

**BEML LIMITED**

(A Govt. of India Mini Ratna Company under Ministry Of Defence)
BANGALORE COMPLEX, POST BOX: 7501, NEW THIPPASANDRA POST,
BANGALORE-560075

NOTICE INVITING TENDER**SRM BID NO: 6100001252****Dt:30.07.2026**

Subject: Development, Implementation and Validation of Safety data Transmission Protocol of CMRL ARE02A Project.

Quotation/offer are invited for **Development of Software** for Metro Rolling stock having experience in **Development, Implementation and Validation of Safety data Transmission Protocol** in accordance with the enclosed terms and conditions within the tender closing date.

Quotations should be submitted online (E-mode) in SRM Portal in Two-Bid system as below:

- 1) Technical Bid**
- 2) Commercial Bid**

Note: 1. Commercial bids of only technically acceptable firms will be opened and considered for further evaluation by BEML.

2. No commercial terms to be indicated in the technical bid else the offers of such bidders will be rejected and not considered for further commercial evaluation

Note: - The tender consists of 39 no. of pages including this page.

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3. General Instructions to Bidders:

1. The Bidders are advised to carefully go through, read and understand this tender documents completely including terms and conditions, Annexures and Appendices etc. before submitting bids
 - a. This NIT is not transferable under any circumstances.
 - b. All entries in the NIT shall be in English either typed or written legibly. Erasing, over-writings and use of correction fluids are not permitted. All cancellations and insertions should be duly signed / attested by bidder concerned.
 - c. All the corresponding documents shall be attached along with the quotation/offer
 - d. The bidder shall **sign each and every page of tender document** before submitting the tender. No corrections/revisions will be entertained after opening the bids.
 - e. Late and/or incomplete tender shall not be considered.
 - f. Canvassing in any manner including unsolicited letters and request for post tender corrections shall render offers of such parties liable for rejection.
 - g. Bidder shall ensure that all the information & documents submitted by them are true & correct.
 - h. In case, it comes to the knowledge of BEML that the bidder has submitted false information before awarding of contract then the offer would be rejected.
 - i. In the event, it comes to the knowledge of BEML that the successful bidder has submitted false information, subsequent to the award of contract, the contract shall be cancelled/short closed by the company and shall invoke Risk purchase clause with liabilities on such bidder for the entire contract quantity. The PBG shall also be encashed as a result of consequence of breach of contract at the discretion of BEML.

2. Abbreviations used in this NIT

GeM-Government E Market Place	BEML -BEML Limited
NIT- Notice Inviting Tender	BMRCCL -Bangalore Metro Rail Corporation Limited, MRS - Mumbai Rolling Stock
TS-Train set	ERTS - Employer's requirements Technical Specification
PTS- Procurement Technical Specification	ERGS- Employer's requirements General Specification
PO-Purchase order	DLMP -Defect Liability and Maintenance Period
GTC- General Terms and Conditions	PBG – Performance Bank Guarantee

3. In case any person/persons, Company, firm, Associations having any litigation, arbitration cases between themselves and BEML Ltd, pending before any court of law/ Arbitrator shall not be eligible to participate in this tender.
4. Non-compliance with any of the tender conditions, incomplete offers, conditional and ambiguous offers are not acceptable and liable for rejection.
5. The bidder shall fill in all the required particulars in the blank space provided for the purpose in the tender document.
6. All the documents shall be uploaded in GeM Portal.
7. Fax/email quotations are not acceptable.
8. BEML reserves the right to accept or reject all tenders or any tender in part or full without assigning any reasons thereto, which is final & binding on the Bidder

4. DETAILS OF THE TENDER

This "Notice Inviting Tender" hereinafter referred to as the 'NIT' is designated as the tender for **Development, Implementation and Validation of Safety data Transmission Protocol of CMRL ARE02A Project.**

1) The tender consists of two parts as indicated below:

Sl. No.	Nature of Bid	Mode of Submission	Details
1	Technical Bid	SRM Portal	- Technical Bid (Without Price Details) shall be uploaded and submitted in the SRM Portal, wherein only technical Bid /technical information in SRM Portal shall be uploaded - Clause by clause compliance to General Terms and conditions. - Compliance to SOW Doc No. GR/TD/8647 Latest Rev. - Submission of Integrity pact.
2	Commercial Bid	SRM Portal	Price details to be duly filled in specified field on GeM Portal. Commercial evaluation will be based on total value

2) Details of Items & Services:

TABLE-1

Sl. No	Description	UoM	Quantity
1	Development, Implementation and Validation of Safety data Transmission Protocol - CMRL ARE02A Project SOW is as per GR/TD/8647 (latest revision)	AU	1

5. SUBMISSIONS OF TECHNICAL BID

Technical Bid submission Conditions	<u>TECHNICAL BID (Without Price Details)</u> shall be uploaded and submitted in the SRM Portal, wherein only technical Bid /technical information in SRM Portal shall be uploaded as indicated below: a. Bidders should upload duly filled, signed & stamped Integrity Pact with two witnesses [Appendix – A]. b. Clause by Clause compliance for the Scope of Work (SOW) Doc No. GR/TD/8647 Latest Rev. [Appendix – B] Bidders to refer “SOW” (Annexure-I) enclosed along with this tender document. Bidders should upload the following documents duly filled, signature & stamped under technical bid. c. Bidder to upload enclosures related to technical & other information deemed appropriate in respect of this tender on the letter head of the company, if any. d. Photographs / Drawings if any, may be uploaded. e. Bidders to refer “GENERAL TERMS AND CONDITIONS (GTC)” (Annexure-II) enclosed along with this tender document and upload clause by clause compliance of GTC duly filled, signature & stamped along with the supporting documents as specified therein. [Appendix – C] f. Bidders to upload duly filled, signature & stamped confidentiality agreement in plain paper [Appendix – D] g. Bidders to upload duly filled, signature & stamped Compliance to Land border sharing Clause – [Appendix – E] h. Bidders to upload duly filled, signature & stamped Compliance to purchase preference under public procurement policy – [Appendix – F] i. Bidders to upload duly filled, signature & stamped Compliance to Contact Details of Supplier/ Bidder – [Appendix – G] BEML at its sole discretion reserves the right to seek the Soft/ Hard copies of the documents which are already been uploaded in GeM, through Courier / post pertaining to technical bid of this tender enquiry at a later date, if required. In such cases, only the documents uploaded in GeM Portal in original has to be couriered at the request of BEML. Any irrelevant documents furnished through courier will not be considered. NOTE: Please note Commercial Bid /Price details should not be indicated in TECHNICAL BID, else bid will not be considered for further evaluation.
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6. SUBMISSION OF COMMERCIAL BID

The price bid to be submitted through SRM Portal. The following details are to be entered in the SRM Portal.

TABLE 1				
Sl. No	Description	UoM	Quantity	Unit Rate in INR
1	Development, Implementation and Validation of Safety data Transmission Protocol- CMRL ARE02A Project SOW is as per GR/TD/8647 (latest revision)	AU	1	Price to be uploaded in commercial bid only

Note:

1. Bidder has to quote for the items as listed in SRM Portal
2. Commercial evaluation will be total value.
3. The commercial bids of the technically acceptable vendors only will be opened for further commercial evaluation.
4. Reverse Auction will be conducted among technically qualified Bidders and L1 status will be arrived based on total bid value.

ANNEXURE – II**8.GENERAL TERMS & CONDITIONS (GTC) FOR PROCUREMENT OF MATERIALS:****1. GLOSSARY, DEFINITIONS & INTERPRETATIONS**

- a) The Purchaser means “(include company name and address)” (A Government of India Undertaking) incorporated under the Companies Act having its registered office at “BEML Soudha, No. 23/1, 4th main, S.R. Nagar, Bengaluru – 560027” and shall be deemed to include its successors and assignee.
- b) Supplier’ means a person having been included in a contract as a Contractor and also means a firm or company with whom the order for supply/execution of work is placed and shall be deemed to include the supplier’s successors, (approved by BEML Ltd.) representatives, heirs, executors and administrators. The supplier may also be referred to as the supplier, Contractor or vendor.
- c) Parties to the Contract’ shall mean the Supplier and the Purchaser as named in the main body of the Purchase Order.
- d) Tender’ means and includes quotation, invitation to tender and all other documents like drawings, specifications, design & quality plan, etc., that form part of the tender document.
- e) Acceptance of Tender’ Means the letter of memorandum communicating supplier, the acceptance of the Tender and includes advance acceptance of this tender.
- f) Purchase Orders (PO) / Contract’ means and includes the invitation to tender, instruction to Tenderers, acceptance of tender, Letter of intent / letter of award, the general terms and conditions of Purchase Order / contract, special conditions of Purchase Order /contract, particulars, descriptions, specifications, schedule of prices, quantities, quality plan, drawings enclosed and other condition specified in the acceptance of tenders and includes the repeat order which has been accepted or acted upon by / for the supplier for the supply of stores and includes an order for performance of service and includes amendments, if any, that may take place subsequent to the discussions, negotiations, mutual agreement if any.
- g) Stores / Materials / Services’ means the goods or services as described in Procurement Technical Specification (P.T.S.) and in the Purchase Order which the supplier has agreed to supply under the Purchase Order.
- h) Specification means technical specifications of the Equipment / Material as set forth in Procurement technical specification (PTS) / technical drawings, which is part of tender. Employer (BMRCL) Requirement Technical specification (ERTS) & Employer (BMRCL) Requirement General specification (ERGS)
- i) End-Customer / End-user means: Bangalore Metro Rail Corporation Ltd (BMRCL).
- j) Words in singular include the plural & vice-versa.
- k) Words imparting the masculine gender shall be taken to include the feminine gender and words imparting persons shall include any firm, company or associations or body of individuals whether incorporated or not.

- l) The heading of these conditions shall not affect the interpretations or construction thereof of the contract.
- m) F.O.B / F.D.D / DAP. is to be interpreted in accordance with the provisions of INCOTERMS 2010, unless otherwise specified in this Tender Document / Purchase order.

2. SUBMISSION OF THE TENDER:

Tender is in TWO-BID system (Technical & Commercial Bid)

Bids should be submitted online mode only as follows:

a) Submission of Technical bid (without price):

- i. The Bidder should upload all the requisite technical documents along with respective supporting documents and other information deemed appropriate in respect of the Tender.
- ii. **The price details/commercial bid details should not be given in the Technical bid.** If any of the bidder have given any price/commercial details in the Technical bid, their offer is liable for rejection and will not be considered for further evaluation.
- iii. Technical Bid will be opened on date and time of bid opening and the commercial Bids of those bidders whose technical bids are qualified (accepted) only will be opened for commercial evaluation.

b) Submission of Commercial bid:

- i. The Commercial Bids of those bidders whose technical bids are qualified (accepted) only will be opened for commercial evaluation.
- ii. Price details in specified field on SRM Portal to be submitted.
- iii. Bidder to quote for all the items /Services if any.

c) General:

- i. If dealers/authorized representatives submitting the bids in place of OEM, Dealer / authorized representatives should submit Authorization letter from OEM.
- ii. BEML reserves right to reject the tender due to unsatisfactory past performance in the execution of a contract at any of BEML projects / units.
- iii. Bidders participating in the tender should declare in their offer that whether they have been black-listed / kept on hold for a specified period / given Business holiday for a specified period by any Public sector undertaking or Government departments. The reasons for such action with details and the current status of such hold shall be furnished to BEML.
- iv. In case any person/persons, Company, firm, Associations having any litigations, arbitration cases between themselves and BEML Ltd, pending before the Court / Arbitrator or initiated litigations/arbitrations in connection with any contract / tender issued by BEML Ltd and any contractor has defaulted against the BEML's orders, they are not eligible to participate in this tender.
- v. BEML may decide to scrap the tender/refloat the tender without assigning any reasons thereof before LOI/PO is committed. BEML reserves the right to accept, split, divide, negotiate, cancel or reject any tender or reject all tenders at any time prior to the award of the contract without incurring any liability to the affected tenderers or any obligation to inform affected tenderer, the grounds of such action.

- vi. BEML reserves the right to verify, in its sole discretion, any information given by the bidders independently through any third-party agencies. During this process, if it is found that any of the information given by the bidder is false / misleading, offers of such bidders would be out rightly rejected.
- vii. BEML also reserves the right to independently assess the capability and capacity of the bidder for execution of the order/contract. BEML's decision on any matter regarding short listing of bidders shall be final.
- viii. The Tender / Notice Inviting Tender is not an offer or a contract.
- ix. Bidders will not be compensated or reimbursed for the costs incurred in preparing Proposals. Proposals shall become BEML property.
- x. BEML's decision is final for Evaluation of the offers.
- xi. **DELIVERY SCHEDULE** : Tentative delivery schedule is indicated in the document ref: GR/TD/8647 Latest Rev . However, the bidder has to start the work, after release of Purchase order based on confirmation from R&D department

3. SUPPLIERS SHARING LAND BORDER WITH INDIA:

Land border sharing Declaration in line with Department of Expenditure (DOE) Public Procurement Division order vide F. No. 6/18/2019-PPD dated 23.07.2020 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products, shall be applicable for bidders / suppliers sharing land border with India. Bidders to upload signed & sealed compliance as per appendix attached as part of Technical Bid.

4. PREFERENCE TO MAKE IN INDIA:

Purchase Preferences as per MII (Make In India Policy) and MSE Purchase Preference as Per Public Procurement Policy is Applicable in-line with revised public procurement (preference to make in India), order 2017 dated 04th June, 2020 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products, shall be applicable for bidders / suppliers under Purchase preferences. Bidders shall upload necessary supporting documents and to upload signed & sealed as per appendix attached as part of Technical Bid.

Consideration of bids shall be as follows:

(i) If technically qualified bid(s) with valid Notice of No Objection / Notice of No Objection with Conditions (NONO/NOWC) from end customer (i.e. CMRL) is available for local supplier (as per MII), then bids of local supplier/s only will be considered and bid of non-local supplier/s will not be considered for commercial bid opening and evaluation.

(ii) In the case of technically qualified bid(s) with valid Notice of No Objection (NONO/NOWC) from end customer (i.e. CMRL) is not available for local supplier (as per MII) then the technically qualified bid(s) with valid NONO/NOWC from end customer (i.e. CMRL) of non-local supplier/s will be considered for commercial bid opening and evaluation

5. DELIVERY TERMS:

Since the subject activity involves strictly Software Development, the delivery terms shall be considered on an FOR (Free on Rail / Free on Road) destination basis for the supply of final licenses and documentation

6. PAYMENT:

Applicable to Indian Bidder:

Terms of payment are 100% in 60 days from the date of completion of scope of Work and subsequent submission of Invoice duly certified by BEML R&D Department & for MSEs 45 days from the date of completion of scope of Work and subsequent submission of Invoice duly certified by BEML R&D Department.

Bidders to indicate the category of their firm under Micro/Small/Medium industries with necessary documentary proof of evidence for purpose of evaluation and BEML data up dation.

Micro and Small enterprises (MSE) registered under UDYAM registration are eligible for the 45 days payment on submission copy of MSE certificate issued by UDYAM.

In case of MSME firms, Payment will be made **through TReDS platform**

Applicable to Foreign Bidder:

Payment will be made through Telegraphic Transfer (T/T) on 60th day from the date of completion of scope of Work and subsequent submission of Invoice duly certified by BEML R&D Department.

Any bank charges incurred in India shall be borne by purchaser and all bank charges outside India shall be borne by the supplier..

The payment is further subject to the following:

- a) The Invoice shall be compliant with GST laws.
- b) GST liability is to be discharged and ensure filing of outward supply details on GSTN portal within timeline prescribed.
- c) Any debit note/supplementary invoice if any, is to be raised within September month following the respective financial year of filing of annual return by BEML, whichever is earlier.
- d) Any loss of tax credit due to the reason attributable to supplier shall be recovered from supplier along with applicable interest and penalty.
- e) Bidders to indicate the GST and other levies applicable. GST shall be paid only after confirmation of payment of GST by vendors on GST Website.
- f) Relevant TDS / TCS as applicable shall be deducted as per prevailing Income Tax / GST / GOI notifications
- g) The supplier should submit the following documents for each supply:
 - Tax Invoice; GSTR-1 return filed with authorities with the relevant abstract
 - GSTR-3B return or any other form of return prescribed by the authorities.
 - Copy of Challans regarding deposit of GST
 - Certificate of Chartered Accountant

- 7. PRICE BID VALIDITY:** The Bid should be valid for 180 days from the date of tender opening. BEML's acceptance of the tender at the quoted / negotiated rates will be binding on the tenderer during the tenure of contract.
- 8. FIRM PRICE.** The prices remain firm for the entire supplies of the purchase order and no escalation shall be entertained under any circumstances. The prices are to be firm & no increase in finalized price will be entertained after awarding contract during the period of Contract for any reasons whatsoever.
- 9. INSPECTION:**

Please refer SOW :. GR/TD/8647 Latest Rev.

