

**RailTel’s Bid Specific Additional Terms & Conditions**

**Information to Bidder for the “Procurement of Routers, Switches, SFP Modules and Other Equipment for Customer Delivery and Projects in the Western Region”**

**Ref:** GeM Bid No. GEM/2025/B/7420894

**Dated:** 07.05.2026

- The item/items in this bid should be quoted as per the technical specifications. *The details of the specifications along with consignee/site details are also available on website [www.railtelindia.com](http://www.railtelindia.com)*

TReDS feature available	Yes, on m1xchange portal  (url: <a href="https://www.m1xchange.com">https://www.m1xchange.com</a> )
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- 1 Wherever support for any feature is specified, it shall be construed to mean that the feature shall be available without requiring any additional hardware from RailTel. Accordingly, all hardware necessary to enable such features shall be included in the bidder’s offer. The detailed technical specifications are provided in Annexure-I.  
In the event of any conflict or deviation between the terms, conditions, or specifications mentioned on the GeM portal and those specified in the Additional Terms and Conditions (ATC), the provisions of the ATC shall prevail and shall be final and binding.
- 2 OEM or Authorized dealer/ distributor/ Partner/ Trader authorized by OEM specific to this bids should have a registered office in India to provide sales and 24x7 support in India. The certificate to this effect should be submitted.
- 3 In case of the bidder is Authorized dealer/ distributor/ Partner/ Trader authorized by OEM specific to this bid, a certificate from the OEM to this effect should be submitted as per the **Annexure-II** (MAF).
- 4 GSTIN ID of vendor should be provided from where goods will be supplied.

**5 Delivery Period, Consignee Address and inspection**

- 5.1 **Delivery Period:** The supplier is required to deliver the material within **120 days** from the date of issuance of either the GeM Contract or LOA, whichever is earlier. If material is not supplied within the approved delivery period, a penalty of 0.5% per week on the undelivered quantity, subject to a maximum of 10% of the contract value, will be levied.

In the event that the Contractor fails to deliver the stores, either in whole or in part, within the stipulated delivery period or within any extension thereof granted without levy of Liquidated Damages, or abandons/repudiates the Contract prior to completion, the Purchaser shall, without prejudice to any other rights and remedies available under the Contract or applicable law, be entitled to recover Liquidated Damages from the Contractor.

Such Liquidated Damages shall be levied at the rate of 0.5% (half percent) per week or part thereof of delay, calculated on the value of the undelivered portion of the stores, inclusive of applicable taxes, duties, freight, and other charges, for the period during which delivery remains delayed beyond the stipulated or extended delivery period, where such delayed delivery is accepted by the Purchaser.

The total Liquidated Damages recoverable under this clause shall, however, be limited to a maximum of 10% (ten percent) of the total Contract value.

**5.2 Name of locations for Consignee Address: As per the Annexure-V.**

The transportation and unloading of the materials at the designated sites shall be the sole responsibility of the vendor and shall be carried out entirely at the vendor's risk and cost. The same shall be deemed to be included in the quoted price, and no additional charges whatsoever shall be payable by the purchaser in this regard.

**5.3 Inspection:**

Inspection of the supplied materials shall be carried out at the consignee site by the nominated RailTel Executive for quality check as per the specifications listed in Annexure-I, only after verification that the offered products are listed as Trusted Products on the Trusted Telecom Portal; failing which, the materials shall not be taken up for inspection.

Supplier should also submit data sheet, guarantee and fitment certificate along with the supply of materials.

Any deficiencies or non-conformities observed during inspection shall render the material liable for rejection. The supplier shall promptly replace the rejected material at no additional cost to RailTel, within the time specified by RailTel.

Failure to comply with the above shall constitute a breach of contract, and RailTel shall be entitled to take appropriate action in accordance with the terms and conditions of the contract, including imposition of liquidated damages, penalties, termination of the contract, and forfeiture of the Performance Bank Guarantee (PBG), without prejudice to any other rights available under the contract.

**6 Estimated cost of tender & Earnest Money Deposit (EMD):**

**6.1 Estimated cost of tender:** Estimated cost of the Tender is **Rs. 3,39,02,385/-** (Incl. GST).

**6.2 Earnest Money Deposit (EMD):** **Rs. 6,78,100/-** with Payment online through RTGS/ internet banking in Beneficiary name RailTel Corporation of India Limited Account No. 11037321307, IFSC Code SBIN0001821, Bank Name: State Bank of India, Branch address: Churchgate Branch, Maharshi Karve Marg, Mumbai- 400020.

**6.2.1** Bidders seeking exemption from submission of Earnest Money Deposit (EMD) shall submit valid supporting documents for the applicable exemption category, in accordance with the GeM General Terms and Conditions.

**Only such bidders who are eligible for and avail of EMD exemption shall be required to submit a Bid Security Declaration (BSD), in lieu of EMD, in the format prescribed at Annexure-IX.**

**6.2.2 Bids received without the prescribed Earnest Money Deposit (EMD) or without valid documentary evidence in support of EMD exemption, as per the above clause, shall be summarily rejected and shall not be considered for further evaluation. No clarification or correspondence in this regard shall be entertained with the bidder.**

- 6.2.3 Notwithstanding any exemption from EMD, all bidders, without exception, shall be required to furnish the Security Deposit/Performance Bank Guarantee (PBG) as stipulated in the Contract. No exemption from submission of Security Deposit/Performance Bank Guarantee shall be available to any bidder.
- 6.2.4 Earnest Money of the unsuccessful bidder will be discharged/returned as promptly as possible. No interest shall be payable on the EMD.
- 6.2.5 **Earnest Money Deposit– Forfeiture Clause**

The Earnest Money Deposit (EMD) shall be liable to be forfeited in any of the following events:

1. If the bidder withdraws its bid or modifies, amends, or alters the terms and conditions of the bid in any manner during the validity period of the bid;
2. If any information or document furnished by the bidder is found to be false, incorrect, misleading, or if the bidder conceals any material information at any stage of the tender process;
3. In the case of a successful bidder, if the bidder fails to accept the Letter of Acceptance (LoA) issued by the Purchaser within the stipulated time period; or
4. If the successful bidder fails to furnish the required Performance Bank Guarantee (PBG) within the prescribed time period specified in the tender document, and despite extension(s), the Purchaser reserves the right to take appropriate action including forfeiture of EMD, in addition to other remedies available under the contract.

The decision of the Purchaser in this regard shall be final and binding on the bidder

- 6.3 RailTel is registered with m1xchange TReDS platform having buyer registration number “BUYER00001496”. The URL for m1xchange platform is <https://m1xchange.com>. MSE suppliers/vendors are required to register themselves on m1xchange platform for availing the facility of bill discounting on TReDS portal. The bidder is mandatorily required to submit its TReDS registration number (as provided by m1xchange portal) and GRN (Goods/ Service Receipt Note) Number (as provided by RailTel on delivery of Goods/ Service) while submitting the invoices if requires to avail TReDS facility.
- 6.4 MSE vendor will bear all costs relating to availing the facility of discounting on TReDS platform including but not limited to Registration charges, Transaction charges for financing, Discounting charges, Interest on financing, or any other charges known by any name shall be borne by MSE vendor.
- 6.5 MSE vendor hereby agrees to indemnify, hold harmless and keep RailTel and affiliates, Directors, Officers, representative, agents and employees indemnified, from any and all damages, losses claims and liabilities (including legal costs) which may arise from Sellers submission, posting or display, participation, in any manner, on the TReDS platform or from the use of Services from the Buyer’s breach of any of the terms and conditions of the Usage terms or of this agreement and any applicable Law on a full indemnity basis.
- 6.6 RailTel shall not be liable for any special, indirect, punitive, incidental or consequential damages or any damages whatsoever (including but not limited to damage for loss of profits or savings,

business interruption, loss of information), whether in contract, tort, equity or otherwise or any other damages resulting from using TReDS platform for discounting their (MSE Vendor's) invoices.

- 7 This bid complies with "Public Procurement (preference to make in India) Policy Order, 2017 or latest issued by DIPP and Public Procurement Policy for Micro and Small Enterprises (MSEs) order,2012" or latest issued by MoMSME." The bidders claiming the preference have to submit relevant documents prescribed under relevant order.

This bid complies with "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 or latest regarding restrictions on procurement from a bidder of a country which shares a land border with India"

**Note: If the bidder wants to avail themselves of the Purchase preference, the bidder must be the manufacturer / OEM of the offered product on GeM. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises and hence resellers offering products manufactured by some other OEM are not eligible for any purchase preference.**

8 **Security Deposit/ Performance Bank Guarantee:**

The successful tenderer shall submit security deposit in the form of DD or irrevocable Bank Guarantee from any scheduled bank for due fulfillment of contract as per the details given below:

- i. Security Deposit/ Performance Bank Guarantee @ 5% of total value of Purchase Order is required to be submitted within 30 days of issue of Purchase Order with validity of 3 months beyond warranty period, failing which a penal interest of 15% per annum shall be charged for the delay period i.e. beyond 30 (thirty) days from the date of issue of LOA/PO. PBG format specified in **Annexure-IV**.
- ii. The security deposit/ PBG shall be submitted to RCIL/WR, Mumbai.
- iii. A separate advice of the BG will invariably be sent by the BG issuing bank to the RailTel's Bank through SFMS and only after this the BG will become acceptable to RailTel. It is therefore in own interest of bidder to obtain RailTel's bank IFSC code, its branch and address and advise these particulars to the BG issuing bank and request them to send advice of BG through SFMS to the RailTel's Bank.

**This PBG should be from a Scheduled commercial Bank (either Private or PSU) but not by any cooperative Bank or NBFC and the claim validity period shall be 1 year after PBG validity for lodging the claim.**

The security deposit/ Performance Bank Guarantee shall be released after successful completion of Contract obligations under the contract, duly adjusting any dues recoverable from the successful tenderer. Payment of Security Deposit in the form of Pay Order/Demand Draft should be made in favor of "RailTel Corporation of India Ltd" payable at Mumbai.

**Note:**

1. Any Performance security up to a value of Rs.5 Lakhs is to be submitted through online transfer only.

2. No interest shall be paid on the amount of Performance Security held by RailTel, at any stage.

## **9 Eligibility Criteria:**

### **9.1 Technical Eligibility Criteria:**

The bidder/ OEM (themselves or through reseller(s)) should have executed project for supply of same or similar category Products (as defined under 'Similar Work' below) during preceding 03 (three) financial years (i.e. current year and three previous financial years) as on opening of bid, as per following criteria:

- (i) Single Order of at least 35% of estimated bid value; or
- (ii) Two Orders of at least 20% each of estimated bid value; or
- (iii) Three Orders of at least 15% each of estimated bid value.

The bidder shall upload Work Completion Certificates issued by the respective Buyer Organization(s) in support of the above-mentioned orders along with the bid.

In case of bunch bids, the eligibility shall be evaluated with reference to the category corresponding to the primary product having the highest bid value, and such category shall meet the above criteria.

**# Definition of similar work: Similar Work' shall mean the supply or supply and installation of IT and/or Telecom equipment, which has been successfully executed, for the organizations stipulated in Clause 9.1a.**

**Note:** In case a contract is started prior to 03 (three) years, ending on the date of opening of bid, but completed in last 03 (three) years, ending on the date of opening of bid, the completed work shall be considered for fulfilment of credentials.

- 9.1a** Work experience certificate from private individual shall not be considered. However, in addition to work experience certificates issued by any Govt. Organization, PSU or any reputed TELCO, work experience certificate issued by Public listed company having average annual turnover of Rs.500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, incorporated/ registered at least 5 years prior to the date of opening of tender, shall also be considered provided the work experience certificate has been issued by a person authorized by the Public listed company to issue such certificates.

### **9.2 Financial Criteria for Bidder:**

The bidder should have minimum cumulative turnover from operation in the previous three financial years and the current financial year, **at least 150%** of the advertised value of the tender. The tenderers shall submit Certificates to this effect which may be an attested Certificate from the concerned department/ client or Audited Balance Sheet duly certified by the Chartered Accountant/ Certificate from Chartered Accountant duly supported by Audited Balance Sheet. The contact details of CA/ Statutory Auditor along with UDIN No. shall be mandatorily mentioned on copy of certified Balance Sheet/ Certificate.

**For Startup:** The bidder should have a minimum cumulative turnover from operations amounting to **at least 50%** of the advertised value of the tender, during the last three (03) completed financial years and the current financial year. Documentary evidence in support of the same, duly certified by a Chartered Accountant / Statutory Auditor, shall be submitted.

Bidders availing this relaxation shall submit a valid **Startup Recognition Certificate issued by DPIIT (Department for Promotion of Industry and Internal Trade)** in support of their claim.

**Note:** Client certificate from other than Govt. Organization should be duly supported by Form 16A/ 26AS generated through TRACES of Income Tax Department of India.

- 9.3 The bidder shall submit an authorization certificate specific to this tender from the respective OEM, as per **Annexure-II**. In case the OEM itself is participating in the bid, a self-declaration to this effect shall be submitted in lieu of the authorization.
- 9.4 The Bidder and the Original Equipment Manufacturer (OEM) shall not have been convicted, within the three (3) years preceding the last date of submission of bids, nor be declared ineligible, suspended, blacklisted, banned, or debarred by any Ministry, Department, or Public Sector Undertaking (PSU) of the Government of India from participation in tender processes of any of its entities.  
The Bidder shall submit an undertaking to this effect, duly signed by its authorized signatory

## **10 Variation of Quantities at the Time of Award**

- i. The purchaser reserves the right to increase or decrease the quantity to be ordered up to 30 percent at the time of placement of contract. The purchasers also reserve the right to increase the ordered quantity by up to 30% of the contracted quantity during the currency of the contract at the contracted rates. Bidders are bound to accept the orders accordingly.
- ii. The provision of + (plus) 30% Option Clause shall be applicable as a Special Condition of Contract with a minimum purchase value of Rs. 1.5 Crores, for fixed quantity contracts, for procurement of materials of which the requirements are of continuing nature. However, such a threshold for inclusion of Option Clause may be decided by RailTel as deemed fit.

## **11 Warranty:**

- 11.1 The materials are to be warranted for 3 years from date of receipt of materials at the consignee site. The tenderer shall warrant that stores to be supplied shall be new and free from all defects and faults in material, workmanship and manufacturing and shall be of the highest grade and consistent with the established and generally accepted standards of materials of the type ordered and shall perform in full conformity with the specifications and drawings.

The supplier shall be responsible for any defects that may develop under the conditions provided by the contract and under proper use, arising from faulty materials, design or workmanship such as corrosion, inadequate quantity of material to meet item requirements, inadequate contact protection, deficiencies in design and/ or otherwise and shall remedy such defects at his own cost when called upon to do so by the Purchaser who shall state in writing in what respect the stores are faulty.

**11.2 SLA:**

During the warranty period, upon notification of any defect or service requirement by the Buyer, the Seller shall complete the required service/rectification within a maximum period of fourteen (14) days.

In the event the Seller fails to complete such service/rectification within the stipulated time, a penalty at the rate of **0.5% (half percent) of the Unit Price of the product per week or part thereof** of delay shall be levied, subject to a maximum of **100% (one hundred percent) of the Unit Price of the product**.

The Seller shall deposit the applicable penalty amount directly with the Buyer. In case of failure to do so, the Buyer shall have the right to recover such penalty from the Performance Security (PBG) and/or from any payments due to the Seller under this Contract or any other contract with the Buyer.

**11.3 Transit Liability:**

The Vendor shall submit an undertaking confirming that it shall be solely responsible for any loss of or damage to the material during transit, until the material is duly delivered and handed over to the consignee.

Any material found to be damaged, dented, or otherwise defective at the time of delivery shall be rejected and shall not be deemed to have been delivered. The Vendor shall replace such material, unconditionally and free of cost, to the satisfaction of the Consignee/Buyer.

The delivery of such material shall be considered complete only upon receipt and acceptance of the replaced material in good condition (free from any damage or defects).

**12 Payment Conditions: -**

- (i) 100% payment against full supply.
- (ii) 80% payment against part supply. 80% payment shall be released on a pro-rata basis against part supply. In the event the bidder completes the supply corresponding to any individual Schedule of Requirement (SOR), the bidder shall be entitled to claim 80% payment for such completed SOR(s). The balance payment shall be released upon completion of the entire supply under the Contract.

(iii) The following documents are to be submitted for payment:

- Original Tax Invoice. (With separate Tax amount, containing POS, RailTel GSTN and Supplier GSTN).
- Delivery Challan/E-way bill
- Original Consignee receipt with GRN No.
- Original Inspection Certificate
- Undertaking against the transit liability as per clause 11.3
- Warranty Certificate of OEM
- Copy of BG/Proof of BG Submission
- Certificate of receipt of Goods in good condition from RailTel

(iv) Any variation in statutory taxes and duties during the Contract period shall be to the account of RailTel, provided such variation occurs within the original Delivery Period (DP).

Beyond the original Delivery Period, any increase in statutory taxes and duties shall be to the account of RailTel only if the delay is attributable to RailTel.

However, any reduction in statutory taxes and duties, whether within or beyond the original Delivery Period and up to the actual date of supply, shall be passed on to RailTel, irrespective of the reason for delay.

### 13 Notarized Affidavit

The tenderers shall submit a notarized affidavit on a non-judicial stamp paper (Rs. 100/-) stating that they are not liable to be disqualified and all their statement/ documents submitted along with bid are true and factual. Standard format of the affidavit to be submitted by the bidder is enclosed as **Annexure-III**. And it shall be mandatorily incumbent upon the tenderer to identify state and submit the supporting **documents duly self-attested** by which they/he is qualifying the Qualifying Criteria mentioned in the Tender Document. It will not be obligatory on the part of Tender Committee to scrutinize beyond the submitted document of tenderer as far as his qualification for the tender is concerned.

The RailTel (RCIL) reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the RailTel (RCIL), make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification by the RailTel (RCIL) shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of the RailTel thereunder.

In case of any wrong information submitted by tenderer, the contract shall be terminated. Performance Guarantee (PG) of contract forfeited and agency barred for doing business on RailTel (RCIL).

**Note: Non-submission of a Notarized Affidavit on prescribed format by the bidder shall render the bid summarily rejected and it shall not be considered for further evaluation. No clarification or correspondence in this regard shall be entertained with the bidder.**

### 14 Online Submissions:

The bidder is required to upload and submit the following documents on line before due date & time of bid. The due date & time for closing of the bid as per GeM Bid and the bid will be opened as per GeM Bid.

- (i) EMD/ Valid Documentary proof of exemption.
- (ii) The bidder shall provide clause-wise compliance along with all documents and annexures mentioned for each clause of the GeM Bid and Additional Terms & Conditions (ATC)/Information to Bidders documents, including any corrigendum(s) issued, if applicable.
- (iii) Data Sheet of offered item/ equipment.
- (iv) Financial (Certified copies of audited balance sheets/ annual reports of last three preceding financial years) and Technical Eligibility Criteria documents.
- (v) Technical Compliance of all Specification of items as per ATC documents.
- (vi) Proof of document required against Eligibility criteria of Bidder/ OEM as per Clause No. 9.
- (vii) MAF/ OEM Authorization as per **Annexure-II**.

- (viii) Notarized affidavit on a non-judicial stamp paper as per **Annexure-III**.
- (ix) Duly notarized Power of Attorney in name of authorized signatory as per Clause No. 18
- (x) NIL deviation declarations as per **Annexure- VI**.
- (xi) Declaration Regarding Minimum local content under preference to “MAKE IN INDIA” Policy as **Annexure-VII**.
- (xii) The bidder is required to submit a certificate on their letterhead, in accordance with Clause 21 of the ITB and in the format prescribed in **Annexure-VIII**.
- (xiii) Bid Securing Declaration as **Annexure-IX**.
- (xiv) Undertaking on non-conviction and non-blacklisting (last 3 years) to be submitted separately by both Bidder and OEM on their respective letterheads, signed by authorized signatories.
- (xv) Undertaking for **Compliance with TTP as per clause 23**.
- (xvi) BOQ of the offered items
- (xvii) OEM certificate/undertaking confirming the minimum service life of the equipment as specified in **Annexure-I**

**15 Offline submission:**

Original copy of documents shall be submitted by tenderer offline at RailTel Corporation of India Western Railway Microwave Complex, Senapati Bapat Marg Mahalaxmi (West) Mumbai - 400013 at any point of time whenever asked for verification. Incase original are not produced before provided due date, bid may be rejected.

**16 Make in India**

The provisions of the Public Procurement (Preference to Make in India) Order 2017 dated June 15, 2017 (or subsequent revisions, if any) by Department of Industrial Policy and Promotion, GoI shall apply to this tender to the extent feasible. Minimum Local Content for SOR items shall be 50% for purchase preference as per the Notification No. 18-10/2017-IP dated 29th August 2018 issued by Department of Telecommunications, Ministry of Communications or as per the latest notification. Bidder shall be required to give a self-certification in his bid that the item offered meets the local content and shall give details of the location(s) at which the local value addition is made. Bidder should submit Self Certification under preference to “MAKE IN INDIA” Policy as **Annexure-VII**.

In case of any false declaration, action shall be taken in line with the provisions of the PPP-MIII order.

In cases of procurement for a value excess of Rs. 10 crores, the ‘Class-I local supplier/ Class-II local supplier’ shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

**17 Clause-wise Compliance:**

The bidder shall submit duly signed clause-wise compliance, along with all documents and annexures specified for each clause of the GeM Bid and Additional Terms & Conditions (ATC)/Information to Bidders documents, including any corrigendum(s) issued, if applicable.

In the event a corrigendum is issued, whether in whole or in part of the tender or any of its conditions, the bidder shall submit duly signed compliance for such corrigendum.

