box/Vault, Printer etc as mentioned in *Annexure-I & Annexure-II*

Sharing API/Communication protocols for interfacing with Bank Note Accepter/Validator device, Smart Card Accepter/dispenser device, Contact & Contact less Smart Card Reader/Writers, Electronic Cash Vault, Printer etc. in a specific format as mentioned in *Annexure-III* and providing necessary assistance to the satisfaction of CRIS to integrate supplied API/Communication protocols with CRIS developed Java based application S/W.

3.1 The services to be performed by the Contractor for application S/W development shall include:

a) Contractor has to supply API/Communication protocols for interfacing with Bank Note Accepter/Validator device, Smart Card Accepter/dispenser device, Contact & Contact less Smart Card Reader/Writers, Electronic Cash Box/Vault, Printer etc. in a specific format as mentioned in *Annexure-III*.

b) Contractor has to provide support in integration of supplied API/Communication protocols with CRIS's application S/W and testing to the satisfaction of CRIS.

c) Contractor has to provide necessary tools to manage all subcomponents in order to simulate the actual machine operation during the performance testing phases.

3.2 The services to be performed by the Contractor for testing, installation and commissioning shall include:

1. Delivery of the equipments at the site of installation. Such delivery sites in this case refer to the Kolkata Metro stations.

2. Installation, Network & Electrical Connectivity: The Contractor shall arrange for electrical and network connectivity of the ASCRMs to the suitable electrical and network interfaces provided by Kolkata Metro. Such installation shall not interrupt/hamper in any way Kolkata Metro's operations. Kolkata Metro will provide a Network and Electrical socket within 10 meters from the place of Installation.

3. Integration, Testing and Commissioning: The Contractor shall arrange for Integration testing of the ASCRM's. The ASCRM's may be commissioned only after obtaining suitable satisfactory testing certificate from CRIS.

4. The successful bidder shall submit a detailed top level and component level design of the ASCRM's to be manufactured /supplied, along with network diagram and power system diagram well in advance to enable review of the same by the CRIS's representatives.

5. The Contractor shall prepare and submit operating and maintenance manuals for the system for approval of CRIS. The bidder has to provide 3 copies of the operating and maintenance manual for each machine. The softcopy of the document should also be submitted.

6. The Contractor shall transfer to CRIS all necessary requirements specifications, legal certificates and documents, licenses, design documents, maintenance manuals, interface specifications and all software source code specifically prepared/modified for this project, or directly/indirectly related to this project with the exception of source code for commercially distributed proprietary software packages from third parties.

7. The Contractor shall provide original software media and original licenses for all proprietary software packages.

4. INSTRUCTION TO BIDDERS:

4.1 General Conditions

a. The bidder shall be one of those firms which has already supplied limited featured ASCRM for Metro Railway, Kolkata for trial run and successfully executed or firms who have received order from Indian Railway/CRIS for supply of Cash operated Ticket Vending machines. Any representative of the firms or a consortium formed with the firms is not allowed to quote for this tender.

b. In case the bidder is not an OEM of the Subcomponents, then the bidder should enclose documentary evidence of back-to-back agreement with OEM to provide support for the following sub components i.e. Bank Note Accepter/Validator, RFID Smartcard Reader/Writer, Contact Card Reader/Writer, Smart Card Accepter/Dispenser, Touch Screen, Thin Client, Printer including availability of software/firmware upgrades and hardware spare for 5 years from the date of delivery.

c. OEM support should be very clearly mentioned in detail along with complete Escalation Matrix & procedure in back to back agreement between the bidder and the OEM.

d. The bidders should enclose documentary evidence that they have the necessary organizational infrastructure to provide support in Kolkata (India). Support office should include full details such as postal address & Telephone no of the office .

e. The bidder must specify item wise compliance to technical specifications as per *Annexure-II*. The make and model nos. of the components e.g. Bank Note Accepter/Validator, Smart Card Accepter/Dispenser, RFID Smart Card Reader/Writer, Contact Card Reader/Writer, Printer, Thin Client/Processor, Touch Screen etc. should be clearly stated. Specific customization made, if any, to the standard product in order to meet the CRIS requirement should be explicitly stated. However, final decision on customization will be taken by CRIS.

f. During the contract period (Warranty period) all patches and upgrades including firmware updates for various major components of ASCRM, Bank Note Accepter/Validator, RFID Smart Card Reader, Contact Card Reader/Writer and Smart Card Accepter/Dispenser should be done at no additional cost to the consignee.

4.2 Submission of Bids

i. The bids will be in submitted electronically in two packets (Technical Bid + Financial Bid) system. These two packets will be submitted at a time electronically before the date of tender opening. The bidder may follow the instructions to bidder document available on **www.ireps.gov.in.**

ii. The technical bid should be open first and will be examined to check that the bid is technically responsive.

iii. CRIS will not be responsible for any delay on the part of the vendor in obtaining the terms & conditions of the tender or submission of online bids. The bids submitted by telex/ telegram/ fax/ E-mail / manually etc. shall not be considered. No correspondence will be entertained on this matter.

4.3 Contents of the Bid

Bids must be furnished along with check-list document placed at *Annexure-VI& Annexure-VII* of this tender. The specific information indicated against each section must be provided. Offers which do not contain the information sought might be considered unresponsive and will be rejected. The Bid prepared by the bidder shall comprise of the following components.

A letter from the Bidder clearly indicating the name, address and telephone number of the Bidder(s) as well as the name, designation, email ID and telephone number of the primary contact person of the bidder responsible till the signing of the Contract as per Annexure-IX.

A. Technical Bid documents

This part of the bid shall include the following documents:

i. Documents as mentioned in **Clause 5 "ELIGIBILITY CRITERIA", Clause 6 "QUALIFYING CRITERIA"** and "**General instruction" section of Clause 4 "INSTRUCTION TO BIDDERS"** of this document.
ii. Letters, Certificates, Technical documents asked in the tender document.
iii. In case any clause or condition is not acceptable to any bidder, he should clearly specify in Statement of Deviations as per *Annexure-VIII*. Otherwise it will be considered that the bidder has accepted all Terms & Condition of the tender document.
iv. Un-priced Schedule of Rates clearly specifying all items as given in the schedule of rates except the prices. It may be noted that the un-priced Schedule of Rates should not mention cost of any item.
v. The complete checklist along with formats of document is placed at *Annexure-VI & Annexure-VII*.

B. Financial Bid documents

This part of the bid shall include the following documents:

i. Schedule of Rates as per the format specified in **clause 17**.

5. ELIGIBILITY CRITERIA:

Bidder should fulfill the following eligibility criteria:-
5.1. The bidder shall be one of those firms which has already supplied limited featured ASCRM for Metro Railway, Kolkata for trial run and successfully executed or firms who have received order from Indian Railway/CRIS for supply of Cash operated Ticket Vending machines. The firm should be registered under Companies Act. Certification of Incorporation to be submitted to CRIS along with the bid.
5.2. The bidder should have established office at Kolkata which has been operating/dealing in the similar business for at least 1 year. Proof for the same has to be submitted along with the bids.

5.3. The bidder should not be blacklisted at the time of bidding by any Government of India Agency/PSU. A declaration for the same should be given by Bidder's authorized signatory.

6. QUALIFYING CRITERIA:

Bidder should fulfil the following qualification criteria:-

6.1. The Bidder should have an average annual turnover of at least **Rs. One Crore** in three consecutive financial years prior to the date of opening of the bid i.e. during financial year 2011-12, 2012-13 and 2013-14 in support of that bidder should submit P&L account and Audited Balance sheet.

6.2. The bidder should have successfully completed sum of purchase orders of value of **Rs. 5 lakh** or more for supply and installation of kiosk with Bank Note Acceptor/Coin validator (self service currency transaction machine) in any one year of the financial years 2011-12, 2012-13, 2013-14 and 2014-2015 (for financial year 2014-2015, purchase order should have executed and completed 3 months prior to the opening of the tender), prior to the date of opening of this tender.

7. **INSPECTION AND ACCEPTANCE PROCEDURE:**

7.1 Inspection shall be carried out by the consignees or their authorized representatives at consignee's premises (Railway Stations) and CRIS representatives. CRIS may also inspect the machine before it is delivered to consignee's premises.

7.2 **Preliminary Acceptance Testing** shall be done by the consignee along with CRIS representatives on receipt in the presence of representatives of the contractor and a preliminary acceptance certificate as per Proforma given in *Annexure-IV* will be prepared in 4 copies, out of which three copies will be issued by the consignee. One copy shall be handed over to the supplier and one copy each shall be sent to Manager Purchase and Chief Manager/UTS/CRIS. Preliminary inspection and acceptance will comprise of the following;
   1. Physical verification of ASCRM and its components, Bank Note Accepter/Validator, RFID Smart Card readers and Smart Card Accepter/Dispenser, Printer as per the supply contract.
   2. Physical inspection of the ASCRM and its components, Bank Note Accepter/Validator, RFID Smart Card readers and Smart Card Accepter/Dispenser, Printer for any physical damage.
   3. "Demand Inspection Report" for all ASCRMs and its components, Bank Note Accepter/Validator, RFID Smart Card Readers, Smart Card Accepter/Dispenser and Printer.
   4. Perform the 'power on test' for all the products/components supplied.
   5. Functional testing of Bank Note Accepter/Validator, Smart Card Accepter/Dispenser and RFID Smart Card Reader with vendor supplied test tool.
   6. The bidder must submit Sybase ASA licenses certificate with ATS certificate to CRIS for warranty period.
   7. Back-to-back agreement with OEM mentioning its commitment to support for next 5 years for the supplied component must be submitted to CRIS by bidder. However, warranty period will be as per clause 11.1 of this document.

7.3 **Installation and commissioning of equipment** shall be done at consignee's site as per Metro Railway's requirement. A Commissioning Certificate as per Performa given in *Annexure-V* will be issued by Metro Railway, Kolkata in four copies, out of which three copies will be issued by the consignee. One copy shall be handed over to the supplier and one copy each shall be sent to Manager Purchase and Chief Manager/UTS/CRIS. The commissioning will comprise of the following:
   1. Installation of equipment at consignee's site as per Metro Railway's requirement.
   2. Testing the installed equipment before make it available for public use.

8. CRIS S/W COMPATIBILITY:

   1. The vendor has to supply ASCRMs, it's subsystem components along with necessary APIs and OEM supplied Communication Protocols for interfacing with the components.

   2. All required APIs should be accessible directly from Java based CRIS application software.

3. The supplied APIs and OEM supplied Communication Protocols should meet all the requirements of Kolkata Metro as annexed in this tender document.

4. The supplier should be able to incorporate the ASCRM application, the Software Program developed by CRIS for implementing prevalent business rules.

5. Supplied APIs and OEM supplied Communication Protocols should provide with means to identify Smart Card threshold values and level of Smart Cards in the Card Stacker.

6. Supplied APIs and OEM supplied Communication Protocols should provide with means to identify Cash Vault opening or closing, Bank Note threshold values and denomination wise count of Bank Note in the electronic Cash Vault.

7. The bidder has to incorporate any subsequent modification in APIs and Communication Protocols to meet changing Functional requirement of Kolkata Metro.

9. TECHNICAL SPECIFICATION

9.1   Detailed technical specifications for the equipments are given in *Annexure-I & II*. The bidder must submit an item wise compliance of these technical specifications.
9.2   The product should be technically responsive.

10. DELIVERY, INSTALLATION, COMMISSIONING& WORK COMPLETION:

1. All items of supply shall be delivered to respective Kolkata Metro Stations.
2. Addresses of consignees and contacts are to be provided by CRIS.
3. Delivery period : 8 weeks from the date of issue of PO.

4. Installation and commissioning: All supplied items will normally be installed or ready to be commissioned within 2 month from the date of issue of PO.
5. Certificate of completion of works (*Annexure-VI*) will be issued by CRIS whenever any one of the following condition is met:
   a) Submission of the satisfactory performance certificate (issued by Metro Railway Kolkata)
   b) 4 months from the date of commissioning of the machines. (Only if the satisfactory performance certificate is not issued inspite of no valid shortcomings of the machines was communicated by Metro.)
   c) 6 months from the date of issue of Preliminary Acceptance Certificate. (Only in case the machines are not commissioned due to reasons for which contractor is not responsible).
   d) Rectification of all shortcomings (in relation to the scope of the contract) as observed and communicated during the first 45 days of business operations.

