

**Invitation for Expression of Interest for Implementation of National
Common Mobility Card (NCCMC) by Integrating with Existing
Automatic Fare Collection System (AFCS) having EMV Enabled
ETM Machines**

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Abbreviations

Abbreviation	Description
CTU	Chandigarh Transport Undertaking
NCMC	National Common Mobility Card
AFCS	Automatic Fare Collection System
ETM	Electronic Ticketing Machine
EMV	Europay Mastercard Visa
POS	Point of Sale
KYC	Know Your Customer
NPCI	National Payment Corporation of India

1. **Introduction and Background**

About CTU

Chandigarh Transport Undertaking (CTU) was established in the year 1966 with a fleet of around 30 buses. It now provides bus services to the public covering the city, suburbs and the neighboring states. CTU is also a member of Association for State Road Transport Undertaking (ASRTU).

Chandigarh Transport Undertaking is responsible for running both city and long distance buses in the city of Chandigarh. CTU runs few city services to neighboring cities of Mohali and Panchkula. For the financial year FY 2021-2022, CTU is operating around 398 buses in city bus service under the scope of this project and likely to introduce another 40 nos' of EV buses in couple of months under this project. CTU has formed a Special Purpose Vehicle (SPV-CCBSS) and appointed PMC for implementation of Intelligent Transport System (ITS). These would be completely used for the city bus services.

2. **About National Common Mobility Card (NCMC)**

A Committee consisting of senior officials from NIC, BIS, CDAC, NPCI, Metros etc. was constituted under the Chairmanship of Additional Secretary Ministry of Urban Development, to evolve a concept of National Common Mobility Card (NCMC) whereby an interoperable, secured and vendor agnostic solution is suggested to achieve country wide interoperability that improves efficiency of fare collection mechanism coupled with reduction in cost of ticketing. The Committee, after comprehensive deliberations with all stakeholders viz., Banks, card networks, technology solution providers, Public Transport Operators etc., evaluated all possible options and critically examined the pros & cons of each option and finally concluded that store value EMV Based Contactless Cards are best suited in the Indian environment.

As per information available on website of NPCI, The NCMC has been operational since June 17th, 2017 since its launch by Hon'ble Prime Minister at Kochi Metro (KMRL), and has been followed by Noida Metro (NMRC), Nagpur Metro (Maha Metro), Delhi Metro (DMRC), Mumbai Metro (MMOPL), BEST Buses, Mumbai, Kadamba Transport Corporation Ltd, Goa. Few other projects viz., Bengaluru Metro (BMRCL), Pune Metro (PMRDA) Mumbai Metro Line 2A & Line 7, MMRDA, Gujarat Metro (GMRC) Chennai Metro (CMRL) Hyderabad Metro (HMRL), Haryana Buses, Directorate of State Transport are under progress. The ultimate vision is that all Public Transport Operators across the country adopt the NCMC specifications to achieve common technology and country wide interoperability over a period of time and save the common man from carrying multiple cards / standing in queues, / carrying change / risks of cash handling etc.

This approach will also lead to huge economies of scale for the Acquirer/SRTUs due to removal of duplicity of efforts as well as standardization across issuance, acceptance, networking interfaces, clearing, settlement and dispute management

systems.

NCMC would eventually provide seamless experience to passengers across all transit systems in the country bringing convenience and ease of payment for them. These payment cards can be issued on debit/credit/prepaid card platform.