Failure to submit compliance for any issued corrigendum shall be deemed as incomplete bid submission, rendering the bid liable for rejection. RailTel reserves the right to raise queries or correspondence in this regard, and the bidder shall have no right to raise objections or claim any clarification thereafter.

**18 Power of Attorney**

A Power of Attorney in favor of the authorized signatory, duly authorizing him/her to sign the bid, shall be submitted online before the due date and time of submission of the e-Tender. The original copy shall be submitted by the successful bidder as per Clause-15 above.

**19 Settlement of Disputes/ Arbitration**

The parties shall, at the first instance, attempt to resolve through good faith negotiation and consultation, any difference, conflict or question arising between the parties hereto relating to or concerning or arising out of or in connection with this agreement, and such negotiation or consultation shall begin promptly after a Party has delivered to another Party a written request for such consultation.

In the event of any dispute, difference, conflict or question arising between the parties hereto, relating to or concerning or arising out of or in connection with this agreement, is not settled through good faith negotiation or consultation, the same shall be referred to arbitration by a sole arbitrator.

For this purpose, RailTel will share to the other party, panel of independent arbitrators maintained by RailTel, having expertise in their respective domains. The other Party will suggest any 3 names out of the said panel for appointment as sole arbitrator. Thereafter, out of the said three names so suggested by the other Party, RailTel shall appoint the sole arbitrator. The seat and the venue of arbitration shall be New Delhi. The arbitration proceedings shall be in accordance with the provision of the Arbitration and Conciliation Act 1996 and any other statutory amendments or modifications thereof. The decision of arbitrator shall be final and binding on both parties. The arbitration proceedings shall be conducted in English Language. The fees and cost of arbitration shall be borne equally between the parties.

**20 Taxes & Duties:**

- 20.1 The price quoted in the offer should be firm, fixed indicating the breakup and inclusive of all taxes & duties like import, custom, Anti-Dumping, CGST, SGST, IGST, UTGST etc. The offer should be inclusive of packing, forwarding, freight up to destination, insurance charges.
- 20.2 Bidder shall issue valid tax invoice to RailTel for availing proper credit of CGST/ SGST/ IGST/ UTGST in case of award of Contract. GST will not be reimbursed in the absence of valid tax invoice.
- 20.3 For all the taxable supplies made by the vendor, the vendor shall furnish all the details of such taxable supplies in the relevant returns to be filed under GST Act.

- 20.4 If the vendor fails to comply with any of the above, the vendor shall pay to purchaser any expense, interest, penalty as applicable under the GST Act.
- 20.5 In case of incorrect reporting of the supply made by the vendor in the relevant return, leading to disallowance of input credit to purchaser, the vendor shall be liable to pay applicable interest under the GST Act to the credit of purchaser. The same provisions shall be applicable in case of debit/ credit notes.
- 20.6 Tenderer shall quote all-inclusive rates, but there shall be break up of basic price and all type of applicable taxes such as SGST/ CGST/ IGST/ UT GST along with respective HSN/ SAC Code under GST Law (Including tax under reverse charges payable by the recipient).
- 20.7 Wherever the law makes it statutory for the Purchaser to deduct any amount towards GST at sources, the same will be deducted and remitted to the concerned authority.
- 20.8 The imposition of any new tax and/or increase/ in the aforesaid taxes, duties levies, after the last stipulated date for the receipt of tender including extensions if any and the bidder there upon necessarily and properly pays such taxes/ levies/ cess, the bidder shall be reimbursed the amount so paid, provided such payments, if any, is not, in the opinion of RailTel attributable to delay in execution of work within the control of bidder. The bidder shall, within a period of 30 days of the imposition of any such tax or levy or cess, give a written notice thereof to RailTel that the same is given pursuant to this condition, together with all necessary information including details of input credit relating thereto. In the event of non-payment/default in payment of any of the above taxes, RailTel reserves the right to with-hold the dues/ payments of bidder and make payment to state/ Central Government authorities as may be applicable. However, if the rates are reduced after the last stipulated date for receipt of tender, bidder has to pass on the benefits to RailTel.

**21 Restrictions under Rule 144(xi) of GFR, 2017:**

Any bidder from a country which shares a land border with India will be eligible to bid in this procurement, if the bidder is registered with the competent authority only, as per Gol guidelines. Office Memorandum F.No.6/18/2019-PPD dated 23.07.2020 by Ministry of Finance, Department of Expenditure, Public Procurement Division shall also apply to this tender. A certificate on their letterheads as per **Annexure-VIII** shall be submitted by all the bidders regarding their compliance with this order. If such certificate given by a bidder whose bid is accepted is found to be false, this would be a ground for immediate termination and further legal action in accordance with law. Registration should be valid at the time of submission of bids and at the time of acceptance of bids. In respect of supply otherwise than by tender, registration should be valid at the time of placement of order.

**22 Force Majeure:**

- (i) A Force Majeure (FM) means extraordinary events or circumstance beyond human control such as an event described as an act of God (like a natural calamity) or events such as a war, strike, riots, crimes (but not including negligence or wrong-doing, predictable/seasonal rain and any other events specifically excluded in the clause). An FM clause in the contract frees both parties from contractual liability or obligation when prevented by such events from fulfilling their obligations under the contract. An FM clause does not excuse a party's nonperformance entirely, but only suspends it for the duration of the FM. The firm has to give notice of FM as soon as it occurs and it cannot be claimed ex-post facto. There may be a FM situation affecting the purchase organization only. In such a situation, the purchase

organization is to communicate with the supplier along similar lines as above for further necessary action. If the performance in whole or in part or any obligation under this contract is prevented or delayed by any reason of FM for a period exceeding 90 (Ninety) days, either party may at its option terminate the contract without any financial repercussion on either side.

- (ii) Notwithstanding the punitive provisions contained in the contract for delay or breach of contract, the supplier would not be liable for imposition of any such sanction so long as the delay and/ or failure of the supplier in fulfilling its obligations under the contract is the result of an event covered in the FM clause.

## **23 Compliance with TTP**

The guidelines and directives issued by the Department of Telecommunications (DoT), Government of India, regarding procurement of telecommunication equipment from trusted sources and use of Trusted Products shall be applicable to this tender.

The OEM shall be listed as a Trusted Source on the Trusted Telecom Portal as on the date of bid submission, and the offered products shall be listed as Trusted Products on Trusted Telecom Portal as on the date of delivery.

**The bidder shall mandatorily submit, along with the bid, an undertaking from the OEM confirming compliance with the above requirements, failing which the bid shall be liable for rejection.**

RailTel reserves the absolute right to:

- Reject any bid / product not complying with TTP requirements;
- Refuse acceptance of material at the time of delivery if the same is not listed as a Trusted Product on TTP;
- Cancel the award, in whole or in part, if compliance is not met.

No claim whatsoever shall be entertained on account of such rejection or cancellation.

Any delay in supply attributable to delay in approval or listing of products as Trusted Products on the Trusted Telecom Portal (TTP) shall be solely at the risk and responsibility of the Bidder / OEM and shall be deemed as delay attributable to the Bidder. RailTel reserves the right to levy Liquidated Damages as per Clause 5.1 for such delay and, without prejudice to any other contractual remedies, to terminate the contract (in whole or in part) and / or forfeit the Performance Bank Guarantee

## **24 ERRORS, OMISSIONS & DISCREPANCIES**

The Contractor shall not take advantage of any error, omission, ambiguity, or discrepancy in the tender documents. In case of any doubt or inconsistency, the Contractor shall immediately bring the same to the notice of the Purchaser in writing and obtain clarification before proceeding with the work.

In the event of any discrepancy or conflict between drawings, specifications, schedules, or other tender documents, the interpretation and decision of the Purchaser shall be final and binding on the Contractor.

No claim for additional cost or extension of time shall be entertained on account of any misunderstanding or misinterpretation of the tender documents. Any work carried out without obtaining prior clarification in case of doubt shall be at the Contractor's risk and cost.

**25 WRONG INFORMATION BY TENDERER**

If the tenderer/s deliberately gives/ give wrong information in his/ their tender which creates/ create circumstances for the acceptance of his/their tender the RailTel reserves the right to reject such tender at any stage.

**26 AMENDMENT OF BID DOCUMENTS:**

At any time, prior to the date for submission of bids, the RAILTEL may, for any reason whether suo-moto or in response to clarification requested by a prospective Bidder, modify the bid documents by amendments.

**27 Purchaser's Right to accept any Bid and to reject any or all Bids**

The purchaser reserves the right to accept or reject any Bid and to annul the bidding process and reject all bids, at any time prior to award of contract without any reason whatsoever and without thereby incurring any liability to the affected bidder or bidders on the grounds for the Purchaser's action.

- Note:**
- 1) The bidder is required to give acceptance of all the clauses of **GeM bid, ATC** and RailTel's Bid Specific **ATC** document. Any deviation/ non-acceptance may lead to rejection of the bid.
  - 2) Information to Bidder viz. corrigendum /addendum/ amendments etc. for this bid shall be posted on [www.railtelindia.com](http://www.railtelindia.com) and GeM only.
  - 3) This bid is governed by the Specific Additional Terms & Conditions and General Terms & Conditions laid down by the GeM against **GeM Bid No: GEM/2026/B/7420894**
  - 4) After the opening of the technical bid, no correspondence or submission of documents initiated by the Bidder shall be entertained. However, the Purchaser reserves the right to seek clarifications in writing from the Bidder, if deemed necessary. Such clarifications must be submitted by the Bidder within the specified target date. Only the clarifications submitted as requested by the Purchaser and within the stipulated timeframe shall be considered for evaluation.
  - 5) In case, if any contradiction between GeM Bid, Additional Terms & Conditions, RailTel's Bid Specific Additional Terms & Conditions and General Terms & Conditions, **RailTel's Bid Specific Additional Terms & Conditions will prevail.**

**Annexure-I****Technical Specification**

The equipment to be supplied shall meet the following requirements:

i. **Service Life:**

All electronic products (except SOR Item Nos. 3, 5 & 6) shall have a minimum service life of 08 years from the date of delivery.

Electronic products covered under SOR Item Nos. 3, 5 & 6 shall have a minimum service life of 05 years from the date of delivery.

An OEM certificate/undertaking in this regard shall be submitted along with the bid.

ii. **Technical Compliance:**

The equipment shall be equipped with necessary hardware and software to comply with all specified requirements and support the required features.

iii. **Warranty:**

Back-to-back warranty from the respective OEM shall be provided for both hardware and software. An OEM certificate/undertaking in this regard shall be submitted along with the bid.

iv. **Service Support:**

The OEM shall have service centres at a minimum of **two locations in major cities in India**.

v. **Certification:**

UL, CE, and FCC certifications are not mandatory for PMA. However, the bidder shall submit an OEM certificate confirming that the offered products are equivalent to UL, CE, and FCC standards and comply with all applicable specifications.

vi. **TTP Compliance:**

Equipment covered under SOR Items 1 to 12 shall be sourced only from Trusted Sources and must be listed as Trusted Products on the Trusted Telecom Portal (TTP).

<b>S N</b>	<b>Description of Item</b>	<b>Unit</b>	<b>Quantity</b>
1	Router Type I as per Technical specification	Nos	4
2	Router Type II as per Technical specification	Nos	21
3	Router Type IV as per Technical specification	Nos	33
4	Router Type V as per Technical specification	Nos	2
5	Router Type VII as per Technical specification	Nos	1

S N	Description of Item	Unit	Quantity
6	Router Type VIII as per Technical specification	Nos	4
7	Router Type IX as per Technical specification	Nos	1
8	Router Type X as per Technical specification	Nos	2
9	Router Type XI as per Technical specification	Nos	1
10	Switch Type V as per Technical specification	Nos	8
11	Switch Type VI as per Technical specification	Nos	136
12	Switch Type VII as per Technical specification	Nos	28
13	SFP 1G 10 KM BIDI as per Technical specification	Nos	4
14	SFP 1G 20 KM BIDI as per Technical specification	Nos	300
15	SFP 1G 40 KM BIDI as per Technical specification	Nos	95
16	SFP 1G 120 KM BIDI as per Technical specification	Nos	4
17	SFP+ 10G 40 KM BIDI as per Technical specification	Nos	123
18	SFP+ 10G 80 KM BIDI as per Technical specification	Nos	20
19	SFP 1G 10 KM Dual Fiber as per Technical specification	Nos	34
20	SFP+ 10G 10 KM Dual Fiber as per Technical specification	Nos	6
21	SFP+ 10G 80 KM Dual Fiber as per Technical specification	Nos	20
22	QSFP28 LR4 as per Technical specification	Nos	22
23	SFP-1x GigE Electrical (1000 Base TX) as per Technical specification	Nos	38
24	2*12F SC type FMS as per Technical Specifications	Nos	1
25	CAT 6A Cable (SF/UTP) as per Technical specification	Box	14

**SOR item 1: Router Type I Technical Specifications**

S N	Description	Compliance
1	a) The router should have minimum 4x100G QSFP28 and 8x10G SFP+ optical Interfaces Day one.	
	b) Router should have redundant power supply unit, Fan Trays unit and fixing arrangement in 19" width rack.	
	c) Router should use maximum 1U rack space in 19" width rack.	
2	The Router should support at least 230 Gbps (Full Duplex) throughput	
3	The router should support the following feature scale from the day one:-	

S N	Description	Compliance
	a) MAC Table Size (64K)	
	b) IPv4 RIB/FIB (1M/128k)	
	c) IPv6 RIB/FIB (512k/32k)	
	d) MPLS Labels(32K)	
	e) Label Stack (5)	
	f) Packet Forwarding Rate (300 Mpps)	
	g) L3VPN (1000)	
	h) L2VPN (1K)	
4	Router can be of either modular/fixed type and shall have modular Operating system where it shall support individual restart of critical processes without affecting other processes or rebooting the entire operating system.	
5	All 10G interfaces shall be of SFP+ type and shall support LR/ER/ZR standards for all OEM vendors. Use of third party optics should not be locked for all interfaces.	
6	Router shall have option checking configuration before committing and option of rolling back to at least five configurations.	
7	Router should have redundant DC with the operating range of -40 to -72 VDC	
8	Digital Optical Monitoring (DOM) should be supported, optics information retrievable including RX/TX-power, threshold-monitoring/alarms, inventory.	
9	It shall support role based privileges for the system access and radius authentication for the System admin.	
10	The router should have a Console or Out-of-band Management.	
11	Alerts for environmental or other hardware based alarms should be visibly implemented on the chassis.	
12	The router should have mechanism for DDoS attack prevention	
13	The router should be IPv6 ready & support IPv4 to IPv6 transition technologies	
14	The router should support filtering based on different parameters like: srcip, dstip, src port, dst port, protocol etc	
15	The router should support IP SLA or RPM (or equivalent) for performance measurements, it should also support monitoring of IP SLA/RPM (or equivalent) probes using SNMP polling (OEM has to provide SNMP MIB information)	
16	Shall support QoS, option of traffic shaping per Interface based.	
17	Shall support at least 8 Queues per port and 3K queues per system	
18	Shall support following class of service features:	
	a) Classification, policing, marking, shaping, filtering	

S N	Description	Compliance
	b) Manage congestion using a weighted random early detection (WRED) algorithm	
	c) Single Rate Three Color Policer RFC 2697	
	d) RFC 2698, A Two Rate Three Color Policer	
	e) Round Robin, WFQ, CBWFQ scheduling algorithms	
19	The router shall support traffic interface mirroring in both ingress & egress directions for both IPv4 & Ipv6	
20	The router shall support provision for event based scripts that shall be capable of performing actions based on certain triggers	
21	The router shall support aggregated Ethernet and bundle upto 16 links.	
22	Shall support following MPLS features	
	a) LDP and RSVP signalling	
	b) The router should be able to do load-balancing over multiple equal cost MPLS LSP	
	c) MPLS Ping, MPLS Trace Route	
	d) Fast Reroute Extensions to RSVP-TE for LSP Tunnels	
23	Shall support MPLS based VPN services	
	a) L3VPN, L2VPN & L2Circuits	
	b) Virtual Private LAN Service (VPLS)	
	c) Next Generation mVPN (P2MP) & mVPN (draft-rosen-vpn-mcast).	
	d) EVPN with VXLAN or Equivalent	
24	The router shall support the following routing features	
	a) BGPv4, BGP confederations and route reflector	
	b) OSPFv2 & OSPVv3	
	c) ISIS	
	d) IGMP v2/v3 & MLD	
	e) PIM-SM, PIM-SSM	
	f) VRRP	
25	Router shall support SNMP v2/v3 and NTP	
26	Shall support BFD for both single hop and multihop sessions	
27	Shall support the following OAM features and actions such as syslog/link down should be configurable on OAM event trigger:	
	802.3ah	

S N	Description	Compliance
	802.1ag	
	Y.1731	
28	Shall support Multi-chassis LAG or equivalent functionality	
29	Ipv6 Features	
	a) Ipv6 Ping	
	b) Ipv6 trace route	
	c) VRRPv3	
	d) Ipv6 CoS (classification & rewrite, scheduling based on TC )	
	e) Ipv6 ACL	
	f) 6PE and 6VPE	
30	Router should support Dual Image/Partition	
31	Router should support security features of Broadcast/Multicast/Unicast Storm control.	
32	Router should comply to following Temperature performance parameters: i. Operating Temperature: 5 to 40 degree C or better	
	Routers should support following Metro Ethernet Features:	
33	i. ITU-T G.8032 Ethernet Ring Protection designed for loop protection.	
	ii. Should support multiple Ring up to 8 ring (main and sub ring) protection failover with in 50 ms or ITU-T G.8032 v2.	
34	The Router shall be designed for continuous operations with dual fan system.	
35	The vendor shall state if it is a fan less architecture.	
36	Router should support CFM and LFM alarms.	
	a. The router should support telemetry based on push model for monitoring network devices	
	b. The router should support various software models/sensors for capturing different health parameters from the devices	
	c. The router should support sending telemetry data to multiple consumers simultaneously	
37	The device should comply to the following safety standards or Equivalent Indian Standard	
	a. EN 55022 Class A Emissions (Europe) or Equivalent Indian Standard	
	b. FCC Class A (USA) Radiated Emissions or Equivalent Indian Standard	
	c. UL 60950-1 Information Technology Equipment – Safety or Equivalent Indian Standard	
	d. EN 60825-1 Safety of Laser Products or Equivalent Indian Standard	

<b>S N</b>	<b>Description</b>	<b>Compliance</b>
	e. EN-61000-4-11 Voltage Dips and Sags or Equivalent Indian Standard	
	f. ETS-300386 Electromagnetic Compatibility Requirements or Equivalent Indian Standard	
	g. The device will conform to the following EN/IEC standard or any other equivalent Indian standard:	
	i. 61000-4-2 ESD	
	ii. 61000-4-3 Rdiated Immunity	
	iii. i61000-4-4 EFT	
	iv. 61000-4-5 Surge	
	v. 61000-4-6 Low Frequency Common Immunity	
38	The proposed router should be NEBS level 3 compliant or equivalent Indian standard if any.	
39	The operating system of the Routers category/series/family should be MEF-9/14 or CE(Carrier Ethernet) Certified/compliant or equivalent Indian Standard	
40	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.	
41	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 2: Router Type II Technical Specifications**

<b>SN</b>	<b>Description</b>	<b>Compliance</b>
1	The Router shall be designed for continuous operations. The bidder shall furnish the MTBF (Mean Time between Failures) and MTRR (Mean Time to Restore) and predicted and observed values along with calculations by manufacturer.	
2	In case of full system failure, Router shall maintain a trace area in the NVRAM, which would be used for analysis/ diagnosis of the problem.	
3	Router shall have built in power on diagnostics system to detect hardware failures.	
4	Should have DC power supply arrangement without any external adaptors with redundant power supply.	
5	Router shall have suitable Visual Indicators for diagnostics and healthy/ unhealthy status of ports & modules.	
6	Router shall have 8 Nos. of Gigabit SFP ports and 4 Nos. RJ45 1000 Base – TX / SFP Port with RJ-45 SFP and 4 Nos. of 10 Gigabit SFP+ ports complying to IEEE 802.3, IEEE 802.3u and 802.3ab standard, supporting half duplex mode, full duplex mode and auto negotiation on each port of 1G to optimize bandwidth.	
7	Router shall have minimum of 52 Gbps (full duplex) forwarding bandwidth at layer 2switching fabric.	
8	Router shall have a minimum of 16000 MAC address space.	