11. WARRANTY AND SUPPORT:
1. ASCRMs, power supply and conditioning equipment along with all the subsystems and component thereof shall be supported with one year on site comprehensive warranty from the date of commissioning of the equipment or 18 months from the date of delivery whichever is earlier.
2. The bidder will train two staff at each installation site (Railway Station) for 3 days in operation of the equipment which will form a part of the final commissioning.
3. The contractor shall provide hand holding support for users of 30 days at each installation location after initial installation of the ASCRM Kiosks.
4. Contractor shall support the supplied machines 24 hours x 7days a week including Saturday, Sunday and Gazetted holidays at Kolkata Metro stations during business hours of Kolkata Metro during warranty period.

5. These engineers shall report to a contractor appointed manager, who shall be single point of contact to Kolkata Metro for ascertaining problem status and details.
6. The contractor should also provide a problem escalation matrix to facilitate escalation of unsolved problems.
7. Bidder will maintain their own inventory of spares so as to give the fast and efficient service, carryout all necessary repairs and replacements of parts without any additional cost, if any. Components that are susceptible to frequent failures should be stocked adequately.
8. Maximum time for initial response to reported problem/failure shall not exceed 6 hours.
9. Preventive maintenance of each ASCRM and its components (i.e. Bank Note Accepter/Validator, Smart Card Accepter/Dispenser, RFID Smart Card Reader/Writer, Printer) will be done by the vendor at least once in a month at convenient time of Metro Railway. The last month PM report should be submitted to the consignees in the first week of every month.

12. PENALTIES FOR WORKS & SERVICES:

12.1. Penalty for overall delay in project execution:
Time is the essence of this project and in time completion of work is important. In the event of any delay in completing the project (refer to **clause 10**) a penalty equal to 0.5% of the total value of contract (as per PO/LOA), for every week of delay or part thereof, subject to a maximum of 10% of the total value of contract will be deducted from balance payments. In event of excessive delays, CRIS reserves the right to cancel the contract.

12.2. Penalty for failure to meet the availability objective:
Penalty will be charged at a rate of **1%** of the total value of contract for each percent drop in availability below **99.0%** and at a rate of **3%** of the total value of contract for each percent drop in availability below **95.0%**. This shall be recovered by en-cashing bank guarantees. Availability will be calculated based on the following:
- It will be calculated quarterly.
- A machine will be considered unavailable if it's operation is completely affected and down time will be calculated after giving a 6 hours free repair/maintenance time for first 3 cases in a month.
- Downtime will be calculated only for those cases where the contractor is solely responsible for the failure.

12.3. Penalty for acceptance of counterfeit currencies:
In case the machine accepts counterfeit/unfit currency then the contractor shall be penalized to settle the equivalent amount. However the contractor shall be given chance to enquire the case. The contractor will be provided with **10 days** time to rectify and installation of new firmware incorporating detection mechanism of that counterfeit/unfit currency. Within this rectification time the contractor will not be charged with any penalty for first 3 occurrences during warranty. In case the contractor fails to rectify the system within 10 days and Metro Railway Kolkata/CRIS will be at liberty to penalise the contractor as per **clause 12.2**.The loss due to acceptance of any fake note, will be worked out on quarterly basis and advise to the contractor to deposit the same with CRIS. Failure to deposit the amount within one month of such advice may be treated as violation of contract leading to encashment of Performance Bank Guarantee.

13. PAYMENT CONDITIONS FOR SERVICES & WORKS:

1. Purchase Order will be released upon submission of Security Deposit in the form of Bank Guarantee for **10%** of the total value of contract.
2. Materials should be delivered as indicated in **clause 10**. Payment for **80%** of the value of goods received shall be made after submission of duly signed :
   a. Preliminary Testing Certificate to be issued by CRIS/Metro Railway, Kolkata.

b. Commissioning certificate to be issued by Metro Railway Kolkata (This is not required if bills submitted after 60 days from date of issue of Preliminary Test Certificate)

3. The Bank Guarantees shall be valid till the end of three months beyond the expiration of warranty period, and shall be extended as necessary to ensure this condition.

4. Final payment shall be made on submission of satisfactory performance certificate to be issued by Metro Railway, Kolkata after one month of commissioning of the machines. If any shortcomings in design or functionality of the machines are observed; Metro Railway Kolkata will communicate the same to CRIS in writing within 45 days from the date of commissioning. The contractor will undertake rectification of all such shortcomings which are within the scope of the contract before claiming further payments.

Absence of any communication on shortcomings within the above stipulated period from Metro Railway Kolkata, will be treated as acceptance of satisfactory performance by Metro Railway Kolkata and in such a case final payment will be made no later than 4 months from the date of commissioning or no later than 6 months from the date of issue of Preliminary Test Certificate .

14. SYSTEM INTEGRATION SUPPORT & TROUBLESHOOTING :

Since these machines will be working as a part of Kolkata Metro AFC system, the contractor has to provide following H/W items to CRIS for integration testing of ASCRM S/W and troubleshooting after technical validation. This has to be complied within 7 days from the date of intimating the same by CRIS through letter/email:

a) Thin Client with pre-installed system software and other necessary software/software packages.
b) Bank Note validator
c) Smart Card Accepter/Dispenser
d) Smart Card Reader/Writers

This may be required during any period of the contract.

15.DOCUMENTATION:

15.1 One Set of manuals and support documents with each ASCRM shall be made available. All the Hardware must be accompanied by original documentation and full set of accessories given by the manufacturers. Any software for installation of the equipment shall be supplied on a CD/DCD.

16. TRAINING:

16.1. The contractor shall train two staff at each installation site (Railway Station) for 7 days in operation of the equipment.

16.2. The contractor shall provide hand holding support for users 1 month per installed location from the date of commissioning.

17. SCHEDULE OF RATES:

17.1. Rates must be quoted in the financial bid in the format given in the schedule of rate given in *Annexure-XIV*. The bidders must quote the rates strictly according to the Performa, giving break ups as asked for. However this proforma as given in *Annexure-XIV* is indicative in nature and bidders need to quote rates as per format given in www.ireps.gov.in.

17.2. Cost of any optional features need to be quoted separately as shown in the rate schedule. These shall not be considered for financial evaluation of the offer.

18. EVALUATION OF BID:

Step I (General):

The bids will be evaluated as per the **eligibility criteria** & **qualifying criteria** mentioned in **Clause 5, Clause 6**, *Annexure-VI.* Only the bids fulfilling the eligibility &qualifying criteria will be eligible for

Limited Tender for Supply, Installation, Testing and Commissioning of Automatic Smart Card Recharge Machines (ASCRM) for Kolkata Metro (Phase-I)

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technical evaluation. The bids not fulfilling the eligibility &qualifying criteria as per **Clause 5, Clause 6**, *Annexure-VI* will be disqualified and no technical evaluation of such bids will be performed.

Step II (Technical bid evaluation):

The technical evaluation of the bids will be done to ascertain whether the bid is substantially technically responsive or not. The technical bid evaluation will be done in two parts which will be carried out concurrently.

Part – I

18.1 All the technical documents will be examined. CRIS will inspect the technical specification compliance sheet as per **clause 9** & *Annexure-VII* of this document. Compliance for any item should not be left blank. If any clarification is required by CRIS, the bidder should comply within 5 working days failing which the bid could face rejection.

Part – II (**Technical Validation**)

18.2   The bidder shall be asked to arrange the hardware for technical validation at CRIS Kolkata. The hardware/product should be made available preferably within **7 days** from the date of intimation to the bidder and in no case should exceed **10 days**. This includes time for shipment and transportation, etc. Any bidder failing in providing the hardware/product within 10 days from the date of intimation to the bidder shall be considered technically unresponsive.

18.3   The bidder shall be given a time period of 1 week for performing technical validation. During this time period, the bidder should provide OEM resources for the installation/configuration and tuning of the product. During the technical validation, if the product needs changes to meet CRIS specification, the bidder shall be intimated and shall be allowed to do changes within the same time period of 1 week. However, make and model of the sub components as stated under **clause 4.1.d** shall not be allowed to change. After 1 week, if the product is not found meeting the technical specifications and functional requirements or there are compatibility issues with the CRIS application the bid shall be considered technically unresponsive.

18.4   The technical validation of the hardware/machine and APIs shall be carried out as per *Annexure-XII*. The bids not meeting any of the criteria mentioned in *Annexure-XII* shall be considered technically unresponsive and shall be rejected.

18.5   At the end of completion of technical validation, all the bidders will sign a technical validation report with CRIS about the outcome of the technical validation without modifying or adding any clause in the report. In case any clause is added or modified by the bidder, the bid shall be considered conditional and shall be disqualified. This report should be signed within 2 working days of completion of technical validation. In case any bidder fails to sign the technical validation report, the bid shall be considered technically unresponsive.

Step III – Financial evaluation

18.6   The Financial bids of only those bidders who are considered substantially technically responsive shall be opened at this stage. Offers that are found in order shall be taken up for financial evaluation as per criteria given below:
- For the purpose of inter se ranking of the offers, all inclusive value for the entire scope of work as defined in *clause 3* above and quantity of equipment/Material/Services as specified in the Schedule of Rates shall be taken into account.

18.7   Additional features/enhancements offered by the bidder, over and above the ones asked for in the tender documents, shall not be considered for evaluation of bids.

Annexure-I

If the bidder feels that the following functionalities cannot be offered by devices having technical specification detailed in Annexure-II, the causes and proposed solution may be mentioned in detail and submitted along with the statement of deviation.

Functional requirements of ASCRM:

1. System Overview:

Self Service AFC Kiosks will be installed in the unpaid area of Kolkata Metro Railway stations. Card vending Kiosk (ASCRM) will be used for Smart Card related functionalities e.g. Smart Card Issue, Smart Card Recharge etc. Commuters can get their Smart Cards recharged or purchase a new Smart Card on payment of Cash through Smart Card Vending Kiosks. Design of the Kiosks will be modular such that if any module fails other modules will continue to operate independently wherever possible. Only Indian currency notes of specified denominations will be accepted as per existing business rules of Metro Railway, Kolkata.

2. Basic Design Philosophy and Requirements:

Proven Design

a. The Contractor shall develop the design the ASCRM's based on this Specification. The design details shall be submitted with technical data and calculations to the CRIS for approval.

b. The ASCRM's including all sub-systems and equipment shall be of proven design. The system/sub-system, equipment, hardware proposed by the Contractor shall have been in use and have established their satisfactory performance over a period of at least two during last five years.

c. Where similar ASCRM's or sub-systems of a different type/specification or configuration are already proven in service, then the design shall be based on such equipment. In case these stipulations are not fulfilled, the Contractor shall furnish sufficient information to prove the basic soundness and reliability of the offered ASCRM's and sub-systems.

d. The design philosophy should meet the following criteria:

- Application of state-of-the-art Technology
- Open architecture for integration with other systems of fare collection and other monetary transactions
- Service proven design
- Minimum life cycle cost
- Ease of maintainability
- Use of interchangeable, modular components
- Extensive and prominent labelling of parts, cables and wires
- Use of unique serial numbers for traceability of components
- High reliability
- Energy efficiency
- System safety
- Adequate redundancy and factor of safety
- Use of fire retardant materials

- Environment friendliness
- Adherence to functional, operational and performance requirements

3. H/W Components of AFC Kiosk:

Although AFC Kiosks will have provision for adding optional modules wherever possible, initially these will comprise only the required devices as per functional requirements placed by Metro Railway, Kolkata.