Key Features of NCMC Specification

Key features of NCMC specifications are as mentioned below:-

Key Features	NCMC Proposition
Payment Model	<ul style="list-style-type: none">Card based payment model – Stored value for offline payments and Credit/Debit/Prepaid cards for online payments
Transaction Type	<ul style="list-style-type: none">Supports online (contact & contactless) & off-line (contactless) transactions
Serves multiple service areas	<ul style="list-style-type: none">Multiple service areas (optional to use with mutual concurrence) to support limited duration tickets / Season Tickets / Smart City Specific application / Loyalty points etc.
Card usage	<ul style="list-style-type: none">Same card to be used for contactless payments at multiple retail outlets, online-commerce payments & multiple transit use cases viz., Toll, parking etc.
Card issuance	<ul style="list-style-type: none">Can be issued by any member authorized by RBI to issue cardsCan be a no-KYC or minimum-KYC card based on customer preference and RBI KYC norms
Topping up the stored value	<ul style="list-style-type: none">Provision of Topping up the stored value through any mode of payment viz., Online using card, Internet Banking, Cash at customer service point at the option of the issuing entity
Transaction Risk	<ul style="list-style-type: none">Since the transaction is permitted against available balance, there is no risk of any loss either to the bank or the SRTU.
Security	<ul style="list-style-type: none">Underlying technology i.e. EMV is best available globally and has been adopted to safeguard against frauds.RBI PPI guidelines shall govern the monetary limits for the Stored Value of this card

3. Purpose of the EOI

- Chandigarh Transport Undertaking is inviting Expression of Interest from the Partner Bank/Financial Institution for Integration of NCMC cards (Open Loop) with the existing Automatic Fare Collection System (AFCS) having closed loop based Smart Card system. Further, the Partner Bank/Financial Institution will also be responsible for the instant issuance of National Common Mobility card (NCMC) cards at operator service points as well as at their own delivery points.
- The proposals should be submitted through Email at ctu-chd@nic.in and Last date of submission of proposal is 21-07-2022 upto 05:30 PM.
- A presentation of interested parties shall be held on 22.07.22 from 11.00 AM onwards at the Command Control Centre (CCC), ISBT – 43, Sector 43, Chandigarh. The parties will be required to make a detailed presentation of

their proposals.

- In case of any query, contact no. 0172- 2990216 may be contacted.
- The sole purpose of this EOI is to finalize the RFP for selection of Partner Bank/Financial Institution. Non participation in this EOI will not be considered as constraint for participation in bid process at later stage.

4. Current Scenario of Automatic Fare Collection System (AFCS)

CTU has already designed and implemented the Automatic Fare Collection System (AFCS). As a part of the system, the Electronic Ticketing Machines and Smart Card (Closed loop) had been launched to provide seamless facility to the commuters through closed loop digital payments by tapping the smart cards. In addition to payment through Samrt Cards (closed loop system), the commuters can also buy the tickets after boarding the bus. The Smart Cards (desfire/myfire) are issued to the commuters through Sampark Centers located throughout the City as well as Customer Service Points located at ISBT 17 and ISBT 43. The total number of ETM Machines and Smart Cards in use for CTU operations is as mentioned below:

Details of ETM Machines:

Sr. No	Particulars	Total Count
1	Conductor- ETM Machine	784
2	Inspection Terminal- ETM Machine	50
3	POS-ETM Machine	50
Total		884

Details of Smart Card (Closed Loop):

Sr. No.	Category of Smart Card	Sub-Category	Total Cards	No. of Card Issued (as on 31 st May 2022)
1	Anonymous Card	e-Wallet	5,000	57
2	Personalized Card	e-Wallet	45,000	267
		Concessional Card like Monthly Pass, Student Pass etc.		22742
Total			50,000	23066

Specification of ETM Machines and Smart Card being used in CTU are mentioned at Annexure- A and B respectively.

5. Tentative Scope of Work

Chandigarh Transport Undertaking (CTU) is looking for Partner Bank/Financial Institution for providing the Solution for Implementation NCMC (Open Loop) cards as per NPCI/Govt. of India guidelines including Integration with the existing Automatic Fare Collection System (AFCS) developed by System Integrator of ITS. The Partner Bank/Financial Institution will also be responsible for carrying out the necessary activities/support for Integration of NCMC cards with the existing System Integrator (M/s Amnex Infotechnologies Pvt. Ltd having EMV enabled ETM Contactless machines.