SN	Description	Compliance
9	Bidder to propose Router having Operating and Storage Temperature as per environmental requirement. However, the Router should be capable of working at temperature 0 to 45 degree (minimum).	
10	It should be possible for the Router to be mounted on a 19-Inch rack. All accessories required for this mounting should be supplied.	
11	Should support jumbo frame.	
12	<b>Shall have the following MPLS features:</b>	
	i. Shall support Static IPv4 and Ipv6 routing. It shall also support OSPFv2 and OSPFv3.	
	ii. Shall also support BGP and ISIS based routing.	
	iii. Shall also support MPLS with RSVP and LDP signaling. It shall support MPLSFRR and L3VRF with upto 128 VRF/L2VPN/VPLS	
	iv. Shall support a scale of 250 VLAN and shall support Ethernet OAM features like BFD, 802.3ah, 802.1ag and Y.1731	
	v. Shall support at least 10K MPLS labels.	
	vi. Shall support 16K for IPv4 routes and 4K for IPv6 routes.	
	vii. It shall support LSP ping and trace.	
	viii. It shall support 8 hardware queues per port and shall support ingress policing and egress shaping.	
	ix. Should support Segment routing, TI-LFA, R-LFA, MPLS-TE	
	x. Shall support MPLS based L3, L2 VPN & VPLS services.	
	xi. It shall also support SYNC Ethernet/ IEEE 1588V2 (PTP) and SNMPv3.	
	xii. Shall support remote telnet and SSH capabilities and it shall be possible to integrate with NMS system	
	xiii. Shall conform to UL 60950 or IEC 60950 Standards for safety requirements\ of IT Equipment.	
	xiv. Shall conform to EN55022 Class A/B or CISPR22 Class A/B or CE Class A/B for EMC for (Electro Magnetic Compatibility) or latest.	
	13 Shall have the following features. All software's/hardware's/License required for this must be supplied along with the Router.	
	i. Link Aggregation Control (LCAP) as per IEEE 802.3ad	
	ii. Support for IEEE 802.1Q VLAN on all ports.	
	iii. Support for minimum 256 VLANs.	
	iv. Support for IEEE 802.1 D spanning tree protocol / 802.1 s MSTP	

SN	Description	Compliance
v.	Support for IEEE 802.1 s MSTP	
vi.	Support Dynamic Host Configuration Protocol (DHCP).	
vii.	Support Auto –MDIX (Media Dependent Interface Cross over)	
viii.	Support Inter VLAN IP routing for full layer -3 routing.	
ix.	Support for IPv6	
x.	Support Strict Priority Queuing	
xi.	Support Network Time Protocol (NTP)/ Simple Network Time Protocol (SNTP) based.	
xii.	RFC 1305/ 2030 for synchronization of date & time from the Central NTP Server.	
xiii.	Support RADIUS protocol for console access restriction and authentication as per RFC 2138.	
xiv.	Support 4 group of embedded RMON (history, static's and alarms). or advanced level monitoring like Performance monitoring, Statistics, Alarm logging and event management, Telemetry and SNMP Polling of data	
xv.	Support multiple privilege level to provide different level of access on console port and telnet sessions	
xvi.	Support classification and scheduling as per IEEE 802.1P on all ports.	
xvii.	Support Port Spanning functionally for measurements using a networks analyzer.	
xviii.	Support all the standard MIBs (MIB-I&II).	
xix.	Support for console port Interface for configuration and diagnostics purposes.	
xx.	Support Port Spanning functionally for measurements using a networks analyzer.	
xxi.	ITU-T G.8032 Ethernet Ring Protection designed for loop protection and fast convergence times (sub 50 ms) in ring topologies	
xxii.	Should support multiple Ring up to 8 ring (Main and Sub Ring) protection failover within 50 ms (up to 10 Router in ring) or ITU-T G.8032 v2 (Confirmed roadmap within a year time is also acceptable for ITU-T G.8032 v2 with no additional cost to RailTel).	
xxiii.	Should support Optical Transceiver Digital Diagnostic Monitoring.	
xxiv.	Priority queues: Eight hardware-based queues per port for flexible QoS management	
xxv.	Traffic prioritization: Flow-based QoS with internal and external (a.k.a., remarking) prioritization	

SN	Description	Compliance
	xxvi. Bandwidth management: Flow-based bandwidth management, ingress rate limiting; egress rate shaping per port.	
	xxvii. Queue management: Configurable scheduling algorithms — Strict Priority Queuing (SPQ), Weighted Round Robin(WRR) and Deficit Round Robin (DRR) or better. Rack Mountable clamps for standard 19 inch Rack for each item.	
	xxviii. The following Metro Ethernet features should support:	
	1. IEEE 802.1ad Provider Bridge.	
	2. Transparent LAN Services with Service VLAN (SVLAN) and Customer VLAN (CVLAN) concept.	
	3. CVLAN to SVLAN translation and mapping	
	4. IEEE 802.1ag Ethernet OAM: Connectivity Fault Management (Support 32 MEPs).	
	5. Ethernet OAM compliant with IEEE 802.3ah.	
	6. ITU-T G.8032 Ethernet Ring Protection designed for loop protection and fast convergence times (sub 50 ms) in ring topologies	
	7. Should support Optical Transceiver Digital Diagnostic Monitoring.	
	8. L2 Protocol Tunneling.	
14	Router shall have support of following Standards:	
	i. IEEE 802.1D (STP) / 802.1 s MSTP	
	ii. IEEE 802.1p (CoS)	
	iii. IEEE 802.1Q (VLANs)	
	iv. IEEE 802.1ag (Connectivity Fault Management)	
	v. IEEE 802.1s (MSTP)	
	vi. IEEE 802.3z (Gigabit Ethernet)	
	vii. IEEE 802.3ab (1000Base-T)	
	viii. IEEE 802.3ac (VLAN Tagging)	
	ix. IEEE 802.3ad (Link Aggregation)	
	x. IEEE 802.3ae (10 Gigabit Ethernet)	
	xi. IEEE 802.3ah	
	xii. ITU-T G.8032/Y.1344 2010: Ethernet Ring	
15	Router shall have the following Certifications:	

SN	Description	Compliance
	i. The model of the Routers series shall have MEF- (9 & 14)/ CE2.0 or IEEE standards or higher certification from authorized agencies.	
	ii. CE / FCC	
	iii. Shall conform to UL 60950 or IEC 60950 or EN 60950 Standards for safety requirements of IT Equipment.	
	iv. Shall Confirm relevant standards of EN/CE/FCC for EMC for (Electro Magnetic Compatibility).	
16	OEM should have a valid ISO 9001 & ISO 14001 certification on the date of opening of bid	
17	IPv6 feature should be ready from day 1.	
18	Router/ Router OS/Router Series should be tested and certified for EAL 2 / NDPP (Network Device Protection Profile) or above under Common Criteria Program for security related functions or under Indian Common Criteria Certification Scheme (IC3S) by STQC, DEIT, Govt. of India.	
19	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.	
20	<b>On Site OEM Warranty (Year) - 3 years</b>	

### **SOR item 3: Router Type IV Technical Specifications**

SN	Description	Compliance
<b>1</b>	<b>Architecture:</b>	
1.1	Proposed Routers should support SDWAN ready	
1.2	The router should be a single box configuration for ease of management.	
1.3	It shall support hardware based VPN (3DES/ AES) Encryption, MD5, SHA, SHA-256	
1.4	The router shall support complete Firewall features.	
1.5	Router shall support minimum 100K IPv4 and 50K Ipv6 routes.	
1.6	The Router shall have enough "High-performance multicore processors capacity and 4 GB DRAM and 4GB Flash Memory from Day1. So as to efficiently meet all the functionalities laid down in the specifications.	
1.7	It shall have integrated USB port.	
1.8	It shall be supplied with necessary power cards, data cables, connectors, bracket accessories, wire managers and other appropriate accessories. Routers shall be capable of working with 110 – 240 Volts AC nominal at frequency 50 +/- 2 Hz.	
<b>2</b>	<b>Performance:</b>	

SN	Description	Compliance
2.1	It shall support high performance traffic forwarding with con-current features like firewall and encryption.	
2.2	Router shall support aggregate WAN throughput of 100 Mbps from Day-1 and IPSEC Throughput of 50 Mbps from Day-1	
2.3	It shall support variety of Ethernet Interfaces – 1 RJ45 GigE and 1 SFP GigE port & 4 port LAN 10/100/1000 Mbps port.	
2.4	It shall support other IP Services like GRE tunnelling, ACLs, IPSEC VPNs, Firewalling, NAT services.	
<b>3</b>	<b>High Availability:</b>	
3.1	It shall support non-stop forwarding for fast re-convergence of routing protocols.	
3.2	It shall support VRRP or equivalent	
<b>4</b>	<b>Protocol Support:</b>	
4.1	The router shall have routing protocols like IS-IS, RIP ver1 & RIP Ver.2, OSPF ver2, BGP4.	
4.2	It shall support multicast routing protocols IGMPv1/ v2/v3, PIM	
4.3	It shall support DHCP, Ipv6 QoS and Ipv6 Multicast, OSPFv3	
<b>5</b>	<b>Quality of Service (QoS) Features:</b>	
5.1	The router shall support the following:	
5.1.1	Classification and Marking: Policy based routing, IP Precedence, DSCP.	
5.1.2	Congestion Management: WRED, Priority queuing, Class based weighted fair queuing.	
5.1.3	Traffic Shaping and Policing for QoS	
<b>6</b>	<b>Security Features:</b>	
6.1	The router shall support GRE Tunneling & NAT Services.	
6.2	It shall support MD-5 route authentication	
6.3	It shall support AAA support using Radius.	
6.4	It shall support DoS prevention	
6.5	It shall support IP Access list to limit Telnet and SNMP access to router.	
6.6	It shall support multiple privilege level authentications for console and telnet access through Local database or through an external AAA Server.	
6.7	It shall support IEEE 802.1x support for MAC address authentication.	
<b>7</b>	<b>Debug, Alarms &amp; Diagnostics:</b>	
7.1	The router shall have display of input and output error statistics on all interfaces.	

SN	Description	Compliance
7.2	It shall have display of dynamic ARP table.	
7.3	Trace-route and Ping shall be available.	
<b>8</b>	<b>It should support Network Time Protocol</b>	
<b>9</b>	<b>Management:</b>	
9.1	The router shall have support for CLI, Telnet and SNMPv3.	
9.2	It shall support Secure Shell for secure connectivity.	
9.3	It shall have to have dedicated console for Local management/ login through USB port/ RJ45 port/ serial	
9.4	Event and System logging: Event and system history logging functions shall be available. The Router shall generate system alarms on events. Facility to put selective logging of events onto a separate hardware where the analysis of log shall be available.	
	<b>Certification Requirements:</b>	
<b>10</b>	“Router/ Router OS should be tested and certified for EAL 2/ NDPP (Network Device Protection Profile) or above under Common Criteria Program for security related functions or under Indian Common Criteria Certification Scheme (IC3S) by STQC, DEIT, Govt. of India.”	
11	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.	
12	<b>On Site OEM Warranty (Year) - 3 years</b>	

#### **SOR item 4: Router Type V Technical Specifications**

SN	Specifications	Requirements	PQC/ Optional	Compliance
1	Router should support 8 minimum 1G/ 10G SFP+ ports from day one (Including SFP of LR type 10G SFP+ Dual Fiber 1310).	8	PQC	
2	Router should have support for 100G Interfaces (Including XFP/ SFP/ QSFP).	4	PQC	
3	Total throughput (Full duplex).	Minimum 280 Gbps	PQC	
4	MAC Table Size	64K	PQC	
5	IPv4 RIB/ FIB	Minimum 1M/128K	PQC	
6	IPv6 RIB/ FIB	Minimum 512K/32K	PQC	
7	MPLS Labels	Minimum 32K	PQC	
8	Label Stack	Minimum 5	PQC	

SN	Specifications	Requirements	PQC/ Optional	Compliance
9	L2/ L3 VPN VRF	Minimum L2 1000, Minimum L3 256	PQC	
10	Packet Forwarding Rate (IMIX traffic) in Mpps	Minimum 300	PQC	
11	Support of number of queues per system	Minimum 4K	PQC	
12	Number of VLAN support	1000	PQC	
13	Operating Temperature	(0 to 40 degree C or better)	PQC	
14	Storage Temperature	(-10 to 60 degree C or better)	PQC	
15	Router can be of either modular/ fixed type and shall have modular Operating system where it shall support individual restart of critical processes without affecting other processes or rebooting the entire operating system.		PQC	
16	All 10G interfaces should support LR, ER and ZR		PQC	
17	Router shall have option checking configuration before committing and option of rolling back to at least five configurations.		PQC	
18	Router should have redundant DC (with the operating range of -40 to -72 VDC) power supplies		PQC	
19	Digital Optical Monitoring (DOM) should be supported, optics information retrievable including RX/ TX-power, threshold monitoring/ alarming, inventory.		PQC	
20	It shall support role based privileges for the system access and radius authentication for the System admin.		PQC	
21	The router should have a Console or Out-of-band Management.		PQC	
22	Alerts for environmental or other hardware based alarms should be visibly implemented on the chassis.		PQC	
23	All interfaces shall support services like L2VPN, L3VPN, VPLS and multicast VPN for both IPv4 and IPv6		PQC	
24	The router should have mechanism to protect itself from DDoS attack.		PQC	
25	The router should be IPv6 ready from day one.		PQC	

SN	Specifications	Requirements	PQC/ Optional	Compliance
26	The router should support filtering based on different parameters like: src ip, dst ip, src port, dst port, protocol etc		PQC	
27	The router should support Netflow, Jflow or equivalent		PQC	
28	The router should support IP SLA or RPM (or equivalent) for performance measurements, it should also support monitoring of IP SLA/ RPM (or equivalent) probes using SNMP polling (OEM has to provide SNMP MIB information)		PQC	
29	Shall support QoS, option of traffic shaping per Interface based.		PQC	
30	Shall support following class of service features:		PQC	
	a) Classification, policing, marking, shaping, filtering			
	b) Manage congestion using a weighted random early detection (WRED) algorithm			
	c) RFC 2474, Definition of the Differentiated Services Field in the IPv4 and IPv6 Headers			
	d) Single Rate Three Color Policer RFC 2697			
	e) Congestion Management through CBWFQ, Round- Robin or equivalent, WFQ or equivalent			
	f) RFC 2597, Assured Forwarding PHB Group			
	g) RFC 2598, An Expedited Forwarding PHB			
	h) Router should be able to classify based on 802.1 ad, 802.1 p, EXP and DSCP bits			
	i) The router shall support traffic interface mirroring in both ingress & egress directions for both IPv4 & IPv6			
31	The router shall support provision for event based scripts that shall be capable of performing actions based on certain triggers		PQC	
32	The router shall support aggregated Ethernet and it shall be possible to bundle Upto 16 links.		PQC	
33	Shall support following MPLS features		PQC	
	a) LDP and RSVP signalling			
	b) RFC 5036, LDP Specification			
	c) RFC 3212 OR Constraint-Based LSP Setup using LDP			
	d) RFC 3215, LDP State Machine			

SN	Specifications	Requirements	PQC/ Optional	Compliance
	e) RFC 3478, Graceful Restart Mechanism for LDP			
	f) RFC 2858, Multiprotocol Extensions for BGP-4			
	g) RFC 3063, MPLS Loop Prevention Mechanism			
	h) RFC 3031, Multiprotocol Label Switching Architecture			
	i) RFC 3032, MPLS Label Stack Encoding			
	j) The router should be able to do load-balancing over multiple equal cost MPLS LSP			
34	The Router shall support MPLS Fast Reroute both link protection and Node protection.		PQC	
35	MPLS Ping, MPLS Trace Route		PQC	
36	Fast Reroute Extensions to RSVP-TE for LSP Tunnels		PQC	
37	The router shall Support of Sync-E & PTP technology (License price to be quoted separately)		PQC	
38	Shall support MPLS based VPN services		PQC	
	a) L3VPN, L2VPN (Kompella BGP/ Martini LDP)			
	b) Internet draft, draft-ietf-l2vpn-vpls-bgp-08.txt, Virtual Private LAN Service (VPLS) Using BGP for Auto-discovery and Signaling			
	c) RFC 4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling			
	d) Next Generation mVPN (P2MP) based on (Draft-ietf-13vpn-2547bis-mcast-01.txt) & mVPN (draft-rosen-vpn-mcast).			
39	The router shall support the following routing features		PQC	
	a) BGPv4, BGP confederations and route reflector			
	b) Dynamic Host Configuration Protocol (DHCP)			
	c) RFC 3101, The OSPF NSSA Option			
	d) RFC 2328, OSPF Version 2			
	e) RFC 3623, OSPF Graceful Restart			
	f) RFC 3630, Traffic Engineering (TE) Extensions to OSPF Version 2			

SN	Specifications	Requirements	PQC/ Optional	Compliance
	g) RFC 1195, Use of OSI IS-IS for Routing in TCP/ IP and Dual Environments			
	h) RFC 2104, HMAC: Keyed-Hashing for Message Authentication			
	i) RFC 2973, IS-IS Mesh Groups			
	j) RFC 3358, Optional Checksums in IS-IS			
	k) RFC 3359, Reserved Type, Length and Value (TLV) Code points in IS-IS			
	l) RFC 3373, Three-Way Handshake for IS-IS Point- to-Point Adjacencies			
	m) RFC 5305, IS-IS Extensions for Traffic Engineering			
	n) RFC 3847, Restart Signalling for IS-IS			
	o) RFC 3590, Source Address Selection for Multicast Listener Discovery Protocol			
	p) IGMP v2 and v3 as described in RFC 2236 and RFC 3376 with IGMP Routing Policies to filter IGMP requests.			
40	The router shall support Virtual Router Redundancy Protocol (VRRP) as per IETF RFC 3768		PQC	
41	Router shall support SNMP v2/v3 and NTP		PQC	
42	Shall support BFD for both single hop and multihop sessions		PQC	
43	Shall support the following OAM features and actions such as syslog/ link down should be configurable on OAM event trigger:		PQC	
	a) 802.3ah			
	b) 802.1ag			
	c) Y.1731			
44	Shall support Multi-chassis LAG or equivalent features			
45	IPv6 Features		PQC	
	a) IPv6 Ping			
	b) IPv6 trace route			
	c) OSPF v3			
	d) IS-IS			
	e) VRRPv3			

SN	Specifications	Requirements	PQC/ Optional	Compliance
	f) IPv6 CoS (classification & rewrite, scheduling based on TC)			
	g) IPv6 ACL			
	h) 6PE and 6VPE			
46	Multicast Feature: It shall support following:		PQC	
	a) It shall support IGMP snooping v2/ v3			
	b) The router shall support PIM Sparse Mode, RFC 4601 (optional)			
	c) Rendezvous Point (RP) - ability to be configured as an RP			
	d) RFC 3569, Source Specific Multicast (SSM)			
	e) RFC 2365, Administratively Scoped IP Multicast			
	f) RFC 3446, Anycast Rendezvous Point (RP) Mechanism using Protocol Independent Multicast (PIM) and Multicast Source Discovery Protocol (MSDP).			
	g) RFC 3618, Multicast Source Discovery Protocol (MSDP).			
47	The proposed router should be NEBS level 3 compliant. NEBS Certification is not required for PMA. However OEM has to produce certificate from standard lab approved or authorized by Govt. of India that the supplied Products are equivalent to NEBS and meet all standard and specification of NEBS		PQC	
48	The device should comply to the following safety standards		PQC	
	a) EN 55022 Class A Emissions (Europe)			
	b) FCC Class A (USA) Radiated Emissions			
	c) UL 60950-1 Information Technology Equipment – Safety			
	d) EN 60825-1 Safety of Laser Products			
	e) EN-61000-4-11 Voltage Dips and Sags			
	f) ETS-300386 Electromagnetic Compatibility Requirements			
	g) The device will conform to the following EN/IEC standard:			
	i. 61000-4-2 – ESD			
	ii. 1000-4-3 Radiated Immunity			

SN	Specifications	Requirements	PQC/ Optional	Compliance
	iii. 61000-4-4 – EFT			
	iv. 61000-4-5 - Surge			
	v. 61000-4-6 – Low Frequency common immunity			
49	The offered devices must support following functionalities to support 3rd party SDN (in future)			
	a) The router should support RFC 6020, YANG - A Data Modelling Language for the Network Configuration		PQC	
	b) Protocol (NETCONF)		PQC	
	c) The solution should support the network configuration protocol (NETCONF) that provides mechanisms to install, manipulate, and delete the configuration of network devices, RFC 6241		PQC	
	d) The router should be able to act as Path computation client in the PCE architecture defined in RFC 4655.		PQC	
	e) The router should support PCECP as defined in RFC5440.		PQC	
	f) The router should support BGP link-state (BGP- LS), RFC 4655		PQC	
	g) <b>The router should support SPRING/ Segment routing</b>		Optional	
50	Devices shall support following for Provisioning			
	a) Use NETCONF (RFC 6241, RFC 6242)		PQC	
	b) REST/ NETCONF/ gRPC based CRUD operations for configuration and management.		PQC	
51	The offered devices must support API/ NBI for auto discovery of Services and Physical & Logical Topology		PQC	
52	TELEMETRY Function: It shall support following:			
	a) The router should support telemetry based on push model for monitoring network devices		PQC	
	b) The router should support various software models/ sensors for capturing different health parameters from the devices		PQC	

SN	Specifications	Requirements	PQC/ Optional	Compliance
	c) The router should support sending telemetry data to multiple consumers simultaneously		PQC	
	d) The router shall support GPB/ GRPC/ KAFKA encoding for telemetry data		PQC	
	e) The software model/ sensors should be based on either yang, xml or open config		PQC	
	f) The solution shall use either UDP or GRPC for transport of telemetry data		PQC	
	g) The system should support streaming granularity of atleast 10 sec		PQC	
	h) The router shall have the ability to interact with open standard based tools		PQC	
	i) The system should support REST API/ gRPC/ Netconf for communication with third party tools and applications		PQC	
	j) Enabling telemetry should not have any adverse impact on the performance of the device/ router		PQC	
	k) Some of the streaming models/ sensors the router should support are:		PQC	
	<b><u>System</u></b>			
	Chassis Environment		PQC	
	Line card utilization (memory, processor, QoS, Temp, Port utilization), errors counters		PQC	
	Controller Card sensors (memory, CPU, Temp etc)		PQC	
	Fabric statistics		Optional	
	ARP table state		Optional	
	Routing prefix information		Optional	
	<b><u>Interface</u></b>			
	Interface statistics (Physical and logical interfaces)		PQC	
	Interface optical diagnostic		Optional	
	Congestion and latency		Optional	
	Filter statistics		Optional	
	Protocol		Optional	
	BGP peer information		Optional	