3.1 Smart Card Vending Kiosk:

- Thin Client
- Capacitive 17'' Touch screen
- Currency Note Accepter with escrow facility and secured Cash Box/Bag with electronic lock.
- Motorized Card Accepter /Card Accepter cum Dispenser with integrated 13.56 MHz RFID reader and ISO 7816 Contact Card reader.
- Motorized Card Dispenser/Card Accepter cum Dispenser with integrated 13.56 MHz RFID reader and ISO 7816 Contact Card reader.
- Thermal Printer
- UPS

Block Diagram of AFC Self Service Kiosk
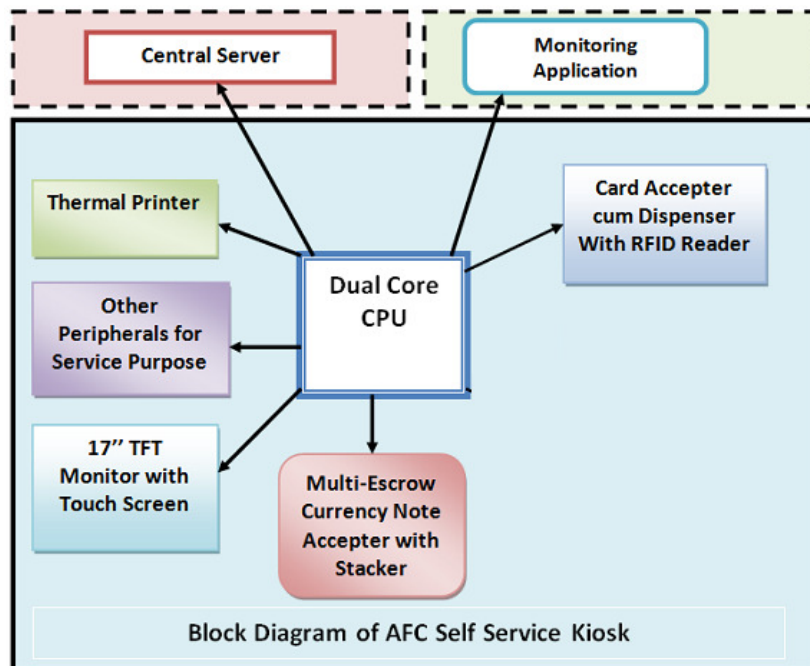
4. S/W Components of AFC Kiosk:

- Stable version of Customized Linux OS
- Java based application software
- Compatible version of Sybase ASA

- Compatible version of Mobilink Server

5. **AFC Kiosk application architecture:**

   a. At top level there will be a Java based user friendly Interface which will interact with the cash, card and all other devices. Transaction data will be stored in a light weight local database.

   b. Locally stored transaction data will be synchronized with the central database at configurable time intervals.

   c. Sybase Mobilink server installed in central server along with its client counterpart installed in Kiosk will be jointly responsible for data synchronization securely in both directions.

   d. Application will check status of the network and other devices before beginning any transaction. In case of network availability it will start the transaction, however; if link goes down after the transaction has already started, it will complete the transaction in local database.

   e. Application will periodically monitor device communication status, card stock etc. and share such data with external monitoring application through TCP/IP message exchange; however, in case of link failure these data will not be available to the monitoring application.

   f. Every administrative task like feeding cards, collecting cash can only be executed after relevant authentication. Thereafter a separate screen comprising cash details, card stock details and transaction details of current business day can be viewed. Authorized user can feed cardstock, collect rejected cards and cash through this administrative screen. Card feeding operation will require relevant user inputs .

AFC Kiosk Application Architecture
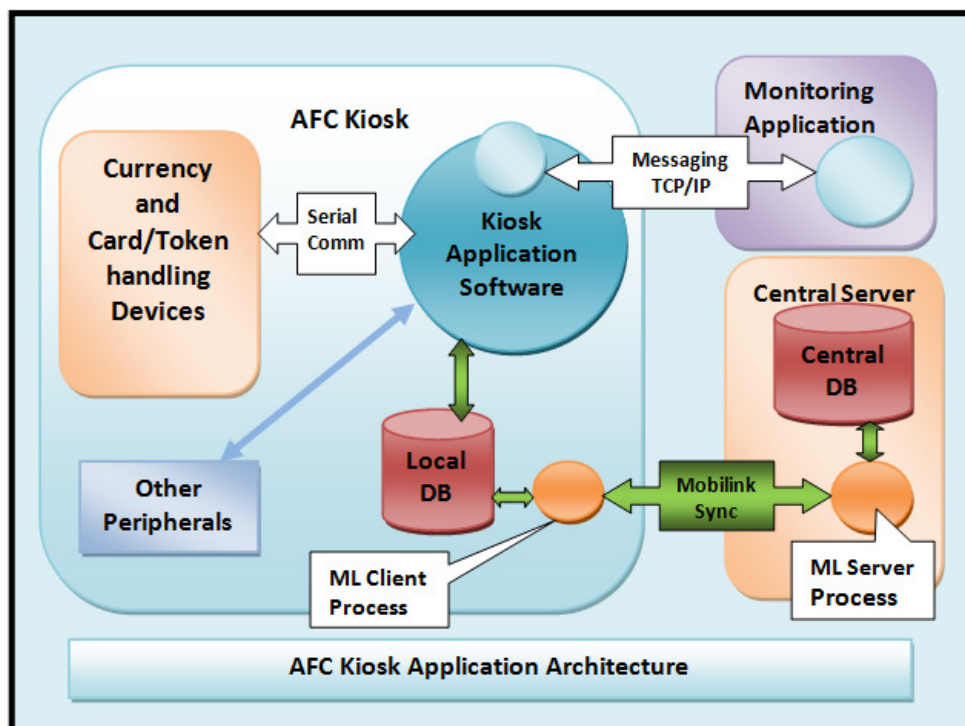
6. **The features of the Kiosk Application S/W:**

   - Issue of new Smart Cards

- Recharging already issued Smart cards
- Card balance & Token Status checking

7. Work flow of Application S/W:

The machine will be ready to operate 24X7. Human intervention will only be required to power-on any machine which was powered-off due to any reason, collection of cash and replenishment of smart cards. It will be a self launching application which will start at a configurable time in the morning everyday and continue service till the end of business hour (configurable). At the beginning it will check status of the network, data synchronization, database and all configured devices. In case it finds any abnormal status of database or any of the minimum required devices, it will display service unavailable message. Otherwise application will be successfully initialized and will wait for following service requests from user:

a. Issue of new Smart Cards:
On welcome screen there will be a button captioned "Buy Card" which needs to be touched to initiate a Smart Card Issue transaction. At this moment Application will recheck all device status and present a screen with Smart Card Issue options for different purse value. Customer has to choose one of these options and wait momentarily until Bank Note accepter gets ready to accept notes. Customer has to pay the exact fare amount through Note accepter one note at a time. On receipt of exact fare amount application will dispense one Smart Card from card stacker and place it under a reader in a protected channel. Before writing any issue data in the card, application will do card issue transaction in local database. Application will forward the card through the channel and hold it for a configurable time at the Card dispensing slot. A printed receipt of the transaction will be given to the customer as well. Application will display the welcome screen only after removal of the card from the slot or occurrence of a timeout.

i. Operating steps for Smart Card Issue :
- Passenger has to select "buy Smart Card" option on welcome screen.
- System will ask for amount to be paid
- Passenger has to choose relevant amount.
- System will request the chosen amount. Cash acceptor will indicate its readiness to accept cash.
- Passenger has to insert the exact amount one note at a time.
- On receipt of this amount system will record this transaction in the database and issue card.
- If card issue fails the system will refund the amount to the passenger and record relevant data in the database.
- System will issue appropriate receipt for the transaction.

- Pre-requirement :
- Pre-initialized card should be stacked with proper input through the administrative menu.
- Printer should be ready with printing stationery. However transaction will continue without printing in case printer is not ready.

b. Recharging already issued Smart cards:
Customer has to insert his Smart Card into accepting slot of the card accepter. Application will take the card inside a protected channel for validation purpose. After successful validation it will display card information and wait to proceed with recharge. Screen will be updated with multiple recharge options for different purse value. Customer has to choose one of these options and wait momentarily until Bank Note accepter gets ready to accept notes. Customer has to pay the exact fare amount through Note accepter one note at a time. On receipt of exact fare amount application will first complete a recharge transaction in the local database and then on the card. Application will forward the card through the channel and hold it in the slot for a configurable time. A printed receipt of the transaction will be given to the customer

whenever possible. Application will display welcome screen only after removal of card from the slot or occurrence of a timeout.

i. Operating steps for Smart Card Recharge:
- Passenger has to insert his/her smart card into card insertion slot.
- System will show current status of the smart card and wait for confirmation
- System will ask for amount to be paid
- Passenger has to choose relevant amount.
- System will request the chosen amount. Cash acceptor will indicate its readiness to accept cash.
- Passenger has to insert exact amount one note at a time.
- On receipt of this amount system will record this transaction in the database and recharge the card.
- If card issue fails the system will refund the amount to passenger and record relevant data in the database.
- System will issue appropriate receipt for the transaction.

c. Kiosk as Card Balance Checking Terminal:
Apart from the aforesaid services Kiosks can be used for card balance checking purpose.

8. Transaction Receipt:

For Smart Card related transaction customer will get a printed receipt of the transaction subject to availability of paper roll. The receipt will bear the following information:

- Transaction Id
- Transaction Time
- Kiosk Id and Station Name
- Card Number
- Transaction Status
- Balance after Issue, recharge or unlock
- Balance before recharge and unlock

9. Interfacing with Monitoring Application:
Kiosk application will be connected to an external application for monitoring purpose through TCP/IP connection. Monitoring application will acquire the status of devices, current card stock and sales details from the Kiosk and display the same. Kiosk application will also intimate failure status of devices to the monitoring application wherever possible. All these information exchanges however are subject to the availability of network.

10. Mode of operations:
The operations of the system can be carried out in three modes:
- Administrative Mode
- User Mode and
- Maintenance Mode

Administrative Mode:
This mode can be used by the station staff for following operations
- Collection of currency notes
- Collection of sales details, cash summary
- Filling up Card stacker
- Collecting rejected cards

To login into Administrative menu one has to insert an administrator card into the Card insertion slot. Such administrator cards are to be issued to each Station Master. Upon successful login user can proceed with the above activities and view the following information:

System Cash details comprising
▪ Denomination wise note counts
▪ Total amount collected in cash box

System Card Stock details comprising
▪ Current Card Stock
▪ Issue count on current business day
▪ Rejected Card counts on current business day

Transaction details comprising
▪ Denomination wise Stored value Issue counts
▪ Denomination wise Stored value Recharge counts
▪ Denomination wise Tourist Issue counts

10.1.1. **Administrative user operations:**

10.1.1.1 **Collection of currency notes:**
Admin has to touch "Collect Cash" on screen button.
System will open the cash vault if he opens the main door within 1 minute, otherwise he has to touch "Collect Cash" once again.
System will open the electronic cash vault after recording this event in database.
Admin has to collect entire cash from the vault
Once the cash vault is opened by the authorized admin; the system will assume that the entire cash has been removed from the vault and the cash vault is empty.
Admin has to close Cash vault and main door
System will come back to normal mode if it detects that these doors are closed.

10.1.1.2 **Collection of sales details summary:**
Admin has to touch "Print Transaction records" after end of business hours. This summary will be generated from the data available in the local machine.
System will print transaction details for the day subject to availability of paper roll.

10.1.1.3 **Day-end account report:**
Day-end report of any Station will be generated from the central database after ensuring that all transaction data of these machines including other POS terminals are available in the central database.

10.1.1.4 **Filling up Card stacker:**
Admin can add Cards in Stacker in whenever required by touching "Update Card"
Admin has to insert cards manually into the stacker.
Admin has to input the no of cards to be added through the key board.
Sufficient care has to be taken by the admin in this card feeding process, system will show incorrect stock details if the actual number of cards fed is different from the value input through key board.

10.1.1.5 **Collecting rejected cards:**
Admin has to collect rejected cards from respective rejection bins by touching "Collect Rejected cards"
The moment system receives the request it will assume that the rejected cards have been collected and therefore it will reset the rejected card counters to zero.

User Mode:
In this mode commuters are allowed to avail following services
• Issue of new Smart Cards

- Recharge of Smart Card
- Users can check their Card balance and validity through the same Kiosk.