10. PERFORMANCE BANK GUARANTEE (PBG):

Firm shall submit the following Performance Bank Guarantees:

- a. Supplier should submit Performance Bank Guarantee for amount equivalent to 5% of the Contract value valid till completion of SOW with additional 3 months claim period. The bank guarantee has to be submitted within 60 days from the date of release of Purchase order from BEML but not later than 30 days before commencement of service activities.
- b) In case BEML is constrained to extend the Performance Bank Guarantee to its customer (BMRCL), due to the failure of aggregates attributable to the supplies made by the supplier or non-fulfilment of NRC activities if applicable, then the costs involved to BEML for such PBG extensions shall be borne by the supplier.
- c) Performance Bank Guarantee shall be returned on completion of the order, based on the recommendations of the User Department (i.e. R&D Dept.), the Bank guarantee will be released to the firm/bidder within three months (03) after completion of the order subject to fulfillment of contractual obligations by the firm
- d) If the minor outstanding works as incorporated in the taking over certificate are not attended by the Supplier within the specified time frame, full amount of Performance Security due to the Supplier shall not be released

General terms of PBG:

- a) In case of foreign bank guarantees, the BGs from foreign banks, authorized /recognized by RBI to issue a Bank Guarantee, in their own letter head will be accepted.

In the case of PBG/s submitted from Indian Bank, the PBG shall be furnished by Scheduled Commercial Banks authorized by RBI to issue a Bank Guarantee.

Format for PBG is attached for reference.

- b) In the absence of performance bank guarantee to be submitted by the supplier as per contract terms, BEML will not open Letter of Credit (LC) in the cases of LC in favor of supplier pertaining to the shipment / stores to be supplied as per first delivery schedule indicated in the purchase order. Any delay in submission of performance bank guarantee by the supplier, the subsequent delay in opening in Letter of Credit by BEML and supplies to

- be effected by the supplier are to the account of the supplier, which attracts liquidated damage charges as per contract terms.
- c) No claim shall lie against BEML Ltd., in respect of interest on cash deposits or Govt. Securities depreciation thereof.
 - d) BEML shall be entitled to and it shall be lawful on its part to encash the Bank Guarantee in whole or in part in the event of any default, failure or neglect on the part of the supplier in the fulfilment or performance in all respect of the Purchase Order.
 - e) The Bank Guarantee shall be established through **Structured Financial Messaging System (SFMS)** mode from a Scheduled Commercial Bank authorized by RBI in India as defined by RBI.
 - f) A separate copy of the BG has to be sent by the issuing bank to the Purchaser's bank through SFMS. The details of Purchaser's bank are as under:

STATE BANK OF INDIA
Overseas Branch, No.65,
St. Marks Road,
Bangalore – 560001
IFSC Code: SBIN0006861

- g) Following codes are to be used by issuing bank for the purpose of Confirmation and amendment in Bank Guarantees:

Code	Purpose
MT760	Confirmation of Bank Guarantee
MT767	Amendment in Bank Guarantee

- h) Bank Guarantee issued on the SFMS platform with any other code other than mentioned above for the purpose shall not be acceptable to the Purchaser.
- i) The Bank Guarantee validity shall be extended as required till the completion of all contractual and warranty obligations in Full.
- j) Bank Guarantee to be submitted in electronic form through NeSL platform as required by BEML

11. RIGHT TO VARY QUANTITIES (In case of Applicability):

“BEML reserves the right to increase or decrease the quantity specified in the schedule of requirements without any change in the unit price or terms and conditions. The purchaser (BEML) may exercise the right on any date/s, before completion of one year from the scheduled delivery of last train set by BEML to end customer.

Purchaser (BEML) at its discretion may advice the contractor (supplying vendor) in writing about the increase in the quantity of the Line items ordered.

Supplier shall be required to supply increased order quantities at the contracted terms & conditions and at determined firm unit price originally ordered and no additional amount on account of quantity variation or escalation or any other account whatsoever is payable to the supplier.

In case of increase in quantity beyond the original quantity, the Key dates for the increased quantities shall be mutually decided at the time of quantity variation by Purchaser.”

12. LIQUIDATED DAMAGES CLAUSE:

The time and the date of delivery of the stores stipulated in the PO shall be deemed to be the essence of the Purchase order and delivery must be completed not later than the dates specified therein. The supplier shall strictly adhere to the delivery schedule indicated in the PO. Any supplies made ahead of this schedule are liable for rejection at the discretion of BEML. Should the supplier fail to deliver the stores or any consignment thereon within the period prescribed for such delivery, BEML shall be entitled:

“To accept the delayed supply and to recover from the supplier Liquidated Damage charges at the rate of 0.1% of total value of the amounts apportioned to the affected delivery schedule for each calendar day of delay for first 28 days and 0.25% of the total value of the amounts apportioned to the affected delivery schedule for each calendar day of delay beyond 28 days to the maximum of 10 % of the affected delivery schedule of the purchase order.

The penalty / LD will be charged on the value of the affected delivery schedule excluding statutory levies, freight and insurance wherever not included in the price.

13. RISK PURCHASE CLAUSE:

The time and the date of delivery of the stores stipulated in the PO shall be deemed to be the essence of PO and delivery must be completed not later than the date specified therein. Shall the supplier fail to deliver the stores or any consignment thereof within the period prescribed for such delivery, BEML shall be entitled at their option either;

- a. To purchase elsewhere, without notice to the supplier on the account and at the risk and cost of the supplier the stores not delivered or other of a similar description (where stores exactly complying with the description and readily procurable) without cancelling the PO in respect of consignment not due for delivery

or

- b. To cancel the purchase order.

In the event of action being taken under clause (a) or (b) above, the supplier shall be liable for any loss, which BEML may sustain on that account but the supplier shall not be entitled to any gain or purchases made against default. As soon as it is apparent that the scheduled dates cannot be adhered to, an application shall be sent by the supplier to BEML, well before the expiry of the delivery period specified in the purchase order. Without prejudice to the foregoing rights, if such failure to deliver in proper time as aforesaid shall have arisen from any cause which BEML may admit as a reasonable ground for an extension of the time (and their decision shall be final) they may allow such additional time as they may consider justified by circumstances of the case.

Delivery required to be made in lots shall be made in lots only and any extra deliveries involved either on account of repeated rejections or variance in supply of lots shall be liable for service charges of 5% of the purchase order value for each extra delivery.

14. SECRECY AND CONFIDENTIALITY:

- a) All the information, know-how, technical data, specification and drawing models or specimens furnished by BEML for the purpose of or in connection with the manufacture and supply of the stores hereby tendered constitute the property of BEML and the supplier shall keep them in strict confidence and he/ she shall not divulge the same to anyone else except under the authority and for the purpose of BEML. All such documents, data, drawing, models and specimens are the property of BEML and shall be returned when done with or when demanded by BEML.
- b) The supplier shall not supply the material ordered by BEML to anyone else other than BEML and shall not disclose any initiations, development or adaptations thereof to anyone.
- c) BEML shall be entitled to prevent a breach of the above and claim damages in case of breach. In case of non-performance in this PO, BEML will have to take procurement action at your risks and cost apart from levy of liquidated damages.
- d) Confidentiality agreement to be executed as per Appendix E.

15. AUTHORITY OF PERSONS SIGNING DOCUMENT:

A person signing the tender or any other document in respect of the tender shall be deemed to have power to do so on behalf of the Supplier.

16. ACCEPTANCE OF ORDER:

The supplier shall send Order Acceptance within two weeks from the date of LOI/LOA/Purchase Order or such other period as specified / agreed by the Purchaser. Purchaser reserves the right to revoke the order placed if the order confirmation differs from the original Purchase Order placed and the Purchaser shall only be legally bound after it has agreed explicitly in writing to be in agreement with the deviation. The acceptance of deliveries or supplies by Purchaser as well as payments made in this regard shall not imply acceptance of any deviations. The Purchase Order will be deemed to have been accepted if no communication to the contrary is received within two weeks (or the time limit as specified / agreed by the Purchaser) of receipt of the order.

17. OTHER CONDITIONS:

- a) Refer BEML Purchase Manual (can be accessed in BEML website www.bemlindia.in) for Important terms and conditions of tender and General Terms & conditions applicable to contracts & purchase orders refer General Terms & Conditions
- b) The firm shall take necessary permission for their employees to enter the factory premises and the firm shall arrange ESI & PF coverage to their employees / labourers if any from their end. The firm shall indicate ESI NUMBERS for the labourers hired or employed in advance in order to prepare work permit inside the factory.
- c) BEML will not have any kind of binding towards the compensation on case of injury / death to the firms employees while working in BEML premises or other wises.
- d) BEML will not have any kind of binding on damages or loss to the tools/instruments etc. brought by the firm for commissioning purpose.

18. PRICE, INVOICING AND PAYMENT:

- a) The agreed prices are **fixed prices** for the supply, in the currency as specified in the Purchase Order. They shall include packing, forwarding, loading and carriage to the place specified by the Purchaser and are inclusive of all applicable taxes, duties etc. except for those specifically

agreed between the supplier and purchaser. The method of invoicing shall be without prejudice to the parties; agreement as to the place of performance. Invoices shall be submitted bearing the Purchase Order number & date, item number / s and supporting documents as called for in the Purchase Order.

As soon as each shipment is made in line with the delivery schedule specified in the purchase order, the supplier shall send **one set of Original documents and three (3) sets of photocopies** each of the following documents to the address indicated below by courier service.

- i. Commercial Invoice
- ii. Delivery Challan
- iii. Packing List
- iv. BEML's Inspection clearance document(s), material test certificates and other applicable quality documents pertaining to the supplies.

Postal Address

The Deputy General Manager,
Purchase Department
BEML, Bangalore Complex,
PB No.7501, New Thippasandra post,
Bangalore, Karnataka, India,
Postal Code - 560 075

19. PROGRESS REPORT:

The supplier shall regularly inform the progress of work and in such form as may be called for by the Purchaser from time to time. The submission and acceptance of such reports shall not prejudice the rights of the Purchaser in any manner.

20. QUALITY & WORKMANSHIP:

The stores supplied shall be of the best quality and Workmanship shall be in strict conformity with all the drawings and specifications furnished with the Purchase Orders and shall answer to the description in all respects. All supplies shall be accompanied by supplier's works inspections / test certificates duly certifying, the Stores are in strict conformity with the drawings / specifications. However, final acceptance will be subject to inspection and approval at BEML works. Once the materials are rejected and communicated to the supplier, no request shall be entertained for re-inspection or acceptance of the stores. However, BEML reserves the right to re-inspect the stores and consider acceptance at its discretion.

21. QUALITY, CONDITION OF DELIVERY:

The Supplier shall guarantee that the delivery is of good quality and free from all defects and in the case of services rendered that they are performed by skilled personnel and that new materials are used. The Supplier shall guarantee that the delivery corresponds exactly with the provisions of the agreement, the reasonable expectations of Purchaser regarding the characteristics, quality and reliability of delivery. The Supplier guarantees that the delivery is suitable for the purpose for which it is intended by its very nature or which is evident from the specifications listed and from the order.

The Supplier shall guarantee that the delivery complies with legal requirements applicable in India and other (international) Government regulations, as applicable. The supplier shall guarantee that the delivery complies with the customary norms and standards in the relevant branch of trade or industry. The supplier shall be responsible for compliance with applicable technical, safety, quality, environmental requirements and other regulations in relation to his product, packaging, and raw and ancillary materials.

22. INSPECTION, TESTING & CONSEQUENCE OF REJECTION:

The goods and stores shall be of approved design and each part /component may be inspected and tested by the Purchaser prior to shipment and shall fully comply with relevant requirements of purchaser.

Purchaser has the right to inspect the delivery. In the event of rejection, Purchaser shall inform the Supplier accordingly and Purchaser shall be entitled to replacement or repair at its discretion or may proceed to terminate or annul the agreement. All this does not affect Purchaser's right to compensation.

In case the goods / stores are rejected at the time of inspection at BEML or the rejections are noticed at the time of further processing the supplier will be informed of these rejections. On receipt of this information the supplier shall immediately arrange to collect the rejected items at his cost and risk and arrange for the replacement of goods within the shortest possible time. Under no circumstances the supplier shall compel the Purchaser to rework the rejected goods.

Wherever the supplier has not collected the rejected items within 60 days from the date of intimation, BEML shall have the right to dispose the goods and all cost related to the cost of material, statutory levies incurred both in procurement and disposal shall be recovered from the supplier from any of the bills that are due. The supplier shall have no claims whatsoever against the Purchaser for such disposal.

Purchaser or his authorized representative shall be entitled at all reasonable times during execution to inspect, examine and test at the Supplier's premises the material and workmanship of all stores to be supplied under the Contract, and if the part of the stores are being manufactured at other premises the Supplier shall obtain Purchaser's or his authorized representative's permission to inspect, examine and test as if the said stores are being manufactured at the Supplier's premises. Such inspection, examination and testing, if made shall not release the Supplier from any obligation under the Contract.

All costs related to inspections and re-inspections shall be borne by the Supplier. The cost of inspection staff / third party specified by the Purchaser shall be borne by Purchaser, unless otherwise specifically agreed. Whether the Contract provides for tests on the premises of the Supplier or any of his Sub-contractor/s, Supplier shall be responsible to provide assistance such as, labour, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by the Purchaser only if specifically agreed.

The supplier shall give the authorized representative of the Purchaser reasonable prior notice in writing of the date on and the place at which any stores will be ready for inspection / testing as provided in the Contract.

23. APPLICABLE LAWS AND JURISDICTION OF COURTS:

Indian laws both substantive and procedure, for the time being in force including modifications thereto, shall govern Contract. The competent Indian courts of shall have sole jurisdiction over disputes between purchaser and the Supplier.

24. JURISDICTION:

Courts of Bangalore alone shall have jurisdiction to decide any issue / dispute arising out of the Arbitration or this Purchase Order in exclusion of all other Courts. However, jurisdiction of any other court may be accepted by mutual discussion and agreement by and between BEML and the Supplier.

25. ARBITRATION:

Any disputes and differences that may arise between the parties in connection with this Agreement/Contract shall be settled by the parties amicably by way of mutual discussion / negotiation / conciliations. In case parties fail to settle the dispute amicably, then the dispute or difference shall be referred to India International Arbitration Centre for resolution. The Arbitration Tribunal shall consist of Sole / three Arbitrator /s. The Arbitrator /s shall be appointed and Arbitration proceeding shall be conducted in accordance with the provision of India International Arbitration Centre (Conduct of Arbitration) Regulations, 2023.

During Arbitration, "Supplies under this Purchase Order, if reasonably possible, may continue by mutual agreement during the dispute / Arbitration proceedings"

26. INTELLECTUAL PROPERTY RIGHTS; LICENSES:

If any Patent design, trademark or any other intellectual property rights apply to the delivery or accompanying documentation, Purchaser shall be entitled to the legal use thereof free of charge by means of a non-exclusive, worldwide, perpetual license. All intellectual property rights that arise due to the execution of the delivery by the Supplier and by its employees or third parties involved by the Supplier for performance of the agreement belong to Purchaser. The Supplier shall be obligated to do everything necessary to obtain or establish the above-mentioned rights. The Supplier guarantees that the delivery does not infringe on any of the intellectual property rights of third parties. The Supplier shall also be obligated to do everything necessary to obtain or establish the alternate acceptable arrangement pending resolution of any (alleged) claims by third parties.

The Supplier shall defend and indemnify BEML against any claims, costs or expenses incurred by reason of any infringement of alleged infringement of any letters, patent, registered design, trademarks or trade name by the use of sale of the stores / goods /material and against all costs or damages which BEML may undergo in legal action for such infringement or for which the BEML may become liable in any such action.

The supplier shall at all times indemnify BEML and shall take all risk of accidents or damage which causes a failure of the supply. The supplier shall comply with the provisions of Contract Labour (Regulation and Abolition) Act, 1970 and the Contract Labour (Regulation and Abolition) Central Rules 1971-as modified from time to time wherever applicable and shall also indemnify the Company from and against any claims under the aforesaid Act and the Rules.

27. BRIBES AND GIFTS:

Any bribe, commission, gift or advantage given, promised or offered by or on behalf of the supplier or his partner, agent or servant or anyone on his or their behalf to any officer, servant, representative or agent of BEML or any person on his or their behalf in relation to the obtaining or to the execution of or any other contract with BEML shall in addition to any criminal liability which the supplier may incur, subject the supplier to the cancellation of the PO and all other contracts with BEML and also to payment of any loss or damage resulting from any such cancellation to like extent as is provided in case of cancellation under **Clause-15** hereof. Any question or dispute as to the committing of any offence under the present clause shall be settled by BEML in such manner and on such evidence of information as they may think fit and sufficient and their decision shall be final and conclusive.

28. FORCE MAJEURE CLAUSE:

Notwithstanding anything contained in the Contract, neither the Supplier nor the Purchaser shall be held responsible for total or partial non-execution of any of the contractual obligations, shall the obligation become unreasonably onerous or impossible due to occurrence of a 'Force Majeure' conditions which directly affect the obligations to be performed by the Purchaser or the Supplier. Such events include war, military operations of any nature, blockages, revolutions, insurrections, riots, civil commotions, insurgency, sabotage, acts of public enemy, fires, explosion, epidemics, quarantine restrictions, floods, earthquake, or acts of God, restrictions by Govt. authorities over which the Supplier or the acts on which the Purchaser has no control.

