


152440/2025


Specifications for Contactless RFID Smart Card

No. Metro/Div/O&M/C-368/Stock Items/Pt.II dtd. 27.02.25

1) Contactless RFID Chip: -

Sl. No.	CRITERIA	SPECIFICATION for MF3ICD41 (DESFire-EV1 - 4KB) or compatible
1.	Operating frequency	13.56 MHz. Nominal. However, the actual resonant frequency will be determined by Metro Railway Readers and this will be ascertained at the time of sample approval.
2.	Communication Standard	ISO/IEC 14443 A
3.	Baud rate	Activation at 106 kbps; application communication up to 848 kbps.
4.	Activation and initialization level	True deterministic anti-collision with cascade level 2. 7-byte UID and configurable ATS.
5.	Random ID	The card must support Random UID feature for added security.
6.	Transport protocol	T=CL Half duplex according to ISO/IEC 14443 part 4
7.	Processor	Secure asynchronous C51 micro controller with built in Operating system
8.	Memory size	Nonvolatile 5088 bytes
9.	Memory structure	Up to 28 applications with up to 32 files in one application. With built in back up management for back-up files
10.	Crypto function supported	Hardware DES, Hardware AES. Multi-application, independent crypto in application level.
11.	Key	Add - 1 card master key for card management, up to 14 keys in one application and 1 application master key for application management.
12.	Key length	DES (56/112/168 bit keys) AES (128 bit keys)
13.	Key Version	Must be supported
14.	Authentication	3-pass mutual authentication based on ISO 7816-4. Data authentication using 8byte CMAC. Authentication on application level required.
15.	Confidentiality	En/Decryption based on crypto used on RF channel with replay attack protection
16.	Integrity	CRC16/32 ,parity, bit coding, bit counting CMAC,MAC
17.	Command set	Native command set ISO/IEC 7816 wrapping of the native command set
18.	File Types to be supported	Standard data file, back-up data file, Value file, Cyclic and Linear record file.
19.	Security	HW Glue logic RAM scrambling multi metal layer


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20.	Exception sensors	Temp voltage
21.	Operating distance	6 cms \pm 1 cms.
22.	Data Retention	\geq 05 years.
23.	Write endurance	Typical 500 000 cycles
24.	Reliability & Test Certificate	Arsenal and CCEAL4+

2) Physical Characteristics of Cards: -


(a)	Card Geometry	Shape and Physical dimensions (including thickness) to be compliant to ISO 14443-1 standard.
(b)	Base material	The complete base material including Card Body and transparent outer layer should be high grade PET-G. The surface must be such that it is low sensitive to dust and moisture adherence.
(c)	Card lifetime	Must be \geq 05 years. Therefore, during this lifetime, the card must not develop cracks, hole, printing fading, major surface imperfection etc due to aging. In case of occurrence of any such defect(s), the defective card(s) will have to be replaced by the firm on call.

3) Electrical Characteristics: -

(a)	Distance of work	Card should work at a distance of 6 cm \pm 1 cm between antenna and card.
(b)	Certification	<p>Supplier to submit Arsenal certificate (specifically for MifareDesfire Cards).</p> <p>The submitted Arsenal certification shall include certification for essential electrical parameters, protocols and characteristics of Type A Desfire contactless card chip or compatible. Such parameters will include (but not limited to):</p> <ul style="list-style-type: none"> • Antenna coil size, Card Chip / antenna inlay design • Communication frequency, Operating field strength, Modulation • User available application memory (4KB) • Read/write time, Read/write endurance (500,000 cycles). • Data retention (\geq 05 years), Data transfer rate upto 848 kbps. • Security features such as Anti-tearing, Momentary power loss protection, Anti-collision, Data integrity (support mutual authentication with the reader), 3DES encryption, EEPROM failure automatic detection, Transaction