Maintenance Mode:

In this mode maintenance staff can check device status and test the devices wherever possible. To login into Maintenance menu one has to insert a maintenance card into the Card insertion slot. System will authenticate the staff and display the following device status:

- Currency Note accepter status
- Card accepter cum dispenser status
- RFID Reader status
- Printer status

Power Failure Management:

a) In the event of power failure to the ASCRM, the battery module should provide enough power to
  - i. finish the transaction in progress
  - ii. complete writing audit data in device registers and
  - iii. make clean ASCRM shutdown.

b) ASCRM shall not allow opening electronic cash vault until power resumes or allow opening it with a secured mechanical key depending on the configuration set by the operator.

Storage and Security of Data on ASCRM's

a) The ASCRM's shall safeguard revenues by the reliable and secure performance of all system functions. Loss of AFC data shall not occur under any circumstances.

b) The ASCRMs should have sufficient memory to store data of at least 7 days transactions at any point during normal operation of the ASCRMs.

c) The ASCRM's shall minimize the scope for personnel and passenger fraud and shall ensure that all fraud is detected.

d) Any operation on an ASCRM that does not constitute a commercial transaction by an user shall be recorded on the ASCRM as audit data.

e) In the event of power failure or faults on any part of the ASCRM's, there shall be no loss of audit/transaction data.

f) It shall be impossible for personnel to tamper with audit/transaction data stored on ASCRM's.

Remote Access to ASCRM's and Time synchronization

a) The ASCRM's shall support TCP/IP (shall support IPv4 with provision for IPv6) and communication with other AFC equipments.

b) The ASCRM's shall be remotely configurable from the SCS.

c) ASCRM should allow remote deployment of software and remote modification of installed software components.

d) All ASCRMs and their component subsystems should be able to download system time from the CCS and they should also synchronize it automatically.

Fault reporting and Alarms

Alarm signals shall be transmitted automatically for display on ASCRM and SCS interface as well. All important alarms shall have to be acknowledged. Alarms shall be for:

a) Power failure to any ASCRM machine.

b) Communication failure to any ASCRM machine.

c) Application program or parameter files download error to any ASCRM machine.

d) Other unwanted events.

e) Tampering with cash handling modules.

f) Other mechanical and electronic problems or anomalous output from the device's own diagnostic and condition monitoring system.

g) Alarms related to Status Monitoring etc.

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Annexure -II

Technical and Statutory Requirements

Basic Technical Requirements for Automatic Smart Card Recharge Machine
The supplied equipments should support the following technical specifications and requirements :

1. Environmental Considerations

a. The ASCRM will operate in the humid and corrosive weather conditions of Kolkata and shall be designed and constituted accordingly.

b. The ASCRM will be exposed to extreme weather conditions such as heat, dust, humidity, salinity, rainfall and occasional seepage. The system design shall take into consideration these conditions and ensure that performance of the system remains unaffected due to such conditions.

c. The gate shall work perfectly in conditions with 90% or more relative humidity.

d. The gate shall work perfectly in a temperature range of 0◦C to 45◦C

2. Cabinet and Control Logic:

1	Type	Floor Clamping
2	Enclosure	Cabinet should be aesthetically pleasing, Sturdy and durable made of high grade stainless steel of 2mm thickness with cooling fans, mounting mechanism for accessories and internal power distribution arrangements. The cabinet should conform to necessary IP (Ingress Protection) standard to prevent foreign objects/dust intake from Note Accepter, Card Accepter bezels. In cash box, water and dust should not go inside from outside when door is closed. It should be shock proof. Built of the cabinet will be such that all cash handling, card filling and maintenance operation shall be done by opening front side panel.
3	Proposed dimensions	W x D x H (2 to 2.5 ft x 2ft x 5.5 to 6 ft) The dimension can be reasonably re-planned depending on the components to be used.
4		Outlet sheet metal structure with necessary access doors (separately for kiosk maintenance and cash box) . Each door should be accessible in a secure manner for system maintenance and cash collection using mechanical & electronically locks.
5		The machine will have distinct security controls installed at its entry points. The door(s) will have mechanical locks for opening or closing operation. The Cashbox of the Currency validator/accepter will have an additional electronic lock system with keypad to make the system more secure. Authorized door opening can only be done using System Admin card along with putting valid user-id and password into the system. The electronic lock will get activated only after authorization from System Admin card. The door(s) and Cashbox will have switches to keep track of the state of the doors i.e. whether it is in open or close state. The kiosk application will continuously monitor the door statuses using built-in device API. In case the application finds any door in open condition and there is no related authorization, the door alarm will start sounding. The API to interact with the cash box for various functionalities should be provided by the vendor.

6	Cash box features	1. Blow alarm for unauthorized access. 2. Blow alarm whenever the door is opened for more than the specified time. The cash box access time should be configurable. 3. Alert whenever the cash box crosses the threshold limit. The threshold limit should be configurable. Threshold limit can be checked in the application through API provided for the number of currencies stacked. 4. All the above events should be communicated to the CRIS application through API mentioned above. 5. The cash box should have a capacity of 5000 notes.
7	Currency collection bags	Minimum 2 bags for collecting cash from the cash box.
8	The KIOSK Base support should be in metal frame and should have necessary arrangement for floor Clamping.	
9	The KIOSK should have required number of socket for spike proof supply.	
10	Cooling System	Should have necessary cooling mechanism in place within the kiosk to ensure that the internal temperature remains below 45°C.
11	Passenger sound device	The sound device should have capability of generating 60-80db(A) sound measured at a distance of 1 meter from source and mounted at suitable position of the cabinet.
12	Position of Smart Card accepter/dispenser with integrated RFID Reader	Should be placed at customer convenient position.
13	Position of Receipt Printer	Should be located at a position such that it's easily accessible to the passenger.
14	Credit/Debit card slot	The cabinet should have slot for future incorporation of topping up by using Credit/Debit cards.
15	UPS	The kiosk should have UPS with at least 30 minutes backup and It should send an alert to the CRIS application whenever there is a power failure.
16	The kiosk should have a proper lighting arrangement inside the enclosure.	
	The kiosk should have a provision of sending alerts to the Central/local server in case of Kiosk and failure of its components, like Currency Note Validator/Acceptor, Smart Card Accepter/Dispenser, Cash Box, Printer, Thin Client, Locks, Shutdown Status and Opening of Cash Box, and UPS status.	

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3. Kiosk Processing Unit

S No	Item	Description
1	Processor	Dual core CPU with clock speed of 1.5 GHz or above
2	Memory	2GB or higher DDR3 RAM
3	VRAM	VRAM minimum 64 MB or above (should be configurable from BIOS and shared with Memory)
4	Flash memory	4GB or higher SATA/mSATA in primary slot or onboard primary
5	Redundant Flash	4GB or higher SATA/mSATA
6	Power Supply	Internal SMPS/External with 110~240 V, 50 Hz, automatic power-down Power Supply
7	Ports	(minimum requirement) 1. Sufficient no of RS232 serial ports (DB 9 pin) required to connect all sub components with future expandability option for one more serial port. 2. One Centronics printer port. 3. Four USB ports. 4. Built in 10/100/1000 Mbps Auto sensing LAN Interface. 5. SVGA Monitor.
8	Slots	One PCI bus or more to meet the configuration.
9	Networking	TCP/IP with DNS, DHCP support,
		Telnet, FTP, RSH, Rexec, SSH, Cron, Rlogin
10	Embedded Operating System and Software (total size not more than 1 GB)	Customizable Embedded Linux (as per CRIS requirement) with X-window Interface
		Touch Screen Calibration Utility.
		Menu based Local Terminal Configuration Utility.
		Java run-time environment version 1.6 or higher
		Sybase ASA11 or Higher with license
		Compatibility with: 1. CRIS application made in Java
		2. Indian languages Printing Support with Hindi and English as default. The other regional language support for future requirement.
		3. API for interface with Currency Validator/Accepter, Smart Card Accepter/Dispenser with integrated RFID Reader & Contact Card (SAM) Reader as per *Annexure-III*.

		Remote Management Software Support 1. Configuration of IP, user profile programming & soft reset 2. Deployment of patches/firmware & updates remotely for all sub systems 3. Remote monitoring of system status.
		Security 1. Provision to enable / disable USB port with password. 2. Password Protected setup for Terminal Configuration
11	Monitor	1. 17" TFT Color monitor with Touch screen facility as per the Touch screen specification. 2. Pixel Pitch – 0.27mm (or better) 3. Resolution – 1280 x 1024 @ 60 Hz (Max) 4. Contrast Ratio – 350 : 1 (or higher) 5. Viewing Angle (H/V) – 140 / 110 (or better)
12	Programmable Function keys Keyboard	Programmable Function key option Microsoft Certified 104/107 Keys Mechanical keyboard.
13	Mouse	Standard 2/3 button mouse of reputed make.
14	Other supports	SNMP V2 along with MIB-II. Should return attributes: Host Name, Mac-Address, OS & its version, Manufacturer Name & Model Number, Serial Number and System Uptime. Cold start/Warm start SNMP Traps

4. Bank Note Accepter specifications	
Acceptance: It should accept all Indian currencies of Gandhi series which are in circulation (Rs. 5 & above)	

SL No	Parameter	Description
1.	**Bill insertion**	Lengthwise in 4 directions
2.	**Validation rate**	96% or higher on first bill insertion
3.	**Width of bill, in mm**	62 - 78 mm wide (multi-width)
4.	**Maximum length of bill, in mm**	172
5.	**Minimum length of bill, in mm**	124
6.	**Threshold setting**	Configurable acceptance threshold
7.	**Bill Table setting**	Configurable bill Table to allow or inhibit any currency note through application
8.	**Bill storage/ Cash Box**	
i.	Capacity	At least 5,000 bills
9.	**Multi-escrow mode:**	
i.	Escrow capacity	up to 15 or more bills
10.	**Processing time, in seconds:**	
i.	Note acceptance time (from bill insertion to stacking)	2.5 seconds or less
11.	**Firmware updates options:**	
i.	Local and over the network and direct as well.	
ii.	Firmware up-gradation capability to accept new notes/security features	
12.	**External Interfaces:**	
i.	RS232 or USB host interface	
13.	**Device Driver:**	
i.	Device driver/API should work in Linux OS and customizable as per CRIS Java based applications need	
14.	**Environment:**	
i.	Operating environment	Indoor or environmentally protected stationary applications
ii.	Operating Temperature	0°C to +55°C external
iii.	Humidity	95%RH at 35°C
iv.	Storage Temperature	-20°C to +70°C external
v.	Humidity (non-condensing)	95%RH
15.	**Reliability:**	
MCBF		500,000
MCBJ		20,000
MTTR		30 min
16.	**Security features:**	
i.	Cross-channel (anti-stringing or anti-fishing)	
i.	The Cashbox will have an electronic lock system to make the system more secured.	
ii.	Authorized Cash Box opening can only be done using System Admin card along with putting valid. user-id and password into the system.	
iii.	Cashbox will have a switch to keep track of the state of the door i.e. whether it is in open or close	

	state.
iv.	There will be a Buzzer to generate alarm when door is opened without authorization.
v.	Rejection of multi-note insertion
17.	**Bezel Options:**
i.	Standard, Running/Steady lights of different color to indicate different status
ii.	Coin, Dust & Water proof metal bezel for validating head
iii.	Coin, Dust & Water proof metal dispensing bezel
iv.	Vandalism-proof metal bezel for validating head
v.	Vandalism-proof metal bezel for dispenser
18.	**Currency Acceptability**
i.	It should accept only Indian Currency from ` 5 to ` 1000 of Gandhi series bank notes.
ii.	There should be a provision to configure/reconfigure desired denomination and new series of notes as and when required through API (Remotely or locally).
iii.	The system should not accept fake and foreign currency. The system should not accept Ashoka series bank notes. Device should be capable of setting at different percentage to accept Cut, Taped, Glued, Colored and Soiled notes.
19.	**Regulatory Compliance**
i.	RoHS (Restriction of Hazardous Substances) or equivalent