SN	Specifications	Requirements	PQC/ Optional	Compliance
	ISIS State, Interface, Adjacency statistics, LSDB		Optional	
	ISIS SPRING / Segment Routing Statistics		Optional	
	RSVP Interface Statistics		PQC	
	LSP statistics		PQC	
	LSP Event Export, Experimental		PQC	
	IP SLA/RPM (or equivalent) reporting		PQC	
	Segment Routing statistics		PQC	
	DHCP statistics		Optional	
53	Router should support Dual Image/ Partition with USB flash drive booting option for OS recovery		PQC	
54	Router should support jumbo frame.		PQC	
55	Router should support port mirroring		PQC	
56	Router should support security features of Broadcast/ Multicast/ Unicast Storm control.		PQC	
57	Router should comply to following Temperature performance parameters:		PQC	
	i. Operating Temperature: -5 to 55 degree C or better			
	ii. Storage Temperature : -10 to 60 degree C or better			
58	Routers should support following Metro Ethernet Features:		PQC	
	i. ITU-T G.8032 Ethernet Ring Protection designed for loop protection or alternate mechanism to achieve ring protection in less than 50 ms			
	ii. Should support multiple Ring up to 8 ring (main and sub ring) protection failover within 50 ms or ITU-T G.8032 v2.			
59	The operating system of the Routers category/ series/family should be MEF 9/14 or CE (Carrier Ethernet) Certified.		PQC	
60	The Router shall be designed for continuous operations with dual fan system.		PQC	
61	Router should support CFM and LFM alarms.		PQC	
62	Shall support HQoS, option of traffic shaping per VLAN based.		PQC	

SN	Specifications	Requirements	PQC/ Optional	Compliance
	i. Shall support at least 4K Queues.			
	ii. Per-VLAN policing.			
	iii. Per-VLAN rewrite			
	iv. Per-VLAN two-rate tri-color marking.			
	v. Per-VLAN classification			
	vi. Per-VLAN filtering			
63	Support for P and PE router functionality for MPLS on the same router simultaneously and on all the interfaces.		PQC	
64	Router shall support E-Line or E-LAN MEF standards.		PQC	
65	Routers should be rack mountable to fit into a standard 19-inch rack		PQC	
66	OEM shall ensure that use of third-party optics shall not be explicitly blocked on the Router. Router must support all MSA complied Optics available in market.		PQC	
67	Segment Routing			
	i. Router should be able to support SR standards on IPv6 whenever it is firmed upto without any cost to RCIL.		PQC	
	ii. The router should support SR-MPLS data plane and protocols OSPF,IS-IS and BGP Segment routing extensions		PQC	
	iii. Controller instantiated SR Policy (PCEP, BGP) and SR policy based on demand next hop		Optional	
	iv. Router should have capability to calculate Bandwidth based path using centralized controller.		PQC	
	v. Shall support SR and MPLS (LDP) Interworking Mapping Server		PQC	
	vi. The router shall support dynamic point-to-point interface latency performance measurement. The measurement must be integrated in the IGP and BGP LS for SDN Controller Analysis.		Optional	
	vii. Label distribution protocol and segment routing should coexist and there should support option to prefer LDP over segment routing.		PQC	

SN	Specifications	Requirements	PQC/ Optional	Compliance
68	EVPN Features			
	i. Router should have support of Ethernet VPN (EVPN with single homing, multi homing)		PQC	
	ii. Router should have support of following features on EVPN: EVPN-IRB, EVPN VPWS, EVPN VPWS Preferred Path over SR-TE Policy		Optional	
69	Router to support GRE tunnels (RFC 2784).		PQC	
70	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.			
71	<b>On Site OEM Warranty (Year) - 3 years</b>			

**SOR item 5: Router Type VII Technical Specifications**

SN	Technical Specifications	Compliance
1	<b>General requirements</b>	
2	Router should have a modular architecture	
3	Minimal performance degradation when running advanced services such as stateful firewall, NAT, and IPSec.	
4	<b>Hardware and interface requirements</b>	
5	Router should have atleast 4 x 10/100/1000 and 2 x 1G SFP ports supporting both LAN and WAN protocols.	
6	Router should have 4GB RAM and 4GB internal Flash	
7	<b>Performance requirements</b>	
8	The Router should have a minimum IMIX Routing performance of 400Mbps	
9	The Router should have a minimum IPSec performance of 200Mbps	
10	<b>Quality of Service (QoS ) requirements</b>	
11	Routers should support 802.1p, DSCP and EXP	
12	Routers should support Marking, policing, and shaping	
13	Routers should support congestion management features like WRED	
14	<b>Routing protocol support</b>	

<b>SN</b>	<b>Technical Specifications</b>	<b>Compliance</b>
15	The Router should support IPv4 and IPv6 routing	
16	The Router should support Static Routing, RIP, VRRP, OSPF, IS-IS and BGP	
17	The Router should support Policy Based Routing	
18	<b>Multicast Features</b>	
19	IGMP v1/v2/v3 and PIM-SM, Source Specific Multicast (SSM)	
20	<b>MPLS Features</b>	
21	Layer 2 and Layer 3 VPN, LDP, RSVP and mVPN/ NGMVPN	
22	<b>Security features (From Day 1)</b>	
23	Routers should support AAA using RADIUS or TACACS	
24	Routers should support Packet Filters/ACL	
25	Routers should have Stateful Firewalling	
26	Routers should support 100 IPsec Tunnels	
27	Routers should have DES (56-bit), 3DES (168-bit), AES (256-bit) encryption and MD5 and SHA-1 authentication	
28	Routers should have role based access mechanisms.	
29	Routers should support Network address translation (NAT).	
30	<b>Management and Troubleshooting</b>	
31	Router should have Console, Telnet and Web for management	
32	Routers should support Software upgrades through Web	
33	Routers should support SNMPv2 and SNMPv3	
34	IPSLA/ Real-Time Performance Monitor	
35	<b>Certifications</b>	
36	Safety certifications UL 60950-1	
37	EMC certifications FCC Class A	
38	The router should be EAL 3/NDPP/ NDcPP certified under Common Criteria.	
39	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.	
40	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 6: Router Type VIII Technical Specifications**

<b>SN</b>	<b>Description</b>	<b>Compliance</b>
<b>1</b>	<b>Architecture:</b>	
1.1	Proposed Routers should support SDWAN ready	
1.2	The router should be a single box configuration for ease of management.	
1.3	It shall support hardware based VPN (3DES/AES) Encryption, MD5, SHA, SHA-256	
1.4	The router shall support complete Firewall features.	
1.5	Router shall support minimum 200K IPv4 and 50K Ipv6 routes.	
1.6	The Router shall have enough "High-performance multicore processors capacity and 4 GB DRAM and 4GB Flash Memory from Day1. So as to efficiently meet all the functionalities laid down in the specifications.	
1.7	It shall have integrated USB port.	
1.8	It shall be supplied with necessary power cards, data cables, connectors, bracket accessories, wire managers and other appropriate accessories. Routers shall be capable of working with 110 – 240 Volts AC nominal at frequency 50 +/- 2 Hz.	
<b>2</b>	<b>Performance:</b>	
2.1	It shall support high performance traffic forwarding with con-current features like firewall and encryption	
2.2	Router shall support aggregate WAN throughput of 200Mbps from Day-1 and IPSEC Throughput of 50 Mbps from Day-1.	
2.3	It shall support variety of Ethernet Interfaces – 2 SFP GigE ports & 4 port LAN 10/100/1000 Mbps port.	
2.4	It shall support other IP Services like GRE tunnelling, ACLs, IPSEC VPNs, Firewalling, NAT services.	
<b>3</b>	<b>High Availability:</b>	
3.1	It shall support non-stop forwarding for fast re-convergence of routing protocols.	
3.2	It shall support VRRP or equivalent	
<b>4</b>	<b>Protocol Support:</b>	
4.1	The router shall have routing protocols like IS-IS, RIP ver1 & RIP Ver.2, OSPF ver2, BGP4.	
4.2	It shall support multicast routing protocols IGMPv1/ v2/v3, PIM	
4.3	It shall support DHCP, Ipv6 QoS and Ipv6 Multicast, OSPFv3	
<b>5</b>	<b>Quality of Service (QoS) Features:</b>	
5.1	The router shall support the following:	
5.1.1	Classification and Marking: Policy based routing, IP Precedence, DSCP.	
5.12	Congestion Management: WRED, Priority queuing, Class based weighted fair queuing.	

SN	Description	Compliance
5.1.3	Traffic Shaping and Policing for QoS	
<b>6</b>	<b>Security Features:</b>	
6.1	The router shall support GRE Tunneling & NAT Services.	
6.2	It shall support MD-5 route authentication	
6.3	It shall support AAA support using Radius.	
6.4	It shall support DoS prevention	
6.5	It shall support IP Access list to limit Telnet and SNMP access to router.	
6.6	It shall support multiple privilege level authentications for console and telnet access through Local database or through an external AAA Server.	
6.7	It shall support IEEE 802.1x support for MAC address authentication.	
<b>7</b>	<b>Debug, Alarms &amp; Diagnostics:</b>	
7.1	The router shall have display of input and output error statistics on all interfaces.	
7.2	It shall have display of dynamic ARP table.	
7.3	Trace-route and Ping shall be available.	
<b>8</b>	<b>It should support Network Time Protocol</b>	
<b>9</b>	<b>Management:</b>	
9.1	The router shall have support for CLI, Telnet and SNMPv3.	
9.2	It shall support Secure Shell for secure connectivity.	
9.3	It shall have to have dedicated console for Local management/ login through USB port/ RJ45 port / Serial	
9.4	Event and System logging: Event and system history logging functions shall be available. The Router shall generate system alarms on events. Facility to put selective logging of events onto a separate hardware where the analysis of log shall be available.	
<b>10</b>	<b>Certification Requirements:</b>	
	"Router/ Router OS should be tested and certified for EAL 2/ NDPP (Network Device Protection Profile) or above under Common Criteria Program for security related functions or under Indian Common Criteria Certification Scheme (IC3S) by STQC, DEIT, Govt. of India."	
11	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.	
12	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 7: Router Type IX Technical Specifications**

SN	Specification- Tier 3 Router	Requirements	PQC/ Optional	Compliance
1	The router should have 12 x 100G QSFP28 ports supporting LR, SR, ER and ZR optics			
2	The router should have BNG functionality by upgrading the Hardware/ License/ OS/ Optics. Two box solution separate for BNG and router solution can be provided and router should support required port capacity in addition to BNG connectivity from Day 1. BNG Hardware cost should be included in SOR in case of two box solution			
3	The router should have option for 4x400G and 4x100G by addition of hardware or license			
4	The router should have dual routing engines/route processors for control-level redundancy.			
5	The Router Hardware should support at least 3.2Tbps (Full Duplex) throughput rate.			
6	The router should support the following functionality from the day one:-			
	a) IPv4 RIB/FIB	10M / 4M		
	b) Ipv6 RIB/FIB	6M / 1M		
	c) MPLS Labels	64K		
	d) Label Stack	8		
	e) L2/L3 VPN	32 L3/L2 MPLS VPN		
	f) Packet Forwarding Rate	1Bpps or higher		
	g) Firewall Filters	8K		
	h) RSVP LSP ingress/transit	8K or more		
	i) Segment Routing IGP prefix Scale	48K		
7	Proposed Router can either be modular or fixed type.			
8	Router shall have option of checking configuration before committing and option of rolling back to at least five configurations			
9	Router should have redundant DC (with the operating range of -40 to -72 VDC) power supply.			

SN	Specification- Tier 3 Router	Requirements	PQC/ Optional	Compliance
10	Digital Optical Monitoring (DOM) should be supported, optics information retrievable including RX/ TX-power, threshold-monitoring/ alarming, inventory			
11	It shall support role-based privileges for the system access and RADIUS/ TACAS authentication for the System admin.			
12	The router should have a Console or Out-of-band Management.			
13	Alerts for environmental or other hardware-based alarms should be supported via SNMP			
14	All interfaces shall support services like L2VPN, L3VPN and multicast VPN (in future if required) for both Ipv4 and Ipv6			
15	Security:			
	a) The router should have mechanism to protect itself from DDoS attack.			
16	The router should be Ipv6 ready from day one.			
17	The router should support filtering based on different parameters like: src ip, s tip, src port, dst port, protocol etc			
18	The router should support IPFIX/ Netflow/ Jflow or equivalent if required by upgrading OS/License	Optional		
19	The router should support IP SLA or RPM (or equivalent) for performance measurements, it should also support monitoring of IP SLA/RPM (or equivalent) probes using SNMP polling (OEM has to provide SNMP MIB information) or through syslog			
20	Shall support QoS, option of traffic shaping per Interface based.			
21	Shall support following class of service features:			
	a) Classification, policing, marking, shaping, filtering			
	b) Manage congestion using a weighted random early detection (WRED) algorithm			
	c) RFC 2474, Definition of the Differentiated Services Field in the Ipv4 and Ipv6 Headers			
	d) RFC 2698, A Two Rate Three Color Policer			

SN	Specification- Tier 3 Router	Requirements	PQC/ Optional	Compliance
	e) Round Robin, WFQ, CBWFQ scheduling algorithms			
	f) Router should be able to classify based on 802.1 ad, 802.1 p, EXP and DSCP bits			
22	The router shall support traffic interface mirroring in both ingress & egress directions for both Ipv4 & Ipv6. It should also be able to mirror local and multicast traffic (in future if required).			
23	The router shall support provision for event based scripts that shall be capable of performing actions based on certain triggers			
24	The router shall support aggregated Ethernet and it shall be possible to bundle Upto 64 links			
25	Shall support following MPLS features			
	a) LDP and RSVP signaling			
	b) RFC 5036, LDP Specification			
	c) RFC 3478, Graceful Restart Mechanism for LDP			
	d) Support for MPLS Traffic engineering using RSVP-TE protocol mechanisms and compliance with RFC3209			
	e) RFC 3564 or IETF compliant Diffserv aware MPLS TE			
	f) RFC 4105 Support for Inter-Area TE			
	g) Support for P2MP LSPs and the ability to map native multicast traffic on the P2MP LSP Tunnels in future if required.	Optional		
	h) Support for P2MP LSPs for building a PIM free MVPN Core	Optional		
	i) Support for LFA and Ti-LFA			
	j) Support for FRR for P2MP LSPs in future if required.	Optional		
	k) Support for RSVP fast hellos			
	l) MPLS ping and traceroute			
	m) Fast Reroute Extensions to RSVP-TE for LSP Tunnels			
26	The router should be able to do load-balancing over multiple equal cost MPLS LSP			

SN	Specification- Tier 3 Router	Requirements	PQC/ Optional	Compliance
27	The Router shall support MPLS Fast Reroute both link protection and Node protection.			
28	Shall support MPLS based VPN services			
	a) L3VPN			
	b) L2VPN (Kompella BGP/ Martini LDP/EVPN-VPWS)			
	c) NG-MVPN (P2MP) in future if required			
29	The router shall support the following routing features			
	a) RFC compliant BGP v4			
	b) RFC7911 Advertisement of Multiple Paths in BGP			
	c) RFC2385 TCP MD5			
	d) RFC7752 BGP-LS			
	e) RFC8669 Segment Routing Prefix SID extensions for BGP			
	f) RFC8360 RPKI support			
	g) RFC1587/RFC3101			
	h) RFC2154 OSPF MD5			
	i) RFC2328 OSPF v2			
	j) RFC3623 Graceful OSPF Restart			
	k) RFC5340 OSPF v3			
	l) RFC2362 PIM SM			
	m) PIM DM/PIM- SSM			
	n) RFC 3630, Traffic Engineering (TE) Extensions to OSPF Version 2			
	o) RFC 5305, IS-IS Extensions for Traffic Engineering			
	p) RFC 3847, Restart Signaling for IS-IS			
	q) IGMP v2 and v3 as described in RFC 2236 and RFC 3376 with IGMP Routing Policies to filter IGMP requests.			
	r) Router shall support SNMP v2/v3 and NTP			
	s) Shall support BFD : single hop, multi-hop and micro BFD or equivalent features			

SN	Specification- Tier 3 Router	Requirements	PQC/ Optional	Compliance
	t) Router to support GRE tunnels (RFC 2784)	Optional		
30	Ipv6 Features :			
	a) Ipv6 Ping			
	b) Ipv6 trace route			
	c) OSPF v3			
	d) IS-IS			
	e) Ipv6 CoS (classification & rewrite, scheduling based on TC )			
	f) Ipv6 ACL			
	g) 6PE and 6VPE			
31	The proposed router should be NEBS level 3 compliant. NEBS Certification is not required for PMA. However, OEM has to produce certificate from standard lab approved or authorized by Govt. of India that the supplied Products are equivalent to NEBS and meet all standard and specification of NEBS.			
32	The device should comply to the following safety standards			
	a) EN 55022/EN55032 Class A Emissions (Europe)			
	b) FCC Class A (USA) Radiated Emissions			
	c) UL 60950-1 Information Technology Equipment – Safety			
	d) EN 60825-1 /EN60950-1 Safety of Laser Products			
33	The offered devices must support following functionalities to support 3 <sup>rd</sup> party SDN (in future)			
	a) The router should support RFC 6020, YANG – A Data Modeling Language for the Network Configuration			
	b) Protocol (NETCONF)			
	c) The solution should support the network configuration protocol (NETCONF) that provides mechanisms to install, manipulate, and delete the configuration of network devices, RFC 6241/RFC 4741			

SN	Specification- Tier 3 Router	Requirements	PQC/ Optional	Compliance
	d) The router should be able to act as Path computation client in the PCE architecture defined in RFC 4655.	Optional		
	e) The router should support PCECP as defined in RFC5440			
	f) The router should support BGP link-state (BGP-LS), RFC 4655			
	g) The router should support SPRING			
	h) The router should have support for NBI/API interfaces and protocols that would allow auto discovery of nodes, services, topology by NMS/EMS, Controller, Orchestration systems etc.			
34	TELEMETRY Function: It shall support following:			
	a) The router should support telemetry based on push model for monitoring network devices			
	b) The router should support various software models/sensors for capturing different health parameters from the devices			
	c) The router should support sending telemetry data to multiple consumers simultaneously			
	d) The router shall support GPB/GRPC/KAFKA encoding for telemetry data	Optional		
	e) The software model/sensors should be based on either yang, xml or open config			
	f) The solution shall use either UDP or GRPC for transport of telemetry data			
	g) The system should support streaming granularity of at least 10 sec			
	h) The router shall have the ability to interact with open standard based tools			
	i) The system should support REST API / gRPC / Netconf for communication with third party tools and applications			
	j) Enabling telemetry should not have any adverse impact on the performance of the device/router			
35	Router Should Support Dual Image/ Partition with USB flash drive booting option for OS recovery			

SN	Specification- Tier 3 Router	Requirements	PQC/ Optional	Compliance
36	Router should support jumbo frame.			
37	Router should comply to following Temperature performance parameters:			
	i. Operating Temperature: 0 to 40 degree C or better			
	ii. Storage Temperature -10 to 60 degree C or better			
38	The operating system of the Routers category/series/family should be MEF-9/14 or CE (Carrier Ethernet) or latest Certified/compliant if not then roadmap for the same shall be submitted at the time of bidding.			
39	The Router shall be designed for continuous operations with dual fan system.			
40	Routers should be rack mountable to fit into a standard 19-inch rack			
41	The OEM shall ensure that the use of third-party optics shall not be explicitly blocked on the Router. Router must support all MSA complied optics available in market			
42	Segment Routing			
	a) The router should support SR-MPLS data plane.			
	b) Traffic Steering of SR policies with Autoroute Include and Segment Routing TI-LFA			
	c) LSP ping, trace-route over Segment Routing, trace route for binding-SID			
	d) MPLS-LDP interworking with SR-ISIS and SR-OSPF			
	e) Router should have capability to calculate Bandwidth based path using centralized controller.			
	f) Shall support SR and MPLS (LDP) Interworking Mapping Server			
	g) Label distribution protocol and segment routing should coexist.			
43	The router should support third Party standard optical modules like QSFP+, QSFP28, QSFP56-DD and etc			

SN	Specification- Tier 3 Router	Requirements	PQC/ Optional	Compliance
44	It may kindly be noted that in the specification wherever support for a feature has been asked for, it will mean that the feature should be available without RailTel requiring any other hardware/software/licenses. Thus all hardware/software/licenses required for enabling the support/feature shall be included in the offer. Any license fee required to be paid for hardware & software during the life cycle of the equipment shall be included in the rate quoted by the tenderer. There shall be no post contractual liability of license fee on RailTel for hardware & software supplied by tenderer.			
45	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.			
46	<b>On Site OEM Warranty (Year) - 3 years</b>			

**SOR item 8: Router Type X Technical Specifications**

MPLS Super Core Router				
SN	Specification- Tier 3 Router	Requirements	PQC/ Optional	Compliance
1	The router should have 8 x 100G QSFP28 ports supporting LR, SR, ER and ZR optics.			
2	The router should have option for 8x100G on QSFP28 ports and BNG functionality by upgrading the Hardware/ license/ OS/ Optics. Two box solution separate for BNG and router solution can be provided and router should support required port capacity in addition to BNG connectivity from Day 1. BNG hardware cost should be included in SOR in case of 2 Box solution.			
3	The router should have dual routing engines/route processors for control-level redundancy.			
4	The Router Hardware should support at least 3.2Tbps (Full Duplex) throughput rate			
5	The router should support the following functionality from the day one:-			
	a) IPv4 RIB/FIB	10M / 4M		