The party claiming to be affected by Force Majeure shall notify the other party in writing without delay, within two weeks on the intervention and on the cessation of such circumstance. Extension of time sought by the Supplier along with supporting evidence and so granted by the Purchaser for the supply / work affected, if any, shall not be construed as waiver in respect of remaining deliveries.

Notwithstanding above provisions, Purchaser shall reserve the right to cancel the order/ Contract, wholly or partly, in order to meet the overall delivery schedule and make alternative arrangements including arrangements with third party for completion of deliveries and other schedules. Purchase may takeover partly processed material at a mutually agreed price.

29. FALL CLAUSE:

- a) The prices charged for the stores supplied under this P.O by the supplier shall in no event exceed the lowest price at which the supplier sells the stores of identical description to any other BEML Office / Division during the pendency of this PO.
- b) If at any time, during the said period, the supplier reduces the sale price of such stores or sells such stores to any other BEML Office / Division at a price lower than the price chargeable under this P.O and the price payable under this PO for the stores supplied after the date of coming into force of such reduction shall stand correspondingly reduced.

30. NON-DISCLOSURE AND INFORMATION OBLIGATIONS:

The supplier shall provide Purchaser with all information pertaining to the delivery in so far as it could be of importance to Purchaser. The Supplier shall not reveal confidential information to its

own employees not involved with the tender / Contract & its execution and delivery or to third parties. The supplier shall not be entitled to use the Purchaser's name in advertisements and other commercial publications without prior written permission from Purchaser.

31. ASSIGNMENT OF RIGHTS AND OBLIGATIONS; SUBCONTRACTING:

The supplier is not permitted to sub-contract the delivery or any part thereof to third parties or to assign the rights and obligations resulting from this agreement in whole or in part to third parties without prior written permission from Purchaser. Any permission or approval given by the Purchaser shall, however, not absolve the supplier of the responsibility of his obligations under the contract.

32. INTEGRITY PACT:

The bidder / contractor should upload duly signed & stamped **Integrity Pact** (if the tender value is more than or equal to Rs.1.00 crore) as per prescribed format (**APPENDIX- A**) on plain paper as part of technical bid.

The bidder should put their authorized signature in the Integrity pact as a Contractor / bidder with their company seal along with witness's signature, name & address. **The agreement shall be in full as per format enclosed on a plain A4 size paper duly signed & stamped on all pages.**

The Integrity Pact envisages an agreement between the prospective tenderer and the buyer committing the persons/officials of both the parties not to exercise any corrupt influence on any aspect of the contract.

For the successful bidder, the integrity pact will remain valid up to 12 months after the last payment under the contract, and for all other Bidders 6 months after the contract has been awarded.

The Central Vigilance Commission (CVC) has appointed Shri Kasividyasagar & Shri Lt. Gen. Abhay Krishna as Independent External Monitor (IEM) to oversee the implementation of the Integrity Pact.

Address of IEM is as below:-

Shri Kasividyasagar, IAS (Retd.)
House no. 55,
Dream valley gated community,
Manikonda, Hyderabad – 500089.
Mobile no. +91 9771407778
Email : kasividyasagar@gmail.com

Shri Lt. Gen. Abhay Krishna , (Retd.)
4A-902, Gurjinder Vihar,
AWHO Township, Sector CHI-1
Greater Noida, UP - 201310
Mobile no: +91 9871234353
Email: abhayabk@gmail.com

33. GST TERMS & CONDITIONS:

1. The Supplier is required to comply with all the applicable provisions of the GST Laws/Rules/Notifications/Circulars and to furnish required documents/details within the prescribed time limit to enable BEML to claim the benefits of GST Input Tax Credit or any other benefit.
2. The Supplier is required to furnish proper Invoice/Supplementary Invoice/Debit Note/Credit Note in the form and manner prescribed under GST Laws/Rules/Notifications/Circulars containing all the particulars mentioned therein and within the prescribed time limit as per prevailing GST Laws/Rules/Notifications/Circulars. In case of non-compliance by the Supplier, BEML shall not make any payment towards GST against such invoice until it is complied with within the timeline prescribed under GST Laws/Rules/Notifications/Circulars, and also subject to BEML being in a position to avail GST Input Tax Credit as per applicable GST Laws/Rules/Notifications/Circulars.
3. In case of discrepancy in the data uploaded by the Supplier in the GSTN portal or in case of any shortages or rejection in the supply, BEML will notify the Supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue Credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the supplies, within the prescribed time limit to enable BEML to avail GST Input Tax Credit.
4. In case, the availment of GST Input Tax Credit by BEML is delayed for any reason other than those attributable to BEML, interest at applicable rate as prescribed under GST Laws/Rules/Notifications/Circulars for such delays shall be recovered from the Supplier.
5. In case Supplier delays declaring such invoice in his GST Return and GST Input Tax Credit availed by BEML is denied or reversed subsequently as per GST Laws/Rules/Notifications/Circulars, GST amount paid by BEML towards such reversal as per GST Laws/Rules/Notifications/Circulars shall be recoverable from Supplier along with applicable interest.

If BEML has not paid/short paid to the Supplier for any invoices within the time limit prescribed under GST Laws/Rules/Notifications/Circulars due to non-compliance of GST Laws/Rules/Notifications/Circulars by Supplier or any other reason attributable to Supplier and leads to any GST Input Tax Credit reversal by BEML, any losses/expenses/cost/penalty, etc., incurred by BEML shall be recoverable from the Supplier.

6. Wherever applicable, BEML will have the right to deduct "Tax Deducted at Source" at the rate prescribed under the GST Laws/Rules/Notifications/Circulars and to remit the same to the Government
7. In case of supplies made under Reverse Charge Mechanism, the Supplier needs to comply with the provisions under the GST Laws/Rules/Notifications/Circulars in terms of supply of Goods/Services and raising of invoice, so as to enable BEML to remit applicable GST to Govt., within the prescribed time limit and avail GST Input Tax Credit on the same. If the Supplier fails to comply with the above and as a result if BEML incurs any losses/expenses/cost/penalty, BEML shall be entitled to recover the same from the Supplier. Further the Supplier has to mention that "the liability of payment of GST amounting to Rs is on the Recipient of Service" in the invoice raised on BEML.
8. The Supplier is required to comply with the E-Way Bill Provisions under GST Laws/Rules/Notifications/Circulars. If the Supplier fails to comply with the said provisions and as a result if BEML incurs any losses/expenses/cost/penalty, BEML shall be entitled to recover the same from the Supplier.

9. In case of materials/goods issued to Supplier for Job Work, the Job Work Supplier is required to return the goods within the time limit prescribed in the Purchase Order. If the Job Work Supplier fails to return the goods as above, BEML will be entitled to raise a GST Supply Invoice on the Job Worker Supplier with applicable interest as per the provisions of GST Laws/Rules/Notifications/Circulars. In such cases, BEML will be entitled to recover all such GST/interest on GST /losses/expenses/cost/penalty, etc. incurred by BEML along with interest from the Job Work Supplier. Further in such cases where the GST invoice has been raised by BEML, on return of such goods after the prescribed time limit, the Job Work Supplier needs to return the same under GST invoice.
10. The Supplier have the option to give one Bank Guarantee of appropriate value after considering his estimated value of GST involved in invoices raised on BEML instead of Bank Guarantee for each Contract/Invoice. In case of payment through LC, suitable provisions/clause will be inserted while opening LC to ensure compliances of above conditions. However, if at any point of time value of such Bank Guarantee falls short of GST plus interest thereof, Supplier will have to either furnish Bank Guarantee for Differential value or such shortfall value of Bank Guarantee vis-à-vis GST plus interest thereof shall be withheld till Suppliers fulfils its obligations specified under above clauses.

BEML will be entitled to recover all losses/expenses/cost/penalty, etc. incurred by BEML along with applicable interest from the Supplier due to reasons other than those attributable to BEML.

11. If the Supplier is a Composition/Unregistered Dealer, the Supplier needs to comply with the provisions under the GST Laws/Rules/Notifications/Circulars in terms of supply of Goods/Service and raising of invoice. In case, the Supplier fails to comply with the above and as a result if BEML incurs any losses/expenses/cost/penalty, BEML shall be entitled to recover the same from the Supplier along with applicable interest.

34. TAX CLAUSE:

~~Any tax and/or duty, which may hereafter be imposed outside India, shall be on Supplier's account. On the other hand, any tax and/or duty, which may hereafter be imposed in India, shall be on BEML's account. Notwithstanding the foregoing, tax on supervising fee and/or other training fees shall be on Supplier's account, however, it shall be withheld and paid by BEML in India on behalf of Supplier according to provisions of the corporation tax law, the local inhabitant tax law and convention between Republic of India and the respective Suppliers country, for the avoidance of double taxation and the prevention of fiscal evasion with respect to taxes on income.~~

~~Where the government of the supplier's country exempts goods in export from any or all of such taxes, levies, duties on imports, the supplier shall charge the purchase price, which are exclusive of and free from such taxes, levies, and duties on imports.~~

Any increase in statutory levies during the period wherein supplier has defaulted to effect supplies as per delivery schedule indicated in contract has to be borne by the supplier.

Any downward revision in taxes or duties imposed in supplier's country should be informed and that benefit should be passed on to the BEML.

HSN CODE/CHAPTER ID and SAC Code details are to be indicated against each item.

TDS (Tax deducted at source) will be applicable for service purchase orders and will be deducted as per law of land. SAC (Service Account code) shall be indicated for the services /NRC that will be carried out by the supplier.

35. PROJECT IMPORT REGISTRATION: (In case of Applicability)

Customs duty on input content imported by domestic bidders to manufacture tendered items. Bangalore Metro Rail Project is eligible for the concessional rate of custom Duty under chapter 98.01 of Custom Tariff Act for Project Import registration mode. In case if an indigenous supplier imports some items from outside India, the firm has to register with customs for availing concessional rate of duty i.e. 7.5% BCD plus cess, through project import registration mode.

To avail the concessional customs duty benefit, Bill of Material (BOM) of such imported material in the prescribed template (containing part number, description, qty, price, source of supply, mode of shipment – Air/Sea, port of arrival etc.,) should be submitted by bidders to BEML within 02 months from finalization of the contract for obtaining PIR sponsoring letter from BMRC. The PIR sponsoring letter should be registered by the bidders with the concerned Customs Authorities at designated Port of Arrival.

The supplier shall maintain details of concessional Custom Duty deposited with the authority and submit the following for reimbursement of Custom Duty: -

- i) Bills of Entry
- ii) Challan for deposit of Custom Duty
- iii) Declaration that the Sub-contractors/Sub-vendors have neither claimed the deemed export benefit nor they will claim the same.
- iv) Declaration that the Contractor has not claimed the deemed export benefit.

However, the custom duty on items procured for meeting the obligations under DLMP shall be reimbursed as applicable and as per actual supply and use for this contract only based on Custom Duty amount indicated in the Bill of Entry (BoE).

36. ACCEPTABLE MODE OF INVITATION

The acceptable mode of participation against the tender enquiry is as below:

	Individual bidder	Joint venture (JV)	Consortium	MoU	TOT
Individual bidder	√	√	√	√	√
Joint venture (JV)	√	√	√	√	√
Consortium	√	√	√	√	√
MoU	√	√	√	×	×
TOT	√	√	√	×	×

1) **Individual Bidder / OEM.**

2) **Joint Venture (JV) / Consortium:**

- (a) All members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms, and
- (b) Authorization of nomination of one of the Members of the JV/Consortium to be in-charge ("Lead member") shall digitally signed by the legally authorized signatories of all Members of Joint Venture.
- (c) All members of the JV/Consortium shall be jointly and severally responsible for the execution of the Contract in accordance with the terms and conditions of the Contract.

3) Subsidiary:

- (a) The OEM shall nominate a representative of the OEM or its subsidiary who shall have the authority to conduct all business for and on behalf of the OEM during the bidding process and, in the event the OEM/OEM subsidiary is awarded the Contract, during Contract execution.
- (b) In the event of later non-existence of the subsidiary, the OEM will be responsible for the fulfilment of contractual obligations.
- (c) The OEM as well as its subsidiary shall be jointly and severally responsible for the execution of the Contract in accordance with the terms and conditions of the Contract.

NOTE: Mode in which entities participate with only MOU or/and TOT without JV/Consortium are not acceptable. Offers of such bids are liable for rejection

37. INSURANCE COVERED BY BEML.

BEML has insured the Material being procured and the risk Coverage under the MCE policy shall commence from the moment of the first goods/consignments are lifted, mechanically or manually or otherwise, from anywhere in the world for loading onto the transport (all modes included) and remain in force during transit up to BEML's works.

APPENDIX- A

(To be executed on plain paper and applicable for all tenders of value _ Rs. 1 Crore and above)

INTEGRITY PACT

Between

BEML Limited (BEML) hereinafter referred to as “The Principal”

And

..... hereinafter referred to as “The Bidder/Contractor”

Preamble

The Principal intends to award, under laid down organizational procedures, contract/s for

.....
The Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness / transparency in its relations with its Bidder(s) and / or Contractor(s). In order to achieve these goals, the Principal will appoint an independent External Monitor (IEM), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

- (1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:
 - a) No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - b) The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - c) The Principal will exclude from the process all known prejudiced persons.
- (2) If the principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section 2 – Commitment of the Bidder(s)/ contractor(s)

- (1) The Bidder(s)/ Contractor(s) commit themselves to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

- a) The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
 - b) The Bidder(s)/ Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
 - c) The Bidder(s)/ Contractor(s) will not commit any offence under the relevant IPC/PC Act; further, the Bidder(s) / Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or documents provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
 - d) The Bidder(s)/ Contractor(s) of foreign origin shall disclose the name and address of the Agents/ Representatives in India, if any. Similarly, the Bidder(s)/ Contractor(s) of Indian Nationality shall furnish the name and address of the foreign Principals, if any. Further, as mentioned in the "Guidelines on Indian Agents of Foreign Suppliers" shall be disclosed by the Bidder(s)/Contractor(s). Further, as mentioned in the Guidelines all the payments made to the Indian agent/representative have to be in Indian Rupees only. Copy of the "Guidelines on Indian Agents of Foreign Suppliers" is placed at **Appendix (A-1)**.
 - e) The Bidder(s) / Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- (2) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2, above or any other form such as to put his reliability or creditability in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or act as per the procedure mentioned in the "Guidelines on Banning of business dealings".

Section 4 – Compensation for Damages

- (1) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- (2) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the contract value or the amount equivalent to Performance Bank Guarantee.

Section 5 – Previous Transgression

- (1) The Bidders declares that no previous transgressions occurred in the last three years with any other Company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprises in India that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the procedure mentioned in “Guidelines on Banning of business dealings”.

Section 6 – Equal treatment of all Bidders /Contractors /Sub-contractors

- (1) The Bidder(s)/ Contractor(s) undertaker(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
- (2) The Principal will enter into agreement with identical conditions as this one with all Bidders, Contractors and subcontractors.
- (3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 – Criminal charges against violating Bidder(s) / Contractor(s) / Subcontractor(s)

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or of the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer

Section 8 – Independent External Monitor / Monitors

- (1) The Principal appoints competent and credible Independent External Monitor for this Pact.
The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement
- (2) The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. It will be obligatory for him to treat the information and documents of the Bidders/Contractors as confidential. He reports to the CMD, BEML.
- (3) The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Subcontractor(s) with confidentiality.
- (4) The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual

relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

- (5) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- (6) The Monitor will submit a written report to the CMD, BEML, within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise submit proposals for correcting problematic situations.
- (7) If the Monitor has reported to the CMD, BEML, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD, BEML has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.
- (8) The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

This pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the contract, and for all other Bidders 6 months after the contract has been awarded. If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/ determined by CMD of BEML

Section 10 – Other provisions

- (1) This agreement is subject to Indian Law. Place of performance and jurisdiction is the Corporate Office of the Principal, i.e. Bangalore.
- (2) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- (3) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- (4) Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- (5) The bidder shall not approach the Courts while representing the matters to IEMs and he/ she will await their decision in the matter.
- (6) In case of joint venture, all the partners of the joint venture should sign the Integrity Pact. In case of sub-contracting, the Principal contractor shall take the responsibility of the adoption of IP by the sub-contractor. It is to be ensured that all sub- contractors also sign IP.
- (7) In the event of any dispute between the management and the contractor relating to those

contracts where Integrity Pact is applicable, in case, both the parties are agreeable, they may try to settle dispute through mediation before the panel of IEMs in a time bound manner. If required, the organization may adopt any mediation rules for this purpose.

In case, the dispute remains unresolved even after mediation by the panel of IEMs, the organization may take further action as per the terms and conditions of the contract.

The fees / expenses on dispute resolution shall be equally shared by both the parties.