Value for accepting different parameters:-

Parameter	Desired behavior
Taped/Glued notes	90% rejection
Colored Notes	90% rejection
Cut Notes	90% rejection
Soiled Notes	90% acceptance for 60-70% soil notes

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5. Motorized Card accepter cum Dispenser with integrated Contact & Contact-less Reader Specifications

General functional specification

Sl. No.	Features
i.	Unique rubbing wheel design for adaptability to embossed cards
ii.	Easy knob setting for dispensing & Accepting cards of various thickness
iii.	In time of dispensing card to customer the unit should hold the card at the front gate such that it doesn't fall down and can be removed from the front gate easily. Removal of card from front gate should be detected accurately.
iv.	The unit should have one Card Stacker for maintaining Card stock, one Rejection Box for collecting rejected cards during dispensing and preferably one*Card Collection Box for collecting deposited cards
v.	Detectors and sensors in Card channel, Card stacker, Rejection bin and Collection bin for accurate status indication (low capacity & card exhaustion of Card stacker, Rejection bin overload, *Collection bin overload, Card positions in card channel etc.)
vi.	Dedicated card conveying wheel design for preventing dust accumulation
vii.	High intensive and wear-resistant plastic card channel for avoiding radio shielding
viii.	Multilevel protection for sensors, good shielding of ambient light
ix.	Multiple doors/shutters of card insertion slot to protect against dust.
x.	Integrated Contact Less RFID Smart Card Reader/Writer Module supporting T=CL Cards (ISO/IEC 14443 1-4) . Detailed specifications of contact less module is given below separately.
xi.	Integrated Contact Card (SAM) (ISO/IEC 7816 T=1) Reader/Writer Module customizable for at least 2 Contact sockets. Detailed specifications of contact module is given below separately.
xii.	Motorized card accepter/dispenser, contact less and contact readers have to be integrated in a single module
xiii.	The integrated readers shall be capable of accessing both Contact and contact less card simultaneously to allow interleaved Contact and contact less card operations.

Technical Specification:

Sl. No.	Parameters	Values
1.	Card Size:	Card size：55mm~86mm, Card thickness：0.2~1.2mm adjustable(Factory Setting: 0.8mm)
2.	Communication Interface:	RS-232
3.	Communication baud rate:	115200 BPS, if Card dispenser, integrated Contact and Contact less readers use common RS-232 interface. Otherwise at least 38400 BPS
4.	Capacity:	Card Stacker: 300 Cards of 0.8mm thickness, configurable for at least 500 cards without affecting performance of the Motor. Rejection Bin: 100 Cards of 0.8mm thickness *Collection Bin: >300 Cards of 0.8mm thickness, configurable for at least 500 cards
5.	Pre-empt detection of stacker	5~50pcs ± 2pcs default setting 10pcs and configurable as per user requirement.
6.	Card dispensing speed	>=15cm/Sec
7.	Operating Condition:	0℃-55℃ External RH: 95% at 35℃
8.	Storage Condition:	-20℃ to +70℃ External RH: 95% (Without condensation)
9.	MCBF	500,000 times

10.	MCBJ	20,000 times
11.	MTTR	30 minutes
12.	Device Driver:	Device driver/API should work in Linux OS and customizable as per CRIS's java based applications need
13.	Firmware update:	Local and over the network Firmware update facility

*The design of the device should have provision for incorporation of one collection bin for future use.

6. Contact Less Reader Specifications		
SL	Parameters	Values
1.	Host to Reader Interface	RS-232 or PC/SC Compliant USB
2.	Host to Reader communication speed	At least 115200 BPS in case of RS-232
3.	RF Communication speed	106, 212, 424 and 848 Kbps
4.	Supported Contactless Standard	ISO/IEC 14443 A&B Part 1-4
5.	Operating frequency	13.56 MHz
6.	Supported Protocol	MIFARE Ultralight & T=CL
7.	Supported Card types	MIFARE UL,MIFARE UL EV1, MIFARE ULC, MIFARE DESFire EV1 and customizable for MIFARE DESFire EV2
8.	Reading distance	Up to 10 cm irrespective of the placement of reader antenna on the Card accepter cum Dispenser device
9.	T=CL Command execution time	Any T=CL Command execution should not exceed 60ms
10.	Supply Voltage	3V to 5V
11.	Power down mode current typical [mA]	10
12.	Wake Time [micro sec]	1000 (Host to Controller)
13.	Temperature range	0°C to 50°C
14.	Device Driver:	Device driver/API should work in Linux OS and customizable as per CRIS's java based applications need
15.	Firmware update:	Local and over the network Firmware update facility

7. Contact Reader Specifications		
SL	Parameters	Values
1.	Host to Reader Interface	Shall be mounted on Contact less Reader PCB
2.	Baud rate	Standard Bit rates with options of supporting up to 1.5 Mbps
3.	Supported Contact card Standard	ISO/IEC 7816
4.	Protocol	T=0 and T=1
5.	Supported Tag IC's	MIFARE SAM AV2 and other ISO/IEC 7816 IC Cards
6.	Card Size	ID-000
7.	No of Contact Sockets	At least 2
8.	T=1 Command execution time	Any T=1 Command execution should not exceed 60ms
8.	Device Driver:	Device driver/API should work in Linux OS and customizable as per CRIS's java based applications need
9.	Firmware update:	Local and over the network Firmware update facility

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8. Touch Screen

S No	Item	Description
1	Touch screen technology	Projected Capacitive Touch screen
2	Input methods	Finger activation only
3	Operation Force	<0.1g
4	Surface Hardness	Mohs>=7 as per ASTMD 3363-05(2011) e2 or equivalent standards
5	Sealibility	Seal should meet NEMA 4 & 12 or IP 65 or equivalent standards.
6	Optical	Pure Glass
7	Finish	Anti-Glare & Anti Reflective
8	Resolution	1024 touch points per axis within the calibrated area.
9	Speed of response	<20 ms
10	Operating temperature	0ºC to 50ºC
11	Operating relative humidity	Non condensing, Relative humidity 0 to 90% up to 40°C or 80% @ 60°C
12	Calibration	One-time calibration and should be stable, drift-free operation–for touch response that's always accurate, even in electrically noisy environments
13	Positional accuracy	Standard deviation of error less than +1.5% error within the active area.
14	Touch activation force	No minimum touch activation force is required
15	Light transmission	Up to 90% per ASTM D1003-92
16	Expected life	Atleast 200 million touches at any one location. Durable, scratch-resistant glass surface
17	Chemical resistance	Glass should not be affected by household and industrial chemicals as per ASTM F 1598-95 and ASTM D 1308-87 or equivalent standards
18	Abrasion resistance	Glass front, unaffected by surface scratching.
19	Water Resistance	Resistant to water droplets on the surface
20	Impact Resistance	Meets UL-60950 and CSA C22.2 No. 60950 ball drop test (0.5 kg, 50 mm diameter ball dropped from height of 1.3 m)
21	Weather	Resistant to snow, ice, rain, sleet, hail, wind, etc
22	Regulatory compliance	HALT/HASS, RoHS or equivalent

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9. Receipt Printer

S No	Item	Description	
1	Print Method	Direct Thermal	
2	Printing Support	Graphics printing capability	
3	Resolution	180 dpi or more	
4	Printing Speed	100 mm per sec or more.	
5	Fast print response	Instant print operation, no warming up.	
6	Paper Type	Thermal paper	
7	Paper width	At least 76mm	
8	Paper thickness	0.06mm ~ 0.09mm	
9	Character/Line	40 columns	
10	Paper Cutter	Automatic & Integrated, High Speed and self sharpening.	
11	Print Head Life	100 KM Paper length	
12	Cutter life	1,000,000cuts	
13	Paper loading	Automatic	
14	Printer Monitoring & Status	Very comfortable & comprehensive monitoring program for checking & verifying all main printer functions and status messages from the printer. Receipt printing application can be programmed to retrieve the status of the printer.	
15	Sensors	Electromechanical sensor for cover, paper out, jam detection, detection of receipt taken, advance indication for paper low and paper load. Paper low sensor monitors the diameter of the roll and gives indication once the particular level (which can be set as desired) is achieved without stopping the printing. This indication is prior information that paper roll is going to be finished. Ticket print status success/failure.	
16	MTBF/MCBF	50000 hrs @ 25% duty cycle/37 million lines	
17	Temperature	5°C to 45°C.	
18	Humidity	10 to 90% RH	
19	Desirable Security Features		1. Facility to monitor number of power on, number of auto cuts, number of times the printer cover has been . 2. Automatic status feedback on paper cut, cable out, printer switched off.
20	Device Driver		Device driver/API should work in Linux OS and customizable as per CRIS's java based applications need.

Annexure - III

API Specifications of Smart Card Accepter/Dispenser, RFID Reader & Contact Card (SAM) Reader and Currency Validator/Accepter Devices:
The APIs will be java based and packaged in jar form as detailed below:
   a) API name will be: ASCRMApi.jar
   b) Package Name : Cris
   c) Classes for Cris use:
              i.   SmartCard.class
              ii.   Currency.class
              iii. Security.class

SmartCard class will have the following card handling and read/write methods:

CARD ACCEPTER/DISPENSER DEVICE API SPECIFICATION:

1. **Connect Device** : To connect to the Card Accepter/Dispenser & RFID Reader combo device.

Method Signature: int ConnectDevice(int PortId, int ChannelClearanceMode, int Timeout)

In parameters:
PortId: Serial Port Number to which the device is connected.
ChannelClearanceMode: If there is a card in the device channel either it will be sent to rejection bin or return from the mouth of the device or kept in its position.
0: Retain in the channel 1: Send to rejection bin 2: Return from the mouth of the device
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Note: In case the combo device uses separate ports for Card Accepter/Dispenser and RFID Reader another PortId input parameter needs to be added.

Return value:
0: Device connected successfully
1: Port doesn't exist
2: Communication failure
3: Channel clearance failed due to rejection bin full
4: Channel clearance failed due to return mouth blocked
5: Channel clearance failed due to unknown reason
6: Operation timeout occurred
7: Other error

2. **Device Status:** To collect status of different components of the device

Method Signature: byte[] GetDeviceStatus(int ComponentId, int Timeout)

In parameters:
ComponentId: 0: All component 1: Reader 2: Stacker 3: Rejection Bin 4: Channel 5: Collection Bin
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value: Execution status of the API and status of the device components to be returned as a byte array as defined below:
Byte0: Execution status of the API
0: Operation successful
1: Communication failure
2: Operation timeout occurred
3: Other error
Byte1: RFID Reader status; 0: Ready 1: Not Ready
Byte2: SAM Reader status; 0: Ready 1: Not Ready

Byte3: Stacker Status; 0: empty 1: nearly empty 2: nearly full 3: full
Byte4: Approx. card count in stacker
Byte5: Rejection Bin status; 0: empty 1: nearly empty 2: nearly full 3: full
Byte6: Card count in Rejection Bin
Byte7: Channel status; 0: Clear 1: blocked
Byte8: Channel sensor status in 8 bits where each bit will indicate whether a sensor is blocked or not;
0: Clear 1: Blocked If no of sensors is less than 8 higher significant bits will be filled with 0's.
Byte9: Collection Bin status; 0: empty 1: nearly empty 2: nearly full 3: full
Byte10: Card count in Collection Bin

When ComponentId is other than 0, API will fill relevant values for the requested component leaving other component status 0; however execution status of the API is mandatory for any value of ComponentId.

3. **Enable Card Acceptance:** It will enable the device to accept a card from front side while insertion slot or channel is not blocked. The API should return immediately after enabling card acceptance. After enabling card acceptance when a card is inserted, device should transport it to a position in the channel where antenna of the RFID Reader is placed for processing the card.

Method Signature: int EnableCardAcceptance(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
0: Operation successful
1: Communication failure
2: Channel blocked
3: Insertion/return mouth blocked
4: Operation timeout occurred
5: Other error

4. **Disable Card Acceptance:** It will disable card acceptance from front side. The API should return immediately after disabling card acceptance. After disabling card acceptance when a card is inserted device should prohibit it by closing the insertion slot of the device.