<b>MPLS Super Core Router</b>				
<b>SN</b>	<b>Specification- Tier 3 Router</b>	<b>Requirements</b>	<b>PQC/ Optional</b>	<b>Compliance</b>
	b) Ipv6 RIB/FIB	6M / 1M		
	c) MPLS Labels	64K		
	d) Label Stack	8		
	e) L2/L3 VPN	32 L3/L2 MPLS VPN		
	f) Packet Forwarding Rate	1Bpps or higher		
	g) Firewall Filters	8K		
	h) RSVP LSP ingress/transit	8K or more		
	i) Segment Routing IGP prefix Scale	48K		
6	Proposed Router can either be modular or fixed type.			
7	Router shall have option of checking configuration before committing and option of rolling back to at least five configurations			
8	Router should have redundant DC (with the operating range of -40 to -72 VDC) power supply.			
9	Digital Optical Monitoring (DOM) should be supported, optics information retrievable including RX/ TX-power, threshold-monitoring/ alarming, inventory.			
10	It shall support role-based privileges for the system access and RADIUS/ TACAS authentication for the System admin.			
11	The router should have a Console or Out-of-band Management.			
12	Alerts for environmental or other hardware-based alarms should be supported via SNMP			
13	All interfaces shall support services like L2VPN, L3VPN and multicast VPN (in future if required) for both Ipv4 and Ipv6			
14	Security:			
	a) The router should have mechanism to protect itself from DDoS attack.			
15	The router should be Ipv6 ready from day one.			
16	The router should support filtering based on different parameters like: src ip, s tip, src port, dst port, protocol etc			

<b>MPLS Super Core Router</b>				
<b>SN</b>	<b>Specification- Tier 3 Router</b>	<b>Requirements</b>	<b>PQC/ Optional</b>	<b>Compliance</b>
17	The router should support IPFIX/ Netflow/ Jflow or equivalent if required by upgrading OS/License		Optional	
18	The router should support IP SLA or RPM (or equivalent) for performance measurements, it should also support monitoring of IP SLA/RPM (or equivalent) probes using SNMP polling (OEM has to provide SNMP MIB information) or through syslog			
19	Shall support QoS, option of traffic shaping per Interface based.			
20	Shall support following class of service features:			
	a) Classification, policing, marking, shaping, filtering			
	b) Manage congestion using a weighted random early detection (WRED) algorithm			
	c) RFC 2474, Definition of the Differentiated Services Field in the Ipv4 and Ipv6 Headers			
	d) RFC 2698, A Two Rate Three Color Policer			
	e) Round Robin, WFQ, CBWFQ scheduling algorithms			
	f) Router should be able to classify based on 802.1 ad, 802.1 p, EXP and DSCP bits			
21	The router shall support traffic interface mirroring in both ingress & egress directions for both Ipv4 & Ipv6. It should also be able to mirror local and multicast traffic (in future if required).			
22	The router shall support provision for event based scripts that shall be capable of performing actions based on certain triggers			
23	The router shall support aggregated Ethernet and it shall be possible to bundle Upto 64 links			
24	Shall support following MPLS features			
	a) LDP and RSVP signaling			
	b) RFC 5036, LDP Specification			

<b>MPLS Super Core Router</b>				
<b>SN</b>	<b>Specification- Tier 3 Router</b>	<b>Requirements</b>	<b>PQC/ Optional</b>	<b>Compliance</b>
	c) RFC 3478, Graceful Restart Mechanism for LDP			
	d) Support for MPLS Traffic engineering using RSVP-TE protocol mechanisms and compliance with RFC3209			
	e) RFC 3564 or IETF compliant Diffserv aware MPLS TE			
	f) RFC 4105 Support for Inter-Area TE			
	g) Support for P2MP LSPs and the ability to map native multicast traffic on the P2MP LSP Tunnels in future if required.		Optional	
	h) Support for P2MP LSPs for building a PIM free MVPN Core		Optional	
	i) Support for LFA and Ti-LFA			
	j) Support for FRR for P2MP LSPs in future if required.		Optional	
	k) Support for RSVP fast hellos			
	l) MPLS ping and traceroute			
	m) Fast Reroute Extensions to RSVP-TE for LSP Tunnels			
25	The router should be able to do load-balancing over multiple equal cost MPLS LSP			
26	The Router shall support MPLS Fast Reroute both link protection and Node protection.			
27	Shall support MPLS based VPN services			
	a) L3VPN			
	b) L2VPN (Kompella BGP/ Martini LDP/EVPN-VPWS)			
	c) NG-MVPN (P2MP) in future if required			
28	The router shall support the following routing features			
	a) RFC compliant BGP v4			
	b) RFC7911 Advertisement of Multiple Paths in BGP			
	c) RFC2385 TCP MD5			
	d) RFC7752 BGP-LS			
	e) RFC8669 Segment Routing Prefix SID extensions for BGP			

<b>MPLS Super Core Router</b>				
<b>SN</b>	<b>Specification- Tier 3 Router</b>	<b>Requirements</b>	<b>PQC/ Optional</b>	<b>Compliance</b>
	f) RFC8360 RPKI support			
	g) RFC1587/RFC3101			
	h) RFC2154 OSPF MD5			
	i) RFC2328 OSPF v2			
	j) RFC3623 Graceful OSPF Restart			
	k) RFC5340 OSPF v3			
	l) RFC2362 PIM SM			
	m) PIM DM/PIM- SSM			
	n) RFC 3630, Traffic Engineering (TE) Extensions to OSPF Version 2			
	o) RFC 5305, IS-IS Extensions for Traffic Engineering			
	p) RFC 3847, Restart Signaling for IS-IS			
	q) IGMP v2 and v3 as described in RFC 2236 and RFC 3376 with IGMP Routing Policies to filter IGMP requests.			
	r) Router shall support SNMP v2/v3 and NTP			
	s) Shall support BFD : single hop, multi-hop and micro BFD or equivalent features			
	t) Router to support GRE tunnels (RFC 2784)		Optional	
29	Ipv6 Features :			
	a) Ipv6 Ping			
	b) Ipv6 trace route			
	c) OSPF v3			
	d) IS-IS			
	e) Ipv6 CoS (classification & rewrite, scheduling based on TC )			
	f) Ipv6 ACL			
	g) 6PE and 6VPE			

<b>MPLS Super Core Router</b>				
<b>SN</b>	<b>Specification- Tier 3 Router</b>	<b>Requirements</b>	<b>PQC/ Optional</b>	<b>Compliance</b>
30	The proposed router should be NEBS level 3 compliant. NEBS Certification is not required for PMA. However, OEM has to produce certificate from standard lab approved or authorized by Govt. of India that the supplied Products are equivalent to NEBS and meet all standard and specification of NEBS.			
31	The device should comply to the following safety standards			
	a) EN 55022/EN55032 Class A Emissions (Europe)			
	b) FCC Class A (USA) Radiated Emissions			
	c) UL 60950-1 Information Technology Equipment – Safety			
	d) EN 60825-1 /EN60950-1 Safety of Laser Products			
32	The offered devices must support following functionalities to support 3 <sup>rd</sup> party SDN (in future)			
	a) The router should support RFC 6020, YANG – A Data Modeling Language for the Network Configuration			
	b) Protocol (NETCONF)			
	c) The solution should support the network configuration protocol (NETCONF) that provides mechanisms to install, manipulate, and delete the configuration of network devices, RFC 6241/RFC 4741			
	d) The router should be able to act as Path computation client in the PCE architecture defined in RFC 4655.		Optional	
	e) The router should support PCECP as defined in RFC5440			
	f) The router should support BGP link-state (BGP-LS), RFC 4655			
	g) The router should support SPRING			

<b>MPLS Super Core Router</b>				
<b>SN</b>	<b>Specification- Tier 3 Router</b>	<b>Requirements</b>	<b>PQC/ Optional</b>	<b>Compliance</b>
	h) The router should have support for NBI/API interfaces and protocols that would allow auto discovery of nodes, services, topology by NMS/EMS, Controller, Orchestration systems etc.			
33	TELEMETRY Function: It shall support following:			
	a) The router should support telemetry based on push model for monitoring network devices			
	b) The router should support various software models/sensors for capturing different health parameters from the devices			
	c) The router should support sending telemetry data to multiple consumers simultaneously			
	d) The router shall support GPB/GRPC/KAFKA encoding for telemetry data		Optional	
	e) The software model/sensors should be based on either yang, xml or open config			
	f) The solution shall use either UDP or GRPC for transport of telemetry data			
	g) The system should support streaming granularity of at least 10 sec			
	h) The router shall have the ability to interact with open standard based tools			
	i) The system should support REST API / gRPC / Netconf for communication with third party tools and applications			
	j) Enabling telemetry should not have any adverse impact on the performance of the device/router			
34	Router Should Support Dual Image/ Partition with USB flash drive booting option for OS recovery			
35	Router should support jumbo frame.			
36	Router should comply to following Temperature performance parameters:			

<b>MPLS Super Core Router</b>				
<b>SN</b>	<b>Specification- Tier 3 Router</b>	<b>Requirements</b>	<b>PQC/ Optional</b>	<b>Compliance</b>
	i. Operating Temperature: 0 to 40 degree C or better			
	ii. Storage Temperature -10 to 60 degree C or better			
37	The operating system of the Routers category/series/family should be MEF-9/14 or CE (Carrier Ethernet) or latest Certified/compliant if not then roadmap for the same shall be submitted at the time of bidding.			
38	The Router shall be designed for continuous operations with dual fan system.			
39	Routers should be rack mountable to fit into a standard 19-inch rack			
40	The OEM shall ensure that the use of third-party optics shall not be explicitly blocked on the Router. Router must support all MSA complied optics available in market			
41	Segment Routing			
	a) The router should support SR-MPLS data plane.			
	b) Traffic Steering of SR policies with Autoroute Include and Segment Routing TI-LFA			
	c) LSP ping, trace-route over Segment Routing, trace route for binding-SID			
	d) MPLS-LDP interworking with SR-ISIS and SR-OSPF			
	e) Router should have capability to calculate Bandwidth based path using centralized controller.			
	f) Shall support SR and MPLS (LDP) Interworking Mapping Server			
	g) Label distribution protocol and segment routing should coexist.			
42	The router should support third Party standard optical modules like QSFP+, QSFP28, QSFP56-DD and etc			
43	It may kindly be noted that in the specification wherever support for a feature has been asked for, it will mean that the feature should be available without RailTel requiring any other hardware/software/licenses. Thus all			

<b>MPLS Super Core Router</b>				
<b>SN</b>	<b>Specification- Tier 3 Router</b>	<b>Requirements</b>	<b>PQC/ Optional</b>	<b>Compliance</b>
	hardware/software/licenses required for enabling the support/feature shall be included in the offer. Any license fee required to be paid for hardware & software during the life cycle of the equipment shall be included in the rate quoted by the tenderer. There shall be no post contractual liability of license fee on RailTel for hardware & software supplied by tenderer.			
44	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.			
45	<b>On Site OEM Warranty (Year) - 3 years</b>			

**SOR item 9: Router Type XI Technical Specifications**

<b>SN</b>	<b>Specification</b>	<b>Compliance</b>
1.0	General Specifications & Architecture	
1.1	Chassis shall fit into a standard sized 19 inch rack mounting.	
1.2	Router should have redundant DC power feeds: -48VDC nominal.	
1.3	Router should be temperature hardened as it is placed at field locations	
1.4	The router shall provide a non-blocked switching matrix upto system capacity.	
1.5	Switching and packet routing (L2 and L3) shall be wire speed on all interfaces. Performance shall not be decreased at maximum traffic load.	
1.6	The router shall be equipped with 8x10G SFP+ and 4x40/100G (Uplink) QSFP28 Optical ports. All the optical interfaces shall be support LR, ER and ZR optics.	
1.4	The router should support Syn-E and PTP on network ports for LTE network	
1.8	The router should have external/ Internal Alarm Option for Chassis temperature and Chassis Power supply.	
1.9	Must have out-of-band Management port.	
1.10	Must have console port.	
1.11	Proposed Router series/ family of same type of OS shall have IP-MPLS interoperability with routers of other multiple OEMs. The product series/ family of same type of OS should be tested at EANTC or any other renowned LAB for INTEROPERABILITY in Multi-OEM FOR IP/MPLS. The product series/ family should be deployed at least two major service provider, Govt, Railways. Customer letter/ Public case studies (Govt/PSU/ISP) with satisfactory performance of the offered make with IP/MPLS should be submitted along with offer.	

SN	Specification	Compliance
2.1	Router should support unicast IPv4/IPv6 routing protocols (BGP, OSPF, IS-IS, OSPF v3, Segment Routing, SR-TE).	
2.2	Router shall support LDP, MPLS-TE with FRR and TI-LFA for sub 50 msec protection.	
2.3	Router must support Traffic Engineering for node and link protection.	
2.4	Router shall support aggregation of links. Minimum 8 links should be supported as part of single aggregation on a network side.	
2.5	Router shall support multi-chassis LAG for aggregation of links across two chassis.	
2.6	Router shall support performance monitoring for Layer-2 and layer-3 services (Y.1731/ Y.1564, CFM, TWAMP or equivalent).	
2.7	Router shall support IPV4 and IPV6, IGMP, MLD, and PIM-SM & SSM, ECMP, NGMVPN.	
2.8	Router shall support 6PE and 6VPE mode for IPV6 transport over IPV4.	
2.9	BGP Prefix independent control (EDGE / Core).	
2.10	Router shall support BFD with interval of 50ms or less.	
2.11	Router should support RFC 3107 of Carrying Label Information in BGP-4.	
2.12	Router should support Point to Point and Point to Multipoint LSP for Unicast and Multicast traffic.	
2.13	Router shall support layer3 and layer2 MPLS VPN, VPLS and EVPN.	
2.14	The router shall support Internet Group Management Protocol (IGMP) v1, v2 and v3.	
2.15	The router shall support Protocol Independent Multicast – PIM-SM and SSM.	
2.16	The switch/ router shall support Multicast troubleshooting tools like Mtrace and mfib ping or equivalent troubleshooting mechanism.	
2.17	IEEE 1588v2 Precision Timing Protocol (PTP) and Synchronous Ethernet support for network synchronization.	
3.0	Quality Of Service	
3.1	The switch/ router shall provide per-service, per-forwarding class queuing and shaping features.	
3.2	The router shall provide following QoS features: classification and hierarchical scheduling, WRR, strict priority (SP), profiled scheduling and multi-tier policing and shaping.	
3.3	Router shall support 3 level HQOS on all kind of Ethernet interface with minimum 8 Queue per port	
3.4	Similar QOS shall be supported for all type of interface including Bundled interfaces.	

SN	Specification	Compliance
3.5	IP Application Mapping. The list of IP match criteria should include Source IP address and mask, Destination IP address and mask, IP protocol, UDP source port, TCP source port, UDP destination port, TCP destination port.	
3.6	VLAN CoS preservation: the IEEE 802.1p priority bits.	
3.7	VLAN CoS differentiation: appropriate service differentiation must be applied according to the 802.1p bits. This will require the mapping of the 802.1p bits to DSCP values and EXP-bits in the MPLS header when the service is offered over a (partially) MPLS-enabled network.	
3.8	End-to-end delay budgets are a strictly-enforced to support critical applications SCADA, VOICE, Video.	
4.0	Security	
4.1	Security forms an integral part of a network design to protect both the end-customers and the network infrastructure. The solution that vendor proposes shall have the necessary provisions to implement the necessary security measures.	
4.2	Support Access Control List to filter traffic based on Source & Destination IP Subnet, Source & Destination Port, Protocol Type (IP, UDP, TCP, ICMP etc) and Port Range etc. Should Support SNMPv1/v2/V3.	
4.3	Black hole filtering: dropping of traffic destined for a specific prefix should be supported to avoid any attack in router	
4.4	Ingress and egress packet filtering based on L2-L4 criteria at wire speed. The possibility to log the deny actions on individual filter rules shall be supported.	
4.5	Protection of local services (http, small udp/tcp servers, dhcp, telnet, ssh) based on L2-L4 criteria.	
4.6	AAA support – Accounting, Authorization and Authentication of users and commands. Support of local authentication, TACACS+ and Radius.	
4.7	Authentication of routing protocol updates: IS-IS, OSPF, BGP.	
4.8	SSH support.	
5.0	Performance	
5.1	Router shall support non-blocking throughput capacity of 280 Gbps full duplex or higher.	
5.2	Router shall support 64k IPv4 routes/ 32k IPv6 routes and Multicast routes 1K.	
5.3	Router shall support 100 multicast groups.	
5.4	Minimum 32 MPLS layer-3 VPN's.	
5.5	Minimum 250 MPLS VPLS.	
5.6	Minimum 500 MPLS Layer-2 PWs.	
5.7	Router shall support min 64 BFD sessions.	
6.0	Certificates and environment standards	

SN	Specification	Compliance
6.1	Should comply to NEBS Level 3 specifications/ Equivalent TEC QM 333 or latest specification	
6.2	Safety: IEC/EN 60825-1 or IEC/EN 60825-2 or EN/IEC 60950-1	
6.3	Storage:EN300 019-2-1 class 1.2 / GR-63-CORE and GR-1089- CORE/ Equivalent TEC QM 333 or latest specification	
6.4	Transport:EN300 019-2-2 class 2.3 / GR-63-CORE and GR-1089- CORE/ Equivalent TEC QM 333 or latest specification	
6.5	In service:EN300 019-2-3 class 3.2 / GR-63-CORE and GR-1089- CORE	
6.6	Relative humidity: 5 to 85% (non-condensing).	
6.7	Operating temperature: 0°C to 40°C.	
7.0	MPLS Labels: Minimum 32K and Label Stack: 5	
8.0	The OEM shall ensure that the use of third-party optics shall not be explicitly blocked on the Router. Router must support all MSA complied optics available in market. Bidder is allowed to quote third party optics of renowned OEM and same should be fully compatible with offer equipment.	
9.0	The offered devices must support following functionalities to support 3rd party SDN (in future)	
9.1	The router should support RFC 6020, YANG - A Data Modeling Language for the Network Configuration	
9.2	Protocol (NETCONF)	
9.3	The solution should support the network configuration protocol (NETCONF)	
9.4	The router should be able to act as Path computation client in the PCE architecture defined in RFC 4655 or should support BGP-LS.	
9.5	The router should support PCECP as defined in RFC5440 should support BGP-LS.	
9.6	The router should support BGP link-state (BGP-LS), RFC 4655	
9.7	The router should support SPRING or Source Packet Routing in Networking or Segment routing	
9.8	The offered devices must support API/ NBIs for auto discovery of Services and Physical & Logical Topology	
10.0	TELEMETRY Function: It shall support following:	
10.1	The router should support telemetry based on push model	
10.2	The router should support various software models/ sensors for capturing different health parameters from the devices	
10.3	The router should support sending telemetry data to multiple consumers simultaneously	

SN	Specification	Compliance
10.4	The router shall support GPB/ GRPC/ KAFKA encoding for telemetry data (Optional)	
10.5	The software model/sensors should be based on either yang, xml or open config	
10.6	The solution shall use either UDP or GRPC for transport of telemetry data	
10.7	The system should support streaming granularity of atleast 10 sec	
10.8	The router shall have the ability to interact with open standard based tools	
10.9	The system should support REST API/ Yang and Netconf for communication with third party tools and applications	
10.10	Enabling telemetry should not have any adverse impact on the performance of the device/ router	
10.11	The OEM shall ensure that the use of third party optics shall not be explicitly blocked on the Router. Router must support all MSA complied optics available in market	
11.0	Segment Routing	
11.1	The router should support SR-MPLS dataplane and protocols OSPF, IS- IS and BGP Segment routing extensions	
11.2	Traffic Steering of SR policies and Segment TI-LFA SRLG Protection	
11.3	LSP ping, trace-route	
11.4	MPLS-LDP interworking with SR-ISIS/ SR-OSPF and LDP over RSVP. Roadmap for same may be acceptable however functionality should available before Final Acceptance (FAC).	
11.5	Router should have capability to calculate Bandwidth based path using centralized controller.	
11.6	Shall support SR and MPLS (LDP) Interworking Mapping Server. Roadmap for same may be acceptable however functionality should available before Final Acceptance (FAC).	
11.7	Label distribution protocol and segment routing should coexist and there should support option to prefer LDP over	
11.8	Router ASIC should be capable of supporting SR-MPLS in future. SRv6-MPLS natively.	
12	Telemetry tool for performance monitoring should be provided along with Routers and Tool should also be provided for generation of configuration to multiple routers based on predefined templates. These tools should not be any additional cost to RailTel however VMs for same will be provided by RailTel in case required.	
13	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.	
14	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 10: Switch Type V Technical Specifications**

<b>SN</b>	<b>Specification:</b>	<b>Compliance</b>
1	The LAN switch shall be standalone / rack mountable with the following ports:	
2	24 ports SFP Based Gigabit ports & and 4 Nos. SFP+ port.	
3	The switch should support RJ-45 console port and industry standard CLI	
4	The switch should support Reset option to make switch reset to default.	
5	The switch should support RJ-45 management port	
6	It should support redundant Dual DC (with the operating range of -40 to -72 V for DC) of power source supply.	
7	<b>General Specification:</b>	
8	The LAN Switch should support below specs Min <b>512 RAM, 256MB flash, 1.5MB buffer</b>	
9	The LAN switch shall be available with minimum Switching Fabric. 128 Gbps	
10	The LAN switch shall have minimum packet forwarding rate at 64-byte packet length 95 Mpps	
11	The LAN switch shall support minimum 16K MAC address.	
12	The LAN switch shall support 512 or higher static MAC address entries	
13	The LAN switch shall have 1K IGMP and 1K MLD snooping groups.	
14	Switch should support Dying Gasp for quick trouble shooting during power failures or system shut downs.	
15	<b>Layer-2 Features:</b>	
16	The LAN switch shall support IEEE 802.1Q VLAN up to 255 Active VLANs and 4094 VLAN ID.	
17	It shall support for Automatic Negotiation of link speed and duplex to help minimize the configuration & errors.	
18	It shall support centralized VLAN Management. VLANs created on the Core Switches shall be propagated to all the other switches automatically, thus reducing the overhead of creating / modifying / deleting VLANs in all the switches in turn eliminating the configuration errors & troubleshooting. It shall support GVRP / VTP for VLAN pruning and management.	
19	It shall support edge port in STP, RSTP, MSTP (16 instances), BPDU filtering.	
20	It shall support 802.1d, 802.1p, 802.1Q, 802.1s, 802.1w, 802.1x, 802.3x, 802.1ab.	
21	It shall support spanning-tree root guard and loop guard to prevent other edge switches becoming the root bridge.	
22	It shall support IGMP snooping v1, v2 and v3, IGMP Proxy, IGMP Querier and MLDv1, MLD Querier.	
23	It shall support Link Aggregation Protocol (LACP) as per IEEE 802.3ad and and 8 groups per device/8 ports per group.	