(8) In the event of any contradiction between the Integrity Pact and its Annexure, the Clause in the integrity pact will prevail

(For & On behalf of the Principal)

(Office Seal)

Place-----

Date -----

Witness 1:
(Name & Address)

Witness 2:
(Name & Address)

(For & On behalf of Bidder/Contractor)

(Office Seal)

Place-----

Date -----

Witness 1:
(Name & Address)

Witness 2:
(Name & Address)

Appendix A-1**(Applicable Agents / Suppliers to Sign, Seal & Upload / Submit)****GUIDELINES FOR INDIAN AGENTS OF FOREIGN SUPPLIERS**

- 1.0 There shall be compulsory registration of agents for all Global (Open) Tender and Limited Tender. An agent who is not registered with BEML LTD shall apply for registration in the prescribed Application-Form available on www.bemlindia.in.
- 1.1 Registered agents will file an authenticated Photostat copy duly attested by a Notary Public/Original certificate of the principal confirming the agency agreement and giving the status being enjoyed by the agent and the commission/remuneration/ salary/ retainer ship being paid by the principal to the agent before the placement of order by BEML LTD.
- 1.2 Wherever the Indian representatives have communicated on behalf of their principals and the foreign parties have stated that they are not paying any commission to the Indian agents, and the Indian representative is working on the basis of salary or as retainer, a written declaration to this effect should be submitted by the party (i.e. Principal) before finalizing the order.
- 2.0 DISCLOSURE OF PARTICULARS OF AGENTS/ REPRESENTATIVES IN INDIA, IF ANY:
 - 2.1 Tenderers of Foreign nationality shall furnish the following details in their offer:
 - 2.1.1 The name and address of the agents/representatives in India, if any and the extent of authorization and authority given to commit the Principals. In case the agent/representative be a foreign Company, it shall be confirmed whether it is real substantial Company and details of the same shall be furnished.
 - 2.1.2 The amount of commission/remuneration included in the quoted price(s) for such agents/representatives in India.
 - 2.1.3 Confirmation of the Tenderer that the commission/ remuneration if any, payable to his agents/representatives in India, may be paid by BEML LTD in Indian Rupees only.
 - 2.2 Tenderers of Indian Nationality shall furnish the following details in their offers:
 - 2.2.1 The name and address of the foreign principals indicating their nationality as well as their status, i.e, whether manufacturer or agents of manufacturer holding the Letter of Authority of the Principal specifically authorizing the agent to make an offer in India in response to tender either directly or through the agents/representatives.
 - 2.2.2 The amount of commission/remuneration included in the price (s) quoted by the Tenderer for himself.
 - 2.2.3 Confirmation of the foreign principals of the Tenderer that the commission/remuneration, if any, reserved for the Tenderer in the quoted price (s), may be paid by BEML LTD in India in equivalent Indian Rupees on satisfactory completion of the Project or supplies of Stores and Spares in case of operation items.
 - 2.3 In either case, in the event of contract materializing, the terms of payment will provide for payment of the commission /remuneration, if any payable to the agents/representatives in India in Indian Rupees on expiry of 90 days after the discharge of the obligations under the contract.
 - 2.4 Failure to furnish correct and detailed information as called for in paragraph-2.0 above will render the concerned tender liable to rejection or in the event of a contract materializing, the same liable to termination by BEML LTD. Besides this there would be a penalty of banning business dealings with BEML LTD or damage or payment of a named sum.

Signature
(For & On behalf of Bidder/Contractor)

APPENDIX B

COMPLIANCE REPORT FOR SCOPE OF WORK (SOW)

A. Compliance to PTS GR/TD/8647 Latest Rev				
PTS Clause No	Description	Complied	Not Complied	Remarks
1. Introduction	1.1 General			
	1.2 Reference			
	1.3 Abbreviations			
2. Safety Data Transmission Protocol overview	2.1 Safety Transmission Protocol			
	2.2 Communication procedure			
3. Network architecture of transmission systems	3.1 Concept			
	3.2 Network structure of TCMS			
	3.3 Category of transmission system			
	3.4 Details of categories of transmission systems			
4. Layer Structure	4.1 General			
	4.2 Message structure in ECN (Vehicle Bus (ECN), Train Bus (ECN))			
	4.3 Message structure in Vehicle Bus (RS485)			
	4.4 Message structure in Vehicle Bus (HDLC Asynchronous)			
5. Safety Transmission Protocol	5.1 Safety related message [A]			
	5.1.1 Frame Format			
	5.1.2 Set Parameters			
	5.1.3 Data format of safety Header			
	5.1.4 Data format of safety Footer			
	5.2 Safety transmission protocol Processing			
	5.2.1 Safe Sequence Counter (Sequence Number)			
	5.2.2 Timeout check			
	5.2.3 Source ID			
	5.2.4 Destination ID			
	5.2.5 Safety Code			
	5.2.6 Cryptographic techniques (Reference)			
	5.2.7 Setting parameters			
	5.2.8 Error list			
6. Precedence of Documents				
7. Scope of work				

8. Life cycle cost				
9. Warranty				
10. Quality	10.1 Manufacturing Inspection			
	10.2 Receiving Inspection			
	10.3 Shipping Inspection			
	10.4 Ensure Inspection with Latest Revisions/Changes			
	10.5 Identification of items using tags etc			
	10.6 Handling			
11. Reliability & Availability	11.1 Availability Requirements			
	11.1.1 Definitions			
	11.1.2 Availability targets			
	11.1.3 Availability demonstration during CMC period			
	11.1.4 Availability damage			
	11.1.5 Penalties on service failures			
12. Others				
13. Submittals – Technical Offer				
14. List of Documents and Drawings attached – Appendices/Annexures				

Authorized signatory with company seal / stamp

APPENDIX – C**COMPLIANCE REPORT OF GENERAL TERMS & CONDITIONS**

(To be submitted along with Technical Bid)

Bid Invitation No :**Firm** :**Item details** :

Sl. No.	Terms / Clause	Complied	Not Complied	Remarks
1.	GLOSSARY, DEFINITIONS & INTERPRETATIONS			
2.	SUBMISSION OF THE TENDER			
3.	SUPPLIERS SHARING LAND BORDER WITH INDIA			
4.	PREFERENCE TO MAKE IN INDIA CLAUSE			
5.	DELIVERY TERMS			
6.	PAYMENT			
7.	PRICE BID VALIDITY			
8.	FIRM PRICE			
9.	INSPECTION			
10.	PERFORMANCE BANK GUARANTEE (PBG)			
11.	RIGHT TO VARY QUANTITIES & QUANTITY OPTION CLAUSE			
12.	LIQUIDATED DAMAGES CLAUSE			
13.	RISK PURCHASE CLAUSE			
14.	SECRECY AND CONFIDENTIALITY			
15.	AUTHORITY OF PERSONS SIGNING DOCUMENT			
16.	ACCEPTANCE OF ORDER			
17.	OTHER CONDITIONS			
18.	PRICE, INVOICING AND PAYMENT			
19.	PROGRESS REPORT			
20.	QUALITY & WORKMANSHIP			

Authorized signatory with company seal / stamp

APPENDIX – C

COMPLIANCE REPORT OF GENERAL TERMS & CONDITIONS

(To be submitted along with Technical Bid)

Bid Invitation No :

Firm :

Item details :

21.	QUALITY, CONDITION OF DELIVERY			
22.	INSPECTION, TESTING & CONSEQUENCE OF REJECTION			
23.	APPLICABLE LAWS AND JURISDICTION OF COURTS			
24.	JURISDICTION			
25.	ARBITRATION			
26.	INTELLECTUAL PROPERTY RIGHTS; LICENSES			
27.	BRIBES AND GIFTS			
28.	FORCE MAJEURE CLAUSE			
29.	FALL CLAUSE			
30.	NON-DISCLOSURE AND INFORMATION OBLIGATIONS			
31.	ASSIGNMENT OF RIGHTS AND OBLIGATIONS; SUBCONTRACTING			
32.	INTEGRITY PACT			
33.	GST TERMS & CONDITIONS			
34.	TAX CLAUSE			
35.	CUSTOMS DUTY ON INPUT CONTENT			
36.	ACCEPTABLE MODE OF PARTICIPATION			
37.	INSURANCE COVERED BY BEML UPTO START OF DLMP			

Authorized signatory with company seal / stamp

APPENDIX – D**CONFIDENTIALITY AGREEMENT****(To be typed on plain paper and submitted along with the technical bid)**

This Confidentiality Agreement is made and entered into between M/s BEML, (hereinafter referred to as BEML), a Govt. of India Undertaking under Ministry of Defence, having its Registered Office at BEML Soudha, No.23/1, 4th Main, Sampangirama Nagar, Bangalore – 560 027 and M/s ----- (hereinafter referred as XXXX) having its Registered Office at..... M/s. BEML, has been patronizing XXXX for components / spares listed in Annexure hereto. A need has been felt to revitalize the business relationship for mutual advantage.

- 1) It is mutually, therefore, agreed that the following shall form part of the terms and conditions for continued business:
 - a) The supplier shall not divulge to anyone else except under the authority and for the purpose of BEML, all information such as technical data, specifications, drawings, models of specimens furnished / supplied by BEML for the purpose of manufacture or in connection with developmental activities, constitute the property of BEML and the supplier shall keep them in strict confidence. This has been explicitly stated in all the details to the supplier through Purchase Order / Drawings etc., released.
 - b) The supplier shall not supply the components / spares exclusively manufactured for BEML with the Technical Data / Specifications / assistance furnished by BEML and shall not disclose my initiations, development of adaptations thereof to anyone else except with the written consent of BEML.
 - c) BEML shall be entitled to prevent breach of the above and to claim damages in case of any breach. It is hereby mutually agreed that for breach of this agreement the Vendor shall pay, without actual proof of damages, a liquidated amount of Rs. 1.00 Crore (Rupees One Crore only).
 - d) **ARBITRATION:** Any disputes and differences that may arise between the parties in connection with this Agreement/Contract shall be settled by the parties amicably by way of mutual discussion / negotiation / conciliations. In case parties fail to settle the dispute amicably, then the dispute or difference shall be referred to India International Arbitration Centre for resolution. The Arbitration Tribunal shall consist of Sole / three Arbitrator /s. The Arbitrator /s shall be appointed and Arbitration proceeding shall be conducted in accordance with the provision of India International Arbitration Centre (Conduct of Arbitration) Regulations, 2023. The courts in Bangalore alone shall have jurisdiction to deal and decide any legal matter or dispute whatsoever arising out of this contract.
- 2) BEML shall be entitled to prevent breach of the above and to claim damages in case of any breach.
- 3) The Signatories hereto declare that they have the sanction and power to execute and deliver this binding agreement.

IN WITNESS WHEREOF, the parties hereto have set their respective hands to this Confidentiality Agreement on written in the presence of Witness.

For BEML**For M/s. XXXX****WITNESS:**

1.

1.

2.

2.

APPENDIX – E

Land Border Sharing Declaration**(To be submitted in the bidder's letter head)**

In-line with Department of Expenditure's (DoE) Public Procurement Division Order vide ref.

F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020

Tender no.

Job:

"I/ we have read the clauses pertaining to Department of Expenditure's (DoE) Public Procurement Division Order (Public procurement no 1, 2 & 3 vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020) regarding restrictions on procurement from a bidder of a country which shares a land border with India. I/We hereby certify that I/ we the bidder < name of the bidder.....> is / are

Bidder to tick (✓) against option (a) or (b) as applicable

☐

a) Not from such a country and eligible to be considered for this tender.

OR

☐

b) From such country, has been registered with the competent authority and eligible to be considered for this tender. (Evidence of valid registration by the competent authority shall be attached)

For and behalf of _____ (Name of the bidder)

(Signature, date & seal of authorized representative of the bidder)"

APPENDIX -F

**DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH
REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017
DATED 04TH JUNE, 2020 AND SUBSEQUENT ORDER(S)**

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,
BEML Limited, Bangalore

Dear Sir,

Sub: Declaration reg. minimum local content in line with Public Procurement (Preference to Make in India), Order 2017-Revision, dated 04th June, 2020 and subsequent order(s).

Ref : 1) NIT/Tender Specification No:
2) All other pertinent issues till date

We hereby certify that the items/works/services offered by.....
(specify the name of the organization here) has a local content of _____ % and this meets the local content requirement for **‘Class-I local supplier’ / ‘Class II local supplier’**** as defined in Public Procurement (Preference to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and subsequent order(s).

The details of the location(s) at which the local value addition is made are as follows:

- | | |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |
| ... | |
| ... | |
| ... | |

Thanking you,
Yours faithfully,

**(Signature, Date & Seal of
Authorized Signatory of the Bidder)**

**** - Strike out whichever is not applicable.**

Note:

1. Bidders to note that above format duly filled & signed by authorized signatory, shall be submitted along with the techno-commercial offer.
2. In case the bidder's quoted value is in excess of Rs. 10 crores, the authorized signatory for this declaration shall necessarily be the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers other than companies).
3. In the event of false declaration, actions as per the above order and as per BEML Guidelines shall be initiated against the bidder.

APPENDIX – G

CONTACT DETAILS OF THE SUPPLIER

(To be filled and submitted by supplier along with the technical bid)

1) Contact Person details in Marketing Office

- (a) Name :**
- (b) Designation :**
- (c) Telephone :**
- (d) Fax :**
- (e) Mobile :**
- (f) Email :**

2) Head Office :

**3) Complete address
including the website :**

**4) Details of the proposed plant from
where item is to be supplied :**

**5) Complete address of the Plant
including Website :**

6) Contact person details in plant

- (a) Name :**
- (b) Designation :**
- (c) Telephone :**
- (d) Fax :**
- (e) Mobile :**
- (f) Email :**

7) Bank Details: (Will used during L/C Execution)

- a) Name of the Bank :**
- b) Full Address of the Bank :**
- c) Suppliers Account Number and Type :**
- b) IBAN No :**
- e) Swift Code :**

FORMAT FOR PERFORMANCE BANK GUARANTEE

Bank Guarantee No.....
 Dated
 Amount
 Valid up to
 Claim up to

The General Manager (Materials- Management)

BEML

Bangalore Complex

PB No 7501

New Thippasandra

Bangalore 560075

1. This deed of Guarantee made this day of..... (Month& year) between Bank of..... (Hereinafter called the "Bank") of the one part, and BEML LIMITED (Hereinafter called "the Employer") of the other part.
2. Whereas BEML LIMITED has awarded the contract for..... (Name of work as per PO) (Hereinafter called the "Contract") to..... (Name of the Contractor) (Hereinafter called "the Contractor").
3. AND WHEREAS the Contractor is bound by the said Contract to submit to the Employer a Performance Security for a total amount of..... (Amount in figures and words).
4. Now, We the Undersigned..... (Name of the Bank) being fully authorized to sign and to incur obligations for and on behalf of and in the name of.....(Full name of Bank), hereby declare that the said Bank will guarantee the Employer the full amount of Rs. (Amount in figures and words) as stated above.
5. NOW THEREFORE, We hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor and we hereby unconditionally, irrevocably and without demur undertake to immediately pay to the Employer upon first written demand and without cavil or argument, any sum or sums within limits of.....(Amount of Guarantee) as aforesaid without reference to the Contractor and without your needing to prove or show grounds or reasons for your demand for the sum specified therein. The Bank shall pay to the Employer any money so demanded notwithstanding any dispute/disputes raised by the Contractor in any suit or proceedings pending before any Court, Tribunal or Arbitrator/s relating thereto and the liability under this Guarantee shall be absolute and unequivocal.
6. This Guarantee is valid till.....(The initial period for which this Guarantee will be valid must be for 24 months (twenty four months) longer than the anticipated date of completion of Job.
7. At any time during the period in which this Guarantee is still valid, if the Employer agrees to grant a time extension to the Contractor or if the Contractor fails to complete the Works within the time of completion as stated in the Contract, or fails to discharge himself of the liability or damages or debts as stated under Para 5, above, it is understood that the Bank will extend this Guarantee under the same conditions for the required time on demand by the Employer and at the cost of the Contractor.
8. The Bank agrees that no change, addition, modifications to the terms of the Contract Agreement or to any documents, which have been or may be made between the Employer

and the Contractor, will in no way release us from the liability under this Guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.

9. The Guarantee here in before contained shall not be affected by any change in the Constitution of the Bank or of the Contractor.
10. The neglect or forbearance of the Employer in enforcement of payment of any moneys, the payment whereof is intended to be hereby secured or the giving of time by the Employer for the payment hereof shall in no way relieve the bank of their liability under this deed.
11. The expressions "the Employer", "the Bank" and "the Contractor" hereinbefore used shall include their respective successors and assigns.
12. Notwithstanding anything contained herein:
 - (a) Our liability under this Bank Guarantee shall not exceed Rs.....
(Rs.....)
 - (b) This Bank Guarantee shall be valid up to.....
 - (c) We are liable to pay the Guarantee amount or part thereof under this Bank Guarantee only & only if you serve upon us a written claim or demand on or before

In witness whereof I/We of the bank have signed and sealed this Guarantee on the.....day of..... (Month & year) being herewith duly authorized.

For and on behalf of theBank.

Signature of Authorized Bank officials.

Name :.....

Designation :

Stamp/Seal of the Bank.....

Signed, sealed and delivered for and on behalf of the Bank by the above namedin the presence of:

Witness 1.

Signature.....