Method Signature: int DisableCardAcceptance(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
0: Operation successful
1: Communication failure
2: Operation timeout occurred
3: Other error

5. **Accept Card:** It will enable the device to accept a card from front side while insertion slot or channel is not blocked. After enabling card acceptance the API should wait for insertion of a card for a predefined time period; if it finds a card at insertion slot the device should transport it to a position in the channel where antenna of the RFID Reader is placed for processing the card and thereafter the API will return. If within the predefined time period the API doesn't find any card or any blocking in the channel is detected, it will return with relevant error code as specified in return value of the API.

Method Signature: int AcceptCard(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:

0: Operation successful
1: Communication failure
2: Channel blocked
3: Insertion/return mouth blocked
4: Operation timeout occurred
5: Other error

6**. Dispense Card:** It dispenses a card from the stacker and position it in the channel where antenna of the RFID Reader is placed for processing the card and thereafter the API will return. If within the predefined time period the API doesn't find any card in the stacker or any blocking in the channel is detected, it will return with relevant error code as specified in return value of the API.

Method Signature: int DispenseCard(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
0: Operation successful
1: Communication failure
2: Channel blocked
3: Insertion/return mouth blocked
4: Stacker empty
5: Operation timeout occurred
6: Other error

7. **Return Card:** It returns a card from the escrow/reader position and hold it at the return mouth of the device until it is taken out by the customer or dispense it immediately; thereafter the API will return. If within the predefined time the API doesn't find any card in the channel or any blocking in the channel is detected, it will return with relevant error code as specified in return value of the API.

Method Signature: int ReturnCard(intDispenseMode, int Timeout)

In parameters:
DispenseMode: This mode will indicate whether the device will hold the card at the return mouth of the device or directly dispense it immediately.
0: Hold at the mouth of the device until it is taken out by the customer
1: Dispense it immediately
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise, return timeout status.

Return value:
0: Operation successful
1: Communication failure
2: Return mouth blocked
3: No card in the channel
4: Operation timeout occurred
5: Other error

8. **Reject Card:** It transports a card from the escrow/reader position to rejection bin of the device if the rejection bin is not full and thereafter the API will return. If within the predefined time period specified with Timeout parameter, the API doesn't find any card in the channel or any blocking in the channel is detected, it will return with relevant error code as specified in return value of the API.

Method Signature: int RejectCard(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:

0: Operation successful
1: Communication failure
2: Rejection bin full
3: No card in the channel
4: Operation timeout occurred
5: Other error

9**. Collect Card:** It transports a card from the escrow/reader position to collection bin of the device if the collection bin is not full and thereafter the API will return. If within the predefined time period specified with Timeout parameter, the API doesn't find any card in the channel or any blocking in the channel is detected, it will return with relevant error code as specified in return value of the API.

Method Signature: int CollectCard(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
0: Operation successful
1: Communication failure
2: Collection bin full
3: No card in the channel
4: Operation timeout occurred
5: Other error

10: **Is Card in the Channel:** This API can be used at any time after the connection is made; especially after EnableCardAcceptance or DispenseCardAPI is called to determine whether a card is reached at the reader position for processing.

Method Signature: int IsCardInChannel(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
0: No card in the channel
1: Card found in the channel
2: Communication failure
3: Operation timeout occurred
4: Other error

11: **Is Card Removed:** This API can be used after a card is returned and held at return mouth of the device to determine whether the returned card has been taken out by the customer.

Method Signature: int IsCardRemoved(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
0: Not removed
1: Removed
2: Communication failure
3: Operation timeout occurred
4: Other error

12: **Disconnect Device:** This API will be used to disconnect the device.

Method Signature: int DisConnectDevice(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
0: Disconnected successfully
1: Disconnected successfully but a card is in the channel
2: Communication failure
3: Operation timeout occurred
4: Other error

CONTACT & CONTACT LESS READER API SPECIFICATION:

13. **Power On/Off Contact card Socket:** Purpose of the API is to power on or off a specific SAM Slot/socket.
Method Signature: int SAMSlotPowerOnOff(intSAMSlotId,intPowerOnOffState)
In parameters:
SAMSlotId: It indicates contact slot id which needs to be powered on or off. SAMSlotId starts from 1.
PowerOnOffState: 0: Power Off 1: Power On
Return Value:
0: Operation failed
1: Operation succeeded

14. **Reset Contact card (SAM):** Purpose of the API is to reset SAM in cold or worm mode.
Method Signature: byte [] ResetSAM(intSAMSlotId, intResetType,int Timeout)
SAMSlotId: It indicates contact slot id which needs to be reset.
ResetType: 0: Cold Reset 1: Worm Reset
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.
Return Value: Command execution status and ATR to be returned as a byte array as defined below:

Byte0: Status of reset
0: No card (SAM) found
1: Operation successful
2: Operation failed
3: Communication failure
4: Operation timeout occurred
5: Other error
Byte-1-Byte-n will hold ATR

15. **Activate Card:** Purpose of this API is to activate a contactless card (specifically MIFARE DESFire EV1 & MIFARE Ultralight card) and contact card (specifically MIFARE SAM AV1 & AV2) for read/write.

Note: Activation of MIFARE DESFire EV1 should include ISO 14443A-3 level commands REQA, AN1 & SELECT Cascade Level 1, AN2 & SELECT Cascade Level 2 followed by ISO 14443-4 level RATS & PPS commands.
Activation of MIFARE Ultralight card should include ISO 14443A-3 level commands REQA, AN1 & SELECT Cascade Level 1, AN2 & SELECT Cascade Level in order to make it ready for read/write operations.
Activation of contact card MIFARE SAM AV2 would mean necessary Reset of SAM followed by transmission of PPS command to select transmission factors F & D and protocol T=1 in order to make the SAM ready for ISO 7816-4 compliant APDU exchange.

Method Signature: byte [] ActivateCard(intCardTechType,intSAMSlotId, int Timeout)

In parameters:

CardTechType: It indicates a contact less or contact card; 0: contact less card 1: contact card
SAMSlotId: It indicates contact slot id of the target SAM which needs to be activated. In case of contact less card i.e.CardTechType=0 value of the SAMSlotId input parameter is always 0. Depending on the no. of Contact SAM slot/sockets the value of the SAMSlotId input parameter will be 1 for first slot, 2 for second slot etc.

Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value: Card activation status and type of contact or contactless card, size of UID and UID to be returned as a byte array as defined below:
Byte0: Status of card activation
0: No card found
1: Card found and activated
2: Card found but activation failed
3: Card found but it is unsupported
4: Communication failure
5: Operation timeout occurred
6: Other error

Byte1: Type of card found
Contact less card type: 1: MIFARE DESFire , 2: MIFARE DESFire EV1, 3: MIFARE Ultralight
Contact card type: 1: MIFARE SAM AV1, 2: MIFARE SAM AV2 etc.
Byte2: Size of UID
Byte3-9: UID bytes

16. **Deactivate Card:** Purpose of this API is to deactivate an already activated contactless card (specifically MIFARE DESFire EV1 card) and contact card (specifically MIFARE SAM AV1 & AV2).

Method Signature: int DeactivateCard(intCardTechType,intSAMSlotId,int Timeout)

In parameters:
CardTechType: It indicates a contact less or contact card; 0: contact less card 1: contact card
SAMSlotId: It indicates contact slot id of the target SAM which needs to be deactivated. In case of contact less card i.e.CardTechType=0 value of the SAMSlotId input parameter is always 0. Depending on the no. of Contact SAM slot/sockets the value of the SAMSlotId input parameter will be 1 for first slot, 2 for second slot etc.
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value: Card deactivation status as defined below:
Status of card deactivation
0: No card found
1: Card found and deactivated
2: Card found but deactivation failed
3: Communication failure
4: Operation timeout occurred
5: Other error

Note: API should support exchanging APDUs with both contact and contactless cards simultaneously if both are activated. Activation of one type of card should not affect the activation status of the other one to allow interleaved APDU exchanges with activated contact and contact less cards.

17**. Exchange APDU:** This API will allow to exchange ISO/IEC 14443-4 T=CL frame in native mode (i.e. DESFire Native APDU) and ISO/IEC 7816 wrapped APDU frame for contact less smart card (e.g. MIFARE DESFire EV1) and ISO7816 frame for contact card (MIFARE SAM AV1 &AV2).

Method Signature: byte [] XChangeAPDU(intCardTechType, byte [] CommandAPDU, intSAMSlotId, int Timeout)

In parameters:

CardTechType: It indicates a contact less or contact card; 0: contact less card 1: contact card
CommandAPDU: ISO/IEC 14443-4 standard T=CL command APDU frame in native mode (i.e. DESFire Native APDU) or ISO/IEC 7816 wrapped APDU frame for contact less smart card and ISO 7816 command APDU frame for contact smart card wrapped in a byte array.
SAMSlotId: It indicates contact slot id of the activated and target SAM with which APDU to be exchanged. In case of contact less card i.e.CardTechType=0 value of the SAMSlotId input parameter is always 0. Depending on the no. of Contact SAM slot/sockets the value of the SAMSlotId input parameter will be 1 for first slot, 2 for second slot etc.
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
ResponseAPDU: Its a byte array containing execution status followed by ISO/IEC 14443-4 standard T=CL response APDU frame in native mode (i.e. DESFire Native APDU) or ISO/IEC 7816 wrapped APDU frame for contact less smart card and ISO 7816 response APDU frame for contact smart card.
Byte0: will indicate status of command execution
0: Error
1: Success
2: Communication failure
3: Operation timeout occurred
4: Other error
Byte1-n: ISO/IEC 14443-4 standard T=CL response APDU frame in native mode (i.e. DESFire Native APDU) or ISO/IEC 7816 wrapped APDU frame for contact less smart card and ISO 7816 response APDU frame for contact smart card.

18. **Read Ultralight Block:** Purpose of the API is to read 16 bytes data starting from a ultralight page address of MIFARE Ultralight.
Method Signature: byte[] ReadUltralightBlock(int Addr, int Timeout)
In parameters:
Addr: is ultralight page address from where 16 bytes data to be read
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.
Return value: The API will return Read status along with 16 bytes data in a byte array; where
Byte0: Read status
0: Read Error
1: Read Success
2: Communication failure
3: Operation timeout occurred
4: Other error
Byte1-16: 16 bytes data (16 bytes should be filled with 0's in case of any error)

19. **Write Ultralight Page:** Purpose of the API is to write 4 bytes (one ultralight page) data to a specific ultralight page address of MIFARE Ultralight.
Method Signature: int WriteUltralightPage(int Addr, byte [] Data, int Timeout)
In parameters:
Addr: is ultralight page address from where 4 bytes data to be written
Data: 4 bytes data to be written
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.
Return value: The API will return status of write operation; where
0: Write Error
1: Write Success
2: Communication failure
3: Operation timeout occurred
4: Other error

Currency class will have the following currency handling methods:

CURRENCY NOTEACCEPTER DEVICE API SPECIFICATION:

1. **Connect Device:**To connect the Currency Note Accepter device.

Method Signature: int ConnectDevice(intPortId,intEscrowClearanceMode,int Timeout)

In parameters:
PortId: Serial Port Number to which the device is connected.
EscrowClearanceMode: If there is any currency note left in the escrow, either it will be sent to collection bin or kept in its position.
0: Retain escrowed note/notes in the escrow 1: Send the escrowed note/notes in the collection bin.
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
-7: Any other exception
 -6: Escrow clearance failed due to unknown reason
-5: Escrow clearance failed due to any blocking
-4: Escrow clearance failed due to collection bin full
-3: Security door is opened
-2: Port doesn't exist
-1: Communication failure
0: Operation timeout occurred
1: Device connected successfully
2: Device connected successfully with few notes escrowed

2. **Device Status:** Purpose of this API is to collect the status or state of the device and its sub-components along with escrowed note counts.

Method Signature: int DeviceStatus(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended task.