The detailed scope of work includes, but not limited to, as mentioned below:

Card Issuance: The Partner Bank/Financial Institution will be responsible for issuance of Instant cards (Prepaid NCMC instant issuance of NCMC cards at service delivery points of Authority (i.e. ISBT -17 & ISBT-43) as well as their own delivery points.

Transaction Acquiring: The commuter will use the NCMC cards for digital payments for paying bus fare in CTU buses. The selected Partner Bank/Financial Institution will act as Acquirer bank and to acquire all bank issued Debit, Pre-Paid cards, Credit NCMC and On the Go form factors (Rupay) wearable transactions.

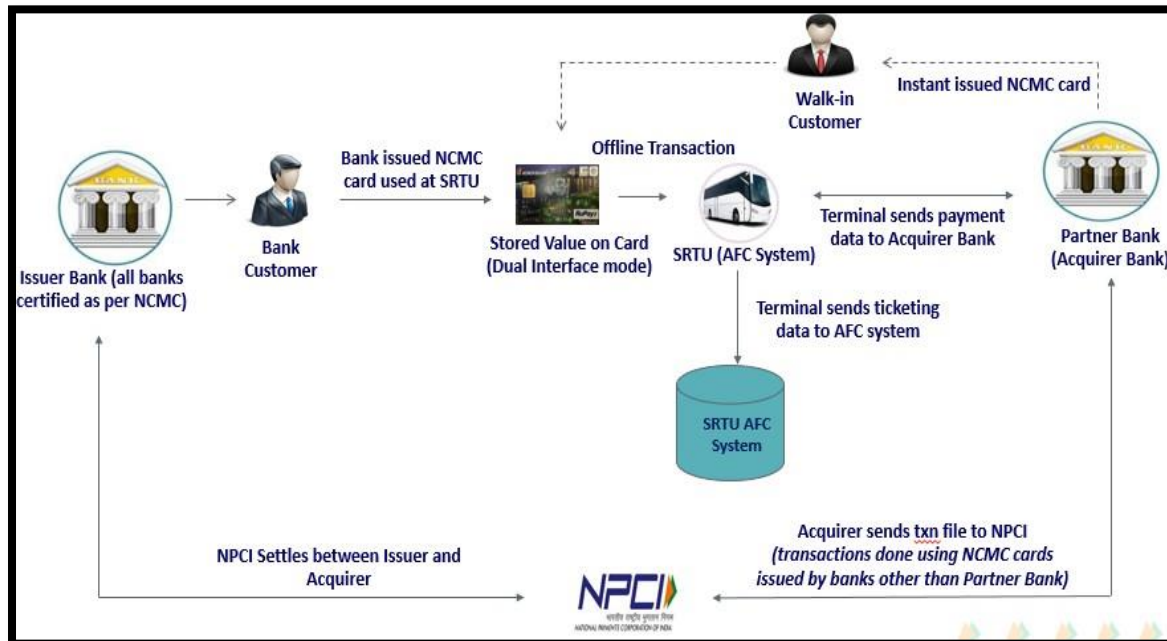
Transaction Settlement: The Partner Bank/Financial Institution should support the transactions settlements across multiple Issuer Banks through Central Clearing House (NPCI).

The key points to be noted are as follows:

- The commuter will be able to use the NCMC cards, issued by any Bank, for the fare payment at Chandigarh Transport Undertaking buses.
- Partner Bank/Financial Institution Bank will integrate with the existing AFC System through APIs in collaboration with respective agencies for seamless acceptance of payments on ETMs through NCMC cards.
- Bank will be responsible for cash management, reconciliation and settlement activities besides maintaining the respective dashboards for the information of authority.
- Selected Partner Bank/Financial Institution shall establish real-time connectivity between AFCS data centers/servers for exchange of data related to card's usage