Name.....

Address.....

Witness 2.

Signature.....

Name.....

Address.....

	BEML LIMITED BANGALORE R & D CENTER	DOC. No.	GR/TD/8647
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**SCOPE OF WORK – SAFETY DATA TRANSMISSION
PROTOCOL FOR CMRL ARE02A PROJECT**

Approved	17.07.2026	Sasikumar M	
Reviewed	17.07.2026	SADHASIVAM M	
Checked	17.07.2026	Jagadish Babu M	
Prepared	17.07.2026	Vinod Meena	
	Date	Name	Signature

	SCOPE OF WORK – SAFETY DATA TRANSMISSION PROTOCOL	DOC. No.	GR/TD/8647
		DATE	17.07.2026
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REVISION DETAILS

REV. NO.	Section NO.	PAGE	CHANGES	DATE
0	All	All	FIRST ISSUE	17.07.2026

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		REV. No.	00
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1 Introduction

1.1 General

This document describes the scope of work for development, implementation, integration and validation of Safety Data Transmission Protocol for CHENNAI METRO RAIL PROJECT - PHASE-2 ARE02A (210 cars).

The CMRL Metro Phase – 2 Project will be approximately 118.9 km long, operating within three corridors i.e.,

- Corridor 3 from Madhavaram to Sipcot of 45.8 Km,
- Corridor 4 from Lighthouse to Poonamalle of 26.1 Km,
- Corridor 5 from Madhavaram to Sholingnallur of 47 Km

And their inter-corridor operations in the Chennai Metro Rail Phase - 2 Project. The route will be approximately 76.3 km elevated and 42.6 km underground.

The Complete network will be electrified at 25kV AC 1 ϕ , 50Hz with auto tensioned Overhead Flexible catenary & contact wire system and overhead rigid catenary system. This overhead catenary system shall be available in elevated, underground, and at-grade system.

The trains shall be able to operate in GoA4 immediately after commissioning and from the initial stage of passenger operations. Unattended Train Operation (UTO) shall be the predominant mode of train operation. In case if BEML does not engage UTO for any reason, at any stage of passenger operation or non-passenger operation, the Train Operator will deploy staff to drive the train under ATO or Manual Mode (under ATP).

The scope shall be on turnkey basis including but not limited to the Design, Development, manufacture, supply, customization, testing, training, installation, commissioning, integrated testing and comprehensive maintenance during DNP and CMC.

The scope of work includes all items of work which may be required to meet the performance requirements, reliable and efficient operation of trains and meeting the best international practices even if not specifically mentioned in this SOW.

This safety transmission protocol designed to apply criteria for all three categories of transmission systems that identifies in Document Ref [1], Section 6. So, this safety transmission protocol specification is general protocol which can apply to any Safety Data communications in the TCMS and it does not depend on the system configuration of the TCMS.

The scope of this document is to define the following items of Safety transmission protocol.

- Safety transmission architecture
- Safety transmission method
- Data format

Note: Byte Sequence except the Safety Code

The byte sequence used for interface data shall be big-endian: the most significant byte (MSB) is addressed at the first byte in the memory reserved for this transmission data, the least

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significant byte (LSB) is addressed in the last byte. And the Lowest bits will be transmitted first.

The subcontractor to consider that the Packet Data included the Block Descriptor under the TRDP. From CCU-O to CC, the subcontractor to handle the block descriptor, for CCU-S to CC, should be considered as part of the SDT implementation. More detailed information of block descriptor is provided in General Interface Control Document of TCMS Supplier that shall be shared during design discussion.

1.2 Reference

Sr No.	Standard	Title
1	EN 50159:2010+A1:2020	Railway applications - Communication, signaling and processing systems - Safety-related communication in transmission systems
2	IEC 61375-2-3:2015 Annex A	Electronic railway equipment - Train communication network (TCN) - Part 2-3: TCN communication profile Annex A Train RealTime Data Protocol (TRDP)
3	IEC 61375-2-3:2015 Annex B	Electronic railway equipment - Train communication network (TCN) - Part 2-3: TCN communication profile Annex B Safe Data Transmission (normative, optional)

Table 1-1: Reference

1.3 Abbreviations

ATC:	Automatic Train Control
BCC:	Backup Control Center
BOM:	Bill Of Material
CMRL:	Chennai Metro Rail Limited
CTC:	Centralized Train Control
CMC:	Comprehensive Maintenance Contract
DCC:	Depot Control Center
DNP:	Defect Notification Period
EMI:	Electro-Magnetic Interference
ERTS:	Employer's Requirement Technical Specification
GCC:	General Condition of Contract
GoA:	Grade of Automation
OCC:	Operations Control Center
SOW:	Scope of Work

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PCC:	Particular Conditions of Contract
RS:	Rolling Stock
RSC:	Rolling Stock Controller
TCMS:	Train Control and Management System
CCU:	Central Control Unit
CN:	Communication Node
CRC:	Cyclic Redundancy Check
ECN:	Ethernet Consist Network that is defined in IEC61375-3-4
ED	End device. This is a subsystem on board.
FCS:	Frame Check Sequence
GPRS:	General Packet Radio Service
GSM:	Global System for Mobile communication
HDLC:	High-Level Data Link Control (ISO/IEC 13239)
ICD:	Interface Control Document
IEC:	International Electrotechnical Commission
IEEE:	The Institute of Electrical and Electronics Engineers, Inc
IP:	Internet Protocol
ISO:	International Organization for Standardization
LAN:	Local Area Network
MD:	Message Data Protocol in TRDP
MVB:	Multi Vehicle Bus
PD:	Process Data Protocol in TRDP
RS485:	Isolated RS485 (IEC/ISO 8482)
SD:	Status Data
SDR:	Status Data Request
SID:	Source Identifier
TCMS:	Train Control Management System
TCP:	Transmission Control Protocol
TCN:	Train Communication Network
TRDP:	Train Real-time Data Protocol, defined in IEC61375-2-3 Annex A
Train:	“Train” is used in this document for the largest entity which full fills a transportation mission. In this project, the Train is

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	equal to the consist. Details are shown in Fig1-1.
Train Bus:	“Train Bus” is used in this document for the Consist network of the TCMS in the train
Train Network:	“Train Network” is used in this document for the network of the TCMS. “Train Bus” and “vehicle Bus” are included in the “Train network”
UDP:	User Datagram Protocol
Vehicle Bus:	“Vehicle Bus” is used in this document for the local network of the TCMS in a car
WAN:	Wide Area Network

2 Safety Data Transmission Protocol overview

2.1 Safety Transmission Protocol

The concept of the Safety Data communication is shown in Figure 2-1 is based on Document Ref [1], Figure 1.

The Safety Data communication is composed of “Safety related application” and “Safety related Transmission function”.

The “Safety related application” manages the data in the Safety related equipment.

The “Safety related Transmission function” applies the safety protection to messages receiving from other Safety related equipment.

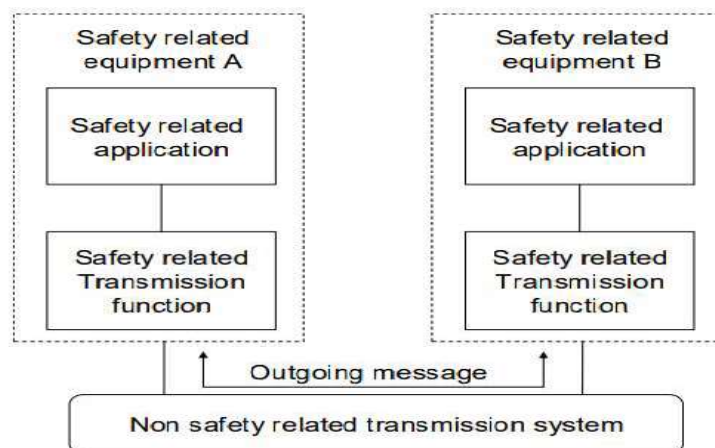


Figure 2-1: Concept of the Safety Data Communication

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2.2 Communication procedure

Communication procedure of exchanging messages between the “Safety related application” and the “Safety related Transmission function” is shown in Figure 3-2.

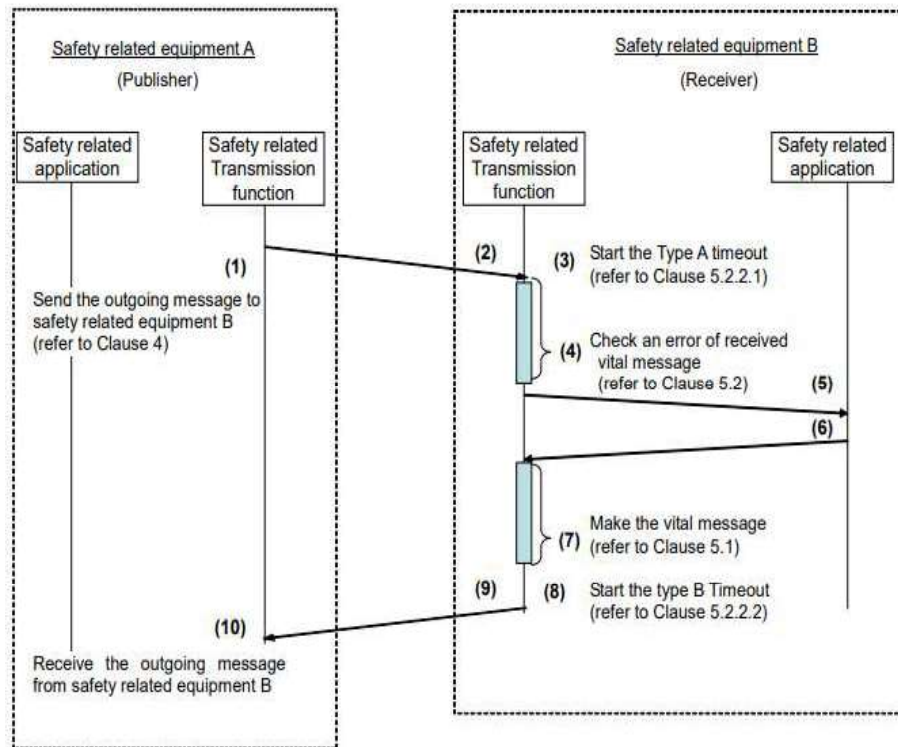


Figure 2-2: Concept of the Safety Data Communication

Description of the data flow is as follows;

List of Defenses Applied.

- Source ID
- Destination ID
- Safe Sequence Counter (Sequence Number)
- Acknowledge Number
- Safety Code (CRC)
- Time Out

With reference to the Figure 2-2, procedures are shown in the following.

- (1) The Safety related equipment A sends a communication message to the equipment B. (For communication messages, refer to Section 4)
- (2) The Safety related Transmission function of the equipment B receives the vital message. (For vital messages, refer to Section 5)
- (3) The Safety related Transmission function of the equipment B starts the timer of the Type A timeout. This timer is for checking whether the system can receive the upcoming message within the threshold time period. (For timeout check of type A, refer to Section 5.2.2.1)

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- (4) The Safety related Transmission function of the equipment B checks the vital message. (For processing, refer to Section 5.2)
- (5) The Safety related Transmission function of the equipment B reports the check result (with error or without error) to the Safety related application of the Equipment B. (For error list, refer to Section 5.2.8)
- (6) The Safety related application of the equipment B creates a safety related user data and passes the data to the Safety related Transmission function.
- (7) The Safety related Transmission function of the equipment B adds a Safety Header and Safety Footer to generate the vital message. (For vital messages, refer to Section 5.1)
- (8) The Safety related Transmission function of the equipment B starts the timer of the Type B timeout. This timer is for checking whether the system can receive the return message within threshold time period. (For timeout check of type B, refer to Section 5.2.2.2)
- (9) The Safety related Transmission function of the equipment B sends back the communication message (including the vital message). (For communication messages, refer to Section 4)
- (10) The equipment A receives the message from the equipment B.

3 Network architecture of transmission systems

This section describes the network architecture of the transmission systems that is applied the Safety related communication.

3.1 Concept

This safety transmission protocol designed to apply all three categories of transmission systems that identified in Document Ref [1], Section 6.3. Three categories of transmission systems are shown below.

Catagory	Contents
1	Closed transmission systems, where all essential properties of all the Equipment or Parameter are under the safety case. The system is under the control of the safety requirement specification. The Characteristics of transmission system are known and fixed. The Risk of malicious to the transmission system shall be negligible.
2	Open transmission systems where, although the transmission is not fully under the control of the safety requirement specification. The Risk of malicious to the transmission system shall be negligible.
3	Open transmission systems where there is opportunity for malicious attack, and Cryptographic defense measures are required.

Table 3-1: Categories of transmission systems in EN50159:2010+A1:2020 [A]

3.2 Network structure of TCMS

Network structure of this TCMS is shown in Figure 3-1.

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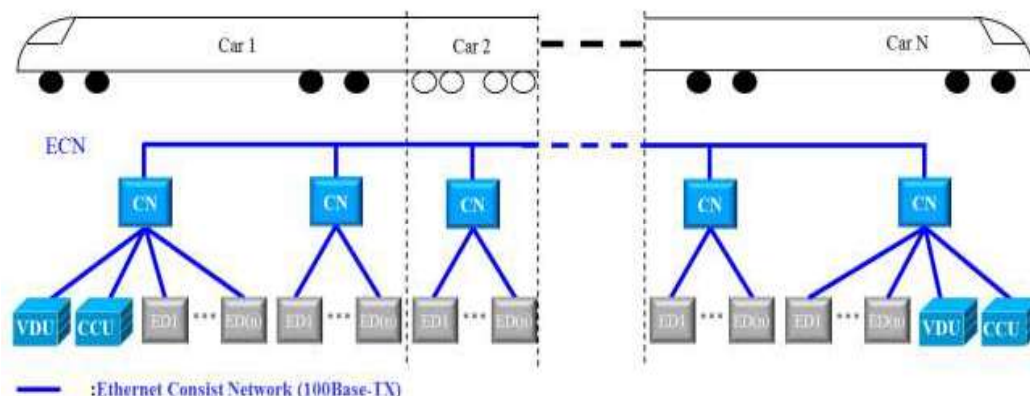


Figure 3-1: TCMS Train Network Structure

3.3 Category of transmission system

The category of transmission system of the TCMS is assumed category 2 according to Table 3-2.

3.4 Details of categories of transmission systems

In Document Ref [1], 38 Annex B, Table B-1, Details of three categories of transmission systems are defined as bellows.

Catagory	Contents	Example transmission systems
1	a) Designed for known and fixed maximum number of participants. b) All properties of the transmission system are known and invariable during the lifetime of the system. c) Negligible opportunity for unauthorized access.	a) Close air-gap transmission (e.g. track balise to train antenna). b) Proprietary serial bus internal to the safety-related system (e.g. PROFIBUS, CAN, MVB (multi-purpose vehicle bus defined by IEC)). c) Industry-standard LAN connecting different equipment (safety-related and non-safety-related) with in a single system, subject to fulfilment and maintenance of the preconditions.
2	a) Properties are unknown, partially unknown or variable during the lifetime of the system. b) Limited scope for extension of user group. c) Known user group or groups. d) Negligible opportunity for unauthorized access (networks are trusted). e) Occasional use of non-trusted networks	a) Proprietary serial bus internal to the safety-related system (e.g. PROFIBUS, MVB), but with the possibility that the transmission system could be reconfigured or substituted by another transmission system during the lifetime. b) Industry-standard LAN connecting different systems (safety-related and non-safety-related) with in a controlled and limited area. c) WAN belonging to the railway, connecting different systems (safety-related and non-safety-related) at various locations. d) Switched circuit in public telephone network, used occasionally and at unpredictable times (e.g. dialup remote diagnostic of an interlocking

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		system). e) Leased permanent point-to-point circuit in public telecom network. f) Radio transmission system with restricted access (e.g. use of wave guides or leaky cables with a link budget limiting the possibility of reception to a close transceiver only, or using a proprietary scheme of modulation, impossible to reproduce with off the shelf or affordable lab equipment).
3	a) Properties are unknown, partially unknown or variable during the lifetime of the system. b) Unknown multiple users groups. c) Significant opportunity for unauthorized access	a) Packet switched data in public telephone network. b) Internet. c) Circuit switched data radio (e.g. GSM-R). d) Packet switched data radio (e.g. GPRS). e) Short range broadcast radio (e.g. Wi-fi). f) Radio transmission systems without restrictions

Table 3-2: Categories of transmission system

4 Layer Structure

4.1 General

This Section explains the layer structure of Safety transmission protocol.

Key Points on Layer structure of Safety Transmission Protocol as below,

- Multiple layer structures.
- Layer structures are composed of both the Safety and Non-Safety Related layers.
- The Safety related layer is a common structure, and Non-Safety Related layer is variable.

The message structure is shown in Figure 4-1 in comparison with OSI reference model.