Return value: Each 31 Lsbs of the 4 byte signed int will signify state, status of different components of the device and serial communication status. Some of the mandatory return state/status are as given below :
Byte0:   bit0 indicates whether serial communication is ok or not 0: Not OK 1: OK
         bit1 indicates whether device is ready 0: Not ready 1: Ready
         bit2 indicates whether security door is opened or closed 0: Opened 1 Closed
         bit3 indicates whether collection box is full or not 0: Not full 1: full
         bit4 indicates whether insertion slot is blocked with foreign particle 0:Not blocked 1:Blocked
         bit5 indicates whether transport channel is blocked with foreign particle 0:Not blocked 1:Blocked
Byte0: bit6-7 reserved for future use

Byte1: bit0-3 indicates no of escrowed INR 10
Byte1: bit4-7 indicates no of escrowed INR 20
Byte2: bit0-3 indicates no of escrowed INR 50
Byte2: bit4-7 indicates no of escrowed INR 100
Byte3: bit0-3 indicates no of escrowed INR 500
Byte3: bit4-6 indicates no of escrowed INR 1000

3**. Get Valid Note:** This API will synchronously enable the accepter to validate a single note and wait for a note if the device is ready to accept a currency note. After validating a note or waiting for a note till timeout it will wait for AcceptCurrentNote API call and keep its acceptance state until StackAcceptedNotes, ReturnAcceptedNotesAPI is called. Application may call this API several times as per requirement.

Method Signature: int GetValidNote(intDenom, int Timeout)

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In parameters:
Denom: Denomination of the currency note
Timeout: API will wait for a note until timeout occurred.
Return Value: An int indicating one of the following:
-4: Any other exception
-3: Note rejected due to insertion of an invalid (mutilated/soiled/non-gandhi series note/counterfeit) note
-2: Note rejected due to insertion of a disallowed denomination
-1: Communication failure
0: Operation timeout occurred
1: Note of correct denomination validated

4. **Accept Current Note:** This API will accept analready validated note in escrow.

Method Signature: int AcceptCurrentNote(intDenom, int Timeout)

In parameters:
Denom: Denomination of the currency note
Timeout: API will wait for a note until timeout occurred.

Return Value: An int indicating one of the following:
-3: Any other exception
-2:Escrow full
-1: Communication failure
0: Operation timeout occurred
1: Note of correct denomination accepted

5. **Return Current Note:** This API will return the currently validated note.

Method Signature: int ReturnCurrentNote(int Timeout)

In parameters:
Timeout: API will try to return notes before timeout is occurred.

Return Value: An int indicating one of the following:
-3: Any other exception
-2:Return mouth blocked
-1: Communication failure
0: Operation timeout occurred
1: Returned

6. **Enable Denominations:** Purpose of this API is to activate denominations of currency notes to be accepted by the Currency validator.
Method Signature: int EnableTheseDenominations(int DenomMask, , int Timeout)
In parameters:
DenomMask: Each bit of LSB of this parameter will indicate whether a specific denomination is allowed or not; 0: Not allowed/Inhibited   1: Allowed/Enabled
Byte0: bit0: indicates INR 5 is to be enabled/disabled
           bit1: indicates INR 10 is to be enabled/disabled
           bit2: indicates INR 20 is to be enabled/disabled
           bit3: indicates INR 50 is to be enabled/disabled
           bit4: indicates INR 100 is to be enabled/disabled
           bit5: indicates INR 500 is to be enabled/disabled
           bit6: indicates INR 1000 is to be enabled/disabled
Timeout: API will try to complete the request within timeout period.
Return Value: An int indicating one of the following:
-2: Any other exception
-1: Communication failure
0: Operation timeout occurred
1: Requested denominations enabled

7**. Accept Notes:** This API will asynchronously enable the accepter to accept notes if the device is ready to

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accept currency note. It will return true immediately after bring the device in acceptance state. Calling application will repeatedly call GetAcceptedAmount API to determine the status of the asynchronous API.

Method Signature: boolean AcceptNotes(int Amount, int Timeout)

In parameters:
Amount: Total amount to be accepted by the device
Timeout: API will wait for notes until timeout occurred.

Return Value: A boolean indicating one of the following:
true: Accepter is in acceptance state
false: Accepter is not ready to accept currency.

8. **Get Accepted Amount:** This API is intended to call periodically after calling asynchronous APIAcceptNotes to determine the status of acceptance or total amount accepted in escrow within timeout period.

Method Signature: int GetAcceptedAmount(byte[] AcptdAmt)

In/Out parameters:
A 1D byte array (Size will be capacity of Escrow of the Bank Note Validator) A byte array where each byte indicates denomination of accepted currency notes. API will fill the bytes in the byte array after accepting each note.

Return value: An integer indicating status of currency acceptance like-
-3: Any other exception
-2:Escrow full
-1: Communication failure
0: Operation timeout occurred
1: Accepting
2: Exact amount accepted
3: Excess amount accepted

9**. Stack Accepted Notes:** Purpose of this API is to take the escrowed currency notes in stacker/cash bag
Method Signature : int StackAcceptedNotes(int Timeout)

In parameters:
Timeout: API will try to stack notes before timeout is occurred.

Return Value: An int indicating one of the following:
-4: Any other exception
-3: Transport Channel blocked
-2: Stacker/Cash box full
-1: Communication failure
0: Operation timeout occurred
1: Stacked

10. **Return Accepted Notes:** Purpose of this API is to return the escrowed currency notes to the customer

Method Signature: int ReturnAcceptedNotes(int Timeout)

In parameters:
Timeout: API will try to return notes before timeout is occurred.

Return Value: An int indicating one of the following:
-3: Any other exception
-2:Return mouth blocked
-1: Communication failure
0: Operation timeout occurred
1: Returned

11. **Is Note Removed:** Purpose of the API is to determine whether customer has taken out the returned notes. Calling application may call the API repeatedly to alert/instruct the customer to remove the returned notes from dispensing outlet.

Method Signature: int IsNoteRemoved(int Timeout)

In parameters:
Timeout: API will determine in a predefined time period specified by Timeout parameter whether returned notes are taken out.

Return Value: An int indicating one of the following:
-2: Any other exception
-1: Communication failure
0: Operation timeout occurred
1: Notes removed

12. **Clear Jammed Notes:** This API will help clearance of notes jammed in escrow or anywhere in the transportation path. Depending on the Clearance mode, API will either stack jammed notes in stacker or return the notes from the dispensing outlet.

Method Signature: int ClearJammedNotes(intEscrowClearanceMode, int Timeout)

In parameters:
EscrowClearanceMode: If there is a currency note in the escrow either it will be sent to collection bin or return from dispensing outlet.
0: Send the escrowed note/notes to return/dispensing outlet 1: Send the escrowed note/notes to the collection bin.
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
-5: Any other exception
-4: Escrow clearance failed due to unknown reason
-3: Escrow clearance failed due to any blocking near the dispensing outlet
-2: Escrow clearance failed due to collection bin full
-1: Communication failure
0: Operation timeout occurred
1: Notes returned
2: Notes collected in collection bin

13: **Disconnect Device:** This API will be used to disconnect the currency device.

Method Signature: int DisConnectDevice(int Timeout)

In parameters:
Timeout: Time in milliseconds the API will try to perform its intended operation otherwise return timeout status.

Return value:
-2: Any other exception
-1: Communication failure
0: Operation timeout occurred
1: Accepter disconnected successfully
2: Disconnected successfully but few notes are still in escrow

Security class will have the following security and UPS status related methods:

1. **Security Door Status:** This function checks the status of individual doors (depending on the DoorType parameter). The door types may be the main door or cash-box door.
Method Signature: int GetDoorStatus(intDoorType)
Input Parameter: Type of door 0: Main door 1:cash-box door
Return Value: An int indicating whether the door is opened or closed 0: Open 1: Closed

2. **Disable Alarm:** In general security mechanism will be such that whenever main door or cash box door is found open, system will sound alarm. Application disables alarm for a predefined time period based on successful user authentication when doors are opened.

Method Signature: int DisableAlarm(int DoorType1, int time1, int DoorType2, int time2)
 (time specified in seconds to disable the alarm).
Input Parameter:
Return Value: The value will be in
1: Success
0: Failure

3. **Get UPS status:** To check whether the main supply is on/off.

Method Signature: int GetUPStatus():

Return Value: The status will be in
0: if main power supply is on
1: if main power supply is down and UPS on
-1: for any Exception

4: **Get Battery status:** To check the remaining battery status of UPS.
Method Signature: int GetBatteryStatus():
Return Value: The value will be in
x: (an integer value from 0 to 100) indicating % level of battery remaining
-1: for any Exception

Note: In case all functionalities and performance of the APIs are not as envisaged, relevant modifications may still be needed in order to meet the needs of application software.

Annexure - IV

Preliminary Inspection Certificate

SUB: INSPECTION DEMAND NOTE – Power On Tests, verification of RDBMS software licenses and ATS certificate, physical inspection of Bank Note Accepter/Validator, Smart Card Accepter/Dispenser, RFID Smartcard Reader, Printer, ASCRM Kiosk and its components for any physical damage and functional testing of Bank Note Accepter/Validator, Smart Card Accepter/Dispenser, RFID Smartcard Reader, Printer.

PURCHASE ORDER NO: _____   DATED: _____

Against the above mentioned purchase order, the items detailed below have been received on _____.

S.No.   **Item Description**   **Qty.**

The goods are conforming to specifications in the purchase order and are acceptable.

	Vendor	**CRIS/ Metro Railway**
By (sign)	_____	_____
Name	_____	_____
Design.	_____	_____
Date	_____	_____

Copy to:
(i)   Station Master/Consignee
(ii)   Manager/Purchase/CRIS/Chankyapuri, New Delhi
(iii)   Chief Manager/UTS/CRIS/ Chankyapuri, New Delhi
(iv)   Chief Traffic Manager/Metro Rly./Kolkata

Annexure - V

Commissioning Certificate

Purchase Order No. _____ Dated ___

Name of site _____

Name of Zonal Railway_____

Name of Item_____

Name of Vendor_____

Against the above mentioned Purchase Order, the items detailed below have been successfully commissioned after installation and testing.

S.No.	Item Description	Qty.

	Vendor	**Metro Railway Kolkata**
By (Sign)	----------------------	----------------------
Name	----------------------	----------------------
Design.	----------------------	----------------------
Date	----------------------	----------------------

Copy to:
(i)   Station Master/Consignee
(ii)   Manager/Purchase/CRIS/Chankyapuri, New Delhi
(iii)   Chief Manager/UTS/CRIS/ Chankyapuri, New Delhi
(iv)   Chief Traffic Manager/Metro Rly./Kolkata

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Annexure - VI

Eligibility & Qualification Document Checklist

All the documents listed here are to be supplied with regard to eligibility & qualification criteria:-

S No	ITEM	Credential to be provided	To be filled by Bidder (Document placed - Page Number in bid)	Reference for format/content to be provide
1	Address and telephone number of the Bidder as well as the name, designation, email ID and telephone number of the primary contact person of the Bidder responsible till the signing of the Contract.			
2	Validity of offer			As per GCC
3	Details of earnest money submitted			As per GCC
4	The bidder should be a company registered under the Companies Act.	Notarized Certificate of incorporation		
5	Annual report clearly specifying average annual turnover of bidder for each of the last three financial years 2011-12, 2012-13 and 2013-14. Specify month and year of closing of last financial year.	P&L account and Audited Annual reports, clearly specifying the Annual Turnover.		
6	Bidder is not Blacklisted by any Government of India Agency/ PSU.	Declaration letter to be given by Bidder's authorized signatory		

Annexure- VII

Technical-Qualification Document Checklist

S No	ITEM	Credential to be provided	To be filled by Bidder (Document placed - Page Number in bid)	Reference for format/content to be provide
1	Product technical specification Compliance.	Fully filled compliance sheet as per *Annexure - I & II*		
2	Documentary evidence of back-to-back agreement with OEM to provide support including firmware upgrade of Bank Note Accepter/Validator, Smart Card Accepter/Dispenser, RFID Smart Card Reader, touch screen, thin client and printer for 5 more years from date of delivery if bidder is not an OEM.	Letter to be submitted by the bidder on the letter head of the OEM for authorization and back to back support.		
3	Customer Support offices of bidder in Kolkata, India.	Declaration letter to be given by Bidder's authorized signatory giving complete Customer support office details including contact person name, telephone no, address.		
4	Statement of deviation if any	As per *Annexure-VIII*		

Limited Tender for Supply, Installation, Testing and Commissioning of Automatic Smart Card Recharge Machines (ASCRM) for Kolkata Metro (Phase-I)

CRIS

Annexure - VIII

Format for statement of Deviation

The following are the particulars of deviations from the requirements of the Instructions to Bidder & General Conditions of Contract given in part-I of tender document and Special conditions given in part-II of tender document:-

S No	CLAUSE	DEVIATION	REMARK(Including Justification)

Annexure-IX

Bidder Information

S No	ITEM	Details
1	Full name of bidder's firm	
2	Full address, telephone numbers, fax numbers, and email address of the primary office of the organization / main / head / corporate office.	
3	Name, designation and full address of the Chief Executive Officer of the bidder's organization as a whole, including contact numbers and email address.	
4	Full address, telephone and fax numbers, and email addresses of the office of the organization dealing with this tender.	
5	Name, designation and full address of the person dealing with the tender to whom all reference shall be made regarding the tender enquiry. His/her telephone, mobile, Fax and email address.	