National Common Mobility Card– Functional Architecture

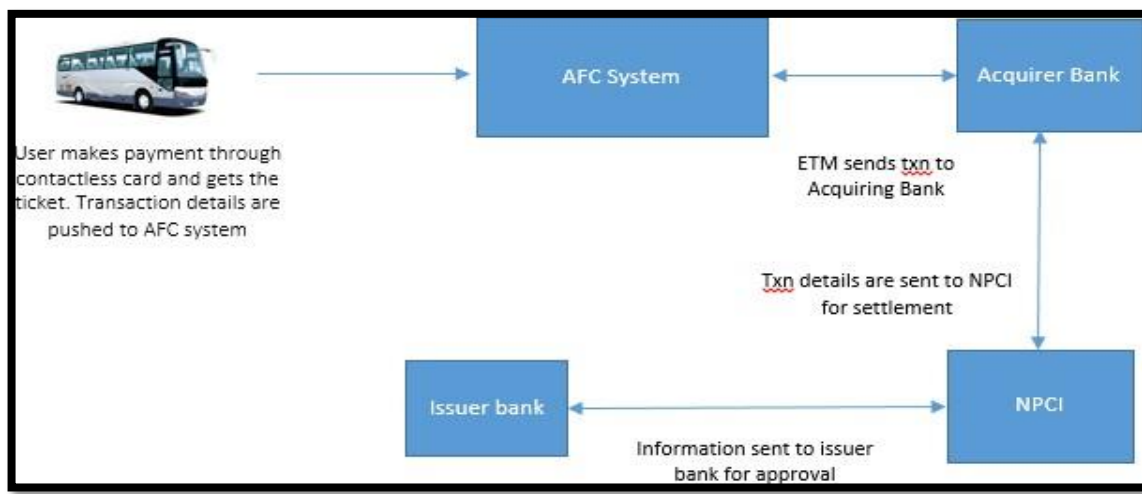
As per the proposed approach for implementing the NCMC Program and Cashless transactions through Open loop cards, the functional flow of transactions shall happen as depicted below:



The customer may get NCMC cards from banks of their own choice through their branches or other service channels. The instant issuance of NCMC cards at service delivery points of the Authority will be done by the selected Partner Bank/Financial Institution. The commuter shall use the NCMC cards for fare payments at multiple transit modes (like, all retail, ecommerce and cash withdrawal). The ticket as well as digital fare collection transactions will be captured by the ETM /PoS devices at various transit / retail PoS. The ETM/POS devices shall be integrated with the Partner Bank/Financial Institution Bank system. These transactions will be streamed on a secure channel to AFCS backend system via GPRS network. Simultaneously, the ETM/PoS devices will send these transactions to the Partner Bank/Financial Institution Bank for further processing. The Partner Bank/Financial Institution Bank shall further send these transactions to NPCI CCH for settlement of transactions with the multiple Issuer Banks.

Ticketing Transaction Flow

The business workflows involved in the Ticketing Transaction have been described below:-



- Issuer Banks shall issue NCMC cards to the commuters after receiving all necessary documents, if applicable, as specified by RBI for the card category (minimum KYC or no-KYC).
- During travel in a bus, the commuter specifies the destination of travel to the conductor who then uses the ETM to punch in the necessary details (destination code, commuter category, no. of tickets, etc.) and generate the e-ticket through ETM printer. Commuter will tap the contactless NCMC card on the ETM machine, which will validate the card and deduct the fare amount for the route from the card. The final amount will be written back on the card by the ETM device.
- Ticket and Fare transactional data from the ETM shall be transmitted to AFCS back-end servers over GPRS at a regular pre-configured frequency over a secure communication channel.
- ETM/AFC System shall further send the transactions data to the Acquirer Bank.
- Clearing House settles the payment balances between the Issuing and Acquirer Banks/FI on a daily basis (in case of an Open Loop card implementation).
- Pass (Concessional Pass) shall be issued to the commuter Over the Counter (OTC) at POS locations. This pass is non-transferable and shall be valid for a certain time. In case of contactless smart cards, the pass information is written on the card including its expiry data. These cards shall be validated inside the bus using ETMs and a Zero value ticket will be issued to the commuter against this pass.
- The commuter may re-charge or load the card through Internet banking or by paying at Point of Sale locations or other payment channel as provided by Issuing Bank.
- At the end of the trip, the Cash and digital money collected during the trip against the issued tickets shall be deposited at the respective depots by the