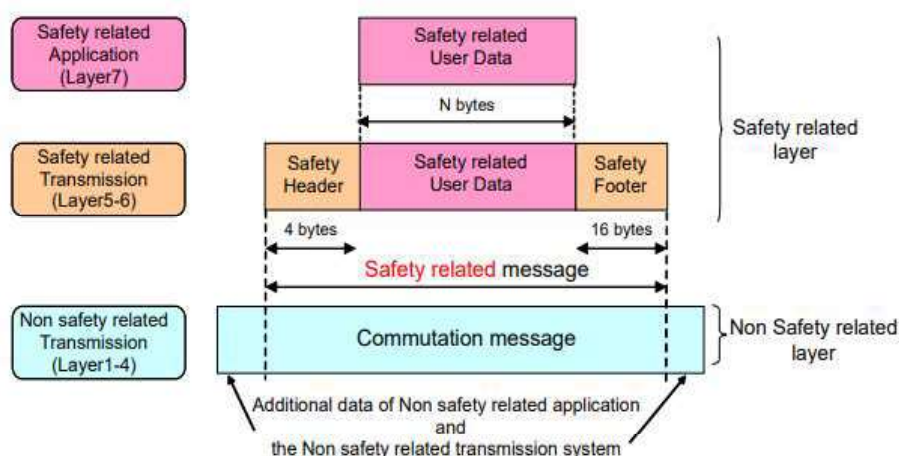


Figure 4-1: Message structure of Safety transmission protocol A

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This safety transmission protocol can apply to various communication systems used in the TCMS, such as Ethernet, RS485, HDLC Asynchronous and so on. Safety related layer (Layer 5 - 7) is common and independent of Layer1 -4.

4.2 Message structure in ECN (Vehicle Bus (ECN), Train Bus (ECN))

Figure 4-2 is shown the message structure of Safety transmission protocol in case of ECN. The EDs connected to the TCMS via ECN (Vehicle Bus (ECN), Train Bus (ECN)) should refer this section.

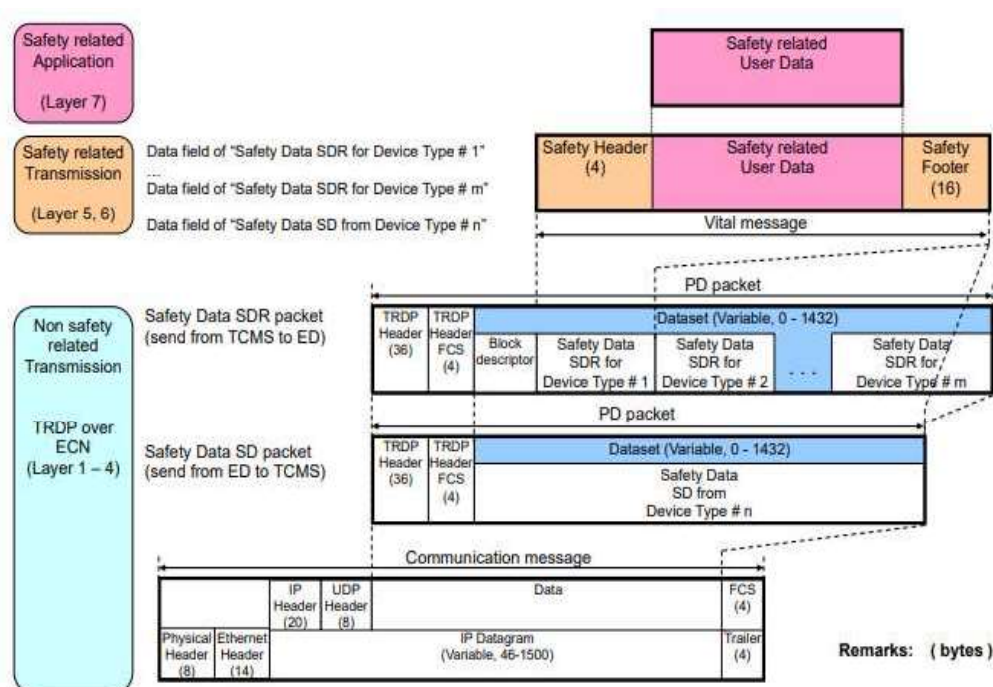


Figure 4-2: Message structure of Safety transmission protocol in ECN

In this ECN, the communication protocols are based on TRDP. The safety transmission protocol is mounted on the upper layer of the TRDP (PD).

More detailed information of above concept is provided in General Interface Control Document of TCMS Supplier that shall be shared during design discussion.

In ECN, for full duplex communication 100Mbps is possible, so Safety Data packets and Non-Safety Data packets transmit as independent packets.

4.3 Message structure in Vehicle Bus (RS485)

Figure 4-3 is shown the message structure of Safety transmission protocol in case of Vehicle Bus (RS485). The EDs connected to the TCMS via Vehicle Bus (RS485) should refer this section.

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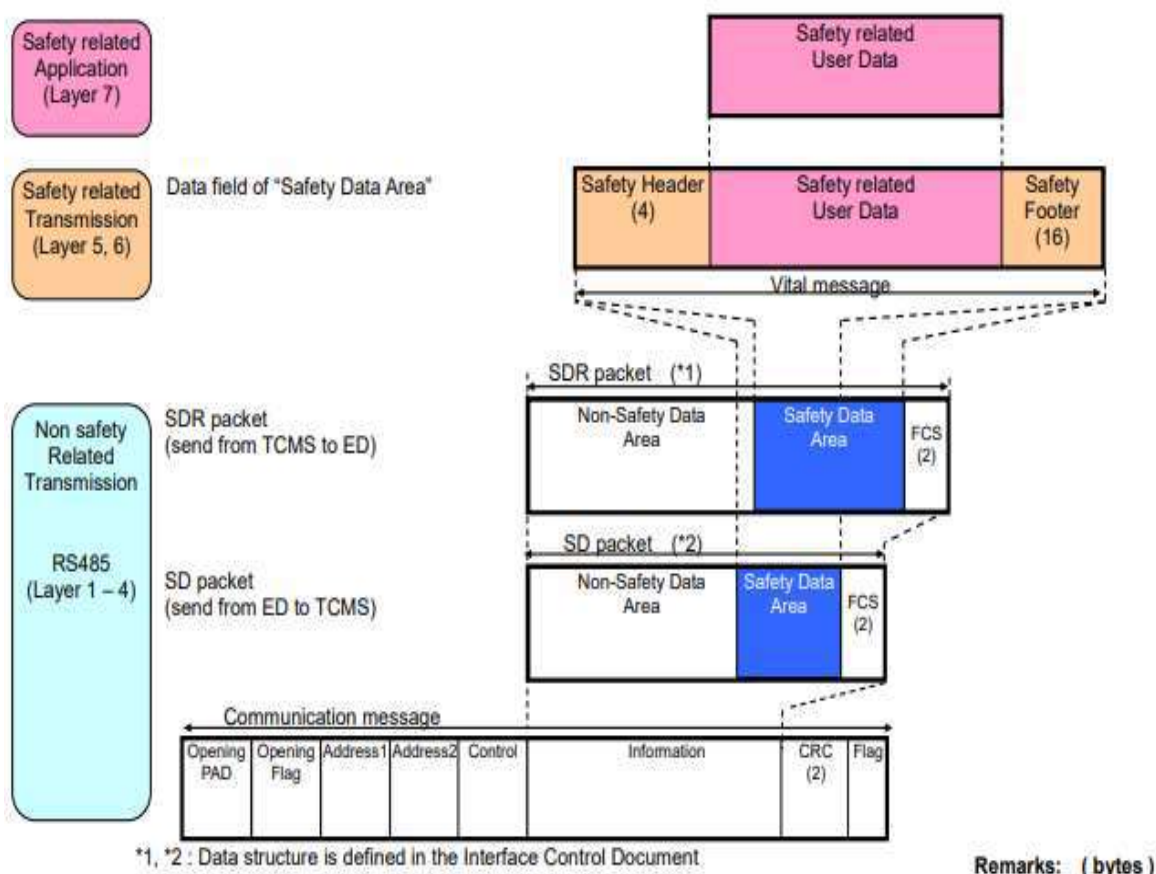


Figure 4-3: Message structure of Safety transmission protocol in Vehicle Bus (RS485)

In Vehicle Bus (RS485), a SDR packet or SD packet is composed of “Non-Safety Data Area” and “Safety Data Area”. In case of some EDs, a SDR packet or SD packet is composed of only “Safety Data Area”. In Vehicle Bus (RS485), because it is a half-duplex communication, so Non-Safety Data and Safety Data are connected to one packet and transmitted periodically.

4.4 Message structure in Vehicle Bus (HDLC Asynchronous)

Figure 4-4 is shown the message structure of Safety transmission protocol in case of Vehicle Bus (HDLC Asynchronous). The EDs connected to the TCMS via Vehicle Bus (HDLC Asynchronous) should refer this section.

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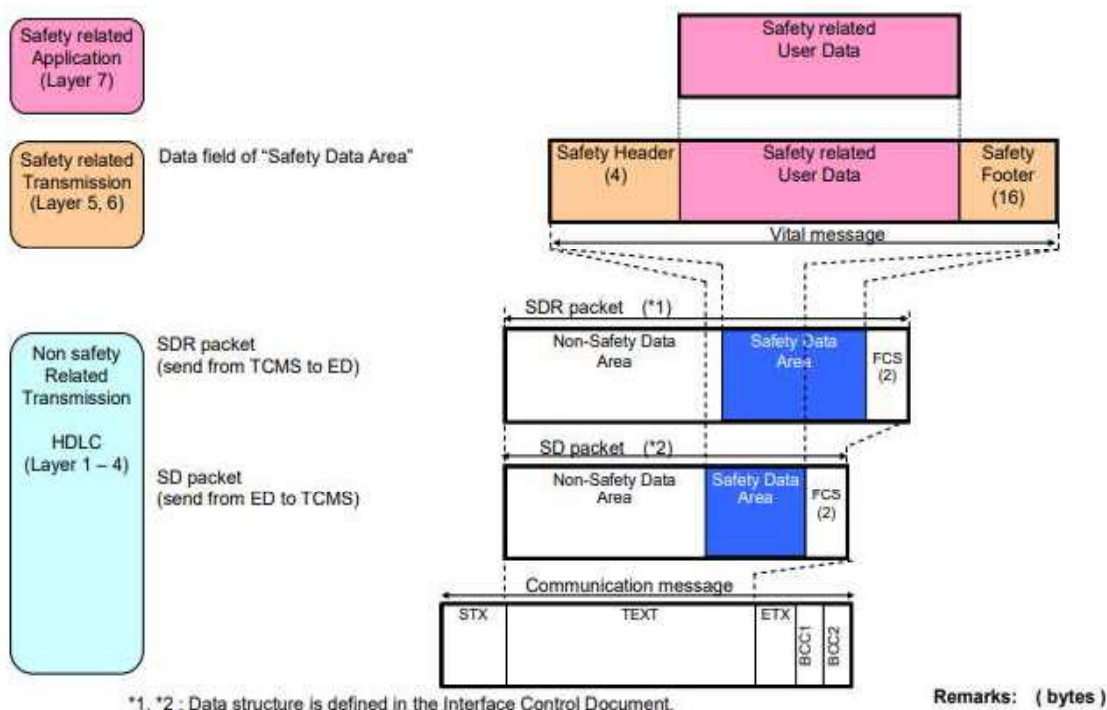


Figure 4-4: Message structure of Safety transmission protocol in Vehicle Bus (HDLC Asynchronous)

In Vehicle Bus (HDLC Asynchronous), a SDR packet or SD packet is composed of “Non-Safety Data Area” and “Safety Data Area”. In case of some EDs, a SDR packet or SD packet is composed of only “Safety Data Area”. In Vehicle Bus (HDLC Asynchronous), because it is a half-duplex communication, so Non-Safety Data and Safety Data are connected to one packet and transmitted periodically.

5 Safety Transmission Protocol

5.1 Safety Related message [A]

5.1.1 Frame Format

Vital message format is defined as shown in Figure 5-1.

This format is in reference to Document Ref [2], Annex B in Section B.9. Safety Related Data Packet. [A]



Figure 5-1: Safety Related message format [A]

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5.1.2 Set parameters

Set parameters and set value of the Safety Header and Safety Footer is used the TCMS Supplier's specified values that are used for Safety transmission protocol.

5.1.3 Data format of Safety Header

Safety header is shown in Figure 5-2 and Data length is 4bytes.

In Document Ref [2], Annex B in Section B.9, this area called SID (Source Identifier).

TEXT No.	Bit No.								Content s	note
	7	6	5	4	3	2	1	0		
0	Source ID (Device ID)									(Note a, b)
1	Reserved									00H fixed
2	Reserved									00H fixed
3	Reserved									00H fixed

Figure 5-2: Data format of Safety Header

Note:

- Source ID
Source ID is composed of Device ID.
- Source ID (Device-ID)
Publishers should set my own Device-ID.
EDs should set the Device-ID of my own.
TCMS should set the Device-ID of the TCMS CCU-S (01H).
Device-ID is document available in design stage

5.1.4 Data format of Safety Footer

Safety Footer is shown in Figure 5-3 and Data length is 16bytes.

Document Ref [2], Annex B in Section B.9, this area called Trailer.

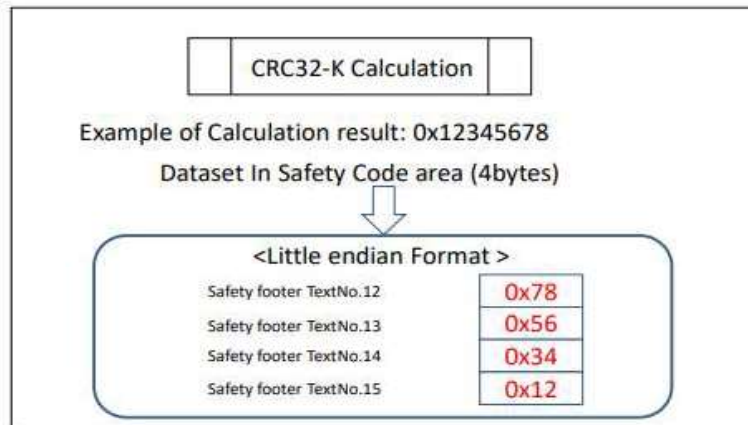
TEXT No.	Bit No.								Contents	note
	7	6	5	4	3	2	1	0		
0-3	Acknowledge Number								4bytes	(Note a, b)
4	Destination ID (Device ID)								Destination ID	(Note c, d)
5	Destination ID (Group ID)									(Note e)
6	Reserved								(note f)	00H fixed
7	Reserved									00H fixed
8-11	Safe Sequence Counter								4bytes	(Note g)
12-15	Safety Code								4bytes	(Note h)

Figure 5-3: Data format of Safety Footer

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Note:

- In Document Ref [2], Annex B in Section B.9, Vital Data Packet, this area is defined as Reserved01. In this system, this area is defined as Acknowledge Number.
- Acknowledge Number Set Value of this area is the Safe Sequence Counter of the latest receiving message from the publisher. (For EDs, Publisher means the TCMS CCU-S).
- In Document Ref [2], Annex B in Section B.9, Vital Data Packet, this area is defined as Reserved02 (2bytes). In this system, this area is defined as Destination ID.
- Destination ID (Device ID)
Publisher should set Device-ID of target.
EDs should set the Device-ID of the TCMS CCU-S (01H).
TCMS should set the device id of the target ED.
Device-ID is document available in design stage.
- Destination ID (Group ID)
Publishers should set the Group ID of my sending packet.
- In Document Ref [2], Annex B in Section B.9, Vital Data Packet, this area is defined as User Data Main Version (1byte) and User Data Sub Version (1byte).
In this system, this area is not used.
- Safe Sequence Counter 4bytes
Safe Sequence Counter is equal to Sequence Number.
Implemented as a counter which is incremented each time a new Vital message is generated and stored to the communication channel interface.
Once a data is transmitted, the publisher increments the Safe Sequence Counter.
Set value of Safe Sequence Counter is 00000001H up to FFFFFFFFH.
(Prohibited to use all0)
The initial Safe Sequence Counter is set as 00000001H, and After FFFFFFFFH, Safe Sequence Counter is set as 000000001H.
- Safety Code 4bytes
The safety code should be used CRC32-K (Koopman: (0xBA0DC66B)).
The safety code is computed over Vital message (in Figure 6-1) starting from Safety Header up to the Safe Sequence Counter.
Safety Code (4bytes) shall be set "Little endian format" shown in below.



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The parameters required for the calculation of CRC code are as follows.

- Initial Value: 0xFFFFFFFF
- Direction of bit shift: Right feed
- After calculation, XOR value: 0xFFFFFFFF

5.2 Safety transmission protocol Processing

This Section describes Safety transmission protocol processing for defenses to threats. Table 5-1 shows the correspondence between the Threats and Defenses matrix, in accordance with Document Ref [1], Section 7.4.

Threats \ Defenses	Defenses					
	Safe Sequence Counter (Sequence Number)	Timeout	Source ID	Destination ID	Safety code	Cryptographic techniques
	refer to Section 5.2.1	refer to Section 5.2.2	refer to Section 5.2.3	refer to Section 5.2.4	refer to Section 5.2.5	refer to Section 5.2.6
Repetition	X					
Deletion	X					
Insertion			X	X		
Re-sequence	X					
Corruption					X	
Delay		X				
Masquerade						X

Table 5-1: Correspondence between the Threats and Defenses matrix

TCMS's implementation functions of Safety transmission protocol processing and ED's implementation functions of Safety transmission protocol processing are shown in Table 5-2.