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	<p>atomicity.</p> <p>The supplied card should comply to all standards /specifications covered under ISO 14443 Type A standard for contactless Smart Cards.</p> <p>The Inlay should be manufactured by the Tenderer himself.</p> <p>The Construction of the Card Antenna should be made of high grade copper-wire and should be embedded type only for long durability and better readability.</p>
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4) Security features: -

(a)	Transportation Keys	Card manufacturer will encode cards with transportation keys prior to delivery to ensure security/integrity of the chip.
(b)	Unique Serial Number	<p>Card shall be issued with a Unique ID (serial number).</p> <p>i) Unique engraved ID will be embossed on the Card Surface (laser engraved). Unique serial no. with padding digits for supplier identification to be used (in consultation with Metro Railway, Kolkata). Each card will have a unique internal ID (7 bytes).</p> <p>ii) Engraved ID and corresponding Unique ID information for complete delivery should be available in recorded electronic media (CD etc) which will be securely delivered to Metro Railway, Kolkata.</p> <p>iii) Card should have tamper protection. Card opening must not be possible without breaking the card itself and card must become useless as a result. If card is torn apart, it should become unusable.</p>

5) Environmental Conditions Parameters: -

Physical card and embedded data should not be tampered in adverse utilization conditions as detailed below: -

(a)	Resistance to environment	Cards must resist up to environment stresses as: Temperature: upto +50°C Relative Humidity: upto 100 %
(b)	Storage condition	Temperature: -10 to +60°C Relative Humidity: 15 to 100 %
(c)	Operating condition Temperature	-10 to +60°C Relative Humidity: 15 to 60 %

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6) Card Packaging, Labeling & Delivery: -


- a) Cards will be packaged in suitable cardboard boxes containing 1000 cards each.
- b) Safe and insured supply of all lots.
- c) Supply to be done as per intimated date at Metro Railway's premises.
- d) Cards to be supplied in suitable cartons ensuring safe storage under environmental variables such as humidity, temperature etc.
- e) Further, the packing should prevent the cards from any accidental electrical or mechanical shock capable of inducing any operational / structural defect in the cards.
- f) On each box, a label will be set with following information. These indications must be readable when boxes are stacked.
 - i. Company logo
 - ii. Batch number
 - iii. Number of the box
 - iv. Number of cards
 - v. Manufacturing date and manufacturer reference
 - vi. Delivery location of cards
 - vii. Weight of the box (if requested)
 - viii. Serial number of cards.
- g) CD containing engraved and unique IDs of cards shall be securely delivered with the batch.
- h) Transport key for the supplied batch shall also be securely delivered to the authorized representative of Metro Railway, Kolkata.


i) Card Layout (indicative)

- i) Back of the card: Commercial Instructions for use or the content received from the likely advertiser, as the case may be.
- ii) Slogan on Smart Card: Will be given during submission/approval of art work.
- iii) Art work on the front face of Card: Will be given during submission/approval of art work.
- iv) The above is only indicative for the purpose of bidding by the manufacturer. However, the firm is required to get the final layout approved by the Operating Branch of Metro Railway before going into production of entire lot.

7) Smart Card Reliability / Warranty: -

- a) Contactless Smart Card must adhere to specifications covered in ISO IEC 10373-1- General characteristics (for the following parameters): -


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- Resistance to dynamic bending stress
- Torsion stress
- Bending stiffness
- Resistance to break
- Flammability, Peel strength
- Card warpage
- Resistance to chemicals
- Adhesion
- Card stability etc.


b) Warranty: -

1. Warranty for a period of Three (03) years or 1,00,000 times of writing whichever is earlier. Warranty will start from the date of receipt of the material at the consignee's store at Metro Railway, Kolkata.
2. During this warranty, the card must not develop cracks, hole, printing fading, major surface imperfection etc. due to aging under normal usage condition. In case of occurrence of any such defect(s) including the chip level malfunctioning, the defective card(s) will have to be replaced by the firm on call.
3. The supplier firm must have to deposit a warrantee BG to cover the warrantee obligation.