Annexure -X

Responsibilities related to works/services:

Work/Service Description	Responsible parties
Delivery of demo ASCRM with OS, database and all necessary device drivers pre-installed along with devices interfacing API/Communication protocols for ASCRM application development and testing.	Contractor
Development of ASCRM S/W	CRIS
Integration Testing of ASCRM S/W in Lab	Contractor and CRIS
Integration of ASCRM with existing AFC setup	CRIS
Providing N/W and power connectivity within 10 meters from the location of ASCRM installation within the stations.	Metro Railway, Kolkata
Delivery, Installation of ASCRM at designated Metro Railway stations	Contractor
Preliminary Inspection	Contractor ,Metro Railway, Kolkata and CRIS
Pre-commission testing of installed ASCRM	Contractor and Metro Railway, Kolkata. CRIS to act as facilitator
Satisfactory Performance Certificate	Metro Railway, Kolkata

Annexure -XI

Trainings:
The Contractor has to arrange for trainings on operation, maintenance, underlying technologies, working and internals of the supplied ASCRMs.
Operational, Maintenance, Diagnostics and Troubleshooting Training. (for O&M staff of Kolkata Metro)

Training Plan:
The Contractor shall prepare and present a plan along with his bid, that shall as a minimum describe the following:
- Training category
- Content
- Duration
- Target audience
- Trainer's profile.
- Training Aids

The Contractor shall prepare and/or provide all necessary training documentation, operating and maintenance manuals etc. for CRIS's approval prior to the commencement of training activities.

The Contractor shall also provide all equipments deemed necessary for the trainings.

Venue
All trainings will be conducted at CRIS/Kolkata Metro premises.

Training Schedule
Detailed training schedule will be provided by CRIS.

Annexure-XII

Test cases for Technical Validation of Automatic Smart Card Recharge Machine and its sub-components:

i. BankNote Validator should allow four-way bill insertion. Validation rate of Bank Note Validator should be of 96% or higher. This should have escrow capacity of at least 15 notes.

ii. The BankNote Validator should reject multi-notes insertion and should ensure smooth bank notes transportation from the BankNote Validator mouth to the cash box through escrow.

iii. BankNote Validator should accept only Indian Currency from Rs. 5 to Rs. 1000 of Gandhi series bank notes. BankNote Validator should not accept Ashoka series bank notes.

iv. BankNote Validator should not accept fake and foreign currency.

v. The device should be capable of setting at different percentage to accept Cut, Taped, Glued, Colored and Soiled notes.

Parameter	Desired behavior
Taped/Glued notes	90% rejection
Colored Notes	90% rejection
Cut Notes	90% rejection
Soiled Notes	90% acceptance for 60-70% soil notes

vi. Smart Card Accepter/Dispenser should accept, dispense and move cards to different positions of the channel smoothly.

vii. The Metal/Fibre enclosure should have necessary arrangements for floor clamping.

viii. The Metal/Fibre enclosure should have access separate doors for kiosk maintenance and cash collection.

ix. The system maintenance door should be accessible through mechanical lock and the cash collection door should be accessible through mechanical & electronic lock.

x. Blow alarm for unauthorized access.

xi. Blow alarm whenever the door is opened for more than configured specified time.

xii. Alert whenever the cash box crosses the configured threshold limit.

xiii. Alert whenever the card stacker is opened.

xiv. Alert whenever the card stacker is empty or rejection bin is full.

xv. All the above events should be communicated to the CRIS application through API.

xvi. The cash box should have a capacity of 5000 notes. Minimum 2 currency collection bags should be provided.

xvii. The card stacker and rejection bin should have a capacity of minimum 300 cards.

xviii. The UPS should provide at least 30 minutes of power backup.

xix. Kiosk should have provision of sending alert to Central/Local server in case of component failures of ASCRM like Bank Note Validator, Electronic Cash Vault, Printer, Thin Client and different events like opening of Cash Vault, UPS status, etc.

xx. The kiosk processing unit should have minimum of 1.5 GHz processor, 2 GB DDR3 RAM, 64 MB VRAM (should be configurable from BIOS and shared with Memory), 4GB or higher SATA/mSATA in primary slot or onboard primary, 4GB or higher SATA/mSATA redundant flash.

xxi. The kiosk processing unit should have one serial port (DB 9 pin) with future expandability for one more serial port, four USB ports, built in 10/100 Mbps Auto sensing LAN Interface and one SVGA port.

xxii. The machine should have support for TCP/IP with DNS, DHCP, Telnet, FTP, SSH, Crontab and Rlogin. There should also be provision to enable / disable USB storage class with password (by default it should be disabled for storage class)

xxiii. There should be password-protected setup for terminal configuration.

xxiv. The terminals should have Embedded Linux (trimmed as per CRIS requirement) having kernel version 2.6.32 and above (2.6.xx) with X-window Interface with Java run-time environment 1.6 or

higher. This should be compatible with CRIS application made in Java and Indian language Printing (e.g. Hindi, Bangla etc.)

xxv.   The machine should have SNMP V2 along with MIB-II. Should return attributes: Host Name, Mac-Address, OS & its version, Manufacturer Name & Model Number, Serial Number and System Uptime. Cold start/Warm start SNMP Traps.

xxvi.   One 17" TFT Color monitor, USB scrollable mouse of reputed make and one USB Microsoft Certified 104/107 Keys Mechanical keyboard with Programmable Function key option should also be provided along with these terminals.

xxvii.   The RFID Reader should be able to communicate with existing MIFARE DESFire EV1 and MIFARE Ultralight family Cards of Metro Railway Kolkata, operating distance up to 100 mm. The Reader PCB should have at least 2 Contact Card (SAM) Sockets for communication with specifically MIFARE SAM AV1 & AV2.

xxviii.   Input method of touch screen should be Finger only.

xxix.   Bidder has to demonstrate the performance of Currency Validator/Acceptor, Smart Card Accepter/Dispenser with integrated Contact & Contact less Card Readers with Indian currency notes, sample MIFARE DESFire EV1, MIFARE Ultralight and MIFARE SAM AV2 using a demo application utilizing the supplied APIs as per *Annexure-III*.

xxx.   Bidder supplied API's will also be validated using CRIS developed java based software in order to determine whether API's are as per the specification in *Annexure-III* and meet the purpose of the application software.

Special Note for bidder:-
Deviation from any of the clause of this annexure shall lead to rejection of bid on technical ground.

At the end of completion of technical validation, all the bidders will sign a technical validation report with CRIS about the outcome of the technical validation. In case any clause is added or modified by the bidder, the bid shall be considered conditional and shall be disqualified. This report should be signed within 2 working days of completion of technical validation. In case any bidder fails to sign the technical validation report, the bid shall be considered technically unresponsive.

Annexure - XIII

Satisfactory Performance Certificate

<u>TO WHOM IT MAY CONCERN</u>

<Metro Railway, Kolkata>

hereby certifies that

<Bidder's Name & Address>

has completed installation, testing, commissioning of Automatic Smart Card Recharge machine(s) [ASCRM(s)] at <Station Names> of Metro Railway, Kolkata and has been maintaining the machines for last ---------- month(s). Performance of the machine(s) during this trial period is found to be satisfactory.

Authorized Representative of
Metro Railway, Kolkata

Limited Tender for Supply, Installation, Testing and Commissioning of Automatic Smart Card Recharge Machines (ASCRM) for Kolkata Metro (Phase-I)

CRIS

<u>Annexure - XIV</u>

SCHEDULE OF RATES

I	II	III	IV	V	VI= (IV+V)	VII	VI*VI =VIII	IX
Item No.	Name of item	Mo del	Unit Price	Taxes	Unit Price (Inclusiv e of taxes)	Qty.	Grand Total	Remarks
Supply of following items with enclosed specs.								
1	Kiosk with Bank Note Validator/Accepter with minimum 15 notes escrow capacity, industrial Thin Client, preloaded Linux OS, compatible Sybase ASA 11 or higher version, Touch screen, Receipt Printer, UPS, security locks and electronic cash box.					2		
2	Smart Card Accepter/Dispenser along with integrated Contact and Contactless Reader/Writers.					4		
All inclusive Value -								

NOTE

Above format is indicative in nature . Bidder should quote rates as per format given in www.ireps.gov.in.
Taxes extra, if any, are to explicitly quoted, failing which the same will not be considered at a later date.
The breakup of bill of material for each location will be specified along with the implementation plan.

Signature of Tenderer   Date

Limited Tender for Supply, Installation, Testing and Commissioning of Automatic Smart Card Recharge Machines (ASCRM) for Kolkata Metro (Phase-I)

CRIS

Annexure - XV

Work Completion Certificate

TO WHOM IT MAY CONCERN

<Centre for Railway Information Systems>

hereby certifies that

<Contractor's Name & Address>

has completed installation, testing, commissioning of Automatic Smart Card Recharge machine(s) [ASCRM(s)] at <Station Names> of Metro Railway, Kolkata and has been maintaining the machines for last ---------- month(s).

Authorized Representative of CRIS

Annexure - XVI

List of Abbreviations:

AFC	Automatic Fare Collection
APDU	Application Protocol Data Unit
API	Application Protocol Interface
ASA	Adaptive Server Anywhere
ASCRM	Automatic Smart Card Recharge Machine
ASTMD	American Society for Testing and Materials
ATS	Annual Technical Support
BIOS	Basic Input Output System
CCS	Central Computer System
CD/DCD	Compact Disk/Digital Versatile Disk
CPU	Central Processing Unit
CRIS	Centre for Railway Information Systems
DB	Database
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Service
FTP	File Transfer Protocol
GCC	General Conditions of Contract
Hz	Hertz
H/W	Hardware
IC	Integrated Chip
IEC	International Electrotechnical Commission
INR	Indian Rupee
ISO	International Organization for Standardization
IT	Information Technology
LAN	Local Area Network
LOA	Letter of Authorization
MCBF	Mean Cycle Between Failure
MCBJ	Mean Cycle Between Jam
MHz	Mega Hertz
mSATA	Mini-SATA
MTTR	Mean Time To Repair
NEMA	National Electrical Manufacturers Association
OEM	Original Equipment Manufacturer
OS	Operating System
O&M	Operational and Maintenance
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PC/SC	Personal Computer/Smart Card
PM	Project Management
PO	Purchase order
PSU	Public Sector Unit
P&L	Profit and Loss
RAM	Random Access Memory
RDBMS	Relational Database Management System

RFID	Radio Frequency Identification
RH	Relative Humidity
RoHS	Restriction of Hazardous Substances
SAM	Secure Access Module
SATA	Serial Advanced Technology Attachment
SCS	Station Computer System
SMPS	Switch Mode Power Supply
SNMP	Simple Network Management Protocol
SVGA	Super Video Graphics Array
SSH	Secure SHell
S/W	Software
TCP/IP	Transport Control Protocol/ Internet Protocol
TFT	Thin Film Transistor
UID	Unique Identifier
UPS	Uninterrupted Power Supply
USB	Universal Serial Bus
VRAM	Virtual RAM

Filename: 2087
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