crew. The depot manager will reconcile this amount received from the crew with the data received at the backend server (using revenue reports) and mark the status of the trip closure report accordingly.

- Commuters who have any issues related to the Smart cards or the deduction of fares can contact the Point of Sale (POS) counters.
- At any point of time, it shall be possible for an inspector to inspect the e-ticket and Smart card validity, using his ETM. In case the e-ticket or the card is found invalid, the inspector may penalize and charge appropriate fine from the commuter and issue a system-generated receipt (from the Electronic Ticketing Machine) for the same.
- Partner Bank/Financial Institution shall provide various payment channels for the Card Top-up on the web/mobile interface provided by the Authority/its vendor. This will include:-

- ✓ Online top-up through various channels
- ✓ Mobile App for online top-up
- ✓ Auto top-up feature - Provide facility to automate top-up of card from any bank account in case of low balance
- ✓ Card-to-card mobile/online transfer
- ✓ Financial Institution (FI) to tie-up with retailers for loading points

This should support standard Internet security including, but not limited to Digital Certificates, Various levels of encryption, Secure Socket Layers (SSL), Secure Hypertext Transfer Protocol (HTTPS).

FI shall be responsible for the Top-up of NCMC Cards, issued by any Bank, based on customers' request. The Partner Bank/Financial Institution shall not charge any additional amount from the Customer and the Authority unless otherwise agreed in the agreement.

- Provide necessary hardware for all the required applications as per mentioned Scope of the Services to be provided by Bank.
- Provide all the certifications as per the guidelines of NPCI for the issuance of open loop based NCMC cards.
- The Partner Bank/Financial Institution/consortium will be responsible for all certifications and compliances required for transactions acquiring of NCMC cards
- Provide central toll-free helpdesk/ IVRS to handle NCMC card transaction related issues
- Provide NCMC Card dedicated support to Issuer Bank with reference to transaction dispute, refunds, chargeback and merchant account management as per RBI requirements
- Provide access to all MIS reports

- CTU foresees the need for implementing changes during the contract period (e.g. generation of new MIS reports, provision to upload additional formats, modify reconciliation logic, etc.). This may also include incorporation of new modes of payment along with the current modes of payment. FI to provide the above with no additional cost to Authority.
- Partner Bank/Financial Institution should have a local technical team set-up in city for operations and support.
- The Bank shall provide dedicated Relationship Manager to take care of all issues of commuters arising out of this contract.
- Provide training to concerned persons/staffs/officials in Hindi/ English/ local language for citizen-friendly operations
- Partner Bank/Financial Institution should provide training material and user manuals
- Partner Bank/Financial Institution should provide training on the FI related MIS report and fund reconciliation
- Manage hardware on field including requests for adding new hardware
- Manage consumables such as printer role and spares in case of faults in the machine
- Manage email/SMS for Commuters and Issuance locations/Partner Bank/Financial Institution merchant.
- Provide MIS integration points for Authority
- Facilitate integration between Authority and MIS dashboard requirements

6. Eligibility Criteria

Only the entities meeting the criteria provided in this section shall be eligible to submit their expressions of interest.

- The Partner Bank/Financial Institution must be a Nationalized Bank or Scheduled Commercial Bank registered with Reserve bank of India (RBI).
- The Partner Bank/Financial Institution should be certified for acquiring the transactions using National Common Mobility Cards (NCMC) as per the guidelines of National Payment Corporation of India (NPCI).
- The Partner Bank/Financial Institution should be certified for instant issuance of NCMC cards.
- The Partner Bank/Financial Institution should support the transactions settlements across multiple Banks through Central Clearing House (NPCI).
- Partner Bank/Financial Institution should have a local set-up in the city for operations and support to Authority.