SN	Specification:	Compliance
24	It shall Support for Detection of Unidirectional links and to disable them to avoid problems such as spanning tree loops and support Unidirectional Link Detection (UDLD) or any other industry equivalent protocol	
25	It shall have supports L2/L3/L4 QoS/CoS solutions help ensure that critical network services such as VoIP, ERP, Intranet, and video conferencing are served with proper priority.	
26	It shall support unknown unicast and multicast port blocking to allow tight control by filtering packets that the switch has not already learned how to forward.	
27	It shall support unicast MAC filtering to prevent the forwarding of any type of packet with a matching MAC address.	
28	Switch shall support for Admission Control features to improve the network's ability to automatically identify, prevent, and respond to security threats and also to enable the switches to collaborate with third-party solutions for security-policy compliance and enforcement before a host is permitted to access the network.	
29	It shall be able to discover the neighboring device of the same OEM giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems. It shall support LLDP or LLDP-MED for network discovery	
30	There shall be support for Asynchronous data flows upstream and downstream from the end station or on the uplink using ingress policing and egress shaping	
31	It shall support Optical Transceiver Digital Diagnostic Monitoring and support 802.3ah link layer remote loopback and discovery	
32	It shall support configuration rollback to replace current configuration with any saved configuration file	
33	It shall support Auto-MDIX	
34	<b>Quality of Service (QoS) Features:</b>	
35	The LAN switch shall have per-port broadcast, multicast, and unicast storm control.	
36	There shall be 8 or better hardware-based queues per port for flexible QoS management.	
37	There shall be Shaping and Scheduling – SP, WRR, SPQ + WRR, WFQ, Weighted Deficit Round Robin (WDRR) or Equivalent Protocol	
38	There shall be Shaping and Scheduling – SP, WRR, SPQ + WRR, WFQ, Weighted Deficit Round Robin (WDRR)	
39	The switch should support QOS based on Switch port, 802.1p priority queues, vLAN ID, MAC addresses, IPv4/IPv6 addresses, DSCP, ToS, Protocol type, TCP/UDP ports, IPv6 traffic class	
40	It should support Time-Based QOS	
41	It shall support BPDU filtering feature, to shut down Spanning Tree Protocol Port Fastenabled interfaces when BPDUs are received to avoid accidental topology loops.	

SN	Specification:	Compliance
42	<b>Network Security Features:</b>	
43	The LAN switch shall support IEEE 802.1x to allow dynamic, port-based security, providing user authentication, Dynamic VLAN assignment	
44	The LAN Switch shall support Compound Authentication and Change of authorization	
45	It shall support unicast MAC filtering to prevent the forwarding of any type of packet with a matching MAC address.	
46	It shall support unknown unicast and multicast port blocking to allow tight control by filtering packets that the switch has not already learned how to forward	
47	It shall support IGMP filtering to provide multicast authentication by filtering out no subscribers and limits the number of concurrent multicast streams available per port	
48	It shall support for SSHv2, SSL v2/v3, SNMPv3 to provide network security by encrypting administrator traffic during Telnet, SSH and SNMP sessions.	
49	It shall support IMPB, DHCP snooping, IPSG and dynamic ARP inspection	
50	The switch shall be able to work on both IPv4 and IPv6 (dual stack) from day one	
51	It shall support Port Mirroring (minimum 4 mirror session) based on port basis/VLAN basis	
52	It shall support RADIUS authentication to enable centralized control of the switch and restrict unauthorized users from altering the configuration.	
53	It shall support MAC address notification to allow administrators to be notified of users added to or removed from the network	
54	It shall support port security up to 1K MAC address to secure the access to an access or trunk port based on MAC address. After a specific timeframe, the aging feature should remove the MAC address from the switch to allow another device to connect to the same port.	
55	It shall support multilevel security on console access to prevent unauthorized users from altering the switch configuration.	
56	It shall support BPDU filtering feature, to shut down Spanning Tree Protocol Port Fast enabled interfaces when BPDUs are received to avoid accidental topology loops.	
57	It shall support Spanning-Tree Root Guard (STRG) to prevent edge devices not in the network administrator's control from becoming Spanning Tree Protocol root nodes.	
58	<b>Management:</b>	
59	It shall have Remote Monitoring software agent to support for enhanced traffic management, monitoring, and analysis or FNF (flexible netflow) or any industry standard.	
60	It shall support Unidirectional Link Detection (UDLD) or equivalent	
61	It shall have Layer 2 trace route to ease troubleshooting by identifying the physical path that a packet takes from source to destination	

SN	Specification:	Compliance
62	It shall support Web based or Trivial File Transfer Protocol (TFTP) and File Transfer Protocol (FTP), SCP	
63	It shall support Simple Network Time Protocol/Network Timing Protocol (SNTP/NTP) to provide an accurate and consistent time stamp to all intranet switches	
64	It shall support RMON v1 and v2 standards and 4 RMON groups	
65	It shall support SNMPv1, SNMPv2c, and SNMPv3 and Telnet interface support to deliver comprehensive in-band management, and a CLI-based management console to provide detailed out-of-band management and Web Management for better manageability.	
66	Switch should support Surge Protection to $\pm 2$ kV (line-earth) and $\pm 2$ kW (line-line) on power input	
67	Loopback Detection (LBD) and Switch should support 802.3ah link layer remote loopback and discovery	
68	It should support 32 IP interface, 8 loopback interfaces and Intervlan routing	
69	It shall support default routing and static routing Support for 128 static IPv4 routes Support for 64 static IPv6 routes	
70	It shall support VRRP v2	
71	Should support authentication to allow an IP phone and a PC to authenticate on the same switch port while being placed on the appropriate voice and data VLANs.	
72	Should support GVRP VLAN Trunking Protocol	
73	It should support Port-based VLAN, MAC-based VLAN, VLAN Trunking, Voice VLAN and Surveillance VLAN, Private VLAN, GVRP, GARP, IP-Subnet Based VLAN and ISM VLAN (MVR), Guest VLAN	
74	Should have the ability to disable per-VLAN MAC learning	
75	Should support MAC Authentication Bypass (MAB) and WebAuth with downloadable ACLs	
76	It should support flex link or ULPP.	
77	It should support Ethernet Ring Protection Switching ERPS v1 and v2 <b>for main ring and sub rings</b> : G.8032 ERPS Ring Protection Switching provides loop avoidance with redundancy in Layer-2 Ethernet networks using concept of RPL (Ring Protection Link). The switch completion time (transfer time) for a failure on a ring link shall be less than 50ms.	
78	It should support IEEE 802.1QinQ mechanism and VLAN translation	
79	It shall support built-in power-on diagnostics and system monitoring capabilities to detect hardware failures.	
80	Bandwidth management: Flow-based bandwidth management, ingress rate-limiting; egress rate shaping per port.	
81	It shall loopback detection and shut or disable a physical port and VLAN based on detection of loop on that interface	

SN	Specification:	Compliance
82	To check support for Standard and Extended Access Lists	
83	It shall support access list based on Ipv4/v6 address Protocol type Ipv6 flow label VLAN-ID MAC-ID DSCP Ipv6 traffic class TCP/UDP Port and User-defined packet content	
84	Switch shall support Time based ACL	
85	The Switch should support minimum 1K Ingress Access Control Entries	
86	To check IGMP static join feature.	
87	To check Login and Access control List violations shall generate alarms to Network Management System and a log of the same shall be generated.	
88	It should support of ICMPv4, ICMPv6, Telnet v4, Telnet v6, SNMP v4 and SNMP v6	
89	Switch should support PVST or equivalent	
90	Switch should support CPU monitoring, Memory monitoring and password recovery.	
91	It should support MAC flapping feature to block a duplicate MAC to learn from uplink and downlink interface	
92	It should support duplicate address inspection	
93	Support multiple privilege level to provide different level of access on console port and telnet sessions	
94	Switch should support traffic segmentation	
95	It should support DOS attack prevention or URPF	
96	Switch should support sflow or netflow	
97	Switch should support Ipv6 Neighbor Discovery (ND)	
98	It shall support MAC address notification to allow administrators to be notified of users added to or removed from the network.	
99	It should support DHCP Client, DHCP Server and DHCP Relay with option 82	
100	It should support IEEE 802.1ag Ethernet OAM: Connectivity Fault Management (Support 32 MEPs)	
101	It should support Ethernet OAM compliant with IEEE 802.3ah/Y.1731	
102	It should support Radius and TACACS + Switch, Local Database	
103	It should support L2 Protocol Tunneling for STP, GVRP and LACP	
104	Should support port and vlan mirroring and jumbo frame 9K.	
105	Switch should support system log, traceroute, PING Size up to 9000 bytes or more.	
106	Switch should have dual image.	
107	Should support Optical Transceiver Digital Diagnostic Monitoring for All SFP ports of 1/10G.	

SN	Specification:	Compliance
108	<b>Switch should support following SNMP traps and syslog</b>	
	i) Interface UP & Down	
	ii) Optical power SFP threshold alarms	
	iii) STP Topology Changes and New root bridge	
	iv) LLDP table changes	
	v) Threshold alarms for Temperature.	
	vi) Ethernet OAM SNMP alarms.	
	vii) Dying Gasp Traps or alarms	
109	<b>Switch should comply to following Temperature performance parameters :</b>	
	i) Operating Temperature - min 0 to 60 °C	
	ii) Storage Temperature - min -20 to 70 °C	
110	<b>Safety Requirement :-</b>	
	i) Switch should have safety compliance of CE/ FCC/ LVD or equivalent	
111	<b>Electromagnetic Compatibility (EMC) Requirements:-</b>	
	i) Switch should have EMC compliance of CE or equivalent	
112	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.	
113	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements	
114	Should be allowed IPv6 ready from Day One.	
115	It shall have comprehensive debugging features required for software & hardware fault diagnosis. Switch should support Dying Gasp for quick trouble shooting during power failures or system shut downs.	
116	Switch should come with default accessories like Switch 3PIN Power cable, RJ-45 console cable, 2 mounting brackets for 19" rack mounting, Mounting kit, Quick Installation Guide	
117	Use of third party optics should not be locked for all interfaces	
118	Should support GUI, CLI, Telnet, TFTP, SNMPv1, SNMPv2/ V2C, SNMPv3, NTP, Open flow 1.3, RMON, SSHv2, Single IP Management, DLDP/ UDLD, SSH Key for open access.	
119	It shall support Link Aggregation Protocol (LACP) as per IEEE 802.3ad and 8 groups per device/8 ports per group.	
120	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.	
121	<b>On Site OEM Warranty (Year) – 3 years</b>	

**SOR item 11: Switch Type VI Technical Specifications**

<b>SN</b>	<b>Description</b>	<b>Compliance</b>
1	Switch shall be Managed, Non-PoE	
2	Should have 24 Number of 1G Copper Ports	
3	Should have 4 No. of 1 G SFP Port (Uplink)	
4	Switch should have Redundant Power supply (from day one) (AC)	
5	Switching Capacity shall be Non Blocking 56 Gbps	
6	Switch Throughput shall be minimum 41.67 MPPS	
7	Switch should have the following Basic Layer-3 Protocol: Static route IPv4 & IPv6	
8	Switch should have the following Security Features: SSH v1/ v2, Port Security, Up to 64 MAC addresses per port	
9	Should support the following Management Protocol: CLI, GUI, Telnet, SNMP	
10	Switch should have (RJ-45 Type) Console port	
11	Switch Should support Quality of Service (QoS) features viz:  CoS based on, Switch port , 802.1p priority , VLAN ID, MAC address, Ether Type	
12	Switch should comply to following performance parameters:	
	i. Operating Temperature - min 0 to 45 °C	
	ii. Minimum Operating Humidity (%RH) 05 - 90	
13	Switch should have EMI CERTIFICATE of FCC/IC /CE	
14	Switch should have SAFETY CERTIFICATE of UL	
15	The operating system of the Switches series/family shall have MEF-9 & 14 or CE (Carrier Ethernet) certified/ compliant.	
16	Switch should support ERPS protocol	
17	Switch should support DHCP Server.	
18	Use of third party optics should not be locked for all interfaces	
19	Switch should support Jumbo frame (9k)	
20	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.	
21	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 12: Switch Type VII Technical Specifications**

<b>SN</b>	<b>Specification:</b>	<b>Compliance</b>
1	The LAN switch shall be standalone / rack mountable with the following ports:	
2	20 ports SFP Based Gigabit ports & 4 Port 1G combo (SFP & RJ-45) and 4 Nos. SFP+ port.	
3	The switch should support RJ-45 console port and industry standard CLI	
4	The switch should support Reset option to make switch reset to default.	
5	The switch should support RJ-45 management port	
6	It should support redundant Dual DC (with the operating range of -40 to -72 V for DC) of power source supply.	
7	<b>General Specification:</b>	
8	The LAN Switch should support below specs Min <b>512 MB RAM, 256MB flash, 1.5MB buffer</b>	
9	The LAN switch shall be available with minimum Switching Fabric. 128 Gbps	
10	The LAN switch shall have minimum packet forwarding rate at 64-byte packet length 95 Mpps	
11	The LAN switch shall support minimum 16K MAC address.	
12	The LAN switch shall support 512 or higher static MAC address entries	
13	The LAN switch shall have 1K IGMP and 1K MLD snooping groups.	
14	Switch should support Dying Gasp for quick trouble shooting during power failures or system shut downs.	
15	<b>Layer-2 Features:</b>	
16	The LAN switch shall support IEEE 802.1Q VLAN up to 255 Active VLANs and 4094 VLAN ID.	
17	It shall support for Automatic Negotiation of link speed and duplex to help minimize the configuration & errors.	
18	It shall support centralized VLAN Management. VLANs created on the Core Switches shall be propagated to all the other switches automatically, thus reducing the overhead of creating / modifying / deleting VLANs in all the switches in turn eliminating the configuration errors & troubleshooting. It shall support GVRP / VTP for VLAN pruning and management.	
19	It shall support edge port in STP, RSTP, MSTP (16 instances), BPDU filtering.	
20	It shall support 802.1d, 802.1p, 802.1Q, 802.1s, 802.1w, 802.1x, 802.3x, 802.1ab.	
21	It shall support spanning-tree root guard and loop guard to prevent other edge switches becoming the root bridge.	
22	It shall support IGMP snooping v1, v2 and v3, IGMP Proxy, IGMP Querier and MLDv1, MLD Querier.	

SN	Specification:	Compliance
23	It shall support Link Aggregation Protocol (LACP) as per IEEE 802.3ad and and 8 groups per device/8 ports per group.	
24	It shall Support for Detection of Unidirectional links and to disable them to avoid problems such as spanning tree loops and support Unidirectional Link Detection (UDLD) or any other industry equivalent protocol	
25	It shall have supports L2/L3/L4 QoS/CoS solutions help ensure that critical network services such as VoIP, ERP, Intranet, and video conferencing are served with proper priority.	
26	It shall support unknown unicast and multicast port blocking to allow tight control by filtering packets that the switch has not already learned how to forward.	
27	It shall support unicast MAC filtering to prevent the forwarding of any type of packet with a matching MAC address.	
28	Switch shall support for Admission Control features to improve the network's ability to automatically identify, prevent, and respond to security threats and also to enable the switches to collaborate with third-party solutions for security-policy compliance and enforcement before a host is permitted to access the network.	
29	It shall be able to discover the neighboring device of the same OEM giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems. It shall support LLDP or LLDP-MED for network discovery	
30	There shall be support for Asynchronous data flows upstream and downstream from the end station or on the uplink using ingress policing and egress shaping	
31	It shall support Optical Transceiver Digital Diagnostic Monitoring and support 802.3ah link layer remote loopback and discovery	
32	It shall support configuration rollback to replace current configuration with any saved configuration file	
33	It shall support Auto-MDIX	
34	<b>Quality of Service (QoS) Features:</b>	
35	The LAN switch shall have per-port broadcast, multicast, and unicast storm control.	
36	There shall be 8 or better hardware-based queues per port for flexible QoS management.	
37	There shall be Shaping and Scheduling – SP, WRR, SPQ + WRR, Weighted Deficit Round Robin (WDRR) or Equivalent Protocol	
38	There shall be Shaping and Scheduling – SP, WRR, SPQ + WRR, Weighted Deficit Round Robin (WDRR)	
39	The switch should support QOS based on Switch port, 802.1p priority queues, vLAN ID, MAC addresses, IPv4/IPv6 addresses, DSCP, ToS, Protocol type, TCP/UDP ports,IPv6 traffic class	
40	It should support Time-Based QOS	

SN	Specification:	Compliance
41	It shall support BPDU filtering feature, to shut down Spanning Tree Protocol Port Fast enabled interfaces when BPDUs are received to avoid accidental topology loops.	
42	<b>Network Security Features:</b>	
43	The LAN switch shall support IEEE 802.1x to allow dynamic, port-based security, providing user authentication, Dynamic VLAN assignment	
44	The LAN Switch shall support Compound Authentication and Change of authorization	
45	It shall support unicast MAC filtering to prevent the forwarding of any type of packet with a matching MAC address.	
46	It shall support unknown unicast and multicast port blocking to allow tight control by filtering packets that the switch has not already learned how to forward	
47	It shall support IGMP filtering to provide multicast authentication by filtering out no subscribers and limits the number of concurrent multicast streams available per port	
48	It shall support for SSHv2, SSL v2/v3, SNMPv3 to provide network security by encrypting administrator traffic during Telnet, SSH and SNMP sessions.	
49	It shall support IMPB, DHCP snooping, IPSG and dyanmic ARP inspection	
50	The switch shall be able to work on both IPv4 and IPv6 (dual stack) from day one	
51	It shall support Port Mirroring (minimum 4 mirror session) based on port basis/VLAN basis	
52	It shall support RADIUS authentication to enable centralized control of the switch and restrict unauthorized users from altering the configuration.	
53	It shall support MAC address notification to allow administrators to be notified of users added to or removed from the network	
54	It shall support port security up to 1K MAC address to secure the access to an access or trunk port based on MAC address. After a specific timeframe, the aging feature should remove the MAC address from the switch to allow another device to connect to the same port.	
55	It shall support multilevel security on console access to prevent unauthorized users from altering the switch configuration.	
56	It shall support BPDU filtering feature, to shut down Spanning Tree Protocol Port Fast enabled interfaces when BPDUs are received to avoid accidental topology loops.	
57	It shall support Spanning-Tree Root Guard (STRG) to prevent edge devices not in the network administrator's control from becoming Spanning Tree Protocol root nodes.	
58	<b>Management:</b>	

SN	Specification:	Compliance
59	It shall have Remote Monitoring software agent to support for enhanced traffic management, monitoring, and analysis or FNF (flexible netflow) or any industry standard.	
60	It shall support Unidirectional Link Detection (UDLD) or equivalent.	
61	It shall have Layer 2 trace route to ease troubleshooting by identifying the physical path that a packet takes from source to destination	
62	It shall support Web based or Trivial File Transfer Protocol (TFTP) and File Transfer Protocol (FTP), SCP	
63	It shall support Simple Network Time Protocol/Network Timing Protocol (SNTP/NTP) to provide an accurate and consistent time stamp to all intranet switches	
64	It shall support RMON v1 and v2 standards and 4 RMON groups	
65	It shall support SNMPv1, SNMPv2c, and SNMPv3 and Telnet interface support to deliver comprehensive in-band management, and a CLI-based management console to provide detailed out-of-band management and Web Management for better manageability.	
66	Switch should support Surge Protection to $\pm 2$ kV (line-earth) and $\pm 2$ kW (line-line) on power input	
67	Loopback Detection (LBD) and Switch should support 802.3ah link layer remote loopback and discovery	
68	It should support 32 IP interface, 8 loopback interfaces and Intervlan routing	
69	It shall support default routing and static routing Support for 128 static IPv4 routes Support for 64 static IPv6 routes	
70	It shall support VRRP v2	
71	Should support authentication to allow an IP phone and a PC to authenticate on the same switch port while being placed on the appropriate voice and data VLANs.	
72	Should support GVRP VLAN Trunking Protocol	
73	It should support Port-based VLAN, MAC-based VLAN, VLAN Trunking, Voice VLAN and Surveillance VLAN, Private VLAN, GVRP, GARP, IP-Subnet Based VLAN and ISM VLAN (MVR), Guest VLAN	
74	Should have the ability to disable per-VLAN MAC learning	
75	Should support MAC Authentication Bypass (MAB) and WebAuth with downloadable ACLs	
76	It should support flex link or ULPP.	
77	It should support Ethernet Ring Protection Switching ERPS v1 and v2 <b>for main ring and sub rings</b> : G.8032 ERPS Ring Protection Switching provides loop avoidance with redundancy in Layer-2 Ethernet networks using concept of RPL (Ring Protection Link). The switch completion time (transfer time) for a failure on a ring link shall be less than 50ms.	