8) Inspection: -

- a) Inspections will be carried out by the authorized representative of Metro Railway, Kolkata.
- b) The supplier will first submit 100 nos of sample cards to Metro Railway, Kolkata for approval on the basis of physical check of design inlay, dimensions, finish, quality of plastic used, quality of lamination and also card Security features as per Clause-4 (b) (iii). The distance of operability (6cm \pm 1cm) and system compatibility check will also be carried out at this stage in Metro Railway's AFC-PC setup.
- c) Out of the 100 nos. of sample cards, 50 nos. will be kept in the custody of Metro Railway, Kolkata and the balance 50 nos. will be returned to the firm in sealed cover-each card marked and signed individually as reference for bulk manufacturing of cards.
- d) The firm will be bound to exactly replicate the quality and all other parameters of the approved samples while manufacturing the ordered quantity. Any discrepancy between the approved sample and the ordered quantity offered for inspection subsequently-be it minor or major-detected at the time of Factory Acceptance Test (FAT) will result in rejection of the entire offered lot.
- e) Once the firm is ready with a deliverable lot as per delivery schedule, it will ask Metro Railway, Kolkata to depute its Inspecting Official for Factory Acceptance Test at the firm's works or at suitable reputed test laboratory or otherwise as decided by Metro Railway, Kolkata administration.


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FAT will be conducted on the basis of the approved samples and the firm's clause-wise compliance submitted with the bid document.

- f) Sample size for FAT will be determined by the nominated Inspecting Official.
- g) Material passed in FAT and received at Metro Railway, Kolkata will be formatted /initialized in Metro Railway's AFC-PC setup. Cards failing to initialize will be returned to the supplier for replacement free of cost.
- h) The entire cost of FAT will be borne by the supplier.


9) Schedule of Supply: -


Delivery to be done as per the following schedule: -

Sl. No.	Item	Schedule
1.	Placement of Purchase Order by the Stores Department	D _o
2.	Submission of 100 nos. sample cards by the firm for testing as per Clause – 8(b)	D _o + 14 days
3.	Communication of Metro Railway's approval of sample to the firm	D _o + 21 days
4.	Delivery of full quantity of smart cards after successful completion of FAT	D _o + 90 days

10) Eligibility Criteria: -

- a) The prospective bidder must be an ISO and ARSENAL Test house certified firm for manufacturing of RFID Contactless Smart Card, having an experience of at least 3 years in the manufacturing of RFID Contactless Smart Cards. Current and valid certificate to this effect must be sustained with the bid.
- b) The bidder must have a registered office in India for a minimum period of last 3 years.
- c) The bidder must have the experience of successfully and satisfactorily executing of supply of Smart Cards in Govt./Semi Govt./PSU Organizations/any other Metro Rail in India.
- d) The bidder will submit documents issued by the purchaser along with the bid.
- e) The standard eligibility criteria for supply contract may be incorporated in NIT.
- f) The bidder will submit documents issued by the purchaser along with the bid.
- g) The bidder will submit with the bid a declaration stating that it has not been blacklisted/debarred by the Government agency.
- h) The bidder will also submit a declaration stating that the product being offered does not in any way infringe on international copy right regulations.
- i) The prospective bidder will submit with the bid, a clause-wise compliance with specific comments in any one of the following three categories as applicable: -
- Compiled/Not Complied. Compliance will be demonstrated by the manufacturer in actual test during FAT.


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- Complied/Not complied. Compliance will be shown on the basis of production of original certificates issued by the Chip Manufacturer/ Arsenal Test house during FAT.
- Complied/Not complied. Compliance will be affirmed on the basis of written declaration by the manufacturer during FAT.

j) The prospect bidder must submit with the bid the authorization letter of the original chip manufacturer for supply and support during the entire lifetime of the chip card specifically for this tender of Metro Railway, Kolkata.

*** END OF SPECIFICATION***

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