- The Partner Bank/Financial Institution should have facilities for payments through various Banking Channels.
- The Partner Bank/Financial Institution proposed for the project must have the experience as an acquirer for acceptance, operations and management of transactions through Open loop Card.
- The Partner Bank/Financial Institution should have technical expertise for Integration of NCMC cards with the existing Automatic Fare Collection System (AFCS).
- The Partner Bank/Financial Institution proposed must have experience as an issuer for issuance of EMV open loop cards.
- The Partner Bank/Financial Institution should be a bank/payment bank/financial institution licensed by Reserve Bank of India (RBI) for issuance of credit/debit/prepaid cards, prepaid payment instruments and for acquiring of card transactions.
- The Partner Bank/Financial Institution should not be blacklisted by Government Agency in India or abroad, or proved to have indulged in serious fraudulent practices by a Court of law or an independent Commission of Inquiry in India or abroad.

7. Submission of Expressions of Interests

- i. The expressions of interests (EOIs) shall be submitted through Email at ctu-chd@nic.in before last date and time as mentioned above.
- ii. Following documents are required to be attached in the EOI:
 - a) Cover letter for expression of interest
 - b) Profile of the Applicant
 - c) Detailed Proposal
 - d) Copy of Presentation
 - e) Any other supporting documents as required in the EOI
- iii. It is clarified that no financial quotes are to be included in EOI like MDR Charges, NCMC Cards/Close loop Cards Charges or any other charges involving financial transaction.
- iv. No EOI will be accepted after last date and time stipulated for submission of EOIs.

Annexure-A

Specification of Existing Electronic Ticketing Machines (ETM):

- The terminals are working under an operating temperature range of 0 to +50 °C.
- The terminals are working under an operating humidity of 90% RH non condensing.
- The terminals having compact and durable design, for indoor and outdoor use.
- The terminals are designed to operate from an internal, battery source which can be charged and re-charged.
- The terminal batteries are utilizing “no memory” battery technology which is state-of-the-art, commercially available and common for use with such equipment.
- The terminals are operating continuously for minimum 12 (Twelve) hours without any disruption to the Operations at any given instance during the shifts. And the appropriate back-up arrangements are made for the handhelds to cover the entire operating shift without disrupting normal Operations.
- The batteries are field replaceable without any loss of data, with field replacement time (from end of operation with previous battery to beginning of operation with new battery) not to exceed three minutes.
- The batteries are recharged to a full charge from a completely discharged state in less than four hours.
- The batteries have a life of at least 500 recharging cycles with not more than 20% loss of efficiency over that lifetime of the battery.
- The terminals are having a Power Adaptor of AC input 100 - 240V, 50/60Hz DC output to fully recharge the battery in less than 4 hours.
- The terminals are having an alphanumeric keypad through which the operator can perform tickets sale and enter destinations.
- The terminals are having a LCD display of
 - Sufficient brightness and clarity according to the conditions of location of the equipment in external sales points.
 - 128 x 64 pixel Graphic FTSN LCD with backlight, or superior
- The terminals are having a high-speed thermal printer for the issuing of tickets. These same printers are printing the sales and validations summaries, if required.
 - The ticket printers are compact thermal printer able to print, as a minimum, tickets (text and graphics), barcodes, and system status information.
 - The print speed is not less than 150 mm/s for both text and graphic and at a minimum resolution of 203 dpi (8 dots/mm).
 - The ticket printers are using readily available paper rolls of standard size.
 - The ticket printers are providing low paper and out of paper indication.
 - The ticket printers are having an automatic cutter with a self-sharpening ceramic rotary knife.
 - The auto-cutter having a reliability of at least 1.5 million cuts.
 - The ticket printer head having a Mean Cycle between Failure (MCBF) of at least 50 million print lines.
 - The ticket printer having a Mean Time between Failure (MTBF) of at least 360,000 hours.
 - The terminals are generating and the printers are printing QR codes
- The terminals are having QR code reader.
- The terminals are having at least 3 SAM slots.
- The terminals are capable of hosting smartphone payment mean by NFC technology for future implementation.
- The terminals are having built-in buzzer for audio indication and LED for visual indication of card acceptance/rejection.
- The terminals are having a Contactless card reader complying with ISO 14443 parts 1, 2, 3 and 4,