SN	Specification:	Compliance
78	It should support IEEE 802.1QinQ mechanism and VLAN translation	
79	It shall support built-in power-on diagnostics and system monitoring capabilities to detect hardware failures.	
80	Bandwidth management: Flow-based bandwidth management, ingress rate-limiting; egress rate shaping per port.	
81	It shall loopback detection and shut or disable a physical port and VLAN based on detection of loop on that interface	
82	To check support for Standard and Extended Access Lists	
83	It shall support access list based on Ipv4/v6 address Protocol type Ipv6 flow label VLAN-ID MAC-ID DSCP Ipv6 traffic class TCP/UDP Port and User-defined packet content	
84	Switch shall support Time based ACL	
85	The Switch should support minimum 1K Ingress Access Control Entries	
86	To check IGMP static join feature.	
87	To check Login and Access control List violations shall generate alarms to Network Management System and a log of the same shall be generated.	
88	It should support of ICMPv4, ICMPv6, Telnet v4, Telnet v6, SNMP v4 and SNMP v6	
89	Switch should support PVST or equivalent	
90	Switch should support CPU monitoring, Memory monitoring and password recovery.	
91	It should support MAC flapping feature to block a duplicate MAC to learn from uplink and downlink interface	
92	It should support duplicate address inspection	
93	Support multiple privilege level to provide different level of access on console port and telnet sessions	
94	Switch should support traffic segmentation	
95	It should support DOS attack prevention or URPF	
96	Switch should support sflow or netflow	
97	Switch should support Ipv6 Neighbor Discovery (ND)	
98	It shall support MAC address notification to allow administrators to be notified of users added to or removed from the network.	
99	It should support DHCP Client, DHCP Server and DHCP Relay with option 82	
100	It should support IEEE 802.1ag Ethernet OAM: Connectivity Fault Management (Support 32 MEPs)	
101	It should support Ethernet OAM compliant with IEEE 802.3ah/Y.1731	
102	It should support Radius and TACACS + Switch, Local Database	

SN	Specification:	Compliance
103	It should support L2 Protocol Tunneling for STP,GVRP and LACP	
104	Should support port and vlan mirroring and jumbo frame 9K.	
105	Switch should support system log, traceroute, PING Size up to 9000 bytes or more.	
106	Switch should have dual image.	
107	Should support Optical Transceiver Digital Diagnostic Monitoring for All SFP ports of 1/10G.	
108	<b>Switch should support following SNMP traps and syslog</b>	
	i) Interface UP & Down	
	ii) Optical power SFP threshold alarms	
	iii) STP Topology Changes and New root bridge	
	iv) LLDP table changes	
	v) Threshold alarms for Temperature.	
	vi) Ethernet OAM SNMP alarms.	
	vii) Dying Gasp Traps or alarms	
109	<b>Switch should comply to following Temperature performance parameters:</b>	
	i) Operating Temperature - min 0 to 60 °C	
	ii) Storage Temperature - min -20 to 70 °C	
110	<b>Safety Requirement :-</b>	
	i) Switch should have safety compliance of CE/ FCC/ LVD or equivalent	
111	<b>Electromagnetic Compatibility (EMC) Requirements:-</b>	
	i) Switch should have EMC compliance of CE or equivalent	
112	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.	
113	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements	
114	Should be allowed IPv6 ready from Day One.	
115	It shall have comprehensive debugging features required for software & hardware fault diagnosis. Switch should support Dying Gasp for quick trouble shooting during power failures or system shut downs.	
116	Switch should come with default accessories like Switch 3PIN Power cable, RJ-45 console cable, 2 mounting brackets for 19" rack mounting, Mounting kit, Quick Installation Guide	
117	Use of third party optics should not be locked for all interfaces	

SN	Specification:	Compliance
118	Should support GUI, CLI, Telnet, TFTP, SNMPv1, SNMPv2/ V2C, SNMPv3, NTP, Open flow 1.3, RMON, SSHv2, Single IP Management, DLDAP/ UDLD, SSH Key for open access.	
119	It shall support Link Aggregation Protocol (LACP) as per IEEE 802.3ad and 8 groups per device/8 ports per group.	
120	The device shall be supplied with a console cable with USB-to-serial converter and a power cable. For DC devices, the power cable shall be 5 meters in length.	
121	<b>On Site OEM Warranty (Year) – 3 years</b>	

**SOR item 13: SFP 1G 10 KM BIDI Technical Specifications**

SN	Specification	Compliance
1	Should be compatible with OEM equipments like Cisco Juniper, Edgecore and D Link. IT should be MSA Compliant.	
2	Should support minimum 10 km optical distance on Single Fiber (ITU-G 652D) (Bi Directional on Single Mode Fiber).	
3	Should have LC type connector	
4	Should provide quantity in such a way that matching pair (BX U & D) can be achieved.	
5	Should have 1 Gigabit Ethernet throughput on single mode fiber.	
6	Important Parameters:	
	A. Link Budget (Max Tx Power- Receiver Sensitivity) 5 dB or better.	
	B. Transceiver supply voltage: 3.3 V (Nominal)	
	C. The case operating temperature -20 Degree Centigrade to +70 Degree Centigrade.	
	D. The storage Temp: -40 Degree Centigrade to +85 Degree Centigrade	
	E. Wavelength- 1270/1330 or 1550/1310 or 1490/1550	
7	Should support Digital Diagnostic Monitoring (MSA-SFF 8472 Compliant) feature with following operating parameters:	
	A. Transceiver temperature	
	B. Laser bias current	
	C. Launch Optical Power	
	D. Received optical power	
	E. Transceiver supply voltage:	
	F. It will provide alarm and warning flags to alert the user when particular operating parameters are outside of a factory set normal range.	

SN	Specification	Compliance
8	Complies with SFF-8431/ 8432 SFP+ MSA (Multi-Source Agreements Standards)	
9	Applications- 1 Gbps Ethernet	
10	Performance Certificate: The bidder will submit a satisfactory performance certificate from Telecom Service Provider/ ISP/ Govt/ PSU for the offered make of the SFP.	
11	Regulatory Compliance	
	A. EMI/EMC compatible with FCC/ EN/ IEC	
	B. Laser Safety compatible with FDA/ EN/ IEC	
	C. RoHS compliant	
12	SFP should support all OEM Vendors devices and open all optic ports	
13	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 14: SFP 1G 20 KM BIDI Technical Specifications**

SN	Description	Compliance
1	SFP module should comply with multi-source agreement (MSA), enabling compatibility with other vendor equipment.	
2	Should support 20 km optical distance on single fiber	
3	Should have LC type connector	
4	Should provide quantity in such a way that matching pair (BX U & D) can be achieved.	
5	Should have 01 Gigabit Ethernet capacity on single mode fiber.	
6	<b>Should support Digital Diagnostic Monitoring feature with following operating parameters: Transceiver temperature" 0 ~ 70 degC Laser bias current Transmitted optical power: -9 to -3dBm Received optical power: -18dBm Transceiver supply voltage: 3.3V It also provides a sophisticated system of alarm and warning flags</b>	
7	OEM should be having valid ISO 9000 Certificate	
8	Should have CE and FCC and UL regulatory Certificate	
9	Operating temperature of the SFP should be minimum 0 to 70°C (23 to 149 °F)	
10	Complies with SFF-8431 SFP+ MSA (Multi-Source Agreements Standards)	
11	Complies with 1310nm/1550nm DFB laser transmitter & CPRI Option 7, 8	
12	Should support 1G to 1.25Gb/s Multi-Rate & 2-wire interface for management and diagnostic monitor compliant with SFF-8472	
13	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 15: SFP 1G 40 KM BIDI Technical Specifications**

SN	Description	Compliance
1	Should be compatible with OEM equipments like Cisco Juniper, Edgecore and D Link. IT should be MSA Compliant.	
2	Should support minimum 40 km optical distance on Single Fiber (ITU-G 652D) (Bi Directional on Single Mode Fiber).	
3	Should have LC type connector.	
4	Should have 1 Gigabit Ethernet throughput on single mode fiber.	
5	Important Parameters	
	A. Link Budget (Max Tx Power- Receiver Sensitivity) 19 dB or better.	
	B. Transceiver supply voltage: 3.3 V (Nominal)	
	C. The case operating temperature -20 Degree Centigrade to +70 Degree Centigrade.	
	D. The storage Temp: -40 Degree Centigrade to +85 Degree Centigrade	
	E. Wavelength- 1550/1310 or 1490/1550	
	F. Should provide quantity in such a way that matching pair (BX U & D) can be achieved.	
6	Should support Digital Diagnostic Monitoring (MSA-SFF 8472 Compliant) feature with following operating parameters	
	A. Transceiver temperature	
	B. Laser bias current	
	C. Launch Optical Power	
	D. Received optical power	
	E. Transceiver supply voltage	
	F. It will provide alarm and warning flags to alert the user when particular operating parameters are outside of a factory set normal range.	
7	Complies with SFF-8431/8432 SFP+ MSA (Multi-Source Agreements Standards)	
8	Applications- 1 Gbps Ethernet	
9	Performance Certificate: The bidder will submit a satisfactory performance certificate from Telecom Service Provider/ ISP/ Govt/ PSU for the offered make of the SFP.	
10	Regulatory Compliance	

SN	Description	Compliance
	A. EMI/EMC compatible with FCC/ EN/ IEC	
	B. Laser Safety compatible with FDA/ EN/ IEC	
	C. RoHS compliant	
11	SFP should support all OEM Vendors devices and open all optic ports	
12	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 16: SFP 1G 120 KM BIDI Technical Specifications**

SN	Description	Compliance
1	<b>General Specifications</b>	
	a) <b>Data Rate:</b> 1.25 Gbps (Gigabit Ethernet)	
	b) <b>Standard Compliance:</b> IEEE 802.3z (1000BASE-ZX / extended reach)	
	c) <b>Form Factor:</b> SFP (Small Form-Factor Pluggable)	
	d) <b>Connector Type:</b> LC simplex	
	e) <b>Transmission Type:</b> Bi-Directional (Single Fiber)	
2	<b>Optical Characteristics</b>	
	a) <b>Wavelength Pair (BiDi):</b> <ul style="list-style-type: none"> <li>• Option-1: Tx 1550 nm / Rx 1310 nm</li> <li>• Option-2: Tx 1310 nm / Rx 1550 nm</li> </ul>	
	b) <b>Fiber Type:</b> Single-Mode Fiber (SMF, G.652 / G.655)	
	c) <b>Maximum Link Distance:</b> 120 km	
	d) <b>Optical Budget:</b> ≥ 30–32 dB	
	e) <b>Laser Type:</b> DFB (Distributed Feedback Laser)	
	f) <b>Receiver Type:</b> APD (Avalanche Photo Diode)	
3	<b>Performance Parameters</b>	
	a) <b>Transmit Output Power:</b> typically +2 dBm to +5 dBm	
	b) <b>Receiver Sensitivity:</b> typically ≤ -34 dBm	
	c) <b>Bit Error Rate (BER):</b> ≤ 1×10 <sup>-12</sup>	
	d) <b>Supported Data Rate Range:</b> 1.0625 Gbps – 1.25 Gbps	

SN	Description	Compliance
4	<b>Electrical &amp; Interface</b>	
	a) <b>Interface:</b> SFP MSA compliant	
	b) <b>Hot-Pluggable:</b> Yes	
	c) <b>Digital Diagnostics Monitoring (DDM / DOM):</b> Supported (Tx/Rx power, temperature, voltage)	
	d) <b>Power Supply:</b> 3.3 V	
5	<b>Environmental Conditions</b>	
	a) <b>Operating Temperature:</b> <ul style="list-style-type: none"> <li>• Commercial: 0 °C to +70 °C</li> <li>• Industrial (optional): -40 °C to +85 °C</li> </ul>	
	b) <b>Storage Temperature:</b> -40 °C to +85 °C	
	c) <b>Humidity:</b> 5% to 95% non-condensing	
6	<b>Compatibility</b>	
	a) Compatible with standard <b>Layer-2 switches, routers, and media converters</b>	
	b) Interoperable with <b>Cisco, Juniper, Huawei, Nokia, ZTE, HP</b> , and equivalent OEMs (coding/vendor-specific variants may be required)	
7	<b>Deployment Notes (Important)</b>	
	a) BiDi modules <b>must be used in matched pairs</b> (Tx1550/Rx1310 ↔ Tx1310/Rx1550)	
	b) Ensure <b>low-loss fiber path</b> , proper splicing, and minimum connectors	
	c) Recommended to include <b>optical attenuators</b> if actual distance is significantly shorter than 120 km	
8	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 17: SFP+ 10G 40 KM BIDI Technical Specifications**

SN	Description	Compliance
1	SFP modules should comply with multi-source agreement (MSA), enabling compatibility with other vendors equipment.	
2	Should support 20-40 kms optical distance on single fiber	
3	Should have LC type connector	
4	Should have 10 Gigabit Ethernet capacities on single mode fiber.	
5	Should support DDMI feature. Option should be available for both SFP+ and XFP	

SN	Description	Compliance
6	Should be having valid ISO 9000 & ISO 14000 certification on the date of opening of bid.	
7	Should have CE and FCC regulatory compliances.	
8	Operating Temperature of the SFP Should be mini 0 to 65 °C (23 to 149°F)	
9	Should provide quantity in such a way that matching pair (BX U & D) can be achieved.	
10	Wavelength- 1550/1310 or 1490/1550	
11	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 18: SFP+ 10G 80 KM BIDI Technical Specifications**

SN	Specification	Compliance
1	Part Number (Site A): Tx 1490 nm / Rx 1550 nm	
2	Part Number (Site B): Tx 1550 nm / Rx 1490 nm	
3	Interface Standard: 10GBASE-BX80 (Bi-Directional Ethernet)	
4	Form Factor: SFP+ (Small Form-factor Pluggable Plus)	
5	Fiber Medium: Single-strand G.652 single-mode fiber (SMF)	
6	Operational Distance: Up to 80 km (without mid-span amplification)	
7	Data Rate: 9.95 Gb/s to 11.3 Gb/s (multi-protocol support)	
8	Connector Type: Simplex LC	
9	Transmitter (Tx): Cooled EML (Electro-absorption Modulated Laser)	
10	Receiver (Rx): APD (Avalanche Photodiode)	
11	Optical Budget: ≥ 23 dB	
12	Transmit Power: 0 to +4 dBm	
13	Receiver Sensitivity: ≤ -23 dBm	
14	Receiver Overload: ≥ -7 dBm	
15	Power Consumption: < 1.5 W	
16	Operating Temperature: Industrial grade (-0°C to +70°C)	
17	It should support all OEM & do not block any specific ports for device compatibility.	
18	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 19: SFP 1G 10 KM Dual Fiber Technical Specifications**

SN	Specification	Compliance
1	Should be compatible with OEM equipments like Cisco Juniper, Edgecore and D Link. IT should be MSA Complaint.	
2	Should support minimum 10 km optical distance on Single mode Fiber (ITU-G 652D) Should have LC type connector.	
3	Should have 1 Gigabit Ethernet throughput on single mode fiber.	
4	Important Parameters:	
	A. Link Budget ( Max Tx Power- Receiver Sensitivity) 5 dB or better.	
	B. Transceiver supply voltage: 3.3 V (Nominal)	
	C. The case operating temperature -20 Degree Centigrade to +70 Degree Centigrade.	
	D. The storage Temp: -40 Degree Centigrade to +85 Degree Centigrade	
	E. Wavelength- 1310nm	
5	Should support Digital Diagnostic Monitoring (MSA-SFF 8472 Compliant) feature with following operating parameters:	
	A. Transceiver temperature	
	B. Laser bias current	
	C. Launch Optical Power	
	D. Received optical power	
	E. Transceiver supply voltage:	
	F. It will provide alarm and warning flags to alert the user when particular operating parameters are outside of a factory set normal range.	
6	Complies with SFF-8431/8432 SFP+ MSA (Multi-Source Agreements Standards)	
7	Applications- 1 Gbps Ethernet	
8	Performance Certificate: The bidder will submit a satisfactory performance certificate from Telecom Service Provider/ISP/Govt/PSU for the offered make of the SFP.	
9	Regulatory Compliance	
	A. EMI/EMC compatible with FCC/EN/IEC	
	B. Laser Safety compatible with FDA/EN/IEC	
	C. RoHS compliant	
10	SFP should support all OEM Vendors devices and open all optic ports	
11	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 20: SFP+ 10G 10 KM Dual Fiber Technical Specifications**

SN	Specification	Compliance
1	Should be compatible with OEM equipment's like Cisco Juniper, Edgecore and D Link. IT should be MSA Compliant.	
2	Should support minimum 10 km optical distance on Single mode Fiber (ITU-G652D) should have LC type connector.	
3	Should have 10 Gigabit Ethernet throughput on single mode fiber.	
4	Important Parameters:	
	A. Link Budget (Max Tx Power- Receiver Sensitivity) 5 dB or better.	
	B. Transceiver supply voltage: 3.3 V (Nominal)	
	C. The case operating temperature -20 Degree Centigrade to +70 Degree Centigrade.	
	D. The storage Temp: -40 Degree Centigrade to +85 Degree Centigrade	
	E. Wavelength- 1310nm (Nominal)	
5	Should support Digital Diagnostic Monitoring (MSA-SFF 8472 Compliant) feature with following operating parameters:	
	A. Transceiver temperature	
	B. Laser bias current	
	C. Launch Optical Power	
	D. Received optical power	
	E. Transceiver supply voltage	
	F. It will provide alarm and warning flags to alert the user when particular operating parameters are outside of a factory set normal range.	
6	Complies with SFF-8431/8432 SFP+ MSA (Multi-Source Agreements Standards)	
7	Applications- 10 Gbps Ethernet	
8	Performance Certificate: The bidder will submit a satisfactory performance certificate from Telecom Service Provider/ ISP/ Govt/ PSU for the offered make of the SFP.	
9	Regulatory Compliance	
	A.EMI/EMC compatible with FCC/EN/IEC	
	B.Laser Safety compatible with FDA/EN/IEC	
	C.RoHS compliant	
10	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 21: SFP+ 10G 80 KM Dual Fiber Technical Specifications**

SN	Specification	Compliance
1	High-performance 10Gbps SFP+ Optical Transceiver designed for long-reach (80km) data transmission over Single-Mode Fiber (SMF) using a duplex LC interface	
2	Interface & Form Factor	
	A. Form Factor: SFP+ (Small Form-factor Pluggable Plus) MSA Compliant.	
	B. Optical Interface: Dual/Duplex LC Connector.	
	C. Hot-Pluggable: Supports "live" insertion/removal without system interruption	
	D. Electrical Interface: Compliant with SFF-8431 (CML Differential I/O).	
3	Optical Performance	
	A. Transmitter Type: Cooled 1550nm EML (Electro-absorption Modulated Laser).	
	B. Receiver Type: High-sensitivity APD (Avalanche Photodiode).	
	C. Operating Wavelength: 1550 nm.	
	D. Max Link Distance: 80 km on Standard G.652 SMF.	
	E. TX Output Power: -1 dBm to +4 dBm.	
	F. RX Sensitivity: ≤ -24 dBm.	
	G. RX Max Input (Overload): -7 dBm.	
4	Data Rates & Protocols	
	A. Supported Bit Rates: 9.95 Gb/s to 11.3 Gb/s (with integrated CDR).	
	B. Ethernet Compliance: 10GBASE-ZR / 10GBASE-ZW (IEEE 802.3ae).	
	C. Fibre Channel: 10G FC (with or without FEC) and backward compatibility to 8.5G/4.25G.	
	D. Telecom Standards: SDH/SONET (OC-192 / STM-64) and OTU2 (10.70 Gb/s).	
5	Monitoring & Power	
	A. Digital Diagnostics (DDM/DOM): Real-time monitoring of Temperature, Supply Voltage, TX Bias Current, TX Optical Power, and RX Optical Power (per SFF-8472).	
	B. Power Supply: Single +3.3V.	
	C. Power Consumption: 1.4W (Typical) to < 2.0W (Maximum).	
6	Universal Compatibility (OEM Neutrality)	
	A. Vendor Interoperability: Hardware must be non-blocking and compatible with all major OEM networking equipment (e.g., Cisco, Juniper, Nokia, Arista).	