Device \ Defenses	Defenses						
	Safe Sequence Counter (Sequence Number)	Timeout Type A	Timeout Type B	Source ID	Destination ID	Safety code	Cryptographic techniques
	refer to Section 5.2.1	refer to Section 5.2.2.1	refer to Section 5.2.2.2	refer to Section 5.2.3	refer to Section 5.2.4	refer to Section 5.2.5	refer to Section 5.2.6
TCMS	X	X		X	X	X	
EDs	X	X		X	X	X	

Table 5-2: Implementation function Lists

The details of processing for defenses are shown below.

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5.2.1 Safe Sequence Counter (Sequence Number)

Once a data is transmitted, the publisher increments one Safe Sequence Counter, and then the receiver checks the Safe Sequence Counter for the received data.

Detectable threats using the Safe Sequence Counter, and how to detect and handle these threats are described later in this section (details in Section 5.2.1.1).

Also see in Figure 5-4 for the concept of detectable threats using such Safe Sequence Counter.

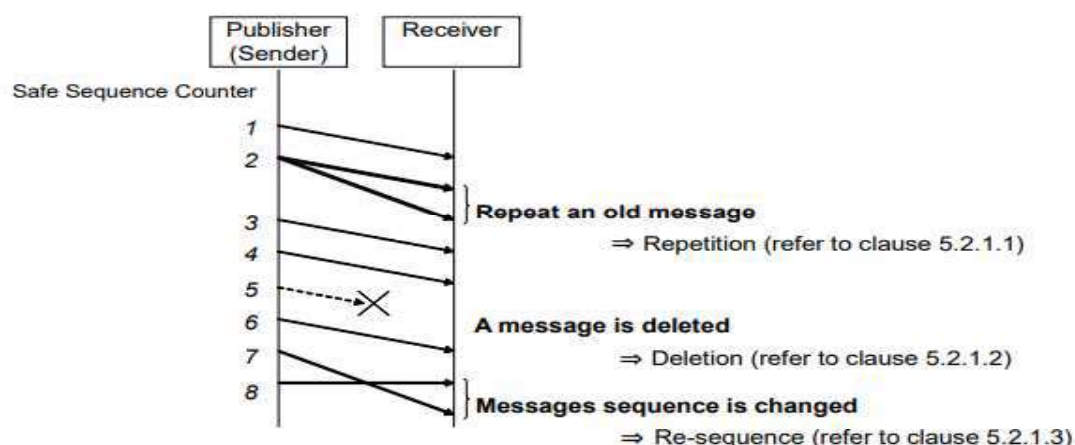


Figure 5-4: Detectable threats by Safe Sequence Counter

5.2.1.1 Detection of Repetition (Receiver processing)

Repetition: Where a receiver receives the same message more than once.

Table 5-3 is shown Detection of Repetition in Safe sequence counter.

Ref.	Safe Sequence Counter Condition	Other condition	Process of Message (Receiver)
a	Same as Previous	----	Previous message Discard
b	Same message	$\geq m1$ times	The error shall be reported (error code: <i>e1</i>)
c	$>$ last received	----	Process the Normal Operation

Table 5-3: Detection of Repetition in Safe sequence counter

- If a receiver detects a Repetition by receiving the same Safe Sequence Counter once again, the previous message should be discarded.
- If the receiver receives the same messages more than or equal to $m1$ times sequentially, the error (error code: *e1*) shall be reported to the application.
- If the receiver receives another message with a Safe Sequence Counter which is greater than the last received normal message from the publisher the receiver carries on the normal operation.

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5.2.1.2 Detection of Deletion (Receiver processing)

Deletion: Where a message is missed out (deleted).

Table 5-4 is shown Detection of Deletion in Safe sequence counter.

Ref.	Safe Sequence Counter Condition	Other condition	Process of Message (Receiver)
a	Skipped counter	----	Deletion
b	Increment	$< \text{set time}(s1)$	Deletion Ignored
c	Increment	$\geq \text{to set time}(s1)$	Discard the Message & error reported (error code: e2)
d	Increment Between new message and last received message	$< \text{set time}(s1)$	Normal Operation

Table 5-4: Detection of Deletion in Safe sequence counter

- If a receiver detects any skipped Safe Sequence Counter, the receiver regards it as Deletion of the message.
- If the increment of Safe Sequence Counter is less than the set value $s1$, the Deletion is ignored and the receiver continues further processes.
- If the increment of Safe Sequence Counter is greater than or equal to $s1$, the message will be discarded and an error (error code: e2) shall be reported to the application. Figure 5-5 is shown an example of this process.
- If the receiver receives new messages, if the increment of Safe Sequence Counter between new messages and the last receiving message (discard message) is less than $s1$, the receiver carries on the normal operation.

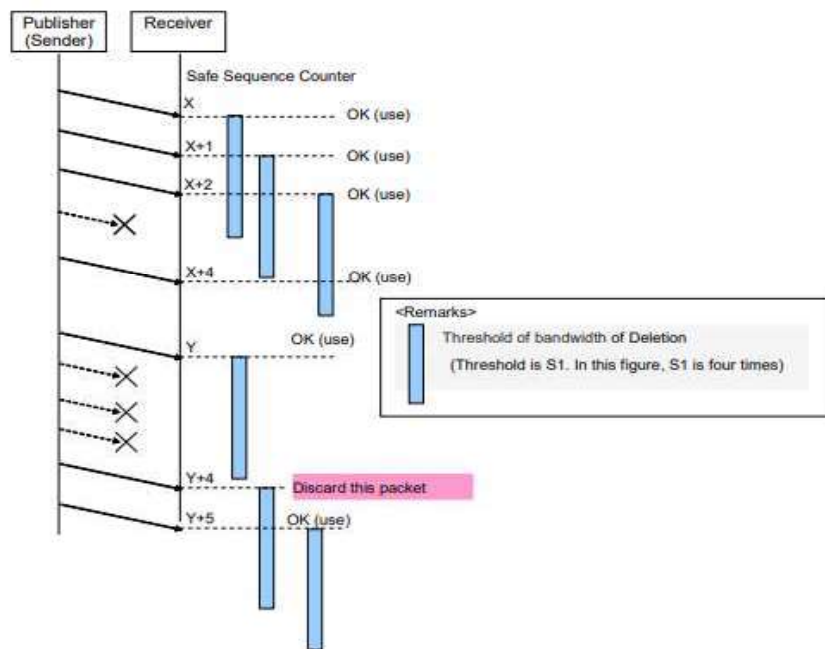


Figure 5-5: Example Detection of Deletion

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5.2.1.3 Detection of Re-sequence (Receiver processing)

Re-sequence: Where the sequence of received messages is changed.

Re-sequence is detected when the Safe Sequence Counter for the received message is decreased.

Table 5-5 is shown Detection of Re-Sequence in Safe sequence counter.

SL No.	Safe Sequence Counter Condition	Other condition	Process of Message (Receiver)
1	Decrement of counter	----	Re-sequence
2	Decrement	< set time(s2)	Re-sequence Ignored
3	Decrement	>= to set time(s2)	Discarded the Message & error reported (error code: e3)
4	Increment Between new message and last received message	< set time(s2)	Normal Operation

Table 5-5: Detection of Re-Sequence in Safe sequence counter

- If the receiver detects decrement of the Safe Sequence Counter, the message is regarded as Re-sequence.
- If the decrement of Safe Sequence Counter is less than the set value s2, the Re-sequence is ignored, and the receiver continues further processes.
- If the decrement of Safe Sequence Counter is greater than or equal to s2, the message will be discarded and an error (error code: e3) shall be reported to the application.
- Then, when the receiver receives messages with a Safe Sequence Counter which is larger than the last received normal message from the publisher, the receiver carries on the normal operation.

In Figure 5-6 is shown an example of this process.

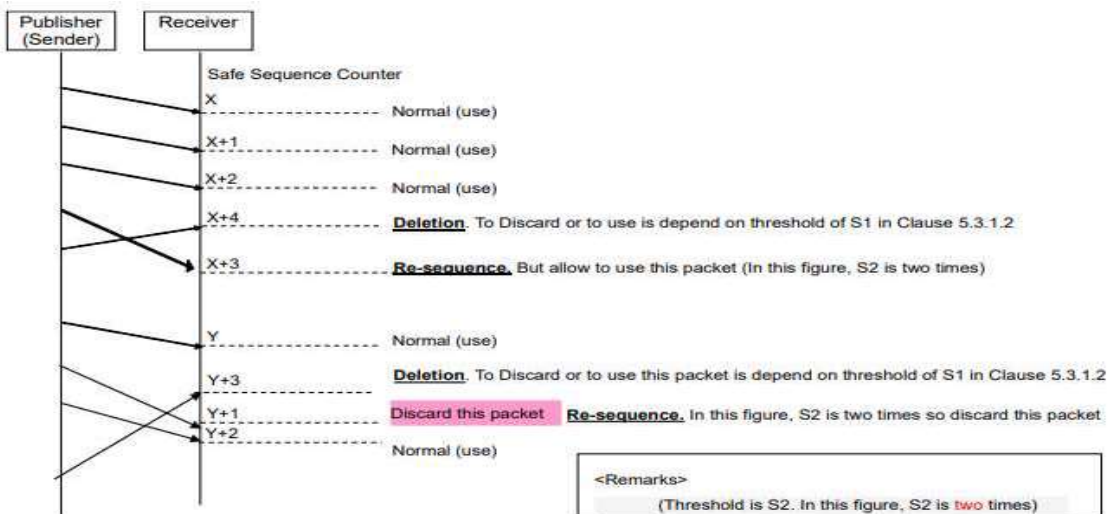


Figure 5-6: Example Detection of Re-sequence [A]

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5.2.2 Timeout check

This section describes the timeout checks.

Timeout is detected by the clock timer where measuring the transmission cycle.

There are two different types of Timeout checks in this safety related transmission protocol; Type A for cyclic transmission and Type B for Bi-directional transmission.

The details of these timeout checks will be described later on this section (details in Section 5.2.2.1 and 5.2.2.2).

5.2.2.1 Detection of Delay Type A: Cyclic transmission (Receiver processing)

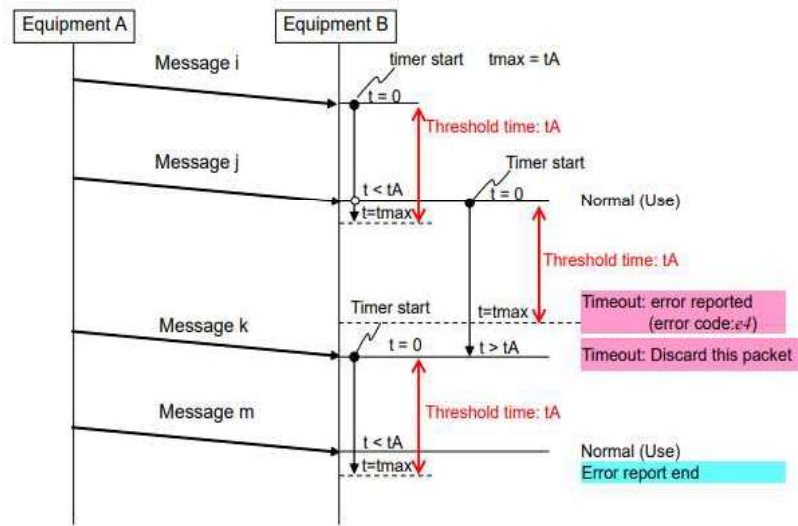


Figure 5-7: Detection of Delay (Type A: Cyclic transmission)

As Figure 5-7 shows, the equipment A transmits a message to the equipment B in pre-defined cycle (periodically).

If the equipment B cannot receive the message within the set time value t_1 (Refer to Table 6-6 after receiving the previous message, the error (error code: e4) shall be reported to the application.

When the equipment B receives the subsequent message within the set time value t_A , the error report shall end, and the operation shall be back to normal.

5.2.2.2 Detection of Delay Type B: Bi-directional transmission (Publisher processing)

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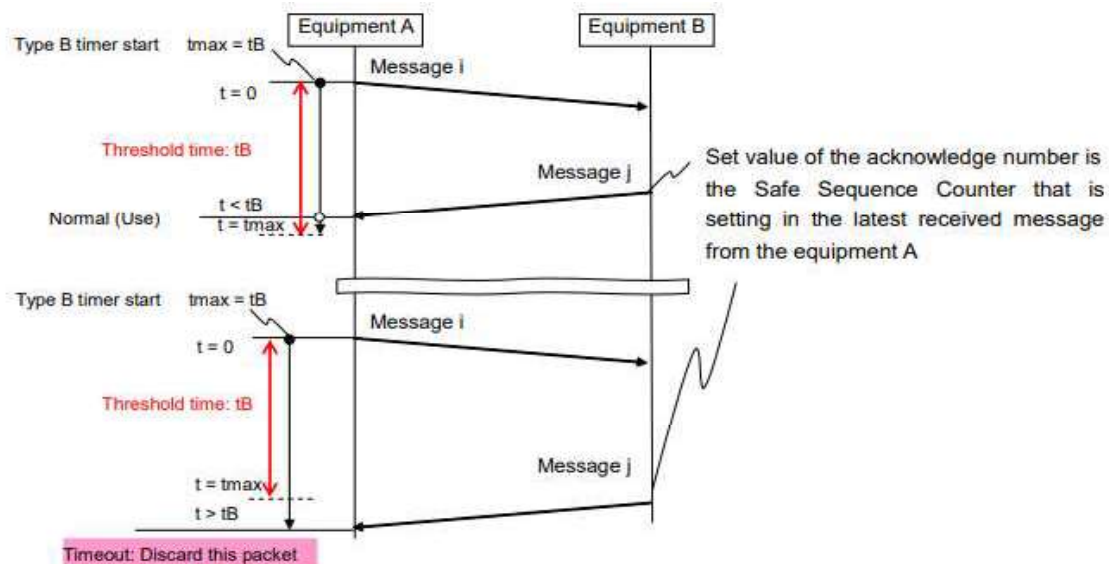


Figure 5-8: Detection of Delay (Type B: Bi-directional transmission)

Details of the timeout check in the equipment A on Figure 5-8 is as follows.

The equipment A starts a timer as it sends the message i.

The equipment B receives the message i, and then sends the message j of which the acknowledge number is equal to the sequence number of the message i.

If the equipment A cannot receive a message corresponding to the message i (In Figure 5-8, it means the "Message j" from equipment B) within a predefined threshold time: t_B seconds, the error (error code: e5) shall be reported to the application.

The acknowledge number 00000000H shall be used until it receives the first message from the publisher (refer to Figure 5-9 (1)).

Under some circumstances, the equipment A may receive a message with the same acknowledge number. If this is the case, and given that the time frame between send and receive is smaller than the set value t_2 , the messages should be accepted (refer to Figure 5-9 (2)).

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This figure shows the following case;

- Equipment A receives the same Acknowledge number message from equipment B.
(Seq, Ack) = (1,1) (2,1))
- Check if the delay of the corresponding the duplicative acknowledge message exceeds
a threshold time t_B .

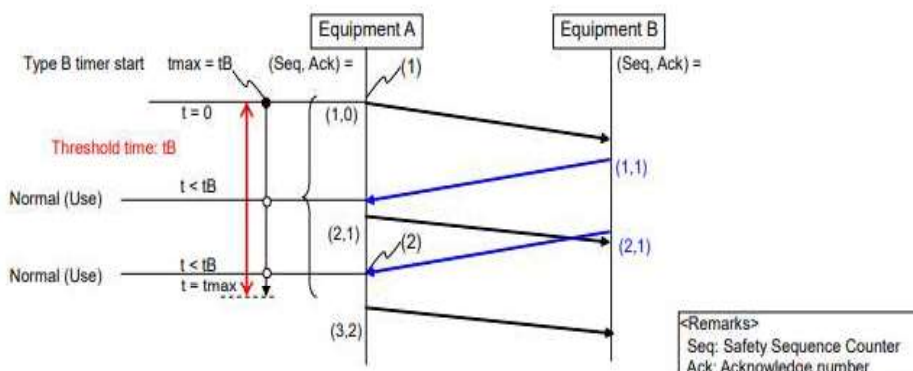


Figure 5-9: Concept of Acknowledge number

5.2.3 Source ID

5.2.3.1 Detection of insertion (Receiver processing)

Source ID is the unique ID that is distinguished the source device (equal to the publisher).

The receiver knows the Source ID of the message to be received in advance. The receiver checks the Source ID of the received message, and if a receiver detects an unexpected Source ID, the receiver regards the message as Insertion and discards this message.

5.2.4 Destination ID

5.2.4.1 Detection of insertion (Receiver processing)

Destination ID is the unique ID that is distinguished the target device (equal to the receiver). The receiver knows the Destination ID (my own ID) of the message to be received in advance. The receiver checks the Destination ID of the received message, and if a receiver detects an unexpected Destination ID, the receiver regards the message as Insertion and discards this message. And then the error (error code: e6) shall be reported to the application.