types A and B.

- The terminals are processing the following cards: MIFARE UltraLight, MIFARE Classic, MIFARE Plus, MIFARE DESFire and MIFARE DESFire EV1, or other similar cards used in this project.
- The terminals are having an anti-collision system according to ISO 14443 and handle multiple cards in the reader field at the same time.
- The terminals are having a maximum time for transaction completion, since the card is placed in front of the reader's surface until the transaction is recorded in the terminal and the receipt is issued, of 3 seconds.
- The terminals are able to manage blacklists and white lists of SCs.
- The terminals are capable of storing sufficient information to:
 - Save information for at least 30 days of operation.
 - Store blacklists and white lists of SCs (at least 750,000 records)
- The terminals are having a Processor: ARM11 32-bit Core CPU @ 400Mhz or superior
- The terminals are having a RTC: high-precision real-time clock synchronized with the rest of the system.
- The terminals are having the following Interface / Connectors:
 - 2 x RS-232 (Serial / Console)
 - 1x USB Device
 - 1x USB Host
 - 1x LAN (RJ45 connector)
 - Micro SD (up to 16 GB)
- The terminals are having an integrated antenna to allow GSM / 3G / 4G / GPRS (or 2G).
- WiFi and Bluetooth connectivity are optional.
- The terminals are homologated with EMV at Level 1 and 2 approved PCI, PTS 3.0 and NCMC compliance.

Annexure-B

Specification of existing Closed Loop Smart Cards (SC):

- Card dimensions: according to ISO-7810 (type ID-1).
- Physical material of the cards: PVC or higher.
- Serial number printed on the outside of the laser engraving card. This number shall correspond to an identical number electronically stored on the card.
- All printing (if used) shall be with laser marking or similar latest technology without any visible degradation for 5 years as the cards shall be used over an extended period.
- The card shall be printed with content to be provided by CTU which may include but not limited to:
 - Standard graphics or images developed by CTU (e.g. logos, promotions, etc.)
 - Standard text developed by CTU (e.g. Terms of use)
- Minimum resolution of information printed on the outside of the card: 300 dpi (dots per inch).
- Compliance with ISO-14443, parts 1, 2, 3 and 4, type A.
- Verification of compliance with the ISO-7810 and ISO-14443 standards by conducting tests according to ISO-10373. The SI shall provide factory test info on cards (i.e. proof of durability) and chip OEM Certificate for authenticity of cards.
- Arsenal Research Certificate and / or the equivalent for the card to use.
- Integrated circuit of the card: MIFARE DESFire EV1, with memory of 4K or higher, or another chip of similar and / or higher performance.
- The integrated supplied circuits shall be less than 1 year when they are purchased by the SI.
- Expected transaction time: less than 300 ms. (Higher times may be authorized)
- Number of minimum write cycles: 100,000
- Operating distance with the reader: up to 10 cm.
- The SI shall supply an interface control document for ensuring integration between the smart cards and any hardware for reading and/or writing to the smart cards as per CTU's requirement.
- The SI shall submit the smart card specifications which would include details on card programming and data structure.
- Reliability of cards including manufacturing and initialization processes:
 - Duration of 9 years under normal conditions of use.
 - Acceptable Quality Level according to MIL-STD-105 standard: 0.65.