SN	Specification	Compliance
	B. EEPROM Coding: The module must support multi-vendor coding/signatures to bypass proprietary software locks.	
7	Environmental & Regulatory	
	A. Operating Case Temp: 0°C to 70°C (Commercial Grade).	
	B. Compliance: RoHS-6 compliant, Lead-Free, and Laser Class 1 Safety.	
8	It should support all OEM no blocking for specific OEM	
9	<b>On Site OEM Warranty (Year) - 3 years</b>	

**SOR item 22: QSFP28 LR4 Technical Specifications**

SN	Description	Compliance
1	Optics Should be compatible with OEM equipments like Cisco, Juniper, D-Link, Zyxel, Edge Core, Ciena	
2	Optics Should support upto 10 km optical distance on single mode fiber	
3	Connector type Dual LC	
4	Signaling rate, each channel 25.78125 GBd +/-100 ppm	
5	Standards compliance (Ethernet/OTN Standard, for e.g. 100GBASE-LR4) IEEE 802.3ba-2010	
6	Operating Temperature (range) 0° C to 70° C	
7	Transmitter output power, each lane (minimum, maximum) -4.3 dBm, 4.5 dBm	
8	Cable type SMF	
9	Receiver input power, each lane (minimum, maximum)	
10	<b>Transmitter wavelengths (range):</b> 1294.53nm ~ 1296.59 nm 1299.02nm ~1301.09 nm 1303.54nm ~ 1305.63 nm 1308.09nm ~ 1310.19 nm	
11	<b>Should support below Digital Diagnostic Monitoring features:</b> Transceiver temperature Laser bias current (4-Channel) Transmitted optical power (4-Channel) Received optical power (4 Channel) Transceiver supply voltage Power consumption < 3.5W	
12	<b>On Site OEM Warranty (Year) – 3 years</b>	

**SOR item 23: SFP-1x GigE Electrical (1000 Base TX) Technical Specifications**

<b>SN</b>	<b>Specification</b>	<b>Compliance</b>
1	1.25Gbps Copper SFP (1000BASE-T)	
2	Core Performance	
	A. Data Rate: Supports bi-directional 1.25 Gbps (1.0625 Gbps for Fiber Channel).	
	B. Transmission Medium: Category 5e or Category 6 Unshielded Twisted Pair (UTP) cable.	
	C. Maximum Reach: Up to 100 meters (328 feet).	
	D. Interface: Standard RJ-45 female connector.	
3	Electrical & Mechanical	
	A. Supply Voltage: Single +3.3V power supply.	
	B. Power Consumption: Typically < 1.2W (Copper SFPs run significantly hotter than optical ones due to the PHY chip inside).	
	C. Footprint: Fully compliant with the SFP Multi-Source Agreement (MSA).	
	D. Hot-Pluggable: Can be inserted or removed without powering down the host device.	
4	Advanced Features	
	A. Auto-Negotiation: Supports 10/100/1000 Mbps auto-sensing (requires the host device to support SGMII).	
	B. MDI/MDI-X: Automatic crossover detection, eliminating the need for crossover cables.	
	C. EMI Shielding: Usually features a full metallic enclosure to reduce electromagnetic interference.	
	D. Digital Diagnostics (DDM): Generally not supported on copper SFPs (unlike the 80km optical version you mentioned earlier), as there is no laser/optical power to monitor.	
	E. SFP Should negotiate on 1000/100/10 Mb	
	F. It should support all OEM no blocking for specific OEM	
5	<b>On Site OEM Warranty (Year) – 3 years</b>	

**SOR item 24: 2\*12F SC type FMS Technical Specifications**

The FMS should be confirming to TEC NO.: GR/FDM-01/02/APR-2007 (Type-I) with latest amendment No. TEC/T/OFC-FDMS/149/2012. However, the FMS should have the following:

SN	Specification	Compliance
1	It should be mountable in standard 19" rack and of slider type.	
2	There should be arrangement of termination of 48/24/12/6 Nos. of fibers (as per SOR).	
3	It should be supplied with 48/24/12/6 Nos. of pigtailed of respective type of connector (as per SOR) of minimum 3 meter length.	
4	Colour coded pigtailed (900 $\mu$ n tight jacket) shall be provided for easy identification.	
5	The FMS should be supplied with arrangement of required Nos. of adapters (as per SOR).	
6	The adapters shall be fixed in such a way that these shall be easily accessible protecting the eye from direct exposure to laser.	
7	There should be minimum two nos. of trays for the provision of termination of the fibers & sufficient space for routing of the fibers in the trays.	
8	Trays shall be numbered bottom to top (tray no. 1 is lower most).	
9	Pigtailed shall follow tray numbering	
10	Pigtailed shall be labeled through colour coding/ferruling.	
11	Adapters shall be numbered Bottom to Top or Left to Right in ascending order.	
12	All adapters shall be provided with dust protection caps.	
13	Important Do's and Don'ts about the operation of the FMS shall be clearly indicated at convenient place on the FMS.	
14	Insertion Loss: $\leq 0.3$ dB	
15	Return Loss: $\geq 45$ dB	
16	The FMS shall be manufactured as per latest state of art technology.	
17	The FMS shall be protected against the entry of dust and insects, rodents etc.	
18	Body should be of MS steel; powder coating painting (min. 70 micrometer thickness) shall be provided with rust resistance paint.	
19	<b>Marking:</b> The marking on the system shall be indelible and following minimum information shall be provided by way of engraving or Laser printing method:	
	a) "RAILTEL" should be written on each FMS to be visible from front.	
	b) Manufacturer's name & date/ year of production.	
	c) Model No./Batch No./ Serial No.	

SN	Specification	Compliance
	d) Capacity i.e. No. of cables and the fibers.	
	e) Identification details/ cables/ Fiber/ labeling facility.	
20	Preferred type of connector is SC/APC for all connectors.	
21	<b>On Site OEM Warranty (Year) – 3 years</b>	

**SOR item 25: CAT 6A Cable (SF/UTP) Technical Specifications**

SN	Details	Specification	Compliance
1	Type	23 AWG solid bard copper, Unshielded Twisted 4 Pair, Category 6A, confirming to TIA 568.C.2, Class EA - ISO/IEC 11801:2002 Amendment 2.	
2	Conductors	Solid bare copper 23 AWG	
3	Insulation	Polyethylene 1.18 mm OD	
4	Jacket	LSZH jacket complying to:  EU Directive 2011/65/EU (ROHS II) IEC 60754-1  IEC 60754-2  IEC Flame Test: 60332-1  ETL Test Report to be submitted for 3 & 4 Connector Channel	
5	Pair Separator	+ Shape Spline	
6	Suitable Applications	Premise Horizontal Cable, 10 Gigabit Ethernet, 100BaseTX, 100BaseVG ANYLAN, 155ATM, 622ATM, NTSC/PAL Component or Composite Video, AES/EBU Digital Audio, AES51, RS-422, Noisy Environments, PoE	
7	Guaranteed Bandwidth	500 MHz for 100 MT Channel	
8	Packing	<b>Box of 305 meters</b>	
9	Cable Outer Diameter	7.2 mm	
10	Delay Skew	45 ns @ 100M	
11	Bend Radius (Operation/ Installation)	29 / 58 mm	
12	Maximum Conductor DC Resistance:	DCR @ 20°C (Ohm/100 m) = 9.5	
13	Maximum Delay:	Delay (ns/100 m) = 537 @ 100MHz	

<b>SN</b>	<b>Details</b>	<b>Specification</b>	<b>Compliance</b>
14	Nom. Mutual Capacitance	Capacitance (nF/km) < 56	
15	Nom. Velocity of Propagation	67 %	
16	Temperature Range Operation	-30 Deg C to +60 Deg C	
17	Performance characteristics @ 500 MHz	Max. Attenuation: 45.4 dB/100m Min. NEXT : 34.8 dB Min. PS NEXT : 31.8 dB Min. Return Loss: 17.3 dB Min. ACR : -10.4 dB Min. PSACR : -13.4 dB Min. PS ANEXT: 52.0 dB Min. PS AACRF: 24.2 dB	
18	PoE Compatibility	PoE Type 1 (15 W), Type 2 (30 W), Type 3 (60 W)	
19	ELV	EU Directive 2000/53/EC	
20	<b>On Site OEM Warranty (Year) – 3 years</b>		

**Annexure-II**

**Principal Executive Director/WR**

.....  
**RailTel Corporation of India Ltd.**  
.....  
.....  
.....

**Subject: Manufacturer Authorization form (MAF) to M/s ..... for .....**

**Ref: GeM Bid No. GEM/2026/B/7420894                      dated: 07.05.2026**

Dear Sir,

We, M/s....., are established and reputed manufacturer and service provider of .....(Product details), having our registered office at .....

We hereby authorize M/s ..... (bidder name), Office ..... to participate in bid and subsequently upon award of the bid to execute the supply and Installation & Commissioning of our range of products against your above said bid.

We further extend our warranty for ..... years for our range of products offered by M/s .....against the above-said bid.

Thanking you,  
Best regards,

**Authorised Signatory**

**Annexure-III**

**FORMAT FOR AFFIDAVIT TO BE UPLOADED BY TENDERER ALONGWITH THE TENDER DOCUMENTS**

(To be executed in presence of Public notary on non-judicial stamp paper of the value of **Rs.100/-**. The stamp paper has to be in the name of the tenderer) \*\*

I..... (Name and designation)\*\* appointed as the attorney/ authorized signatory of the tenderer (including its constituents),  
M/s. \_\_\_\_\_ (hereinafter called the tenderer) for the purpose of the Tender documents for the work of \_\_\_\_\_ as per the tender No. \_\_\_\_\_ of RailTel/WR, do hereby solemnly affirm and state on the behalf of the tenderer including its constituents as under:

- (i) I/We the tenderer (s) am/are signing this document after carefully reading the contents.
- (ii) I/we the tenderer(s) also accept all the conditions of the tender and have signed all the pages in confirmation thereof.
- (iii) I/We hereby declare that I/We have downloaded the tender documents from RailTel's website [www.railtelindia.com](http://www.railtelindia.com) or GeM Portal [gem.gov.in](http://gem.gov.in). I/We have verified the content of the document from the website and there is no addition, no deletion or no alteration to the content of the tender document. In case of any discrepancy noticed at any stage i.e. evaluation of tenderers, execution of work or final payment of the contract, the master copy available with the RailTel Administration shall be final and binding upon me/us.
- (iv) I/We declare and certify that I/we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
- (v) **I/We also understand that my/our offer will be evaluated based on the documents/ credentials submitted along with the offer and same shall be binding upon me/us.**
- (vi) **I/We declare that the information and documents submitted along with the tender by me/us are correct and I/we are fully responsible for the correctness of the information and documents submitted by us.**
- (vii) I/We undersigned that if the certificates regarding eligibility criteria submitted by us are found to be forged/ false or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender EMD besides banning of business for five year on entire RailTel. Further, I/we (*insert name of the tenderer*) \*\* \_\_\_\_\_ and all my/our constituents understand that my/our offer shall be summarily rejected.
- (viii) I/we also understand that if the certificates submitted by us are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of EMD/SD and Performance Guarantee besides any other action provided in the contract including banning of business for five year on entire RailTel.

**DEPONENT  
SEAL AND SIGNATURE**

**OF THE TENDERER**

VERIFICATION

I/We above named tenderer do hereby solemnly affirm and verify that the contents of my/our above affidavit are true and correct. Nothing has been concealed and no part of it is false.

**DEPONENT  
SEAL AND SIGNATURE  
OF THE TENDERER**

Place:

Dated:

\*\* The contents in Italics are only for guidance purpose. Details as appropriate are to be filled in suitably by tenderer. Attestation before Magistrate/ Notary Public.

**Annexure -IV**

**Guarantee Bond for Performance Guarantee  
(On Stamp Paper of requisite value)  
(To be used by approved Scheduled Banks)**

1. In consideration of the RailTel Corporation of India Limited, Registered office at Plate-A, 6th Floor, Office Block, Tower-2, East Kidwai Nagar, New Delhi-110023 and Regional office at RailTel Corporation of India Ltd, Mahalaxmi Railway Microwave Compound, Senapati Bapat Marg, Mahalaxmi- Mumbai- 400 013 (hereinafter called "the RailTel") having agreed to exempt ..... **(Name and address of the Company/ Contractor both Registered and Regional office address)** (hereinafter called "the said Contractor(s)") from the demand, under the terms and conditions of an L.O.A No..... Dated..... [L.O.A Date] made between ..... and RailTel Corporation of India Limited, for ..... [Name of Work/ Supply of Materials] (hereinafter called "the said Agreement") of **Performance Guarantee** for the due fulfillment by the said contractor's) of the terms and conditions contained in the said Agreement, or production of a Bank Guarantee for Rs..... (Rs. .... Only). We, ..... (indicate the name of the Bank and address) hereinafter referred to as "the Bank") at the request of. M/s..... Contractor(s) do hereby undertake to pay the **RailTel** an amount not exceeding Rs. .... Against any loss or damage caused to or suffered or would be caused to or suffered by the RailTel by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.

2. We, ..... Bank (indicate the name of the Bank and address) do hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on demand from the **RailTel** stating that the amount is claimed is due by way of loss or damage caused to or would be caused to or suffered by the **RailTel** by reason of breach by the said Contractor(s) of any of terms or conditions contained in the said Agreement or by reason of the Contractor(s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ....

3. We, ..... Bank (indicate the name of the Bank and address) undertake to pay to the **RailTel** any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s)/ Supplier(s) in any suit or proceedings pending before any court or Tribunal relating thereto our liability under this present being, absolute and unequivocal.

The Payment so made by us under this Bond shall be a valid discharge of our liability for payment thereunder and the Contractor(s)/ Supplier(s) shall have no claim against us for making such payment.

4. We, ..... Bank (indicate the name of the Bank and address) further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the RailTel under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till **RailTel** certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this Guarantee. Unless a demand or claim under the Guarantee is made on us in writing on or before the ..... We shall be discharged from all liability under this Guarantee thereafter.

5. We, .....(indicate the name of the Bank and address) further agree with the **RailTel** that the **RailTel** shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the Agreement or to extend time of to postpone for any time or from time to time any of the powers exercisable by the **RailTel** against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension to the said Contractor(s) or for any forbearance, act or omission on the part of **RailTel** or any indulgence by the **RailTel** to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have affect of so relieving us.
6. This Guarantee will not be discharged due to the change in the Constitution of the Bank or the Contractor(s) Supplier(s).
7. We, ..... (indicate the name of Bank) lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the **RailTel** in writing.
8. Notwithstanding anything contained herein,
  1. Our liability under the Bank guarantee shall not exceed Rs. .... (In Rupees)
  2. This Bank Guarantee shall be valid up to .....and
  3. We are liable to pay the guaranteed and or any part thereof under this Bank Guarantee only and only if you serve upon is a written claims or demand or before ..... (date of expiry of guarantee).

Dated the day of 2026 for

.....  
(Indicate the name of the Bank)

Witness:

1. Signature Name
2. Signature Name

**Annexure - V****Consignee Details:**

<b>SN</b>	<b>Site name</b>	<b>Address &amp; Contact</b>	<b>Contact No.</b>	<b>SOR item No.</b>	<b>Item to be delivered</b>
1	<b>Vasai Store</b>	RailTel Corporation of India Ltd, Shivam Industrial Estate* Gala No. 16 Ground Floor Nearby blue whale industrial estate Chinchapdha Vasai Road (E) PIN-401208 Distt-Palghar(MH)	Mr. V V Dixit – Sr. Manager/ store Ph: 9717644129	SOR item No. 1 to 25	All qty

Note: All the above-mentioned locations/stations are tentative and may be revised. The successful bidder may obtain the final locations with complete addresses after tender finalization. RailTel reserves the right to change locations within the Western Region, and the bidder shall supply and commission the equipment at the locations specified by RailTel.

**Annexure-VI**

PROFORMA FOR Nil Deviation Component Compliance Undertaking Letter  
(TO BE SIGNED BY BIDDER)

To,  
Principal Executive Director/WR  
RailTel Corporation of India Ltd.  
Mahalaxmi, Mumbai-400013

Dear Sir,

Sub: NIL Deviation Compliance for **GeM Bid No. GEM/2026/B/7420894** dtd: **07.05.2026**

Over and above all our earlier conformations and submissions as per your requirements of the bid, we confirm that,

We will ensure our unconditional compliance of all the terms and conditions as mentioned in the Tender document. In case of any deviation, the same should be attached as an Annexure (as per Format given below) to this form. In case of any deviation, RailTel reserves the right to reject the bid without giving any justification. Format of Annexure (Deviation Statement)

S. No.	Clause No. & Chapter No.	Existing Clause of Tender	Proposed Clause	Remarks, if any

All the proposed items to be supplied as per SOR for the technical specifications as mentioned in Annexure-I of Bid.

We hereby certify that the items/materials mentioned in our offer are complete.

We confirm that there is no requirement of any other hardware and software to fulfill requirements as per scope against the bid. If any additional hardware and software is required to meet in scope requirements, then it would be provided by us at no extra cost to RailTel.

Place:

Date:

Seal and signature of the bidder

(This Form along with Annexure (if required) should be on the letterhead of the bidder duly signed by an authorized signatory)

**Annexure-VII**

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

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

-----  
To,

(Write Name & Address of Officer of RCIL inviting the Tender)

Dear Sir,

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

**Ref :** 1) NIT/GeM Bid No: **GEM/2026/B/7420894**      **dtd: 07.05.2026**  
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 RCIL Guidelines shall be initiated against the bidder.

**Annexure – VIII**

**Land Border Sharing Declaration**

- i. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority [The Competent Authority for the purpose of registration under this Order shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT)].
- ii. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- iii. "Bidder from a country which shares a land border with India" for the purpose of this Order means: -
  1. An entity incorporated, established or registered in such a country; or
  2. A subsidiary of an entity incorporated, established or registered in such a country; or
  3. An entity substantially controlled through entities incorporated, established or registered in such a country; or
  4. An entity whose beneficial owner is situated in such a country; or
  5. An Indian (or other) agent of such an entity; or
  6. A natural person who is a citizen of such a country; or
  7. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- iv. The beneficial owner for the purpose of (iii) above will be as under:
  1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means. Explanation
    - a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five percent. of shares or capital or profits of the company;
    - b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
  2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
  3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
  4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;

5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
6. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.
7. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

**Certificate to be given by the Tenderer:**

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that I am not from such a country or, if from such a country, I have been registered with the Competent Authority. I hereby certify that I fulfill all requirements in this regard and I am eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached.]"

**Certificate to be given by Tenderer for Works involving possibility of sub-contracting:**

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that I am not from such a country or, if from such a country, I have been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I hereby certify that I fulfill all requirements in this regard and I am eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached.]"

**Annexure – IX**

Note: Bidders exempted from submission of bid security are required to submit this form.

**Bid Securing Declaration**  
(on Company Letter-head)

Bidder's Name \_\_\_\_\_  
[Address and Contact Details]

To,  
Principal Executive Director/WR  
RailTel Corporation of India Ltd.  
Mahalaxmi, Mumbai-400013

**Ref: GeM Bid No. GEM/2026/B/7420894**                      **dtd: 07.05.2026**

Sir/ Madam

We, the undersigned, solemnly declare that:

We understand that according to the conditions of this Tender Document, the bid must be supported by a Bid Securing Declaration in lieu of Bid Security.

We unconditionally accept the conditions of this Bid Securing Declaration. We understand that we shall stand automatically suspended from being eligible for bidding in any tender in RailTel Corporation of India Ltd for 2 years from the date of opening of this bid if we breach our obligation(s) under the tender conditions if we:

- 1) Withdraw/ amend/ impair/ derogate, in any respect, from our bid, within the bid validity; or
- 2) Being notified within the bid validity of the acceptance of our bid by the Procuring Entity:
  - a. Refused to or failed to produce the original documents for scrutiny or the required Performance Security within the stipulated time under the conditions of the Tender Document.
  - b. Fail or refuse to sign the contract.

**We know that this bid-Securing Declaration shall expire if the contract is not awarded to us, upon:**

- 3) Receipt by us of your notification
  - a. of cancellation of the entire tender process or rejection of all bids or
  - b. of the name of the successful bidder or
- 4) Ninety days after the expiration of the bid validity or any extension to it.

(Signed by the Authorized Representative of Firm)

Name of Authorized Representative:  
Name of Firm:  
Date:

**Annexure – X****CHECKLIST FOR SUBMISSION OF OFFER**

<b>SN</b>	<b>Required documents</b>	<b>Remarks</b>
1	Earnest Money Deposit (On line payment)/ Valid Documentary proof of exemption as per Clause-6 of ITB.	
2	Notarized affidavit on a non-judicial stamp paper <b>(Rs.100/-)</b> as per <b>Annexure-III</b>	
3	SOR Item Technical Specification compliance ( <b>Annexure-I</b> ) (Technical Compliance of all Specification of items as per ATC documents.)	
4	Make, Model and Data Sheet of offered item/ equipment. (Complete technical data and particulars of the equipment offered, as specified in the Tender)	
5	In case of the bidder is Authorized dealer/ distributor/ Partner/ Trader authorized by OEM specific to this bid, a certificate from the OEM to this effect should be submitted as per the <b>Annexure-II (MAF)/ Self declaration of OEM</b>	
6	Proforma for Nil Deviation Component Compliance Undertaking Letter ( <b>Annexure-VI</b> )	
7	Bidder Declaration Regarding Minimum local content under preference to "MAKE IN INDIA" Policy as <b>Annexure-VII</b>	
8	The bidder is required to submit a certificate on their letterhead, in accordance with Clause 21 of the ITB and in the format prescribed in <b>Annexure-VIII</b> .	
9	<b>Bid Securing Declaration</b> - Bidders exempted from submission of bid security as per <b>Annexure-IX</b>	
10	If the Firm is registered with MSME/NSIC, the Valid Certificate with same scope of work as per Tender	
11	Upload Signed Copy of ITB, GeM Bid/ Corrigenda/ Addenda (Clause-wise compliance along with all documents and annexures mentioned for each clause of the GeM Bid and Additional Terms & Conditions (ATC)/Information to Bidders documents, including any corrigendum(s) issued, if applicable)	
12	Technical Eligibility Criteria (as per Clause No.9.1) documents along with completion certificate	
13	Financial Eligibility Criteria (Turnover Certificate along with Certified copies of audited balance sheets/ annual reports of last three preceding financial years) (as per Clause No.9.2)	
14	Bidder and OEM Undertaking – Non Blacklisting (as per Clause No.9.4)	
15	Compliance for Delivery Period (as per Clause No. 5)	
16	Compliance for Warranty Period (as per Clause No.11)	
17	NIL deviation declarations as per <b>Annexure- VI</b> .	
18	GST Registration Details	
19	Undertaking for TTP Compliance as per Clause 23	
20	BOQ of the offered items	
21	Duly notarized Power of Attorney in name of authorized signatory	
22	OEM certificate/undertaking confirming the minimum service life of the equipment as specified in <b>Annexure-I</b> .	

\*\*\*\*\*