5.2.5 Safety Code

5.2.5.1 Detection of Corruption (Receiver processing)

The receiver computed CRC32 over Vital message (in Figure 5-1) starting from Safety Header up to the Safe Sequence Counter and compare the set value of the Safety Code set in the receiving message. If a receiver detects an CRC error, the receiver regards the message as Corruption and discards this message. If receiver detects Corruption more than or equal to m2 times sequentially, the error (error code: e7) shall be reported to the application.

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5.2.6 Cryptographic techniques (Reference)

Cryptographic techniques apply only to the data transmission of Category 3.

The techniques shall be used wherever malicious attacks within the open transmission network cannot be eliminated.

Against intentional attacks on messages to safety-related applications, the communication messages shall be protected using these cryptographic techniques.

Note that the radio transmission is the only one classified as Category 3 in this safety transmission system, and that Cryptographic techniques are not included in this safety related transmission protocol specification.

5.2.7 Setting parameters

Setting parameter is as shown in Table 5-6.

Refer to former sections for details (reference sections are specified in the table).

Reference section	Setting parameters	Value	Set Value	processing in the Safety related Application
5.2.1.1	Repetition threshold times	$m1$ [times]	Defined in each ICD	Defined in each ICD
5.2.1.2	Deletion increment threshold value	$s1$ [times]		
5.2.1.3	Re-sequence decrement threshold value	$s2$ [times]		
5.2.2.1	Type A Timeout threshold time	tA [seconds]		
5.2.2.2	Type B Timeout threshold time	tB [seconds]		
5.2.5	Corruption threshold times	$m2$ [times]		

Table 5-6: Set values of setting parameters

5.2.8 Error list

Error codes are as shown in Table 5-7. Refer to former sections for error details (reference sections are specified in the table).

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Reference section	Content	Error code	Remarks
5.2.1.1	Repetition error	e1	ED should set this error code in the vital message area in SD and inform to the TCMS
5.2.1.2	Deletion error	e2	
5.2.1.3	Re-sequence error	e3	
5.2.2.1	Type A Delay error	e4	
5.2.2.2	Type B Delay error	e5	
5.2.3	Insertion error	e6	
5.2.4	Corruption error	e7	

Table 5-7: Error list

6 Precedence of Documents

The SOW shall be read in conjunction with the Notice Inviting Tender (NIT)/ General Terms and Conditions (GTC)/Special Contract Conditions (SCC) of the tender & ERTS (RS & CMC). To the extent that any provision of the SOW is inconsistent with any provision of the Commercial Specification, the provisions of the NIT shall prevail.

To the extent that any provision of NIT is inconsistent with any provisions of the ERTS (RS & CMC), the provisions of ERTS (RS & CMC) shall prevail.

This SOW in no way relieves the sub-contractor from any requirements specified in the technical specification. If a conflict is discovered among any of the above contract documents, the following order of priority shall govern:

Order of precedence	Document Title
1	CMRL Phase-2 ERTS-RS and ERTS-CMC & DP&M
2	SOW
3	NIT/GTC/SCC

This SOW shall in no way relieve the subcontractor from any requirements specified in the ERTS.

The complete requirements are those found in the above documents. It shall be the subcontractor's responsibility to ensure that equipment, installation, documentation, and services furnished against this SOW are in full compliance with all the above documents.

Also, in the event of any conflict among the requirements of particular parts of the SOW and ERTS, the subcontractor shall seek clarification with BEML prior to making a contract. After making a contract, the subcontractor shall comply with BEML's Interpretation for any discrepancies.

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7 Scope of work

The scope shall be on turnkey basis including but not limited to the following:

The subcontractor shall design, development, interfacing with the TCMS Supplier, manufacture, supply, customization, testing, training, installation, commissioning, integrated testing of the Safety data Transmission Protocol in accordance with the Safety Data Transmission Protocol developed by TCMS Supplier and suitable for UTO operation for the CMRL ARE02A Project.

In the event of any additional requirement of component/aggregate/modification required for smooth operation of the train to meet the performance requirement as per ERTS-RS and ERTS CMC & DP&M, the same shall be provided by the sub-contractor.

8 Life cycle cost

The subcontractor shall comply the requirements as per the ERTS-RS 2.27 and submit the Life Cycle Cost calculation document (as per format shared) in the technical offer for Scope of equipment.

The sub-contractor shall develop a life cycle cost plan in accordance with IEC 60300-3-3 with an aim to minimize the overall life cycle cost whilst meeting the safety, quality, availability, maintainability, and reliability requirement of this particular specification.

The LCC shall include the capital cost, cost of operation, maintenance (both material and labor), depreciation, refurbishment, inflation etc.

The subcontractor shall declare the useful life (years) / life class of the electronic equipment as per EN 50155 for Life Cycle Cost (LCC) evaluation.

Items/equipment having an OEM rated design-life that will lapse during the course of the DNP shall be replaced by the sub-contractor (on or before expiry) as part of the obligations of the comprehensive maintenance scope.

List of such items shall be submitted as part of Spares in the technical offer for DNP and CMC and shall be updated based on the final design.

9 Warranty

Refer ERTS-RS and ERTS-CMC & DP&M related clauses of the tender.

Sub-contractor shall ensure minimum spare parts that he intends to make available during the installation, erection, commissioning and warranty period.

The sub-contractor shall keep on site, throughout the installation, erection, commissioning and warranty period, stocks of spare parts, to enable rapid replacement of any item found to be defective or in any way in nonconformance with the specification.

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10 Quality

10.1 Manufacturing Inspection

Inspection shall occur at appropriate points in the manufacturing sequence to ensure quality consideration for compliance with drawings, test specifications, process specifications and quality standards. BEML may designate inspection hold (or witness) points into the Supplier's Inspection and Test Plan (ITP) upon review of the Supplier's efforts. Inspection/test shall be 100% (one hundred percent) unless there is a specified sampling plan in the specification of BEML. Non-conforming materials shall be identified as discrepant, and shall be segregated and reviewed for disposition.

10.2 Receiving Inspection

The Supplier's receiving inspection activities shall provide for the inspection of all incoming materials. These inspection measures shall use to preclude the use of incorrect or discrepant materials and to ensure that only correct and accepted items are used and installed. All material certifications and test reports used as the basis for acceptance by the Supplier shall be preserved. Inspection measures shall identify any item at any stage of production to an applicable drawing, specification or other pertinent technical document. Permanent physical identification shall be used to the maximum extent possible.

10.3 Shipping Inspection

The Supplier's Quality Assurance Program shall provide and enforce procedures for the proper inspection of all products to assure completion and conformance as required by the Contract prior to shipment. All shipments shall be prepared as require precluding damage during shipment. The inspections and preparation for shipment shall be verified by the Supplier's QA/QC personnel.

10.4 Ensure Inspection with Latest Revisions/ Changes

The Supplier shall ensure that inspection and tests are based on the latest approved revision or change to drawings and specifications. The Supplier shall ensure that obsolete drawings and change requirements are promptly removed from all points of issue and use. Means of recording the effective points of changes shall be employed.

10.5 Identification of Items using tags etc.

The Supplier shall maintain a system for identifying the progressive inspection status of materials, components, sub-assemblies and assemblies as to their acceptance, rejection or non-inspection. The system shall provide for ensuring that required inspections and tests are performed and that the status of items with regard to inspections and test performance is known throughout manufacturing, installation and testing. Nonconforming items shall be

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identified by physical segregation and status indicators such as tags, serialization, markings, stamps and inspection records. The identification system shall ensure that only items that have passed the required inspection and tests are used or installed.

10.6 Handling

The Supplier's Quality Assurance Program shall provide for adequate surveillance work and inspection instructions for the handling, storing, preserving, packaging, marking and shipping to protect the quality of products.

11 Reliability & Availability

The subcontractor shall comply with the reliability and maintainability requirements prepared by BEML in accordance with the requirements specified in per ERTS section VI A chapter 18, ERTS section VI C 3.2 and 3.3.

11.1 Availability Requirements

11.1.1 Definitions

Commercial / Revenue Hours of Operation: This defines the period when trains are expected to run according to a timetable to convey passengers. It is expected that this shall ordinarily be between 04:00 hrs - 00:00 hrs. However, CMRL may at its sole discretion apply minor changes to the start / end times to allow for flexibility in the timetable.

Non-Revenue Hours: Defines the period when trains are not required to convey passengers and is expected to be between 00:00 hrs - 04:00 hrs.

Morning Peak Hours: Defines the anticipated morning rush hours, during which shorter headways will be planned. It shall ordinarily be between 08:00 hrs - 11:00 hrs on Weekdays.

Evening Peak Hours: Defines the anticipated evening rush hours, during which shorter headways will be planned. It shall ordinarily be between 17:00 hrs - 20:00 hrs on Weekdays.

Peak Hours: Shall be taken to mean either Morning Peak Hours, Evening Peak Hours or the combination of both as the case may be. CMRL may at its sole discretion apply minor changes to the nominal Peak Hours to respond to changes in passenger demand.

Availability shall be assessed by the following measure:

$$\% \text{Availability} = \left[1 - \left(\frac{\text{DT(SC)} + \text{DT(OPM)} + \text{DT(CM)}}{\text{Total Time}} \right) \right] \times 100$$

Total Time Where:

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- (i) Total Time is the time in hours during the assessment period multiplied by the total number of trains of the fleet.
- (ii) DT (SC), or Down Time due to service checks, is the total down time in hours due to service checks summed over all the trains during the assessment period.
- (iii) DT(OPM), or Down Time due to Other Preventive Maintenance, is the total down time in hours due to Preventive Maintenance other than service checks, summed over all sessions carried out on all trains during the assessment period.
- (iv) DT (CM), or Down Time due to Corrective Maintenance, is the total down time in hours due to corrective maintenance or retrofit modifications in trains, summed over all sessions carried out on the trains in revenue operation during the assessment period. Any unreasonable delay in handing over the train for repairs for reasons not attributable to the Contractor shall be excluded. Time spent on train integrity inspections after train reformations arising from corrective maintenance work shall be included.
- (v) DT(CM) shall be counted starting from the moment when the defective train is handed over to the Contractor and shall end when the train is restored to service condition.
- (vi) The down times DT (SC), DT (OPM) and DT (CM) shall also cover the full content of the maintenance work concerned, including safety precautions, inspections, servicing, replacement of equipment, defect detection and rectification, testing and restoration to service condition.

11.1.2 Availability targets

The sub-contractor shall ensure that Trains are offered and made available for operation at the respective Depot as per the Train Operation Plan and in accordance with the procedures agreed upon during execution phase. The entire process pertaining to monitoring of Train Operation Plans shall be administered through DCC / PPIO. Detailed procedures for placement and withdrawal of the Trains, daily availability monitoring of trains and anything necessary to apply the above-mentioned requirements shall be finalized and agreed during the execution phase.

CMRL shall prepare the monthly Train Operation Plan (TOP) indicating the scheduled placement and withdrawal timings of Trains from the train handover point and inform the same at least 7 (seven) days before start of each month.

In some emergency / festive scenarios, TOP can be changed subject to condition that it will be informed at least 24 hours in advance and for not more than 15 days in a calendar year.

At the time of major maintenance such as major overhaul of trains, the availability targets as applicable will be revised by CMRL, decision of CMRL shall be final and binding.

The fleet of trains supplied shall achieve a minimum average availability target of 95.0% overall for the assessment durations mentioned in ERTS section VI C clause 3.3.3.

11.1.3 Availability demonstration during CMC period

The availability of trains shall generally be more than 95% during CMC period.

The average availability of the trains shall be assessed during CMC period under the Contract. The total down times for all trains shall be collected by the CMRL on monthly basis, and the

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average availability during the preceding three (3) months (assessed quarterly of respective year) shall be worked out from the above-mentioned formula in ERTS section VI C clause 3.3.1.

The assessment period for the availability calculation shall be scheduled from the actual date of start of CMC Works and assessed separately for each quarter of respective year for the entire duration of CMC period. The sub-contractor shall submit monthly reports and the calculation of availability demonstration as below,

$$ADQ = (AD1 + AD2 + AD3) / 3$$

Where ADQ is the average availability demonstration of the monthly score AD1, AD2, AD3. If the availability target mentioned in ERTS section VI C clause 3.3.2 (e) is not achieved for any assessment period duration, availability penalty/damages is applicable as per ERTS section VI C clause 3.3.4 of this chapter.

11.1.4 Availability damage

Trainsets shall be considered as 'Available' provided they are offered for revenue service at least 30 minutes prior to the scheduled departure time as per the Train Operation Plan.

As far as reasonably practicable, no trainset shall be inducted on mainline with a defect, the Contractor may however, prepare and submit the list based on previous experience for CMRL review and acceptance.

Penalty / Damages on not meeting Availability targets: Penalties for not meeting Availability targets shall be imposed on the sub-contractor through a reduction of the certified payment for Price Center RS-CMC. Availability performance shall be calculated on a Monthly basis. The assessment period against the targets defined in below Table shall be on a quarterly basis throughout the entire CMC period.

SL No.	Availability target	Penalty / Damages
1	> 95%	No penalty shall be imposed during the respective quarter when this target is met.
2	> 93% to ≤ 95%	0.5% Penalty on the respective quarter Price Center RS-CMC apportioned amount.
3	> 90% to ≤ 93%	1% Penalty on the respective quarter Price Center RS-CMC apportioned amount.
4	≤ 90%	2% Penalty on the respective quarter Price Center RS-CMC apportioned amount. If availability ADQ is ≤ 90% consecutively for 3 (three) times, the CMC Works is liable for termination as per the provisions of GCC.

11.1.5 Penalties on service failures

Penalties on account of service failures: If train is withdrawn from service as per withdrawal scenario present in ERTS Appendices I of Section VI A Part 2 then penalty shall be imposed on sub-contractor as per below table.

Trainset available with delay: A Trainset shall be considered as available with delay if such

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Trainset is offered with a delay such that it affects its scheduled departure time as per the Train Operation Plan. Availability damages in such cases shall be as per the Number of trip(s) delayed / cancelled as defined and penalty shall be imposed on sub-contractor as per below table. CMRL shall return the trains as per TOP ordinarily.

Non-Available Trainset: A trainset can be classified as non-available if the sub-contractor is already accruing penalties outlined in SL No. 3 of below table or is attending to a fault/defect (service failure/relevant failure) in the train(s) that are attributable to the sub-contractor.

The subcontractor shall comply to ERTS section VI C 3.3 for availability of trainset for commercial services.

Detailed list of different conditions and corresponding penalty / damages which shall be levied on the sub-contractor are outlined below.

SL No.	Conditions	Penalty / Damages per incident (Figures in INR)
1	Passenger De-boarding & Train withdraw in mid-section due to train immobilization	20,00,000
2	Passenger De-boarding & Train withdrawn at station due to train immobilization	15,00,000
3	Passenger De-boarding at any Station, but train not immobilized	1,00,000
4	Train withdrawn at terminal Station during Peak Hour	20,000
5	Train withdrawn at terminal Station during Non- Peak Hour	10,000
6	>2 minutes ≤5 minutes (Trip Delay)	10,000 per trip delay
7	>5 minutes	20,000 per trip delay
8	Trip Cancellation	75,000 per trip cancellation

Note:

1. Penalty / Damage figures shall prevail for the entire CMC Period.
2. Where a failure arising on a single trainset causes scenarios 1 – 5 to occur on multiple Trainsets; only one penalty shall be imposed on the sub-contractor derived by the scenario attracting the highest penalty amount.
3. Delays shall be calculated according to the time deviation from Timetable recorded at the destination station (one-way trip). BEML judgement shall be final and binding on the sub-contractor.
4. In case of partial trip cancellation, penalty corresponding to 8 of table above shall be applicable on pro-rata basis.
5. The damages mentioned above are calculated on a per train incident basis and shall be recovered by deduction from the certified payment amount for Price Center RS-CMC
6. Escalation of 5% compounded annually shall be applicable for the figures mentioned under Penalty / Damages from the Commencement date of the Contract.

Penalties as defined in Table above shall not be applicable to the sub-contractor for delay / withdrawal / de-boarding due to faults in equipment which are maintained by CMRL or other designated Contractors viz. Signalling, Telecom etc.

Incorrect troubleshooting by Train Operators / Attender / Station Controller shall not relinquish

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the sub-contractor from failure attribution.

12 Others

The delivery format of all deliverables (design submission, maintenance manuals, training manuals and etc.) shall be approved by BEML.

Any discrepancy in specifications can be clarified after the discussion between BEML and the subcontractor.

13 Submittals – Technical Offer

The sub-contractor shall provide the submittals as per Submittals check list as part of technical offer for technical evaluation,

Note:

Offers with Non-compliance and deviations to any of the ERTS, SOW & Interface clauses with regard to Safety Transmission Protocol system are liable for rejection.

14 List of Documents and Drawings attached- Appendices/Annexures

1. ERTS CMRL phase-2 ARE02A
2. Compliance Matrix format
3. Vendor Subcontractor Suppliers Credentials Format
4. RAMS formats
5. LCC format
